FLOOD INSURANCE STUDY

SEMINOLE COUNTY, FLORIDA
AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
ALTAMONTE SPRINGS, CITY OF	120290
CASSELBERRY, CITY OF	120291
LAKE MARY, CITY OF	120416
LONGWOOD, CITY OF	120292
OVIEDO, CITY OF	120293
SANFORD, CITY OF	120294
SEMINOLE COUNTY (UNICORPORATED AREAS)	120289
WINTER SPRINGS, CITY OF	120295

REVISED:
SEPTEMBER 28, 2007

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
12117CV000A

NOTICE TO
FLOOD INSURANCE STUDY USERS

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

Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS components.

Initial Countywide FIS Effective Date: April 17, 1995

Revised Countywide FIS Dates: September 28, 2007

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FLOOD INSURANCE STUDY
SEMINOLE COUNTY, FLORIDA, AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and supersedes the FIS reports and/or Flood Insurance Rate Maps (FIRMs) in the geographic area of Seminole County, Florida, including the Cities of Altamonte Springs, Casselberry, Lake Mary, Longwood, Oviedo, Sanford, and Winter Springs; and the unincorporated areas of Seminole County (hereinafter referred to collectively as Seminole County), and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates. This information will also be used by Seminole County to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP), and by local and regional planners to further promote sound land use and floodplain development. Minimum floodplain management requirements for participation in the NFIP are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

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

1.2 Authority and Acknowledgments

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

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

Altamonte Springs, City of:	The hydrologic and hydraulic analyses for the FIS report dated September 1979 (FIRM dated March 18, 1980) were prepared by the U. S. Army Corps of Engineers (USACE), Jacksonville District, for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement Nos. IAA-H-7-76, Project Order No. 23 and IAA-H-10-77, Project Order No. 2. That work was completed in July 1978.

Casselberry, City of:	The hydrologic and hydraulic analyses for the FIS report dated January 1980 (FIRM dated July 2, 1980) were prepared by the USACE, Jacksonville District, for FEMA, under Inter-Agency Agreement Nos. IAA-H-7-76, Project Order No. 23 and IAA-H-10-77, Project Order No. 2. That work was completed in July 1978.
Lake Mary, City of:	The hydrologic and hydraulic analyses for the FIS report dated September 1979 (FIRM dated March 18, 1980) were prepared by the USACE, Jacksonville District, for FEMA, under Inter-Agency Agreement Nos. IAA-H-7-76, Project Order No. 23 and IAA-H-10-77, Project Order No. 2. That work was completed in December 1977.
Longwood, City of:	The hydrologic and hydraulic analyses for the FIS report dated September 1979 (FIRM dated March 18, 1980) were prepared by the USACE, Jacksonville District, for FEMA, under Inter-Agency Agreement Nos. IAA-H-7-76, Project Order No. 23 and IAA-H-10-77, Project Order No. 2. That work was completed in January 1978.
Oviedo, City of:	The hydrologic and hydraulic analyses for the FIS report dated March 1979 (FIRM dated September 28, 1979) were prepared by the USACE, Jacksonville District, for FEMA, under Inter-Agency Agreement Nos. IAA-H-7-76, Project Order No. 23 and IAA-H-10-77, Project Order No. 2. That work was completed in January 1978.
Sanford, City of:	The hydrologic and hydraulic analyses for the FIS report dated March 1980 (FIRM dated September 17, 1980) were prepared by the USACE, Jacksonville District, for FEMA, under Inter-Agency Agreement Nos. IAA-H-7-76, Project Order No. 23 and IAA-H-10-77, Project Order No. 2. That work was completed in February 1978.
Winter Springs, City of:	The hydrologic and hydraulic analyses for the FIS report dated March 16, 1981 (FIRM dated January 15, 1982) were prepared by the USACE, Jacksonville District, for FEMA, under Inter-Agency Agreement No. IAA-H-10-77, Project Order No. 2. That work was completed in August 1978.

Seminole County (Unincorporated Areas):	The hydrologic and hydraulic analyses for the FIS report dated May 5, 1981 were prepared by the USACE, Jacksonville District, for FEMA, under Inter-Agency Agreement Nos. IAA-H-7-76, Project Order No. 23 and IAA-H-10-77, Project Order No. 2. That work was completed in January 1979. For the revised FIS report dated January 16, 1987, hydrologic and hydraulic analyses for Lake Irish, Lake Marietta, Island Lake, Banana Lake, Sawyer Lake, Golf Course Lake, and Lakes 7, 8, and 9, were prepared by Conklin, Porter and Holmes Engineers, Inc. and the Seminole County Public Works Department. For the revised FIS report dated December 5, 1989, hydrologic and hydraulic analyses for the St. Johns River were performed by the St. Johns River Water Management District; and hydrologic and hydraulic analyses for the Econlockhatchee River and the Little Econlockhatchee River were prepared by Ghioto, Singhofen and Associates.

For the original April 17, 1995, Countywide FIS, the hydrologic and hydraulic analyses for Forest Lake and Harriet Lake were prepared by the St. Johns River Water Management District. The hydrologic and hydraulic analyses for all other lakes studied in the unincorporated areas of the county were prepared by the USACE, Jacksonville District, for FEMA under Inter-Agency Agreement No. EMW-88-E-2739, Project Order No. 1. This work was completed in October 1990.

For this Countywide revision, the base hydrologic and hydraulic analyses for the Big Wekiva River Watershed, Cloud Branch Watershed, Gee Creek Watershed, Lake Jesup (North and South) Watershed, Lake Monroe Watershed, Little Lake Howell Watershed, and Soldier Creek Watershed, were provided by Seminole County and updated by the Watershed IV Alliance, for FEMA under Contract No. EMA-2002-CO-0011, Task Order No. 9. This work was completed in May 2007.

Base map information shown on the FIRMs was derived from multiple sources. Digital terrain data in the form of 1-foot interval contours, as well as LiDAR data, was provided by the St. Johns River Water Management District and Seminole County. The 2004 orthophotography was provided by the St. Johns River Water Management District. GIS data for roads, parcels, corporate limits, and hydrography were provided by Seminole County.

The coordinate system used for the production of this FIRM is the State Plane Coordinate System, Florida East (FIPSZONE 0901), referenced to the North American Datum of 1983 (NAD83), GRS 80 spheroid. Distance units were measured in U. S. feet. Variances 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's (CCO) meeting is held with representatives from FEMA, the community, and the study contractor to explain the nature and purpose of a FIS, and to identify the streams to be studied by detailed methods. A final CCO meeting is held with the same representatives to review the results of the study.

The dates of the initial and final CCO meetings held for the communities within Seminole County are shown in Table 1.

TABLE 1. PRE-COUNTYWIDE INITIAL AND FINAL CCO MEETING DATES

Community Name	Initial CCO Date	Final CCO Date
Altamonte Springs, City of	December 4, 1975	January 31, 1979
Casselberry, City of	December 4, 1975	April 27, 1979
Lake Mary, City of	March 25, 1976	January 31, 1979
Longwood, City of	December 4, 1975	January 31, 1979
Oviedo, City of	December 4, 1975	September 27, 1978
Sanford, City of	December 4, 1975	July 10, 1979
Seminole County (Unincorporated Areas)	December 4, 1975	July 10, 1979
Winter Springs, City of	December 4, 1975	January 30, 1980

For the April 17, 1995 countywide FIS, an initial CCO meeting was held on April 23, 1987. Agencies contacted for coordination of information for this countywide study included the National Weather Service, the St. Johns River Water Management District, and the Seminole County Engineering Department. A final CCO meeting was held on January 10, 1994, and was attended by representatives of the USACE, St. Johns River Water Management District, Florida Department of Transportation, Orange County Stormwater Management Division, Conklin, Porter and Holmes Engineers, Inc., and Seminole County and its incorporated areas, except for the City of Oviedo.

For this countywide FIS revision, an initial Scoping Meeting was held on September 20, 2004 in Orlando, which was held jointly with Orange County. Attendees for this meeting included representatives from the St. Johns River Water Management District, FEMA, Seminole County and its incorporated communities, communities from Orange County, local engineering firms, and the Watershed IV Alliance. Additional project meetings were held on May 17, 2005, October 31, 2005, and December 15, 2005. Coordination with community officials and Federal, State, and regional agencies produced a variety of information pertaining to floodplain regulations, available community maps, flood history, and other hydrologic data. All problems raised in the meetings have been addressed.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS covers the geographic area of Seminole County, Florida, including the incorporated communities listed in Section 1.1.

For this countywide revision, all or portions of the following flooding sources, listed in Table 2 below, were restudied and/or newly studied by detailed methods. Limits of detailed study are indicated on the Flood Insurance Rate Map (FIRM) (Exhibit 2).

TABLE 2. FLOODING SOURCES STUDIED BY DETAILED METHODS

Canal Between Lake Wildmere and Fairy Lake
Fairy Lake Drainage Canal
Grassy Lake Drainage Channel to Triplet Lake
Secret Lake Drainage Canal
Soldier Creek (Upper)
Lake Ada
Lake Alma
Lake Anette
Bel Air Lake
Big Lake Mary
Lake Bingham
Bird Lake
Boat Lake
Border Lake
Lake Brantley
Lake Cecile
Lake Charm
Clear Lake
Lake Como
Lake Concord
Crane Lake
Crystal Bowl
Crystal Lake
Dawson Lake
De Forest Lakes
Duck Pond
East Lake
Lake Ellen
Lake Emily
Lake Emma
Lake Evergreen
Fairy Lake
Lake Fern
Lake Gem
Lake Geoffrey
Golden Lake
Golf Course Lake 1
Golf Course Lake 2
Golf Course Lake 3
Golf Course Lake 4
Grace Lake
Grassy Lake
Lake Greenwood
Lake Griffin
Gull Lake
Hidden Lake
Lake Hodge
Lake Irene North
Lake Irene South
Island Lake (Longwood)
Lake Jane
Lake Jennie
Little Crystal Lake
Little Lake Howell
Little Lake Mary
Little Lake Wildmere
Lost Lake
Lake Lotus
Lake Lucerne
Lake Maltbie
Lake Marie
Lake Minnie
Mud Lake
North Side Lake
Lake Onora
Lake Orange
Pearl Lake (East Altamonte Springs)
Pelican Lake
Piney Ridge Lake
Plaza Pool
Pot Lake
Prairie Lake
Quail Pond
Queens Mirror Lake
Reservoir Lake
Rock Lake
Lake Ruth
Sand Lake
Lake Searcy
Secret Lake
Silver Lake
Lake Talmo
Lake Tony
Triplet Lake (North)
Triplet Lake (South)
Trout Lake (Casselberry)
Twin Lakes (Sanford East)
Twin Lakes (Sanford West)
Lake Wayman
West Lake
Lake Wildmere
Lake Winsor
Lake Yvonne
Lake 1
Lake 2
Lake 3
Lake 13
Lake 14
Lake 15
Lake 16
Lake 17
Lake 18
Lake 19
Lake 20
Lake 21
Lake 22
Lake 23
Lake 24
Lake 25
Lake 26
Lake 27

TABLE 2. FLOODING SOURCES STUDIED BY DETAILED METHODS - continued

Lake 28	Lake 55	Ponding Area 8
Lake 29	Lake 56	Ponding Area 9
Lake 30	Lake 57	Ponding Area 10
Lake 31	Lake 58	Ponding Area 11
Lake 32	Lake 59	Ponding Area 12
Lake 33	Lake 60	Ponding Area 13
Lake 34	Lake 61	Ponding Area 14
Lake 35	Lake 62	Ponding Area 15
Lake 36	Lake 63	Ponding Area 16
Lake 37	Lake 64	Ponding Area 17
Lake 38	Lake 65	Ponding Area 18
Lake 39	Lake 66	Ponding Area 19
Lake 40	Lake 67	Ponding Area 20
Lake 41	Lake 68	Ponding Area 21
Lake 42	Lake 69	Ponding Area 22
Lake 43	Lake 70	Ponding Area 23
Lake 44	Lake 71	Ponding Area 26
Lake 45	Lake 72	Ponding Area 27
Lake 46	Lake 73	Ponding Area 28
Lake 47	Lake 74	Ponding Area 29
Lake 48	Lake 75	Ponding Area 30
Lake 49	Lake 76	Ponding Area 31
Lake 50	Lake 77	Ponding Area 32
Lake 51	Lake 78	Ponding Area 33
Lake 52	Lake 79	Ponding Area 34
Lake 53	Ponding Area 6	Ponding Area 35
Lake 54	Ponding Area 7	

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

All or portions of numerous flooding sources were studied by approximate methods. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to and agreed upon by FEMA and Seminole County.

Floodplain boundaries of flooding sources that have been previously studied by detailed methods were re-delineated based on more detailed and up-to-date topographic information.

This countywide FIS reflects a vertical datum conversion from the National Geodetic Vertical Datum of 1929 (NGVD) to the North American Vertical Datum of 1988 (NAVD).

This countywide FIS revision incorporates the effects of annexations or de-annexations by the communities in Seminole County.

This countywide FIS revision also incorporates the determination of letters issued by FEMA resulting in map changes that are still valid.

2.2 Community Description

Seminole County is located in central Florida and is bordered by Volusia County, Florida, to the north and east; Orange County, Florida to the west and south; and Lake County, Florida to the northwest. The county covers approximately 308 square miles, and has 7 strong municipalities.

Seminole County is one of the fastest growing counties in Florida, and is partially consumed by the Greater Orlando Metropolitan District. The 2004 population of Seminole County was estimated at 391,449 (Reference 1).
The climate of Seminole County is semi-tropical, and is characterized by warm, humid summers and mild, dry winters. Daily maximum temperatures average 90 degrees Fahrenheit (°F) in the summer and average daily minimums are approximately 50°F in the winter. Temperature extremes of more than 100°F or less than 20°F are rare. The average annual precipitation over the study area is approximately 51 inches, most of which occurs in the rainy season from June to October.

The soils in Seminole County consist of 11 different soil associations. Two consist of undulating soils that are mainly moderately well drained to excessively drained. The rest consist of nearly level soils that are mainly somewhat poorly drained to very poorly drained (Reference 2).

The floodplains of Seminole County consist of lowlands adjacent to the streams and lakes. The topography of Seminole County is relatively flat with some gently rolling hills. Ground elevations in Seminole County range from less than 5 feet North American Vertical Datum of 1988 (NAVD) to 130 feet NAVD.

2.3 Principal Flood Problems

Floods can occur in Seminole County any time during the year; however, they are most frequent during the rainy season from June through October. Floods on the lakes studied by detailed methods would result from prolonged heavy rainfall over the study area with high antecedent lake stages. This would cause the lakes to overflow their banks. Flooding on the streams would result from prolonged heavy rainfall over a large area. The flooding would be more severe from rainfall associated with hurricanes or tropical storms and when antecedent rainfall has resulted in saturated ground conditions when the infiltration is minimal. Cloudburst storms can occur at any time, but do not constitute a serious flood hazard in the study area.

In September 1960, heavy rainfall in early spring and late summer left the soil very moist and the water table high when Hurricane Donna passed through the area, causing extensive flooding in Seminole County. The flooding associated with this hurricane has been estimated by local officials and others to have a recurrence interval of greater than 100 years for portions of the county.

The following is a list of lakes in Altamonte Springs with the September 1960 maximum stages:

Lake	Elevation (feet NAVD)
Adelaide	59.6
Cranes Roost	59.6
Destiny	90.2
Florida	59.6
Lotus	65.7
North	60.3
Orienta	66.8
Pearl	59.9
Spring Wood	90.2
Trout	65.2

The most severe flooding in Casselberry occurred in 1960 during Hurricane Donna and in 1964 during the perimeter rains of Hurricane Dora. The September 1964 rainfall was not nearly as severe as the total precipitation of the 1960 storm. High water levels were also lower for the 1964 storm. Listed below are areas which have been subjected to troublesome flooding, other than local ponding in recent years (Reference 3):

- Lands adjacent to Prairie, Pearl, and Maltbie Lakes
- Grassy Lake (moderate flooding) with flooding of the upper end of its drainage area north along Lake Howell Road
- Connecting ditch to Middle Triplet in the Overbrook Drive – Sunset Drive area
- Queens Mirror area in 1964
- Lands adjacent to Lake Triplet
- Secret Lake canal outlet to Lake Kathryn at Seminole Boulevard
- Lake Griffin – Trout Lake area and outlet
- Lands adjacent to Lake Kathryn
- Blockage of Gee Creek at Lake Kathryn and at several crossing locations along its route to Lake Jesup

The following table lists lakes in Casselberry with their experienced high water level:

Lake	Elevation (feet NAVD)
Prairie-Pearl	87.8
Grassy	85.1
Queens Mirror	55.1
Lost	54.9
Triplet	54.9
Concord	58.9
Secret	54.9
Kathryn	53.7

Floods on Soldier Creek Flowpath A in the City of Lake Mary and Sweetwater Creek in the City of Oviedo would result from prolonged heavy rainfall over a large area.

Information on significant past floods in Longwood is sparse. It is reported that past flooding in Longwood has occurred; however, dates of flooding or high water marks are unavailable.

It is reported that flooding occurred in Sanford in October 1953 and October 1960. During the summer of 1953, rainfall over the St. Johns River basin was above normal. Also, additional heavy rainfall occurred due to the passage of a tropical storm south of Sanford on October 9. This excessive rainfall caused Lake Monroe to rise to a peak elevation of 7.4 feet NAVD at Sanford causing floodwaters to cover lakefront areas. Flood depths as much as 2 feet were reported reaching floor levels of several residential, commercial, and government buildings, and making some interior drainage facilities inoperable because of high Lake Monroe stages. In 1960, heavy rainfall in early spring and August, and excessive rainfall in September resulting from Hurricane Donna and Tropical Storm Florence caused Lake Monroe to rise to a peak stage of 7.08 feet NAVD. Floodwaters again covered extensive lakefront areas.

There is little or no information on high-water marks from significant past flooding in the City of Winter Springs. It has been reported by local officials that Gee Creek has come out of its banks, but high-water marks could not be obtained.

2.4 Flood Protection Measures

Seminole County has constructed various localized drainage projects to alleviate "nuisance" flooding, and the Little Wekiva River drainage was improved in past years. The county continues to investigate the various watershed basins for the possibility of future flood protection measures.

The City of Altamonte Springs has constructed numerous works to eliminate "nuisance" flooding. In addition, the city has constructed a pump station at Cranes Roost to ameliorate a flood problem brought about by urban development. Commercial construction around Cranes Roost has significantly reduced flood storage capacity and increased rainfall runoff. Substantial drainage improvements have also been made on the Little Wekiva River and the outlet of Pearl Lake.

The City of Casselberry has constructed improvements to alleviate flooding on the Grassy Lake drainage channels. Those improvements were reflected in the hydrologic study for the Grassy Lake drainage channels. The city has also constructed several other drainage improvement projects which alleviate flooding in various areas of Casselberry.

There are no significant flood protection measures in the Cities of Lake Mary, Longwood, Oviedo, Sanford, and Winter Springs.

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 FIS. Flood events of a magnitude that are expected to be equaled or exceeded once on the average

during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 1-percent-annual-chance flood in any 50-year period is approximately 40 percent (4 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

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

Pre-Countywide FIS Analyses

In all of the incorporated communities and the unincorporated areas of Seminole County, hydrologic analyses were carried out to establish the interrelationship between rainfall, runoff, and stage rise for floods of the selected recurrence intervals for the lakes studied in detail in the community. Rainfall-frequency estimates were obtained by statistical analyses of records from eight long-term rainfall stations in and near Seminole County (Reference 4). Results of the rainfall study are summarized below.

	Rainfall (inches)			
Duration	10-percent	2-percent	1-percent	0.2-percent
24-hours	6.6	9.7	11.3	16.4
2-days	7.1	10.0	11.7	16.8
3-days	7.7	10.6	12.3	17.3
4-days	8.2	11.2	12.9	17.8
5-days	8.7	11.8	13.5	18.3
7-days	9.6	12.9	14.1	19.3
30-days	18.2	23.0	25.1	28.4

The amount of rainfall that will run off (rainfall excess) from a particular basin is less than the rainfall due to soil permeability, vegetation cover, and other characteristics. To estimate the rainfall excess, the Soil Conservation Service (SCS/NRCS) developed runoff curve numbers (CN), which relate rainfall to direct runoff (Reference 5). Runoff CN values were used to calculate the infiltration losses based on the soil type and land use.

There are seven stream gages within Seminole County (one on the Little Wekiva River, one on Howell Creek, two on Soldier Creek, one on Gee Creek, one on the Econlockhatchee River, and one on the outlet of Lake Jesup to the St. Johns River), which are being monitored by and listed in the USGS Surface Water Data Report. The gage on Gee Creek was used only as a check.

The hydrology for the Grassy Lake Drainage Channel, Bear Creek, Creek A; and the portions of Gee Creek, Howell Creek, and Soldier Creek in the City of Winter Springs, for the 10-, 2-, 1-, and 0.2-percent-annual-chance flood event, was calculated using the TRACOR Method (Reference 6). The TRACOR Method of urban hydrology uses mathematical equations derived from field experiments and observations to calculate volume and peak rates of storm runoff at a desired location as a result of recurring storms of 10-, 2-, 1-, and 0.2-percent. The TRACOR method was used to determine unit hydrographs. In the City of Winter Springs, flood hydrographs were developed by applying the 24-hour rainfall excess to the unit hydrographs using the SCS/NRCS Type III storm distribution (Reference 5). The flood hydrographs were then routed and combined using the HEC-1 Flood Hydrograph Package (Reference 7).

Standard SCS/NRCS methodology was used to determine the hydrology for the following streams (Reference 5): Gee Creek in the City of Casselberry and the unincorporated areas of Seminole County; Howell Creek in the City of Casselberry and the unincorporated areas of Seminole County; Six Mile Creek and its tributary; Soldier Creek Flowpath A; Sweetwater Creek; Tributary to Lake Howell; and Tributary B. The SCS/NRCS method was used to determine both unit and storm hydrographs. Flood hydrographs were developed by applying the 24-hour rainfall excess to the unit hydrographs using the SCS/NRCS Type II rainfall distribution at drainage structures (culverts) located on the streams. These flood hydrographs were routed through the structures to obtain the peak discharges for hydraulic application. Peak discharges of the flood hydrographs were then used for hydraulic application.

In the original study for the unincorporated areas, flooding information for the Econlockhatchee River and the Little Econlockhatchee River was taken from a previous study by the USACE (Reference 8). That study determined the 1-percent-annual-chance flood profile and also presented the 1960 flood of record (35-year flood). The 10-, 2-, and 0.2-percent-annual-chance flood profiles for the original FIS were determined by plotting the 35-year and 1-percent-annual-chance elevations at various locations along those rivers on probability paper and extending the lines produced by these points.

The methods used to determine discharges on the Econlockhatchee River and the Little Econlockhatchee River in the December 5, 1989, revision for the unincorporated areas are discussed in the Ghioto, Singhofen and Associates (GSA) report entitled Floodplain Study of the Econlockhatchee Rivers (Reference 9). GSA used the SCS/NRCS Unit Hydrograph Program to compute stormwater runoff hydrographs for sub-basins of the watershed (Reference 10). Output from the SCS/NRCS Unit Hydrograph Program was used as input for the Explicit Channel Routing Model to develop an unsteady-flow hydraulic model (Reference 11).

The 1- and 0.2-percent-annual-chance discharges on the Little Wekiva River in the City of Altamonte Springs, and in the original study for the unincorporated areas of Seminole County, were taken from the USACE Flood Plain Information Report for the Little Wekiva River (Reference 12). Hydrology for that report was based on Snyder's synthetic techniques for transferring unit hydrograph parameters from gaged basins to ungaged basins with similar watershed characteristics. To extend the discharges produced by this analysis to include the 10- and 2-percent-annual-chance discharges, recourse was made to frequency statistics developed from long-term gage data at State Route 46 downstream of the study area.

In the December 1989, revision for the unincorporated areas, the hydrologic analyses of the St. Johns River were performed using methods described in the St. Johns River Water Management District report entitled The Mean Annual, 10-year, 25-year, and 100-year Flood Profiles for the Upper St. Johns River Under Existing Conditions (Reference 13).

Soldier Creek upstream of CSX Transportation was studied by Canin/Miller Associates for the Florida Land Company (Reference 14). In that study, only the 1-percent-annual-chance flood elevations were determined.

The Wekiva River was studied previously by the USACE (Reference 15). That study determined the 1-percent-annual-chance and Standard Project Flood (0.4-percent-annual-chance) profiles for the river. The 10-, 2-, and 0.2-percent-annual-chance flood profiles for the Wekiva River in the original study for the unincorporated areas of Seminole County were determined by plotting the 1-percent-annual-chance and Standard Project Flood elevations at various locations along the river on probability paper and extending the lines produced by these points to determine the 10-, 2-, and 0.2-percent-annual-chance flood elevations.

Aside from the exceptions noted below, the volumetric-runoff method was used to analyze the lakes studied in detail. This method involved analyzing several storms with respect to the various lake basins to determine the percent of rainfall that can be expected to run off the land area into the lakes, determining the rainfall excess, and determining the infiltration losses (Reference 5). The next step involved applying the 5-day rainfall, calculating the volume of rain falling directly on the lake by multiplying the rainfall depth by the lake area, calculating the volume of rainfall runoff from the land area into the lake by determining the rainfall excess and multiplying the value by land area (Reference 4). The shorter duration storm was applicable on Lakes Destiny and Spring Wood because of their large outlet capacity to Spring Lake. The sum of the volume of rain falling on the lake and the volume of rain running off the land gives the total volume of rainfall the lake received during the particular storm. Area-capacity curves were developed for the lakes from the USGS quadrangle sheets (Reference 16). The computed rainfall volumes were applied to area-capacity curves revealing lake stage and inundated area for each particular storm.

The volumetric-runoff technique was applied to the lakes, and if bank overflow occurred (or outflow was obvious), a flood routing procedure was performed, using the USACE's HEC-1 computer program (Reference 7).

The volumetric-runoff method does not apply to Lakes Jennie and Hidden since they have outlets, nor does it apply to Lakes Wildmere and Fairy, which are interconnected. The methodology for those lakes consisted of calculating unit hydrographs, applying rainfall to the unit hydrographs, and flood routing using the USACE's HEC-1 computer program (Reference 7).

Lake Monroe flood elevations were determined from an analysis of records for stream gage locations on the St. Johns River and involved stream routings using HEC-1 to correlate past storm events at the stream gage locations (Reference 7). From this analysis, elevation-frequency curves were developed.

Elevations for the 10-, 2-, 1-, and 0.2-percent-annual-chance flood events for Lake Jesup were taken from the FIS for the unincorporated areas of Seminole County (Reference 17). These elevations are based on backwater from the St. Johns River.

Stages on North Lake are influenced greatly by ground water levels and correlate closely with the stages in Cranes Roost. Accordingly, the selected flood stages in North Lake were determined by applying the difference in water levels observed during past flood events to the stages computed for Cranes Roost. Cranes Roost, Lake Adelaide, and Lake Florida become one large interconnected sinkhole basin at flood stages. Until recently, the basin was landlocked. A 17 cfs capacity pumping station became operational in 1978 and was considered in the analysis.

Topographically, the centermost part of the City of Casselberry is the lowest in elevation and contains four lakes at very nearly the same water-surface level. These lakes (Lake Kathryn, Lake Triplet, Lost Lake, and Secret Lake), act like a collection basin for flows from surrounding higher lakes. The analysis considers these 4 lakes as one and refers to them as the "basin". The waters eventually reach Lake Jesup via Gee Creek, flowing northeast out of Lake Kathryn. The higher lakes surrounding the "basin" are sometimes separate and sometimes grouped naturally (i.e., are close together and at the same water-surface elevation). These lakes, or groups of lakes, are:

a. Lakes Annette, Cecile, Yvonne, Emily, and Marie, which are all generally at the same surface elevation and at flood conditions, overflow into a ditch and through three culverts under Winter Park Drive into the "basin."

b. Grassy Lake, in the western edge of the city, receives inflow from Prairie and Pearl Lakes in Altamonte Springs, and empties into the "basin" through riverine channels to Lake Triplet and Queens Mirror Lake.

c. Lake Concord, a separate lake in the northwestern part of the city, flows into the "basin" through Secret Lake.

d. Trout Lake overflows into Lake Griffin. Lake Griffin overflows into a series of ditches and culverts, which overflow into Lake Kathryn.

e. Lake Howell and Lake Ann in the south part of town do not flow into the "basin." Lake Ann overflows into nearby low-lying areas that eventually reach Lake Howell. Lake Howell receives an inflow from a series of lakes in Orange County and discharges into Howell Creek, flowing northeasterly to Lake Jesup.

Hydrologic analyses for Lake Irish, Lake Marietta, Island Lake, Banana Lake, Sawyer Lake, Golf Course Lake, and Lakes 7, 8, and 9 were taken from a study entitled Master Drainage Study, Heathrow Planned Unit Development, which uses the SCS/NRCS hydrology program (References 18 and 19). The computed 1-percent-annual-chance flood elevations assumed a linear storage curve, and at given contours, were based on planimetric areas that were averaged and multiplied by the contour interval. The flood hazard factors for the lakes were calculated by comparing the 1-percent-annual-chance elevations and the normal-pool elevations.

The following tabulation lists normal pool elevations that were calculated in the January 16, 1987, revision for the unincorporated areas of Seminole County:

Flooding Source	Normal Pool Elevation (feet NAVD)
Banana Lake	47.9
Golf Course Lake	39.9
Lake Irish	42.9
Lake Marietta	41.9
Sawyer Lake	42.9
Lake 7	39.6
Lake 8	42.9
Lake 9	38.4

A re-analysis was performed by the Seminole County Public Works Department for Banana Lake and Island Lake to model the two as a single-basin system. This study was incorporated into the January 16, 1987, revision to the FIS for the unincorporated areas of the county, and consisted of a basin hydrograph analysis and a modified version of the Stormwater Management and Design Aid (Reference 20). The flood routing was performed using the interconnected pond routing program developed by Peter J. Singhofen, P.E., (Reference 21). The input data for both programs were taken from the previously mentioned hydrologic analyses and augmented with surveyed information.

April 17, 1995, Countywide FIS Analyses

For the April 17, 1995, Countywide FIS, two different methods were used to analyze the flood potential of the lakes studied by detailed methods within the unincorporated areas of the county. The method used for each lake depended on whether a lake had an outlet. For those lakes with outlets, the peak flood stages were determined by routing runoff from a 24-hour storm through storage in the lake beginning at a mean high-water level. Outlet discharge capacity was determined by standard step-backwater computations and hydraulic formulas.

Landlocked lakes and those overflowing onto natural ground and sloughs were determined by coincident-frequency analyses. This method considers that lake levels respond to two independent hydrologic systems, and that flood levels result from a superimposed reaction to short term rainfall and long term groundwater cycles. Coincident-frequency analysis determined stage frequency by analyzing the joint probability of all possible combinations of 5-day rainfall runoff and antecedent ground water levels. One regional groundwater fluctuation curve was developed from analysis of well records, lake stages, and historical rainfall throughout the county. Results show that the groundwater, which is the accumulation of rainfall excess over several years, fluctuates by almost 7 feet. The regional groundwater curve was used to establish a stage duration curve for each lake. The coincident-frequency method considers the incremental time that a lake is at each elevation and multiplies it by the probability of getting a storm of a specific magnitude at that time. The total flood frequency is determined by integrating all the time increments on the stage duration curve. The following lakes were studied by the coincident-frequency method: Boat, Buck, Cockran, Clear, Geneva, Howard, Linden, Marion, Markham, Nixon, Rice, Ross, Twin (Oviedo), and Twin (Sanford).

Rainfall data were taken from the National Weather Service Technical Paper No. 40 (Reference 22). The SCS/NRCS has devised a method of determining the amount of runoff based on soil classification, land use, and antecedent moisture conditions. Each soil in the county was analyzed and assigned a rainfall runoff classification. From previous SCS/NRCS studies, each runoff soil group was assigned a runoff curve number value representing the approximate percentage of water that will become runoff during a given storm rainfall.

Inflow unit hydrographs were developed for each of the lakes with a well-defined outlet. Lag times were determined by overland travel times based on slope and cover. Flood hydrographs were routed through the storage in the lakes using the USACE HEC-1 model (Reference 7).

This Countywide Revision

Watershed-based studies were provided by the County for this revision. The watersheds studied included the following:

Big Wekiva River Watershed (Reference 23)
Gee Creek Watershed (Reference 24)
Lake Jesup (North and South) Watershed (Reference 25)
Lake Monroe Watershed (Reference 26)
Little Lake Howell Watershed (Reference 27)
Soldier Creek Watershed (Reference 28)

Standard SCS/NRCS methodology was used to calculate rainfall runoff in the models, with precipitation totals based on the St. Johns River Water Management District Technical Publication SJ 88-3, Rainfall Analysis for Northeast Florida, Part VI: 24-Hour to 96-Hour Maximum Rainfall for Return Periods 10 Years, 25 Years, and 100 Years (Reference 29). The 2-percent-annual-chance rainfall values were interpolated, while the 0.2-percent-annual-chance values were extrapolated. The 96-hour rainfall event was used for all the numerical modeling for this revision. Initial conditions for ponding areas were based on the lower of a mean-annual 96-hour simulation results, or the outfall sill elevation. The hydrologic calculations were performed using the ICPR unsteady flow program, version 3.02.

A summary of the drainage area-peak discharge relationships for a portion of the streams studied by detailed methods is shown in Table 3, “Summary of Discharges.”

TABLE 3. SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs)			
		10-percent	2-percent	1-percent	0.2-percent
BEAR CREEK					
At confluence with Howell Creek	17.6	1,430	3,540	4,800	6,500
CITY DITCH (EAST BRANCH)					
At confluence with West Branch	0.87	340	400	410	460
At 8th Street	0.65	250	295	305	340
CITY DITCH (WEST BRANCH)					
At confluence with East Branch	1.84	380	720	920	1,400
At 8th Street	1.46	320	610	780	1,180
CREEK A					
At State Route 419	1.7	110	290	390	750
ECONLOCKHATCHEE RIVER					
At State Route 13	*	7,260	*	13,650	*
Approx. 500’ upstream of State Route 419	*	5,000	*	9,390	*
At Orange County boundary	*	5,050	*	9,170	*
FAIRY LAKE DRAINAGE CANAL					
At mouth	0.5	148	220	246	359
At Wildmere Avenue	0.4	43	50	54	71
GEE CREEK					
At Lake Jessup	5.6	500	830	1,030	1,660
At North Winter Park Drive	5.56	500	830	1,030	1,660
At State Route 419	3.2	500	830	1,030	1,660

* Data not available

TABLE 3. SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs)			
		10-percent	2-percent	1-percent	0.2-percent
GRASSY LAKE DRAINAGE CHANNEL TO TRIPLET LAKE					
At Sunset Drive	1.6	93	145	179	289
At U.S. Route 17-92	1.4	28	41	46	56
HOWELLCREEK					
At Lake Jesup	27.2	2,080	4,630	6,420	12,140
At State Route 419	26.4	2,030	4,500	6,240	11,750
At Cross Section G	23.5	680	1,410	2,110	3,880
At Lake Howell	20.1	500	800	1,200	1,800
At State Route 436	19.0	440	710	880	1,410
LITTLE ECONLOCKHATCHEE RIVER					
At Lockwood Road	*	3,250	*	6,440	*
At State Route 520	*	4,760	*	8,520	*
At Orange County boundary	*	4,720	*	8,360	*
LITTLE HOWELL CREEK					
At mouth	2.4	450	1,150	1,370	3,110
LITTLE WEKIVA RIVER					
At State Route 434	33.8	920	1,500	1,800	2,580
At Montgomery Road	31.1	780	1,280	1,520	2,070
At CSX Transportation	27.6	700	1,140	1,370	1,830
At State Route 431	25.4	550	880	1,050	1,610
SIX MILE CREEK					
At Lake Jesup	4.5	430	780	950	1,530
SIX MILE CREEK TRIBUTARY					
At mouth	2.4	230	480	560	820

* Data not available

TABLE 3. SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs)			
		10-percent	2-percent	1-percent	0.2-percent
SOLDIER CREEK					
At Lake Jesup	27.2	480	1,120	1,370	2,260
At State Route 419	10.2	480	1,120	1,370	2,260
At U.S. Route 17-92	8.1	300	700	860	1,420
At CSX Transportation	5.8	470	*	910	1,590
SOLDIER CREEK FLOWPATH A					
At Sewage Disposal Road	3.13	150	350	430	710
At CSX Transportation	2.67	100	200	210	260
SWEETWATER CREEK					
At Lake Jesup	2.8	135	300	400	760
At State Route 426	0.19	70	170	220	420
At Geneva Drive	0.19	100	220	300	520
At CSX Transportation	0.17	60	140	180	350
TRIBUTARY A					
At mouth	0.6	110	180	230	360
TRIBUTARY B					
At mouth	2.9	150	230	400	760
TRIBUTARY TO LAKE HOWELL	1.6	280	480	610	950

* Data not available

The stillwater elevations for the 10-, 2-, 1-, and 0.2-percent-annual-chance flood event have been determined for the lakes studied by detailed methods and are summarized in Table 4, “Summary of Stillwater Elevations”. Unless otherwise noted, the elevations listed in Table 4 apply for the entire shoreline of the lake within the county.

TABLE 4. SUMMARY OF STILLWATER ELEVATIONS

FLOODING SOURCE	ELEVATION (FEET NAVD) 10- percent	2-percent	1-percent	0.2-percent
Lake Ada	38.3	39.3	39.8	40.7
Lake Adelaide	57.1	59.1	60.2	62.6
Lake Alma	57.2	58.2	58.7	59.8
Lake Annette	55.0	56.1	56.5	57.3
Lake Ann	60.9	61.1	61.7	63.3
Banana Lake	*	*	48.9	*
Bath Lake	66.5	66.7	66.9	67.7
Bear Lake	104.5	105.3	105.8	106.9
Bear Gully Lake	50.1	51.7	52.2	53.3
Bel Air Lake	43.4	44.2	44.5	45.4
Big Lake Mary	41.6	42.3	42.7	43.9
Lake Bingham	42.5	43.4	43.8	44.7
Bird Lake	59.5	60.9	61.4	62.4
Boat Lake	51.7	52.8	53.3	54.3
Border Lake	73.5	75.6	76.5	77.7
Lake Brantley	46.7	47.6	48.1	49.0
Buck Lake	29.2	30.7	31.1	32.0
Lake Burkette	53.6	54.5	54.9	56.2
Lake Catherine	55.4	56.2	56.5	57.3
Lake Cecile	55.0	56.1	56.5	57.3
Lake Charm	43.5	44.7	45.3	46.6
Clear Lake	62.5	63.6	64.0	65.0
Lake Cockran	27.8	28.6	29.0	29.9
Lake Como	44.5	45.5	46.1	47.6
Lake Concord	59.9	61.2	61.5	61.9
Crane Lake	62.2	62.5	62.6	62.9
Cranes Roost	57.1	59.1	60.2	62.6
Crystal Bowl	63.9	64.9	65.4	66.3
Crystal Lake	43.5	44.2	44.6	45.4
Cub Lake	103.1	103.4	103.5	103.9
Dawson Lake	43.3	44.4	44.9	45.4
De Forest Lakes	43.4	44.2	44.5	45.4
Lake Deeks	64.4	65.3	65.6	67.9
Lake Destiny	88.3	89.3	89.9	90.9
Dewdrop Pool	67.8	68.7	69.2	70.4
Duck Pond	57.4	57.5	58.0	59.3
East Lake	60.7	61.3	61.6	62.0
Lake Ellen	67.0	67.7	68.0	68.6
Lake Emily	55.0	56.1	56.5	57.3

* Data not computed

TABLE 4. SUMMARY OF STILLWATER ELEVATIONS - continued

FLOODING SOURCE	ELEVATION (FEET NAVD) 10 -percent	2- percent	1- percent	0.2- percent
Lake Emma	43.1	44.4	45.0	46.2
Lake Evergreen	61.2	62.3	62.9	64.1
Fairy Lake	56.4	57.2	57.6	58.9
Lake Faith	70.3	71.9	72.4	72.8
Lake Fern	63.2	63.4	63.6	64.1
Lake Florence	64.6	65.5	66.1	67.6
Lake Florida	57.1	59.1	60.2	62.6
Garden Lake	54.1	54.4	54.6	54.8
Lake Gary	45.0	46.3	46.8	48.0
Lake Gem	73.5	73.7	73.7	73.8
Lake Geneva	27.9	29.6	30.2	31.5
Lake Geoffrey	49.6	50.6	51.1	51.5
Golden Lake	39.6	40.4	40.7	41.6
Golf Course Lake	*	*	46.9	*
Golf Course Lake 1	50.7	51.3	51.5	51.8
Golf Course Lake 2	47.4	49.3	49.5	49.9
Golf Course Lake 3	45.8	47.6	47.8	48.5
Golf Course Lake 4	45.8	47.6	47.8	48.5
Golf Course Lake 5	*	*	46.9	*
Lake Gore	41.3	41.8	42.1	43.7
Grace Lake	66.3	67.0	67.1	67.2
Grassy Lake	85.6	86.8	87.3	88.8
Lake Greenwood	42.5	44.1	44.7	45.7
Lake Griffin	76.3	76.5	76.6	76.8
Gull Lake	68.4	68.5	68.6	68.6
Lake Harriet	53.7	55.2	55.7	56.6
Hidden Lake	37.6	38.5	38.7	39.2
Lake Hodge	49.0	50.4	51.0	52.2
Lake Hope	70.5	72.8	73.3	73.7
Horseshoe Lake	38.4	38.8	39.1	40.5
Lake Howard	45.0	46.3	46.8	48.0
Lake Howell	54.1	55.1	55.5	56.9
Lake Irene North	57.7	58.7	59.1	60.0
Lake Irene South	60.3	61.7	62.2	63.3
Lake Irish	*	*	44.8	*
Island Lake (Lake Mary)	45.9	46.2	46.5	47.4
Island Lake (Longwood)	83.7	84.6	84.9	85.7
Lake Jane	65.7	65.8	65.9	66.0
Lake Jennie	36.9	37.9	38.2	38.7
Lake Jesup	7.0	8.2	8.7	9.5
Lake Kathryn	52.4	53.5	54.0	55.6
Linden Lake	39.7	40.5	40.7	41.1
Little Crystal Lake	43.4	44.2	44.5	45.4

* Data not computed

TABLE 4. SUMMARY OF STILLWATER ELEVATIONS - continued

FLOODING SOURCE	ELEVATION (FEET NAVD) 10 -percent	2- percent	1- percent	0.2- percent
Little Lake Howell	54.9	55.6	55.8	56.5
Little Lake Mary	42.5	43.6	44.0	44.1
Little Lake Wildmere	63.2	63.4	63.6	64.1
Loch Low Lake	42.9	43.5	43.8	44.8
Long Lake	45.6	46.0	46.1	46.8
Lost Lake	54.5	55.4	55.8	56.6
Lake Lotus	85.5	85.5	85.6	85.8
Lotus Lake (Altamonte Springs)	61.1	62.5	63.0	64.6
Lucerne Lake	57.1	57.4	57.6	57.8
Lake Maltbie	89.2	90.3	90.7	91.5
Lake Marie	55.0	56.1	56.5	57.3
Lake Marietta	*	*	45.0	*
Lake Marion	58.1	59.9	60.6	62.4
Lake Markham	45.0	46.3	46.8	48.0
Mills Lake	42.4	43.2	43.5	44.5
Lake Minnie	35.2	36.8	37.4	38.9
Lake Mobile	79.1	79.7	79.9	80.3
Mud Lake	83.9	84.4	84.6	85.0
Lake Myrtle	*	*	50.7	*
Lake Nixon	44.2	44.8	45.0	45.4
North Lake	57.7	59.8	60.8	63.2
North Side Lake	66.2	67.3	67.7	68.4
Lake Onora	45.2	45.3	45.4	45.6
Lake Orange	75.7	75.8	75.9	76.0
Lake Orienta	63.9	65.2	66.1	68.3
Pearl Lake	50.5	52.1	52.8	54.6
Pearl Lake (East Altamonte Springs)	86.5	87.6	88.0	88.9
Pearl Lake (West Altamonte Springs)	59.3	59.8	60.0	60.8
Pelican Lake	68.4	68.6	68.8	69.0
Piney Ridge Lake	87.6	87.8	87.9	88.0
Plaza Pool	75.5	75.5	75.5	75.6
Pot Lake	86.5	87.6	88.0	88.9
Prairie Lake	86.5	87.6	88.0	88.9
Lower Proctor Lake	26.2	27.0	27.4	28.9
Upper Proctor Lake	28.6	29.7	29.8	30.5
Quail Pond	63.4	64.4	64.8	65.7
Queens Mirror Lake	54.8	55.8	56.0	56.8
Red Bug Lake	66.0	66.7	67.1	68.2
Reservoir Lake	43.1	43.8	44.2	44.8
Rice Lake	39.7	40.5	40.7	41.1

* Data not computed

TABLE 4. SUMMARY OF STILLWATER ELEVATIONS - continued

FLOODING SOURCE	ELEVATION (FEET NAVD) 10 -percent	2- percent	1- percent	0.2- percent
Rock Lake	81.0	82.1	82.8	84.3
Lake Rogers	72.4	73.4	73.9	74.6
Ross Lake	43.8	44.7	46.8	48.0
Round Lake	46.1	46.7	46.9	47.3
Lake Roy	*	*	89.3	*
Lake Ruby	*	*	89.5	*
Lake Ruth	62.8	63.4	63.5	63.8
Sand Lake	114.4	114.6	114.7	115.1
Sawyer Lake	*	*	47.1	*
Lake Searcy	67.8	69.2	69.9	71.3
Secret Lake	54.3	55.0	55.4	56.1
Silver Lake	43.1	43.7	44.0	44.5
Spring Lake	64.3	65.5	66.1	68.1
Spring Wood Lake	88.3	89.3	89.9	90.9
Lake Talmo	55.9	57.8	58.6	60.3
Lake Tillie	49.1	50.9	51.9	53.3
Lake Tony	58.6	58.9	59.0	59.1
Triplet Lake (North)	54.3	55.0	55.4	56.0
Triplet Lake (South)	54.5	55.4	55.8	56.6
Trout Lake (Altamonte Springs)	60.6	61.9	62.4	64.0
Trout Lake (Casselberry)	79.5	79.8	79.9	80.1
Twin Lakes (Oviedo)	30.4	31.9	32.5	33.5
Twin Lakes (Sanford East)	44.0	44.8	45.2	46.1
Twin Lakes (Sanford West)	48.2	49.3	49.8	51.0
Lake Wayman	74.6	75.6	76.0	76.7
West Lake	62.6	64.0	64.7	66.1
Lake Wildmere	61.2	62.3	62.9	64.1
Lake Winsor	83.3	84.1	84.4	85.2
Lake Yvonne	55.0	56.1	56.5	57.3
Lake 1	47.3	49.6	50.0	50.0
Lake 2	44.8	45.5	45.6	45.8
Lake 3	43.5	44.2	44.6	45.4
Lake 4	44.9	45.5	45.9	46.8
Lake 7	*	*	43.5	*
Lake 7A	*	*	43.5	*
Lake 7B	*	*	43.5	*
Lake 8	*	*	48.4	*
Lake 9	*	*	45.9	*
Lake 10	*	*	44.6	*
Lake 11	*	*	44.6	*
Lake 12	*	*	48.7	*
Lake 13	48.4	50.5	51.4	52.8

* Data not computed

TABLE 4. SUMMARY OF STILLWATER ELEVATIONS - continued

FLOODING SOURCE	ELEVATION (FEET NAVD) 10 -percent	2- percent	1- percent	0.2- percent
Lake 14	64.5	64.7	64.8	65.0
Lake 15	57.3	59.6	60.5	62.1
Lake 16	49.1	49.8	50.2	51.0
Lake 17	23.4	24.3	24.9	25.9
Lake 18	64.8	65.8	66.3	67.2
Lake 19	71.2	71.8	71.9	72.3
Lake 20	66.1	67.4	68.1	69.5
Lake 21	71.4	71.7	71.9	72.3
Lake 22	48.2	49.3	49.8	51.0
Lake 23	43.9	45.5	46.0	46.6
Lake 24	51.3	51.7	51.9	52.2
Lake 25	48.2	50.1	51.0	51.8
Lake 26	43.5	44.2	44.6	45.4
Lake 27	44.8	46.3	46.6	47.0
Lake 28	42.6	44.2	44.8	46.1
Lake 29	42.4	43.8	44.3	45.1
Lake 30	46.1	47.3	48.2	50.3
Lake 31	42.5	44.6	45.6	47.8
Lake 32	77.2	78.9	79.7	81.5
Lake 33	66.5	66.7	66.9	67.1
Lake 34	59.3	59.9	60.2	61.2
Lake 35	63.5	63.6	63.7	63.8
Lake 36	84.5	85.7	85.9	86.4
Lake 37	64.6	64.9	65.0	65.1
Lake 38	57.8	58.8	59.3	60.5
Lake 39	57.7	58.6	59.2	60.6
Lake 40	40.8	40.9	40.9	41.0
Lake 41	54.6	55.4	55.8	56.7
Lake 42	66.0	68.9	69.7	70.8
Lake 43	74.9	76.0	76.1	76.4
Lake 44	56.1	57.4	58.0	59.3
Lake 45	63.8	63.9	63.9	64.0
Lake 46	56.5	57.8	58.4	59.6
Lake 47	58.6	58.9	59.0	59.2
Lake 48	59.3	60.8	61.3	61.6
Lake 49	56.1	57.5	58.0	58.8
Lake 50	54.1	54.6	54.8	55.3
Lake 51	48.7	49.4	49.7	50.5
Lake 52	50.1	51.5	52.1	52.5
Lake 53	52.1	53.8	54.6	56.3
Lake 54	49.4	50.3	50.6	51.4
Lake 55	60.9	61.1	61.1	61.2
Lake 56	39.8	41.1	41.7	42.6

* Data not computed

TABLE 4. SUMMARY OF STILLWATER ELEVATIONS - continued

FLOODING SOURCE	ELEVATION (FEET NAVD) 10 -percent	2- percent	1- percent	0.2- percent
Lake 57	50.6	50.7	50.7	50.8
Lake 58	50.3	51.5	51.5	51.8
Lake 59	57.6	59.1	59.9	60.5
Lake 60	41.1	42.4	43.0	44.6
Lake 61	39.7	41.6	42.6	44.6
Lake 62	39.7	41.6	42.6	44.6
Lake 63	25.7	26.2	26.4	26.8
Lake 64	25.7	26.2	26.4	26.8
Lake 65	22.3	23.2	23.7	24.6
Lake 66	54.1	55.2	55.3	55.4
Lake 67	51.2	51.7	51.7	51.9
Lake 68	42.9	43.3	43.4	43.7
Lake 69	62.5	62.9	63.0	63.3
Lake 70	86.2	87.9	88.6	89.5
Lake 71	58.0	62.0	63.5	63.7
Lake 72	58.0	62.0	63.5	63.7
Lake 73	106.0	106.1	106.1	106.2
Lake 74	112.4	114.0	114.4	115.1
Lake 75	122.2	124.0	124.9	127.0
Lake 76	48.1	50.3	51.3	53.3
Lake 77	45.4	50.3	51.3	53.3
Lake 78	45.5	45.9	46.0	46.2
Lake 79	44.9	45.9	45.9	46.2
Ponding Area 1	*	*	93.5	*
Ponding Area 2	*	*	94.8	*
Ponding Area 3	*	*	61.4	*
Ponding Area 4	*	*	63.8	*
Ponding Area 5	*	*	65.9	*
Ponding Area 6	93.1	93.4	93.5	93.8
Ponding Area 7	20.8	21.8	22.1	22.7
Ponding Area 8	60.5	60.7	60.8	60.9
Ponding Area 9	57.7	58.8	59.3	59.8
Ponding Area 10	66.1	66.8	66.8	67.0
Ponding Area 11	51.9	52.1	52.1	52.3
Ponding Area 12	52.8	53.9	54.5	54.8
Ponding Area 13	54.2	55.3	55.5	55.7
Ponding Area 14	64.0	65.3	65.9	67.2
Ponding Area 15	89.1	89.7	89.9	90.4
Ponding Area 16	56.6	56.8	56.8	56.9
Ponding Area 17	*	*	79.6	*
Ponding Area 18	72.9	74.4	75.0	76.4
Ponding Area 19	*	*	57.9	58.6
Ponding Area 20	55.9	56.8	57.2	57.9

* Data not computed

TABLE 4. SUMMARY OF STILLWATER ELEVATIONS - continued

FLOODING SOURCE	ELEVATION (FEET NAVD) 10 -percent	2- percent	1- percent	0.2- percent
Ponding Area 21	56.1	57.4	58.0	59.3
Ponding Area 22	50.1	50.3	50.3	50.4
Ponding Area 23	44.8	45.5	45.6	45.8
Ponding Area 24	64.4	65.3	65.6	67.9
Ponding Area 25	64.4	65.3	65.6	67.9
Ponding Area 26	46.7	46.7	46.8	46.9
Ponding Area 27	55.6	56.5	56.6	56.8
Ponding Area 28	59.5	59.5	59.6	59.6
Ponding Area 29	38.3	39.3	39.6	40.2
Ponding Area 30	43.7	44.0	44.1	44.3
Ponding Area 31	41.3	41.9	42.1	43.0
Ponding Area 32	44.9	45.2	45.3	45.5
Ponding Area 33	58.2	58.8	59.0	59.4
Ponding Area 34	52.3	53.2	53.6	54.3
Ponding Area 35	65.8	66.1	66.3	66.7
Ponding Area 36	*	*	86.9	*

*Data not computed

3.2 Hydraulic Analyses

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

Pre-Countywide FIS Analyses

Cross sections for the backwater analysis were determined from field surveys. Cross sections were located at close intervals above and below bridges and culverts in order to compute the significant backwater effects of these structures.

Water-surface elevations for floods of the selected recurrence intervals were determined using the USACE HEC-2 step-backwater computer program (Reference 30).

The hydraulic analyses for Deer Run and Little Howell Creek determined that the flooded area is subject to shallow flooding where average depths of flooding are less than 3 feet.

There is no hydraulic action connected with Lake Charm and Round Lake. It has no inflow or outflow, and the lake level was determined solely by rainfall. Long Lake has an outlet at the south end which overflows into the Little Econlockhatchee River. Thus,

the water surface elevation of Long Lake is determined not only by rainfall, but by outflow to the south.

Starting water-surface elevations for the following streams were based on the slope-area method: Deer Run, Gee Creek in the City of Casselberry, Grassy Lake Drainage Channel, Howell Creek in the City of Casselberry, Little Wekiva River, and Soldier Creek in the City of Lake Mary.

Starting water-surface elevations for the following streams were based on the computed water-surface elevations of the receiving stream or lake: tributaries in Altamonte Springs, Bear Creek, City Ditch, Creek A, Drainage Canal to Fairy Lake, the Econlockhatchee River, Gee Creek in the unincorporated areas of the county and the City of Winter Springs, Howell Creek in the unincorporated areas of the county and the City of Winter Springs, the Little Econlockhatchee River, Little Howell Creek, the Little Wekiva River in the unincorporated areas of the county, the St. Johns River, Six Mile Creek and its tributary, Soldier Creek in the unincorporated areas of the county and the City of Winter Springs, Sweetwater Creek, Tributary to Lake Howell, Tributary B, and the Wekiva River.

April 17, 1995 Countywide FIS Analyses

Aerial photography maps with a contour interval of 1 foot were provided for most of the lake basins in the western half of the county by the Seminole County Engineering Department and the St. Johns River Water Management District. This information was a compilation of maps from 5 separate aerial surveys. Topographic information on lakes in the eastern portion of the county were obtained from USGS topographic maps and verified and supplemented by the USACE field surveys in March and April of 1989 (Reference 16). In addition, all lake outlets except the weir at Sand Lake were field surveyed. Data on weir structure at Sand Lake was taken from As-Built drawings.

The Modified Puls Reservoir Routing procedure was used to route the flood hydrograph volume through storage in the lakes. The initial stage of the lake prior to the storm was taken to be the high mean stage or the invert elevation of the outlet. Outlet rating curves were developed for each lake using the standard hydraulic formulas and the HEC-2 backwater computer program to model the tailwater influence on the outlet (Reference 30).

The following tabulation lists the lake basins where runoff was modeled by HEC-1, and the outlet capacity determined by the HEC-2 and hydraulic formulas:

LAKE NAME	LOCATION (Section-Township-Range)	OUTLET	INVERT ELEVATION (NAVD)
Bath	22-21-31	Type H inlet	65.7
Catherine	21-21-32	24-inch RCP*	53.9
Deeks	26-21-30	Drop inlet	62.4
Gore	22-31-32	Manmade channel	35.7
Harriet	16-21-29	60-inch pipe	46.4
Horseshoe	29-21-31	Natural Creek	43
Mills	28-21-32	Mills Creek	39.9
Lower Proctor	22-20-32	Open ditch	23.9
Upper Proctor	22-20-32	2 36-inch RCPs*	27.9
Rogers	22-21-31	Natural ridge	74

* Round corrugated pipe

Lakes Forest and Harriet were studied by the St. Johns River Water Management District as part of a detailed and comprehensive study of the Little Wekiva River. A review of their report shows a complete HEC-1 and HEC-2 hydrologic investigation, using the same procedures previously described for studying lakes with outlets (Reference 31).

Channel roughness factors (Manning's "n") used in the hydraulic computations for this countywide study were chosen by engineering judgment and field inspections. For the streams studied by detailed methods, the channel "n" values ranged from 0.030 to 0.100 and the overbank "n" values ranged from 0.060 to 0.100.

The approximate flooded areas were determined using USGS Flood Prone Maps, aerial photographs, and field inspections (References 32 and 33). Approximate flooded areas in the City of Oviedo were also determined by using the Econlockhatchee River, Florida Survey Review Report (Reference 8). For the City of Casselberry, the approximate flooded areas were also determined using the Flood Hazard Boundary Map (Reference 34).

This Countywide Revision

Watershed-based studies were provided by the County for this revision. The watersheds studied included the following:

Big Wekiva River Watershed (Reference 23)
Gee Creek Watershed (Reference 24)
Lake Jesup (North and South) Watershed (Reference 25)
Lake Monroe Watershed (Reference 26)
Little Lake Howell Watershed (Reference 27)
Soldier Creek Watershed (Reference 28)

The original analyses were updated and modified for the purposes of this study. The dynamic hydraulic routing was performed using the ICPR program, version 3.02.

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.

All elevations are referenced to NAVD.

3.3 Vertical Datum

All FIS reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum in use for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD). With the finalization of the North American Vertical Datum of 1988 (NAVD), many FIS reports and FIRMs are being prepared using NAVD as the referenced vertical datum.

All flood elevations shown in this FIS report and on the FIRM are referenced to NAVD. Structure and ground elevations in the community must, therefore, be referenced to NAVD. It is important to note that adjacent counties may be referenced to NGVD. This may result in differences in Base Flood Elevations (BFEs) across the corporate limits between the counties.

Prior versions of the FIS report and FIRM were referenced to NGVD. When datum conversion is effected for an FIS report and FIRM, the flood profiles, BFEs, and elevation reference marks (ERMs) reflect the new datum values. To compare structure and ground elevations to 1-percent-annual-chance flood elevations shown in the FIS report and on the FIRMs, the subject structure and ground elevations must be referenced to the new vertical datum values.

As noted above, the elevations shown in the FIS report and on the FIRM for Seminole County are referenced to NAVD. Ground, structure, and flood elevations may be compared and/or referenced to NGVD by applying a conversion factor. To convert elevations from NAVD to NGVD, add 1.06 feet to the NAVD elevation. The 1.06 feet value is an average for the entire County. The BFEs shown on the FIRM represent whole-foot rounded values. For example, a BFE of 12.4 feet will appear as 12 feet on the FIRM, and 12.6 feet as 13 feet. Users who wish to convert the elevations in this FIS report to NGVD should apply the stated conversion factor to elevations shown on the Flood Profiles and supporting data tables in the FIS report, which are shown at a minimum to the nearest 0.1 foot.

To obtain current elevation, description, and/or location information for bench marks shown on the FIRM for this jurisdiction, or for information regarding conversion between the NGVD and NAVD, see the FEMA publication entitled *Converting the National Flood Insurance Program to the North American Vertical Datum of* 1988 (FEMA, June 1992), or contact the Vertical Network Branch, National Geodetic Survey, Coast and Geodetic Survey, National Oceanic and Atmospheric Administration, Rockville, Maryland 20910 (Internet address http://www.ngs.noaa.gov).

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

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages 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 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 report, including Flood Profiles, Floodway Data Table, and Summary of Stillwater Elevations Table. Users should reference the data presented in the FIS report as well as additional information that may be available at the local 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 County. 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 revision, 1-foot and 5-feet interval digital topographic contours, as well as LiDAR data, was provided by the County and the St. Johns River Water Management District. They were used to delineate the floodplain boundaries. The acquisition date of the topographic data ranged from the 1980's to 2005.

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

For the streams studied by 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 1-percent-annual-chance flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this FIS are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodway presented in this FIS report and on the FIRM was computed for certain stream segments on the basis of equal-conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations have been tabulated for selected cross sections of detailed study streams in Table 5. 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.

A floodway generally is not appropriate in areas such as those that may be inundated by floodwaters from lakes. Thus, no floodway was prepared for the area adjacent to the lakes studied in detail in Seminole County.

It was determined by representatives of FEMA and the USACE that floodways would not be determined for the St. Johns River, the Wekiva River, the Econlockhatchee River, and the Little Econlockhatchee River. These streams have relatively little development along them and the flood profiles for these streams in the original study for the unincorporated areas of the Seminole County were taken from previously published USACE reports that did not include the determination of floodways.

Encroachment into areas subject to inundation by floodwaters having hazardous velocities aggravates the risk of flood damage, and heightens potential flood hazards by further increasing velocities. For detailed study streams, a listing of stream velocities at selected cross sections is provided in Table 5. In order to reduce the risk of property damage in areas where the stream velocities are high, the county may wish to restrict development in areas outside the floodway.

Near the mouths of streams studied in detail, floodway computations are made without regard to flood elevations on the receiving water body. Therefore, “Without Floodway” elevations presented in Table 5 for certain downstream cross sections of Howell Creek are lower than the regulatory flood elevations in that area, which must take into account the 1-percent-annual-chance flooding due to backwater from other sources.

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

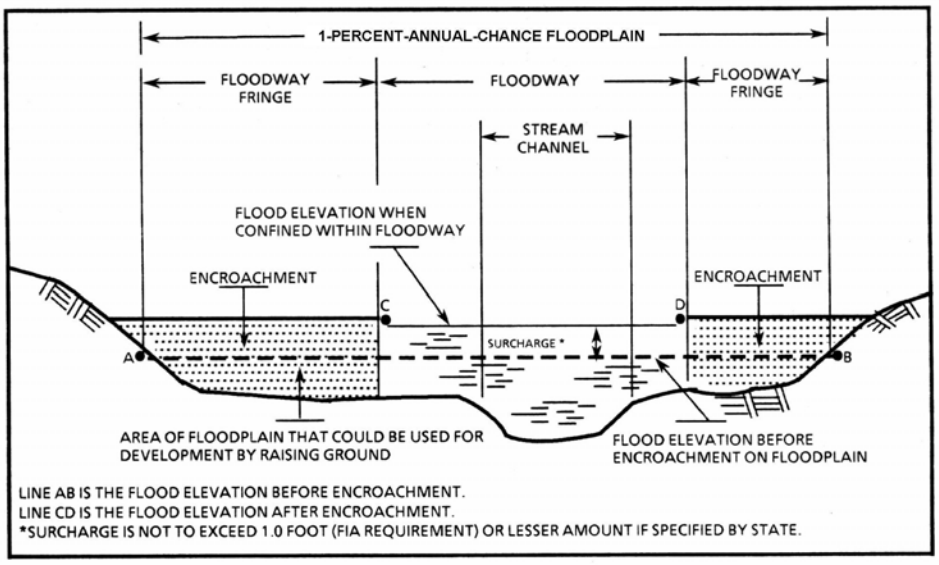

FIGURE 1. FLOODWAY SCHEMATIC

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Bear Creek								
A	1,400	327	2,370	2.0	17.8	17.8	18.6	0.8
B	1,800	415	4,480	1.1	21.9	21.9	22.8	0.9
C	2,000	361	2,540	1.9	21.9	21.9	22.8	0.9
D	5,360	583	5,100	0.9	22.2	22.2	23.1	0.9
E	8,310	300	2,820	1.7	22.4	22.4	23.3	0.9
City Ditch (East Branch)								
A	850	52	295	1.4	8.5	8.5	9.5	1.0
B	1,620	42	209	2.0	9.0	9.0	9.9	0.9
C	2,363	22	74	5.4	11.2	11.2	11.6	0.4
D	2,783	58	162	2.3	13.8	13.8	14.0	0.2
E	3,653	18	53	7.2	18.0	18.0	18.7	0.7
F	4,361	25	162	2.1	24.6	24.6	25.0	0.4
G	4,513	54	226	1.3	24.7	24.7	25.4	0.7
H	5,263	48	228	1.3	24.8	24.8	25.8	1.0

[1] Feet above mouth

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS

FLOODWAY DATA

BEAR CREEK – CITY DITCH (EAST BRANCH)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
City Ditch (West Branch)								
A	800	32	209	4.4	8.5	8.5	9.5	1.0
B	2,100	390	1,648	0.6	9.6	9.6	10.5	0.9
C	2,293	34	234	3.8	10.5	10.5	11.3	0.8
D	2,793	62	360	2.5	11.6	11.6	12.5	0.9
E	2,933	100	983	0.9	11.9	11.9	12.9	1.0
F	3,187	61	299	2.9	12.0	12.0	12.9	0.9
G	3,452	155	808	1.1	12.7	12.7	13.5	0.8
H	4,252	57	360	2.4	13.2	13.2	13.9	0.7
I	4,852	75	215	4.0	14.4	14.4	15.2	0.8
J	5,155	37	209	3.8	15.5	15.5	16.3	0.8
K	5,501	108	508	1.6	17.6	17.6	17.9	0.3
L	5,709	248	1,355	0.6	22.2	22.2	22.5	0.3
M	6,829	61	273	2.8	22.3	22.3	22.6	0.3
N	7,519	84	155	5.0	25.4	25.4	25.8	0.4
Creek A								
A	2,500	50	60	6.4	18.7	18.7	18.9	0.2
B	4,400	200	220	1.7	26.0	26.0	26.3	0.3
C	5,840	227	240	1.6	28.2	28.2	28.6	0.4
D	7,840	70	90	2.7	32.7	32.7	32.8	0.1

[1] Feet above mouth

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS

FLOODWAY DATA

CITY DITCH (WEST BRANCH) – CREEK A

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Gee Creek								
A	3,620	43	260	4.0	10.5	10.5	11.2	0.7
B	3,910	200	620	1.7	11.3	11.3	11.8	0.5
C	4,670	198	440	2.3	12.2	12.2	12.5	0.3
D	7,140	100	580	1.8	20.7	20.7	21.7	1.0
E	8,200	64	520	2.0	25.1	25.1	26.0	0.9
F	10,310	54	260	3.9	27.7	27.7	28.2	0.5
G	15,350	182	640	1.6	38.3	38.3	38.7	0.4
H	15,980	60	290	3.6	40.2	40.2	40.7	0.5
I	16,700	41	240	4.3	42.3	42.3	42.5	0.2
J	17,370	196	760	1.3	43.2	43.2	43.5	0.3
K	19,450	164	420	2.5	45.9	45.9	46.3	0.4
L	20,170	123	320	3.2	48.7	48.7	49.1	0.4
M	22,670	219	630	1.6	54.0	54.0	55.0	1.0
N	22,900	268	910	1.1	54.0	54.0	55.0	1.0

[1] Feet above mouth

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Howell Creek								
A	3,960	600	2,600	1.1	8.7	8.5[2]	8.9	0.4
B	5,200	314	1,195	5.4	13.4	13.4	14.1	0.7
C	7,250	239	1,938	3.2	15.7	15.7	16.5	0.8
D	9,600	158	1,520	1.5	17.6	17.6	18.2	0.6
E	13,200	108	597	3.8	18.2	18.2	18.8	0.6
F	15,600	67	380	6.0	24.3	24.3	24.8	0.5
G	19,000	131	950	2.4	30.8	30.8	31.8	1.0
H	19,450	200	610	3.4	31.6	31.6	32.5	0.9
I	24,800	85	400	2.2	42.4	42.4	42.6	0.2
J	27,100	57	450	2.7	42.6	42.6	43.4	0.8
K	31,250	65	520	2.3	50.7	50.7	50.8	0.1
L	36,400	222	610	2.0	55.5	55.5	55.5	0.0
M	50,100	148	650	1.6	57.3	57.3	58.3	1.0
N	51,325	52	270	3.9	59.6	59.6	59.9	0.3
O	51,720	40	250	4.2	61.3	61.3	61.9	0.6

[1] Feet above mouth
[2] Elevation computed without consideration of backwater effects from Lake Jesup

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS

FLOODWAY DATA

HOWELL CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Little Wekiva River								
A	22,967	148	510	3.5	16.8	16.8	17.5	0.7
B	25,567	88	310	5.8	22.7	22.7	23.6	0.9
C	28,557	229	730	2.5	25.4	25.4	26.2	0.8
D	29,557	63	250	6.1	27.2	27.2	27.8	0.6
E	29,800	101	470	3.2	28.3	28.3	29.0	0.7
F	29,980	56	260	5.7	28.4	28.4	28.9	0.5
G	31,820	65	400	3.8	31.2	31.2	32.2	1.0
H	32,420	62	340	4.4	32.0	32.0	33.0	1.0
I	34,400	98	440	3.4	35.1	35.1	35.8	0.7
J	34,620	54	300	5.0	35.2	35.2	36.0	0.8
K	35,520	74	410	3.7	36.9	36.9	37.4	0.5
L	37,400	47	260	5.9	39.0	39.0	39.7	0.7
M	38,730	36	250	6.0	41.8	41.8	42.7	0.9
N	41,050	353	790	1.7	44.8	44.8	45.5	0.7
O	42,150	39	170	8.1	45.4	45.4	46.4	1.0
P	42,790	74	270	5.1	49.0	49.0	49.2	0.2
Q	43,450	61	330	4.1	50.2	50.2	50.9	0.7
R	45,350	35	240	4.4	54.1	54.1	54.6	0.5
S	47,290	31	150	7.0	56.7	56.7	57.5	0.8
T	49,750	51	230	4.5	60.8	60.8	61.1	0.3
U	52,080	39	250	4.2	62.5	62.5	63.2	0.7

[1] Feet above mouth

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS

FLOODWAY DATA

LITTLE WEKIVA RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Six Mile Creek								
A	2,630	202	730	1.3	12.5	12.5	13.3	0.8
B	3,430	155	600	1.5	14.4	14.4	15.2	0.8
C	5,390	133	590	1.5	16.3	16.3	16.9	0.6
D	9,260	14	80	2.5	21.3	21.3	22.1	0.8
E	10,330	50	180	1.1	23.1	23.1	24.1	1.0
F	12,680	40	100	1.3	27.5	27.5	28.4	0.9
G	15,780	20	60	2.5	36.7	36.7	37.5	0.8
Six Mile Creek Tributary								
A	2,000	23	100	5.4	16.6	16.6	17.6	1.0
B	3,260	67	400	1.3	24.0	24.0	25.0	1.0
C	6,130	37	160	2.6	28.0	28.0	28.4	0.4
D	10,170	130	400	1.1	30.8	30.8	31.7	0.9

[1] Feet above mouth

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS

FLOODWAY DATA

SIX MILE CREEK - SIX MILE CREEK TRIBUTARY

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Soldier Creek								
A	4,985	83	250	5.5	12.5	12.5	12.5	0.0
B	5,095	75	310	4.4	13.7	13.7	14.2	0.5
C	5,240	134	880	1.6	15.6	15.6	16.1	0.5
D	6,980	96	430	3.2	16.7	16.7	17.5	0.8
E	8,685	55	340	2.5	18.1	18.1	19.1	1.0
F	11,600	170	909	1.8	24.1	24.1	24.9	0.8
G	15,515	250	1,963	0.5	40.2	40.2	40.2	0.0
Soldier Creek Flowpath A								
A	14,800	284	221	2.0	29.3	29.3	30.2	0.9
B	16,800	231	441	0.7	33.8	33.8	34.3	0.5
C	17,350	60	173	1.9	35.5	35.5	36.2	0.7
D	19,100	116	594	0.3	38.9	38.9	39.5	0.6
E	21,800	119	405	0.1	38.9	38.9	39.7	0.8
F	23,350	19	57	0.3	38.9	38.9	39.8	0.9

[1] Feet above mouth

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Sweetwater Creek								
A	3,200	20	60	6.3	10.4	10.4	11.4	1.0
B	5,600	27	110	3.6	21.6	21.6	22.6	1.0
C	8,860	34	111	3.6	24.3	24.3	24.9	0.6
D	10,460	25	233	1.7	29.0	29.0	29.7	0.7
E	11,560	192	344	0.9	32.2	32.2	32.6	0.4
F	12,460	112	237	0.9	33.2	33.2	34.2	1.0
G	13,190	95	511	0.4	38.3	38.3	38.3	0.0
H	13,555	25	35	6.4	38.3	38.3	38.3	0.0
Tributary A								
A	720	60	200	1.1	41.0	41.0	41.7	0.7
B	1,470	60	290	0.8	41.1	41.1	42.0	0.9
C	1,880	60	220	0.7	41.6	41.6	42.1	0.5
D	2,470	130	540	0.3	41.8	41.8	42.8	1.0

[1] Feet above mouth

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS

FLOODWAY DATA

SWEETWATER CREEK – TRIBUTARY A

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Tributary B								
A	630	100	170	2.4	45.6	45.6	46.2	0.6
B	940	60	290	1.4	46.3	46.3	46.6	0.3
C	1,590	100	390	1.0	47.1	47.1	47.4	0.3
D	2,925	100	400	1.0	47.1	47.1	47.6	0.5
E	3,300	24	70	5.6	50.5	50.5	51.1	0.6
F	3,640	38	120	2.2	52.2	52.2	52.7	0.5
G	3,890	50	90	2.9	52.5	52.5	53.0	0.5
H	5,425	38	100	2.8	53.6	53.6	54.4	0.8
Tributary to Lake Howell								
A	730	37	110	4.8	58.2	58.2	59.2	1.0
B	4,900	40	150	2.1	83.4	83.4	84.4	1.0
C	7,280	67	200	1.4	86.5	86.5	86.6	0.1
D	9,100	38	100	1.7	88.4	88.4	88.4	0.0

[1] Feet above mouth

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS

FLOODWAY DATA

TRIBUTARY B – TRIBUTARY TO LAKE HOWELL

5.0 INSURANCE APPLICATION

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

Zone A

Zone A is the flood insurance rate zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no BFEs, or flood 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 BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 1-percent-annual-chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot BFEs 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, areas of 1-percent-annual-chance flooding where average depths are less than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the base flood by levees. No BFEs or depths are shown within this zone.

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 BFEs or average depths. Insurance agents use the zones and BFEs in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 1- and 0.2-percent-annual-chance floodplains, floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

The countywide FIRM presents flooding information for the entire geographic area of Seminole County. Historical data relating to the maps prepared for each community are presented in Table 6, “Community Map History.

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Seminole County (Unincorporated Areas)	January 17, 1975	April 8, 1977	May 5, 1981	January 16, 1987 December 5, 1989 April 17, 1995 September 28, 2007
Altamonte Springs, City of	February 15, 1974	February 13, 1976	March 18, 1980	April 17, 1995 September 28, 2007
Casselberry, City of	February 1, 1974	October 10, 1975 October 15, 1976	July 2, 1980	April 17, 1995 September 28, 2007
Lake Mary, City of	July 8, 1977	---	March 18, 1980	April 17, 1995 September 28, 2007
Longwood, City of	January 23, 1974	September 17, 1976	March 18, 1980	April 17, 1995 September 28, 2007
Oviedo, City of	January 23, 1974	February 13, 1976	September 28, 1979	April 17, 1995 September 28, 2007
Sanford, City of	August 16, 1974	February 14, 1975	September 17, 1980	April 17, 1995 September 28, 2007
Winter Springs, City of	January 10, 1975	January 2, 1976	September 16, 1981	January 15, 1982 April 17, 1995 September 28, 2007

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

7.0 OTHER STUDIES

FEMA has published FIS reports and FIRMs for Volusia, Orange, and Lake Counties (References 35, 36, and 37).

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

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting Federal Insurance and Mitigation Division, FEMA Region IV, Koger-Center — Rutgers Building, 3003 Chamblee Tucker Road, Atlanta, GA 30341.

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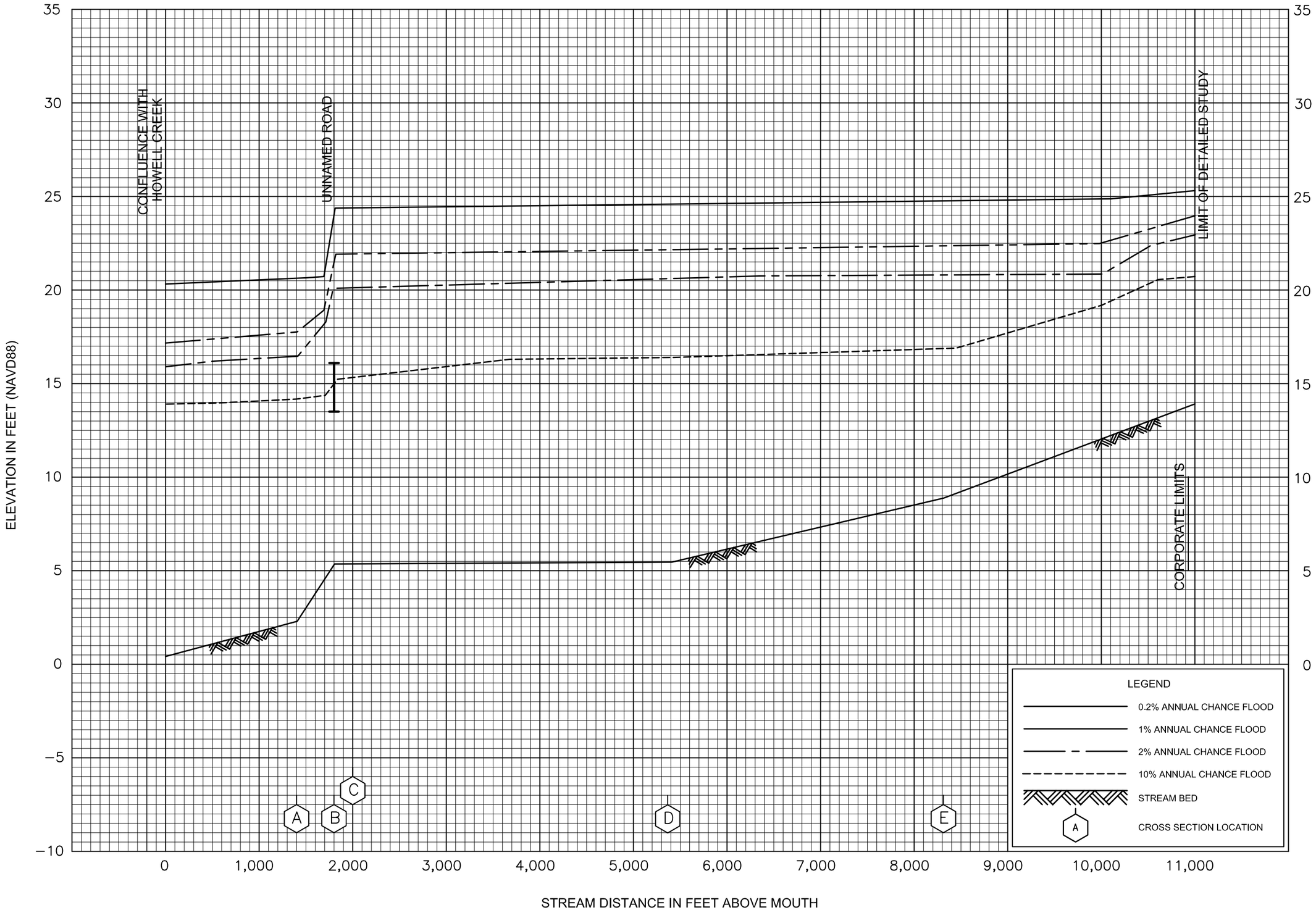


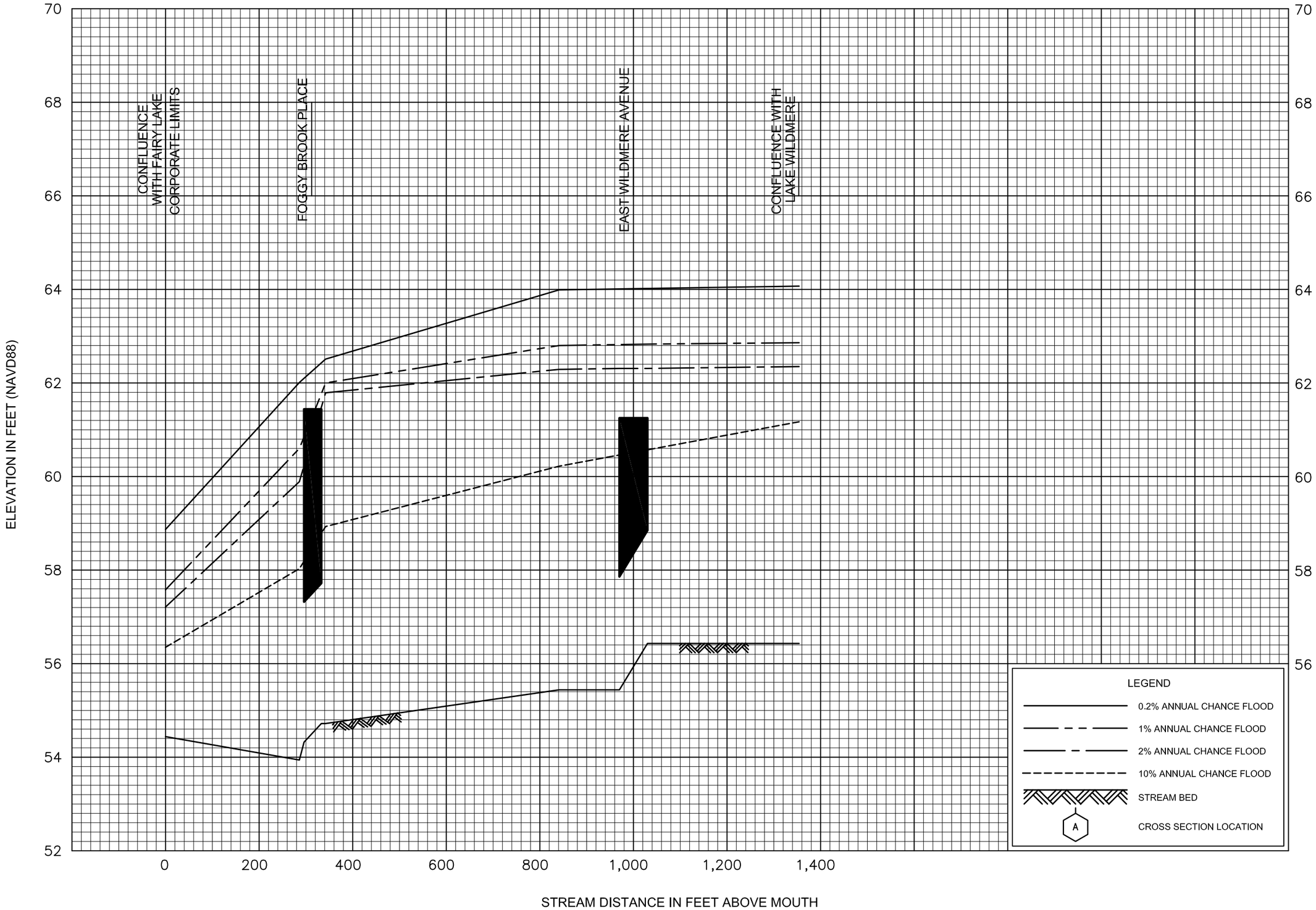
FLOOD PROFILES

BEAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL
AND INCORPORATED AREAS

01P



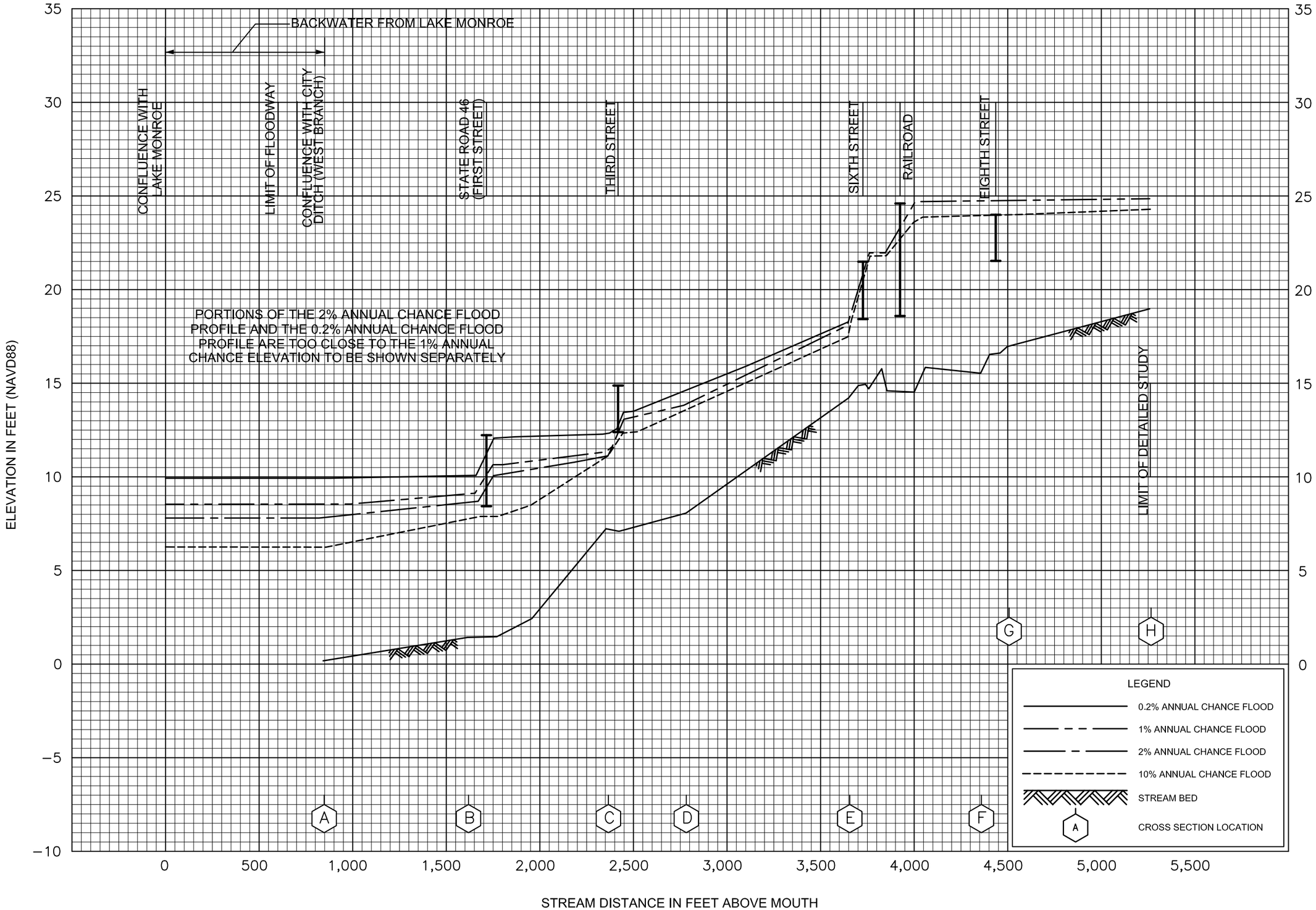
FLOOD PROFILES

CANAL BETWEEN LAKE WILDMERE AND FAIRY LAKE

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS

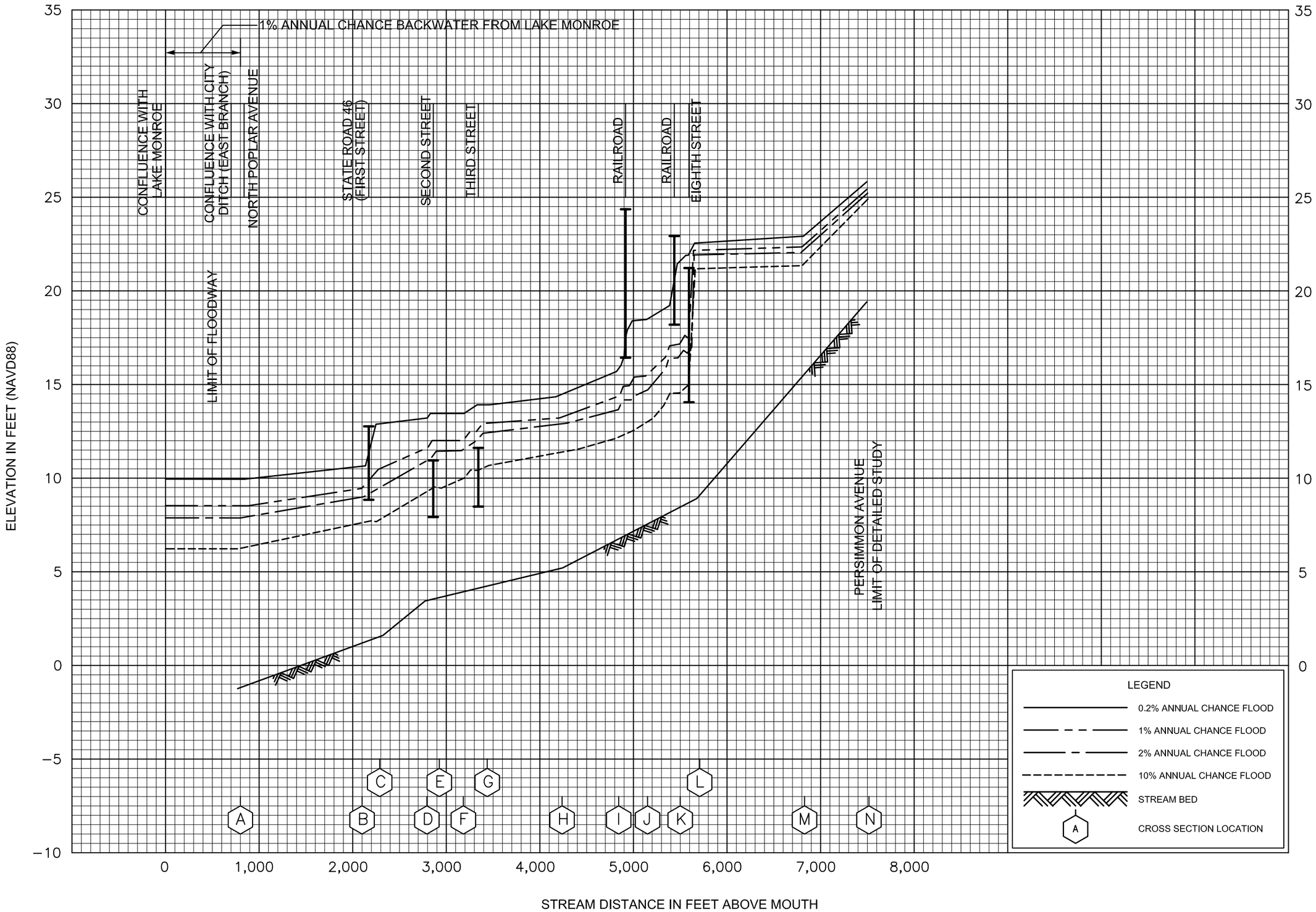


FLOOD PROFILES

CITY DITCH (EAST BRANCH)

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL
AND INCORPORATED AREAS



FLOOD PROFILES

CITY DITCH (WEST BRANCH)

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS

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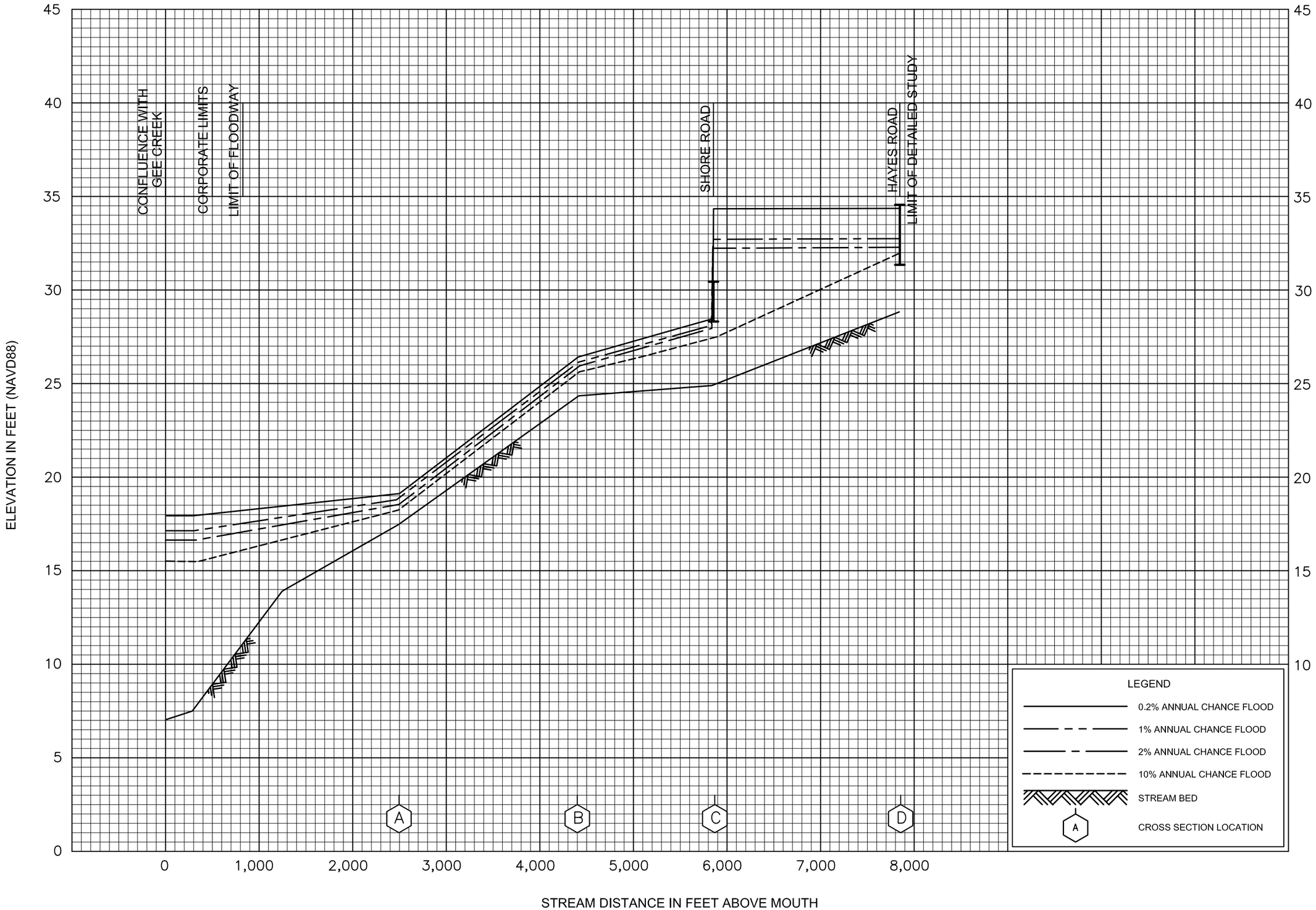


FLOOD PROFILES

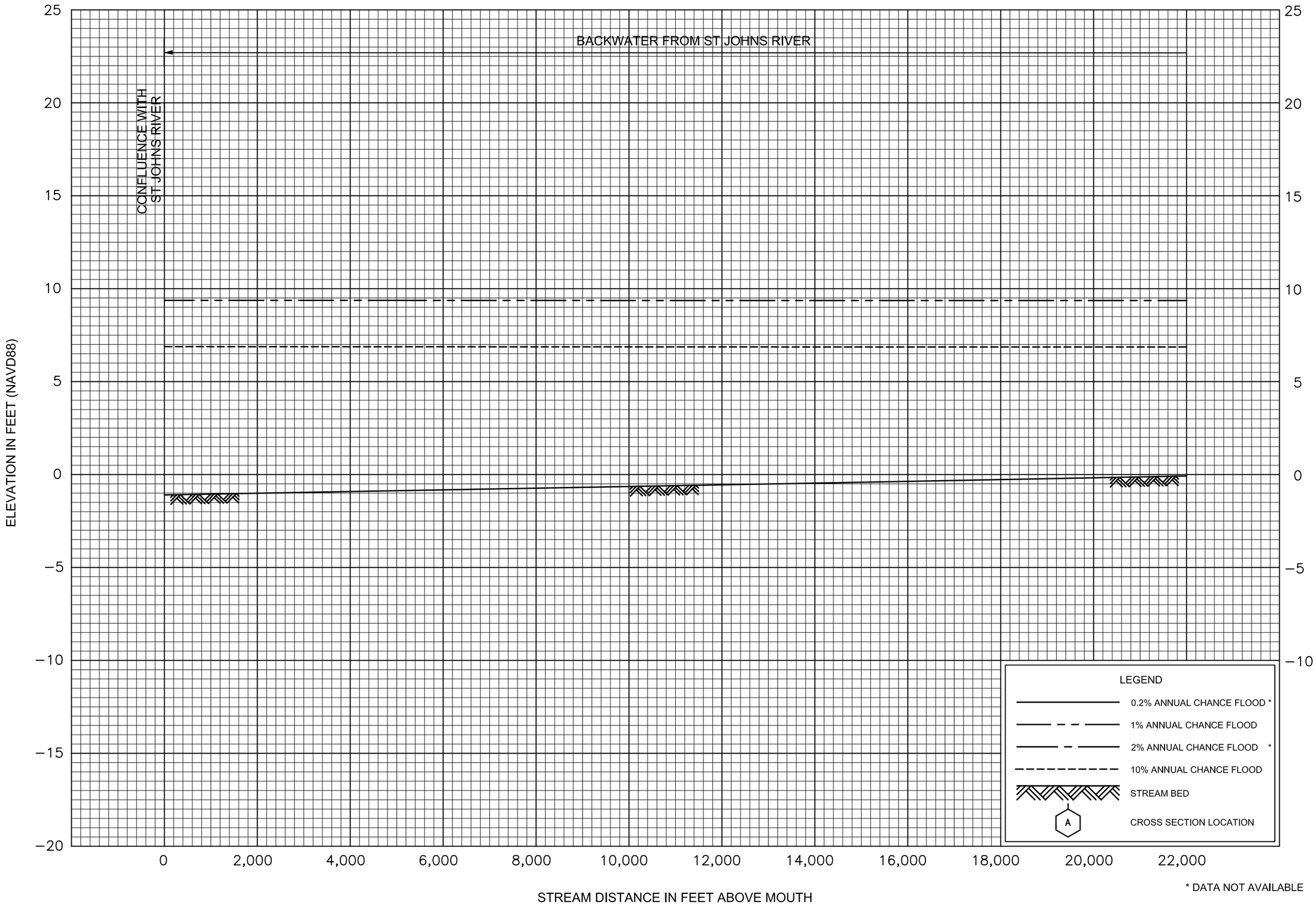
CREEK A

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS

05P



FLOOD PROFILES

ECONLOCKHATCHEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS

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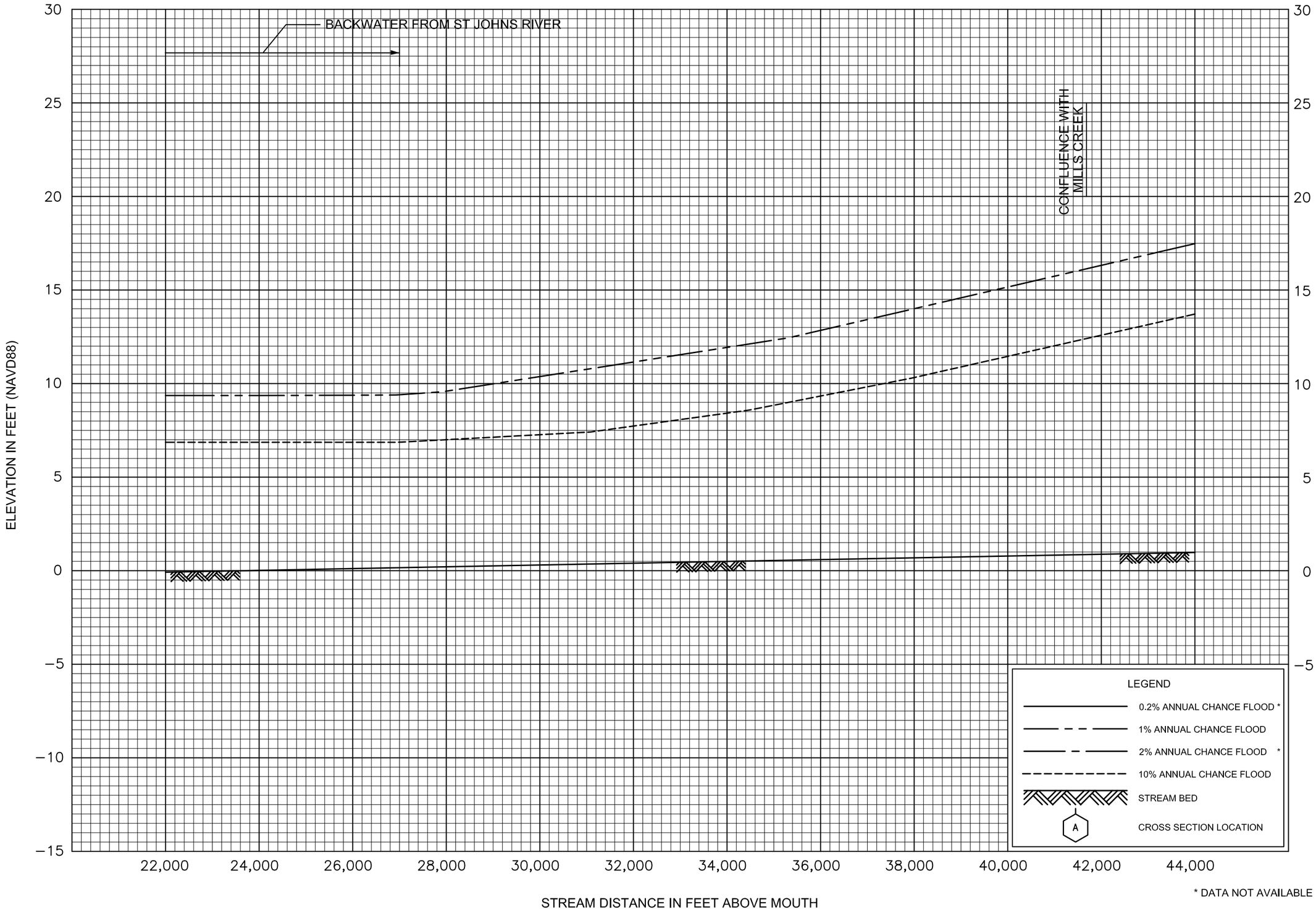


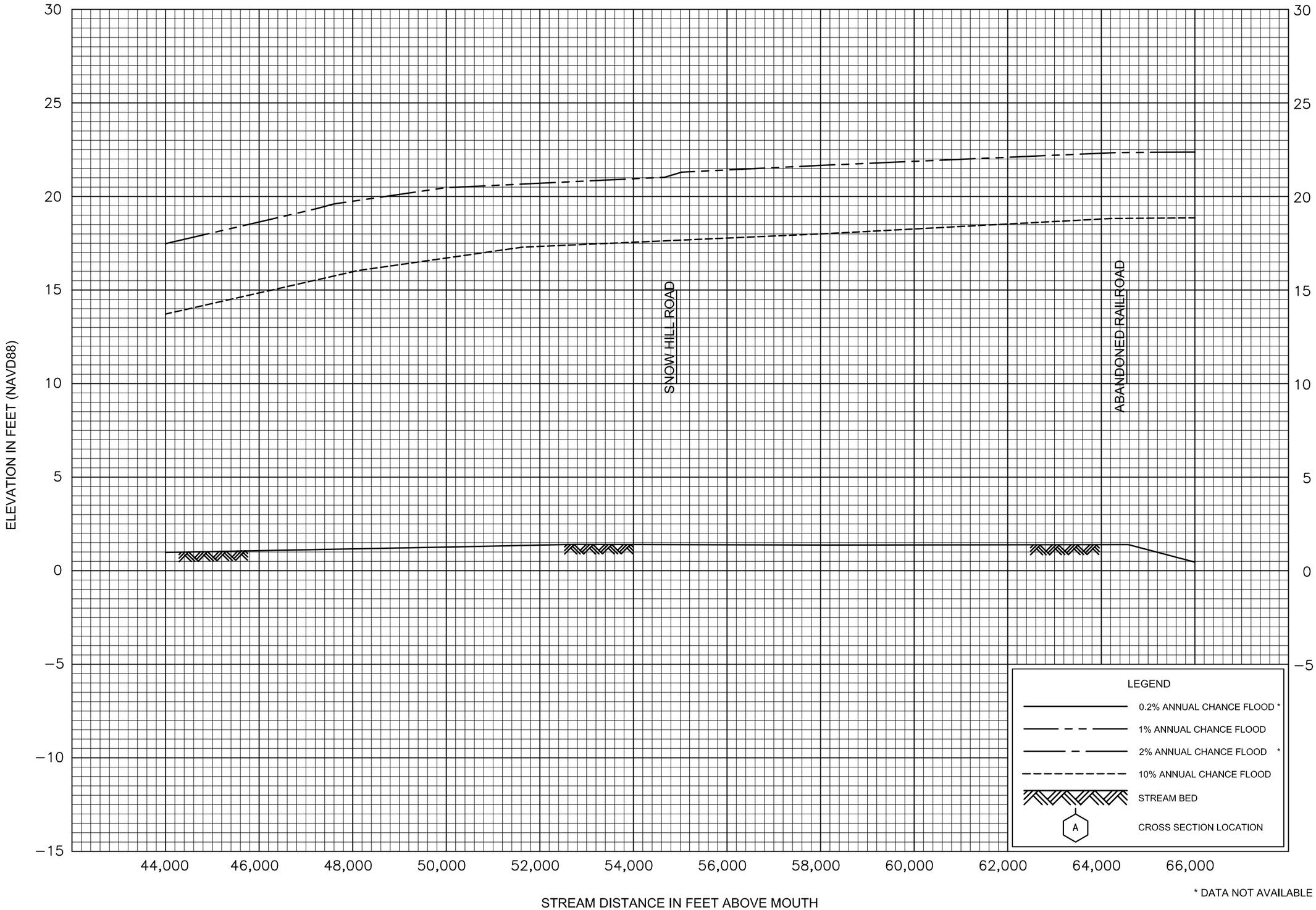
FLOOD PROFILES

ECONLOCKHATCHEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS



* DATA NOT AVAILABLE

FLOOD PROFILES

ECONLOCKHATCHEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS

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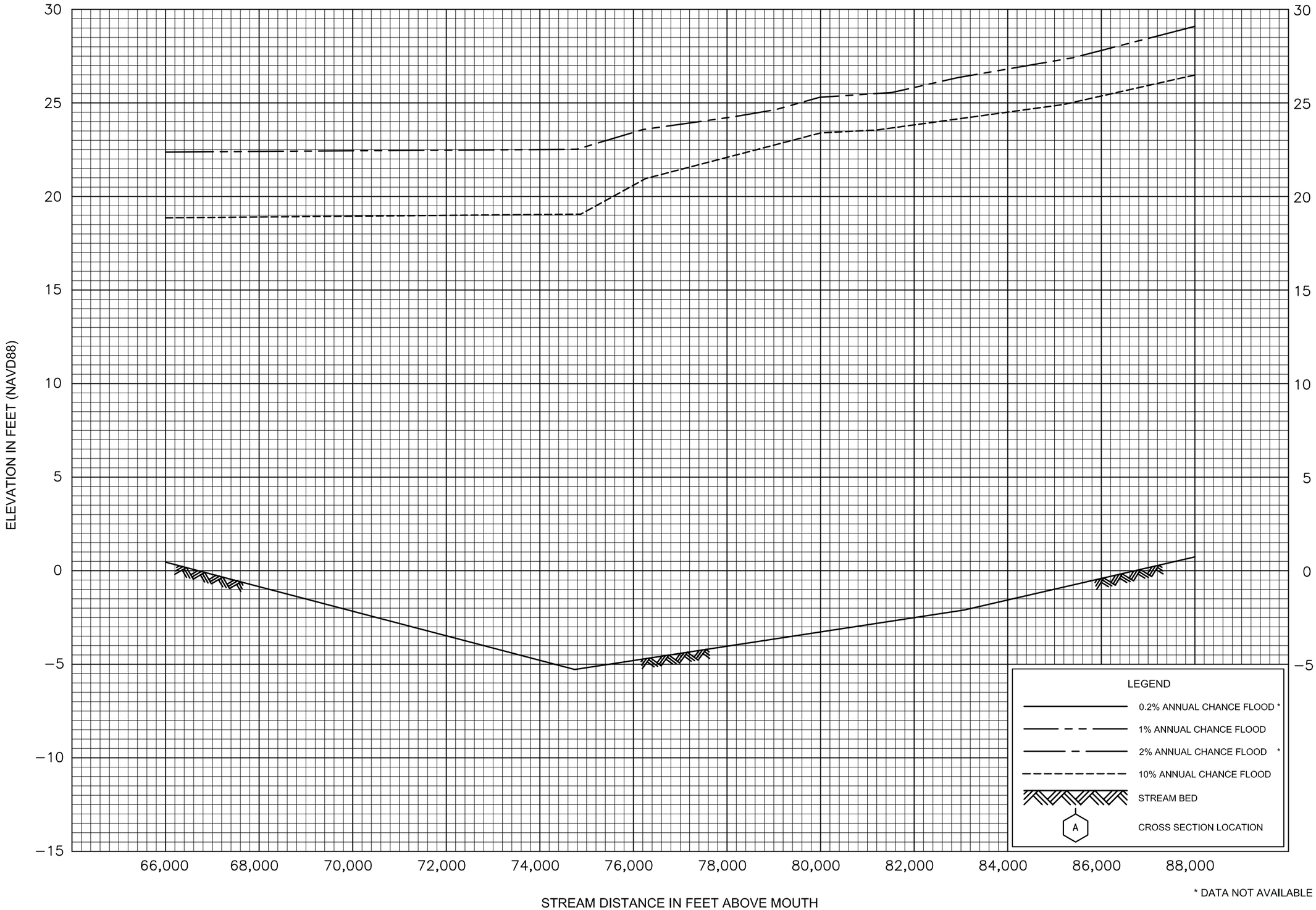


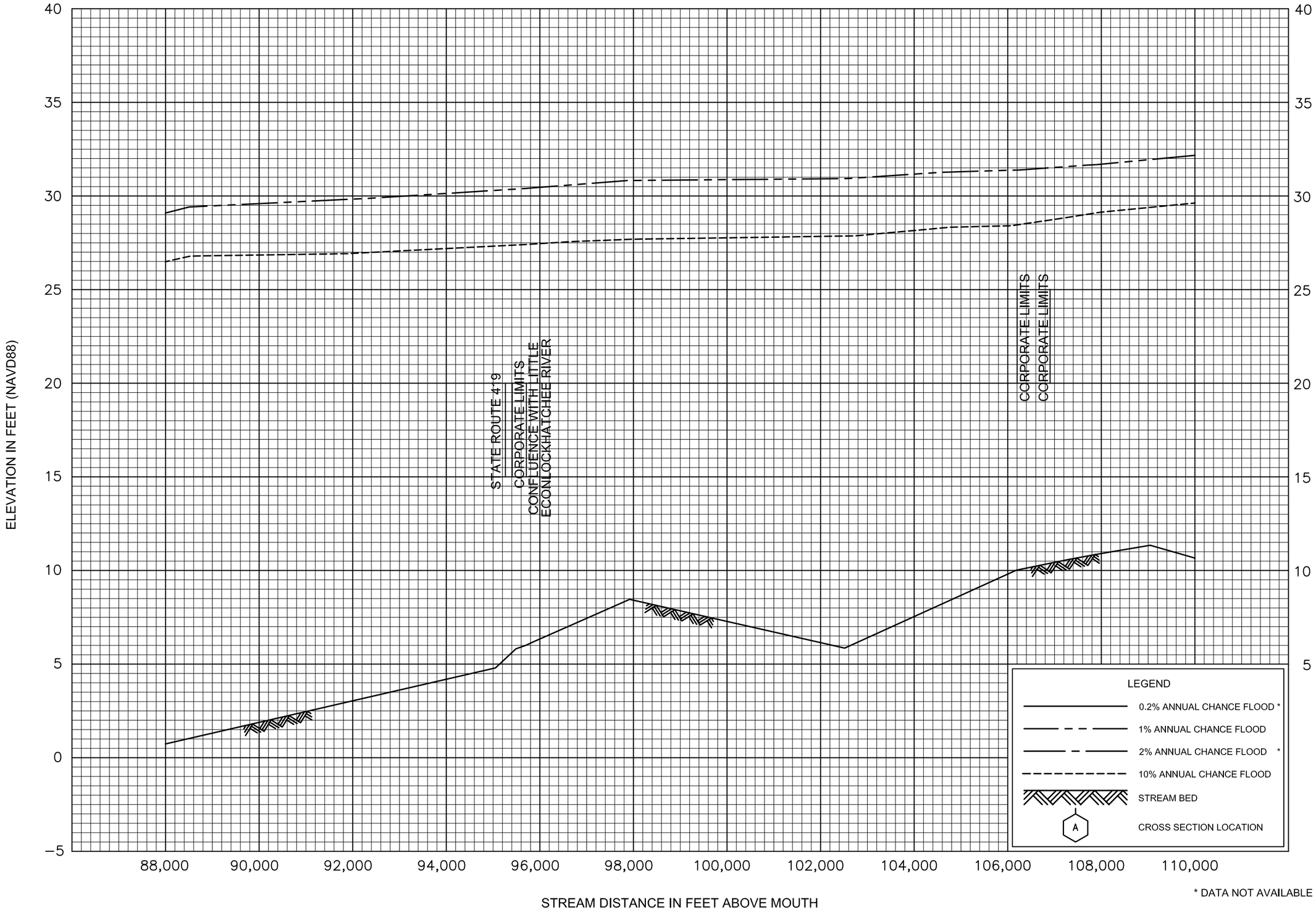
FLOOD PROFILES

ECONLOCKHATCHEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS



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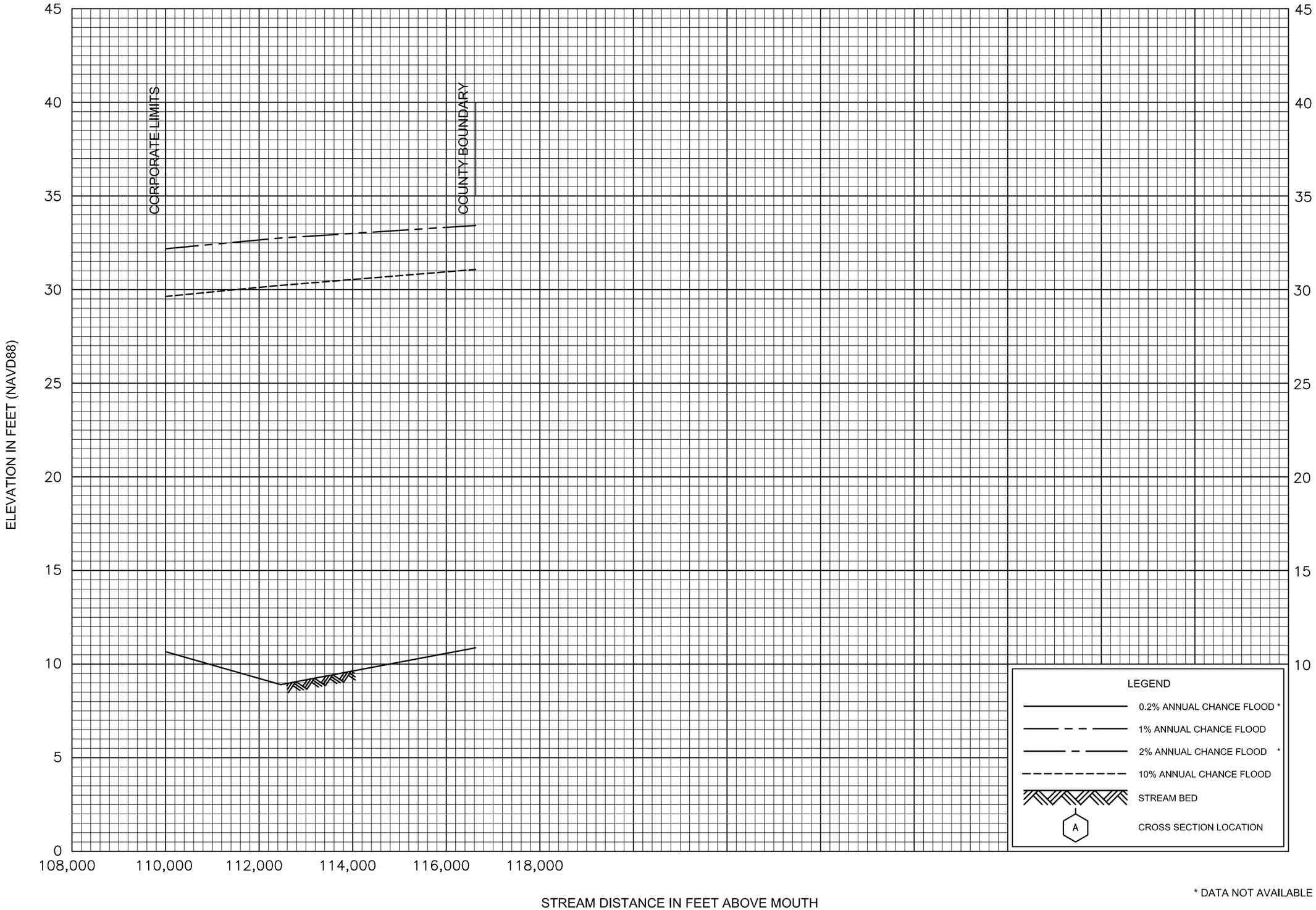
FLOOD PROFILES

ECONLOCKHATCHEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL
AND INCORPORATED AREAS



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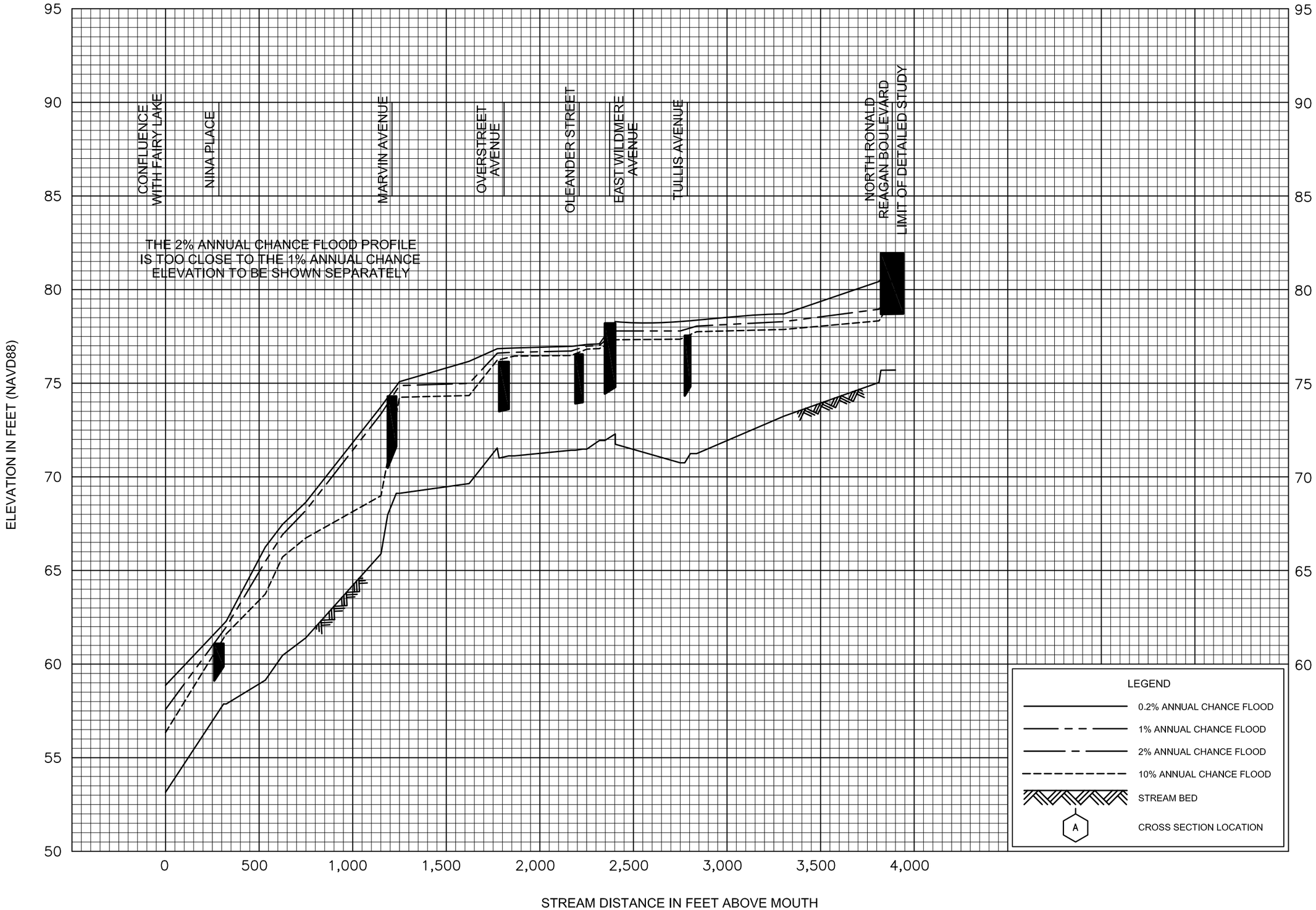
FLOOD PROFILES

ECONLOCKHATCHEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS



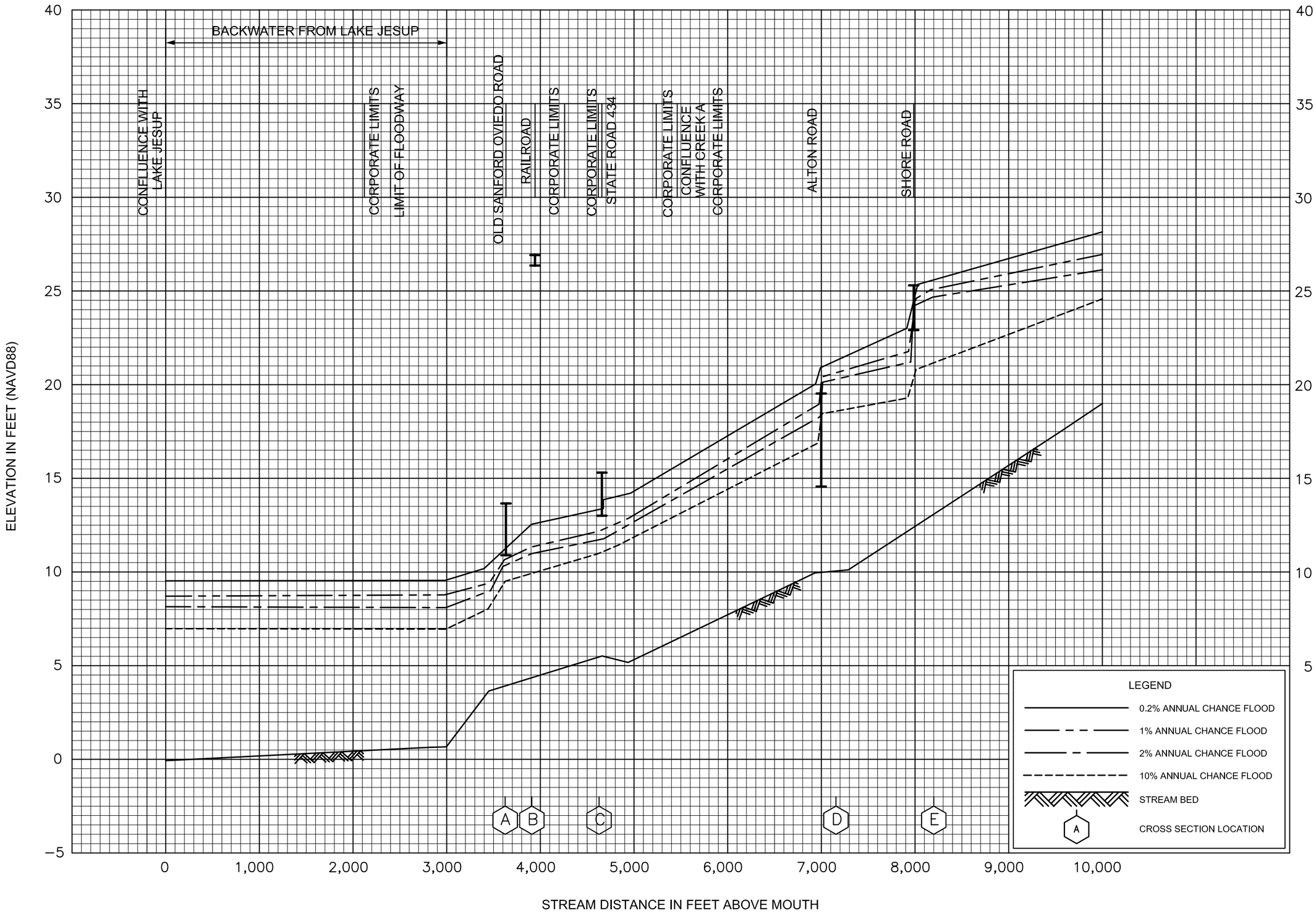
FLOOD PROFILES

FAIRY LAKE DRAINAGE CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS



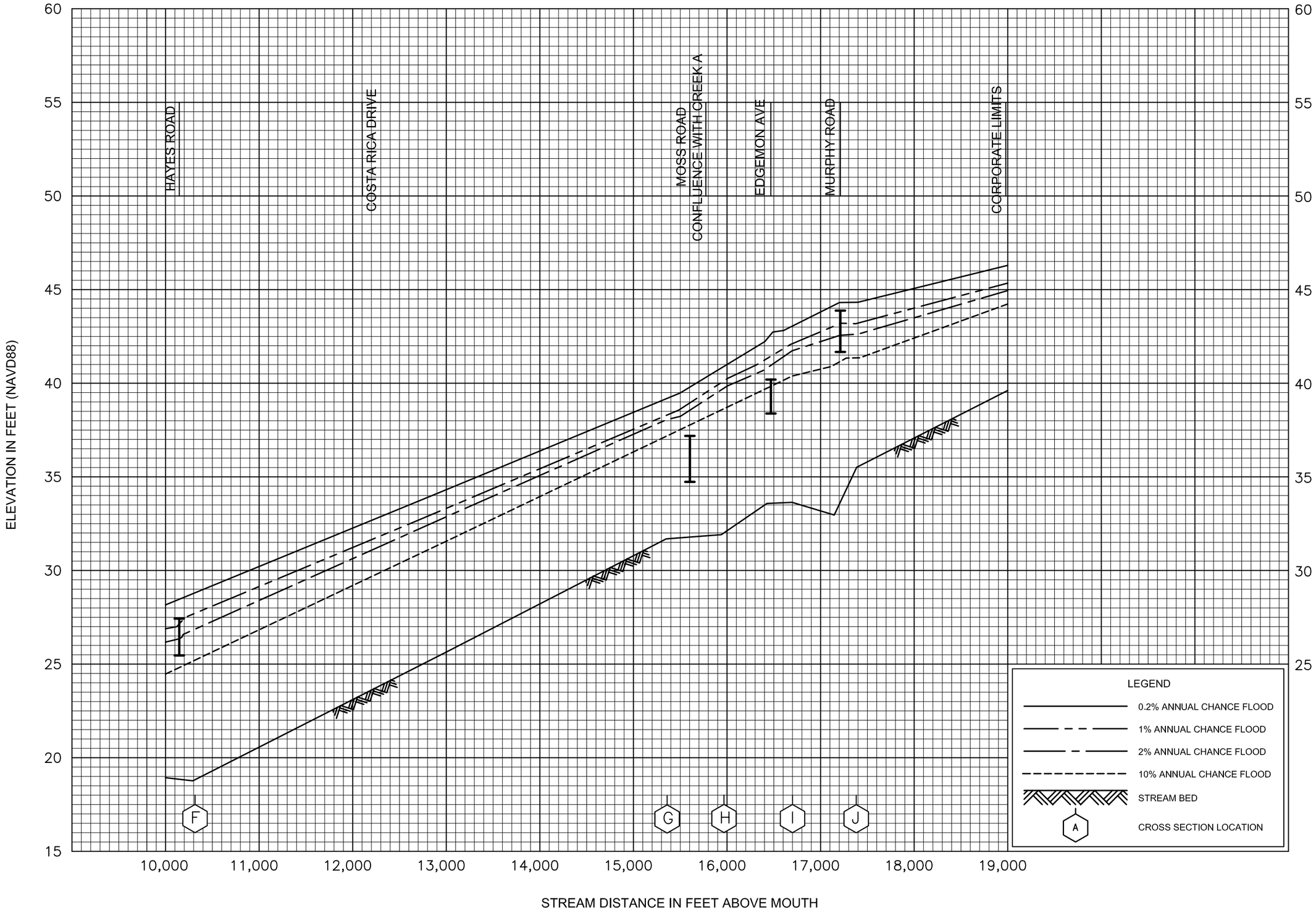
FLOOD PROFILES

GEE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS



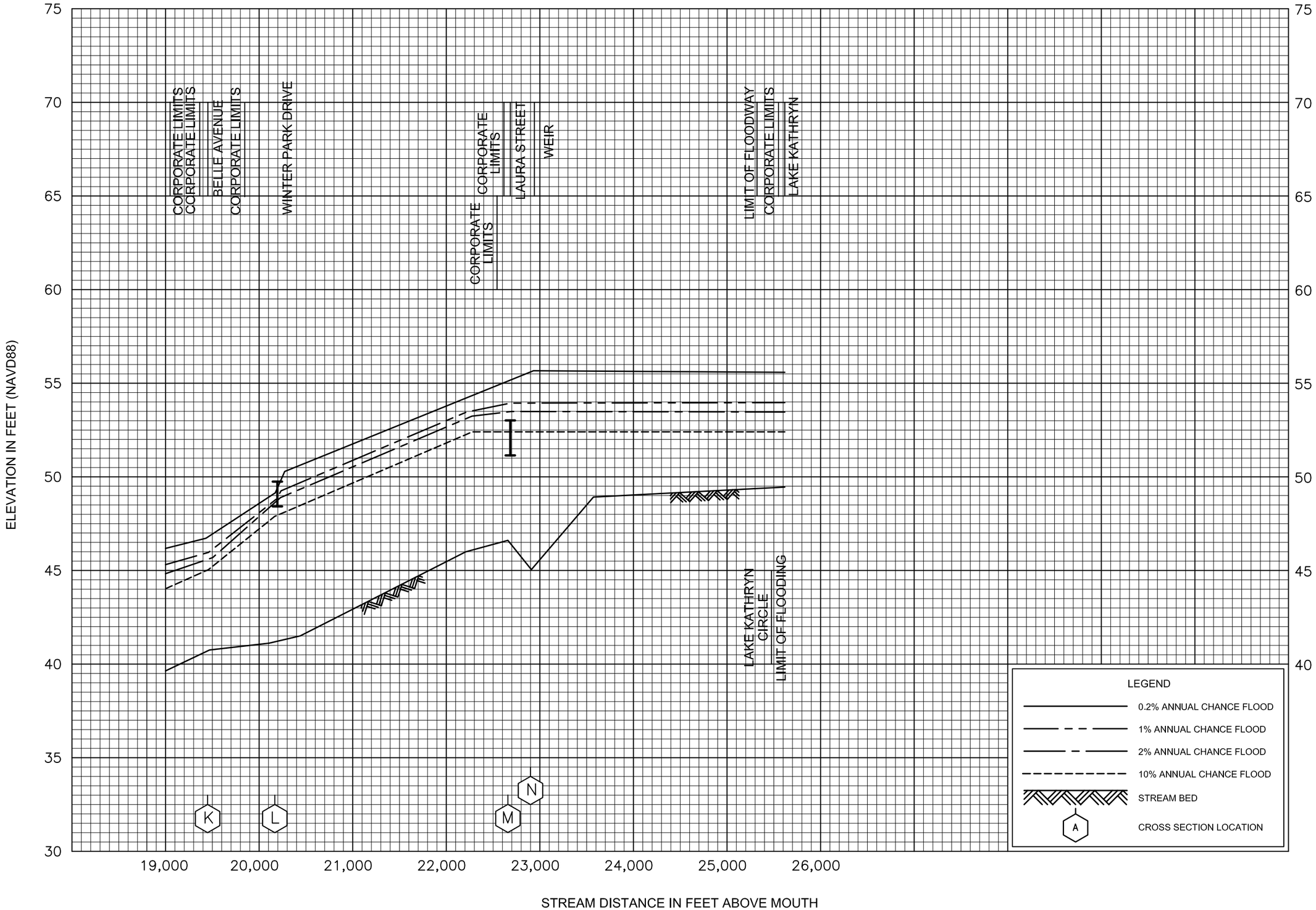
FLOOD PROFILES

GEE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS

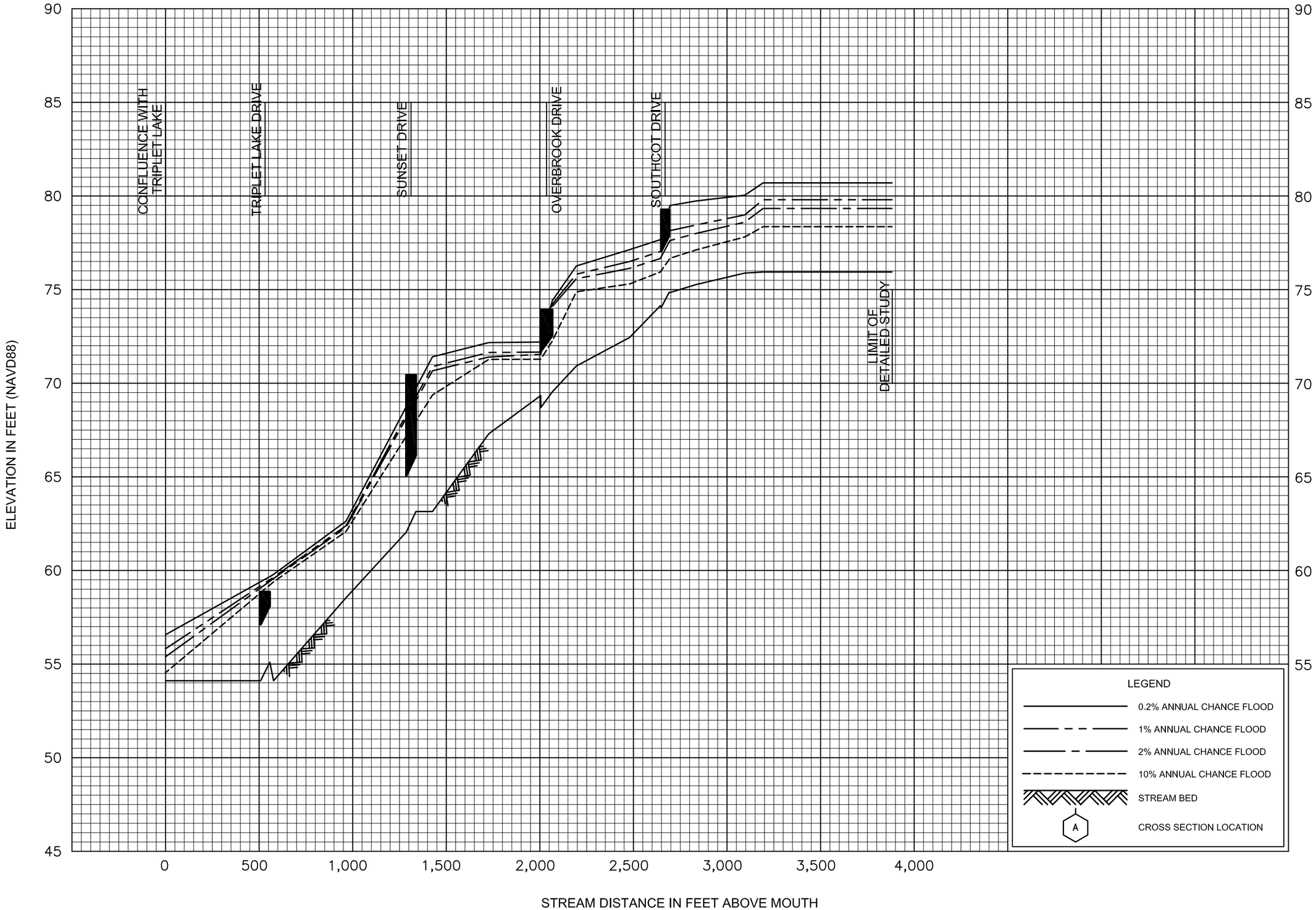


FLOOD PROFILES

GEE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL
AND INCORPORATED AREAS

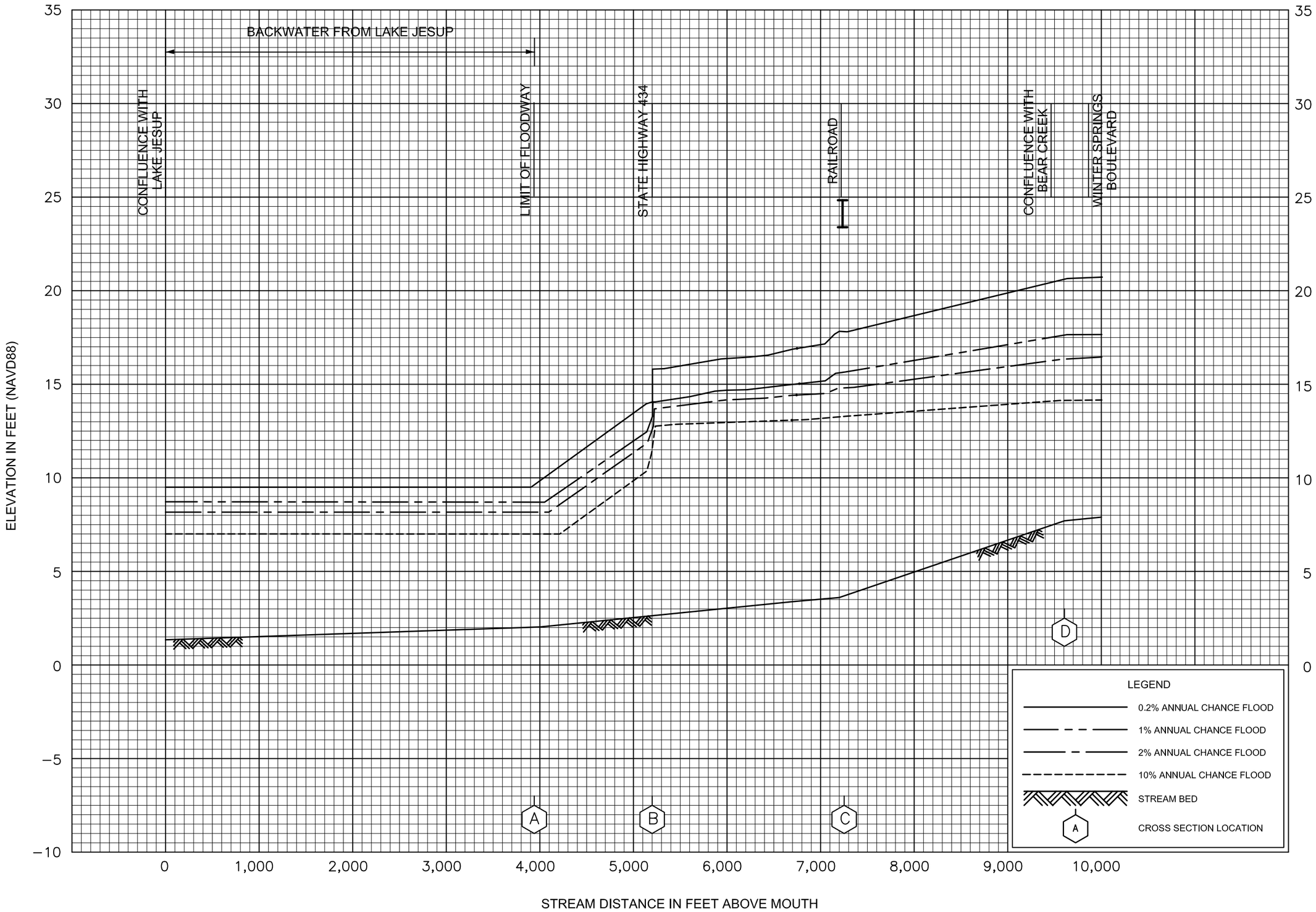


FLOOD PROFILES

GRASSY LAKE DRAINAGE CHANNEL TO TRIPLET LAKE

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL
AND INCORPORATED AREAS



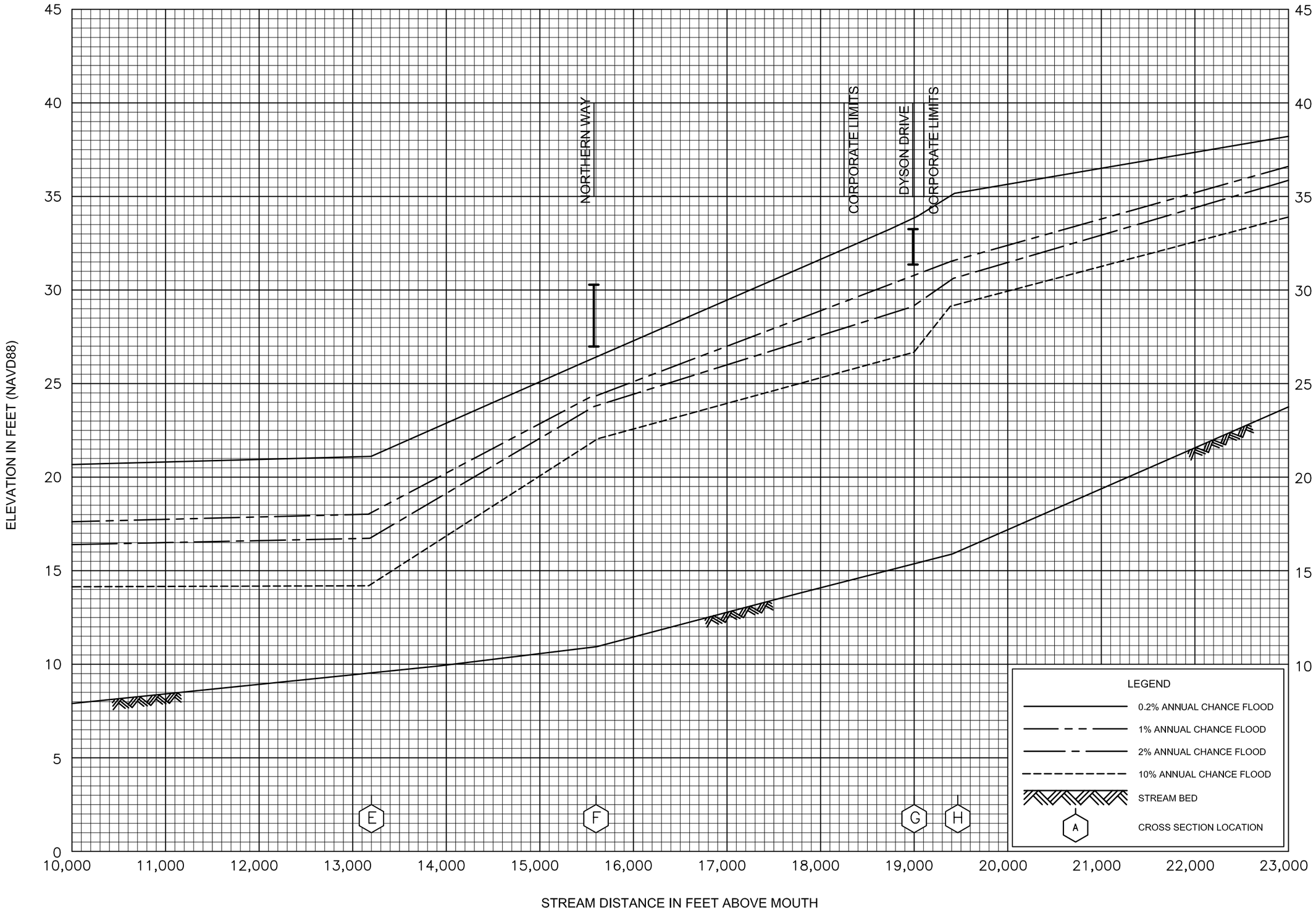
FLOOD PROFILES

HOWELL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS



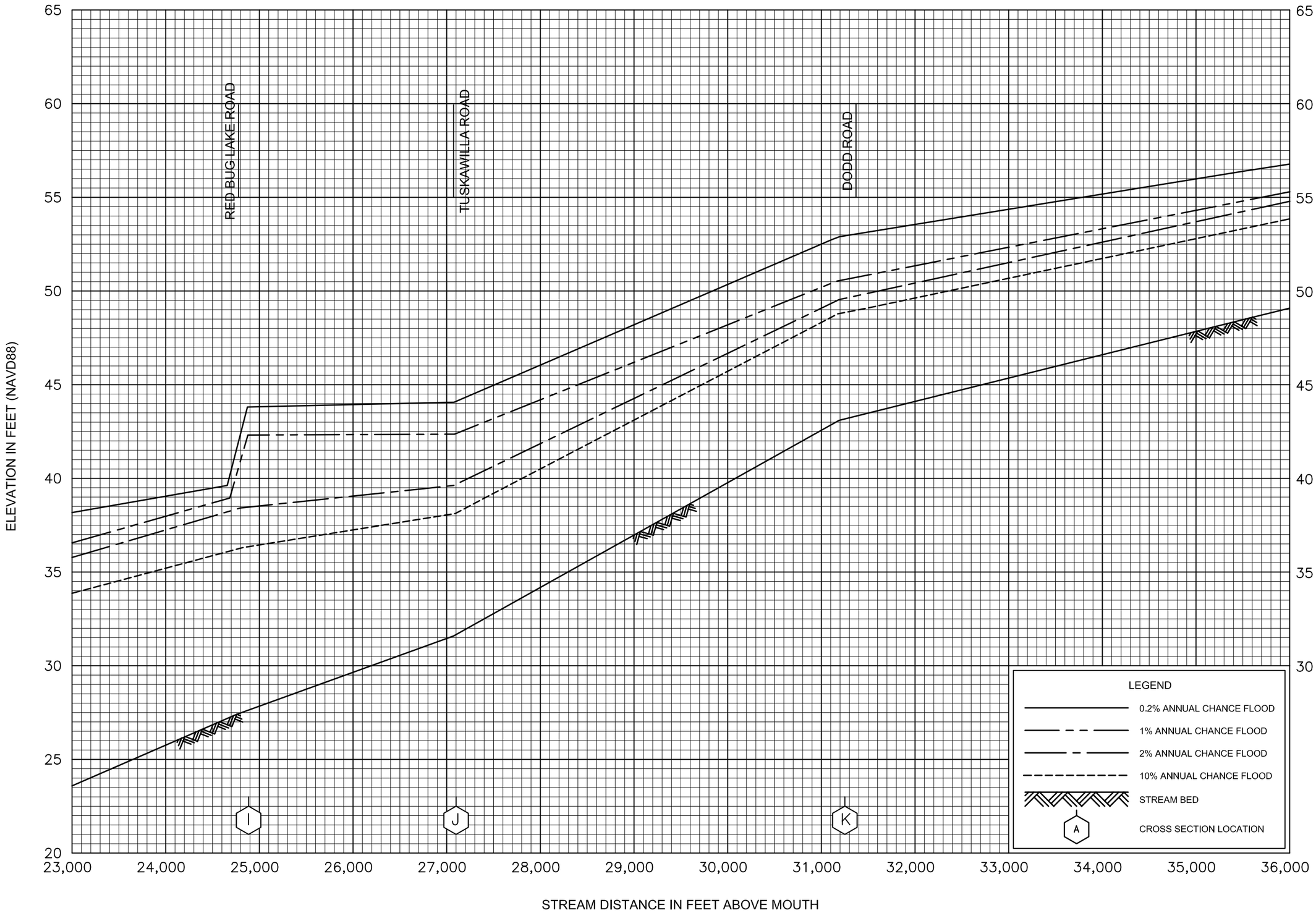
FLOOD PROFILES

HOWELL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS



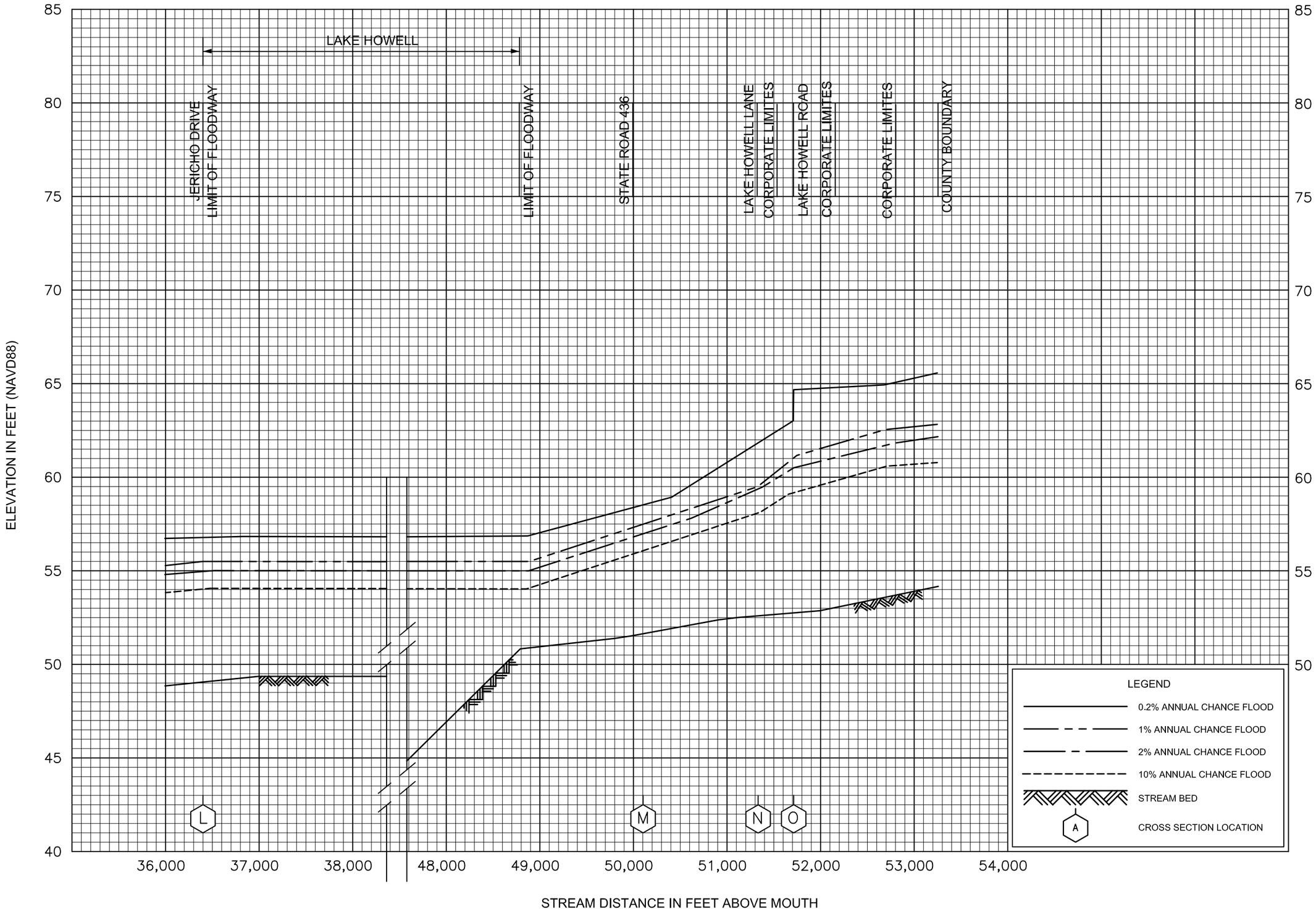
FLOOD PROFILES

HOWELL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS



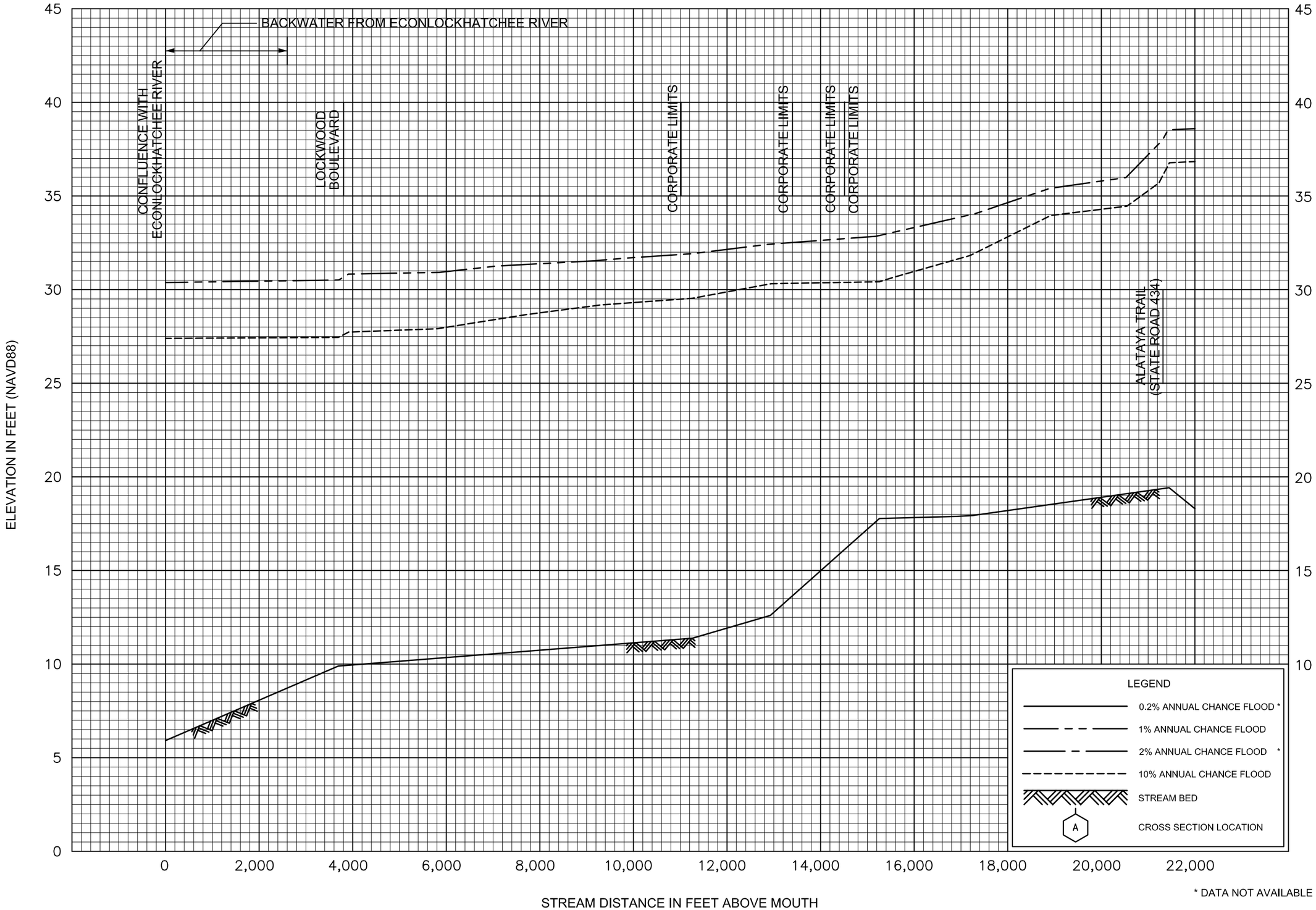
FLOOD PROFILES

HOWELL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS



FLOOD PROFILES

LITTLE ECONLOCKHATCHEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS

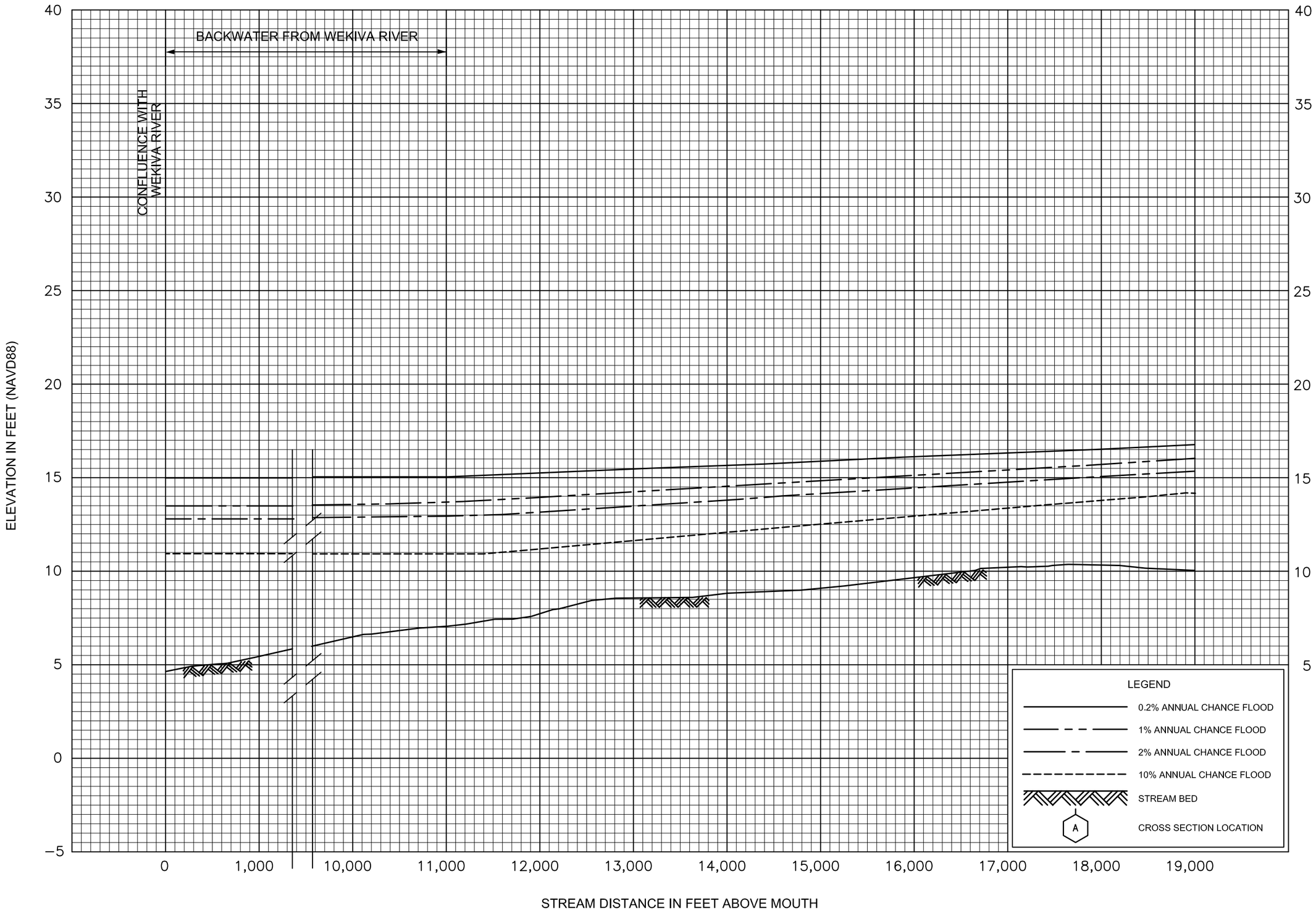
FLOOD PROFILES

LITTLE ECONLOCKHATCHEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS



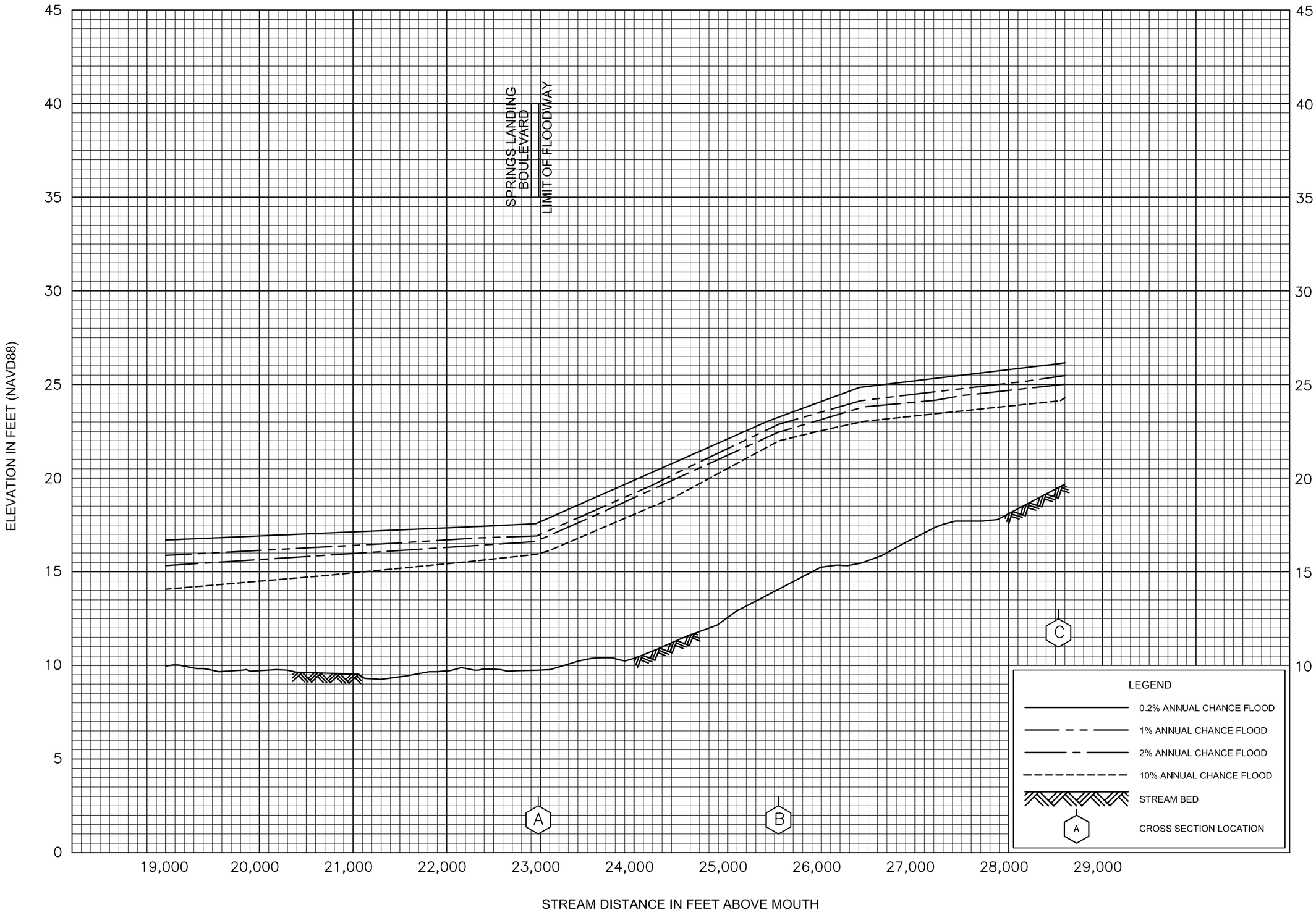
FLOOD PROFILES

LITTLE WEKIVA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS



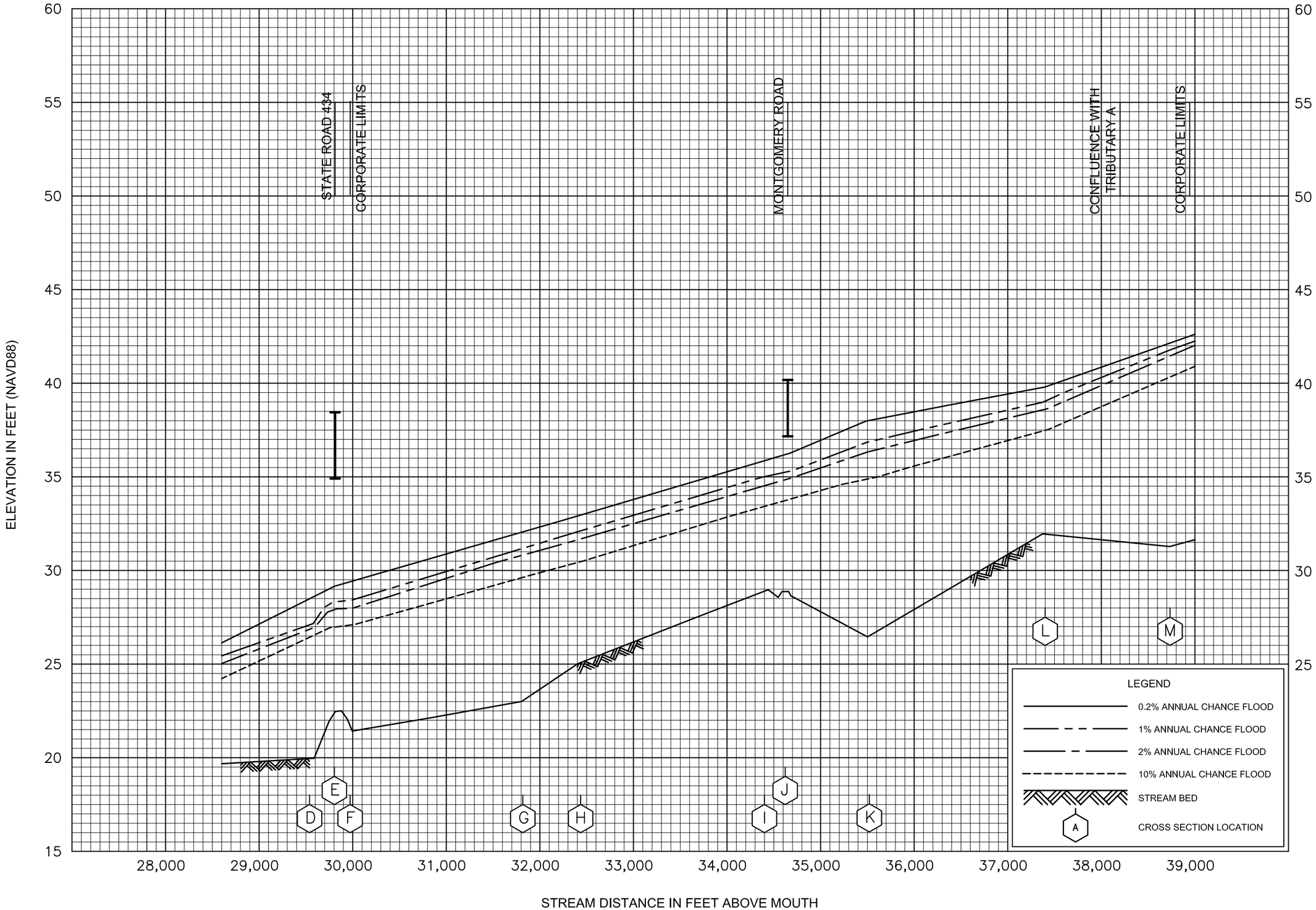
FLOOD PROFILES

LITTLE WEKIVA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS

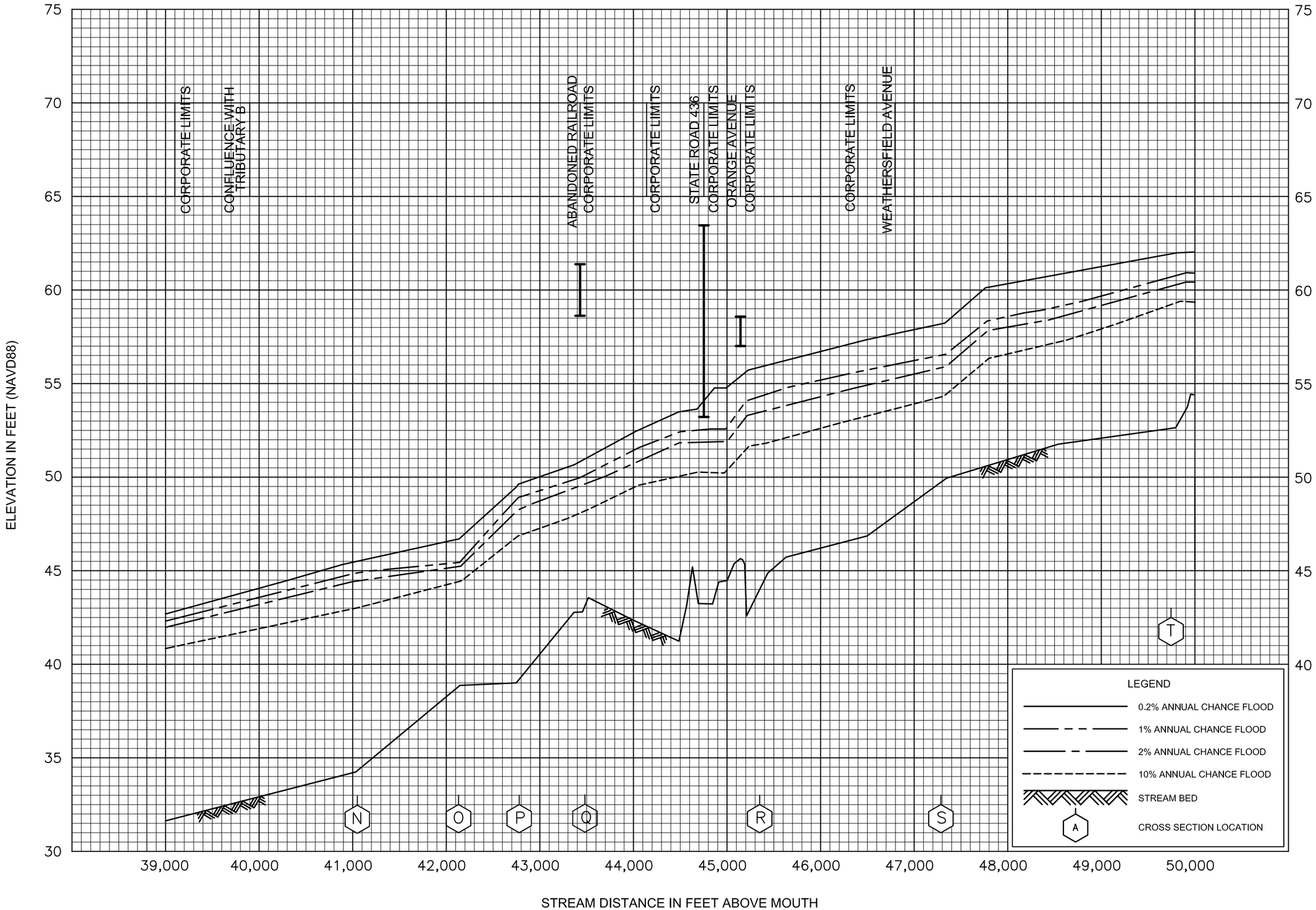


FLOOD PROFILES

LITTLE WEKIVA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL
AND INCORPORATED AREAS

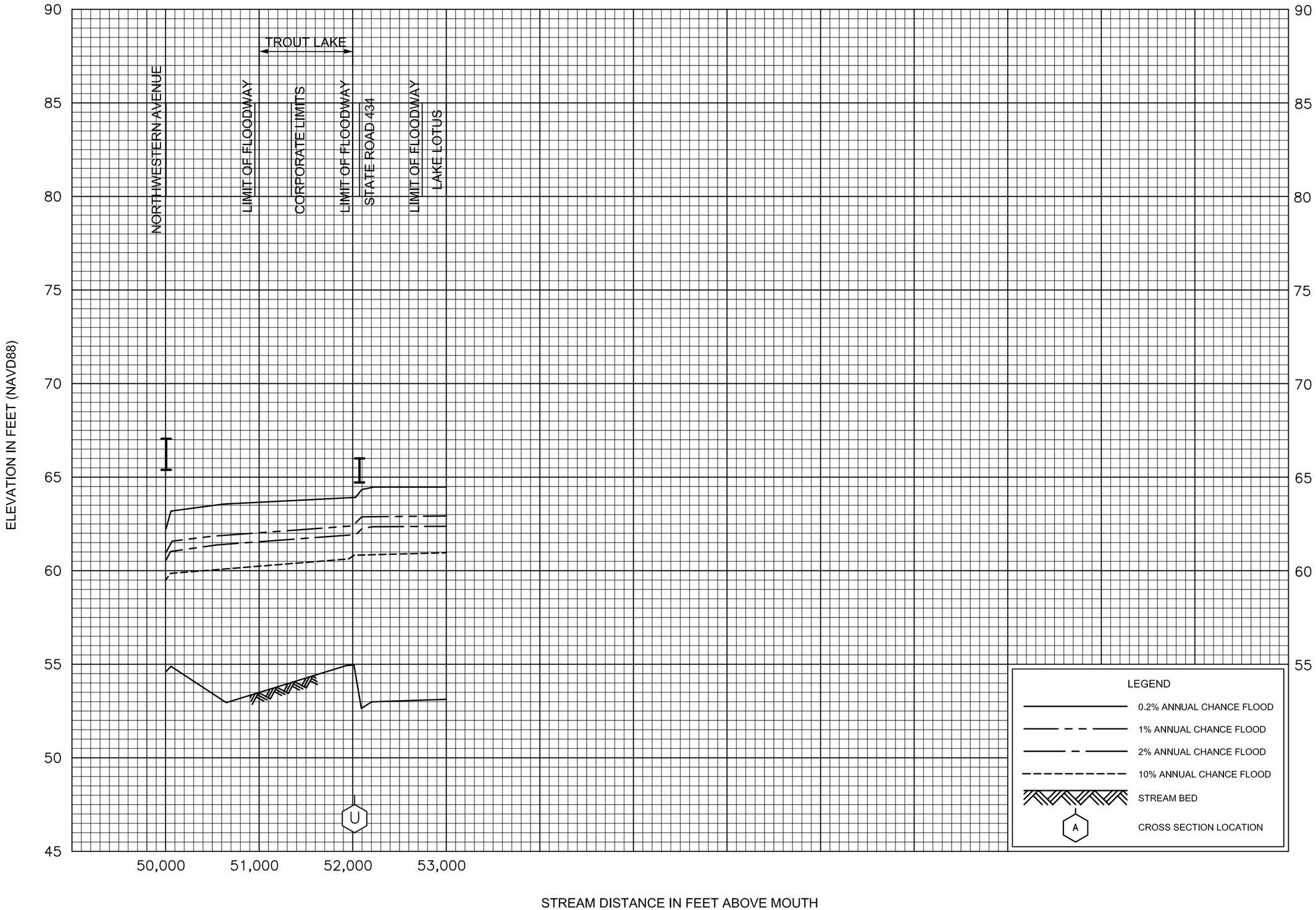


FLOOD PROFILES

LITTLE WEKIVA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL
AND INCORPORATED AREAS

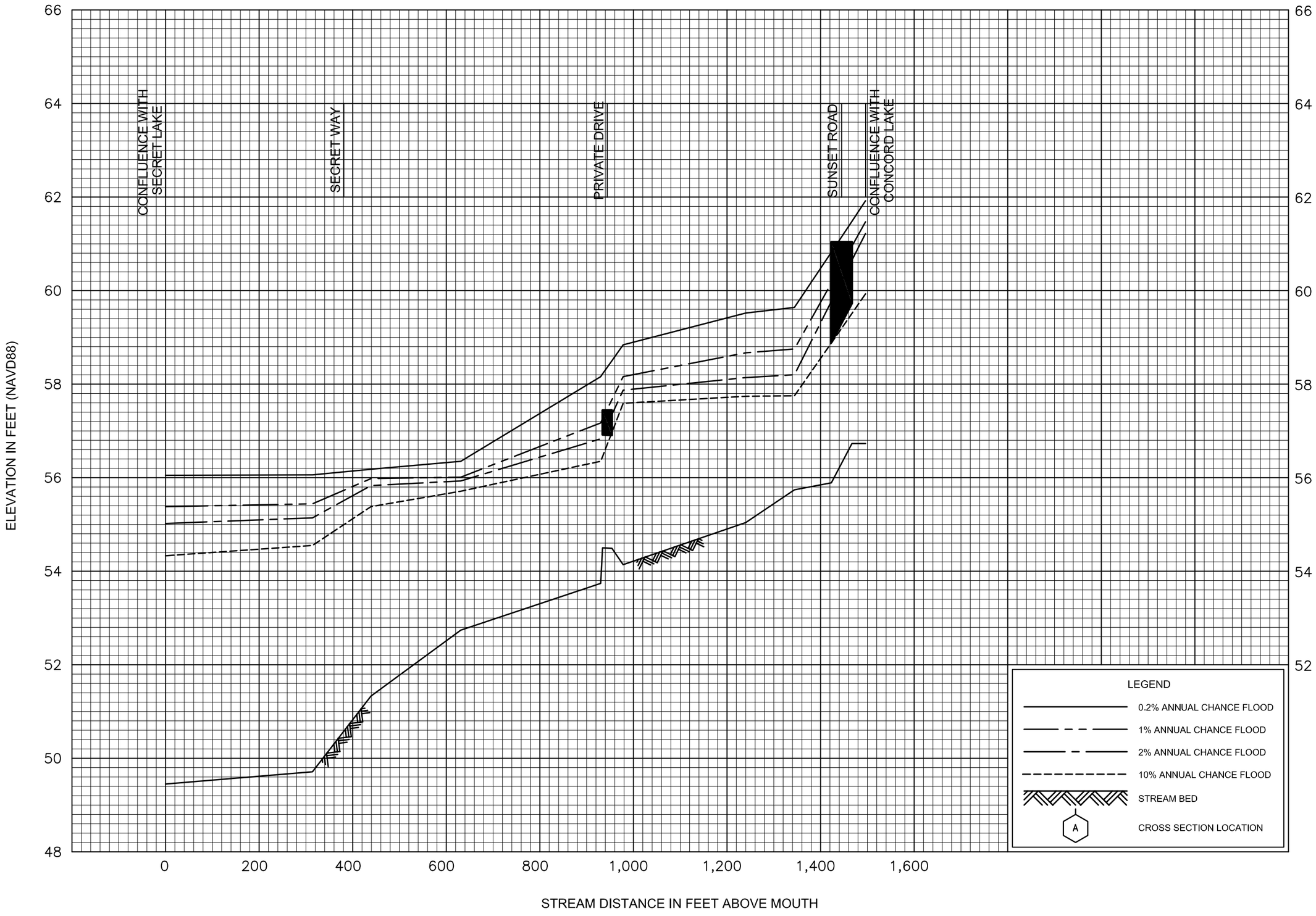


FLOOD PROFILES

LITTLE WEKIVA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL
AND INCORPORATED AREAS



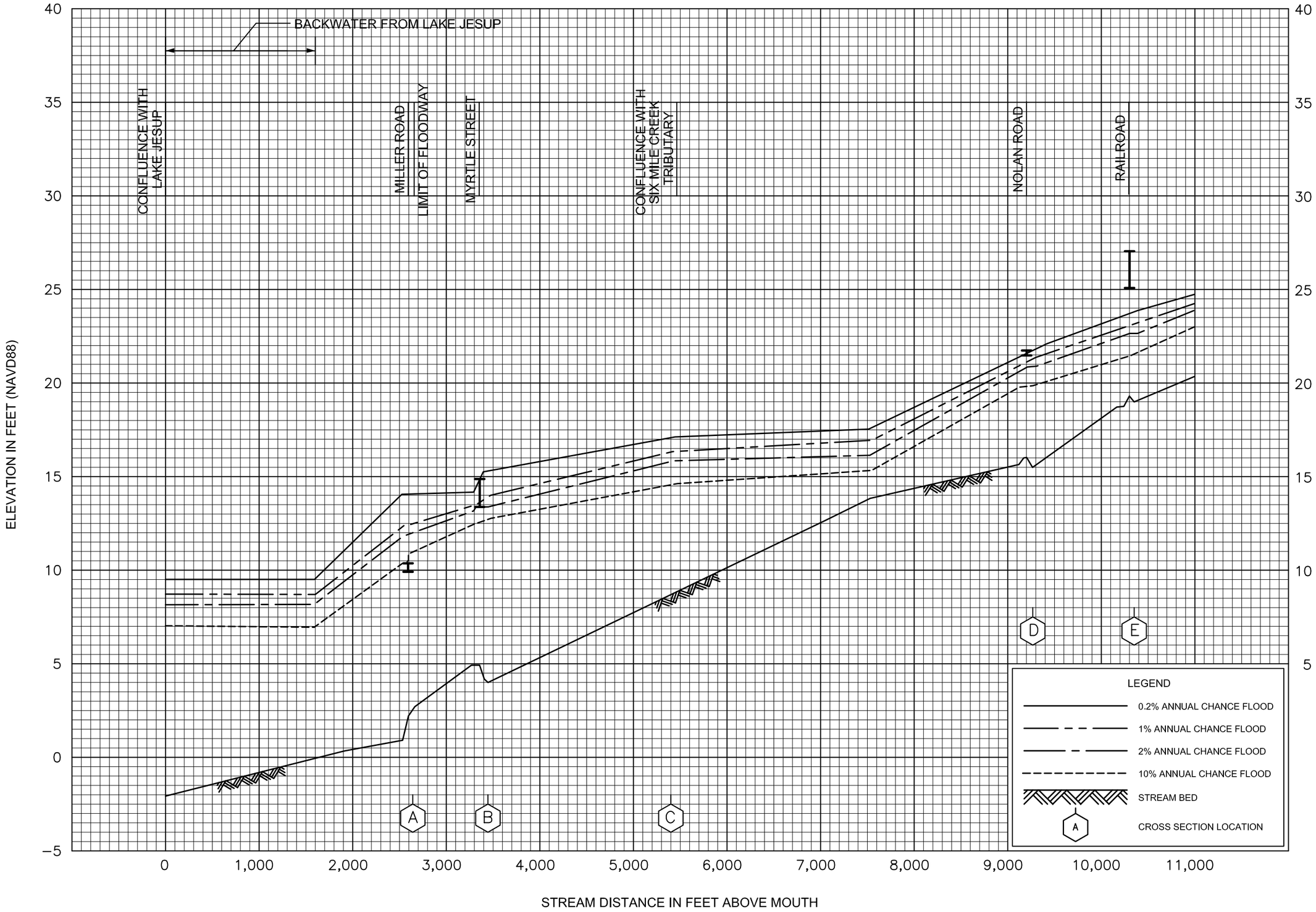
FLOOD PROFILES

SECRET LAKE DRAINAGE CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS



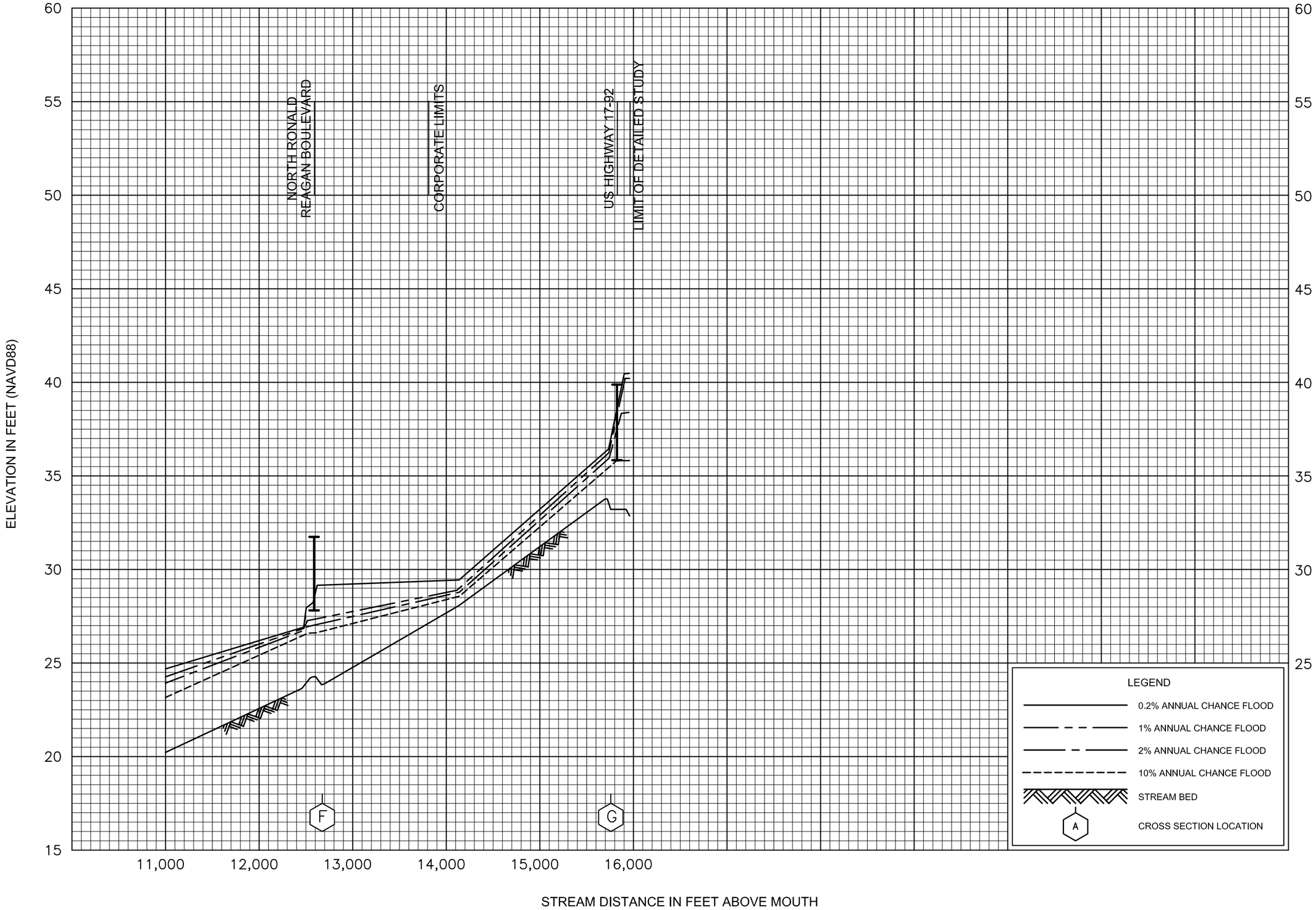
FLOOD PROFILES

SIX MILE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS



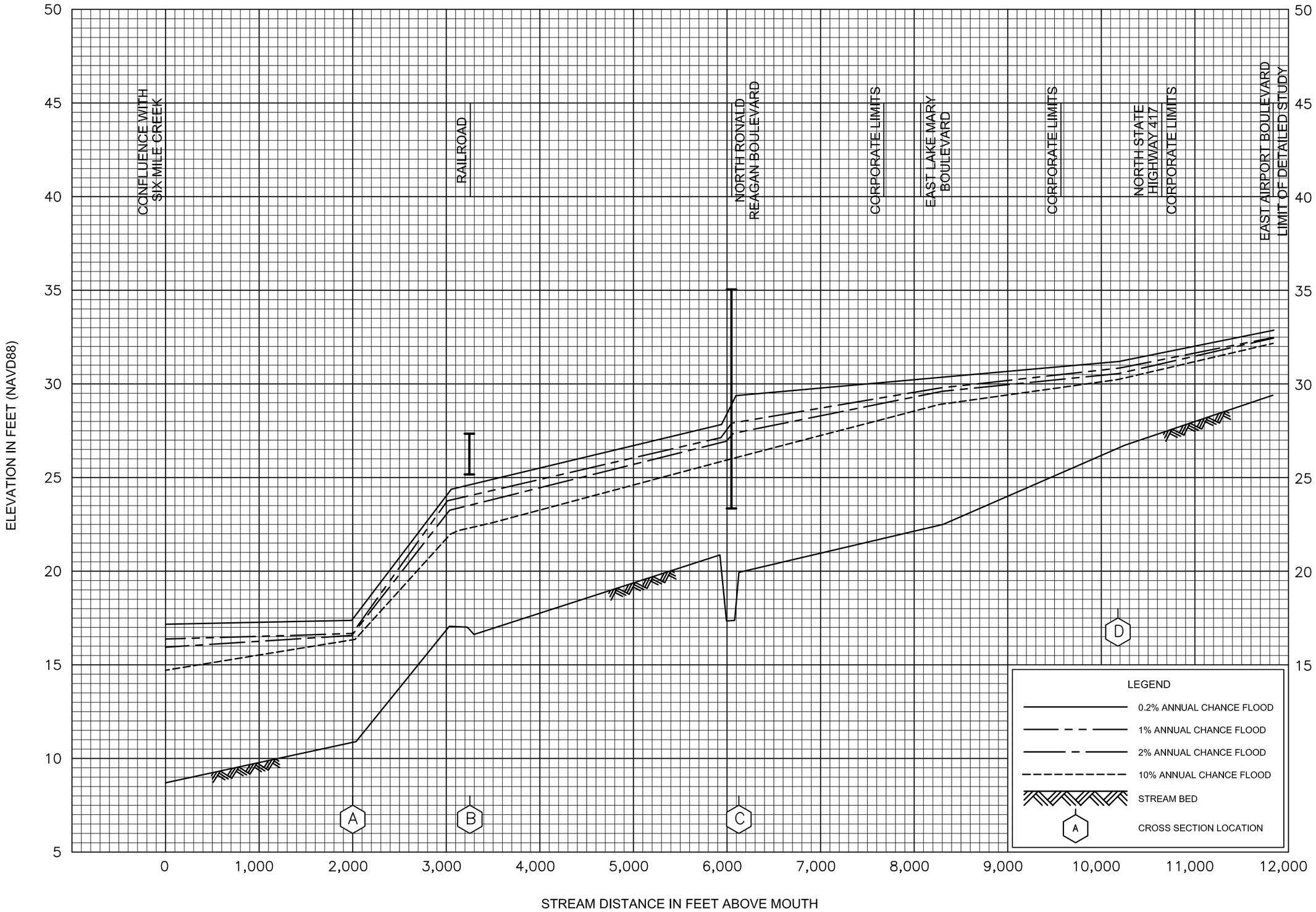
FLOOD PROFILES

SIX MILE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS



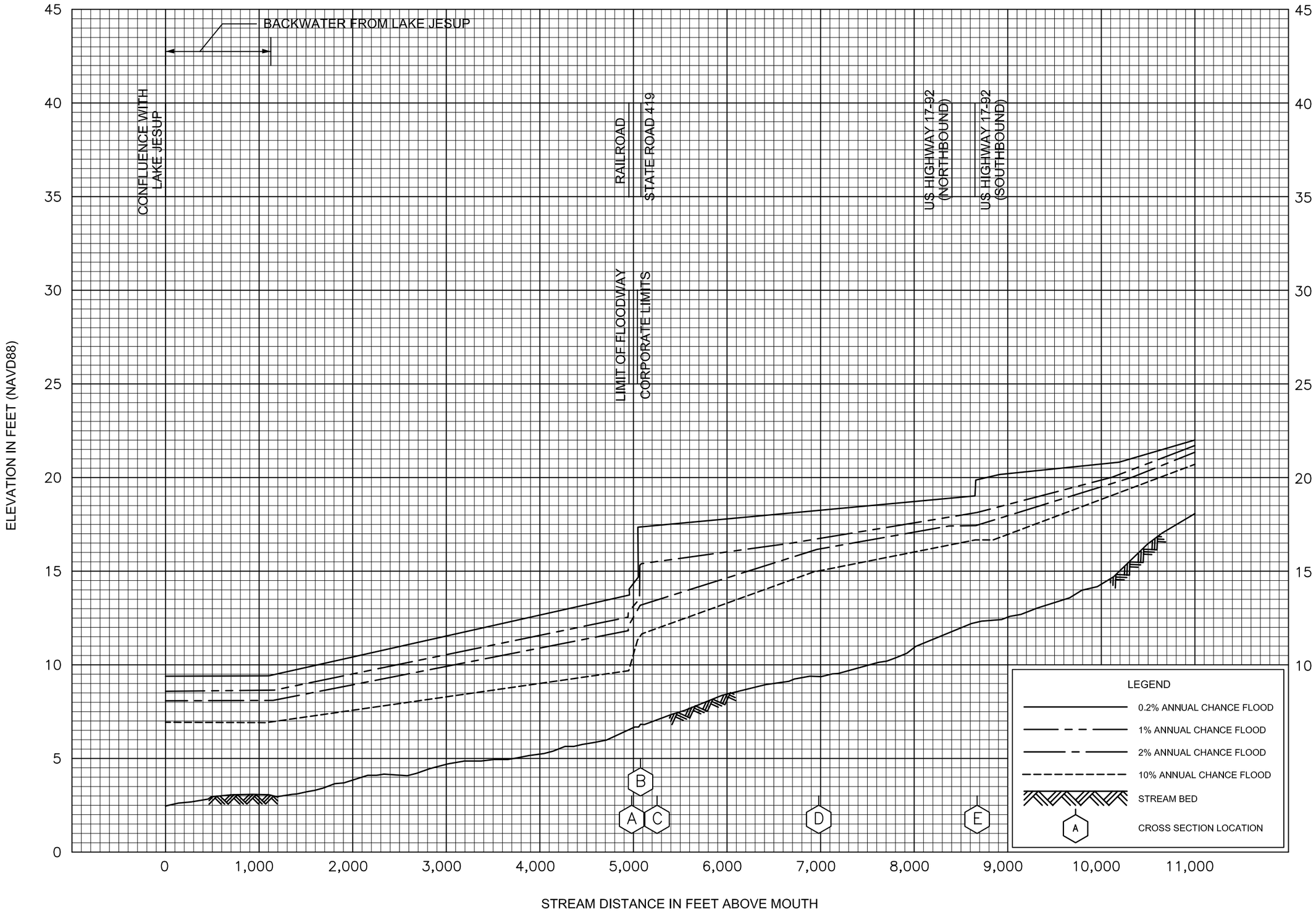
FLOOD PROFILES

SIX MILE CREEK TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS



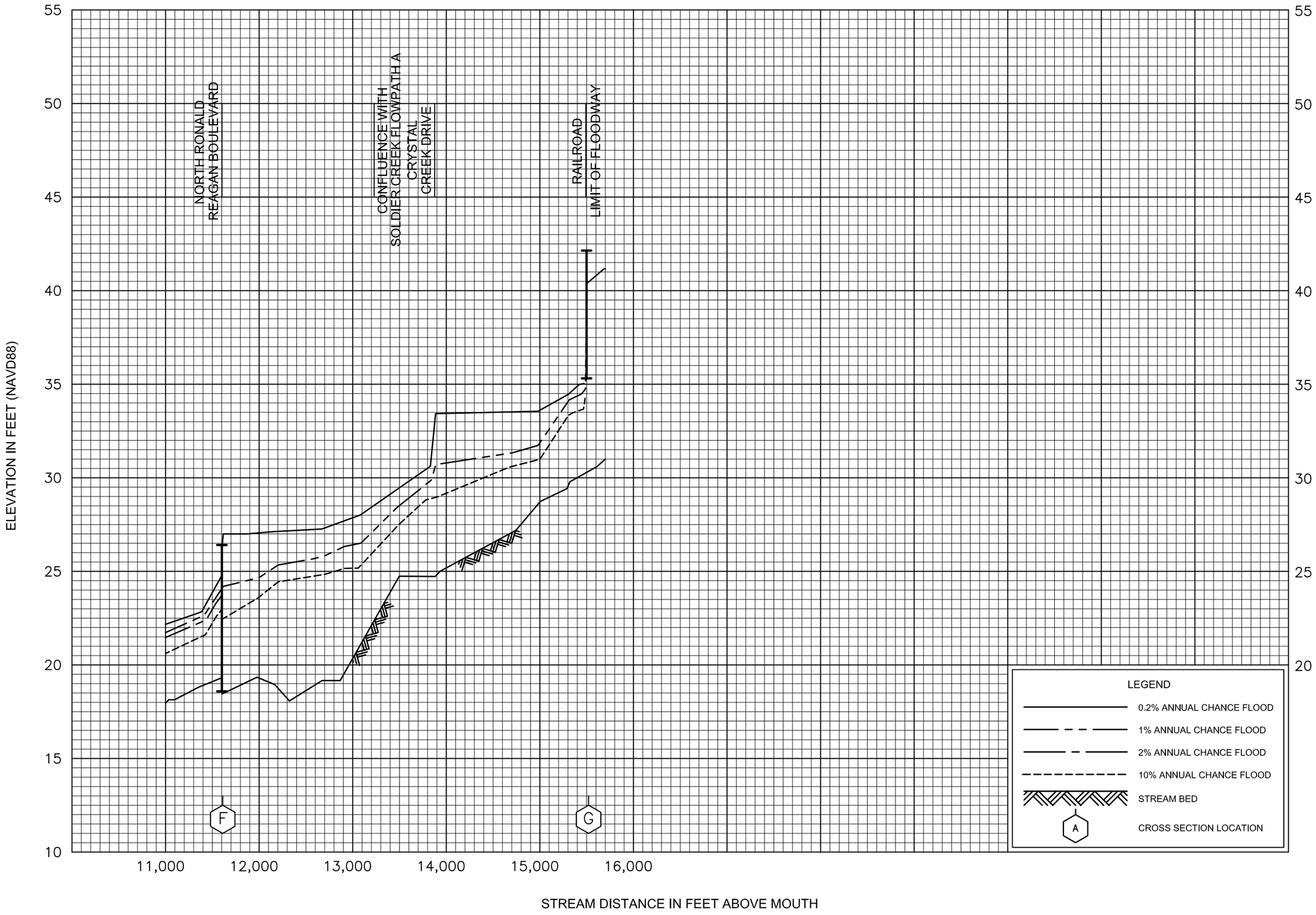
FLOOD PROFILES

SOLDIER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS



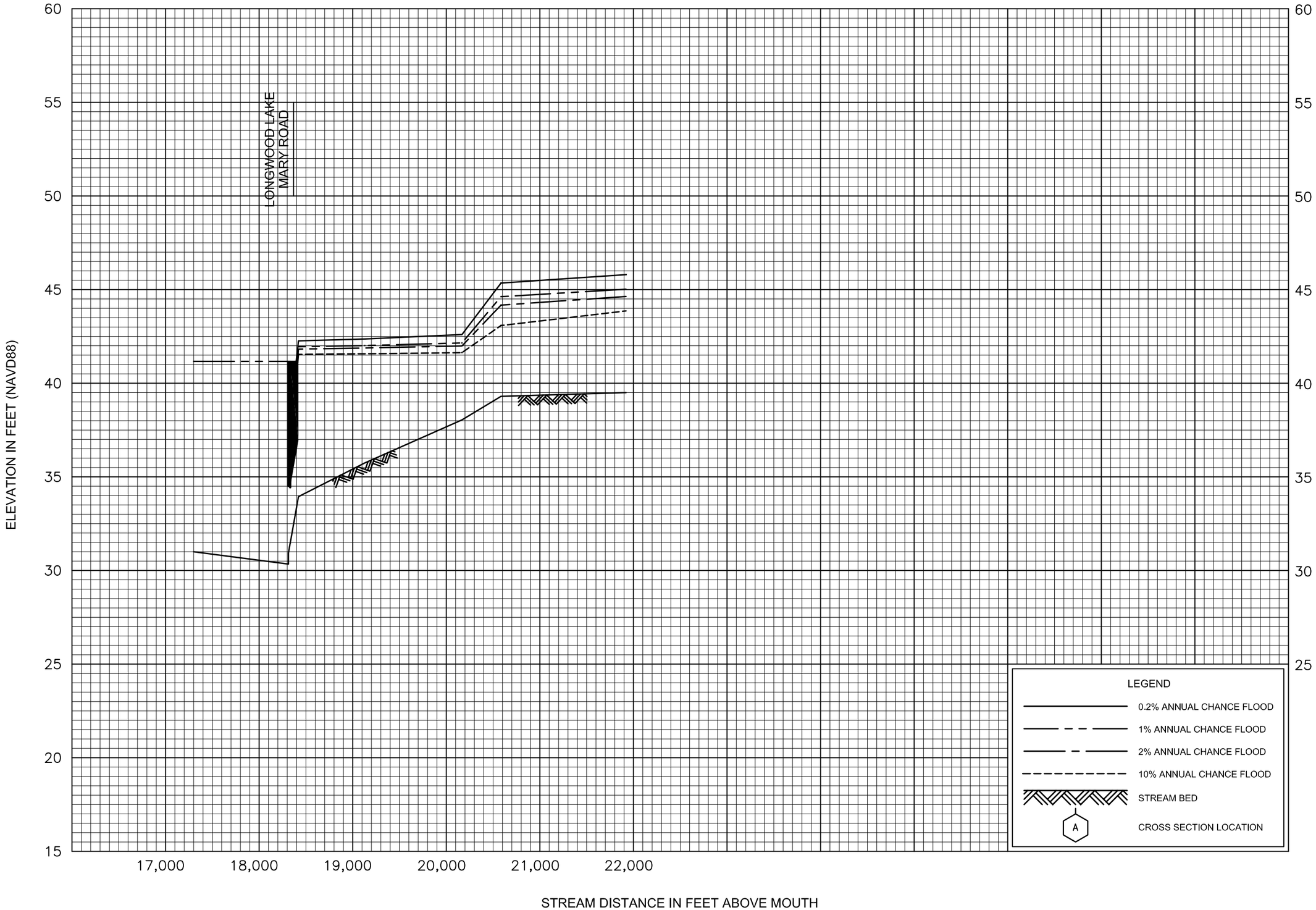
FLOOD PROFILES

SOLDIER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS

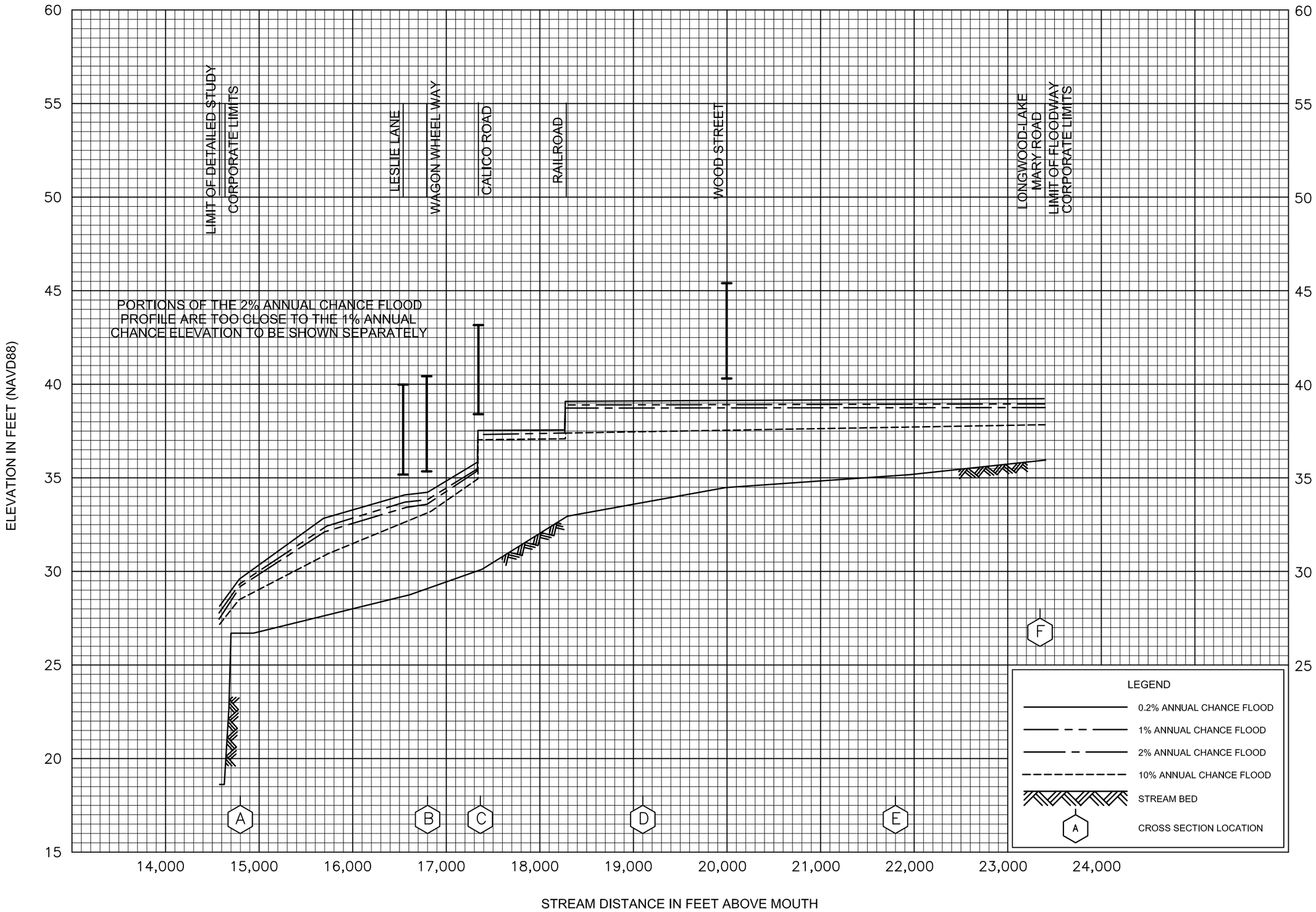


FLOOD PROFILES

SOLDIER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL
AND INCORPORATED AREAS



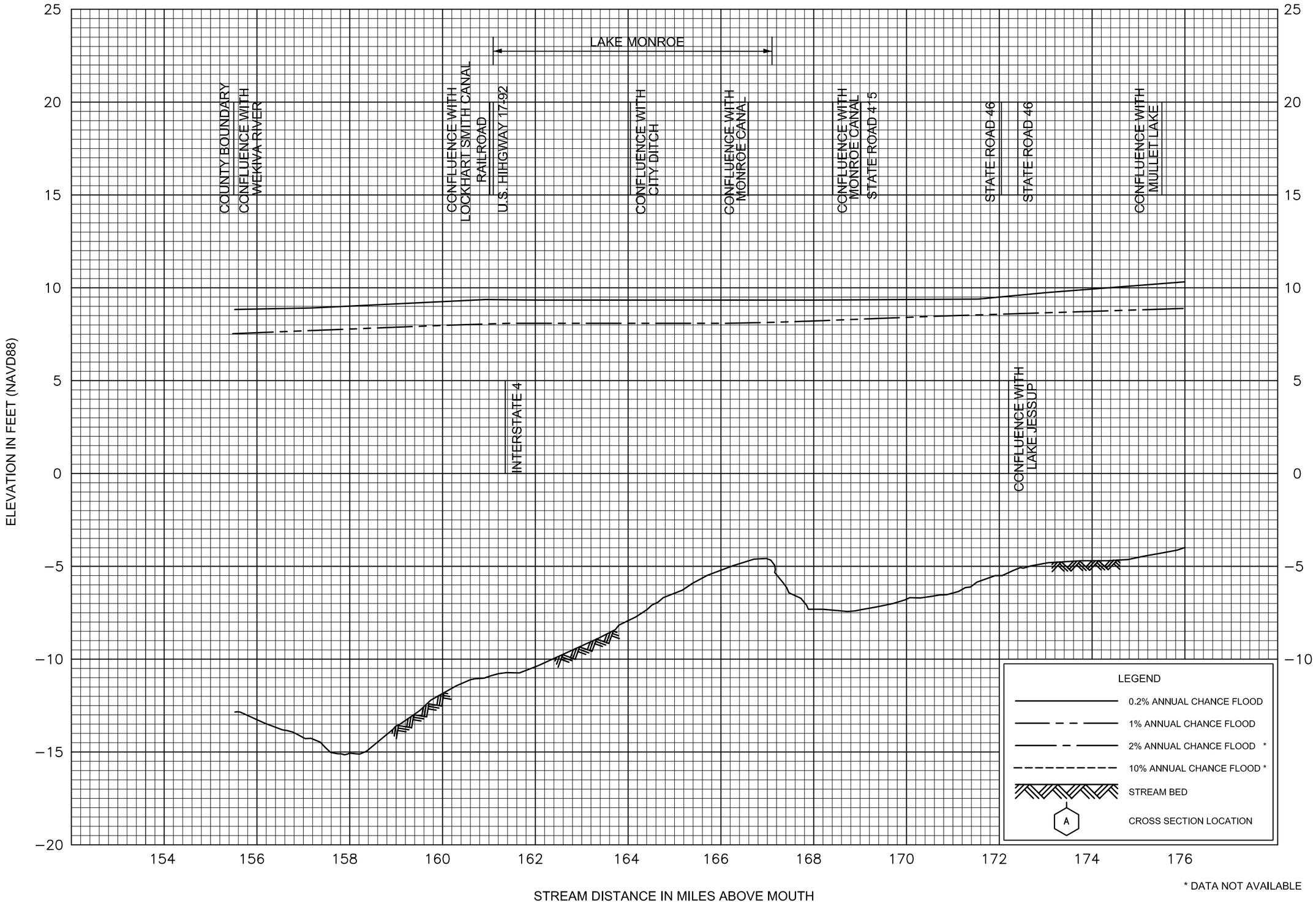
FLOOD PROFILES

SOLDIER CREEK FLOWPATH A

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS



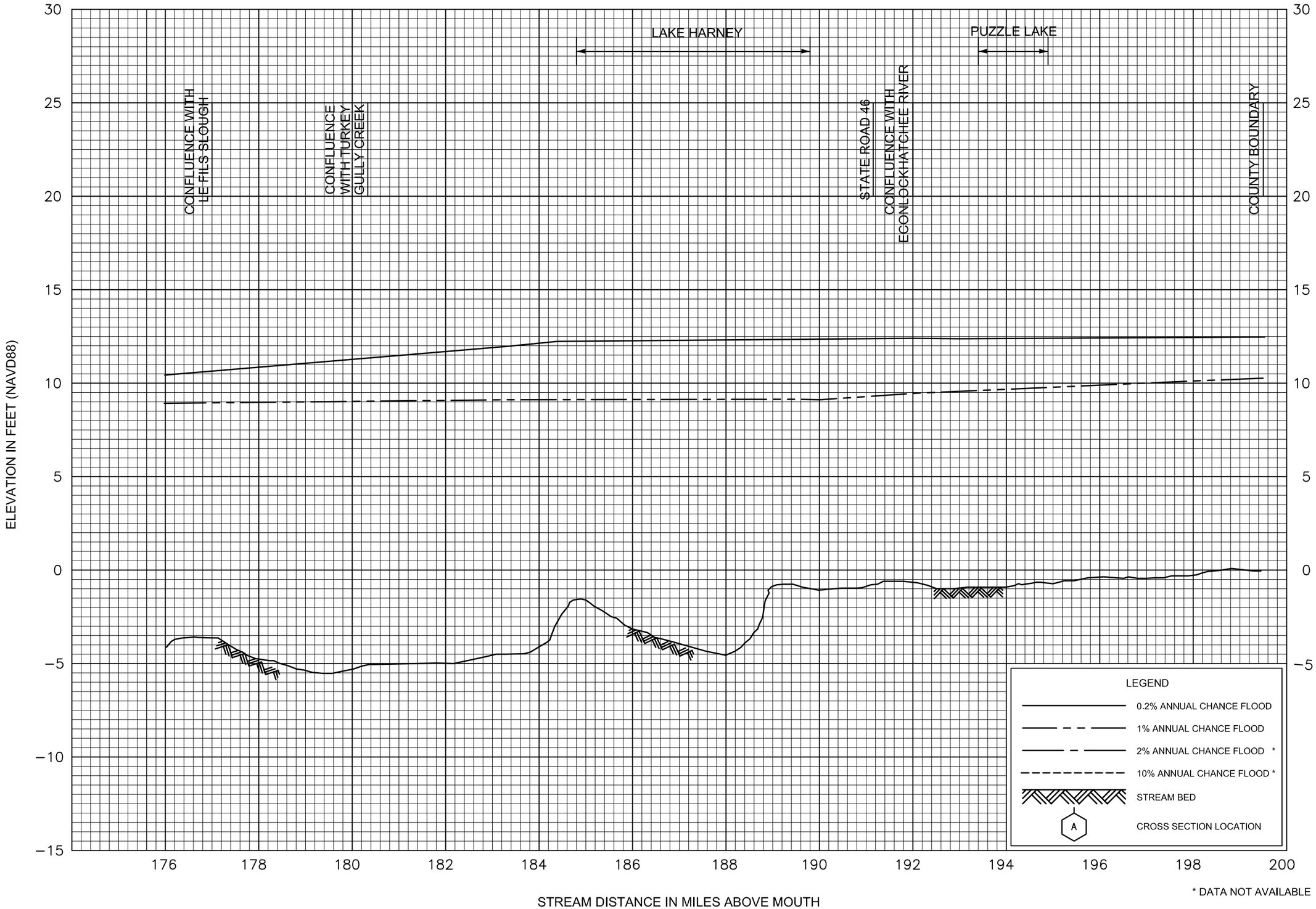
FLOOD PROFILES

ST. JOHNS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS

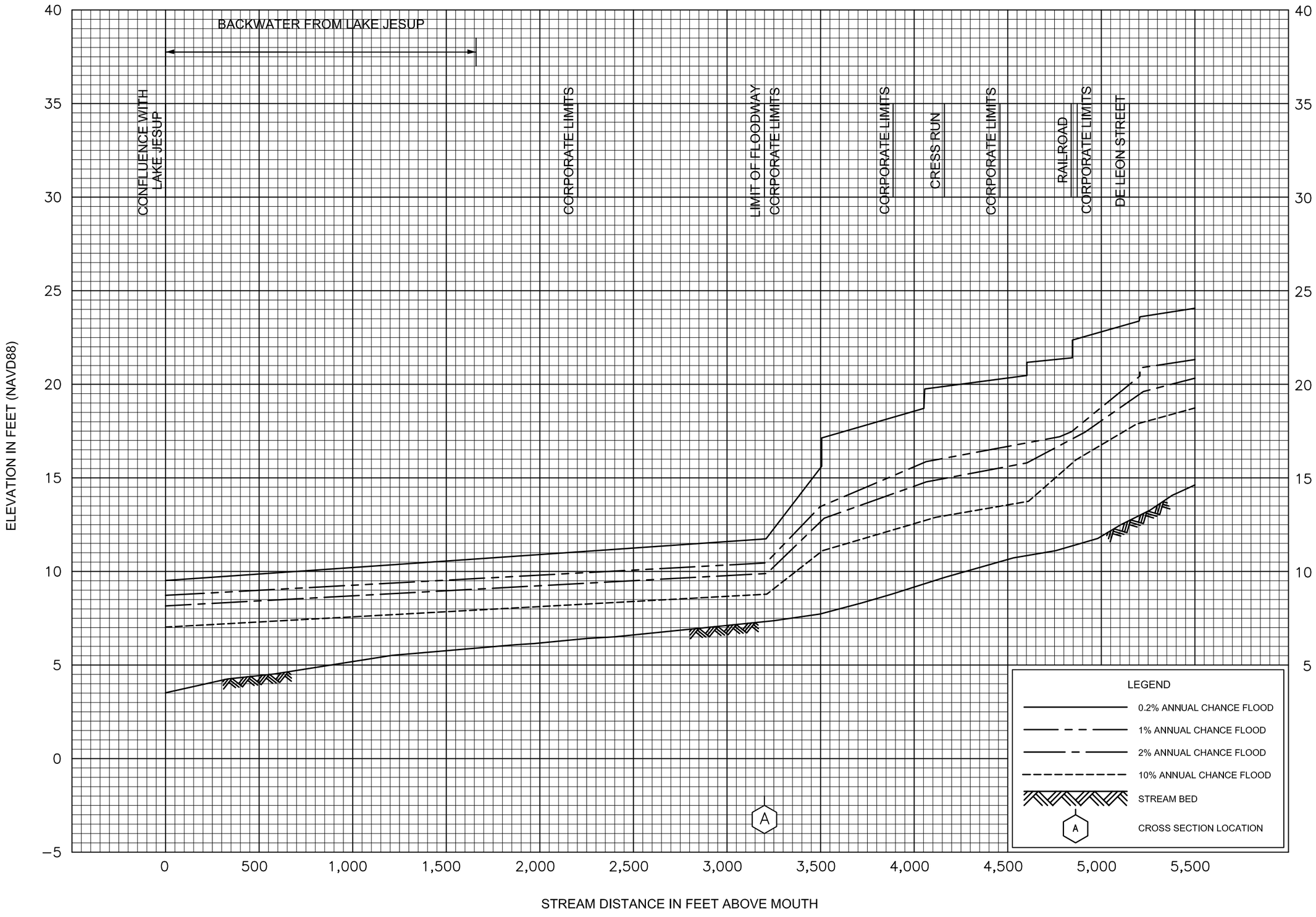


FLOOD PROFILES

ST. JOHNS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL
AND INCORPORATED AREAS



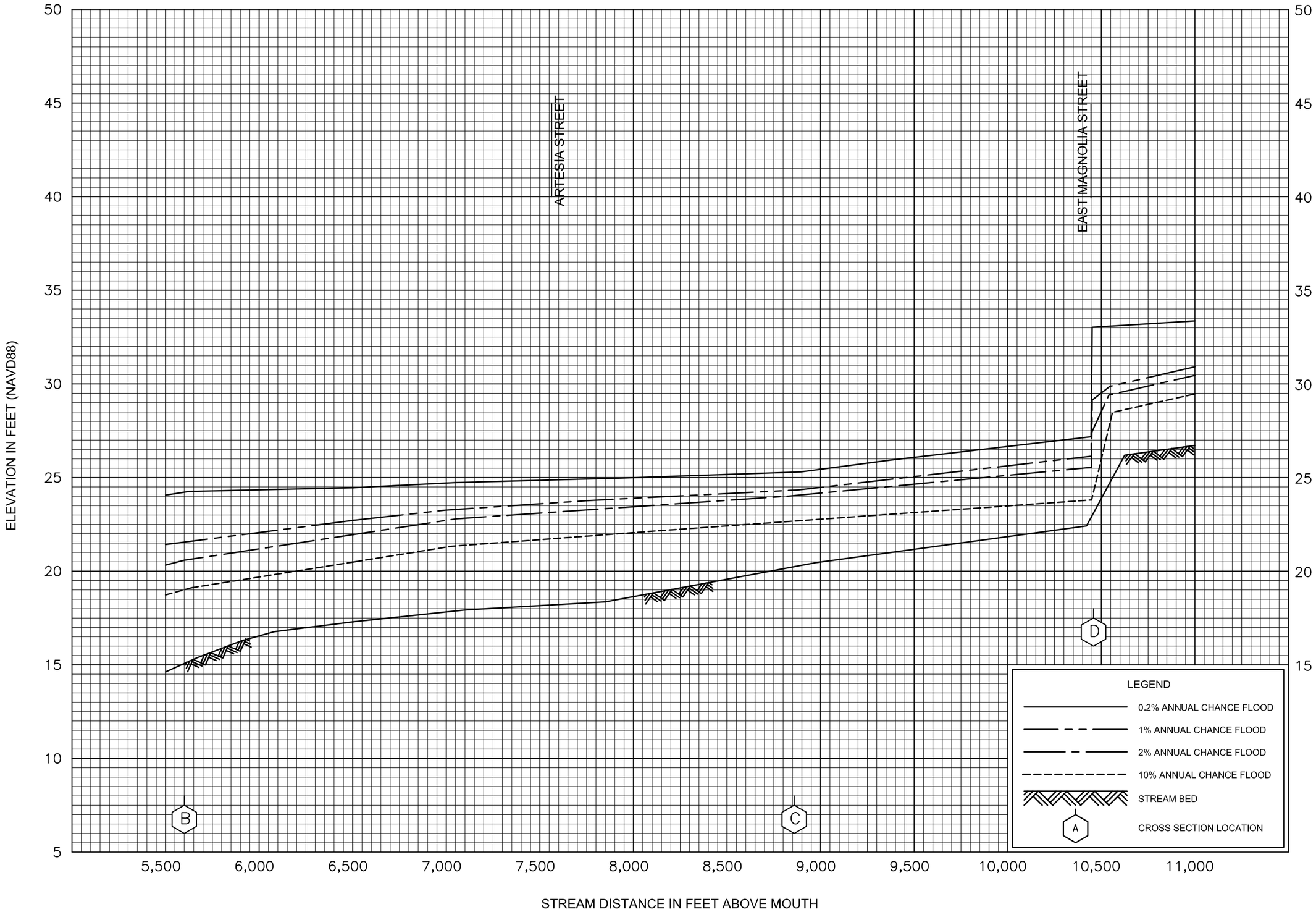
FLOOD PROFILES

SWEETWATER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS



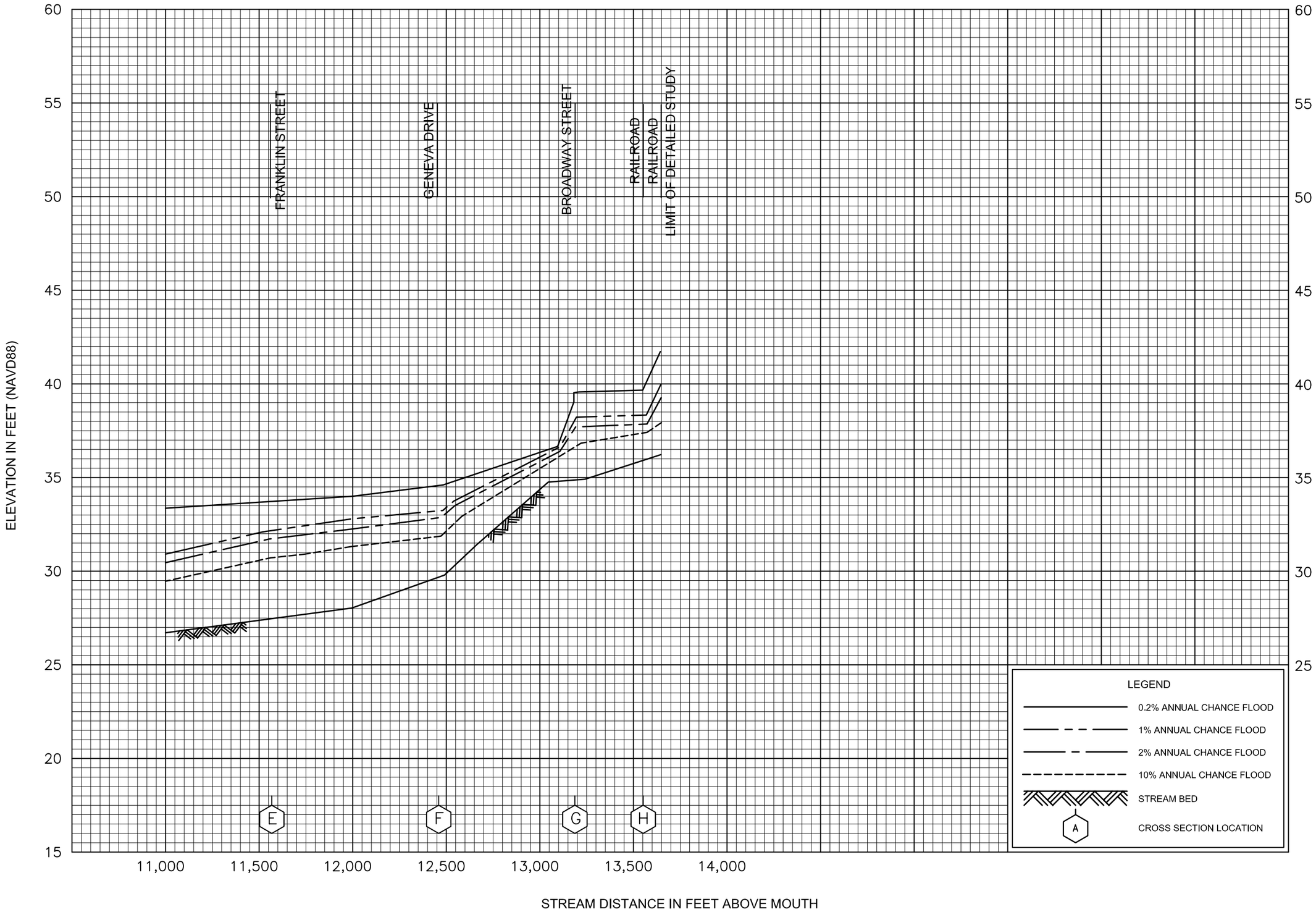
FLOOD PROFILES

SWEETWATER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS



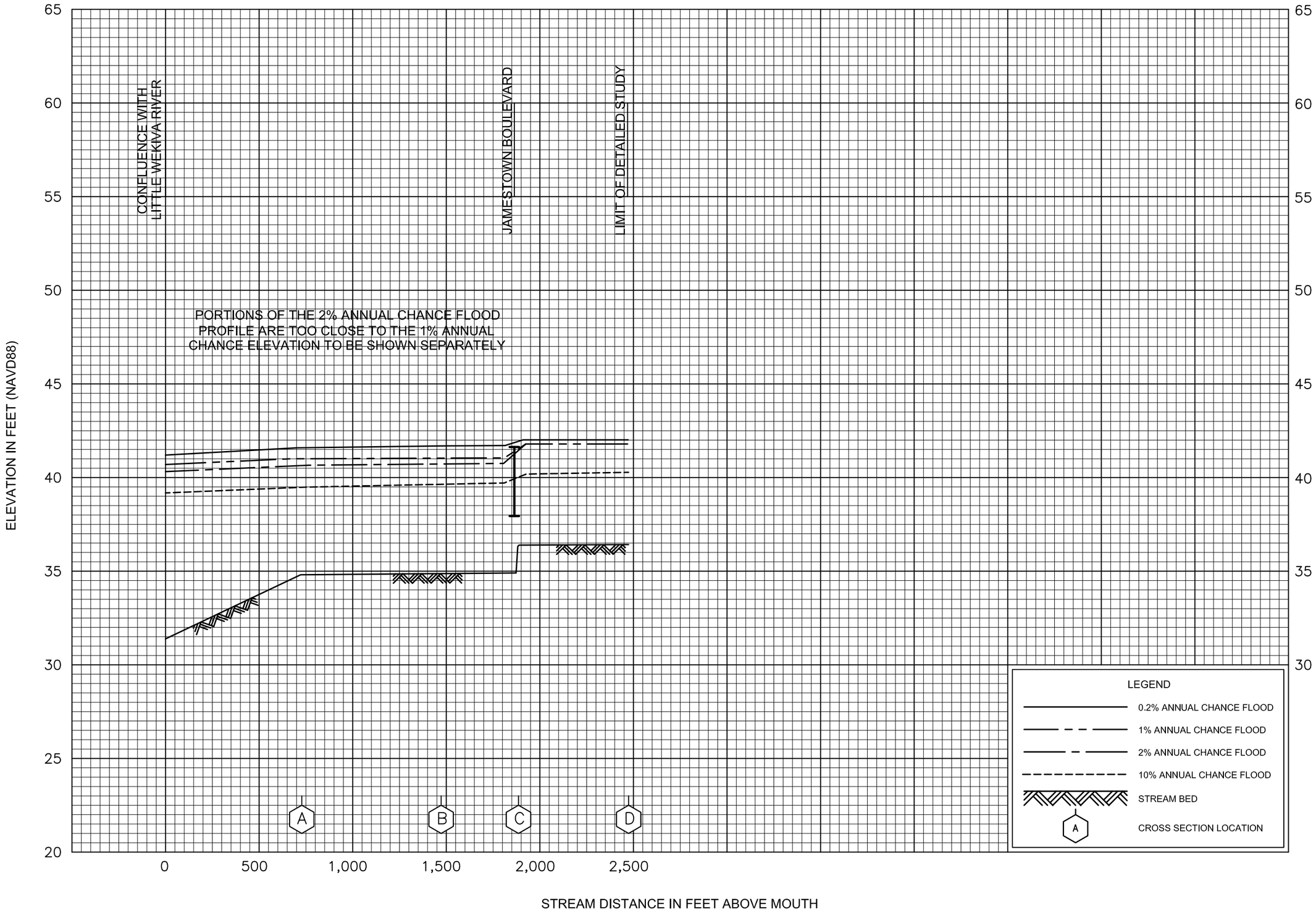
FLOOD PROFILES

SWEETWATER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS



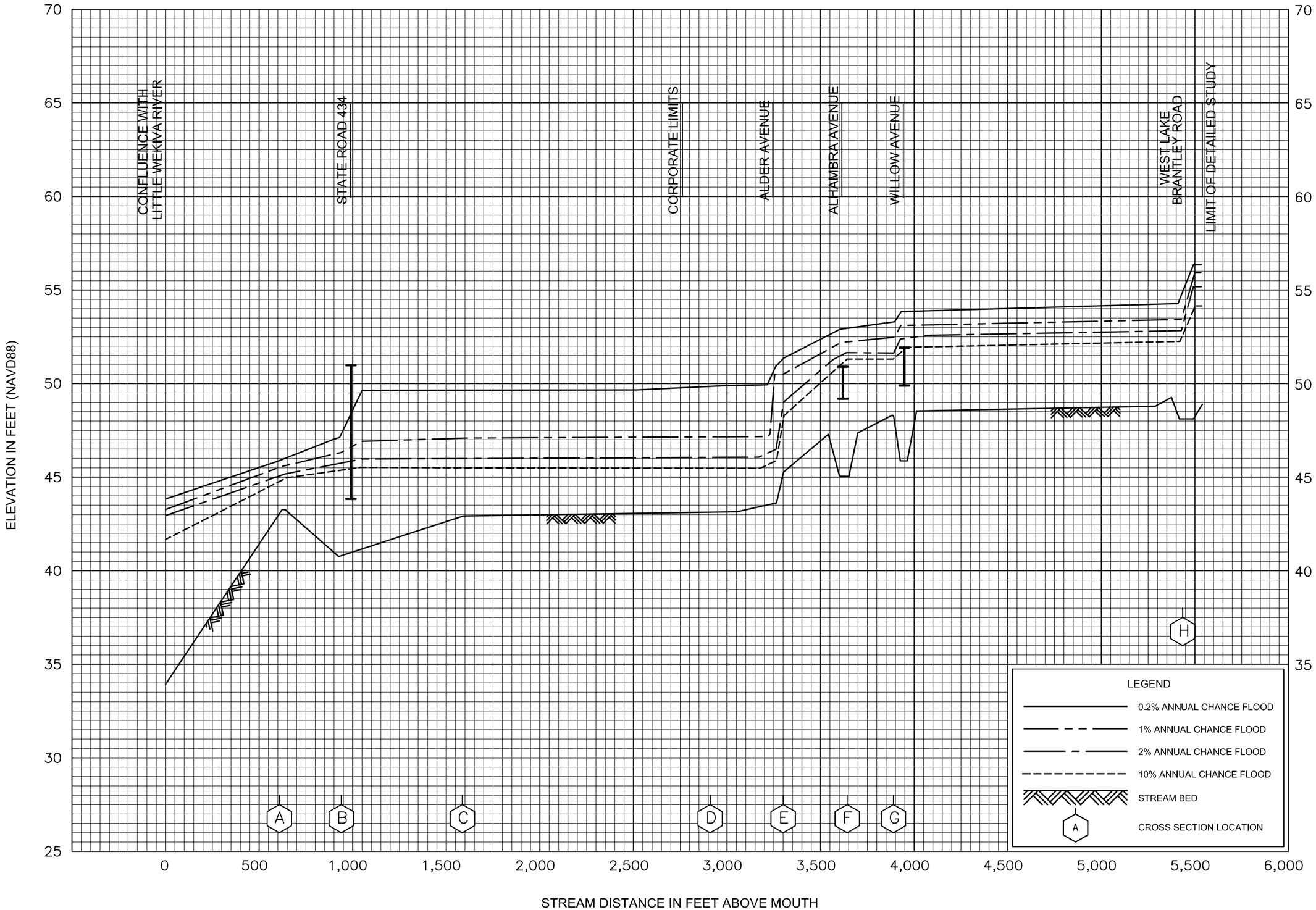
FLOOD PROFILES

TRIBUTARY A

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS



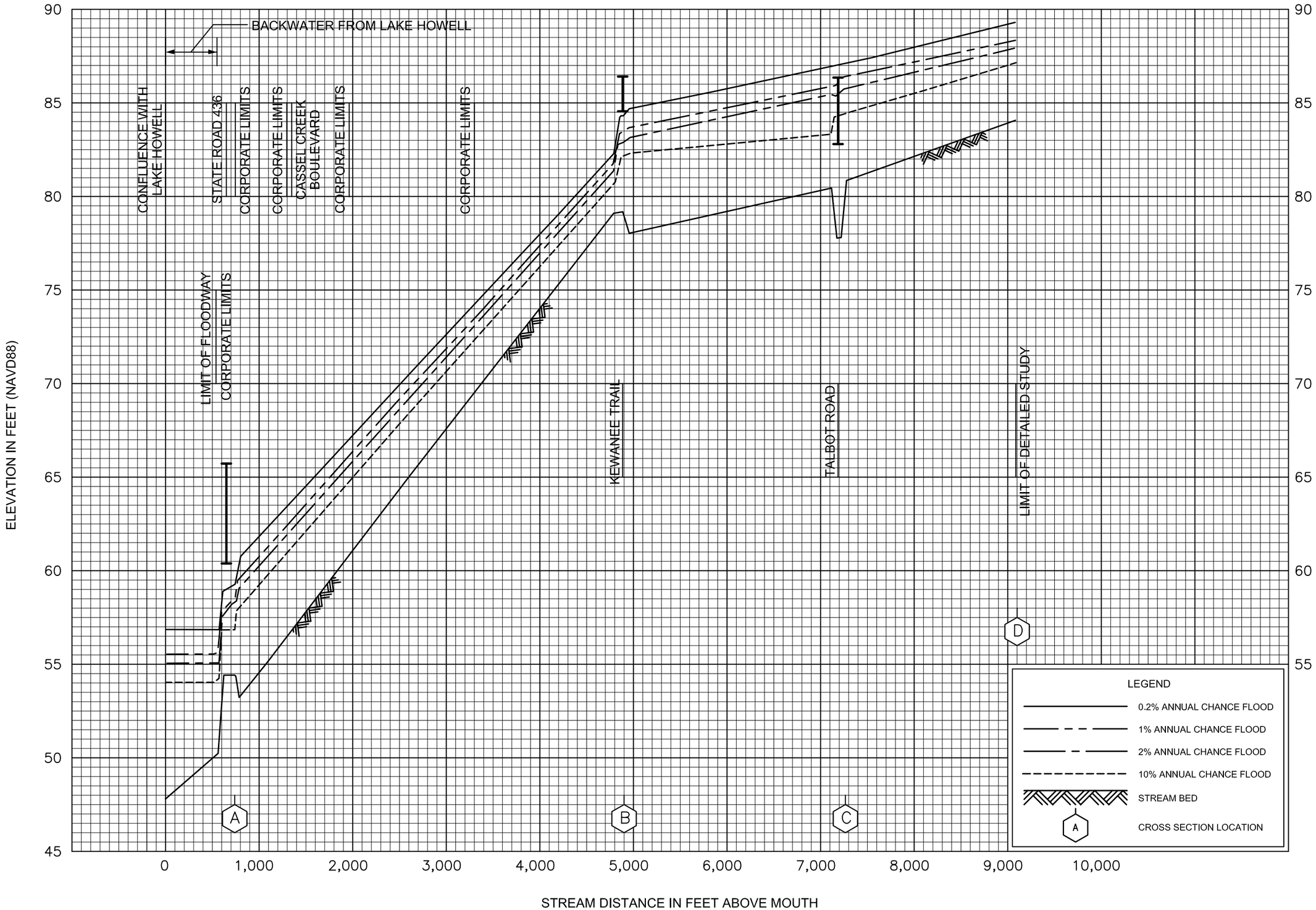
FLOOD PROFILES

TRIBUTARY B

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS

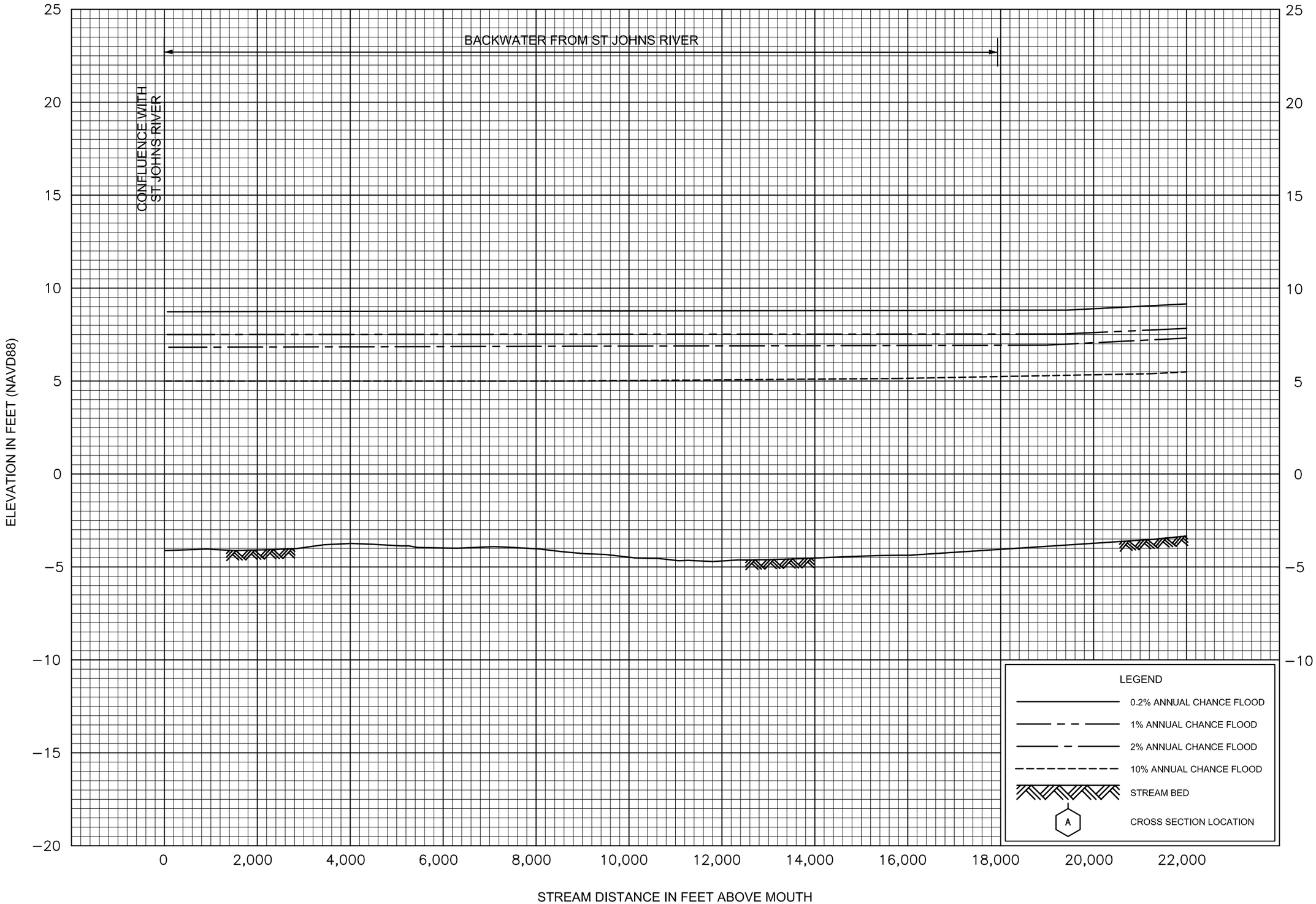


FLOOD PROFILES

TRIBUTARY TO LAKE HOWELL

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL
AND INCORPORATED AREAS

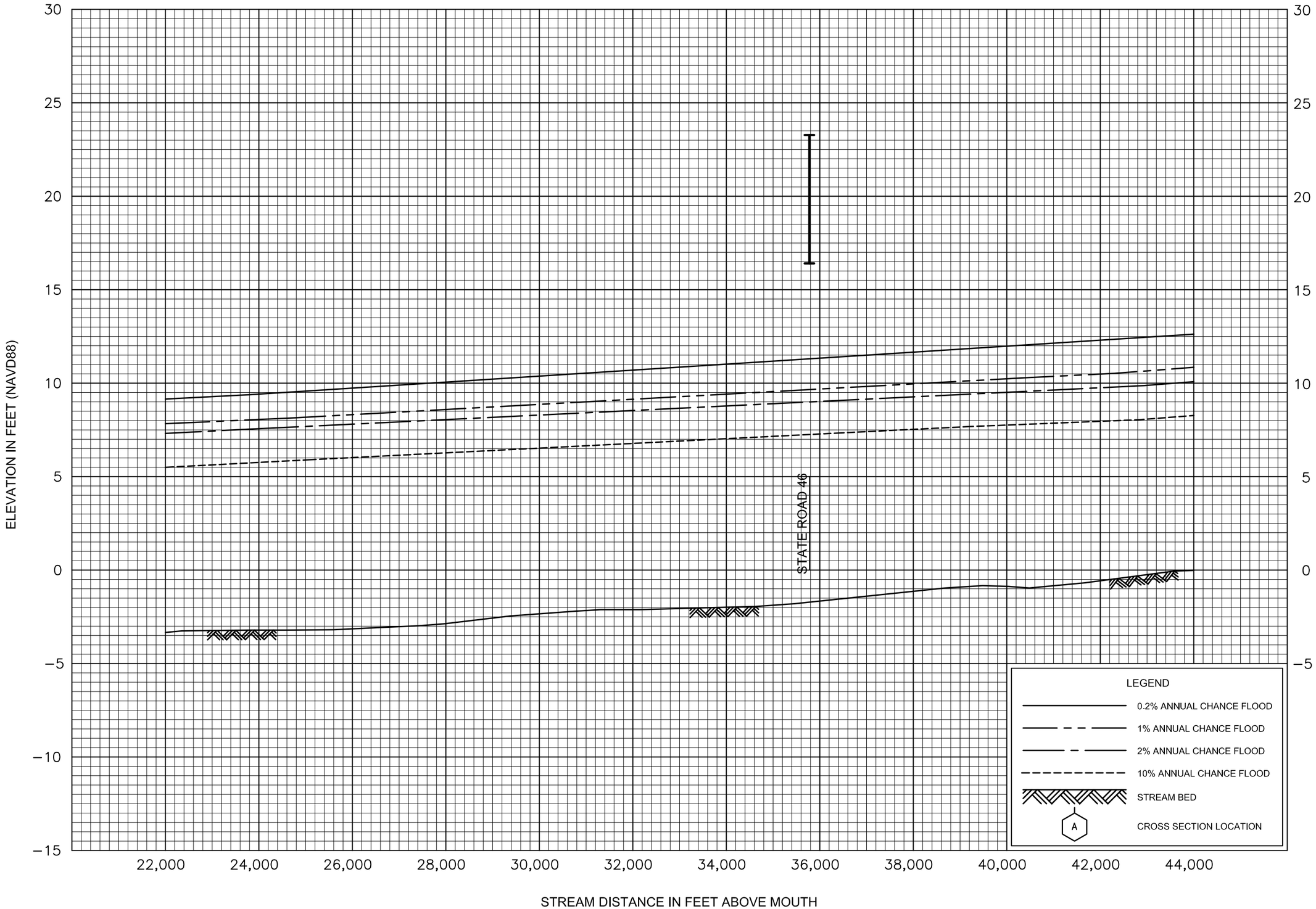


FLOOD PROFILES

WEKIVA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL
AND INCORPORATED AREAS

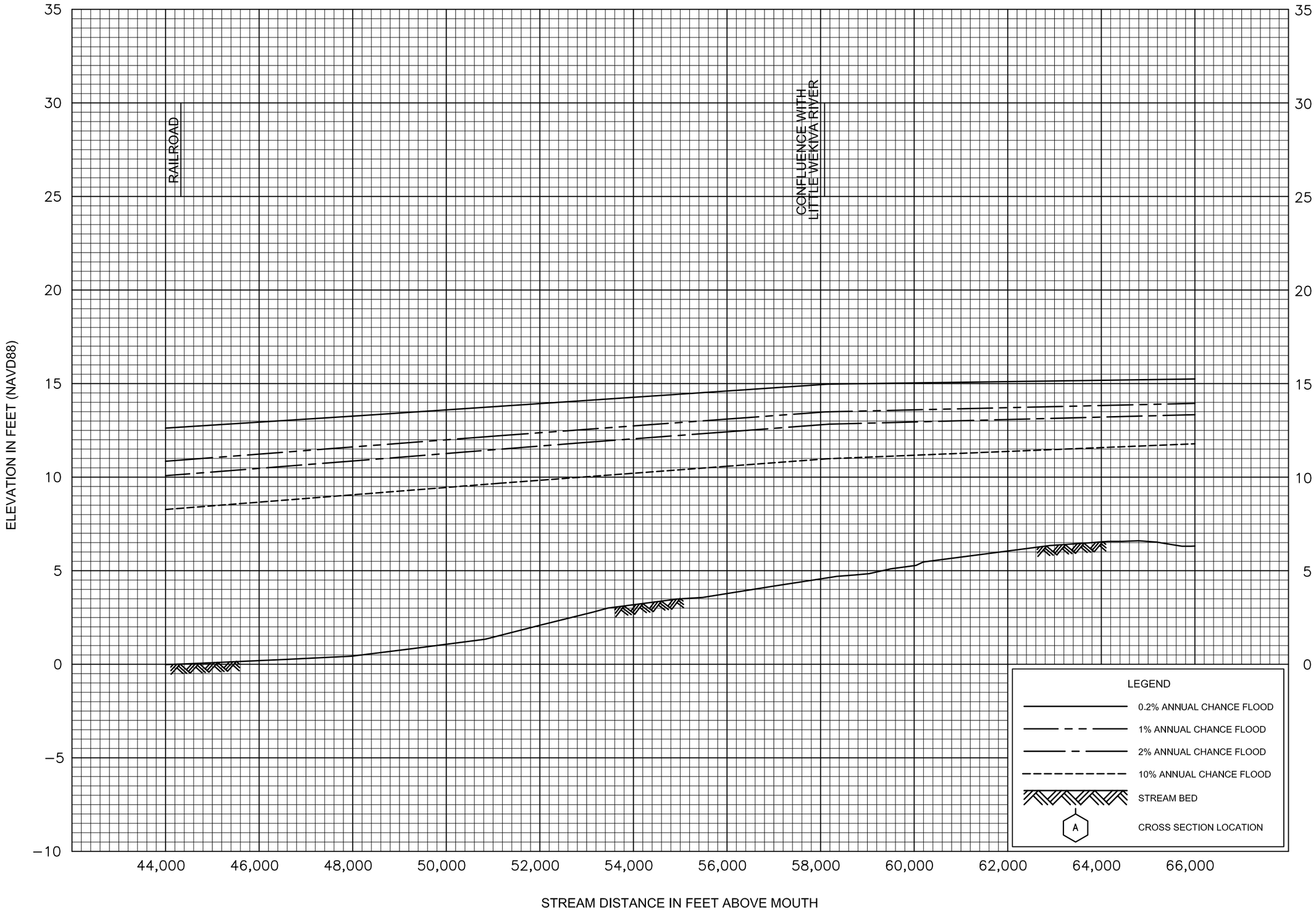


FLOOD PROFILES

WEKIVA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL
AND INCORPORATED AREAS



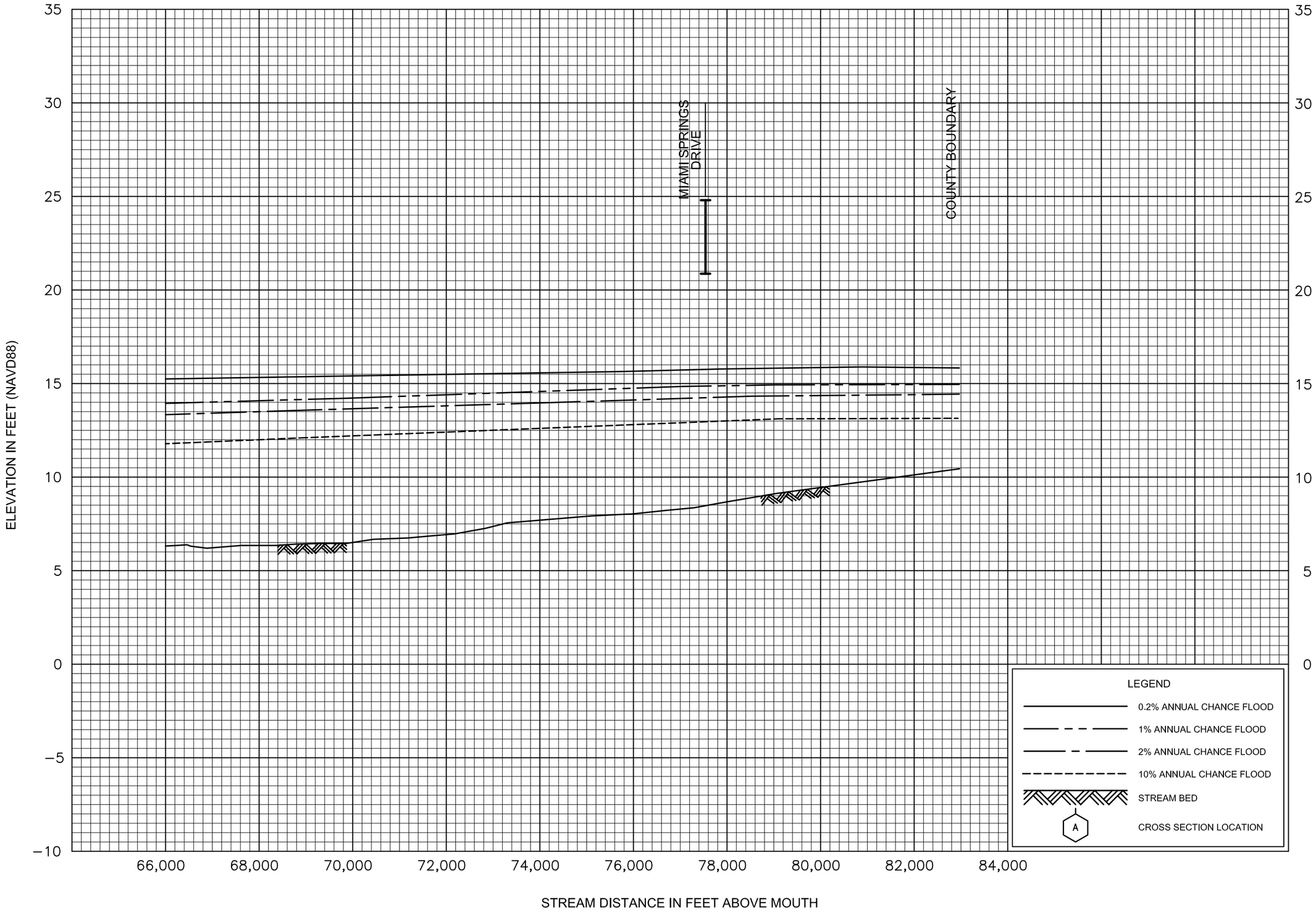
FLOOD PROFILES

WEKIVA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS



FLOOD PROFILES

WEKIVA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE COUNTY, FL

AND INCORPORATED AREAS