FLOOD INSURANCE STUDY

ESSEX COUNTY, MASSACHUSETTS
(ALL JURISDICTIONS)
Volume 4 of 4

COMMUNITY NAME	COMMUNITY NUMBER
AMESBURY, CITY OF	250075
ANDOVER, TOWN OF	250076
BEVERLY, CITY OF	250077
BOXFORD, TOWN OF	250078
DANVERS, TOWN OF	250079
ESSEX. TOWN OF	250080
GEORGETOWN, TOWN OF	250081
GLOUCESTER, CITY OF	250082
GROVELAND, TOWN OF	250083
HAMILTON, TOWN OF	250084
HAVERHILL, CITY OF	250085
IPSWICH, TOWN OF	250086
LAWRENCE, CITY OF	250087
LYNN, CITY OF	250088
LYNNFILED, TOWN OF	250089
MANCHESTER BY THE SEA, TOWN OF	250090
MARBLEHEAD, TOWN OF	250091
MERRIMAC, TOWN OF	250092
METHUEN, CITY OF	250093
MIDDLETON, TOWN OF	250094
NAHANT, TOWN OF	250095
NEWBURY, TOWN OF	250096
NEWBURYPORT, CITY OF	250097
NORTH ANDOVER, TOWN OF	250098
PEABODY, CITY OF	250099
ROCKPORT, TOWN OF	250100
ROWLEY, TOWN OF	250101
SALEM, CITY OF	250102
SALISBURY, TOWN OF	250103
SAUGUS, TOWN OF	250104
SWAMPSCOTT, TOWN OF	250105
TOPSFIELD, TOWN OF	250106
WENHAM, TOWN OF	250107
WEST NEWBURY, TOWN OF	250108

PRELIMINARY:
SEPTEMBER 13, 2016

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
25009CV004C

NOTICE TO
FLOOD INSURANCE STUDY USERS

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

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

Old Zone	New Zone
A1 through A30	AE
V1 through V30	VE
B	X
C	X

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

Initial Countywide FIS Effective Date: July 3, 2012

Revised Coastal FIS Effective Date: July 16, 2014

Revised Levee Accreditation FIS Effective Date:

TABLE OF CONTENTS

Table of Contents - Volume 1

		Page
1.0	INTRODUCTION	1
1.1	Purpose of Study	1
1.2	Authority and Acknowledgments	1
1.3	Coordination	9
2.0	AREA STUDIED	12
2.1	Scope of Study	12
2.2	Community Description	25
2.3	Principal Flood Problems	27
2.4	Flood Protection Measures	35
3.0	ENGINEERING METHODS	40
3.1	Hydrologic Analyses	41
3.2	Hydraulic Analyses	67
3.3	Coastal Analyses	73
3.4	Vertical Datum	105
4.0	FLOODPLAIN MANAGEMENT APPLICATIONS	106
4.1	Floodplain Boundaries	106
4.2	Floodways	109

FIGURES

Figure 1 – Transect Location Map	104
Figure 2 – Transect Schematic	105
Figure 3 – Floodway Schematic	113

Table of Contents - Volume 1

Page

TABLES

Table 1 – CCO Meetings Dates for Pre-Partial Countywide FIS 9

Table 2 – Flooding Sources Studied by Detailed Methods 12

Table 3 – Flooding Sources Studied by Detailed Approximate Methods 22

Table 4 – Letters of Map Change 25

Table 5 – Population and Total Area by Community 26

Table 6 – Summary of Discharges 50

Table 7 – Manning's "n" Values 71

Table 8 – Precountywide Summary of Stillwater Elevations 76

Table 9 – Summary of Revised Stillwater Elevations 80

Table 10 – Countywide Transect Descriptions 85

Table 11 – Countywide Transect Data 95

TABLE OF CONTENTS – continued

Table of Contents - Volume 2

		Page
5.0	INSURANCE APPLICATIONS	178
6.0	FLOOD INSURANCE RATE MAP	179
7.0	OTHER STUDIES	183
8.0	LOCATION OF DATA	183
9.0	BIBLIOGRAPHY AND REFERENCES	183

TABLES

Table 12 – Floodway Data	115
Table 13 – Community History Map	180

TABLE OF CONTENTS – VOLUME 3

EXHIBITS

Exhibit 1 - Flood Profiles

Argilla Brook	Panel 01P-02P
Artichoke River - Reservoir	Panel 03P-05P
Bare Meadow Brook	Panel 06P-07P
Bartlett Brook	Panel 08P-09P
Bates Brook	Panel 10P
Beaver Brook (Town of Danvers)	Panel 11P-12P
Beaver Brook (Town of West Newbury)	Panel 13P-14P
Beaverdam Brook	Panel 15P-17P
Bennett's Pond Brook	Panel 18P-19P
Boston Brook	Panel 20P-22P
Branch of Ipswich and Cleveland Brook	Panel 23P-24P
Bulford Brook	Panel 25P
Centerville Creek	Panel 26P-27P
Chubbs Brook	Panel 28P
Cochichewick Brook	Panel 29P-30P

TABLE OF CONTENTS – continued

Table of Contents - Volume 3

EXHIBITS - continued

Exhibit 1 - Flood Profiles – continued

Crane River and Crane Brook	Panel 31P
Crane Brook	Panel 32P
Creek Brook	Panel 33P-34P
Emerson Brook	Panel 35P
Fish Brook	Panel 36P-41P
Fish Brook (Town of Andover)	Panel 42P-43P
Fiske Brook	Panel 44P
Goldthwaite Brook	Panel 45P-47P
Harris Brook	Panel 48P-49P
Hawkes Brook	Panel 50P-52P
Howlett Brook	Panel 53P-54P
Howlett Brook and Pye Brook	Panel 55P
Hussey Brook	Panel 56P-57P
Hussey Brook Tributary	Panel 58P
Ipswich River	Panel 59P-70P
Jackman Brook	Panel 71P-72P
Johnson Creek	Panel 73P-74P
Little River	Panel 75P-78P

TABLE OF CONTENTS – VOLUME 4

EXHIBITS – continued

Merrimack River	Panel 79P-92P
Mile Brook	Panel 93P
Miles River	Panel 94P-98P
Mill River (City of Gloucester)	Panel 99P
Mill River (Town of Rowley)	Panel 100P
Millvale Reservoir Brook	Panel101P-102P
Mosquito Brook	Panel103P-105P
North Beverly Drainage Ditch	Panel 106P
North River and Proctor Brook	Panel 107P
Proctor Brook	Panel 108P-110P
North Tributary Brook	Panel 111P-112P
Parker River (Town of Boxford)	Panel 113P-115P

TABLE OF CONTENTS - continued

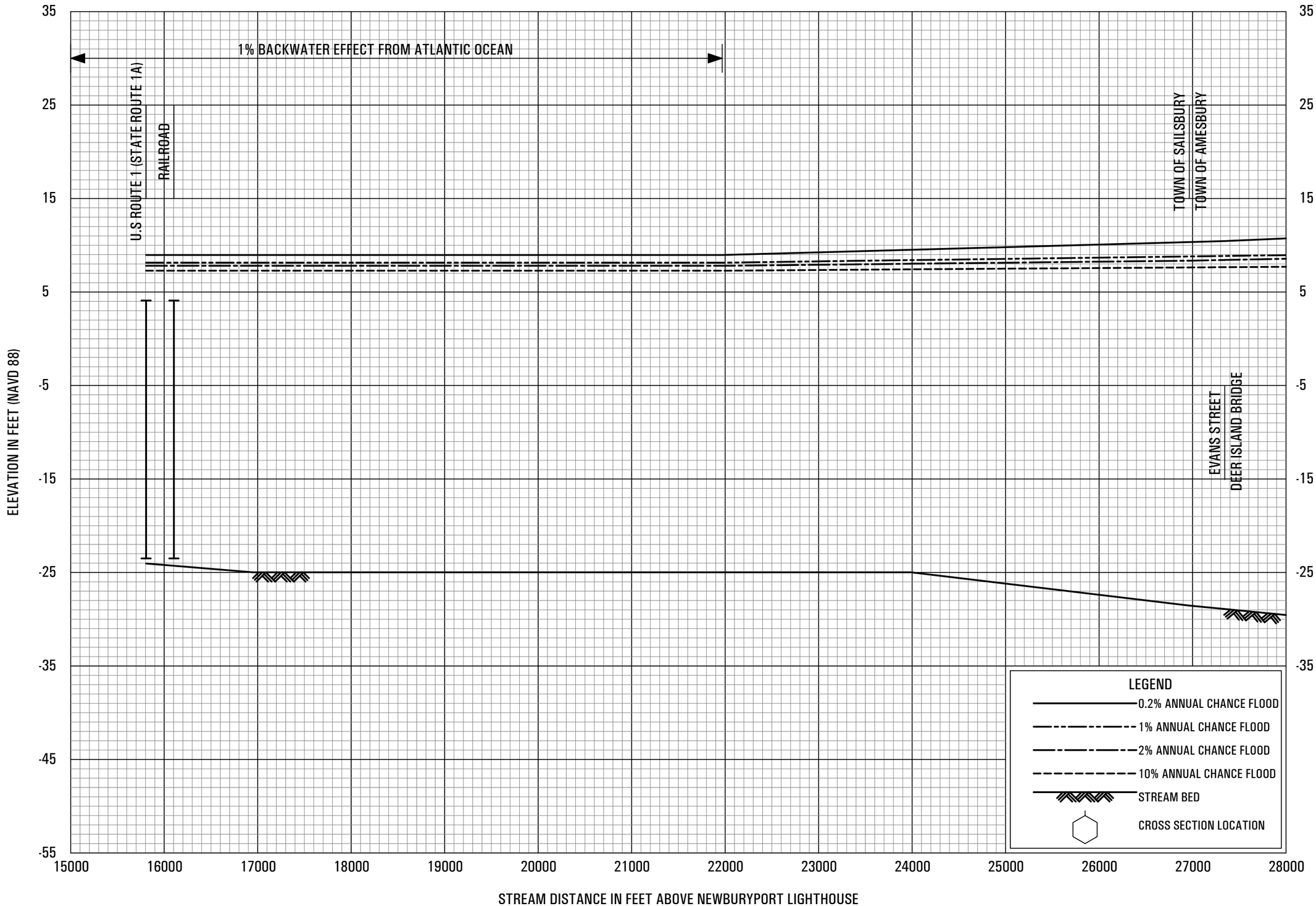
Table of Contents - Volume 4

EXHIBITS – continued

Exhibit 1 - Flood Profiles – continued

Parker River (Town of Georgetown)	Panel 116P-117P
Parker River (Town of Newbury)	Panel 118P-120P
Peat Meadow Brook	Panel 121P-123P
Penn Brook	Panel 124P-126P
Porter River	Panel 127P
Porter River and Frost Fish Brook	Panel 128P
Powwow River	Panel 129P-132P
Riverside Airport Brook	Panel 133P-134P
Saugus River	Panel 135P-141P
School Brook	Panel 142P
Shawsheen River	Panel 143P-147P
Shute Brook	Panel 148P-149P
Skug River	Panel 150P
Spicket River	Panel 151P-153P
Strongwater Brook	Panel 154P
Tapley Brook	Panel 155P
Tributary A to Ipswich River	Panel 156P-157P
Tributary to Neal Pond	Panel 158P
Unnamed Tributary to Fish Brook	Panel 159P

Exhibit 2 - Flood Insurance Rate Map Index
Flood Insurance Rate Map



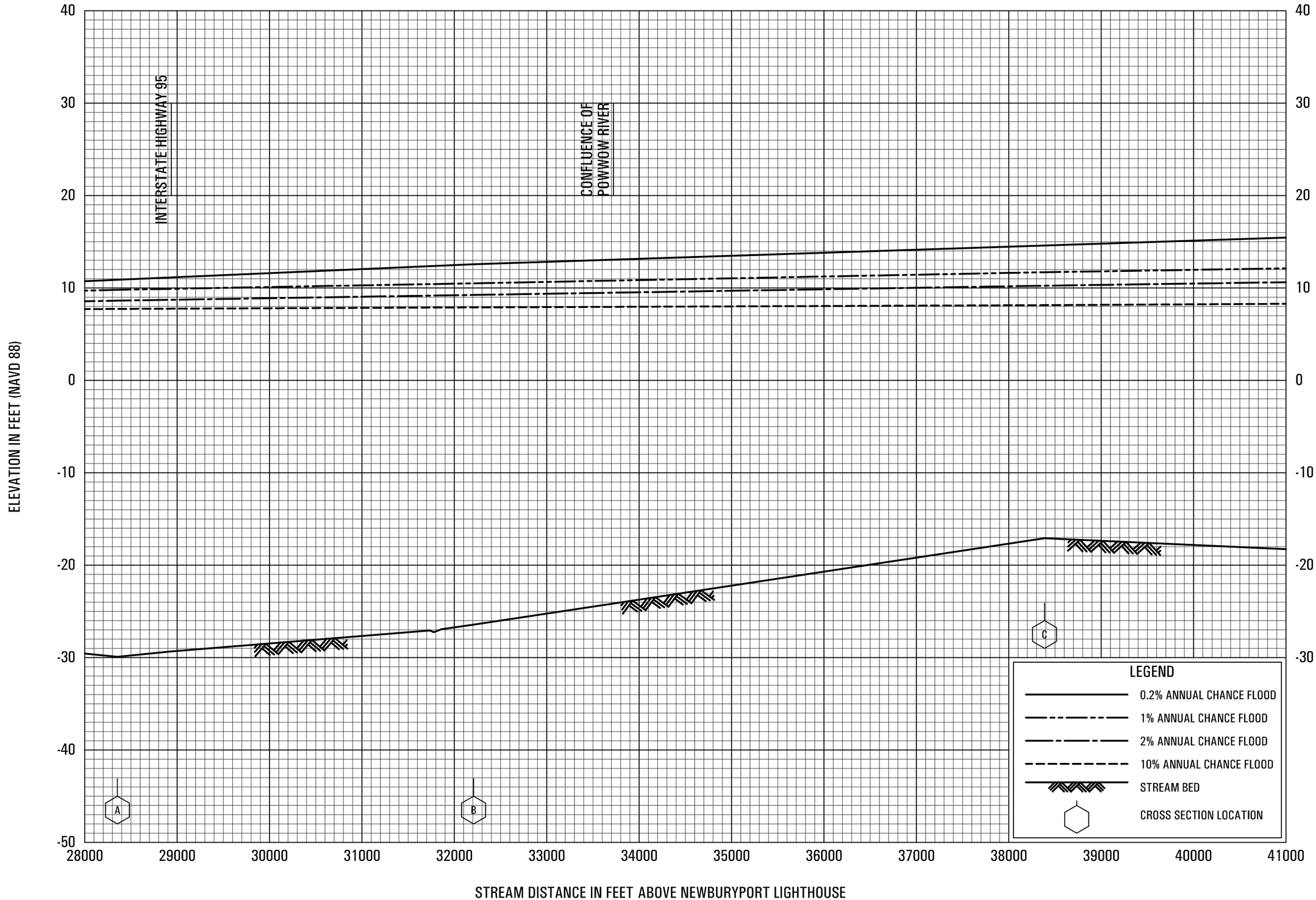
FLOOD PROFILES

MERRIMACK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



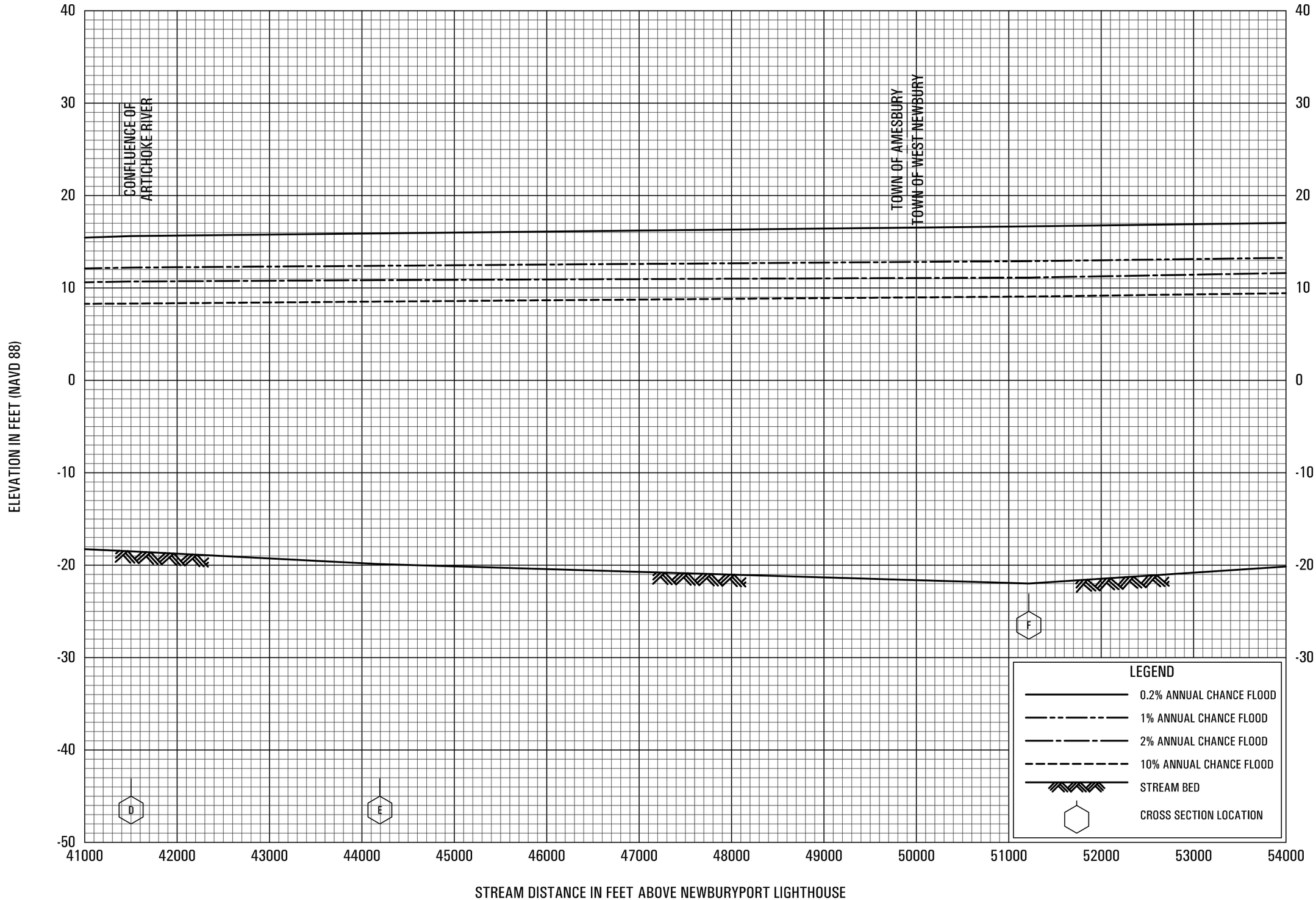
FLOOD PROFILES

MERRIMACK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



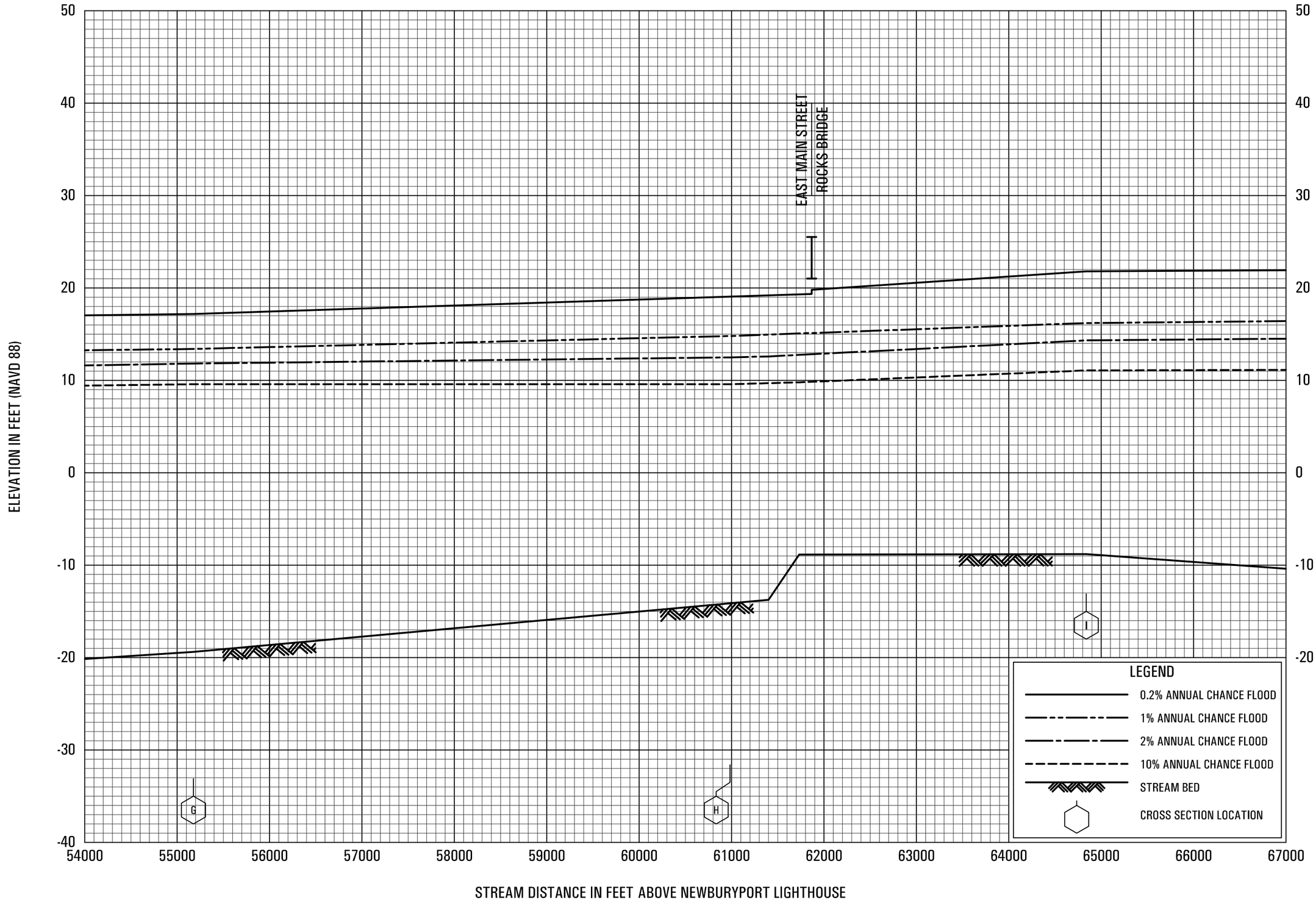
FLOOD PROFILES

MERRIMACK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



FLOOD PROFILES

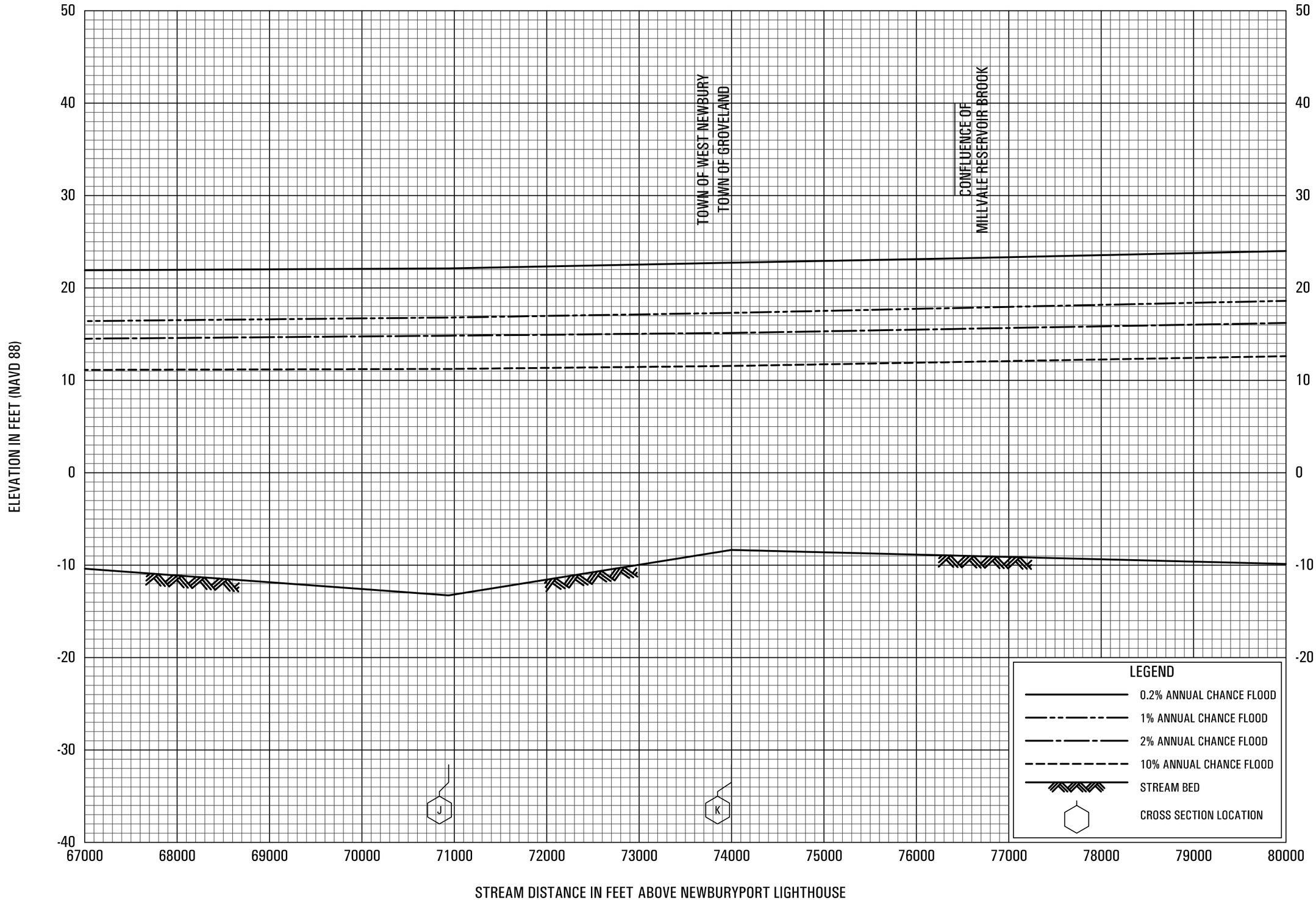
MERRIMACK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)

82P



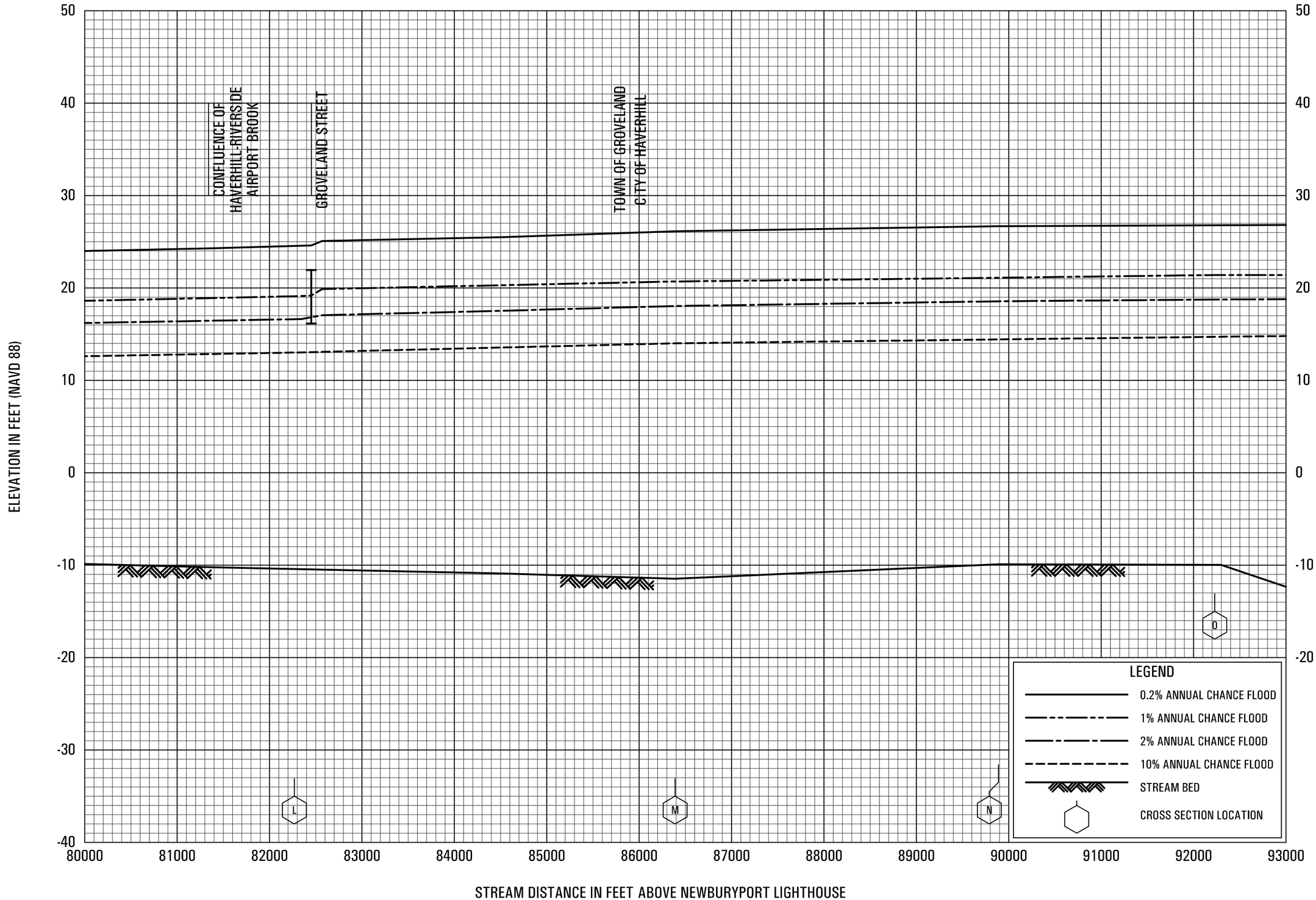
FLOOD PROFILES

MERRIMACK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



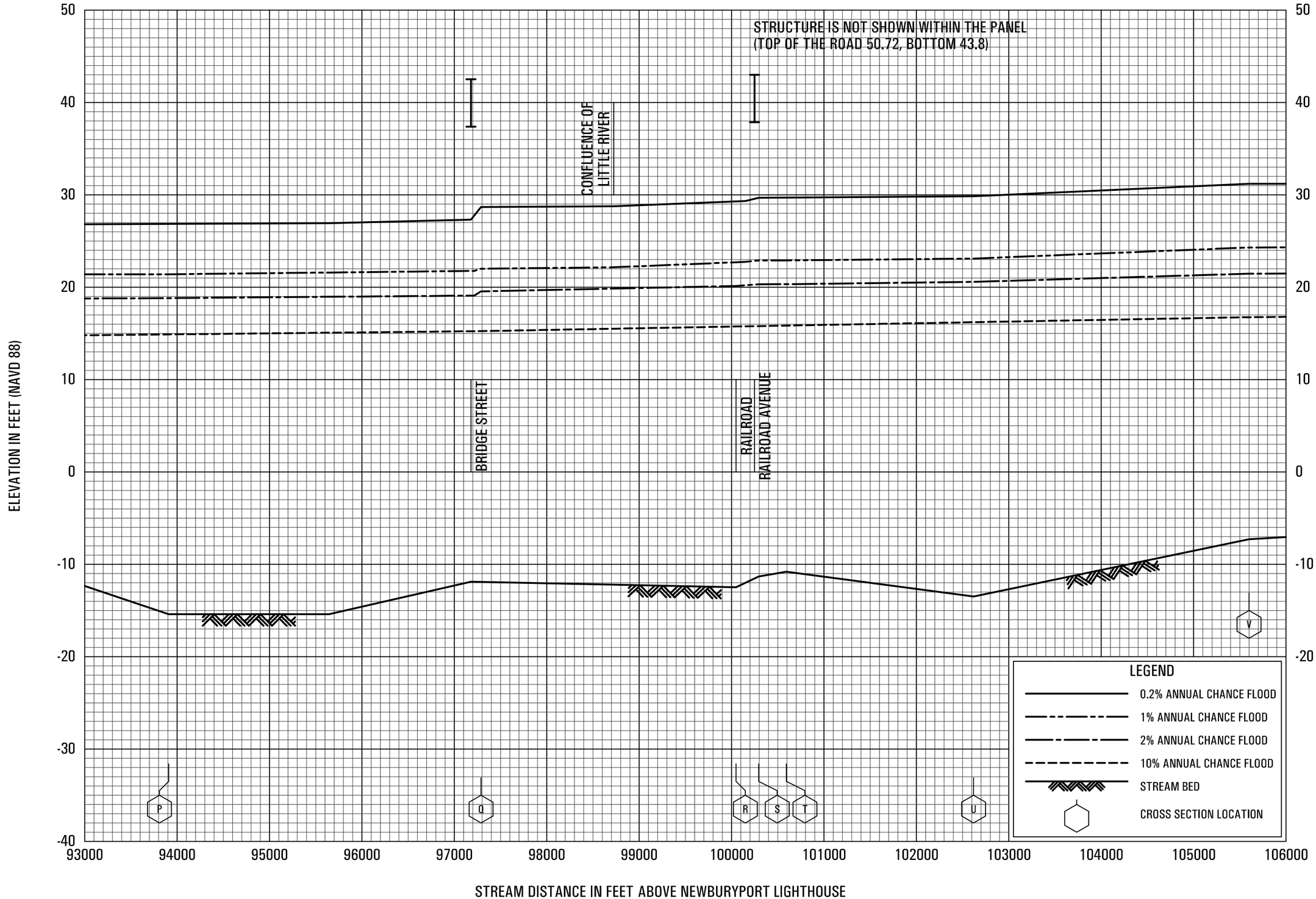
FLOOD PROFILES

MERRIMACK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



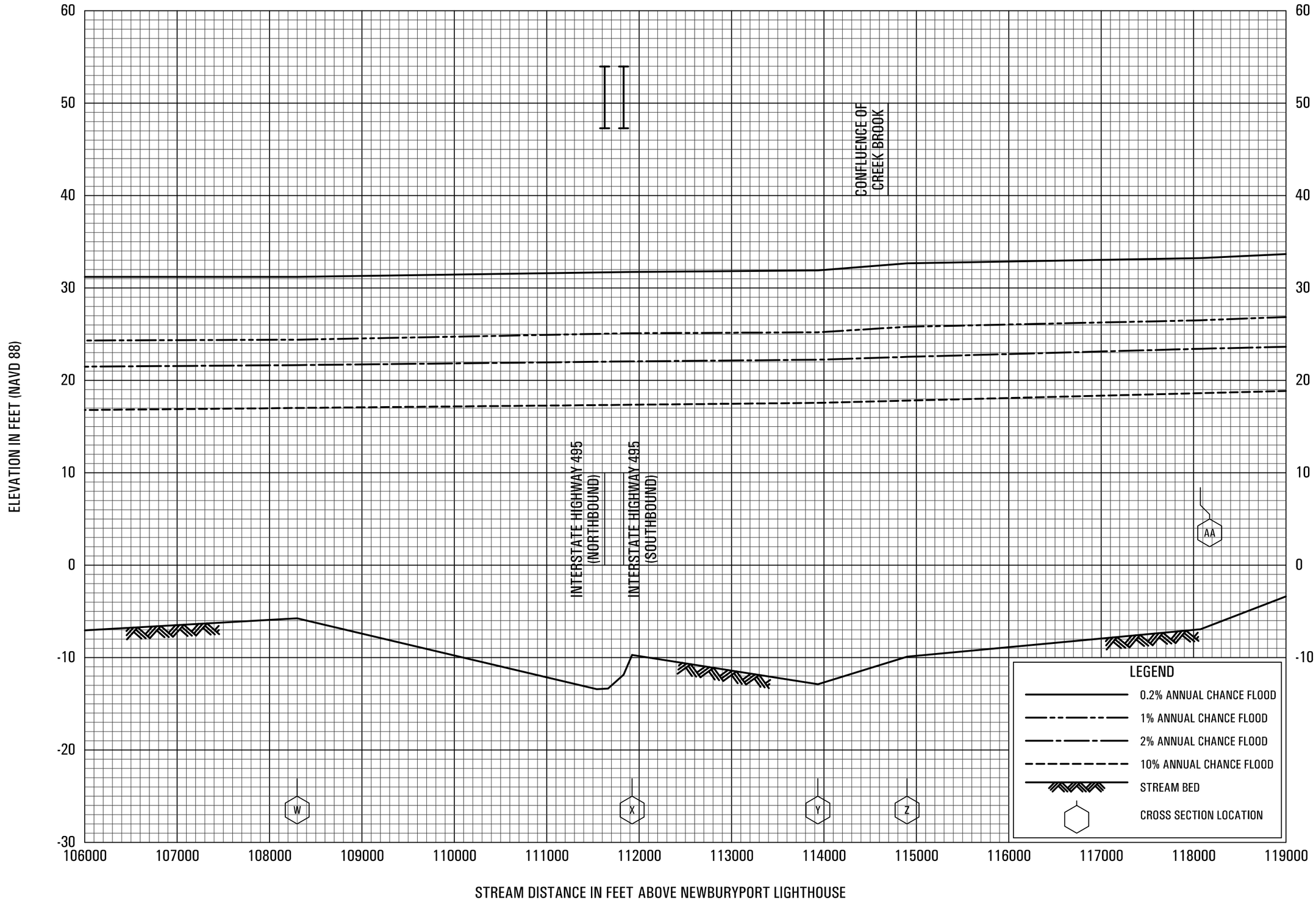
FLOOD PROFILES

MERRIMACK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



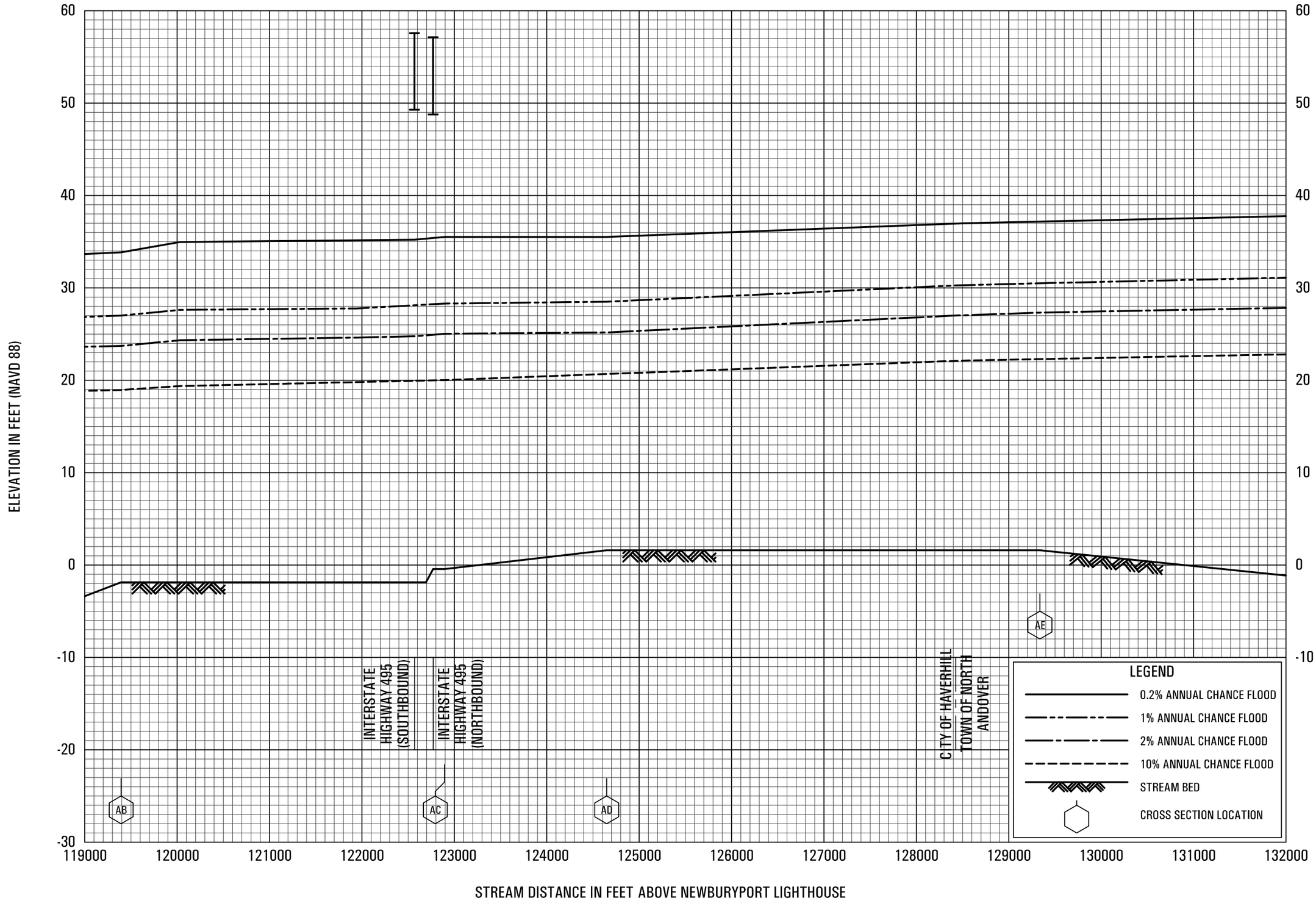
FLOOD PROFILES

MERRIMACK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



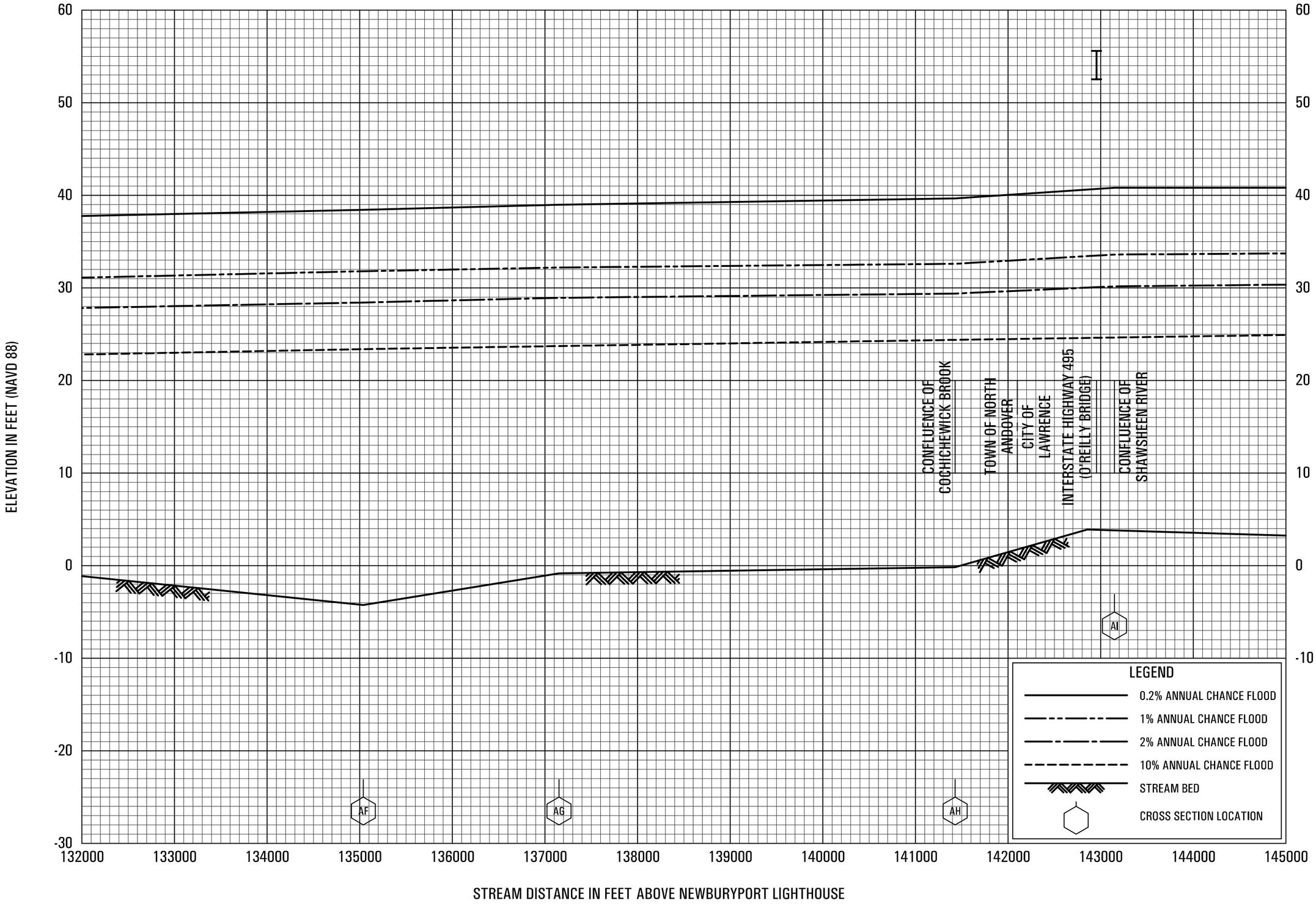
FLOOD PROFILES

MERRIMACK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



FLOOD PROFILES

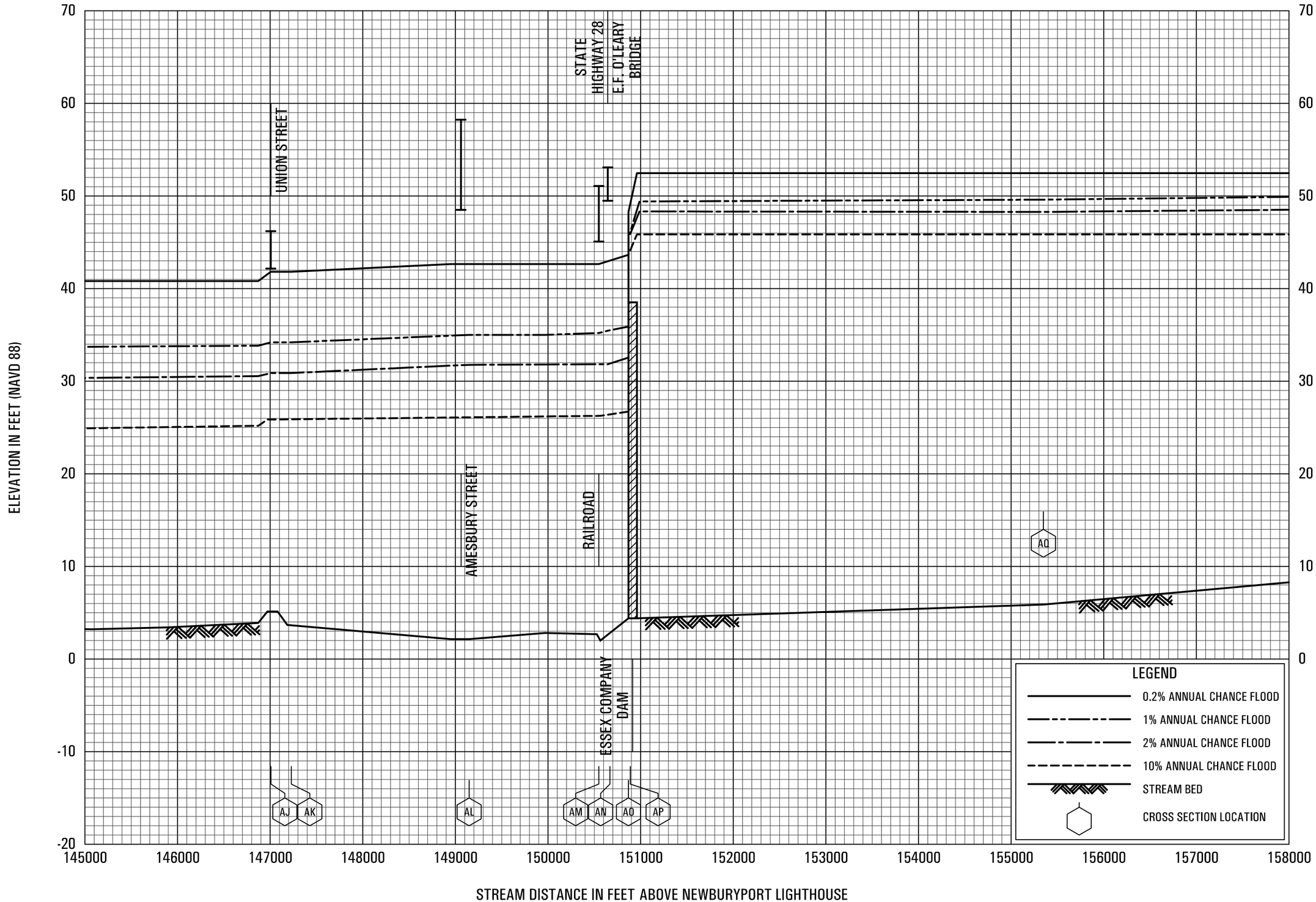
MERRIMACK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)

88P



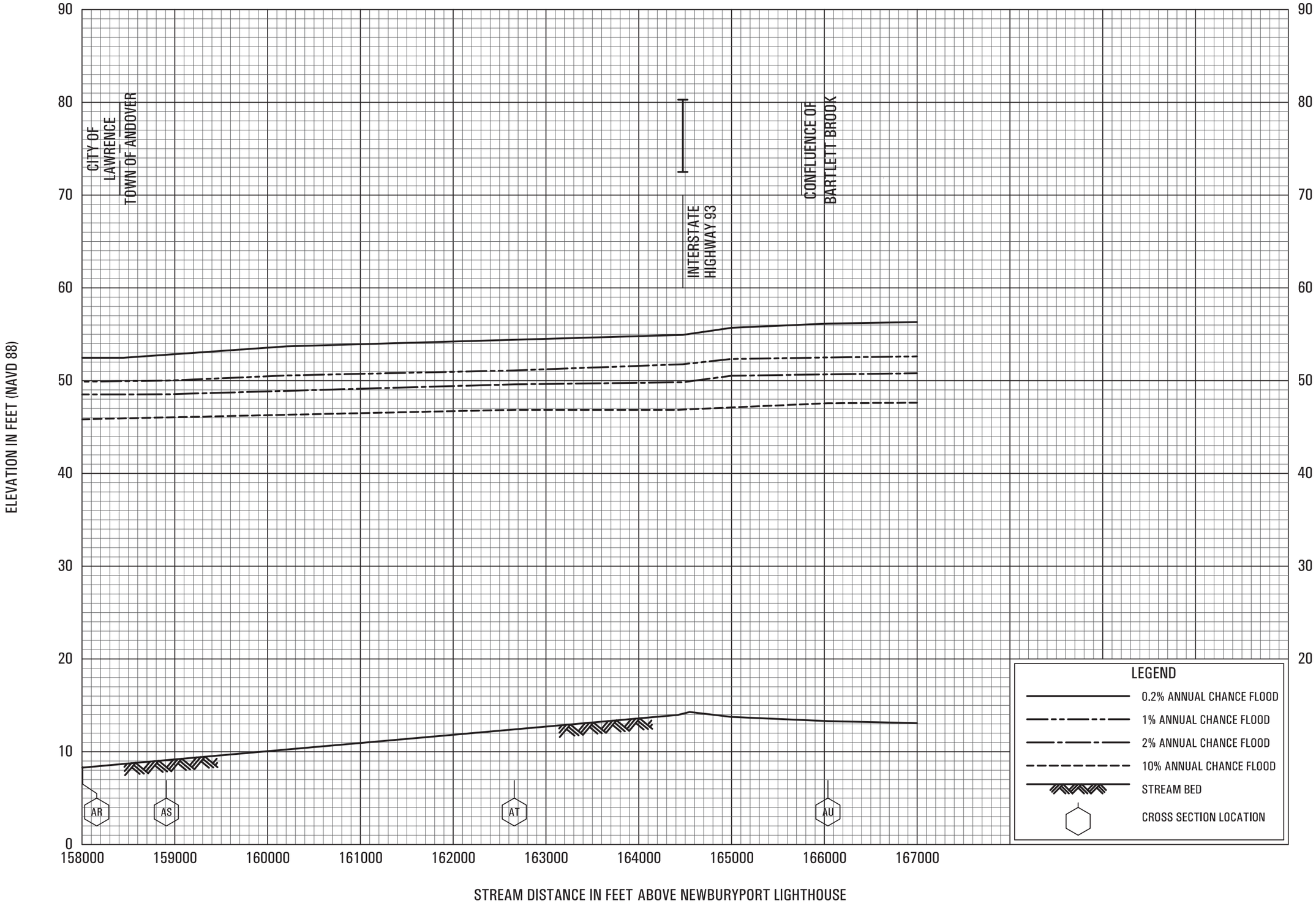
FLOOD PROFILES

MERRIMACK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



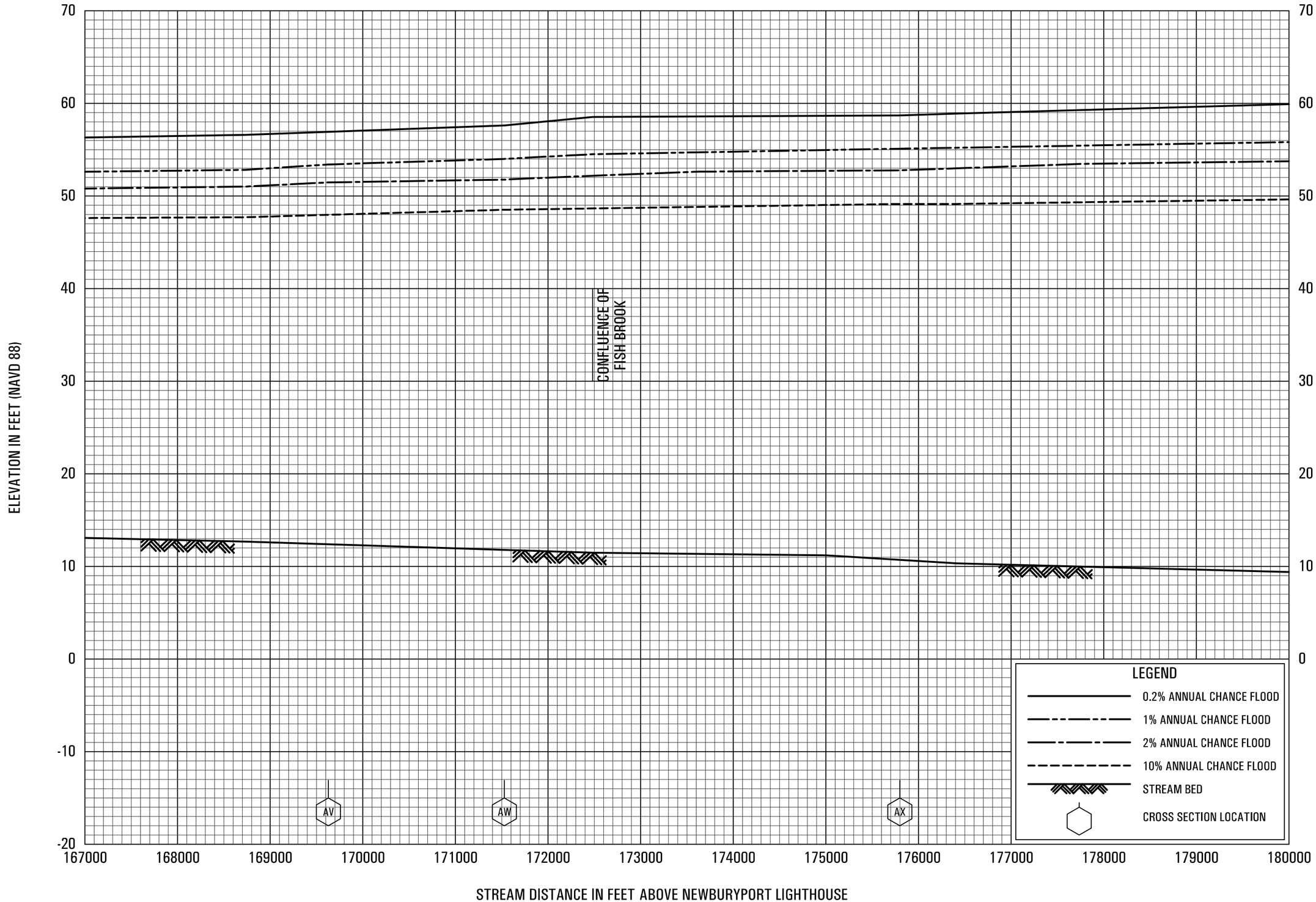
FLOOD PROFILES

MERRIMACK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



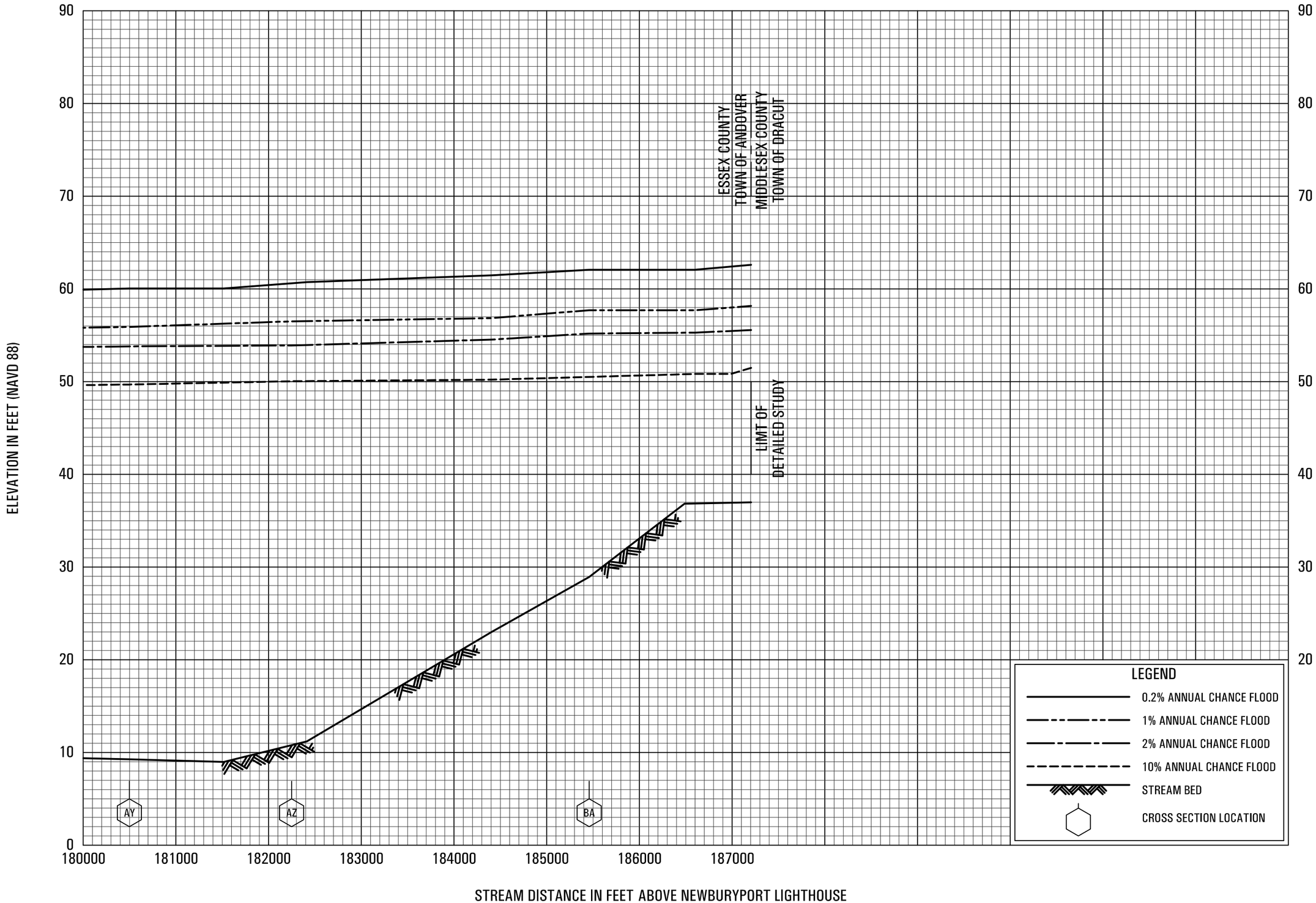
FLOOD PROFILES

MERRIMACK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



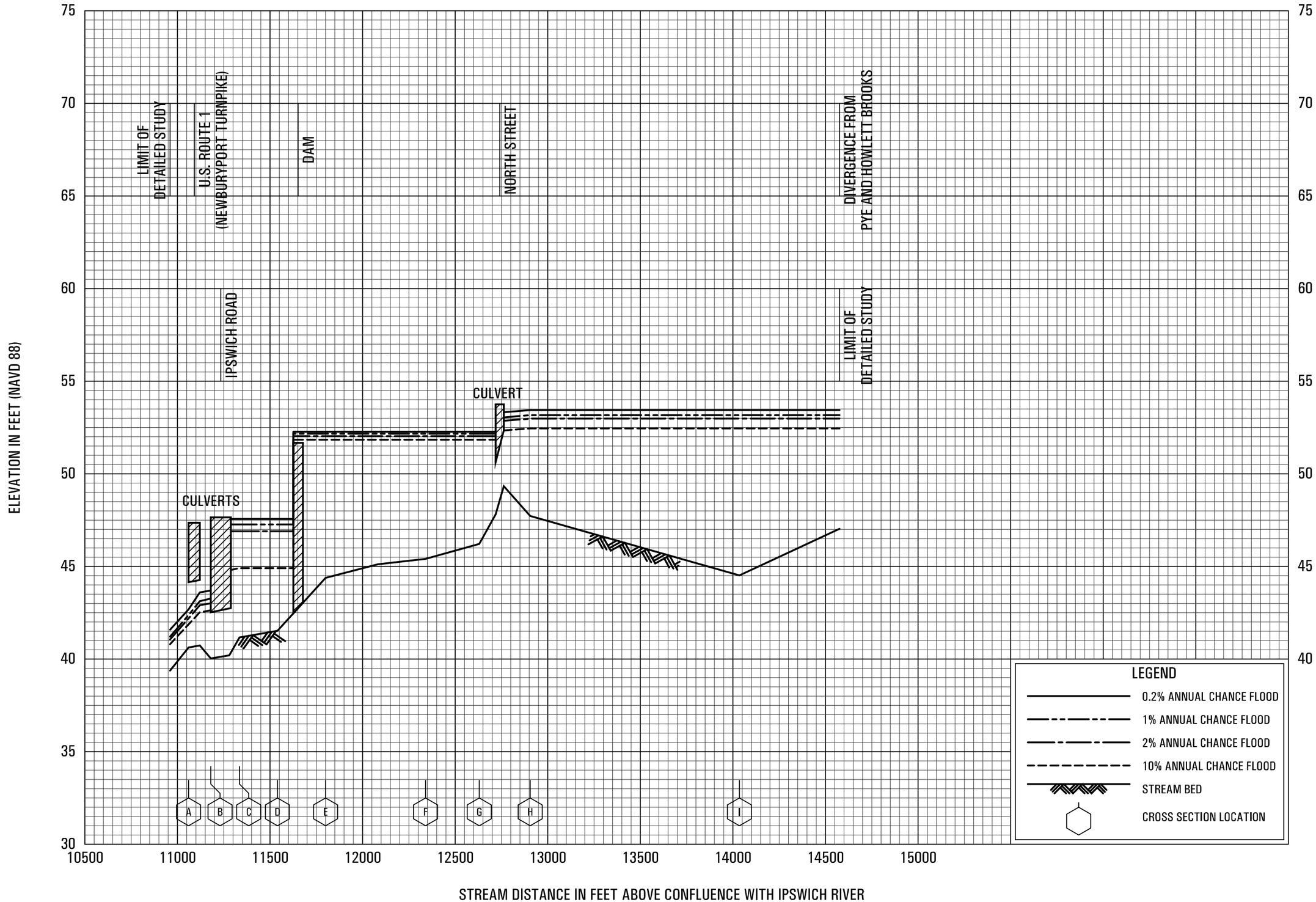
FLOOD PROFILES

MERRIMACK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



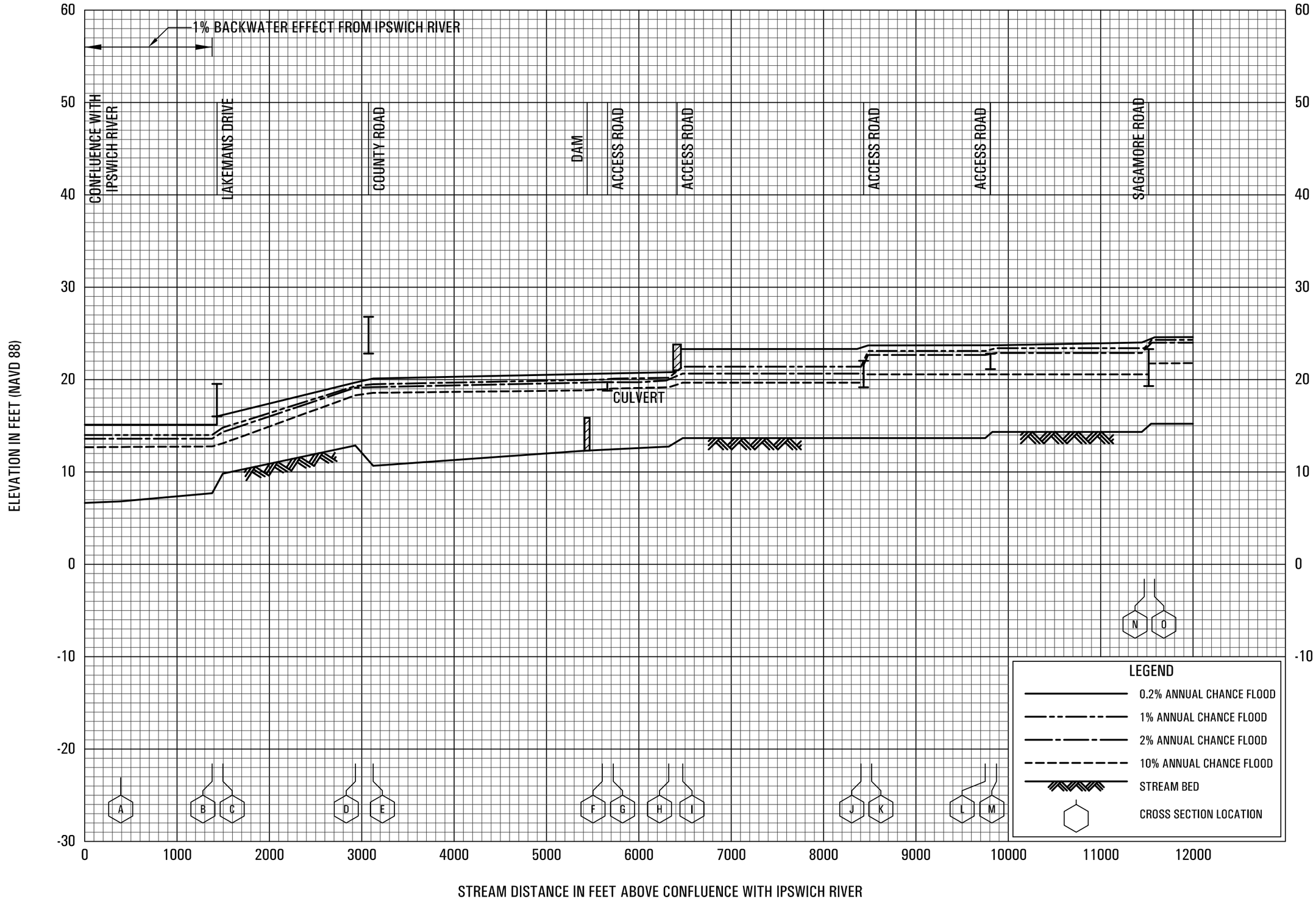
FLOOD PROFILES

MILE BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



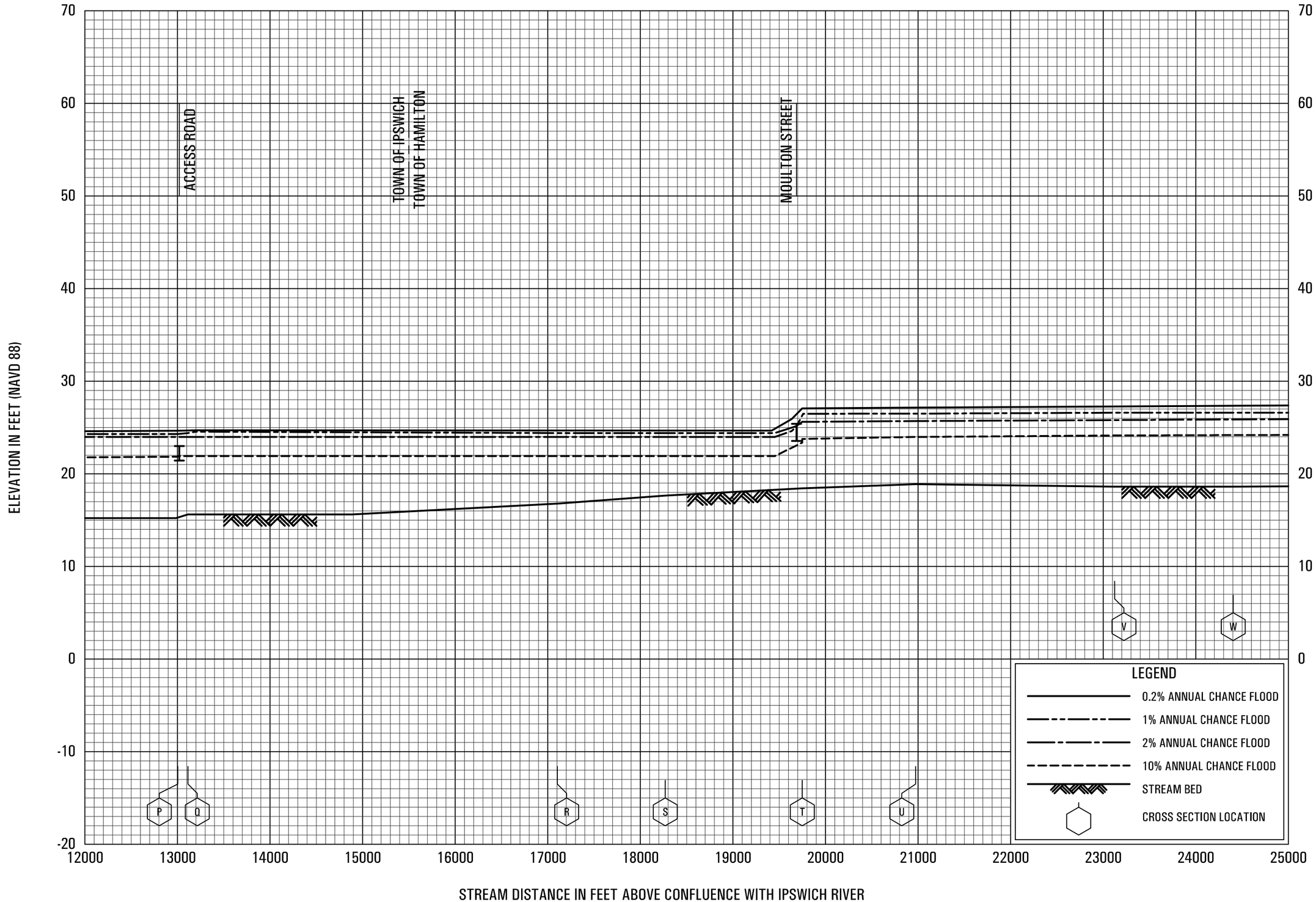
FLOOD PROFILES

MILES RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



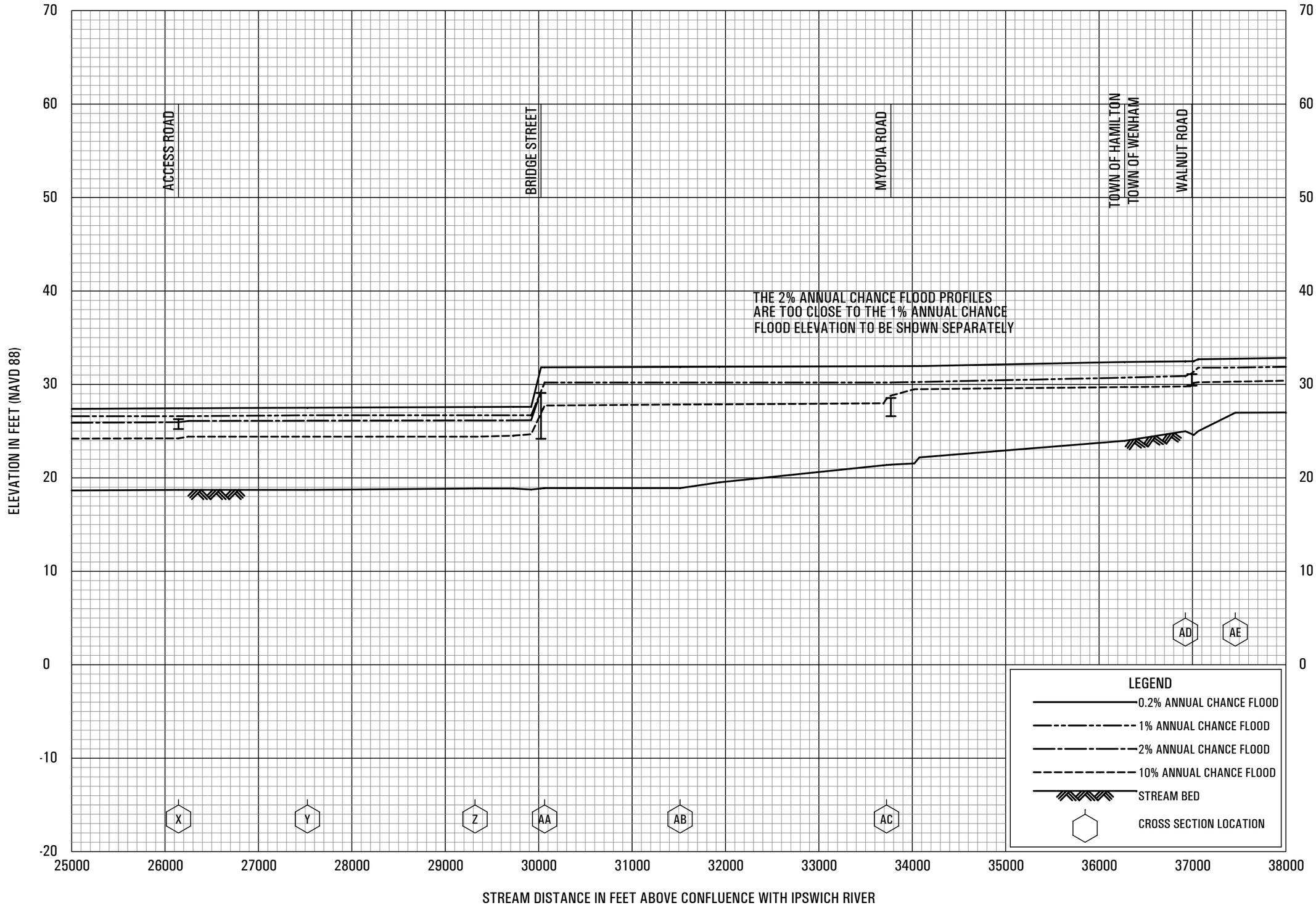
FLOOD PROFILES

MILES RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



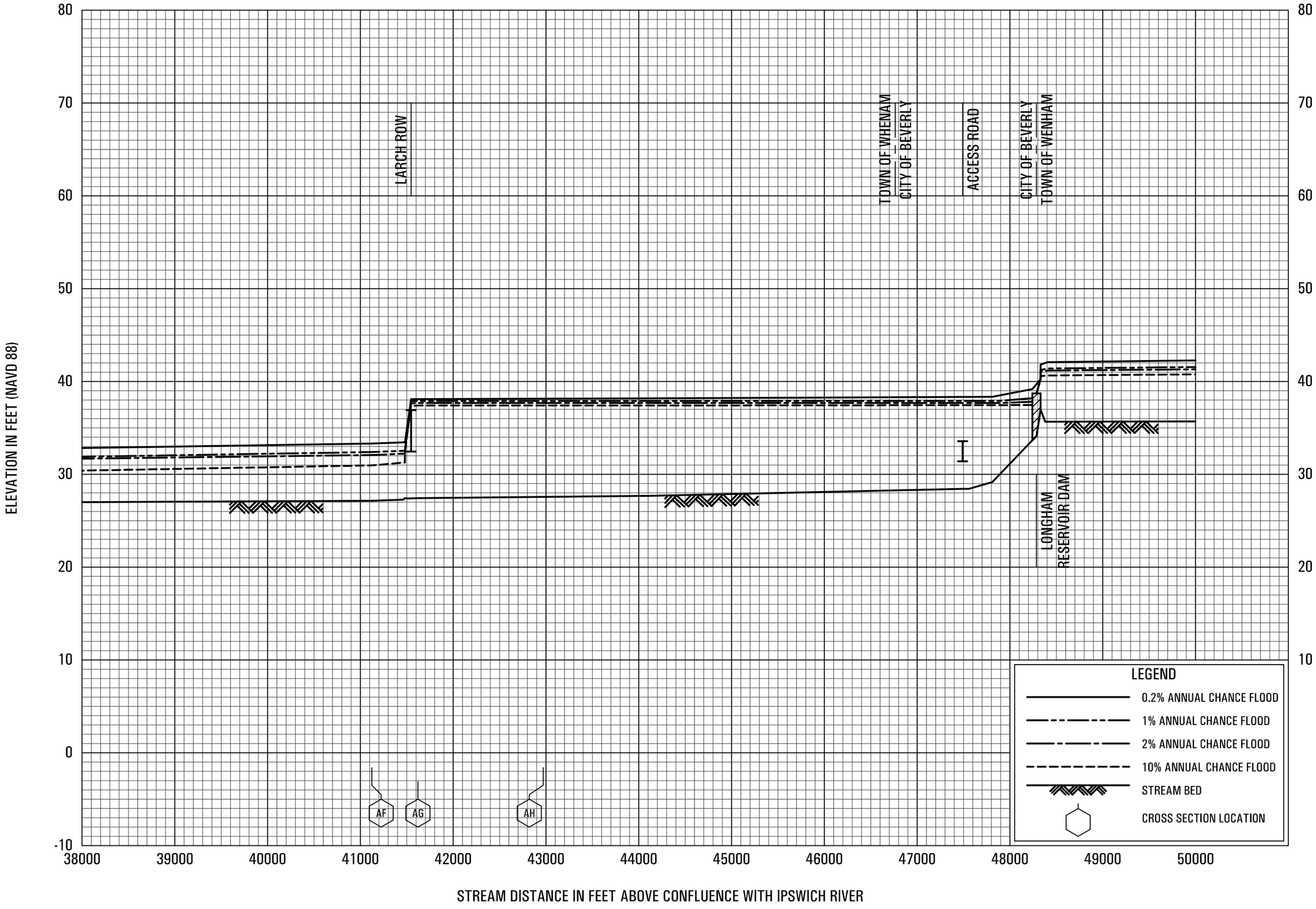
FLOOD PROFILES

MILES RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



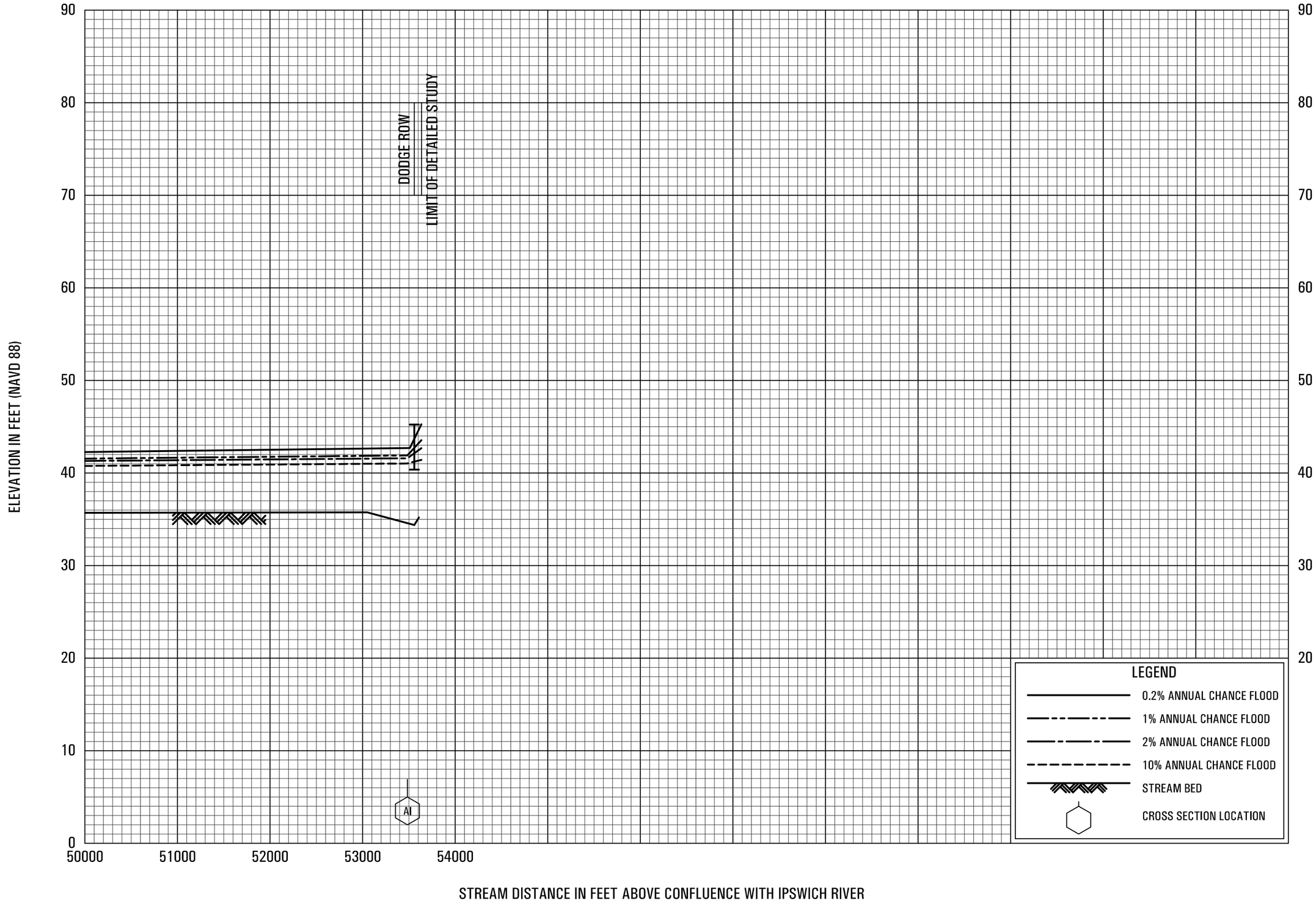
FLOOD PROFILES

MILES RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



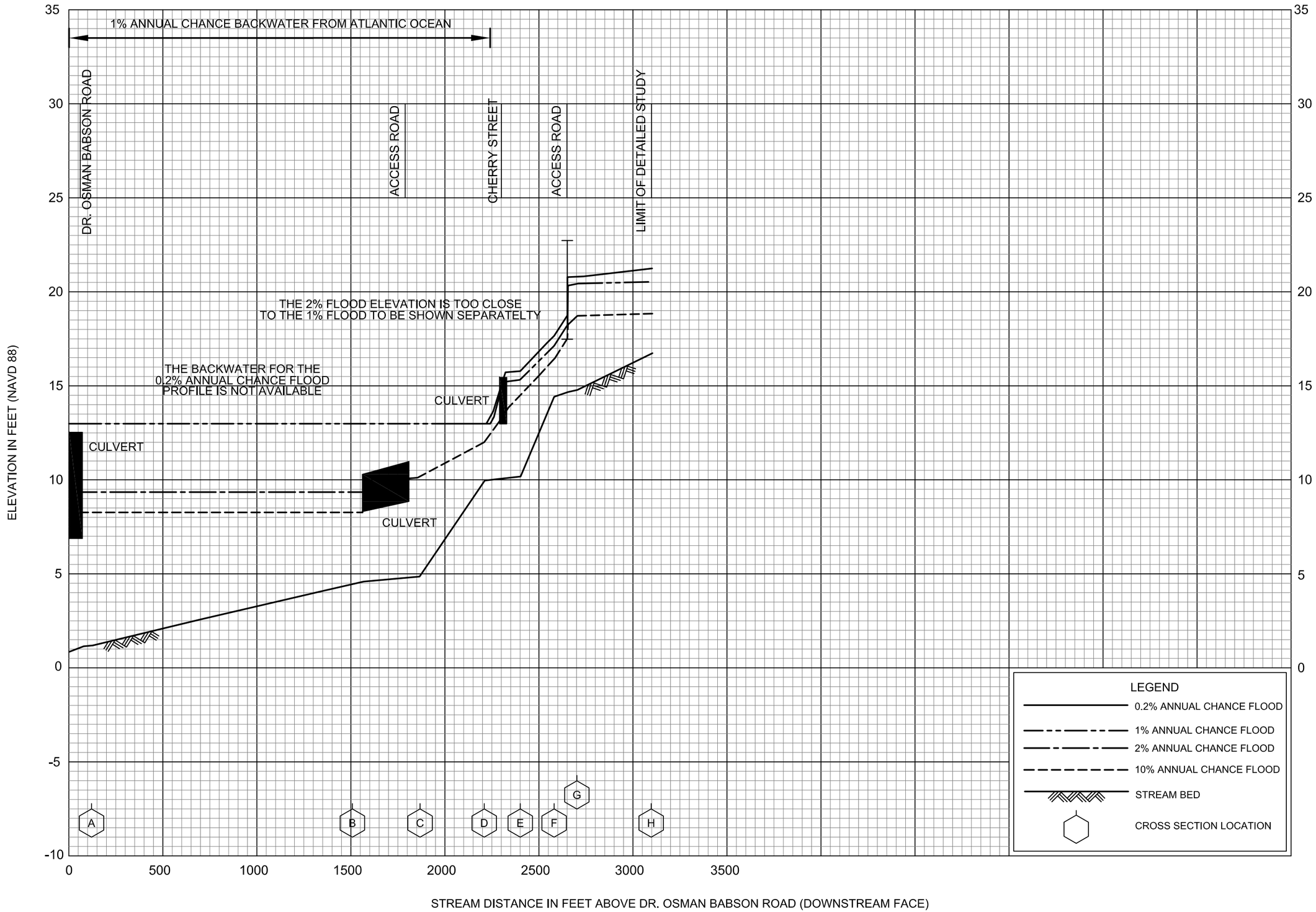
FLOOD PROFILES

MILES RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



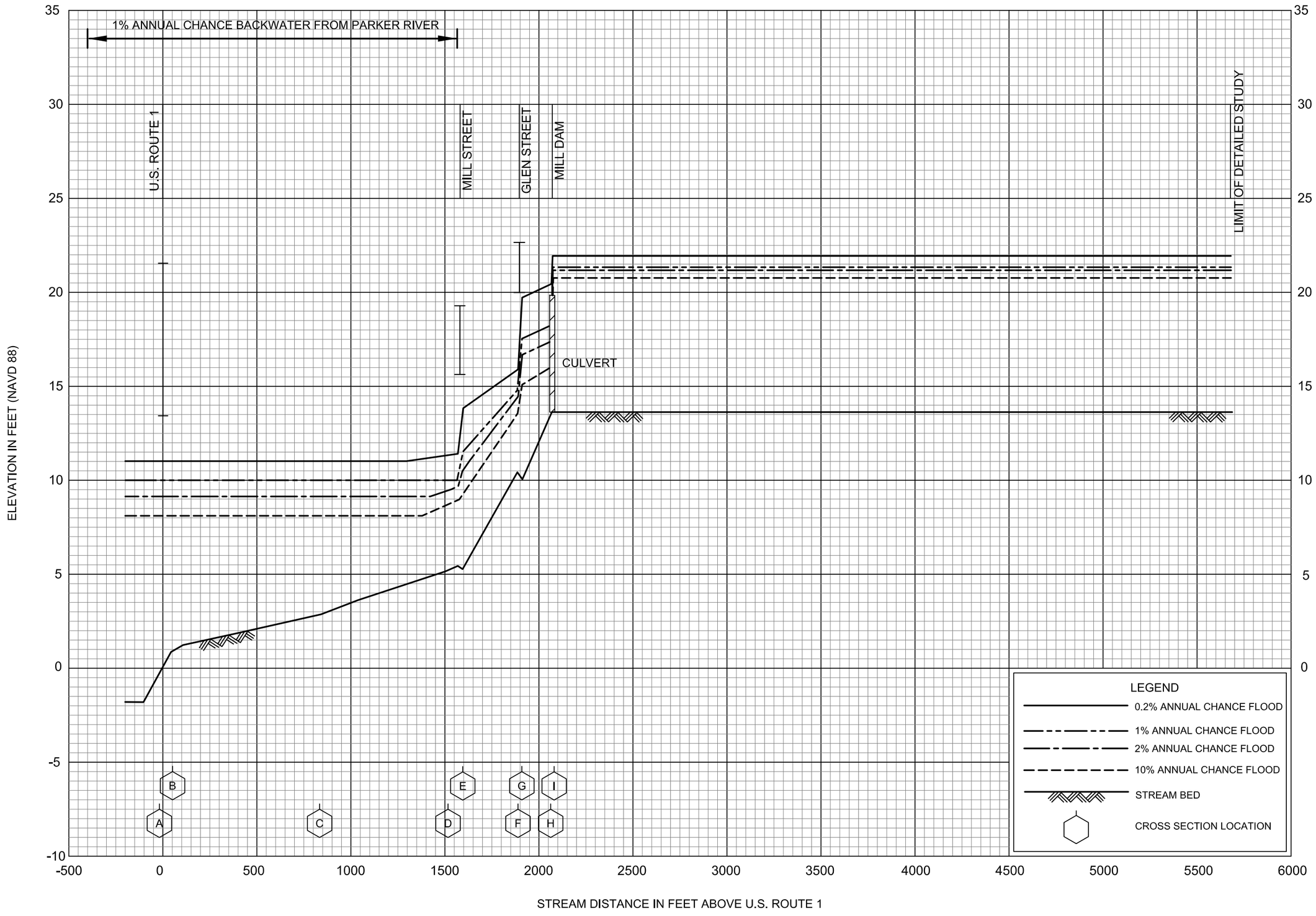
FLOOD PROFILES

MILL RIVER (CITY OF GLOUCESTER)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



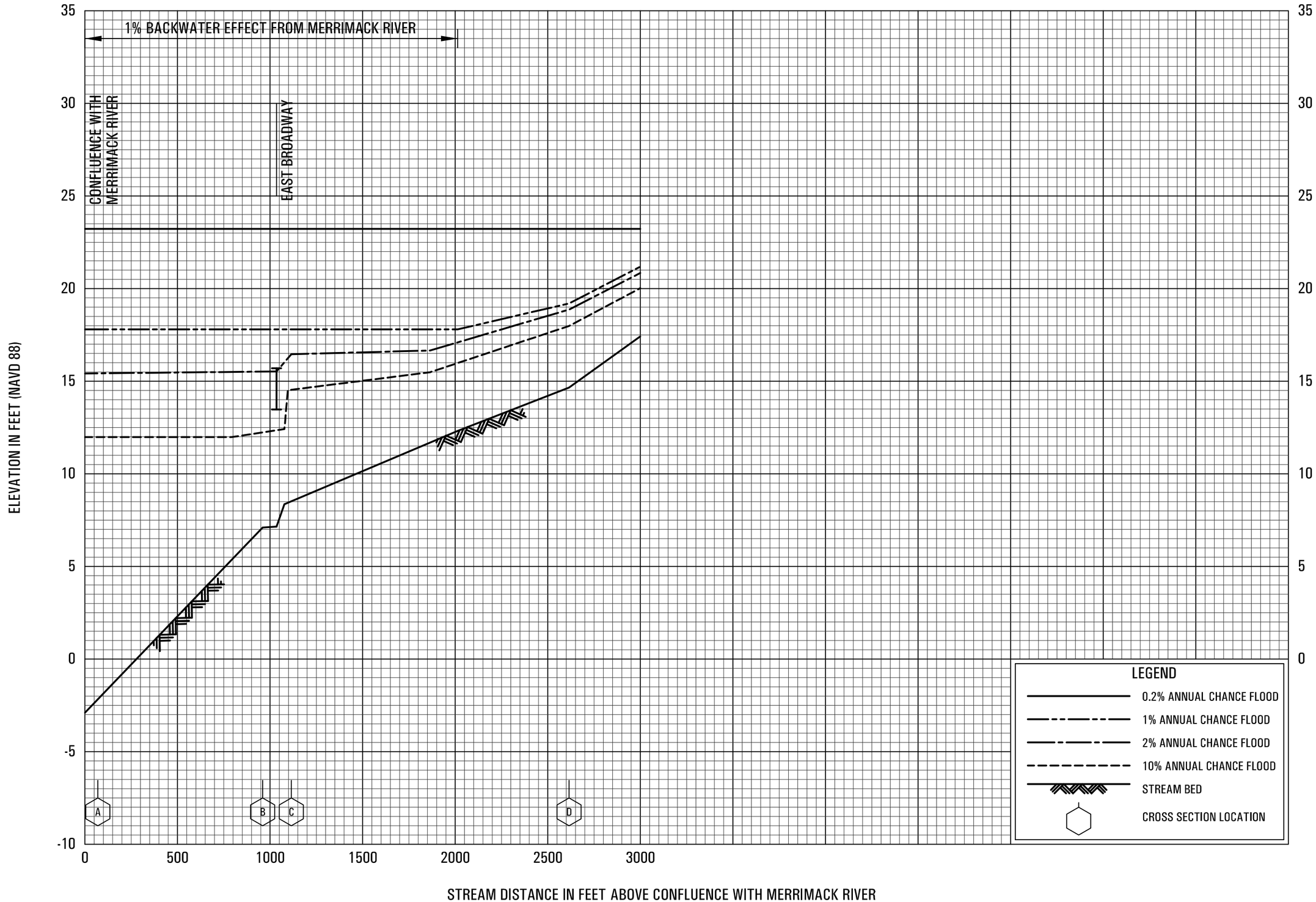
FLOOD PROFILES

MILL RIVER (TOWN OF ROWLEY)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



FLOOD PROFILES

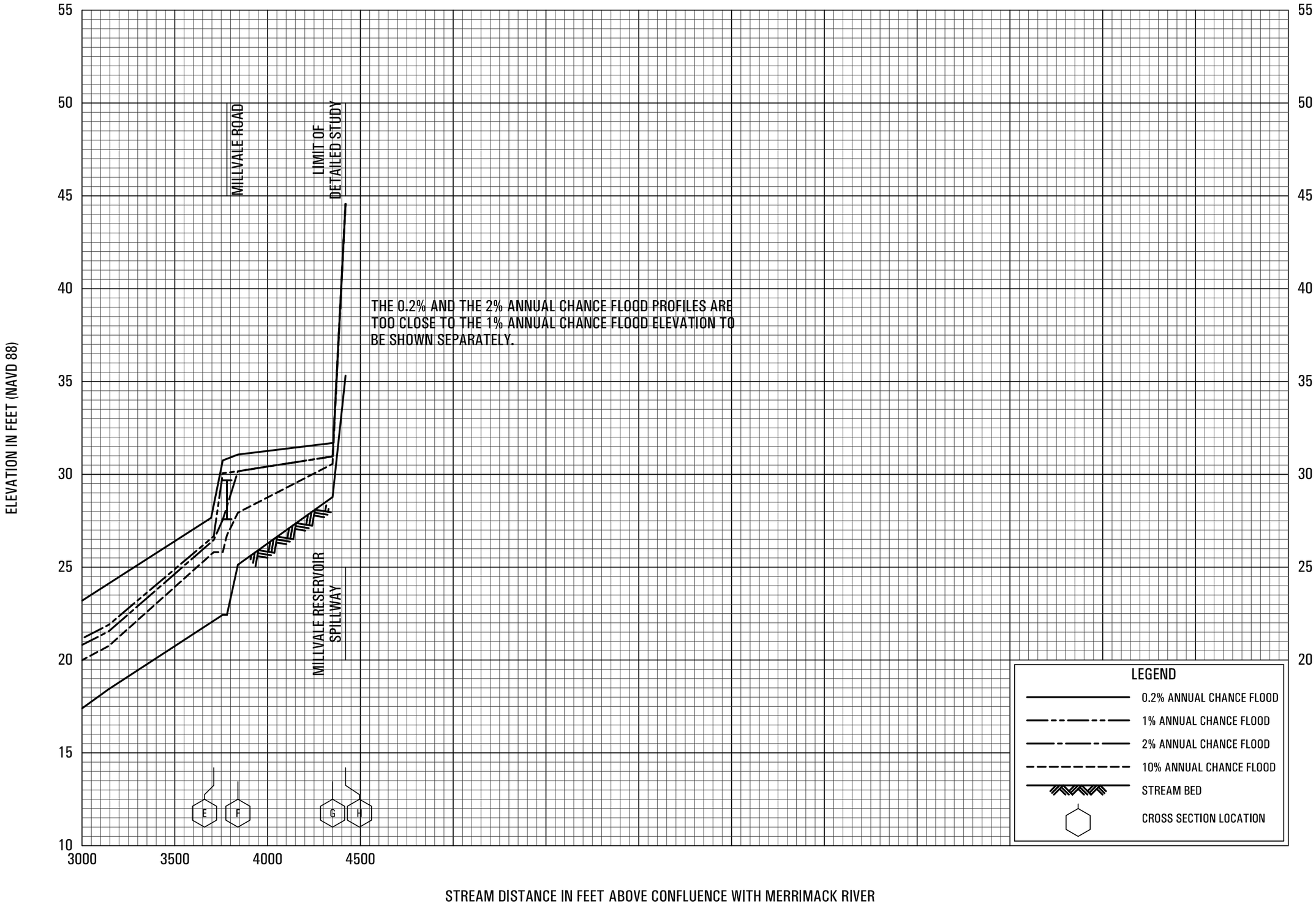
MILLVALE RESERVOIR BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)

101P



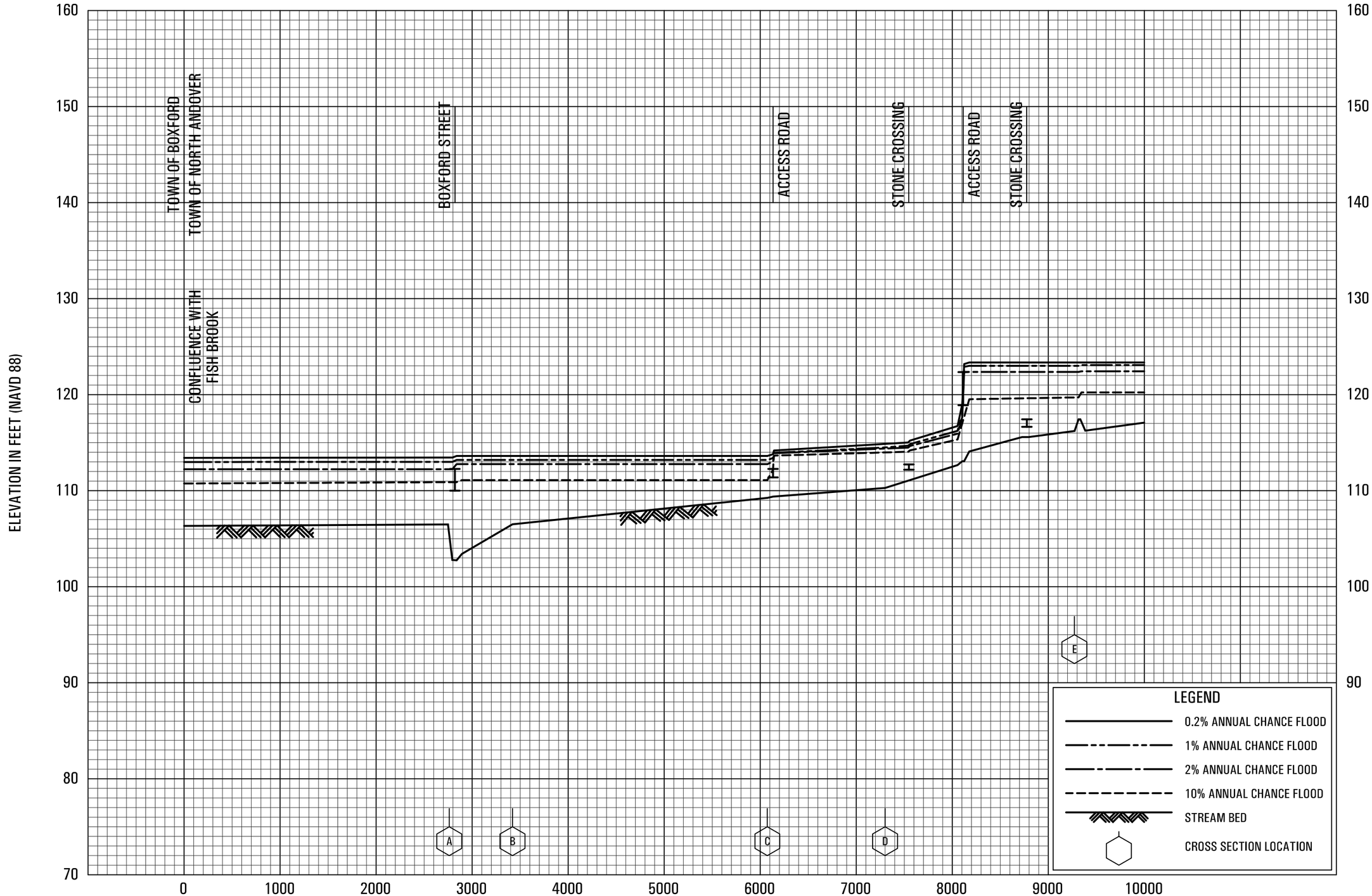
FLOOD PROFILES

MILLVALE RESERVOIR BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



RSQD@L CHRS@MBD HM EDDS @ANUD BNMEKTDMBD VHSG EHRG AQNNJ

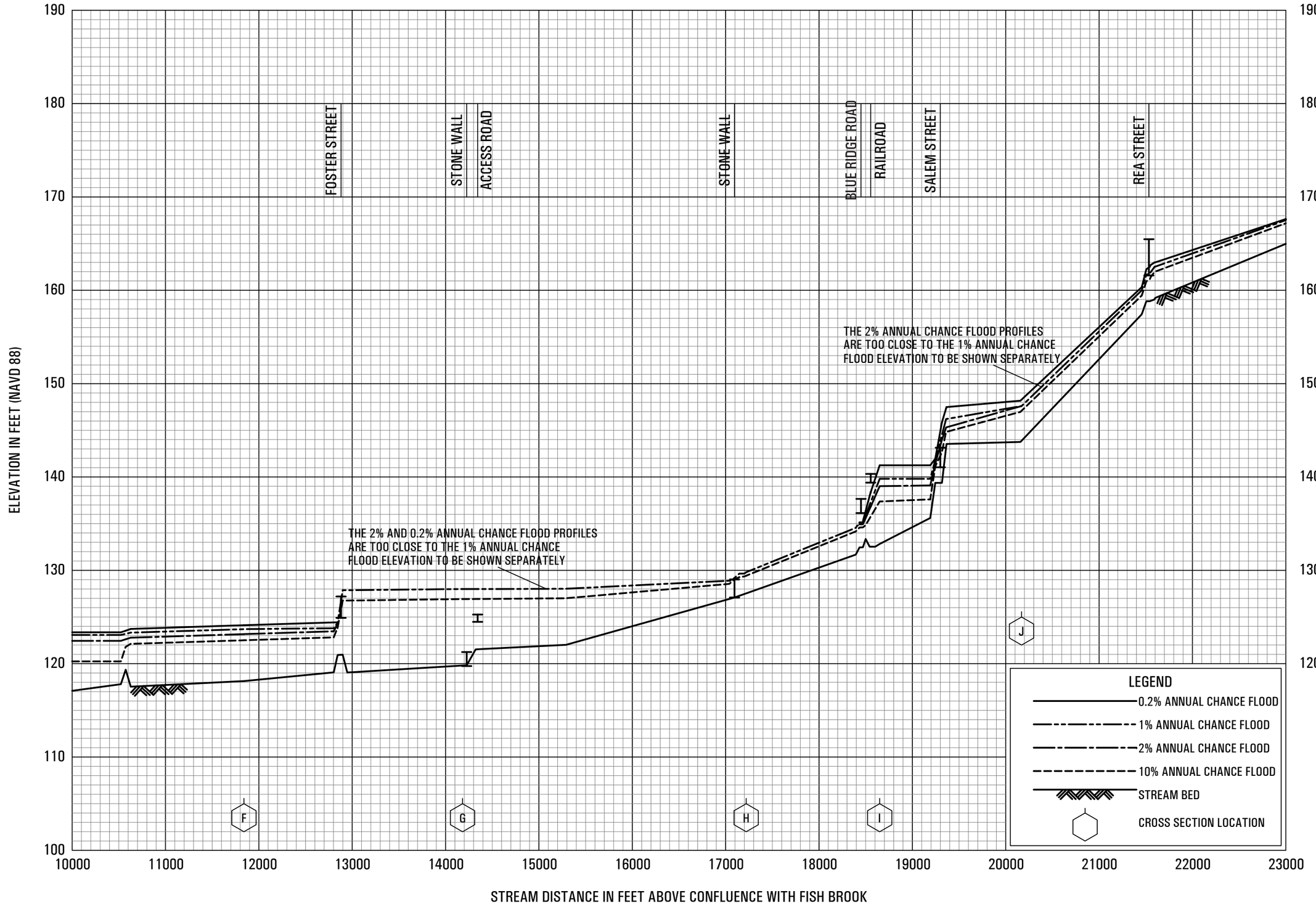
FLOOD PROFILES

MOSQUITO BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



FLOOD PROFILES

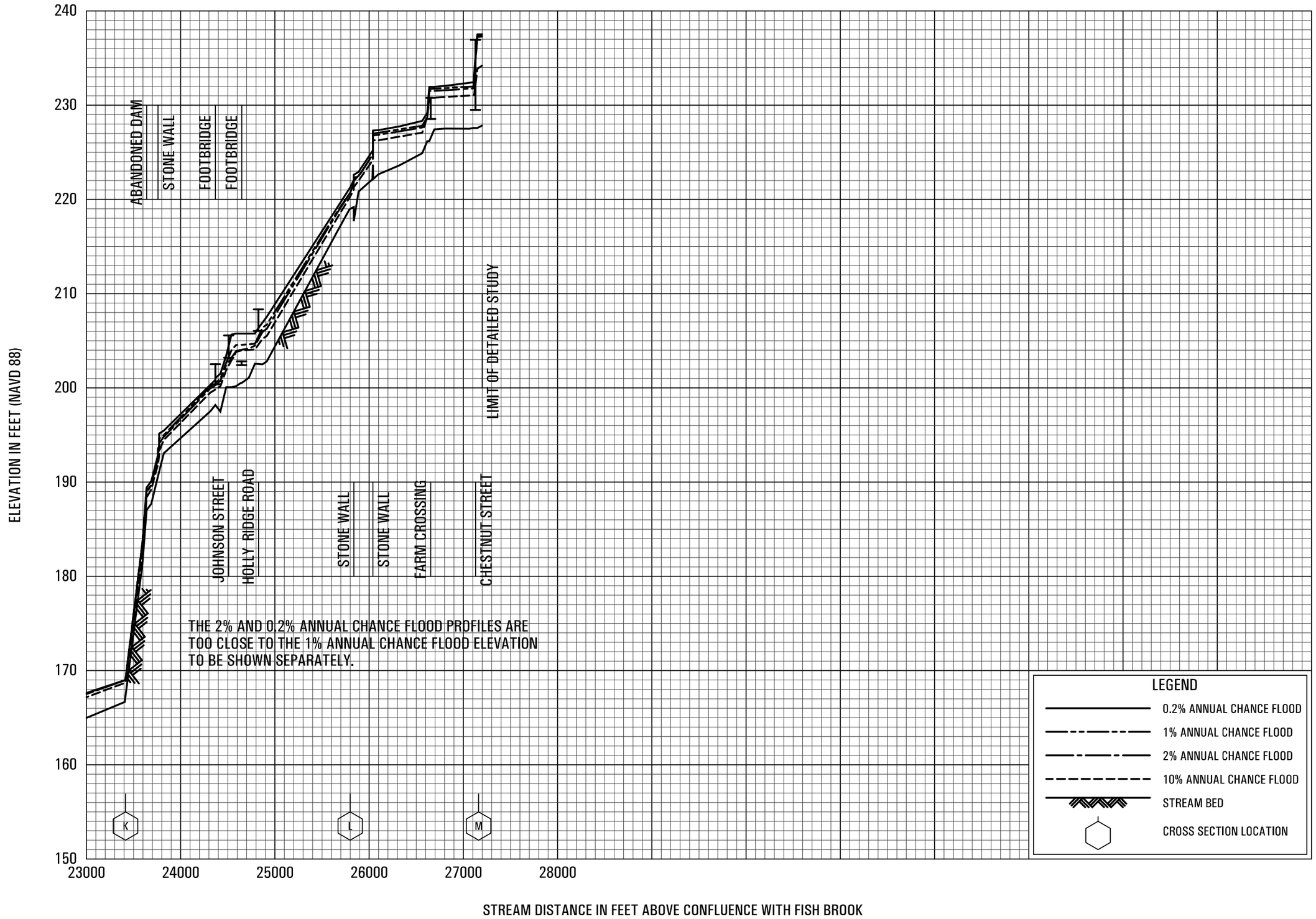
MOSQUITO BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)

104P



FLOOD PROFILES

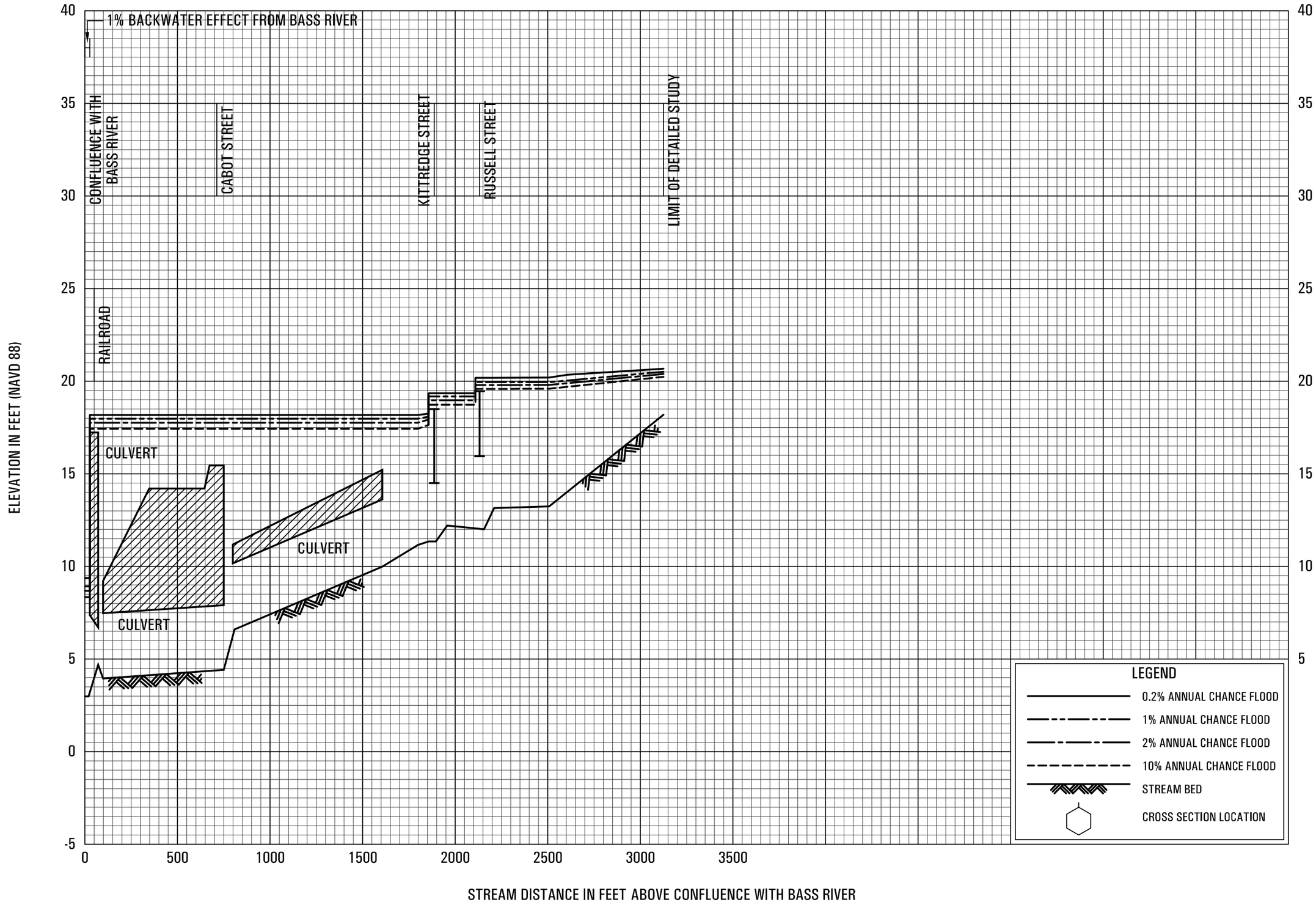
MOSQUITO BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)

105P



FLOOD PROFILES

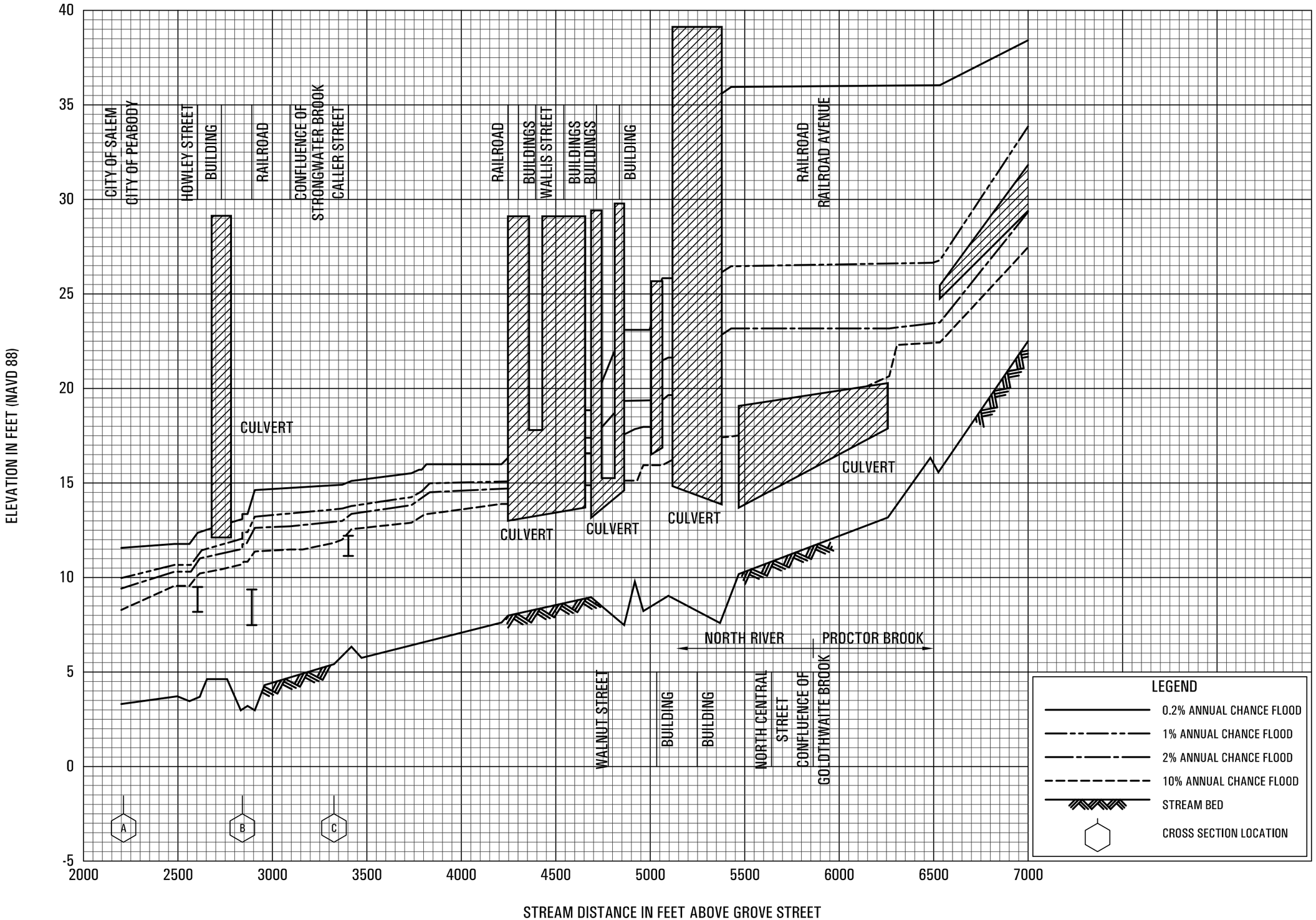
NORTH BEVERLY DRAINAGE DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)

106P



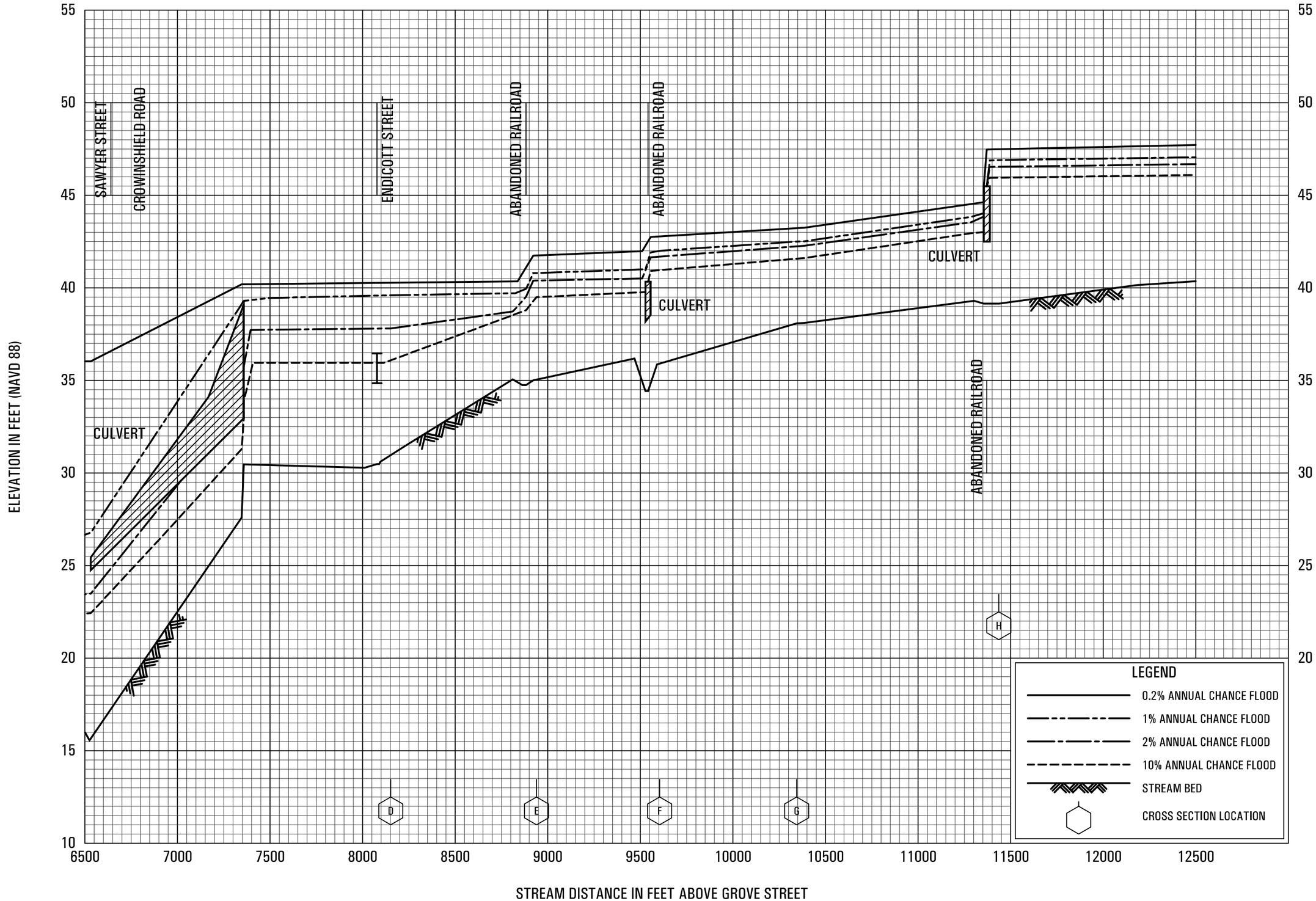
FLOOD PROFILES

NORTH RIVER AND PROCTOR BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



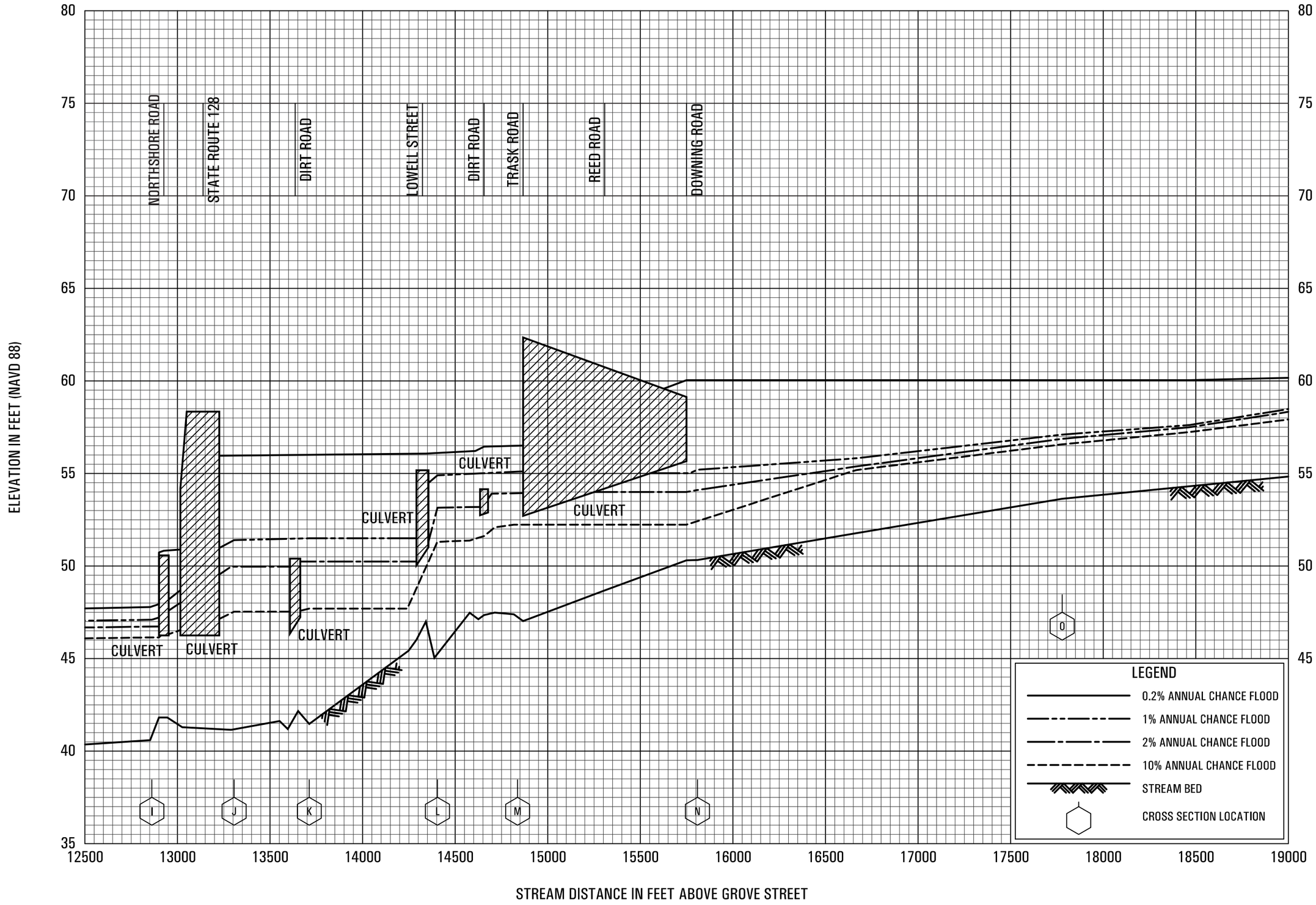
FLOOD PROFILES

PROCTOR BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



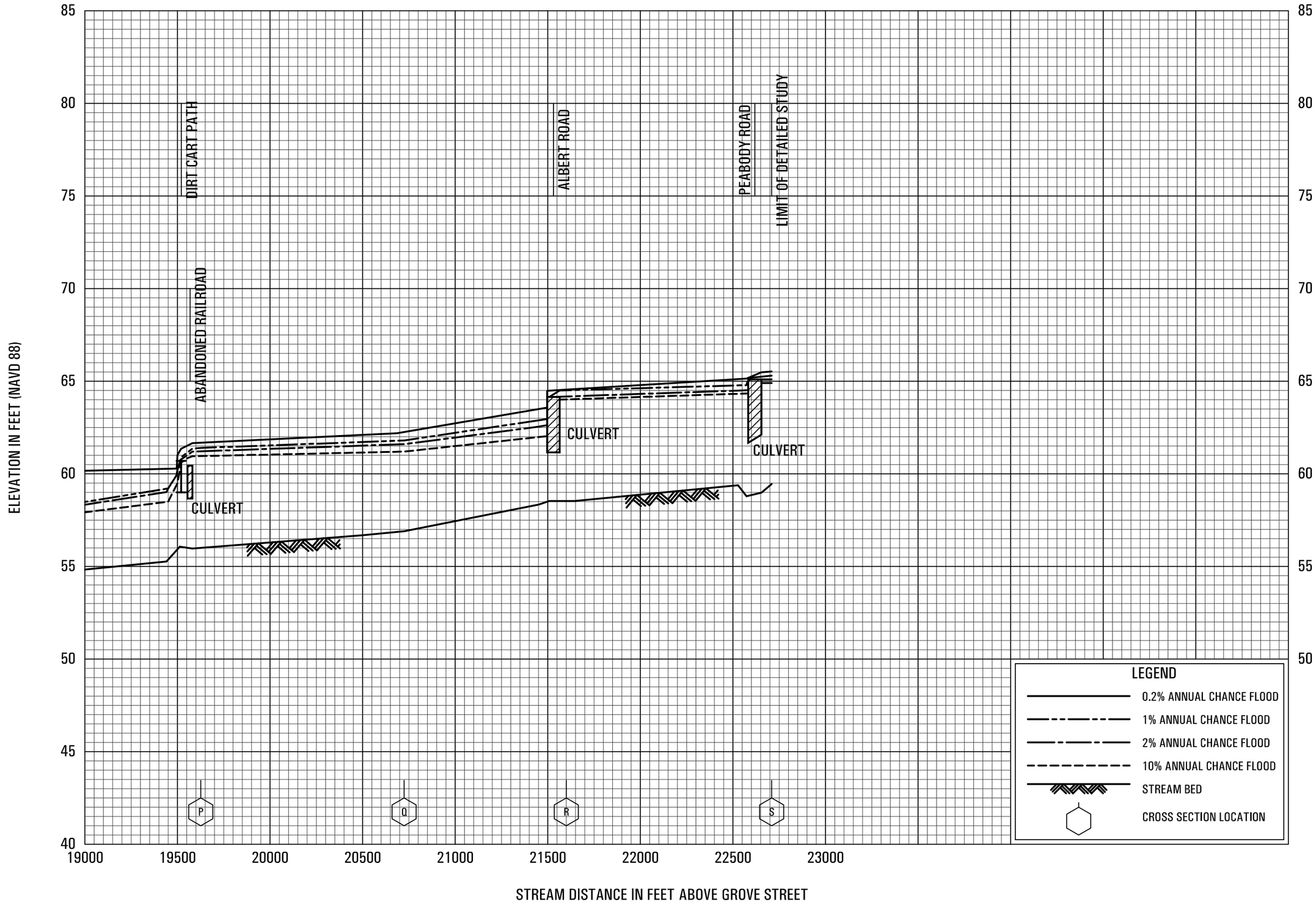
FLOOD PROFILES

PROCTOR BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



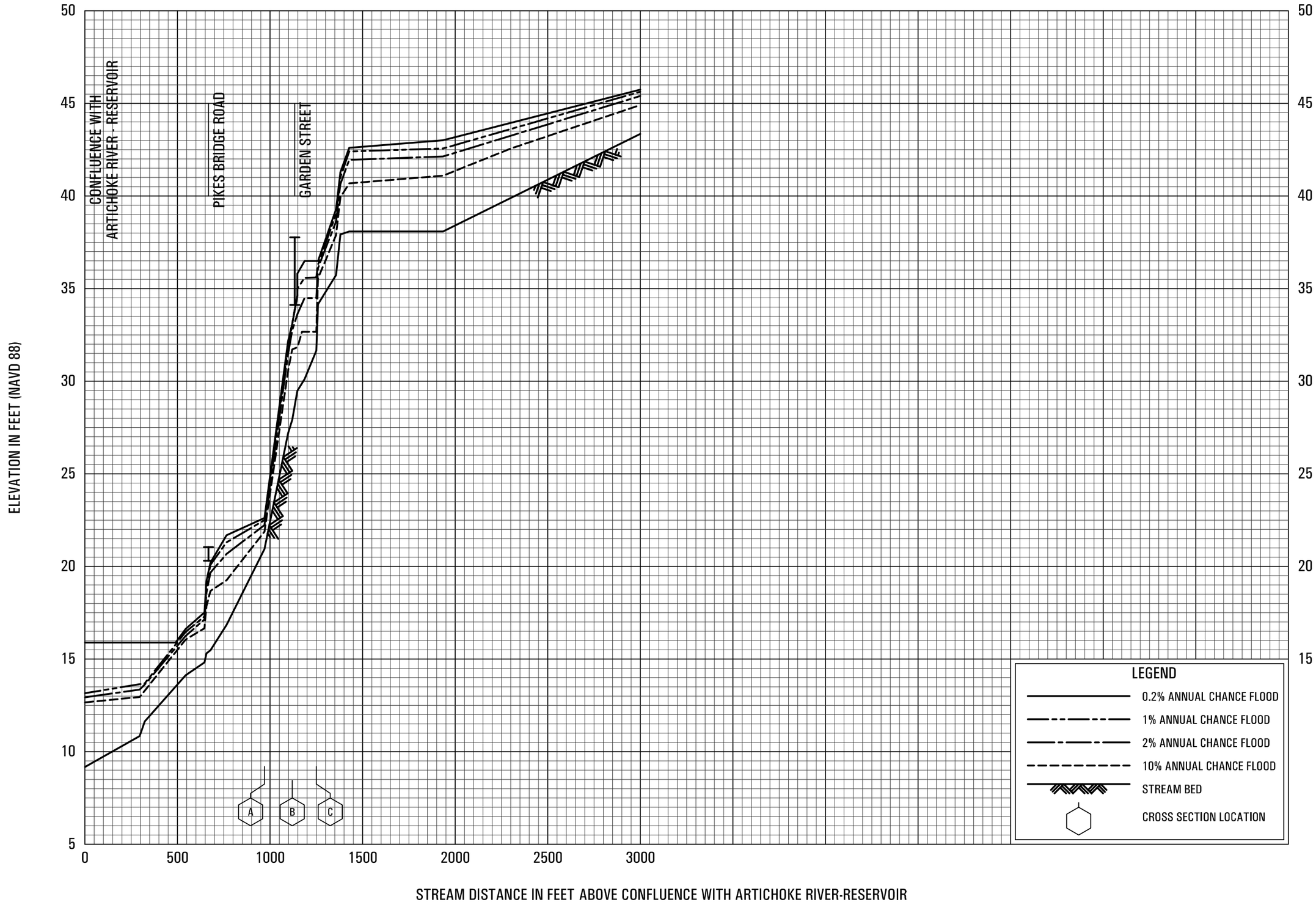
FLOOD PROFILES

PROCTOR BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



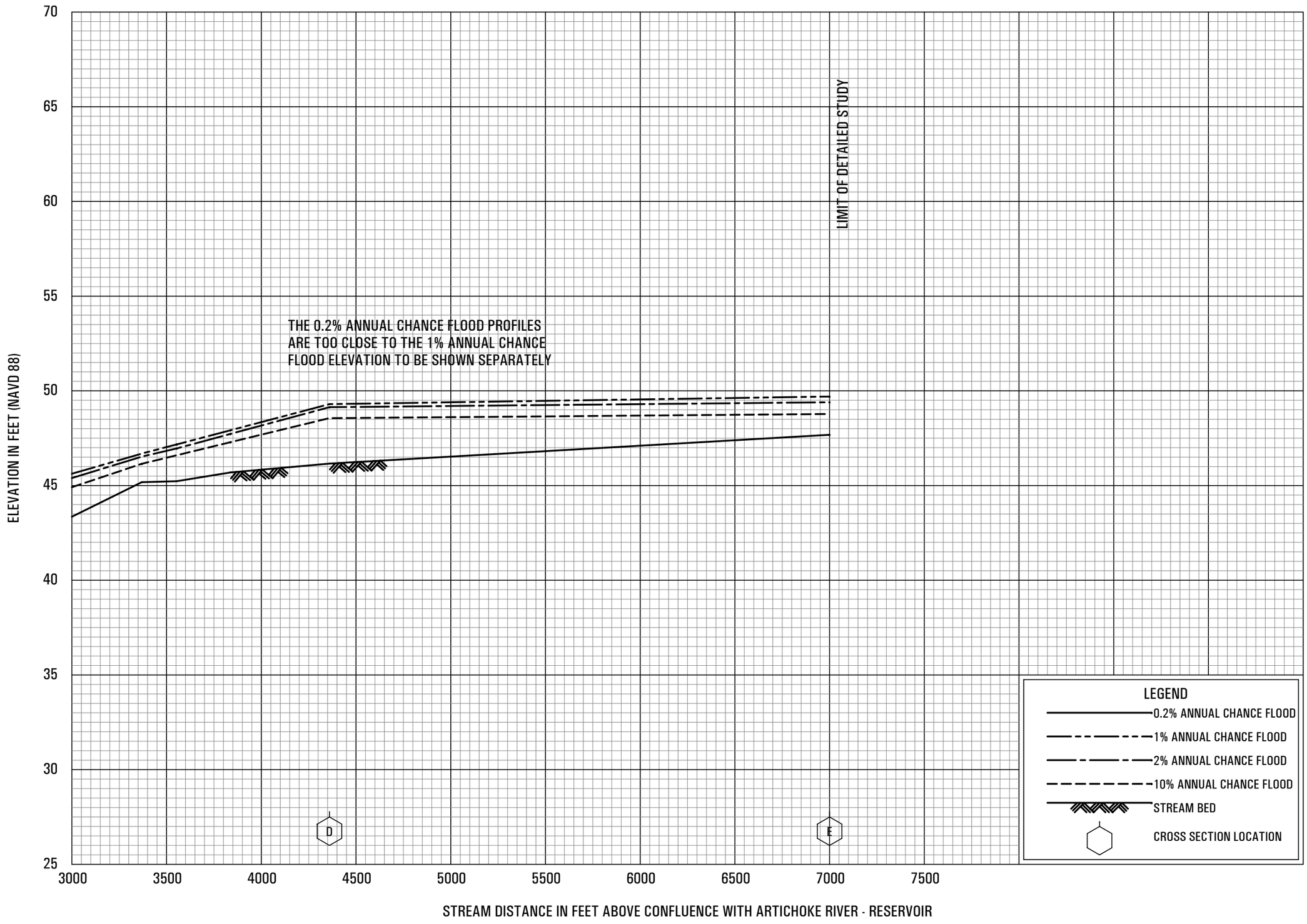
FLOOD PROFILES

NORTH TRIBUTARY BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



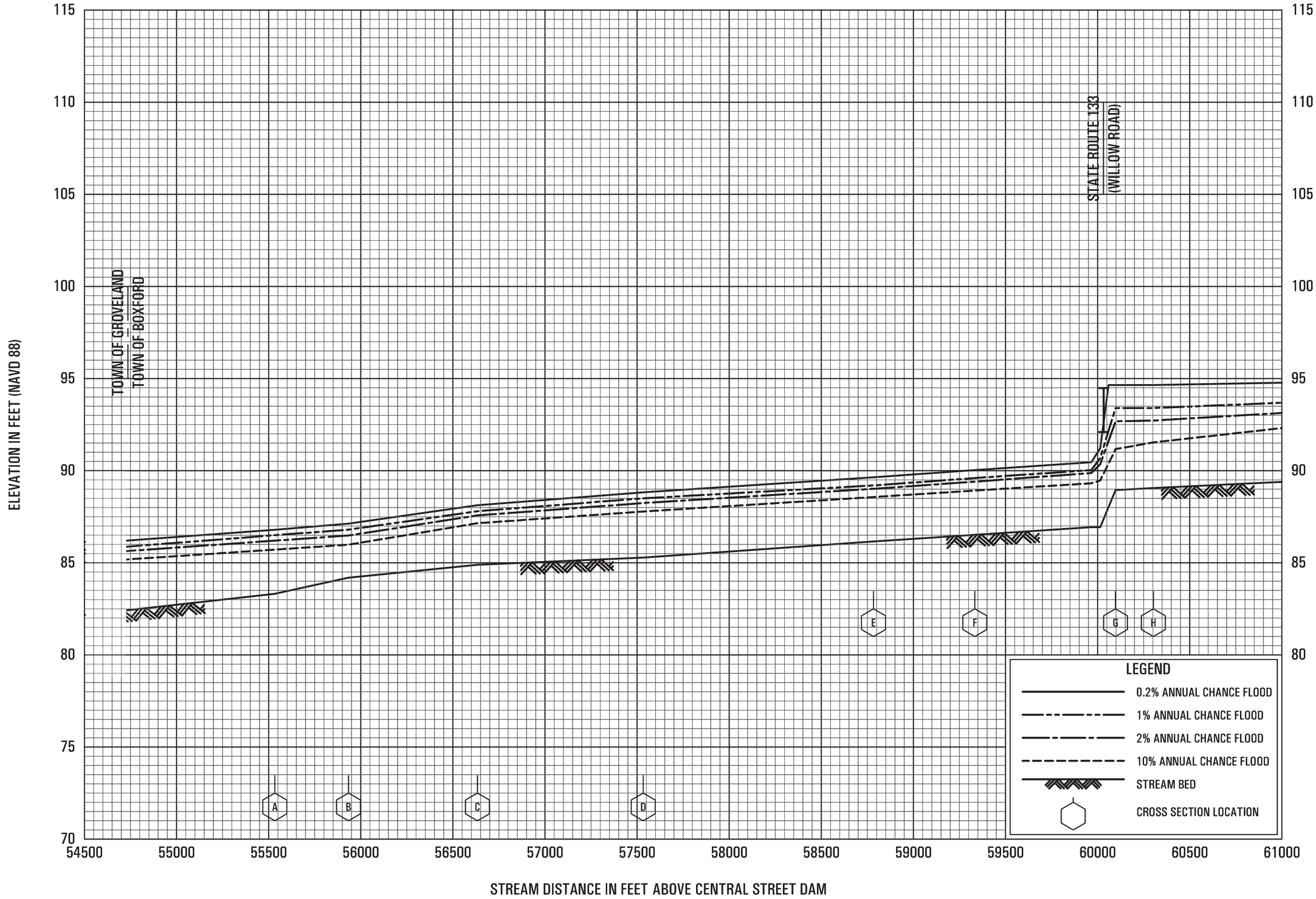
FLOOD PROFILES

NORTH TRIBUTARY BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



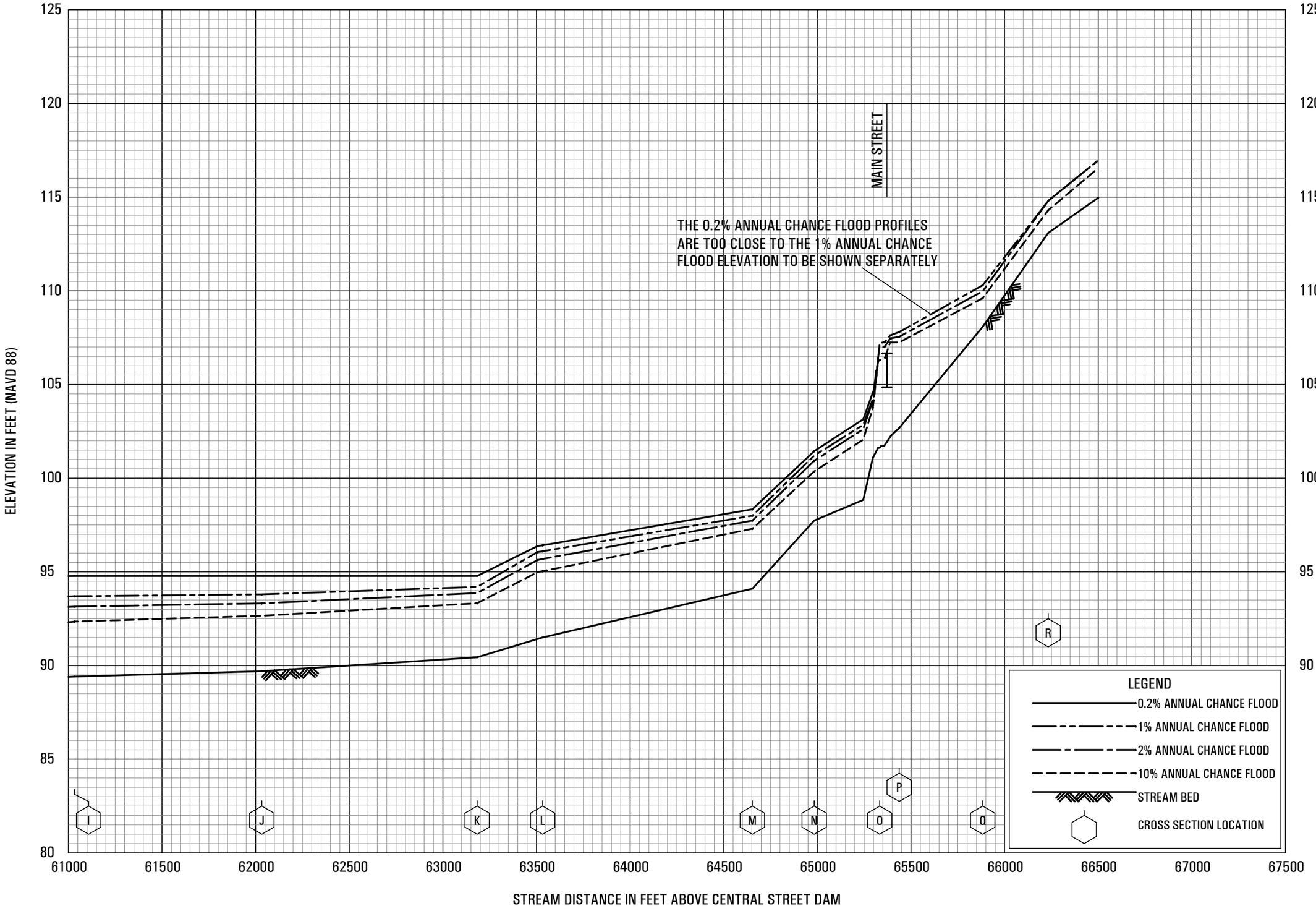
FLOOD PROFILES

PARKER RIVER (TOWN OF BOXFORD)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



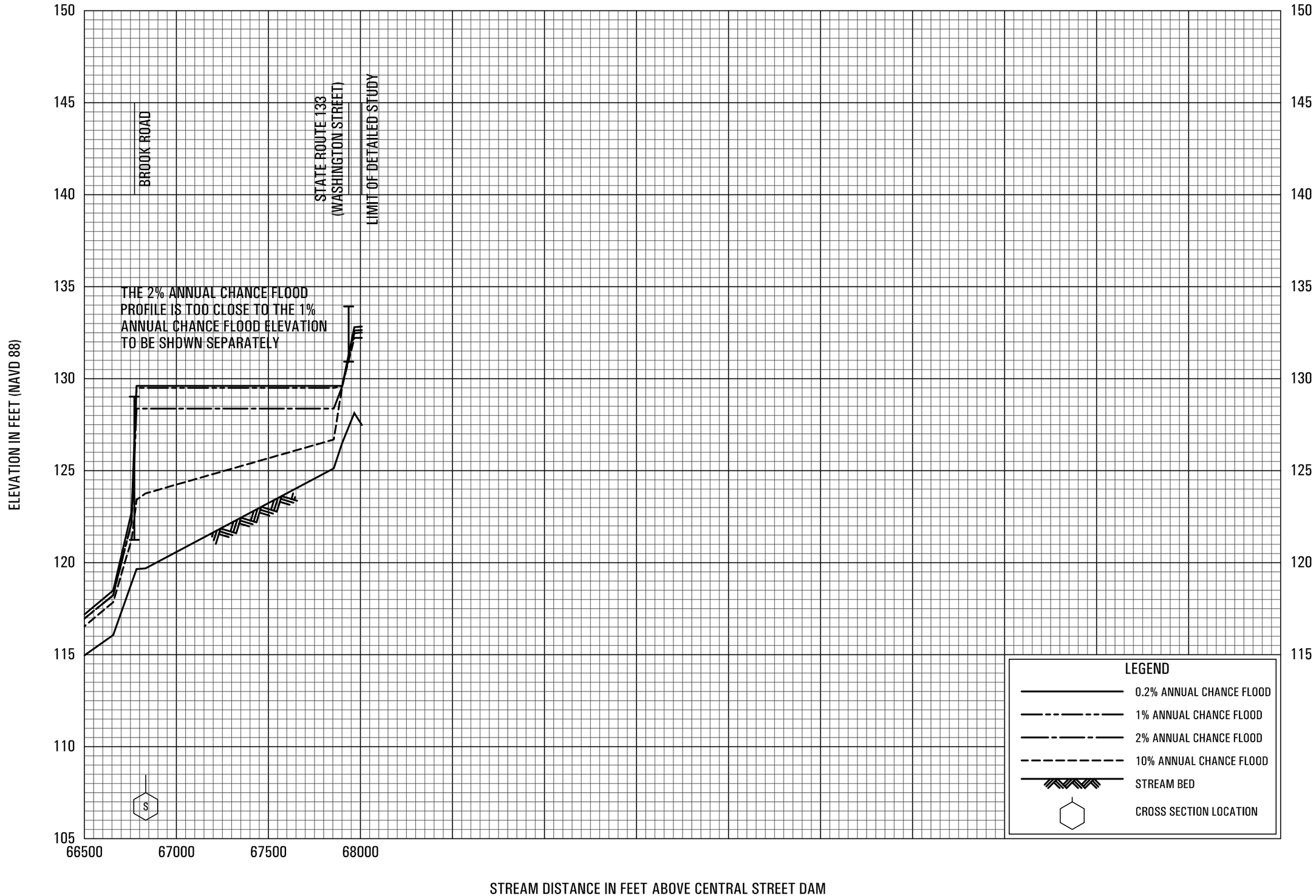
FLOOD PROFILES

PARKER RIVER (TOWN OF BOXFORD)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



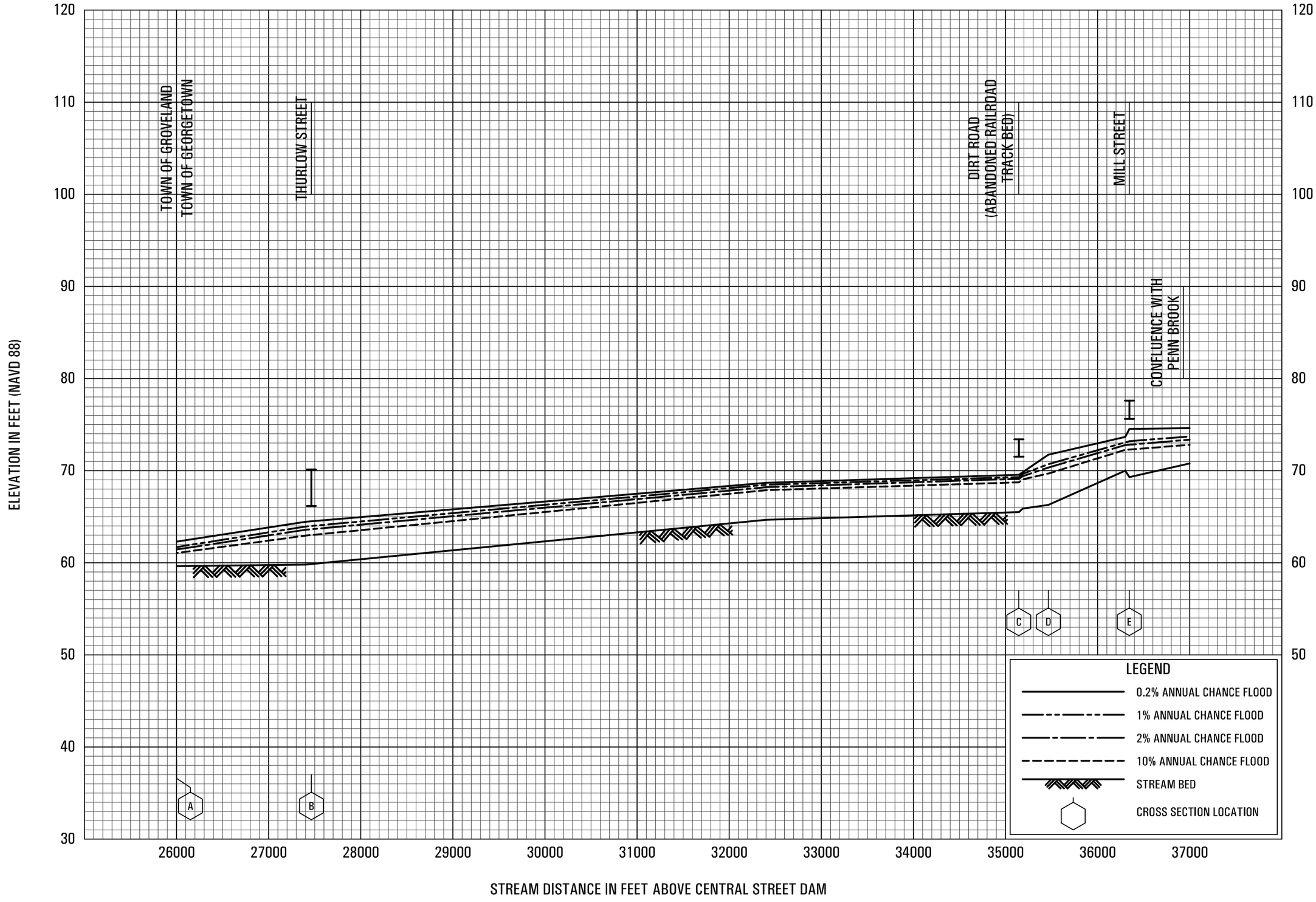
FLOOD PROFILES

PARKER RIVER (TOWN OF BOXFORD)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



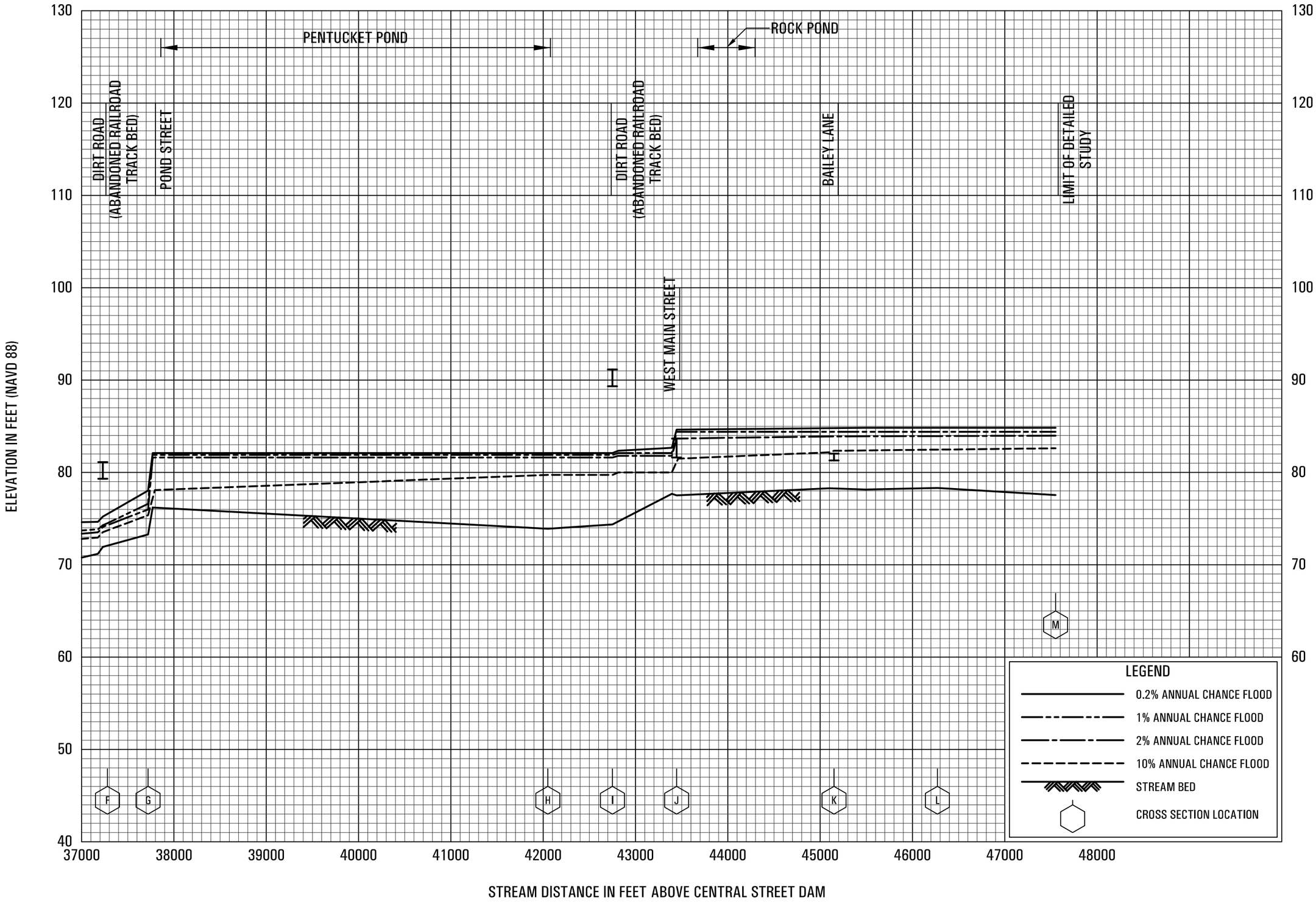
FLOOD PROFILES

PARKER RIVER (TOWN OF GEORGETOWN)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



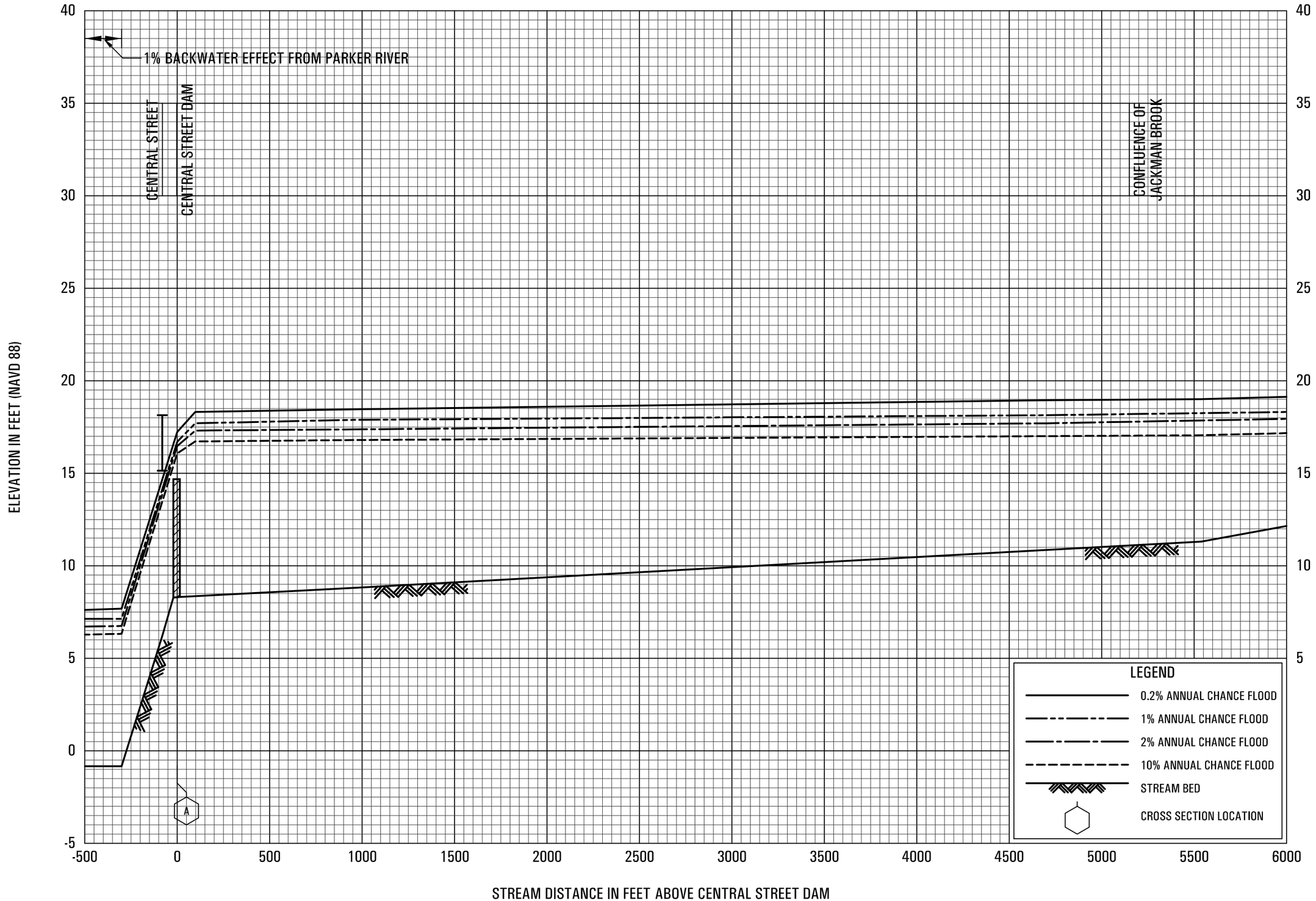
FLOOD PROFILES

PARKER RIVER (TOWN OF GEORGETOWN)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



FLOOD PROFILES

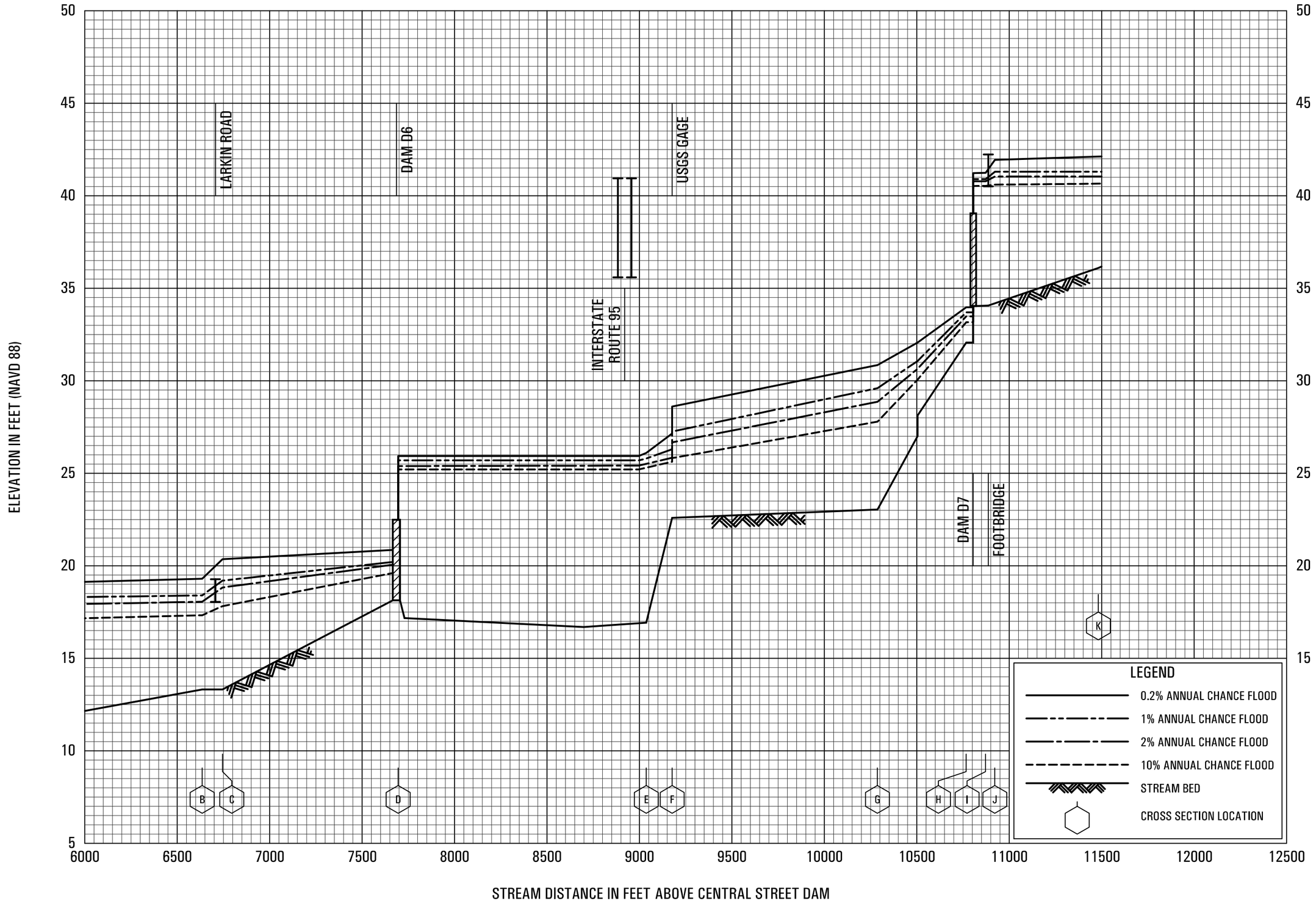
PARKER RIVER (TOWN OF NEWBURY)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)

118P



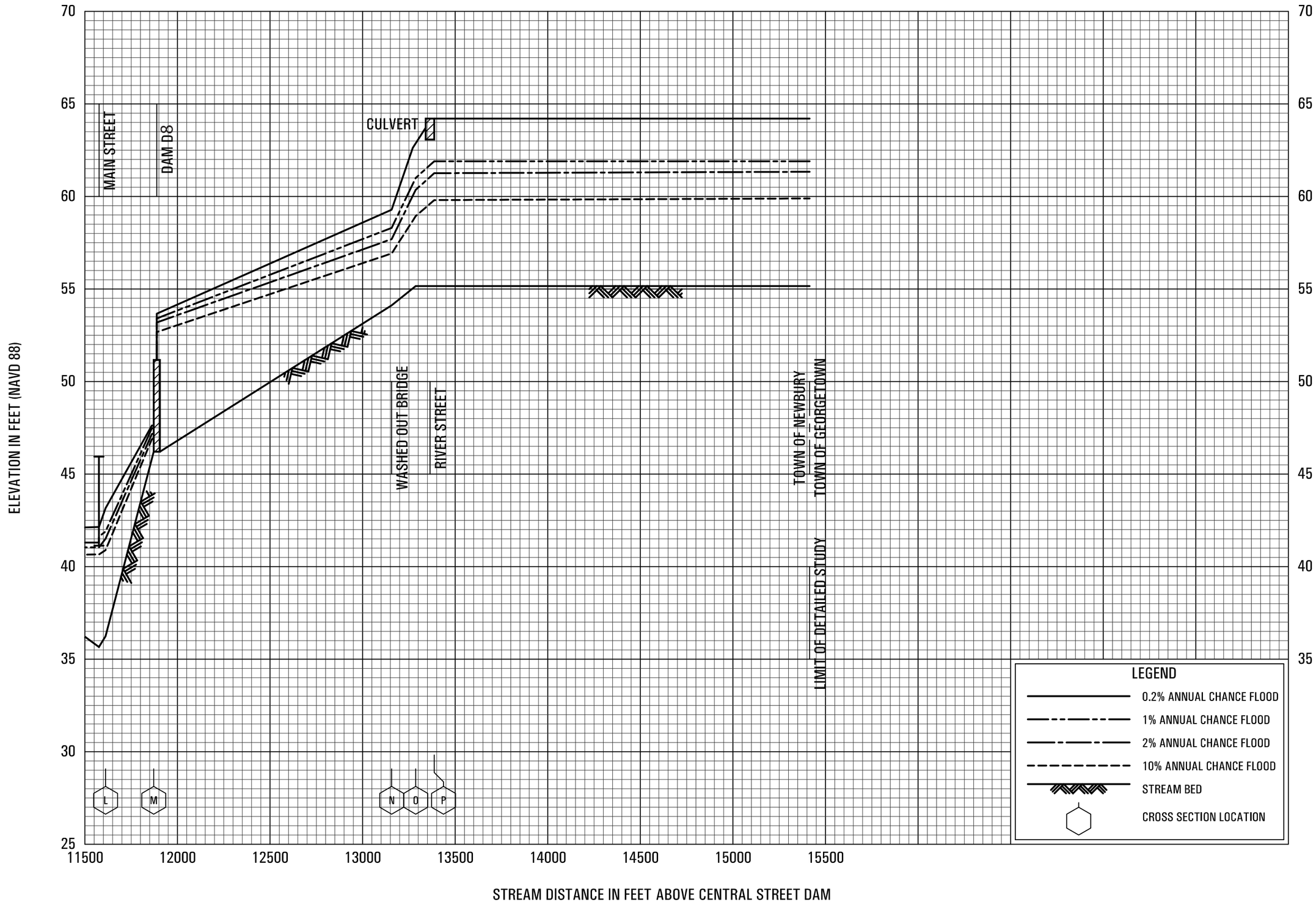
FLOOD PROFILES

PARKER RIVER (TOWN OF NEWBURY)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



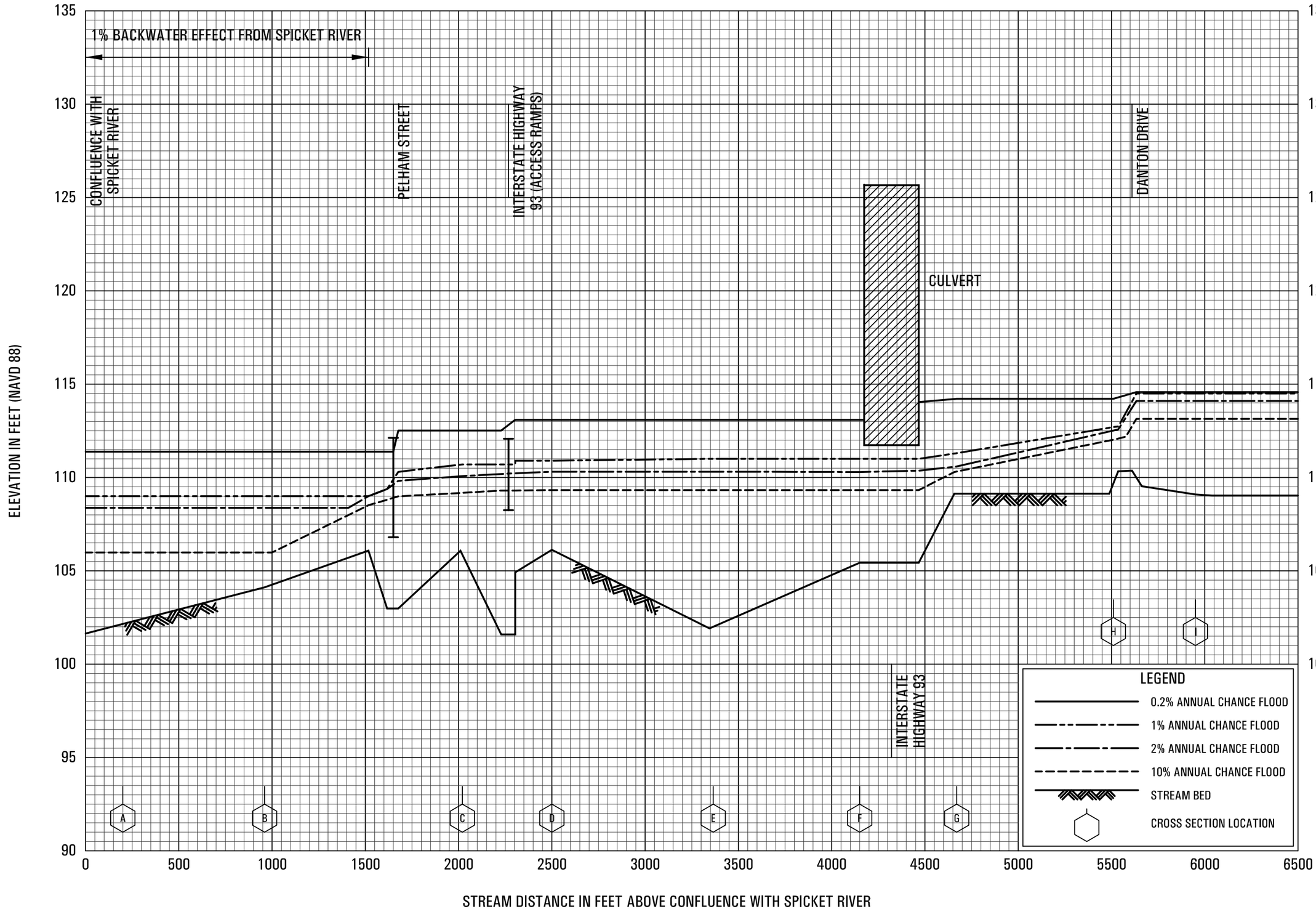
FLOOD PROFILES

PARKER RIVER (TOWN OF NEWBURY)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



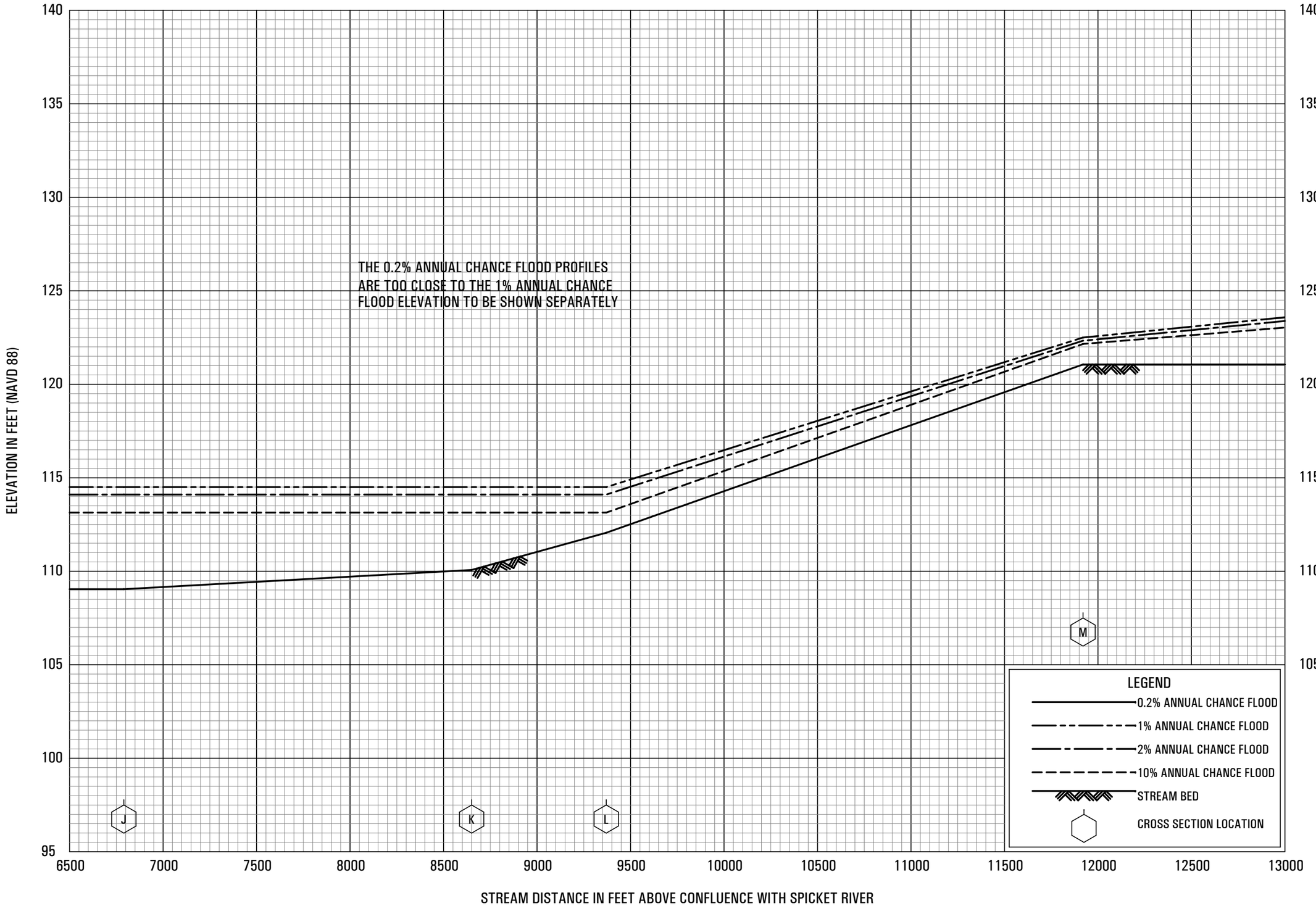
FLOOD PROFILES

PEAT MEADOW BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



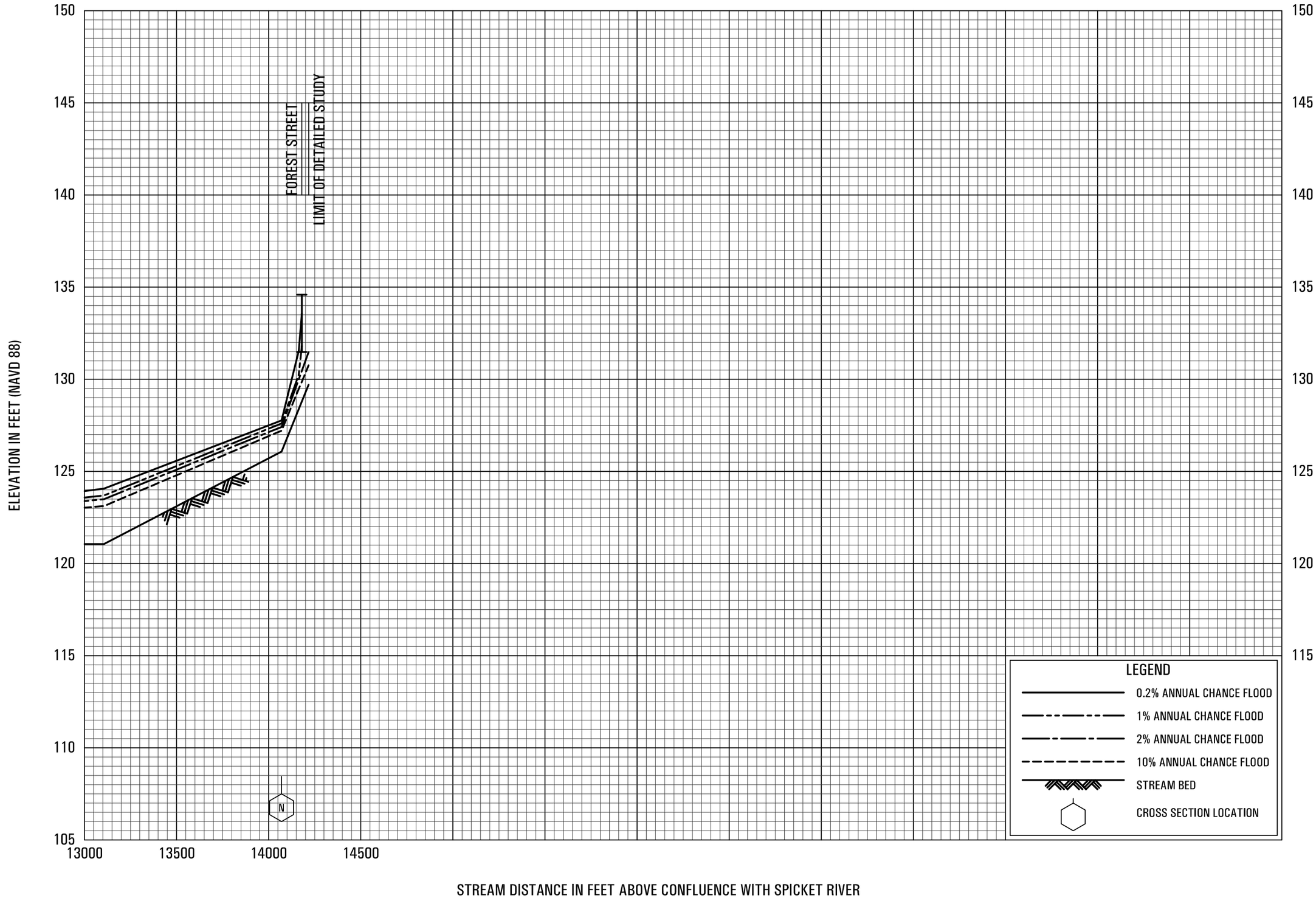
FLOOD PROFILES

PEAT MEADOW BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



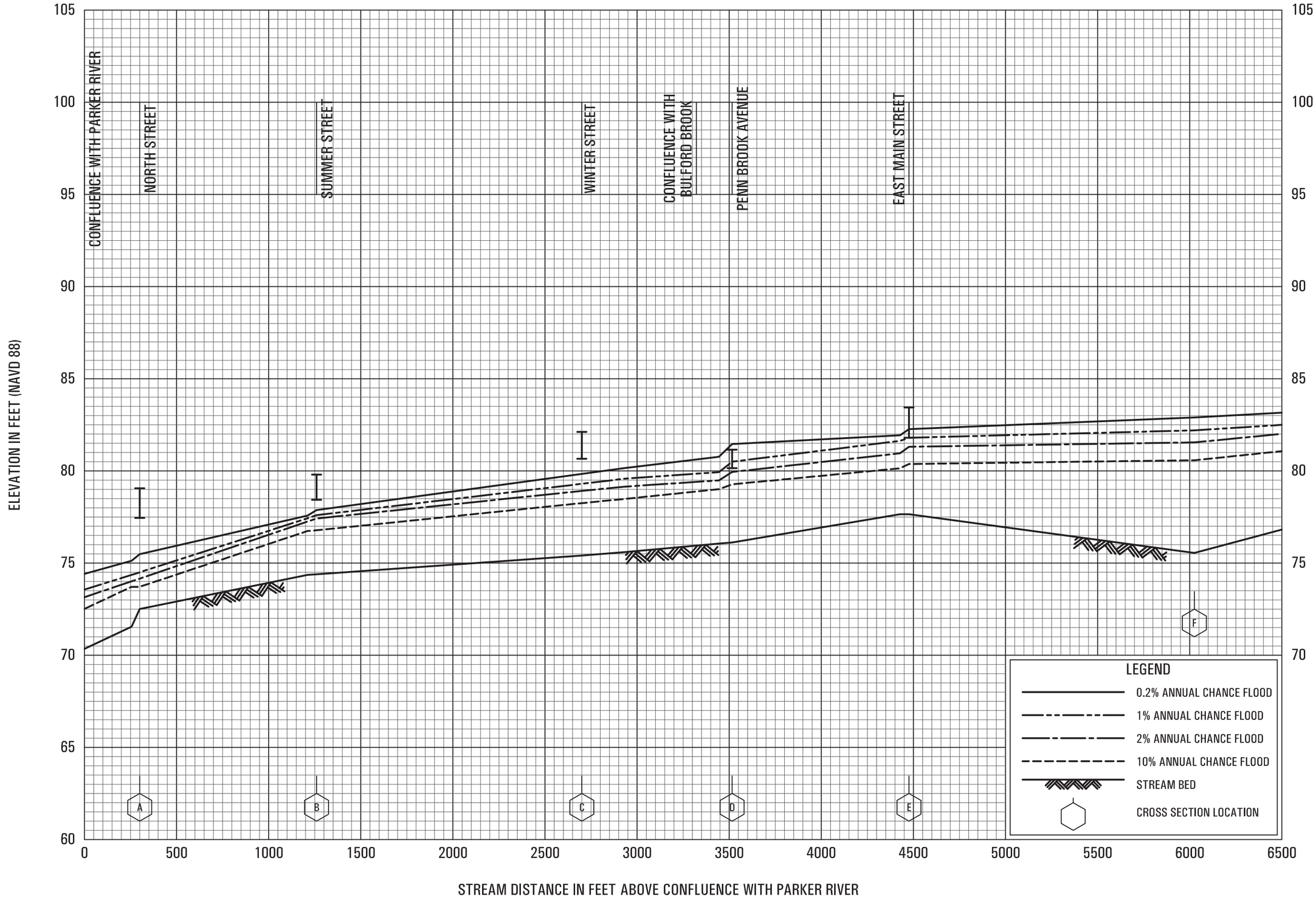
FLOOD PROFILES

PEAT MEADOW BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



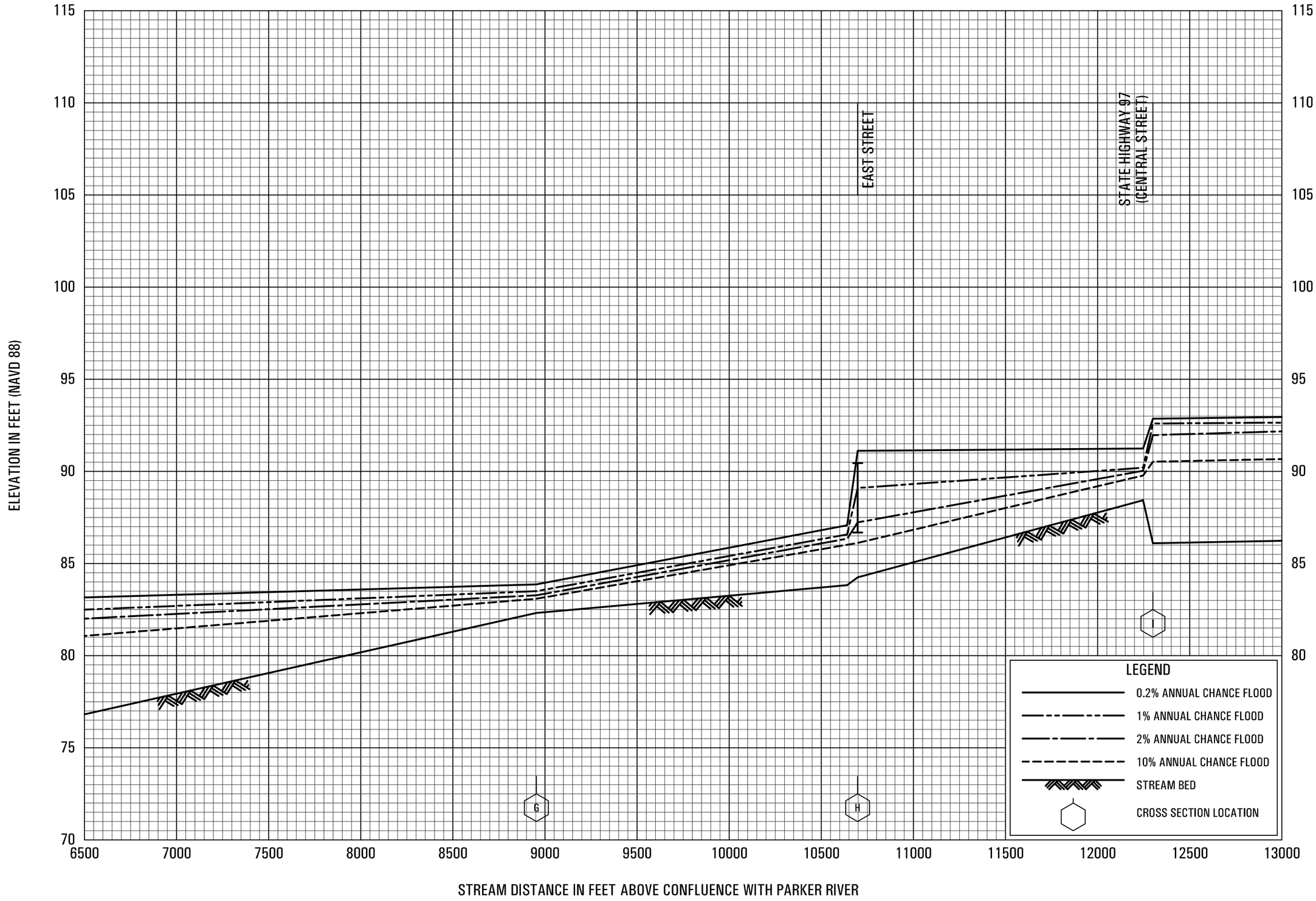
FLOOD PROFILES

PENN BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



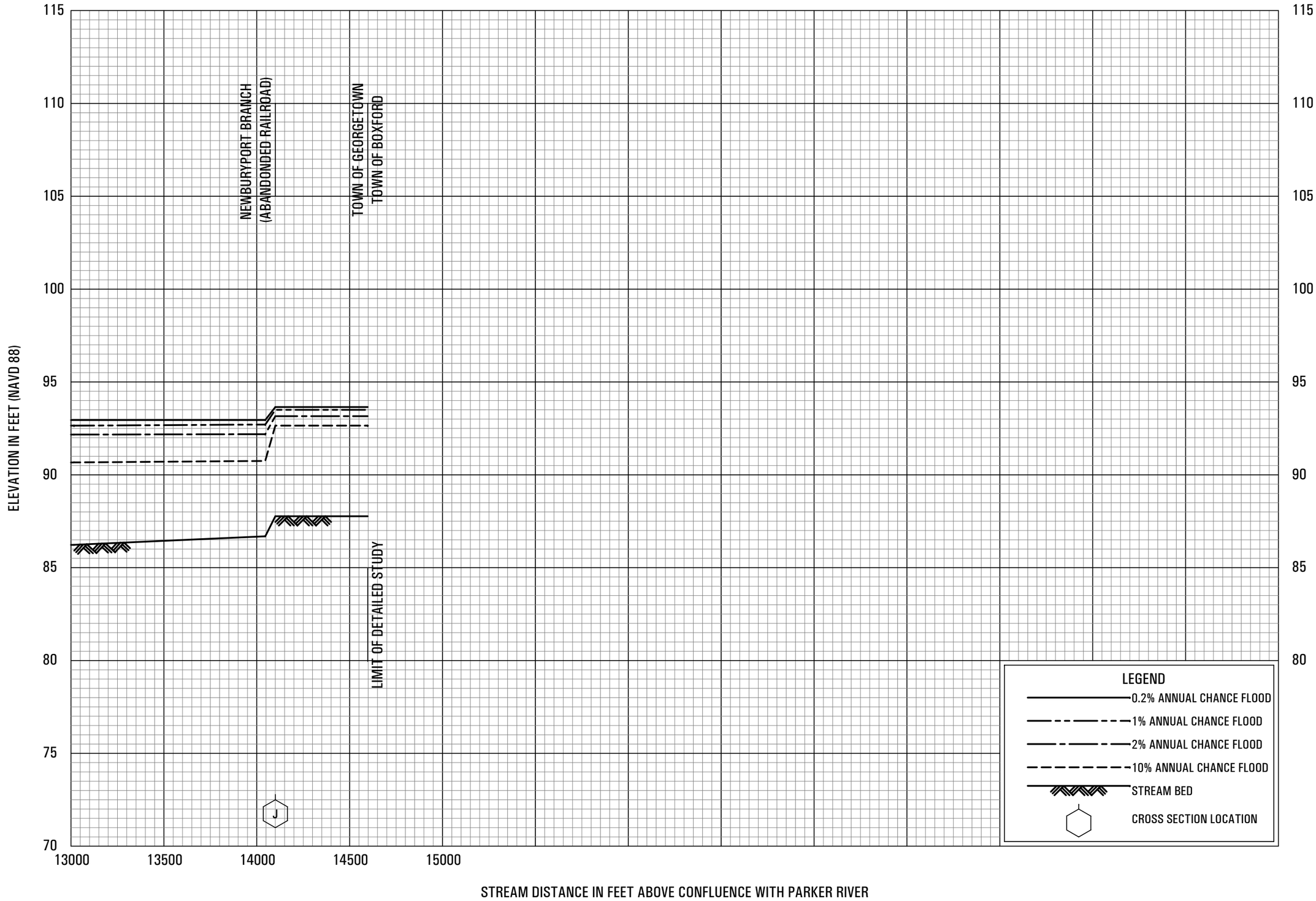
FLOOD PROFILES

PENN BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



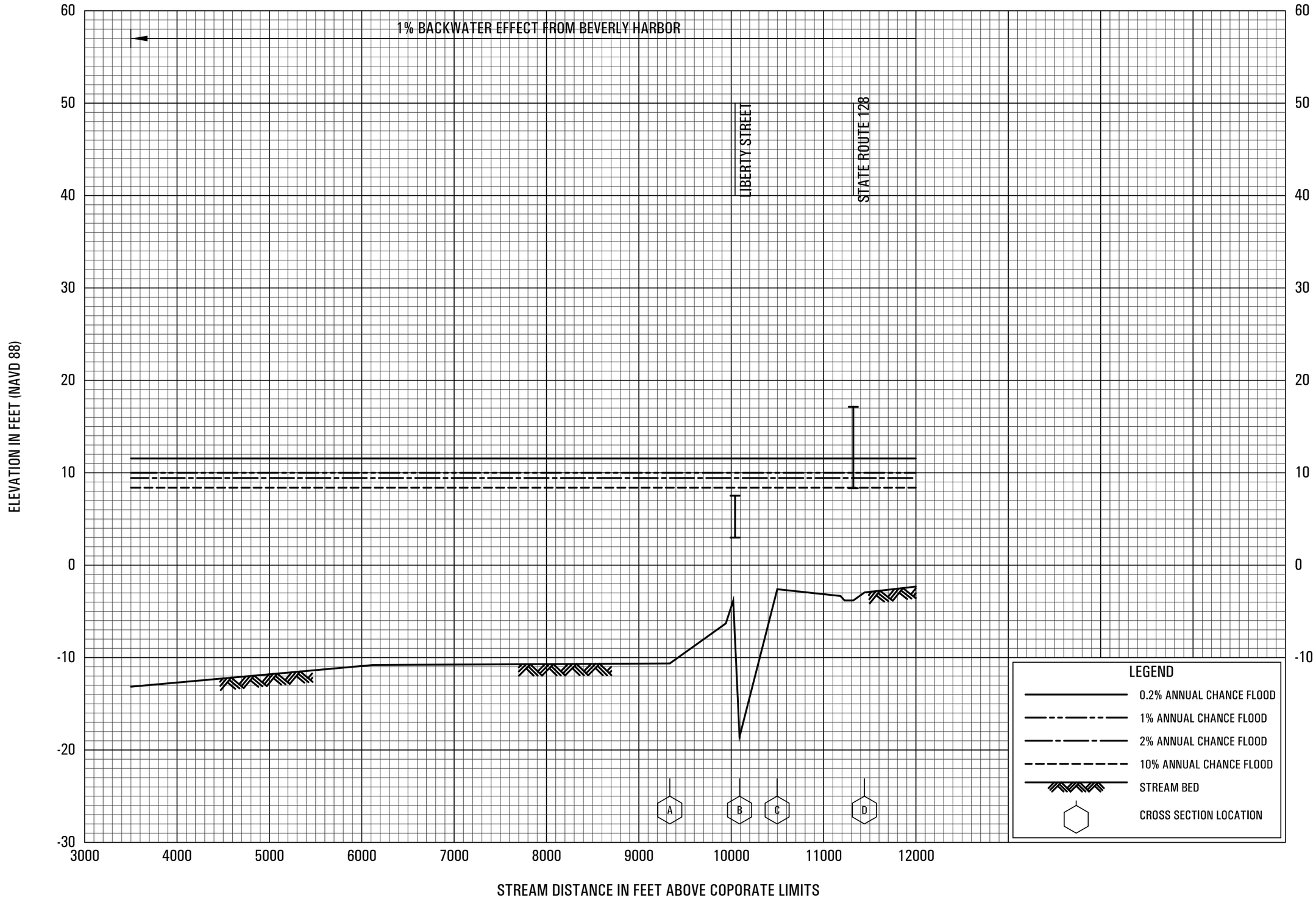
FLOOD PROFILES

PENN BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



FLOOD PROFILES

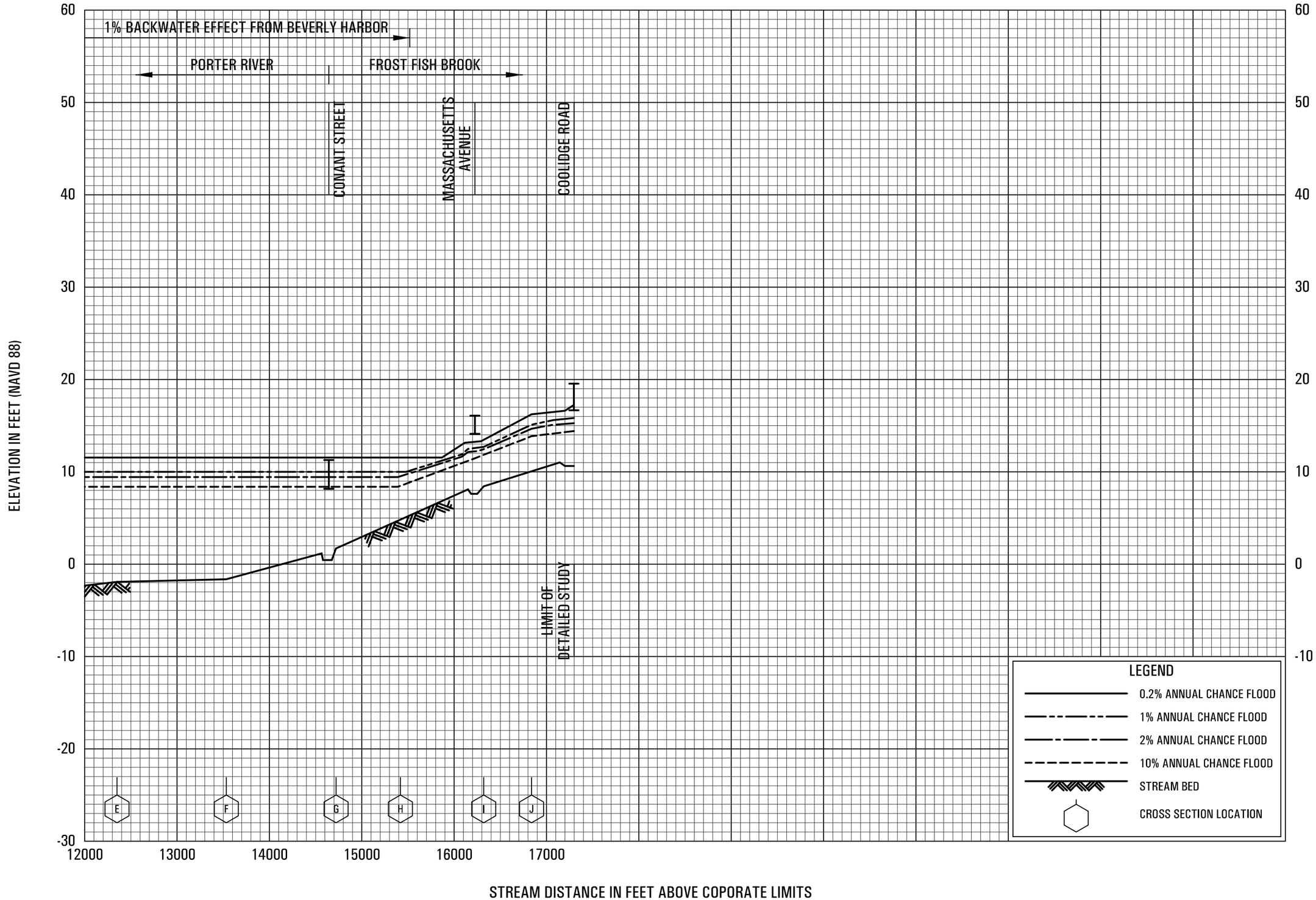
PORTER RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)

127P



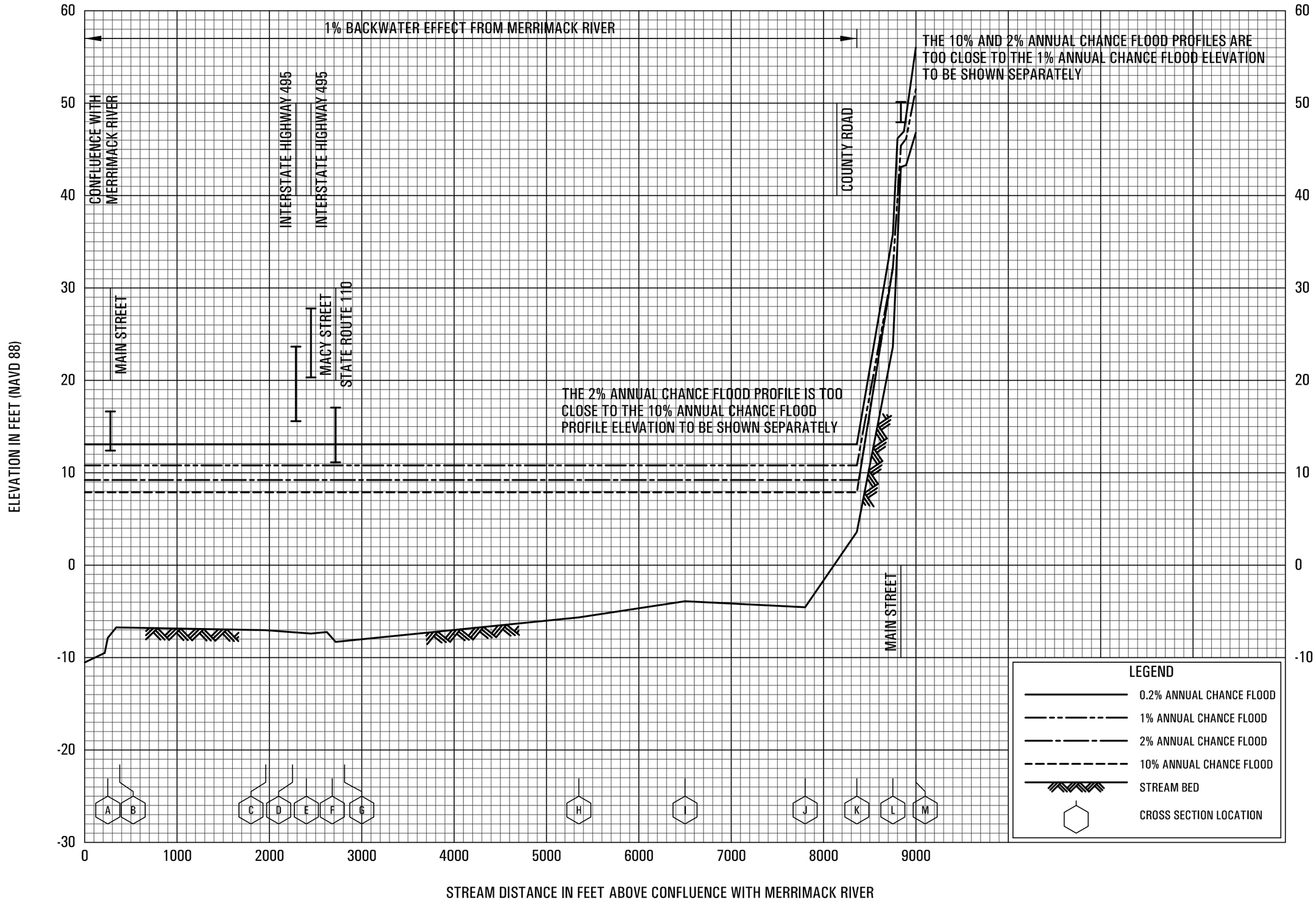
FLOOD PROFILES

PORTER RIVER AND FROST FISH BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



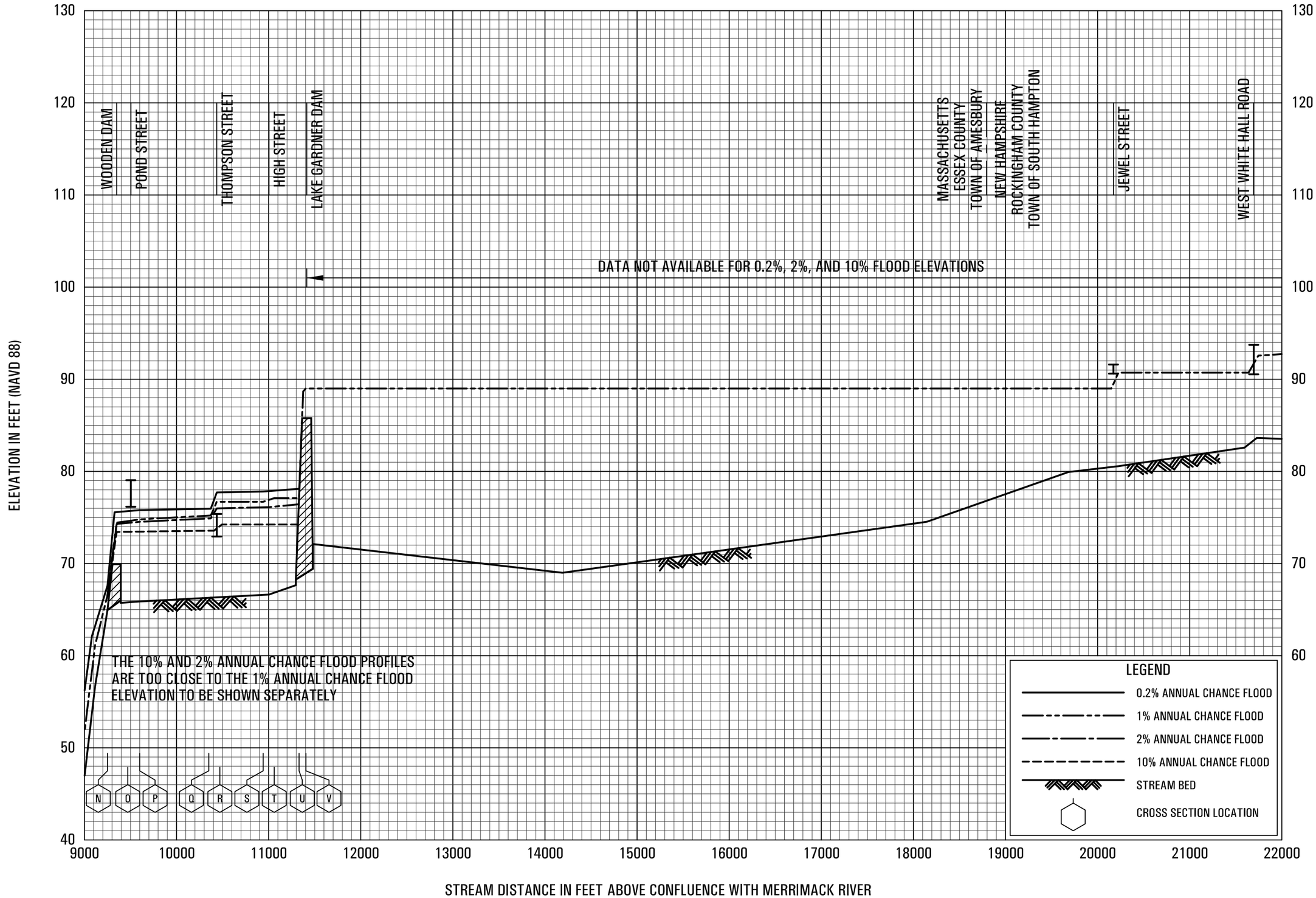
FLOOD PROFILES

POWWOW RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



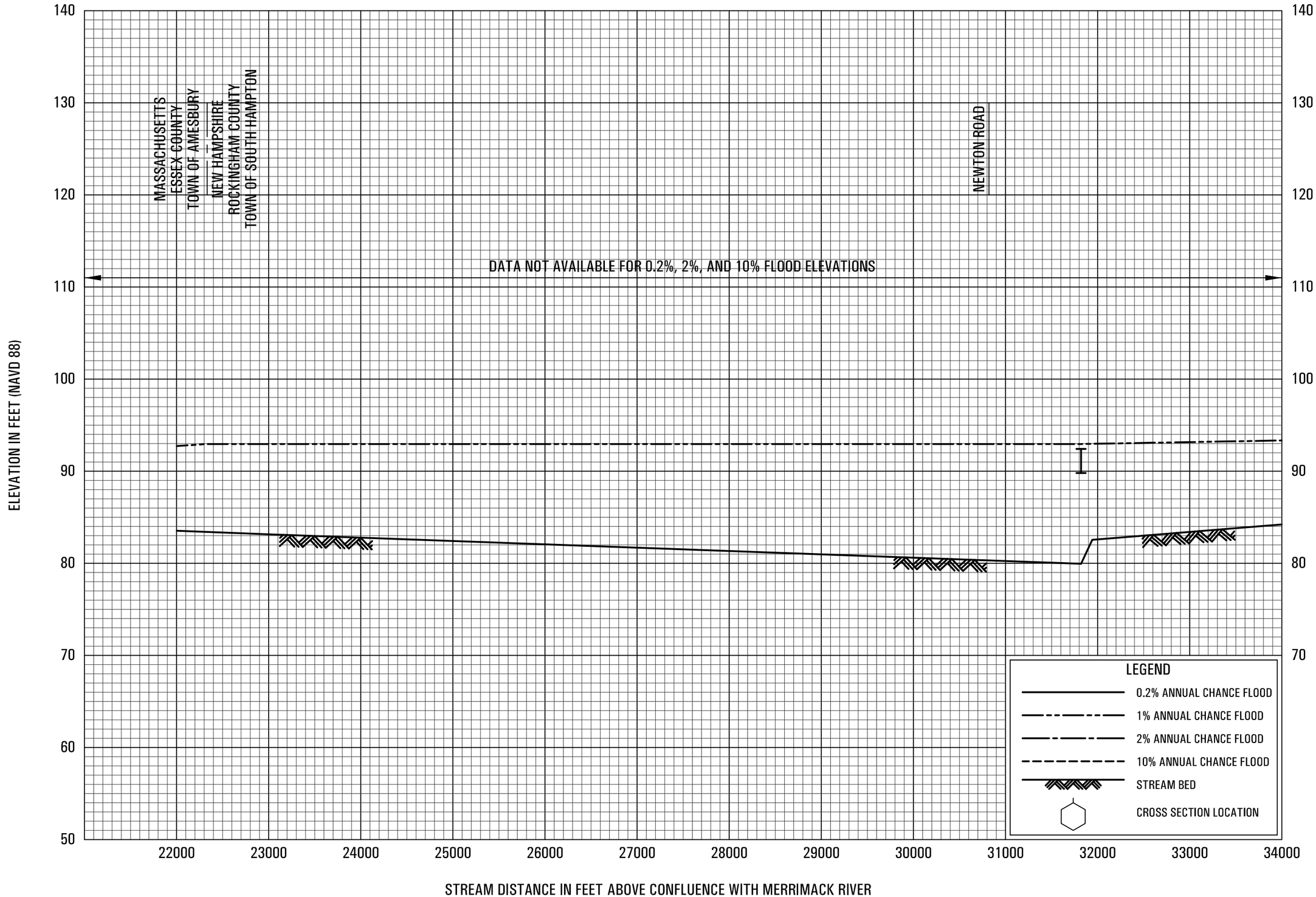
FLOOD PROFILES

POWWOW RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



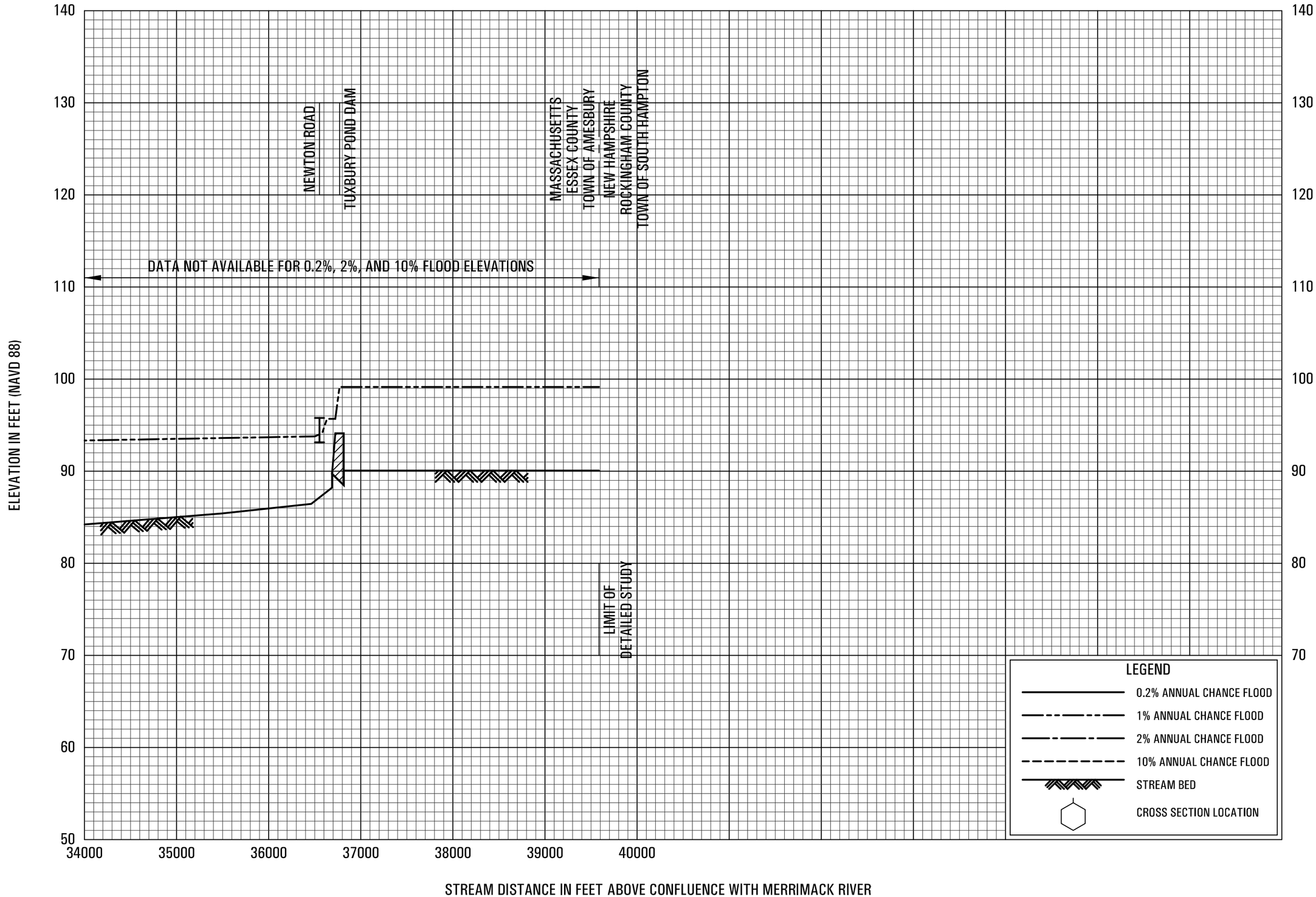
FLOOD PROFILES

POWWOW RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



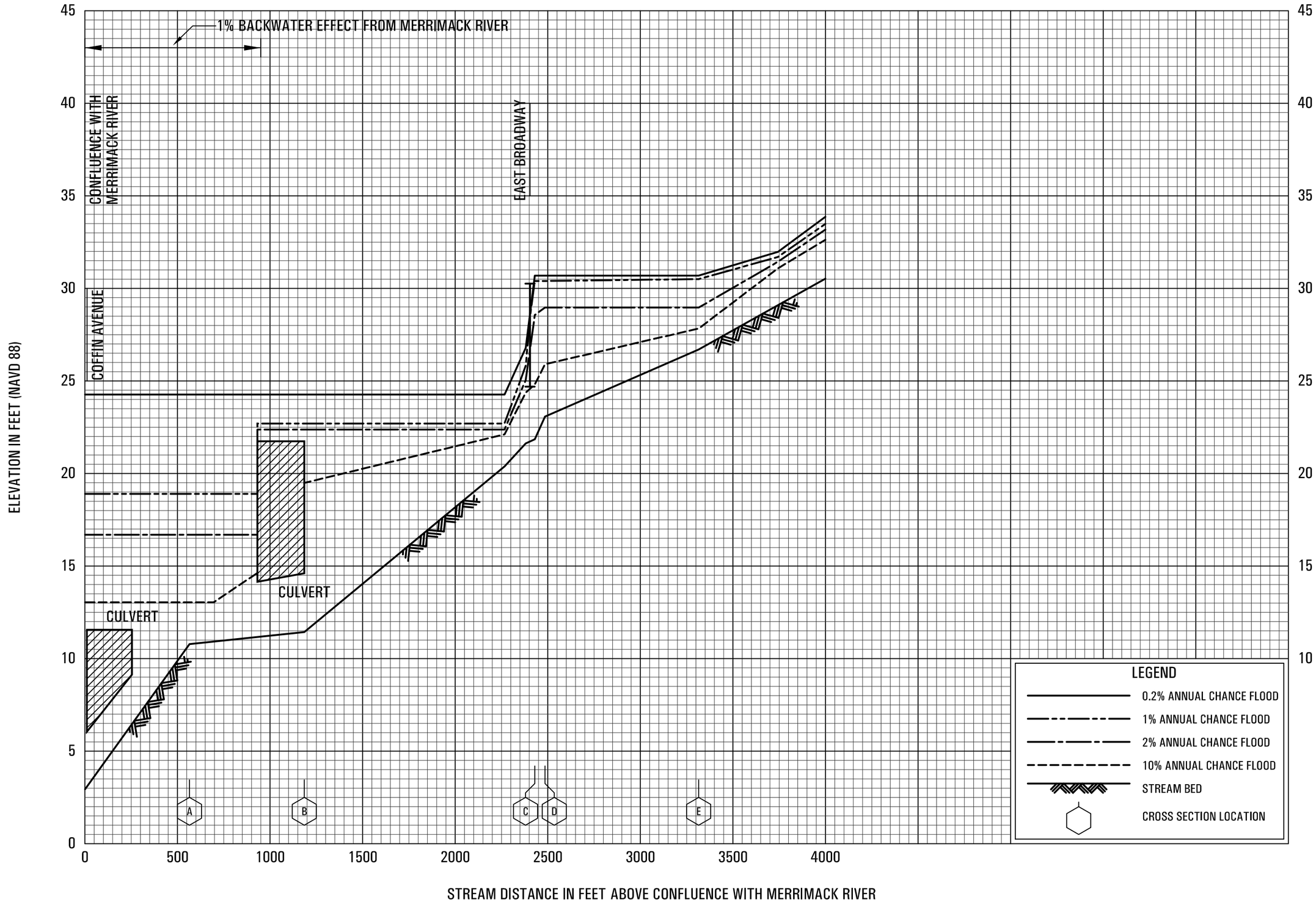
FLOOD PROFILES

POWWOW RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



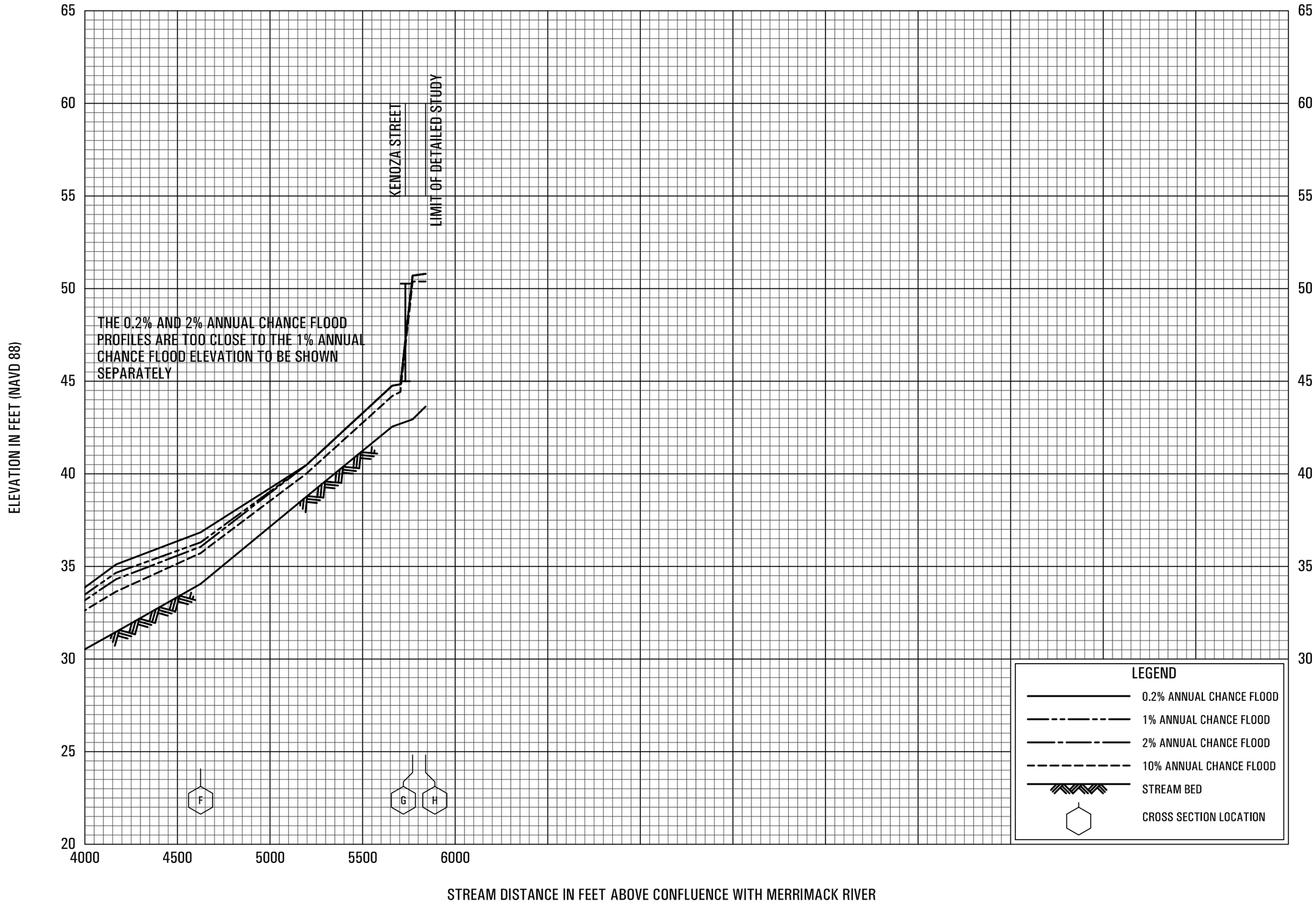
FLOOD PROFILES

RIVERSIDE AIRPORT BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



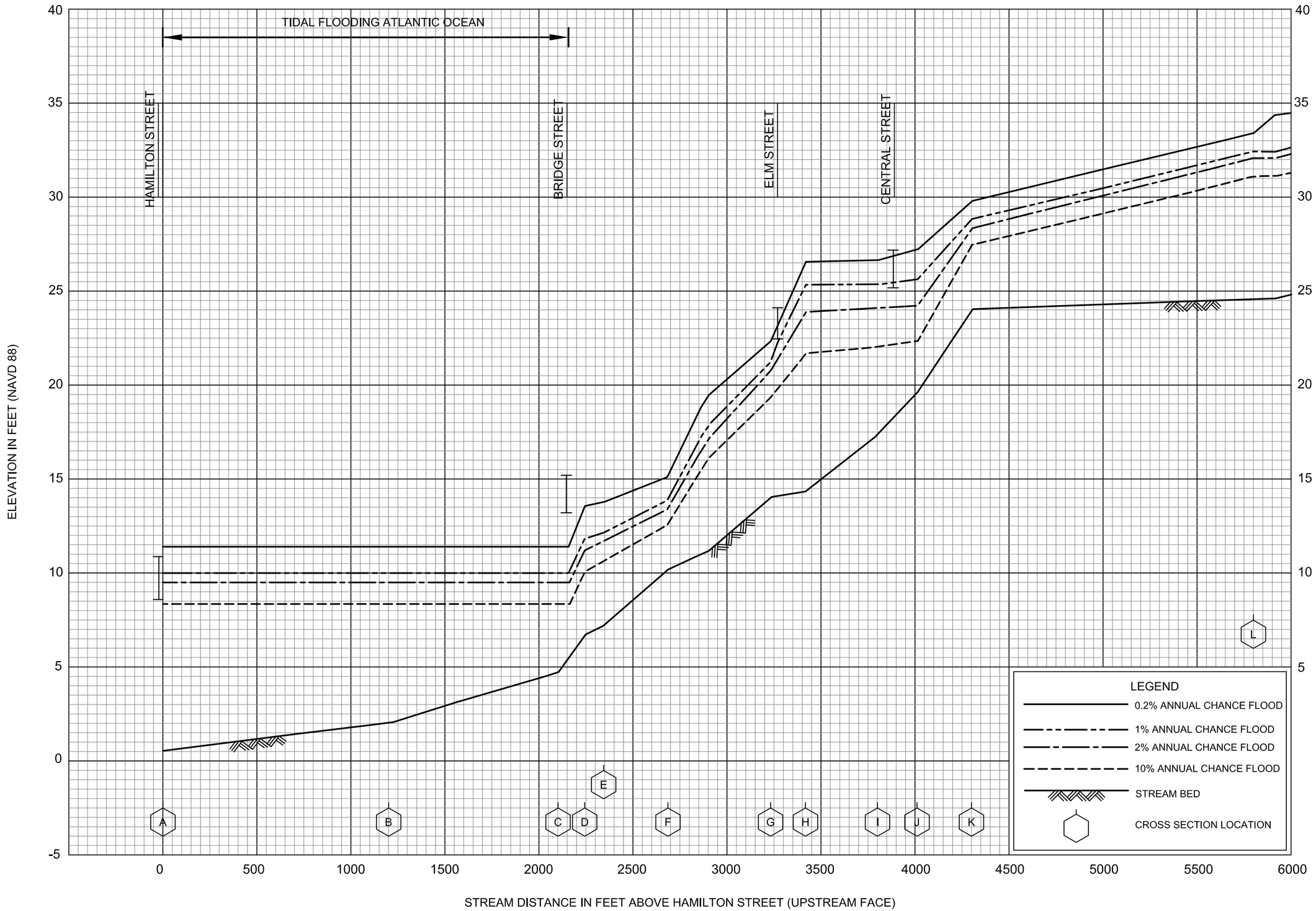
FLOOD PROFILES

RIVERSIDE AIRPORT BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



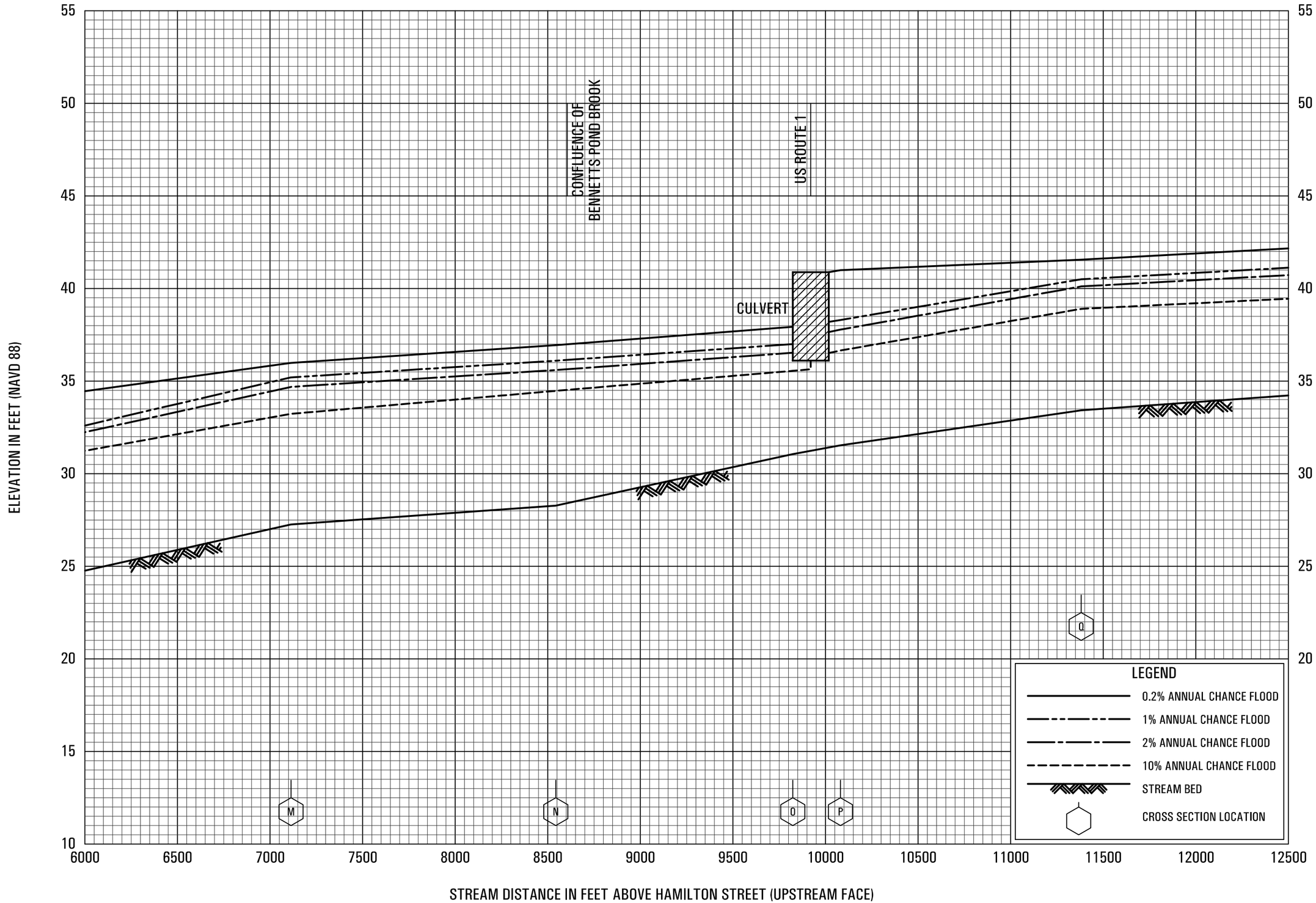
FLOOD PROFILES

SAUGUS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



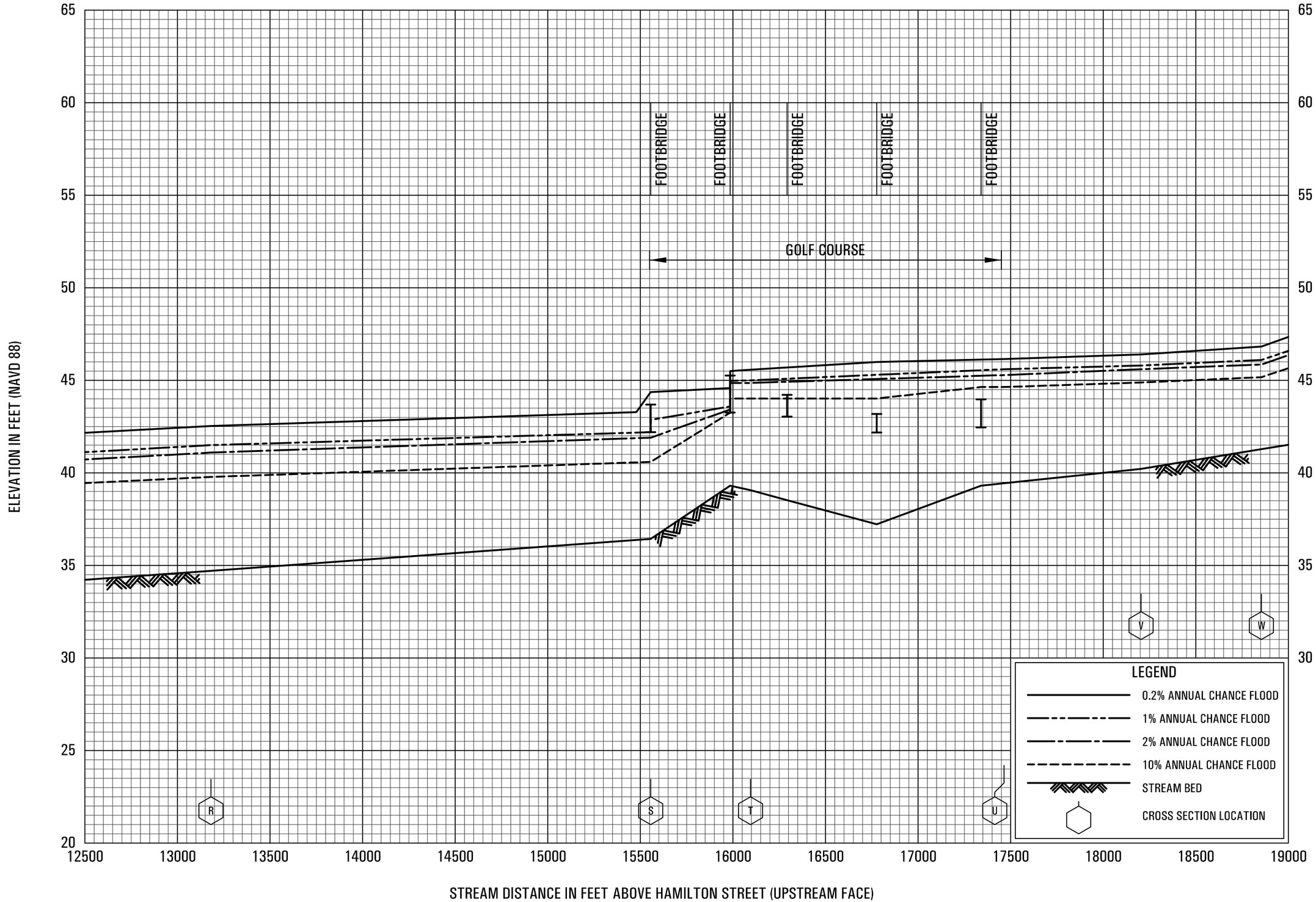
FLOOD PROFILES

SAUGUS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



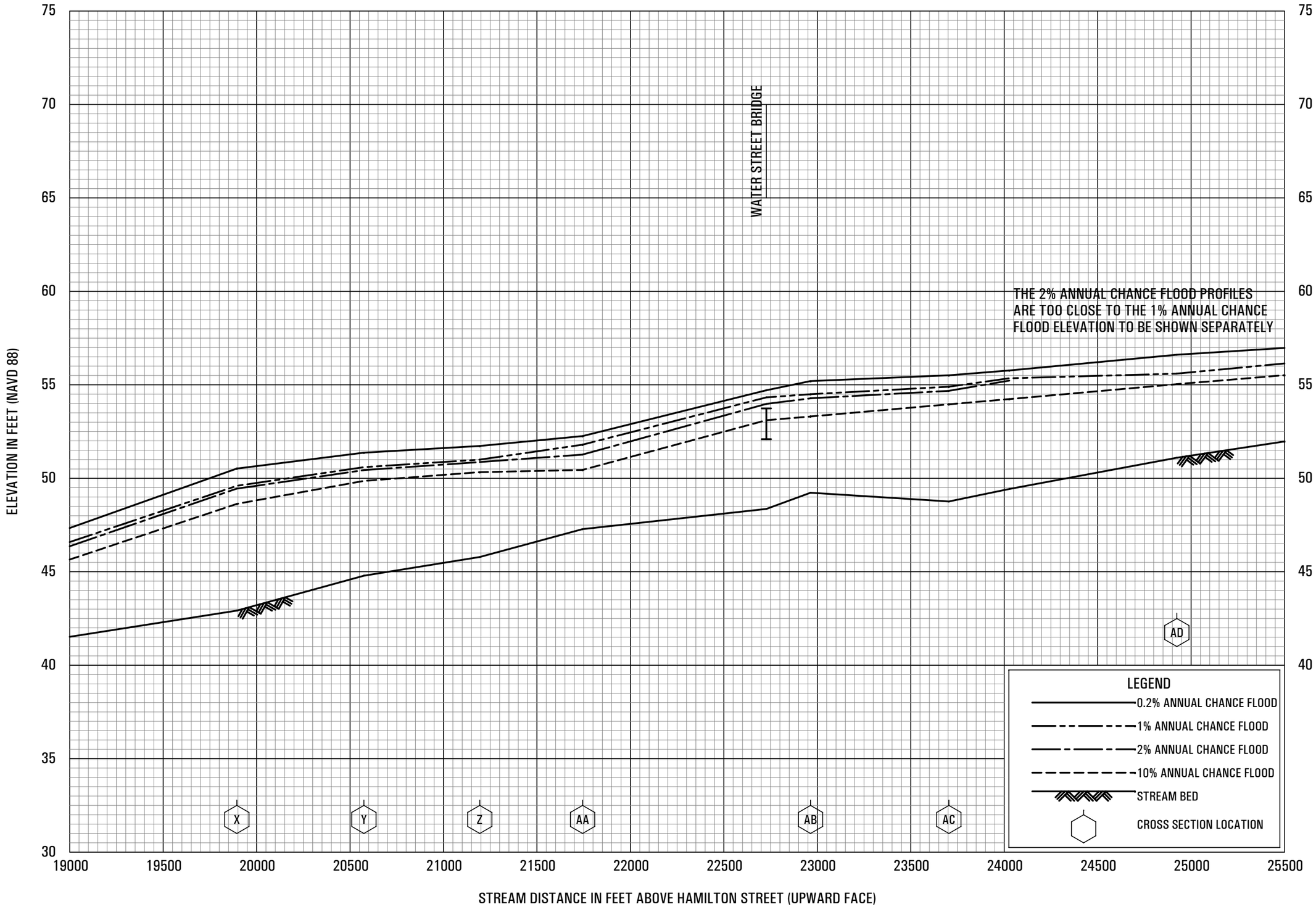
FLOOD PROFILES

SAUGUS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



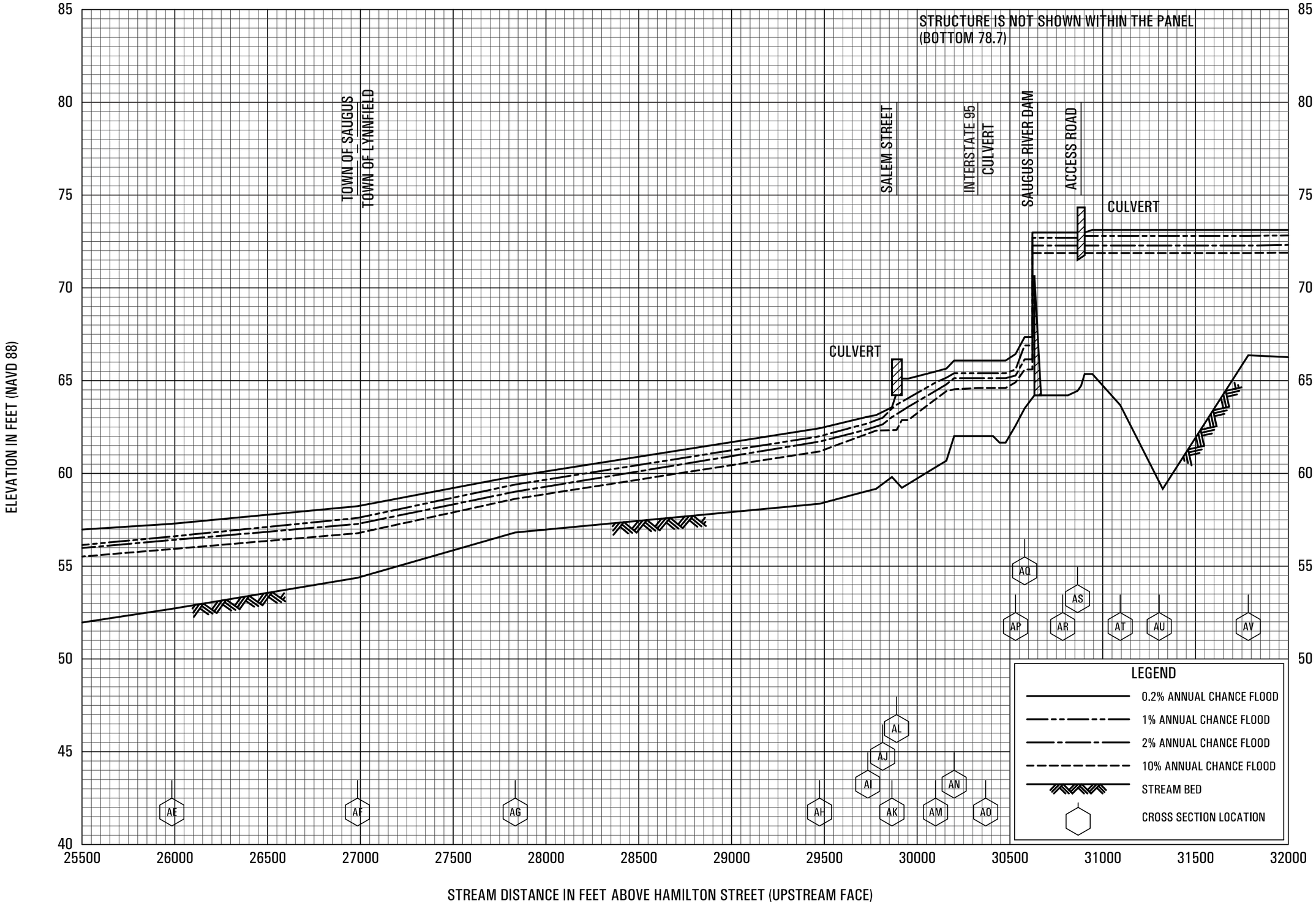
FLOOD PROFILES

SAUGUS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



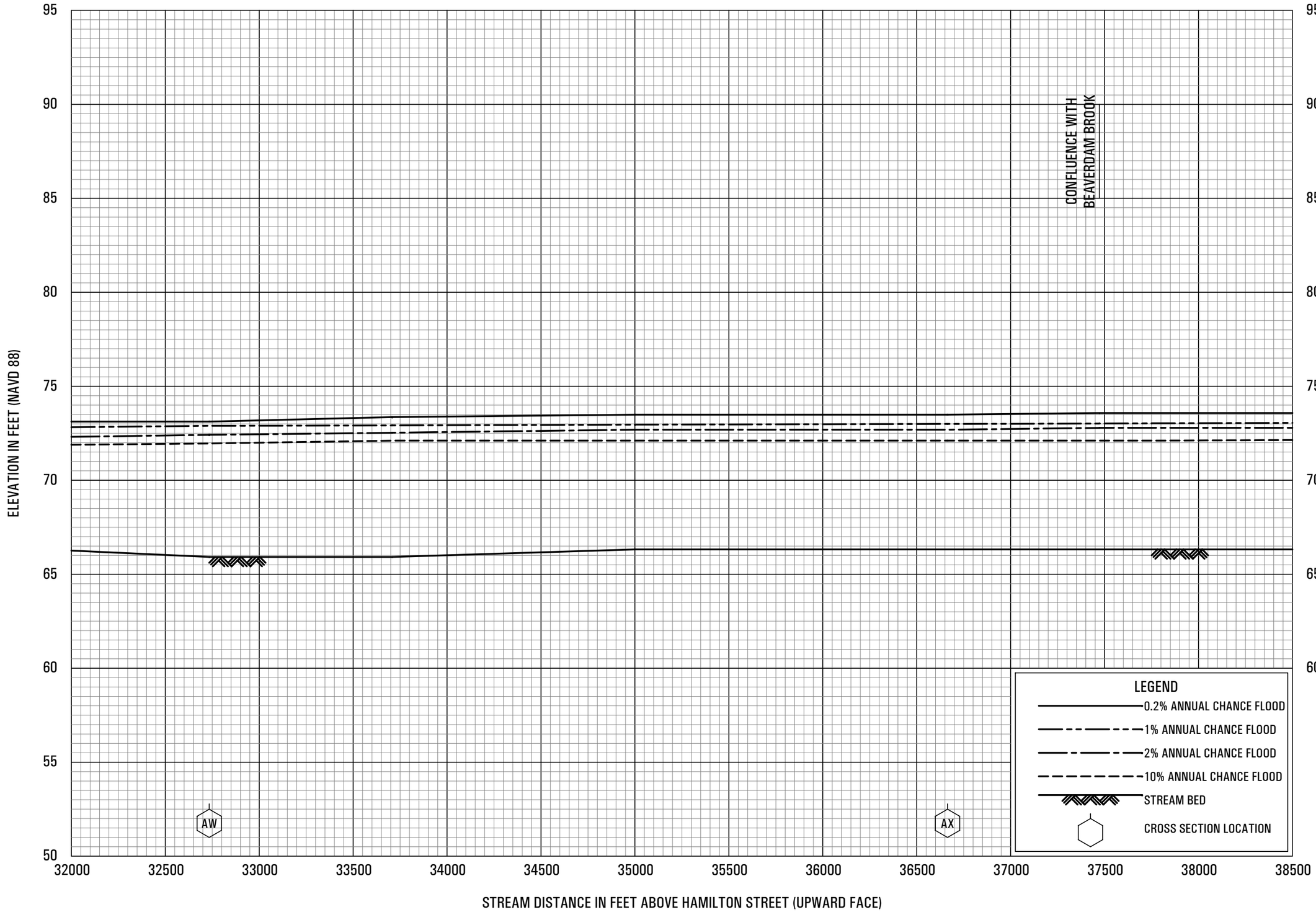
FLOOD PROFILES

SAUGUS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



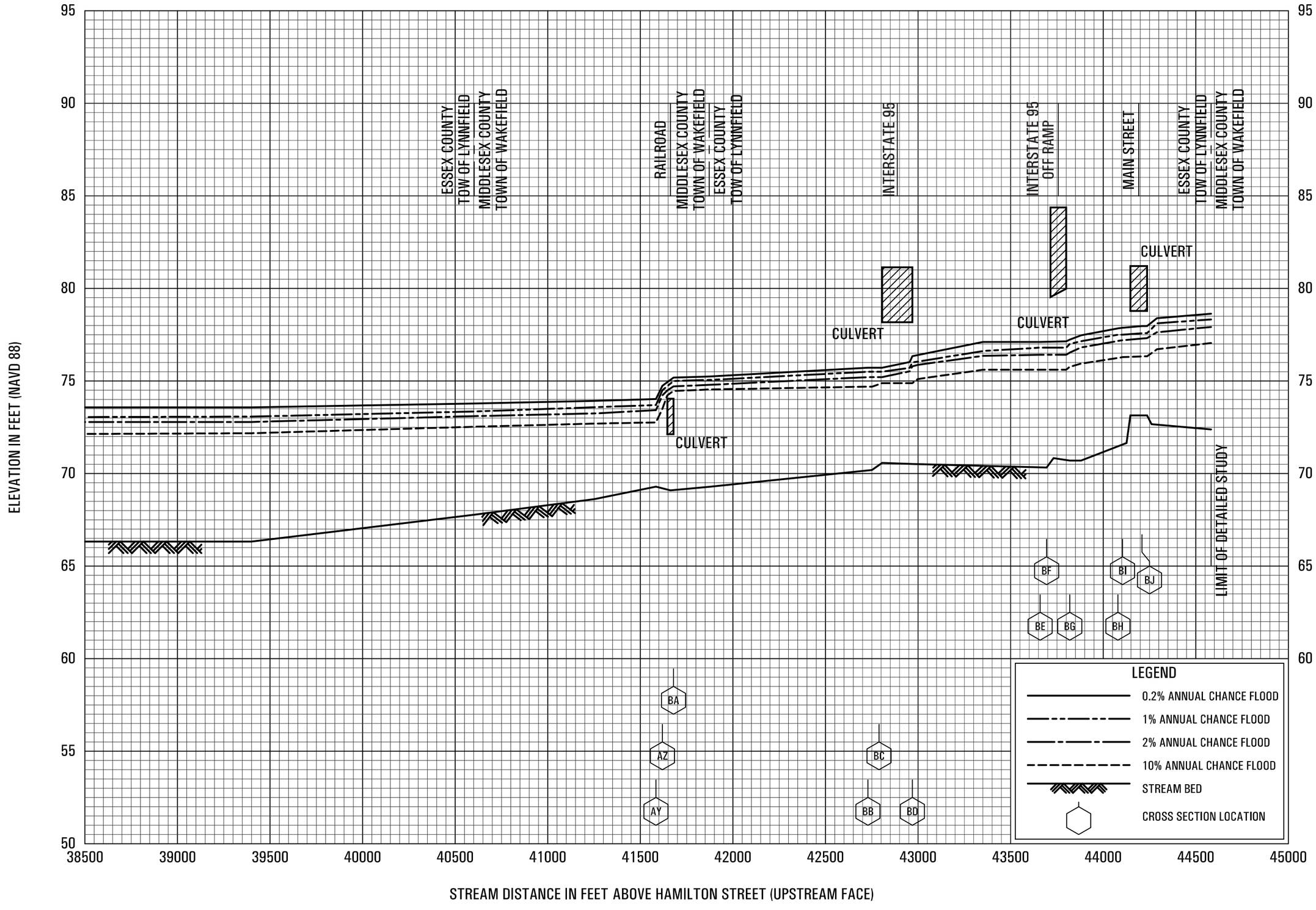
FLOOD PROFILES

SAUGUS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



FLOOD PROFILES

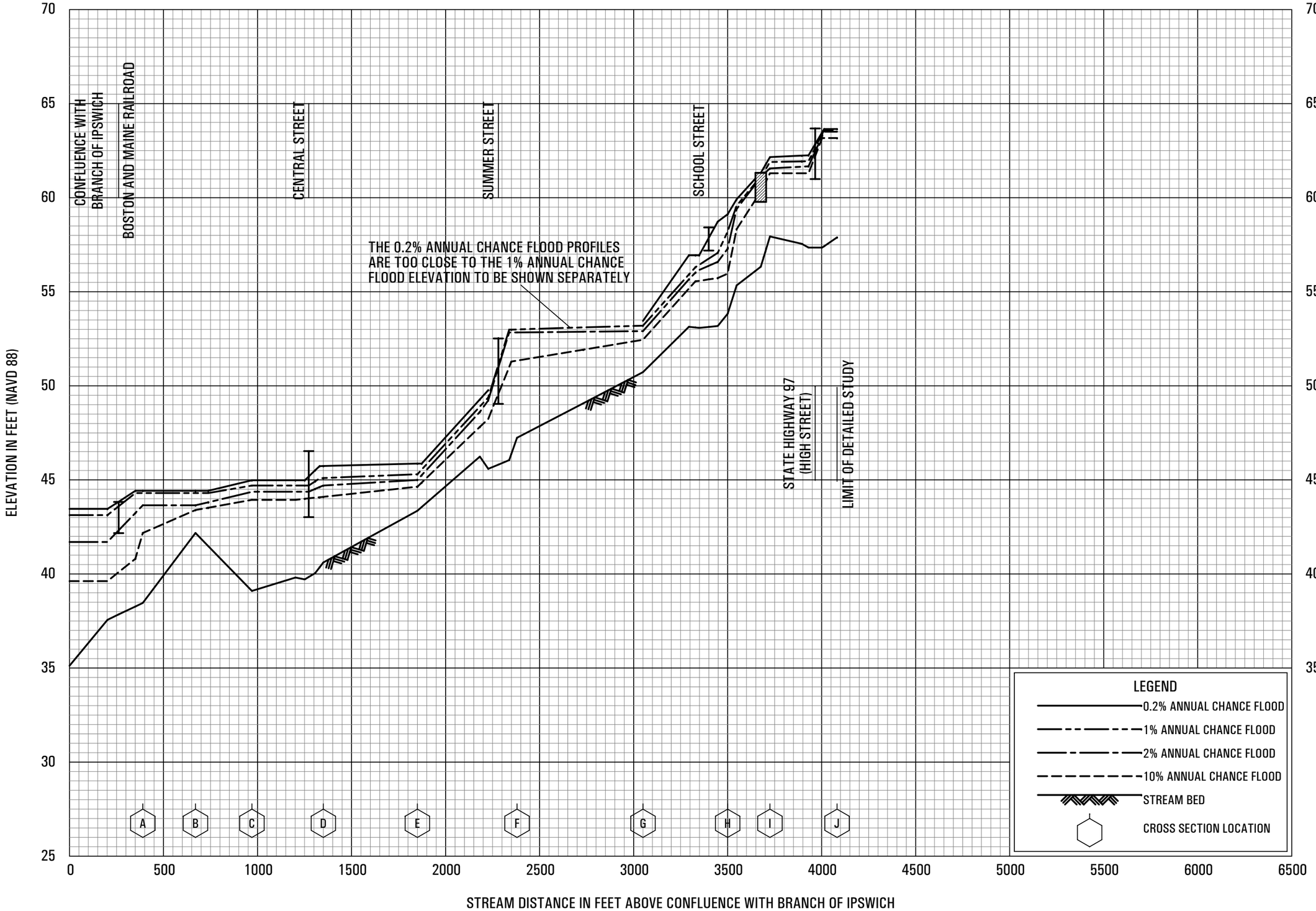
SAUGUS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)

141P



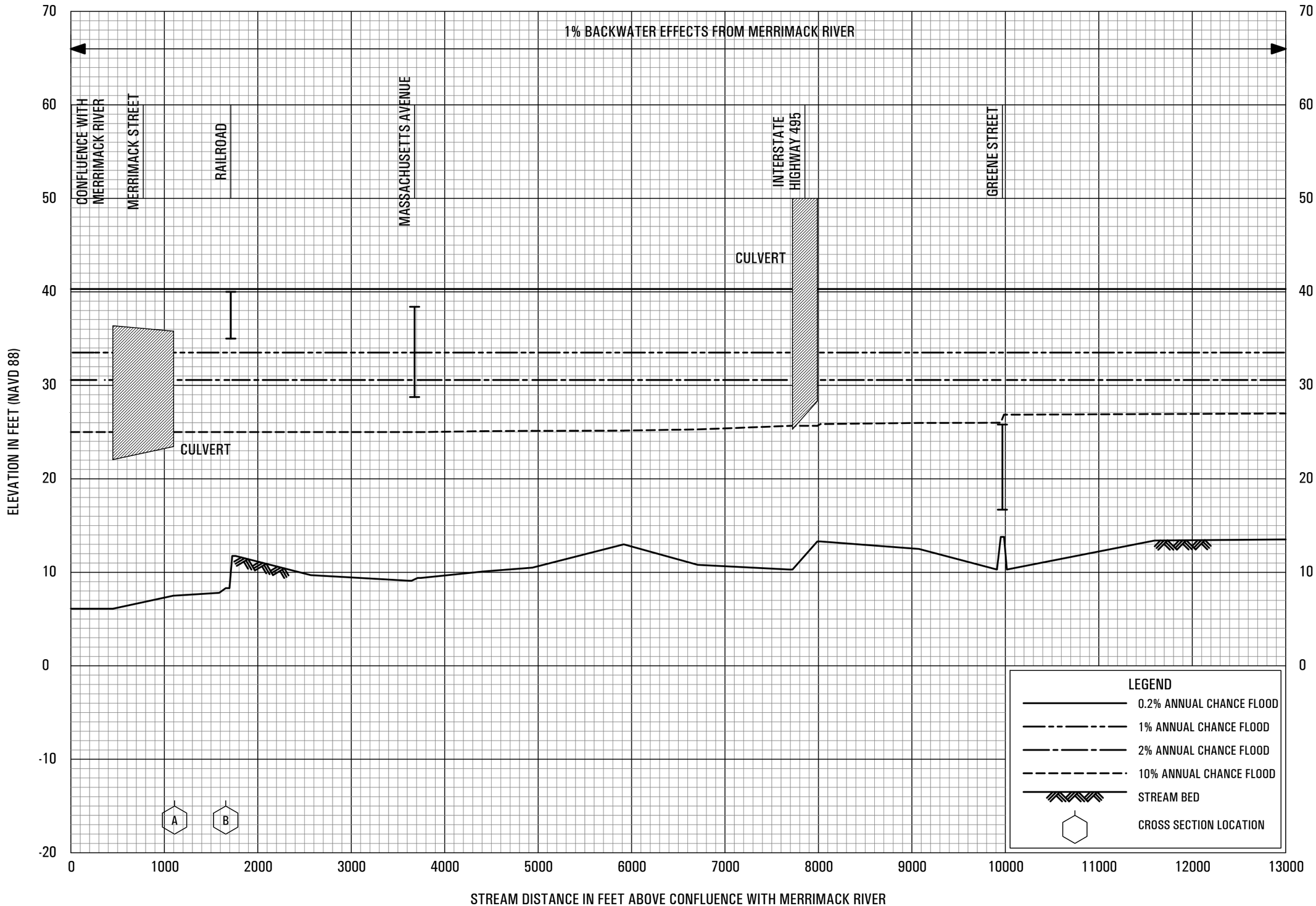
FLOOD PROFILES

SCHOOL BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



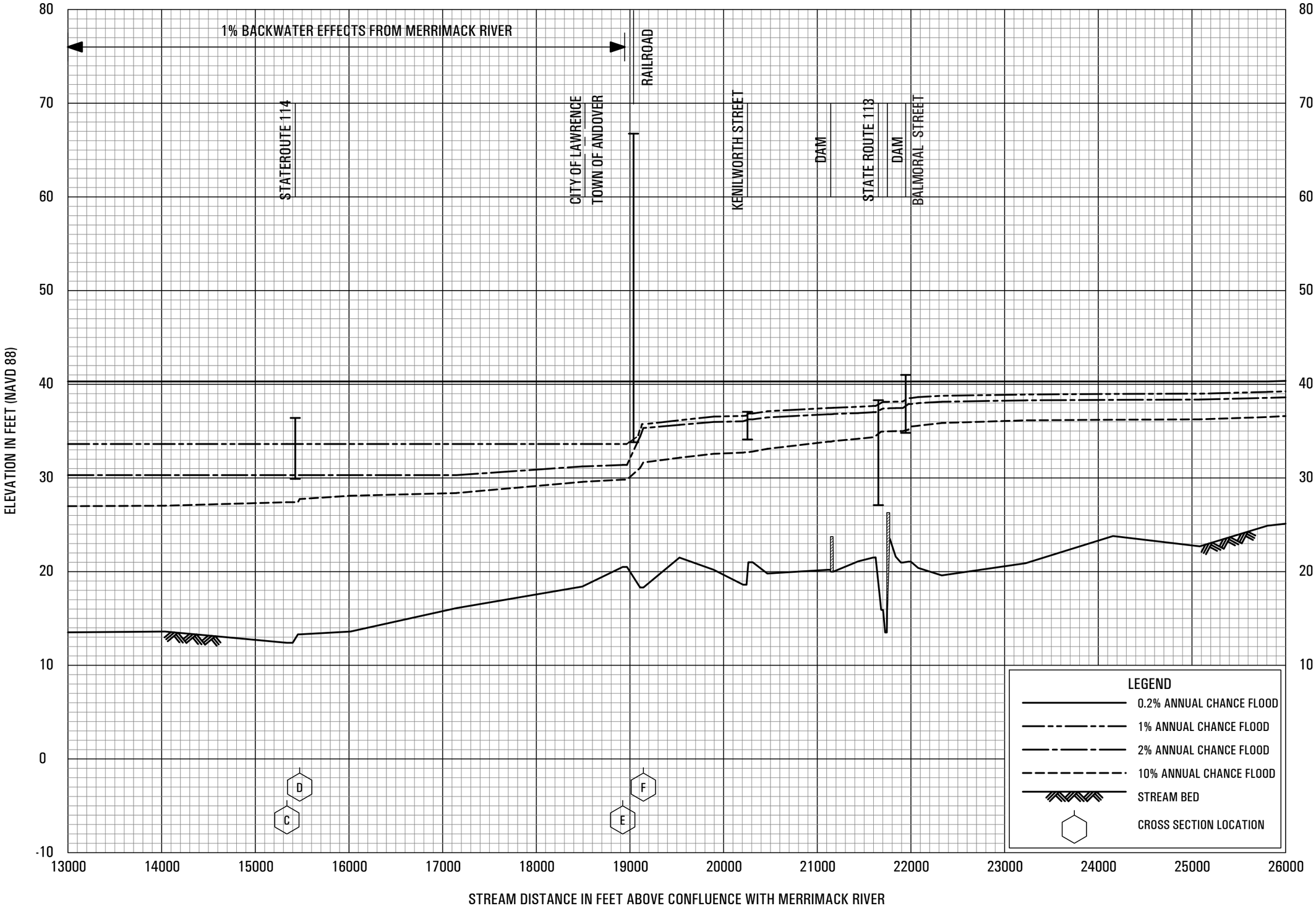
FLOOD PROFILES

SHAWSHEEN RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



FLOOD PROFILES

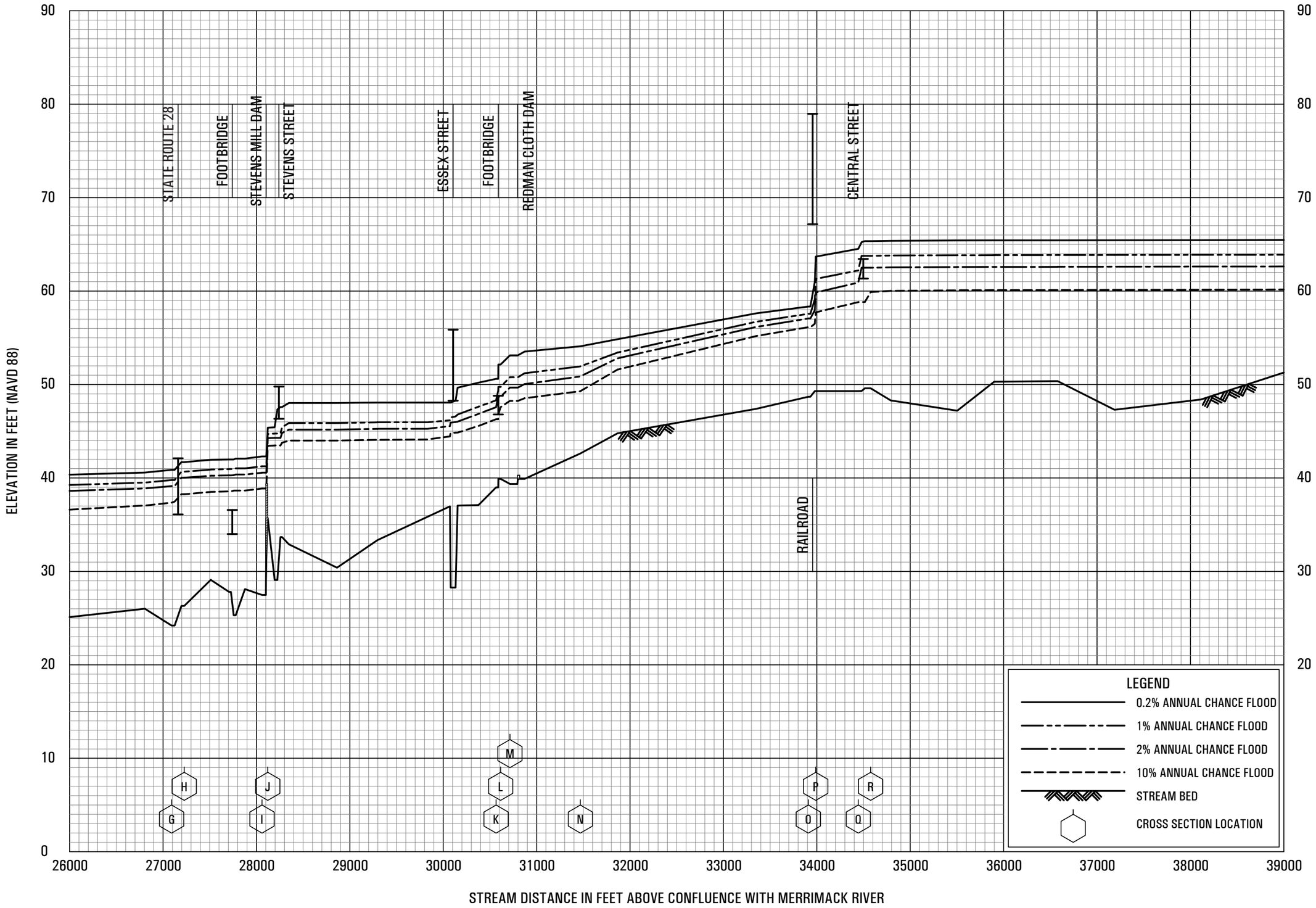
SHAWSHEEN RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)

144P



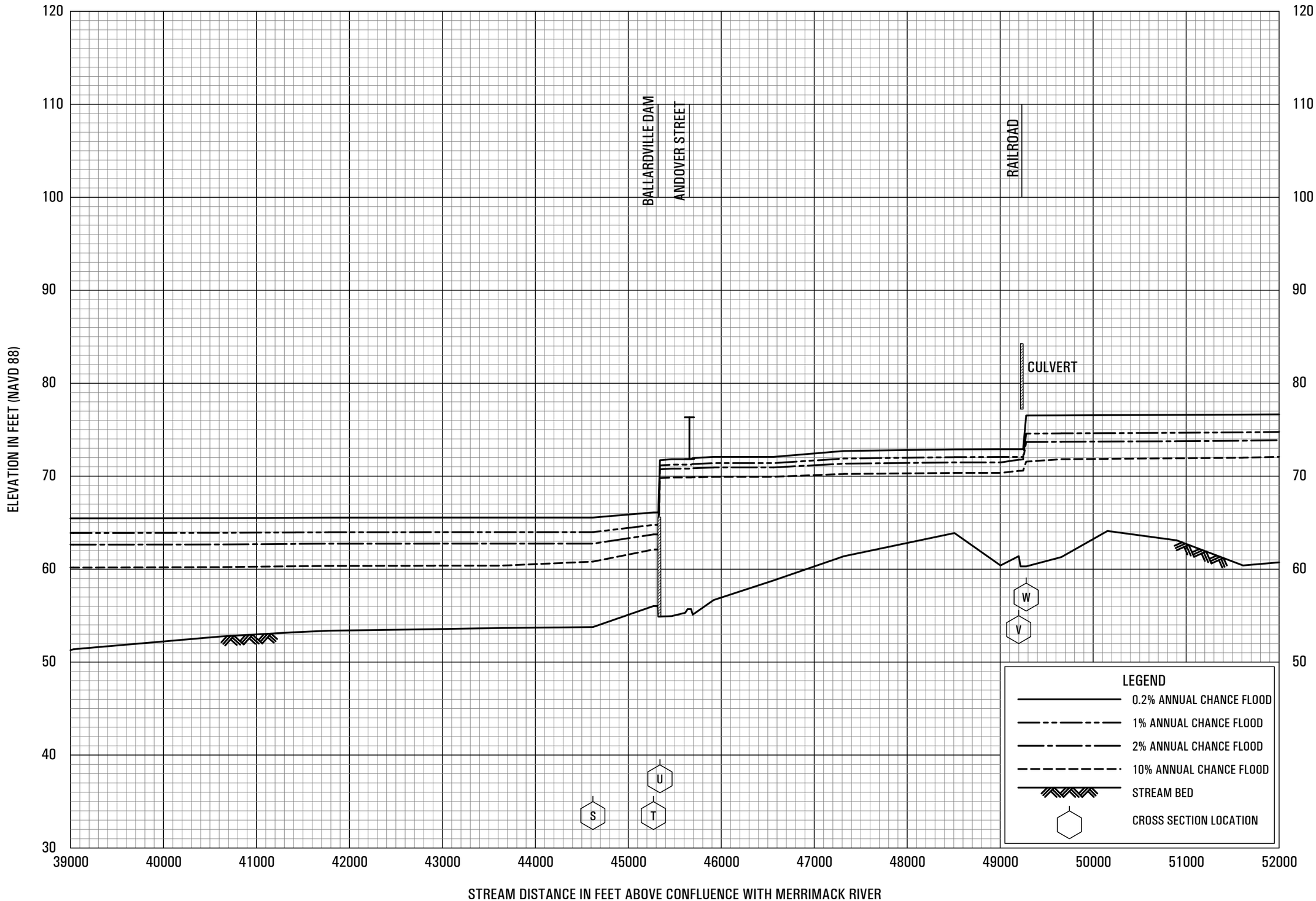
FLOOD PROFILES

SHAWSHEEN RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



FLOOD PROFILES

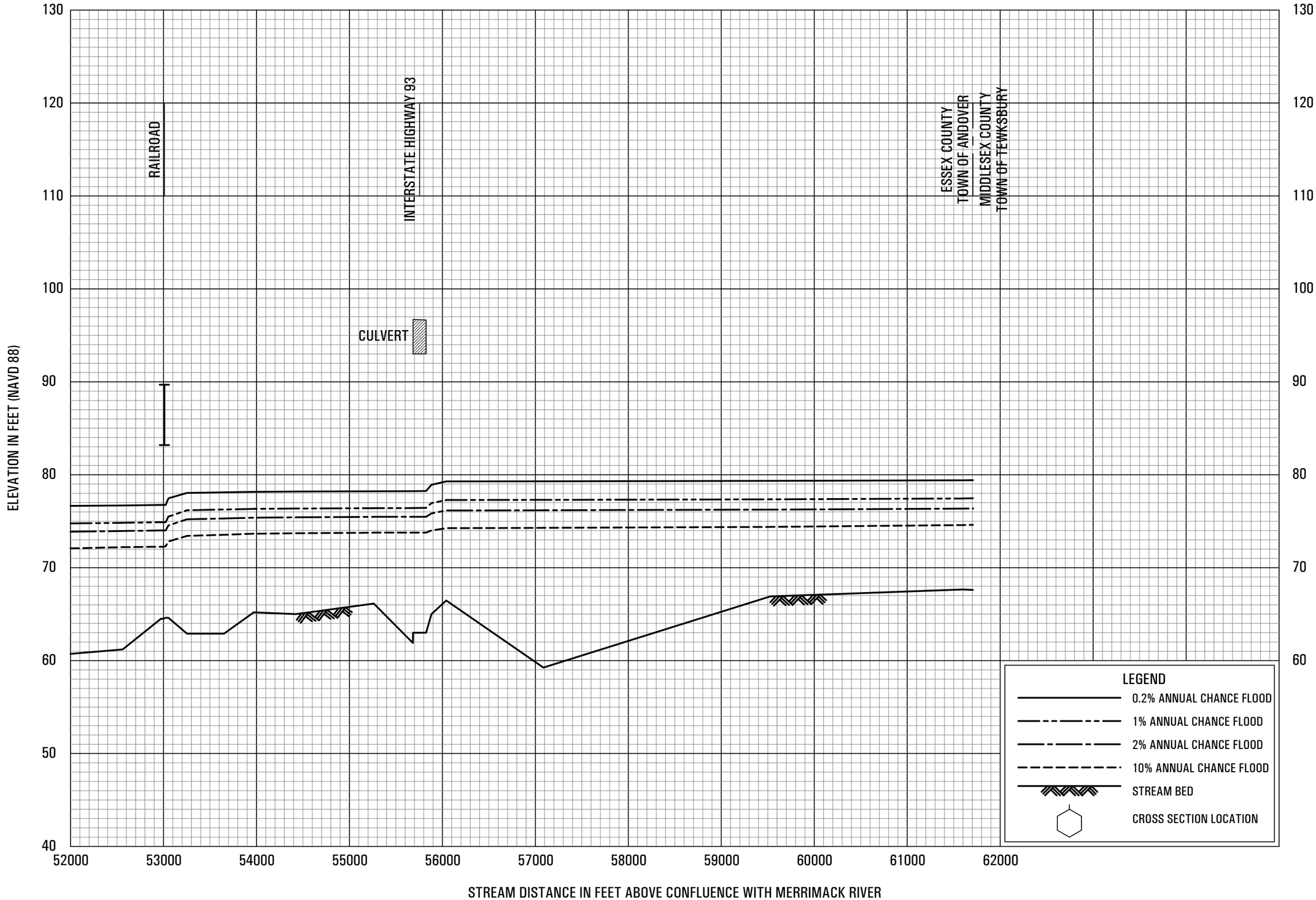
SHAWSHEEN RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)

146P



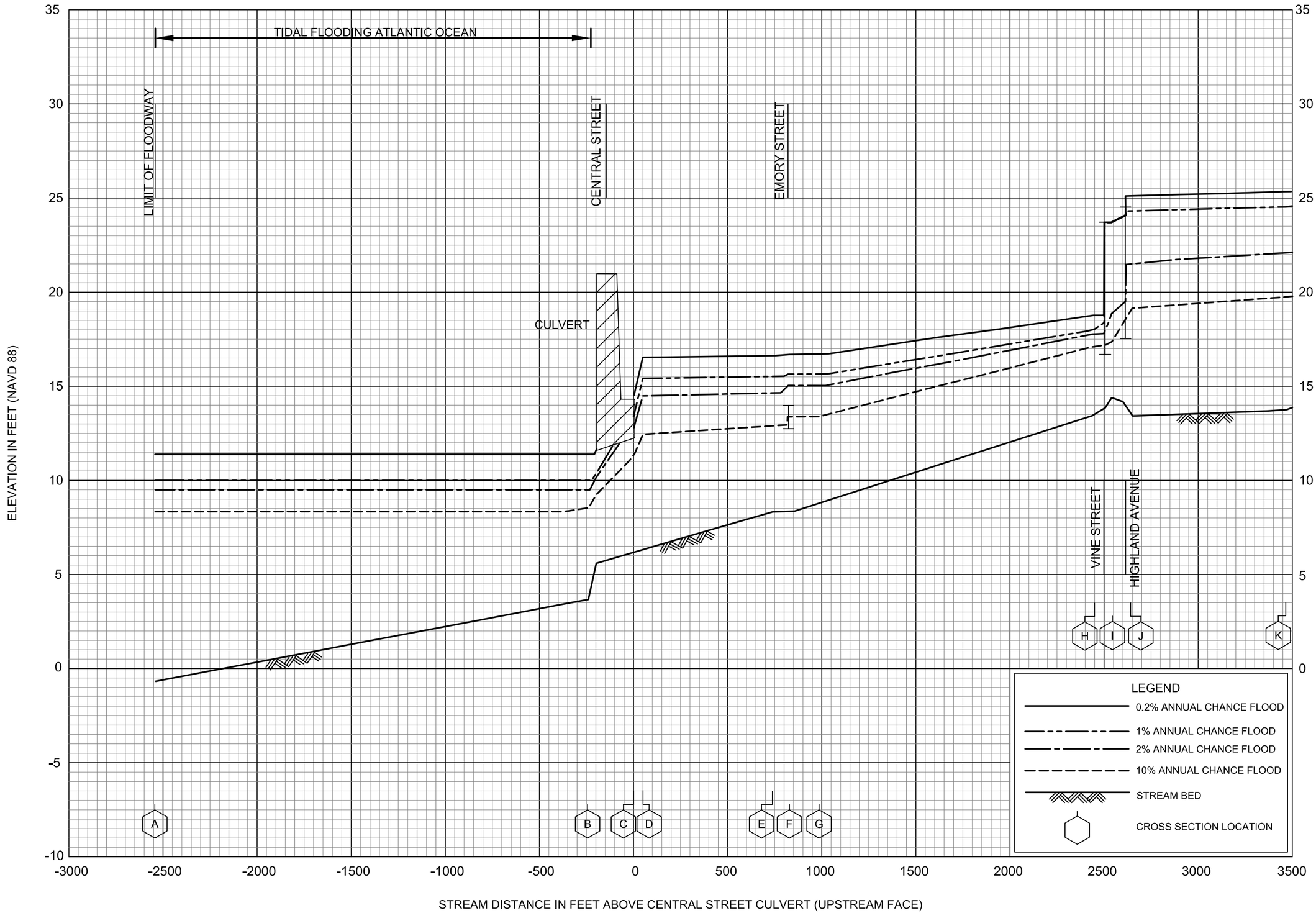
FLOOD PROFILES

SHAWSHEEN RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



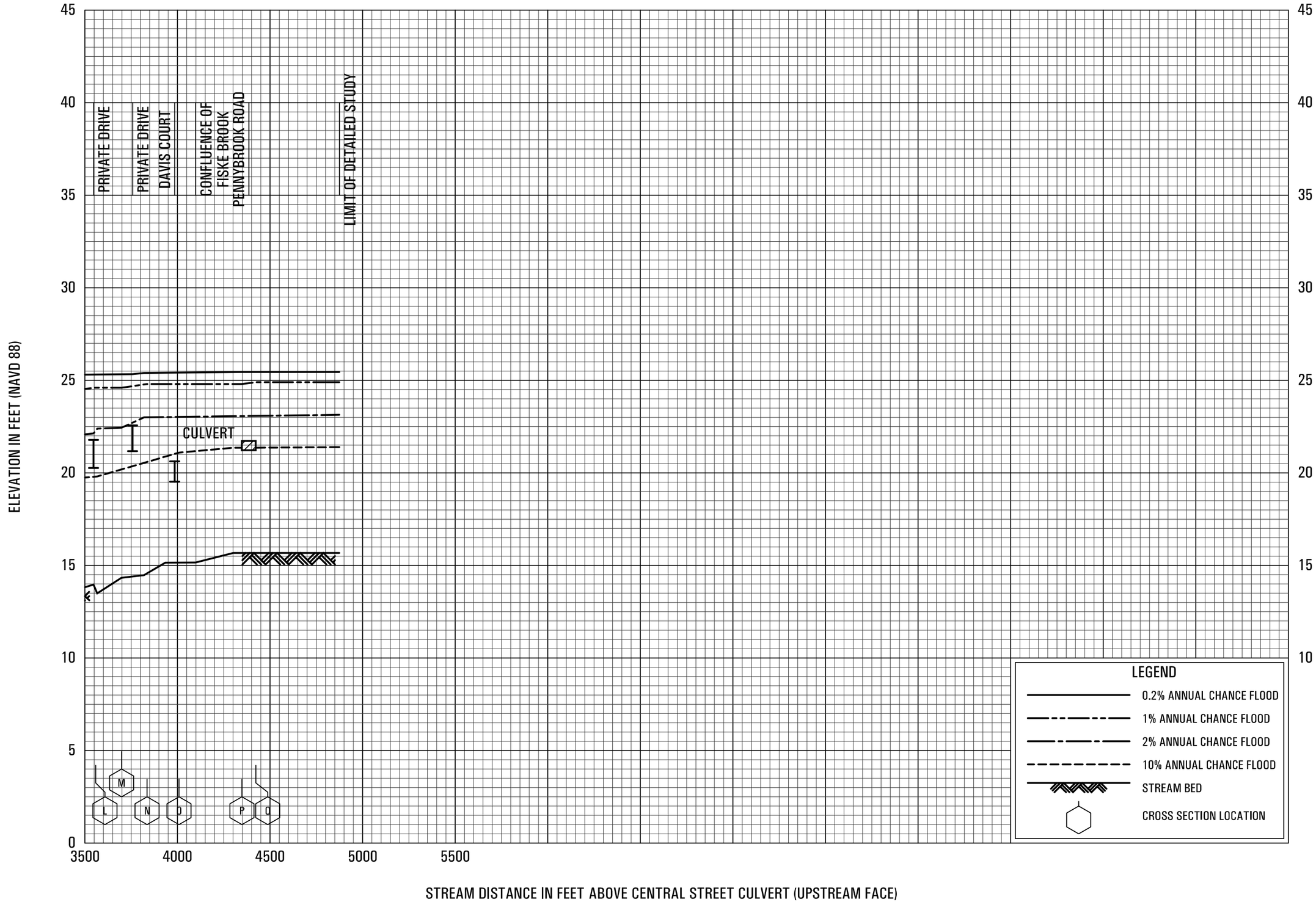
FLOOD PROFILES

SHUTE BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



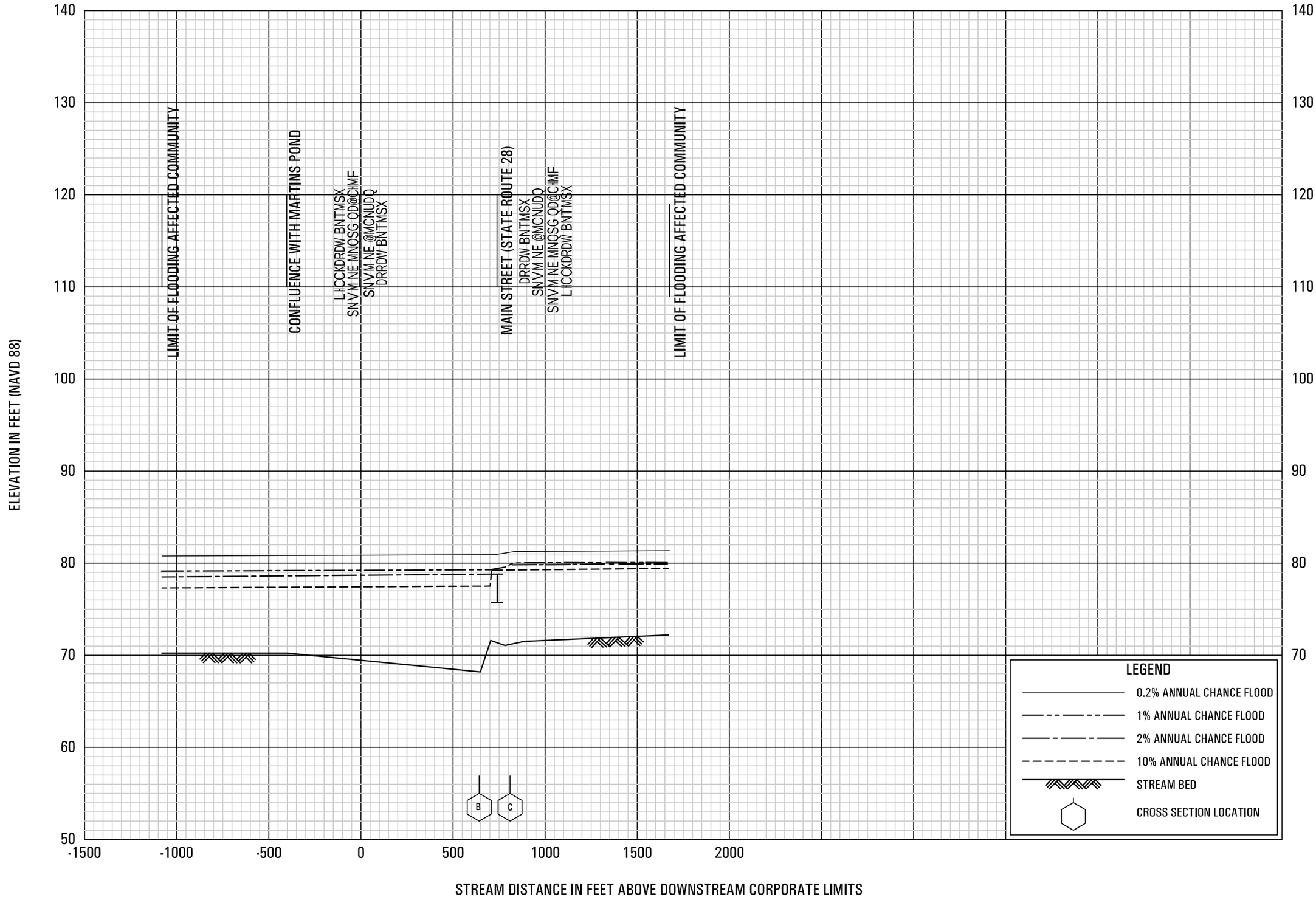
FLOOD PROFILES

SHUTE BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



FLOOD PROFILES

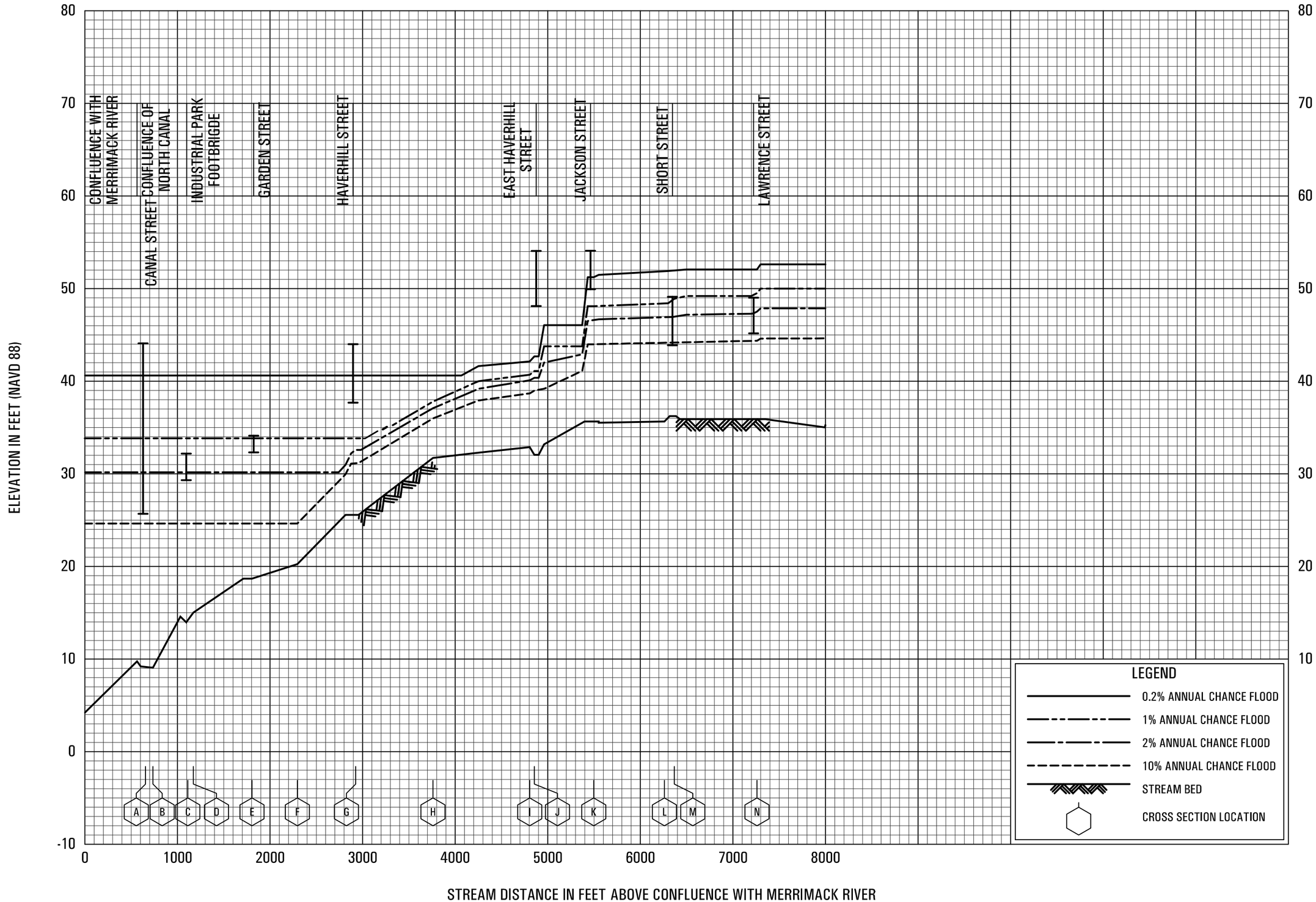
SKUG RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)

150P



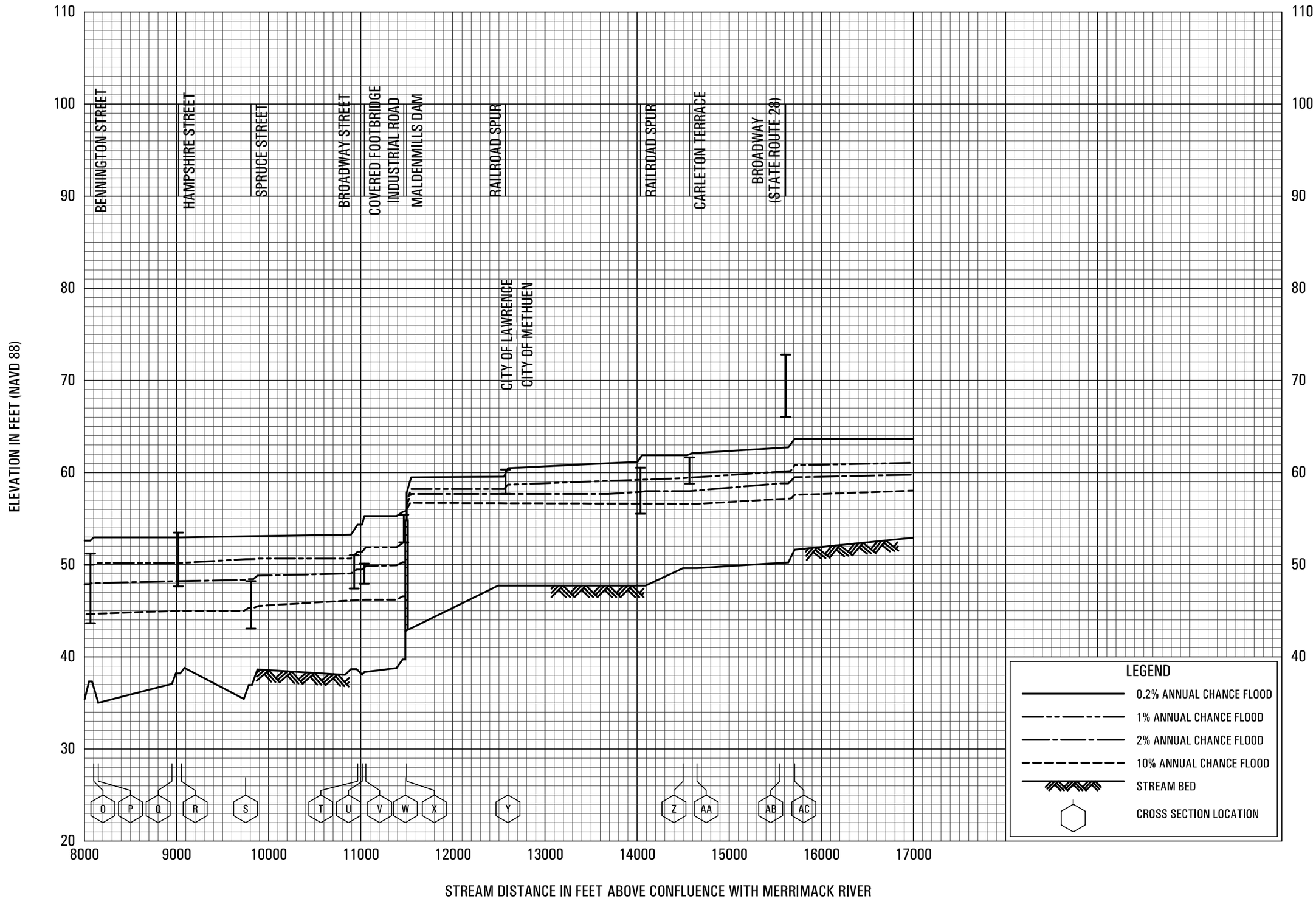
FLOOD PROFILES

SPICKET RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



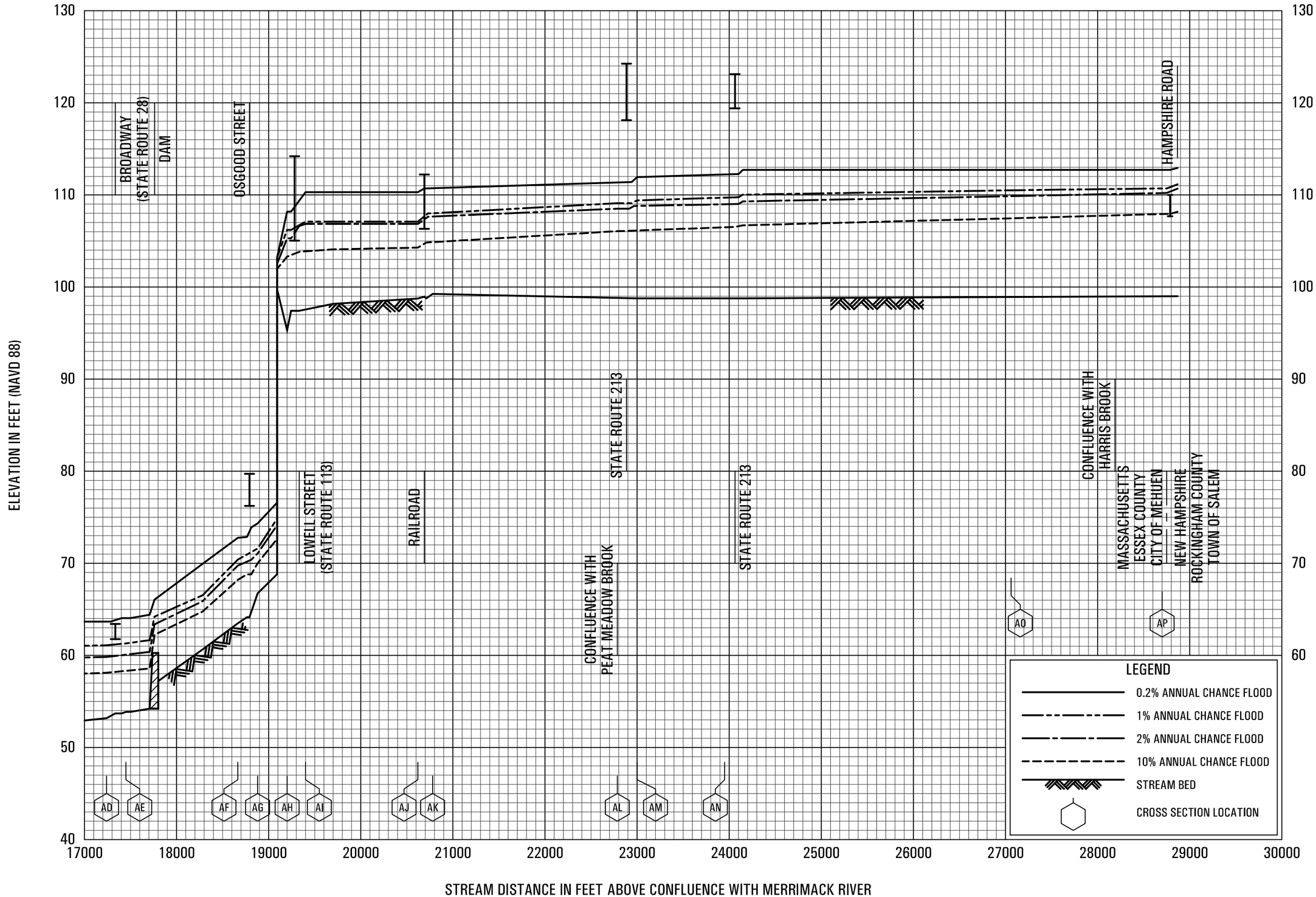
FLOOD PROFILES

SPICKET RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



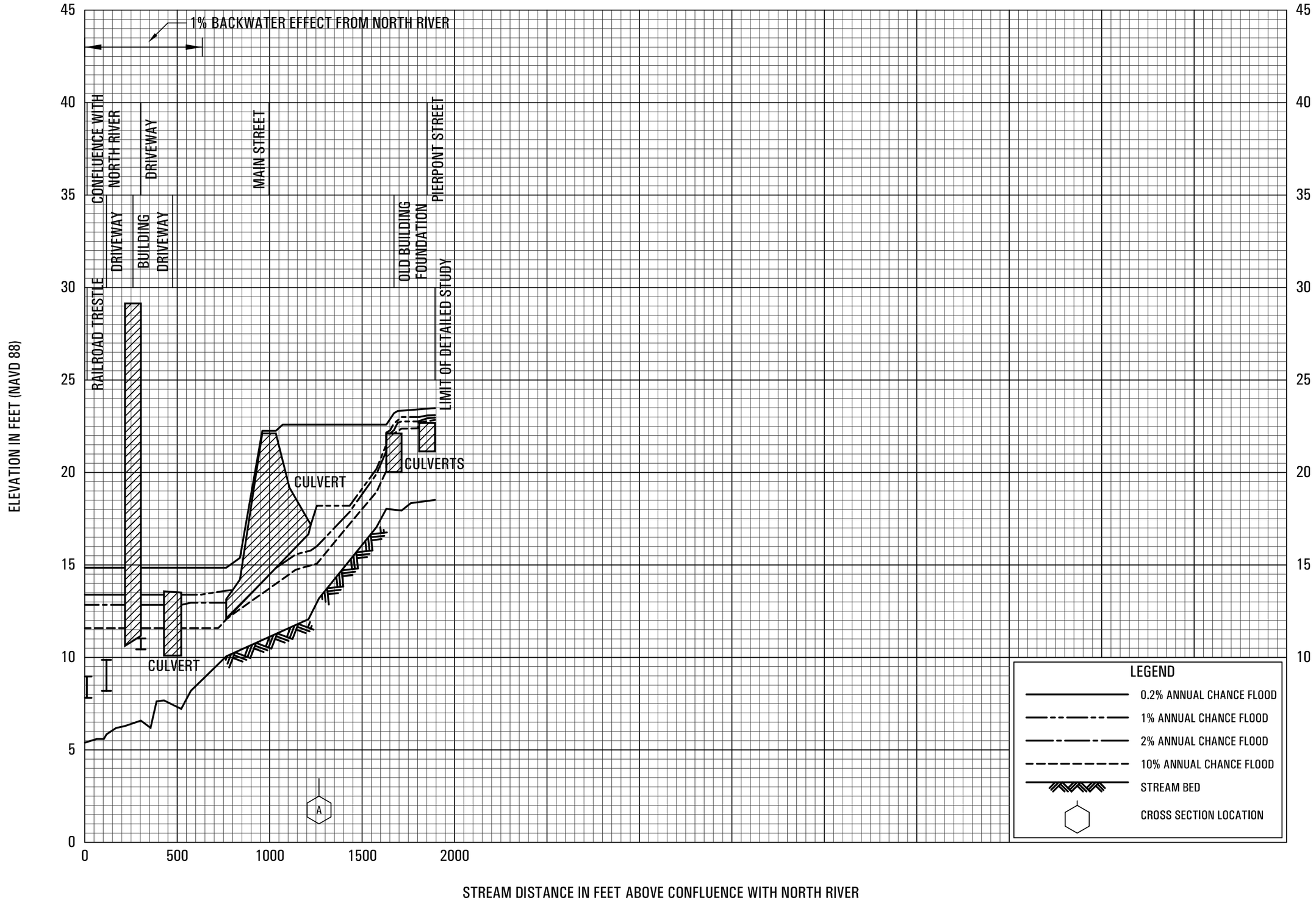
FLOOD PROFILES

SPICKET RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



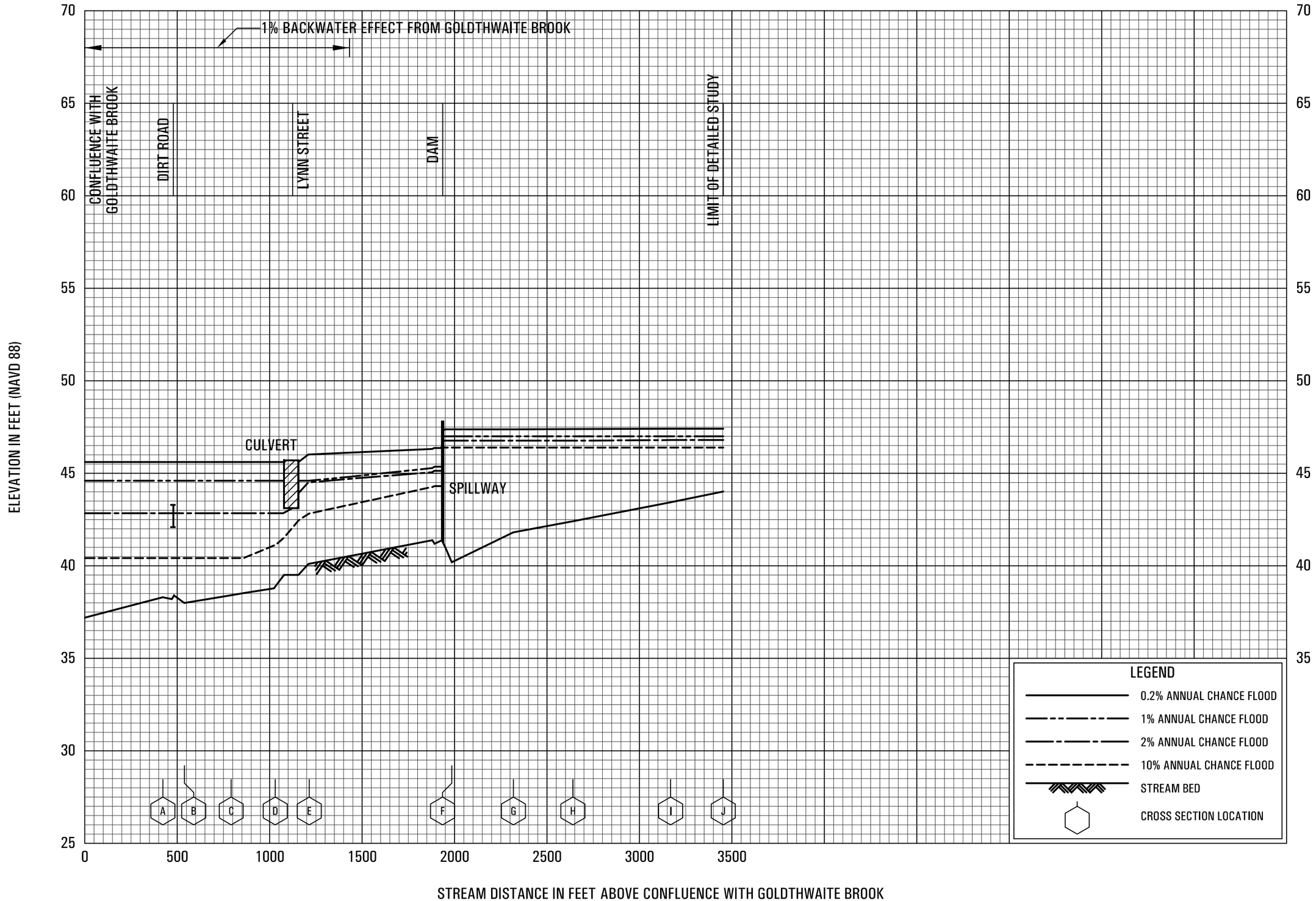
FLOOD PROFILES

STRONGWATER BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



FLOOD PROFILES

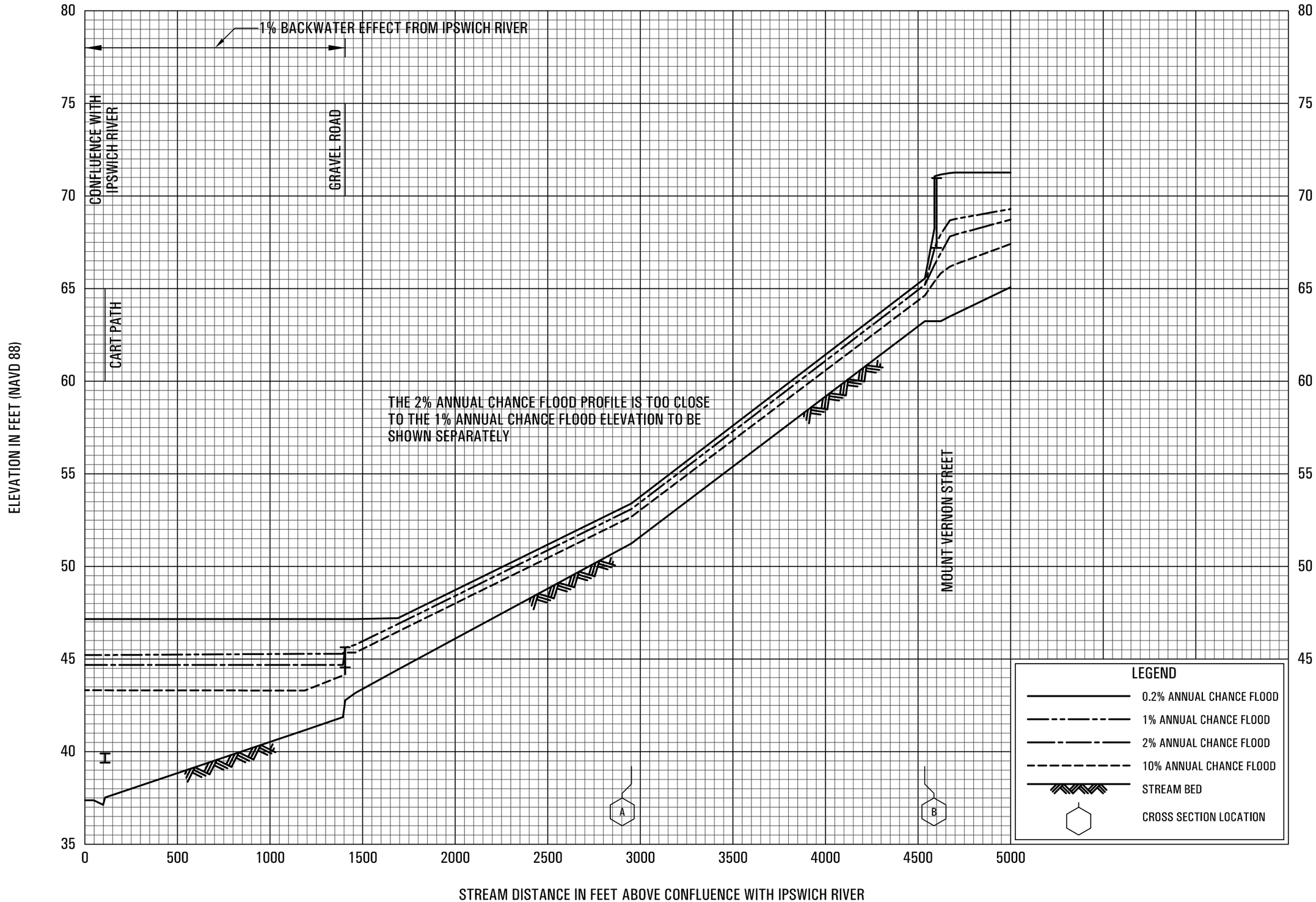
TAPLEY BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)

155P



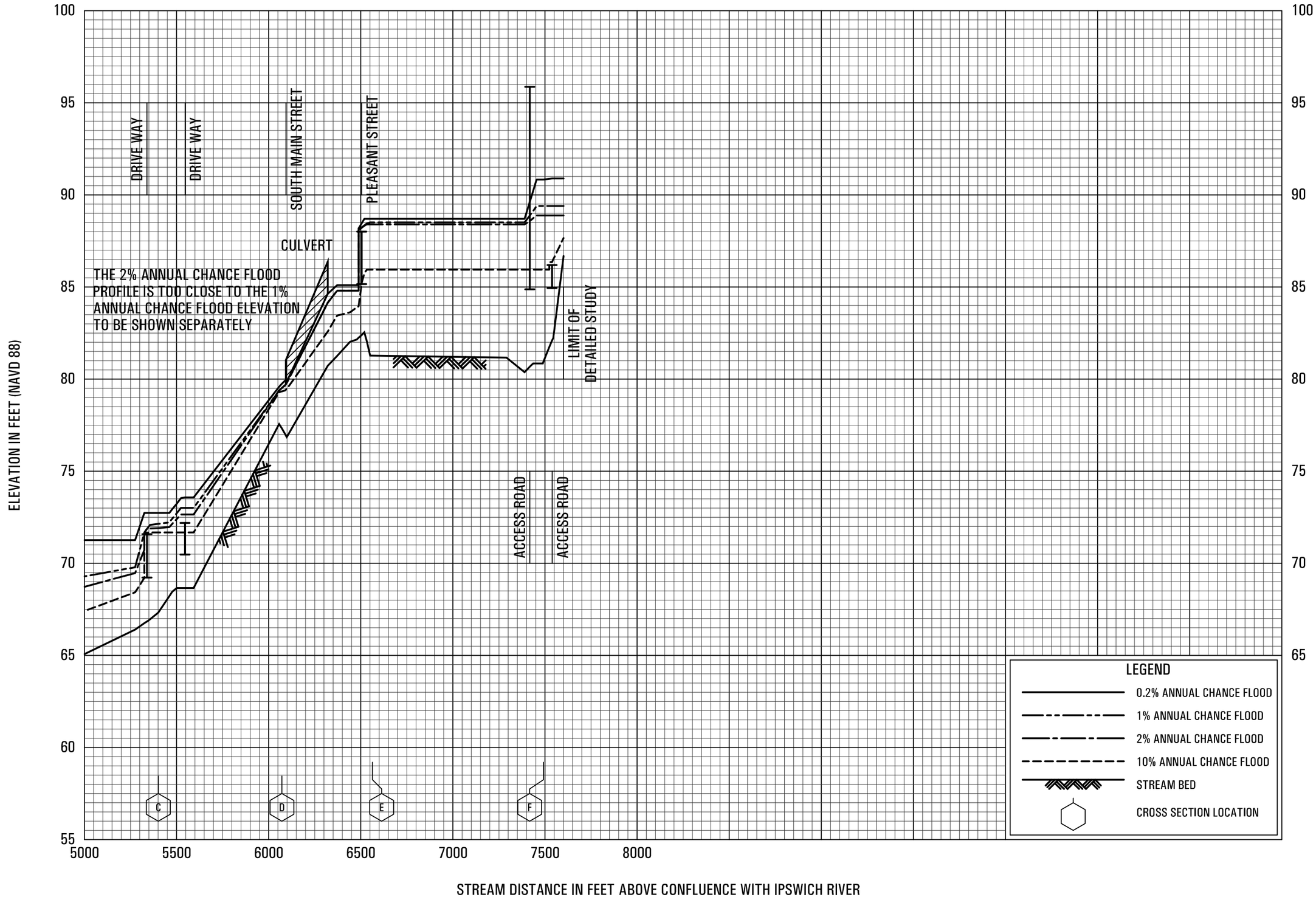
FLOOD PROFILES

TRIBUTARY A TO IPSWICH RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)



FLOOD PROFILES

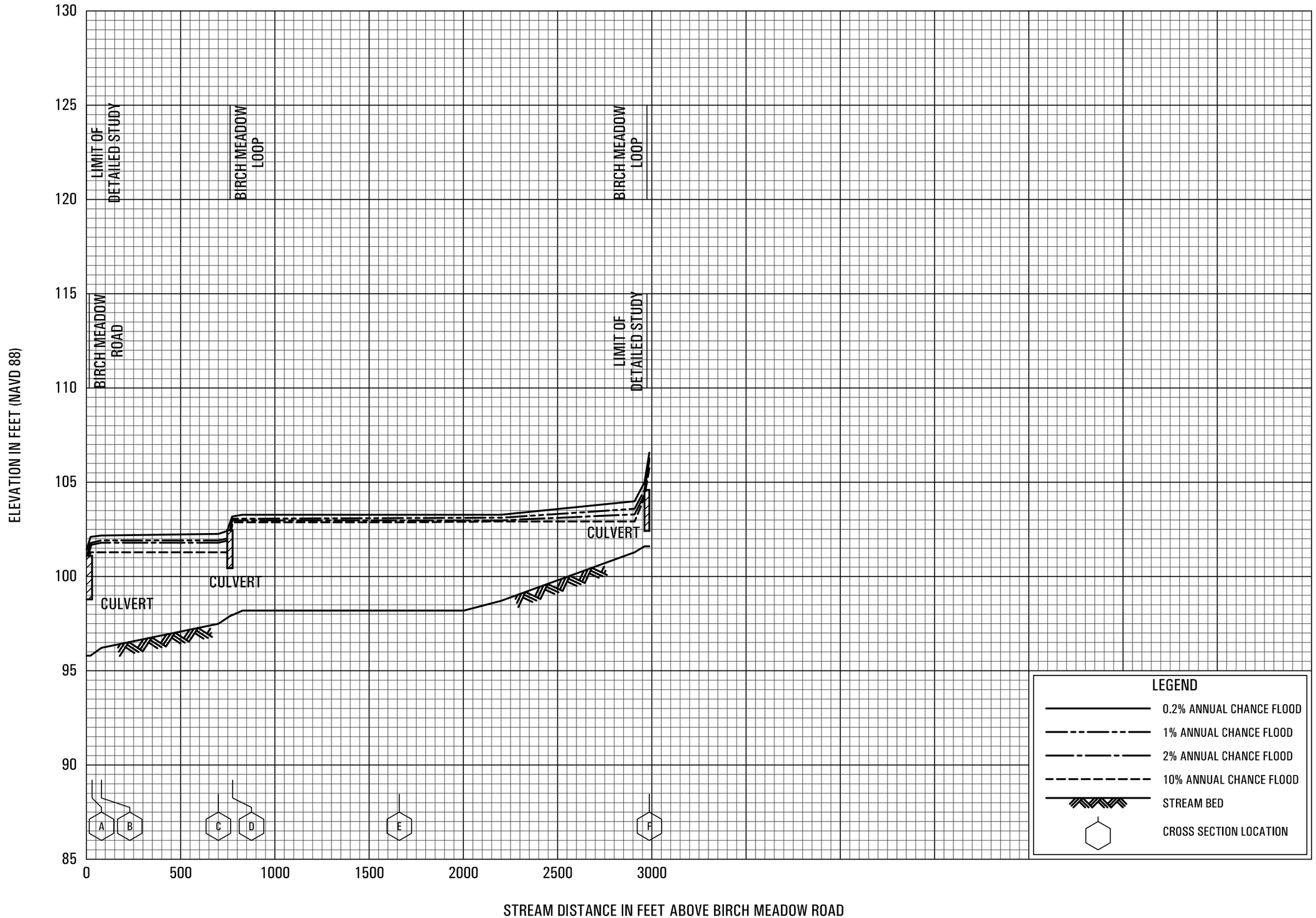
TRIBUTARY A TO IPSWICH RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)

157P



FLOOD PROFILES

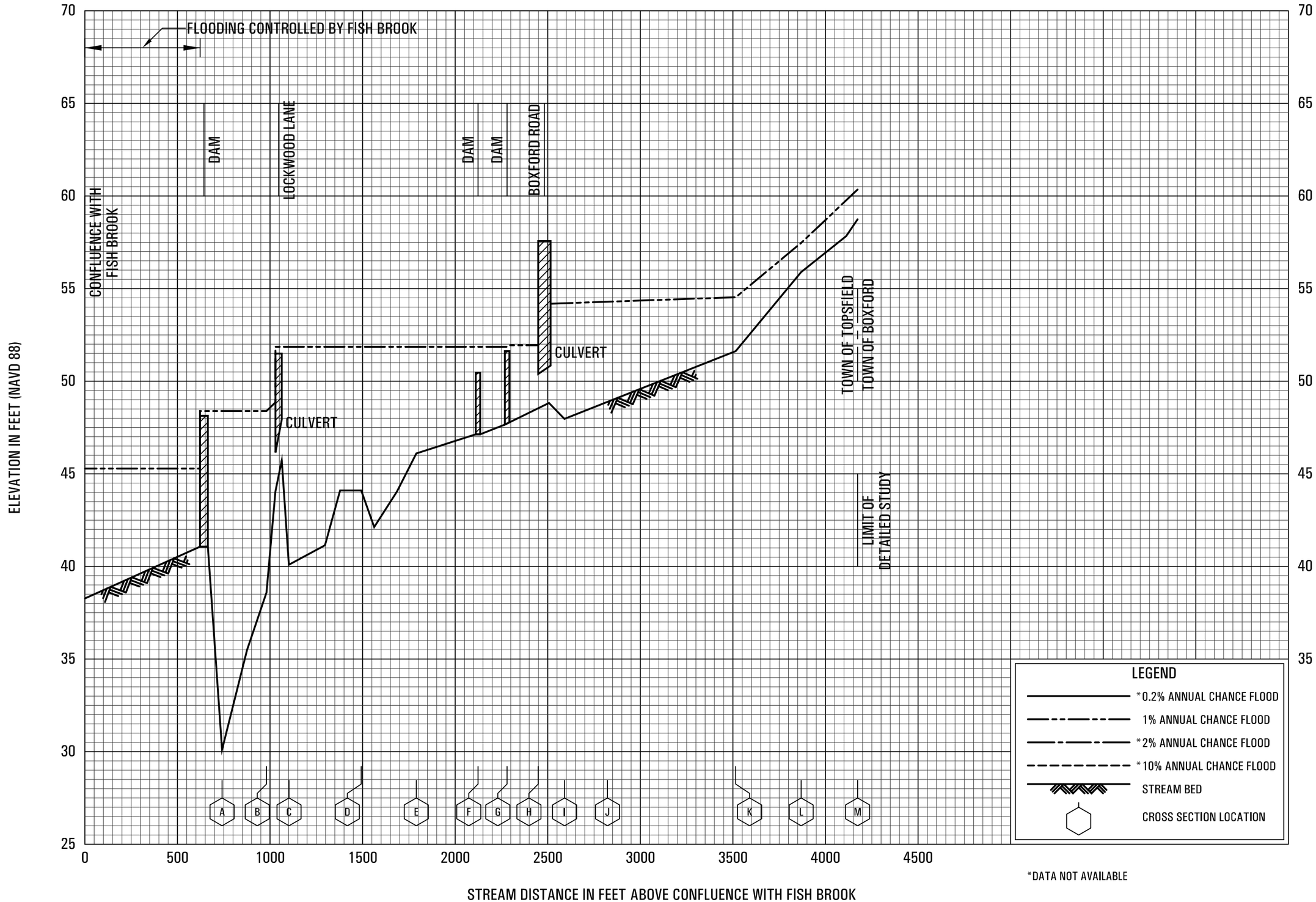
TRIBUTARY TO NEAL POND

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)

158P



FLOOD PROFILES

UNNAMED TRIBUTARY TO FISH BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ESSEX COUNTY, MA

(ALL JURISDICTIONS)

159P