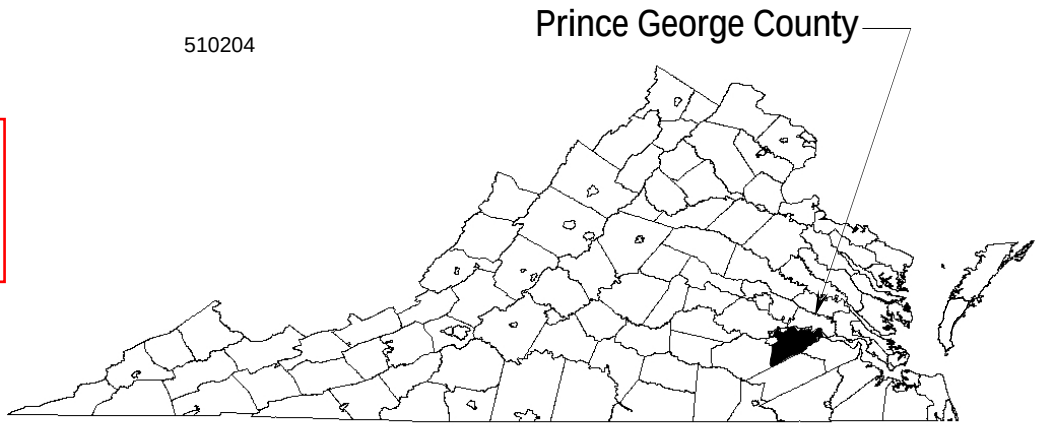
FLOOD INSURANCE STUDY

PRINCE GEORGE COUNTY, VIRGINIA
AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
PRINCE GEORGE COUNTY (UNINCORPORATED AREAS)	510204

PRELIMINARY

SEPTEMBER 30, 2010



Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
51149CV000A

NOTICE TO
FLOOD INSURANCE STUDY USERS

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

The Federal Emergency Management Agency (FEMA) may revise and republish part or all of this FIS report at any time. In addition, FEMA may revise part of this FIS report by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS report. Therefore, users should consult with community officials and check the Community Map Repository to obtain the most current FIS report components.

Selected Flood Insurance Rate Map (FIRM) panels for this community contain information that was previously shown separately on the corresponding Flood Boundary and Floodway Map (FBFM) panels (e.g., floodways, cross sections). In addition, former flood hazard zone designations have been changed as follows:

Old Zone(s)	New Zone
A1 through A30	AE
B	X
C	X

Initial Countywide FIS Effective Date:

TABLE OF CONTENTS

TABLE OF CONTENTS - continued

FLOOD INSURANCE STUDY
PRINCE GEORGE COUNTY, VIRGINIA AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This countywide Flood Insurance Study (FIS) investigates the existence and severity of flood hazards in, or revises and updates previous FISs/Flood Insurance Rate Maps (FIRMs) in the geographic area of Prince George County, Virginia and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This FIS has developed flood-risk data for various areas of the community that will be used to establish actuarial flood insurance rates. This information will also be used by Prince George County to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP), and will also be used by local and regional planners to further promote sound land use and floodplain development. Minimum floodplain management requirements for participation in the NFIP are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

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

1.2 Authority and Acknowledgments

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

This FIS was prepared to include the unincorporated areas of Prince George County in a countywide format FIS. Information on the authority and acknowledgements for each jurisdiction included in this countywide FIS, as compiled form their previously printed FIS reports, is shown below. There are no incorporated cities or towns within Prince George County.

The hydrologic and hydraulic analyses for the November 1979 Prince George County FIS were prepared by Howard, Needles, Tammen, and Bergendoff for the Federal Insurance Administration (FIA), under Contract No. 3963. That work was completed in July 1977. The FIRMs were dated May 1, 1980.

For this countywide FIS, the 1980 Prince George County FIRMs were converted to digital FIRMs, utilizing updated aerial photography as the base map (Reference 1). The digital conversion for this study was prepared by the Norfolk District of the U.S. Army Corps of Engineers (USACE) for FEMA, under Interagency Agreement No. HSFE03-06-X-0023. No revised hydrologic and hydraulic analyses were prepared, except for Harrison Creek. In the 1979 FIS, Harrison Creek was studied by approximate methods. For this countywide FIS, detailed study data from the

City of Petersburg FIS (Reference 2) was incorporated for Harrison Creek. In addition, floodplain boundaries for Bailey Creek were redelineated using more up to date topographic mapping (Reference 3), to have agreement with the City of Hopewell FIS (Reference 4). This work was completed in December 2009. Flood elevations from the 1979 FIS and 1980 FIRMs have been converted and referenced to the North American Vertical Datum of 1988 (NAVD 88). The 1980 FIRM panels were shown at a scale of 1:24,000; the countywide FIRM panels are shown at scales of 1:6,000, 12,000, and 24,000.

Base map information was provided in digital format by the Prince George County Geographic Information Systems (GIS) office, using 2002 orthophotography developed through the Commonwealth of Virginia (Reference 1). The projection used in the preparation of the FIRMs is Universal Transverse Mercator Zone 18. The horizontal datum is the North American Datum of 1983, Geodetic Reference System 80 Spheroid.

The community boundary was based on the United States Geological Survey (USGS) 7.5 Minute Series Topographic mapping (Reference 5), except along the Appomattox and James Rivers and Bailey Creek. This portion of the boundary is defined using the 2002 orthophotography.

1.3 Coordination

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

For the 1979 FIS, an initial CCO meeting was held on February 26, 1976 with representatives from the FIA, Prince George County, State Water Control Board, U.S. Soil Conservation Service (SCS), and the study contractor, Howard, Needles, Tammen and Bergendoff. A final CCO meeting was held on July 10, 1978.

For this countywide FIS, Prince George County was notified by _____ on _____ that their FIS would be revised and converted to a countywide format. A final CCO meeting was held on _____ to review the results and was attended by representatives of FEMA, Prince George County, the Virginia Department of Conservation and Recreation, and USACE, Norfolk District.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS covers the geographic area of Prince George County, Virginia. The Fort Lee Military Reservation and Petersburg National Battlefield are not included in this study.

The streams that were studied by detailed methods include the Appomattox River, from the Hopewell City limits to the Petersburg City limits; Bailey Creek, from approximately 0.5 mile downstream of Virginia Route 10 to the Fort Lee Military Reservation boundary; Blackwater Swamp, from approximately 0.1 mile downstream of Virginia Route 156 to approximately 0.4 mile upstream of Virginia Route 603; Chappell Creek, from approximately 0.7 mile downstream of Virginia Route 10 to approximately 1.3 miles upstream of Virginia Route 10; Harrison Creek, from the confluence of the Appomattox River Navigation Channel to just upstream of East Washington Street; Jones Hole Swamp, from approximately 0.6 mile downstream of Virginia Route 638 to the Prince George and Dinwiddie County boundary; Manchester Run, from the confluence with Bailey Creek to approximately 1.2 miles upstream of Virginia Route 156; Powell Creek, from approximately 0.6 mile downstream of Virginia Route 10 to approximately 0.4 mile upstream of Virginia Route 10; Southerly Run, from the confluence with Bailey Creek to approximately 0.3 mile upstream of Virginia Route 646; Walls Run, from the confluence with Powell Creek to approximately 0.2 mile upstream of Virginia Route 10; and Wards Creek, from approximately 0.4 mile downstream of Virginia Route 10 to approximately 0.4 mile upstream of Virginia Route 10.

Tidal stages for the James River were analyzed in the 1979 FIS to establish the backwater effects along the Appomattox River, Bailey Creek, and Chappell Creek.

The following structures were not in place during the 1979 FIS and were not included in this countywide FIS, but do appear on the countywide digital FIRMs: Interstate 295 along Bailey Creek and Blackwater Swamp**.**

The streams studied by approximate methods include: Blackwater Swamp, Cattail Creek, Cherry Orchard Branch, Comers Branch, Gosee Swamp, the James River (based on tidal flooding) and its reaches which include Billy Creek, Brickers Creek, Chappell Creek, Flowerdew Hundred Creek, Jenny Creek, Manchester Run, Powell Creek, Upper Chippokes Creek, Walls Run, and Wards Creek, Jones Hole Swamp, Joseph Swamp, North Fork Blackwater Swamp, Otterdam Swamp, Rowanty Creek, Second Swamp, and Warwich Swamp.

In the 1979 FIS, a portion of Bailey Creek located within the Fort Lee Military Reservation was studied by approximate methods, due to several small private businesses located along the stream.

No additional flooding sources were studied in this countywide FIS.

The scope and methods of the study were proposed to, and agreed upon by, FEMA and Prince George County.

2.2 Community Description

Prince George County is located in southeastern Virginia. It is located approximately 25 miles south of Virginia’s capitol of Richmond, 125 miles south

of Washington, D.C, and 90 miles northwest of the Port of Hampton Roads. The surrounding communities include the Cities of Petersburg, Colonial Heights, and Hopewell and the Counties of Surry, Sussex, and Dinwiddie. The Richmond Metropolitan Statistical Area (MSA) includes Prince George County. The Fort Lee Military Reservation and a portion of the Petersburg National Battlefield are also located within the county. The Appomattox and James Rivers border along the northern county boundary. Prince George County has a land area of approximately 266 square miles. The population has been gradually increasing, with 27,394 in 1990, 33,047 in 2000, estimated at 36,089 in 2008, and projected to be 53,061 in 2020 (References 6, 7, and 8).

Prince George County was established in 1702 and was named for Prince George of Denmark, the husband of England's Queen Anne. The area was first visited by Captain Christopher Newport in 1607, when the English were in search a permanent settlement. Permanent land grants were given to settlers starting in 1616. The County is home to Merchants Hope Church, the oldest Episcopalian church in America, built in 1657 and still in use today. The County was a part of history during the Revolutionary and Civil Wars and World Wars I and II (Reference 6).

The County lies entirely within the Atlantic Coastal Plain physiographic region, an area typified by its low relief. Elevations range from sea level to approximately 175 feet above sea level. The land is generally level, but some streams are short in length with steep gradients. Sandy soil and clay subsoil are predominant, where in general, much of the soils are well suited for agricultural uses. Portions of four major watersheds are in the County: the James River, Appomattox River, Blackwater River, and Nottoway River (Reference 9).

The area enjoys a temperate climate with moderate seasonal changes. The climate is characterized by warm humid summers, where the mean daily high temperature is approximately 69°F. Winters are mild, where the mean daily low temperature is approximately 46°F. Average annual precipitation is about 44 inches. There is some variation in the monthly averages; however, this rainfall is distributed fairly uniform throughout the year. The snow in normal winters is seldom on the ground for any great length of time (Reference 9).

The economy of Prince George County is diverse in many ways. The Federal government, services, utilities, trade, manufacturing, and construction provide economic assets to the County. With the County's proximity to major transportation routes, such as Interstate 95 and U.S. Route 460, the Port of Richmond, the Richmond International Airport and numerous local municipal airports, and access to the railway system, economic development within the County is expected to continue and pressures leading to intensified floodplain use will undoubtedly accompany development.

2.3 Principal Flood Problems

Prince George County, with its numerous watersheds and major rivers, has experienced fluvial and tidal flooding in varying degrees but has been fortunate in

not receiving any major property damage. Floods have occurred during all seasons of the year. Tropical storms are responsible for some of the larger floods, particularly on the Appomattox and James Rivers. Flooding from this source almost always occurs in the period of May through November. Several small businesses and private structures in low lying areas have been subjected to flooding.

In October 1972, a storm caused heavy rains in the Appomattox River watershed and affected the general area of Petersburg to Hopewell. Rainfall during this storm was reported to have totaled in excess of 5 inches over the entire watershed. Major flooding on the Appomattox River occurred east of Farmville with a record crest at Petersburg and along the Prince George boundary to Hopewell. The flood caused a break in the dike at Petersburg which resulted in extensive flood damage. It was estimated at that time flood damage in the Petersburg area reached $6 million (Reference 10). The Matoaca gaging station (#02041650) on the Appomattox River, located approximately 7 miles above the county boundary and just upstream of Petersburg, recorded a peak flow of 40,800 cubic feet per second (cfs) which was a flood frequency of a 100-year event. In June of the same year, a peak flow of 22,800 cfs (25-year event) was also recorded, but little damage was noted. The Petersburg gaging station (#02041500) that was discontinued in September 1966, located approximately 4 miles upstream of the Matoaca gage recorded the following peak flows: April 1937, 19,000 cfs (15-year event); July 1938, 18,200 cfs (12-year event); August 1940, 28,000 cfs (50-year event); and July 1945, 17,900 cfs (10-year event) (Reference 11).

Flooding has also occurred in other parts of Prince George County. Flooding was reported in August 1969, October 1971 and the previously mentioned storms of June and October 1972. In the October 1972 storm, a number of roads were closed, school and postal service were interrupted and several structures at the lower elevations were flooded.

In addition to fluvial flooding, the Appomattox and James Rivers are affected by tidal flooding. The most recent tidal stage of major proportions occurred during Hurricane Isabel, making landfall on September 18, 2003 along the Outer Banks of North Carolina and tracking northward through Virginia and up to Pennsylvania. At landfall, maximum sustained winds were estimated at 104 mph. Isabel weakened to a tropical storm by the time it moved into Virginia and lost tropical characteristics as it moved into Pennsylvania. The storm tracked approximately 30 miles west of the City of Richmond. The storm caused high winds, storm surge flooding, and extensive property damage throughout the Chesapeake Bay region. Within Virginia, ninety-nine communities were directly affected by Isabel. There were thirty-three deaths, over a billion dollars in property damage, and over a million electrical customers without power for many days (Reference 12). At the Richmond City Locks gage located on the James River, the maximum storm surge or rise above the normal water level was measured at 10.8 feet (Reference 13). A storm surge of greater than 8 feet occurred at the confluence of the James and Appomattox Rivers. Heavy rainfall also caused minor to moderate flooding along many streams within the central areas of Virginia. The County received approximately 6 inches of total rainfall

(Reference 14). Flash flooding caused approximately 300 homes to be damaged. At Jordan Point Marina, 100 boats were displaced, buildings destroyed, and docks sunk. Route 460 was closed. Damages were estimated at $14 million (Reference 15).

On August 30, 2004, the remnants of Hurricane Gaston passed through Virginia, producing torrential rainfall of approximately 6 to 12 inches in about an 8 hour period. Total damages in Virginia were estimated at $30 million. The most severe impacts occurred within the City of Richmond and surrounding communities. There was widespread flooding, with many roads closed including Interstate 95 (Reference 16). Within the Shockoe Bottom neighborhood in the City of Richmond, 14 inches of rainfall was reported, causing flash flooding, extensive damage, and several fatalities (Reference 17).

2.4 Flood Protection Measures

There are no known flood protection projects in Prince George County. However, there are a number of farm ponds and small privately owned lakes that could function as retention or detention facilities.

There are also a number of measures that have afforded some protection against flooding, including bulkheads and seawalls, jetties, sand dunes, and non-structural measures for floodplain management such as zoning codes. The "Uniform Statewide Building Code" which went into effect in September 1973 states, "where a structure is located in a 100-year floodplain, the lowest floor of all future construction or substantial improvement to an existing structure . . ., must be built at or above that level, except for non-residential structures which may be flood proofed to that level" (Reference 18).

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that 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 one year are considered. For example, the risk of having a flood which equals or exceeds the 1-percent-annual-chance flood in any 50-year period is approximately 40 percent (four in ten); for any 90-year period, the risk increases to approximately 60 percent (six in ten). 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 elevation-frequency relationships for each flooding source studied in detail affecting the community.

Precountywide Analyses

In the 1979 Prince George County FIS, the hydrologic analysis of the Appomattox River, which flows from west to east along the northern boundary of Prince George County, was completed by the use of flow data from two gaging stations. The Matoaca gage located approximately 7 miles upstream of the study area was established in October 1969, subsequent to the destruction of the Petersburg gage several miles further upstream. This relocation was a consequence of the construction of the Brasfield Dam and Lake Chesdin which are located several miles upstream from the county along the Appomattox River. The previous gaging station provided a forty-year record from 1927 to 1966 inclusive (Reference 11). Contact was made with the Appomattox River Water Authority which controls Lake Chesdin and confirmed that the Brasfield Dam is not operated with the intent of flood control, and consequently must be assumed to be at spillway crest for flood analysis (Reference 19). With data from existing gages, a log-Pearson Type III analysis was performed in accordance with current (1976) recommendations of the Water Resources Council (Reference 20). The log-Pearson analysis utilized computed skew and the combined records of both gaging stations records. Discharges in the lower reaches of the study area have been adjusted to reflect the confluence with Swift Creek, a tributary at the Appomattox River. The drainage area variations between Swift Creek and the Appomattox River and a comparison of the dates of peak events indicates that peak flows in Swift Creek are either unrelated to peak flows in the Appomattox River or precede such flows by periods in excess of 24 hours (Reference 21). Consequently, flow increases at the confluence and further downstream have been based on the Appomattox River Basin which makes utilization of regional curves questionable. Flows, therefore, were adjusted to the drainage area following the proration procedure recommended in the SCS National Engineering Handbook (Reference 22).

The remainder of streams studied by detailed methods were ungaged. Therefore, a method of analysis contained in the USGS report, Floods in Virginia – Magnitude and Frequency, utilizing stochastic procedure was used (Reference 23). This procedure is based on data compiled exclusively for streams in Virginia and collected through 1969. Extension procedures suggested in the paper, Approximate Method for Quick Flood Plain Mapping, were used (Reference 24). Regionalized equations that account for the effects of drainage area, slope and local physiographic characteristics were utilized to determine final flows.

This procedure was also used to establish 1-percent-annual chance peak flows for the other streams that were studied by the approximate method.

In addition to fluvial flooding characteristics, the James River is considered by the USACE, Norfolk District to have significant rises in river stages resulting from tidal flooding (Reference 25). Although a detailed study was not required for this report, the 10-, 2-, 1-, and 0.2-percent annual chance tidal flood elevations were analyzed. These were approximated for use in establishing backwater effects for the Appomattox River, Bailey Creek, and Chappell Creek being studied in detail. The 1-percent annual chance flood was used to establish the boundary for the approximate study on the James River. Data from the USACE, Norfolk District and tidal records at Hampton Roads and Portsmouth, Virginia, covering a period of 50 years, were used to establish estimated tidal flood elevations at Hopewell, at the confluence of the Appomattox and James Rivers (Reference 25 and 26). Stillwater elevations were estimated based on stage frequency relationships utilizing log-Pearson analysis. The flood elevations that were previously developed were then adjusted to NAVD 88 using an average conversion factor for the community (See Section 3.3). The elevations summarized in Table 1, "Summary of Stillwater Elevations", are referenced to NAVD 88.

TABLE 1 - SUMMARY OF STILLWATER ELEVATIONS

	Elevation (Feet, NAVD 88)			
Flood Source and Location	10-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
JAMES RIVER				
At confluence of Appomattox River	5.4	6.6 (6.7)*	7.2 (7.4)*	8.5

* USACE, Norfolk District

Countywide Revision

For this countywide FIS, detailed study data from the City of Petersburg FIS (Reference 2) was incorporated for Harrison Creek. In that 1980 FIS, there were no stream flow records for Harrison Creek. Thus, discharges were developed using analytical methods. Based on hydraulic parameters such as slope, length, drainage area, channel roughness (Manning's "n"), and time of concentration, unit-graphs were developed for several locations on each stream using Clark's Method. Rainfall-frequency values selected from a Rainfall Frequency Atlas were applied to the unit graphs to obtain the desired discharge frequencies (Reference 27).

A summary of the drainage area-peak discharge relationships for all the streams studied by the detailed methods is shown in Table 2, "Summary of Discharges".

Table 2 – SUMMARY OF DISCHARGES

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cubic feet per second) 10-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
APPOMATTOX RIVER					
Prince George County/ Hopewell City Limits	1,599	17,800	33,300	43,000	76,600
Above Swift Creek	1,394	16,800	31,400	40,600	72,400
BAILEY CREEK					
State Routes 10 and 156	20	1,300	3,200	4,600	9,800
State Route 156	14	1,100	2,800	3,900	8,300
State Route 630	4	400	1,100	1,500	3,200
BLACKWATER SWAMP					
State Route 156	19	900	2,300	3,200	6,800
11.9 miles above the corporate limits	13	700	1,800	2,500	5,400
State Route 106	11	600	1,500	2,100	4,500
State Route 156	9	600	1,400	2,000	4,200
CHAPPELL CREEK					
1.77 miles above the James River	4	430	1,050	1,500	3,200
State Route 10	3	400	1,100	1,500	3,200
Earthen dam, 2.57 miles above the James River	2	300	800	1,100	2,300
HARRISON CREEK					
At mouth	2.3	1,500	2,070	2,330	3,050
State Route 142	1.36	1,130	1,550	1,750	2,250
JONES HOLE SWAMP					
State Route 638	16	1,000	2,400	3,400	7,300
At 8.52 miles above the mouth	10	700	1,700	2,300	4,600
State Route 621	8	600	1,500	2,100	4,600
Earthen Dam at 11.86 miles above the mouth	5	400	1,000	1,400	3,100
Prince George/Dinwiddie County Line	4	300	700	1,000	2,100
MANCHESTER RUN					
Confluence with Bailey Creek	5	500	1,200	1,700	3,600
State Route 156	4	500	1,100	1,600	3,400

Table 2 – SUMMARY OF DISCHARGES

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cubic feet per second) 10-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
POWELL CREEK					
Below Walls Run	26	1,700	4,200	5,900	12,600
State Route 10	15	1,100	2,700	3,700	8,000
SOUTHERLY RUN					
Confluence with Bailey Creek	3	400	900	1,300	2,800
State Route 646	3	400	900	1,200	2,600
WALLS RUN					
State Route 641	10	900	2,100	3,000	6,400
State Route 10	10	900	2,100	3,000	6,400
WARDS CREEK					
At 5.75 miles above the mouth	19	1,300	3,100	4,300	9,300
State Route 10	16	1,100	2,700	3,800	8,100

3.2 Hydraulic Analyses

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

Precountywide Analyses

In the 1979 Prince George County FIS, cross-section data for all the streams studied in detail were field surveyed, including measurements of all drainage structures relating to stream flow. Several field cross sections on the upper reach of the Appomattox River were obtained from the USACE (Reference 28).

Water-surface elevations of floods of the selected recurrence intervals were computed through use of the USACE's HEC-2 step-backwater computer program (Reference 29). Flood profiles were drawn showing computed water-surface

elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals. Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For the Appomattox River, Bailey Creek, and Chappell Creek, streams affected by tidal flooding from the James River, the mean high tide for the James River was used as the starting water-surface elevation using the HEC-2 step-backwater program. Final water-surface elevations were determined by modeling these streams at the confluence with the James River. After the final profiles were completed, backwater profiles from the 10-, 2-, 1-, and 0.2-percent annual chance tidal floods from the James River were superimposed on each profile. For the streams studied by detailed methods which were not affected by the James River tidal flooding, the slope/area method was used in obtaining the starting water-surface elevations.

Roughness coefficients (Manning's "n" values) were estimated based on a field inspection of the individual streams supplemented by the use of aerial photographs (Reference 30). Field inspection indicated that most stream flows were sluggish to standing. The stream beds are of fine sand and silt with irregular banks. The floodplains are wide, swampy and covered with dense vegetation. The average range of roughness coefficients used for the streams studied in detail was 0.03 to 0.08 for stream channels and the values used for the floodplain ranged from 0.045 to 0.20 (Reference 31).

Highwater marks attributed to the flood of October 1972 were used in comparing with the computed 1-percent-annual chance year flood elevation along the Appomattox River and Bailey Creek. These elevations differed by less than one-half foot.

On Jones Hole Swamp and Chappell Creek, there are two small privately owned lakes with earthen dams. Field inspection of these sites revealed no mechanical means of controlling water levels within the lake during times of flooding. However, during normal operation it appeared that both lakes could be drained over a period of time through a stand pipe system. Therefore, it was assumed for the report that the lakes would be at or near emergency spillway elevation. Flood profiles were computed up to the face of the dam and restarted at critical depth for the cross section across the top of the dam.

The estimated 1-percent annual chance tidal flood was used to establish the boundary for the approximate study on the James River. The 1-percent annual chance flood boundaries for all other streams studied by approximate methods were determined by modeling selected control sections along each stream. A slope stage relationship was prepared from the data modeled and depths for the 1-percent annual chance flows were selected at intermediate points by interpolation, using topographic maps at a scale of 1:24,000, with contour intervals of 10 feet (Reference 32).

Countywide Revision

For this countywide FIS, detailed study data from the City of Petersburg FIS (Reference 2) was incorporated for Harrison Creek. In that 1980 FIS, cross-sections

were field surveyed. All bridges, dams, and culverts were field-checked to obtain elevation data and structural geometry. Manning's "n" roughness values were assigned on the basis of field inspection of the floodplain areas. An "n" value of 0.05 was used for the main channel and 0.08 for the overbanks. Water-surface elevations of floods for the selected recurrence intervals were computed through use of the USACE's HEC-2 step-backwater computer program (Reference 29). Starting water-surface elevations were calculated at control structures using the slope/area method. Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals. The stream is also influenced by backwater effects from the Appomattox River Navigation Channel.

For the Appomattox River, a station distance discrepancy was identified while comparing Floodway Data Tables from the City of Colonial Heights and Chesterfield and Prince George Counties. The profile and Floodway Data Tables for Prince George County were modified to align with the City of Colonial Heights and Chesterfield County, beginning at distance 5.4 miles above the confluence of the James River.

The hydraulic analyses for this FIS were based on 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.

All elevations in this countywide FIS are referenced to NAVD 88.

All qualifying bench marks (elevation reference marks) within a given jurisdiction that are cataloged by the National Geodetic Survey (NGS) and entered into the National Spatial Reference System (NSRS) as First or Second Order Vertical and have a vertical stability classification of A, B, or C are shown and labeled on the FIRM with their 6-character NSRS Permanent Identifier.

Bench marks cataloged by the NGS and entered into the NSRS vary widely in vertical stability classification. NSRS vertical stability classifications are as follows:

- Stability A: Monuments of the most reliable nature, expected to hold position/elevation well (e.g., mounted in bedrock)

- Stability B: Monuments which generally hold their position/elevation well (e.g., concrete bridge abutment)

- Stability C: Monuments which may be affected by surface ground movement (e.g., concrete monument below frost line)

- Stability D: Mark of questionable or unknown stability (e.g., concrete monument above frost line, or steel witness post)

In addition to NSRS bench marks, the FIRM may also show vertical control monuments established by a local jurisdiction; these monuments will be shown on

the FIRM with the appropriate designations. Local monuments will only be placed on the FIRM if the community has requested that they be included, and if the monuments meet the aforementioned NSRS inclusion criteria.

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

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

3.3 Vertical Datum

All FISs and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum in use for newly created or revised FISs and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD 29). With the finalization of the North American Vertical Datum of 1988 (NAVD 88), many FIS reports and FIRMs are being prepared using NAVD 88 as the referenced vertical datum.

All flood elevations shown in this FIS report and on the FIRM are referenced to NAVD 88. In order to perform this conversion, effective NGVD 29 elevation values were adjusted downward by 1.1 feet. For example, 8.3 feet, NGVD 29 is equivalent to 7.2 feet, NAVD 88. Structure and ground elevations in the community must, therefore, be referenced to NAVD 88. It is important to note that adjacent communities may be referenced to NGVD 29. This may result in differences in flood elevations across the corporate limits between the communities.

NGVD 29 – 1.1 = NAVD 88

For more information on NAVD 88, see Converting the National Flood Insurance Program to the North American Vertical Datum of 1988, FEMA Publication FIA-20/June 1992, or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282
(301) 713-3242
http://www.ngs.noaa.gov/

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

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

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent annual chance flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2 percent annual chance flood is employed to indicate additional areas of flood risk in the community. For the flooding sources studied in detail, the 1- and 0.2-percent annual chance floods 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 1:24,000 and enlarged to a working scale of 1:12,000 and 1:6,000, with contour interval of 10 feet (Reference 32). For Bailey Creek and Harrison Creek, flood boundaries were delineated using GIS analyses and digital elevation data, able to support a topographic mapping contour of two feet (Reference 3). In cases where the 1- and 0.2 percent annual chance flood boundaries are close together, only the 1-percent annual chance floodplain boundary has been shown.

The approximate tidal flood boundaries for the James River were established by using the data collected from the USACE and the National Oceanic and Atmospheric Administration (NOAA) (References 25 and 26). Flood boundaries for the remaining streams studied by approximate methods were determined by modeling selected locations along each stream. Depths for the approximate 1-percent annual chance event were determined at each location and a slope stage relationship was prepared using the topographic maps at a scale of 1:24,000 and a contour interval of 10 feet (Reference 32). The depths computed for each stream were applied to the maps and the 1-percent annual chance approximate flood boundaries were drawn.

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

due to limitations of the map scale and/or lack of detailed topographic data. For the streams studied by approximate methods, only the 1-percent annual chance floodplain boundary is shown on the FIRM (Exhibit 2).

For this countywide FIS, for all flooding sources except Harrison Creek and Bailey Creek, the 1980 Prince George County FIRMs were georeferenced using USGS 1:24,000 Quadrangles. The floodplain boundaries were then digitized to create a GIS digital layer. The digitized floodplain boundaries were then compared to the stream centerlines as shown on the 2002 orthophotography base map, and in some cases, spatially adjusted to preserve the relationship between the stream and the floodplain. The 1980 FIRM panels were shown at a scale of 1:24,000; the countywide FIRM panels are shown at scales of 1:6,000, 12,000, and 24,000.

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces the flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a toll to assist local communities in this aspect of floodplain management. Under this concept, the area of the 1-percent annual chance floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free from encroachment in order that the base flood may be carried without substantial increases in flood height. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this report are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were computed 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 in Table 3, “Floodway Data”. The computed floodways are shown on the FIRMs (Exhibit 2). In cases where the floodway and 1-percent annual chance floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

Near the mouths of streams studied in detail, floodway computations are made without regard to flood elevations on the receiving water body. Therefore, “Without Floodway” elevations presented in Table 3 for certain downstream cross sections for the Appomattox River, Bailey Creek, Chappell Creek, and Harrison Creek are lower than the regulatory flood elevations in that area, which must take into account the 1-percent annual chance flooding due to backwater from other sources.

Encroachment into areas subject to inundation by floodwaters having hazardous velocities aggravates the risk of flood damage and heightens potential flood hazards by further increasing velocities. A listing of stream velocities at selected cross sections is provided in Table 3. To reduce the risk of property damage in areas where the stream velocities are high, the community may wish to restrict development in areas outside the floodway.

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Appomattox River								
A	3.67	835[2]	13,615	3.2	7.2	5.5[4]	6.5	1.0
B	4.12	197/2,360[3]	24,462	1.8	7.2	5.9[4]	6.9	1.0
C	4.40	197/2,500[3]	24,750	1.7	7.2	6.1[4]	7.0	0.9
D	4.80	300/1,805[3]	20,980	2.0	7.2	6.4[4]	7.3	0.9
E	5.38	151/5,165[3]	43,775	1.0	7.2	6.8[4]	7.6	0.8
F	6.62	138/2,865[3]	25,596	1.6	7.4	7.4	8.1	0.7
G	7.21	90/1,809[3]	17,217	2.4	7.8	7.8	8.4	0.6
H	7.66	415/2,043[3]	18,601	2.2	8.1	8.1	8.7	0.6
I	8.28	204/1,801[3]	17,827	2.3	8.8	8.8	9.3	0.5
J	9.03	164/1,029[3]	11,756	3.5	9.7	9.7	10.1	0.4
K	9.67	57/847[3]	9,443	4.3	10.5	10.5	10.9	0.4

[1]Miles above confluence with James River

[2]Cross-section falls outside of corporate limits

[3]Floodway width within Prince George County / Total floodway width

[4]Elevations computed without considering backwater effects from the James River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA AND INCORPORATED AREAS

FLOODWAY DATA

APPOMATTOX RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Bailey Creek								
A	1.55	145 / 186[2,4]	1,152	4.0	7.2	2.3[3]	3.3	1.0
B	1.78	237 / 291[2]	2,816	1.6	7.2	5.3[3]	6.0	0.7
C	2.05	727 / 804[2]	4,933	0.9	7.2	5.9[3]	6.7	0.8
D	2.47	235 / 285[2,4]	2,147	2.1	7.4	7.4	8.3	0.9
E	2.73	855 / 902[2]	7,359	0.6	8.0	8.0	9.0	1.0
F	3.02	320 / 678[2,4]	5,672	0.8	8.3	8.3	9.3	1.0
G	3.42	543 / 610[2]	5,828	0.8	9.4	9.4	10.4	1.0
H	4.02	159 / 544[2]	4,735	0.8	10.5	10.5	11.5	1.0
I	4.58	636 / 679[2]	4,190	0.9	12.3	12.3	13.1	0.8
J	4.83	117 / 480[2]	2,187	1.3	13.6	13.6	14.5	0.9
K	5.14	57 / 240[2]	1,134	2.5	18.2	18.2	19.2	1.0
L	5.50	0 / 129[2]	830	3.4	27.6	27.6	28.5	0.9
M	5.87	334 / 338[2]	2,088	1.4	33.0	33.0	34.0	1.0
N	6.37	0	473	3.5	38.2	38.2	39.0	0.8
O	6.78	144[4]	885	1.9	47.8	47.8	48.8	1.0
P	6.92	195	776	2.2	49.6	49.6	50.5	0.9
Q	7.03	271[4]	1,223	1.2	52.1	52.1	52.5	0.4

[1]Miles above main channel of the James River

[2]Floodway width within Prince George County / Total floodway width

[3]Elevations computed without considering backwater effects from the James River

[4]Mapping does not match width

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA AND INCORPORATED AREAS

FLOODWAY DATA

BAILEY CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Blackwater Swamp								
A	9.75	712	4,061	0.8	100.7	100.7	101.7	1.0
B	10.29	990	4,560	0.7	101.4	101.4	102.4	1.0
C	10.70	319	1,524	2.1	102.6	102.6	103.6	1.0
D	11.07	639	3,522	0.9	103.8	103.8	104.8	1.0
E	11.45	400	1,150	2.8	105.3	105.3	106.2	0.9
F	11.90	475	2,344	1.1	109.0	109.0	109.5	0.5
G	12.32	420	2,097	1.2	110.0	110.0	110.7	0.7
H	12.63	640	3,572	0.7	110.5	110.5	111.2	0.7
I	12.99	744	4,173	0.6	110.7	110.7	111.5	0.8
J	13.39	1,248	9,530	0.2	114.7	114.7	114.8	0.1
K	13.60	889	5,426	0.4	114.7	114.7	114.8	0.1
L	13.96	316	1,937	1.1	114.8	114.8	114.9	0.1
M	15.14	500	2,301	0.9	115.8	115.8	116.3	0.5
N	15.61	363	899	2.2	117.0	117.0	117.5	0.5
O	16.05	218	1,420	1.4	119.0	119.0	120.0	1.0

[1]Miles above corporate limits

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA AND INCORPORATED AREAS

FLOODWAY DATA

BLACKWATER SWAMP

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Chappell Creek								
A	1.86	120	407	3.7	7.2	1.5[3]	2.5	1.0
B	2.16	250	1,197	1.3	7.2	5.5[3]	6.4	0.9
C	2.46	217	667	2.2	7.9	7.9	8.8	0.9
D	2.70	455[2]	3,312	0.3	17.5	17.5	18.0	0.5
E	2.90	385	1,688	0.6	17.5	17.5	18.0	0.5
F	3.22	165	446	2.4	24.4	24.4	24.9	0.5
G	3.48	66	189	4.2	32.4	32.4	33.2	0.8
H	3.84	32	150	5.3	46.5	46.5	47.0	0.5

[1]Miles above main channel of the James River

[2]Mapping does not match width

[3]Elevations computed without considering backwater effects from the James River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA AND INCORPORATED AREAS

FLOODWAY DATA

CHAPPELL CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Harrison Creek								
A	600	306[2]	1,102	2.1	10.5	6.1[3]	7.1	1.0
B	1,525	104 / 267[4]	2,599	0.8	19.5	19.5	19.5	0.0
C	2,250	0 / 43[4]	258	8.1	21.5	21.5	21.6	0.1
D	2,850	222 / 256[4]	2,794	0.7	28.8	28.8	28.8	0.0
E	3,850	86 / 173[4]	1,601	1.2	28.9	28.9	28.9	0.0

[1]Feet above confluence with Appomattox River Navigation Channel

[2]Cross section outside of corporate limits

[3]Elevation computed without consideration of backwater effects from Appomattox River Navigation Channel

[4]Floodway width within Prince George County / Total floodway width

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA AND INCORPORATED AREAS

FLOODWAY DATA

HARRISON CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Jones Hole Swamp								
A	7.31	597	2,912	1.2	84.5	84.5	85.5	1.0
B	8.03	203	708	4.8	86.6	86.6	87.3	0.7
C	8.22	726	4,031	0.7	90.6	90.6	91.4	0.8
D	8.52	687	4,030	0.7	91.5	91.5	92.3	0.8
E	8.85	1,230	5,479	0.4	92.4	92.4	93.1	0.7
F	9.27	257	898	2.6	94.4	94.4	95.1	0.7
G	9.80	471	2,414	1.0	100.6	100.6	101.3	0.7
H	10.00	279	1,702	1.4	102.0	102.0	102.7	0.7
I	10.17	754	5,369	0.4	102.4	102.4	103.1	0.7
J	10.51	615	6,763	0.3	108.4	108.4	109.4	1.0
K	11.14	322	2,359	0.8	108.6	108.6	109.6	1.0
L	11.39	240	1,669	1.2	109.1	109.1	110.1	1.0
M	11.71	197[2]	1,178	1.7	110.6	110.6	111.6	1.0
N	12.03	355	4,123	0.5	118.9	118.9	119.9	1.0
O	12.24	292	3,055	0.7	118.9	118.9	119.9	1.0
P	12.43	317	3,672	0.4	118.9	118.9	119.9	1.0
Q	12.70	223	2,134	0.7	119.1	119.1	120.1	1.0
R	13.05	170	1,438	1.0	119.4	119.4	120.4	1.0

[1]Miles above confluence with Nottoway River

[2]Mapping does not match width

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA AND INCORPORATED AREAS

FLOODWAY DATA

JONES HOLE SWAMP

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Manchester Run								
A	0.15	330[2]	1,380	1.2	14.3	14.3	15.3	1.0
B	0.46	140[2]	710	2.4	23.1	23.1	23.9	0.8
C	0.52	175[2]	812	2.1	24.4	24.4	25.0	0.6
D	0.77	185[2]	1,078	1.4	30.4	30.4	30.4	0.0
E	0.98	100	256	6.1	33.3	33.3	33.3	0.0
F	1.16	100[2]	583	2.7	39.7	39.7	40.0	0.3
G	1.29	165[2]	1,069	1.5	40.7	40.7	41.1	0.4
H	1.48	146[2]	680	2.3	42.1	42.1	42.7	0.6
I	1.63	60[2]	305	4.7	45.5	45.5	46.3	0.8
J	1.78	132[2]	684	2.1	48.4	48.4	49.3	0.9

[1]Miles above confluence with Bailey Creek

[2]Mapping does not match width

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA AND INCORPORATED AREAS

FLOODWAY DATA

MANCHESTER RUN

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Powell Creek								
A	5.3	410	2,612	2.3	9.5	9.5	10.5	1.0
B	5.5	321	2,769	1.4	10.9	10.9	11.7	0.8
C	5.8	674	6,593	0.6	11.3	11.3	12.1	0.8
D	5.9	620	5,020	0.7	11.4	11.4	12.2	0.8
E	6.3	223	1,469	2.5	13.9	13.9	14.7	0.8

[1]Miles above main channel of the James River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA AND INCORPORATED AREAS

FLOODWAY DATA

POWELL CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Southerly Run								
A	0.09	171	740	1.8	33.4	33.4	34.4	1.0
B	0.38	170	521	2.5	38.3	38.3	39.2	0.9
C	0.69	86	453	2.6	46.5	46.5	47.4	0.9
D	0.82	110[2]	586	2.0	48.5	48.5	49.3	0.8
E	0.98	85	274	3.6	51.3	51.3	51.9	0.6

[1]Miles above confluence with Bailey Creek

[2]Mapping does not match width

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA AND INCORPORATED AREAS

FLOODWAY DATA

SOUTHERLY RUN

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Walls Run								
A	0.20	296	2,795	1.1	11.1	11.1	12.1	1.0
B	0.45	262	1,896	1.6	12.0	12.0	13.0	1.0
C	0.66	472	3,428	0.9	12.6	12.6	13.6	1.0
D	0.87	234	1,860	1.6	16.5	16.5	17.4	0.9
E	1.01	279	1,851	1.6	17.3	17.3	18.3	1.0

[1]Miles above confluence with Powell Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA AND INCORPORATED AREAS

FLOODWAY DATA

WALLS RUN

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Wards Creek								
A	5.75	468	1,715	2.5	15.5	15.5	16.5	1.0
B	5.95	605	2,092	1.8	17.7	17.7	18.7	1.0
C	6.11	257	1,388	2.7	18.6	18.6	19.6	1.0
D	6.28	527	3,246	1.2	23.9	23.9	23.9	0.0
E	6.55	573	2,582	1.5	24.4	24.4	24.7	0.3

[1]Miles above main channel of the James River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA AND INCORPORATED AREAS

FLOODWAY DATA

WARDS CREEK

The area between the floodway and the 1-percent annual chance floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 1-percent annual chance flood more then 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1. Portions of the floodway and floodway fringe on the Appomattox River, Bailey Creek, and Harrison Creek are located outside the county boundary of Prince George County. The revised base map reflects more detailed and up-to-date stream configurations than those shown on the previous FIRM. As a result, the Flood Profiles and Floodway Data Tables may reflect previous channel distances that differ from what is shown on the revised FIRM.

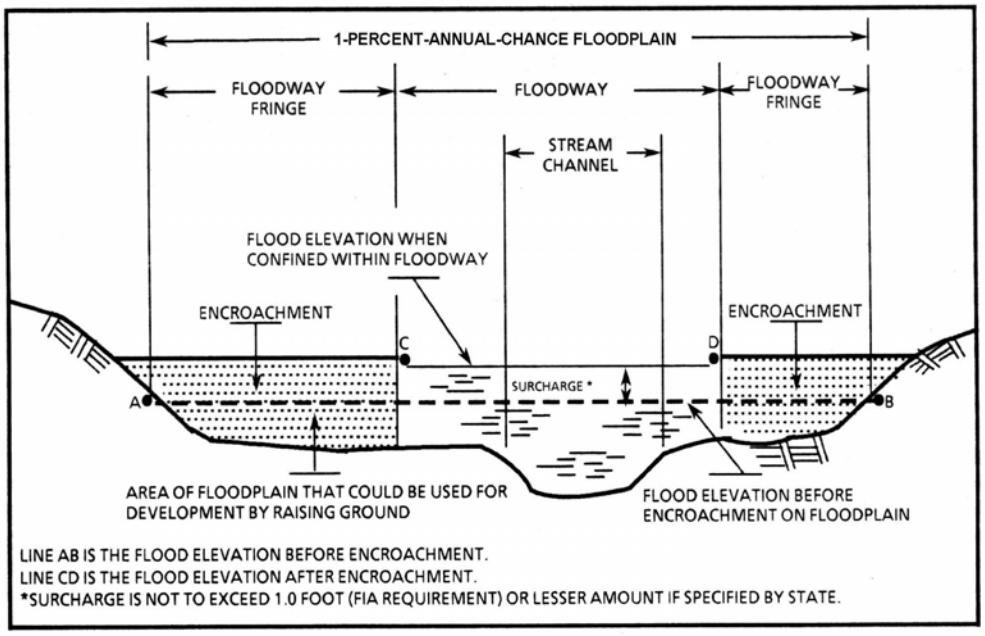


FIGURE 1 – FLOODWAY SCHEMATIC

5.0 INSURANCE APPLICATIONS

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

Zone A

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

Zone AE

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

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 0.2-percent annual chance floodplain, areas within the 0.2-percent annual chance floodplain, areas of 1-percent annual chance flooding where average depths are less than 1 foot, areas of 1-percent annual chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent annual chance flood by levees. No BFEs or depths are shown within this zone.

6.0 FLOOD INSURANCE RATE MAP

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

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

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

The countywide FIRM presents flooding information for the entire geographic area of Prince George County. Historical data relating to the maps prepared for each community, up to and including this countywide FIS, are presented in Table 4, “Community Map History”.

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Prince George County (Unincorporated Areas)	January 24, 1975	None	May 1, 1980	2010

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA
AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

7.0 OTHER STUDIES

Flood Insurance Studies have been prepared for the adjacent Counties of Charles City, Chesterfield, Dinwiddie, Surry, and Sussex and the Cities of Hopewell and Petersburg. (References 33, 34, 35, 36, 37, 4, and 2). This countywide FIS is in agreement with the Counties of Dinwiddie, Surry, and Sussex and the Cities of Hopewell and Petersburg.

This countywide FIS is not in exact agreement with the Counties of Charles City and Chesterfield. Along the James River, the 1-percent annual chance tidal flood elevation for establishing backwater effects is 8.5 feet and 8.4 feet, NGVD 29, respectively, as shown in the FIS reports. For this countywide FIS, the tidal backwater elevation is 8.3 feet, NGVD 29 or 7.2 feet, NAVD 88.

A Flood Plain Information Report on the Appomattox River at Petersburg was prepared by the USACE, Norfolk District in March 1975 (Reference 28). The study begins approximately 1.5 miles downstream of the boundary between the City Petersburg and the Counties of Prince George and Chesterfield, and extends approximately 10 miles upstream to the Brasfield Dam and Lake Chesdin. The USACE report, which established flood profiles for the Standard Project Flood (62,000 cfs) and the Intermediate Regional Flood (40,000 cfs), was based on a statistical analysis of stream flow records for the Appomattox River near Petersburg, together with the USACE analysis of other data in the region. The 1975 report discounted the effects of Lake Chesdin on floods of higher magnitude. Concurrence was achieved for both stream flow (40,600 cfs) and profile interface for the 1-percent annual chance flood. The USACE report did not establish profiles for the 10-, 2-, and 0.2 annual chance flood events.

In a general memo (undated) from the USACE, Norfolk District titled, "Flood Heights on the James River in the Vicinity of Hopewell, Va.", tidal flood heights for the 2- and 1-percent annual chance floods and the Standard Project Flood were established (Reference 25). This data was used in the 1979 Prince George County FIS along with the study contractor's analysis to establish tidal flooding for the 10-, 2-, 1- and 0.2-annual chance flood events, for backwater effects on the detailed study streams: Appomattox River, Bailey Creek, and Chappell Creek.

The USGS prepared flood prone maps (1974) for portions of the James River, Appomattox River, Bailey Creek, Manchester Run, and Southerly Run (Reference 38). These maps were used as a reference for completing the detailed study areas in the 1979 Prince George County FIS.

The following FIA Flood Hazard Boundary Maps (FHBMs) were available during the 1979 FIS: Counties of Charles City, Chesterfield, Dinwiddie, Prince George, and Surry, and the Cities of Colonial Heights, Hopewell, and Petersburg (Reference 39). For the 1979 FIS, the maps were reviewed and compared to the approximate study areas that were contiguous to this study. In general, the maps agreed with those prepared for the 1979 FIS. In many locations along the James River, the FIA maps appeared to extend to higher elevations than those determined in the 1979 FIS. The differences may be attributed to the flood data used and the scale used in preparing the maps.

Information pertaining to revised and unrevised flood hazards for each jurisdiction within Prince George County has been compiled into this FIS. Therefore, this FIS supersedes all previously printed FIS Reports, FHBMs, and FIRMs for all of the unincorporated jurisdictions within Prince George County.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this FIS can be obtained by contacting FEMA, Federal Insurance and Mitigation Division, Sixth Floor, 615 Chestnut Street, Philadelphia, Pennsylvania 19106-4404.

9.0 BIBLIOGRAPHY AND REFERENCES

1. Commonwealth of Virginia, Information Technologies Agency, Virginia Geographic Information Network, Virginia Base Mapping Program, Orthophotography, Scale: 1:2,400, 2002.

2. Federal Emergency Management Agency, Flood Insurance Study, City of Petersburg, Virginia, Independent City, Washington, D.C., September 16, 1980.

3. Commonwealth of Virginia, Information Technologies Agency, Virginia Geographic Information Network, Virginia Base Mapping Program, Digital Topographic Contours, Prepared by Sanborn Map Company, Contour Interval: 2 feet, 2007.

4. Federal Emergency Management Agency, Flood Insurance Study, City of Hopewell, Virginia, Independent City, Washington, D.C., March 1979.

5. U.S. Department of the Interior, Geological Survey, 7.5 Minute Series Topographic Maps, Scale: 1:24,000: Brandon, 1965, revised 1980; Carson, 1969, revised 1987; Charles City, 1965, revised 1987; Claremont, 1966, revised 1986; Disputanta North, 1965, revised 1974; Disputanta South, 1968, revised 1981; Hopewell, 1969, revised 1987; Petersburg, 1969, revised 1987; Prince George, 1994; Savedge, 1966, revised 1974; Templeton, 1969, revised 1974; and Westover, 1994.

6. Prince George County, Virginia, About Prince George, Demographics, History, Internet Address: http://www.princegeorgeva.org.

7. U.S. Census Bureau, Population Finder, Internet Address: http://factfinder.census.gov.

8. Commonwealth of Virginia, Virginia Employment Commission, Virginia Workforce Connection, Labor Market Data, Demographics, Population, State Demographer Projections, Internet Address: http://www.vawc.virginia.gov.

9. Prince George County Planning Commission, Prince George County, Virginia, 2007 Comprehensive Plan, December 11, 2007, Internet Address: http://www.princegeorgeva.org, Planning and Zoning Department.
10. The Progress Index, Petersburg, Virginia, excerpts from a newspaper article, October 1972.

11. U.S. Department of the Interior, Geological Survey, Water Resources Data for Virginia, 1970-1975.

12. Commonwealth of Virginia, An Assessment: Virginia's Response to Hurricane Isabel, Richmond, Virginia, December 2003.

13. Federal Emergency Management Agency, Regions III and IV, U.S. Army Corps of Engineers, Philadelphia and Wilmington Districts, Hurricane Isabel Assessment, Prepared by Post, Buckley, Schuh, and Jernigan, March 2005.

14. U.S. Department of Commerce, National Oceanic Atmospheric Administration, National Weather Service, Wakefield, Virginia Forecast Office, Data Feeds, Tropical Weather, Post-Storm Report, Hurricane Isabel, September 22, 2003, Internet Address: http://www.erh.noaa.gov/er/akq/.

15. Crater Planning District Commission, Environment, Crater Regional Hazard Mitigation Plan, March 2006, Internet Address: http://www.craterpdc.org.

16. U.S. Department of Commerce, National Oceanic Atmospheric Administration, National Weather Service, National Hurricane Center, Tropical Cyclone Report, Hurricane Gaston, September 19, 2004, Revised February 16, 2005, Internet Address: http://www.nhc.noaa.gov/.

17. Federal Emergency Management Agency, Flood Insurance Study, City of Richmond, Virginia, Independent City, Washington, D.C., Revised April 2, 2009.

18. Commonwealth of Virginia, Virginia Uniform Statewide Building Code, Article 8, Part C, Section 872.6, September 1973.

19. Appomattox River Water Authority, Memo and Data, September 1976.

20. Water Resources Council, "Guidelines for Determining Flood Flow Frequency", Bulletin No. 17, March 1976.

21. U.S. Army Corps of Engineers, Norfolk District, Flood Plain Information Report – Swift Creek, Chesterfield, Virginia, 1974.

22. U.S. Department of Agriculture, Soil Conservation Service, Soil Conservation Service, National Engineering Handbook, Section 4, Hydrology, Chapter 14, August 1972.

23. U.S. Department of the Interior, Geological Survey, Floods in Virginia - Magnitude and Frequency, Open-File Report By E.M. Miller, 1969.

24. American Society of Civil Engineers, Approximate Method for Quick Flood Plain Mapping, Meeting Preprint 2559, November 1975.
25. U.S. Army Corps of Engineers, Norfolk District, "Flood Heights on the James River in the Vicinity of Hopewell, Virginia", Memo, Undated.

26. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Monthly High Tides for Hampton Roads and Portsmouth, Virginia, 1927-1974.
27. U.S. Department of Commerce, Weather Bureau Technical Paper No. 40, Rainfall Frequency Atlas of the United States, Washington, D.C., 1963.

28. U.S. Army Corps of Engineers, Norfolk District, Flood Plain Information Study, Appomattox River, Chesterfield County and Petersburg, Virginia, March 1975.

29. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Generalized Computer Program, Davis, California, October 1973.

30. Commonwealth of Virginia, Department of Highways and Transportation, Photogrammetric Engineer, "Aerial Photographs, Prince George County," Scale 1:24,000, 1976.

31. U.S. Department of Interior, Geological Survey, Roughness Characteristics of Natural Channels, Water Supply Paper 1849, 1967.

32. U.S. Department of Interior, Geological Survey, 7.5 Minute Series (Topographic) Maps, Scale 1:24,000, Contour Interval 10 feet: Chester (1969), Hopewell (1969), Westover (1965), Charles City (1965), Petersburg (1969), Prince George (1969), Disputanta North (1965), Disputanta South (1968), Savedge (1966), Claremont (1973), Carson (1969), Templeton (1969).

33. Federal Emergency Management Agency, Flood Insurance Study, Charles City County, Virginia and Incorporated Areas, Washington, D.C., March 16, 2009.

34. Federal Emergency Management Agency, Flood Insurance Study, Chesterfield County, Virginia, Unincorporated Areas, Washington, D.C., Revised May 2, 1994.

35. Federal Emergency Management Agency, Flood Insurance Study, Dinwiddie County, Virginia, Unincorporated Areas, Washington, D.C., Study underway.

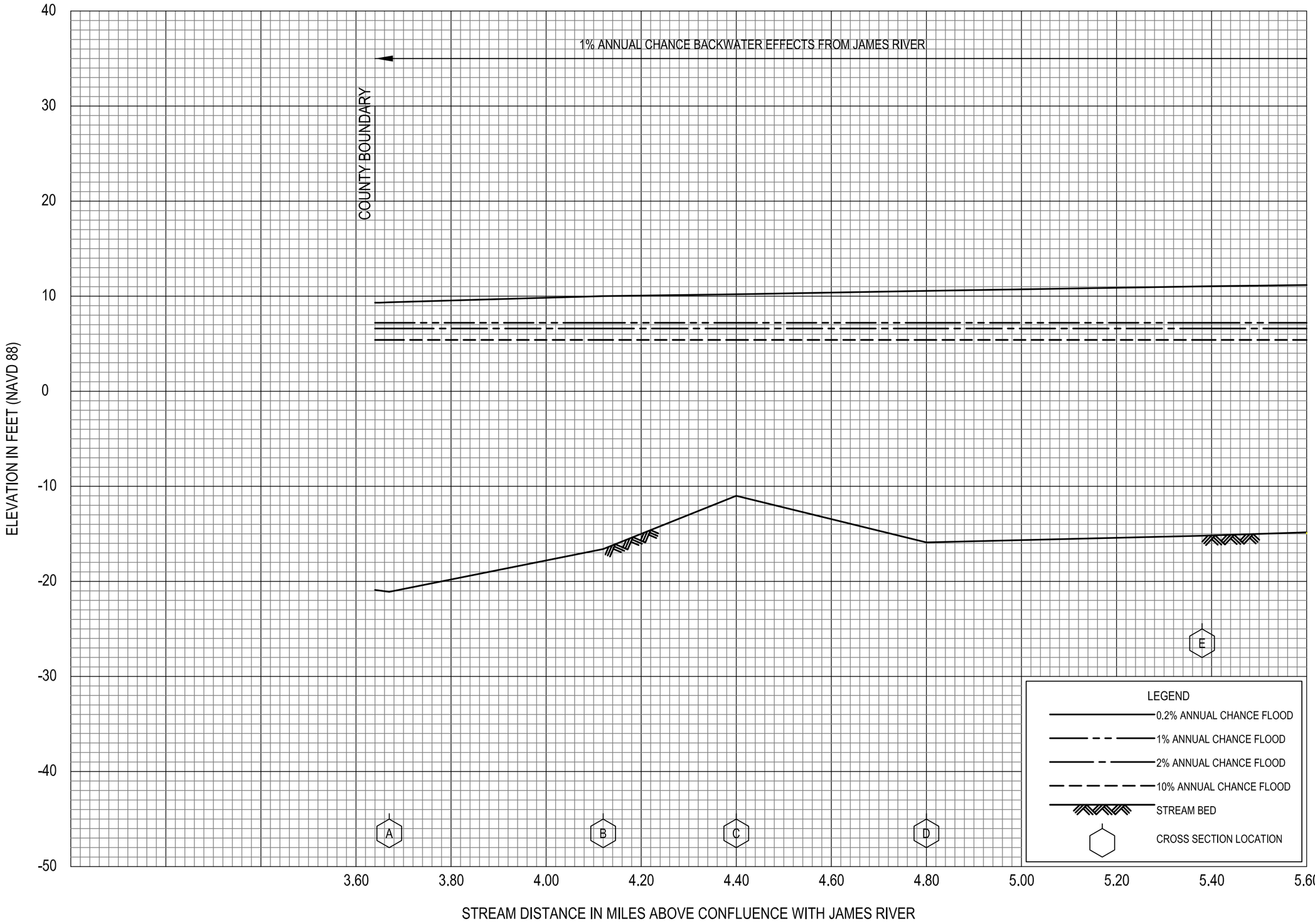
36. Federal Emergency Management Agency, Flood Insurance Study, Surry County, Virginia and Incorporated Areas, Washington, D.C., Revised April 2, 2009.

37. Federal Emergency Management Agency, Flood Insurance Study, Sussex County, Virginia and Incorporated Areas, Washington, D.C., July 7, 2009.

38. U.S. Department of the Interior, Geological Survey, Maps of Flood – Prone Areas, Scale 1:24,000, Contour Interval 10 feet: Chester, Va., 1974; Hopewell, Va., 1974; and Petersburg, Va., 1974.

39. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Maps: Counties of Prince George, 1975;

Chesterfield, 1975; Charles City, 1975; and Dinwiddie, 1974; Cities of Colonial Heights, 1974; Petersburg, 1976; Surry, 1974; and Hopewell, 1975.



FLOOD PROFILES

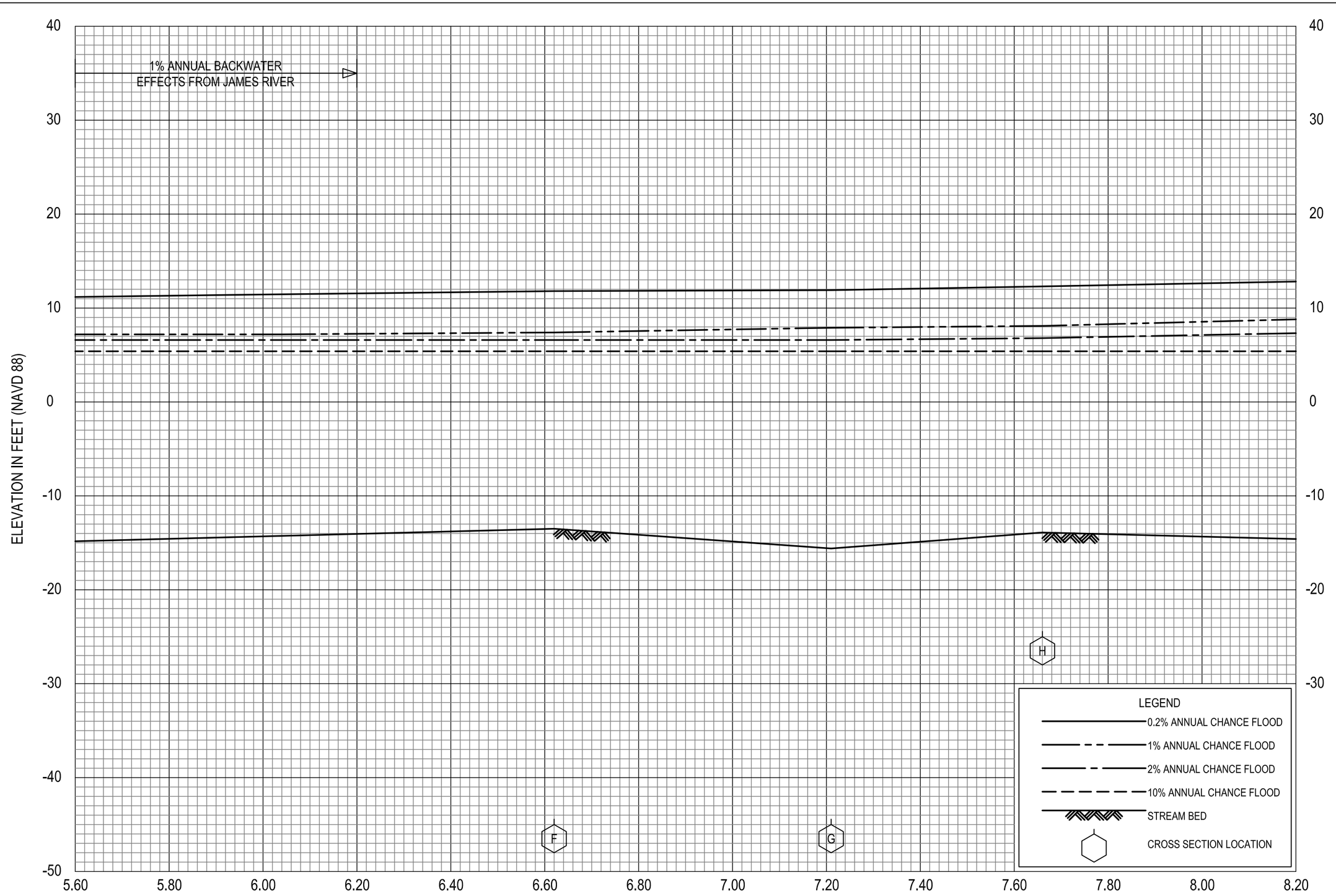
APPOMATTOX RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA

AND INCORPORATED AREAS

01P



FLOOD PROFILES

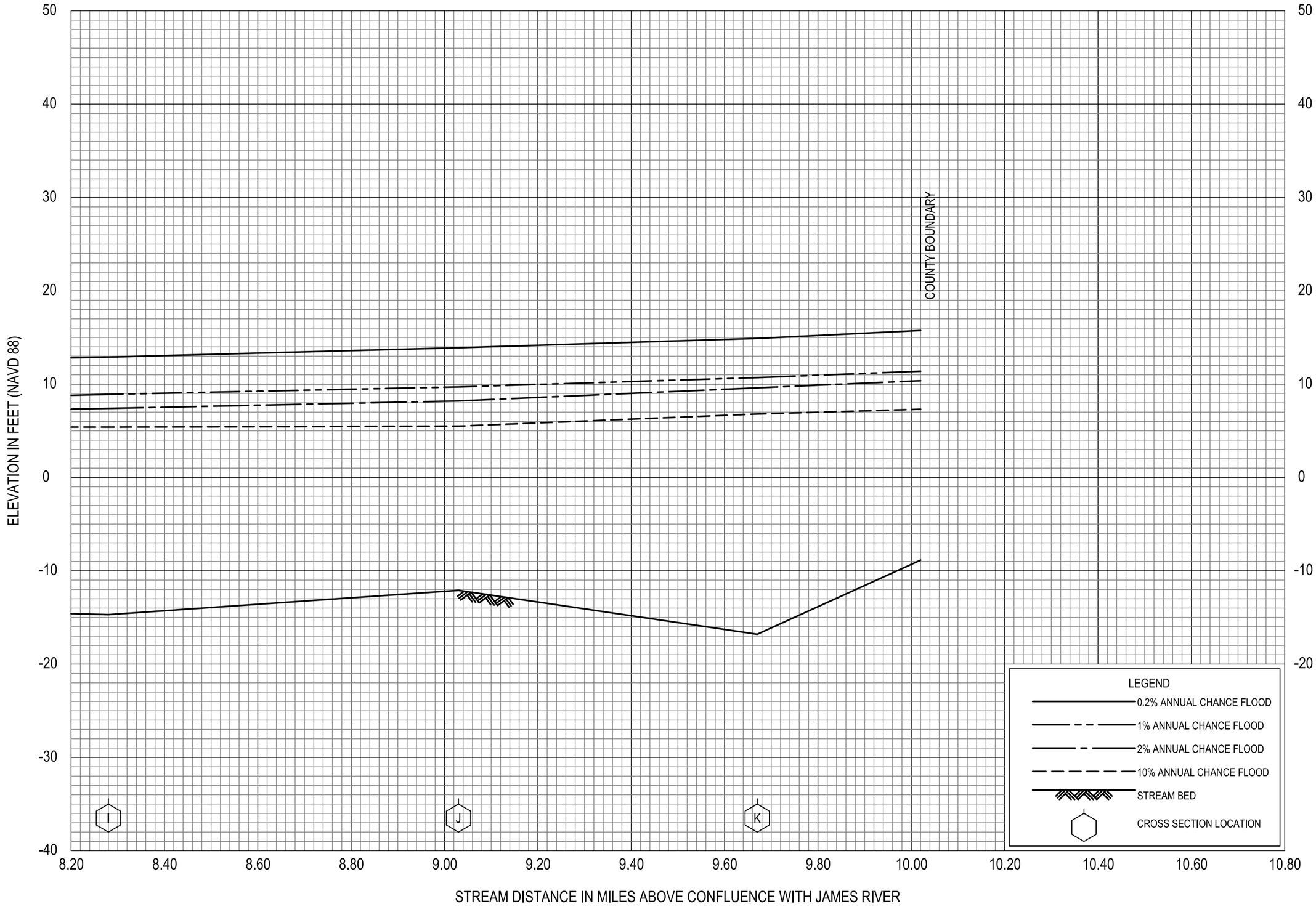
APPOMATTOX RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY

AND INCORPORATED AREAS

02P



FLOOD PROFILES

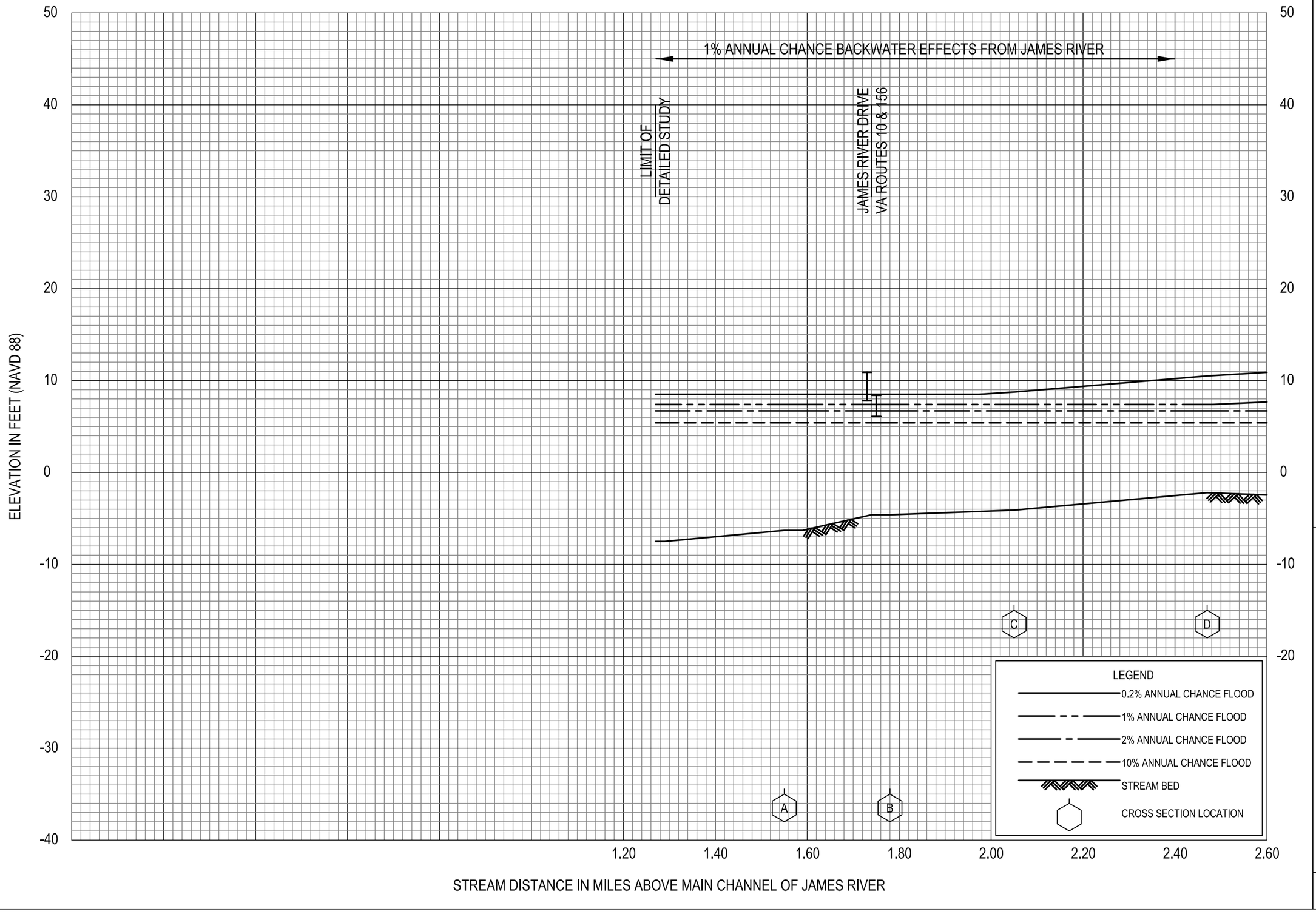
APPOMATTOX RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA

AND INCORPORATED AREAS

03P



FLOOD PROFILES

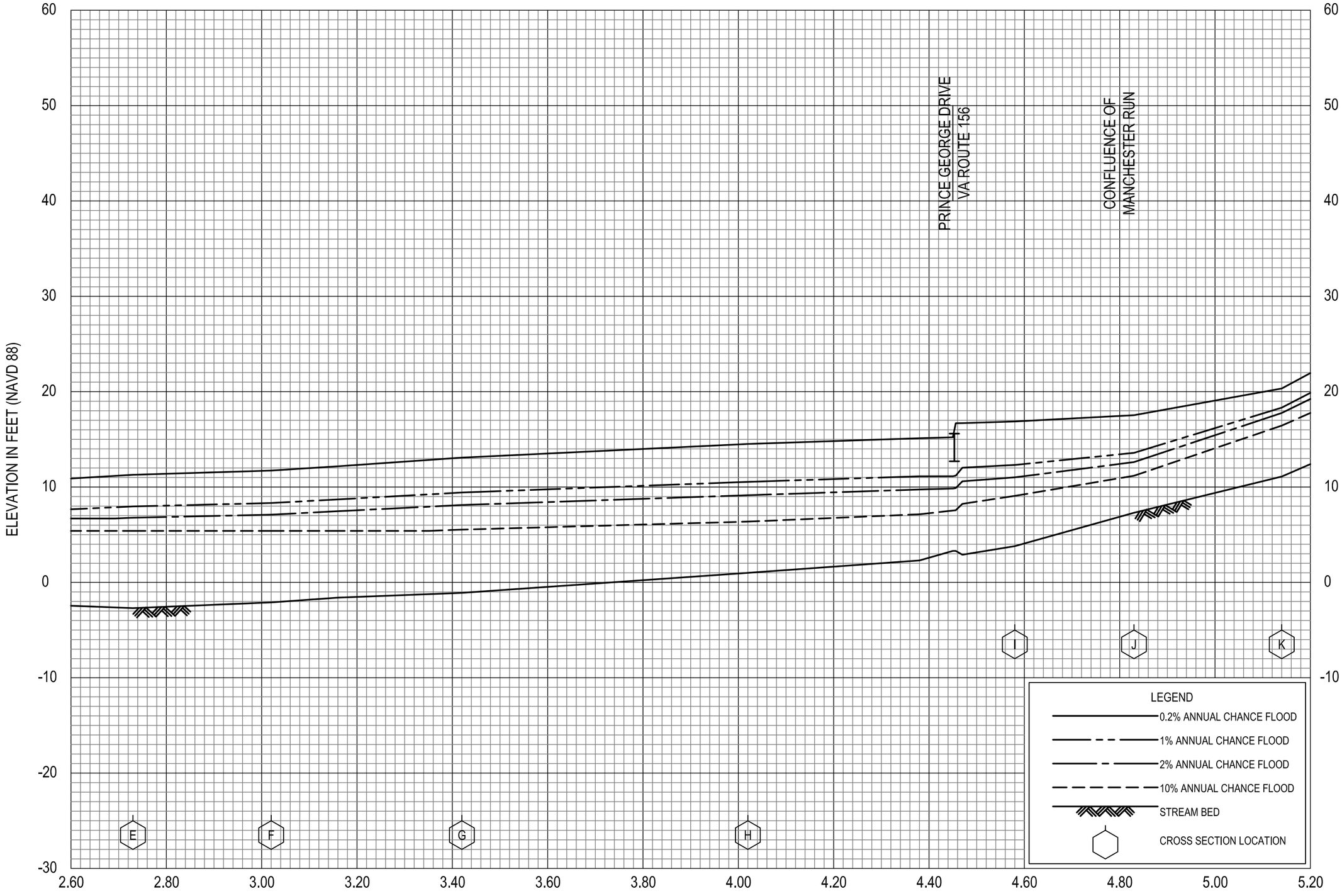
BAILEY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA

AND INCORPORATED AREAS

04P



FLOOD PROFILES

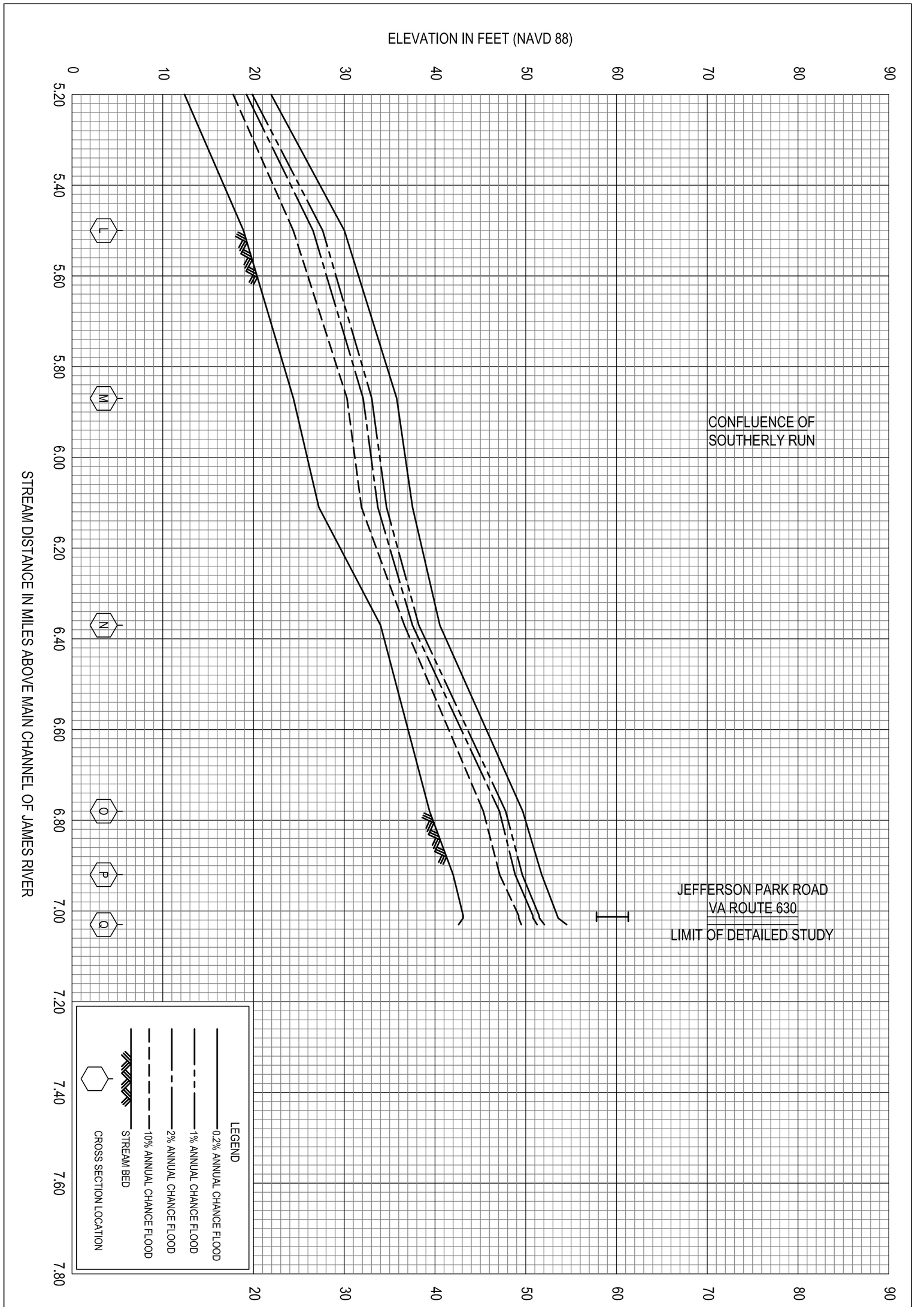
BAILEY CREEK

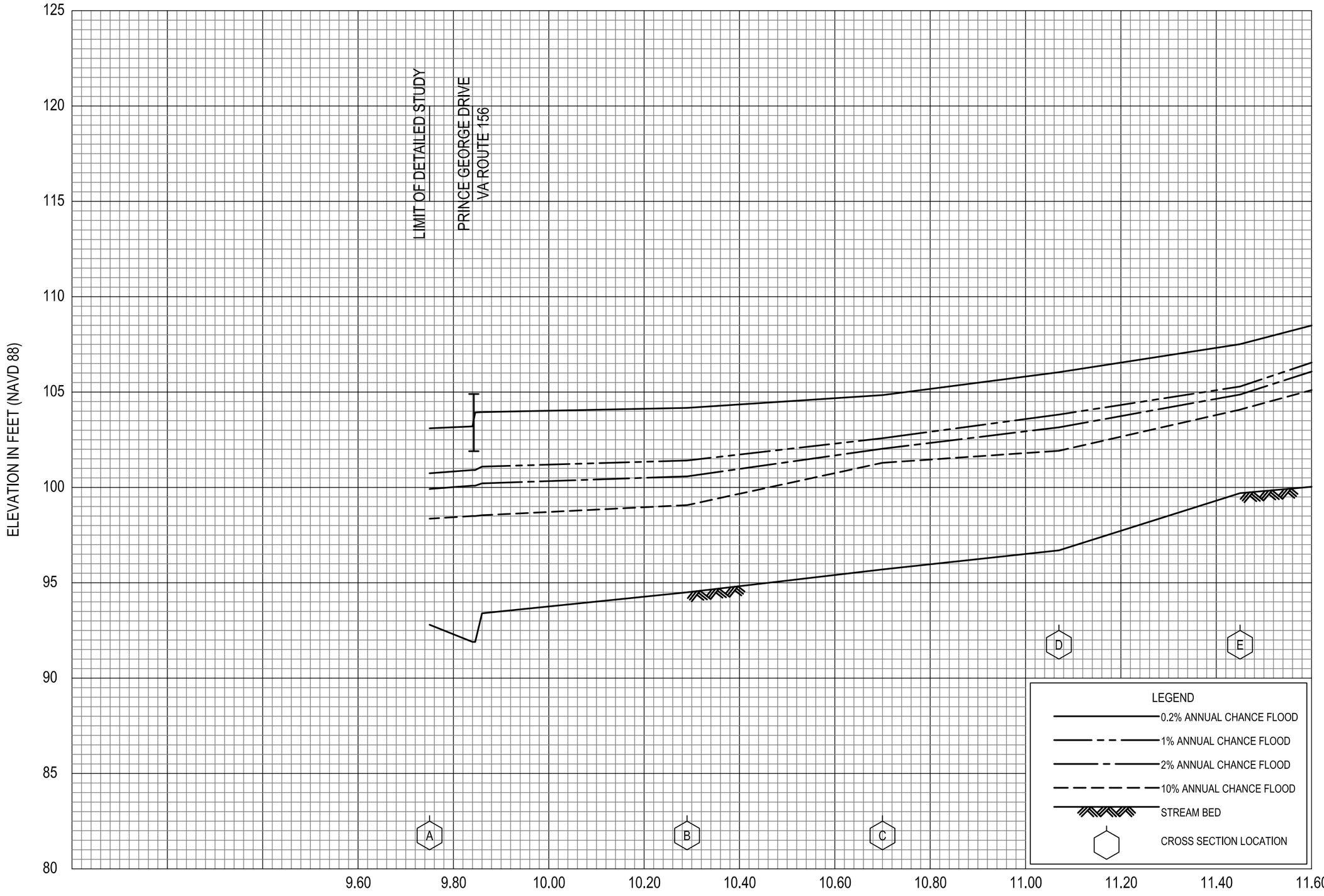
FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA

AND INCORPORATED AREAS

05P


ELEVATION IN FEET (NAVD 88)
0
10
20
30
40
50
60
70
80
90
5.20
5.40
5.60
5.80
6.00
6.20
6.40
6.60
6.80
7.00
7.20
7.40
7.60
7.80
L
M
N
O
P
Q
CONFLUENCE OF
SOUTHERLY RUN
JEFFERSON PARK ROAD
VA ROUTE 630
LIMIT OF DETAILED STUDY
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
STREAM DISTANCE IN MILES ABOVE MAIN CHANNEL OF JAMES RIVER



FLOOD PROFILES

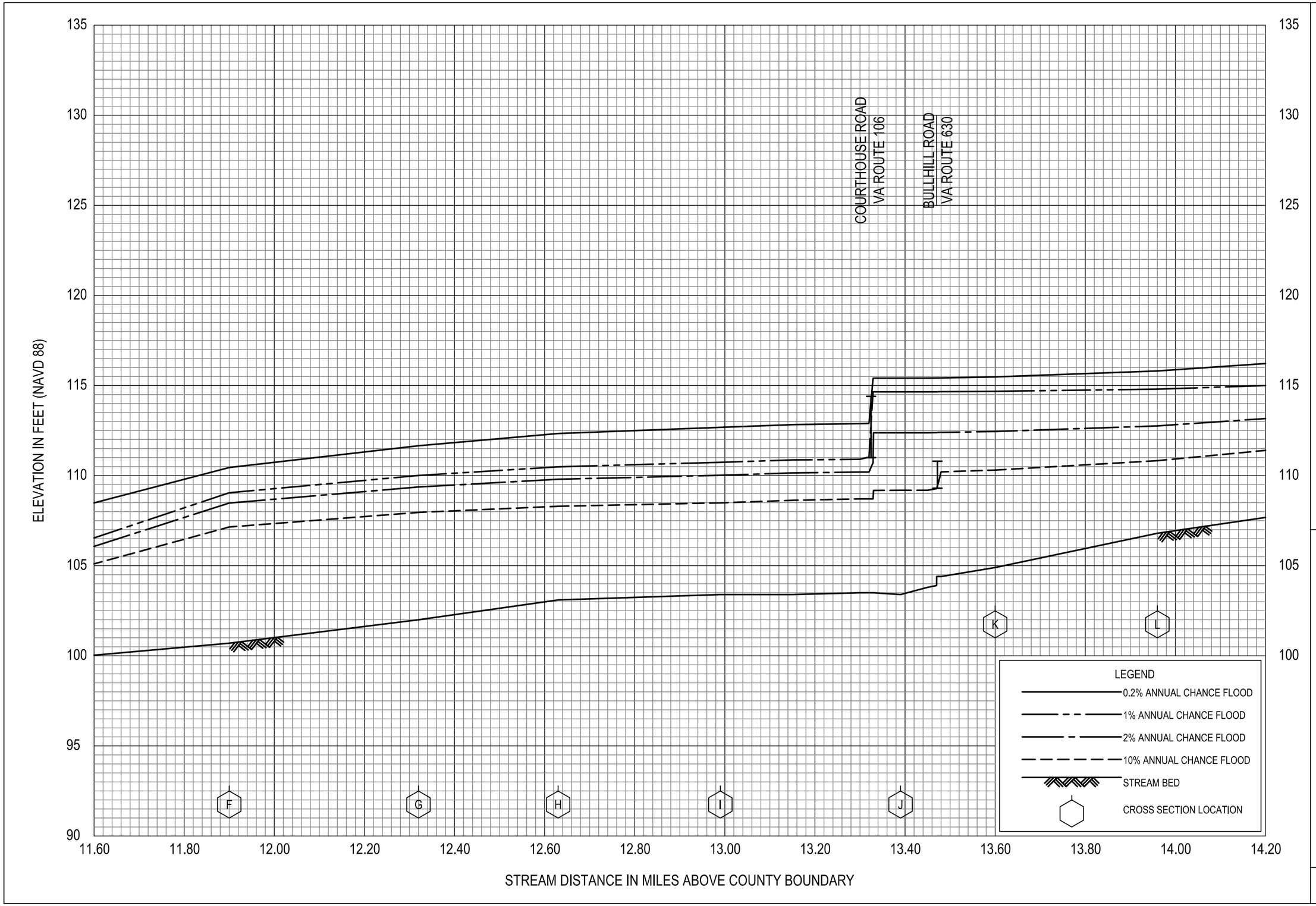
BLACKWATER SWAMP

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA

AND INCORPORATED AREAS

07P



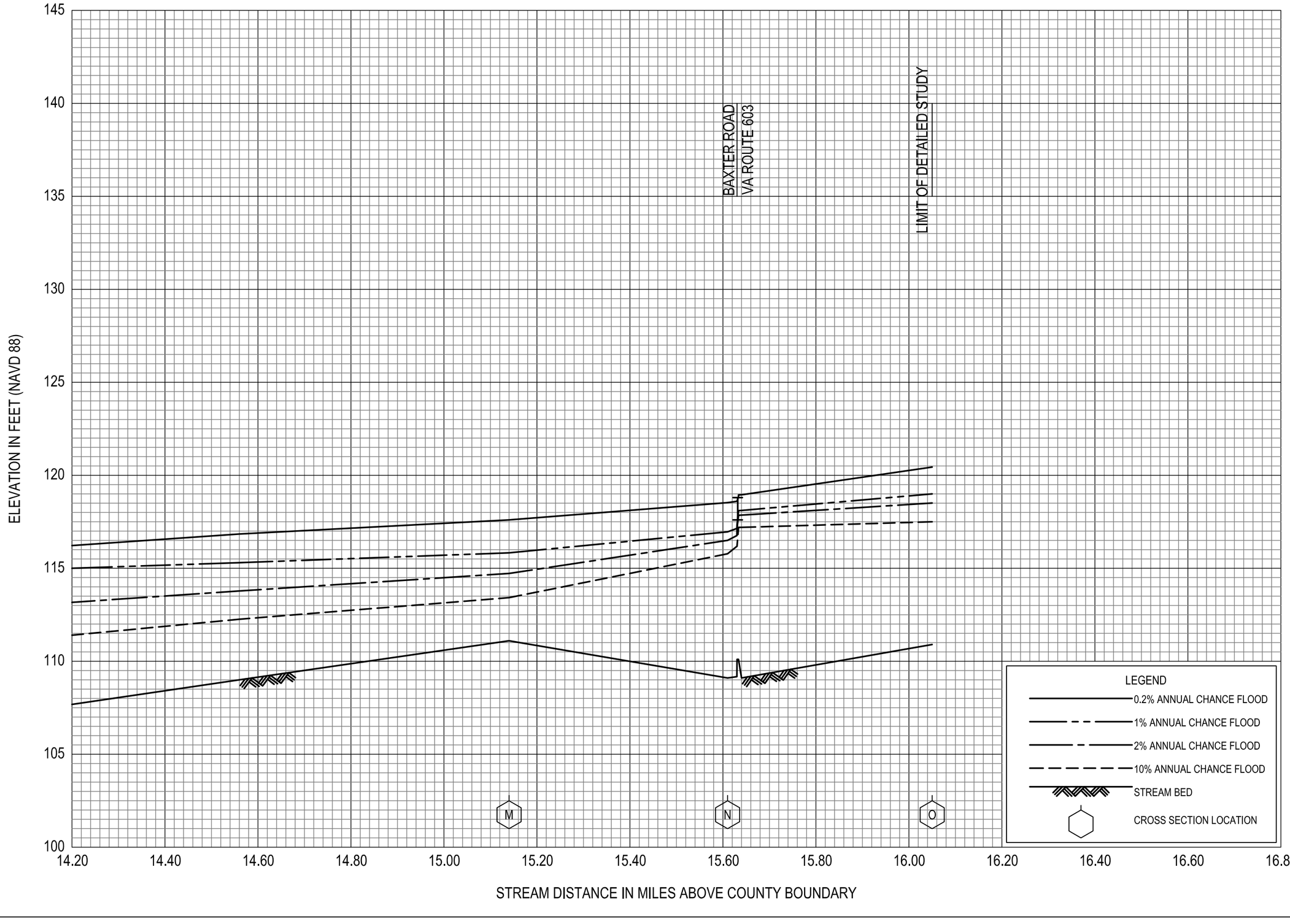
FLOOD PROFILES

BLACKWATER SWAMP

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA

AND INCORPORATED AREAS



FLOOD PROFILES

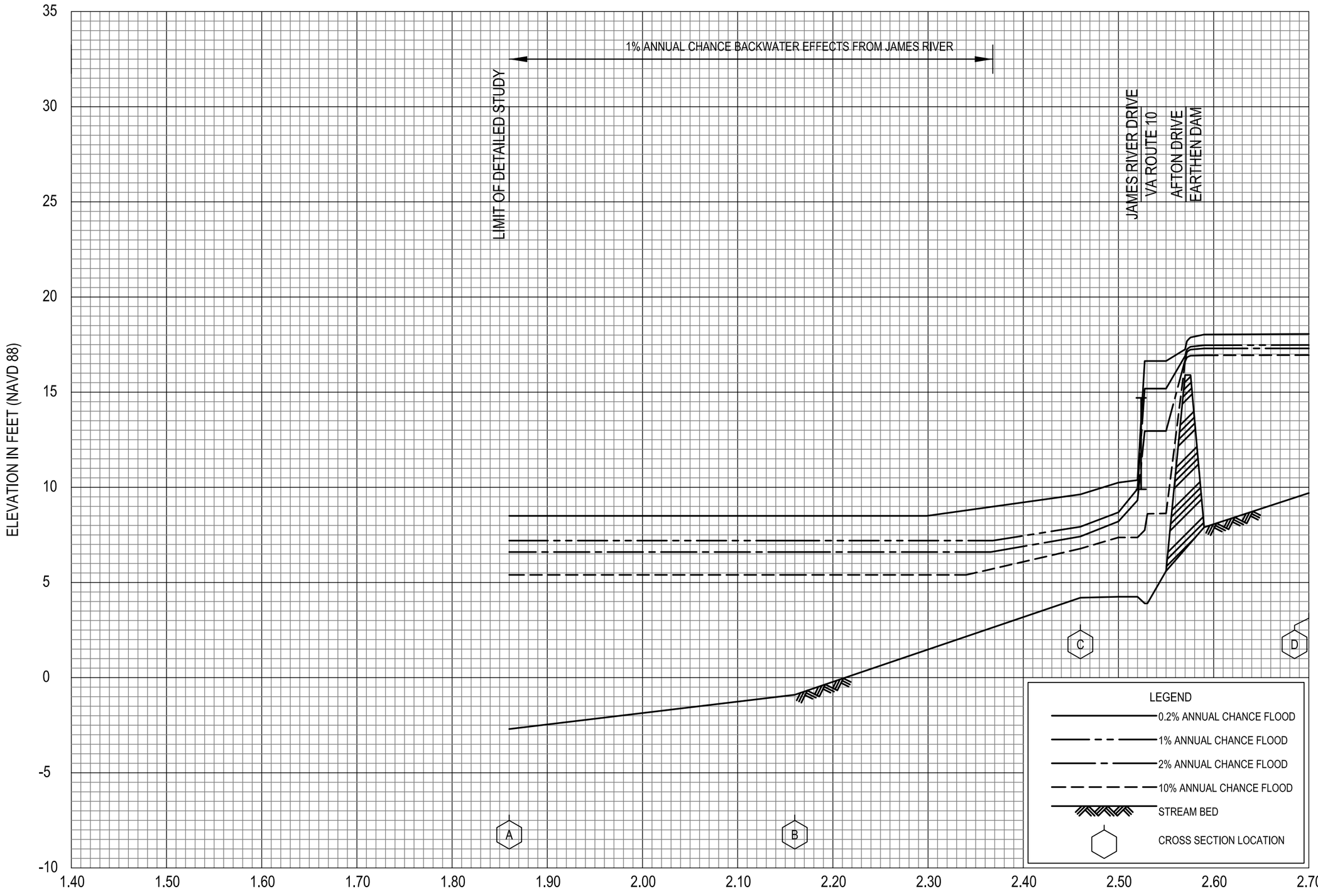
BLACKWATER SWAMP

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA

AND INCORPORATED AREAS

09P



FLOOD PROFILES

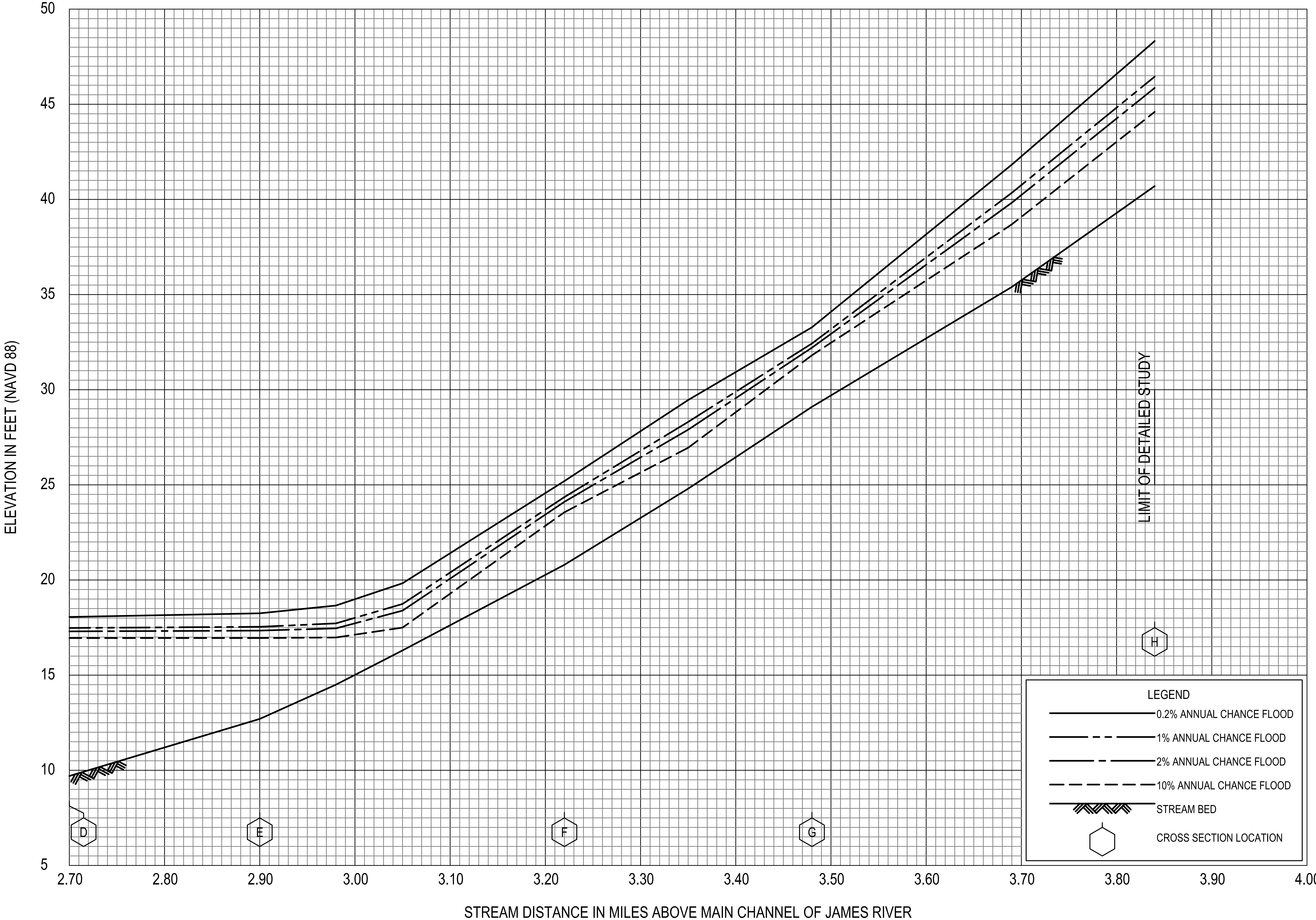
CHAPPELL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA

AND INCORPORATED AREAS

10P



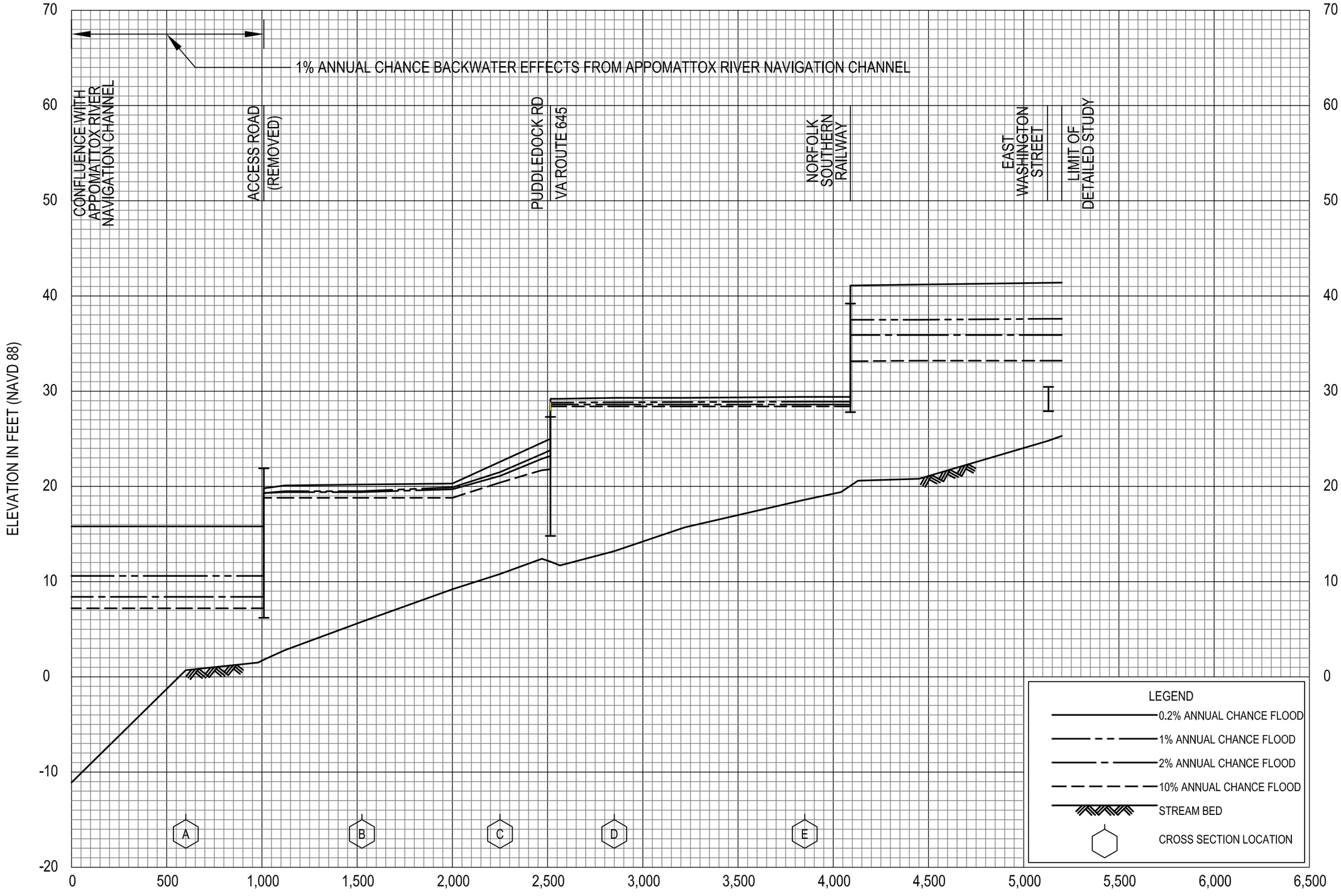
FLOOD PROFILES

CHAPPELL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA

AND INCORPORATED AREAS



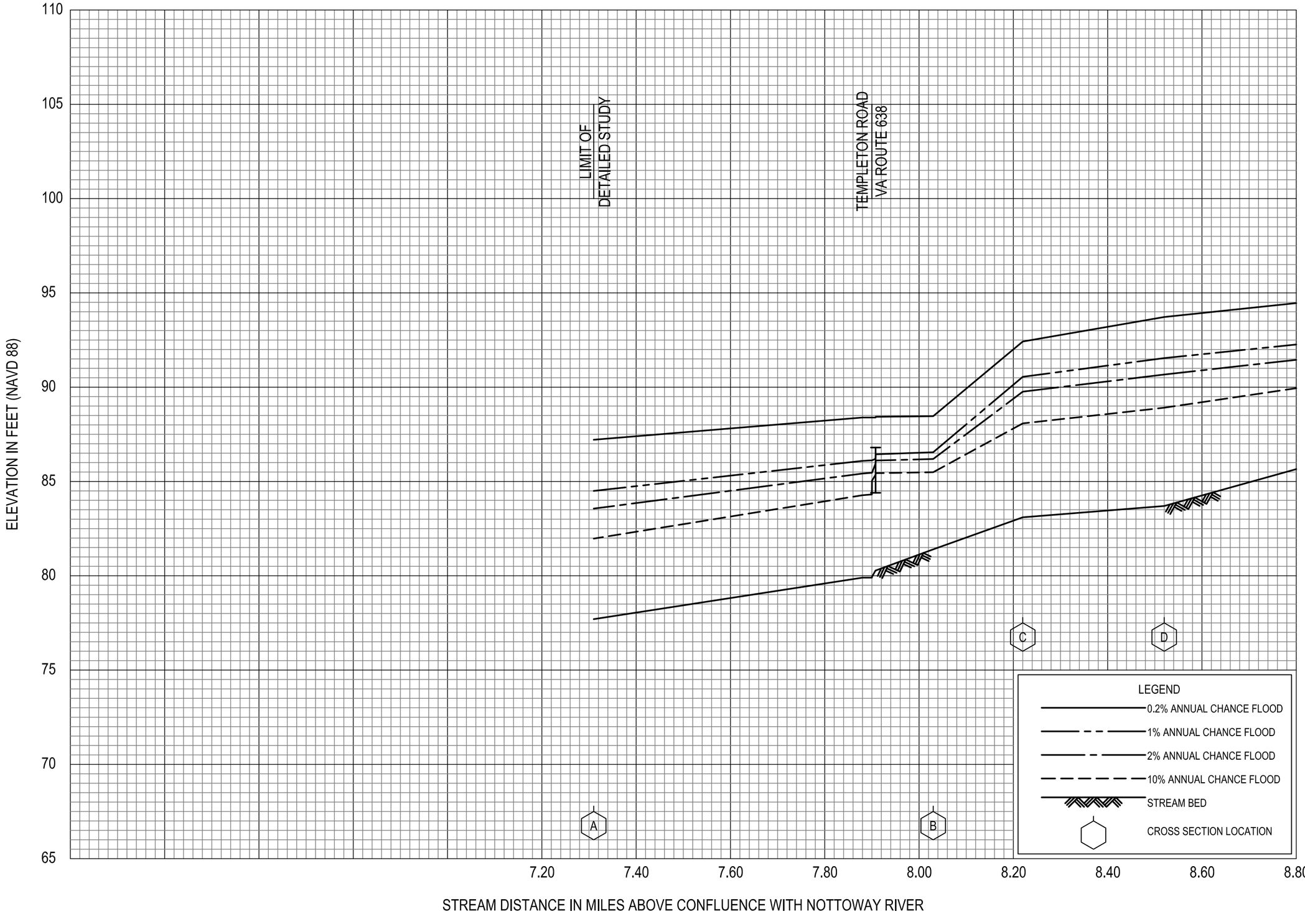
FLOOD PROFILES

HARRISON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA

AND INCORPORATED AREAS



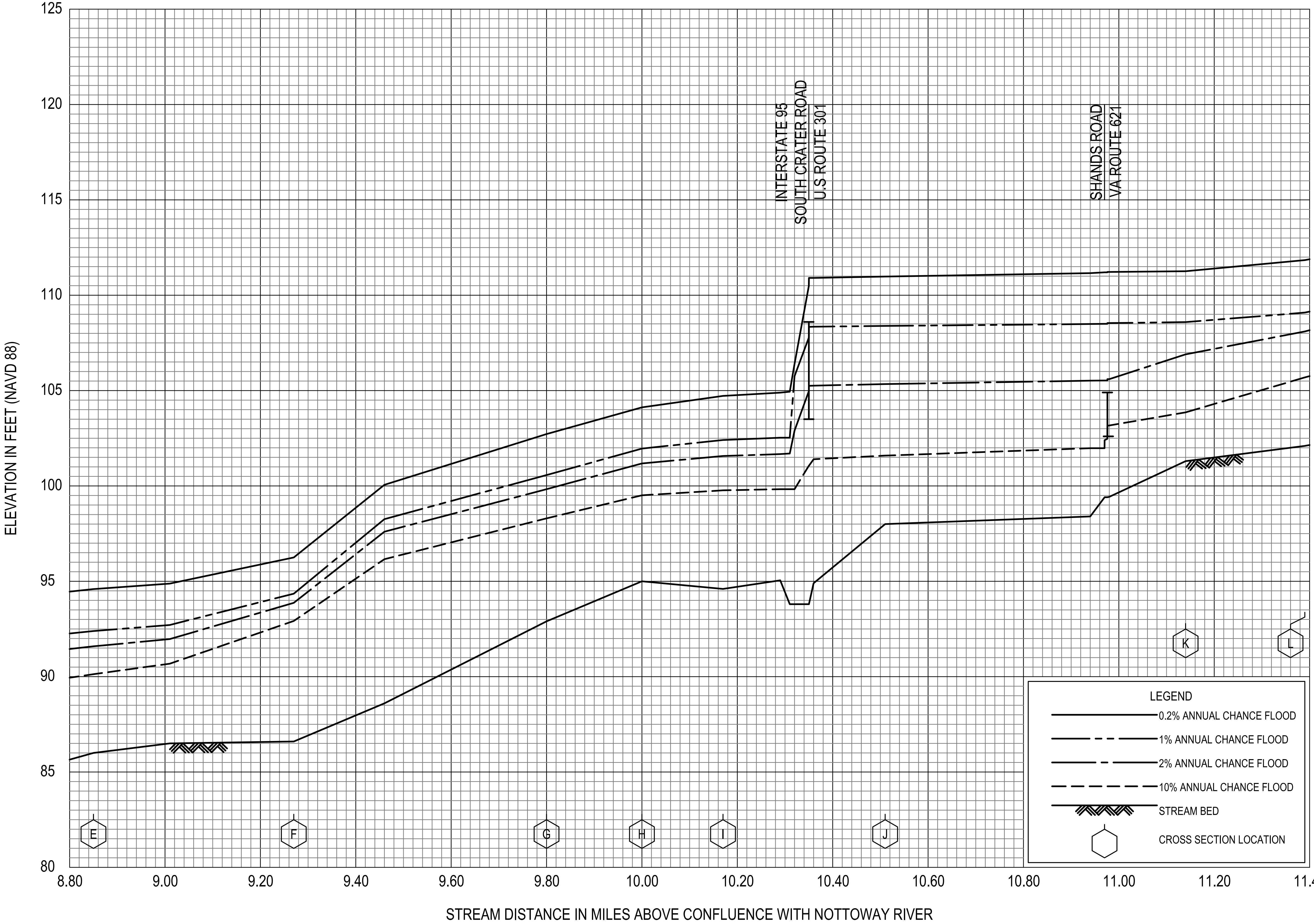
FLOOD PROFILES

JONES HOLE SWAMP

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA

AND INCORPORATED AREAS



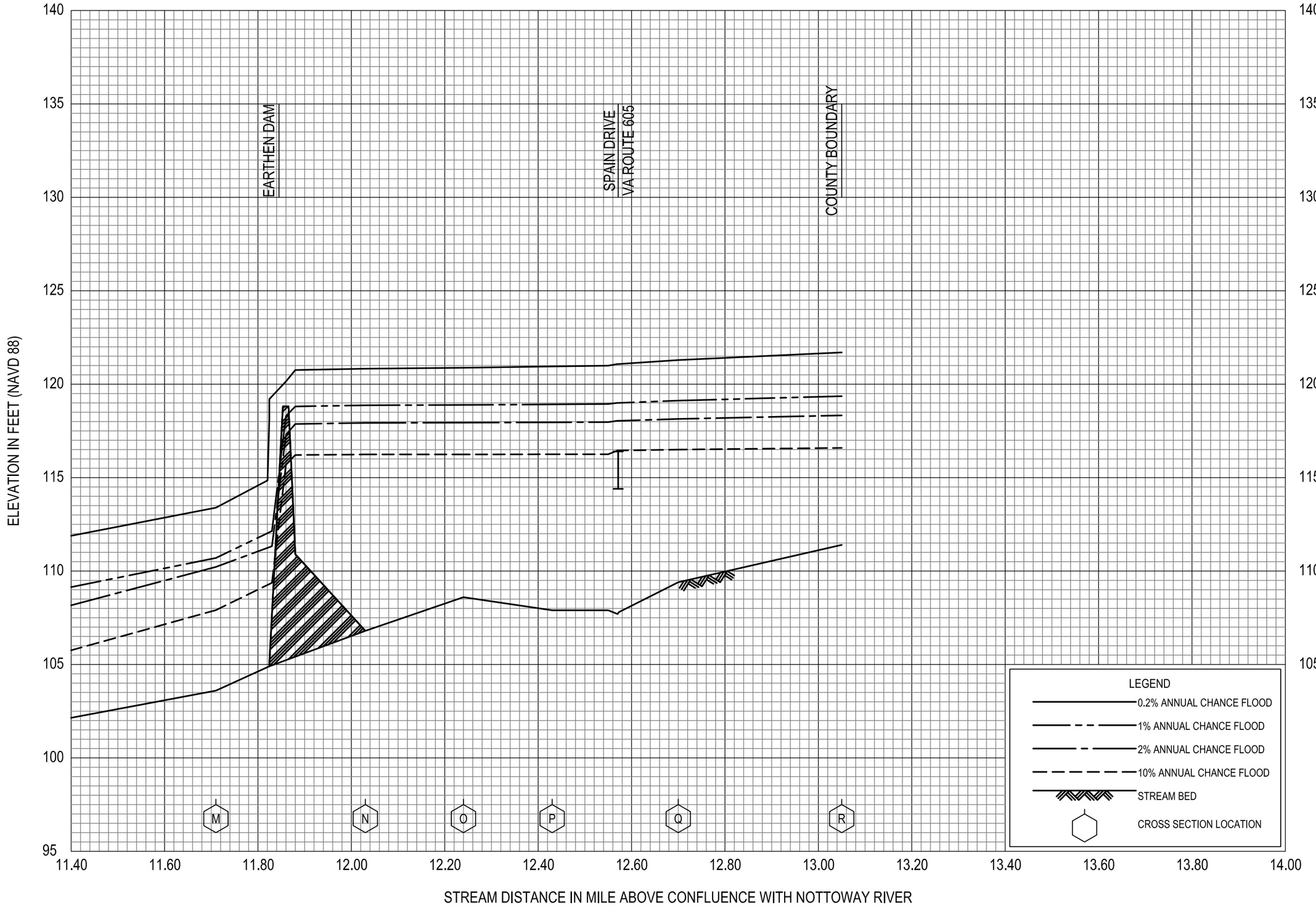
FLOOD PROFILES

JONES HOLE SWAMP

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA

AND INCORPORATED AREAS



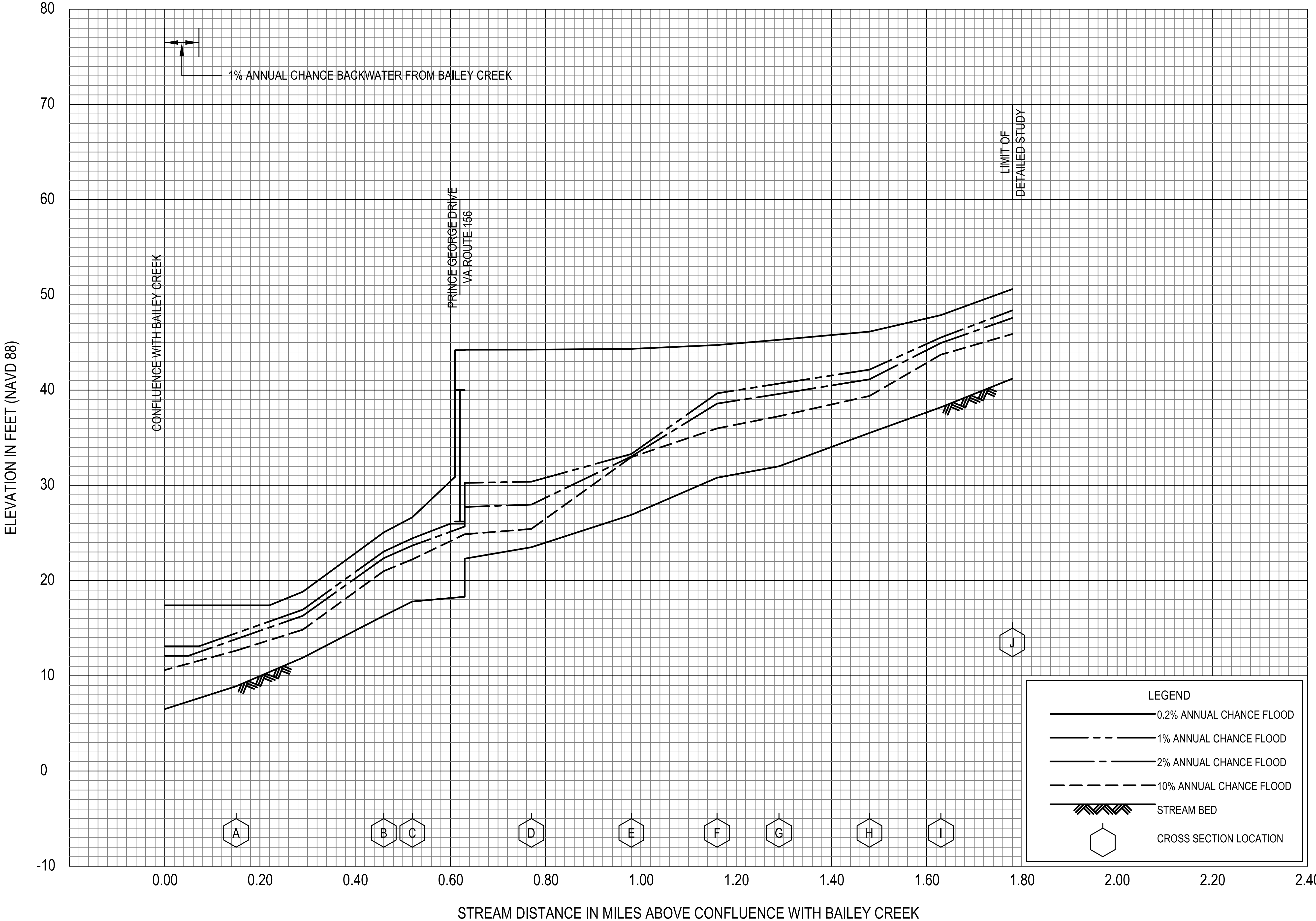
FLOOD PROFILES

JONES HOLE SWAMP

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA

AND INCORPORATED AREAS



FLOOD PROFILES

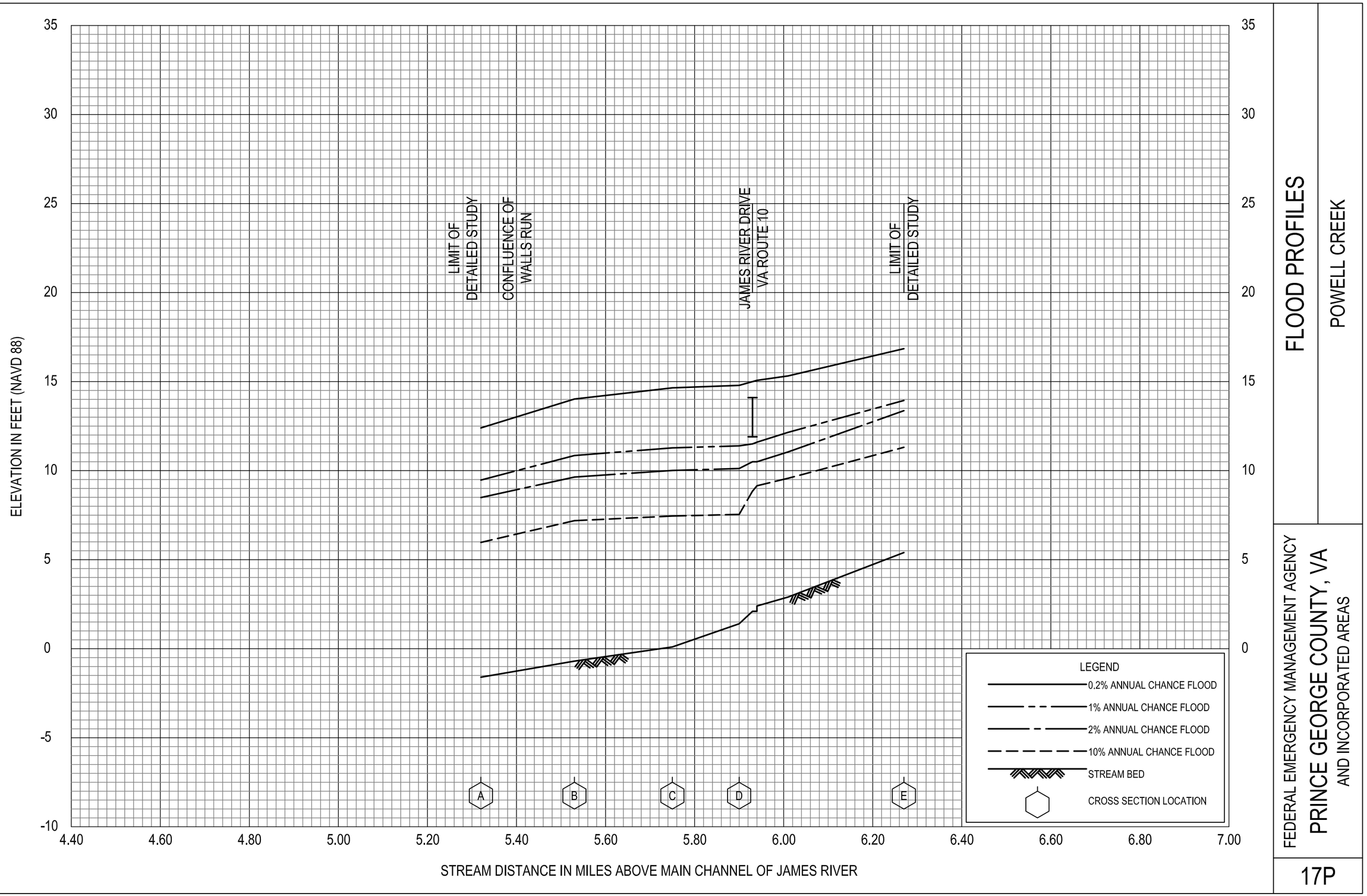
MANCHESTER RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA

AND INCORPORATED AREAS

16P



FLOOD PROFILES

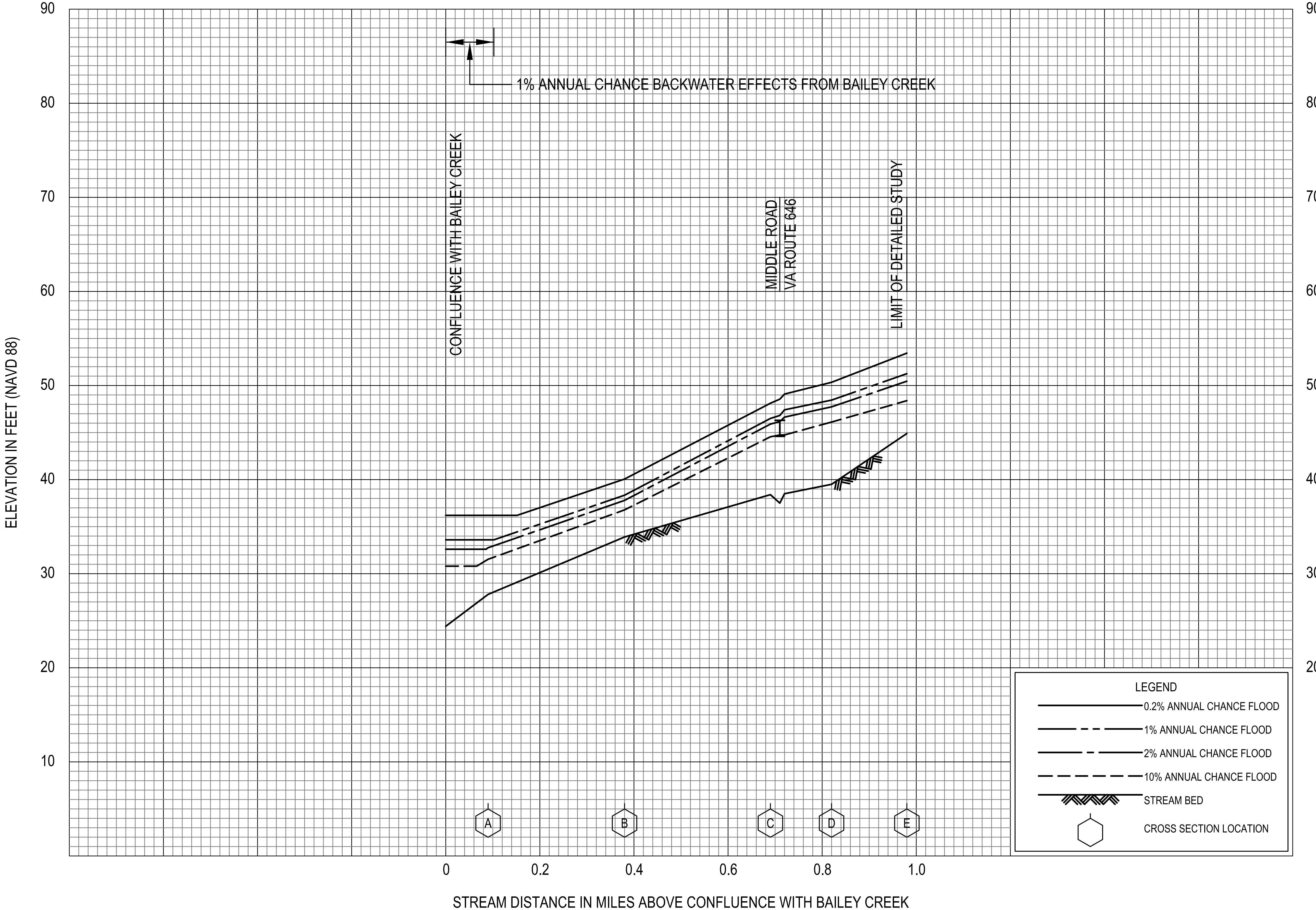
POWELL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA

AND INCORPORATED AREAS

17P



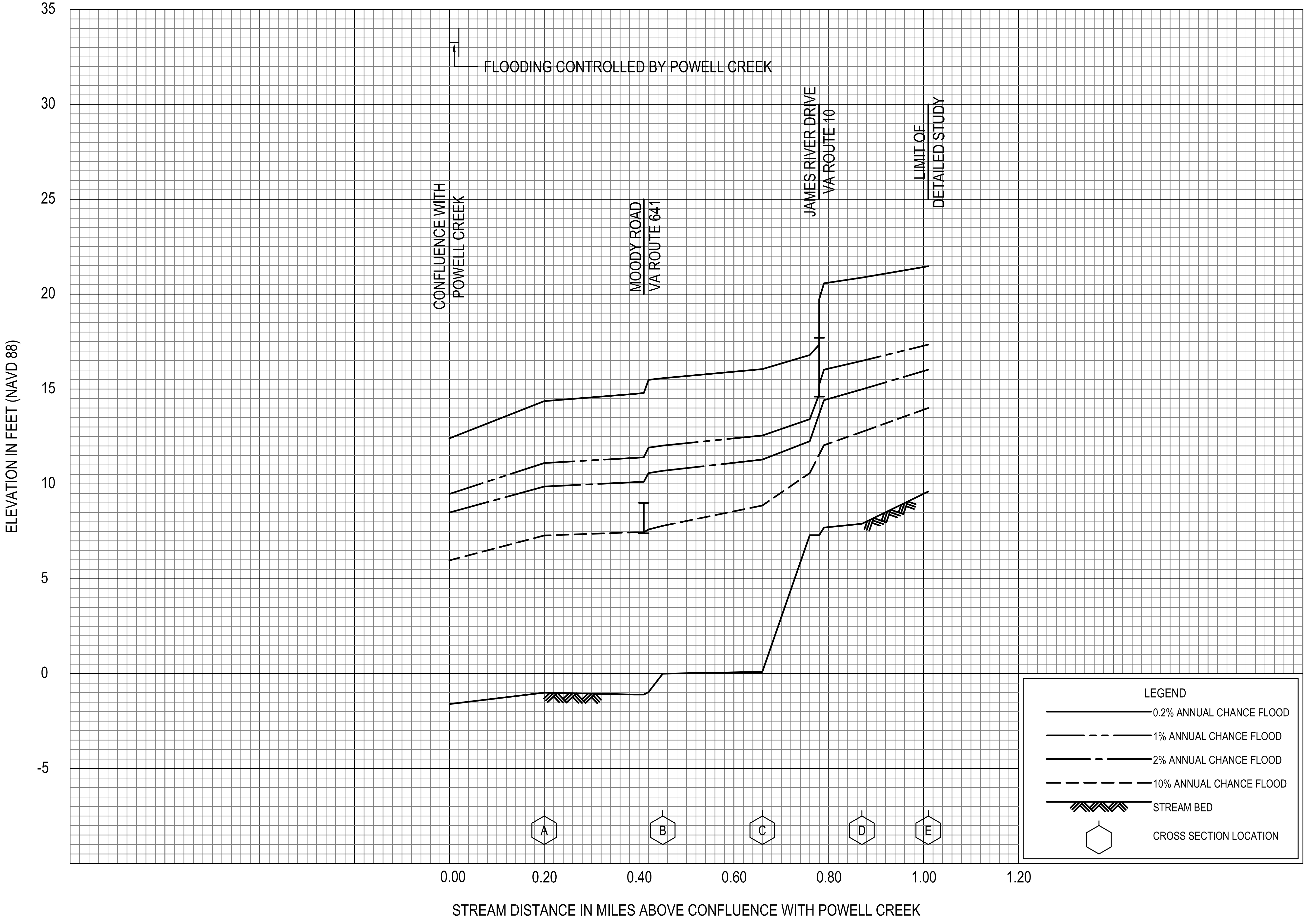
FLOOD PROFILES

SOUTHERLY RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA

AND INCORPORATED AREAS



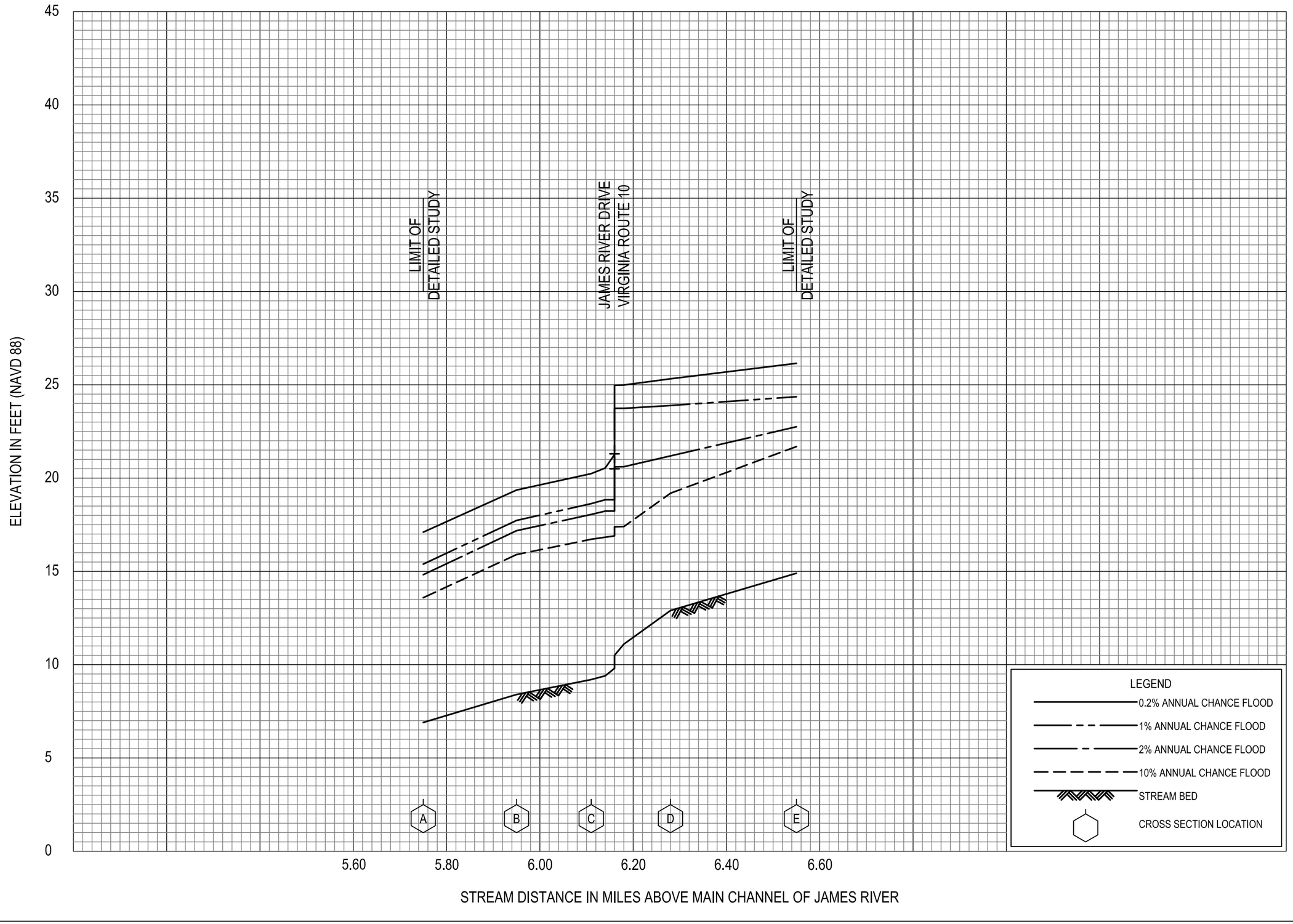
FLOOD PROFILES

WALLS RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA

AND INCORPORATED AREAS



FLOOD PROFILES

WARDS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PRINCE GEORGE COUNTY, VA

AND INCORPORATED AREAS