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FLOOD INSURANCE STUDY

HILLSBOROUGH COUNTY, UNINCORPORATED AREAS, FLORIDA

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Unincorporated Areas of Hillsborough County, Florida, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. Initial use of this information will be to convert Hillsborough County to the regular program of flood insurance by the Federal Insurance Administration. Further use of the information will be made by local and regional planners in their efforts to promote sound land use and floodplain development.

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.

The hydrologic and hydraulic analyses for this study, excluding the wave height analysis, were performed by Tetra Tech, Inc., for the Federal Insurance Administration (FIA), under Contract No. H-4510. This study was completed in July 1979. A wave height analysis was performed by the Federal Emergency Management Agency (FEMA), and added to the Flood Insurance Study in October 1983.

1.3 Coordination

Information describing hydrological conditions, drainage patterns, and other flood-related data, as well as information on the topography, roads, bench marks, and demography of Hillsborough County, was sought from the following:

County of Hillsborough
Dames & Moore
Deltona Corporation
Florida State Department of Community Affairs
Florida State Department of Transportation
Heidt and Associates, Tampa, Florida
National Oceanic and Atmospheric Administration
U.S. Soil Conservation Service
Southwest Florida Water Management District
Tampa Bay Regional Planning Council
Tampa Department of Public Works
U.S. Army Corps of Engineers, Jacksonville District
U.S. Geological Survey

On August 21, 1979, the results of the original Flood Insurance Study were reviewed and accepted at a final coordination meeting attended by representatives of the Study Contractor, FEMA, and the community.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the unincorporated areas of Hillsborough County, Florida. The area of study is shown on the Vicinity Map (Figure 1). The incorporated areas within the county were excluded from this study.

Flooding sources in Hillsborough County studied by detailed methods included the Alafia River, the North and South Prongs Alafia River, Blackwater Creek, Bullfrog Creek, Cypress Creek, Delaney Creek, the Hillsborough River, the Little Manatee River, Rice Creek, Rocky Creek, and Ruskin Inlet. In addition, a wave height analysis was performed for flooding from the Gulf of Mexico.

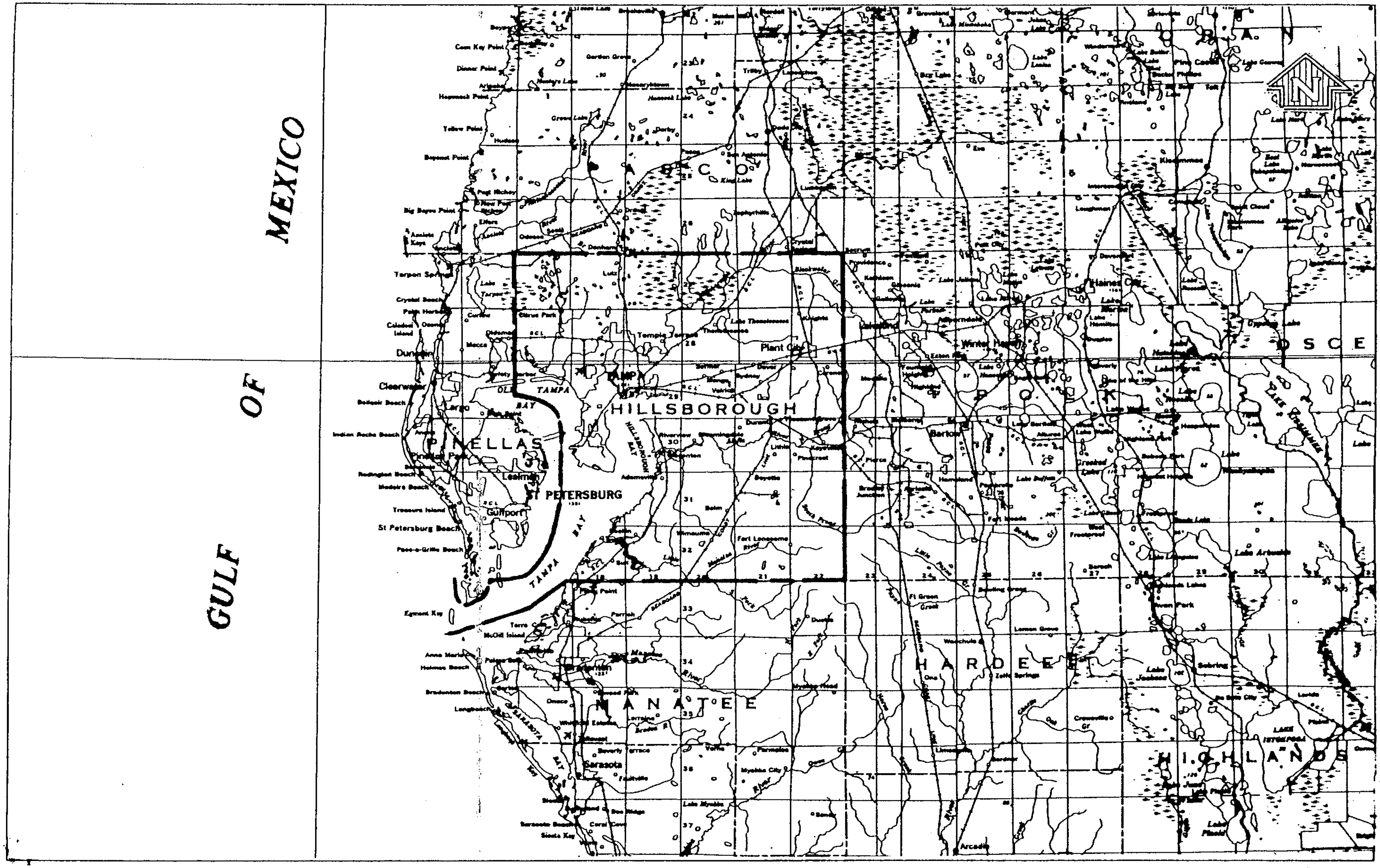
Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to and agreed upon by FIA and Hillsborough County.

Those areas studied by detailed methods were chosen with consideration given to all proposed construction and forecasted development through 1984.

2.2 Community Description

Hillsborough County occupies an area of approximately 1,062 square miles in west-central Florida. The study area is bounded on the north by Pasco County, on the east by Polk County, on the south by Manatee County, and on the west by Pinellas County and Tampa Bay. Tampa, the county seat and largest city, is located approximately 210 miles northwest of Miami, approximately 170 miles southwest of Jacksonville, and approximately 205 miles southeast of Tallahassee. The 1980 population of Hillsborough County was reported to be 646,960 (Reference 1), an increase over the 1970 population of 490,260.

The inland areas of the county are primarily agricultural, with citrus groves in the well-drained upland areas in the northwestern and west-central portions, and truck crops and pasture grasses in the lower flatlands. Phosphate mining in the central and southeastern areas also makes substantial contributions to the county economy. New inland developments, especially in the Sun City area in southern Hillsborough County, and in the Trout Creek area west of the Hillsborough River State Park in northern Hillsborough County, are becoming more extensive. The coastal areas are primarily urban and are well developed.



FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

APPROXIMATE SCALE

16 0 16 32 48 MILES

VICINITY MAP

FIGURE 1

The study area is located in the subtropical climatic zone, which is characterized by mild, dry winters and warm, wet summers. The wet season extends from June through September and coincides with the hurricane season. During this period, the study area receives nearly two-thirds of its annual precipitation. The average annual precipitation in the western part of the county is approximately 50 inches, and in the eastern part approximately 56 inches. The average annual temperature is approximately 72 degrees Fahrenheit (Reference 2).

The subtropical climate allows for the growth of many varieties of vegetation. The higher regions of the county provide suitable habitat for pine, saw palmetto, huckleberry bushes, and grasses, with occasional hummocks of cabbage palmetto. In the wetter regions, the principal growth consists of mixed hardwood forests, vines, shrubs, and grasses. Along the coastal areas that are sometimes covered by high tides, mangrove trees and salt-tolerant plants form the vegetative cover.

The terrain of Hillsborough County ranges from nearly level areas with numerous intermittent marshes, swamps, sinks, lakes, and springs, to gently undulating areas that extend from the northwestern corner southeastward across the county. The county gradually slopes southwestward toward Tampa Bay. The elevations in the study area range from sea level at Tampa Bay to approximately 160 feet in the eastern part of the county.

The major streams within the county are the Hillsborough, Alafia, and Little Manatee Rivers. The Hillsborough River, which originates at the edge of Green Swamp north of Lakeland, Florida, flows southwesterly for approximately 54 miles through the north-central portion of Hillsborough County into Hillsborough Bay at Tampa. The total drainage area of the Hillsborough River is approximately 690 square miles. Cypress Creek, the main tributary of the Hillsborough River, has a drainage area of 164 square miles. It originates in south-central Pasco County and flows southerly through numerous swamps to join the Hillsborough River approximately 1 mile below the Lower Hillsborough Flood Detention Area.

The Alafia River headwaters are located in Polk County, from where the river flows in a generally westerly direction into Tampa Bay at East Tampa. The South Prong and North Prong Alafia Rivers are the two main tributaries of the Alafia River; Rice and Bell Creeks are its minor tributaries. The total drainage area of the Alafia River at Tampa Bay is approximately 420 square miles.

The Little Manatee River headwaters are located in southeastern Hillsborough County, from where the river flows in a westerly direction into Tampa Bay near Ruskin. The Hillsborough, Alafia, and Little Manatee Rivers drain approximately 84 percent of Hillsborough County.

The small coastal basins of Rocky, Sweetwater, Double Branch, Bullfrog, and Delaney Creeks, and Ruskin Inlet drain several miles inland. Both Rocky and Sweetwater Creeks have many shallow lakes in their upper reaches, ranging in size from 1 to 2 acres up to approximately 250 acres. Double Branch is well defined near Old Tampa Bay, but branches out in at least three directions with poorly defined subwatershed boundaries. Bullfrog Creek originates slightly northeast of Wimauma in a marshy area. It flows westerly, then northerly and westerly, finally emptying into Hillsborough Bay approximately 2 miles south of the Alafia River mouth. Its drainage area is approximately 40 square miles.

2.3 Principal Flood Problems

Flooding in Hillsborough County results primarily from overflow of streams caused by rainfall and runoff, and from tidal surge in the costal areas of the county caused by hurricanes and tropical storms. Not all storms that pass close to the study area produce extremely high tides. Similarly, storms that produce flooding conditions in one area may not necessarily produce flooding conditions in other parts of the study area.

The Alafia, Little Manatee, and Hillsborough Rivers are broad estuaries, and, under certain conditions, tides generated at their mouths in Tampa Bay can intrude far upstream. Rainfall that accompanies hurricanes can aggravate the tidal flood situation, particularly in areas where the secondary drainage system is poorly developed.

Storms passing Florida in the vicinity of Hillsborough County have produced severe floods as well as structural damage. A brief description of several significant tropical storms provides historic information to which coastal and riverine flood hazards and the projected flood depths can be compared (References 3-8).

The September 25, 1848, hurricane entered the western coast of Florida in the vicinity of Tampa Bay. The tide at Fort Brooke, the military post at the present site of Tampa, was estimated at approximately 14 feet. High winds and tides destroyed all the wharves and most public buildings at the post. A second hurricane on October 12 affected the same area, causing tides estimated at 9 feet.

The tropical storm of October 21 to 31, 1921, originated in the western Caribbean Sea and entered Florida north of Tarpon Springs. Flooding conditions were prolonged because of the slow forward movement of the storm. At Tampa, peak winds of 75 miles per hour were recorded, and a tide height of 9.6 feet was observed. A combination of high tides with wave action resulted in heavy damage in Hillsborough County.

Intense rainfall associated with the tropical hurricane of September 4, 1933, which passed across central Florida northwesterly from the Atlantic Ocean, caused extensive damage in Hillsborough County, particularly to citrus trees and transportation facilities. Urban damage was severe in the Tampa suburb of Sulphur Springs following failure of the Tampa Electric Company dam on the Hillsborough River. Sudden release of the stored waters washed out bridges and overflowed banks in the lower river reaches. The river flowed out of its banks for approximately 5 weeks. Much of the area experienced maximum stages and discharges of record, with estimated frequencies of occurrence greater than once in 50 years. At the 40th Street bridge in Tampa, a discharge of 16,500 cubic feet per second (cfs) was measured near the flood crest (26.3 feet) in the Hillsborough River.

The small but severe hurricane of September 1 to 7, 1950, struck the west coast of Florida. It was accompanied by intense rainfall which caused streams and lakes in the vicinity of Tampa to overflow their banks, inundating and causing washouts on highways and damage to buildings and pastureland. Tampa also experienced the highest tides reported in the area since the 1921 hurricane. The Courtney Campbell Causeway across the northern end of Old Tampa Bay was damaged by wave action.

From March 15 through March 18, 1960, thunderstorms and heavy rainfall averaging more than 10 inches over a 10,000-square mile area occurred in central Florida. The most intense rains occurred in the area between Tampa and Brooksville, where unofficial reports indicate over 27 inches of rain fell during the 4 days. Damage to agricultural and urban land in the Hillsborough River basin was estimated at that time at more than $6 million.

Hurricane Donna occurred on September 10 and 11, 1960. Tampa received 13.96 inches of rainfall in 2 days. Also, a pre-storm rainfall of approximately 10 inches in the previous 3 weeks had saturated the ground, and, consequently, considerable flooding resulted. Damage to the Hillsborough River basin was estimated at that time at more than $1 million.

Hurricane Agnes originated on the northeastern tip of the Yucatan Peninsula on June 19, 1972, and traveled westward. The storm was of large diameter, and, although the center of this storm passed approximately 150 miles west of the Florida peninsula, it produced a high, damaging tidal surge. In Hillsborough County, tides were approximately 5.6 feet at Tampa. An accompanying tornado caused minor damage to trees and buildings on the eastern side of Tampa Bay.

2.4 Flood Protection Measures

The U.S. Army Corps of Engineers (COE) has initiated construction of the Four River Basin Project (Reference 4), which includes stream improvement, systems of canals, flood detention area, and auxiliary water control structures. The construction of the Tampa Bay By-Pass Canal and the Lower Hillsborough Flood Detention Area was in progress at the time of this study. The estimated completion date for the project was Fiscal Year 1979. This study reflects the flood situation after completion of this project.

The Hillsborough Soil Conservation District, Hillsborough County Board of Commissioners, with assistance from the U.S. Department of Agriculture, Soil Conservation Service (SCS), developed a watershed work plan for improving the Upper Tampa Bay watershed in western Hillsborough County (Reference 9). The improvement includes land treatment measures for watershed protection and structural measures for flood prevention, diversion channels, and agricultural water management. These measures have a minimal effect on the larger floods considered in this report.

In areas where mangrove stands front the bay, waves with heights of 3 feet or greater are dissipated within approximately 200 feet of the shoreline. Along portions of Apollo Beach and the Tampa Electric Company plant, waves greater than 3 feet are dissipated at the shoreline by rapidly rising ground elevations.

Seawalls and bulkheads have been constructed along portions of the shoreline on Tampa Bay in Hillsborough County. These structures are expected to remain intact during a 100-year storm tide and are considered to be effective wave energy dissipators when of sufficient elevation.

This study has taken all existing improvements into consideration.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that 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 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each riverine flooding source studied in detail affecting the community.

For the stream flooding in the Hillsborough River downstream of the Lower Hillsborough Flood Detention Area, the study was conducted on the premise that the detention area and the Tampa By-Pass Canal would be able to detain and divert floods up to and including the 500-year flood. Consequently, the magnitude and frequency of floods up to the 500-year return period downstream from the detention area may be determined based on the local runoffs only. The study began with the consideration of natural conditions with the flood control gates on the Hillsborough River closed at the detention area (S-155) and at Harney (S-161). The effects of the gate operations during the floods were then incorporated (Reference 4). To investigate the natural flood discharges, an incremental procedure based on the regression estimates developed by the U.S. Geological Survey (USGS) was used (Reference 10). Adjustment due to the effects of urbanization near the Tampa area was performed using the procedure outlined by Leopold (Reference 11) in conjunction with the rainfall data from the National Weather Service (Reference 12). The flood diversion gate along the Hillsborough River at Harney (S-161) was assumed to be open whenever flow through the Tampa Waterworks Dam exceeded 6,200 cfs, the estimated nondamaging bankfull capacity downstream of the dam.

Floodflow frequencies for the Alafia River, the North Prong and South Prong Alafia River, Blackwater Creek, the Hillsborough River, and Ruskin Inlet were based on standard log-Pearson Type III analyses as outlined by the U.S. Water Resources Council (Reference 13). Data used in the analyses were obtained from gage records on the Alafia River at Lithia (45 years of record), the North Prong Alafia River at Keysville (27 years of record), the South Prong Alafia River near Lithia (15 years of record), Blackwater Creek near Knights (26 years of record), and the Hillsborough River at Zephyrhills (38 years of record). On reaches of the streams for which no gage records were available, streamflow data were synthesized from nearby gages within the same basin.

Discharges for Bullfrog Creek, Delaney Creek, and Rocky Creek were derived by using the Clarke unit hydrograph method (Reference 14). Rainfall data used in this analysis were obtained from the National Oceanic and Atmospheric Administration (References 12 and 15).

Floodflow frequencies for Rice Creek were obtained by using the SCS small watershed method (Reference 16).

Discharge values for Cypress Creek and the Little Manatee River were taken from previous reports prepared by the USGS (Reference 10) and Dames & Moore (Reference 17), respectively.

Peak discharges for the 10-, 50-, 100-, and 500-year floods of each flooding source studied in detail in the community are shown in Table 1.

Inundation from the Gulf of Mexico caused by passage of storms (storm surge) was determined by the joint probability method (Reference 18). The storm populations were described by probability distributions of 5 parameters that influence surge heights. These were central pressure depression (which measures the intensity of the storm), radius to maximum winds, forward speed of the storm, shoreline crossing point, and crossing angle. These characteristics were described statistically based on an analysis of observed storms in the vicinity of Hillsborough County. Primary sources of data for this were the National Climatic Center (Reference 19), Cry (Reference 20), Ho, Schwerdt, and Goodyear (Reference 21), the National Hurricane Research Project (Reference 22), and the Monthly Weather Review (Reference 23). Digitized storm information for all storms from 1886 through 1977 was used to correlate statistics (Reference 24). A summary of the parameters used for the area is presented in Table 2, Parameter Values for Surge Elevations.

This procedure utilizes a grid pattern approximating the geographical features of the study area and the adjoining areas. Surges were computed utilizing grids of 5 nautical miles, or 1 nautical mile, depending on the resolution required.

Surge levels in the Hillsborough River, the Alafia River, Bullfrog Creek, and the Little Manatee River were computed with the aid of a one-dimensional unsteady-flow model. The values for the mouth were taken from the results of the coastal model.

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
ALAFIA RIVER at Lithia Gaging Station	335	8,740	16,600	20,900	33,800
NORTH PRONG ALAFIA RIVER at Keysville Gaging Station	135	4,140	7,320	8,980	13,500
SOUTH PRONG ALAFIA RIVER near Lithia Gaging Station	107	4,180	7,852	9,800	15,200
BLACKWATER CREEK near Knights	110	2,410	3,730	4,350	6,030
BULLFROG CREEK at mouth	40	3,570	6,110	7,420	11,100
CYPRESS CREEK at mouth	164	2,270	4,230	5,200	7,800
DELANEY CREEK at mouth	10.69	1,390	2,350	2,850	4,210
HILLSBOROUGH RIVER					
at Tampa Dam	183.5	3,500	4,480	6,110	6,200
at Sephyrhills	220	5,250	8,980	11,100	16,300
LITTLE MANATEE RIVER near Wimauma	149	7,930	14,800	18,500	32,000
RICE CREEK at confluence with the Alafia River	5	686	1,200	1,430	2,140

TABLE 1 - SUMMARY OF DISCHARGES (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS)			
		10-YEAR	50-YEAR	100-YEAR	500-YEAR
ROCKY CREEK at Gaging Station near Sulpher Springs	35	2,330	3,890	4,640	7,080
RUSKIN INLET at mouth	5.3	1,450	2,688	3,360	5,360

Central Pressure Depression (mb)		85	75	65	55	45	35	25	15	5
Probabilities	Entering Exiting Parallel	0.02 0.04 0.06	0.02 0.04 0.06	0.03 0.05 0.08	0.04 0.07 0.11	0.15 0.09 0.13	0.09 0.11 0.13	0.25 0.2 0.14	0.25 0.2 0.15	0.25 0.2 0.14
Storm Radius (nm)				15			30			
Probability				0.55			0.45			
Forward Speed (knots)				8	14	20				
Probabilities	Entering Exiting Parallel			0.26 0.55 0.62	0.46 0.41 0.34	0.28 0.04 0.04				
		Exiting							Entering	
Angles (degrees)		-90		045		0	45		90	
Probability (Angular Rates		0.05 0.000204		0.17 0.00098		0.22 0.000898	0.26 0.015		0.30 0.00122)	
Frequency	4.08×10^{-3} storms/nm – year									

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HILLSBOROUGH COUNTY, FL
(UNINCORPORATED AREAS)

PARAMETER VALUES FOR SURGE ELEVATIONS

TABLE 2

Surge elevations for floods of the selected recurrence intervals along the coast are shown in Table 3.

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.

Water-surface profiles for the Alafia River and Cypress Creek were developed using the COE step-backwater computer program (Reference 25). The COE program was used to develop water-surface profiles for the remaining streams studied in detail in the county (Reference 26).

Cross-section data for the Alafia River, North Prong Alafia River, and the South Prong Alafia River were obtained by field surveys and supplemented with data from the USGS report of the area (Reference 27). All cross sections used in the hydraulic analyses for Cypress Creek were taken from the USGS study (Reference 10). The Little Manatee River cross sections were taken from the Dames & Moore report (Reference 17). Cross-section data for Delaney Creek were obtained from Hillsborough County. All other streams studied in detail were field surveyed.

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

Roughness coefficients (Manning's "n") used in this study were determined from aerial photographs (References 28-30) and calibrated using high-water marks. Roughness values ranged from 0.030 to 0.080 in the channels and from 0.050 to 0.200 in the overbank areas.

Starting elevations for the Alafia River, Bullfrog Creek, Delaney Creek, the lower reach of the Hillsborough River, the Little Manatee River, Rocky Creek, and Ruskin Inlet were taken as mean high tide on Tampa Bay. Normal depth calculations were used to determine starting elevations for Rice Creek. Starting elevations for Blackwater Creek, Cypress Creek, the North Prong Alafia River, and the South Prong Alafia River were taken to be the main stream elevations at their respective confluence. For the upper reach of the Hillsborough River, starting elevations were taken from the USGS rating curve for the Tampa Water Works Dam (Reference 31).

Computations for flood levels along the streams studied in detail that are subject to flooding caused by both coastal surges and runoff were performed independently. The independent results were combined statistically to obtain flood levels for each selected return period.

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals (Exhibit 1).

During the dry winter months, water is stored upstream of the Tampa Water Works Dam at a level in excess of the expected stage during a 500-year

TABLE 3 - SUMMARY OF SURGE ELEVATIONS

FLOODING SOURCE AND LOCATION	PEAK ELEVATIONS (FEET NGVD)			
	10-YEAR	50-YEAR	100-YEAR	500-YEAR
GULF OF MEXICO				
OLD TAMPA BAY				
near mouth of Boat Bayou	5.5	8.7	10.1	13.2
near mouth of Rocky Creek	5.3	8.6	10.2	13.4
HILLSBOROUGH BAY				
near mouth of Delaney Creek	5.7	9.3	11.0	14.2
near mouth of the Alafia River	6.0	9.3	11.1	14.3
TAMPA BAY				
near Apollo Beach Road	5.3	8.8	10.3	13.5
near mouth of the Little Manatee River	5.0	9.2	9.5	12.6
near Mill Bayou on the Little Manatee River	5.0	8.1	9.4	12.4
near intersection of Cockroach Bay Road and Gulf City Road	5.0	8.0	9.4	12.3
near mouth of Piney Point Creek	4.8	7.7	9.0	11.6

event with the flood diversion gate at Harney open. The dry season stage, approximately 22.5 feet, therefore represents all frequency events up to and in excess of the 500-year event upstream of the dam for approximately 25,000 feet.

Hydraulic analyses, considering storm characteristics and the shoreline and bathymetric characteristics of the flooding sources studied, were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each of the shorelines.

The methodology for analyzing the effects of wave heights associated with coastal storm surge flooding is described in a report prepared by the National Academy of Sciences (Reference 32). This method is based on the following major concepts. First, depth-limited waves in shallow water reach a maximum breaking height that is equal to 0.78 times the stillwater depth. The wave crest is 70 percent of the total wave height above the stillwater level. The second major concept is that wave height may be diminished by dissipation of energy due to the presence of obstructions, such as sand dunes, dikes and seawalls, buildings, and vegetation. The amount of energy dissipation is a function of the physical characteristics of the obstruction and is determined by procedures prescribed in Reference 32. The third major concept is that wave height can be regenerated in open fetch areas due to the transfer of wind energy to the water. This added energy is related to fetch length and depth.

Wave heights were computed along transects (cross-section lines) that were located along the coastal areas, as illustrated in Figure 2, Transect Location Map, in accordance with the "Users Manual for Wave Height Analysis" (Reference 33). The transects were located with consideration given to the physical and cultural characteristics of the land so that they would closely represent conditions in their locality. Transects were spaced close together in areas of complex topography and dense development. In areas having more uniform characteristics, they were spaced at large intervals. It was also necessary to locate transects in areas where unique flooding existed and in areas where computed wave heights varied significantly between adjacent transects.

Each transect was taken perpendicular to the shoreline and extended inland to a point where wave action ceased. Along each transect, wave heights and elevations were computed considering the combined effects of changes in ground elevation, vegetation, and physical features. The stillwater elevations for the 100-year flood were used as the starting elevations for these computations. Wave heights were calculated to the nearest 0.1 foot, and wave elevations were determined at whole-foot increments along the transects. The location of the 3-foot breaking wave for determining the terminus of the V zone (area with velocity wave action) was also computed at each transect.

Figure 3 represents a sample transect that illustrates the relationship between the stillwater elevation, the wave crest elevation, the ground elevation profile, and the location of the V/A zone boundary.

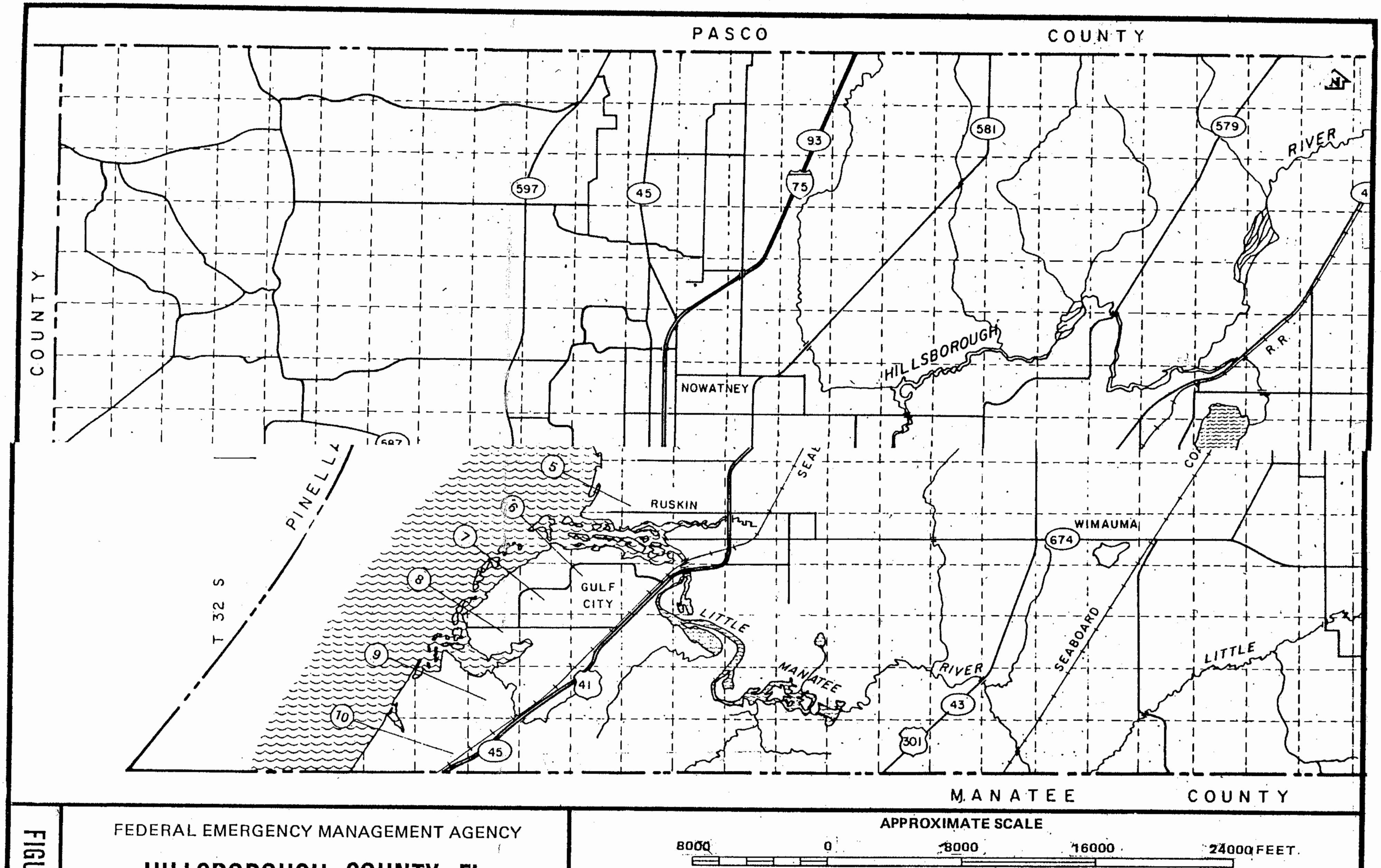

FIGURE 2

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HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

TRANSECT LOCATION MAP

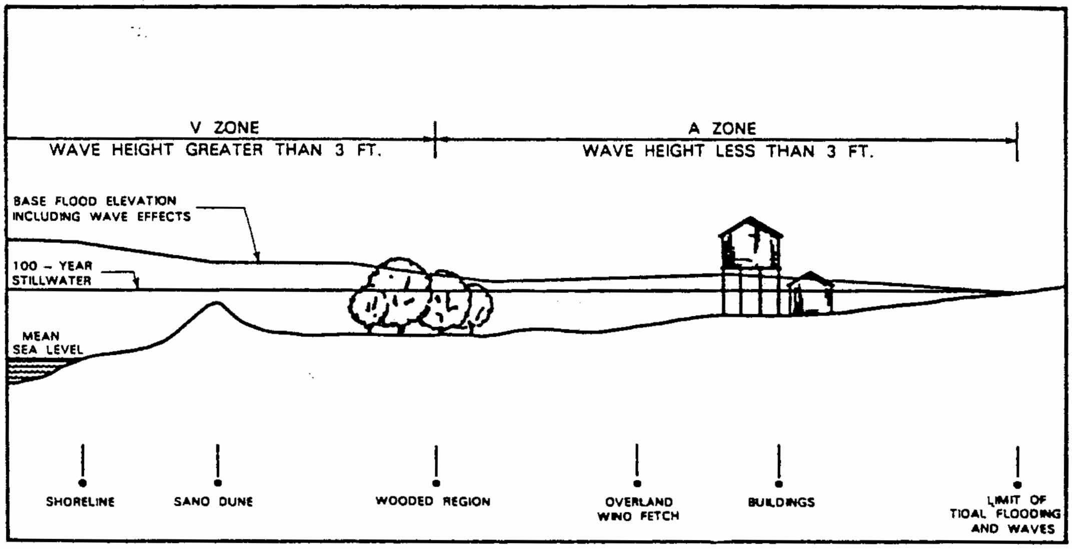

FIGURE 3 - Transect Schematic

After analyzing wave heights along each transect, wave elevations were interpolated between transects. Various source data were used in the interpolation, including topographic maps (References 34-36), aerial photographs (References 28-30), and engineering judgment. Controlling features affecting the elevations were identified and considered in relation to their positions at a particular transect and their variation between transects.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at scales of 1:2400, 1:12000, and 1:24000 with contour intervals of 1 foot, 2 feet, and 5 feet, respectively (References 28-30 and 34-36). For each coastal flooding source studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each transect. Between transects, the boundaries were interpolated using topographic maps (References 34-36), aerial photographs (References 28-30) and engineering judgment.

Approximate flood boundaries were taken from studies prepared by FIA (Reference 37), USGS (Reference 38), and Southwest Florida Water Management District (Reference 39).

The 100- and 500-year floodplain boundaries are shown on the Flood Boundary and Floodway Map. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year 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.

Floodplain boundaries are indicated on the Flood Insurance Rate Map. On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zone A and numbered A zones) and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards (Zone B). In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year 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.

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces the flood-carrying capacity, increases the 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 National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year 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 100-year 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 presented in this study were computed on the basis of equal conveyance reduction from each side of the floodplain. The results of these computations were tabulated at selected cross sections for each stream segment for which a floodway was computed and are presented in Table 4, Floodway Data.

As shown on the Flood Boundary and Floodway Map, the floodway boundaries were computed at cross sections. Between cross sections, the boundaries were interpolated. In cases where the floodway and the 100-year floodplain boundaries are either close together or collinear, only the floodway boundary has been shown.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Alafia River								
A	1,800	1,274	10,908	2.4	11.1[2]	3.4	4.3	0.9
B	4,200	1,020	8,933	2.9	11.1[2]	4.0	4.7	0.7
C	8,160	678	6,634	3.9	11.1[2]	4.8	5.5	0.7
D	11,440	968	9,974	2.6	11.1[2]	5.8	6.4	0.6
E	14,940	515	6,104	4.2	11.2[3]	6.8	7.3	0.5
F	20,080	370	6,362	4.1	11.8[3]	9.1	9.7	0.6
G	23,500	259	4,609	5.7	12.3[3]	10.1	10.7	0.6
H	25,640	376	5,730	4.6	12.8[3]	11.1	11.9	0.8
I	31,080	548	7,113	3.7	14.6[3]	14.0	14.9	0.9
J	33,900	306	5,258	5.0	15.7[3]	15.1	15.9	0.8
K	36,220	836	11,289	2.3	16.6[3]	16.7	17.6	0.9
L	39,000	273	4,007	5.9	17.6[3]	16.9	17.9	1.0
M	43,410	477	6,376	3.7	18.5	18.5	19.5	1.0
N	44,840	278	4,297	5.5	19.0	19.0	20.0	1.0
O	45,940	763	9,680	2.4	20.2	20.2	21.0	0.8
P	47,680	880	11,924	2.0	20.6	20.6	21.5	0.9
Q	52,140	341	3,628	6.5	21.7	21.7	22.5	0.8
R	55,210	528	6,056	3.9	24.2	24.2	24.9	0.7
S	57,720	391	5,910	4.0	26.3	26.3	27.1	0.8
T	60,560	339	6,093	3.9	27.9	27.9	28.7	0.8
U	62,840	1,043	17,450	1.4	28.7	28.7	29.6	0.9
V	65,400	967	16,040	1.5	29.2	29.2	30.1	0.9
W	70,400	1,449	21,383	1.0	29.9	29.9	30.9	1.0
X	72,980	1,186	15,931	1.3	30.1	30.1	31.1	1.0
Y	74,480	552	8,381	2.5	30.2	30.2	31.2	1.0
Z	77,860	1,360	17,885	1.2	30.4	30.4	31.4	1.0

[1] Feet Above U.S. Highway 41 [2] Gulf of Mexico Tidal Surge Elevation
[3] Elevation Influenced by Tidal Surge From Gulf of Mexico

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL
(UNINCORPORATED AREAS)

FLOODWAY DATA

ALAFIA RIVER

TABLE 4

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Alafia River (Continued)								
AA	81,400	969	12,408	1.7	31.3	31.3	32.2	0.9
AB	87,100	1,819	18,613	1.1	32.0	32.0	33.0	1.0
AC	90,020	1,780	17,238	1.2	32.9	32.9	33.9	1.0
AD	98,980	1,085	9,615	1.9	37.9	37.9	38.6	0.7
AE	105,700	1,462	16,620	1.1	41.3	41.3	42.2	0.9
AF	114,160	2,081	22,464	0.8	43.0	43.0	44.0	1.0
AG	120,990	949	11,155	1.6	45.9	45.9	46.8	0.9

[1]Feet Above U.S. Highway 41

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL
(UNINCORPORATED AREAS)

FLOODWAY DATA

ALAFIA RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
North Prong Alafia River								
A	4,400	1,054	11,797	0.9	47.2	47.2	48.2	1.0
B	8,540	1,249	13,302	0.8	47.8	47.8	48.8	1.0
C	10,940	1,191	12,393	0.8	48.1	48.1	49.1	1.0
D	12,520	722	5,134	2.0	49.4	49.4	50.2	0.8
E	13,090	1,255	8,922	1.1	50.6	50.6	51.4	0.8
F	16,790	1,180	12,129	0.7	51.7	51.7	52.6	0.9
G	20,190	1,291	10,700	0.8	52.4	52.4	53.2	0.8
H	22,690	1,278	10,496	0.9	53.3	53.3	54.1	0.8
I	25,700	1,317	10,724	0.8	54.4	54.4	55.3	0.9
J	27,920	1,056	6,934	1.3	55.3	55.3	56.2	0.9
K	29,600	742	6,935	1.3	56.6	56.6	57.5	0.9
L	32,040	1,110	10,089	0.9	57.5	57.5	58.4	0.9
M	35,940	854	6,553	1.2	59.1	59.1	60.0	0.9
N	42,100	901	7,895	1.0	61.9	61.9	62.9	1.0
O	46,680	579	5,379	1.5	64.3	64.3	65.2	0.9
P	48,840	972	8,288	1.0	65.5	65.5	66.4	0.9

[1]Feet Above Confluence With Alafia River

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL
(UNINCORPORATED AREAS)

FLOODWAY DATA

NORTH PRONG ALAFIA RIVER

TABLE 4

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY	INCREASE
South Prong Alafia River								
A	4,080	1,219	13,555	0.7	47.0	47.0	48.0	1.0
B	8,880	1,075	10,920	0.9	47.3	47.3	48.3	1.0
C	10,620	1,119	11,637	0.8	47.5	47.5	48.5	1.0
D	12,700	1,005	10,576	0.9	47.7	47.7	48.7	1.0
E	14,560	999	8,056	1.2	48.0	48.0	49.0	1.0
F	16,680	1,213	10,380	0.9	49.2	49.2	50.2	1.0
G	18,480	947	7,714	1.3	49.7	49.7	50.7	1.0
H	22,360	1,006	7,047	1.4	50.5	50.5	51.5	1.0
I	26,160	1,028	8,252	1.1	53.5	53.5	54.5	1.0
J	28,800	833	5,587	1.6	54.0	54.0	55.0	1.0
K	31,260	853	6,128	1.5	55.2	55.2	56.2	1.0
L	33,260	817	5,722	1.6	55.9	55.9	56.8	0.9
M	35,360	858	5,807	1.5	57.0	57.0	57.9	0.9
N	37,240	950	6,496	1.4	57.8	57.8	58.7	0.9
O	40,220	1,237	7,158	1.3	58.9	58.9	59.8	0.9
P	41,520	1,080	7,077	1.1	59.4	59.4	60.3	0.9
Q	45,000	824	5,268	1.5	61.4	61.4	62.2	0.8
R	46,720	705	4,858	1.6	62.2	62.2	63.1	0.9
S	48,220	804	5,319	1.5	63.2	63.2	64.1	0.9
T	49,680	1,139	7,441	1.1	64.0	64.0	64.9	0.9
U	51,080	647	4,113	1.9	65.4	65.4	66.3	0.9
V	52,960	941	6,082	1.3	67.9	67.9	68.8	0.9

[1]Feet Above Confluence With Alafia River

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL
(UNINCORPORATED AREAS)

FLOODWAY DATA

SOUTH PRONG ALAFIA RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Blackwater Creek								
A	2,100	1,445	10,180	0.4	50.8	50.8	51.5	0.7
B	3,800	473	4,366	1.0	51.0	51.0	52.0	1.0
C	4,600	82	1,095	4.0	51.2	51.2	52.1	0.9
D	6,800	506	3,657	1.2	52.8	52.8	53.8	1.0
E	8,200	524	3,685	1.2	53.9	53.9	54.8	0.9
F	9,600	407	2,518	1.7	55.8	55.8	56.7	0.9
G	12,700	530	3,007	1.4	63.0	63.0	63.9	0.9
H	14,700	646	3,264	1.3	65.5	65.5	66.3	0.8
I	16,700	898	5,010	0.9	66.9	66.9	67.8	0.9
J	18,700	645	3,000	1.4	69.0	69.0	69.8	0.8
K	20,700	706	2,838	1.5	73.4	73.4	74.3	0.9
L	22,700	376	2,441	1.8	75.6	75.6	76.5	0.9
M	24,700	393	2,413	1.8	77.2	77.2	78.2	1.0
N	25,700	671	2,932	1.5	78.7	78.7	79.6	0.9

[1]Feet Above Confluence With Hillsborough River

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL
(UNINCORPORATED AREAS)

FLOODWAY DATA

BLACKWATER CREEK

TABLE 4

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Bullfrog Creek								
A	3,937	214	1,944	3.8	11.2[2]	5.1	6.1	1.0
B	7,169	159	1,447	5.1	11.2[2]	7.0	7.6	0.6
C	9,564	320	2,295	3.2	11.2[2]	8.2	9.1	0.9
D	11,769	338	2,826	2.6	11.4[3]	9.1	10.0	0.9
E	14,769	113	1,347	5.5	11.8[3]	10.4	11.3	0.9
F	17,769	98	1,250	5.9	13.3[3]	12.8	13.5	0.7
G	20,949	168	1,925	3.9	15.1	15.1	16.1	1.0
H	23,149	335	2,881	2.6	16.3	16.3	17.3	1.0
I	25,349	174	1,629	4.6	17.8	17.8	18.8	1.0
J	28,710	378	3,666	2.0	21.3	21.3	22.3	1.0
K	30,510	472	3,064	2.2	22.0	22.0	23.0	1.0
L	36,010	368	2,734	2.4	28.5	28.5	29.5	1.0
M	40,010	1,484	7,158	0.9	31.3	31.3	32.3	1.0
N	45,410	744	4,889	1.4	32.7	32.7	33.6	0.9

[1] Feet Above Mouth [2] Gulf of Mexico Tidal Surge Elevation [3] Elevation Influenced by Tidal Surge From Gulf of Mexico

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL
(UNINCORPORATED AREAS)

FLOODWAY DATA

BULLFROG CREEK

TABLE 4

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY[3] (FEET NGVD)	WITHOUT FLOODWAY[3] (FEET NGVD)	WITH FLOODWAY[4] (FEET NGVD)	INCREASE (FEET)
CYPRESS CREEK								
A	4750	1613	9266	0.56	29.9	29.9	30.9	1.0
B	8103	1730	10,378	0.50	30.2	30.2	31.1	0.9
C	13,120	1147	6060	0.86	33.0	33.0	33.9	0.9
D	15,420	1050	9890	0.53	35.0	35.0	35.7	0.7
E	21,920	2190	16,815	0.31	35.2	35.2	35.9	0.7
F	25,220	1830	6781	0.77	36.1	36.1	36.7	0.6
G	27,120	1540	9320	0.41	37.1	37.1	37.8	0.7
H	29,820	2747	13,733	0.28	38.3	38.3	39.1	0.8
I	32,020	1642	10,670	0.36	38.7	38.7	39.6	0.9
J	35,070	2378	14,402	0.27	39.1	39.1	40.0	0.9
K	37,700	2840	15,287	0.25	39.7	39.7	40.5	0.8
L	40,850	2360	12,885	0.35	40.5	40.5	41.1	0.6
M	43,380	4400	19,704	0.23	41.0	41.0	41.8	0.8
N	45,460	2450	10,501	0.43	42.0	42.0	42.8	0.8
O	47,630	400/900[2]	4205	1.07	45.9	45.9	46.5	0.6
P	50,630	1709	8314	0.54	49.9	49.9	50.7	0.8

[1]MILES ABOVE MOUTH
[2]LEFT CHANNEL/RIGHT CHANNEL
[3]ELEVATION BASED ON HYDRAULIC ANALYSIS DESCRIBED IN SECTION 9.2(c)
[4]ELEVATION ESTIMATED. SEE SECTION 9.2 (d)

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOODWAY DATA

CYPRESS CREEK

TABLE 4

REVISED: 8/15/89

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY[4] (FEET NGVD)	WITHOUT[4] FLOODWAY (FEET NGVD)	WITH[5] FLOODWAY (FEET NGVD)	INCREASE (FEET)
DELANEY CREEK								
A	−150	233	888	3.2	11.0	5.0[2]	5.3[2]	0.3
B	1050	631	2483	1.1	11.0	8.1[2]	8.7[2]	0.6
C	1680	405	2370	1.2	11.0	9.7[2]	10.4[2]	0.7
D	3180	50	575	5.0	11.0	10.9[3]	11.7[3]	0.8
E	6580	321	1488	1.9	15.2	15.2	16.2	1.0
F	8080	281	1236	2.3	16.3	16.3	17.2	0.9
G	9610	781	3554	0.8	19.1	19.1	20.0	0.9
H	10,860	687	3231	0.9	20.4	20.4	21.3	0.9
I	11,660	467	2192	1.3	21.0	21.0	21.9	0.9
J	12,660	140	793	3.6	21.4	21.4	22.2	0.8
K	13,360	72	511	5.6	22.2	22.2	23.0	0.8
L	14,455	110	381	2.1	22.7	22.7	23.1	0.4
M	14,895	90	257	3.2	23.0	23.0	23.3	0.3
N	15,855	60	426	1.9	23.5	23.5	23.8	0.3
O	16,365	50	429	1.9	23.7	23.7	23.9	0.2
P	17,485	100	471	1.7	24.2	24.2	24.4	0.2
Q	19,200	125	441	1.9	24.6	24.6	24.8	0.2
R	20,180	150	963	0.8	24.9	24.9	25.2	0.3

[1]FEET ABOVE U.S. HIGHWAY 41
[2]ELEVATION SHOWN WITHOUT CONSIDERATION OF GULF OF MEXICO TIDAL SURGE
[3]ELEVATION SHOWN WITHOUT CONSIDERATION OF INFLUENCE OF TIDAL SURGE FROM GULF OF MEXICO
[4]ELEVATION BASED ON HYDRAULIC ANALYSIS DESCRIBED IN SECTION 9.2(c)
[5]ELEVATION ESTIMATED. SEE SECTION 9.2(d)

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOODWAY DATA

DELANEY CREEK

TABLE 4

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Hillsborough River								
A	18,400	64[2]	4,801	1.2	22.5	22.5	22.5	0.0
B	20,300	1,085/790[3]	10,243	0.6	22.5	22.5	22.5	0.0
C	22,150	970/560[3]	7,609	0.8	22.5	22.5	22.5	0.0
D	23,950	880/395[3]	6,096	0.9	22.5	22.5	22.5	0.0
E	25,550	715/75[3]	3,510	1.7	22.5	22.5	22.5	0.0
F	27,750	480/80[3]	3,013	2.0	22.5	22.5	22.5	0.0
G	29,000	500/125[3]	3,203	1.9	22.5	22.5	23.5	1.0
H	31,250	715/120[3]	3,809	1.6	23.1	23.1	23.1	0.0
I	32,450	402/235[3]	3,731	1.5	23.5	23.5	24.5	1.0
J	33,450	275/185[3]	2,044	2.7	23.7	23.7	24.7	1.0
K	34,750	275/185[3]	3,767	1.5	24.1	24.1	25.1	1.0
L	35,850	377/250[3]	4,082	1.4	24.2	24.2	25.2	1.0
M	37,250	255/100[3]	2,462	2.3	24.4	24.4	25.4	1.0
N	38,250	539/250[3]	3,392	1.6	24.8	24.8	25.8	1.0
O	40,190	539/445[3]	3,529	1.6	25.6	25.6	26.6	1.0
P	42,490	725/645[3]	4,685	1.2	26.3	26.3	27.3	1.0
Q	45,890	768/710[3]	5,137	1.1	27.3	27.3	28.3	1.0
R	48,190	205/115[3]	2,366	2.3	28.0	28.0	29.0	1.0
S	49,740	491/260[3]	3,103	1.8	28.6	28.6	29.6	1.0
T	51,470	310/157[4]	3,895	1.4	29.1	29.1	30.1	1.0
U	53,570	175	3,695	1.5	29.2	29.2	30.2	1.0
V	55,770	168	2,352	2.4	29.3	29.3	30.3	1.0

[1]Feet Above Tampa City Dam [2]Floodway Lies Entirely Within Area Not Included [3]Width/Width Within County Limits [4]Left Channel/Right Channel

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL
(UNINCORPORATED AREAS)

FLOODWAY DATA

HILLSBOROUGH RIVER

TABLE 4

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Hillsborough River (Continued)								
W	57,570	157	3,095	1.8	29.5	29.5	30.4	0.9
X	59,820	163	3,228	1.7	29.7	29.7	30.6	0.9
Y	62,820	1,246	9,944	0.6	29.8	29.8	30.7	0.9
Z	66,700	2,635	25,226	0.2	29.9	29.9	30.9	1.0
AA	69,400	3,837	31,628	0.2	30.0	30.0	31.0	1.0
AB	71,600	4,100	32,236	0.2	30.0	30.0	31.0	1.0
AC	73,800	5,010	41,808	0.1	30.1	30.1	31.1	1.0
AD	77,100	4,180	34,301	0.2	30.1	30.1	31.1	1.0
AE	79,300	2,246	16,575	0.3	30.1	30.1	31.1	1.0
AF	80,700	200/410[2]	6,308	0.8	30.2	30.2	31.2	1.0

[1]Feet Above Tampa City Dam [2]Left Channel/Right Channel

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL
(UNINCORPORATED AREAS)

FLOODWAY DATA

HILLSBOROUGH RIVER

TABLE 4

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Hillsborough River (Upstream of U.S Highway 301)								
A	650	1,469	13,125	0.8	49.9	49.9	50.9	1.0
B	1,500	1,385	13,997	0.8	50.2	50.2	51.2	1.0
C	6,200	1,317	11,198	0.4	51.6	51.6	52.6	1.0
D	9,400	848	6,365	0.8	52.9	52.9	53.9	1.0
E	12,400	772	6,739	0.7	54.7	54.7	55.7	1.0
F	15,400	833	7,424	0.7	56.7	56.7	57.7	1.0

[1]Feet Above U.S. Highway 301

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL
(UNINCORPORATED AREAS)

FLOODWAY DATA

HILLSBOROUGH RIVER (UPSTREAM OF U.S. HIGHWAY 301)

TABLE 4

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Little Manatee River								
A	13,730	685	11,176	2.4	9.5[2]	4.3	5.3	1.0
B	14,930	800	13,046	2.1	9.5[2]	4.5	5.4	0.9
C	17,960	858	8,366	3.2	9.5[2]	5.0	5.9	0.9
D	21,400	800	13,588	2.0	9.5[2]	5.7	6.6	0.9
E	24,870	848	10,948	2.5	9.5[2]	6.2	7.1	0.9
F	27,310	926	8,907	3.0	9.5[2]	6.7	7.6	0.9
G	31,490	730	12,977	2.1	9.5[2]	7.5	8.5	1.0
H	34,270	1,728	14,966	1.8	10.2[3]	8.3	9.3	1.0
I	36,350	1,074	10,943	2.5	10.5[3]	9.2	10.2	1.0
J	39,575	1,571	18,794	1.3	11.0[3]	10.4	11.4	1.0
K	41,825	1,801	21,086	1.2	11.4[3]	10.8	11.8	1.0
L	42,775	2,076	21,061	1.2	11.8[3]	11.0	12.0	1.0
M	44,825	3,049	35,733	0.7	12.1[3]	11.3	12.3	1.0
N	49,275	2,037	22,401	1.1	12.5[3]	11.8	12.8	1.0
O	53,345	1,298	17,050	1.3	12.9[3]	12.8	13.8	1.0
P	55,005	1,451	18,222	1.2	13.3	13.3	14.3	1.0
Q	59,405	1,184	15,580	1.5	14.5	14.5	15.5	1.0
R	64,595	1,791	23,095	1.0	15.8	15.8	16.8	1.0
S	66,495	1,298	16,982	1.3	16.2	16.2	17.2	1.0
T	69,475	1,849	19,708	1.0	16.9	16.9	17.9	1.0
U	72,995	1,146	13,783	1.5	17.7	17.7	18.7	1.0
V	75,925	1,054	9,079	2.3	19.1	19.1	20.0	0.9
W	77,525	1,229	12,713	1.6	20.5	20.5	21.5	1.0
X	81,024	1,627	11,111	1.7	22.2	22.2	23.0	0.8
Y	84,738	1,520	11,813	1.6	23.8	23.8	24.7	0.9
Z	88,498	1,093	9,848	1.9	25.8	25.8	26.7	0.9

[1] Feet Above Mouth [2] Gulf of Mexico Tidal Surge Elevation [3] Elevation Influenced by Tidal Surge From Gulf of Mexico

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL
(UNINCORPORATED AREAS)

FLOODWAY DATA

LITTLE MANATEE RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Little Manatee River (Continued)								
AA	90,568	1,018	11,718	1.4	28.3	28.3	29.0	0.7
AB	103,838	1,495	15,790	1.0	32.7	32.7	33.6	0.9
AC	108,268	636	7,248	1.9	34.4	34.4	35.3	0.9
AD	110,718	1,373	16,720	0.8	35.4	35.4	36.3	0.9
AE	115,168	1,293	13,912	0.8	36.7	36.7	37.6	0.9
AF	120,708	809	9,122	1.3	37.6	37.6	38.5	0.9
AG	124,728	749	7,366	1.6	38.8	38.8	39.7	0.9
AH	127,238	554	5,366	2.2	40.0	40.0	41.0	1.0
AI	131,388	663	6,016	1.6	42.9	42.9	43.9	1.0
AJ	135,508	1,060	9,362	1.0	44.1	44.1	45.1	1.0
AK	142,468	1,611	11,178	0.6	46.4	46.4	47.3	0.9
AL	143,568	1,200	9,293	0.8	47.0	47.0	47.9	0.9
AM	146,818	1,094	7,346	1.0	48.3	48.3	49.2	0.9
AN	150,968	1,178	7,281	1.0	50.1	50.1	51.0	0.9
AO	152,388	1,074	7,900	0.9	50.9	50.9	51.8	0.9
AP	156,768	578	4,236	1.1	55.2	55.2	56.2	1.0
AQ	159,708	754	5,052	0.9	57.0	57.0	57.9	0.9
AR	163,328	494	3,582	0.7	58.6	58.6	59.4	0.8
AS	164,928	340	3,252	0.8	59.2	59.2	60.0	0.8
AT	166,218	980	4,778	0.5	59.8	59.8	60.5	0.7
AU	169,498	264	1,957	1.1	63.4	63.4	64.1	0.7
AV	171,998	253	2,169	1.0	65.5	65.5	66.0	0.5
AW	176,148	160	1,488	1.5	68.3	68.3	68.8	0.5
AX	179,648	1,088	6,339	0.3	70.2	70.2	71.0	0.8
AY	181,348	383	1,733	1.2	71.5	71.5	72.4	0.9

[1]Feet Above Mouth

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL
(UNINCORPORATED AREAS)

FLOODWAY DATA

LITTLE MANATEE RIVER

TABLE 4

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Rice Creek								
A	150	85	337	4.2	12.5	4.2[2]	5.1	0.9
B	835	80	321	4.5	12.5	6.6[2]	6.7	0.1
C	2,035	45	326	4.4	12.5	7.6[2]	8.0	0.4
D	2,515	36	263	5.4	12.5	8.1[2]	8.8	0.7
E	3,565	57	215	5.6	12.5	12.3[2]	13.0	0.7
F	4,790	49	338	5.0	14.8	14.8	15.3	0.5
G	5,990	44	266	4.5	18.3	18.3	18.5	0.2
H	7,490	36	266	3.4	20.6	20.6	21.4	0.8
I	8,490	20	133	6.8	23.1	23.1	24.1	1.0
J	9,990	40	155	5.8	31.0	31.0	31.4	0.4
K	11,990	95	227	4.0	39.8	39.8	39.8	0.0

[1]Feet Above Confluence With Alafia River

[2]Elevation Computed Without Consideration of Backwater Effects From Alafia River

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL
(UNINCORPORATED AREAS)

FLOODWAY DATA

RICE CREEK

TABLE 4

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
ROCKY CREEK								
A	1600	170	2073	2.2	10.2	5.3[2]	6.3	1.0
B	3880	110	1388	3.3	10.2	5.9[2]	6.8	0.9
C	4965	125	1708	2.7	14.5	14.5	15.3	0.8
D	6727	287	1959	2.4	16.4	16.4	17.1	0.7
E	8077	395	4260	1.1	17.0	17.0	17.8	0.8
F	9677	136	1935	2.4	17.5	17.5	18.4	0.9
G	10,677	272	2417	1.9	18.2	18.2	19.2	1.0
H	12,427	238	1901	2.4	18.5	18.5	19.5	1.0
I	14,507	367	2849	1.6	19.3	19.3	20.2	0.9
J	15,957	265	1817	2.6	19.9	19.9	20.9	1.0
K	17,157	227	2138	2.2	20.4	20.4	21.3	0.9
L	20,357	178	1679	2.8	21.8	21.8	22.8	1.0
M	22,777	206	1649	2.8	22.5	22.5	23.5	1.0
N	23,577	220	1716	2.7	23.1	23.1	24.0	0.9
O	26,377	258	1916	2.4	25.4	25.4	26.4	1.0
P	28,327	290	2410	1.9	27.3	27.3	28.2	0.9
Q	28,777	181	1262	3.7	27.7	27.7	28.6	0.9
R	29,375	372	2138	0.8	30.6	30.6	31.0	0.4
S	32,865	186	951	1.9	33.8	33.8	34.8	1.0
T	35,325	331	2294	0.7	36.3	36.3	37.3	1.0
U	38,485	165	1165	0.9	40.3	40.3	41.1	0.8
V	43,905	161	694	1.5	47.7	47.7	47.7	0.0
W	57,025	184	985	0.8	49.8	49.8	50.2	0.4
X	58,725	360	1505	0.5	50.7	50.7	51.7	1.0
Y	61,595	285	786	1.0	53.7	53.7	54.7	1.0
Z	70,486	550	2065	0.5	57.4	57.4	57.5	0.1
AA	78,930	250	1401	0.7	63.8	63.8	63.8	0.0
AB	81,574	100	701	1.3	64.5	64.5	65.1	0.6

[1]FEET ABOVE WATERS AVENUE
[2]ELEVATIONS WITHOUT CONSIDERING TIDAL EFFECT FROM GULF OF MEXICO

REVISED:8/3/92

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL
(UNINCORPORATED AREAS)

FLOODWAY DATA

ROCKY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
BAKER-PEMBERTON CREEK								
A	1892	134	1055	1.3	39.9	39.9	40.9	1.0
B	5392	64	290	4.7	42.0	42.0	42.3	0.3
C	7156	100	773	1.5	44.3	44.3	45.3	1.0
D	10,156	23	173	6.7	46.0	46.0	46.4	0.4
E	13,118	87	553	2.1	51.9	51.9	52.7	0.8
F	16,179	50	336	3.4	55.4	55.4	56.4	1.0
G	18,379	35	286	4.1	67.6	67.6	68.0	0.4
H	21,179	54	348	3.3	71.5	71.5	72.1	0.6
I	23,279	26	190	5.9	75.0	75.0	75.7	0.7
J	25,759	120	597	1.9	79.1	79.1	80.1	1.0
K	27,369	51	259	4.0	81.3	81.3	82.1	0.8
L	28,745	41	311	3.3	85.3	85.3	85.6	0.3
M	31,506	53	345	3.0	89.4	89.4	89.8	0.4
RUSKIN INLET								
A	4486[2]	824	3819	0.9	9.8	8.3[3]	8.7	0.4
B	5700[2]	782	3299	0.9	10.0	8.5[3]	9.1	0.6
C	6300[2]	419	927	3.6	10.2	9.3[3]	9.9	0.6
D	7121[2]	1592	5430	0.6	11.9	11.9	12.3	0.4
E	8121[2]	1330	3679	0.9	12.0	12.0	12.4	0.4
F	8921	240	502	6.7	13.6	13.6	14.4	0.8

[1]FEET ABOVE MOUTH
[2]FEET ABOVE U.S. ROUTE 41
[3]ELEVATIONS WITHOUT CONSIDERING TIDAL EFFECT FROM GULF OF MEXICO

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL
(UNINCORPORATED AREAS)

FLOODWAY DATA

BAKER-PEMBERTON CREEK—RUSKIN INLET

TABLE 4

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
TRIBUTARY A								
A	733	117	469	0.9	80.8	80.8	81.6	0.8
B	1678	81	279	1.5	84.5	84.5	85.5	1.0
C	3018	42	258	1.5	86.0	86.0	86.6	0.6
D	3568	18	118	3.2	86.0	86.0	86.9	0.9
SPARTMAN BRANCH								
A	561	146	998	0.8	91.1	91.1	92.1	1.0
B	1351	62	352	2.2	91.7	91.7	92.5	0.8
C	3171	70	462	1.6	93.5	93.5	94.3	0.8
D	5457	101	511	1.4	97.2	97.2	97.8	0.6
E	6857	288	959	0.8	97.9	97.9	98.9	1.0
F	9222	192	568	1.1	99.9	99.9	100.8	0.9
G	11,272	136	618	1.0	101.2	101.2	102.2	1.0
BRUSHY CREEK								
A	70[2]	566	3735	1.0	32.7	32.7	33.7	1.0
B	3160[2]	861	5553	0.7	33.7	33.7	34.7	1.0
C	5970[2]	450	2714	1.0	36.0	36.0	36.5	0.5
D	11,200[2]	248	1462	1.9	42.1	42.1	42.9	0.8
E	15,560[2]	310	1908	1.5	46.6	46.6	47.3	0.7
F	21,070[2]	219	920	1.5	50.7	50.7	51.4	0.7
G	26,600[2]	87	372	0.8	54.0	54.0	54.7	0.7
H	28,037[2]	67	284	1.0	55.2	55.2	55.8	0.6

[1]FEET ABOVE MOUTH
[2]FEET ABOVE GUNN HIGHWAY

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL
(UNINCORPORATED AREAS)

FLOODWAY DATA

TRIBUTARY A—SPARTMAN BRANCH—BRUSHY CREEK

TABLE 4

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
SWEETWATER CREEK DIVERSION								
A	1850	111	745	1.6	10.2	4.5[2]	5.5	1.0
B	5951	96	628	1.9	10.2	6.0[2]	7.0	1.0
SWEETWATER CREEK								
C	11,316	55	635	1.9	15.7	15.7	15.7	0.0
D	12,963	60	567	2.1	16.1	16.1	17.1	1.0
E	17,677	120	1111	0.9	26.3	26.3	27.3	1.0
F	18,123	110	724	1.3	27.2	27.2	28.1	0.9
G	20,361	44	340	2.9	29.2	29.2	30.1	0.9
H	24,085	130	611	1.3	33.0	33.0	33.9	0.9
I	25,668	120	694	1.3	33.7	33.7	34.6	0.9
J	26,868	62	526	1.7	34.9	34.9	35.7	0.8
K	29,111	45	325	1.9	35.5	35.5	36.2	0.7
L	31,611	45	260	2.1	39.2	39.2	39.2	0.0
M	33,247	55	465	1.1	39.4	39.4	40.4	1.0
N	34,131	57	199	1.0	39.6	39.6	40.6	1.0
O	36,149	38	139	1.4	41.2	41.2	41.6	0.4
P	37,978	117	127	1.5	43.3	43.3	43.3	0.0
Q	40,688	35	217	0.9	43.5	43.5	43.5	0.0
R	41,323	20	74	2.6	43.6	43.6	44.6	1.0
S	43,523	25	66	2.3	47.0	47.0	47.0	0.0
T	45,632	29	108	1.4	50.7	50.7	51.5	0.8
U	46,726	35	146	1.0	51.2	51.2	52.2	1.0

[1]FEET ABOVE MOUTH
[2]ELEVATIONS WITHOUT CONSIDERING TIDAL EFFECT FROM GULF OF MEXICO

REVISED:8/3/92

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL
(UNINCORPORATED AREAS)

FLOODWAY DATA

SWEETWATER CREEK DIVERSION/SWEETWATER CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
CURIOSITY CREEK								
A	1541	141	803	1.0	34.7	34.7	35.4	0.7
B	3041	148	523	1.6	35.2	35.2	36.2	1.0
C	5259	90	379	1.2	40.7	40.7	41.6	0.9
D	6945	155	788	0.4	41.9	41.9	42.7	0.8
E	8655	23	142	1.7	44.4	44.4	45.4	1.0
F	9436	80	519	1.0	47.9	47.9	48.6	0.7
G	10,407	119	429	1.2	48.2	48.2	49.1	0.9
H	10,907	80	484	0.8	50.4	50.4	51.3	0.9
I	12,616	75	546	0.6	50.4	50.4	51.3	0.9
J	14,366	33	175	1.9	50.5	50.5	51.5	1.0
BROOKER CREEK								
A	900[2]	118	488	2.8	30.5	30.5	31.5	1.0
B	5247[2]	133	650	1.8	32.7	32.7	33.7	1.0
C	8497[2]	129	616	1.8	34.2	34.2	34.8	0.6
D	11,247[2]	144	647	1.7	35.8	35.8	36.7	0.9
E	16,771[2]	468	1555	0.7	40.7	40.7	41.7	1.0
F	37,031[2]	70	474	1.2	44.2	44.2	45.2	1.0

[1]FEET ABOVE FOWLER AVENUE
[2]FEET ABOVE COUNTY BOUNDARY

REVISED:8/3/92

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL
(UNINCORPORATED AREAS)

FLOODWAY DATA

CURIOSITY CREEK—BROOKER CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
FLINT CREEK								
A	8863	64	369	3.9	39.0	35.4[2]	36.4	1.0
B	11,183	61	486	2.6	39.0	37.9[2]	38.9	1.0
C	13,833	115	647	1.9	40.0	40.0	40.8	0.8
CAMPBELL BRANCH								
D	18,566	68	251	3.2	41.6	41.6	42.5	0.9
E	22,300	65	320	2.3	45.5	45.5	46.1	0.6
F	26,630	35	202	3.7	60.8	60.8	61.8	1.0
G	31,320	94	396	1.9	72.7	72.7	73.7	1.0
H	34,126	75	367	1.4	77.0	77.0	78.0	1.0
I	37,210	78	203	2.5	82.7	82.7	82.7	0.0
J	40,194	36	187	2.2	85.0	85.0	85.8	0.8
K	41,720	54	180	2.3	85.5	85.5	86.3	0.8
L	45,375	62	565	0.7	92.0	92.0	92.9	0.9

[1]FEET ABOVE MOUTH
[2]ELEVATIONS WITHOUT CONSIDERING BACKWATER EFFECT FROM HILLSBOROUGH RIVER

REVISED:8/3/92

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL
(UNINCORPORATED AREAS)

FLOODWAY DATA

FLINT CREEK/CAMPBELL BRANCH

The area between the floodway and the 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe thus encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 4.

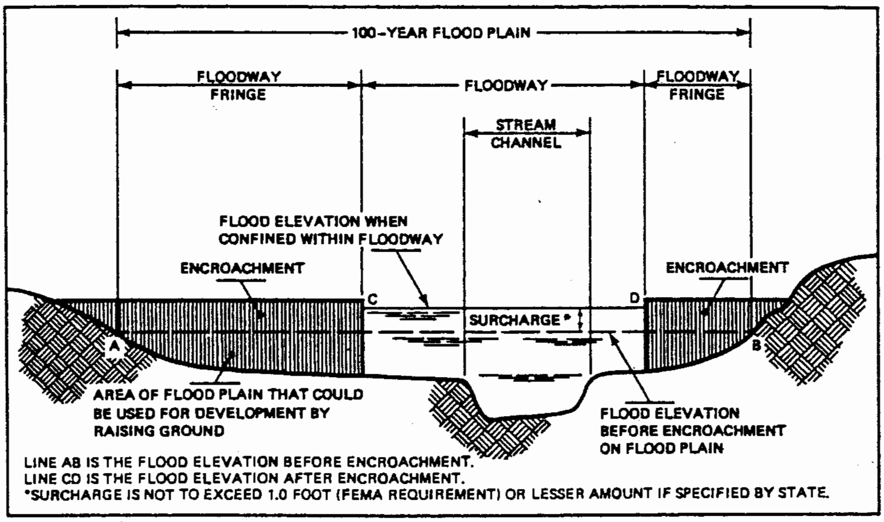

FIGURE 4 - Floodway Schematic

The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

5.0 INSURANCE APPLICATION

To establish actuarial insurance rates, data from the engineering study must be transformed into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for each flooding source studied in detail affecting Hillsborough County.

5.1 Reach Determinations

Reaches are defined as sections of floodplain that have relatively the same flood hazard, based on the weighted average difference in water-surface elevations between the 10- and 100-year floods. This difference may not have a variation greater than that indicated in the following table for more than 20 percent of the reach:

Average Difference Between 10- and 100-year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

The locations of the reaches determined for the riverine flooding sources of Hillsborough County are shown on the Flood Profiles (Exhibit 1) and are summarized in Table 5, Flood Insurance Zone Data.

In coastal areas, reaches are limited to the distance for which the 100-year flood elevation does not vary more than 1.0 foot. The location of these reaches are shown on the Flood Insurance Rate Map and summarized in Table 6.

5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is used to establish relationships between depth and frequency of flooding in any reach. This relationship is then used with depth-damage relationships for various classes of structures to establish actuarial insurance rate tables.

The FHF for a riverine reach is the weighted average difference between the 10- and 100-year flood water-surface elevations rounded to the nearest 0.5 foot, multiplied by 10, and shown as a 3-digit code.

The FHF for areas subject only to storm surge flooding is the difference between the 10- and 100-year stillwater elevations rounded to the nearest 0.5 foot, multiplied by 10, and shown as a 3-digit code. For areas with wave heights less than 3 feet, the FHF is the weighted average difference between the 100-year wave crest elevation and the 10-year stillwater elevation. For areas with wave heights greater than 3 feet, the FHF is determined using the difference between the 10- and 100-year stillwater elevations multiplied by 1.55, then rounded to the nearest 0.5 foot, multiplied by 10, and shown as a 3-digit code.

For example, if the difference between elevations is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference is greater than 10.0 feet, it is rounded to the nearest whole foot.

5.3 Flood Insurance Zones

Flood insurance zones and zone numbers are assigned based on the type of flood hazard and the FHF, respectively. A unique zone number is associated with each possible FHF and varies from 1 for a FHF of 005 to a maximum of 30 for a FHF of 200 or greater.

Zone A: Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations are shown or FHFs determined.

Zones A1, A3-12:	Special Flood Hazard Areas inundated by the 100-year flood, with base flood elevations shown, and zones subdivided according to FHFs.
Zones V9, V10, and V13-16:	Special Flood Hazard Areas along coasts inundated by the 100-year flood that have additional velocity hazards associated with waves of 3-foot amplitude or greater, with base flood elevations shown, and zones subdivided according to FHFs.
Zone B:	Areas between Special Flood Hazard Areas and the limits of the 500-year flood; areas that are protected from the 100- and 500-year floods by dike, levee, or other water control structure; areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and, areas subject to 100-year flooding from sources with drainage areas of less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding; not subdivided.

Flood elevation differences, FHFs, flood insurance zones, and base flood elevations for each flooding source studied in detail in the community are shown in Table 5, Flood Insurance Zone Data, and Table 6, Coastal Flood Insurance Zone Data.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for Hillsborough County is, for insurance purposes, the principal product of the Flood Insurance Study. This map contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines for riverine flooding sources show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. For coastal flooding sources, the expected water-surface elevations of the base (100-year) flood are shown as a weighted average within zones. Each whole-foot elevation is delineated except where cartographic considerations require the combination of two or more elevation zones. The base flood elevations and zone numbers are used by insurance agents, in conjunction with structure elevations and characteristics, to assign actuarial insurance rates to structures and contents insured under the National Flood Insurance Program.

6.0 OTHER STUDIES

FIA has published a Flood Hazard Boundary Map for the Unincorporated Areas of Hillsborough County (Reference 37). Due to the more detailed analyses presented in this Flood Insurance Study, it supersedes the above-mentioned Flood Hazard Boundary Map for Hillsborough County.

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION (FEET NGVD)[3]
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
Alafia River							
Reach 1	389,393, 415,420, 501,502, 506,507, 530,535	-4.8	-1.4	3.2	050	A10	Varies - See Map
North Prong Alafia River							
Reach 1	420,440, 445,535, 555	-4.0	-1.2	2.7	040	A8	Varies - See Map
Reach 2	440,445	-2.9	-0.8	2.0	030	A6	Varies - See Map
South Prong Alafia River							
Reach 1	535,555	-4.0	-1.2	2.7	040	A8	Varies - See Map
Reach 2	545,555, 565	-2.3	-0.6	1.6	025	A5	Varies - See Map

[1] Flood Insurance Rate Map Panel [2] Weighted Average [3] Rounded to Nearest Foot

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL
(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

ALAFIA RIVER-NORTH PRONG ALAFIA RIVER-SOUTH PRONG ALAFIA RIVER

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION[3] (FEET NGVD)
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
BLACKWATER CREEK							
REACH 1	0115	-3.0	-0.9	1.5	030	A6	VARIES—SEE MAP
REACH 2	0115,0120	-1.3	-0.3	0.9	015	A3	VARIES—SEE MAP
BULLFROG CREEK							
REACH 1	501,503,504,511,515	-3.4	-1.0	2.1	035	A7	VARIES—SEE MAP
CYPRESS CREEK							
REACH 1	0210	-1.5	-0.6	1.4	015	A3	VARIES—SEE MAP
REACH 2	0210	-1.9	-0.6	1.5	020	A4	VARIES—SEE MAP
REACH 3	0070,0210	-1.4	-0.6	1.6	015	A3	VARIES—SEE MAP
REACH 4	0070	-2.0	-0.6	1.6	020	A4	VARIES—SEE MAP
DELANEY CREEK							
REACH 1	367,378,380,386, 387,395	-1.4	N/A	N/A	015	A3	VARIES—SEE MAP
TROUT CREEK							
REACH 1	0230	-2.5	-0.6	1.9	025	A5	VARIES—SEE MAP
REACH 2	0090,0230	-2.2	-0.5	1.6	020	A4	VARIES—SEE MAP
REACH 3	0090	-2.4	-0.4	1.8	025	A5	VARIES—SEE MAP

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

BLACKWATER CREEK—BULLFROG CREEK—CYPRESS CREEK—DELANEY CREEK—TROUT CREEK

TABLE 5

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1% (100-YEAR) FLOOD AND 10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)	FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION[3] (FEET NGVD)
Hillsborough River							
Reach 1	219	0.0	0.0	0.0	005	A1	23
Reach 2	210,217, 219,230, 236,238	-2.1	-1.1	1.8	020	A4	Varies - See Map
Hillsborough River (Upstream of U.S. Highway 301)							
Reach 1	115	-2.8	-0.8	1.5	030	A6	Varies - See Map
Reach 2	115,120	-2.1	-0.6	1.4	020	A4	Varies - See Map
Little Manatee River							
Reach 1	670,665, 690,695	-5.0	-1.4	3.7	050	A10	Varies - See Map
Reach 2	685,695, 705,710, 715	-2.9	-0.8	2.9	030	A6	Varies - See Map
Reach 3	710,720	-1.8	-0.3	1.5	020	A4	Varies - See Map
Rice Creek							
Reach 1	502,504	-2.3	-0.7	3.0	025	A5	Varies - See Map
Rocky Creek							
Reach 1	180,185, 190,195	-2.9	-1.0	2.0	030	A6	Varies - See Map
Ruskin Inlet							
Reach 1	658	-1.4	-0.7	0.8	015	A3	Varies - See Map

[1] Flood Insurance Rate Map Panel [2] Weighted Average [3] Rounded to Nearest Foot

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

HILLSBOROUGH RIVER-LITTLE MANATEE RIVER-RICE CREEK-POCKY CREEK-RUSKIN INLET

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION[3] (FEET NGVD)
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
BUCKHORN CREEK							
REACH 1	0393	−1.9	−0.5	2.5	020	A4	VARIES—SEE MAP
REACH 2	0393	−2.4	−0.7	1.5	025	A5	VARIES—SEE MAP
REACH 3	0393	−3.1	−0.9	2.1	030	A6	VARIES—SEE MAP
TRIBUTARY CANAL							
REACH 1	0393	−1.5	−0.4	1.2	015	A3	VARIES—SEE MAP

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT

REVISED: 1/16/87

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

BUCKHORN CREEK—TRIBUTARY CANAL

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION[3] (FEET NGVD)
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
Gulf of Mexico							
Reach 1	634,641, 642,643	-4.2	-1.3	2.7	040	V8	9
Reach 2	641,642, 643,644, 665	-4.2	-1.3	2.7	040	A8	9
Reach 3	634,642, 653	-4.4	-1.4	2.9	045	V9	9
Reach 4	634,642, 653,654 665,670	-4.4	-1.4	2.9	045	A9	9
Reach 5	169,190, 326,458, 459,478, 489,493, 634,651, 652,653	-4.7	-1.5	3.1	045	V9	10
Reach 6	167,169, 190,326, 489,493, 494,651, 652,653, 654,656, 658,660	-4.7	-1.5	3.1	045	A9	10
Reach 7	478,489, 491,493	-4.9	-1.5	3.2	050	V10	10

[1] Flood Insurance Rate Map Panel [2] Weighted Average [3] Rounded to Nearest Foot

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL
(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

GULF OF MEXICO

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION (FEET NGVD)[3]
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
Gulf of Mexico (Continued)							
Reach 8	491,492, 493,494	-4.9	-1.5	3.2	050	A10	10
Reach 9	366,368, 369,476, 478,482, 484,491, 492	-5.2	-1.6	3.2	050	V10	11
Reach 10	359,366, 367,368, 369,378, 388,482, 484,491, 492,494, 501,503	-5.2	-1.6	3.2	050	A10	11
Reach 11	326	-4.9	-1.5	3.2	050	V10	10
Reach 12	190,195, 326,331	-4.9	-1.5	3.2	050	A10	10

[1]Flood Insurance Rate Map Panel [2]Weighted Average [3]Rounded to Nearest Foot

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

GULF OF MEXICO

TABLE 5

FLOODING SOURCE	TRANSECT	PANEL[1]	ELEVATION DIFFERENCE[2,5] BETWEEN 1.0% (100-YEAR) FLOOD AND 10% (10-YEAR)	FLOOD HAZARD	ZONE	BASE FLOOD ELEVATION[3,4] (FEET NGVD)
GULF OF MEXICO						
Old Tampa Bay from Mobbly Bay to Double Bayou.	N/A	0169, 0190, 0167 0307, 0326	4.6	045	V9	10
Old Tampa Bay from Double Bayou to the City of Tampa	N/A	0326, 0327, 0190 0331, 0195	4.9	050	V10 A10	10
Hillsborough Bay from the City of Tampa to the Kitchen	N/A	0357, 0358, 0359, 0366, 0367, 0368, 0369, 0388, 0482, 0484, 0501, 0503	5.1	050	V10 A10	11
Tampa Bay from the Kitchen to Big Bend	1	0484, 0491, 0492	5.2	080 060 050	V16 A12 A10	13–16 11–13 11
Tampa Bay from Big Bend to approximately 2 miles south of Big Bend	2	0491, 0492, 0493 0494	5.0	075 060 050	V15 A12 A10	12–16 10–12 10
Tampa Bay from approximately 2 miles south of Big bend to Little Cockroach Rock Pass	3, 4 5, 6	0493, 0494, 0489, 0651, 0652, 0653, 0654, 0634, 0656, 0660, 0658	4.7	075 055 045	V15 A11 A9	12–15 10–12 10
Tampa Bay from Little Cockroach Rock Pass to Cockroach Channel	7, 8	0634, 0653, 0665 0642	4.4	070 055	V14 A11	11–14 9–11

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE IN FEET
[3]ROUNDED TO NEAREST FOOT
[4]DUE TO MAP SCALE LIMITATIONS, BASE FLOOD ELEVATIONS SHOWN ON MAP MAP REPRESENT AVERAGE ELEVATIONS FOR THE ZONES DEPICTED
[5]INCLUDES EFFECT OF WAVE ACTION

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH CO., FL
(UNINCORPORATED AREAS)

COASTAL FLOOD INSURANCE ZONE DATA

GULF OF MEXICO

FLOODING SOURCE	TRANSECT	PANEL[1]	ELEVATION DIFFERENCE[2,5] BETWEEN 1.0% (100-YEAR) FLOOD AND 10% (10-YEAR)	FLOOD HAZARD	ZONE	BASE FLOOD ELEVATION[3,4] (FEET NGVD)
GULF OF MEXICO						
Tampa Bay from Cockroach Channel to Southern County Limits	9, 10	0641, 0642, 0643, 0644, 0665	4.2	065 050	V13 A10	11–14 9–11
Tampa Bay from intersection of Sunshine Skyway and Northern County Boundary to Egmont Key	N/A	N/A	4.2	065	V13	13
Tampa Bay along Southern County Limits in vicinity of Sunshine Skyway	N/A	N/A	4.5	070	V14	14

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE IN FEET
[3]ROUNDED TO NEAREST FOOT
[4]DUE TO MAP SCALE LIMITATIONS, BASE FLOOD ELEVATIONS SHOWN ON MAP MAP REPRESENT AVERAGE ELEVATIONS FOR THE ZONES DEPICTED
[5]INCLUDES EFFECT OF WAVE ACTION

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH CO., FL
(UNINCORPORATED AREAS)

COASTAL FLOOD INSURANCE ZONE DATA

GULF OF MEXICO

TABLE 6

A Flood Insurance Study for the City of Temple Terrace was published in 1975 (Reference 40). Discharge and elevation values for the Hillsborough River in the Temple Terrace study are greater than the values presented here. This discrepancy results from the incorporation of the Lower Hillsborough Flood Detention Area in the hydrologic model used for Hillsborough County.

Flood Insurance Studies for the adjacent City of Tampa and the Unincorporated Areas of Manatee County were revised concurrently with Hillsborough County. The revised studies are in agreement with this study. The Flood Insurance Study for the City of Oldsmar also agrees with this study.

7.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, 1371 Peachtree Street, NE., Suite 736, Atlanta, Georgia 30309.

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9.0 REVISIONS DESCRIPTION

This section has been added to provide information regarding significant revisions made since the original Flood Insurance Study was printed. Future revisions may be made that do not result in the republishing of the Flood Insurance Study report. To assure that any user is aware of all revisions, it is advisable to contact the community repository of flood hazard data located at the Building Department, Hillsborough County, 800 Twiggs Street, Tampa, Florida.

9.1 First Revision (Revised January 16, 1987)

a. Acknowledgments

The hydrologic and hydraulic analyses for this Revisions Description were performed by the Nelson Consulting Group. New cross-section data were obtained by Ghioto Singhofen & Associates, Inc. The Federal Emergency Management Agency (FEMA) reviewed and accepted these data for purposes of this revision.

b. Scope

Detailed study was added for Buckhorn Creek, from its confluence with the Alafia River to Kings Avenue, and for Tributary Canal, from its confluence with Buckhorn Creek to about 3,900 feet upstream. In addition, a revised hydraulic analysis was performed for Delaney Creek from 78th Street to U.S. Highway 301. Shallow flooding from the portion of the Delaney Creek watershed south of Lumsden Avenue was also added as part of this Flood Insurance Study revision. The area surrounding Hickory Hammonds Lake was redelineated using the unit hydrograph data submitted by Hillsborough County.

c. Hydrologic and Hydraulic Analyses

Peak discharges for Buckhorn Creek and Tributary Canal were computed using methods outlined in the U.S. Geological Survey report "Technique for Estimating Magnitude and Frequency of Floods on Natural-Flow Streams in Florida" (Reference 41). Peak discharges for the 10-, 50-, 100-, and 500-year floods are shown in Table 7, Revised Summary of Discharges.

TABLE 7 - REVISED SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
BUCKHORN CREEK					
at the confluence with the Alafia River	7.8	777	1,374	1,661	2,411
at Kings Avenue	5.6	366	669	823	1,287
TRIBUTARY CANAL					
at the confluence with Buckhorn Creek	1.5	167	309	381	594
about 3,900 feet upstream of the confluence with Buckhorn Creek	1.1	134	250	308	483

Cross sections used in the hydraulic analyses were obtained by field survey. Roughness values (Manning's "n") for Buckhorn Creek ranged from 0.05 to 0.08 for the channel and from 0.1 to 0.2 for the overbanks. A Manning's "n" value of 0.03 was used for the Tributary Canal channel.

Starting water-surface elevations for Buckhorn Creek were determined by the slope-area method. Starting water-surface elevations for Tributary Canal were determined by coincident peaks. Water-surface profiles for Buckhorn Creek and Tributary Canal were determined using the U.S. Army Corps of Engineers HEC-2 step-backwater computer program (Reference 42).

The revised hydraulic analysis for Delaney Creek was accomplished through use of the HEC-2 computer program (Reference 42). New cross-section data were obtained from field surveys. The starting water-surface elevations, discharges, and roughness coefficients (Manning's "n") for Delaney Creek are unchanged from the original Flood Insurance Study.

Shallow flooding for the portion of the Delaney Creek watershed south of Lumsden Avenue embankment results from impoundment of surface runoff. Volumetric (or storage capacity) calculations were made to assess the magnitude of shallow flooding in this area. There is sufficient runoff to fill available storage areas to the point where additional runoff flows across Lumsden Avenue to the north and into the Buckhorn Creek watershed to the south. The 100-year water-surface elevation for the shallow flooding area south of Lumsden Avenue and west of Kings Avenue were computed to be approximately 32 feet National Geodetic Vertical Datum of 1929.

d. Floodways

Floodway computations for Delaney Creek were revised as a result of the new hydraulic analysis. The floodways were computed on the basis of equal conveyance reduction from each side of the floodplain. The results of these computations were tabulated at selected cross sections for each stream segment for which a floodway was revised and are presented in Table 4, Floodway Data.

e. References and Bibliography

41. U.S. Geological Survey, Water Resources Investigations 82-4012, Technique for Estimating Magnitude and Frequency of Floods on Natural-Flow Streams in Florida, Wayne C. Bridges, 1982.

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9.2 Second Revision (Revised August 15, 1989)

a. Acknowledgments

The hydrologic and hydraulic analyses for this Revisions Description were performed by the Southwest Florida Water Management District (SWFWMD) for Trout and Cypress Creeks. Ghioto, Singhofen and Associates, Inc. (GSA) performed the hydrologic and hydraulic analyses for Delaney Creek. FEMA reviewed and accepted these data for purposes of this revision.

b. Scope

Detailed methods were used to study Trout, Cypress, and Delaney Creeks. Flood boundaries and streamlines along the entire reaches of the three creeks were revised. The locations of several streets along Brushy Creek between Gunn Highway and Ehrlich Road were revised. The base flood elevations and Special Flood Hazard Area for Grace Lake were reduced.

c. Hydrologic and Hydraulic Analyses

The methods used for the hydrologic and hydraulic analyses for Trout and Cypress Creeks are discussed in the SWFWMD Floodplain Information reports on Trout Creek and Cypress Creek (References 43 and 44). The discharges for Trout Creek were calculated using data collected from the U.S. Geological Survey (USGS) gaging station at the State Road 581 and Trout Creek crossing. The discharges for Cypress Creek were developed using the USGS report titled "Techniques for Estimating Magnitude and Frequency of Floods in Natural-Flow Streams in Florida" (Reference 45). The revised discharges for Trout and Cypress Creeks are listed in Table 8, Revised Summary of Discharges.

The hydraulic analyses for both creeks were performed by the SWFWMD using the USGS E431 computer program (Reference 46). The flood boundaries were redelineated by the SWFWMD using aerial topographic maps (Reference 47).

The methods used for the hydrologic and hydraulic analyses for Delaney Creek are discussed in the GSA report titled "Delaney Creek Stormwater Management Master Plan" (Reference 48). GSA used the SCS Unit Hydrograph Program (Reference 49) to compute stormwater runoff hydrographs for subbasins of the Delaney Creek watershed. Output from the SCS Unit Hydrograph Program was used as input for the Explicit Channel Routing Model (Reference 50) to develop an unsteady flow hydraulic model for Delaney Creek. Selected peak discharges for Delaney Creek are listed in Table 8.

TABLE 8 - REVISED SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS)			
		10-YEAR	50-YEAR	100-YEAR	500-YEAR
TROUT CREEK just downstream of State Road 581	23*	833	1,899	2,473	4,178
CYPRESS CREEK just downstream of State Road 581	160	1,690	3,010	3,710	5,560
DELANEY CREEK just downstream of Maydell Drive	15.2	838	N/A	1,134	N/A

* does not include the drainage area upstream of the divergence with Cypress Creek

The hydrologic and hydraulic analyses for Grace Lake were performed by SWFWMD using the SCS Unit Hydrograph Program and the Interconnected Pond Routing Model (Reference 51).

d. Floodways

The floodway models for Cypress and Delaney Creeks were not recalculated for this revision. The "regulatory" and "without floodway" elevations presented in Table 4 were changed to reflect the new hydraulic analysis described in the previous section. The "with floodway" elevations were estimated by adding the existing "increase" to the new "without floodway" elevations. All other data presented in the Floodway Data Table remain unchanged from the previously effective Flood Insurance Study.

e. Other Studies

The Flood Insurance Study published for Pasco County, Florida (Reference 52) is being revised in conjunction with this revision and will be in agreement.

f. References and Bibliography

43. Southwest Florida Water Management District, Floodplain Information on Trout Creek, Hillsborough and Pasco Counties, Florida, June 1983.

44. ----------, Floodplain Information on Cypress Creek, Hillsborough and Pasco Counties, Florida, June 1986.

45. U.S. Geological Survey, Techniques for Estimating Magnitude and Frequency of Floods in Natural-Flow Streams in Florida, 1982.

46. U.S. Department of the Interior, Geological Survey, Open-File Report, Computer Program E431, Users Manual, Computer Applications for Step-Backwater and Floodway Analysis, James O. Shearman, Washington, D.C., 1976.

47. Southwest Florida Water Management District, Aerial Photography with Contours, Hillsborough River Basin, Scale 1:1200, Contour Interval 2 Feet: Cypress Creek, Sheet No. 1, May 1973; Cypress Creek, Sheet No. 2, May 1973; Lower Hillsborough Detention Area, Sheet No. 1, May 1973.

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49. Ghioto, R.D., SCS Unit Hydrograph Method for Multiple Basins, User's Manual, Orlando, Florida, June 1984.

50. Ghioto, R.D., and P.J. Singhofen, Explicit Channel Routing Model, Orlando, Florida, 1986.

51. Singhofen, P.J., Inter-Connected Pond Routing Model, Orlando, Florida, 1983.

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9.3 Third Revision (Revised August 3, 1992)

a. Acknowledgments

The hydrologic and hydraulic analyses for this Revisions Description were performed by Gee & Jenson, Inc., under Contract No. EMW-88-C-2612. The Federal Emergency Management Agency (FEMA) reviewed and accepted these data for purposes of this revision. This study was completed in July 1989.

Cross section data and updated bridge information were provided by Southwest Florida Water Management District and Hillsborough County.

b. Scope

Flooding was studied using detailed methods on Baker Creek, Pemberton Creek, Tributary A, Spartman Branch, Brooker Creek, Brushy Creek, Curiosity Creek, Flint Creek, Campbell Branch, Sweetwater Creek, Sweetwater Creek Diversion, and Rocky Creek upstream of Gunn Highway.

c. Hydrologic and Hydraulic Analyses

Three regression methodologies developed by the U.S. Geological Survey (USGS) (References 41, 53, and 54) were used, along with the log-Pearson Type III analysis (Reference 55) at stream gaging stations that had sufficient records for statistical analysis, to investigate the flood discharges. There are 10 stream-flow gaging stations maintained by the USGS in the study area. The USGS gaging station No. 02303300 on Flint Creek is at the mouth of Lake Thonotosassa. On Brooker Creek, the USGS gaging station No. 02307323 is at Tarpon Springs-Lake Fern Road, just upstream of the county boundary.

For Baker/Pemberton Creek, Tributary A, Spartman Branch, Flint Creek, Campbell Branch, and Brooker Creek, results of the USGS methodologies (References 41, 53, and 54) were compared to the log-Pearson Type III analysis to estimate the peak discharges. The results of one USGS method (Reference 53) closely compared with the log-Pearson Type III analysis, and was used to establish peak discharges for these streams.

The peak discharges for Rocky, Brushy, Sweetwater, and Curiosity Creeks were determined from previous reports (References 56-58).

To establish flood elevations for the major lakes which lie in the middle of the creeks, the log-Pearson Type III analysis (Reference 55) was applied with available historical lake level records from the lake level gaging stations. In some lakes, flood elevations were adopted from previous studies (References 56 and 59).

The flood elevations for the lakes obtained from the statistical analysis were then inserted into the HEC-2 computer program (Reference 60) using X5 cards.

Peak discharge-drainage area relationships for the 10-, 50-, 100-, and 500-year floods of each flooding source studied in detail in the community are shown in Table 9.

TABLE 9 - REVISED SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
BROOKER CREEK					
at county boundary	16.7	430	1,030	1,350	2,300
at dirt road	12.4	350	800	1,060	1,850
at Island Ford Lake	10.9	310	710	960	1,690
at Tarpon Spring Road	8.4	260	560	770	1,370
at Gunn Highway	5.9	200	400	560	1,030
at Van Dyke Road	4.7	150	330	450	850
FLINT CREEK					
at U.S. Route 301	65.5	700	1,180	1,430	2,100
CAMPBELL BRANCH					
at mouth	9.9	350	680	850	1,330
at McIntosh Road	7.8	290	580	750	1,160
at Harwell Road	5.7	240	470	640	980
at Cooper Road	3.8	150	350	500	770
at Thonotosassa Road	3.0	130	280	420	650
at Forbes Road	2.0	80	200	300	500
BAKER CREEK					
at mouth	52.7	660	1,140	1,350	2,050
at Pemberton Creek Drive	21.6	530	970	1,160	1,850
PEMBERTON CREEK					
at Fritzke Road	19.3	510	930	1,120	1,800
at Bethlehem Road	15.8	470	860	1,040	1,650
at Forbes Road	7.3	270	560	740	1,130
SPARTMAN BRANCH					
at Harvey Tew Road	7.9	300	600	760	1,180
at U.S. Route 92	7.1	270	550	730	1,100
at Turkey Creek Road	5.5	230	450	620	950
at State Road 574	4.7	200	400	570	870
at CSX railroad	3.0	130	280	420	650

TABLE 9 - REVISED SUMMARY OF DISCHARGES (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
ROCKY CREEK					
just upstream of confluence of Brushy Creek	18.0	671	1,465	1,892	3,300
at Gunn Highway	17.9	643	1,404	1,815	3,150
at Ehrlich Road	16.9	561	1,228	1,591	2,750
at Turtle Creek Boulevard	13.8	356	788	1,033	1,800
at Hammock Woods Drive	13.8	354	785	1,019	1,750
at Rock Lake	12.0	351	642	786	1,250
at Fitzgerald Road	12.0	351	642	786	1,250
at Van Dyke Road	10.7	333	591	756	1,100
at Turkey Ford Lake	7.2	300	696	966	1,820
at South Cheval Trail Bridge	7.2	296	674	941	1,750
at Lutz-Lake Fern Road	5.8	209	523	740	1,450
BRUSHY CREEK					
at Gunn Highway	18.2	1,364	2,935	3,877	6,700
at Henderson Road	17.3	1,270	2,740	3,628	6,200
at Lynn-Turner Road	17.0	1,001	2,137	2,839	4,950
at West Village Drive	14.2	975	2,099	2,780	4,700
at Ehrlich Road	13.3	1,022	2,208	2,930	5,050
at Northdale Boulevard	10.8	478	1,036	1,379	2,300
just downstream of Interceptor Canal	10.0	164	427	610	1,180
at Interceptor Canal	6.8	131	238	286	435
SWEETWATER CREEK					
about 2,900 feet downstream of Waters Avenue	14.5	436	780	960	1,460
at Waters Avenue	14.2	425	770	950	1,440
at Florida Mining Road	14.0	407	780	981	1,550
about 1,900 feet upstream of Florida Mining Road	13.7	394	780	999	1,640
at CSX railroad	13.2	344	650	812	1,280
at Linebaugh Avenue	10.7	350	690	879	1,400
at USGS gaging station	10.3	295	510	605	900
at Floyd Road	9.6	244	440	550	840
at Water Control Structure No. 1	9.6	218	430	550	880
at Hudson Lane	9.5	222	410	509	790
at Dale Mabry Highway	8.9	120	180	191	245

TABLE 9 - REVISED SUMMARY OF DISCHARGES (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
TRIBUTARY A					
at Interstate 4	2.9	130	280	410	630
CURIOSITY CREEK					
at Country Club Drive	2.9	471	725	839	1,150
at 122nd Avenue	2.7	432	690	819	1,120
at private driveway	1.9	417	680	819	1,160
at Michigan Trailer Park Road	1.8	420	690	828	1,180
at dirt road	1.7	307	400	441	530
at 131st and Florida Avenue	1.7	307	400	441	530
at McDonald Trailer Park Road	1.5	294	350	371	420
at Fletcher Avenue	1.4	244	280	294	325
at 138th Avenue	1.3	221	238	242	255
at Florida Avenue	1.2	205	395	498	800
at dirt road	1.2	279	430	498	675
at Rose Lake Estate Trailer Park Road	1.0	267	345	377	450
at Floral Drive	0.6	204	290	329	425
at Learss Avenue	0.1	45	65	74	97

Cross sections used in the hydraulic analyses for Brooker Creek, Baker/Pemberton Creek, Tributary A, Spartman Branch, Flint Creek, and Campbell Branch were obtained from field surveys. Cross sections for Sweetwater, Curiosity, Rocky, and Brushy Creeks were taken from previous reports (References 56-58). In some cases, topographic maps (Reference 61) or aerial topographic surveys (Reference 62) were used to extend surveyed cross sections for geometry of floodplains. For the streams studied in detail, water-surface elevations for floods of the selected recurrence intervals were developed using the HEC-2 computer program (Reference 60).

Hydraulic analyses for Brooker Creek were verified with the high-water marks of the 1960 flood, the highest ever recorded (Reference 63).

Hydraulic analyses for Flint Creek, Campbell Branch, and Baker/Pemberton Creek near Lake Thonotosassa were verified with previous high-water marks measured by the Southwest Florida Water Management District (SWFWMD).

Bridges and culverts were field checked and surveyed to obtain elevation and structural geometry data of waterway crossings for Brooker Creek, Baker/Pemberton Creek, Tributary A, Spartman Branch, Flint Creek, and Campbell Branch.

Cross-section geometry adopted for Sweetwater, Curiosity, Rocky, and Brushy Creeks, and taken from previous studies, were field checked and coordinated with Hillsborough County officials for revisions of new bridges.

Roughness coefficients (Manning's "n") used in the hydraulic computations were chosen on the basis of field observations and descriptions in various reports (References 64-66). Roughness values used are listed below.

	MANNING'S "n"	
STREAM	CHANNEL	OVERBANK
Brooker Creek	0.035-0.08	0.04-0.15
Baker/Pemberton Creek	0.03 -0.07	0.10-0.15
Tributary A	0.045-0.07	0.07-0.15
Spartman Branch	0.035-0.08	0.06-0.15
Flint Creek	0.035-0.08	0.06-0.15
Rocky Creek	0.04 -0.08	0.07-0.15
Brushy Creek	0.035-0.10	0.07-0.15
Sweetwater Creek/ Sweetwater Creek Diversion	0.035-0.08	0.06-0.15
Curiosity Creek	0.04 -0.10	0.08-0.15
Campbell Branch	0.035-0.08	0.06-0.15

The slope-area method was used to compute the starting water-surface elevations for all streams studied in detail.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles and on the Flood Insurance Rate Map.

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

For each stream studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24000 with a contour interval of 5 feet, and aerial photographs at a scale of 1:2400 with a contour interval of 1 foot (References 61 and 62).

Floodplain boundaries are indicated on the Flood Insurance Rate Map. On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, AH, A0, A99, V, and VE, numbered A, and numbered V Zones), and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards (Zone B and Zone X shaded).

d. Floodways

Floodway computations for Baker-Pemberton Creek, Tributary A, Spartman Branch, Brooker Creek, Brushy Creek, Curiosity Creek, Flint Creek, Campbell Branch, Sweetwater Creek, Sweetwater Creek Diversion, and Rocky Creek were revised or added as a part of this Revisions Description.

The floodways for this study were 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 are tabulated for selected cross sections and are shown in Table 4, Floodway Data. The computed floodways are shown on the Flood Insurance Rate Map.

Along streams where floodways have not been computed, the community must ensure that the cumulative effect of development in the floodplain will not cause more than a 1.0-foot increase in the base flood elevations at any point within the community.

e. Insurance Application

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. The detailed data included the determination of reaches and Flood Hazard Factors (FHFs) and numbered flood insurance zone designations. The reach determinations and FHFs are no longer applicable. The Flood Insurance Zones have been redesignated and are described as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE (includes Zones A1 through A30)

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X (includes Zone B and Zone C)

Zone X is the flood insurance rate zone that corresponds to areas outside the 100-year floodplain, areas of 100-year flooding where average depths are less than one foot, areas of 100-year flooding where the contributing drainage area is less than one square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

f. Flood Insurance Rate Map

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as previously described and, for cases involving 100-year floodplains studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols the 100- and 500-year floodplains, the floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

For some map panels, the floodways and selected cross sections are shown on the Flood Boundary and Floodway Map.

g. Other Studies

The Flood Insurance Studies published for Pinellas County, Florida, and the City of Tampa, Florida (References 67 and 68), agree with this study.

The revision in progress to the published Flood Insurance Study for Pasco County, Florida (Reference 69), agrees with this study.

A Flood Insurance Rate Map was published for the City of Plant City, Florida (Reference 70). However, the detailed data used in the Hillsborough County study were not available when the City of Plant City study was prepared. Hence, they are not in exact agreement.

If the Flood Insurance Study for the City of Plant City is revised in the future, the new data from the Hillsborough County study will be incorporated into the revised Flood Insurance Study.

This Flood Insurance Study supersedes the previously published Flood Insurance Study for the Unincorporated Areas of Hillsborough County, Florida (Reference 71).

h. References and Bibliography

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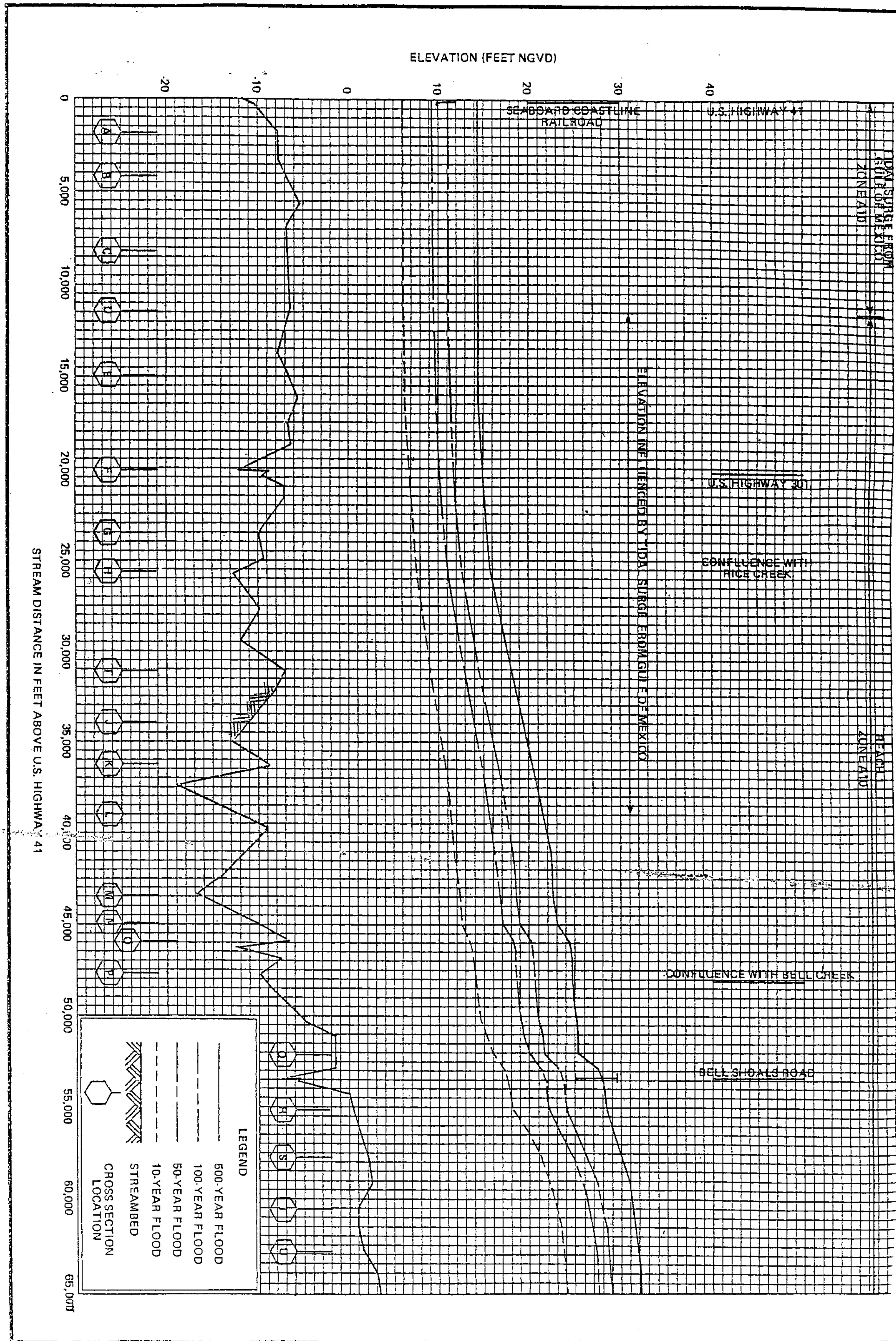
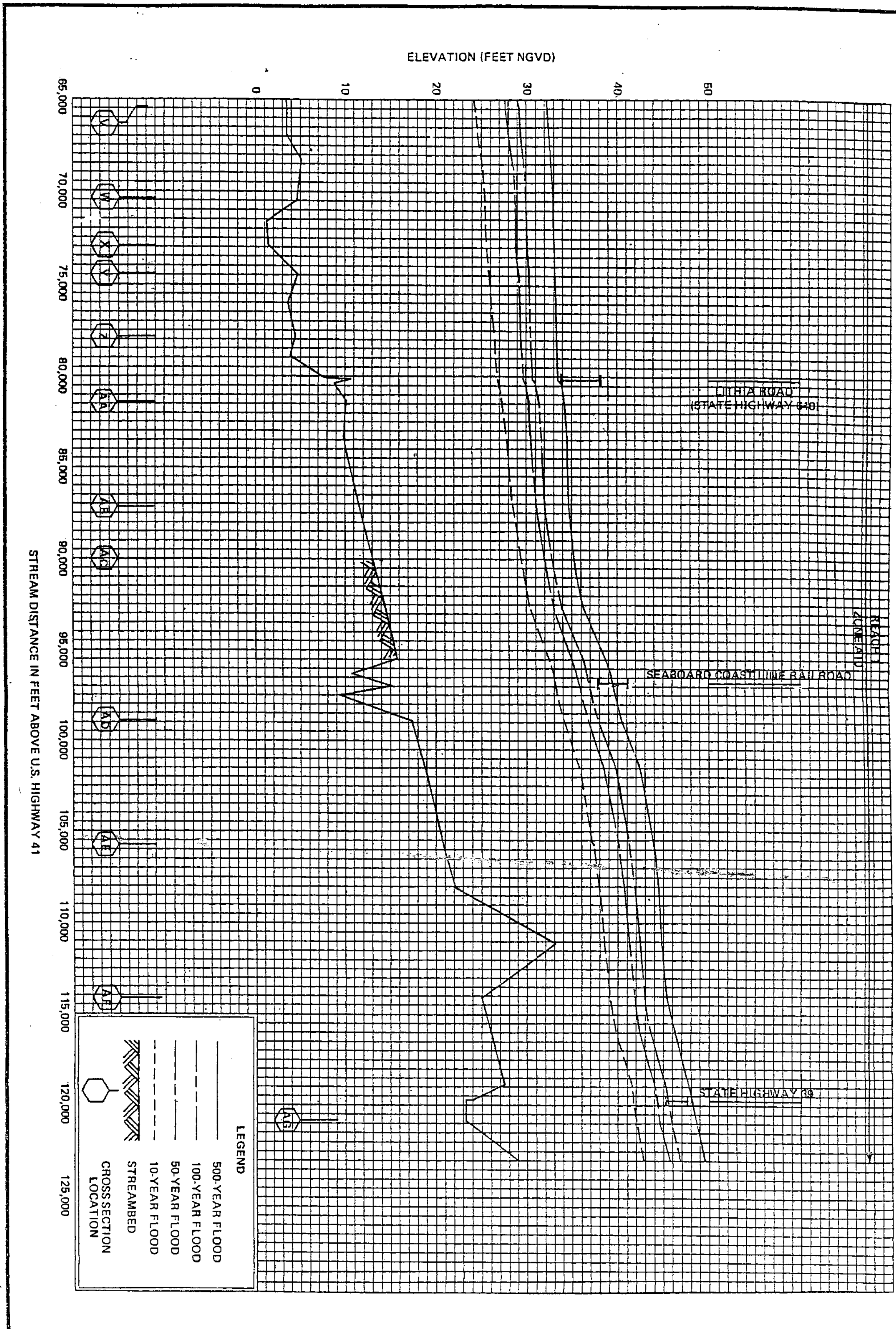
Hillsborough County, Work Plan for Pemberton Creek Watershed, 1971.

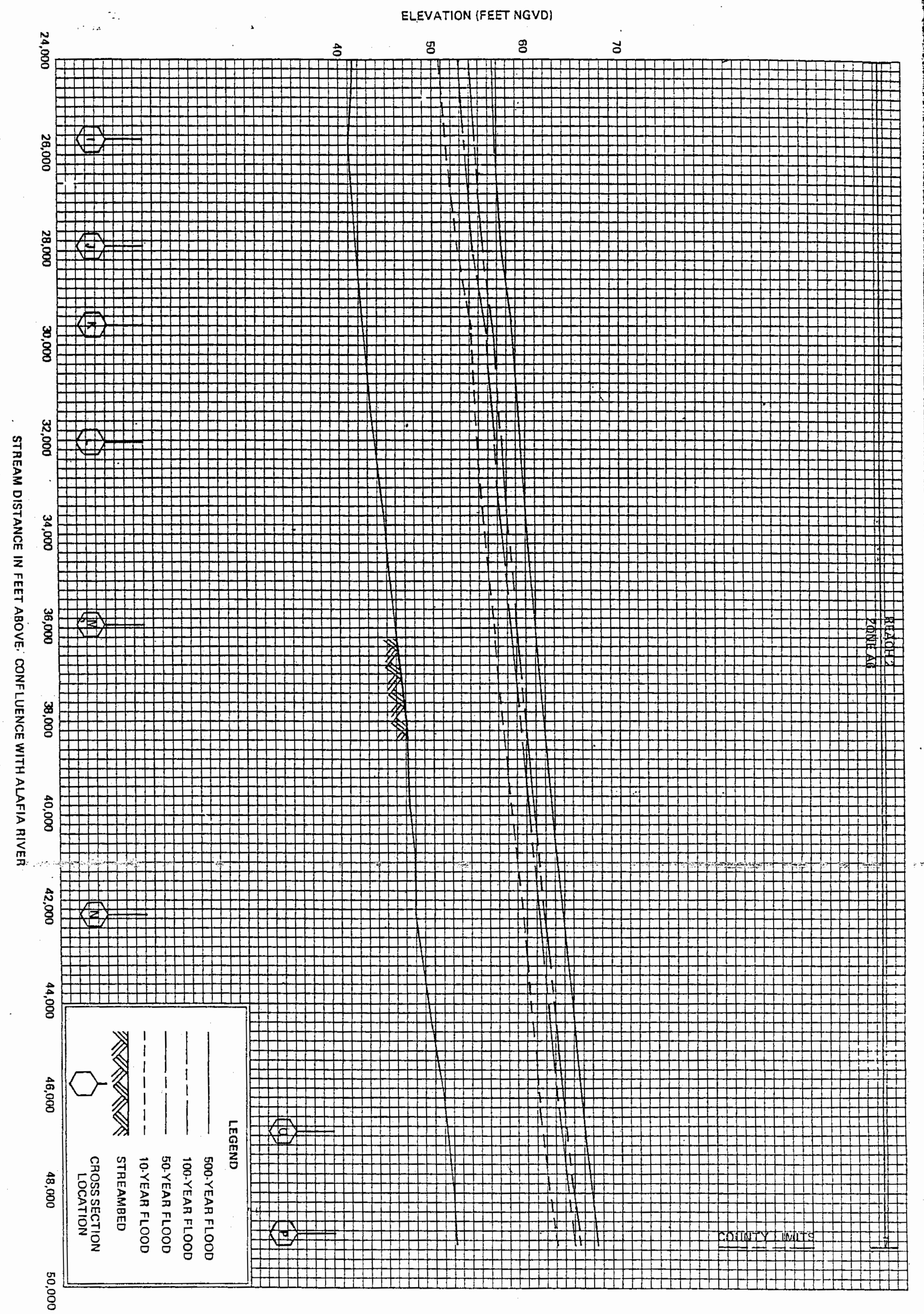

ELEVATION (FEET NGVD)
-20
-10
0
10
20
30
40
STREAM DISTANCE IN FEET ABOVE U.S. HIGHWAY 41
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
50,000
55,000
60,000
65,000
SEABOARD COASTLINE RAILROAD
U.S. HIGHWAY 41
TIDAL SURGE FROM GULF OF MEXICO ZONE A10
ELEVATION INFLUENCED BY TIDAL SURGE FROM GULF OF MEXICO
U.S. HIGHWAY 301
CONFLUENCE WITH RICE CREEK
REACH 1 ZONE A10
CONFLUENCE WITH BELL CREEK
BELL SHOALS ROAD
LEGEND
500-YEAR FLOOD
100-YEAR FLOOD
50-YEAR FLOOD
10-YEAR FLOOD
STREAMBED
CROSS SECTION LOCATION
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U



ELEVATION (FEET NGVD)
0
10
20
30
40
50
65,000
70,000
75,000
80,000
85,000
90,000
95,000
100,000
105,000
110,000
115,000
120,000
125,000
STREAM DISTANCE IN FEET ABOVE U.S. HIGHWAY 41
V
W
X
Y
Z
AA
AB
AC
AD
AE
AF
AG
LITHIA ROAD
(STATE HIGHWAY 640)
SEABOARD COASTLINE RAILROAD
STATE HIGHWAY 39
REACH 1
ZONE A10
LEGEND
500-YEAR FLOOD
100-YEAR FLOOD
50-YEAR FLOOD
10-YEAR FLOOD
STREAMBED
CROSS SECTION LOCATION

FEDERAL EMERGENCY MANAGEMENT AGENCY

FLOOD PROFILES



FEDERAL EMERGENCY MANAGEMENT AGENCY

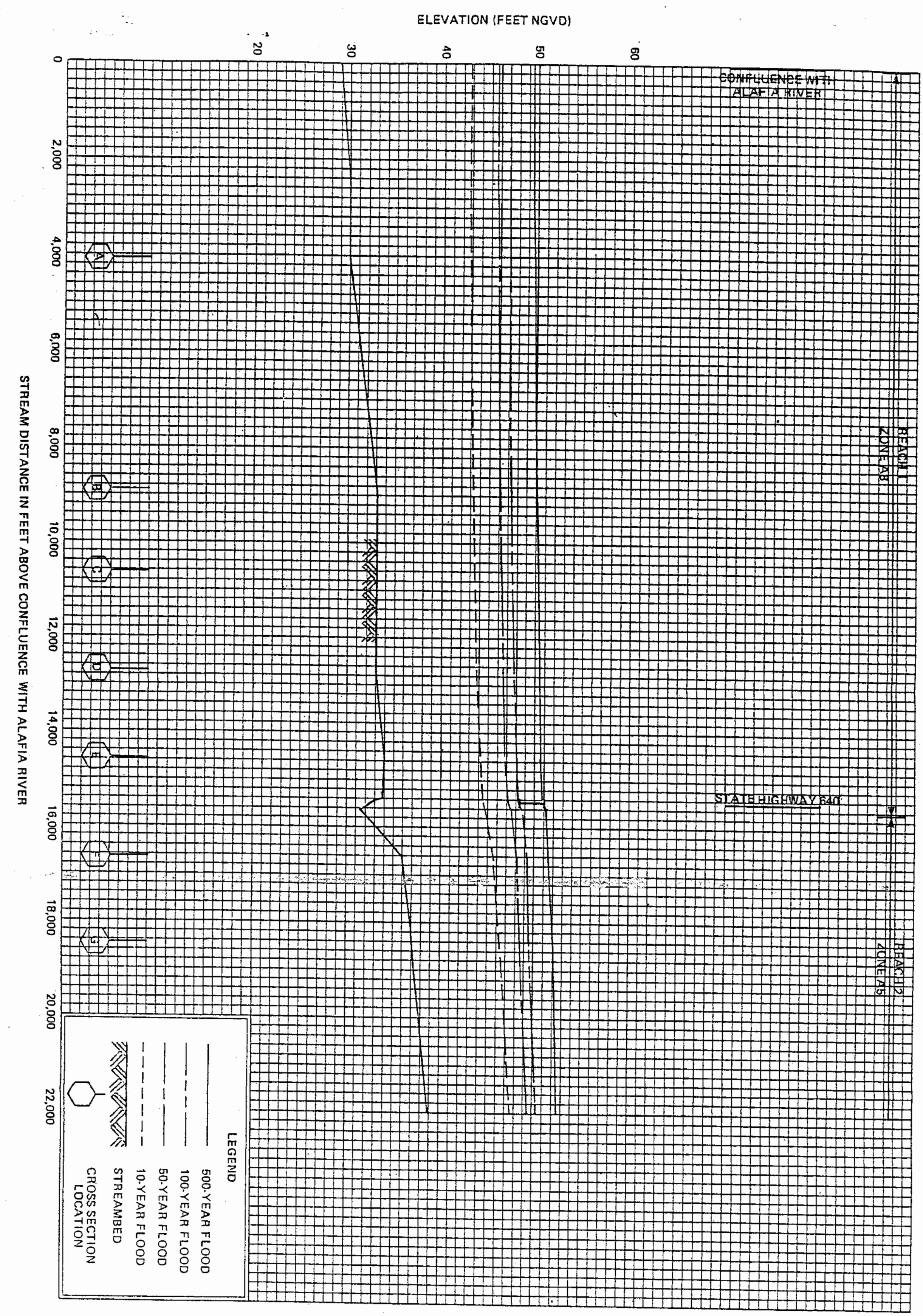
HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

NORTH PRONG ALAFIA RIVER

04P



05P

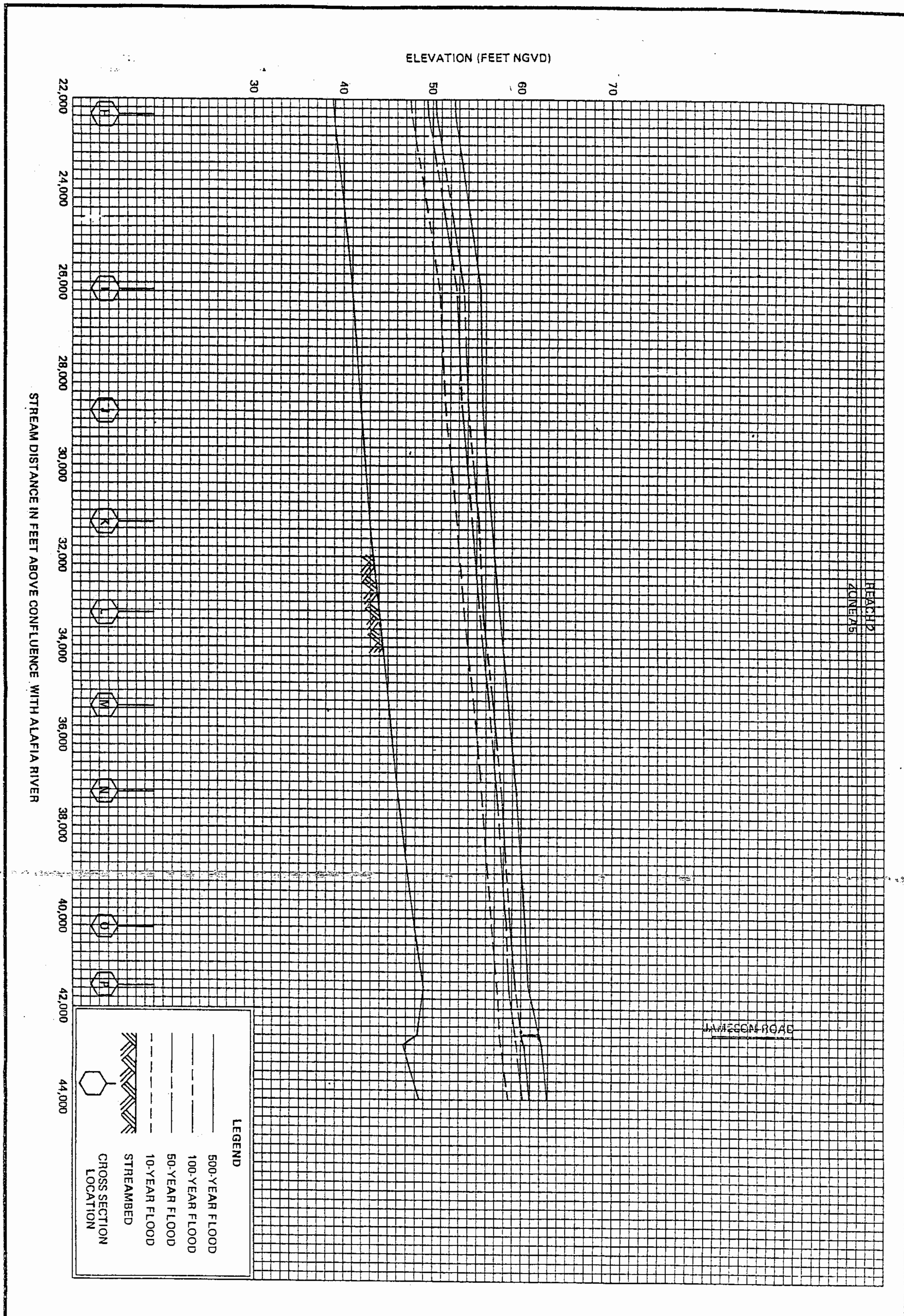
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

SOUTH PRONG ALAFIA RIVER



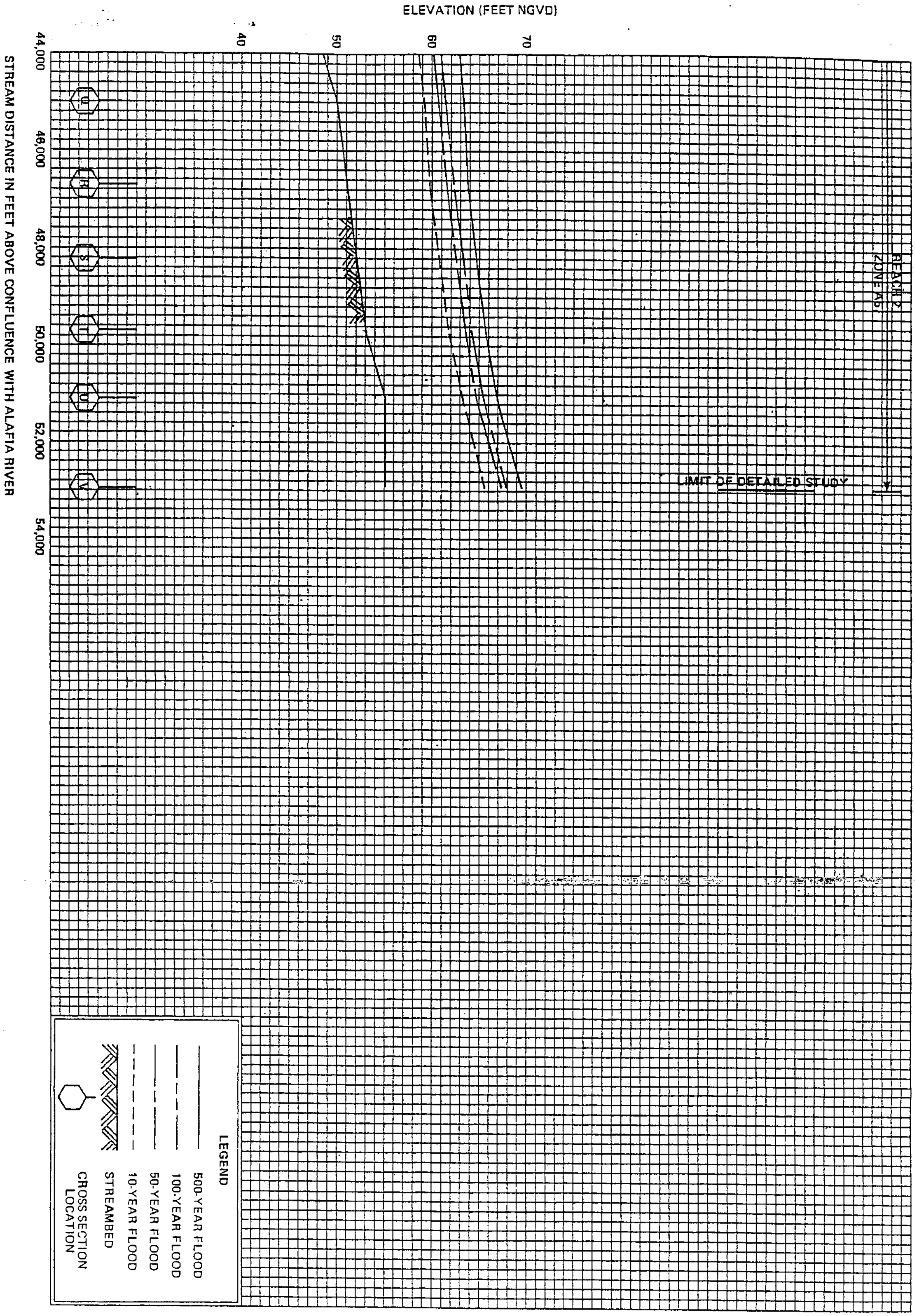
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

SOUTH PRONG ALAFIA RIVER



FEDERAL EMERGENCY MANAGEMENT AGENCY

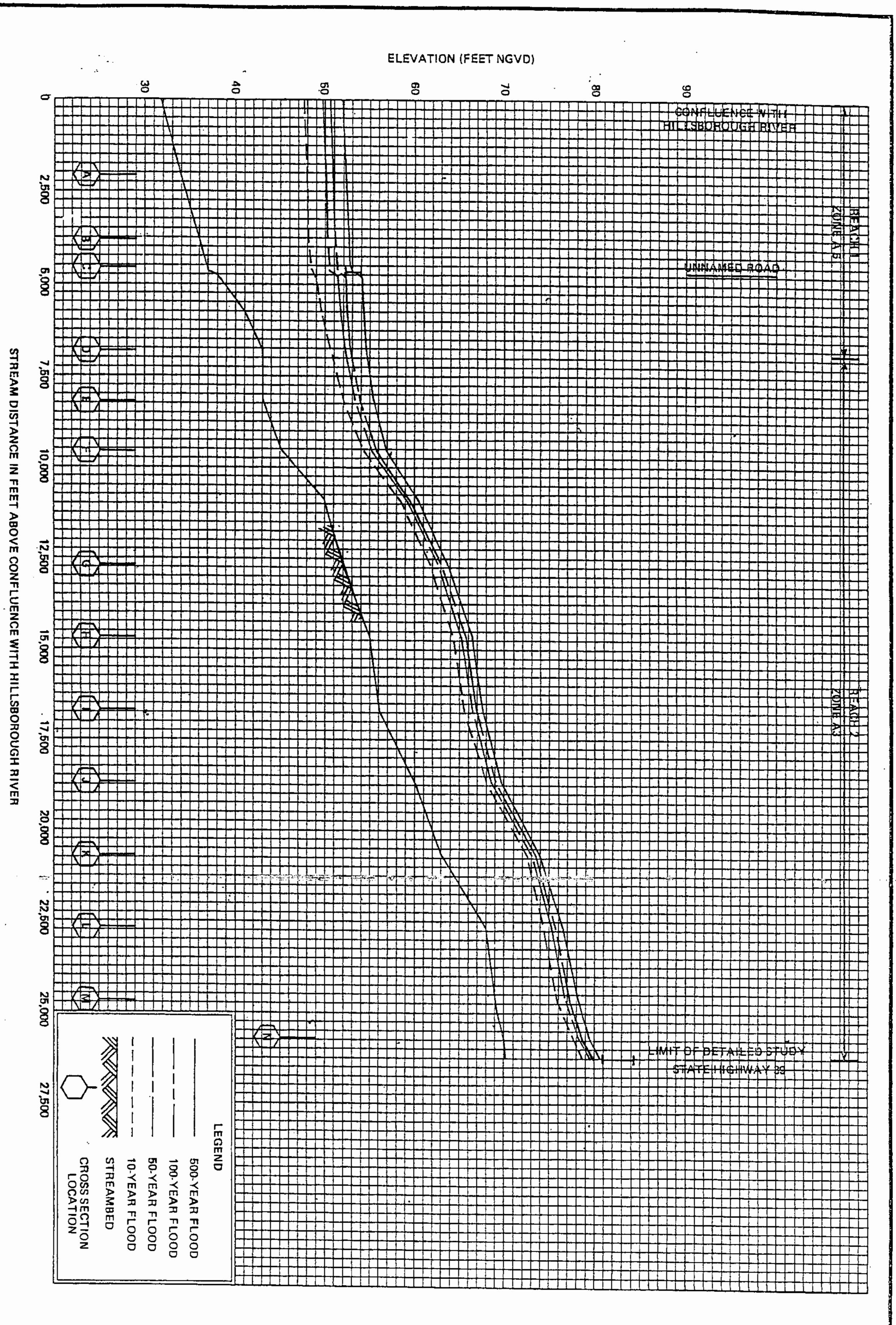
HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

SOUTH PRONG ALAFIA RIVER

07P



08P

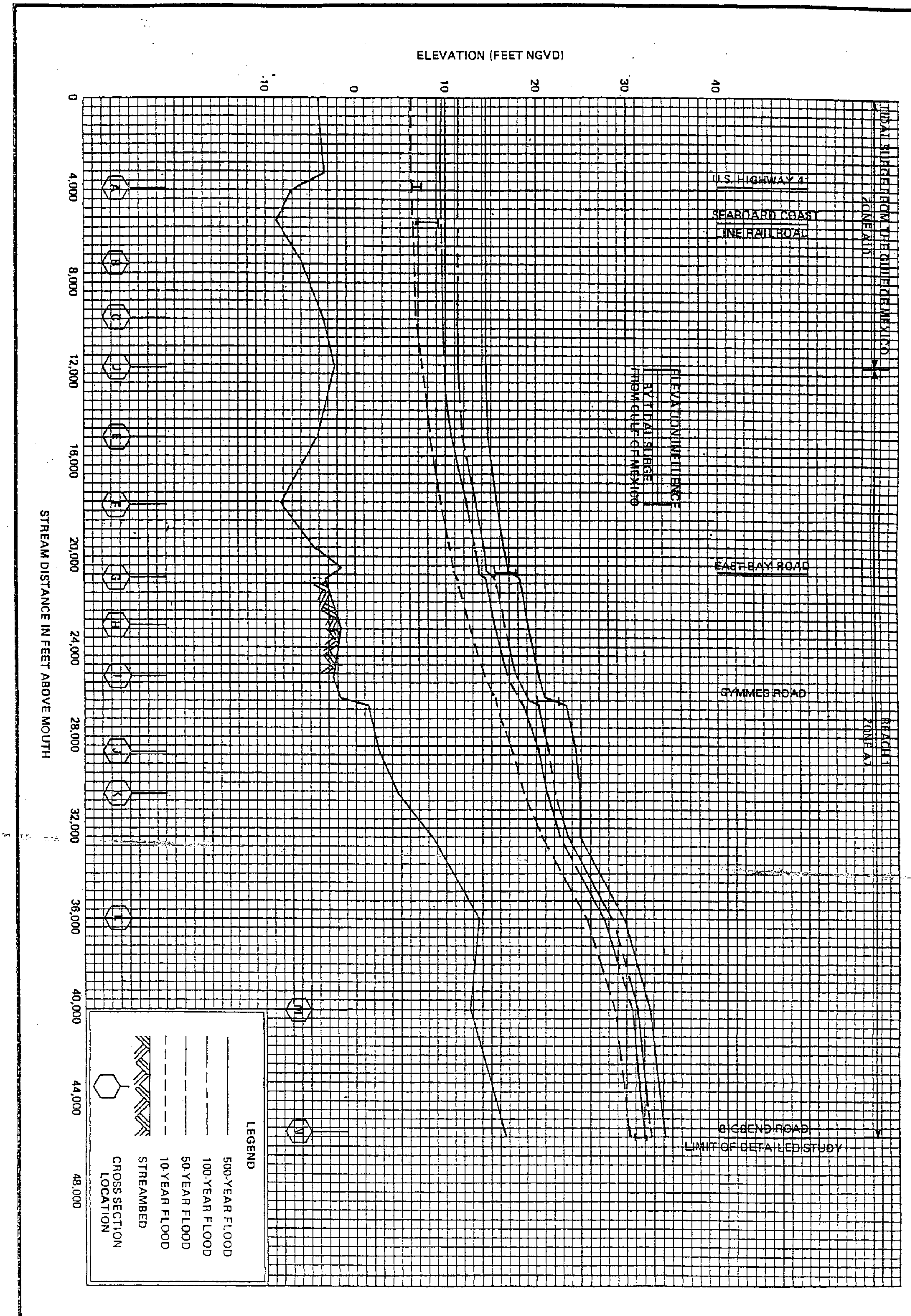
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

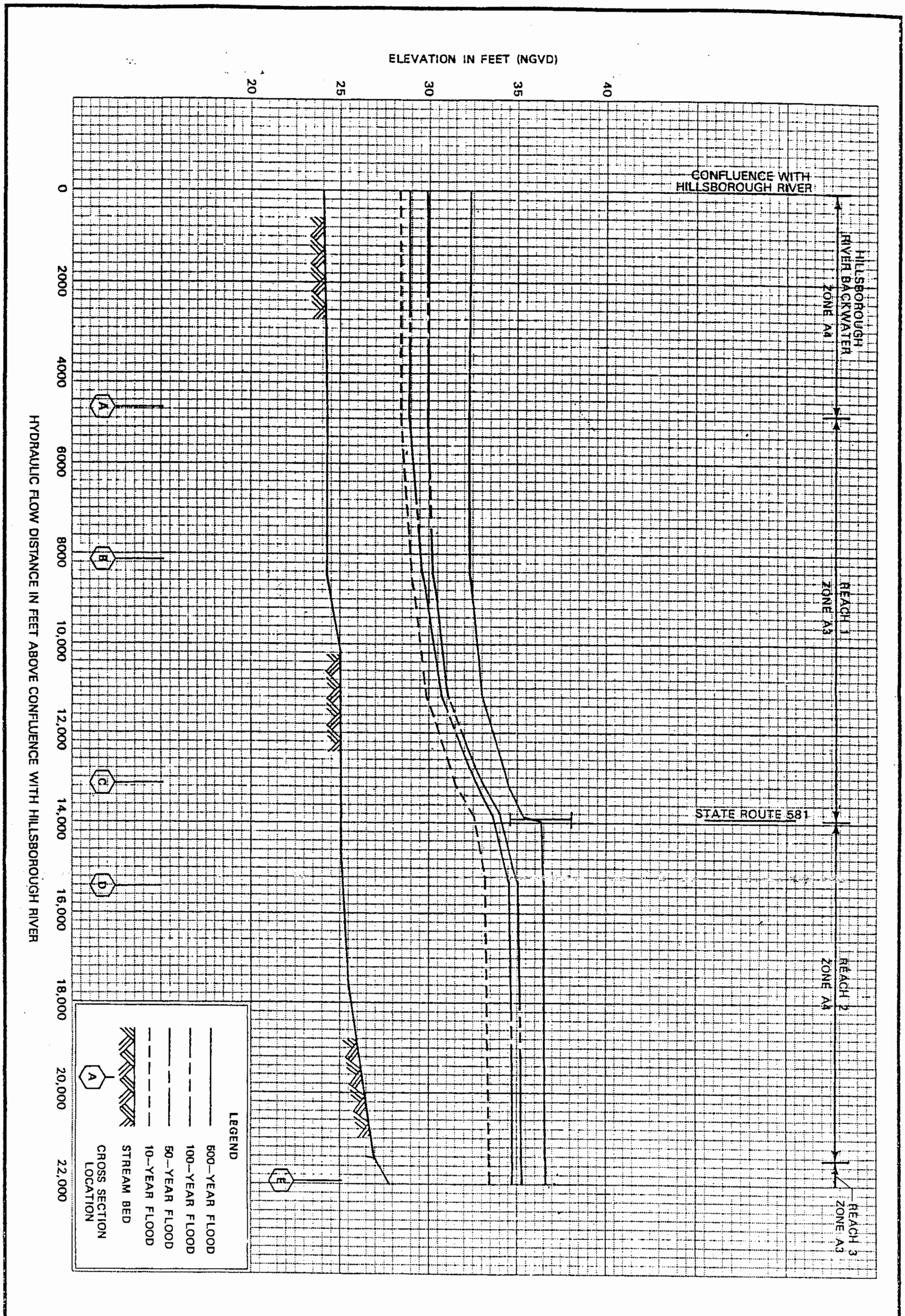
BLACKWATER CREEK



FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

FLOOD PROFILES



10P

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

CYPRESS CREEK

REVISED 8/15/89

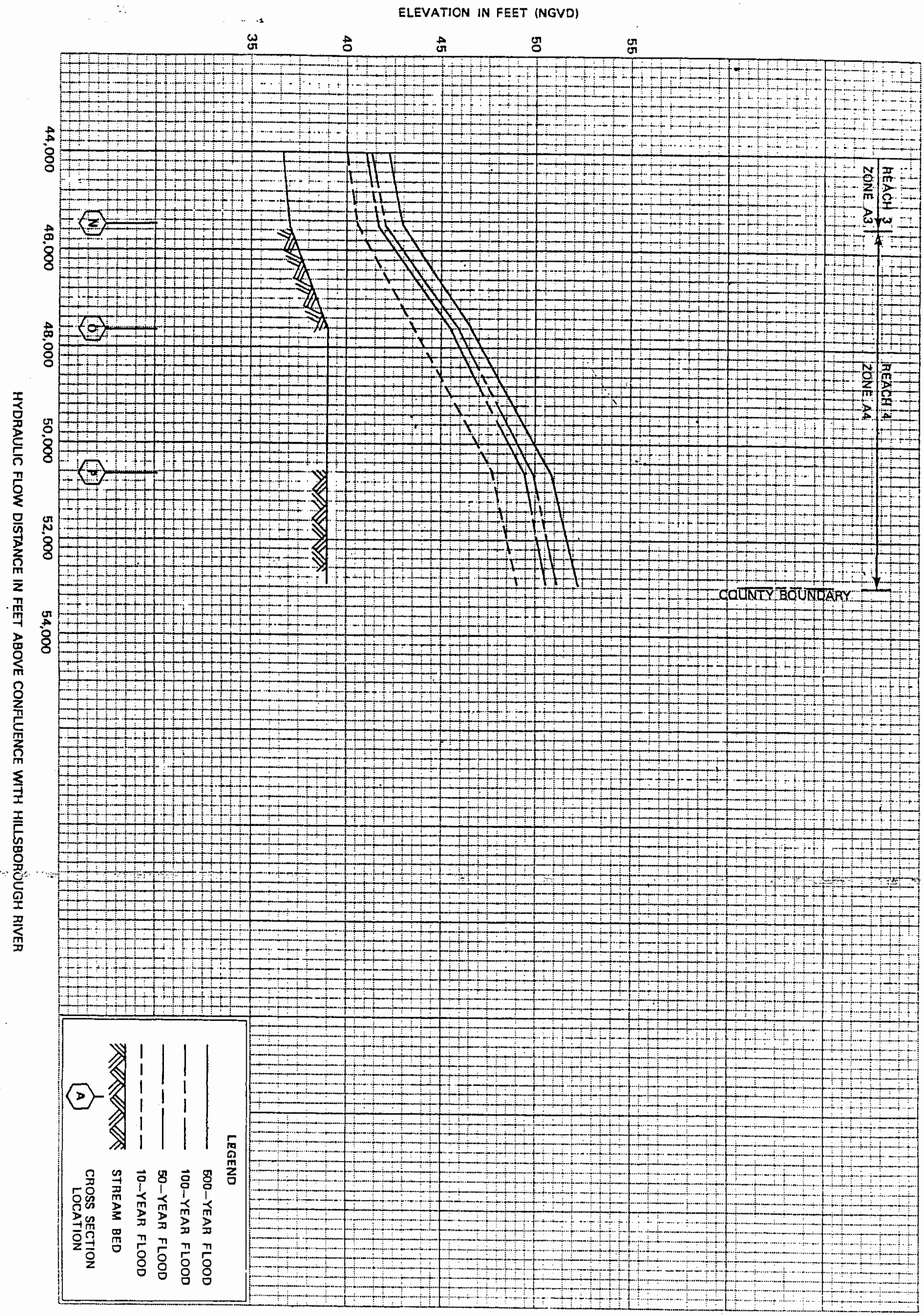
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

CYPRESS CREEK



REVISED 8/15/89

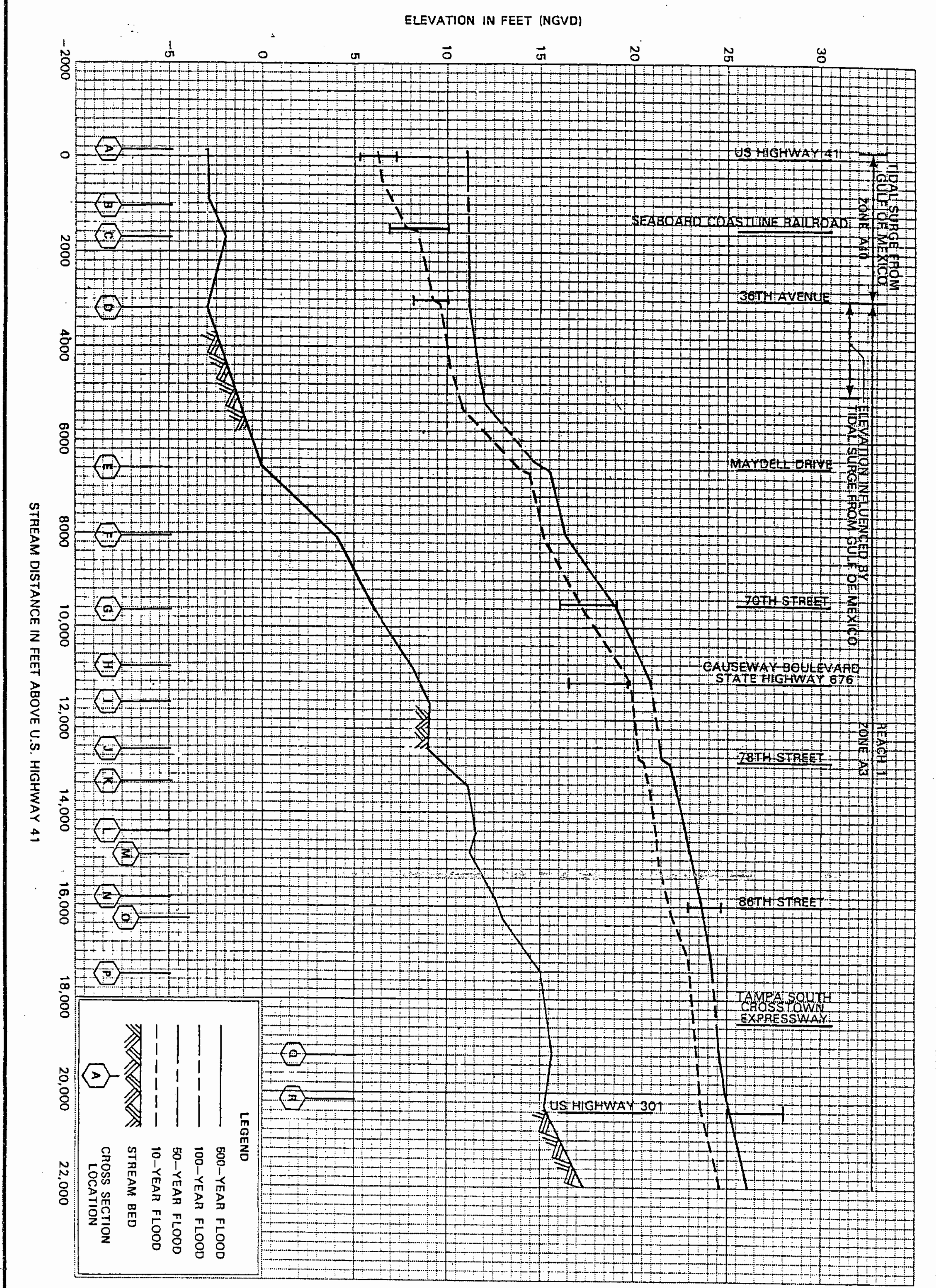
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

CYPRESS CREEK

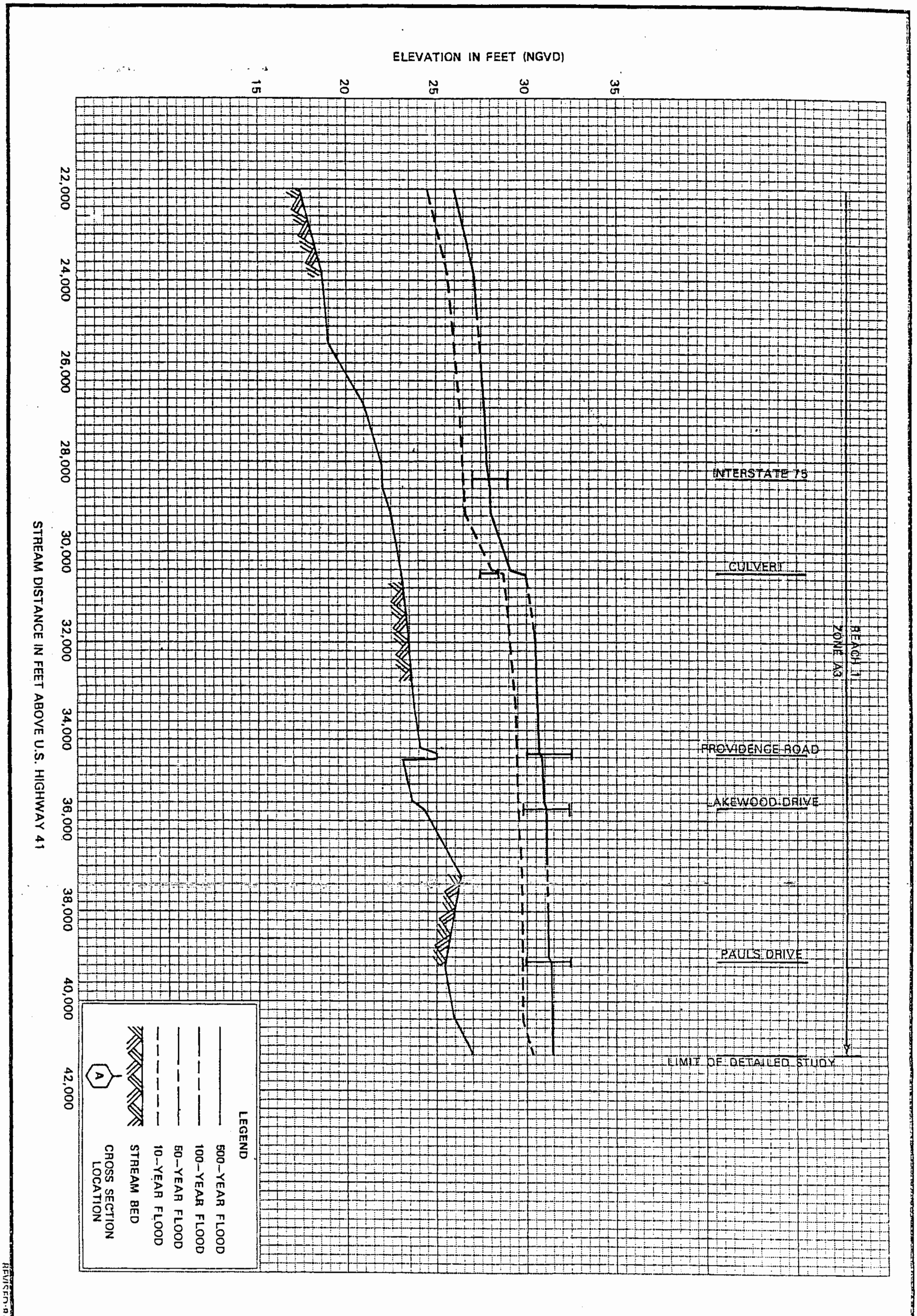


FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL
(UNINCORPORATED AREAS)

FLOOD PROFILES

DELANEY CREEK



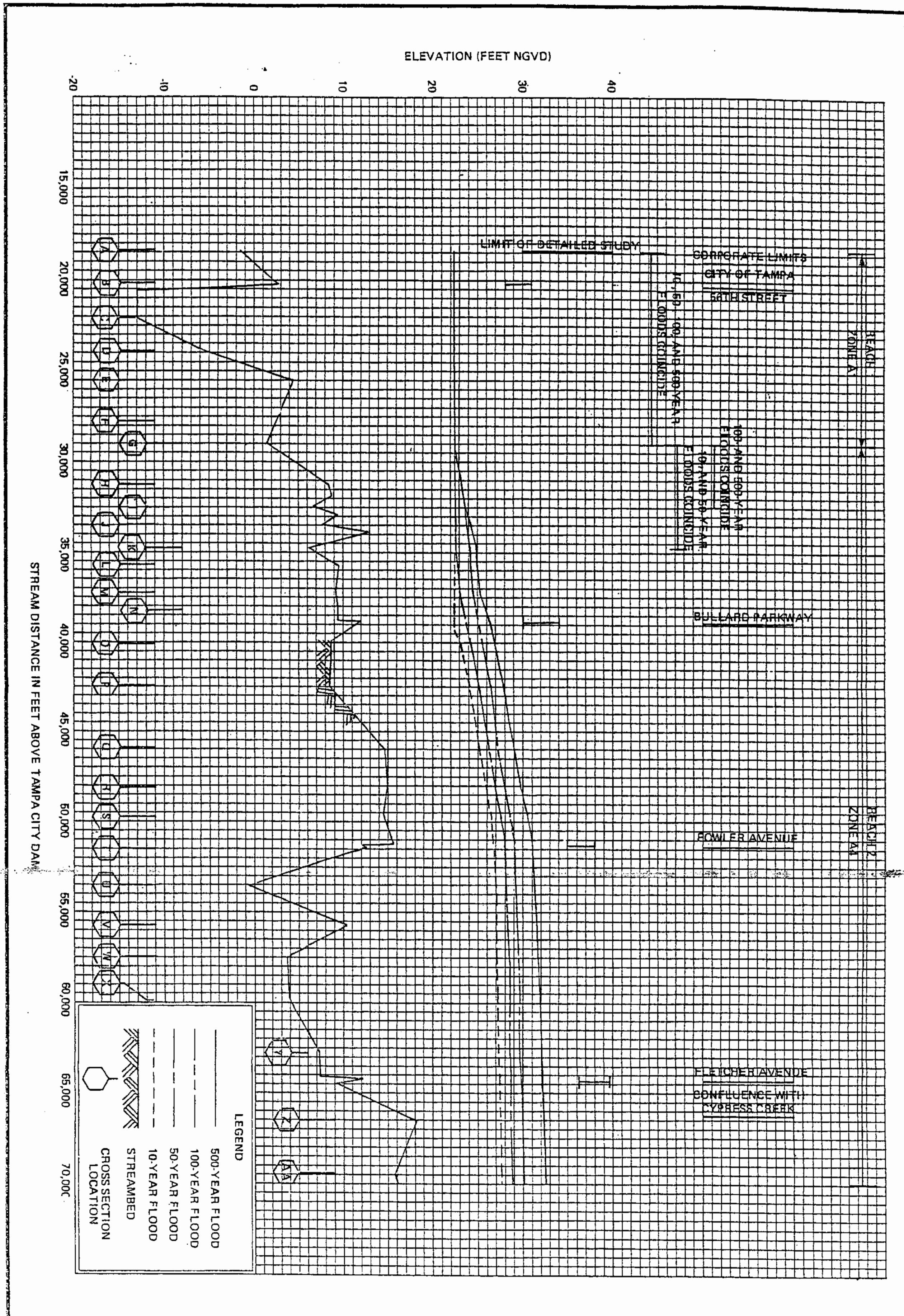
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

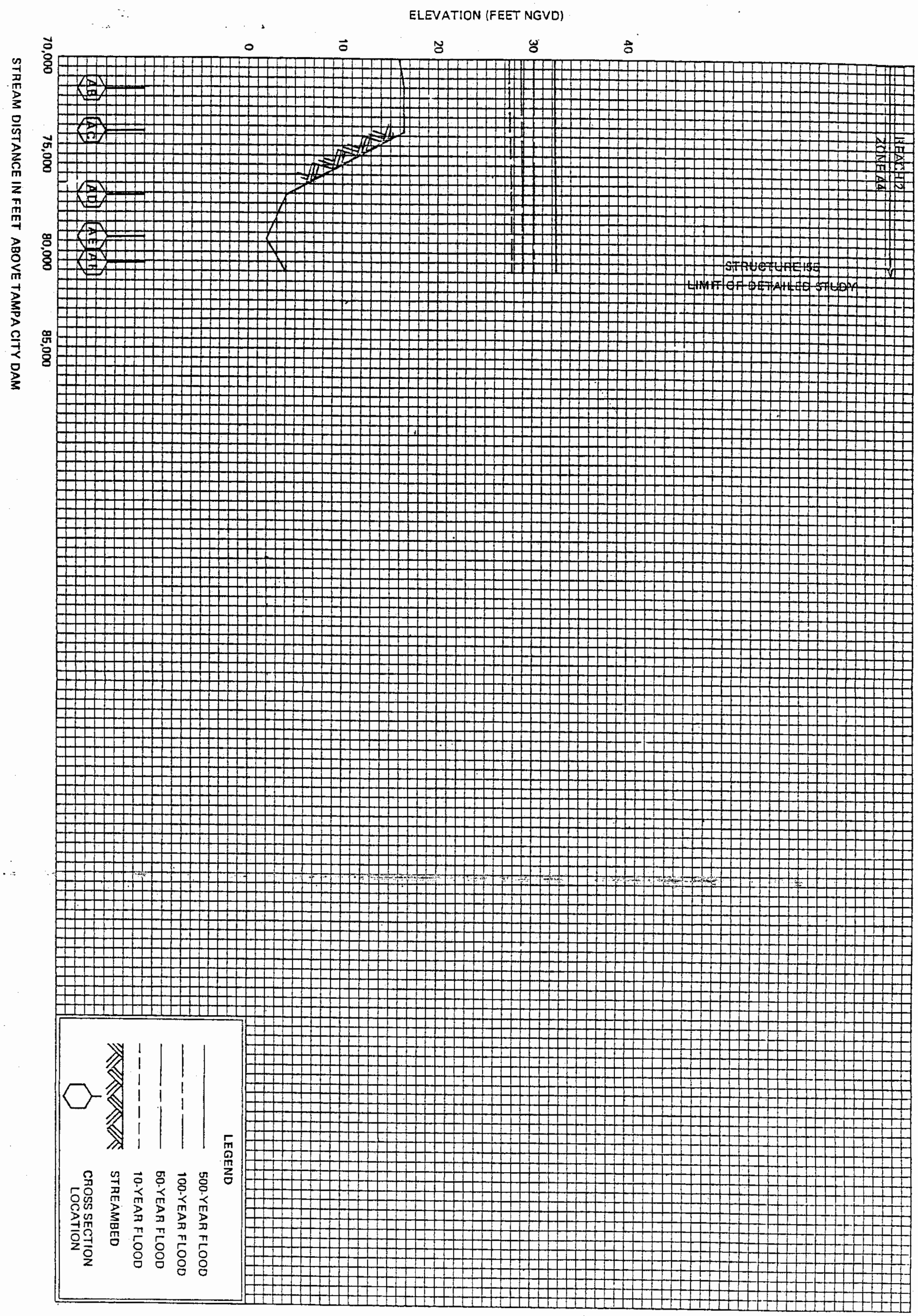
(UNINCORPORATED AREAS)

FLOOD PROFILES

DELANEY CREEK



15P	FEDERAL EMERGENCY MANAGEMENT AGENCY HILLSBOROUGH COUNTY, FL (UNINCORPORATED AREAS)	FLOOD PROFILES HILLSBOROUGH RIVER



16P

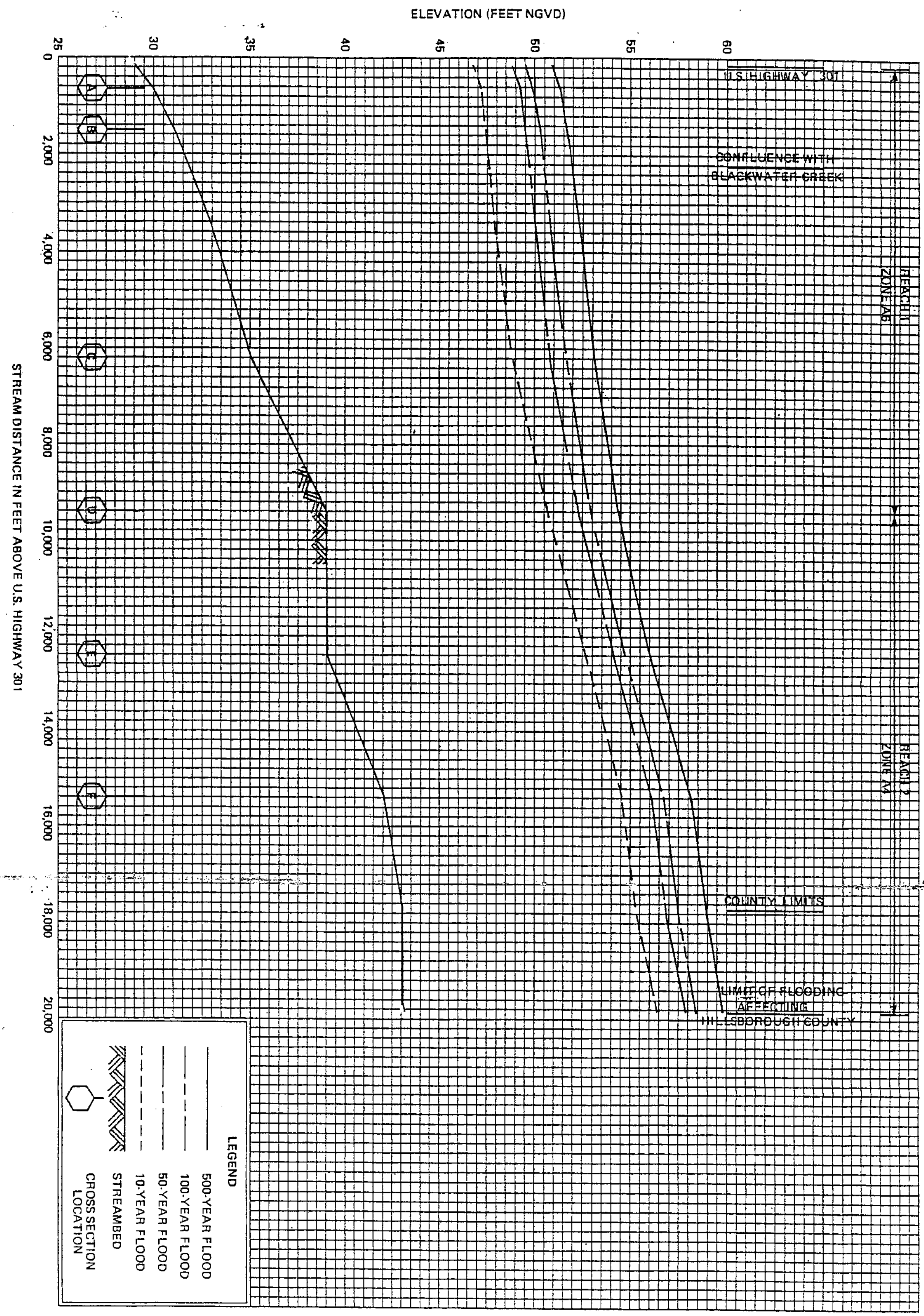
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

HILLSBOROUGH RIVER



17P

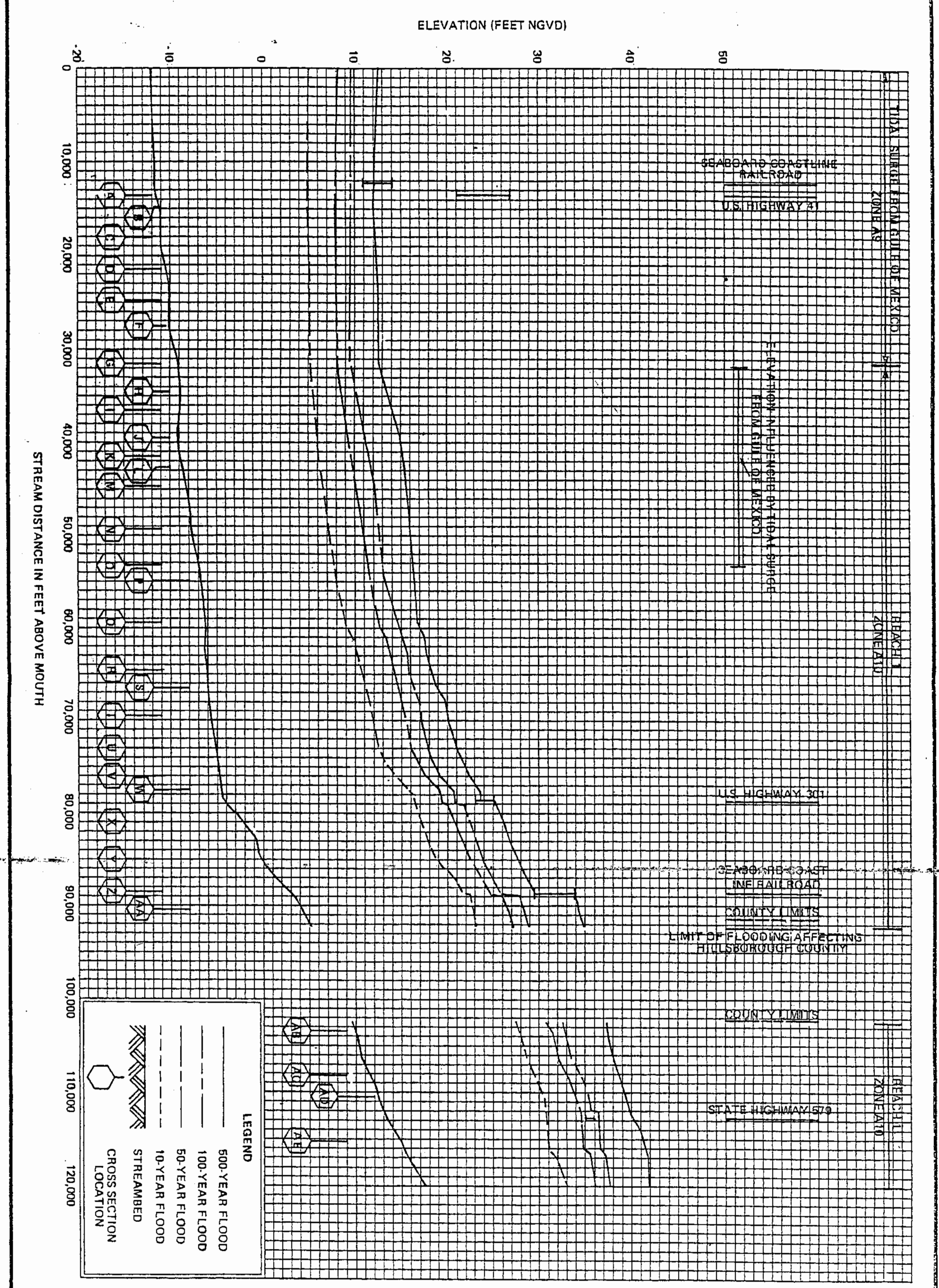
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

HILLSBOROUGH RIVER (UPSTREAM OF U.S. HIGHWAY 301)



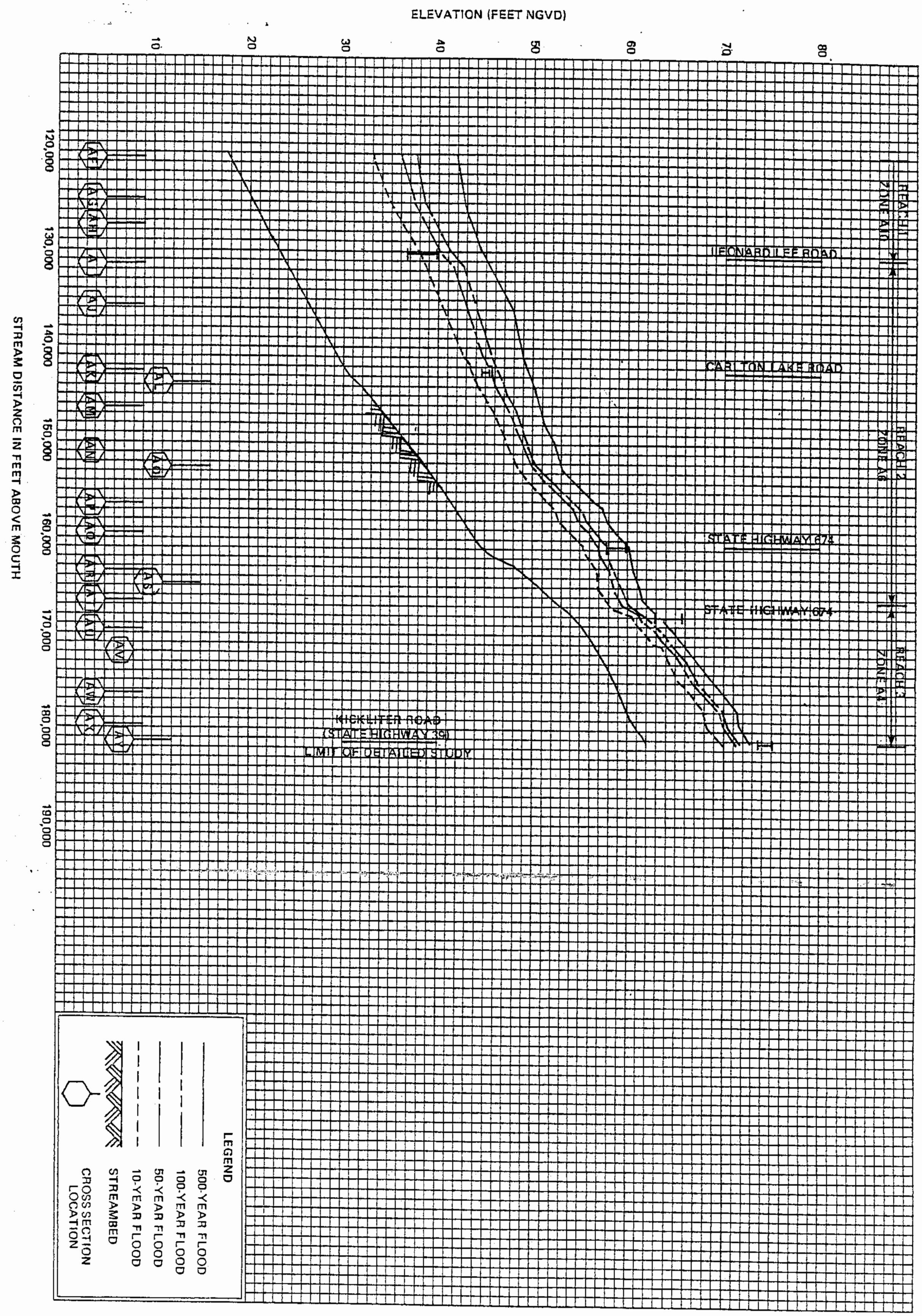
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

LITTLE MANATEE RIVER



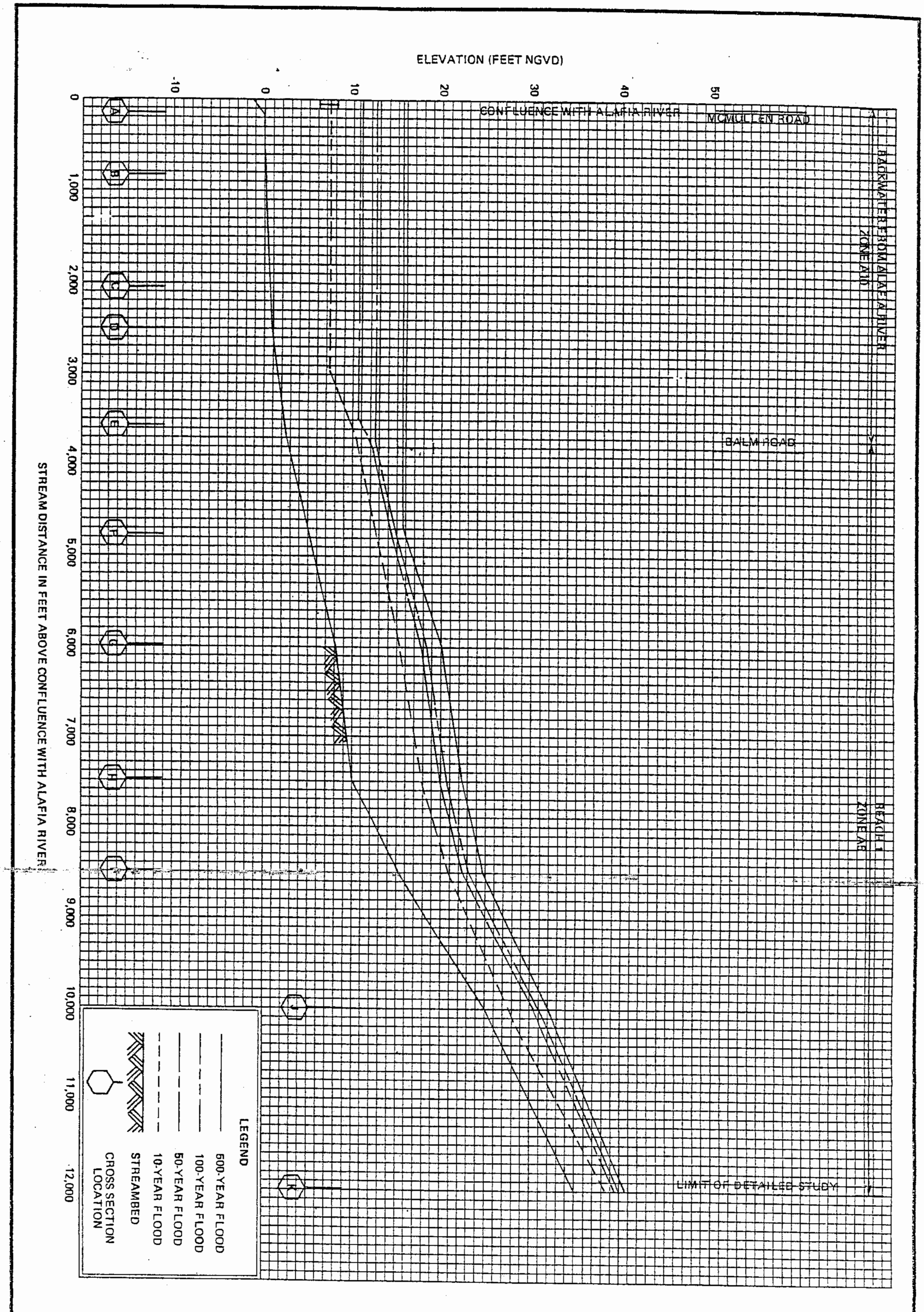
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

LITTLE MANATEE RIVER



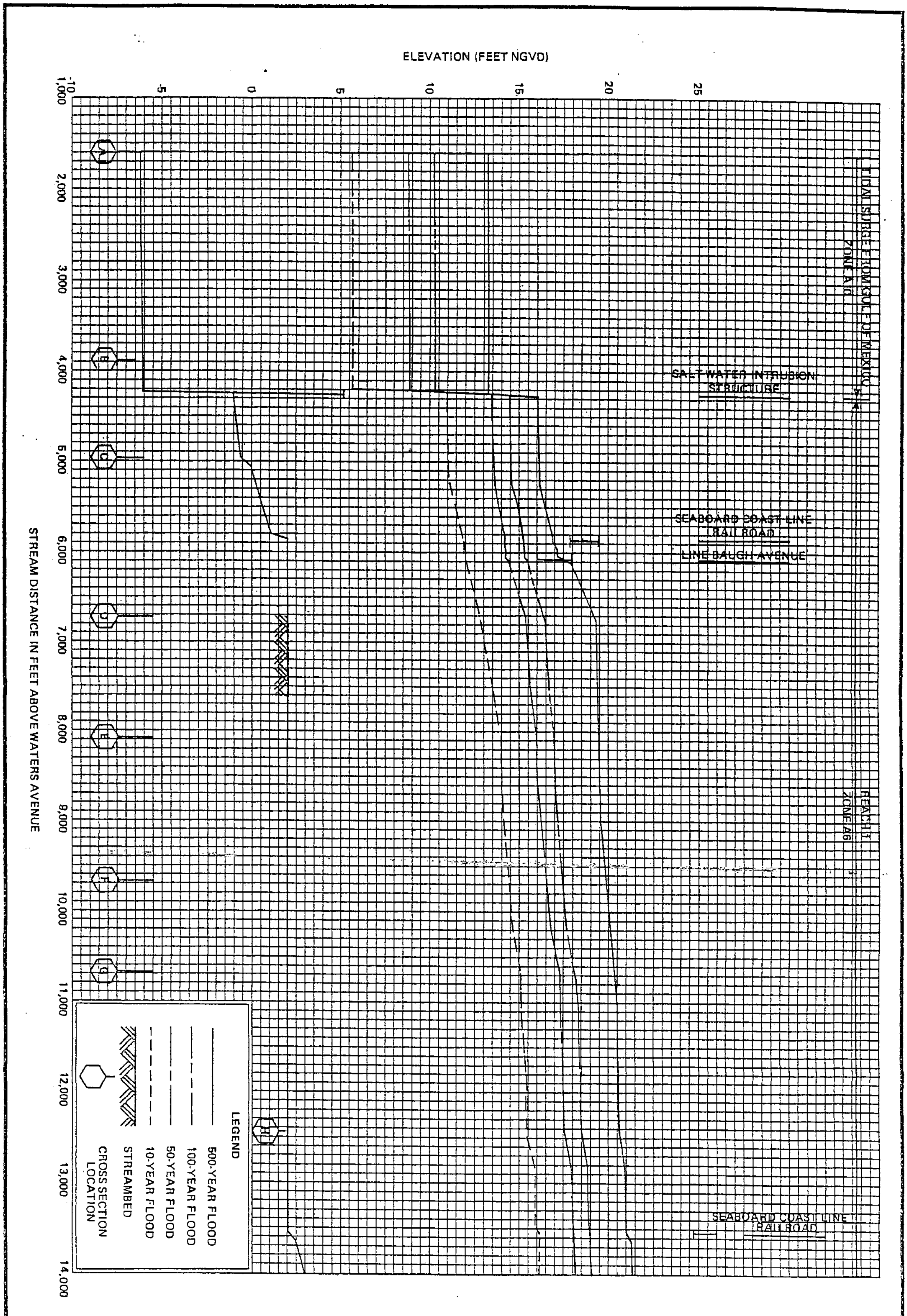
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

RICE CREEK

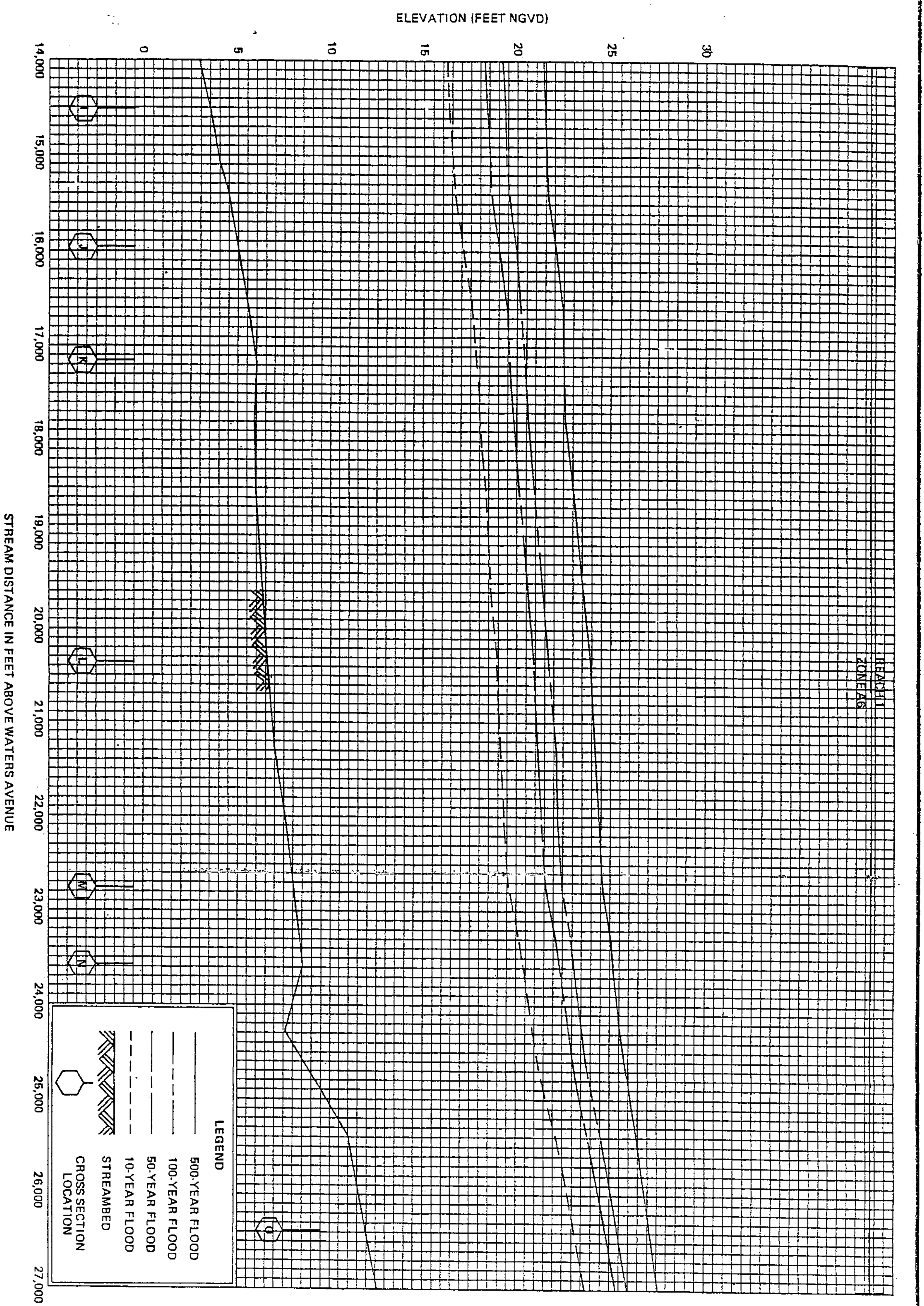


FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

FLOOD PROFILES

ROCKY CREEK



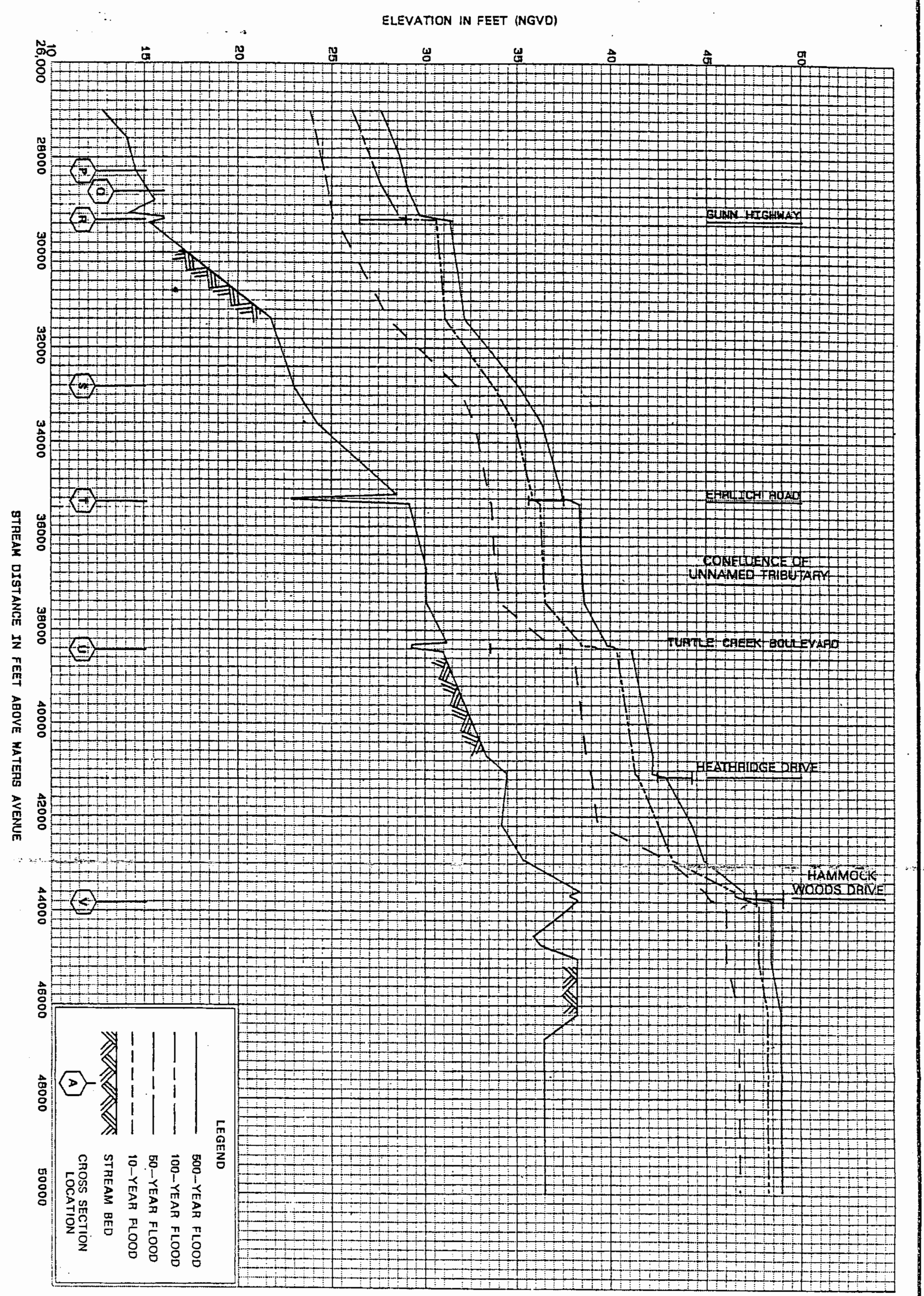
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

ROCKY CREEK



FEDERAL EMERGENCY MANAGEMENT AGENCY

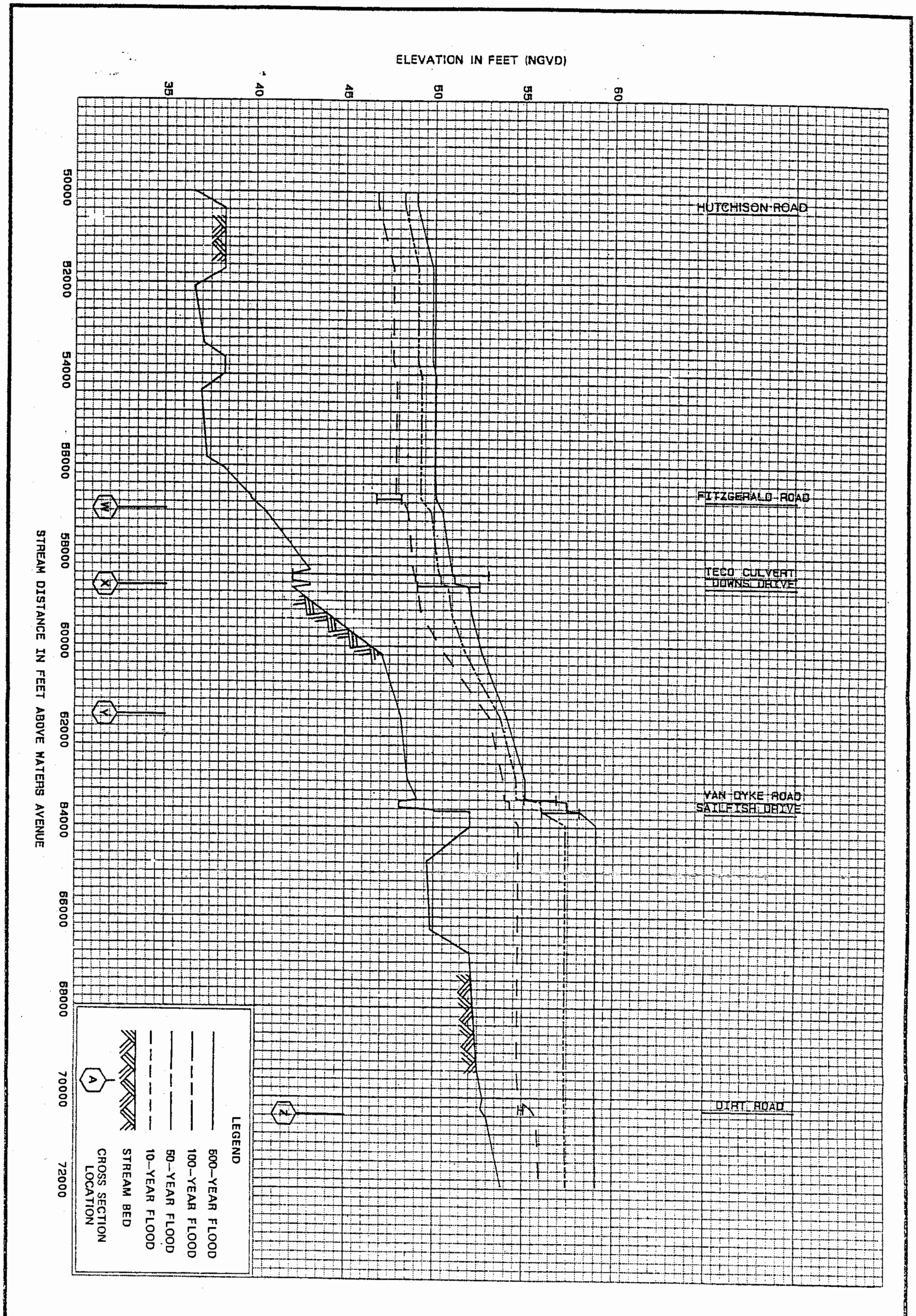
HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

ROCKY CREEK

23P



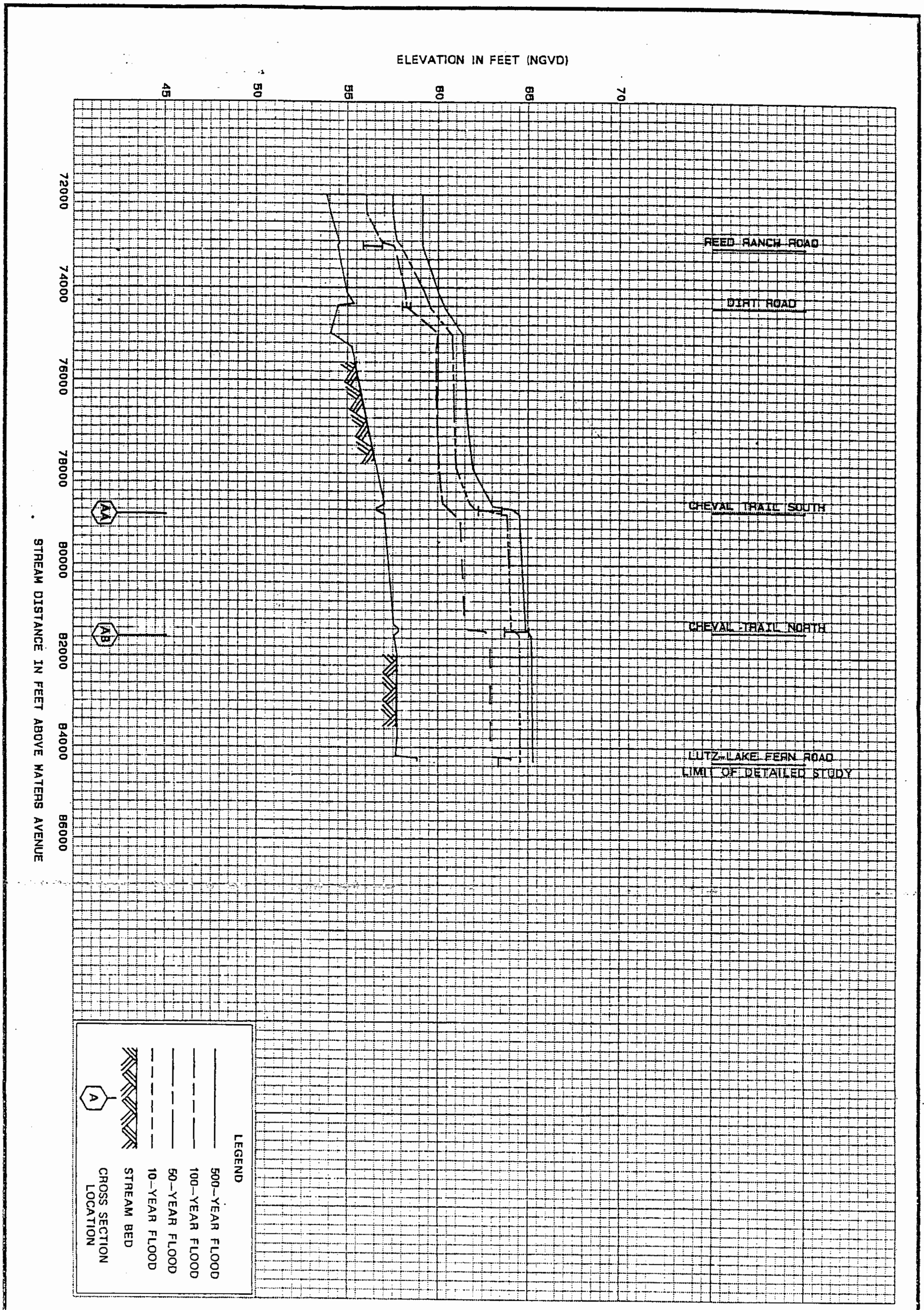
24P

FEDERAL EMERGENCY MANAGEMENT AGENCY

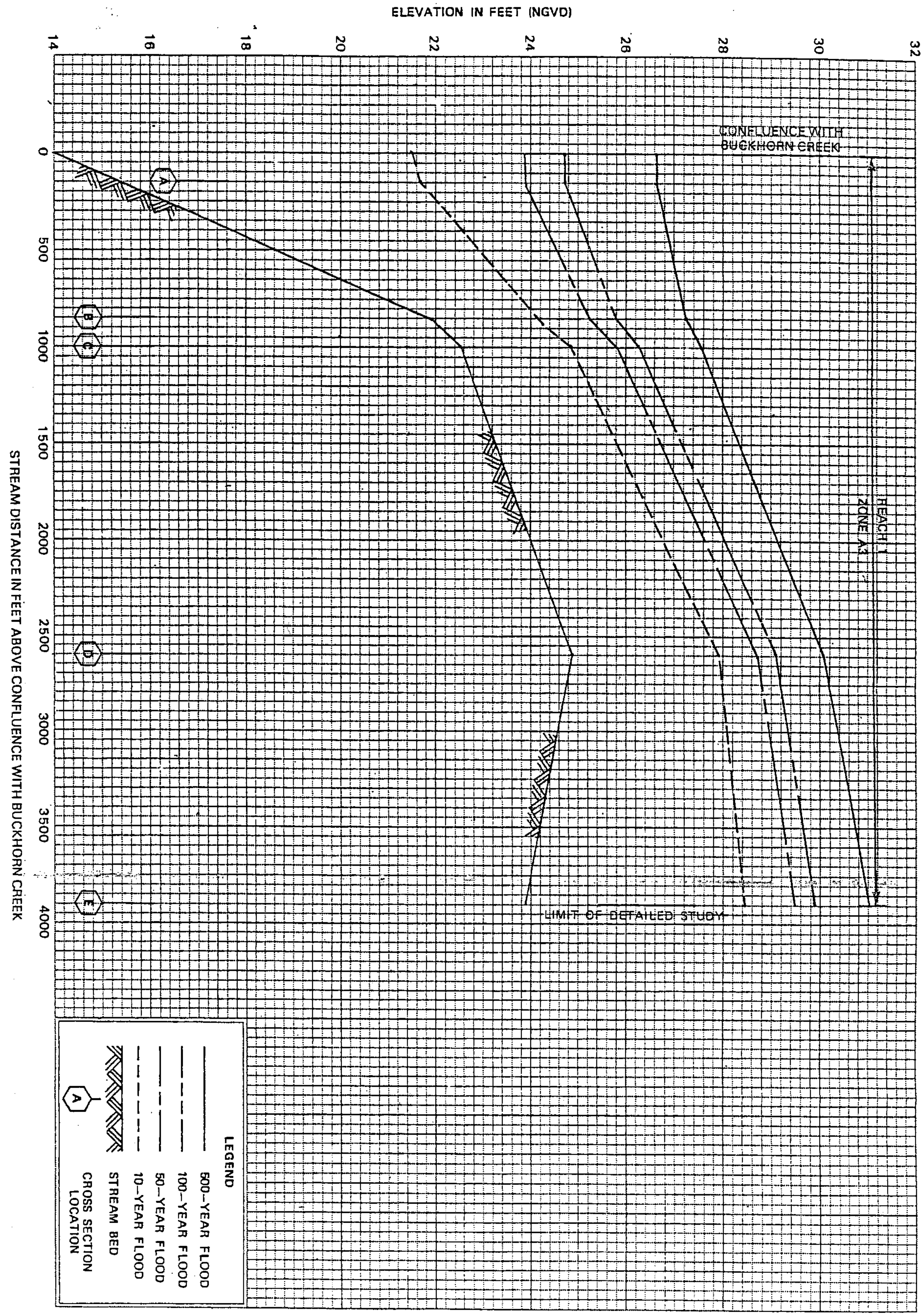
HILLSBOROUGH COUNTY, FL
(UNINCORPORATED AREAS)

FLOOD PROFILES

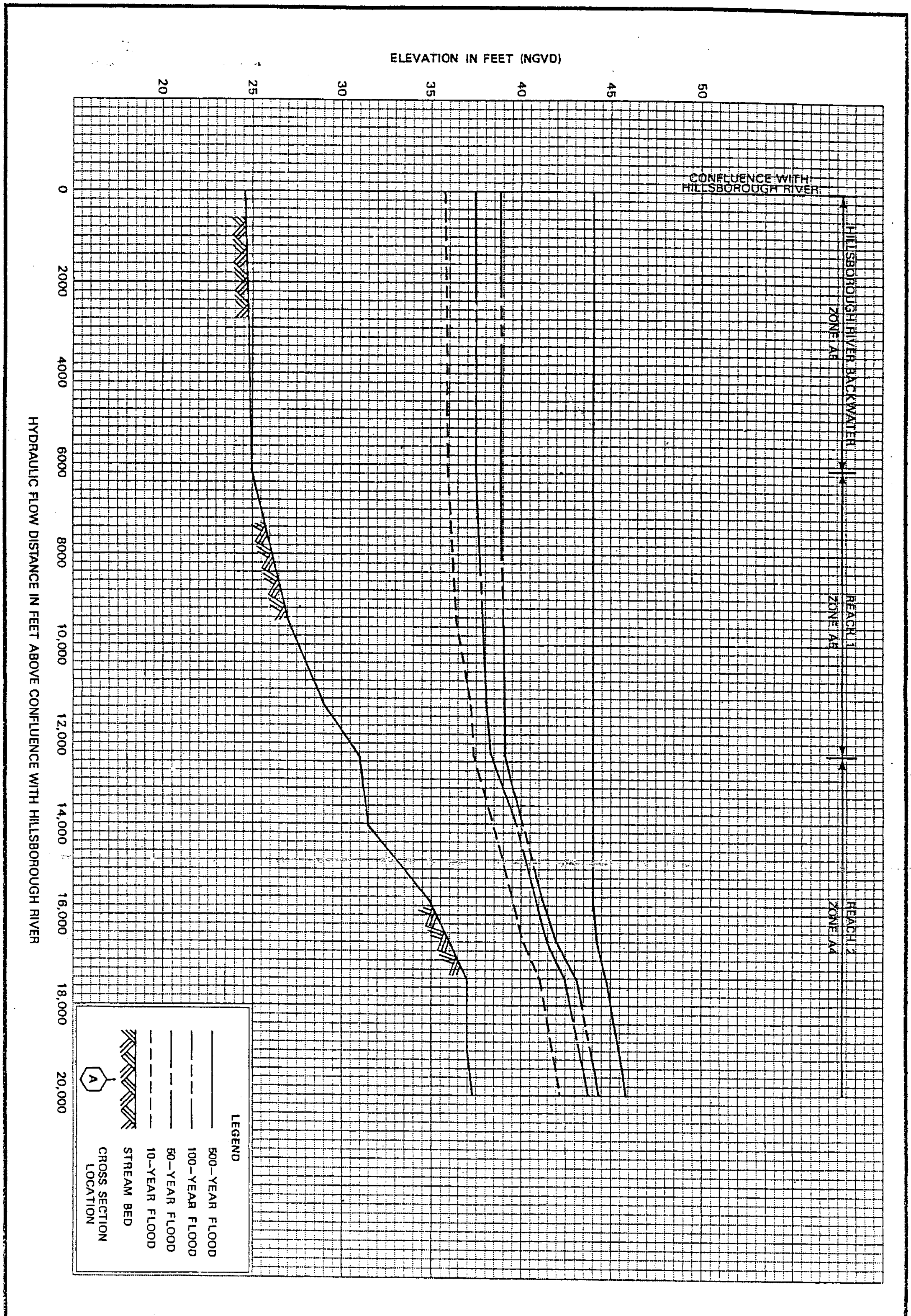
ROCKY CREEK



25P	FEDERAL EMERGENCY MANAGEMENT AGENCY **HILLSBOROUGH COUNTY, FL** *(UNINCORPORATED AREAS)*	**FLOOD PROFILES** **ROCKY CREEK**



26P	FEDERAL EMERGENCY MANAGEMENT AGENCY **HILLSBOROUGH COUNTY, FL** (UNINCORPORATED AREAS)	**FLOOD PROFILES** **TRIBUTARY CANAL**



REVISED 8/15/89

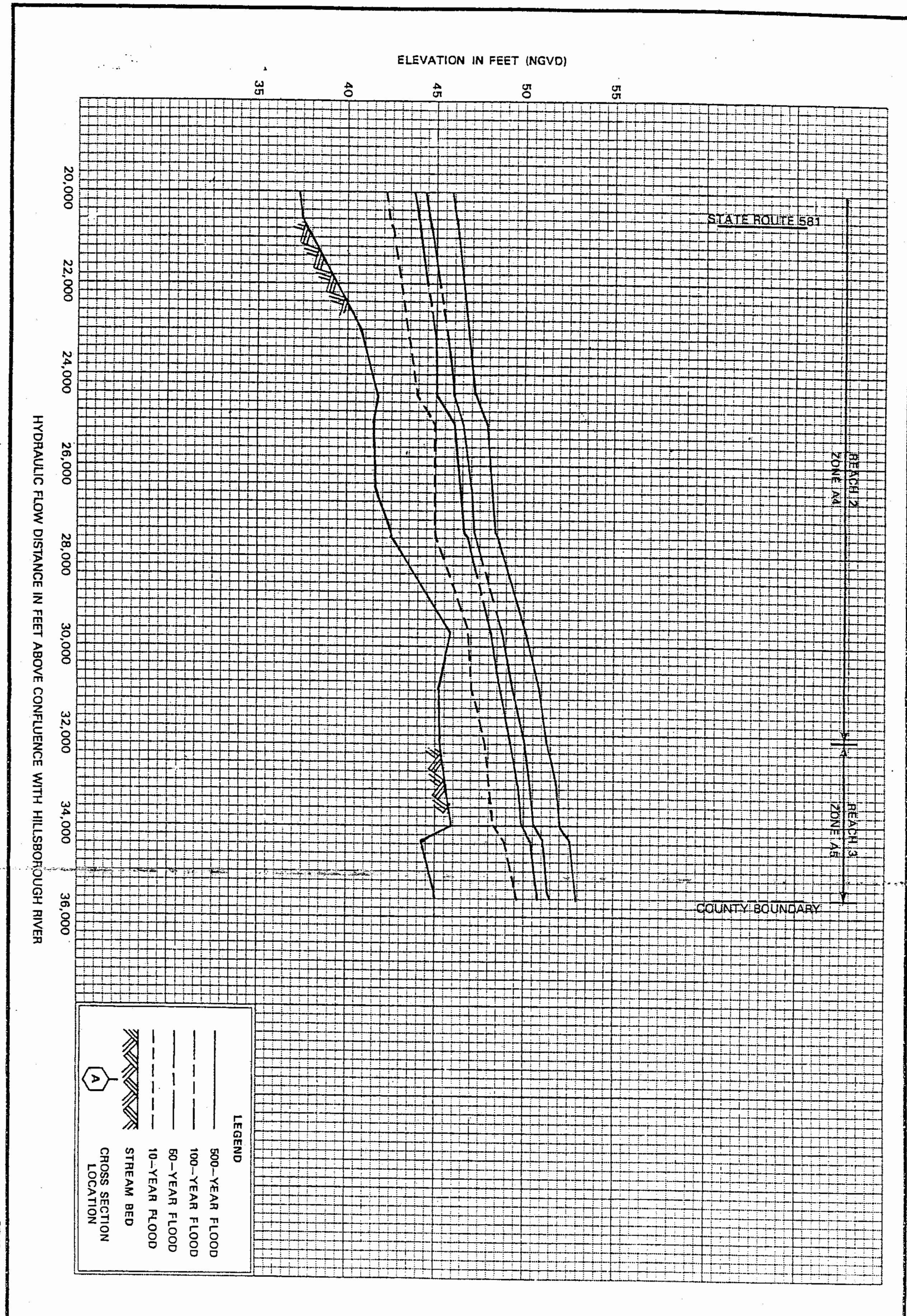
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

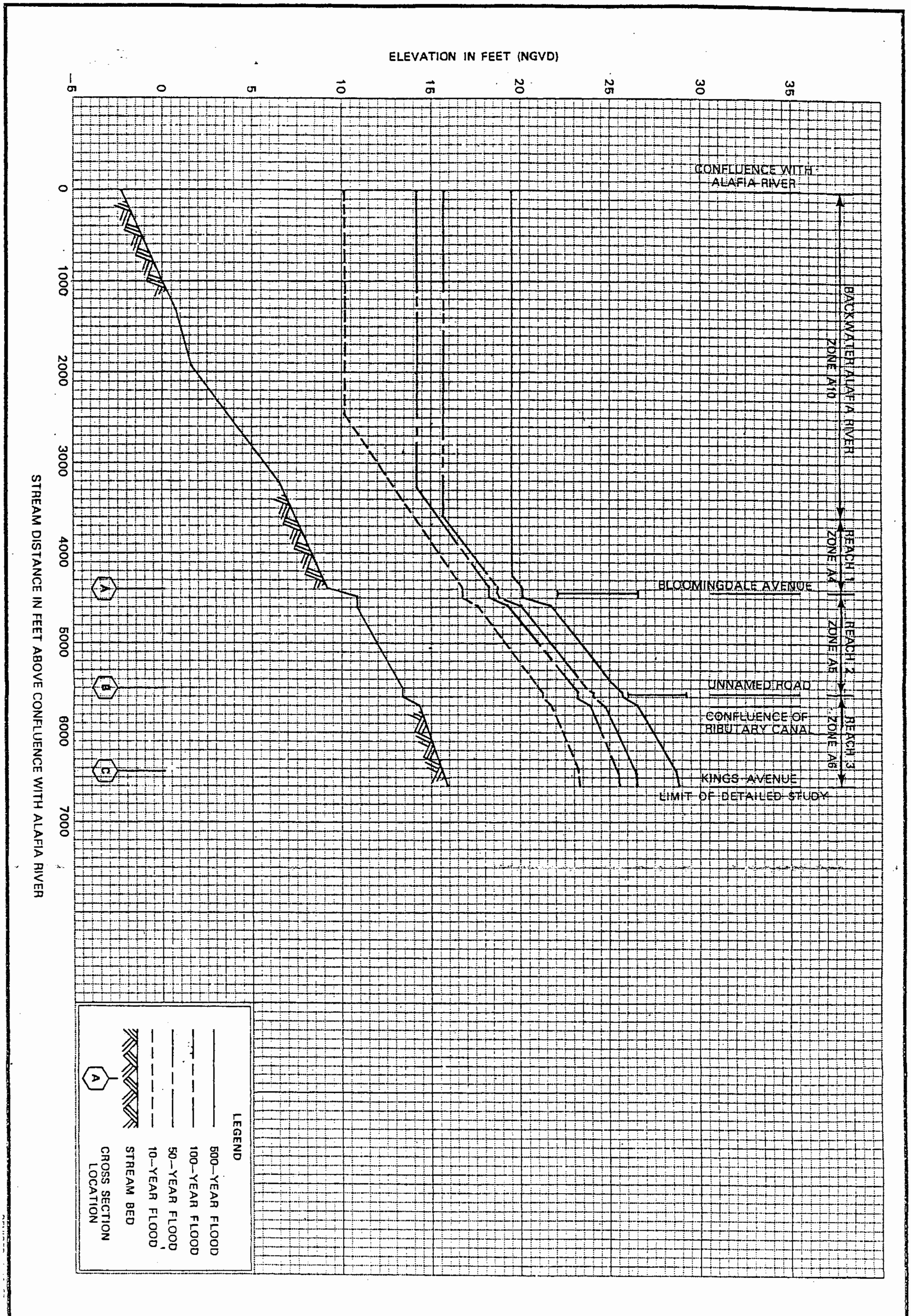
(UNINCORPORATED AREAS)

FLOOD PROFILES

TROUT CREEK



20P	FEDERAL EMERGENCY MANAGEMENT AGENCY **HILLSBOROUGH COUNTY, FL** *(UNINCORPORATED AREAS)*	**FLOOD PROFILES** **TROUT CREEK**



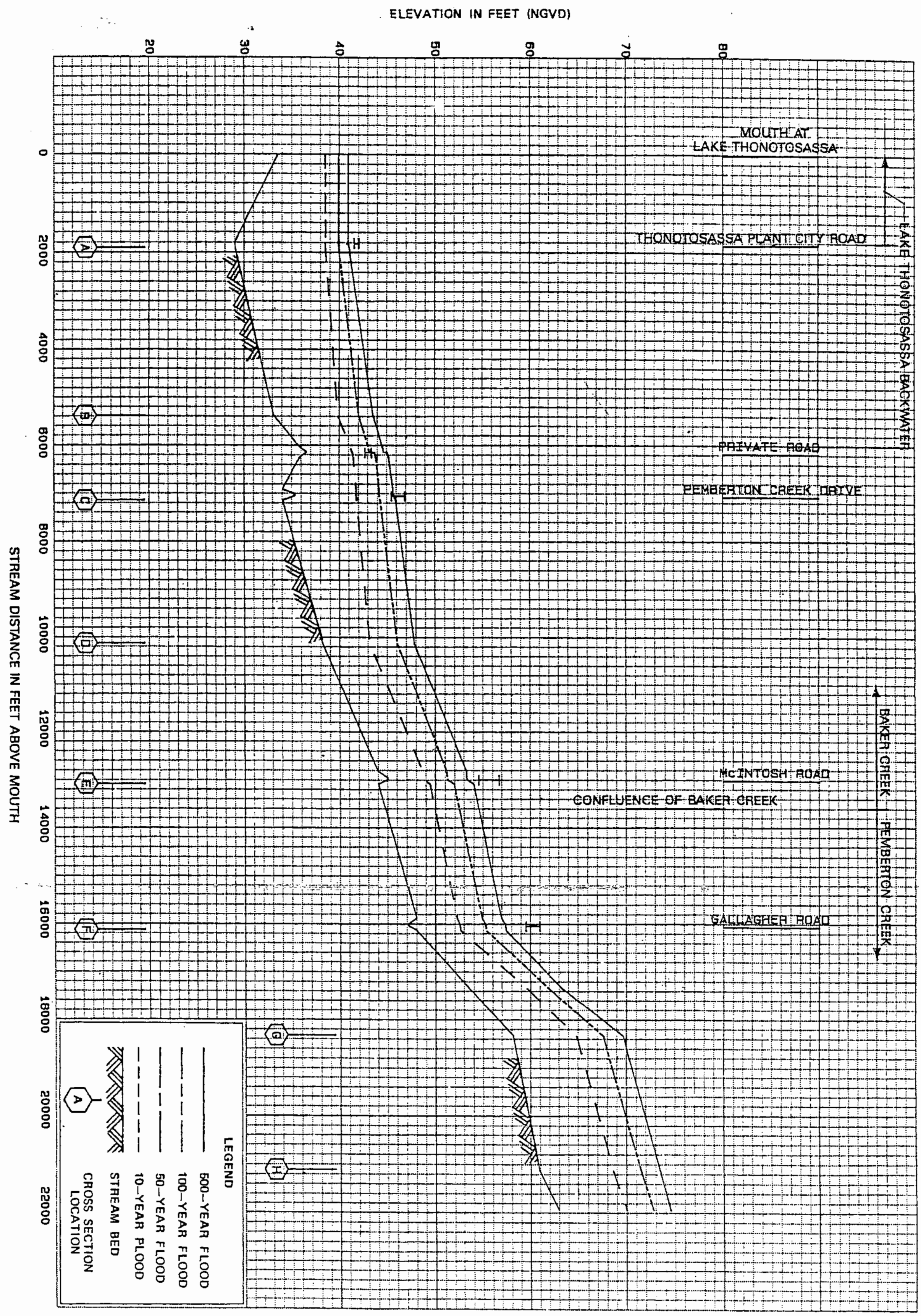
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

BUCKHORN CREEK



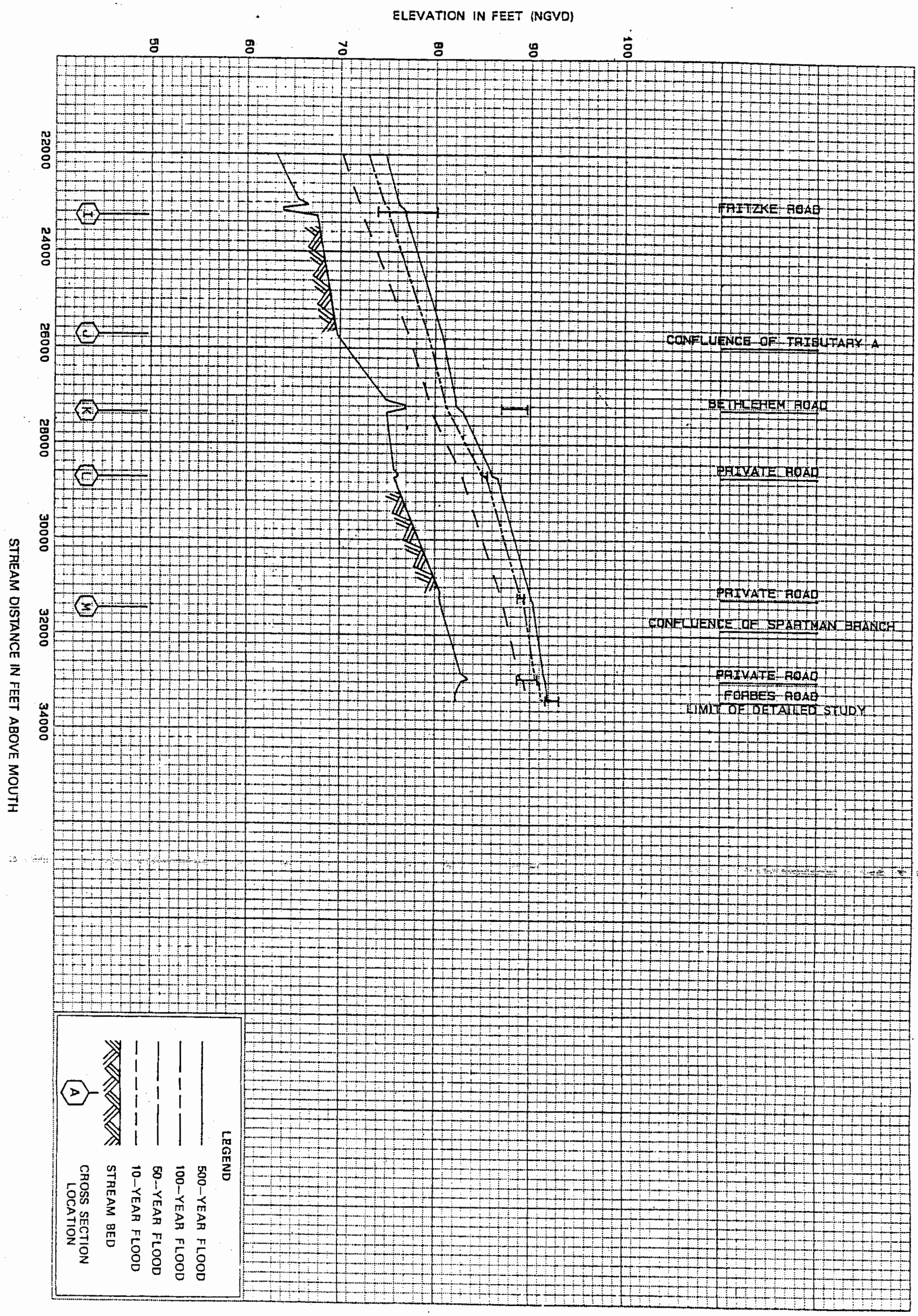
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

BAKER CREEK/PEMBERTON CREEK



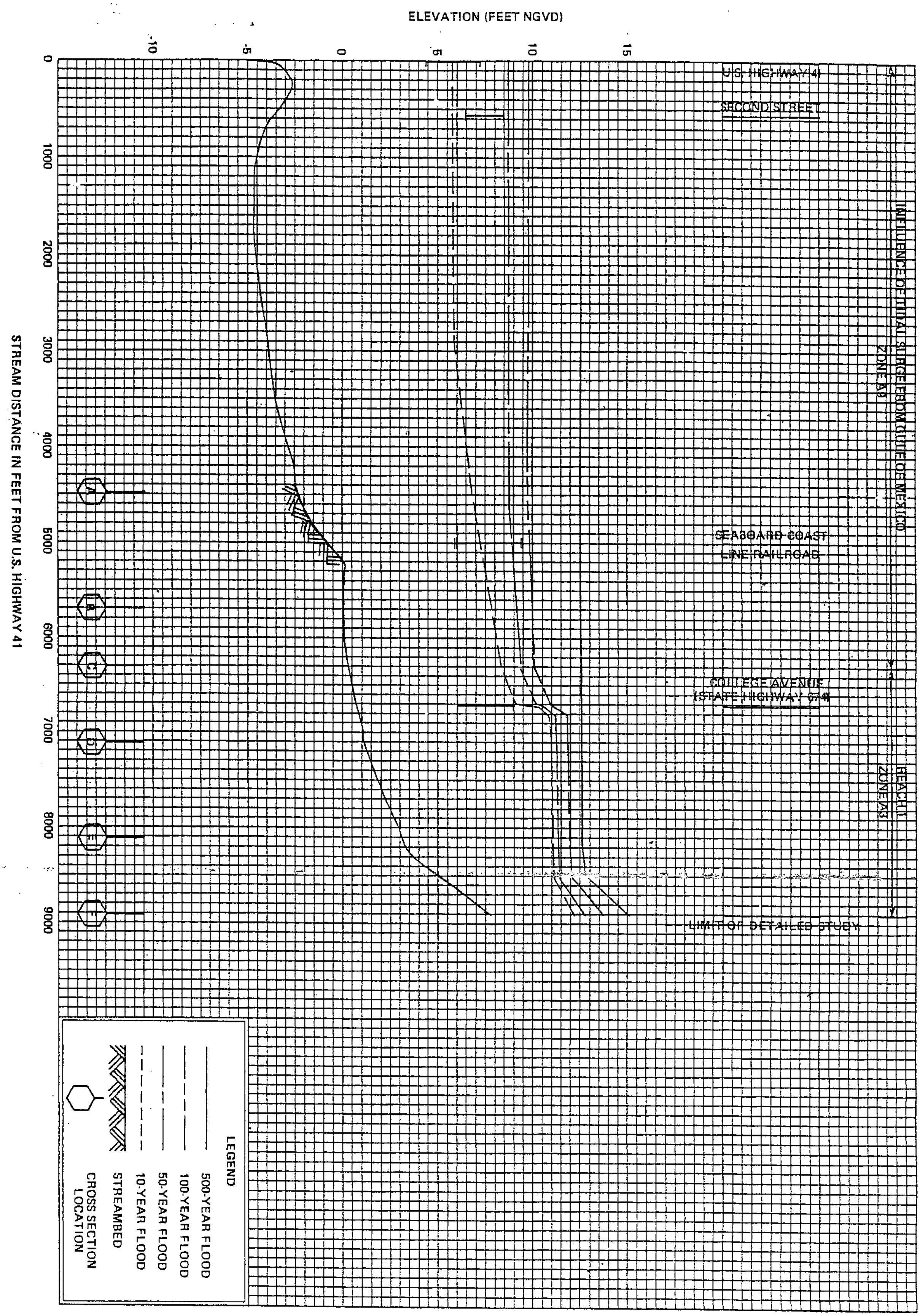
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

PEMBERTON CREEK



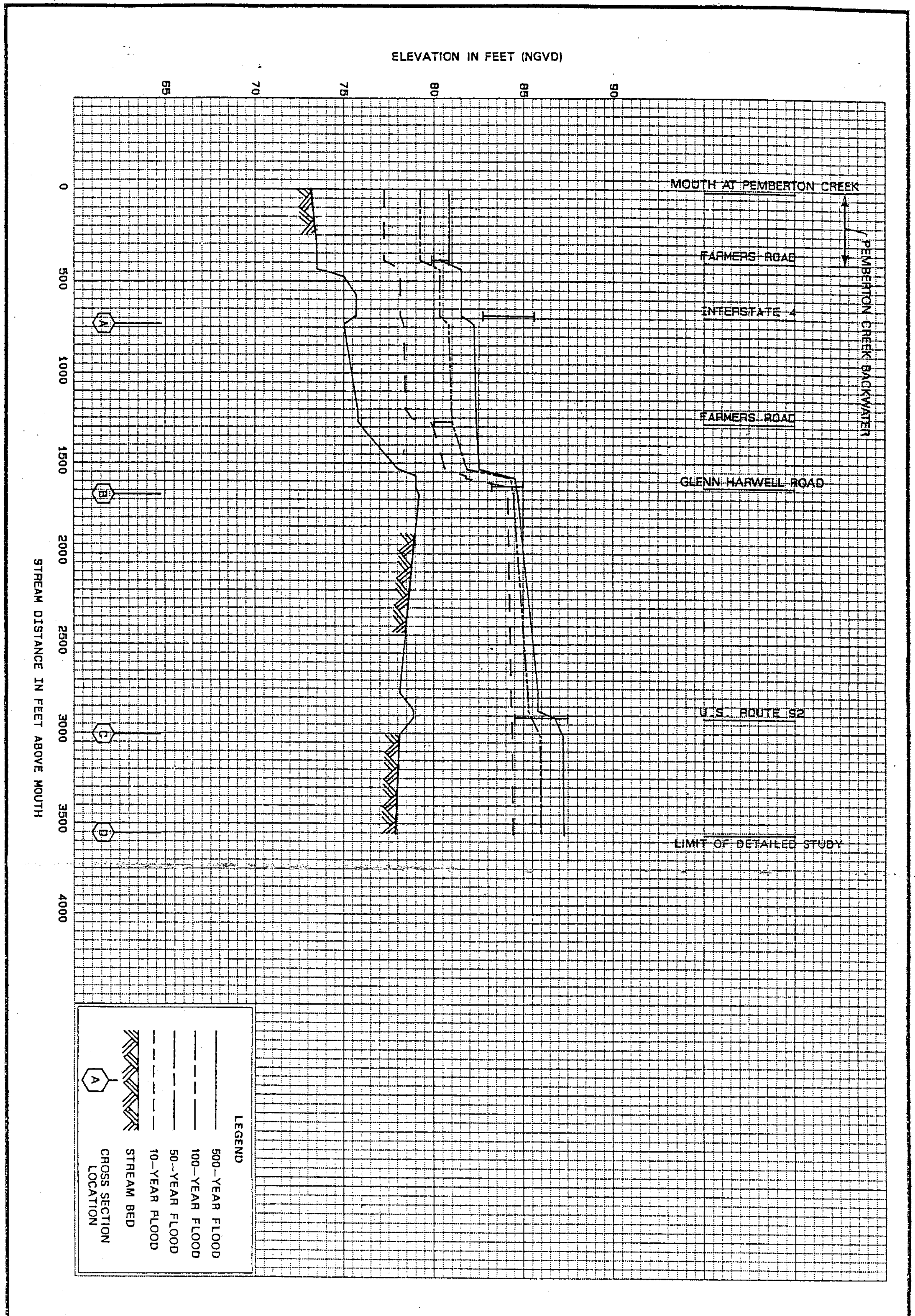
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

RUSKIN INLET

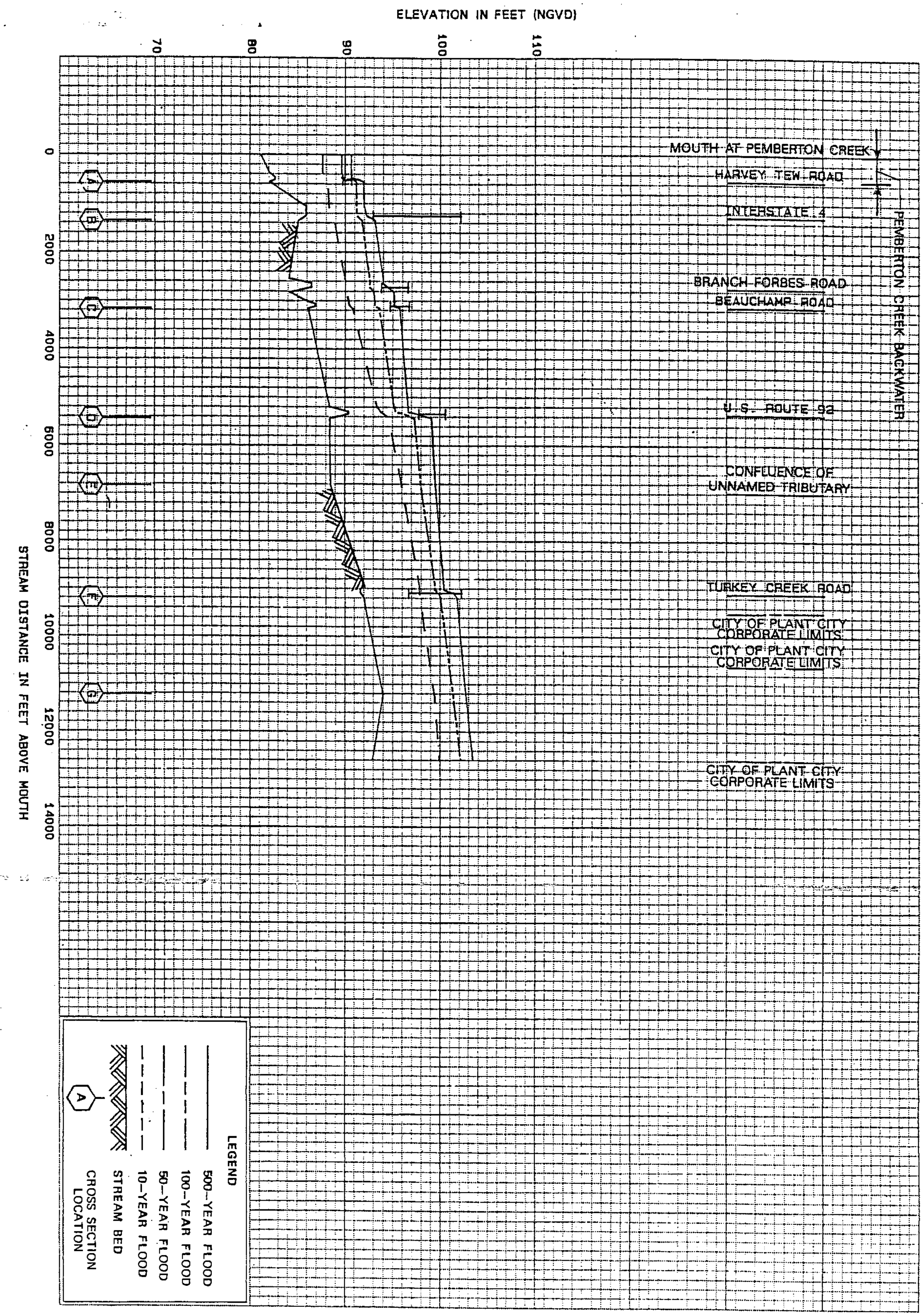


FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL
(UNINCORPORATED AREAS)

FLOOD PROFILES

TRIBUTARY A



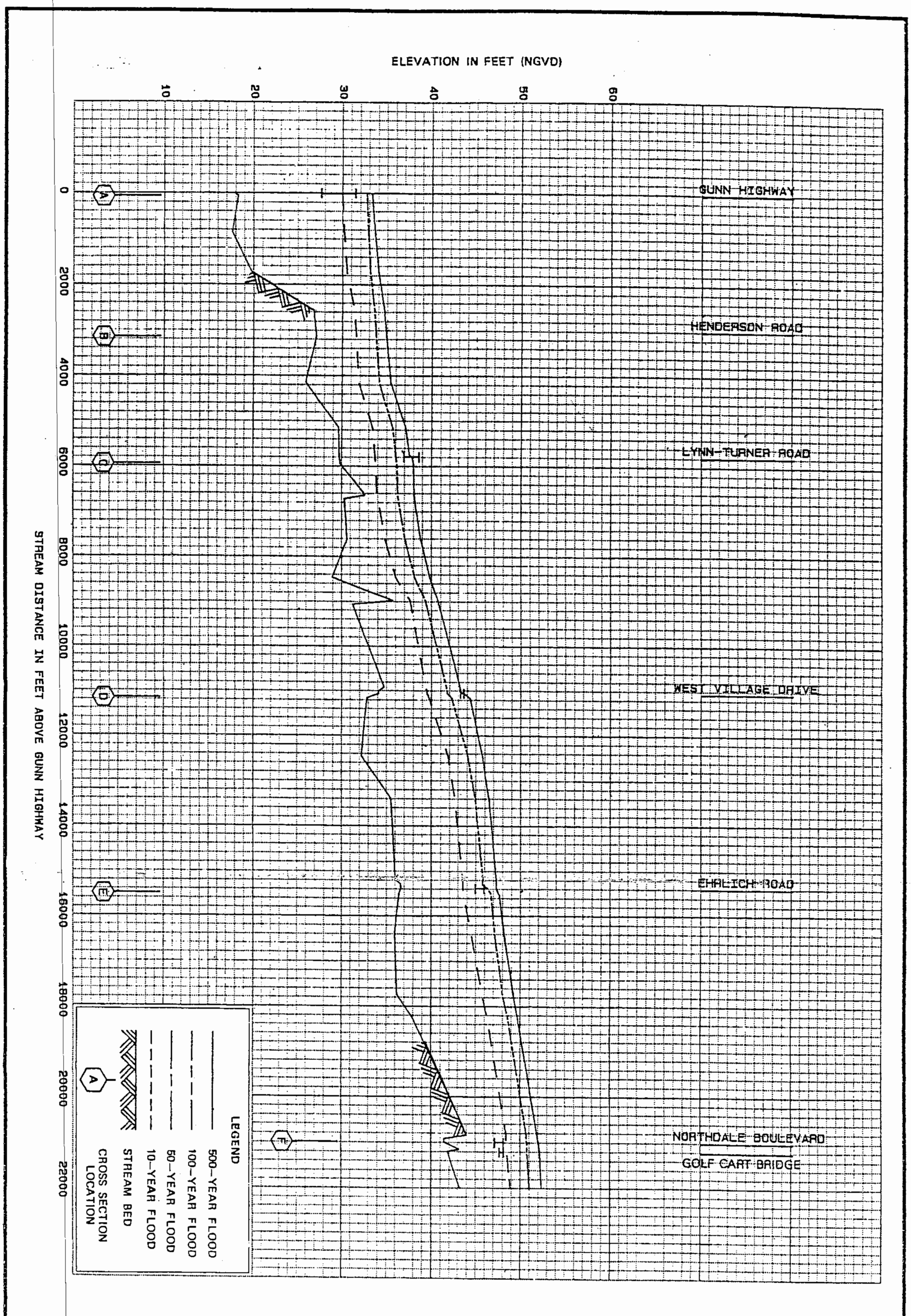
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

SPARTMAN BRANCH



35P

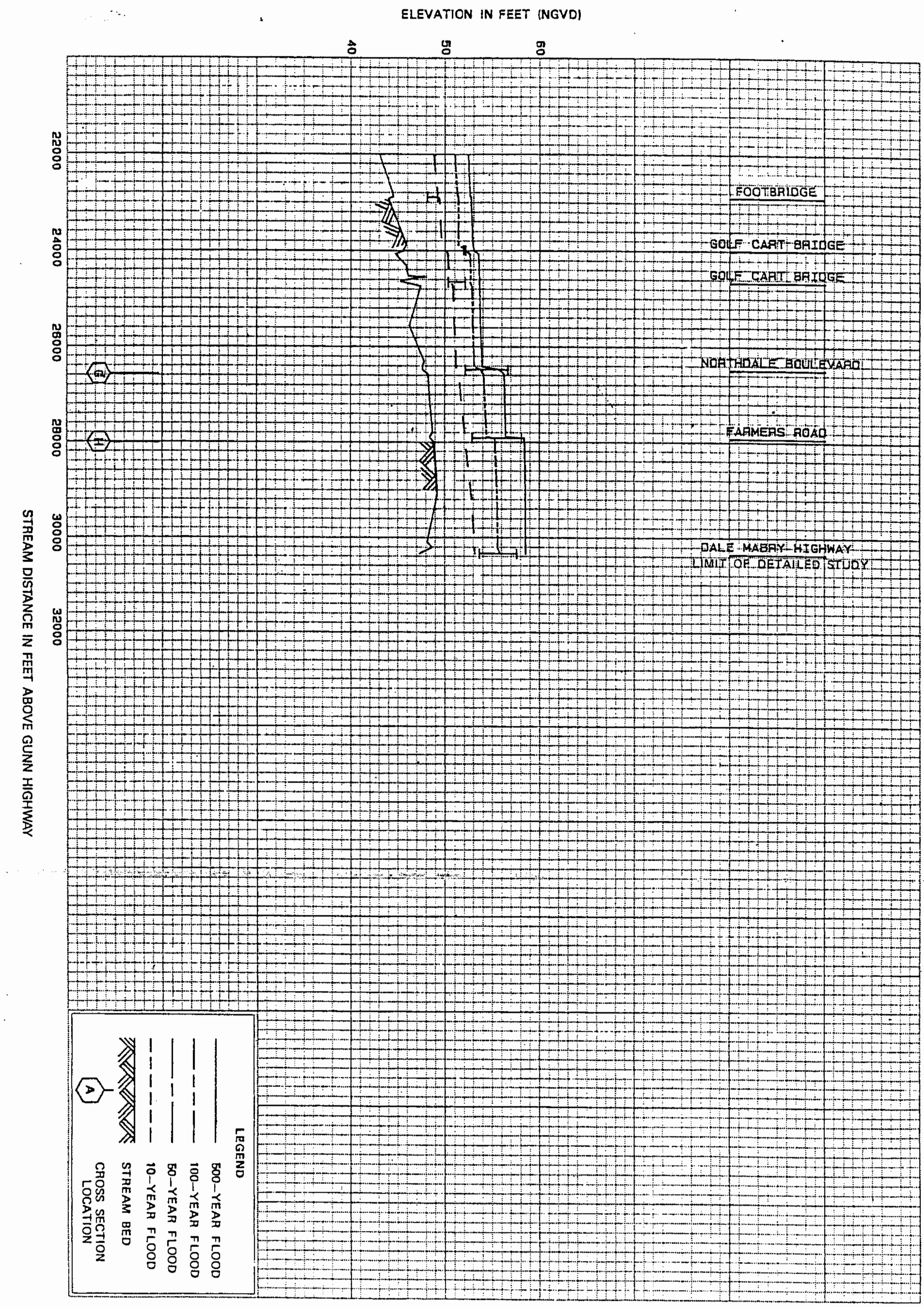
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

BRUSHY CREEK



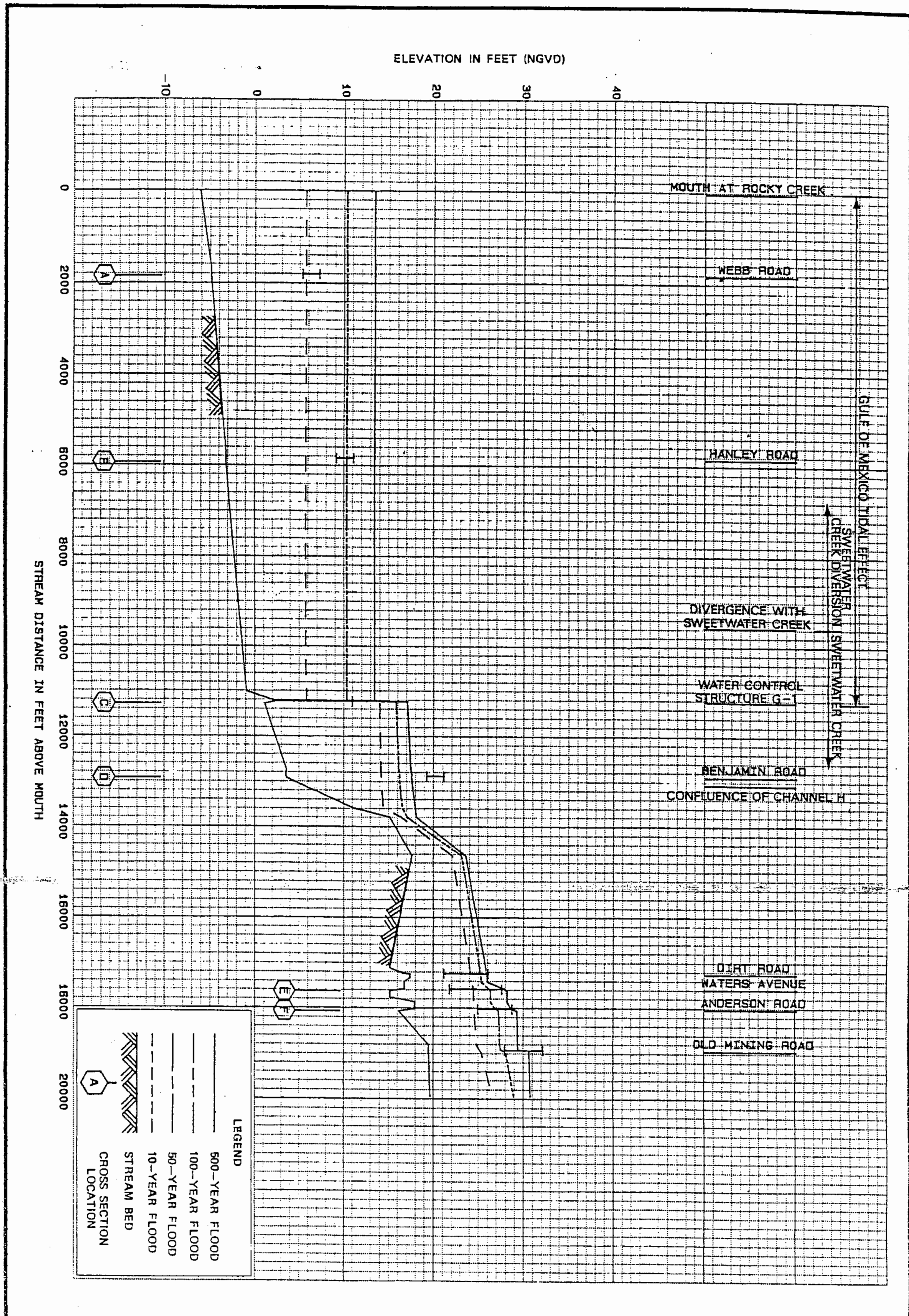
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

BRUSHY CREEK



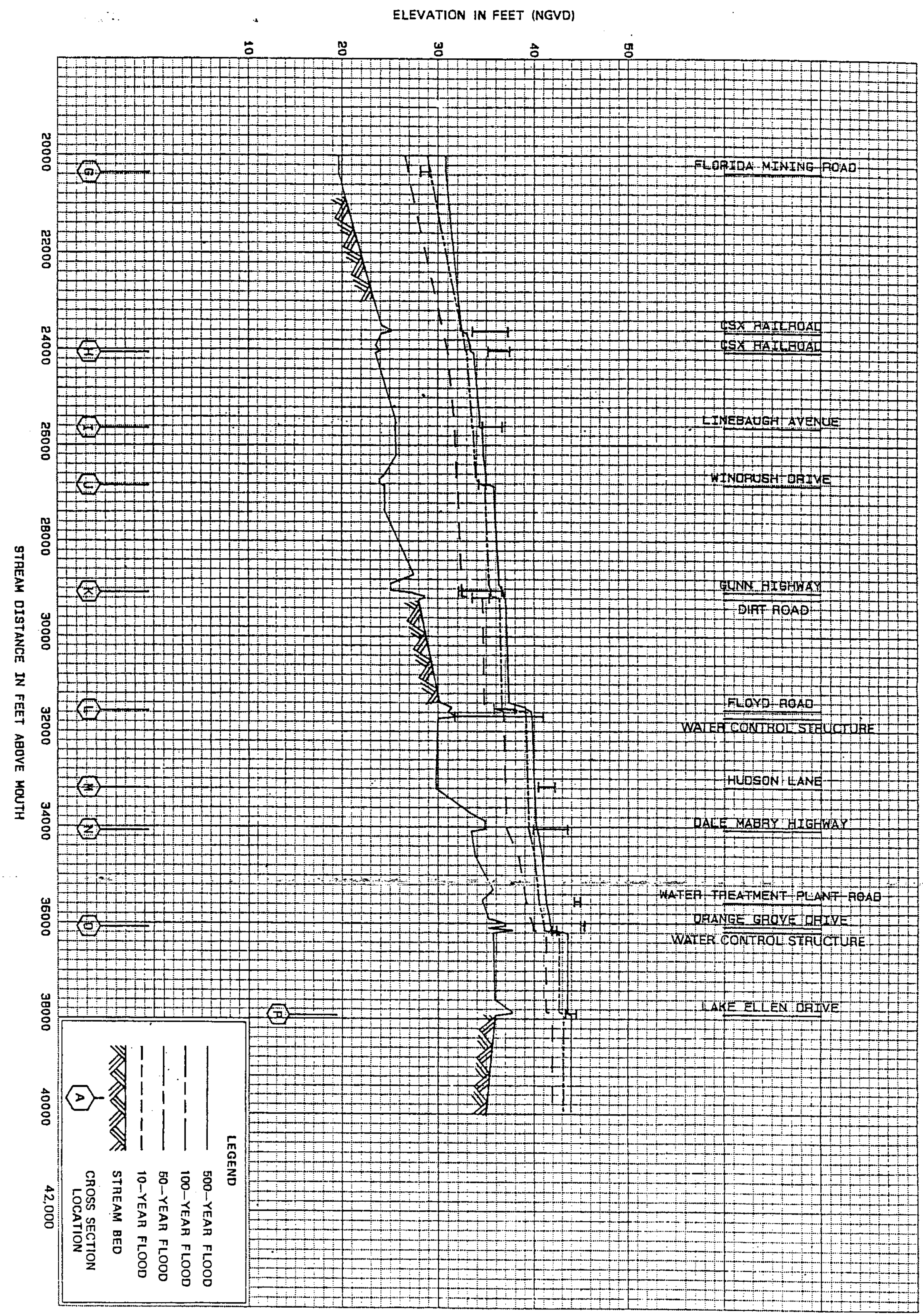
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

SWEETWATER CREEK DIVERSION/SWEETWATER CREEK



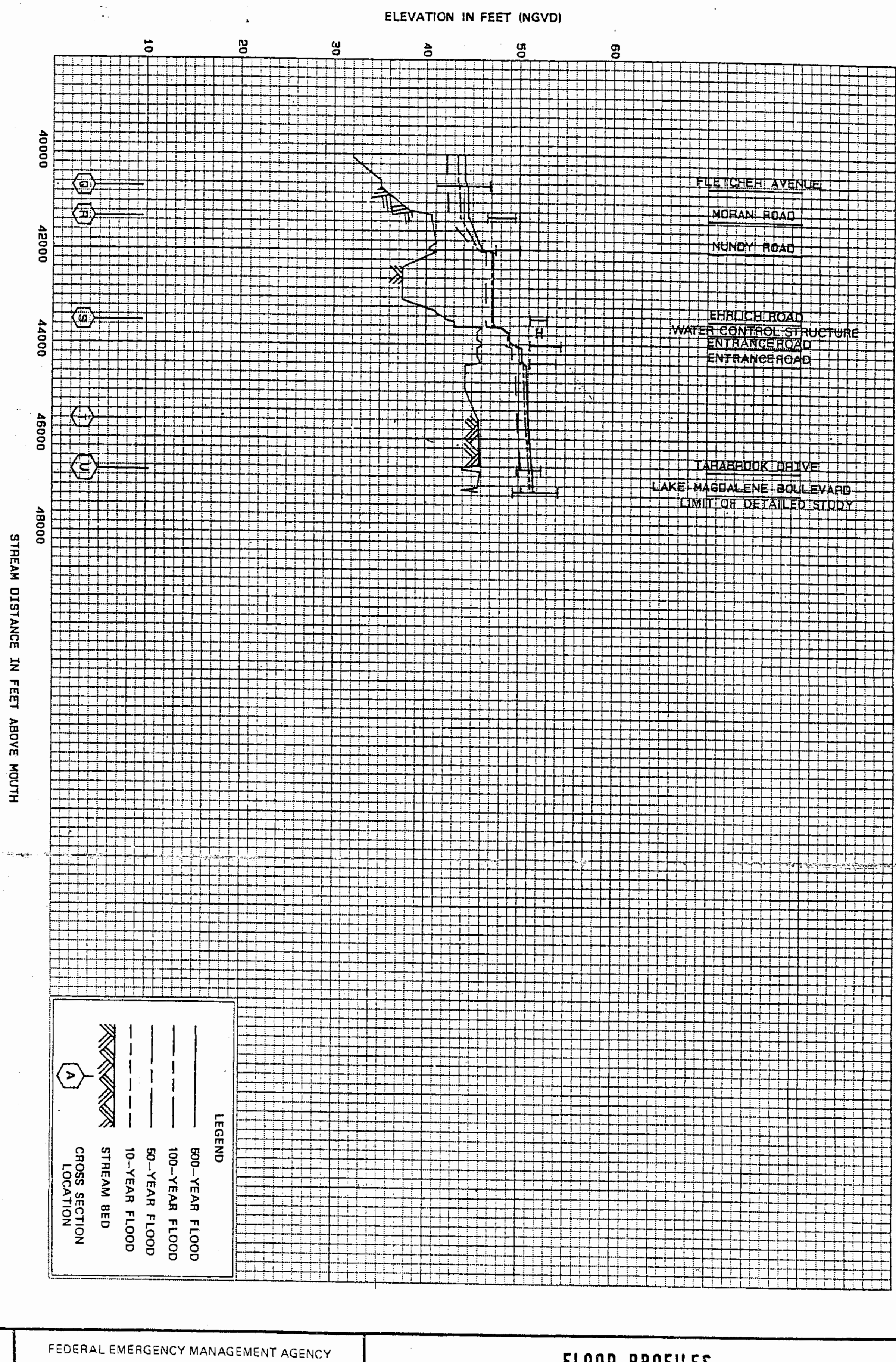
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

SWEETWATER CREEK



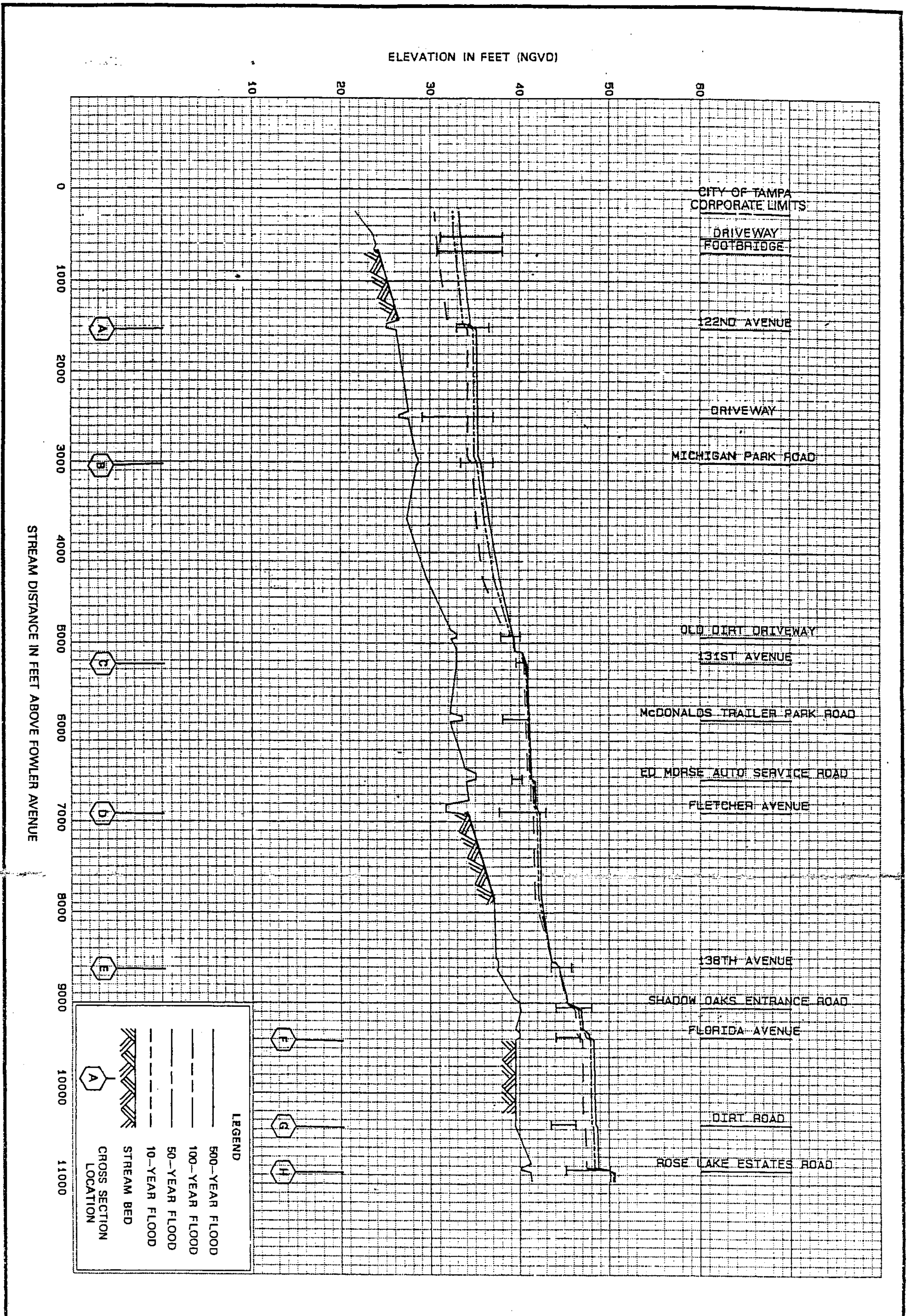
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

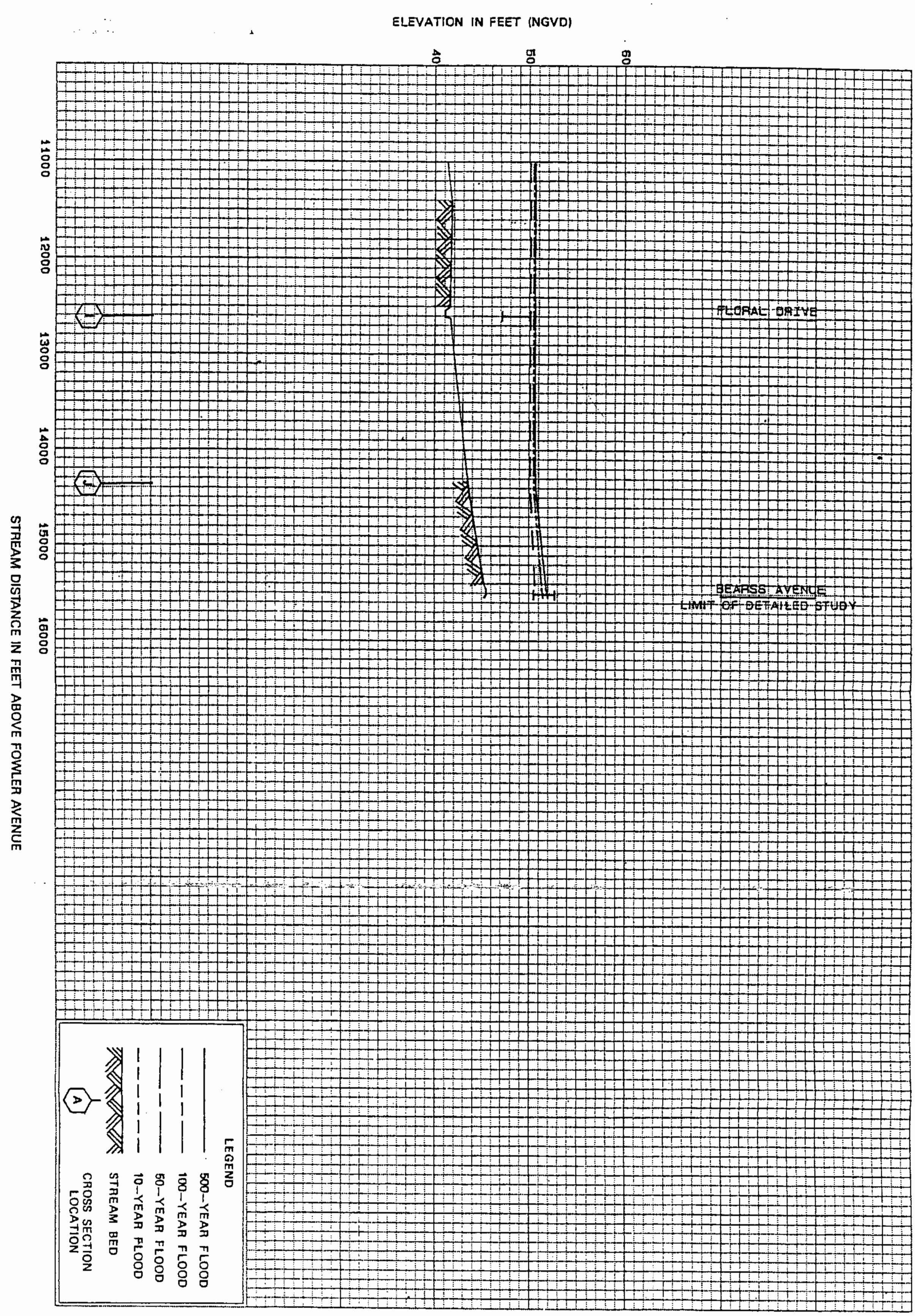
(UNINCORPORATED AREAS)

FLOOD PROFILES

SWEETWATER CREEK



40P	FEDERAL EMERGENCY MANAGEMENT AGENCY **HILLSBOROUGH COUNTY, FL** *(UNINCORPORATED AREAS)*	**FLOOD PROFILES** **CURIOSITY CREEK**



41P

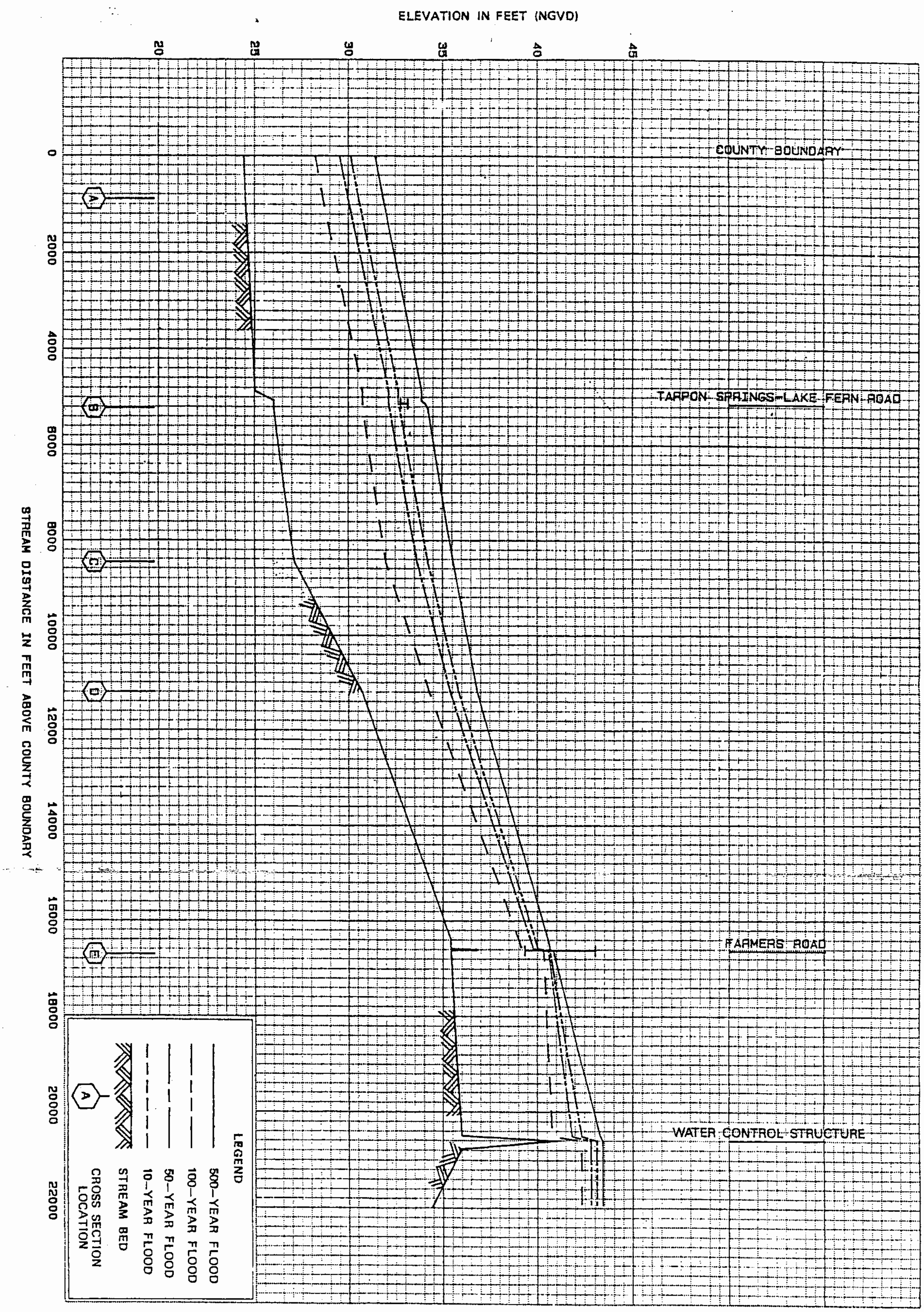
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

CURIOSITY CREEK



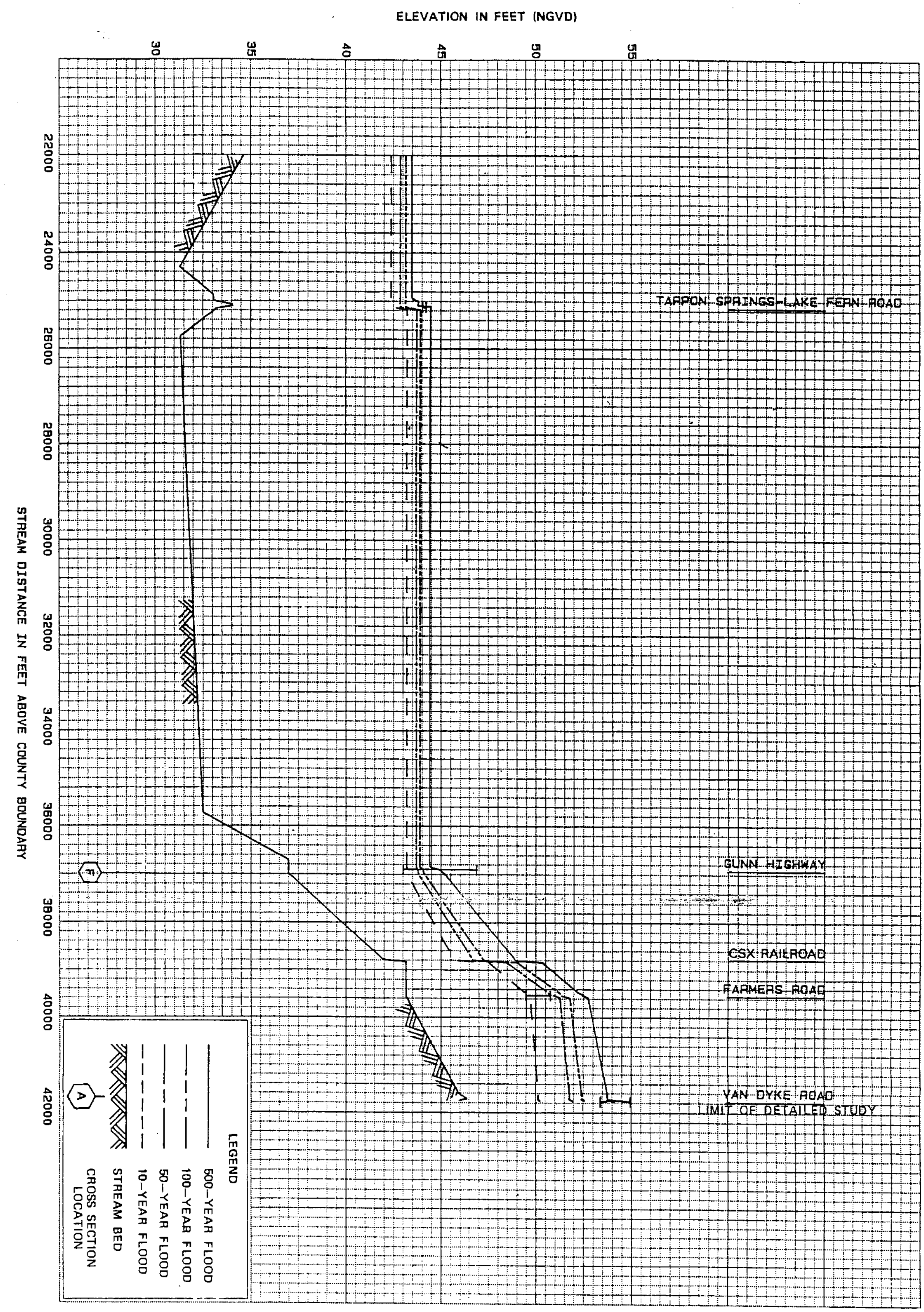
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

BROOKER CREEK



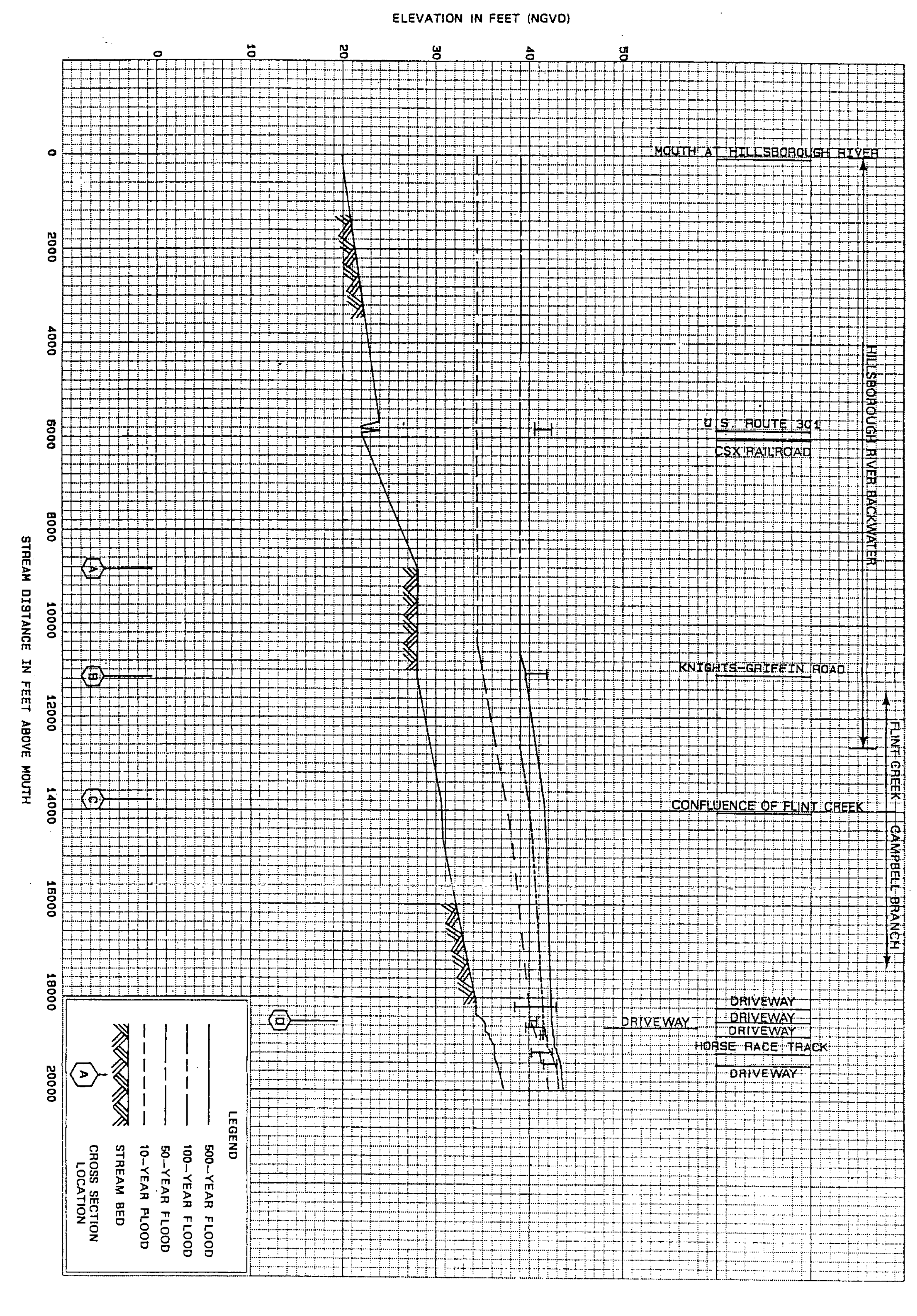
43P

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL
(UNINCORPORATED AREAS)

FLOOD PROFILES

BROOKER CREEK



44P

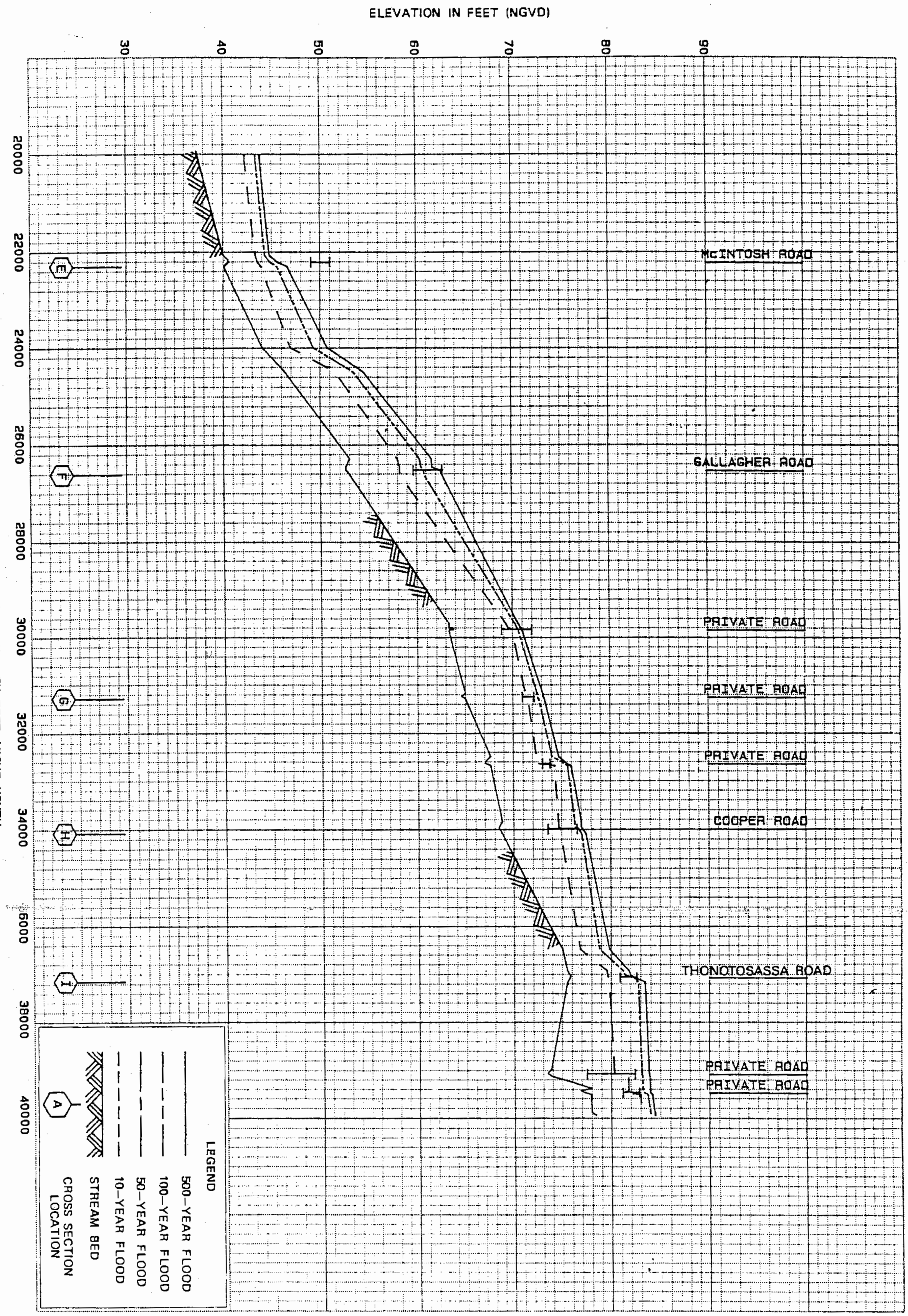
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

FLINT CREEK/CAMPBELL BRANCH



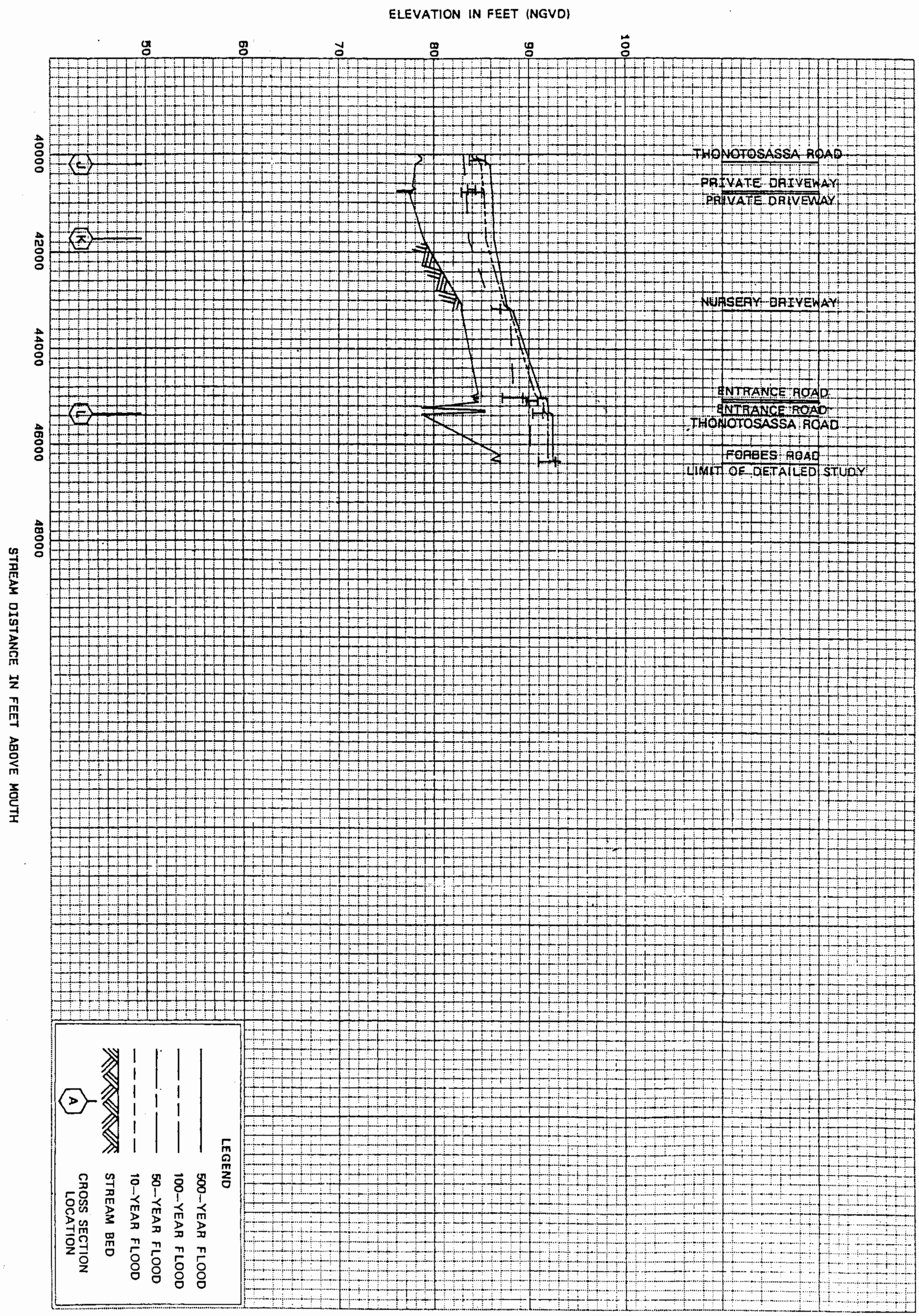
FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

CAMPBELL BRANCH



46P

FEDERAL EMERGENCY MANAGEMENT AGENCY

HILLSBOROUGH COUNTY, FL

(UNINCORPORATED AREAS)

FLOOD PROFILES

CAMPBELL BRANCH