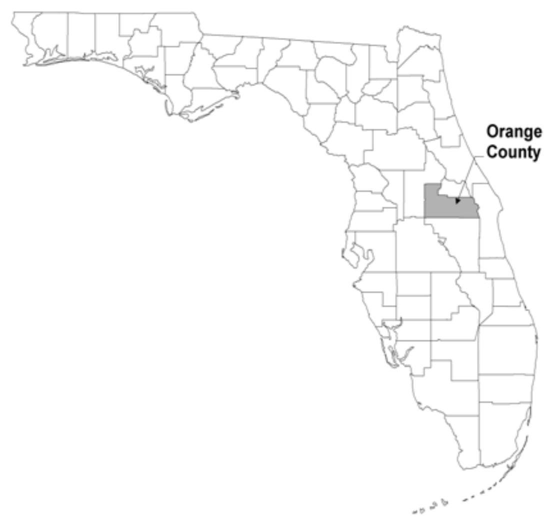
FLOOD INSURANCE STUDY

ORANGE COUNTY, FLORIDA

AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
APOPKA, CITY OF	120180
BAY LAKE, CITY OF	120576
BELLE ISLE, CITY OF	120181
EATONVILLE, TOWN OF	120182
EDGEWOOD, CITY OF	120183
LAKE BUENA VISTA, CITY OF	120341
MAITLAND, CITY OF	120184
OAKLAND, TOWN OF	120663
OCOEE, CITY OF	120185
ORANGE COUNTY (UNINCORPORATED AREAS)	120179
ORLANDO, CITY OF	120186
REEDY CREEK IMPROVEMENT DISTRICT	120577
WINDERMERE, TOWN OF	120381
WINTER GARDEN, CITY OF	120187
WINTER PARK, CITY OF	120188



Revised:
September 24, 2021

Federal Emergency Management Agency
FLOOD INSURANCE STUDY NUMBER
12095CV000C

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:	December 6, 2000
Revised Countywide FIS Dates:	September 24, 2021 June 20, 2018 September 25, 2009

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FLOOD INSURANCE STUDY
ORANGE 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 Orange County, Florida, including the Cities of Apopka, Bay Lake, Belle Isle, Edgewood, Lake Buena Vista, Maitland, Ocoee, Orlando, Winter Garden and Winter Park; the Towns of Eatonville, Oakland and Windermere; the Reedy Creek Improvement District; and unincorporated areas of Orange County (hereinafter referred to collectively as Orange 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 Orange 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 Flood Insurance Study 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, Orange 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.

Apopka, City of:	The hydrologic and hydraulic analyses for the FIS report dated March 1978 were prepared by the U.S. Army Corps of Engineers (USACE), Jacksonville District, for the Federal Insurance Agency (FIA), under Inter-Agency Agreement Nos. IAA-H-7-76 and IAA-H-10-77, Project Order Nos. 23 and 2, respectively. That work was completed in August 1977.

Belle Isle, City of:	The hydrologic and hydraulic analyses for the FIS report dated March 1978 were prepared by the USACE, Jacksonville District, for the FIA, under Inter-Agency Agreement Nos. IAA-H-7-76 and IAA-H-10-77, Project Order Nos. 23 and 2, respectively. That work was completed in May 1977
Eatonville, Town of:	The hydrologic and hydraulic analyses for the FIS report dated June 1978 were prepared by the USACE, Jacksonville District, for the FIA, under Inter-Agency Agreement Nos. IAA-H-7-76 and IAA-H-10-77, Project Order Nos. 23 and 2, respectively. That work was completed in August 1977.
Edgewood, City of:	The hydrologic and hydraulic analyses for the FIS report dated march 1978 were prepared by the USACE, Jacksonville District, for the FIA, under Inter-Agency Agreement Nos. IAA-H-7-76 and IAA-H-10-77, Project Order Nos. 23 and 2, respectively.
Maitland, City of:	The hydrologic and hydraulic analyses for the FIS report dated March 1979 were prepared by the USACE, Jacksonville District, for the FIA, under Inter-Agency Agreement Nos. IAA-H-7-76 and IAA-H-10-77, Project Order Nos. 23 and 2, respectively. That work was completed in December 1977.
Ocoee, City of:	The hydrologic and hydraulic analyses for the FIS report dated May 1978 were prepared by the USACE, Jacksonville District, for the FIA, under Inter-Agency Agreement Nos. IAA-H-7-76 and IAA-H-10-77, Project Order Nos. 23 and 2, respectively. That work was completed in September 1977.
Orange County (Unincorporated Areas):	The hydrologic and hydraulic analyses for the FIS report dated December 1981 were prepared by the USACE, Jacksonville District, for the FIA, under Inter-Agency Agreement Nos. IAA-H-10-76 and IAA-H-10-77, Project Order Nos. 23 and 2, respectively. That work was completed in March 1979. The hydrologic and hydraulic analyses for the Little Econlockhatchee River and its major tributaries for the FIS report dated August 5, 1986, were taken from a report entitled “Little Econlockhatchee River Restoration Study,”

prepared by Miller & Miller Engineers, Environmental Scientists, Planners, Inc. (Reference 1). The hydraulic analyses for Shingle Creek were obtained from the Florida Department of Transportation (DOT) (Reference 2). For the FIS report dated December 5, 1989, the hydrologic and hydraulic analyses for the St. John's River were prepared by the St. John's River Water Management District. Miller and Einhouse, Inc., prepared the hydrologic and hydraulic analyses for the Little Econlockhatchee River, for Unnamed Slough and for Park Manor Outfall Canal. Donald W. McIntosh Associates, Inc., prepared the hydrologic and hydraulic analyses for Lake Phillips and submitted information about the relocated Americana Canal. Harling, Locklin and Associates, Inc., prepared the hydrologic and hydraulic analyses for Harvest Lake.

Orlando, City of:	The hydrologic and hydraulic analyses for the FIS report dated March 1980 were prepared by the USACE, Jacksonville District, for the FIA, under Inter-Agency Agreement Nos. IAA-H-7-76 and IAA-H-10-77, Project Order Nos. 23 and 2, respectively. That work was completed in April 1978.
Windermere, Town of:	The hydrologic and hydraulic analyses for the FIS report dated June 18, 1984, were obtained from the December 1981 FIS for the unincorporated areas of Orange County (Reference 3).
Winter Garden, City of:	The hydrologic and hydraulic analyses for the FIS report dated March 1978 were prepared by the USACE, Jacksonville District, for the FIA, under Inter-Agency Agreement Nos. IAA-H-7-76 and IAA-H-10-77, Project Order Nos. 23 and 2, respectively. That work was completed in August 1977.
Winter Park, City of:	The hydrologic and hydraulic analyses for the FIS report dated May 1979 were prepared by USACE, Jacksonville District, for the FIA, under Inter-Agency Agreement Nos. IAA-H-7-76 and IAA-H-10-77, Project Order Nos. 23 and 2, respectively. That work was completed in December 1977.

The authority and acknowledgements for the Cities of Bay Lake and Lake Buena Vista, the Town of Bithlo, and the Reedy Creek Improvement District are not included because there were no previously printed FIS reports for those communities.

For the original December 6, 2000, Countywide FIS, the hydrologic and hydraulic analyses for Disston Canal, Hart Branch, Tributary to Hart Branch, Tributary to Lake Lotta, Myrtle Bay, Rio Pinar Canal, East Tributary to the Econlockhatchee River and West Tributary to the Econlockhatchee River were prepared by Engineering Methods & Applications, Inc., for the Federal Emergency Management Agency (FEMA), under Contract No. EMW-92-C-3835. This work was completed in July 1993. Additionally, the elevations for the newly studied and revised lakes were prepared by Engineering Methods & Applications, Inc., under the previously mentioned contract, or were taken from the Orange County Stormwater Management Department Lake Index.

For the 2009 countywide revision, the base hydrologic and hydraulic analyses for the Reedy Creek and Cypress Creek Watersheds (Reference 4), and Lakes Stanley, Florence, Lucy, and Ponding Area No. 81 (Reference 5) were provided by Orange County, and reviewed and updated by the Watershed IV Alliance, for FEMA under Contract No. EMA-2002- CO-0011, Task Order No. 9. Similarly, the base hydrologic and hydraulic analyses for the following were provided by the City of Orlando: Lake Cay Dee, Druid Lake, Lake Shannon, Lake Theresa (Reference 6); the John Young Parkway Drainage Canal and Ponding Area Nos. 30 through 34 (Reference 7); Lake Angel and Lake June (Reference 8), Lake Notasulga, Rock Lake, and Texas Ponding Area (Reference 9); Shingle Creek (Reference 10), Orange County Pond Outfall Canal, Southport Ditch, and Tradeport Ditch (Reference 11), and Ponding Area Nos. 35 through 37 and Pond 740 (Reference 12). Finally, the City of Ocoee provided the base hydrologic and hydraulic analyses for the following: Ponding Area Nos. 79 and 80 (Reference 13); Lake Lotta and Ponding Area No. 78 (Reference 14); Lake Moxie, Peach Lake, Stream B (Swamp), Stream B, and Stream C (Reference 15); Lake Johio and Spring Lake No. 3 (Reference 16); and Lake Olympia, Ponding Area No. 82, Lake Prima Vista, Starke Lake, and Stream A No.1 (Reference 17).

Base map information shown on the FIRMs were derived from multiple sources. Digital terrain data in the form of 1-foot interval contours and LiDAR data were provided by the St. Johns River Water Management District, South Florida Water Management District, and the National Geospatial Intelligence Agency. The 2004 orthophotography was provided by Orange County, as well as additional base data layers.

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 Orange County are shown in Table 1.

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

Community Name	Initial CCO Date	Final CCO Date
Apopka, City of	December 8, 1975	September 7, 1977
Belle Isle, City of	December 8, 1975	September 8, 1977
Eatonville, Town of	December 8, 1975	September 8, 1977
Edgewood, City of	December 8, 1975	September 1977
Maitland, City of	December 8, 1975	July 20, 1978
Ocoee, City of	December 8, 1975	December 6, 1977
Orange County (Unincorporated Areas)	December 8, 1975	April 3, 1980
Orlando, City of	December 9, 1975	February 1, 1979
Windermere, Town of	* December 8,	December 7, 1983
Winter Garden, City of	1975	September 7, 1977
Winter Park, City of	December 8, 1975	July 20, 1978

* Data not available

For the December 6, 2000 countywide FIS, FEMA notified the county by letter on April 17, 1997, that this revision would be prepared using the Engineering Methods & Applications, Inc., analyses.

For the 2009 countywide FIS revision, an initial CCO Meeting was held on September 20, 2004 in Orlando, which was held jointly with Seminole County. Attendees for this meeting included representatives from the St. Johns River Water Management District, South Florida Water Management District, FEMA, Orange County and its incorporated communities, communities from Seminole County, local engineering firms, and the Watershed IV Alliance. A final CCO meeting was held on May 17, 2005. 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 Orange County, Florida, including the incorporated communities listed in Section 1.1.

For the 2009 countywide revision, all or portions of the following flooding sources, listed in Table 2, 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

Cypress Creek	Orange County Pond	Southport Ditch
John Young Parkway	Outfall Canal	Stream A No. 1
Drainage Canal	Shingle Creek	Stream B

TABLE 2. FLOODING SOURCES STUDIED BY DETAILED METHODS - continued

Stream C	Pond 740	Ponding Area No. 76
Tradeport Ditch	Ponding Area 725-1	Ponding Area No. 77
Lake Angel	Ponding Area No. 30	Ponding Area No. 78
Apache Lake	Ponding Area No. 31	Ponding Area No. 79
Lake Austin	Ponding Area No. 32	Ponding Area No. 80
Bear Bay	Ponding Area No. 33	Ponding Area No. 81
Lake Bessie	Ponding Area No. 34	Ponding Area No. 82
Lake Blanche	Ponding Area No. 35	Ponding Area No. 83
Lake Britt	Ponding Area No. 36	Lake Prima Vista
Lake Burden	Ponding Area No. 37	Raccoon Lake
Lake Butler	Ponding Area No. 38	Lake Reams
Lake Cay Dee	Ponding Area No. 39	Reedy Lake
Lake Chapin	Ponding Area No. 40	Lake Rexford
Lake Chase	Ponding Area No. 41	Lake Rhea
Lake Crescent	Ponding Area No. 42	Rock Lake
Cypress Lake	Ponding Area No. 43	Lake Ruby
Doe Lake	Ponding Area No. 44	Lake Sawgrass
Lake Down	Ponding Area No. 45	Lake Sawyer
Druid Lake	Ponding Area No. 46	Little Lake Sawyer
Little Fish Lake	Ponding Area No. 47	Lake Scott
Lake Florence	Ponding Area No. 48	Lake Sentinel
Lake Fran	Ponding Area No. 49	Lake Shannon
Grass Lake	Ponding Area No. 50	Lake Sharp
Lake Gifford	Ponding Area No. 51	Lake Sheen
Lake Hancock	Ponding Area No. 52	South Lake
Lake Hartley	Ponding Area No. 53	Lake Speer
Lake Heney	Ponding Area No. 54	Spring Lake No. 3
Hickorynut Lake	Ponding Area No. 55	Lake Stanley
Huckleberry Lake	Ponding Area No. 56	Lake Star
Lake Ihrig	Ponding Area No. 57	Starke Lake
Lake Johio	Ponding Area No. 58	Stream B (Swamp)
Lake June	Ponding Area No. 59	Texas Basin Ponding Area
Lake Lotta	Ponding Area No. 60	Lake Theresa
Lake Louise No. 1	Ponding Area No. 61	Lake Tibet
Lake Lucy	Ponding Area No. 62	Tub Lake
Lake Luzom	Ponding Area No. 63	Unnamde Lake 14
Lake Mabel	Ponding Area No. 64	Unnamed Lake 15
Lake Mac	Ponding Area No. 65	Unnamed Lake 17
Lake Moxie	Ponding Area No. 66	Unnamed Lake D
Mudd Lake	Ponding Area No. 67	Unnamed Lake E
Lake Notasulga	Ponding Area No. 68	Unnamed Lake F
Lake Oliver	Ponding Area No. 69	Unnamed Lake G
Lake Olympia	Ponding Area No. 70	Unnamed Lake H
Osage Lake	Ponding Area No. 71	Unnamed Lake I
Little Osage Lake	Ponding Area No. 72	Unnamed Lake J
Lake Palmer	Ponding Area No. 73	Unnamed Lake K
Peach Lake	Ponding Area No. 74	Lake Whitney
Lake Pit	Ponding Area No. 75	Lake William Davis
Pocket Lake		

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 Orange County.

As part of this countywide FIS, revised detailed analyses were included for the flooding sources shown in Table 2.

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 FIS reflects a vertical datum conversion from the National Geodetic Vertical Datum of 1929 (NGVD29) to the North American Vertical Datum of 1988 (NAVD88).

This FIS incorporates the effects of annexations or de-annexations by the communities in Orange County.

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

2.2 Community Description

Orange County is located in central Florida and is bordered by Seminole County to the north, Brevard County to the east, Osceola County to the south, and Lake County to the west. Orange County covers 907 square miles. The 2005 population of Orange County was estimated at 1,023,023 (Reference 18).

The floodplains of Orange County consist of lowlands adjacent to the streams and lakes. The topography in Orange County is relatively flat with some gently rolling hills.

The climate of Orange 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 Orange County consist of 7 different soil associations. Two consist of undulating soils that are mainly somewhat excessively drained. The rest consist of nearly level soils that are mainly somewhat poorly drained to very poorly drained (Reference 19).

Agriculture is important in Orange County. Vegetable crops and cattle are raised throughout the county. Citrus groves are also located in Orange County. Much of the woodland is in poor condition and used mainly for range (Reference 19).

The topography in the City of Apopka is karst, and most of the lakes in and around Apopka have appeared because of the formation of limestone sinkholes. The high percolation rate of the sandy soil and the numerous orange groves in the area reduces the surface runoff. Also, fluctuations of the water-surface elevations show a close correlation to fluctuations in the Floridian Aquifer and the ground water tables.

The soils in the Cities of Maitland, Orlando and Winter Park are mainly Lakeland-Blanton association, which are well drained to somewhat excessively drained sandy soils interspersed with many lakes and ponds. The water table is normally below 60 inches, and in moderately well drained areas it rises to within 24 inches of the surface during periods of high rainfall. Maitland is highly urbanized and the native vegetation consists principally of bluejack oak, turkey oak, longleaf pine, runner oak, pineland threeawn (wiregrass) and a few scattered palmettos on the ridges (Reference 20).

The soils in the outer areas of the City of Orlando are Leon-Rutledge association. This association contains somewhat poorly drained sandy soils interspersed with very poorly drained soils in grassy sloughs, shallow intermittent ponds and swamps.

2.3 Principal Flood Problems

Floods can occur in Orange County at any time during the year; however, they are most frequent during June and October. Floods on the lakes would result from prolonged heavy rainfall over the study area with high antecedent lake stages. Floods 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.

Information on past floods in Orange County is sparse. In 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 in September causing extensive flooding in Orange County. The flooding associated with this hurricane has been estimated by local officials and others to be between a once-in-fifty year and a once-in-one- hundred year event for portions of Orange County.

Table 3, “Historic Flood Elevations,” lists select lakes in Orange County with records of past stages. The table shows the historic peak, the date of the historic peak, and the date of the first year of the stage records.

TABLE 3. HISTORIC FLOOD ELEVATIONS

Flooding Source	Historic Peak (Feet NAVD)	Date	First Year of Records
Lake Apopka	68.39	October 1936	1935
Lake Barton	95.12	August 1960	1960
Little Lake Barton	94.37	August 1960	1960
Bay Lake	91.10	August 1960	1960
Lake Beauclair	62.58	July 1968	1960
Lake Bell	90.41	August 1960	1959

TABLE 3. HISTORIC FLOOD ELEVATIONS - continued

Lake Bessie	101.22	August 1960	1960
Black Lake	97.37	August 1960	1960
Lake Blanche	99.89	August 1960	1960
Lake Bosse	63.40	August 1960	1960
Lake Butler	100.89	September 1960	1933
Lake Cane	98.90	August 1960	1959
Lake Carlton	62.61	November 1975	1960
Lake Catherine	92.57	August 1960	1960
Lake Charity	71.54	October 1960	1960
Clear Lake	95.56	October 1960	1951
Lake Conway	88.08	August 1960	1960
Lake Cora Lee	73.65	November 1960	1960
Crooked Lake	76.96	December 1960	1960
Lake Destiny	90.36	October 1960	1960
Lake Dora	64.79	1927	1927
Lake Down	100.74	January 1960	1960
Lake Fairview	89.10	August 1960	1959
Lake Faith	71.34	November 1960	1960
Little Fish Lake	100.86	August 1960	1960
Lake Fuller	67.49	September 1960	1960
Lake Gandy	74.31	August 1960	1960
Lake Georgia	60.43	October 1959	1959
Lake Hart	63.88	September 1945	1941
Lake Herrick	80.05	November 1960	1960
Lake Hiawassa	81.42	November 1960	1960
Lake Holden	91.01	September 1960	1959
Lake Hope	72.89	October 1960	1960
Lake Irma	55.34	September 1960	1959
Lake Jessamine	92.86	September 1960	1959
Johns Lake	97.55	August 1960	1959
Lake Kilarney	84.28	August 1960	1959
Lawne Lake	91.54	September 1960	1959
Lake Lockhart	74.51	August 1960	1960
Long Lake	79.53	October 1960	1959
Lake Louisa		March 1970	1959
Lake Maitland	66.68	September 1960	1945
Lake Mann	93.41	September 1960	1959
Lake Mary	93.36	August 1960	1960
Lake Mary Jane	63.79	March 1960	1949
Lake Ola	72.79	November 1975	1959
Lake Orlando	85.40	August 1960	*
Lake Phillips	63.96	September 1960	1960
Lake Pinelock	94.23	September 1960	1959
Lake Pleasant	81.27	December 1960	1959
Pocket Lake	57.27	September1960	1959
Lake Rose	86.09	November 1960	1960
Lake Rowena	74.33	September 1945	1945

* Data not available

TABLE 3. HISTORIC FLOOD ELEVATIONS - continued

Lake Ruby	116.34	August 1960	1960
Big Sand Lake	99.52	November 1960	1959
Little Sand Lake	100.90	August 1960	1960
Lake Shadow	83.30	August 1960	1960
Lake Sheen	100.05	August 1960	1960
Lake Sherwood	87.46	October 1960	1960
South Lake	94.78	August 1960	1960
Spring Lake			
(near Little Sand Lake)	100.76	September 1960	1960
Lake Steer	85.98	November 1960	1960
Lake Sue	72.74	September 1964	1960
Lake Telfer	59.19	September 1960	1960
Lake Tibet	99.83	October 1960	1960
Trout Lake	73.93	December 1960	1959
Turkey Lake	95.94	August 1960	1960
Lake Warren	86.57	August 1960	1960
Lake Waunatta	62.04	September 1960	1960

2.4 Flood Protection Measures

Orange County's Stormwater Management Department's Flood Protection Measures include regulation of development in the floodplains. Orange County also has numerous channelized streams and manmade canals, but these are not generally designed to contain the 100-year flood.

Drainage wells are a method of flood protection that is being slowly phased out. These wells were installed in the first half of this century. They were drilled such that overflow from ponds and lakes drain directly into the aquifer. These wells are being plugged and other outfalls are being constructed where possible because of pollution being introduced into the groundwater.

The USACE authorized a flood control project on Boggy Creek. The effects of the project are not reflected in this FIS.

There are no existing or proposed flood protection projects in Orange County and the surrounding area that would alleviate or significantly reduce the 100-year flood levels in Orange County.

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 and peak elevation-frequency relationships for each flooding source studied by detailed methods affecting the community.

Pre-Countywide Riverine Analyses

The hydrologic analyses for the Wekiva River, the Econlockhatchee River, the Little Econlockhatchee River and Cypress Creek were taken from reports by the USACE (References 21, 22, and 23).

The Little Econlockhatchee River, Landfill Outfall Canal, Goldenrod Canal, East Orlando Outfall Canal, E40 Canal, Lake Corrine Outfall Canal, Azalea Park Outfall Canal, Crane Strand Canal and Winter Park Pines Canal were revised to incorporate the results of revised and new hydrologic analyses presented in “Little Econlockhatchee River Restoration Study” (Reference 1). A hydrometeorological approach was used in the hydrologic analyses conducted for the Little Econlockhatchee River Landfill Outfall Canal, Goldenrod Canal, East Orlando Outfall Canal, E40 Canal, Lake Corrine Outfall Canal, Azalea Park Outfall Canal, Park Manor Outfall Canal, Crane Strand Canal and Winter Park Pines Canal.

The portion of the Little Econlockhatchee River drainage basin located within Orange County was divided into 14 major subbasins. Stormwater runoff hydrographs were computed for various design storm events within each subbasin based on a computation procedure outlined by the SCS (Reference 24). Total point rainfall depths were determined from U.S. Weather Bureau Technical Paper No. 40 (Reference 25).

In many areas of the Little Econlockhatchee River watershed within Orange County, significant storage exists in the form of lakes and swamps. These storage areas influence the watershed hydrology by attenuating and lagging outflows from the subbasins. A computer-based mathematical simulation model, developed by Miller & Miller, Inc., was used to route stormwater runoff quantities through the offstream storage areas. Runoff routing through main stream channels, canals and overland flow areas was accomplished using the USACE HEC-1 computer program (Reference 26).

Portions of St. Johns River were revised as part of the December 5, 1989, FIS for the unincorporated areas of Orange County. The hydrologic analyses used to estimate peak discharges for the St. Johns River were obtained from the St. Johns River Water Management District’s report, “The Mean Annual, 10-year, 25-year and 100-year Flood Profiles for the Upper St. Johns River Under Existing Conditions” (Reference 27).

For all other streams studied by detailed methods in Orange County, rainfall-frequency estimates were obtained by statistical analysis of records from eight long-term rainfall stations in and near Orange and Seminole Counties (Reference 24). Results of the rainfall study are summarized in the tabulation 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. For Fern Creek, Stream A No. 1, Stream A No. 2, Stream B, Stream C, Winter Garden Co-op Ditch and the portions of Lakes Bay, Dot, Lawne and Pineloch located in the City of Orlando, to estimate the rainfall excess, the SCS developed Runoff Curve Numbers (CN), which relate rainfall to direct runoff (Reference 28). Runoff CN were used to calculate the infiltration losses based on the soil type and land use.

For Stream A No. 1, Stream B, Stream C, Fern Creek and Winter Garden Co-op Ditch, the Rational Method (Q=CIA) was used to check values obtained with the SCS method and the results compared favorably.

No long-term stream gages are located on the streams studied in detail in the unincorporated areas of Orange County. The hydrologic data for Boggy Creek and the Little Wekiva River were obtained from previous studies (References 29 and 30). The hydrology for Howell Creek for the 10-, 50-, 100- and 500-year frequency was calculated using the standard SCS methodology (Reference 24). The SCS methodology 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 Type II storm distribution. Peak discharges of the flood hydrographs were then used for hydraulic application.

In the City of Winter Park, the hydrology for Stream A No. 3 between Lake Sue and Lake Virginia involved developing a discharge rating curve at the outflow of Lake Sue by applying various discharges to the USACE HEC-2 step-backwater computer program (Reference 31). No stream gages are located on Stream A No. 3. The 10-, 50-, 100- and 500-year discharges for Stream A No. 3 were determined by applying the Lake Sue flood stages for the selected recurrence interval floods to the discharge rating curve.

Two stream gages are located on Howell Creek and both gages are located downstream of Howell Creek in Winter Park. One gage is located near Slavia and the other gage is located near Oviedo and both have been recording since 1972. Howell Creek originates at a weir located at Lake Maitland. Lake Maitland receives flow from several neighboring lakes, such as Lakes Sue, Virginia, Osceola, Park and Minnehaha. Lake Maitland, in turn, discharges into Howell Creek over a weir. The hydrology for the Lake Maitland basin was performed by calculating the rainfall runoff in the several lakes and routing the runoff through these lakes into Howell Creek. The rainfall runoff was computed by applying a 24-hour storm to the basin. The runoff hydrographs were computed by applying the effective precipitation to unit hydrographs by SCS methodology (Reference 24). The runoff hydrographs were then routed through the chain of lakes into Howell Creek using HEC-1 (Reference 26).

December 6, 2000, Countywide Riverine FIS Analyses

Hydrology for East Tributary to Econlockhatchee River, West Tributary to Econlockhatchee River, Hart Branch, Tributary to Hart Branch and Tributary to Lake Lotta was calculated using the SCS methods with the USACE HEC-1 computer program (References 24 and 26).

Hydrology for Myrtle Bay and Rio Pinar Canal was calculated using the SCS methods with the Advanced Inter-Connected Pond Routing model (adICPR) computer program (References 24 and 32).

Disston Canal was also modeled using adICPR. Disston Canal includes four culverts along its length and connects Lake Mary Jane and the Econlockhatchee River.

For all streams, rainfall values were determined from analysis of rain gage data for locations in and around Orange County (Reference 33). A 4-day storm was chosen based on historical data.

Time of concentration for streams was calculated using either the SCS velocity method or the SCS lag equation. Rainfall infiltration calculations were based on SCS curve number methods. Curve numbers were calculated based on SCS Orange County Soil maps and land use as determined from 1990 Department of Transportation aerial photographs and field surveys (References 34 and 35).

SCS Unit hydrographs with Peak Rate Factors (PRF) of 484 were used to determine basin runoff.

September 25, 2009, Riverine FIS Revision

Watershed-based studies, as well as project-specific numerical modeling and associated backup documentation, were provided by Orange County, the City of Orlando, and the City of Ocoee, to be used as the basis of the detailed studies in this FIS revision. These riverine (although titled “riverine”, these studies also include a significant level of detail for lacustrine-type flooding areas associated with the riverine systems) studies include the following:

Cypress Creek Watershed (Reference 4)
John Young Parkway Corridor (Reference 7)
Northwest Ditch (Reference 15)
Reedy Creek Watershed (Reference 4)
Shingle Creek (Reference 10)
Southport (Reference 11)
Starke Lake and Lake Olympia (Reference 17)

Standard SCS/NRCS methodology was used to calculate rainfall runoff in the models, with precipitation totals based on either the St. Johns River Water Management District (SJRWMD) 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 36), or the South Florida Water Management District (SFWMD) 1- or 3- day (24-hour or 72-hour) rainfall data, published in Environmental Resource Permitting Information Manual, Part D: Project Design Aids, Management and Storage of Surface Waters, Permit Information Manual (Reference 37). The 2-percent-annual-chance rainfall values were interpolated, while the 0.2-percent-annual-chance values were extrapolated. The design storm criteria were based on the location of the study site (either within the jurisdiction of the SJRWMD or the SFWMD), with the storm duration selected based on time to peak sensitivity of the watershed and land-locked considerations. All hydrologic calculations were performed using the ICPR unsteady flow program, version 3.02 (Reference 38).

Rainfall totals used in the riverine analyses are listed below:

Study	Rainfall Parameters (1% annual-chance total)
Cypress Creek Watershed	SFWMD 72-hr (12 inches)
John Young Parkway Corridor	SJRWMD 24-hr (11.3 inches)
Northwest Ditch	SJRWMD 96-hr (15 inches)
Reedy Creek Watershed	SFWMD 72-hr (12 inches)
Shingle Creek	SFWMD 72-hr (12 inches)
Southport	SFWMD 24-hr (9 inches)
Starke Lake and Lake Olympia	SJRWMD 96-hr (15 inches)

A summary of the drainage area-peak discharge relationships for a portion of the streams studied by detailed methods is shown in Table 4, "Summary of Discharges."

TABLE 4. SUMMARY OF DISCHARGES

		PEAK DISCHARGES (cfs)			
FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	10-percent	2-percent	1-percent	0.2-percent
AZALEA PARK OUTFALL CANAL					
Just upstream of the confluence with Landfill Outfall Canal	6.70	1,355	*	2,936	*
At Curry Ford Rd	*	920	*	1,359	*
BOGGY CREEK					
At Swamp Outflow	55.7	3,000	5,090	6,310	8,920
EAST BRANCH BOGGY CREEK					
At Swamp Inflow	18.6	1,450	2,450	3,060	4,280
At Beeline Expressway	4.0	320	560	710	1,020

* Data not available

TABLE 4. SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs) 10-percent	2-percent	1-percent	0.2-percent
CRANE STRAND CANAL					
Just upstream of mouth	7.86	1,622	*	2,551	*
At CSX Transportation	*	754	*	1,142	*
CYPRESS CREEK					
500 feet US of east Buena Vista Dr	*	335	335	346	385
Just US of Winter Garden Vineland Rd	*	120	191	222	288
6350 feet US of Winter Garden Vineland Rd	*	99	167	208	293
DISSTON CANAL					
At its confluence with Lake Mary Jane	4.15	*	*	3,141	*
At a point approximately 12,600 feet west of Lake Mary Jane Rd	4.854	*	*	1,851	*
At its confluence with the Econlockhatchee River	0.57	*	*	1,823	*
EAST ORLANDO OUTFALL CANAL					
Just upstream of mouth	10.68	1,230	*	1,492	*
At Goldenrod Rd	*	881	*	1,314	*
EAST TRIBUTARY TO ECONLOCKHATCHEE RIVER					
At mouth	3.39	1,115	1,596	1,813	2,291
Upstream of confluence of Unnamed Tributary	2.92	937	1,304	1,461	1,817
At State Route 50	2.61	912	1,262	1,412	1,749
ECONLOCKHATCHEE RIVER	*	*	*	*	*
E40 CANAL					
At State Road 50	*	564	*	855	*
Just downstream of Peppercorn Dr	*	127	*	196	*
FERN CREEK					
At Alto Loma St	0.17	40	80	110	190
At South St	0.68	80	150	200	390

* Data not available

TABLE 4. SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs) 10-percent	2-percent	1-percent	0.2-percent
GOLDENROD CANAL					
Just upstream of the confluence with the Little Econlockhatchee River	*	3,248	*	6,414	*
Just upstream of Goldenrod Rd Dam	*	954	*	1,516	*
HART BRANCH					
At mouth	4.36	1,015	1,451	1,649	2,098
At Moss Park Rd	3.56	924	1,299	1,463	1,844
Downstream of Tributary	2.75	678	940	1,066	1,332
HOWELL CREEK					
At mouth	20.1	440	710	880	950
LAKE CORRINE OUTFALL CANAL					
At the Arcadia Acres weir	2.62	993	*	1,484	*
Approximately 1,500 feet upstream of State Road 436	*	73	*	130	*
LANDFILL OUTFALL CANAL					
At Curry Ford Rd	9.88	2,677	*	4,458	*
Approximately 2.83 miles upstream of the confluence of East Orlando Outfall Canal	*	102	*	150	*
LITTLE ECONLOCKHATCHEE RIVER					
At the downstream county boundary	18.33	6,834	*	10,701	*
At State Road 50	13.98	3,616	*	5,861	*
At Curry Ford Rd	*	2,677	*	4,458	*
LITTLE WEKIVA RIVER					
At mouth	*	*	*	900	*
MYRTLE BAY					
At mouth	7.8	*	*	1,247	*
At railroad bridge	6.9	*	*	1,484	*
At Narcoosee Rd	4.41	*	*	503	*

* Data not available

TABLE 4. SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs) 10-percent	2-percent	1-percent	0.2-percent
PARK MANOR OUTFALL CANAL					
Just upstream of the mouth	*	651	*	931	*
At Park Manor Dr	*	84	*	124	*
RIO PINAR CANAL					
At mouth of Outfall to Azalea Park Canal	0.6[1]	*	*	591	*
At Curry Ford Rd	0.4[1]	*	*	187	*
SHINGLE CREEK					
At Interstate Highway 4	20.0	657	859	931	1171
At Florida Turnpike	30.2	2,050	3,268	3,692	4,799
At Beeline Expressway	46.8	2,402	3,746	4,279	5,634
STREAM A NO. 1					
Just US of North Bluford Avenue	0.35	79	98	132	201
Just US of West Oakland Avenue	0.20	45	107	111	163
STREAM A NO. 2					
At mouth of Lake-of-the-Woods	0.25	10	17	23	41
STREAM A NO. 3					
Mouth at Lake Sue	1.1	250	300	350	425
STREAM B					
US of confluence with Stream C	0.84	111	173	201	227
STREAM C					
Just US of SR-429	0.33	843	1478	1857	2492
2750 feet US of SR-429	1.4	353	572	681	867
US of confluence with Stream B	2.47	202	303	352	443
ST. JOHNS RIVER	*	*	*	*	*

* Data not available

[1] Estimated – part of basin flow north to Lake Underhill Canal

TABLE 4. SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs) 10-percent	2-percent	1-percent	0.2-percent
TRIBUTARY TO HART BRANCH					
At mouth	*	*	*	*	*
TRIBUTARY TO ECONLOCKHATCHEE RIVER					
At the confluence with the Econlockhatchee River	0.23	*	*	267	*
TRIBUTARY TO LAKE LOTTA					
At Highway 50	2.65	448.3	553.2	593.8	796.3
At Dirt Rd	2.17	732	990	1,109	1,381
At Clarcona Ocoee Rd	1.63	679	917	1,013	1,253
UNNAMED TRIBUTARY TO LAKE APOPKA					
Approximately 550 feet US of mouth	*	*	*	567	*
Approximately 1,050 feet US of mouth	*	*	*	394	*
Approximately 2,300 feet US of mouth	*	*	*	257	*
Approximately 2,600 feet US of mouth	*	*	*	216	*
Approximately 2,950 feet US of mouth	*	*	*	197	*
UNNAMED TRIBUTARY TO ECONLOCKHATCHEE RIVER					
At Sunflower Trail	1.88	*	*	1,104	*
UNNAMED TRIBUTARY TO ECONLOCKHATCHEE RIVER NO. 2					
At Guy Rd	87.86	*	*	678	*
At a point approximately 1,900 feet US of Guy Rd	75.28	*	*	479	*
At a point approximately 2,460 feet US of Guy Rd	65.78	*	*	305	*
At a point approximately 3,280 feet US of Guy Rd	54.57	*	*	299	*
At a point approximately 3,700 feet US of Guy Rd	43.80	*	*	291	*
At a point approximately 4,080 feet US of Guy Rd	32.61	*	*	115	*
At a point approximately 4,560 feet US of Guy Rd	19.10	*	*	95	*

* Data not available

TABLE 4. SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs) 10-percent	2-percent	1-percent	0.2-percent
WEKIVA RIVER	*	*	*	*	*
WEST BRANCH BOGGY CREEK					
At Swamp Inflow	28.6	1,180	1,970	2,420	3,440
At Beeline Expressway	7.6	980	1,530	1,850	2,500
WEST TRIBUTARY TO ECONLOCKHATCHEE RIVER					
At mouth	6.35	942	1,398	1,614	2,086
Upstream of Tributary in Sec 13-22-31	5.93	903	1,339	1,542	1,989
At State Route 50	5.46	893	1,321	1,518	1,958
WINTER GARDEN CO-OP DITCH					
At Fuller’s Crossing	0.52	85	135	175	320
At Seaboard Coast Line Railroad	0.11	50	60	75	110
WINTER PARK PINES CANAL					
Just upstream of the mouth	*	432	*	699	*
Just upstream of Ranger Blvd	*	272	*	446	*

* Data not available

Pre-Countywide Lacustrine Analyses

In the Cities of Maitland and Winter Park, rainfall-frequency estimates were obtained as described above and the rainfall excess was estimated using the runoff curve numbers described above (Reference 24).

For the lakes studied by detailed methods in the unincorporated areas of Orange County, Lake Jennie Jewel in the City of Edgewood, Lake Bell and Lake King in the City of Eatonville, Lake Moxie and Peach Lake in the City of Ocoee, the volumetric-runoff method was used. 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 24). 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 (Reference 28). 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 receives during the particular storm.

For the lakes in the unincorporated areas of Orange County, Lake Bell and Lake King in the City of Eatonville, area-capacity curves were developed for the lakes from topographic maps (Reference 39). The computed rainfall volumes were applied to area-capacity curves revealing lake stage and inundated area for each particular storm.

The hydrologic analyses for Unnamed Slough are described in the report, "Little Econlockhatchee River Analysis of Downstream Reach in Orange County, Florida, Supporting Calculations and Information" (Reference 40).

In the City of Eatonville, the Lake Bell basin is not totally landlocked, as are Lakes King and Hungerford. Lake Bell has a small capacity to discharge into Lee Road drainage system which outlets to Lake Killarney. This capacity made additional 40 acre-feet of storage available in Lake Bell. In addition to this outlet capacity, Lake Bell has storage areas that absorb runoff before reaching Lake Bell. Storage in Department of Transportation Retention Area No. 2 and the Borrow Pit west of Lake Bell were added to the available storage in Lake Bell.

The lakes with historical stage records in the unincorporated areas of Orange County, Lakes Arnold, Barton, Beauty, Copeland, Giles, Greenwood, Orlando, Rabama, Sunset, Susannah, Theresa and Underhill in the City of Orlando, Lakes Down and Butler in the City of Windermere, Lake Apopka in the City of Winter Garden (which has gage records from 1943 to 1975) were analyzed using a frequency analysis of yearly maximum stages from historical records. Stage records are available for Lakes Arnold, Barton, Beauty, Copeland, Giles and Theresa from 1959 to 1980; Lakes Greenwood, Sunset and Orlando from 1960 to 1980; Lake Rabama from 1966 to 1980 and Lake Susannah from 1968 to 1980 were analyzed using a frequency analysis of the yearly maximum stages from those historical gage records. The data was plotted on probability paper using Weibull's plotting position formula (Reference 41). Methodology on some lakes in the City of Orlando and Lake Bessie in the City of Windermere involved applying a regional standard deviation and/or correlating available data for two or more lakes.

Lake Apopka was also studied using a rainfall runoff-into-storage approach. Results of both analyses compared favorably.

For Lakes Marion, Dream, McCoy, Pike, I, II, III, IV and Buchan Pond in the City of Apopka; Lake Jennie Jewel in the City of Edgewood; Lakes Faith, Sybelia, Catherine No. 2, Eulalia, Lily and Jackson No. 1 in the City of Maitland; Lakes Knowles, Wilbar, Sylvan, Chelton, Spier, Corrine, Midget, Killarney, Maitland, Osceola, Mizell, Virginia, Berry and Sue in the City of Winter Park, the hydrologic analyses performed used a volumetric-runoff analysis and a coincident-frequency method. The results of both methods gave essentially the same lake stages for the floods of the selected recurrence intervals. Lake Hiawassee, located approximately 10 miles south of Apopka in Orange County, has a stage recorder and a rainfall gage. Lake Hiawassee was used to determine the percentage of rainfall that can be expected to run off the land area into the lake. The 10 percent of runoff on Lake Hiawassee was used with confidence of the Apopka Lakes.

For Lakes Maitland, Minnehaha, Nina, Hope, Charity, Park, Gem, Killarney, Osceola, Mizell, Virginia, Berry, and Sue in the City of Winter Park, which are interconnected, flood routings were conducted in addition to the volumetric-runoff and coincident-frequency analyses.

For Lake Jennie Jewel in the City of Edgewood, area capacity curves were developed from USGS Quadrangle Sheets (Reference 39). The computed rainfall volumes were applied to area-capacity curves revealing lake stage and inundated area for each particular storm.

Rainfall-frequency estimates for the lakes in the City of Apopka, were obtained by statistical analysis of records from eight long-term rainfall stations in and near Orange County, as described above (Reference 28).

The coincident-frequency method was developed by the USACE (Reference 42). This method uses the total probability theorem. Stage-duration curves were developed for the Apopka lakes having stage data. Stage-duration curves for lakes having limited stage data were developed by plotting stage-versus-Lake Butler stage (Lake Butler is located approximately 12 miles south of Apopka). Lake Butler has 33 years of record. The next step was to arbitrarily choose a lake stage and several antecedent lake stages. From the stage-duration curve, the amount of time the lake can be expected to be at each of the arbitrarily chosen antecedent stages was determined.

Next, the difference between the initial lake stage and each antecedent stage, which is the distance the lake must be elevated to raise the antecedent stage to the initial stage, was determined. The next step was determining the probability of a 24-hour rainfall increasing the antecedent stage to the initial stage. The final step was summing the products of the probability of occurrence of the antecedent stages and the corresponding rainfall probability. This assigned a frequency to the initial stage. This procedure was repeated with several initial stages, and the results were plotted on probability paper, yielding a stage-frequency curve.

Stage-duration analyses of existing lake stage data were used to determine the mean stage on each of the lakes in the City of Apopka (Reference 43). The mean stage was used as the water-surface elevation in the beginning of the storm.

For Lake Gatlin, Little Lake Conway and Lake Conway in the Cities of Belle Isle and Edgewood, analysis showed that these lakes were sufficiently connected hydraulically to be considered one large lake. However, to study the flood potential of this trio of lakes, it was necessary to determine the coincident inflow from Lake Jessamine and outflow to Lake Warren No. 2. Accordingly, detailed hydrologic analyses were extended to the Lake Jessamine basin and its connecting channel with Little Lake Conway. Additional considerations were the lake Warren outlet channel, Lake Warren and Lake Warren's discharge to Boggy Creek. Rainfall-frequency estimates were obtained by statistical analyses of records of rainfall stations as described above (Reference 28). The analyses used the SCS rainfall runoff curve numbers to determine the percentage of runoff (Reference 24).

Triangular unit hydrographs were developed from each lake basin in the City of Belle Isle, except Lake Jennie Jewel, to account for the time distribution or runoff into the lakes. Twenty percent of the runoff was assumed to occur before the peak of the unit hydrograph. The time to peak was based on overland flow and channel flow travel time to the lake. The 5-day, 10-, 50-, 100- and 500-year rainfall excess was applied to the unit hydrograph and the results were combined with direct rain on each lake to obtain the total basin inflow hydrograph.

In the unincorporated areas of Orange County, the base flood elevation for Lake Phillips was revised using the Inter-Connected Pond Routing Model (Reference 38) and the Special Flood Hazard Area was redelineated using a detailed topographic map (Reference 44). The HEC-1 computer program (Reference 26) was used for the hydrologic and flood routing analysis for Harvest Lake.

For the Lakes in the City of Eatonville, stage duration analyses of existing lake stage data were used to determine the mean stage on each of the lakes (Reference 43). The mean stage was used as the water-surface elevation at the beginning of the storm.

A unit hydrograph for Lake Destiny in the City of Maitland, was developed using the TRACOR method (Reference 45). The rainfall runoff was computed by applying a 24-hour storm to the area. The runoff hydrographs were computed by applying the effective precipitation to unit hydrographs by SCS methodology (Reference 24). Area-capacity curves were developed from topographic maps (Reference 39). The runoff hydrographs were then routed through Lake Destiny to Spring Lake (in Seminole County) using the USACE HEC-1 computer program and the computed peak storage volumes were applied to the area-capacity curves revealing the lake stage and inundated area for each particular storm (Reference 26).

Two stream gages are located on Howell Creek and both gages are located downstream of Howell Creek in Maitland. One gage is located near Slavia and the other gage is located near Oviedo and both have been recording since 1972. Howell Creek originates at a weir located at Lake Maitland. Lake Maitland received flow from several neighboring lakes, such as: Lakes Sue, Virginia, Osceola, Park and Minnehaha. Lake Maitland, in turn, discharges into Howell Creek over a weir. The hydrology for the Lake Maitland basin was performed by calculating the rainfall, runoff into the several lakes, and routing the runoff through these lakes into Howell Creek. The rainfall runoff was computed by applying a 24-hour storm to the basin. The runoff hydrographs were computed by applying the effective precipitation to unit hydrographs by SCS methodology (Reference 24). The runoff hydrographs were then routed through the chain of lakes into Howell Creek using the USACE HEC-1 computer program (Reference 26).

The coincident-frequency method was used to analyze Starke Lake, Lake Prima Vista, Spring Lake No. 3 and Lake Bennet in the City of Ocoee, Lakes Adair, Beardall, Cherokee, Clear, Como, Concord, Davis, Eola, Estelle, Fairhope, Fairview, Formosa, Highland, Ivanhoe, Lancaster, Lawsona, Lorna Doone, Lucerne, Lurna, Mann, Olive, Park, Rowena, Spring No. 2, Turkey, Walker, Weldona, Winyah and Woods in the City of Orlando. Stage-duration curves for Spring Lake No. 2 and Lake Bennet were developed from historical stage records. Because Starke Lake has limited stage data, a stage-duration curve was developed based on a correlation with Lake Butler. Lake Butler is located approximately 4 miles south of Ocoee and has 33 years of record.

In the City of Ocoee, because the swamp on Stream B has an outlet through a culvert under State Route 437, the flood stages upstream of the culvert were determined by flood routing using the USACE HEC-1 computer program (Reference 26). Upstream stages were obtained for the various frequency floodflows and are treated as lake stages (that is, ponding) and not as streamflow.

Lakes Bay, Dot, Lawne and Pineloch were analyzed using the volumetric-runoff method. This method involved applying the 24-hour design precipitation to the lake drainage area, subtracting infiltration losses and calculating the resultant rise in lake stage. Area-capacity curves were developed for the lakes using surveyed cross sections and topographic maps (Reference 39). The computed rainfall volumes were applied to the area capacity curve revealing lake stage and inundated area for each storm. In the case where a significant control structure regulated the lake, computer program HEC-1 was used to route the flood through that structure (Reference 26).

The hydrology for Stream A No. 2 between Lake-of-the-Woods and Lake Minnehaha involved applying the various recurrence interval 24-hour rainfall to the Lake-of-the-Woods hydrograph. The SCS methodology was used to develop the unit hydrograph (Reference 24).

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Hydrology for Myrtle Bay was calculated using SCS methods with the adICPR computer program (References 24 and 32). Calculated flood elevations for Myrtle bay are usually dependent on starting elevations at the beginning of each storm.

The hydrology for the lakes shown in the following tabulation was developed using SCS methods with the adICPR computer program (References 24 and 32).

Lake Addah	Lake Jackson No. 2	Pond A (Trib to Apopka)
Lake Alma	Lake Minore	Pond B (Trib to Apopka)
Lake Alpharetta	Lake Lilly	Pond C (Trib to Apopka)
Lake Arlie	Lake Lotta	Lake Prevatt
Lake Austin	Lake Louise No. 2	Red Lake
Lake Baldwin	Lower Doe Lake	Rhea Lake
Lake Bartho	Lake Lucie	Lake Rose
Border Lake	Lake Luzom	Lake Rouse
Buck Lake	Mac Lake	Lake Sentinel
Club Lake	Lake Maggiore	Lake Shannon
Lake Cora	Marshall Lake	Sheppard Lake
Corner Lake	Merril Lake	Lake Small
Lake Cortez	Mud Lake	Lake Star
Lake Crescent	Mudd Lake	Lake Tanner
Lake Dover	Lake Nan	Lake Tiny
Lake Drawdy	Needham Lake	Tub Lake
Dwarf Lake	Neighborhood Lake	Unnamed Lake 12 (L)
Lake Frederica	Lake Nona	Unnamed Lake 13 (M)
Lake Fuller	Lake Oliver	Unnamed Lake 14
Lake Gear	Lake Olivia	Unnamed Lake 15
Gigi Lake	Olivia Lake – East	Unnamed Lake 17
Grass Lake	Lake Opal	Unnamed Lake A
Heiniger Lake	Lake Paxton	Unnamed Lake B
Lake Heney	Lake Pearl No. 3	Unnamed Lake C
Hickorynut Lake	Lake Pickett	Unnamed Lake D
Holts Lake	Lake Pinto	Unnamed Lake E

Unnamed Lake F	Unnamed Lake J	Whitney Lake
Unnamed Lake G	Unnamed Lake K	Lake Witherington
Unnamed Lake H	Upper Doe Lake	Wolf Lake
Unnamed Lake I		

Lake Crowell, Lake Fran, and Little Lake Bryan were included in the adICPR analysis for Shingle Creek.

A four-day rainfall duration was chosen based on historical data. The time of concentration and unit hydrograph PRF used are the same as described in the previous section on hydrology for streams studied for this revision.

The hydrology for Lakes Buchanan, Ellenore, Eve, Pamela and Sandy Lake was based on a HEC-1 analysis for each lake.

The starting elevations used for most of the Orange County lake analyses were average yearly highs. These elevations were calculated from the Orange County Lake Level data with additional elevations taken from USGS topographic maps and aerial photographs (Reference 39). Certain isolated lakes have experienced large variations in levels mirroring the ground water levels in the area. For these lakes, a joint probability method was adopted.

The hydrology for Alden Lake and Lakes Avalon, Carter, Francis, Hiawatha, Lucy, Marden, Rutherford, Semmes and Standish was based on a probability distribution function (PDF) developed from lake level data from the 1950s up to the early 1990s.

Lake levels for Lakes Gem Mary, Lerla, Warren No. 1, Buynak and Downey Lake were developed by the Orange County Stormwater Management Department Lake Index and are supported by long term well data (Reference 46).

September 25, 2009, Lacustrine FIS Revision

Detailed hydrologic calculations for the 2009 countywide revision were performed using the ICPR program (Reference 38), using the studies provided by several Orange County communities. As with the riverine analyses revisions, standard SCS methodology was utilized, however, a longer-duration design storm (as compared to the 24-hour storm) was used for these lacustrine systems. The storm parameters were based on guidance and documentation from the SJRWMD or SFWMD. Typical rainfall totals are listed

Rainfall totals used in the lacustrine analyses are listed below:

Study	Rainfall Parameters (1% annual-chance total)
Audubon	SJRWMD 96-hr (15 inches)
Lake Angel and Lake June	SJRWMD 96-hr (15 inches)
Lake Lotta	SJRWMD 96-hr (15 inches)
Lake Meadow and Prairie Lake	SJRWMD 96-hr (15 inches)
Lake Notasulga, Texas Basin, and Rock Lake	SFWMD 72-hr (13 inches)
Spring Lake and Lake Johio	SJRWMD 96-hr (15 inches)

Study	Rainfall Parameters (1% annual-chance total)
Lakes Stanley, Lucy, Barlow, Florence, and Lenore	SJRWMD 96-hr (15 inches)
West Colonial and Mercy Drive Area	SFWMD 72-hr (13 inches)

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 5, "Summary of Stillwater Elevations". Unless otherwise noted, the elevations listed in Table 5 apply for the entire shoreline of the lake within the county.

TABLE 5. SUMMARY OF STILLWATER ELEVATIONS

	ELEVATION (FEET NAVD)			
FLOODING SOURCE	10- percent	2-percent	1-percent	0.2-percent
LAKE ADAIR	79.2	80.1	80.6	81.5
LAKE ADDAH	*	*	69.6	*
LAKE ALDEN	65.1	66.3	67.1	68.6
LAKE ALMA	*	*	72.1	*
LAKE ALPHARETTA	*	*	72.4	*
LAKE ANGEL	99.7	102.6	103.5	104.6
APACHE LAKE	*	*	111.4	*
LAKE APOPKA	67.5	68.1	68.3	68.8
LAKE ARLIE	*	*	72.9	75.8
LAKE ARNOLD	97.0	98.6	99.2	100.4
LAKE AUSTIN	*	*	113.3	*
LAKE AVALON	95.2	96.7	97.7	99.6
LAKE BALDWIN	*	*	93.2	*
LAKE BARTHO	*	*	54.8	*
LAKE BARTON	94.3	95.0	95.3	96.0
LITTLE LAKE BARTON	93.6	94.3	94.6	95.3
BAY LAKE	90.4	90.9	91.6	92.6
LAKE BEARDALL	96.3	98.1	98.7	99.9
LAKE BEAUCLAIR	64.0	64.7	65.0	65.6
LAKE BEAUTY	91.6	92.4	93.8	95.2
LAKE BELL	89.8	90.8	91.4	92.7
LAKE BENNET	115.3	116.9	117.4	118.5
LAKE BERRY	69.7	70.1	70.7	71.8
LAKE BESSIE	100.0	100.4	100.6	101.0
BIG SAND LAKE	96.9	99.5	100.5	102.3
BLACK LAKE	96.9	99.0	99.7	101.1
LAKE BLANCHE	100.1	100.5	100.7	101.2
BOO BOO LAKE	96.9	99.5	100.5	102.3
BORDER LAKE	73.5	75.6	76.5	77.7
LAKE BOSSE	62.2	63.4	63.8	64.5
LAKE BRYAN	98.5	98.9	99.2	99.9
LITTLE LAKE BRYAN	101.9	102.0	100.3	102.0
BUCHAN POND	138.6	*	139.6	*
LAKE BUCHANAN	93.0	93.5	93.7	94.0
BUCK LAKE	*	*	78.5	*
LAKE BURDEN	106.8	107.4	107.7	108.4

* Data not computed

TABLE 5. SUMMARY OF STILLWATER ELEVATIONS – continued

FLOODING SOURCE	ELEVATION (FEET NAVD)			
	10 -percent	2- percent	1- percent	0.2- percent
LAKE BURKETT	53.7	54.6	55.0	56.3
LAKE BUTLER	100.1	100.5	100.7	101.2
LAKE BUYNAK	*	*	113.3	*
LAKE CANE	98.7	99.1	99.3	100.1
LAKE CARLTON	64.0	64.7	65.0	65.6
LAKE CARTER	72.5	73.9	74.6	76.1
LAKE CATHERINE NO. 1	91.5	92.6	92.9	93.5
LAKE CATHERINE NO. 2	68.2	69.5	70.4	72.7
LAKE CAY DEE	108.2	109.4	109.9	110.6
LAKE CHAPIN	*	*	111.4	*
LAKE CHARITY	69.2	71.6	72.2	72.8
LAKE CHASE	100.1	100.5	100.7	101.2
LAKE CHELTON	82.2	82.9	83.3	84.1
LAKE CHEROKEE	72.8	73.4	74.3	75.5
CLEAR LAKE	94.9	95.9	96.3	97.1
CLUB LAKE	*	*	60.5	*
LAKE COMO	96.8	99.7	100.7	102.7
LAKE CONCORD	78.7	79.6	80.1	81.0
LAKE CONWAY	87.0	87.6	88.0	88.8
LITTLE LAKE CONWAY	87.0	87.6	88.0	88.8
LAKE COPELAND	78.2	78.8	79.1	79.7
LAKE CORA	*	*	63.2	*
LAKE CORA LEE	70.6	74.3	75.5	78.1
CORNER LAKE	*	*	62.2	*
LAKE CORONI	61.8	*	63.8	*
LAKE CORTEZ	*	*	67.8	*
LAKE CRESCENT	103.4	103.9	104.1	104.7
CROOKED LAKE	73.6	77.6	79.0	81.9
CROWELL LAKE	*	*	102.6	*
CYPRESS LAKE	100.1	100.7	100.9	101.2
LAKE DAVIS	71.0	73.4	74.3	75.5
LAKE DESTINY	88.4	89.4	90.0	91.0
DOE LAKE	*	*	107.7	*
LOWER LAKE DOE	*	*	70.3	*
UPPER LAKE DOE	*	*	70.3	*
LAKE DORA	64.0	64.7	65.0	65.6
LAKE DOT	93.2	93.7	94.0	97.2
LAKE DOVER	*	*	110.0	*
LAKE DOWN	100.1	100.5	100.7	101.2
DOWNEY LAKE	*	*	72.2	*
LAKE DRAWDY	*	*	58.0	*
DREAM LAKE	115.8	*	117.4	*
DRUID LAKE	102.3	103.8	104.4	105.4
DWARF LAKE	*	*	76.2	*
LAKE ELLENORE	96.5	97.0	97.1	97.5
LAKE EOLA	89.2	89.6	89.8	90.2
LAKE ERROL	*	*	67.1	68.6

* Data not computed

TABLE 5. SUMMARY OF STILLWATER ELEVATIONS – continued

FLOODING SOURCE	ELEVATION (FEET NAVD)			
	10 -percent	2- percent	1- percent	0.2- percent
LAKE ESTELLE	72.7	73.3	73.8	74.4
LAKE EULALIA	68.2	69.5	70.4	72.7
LAKE EVE	105.1	105.3	105.4	105.5
LAKE FAIRHOPE	94.4	95.0	95.3	95.8
LAKE FAIRVIEW	88.8	89.6	89.8	90.4
LAKE FAITH	70.3	71.9	72.4	72.8
FISCHER LAKE	92.1	92.9	93.3	94.8
LITTLE FISH LAKE	100.1	100.5	100.7	101.1
LAKE FLORENCE	76.7	79.0	80.7	81.4
LAKE FORMOSA	72.7	73.3	73.8	74.4
LAKE FRAN	*	*	94.8	*
LAKE FRANCIS	61.6	63.3	64.2	65.8
LAKE FREDERICA	*	*	98.7	*
LAKE FULLER	*	*	69.3	*
LAKE GANDY	73.6	74.6	75.0	75.8
LAKE GATLIN	87.0	87.6	88.0	88.8
LAKE GEAR	*	*	110.5	*
LAKE GEM	70.9	71.5	71.7	71.9
LAKE GEM MARY	*	*	92.2	*
LAKE GEORGIA	60.1	60.6	60.9	61.8
LAKE GEYER	78.3	81.4	82.6	84.8
LAKE GIFFORD	*	*	113.1	*
LAKE GIGI	*	*	89.3	*
LAKE GILES	104.0	105.1	105.6	107.2
GRASS LAKE	*	*	113.2	*
LAKE GREENWOOD	66.3	72.2	74.6	79.3
LAKE HANCOCK	*	*	98.9	*
LAKE HART	61.3	62.6	63.0	63.9
LAKE HARTLEY	*	*	99.1	*
HARVEST LAKE	*	*	91.0	*
HEINIGER LAKE	*	*	71.3	*
LAKE HENEY	*	*	105.7	*
LAKE HERRICK	75.6	80.1	81.6	84.8
LAKE HIAWASSEE	78.3	81.4	82.6	84.8
LAKE HIAWATHA	71.7	73.0	73.5	74.9
HICKORYNUT LAKE	*	*	104.0	*
LAKE HIGHLAND	78.7	79.6	80.1	81.0
LAKE HOLDEN	90.7	91.4	91.8	93.1
HOLTS LAKE	*	*	105.2	*
LAKE HOPE	70.5	72.8	73.3	73.7
HUCKLEBERRY LAKE	*	*	96.6	*
LAKE HUNGERFORD	94.6	94.8	95.0	95.2
LAKE IHRIG	*	*	106.2	*
LAKE IRMA	55.1	55.6	56.1	57.1
LAKE ISABEL	80.0	81.1	81.7	83.4
LAKE IVANHOE	78.2	79.1	79.6	80.5
LAKE JACKSON NO. 1	80.9	82.2	83.4	85.7
LAKE JACKSON NO. 2	*	*	81.4	*

* Data not computed

TABLE 5. SUMMARY OF STILLWATER ELEVATIONS – continued

FLOODING SOURCE	ELEVATION (FEET NAVD)			
	10 -percent	2- percent	1- percent	0.2- percent
LAKE JENNIE JEWEL	90.0	90.7	91.0	92.1
LAKE JESSAMINE	92.1	92.7	93.1	94.0
LAKE JOHIO	116.9	118.8	119.8	121.8
JOHNS LAKE	96.9	99.0	99.7	101.1
LAKE JUNE	102.5	104.0	104.6	105.5
LAKE KILLARNEY	83.2	84.0	84.4	84.8
LAKE KING	94.4	95.2	95.7	96.7
LAKE KNOWLES	77.7	78.1	78.7	80.0
LAKE OF THE WOODS	77.2	78.6	79.0	80.0
LAKE LANCASTER	72.2	73.7	74.3	75.5
LAWNE LAKE	88.1	89.1	89.4	90.5
LAKE LAWSONA	72.7	73.9	74.3	75.3
LAKE LENORE	70.6	74.3	75.5	78.1
LAKE LERLA	63.3	*	65.6	*
LAKE LILY	70.1	70.8	72.4	74.2
LAKE LILLY NO. 1	*	*	121.4	*
LAKE LINDA	73.6	74.6	75.0	75.8
LOCK LOMOND	88.4	89.4	90.0	91.0
LAKE LOCKHART	73.6	74.7	75.1	75.9
LONG LAKE	72.1	74.8	75.1	75.8
LAKE LORNA DOONE	98.3	100.1	100.8	102.0
LAKE LOTTA	90.0	90.7	90.9	91.4
LAKE LOUISE NO. 1	100.1	100.5	100.7	101.2
LAKE LOUISE NO. 2	*	*	62.3	*
LAKE LUCERNE	86.1	87.3	87.7	88.6
LAKE LUCIE	61.0	62.8	63.5	65.1
LAKE LUCIEN	92.0	92.6	92.8	93.0
LAKE LUCY	77.2	79.0	80.7	81.4
LAKE LURNA	91.1	92.1	92.4	93.2
LAKE LUZOM	*	*	110.8	*
LAKE MABEL	94.2	94.5	94.6	94.9
LAKE MAC	*	*	114.1	*
LAKE MAGGIORE	*	*	87.4	*
LAKE MAITLAND	66.6	67.4	68.9	69.7
LAKE MANN	91.3	93.4	94.1	95.7
LAKE MARDEN	75.3	76.9	77.6	79.8
LAKE MARION	64.0	64.5	65.0	66.3
LAKE MARSHA	127.8	128.4	128.8	129.9
MARSHALL LAKE	*	*	70.3	*
LAKE MARY	93.3	93.9	94.3	95.2
LAKE MARY JANE	61.3	62.6	63.0	63.9
LAKE MAYNARD	65.8	67.9	69.3	70.8
LAKE MCCOY	54.4	*	65.6	*
LAKE MEADOW	82.7	83.1	84.6	85.4
MEDICINE LAKE	70.9	71.6	72.0	73.1
LAKE MERRIL	*	*	62.6	*
LAKE MIDGET	89.0	90.2	91.0	91.9

* Data not computed

TABLE 5. SUMMARY OF STILLWATER ELEVATIONS – continued

FLOODING SOURCE	ELEVATION (FEET NAVD) 10 -percent	2- percent	1- percent	0.2- percent
LAKE MINNEHAHA	66.7	67.1	67.3	67.5
LAKE MINORE	*	*	87.4	*
LAKE MIRA	59.0	59.5	60.0	61.0
LAKE MIZELL	66.7	67.1	67.3	67.5
LAKE MOXIE	139.4	142.4	143.4	146.1
MUD LAKE	*	*	75.4	*
MUDD LAKE	*	*	113.2	*
LAKE NAN	*	*	65.8	*
LAKE NEEDHAM	*	*	106.0	*
NEIGHBORHOOD LAKES	59.1	60.2	60.7	61.4
LAKE NINA	66.7	67.1	67.3	67.5
LAKE NONA	*	*	78.5	*
LAKE NOTASULGA	96.9	98.2	98.8	99.9
LAKE OLA	72.9	73.3	73.5	73.8
LAKE OLIVE	74.2	75.7	76.2	77.3
LAKE OLIVER	*	*	113.3	*
LAKE OLIVIA	*	*	96.8	*
LAKE OLIVIA EAST	*	*	98.2	*
LAKE OLYMPIA	100.0	101.1	101.6	102.6
LAKE OPAL	*	*	84.0	*
LAKE ORLANDO	84.2	86.0	86.9	89.0
OSAGE LAKE	*	*	111.3	*
LITTLE OSAGE LAKE	*	*	111.3	*
LAKE OSCEOLA	66.7	67.1	67.3	67.5
LAKE PALMER	100.1	100.5	100.7	101.2
LAKE PAMELA	111.1	112.0	112.5	113.4
PARK LAKE NO. 1	70.9	71.5	71.7	71.9
PARK LAKE NO. 2	92.7	94.0	94.5	95.8
LAKE PAXTON	*	*	48.5	*
PEACH LAKE	147.9	150.1	151.3	152.4
LAKE PEARL NO. 1	65.2	68.0	69.2	71.3
LAKE PEARL NO. 2	53.7	54.6	55.0	56.3
LAKE PEARL NO. 3	*	*	121.4	*
LAKE PHILLIPS	*	*	59.9	*
LAKE PICKETT	*	*	57.7	*
PIKE LAKE	65.2	65.9	66.2	68.7
LAKE PINELOCH	93.2	94.2	94.8	97.0
LAKE PINTO	*	*	83.4	*
LAKE PIT	*	*	113.3	*
LAKE PLEASANT	80.0	81.1	81.7	83.4
POCKET LAKE	100.1	100.5	100.7	101.2
POND 19	*	*	95.1	*
POND 740	97.9	98.6	98.8	99.3
POND A	*	*	69.1	*
POND B	*	*	69.1	*
POND C	*	*	68.9	*
PRAIRIE LAKE	83.4	83.9	84.9	85.7
LAKE PREVATT	58.5	*	59.6	*

* Data not computed

TABLE 5. SUMMARY OF STILLWATER ELEVATIONS – continued

FLOODING SOURCE	ELEVATION (FEET NAVD)			
	10 -percent	2- percent	1- percent	0.2- percent
LAKE PRIMA VISTA	100.0	101.1	101.6	102.6
LAKE RABAMA	109.0	110.0	110.4	111.4
RACCOON LAKE	*	*	105.0	*
LAKE REAMS	*	*	98.8	*
RED LAKE	*	*	78.5	*
REEDY LAKE	*	*	96.0	*
LAKE REXFORD	*	*	112.0	*
LAKE RHEA	117.3	118.0	118.2	118.7
ROCK LAKE	98.3	99.4	99.9	100.8
LAKE ROSE	*	*	88.7	*
LAKE ROUSE	*	*	69.0	*
LAKE ROWENA	72.7	73.3	73.8	74.4
LAKE RUBY	116.2	117.0	117.2	117.7
LAKE RUTHERFORD	68.5	69.7	70.1	71.4
SANDY LAKE	98.2	98.9	99.2	99.9
LITTLE SAND LAKE	97.3	99.9	100.9	102.7
LAKE SARAH	*	*	89.8	*
LAKE SAWGRASS	*	*	99.2	*
LAKE SAWYER	*	*	106.4	*
LITTLE LAKE SAWYER	*	*	106.4	*
LAKE SCOTT	*	*	112.0	*
LAKE SEMMES	69.5	70.3	70.6	71.4
LAKE SENTINEL	*	*	110.4	*
LAKE SHADOW	82.6	83.2	83.6	84.7
LAKE SHANNON	110.2	111.4	112.0	113.0
LAKE SHARP	*	*	98.8	*
LAKE SHEEN	100.1	100.5	100.7	101.2
SHEPPARD LAKE	*	*	70.7	*
LAKE SHERWOOD	82.1	87.5	89.3	92.1
LAKE SIMS	80.6	84.3	85.5	88.1
LAKE SMALL	*	*	78.1	*
SOUTH LAKE	94.1	94.5	94.6	94.9
LAKE SPEER	*	*	100.6	*
LAKE SPIER	89.6	91.2	94.3	96.9
SPRING LAKE NO. 1	97.6	100.2	101.2	103.0
SPRING LAKE NO. 2	90.1	90.8	91.1	91.8
SPRING LAKE NO. 3	114.7	116.5	117.3	118.7
LAKE STANDISH	64.7	66.2	66.9	68.5
LAKE STANLEY	80.7	82.5	83.9	85.5
LAKE STAR	*	*	111.1	*
STARKE LAKE	100.0	101.1	101.6	102.6
LAKE STEER	83.1	86.3	87.6	90.1
STREAM B (SWAMP)	117.9	118.7	119.1	119.8
LAKE SUE	72.7	73.3	73.8	74.4
SUNSET LAKE	96.9	97.7	98.0	98.6
LAKE SUSANNAH	96.9	97.7	96.3	98.7

*Data not computed

TABLE 5. SUMMARY OF STILLWATER ELEVATIONS – continued

FLOODING SOURCE	ELEVATION (FEET NAVD) 10 -percent	2- percent	1- percent	0.2- percent
LAKE SYBELIA	72.6	75.1	76.7	78.5
LAKE SYLVAN	71.0	72.3	73.7	77.0
LAKE TANNER	*	*	49.0	*
LAKE TELFER	58.6	59.1	59.6	60.6
TEXAS BASIN PONDING AREA	99.6	100.0	100.1	100.3
LAKE THERESA	109.8	112.7	113.3	113.7
LAKE TIBET	100.1	100.5	100.7	101.2
LAKE TINY	*	*	74.7	*
TROUT LAKE	70.4	74.1	75.3	78.1
TUB LAKE	*	*	96.0	*
TURKEY LAKE	93.0	95.8	96.8	98.9
LAKE TYLER	93.4	93.7	93.8	94.0
LAKE TYNER	92.1	92.7	93.1	94.0
LAKE UNDERHILL	99.9	101.0	101.4	102.4
LAKE VIRGINIA	66.7	67.1	67.3	67.5
LAKE WALKER	94.9	95.9	96.3	97.1
LAKE WARREN NO. 1	*	*	89.1	*
LAKE MARE PRAIRIE	84.8	86.4	88.2	89.7
LAKE WAUNATTA	61.8	62.3	62.8	63.8
LAKE WELDONA	73.7	75.0	75.4	76.3
LAKE WHITNEY	112.0	112.4	112.6	113.0
LAKE WILBAR	82.7	83.8	86.3	89.0
LAKE WILLIAM DAVIS	100.1	100.8	101.1	101.7
LAKE WILLIS	105.6	106.4	107.0	107.6
LAKE WINYAH	72.7	73.3	73.8	74.4
LAKE WITHERINGTON	*	*	69.3	*
WOLF LAKE	*	*	62.6	*
LAKE I	80.6	84.4	86.5	87.0
LAKE II	148.4	148.8	148.9	149.1
LAKE III	74.7	77.9	80.1	81.5
LAKE IV	71.6	73.2	73.7	74.3
LAKE 72	58.0	62.0	63.5	63.7
LAKE 74	112.4	114.0	114.4	115.1
PONDING AREA NO. 1	*	*	65.9	*
PONDING AREA NO. 2	*	*	57.9	*
PONDING AREA NO. 3	*	*	54.9	*
PONDING AREA NO. 4	*	*	57.9	*
PONDING AREA NO. 5	*	*	53.9	*
PONDING AREA NO. 6	*	*	58.2	*
PONDING AREA NO. 7	*	*	93.4	*
PONDING AREA NO. 8	*	*	62.3	*

*Data not computed

TABLE 5. SUMMARY OF STILLWATER ELEVATIONS – continued

FLOODING SOURCE	ELEVATION (FEET NAVD) 10 -percent	2- percent	1- percent	0.2- percent
PONDING AREA NO. 9	*	*	62.9	*
PONDING AREA NO. 10	*	*	62.6	*
PONDING AREA NO. 11	*	*	62.9	*
PONDING AREA NO. 12	*	*	63.5	*
PONDING AREA NO. 13	*	*	61.6	*
PONDING AREA NO. 14	*	*	65.0	*
PONDING AREA NO. 15	*	*	64.9	*
PONDING AREA NO. 16	*	*	62.6	*
PONDING AREA NO. 17	*	*	58.5	*
PONDING AREA NO. 18	*	*	65.2	*
PONDING AREA NO. 19	*	*	64.0	*
PONDING AREA NO. 20	*	*	65.3	*
PONDING AREA NO. 21	*	*	65.4	*
PONDING AREA NO. 23	*	*	64.1	*
PONDING AREA NO. 24	*	*	59.3	*
PONDING AREA NO. 25	*	*	50.6	*
PONDING AREA NO. 26	*	*	53.1	*
PONDING AREA NO. 27	*	*	52.3	*
PONDING AREA NO. 28	*	*	51.8	*
PONDING AREA NO. 29	*	*	56.7	*
PONDING AREA NO. 30	*	*	97.6	*
PONDING AREA NO. 31	*	*	96.5	*
PONDING AREA NO. 32	*	*	95.7	*
PONDING AREA NO. 33	*	*	98.1	*
PONDING AREA NO. 34	*	*	96.0	*
PONDING AREA NO. 35	94.6	95.6	95.9	96.7
PONDING AREA NO. 36	96.0	96.1	96.2	96.7
PONDING AREA NO. 37	94.7	95.6	95.9	96.7
PONDING AREA NO. 38	*	*	104.9	*
PONDING AREA NO. 39	*	*	104.9	*
PONDING AREA NO. 40	*	*	109.6	*
PONDING AREA NO. 41	*	*	104.8	*
PONDING AREA NO. 42	*	*	104.6	*
PONDING AREA NO. 43	*	*	109.9	*
PONDING AREA NO. 44	*	*	107.1	*
PONDING AREA NO. 45	*	*	106.2	*
PONDING AREA NO. 46	*	*	105.9	*
PONDING AREA NO. 47	*	*	113.9	*
PONDING AREA NO. 48	*	*	114.9	*

*Data not computed

TABLE 5. SUMMARY OF STILLWATER ELEVATIONS – continued

FLOODING SOURCE	ELEVATION (FEET NAVD) 10 -percent	2- percent	1- percent	0.2- percent
PONDING AREA NO. 49	*	*	116.0	*
PONDING AREA NO. 50	*	*	112.4	*
PONDING AREA NO. 51	*	*	113.1	*
PONDING AREA NO. 52	*	*	112.3	*
PONDING AREA NO. 53	*	*	112.3	*
PONDING AREA NO. 54	*	*	112.8	*
PONDING AREA NO. 55	*	*	112.0	*
PONDING AREA NO. 56	*	*	111.3	*
PONDING AREA NO. 57	*	*	114.9	*
PONDING AREA NO. 58	*	*	104.1	*
PONDING AREA NO. 59	*	*	105.8	*
PONDING AREA NO. 60	*	*	105.7	*
PONDING AREA NO. 61	*	*	99.6	*
PONDING AREA NO. 62	*	*	102.2	*
PONDING AREA NO. 63	*	*	101.6	*
PONDING AREA NO. 64	*	*	116.0	*
PONDING AREA NO. 65	*	*	106.7	*
PONDING AREA NO. 66	*	*	103.3	*
PONDING AREA NO. 67	*	*	98.9	*
PONDING AREA NO. 68	106.1	106.1	106.2	106.3
PONDING AREA NO. 69	106.8	107.4	107.7	108.7
PONDING AREA NO. 70	100.7	101.3	101.4	101.6
PONDING AREA NO. 71	104.9	105.5	105.6	105.8
PONDING AREA NO. 72	102.0	102.7	102.9	103.3
PONDING AREA NO. 73	100.8	101.6	102.0	102.7
PONDING AREA NO. 74	100.6	101.6	102.0	102.8
PONDING AREA NO. 75	108.6	110.6	111.2	112.9
PONDING AREA NO. 76	102.2	102.6	102.6	102.8
PONDING AREA NO. 77	102.9	103.1	103.3	103.6
PONDING AREA NO. 78	91.0	91.9	92.2	92.7
PONDING AREA NO. 79	*	*	89.2	*
PONDING AREA NO. 80	*	*	95.6	*
PONDING AREA NO. 81	102.6	111.4	114.9	119.6
PONDING AREA NO. 82	93.9	96.1	97.1	99.0
PONDING AREA NO. 83	104.3	104.4	104.4	104.7
PONDING AREA NO. 84	*	*	82.0	*
PONDING AREA NO. 85	*	*	99.4	*
PONDING AREA NO. 86	*	*	99.3	*
PONDING AREA 395-1	*	*	62.0	*
PONDING AREA 725-1	*	*	114.0	*

*Data not computed

TABLE 5. SUMMARY OF STILLWATER ELEVATIONS – continued

FLOODING SOURCE	ELEVATION (FEET NAVD)			
	10 -percent	2- percent	1- percent	0.2- percent
CYPRESS CREEK PONDING AREA 1	*	*	96.1	*
CYPRESS CREEK PONDING AREA 2	*	*	95.1	*
CYPRESS CREEK PONDING AREA 3	*	*	96.1	*
CYPRESS CREEK PONDING AREA 4	*	*	96.1	*
CYPRESS CREEK PONDING AREA 5	*	*	96.1	*
CYPRESS CREEK PONDING AREA 6	*	*	96.1	*
CYPRESS CREEK PONDING AREA 7	*	*	96.1	*
CYPRESS CREEK PONDING AREA 8	*	*	96.1	*
CYPRESS CREEK PONDING AREA 9	*	*	95.1	*
CYPRESS CREEK PONDING AREA 10	*	*	95.1	*
CYPRESS CREEK PONDING AREA 11	*	*	95.1	*
CYPRESS CREEK PONDING AREA 12	*	*	95.1	*
CYPRESS CREEK PONDING AREA 13	*	*	95.1	*
CYPRESS CREEK PONDING AREA 14	*	*	95.1	*
CYPRESS CREEK PONDING AREA 15	*	*	95.1	*
CYPRESS CREEK PONDING AREA 16	*	*	95.1	*
CYPRESS CREEK PONDING AREA 17	*	*	95.1	*
CYPRESS CREEK PONDING AREA 18	*	*	95.1	*
CYPRESS CREEK PONDING AREA 19	*	*	95.1	*
CYPRESS CREEK PONDING AREA 20	*	*	95.1	*
CYPRESS CREEK PONDING AREA 21	*	*	95.1	*
SHINGLE CREEK PONDING AREA 1	*	*	96.1	*
SHINGLE CREEK PONDING AREA 2	*	*	96.1	*
SHINGLE CREEK PONDING AREA 3	*	*	96.1	*
SHINGLE CREEK PONDING AREA 4	*	*	96.1	*
SHINGLE CREEK PONDING AREA 5	*	*	96.1	*
SHINGLE CREEK PONDING AREA 6	*	*	96.1	*
SHINGLE CREEK PONDING AREA 7	*	*	96.1	*
SHINGLE CREEK PONDING AREA 8	*	*	96.1	*
UNNAMED LAKE 12	*	*	69.1	*
UNNAMED LAKE 13	*	*	69.1	*
UNNAMED LAKE 14	*	*	103.2	*
UNNAMED LAKE 15	*	*	102.9	*
UNNAMED LAKE 17	104.9	105.4	105.6	106.0
UNNAMED LAKE D	*	*	104.6	*
UNNAMED LAKE E	*	*	104.6	*
UNNAMED LAKE F	*	*	104.0	*
UNNAMED LAKE G	*	*	104.0	*
UNNAMED LAKE H	*	*	104.0	*
UNNAMED LAKE I	*	*	104.0	*

*Data not computed

TABLE 5. SUMMARY OF STILLWATER ELEVATIONS – continued

FLOODING SOURCE	ELEVATION (FEET NAVD) 10 -percent	2- percent	1- percent	0.2- percent
UNNAMED LAKE J	*	*	106.6	*
UNNAMED LAKE K	*	*	106.2	*
UNNAMED SLOUGH	*	*	45.2	*
UNNAMED TRIBUTARY NO. 1				
AT CONFLUENCE	*	*	79.0	*
AT A POINT 0.09 MILE UPSTREAM OF CONFLUENCE	*	*	80.0	*
AT A POINT 0.76 MILE UPSTREAM OF CONFLUENCE	*	*	81.0	*
AT A POINT 1.40 MILE UPSTRAEM OF CONFLUENCE	*	*	82.0	*

*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 Tables in the FIS report. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are 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.

The Wekiva River was studied previously by the USACE (Reference 21). That study determined 100-year and Standard Project Flood Profiles for the Wekiva River. The 10-, 50-, and 500-year flood profiles for this FIS were determined by plotting the 100-year Standard Project Flood (250-year) elevations at various locations along the Wekiva River on probability paper and extending the lines produced by these points to determine the 10-, 50- and 500-year flood elevations.

The Econlockhatchee River and Little Econlockhatchee River were studied previously by the USACE (Reference 22). That study determined the 100-year flood profile and also presented the 1960 flood of record (35-year flood). The 10-, 50- and 500-year flood profiles for this FIS were determined by plotting the 35-year and 100-year elevations at various locations along those rivers on probability paper and extending the lines produced by these points to determine the 10-, 50- and 500-year flood elevations.

Cypress Creek was studied previously by USACE (Reference 23). That study determined the 100-year Standard Project Flood Profiles and also presented the 1960 flood of record profile. The 10-, 50- and 500-year flood profiles for this FIS were determined using the statistical analysis of available records in the Cypress Creek basin.

For the portion of Stream B (swamp) in the City of Ocoee, the hydraulic analysis was limited to the swamp upstream of State Route 437 because this is the only section of the stream within the corporate limits. Therefore, stream profiles were not calculated downstream of this point.

For the St. Johns River in the unincorporated areas of Orange County, the hydraulic analyses were taken from “The Mean Annual, 10-Year, 25-Year and 100-Year Flood Profiles for the Upper St. Johns River Under Existing Conditions” (Reference 27).

Ghioto, Singhofen and Associates (GSA) performed hydrologic analyses and published a study for the Seminole County portion of the Little Econlockhatchee River. The HEC-2 computer analysis (Reference 47) for the Little Econlockhatchee River within Orange County was identical to that in the 1984 Miller & Miller, Inc. study as described in Section 9.1 of this report, except that the starting water-surface elevation at the Orange/Seminole County boundary was based on the GSA study. The base flood elevations for the Little Econlockhatchee River upstream of Michaels Dam were not affected by the revised starting water-surface elevation at the Orange/Seminole County boundary.

For the portion of Unnamed Slough in the unincorporated areas of Orange County, the hydraulic analyses were taken from “Little Econlockhatchee River Analysis of Downstream Reach in Orange County, Florida, Supporting Calculations and Information” (Reference 40). Because of the large amount of storage that Unnamed Slough provides, the overflow from the Little Econlockhatchee River would not raise the base flood elevation of Unnamed Slough to the base flood elevation of the Little Econlockhatchee River in the amount of time that the Little Econlockhatchee River is at peak flood stage. Therefore, the base flood elevation for Unnamed Slough is lower than the base flood elevation for the Little Econlockhatchee River.

The HEC-2 computer analysis (Reference 47) for Park Manor Outfall Canal within the unincorporated areas of Orange County was revised from the mouth to about 4,000 feet upstream by lowering the starting water-surface elevation to match the revised water-surface elevation for the Little Econlockhatchee River and Park Manor Outfall Canal were revised using aerial topographic maps (Reference 48).

Cross sections for the following flooding sources studied by detailed methods were obtained from field surveys: Boggy Creek, East Branch of Boggy Creek, Fern Creek, the Little Wekiva River, West Branch of Boggy Creek, the Wekiva River, Stream C and Winter Garden Co-op Ditch.

Water-surface elevations of floods of the selected recurrence intervals were computed using the USACE HEC-2 step-backwater computer program for Boggy Creek, East Branch of Boggy Creek, Fern Creek, the Little Wekiva River, West Branch of Boggy

Creek, The Wekiva River, Stream C, and Winter Garden Co-op Ditch (Reference 31). Starting water-surface elevations for the streams in the unincorporated areas of Orange County were based on the computed water-surface elevations of the receiving stream or lake. For the portion of Howell Creek studied by detailed methods in the City of Maitland, starting water-surface elevations were taken from the FIS for the City of Winter Park (Reference 49). For Stream A No. 2, starting water-surface elevations were taken from the elevation from Lake Minnehaha.

Starting water-surface elevations for Winter Garden Co-op Ditch were obtained from the confluence elevations with Lake Apopka.

Starting water-surface elevations for Stream A No. 3 and Howell Creek in the City of Winter Park were obtained from Lake Virginia and Lake Waumpi.

Starting water-surface elevations for Landfill Outfall Canal, Goldenrod Canal, East Orlando Outfall Canal, E40 Canal, Lake Corrine Outfall Canal, Azalea Park Outfall Canal, Crane Strand Canal and Winter Park Pines canal were the computed water-surface elevations along the Little Econlockhatchee River at the confluence of each tributary listed above.

Roughness factors (Manning's "n") used in the hydraulic computations were chosen by engineering judgment and were based on field observation of the stream and overbank areas. The tabulation on page 37 shows the channel and overbank "n" values for the streams studied by detailed methods.

Flood boundaries in various locations in the unincorporated areas of Orange County, which overflow relatively undeveloped areas, were determined by approximate methods. The approximate methods involved using USGS Flood-Prone Area Maps; Flood Hazard Boundary Maps; aerial photographs and field observations (References 50 and 51). For the streams studied by approximate methods in the City of Eatonville, elevations were determined from aerial photographs and field observations (Reference 52).

For the streams studied by approximate methods in the City of Ocoee, elevations were determined using an engineering report on Lake Lotta subbasin, aerial photographs and field observation (References 48 and 53).

For the streams studied by approximate methods in the City of Orlando, elevations were determined using USGS Flood-Prone Area Maps, aerial photographs and field observations (Reference 50).

December 6, 2000 Countywide FIS Analyses

Cross sections were obtained by field survey. All bridges and valley sections were surveyed to obtain elevation data and structural geometry.

Water-surface elevations of floods of the selected recurrence intervals were determined using the USACE HEC-2 step-backwater computer program for Hart Branch, Tributary to Lake Lotta, Myrtle Bay, Rio Pinar Canal, East Tributary to Econlockhatchee River, West Tributary to Econlockhatchee River and Tributary to Hart Branch (Reference 31). Starting water-surface elevations were determined using the normal depth method.

The adICPR computer program was used to determine the peak elevation for Disston Canal, which flows between Lake Mary Jane and the Econlockhatchee River in both directions (Reference 32).

September 25, 2009 Countywide Revision

Watershed studies were provided by Orange County, the City of Orlando, and the City of Ocoee for this revision. 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 (Reference 38).

Roughness coefficients were chosen by engineering judgment and were based on field observations of the stream and floodplain areas. The following tabulation shows the channel and overbank "n" values for all streams studied by detailed methods:

Stream	Channel "n"	Overbank "n"
Azalea Park Outfall Canal	0.028-0.035	0.070-0.150
Boggy Creek	0.030	0.150
East Branch Boggy Creek	0.030	0.150
Crane Strand Canal	0.028-0.035	0.070-0.150
Cypress Creek	0.04	0.3
Disston Canal	0.045	0.045
East Orlando Outfall Canal	0.028-0.035	0.070-0.150
East Tributary to Econlockhatchee River	0.015-0.100	0.060-0.200
E40 Canal	0.028-0.035	0.070-0.150
Econlockhatchee River	0.030	0.150
Fern Creek	0.015-0.018	0.050-0.120
Goldenrod Canal	0.028-0.035	0.070-0.150
Hart Branch	0.015-0.100	0.060-0.200
Howell Creek	0.020-0.100	0.030-0.150
John Young Parkway Drainage Canal	0.06	0.06
Lake Corrine Outfall Canal	0.028-0.035	0.070-0.150
Little Econlockhatchee River	0.028-0.035	0.070-0.150
Landfill Outfall Canal	0.028-0.035	0.070-.0150
Little Wekiva River	0.025-0.080	0.050-0.150
Myrtle Bay	0.015-0.100	0.060-0.200
Park Manor Outfall Canal	0.028-0.035	0.070-0.150
Rio Pinar Canal	0.015-0.100	0.060-0.200
Shingle Creek	0.045-0.060	0.080-0.130
St. Johns River	0.030	0.150
Stream A No. 1	0.03-0.06	0.03-0.06
Stream A No. 2	0.020-0.100	0.030-0.140
Stream A No. 3	0.020-0.100	0.030-0.140
Stream B	0.045-0.15	0.045-0.15
Stream C	0.075	0.075
Tributary to Hart Branch	0.060-0.010	0.100-0.200
Tributary to Lake Lotta	0.015-0.100	0.060-0.200
Tributary to Econlockhatchee River	0.085	0.135
West Branch Boggy Creek	0.030	0.150
West Tributary to Econlockhatchee River	0.015-0.100	0.060-0.200

Stream	Channel “n”	Overbank “n”
Wekiva River	0.030	0.150
Winter Garden Co-op Ditch	0.045	0.050-0.100
Winter Park Pines Canal	0.028-0.035	0.070-0.150

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

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

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 (NGVD29). With the finalization of the North American Vertical Datum of 1988 (NAVD88), many FIS reports and FIRMs are being prepared using NAVD88 as the referenced vertical datum.

All flood elevations shown in this FIS report and on the FIRM are referenced to 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 Orange County are referenced to NAVD88. Ground, structure, and flood elevations may be compared and/or referenced to NGVD29 by applying a conversion factor. Due to a greater-than-allowable variation in applying a single countywide conversion factor, multiple datum conversion factors were calculated for use in this revision. Rather than a countywide factor, specific watershed-based factors were established, as shown in Figure 1 and Table 6, below.

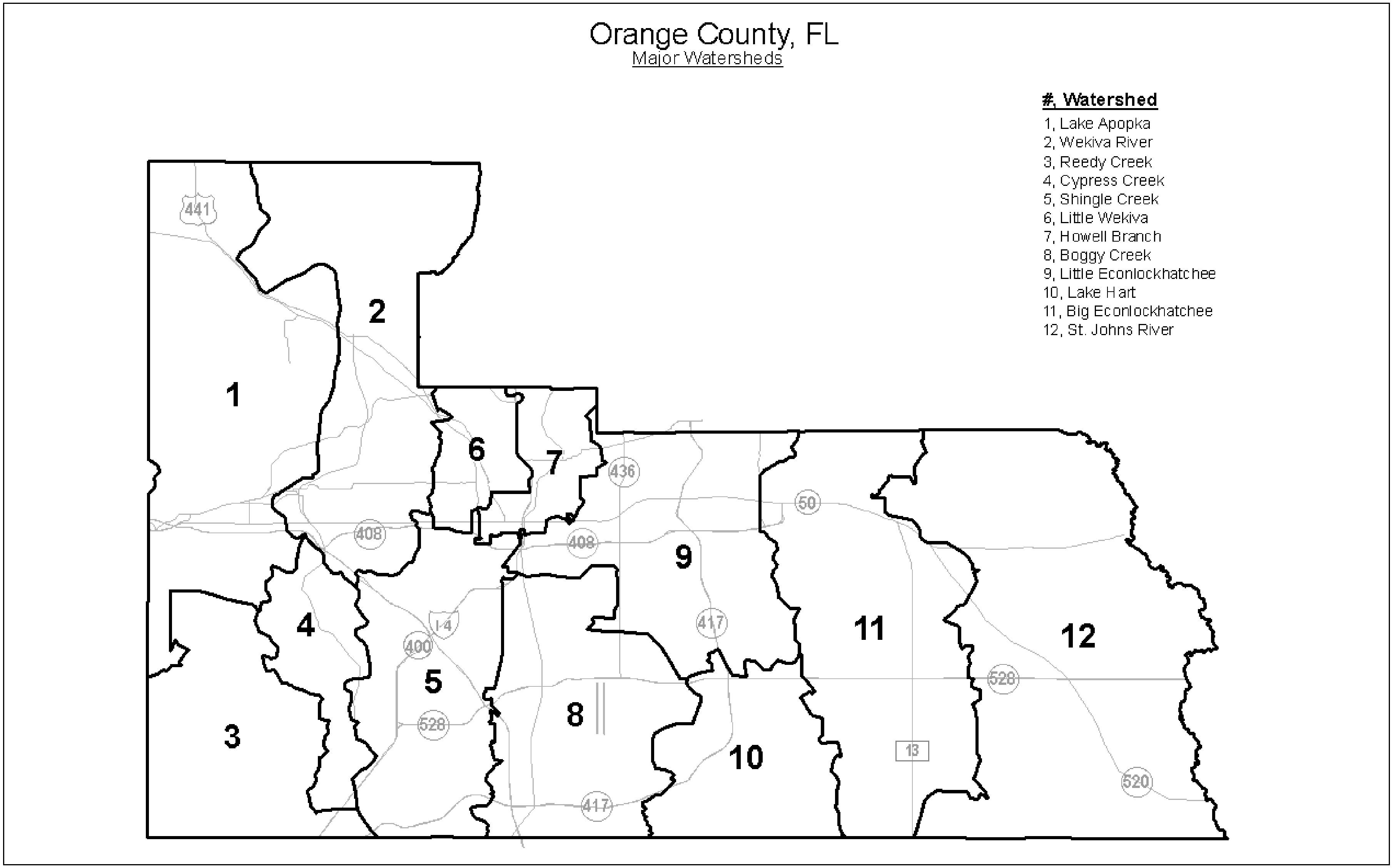

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS

Watershed Locator Map

TABLE 6 – VERTICAL DATUM CONVERSION FACTORS (feet)

Watershed Name	Minimum Conversion	Maximum Conversion	Average Conversion	Maximum Offset
St. Johns River	-1.08	-1.33	-1.19	0.14
Boggy Creek	-0.91	-1.01	-0.96	0.05
Little Econlockhatchee River	-0.92	-1.07	-1.01	0.09
Wekiva River	-0.88	-1.01	-0.94	0.07
Lake Apopka	-0.87	-0.97	-0.91	0.06
Reedy Creek	-0.86	-0.89	-0.88	0.02
Cypress Creek	-0.87	-0.91	-0.89	0.02
Little Wekiva River	-0.91	-1.02	-0.95	0.07
Howell Branch	-0.96	-1.05	-0.98	0.07
Shingle Creek	-0.88	-0.95	-0.91	0.04
Lake Hart	-0.97	-1.07	-1.02	0.05
Big Econlockhatchee River	-1.03	-1.15	-1.09	0.06

To convert elevations from NAVD88 to NGVD29, add the appropriate conversion factor to the NAVD elevation. 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 NGVD29 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.

For more information on NAVD88, see Converting the National Flood Insurance Program to the North American Vertical Datum of 1988, FEMA Publication FIA-20/June 1992, or contact the Vertical Network Branch, National Geodetic Survey, Coast and Geodetic Survey, National Oceanic and Atmospheric Administration, Rockville, Maryland 20910 (Internet address http://www.ngs.noaa.gov).

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 the September 25, 2009 revision, 1-foot and 5-feet interval digital topographic contours, as well as LiDAR data, was provided by the St. Johns River Water Management District, South Florida Water Management District, and the National Geospatial Intelligence Agency. They were used to delineate the floodplain boundaries. The acquisition date of the topographic data ranged from the 1980's to 2004.

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 7. 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 Orange 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, the Little Econlockhatchee River, and Cypress Creek in the unincorporated areas of Orange County whose hydrologic and hydraulic analyses were taken from USACE reports. Other streams without floodways include Azalea Park Outfall Canal, Crane Strand Canal, East Orlando Outfall Canal, Disston Canal, E40 Canal, Goldenrod Canal, Lake Corrine Outfall Canal, Landfill Outfall Canal, the Little Wekiva River, Park Manor Outfall Canal, Stream A No. 1, Stream A No. 2, and Winter Park Pines Canal.

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 7 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.

Encroachment into areas subject to inundation by floodwaters having hazardous velocities aggravates the risk of flood damage, and heightens potential flood hazards by further increasing velocities. A listing of stream velocities at selected cross sections is provided in Table 7. 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.

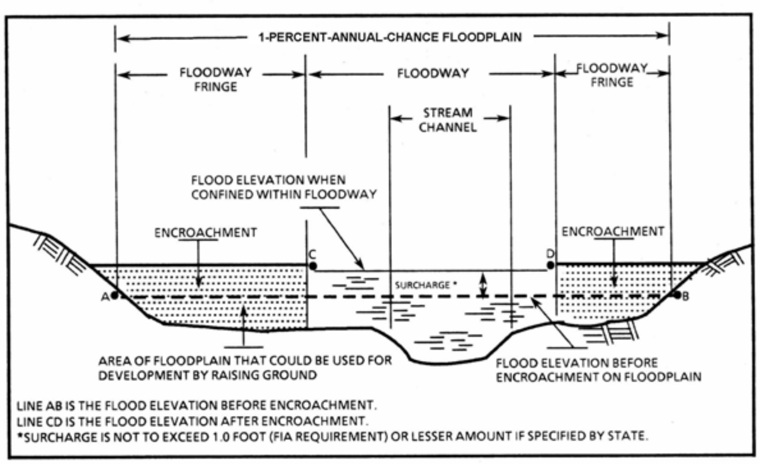

FIGURE 2. FLOODWAY SCHEMATIC

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 2.

FLOODING SOURCE		FLOODWAY				BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Boggy Creek								
A	19,694	700	3,385	1.9	70.2	70.2	71.2	1.0
East Branch Boggy Creek								
B	33,686	70	510	5.1	76.6	76.6	77.5	0.9
C	39,917	50	363	3.4	80.0	80.0	80.4	0.4
D	45,725	54	358	2.7	83.5	83.5	83.9	0.4
E	51,638	50	282	2.5	86.0	86.0	86.5	0.5
East Tributary to Econlockhatchee River								
A	3,350	283	1,410	1.3	46.4	45.8[3]	46.2	0.4
B	5,111	178	1,012	1.4	50.7	50.7	51.3	0.6
C	6,401	153	607	2.4	53.7	53.7	54.1	0.4
D	7,436	186	958	1.5	56.0	56.0	57.0	1.0

[1] Feet above mouth
[2] Value is inaccurate, as the floodway width has been adjusted in this area to match topographic-based floodplain redelineation
[3] Elevations computed without consideration of backwater effects from the Econlockhatchee River

Based on Orange County FIS dated 12/06/2000

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS

FLOODWAY DATA

BOGGY CREEK – EAST BRANCH BOGGY CREEK – EAST TRIBUTARY TO ECONLOCKHATCHEE RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Fern Creek								
A	1,285	15	201	1.0	74.8	74.8	75.8	1.0
B	1,595	31	272	0.8	74.9	74.9	75.8	0.9
C	3,640	19	50	4.5	80.0	80.0	80.1	0.1
D	4,090	22	70	3.2	83.9	83.9	83.9	0.0
E	5,400	28	207	0.5	96.8	96.8	97.8	1.0
F	5,760	20	165	0.7	98.9	98.9	99.9	1.0
Hart Branch								
A	1,900	654	2,091	0.8	64.4	64.3	65.3	1.0
B	4,080	495	1,605	1.0	67.7	67.6	68.6	1.0
C	6,270	188	662	2.5	72.6	72.5	73.5	1.0
D	7,536	109	575	2.5	77.0	76.9	77.2	0.3
E	8,769	287	1,650	0.4	77.4	77.3	78.3	1.0
F	11,159	126	552	1.1	78.6	78.5	79.5	1.0
Howell Creek								
A	5,190[3]	1,380	7,360	0.1	63.1	63.1	63.4	0.3
B	10,320[3]	90	290	3.7	67.2	67.2	68.1	0.9

[1] Feet above mouth
[2] Value is inaccurate, as the floodway width has been adjusted in this area to match topographic-based floodplain redelineation
[3] Feet above Lake Howell

Based on Orange County FIS dated 12/06/2000

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY
ORANGE COUNTY, FL
AND INCORPORATED AREAS

FLOODWAY DATA

FERN CREEK – HART BRANCH – HOWELL CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Little Wekiva River								
A	58,150	35	250	3.6	64.8	64.8	65.3	0.5
B	59,450	35	150	6.1	66.6	66.6	67.2	0.9
C	61,250	*	*	*	*	*	*	*
D	65,120	50	300	3.0	79.1	79.1	80.0	0.9
E	65,620	40	150	3.8	80.1	80.1	80.6	0.5
F	71,030	45	350	1.7	86.2	86.2	86.4	0.2
Myrtle Bay								
A	1,335	165[2]	571	2.2	65.9	65.9	66.9	1.0
B	2,960	153[2]	432	2.9	69.9	69.9	70.9	1.0
C	4,102	193[2]	666	1.9	73.9	73.9	74.5	0.6
D	5,399	240[2]	1,136	1.1	74.7	74.7	75.4	0.7
E	9,766	175[2]	562	0.9	77.4	77.4	78.1	0.7
F	10,907	119[2]	329	1.5	77.8	77.8	78.8	1.0

[1] Feet above mouth
[2] Value is inaccurate, as the floodway width has been adjusted in this area to match topographic-based floodplain redelineation
* Data not available

~~Based on Orange County FIS dated 12/06/2000~~

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY
ORANGE COUNTY, FL
AND INCORPORATED AREAS

FLOODWAY DATA

LITTLE WEKIVA RIVER – MYRTLE BAY

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Rio Pinar Canal								
A	1,550	221	716	0.8	78.3	78.3	79.3	1.0
B	2,330	202	747	0.7	78.7	78.7	79.6	0.9
C	3,990	164	532	0.6	79.5	79.5	80.3	0.8

[1] Feet above mouth

Based on Orange County FIS dated 12/06/2000

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS

FLOODWAY DATA

RIO PINAR CANAL

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Shingle Creek								
A	55,527	2,468	14,577	0.3	78.9	78.9	79.7	0.8
B	65,318	1,022	6,315	0.9	80.2	80.2	81.0	0.8
C	67,572	860	4,743	1.2	80.8	80.8	81.7	0.9
D	73,707	2,076	11,806	0.4	82.2	82.2	83.1	0.9
E	76,508	1,117	6,438	0.7	82.5	82.5	83.5	1.0
F	80,173	300	2,271	1.9	85.0	85.0	85.8	0.8
G	82,827	460	2,959	1.1	85.8	85.8	86.7	0.9
H	86,095	1,338	7,243	0.5	86.3	86.3	87.1	0.8
I	88,892	2,068	11,188	0.3	86.6	86.6	87.4	0.8
J	95,694	498	2,295	1.3	89.5	89.5	90.1	0.6
K	99,833	79	680	3.0	92.0	92.0	92.6	0.6
L	101,896	101	470	2.3	92.8	92.8	93.2	0.4
M	103,196	100	521	2.1	93.4	93.4	93.7	0.3
N	105,575	59	394	2.3	94.1	94.1	94.2	0.1
O	107,978	67	440	2.2	94.5	94.5	94.6	0.1
P	108,833	96	395	2.5	94.6	94.6	94.8	0.2
Q	110,818	103	701	1.5	94.6	94.6	95.1	0.5
R	113,728	80	703	1.3	94.7	94.7	95.2	0.5
S	115,848	56	492	1.1	94.9	94.9	95.3	0.4
T	117,694	55	335	2.7	95.2	95.2	95.7	0.5
U	119,846	47	269	2.2	95.8	95.8	96.4	0.6

[1] Feet above Lake Tohopekaliga

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS

FLOODWAY DATA

SHINGLE CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Stream A No. 3								
A	200	23	169	2.1	69.7	69.7	70.6	0.9
B	3,400	48	278	1.3	73.0	73.0	73.8	0.8
C	5,000	96	619	0.6	73.8	73.8	74.7	0.9
Tributary to Hart Branch								
A	360	149	915	0.5	77.4	77.3[2]	78.2	0.9
B	2,620	157	615	0.8	78.6	78.6	79.6	1.0
Tributary to Lake Lotta								
A	3,487	569	7,503	0.1	100.2	100.2	101.2	1.0
B	5,142	144	1,170	0.5	100.2	100.2	101.2	1.0
C	5,522	73	519	2.1	100.3	100.3	101.3	1.0
D	6,587	243	1,938	0.6	100.7	100.7	101.7	1.0
E	7,297	55	212	5.2	102.4	102.4	102.8	0.4
F	7,777	97	429	2.6	105.7	105.7	106.2	0.5
G	8,492	650	3,928	0.3	106.1	106.1	106.6	0.5
H	11,038	90	685	1.5	112.6	112.6	113.6	1.0

[1] Feet above mouth
[2] Elevations computed without consideration of backwater effects from Hart Branch

Based on Orange County FIS dated 12/06/2000

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY
ORANGE COUNTY, FL
AND INCORPORATED AREAS

FLOODWAY DATA

STREAM A NO. 3 – TRIBUTARY TO HART BRANCH – TRIBUTARY TO LAKE LOTTA

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
West Branch Boggy Creek								
A	15,312	315	940	2.6	78.0	78.0	78.5	0.5
B	22,704	385	475	4.2	81.8	81.8	81.8	0.0
C	28,354	500	2,517	0.8	88.5	88.5	89.5	1.0
D	35,270	400	922	1.7	90.3	90.3	90.4	0.1
E	38,016	149	608	2.6	91.0	91.0	91.0	0.0
F	41,712	120	478	3.3	94.9	94.9	94.9	0.0
G	42,768	93	600	2.6	96.5	96.5	96.8	0.3
H	44,035	120	769	2.0	96.5	96.5	96.8	0.3
I	51,110	100	987	1.9	96.5	96.5	96.8	0.3
J	53,328	320	875	2.1	96.5	96.5	97.1	0.6
K	57,288	270	2,222	0.3	96.5	96.5	97.3	0.8
L	60,086	200	2,096	0.3	96.5	96.5	97.3	0.8
West Tributary to Econlockhatchee River								
A	725	329	1,167	1.4	40.6	31.0[2]	32.0	1.0
B	3,550	228	1,159	1.3	40.6	40.1[2]	41.1	1.0
C	5,161	200	1,113	1.4	43.9	43.9	44.5	0.6
D	7,461	170	955	1.6	47.7	47.7	48.7	1.0

[1] Feet above mouth
[2] Elevations computed without consideration of backwater effects from the Econlockhatchee River

Based on Orange County FIS dated 12/06/2000

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS

FLOODWAY DATA

WEST BRANCH BOGGY CREEK –
WEST TRIBURARY TO ECONLOCKHATCHEE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Winter Garden Co-op Ditch								
A	580	61	321	0.5	74.9	74.9	75.9	1.0
B	800	34	144	1.2	74.9	74.9	75.9	1.0
C	2,580	17	34	2.1	77.6	77.6	77.6	0.0
D	4,740	26	26	2.7	88.2	88.2	88.2	0.0

[1] Feet above mouth

Based on Orange County FIS dated 12/06/2000

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS

FLOODWAY DATA

WINTER GARDEN CO-OP DITCH

5.0 INSURANCE APPLICATIONS

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.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

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

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 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 Orange County. Historical data relating to the maps prepared for each community are presented in Table 8, "Community Map History".

7.0 OTHER STUDIES

FISs have been prepared for the unincorporated areas of Brevard, Lake, Osceola and Seminole Counties (References 54, 55, 56 and 57).

The USACE, Jacksonville District, prepared a floodplain information report on the Little Wekiva River (Reference 30). The USACE, Jacksonville District, also prepared a survey-review report on the Econlockhatchee River (Reference 22). The survey-review report included 100-year flood profiles for the Econlockhatchee River and the Little Econlockhatchee River. The USACE, Jacksonville District, also prepared a floodplain information report on the Wekiva River (Reference 21). That report included 100-year and standard project flood profiles for the Wekiva River. The USACE, Jacksonville District, prepared a floodplain information report on Cypress Creek (Reference 23). That report included 100-year and standard project flood profiles and elevations for various lakes in the Cypress Creek basin. The USACE, Jacksonville District, prepared an expanded floodplain information report on the Boggy Creek basin (Reference 29). The USACE, Jacksonville District, has prepared a special flood hazard information report on Howell Creek Basin Lakes (Reference 49). The USACE, Jacksonville District, prepared a special flood hazard information report on the Upper Wekiva River Lake Region (Reference 58). The lake stages in this countywide FIS differ slightly with the lake stages presented in that report.

Information pertaining to revised and unrevised flood hazards for each jurisdiction within Orange 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 Orange 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.

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Apopka, City of	July 19, 1974	March 5, 1976	September 29, 1978	October 23, 1981
Bay Lake, City of	December 6, 2000[2]	---	December 6, 2000[2]	September 25, 2009
Belle Isle, City of	July 19, 1974	January 30, 1976	September 15, 1978	
Eatonville, Town of	July 19, 1974	May 14, 1976	December 1, 1978	
Edgewood, City of	July 19, 1974	September 10, 1976	September 29, 1978	
Lake Buena Vista, City of	December 6, 2000[2]	---	December 6, 2000[2]	
Maitland, City of	July 19, 1974	October 24, 1975	September 5, 1979	
Oakland, Town of[1]	January 30, 1976	April 15, 1977	December 1, 1981	June 15, 1984 August 5, 1986 December 5, 1989

[1] This community did not have its own FIRM prior to the current countywide FIS. The land area for this community was previously shown on the FIRM for the unincorporated areas of Orange County, but was not identified as a separate NFIP community. Therefore, the dates for this community were taken from the FIRM for Orange County.

[2] This community had no map history prior to first county wide map for Orange County.

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Ocoee, City of	August 2, 1974	May 21, 1976	November 1, 1978	
Orange County (Unincorporated Areas)	January 30, 1976	April 15, 1977	December 1, 1981	June 15, 1984 August 5, 1986 December 5, 1989
Orlando, City of	August 2, 1974	July 2, 1976 March 18, 1977	September 3, 1980	March 26, 1982
Reedy Creek Improvement District	December 6, 2000[2]	---	December 6, 2000[2]	September 25, 2009
Windermere, Town of	April 22, 1977	---	December 18, 1984	
Winter Garden, City of	July 19, 1974	March 26, 1976	September 29, 1978	
Winter Park, City of	October 18, 1974	August 6, 1976	November 15, 1979	February 4, 1983

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

9.0 BIBLIOGRAPHY AND REFERENCES

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50. U.S. Department of the Interior, Geological Survey, Maps of Flood Prone Areas: Apopka, Florida, 1960; Astatula, Florida, 1962; Bithlo, Florida, 1953; Clermont East, Florida, 1962; Eustis, Florida, 1966; Forest City, Florida, 1959; Intercession City, Florida, 1952; Kissimmee, Florida, 1953; Lake Jessamine, Florida, 1969; Lake Louisa, Florida, 1959; Lake Louisa SW, Florida, 1959; Lake Poinsett, Florida, 1953; Lake Poinsett NW, Florida, 1953; Narcoossee, Florida, 1953; Narcoossee NE, Florida, 1953; Narcoossee NW, Florida, 1953; Narcoossee SE, Florida, 1953; Orlando east, Florida, 1969; Orlando West, Florida, 1969; Oviedo SW, Florida, 1953; Pinecastle, Florida, 1970; Sanford SW, Florida, 1960; St. Cloud North, Florida, 1953; Sorrento, Florida, 1960; Titusville, Florida, 1953; Windermere, Florida, 1953; Winter Garden, Florida, 1956; Sharpes, Florida, 1949.

51. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Orange County, Florida (Unincorporated Areas), April 15, 1977.

52. Kucera and Associates, Aerial Photographs, Town of Eatonville, Florida, Scale 1:24,000, 1976.

53. Glace and Radcliffe, Inc., Consulting Engineers, Specific Information Report, Lake Lotta Subbasin, Wekiva River Drainage Basin, December 1976.

54. Federal Emergency Management Agency, Flood Insurance Study, Brevard County, Florida (Unincorporated Areas), Washington, D.C., November 19, 1997.

55. Federal Emergency Management Agency, Flood Insurance Study, Lake County, Florida (Unincorporated Areas), Washington, D.C., April 1, 1982.

56. Federal Emergency Management Agency, Flood Insurance Study, Osceola County, Florida(Unincorporated Areas), Washington, D.C., November 20, 1996.

57. Federal Emergency Management Agency, Flood Insurance Study, Seminole County, Florida (Unincorporated Areas), Washington, D.C., April 17, 1995.

58. U.S. Army Corps of Engineers, Jacksonville District, Special Flood Hazard Information Report, Upper Wekiva River Lake Region, October 1970.

10.0 REVISIONS DESCRIPTION

This section has been added to provide information regarding significant revisions made since the original FIS report and FIRM were printed. Future revisions may be made that do not result in the republishing of the FIS report. All users are advised to contact the Community Map Repository at the address below to obtain the most up-to-date flood hazard data.

Orange County Stormwater Management Division
4200 South John Young Parkway
Orlando, Florida 32839

10.1 Second Revision (Revised June 20, 2018)

a. Acknowledgments

The purpose of this physical map revision (PMR) is to incorporate a Letter of Map Revision (LOMR), Case Number 13-04-3226P. For this LOMR, ponding areas were restudied by Gemini Engineering & Sciences, Inc., around the intersection of State Route 528 and the Central Florida Greenway. The revisions were incorporated in to this FIS under Contract No. HSFEHQ-09-D-0368, Task Order HSFE04-13-J-9001 by BakerAECOM.

The digital base map information files were provided by Orange County. The digital orthophotography was from the USGS National Map, which was acquired in February 2011, with the imagery processed to a 0.5-foot pixel resolution.

b. Scope

This revision also incorporates the determination of letters issued by FEMA resulting in Letters of Map Change since the last effective date of September 25, 2009. Incorporated LOMR's are listed in Table 9 below, "Letters of Map Revision (LOMRs) Incorporated Under Second Revision." Other than LOMR 13-04-3226P, the revisions from the LOMR's listed below are already included in the National Flood Hazard Layer (NFHL). As a result of this PMR, they will be reflected on the revised FIRM panels and the Stillwater elevations listed in this Flood Insurance Study (FIS) report.

TABLE 9. LETTERS OF MAP REVISION (LOMRS)
INCORPORATED UNDER SECOND REVISION

Case Number	Flooding Source(s)	Communities Affected	Effective Date
10-04-0788P	Village Walk at Lake Nona	City of Orlando	12/17/2010
10-04-0789P	Lake Nona South	City of Orlando	9/24/2010
11-04-7338P	Tivoli Woods Village B Ponds	City of Orlando	3/28/2012
11-04-5608P	Unnamed Flooding Area Laureate Park Wetland Area 1 & 2	City of Orlando	9/20/2011

TABLE 9. LETTERS OF MAP REVISION (LOMRS) INCORPORATED UNDER SECOND REVISION

Case Number	Flooding Source(s)	Communities Affected	Effective Date
12-04-2577P	Unnamed Ponding Areas/Pershing Park	Unincorporated Areas of Orange County	9/21/2012
12-04-4611P	Ponding Area H-5A	City of Orlando, Unincorporated Areas of Orange County	4/19/2013
12-04-5845P	Lake Nona Area	City of Orlando	3/8/2013
13-04-0278P	Unnamed Flooding Areas	City of Orlando	5/24/2013
13-04-0940P	Unnamed Flooding Areas, Ponds B-CV1 & CV2	City of Orlando	8/2/2013
13-04-2963P	Stonebridge Ponds, Vista Lakes and Vista Wetlands	City of Orlando, Unincorporated Areas of Orange County	2/7/2014
13-04-3226P	East Park Ponding Areas, Unnamed Tributary No. 1	City of Orlando, Unincorporated Areas of Orange County	9/26/2013
13-04-7164P	South Laureate Wetland Area 3 & 4	City of Orlando	4/25/2014
14-04-A992P	Wetland W-32 & 34	Unincorporated Areas of Orange County	8/21/2015
14-04-0780P	Unnamed Wetland W1	Unincorporated Areas of Orange County	10/17/2014
14-04-7362P	Lake Michelle	City of Orlando	1/23/2015
15-04-1669P	Wetland W-23	City of Orlando	8/24/2015
15-04-4657X	Lake Michelle	City of Orlando	8/24/2015
15-04-A035X	Boggy Creek Ponding Area 1	Unincorporated Areas of Orange County	11/20/2015
15-04-7419P	Unnamed Wetland Area (W-103S)	City of Orlando	3/7/2016
16-04-0720P	Lake Michelle	City of Orlando	5/31/2016
16-04-4432X	Unnamed Local Wetland	Unincorporated Areas of Orange County	9/19/2016
16-04-5226P	Lake Nona South Laureate Park SMAs 1, 6, 7, 8A-8B1, 11A, 12, 14	City of Orlando	3/10/2017

TABLE 9. LETTERS OF MAP REVISION (LOMRS)
INCORPORATED UNDER SECOND REVISION

Case Number	Flooding Source(s)	Communities Affected	Effective Date
16-04-7503P	Eagle Creek Village D&E Ponds A & 7, and Wetland 5	Unincorporated Areas of Orange County	7/21/2017

The panels listed below are those that were updated under this revision:

12095C0435G	12095C0455G
12095C0445G	12095C0465G
12095C0650G	12095C0675G

c. Hydrologic Analyses

For the second revision, due to considerations for the South Florida Water Management District (SFWMD) and St. Johns River Water Management District (SJRWMD), Gemini Engineering & Sciences, Inc., used two ICPR models with different design storm criteria to evaluate the base flood. While the entire revision area is hydraulically connected, it was determined that stormwater runoff from one District did not outfall into the adjacent District. Therefore, it was deemed appropriate to use the separate criteria for each District.

The boundary between the Districts is located along State Highway 528, with the area to the north being under the jurisdiction of SJRWMD and the area to the south being under the jurisdiction of the SFWMD. For the area within SJRWMD, a design storm of 24 hours with a rainfall depth of 11.8 inches was used. For the area within SFWMD, a design storm of 72 hours with a rainfall depth of 14 inches was used. The Florida Modified Type II rainfall distribution was used for the 24 hour storm and the SFWMD 72 hour rainfall distribution was used for the 72 hour storm.

A summary of the revised discharges and revised stillwater elevations for the 10-, 2-, 1-, and 0.2-percent-annual-chance flood events for those detailed studies incorporated under this PMR, including the effective LOMR's, are listed in Table 10, "Revised Summary of Discharges" and Table 11, "Revised Summary of Stillwater Elevations". Unless otherwise noted, the elevations listed in Table 10 apply for the entire shoreline of the lake within the county.

TABLE 10. SECOND REVISION - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs)			
		10-percent	2-percent	1-percent	0.2-percent
UNNAMED WETLAND AREA W-103S					
At Narcoossee Road	1.32	*	*	632	*

*Data not computed

TABLE 11. SECOND REVISION - SUMMARY OF STILLWATER ELEVATIONS

FLOODING SOURCE	ELEVATION (FEET NAVD) 10-percent	2-percent	1-percent	0.2-percent
DOWDEN POND	*	*	90.2	*
DOWDEN WETLAND	*	*	88.7	*
EAST PARK PONDING AREA NO. 1	*	*	80.3	*
EAST PARK PONDING AREA NO. 2	*	*	83.5	*
EAST PARK PONDING AREA NO. 3	*	*	85.3	*
EAST PARK PONDING AREA NO. 4	*	*	84.1	*
EAST PARK PONDING AREA NO. 5	*	*	85.2	*
EAST PARK PONDING AREA NO. 6	*	*	86.0	*
EAST PARK PONDING AREA NO. 7	*	*	85.1	*
EAST PARK PONDING AREA NO. 8	*	*	84.1	*
EAST PARK PONDING AREA NO. 9	*	*	84.0	*
EAST PARK PONDING AREA NO. 10	*	*	83.6	*
EAST PARK PONDING AREA NO. 11	*	*	83.7	*
EAST PARK PONDING AREA NO. 12	*	*	84.3	*
EAST PARK PONDING AREA NO. 13	*	*	86.2	*
EAST PARK PONDING AREA NO. 14	*	*	86.5	*
EAST PARK PONDING AREA NO. 15	*	*	87.2	*
EAST PARK PONDING AREA NO. 16	*	*	85.2	*
EAST PARK PONDING AREA NO. 17	*	*	84.0	*
EAST PARK PONDING AREA NO. 18	*	*	83.7	*
EAST PARK PONDING AREA NO. 19	*	*	84.0	*
EAST PARK PONDING AREA NO. 20	*	*	84.1	*
EAST PARK PONDING AREA NO. 21	*	*	83.6	*
EAST PARK PONDING AREA NO. 22	*	*	83.7	*
EAST PARK PONDING AREA NO. 23	*	*	82.4	*
EAST PARK PONDING AREA NO. 24	*	*	83.9	*
EAST PARK PONDING AREA NO. 25	*	*	82.3	*
EAST PARK PONDING AREA NO. 26	*	*	88.1	*
EAST PARK PONDING AREA NO. 27	*	*	87.4	*
EAST PARK PONDING AREA NO. 28	*	*	86.0	*
EAST PARK PONDING AREA NO. 29	*	*	86.6	*
EAST PARK PONDING AREA NO. 30	*	*	86.5	*
EAST PARK PONDING AREA NO. 31	*	*	86.7	*
EAST PARK PONDING AREA NO. 32	*	*	84.5	*
EAST PARK PONDING AREA NO. 33	*	*	81.7	*
EAST PARK PONDING AREA NO. 34	*	*	81.9	*
EAST PARK PONDING AREA NO. 35	*	*	81.3	*
EAST PARK PONDING AREA NO. 36	*	*	81.2	*
EAST PARK PONDING AREA NO. 37	*	*	81.6	*
EAST PARK PONDING AREA NO. 38	*	*	83.0	*
EAST PARK PONDING AREA NO. 39	*	*	82.0	*
EAST PARK PONDING AREA NO. 40	*	*	81.4	*

*Data not computed

TABLE 11. SECOND REVISION - SUMMARY OF STILLWATER ELEVATIONS

FLOODING SOURCE	ELEVATION (FEET NAVD)			
	10-percent	2-percent	1-percent	0.2-percent
EAST PARK PONDING AREA NO. 41	*	*	81.4	*
EAST PARK PONDING AREA NO. 42	*	*	82.1	*
EAST PARK PONDING AREA NO. 43	*	*	79.8	*
EAST PARK PONDING AREA NO. 44	*	*	78.7	*
EAST PARK PONDING AREA NO. 45	*	*	81.0	*
EAST PARK PONDING AREA NO. 46	*	*	77.6	*
FOUNTAINS AT PERSHING PARK POND	*	*	96.1	*
LAKE NONA SOUTH POND 1	*	*	86.4	*
LAKE NONA SOUTH POND 2	*	*	85.1	*
LAKE NONA SOUTH WETLAND AREA 1	*	*	84.8	*
LAKE NONA SOUTH WETLAND AREA 2	*	*	84.8	*
LAKE PAMELA	108.9	109.4	109.7	110.3
LAUREATE PARK WETLAND AREA	*	*	78.8	*
LAUREATE PARK WETLAND AREA	*	*	80.0	*
NONA POND 2BNE	*	*	90.6	*
NONA POND 2BSE	*	*	89.7	*
NONA ESTATE POND	*	*	88.7	*
NONA POND 67	*	*	87.7	*
NONA WETLAND 78N	*	*	88.8	*
NONA WETLAND 78M	*	*	88.8	*
NONA WETLAND 78S	*	*	88.8	*
NONA WETLAND 152	*	*	87.7	*
POND A	*	*	77.0	*
POND 7	*	*	78.7	*
POND 8	*	*	76.3	*
POND 9	*	*	77.0	*
POND B-CV1	*	*	85.0	*
POND B-CV2	*	*	84.1	*
POND AREA H-5A	*	*	75.3	*
STONEBRIDGE POND B-1	*	*	86.2	*
STONEBRIDGE POND B-2	*	*	86.4	*
SOUTH LAUREATE WELAND AREA 4	*	*	77.7	*
SOUTH LAUREATE STORWATER MANAGEMENT AREA SMA-1	*	*	81.3	*
SOUTH LAUREATE STORMWATER MANAGEMENT AREA SMA-2	*	*	80.2	*
SMA-1	*	*	79.8	*
SMA-6	*	*	83.8	*
SMA-7	*	*	82.4	*
SMA-8A	*	*	84.4	*

*Data not computed

TABLE 11. SECOND REVISION - SUMMARY OF STILLWATER ELEVATIONS

FLOODING SOURCE	ELEVATION (FEET NAVD) 10-percent	2-percent	1-percent	0.2-percent
SMA-8B	*	*	84.4	*
SMA-8B1	*	*	84.2	*
SMA-11A	*	*	82.6	*
SMA-12	*	*	80.1	*
SMA-14	*	*	83.6	*
TIVOLI WOODS VILLAGE B POND 1	*	*	78.5	*
TIVOLI WOODS VILLAGE B POND 2	*	*	78.5	*
UNNAMED WETLAND W1	*	*	76.3	*
VILLAGEWALK AT LAKE NONA PONDING AREA 1	*	*	87.5	*
VILLAGEWALK AT LAKE NONA PONDING AREA 2	*	*	82.6	*
VILLAGEWALK AT LAKE NONA WETLAND AREA	*	*	83.3	*
VISTA LAKES POND 1	*	*	86.5	*
VISTA LAKES POND 2	*	*	86.2	*
VISTA LAKES POND 3	*	*	86.2	*
VISTA LAKES POND 4	*	*	86.6	*
VISTA LAKES POND 5	*	*	86.8	*
VISTA LAKES POND 6	*	*	86.7	*
WETLAND 5	*	*	79.0	*
VISTA LAKES POND 7	*	*	84.7	*
VISTA LAKES POND 8	*	*	84.4	*
VISTA LAKES POND 9	*	*	85.6	*
VISTA LAKES POND 10	*	*	82.4	*
VISTA LAKES POND 11	*	*	81.0	*
VISTA LAKES POND 12	*	*	81.0	*
VISTA LAKES WETLAND 1	*	*	84.5	*
VISTA LAKES WETLAND 2	*	*	88.5	*
VISTA LAKES WETLAND 3	*	*	84.3	*
VISTA LAKES WETLAND 4	*	*	84.5	*
VISTA LAKES WETLAND 5	*	*	87.1	*
VISTA LAKES WETLAND 6	*	*	84.4	*
VISTA LAKES WETLAND 7	*	*	83.3	*
WETLAND W-23	*	*	80.5	*
WETLAND W-31	*	*	76.5	*
WETLAND W-32	*	*	76.8	*
WETLAND W-34	*	*	80.0	*
WETLAND W-35	*	*	78.5	*
WETLAND W-103S	*	*	75.3	*

*Data not computed

d. Hydraulic Analyses

For this revision, Gemini Engineering & Sciences, Inc. developed an ICPR model to determine the 1-percent-annual-chance water surface elevation for the East Park Area Ponds and Wetlands and Unnamed Tributary No. 1.

e. Floodplain Boundaries

The 1.0- and 0.2- percent-annual-chance floodplain boundaries are shown on the FIRM (Exhibit 2) for streams studied by detailed methods. In cases where the 1.0- and 0.2-percent annual-chance floodplain boundaries are close together, only the 1.0-percent annual-chance floodplain boundary has been shown.

For this revision, floodplain boundaries were provided by Gemini Engineering & Sciences, Inc for the portions of the East Park ponding areas and Unnamed Tributary No. 1 that were revised.

f. Floodways

No floodways were computed or revised for this revision.

g. Bibliography and References

Streamline Technologies, Inc. (2002). ICPR Advanced: User's Manual Version 3, Winter Park, Florida.

10.2 Third Revision (Revised September 24, 2021)

a. Acknowledgments

The purpose of this physical map revision (PMR) is to update the flood hazards within the Ocklawaha Watershed. The PMR includes revised hydrologic and hydraulic analyses on several detailed studies, updating hydrologic and hydraulic modeling along two approximate zones, and redelineating detailed and approximate ponding areas within the watershed. The revisions were incorporated in to this FIS under Contract No. HSFEHQ-09-D-0368, Task Order HSFE04-12-J-0016 by BakerAECOM.

The digital base map information files were provided by Orange County, including the digital orthophotography, which was acquired in 2017 with a 0.25-ft pixel resolution. The final CCO Meeting was held on April 9 2019.

b. Scope

Detailed studies along Stream B and Stream C were updated using ICPR. The ICPR model also includes updated flood elevations for Lake Moxie and Peach Lake. Additionally, flood hazard information was added to Stream C Tributary 1, Tributary 2 and Tributary 3, however flood profiles were not developed.

FEMA Region 4 is aware of the insufficient elevation data between each node and has approved the method, which was to interpolate between nodes and place elevations along the stream line on Stream C Tributary 1, Tributary 2, and Tributary 3.

Approximate models were developed in HEC-RAS along two Unnamed Tributaries to Lake Apopka. Redelineation was also performed for ponding Zone A and Zone AE areas within the Ocklawaha Watershed using 2006 LiDAR.

This revision also incorporates the determination of letters issued by FEMA resulting in Letters of Map Change since the last effective date of September 25, 2009. Incorporated LOMR's are listed in Table 12 below, "Letters of Map Revision (LOMRs) Incorporated Under This Revision." The revisions from the LOMR's listed below are already included in the National Flood Hazard Layer (NFHL). As a result of this PMR, they will be reflected on the revised FIRM panels and the Stillwater elevations listed in this Flood Insurance Study (FIS) report.

TABLE 12. LETTERS OF MAP REVISION (LOMRS)
INCORPORATED UNDER THIS REVISION

Case Number	Flooding Source(s)	Communities Affected	Effective Date
15-04-4919P	Beck/Overstreet P.D.	Unincorporated Areas of Orange County	12/24/2015
10-04-4198P	Ponding Area No. 80	City of Ocoee Unincorporated Areas of Orange County	5/21/2010
09-04-6911P	Summerlake Development, 301 East Pine Street	Unincorporated Areas of Orange County	1/19/2010

The panels listed below are those that were updated under this revision:

12095C0020H	12095C0200H
12095C0050H	12095C0205H
12095C0100H	12095C0210H
12095C0110H	12095C0215H
12095C0120H	12095C0220H
12095C0125H	12095C0380H

c. Hydrologic Analyses

For this revision, an ICPR model was used to determine base flood elevations for Stream C, Stream C and Stream C Tributaries 1, 2, and 3. Basin boundaries were initially taken from a previously completed ICPR model, and updated using 2006 LiDAR. To estimate the runoff generated in each modeled subbasin, the SCS Unit Hydrograph method was utilized. The Florida Modified Type II rainfall distribution was used, in conjunction with 24-hour rainfall amounts from NOAA Atlas 14, Volume 9, Version 2 Report.

Recurrence Interval	Rainfall Amount (Inches)
10-percent	6.05
2-percent	8.72
1-percent	10.1
0.2-percent	13.9

The SCS Runoff Curve Number Method was used to compute runoff volume from rainfall. Area weighted curve numbers were calculated for each subbasin by intersecting the soil type (hydrologic soil group) and land use data (from Orange County) within each subbasin. A curve number look up table was established and imported in to ICPR for computations. Additionally, time of concentration was developed using GIS and computed times were imported in to ICPR.

For the revised approximate studies, a drainage area and discharge relationship was established using effective discharges from the FIS. The linear equation was then applied to the drainage area computed for the approximate studied streams.

A summary of the revised discharges and revised stillwater elevations for the 10-, 2-, 1-, and 0.2-percent-annual-chance flood events for those detailed studies incorporated under this PMR are listed in Table 13, "Third Revision - Summary of Discharges" and Table 14, "Third Revision - Summary of Stillwater Elevations".

TABLE 13. THIRD REVISION - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs)			
		10-percent	2-percent	1-percent	0.2-percent
STREAM B					
At the confluence with Stream C	0.86	57	105	130	190
STREAM C					
Downstream limits at Lake Apopka	3.1	1,020	1,640	1,980	2,870
Upstream of SR-429	1.3	225	410	530	880
STREAM C TRIBUTARY 1					
At the confluence with Stream C	0.12	30	85	130	250
STREAM C TRIBUTARY 2					
At the confluence with Stream C	0.4	60	100	120	190
STREAM C TRIBUTARY 3					
At the confluence with Stream C	0.8	30	85	750	1130

TABLE 14. THIRD REVISION - SUMMARY OF STILLWATER ELEVATIONS

FLOODING SOURCE	ELEVATION (FEET NAVD)			
	10-percent	2-percent	1-percent	0.2-percent
LAKE MOXIE	136.7	138.3	139.2	141.5
PEACH LAKE	146.4	147.9	148.4	150.2
PONDING AREA NO. 80	*	*	90.5	*
PONDING AREA NO. 81	*	*	90.5	*
PONDING AREA NO. 87	*	*	102.0	*
PONDING AREA NO. 88	*	*	108.2	*
PONDING AREA NO. 89	*	*	108.3	*
PONDING AREA NO. 90	*	*	105.3	*
PONDING AREA NO. 91	*	*	106.4	*
PONDING AREA NO. 92	*	*	106.7	*

*Data not computed

d. Hydraulic Analyses

For this revision, BakerAECOM developed an ICPR model to determine the 10-, 2-, 1-, and 0.2-percent-annual-chance water surface elevation for Stream B, Stream C and Stream C Tributaries 1, 2 and 3. Field survey was conducted along Stream C and incorporated in to the study. The field survey was supplemented with 2006 LiDAR. For portions of the model, a previously developed ICPR model from 1996 was used for structure information when survey was not available.

For the revised approximate studies, HEC-RAS version 5.0.5 was used to compute 1-percent annual chance flood elevations. Field survey was used to model the structures and supplemented with 2006 LiDAR.

Manning’s n-values were based on field observation and 2017 imagery.

e. Floodplain Boundaries

The 1.0- and 0.2- percent-annual-chance floodplain boundaries are shown on the FIRM (Exhibit 2) for streams studied by detailed methods.

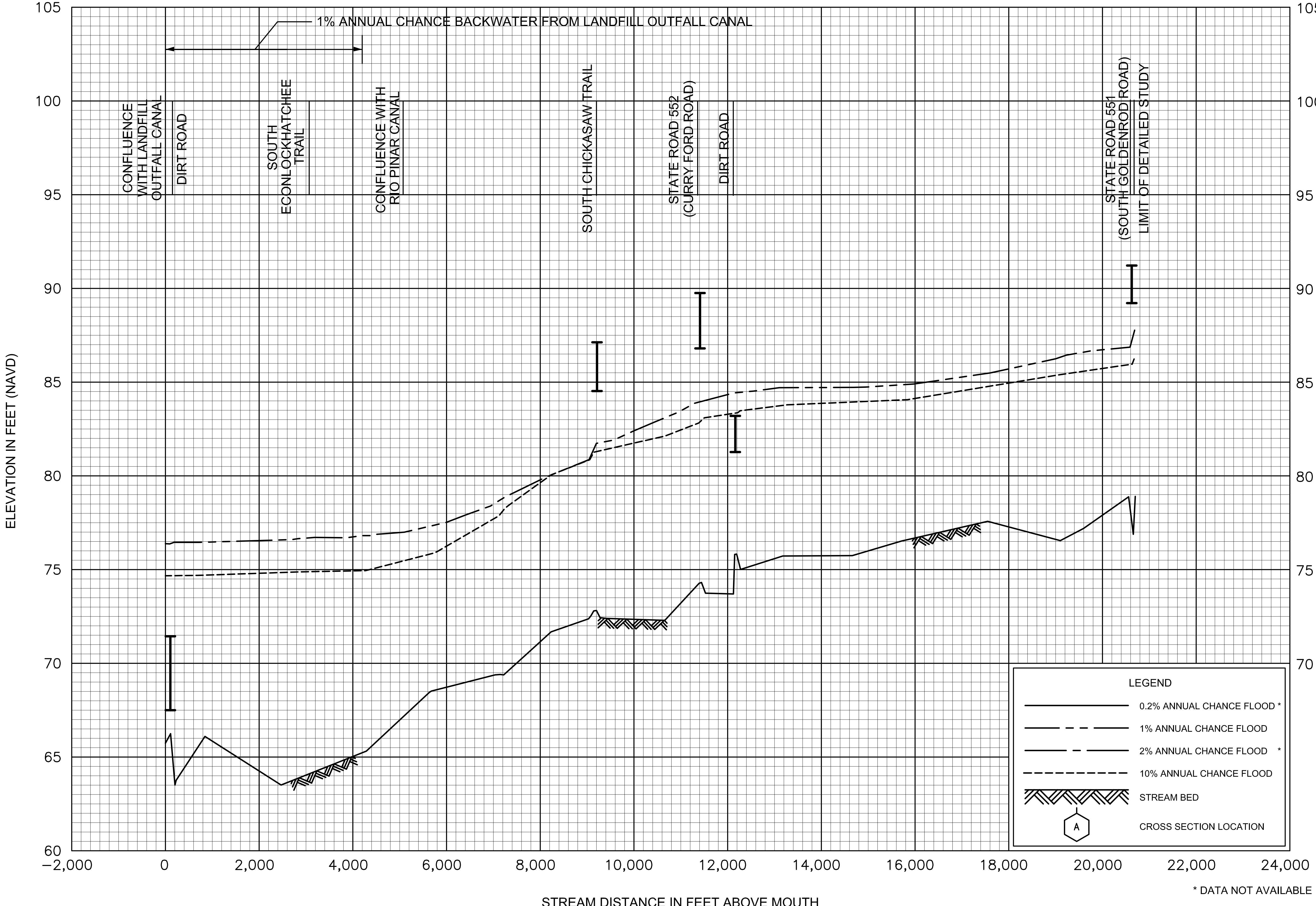
For this revision, floodplain boundaries were mapped using 2006 LiDAR for the revised detailed studies, the updated approximate studies and the redelineated reaches and ponds. For the redelineated Zone A ponds, flood elevations were determined using LOMC flood elevations or environmental permitting information, and mapped using LiDAR.

f. Floodways

No floodways were computed or revised for this revision.

g. Bibliography and References

Streamline Technologies, Inc. (2002). ICPR Advanced: User's Manual Version 4.0.4, Winter Park, Florida.



* DATA NOT AVAILABLE

BASED ON ORANGE COUNTY FIS DATED 12/06/2000

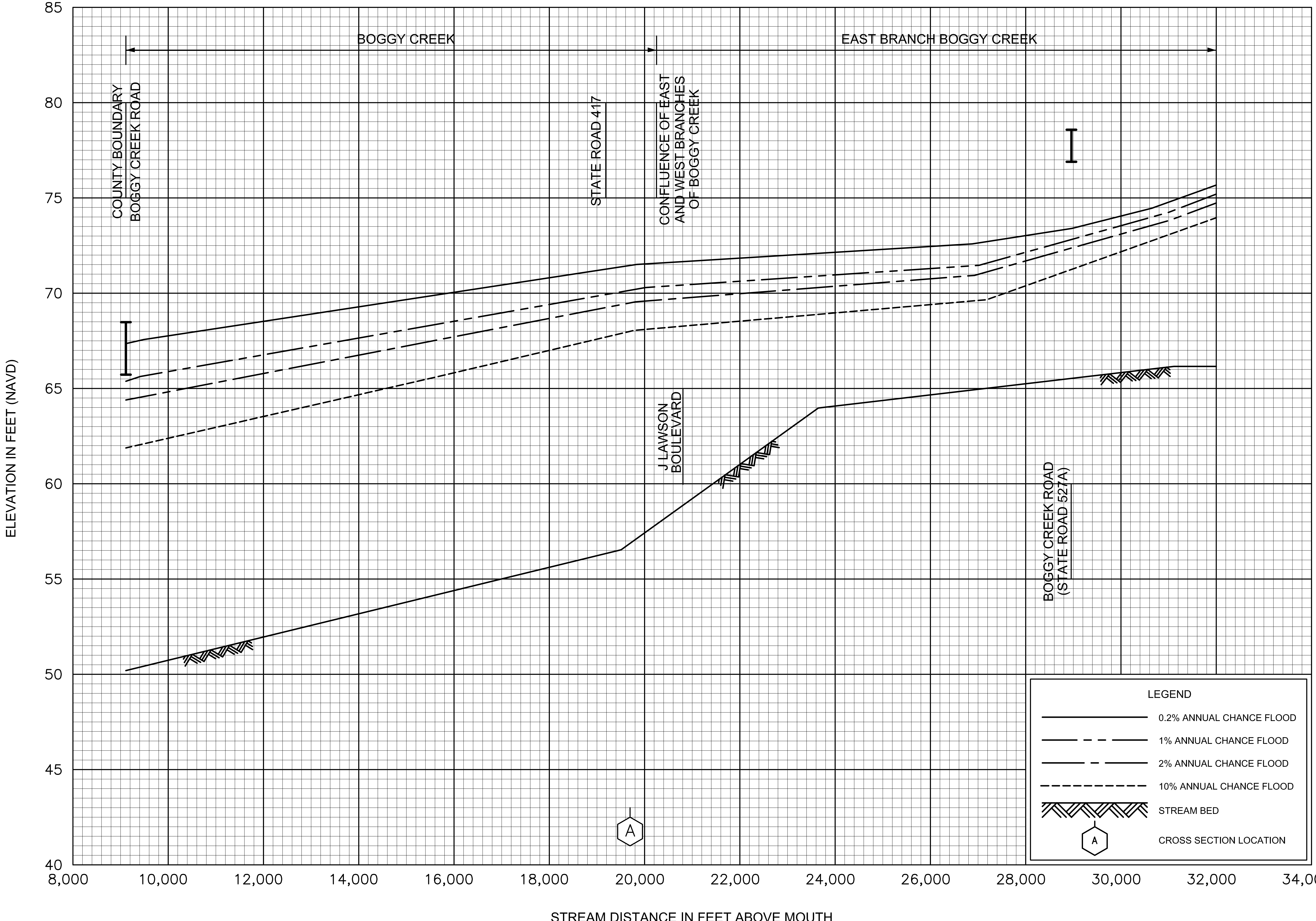
FLOOD PROFILES

AZALEA PARK OUTFALL CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS

01P



BASED ON ORANGE COUNTY FIS DATED 12/06/2000

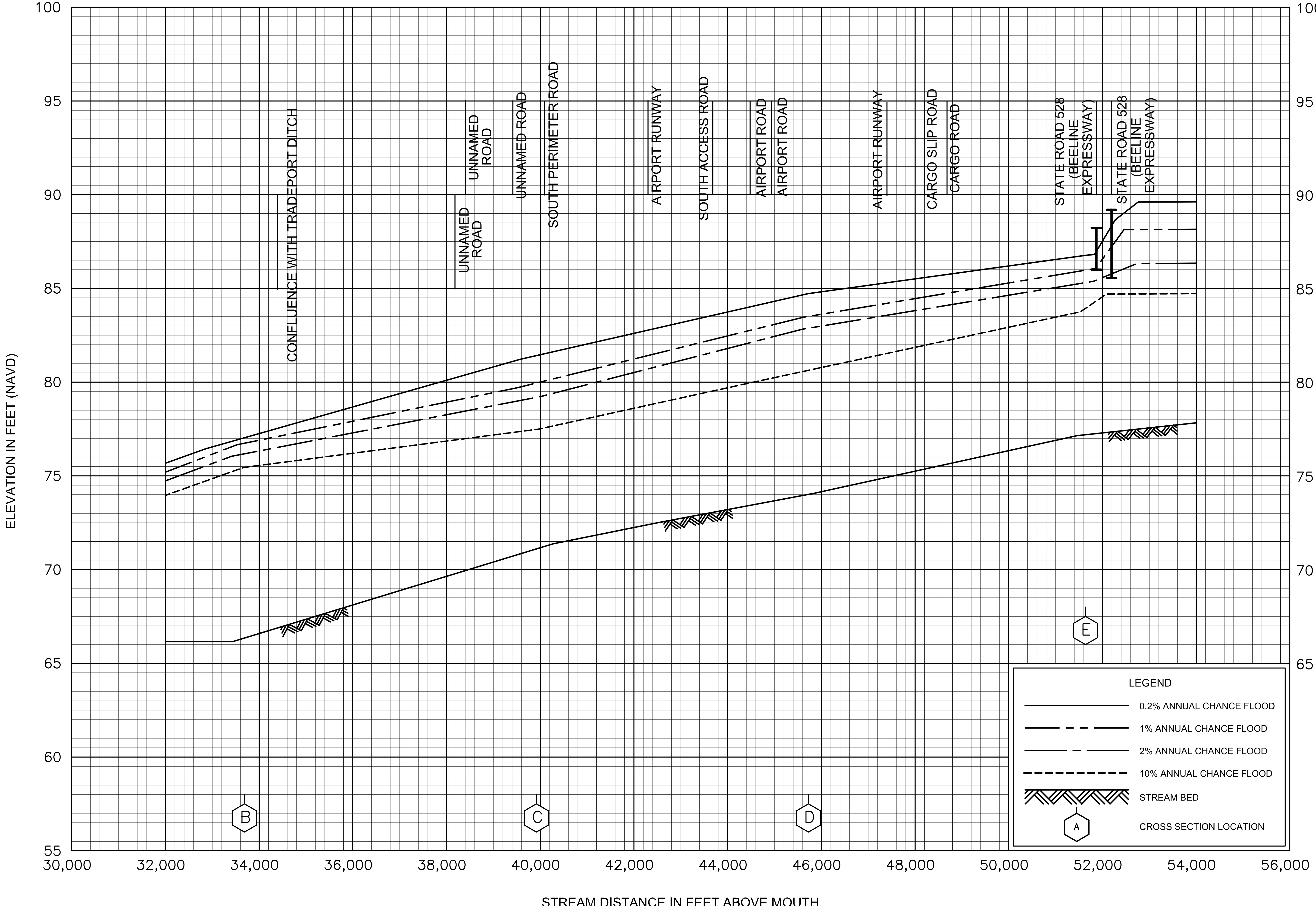
FLOOD PROFILES

BOGGY CREEK - EAST BRANCH BOGGY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS

02P



BASED ON ORANGE COUNTY FIS DATED 12/06/2000

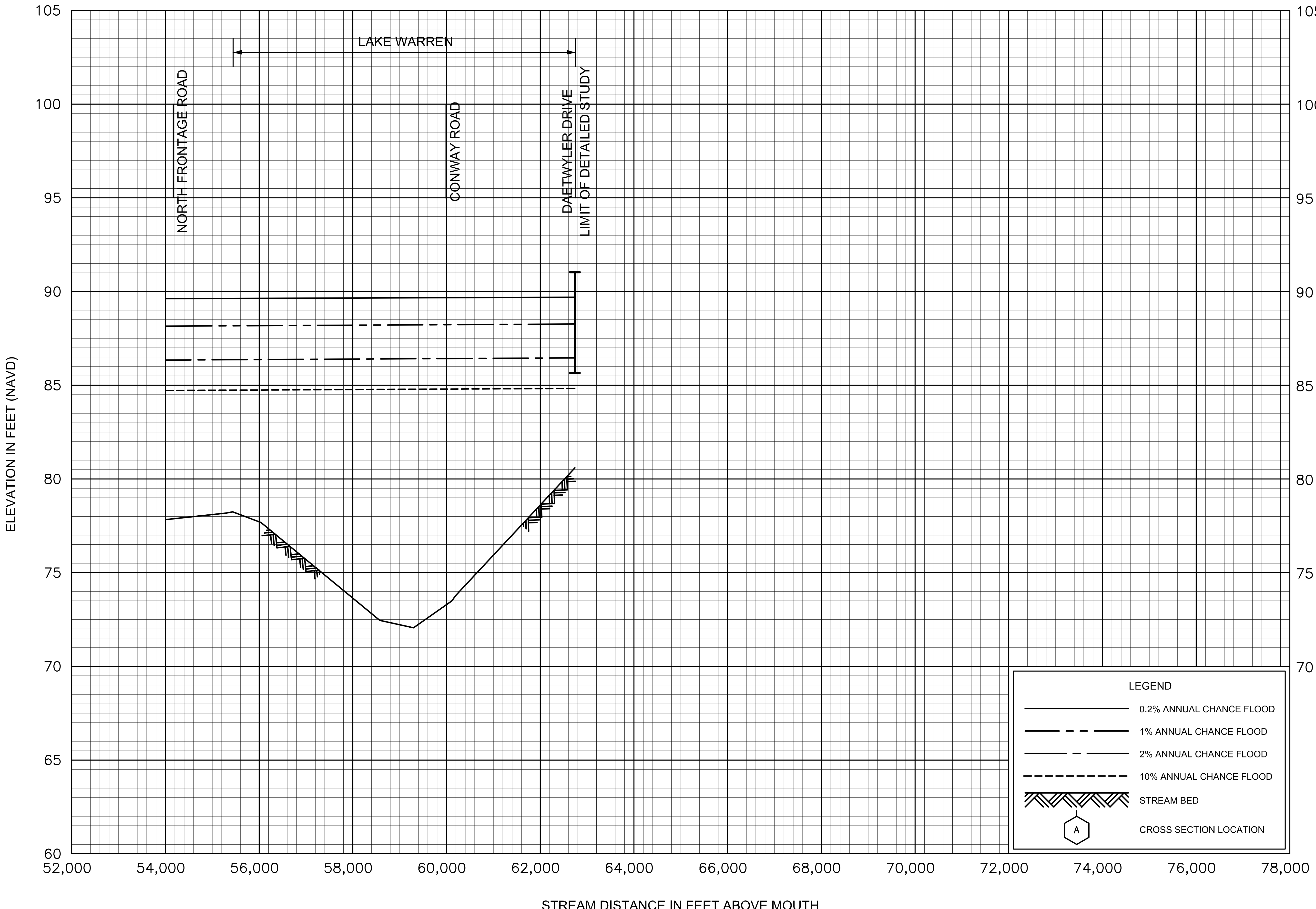
FLOOD PROFILES

EAST BRANCH BOGGY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS



BASED ON ORANGE COUNTY FIS DATED 12/06/2000

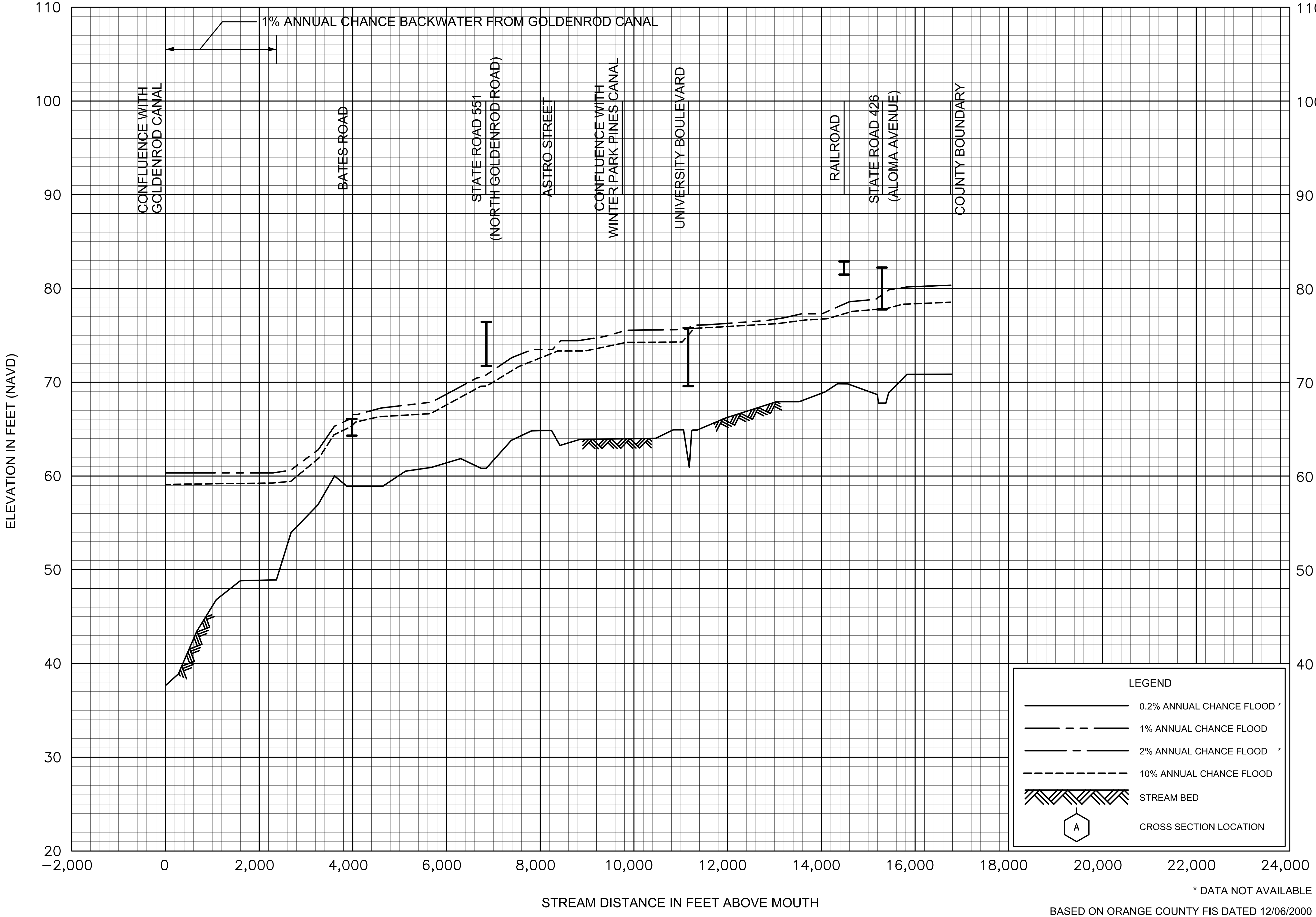
FLOOD PROFILES

EAST BRANCH BOGGY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS



* DATA NOT AVAILABLE

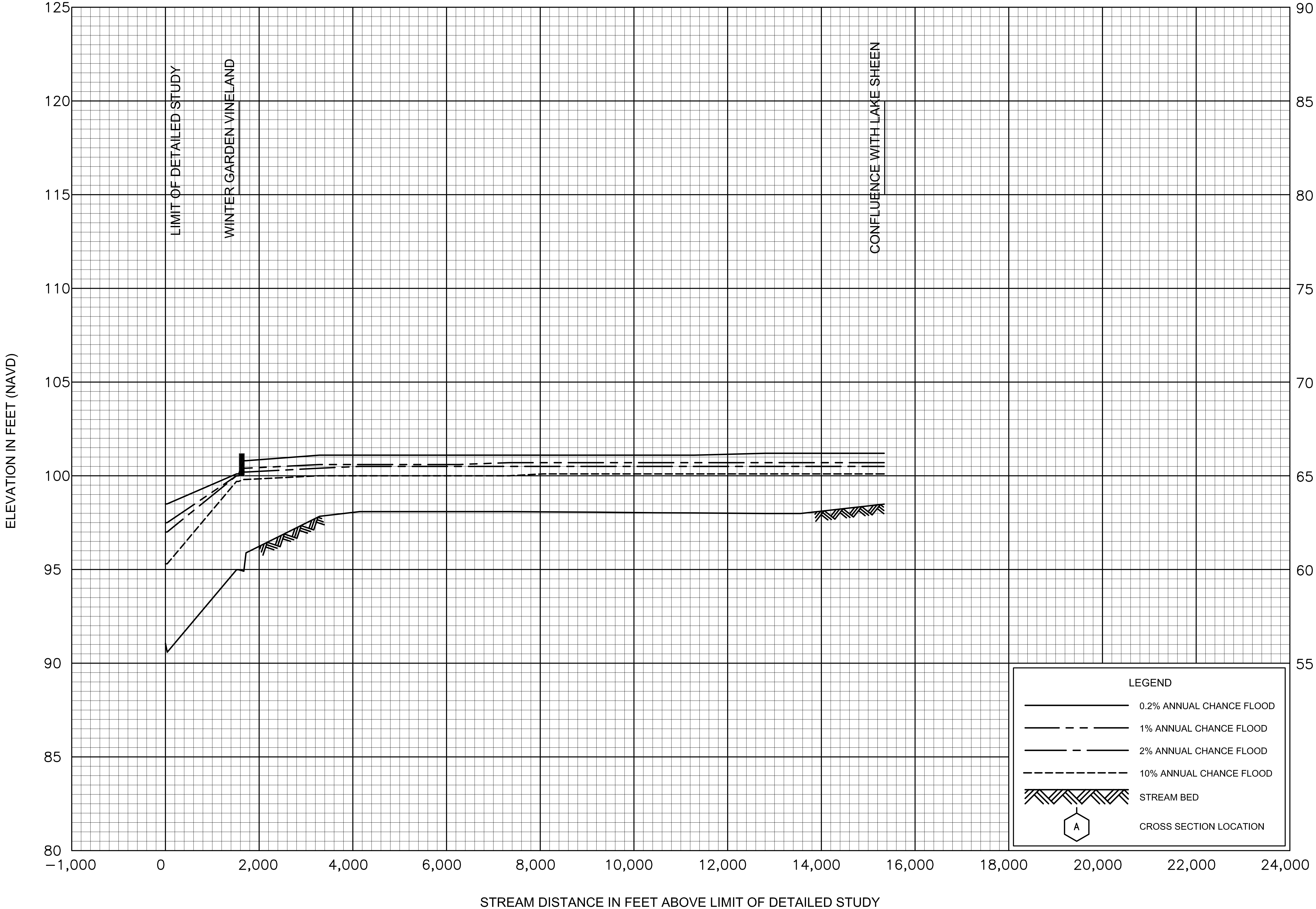
BASED ON ORANGE COUNTY FIS DATED 12/06/2000

FLOOD PROFILES

CRANE STRAND CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS



FLOOD PROFILES

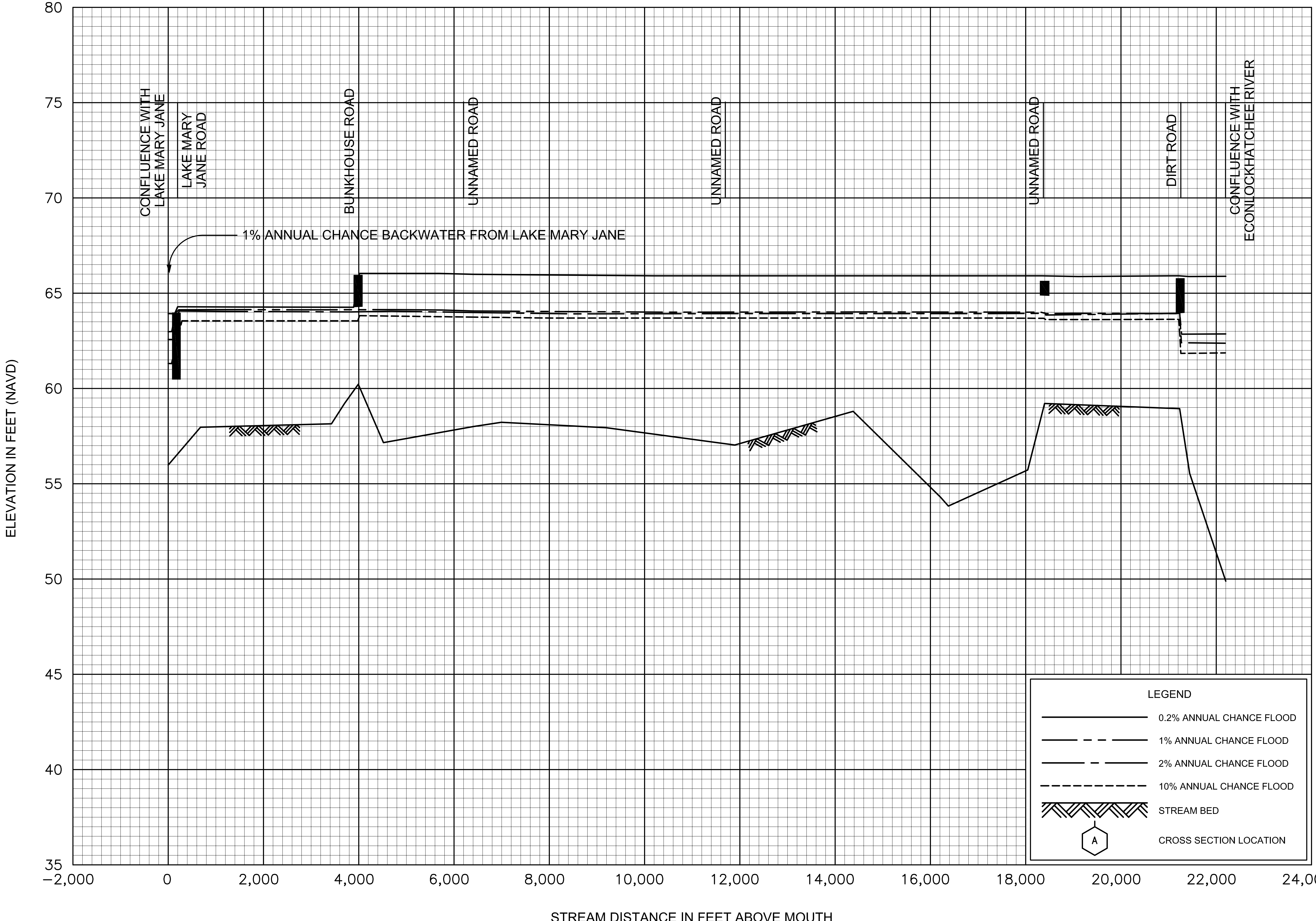
CYPRESS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS

06P



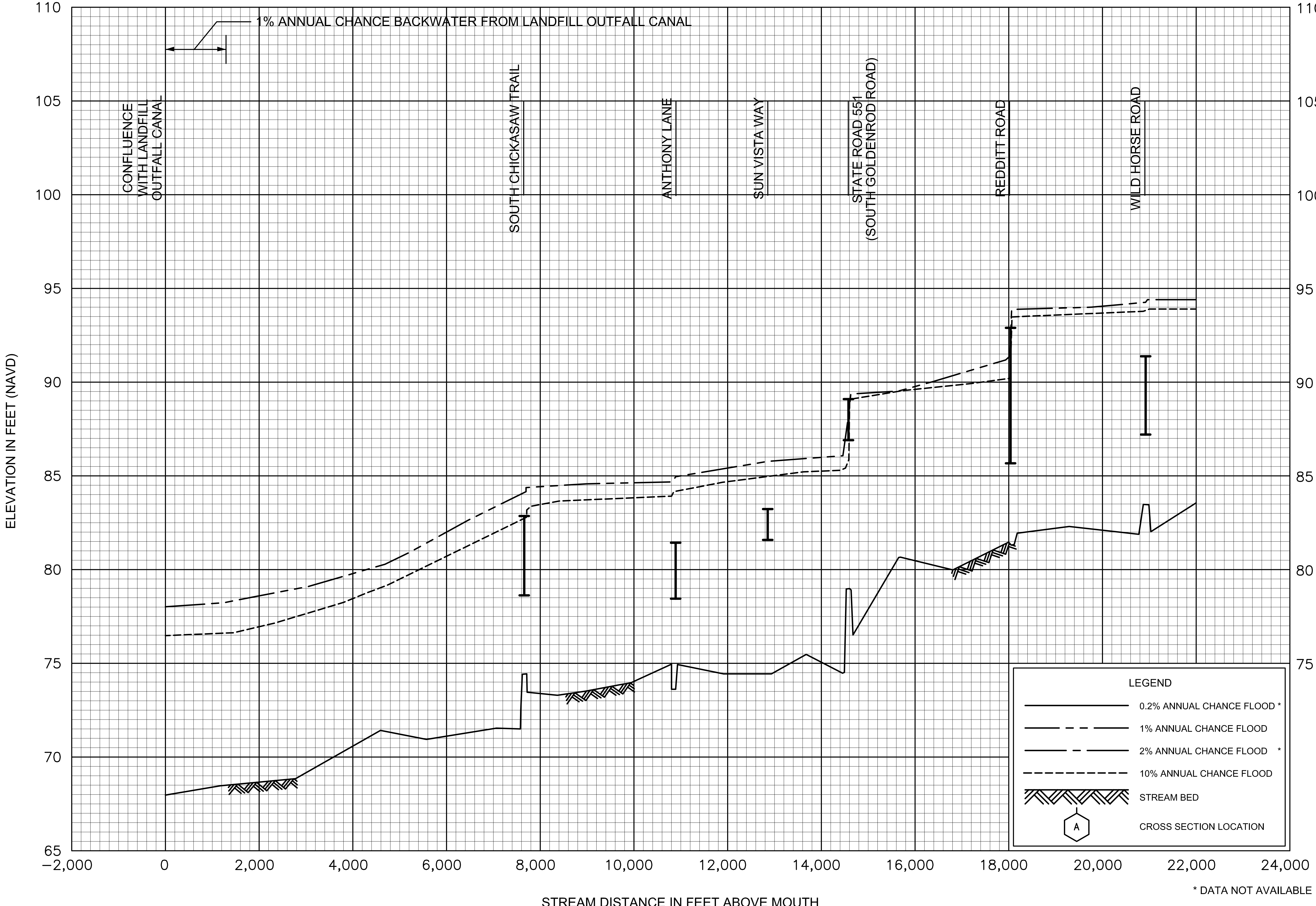
BASED ON ORANGE COUNTY FIS DATED 12/06/2000

FLOOD PROFILES

DISSTON CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL AND INCORPORATED AREAS



* DATA NOT AVAILABLE

BASED ON ORANGE COUNTY FIS DATED 12/06/2000

FLOOD PROFILES

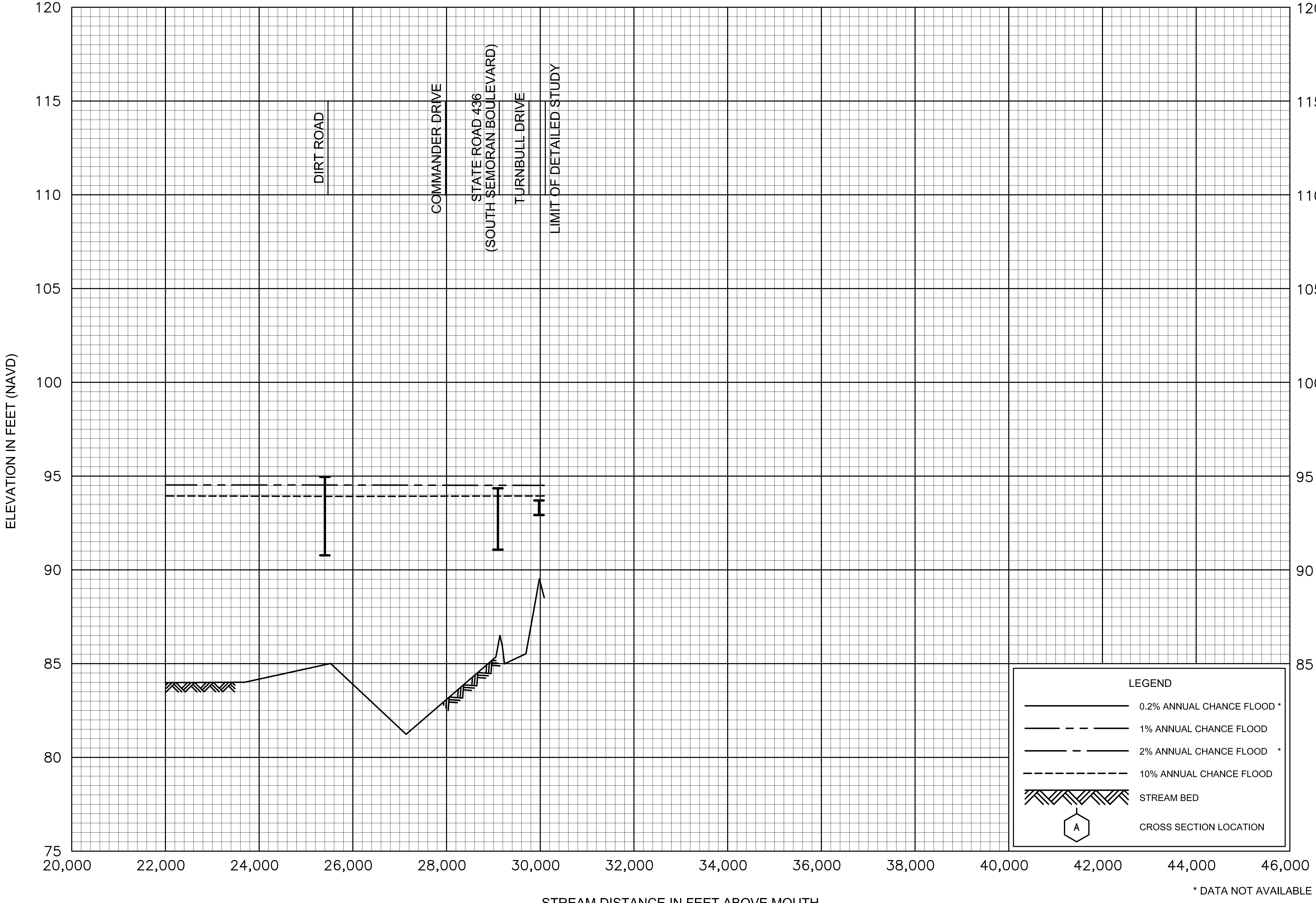
EAST ORLANDO OUTFALL CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS

08P



* DATA NOT AVAILABLE

BASED ON ORANGE COUNTY FIS DATED 12/06/2000

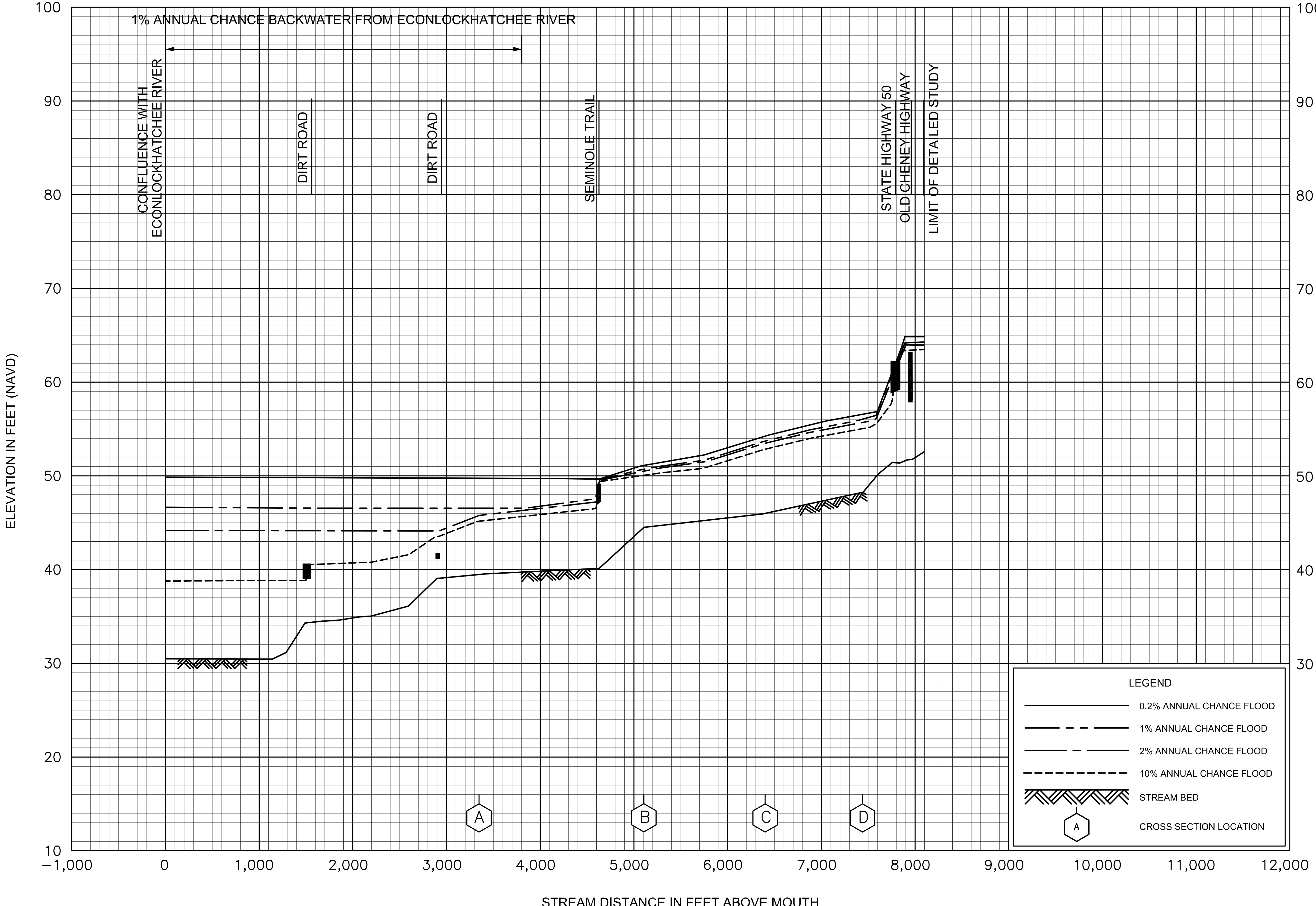
FLOOD PROFILES

EAST ORLANDO OUTFALL CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS

09P



BASED ON ORANGE COUNTY FIS DATED 12/06/2000

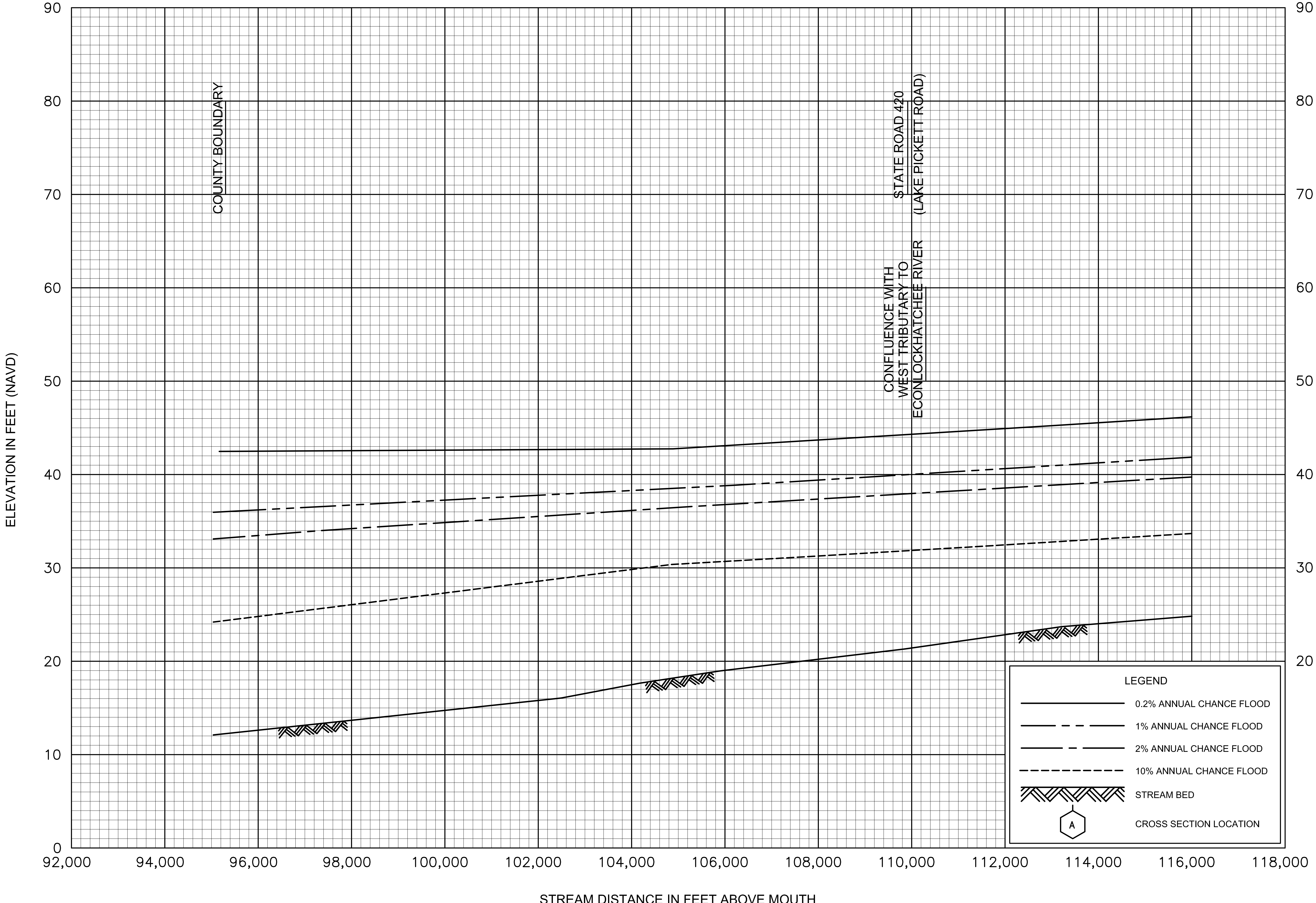
FLOOD PROFILES

EAST TRIBUTARY TO ECONLOCKHATCHEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS



BASED ON ORANGE COUNTY FIS DATED 12/06/2000

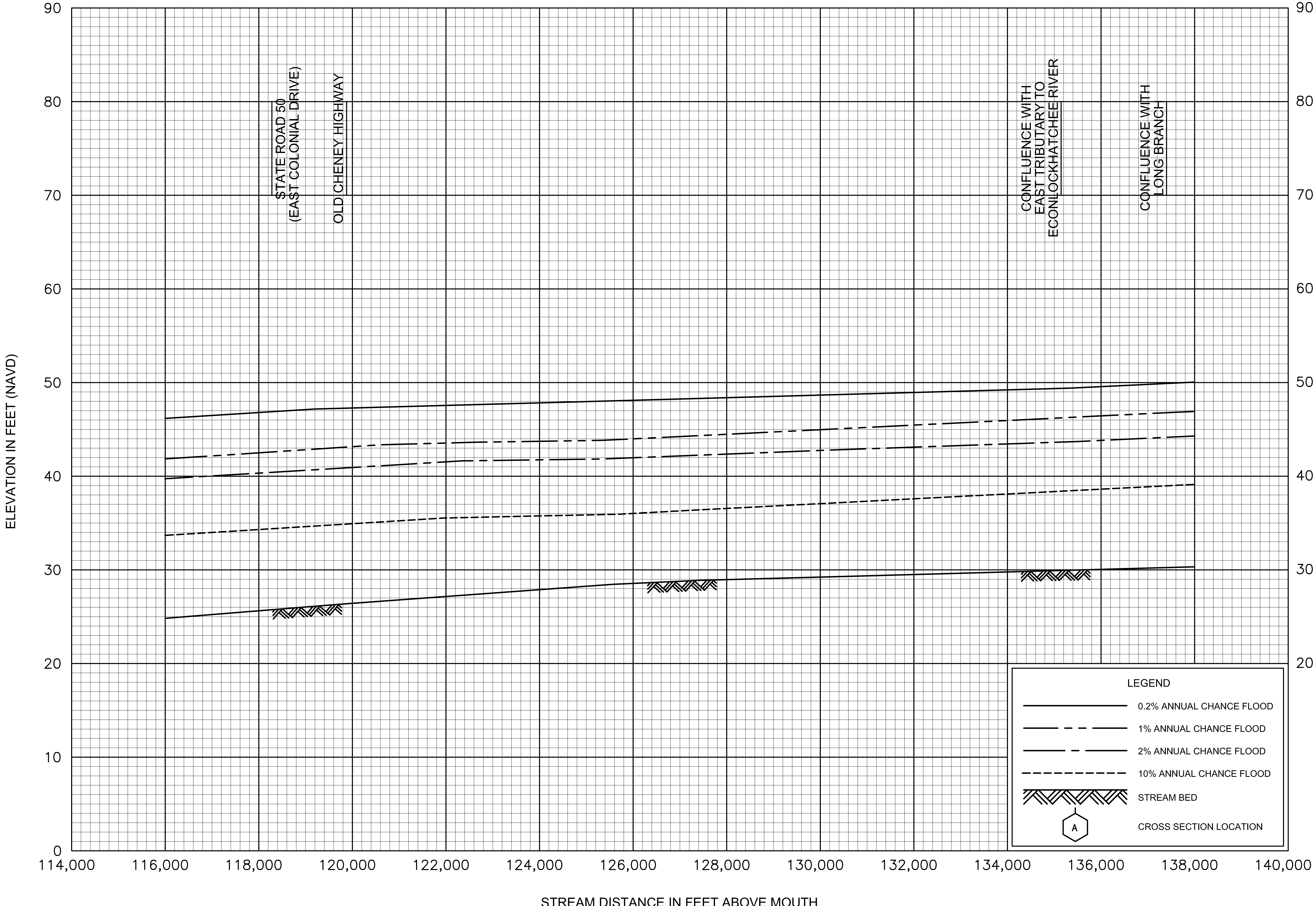
FLOOD PROFILES

ECONLOCKHATCHEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS



BASED ON ORANGE COUNTY FIS DATED 12/06/2000

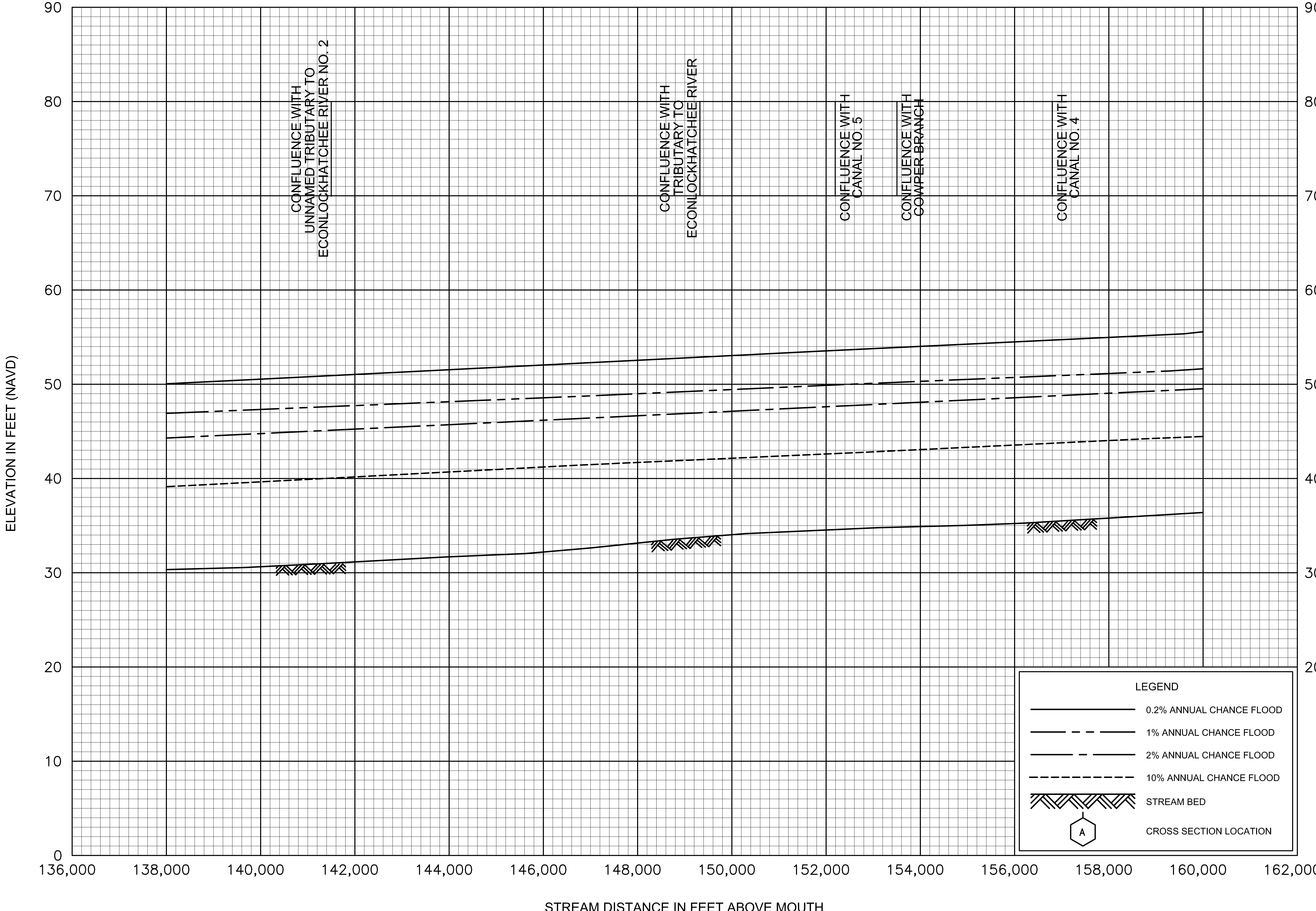
FLOOD PROFILES

ECONLOCKHATCHEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS

12P



BASED ON ORANGE COUNTY FIS DATED 12/06/2000

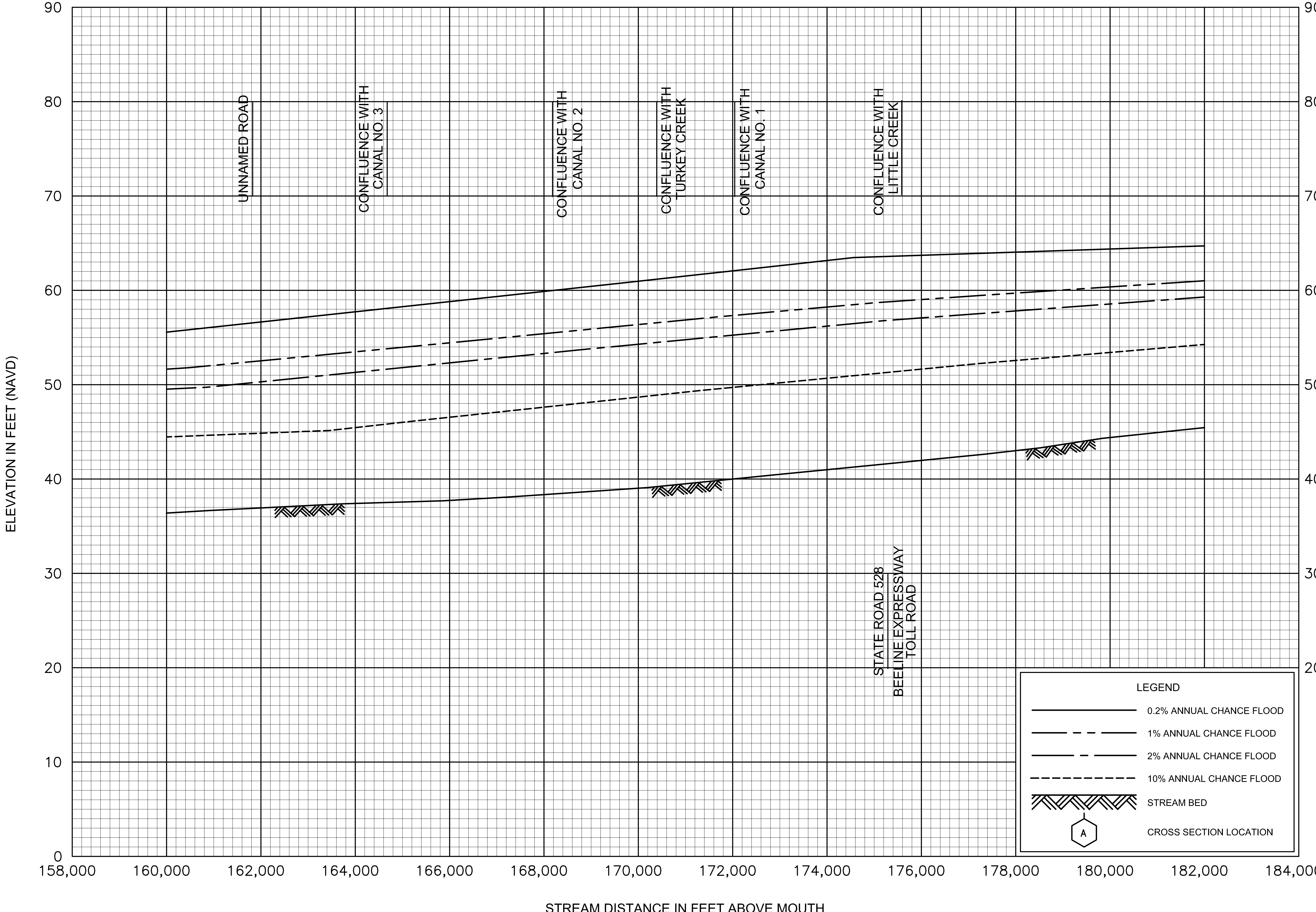
FLOOD PROFILES

ECONLOCKHATCHEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS



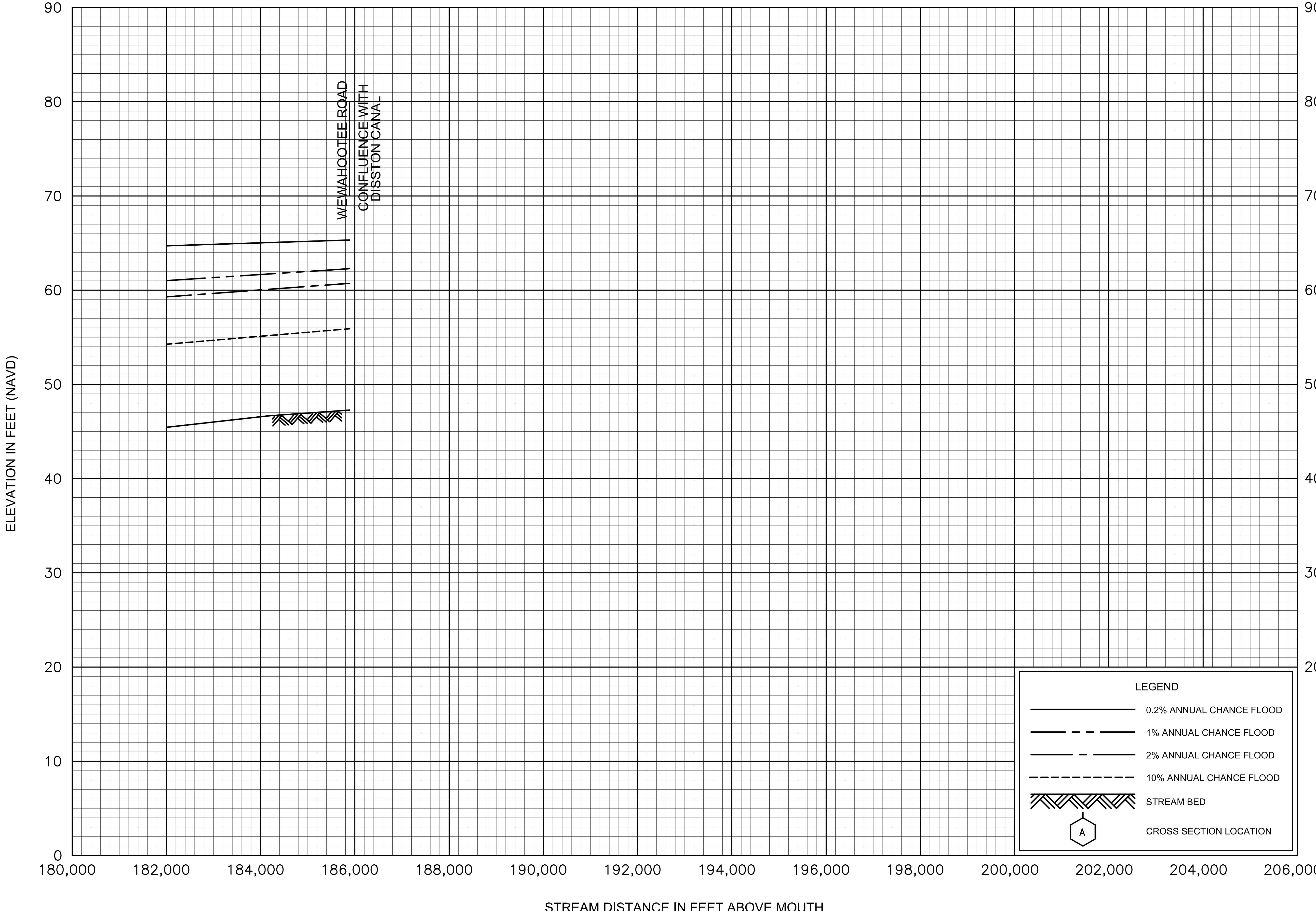
BASED ON ORANGE COUNTY FIS DATED 12/06/2000

FLOOD PROFILES

ECONLOCKHATCHEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS



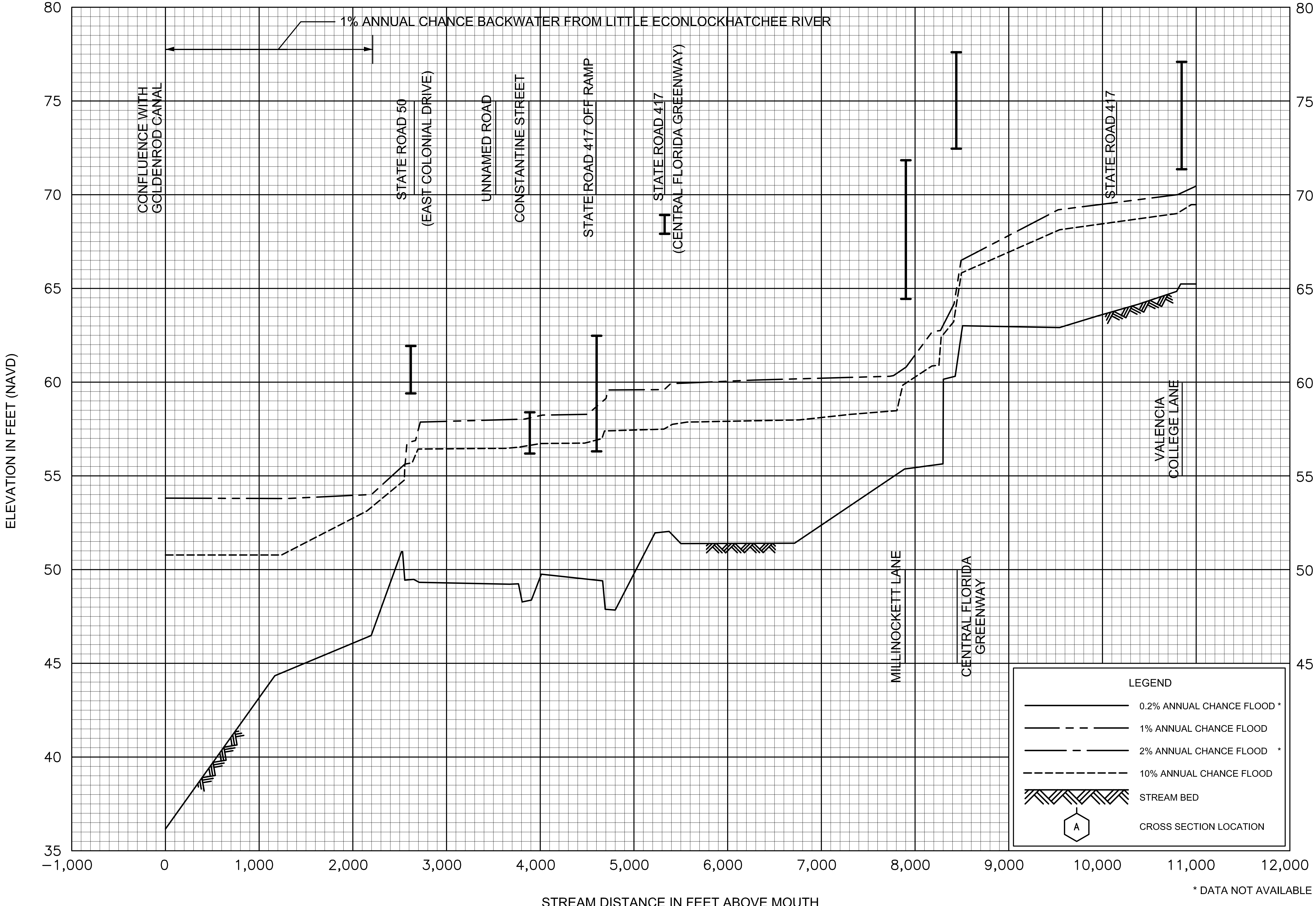
BASED ON ORANGE COUNTY FIS DATED 12/06/2000

FLOOD PROFILES

ECONLOCKHATCHEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS



* DATA NOT AVAILABLE

BASED ON ORANGE COUNTY FIS DATED 12/06/2000

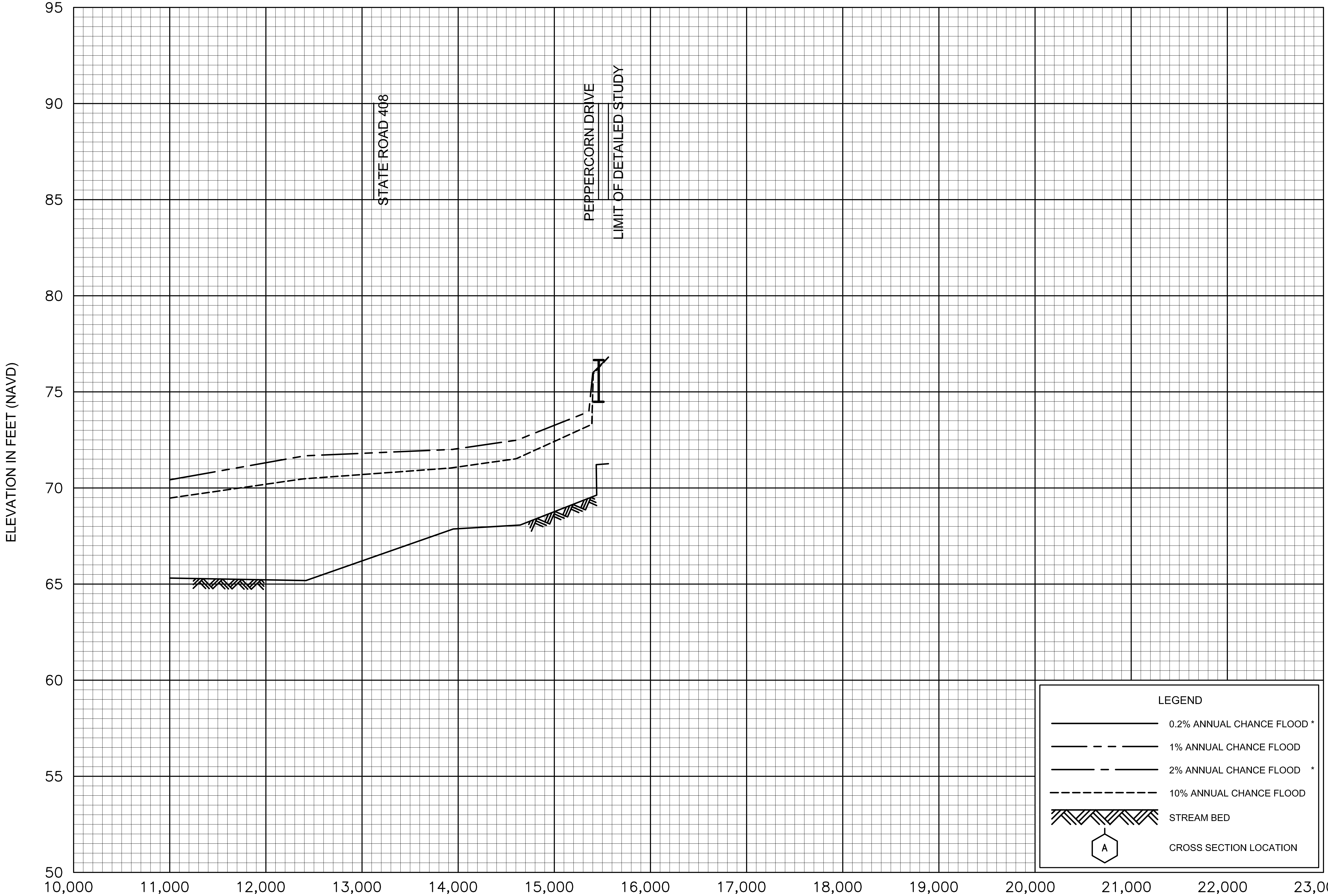
FLOOD PROFILES

E40 CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS



* DATA NOT AVAILABLE

BASED ON ORANGE COUNTY FIS DATED 12/06/2000

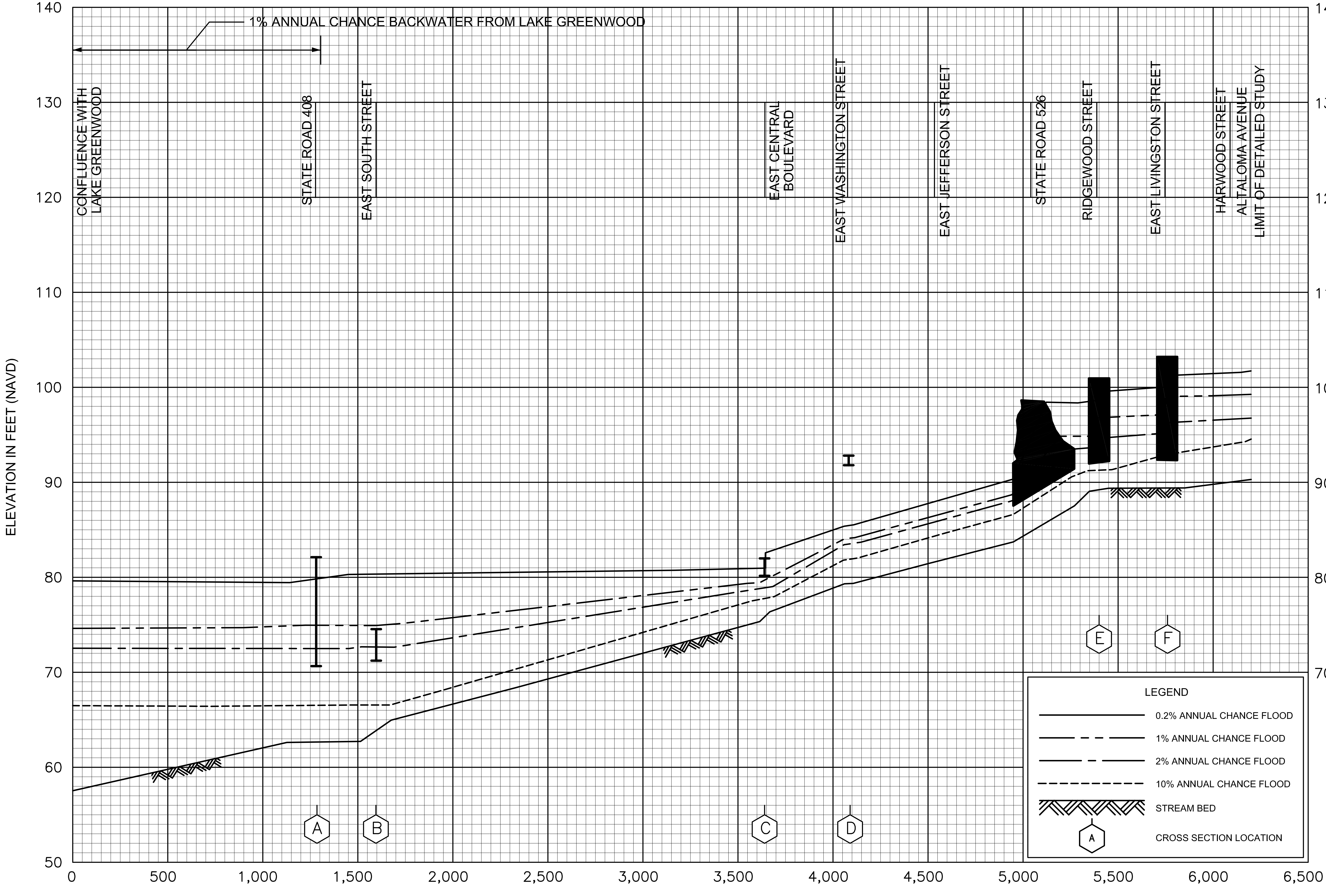
FLOOD PROFILES

E40 CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS



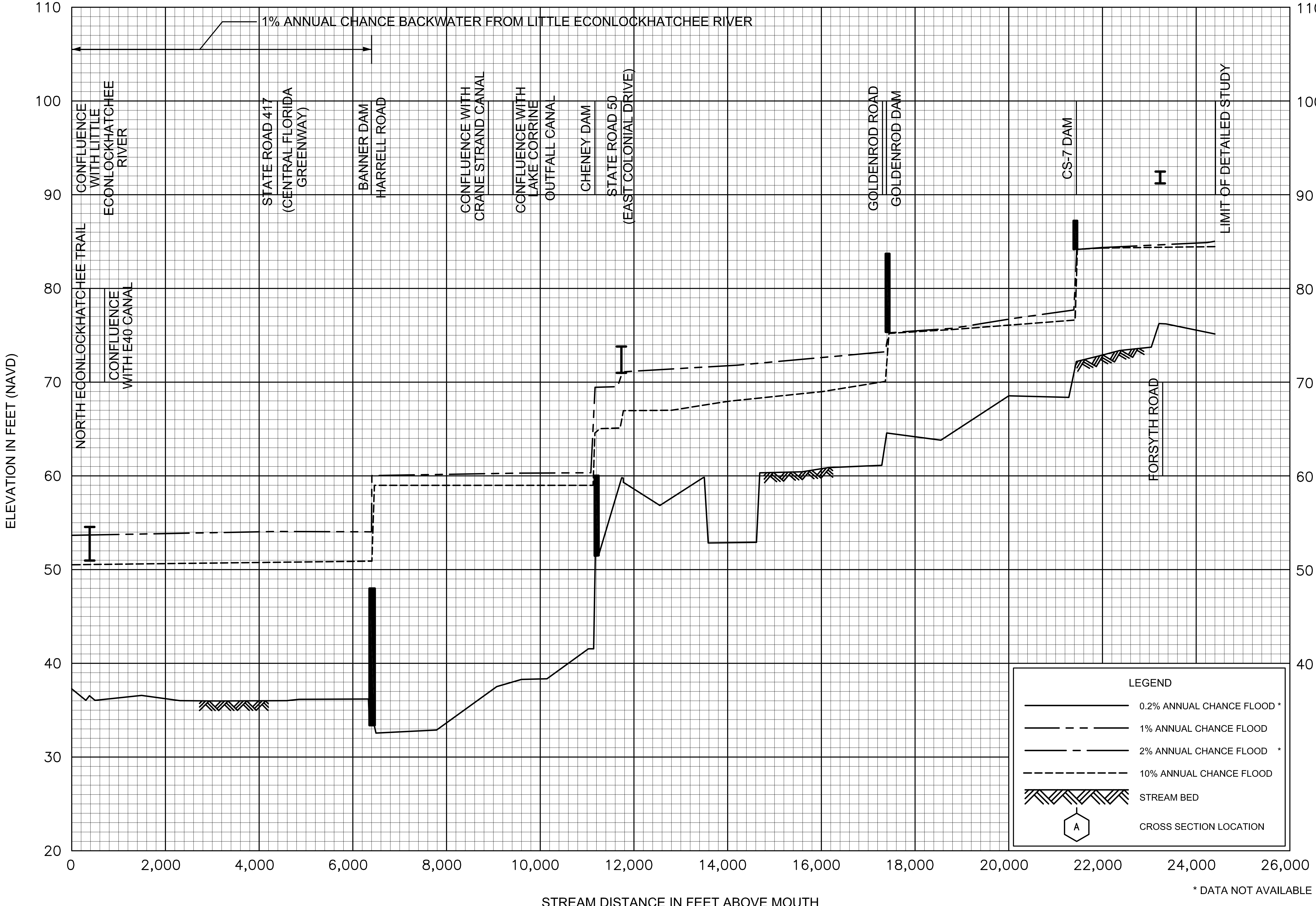
BASED ON ORANGE COUNTY FIS DATED 12/06/2000

FLOOD PROFILES

FERN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS



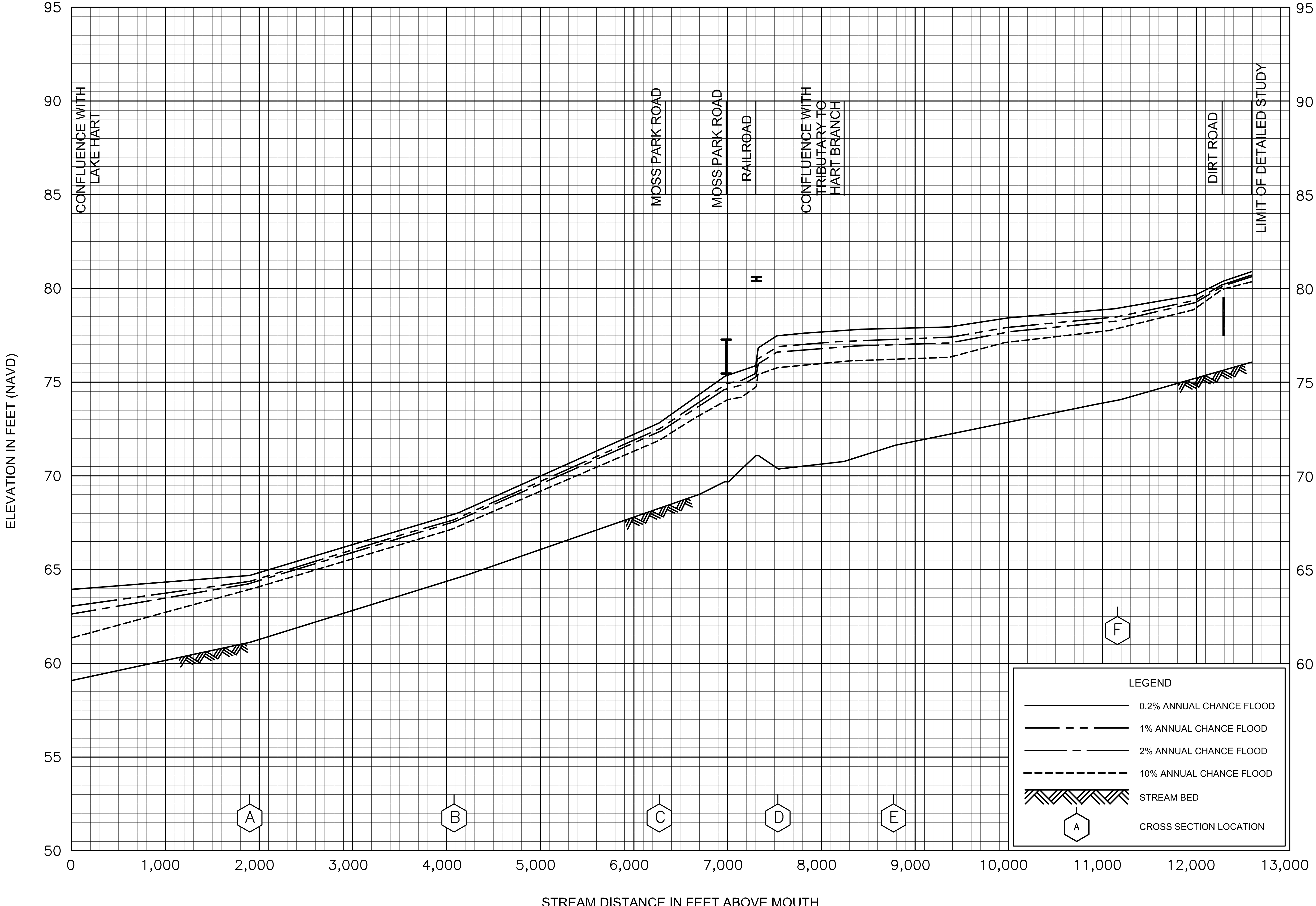
BASED ON ORANGE COUNTY FIS DATED 12/06/2000

FLOOD PROFILES

GOLDENROD CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL AND INCORPORATED AREAS



BASED ON ORANGE COUNTY FIS DATED 12/06/2000

FLOOD PROFILES

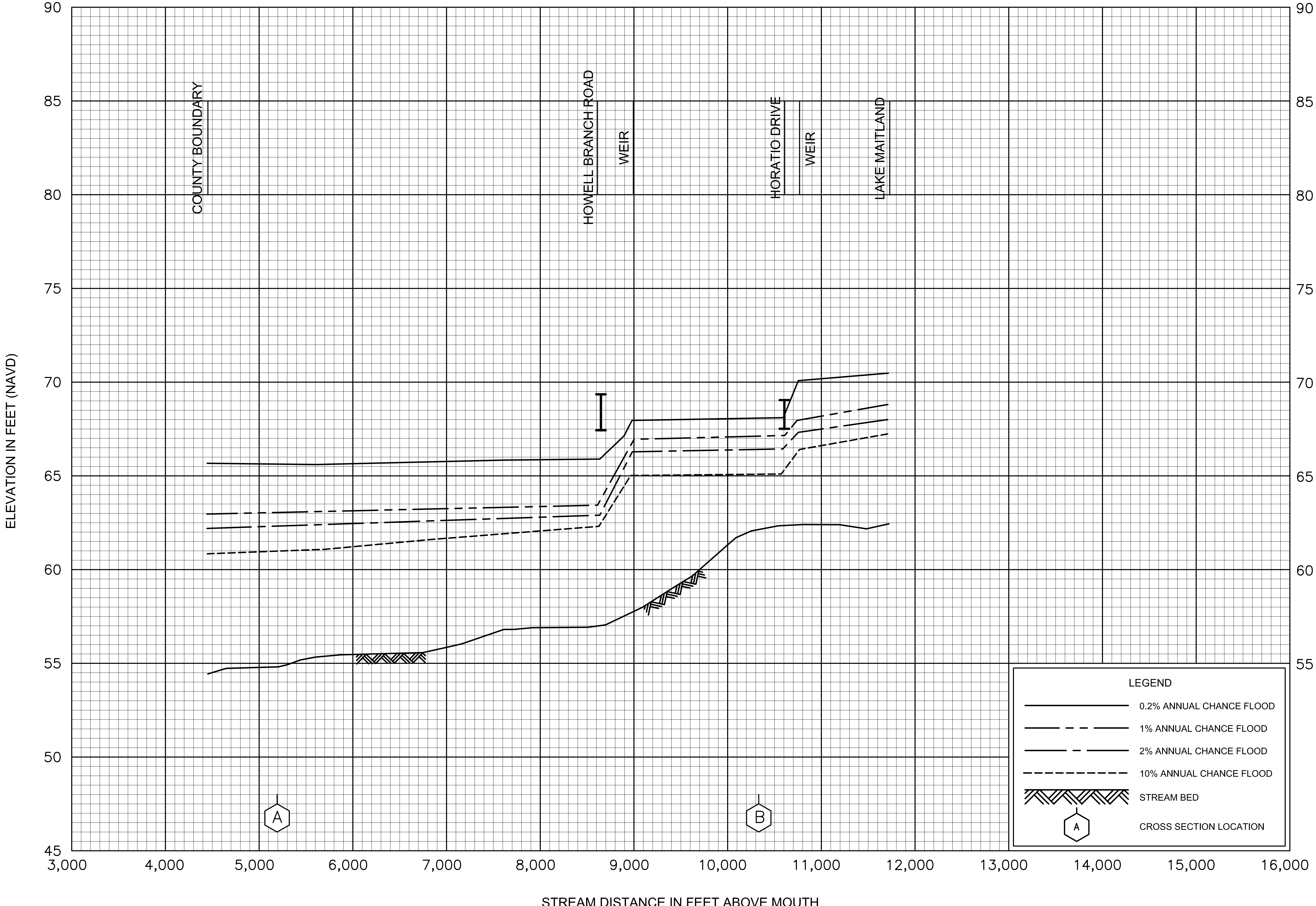
HART BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS

20P



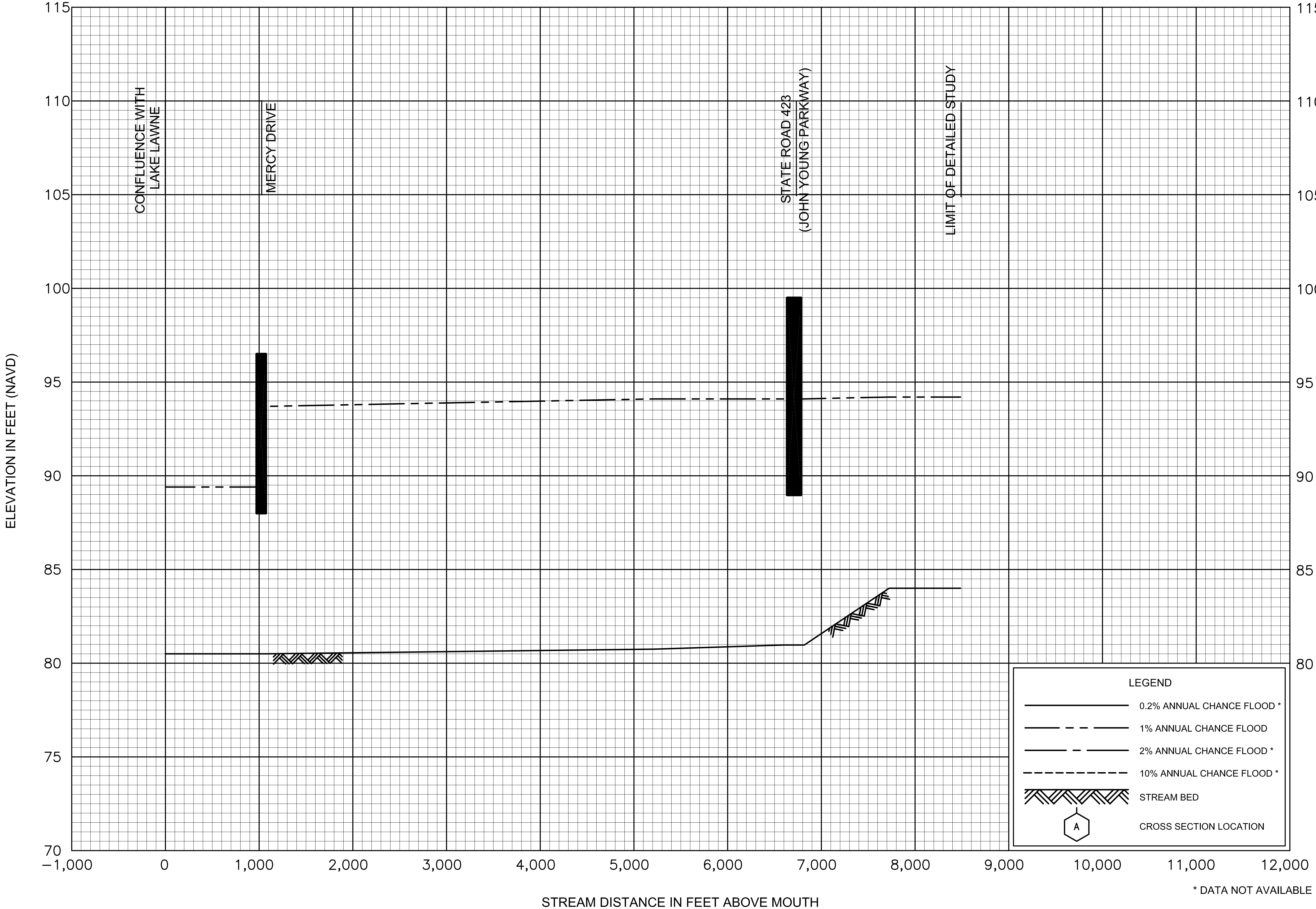
BASED ON ORANGE COUNTY FIS DATED 12/06/2000

FLOOD PROFILES

HOWELL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS

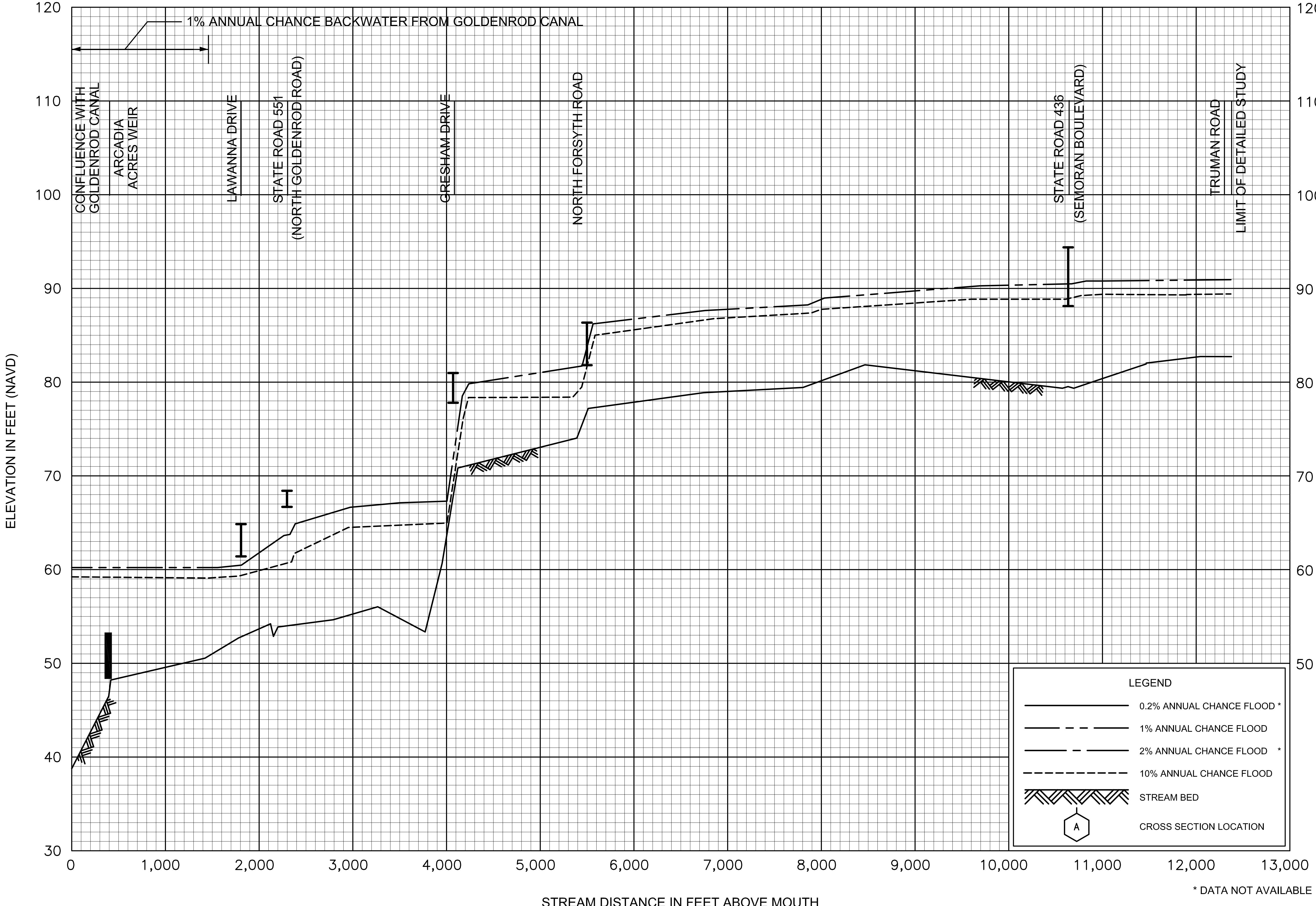


FLOOD PROFILES

JOHN YOUNG PARKWAY DRAINAGE CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS



* DATA NOT AVAILABLE

BASED ON ORANGE COUNTY FIS DATED 12/06/2000

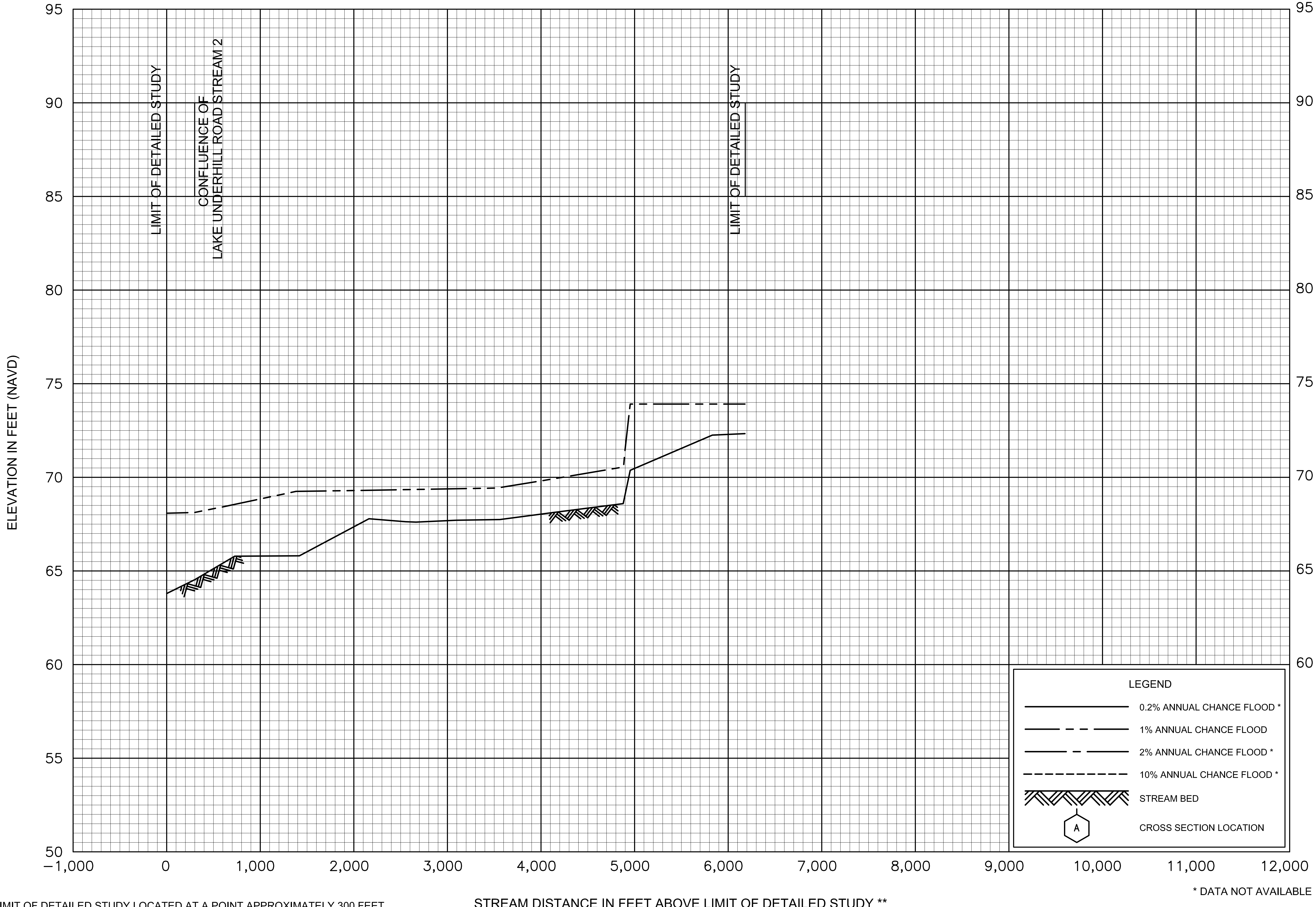
FLOOD PROFILES

LAKE CORRINE OUTFALL CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS



* DATA NOT AVAILABLE

** LIMIT OF DETAILED STUDY LOCATED AT A POINT APPROXIMATELY 300 FEET DOWNSTREAM OF CONFLUENCE OF LAKE UNDERHILL ROAD STRAM 2

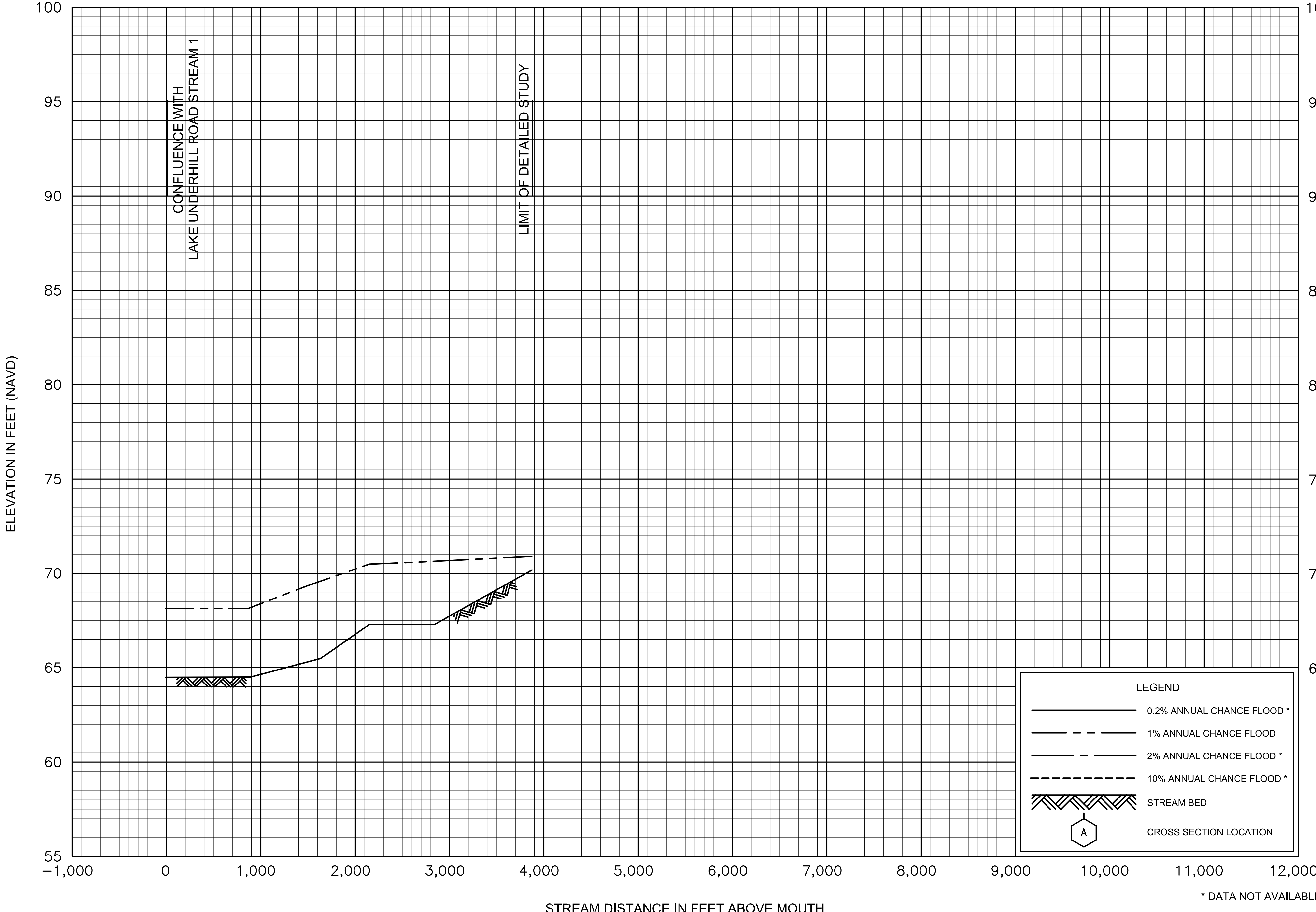
BASED ON ORANGE COUNTY FIS DATED 12/06/2000

FLOOD PROFILES

LAKE UNDERHILL ROAD STREAM 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS



* DATA NOT AVAILABLE

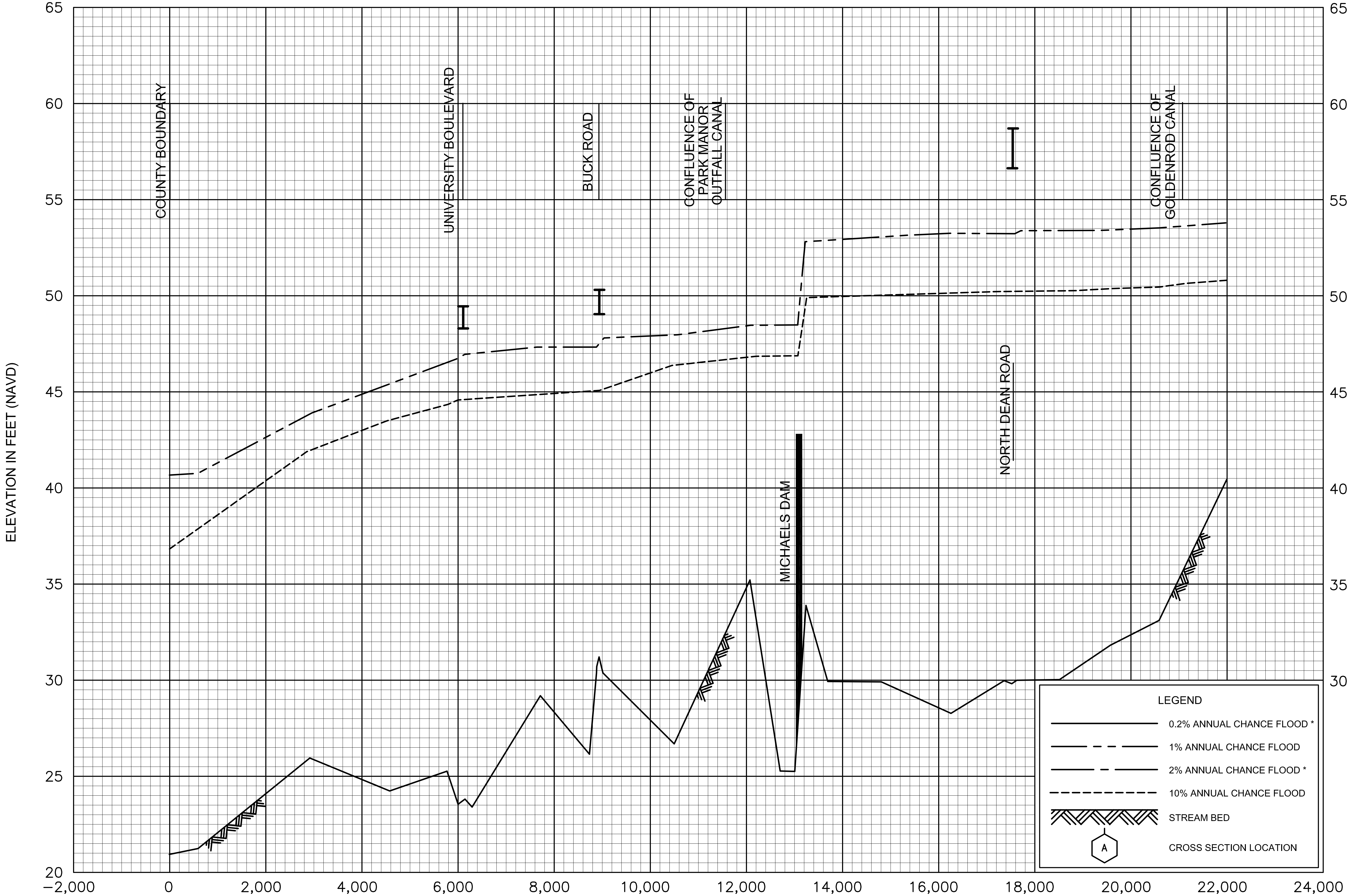
BASED ON ORANGE COUNTY FIS DATED 12/06/2000

FLOOD PROFILES

LAKE UNDERHILL ROAD STREAM 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS



* DATA NOT AVAILABLE

BASED ON ORANGE COUNTY FIS DATED 12/06/2000

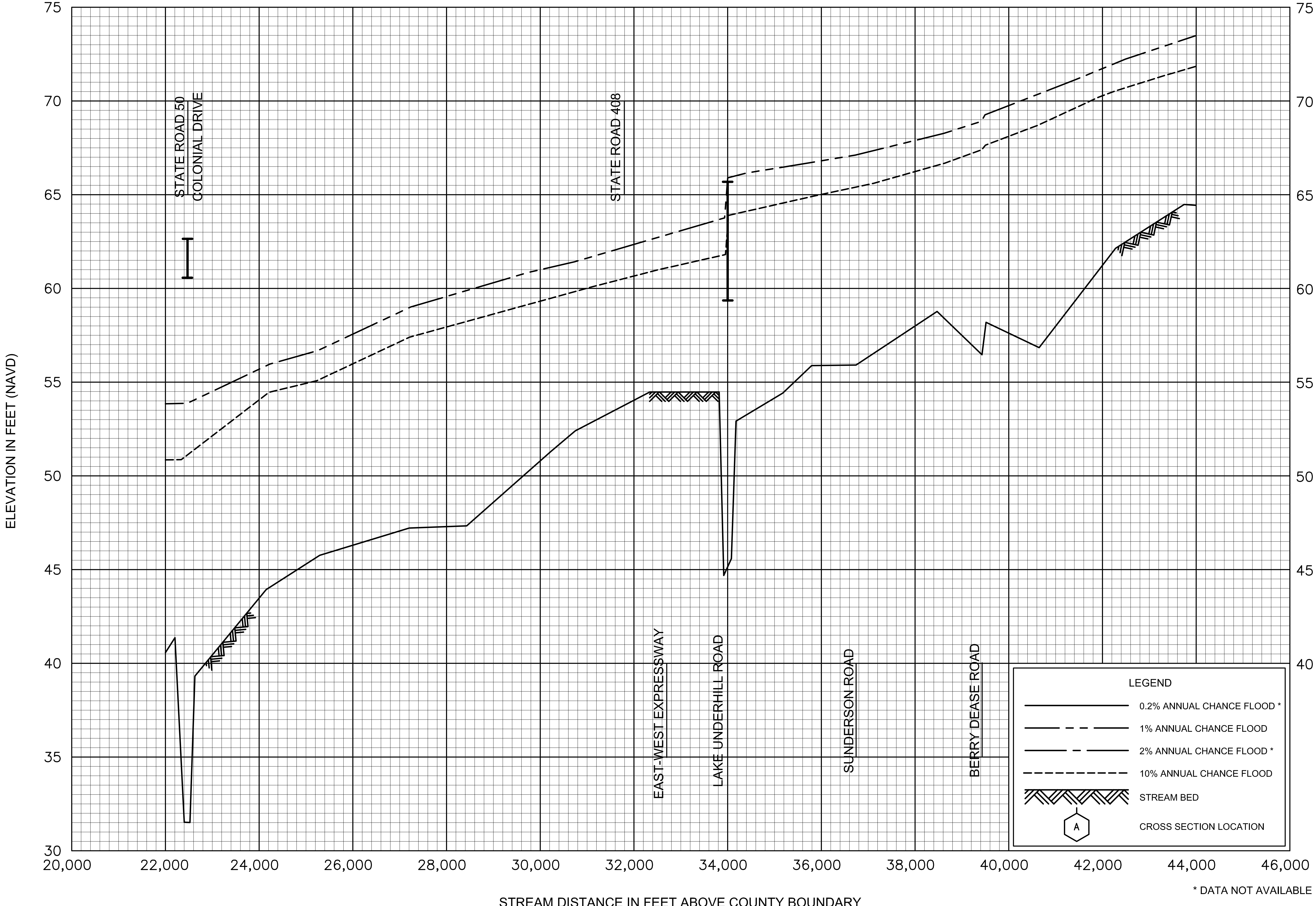
FLOOD PROFILES

LITTLE ECONLOCKHATCHEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS



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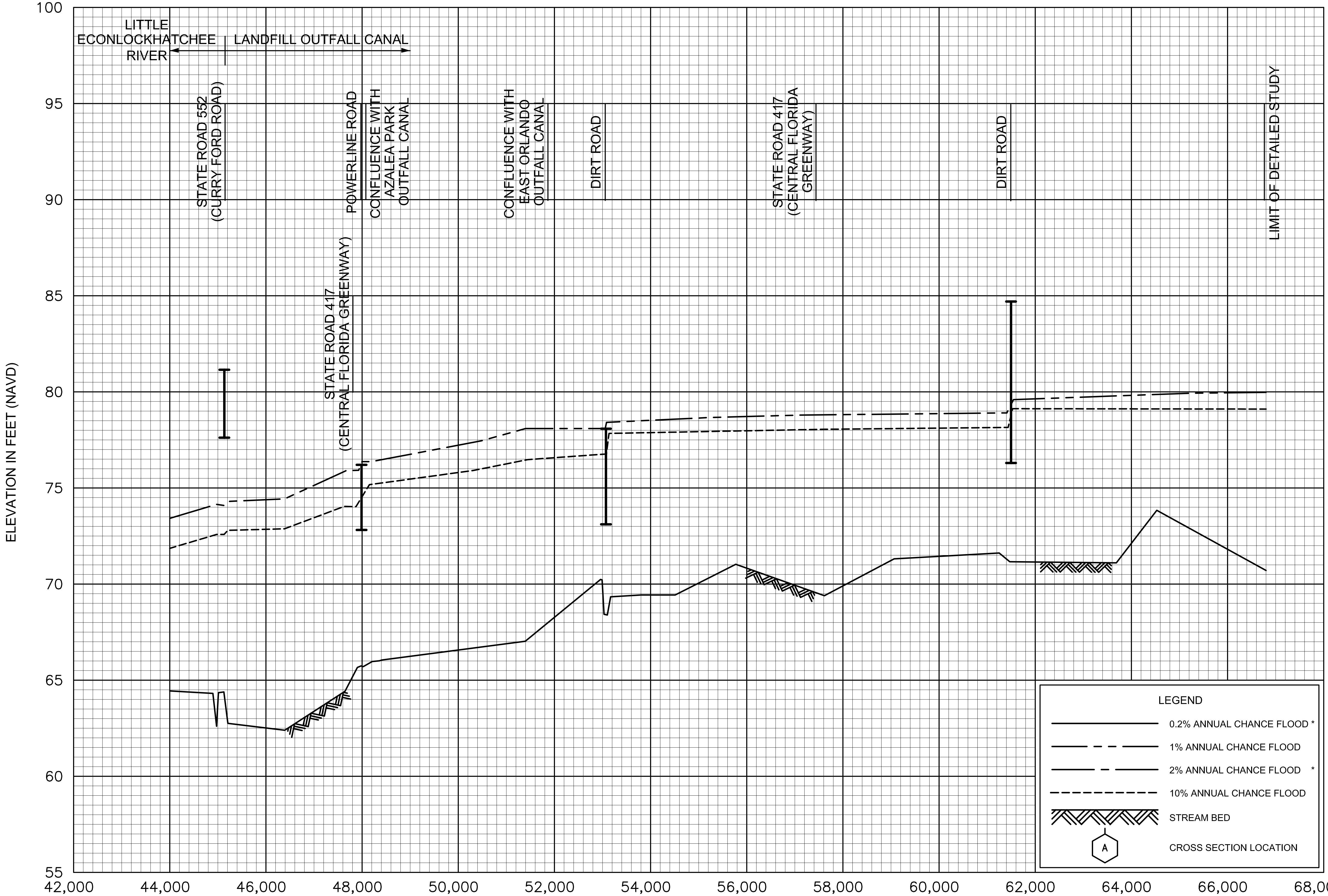
BASED ON ORANGE COUNTY FIS DATED 12/06/2000

FLOOD PROFILES

LITTLE ECONLOCKHATCHEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS



* DATA NOT AVAILABLE

BASED ON ORANGE COUNTY FIS DATED 12/06/2000

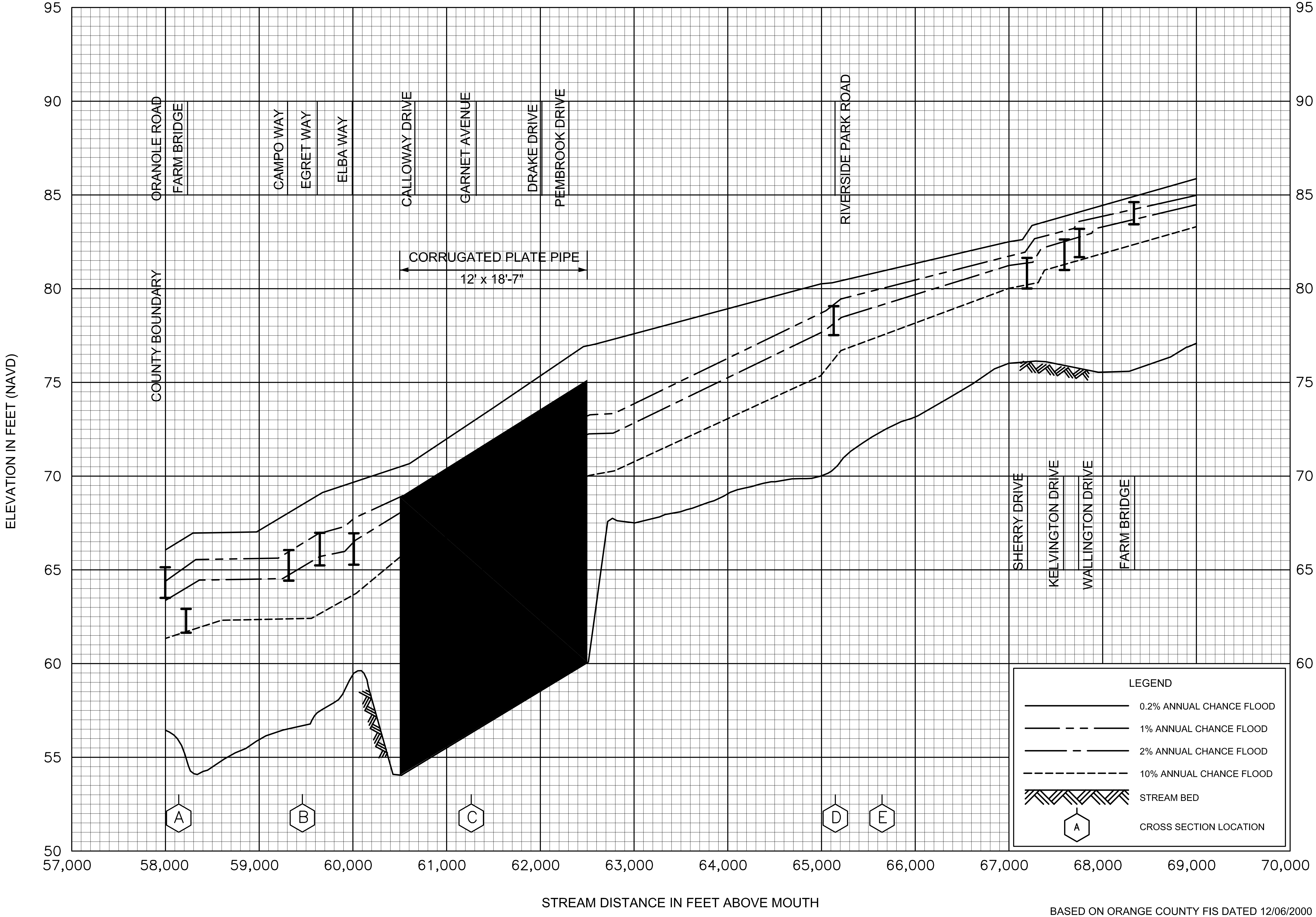
FLOOD PROFILES

LITTLE ECONLOCKHATCHEE RIVER - LANDFILL OUTFALL CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS



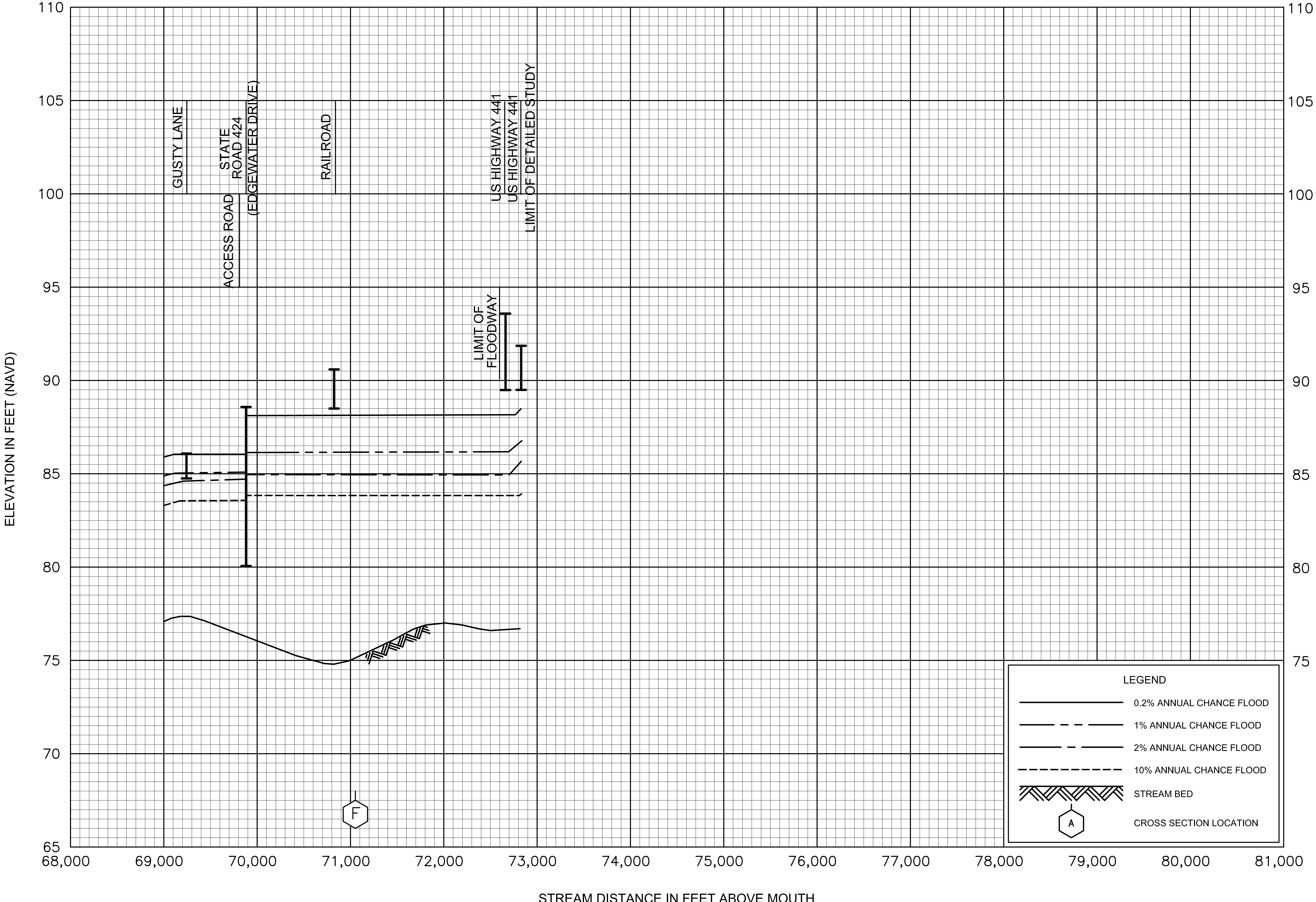
BASED ON ORANGE COUNTY FIS DATED 12/06/2000

FLOOD PROFILES

LITTLE WEKIVA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS



BASED ON ORANGE COUNTY FIS DATED 12/06/2000

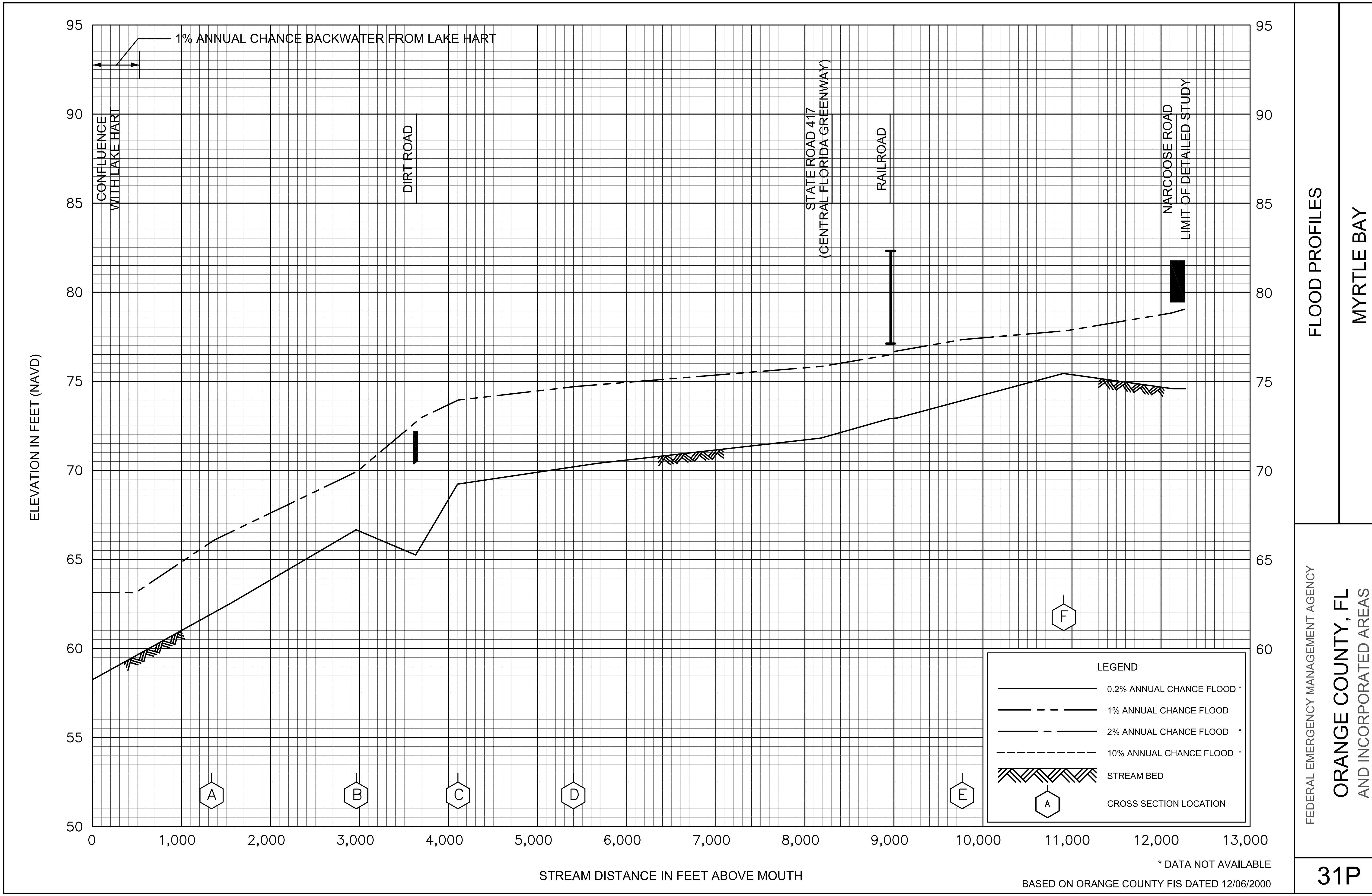
FLOOD PROFILES

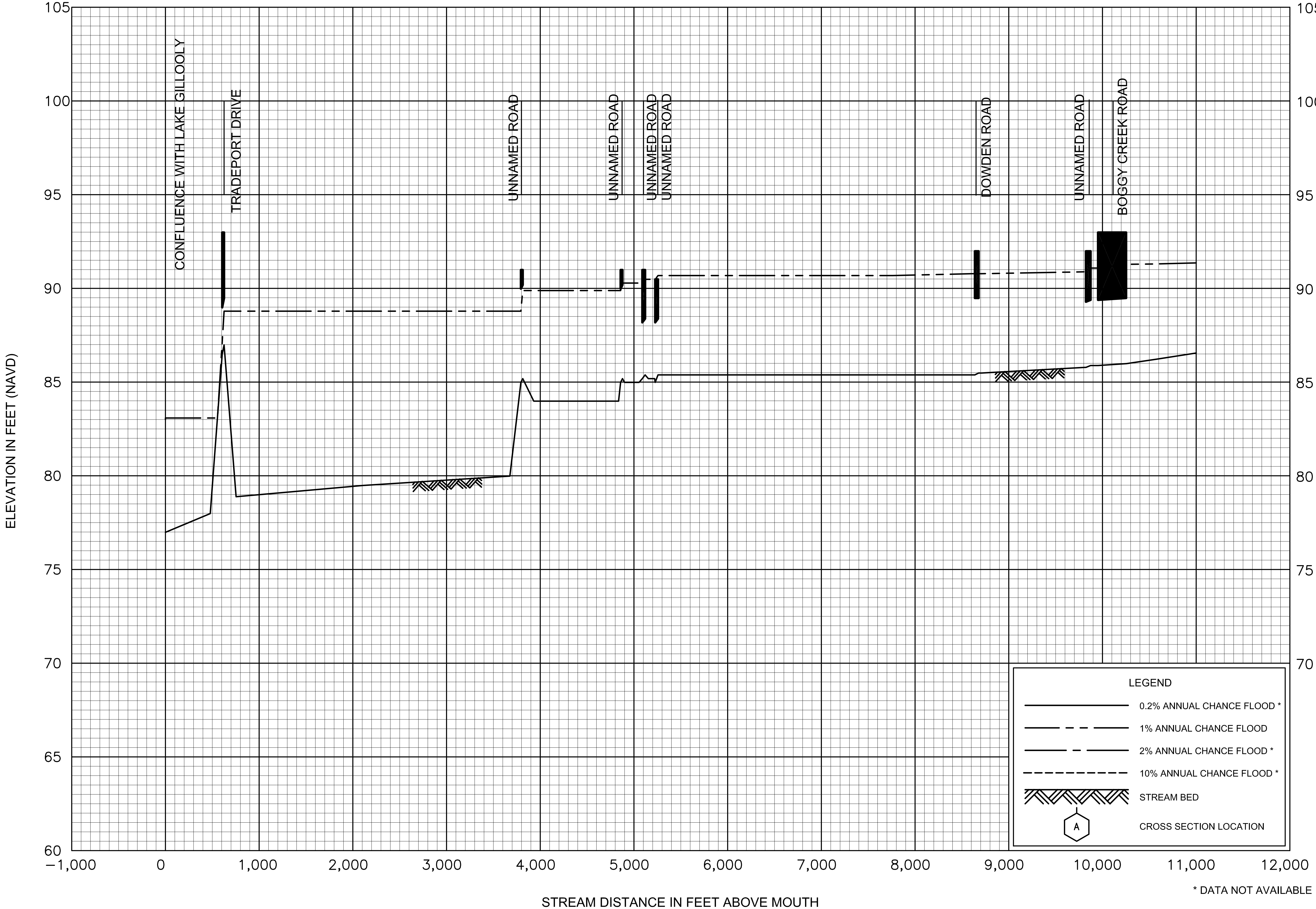
LITTLE WEKIVA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS


1% ANNUAL CHANCE BACKWATER FROM LAKE HART
CONFLUENCE WITH LAKE HART
DIRT ROAD
STATE ROAD 417 (CENTRAL FLORIDA GREENWAY)
RAILROAD
NARCOOSE ROAD
LIMIT OF DETAILED STUDY
ELEVATION IN FEET (NAVD)
95
90
85
80
75
70
65
60
55
50
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
11,000
12,000
13,000
STREAM DISTANCE IN FEET ABOVE MOUTH
A
B
C
D
E
F
LEGEND
0.2% ANNUAL CHANCE FLOOD *
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD *
10% ANNUAL CHANCE FLOOD *
STREAM BED
CROSS SECTION LOCATION
* DATA NOT AVAILABLE
BASED ON ORANGE COUNTY FIS DATED 12/06/2000
FLOOD PROFILES
MYRTLE BAY
FEDERAL EMERGENCY MANAGEMENT AGENCY
ORANGE COUNTY, FL
AND INCORPORATED AREAS
31P



FLOOD PROFILES

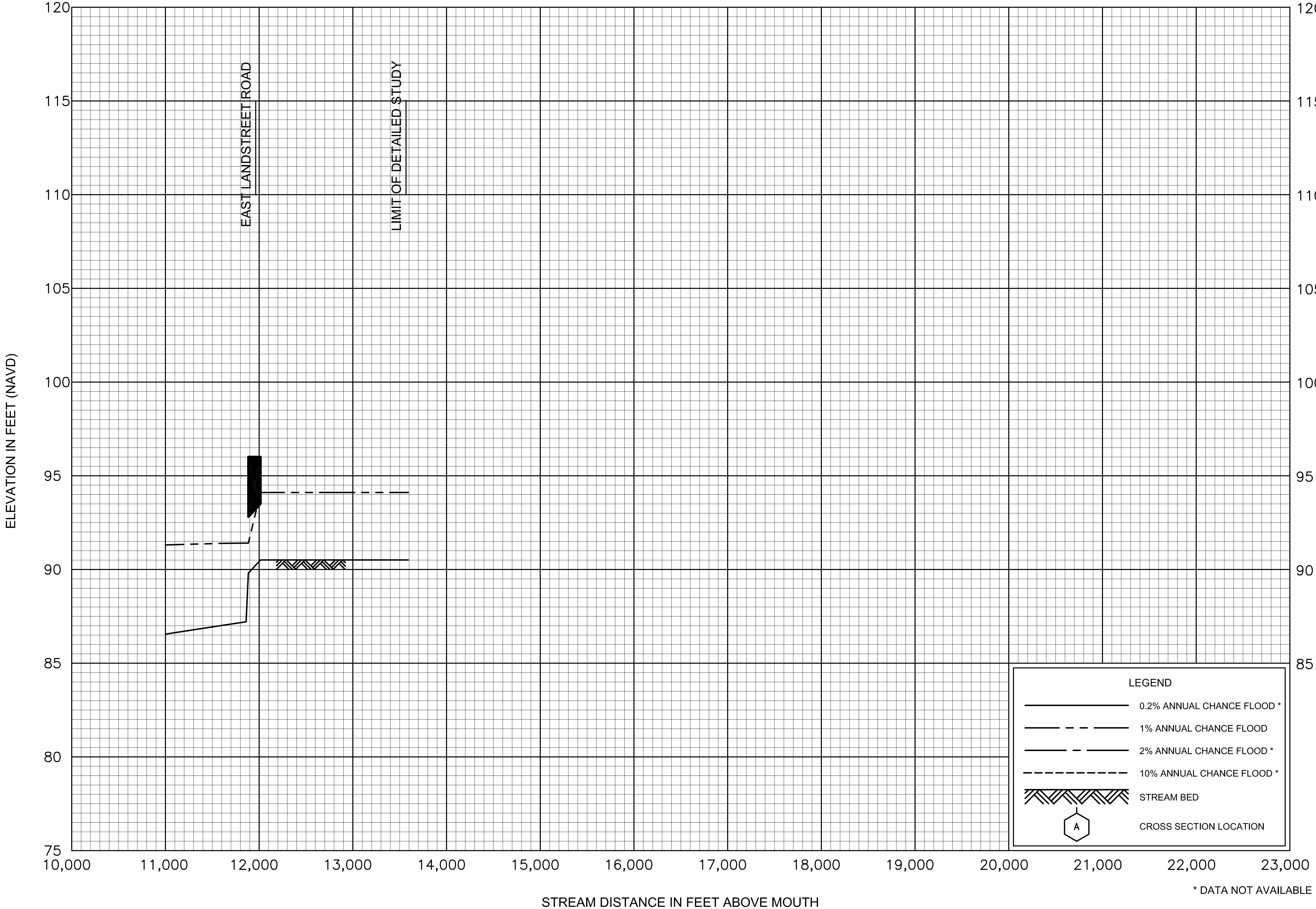
ORANGE COUNTY POND OUTFALL CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS

32P



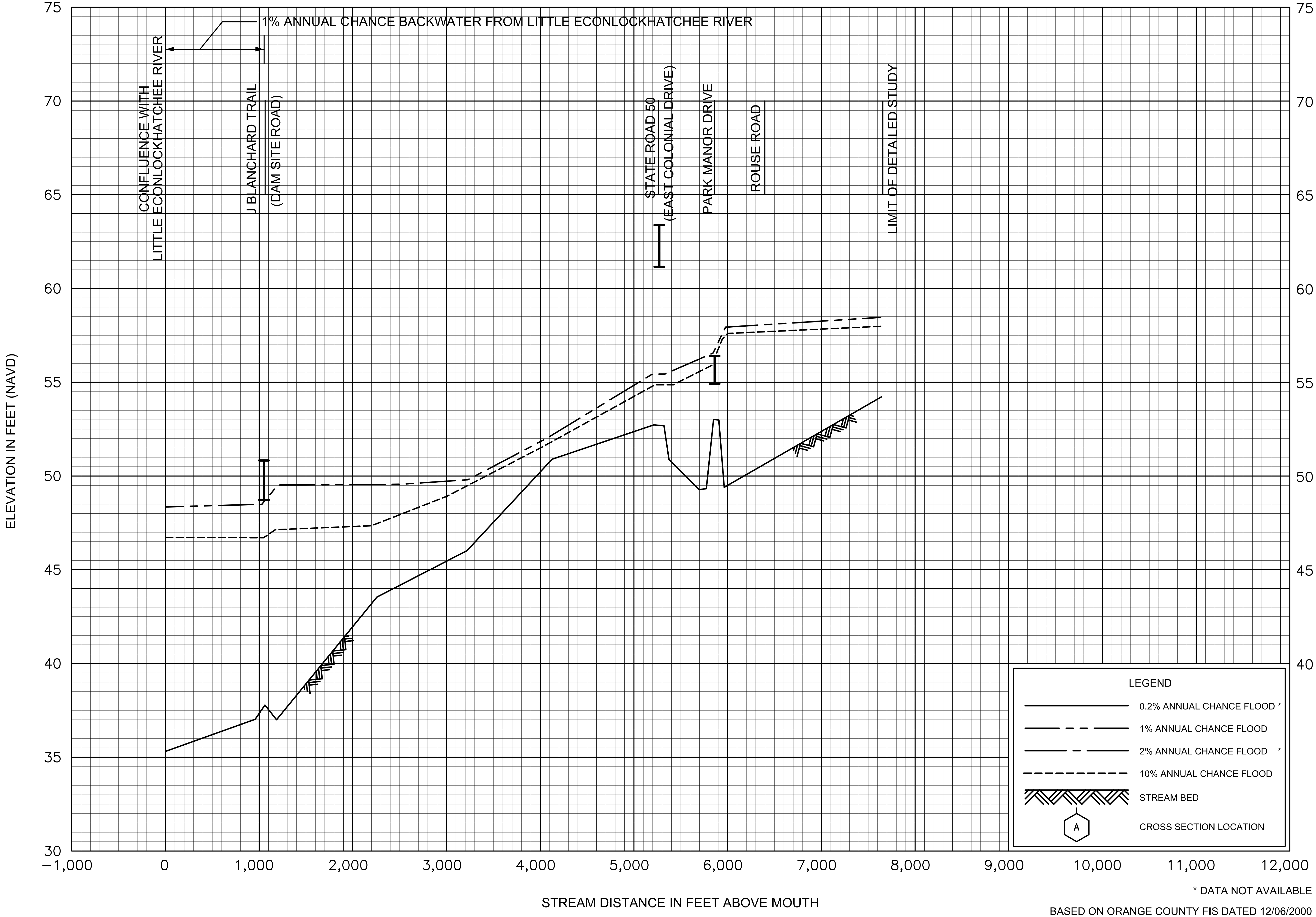
FLOOD PROFILES

ORANGE COUNTY POND OUTFALL CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS

33P



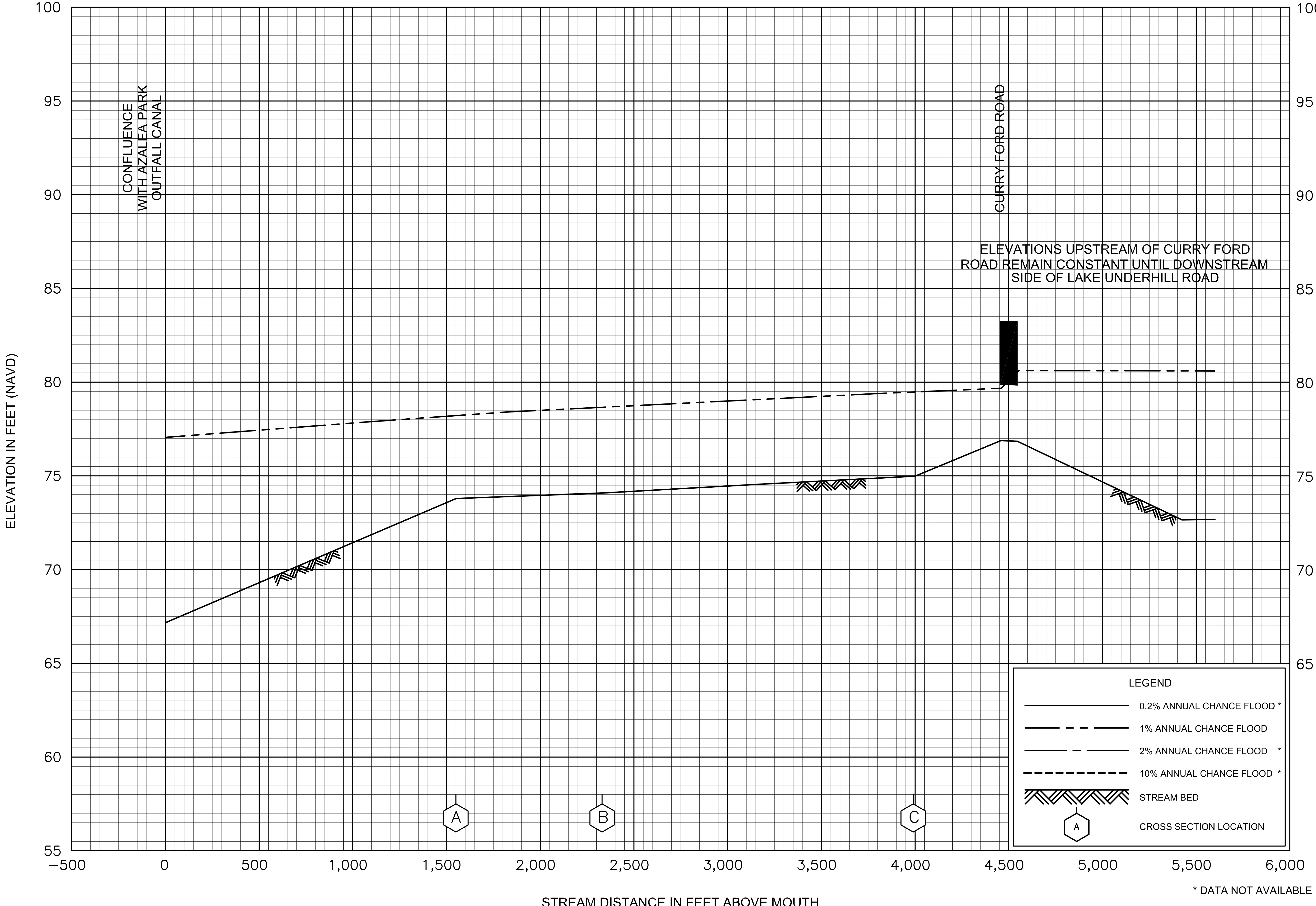
FLOOD PROFILES

PARK MANOR OUTFALL CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS



* DATA NOT AVAILABLE

BASED ON ORANGE COUNTY FIS DATED 12/06/2000

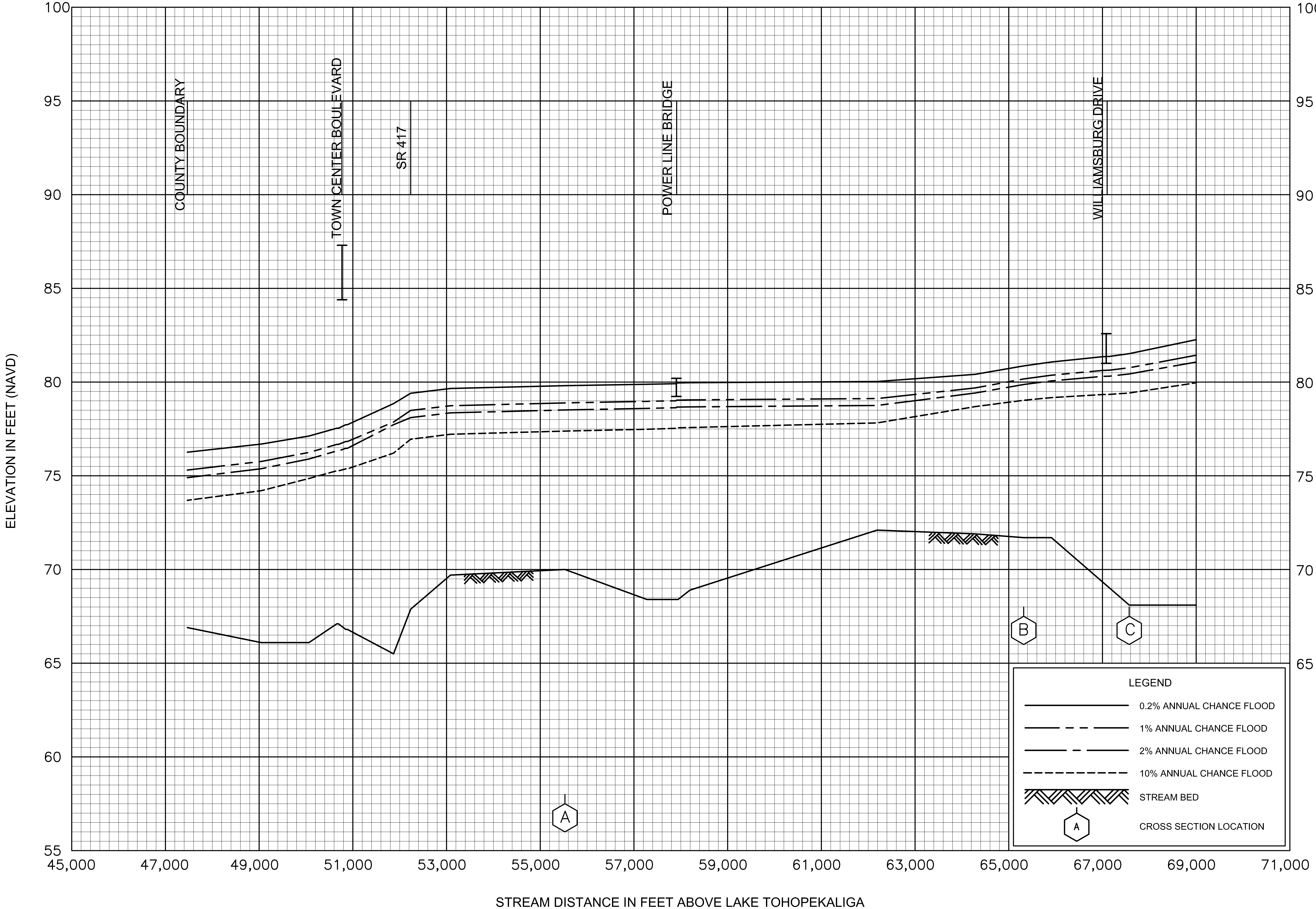
FLOOD PROFILES

RIO PINAR CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS



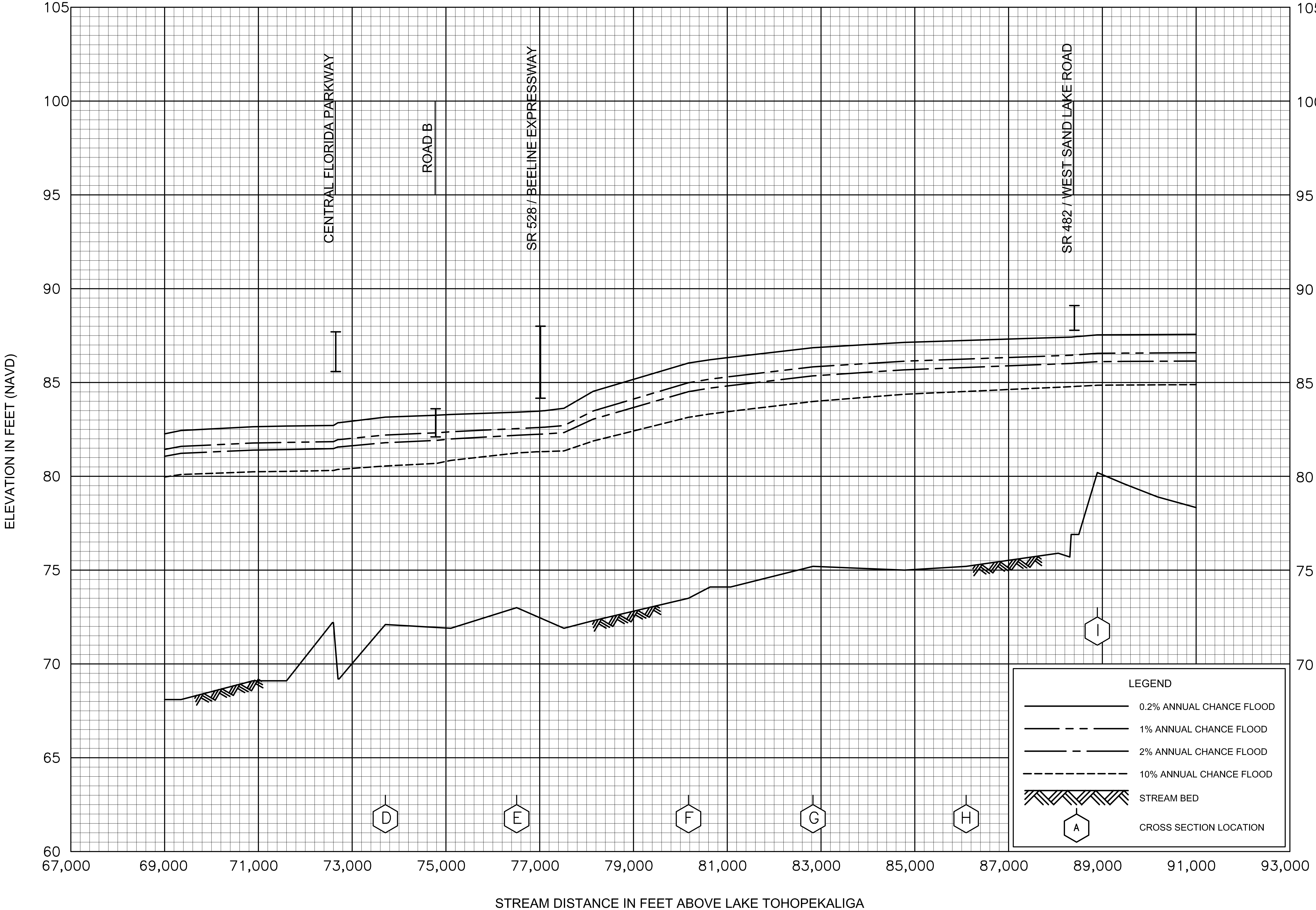
FLOOD PROFILES

SHINGLE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS

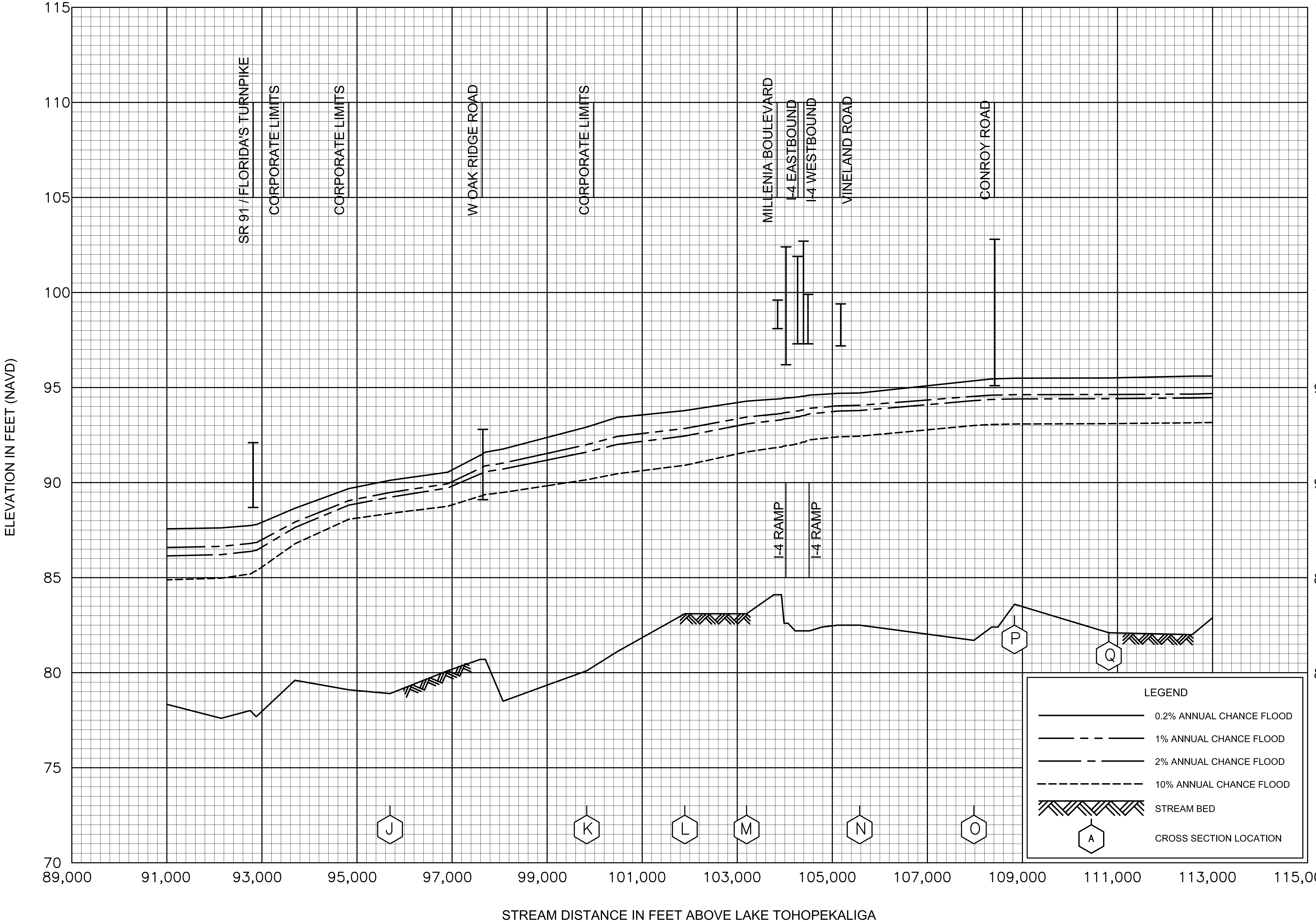


FLOOD PROFILES

SHINGLE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS



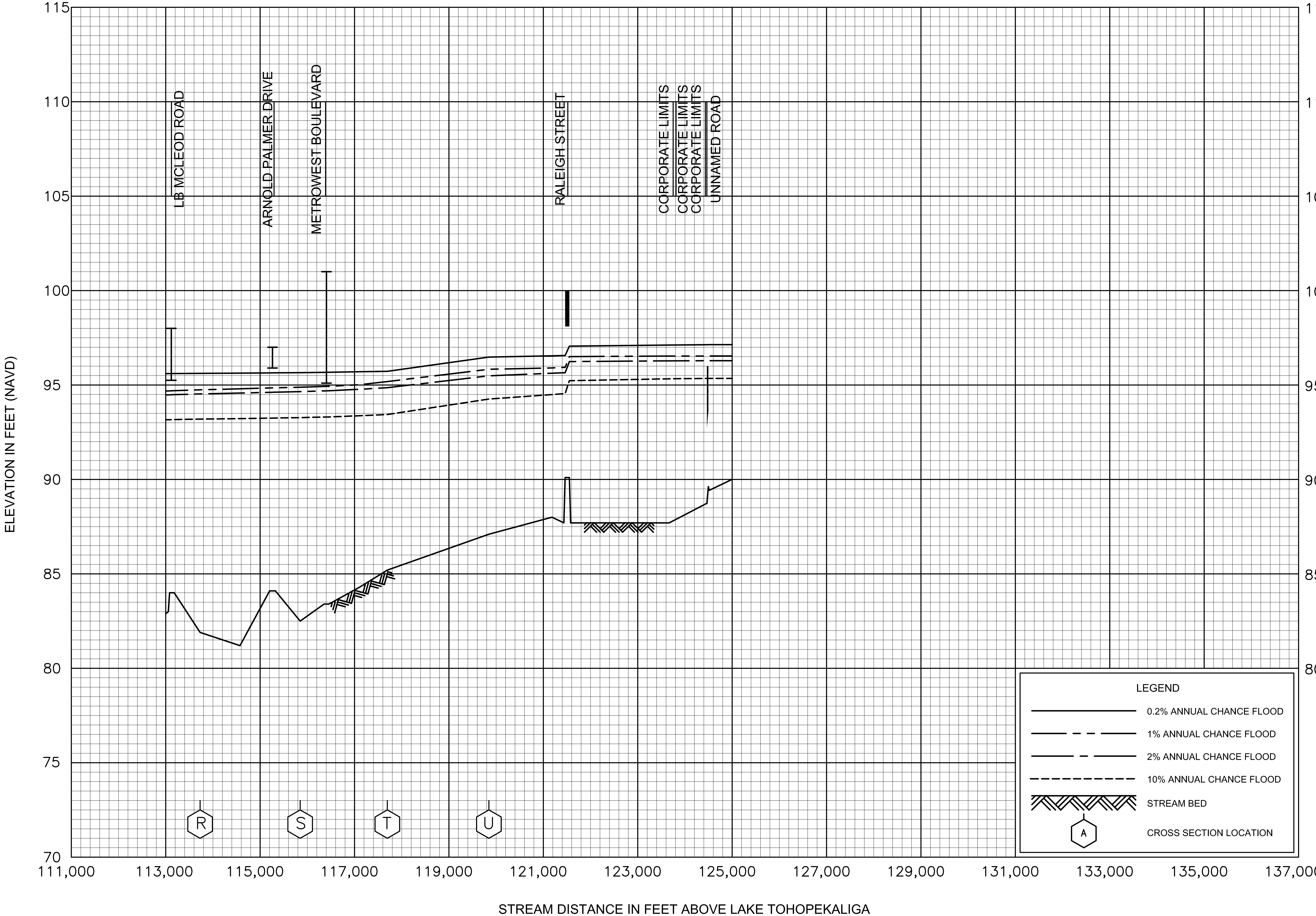
FLOOD PROFILES

SHINGLE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS

38P



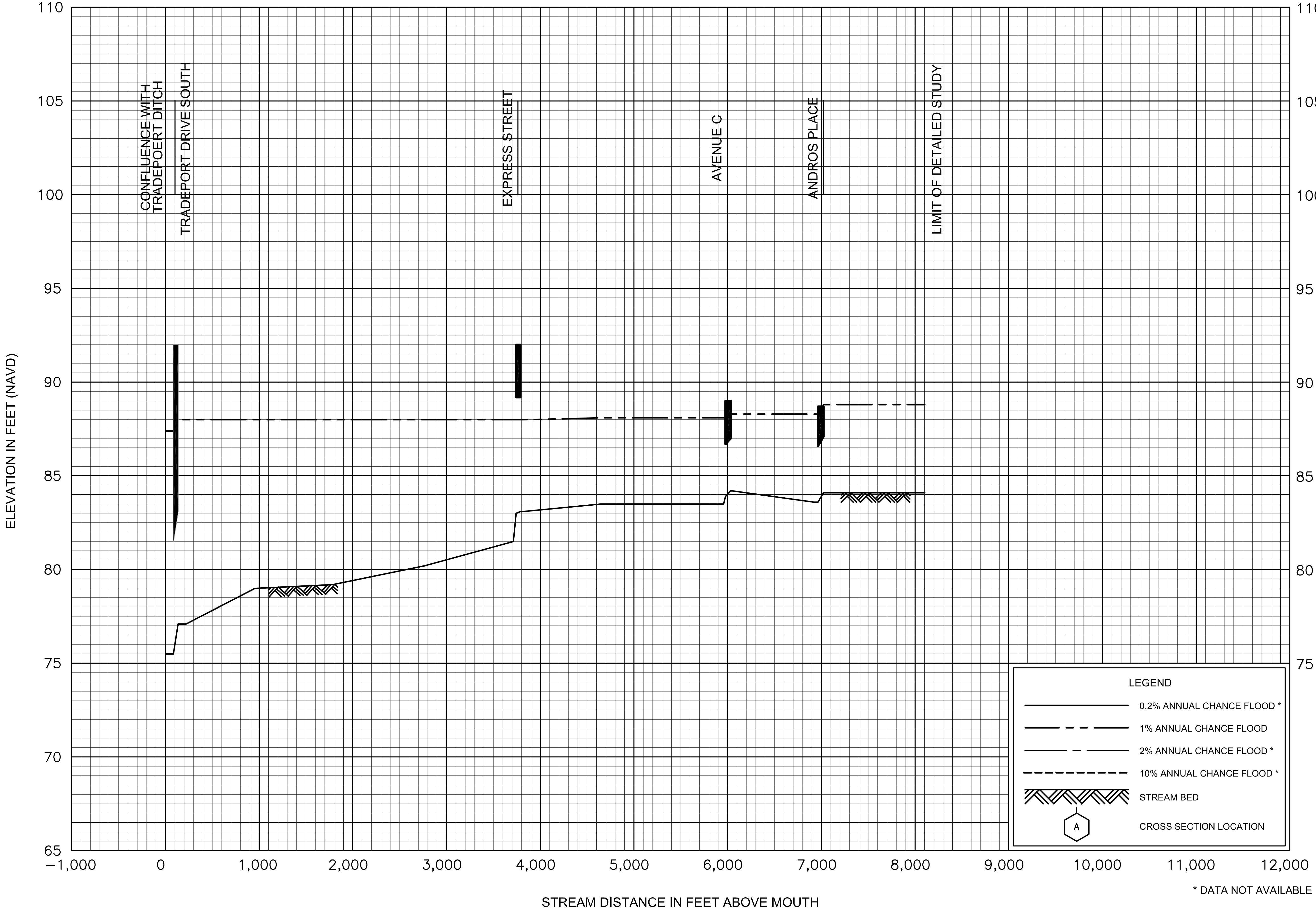
FLOOD PROFILES

SHINGLE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS



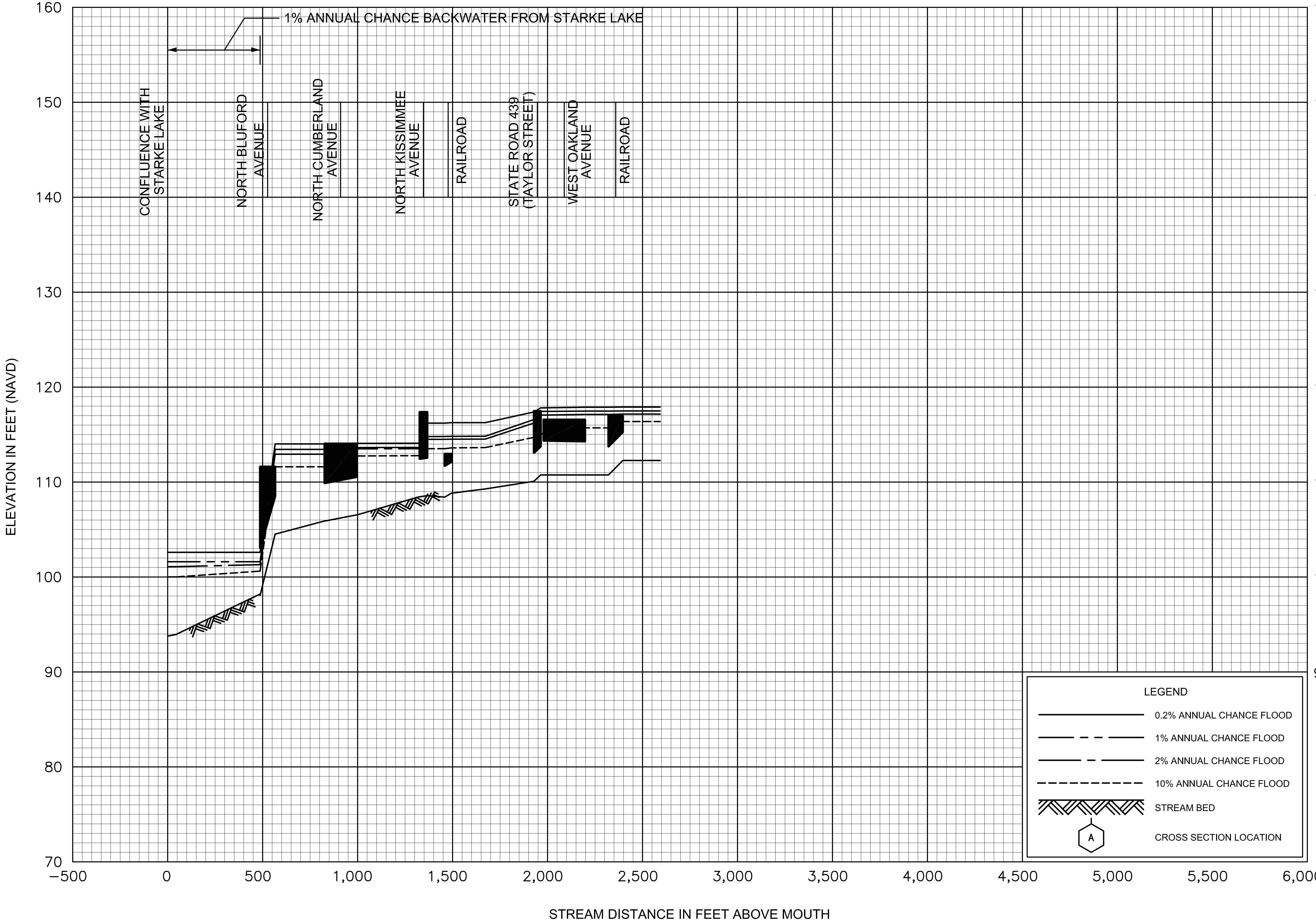
FLOOD PROFILES

SOUTHPORT DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS

40P

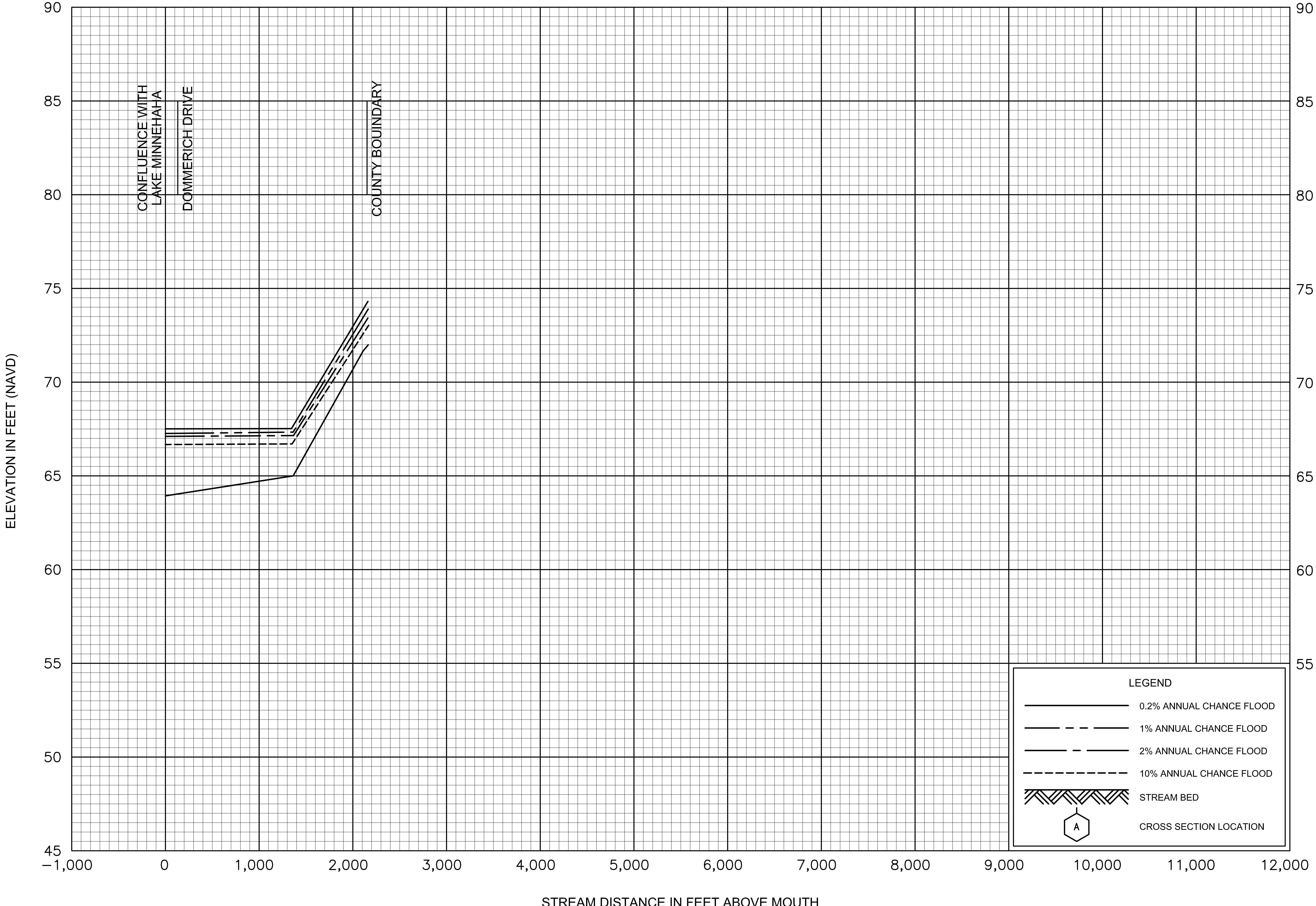


FLOOD PROFILES

STREAM A NO. 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS



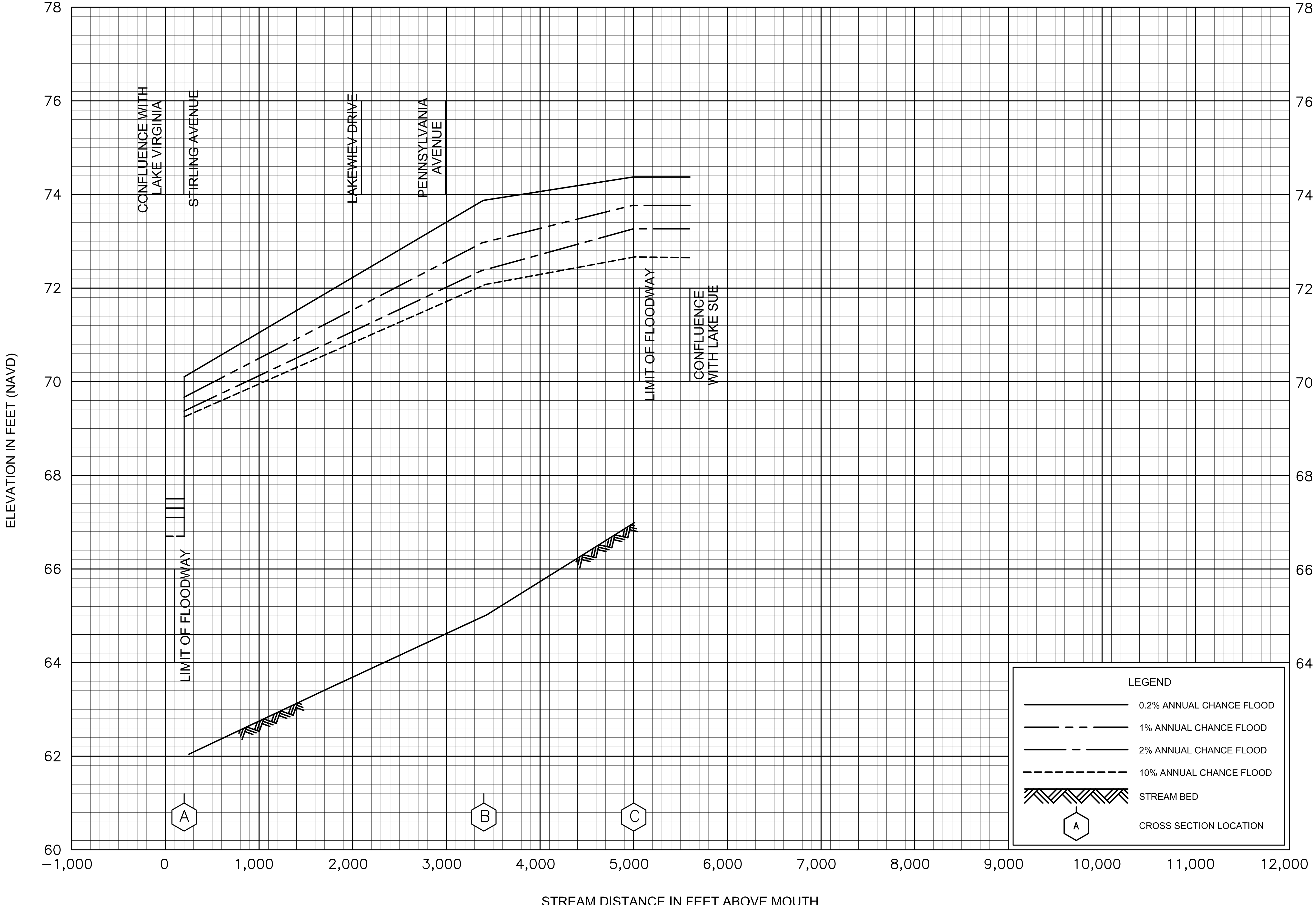
BASED ON ORANGE COUNTY FIS DATED 12/06/2000

FLOOD PROFILES

STREAM A NO. 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS



BASED ON ORANGE COUNTY FIS DATED 12/06/2000

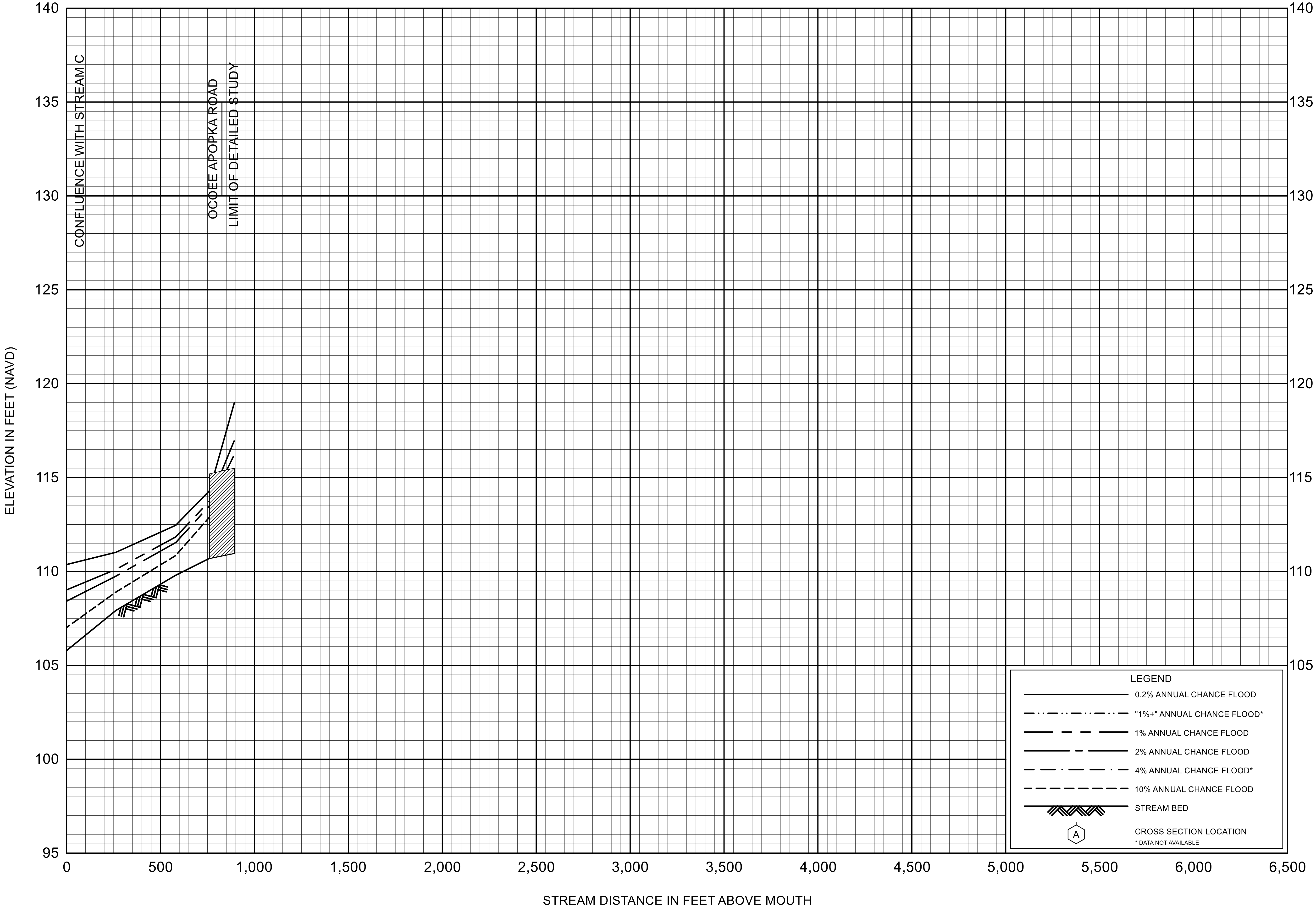
FLOOD PROFILES

STREAM A NO. 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS



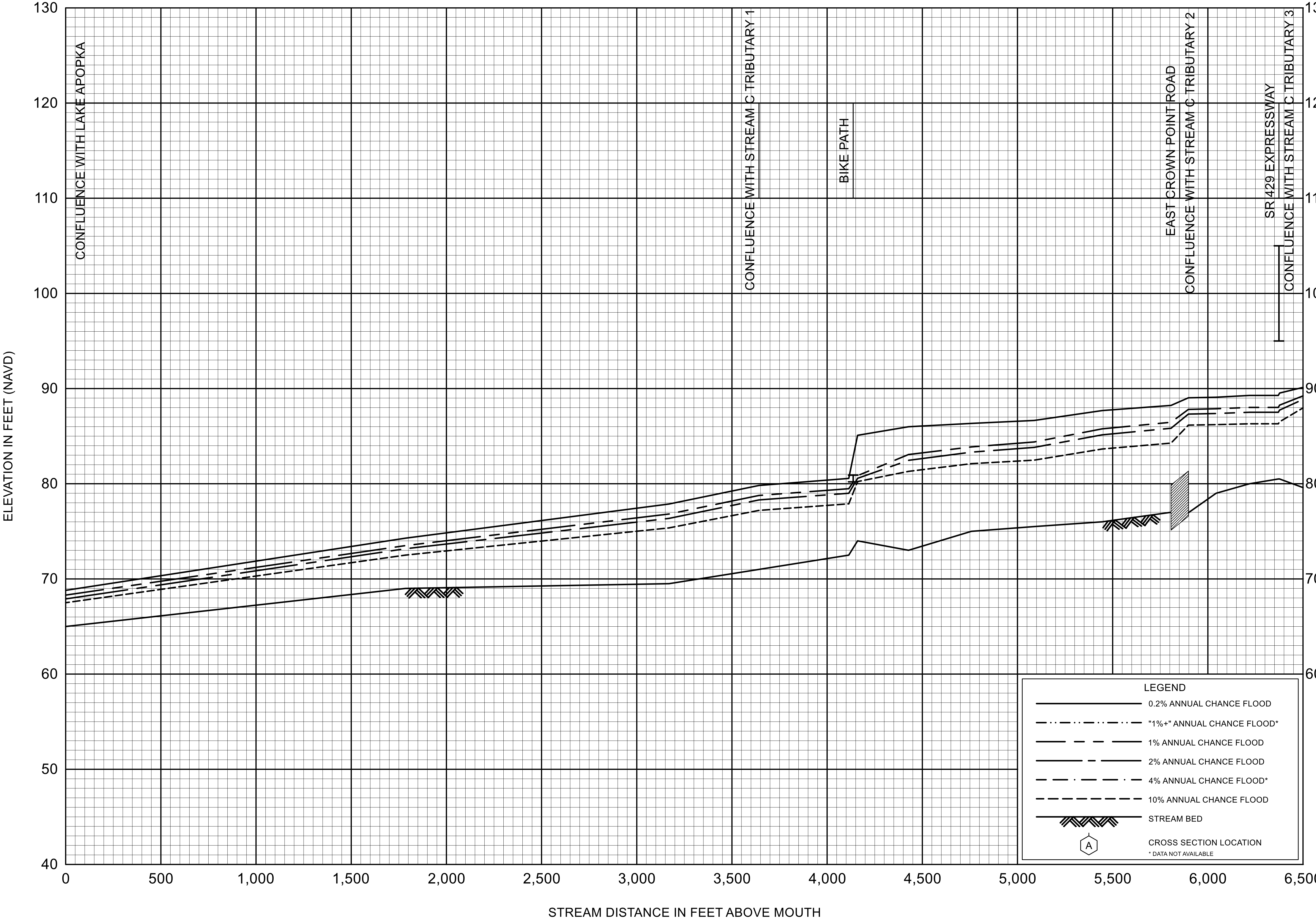
FLOOD PROFILES

STREAM B

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE, FL

AND INCORPORATED AREAS



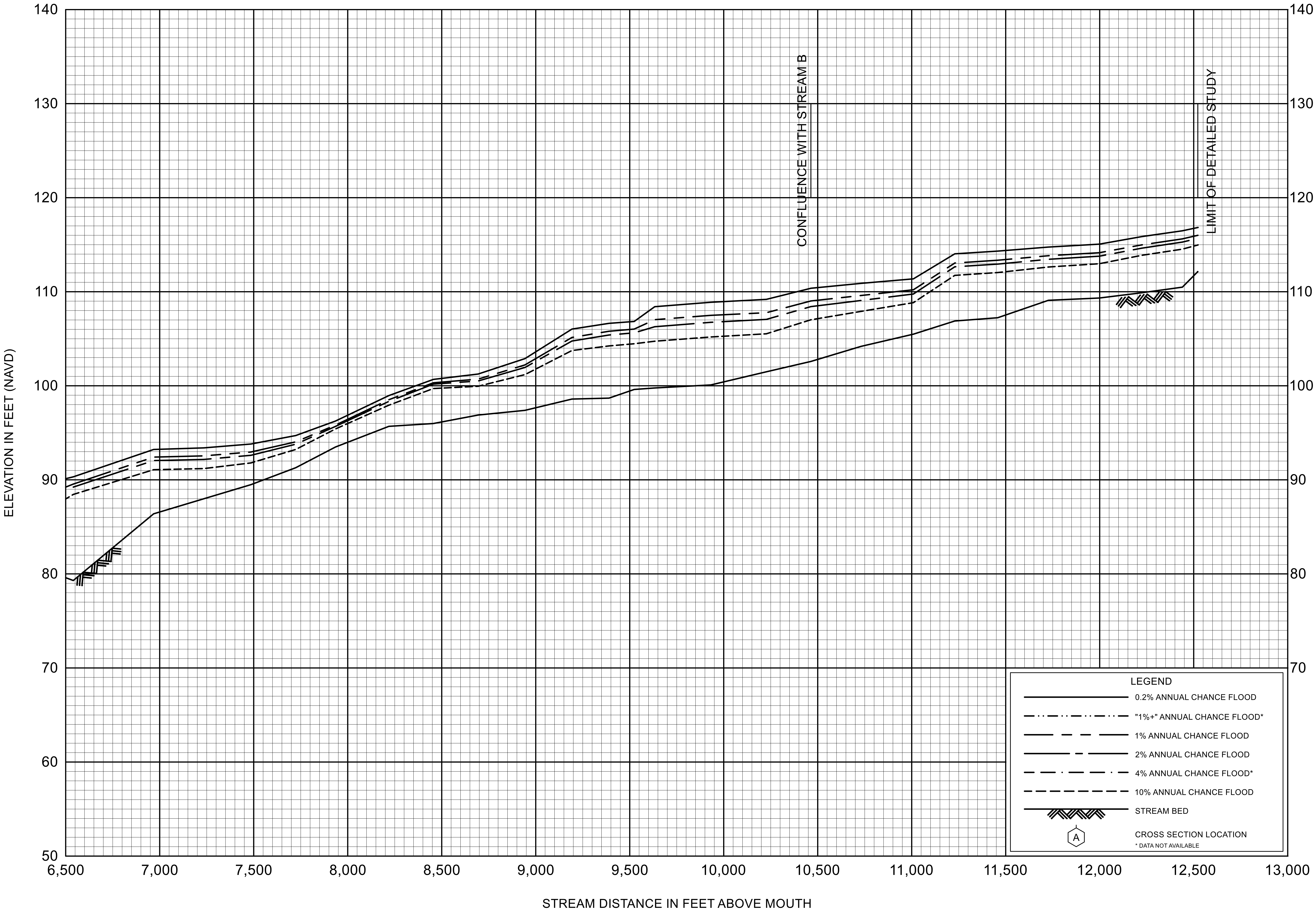
FLOOD PROFILES

STREAM C

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS



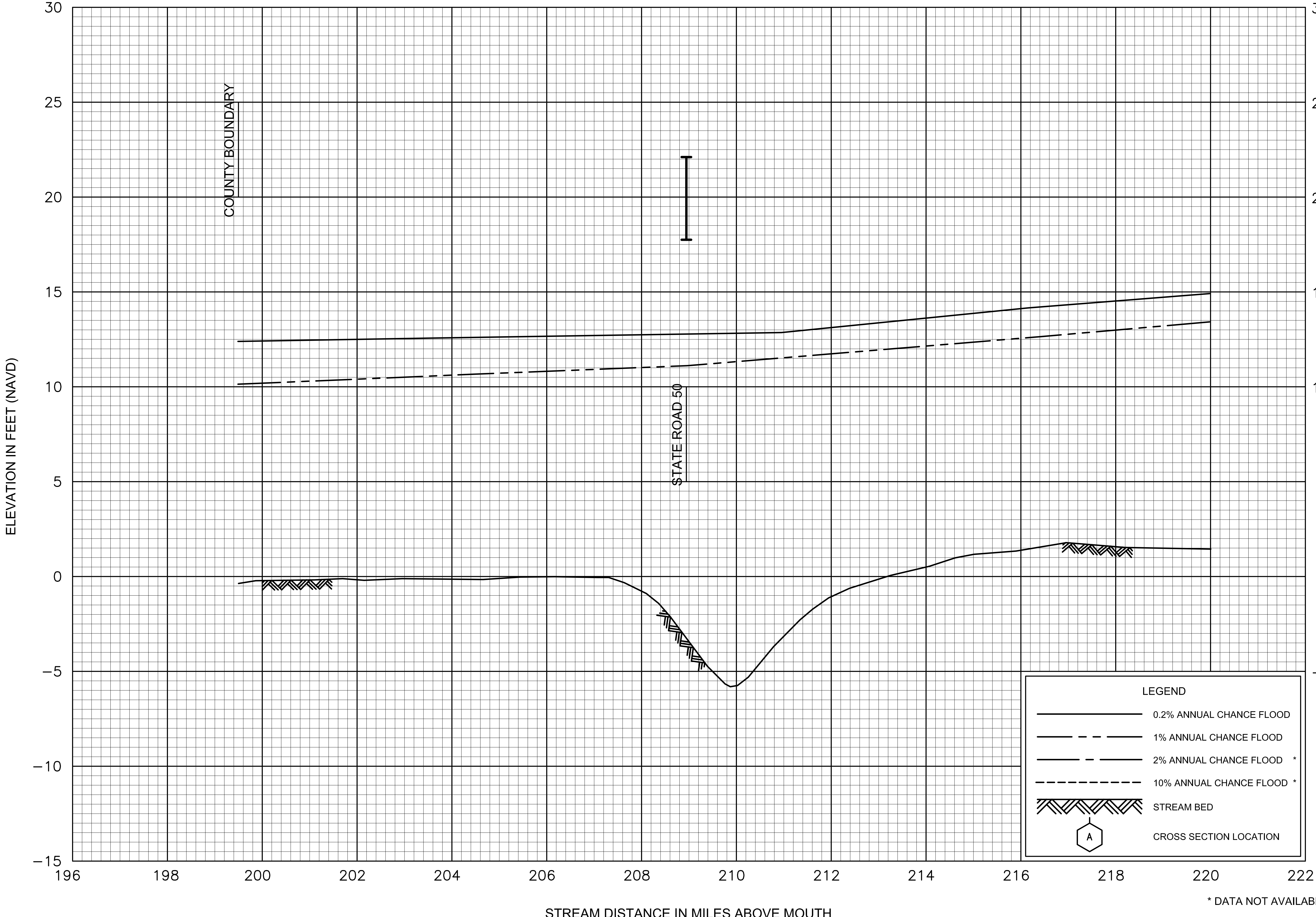
FLOOD PROFILES

STREAM C

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS



* DATA NOT AVAILABLE

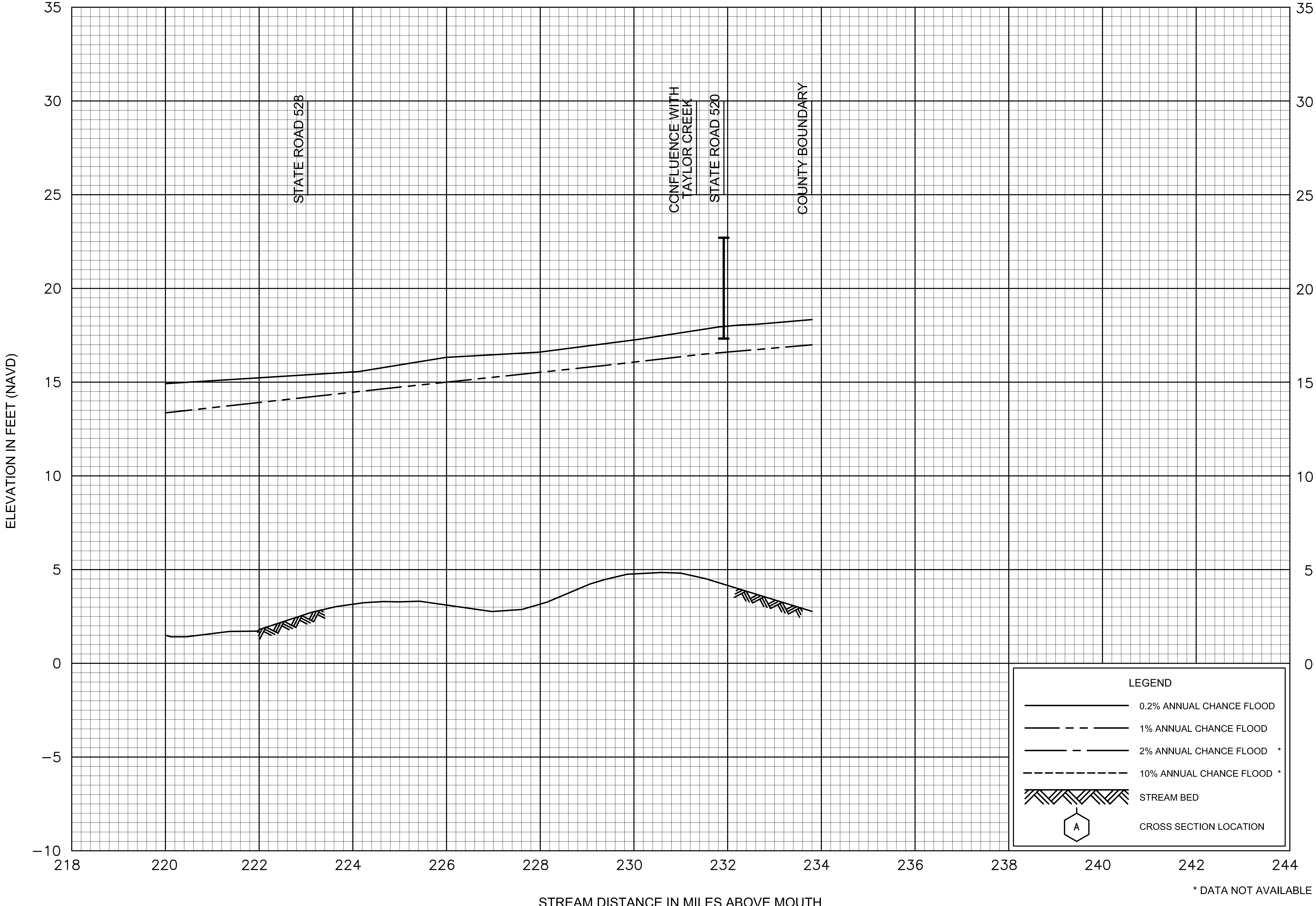
BASED ON ORANGE COUNTY FIS DATED 12/06/2000

FLOOD PROFILES

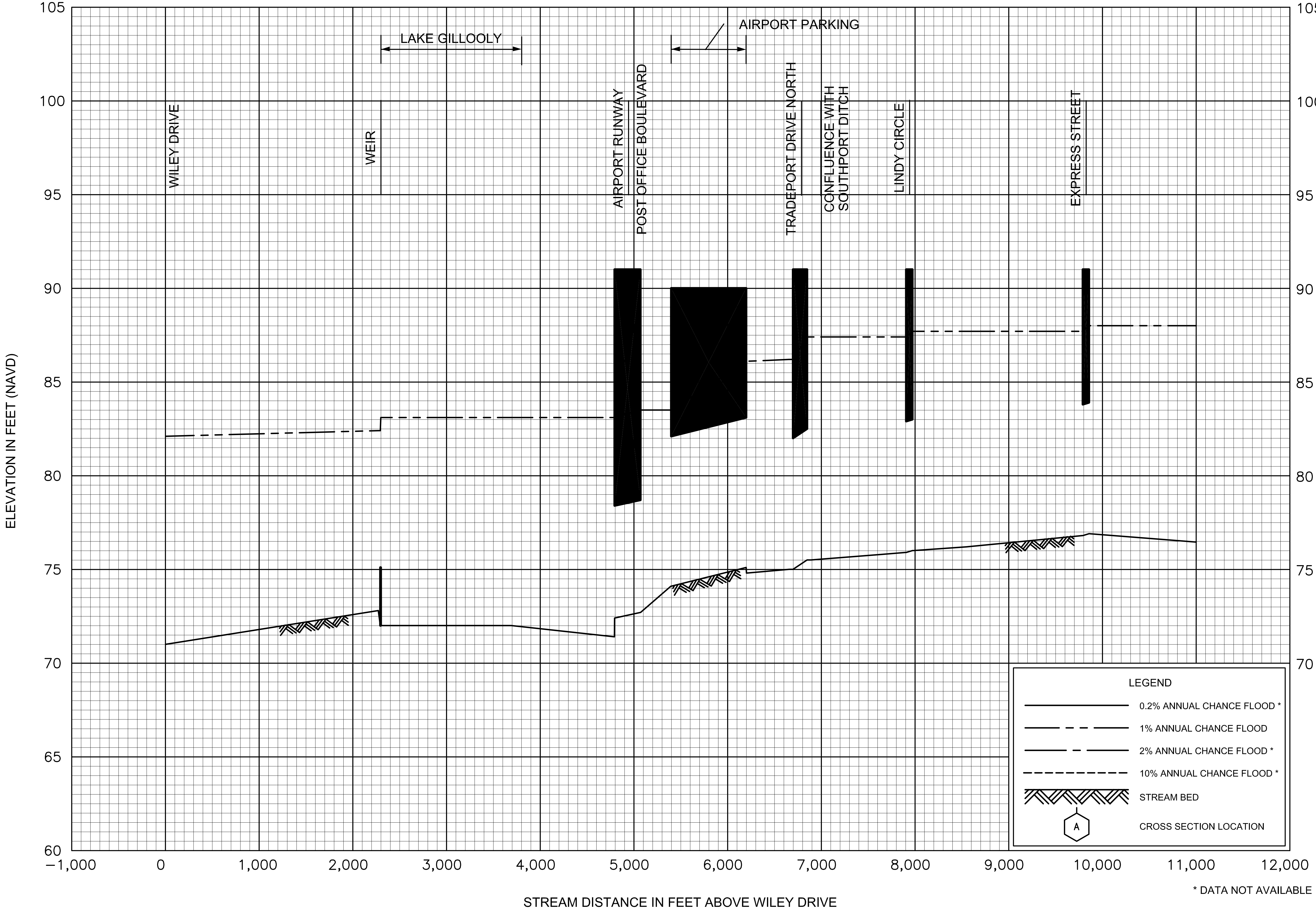
ST. JOHNS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS



ELEVATION IN FEET (NAVD)
STREAM DISTANCE IN MILES ABOVE MOUTH
STATE ROAD 528
CONFLUENCE WITH TAYLOR CREEK
STATE ROAD 520
COUNTY BOUNDARY
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD *
10% ANNUAL CHANCE FLOOD *
STREAM BED
A
CROSS SECTION LOCATION
* DATA NOT AVAILABLE
BASED ON ORANGE COUNTY FIS DATED 12/06/2000
FLOOD PROFILES
ST. JOHNS RIVER
FEDERAL EMERGENCY MANAGEMENT AGENCY
ORANGE COUNTY, FL
AND INCORPORATED AREAS

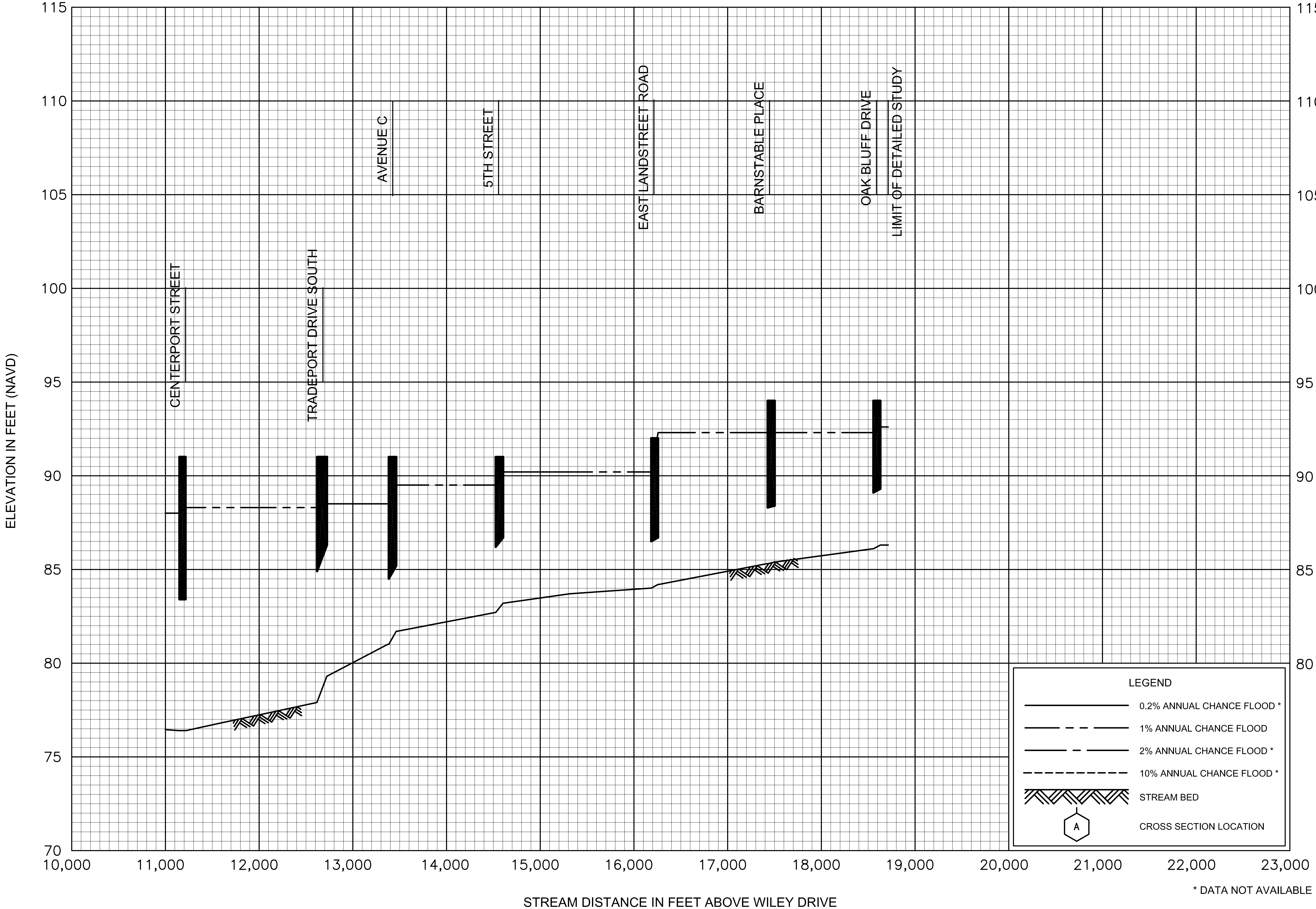


FLOOD PROFILES

TRADEPORT DITCH

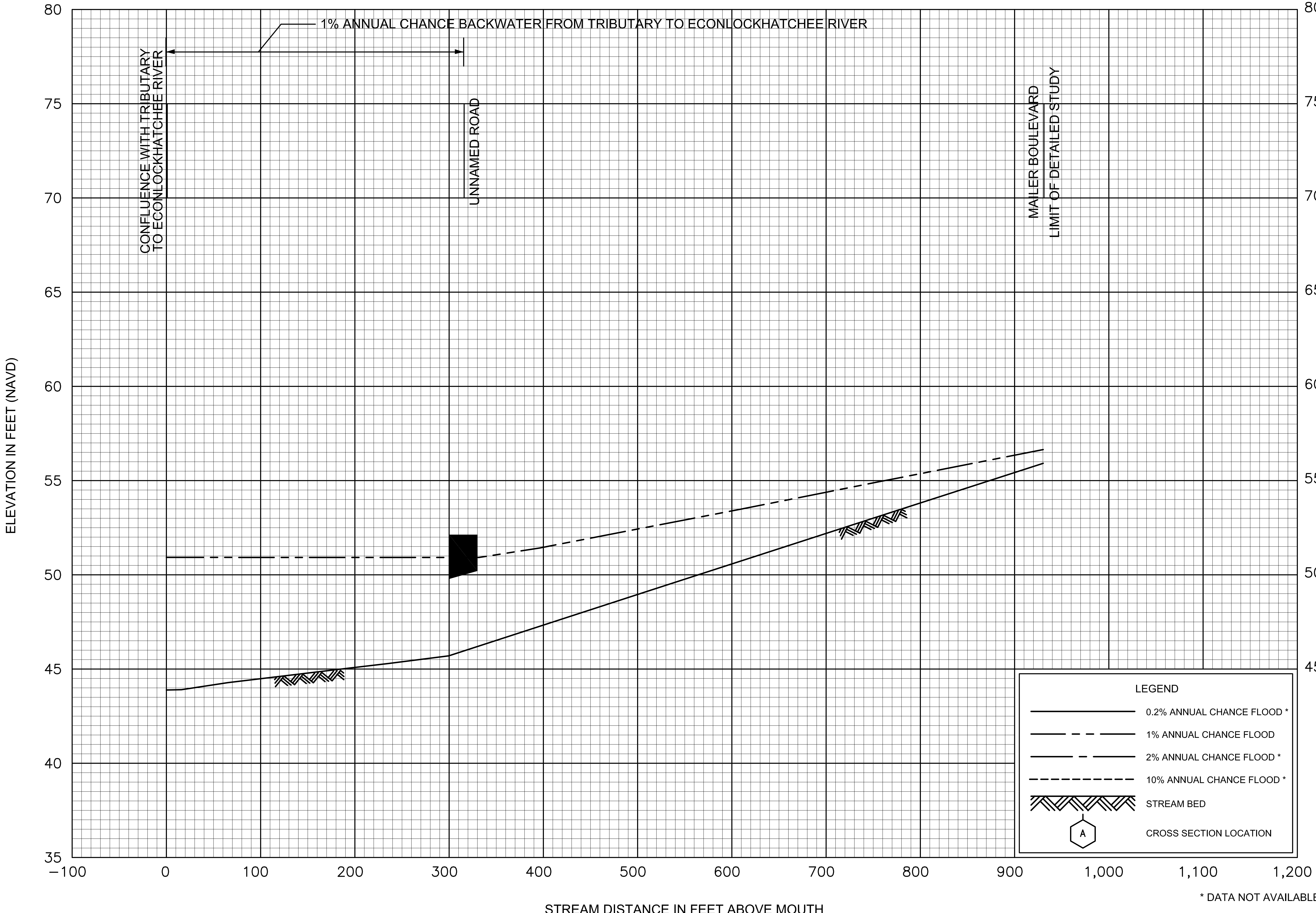
FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS



FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS



* DATA NOT AVAILABLE

BASED ON ORANGE COUNTY FIS DATED 12/06/2000

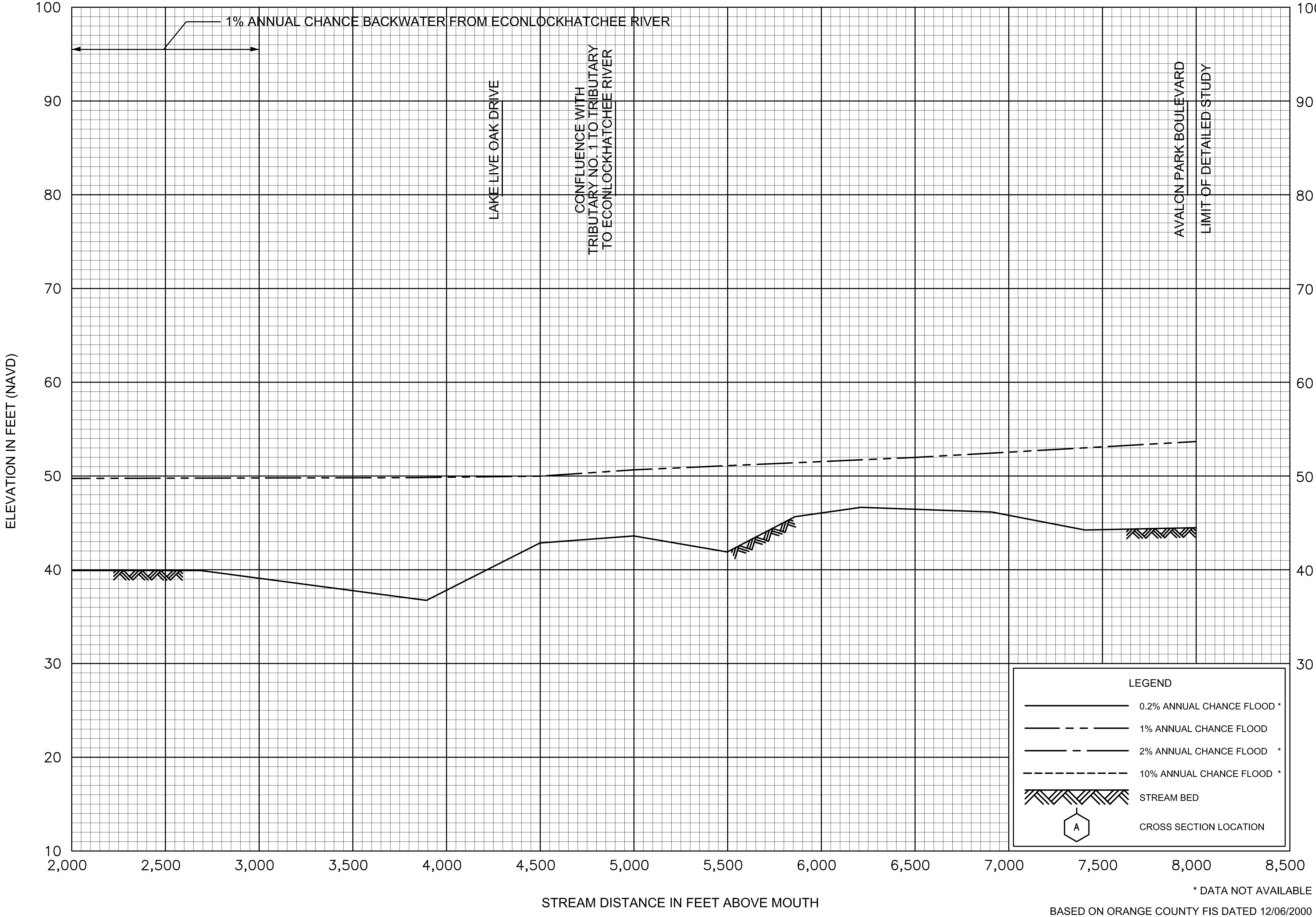
FLOOD PROFILES

TRIBUTARY NO.1 TO TRIBUTARY TO ECONLOCKHATCHEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS



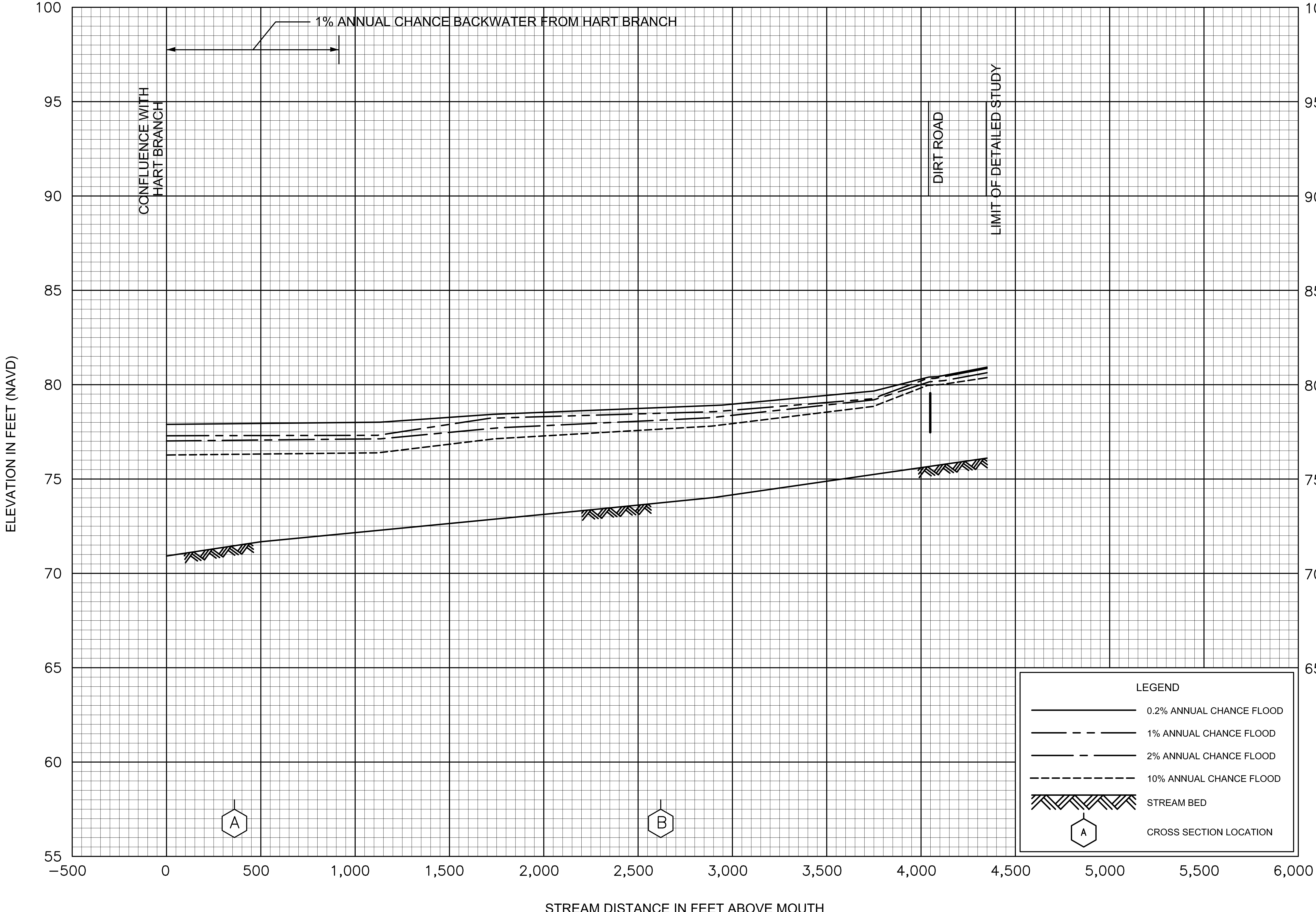
FLOOD PROFILES

TRIBUTARY TO ECONLOCKHATCHEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS



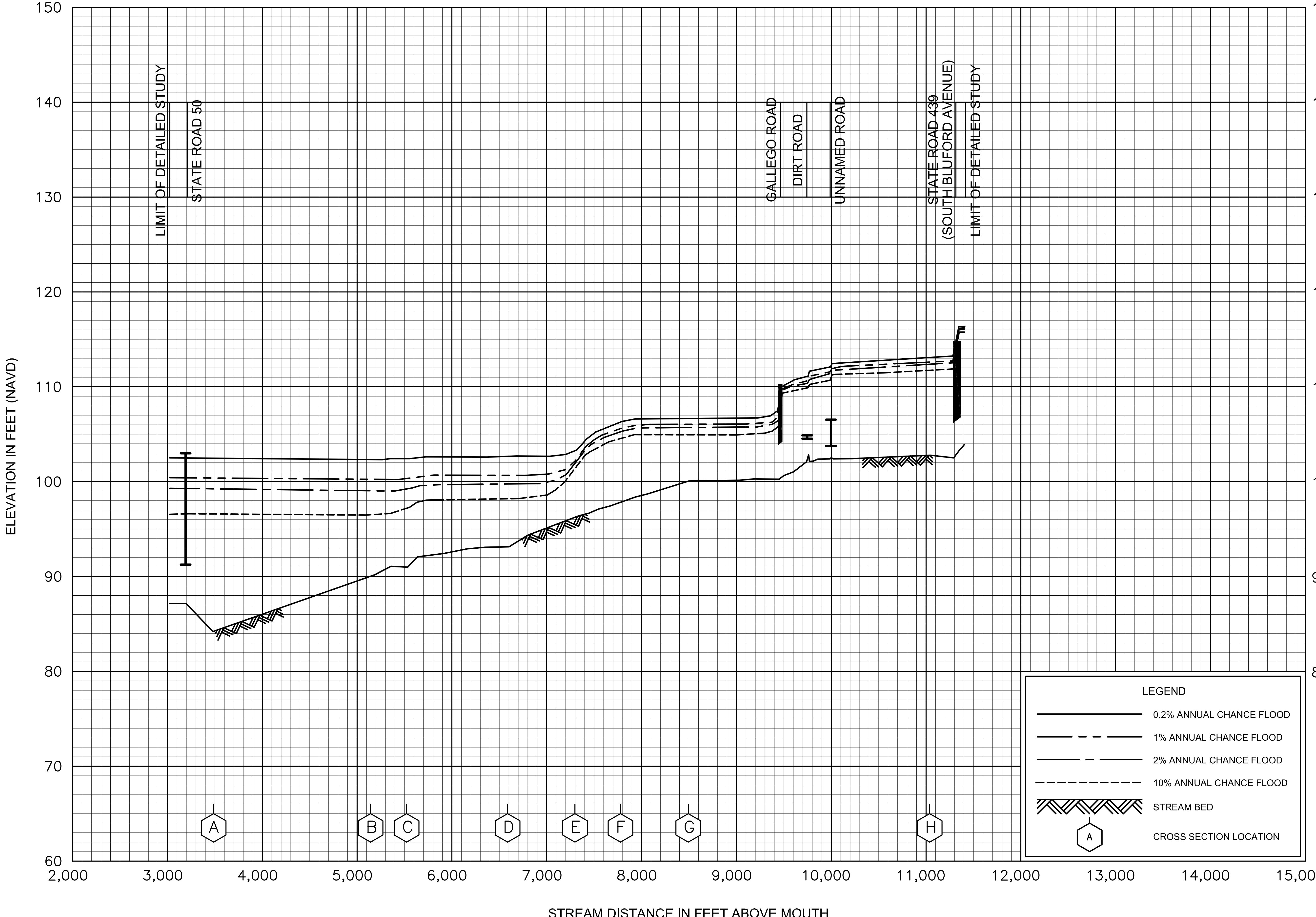
BASED ON ORANGE COUNTY FIS DATED 12/06/2000

FLOOD PROFILES

TRIBUTARY TO HART BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS



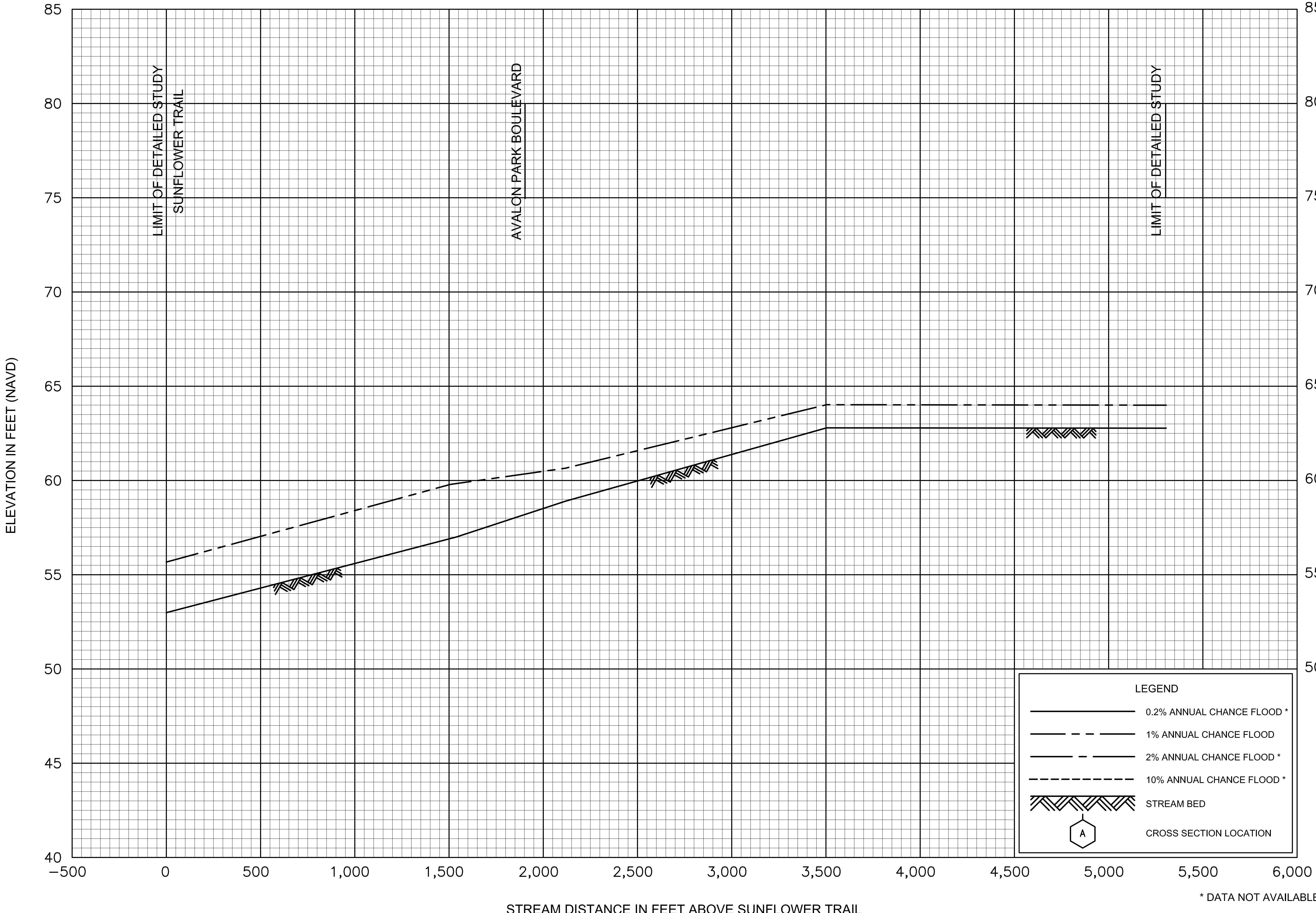
BASED ON ORANGE COUNTY FIS DATED 12/06/2000

FLOOD PROFILES

TRIBUTARY TO LAKE LOTTA

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS



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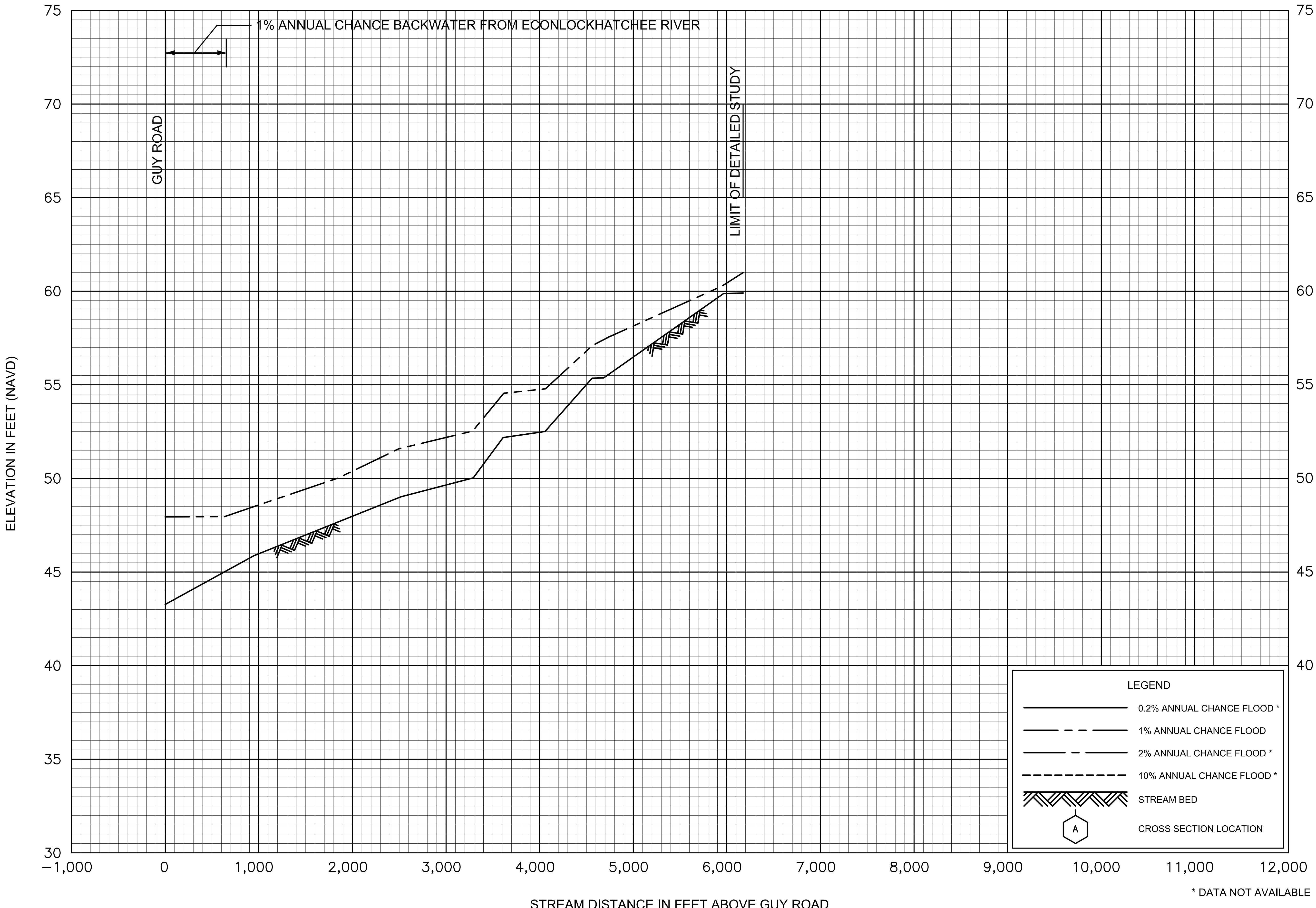
BASED ON ORANGE COUNTY FIS DATED 12/06/2000

FLOOD PROFILES

UNNAMED TRIBUTARY TO ECONLOCKHATCHEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS



* DATA NOT AVAILABLE

BASED ON ORANGE COUNTY FIS DATED 12/06/2000

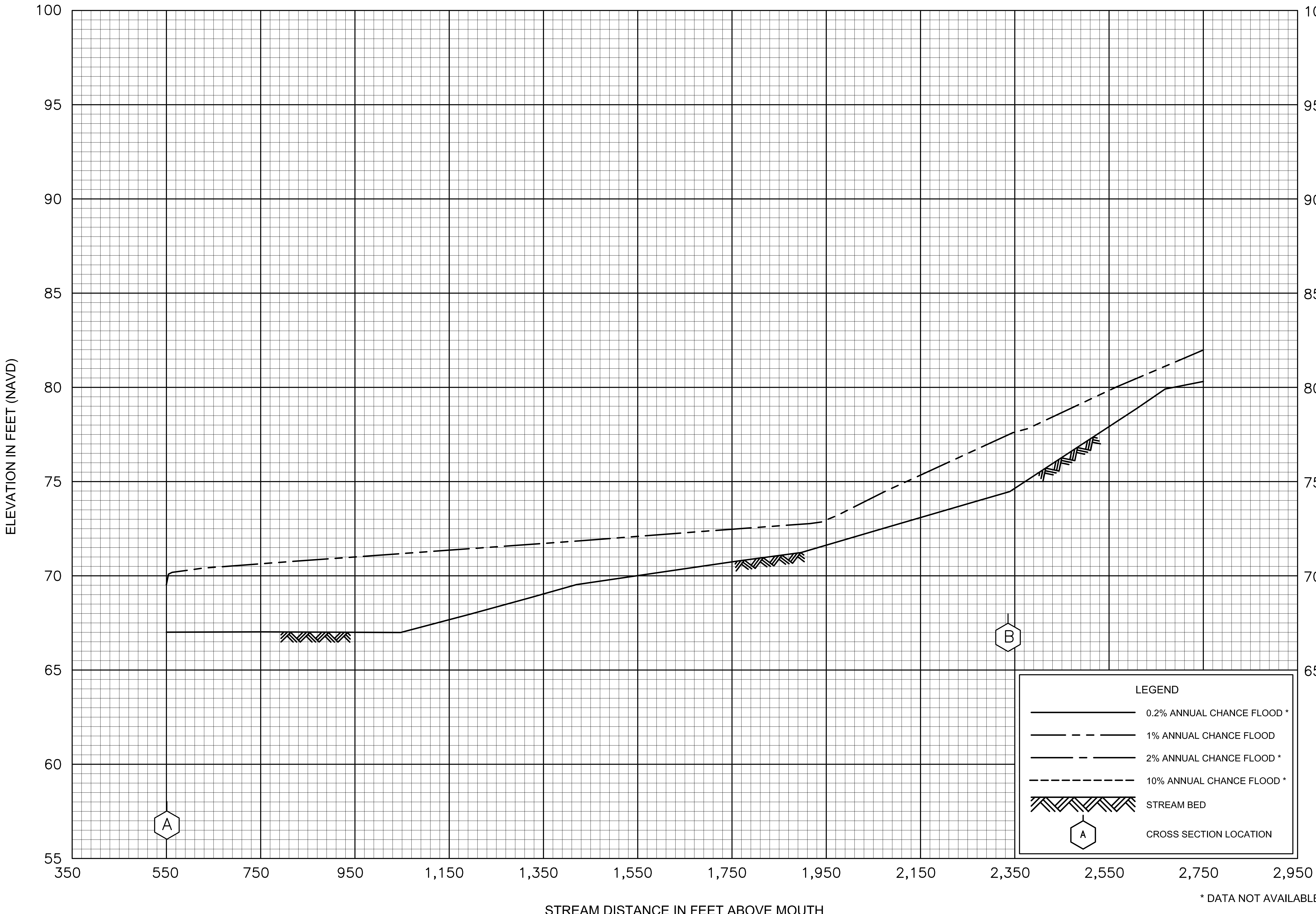
FLOOD PROFILES

UNNAMED TRIBUTARY TO ECONLOCKHATCHEE RIVER NO. 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS



* DATA NOT AVAILABLE

BASED ON ORANGE COUNTY FIS DATED 12/06/2000

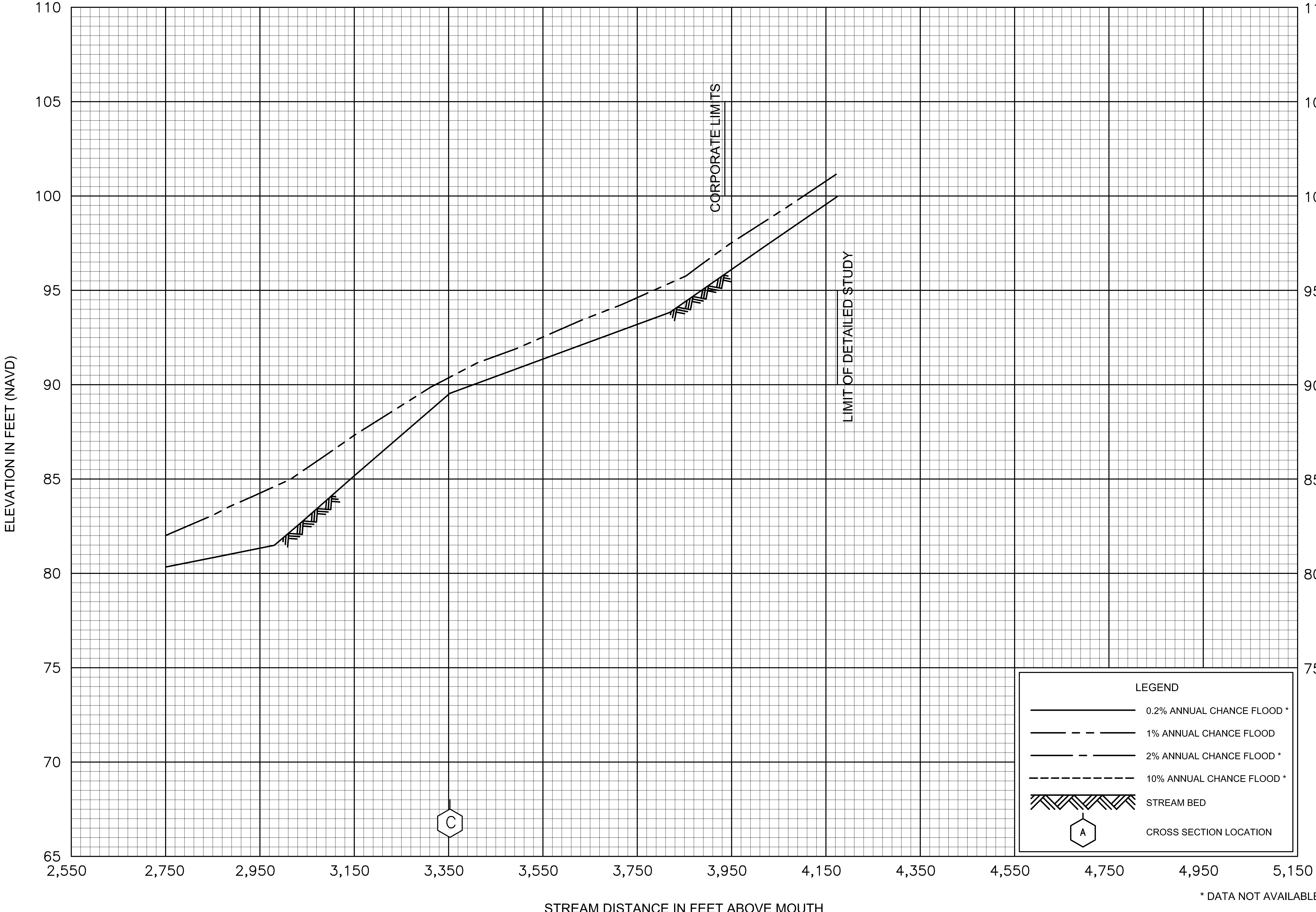
FLOOD PROFILES

UNNAMED TRIBUTARY TO LAKE APOPKA

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS



* DATA NOT AVAILABLE

BASED ON ORANGE COUNTY FIS DATED 12/06/2000

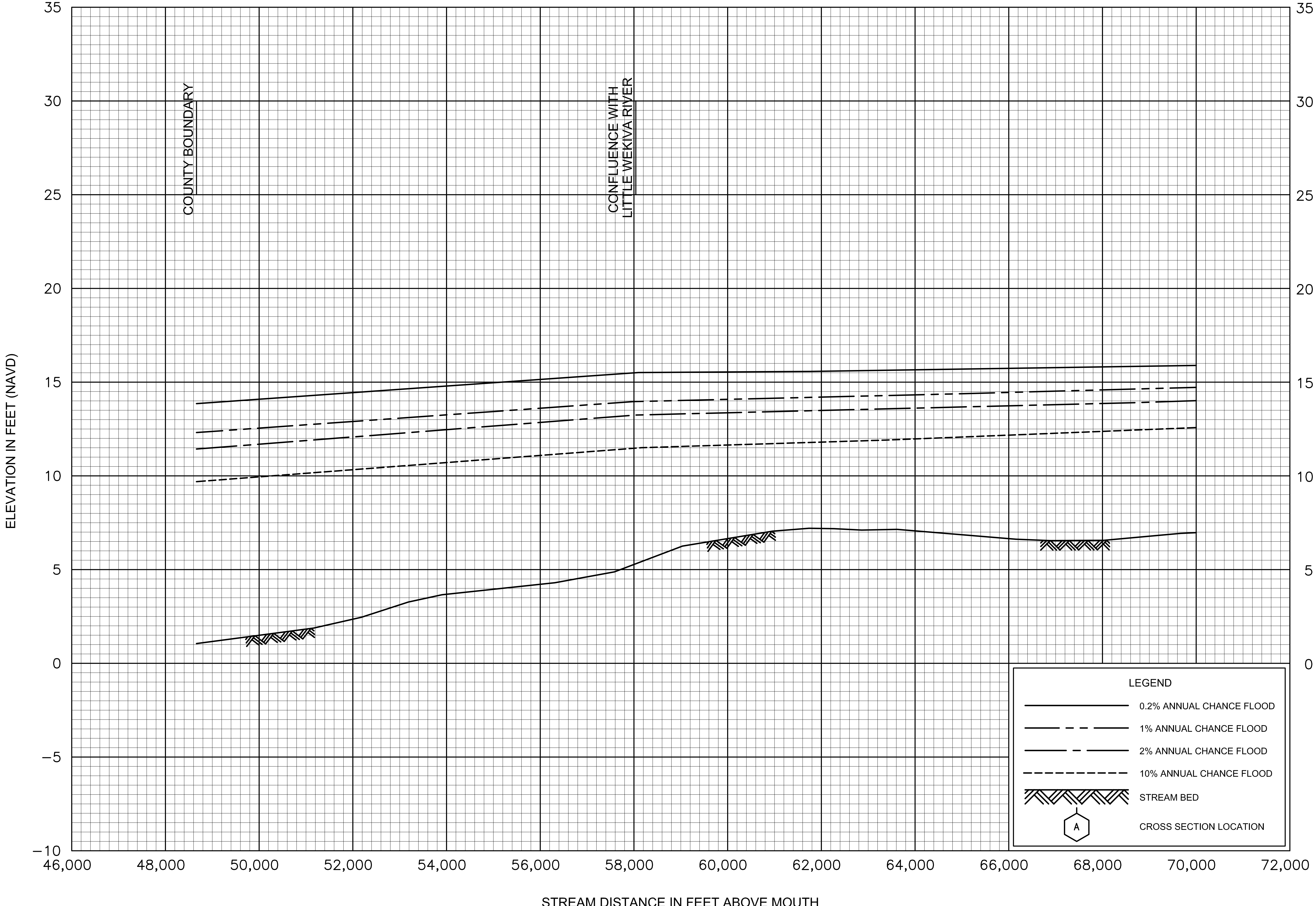
FLOOD PROFILES

UNNAMED TRIBUTARY TO LAKE APOPKA

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS



BASED ON ORANGE COUNTY FIS DATED 12/06/2000

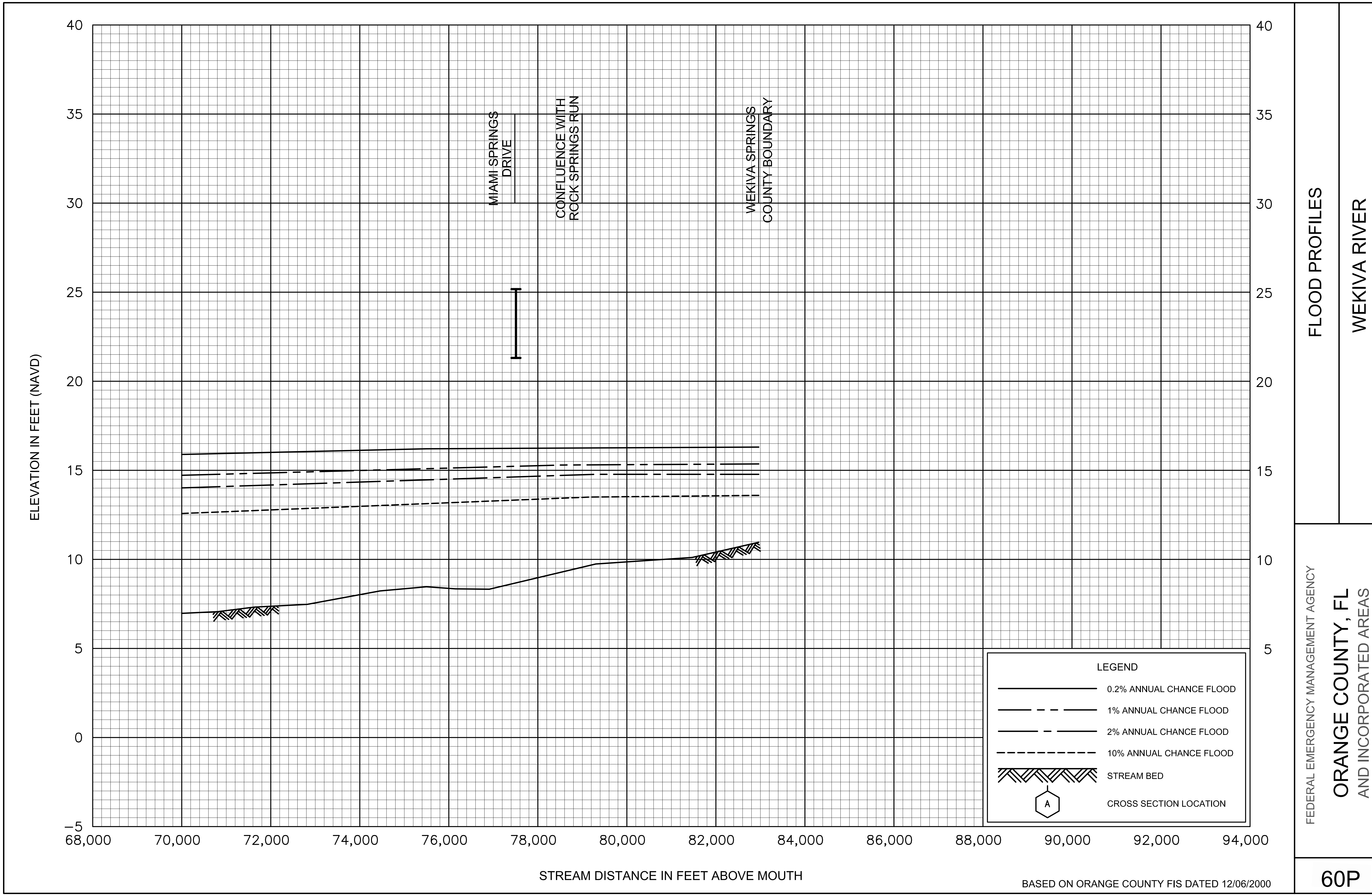
FLOOD PROFILES

WEKIVA RIVER

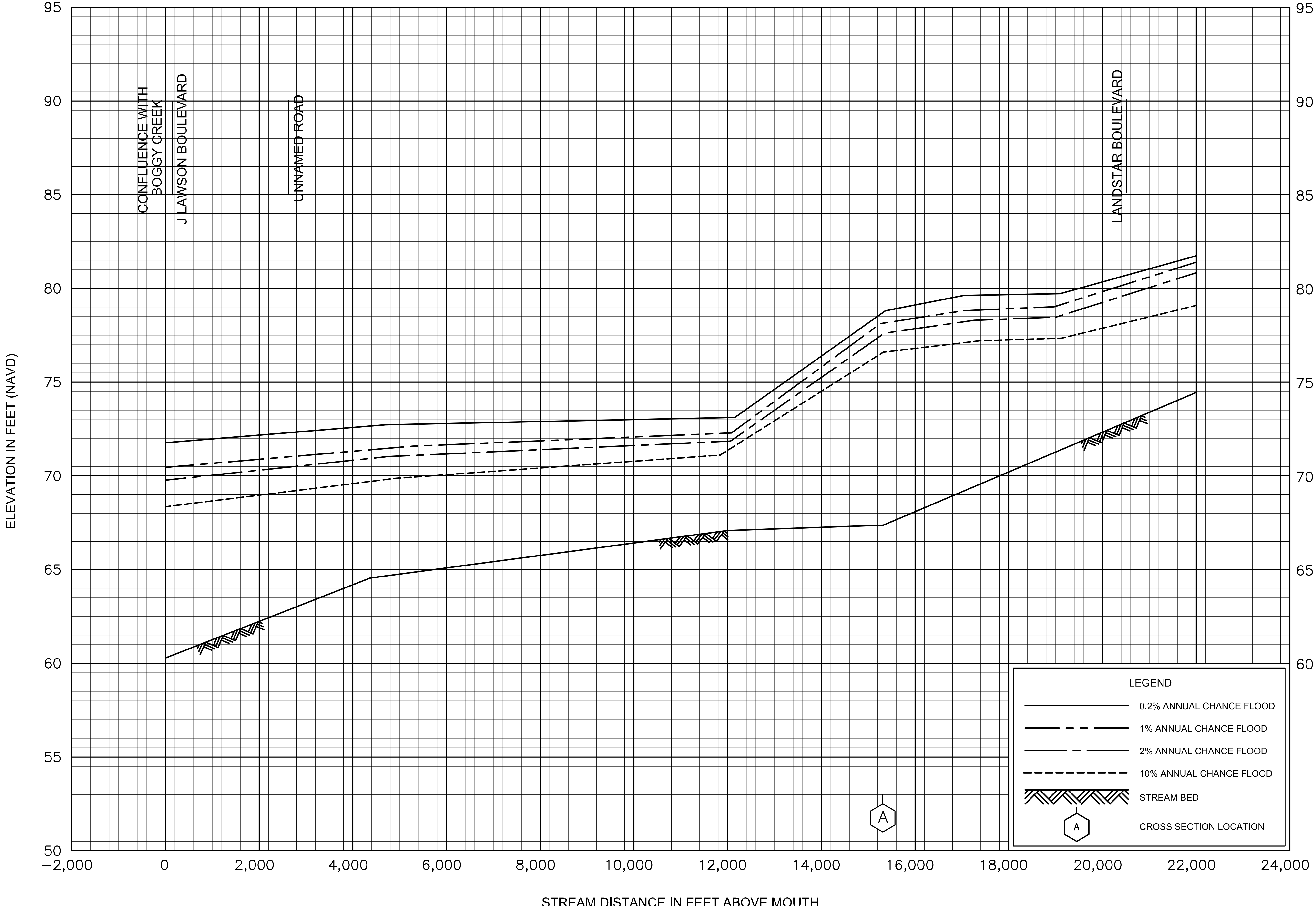
FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS



FLOOD PROFILES
WEKIVA RIVER
FEDERAL EMERGENCY MANAGEMENT AGENCY
ORANGE COUNTY, FL
AND INCORPORATED AREAS
60P
ELEVATION IN FEET (NAVD)
STREAM DISTANCE IN FEET ABOVE MOUTH
MIAMI SPRINGS DRIVE
CONFLUENCE WITH ROCK SPRINGS RUN
WEKIVA SPRINGS COUNTY BOUNDARY
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
A
40
35
30
25
20
15
10
5
0
−5
68,000
70,000
72,000
74,000
76,000
78,000
80,000
82,000
84,000
86,000
88,000
90,000
92,000
94,000
BASED ON ORANGE COUNTY FIS DATED 12/06/2000



BASED ON ORANGE COUNTY FIS DATED 12/06/2000

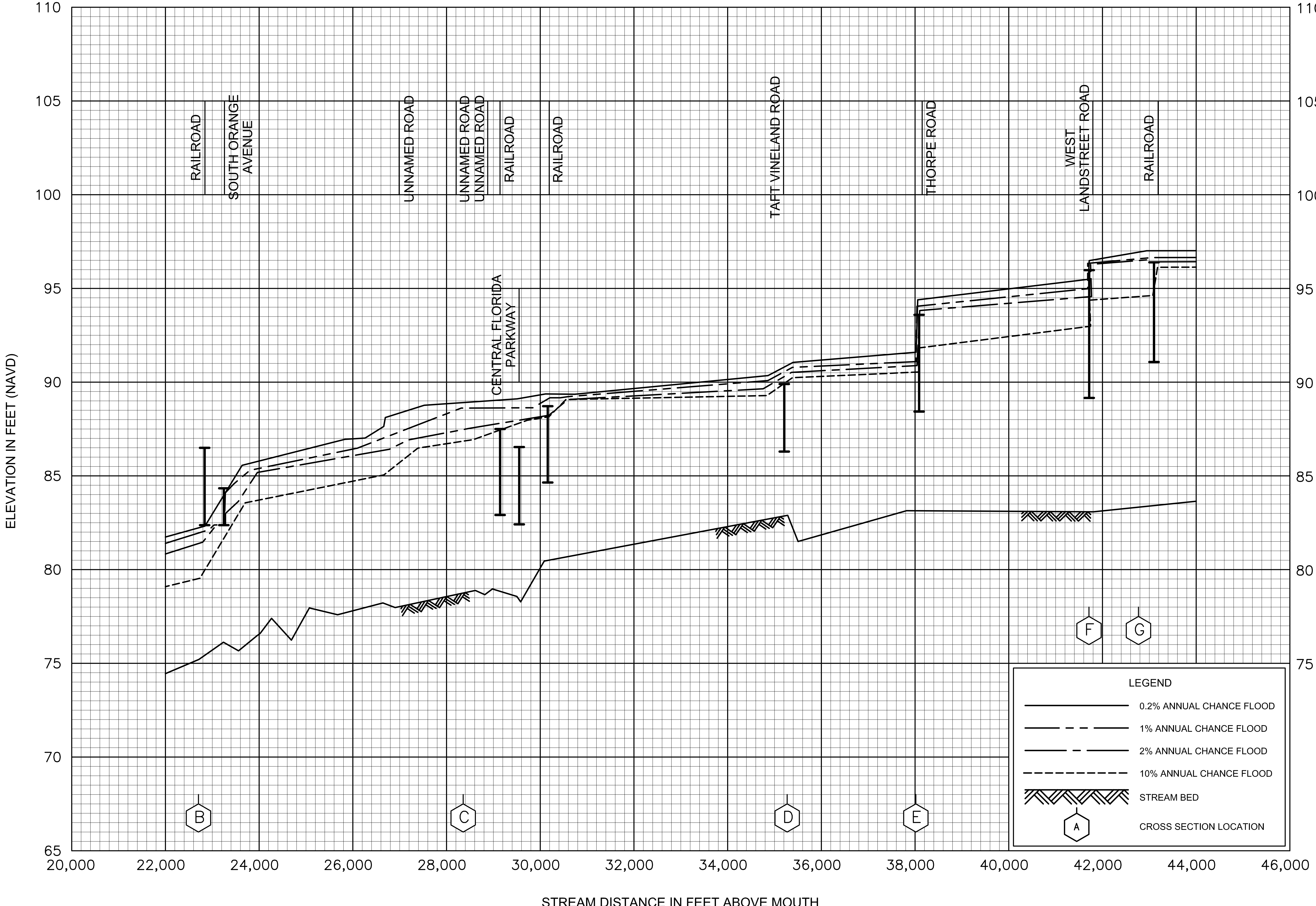
FLOOD PROFILES

WEST BRANCH BOGGY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS



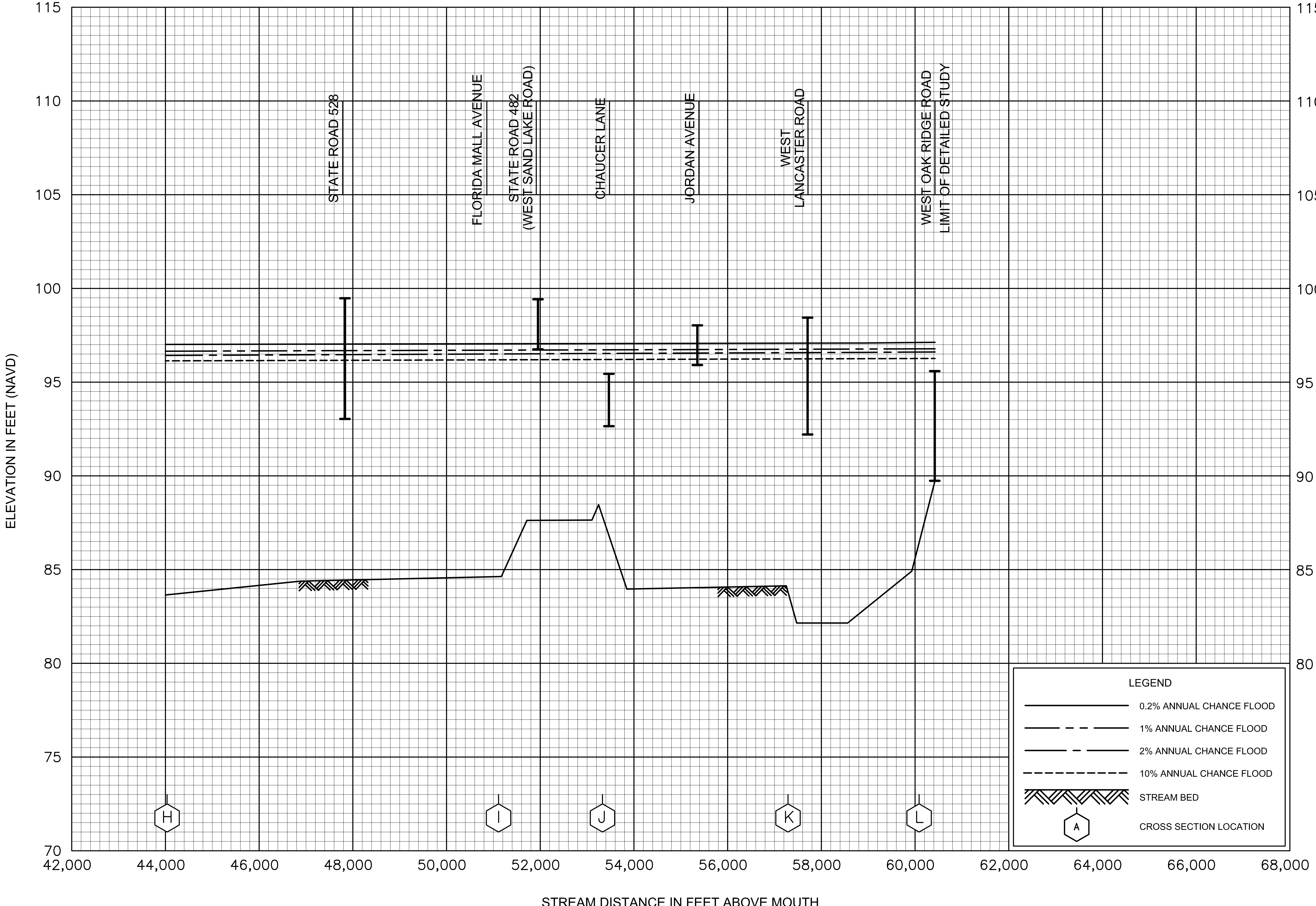
BASED ON ORANGE COUNTY FIS DATED 12/06/2000

FLOOD PROFILES

WEST BRANCH BOGGY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS



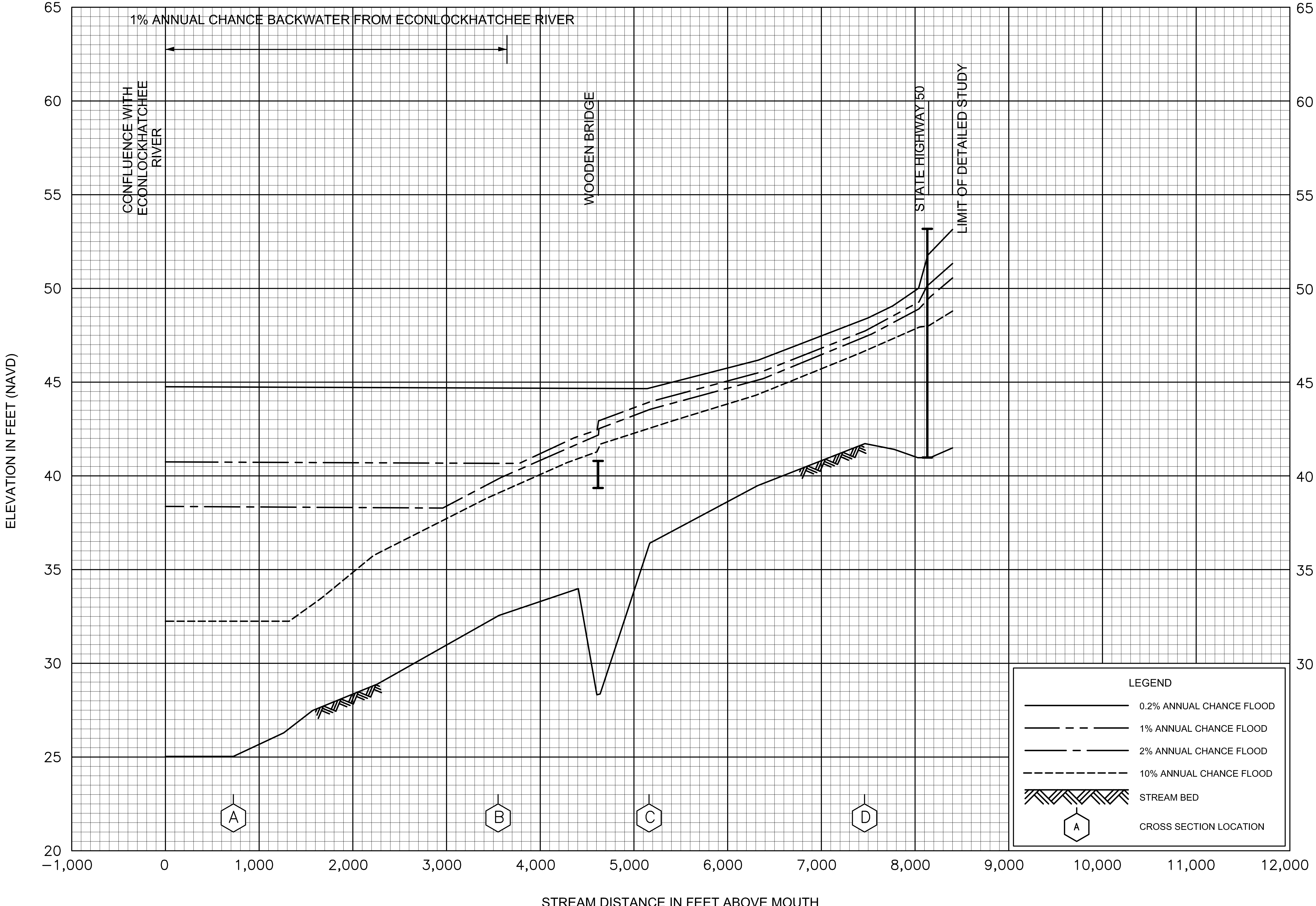
BASED ON ORANGE COUNTY FIS DATED 12/06/2000

FLOOD PROFILES

WEST BRANCH BOGGY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS



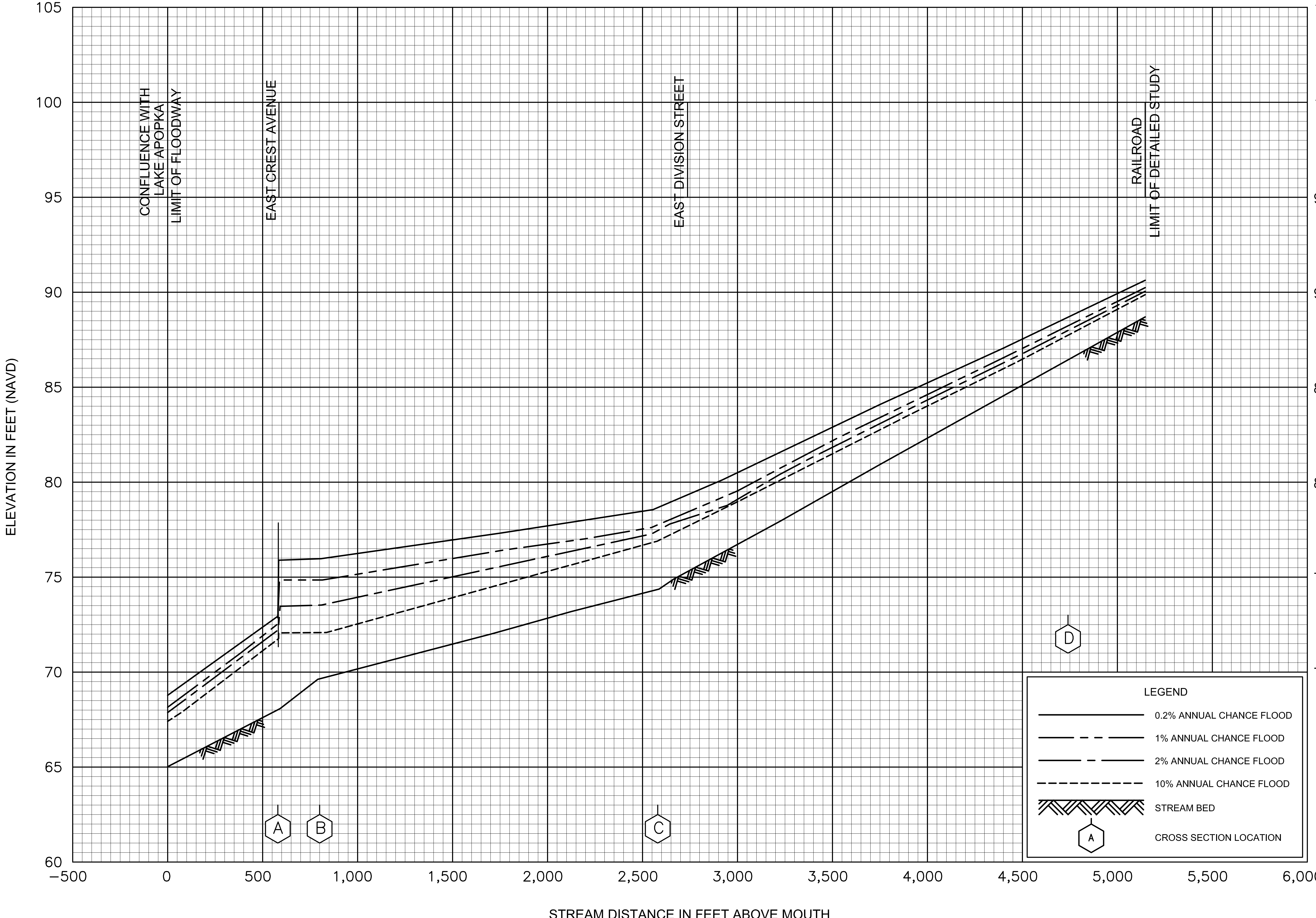
BASED ON ORANGE COUNTY FIS DATED 12/06/2000

FLOOD PROFILES

WEST TRIBUTARY TO ECONLOCKHATCHEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL
AND INCORPORATED AREAS



BASED ON ORANGE COUNTY FIS DATED 12/06/2000

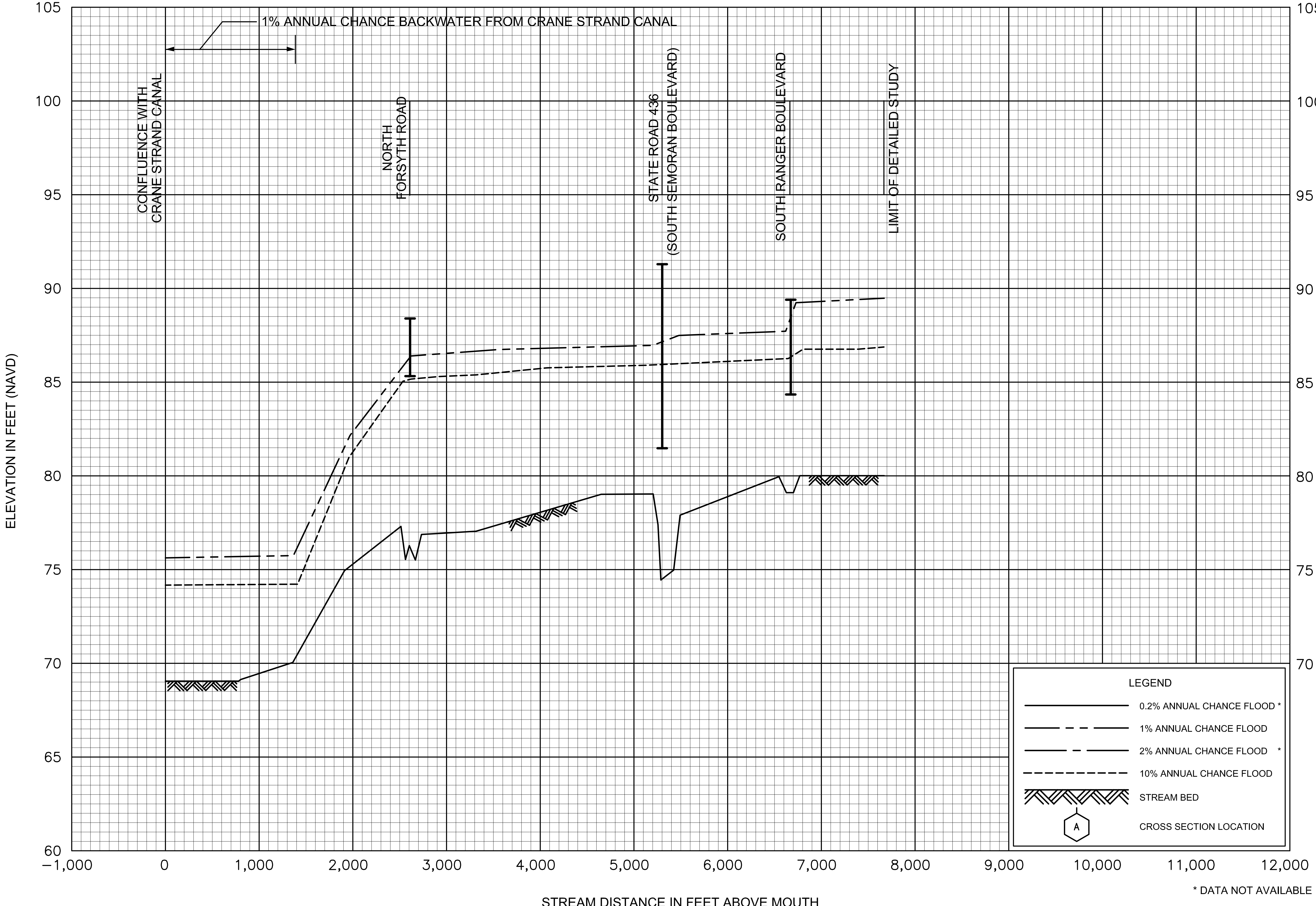
FLOOD PROFILES

WINTER GARDEN CO-OP DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS



* DATA NOT AVAILABLE

BASED ON ORANGE COUNTY FIS DATED 12/06/2000

FLOOD PROFILES

WINTER PARK PINES CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

ORANGE COUNTY, FL

AND INCORPORATED AREAS

Nodes Table

FLOODING SOURCE	ELEVATION (FEET NAVD) 10-percent	2-percent	1-percent	0.2-percent
0401N01L	146.36	147.91	148.37	150.20
0402N01L	136.74	138.31	139.16	141.46
0412N03W	117.25	118.04	118.45	119.67
0412N04D	114.56	116.24	116.99	119.00
0414N01D	117.21	117.49	117.62	117.91
0420N01D	114.97	115.67	116.00	116.83
0420N02D	114.53	115.28	115.62	116.48
0420N03D	113.87	114.63	114.98	115.86
0420N04D	112.98	113.78	114.15	115.06
0420N05D	112.63	113.45	113.83	114.75
0420N06D	112.04	112.94	113.35	114.32
0420N07D	111.74	112.65	113.05	114.03
0420N08D	108.84	109.76	110.21	111.37
0420N09D	107.91	109.07	109.60	110.89
0420N10D	112.89	113.50	113.75	114.30
0420N11D	110.85	111.54	111.84	112.46
0420N12D	108.90	109.75	110.11	111.02
0421N01D	107.02	108.42	109.02	110.37
0421N02D	105.53	107.06	107.77	109.19
0421N03D	105.19	106.75	107.49	108.88
0421N04D	104.74	106.28	107.03	108.41
0428N02D	100.76	102.70	103.46	105.24
0435N02D	95.36	95.69	95.80	96.04
0437N02D	104.47	105.63	106.03	106.84
0437N03D	104.24	105.40	105.80	106.64
0437N04D	103.75	104.76	105.14	106.03
0437N05D	101.19	101.95	102.22	102.89
0437N06D	99.95	100.51	100.71	101.25
0437N07D	99.71	100.18	100.32	100.68
0437N08D	97.94	98.34	98.52	98.96
0437N09D	95.41	95.68	95.82	96.25
0437N10D	93.23	93.79	94.04	94.71
0437N11D	91.80	92.61	92.96	93.81
0437N12D	91.20	92.17	92.55	93.40
0437N13D	91.08	92.05	92.42	93.23
0437N14D	88.45	89.23	89.55	90.32
0437N15D	98.63	99.29	99.54	100.16
0437N16D	95.14	95.91	96.22	96.92
0437N17D	93.80	94.56	94.85	95.48
0437N18D	92.51	93.42	93.72	94.41
0437N19D	91.27	92.24	92.54	93.24
0437N20D	88.44	89.41	89.81	90.81
0437N21D	86.80	87.89	88.38	89.62
0437N22D	86.51	87.74	88.26	89.53

Nodes Table

FLOODING SOURCE	ELEVATION (FEET NAVD)			
	10-percent	2-percent	1-percent	0.2-percent
0437N23D	86.30	87.51	88.02	89.28
0437N24D	86.21	87.38	87.88	89.09
0437N25D	86.16	87.32	87.81	89.03
APAP160N	84.27	85.83	86.46	88.23
FEMA_PondDa	97.35	97.57	97.75	98.02
FEMA_Ret4b	97.29	98.64	99.80	101.56
FEMA_Ret5b	98.08	98.45	98.61	98.96
FEMA_StrC1	72.50	73.17	73.50	74.28
FEMA_StrC2	75.36	76.36	76.82	77.87
FEMA_StrC3	77.20	78.30	78.77	79.82
FEMA_StrC3a	77.89	79.00	79.48	80.56
FEMA_StrC4	80.23	80.57	80.85	85.09
FEMA_StrC5	81.30	82.46	83.07	85.99
FEMA_StrC6	82.11	83.32	83.87	86.34
FEMA_StrC7	82.48	83.82	84.39	86.65
FEMA_StrC8	83.65	85.14	85.77	87.69
FEMA_StrC9	102.50	103.72	104.29	105.79
FEMA_StrC10	120.78	121.10	121.25	121.63
FEMAStrT11a	85.32	85.59	85.77	86.12
FEMAStrT11b	83.17	83.81	84.18	84.92