# FLOOD INSURANCE STUDY

# OUTAGAMIE COUNTY, WISCONSIN
## AND INCORPORATED AREAS

| Community Name | Community Number |
|---|---|
| Appleton, City of | 555542 |
| Bear Creek, Village of | 550526 |
| Black Creek, Village of | 550584 |
| Combined Locks, Village of | 550304 |
| Hortonville, Village of | 550529 |
| *Howard, Village of | 550023 |
| Kaukauna, City of | 550305 |
| Kimberly, Village of | 550306 |
| Little Chute, Village of | 550307 |
| New London, City of | 550308 |
| Nichols, Village of | 550467 |
| Outagamie County (Unincorporated Areas) | 550302 |
| Seymour, City of | 550534 |
| Shiocton, Village of | 550309 |
| *Wrightstown, Village of | 550025 |


*No Special Flood Hazard Areas Identified in Outagamie County

July 22, 2010

Federal Emergency Management Agency
FLOOD INSURANCE STUDY NUMBER
55087CV000A

Outagamie County, Wisconsin
And Incorporated Areas

# NOTICE TO
# FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

The Federal Emergency Management Agency (FEMA) may revise and republish part or all of this Preliminary FIS report 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 community officials and check the Community Map Repository to obtain the most current FIS components.

Effective Date: July 22, 2010

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# FLOOD INSURANCE STUDY
# OUTAGAMIE COUNTY, WISCONSIN AND INCORPORATED AREAS

## 1.0 INTRODUCTION

### 1.1 Purpose of Study

This countywide Flood Insurance Study (FIS) revises and updates information on the existence and severity of flood hazards in the geographic area of Outagamie County, including the Cities of Appleton, Kaukauna, New London, and Seymour, the Villages of Bear Creek, Black Creek, Combined Locks, Hortonville, Kimberly, Little Chute, and Shiocton, and the unincorporated areas of Outagamie County (referred to collectively herein as Outagamie County). Note that the Villages of Howard and Wrightstown do not identify any special flood hazard area in this FIS. Additionally, note that the Cities of Appleton and Seymour, and the Villages of Bear Creek, Nichols, and Wrightstown did not have previous FIS text. Furthermore, note the boundaries of the Oneida Tribe of Indians of Wisconsin are shown on the FIRMS.

The flood-hazard information for the portions of the Cities of Appleton and New London and of the Villages of Howard and Wrightstown that lie in Outagamie County is included in this FIS report. For flood-hazard information for the portions of these municipalities that lie in Brown, Calumet, Winnebago, and Waupaca Counties, see separately published FIS report and Flood Insurance Rate Maps (FIRM).

This FIS aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This FIS has developed flood risk data for various areas of the county that will be used to establish actuarial flood insurance rates. This information will also be used by the communities of Outagamie County to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP), and will also be used by local and regional planners to further promote sound land use and floodplain development. Minimum floodplain management requirements for participation in the NFIP are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some States or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence, and the State (or other jurisdictional agency) will be able to explain them.

### 1.2 Authority and Acknowledgments

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

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

| | |
|---|---|
| Black Creek, Village of | The hydrologic and hydraulic analyses were performed by Carl C. Crane, Inc., for the Federal Insurance Administration, under Contract No. H-4785. This study was completed in August 1979. |
| Combined Locks, Village of | The hydrologic and hydraulic analyses for the Fox River were transferred directly from the Fox River Flood Plain Information Report, Winnebago and Outagamie Counties, Wisconsin. This study was completed in October 1979.<br><br>The hydrologic and hydraulic analyses for Garners Creek were performed by Carl C. Crane, Inc. and were completed in November 1979 for the Federal Insurance Administration under Contract No. H-4785. |
| Hortonville, Village of | The hydrologic and hydraulic analyses were performed by Carl C. Crane, Inc., for the Federal Insurance Administration, under Contract No. H-4785. This study was completed in December 1979. |
| Kaukauna, City of | The hydrologic and hydraulic analyses were performed by Carl C. Crane, Inc., for the Federal Insurance Administration, under Contract No. H-4785. This study was completed in October 1979. |
| Kimberly, Village of | The hydrologic and hydraulic analyses were performed by Carl C. Crane, Inc., for the Federal Insurance Administration, under Contract No. H-4785. This study was completed in October 1979. |
| Little Chute, Village of | The hydrologic and hydraulic analyses were performed by Carl C. Crane, Inc., for the Federal Insurance Administration, under Contract No. H-4785. This study was completed in October 1979. |

| | |
|---|---|
| New London, City of | Analyses were conducted by Owen Ayres and Associates, Inc., at the request of the Federal Insurance Administration, U.S. Department of Housing and Urban Development. Authority and financing are contained in Contract No. H-3705 between the contractor and the Federal Insurance Administration. |
| Outagamie County, Unincorporated Areas | The hydrologic and hydraulic analyses for the Wolf River, Embarrass River, and Bear Creek, were prepared by Carl C. Crane, Inc., for the Federal Emergency Management Agency (FEMA), under Contract No. H-3681. The hydrologic and hydraulic analyses for the Fox River were obtained from the FIS for the Cities of Appleton and Kaukauna and the Villages of Kimberly and Combined Locks (Reference 1, 2, 3, and 4). The hydrologic and hydraulic analyses for Black Otter Creek were taken from the FIS for the Village of Hortonville (Reference 5).<br><br>For the September 1993 revision, the hydrologic and hydraulic analyses for Mud Creek and Mud Creek Tributary 2 were prepared by the Wisconsin Department of Natural Resources (WDNR). This work was completed in September 1991. |
| Shiocton, Village of | The hydrologic and hydraulic analyses for this study were performed by Carl C. Crane, Inc., for the Federal Insurance Administration, under Contract No. H-4785. This study was completed in January 1980. |

For this countywide FIS, detailed study and redelineation of special flood hazard areas was performed by CDM Federal Programs Corporation (CDM), under purchase order NMH00000747. Work was completed July 2008. The digital base mapping information was provided in digital format by WDNR. This information was derived from data compiled in 2005. These data meet or exceed National Mapping Accuracy Standards. Users of this FIS should be aware that minor adjustments may have been made to specific FIRM base map features.

The coordinate system used for the production of the FIRM is Universal Transverse Mercator (UTM) Zone 16, North American Datum of 1983 (NAD 83), GRS 80 spheroid. Differences in the datum and spheroid used in the production of FIRMs for adjacent counties may result in slight positional differences in map features at the

county boundaries. These differences do not affect the accuracy of information shown on the FIRM.

### 1.3 Coordination

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

The dates of the initial and final CCO meetings held for previous FIS for jurisdictions within Outagamie County are shown in Table 1, "Initial and Final CCO Meetings."

**TABLE 1 – INITIAL AND FINAL CCO MEETINGS**

| Community | Initial CCO Date | Final CCO Date |
|---|---|---|
| Black Creek, Village of | April 20, 1978 | March 20, 1980 |
| Combined Locks, Village of | April 27, 1978 | July 23, 1980 |
| Hortonville, Village of | April 20, 1978 | August 19, 1980 |
| Kaukauna, City of | April 27, 1978 | August 19, 1980 |
| Kimberly, Village of | April 27, 1978 | June 15, 1981 |
| Little Chute, Village of | April 27, 1978 | July 29, 1980 |
| New London, City of | * | August 27, 1975 |
| Outagamie County, Unincorporated Areas | * | January 5, 1976 |
| Shiocton, Village of | April 25, 1978 | July 30, 1980 |

*Information Not Available

For this countywide FIS, the Scoping meeting was held July 3, 2007 and was attended by representatives of WDNR, FEMA, and the communities of Outagamie County. The results of the study were reviewed at the Open House held on February 17, 2009 and attended by representatives of WDNR, FEMA and the communities. All problems raised at that meeting have been addressed in this study.

## 2.0 AREA STUDIED

### 2.1 Scope of Study

This FIS report covers the geographic area of Outagamie County, Wisconsin, including the incorporated communities listed in Section 1.1.The areas studied by

detailed methods were selected with priority given to all known flood hazards and areas of projected development and proposed construction.

At the Scoping meeting held on July 3, 2007, potential flood hazard areas of concern were identified by communities. WDNR performed a validation check on all previously effective detailed study areas. The communities and WDNR determined that the highest priorities for new detailed flood studies were the Mud Creek watershed, the Garners Creek watershed, and Apple Creek. In addition, numerous existing leverage studies were brought forth and incorporated into this FIS, including the upper Apple Creek watershed (upstream of Holland Road), the Fox River through the City of Appleton and downstream of the City of Kaukauna, Garners Creek and Tributaries 3 and 3.1, and the Wolf River from New London through approximately 8,300 feet upstream of U.S. Highway 45.

All or portions of the flooding sources listed in Table 2, "Flooding Sources Studied by Detailed Methods," were studied by detailed methods. The limits of detailed study are indicated on the Flood Profiles (Exhibit 1) and on the FIRM (Exhibit 2).

**TABLE 2 – FLOODING SOURCES STUDIED BY DETAILED METHODS**

| Stream | Limits of Detailed Study |
|---|---|
| AAL Tributary | Approximately 300 feet upstream of Lightning Drive to confluence with Apple Creek |
| Apple Creek | Approximately 1,800 feet upstream of U.S. Highway 41 to the Outagamie/Brown County boundary |
| Apple Creek North | Approximately 100 feet upstream of North Ballard Road to confluence with Apple Creek |
| Apple Creek North Overland Flow | Divergence from Apple Creek North to confluence with Apple Creek Northeast |
| Apple Creek Northeast | Approximately 1,900 feet upstream of Lanser Lane to the confluence with Apple Creek |
| Apple Creek Overland Flow | Approximately 1,300 feet upstream of confluence with Apple Creek to confluence with Apple Creek |
| Bear Creek | Approximately 7,300 feet upstream of State Highway 76 to confluence with the Wolf River |

**TABLE 2 – FLOODING SOURCES STUDIED BY DETAILED METHODS (Continued)**

| Stream | Limits of Detailed Study |
|---|---|
| Black Creek | Approximately 1,000 feet upstream of State Highway 47 to approximately 1,300 feet downstream of the Soo Line Railroad |
| Black Otter Creek | Approximately 3,700 feet upstream of Black Otter Lake Dam to approximately 4,400 feet downstream of U.S. Highway 15 |
| County Highway JJ Swale | Approximately 900 feet upstream of confluence with Apple Creek to the confluence with Apple Creek |
| Embarrass River | From approximately 13,000 feet upstream of Spurr Road to the confluence with the Wolf River |
| Fox River | From the Outagamie/Winnebago County boundary to the Outagamie/Brown County boundary |
| French Road Overland Flow | Approximately 1,000 feet upstream of confluence with French Road Swale to confluence with French Road Swale |
| French Road Swale | Divergence from Apple Creek North to confluence with Apple Creek |
| Garners Creek | From approximately 1,500 feet upstream of Stoney Brook Road to confluence with Fox River |
| Garners Creek Tributary 1 | From the Outagamie County boundary to the confluence with Garners Creek |
| Garners Creek Tributary 2 | From Greenspire Way to the confluence with Garners Creek |
| Garners Creek Tributary 3 | Approximately 100 feet upstream of Fenceline Drive to confluence with Garners Creek |
| Garners Creek Tributary 3.1 | Approximately 1,400 feet upstream of the confluence with Garners Creek Tributary 3 to the confluence with Garners Creek Tributary 3 |

**TABLE 2 – FLOODING SOURCES STUDIED BY DETAILED METHODS (Continued)**

| Stream | Limits of Detailed Study |
|---|---|
| Garners Creek Tributary 4 | From State Highway 441 to confluence with Garners Creek |
| Glory Lane Swale | Approximately 700 feet upstream of confluence with Apple Creek to confluence with Apple Creek |
| Mud Creek | Mayflower Drive to the Outagamie/Winnebago County boundary |
| Mud Creek Tributary 2 | From approximately 1,900 feet upstream of Marquette Street to confluence with Mud Creek |
| Mud Creek Tributary 3 | Confluence with Mud Creek Tributary 3.2 to the confluence with Mud Creek |
| Mud Creek Tributary 3.2 | Richmond Street to the confluence with Mud Creek Tributary 3 |
| Mud Creek Tributary 3.3 | Mayflower Drive to the confluence with Mud Creek Tributary 3 |
| Mud Creek Tributary 3.3.2 | County Highway JJ/Edgewood Drive to the confluence with Mud Creek Tributary 3.3 |
| Mud Creek Tributary 3.3.3 | County Highway JJ/Edgewood Drive to the confluence with Mud Creek Tributary 3.3 |
| Willow Creek | From approximately 4,800 feet upstream of Elm Road to State Highway 76 |
| Wolf River | From approximately 5.7 miles upstream of State Highway 54 to the Outagamie/Waupaca County boundary |

As part of this countywide FIS, updated analyses were included for the flooding sources shown in Table 3, "New Detailed Studies."

## TABLE 3 – NEW DETAILED STUDIES

| Stream | Limits of Revised or New Detailed Study |
|---|---|
| AAL Tributary | Approximately 300 feet upstream of Lightning Drive to confluence with Apple Creek |
| Apple Creek | Approximately 1,800 feet upstream of U.S. Highway 41 to the Outagamie/Brown County boundary |
| Apple Creek North | Approximately 100 feet upstream of North Ballard Road to confluence with Apple Creek |
| Apple Creek North Overland Flow | Divergence from Apple Creek North to confluence with Apple Creek Northeast |
| Apple Creek Northeast | Approximately 1,900 feet upstream of Lanser Lane to the confluence with Apple Creek |
| Apple Creek Overland Flow | Approximately 1,300 feet upstream of confluence with Apple Creek to confluence with Apple Creek |
| County Highway JJ Swale | Approximately 900 feet upstream of confluence with Apple Creek to confluence with Apple Creek |
| Fox River | Outagamie/Winnebago County boundary to approximately 300 feet downstream of State Highway 441 |
| | Approximately 4,000 feet downstream of the Thilmany Dam to the Outagamie/Brown County boundary |
| French Road Overland Flow | Approximately 1,000 feet upstream of confluence with French Road Swale to confluence with French Road Swale |
| French Road Swale | Divergence from Apple Creek North to confluence with Apple Creek |
| Garners Creek | From approximately 1,500 feet upstream of Stoney Brook Road to confluence with Fox River |

**TABLE 3 – NEW DETAILED STUDIES (Continued)**

| Stream | Limits of Revised or New Detailed Study |
|---|---|
| Garners Creek Tributary 1 | From the Outagamie County boundary to the confluence with Garners Creek |
| Garners Creek Tributary 2 | From Greenspire Way to the confluence with Garners Creek |
| Garners Creek Tributary 3 | Approximately 100 feet upstream of Fenceline Drive to confluence with Garners Creek |
| Garners Creek Tributary 3.1 | Approximately 1,400 feet upstream of the confluence with Garners Creek Tributary 3 to the confluence with Garners Creek Tributary 3 |
| Garners Creek Tributary 4 | From State Highway 441 to confluence with Garners Creek |
| Glory Lane Swale | Approximately 700 feet upstream of confluence with Apple Creek to confluence with Apple Creek |
| Mud Creek | Mayflower Drive to the Outagamie/Winnebago County boundary |
| Mud Creek Tributary 3 | Confluence with Mud Creek Tributary 3.2 to the confluence with Mud Creek |
| Mud Creek Tributary 3.2 | Richmond Street to the confluence with Mud Creek Tributary 3 |
| Mud Creek Tributary 3.3 | Mayflower Drive to the confluence with Mud Creek Tributary 3 |
| Mud Creek Tributary 3.3.2 | County Highway JJ/Edgewood Drive to the confluence with Mud Creek Tributary 3.3 |
| Mud Creek Tributary 3.3.3 | County Highway JJ/Edgewood Drive to the confluence with Mud Creek Tributary 3.3 |
| Wolf River | Approximately 8,300 feet upstream of U.S. Highway 45 to the Outagamie/Waupaca County boundary |

For this countywide FIS, flooding sources that were previously studied by detailed methods and their floodplains redelineated are shown in Table 4, “Redelineated Flooding Sources.”

**TABLE 4 – REDELINEATED FLOODING SOURCES**

| Stream | Limits of Redelineated Study |
|---|---|
| Bear Creek | Approximately 7,300 feet upstream of State Highway 76 to confluence with the Wolf River |
| Black Creek | Approximately 1,000 feet upstream of State Highway 47 to approximately 1,300 feet downstream of the Soo Line Railroad |
| Black Otter Creek | Approximately 3,700 feet upstream of Black Otter Lake Dam to approximately 4,400 feet downstream of U.S. Highway 15 |
| Embarrass River | From approximately 13,000 feet upstream of Spurr Road to the confluence with the Wolf River |
| Fox River | From approximately 300 feet downstream of State Highway 441 to Approximately 4,000 feet downstream of the Thilmany Dam |
| Mud Creek Tributary 6 | From approximately 1,300 feet upstream of the Outagamie/Winnebago County boundary to the Outagamie/Winnebago County boundary |
| Willow Creek | From approximately 4,800 feet upstream of Elm Road to State Highway 76 |
| Wolf River | From approximately 5.7 miles upstream of State Highway 54 to approximately 8,300 feet upstream of U.S. Highway 45 |

This FIS also incorporates the determinations of letters issued by FEMA resulting in map changes (Letter of Map Revision [LOMR], Letter of Map Revision-based on Fill [LOMR-F], and Letter of Map Amendment [LOMA]) as shown in Table 5, "Letters of Map Change."

**TABLE 5 – LETTERS OF MAP CHANGE**

| Community | Flooding Source(s)/Project Identifier | Date Issued | Type |
|---|---|---|---|
| Outagamie County, Unincorporated | Mud Creek Tributary 2 / 06-05-C366X-550302 | 10/16/06 | LOMR |
| Outagamie County, Unincorporated | Unnamed Tributary to Bear Creek / 08-05-1868P-550302 | 2/15/08 | LOMR |
| City of New London | Embarrass River / 08-05-4225P-550308 | 5/29/09 | LOMR |
| Outagamie County, Unincorporated | Wolf River / 09-05-3911P-550302 | 8/20/09 | LOMR |

All or portions of Apple Creek Tributaries, Bear Creek and Tributaries, Black Creek, Black Otter Creek and Tributaries, Duck Creek and Tributaries, Embarrass River, Garners Tributary 1.1, Herman Creek, Kankapot Creek and Tributaries, Maple Creek, Rat River, Shioc River and Tributaries, Toad Creek, Wolf River and Tributaries, and numerous unnamed streams were studied by approximate methods.

Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The Zone A floodplain boundaries for the streams listed above in Outagamie County were developed using approximate study techniques. The scope and methods of study were proposed to, and agreed upon, by FEMA and the WDNR.

## 2.2 Community Description

Outagamie County is located in east-central Wisconsin. Clockwise from the northeast, surrounding counties are Brown, Calumet, Winnebago, Waupaca, and Shawano. In 1990 and 2000, the U.S. Bureau of the Census reported the population of the area to be 140,510 and 160,971, respectively (Reference 6).

The topography of Outagamie County is quite gently sloping and without prominent relief. The Fox River flows northward across the southeastern part of the county and the Wolf River flows southward across the northwestern part. The divide between these rivers, forming the highest land in the county, extends northeast-southwest diagonally across the central part of the county. The lowland along the Fox River and the Wolf River is a little above 75 feet; hence the maximum range in elevation is between 100 and 150 feet. A belt of undulating drift hills extend northward along this divide, through the vicinity of Greenville and Black Creek. The land in the flood plain is typically open space. Because of low land conditions, it is not agriculturally or commercially used.

The geological formations of Outagamie County are the Upper Cambrian (Potsdam) sandstone, the Lower Magnesian limestone, the St. Peter sandstone, and the Galena-

Platteville (Trenton) limestone. These indurated rock formations are quite generally covered with glacial drift on the divides, and with alluvial sand and gravel, and glacial drift in the valleys. The lower Magnesian formation is variable in character, consisting largely of limestone in the Combined Locks, Kaukauna, Kimberly, and Little Chute areas (Reference 7).

The climate is characteristic of central Wisconsin, with an average monthly maximum temperature of 71 degrees Fahrenheit ($^{o}$F) and a monthly minimum temperature of and 16 $^{o}$F. Temperatures have reached as high as 99 $^{o}$F and as low as -30 $^{o}$F. The average annual precipitation is 30 inches and average recorded snowfall is 42 inches.

## 2.3 Principal Flood Problems

The county is almost exclusively within one watershed, with the Wolf River providing its major artery. All of the other streams and rivers drain into this river at some point along its course. Most major flooding in the past has been confined to this river; however, if development along the smaller rivers is left unchecked, more extensive property damage can be anticipated.

Typical of large watersheds in Wisconsin, flooding usually occurs in the spring. This flooding is the result of heavy spring rains, coupled with a large amount of snowmelt. Frozen ground during this time also compounds the problem by increasing the amount of runoff.

In the Village of Black Creek, flooding occurring on Black Creek is often a result of flooding from backwaters of the Wolf River. Local heavy rains, however, can cause flooding of the creek independent of the Wolf River. The calculated 1-percent-annual chance discharge for the Black Creek at the railroad bridge is 440 cfs. High water marks of 771.6 feet NAVD were recorded for the flood of April 1979.

The history of flooding on the Black Otter Creek indicates the flooding may occur during any season of the year. Flooding occurring on Black Otter Creek is often a result of locally heavy rains and can cause flooding of the creek independent of the Wolf River. The calculated 1-percent-annual chance discharge for Black Otter Creek at U.S. Highway 45 Bridge is 1,390 cfs.

Flooding of the Fox River is mainly the result of releases from the Lake Winnebago Pool, which are necessary to control the lake level. This is accentuated by rainfall on the drainage basin below Lake Winnebago and above the Upper Appleton Dam. Major floods occurred in the lower Fox River basin in 1943, 1946, 1952, and 1960. The magnitude and frequency for these floods, as measured by the USGS gaging station (No. 04-0845) at the Rapids Croche Dam near Wrightstown, are listed in Table 6, “Major Floods in the Lower Fox River Basin.”

**TABLE 6 – MAJOR FLOODS IN THE LOWER FOX RIVER BASIN**

| Date | Discharge (cfs) | Exceedence Frequency |
|---|---|---|
| June 6, 1943 | 21,300 | 17 years |
| March 27, 1946 | 21,300 | 17 years |
| April 18, 1952 | 24,000 | 43 years |
| May 18, 1960 | 23,600 | 33 years |

Due to the smaller basin size of Garners Creek, it is more responsive to locally heavy rains. Therefore, Garners Creek could flood during any of the warmer months of the year. No gage records are available for this creek.

The City of New London is susceptible to flooding from both the Wolf and Embarrass Rivers. Historical accounts indicate that the 1888, 1912, 1922, 1952, 1960, and the 1973 floods were the most serious on the Wolf River. The 1973 flood, with a discharge of 14,000 cfs, resulted in extensive damage within the community. Ice flows were also a problem and had to be broken up at the Shawano River Bridge during the 1973 flood. During the flood of 1922, the Wolf River attained an estimated discharge of 15,500 cfs, which is the greatest discharge ever recorded on this river.

A USGS recording gaging station (No. 04-0790) has been in operation on the Wolf River near New London downstream of Shiocton since 1896 (Reference 8). A staff gage has been operated by the USACE on the Wolf River in Shiocton since 1914. Results of these two gages confirm that major floods occurred in 1922, 1952, 1960, 1973, 1976, and 1979. Expected recurrence intervals for these storms are 75, 40, 27, 40, 24, and 55 years, respectively.

Six more recent flood events were documented on the National Oceanic and Atmospheric Administration website (Reference 9) as discussed below.

June 16-20, 1996
Heavy rainfall fell across most of Central and East Central Wisconsin, as well as parts of Northeast Wisconsin from June 16th through the 18th. Amounts over the three day period ranged from 2 to 7 inches in most locales. Shawano, Waupaca and Outagamie counties were among the heaviest hit, with several locations receiving between 5 and 7 inches of rain during the three day period. Runoff from the heavy rainfall caused rivers to rise substantially, with several peaking well above flood stage. Several streets, parks, campgrounds and county roads were flooded, and a few roads were washed out.

April 1, 1998
The flooding that occurred in early April was a carryover from the excessive precipitation that fell in late March. Four locations along 3 rivers exceeded flood stage during April. The Wolf River at Shiocton (Outagamie Co.) and New London (Outagamie and Waupaca counties) also exceeded flood stage. Shiocton reached 10.83 feet (estimate) and New London peaked at 9.38 feet, both on April 5. The only significant inconvenience from the floods occurred along the Wolf River. In New London, a few local roads were flooded and closed for a couple of days. The city park along the banks of the river was also flooded. In Shiocton, homes near the river were surrounded by water and the city park adjacent to the river was flooded throughout the event.

June 27, 1998
Scattered thunderstorms moved across central Wisconsin yet again, this time producing wind gusts to 60 mph and flooding rains. Numerous roads were flooded in southern Outagamie county from the heavy rains, and Mud Creek went over its banks, scattering logs and debris for 50 yards on each side of the stream.

June 10, 1999
Thunderstorms with damaging winds, heavy rains and hail struck northeast Wisconsin during the evening. Heavy rain caused street flooding from the Appleton area (Outagamie Co.) south into Neenah, Menasha (Winnebago Co.) and Oshkosh. Water was 3 to 4 feet deep in the streets of Neenah and Menasha.

July 30, 2003
Flash flooding occurred ahead of a cold front that moved southeast into a warm and unstable air mass. Early storms produced large hail and some wind damage before an east to west boundary formed in the Appleton area, providing the focus for training thunderstorms and flooding. The highest measured rainfall was 6.50 inches in Darboy (Calumet Co.) including 3 inches in one hour. Heavy rain resulted in flash flooding that left 2 to 3 feet of water over many roads. Manhole covers popped off on streets in Appleton (Outagamie Co.). A bridge over the Fox River in Neenah (Outagamie Co.) had to be closed due to flooding. Strong winds tipped over a semi in Center Valley (Outagamie Co.). A 20 foot steel scaffolding, that had been set up to repair a chimney in Appleton (Outagamie Co.), was blown down by strong winds causing damage to a car, power lines and a neighboring house. Half dollar size hail fell at Menasha and there were several reports of dime to quarter size hail. Scattered power outages, impacting about 650 customers, were reported around Appleton, Neenah and Menasha.

March 31, 2004 to April 5, 2004
Flooding along the Wolf River in Shawano County late on the 29th made its way downstream to Shiocton (Outagamie Co.). The Wolf River at Shiocton rose above stage early on the 31st. Minor flooding on the Wolf River ended on the first of the month at Shiocton (Outagamie Co.) but the river rose above flood stage downstream at New London (Outagamie County) earlier in the day. The Wolf River at New London fell below flood stage on the evening of the 5th.

## 2.4 Flood Protection Measures

Flood protection measures for Black Otter Creek are limited to the Black Otter Lake Dam. Although control of the dam is limited to the removal or addition of flash boards, the lake behind the structure provides a significant amount of storage. This storage effectively reduces peak flood discharges on the downstream portions of Black Otter Creek.

For the Villages of Combined Locks, Kimberly, and Little Chute, and the City of Kaukauna, Lake Winnebago acts as a natural reservoir to store floodwaters and thus attenuate peak discharges. A U.S. government dam at Menasha and a privately owned dam at Neenah control the outlets which discharge the water from Lake Winnebago into Little Lake Butte des Mortes and the lower Fox River. There are numerous other dams in these areas, but their main functions are for recreation and hydraulic power generation and not flood control.

Flooding on the Wolf River within Outagamie County is uncontrolled; however, the Shawano Dam located in Shawano County controls flooding to some degree. This dam along with the flood retention characteristics of Shawano Lake help control the flood waters downstream on the Wolf River.

Concrete retaining walls within the commercial district of the City of New London confine the flow of the Wolf River under normal conditions. A bypass channel has been constructed between the Green Bay and Western Railroad and State Highway 54. This channel was built to alleviate some of the flooding due to the Embarrass River. Historical records indicate that the discharges through this channel are a function of the Wolf River's stage during flood conditions.

There are no known flood protection measures for the Wolf River or Willow Creek within the corporate limits of Shiocton. There is an agriculture levee located along Willow Creek north of the pump station, but it provides no flood protection.

# 3.0 ENGINEERING METHODS

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

for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the county at the time of completion of this FIS. Maps and flood elevations will be amended periodically to reflect future changes.

## 3.1 Hydrologic Analyses

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

New hydrologic analyses were performed by the WDNR in 2007 for the Apple Creek and Mud Creek watersheds. Discharges were computed using the Hydrologic Engineering Center's *Hydrologic Modeling System (HEC-HMS)* computer software, version 3.1.0 (Reference 23). For each subbasin, runoff Curve Numbers (CNs) were estimated using SSURGO soils data and 2002-2003 landuse data developed by the East Central Regional Planning Commission. Times of concentration were estimated using the TR-55 flowpath segment method. The rainfall distribution used was developed by the WDNR and is based on recorded storms 2 inches and larger from 1975 to 2003 at the Madison NWS gage (474961). Floodplain storage was taken into account were permanent water bodies existed, such as ponds, lakes, or manmade detentions structures, or where there were significant wetlands identified in the Wisconsin Wetland Inventory. It is assumed that no major construction or filling will occur in these areas that would reduce the amount of available storage volume. In the Mud Creek watershed, a detention pond was constructed in 2000 on the right side (looking downstream) of Mud Creek Tributary 3 just upstream of the railroad. This pond was accounted for in the modeling and provides for significant reduction in peak discharge downstream.

For the upper Apple Creek watershed (upstream of Holland Road), a leverage study provided by Earth Tech was incorporated into this FIS. Discharges were computed using the Hydrologic Engineering Center's *Hydrologic Modeling System (HEC-HMS)* computer software, version 3.1.0 (Reference 23). The model represents existing conditions as of fall 2007. This model is upstream of the new hydrologic analysis performed by the WDNR. For consistency, the outflow hydrographs of the Earth Tech model were used as input to the WDNR HEC-HMS model downstream.

For the Garners Creek watershed, a 1994 leverage study by Foth and Van Dyke was incorporated into this FIS. Hydrologic analysis was completed utilizing the NRCS TR-20 computer program for project formulation (Reference 12). The TR-20 model was calibrated to existing models within the limits of the study area as provided by WDNR, as summarized in the "Floodplain Management Community Status Report", of which one is a Flood Insurance Study for the Village of Combined Locks (Reference 4). The remainder were models developed for various bridge replacement evaluations. After reviewing the growth patterns in the study area, it was mutually agreed upon with the WDNR that this area is classified as "rapidly developing". Therefore, the final TR-20 modeling hydrology was determined utilizing future conditions for the study areas

north of County Highway KK. Also, the new regional detention facility just upstream of State Highway 441 was included in the runoff flow calculations.

Each incorporated community within, and the unincorporated areas of, Outagamie County, with the exception of the Cities of Appleton and Seymour and the Villages of Bear Creek, Nichols, and Wrightstown have a previously printed FIS report. The hydrologic analyses described in those reports have been compiled by waterway and summarized below.

Bear Creek – In unincorporated Outagamie County, the discharges for Bear Creek were developed using multiple regression analyses in which basin characteristics, drainage areas, main channel slope, and the percent of lakes and marshes were independent variables. The method is described in the USGS publication, Estimating Magnitude and Frequency of Floods in Wisconsin (Reference 8).

Black Creek – For the detailed analyses of the Black Creek in the Village of Black Creek, the hydrology was investigated by using the procedures outlined in the Soil Conservation Service (SCS) National Engineering Handbook (Reference 10). Using this procedure, the time of concentration and time of peak were computed for the basin. A unit hydrograph was then developed using the "pattern" hydrograph developed by the SCS. The expected 6-hour rainfall for the desired frequency event was obtained from Technical Paper 40 (Reference 11) and distributed into 30-minute amounts as described in the SCS criteria for design storms. A 6-hour duration was chosen since it was determined to be the "effective duration" for areas having an annual precipitation of approximately 30 inches. Rainfall excess was computed from accumulated rainfall, using an SCS runoff equation with equates runoff as a function of soil type, land use, and antecedent moisture conditions. Utilizing these precipitation data and the derived unit hydrograph, an outflow hydrograph was computed.

The Black Creek drainage basin immediately upstream of the Village of Black Creek is extremely flat and marshy. A controlled outlet is produced by the Soo Line Railroad Bridge and the bridge at State Highway 47. In an effort to evaluate the storage capacity of this marshy area, a TR-20 basin model was established (Reference 12) and a Modified Puls Routing scheme was developed. A substantial attenuation and subsequent reduction of peak discharges occur as a result of this flat area. Peak discharges contained in this report reflect the effects of the storage area.

Black Otter Creek – In the Village of Hortonville the hydrology of Black Otter Creek was investigated using the procedures outlined in the SCS National Engineering Handbook. A TR-20 basin model was established for the Black Otter Creek Basin. This hydrologic model was analyzed using the SCS TR-20 computer program for project formulation (Reference 12). This model was analyzed using a 24-hour Type II rainfall distribution as recommended in the SCS National Engineering Handbook. Different frequency rainfalls from Technical Paper No. 40 (Reference 11) were applied to this rainfall distribution. A storage vs. outflow curve for Black Otter Lake Dam was developed to determine the attenuation due to the dam and also to determine lakes stages for various frequency floods.

In unincorporated Outagamie County, the discharges for Black Otter Creek were developed using the procedures outlined in the SCS National Engineering Handbook (Reference 9). A TR-20 basin model was established for the Black Otter computer program for project formulation (Reference 12).

Embarrass River - In the October 1984 FIS for unincorporated Outagamie County, the discharges for the Embarrass River were developed from data gathered at gages along the entire length of the river and submitted by the Chicago District of the USACE. These discharges were coordinated with studies for the City of New London (References 15). A USGS gaging station (No.4-0790) is located within the corporate limits of New London on the right bank of the Wolf River, 100 feet downstream of the Pearl Street Bridge. This gage has 88 years of record. Information from this gage was used and correlated in the FIS.

In the City of New London, the discharges for the Embarrass River were those used in the FIS for Waupaca County (Reference 22). The peak discharges on the Wolf and Embarrass Rivers are not expected to occur simultaneously.

In evaluating the amount of water flowing through the bypass channel and in the main Embarrass River channel during flood stage in the City of New London, an analysis was made of historical records to evaluate the expected stage on the Wolf River. The stage on the Wolf River significantly affects the carrying capacity of the bypass channel. As the stage of the Wolf River rises, the bypass channel capacity decreases. However, the Embarrass River has the maximum influence on the Bypass Channel; therefore, the Embarrass River flooding was used to designate the zone boundaries along the Bypass Channel.

Fox River – For the detailed studies of the Fox River in the City of Kaukauna and the Villages of Combined Locks, Kimberly, and Little Chute, peak flood discharges were taken directly from the HEC-1 analysis (Reference 13) done for the Fox River Flood Plain Information Report (Reference 14).

In the October 1984 FIS for unincorporated Outagamie County, the discharges for the Fox River were developed from data gathered at gages along the entire length of the river and submitted by the Chicago District of the USACE. These discharges were coordinated with studies for the City of Appleton (Reference 1).

Mud Creek Tributary 2 – In the September 1993 FIS revision for unincorporated Outagamie County, the discharges for Mud Creek Tributary 2 were developed using the HEC-1 computer model with extended lag times in the upper basin areas (Reference 17).

Mud Creek Tributary 6 – The backwater elevation along Mud Creek Tributary 6 was determined from detailed information for Little Lake Butte Des Mortes, which was taken from the FIS for unincorporated Winnebago County (Reference 18).

Willow Creek – For the detailed analyses of Willow Creek in the Village of Shiocton, the hydrology was investigated by using the procedures outlined in the Soil Conservation Service (SCS) National Engineering Handbook (Reference 10). Using this procedure, the time of concentration and time of peak were computed for the basin. A unit hydrograph was then developed using the "pattern" hydrograph developed by the SCS. The expected 6-hour rainfall for the desired frequency event was obtained from Technical Paper 40 (Reference 11) and distributed into 30-minute amounts as described in the SCS criteria for design storms. A 6-hour duration was chosen since it was determined to be the "effective duration" for areas having an annual precipitation of approximately 30 inches. Rainfall excess was computed from accumulated rainfall, using an SCS runoff equation with equates runoff as a function of soil type, land use, and antecedent moisture conditions. Utilizing these precipitation data and the derived unit hydrograph, an outflow hydrograph was computed.

For the detailed study of Willow Creek in the Village of Shiocton, the hydrologic analysis was also investigated utilizing the State's Multiple Regression Equations with drainage area, main channel slope, percent lakes and marsh, areal factor, and mean snowfall as the independent variables. The derivation of these methods is described in detail in Estimating Magnitude and Frequency of Floods in Wisconsin (Reference 8). The hydrologic analysis for Willow Creek was based on its basin characteristics only. No interbasin flow from either the Shioc River or the Wolf River were computed. The results of these studies of peak discharge were also compared with data obtained from similar gaged basins. These discharges reflect the present land use within the basin. Increased development without regard to changes in the runoff characteristics of the basin could substantially increase these flows.

Wolf River - In the October 1984 FIS for unincorporated Outagamie County, the discharges for the Wolf River were developed from data gathered at gages along the entire length of the river and submitted by the Chicago District of the USACE. These discharges were coordinated with studies for the City of New London and the Village of Fremont (References 15 and 16). A USGS gaging station (No.4-0790) is located within the corporate limits of New London on the right bank of the Wolf River, 100 feet downstream of the Pearl Street Bridge. This gage has 88 years of record. Information from this gage was used and correlated in the FIS.

The peak discharge-frequency analyses for the Wolf River in the City of New London were provided by the USACE, Chicago District. The log-Pearson Type III analysis for the flow records at New London was used (Reference 20). Records are available for this gage from 1896 through 1976 (Reference 21).
For the detailed study of the Wolf River in the Village of Hortonville, peak flood discharges were obtained from the Outagamie County FIS (Reference 19).

For the detailed study of the Wolf River in the Village of Shiocton, an analysis was done of the 82-years of record for the New London gage (No. 04-0790), using a log-Pearson Type III statistical distribution as outlined in Estimating Magnitude and Frequency of Floods in Wisconsin (Reference 8). A statistical analysis was also

done for the 68-years of records at the Shiocton crest gage. These two analyses were then combined to establish frequency flows at Shiocton (Reference 19).

A summary of the drainage area-peak discharge relationships for all of the streams studied by detailed methods is shown in Table 7, "Summary of Discharges."

## TABLE 7 – SUMMARY OF DISCHARGES

| FLOODING SOURCE AND LOCATION | DRAINAGE AREA (sq. miles) | PEAK DISCHARGES (cfs) 10-PERCENT ANNUAL CHANCE | 2-PERCENT ANNUAL CHANCE | 1-PERCENT ANNUAL CHANCE | 0.2-PERCENT ANNUAL CHANCE |
|---|---|---|---|---|---|
| AAL TRIBUTARY | | | | | |
| At confluence with Apple Creek | 0.5 | 360 | 490 | 550 | 650 |
| APPLE CREEK | | | | | |
| Approximately 1,800 feet upstream of US Highway 41 | 0.8 | 520 | 780 | 910 | 1,160 |
| Downstream of divergence from Apple Creek Overland Flow | 0.9 | 60 | 70 | 80 | 100 |
| Downstream of US Highway 41 (AW) | 1.0 | 740 | 1,150 | 1,340 | 1,720 |
| Upstream of Ballard Road (AT) | 1.8 | 410 | 440 | 480 | 860 |
| Downstream of confluence with AAL Tributary | 2.5 | 640 | 940 | 1,080 | 1,250 |
| Upstream of French Road | 5.7 | 800 | 1,260 | 1,540 | 1,950 |
| Downstream of Cherryvale Avenue | 6.0 | 820 | 1,240 | 1,480 | 2,060 |
| Upstream of County Highway JJ | 6.1 | 440 | 780 | 1,010 | 1,720 |
| Upstream of Holland Road | 6.2 | 650 | 1,130 | 1,440 | 2,210 |
| Downstream of confluence with Apple Creek Northeast | 8.4 | 950 | 1,550 | 1,940 | 3,000 |
| Downstream of confluence at County Highway N | 12.9 | 1,330 | 2,300 | 2,440 | 3,580 |
| At confluence approximately 0.6 miles upstream of Weyers Road | 20.3 | 1,630 | 2,990 | 3,420 | 4,770 |
| At confluence approximately 700 feet upstream of Maloney Road | 23.5 | 1,760 | 3,250 | 3,790 | 5,250 |
| At confluence approximately 3,300 feet downstream of Farrell Road | 28.6 | 1,880 | 3,500 | 4,190 | 5,740 |

## TABLE 7 – SUMMARY OF DISCHARGES (Continued)

| FLOODING SOURCE AND LOCATION | DRAINAGE AREA (sq. miles) | PEAK DISCHARGES (cfs) 10-PERCENT ANNUAL CHANCE | 2-PERCENT ANNUAL CHANCE | 1-PERCENT ANNUAL CHANCE | 0.2-PERCENT ANNUAL CHANCE |
|---|---|---|---|---|---|
| APPLE CREEK (Continued) | | | | | |
| At confluence approximately 4,200 feet downstream of Farrell Road | 29.4 | 1,880 | 3,510 | 4,210 | 5,760 |
| At confluence approximately 300 feet upstream of McCabe Road | 33.7 | 1,970 | 3,660 | 4,400 | 6,010 |
| At confluence approximately 150 feet upstream of County Highway U | 45.8 | 2,330 | 4,350 | 5,290 | 7,220 |
| APPLE CREEK NORTH | | | | | |
| Upstream of Ballard Road | 1.3 | 400 | 690 | 820 | 1,230 |
| Downstream of Ballard Road | 2.2 | 640 | 1,090 | 1,300 | 1,830 |
| Upstream of French Road | 2.5 | 540 | 960 | 970 | 1,450 |
| Downstream of French Road | 1.3 | 340 | 480 | 500 | 830 |
| Approximately 1,100 feet upstream of confluence with Apple Creek | 1.4 | 330 | 430 | 430 | 500 |
| APPLE CREEK NORTH OVERLAND FLOW | | | | | |
| Upstream of confluence with Apple Creek Northeast | * | 210 | 400 | 480 | 660 |
| APPLE CREEK NORTHEAST | | | | | |
| Upstream of Lanser Lane | 0.5 | 90 | 190 | 220 | 340 |
| Upstream of French Road | 0.7 | 160 | 310 | 370 | 530 |
| Upstream of Holland Road | 1.5 | 380 | 750 | 910 | 1,340 |
| APPLE CREEK OVERLAND FLOW | | | | | |
| At confluence with Apple Creek | * | 520 | 830 | 970 | 1250 |
| BEAR CREEK | | | | | |
| At confluence with Wolf River | 59.0 | 1,000 | 1,600 | 1,900 | 2,300 |
| BLACK CREEK | | | | | |
| At State Highway 47 | 55.9 | 410 | 425 | 440 | 460 |
| BLACK OTTER CREEK | | | | | |
| At Hortonville's north corporate limit | 16.5 | 770 | 1,150 | 1,390 | 1,810 |
| COUNTY HIGHWAY JJ SWALE | | | | | |
| At confluence with Apple Creek | * | 1 | 50 | 60 | 280 |

## TABLE 7 – SUMMARY OF DISCHARGES (Continued)

| FLOODING SOURCE AND LOCATION | DRAINAGE AREA (sq. miles) | PEAK DISCHARGES (cfs) 10-PERCENT ANNUAL CHANCE | 2-PERCENT ANNUAL CHANCE | 1-PERCENT ANNUAL CHANCE | 0.2-PERCENT ANNUAL CHANCE |
|---|---|---|---|---|---|
| EMBARRASS RIVER | | | | | |
| Main Channel Below the Bypass Channel | * | 2,800 | 5,650 | 7,300 | 11,150 |
| At New London – total flow | 676.0 | 5,400 | 8,800 | 10,600 | 15,000 |
| EMBARRASS RIVER BYPASS CHANNEL | | | | | |
| Discharge in bypass channel and overland flow | * | 2,600 | 3,150 | 3,300 | 3,850 |
| FOX RIVER | | | | | |
| At South Memorial Drive | 6,097 | 20,300 | 23,900 | 25,300 | 28,500 |
| At Cedar Lock Dam | 6,106 | 20,600 | 24,300 | 25,700 | 29,000 |
| At Little Chute Dam | 6,110 | 21,200 | 24,900 | 26,500 | 29,600 |
| At Combined Locks Dam | 6,111 | 21,200 | 24,900 | 26,500 | 29,600 |
| At Kaukauna Dam | 6,125 | 21,500 | 25,200 | 27,000 | 30,000 |
| At Rapids Croche Dam | 6,150 | 21,900 | 25,500 | 27,400 | 30,500 |
| FRENCH ROAD OVERLAND FLOW | | | | | |
| At confluence with French Road Swale | * | 1 | 110 | 210 | 270 |
| FRENCH ROAD SWALE | | | | | |
| At Edgewood Drive | * | 130 | 170 | 180 | 230 |
| Upstream of Asbury Drive | * | 130 | 280 | 400 | 520 |
| GARNERS CREEK | | | | | |
| Approximately 1500 ft upstream of Stoney Brook Drive | 0.4 | 220 | 310 | 360 | 440 |
| Approximately 600 ft upstream of Stoney Brook Drive | 0.7 | 410 | 570 | 650 | 800 |
| Approximately 800 ft downstream of Spring Field Drive | 1.0 | 510 | 730 | 850 | 1060 |
| At Creekview Lane | 2.6 | 1,000 | 1,420 | 1,660 | 2,110 |
| At County Highway N | 7.1 | 1,510 | 2,220 | 2,600 | 3,310 |
| At confluence with Fox River | 11.5 | 2,020 | 2,900 | 3,350 | 4,330 |
| GARNERS CREEK TRIBUTARY 1 | | | | | |
| County Boundary | 1.6 | 320 | 480 | 570 | 740 |
| Approximately 600 ft upstream of Buchanan Road | 3.0 | 540 | 750 | 850 | 1,100 |

## TABLE 7 – SUMMARY OF DISCHARGES (Continued)

| FLOODING SOURCE AND LOCATION | DRAINAGE AREA (sq. miles) | PEAK DISCHARGES (cfs) 10-PERCENT ANNUAL CHANCE | 2-PERCENT ANNUAL CHANCE | 1-PERCENT ANNUAL CHANCE | 0.2-PERCENT ANNUAL CHANCE |
|---|---|---|---|---|---|
| GARNERS CREEK TRIBUTARY 2 | | | | | |
| County Boundary | 0.3 | 50 | 90 | 100 | 130 |
| Approximately 480-ft upstream of Marion Avenue | 0.8 | 200 | 280 | 330 | 400 |
| GARNERS CREEK TRIBUTARY 3 | | | | | |
| At Fenceline Drive | 0.7 | 130 | 180 | 210 | 260 |
| Downstream of confluence with Garners Creek Tributary 3.1 | 3.2 | 540 | 840 | 990 | 1270 |
| GARNERS CREEK TRIBUTARY 3.1 | | | | | |
| Approximately 1,400 feet upstream of confluence with Garners Creek Tributary 3 | 1.2 | 310 | 470 | 550 | 700 |
| GARNERS CREEK TRIBUTARY 4 | | | | | |
| At Mouth | 1.2 | 1,000 | 1,420 | 1,660 | 2,110 |
| GLORY LANE SWALE | | | | | |
| At confluence with Apple Creek | 0.3 | 50 | 80 | 120 | 130 |
| MUD CREEK | | | | | |
| Mayflower Drive | 1.0 | 290 | 440 | 520 | 670 |
| Approximately 1,200 feet upstream of N McCarthy Road | 1.4 | 450 | 660 | 780 | 1,010 |
| Upstream of WIS Avenue / Mall lot culvert | 1.7 | 500 | 750 | 890 | 1,140 |
| Downstream of Mall lot culvert / Upstream of US HWY 41 | 2.1 | 650 | 970 | 1,150 | 1,480 |
| Upstream of confluence with Tributary 3 | 2.6 | 730 | 1,100 | 1,310 | 1,700 |
| Downstream of confluence with Tributary 3 | 10.5 | 1,200 | 1,820 | 2,210 | 2,930 |
| Upstream of confluence with Tributary 2 | 10.7 | 1,230 | 1,850 | 2,250 | 2,980 |
| Downstream of confluence with Tributary 2 | 13.2 | 1,810 | 2,700 | 3,240 | 4,260 |
| Approximately 1,110 feet downstream of W Spencer Street | 13.5 | 1,900 | 2,820 | 3,380 | 4,430 |

## TABLE 7 – SUMMARY OF DISCHARGES (Continued)

| FLOODING SOURCE AND LOCATION | DRAINAGE AREA (sq. miles) | PEAK DISCHARGES (cfs) 10-PERCENT ANNUAL CHANCE | 2-PERCENT ANNUAL CHANCE | 1-PERCENT ANNUAL CHANCE | 0.2-PERCENT ANNUAL CHANCE |
|---|---|---|---|---|---|
| MUD CREEK (Continued) | | | | | |
| Upstream of confluence with Tributary 1 | 13.7 | 1,910 | 2,850 | 3,410 | 4,470 |
| Downstream of confluence with Tributary 1 | 14.6 | 2,140 | 3,180 | 3,800 | 4,970 |
| At Outagamie/Winnebago County Boundary | 14.7 | 2,150 | 3,200 | 3,820 | 4,990 |
| MUD CREEK TRIBUTARY 2 | | | | | |
| At confluence with Mud Creek | 2.4 | 500 | 800 | 900 | 1,150 |
| MUD CREEK TRIBUTARY 3 | | | | | |
| At confluence with Tributary 3.2 | 6.1 | 630 | 1,030 | 1,270 | 1,730 |
| Downstream of Detention Pond Spillway | 6.1 | 270 | 400 | 700 | 1,110 |
| Downstream of US Highway 41 | 7.9 | 620 | 960 | 1,160 | 1,540 |
| MUD CREEK TRIBUTARY 3.2 | | | | | |
| West Elsner Road | 0.6 | 90 | 170 | 210 | 290 |
| US Highway 41 | 1.4 | 120 | 210 | 280 | 400 |
| West Northland Avenue | 2.0 | 160 | 270 | 340 | 500 |
| Tri-Park Way | 2.4 | 250 | 380 | 460 | 610 |
| MUD CREEK TRIBUTARY 3.3 | | | | | |
| North McCarthy Road | 0.2 | 60 | 90 | 110 | 140 |
| West Capitol Drive | 0.5 | 80 | 140 | 160 | 210 |
| Upstream of confluence with Tributary 3.3.3 | 1.0 | 80 | 140 | 170 | 240 |
| Downstream of confluence with Tributary 3.3.3 | 1.3 | 100 | 160 | 210 | 290 |
| Upstream of confluence with Tributary 3.3.2 | 1.5 | 110 | 180 | 220 | 310 |
| Downstream of confluence with Tributary 3.3.2 | 2.4 | 180 | 290 | 370 | 510 |
| CTH OO / Northland Avenue | 3.3 | 340 | 560 | 690 | 940 |
| Approximately 3,140 feet upstream of confluence with Tributary 3.2 | 3.5 | 370 | 610 | 750 | 1,020 |
| Upstream of confluence with Tributary 3.2 | 3.7 | 420 | 680 | 830 | 1,130 |

## TABLE 7 – SUMMARY OF DISCHARGES (Continued)

| FLOODING SOURCE AND LOCATION | DRAINAGE AREA (sq. miles) | PEAK DISCHARGES (cfs) 10-PERCENT ANNUAL CHANCE | 2-PERCENT ANNUAL CHANCE | 1-PERCENT ANNUAL CHANCE | 0.2-PERCENT ANNUAL CHANCE |
|---|---|---|---|---|---|
| MUD CREEK TRIBUTARY 3.3.2 | | | | | |
| North Gillett Street | 0.5 | 30 | 60 | 70 | 100 |
| Approximately 1,000 feet downstream of Railroad Crossing | 0.9 | 80 | 130 | 150 | 210 |
| MUD CREEK TRIBUTARY 3.3.3 | | | | | |
| West Edgewood Drive | 0.2 | 30 | 50 | 60 | 80 |
| Approximately 600' upstream of Barley Way | 0.4 | 60 | 100 | 130 | 170 |
| WILLOW CREEK | | | | | |
| At Green Bay and Western Railroad near Second Street | 4.7 | 8 | 28 | 38 | 58 |
| At Green Bay and Western Railroad near Broad Street | 4.7 | 45 | 65 | 75 | 95 |
| At downstream Shiocton corporate limit | 20.7 | 200 | 310 | 355 | 465 |
| WOLF RIVER | | | | | |
| Downstream Shiocton corporate limits | 1,460 | 5,300 | 6,900 | 7,300 | 8,600 |
| At County Highway M | 1,564 | 9,800 | 13,200 | 14,700 | 18,200 |
| Above confluence with Embarrass River | 1,710 | 9,400 | 12,700 | 14,150 | 17,800 |
| Below confluence with Embarrass River – total flow | 2,240 | 12,100 | 16,300 | 18,190 | 22,900 |
| WOLF RIVER BYPASS CHANNEL | | | | | |
| Discharge in bypass channel and overland flow | * | 2,500 | 3,500 | 3,850 | 4,700 |

*Information Not Available

### 3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals. Users should be aware that flood elevations shown on the FIRM represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the Floodway Data tables in the FIS report. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the

flood elevation data presented in this FIS in conjunction with the data shown on the FIRM.

The 1999 Foth & Van Dyke Apple Creek leverage study model was updated in 2001 by Earth Tech for modifications to French Road Swale and the new Glory Lane Swale (Reference 32). Further modifications were made by Earth Tech in 2006 to reflect a channel modification project and several culvert crossings on French Road Swale. Following the end of construction in the summer of 2006, the channel was re-surveyed and the hydraulic model was updated to reflect as-built conditions. In 2008, WDNR combined the four profiles and added the 1-percent-annual chance encroachment run to the model. Water-surface elevations were computed through the use of the USACE HEC-RAS 3.1.3 program (Reference 33). The leverage study model results were utilized for DFIRM mapping for Apple Creek and Apple Creek Northeast upstream of Holland Road. AAL Tributary, Apple Creek North, Apple Creek North Overland Flow, Apple Creek Overland Flow, County Highway JJ Swale, French Road Overland Flow, French Road Swale, and Glory Lane Swale were mapped in their entirety from this leverage study.

For the Apple Creek Mainstem and Apple Creek Northeast revision, cross sections were developed using the countywide 2-foot contours dated 2005. Field survey was completed in December 2007 for the 12 structures and numerous intermediate cross sections incorporated into the hydraulic model. Water-surface elevations were computed through the use of the USACE HEC-RAS 3.1.3 program (Reference 33). The downstream boundary condition for the Apple Creek Mainstem was assumed to be normal depth. The Apple Creek and Apple Creek Northeast reaches were included in one HEC-RAS model, thus the downstream boundary condition for Apple Creek Northeast was the backwater elevation from Apple Creek Mainstem for each storm event.

In the City of Appleton, and in unincorporated Outagamie County from the City of Kaukauna corporate limit to the Brown County boundary, the Fox River models from the 1974 Fox River Flood Plain Information Report (Reference 26) were converted to HEC-RAS (Reference 33) by the WDNR. The converted models were updated to match the study workmaps for floodway widths and distances between cross sections.

The 1995 Foth & Van Dyke Garners Creek leverage study model was incorporated into this FIS. The hydraulic analysis initially utilized the Army Corps of Engineers backwater computer program HEC-2 (Reference 24). Cross sections were obtained from field survey at all structures and along the stream reaches studied. Additional cross sections were added to the model where appropriate based on existing survey information, field observation, and best available mapping (including existing 1' and 2' contour interval mapping, and computer generated 5' contour interval mapping developed from USGS topographic mapping). Also, all hydraulic structures, i.e. bridges and dams, within the detailed study area were field measured for vertical and horizontal dimensioning. Channel roughness (Manning's "n") was determined by field observation of channel condition and overbank vegetation and condition. In 2008, this model was imported into HEC-RAS 3.1.3 (Reference 33) by the WDNR and updated

to use the 10-percent-annual chance elevation on the Fox River for all storm events. The leverage study model results were utilized for DFIRM mapping for Tributary 4, the mainstem from the confluence with Tributary 4 to the Fox River, Tributary 3, and Tributary 3.1.

For the new detailed modeling on Garners Creek, Garners Creek Tributary 1, and Garners Creek Tributary 2, cross sections were developed using the countywide 2-foot contours dated 2005. Field survey was completed in December 2007 for the 23 structures and numerous intermediate cross sections incorporated into the hydraulic model. Water-surface elevations were computed through the use of the USACE HEC-RAS 3.1.3 program (Reference 33). The downstream boundary condition for the three stream reaches was based on the 1995 Foth & Van Dyke leverage study.

For the Mud Creek Mainstem, Tributary 3, Tributary 3.2, Tributary 3.3, Tributary 3.3.2, and Tributary 3.3.3, cross sections were developed using the countywide 2-foot contours dated 2005. Field survey was completed in December 2007 for the 75 structures and numerous intermediate cross sections incorporated into the hydraulic model. Water-surface elevations were computed through the use of the USACE HEC-RAS 3.1.3 program (Reference 33). The downstream boundary condition for the Mud Creek Mainstem model was cross section E from the effective 2003 Winnebago FIS for all events. The Mud Creek tributary reaches were included in one HEC-RAS model, thus the downstream boundary conditions for the Mud Creek tributaries was the backwater elevation from the downstream confluences listed in Table 3 for each storm event.

The Wolf River 1987 effective model was converted to HEC-RAS by the WDNR. The converted model was updated to match the effective FIRM for floodway widths and distances between cross sections up through cross section K.

Each incorporated community within, and the unincorporated areas of, Outagamie County, with the exception of the Cities of Appleton and Seymour and the Villages of Bear Creek, Nichols, and Wrightstown have a previously printed FIS report. The hydraulic analyses described in those reports have been compiled by waterway and summarized below.

Black Creek – In the Village of Black Creek, the 1-percent-annual chance starting water-surface elevation used for the Black Creek was the 10-percent-annual chance starting water-surface elevation for the Wolf River, adjusted to this location (Reference 19). The 10-percent-annual chance starting water-surface elevation on the Black Creek was the normal elevation on the Wolf River. The 2 and 0.2-pecent-annual chance starting elevations were determined in similar manners. Water surface elevations of floods of the selected recurrence intervals were computed through use of the USACE HEC-2 step-backwater computer program (Reference 24). The profiles for Black Creek reflect the backwater of the Wolf River to approximately 300 feet downstream of the Soo Line Railroad Bridge.

Black Otter Creek – In the Village of Hortonville, cross sections and bridge elevation data and structural geometry for the backwater analyses of Black Otter Creek were obtained by field surveys. The channel soundings were also obtained by field measurement. Cross sections for the Wolf River were taken from the Outagamie County FIS. The 1-percent-annual chance starting water-surface elevations for Black Otter Creek were determined by comparing normal depths analysis results with selected flood elevations on the Wolf River. It was found that the normal depths computed for Black Otter Creek, using the Hydraulic Review of Natural or Constricted Waterways (Reference 25) computer program, produced the appropriate starting water-surface elevations.

Flood profiles for Black Otter Creek below the dam in the Village of Hortonville were determined using the USACE HEC-2 step-backwater computer program (Reference 24). These profiles were also used to establish a tail water rating curve for the Black Otter Lake Dam.

Embarrass River - In the Village of New London, the Embarrass River water-surface elevations were computed through the use of the USACE HEC-2 step-backwater computer program (Reference 27). The water-surface elevation in the bypass channel is influenced by the backwater of the Wolf River and/or the flood stage of the Embarrass River. The anticipated upper limit elevations in this area are expected to be from 760 to 761 feet NAVD.

Fox River – For the City of Kaukauna and the Villages of Combined Locks, Kimberly, and Little Chute, results of the hydraulic analyses on the Fox River were obtained directly from the Fox River Flood Plain Information Report (Reference 26). Starting water-surface elevations in that report were based on normal depth calculations. Water-surface elevations of floods of the selected recurrence intervals were computed through the use of the USACE HEC-2 step-backwater computer program (Reference 24). Cross sections used were determined through field surveys conducted by the USACE.

In the Villages of Kimberly and Little Chute, the Fox River starting water-surface elevations were obtained from rating curves developed for Little Chute Dam and Cedars Lock Dam. These curves were determined through structural analysis of the dams.

The U.S. Canal located within the Village of Little Chute corporate limits was studied by detailed methods in the Fox River Flood Plain Information Report. However, this area was determined to be a minimal flood hazard. The approximate boundaries agree with the 1-percent-annual chance boundaries obtained from the Fox River Flood Plain Information Report.

Willow Creek - In the Village of Shiocton, starting water-surface elevations for Willow Creek used a 10-percent-annual chance Wolf River stage. Water-surface elevations of floods of the selected recurrence intervals were computed through use of the USACE HEC-2 step-backwater computer program (Reference 24). Cross

sections and bridge elevation data and structural geometry for the backwater analyses of Willow Creek were obtained by field surveys.

Several areas of divided flow exist in the Village of Shiocton. Along Willow Creek, the divided flow under the Green Bay and Western Railroad was computed only through the auxiliary culvert.

Wolf River - In the Village of New London, the Wolf River water-surface elevations were computed through the use of the USACE HEC-2 step-backwater computer program (Reference 27). The water-surface elevation in the bypass channel is influenced by the backwater of the Wolf River and/or the flood stage of the Embarrass River. The anticipated upper limit elevations in this area are expected to be from 760 to 761 feet NAVD. Stream mileages for the Wolf River were matched with the published Flood Plain Information Report (Reference 28) and the FIS in Waupaca County (Reference 22). All distances were measured on recent topographic maps (Reference 29). All computed elevations on the Wolf River were compared with the USGS gage. The 1973 historical flood was used as the basis for constructing the hydraulic model used.

In unincorporated Outagamie County, water-surface elevations of floods of the selected recurrence intervals were determined by the slope/area method, the HEC-2 step-backwater computer program, and hand calculations (Reference 30). Cross sections for the backwater analyses of the streams were field surveyed and were located at close intervals above and below bridges in order to compute the significant backwater effects of these structures in highly urbanized areas. Other cross sections in the original study were located from USGS topographic maps (Reference 31).

In the Village of Shiocton the hydraulic data for the Wolf River was taken directly from a WDNR study completed in 1969, with the use of the HEC-2 step-backwater computer program (Reference 24). In this study the cross sections were obtained by field survey and from the Outagamie FIS (Reference 19). The channel soundings were obtained by field measurements. These data were restudied considering channel storage, and the results presented are the final adjusted elevations. Several areas of divided flow exist in the Village of Shiocton. The Wolf River along State Highway 54 was modeled as divided flow.

Roughness factors (Manning's "n" values) used in the hydraulic computations were chosen by engineering judgment and were based on field observations of the streams and floodplain areas. Roughness factors for all streams studied by detailed methods are shown in Table 8, "Manning's “n” Values."

**TABLE 8 - MANNING'S "n" VALUES**

| Stream | Channel "n" | Overbank "n" |
|---|---|---|
| AAL Tributary | 0.040 | 0.040 |
| Apple Creek | 0.030 – 0.050 | 0.030 – 0.100 |
| Apple Creek Northeast | 0.030 – 0.055 | 0.030 – 0.100 |
| Apple Creek North | 0.040 – 0.050 | 0.045 – 0.055 |
| Apple Creek North Overland Flow | 0.040 | 0.040 |
| Apple Creek Overland Flow | 0.040 | 0.040 |
| Bear Creek | 0.030 – 0.045 | 0.040 – 0.110 |
| Black Creek | 0.045 | 0.065 |
| County Highway JJ Swale | 0.040 | 0.045 |
| Embarrass River | 0.030 – 0.045 | 0.040 – 0.110 |
| Fox River | 0.025 – 0.043 | 0.021 – 0.120 |
| French Road Overland Flow | 0.040 | 0.040 |
| French Road Swale | 0.040 | 0.040 |
| Garners Creek | 0.028 – 0.075 | 0.035 – 0.120 |
| Garners Creek Tributary 1 | 0.035 – 0.045 | 0.035 – 0.120 |
| Garners Creek Tributary 2 | 0.028 – 0.030 | 0.030 – 0.100 |
| Garners Creek Tributary 3 | 0.035 – 0.060 | 0.060 – 0.100 |
| Garners Creek Tributary 3.1 | 0.060 – 0.065 | 0.075 – 0.095 |
| Garners Creek Tributary 4 | 0.015 – 0.045 | 0.030 – 0.080 |
| Glory Lane Swale | 0.040 | 0.040 |
| Mud Creek | 0.030 – 0.050 | 0.030 – 0.150 |
| Mud Creek Tributary 2 | 0.030 – 0.040 | 0.030 – 0.100 |
| Mud Creek Tributary 3 | 0.030 – 0.040 | 0.020 – 0.100 |
| Mud Creek Tributary 3.2 | 0.025 – 0.045 | 0.030 – 0.150 |
| Mud Creek Tributary 3.3 | 0.030 – 0.040 | 0.020 – 0.150 |
| Mud Creek Tributary 3.3.2 | 0.030 – 0.040 | 0.035 – 0.100 |
| Mud Creek Tributary 3.3.3 | 0.035 – 0.040 | 0.030 – 0.080 |
| Willow Creek | 0.035 – 0.060 | 0.070 – 0.100 |
| Wolf River | 0.028 – 0.040 | 0.030 – 0.150 |

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

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the Flood Profiles (Exhibit 1) are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

## 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 used for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD29). With the completion of the North American Vertical Datum of 1988 (NAVD88), many FIS reports and FIRMs are now prepared using NAVD88 as the referenced vertical datum.

Flood elevations shown in this FIS report and on the FIRM are referenced to the NAVD. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. Some of the data used in this revision were taken from the prior effective FIS reports and FIRMs and adjusted to NAVD88. To determine the conversion factor, locations at all quadrangle corners within the county and quadrangle corners within 2.5 miles of the county were evaluated using the WISCON v2.2 (06/01/2003) datum conversion software. The results of the conversion analysis are contained in Table 9. The datum conversion factor from NGVD29 to NAVD88 in Outagamie County is -0.1 feet. This translates in Outagamie County to (NGVD -0.1) = NAVD.

**Table 9 – VERTICAL DATUM CONVERSION FACTORS**

| Quad Name | Corner | Latitude | Longitude | Conversion from NGVD29 to NAVD88 (ft) |
|---|---|---|---|---|
| Embarrass | SW | 44.625 | 88.750 | -0.09 |
| Lunds | SW | 44.625 | 88.625 | -0.09 |
| Bonduel | SW | 44.625 | 88.500 | -0.08 |
| Zachow | SW | 44.625 | 88.375 | -0.06 |
| Pulaski | SW | 44.625 | 88.250 | -0.07 |
| Bear Creek | SW | 44.500 | 88.750 | -0.09 |
| Leeman | SW | 44.500 | 88.625 | -0.10 |
| Nichols | SW | 44.500 | 88.500 | -0.09 |
| Seymour | SW | 44.500 | 88.375 | -0.10 |
| Oneida North | SW | 44.500 | 88.250 | -0.11 |
| New London | SW | 44.375 | 88.750 | -0.12 |
| Shiocton | SW | 44.375 | 88.625 | -0.10 |
| Black Creek | SW | 44.375 | 88.500 | -0.11 |
| Freedom | SW | 44.375 | 88.375 | -0.12 |
| Oneida South | SW | 44.375 | 88.250 | -0.11 |
| Hortonville | SW | 44.250 | 88.750 | -0.07 |
| Greenville | SW | 44.250 | 88.625 | -0.10 |
| Appleton | SW | 44.250 | 88.500 | -0.10 |
| Kaukauna | SW | 44.250 | 88.375 | -0.09 |
| Wrightstown | SW | 44.250 | 88.250 | -0.09 |

For additional information regarding conversion between the NGVD29 and NAVD88, visit the National Geodetic Survey website at www.ngs.noaa.gov, or contact the National Geodetic Survey at the following address:

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

Temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the Technical Support Data Notebook associated with the FIS report and FIRM for this community.

Interested individuals may contact FEMA to access these data.

To obtain current elevation, description, and/or location information for benchmarks shown on this map, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their website at www.ngs.noaa.gov.

## 4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. To assist in this endeavor, each FIS provides 1-percent annual chance floodplain data, which may include a combination of the following: 10-, 2-, 1-, and 0.2-percent annual chance flood elevations; delineations of the 1-percent annual chance and 0.2-percent annual chance floodplains; and 1-percent annual chance floodway. This information is presented on the FIRM and in many components of the FIS, including Flood Profiles, Floodway Data tables, and Summary of Stillwater Elevation tables. Users should reference the data presented in the FIS as well as additional information that may be available at the local community map repository before making flood elevation and/or floodplain boundary determinations.

### 4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent annual chance flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent-annual-chance flood is employed to indicate additional areas of flood risk in the community. For each stream studied by detailed methods, the 1- and 0.2-percent-annual-chance floodplain boundaries have been delineated using the flood elevations determined at each cross section.

For this countywide study, the 1- and 0.2-percent annual chance floodplain boundaries were delineated using a digital terrain model that meets the National Map Accuracy Standards for mapping at a scale of 1:1,200 (Reference 34). Three stream

reaches were digitized based on workmaps in the Apple Creek leverage study (Reference 32). They are French Road Overland Flow, French Road Swale, and Glory Lane Swale. These delineations were based on more recent field survey that supersedes the 2005 terrain model mentioned above.

The 1- and 0.2-percent annual chance floodplain boundaries are shown on the FIRM (Exhibit 2). On this map, the 1-percent annual chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE), and the 0.2-percent annual chance floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 1- and 0.2-perent annual chance floodplain boundaries are close together, only the 1-percent annual chance floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 1-percent-annual-chance floodplain boundary is shown on the FIRM (Exhibit 2).

## 4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 1-percent-annual-chance floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the base flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. However, Wisconsin has established a more strict policy and does not allow any increase in the regional flood height for flood fringe developments (Reference 35).

Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections (see Table 10, “Floodway Data”). The computed floodways are shown on the FIRM (Exhibit 2). In cases where the floodway and 1-percent-annual-chance floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

In the City of Kaukauna a divided floodway condition exists where Elm Street crosses the Fox River between Thilmany Road and Island Street. The floodway in the area just upstream of Elm Street is constricted by a retaining wall and tops the retaining wall just downstream of Elm Street. No floodway has been actually

computed because of direct transfer of profiles from the Flood Plain Information Report and lack of data.

In the City of New London a floodway was not determined for the bypass channel between the Embarrass and Wolf Rivers because there were no detailed hydraulic computations made for the bypass channel alone.

In unincorporated Outagamie County, no floodway has been shown between the southern corporate limits of Hortonville and the Chicago & Northwestern Railway at Black Otter Lake along Black Otter Creek because the floodway concept is not applicable to non-conveyance areas.

In the Village of Shiocton, in areas of divided flow the floodways on the Wolf River and Willow Creek were computed by summing the divided floodways to produce the total floodway.

In the redelineation efforts, the floodways were not recalculated. As a result, there were areas where the previous floodway did not fit within the boundaries of the redelineated 1-percent annual chance floodplain. In these areas, the floodway was reduced. Water surface elevations, with and without a floodway, the mean velocity in the floodway, and the location and area at each surveyed cross section as determined by the hydraulic methods can be seen in Table 10. 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 area between the floodway and 1-percent-annual-chance floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation (WSEL) of the base flood more than 1-foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1, “Floodway Schematic.”

| FLOODING SOURCE | | FLOODWAY | | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88) | | | |
|---|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | WIDTH REDUCED FROM PRIOR STUDY (FEET) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| AAL TRIBUTARY | | | | | | | | | |
| A | 327[1] | 142 | 194 | 3.0 | 0 | 741.6 | 741.6 | 741.6 | 0.0 |
| B | 780[1] | 113 | 204 | 2.7 | 61 | 743.7 | 743.7 | 743.7 | 0.0 |
| C | 1,307[1] | 113 | 179 | 3.1 | 34 | 745.5 | 745.5 | 745.5 | 0.0 |
| APPLE CREEK | | | | | | | | | |
| A | 1,444[2] | 797 | 3,091 | 1.4 | 0 | 647.1 | 647.1 | 647.1 | 0.0 |
| B | 3,973[2] | 448 | 1,734 | 2.5 | 0 | 650.7 | 650.7 | 650.7 | 0.0 |
| C | 6,723[2] | 472 | 3,504 | 1.3 | 0 | 656.0 | 656.0 | 656.0 | 0.0 |
| D | 10,982[2] | 467 | 1,285 | 3.4 | 0 | 657.4 | 657.4 | 657.4 | 0.0 |
| E | 13,191[2] | 804 | 4,486 | 1.0 | 0 | 660.0 | 660.0 | 660.0 | 0.0 |
| F | 16,387[2] | 291 | 1,698 | 2.7 | 0 | 662.7 | 662.7 | 662.7 | 0.0 |
| G | 17,367[2] | 442 | 3,901 | 1.1 | 0 | 664.8 | 664.8 | 664.8 | 0.0 |
| H | 19,413[2] | 611 | 4,260 | 1.4 | 0 | 665.2 | 665.2 | 665.2 | 0.0 |
| I | 21,797[2] | 412 | 2,007 | 2.1 | 0 | 667.3 | 667.3 | 667.3 | 0.0 |
| J | 23,646[2] | 858 | 3,761 | 1.1 | 0 | 669.6 | 669.6 | 669.6 | 0.0 |
| K | 25,915[2] | 374 | 1,974 | 2.1 | 0 | 670.8 | 670.8 | 670.8 | 0.0 |
| L | 29,779[2] | 438 | 2,126 | 1.8 | 0 | 673.8 | 673.8 | 673.8 | 0.0 |
| M | 31,618[2] | 532 | 3,342 | 1.1 | 0 | 678.4 | 678.4 | 678.4 | 0.0 |
| N | 34,396[2] | 404 | 1,989 | 1.9 | 0 | 678.8 | 678.8 | 678.8 | 0.0 |
| O | 36,122[2] | 429 | 2,013 | 1.9 | 0 | 680.1 | 680.1 | 680.1 | 0.0 |
| P | 39,983[2] | 374 | 1,989 | 1.9 | 0 | 683.0 | 683.0 | 683.0 | 0.0 |
| Q | 41,501[2] | 641 | 4,545 | 0.8 | 0 | 686.7 | 686.7 | 686.7 | 0.0 |
| R | 44,975[2] | 361 | 1,378 | 2.5 | 0 | 687.7 | 687.7 | 687.7 | 0.0 |
| S | 47,586[2] | 464 | 1,776 | 1.9 | 0 | 691.4 | 691.4 | 691.4 | 0.0 |
| T | 49,411[2] | 546 | 3,554 | 1.0 | 0 | 696.4 | 696.4 | 696.4 | 0.0 |

[1]FEET ABOVE CONFLUENCE WITH APPLE CREEK, [2]FEET ABOVE OUTAGAMIE COUNTY BOUNDARY

TABLE 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OUTAGAMIE COUNTY, WI**

**AND INCORPORATED AREAS**

# FLOODWAY DATA

## AAL TRIBUTARY - APPLE CREEK

| FLOODING SOURCE | | FLOODWAY | | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88) | | | |
|---|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | WIDTH REDUCED FROM PRIOR STUDY (FEET) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| APPLE CREEK (CONTINUED) | | | | | | | | | |
| U | 53,386 | 407 | 1,582 | 1.5 | 0 | 698.2 | 698.2 | 698.2 | 0.0 |
| V | 56,746 | 468 | 1,780 | 1.4 | 0 | 701.2 | 701.2 | 701.2 | 0.0 |
| W | 59,178 | 432 | 1,757 | 1.4 | 0 | 704.8 | 704.8 | 704.8 | 0.0 |
| X | 62,020 | 526 | 1,957 | 1.3 | 0 | 707.5 | 707.5 | 707.5 | 0.0 |
| Y | 64,336 | 387 | 1,336 | 1.8 | 0 | 710.2 | 710.2 | 710.2 | 0.0 |
| Z | 65,308 | 280 | 1,375 | 1.8 | 0 | 713.3 | 713.3 | 713.3 | 0.0 |
| AA | 68,655 | 303 | 1,470 | 1.7 | 0 | 715.2 | 715.2 | 715.2 | 0.0 |
| AB | 70,248 | 330 | 1,330 | 1.5 | 0 | 716.6 | 716.6 | 716.6 | 0.0 |
| AC | 72,898 | 226 | 612 | 3.2 | 0 | 718.7 | 718.7 | 718.7 | 0.0 |
| AD | 75,044 | 299 | 710 | 2.0 | 0 | 721.9 | 721.9 | 721.9 | 0.0 |
| AE | 77,436 | 354 | 674 | 2.1 | 0 | 724.1 | 724.1 | 724.1 | 0.0 |
| AF | 80,586 | 83 | 983 | 4.6 | 0 | 726.8 | 726.8 | 726.8 | 0.0 |
| AG | 80,813 | 140 | 553 | 3.5 | 0 | 727.9 | 727.9 | 727.9 | 0.0 |
| AH | 81,308 | 133 | 425 | 2.4 | 0 | 728.7 | 728.7 | 728.7 | 0.0 |
| AI | 81,628 | 209 | 711 | 1.4 | 0 | 729.2 | 729.2 | 729.2 | 0.0 |
| AJ | 82,691 | 976 | 7,559 | 0.2 | 0 | 732.1 | 732.1 | 732.1 | 0.0 |
| AK | 84,555 | 188 | 1,099 | 1.4 | 0 | 732.1 | 732.1 | 732.1 | 0.0 |
| AL | 85,465 | 186 | 1,079 | 1.4 | 0 | 732.4 | 732.4 | 732.4 | 0.0 |
| AM | 87,414 | 196 | 1,079 | 1.4 | 0 | 732.7 | 732.7 | 732.7 | 0.0 |
| AN | 88,629 | 185 | 985 | 1.4 | 0 | 733.3 | 733.3 | 733.3 | 0.0 |
| AO | 90,612 | 144 | 642 | 1.7 | 0 | 733.5 | 733.5 | 733.5 | 0.0 |
| AP | 91,528 | 145 | 350 | 3.1 | 0 | 740.2 | 740.2 | 740.2 | 0.0 |
| AQ | 92,925 | 143 | 200 | 2.4 | 0 | 742.3 | 742.3 | 742.3 | 0.0 |
| AR | 93,842 | 78 | 201 | 2.4 | 78 | 743.9 | 743.9 | 743.9 | 0.0 |

[1]FEET ABOVE OUTAGAMIE COUNTY BOUNDARY

| FLOODING SOURCE | | FLOODWAY | | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88) | | | |
|---|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | WIDTH REDUCED FROM PRIOR STUDY (FEET) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| APPLE CREEK (CONTINUED) | | | | | | | | | |
| AS | 95,152[1] | 96 | 225 | 2.1 | 61 | 746.9 | 746.9 | 746.9 | 0.0 |
| AT | 95,966[1] | 72 | 281 | 1.7 | 0 | 750.0 | 750.0 | 750.0 | 0.0 |
| AU | 96,760[1] | 503 | 3,173 | 0.5 | 0 | 754.5 | 754.5 | 754.5 | 0.0 |
| AV | 97,940[1] | 811 | 2,890 | 0.5 | 0 | 754.5 | 754.5 | 754.5 | 0.0 |
| AW | 98,608[1] | 204 | 566 | 2.4 | 0 | 756.1 | 756.1 | 756.1 | 0.0 |
| AX | 99,296[1] | 37 | 77 | 1.0 | 0 | 757.3 | 757.3 | 757.3 | 0.0 |
| AY | 99,935[1] | 20 | 27 | 2.8 | 0 | 760.2 | 760.2 | 760.2 | 0.0 |
| AZ | 100,300[1] | 22 | 23 | 3.2 | 0 | 762.6 | 762.6 | 762.6 | 0.0 |
| BA | 100,722[1] | 20 | 26 | 2.9 | 0 | 764.9 | 764.9 | 764.9 | 0.0 |
| BB | 101,168[1] | 140 | 179 | 5.1 | 0 | 767.9 | 767.9 | 767.9 | 0.0 |
| BC | 102,321[1] | 102 | 249 | 3.6 | 189 | 774.3 | 774.3 | 774.3 | 0.0 |
| APPLE CREEK NORTH | | | | | | | | | |
| A | 775[2] | 41 | 139 | 4.1 | 0 | 730.1 | 730.1 | 730.1 | 0.0 |
| B | 1,936[2] | 89 | 440 | 2.5 | 0 | 733.0 | 733.0 | 733.0 | 0.0 |
| C | 3,247[2] | 40 | 106 | 4.7 | 0 | 737.7 | 737.7 | 737.7 | 0.0 |
| D | 4,480[2] | 65 | 584 | 4.9 | 0 | 744.3 | 744.3 | 744.3 | 0.0 |
| E | 4,844[2] | 224 | 860 | 2.0 | 0 | 746.7 | 746.7 | 746.7 | 0.0 |
| F | 5,791[2] | 685 | 795 | 1.7 | 39 | 747.7 | 747.7 | 747.7 | 0.0 |
| G | 7,775[2] | 715 | 775 | 1.9 | 0 | 753.5 | 753.5 | 753.5 | 0.0 |
| H | 9,842[2] | 300 | 530 | 2.4 | 0 | 762.1 | 762.1 | 762.1 | 0.0 |
| I | 11,164[2] | 238 | 307 | 4.2 | 0 | 766.7 | 766.7 | 766.7 | 0.0 |
| J | 12,458[2] | 112 | 405 | 3.2 | 0 | 772.5 | 772.5 | 772.5 | 0.0 |
| K | 12,734[2] | 360 | 2,019 | 0.4 | 0 | 779.9 | 779.9 | 779.9 | 0.0 |

[1]FEET ABOVE OUTAGAMIE COUNTY BOUNDARY, [2]FEET ABOVE CONFLUENCE WITH APPLE CREEK

TABLE 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OUTAGAMIE COUNTY, WI**

**AND INCORPORATED AREAS**

# FLOODWAY DATA

## APPLE CREEK - APPLE CREEK NORTH

| FLOODING SOURCE | | FLOODWAY | | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88) | | | |
|---|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | WIDTH REDUCED FROM PRIOR STUDY (FEET) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| APPLE CREEK NORTH OVERLAND FLOW | | | | | | | | | |
| A | 793[1] | 126 | 95 | 5.0 | 0 | 739.3 | 739.3 | 739.3 | 0.0 |
| APPLE CREEK NORTHEAST | | | | | | | | | |
| A | 424[2] | 117 | 219 | 4.2 | 0 | 721.2 | 721.2 | 721.2 | 0.0 |
| B | 1,892[2] | 211 | 334 | 2.7 | 0 | 724.5 | 724.5 | 724.5 | 0.0 |
| C | 2,787[2] | 360 | 459 | 2.0 | 0 | 726.0 | 726.0 | 726.0 | 0.0 |
| D | 3,600[2] | 271 | 418 | 2.2 | 0 | 728.2 | 728.2 | 728.2 | 0.0 |
| E | 6,058[2] | 277 | 809 | 1.1 | 423 | 731.2 | 731.2 | 731.2 | 0.0 |
| F | 7,680[2] | 206 | 262 | 3.5 | 43 | 736.3 | 736.3 | 736.3 | 0.0 |
| G | 8,585[2] | 181 | 202 | 1.8 | 0 | 737.9 | 737.9 | 737.9 | 0.0 |
| H | 9,015[2] | 167 | 222 | 1.6 | 46 | 738.9 | 738.9 | 738.9 | 0.0 |
| I | 10,677[2] | 32 | 128 | 2.8 | 149 | 741.0 | 741.0 | 741.0 | 0.0 |
| J | 11,717[2] | 192 | 226 | 1.6 | 0 | 745.4 | 745.4 | 745.4 | 0.0 |
| K | 12,497[2] | 312 | 444 | 0.5 | 0 | 750.6 | 750.6 | 750.6 | 0.0 |
| L | 13,237[2] | 126 | 251 | 0.9 | 89 | 751.1 | 751.1 | 751.1 | 0.0 |
| M | 14,445[2] | 42 | 51 | 4.3 | 0 | 755.7 | 755.7 | 755.7 | 0.0 |
| N | 14,579[2] | 170 | 1,640 | 0.3 | 0 | 760.2 | 760.2 | 760.2 | 0.0 |
| O | 16,357[2] | 42 | 27 | 2.8 | 0 | 761.3 | 761.3 | 761.3 | 0.0 |
| APPLE CREEK OVERLAND FLOW | | | | | | | | | |
| A | 297[2] | 234 | 403 | 2.4 | 121 | 757.9 | 757.9 | 757.9 | 0.0 |
| B | 1,093[2] | 155 | 211 | 4.6 | 0 | 765.0 | 765.0 | 765.0 | 0.0 |

[1]FEET ABOVE CONFLUENCE WITH APPLE CREEK NORTHEAST, [2]FEET ABOVE CONFLUENCE WITH APPLE CREEK

| FLOODING SOURCE | | FLOODWAY | | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88) | | | |
|---|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | WIDTH REDUCED FROM PRIOR STUDY (FEET) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| BEAR CREEK | | | | | | | | | |
| A | 5,778[1] | 300 | 600 | 2.9 | 0 | 763.7 | 757.2[2] | 757.2 | 0.0 |
| B | 8,423[1] | 250 | 820 | 2.1 | 0 | 763.7 | 759.1[2] | 759.1 | 0.0 |
| C | 10,183[1] | 47 | 360 | 4.8 | 43 | 763.7 | 763.4[2] | 763.4 | 0.0 |
| D | 11,967[1] | 57 | 490 | 3.6 | 63 | 765.3 | 765.3 | 765.3 | 0.0 |
| E | 17,533[1] | 56 | 2,840 | 0.6 | 119 | 766.5 | 766.5 | 766.5 | 0.0 |
| BLACK CREEK | | | | | | | | | |
| A | 17,477[3] | 494 | 1,120 | 0.4 | 0 | 768.4 | 767.2[2] | 767.2 | 0.0 |
| B | 18,333[3] | 190 | 464 | 1.0 | 0 | 768.4 | 767.3[2] | 767.3 | 0.0 |
| C | 18,942[3] | 42 | 138 | 3.2 | 0 | 769.5 | 769.5 | 769.5 | 0.0 |
| D | 19,444[3] | 434 | 664 | 0.7 | 0 | 770.0 | 770.0 | 770.0 | 0.0 |
| E | 19,815[3] | 128 | 343 | 1.3 | 0 | 770.1 | 770.1 | 770.1 | 0.0 |
| BLACK OTTER CREEK | | | | | | | | | |
| A | 9,468[1] | 310 | 1,139 | 1.2 | 213 | 764.1 | 764.1 | 764.1 | 0.0 |
| B | 10,029[1] | 194 | 554 | 2.5 | 70 | 765.4 | 765.4 | 765.4 | 0.0 |
| C | 11,313[1] | 127 | 673 | 2.1 | 84 | 767.8 | 767.8 | 767.8 | 0.0 |
| D | 11,782[1] | 145 | 408 | 3.4 | 0 | 768.9 | 768.9 | 768.9 | 0.0 |
| E | 12,277[1] | 24 | 171 | 8.1 | 0 | 771.0 | 771.0 | 771.0 | 0.0 |
| F | 12,963[1] | 168 | 488 | 2.9 | 0 | 773.0 | 773.0 | 773.0 | 0.0 |
| G | 13,368[1] | 30 | 201 | 6.9 | 0 | 777.4 | 777.4 | 777.4 | 0.0 |
| H | 13,894[1] | 55 | 227 | 6.1 | 0 | 780.1 | 780.1 | 780.1 | 0.0 |

[1]FEET ABOVE CONFLUENCE WITH WOLF RIVER, [2]ELEVATION COMPUTED WITHOUT CONSIDERATION OF BACKWATER EFFECTS FROM WOLF RIVER,
[3]FEET ABOVE CONFLUENCE WITH SHIOC RIVER

TABLE 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OUTAGAMIE COUNTY, WI**

**AND INCORPORATED AREAS**

# FLOODWAY DATA

## BEAR CREEK - BLACK CREEK - BLACK OTTER CREEK

| FLOODING SOURCE | | FLOODWAY | | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88) | | | |
|---|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | WIDTH REDUCED FROM PRIOR STUDY (FEET) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| COUNTY HIGHWAY JJ SWALE | | | | | | | | | |
| A | 378[1] | 31 | 189 | 1.0 | 0 | 729.2 | 729.2 | 729.2 | 0.0 |
| B | 753[1] | 19 | 105 | 2.7 | 0 | 729.6 | 729.6 | 729.6 | 0.0 |
| EMBARRASS RIVER | | | | | | | | | |
| A | 365[2] | 760 | 4,230 | 1.7 | 0 | 760.4 | 759.4[4] | 759.4 | 0.0 |
| B | 1,136[2] | 201 | 1,680 | 4.3 | 544 | 760.6 | 759.5[4] | 759.5 | 0.0 |
| C | 1,186[2] | 90 | 1,170 | 6.2 | 0 | 760.6 | 759.5[4] | 759.5 | 0.0 |
| D | 1,240[2] | 270 | 2,300 | 3.2 | 0 | 760.6 | 759.9[4] | 759.9 | 0.0 |
| E | 2,870[2] | 590/1,670[5] | 4,465 | 1.6 | 0 | 760.6 | 760.5[4] | 760.5 | 0.0 |
| F | 7,886[2] | 245 | 3,004 | 3.5 | 105 | 761.9 | 761.9 | 761.9 | 0.0 |
| G | 7993[2] | 252 | 3,000 | 3.5 | 248 | 761.9 | 761.9 | 761.9 | 0.0 |
| H | 8,206[2] | 220 | 2,410 | 4.4 | 0 | 762.1 | 762.1 | 762.1 | 0.0 |
| I | 8,860[2] | 1,400 | 5,140 | 2.1 | 0 | 762.6 | 762.6 | 762.6 | 0.0 |
| J | 13,048[2] | 2,670 | 11,180 | 0.9 | 0 | 763.6 | 763.6 | 763.6 | 0.0 |
| K | 18,777[2] | 2,650 | 25,140 | 0.4 | 0 | 764.9 | 764.9 | 764.9 | 0.0 |
| L | 31,733[2] | 2,100 | 17,200 | 0.6 | 0 | 765.9 | 765.9 | 765.9 | 0.0 |
| M | 34,685[2] | 1,650 | 18,080 | 0.6 | 0 | 766.1 | 766.1 | 766.1 | 0.0 |
| N | 44,481[2] | 1,430 | 24,050 | 0.4 | 0 | 766.6 | 766.6 | 766.6 | 0.0 |
| FOX RIVER | | | | | | | | | |
| A | 105,067[3] | 791 | 7,944 | 3.5 | 0 | 607.1 | 607.1 | 607.1 | 0.0 |
| B | 107,561[3] | 722 | 7,882 | 3.5 | 39 | 607.6 | 607.6 | 607.6 | 0.0 |
| C | 110,150[3] | 635 | 8,324 | 3.3 | 0 | 608.0 | 608.0 | 608.0 | 0.0 |
| D | 113,032[3] | 502 | 6,295 | 4.4 | 0 | 608.4 | 608.4 | 608.4 | 0.0 |

[1]FEET ABOVE CONFLUENCE WITH APPLE CREEK, [2]FEET ABOVE CONFLUENCE WITH WOLF RIVER, [3]FEET ABOVE MOUTH AT GREEN BAY,

[4]ELEVATION COMPUTED WITHOUT CONSIDERATION OF FLOODING CONTROLLED BY WOLF RIVER , [5] WIDTH WITHIN OUTAGAMIE COUNTY/TOTAL WIDTH

TABLE 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OUTAGAMIE COUNTY, WI**

**AND INCORPORATED AREAS**

# FLOODWAY DATA

## COUNTY HIGHWAY JJ SWALE - EMBARRASS RIVER - FOX RIVER

| FLOODING SOURCE | | FLOODWAY | | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88) | | | |
|---|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | WIDTH REDUCED FROM PRIOR STUDY (FEET) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| FOX RIVER (CONTINUED) | | | | | | | | | |
| E | 114,504 | 708 | 8,549 | 3.2 | 0 | 608.8 | 608.8 | 608.8 | 0.0 |
| F | 119,134 | 1,261 | 13,577 | 2.0 | 0 | 609.3 | 609.3 | 609.3 | 0.0 |
| G | 122,942 | 1,600 | 16,352 | 1.9 | 0 | 609.6 | 609.6 | 609.6 | 0.0 |
| H | 124,765 | 937 | * | * | 65 | 609.8 | 609.8 | 609.8 | 0.0 |
| I | 126,749 | 96 | * | * | 94 | 611.1 | 611.1 | 611.1 | 0.0 |
| J | 126,903 | 98 | * | * | 62 | 612.4 | 612.4 | 612.4 | 0.0 |
| K | 127,040 | 200 | * | * | 0 | 630.8 | 630.8 | 630.8 | 0.0 |
| L | 128,542 | 631 | * | * | 209 | 639.8 | 639.8 | 639.8 | 0.0 |
| M | 129,481 | 645 | * | * | 0 | 642.9 | 642.9 | 642.9 | 0.0 |
| N | 129,974 | 339 | * | * | 0 | 647.4 | 647.4 | 647.4 | 0.0 |
| O | 130,757 | 340 | * | * | 0 | 649.9 | 649.9 | 649.9 | 0.0 |
| P | 131,161 | 590 | * | * | 0 | 651.2 | 651.2 | 651.2 | 0.0 |
| Q | 131,298 | 580 | * | * | 0 | 656.2 | 656.2 | 656.2 | 0.0 |
| R | 132,305 | 665 | * | * | 0 | 656.7 | 656.7 | 656.7 | 0.0 |
| S | 134,024 | 520 | * | * | 0 | 657.2 | 657.2 | 657.2 | 0.0 |
| T | 137,201 | 558 | * | * | 0 | 659.0 | 659.0 | 659.0 | 0.0 |
| U | 140,867 | 775 | 3,359 | 8.0 | 0 | 660.5 | 660.5 | 660.5 | 0.0 |
| V | 141,066 | 715 | 9,904 | 2.7 | 0 | 677.0 | 677.0 | 677.0 | 0.0 |
| W | 143,211 | 1,085 | 10,192 | 2.6 | 0 | 677.4 | 677.4 | 677.4 | 0.0 |
| X | 145,403 | 900 | 4,083 | 6.5 | 0 | 678.5 | 678.5 | 678.5 | 0.0 |
| Y | 145,713 | 760 | 3,421 | 7.8 | 0 | 679.8 | 679.8 | 679.8 | 0.0 |
| Z | 145,897 | 830 | 9,325 | 2.8 | 0 | 691.7 | 691.7 | 691.7 | 0.0 |
| AA | 146,749 | 620 | 6,948 | 3.8 | 0 | 691.9 | 691.9 | 691.9 | 0.0 |
| AB | 150,033 | 665 | 5,001 | 5.3 | 0 | 694.2 | 694.2 | 694.2 | 0.0 |

[1]FEET ABOVE MOUTH AT GREEN BAY, *NOT APPLICABLE

TABLE 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OUTAGAMIE COUNTY, WI**

**AND INCORPORATED AREAS**

# FLOODWAY DATA

## FOX RIVER

| FLOODING SOURCE | | FLOODWAY | | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88) | | | |
|---|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | WIDTH REDUCED FROM PRIOR STUDY (FEET) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| FOX RIVER (CONTINUED) | | | | | | | | | |
| AC | 150,691 | 735 | 10,922 | 2.4 | 0 | 701.6 | 701.6 | 701.6 | 0.0 |
| AD | 152,136 | 598 | 7,680 | 3.4 | 0 | 701.8 | 701.8 | 701.8 | 0.0 |
| AE | 154,148 | 497 | 6,360 | 4.0 | 0 | 702.2 | 702.2 | 702.2 | 0.0 |
| AF | 155,040 | 750 | 9,837 | 2.6 | 0 | 702.6 | 702.6 | 702.6 | 0.0 |
| AG | 156,387 | 649 | 8,615 | 3.0 | 30 | 702.8 | 702.8 | 702.8 | 0.0 |
| AH | 158,411 | 600 | 9,228 | 2.8 | 40 | 703.1 | 703.1 | 703.1 | 0.0 |
| AI | 160,529 | 644 | 9,446 | 2.7 | 47 | 703.3 | 703.3 | 703.3 | 0.0 |
| AJ | 162,890 | 364 | 3,427 | 7.5 | 0 | 703.4 | 703.4 | 703.4 | 0.0 |
| AK | 163,990 | 681 | 9,740 | 2.6 | 0 | 704.6 | 704.6 | 704.6 | 0.0 |
| AL | 166,116 | 676 | 10,174 | 2.5 | 0 | 704.9 | 704.9 | 704.9 | 0.0 |
| AM | 167,400 | 702 | 8,818 | 2.9 | 0 | 705.0 | 705.0 | 705.0 | 0.0 |
| AN | 168,457 | 469 | 5,683 | 4.5 | 0 | 705.1 | 705.1 | 705.1 | 0.0 |
| AO | 168,776 | 491 | 4,245 | 6.0 | 0 | 705.5 | 705.5 | 705.5 | 0.0 |
| AP | 169,308 | 474 | 5,556 | 4.6 | 68 | 711.2 | 711.2 | 711.2 | 0.0 |
| AQ | 170,140 | 655 | 9,519 | 2.7 | 46 | 711.7 | 711.7 | 711.7 | 0.0 |
| AR | 170,687 | 480 | 5,730 | 4.5 | 0 | 711.7 | 711.7 | 711.7 | 0.0 |
| AS | 171,156 | 550 | 5,663 | 4.5 | 0 | 711.9 | 711.9 | 711.9 | 0.0 |
| AT | 171,841 | 396 | 3,574 | 7.2 | 0 | 713.1 | 713.1 | 713.1 | 0.0 |
| AU | 172,458 | 491 | 4,641 | 5.5 | 41 | 714.1 | 714.1 | 714.1 | 0.0 |
| AV | 173,503 | 549 | 4,826 | 5.3 | 0 | 715.1 | 715.1 | 715.1 | 0.0 |
| AW | 173,834 | 387 | 4,822 | 7.1 | 0 | 715.2 | 715.2 | 715.2 | 0.0 |
| AX | 174,023 | 365 | 3,203 | 7.9 | 0 | 719.2 | 719.2 | 719.2 | 0.0 |
| AY | 175,146 | 770 | 6,889 | 3.7 | 0 | 726.5 | 726.5 | 726.5 | 0.0 |
| AZ | 175,683 | 444 | 3,465 | 7.3 | 0 | 726.4 | 726.4 | 726.4 | 0.0 |

[1]FEET ABOVE MOUTH AT GREEN BAY

| FLOODING SOURCE | | FLOODWAY | | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88) | | | |
|---|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | WIDTH REDUCED FROM PRIOR STUDY (FEET) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| FOX RIVER (CONTINUED) | | | | | | | | | |
| BA | 176,526[1] | 615 | 7,429 | 3.4 | 0 | 737.7 | 737.7 | 737.7 | 0.0 |
| BB | 177,351[1] | 727 | 7,722 | 3.3 | 0 | 738.1 | 738.1 | 738.1 | 0.0 |
| BC | 178,180[1] | 633 | 6,961 | 3.6 | 28 | 738.4 | 738.4 | 738.4 | 0.0 |
| BD | 179,161[1] | 553 | 5,420 | 4.7 | 0 | 739.0 | 739.0 | 739.0 | 0.0 |
| BE | 180,151[1] | 489 | 5,883 | 4.3 | 63 | 739.8 | 739.8 | 739.8 | 0.0 |
| BF | 180,626[1] | 547 | 5,547 | 4.6 | 0 | 740.1 | 740.1 | 740.1 | 0.0 |
| BG | 183,623[1] | 696 | 6,640 | 3.8 | 0 | 741.5 | 741.5 | 741.5 | 0.0 |
| FRENCH ROAD OVERLAND FLOW | | | | | | | | | |
| A | 396[2] | 33 | 36 | 5.9 | 0 | 740.5 | 740.5 | 740.5 | 0.0 |
| B | 953[2] | 49 | 61 | 3.3 | 0 | 743.5 | 743.5 | 743.5 | 0.0 |
| FRENCH ROAD SWALE | | | | | | | | | |
| A | 421[3] | 38 | 82 | 4.8 | 0 | 734.7 | 734.7 | 734.7 | 0.0 |
| B | 606[3] | 55 | 132 | 3.0 | 0 | 735.7 | 735.7 | 735.7 | 0.0 |
| C | 1,178[3] | 51 | 100 | 4.0 | 0 | 737.0 | 737.0 | 737.0 | 0.0 |
| D | 1,423[3] | 59 | 121 | 3.3 | 0 | 737.9 | 737.9 | 737.9 | 0.0 |
| E | 1,605[3] | 73 | 68 | 2.7 | 0 | 738.3 | 738.3 | 738.3 | 0.0 |
| F | 2,100[3] | 46 | 72 | 2.5 | 0 | 739.7 | 739.7 | 739.7 | 0.0 |
| G | 2,692[3] | 69 | 51 | 3.5 | 0 | 741.8 | 741.8 | 741.8 | 0.0 |

[1]FEET ABOVE MOUTH AT GREEN BAY, [2]FEET ABOVE CONFLUENCE WITH FRENCH ROAD SWALE, [3]FEET ABOVE CONFLUENCE WITH APPLE CREEK

TABLE 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OUTAGAMIE COUNTY, WI**

**AND INCORPORATED AREAS**

# FLOODWAY DATA

**FOX RIVER - FRENCH ROAD OVERLAND FLOW - FRENCH ROAD SWALE**

| FLOODING SOURCE | | FLOODWAY | | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88) | | | |
|---|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | WIDTH REDUCED FROM PRIOR STUDY (FEET) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| GARNERS CREEK | | | | | | | | | |
| A | 952 | 94 | 746 | 4.5 | 0 | 663.4 | 663.4 | 663.4 | 0.0 |
| B | 1,231 | 70 | 768 | 4.4 | 34 | 664.0 | 664.0 | 664.0 | 0.0 |
| C | 2,199 | 196 | 1,417 | 1.9 | 32 | 665.6 | 665.6 | 665.6 | 0.0 |
| D | 3,444 | 276 | 1,502 | 1.8 | 0 | 669.8 | 669.8 | 669.8 | 0.0 |
| E | 4,527 | 68 | 611 | 4.4 | 0 | 674.0 | 674.0 | 674.0 | 0.0 |
| F | 5,130 | 323 | 2,114 | 1.3 | 0 | 677.3 | 677.3 | 677.3 | 0.0 |
| G | 7,483 | 279 | 944 | 2.9 | 0 | 678.5 | 678.5 | 678.5 | 0.0 |
| H | 10,049 | 187 | 473 | 5.7 | 0 | 684.5 | 684.5 | 684.5 | 0.0 |
| I | 12,410 | 278 | 1,159 | 2.3 | 0 | 693.2 | 693.2 | 693.2 | 0.0 |
| J | 16,026 | 49 | 285 | 9.1 | 0 | 704.3 | 704.3 | 704.3 | 0.0 |
| K | 16,366 | 185 | 1,302 | 2.0 | 0 | 710.3 | 710.3 | 710.3 | 0.0 |
| L | 16,747 | 83 | 466 | 5.6 | 0 | 710.3 | 710.3 | 710.3 | 0.0 |
| M | 17,578 | 187 | 658 | 2.5 | 0 | 713.5 | 713.5 | 713.5 | 0.0 |
| N | 19,973 | 137 | 254 | 6.5 | 0 | 718.9 | 718.9 | 718.9 | 0.0 |
| O | 21,675 | 183 | 501 | 3.3 | 0 | 727.8 | 727.8 | 727.8 | 0.0 |
| P | 22,487 | 121 | 405 | 4.1 | 0 | 731.1 | 731.1 | 731.1 | 0.0 |
| Q | 23,154 | 184 | 3,104 | 0.5 | 318 | 739.1 | 739.1 | 739.1 | 0.0 |
| R | 24,155 | 253 | 1,107 | 1.5 | 0 | 739.3 | 739.3 | 739.3 | 0.0 |
| S | 25,208 | 70 | 264 | 6.3 | 0 | 741.2 | 741.2 | 741.2 | 0.0 |
| T | 25,648 | 162 | 533 | 3.1 | 0 | 744.5 | 744.5 | 744.5 | 0.0 |
| U | 26,665 | 88 | 399 | 4.2 | 26 | 747.3 | 747.3 | 747.3 | 0.0 |
| V | 27,005 | 310 | 905 | 1.8 | 0 | 752.6 | 752.6 | 752.6 | 0.0 |
| W | 27,470 | 211 | 922 | 1.2 | 0 | 752.9 | 752.9 | 752.9 | 0.0 |
| X | 28,274 | 71 | 165 | 5.2 | 0 | 753.8 | 753.8 | 753.8 | 0.0 |
| Y | 29,235 | 33 | 431 | 6.6 | 0 | 758.7 | 758.7 | 758.7 | 0.0 |

[1]FEET ABOVE CONFLUENCE WITH FOX RIVER

TABLE 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OUTAGAMIE COUNTY, WI**

**AND INCORPORATED AREAS**

# FLOODWAY DATA

## GARNERS CREEK

| FLOODING SOURCE | | FLOODWAY | | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88) | | | |
|---|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | WIDTH REDUCED FROM PRIOR STUDY (FEET) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| GARNERS CREEK (CONTINUED) | | | | | | | | | |
| Z | 29,736[1] | 91 | 250 | 2.6 | 0 | 761.1 | 761.1 | 761.1 | 0.0 |
| AA | 30,425[1] | 410 | 634 | 1.0 | 0 | 762.4 | 762.4 | 762.4 | 0.0 |
| AB | 30,635[1] | 300 | 313 | 2.1 | 0 | 763.3 | 763.3 | 763.3 | 0.0 |
| AC | 31,160[1] | 419 | 398 | 1.8 | 0 | 766.1 | 766.1 | 766.1 | 0.0 |
| AD | 32,039[1] | 30 | 49 | 7.3 | 0 | 773.2 | 773.2 | 773.2 | 0.0 |
| GARNERS CREEK TRIBUTARY 1 | | | | | | | | | |
| A | 604[2] | 176 | 425 | 2.0 | 0 | 666.2 | 666.2 | 666.2 | 0.0 |
| B | 2,075[2] | 169 | 298 | 2.9 | 0 | 671.0 | 671.0 | 671.0 | 0.0 |
| C | 2,878[2] | 185 | 748 | 1.1 | 0 | 677.7 | 677.7 | 677.7 | 0.0 |
| D | 3,608[2] | 104 | 178 | 3.2 | 0 | 678.5 | 678.5 | 678.5 | 0.0 |
| E | 4,323[2] | 135 | 382 | 1.5 | 0 | 685.1 | 685.1 | 685.1 | 0.0 |
| F | 5,739[2] | 96 | 235 | 2.4 | 0 | 691.2 | 691.2 | 691.2 | 0.0 |
| G | 6,387[2] | 85 | 533 | 1.7 | 0 | 698.4 | 698.4 | 698.4 | 0.0 |
| H | 6,953[2] | 71 | 127 | 4.5 | 0 | 699.8 | 699.8 | 699.8 | 0.0 |
| I | 7,654[2] | 80 | 119 | 4.8 | 0 | 704.7 | 704.7 | 704.7 | 0.0 |
| J | 9,374[2] | 172 | 330 | 1.7 | 0 | 714.6 | 714.6 | 714.6 | 0.0 |
| K | 12,131[2] | 73 | 108 | 5.3 | 0 | 724.7 | 724.7 | 724.7 | 0.0 |
| L | 12,787[2] | 194 | 402 | 1.4 | 0 | 728.9 | 728.9 | 728.9 | 0.0 |
| M | 14,960[2] | 130 | 246 | 2.3 | 0 | 735.8 | 735.8 | 735.8 | 0.0 |
| N | 16,129[2] | 115 | 120 | 4.7 | 0 | 738.5 | 738.5 | 738.5 | 0.0 |
| O | 17,530[2] | 240 | 197 | 2.9 | 0 | 742.4 | 742.4 | 742.4 | 0.0 |
| P | 18,104[2] | 172 | 299 | 1.9 | 0 | 745.1 | 745.1 | 745.1 | 0.0 |

[1]FEET ABOVE CONFLUENCE WITH FOX RIVER, [2]FEET ABOVE CONFLUENCE WITH GARNERS CREEK

TABLE 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OUTAGAMIE COUNTY, WI**

**AND INCORPORATED AREAS**

# FLOODWAY DATA

## GARNERS CREEK - GARNERS CREEK TRIBUTARY 1

| FLOODING SOURCE | | FLOODWAY | | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88) | | | |
|---|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | WIDTH REDUCED FROM PRIOR STUDY (FEET) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| GARNERS CREEK TRIBUTARY 1 (CONTINUED) | | | | | | | | | |
| Q | 19,073 | 523 | 625 | 0.9 | 0 | 747.1 | 747.1 | 747.1 | 0.0 |
| GARNERS CREEK TRIBUTARY 2 | | | | | | | | | |
| A | 762 | 111 | 110 | 3.0 | 0 | 703.9 | 703.9 | 703.9 | 0.0 |
| B | 1,353 | 63 | 75 | 4.4 | 0 | 709.1 | 709.1 | 709.1 | 0.0 |
| C | 1,643 | 158 | 718 | 0.5 | 0 | 721.9 | 721.9 | 721.9 | 0.0 |
| D | 2,011 | 169 | 1,379 | 0.2 | 0 | 724.7 | 724.7 | 724.7 | 0.0 |
| E | 2,512 | 206 | 1,050 | 0.3 | 0 | 724.7 | 724.7 | 724.7 | 0.0 |
| F | 3,166 | 119 | 549 | 0.6 | 0 | 728.4 | 728.4 | 728.4 | 0.0 |
| G | 3,649 | 41 | 96 | 3.4 | 0 | 728.4 | 728.4 | 728.4 | 0.0 |
| H | 3,845 | 53 | 125 | 2.6 | 0 | 729.7 | 729.7 | 729.7 | 0.0 |
| I | 4,148 | 27 | 45 | 7.3 | 0 | 730.6 | 730.6 | 730.6 | 0.0 |
| J | 4,324 | 87 | 175 | 1.9 | 0 | 733.7 | 733.7 | 733.7 | 0.0 |
| K | 5,026 | 30 | 59 | 5.6 | 0 | 735.4 | 735.4 | 735.4 | 0.0 |
| L | 5,652 | 27 | 52 | 6.3 | 0 | 738.3 | 738.3 | 738.3 | 0.0 |
| M | 6,212 | 120 | 288 | 1.2 | 0 | 742.0 | 742.0 | 742.0 | 0.0 |
| N | 6,806 | 50 | 353 | 0.7 | 0 | 743.7 | 743.7 | 743.7 | 0.0 |
| O | 7,054 | 103 | 161 | 0.6 | 0 | 743.8 | 743.8 | 743.8 | 0.0 |
| P | 7,285 | 231 | 404 | 0.3 | 0 | 745.0 | 745.0 | 745.0 | 0.0 |
| Q | 7,841 | 108 | 165 | 0.6 | 0 | 745.6 | 745.6 | 745.6 | 0.0 |
| R | 8,542 | 75 | 195 | 0.8 | 0 | 747.0 | 747.0 | 747.0 | 0.0 |
| S | 9,066 | 101 | 340 | 0.6 | 0 | 748.4 | 748.4 | 748.4 | 0.0 |

[1]FEET ABOVE CONFLUENCE WITH GARNERS CREEK

TABLE 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OUTAGAMIE COUNTY, WI**

**AND INCORPORATED AREAS**

# FLOODWAY DATA

## GARNERS CREEK TRIBUTARY 1 - GARNERS CREEK TRIBUTARY 2

| FLOODING SOURCE | | FLOODWAY | | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88) | | | |
|---|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | WIDTH REDUCED FROM PRIOR STUDY (FEET) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| GARNERS CREEK TRIBUTARY 3 | | | | | | | | | |
| A | 484[1] | 273 | 1,699 | 0.6 | 0 | 713.1 | 713.1 | 713.1 | 0.0 |
| B | 1,829[1] | 142 | 455 | 2.2 | 0 | 713.6 | 713.6 | 713.6 | 0.0 |
| C | 2,345[1] | 260 | 1,622 | 0.6 | 0 | 721.3 | 721.3 | 721.3 | 0.0 |
| D | 3,222[1] | 199 | 1,200 | 0.8 | 0 | 724.0 | 724.0 | 724.0 | 0.0 |
| E | 3,909[1] | 172 | 1,567 | 0.6 | 0 | 724.1 | 724.1 | 724.1 | 0.0 |
| F | 5,286[1] | 131 | 356 | 1.5 | 0 | 728.6 | 728.6 | 728.6 | 0.0 |
| G | 6,359[1] | 181 | 641 | 0.8 | 0 | 739.2 | 739.2 | 739.2 | 0.0 |
| H | 7,365[1] | 74 | 146 | 1.4 | 0 | 742.9 | 742.9 | 742.9 | 0.0 |
| I | 7,620[1] | 10 | 34 | 6.2 | 0 | 743.4 | 743.4 | 743.4 | 0.0 |
| J | 8,196[1] | 77 | 82 | 2.6 | 0 | 748.7 | 748.7 | 748.7 | 0.0 |
| K | 8,775[1] | 29 | 37 | 5.6 | 0 | 752.5 | 752.5 | 752.5 | 0.0 |
| L | 9,152[1] | 57 | 100 | 2.1 | 0 | 757.1 | 757.1 | 757.1 | 0.0 |
| GARNERS CREEK TRIBUTARY 3.1 | | | | | | | | | |
| A | 305[2] | 138 | 234 | 2.4 | 0 | 733.6 | 733.6 | 733.6 | 0.0 |
| B | 1,363[2] | 130 | 302 | 1.8 | 0 | 740.1 | 740.1 | 740.1 | 0.0 |
| GARNERS CREEK TRIBUTARY 4 | | | | | | | | | |
| A | 298[1] | 150 | 609 | 1.2 | 0 | 752.9 | 752.9 | 752.9 | 0.0 |
| B | 610[1] | 22 | 139 | 5.2 | 0 | 752.9 | 752.9 | 752.9 | 0.0 |

[1]FEET ABOVE CONFLUENCE WITH GARNERS CREEK, [2]FEET ABOVE CONFLUENCE WITH GARNERS CREEK TRIBUTARY 3

TABLE 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OUTAGAMIE COUNTY, WI**

**AND INCORPORATED AREAS**

# FLOODWAY DATA

**GARNERS CREEK TRIBUTARY 3 - GARNERS CREEK TRIBUTARY 3.1 - GARNERS CREEK TRIBUTARY 4**

| FLOODING SOURCE | | FLOODWAY | | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88) | | | |
|---|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | WIDTH REDUCED FROM PRIOR STUDY (FEET) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| GLORY LANE SWALE | | | | | | | | | |
| A | 249[1] | 45 | 101 | 1.2 | 0 | 733.4 | 733.4 | 733.4 | 0.0 |
| B | 714[1] | 44 | 69 | 1.7 | 0 | 733.6 | 733.6 | 733.6 | 0.0 |
| MUD CREEK | | | | | | | | | |
| A | 3,297[2] | 456 | 2,670 | 1.3 | 0 | 745.3 | 745.3 | 745.3 | 0.0 |
| B | 4,906[2] | 348 | 1,014 | 3.4 | 0 | 746.2 | 746.2 | 746.2 | 0.0 |
| C | 5,841[2] | 267 | 669 | 5.1 | 0 | 747.7 | 747.7 | 747.7 | 0.0 |
| D | 6,940[2] | 322 | 865 | 3.9 | 0 | 749.7 | 749.7 | 749.7 | 0.0 |
| E | 8,573[2] | 393 | 1,513 | 2.2 | 0 | 754.7 | 754.7 | 754.7 | 0.0 |
| F | 10,553[2] | 54 | 260 | 8.6 | 0 | 762.3 | 762.3 | 762.3 | 0.0 |
| G | 10,819[2] | 196 | 1,692 | 1.3 | 0 | 765.1 | 765.1 | 765.1 | 0.0 |
| H | 11,462[2] | 283 | 1,344 | 1.6 | 0 | 765.8 | 765.8 | 765.8 | 0.0 |
| I | 12,191[2] | 402 | 1,546 | 1.5 | 0 | 768.3 | 768.3 | 768.3 | 0.0 |
| J | 12,616[2] | 272 | 1,718 | 1.3 | 0 | 768.3 | 768.3 | 768.3 | 0.0 |
| K | 13,719[2] | 201 | 1,017 | 1.1 | 0 | 768.6 | 768.6 | 768.6 | 0.0 |
| L | 17,144[2] | 53 | 249 | 3.6 | 0 | 783.4 | 783.4 | 783.4 | 0.0 |
| M | 18,494[2] | 74 | 308 | 6.8 | 0 | 787.2 | 787.2 | 787.2 | 0.0 |
| N | 19,405[2] | 54 | 100 | 7.8 | 0 | 797.0 | 797.0 | 797.0 | 0.0 |
| O | 20,084[2] | 137 | 709 | 2.1 | 0 | 806.4 | 806.4 | 806.4 | 0.0 |
| P | 21,058[2] | 54 | 104 | 7.5 | 0 | 814.3 | 814.3 | 814.3 | 0.0 |
| Q | 22,986[2] | 113 | 110 | 4.7 | 0 | 828.3 | 828.3 | 828.3 | 0.0 |
| R | 23,980[2] | 302 | 253 | 2.1 | 0 | 836.5 | 836.5 | 836.5 | 0.0 |

[1]FEET ABOVE CONFLUENCE WITH APPLE CREEK, [2]FEET ABOVE CONFLUENCE WITH LAKE BUTTE DES MORTS

TABLE 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OUTAGAMIE COUNTY, WI**

**AND INCORPORATED AREAS**

# FLOODWAY DATA

## GLORY LANE SWALE - MUD CREEK

| FLOODING SOURCE | | FLOODWAY | | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88) | | | |
|---|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | WIDTH REDUCED FROM PRIOR STUDY (FEET) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| MUD CREEK TRIBUTARY 2 | | | | | | | | | |
| A | 55[1] | 170 | 1,030 | 0.9 | 0 | 761.5 | 758.8[3] | 758.8 | 0.0 |
| B | 480[1] | 86 | 586 | 1.5 | 0 | 763.9 | 763.9 | 763.9 | 0.0 |
| C | 2,014[1] | 49 | 307 | 1.2 | 0 | 774.3 | 774.3 | 774.3 | 0.0 |
| D | 5,517[1] | 202 | 699 | 0.6 | 0 | 780.3 | 780.3 | 780.3 | 0.0 |
| E | 6,521[1] | 120 | 418 | 1.0 | 0 | 780.3 | 780.3 | 780.3 | 0.0 |
| F | 7,021[1] | 33 | 186 | 1.6 | 0 | 783.5 | 783.5 | 783.5 | 0.0 |
| G | 9,098[1] | 80 | 159 | 1.3 | 0 | 784.4 | 784.4 | 784.4 | 0.0 |
| H | 9,407[1] | 80 | 90 | 1.6 | 0 | 784.4 | 784.4 | 784.4 | 0.0 |
| I | 10,029[1] | 80 | 1 | 1.5 | 0 | 785.4 | 785.4 | 785.4 | 0.0 |
| MUD CREEK TRIBUTARY 3 | | | | | | | | | |
| A | 498[1] | 357 | 2,979 | 0.4 | 0 | 768.4 | 768.4 | 768.4 | 0.0 |
| B | 1,391[1] | 128 | 678 | 1.8 | 0 | 768.4 | 768.4 | 768.4 | 0.0 |
| C | 2,360[1] | 91 | 425 | 1.7 | 0 | 768.8 | 768.8 | 768.8 | 0.0 |
| D | 3,082[1] | 68 | 591 | 2.1 | 0 | 769.2 | 769.2 | 769.2 | 0.0 |
| E | 4,346[1] | 72 | 258 | 2.7 | 0 | 770.3 | 770.3 | 770.3 | 0.0 |
| F | 4,684[1] | 52 | 236 | 3.0 | 0 | 770.9 | 770.9 | 770.9 | 0.0 |
| G | 5,646[1] | 87 | 488 | 3.8 | 0 | 772.0 | 772.0 | 772.0 | 0.0 |
| H | 5,779[1] | 245 | 804 | 1.6 | 0 | 773.8 | 773.8 | 773.8 | 0.0 |
| MUD CREEK TRIBUTARY 3.2 | | | | | | | | | |
| A | 704[2] | 93 | 486 | 1.7 | 0 | 774.1 | 774.1 | 774.1 | 0.0 |

[1]FEET ABOVE CONFLUENCE WITH MUD CREEK, [2]FEET ABOVE CONFLUENCE WITH MUD CREEK TRIBUTARY 3

[3]ELEVATION COMPUTED WITHOUT CONSIDERATION OF BACKWATER EFFECTS FROM MUD CREEK

TABLE 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OUTAGAMIE COUNTY, WI**

**AND INCORPORATED AREAS**

# FLOODWAY DATA

**MUD CREEK TRIBUTARY 2 - MUD CREEK TRIBUTARY 3 - MUD CREEK Tributary 3.2**

| FLOODING SOURCE | | FLOODWAY | | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88) | | | |
|---|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | WIDTH REDUCED FROM PRIOR STUDY (FEET) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| MUD CREEK TRIBUTARY 3.2 (CONTINUED) | | | | | | | | | |
| B | 1,244 | 207 | 485 | 1.0 | 0 | 775.8 | 775.8 | 775.8 | 0.0 |
| C | 1,869 | 276 | 1,166 | 0.4 | 0 | 775.9 | 775.9 | 775.9 | 0.0 |
| D | 2,881 | 130 | 228 | 1.5 | 0 | 777.8 | 777.8 | 777.8 | 0.0 |
| E | 3,694 | 78 | 175 | 2.0 | 0 | 778.6 | 778.6 | 778.6 | 0.0 |
| F | 4,440 | 48 | 149 | 2.3 | 0 | 780.8 | 780.8 | 780.8 | 0.0 |
| G | 5,393 | 63 | 219 | 1.6 | 0 | 782.2 | 782.2 | 782.2 | 0.0 |
| H | 5,694 | 39 | 144 | 2.4 | 0 | 783.3 | 783.3 | 783.3 | 0.0 |
| I | 6,629 | 238 | 363 | 0.8 | 0 | 784.0 | 784.0 | 784.0 | 0.0 |
| J | 8,160 | 242 | 177 | 1.6 | 0 | 785.0 | 785.0 | 785.0 | 0.0 |
| K | 8,537 | 34 | 62 | 4.5 | 0 | 785.7 | 785.7 | 785.7 | 0.0 |
| L | 9,209 | 66 | 125 | 2.3 | 0 | 787.9 | 787.9 | 787.9 | 0.0 |
| M | 9,880 | 46 | 124 | 2.3 | 0 | 788.2 | 788.2 | 788.2 | 0.0 |
| N | 10,128 | 61 | 121 | 2.3 | 0 | 788.6 | 788.6 | 788.6 | 0.0 |
| O | 10,548 | 253 | 459 | 0.8 | 0 | 790.1 | 790.1 | 790.1 | 0.0 |
| P | 11,058 | 212 | 270 | 1.0 | 0 | 790.9 | 790.9 | 790.9 | 0.0 |
| Q | 11,594 | 93 | 135 | 2.1 | 0 | 791.9 | 791.9 | 791.9 | 0.0 |
| R | 12,488 | 96 | 172 | 1.6 | 0 | 794.0 | 794.0 | 794.0 | 0.0 |
| S | 12,751 | 90 | 399 | 1.5 | 0 | 794.8 | 794.8 | 794.8 | 0.0 |
| T | 14,687 | 363 | 569 | 0.5 | 0 | 796.0 | 796.0 | 796.0 | 0.0 |
| U | 15,794 | 343 | 620 | 0.5 | 0 | 796.3 | 796.3 | 796.3 | 0.0 |
| V | 16,237 | 24 | 54 | 5.2 | 0 | 796.5 | 796.5 | 796.5 | 0.0 |
| W | 16,594 | 32 | 87 | 3.2 | 0 | 798.4 | 798.4 | 798.4 | 0.0 |
| X | 18,474 | 148 | 261 | 1.0 | 0 | 799.0 | 799.0 | 799.0 | 0.0 |

[1]FEET ABOVE CONFLUENCE WITH MUD CREEK TRIBUTARY 3

| FLOODING SOURCE | | FLOODWAY | | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88) | | | |
|---|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | WIDTH REDUCED FROM PRIOR STUDY (FEET) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| MUD CREEK TRIBUTARY 3.2 (CONTINUED) | | | | | | | | | |
| Y | 18,868 | 394 | 188 | 1.3 | 0 | 800.1 | 800.1 | 800.1 | 0.0 |
| Z | 19,287 | 249 | 209 | 1.0 | 0 | 800.8 | 800.8 | 800.8 | 0.0 |
| AA | 19,936 | 23 | 352 | 5.2 | 0 | 801.7 | 801.7 | 801.7 | 0.0 |
| AB | 20,166 | 355 | 137 | 1.5 | 0 | 802.3 | 802.3 | 802.3 | 0.0 |
| AC | 20,377 | 313 | 189 | 1.1 | 0 | 802.5 | 802.5 | 802.5 | 0.0 |
| AD | 20,742 | 214 | 98 | 2.1 | 0 | 803.1 | 803.1 | 803.1 | 0.0 |
| AE | 21,256 | 166 | 162 | 1.3 | 0 | 805.2 | 805.2 | 805.2 | 0.0 |
| MUD CREEK TRIBUTARY 3.3 | | | | | | | | | |
| A | 602 | 67 | 228 | 3.3 | 0 | 774.1 | 774.1 | 774.1 | 0.0 |
| B | 1,847 | 81 | 463 | 1.6 | 0 | 778.0 | 778.0 | 778.0 | 0.0 |
| C | 2,692 | 354 | 1,789 | 0.4 | 0 | 778.8 | 778.8 | 778.8 | 0.0 |
| D | 3,582 | 258 | 746 | 0.9 | 0 | 779.4 | 779.4 | 779.4 | 0.0 |
| E | 4,051 | 31 | 77 | 9.0 | 0 | 779.8 | 779.8 | 779.8 | 0.0 |
| F | 4,194 | 104 | 304 | 2.7 | 0 | 782.2 | 782.2 | 782.2 | 0.0 |
| G | 4,690 | 120 | 365 | 1.2 | 0 | 783.0 | 783.0 | 783.0 | 0.0 |
| H | 5,482 | 93 | 155 | 2.4 | 0 | 783.6 | 783.6 | 783.6 | 0.0 |
| I | 6,427 | 104 | 158 | 2.4 | 0 | 784.7 | 784.7 | 784.7 | 0.0 |
| J | 7,755 | 177 | 136 | 2.7 | 0 | 786.6 | 786.6 | 786.6 | 0.0 |
| K | 7,846 | 143 | 216 | 1.7 | 0 | 787.1 | 787.1 | 787.1 | 0.0 |
| L | 9,578 | 85 | 125 | 3.0 | 0 | 789.5 | 789.5 | 789.5 | 0.0 |
| M | 10,531 | 186 | 338 | 1.1 | 0 | 791.1 | 791.1 | 791.1 | 0.0 |

[1]FEET ABOVE CONFLUENCE WITH MUD CREEK TRIBUTARY 3

TABLE 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OUTAGAMIE COUNTY, WI**

**AND INCORPORATED AREAS**

# FLOODWAY DATA

## MUD CREEK TRIBUTARY 3.2 - MUD CREEK TRIBUTARY 3.3

| FLOODING SOURCE | | FLOODWAY | | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88) | | | |
|---|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | WIDTH REDUCED FROM PRIOR STUDY (FEET) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| MUD CREEK TRIBUTARY 3.3 (CONTINUED) | | | | | | | | | |
| N | 11,183 | 110 | 133 | 1.7 | 0 | 791.1 | 791.1 | 791.1 | 0.0 |
| O | 11,772 | 32 | 143 | 1.5 | 0 | 792.0 | 792.0 | 792.0 | 0.0 |
| P | 12,019 | 48 | 97 | 2.2 | 0 | 793.4 | 793.4 | 793.4 | 0.0 |
| Q | 12,490 | 13 | 31 | 6.7 | 0 | 793.9 | 793.9 | 793.9 | 0.0 |
| R | 12,868 | 333 | 209 | 1.0 | 0 | 795.5 | 795.5 | 795.5 | 0.0 |
| S | 13,548 | 179 | 290 | 1.3 | 0 | 796.8 | 796.8 | 796.8 | 0.0 |
| T | 14,301 | 36 | 155 | 2.1 | 0 | 797.8 | 797.8 | 797.8 | 0.0 |
| U | 15,559 | 254 | 191 | 0.9 | 0 | 799.4 | 799.4 | 799.4 | 0.0 |
| V | 16,468 | 20 | 44 | 3.6 | 0 | 799.9 | 799.9 | 799.9 | 0.0 |
| W | 18,573 | 528 | 670 | 0.5 | 0 | 800.7 | 800.7 | 800.7 | 0.0 |
| X | 19,159 | 299 | 203 | 0.8 | 0 | 800.9 | 800.9 | 800.9 | 0.0 |
| Y | 21,047 | 17 | 41 | 3.9 | 0 | 801.8 | 801.8 | 801.8 | 0.0 |
| Z | 21,488 | 144 | 114 | 1.4 | 0 | 802.6 | 802.6 | 802.6 | 0.0 |
| AA | 22,054 | 407 | 590 | 0.3 | 0 | 803.3 | 803.3 | 803.3 | 0.0 |
| AB | 22,983 | 353 | 658 | 0.2 | 0 | 804.7 | 804.7 | 804.7 | 0.0 |
| AC | 24,445 | 19 | 267 | 5.8 | 0 | 806.7 | 806.7 | 806.7 | 0.0 |
| AD | 24,979 | 35 | 188 | 2.6 | 0 | 811.0 | 811.0 | 811.0 | 0.0 |
| AE | 26,138 | 25 | 166 | 2.2 | 0 | 816.7 | 816.7 | 816.7 | 0.0 |
| AF | 28,209 | 38 | 48 | 2.3 | 0 | 825.2 | 825.2 | 825.2 | 0.0 |
| AG | 29,148 | 448 | 413 | 0.3 | 0 | 830.0 | 830.0 | 830.0 | 0.0 |
| AH | 29,856 | 447 | 819 | 0.1 | 0 | 832.3 | 832.3 | 832.3 | 0.0 |
| AI | 30,835 | 26 | 21 | 5.2 | 0 | 832.7 | 832.7 | 832.7 | 0.0 |
| AJ | 31,035 | 160 | 585 | 0.3 | 0 | 838.1 | 838.1 | 838.1 | 0.0 |

[1]FEET ABOVE CONFLUENCE WITH MUD CREEK TRIBUTARY 3

TABLE 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OUTAGAMIE COUNTY, WI**

**AND INCORPORATED AREAS**

# FLOODWAY DATA

## MUD CREEK TRIBUTARY 3.3

| FLOODING SOURCE | | FLOODWAY | | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88) | | | |
|---|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | WIDTH REDUCED FROM PRIOR STUDY (FEET) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| MUD CREEK TRIBUTARY 3.3 (CONTINUED) | | | | | | | | | |
| AK | 31,233[1] | 256 | 655 | 0.2 | 0 | 839.8 | 839.8 | 839.8 | 0.0 |
| AL | 32,765[1] | 197 | 235 | 0.5 | 0 | 845.6 | 845.6 | 845.6 | 0.0 |
| MUD CREEK TRIBUTARY 3.3.2 | | | | | | | | | |
| A | 464[2] | 70 | 111 | 1.4 | 0 | 791.2 | 791.2 | 791.2 | 0.0 |
| B | 960[2] | 157 | 149 | 1.0 | 0 | 792.1 | 792.1 | 792.1 | 0.0 |
| C | 1,323[2] | 124 | 159 | 1.1 | 0 | 792.8 | 792.8 | 792.8 | 0.0 |
| D | 3,237[2] | 128 | 80 | 1.9 | 0 | 794.5 | 794.5 | 794.5 | 0.0 |
| E | 4,339[2] | 27 | 49 | 1.5 | 0 | 795.3 | 795.3 | 795.3 | 0.0 |
| F | 5,535[2] | 33 | 31 | 2.3 | 0 | 796.9 | 796.9 | 796.9 | 0.0 |
| G | 6,725[2] | 185 | 155 | 0.6 | 0 | 798.4 | 798.4 | 798.4 | 0.0 |
| H | 7,914[2] | 288 | 165 | 0.4 | 0 | 799.6 | 799.6 | 799.6 | 0.0 |
| MUD CREEK TRIBUTARY 3.3.3 | | | | | | | | | |
| A | 251[2] | 43 | 85 | 1.5 | 0 | 797.4 | 797.4 | 797.4 | 0.0 |
| B | 918[2] | 82 | 84 | 1.6 | 0 | 798.2 | 798.2 | 798.2 | 0.0 |
| C | 1,507[2] | 75 | 82 | 1.6 | 0 | 799.0 | 799.0 | 799.0 | 0.0 |
| D | 2,182[2] | 26 | 40 | 1.5 | 0 | 799.5 | 799.5 | 799.5 | 0.0 |
| E | 3,776[2] | 101 | 62 | 1.0 | 0 | 800.5 | 800.5 | 800.5 | 0.0 |

[1]FEET ABOVE CONFLUENCE WITH MUD CREEK TRIBUTARY 3, [2]FEET ABOVE CONFLUENCE WITH MUD CREEK TRIBUTARY 3.3

TABLE 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OUTAGAMIE COUNTY, WI**

**AND INCORPORATED AREAS**

# FLOODWAY DATA

**MUD CREEK TRIBUTARY 3.3 - MUD CREEK TRIBUTARY 3.3.2 - MUD CREEK TRIBUTARY 3.3.3**

| FLOODING SOURCE | | FLOODWAY | | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88) | | | |
|---|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | WIDTH REDUCED FROM PRIOR STUDY (FEET) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| WILLOW CREEK | | | | | | | | | |
| A | 2,323[1] | 26 | 249 | 1.4 | 0 | 766.1 | 764.7[2] | 764.7 | 0.0 |
| B | 3,116[1] | 366 | 1,183 | 0.3 | 0 | 766.1 | 764.8[2] | 764.8 | 0.0 |
| C | 3,889[1] | 515 | 465 | 0.8 | 0 | 766.3 | 764.9[2] | 764.9 | 0.0 |
| D | 4,664[1] | 7 | 21 | 1.8 | 0 | 767.2 | 765.3[2] | 765.3 | 0.0 |
| E | 5,333[1] | 56 | 268 | 0.3 | 0 | 767.4 | 765.5[2] | 765.5 | 0.0 |
| F | 6,305[1] | 60 | 270 | 0.3 | 0 | 767.4 | 765.5[2] | 765.5 | 0.0 |
| G | 7,081[1] | 66 | 288 | 0.3 | 0 | 767.4 | 765.6[2] | 765.6 | 0.0 |
| H | 7,616[1] | 50 | 230 | 0.3 | 0 | 767.4 | 765.6[2] | 765.6 | 0.0 |
| I | 8,710[1] | 40 | 168 | 0.5 | 0 | 767.4 | 765.6[2] | 765.6 | 0.0 |
| WOLF RIVER | | | | | | | | | |
| A | 172,875[3] | 1,118 | 4,668 | 3.0 | 0 | 760.6 | 760.6 | 760.6 | 0.0 |
| B | 174,118[3] | 227 | 4,465 | 3.2 | 0 | 760.9 | 760.9 | 760.9 | 0.0 |
| C | 174,174[3] | 173 | 3,254 | 4.5 | 0 | 760.9 | 760.9 | 760.9 | 0.0 |
| D | 174,222[3] | 173 | 3,286 | 4.4 | 0 | 761.0 | 761.0 | 761.0 | 0.0 |
| E | 174,415[3] | 390 | 5,575 | 3.2 | 0 | 761.1 | 761.1 | 761.1 | 0.0 |
| F | 175,485[3] | 1,099 | 10,728 | 1.6 | 0 | 761.4 | 761.4 | 761.4 | 0.0 |
| G | 176,795[3] | 1,300 | 11,886 | 1.4 | 0 | 761.5 | 761.5 | 761.5 | 0.0 |
| H | 179,570[3] | 1,300 | 15,594 | 1.5 | 0 | 761.9 | 761.9 | 761.9 | 0.0 |
| I | 181,470[3] | 1,400 | 22,095 | 1.3 | 0 | 762.1 | 762.1 | 762.1 | 0.0 |
| J | 182,964[3] | 2,200 | 24,340 | 0.7 | 0 | 762.3 | 762.3 | 762.3 | 0.0 |
| K | 187,564[3] | 2,000 | 25,691 | 0.9 | 0 | 762.4 | 762.4 | 762.4 | 0.0 |
| L | 195,413[3] | 3,950 | * | * | 0 | 762.5 | 762.5 | 762.5 | 0.0 |
| M | 210,472[3] | 7,300 | * | * | 0 | 762.5 | 762.5 | 762.5 | 0.0 |
| N | 232,330[3] | 4,850 | * | * | 0 | 762.8 | 762.8 | 762.8 | 0.0 |

[1]FEET ABOVE CONFLUENCE WITH WOLF RIVER, [2]ELEVATION COMPUTED WITHOUT CONSIDERATION OF BACKWATER EFFECTS FROM WOLF RIVER,
[3]FEET ABOVE CONFLUENCE WITH LAKE POYGAN

TABLE 10

FEDERAL EMERGENCY MANAGEMENT AGENCY
**OUTAGAMIE COUNTY, WI**
**AND INCORPORATED AREAS**

# FLOODWAY DATA

## WILLOW CREEK - WOLF RIVER

| FLOODING SOURCE | | FLOODWAY | | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88) | | | |
|---|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | WIDTH REDUCED FROM PRIOR STUDY (FEET) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| WOLF RIVER (CONTINUED) | | | | | | | | | |
| O | 245,610 | 6,900 | * | * | 0 | 763.6 | 763.6 | 763.6 | 0.0 |
| P | 256,961 | 1,200 | * | * | 0 | 763.9 | 763.9 | 763.9 | 0.0 |
| Q | 266,111 | 6,700 | * | * | 0 | 764.0 | 764.0 | 764.0 | 0.0 |
| R | 271,980 | 1,750 | * | * | 0 | 764.1 | 764.1 | 764.1 | 0.0 |
| S | 277,246 | 1,800 | * | * | 0 | 764.5 | 764.5 | 764.5 | 0.0 |
| T | 283,994 | 2,900 | * | * | 0 | 765.5 | 765.5 | 765.5 | 0.0 |
| U | 288,087 | 1,450 | 2,940 | 2.5 | 0 | 766.0 | 766.0 | 766.0 | 0.0 |
| V | 288,898 | 350 | 3,218 | 2.3 | 0 | 766.4 | 766.4 | 766.4 | 0.0 |
| W | 289,663 | 1,110 | 4,414 | 1.7 | 0 | 766.4 | 766.4 | 766.4 | 0.0 |
| X | 290,469 | 1,490 | 4,561 | 1.6 | 0 | 766.6 | 766.6 | 766.6 | 0.0 |
| Y | 291,314 | 1,100 | 3,416 | 2.1 | 0 | 766.7 | 766.7 | 766.7 | 0.0 |
| Z | 293,118 | 590 | 3,056 | 2.4 | 0 | 767.2 | 767.2 | 767.2 | 0.0 |
| AA | 294,252 | 375 | 4,348 | 1.7 | 0 | 767.4 | 767.4 | 767.4 | 0.0 |
| AB | 297,148 | 2,825 | 6,685 | 1.1 | 0 | 767.7 | 767.7 | 767.7 | 0.0 |
| AC | 300,247 | 1,900 | 13,860 | 0.5 | 0 | 767.8 | 767.8 | 767.8 | 0.0 |
| AD | 308,019 | 3,360 | * | * | 0 | 768.1 | 768.1 | 768.1 | 0.0 |
| AE | 313,871 | 2,280 | * | * | 0 | 768.4 | 768.4 | 768.4 | 0.0 |
| AF | 318,444 | 1,805 | * | * | 55 | 768.6 | 768.6 | 768.6 | 0.0 |
| AG | 324,369 | 3,800 | * | * | 0 | 769.5 | 769.5 | 769.5 | 0.0 |

[1]FEET ABOVE CONFLUENCE WITH LAKE POYGAN, *NOT APPLICABLE

TABLE 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

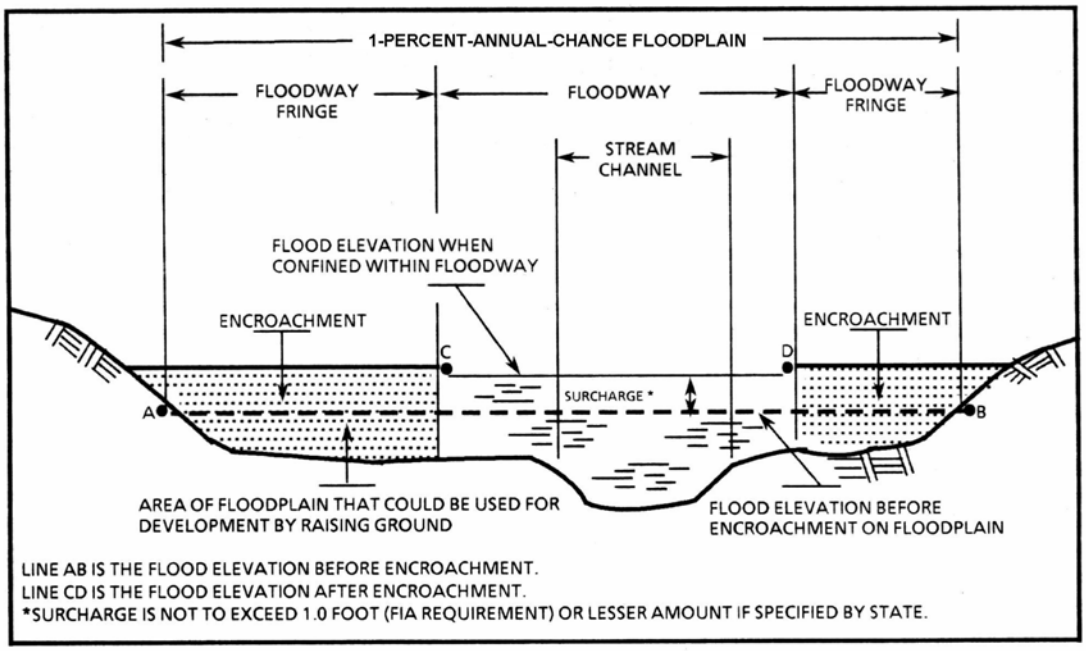
**OUTAGAMIE COUNTY, WI**

**AND INCORPORATED AREAS**

# FLOODWAY DATA

## WOLF RIVER

FIGURE 1 – FLOODWAY SCHEMATIC




## 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. The zones are as follows:

Zone A

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

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 1-percent annual chance floodplains that are determined in the FIS by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 0.2-percent annual chance floodplain, areas within the 0.2-percent annual chance floodplain, and to 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 base flood elevations or depths are shown within this zone.

## 6.0 FLOOD INSURANCE RATE MAP

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

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 1-percent-annual-chance floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 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.

The countywide FIRM presents flooding information for the entire geographic area of Outagamie County. Previously, FIRMs were prepared for each incorporated community and the unincorporated areas of the County identified as flood-prone. This countywide FIRM also includes flood-hazard information that was presented separately on Flood Boundary and Floodway Maps (FBFMs), where applicable. Historical data relating to the maps prepared for each community are presented in Table 11, “Community Map History.”

| COMMUNITY NAME | INITIAL IDENTIFICATION | FLOOD HAZARD BOUNDARY MAP REVISION DATE(S) | FLOOD INSURANCE RATE MAP EFFECTIVE DATE | FLOOD INSURANCE RATE MAP REVISION DATE(S) |
|---|---|---|---|---|
| Appleton, City of | April 6, 1973 | None | April 6, 1973 | July 1, 1974<br>December 26, 1975<br>April 9, 1982 |
| Bear Creek, Village of | TBD | None | TBD | None |
| Black Creek, Village | March 2, 1981 | None | March 2, 1981 | None |
| Combined Locks, Village of | June 21, 1974 | September 19, 1975 | June 15, 1981 | None |
| Hortonville, Village of | November 29, 1974 | None | July 2, 1981 | None |
| Howard, Village of* | December 28, 1973 | May 14, 1976 | February 17, 1982 | None |
| Kaukauna, City of | June 28, 1974 | November 7, 1975<br>February 13, 1976 | July 16, 1981 | None |
| Kimberly, Village of | June 14, 1974 | October 17, 1975 | May 17, 1982 | None |
| Little Chute, Village of | June 14, 1974 | August 29, 1975 | June 15, 1981 | None |
| Nichols, Village of | June 4, 2010 | None | June 4, 2010 | None |
| New London, City of | November 9, 1973 | None | March 15, 1977 | None |
| Outagamie County (Unincorporated Areas) | January 31, 1975 | None | September 30, 1977 | October 16, 1984<br>September 30, 1993 |
| Seymour, City of | November 29, 1974 | None | November 9, 1979 | None |

*No Special Flood Hazard Areas Identified Within Outagamie County

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OUTAGAMIE COUNTY, WI AND INCORPORATED AREAS**

**COMMUNITY MAP HISTORY**

| COMMUNITY NAME | INITIAL IDENTIFICATION | FLOOD HAZARD BOUNDARY MAP REVISION DATE(S) | FLOOD INSURANCE RATE MAP EFFECTIVE DATE | FLOOD INSURANCE RATE MAP REVISION DATE(S) |
|---|---|---|---|---|
| Shiocton, Village of | May 31, 1974 | July 23, 1976 | July 16, 1981 | None |
| Wrightstown, Village of* | August 22, 1975 | None | May 19, 1981 | None |

*No Special Flood Hazard Areas Identified Within Outagamie County

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OUTAGAMIE COUNTY, WI AND INCORPORATED AREAS**

**COMMUNITY MAP HISTORY**

## 7.0 OTHER STUDIES

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

The Countywide studies for Brown, Portage, Waupaca, and Winnebago County, Wisconsin, are in progress and might impact the information presented in this countywide FIS report.

## 8.0 LOCATION OF DATA

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

## 9.0 BIBLIOGRAPHY AND REFERENCES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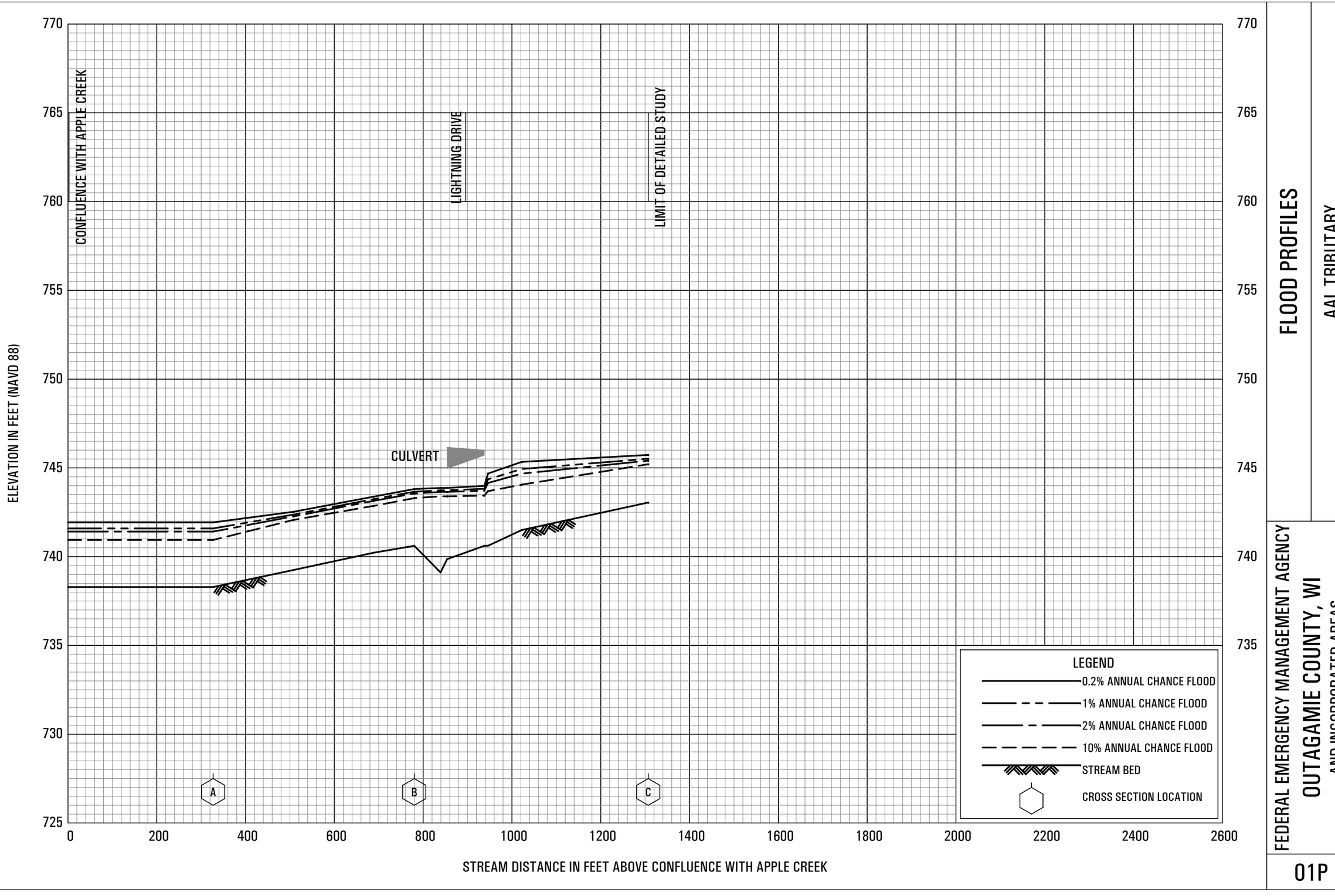



# FLOOD PROFILES

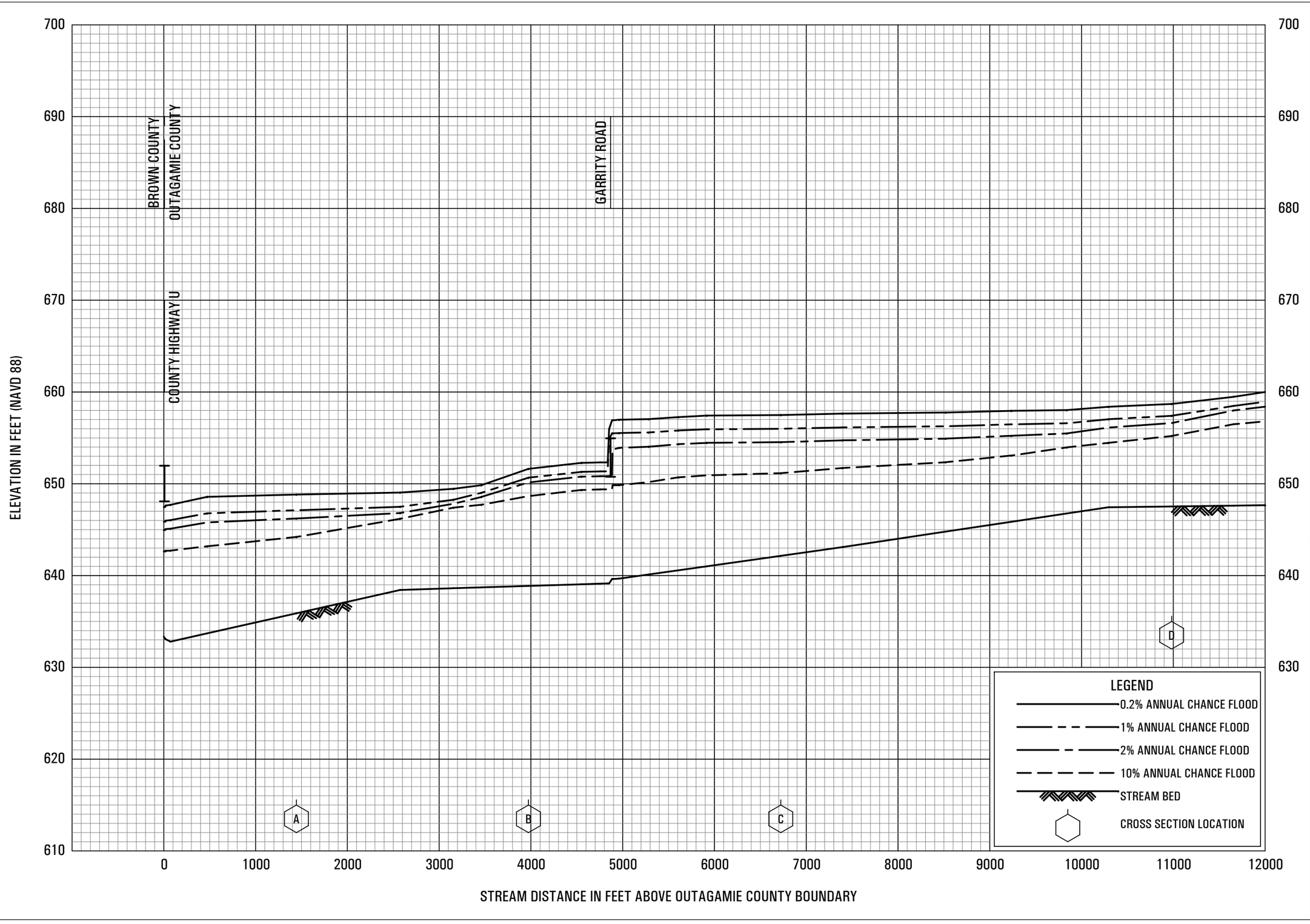
AAL TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

01P




# FLOOD PROFILES

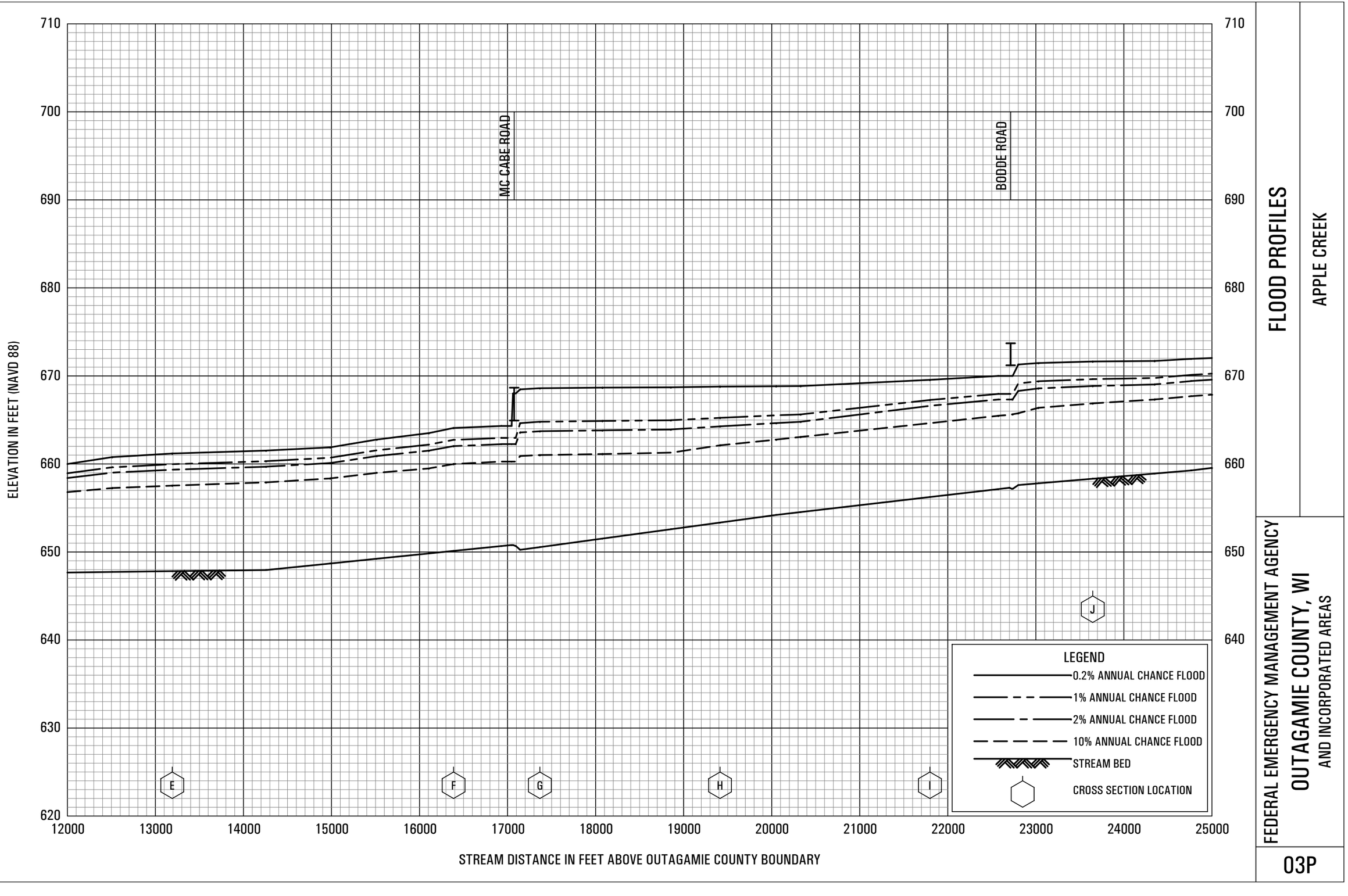
APPLE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

02P




# FLOOD PROFILES

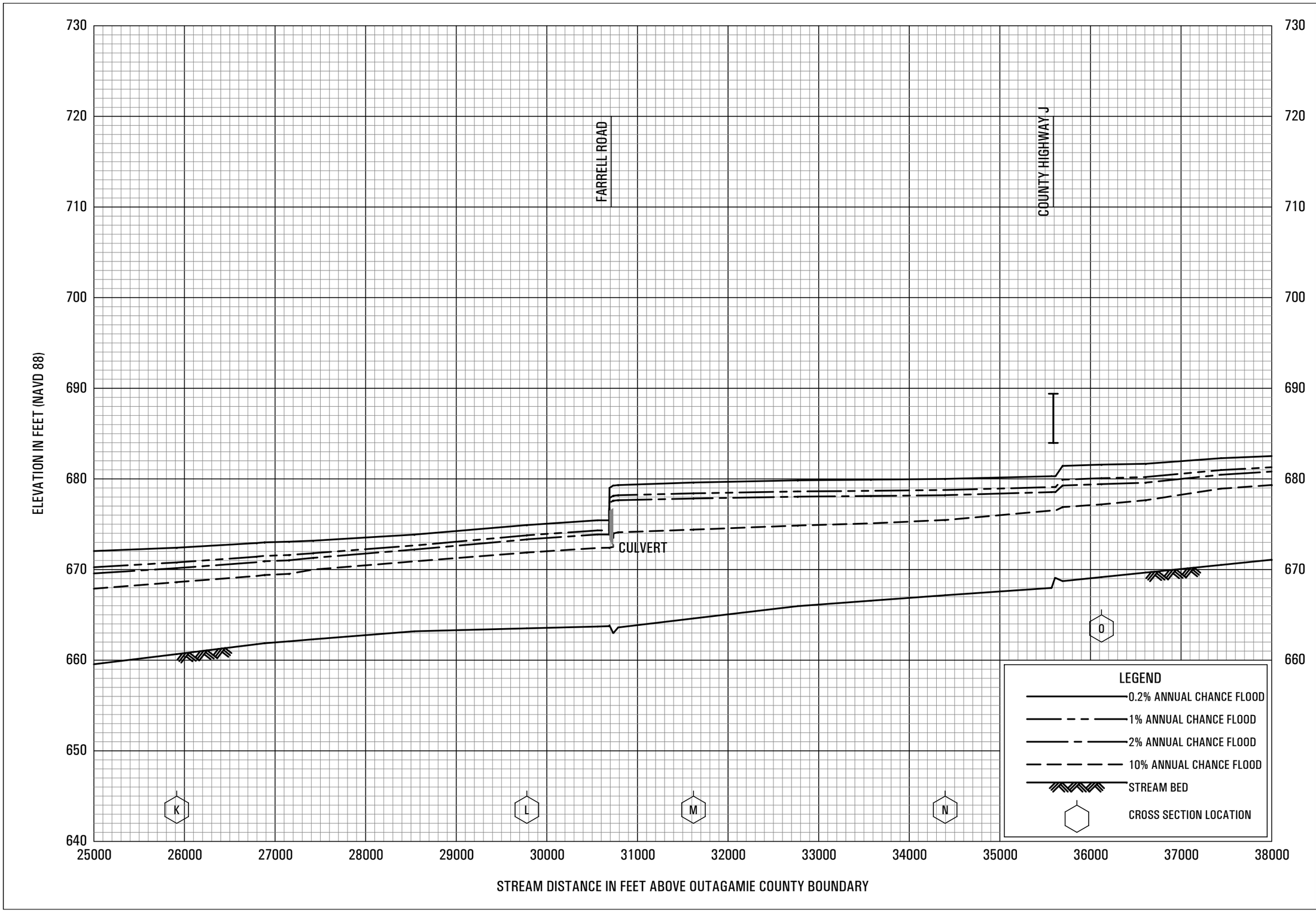
APPLE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

03P




FLOOD PROFILES

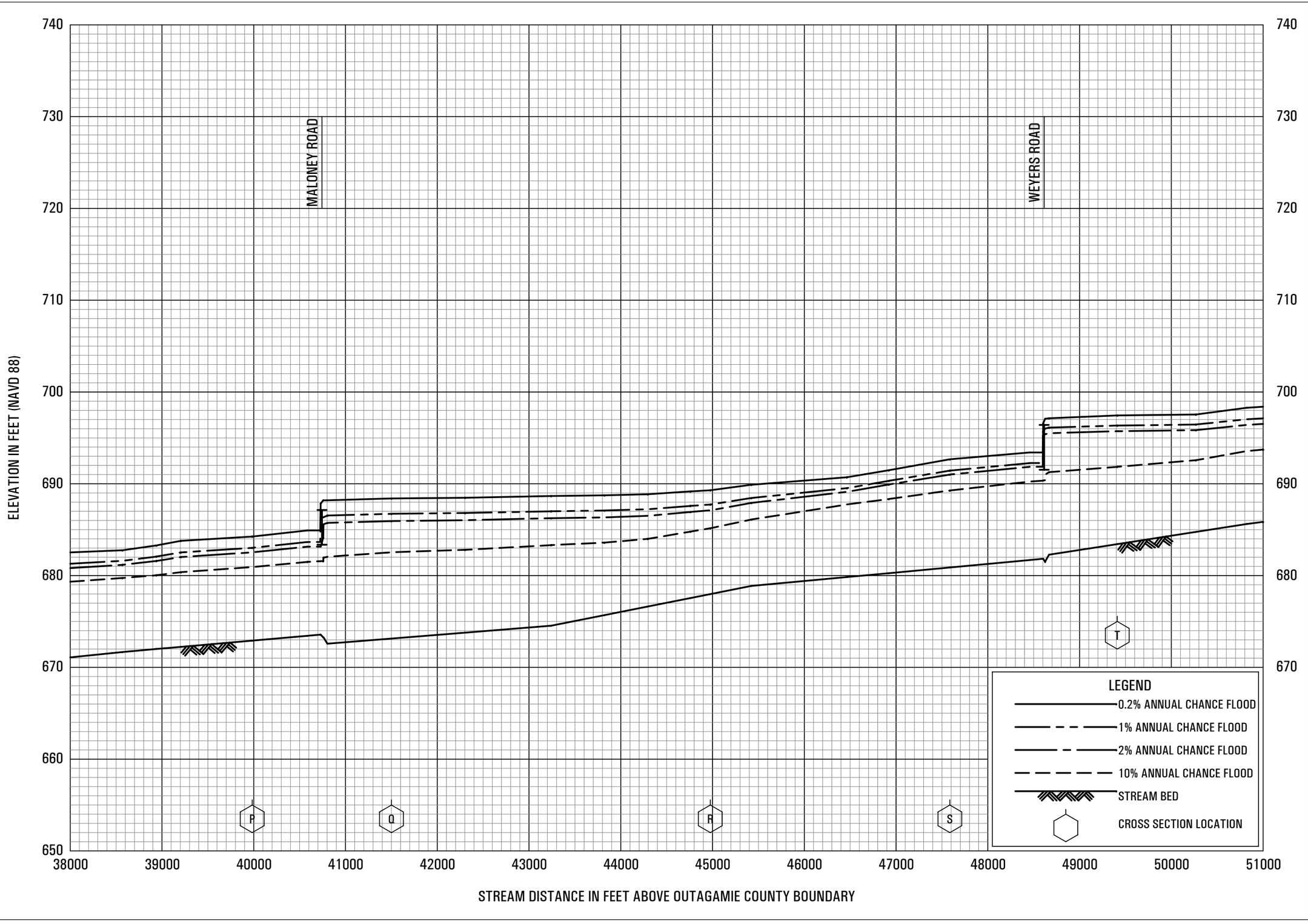
APPLE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

04P




# FLOOD PROFILES

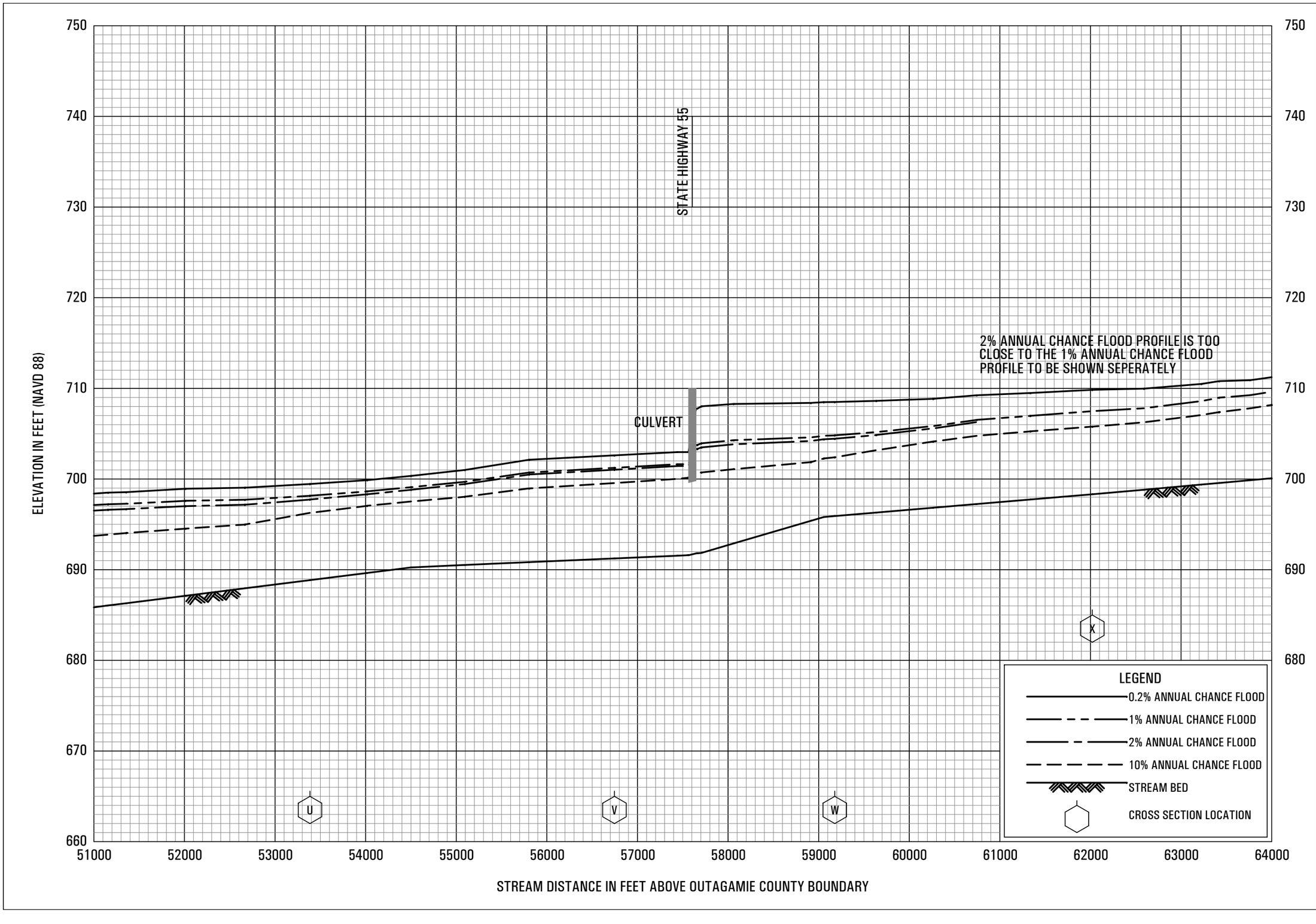
## APPLE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

05P




# FLOOD PROFILES

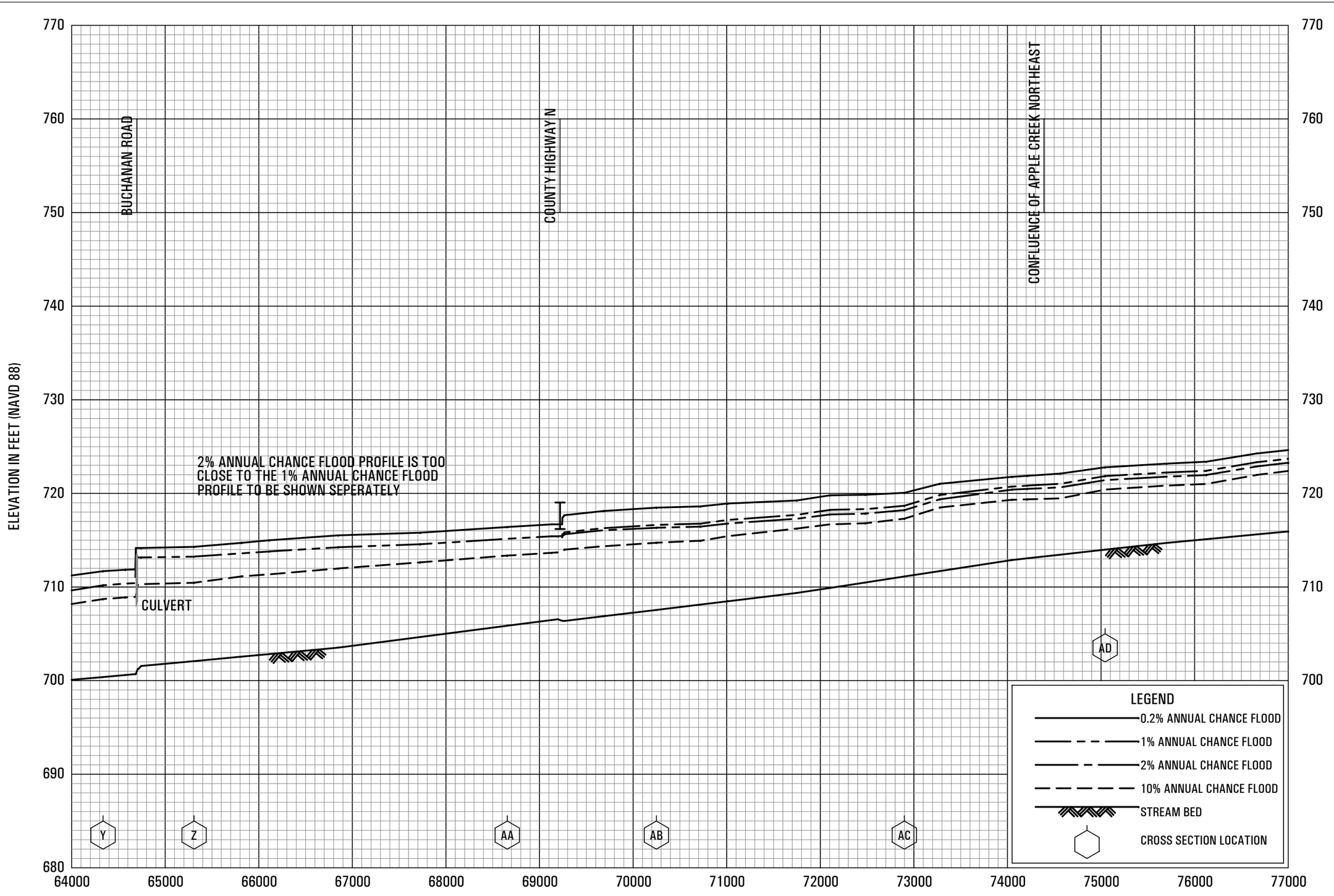
## APPLE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

06P




# FLOOD PROFILES

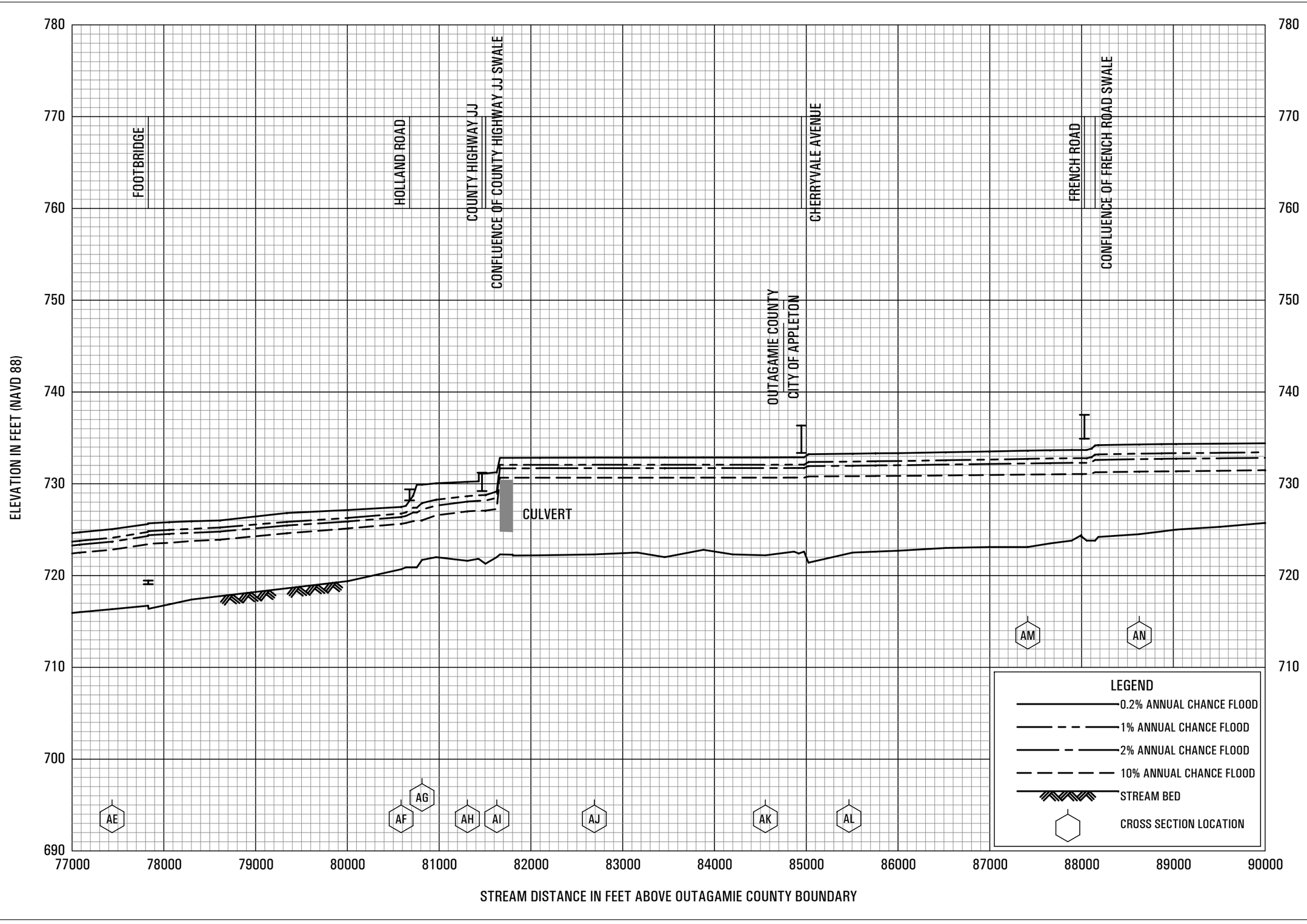
APPLE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

07P




# FLOOD PROFILES

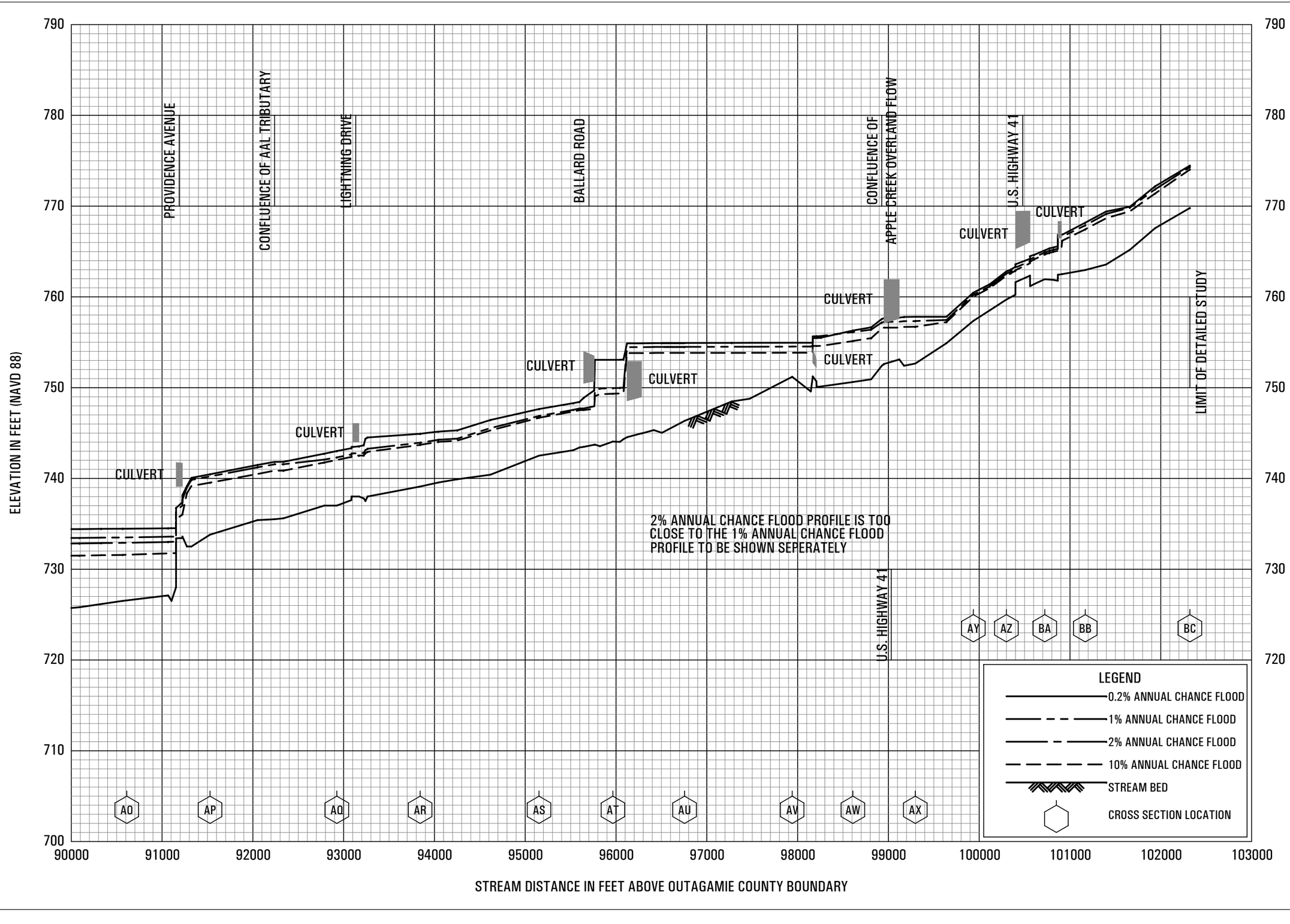
## APPLE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

08P




FLOOD PROFILES

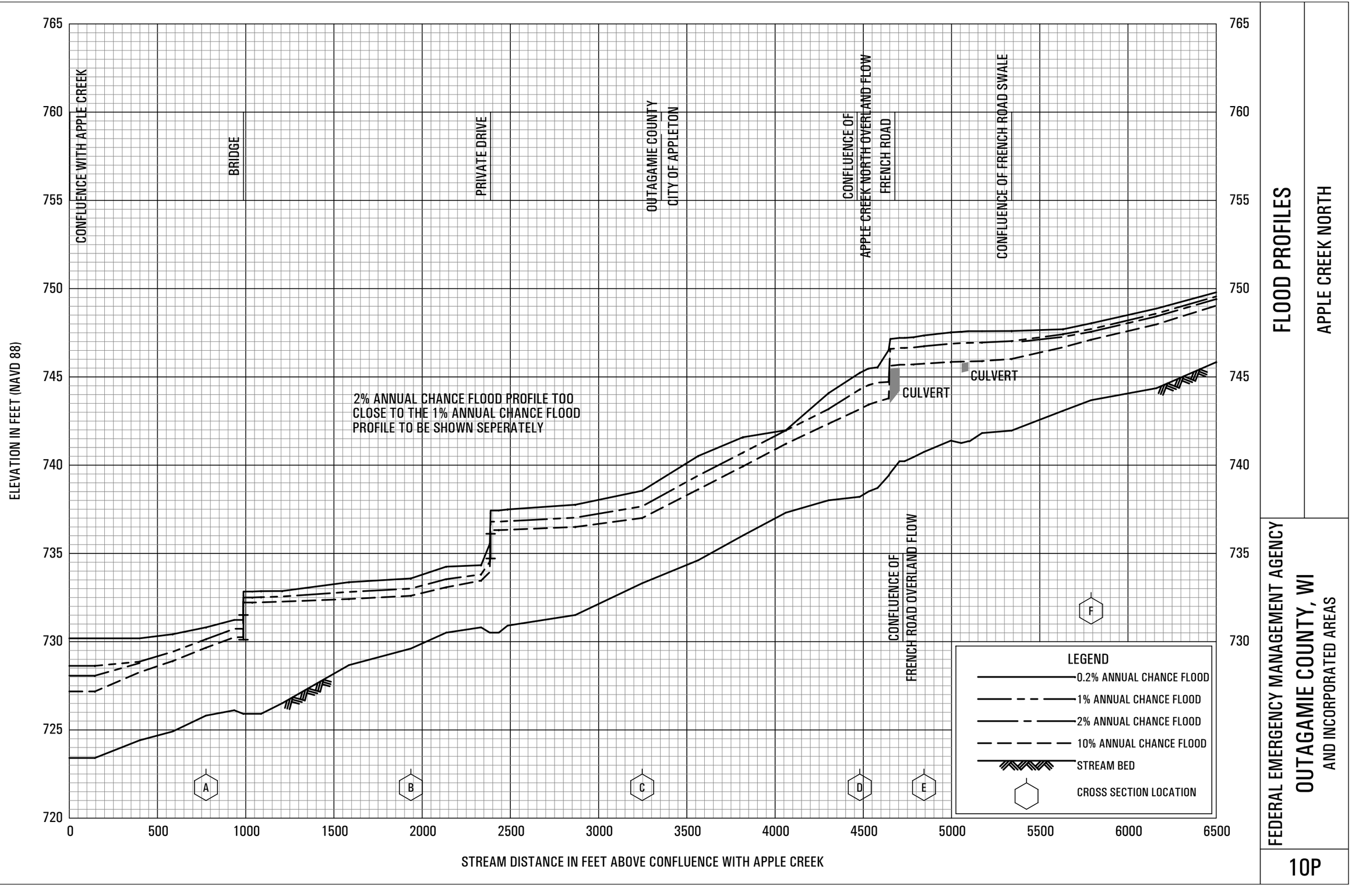
APPLE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

09P




# FLOOD PROFILES

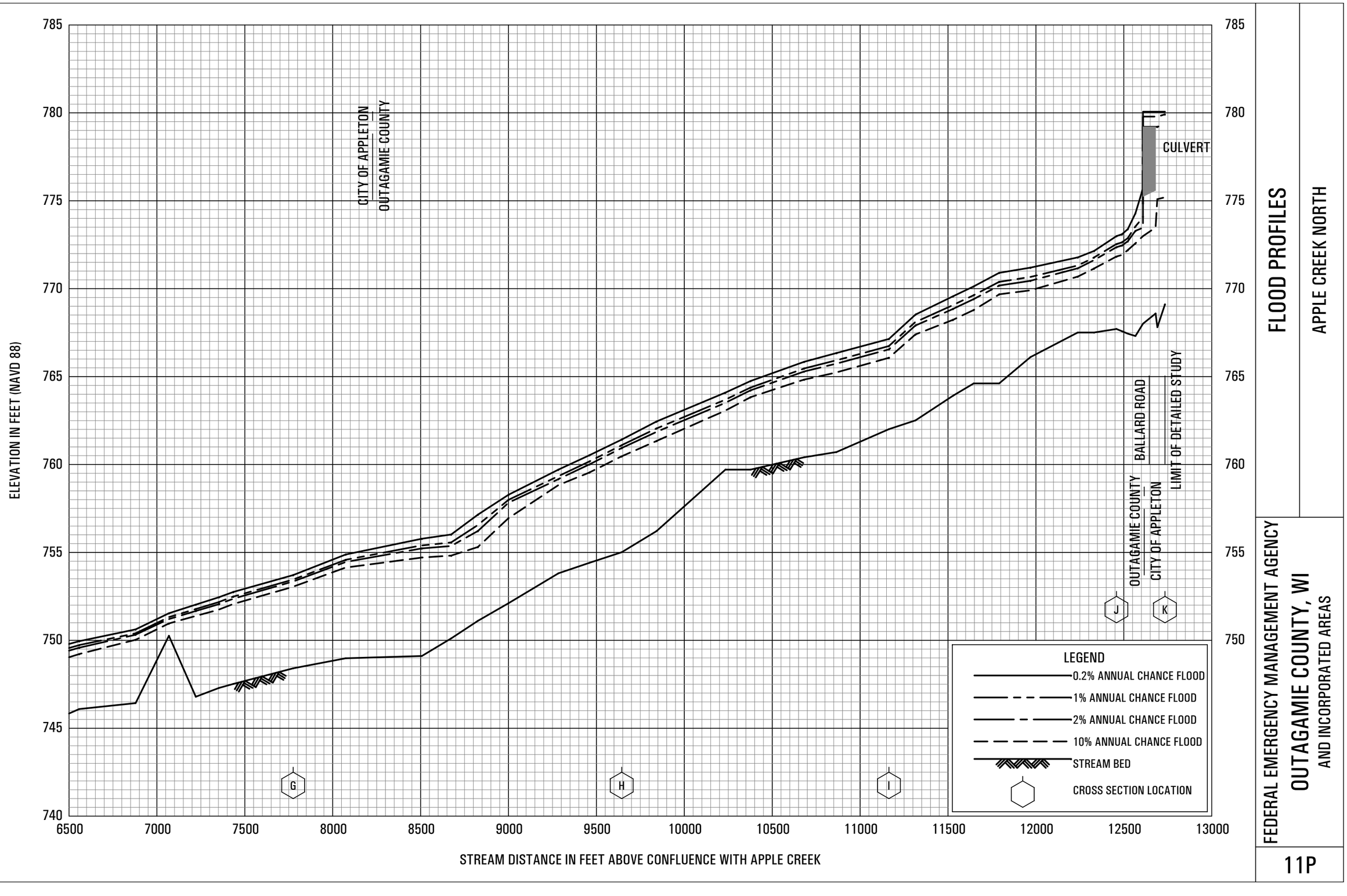
## APPLE CREEK NORTH

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

10P



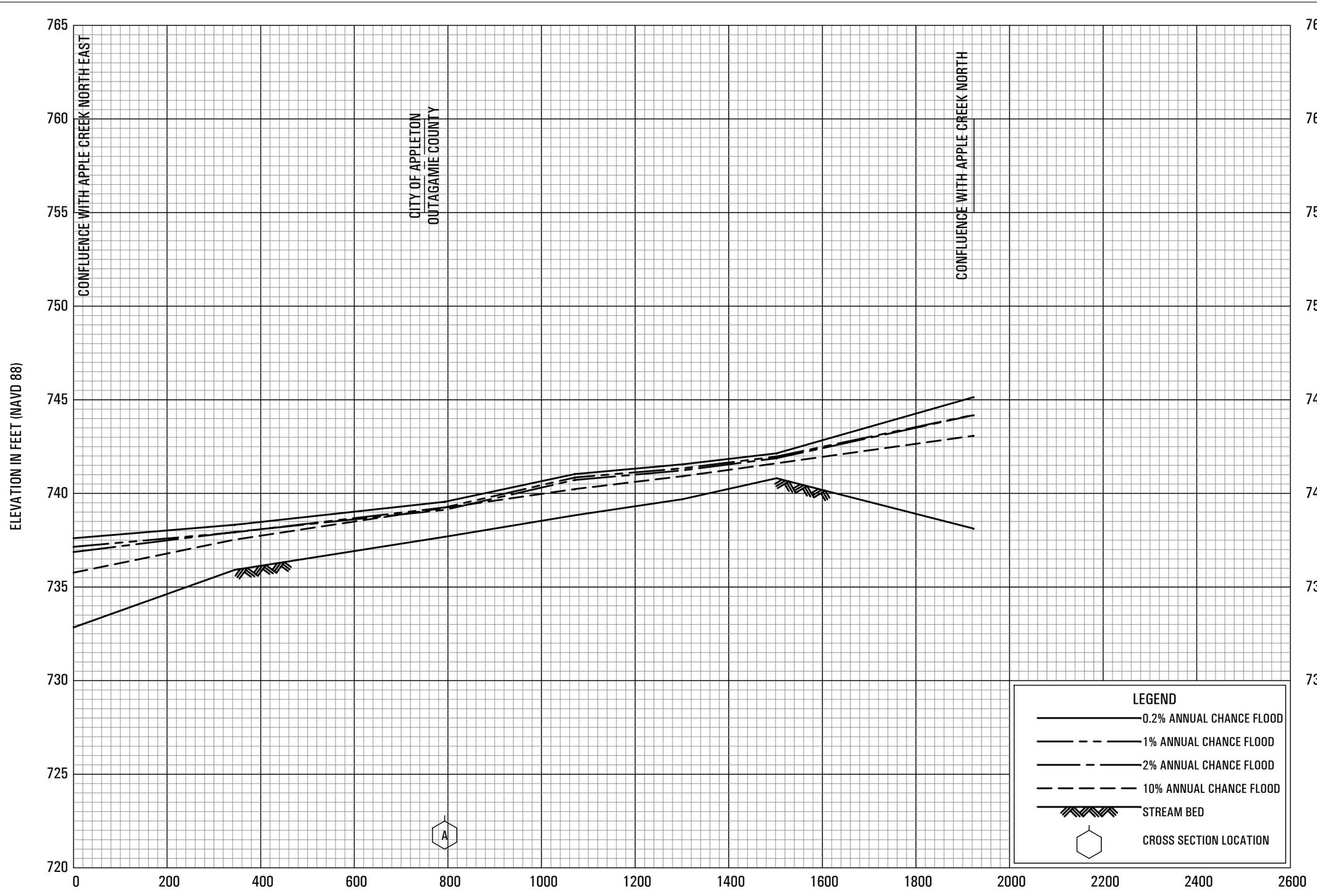

# FLOOD PROFILES

APPLE CREEK NORTH

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS




# FLOOD PROFILES

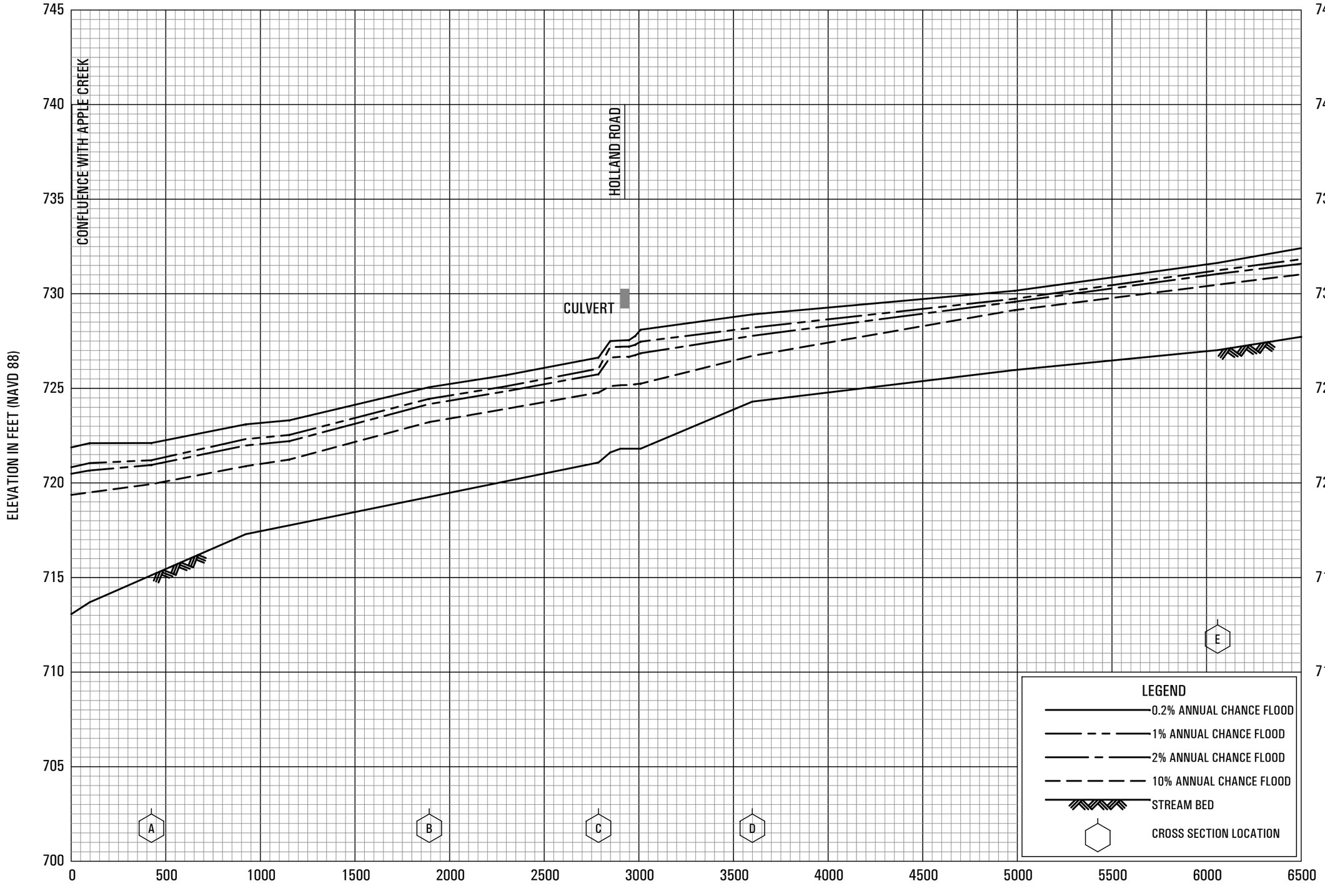
## APPLE CREEK NORTH OVERLAND FLOW

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

12P



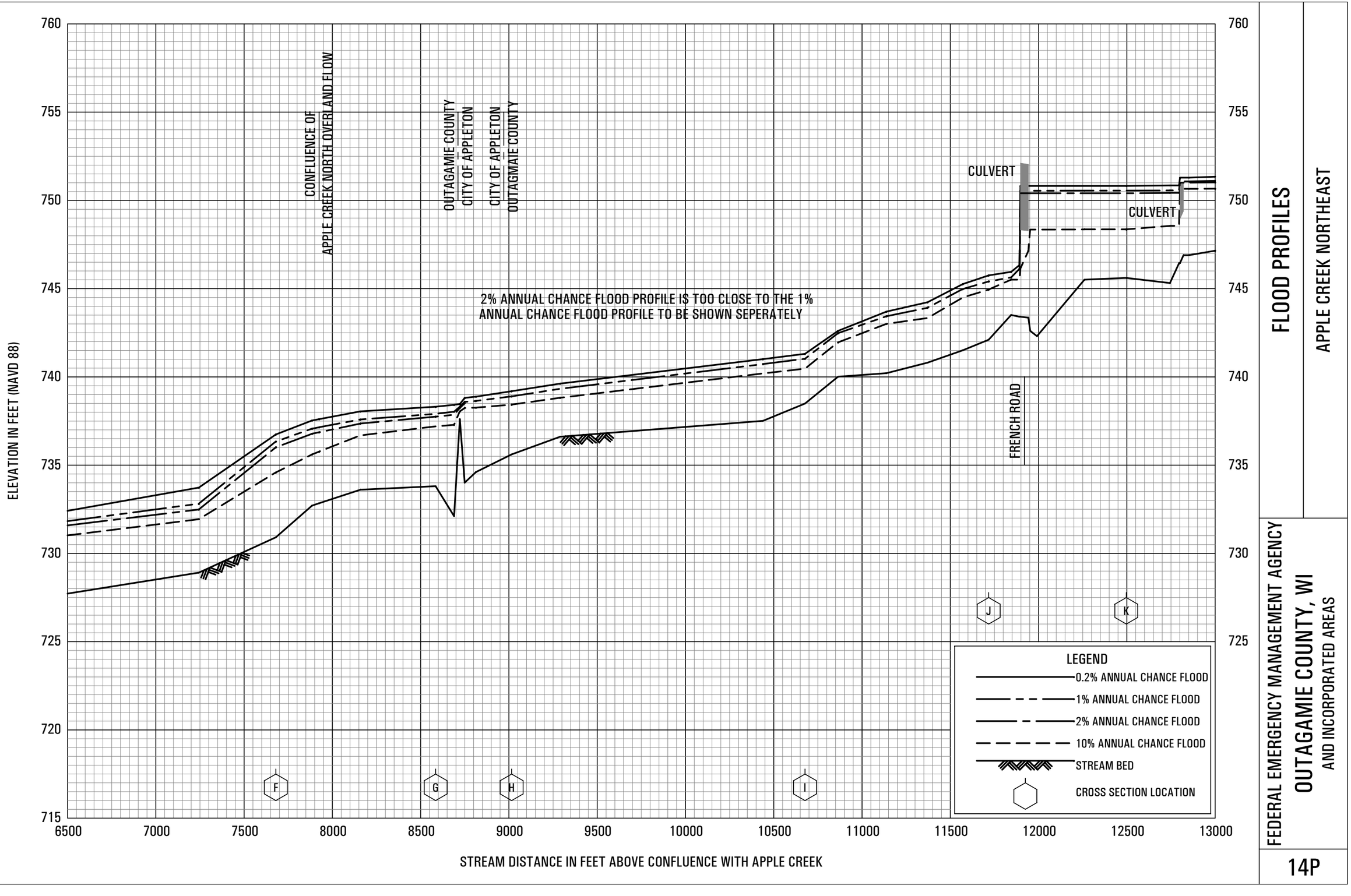

# FLOOD PROFILES

APPLE CREEK NORTHEAST

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS



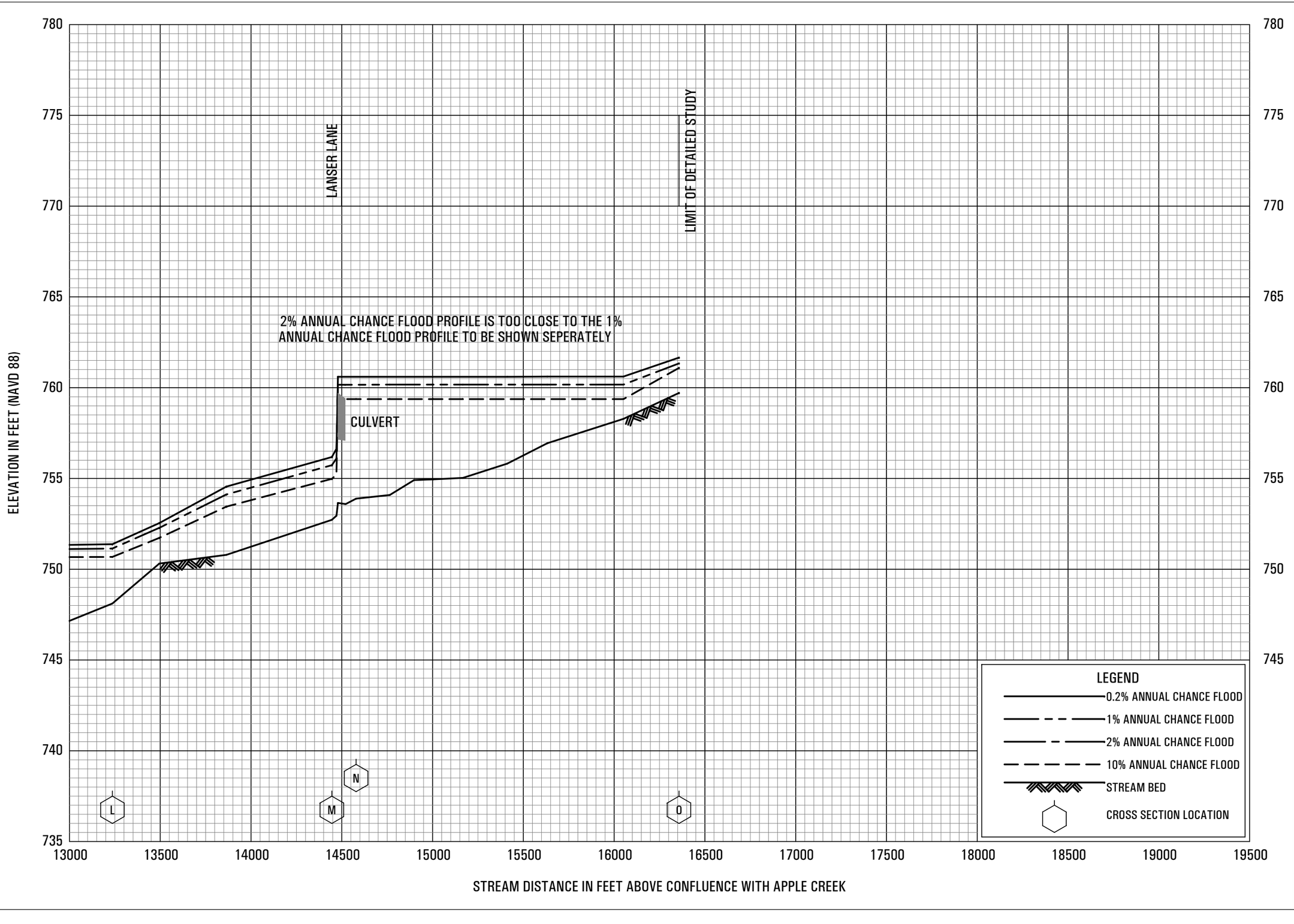

# FLOOD PROFILES

APPLE CREEK NORTHEAST

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS



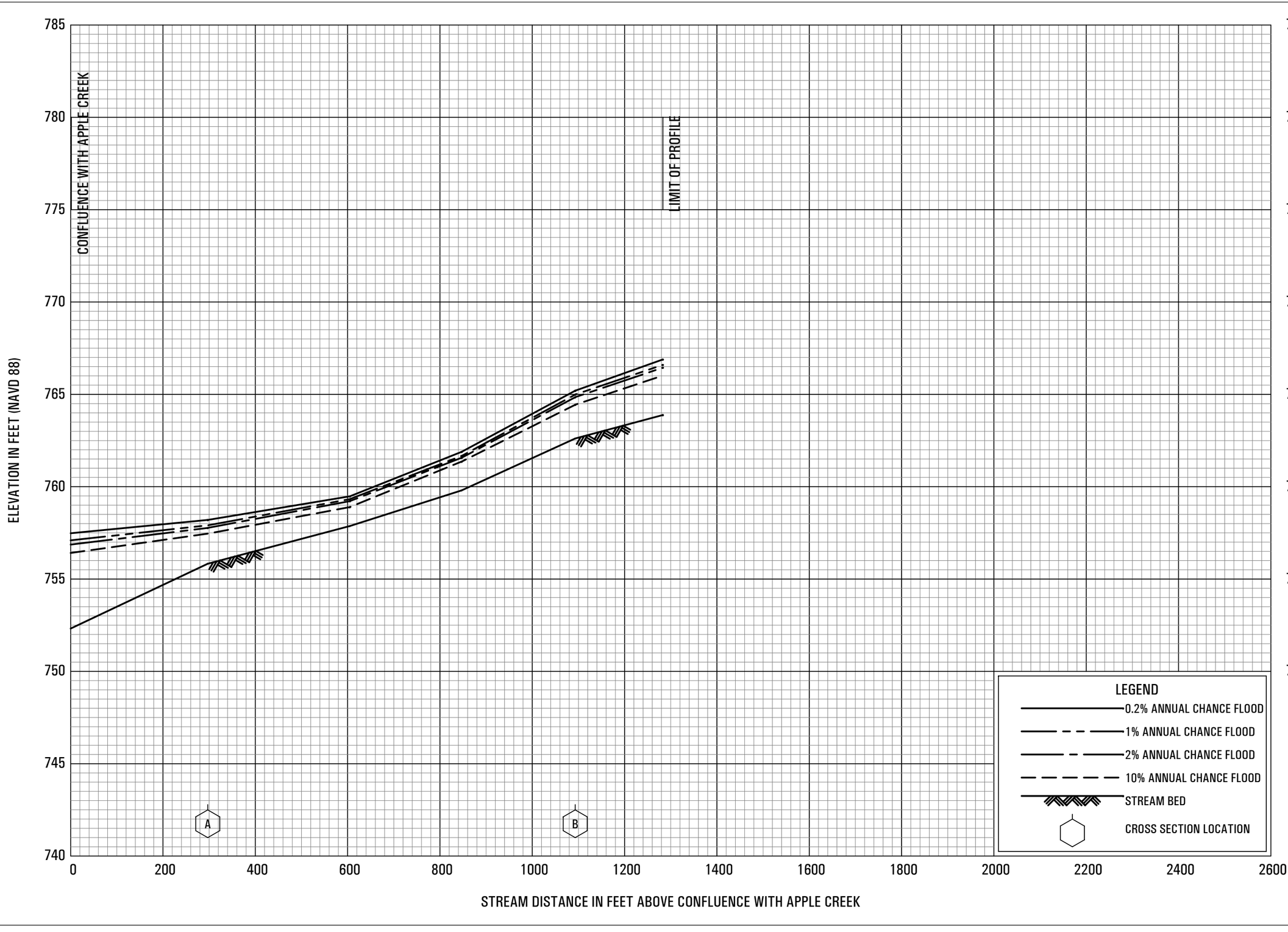

FLOOD PROFILES

APPLE CREEK NORTHEAST

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS




# FLOOD PROFILES

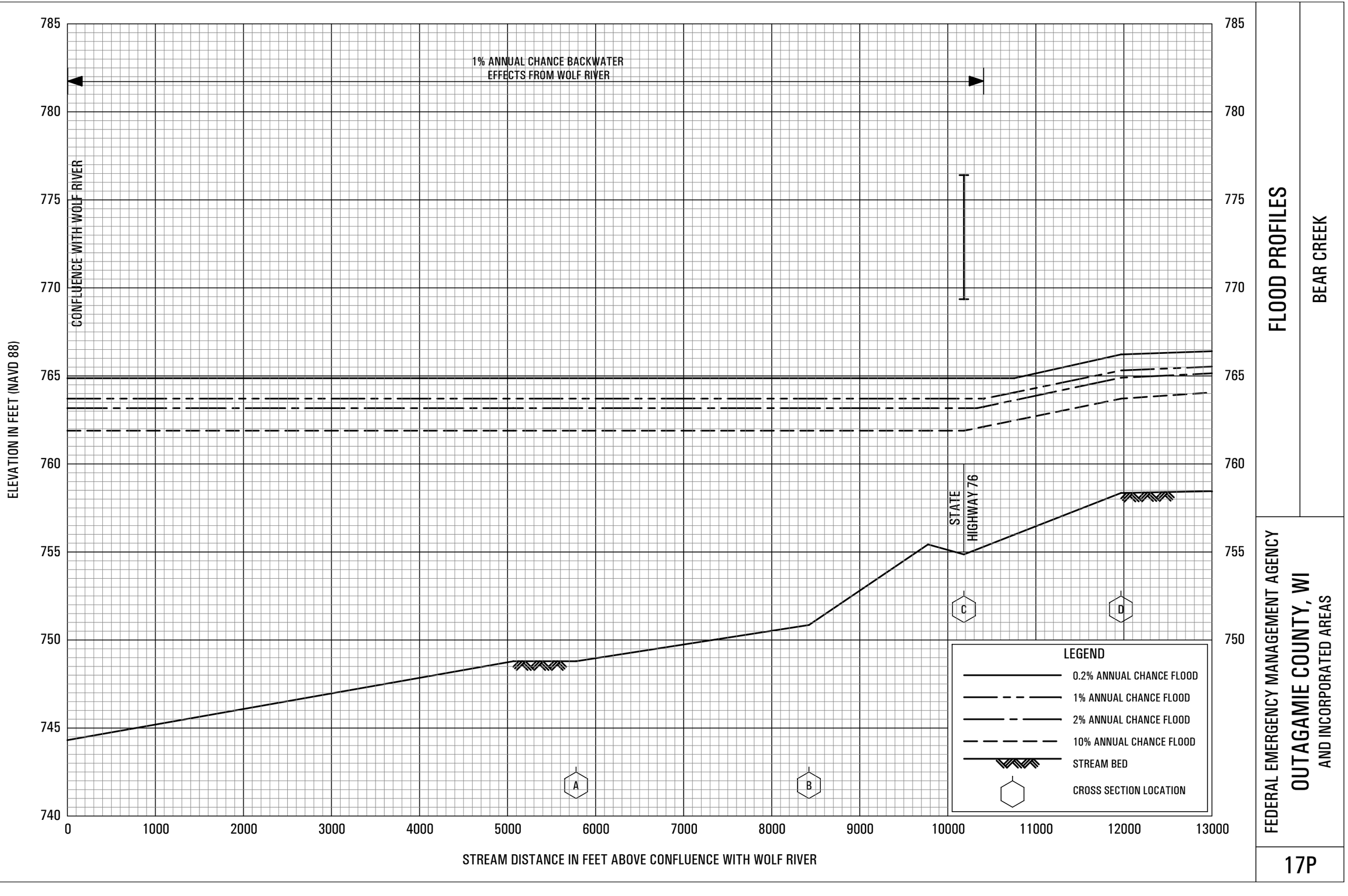
APPLE CREEK OVERLAND FLOW

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

16P



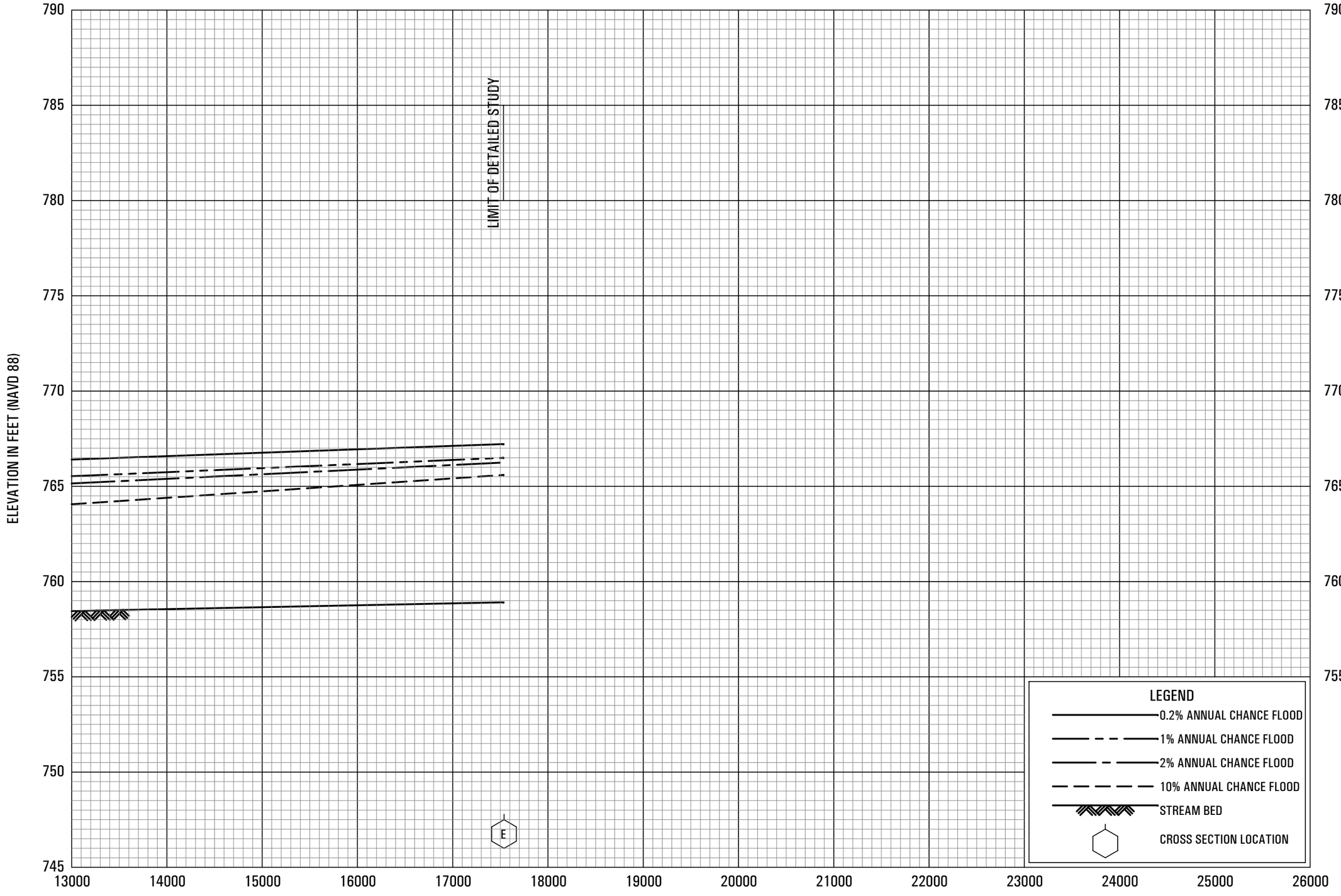

FLOOD PROFILES

BEAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI
AND INCORPORATED AREAS

17P




FLOOD PROFILES

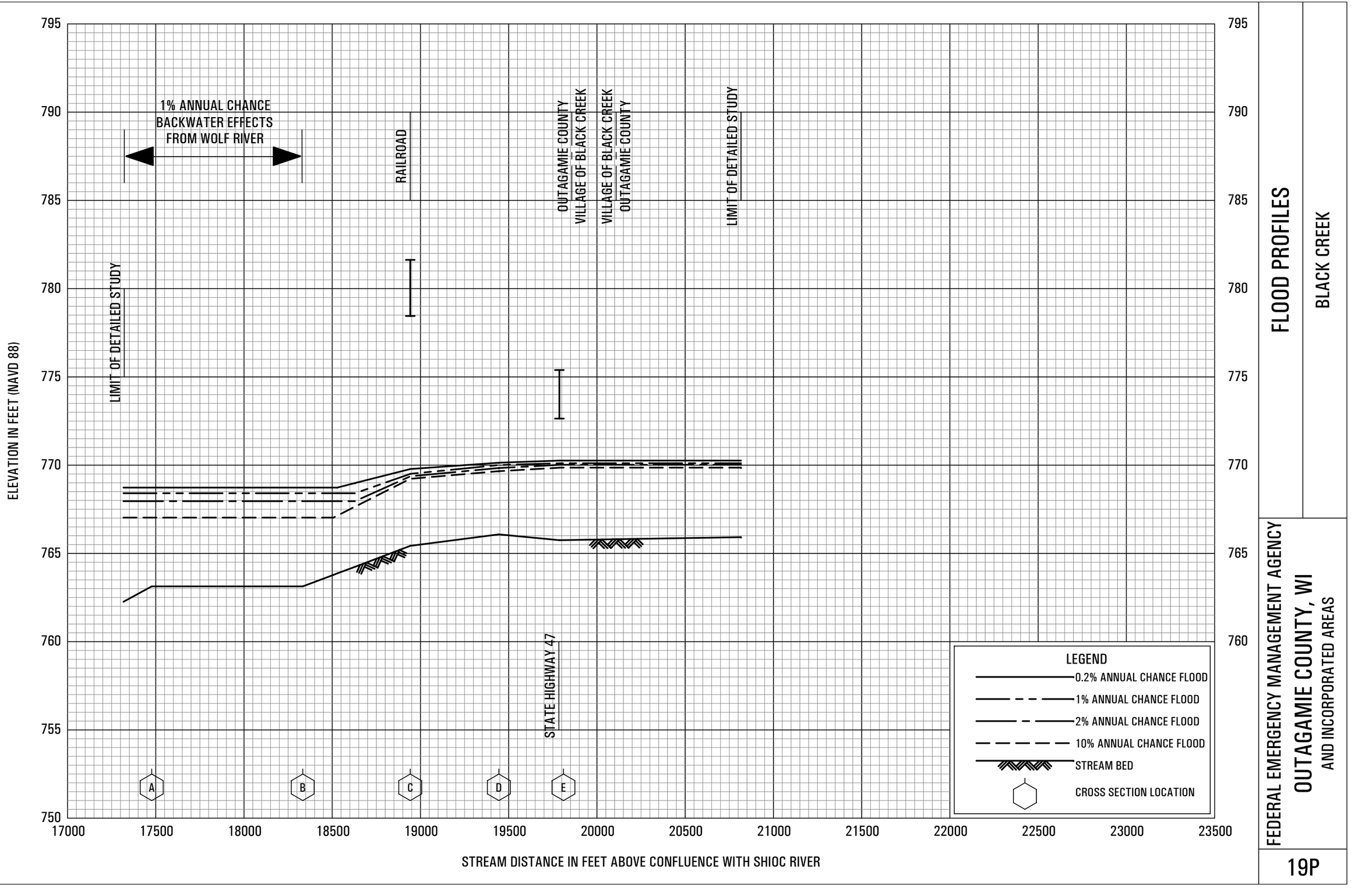
BEAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

18P




# FLOOD PROFILES

## BLACK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

ELEVATION IN FEET (NAVD 88)

800
795
790
785
780
775
770
765
760
755

7000 8000 9000 10000 11000 12000 13000 14000 15000 16000 17000 18000 19000 20000

STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH WOLF RIVER

LIMIT OF DETAILED STUDY

OUTAGAMIE COUNTY
VILLAGE OF HORTONVILLE

STATE HIGHWAY 15
WEST MAIN STREET

MILL STREET

NASH STREET

BLACK OTTER LAKE

LIMIT OF DETAILED STUDY

BLACK OTTER LAKE DAM

VILLAGE OF HORTONVILLE
OUTAGAMIE COUNTY

A B C D E F G H

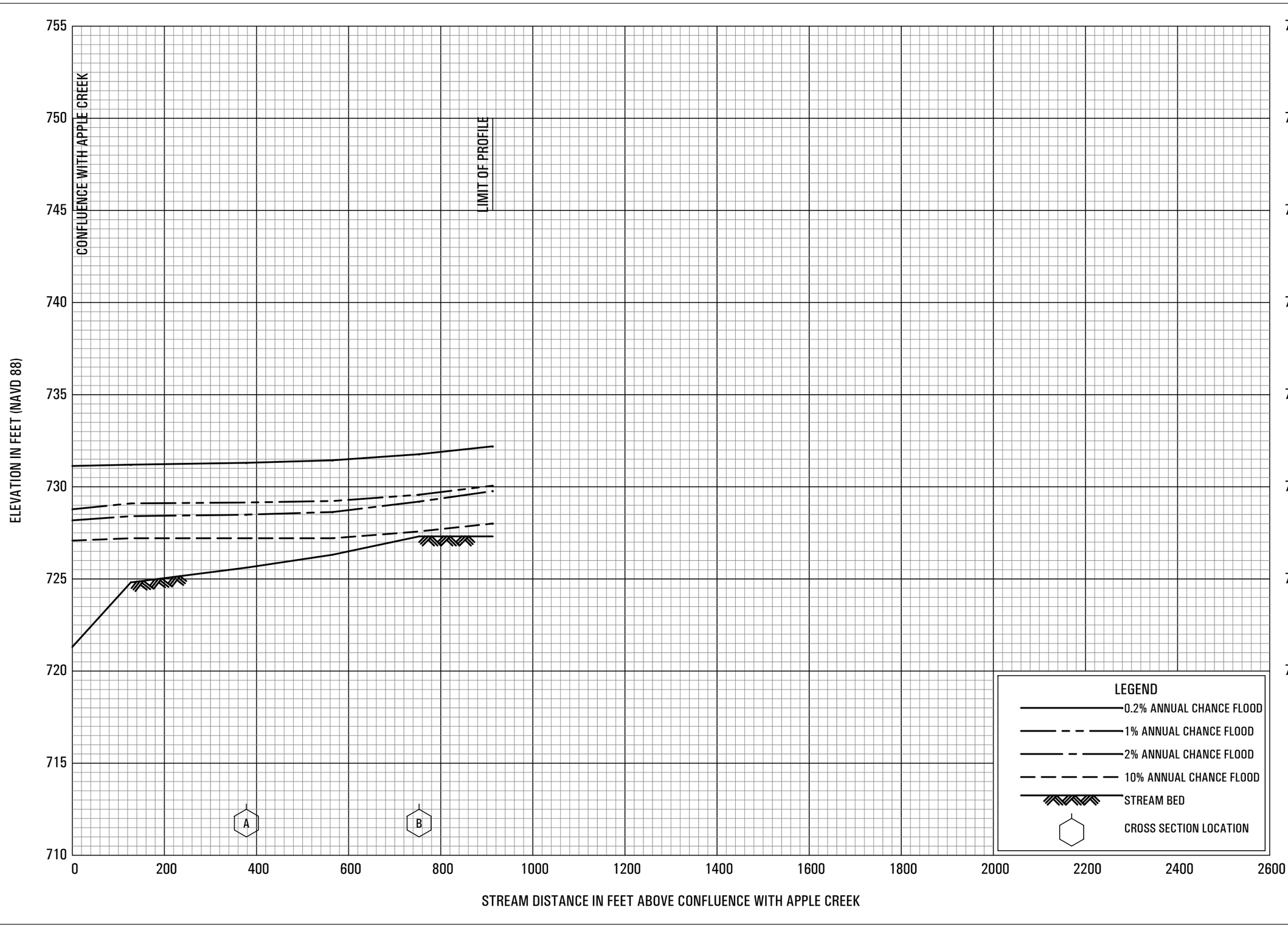
LEGEND

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

# FLOOD PROFILES

## BLACK OTTER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
OUTAGAMIE COUNTY, WI
AND INCORPORATED AREAS




# FLOOD PROFILES

COUNTY HIGHWAY JJ SWALE

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

FLOODING CONTROLLED BY WOLF RIVER

WAUPACA COUNTY
CITY OF NEW LONDON

EAST NORTH WATER STREET

CITY OF NEW LONDON
WAUPACA COUNTY

RIVER ROAD

RAILROAD

STATE HIGHWAY 54

RAILROAD

CITY OF NEW LONDON
OUTAGAMIE COUNTY

CONFLUENCE WITH WOLF RIVER

WAUPACA COUNTY
CITY OF NEW LONDON

ELEVATION IN FEET (NAVD 88)

780
775
770
765
760
755
750
745
740
735

0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 11000 12000 13000

STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH WOLF RIVER

A B C D E F G H I

LEGEND

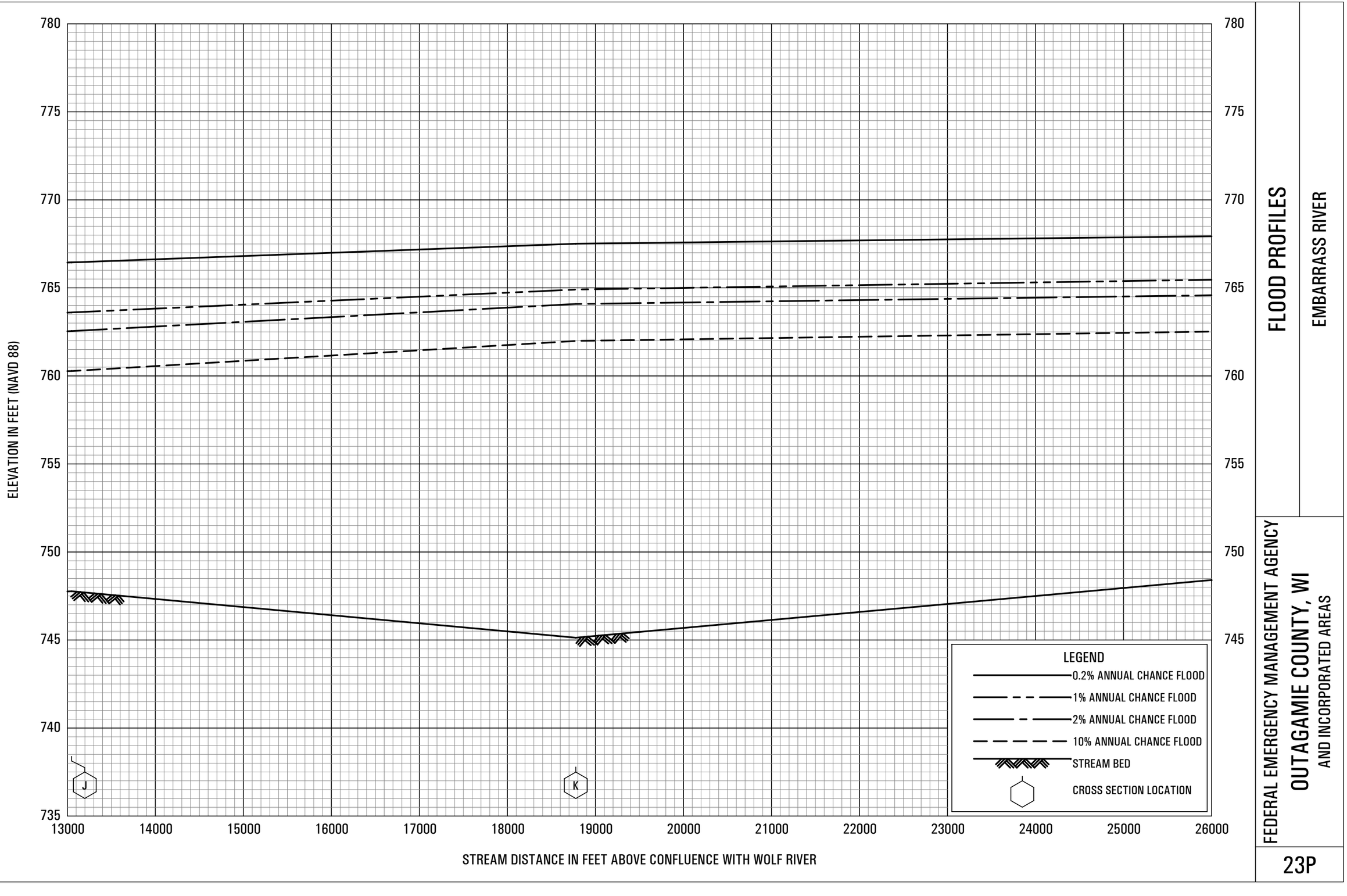
- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- CROSS SECTION LOCATION

# FLOOD PROFILES

EMBARRASS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI
AND INCORPORATED AREAS




FLOOD PROFILES

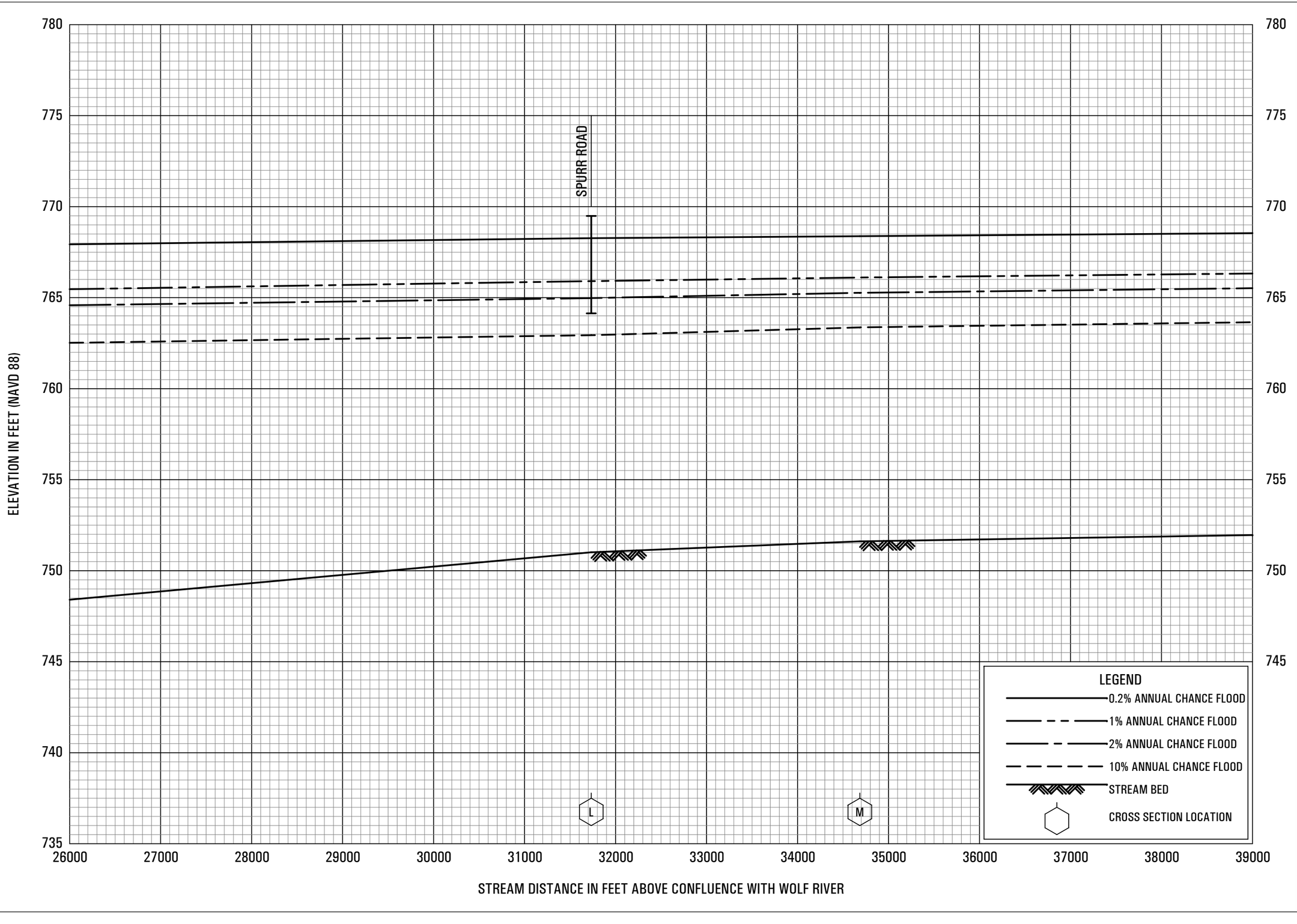
EMBARRASS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

23P



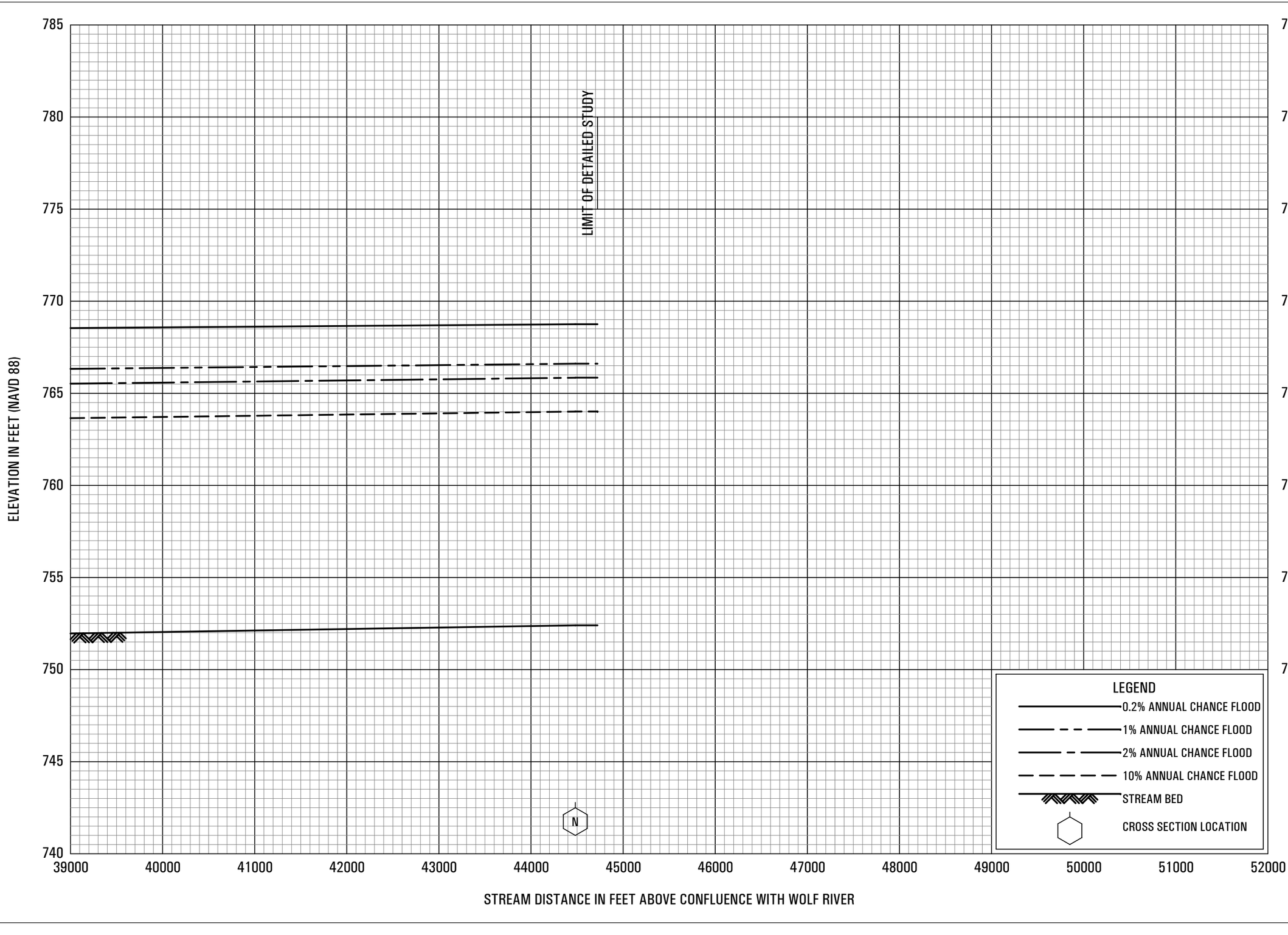

# FLOOD PROFILES

EMBARRASS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS




# FLOOD PROFILES

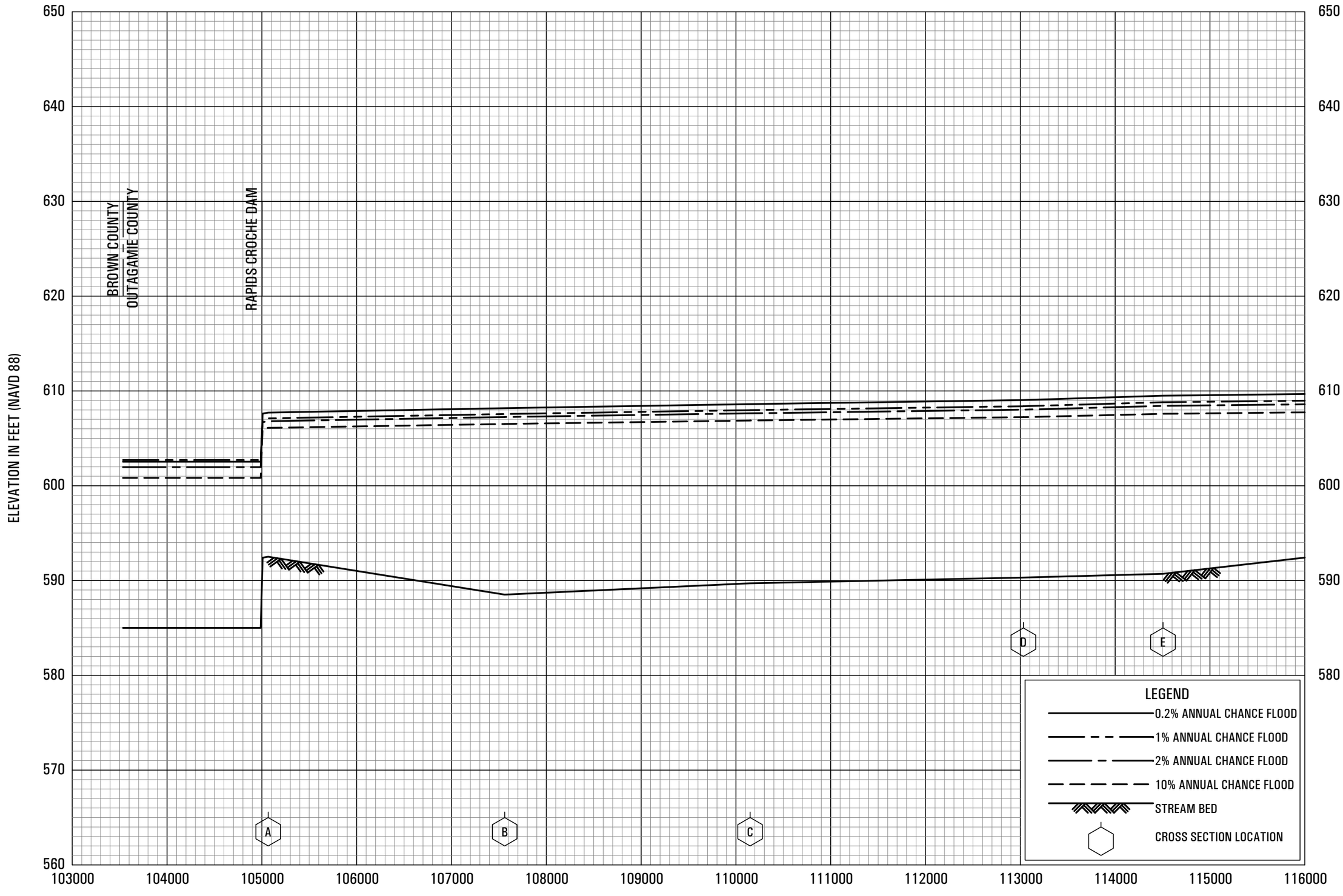
EMBARRASS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

25P



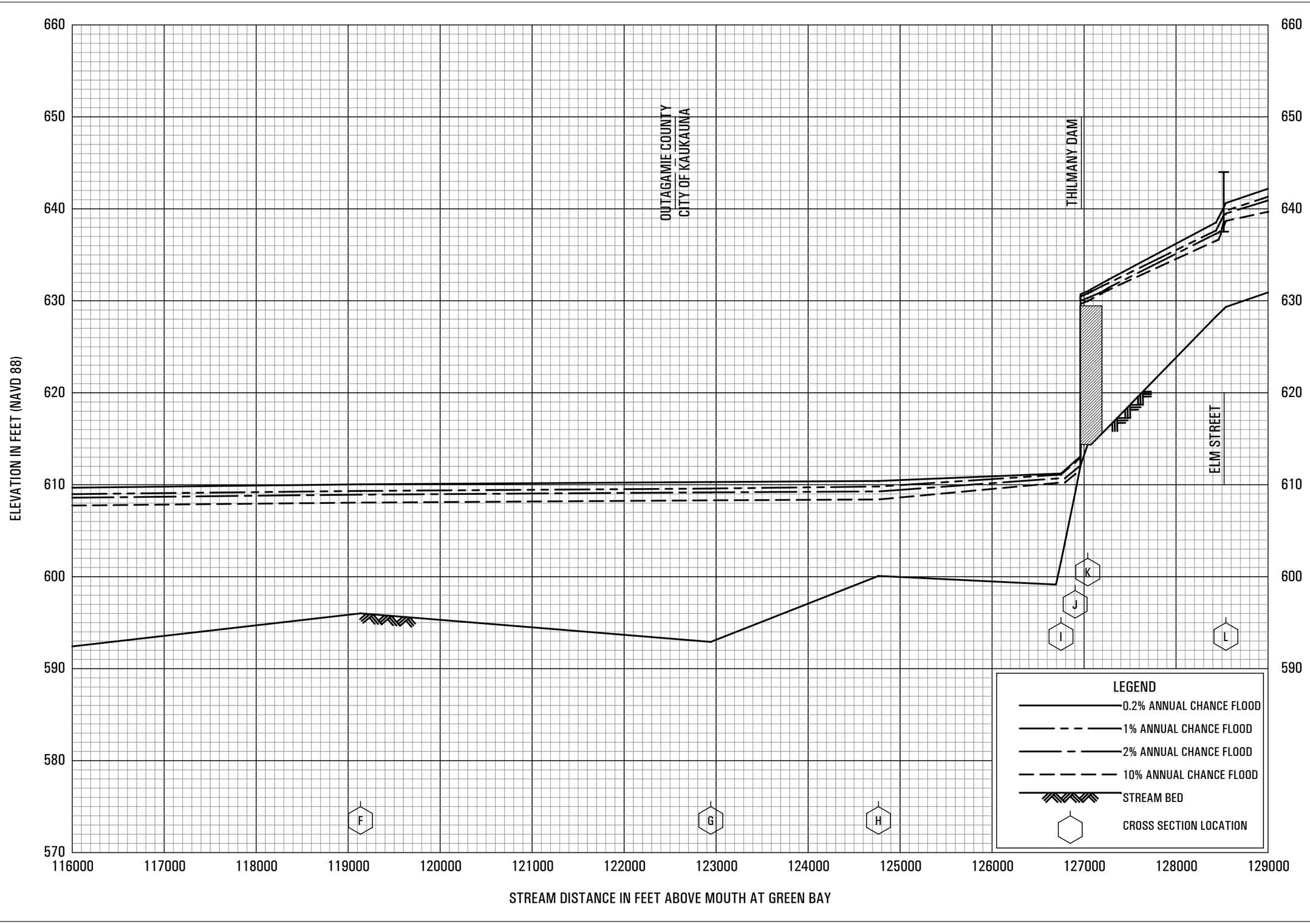

FLOOD PROFILES

FOX RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS



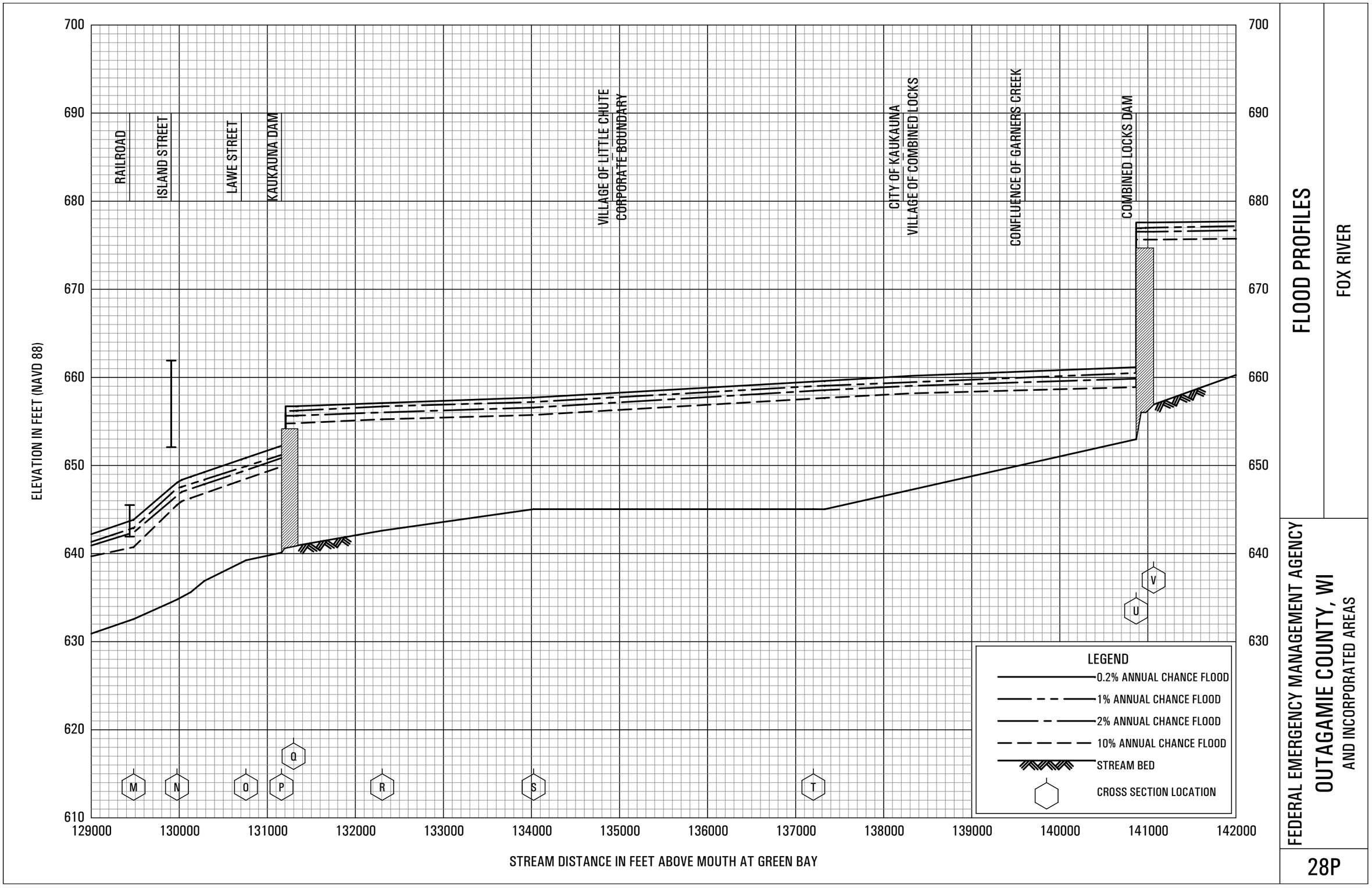

# FLOOD PROFILES

FOX RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS




# FLOOD PROFILES

FOX RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

28P

730
720
710
700
690
680
670
660
650
640

ELEVATION IN FEET (NAVD 88)

LITTLE CHUTE DAM
NORTH WASHINGTON STREET
CEDARS LOCK DAM
VILLAGE OF COMBINED LOCKS
VILLAGE OF KIMBERLY

W X Y Z AA AB AC AD AE

142000 143000 144000 145000 146000 147000 148000 149000 150000 151000 152000 153000 154000 155000

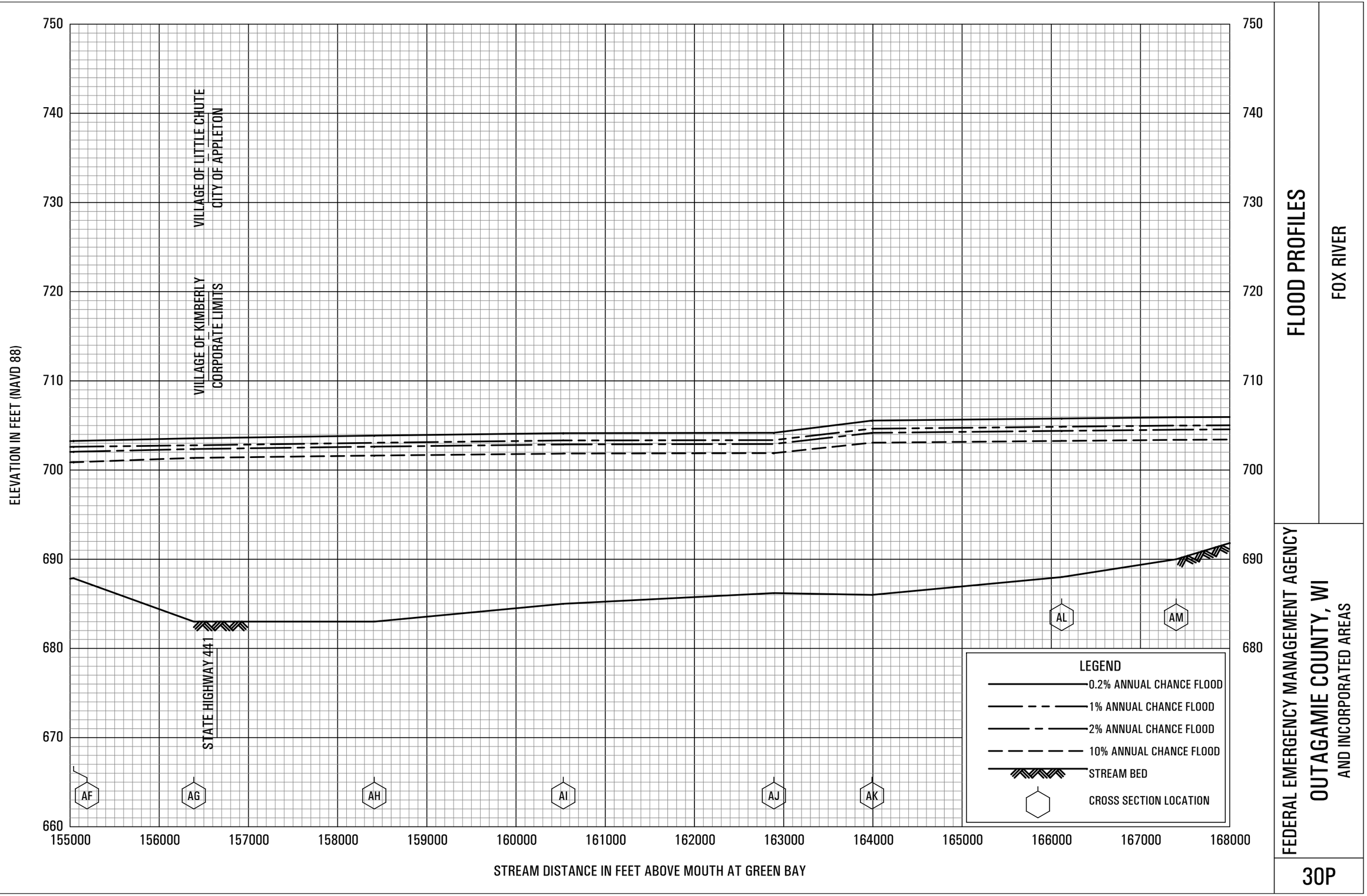
STREAM DISTANCE IN FEET ABOVE MOUTH AT GREEN BAY

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

# FLOOD PROFILES

FOX RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY
OUTAGAMIE COUNTY, WI
AND INCORPORATED AREAS



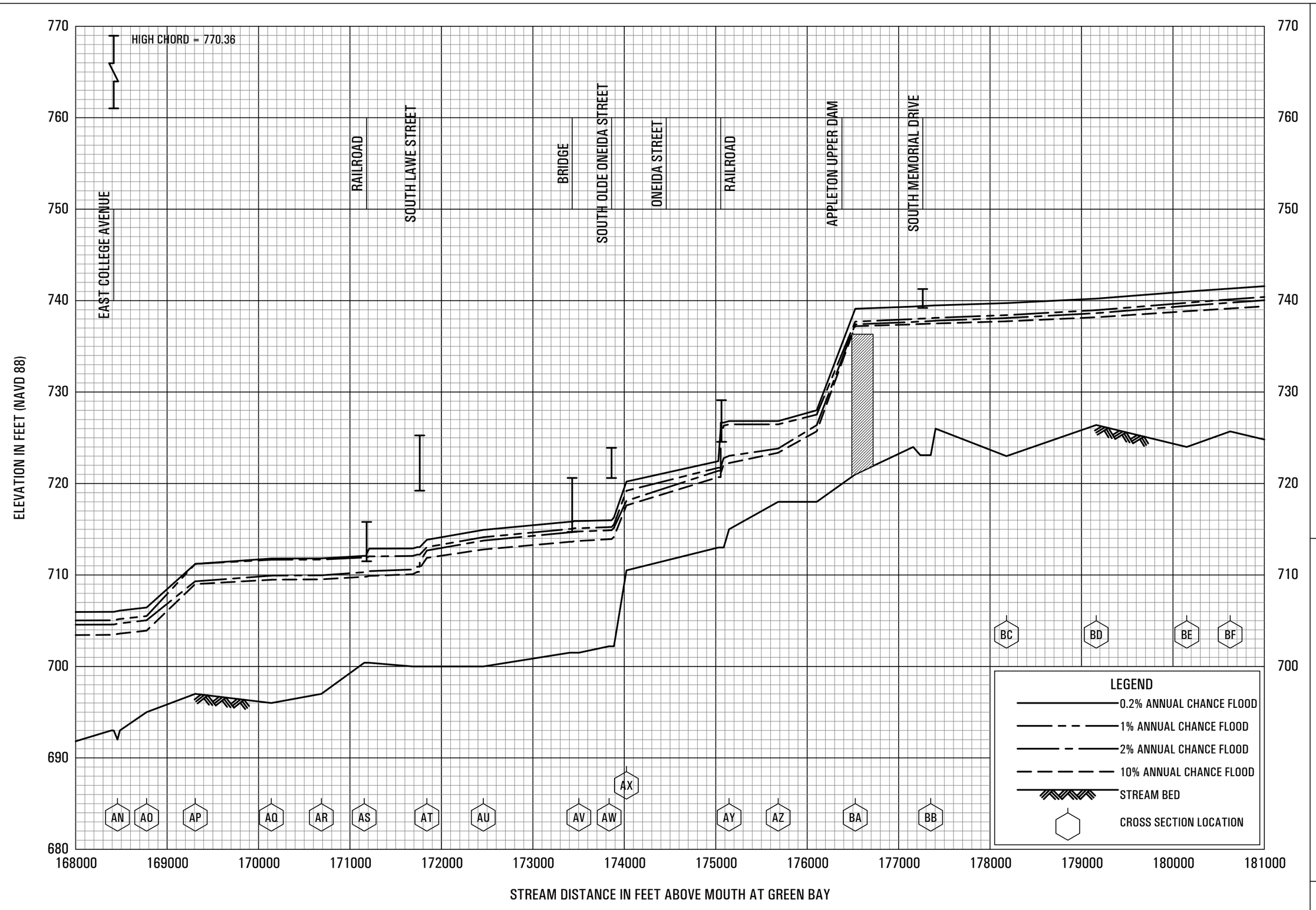

FLOOD PROFILES

FOX RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS



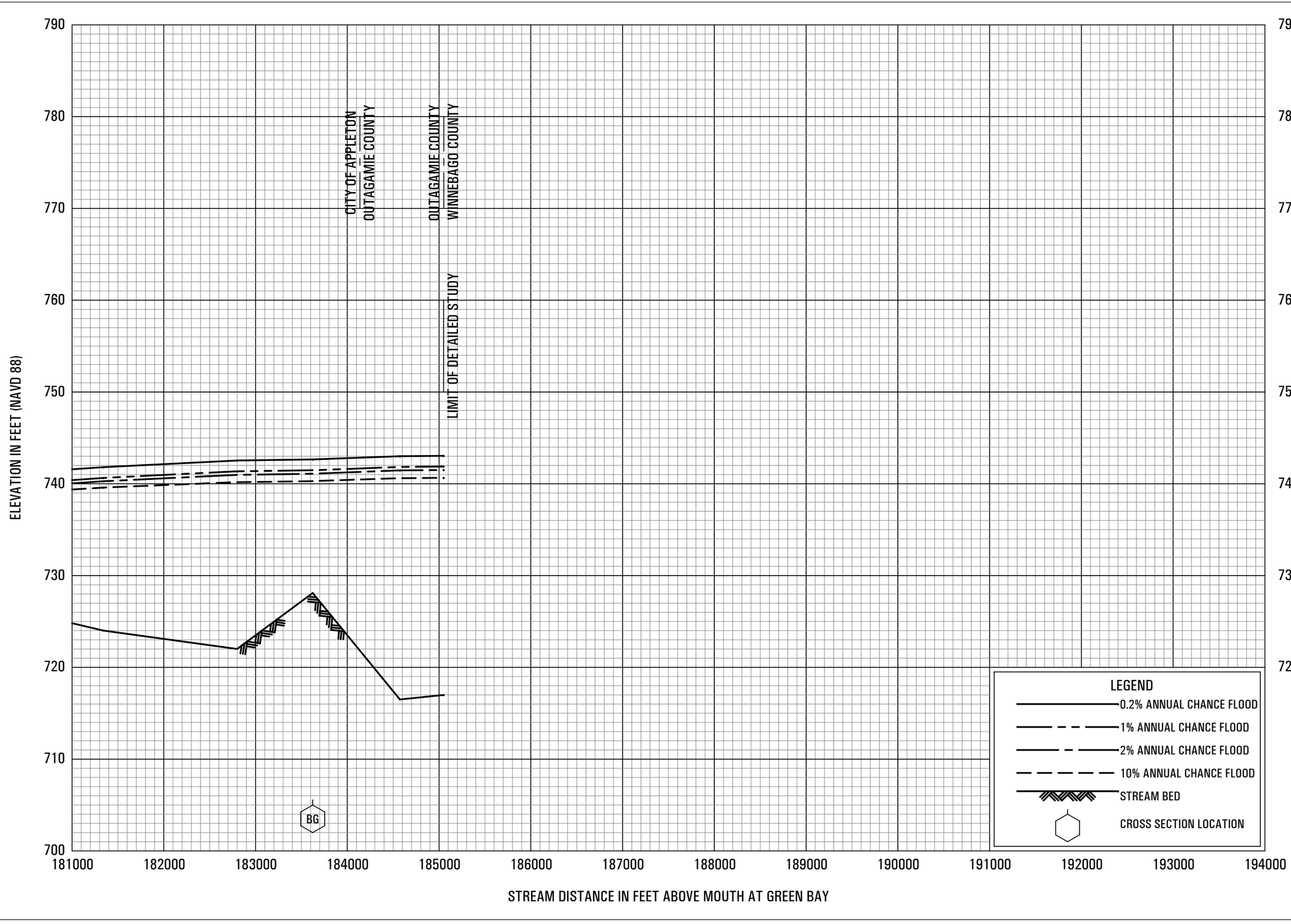

FLOOD PROFILES

FOX RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS



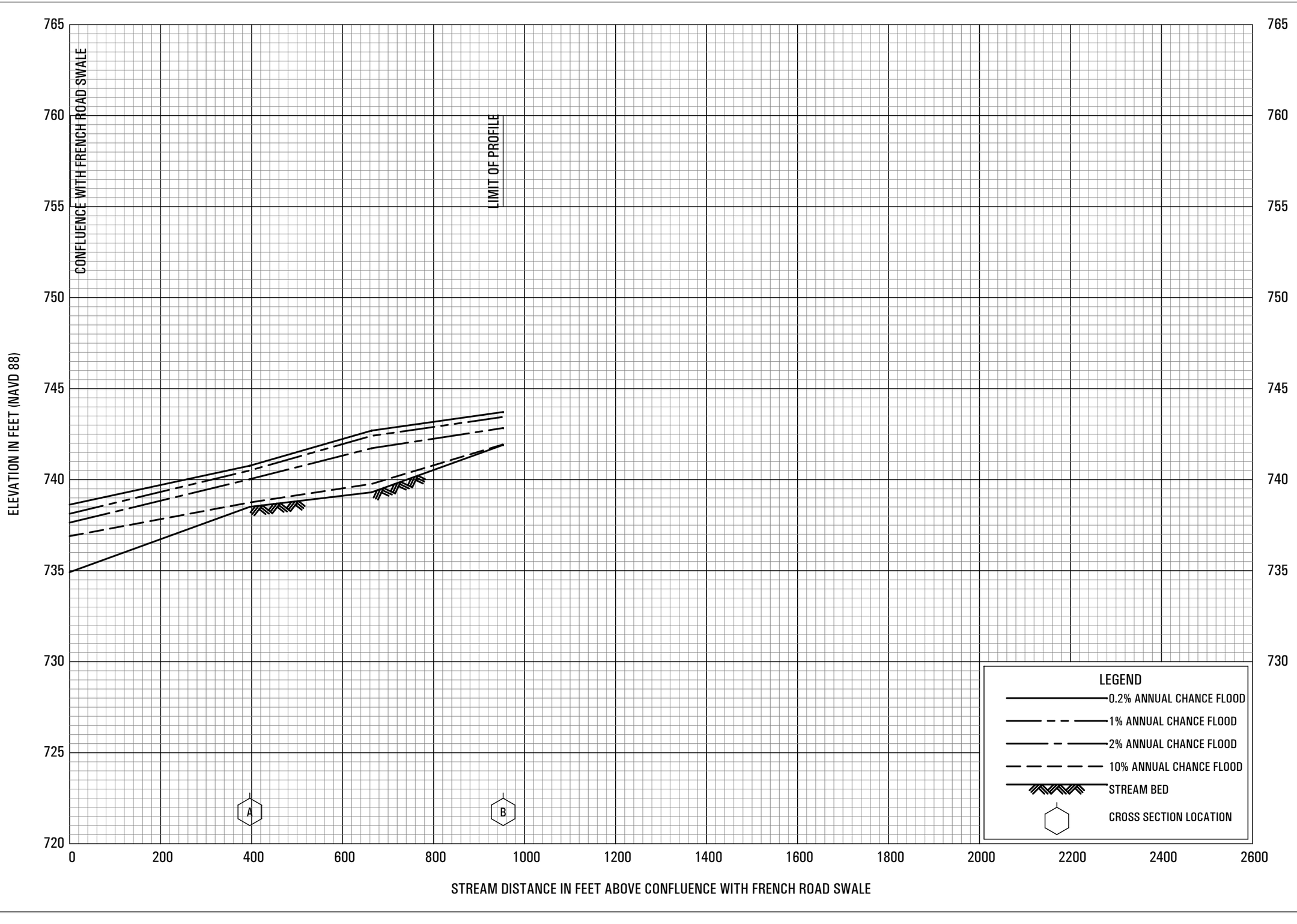

# FLOOD PROFILES

FOX RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS




# FLOOD PROFILES

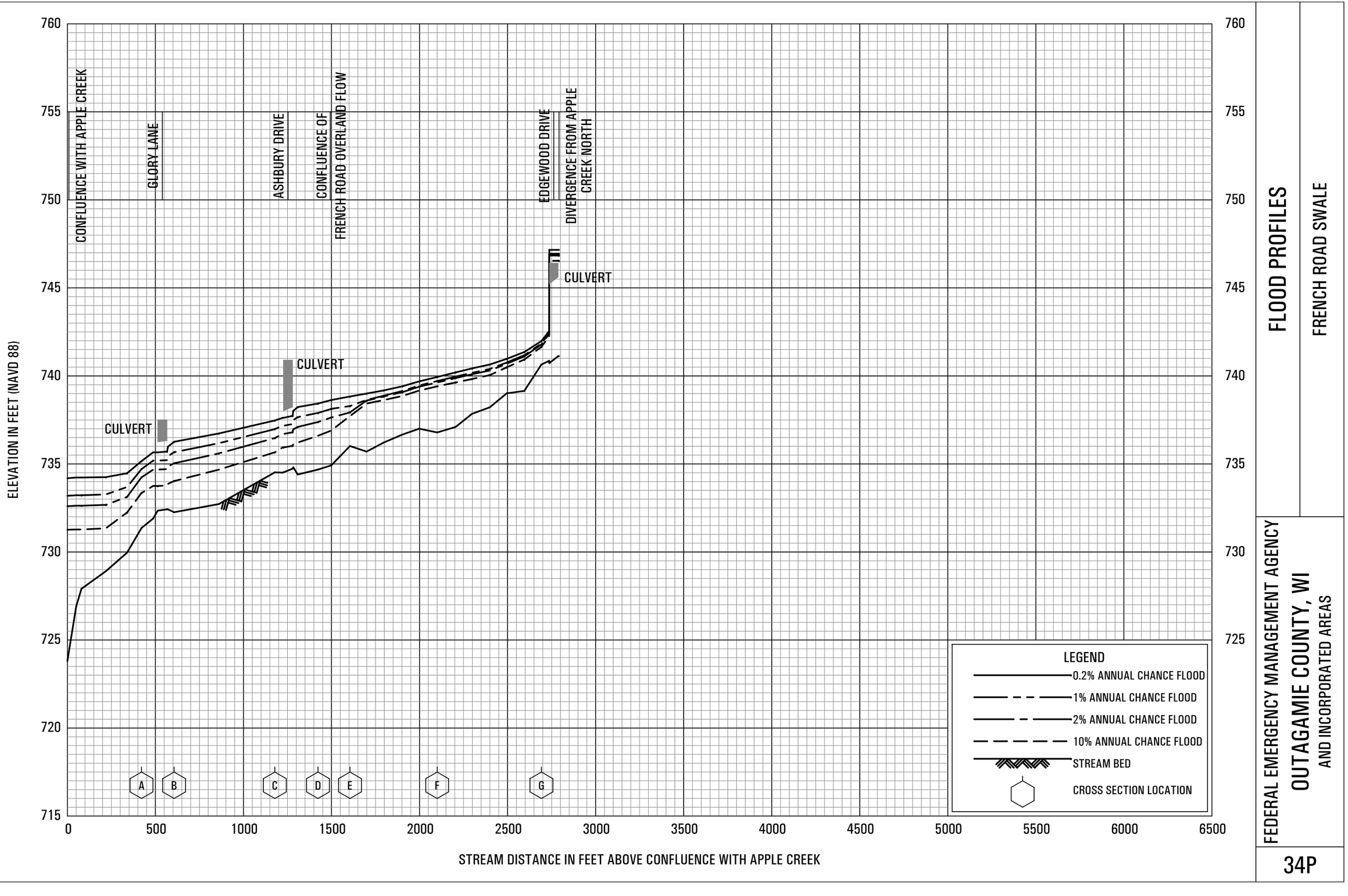
FRENCH ROAD OVERLAND FLOW

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

33P



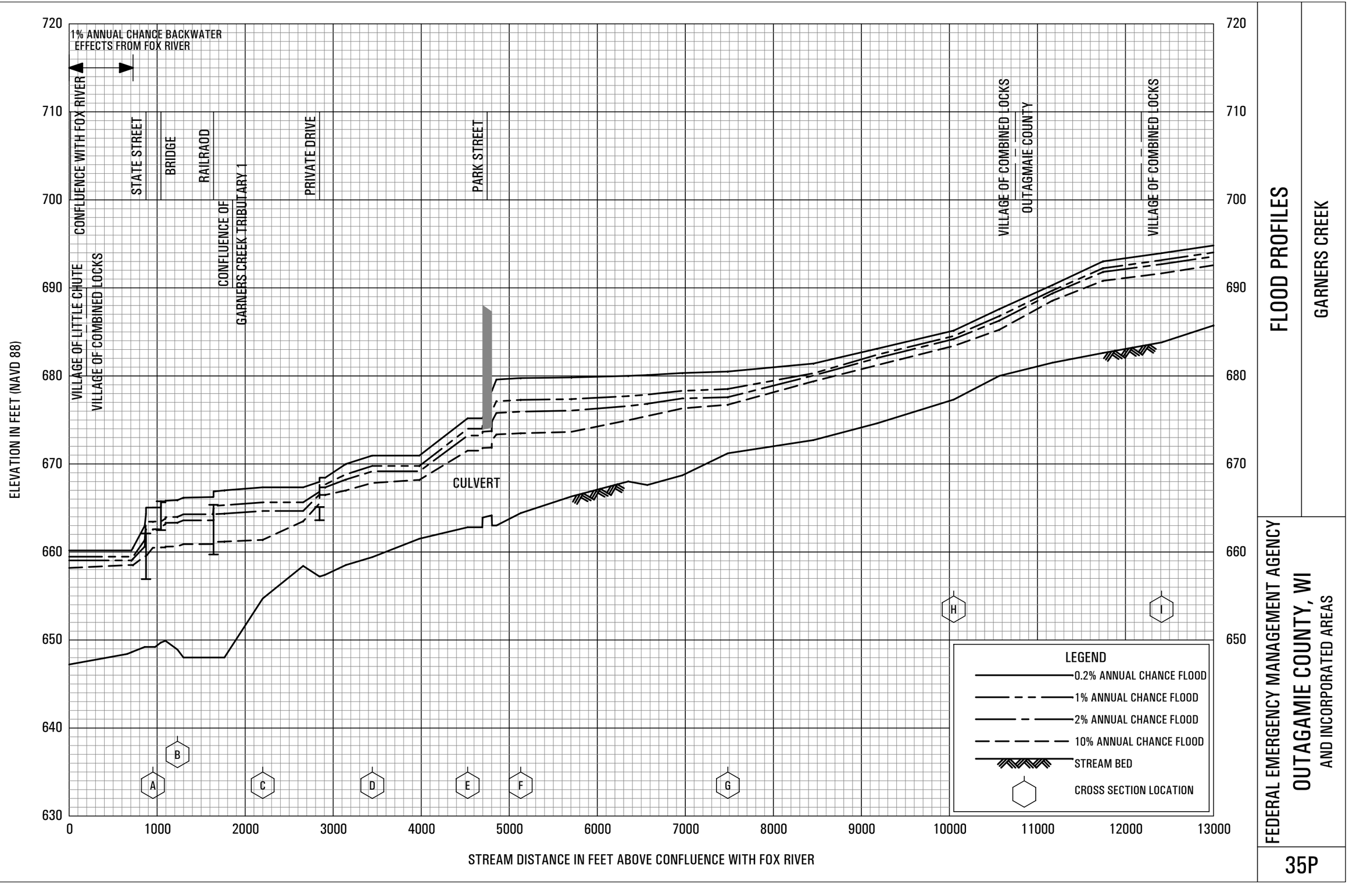

# FLOOD PROFILES

FRENCH ROAD SWALE

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS



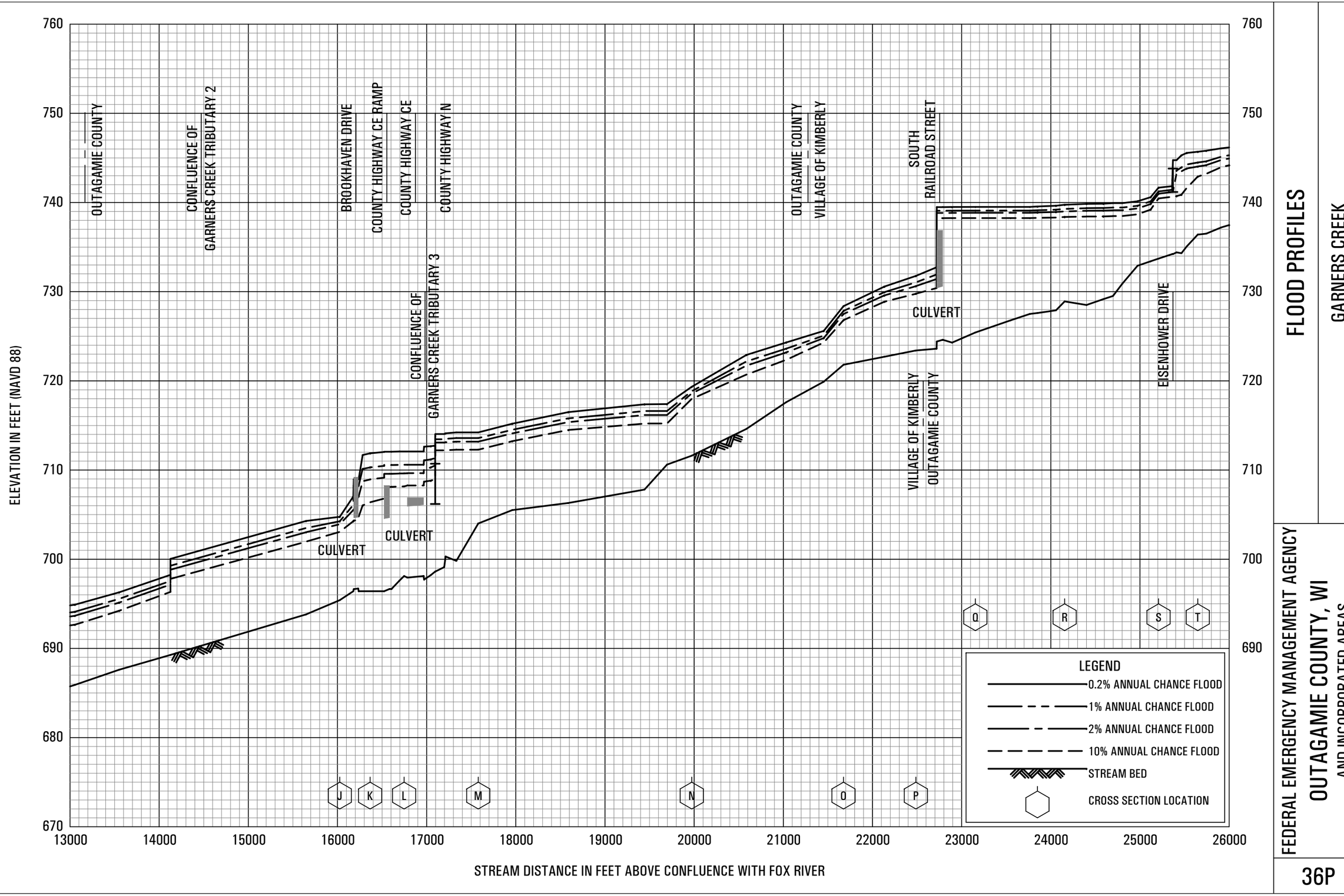

# FLOOD PROFILES

GARNERS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS



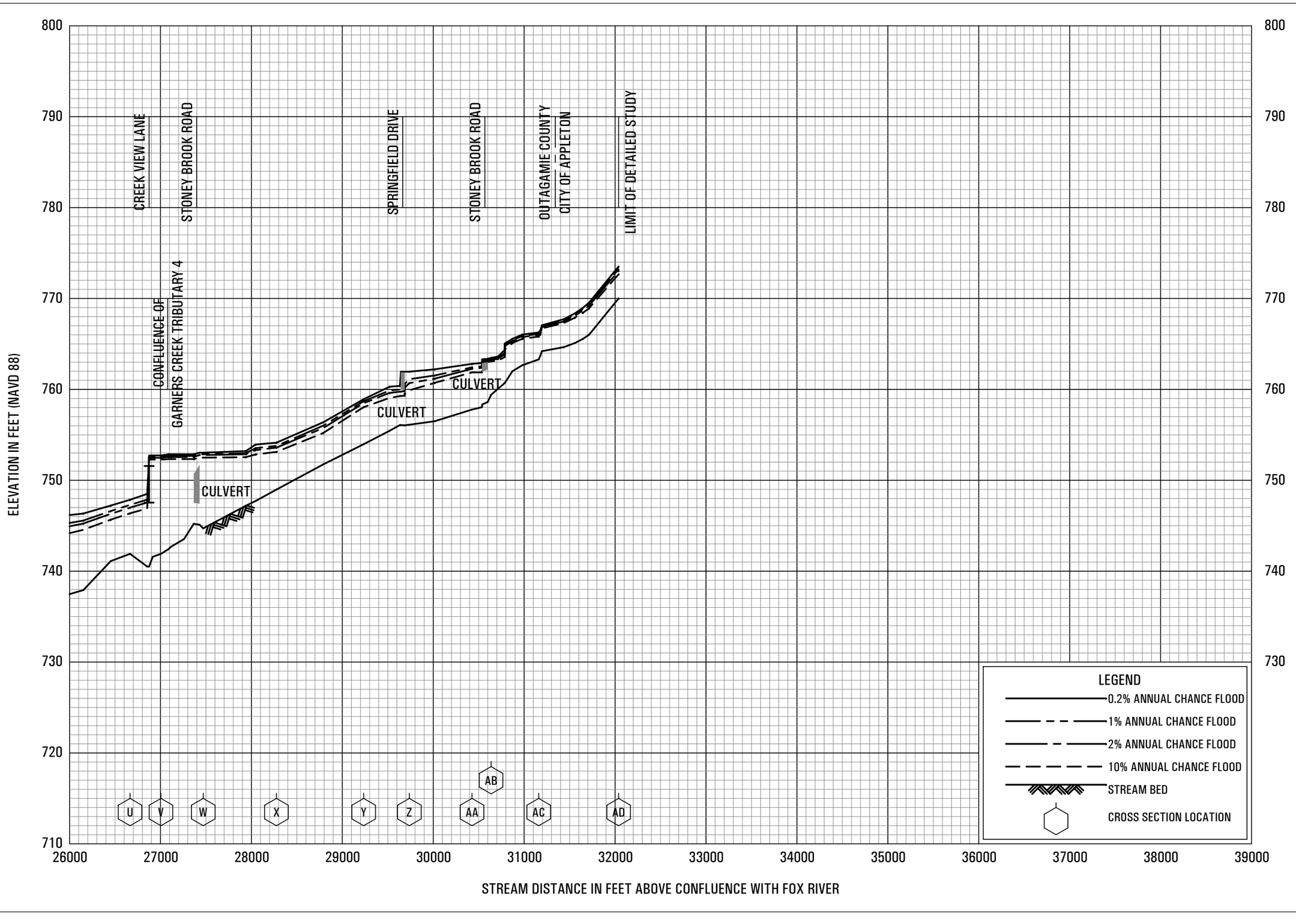

# FLOOD PROFILES

## GARNERS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OUTAGAMIE COUNTY, WI**

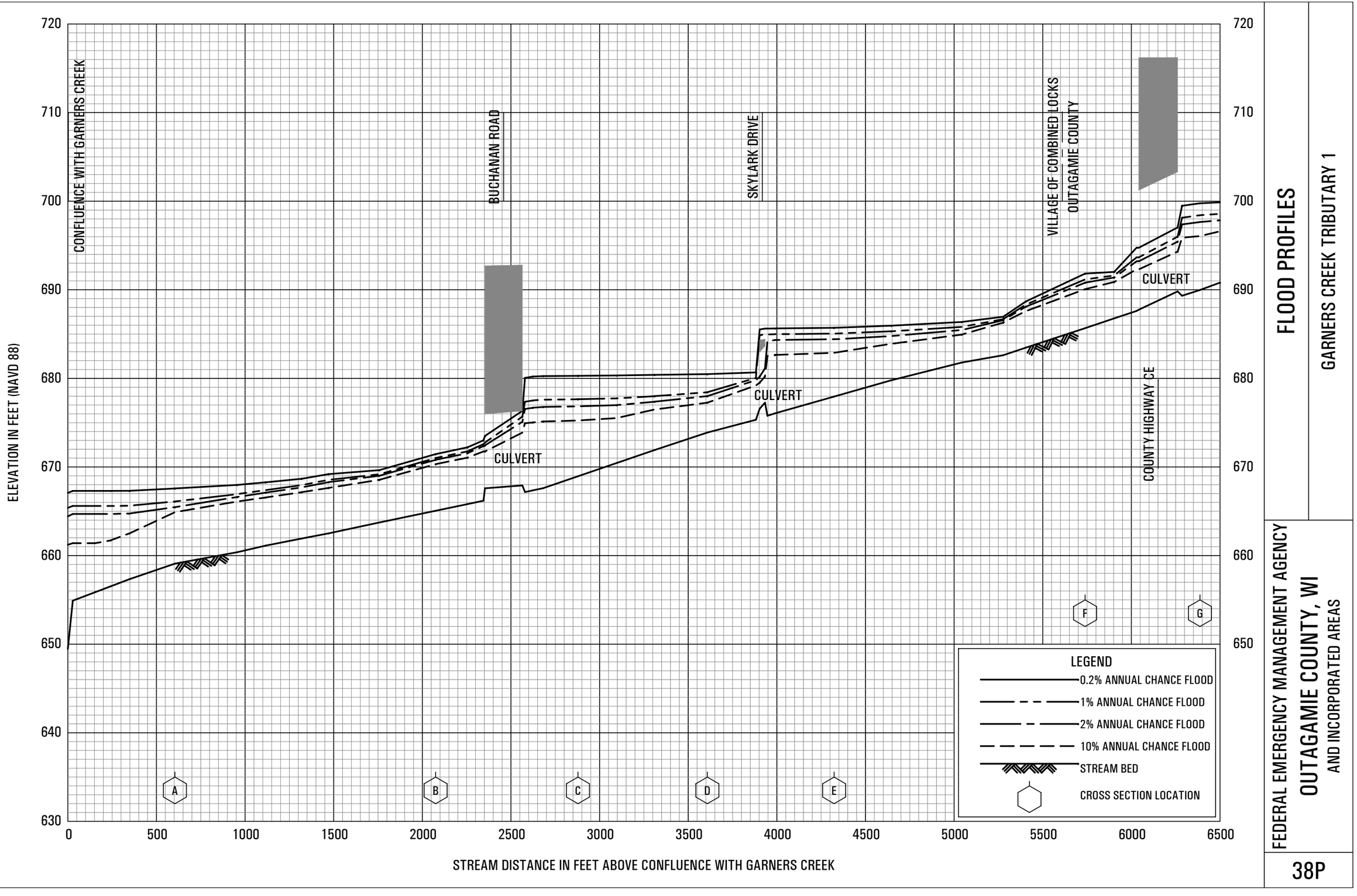
AND INCORPORATED AREAS




FLOOD PROFILES

GARNERS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
OUTAGAMIE COUNTY, WI
AND INCORPORATED AREAS



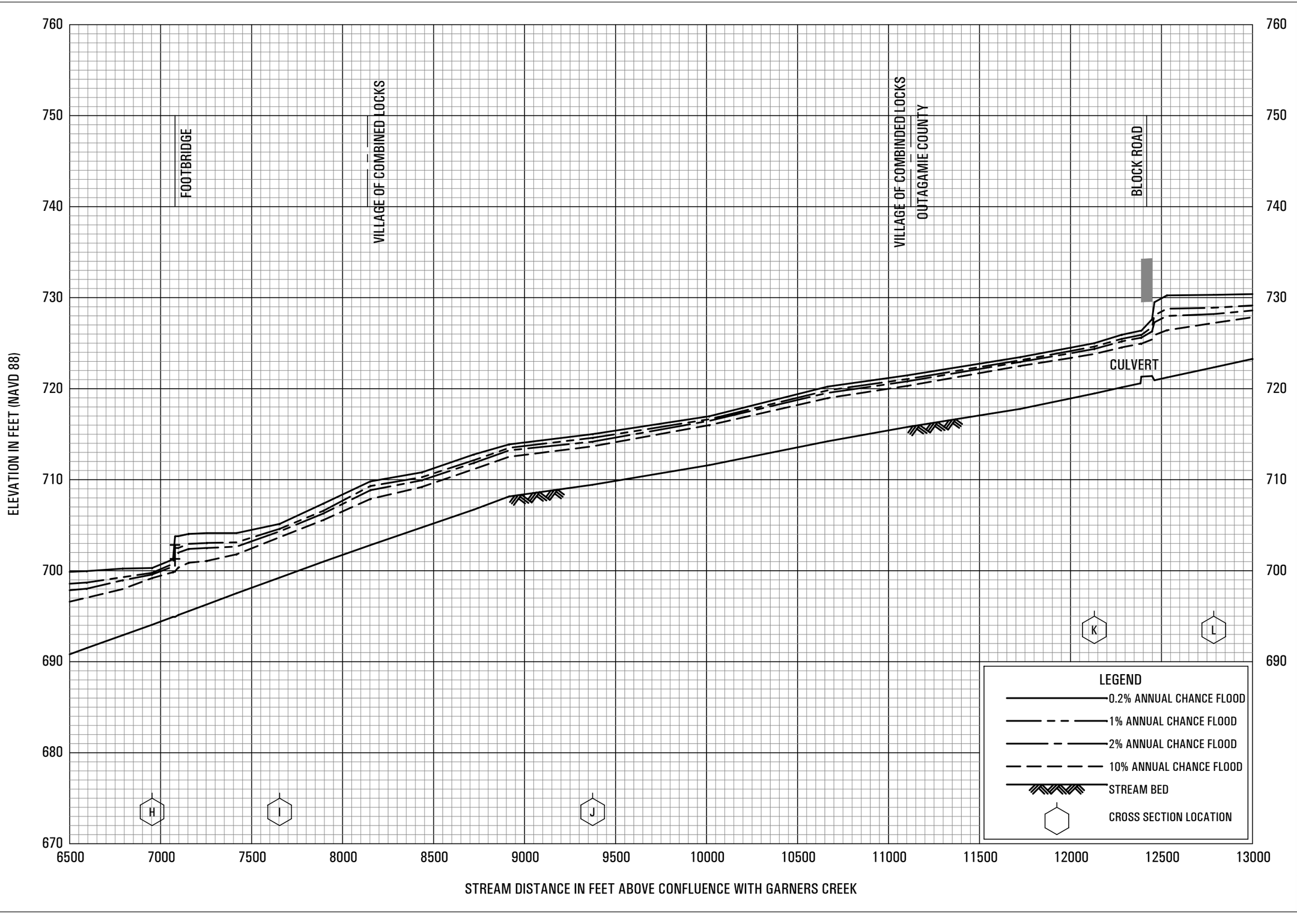

# FLOOD PROFILES

## GARNERS CREEK TRIBUTARY 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS



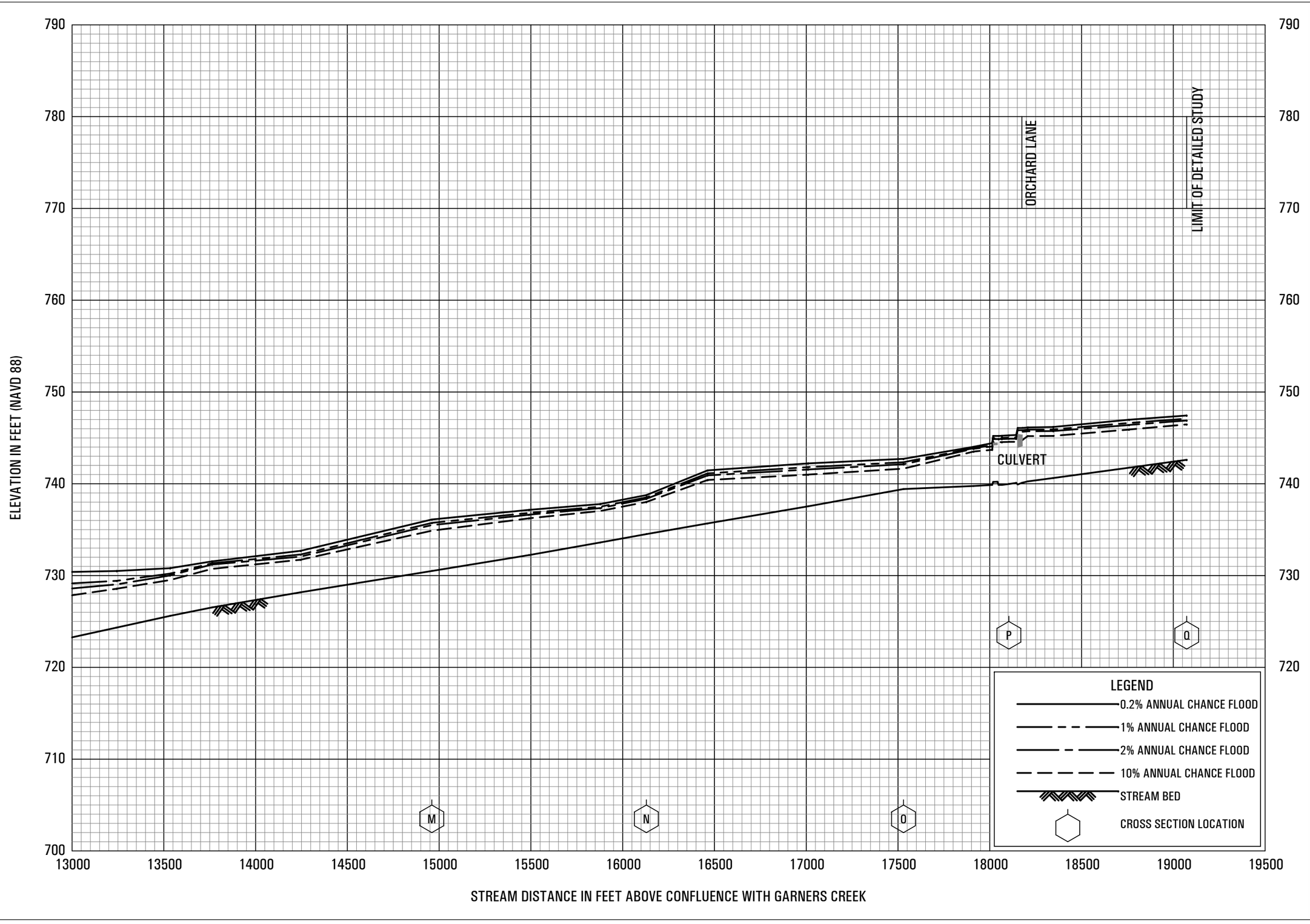

# FLOOD PROFILES

GARNERS CREEK TRIBUTARY 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS



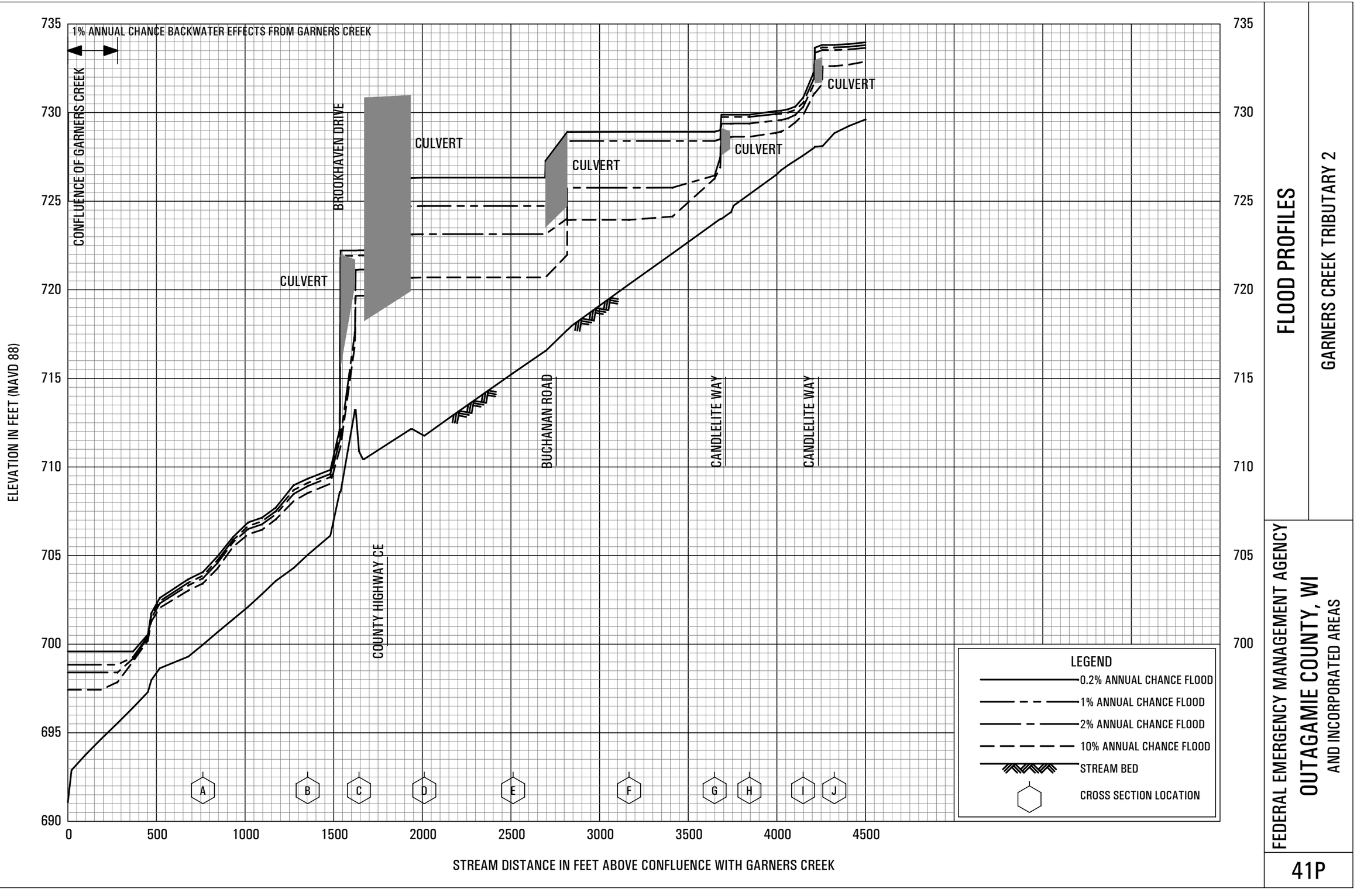

# FLOOD PROFILES

GARNERS CREEK TRIBUTARY 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS



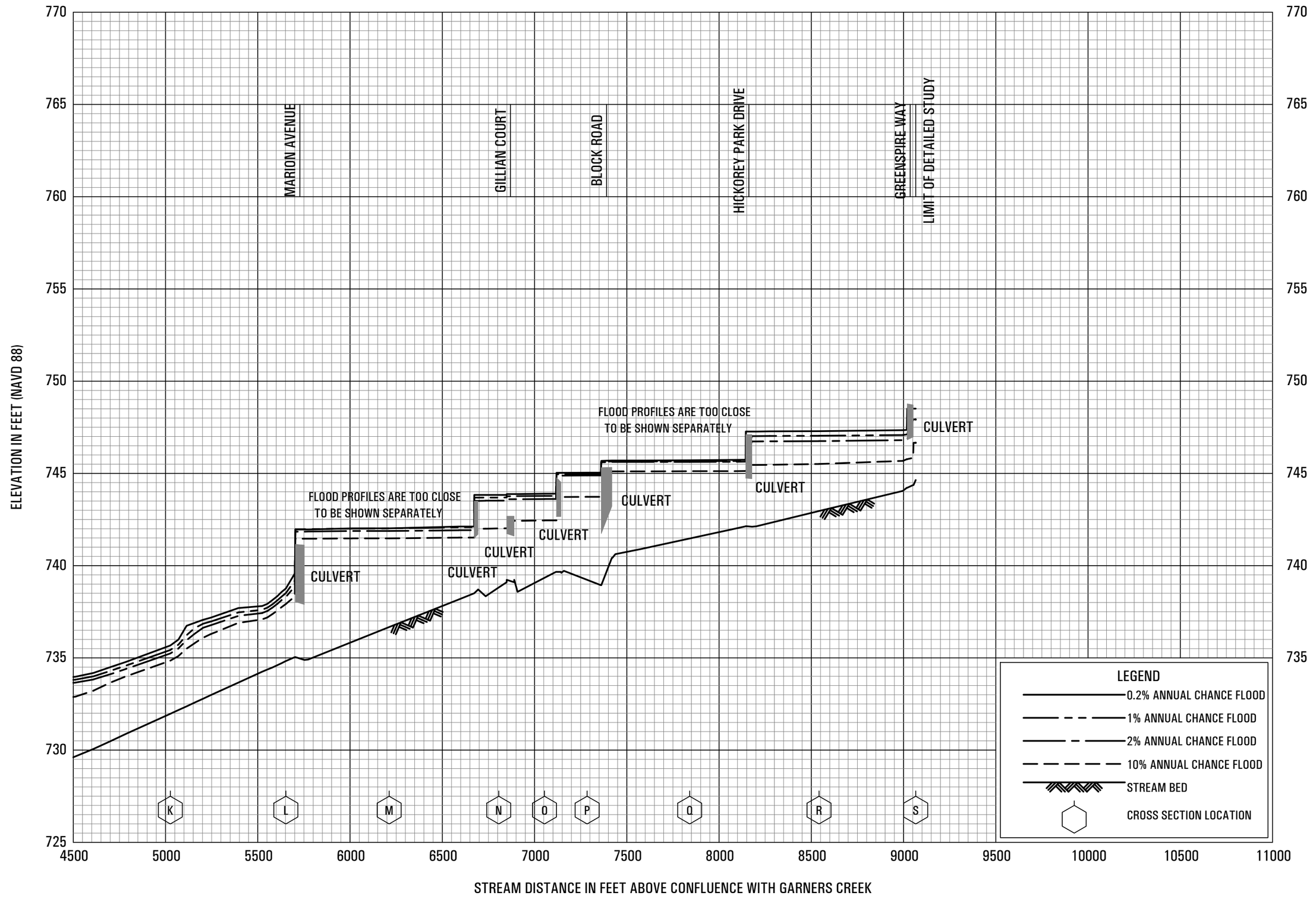

# FLOOD PROFILES

GARNERS CREEK TRIBUTARY 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS




# FLOOD PROFILES

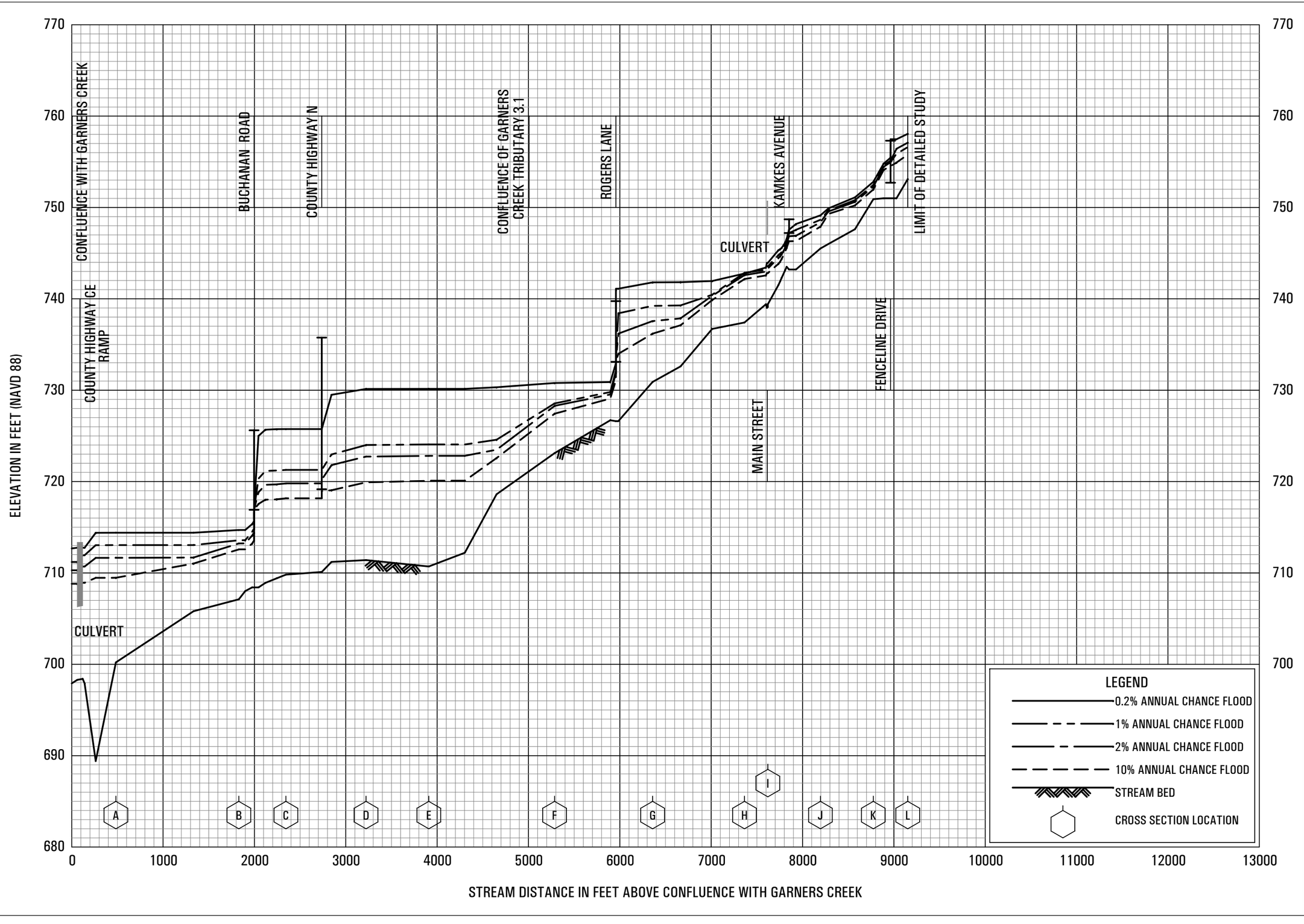
GARNERS CREEK TRIBUTARY 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

42P



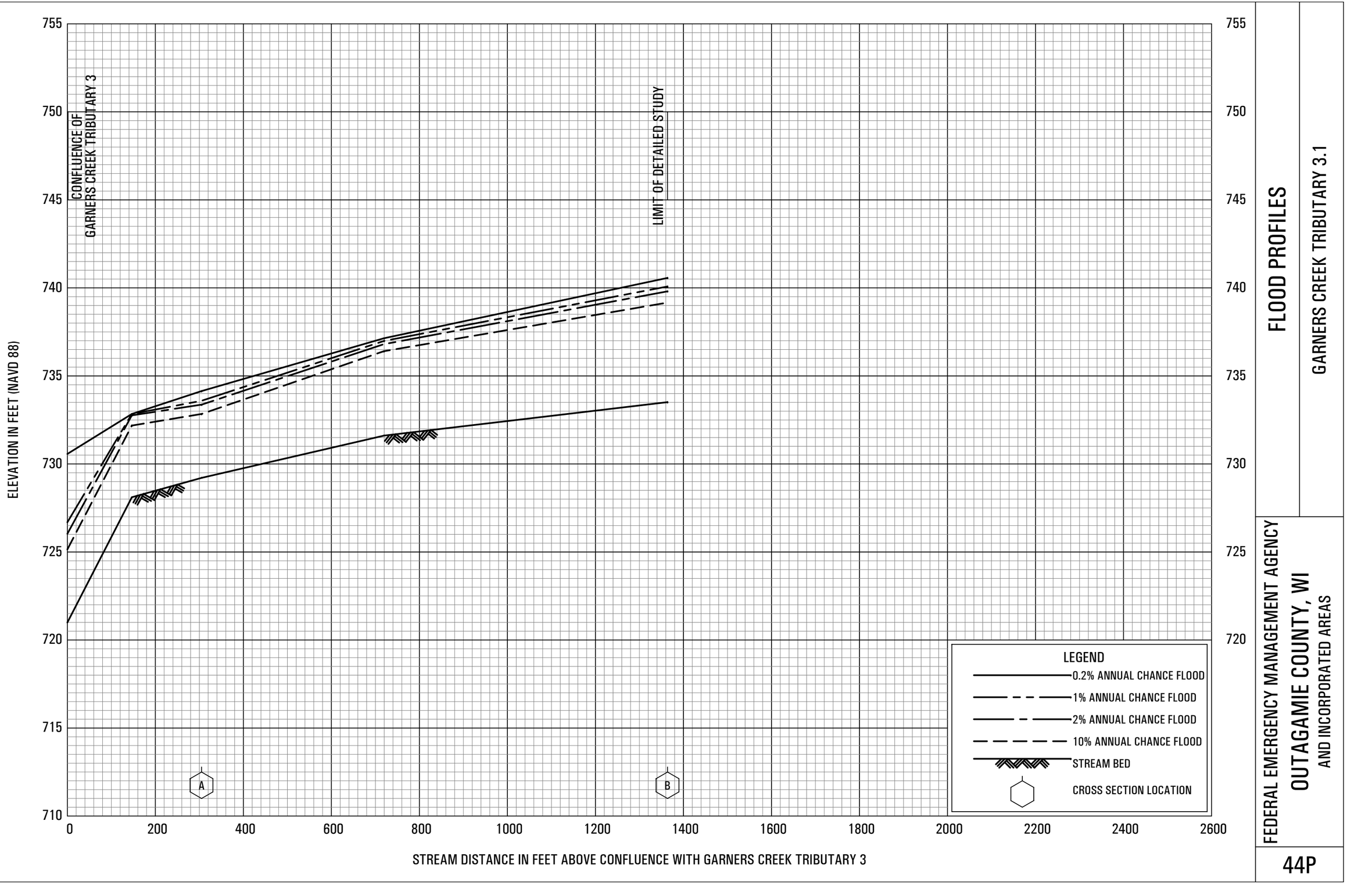

# FLOOD PROFILES

## GARNERS CREEK TRIBUTARY 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS



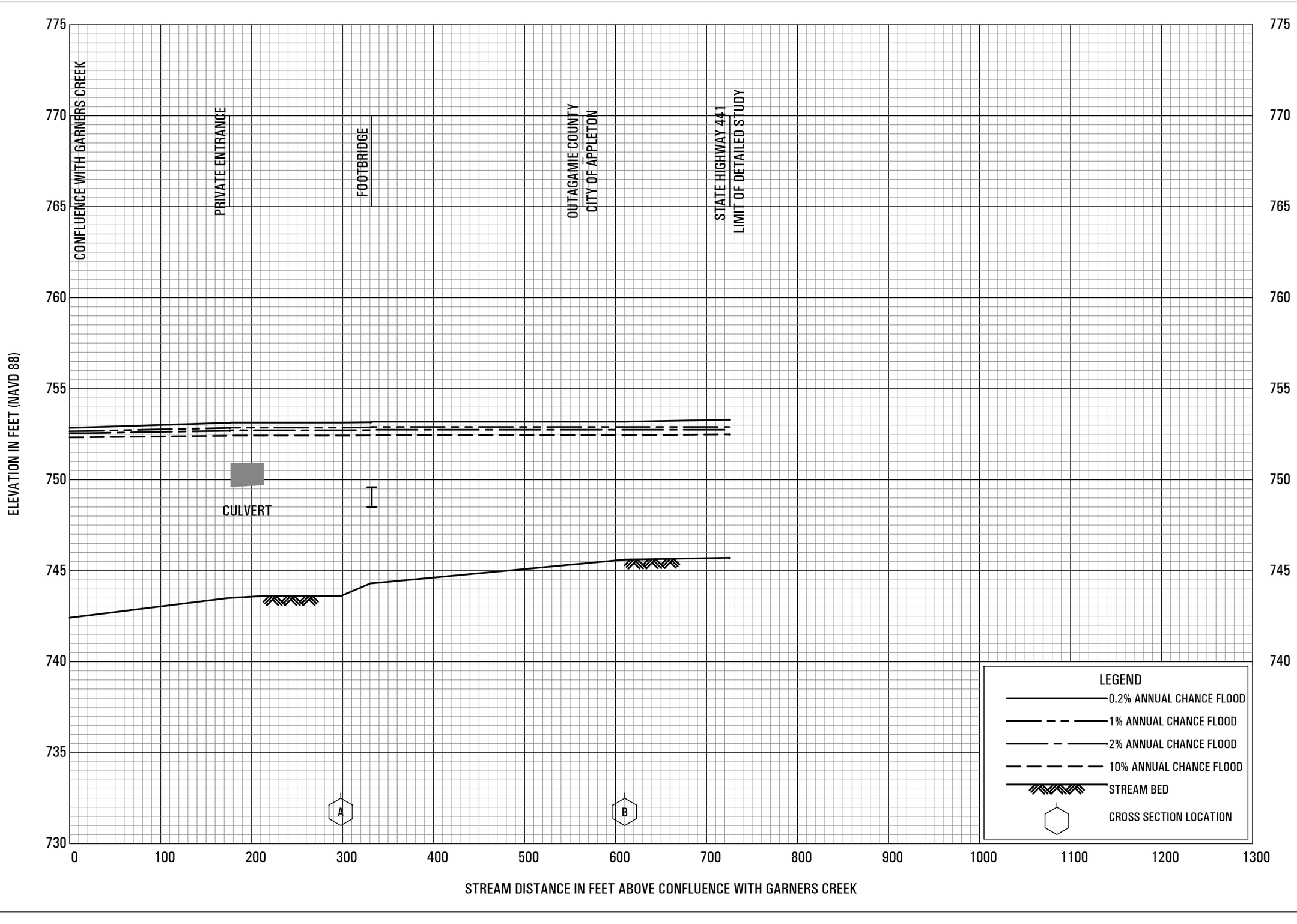

# FLOOD PROFILES

GARNERS CREEK TRIBUTARY 3.1

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

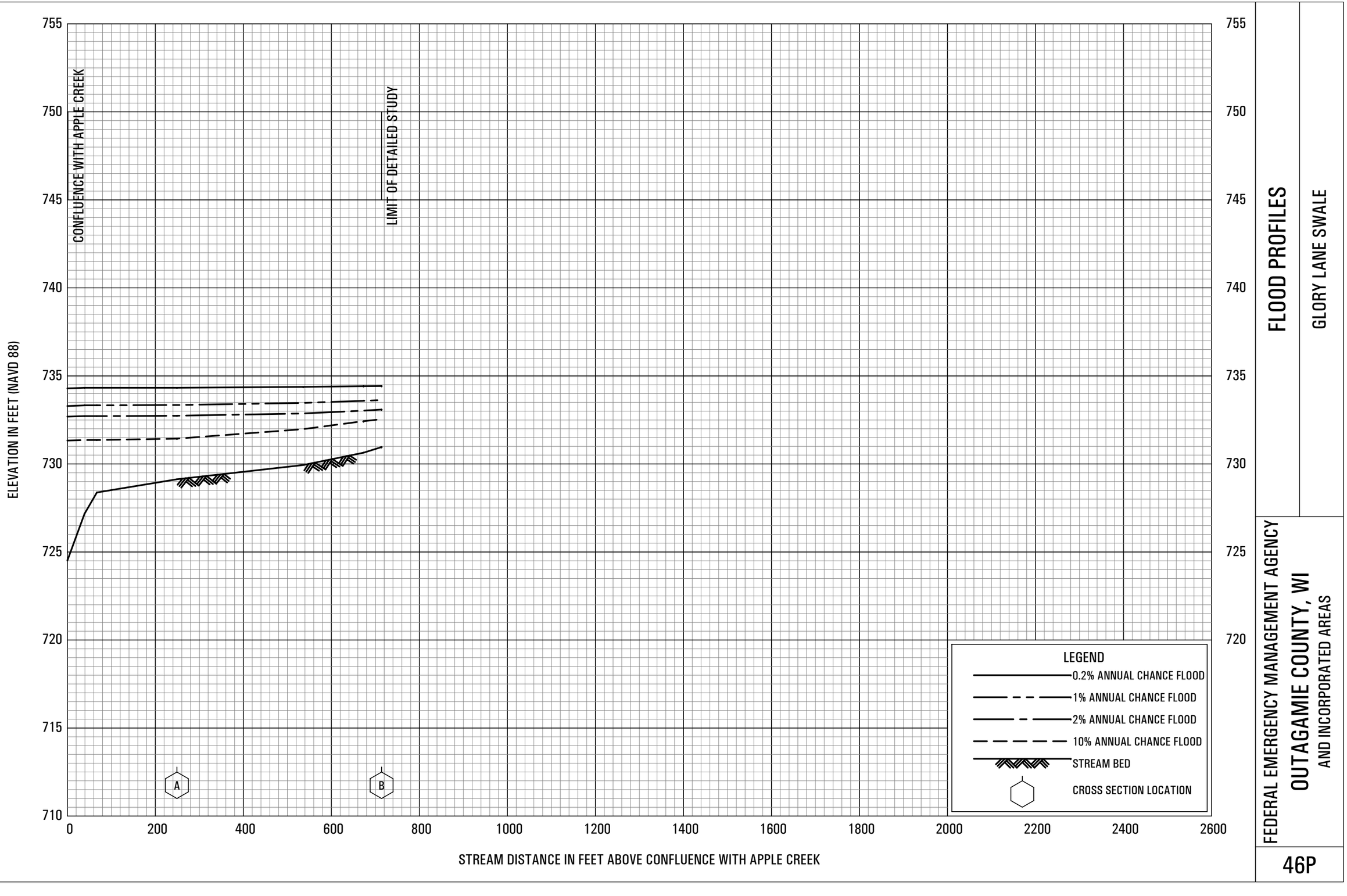
AND INCORPORATED AREAS




# FLOOD PROFILES

## GARNERS CREEK TRIBUTARY 4

FEDERAL EMERGENCY MANAGEMENT AGENCY
OUTAGAMIE COUNTY, WI
AND INCORPORATED AREAS



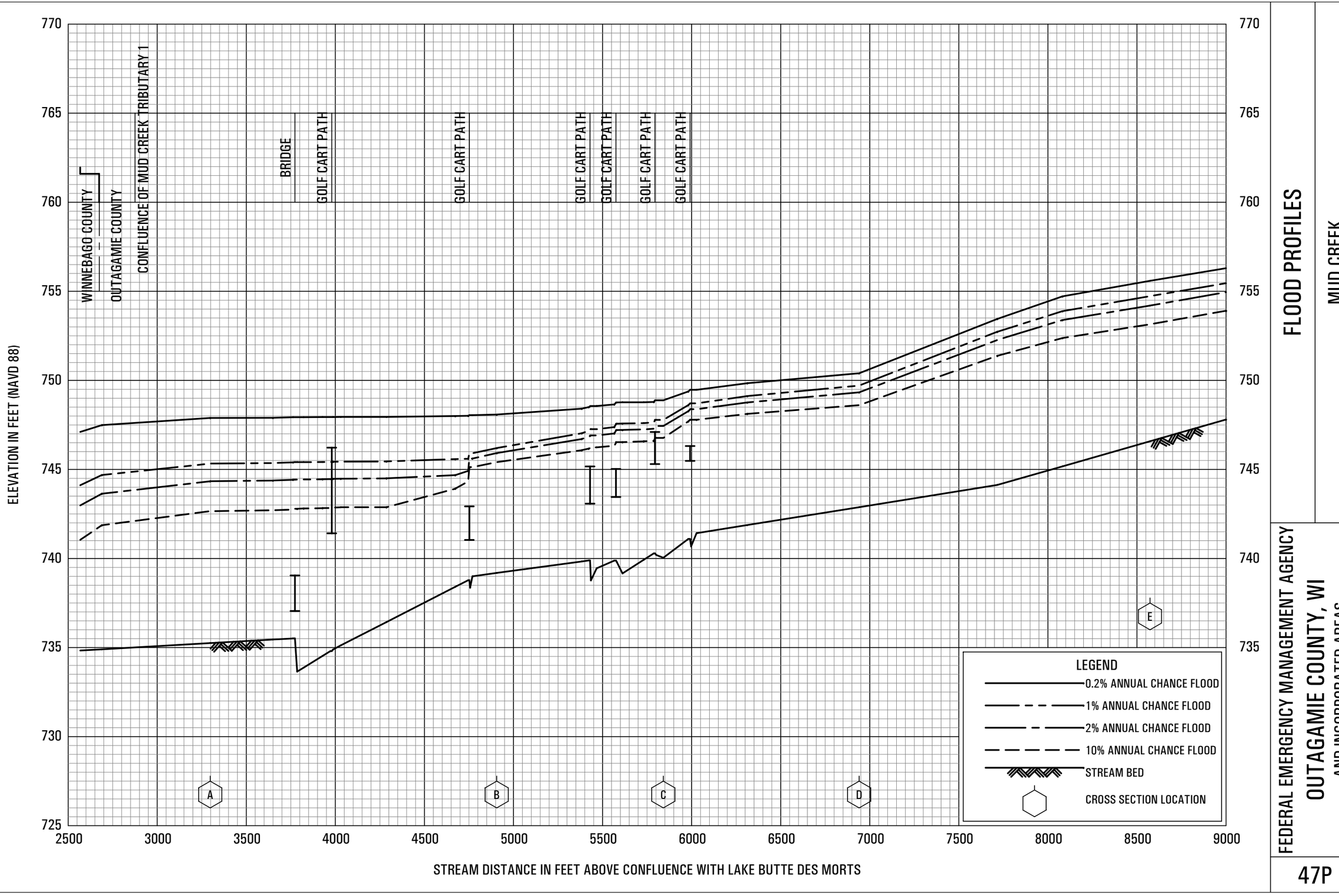

# FLOOD PROFILES

GLORY LANE SWALE

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS



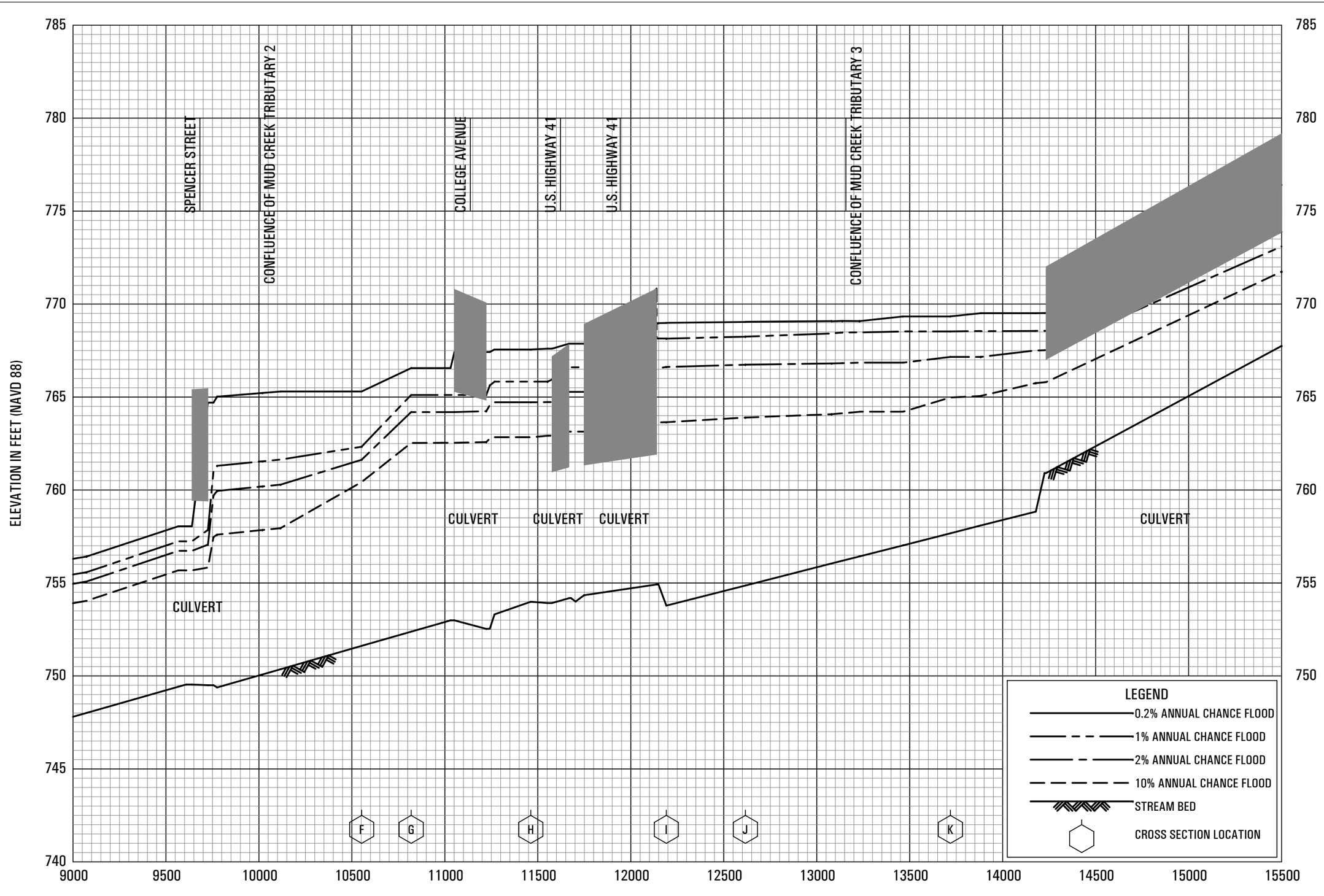

# FLOOD PROFILES

## MUD CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS



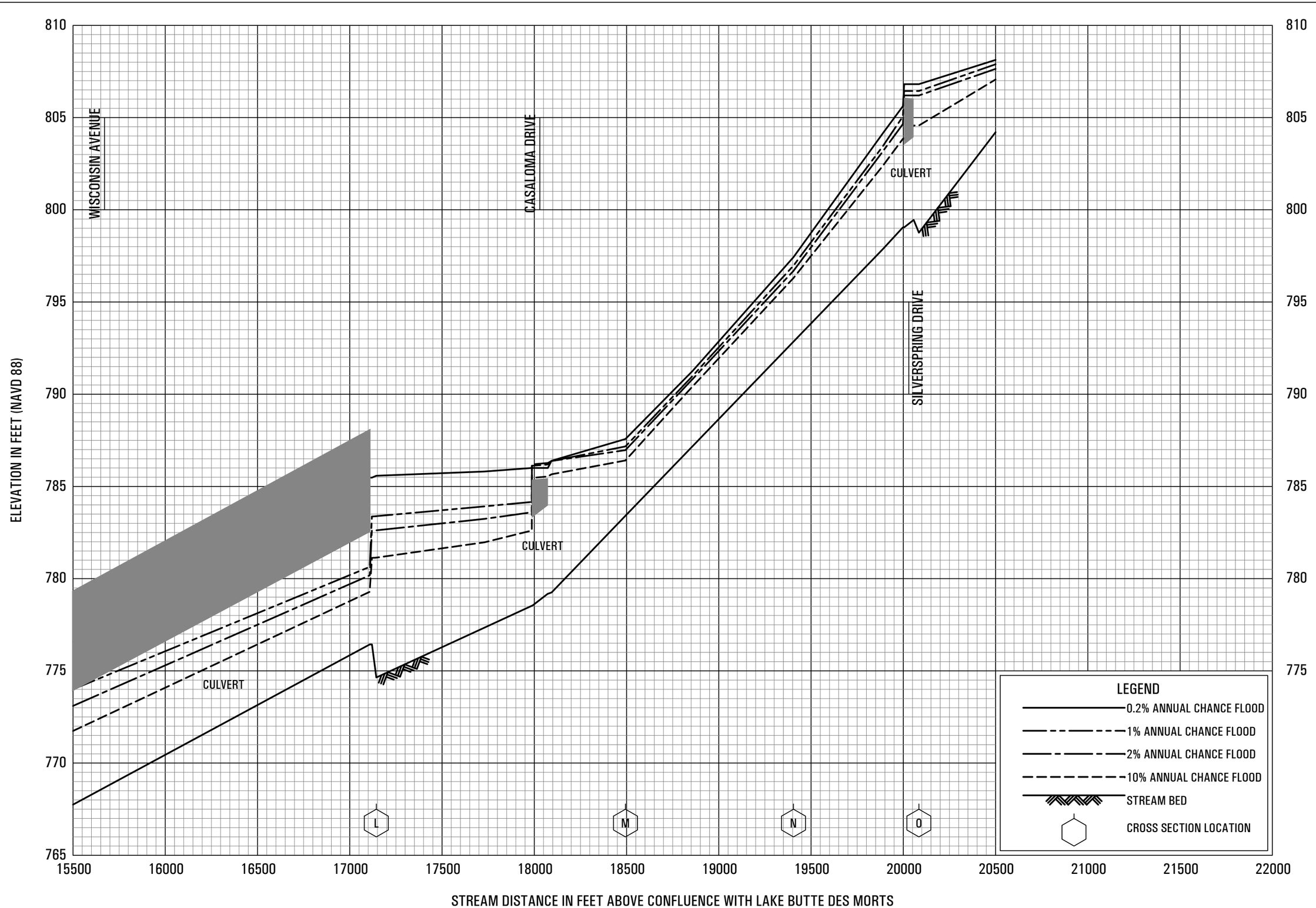

FLOOD PROFILES

MUD CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS



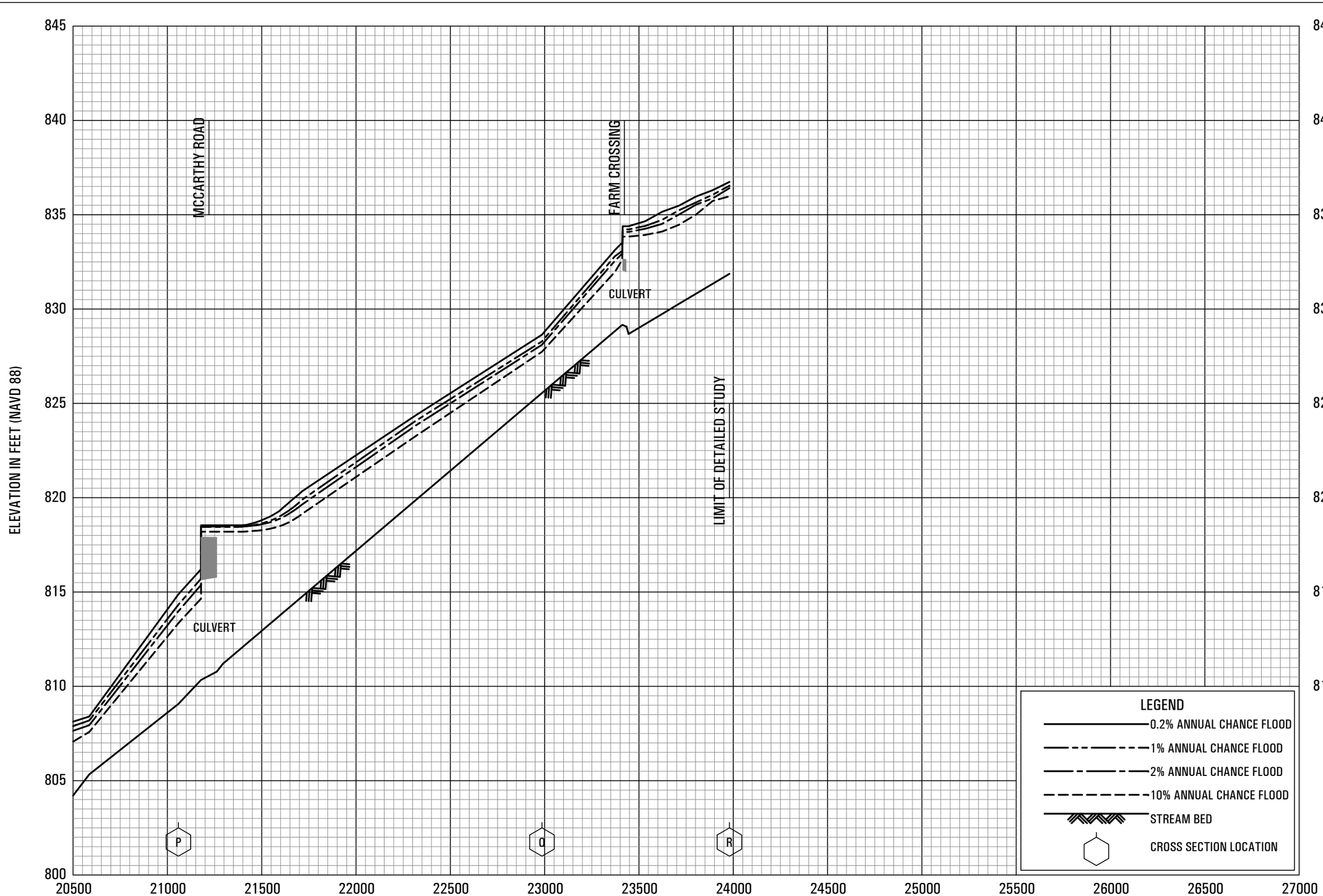

FLOOD PROFILES

MUD CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS




FLOOD PROFILES

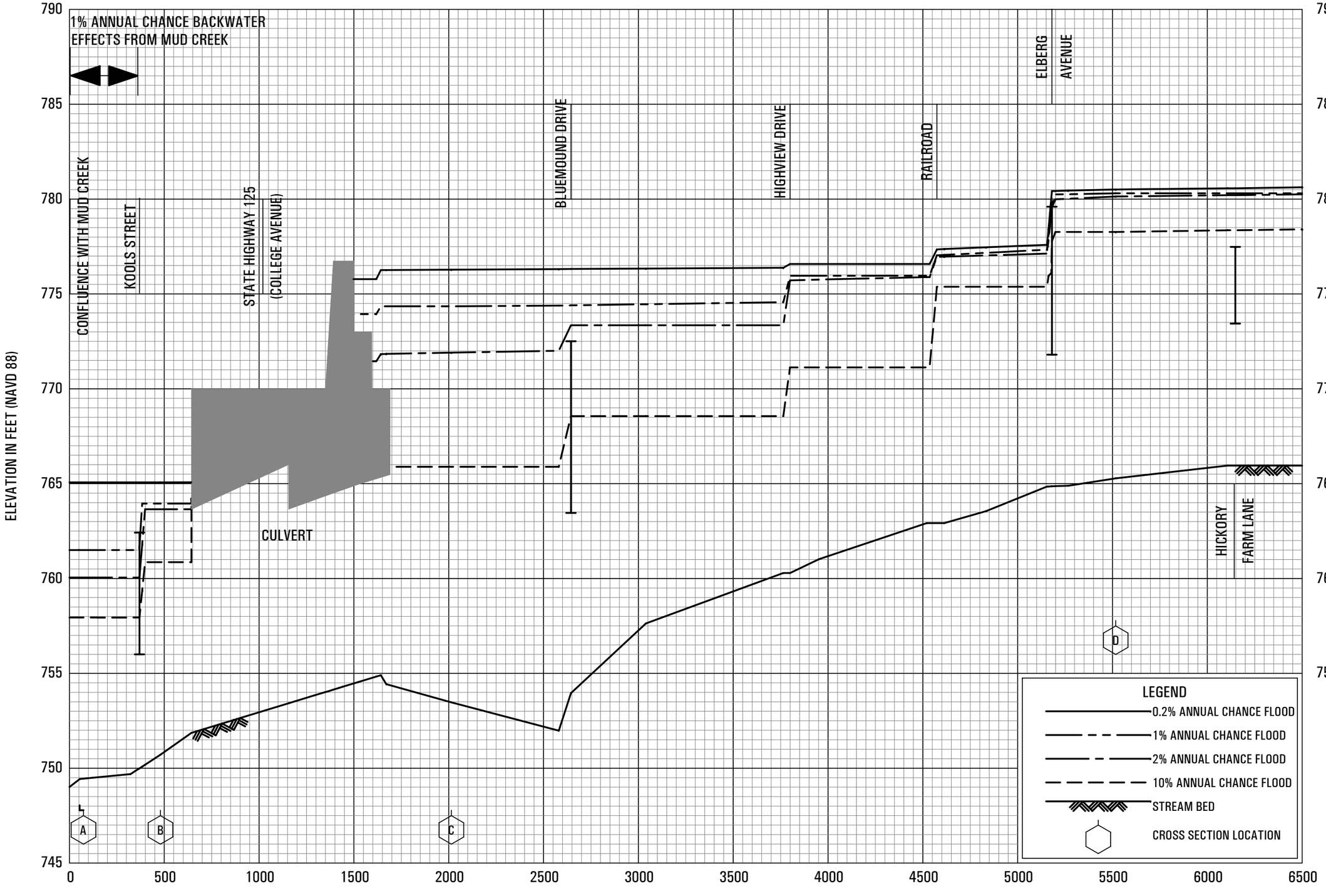
MUD CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

50P



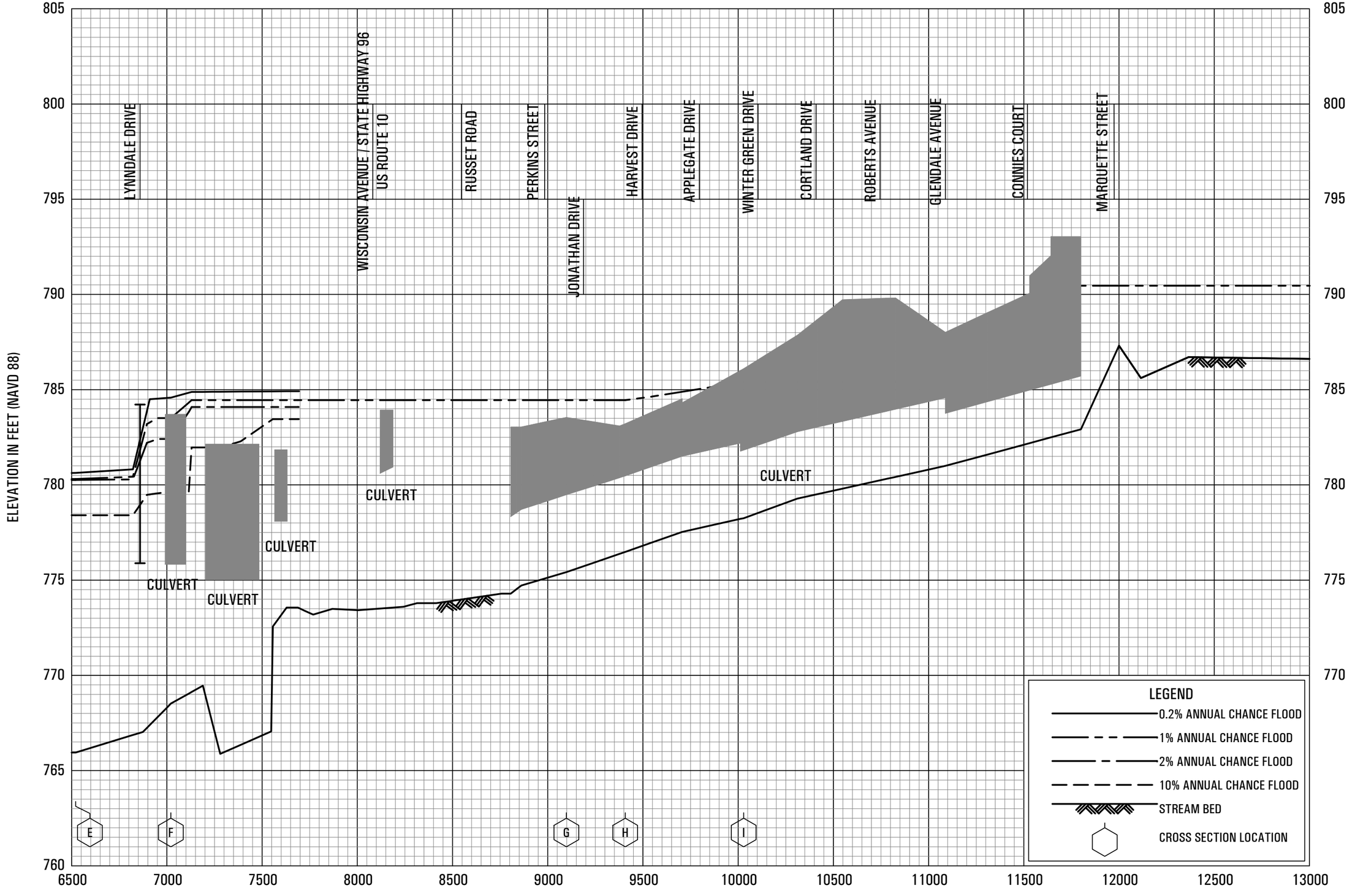

# FLOOD PROFILES

## MUD CREEK TRIBUTARY 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS



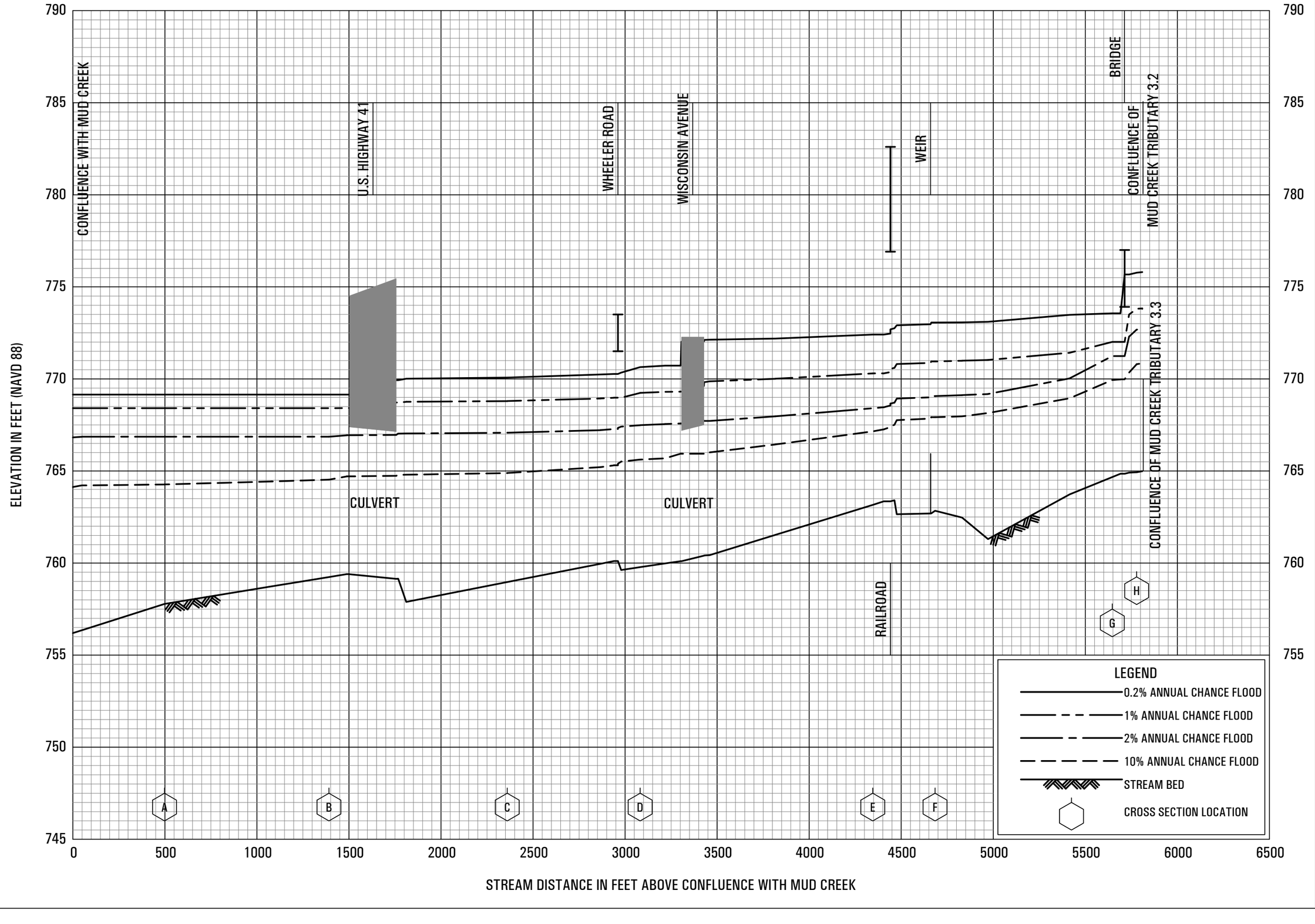

# FLOOD PROFILES

## MUD CREEK TRIBUTARY 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS



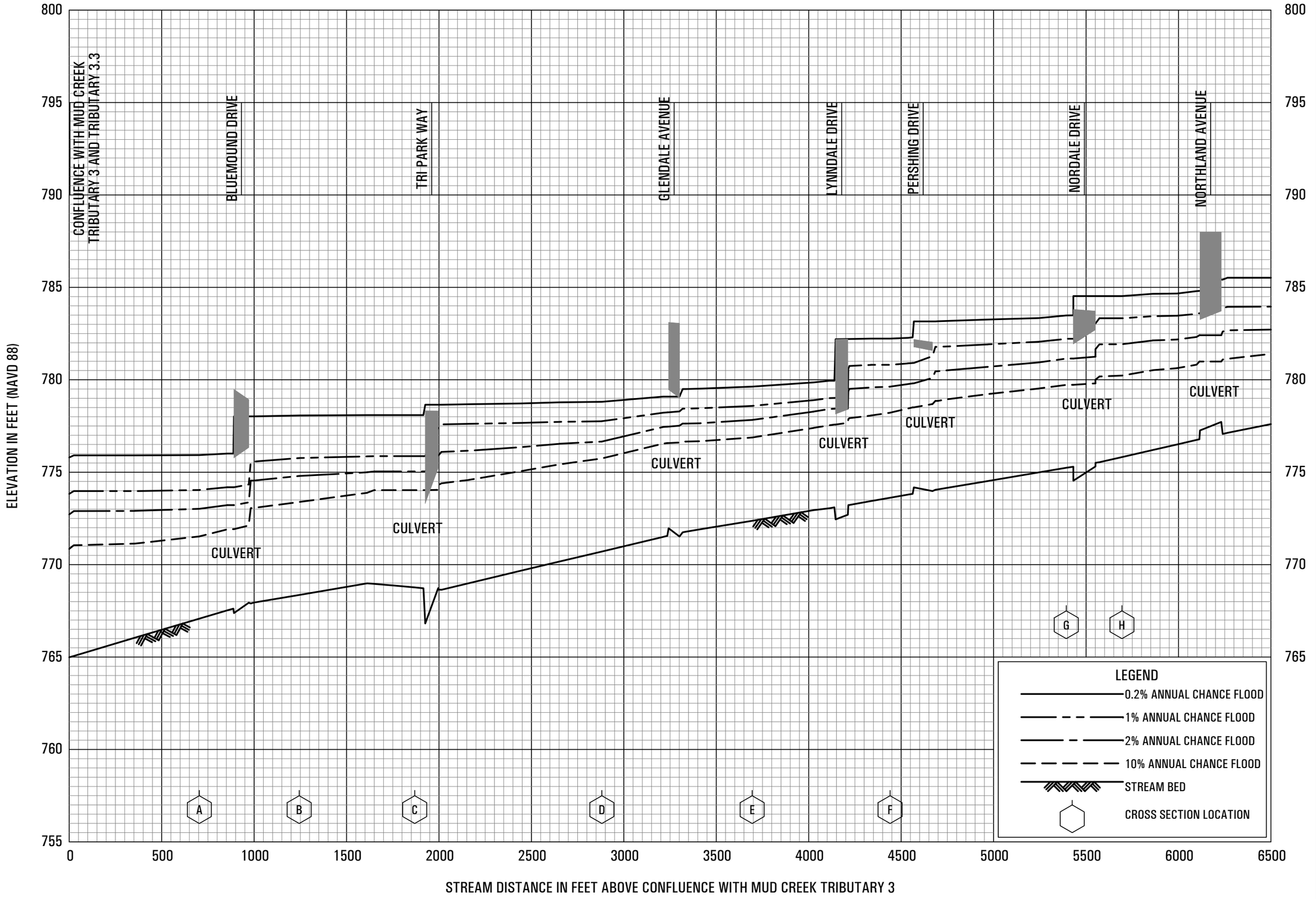

# FLOOD PROFILES

## MUD CREEK TRIBUTARY 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS



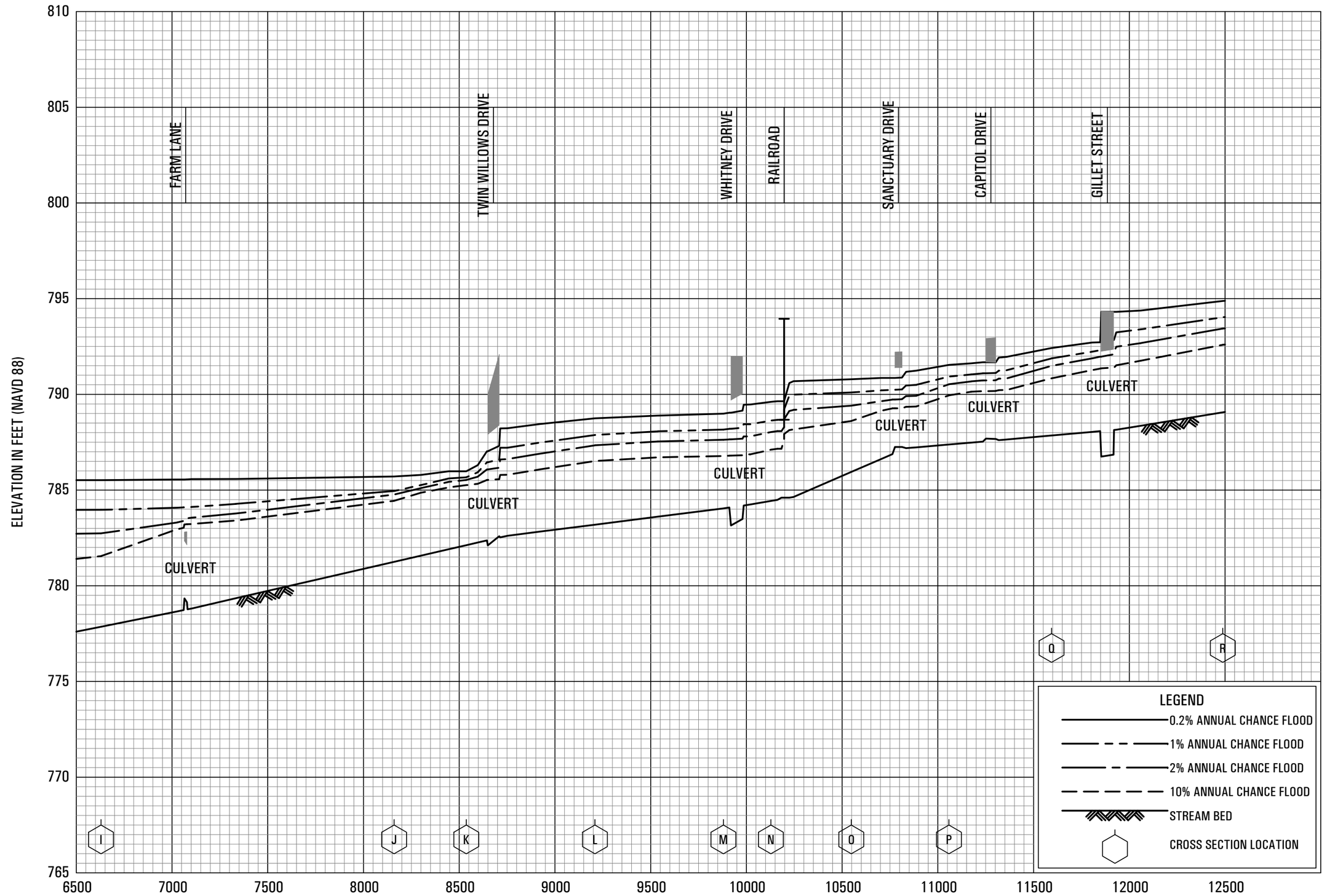

# FLOOD PROFILES

## MUD CREEK TRIBUTARY 3.2

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS




FLOOD PROFILES

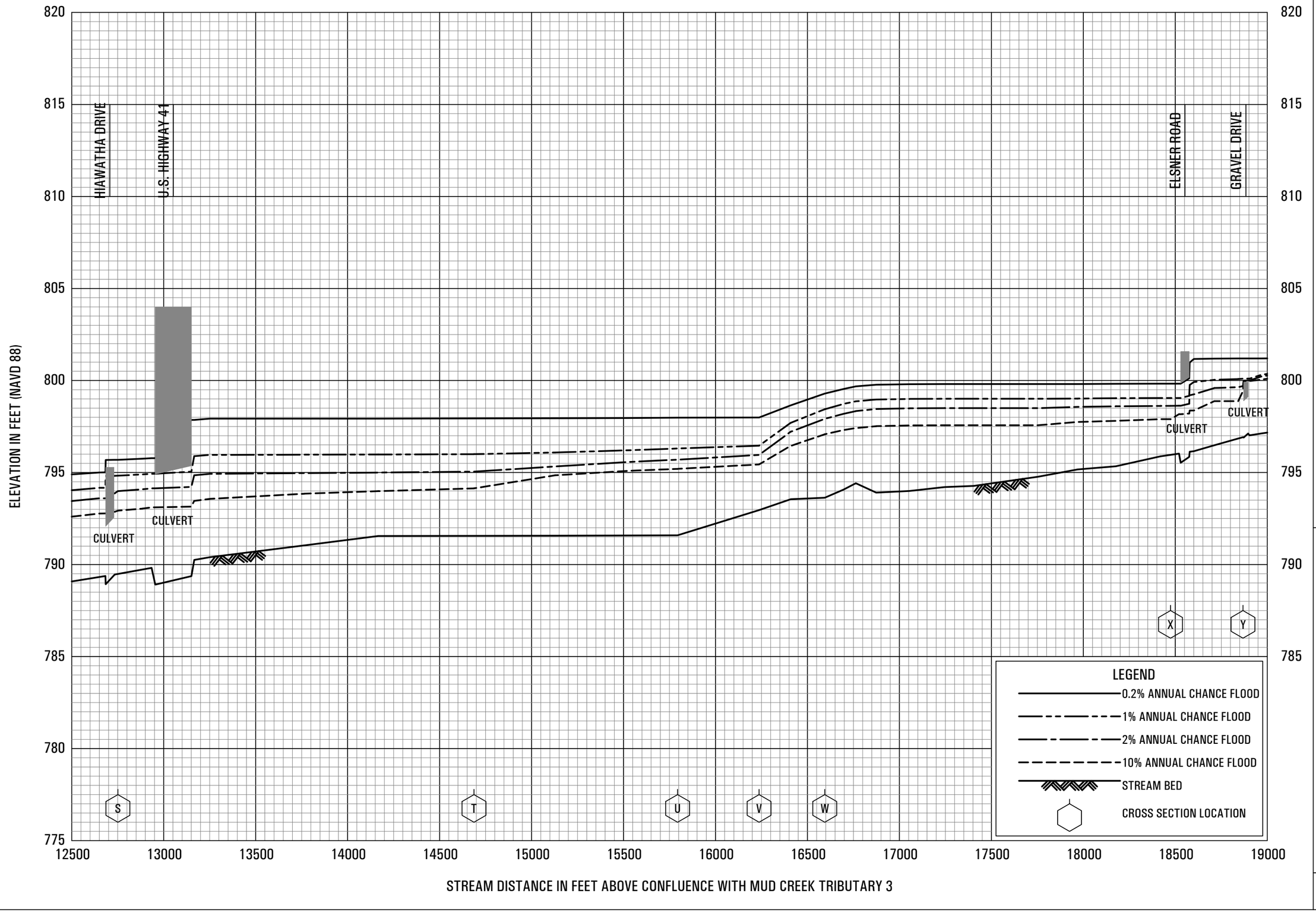
MUD CREEK TRIBUTARY 3.2

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

55P



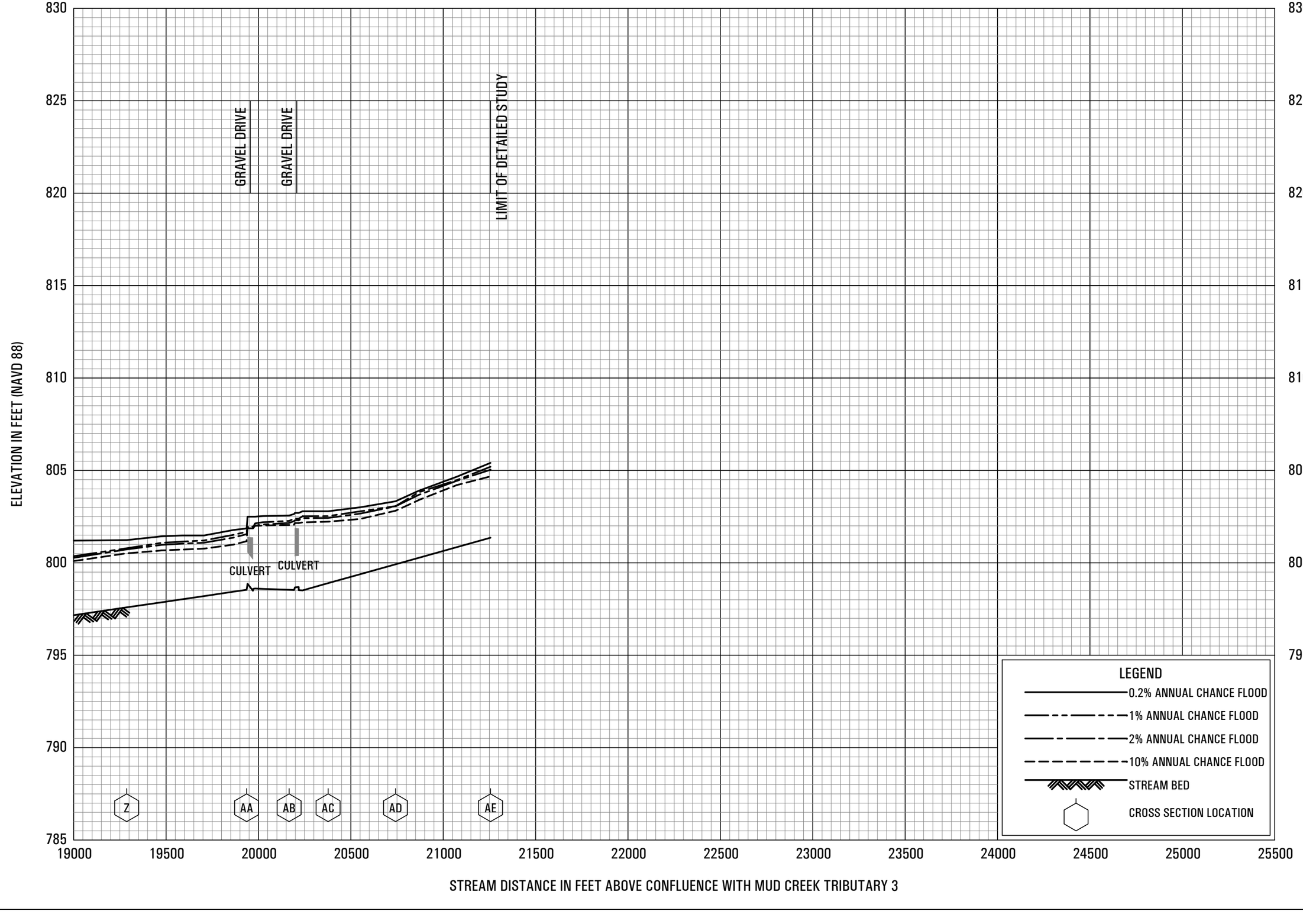

FLOOD PROFILES

MUD CREEK TRIBUTARY 3.2

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS



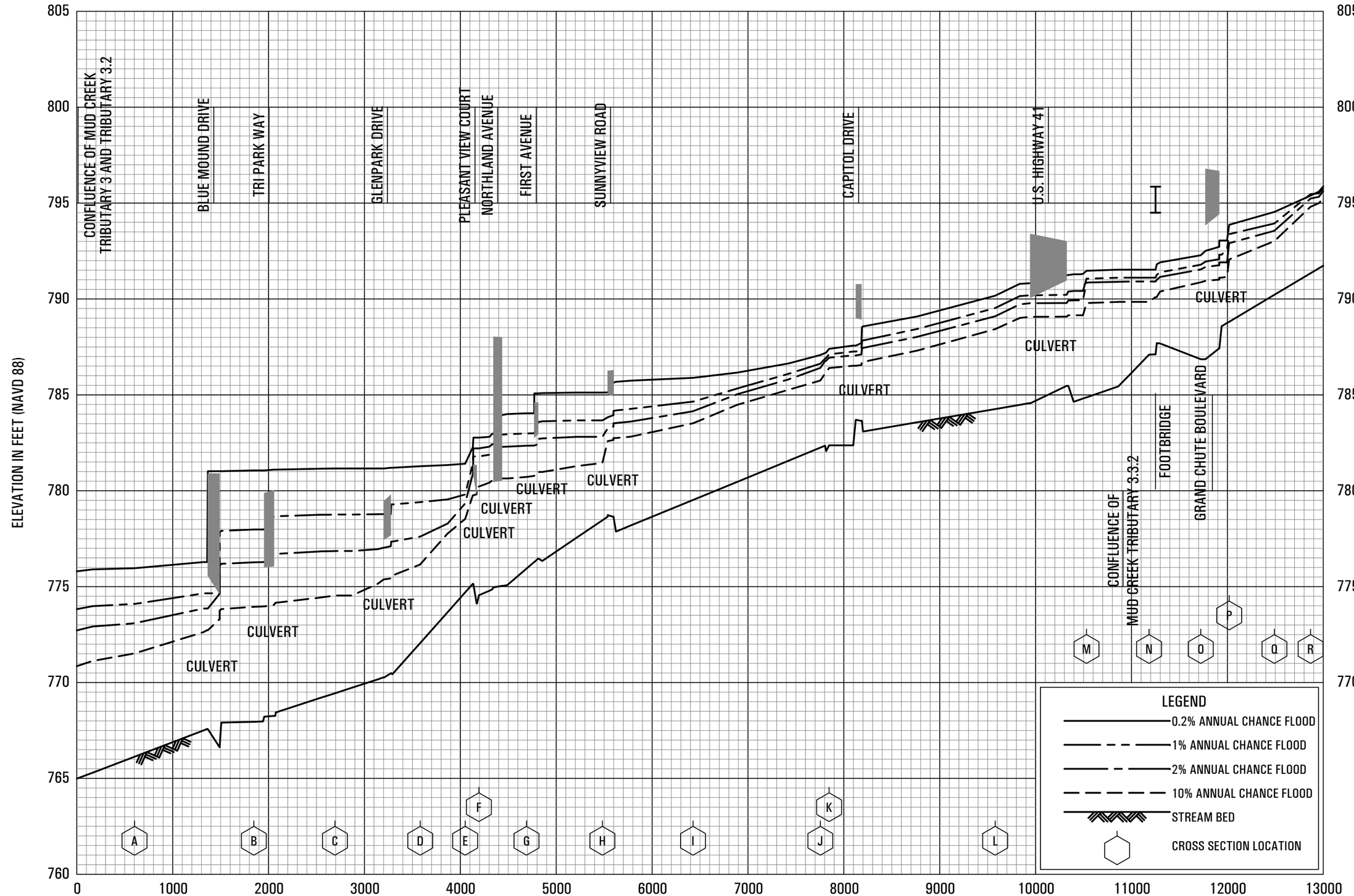

# FLOOD PROFILES

MUD CREEK TRIBUTARY 3.2

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS



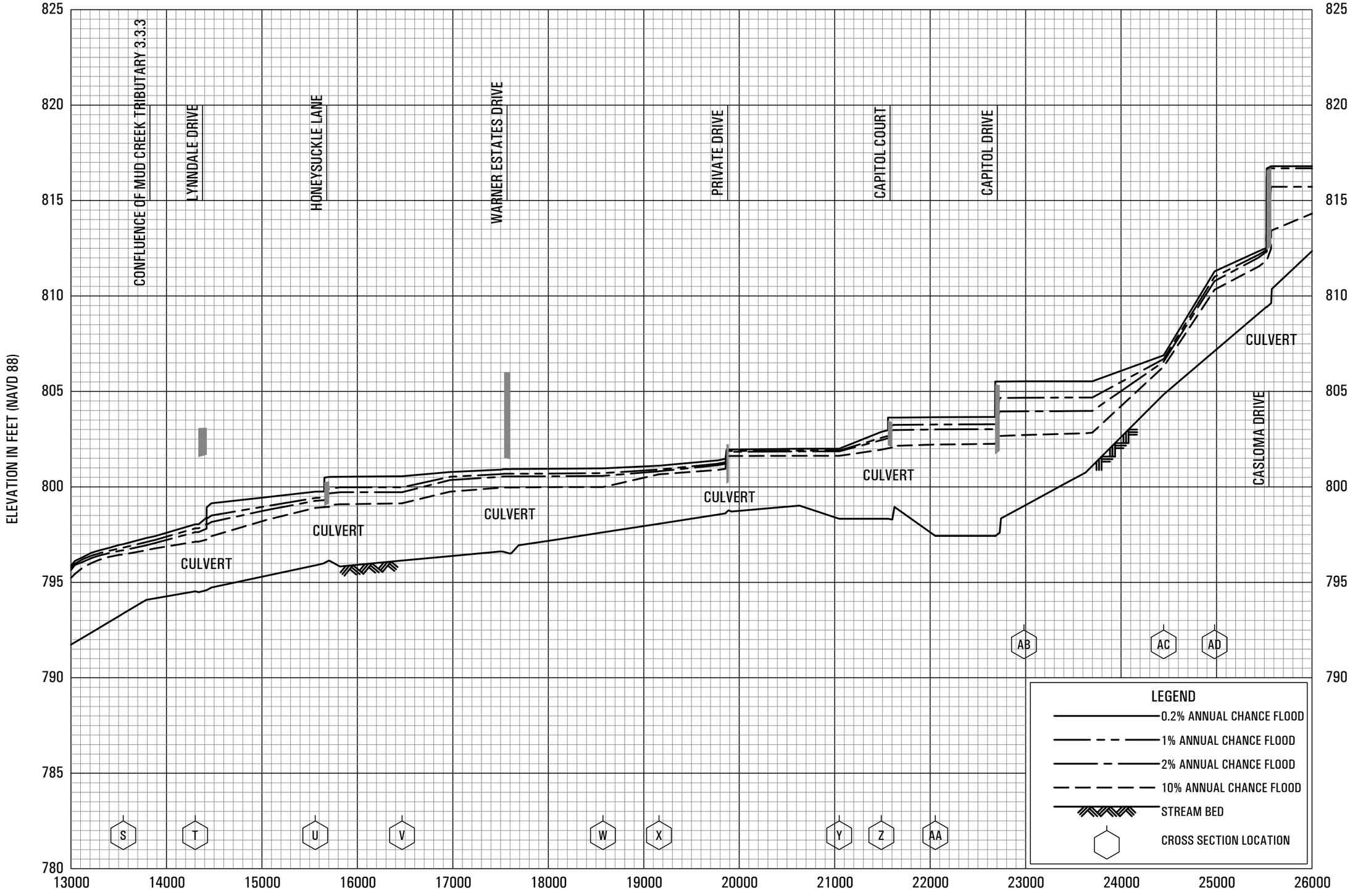

# FLOOD PROFILES

## MUD CREEK TRIBUTARY 3.3

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS




FLOOD PROFILES

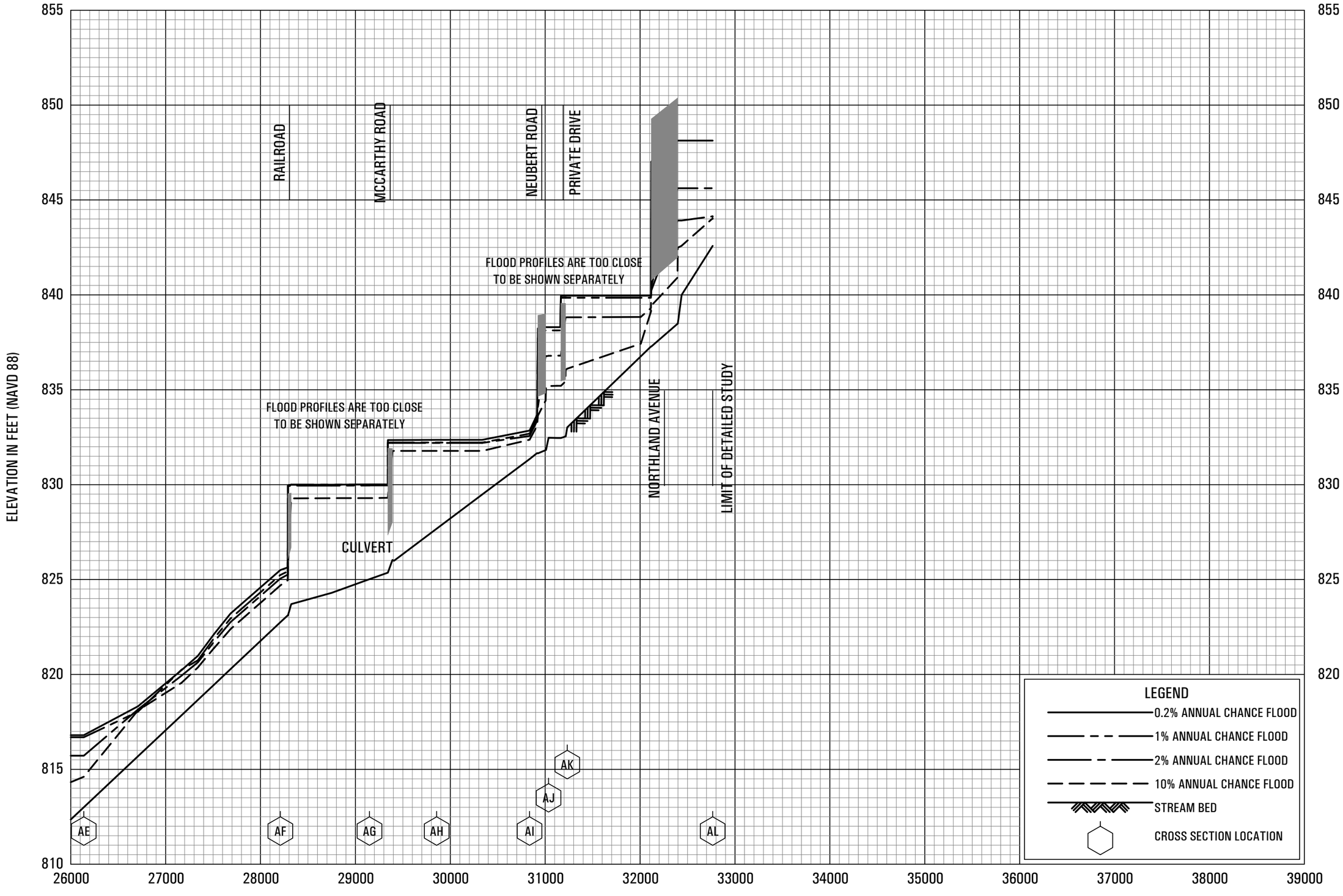
MUD CREEK TRIBUTARY 3.3

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

59P




# FLOOD PROFILES

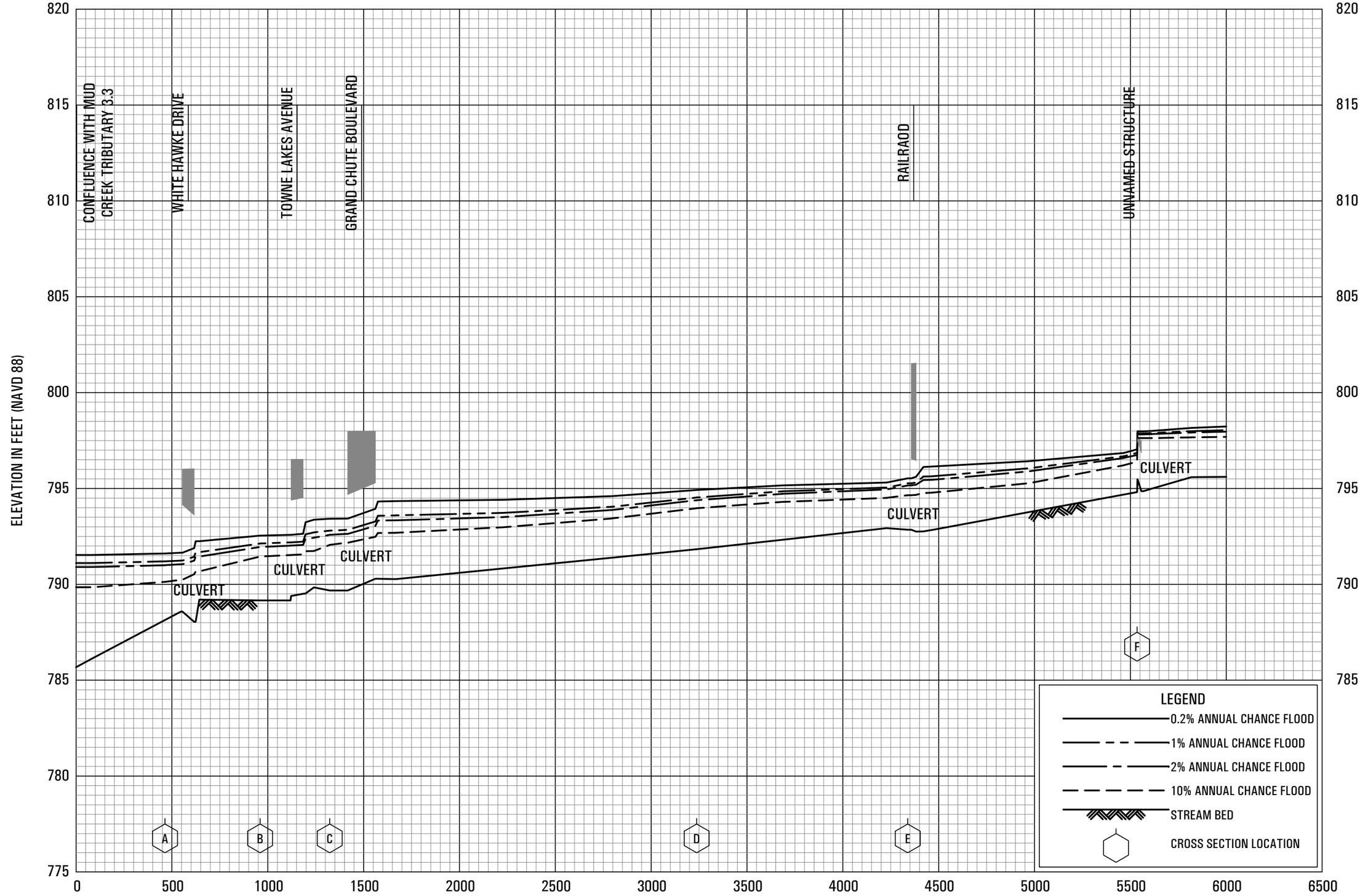
MUD CREEK TRIBUTARY 3.3

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

60P



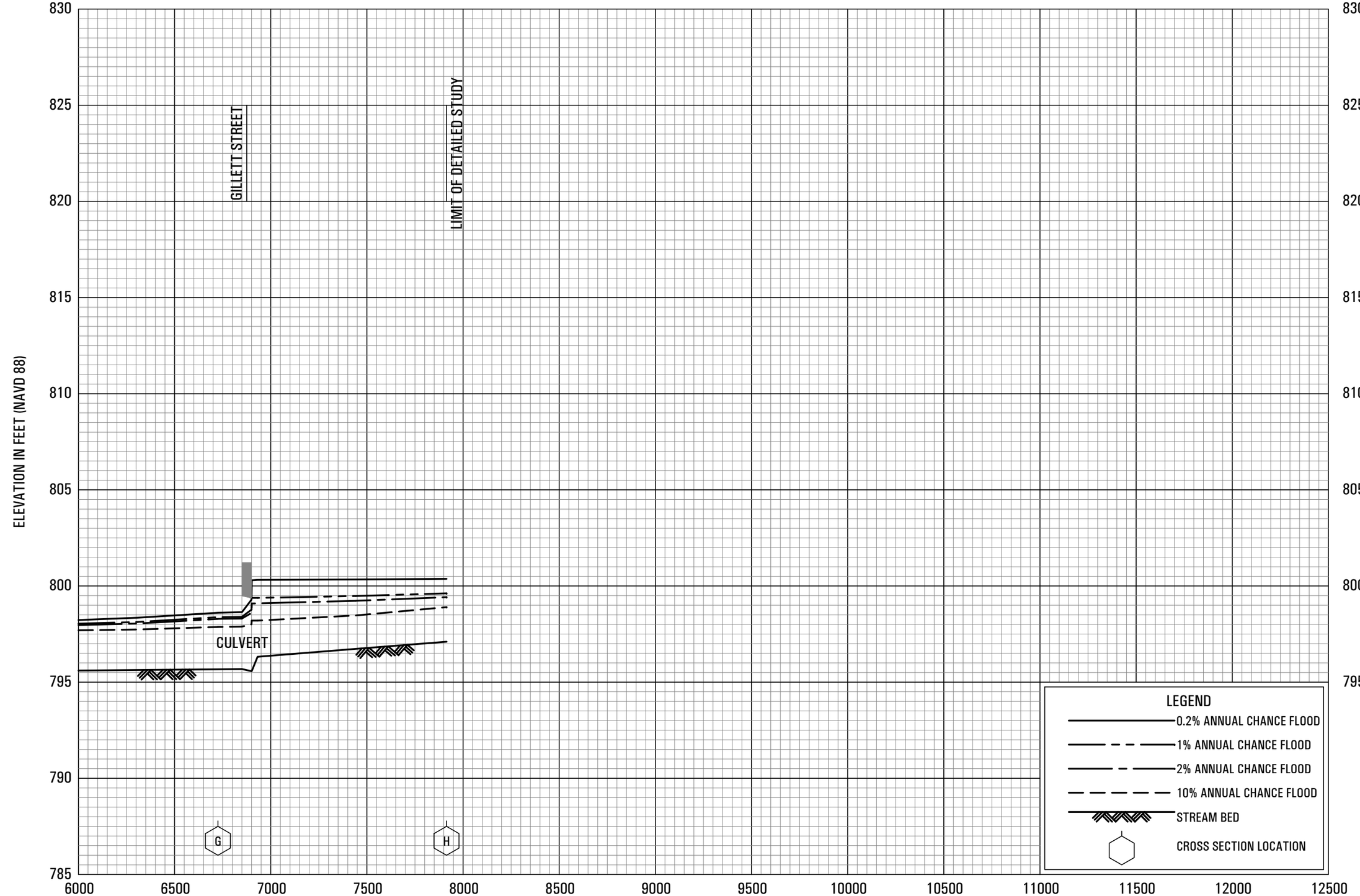

# FLOOD PROFILES

## MUD CREEK TRIBUTARY 3.3.2

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS



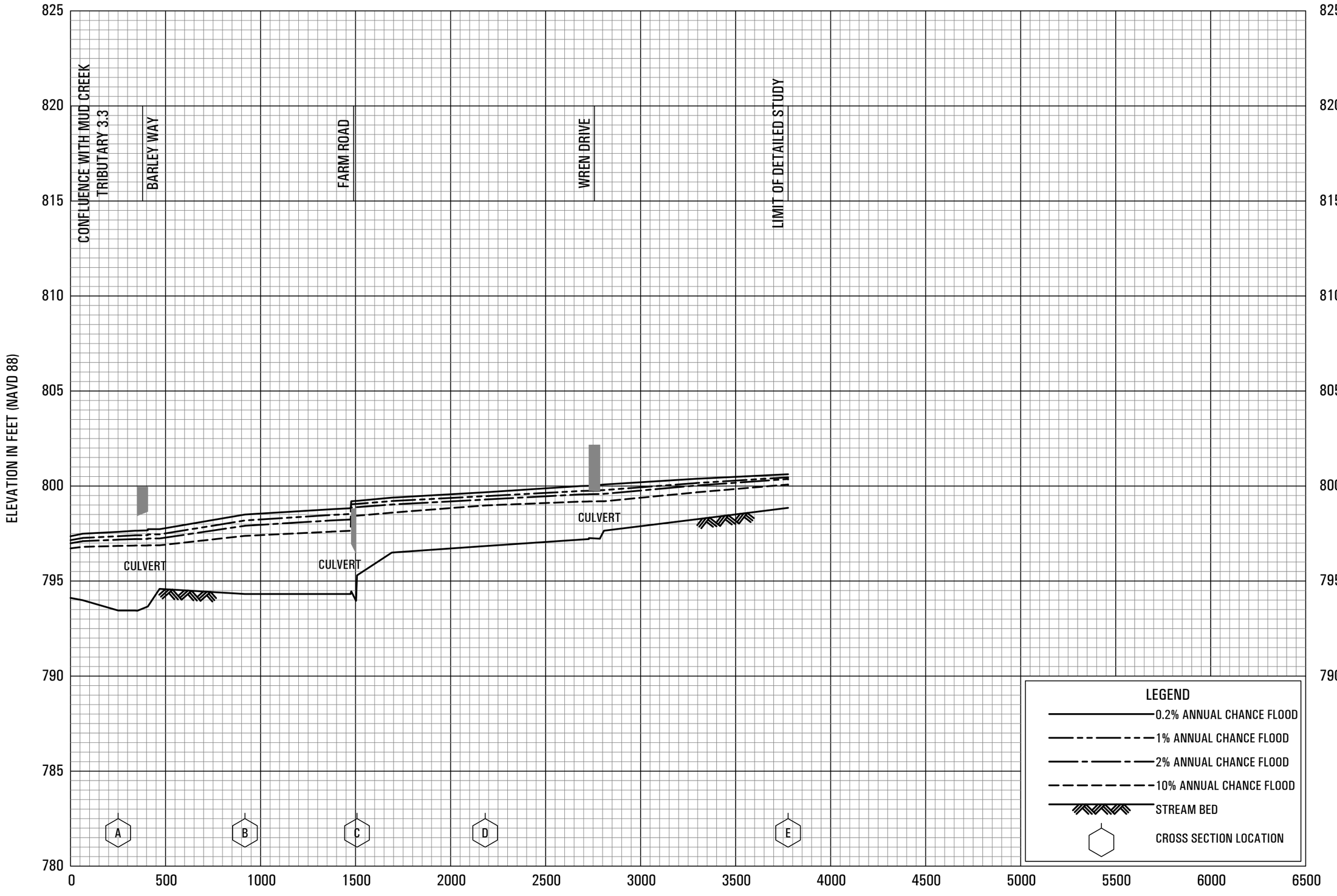

# FLOOD PROFILES

## MUD CREEK TRIBUTARY 3.3.2

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS



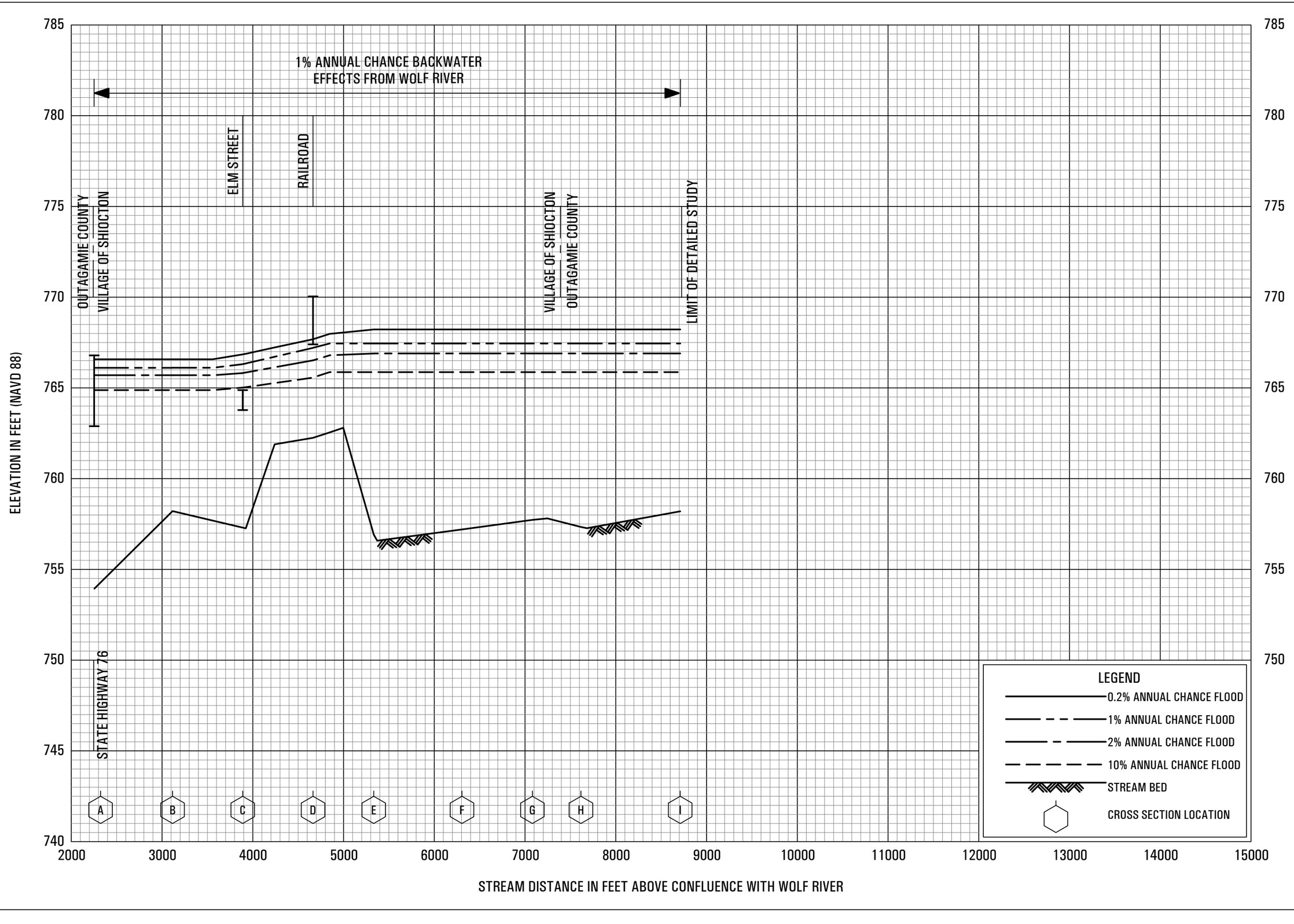

# FLOOD PROFILES

## MUD CREEK TRIBUTARY 3.3.3

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS




FLOOD PROFILES

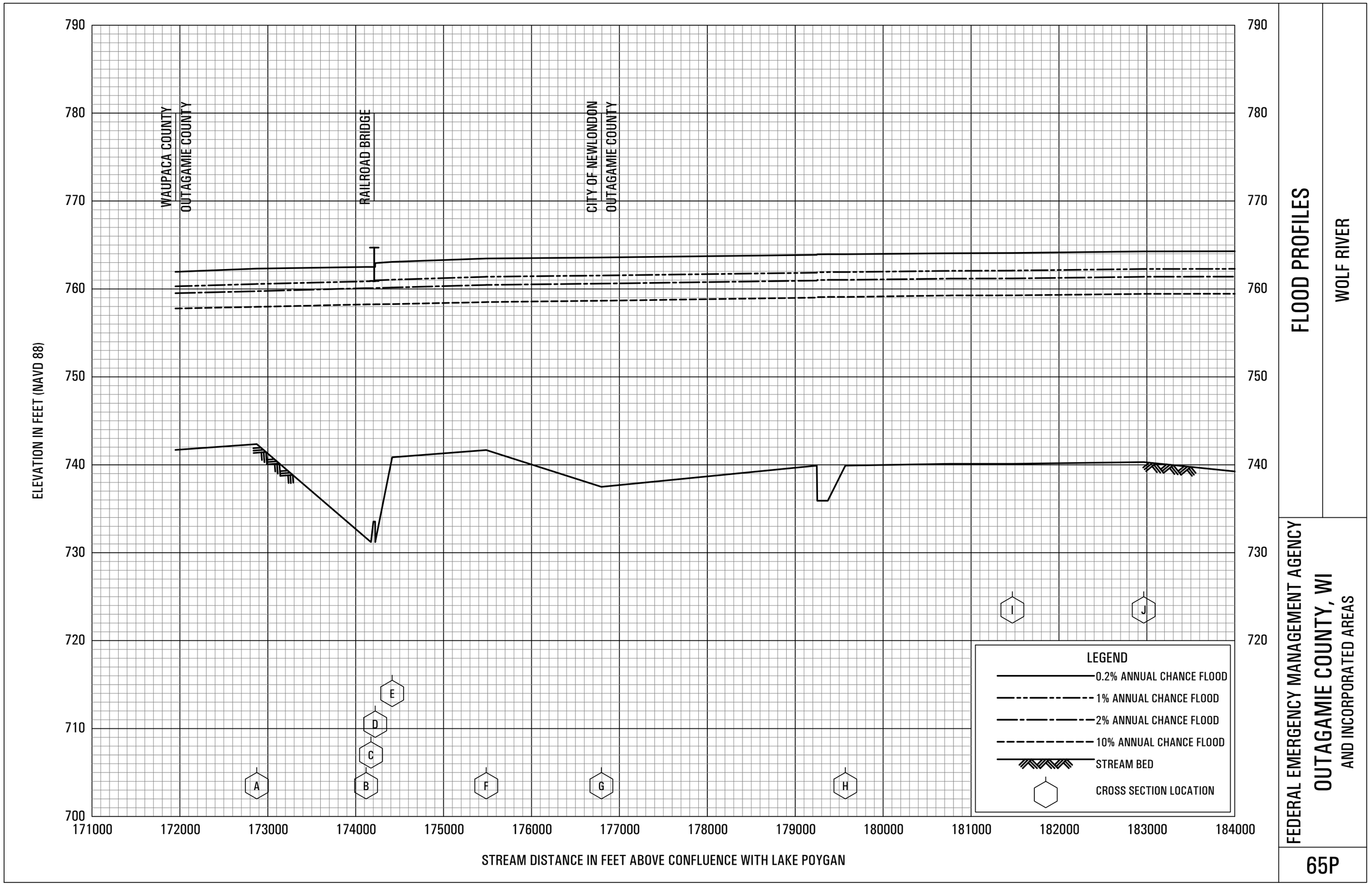
WILLOW CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

64P




# FLOOD PROFILES

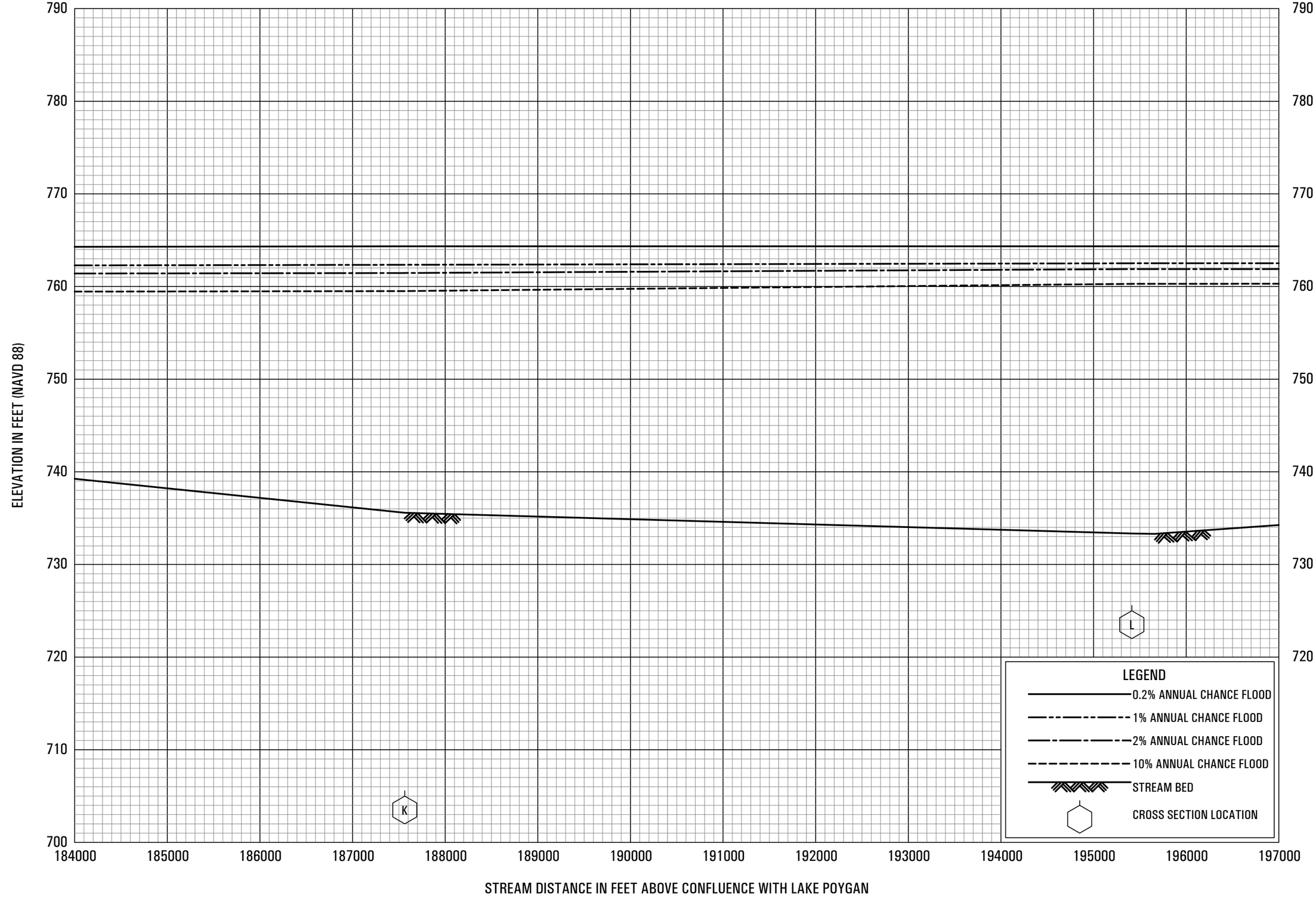
WOLF RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

65P




FLOOD PROFILES

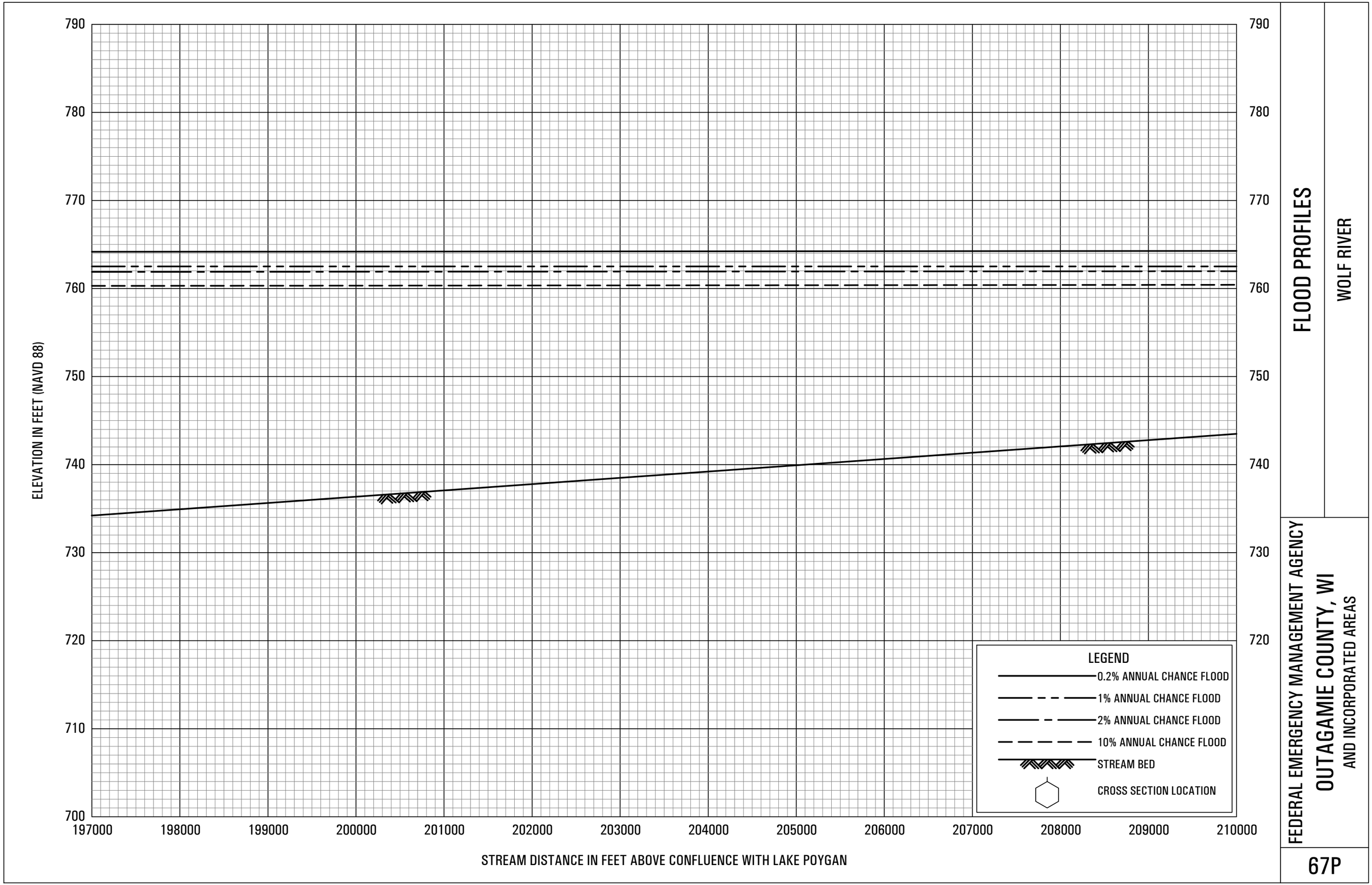
WOLF RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

66P




FLOOD PROFILES

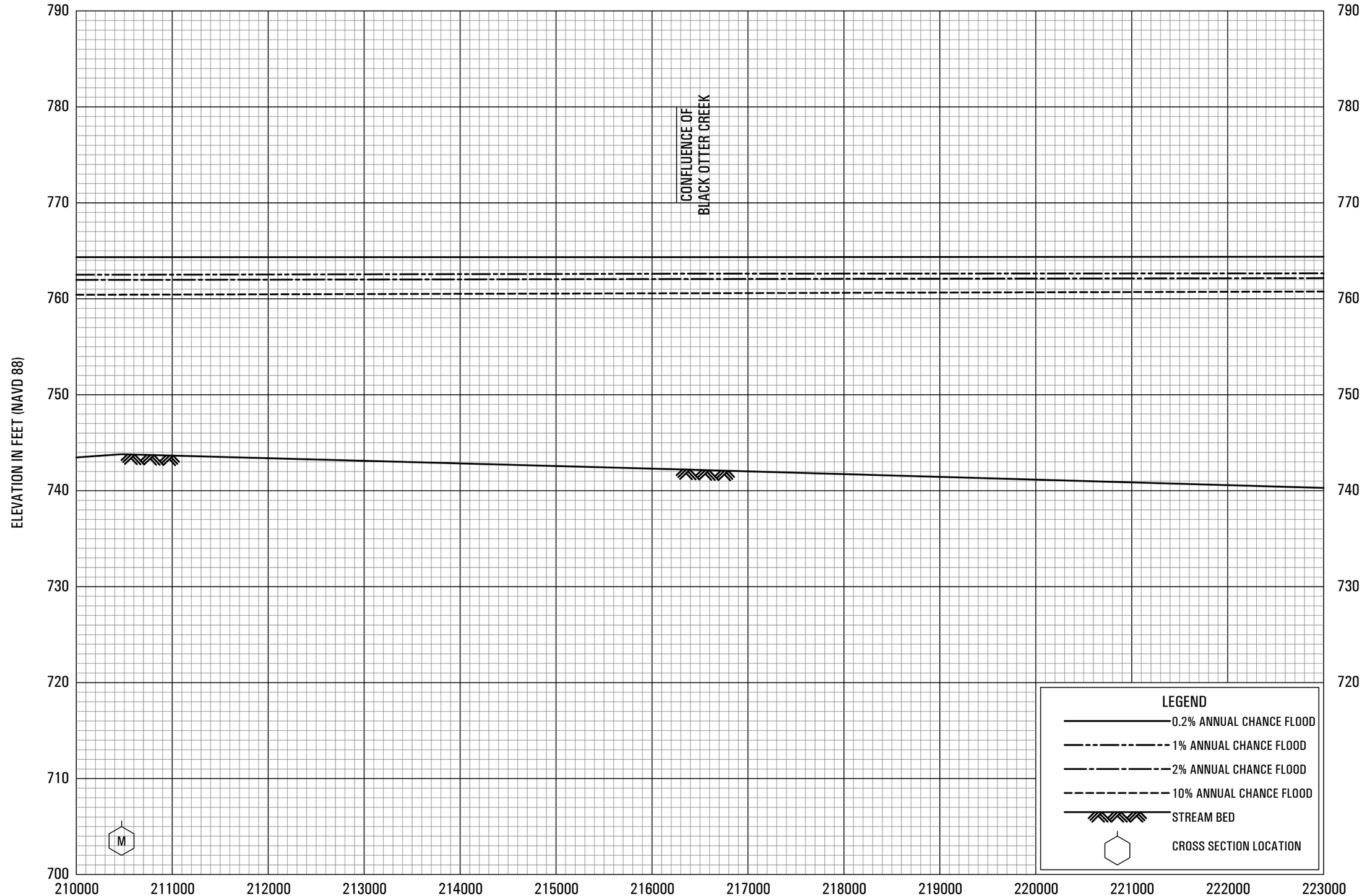
WOLF RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

67P




# FLOOD PROFILES

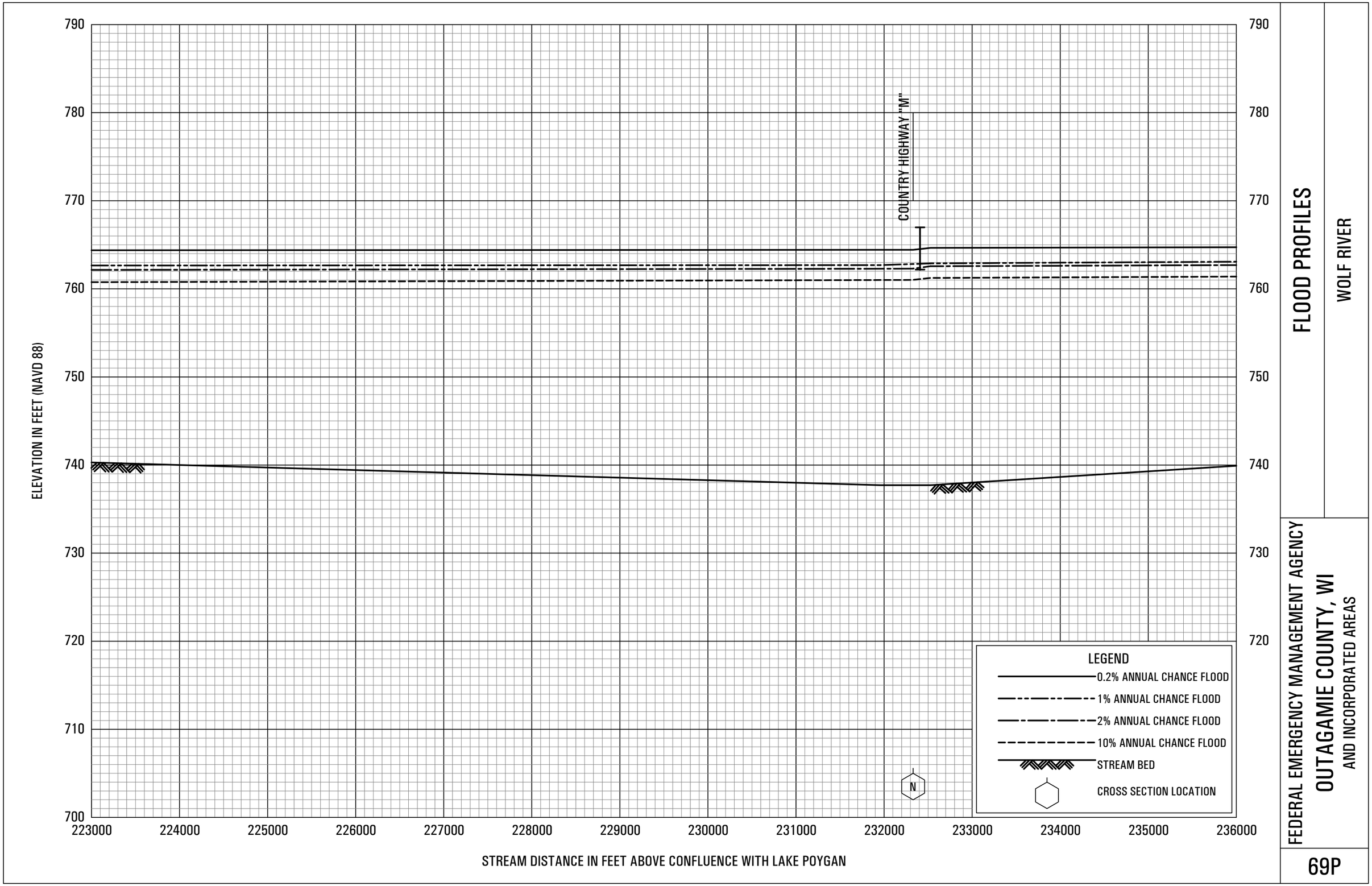
WOLF RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

68P




FLOOD PROFILES

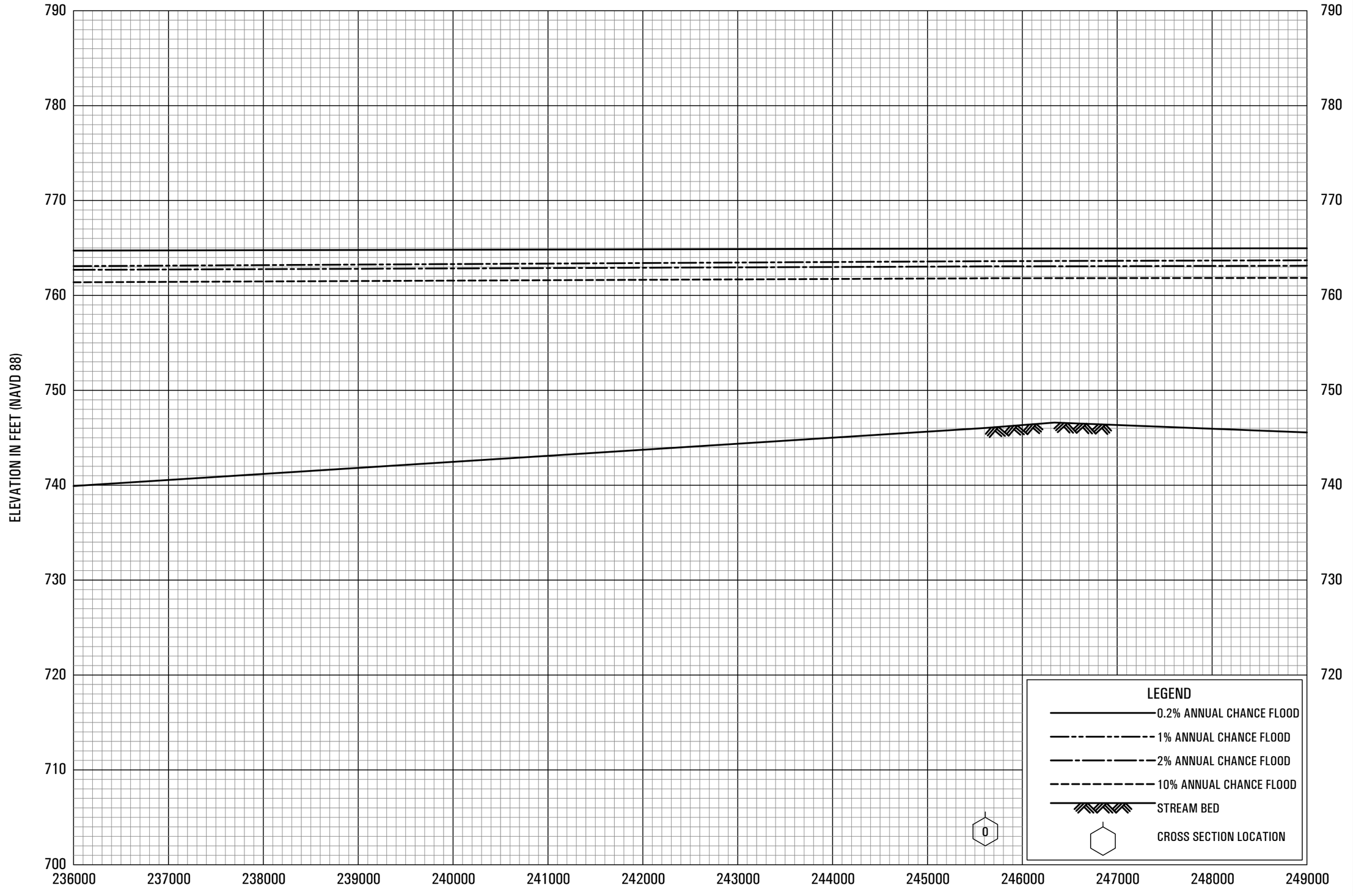
WOLF RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

69P




FLOOD PROFILES

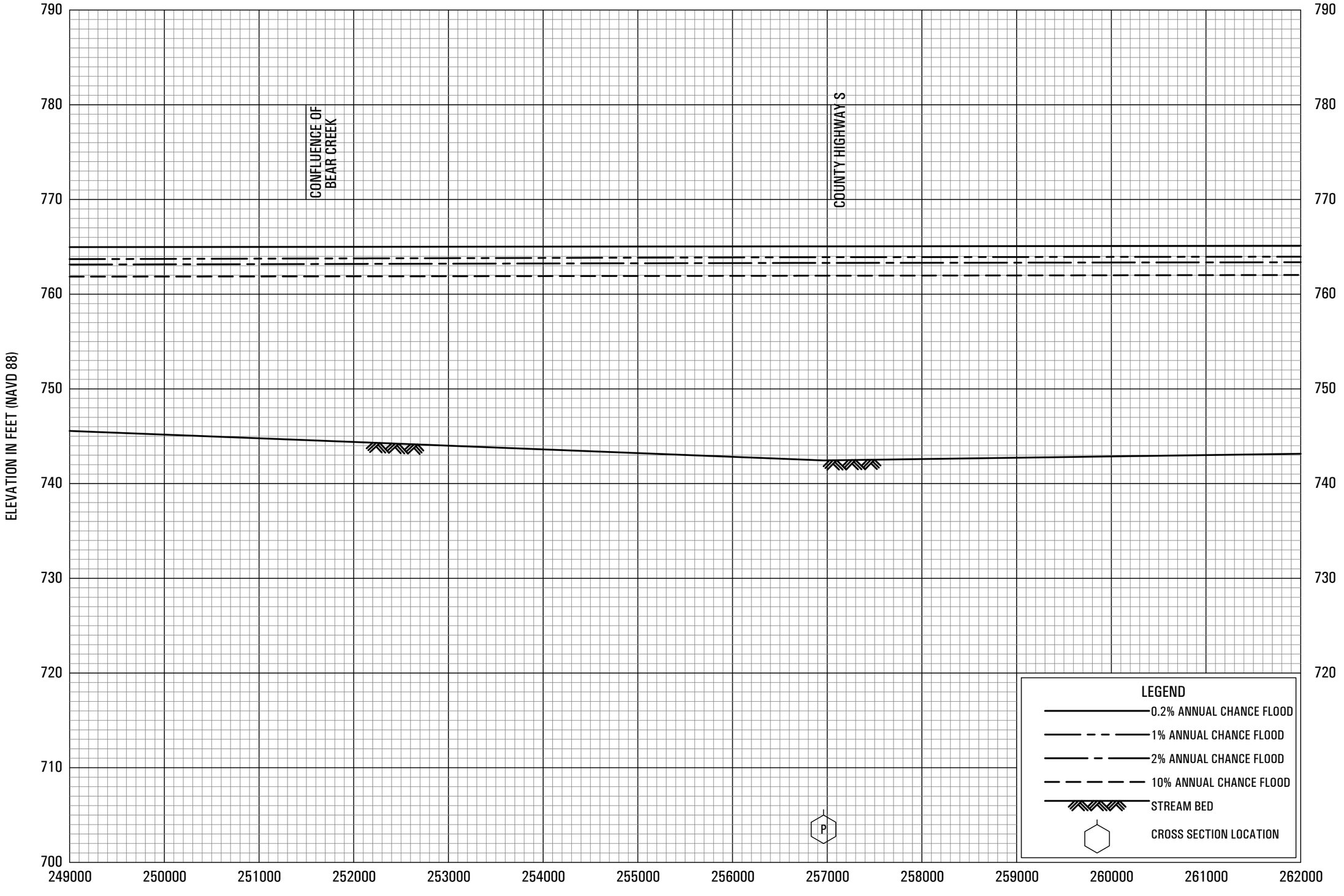
WOLF RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

70P




FLOOD PROFILES

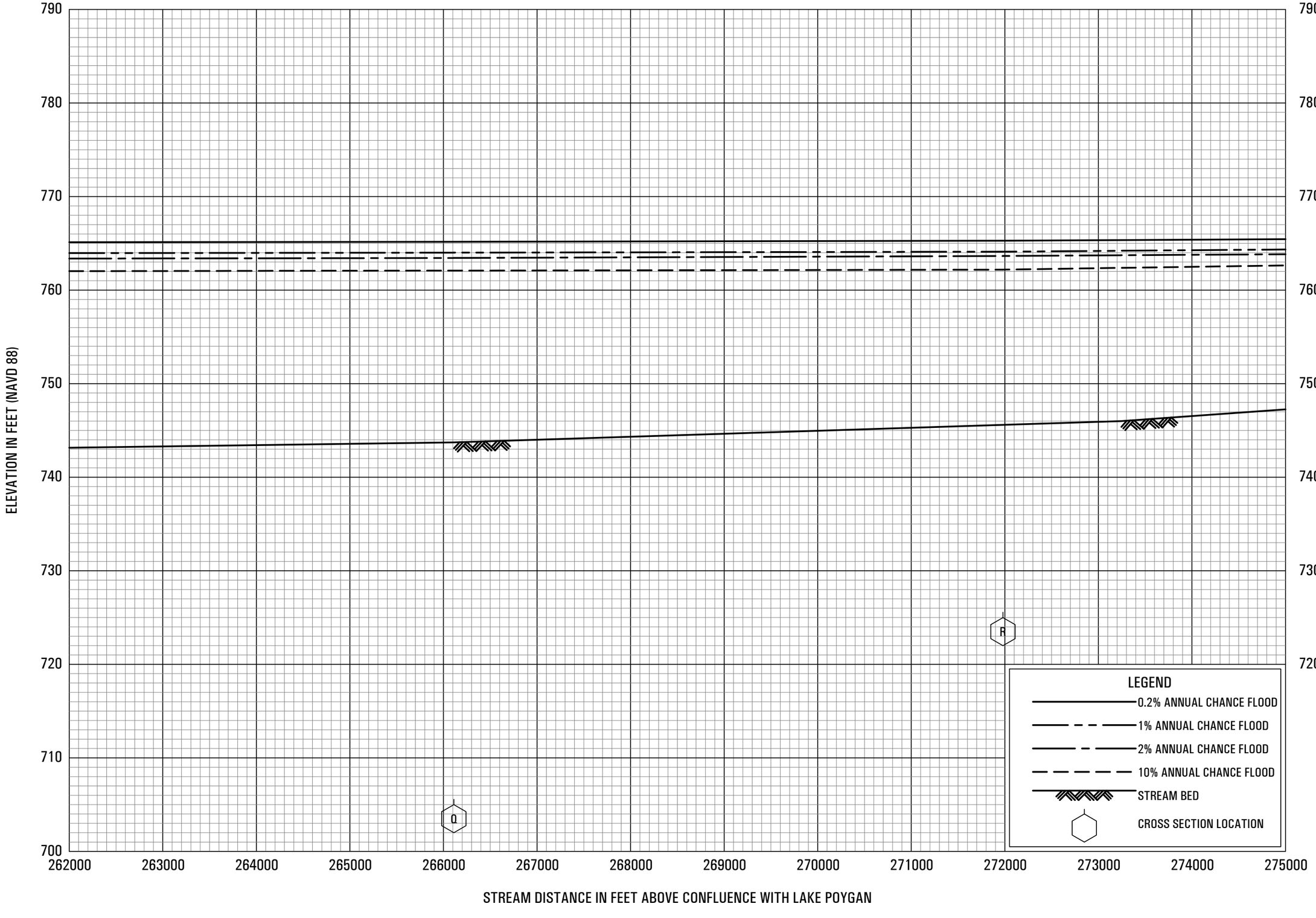
WOLF RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

71P




FLOOD PROFILES

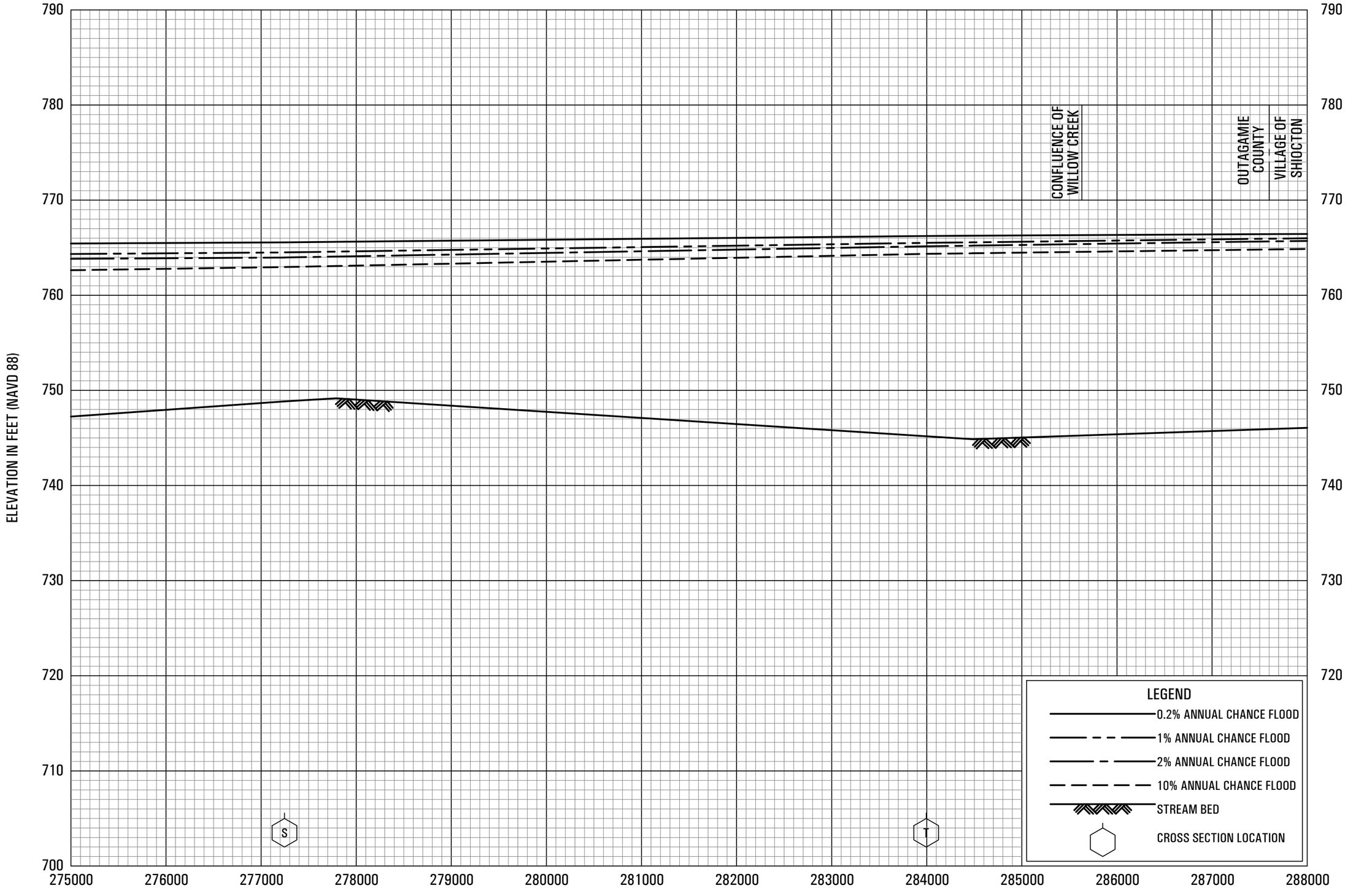
WOLF RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

72P



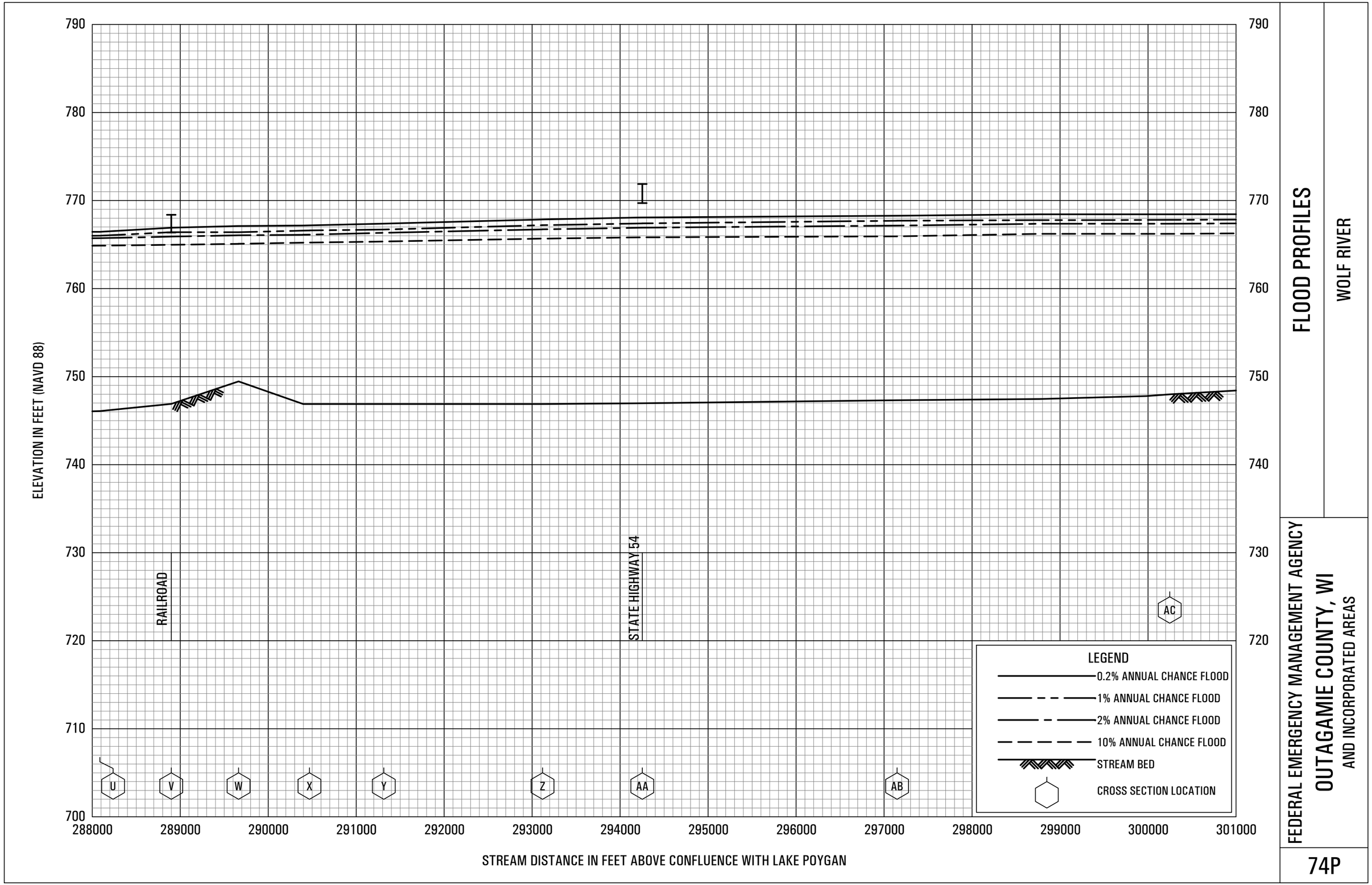

# FLOOD PROFILES

WOLF RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI
AND INCORPORATED AREAS

73P




FLOOD PROFILES

WOLF RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS

74P

VILLAGE OF SHIOCTON
OUTAGAMIE COUNTY

ELEVATION IN FEET (NAVD 88)

800
790
780
770
760
750
740
730
720
710

301000 302000 303000 304000 305000 306000 307000 308000 309000 310000 311000 312000 313000 314000

AD
AE

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

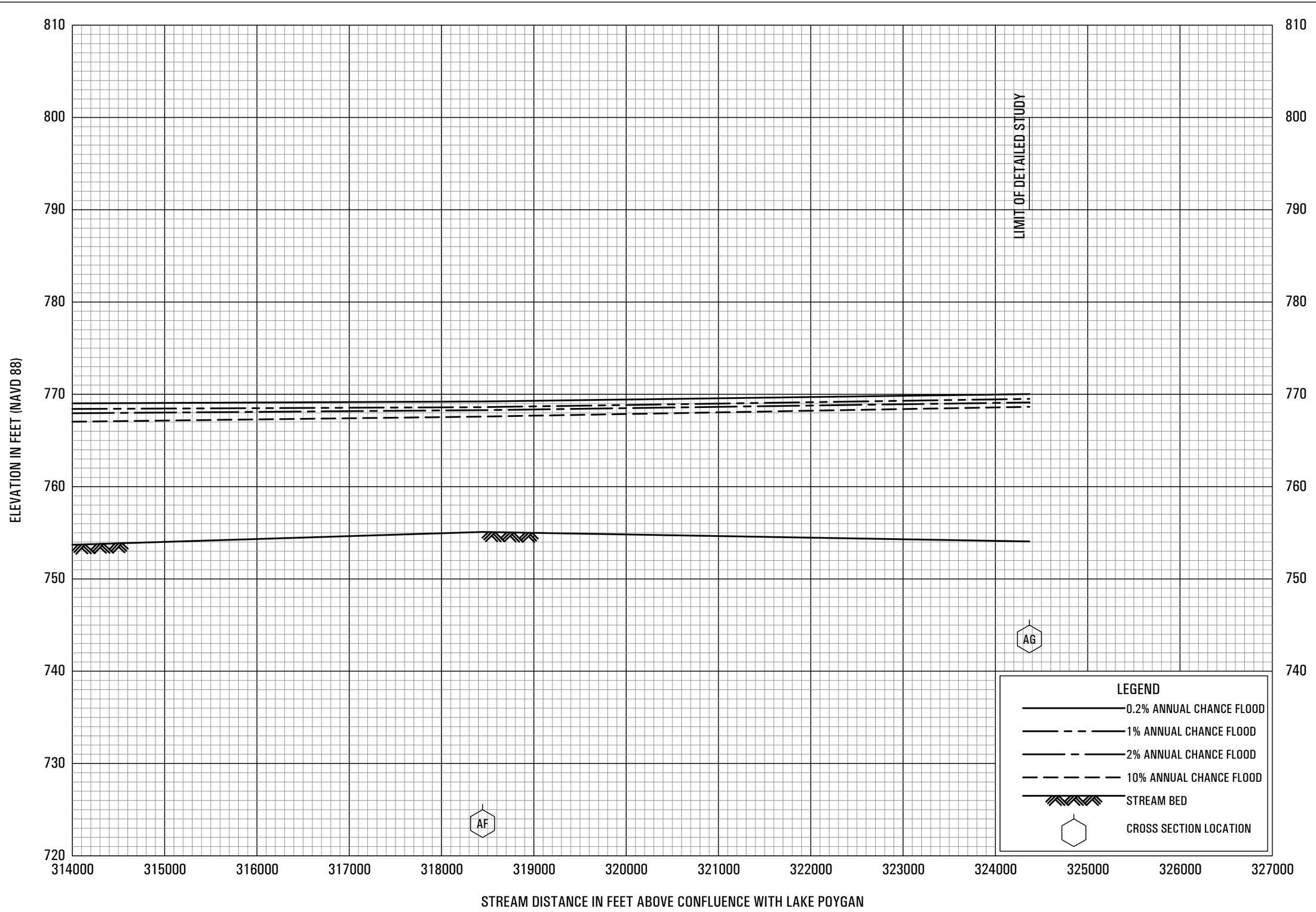
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH LAKE POYGAN

FLOOD PROFILES

WOLF RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY
OUTAGAMIE COUNTY, WI
AND INCORPORATED AREAS

75P




FLOOD PROFILES

WOLF RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

OUTAGAMIE COUNTY, WI

AND INCORPORATED AREAS