CITY OF SALISBURY

PURCHASING DEPARTMENT

SALISBURY, MARYLAND

PROPOSAL DOCUMENTS

FOR

CONTRACT NO. RFP 11-12
ENGINEERING DESIGN FOR BEAVERDAM CREEK DAM IMPROVEMENTS

THIS SPACE FOR PROCUREMENT DEPARTMENT
Date of Award:
Awarded To:
Chargeable to Account :
Bid Date: Tuesday, March 27, 2012
Bid Time: 2:30 P.M.
Pre Bid Meeting Scheduled: Friday, March 9, 2012
Room 306
Ad Run:

ADVERTISEMENT

CITY OF SALISBURY
RFP 11-12
ENGINEERING DESIGN FOR BEAVERDAM CREEK DAM IMPROVEMENTS

The City of Salisbury is seeking proposals from qualified and experienced vendors to provide professional engineering, geotechnical, and surveying services for the repair or replacement of the existing tidal dam within Salisbury Zoological Park. The dam, a historic structure within a Historic Easement, is immediately upstream (east) of Snow Hill Road (MD Route 12) on the East Prong of the Wicomico River. Further upstream of the historic dam is an existing temporary dam to be removed after repair or replacement of the historic dam is complete.

The project will include evaluation of the historic dam for stability and feasibility of restoration, a recommendation for restoration or replacement of the dam, coordination with the Maryland Historic Trust and other agencies, and the development of detailed construction drawings and specifications.

Proposal documents for RFP 11-12 may be obtained from the City of Salisbury Procurement Division, Room 104, Government Office Building, 125 N. Division Street, Salisbury, Maryland 21801, by calling 410-548-3190, during normal business hours, or via our website, www.ci.salisbury.md.us, Bids & RFPs. Vendors are responsible for checking this website for addenda prior to submitting their bids. The City of Salisbury is not responsible for the content of any Proposal Document received through any third party bid service. It is the sole responsibility of the vendor to ensure the completeness and accuracy of the Completed Proposal Documents.

A Pre-Proposal Meeting will be held on Friday, March 9, 2012 at 10:00 A.M. (local time) in Room 306 of the Government Office building, address listed above. Attendance is not mandatory but highly recommended.

Questions are due no later than Friday, March 16, 2012 at 12:00 P.M., local time, at the above location. No further questions will be accepted after this date. All questions will be written and can be faxed, mailed, hand delivered, or emailed to Tom Tengman, Senior Buyer, Procurement Division, 125 N. Division Street, Room 104, Salisbury, MD 21801, by fax at 410-548-3192, or via email at ttengman@ci.salisbury.md.us.

Sealed Proposal Documents are due in the Office of the Assistant Director of Internal Services – Procurement Division, address above, Room 104, on Tuesday, March 27, 2012 at 2:30 P.M. (local time), at which time and place they will be publicly opened and names of vendors read aloud. No late Completed Proposal Documents ("CPD") will be accepted; late CPD's will be returned unopened.

All minority business enterprise vendors are encouraged to compete for award of said Services.

Catrice Parsons
Assistant Director of Internal Services
Procurement Division
City of Salisbury, Maryland

TABLE OF CONTENTS
CONTRACT NO. RFP 11-12

ENGINEERING DESIGN FOR BEAVERDAM CREEK DAM IMPROVEMENTS

SECTION I: INTRODUCTION

1 PURPOSE
2 CLARIFICATION OF TERMS
3 QUESTIONS AND INQUIRIES
4 FILLING OUT PROPOSAL DOCUMENTS
5 SUBMISSION OF PROPOSAL DOCUMENTS
6 OPENING OF PROPOSAL DOCUMENTS
7 ACCEPTANCE OR REJECTION OF PROPOSAL DOCUMENTS
8 NOTICE TO VENDORS

SECTION II: GENERAL INFORMATION

1 ECONOMY OF PROPOSAL
2 RESPONSIBILITIES OF THE VENDOR
3 PROPRIETARY INFORMATION OR TRADE SECRETS
4 OWNERSHIP OF MATERIALS
5 CONTRACT AWARD
6 AUDIT
7 KEY PERSONNEL
8 NONPERFORMANCE
9 ASSIGNMENT
10 MODIFICATION OR WITHDRAWAL OF PROPOSAL
11 DEFAULT
12 COLLUSIONAL/FINANCIAL BENEFIT
13 TAX EXEMPTION
14 EQUAL EMPLOYMENT OPPORTUNITY AND NON-DISCRIMINATION
15 INDEMNITY
16 STATUS OF VENDOR
17 APPLICABLE LAWS
18 SUSPENSION OR TERMINATION FOR CONVENIENCE
19 CONTRACT CHANGES
20 ADDENDUM
21 INSURANCE REQUIREMENTS

SECTION III: SCOPE OF SERVICES

1 PROJECT DESCRIPTION
2 SCOPE OF WORK
3 GEOTECHNICAL INVESTIGATION REQUIREMENTS
4 DEWATERING PLAN
5 AS-BUILT DRAWINGS
6 TIMELINES

SECTION IV: EXPERIENCE AND STAFFING

1 EXPERIENCE
2 STAFFING

3 OTHER REQUIREMENTS

SECTION V: EVALUATION AND SELECTION PROCESS
1 EVALUATION

SECTION VI: FORM OF PROPOSAL
FORM OF PROPOSAL
REFERENCES
EXCEPTIONS AND ADDENDA
CORPORATION INFORMATION
AFFIDAVIT OF QUALIFICATION TO BID
NON-COLLUSIVE AFFIDAVIT

ATTACHMENT
DRAFT FLOOD INSURANCE STUDY

SECTION I: INTRODUCTION

1. PURPOSE

1.1. The purpose of this Request for Proposal is for the City of Salisbury ("City") to obtain proposals from qualified and experienced vendors to provide professional engineering, geotechnical and surveying services for the repair or replacement of the existing tidal dam within Salisbury Zoological Park. The dam, a historic structure within a Historic Easement, is immediately upstream (east) of Snow Hill Road (MD Route 12) on the East Prong of the Wicomico River. Further upstream of the historic dam is an existing temporary dam to be removed after repair or replacement of the historic dam is complete. The project will include evaluation of the historic dam for stability and feasibility of restoration, a recommendation for restoration or replacement of the dam, coordination with the Maryland Historic Trust and other agencies, and the development of detailed construction drawings and specifications.

Hydraulic modeling of the improvements will be limited to showing the restored or replaced dam is hydraulically similar to the existing dam, with hydrologic data obtained from the Draft Wicomico County Flood Insurance Study.

Any modifications to or replacement of the historic dam must be approved by the Maryland Historic Trust (MHT). The Successful Vendor shall be required to present the proposed changes to Salisbury City Council, Salisbury Park Committee and the Chesapeake Bay Critical Area Commission. Permits will be required, at a minimum, from the MDE Wetlands and Waterways Program (Non-Tidal Wetlands and Waterways Division and the Tidal Wetlands Division), as well as the Wicomico Soil Conservation District and the Chesapeake Bay Critical Area Commission. Salisbury Public Works (SPW) will provide input on the final design.

2. CLARIFICATION OF TERMS

2.1. Professional firms or individuals that submit a bid for award of a contract ("Contract") are referred to as vendors ("Vendors") in this document. The Vendor that is awarded the Contract is herein referred to as the ("Successful Vendor").

3. QUESTIONS AND INQUIRIES

For information regarding bid documents and bidding requirements, please contact

Tom Tengman
Senior Buyer
Procurement Division
City of Salisbury
125 North Division Street, Room 104
Salisbury, Maryland 21801
Phone (410) 548-3190
Fax (410) 548-3192

3.1. Copies of the Proposal Documents are available in the Office of the Assistant Director of Internal Services-Procurement Division, 125 North Division Street, Room 104, Salisbury, Maryland 21801 or by calling (410) 548-3190 during normal business hours, or via our web site www.ci.salisbury.md.us., by clicking on the link Bids and RFPs.

4. FILLING OUT PROPOSAL DOCUMENTS

4.1. Use only forms supplied by the City.

4.2. Submit one (1) unbound original and one (1) bound copy of completed Proposal Documents.

4.3. All blanks on the Proposal Documents will need to be filled in electronically or manually in ink.

4.4. Where so indicated by the make up of the Proposal Documents, sums will be expressed in both words and figures, and in the case of a discrepancy between the two, the amount written in words will govern. In the event there is a discrepancy between the unit price and the extended totals, the unit prices will govern.

4.5. Any interlineation, alteration, or erasure will be initialed by the signer of the Proposal Documents.

4.6. Each copy of the Proposal Documents will be signed by the person(s) legally authorized to bind the Vendor to a contract, using the legal name of the signer. Proposal Documents submitted by an agent will have a current Power of Attorney attached certifying the agent's authority to bind the Vendor.

4.7. Vendor will supply all information and submittals required by the Proposal Documents to constitute a proper and responsible completed Proposal Document package.

4.8. Any ambiguity in the Proposal Documents as a result of omission, error, lack of clarity or non-compliance by the Vendor with specifications, instructions, and/or all conditions of bidding will be construed in the light most favorable to the City.

5. SUBMISSION OF PROPOSAL DOCUMENTS

5.1. All copies of the Proposal Documents and any other documents required to be submitted with the Proposal Documents will be enclosed in a sealed envelope. The envelope will be addressed to the Assistant Director of Internal Services–Procurement Division and will be identified with the project name and the Vendor's name and address. If the Proposal Documents are sent by mail, the sealed envelope will be enclosed in a separate mailing envelope with the notation "SEALED PROPOSAL DOCUMENTS ENCLOSED" on the face thereof.

5.2. Proposal Documents will be deposited at the designated location prior to the time and date for receipt of Proposal Documents as indicated in the Advertisement or Request for Proposal, or any extension made by Addendum. Proposal Documents received after the time and date for receipt will be returned unopened.

5.3. Vendor will assume full responsibility for taking whatever measures necessary to ensure that the Proposal Documents reach the Office of the Assistant Director of Internal Services-Procurement Division prior to the local time and date specified for receipt of Proposal Documents. The City will NOT BE RESPONSIBLE for any Proposal Document delayed in the postal or other delivery service nor any late Proposal Document, amendment, or request for withdrawal of Proposal Document, received after the Proposal Document submission date.

5.4. Vendors, or their authorized agents, are expected to fully inform themselves as to the conditions, requirements, and specifications before submitting Proposal Documents; failure to do so will be at the Vendor's own risk.

5.5. A fully executed Affidavit of Qualification to Bid will be attached to each Proposal Document.

5.6. ALL MINORITY BUSINESS ENTERPRISE VENDORS ARE ENCOURAGED TO PARTICIPATE.

5.7. All Vendor submitted Proposal Documents will be valid for a minimum of one hundred twenty (120) days from the date of Proposal Document opening.

6. OPENING OF PROPOSAL DOCUMENTS

6.1. Proposal Documents received on time will be opened publicly and only vendor's names will be read aloud for the record.

6.2. The Contract will be awarded or all Proposal Documents will be rejected within one hundred twenty (120) days from the date of the Proposal Document opening.

7. ACCEPTANCE OR REJECTION OF PROPOSAL DOCUMENTS

7.1. Unless otherwise specified, the Contract will be awarded to the most RESPONSIBLE and RESPONSIVE Vendor complying with the provisions of the Proposal Documents, provided the proposal price is reasonable, does not exceed the funds available, and it is in the best interest of the City to accept it. The City reserves the right to reject the Proposal Documents of any Vendor who has previously failed to perform properly in any way or complete on time contracts of a similar nature; or a Proposal Document from a Vendor who, investigation shows, is not in a position to perform the Contract; or Proposal Documents from any person, firm, or corporation which is in arrears or in default to the City for any debt or contract.

7.2. In determining a Vendor's RESPONSIBILITY, the City may consider the following qualifications, in addition to price:

7.2.1. Ability, capacity, and skill to provide the commodities or services required within the specified time, including future maintenance and service, and including current financial statement or other evidence of pecuniary resources and necessary facilities.

7.2.2. Character, integrity, reputation, experience, and efficiency.

7.2.3. Quality of past performance on previous or existing contracts, including a list of current and past contracts and other evidence of performance ability.

7.2.4. Previous and existing compliance with laws and ordinances relating to contracts with the City and to the Vendor's employment practices.

7.2.5. Evidence of adequate insurance to comply with Contract terms and conditions.

7.2.6. Statement of current work load and capacity.

7.2.7. Explanation of methods to be used in fulfilling the Contract.

7.2.8. The Vendor, if requested, will be prepared to supply evidence of its qualifications, listed above, and its capacity to perform the Services; such evidence to be supplied within a specified time and to the satisfaction of the City.

7.3. In determining a Vendor's RESPONSIVENESS, the City will consider whether the Proposal Documents conforms in all material respects to the Request for Proposal. The City reserves the right to waive any irregularities that may be in its best interest to do so.

7.4. The City will have the right to reject any and all Proposal Documents, where applicable, to accept in whole or in part, to add or delete quantities, to waive any informalities or irregularities in the Proposal Document received, to reject a Proposal Document not accompanied by required proposal security or other data required by the Proposal Documents, and to accept or reject any Proposal Document which deviates from specifications when in the best interest of the City. Irrespective of any of

the foregoing, the City will have the right to award the Contract in its own best interests.

8. NOTICE TO VENDORS

8.1. Before a Vendor submits the Proposal Documents it will need to become fully informed as to the extent and character of the Services required and are expected to completely familiarize themselves with the requirements of this Proposal Document's specifications. Failure to do so will not relieve the Vendor of the responsibility to fully perform in accordance therewith. No consideration will be granted for any alleged misunderstanding of the material to be furnished or the Services to be performed, it being understood that the submission of a Proposal Document is an agreement with all of the items and conditions referred to herein.

END OF SECTION

SECTION II: GENERAL INFORMATION

1. ECONOMY OF PROPOSAL

1.1. Proposal Documents will be prepared simply and economically, providing straightforward and concise description of the Vendor's capabilities to satisfy the requirements of the Proposal Documents. Emphasis should be on completeness and clarity of content. Elaborate brochures and other representations beyond that sufficient to present a complete and effective Proposal Document are neither required nor desired.

2. RESPONSIBILITIES OF THE VENDOR

2.1. The Vendor will be responsible for the professional quality and technical accuracy of their advice and other services furnished in the Proposal Documents. The Vendor will perform services with the degree of skill that is normally exercised by recognized professionals as the Standard of Care with respect to services of a similar nature.

2.2. Neither the City's review, approval or acceptance of, nor payment for, any of the services required under the Contract will be construed to operate as a waiver of any rights under the Contract or any cause of action arising out of the performance of the Contract, and the Vendor will be liable to the City in accordance with applicable law for all damages to the City caused by the Vendor's negligent performance of any of the services furnished under the Contract.

2.3. The rights of the City provided for under the Contract are in addition to any rights and remedies provided by law.

3. PROPRIETARY INFORMATION OR TRADE SECRETS

3.1. The Vendor may invoke proprietary information or trade secret protection for submission of any data/material by (1) identifying the data/material in a written description, (2) clearly marking the data/material as proprietary, and (3) providing a written statement detailing the reasons why protection is necessary. The City reserves the right to ask for additional clarification prior to establishing protection.

4. OWNERSHIP OF MATERIALS

4.1. Ownership of all material and documentation originated and prepared pursuant to the Proposal Documents will belong exclusively to the City and is subject to public inspection in accordance with the Public Information Act. Trade secrets or proprietary information submitted by a Vendor in connection with a procurement transaction will not be subject to disclosure under the Public Information Act. However, the Vendor must invoke the protections of this section and be in accordance with Section 3.1.

5. CONTRACT AWARD

5.1. A written award by the City to the Successful Vendor in the form of a Purchase Order or other contract document will result in a binding Contract without further action by either party. If the Successful Vendor fails or refuses to sign and deliver the Contract and the required insurance documentation, the City will have the right to award to the next responsible and responsive Vendor. Contract will be executed by the Successful Vendor within fifteen (15) working days of receipt of the Contract.

5.2. Proposal Documents and Contracts issued by the City will bind the Vendor to applicable conditions and requirements herein set forth, unless otherwise specified in the Proposal Documents, and are subject to all federal, state, and municipal laws, rules, regulations, and limitations.

5.3. City personal property taxes ("Taxes") must be on a current basis; if any such Taxes are delinquent, they must be paid before award of Contract. Failure to pay will result in the award of Contract to another Vendor.

5.4. The City reserves the right to engage in individual discussions and interviews with those Vendors deemed fully qualified, responsible, suitable, and professionally competent to provide the required services should the project size warrant it. Vendors will be encouraged to elaborate on their qualifications, performance data, and staff expertise. Proprietary information from competing Vendors will not be disclosed to the public or to competitors.

6. AUDIT

6.1. The Successful Vendor agrees to retain all books, records, and other documents relative to the awarded Contract for five (5) years after final payment, or until audited. The City, its authorized agents, and/or State auditors will have full access to and the right to examine any of said materials during said period.

7. KEY PERSONNEL

7.1. The personnel named in the technical Proposal Document will remain responsible throughout the period of the awarded Contract. No replacement may be made without submission of a resume of the proposed replacement with final approval being granted by the Assistant Director of Internal Services–Procurement Division.

8. NONPERFORMANCE

8.1. The City reserves the right to inspect all operations and to withhold payment for any Services not performed or not performed in accordance with the specifications in this Proposal Document. Errors, omissions, or mistakes in performance will be corrected at no cost to the City. Failure to do so will be cause for withholding of payment for that Service. In addition, if deficiencies are not corrected in a timely manner, the City may characterize the Successful Vendor as uncooperative, which may jeopardize future project order solicitations.

9. ASSIGNMENT

9.1. Successful Vendor will not assign, transfer or subject the Contract, or its rights, title interests or obligations therein without City's prior written approval.

9.2. Violation of the terms of this paragraph will constitute a breach of Contract. All rights, title, interest and obligations of the Successful Vendor will thereupon cease and terminate.

10. MODIFICATION OR WITHDRAWAL OF PROPOSAL

10.1. A Proposal Document may not be modified, withdrawn, or cancelled by the Vendor during the stipulated time period following the time and date designated for the receipt of Proposal Documents, and each Vendor so agrees in submitting Proposal Documents.

11. DEFAULT

11.1. The Contract may be cancelled or annulled by the City in whole or in part by written notice of default to the Successful Vendor upon non-performance, violation of Contract terms, delivery failure, bankruptcy or insolvency, any violation of state or local laws, or the making of an assignment for the benefit of creditors. An award may then be made to the next most highly rated Vendor, or when time is of the essence, similar commodities and/or service may be purchased on the open market. In either event, the defaulting Vendor (or his surety) will be liable to the City for cost to the City in excess of the defaulted Contract price.

12. COLLUSION/FINANCIAL BENEFIT

12.1. The Vendor certifies that its Proposal is made without any previous understanding, agreement, or connection with any person, firm, or corporation making a Proposal Document for the same project; without prior knowledge of competitive prices; and is in all respects fair, without outside control, collusion, fraud, or otherwise illegal action.

12.2. Upon signing the Proposal Document, Vendor certifies that no member of the governing body of the City, or members of his/her immediate family, including spouse, parents or children, or any other officer or employee of the City, or any member or employee of a Commission, Board, or Corporation controlled or appointed by the Mayor or Council, has received or has been promised, directly or indirectly, any financial benefit related to this Contract.

13. TAX EXEMPTION

13.1. The City is exempt from Federal Excise Taxes, Maryland Sales and Use Taxes, and Transportation Taxes. This exemption cannot be used by Vendors doing business with the City. Vendors are responsible for State Sales Tax of real property furnished and installed or constructed for the City.

14. EQUAL EMPLOYMENT OPPORTUNITY AND NON-DISCRIMINATION

14.1. All Vendors are subject to, and must comply with, the provisions of all applicable state and federal anti-discrimination laws. The City encourages equal employment opportunity to businesses owned and controlled by minorities and women.

14.2. The successful Vendor will not discriminate against any employee or applicant for employment or any member of the public because of race, color, creed, religion, national origin, sex, sexual preference, disability, marital status, age; or otherwise commit an unfair employment practice. Vendor further agrees that this nondiscriminatory agreement will be incorporated by the Vendor in all contracts entered into with suppliers of commodities and services, contractors and subcontractors, and all labor organizations furnishing skilled, unskilled, and craft union skilled labor, or who may perform any such labor or services in connection with this Contract.

15. INDEMNITY

15.1. The Successful Vendor agrees to indemnify, defend, and hold harmless the City and its officers, employees, and agents from any and all liability, loss, cost, damage, and expense (including reasonable attorney's fees and court costs) resulting from, arising out of, or incurred by reason of any claims, actions, or suits based upon or alleging bodily injury, including death, or property damage rising out of or resulting from the Vendor's operations under the Contract, whether such operations be by the Vendor or by any subcontractor or by anyone directly or indirectly employed by either the Vendor or subcontractor.

15.2. Vendor further agrees to furnish adequate protection against damage(s) as a result of the Vendor's and Vendor's subcontractors' negligence in providing the Services under this Contract.

16. STATUS OF VENDOR

16.1. The Vendor will be responsible to the City for acts and omissions of their employees, subcontractors, and their agents and employees, and other persons performing portions of the Services under the Contract or other arrangement with the Vendor.

16.2. It is understood that the relationship of Vendor to the City will be that of an "Independent Contractor." Nothing contained herein will be deemed or construed to (1) make the Vendor the agent, servant, or employee of the City, or (2) create any partnership, joint venture, or other association between the City and the Vendor.

17. APPLICABLE LAWS

17.1. Vendor will observe and comply with all applicable federal, state, and local laws and regulations in the performance of the Contract. The Contract will be construed and interpreted in accordance with the laws of the State of Maryland and all questions of performance hereunder will be determined in accordance with such laws.

18. SUSPENSION OR TERMINATION FOR CONVENIENCE

18.1. The City will have the right, at any time by written notice, for its convenience, to suspend the Services under the Contract for such time as may be determined by the City to be necessary or desirable up to ninety (90) days, unless a longer time is agreed upon in writing by both parties; and thereafter, to require resumption of the whole or any part of the Services without invalidating the provisions of the Contract.

18.2. The City will have the right, at any time by written notice, for its convenience, to terminate the Services in whole or in part.

18.3. Any notice issued pursuant to Sections 18.1 and/or 18.2 will state the extent and effective date of such notice, except as otherwise directed, the Vendor will stop Services on the date of receipt of the Notice of Termination or other date specified in the notice; place no further orders or subcontracts for materials, services, or facilities, except as necessary for the completion of such portion of the Services not terminated.

18.4. The Vendor, within thirty (30) days of the Notice of Termination, will submit a final invoice reflecting Services actually furnished pursuant to the Contract to the satisfaction of the City and for which no previous invoice was submitted to the City.

18.5. In the event of a termination, pursuant to Section 18.2, the City will pay the Vendor's expenses verified by final invoice as set forth in Section 18.4 for the following:

18.5.1. Completed and acceptable Services executed in accordance with the Contract prior to the effective date of termination, including fair and reasonable sums for overhead and profit for such Services;

18.5.2. Expenses sustained prior to the effective date of termination in performing Services and furnishing labor, materials, or equipment as required by the Contract in connection with uncompleted Services, plus fair and reasonable sums for overhead and profit.

18.6. The Vendor will not be paid on account of loss of anticipated profits or revenues or for Services not completed prior to the date of termination of the Contract.

19. CONTRACT CHANGES

19.1. NO CLAIMS may be made by anyone that the scope of the project or that the Vendor's Services have been changed (requiring changes to the amount of compensation to the Vendor or other adjustments to the Contract) UNLESS such changes or adjustments have been made by an approved WRITTEN AMENDMENT (Change Order) to the Contract signed by the Assistant Director of Internal Services-Procurement Division (and the City Council, if required), prior to additional Services being initiated. Extra Services performed without prior, approved, written authority will be considered as unauthorized and at the expense of the Vendor. Payment will not be made by the City.

19.2. NO ORAL conversations, agreements, discussions, or suggestions, which involve changes to the scope of the Contract, made by anyone including any City employee, will be honored or valid. No written agreements or changes to the scope of the Contract made by anyone other than the Assistant Director of Internal Services–Procurement Division (with City Council approval, if required) will be honored or valid.

19.3. If any Change Order in the Services results in a reduction in the Services, the Vendor will neither have, nor assert any claim for, nor be entitled to any additional compensation for damages or for loss of anticipated profits on Services that are eliminated.

19.4. No inspection, or any failure to inspect, at any time or place, will relieve the Vendor from its obligation to perform all the Services strictly in accordance with the requirements of the specifications of the Contract. The City's Project Representatives (construction inspectors) are NOT authorized to revoke, alter, enlarge, relax, or release any requirement of these specifications, nor to approve or accept any portion of Services, nor to issue instruction contrary to the drawings and specifications of the Contract.

20. ADDENDUM

20.1. No oral statements of any person will modify or otherwise affect or interpret the meaning of the Contract specifications, or the terms, conditions, or other portions of the Contract. All modifications and every request for any interpretation must be addressed to the Assistant Director of Internal Services, Procurement Division, Government Office Building, 125 N. Division Street, Room 104, Salisbury, Maryland 21801, and to be given consideration, must be received at the above address at least seven (7) days prior to the date fixed for the opening of Proposal Documents.

20.2. Any and all interpretations, corrections, revisions, and amendments will be issued by the Department of Internal Services-Procurement Division to all holders of Proposal Documents in the form of written addenda. Vendors are cautioned that any oral statements made by any City employee that materially change any portion of the Proposal Documents will not be relied upon unless subsequently ratified by a formal written amendment to the Proposal Document.

20.3. All addenda will be issued so as to be received at least five (5) days prior to the time set for receipt of Proposal Documents, and will become part of the Contract and will be acknowledged in the Proposal Document form. Failure of any Vendor to receive any such addenda will not relieve said Vendor from any obligation under the Proposal Document as submitted.

20.4. Vendors are cautioned to refrain from including in their Proposal Document any substitutions which are not confirmed by written addenda. To find out whether the City intends to issue an amendment reflecting an oral statement made by any employee, contact Catrice Parsons, Assistant Director of Internal Services–Procurement Division, at 410-548-3190 during normal business hours.

20.5. The Assistant Director of Internal Services–Procurement Division, reserves the right to postpone the Proposal Document opening for any major changes occurring in the 5-day interim which would otherwise necessitate an Addendum.

21. INSURANCE REQUIREMENTS

21.1. Unless otherwise required by Special Conditions for this Agreement the Vendor will be required to purchase and maintain during the life of the Agreement the following types and amounts of insurance (minimum).

21.1.1. Commercial General Liability: $1,000,000 (One million dollars) per occurrence $2,000,000 (Two million dollars) aggregate for bodily injury and property damage. The general aggregate limit will apply separately to the project/location or the general aggregate will be twice the required occurrence limit.

21.1.2. Professional Liability: $1,000,000 (One Million dollars) per claim.

21.1.3. Commercial Automobile: $1,000,000 (One million dollars) combined single limit per accident for bodily injury and property damage. Including hired, non-ownership coverage and owned vehicle coverage if company owns a vehicle.

21.1.4. As mandated by the Code of the State of Maryland and Employer's Liability the Vendor will be required to provide Worker's Compensation Insurance.

21.1.4.1. ..... The Vendor will provide the City with certificates of insurance evidencing the coverage required above. Such certificates will provide that the City be given at least thirty (30) days prior written notice of cancellation of, intention to not renew, or material change in such coverage. Vendor will provide certificates of insurance before commencing work in conjunction with this Agreement.

21.1.4.1.1. ..... Failure to provide and continue in force such insurance as required above, will be deemed a material breach of the Agreement, will cause the Vendor to be in DEFAULT, and will operate as an immediate termination thereof. The City reserves the right to require higher limits on any Agreement. A 30-day notice in writing of cancellation or non-renewal will be furnished by certified mail to the Assistant Director of Internal Services–Procurement Division at the address listed in solicitation. The Vendor agrees to be

responsible for, indemnify, defend, and hold harmless the City, its officers, agents, and employees from the payment of all sums of money by reason of any claim against them arising out of any and all occurrences resulting in bodily or mental injury or property damage that may happen in connection with and during the performance of the Agreement including, but not limited to, claims under the Worker's Compensation Act.

21.1.4.1.2. ..... ON THE COMMERCIAL GENERAL LIABILITY POLICY THE CITY MUST BE

21.1.4.1.3. ..... NAMED AS ADDITIONAL INSURED AND THE INSURANCE CERTIFICATE FURNISHED TO THE CITY WIL INDICATE SUCH COVEAGE. THE PROVIDING OF ANY INSURANCE REQUIRED HEREIN DOES NOT RELIEVE THE VENDOR OF ANY OF THE RESPONSIBILITIES OR OBLIGATIONS ASSUMED BY THE VENDOR IN THIS AGREEMENT, OR FOR WHICH THE VENDOR MAY BE LIABLE BY LAW OR OTHERWISE.

END OF SECTION

SECTION III: SCOPE OF SERVICES

1. PROJECT DESCRIPTION
   1.1. Design Phase Services
      1.1.1. The City is seeking proposals from qualified and experienced vendors to provide professional engineering, geotechnical, and surveying services for the repair or replacement of the existing tidal dam within Salisbury Zoological Park. The dam, a historic structure within a Historic Easement, is immediately upstream (east) of Snow Hill Road (MD Route 12) on the East Prong of the Wicomico River. Further upstream of the historic dam is an existing temporary dam to be removed after repair or replacement of the historic dam is complete.
         1.1.1.1. The project will include evaluation of the historic dam for stability and feasibility of restoration, a recommendation for restoration or replacement of the dam, coordination with the Maryland Historic Trust (MHT) and other agencies, and the development of detailed construction drawings and specifications.
         1.1.1.2. Hydraulic modeling of the improvements will be limited to showing the restored or replaced dam is hydraulically similar to the existing dam, with hydrologic data obtained from the Draft Wicomico County Flood Insurance Study.
         1.1.1.3. Any modifications to or replacement of the historic dam must be approved by the MHT. The Successful Vendor shall be required to present the proposed changes to Salisbury City Council, Salisbury Park Committee and the Chesapeake Bay Critical Area Commission. Permits will be required, at a minimum, from the MDE Wetlands and Waterways Program (Non-Tidal Wetlands and Waterways Division and the Tidal Wetlands Division), as well as the Wicomico Soil Conservation District and the Chesapeake Bay Critical Area Commission. Salisbury Public Works (SPW) will provide input on the final design.
      1.1.2. The historic dam consists of a bulkhead with an exposed aggregate cap and wooden slide gates accessed by a wooden platform. The era of construction and type, depth and condition of the bulkhead are unknown. The existing wooden slidegates are lifted vertically by attaching the hoist of a mobile crane to an eye-bolt at the top of the gates. It is the City's intent, if approved by the MHT, to have the slidegates of the restored or replacement dam be operated by pedestal-mounted worm-gear gate lifts and for these slidegates to control the upstream water surface by being lowered, instead of being raised.
      1.1.3. The Successful Vendor must produce a design that can be implemented from the shore. Motor-driven construction equipment will not be allowed within the stream.
      1.1.4. A dam safety analysis will not be required.
      1.1.5. The construction drawings must show staging and stockpiling areas outside of any wetlands and the 100 Year Floodplain.
      1.1.6. The Successful Vendor will provide a hydrographic survey a sufficient distance up- and down-stream of the historic dam that will be used as a basis for the construction drawings.
      1.1.7. The City will provide, by pdf attachment to this RFP, a copy of the Draft Wicomico County Flood Insurance Study.

1.1.8. The design will include a demolition plan for the historic dam (if full replacement is allowed by the MHT) and the temporary dam.

1.1.9. The Successful Vendor will provide a dewatering plan that will allow restoration or replacement of the historic dam, and demolition of the temporary dam.

1.1.10. The Successful Vendor will obtain all necessary permits and provide any surveying required during the design phase.

1.1.11. The Successful Vendor will provide as-built drawings.

1.1.12. The Successful Vendor should be aware that the City may not have the funds to construct these improvements at the time of design completion and that no construction activity will be allowed from March 1 through June 15 of any year. Therefore, the Successful Vendor will provide prices for the Bidding and Construction Phase Services that will be valid for three (3) years after receiving written SPW approval of design phase completion. After three years the City and Successful Vendor reserve the right to negotiate prices for Bidding and Construction Phase Services to see the project through to completion.

1.1.13. The Successful Vendor will provide all necessary construction specifications, bid forms and a list of contractor pay items.

1.1.14. The Successful Vendor will provide Erosion and Sediment Control Plans (with signature block for MDE), all necessary Detail Plans, and any other plans necessary to obtain agency approvals.

1.1.15. The Successful Vendor will provide a schedule showing design and construction timelines in a Gantt chart format compatible with Microsoft Project 2007, and a construction cost estimate in Microsoft Excel 2010 format, updated for each submittal.

1.2. Bid Phase Services

1.2.1. The Successful Vendor will develop a complete set of bid documents including construction drawings, specifications and bid forms. The City will provide General Condition documents to the Successful Vendor for inclusion in the bid package. The Successful Vendor will conduct a pre-bid meeting, at a date and time to be provided by the City, prior to bid opening and respond to all Requests for Information (RFI's) during the bidding process. The Successful Vendor will tabulate the bids and make a recommendation as to the successful bidder.

1.3. Construction Phase Services

1.3.1. The Successful Vendor will conduct a pre-construction meeting and respond to all Contractor RFI's during construction. The Successful Vendor will be prepared to provide construction inspection services, if needed, on a time and materials basis. The Successful Vendor will conduct monthly construction progress meetings, develop minutes and distribute. The Successful Vendor will prepare as-built drawings in Autocad 2008 format upon completion of construction.

2. SCOPE OF WORK

2.1. Design Phase

2.1.1. <u>Project Kick-Off Meeting</u>.

2.1.1.1. Upon receipt of the Notice to Proceed, the Successful Vendor will schedule a project kickoff meeting with SPW. The purpose of this meeting will be to establish points of contact for the Successful Vendor and SPW, to clarify any issues concerning the contract or scope-of-work or invoicing, and for SPW to provide any documents or guidance necessary to begin the design of the

project. The Successful Vendor will provide a preliminary project schedule at this time.

2.1.2. 35% Submittal.

2.1.2.1. The 35% submittal will consist of an engineering report detailing the stability analysis of the historic dam and a recommendation concerning the feasibility of restoration of the structure or a complete replacement of the dam.

2.1.3. 50% Submittal.

2.1.3.1. The 50% submittal will consist of a conceptual design of the restoration or replacement of the historic dam and all forms and supporting documents required for submittal to the MHT. The Successful Vendor shall schedule and conduct a presentation to MHT.

2.1.3.2. After incorporation of any comments or decisions made by MHT the Successful Vendor shall present the design to Salisbury City Council, Salisbury Park Committee and the Chesapeake Bay Critical Area Commission.

2.1.4. 65% Submittal.

2.1.4.1. After presentation and resolution of all comments received by those agencies listed in Sec. 2.1.3 the Successful Vendor shall advance the design to a 65% level of completion and submit one (1) set of construction drawings showing all improvements to SPW. The construction drawings shall be in 24" x 36" format.

2.1.5. 95% Submittal.

2.1.5.1. The Successful Vendor will incorporate SPW's comments on the previous submittal and proceed towards final design. The 95% submittal will consist of one set, and will include all drawings and specifications necessary for successful bidding and construction of the improvements, including the City's standard specifications, any special specifications, all bid forms, a list of contractor's pay items, and copies of permits received or applied for.

2.1.5.2. Standard SPW construction detail drawings are not required to be shown, but the Successful Vendor will provide any special detail drawings. An updated construction cost estimate will also be provided. SPW will review the submittal and provide comments.

2.1.5.3. The plans and specifications shall state that all materials salvaged from the demolition of the temporary dam are to be loaded at the site on vehicles to be provided by High Tide Marine Construction, Snow Hill, Maryland.

2.1.5.4. Upon endorsement by SPW the Successful Vendor will submit these construction documents and the engineering report to MDE and the MHT. Upon receipt of MDE and MHT comments, the Successful Vendor will revise the submittal as necessary to obtain permitting by MDE and approval by MHT. It is anticipated that the review by MDE will take six to nine months.

2.1.6. 100% Final Submittal.

2.1.6.1. The final submittal will consist of one (1) set of construction drawings on Mylar, ready for signatures, and one (1) set of specifications. The final submittal will be made as soon as approval is received from MDE and MHT. Note that all reimbursables, including prints, plots, mylars, photocopies, gas mileage, etc. will be included in the Successful Vendor's proposal. No separate line item will be provided nor any reimbursement made for items typically considered "reimbursables".

2.2. Bidding Phase

2.2.1. Provide SPW with two (2) labeled compact discs with plastic cases containing 100% bid-ready construction plans and specifications in a PDF format. Note that the PDF drawings may be produced directly from AutoCAD files or may be produced from scanned signed and sealed mylars. Provide ten (10) full-size and two (2) half-size bound paper copies of the 24"x36" 100% bid-ready construction plans. Provide ten (10) copies of the specifications. Return the signed mylars. Provide an electronic copy of the construction drawings in AutoCAD 2008 format and the specifications in Microsoft Word 2010 format on a labeled compact disc with a plastic case.

2.2.2. Provide a list of recommended contractors to Salisbury Purchasing Department.

2.2.3. Conduct a pre-bid meeting, at a date and time to be determined by the City, prior to bid opening and respond to all Requests for Information (RFI's) during the bidding process. Prepare meeting minutes and supply copies to SPW and the City Purchasing Department.

2.2.4. Prepare technical addenda during the advertising/bidding period as required and supply copies to SPW and the City Purchasing Department.

2.2.5. Prepare an engineer's cost estimate based on any modifications listed in addenda.

2.2.6. Prepare bid tabulation and a recommendation for award.

2.3. Construction Phase

2.3.1. Conduct a pre-construction meeting, prepare meeting minutes and distribute to all parties.

2.3.2. Review shop drawings and cut sheets for compliance with contract documents prior to submitting to SPW.

2.3.3. Respond to the Contractor's RFI's.

2.3.4. Prepare potential change orders.

2.3.5. Conduct monthly construction progress meetings, prepare meeting minutes and distribute to all parties.

2.3.6. Conduct a substantial completion walkthrough and develop a punch list.

2.3.7. Review and recommend approval of red-line construction document markups maintained by the contractor.

2.3.8. Review and approve Contractor payment requests prior to SPW review and approval.

2.3.9. Provide an hourly rate for construction inspection services.

2.3.10. Recommend acceptance of completed project to SPW.

2.3.11. Have a survey crew ready to respond within 24 hours of receiving notice from SPW that an RFI or conflict has been submitted whose resolution requires surveyed field data. Charges associated with the responding survey crew will be included in the prices bid.

2.3.12. Prepare as-built drawings. See Section 5 for requirements.

3. GEOTECHNICAL INVESTIGATION REQUIREMENTS

3.1. The geotechnical investigation will serve as the basis for the Successful Vendor's analysis of the stability of the historic dam and, if replacement is required, the basis for the design of the new dam.

3.2. There will be a minimum of one soil boring on each bank.

3.3. All borings shall be completed by a geotechnical engineering. The report shall be sealed by a P.E. currently registered in Maryland.

4. DEWATERING PLAN

4.1. The Successful Vendor will provide a dewatering plan that will allow restoration or replacement of the historic dam, and demolition of the temporary dam. The dewatering plan shall provide a means for bypassing the existing weir flow of the temporary and historic dams to a point downstream of the historic dam, as well as dewatering the area between the historic and temporary dam and the area immediately downstream of the historic dam. The bypassing of existing weir flow may be accomplished by installation of temporary gravity storm sewer, if feasible, or by pumping. If gravity sewer is used the shoreline bulkhead will be penetrated by the pipe(s) and the Successful Vendor must include a design of the repair to the shoreline bulkhead in the contract documents.

4.2. The following items must be addressed when bypass pumping is used:

4.2.1. The pumping rate (the proposed pump must be capable of handling average and peak flows).

4.2.2. Size of suction and discharge line, material and method of connection (discharge line must contain a check valve and a separate line for each pump).

4.2.3. Pump from suction point; Pump discharge point.

4.2.4. Proposed layout of bypass pipe path.

4.2.5. Proposed pipe to pipe connection type.

4.2.6. Provide system & pump curves.

4.2.7. Specify the type of bypass pump (diaphragm pumps are not allowed).

4.2.8. The number of pumps.

4.2.9. The plan will contain the following note:

"The bypass pumping plan represents the Engineer's best recommended course of action to meet the stated goals. The exclusion of any item or task from the bypass pumping plan will in no way relieve the Contractor of his or her duty to provide any and all items and perform any and all tasks necessary to complete the entire project as contained within the contract documents. The plan can be modified if the Contractor has a preferred method of implementing the bypass pumping plan. Any modifications will be included in prices and at no additional cost to the City. The Contractor must satisfy himself that the plan is complete and can be implemented as indicated. "

5. AS-BUILT DRAWINGS

5.1. The Successful Vendor understands that the as-builts prepared by the Successful Vendor will be based on red-line drawings prepared by the Contractor during construction. The Successful Vendor understands that the as-built drawings must be sealed by the Successful Vendor's registered professional engineer who must be currently registered in Maryland. It will be the Successful Vendor's responsibility to determine what level of Contractor oversight is needed for the Successful Vendor to feel comfortable enough to sign and seal the as-built drawings

5.2. The work effort associated with the oversight will be included in the prices bid pertaining to the creation of as-built drawings and will be separate from any full or part-time resident project inspection that may be required for this project.

5.3. Prepare as-built drawings based on approved Contractor's red-line markups. Submit as-built drawings to SPW for approval and make any revisions required. Provide two (2) paper copies with each submittal. The final submittal will be on Mylar and accompanied by an electronic copy in AutoCAD 2008 format on a labeled compact disc with a plastic case.

6. TIMELINES

6.1. The Successful Vendor shall have an engineering report six (6) weeks from the Notice to proceed; a conceptual design ready for submittal to MHT within eight (8) weeks of SPW recommendation of the engineering report; and a complete engineering design ready for submittal to MDE and MHT within eight (8) weeks of receipt of comments on the conceptual design.

6.2. Bidding and award of the construction contract is expected to take two (2) months.

END OF SECTION

SECTION IV: EXPERIENCE AND STAFFING

1. EXPERIENCE
   - 1.1. Provide a current Form 254 and 255, or Form 330, and any other additional information that will document the Vendor's qualifications and ability to provide the required services.
   - 1.2. Include five (5) recent examples of municipal public works projects, similar in nature to this RFP, completed. Include the name and telephone number of the client contact for each project. Examples should be of the same type of work as requested within this RFP.
   - 1.3. For the projects listed above, provide information on keeping cost performance and scheduling performance within project budgets and design estimates. Provide a Change Order history for both the Firm's architectural/engineering services AND the project as a whole.

2. STAFFING
   - 2.1. Provide an organizational chart of the organization to clearly show interrelationship of management and design team components, including all subcontractors, survey, drafting and field personnel.
   - 2.2. Identify and provide a statement of qualifications and specific responsibilities for all project team members who will be assigned to this project, including those responsible for "hands on" work, as well as those assigned for supervision and oversight responsibilities.
   - 2.3. Identify and provide a statement of qualifications for all members of the Organization's quality control team.

3. OTHER REQUIREMENTS
   - 3.1. Provide the geographic location of the Vendor relative to the City's location. The Vendor should include the complete address of the office proposed to handle the work.
   - 3.2. Provide a statement of the Vendor's ability to furnish adequate and effective construction supervision and inspection services should they become necessary.
   - 3.3. Provide a statement addressing whether the Vendor can perform the work within the time allowance.
   - 3.4. Provide a current hourly rate for all proposed project team members.
   - 3.5. Provide manhours assigned to each task.

END OF SECTION

SECTION V: EVALUATION AND SELECTION PROCESS

1. EVALUATION

1.1. Proposals will be evaluated using the following criteria:

Weighting Factor	Criterion
30%	Expertise, experience, and qualifications of the Vendor, its personnel and proposed subcontractors as related to the Scope of Services, with special emphasis on work related to bulkhead dams and the Maryland Historic Trust.
20%	Price and billable rates.
25%	Approach to project as described in the proposal documents.
20%	Experience working with municipal governments and municipal projects with emphasis on projects with the City and Wicomico County or similar type municipalities and documented ability to meet deadlines and documented change order history.
5%	Geographic location of the Vendor relative to the location of the City and the Vendor's ability to respond to routine everyday type requests

1.2. Each Vendor will be rated for each criterion on a scale of zero to four as described below.

Unacceptable	0
Poor	1
Fair	2
Good	3
Superior	4

1.2.1. A Vendor's final grade will be the sum of each criterion's rating multiplied by the weighting factor listed above.

THIS AND PRECEDING SECTIONS DO NOT NEED TO BE RETURNED WITH SUBMITTAL.

FORM OF PROPOSAL
RFP 11-12
ENGINEERING DESIGN FOR BEAVERDAM CREEK DAM IMPROVEMENTS

To whom it may concern:

We hereby submit our Proposal Documents for "ENGINEERING DESIGN FOR BEAVERDAM CREEK DAM IMPROVEMENTS" as indicated in the Proposal Documents.

Having carefully examined the Proposal Documents and having received clarification on all items of conflict or upon which any doubt arose, the undersigned hereby requests consideration of our Vendor for award of the referenced Contract.

TASK		LUMP SUM FEE
I. Design Phase*		
A. Engineering Report* B. Construction Docs. & Permitting.*		$ $
	Total Section I: Design Phase	$
II. Bidding Phase*		
A. Pre-bid, RFI, minutes, addendum, etc.*	**Total Section II: Bidding Phase**	$
III. Construction Phase*		
A. Administration/Engineering*		$
B. As-Built Drawings*		$
	Total Section III: Construction Phase	$
	Total Sections I, II & III	$
IV. ADD ALTERNATE		
A. Inspection Services	**Per Hour Amount**	$/hr

* PRICES QUOTED ARE BASED ON A NOT-TO-EXCEED PRICE
**No reimbursement will be made for items typically considered "reimbursables".

_____ Total Section I written

_____ Total Section II written

_____ Total Section III written

_____ Total all sections (I,II & III) written

_____ Sign for Identification

_____ Printed Name

REFERENCES

List five (5) references for Services successfully implemented/performed in the last 12-36 months. Include contact name, address, telephone number and services performed.

Company Name:		Company Name:	
Type of Project:		Type of Project:	
Address:		Address:	
City, State, Zip Code:		City, State, Zip Code:	
Contact Person:		Contact Person:	
Telephone Number:		Telephone Number:	
Date of Service:		Date of Service:	
Company Name:		Company Name:	
Type of Project:		Type of Project:	
Address:		Address:	
City, State, Zip Code:		City, State, Zip Code:	
Contact Person:		Contact Person:	
Telephone Number:		Telephone Number:	
Date of Service:		Date of Service:	
Company Name:			
Type of Project:			
Address:			
City, State, Zip Code:			
Contact Person:			
Telephone Number:			
Date of Service:			

_____ _____

Sign for Identification Printed Name

EXCEPTIONS AND ADDENDA

The undersigned hereby certifies that, except as listed below, or on separate sheets attached hereto, the enclosed Proposal Document covers all items as specified.

EXCEPTIONS:

(If none, write NONE) _____

THE VENDOR HEREBY ACKNOWLEDGES RECEIPT OF THE FOLLOWING ADDENDA.

NumberDateInitials

_____

_____

_____

_____ _____

Sign for Identification Printed Name

INDIVIDUAL PRINCIPAL

Vendor Name: _____

Signed By: _____ In the presence of: _____

Address of Vendor: _____ City, State, Zip

_____

Telephone No.: _____ Fax: _____

****

CO-PARTNERSHIP PRINCIPAL

Name of Co-Partnership: _____

Address: _____ City, State, Zip _____

Telephone No.: _____ Fax: _____

Signed By: _____ In the presence of: _____
Partner Witness

Signed By: _____ In the presence of: _____
Partner Witness

Signed By: _____ In the presence of: _____
Partner Witness

****

CORPORATE PRINCIPAL

Name of Corporation: _____

Address: _____ City, State, Zip _____

Telephone No.: _____ Fax: _____

Signed By: _____ In the presence of: _____
President Witness

Attest: _____
Corporate Secretary

Affix Corporate Seal

CONTRACTOR'S AFFIDAVIT OF QUALIFICATION TO BID

I HEREBY AFFIRM THAT:

I, _____ am the _____

(Printed Name) (Title)

and the duly authorized representative of the Vendor of

_____ whose address is

(Name of corporation)

_____

_____

and that I possess the legal authority to make this affidavit on behalf of myself and the Vendor for which I am acting.

Except as described in paragraph 3 below, neither I nor the above Vendor, nor to the best of my knowledge and of its officers, directors or partners, or any of its employees directly involved in obtaining contracts with the State or any county, bi-county or multi-county agency, or subdivision of the State have been convicted of, or have pleaded nolo-contendere to a charge of, or have during the course of an official investigation or other proceeding admitted in writing or under oath acts or omissions which constitute bribery, attempted bribery, or conspiracy to bride under the provisions of Article 27 of the Annotated Code of Maryland or under the laws of any state or federal government (conduct prior to July 1, 1977 is not required to be reported).

(State "none" or, as appropriate, list any conviction, plea or admission described in paragraph 2 above, with the date, court, official or administrative body, the individuals involved and their position with the Vendor, and the sentence or disposition, if any.)

_____

_____

_____

I acknowledge that this affidavit is to be furnished to the City, I acknowledge that, if the representations set forth in this affidavit are not true and correct, the City may terminate any Contract awarded and take any other appropriate action. I further acknowledge that I am executing this affidavit in compliance with section 16D of Article 78A of the Annotated Code of Maryland, which provides that certain persons who have been convicted of or have admitted to bribery, attempted bribery or conspiracy to bribe may be disqualified, either by operation of law or after a hearing, from entering into contracts with the State or any of its agencies or subdivisions.

I do solemnly declare and affirm under the penalties of perjury that the contents of this affidavit are true and correct.

_____ _____

Sign for Identification Printed Name

NON-COLLUSIVE AFFIDAVIT

_____being first duly sworn, deposes and says that:

1. He/she is the _____, (Owner, Partner, Officer, Representative or Agent) of _____, the Vendor that has submitted the attached Proposal Document;

2. He/she is fully informed respecting the preparation and contents of the attached Proposal Document and of all pertinent circumstances respecting such Proposal Documents;

3. Such Proposal Document is genuine and is not a collusive or sham Proposal Document;

4. Neither the said Vendor nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, have in any way colluded, conspired, connived or agreed, directly or indirectly, with any other Vendor, firm, or person to submit a collusive or sham Proposal Document in connection with the Services for which the attached Proposal Document has been submitted; or to refrain from bidding in connection with such Services; or have in any manner, directly or indirectly, sought by agreement or collusion, or communication, or conference with any Vendor, firm, or person to fix the price or prices in the attached Proposal Document or of any other Vendor, or to fix any overhead, profit, or cost elements on the Proposal Document price or the Proposal Document price of any other Vendor, or to secure through any collusion, conspiracy, connivance, or unlawful agreement any disadvantage against (Recipient), or any person interested in the Services;

5. The price or prices quoted in the attached Proposal Document are fair and proper and are not tainted by any collusion, conspiracy, connivance, or unlawful agreement on the part of the Vendor or any other of its agents, representatives, owners, employees or parties in interest, including this affiant.

Signed, sealed and delivered in the presence of:

_____By: _____

Witness Signature

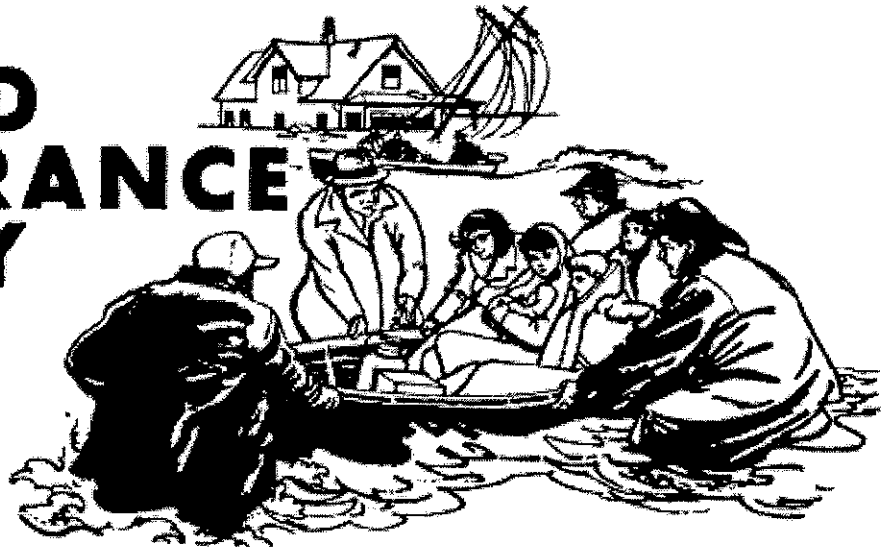
_____ _____

Witness Printed Name

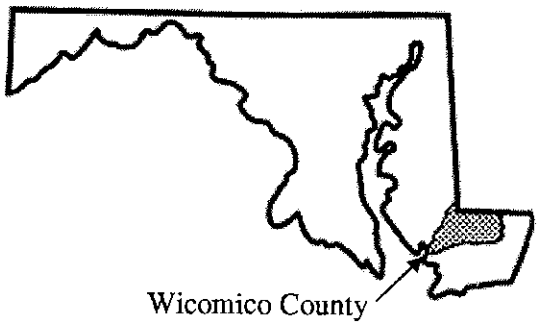
_____

Title

FLOOD INSURANCE STUDY



WICOMICO COUNTY, MARYLAND AND INCORPORATED AREAS



Community	CID
Wicomico County (Unincorporated Areas)	240078
Delmar, Town of	240186
Fruitland, City of	240139
*Hebron, Town of	240143
Mardela Springs, Town of	240079
*Pittsville, Town of	240110
Salisbury, City of	240080
Sharptown, Town of	240081
Willards, Town of	240082

*Non-Floodprone

PRELIMINARY

AUG 13 2009

Federal Emergency Management Agency

COMMUNITY NUMBER

24045CV000A

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) report may not contain all data available within the Community Map Repository. Please contact the Community Map Repository for any additional data.

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

Old Zone(s)	New Zone
A1 – A30	AE
V1 – V30	VE
B	X
C	X

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.

TABLE OF CONTENTS

Page

1.0 INTRODUCTION 1
- 1.1 Purpose of Study 1
- 1.2 Authority and Acknowledgements 1
- 1.3 Coordination 2

2.0 AREA STUDIED 3
- 2.1 Scope of Study 3
- 2.2 Community Description 4
- 2.3 Principal Flood Problems 5
- 2.4 Flood Protection Measures 6

3.0 ENGINEERING METHODS 7
- 3.1 Hydrologic Analyses. 7
- 3.2 Hydraulic Analyses 13
- 3.3 Vertical Datum 20

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS 20
- 4.1 Floodplain Boundaries 20
- 4.2 Floodways 21

5.0 INSURANCE APPLICATION 38

6.0 FLOOD INSURANCE RATE MAP 38

7.0 OTHER STUDIES 39

8.0 LOCATION OF DATA 39

9.0 BIBLIOGRAPHY AND REFERENCES 41

FIGURES

Figure 1 – Transect Location Map 18
Figure 2 – Typical Transect Schematic 19
Figure 3 – Floodway Schematic 22

TABLES

Table 1 – Names of streams and rivers studied in whole or part by detailed methods 3
Table 2 – Names of streams and rivers studied in whole or part by approximate methods 4
Table 3 – Eastern Coastal Plain Fixed Region Regression Equations 8
Table 4 – Summary of Discharges 9
Table 5 – Summary of Elevations 13
Table 6 – Transect Descriptions 16
Table 7 – Floodway Data Table 23-37
Table 8 – Community Map History 40

EXHIBITS

Exhibit 1 – Flood Profiles
Beaglin Branch Panels 01P – 02P
Beaverdam Creek Panels 03P – 05P
Brewington Branch Panels 06P – 07P
Connelly Mill Branch Panels 08P – 09P
Coty Cox Branch Panels 10P – 12P
Jackson Branch Panel 13P
Leonard Pond Run Panels 14P – 17P
Mayer Branch Panels 18P – 19P
Middle Neck Branch Panels 20P – 23P
Morris Prong Panels 24P – 25P
North Prong (Leonard Pond) - Andrews Branch Panels 26P – 27P
Owens Branch Panel 28P
Peggy Branch Panels 29P – 30P
Slab Bridge Creek Panel 31P- 32P
South Prong Panel 33P
Tonytank Creek Panels 34P – 37P
Tuxents Branch Panel 38P
Unnamed Tributary to Beaglin Branch Panel 39P
Unnamed Tributary to South Prong Panel 40P
Walston Branch Panel 41P
White Marsh Creek Panel 42P
Wood Creek Panel 43P
Exhibit 2 – Flood Insurance Rate Map Index
Flood Insurance Rate Map

FLOOD INSURANCE STUDY
WICOMICO COUNTY, MARYLAND AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and supersedes the FIS reports and/or Flood Insurance Rate Maps (FIRMs) for the City of Fruitland, the City of Salisbury, the Town of Delmar, the Town of Hebron, the Town of Mardela Springs, the Town of Pittsville, the Town of Sharptown, the Town of Willards, and the Unincorporated Areas of Wicomico County (hereinafter referred to collectively as Wicomico County), and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates. This information will also be used by D.C. to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP), and by local and regional planners to further promote sound land use and floodplain development. Minimum floodplain management requirements for participation in the NFIP are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

Please note that the Town of Hebron and the Town of Pittsville are non-floodprone.

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 Acknowledgements

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 were performed by the U.S. Army Corps of Engineers (USACE) for Maryland Department of Environment (MDE) as part of the Federal Emergency Management Agency's (FEMA) Map Modernization Program (MMP) under Contract No. ICA-05-CRL-01. The MMP study was completed in March 2009.

This Flood Insurance Study is a revision and compilation of the five existing FIS studies in Wicomico County, Maryland: the City of Fruitland, the City of Salisbury, the Town of Mardela Springs, the Town of Sharptown, and the Unincorporated Areas of Wicomico County (FEMA 1985a, FEMA 1984a, FEMA 1985b, FEMA 1985c, and FEMA 1984b). All of these Flood Insurance Studies

were prepared by the Flood Management Division of the Maryland Water Resources Administration of the State of Maryland for the Federal Insurance Administration under Contract No. EMW-C- 274, and are dated November 15, 1985, September 27, 1985, March 28, 1984, September 27, 1985, and March 28, 1984, respectively.

The base mapping for this Map Modernization Program (MMP) study was obtained from the Maryland Department of Natural Resources. This data was flown at scale of 1:2400 and was published on April 30, 2004. The data is in the Maryland Stateplane Coordinate System and horizontally referenced to the North American Datum of 1983 (NAD83) and vertically to the North American Vertical Datum of 1988 (NAVD88).

For the Wicomico Countywide Map Modernization Study, USACE was tasked with converting the hard copy flood maps to a digital format. USACE provided the value-added service of creating georeferenced hydraulic models for the detailed and approximate studies included in the existing FIS studies for Wicomico County, Maryland. The hydrologic analysis was provided to the Corps from Dr. Moglen at the University of Maryland, and the hydraulic analyses utilized LIDAR and bridge inventory data received from MDE, along with the surveyed channel data from the previous HEC2 studies for detailed studies, to create updated HEC-RAS hydraulic models. The existing tidal analysis was converted from NGVD29 to NAVD88 and remapped onto the update ground surface.

1.3 Coordination

The purpose of the initial Consultation Coordination Officer (CCO) meeting is to discuss the scope of the meeting. A final CCO meeting is held to review the results of the study.

On August 3, 1979, an initial Consultation and Coordination Officer's (CCO) meeting for all of the studies was attended by representatives of FEMA, Wicomico County, local governments, and the Study Contractor. Further coordination occurred with USACE, the U.S. Geological Survey (USGS), the U.S. Department of Agriculture, Soil Conservation Service (SCS), and Wicomico County officials. The results of the previous studies were reviewed at final CCO meetings attended by representatives of the Study Contractor, FEMA, and the community. For the City of Salisbury and the unincorporated areas of Wicomico, the final CCO meeting was held on September 21, 1983; for the Towns of Mardela Springs and Sharptown, the final CCO meeting was held on March 21, 1984; for the City of Fruitland, the final CCO meeting was held on June 1, 1984.

The initial CCO meeting for this study was held on April 12, 2005 at the Maryland Department of Environment offices and attended by representatives of MDE, FEMA, and USACE (study contractor for this study).

Coordination with City officials and Federal, State, and regional agencies produced information pertaining to floodplain regulations, community maps, flood history, and other hydrologic data.

The results of the study were reviewed at the final CCO meeting held on date, and attended by representatives of FEMA, the community, and the study contractor. All problems raised at that meeting have been addressed.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS covers the geographic area of Wicomico County, Maryland, including all unincorporated areas of the county, the Town of Delmar, the City of Fruitland, the Town of Hebron, the Town of Mardela Springs, the Town of Pittsville, the City of Salisbury, the Town of Sharptown, and the Town of Willards.

The USACE was contracted to perform detailed studies on the same streams studied with detailed methods in the effective FIS. The selection of streams for detailed study in the effective FIS was made with priority given to all known flood hazard areas and areas of projected development and proposed construction through September 1984. Table 1 lists the rivers or streams studied in whole or in part by detailed methods in the MMP.

Table 1. Names of streams and rivers studied in whole or part by detailed methods

Beaglin Branch	Owens Branch
Beaverdam Creek	Peggy Branch
Brewington Branch	Slab Bridge Creek
Connelly Mill Branch	South Prong (Leonard Pond)
Coty Cox Branch	Tonytank Creek
Jackson Branch	Tuxents Branch
Leonard Pond Run	Unnamed Tributary to Beaglin Branch
Mayer Branch	Unnamed Tributary to South Prong
Middle Neck Branch	Walston Branch
Morris Prong	White Marsh Creek
North Prong (Leonard Pond)-Andrews Branch	Wood Creek

USACE's detailed methodology included comparing existing condition hydrology calculations to the results used in the effective FIS (refer to Section 3.1). New

georeferenced hydraulic models were created for each stream studied in detail, and the resulting GIS layers (floodplains, cross-sections, floodways) were used in the development of the updated FIS mapping (refer to Section 3.2).

Flooding in parts of the community with low development potential or minimal flood hazard was studied by approximate methods in both the effective FIS and MMP. Table 2 lists the streams studied in part or in whole by approximate methods.

Table 2. Names of streams and rivers studied in whole or part by approximate methods

Adkins Race	North Prong Wicomico River
Andrews Branch	Pokomoke River
Barren Creek	Pryor Branch
Burnt Mill Branch	Quantico Creek
Gordys Branch	South Prong Wicomico River
Green Run	Tributary to Walston Branch
Horse Bridge Creek	Unnamed Creek
Little Burnt Branch	Widow Hawkins Branch
Nassawango Creek	

USACE's methodology for approximate method streams included developing the 1-percent annual chance discharge for the stream (refer to Section 3.1), creating new georeferenced hydraulic models, and developing a resulting GIS layer for the 1-percent annual chance inundation area for updated FIS mapping.

Portions of the approximate study areas were found to be inundated by tidal flooding from the Chesapeake Bay. For these areas, the detailed tidal surge elevation from the effective FIS, converted from the National Geodetic Vertical Datum of 1929 to the North American Vertical Datum of 1988, is shown.

2.2 Community Description

Wicomico County is located on the Eastern Shore of Maryland and is bordered to the northwest by the Nanticoke River and Dorchester County, to the north and east by the State of Delaware and Worcester County, to the south by Somerset County and to the west by the Chesapeake Bay. According to U.S. Census Bureau, the population of Wicomico County was 84,644 in 2000. The estimated population of the county in 2005 was 90,402 (Census). Salisbury is the county seat of Wicomico County. Local rural industries include agriculture, fishing and service trades.

The continental climate of Wicomico County is moderated by effects from the Chesapeake Bay and the Atlantic Ocean. The highest temperature recorded in Salisbury was 106 degrees Fahrenheit (F.) and occurred in August 1918 and July 1930. The lowest temperature of -9 degrees F. was recorded in January 1918 (Maryland Department of Economic and Community Development). The average annual temperature of Wicomico County is 57.6 degrees F. There are approximately 204 frost free days per year. The average annual rainfall is 45.97 inches (Maryland State Climatologist Office), with an average annual snowfall of 11.6 inches (Maryland Department of Business and Economic Development). The maximum rainfall record of 8.9 inches occurred in Salisbury on August 30, 1936 (Maryland Department of Economic and Community Development).

The underlying unconsolidated sediments slope gently toward the southeast at approximately 10 to 95 feet per mile. These unconsolidated deposits were the result of the deposition of sediment from melt water of the continental glaciers and the terracing effect of several sea level oscillations. Beneath the coastal plain sediments lie older Paleozoic crystalline rocks at an average depth of 2,500 feet. Abundant groundwater is available throughout Wicomico County with the water table depth generally less than 25 feet.

Major drainage basins in the county provide drainage directly into the Chesapeake Bay. The eastern one-third of the county drains south toward the Pocomoke River and its tributaries. The central portion of the county is drained by the Wicomico River which flows in a southwesterly orientation. The portion of the county west of a line extending from the Delaware state line south through Hebron to Nanticoke is drained by the Nanticoke River.

The maximum elevation for the Nanticoke River watershed is approximately 40 feet. The highest elevation of the Wicomico River and Pocomoke River watersheds in the county are 60 feet and 85 feet, respectively. The highest elevation in Wicomico County, 85 feet, is near the Town of Parsonsburg (USGS).

The irregular shoreline is a result of drowned river valleys formed by the gradually sinking land mass. This has led to a change in the overall drainage pattern due to widening rivers and creeks. Extensive estuaries and tidal basins have resulted, producing a myriad of waterways.

Floodplain development in Wicomico County is primarily single-family residential homes. Some commercial and industrial development is present on the Wicomico River.

2.3 Principal Flood Problems

The low lying, relatively undisturbed topography, high seasonal water tables, poor drainage and high runoff characteristics of the soils combine to provide a high flooding potential. When heavy rainfall and a high river discharge combine with

storm tides, low lying areas adjacent to rivers and estuaries become inundated with saltwater. Major floods in the Wicomico County area have occurred in 1876, 1933, 1935, 1954, 1955, 1967, 1972, 1975 1984, 1999, 2003, and 2006. Few detailed records of historical flood damage are available.

Little is known of the 1876 flood which is known locally as the Centennial Storm. Senator J.S. Shepard stated in 1933 that the Centennial Storm resulted in severe damage to the lower sections of Dorchester and Wicomico Counties where thousands of acres were ruined by saltwater flooding. Wicomico County experienced tides running five feet higher than the normal high tide which at that time was the highest ever experienced (The Cambridge Record).

On August 17, 1955, Hurricane Diane brought tides 1.5 to 2.5 feet above normal. The full force of the hurricane missed the Delmarva Peninsula and Wicomico County (The Banner).

Hurricane Donna struck on September 16, 1960 causing minor wind and water damage (Star Democrat). No tidal information can be found for this storm.

Tropical Storm Agnes brought winds up to 55 miles per hour during late June 1972 (The Banner). Some local flooding occurred but damage was primarily restricted to crops.

Heavy rains caused statewide flooding and intense costal erosion, especially along the lower Chesapeake Bay on March 28–29, 1984 (MDE).

Hurricane Floyd caused widespread flooding on the northern portion of the Eastern Shores on September 16, 1999 (MDE).

Remnants of Hurricane Isabel caused widespread tidal surge flooding on September 18-19, 2003 (MDE).

A large storm event in June 2006 dropped 3 to 6 inches of rain in most of Wicomico County between June 22 and June 30, 2006 (NWS), which caused widespread flooding.

2.4 Flood Protection Measures

The State of Maryland Department of Natural Resources has established rules and regulations governing construction on nontidal waters and flood plains. It restricts development in, obstructions to, and encroachment on the 100-year flood plain.

Wicomico County has incorporated a number of flood protection measures into its ordinances and regulations. Adopted within the county are subdivision regulations which include the right to deny development in floodprone areas, requirements of storm drainage systems satisfactory to the County Department of Public Works, and requirements for the formation of a home owners association for the purpose

of assigning responsibility for maintenance of stormwater systems related to the subdivision; with the right of the county to enforce maintenance through assessment of costs against property owners.

The county has also adopted a stormwater management ordinance which requires the detention on site of stormwater runoff in excess of that which would occur on undeveloped land based on a 25-year storm (Wicomico County).

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in the community (Table 1), 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 1-percent annual chance flood in any 50-year period is approximately 40 percent (4 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses.

The effective Flood Insurance Studies for Dorchester County, Maryland included hydrologic analyses for the areas studied in detail. The objectives of the hydrologic portions of the FIS update are to calculate revised 10-, 2-, 1-and 0.2-percent annual chance flows, along with an ultimate 1-percent annual chance flow, based on regression equations produced by Dr. Glen Moglen at the University of Maryland. The ultimate 1-percent annual chance flow is based on floods that can be anticipated when the watershed land-use changes to a future "ultimate development" condition. The current FIS update has an additional objective, to establish 10-, 2-, 1-, ult 1-, and 0.2-percent annual chance flows for streams identified within the effective FIS and Flood Insurance Rate Map approximate flood zones and previously unstudied areas. Methods and results of the updated hydrologic analyses are presented below.

The Maryland Department of Environment contracted Dr. Glenn Moglen of the Department of Civil and Environmental Engineering at the University of Maryland to perform the hydrologic calculations for this Flood Insurance Study.

The current regional regression equations being used by the Maryland State Highway Administration were developed by Jonathan Dillow, a hydrologist for the USGS. Dillow defined regression equations for five hydrologic fixed regions: Appalachian Plateaus and Allegheny Ridges, Blue Ridge and Great Valley, Piedmont, Western Coastal Plain and Eastern Coastal Plain (Dillow).

Dr. Moglen developed a new set of regression equations, called the fixed region regression equations, for the State of Maryland. The fixed region method used in his study is based on the predefined regions of Dillow since these regions are based on physiographic regions. Dorchester County is located entirely in the Eastern Coastal Plain Region.

W. Com. 68

The region regression equations for the Eastern Coastal Plain Region (Table 3) are based on 15 stations in Maryland and 9 stations in Delaware with drainage area (DA) ranging from 2.27 to 112.20 square miles, basin relief (BR) ranging from 5.1 to 43.5 feet, and percent A soils (S_A) ranging from 0.0 to 49.4 percent. Basin relief is not statistically significant for discharges less than the 5-yr event but is included in the equations for consistency. The standard errors range from 33.7 percent (0.142 log units) for Q_{1_50} to 50.8 percent (0.208 log units) for Q_{500}.

Table 3. Eastern Coastal Plain Fixed Region Regression Equations

Eastern Coastal Plain Fixed Region Regression Equation	Standard error (percent)	Equivalent years of record
$Q_{1.25} = 19.85\ DA^{0.796}\ BR^{0.066}\ (S_A+1)^{-0.106}$	34.2	4.5
$Q_{1.50} = 20.48\ DA^{0.795}\ BR^{0.156}\ (S_A+1)^{-0.140}$	33.7	4.1
$Q_{1.75} = 20.81\ DA^{0.799}\ BR^{0.197}\ (S_A+1)^{-0.146}$	34.2	4.1
$Q_{2} = 20.95\ DA^{0.803}\ BR^{0.222}\ (S_A+1)^{-0.144}$	34.9	4.1
$Q_{5} = 25.82\ DA^{0.793}\ BR^{0.368}\ (S_A+1)^{-0.190}$	36.9	6.8
$Q_{10} = 31.17\ DA^{0.777}\ BR^{0.439}\ (S_A+1)^{-0.215}$	38.2	9.5
$Q_{25} = 40.26\ DA^{0.751}\ BR^{0.511}\ (S_A+1)^{-0.242}$	40.0	13
$Q_{50} = 50.00\ DA^{0.732}\ BR^{0.549}\ (S_A+1)^{-0.261}$	41.7	16
$Q_{100} = 63.44\ DA^{0.711}\ BR^{0.576}\ (S_A+1)^{-0.279}$	44.0	18
$Q_{200} = 79.81\ DA^{0.689}\ BR^{0.601}\ (S_A+1)^{-0.296}$	46.5	19
$Q_{500} = 108.7\ DA^{0.660}\ BR^{0.628}\ (S_A+1)^{-0.316}$	50.8	21

Drainage Area Basin Relief Area of 'A' soils

All calculations using the fixed region regression equations were preformed with GISHydro2000. GISHydro is a computer program used to assemble and evaluate hydrologic models for watershed analysis. Originally developed in the mid-1980s, the program combines a database of terrain, land use, and soils data with specialized GIS tools for assembling data and extracting model parameters. The primary purpose of the GISHydro program is to assist engineers in performing watershed analyses in the State of Maryland. In the Fall of 1997, a new collaborative project between the Department of Civil and Environmental Engineering at the University of Maryland and the Maryland State Highway Administration began to update and enhance GISHydro into GISHydro2000.

It should also be emphasized that these regression equations, although not developed by the U.S. Geological Survey (USGS), provide better standard error performance than the current USGS regression equations for Maryland and also apply not just to rural but to both rural and urban watershed conditions. These equations were endorsed for use in Maryland by the Maryland Hydrology Panel as documented in their report which can be obtained from the Maryland State Highway Administration or from the following URL: http://www.gishydro.umd.edu/HydroPanel/panel_report_103106.pdf (University of Maryland 2006).

Results of Dr. Moglen's hydrologic analysis are list below in Table 4.

Table 4. Summary of Discharges.

Flooding Source and Location	Drainage Area (Mi^2)	Exceedance Probability Discharge (cfs)				
		10%	2%	1 %	1% ult*	0.2 %
Beaglin Branch at confluence with Beaverdam Creek.	2.00	91	166	211	211	354
Beaverdam Creek approx. 800 ft. upstream of Beaglin Park Dr.	18.92	788	1430	1790	1790	2870
Beaverdam Creek upstream of Main St.	22.03	2565	3826	4633	4633	6661
Brewington Branch approx. 800 ft. upstream of Northwood Dr.	4.45	188	340	428	428	705
Brewington Branch downstream of Northwood Dr.	4.56	163	284	355	355	575
Brewington Branch downstream of Emerson Ave.	26.23	203	372	470	470	778
Connelly Mill Branch at confluence with Leonard Pond Run.	4.59	229	431	548	548	923
Coty Cox Branch approx. 250 ft. upstream of N. Lake Park Dr.	1.72	73	132	167	167	281
Coty Cox Branch approx. 450 ft. upstream of Booth St.	1.84	80	145	183	183	308

Flooding Source and Location	Drainage Area (Mi²)	Exceedance Probability Discharge (cfs)				
		10%	2%	1 %	1% ult*	0.2 %
Jackson Branch at confluence with North Prong.	1.19	54	98	125	125	216
Leonard Pond Run upstream of confluence with Wood Creek.	12.73	223	404	514	869	869
Leonard Pond Run downstream of confluence with Wood Creek.	14.66	420	716	881	881	1354
Leonard Pond Run at Conrail Railroad	14.95	513	887	1100	1100	1730
Leonard Pond Run approx. 900 ft. upstream of Naylor Mill Rd.	20.22	819	1480	1850	1850	2940
Leonard Pond Run upstream of Naylor Mill Rd.	25.10	969	1740	2160	2160	3390
Leonard Pond Run at confluence with Johnson Pond.	26.43	991	1770	2180	2180	3420
Mayer Branch at confluence with North Prong.	1.93	103	194	252	252	443
Middle Neck Branch just downstream of confluence with Peggy Branch.	2.88	141	264	336	336	569
Middle Neck Branch approx. 325 ft. downstream of Emerson Ave.	6.91	302	555	697	697	1140
Morris Prong at confluence with Slab Bridge Creek	3.83	139	273	355	355	630
North Prong upstream of Williams Millpond Rd.	6.64	220	404	515	515	871
North Prong at mouth	8.24	345	621	784	784	1290
Owens Branch approx. 2600 ft. upstream of Nanticoke Rd.	1.06	82	168	223	223	415
Owens Branch downstream of Nanticoke Rd.	2.84	209	428	564	564	1020
Owens Branch upstream of Fitzwater St.	3.16	215	432	564	564	1010
Peggy Branch at confluence with Middle Neck Branch.	2.88	139	259	330		556
Slab Bridge Creek at confluence with Tonytank Creek.	5.11	297	580	747	747	1290
South Prong upstream of Rum Ridge Rd.	1.45	139	249	314	314	514
South Prong approx. 700 ft. downstream of confluence with Unnamed Tributary to South Prong.	3.80	169	306	389	389	653

Flooding Source and Location	Drainage Area (Mi^2)	Exceedance Probability Discharge (cfs)				
		10%	2%	1 %	1% ult*	0.2 %
Tonytank Creek just downstream of Nutters Cross Rd.	1.23	87	169	221	221	398
Tonytank Creek just downstream of White Marsh Creek.	2.88	220	416	531	531	902
Tonytank Creek approx. 2000 ft. downstream of Division St.	5.02	233	430	545	545	910
Tonytank Creek downstream of Salisbury Blvd.	5.60	263	488	618	618	1030
Tonytank Creek approx. 250 ft downstream of Tuxents Branch	13.81	586	1070	1340	1340	2150
Tuxents Branch downstream of Clyde Ave.	.51	22	39	50	50	86
Tuxents Branch downstream of Camden Ave.	1.02	43	77	98	98	166
Tuxents Branch upstream of Covered Bridge Ln.	1.17	56	103	131	131	224
Unnamed Tributary to Beaglin Branch at confluence with Beaglin Branch.	0.66	94	181	237	237	424
Unnamed Tributary to South Prong at confluence with South Prong.	0.49	30	57	75	75	139
Walston Branch at Salisbury Bypass.	6.82	263	461	579	579	950
White Marsh Creek approx. 150 ft. upstream of confluence with Tonytank Creek.	1.46	76	141	182	182	320
Wood Creek approx. 2225 ft. upstream of confluence with Leonard Pond Run.	1.92	93	171	219	219	376

* 1 % Ultimate Exceedence Probability Discharge

No new tidal analysis was conducted for the Wicomico County FIS update. The existing tidal elevations from the previous effective FIS for the City of Fruitland (FEMA, 1985a), the City of Salisbury (FEMA, 1984a), the Town of Mardela Springs (FEMA, 1985b), the Town of Sharptown (FEMA, 1985c) , and the unincorporated areas of Wicomico County, Maryland (FEMA, 1984b) have been used, but converted from NGVD29 to NAVD88. A description of the effective stillwater surge elevations and tidal analysis is given below.

The stillwater surge elevations were determined for various frequency relationships by the Virginia Institute of Marine Science (VIMS, 1978). The relationships were computed by using a finite element, hydrodynamic computer model of the Chesapeake Bay and the Virginia offshore area of the Atlantic

Ocean. The model utilized meteorologic, topographic, and bathymetric input to generate and modify storm surges. This general input included the astronomical tide, the inverted barometer effect, wind stress acting on water surface, coastal configurations, bottom topography, bottom friction, internal stress, and discharge and surface elevations of rivers. The compilation and analysis of this data were accomplished using a high speed digital computer which forecasted peak elevations. Bathymetric data were derived from standard bathymetric charts published by the U.S. Coast and Geodetic Survey.

Water-surface elevations were developed by VIMS using a unique storm surge model for the Chesapeake Bay (VIMS, 1978). Specific input parameters developed by VIMS include bathymetric data recorded and coded for computer use, historical storm events analyzed for their probability of occurrence where known and unknown elevations were identifiable, astronomical tides (periodic rise and fall of the water surface resulting from gravitational interactions between the sun, moon, and earth) were mathematically described, and orthogonal segments were designed to describe coastal configurations. The model was verified and calibrated by known water-surface elevations and measured storm surges from field data and gage records.

The stillwater surge elevation is the elevation of the water due solely to the effects of the astronomical tides, storm surge, and wave setup on the water surface but does not include wave heights. The inclusion of wave heights, which is the distance from the trough to the crest of the wave, increases the water-surface elevations. The height of a wave is dependent upon wind speed and its duration, depth of water, and length of fetch. The wave crest elevation is the sum of the stillwater elevation and the portion of the wave height above the stillwater elevation. Wave heights and corresponding waved crest elevations were determined using the National Academy of Science (NAS) methodology (NAS, 1977).

It was determined that the highest possible surge would occur when a hurricane travels north along the Western Shore of the Chesapeake Bay. This will produce high southwesterly winds changing to westerly as the storm passes north of the region. Shorelines exposed to the southwesterly winds are the most likely to experience wave velocity effects in conjunction with high stillwater surge. For this reason, the wave height analysis was limited to southwesterly facing shorelines.

Tidal frequency data for the Wicomico and Nanticoke Rivers were based upon the relationships developed by VIMS. Tidal frequency data were based upon tidal gages, both permanent and temporary, established at designated points on each river. After a starting elevation at the confluence of the Wicomico and Nanticoke Rivers was established, a tidal surge computer model, Dynamic Routing Model (DWOPER) (NWS, 1978), was used to extrapolate tidal surge elevations throughout the tidal limits of each river.

A summary of peak elevation-frequency relationships is shown in Table 5, "Summary of Elevations."

Table 5. Summary of Stillwater Elevations.

	Elevation (feet) NAVD88			
Flooding Source and Location	**10%**	**2%**	**1%**	**0.2%**
TIDAL				
NANTICOKE RIVER	3.4	4.6	5.0	6.0
WICOMICO RIVER	3.4	4.6	5.0	6.0
RIVERINE				
JOHNSON POND	11.5	12.5	13.2	14.3

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. Users should be aware that flood elevations shown on the Flood Insurance Rate Map (FIRM) represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the Floodway Data table in the FIS report. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to us the flood elevation data presented in this FIS report in conjunction with the data shown on the FIRM.

A triangulated irregular network (TIN), which is a 3-D model of a ground surface, was created from LiDAR provided by the Maryland Department of Natural Resources. Cross sections for the backwater analyses were obtained from this TIN. The below-water portions of the cross sections were either obtained from the effective hydraulic models, which were originally obtained by field survey or from sounding maps, or estimated from the thalweg on the profile sheet in the effective FIS if the effective hydraulic model was not found. Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1) and on the FIRM (Exhibit 2).

All bridges and culverts in the original hydraulic models were surveyed to obtain elevation data and structural geometry. In an effort to identify any bridges that had been modified since the original FIS had been conducted, USACE contacted the MDE and Wicomico County to acquire the most recent data on all bridges and culverts. The data from MDE and Wicomico County were compared to the effective hydraulic models and if a difference existed, the bridge data were replaced with the more recent information. There were several bridges and culverts for which MDE or Wicomico County did not have data. For these

crossings, USACE conducted a field survey to acquire the data required to model the bridge or culvert. (Note: There are some bridges and culverts that have been built since the previous study for which USACE could not obtain any information. No information on these new stream crossings was available from either MDE or Wicomico County, and USACE could not gain access to the bridges or culverts due to fences around private property, or due to safety concerns. Notes have been added to the hydraulic models for any stream with this situation.)

Water-surface elevations for floods of the selected recurrence intervals were computed through use of the USACE Hydrologic Engineering Centers River Analysis System (HEC-RAS version 3.1.3) step-backwater computer program.

Starting water-surface elevations were calculated using the slope-area method for most detailed study streams. Where the detailed study began at an existing structure, the headwater elevation for each frequency flood was acquired from the effective FIS and used as the starting water surface elevation in the hydraulic analysis.

Channel and overbank roughness factors (Manning's "n" values) used in the original hydraulic computations were chosen by engineering judgment and were based on field observations of the stream and floodplain areas. Roughness values for the main channel of the streams in Wicomico County ranged from 0.03 to 0.05, while floodplain roughness ranged from 0.05 to 0.16 for all floods.

No new wave run-up analysis was conducted for the Wicomico County FIS update. The existing tidal elevations from the previous effective FIS for the City of Fruitland (FEMA, 1985a), the City of Salisbury (FEMA, 1984a), the Town of Mardela Springs (FEMA, 1985b), the Town of Sharptown (FEMA, 1985c) , and the unincorporated areas of Wicomico County, Maryland (FEMA, 1984b) have been used, but converted from NGVD29 to NAVD88. A description of the effective wave analysis is given below.

Hydraulic analyses of the shoreline characteristics of the flooding sources studied in detail were carried out to provide estimate of wave heights and corresponding wave crest elevations of floods of the selected recurrence intervals along each of the shorelines.

Areas of coastline subject to significant wave attack are referred to as coastal high hazard zones. The COE has established the three-foot breaking wave as the criterion for identifying the limit of coastal high hazard zones (USACE, 1975). The three-foot wave has been determined as the minimum size wave capable of causing major damage to conventional wood-frame or brick-veneer structures. This criterion has been adopted by FEMA for the determination of V-Zones.

The methodology for analyzing wave heights and corresponding wave crest elevations were developed by the National Academy of Science (NAS) (NAS, 1977). The NAS methodology is based on three 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 elevation 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 natural or man-made obstructions. The energy dissipation is a function of the physical characteristics of the obstruction and is determined by procedures described in the National Academy of Sciences report (NAS, 1977). 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.

These concepts and equations were used to compute wave heights and wave crest elevations associated with the 1% annual chance storm surge. Accurate topographic, land use, and land cover data are required for the wave height analysis. Maps of the study area prepared by the Study Contractor with a scale of 1:7,200 and contour intervals of two feet were used for the topographic data (MDNR, 1981). The land use data were obtained through field surveys and aerial photographic interpretations.

Wave heights were computed along transects (cross-section lines) that were located perpendicular to the average mean shoreline, in accordance with the Users Manual for Wave Height Analysis (FEMA, 1981a). 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 larger 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. The transects located on the Nanticoke River were extended across the river into the adjacent Dorchester County marshland in order to model the incident wave heights in the marshes. Figure 1 illustrates the location of the transects for the community and Table 6 provides a physical description of the area along the shorelines represented by each transect.

A computer program that determines wave height elevations for Flood Insurance Studies (WHAFIS) was used (FEMA, 1981b). Each transect was taken perpendicular to the shoreline and extended inland to a point where wave action ceased. Along each transect, wave heights and wave crest elevations were computed considering the combined effects of changes in ground elevation, vegetation, and physical features. Wave heights were calculated to the nearest 0.1 foot, and wave crest elevations were determined at whole-foot increments along the transects in the original study. Since converting to the NAVD88 datum, the

wave elevations are no longer listed as whole-foot increments. The calculations were carried inland along the transect until the surge elevation or the coastal flooding met another flooding source (i.e., riverine) with an equal water-surface elevation. The results of the calculations are accurate until local topography, vegetation, or cultural development of the community undergoes major changes.

Table 6 provides a listing of the transect location and stillwater starting elevations, as well as maximum wave crest elevations. All dunes and structures were assumed to remain intact for the purposes of this analysis.

Table 6. Transect Descriptions.

		1% Elevation (feet) NAVD88	
Transect	Location	Stillwater	Maximum Wave Crest
1	Nanticoke Point, north to Jones Creek	5.0	8.2
2	Jones Creek, north to Salisbury-Nanticoke Road	5.0	8.2
3	Salisbury-Nanticoke Road north to Private Drive	5.0	8.2
4	Private Drive to MD Route 349 and Nanticoke Drive intersection	5.0	8.2
5	MD Route 349 and Nanticoke Drive intersection to midpoint on Nanticoke Drive	5.0	8.2
6	Midpoint on Nanticoke Drive to Nanticoke Wharf Road (extended)	5.0	8.2
7	Nanticoke Wharf Road (extended) to Roaring Point	5.0	8.2
8	Roaring Point to Nanticoke Harbor	5.0	7.2
9	Nanticoke Harbor to MD Route 321 (extended)	5.0	7.2
10	MD Route 321 (extended) to Unnamed Road	5.0	7.2
11	Unnamed Road to Windsor Creek	5.0	7.2
12	Windsor Creek to Ragged Point	5.0	7.2
13	Ragged Point to Dunn Creek	5.0	7.2
14	Dunn Creek to Bivalve	5.0	7.2
15	Bivalve to Hatcrown Point	5.0	7.2
16	Hatcrown Point to Wetipquin Road (extended)	5.0	7.2
17	Wetipquin Road (extended) to Runaway Point	5.0	7.2
18	Runaway Point to Flatty Creek	5.0	7.2
19	Mollies Point east to Trinity Chruch Road (extended)	5.0	7.2
20	Trinity Church Road (extended) to New Road Landing	5.0	7.2
21	New Road Landing to Shiles Creek	5.0	7.2

Figure 2 represents the profile for a typical transect which illustrates the relationship between the stillwater elevation, the wave crest elevation, the ground elevation profile, and the location of the A/V Zone boundary.

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

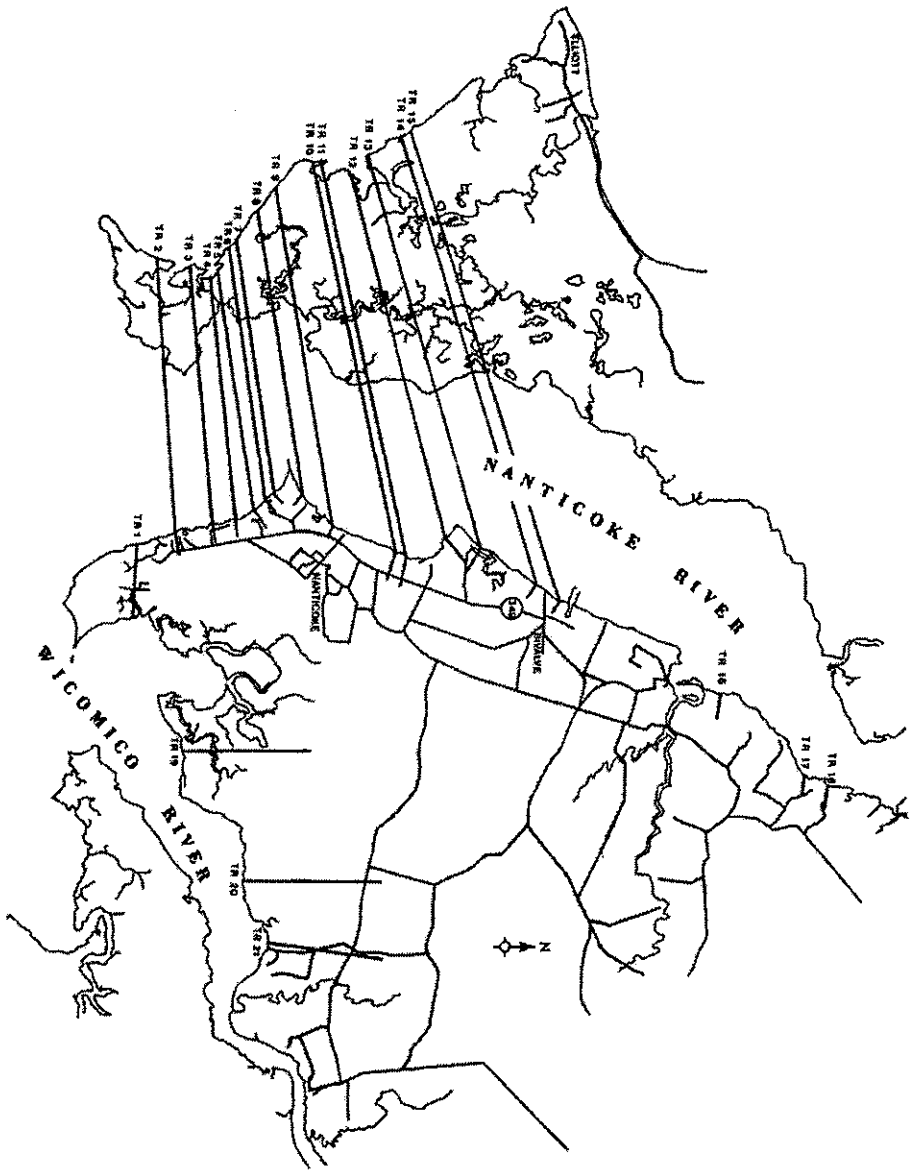


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

APPROXIMATE SCALE

2 0 2 4 MILES

TRANSECT LOCATION MAP

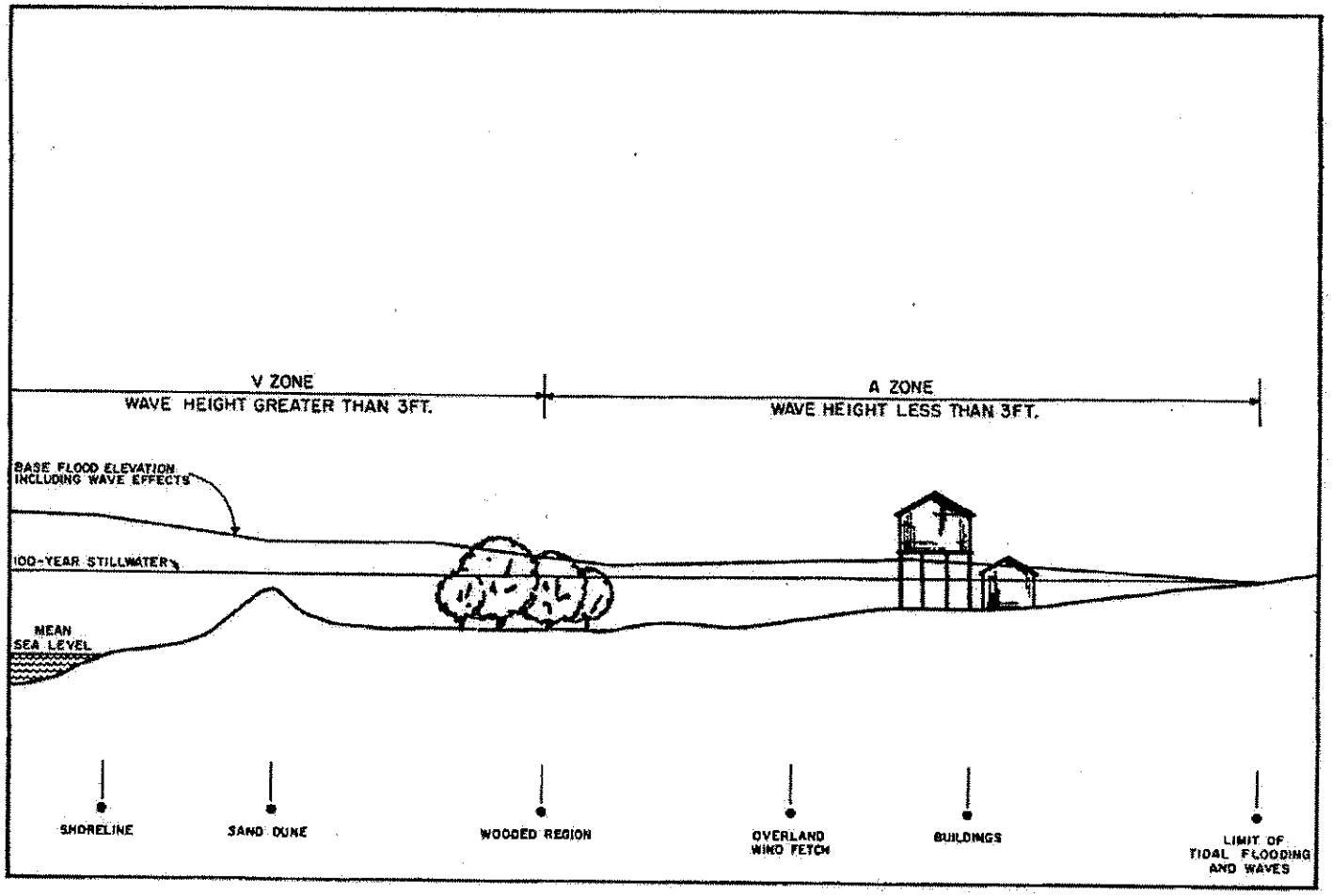


FIGURE 2
TYPICAL TRANSECT SCHEMATIC

3.3 Vertical Datum

All FIS reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum in use for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD29). With the finalization of the North American Vertical Datum of 1988 (NAVD88), many FIS reports and FIRMs are being prepared using NAVD88 as the referenced vertical datum.

All flood elevations shown in this FIS report and on the FIRM are referenced to NAVD88. Structure and ground elevations in the community must, therefore, be referenced to NAVD88. It is important to note that adjacent communities may be referenced to NGVD29. This may result in differences in Base Flood Elevations (BFEs) across the corporate limits between the communities. The vertical datum conversion factor from NGVD29 to NAVD88 for Wicomico County is –0.83 feet.

For more information on NAVD 88, see FEMA publication entitled, 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 online (http://www.ngs.noaa.gov) or at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center 3
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program (NFIP) encourages state and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study produces maps designed 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 1- and 0.2-percent annual chance floodplain boundaries have been delineated using the flood elevations determined at each

cross section. Between cross sections the boundaries were interpolated using the triangulated irregular network discussed in Section 3.2.

The 1- and 0.2-percent annual chance floodplain boundaries are shown on the Flood Insurance Rate Maps (Exhibit 2). In cases where the 1- and 0.2-percent annual chance floodplain boundaries are close together, only the 1-percent annual chance boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to the limitations of the map scale.

For the streams studied by approximate methods only the 1-percent annual chance floodplain boundary is shown.

4.2 Floodways

Encroachment of 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 1-percent annual chance floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1-percent annual chance flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced.

The following streams had floodway analyses conducted as part of the previous FIS: Beaglin Branch, Beaverdam Creek, Brewington Branch, Connelly Mill Branch, Coty Cox Branch, Jackson Branch, Leonard Pond Run, Mayer Branch, Middle Neck Branch, Morris Prong, North Prong (Leonard Pond) – Andrews Branch, Peggy Branch, Slab Bridge Creek, South Prong, Tonytank Creek, Tuxents Branch, Unnamed Tributary to Beaglin Branch, Unnamed Tributary to South Prong, Walston Branch, White Marsh Creek, and Wood Creek. The floodways presented in the effective FIS were computed on the basis of equal conveyance reduction from each side of the floodplain. No floodway was computed for Owens Branch in the previous FIS.

For this update, USACE conducted floodway analyses on the streams that had floodway analyses in the effective FIS: Beaglin Branch, Beaverdam Creek, Brewington Branch, Connelly Mill Branch, Coty Cox Branch, Jackson Branch, Leonard Pond Run, Mayer Branch, Middle Neck Branch, Morris Prong, North Prong (Leonard Pond) – Andrews Branch, Peggy Branch, Slab Bridge Creek, South Prong, Tonytank Creek, Tuxents Branch, Unnamed Tributary to Beaglin

Branch, Unnamed Tributary to South Prong, Walston Branch, White Marsh Creek, and Wood Creek. No floodway was computed for Owens Branch to match the scope of the effective FIS. The objective of the floodway analyses was to update the floodways on the aforementioned streams. 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 computed and are presented in Table 7.

As shown on the updated Flood Insurance Rate Maps (Exhibit 2), the floodway boundaries were computed at cross sections. Between cross sections, the boundaries were interpolated. In cases where the boundaries of the floodway and the 1-percent annual chance flood are either close together or collinear, only the floodway boundary has been shown.

The area between the floodway and the 1-percent annual chance 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 1-percent annual chance flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 3.

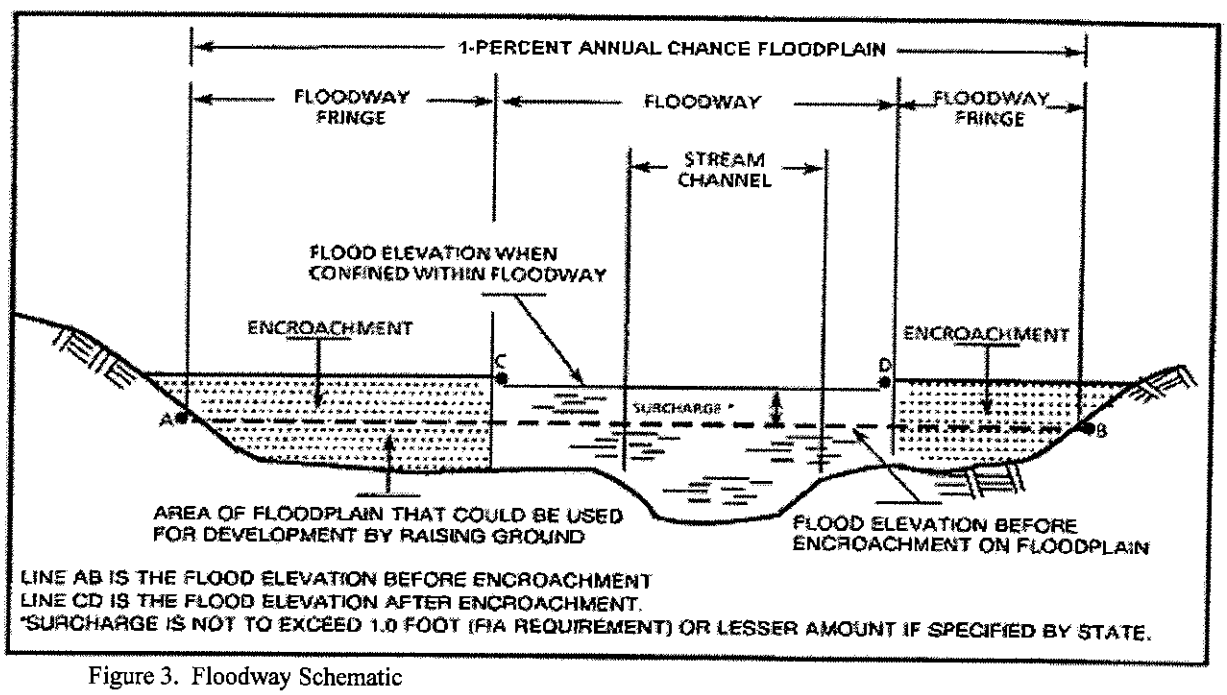


Figure 3. Floodway Schematic

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.

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Beaglin Branch								
A	929.6[1]	44	264	0.8	17.2	17.2	17.2	0.0
B	1091.9[1]	53	311	1.8	17.2	17.2	17.2	0.0
C	1999.7[1]	29	255	0.8	22.6	22.6	22.7	0.1
D	3058.2[1]	40	252	0.8	22.7	22.7	22.7	0.0
E	4169.2[1]	35	86	2.4	22.8	22.8	23.0	0.2
F	4948.7[1]	75	376	0.6	26.9	26.9	27.3	0.4
G	6039.4[1]	48	291	0.7	28.9	28.9	29.7	0.8
H	6670.5[1]	51	310	0.7	30.6	30.6	31.2	0.6
I	6951.7[1]	47	262	0.8	30.7	30.7	31.3	0.6
J	7746.6[1]	99	731	0.3	34.5	34.5	35.3	0.8
Beaverdam Creek								
A	4149.8[2]	550	2466	1.9	11.8	11.8	12.8	1.0
B	5835.3[2]	338	2230	2.1	13.4	13.4	14.4	1.0
C	7739.8[2]	257	1515	3.1	15.3	15.3	16.3	1.0
Brewington Branch								
A	1789.9[3]	140	388	1.2	13.6	13.6	13.9	0.3
B	1990.9[3]	143	556	0.9	13.6	13.6	13.9	0.3

[1]Stream distance in feet above confluence with Beaverdam Creek
[2]Stream distance in feet above Tidal Weir
[3]Stream distance in feet above confluence with Johnson Pond

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD AND INCORPORATED AREAS

FLOODWAY DATA

BEAGLIN BRANCH - BEAVERDAM CREEK BREWINGTON BRANCH

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Brewington Branch (continued)								
C	2290.9[1]	140	558	0.8	13.7	13.7	14.0	0.3
D	2474.0[1]	139	539	5.1	13.5	13.5	13.9	0.4
E	2962.2[1]	192	1601	0.8	19.3	19.3	19.4	0.1
F	3435.3[1]	315	3925	0.1	31.1	31.1	31.3	0.2
G	3690.2[1]	355	2614	0.1	31.1	31.1	31.3	0.2
H	4008.6[1]	257	4227	0.1	31.1	31.1	31.3	0.2
I	5173.0[1]	275	3185	0.1	31.1	31.1	31.3	0.2
J	5415.7[1]	276	2936	0.2	31.1	31.1	31.3	0.2
K	5488.0[1]	293	3850	0.1	31.1	31.1	31.3	0.2
L	6191.8[1]	187	2291	0.2	31.1	31.1	31.3	0.2
M	6645.1[1]	122	1232	0.4	31.1	31.1	31.3	0.2
N	7245.3[1]	75	568	0.8	31.1	31.1	31.3	0.2
O	7408.6[1]	105	1105	0.9	31.3	31.3	31.8	0.5
P	7609.7[1]	153	1415	0.9	31.6	31.6	32.1	0.5
Q	7913.8[1]	154	1393	0.3	31.6	31.6	32.1	0.5
R	9117.8[1]	154	1355	0.3	31.6	31.6	32.1	0.5
S	9902.0[1]	71	505	2.7	31.6	31.6	32.1	0.5
Connelly Mill Branch								
A	707.6[2]	188	457	1.2	18.6	17.8[3]	18.7	0.9

[1]Stream distance in feet above confluence with Johnson Pond
[2]Stream distance in feet above confluence with Leonard Pond Run
[3]Elevation computed without consideration of backwater effects from Leonard Pond Run

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD AND INCORPORATED AREAS

FLOODWAY DATA

BREWINGTON BRANCH - CONNELLY MILL BRANCH

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Connelly Mill Branch (continued)								
B	1878.4[1]	108	320	1.7	19.5	19.5	20.3	0.8
C	2541.3[1]	130	355	1.5	20.4	20.4	21.4	1.0
D	3810.5[1]	135	361	1.5	22.9	22.9	23.9	1.0
E	4908.7[1]	95	309	1.8	24.7	24.7	25.7	1.0
F	5502.8[1]	95	328	1.7	25.6	25.6	26.6	1.0
G	6116.8[1]	80	267	2.1	26.7	26.7	27.6	0.9
H	6874.3[1]	74	271	2.0	28.2	28.2	29.2	1.0
I	7363.4[1]	76	257	2.1	29.3	29.3	30.2	0.9
J	7750.7[1]	80	220	9.3	30.6	30.6	31.4	0.8
Coty Cox Branch								
A	862.6[2]	39	305	1.0	12.2	12.2	12.2	0.0
B	1438.3[2]	98	671	0.3	12.3	12.3	12.3	0.0
C	1848.1[2]	66	428	0.4	12.3	12.3	12.3	0.0
D	2170.8[2]	39	140	2.6	14.3	14.3	14.8	0.5
E	2851.5[2]	148	685	0.3	20.6	20.6	20.8	0.1
F	3187.5[2]	311	1305	0.1	20.6	20.6	20.8	0.2
G	3569.1[2]	212	1691	0.1	20.6	20.6	20.8	0.1
H	3769.0[2]	282	2073	0.1	20.6	20.6	20.8	0.1
I	3997.2[2]	315	2276	0.1	20.6	20.6	20.8	0.1

[1]Stream distance in feet above confluence with Leonard Pond Run

[2]Stream distance in feet above confluence with Owens Branch

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD AND INCORPORATED AREAS

FLOODWAY DATA

CONNELLY MILL BRANCH - COTY COX BRANCH

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Coty Cox Branch (continued)								
J	4172.0[1]	284	1741	0.1	20.7	20.7	20.8	0.1
K	4548.4[1]	148	897	0.2	20.7	20.7	20.8	0.1
L	5021.8[1]	63	396	0.5	20.7	20.7	20.8	0.1
M	5220.8[1]	86	690	0.3	20.7	20.7	20.8	0.1
N	5778.5[1]	59	489	0.4	20.7	20.7	20.8	0.1
O	6661.8[1]	91	557	0.3	20.7	20.7	20.8	0.1
P	6836.4[1]	107	667	0.3	20.7	20.7	20.8	0.1
Q	7027.3[1]	92	379	0.4	20.7	20.7	20.8	0.1
R	7630.5[1]	85	393	0.4	20.7	20.7	20.9	0.2
S	8239.0[1]	160	694	0.2	20.7	20.7	20.9	0.2
T	9055.5[1]	40	240	0.7	21.9	21.9	22.1	0.2
U	9804.3[1]	48	273	0.6	24.4	24.4	24.8	0.4
V	10192.4[1]	44	242	0.7	25.4	25.4	25.9	0.5
W	10765.1[1]	84	348	0.5	25.4	25.4	25.9	0.5
X	11333.0[1]	62	154	1.1	25.4	25.4	25.9	0.5
Y	12067.7[1]	57	221	0.8	25.5	25.5	25.9	0.4
Z	12757.3[1]	180	388	0.4	28.7	28.7	28.8	0.1
Jackson Branch								
A	476.3[2]	33	79	1.6	36.4	33.8[3]	34.7	0.9

[1]Stream distance in feet above confluence with Owens Branch

[2]Stream distance in feet above confluence with North Prong (Leonard Pond)

[3]Elevation computed without consideration of backwater effects from North Prong (Leonard Pond)

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD AND INCORPORATED AREAS

FLOODWAY DATA

COTY COX BRANCH - JACKSON BRANCH

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Jackson Branch (continued)								
B	990.2[1]	61	106	1.2	36.4	34.3[3]	35.3	1.0
C	1384.9[1]	10	26	4.8	36.4	35.3[3]	36.0	0.7
D	2038.6[1]	28	88	1.4	36.9	36.9	37.8	0.9
E	2405.0[1]	27	88	1.4	37.2	37.2	38.1	0.9
F	2834.0[1]	21	64	2.0	37.7	37.7	38.6	0.9
G	3261.9[1]	19	449	0.3	39.2	39.2	39.4	0.2
H	3369.9[1]	21	134	0.9	40.9	40.9	41.4	0.5
I	4389.3[1]	23	129	1.0	40.9	40.9	41.6	0.7
J	5236.4[1]	23	132	0.9	40.9	40.9	41.7	0.8
K	5382.1[1]	22	109	1.2	41.0	41.0	41.8	0.8
L	5620.8[1]	21	84	1.5	41.0	41.0	41.9	0.9
Leonard Pond Run								
A	815.9[2]	300	1271	1.7	14.2	14.2	15.0	0.8
B	2326.5[2]	293	1489	1.5	14.8	14.8	15.7	0.9
C	3152.4[2]	236	1086	2.0	15.2	15.2	16.0	0.8
D	4178.0[2]	250	1116	1.9	16.0	16.0	16.7	0.7
E	4941.1[2]	290	1210	1.8	16.3	16.3	17.2	0.9
F	5334.4[2]	255	1073	2.0	16.5	16.5	17.5	1.0
G	5875.1[2]	61	468	4.6	16.8	16.8	17.8	1.0

[1]Stream distance in feet above confluence with North Prong (Leonard Pond) [2]Stream distance in feet above confluence with Johnson Pond
[3]Elevation computed without consideration of backwater effects from North Prong (Leonard Pond)

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD AND INCORPORATED AREAS

FLOODWAY DATA

JACKSON BRANCH - LEONARD POND RUN

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Leonard Pond Run (continued)								
H	7312.0[1]	317	1610	0.7	18.4	18.4	19.2	0.8
I	8181.6[1]	309	1445	0.8	18.5	18.5	19.3	0.8
J	9312.7[1]	148	660	1.7	18.7	18.7	19.5	0.8
K	9824.5[1]	165	771	1.4	18.9	18.9	19.7	0.8
L	10680.8[1]	239	915	1.2	19.2	19.2	20.0	0.8
M	11504.3[1]	225	784	1.4	19.6	19.6	20.3	0.7
N	11946.4[1]	210	531	2.1	20.0	20.0	20.6	0.6
O	12218.5[1]	56	229	4.8	20.6	20.6	21.0	0.4
P	12839.8[1]	126	901	1.0	25.0	25.0	25.0	0.0
Q	14267.5[1]	213	1177	0.8	25.0	25.0	25.1	0.1
R	15675.6[1]	229	889	0.6	25.1	25.1	25.2	0.1
S	16108.9[1]	125	423	1.2	25.1	25.1	25.3	0.2
T	16494.8[1]	130	371	1.4	25.2	25.2	25.3	0.1
U	17720.9[1]	38	142	3.6	25.5	25.5	25.7	0.2
Mayer Branch								
A	275.1[2]	84	396	0.6	39.3	39.0[3]	39.4	0.4
B	460.8[2]	130	609	0.4	39.3	39.0[3]	39.4	0.4
C	1291.4[2]	114	520	0.5	39.3	39.1[3]	39.5	0.4
D	1598.7[2]	173	705	0.4	39.3	39.1[3]	39.5	0.4

[1]Stream distance in feet above confluence with Johnson Pond
[2]Stream distance in feet above confluence with Andrews Branch (Williams Mill Pond)
[3]Elevation computed without consideration of backwater effects from Andrews Branch (Williams Mill Pond)

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD AND INCORPORATED AREAS

FLOODWAY DATA

LEONARD POND RUN - MAYER BRANCH

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Mayer Branch (continued)								
E	2365.4[1]	149	583	0.4	39.3	39.1[3]	39.6	0.4
F	3106.9[1]	122	458	0.6	39.3	39.2[3]	39.6	0.4
G	3902.1[1]	109	375	0.7	39.3	39.3	39.8	0.5
H	5132.2[1]	186	438	0.6	39.5	39.5	40.0	0.5
I	5354.8[1]	178	447	0.6	39.7	39.7	40.1	0.4
J	5479.6[1]	167	355	0.7	39.8	39.8	40.2	0.4
K	5832.3[1]	32	139	1.8	42.4	42.4	42.9	0.5
Middle Neck Branch								
A	3048.9[2]	29	147	4.7	15.5	15.5	16.0	0.5
B	3130.0[2]	84	392	2.3	19.4	19.4	20.2	0.8
C	3424.8[2]	100	728	2.0	19.5	19.5	20.3	0.8
D	3500.8[2]	100	1898	1.1	31.8	31.8	32.4	0.6
E	3865.6[2]	100	1774	0.4	31.9	31.9	32.5	0.6
F	4113.9[2]	100	1351	0.5	31.9	31.9	32.5	0.6
G	4215.9[2]	100	1248	0.6	31.9	31.9	32.5	0.6
H	4631.5[2]	100	1409	0.5	31.9	31.9	32.5	0.6
I	4796.8[2]	70	1027	0.7	31.9	31.9	32.5	0.6
J	4915.0[2]	70	956	0.8	31.9	31.9	32.5	0.6
K	5023.0[2]	135	1075	0.7	31.9	31.9	32.5	0.6

[1]Stream distance in feet above confluence with Andrews Branch (Williams Mill Pond) [2]Stream distance in feet above confluence with Johnson Pond
[3]Elevation computed without consideration of backwater effects from Andrews Branch (Williams Mill Pond)

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD AND INCORPORATED AREAS

FLOODWAY DATA

MAYER BRANCH - MIDDLE NECK BRANCH

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Middle Neck Branch (continued)								
L	7194.2[1]	70	1046	0.7	31.9	31.9	32.5	0.6
M	7478.9[1]	70	1026	0.7	31.9	31.9	32.6	0.7
N	8604.3[1]	60	901	0.4	31.9	31.9	32.6	0.7
O	10592.8[1]	60	792	0.4	31.9	31.9	32.6	0.7
P	11603.2[1]	60	718	0.5	31.9	31.9	32.6	0.7
Q	12122.9[1]	60	659	0.5	31.9	31.9	32.6	0.7
R	12323.1[1]	60	699	0.5	31.9	31.9	32.6	0.7
S	12526.5[1]	60	710	0.5	31.9	31.9	32.7	0.8
T	13670.8[1]	60	548	0.6	31.9	31.9	32.7	0.8
U	15385.2[1]	60	407	0.8	31.9	31.9	32.8	0.9
V	16132.0[1]	60	224	2.5	31.9	31.9	32.9	1.0
W	16221.4[1]	60	307	1.6	33.4	33.4	34.0	0.6
X	17747.5[1]	60	255	1.3	33.6	33.6	34.5	0.9
Morris Prong								
A	1264.8[2]	110	429	0.8	22.5	22.5	23.5	1.0
B	2058.5[2]	50	134	2.7	22.8	22.8	23.6	0.8
C	2478.6[2]	39	80	4.4	23.9	23.9	24.2	0.3
D	2787.3[2]	50	278	1.5	26.9	26.9	27.0	0.3
E	3669.6[2]	35	137	2.6	27.2	27.2	27.3	0.1

[1]Stream distance in feet above confluence with Johnson Pond

[2]Stream distance in feet above confluence with Slab Bridge Creek

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD AND INCORPORATED AREAS

FLOODWAY DATA

MIDDLE NECK BRANCH - MORRIS PRONG

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Morris Prong (continued)								
F	4571.2[1]	62	195	1.8	27.3	27.3	27.9	0.6
G	5963.4[1]	65	141	2.5	28.6	28.6	29.5	0.9
H	7803.6[1]	22	173	2.1	38.0	38.0	38.6	0.6
North Prong (Leonard Pond) Andrews Branch								
A	4158.8[2]	189	950	0.8	36.3	36.3	37.3	1.0
B	4407.6[2]	220	1072	0.7	36.4	36.4	37.4	1.0
C	4712.6[2]	250	1285	0.6	36.4	36.4	37.4	1.0
D	4797.7[2]	234	1211	0.7	36.4	36.4	37.4	1.0
E	4871.5[2]	270	1371	0.6	36.4	36.4	37.4	1.0
F	6865.6[2]	258	515	1.0	39.4	39.4	40.1	0.7
G	8114.7[2]	150	800	0.6	39.4	39.4	40.3	0.9
H	8853.5[2]	196	956	0.5	39.4	39.4	40.4	1.0
I	9411.6[2]	200	965	0.5	39.5	39.5	40.4	0.9
J	10242.9[2]	210	929	0.6	39.5	39.5	40.5	1.0

[1]Stream distance in feet above confluence with Slab Bridge Creek

[2]Stream distance in feet above confluence with Leonard Pond

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD AND INCORPORATED AREAS

FLOODWAY DATA

MORRIS PRONG - NORTH PRONG (LEONARD POND) / ANDREWS BRANCH

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
North Prong (Leonard Pond) Andrews Branch (continued)								
K	10471.7[1]	211	871	0.6	39.5	39.5	40.5	1.0
L	10690.0[1]	190	739	0.7	39.6	39.6	40.6	1.0
M	10782.4[1]	126	410	1.3	39.6	39.6	40.6	1.0
N	10866.3[1]	70	470	1.1	41.8	41.8	42.5	0.7
Peggy Branch								
A	269.8[2]	44	142	2.3	31.9	19.3[3]	20.3	1.0
B	877.6[2]	13	60	5.5	31.9	21.1[3]	22.1	1.0
C	1875.9[2]	65	273	1.2	31.9	23.0[3]	24.0	1.0
D	2248.7[2]	70	264	1.3	31.9	23.2[3]	24.2	1.0
E	2821.3[2]	35	122	2.7	31.9	24.6[3]	25.5	0.9
F	3155.8[2]	49	134	2.5	31.9	25.3[3]	26.2	0.9
G	3207.3[2]	53	138	2.4	31.9	25.7[3]	26.4	0.7
H	4409.4[2]	59	141	2.3	31.9	28.7[3]	28.9	0.2
I	4752.9[2]	54	194	1.7	31.9	29.5[3]	29.7	0.2
J	5470.0[2]	60	209	1.6	31.9	30.1[3]	30.7	0.6
K	5572.5[2]	60	224	1.5	32.2	32.2	32.6	0.4
L	6047.1[2]	59	273	1.2	32.4	32.4	32.8	0.4
M	6756.1[2]	75	228	1.5	32.8	32.8	33.2	0.4

[1]Stream distance in feet above confluence with Leonard Pond
[2]Stream distance in feet above confluence with Middle Neck Branch
[3]Elevation computed without consideration of backwater effects from Middle Neck Branch

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD AND INCORPORATED AREAS

FLOODWAY DATA

NORTH PRONG (LEONARD POND) / ANDREWS BRANCH - PEGGY BRANCH

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Peggy Branch (continued)								
N	6831.1[1]	76	345	1.0	35.1	35.1	35.8	0.7
O	7748.8[1]	40	195	1.7	35.4	35.4	36.3	0.9
P	8927.0[1]	46	224	1.5	36.1	36.1	37.0	0.9
Q	10045.0[1]	56	162	2.0	38.9	38.9	39.8	0.9
R	10092.4[1]	56	237	1.4	39.5	39.5	40.4	0.9
S	10842.1[1]	115	389	0.9	39.8	39.8	40.7	0.9
T	11114.7[1]	112	378	0.9	39.9	39.9	40.8	0.9
U	11677.6[1]	56	195	1.7	40.2	40.2	41.2	1.0
Slab Bridge Creek								
A	2259.2[2]	135	441	1.7	10.3	10.3	11.3	1.0
B	6191.9[2]	140	789	1	22.1	22.1	23.1	1.0
C	6926.4[2]	130	753	1	22.2	22.2	23.2	1.0
D	7597.9[2]	120	674	1.1	22.3	22.3	23.2	1.0
E	8769.6[2]	75	307	1.0	23.0	23.0	23.9	0.9
F	9354.4[2]	101	234	1.3	23.5	23.5	24.4	0.9
G	10054.4[2]	42	121	2.5	25.4	25.4	26.4	1.0

[1]Stream distance in feet above confluence with Middle Neck Branch

[2]Stream distance in feet above confluence with Tonytank Creek

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD AND INCORPORATED AREAS

FLOODWAY DATA

PEGGY BRANCH - SLAB BRIDGE CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
South Prong								
A	1117.2[1]	198	598	0.7	35.4	35.4	36.4	1.0
B	1882.7[1]	175	501	0.8	35.6	35.6	36.6	1.0
C	2459.6[1]	197	875	0.4	35.7	35.7	36.7	1.0
D	2663.5[1]	170	725	0.5	35.7	35.7	36.7	1.0
F	2878.6[1]	184	735.9	0.5	35.7	35.7	36.7	1.0
G	2994.6[1]	178	665.5	0.6	35.7	35.7	36.7	1.0
H	3469.5[1]	148	691.8	0.5	35.8	35.8	36.8	1.0
I	3840.4[1]	165	745.0	0.4	35.8	35.8	36.8	1.0
J	4412.8[1]	219	959.5	0.3	35.8	35.8	36.8	1.0
K	4949.8[1]	81	321.7	1.0	35.9	35.9	36.9	1.0
Tonytank Creek								
A	9732.2[2]	161	1265	0.4	15.3	15.3	15.4	0.1
B	10888.0[2]	123	821	0.7	15.4	15.4	15.5	0.1
C	12133.9[2]	113	390	1.4	15.4	15.4	15.7	0.3
D	15115.5[2]	321	1382	0.4	21.9	21.9	22.7	0.8
E	16381.5[2]	167	824	0.6	22.0	22.0	22.8	0.8
F	17364.0[2]	122	439	1.2	22.2	22.2	23.0	0.8
G	17568.5[2]	16	46	11.5	23.8	23.8	23.8	0.0
H	17841.7[2]	14	146	3.6	29.2	29.2	29.2	0.0
I	18587.5[2]	177	1619	0.3	29.4	29.4	29.4	0.0

[1]Stream distance in feet above confluence with Leonard Pond

[2]Stream distance in feet above confluence with Wicomico River

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD AND INCORPORATED AREAS

FLOODWAY DATA

SOUTH PRONG - TONYTANK CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Tonytank Creek (continued)								
J	20890.9[1]	194	1181	0.5	29.4	29.4	29.5	0.1
K	23017.8[1]	74	304	1.8	29.9	29.9	30.3	0.4
L	24256.6[1]	52	205	2.6	32.9	32.9	33.8	0.9
M	25021.6[1]	42	346	0.6	40.2	40.2	40.6	0.4
Tuxents Branch								
A	1267.5[2]	67	133	1.0	8.9	5.4[3]	5.4	0.0
B	1742.2[2]	25	24	5.4	8.9	6.0[3]	6.2	0.2
C	1960.5[2]	39	54	2.4	8.9	7.4[3]	7.7	0.3
D	2159.2[2]	35	37	4.0	8.9	8.0[3]	8.2	0.2
E	2232.7[2]	31	170	0.8	13.3	13.3	13.4	0.1
F	2317.9[2]	34	173	0.8	13.3	13.3	13.4	0.1
G	2778.9[2]	30	93	1.1	13.3	13.3	13.5	0.2
H	3496.8[2]	24	35	2.8	13.9	13.9	14.0	0.1
I	3949.0[2]	12	24	4.0	15.8	15.8	15.8	0.0
J	4150.8[2]	17	34	2.9	16.6	16.6	16.6	0.0
K	4239.7[2]	34	94	0.9	19.4	19.4	19.4	0.0

[1]Stream distance in feet above confluence with Wicomico River
[2]Stream distance in feet above confluence with Tonytank Creek
[3]Elevation computed without consideration of backwater effects from Tonytank Creek

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD AND INCORPORATED AREAS

FLOODWAY DATA

TONYTANK CREEK - TUXENTS BRANCH

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Unnamed Tributary to Beaglin Branch								
A	117.4[1]	56	121	2.0	26.9	25.5[4]	26.5	0.9
B	877.7[1]	20	75	3.2	27.3	27.3	28.3	1.0
C	1447.8[1]	14	57	4.2	30.1	30.1	30.8	0.8
Unnamed Tributary to South Prong								
A	135.2[2]	15	29	2.6	35.8	32.8[5]	33.8	1.0
B	380.4[2]	15	36	2.1	35.8	33.7[5]	34.7	1.0
C	591.1[2]	15	41	1.8	35.8	34.1[5]	35.1	1.0
D	1328.7[2]	10	23	3.3	36.2	36.2	37.0	0.8
E	1686.5[2]	17	39	1.9	37.6	37.6	38.2	0.6
F	1809.2[2]	10	100	0.8	40.8	40.8	41.8	1.0
Walston Branch								
A	144.7[3]	732	2848	0.2	25.6	25.6	26.2	0.6
B	750.1[3]	74	460	1.3	25.6	25.6	26.3	0.7
C	1028.5[3]	53	345	1.7	25.6	25.6	26.3	0.7
D	1542.5[3]	33	329	1.8	28.1	28.1	28.8	0.7

[1]Stream distance in feet above confluence with Beaglin Branch
[2]Stream distance in feet above confluence with South Prong
[3]Stream distance in feet above confluence with Beaverdam Creek
[4]Elevation computed without consideration of backwater effects from Beaglin Branch
[5]Elevation computed without consideration of backwater effects from South Prong

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD AND INCORPORATED AREAS

FLOODWAY DATA

UNNAMED TRIBUTARY TO BEAGLIN BRANCH - UNNAMED TRIBUTARY TO SOUTH PRONG - WALSTON BRANCH

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Walston Branch (continued)								
E	3011.4[1]	200	1471	0.4	29.6	29.6	30.4	0.8
F	4506.3[1]	160	960	0.6	29.7	29.7	30.5	0.8
White Marsh Creek								
A	1806.1[2]	28	80	2.3	31.2	31.2	31.9	0.7
B	3806.6[2]	21	82	2.2	35.3	35.3	36.0	0.7
C	4036.9[2]	15	61	3.0	35.6	35.6	36.3	0.7
Wood Creek								
A	515.2[3]	17	61	3.6	24.8	20.3[4]	21.3	1.0
B	1875.1[3]	10	53	4.2	24.8	24.8	25.0	0.2
C	2949.1[3]	17	77	2.8	26.9	26.9	27.7	0.8
D	3940.9[3]	31	93	2.4	29.2	29.2	30.0	0.8
E	4809.5[3]	18	68	3.2	31.5	31.5	32.5	1.0
F	5220.1[3]	12	53	4.2	32.8	32.8	33.8	1.0
G	5449.2[3]	11	48	4.5	34.0	34.0	35.0	1.0
H	5626.7[3]	50	245	0.9	34.7	34.7	35.4	0.7

[1]Stream distance in feet above confluence with Beaverdam Creek
[2]Stream distance in feet above confluence with Tonytank Creek
[3]Stream distance in feet above confluence with Leonard Pond Run
[4]Elevation computed without consideration of backwater effects from Leonard Pond Run

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD AND INCORPORATED AREAS

FLOODWAY DATA

WALSTON BRANCH - WHITE MARSH CREEK - WOOD CREEK

5.0 INSURANCE APPLICATION

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

Zone A:

Zone A is the flood insurance risk 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 risk 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 VE:

Zone VE is the flood insurance risk zone that corresponds to the 1-percent-annual-chance coastal floodplains that have additional hazards associated with storm waves. 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 risk 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 base flood 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 risk zones as described in Section 5.0 and, in the 1-percent annual chance floodplains that were studied by detailed methods, shows selected whole-foot BFEs or average depths. Insurance agents use the zones and BFEs in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

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

The current FIRM presents flooding information for the entire geographic area of Wicomico County. Previously, separate FIRMs were prepared for each identified floodprone incorporated community and for the unincorporated areas of the county. Historical data relating to the maps prepared for each community are presented in Table 8.

7.0 OTHER STUDIES

A Flood Insurance Study is being conducted for Dorchester County, Maryland, which borders the Wicomico County, Maryland on the northwest, and for Somerset County, Maryland, which borders Wicomico County on the south.

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

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Flood Insurance and Mitigation Division, Federal Emergency Management Agency, One Independence Mall, 6th floor, 615 Chestnut Street, Philadelphia, PA 19106.

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Wicomico County, MD (Unincorporated Areas)	August 19, 1977	September 16, 1977	September 28, 1984	None
Delmar, Town of	NA	NA	NA	NA
Fruitland, Town of	January 28, 1977	None	January 28, 1977	November 15, 1985
*Hebron, Town of	NA	NA	NA	NA
Mardela Springs, Town of	December 13, 1974	None	December 13, 1974	September 27, 1985
*Pittsville, Town of	NA	NA	NA	NA
Salisbury, City of	October 18, 1974	May 21, 1976	October 18, 1974	May 21, 1976 September 28, 1984
Sharptown, Town of	August 9, 1974	December 26, 1975	August 9, 1974	December 26, 1975 September 27, 1985
Willards, Town of	NA	NA	NA	NA

* Non-floodprone

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD
AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

9.0 BIBLIOGRAPHY AND REFERENCES

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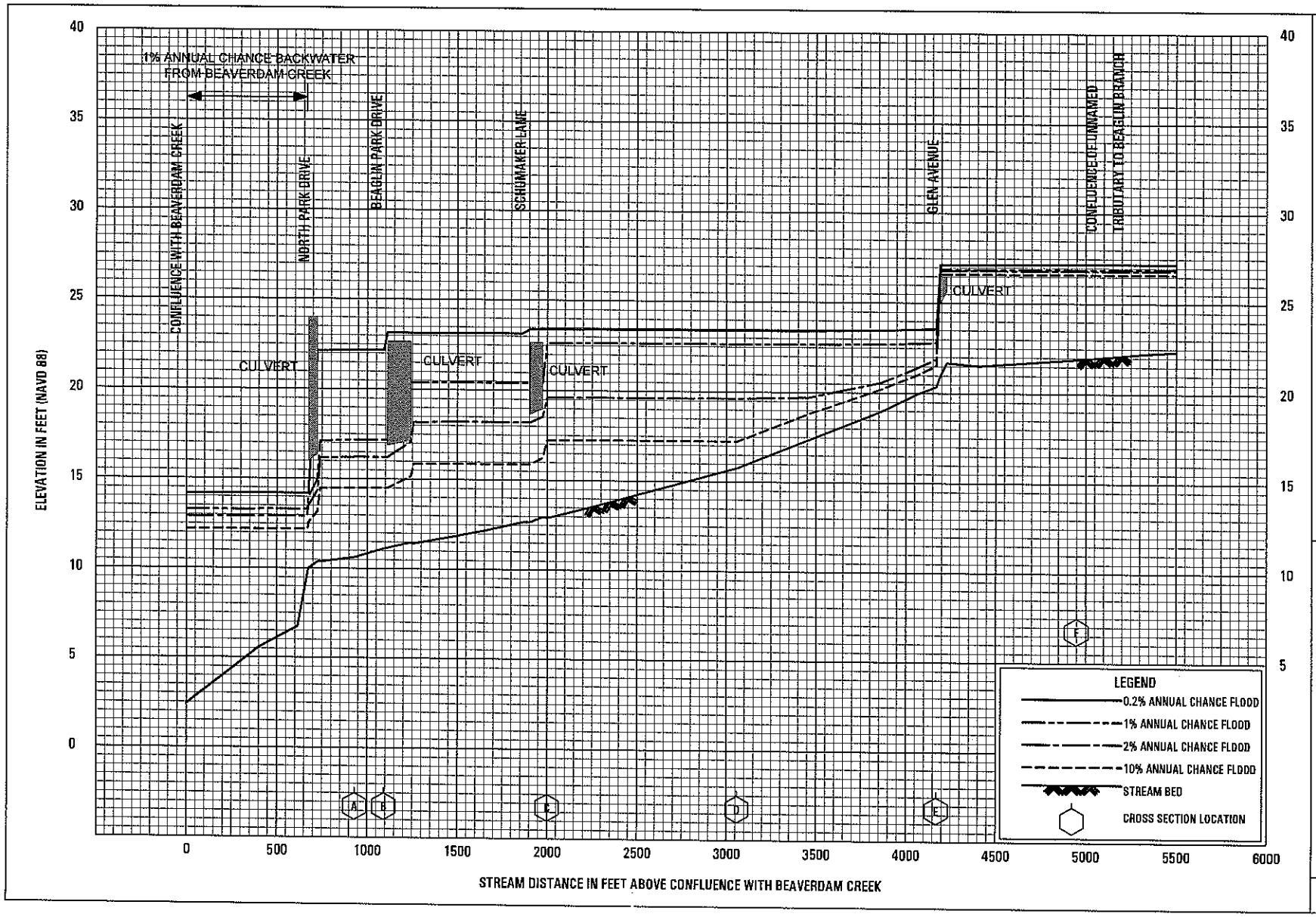

FLOOD PROFILES

BEAGLIN BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS

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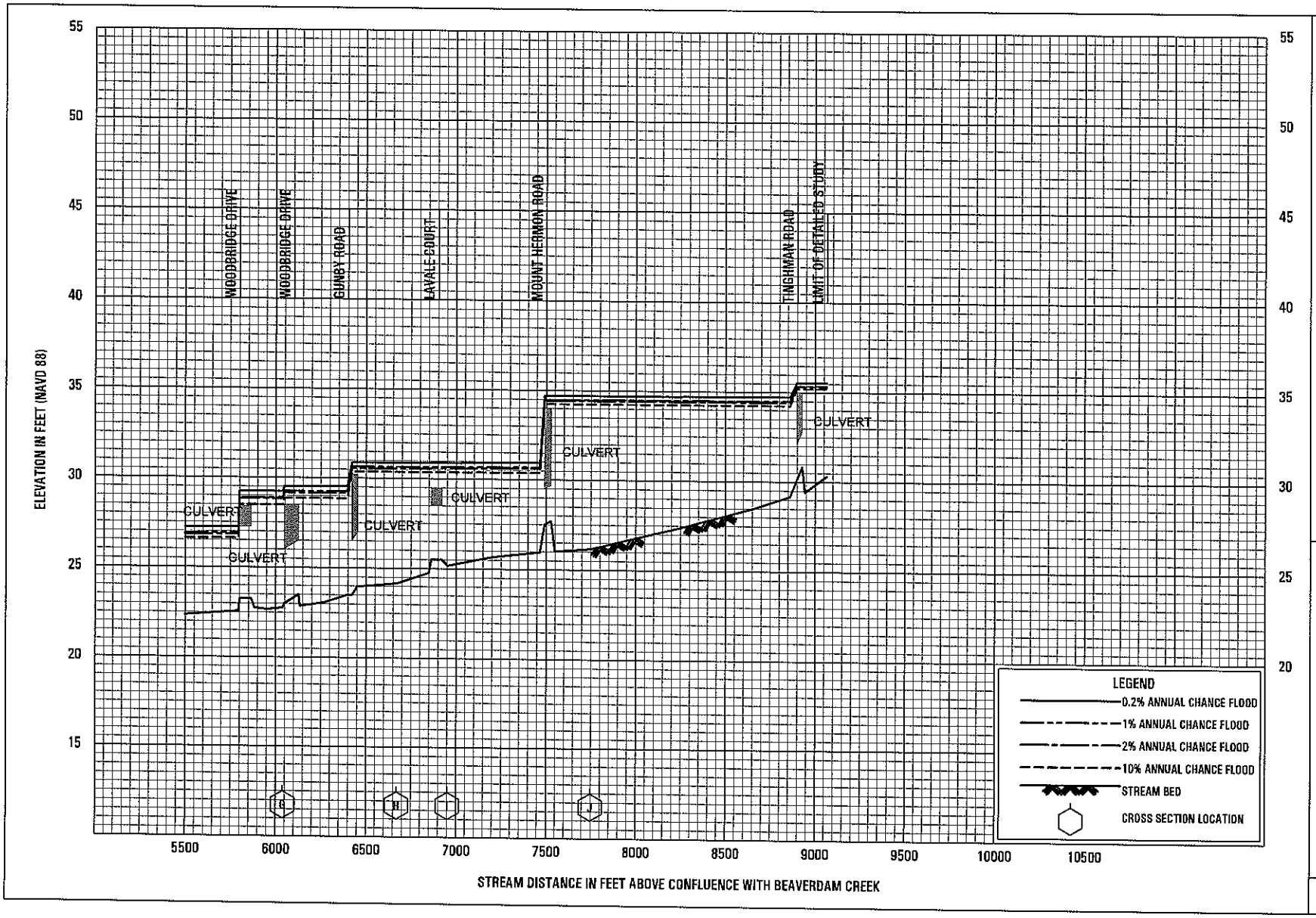

FLOOD PROFILES

BEAGLIN BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS

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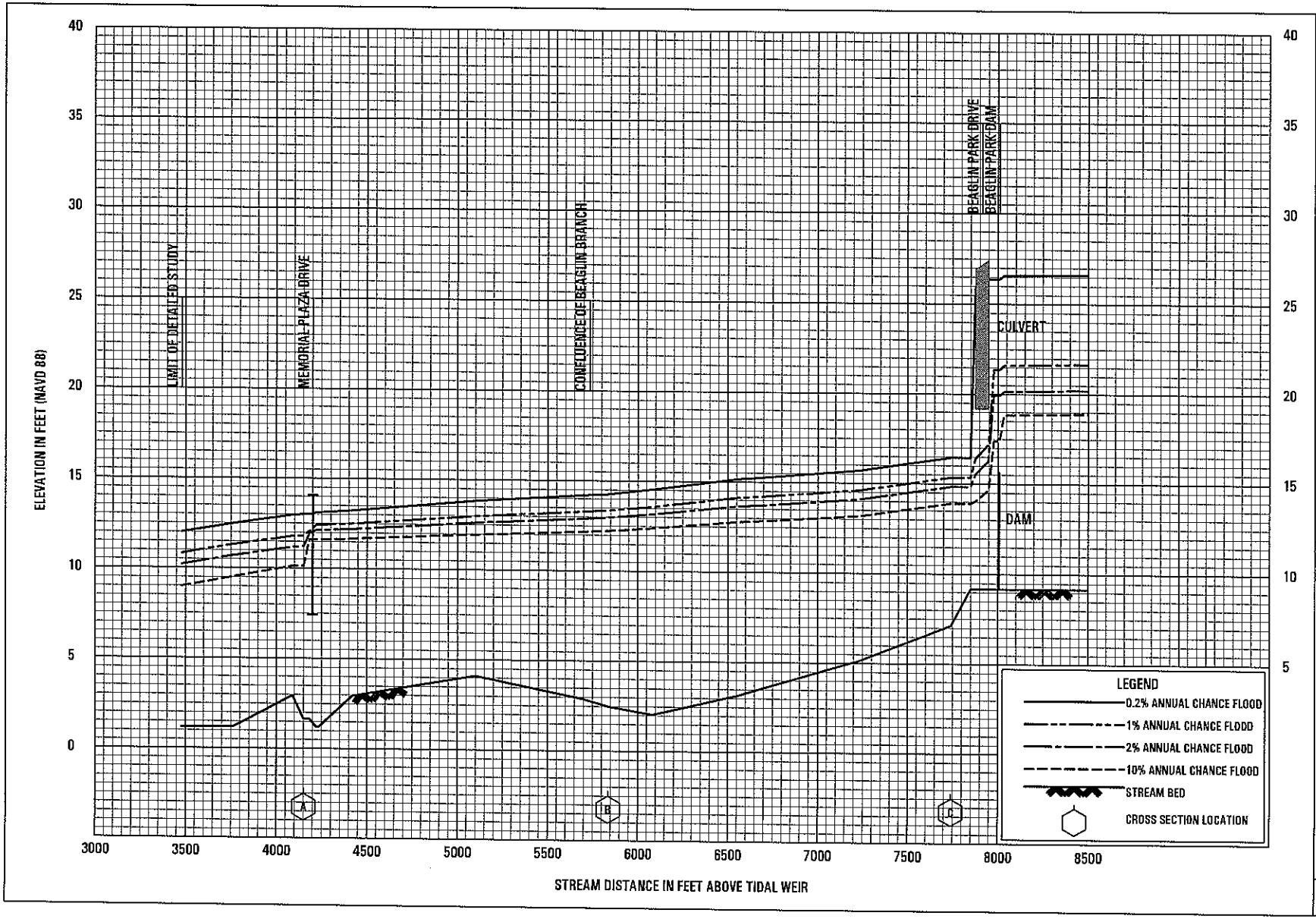

FLOOD PROFILES

BEAVERDAM CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND UNINCORPORATED AREAS

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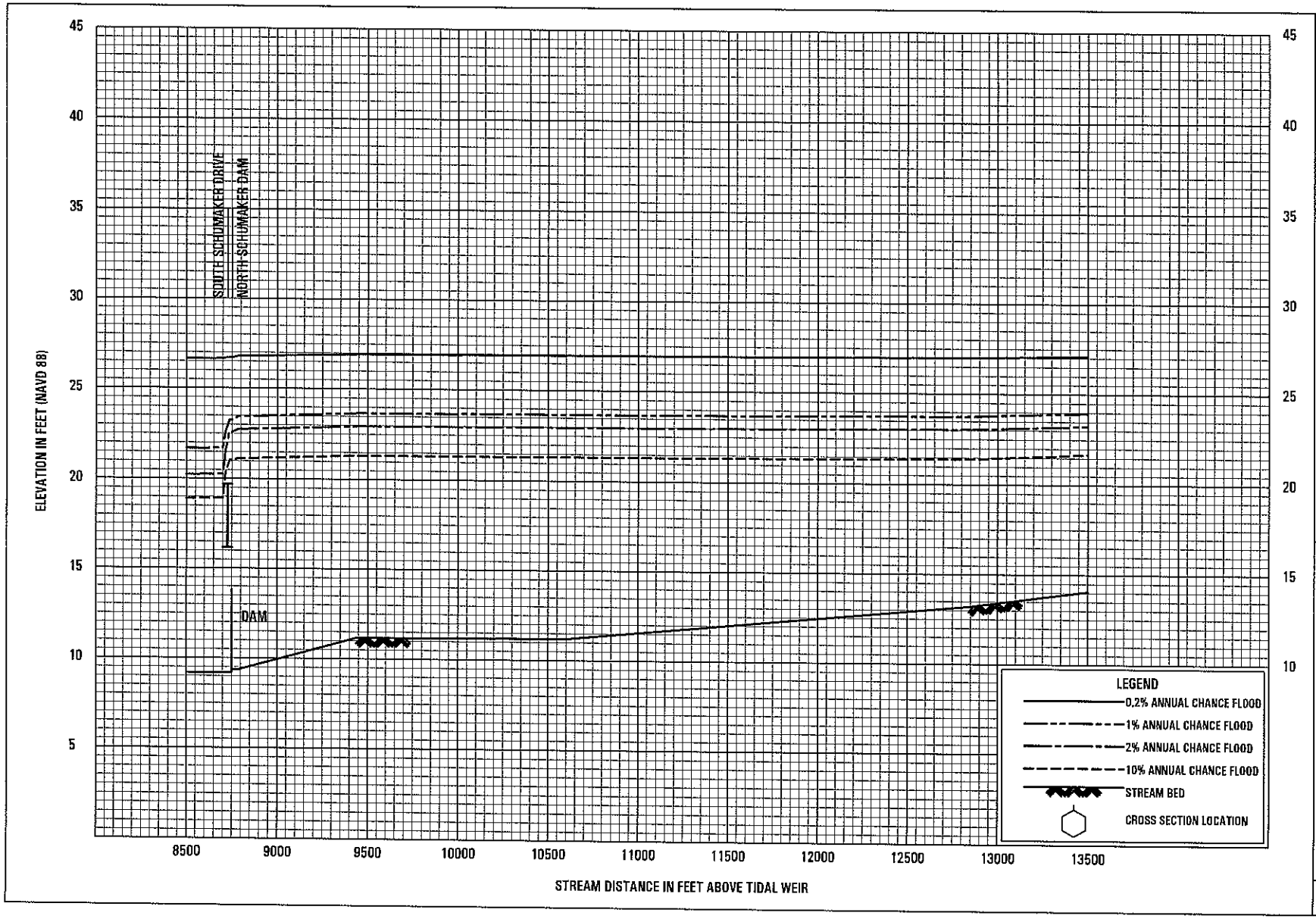

FLOOD PROFILES

BEAVERDAM CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND UNINCORPORATED AREAS

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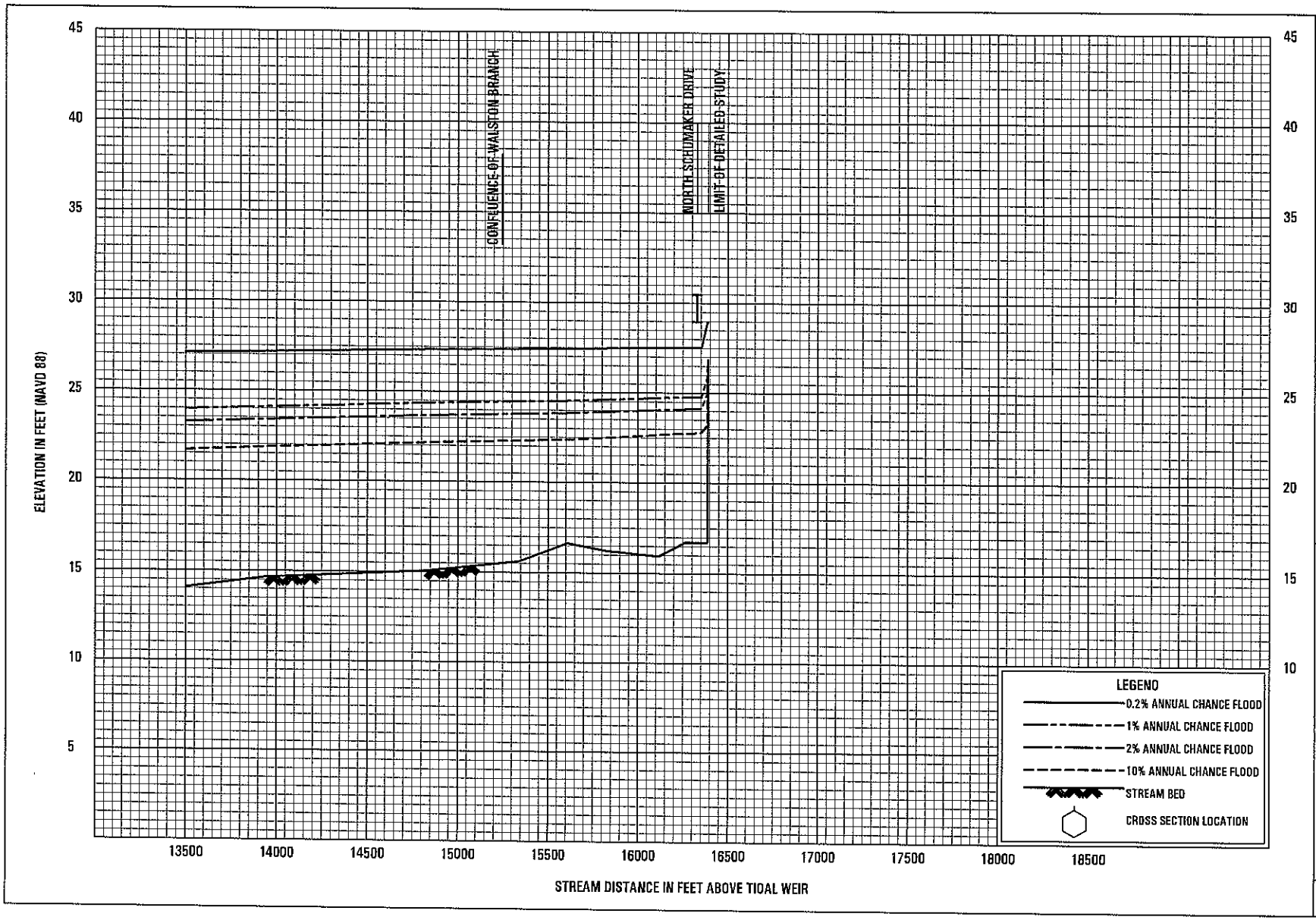

FLOOD PROFILES

BEAVERDAM CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND UNINCORPORATED AREAS

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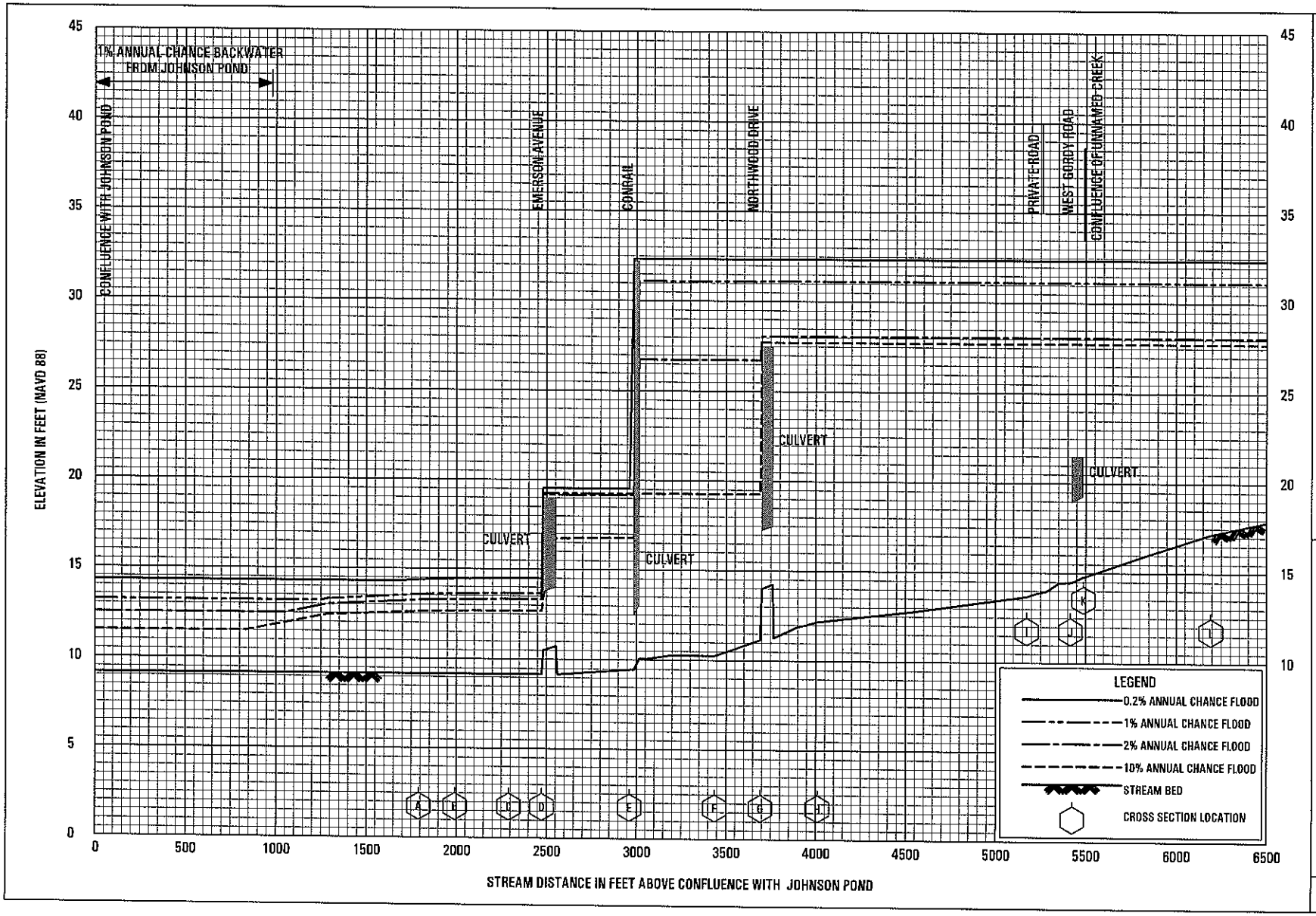

FLOOD PROFILES

BREWINGTON BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS

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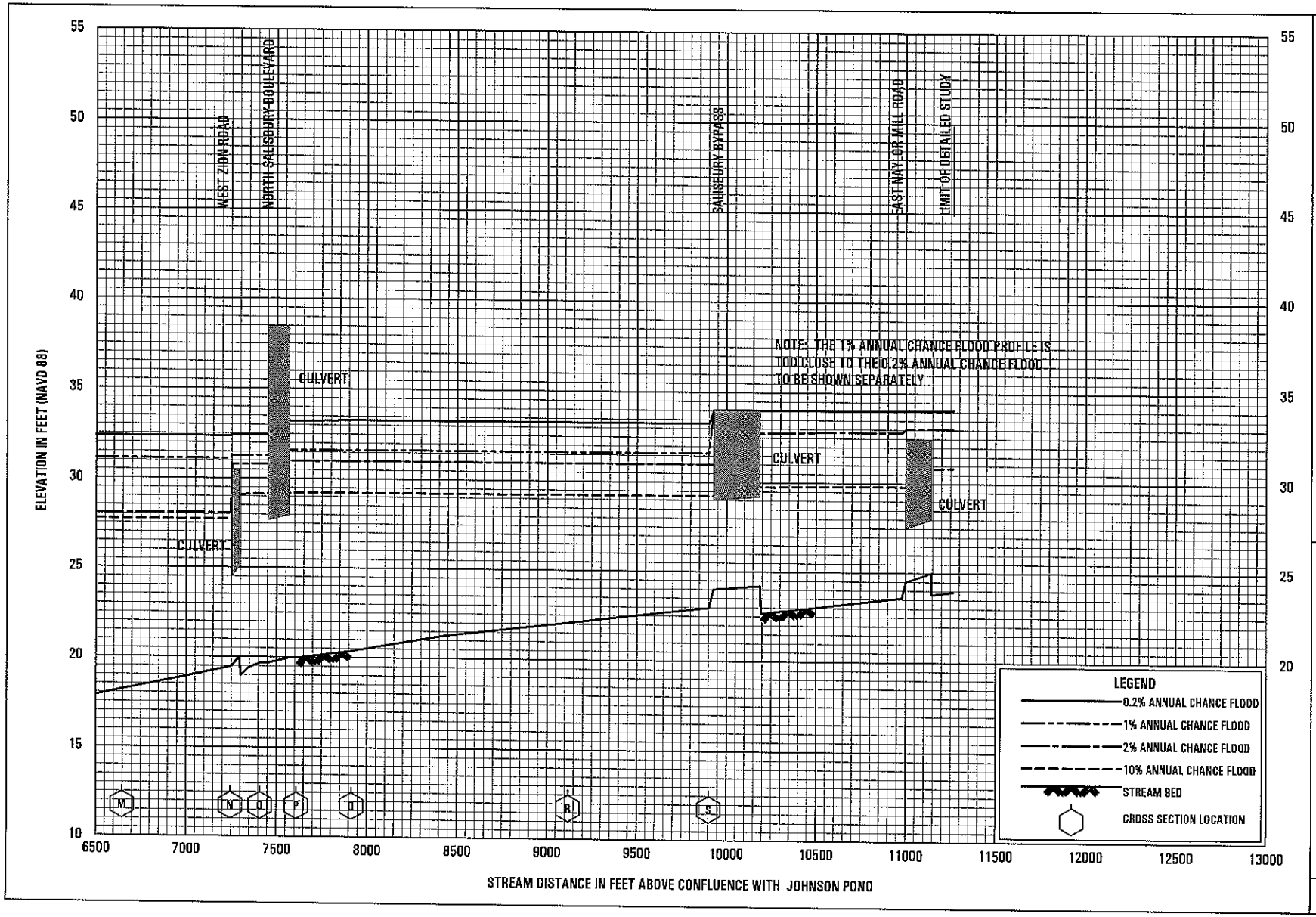

FLOOD PROFILES

BREWINGTON BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS

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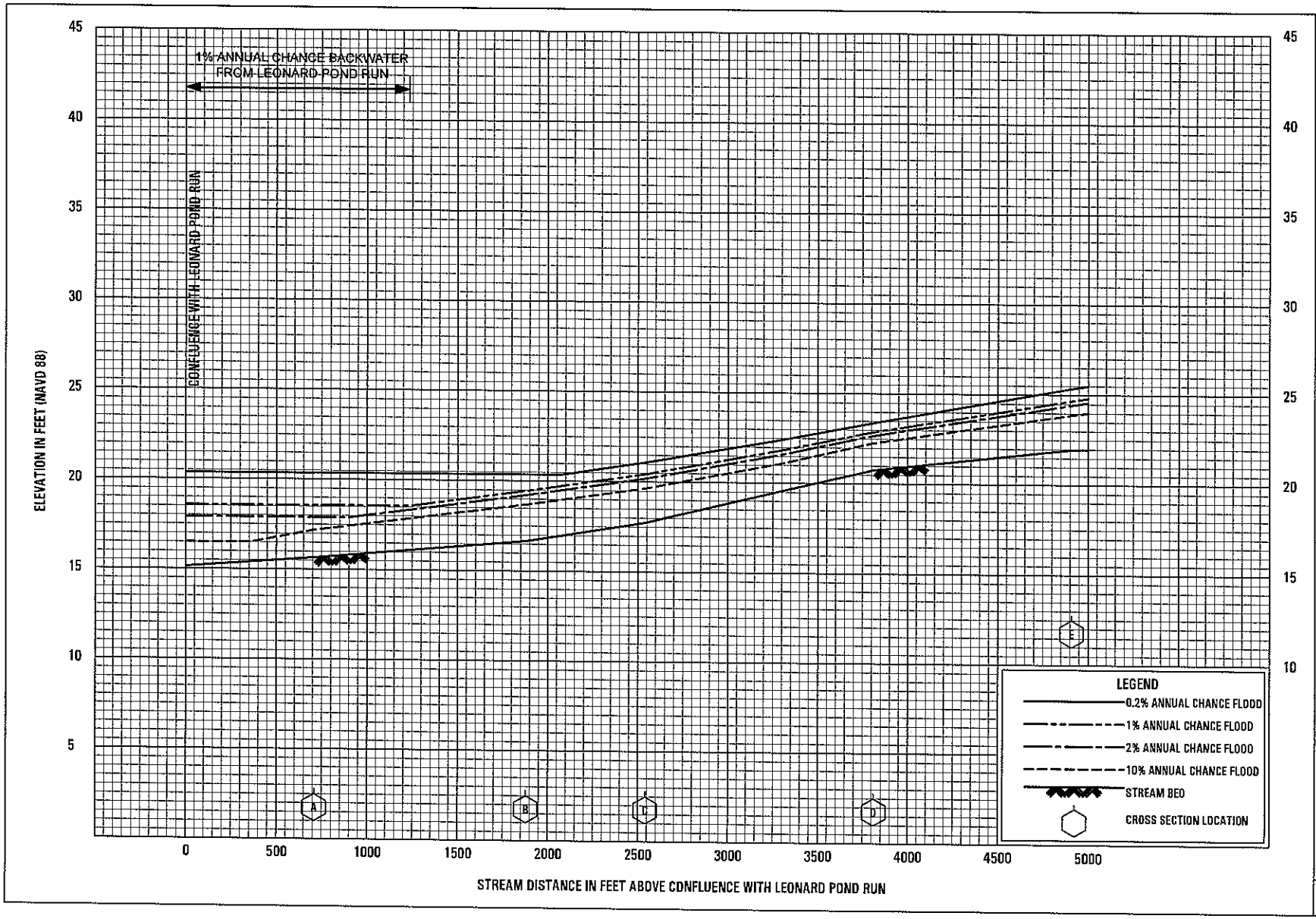

FLOOD PROFILES

CONNELLY MILL BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND UNINCORPORATED AREAS

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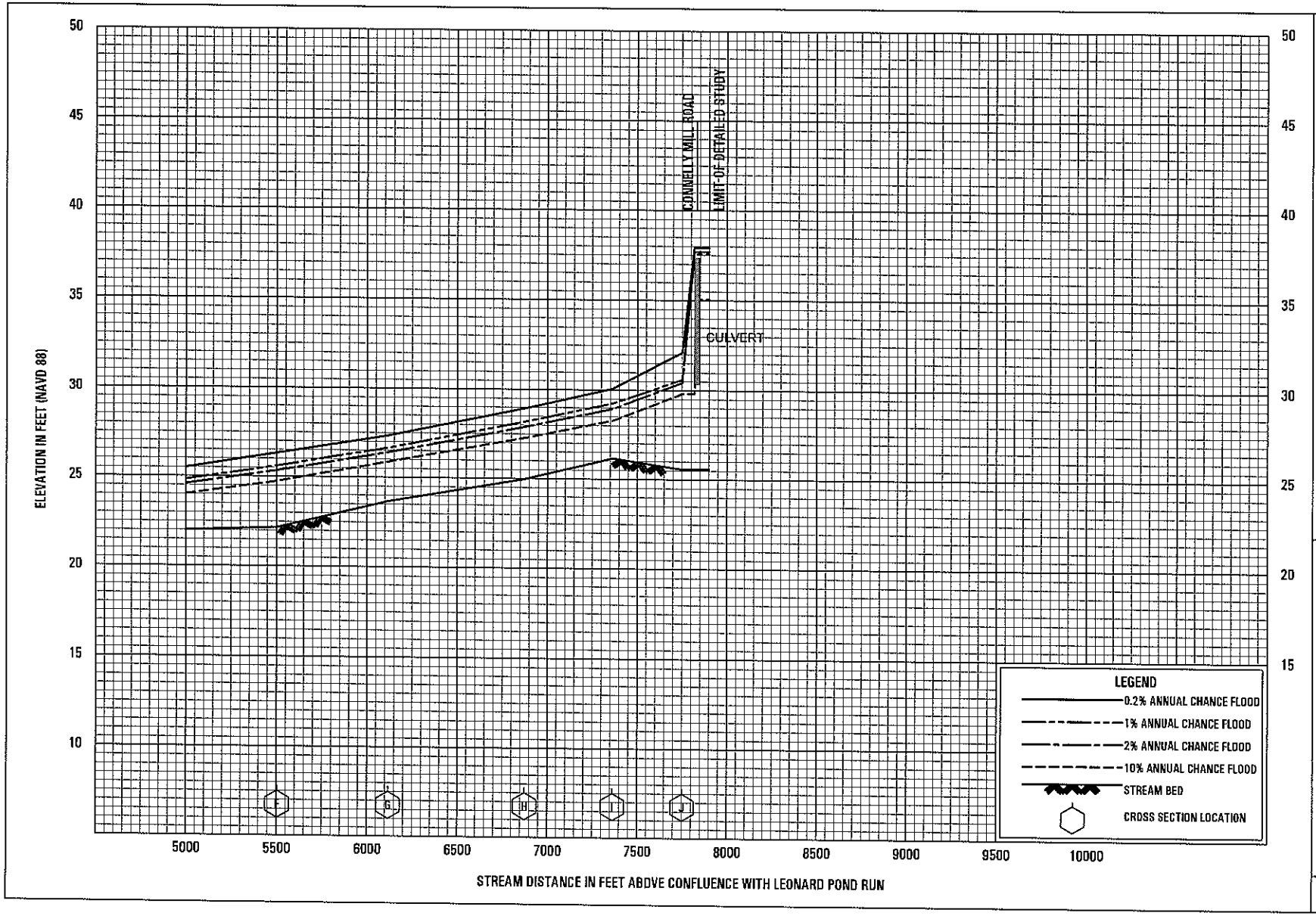

FLOOD PROFILES

CONNELLY MILL BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS

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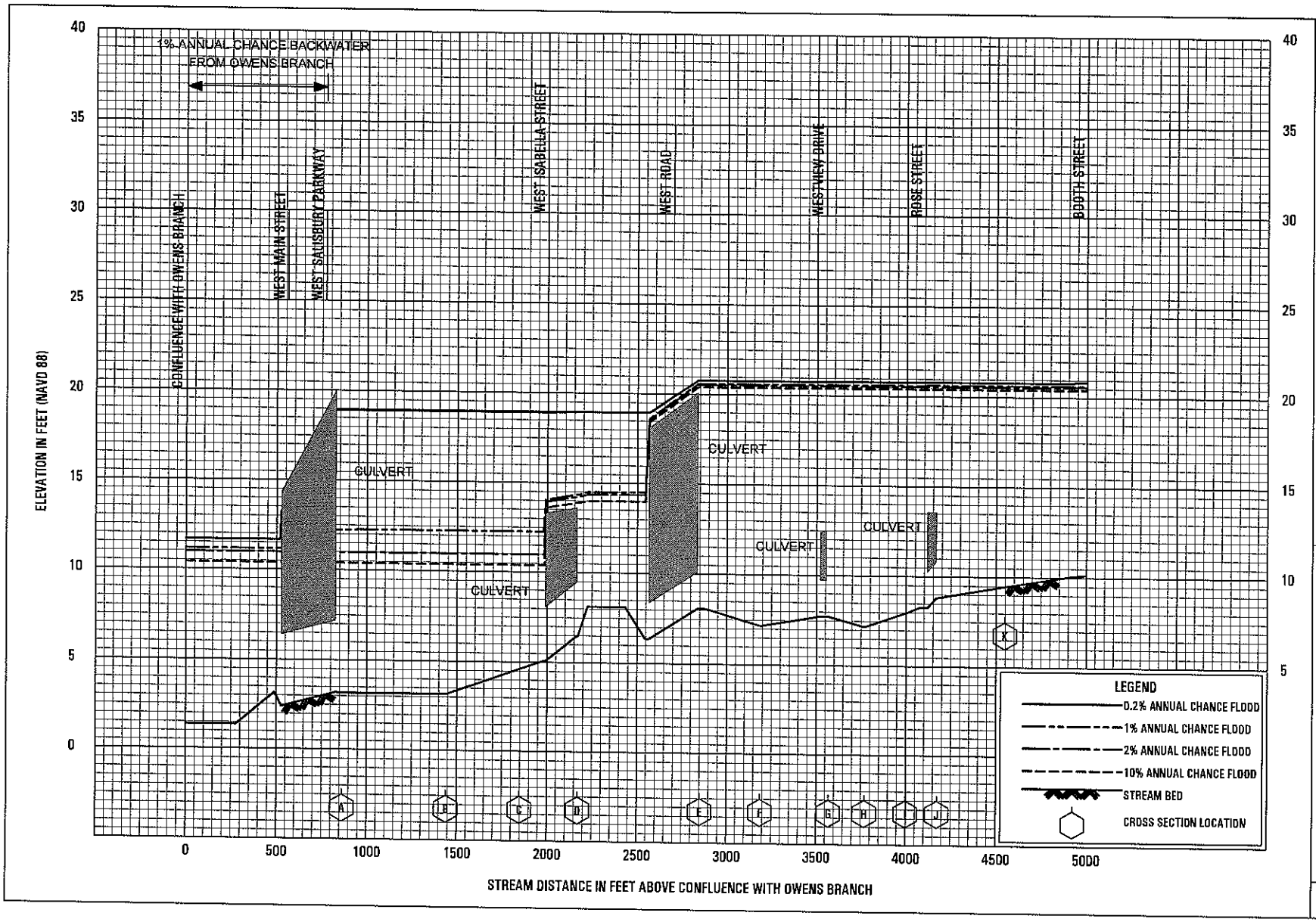

FLOOD PROFILES

COTY COX BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS

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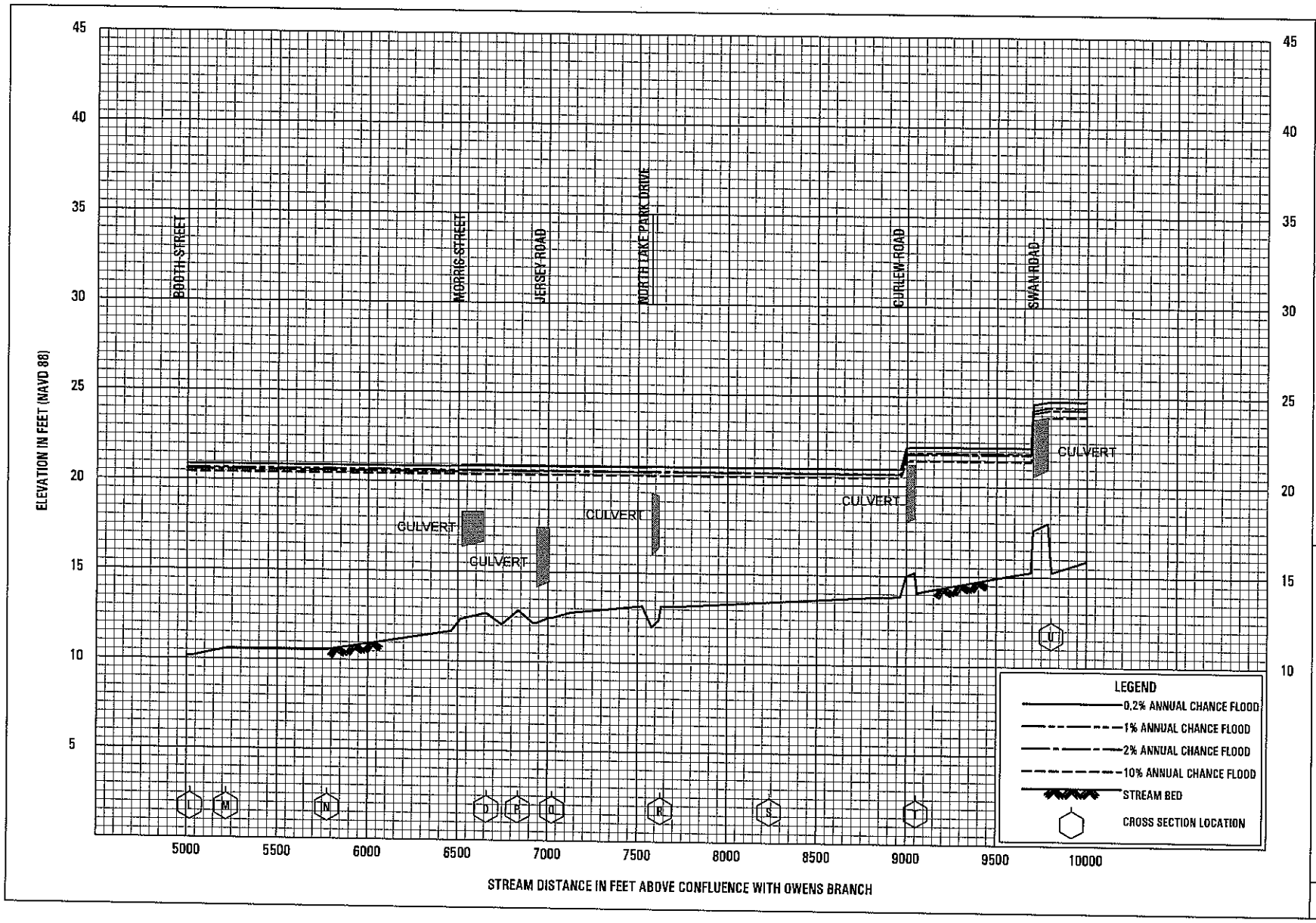


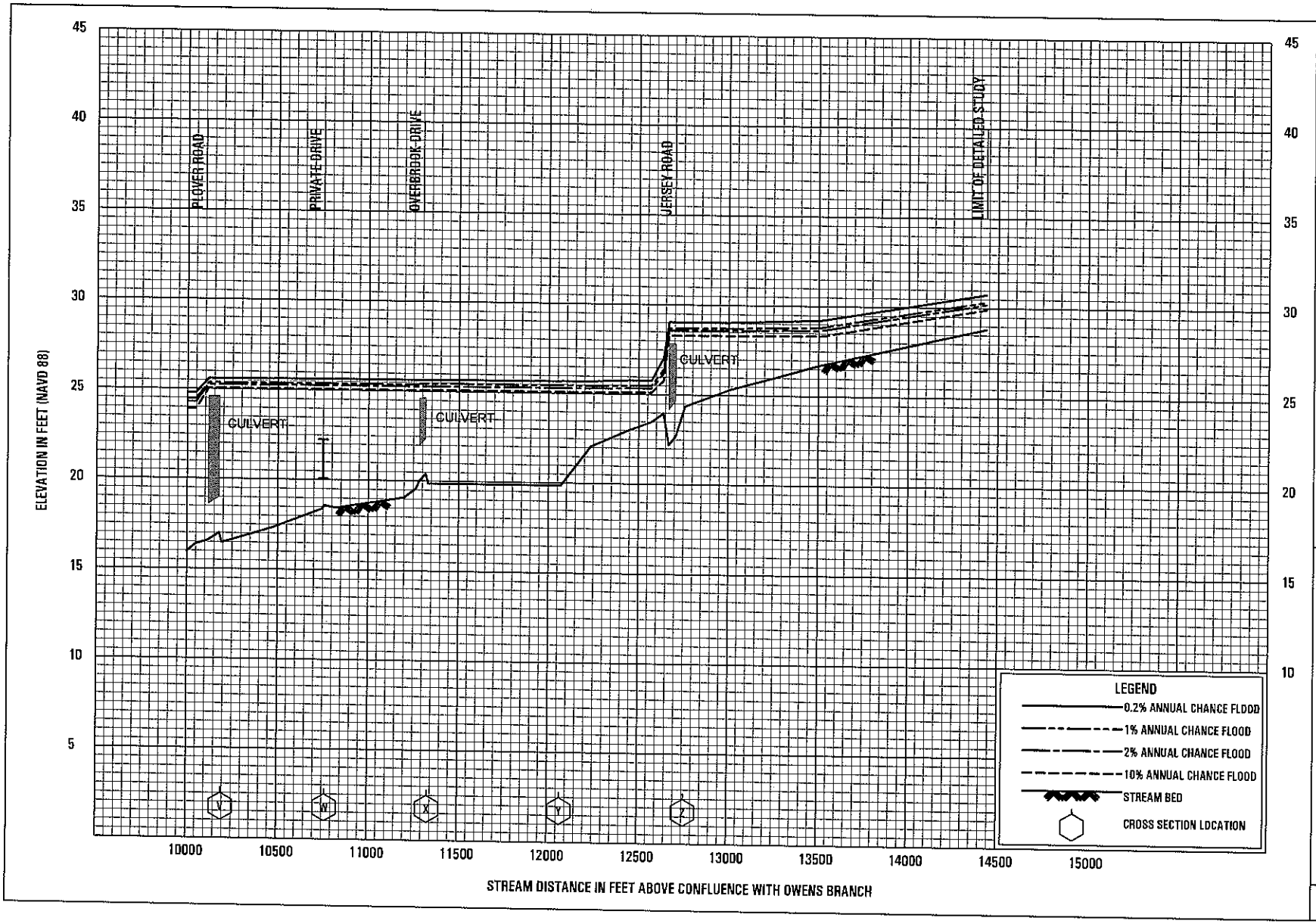
FLOOD PROFILES

COTY COX BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS



FLOOD PROFILES

COTY COX BRANCH

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WICOMICO COUNTY, MD

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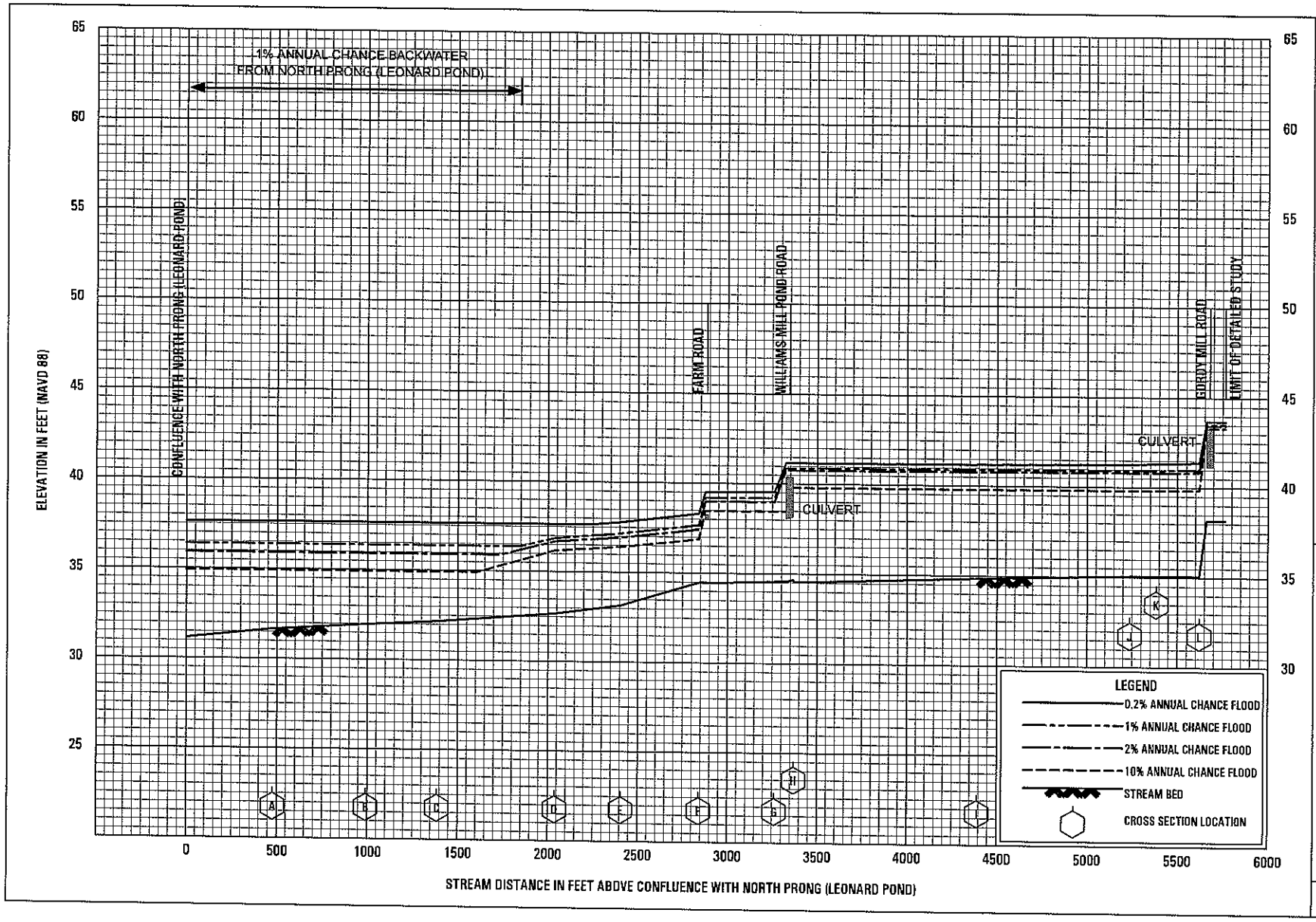


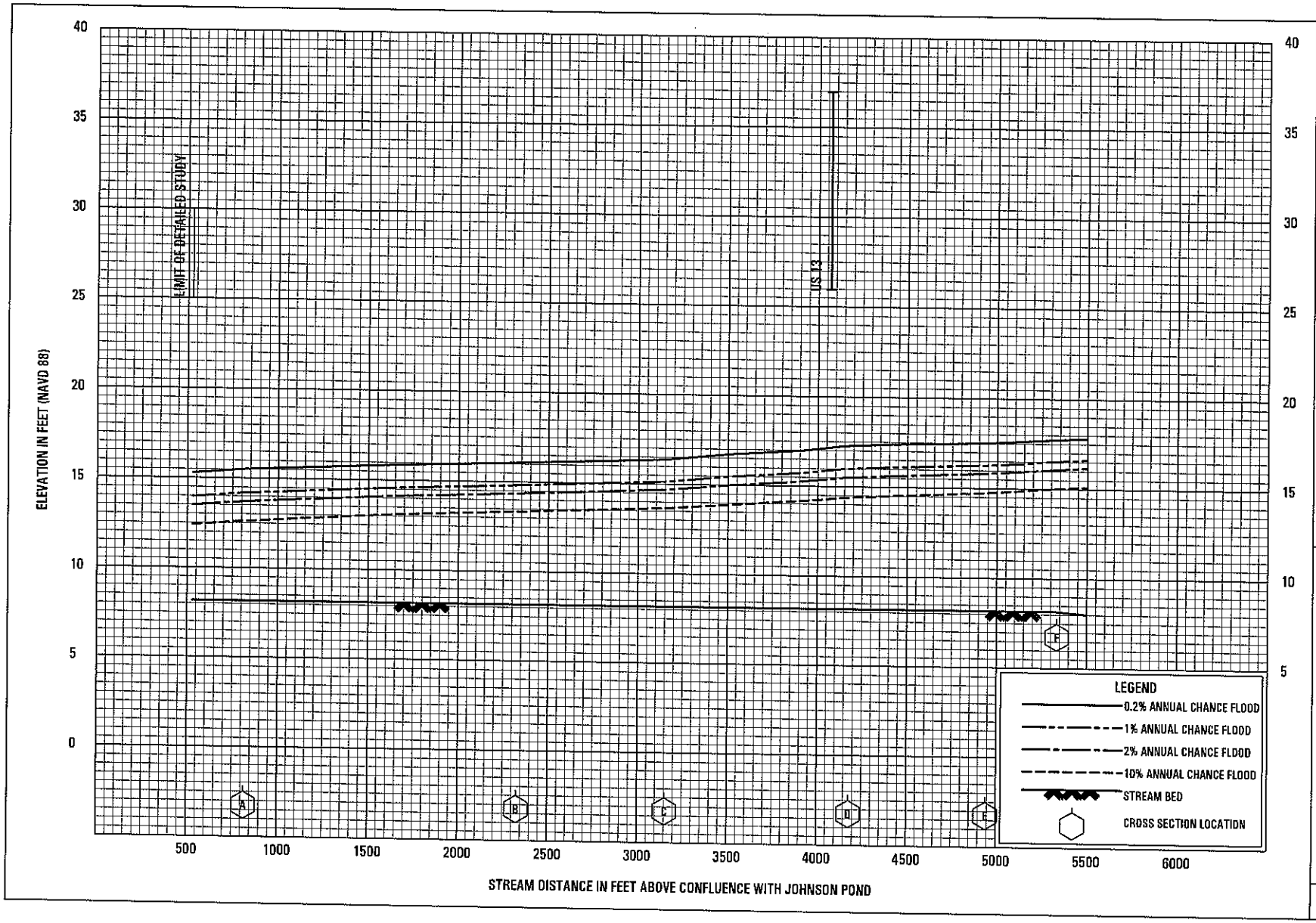
FLOOD PROFILES

JACKSON BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS



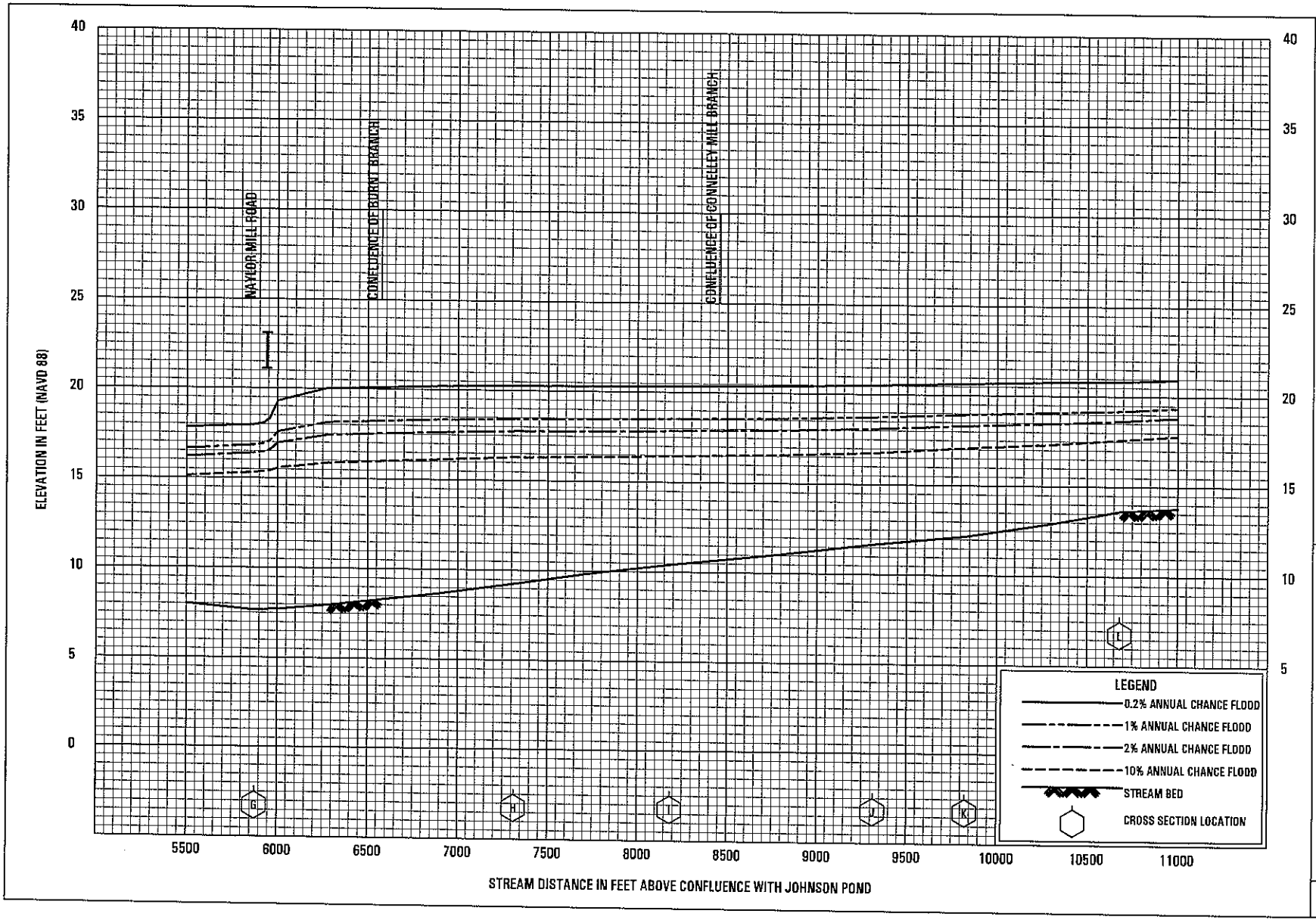
FLOOD PROFILES

LEONARD POND RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS



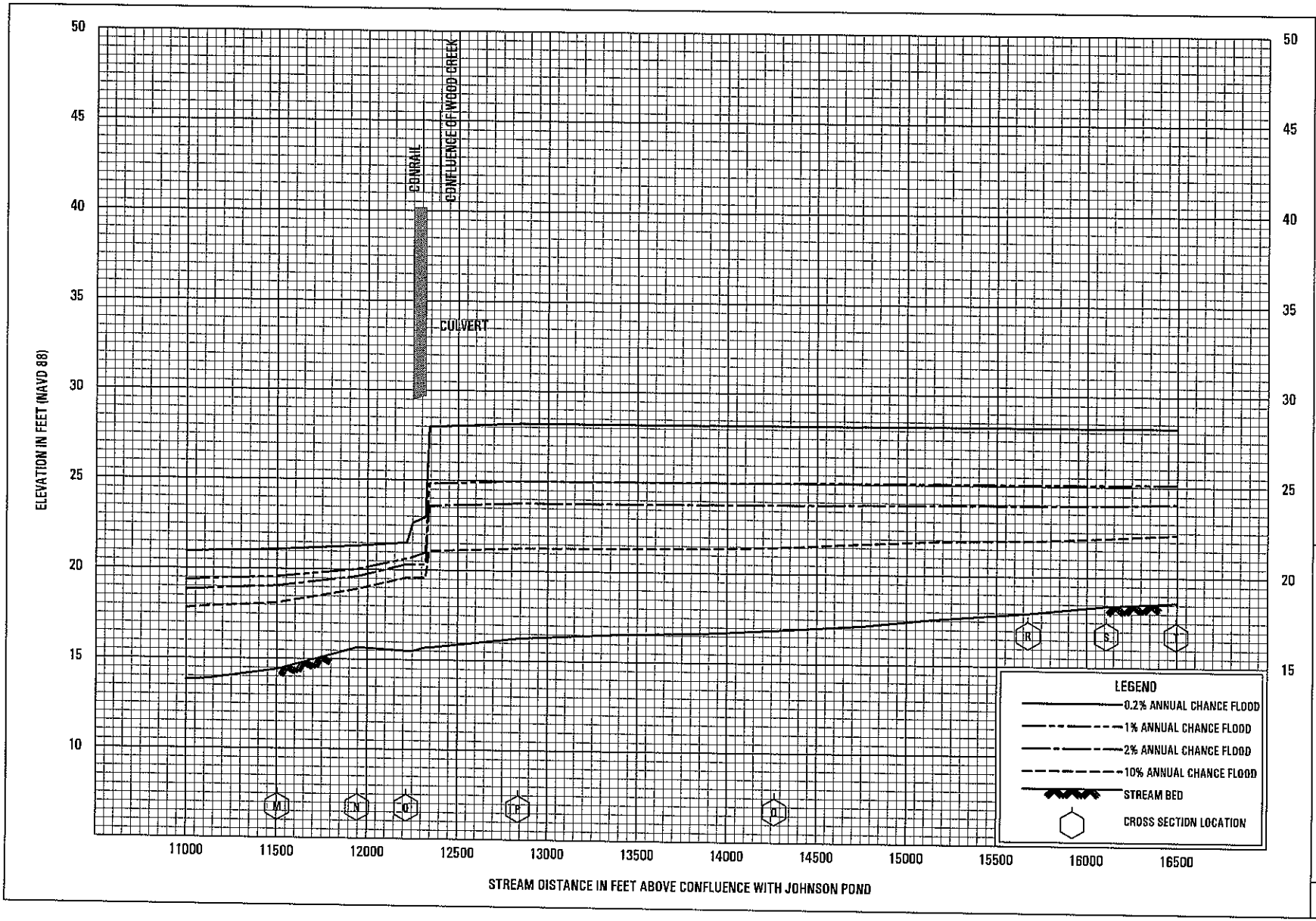
FLOOD PROFILES

LEDNARD POND RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS



FLOOD PROFILES

LEDNARD POND RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS

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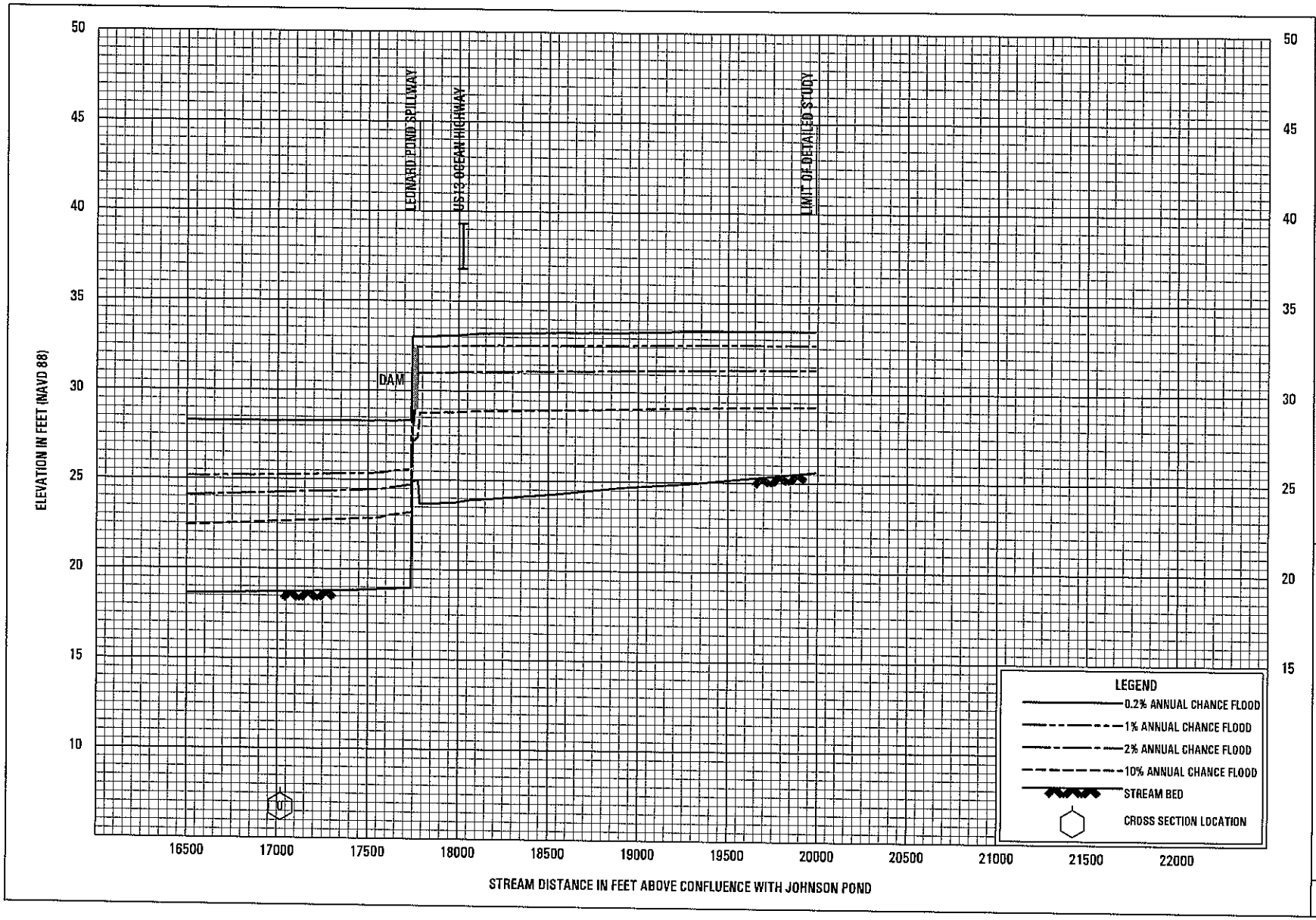


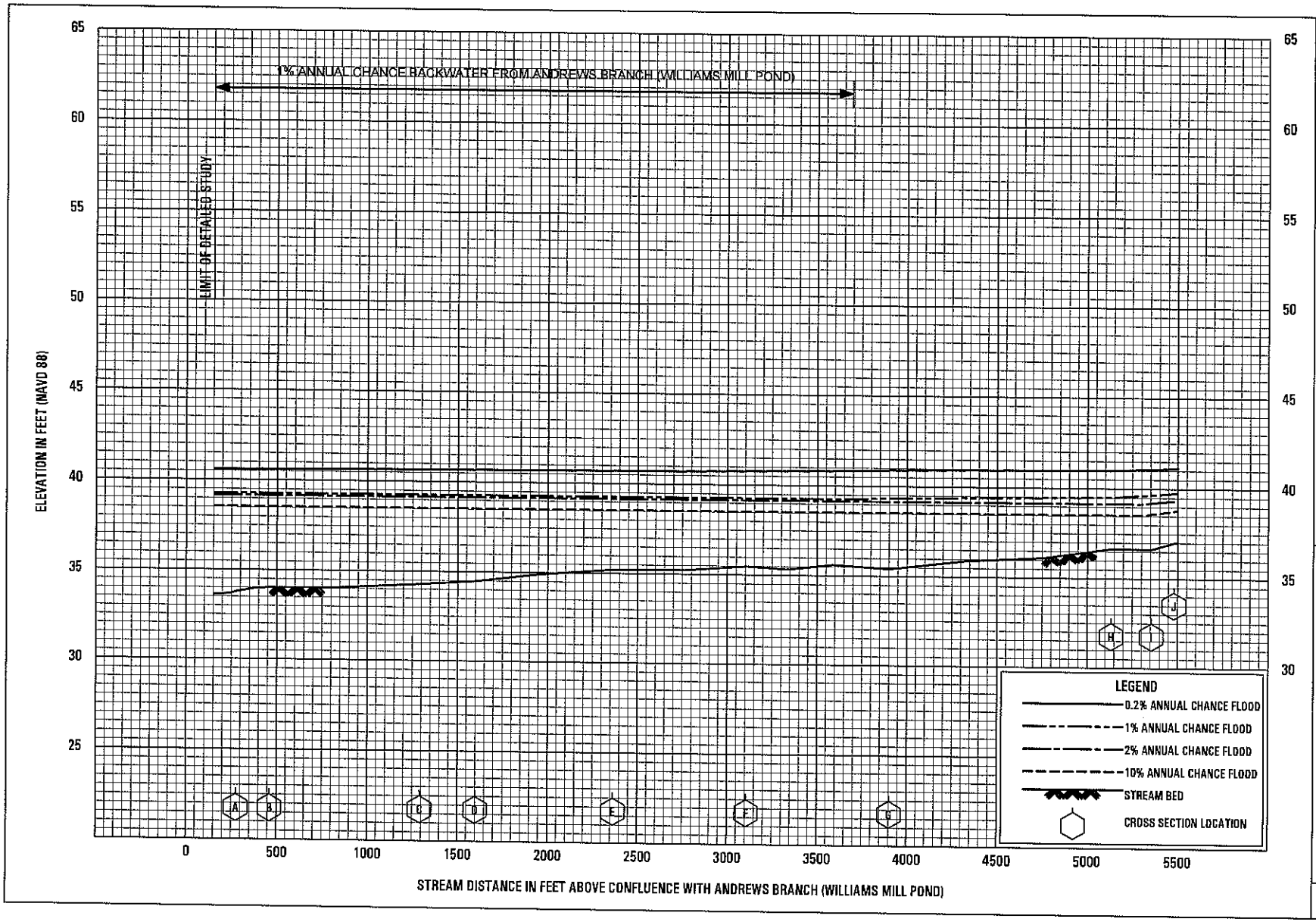
FLOOD PROFILES

LEONARD POND RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS



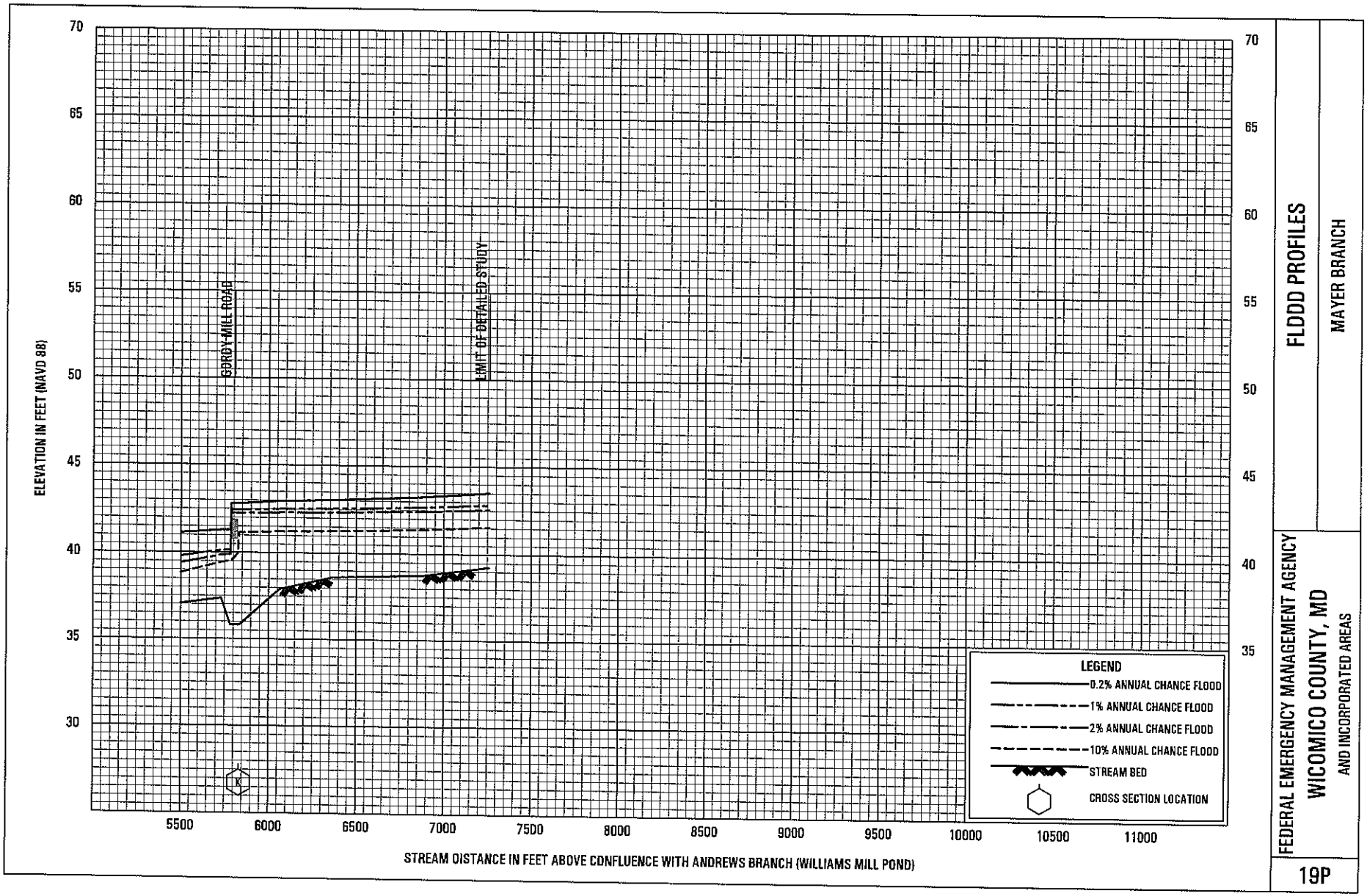
FLOOD PROFILES

MAYER BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS



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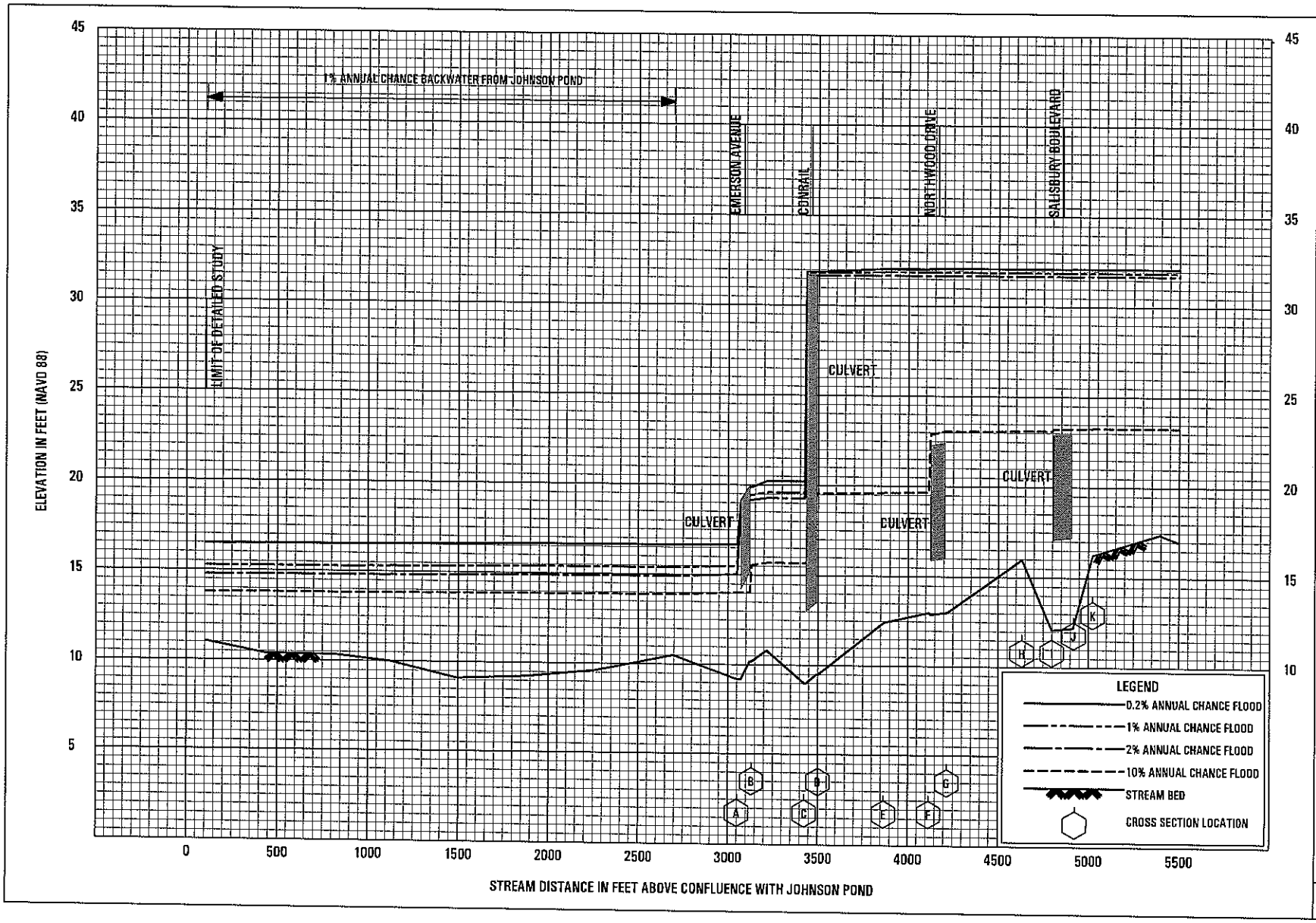
MAYER BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS



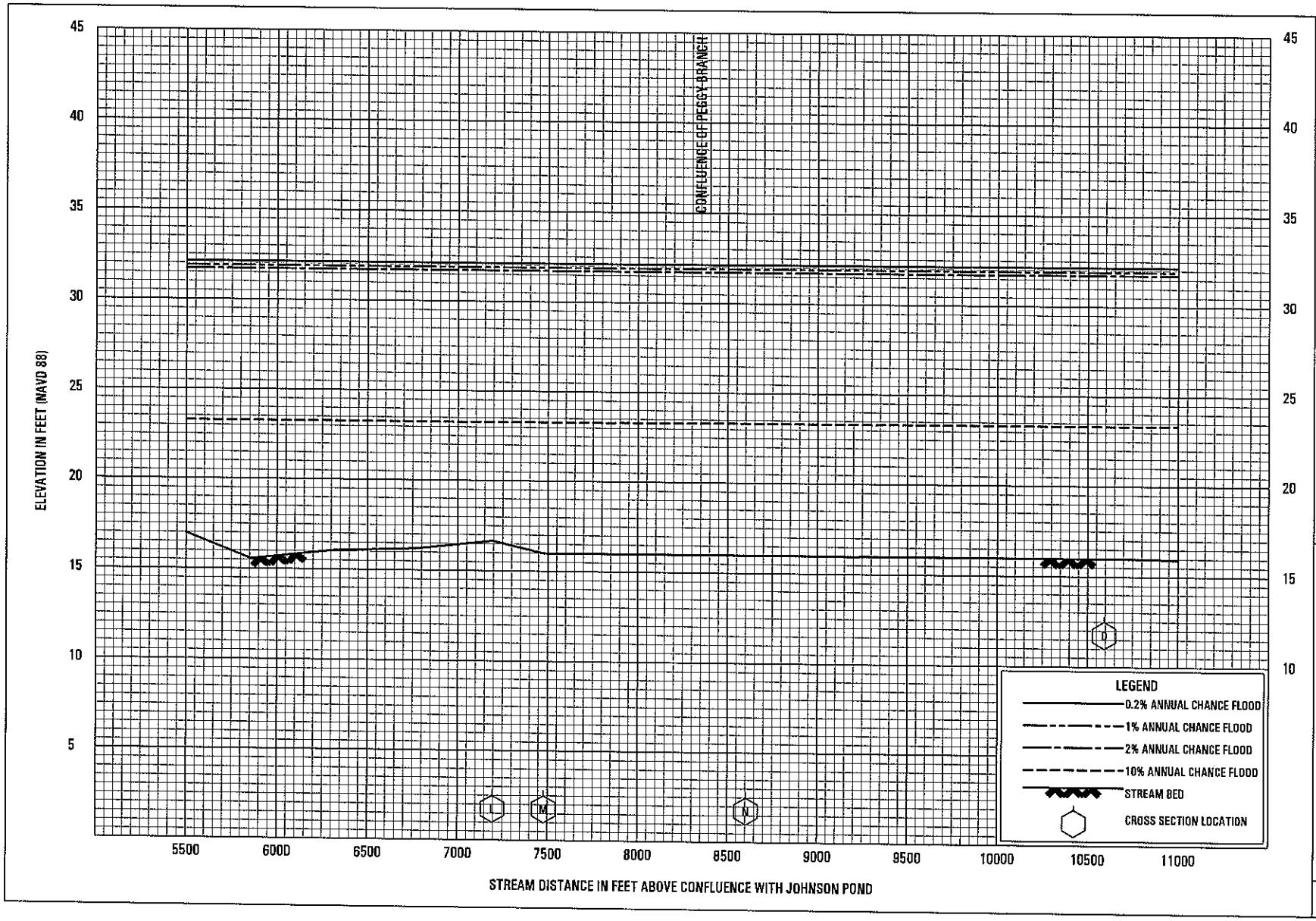
FLOOD PROFILES

MIDDLE NECK BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS



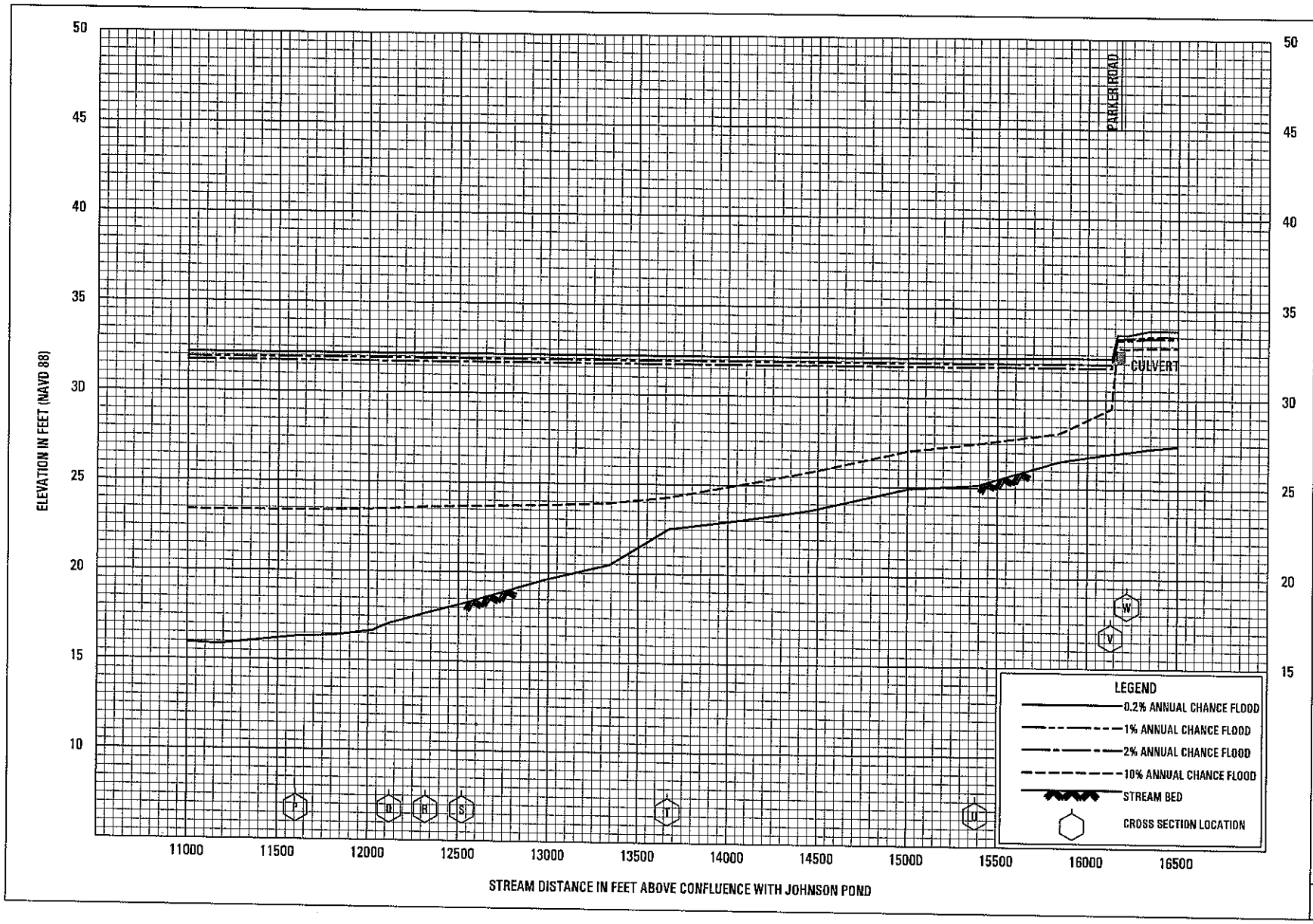
FLOOD PROFILES

MIDDLE NECK BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS



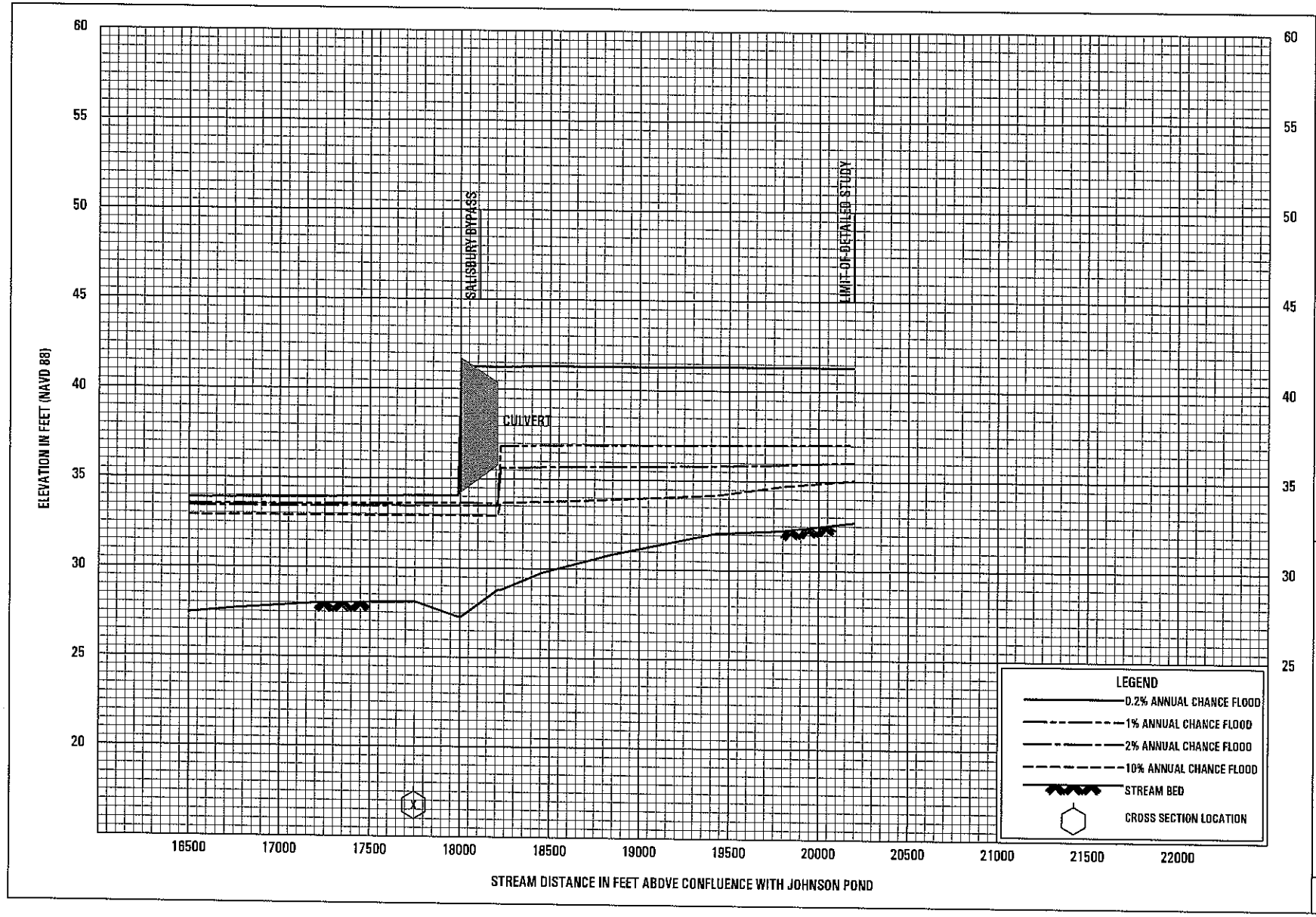
FLOOD PROFILES

MIDDLE NECK BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS



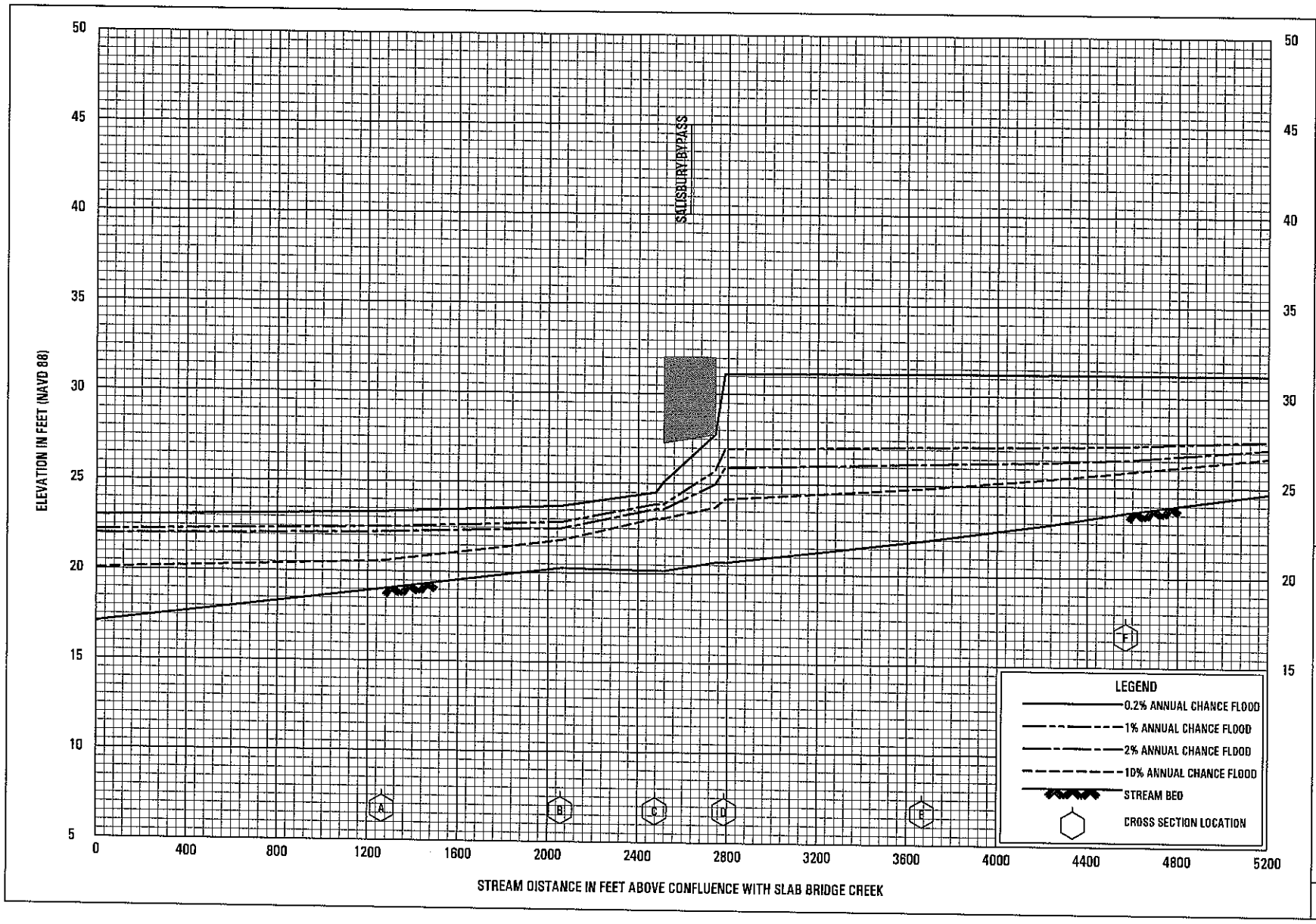
FLOOD PROFILES

MIDDLE NECK BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS



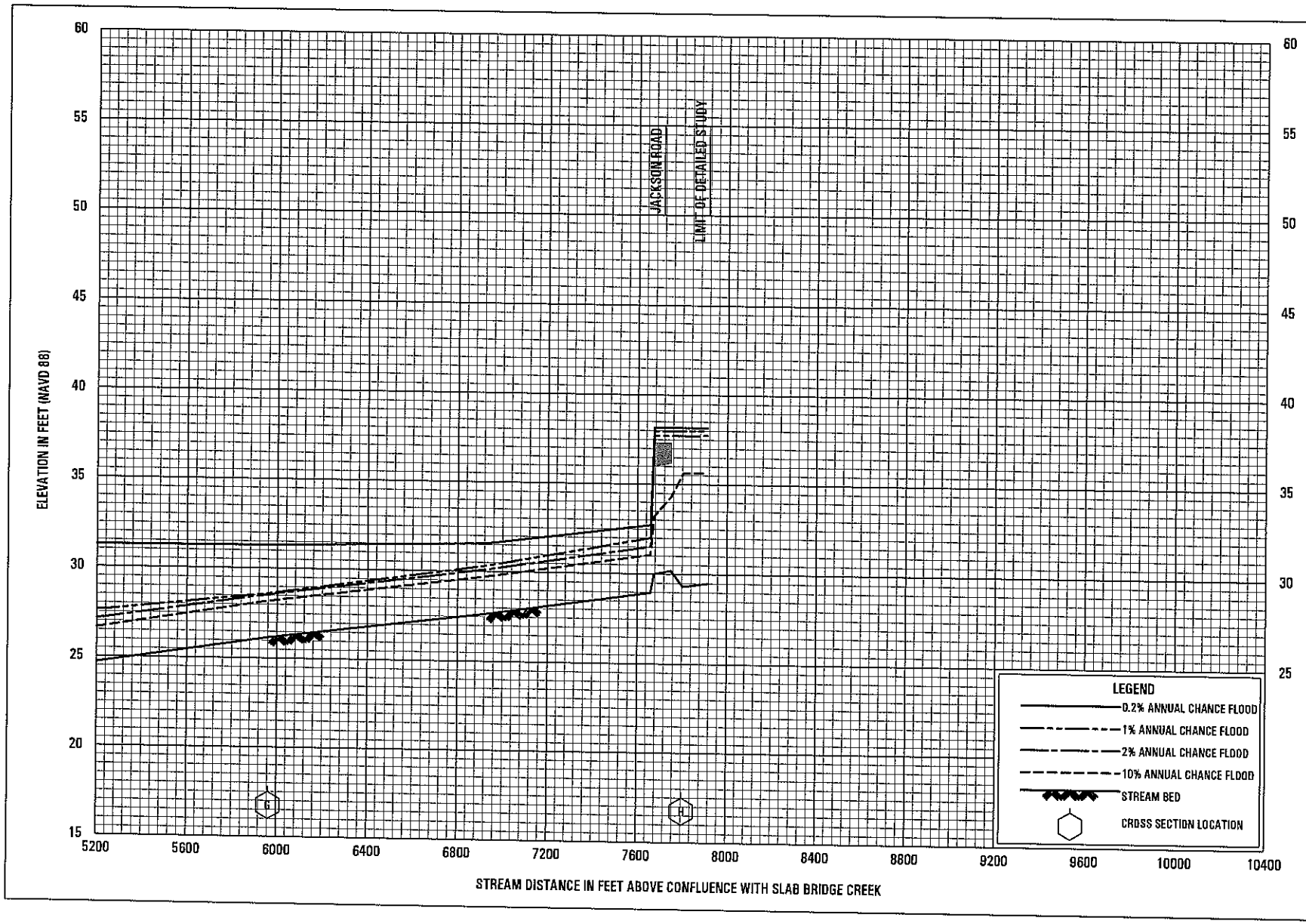
FLOOD PROFILES

MORRIS PRONG

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS



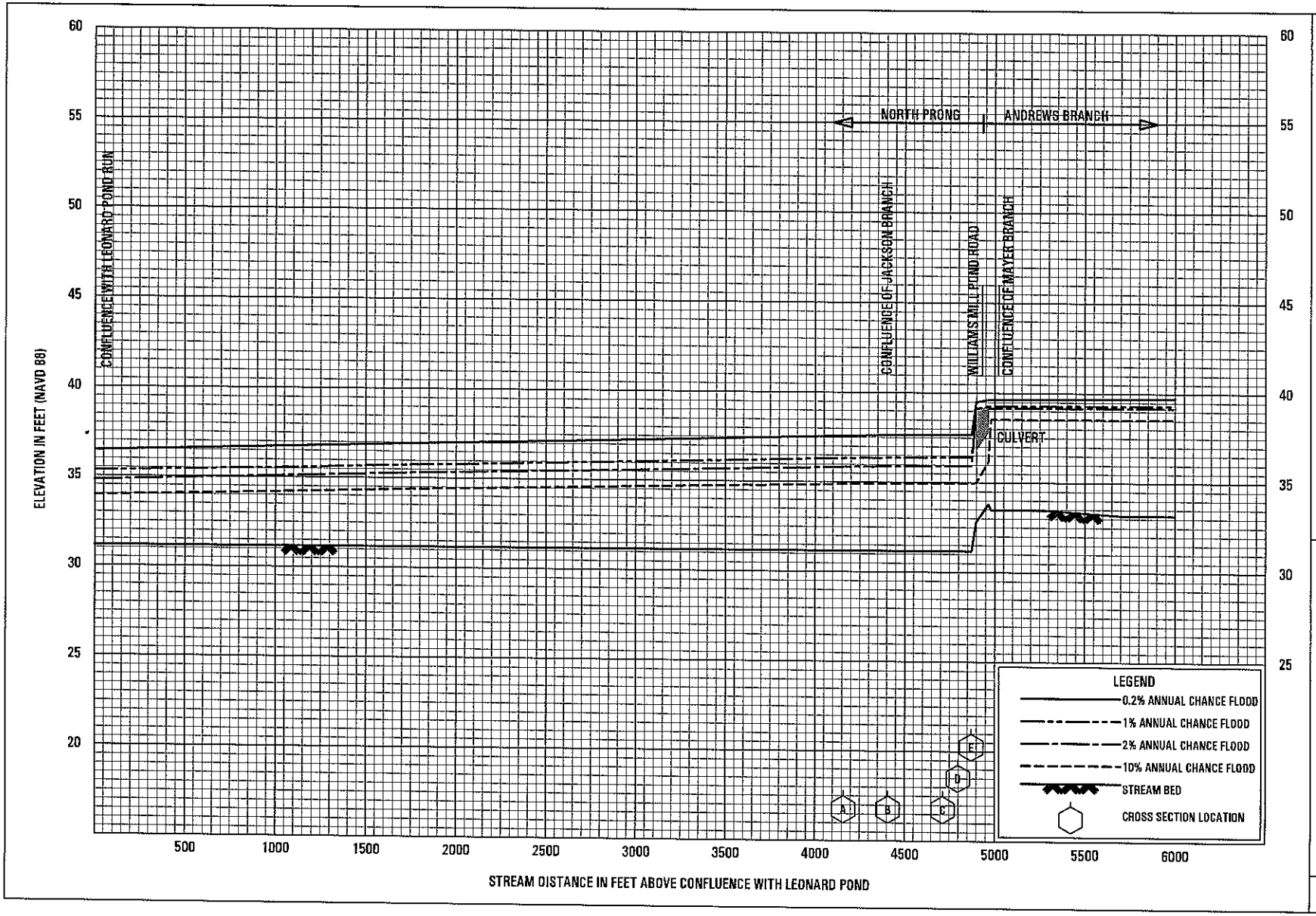
FLOOD PROFILES

MORRIS PRONG

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS



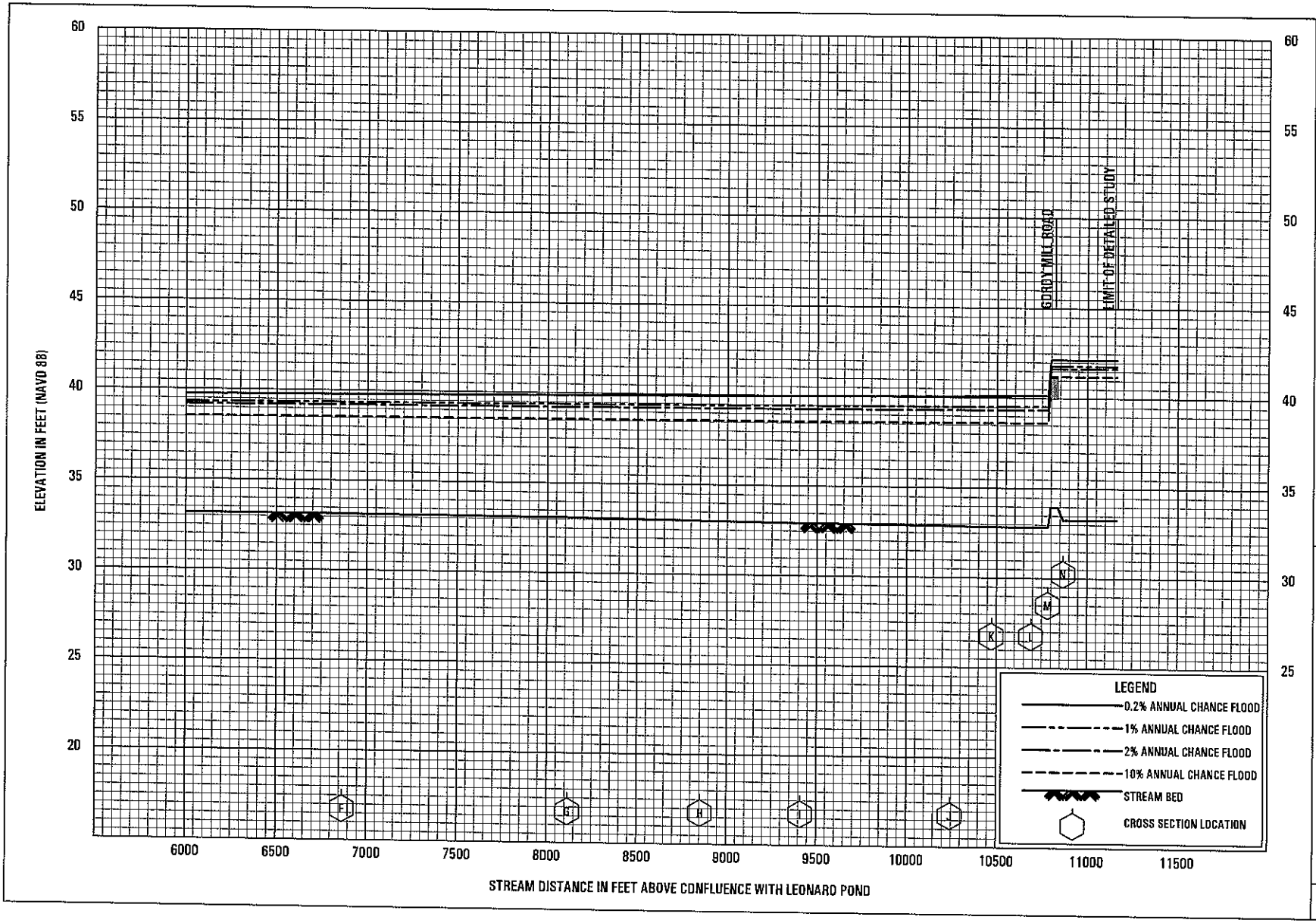
FLOOD PROFILES

NORTH PRONG (LEONARD POND) - ANDREWS BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS



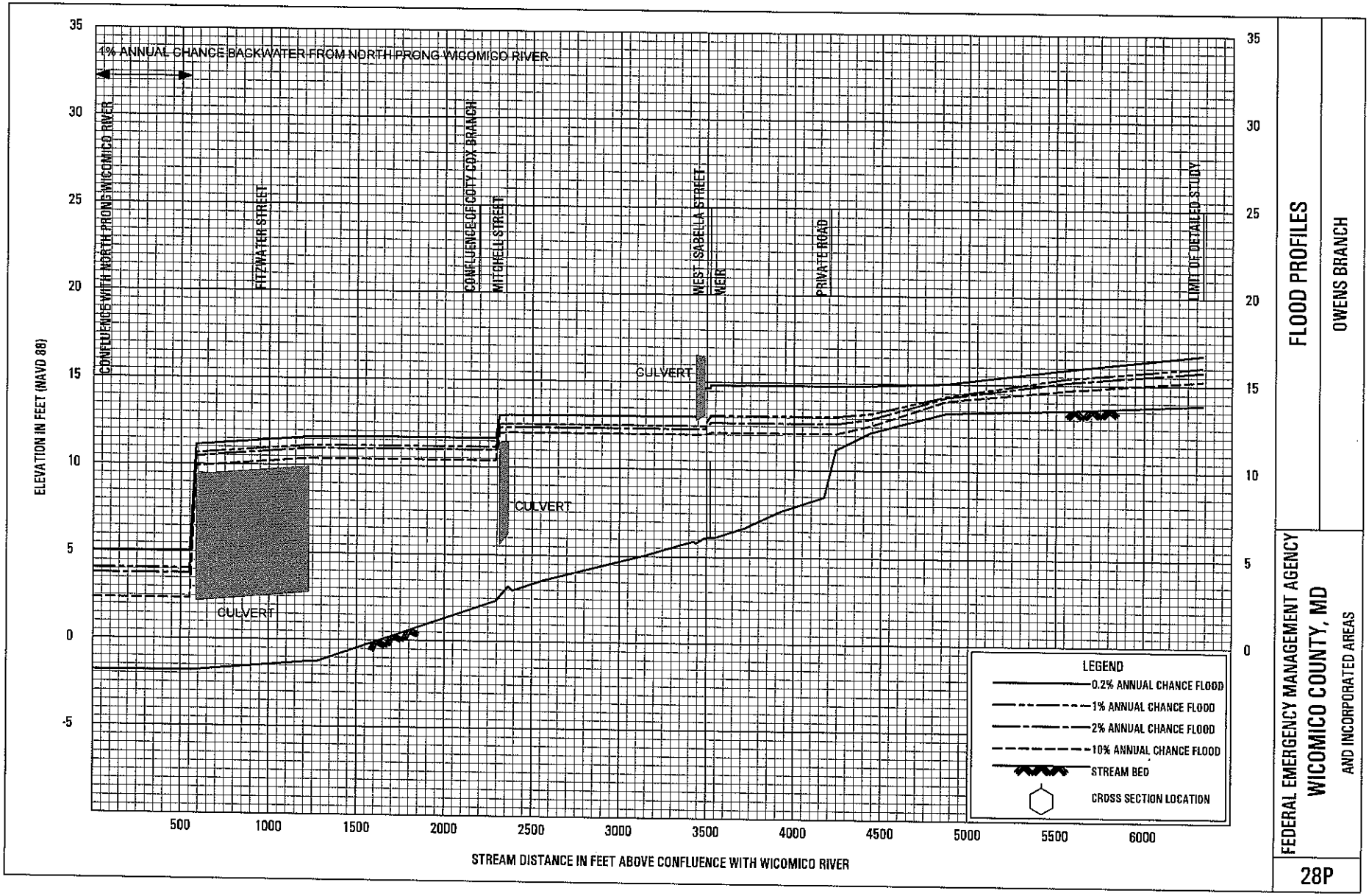
FLOOD PROFILES

ANDREWS BRANCH (WILLIAMS MILL POND)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS



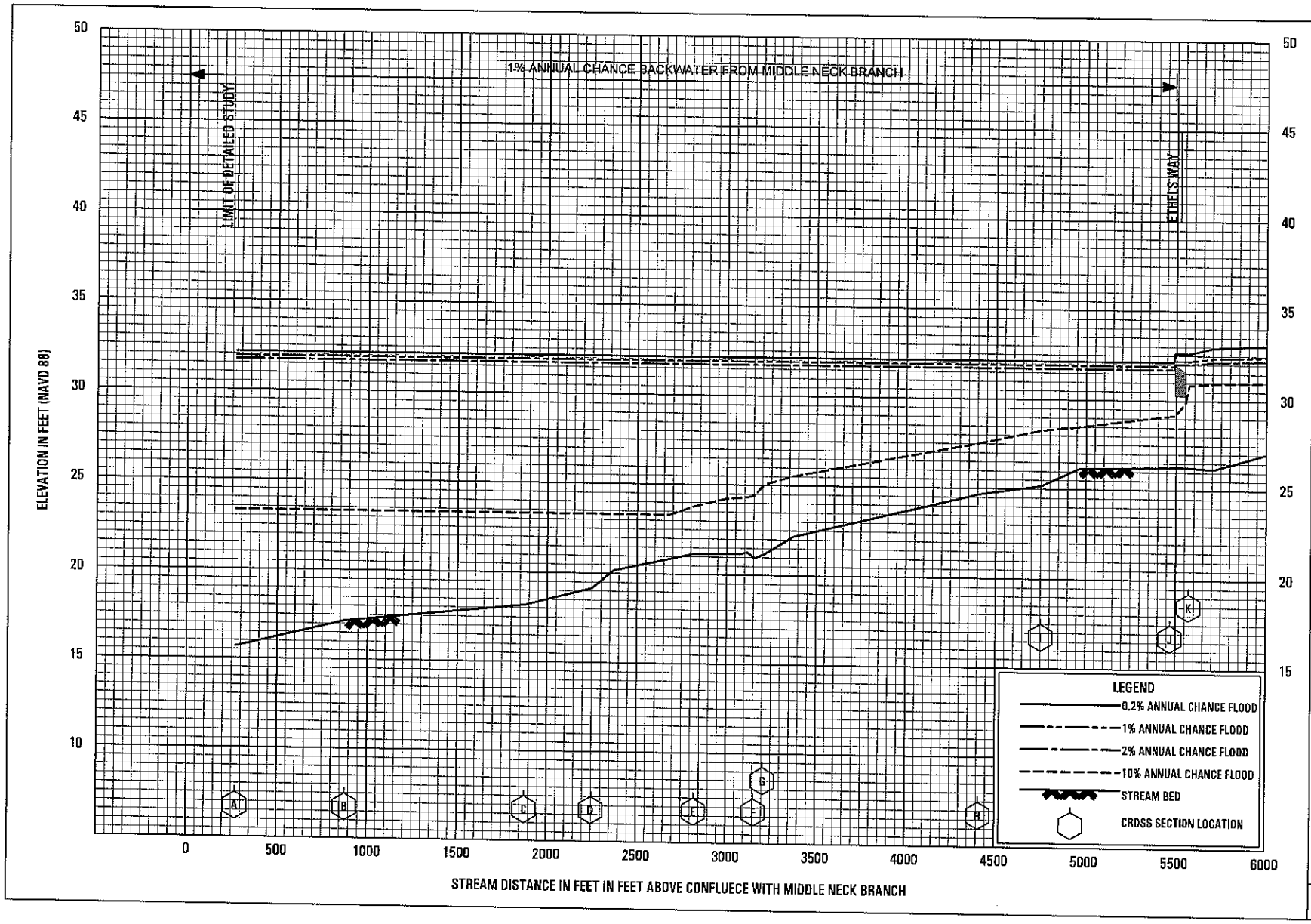
FLOOD PROFILES

OWENS BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS



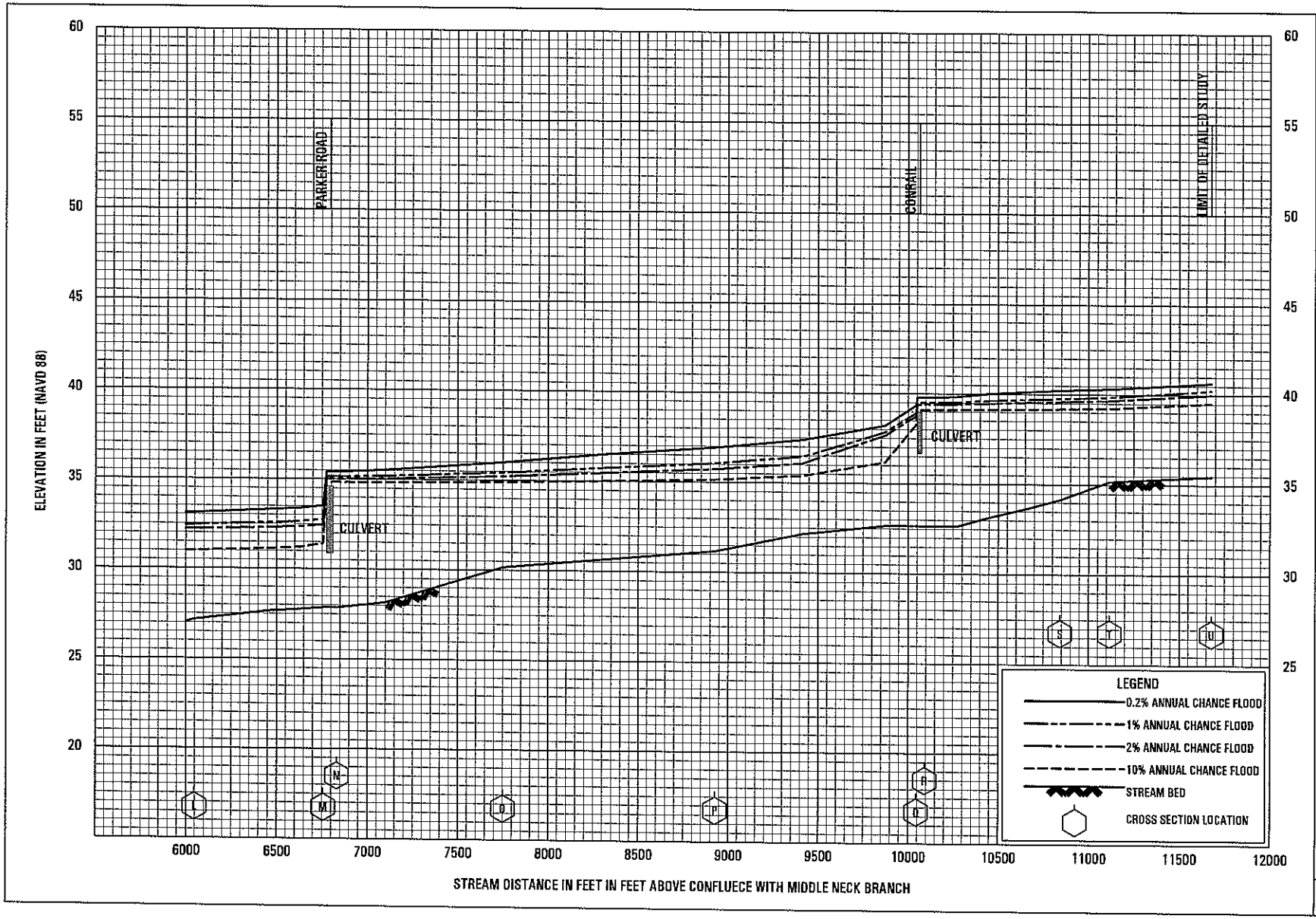
FLOOD PROFILES

PEGGY BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS



FLOOD PROFILES

PEGGY BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

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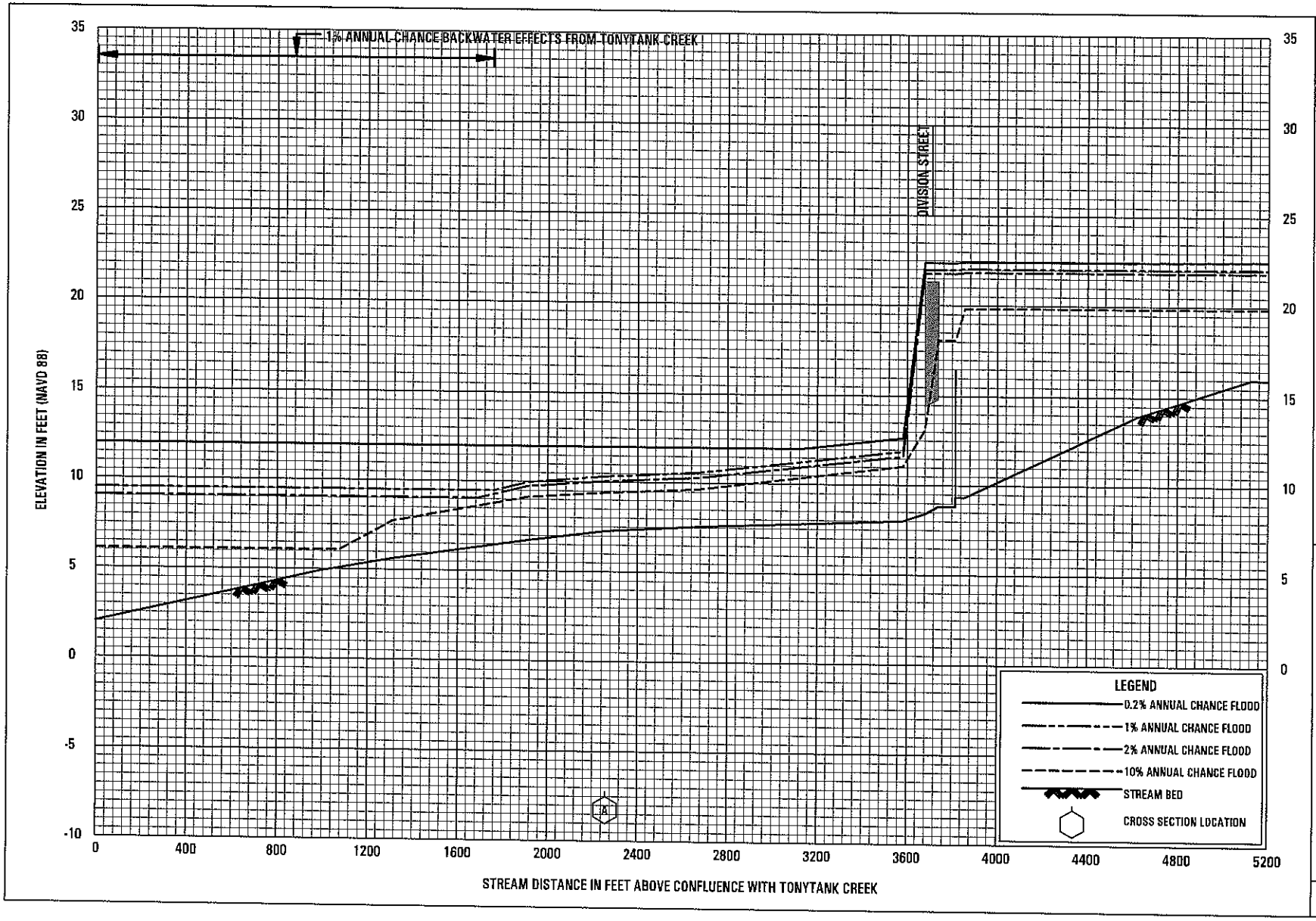


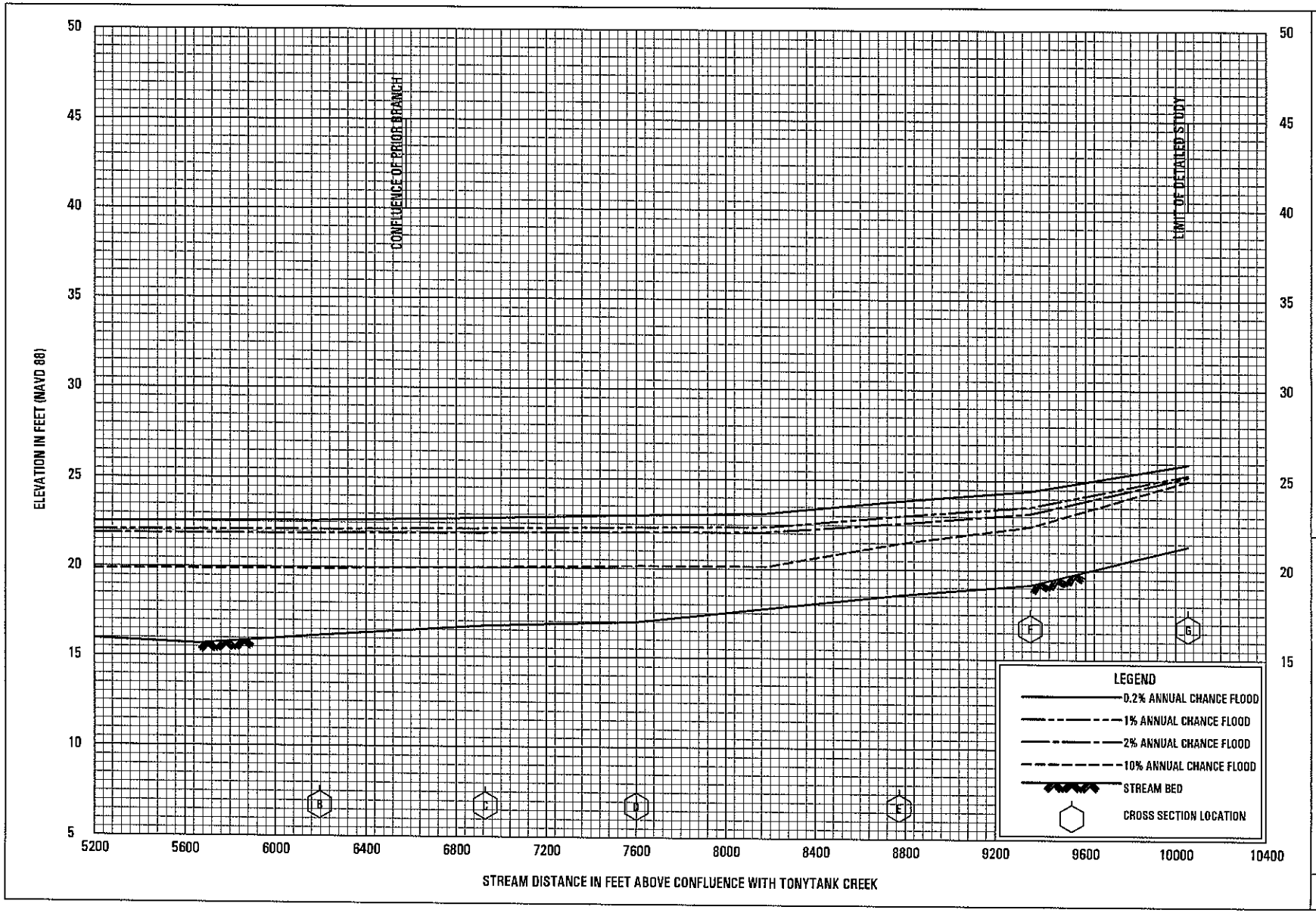
FLOOD PROFILES

SLAB BRIDGE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS



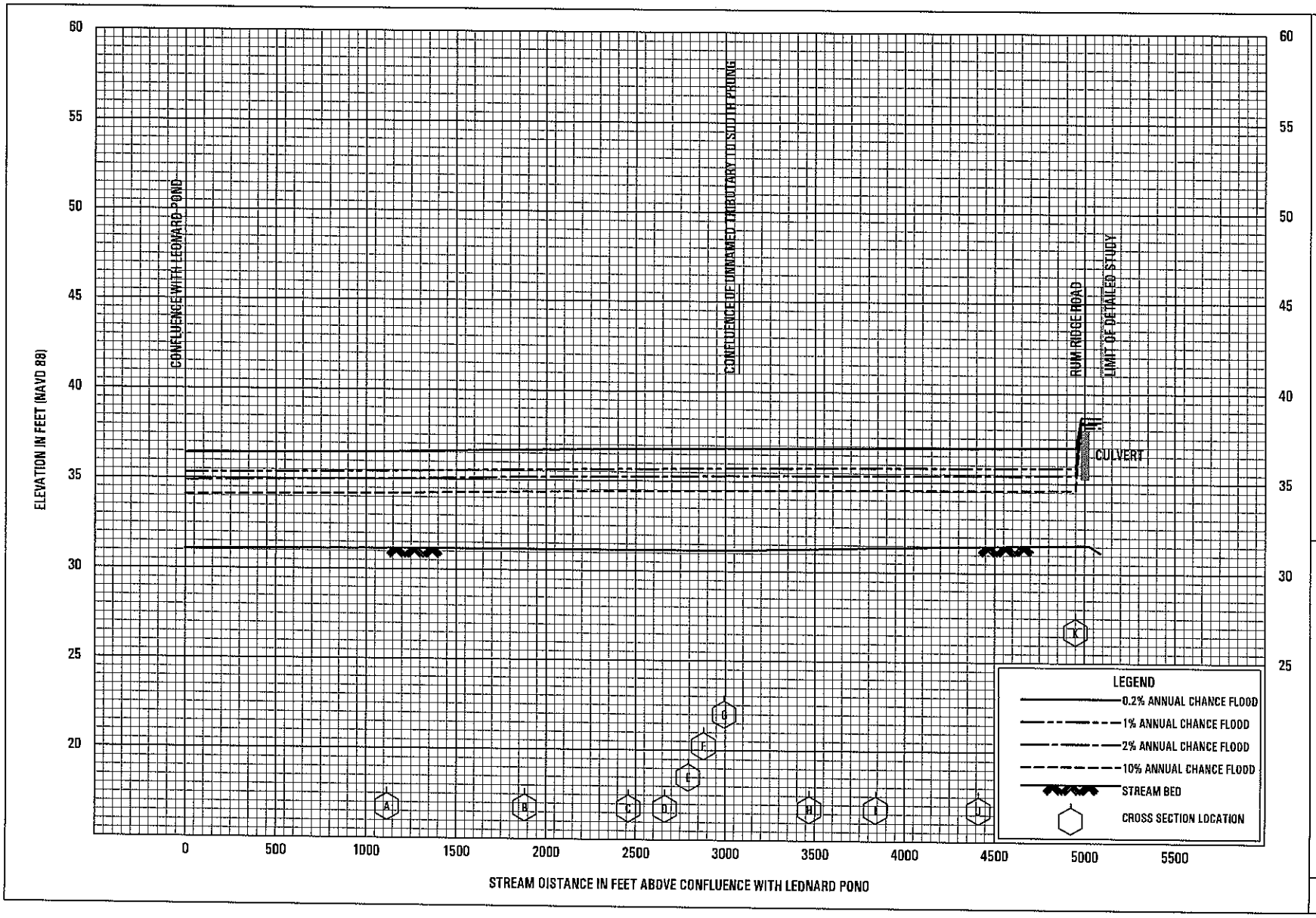
FLOOD PROFILES

SLAB BRIDGE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS



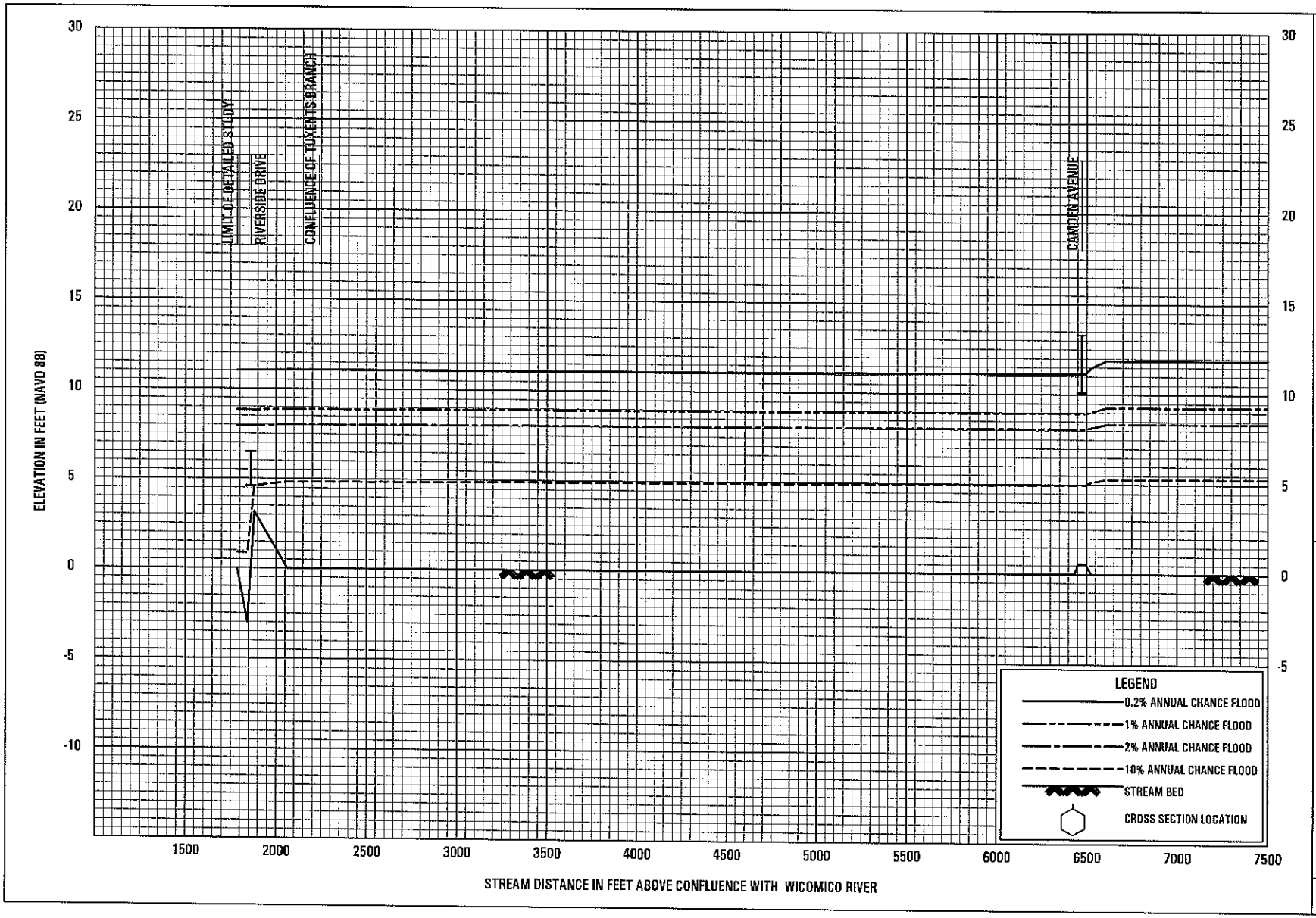
FLOOD PROFILES

SOUTH PRONG

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS



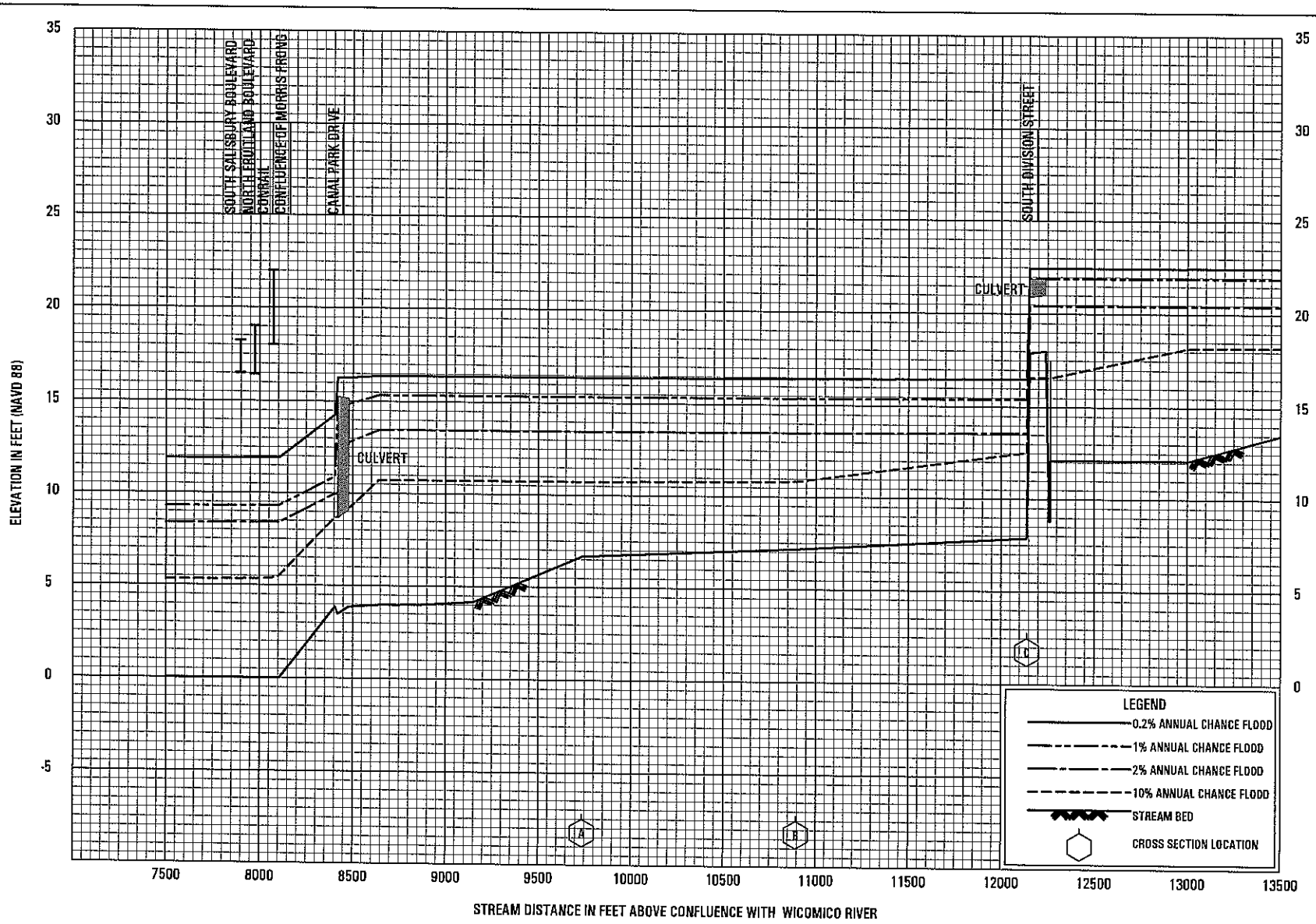
FLOOD PROFILES

TONYTANK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS



FLOOD PROFILES

TONYTANK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

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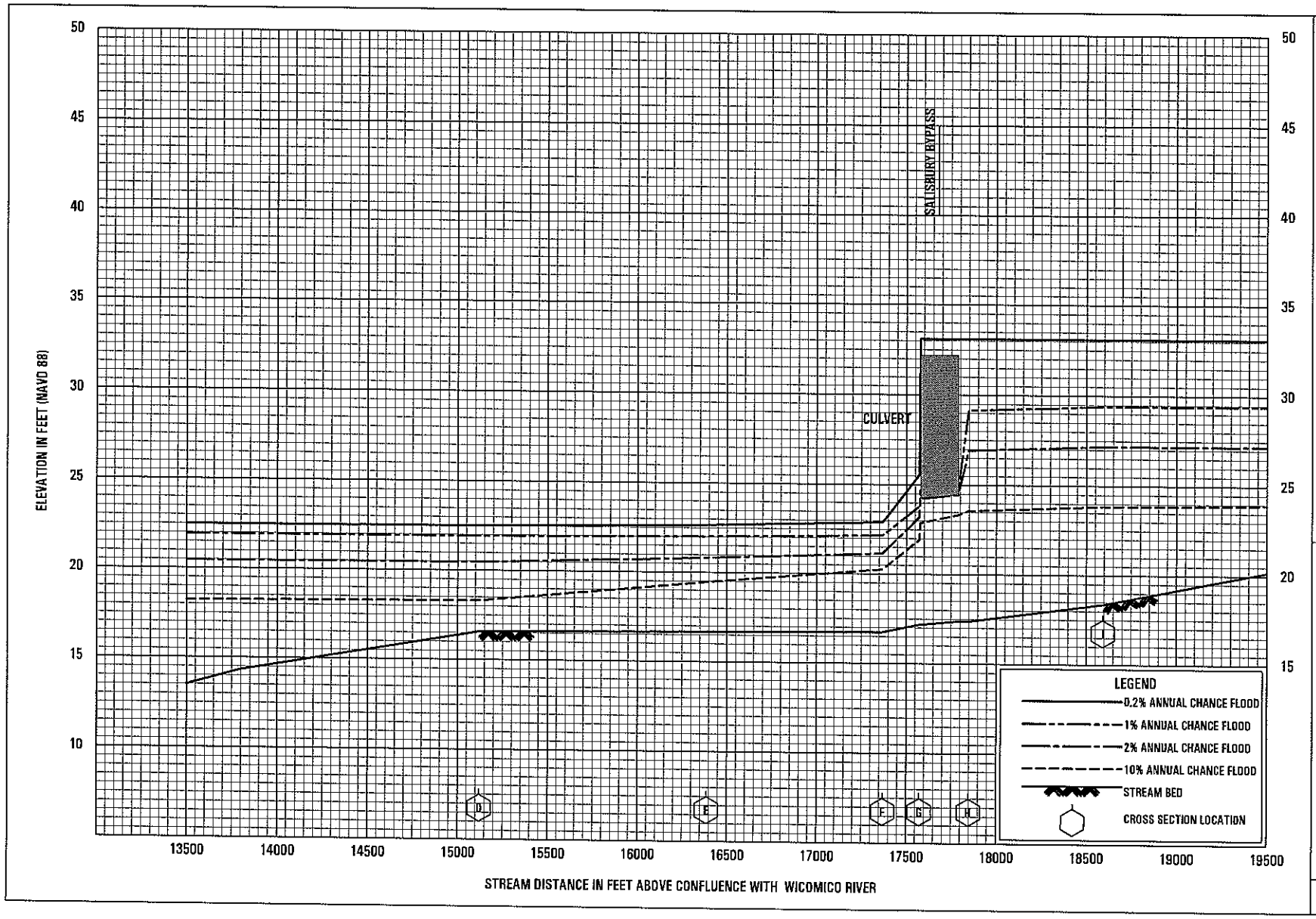

FLOOD PROFILES

TONYTANK CREEK

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WICOMICO COUNTY, MD

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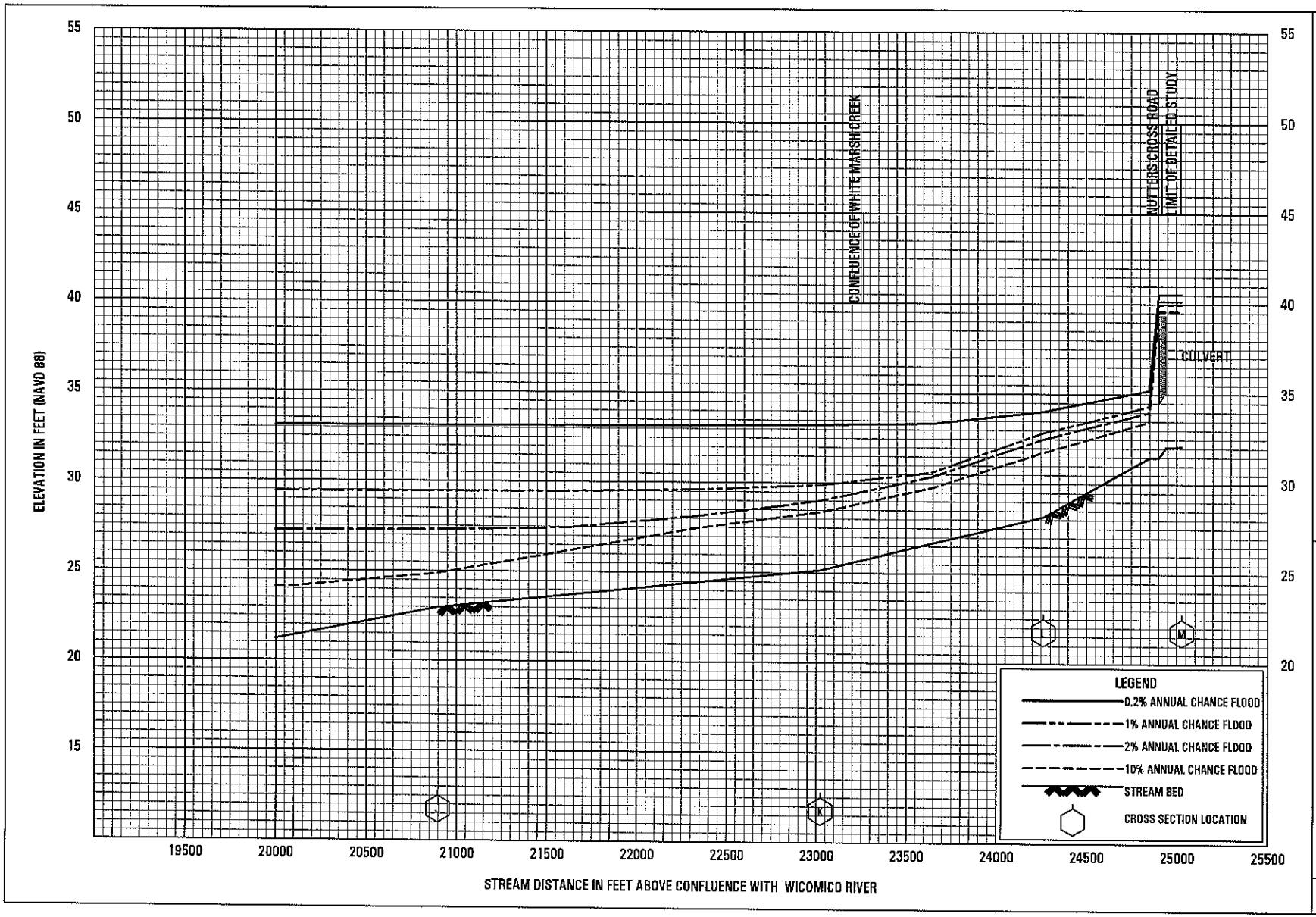

FLOOD PROFILES

TONYTANK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

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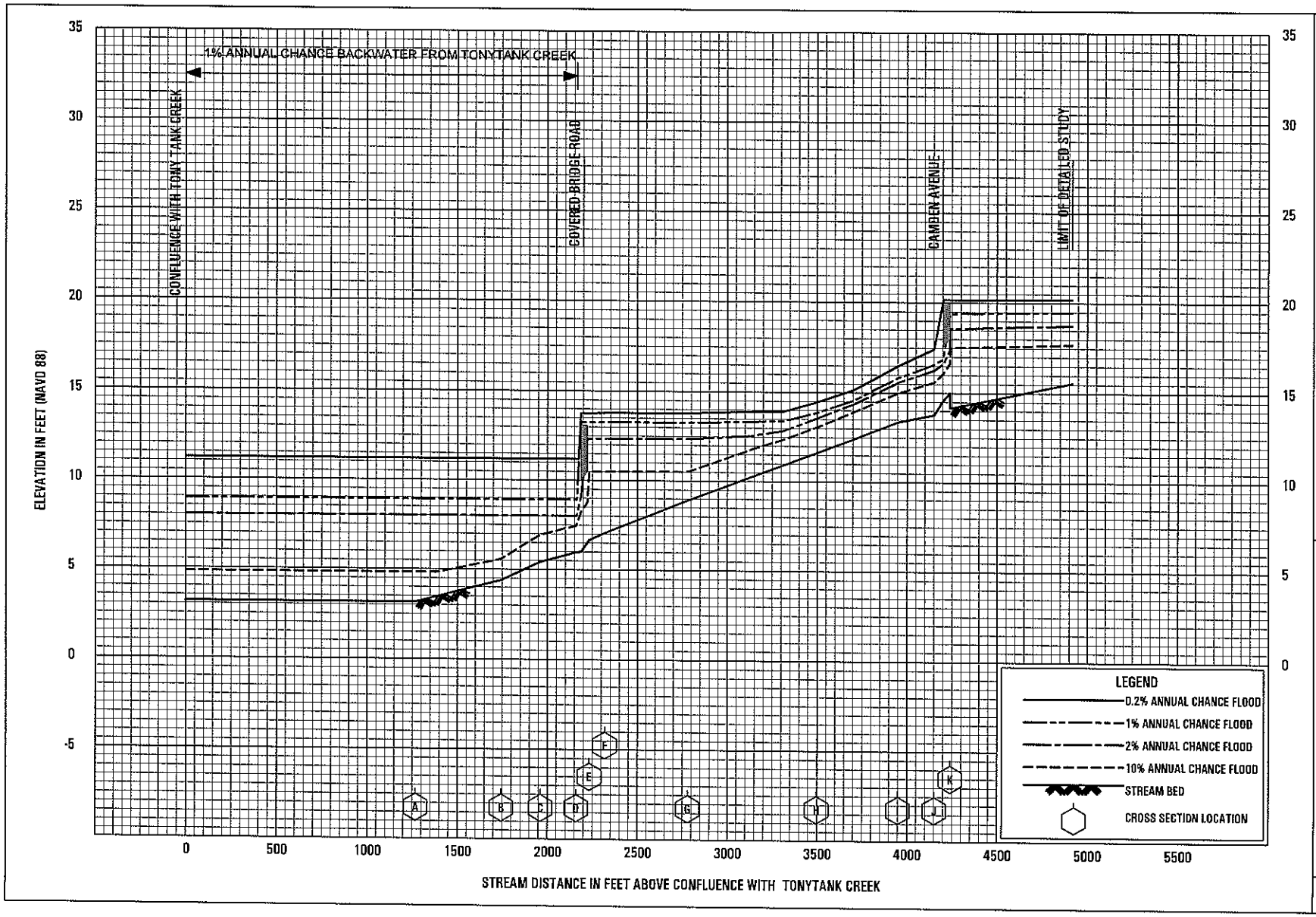


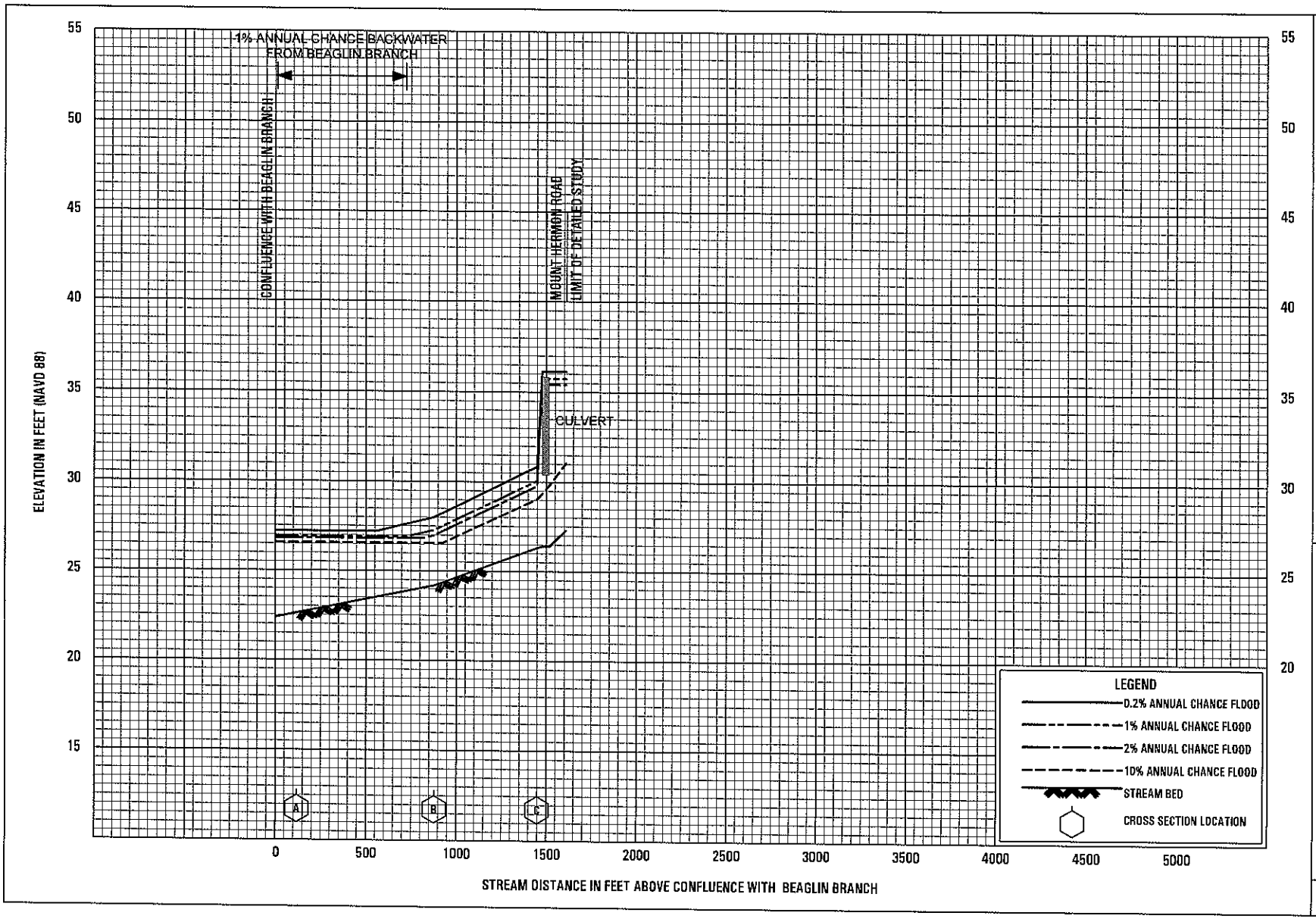
FLOOD PROFILES

TUXENTS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS



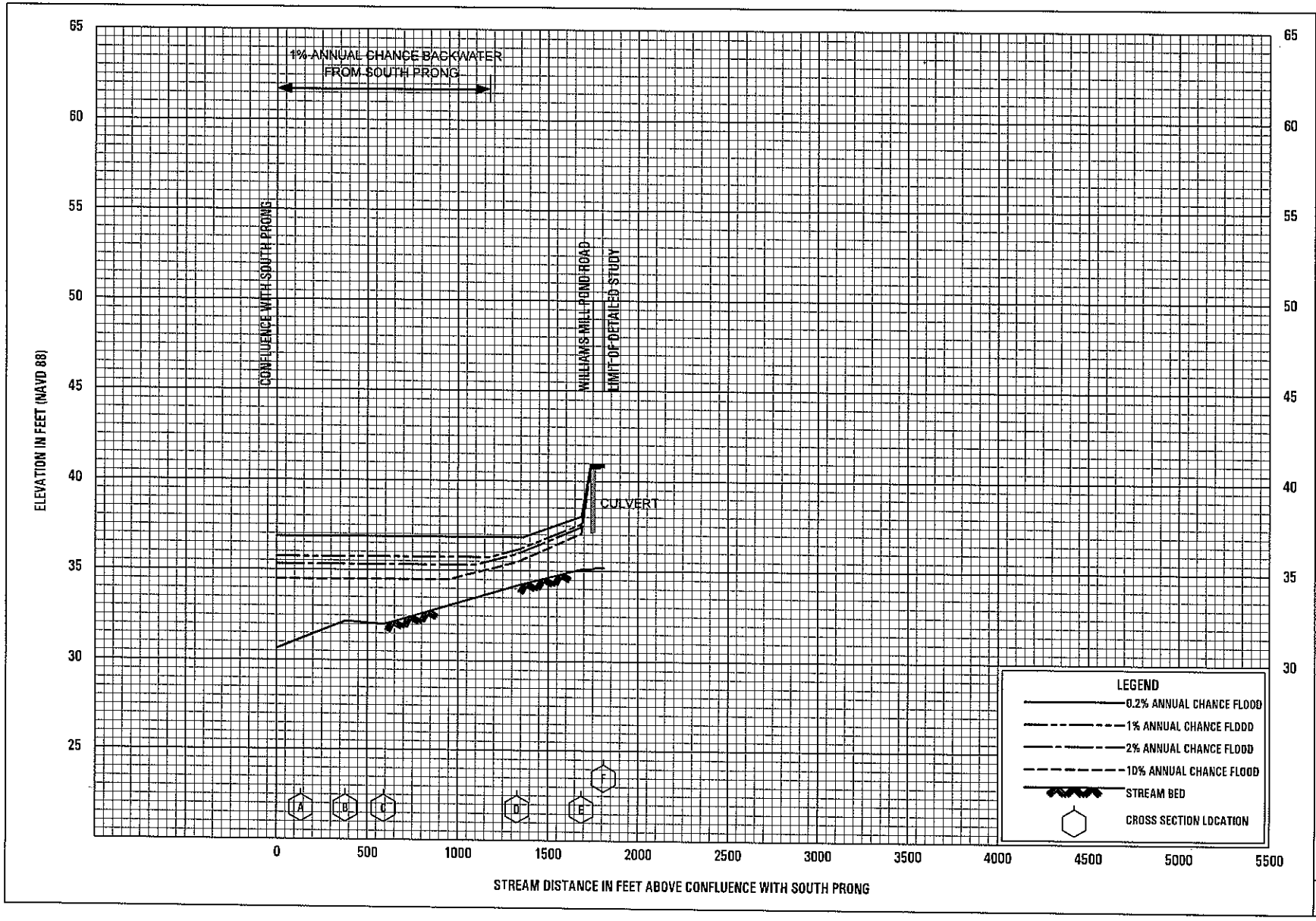
FLOOD PROFILES

UNNAMED TRIBUTARY TO BEAGLIN BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS



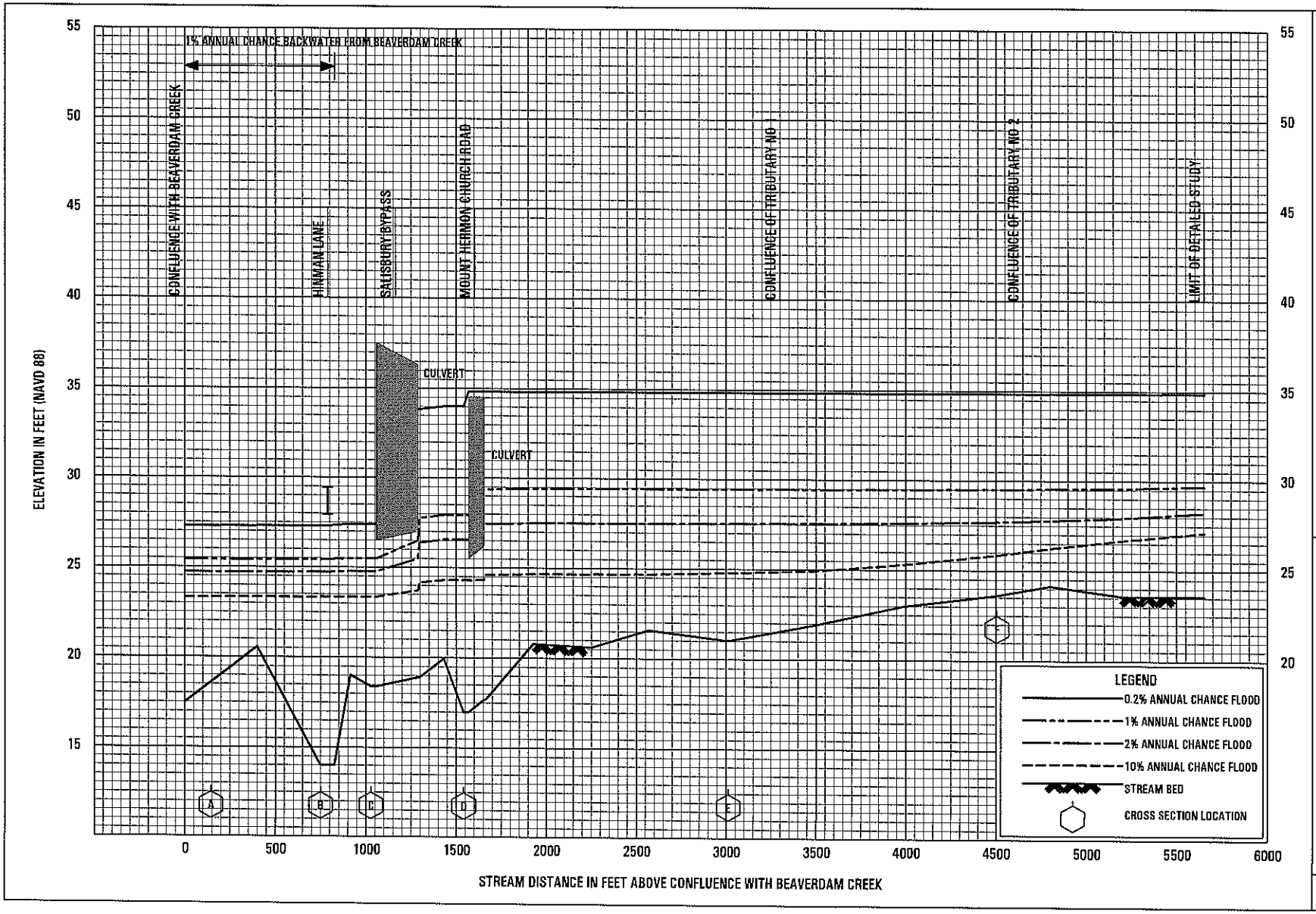
FLOOD PROFILES

UNNAMED TRIBUTARY TO SOUTH PRONG

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS



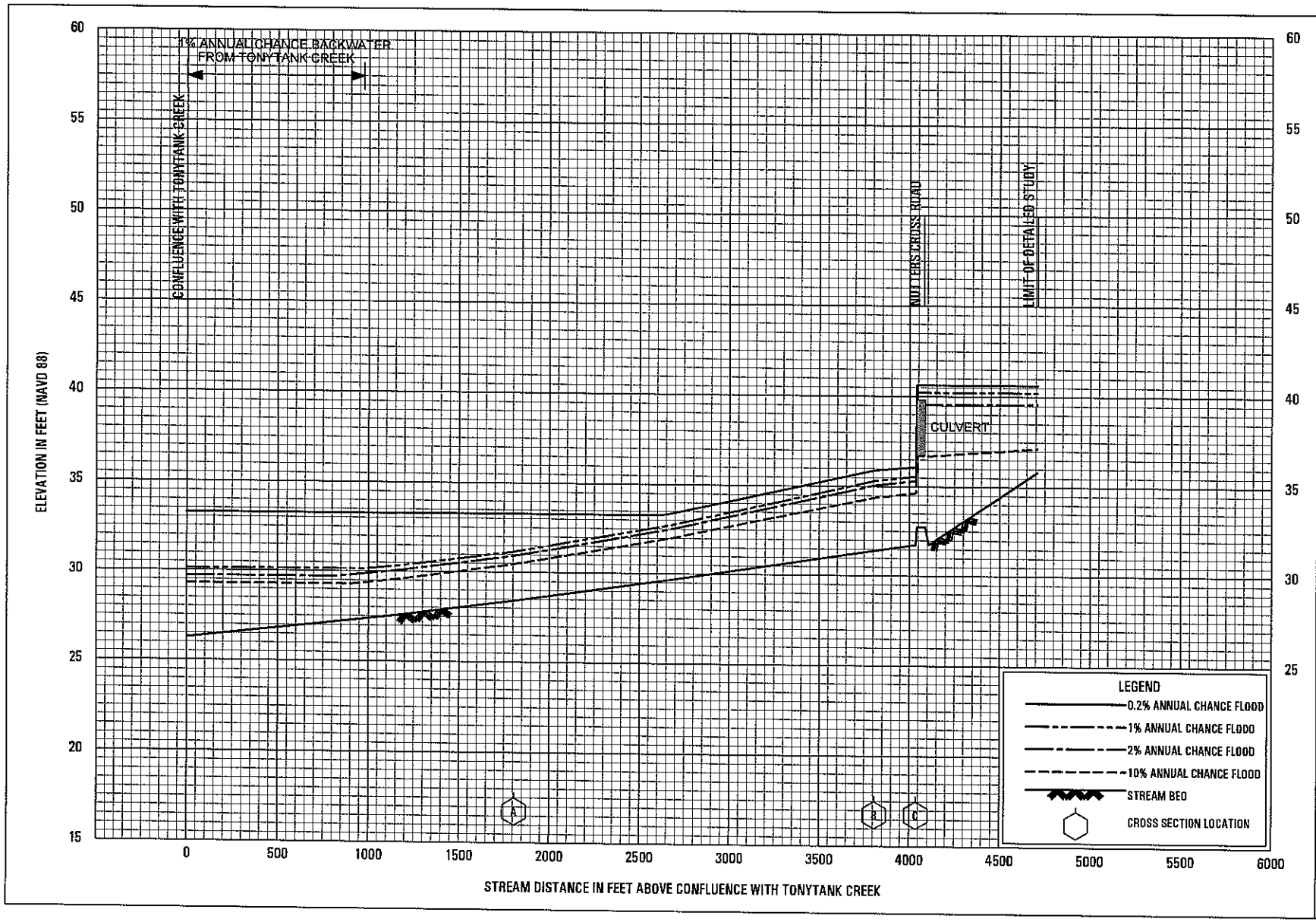
FLOOD PROFILES

WALSTON BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS



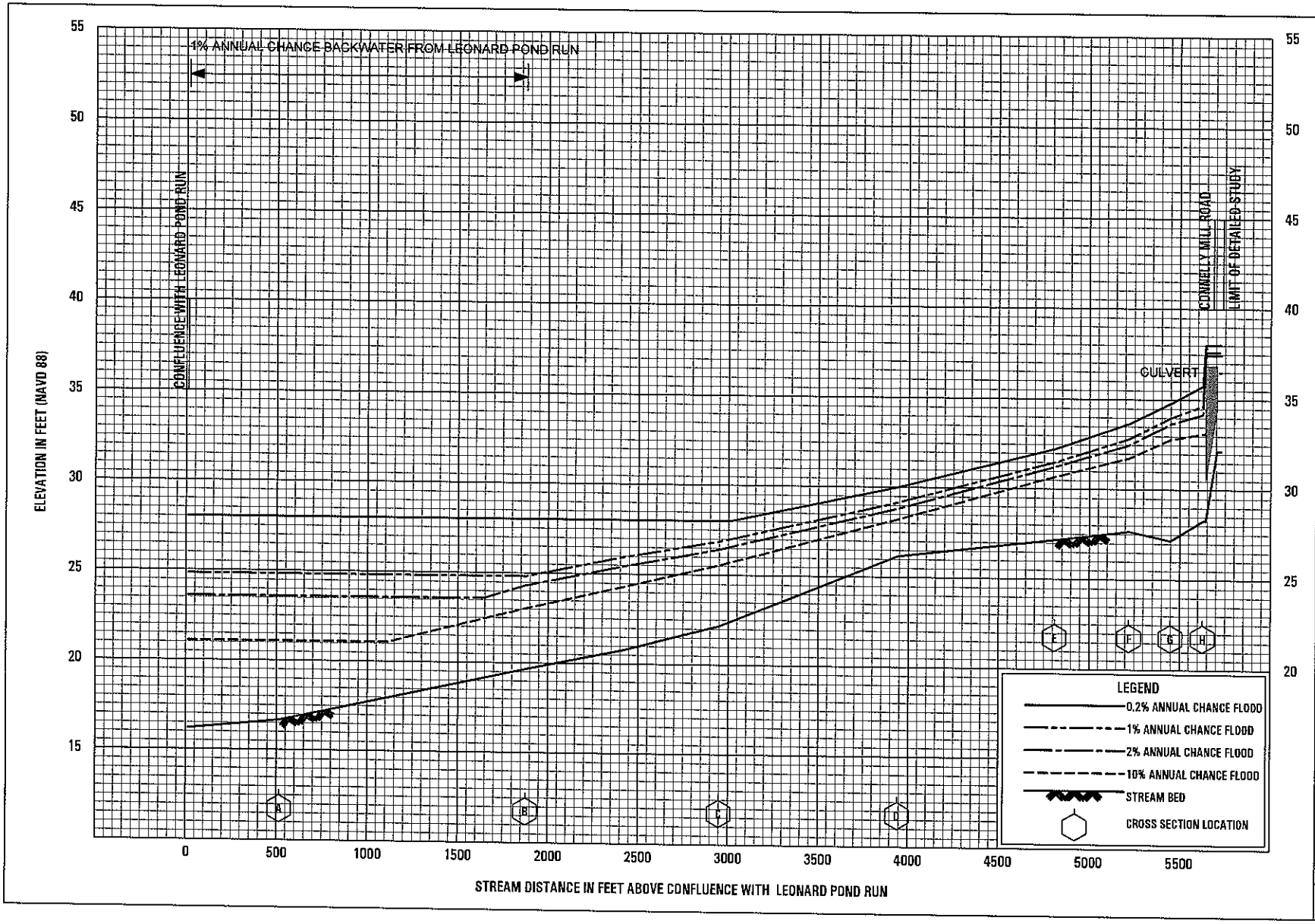
FLOOD PROFILES

WHITE MARSH CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS



FLOOD PROFILES

WOOD CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WICOMICO COUNTY, MD

AND INCORPORATED AREAS

43P