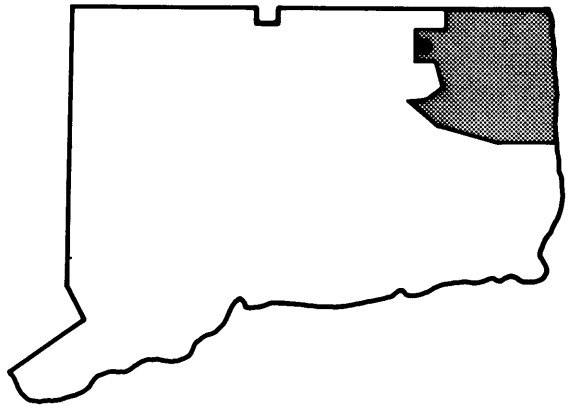
FLOOD INSURANCE STUDY

TOWN OF ASHFORD, CONNECTICUT
WINDHAM COUNTY



JUNE 1, 1981

federal emergency management agency
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FLOOD INSURANCE STUDY
TOWN OF ASHFORD, CONNECTICUT

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Town of Ashford, Windham County, Connecticut, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert Ashford to the regular program of flood insurance by the Federal Insurance Administration (FIA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these federally-supported studies are based. These criteria take precedence over the minimum federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 44 CFR, 60.3. In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgements

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were prepared by the U. S. Army Corps of Engineers for the Federal Insurance Administration, under Inter-Agency Agreement No. IAA-H-9-79. This work was completed in January 1980.

1.3 Coordination

In November 1978, streams requiring detailed study were identified at an initial Consultation and Coordination Officer's (CCO) meeting attended by representatives of the FIA, the Town of Ashford, and the U. S. Army Corps of Engineers (COE). On December 10, 1980, the results of the study were reviewed at a final CCO meeting held with representatives of the FIA, the town, and the COE.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Town of Ashford, Windham County, Connecticut. The area of study is shown on the Vicinity Map (Figure 1).

The Mount Hope River was studied by detailed methods from the downstream corporate limits to the confluence of the East Branch Mount Hope River. The East Branch Mount Hope River was studied by detailed methods from the confluence with the Mount Hope River to Mosley Road. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction for the next five years, through January 1985.

Stowell Pond, Ashford Lake, Sabo Pond, Moritz Pond, Leander Pond, Knowlton Pond, Zaicek Pond, portions of Kidder, Hammond, Bebbington, Gardner, Knowlton, Lowry, Urda, and Goss Brooks, Lake Chafee, Armitage Pond, North Chism Brook, the remaining portion of the East Branch Mount Hope River, and various unnamed swamps were studied by approximate methods. Approximate methods of analysis were used to study those areas having low development potential and minimal flood hazards as identified at the initiation of the study.

2.2 Community Description

The Town of Ashford is located in the northwestern portion of Windham County in northeastern Connecticut, approximately 25 miles northeast of the City of Hartford. It is bordered by the Town of Eastford to the east, the Town of Union to the north, the Town of Willington to the west, the Town of Mansfield to the southwest, and the Town of Chaplin to the southeast.

The total land area contained in the town limits is approximately 50 square miles. The population of Ashford increased from 1,315 in 1960 to 2,156 in 1970 (Reference 1).

2.3 Principal Flood Problems

Floods in Ashford have occurred in every season of the year. Spring floods are common and are caused by rainfall in combination with snowmelt. Floods in late summer and fall are usually the result of hurricanes or other storms moving notheast along the Atlantic coast. Winter floods result from occasional thaws, particularly in years of heavy snowfall.

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWN OF ASHFORD, CT
(WINDHAM CO.)

APPROXIMATE SCALE

4 0 4 8 12 MILES

VICINITY MAP

Major floods of the past 50 years occurred in Ashford in March 1936, September 1938, and August 1955. The 1936 and 1938 floods were equivalent to 20-year and 100-year frequency floods, respectively. Of these, the flood of August 1955, which was caused by a hurricane, was by far the most severe in terms of amount of runoff and property damage. The Mount Hope River at the U. S. Geological Survey (USGS) gaging station (No. 01121000, with 39 years of record) located just upstream of State Route 89 recorded a peak discharge of 5,590 cubic feet per second on August 19, 1955. This is equivalent to a flood having a recurrence interval of more than 100 years.

2.4 Flood Protection Measures

There are no existing or proposed structural flood protection measures within the Town of Ashford.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data for this study. Flood events of a magnitude which are expected to be equalled 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 flood plain management and for flood insurance premium 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 equalled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (one-percent chance of annual occurrence) in any 50-year period is about 40 percent (four in ten) and, for any 90-year period, the risk increases to about 60 percent (six in ten). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for floods of the selected recurrence intervals for the flooding sources studied in detail affecting the community.

The total drainage area of the Mount Hope River at the furthest downstream point of study is 29 miles. Discharge frequencies for the Mount Hope River were obtained from the Flood Insurance Study for the

Town of Mansfield (Reference 2). The Mansfield flows were adjusted for Ashford by multiplying the adopted discharges in Mansfield by a factor equal to the ratio of the drainage areas to the 0.7 exponential power.

A summary of drainage area-peak discharge relationships for the Mount Hope River and the East Branch Mount Hope River is shown in Table 1, "Summary of Discharges".

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
MOUNT HOPE RIVER					
At the Ashford/Mansfield town boundary	29.0	2,100	3,900	5,000	8,400
At U. S. Highway 44	16.5	1,400	2,630	3,370	5,700
EAST BRANCH MOUNT HOPE RIVER					
At Mosley Road	11.2	1,080	2,000	2,570	4,300

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the flooding sources studied in detail were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along these flooding sources.

Cross sections for the backwater analyses of the Mount Hope River and the East Branch Mount Hope River were obtained from aerial photographs flown in April 1979 at a scale of 1"=1,000' (Reference 3). All bridges, dams, and culverts were field checked to obtain elevation data and structural geometry.

Channel roughness factors (Manning's "n") used in the hydraulic computations were chosen by engineering judgment and based on field observations of the stream and flood plain area. The channel "n" value for the Mount Hope River and the East Branch Mount Hope River ranged from 0.045 to 0.050, and the overbank "n" value was 0.100.

Water-surface elevations of floods of the selected recurrence intervals were computed through the use of the COE HEC-2 computer program (Reference 4). Starting water-surface elevations for the Mount Hope River were obtained from the Flood Insurance Study for the Town of Mansfield (Reference 2). Starting water-surface elevations for the East Branch Mount Hope River were obtained from the flood profiles for the Mount Hope River.

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals. Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway is computed (Section 4.2), selected cross-section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 3).

All elevations used in this study are referenced to the National Geodetic Vertical Datum of 1929 (NGVD), formerly referred to as Sea Level Datum of 1929. Locations of the elevation reference marks used in the study are shown on the maps.

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

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the FIA as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. For the streams studied in detail, the boundaries of the 100- and 500-year floods have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using topographic maps at a scale of 1"=200' with a contour interval of 5 feet (Reference 5). In cases where the 100- and 500-year flood boundaries are close together, only the 100-year boundary has been shown.

For the flooding sources studied by approximate methods, the boundary of the 100-year flood was delineated using field inspection and USGS topographic maps (Reference 6).

The boundaries of the 100- and 500-year floods are shown on the Flood Boundary and Floodway Map (Exhibit 3). Small areas within the flood boundaries may lie above the flood elevations and, therefore, may not be subject to flooding. Owing to limitations of the map scale and lack of detailed topographic data, such areas are not shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood can be carried without substantial increases in flood heights. Minimum standards of the FIA limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this report are presented to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

The floodways presented in this study were computed on the basis of equal conveyance reduction from each side of the flood plains. The results of these computations are tabulated at selected cross sections for each stream segment for which a floodway is computed (Table 2).

As shown on the Flood Boundary and Floodway Map (Exhibit 3), the floodway widths were determined at cross sections; between cross sections, the boundaries were interpolated. In cases where the boundaries of the floodway and the 100-year flood are either close together or collinear, only the floodway boundary has been shown.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FIA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHFs), and flood insurance zone designations for the flooding sources affecting the Town of Ashford.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Mount Hope River								
A	0	400	2,143	2.3	340.0	340.0	340.2	0.2
B	1,072	400	2,387	2.1	340.5	340.5	341.4	0.9
C	2,054	400	2,891	1.7	341.0	341.0	342.0	1.0
D	3,242	400	2,395	2.1	341.6	341.6	342.5	0.9
E	3,422	300	1,767	2.8	343.2	343.2	343.8	0.6
F	4,325	214	1,174	4.3	344.4	344.4	345.1	0.7
G	5,658	182	1,060	4.7	347.9	347.9	348.1	0.2
H	6,460	138	941	5.3	350.1	350.1	350.8	0.7
I	7,403	127	601	8.3	353.3	353.3	354.3	1.0
J	8,290	210	912	5.5	360.0	360.0	360.0	0.0
K	10,268	155	1,143	4.4	365.9	365.9	366.7	0.8
L	11,270	110	520	9.6	369.4	369.4	369.6	0.2
M	12,062	125	730	6.9	376.3	376.3	376.4	0.1
N	12,760	231	945	5.3	379.5	379.5	379.8	0.3
O	13,475	120	672	7.4	383.1	383.1	383.2	0.1
P	13,610	100	871	3.9	389.3	389.3	389.3	0.0
Q	14,264	100	1,108	3.0	389.4	389.4	389.6	0.2
R	14,870	100	1,018	3.3	389.4	389.4	389.9	0.5

[1]Feet above corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWN OF ASHFORD, CT
(WINDHAM CO.)

FLOODWAY DATA

MOUNT HOPE RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Mount Hope River (continued)								
S	15,530[1]	80	644	5.2	389.4	389.4	390.4	1.0
T	15,685[1]	150	1,337	2.5	391.4	391.4	391.7	0.3
U	16,325[1]	265	1,839	1.8	391.7	391.7	392.3	0.6
V	17,740[1]	400	1,649	2.0	392.8	392.8	393.3	0.5
W	18,900[1]	494	1,460	2.3	395.0	395.0	395.8	0.8
X	19,778[1]	200	537	6.3	401.4	401.4	401.8	0.4
Y	20,424[1]	200	959	3.5	405.6	405.6	406.5	0.9
Z	20,838[1]	150	627	5.4	407.6	407.6	408.2	0.6
AA	21,042[1]	150	673	5.0	408.9	408.9	409.3	0.4
AB	21,430[1]	100	357	9.4	412.9	412.9	412.9	0.0
East Branch Mount Hope River								
A	167[2]	100	462	5.6	415.9	415.9	416.4	0.5

[1]Feet above corporate limits

[2]Feet above confluence with Mount Hope River

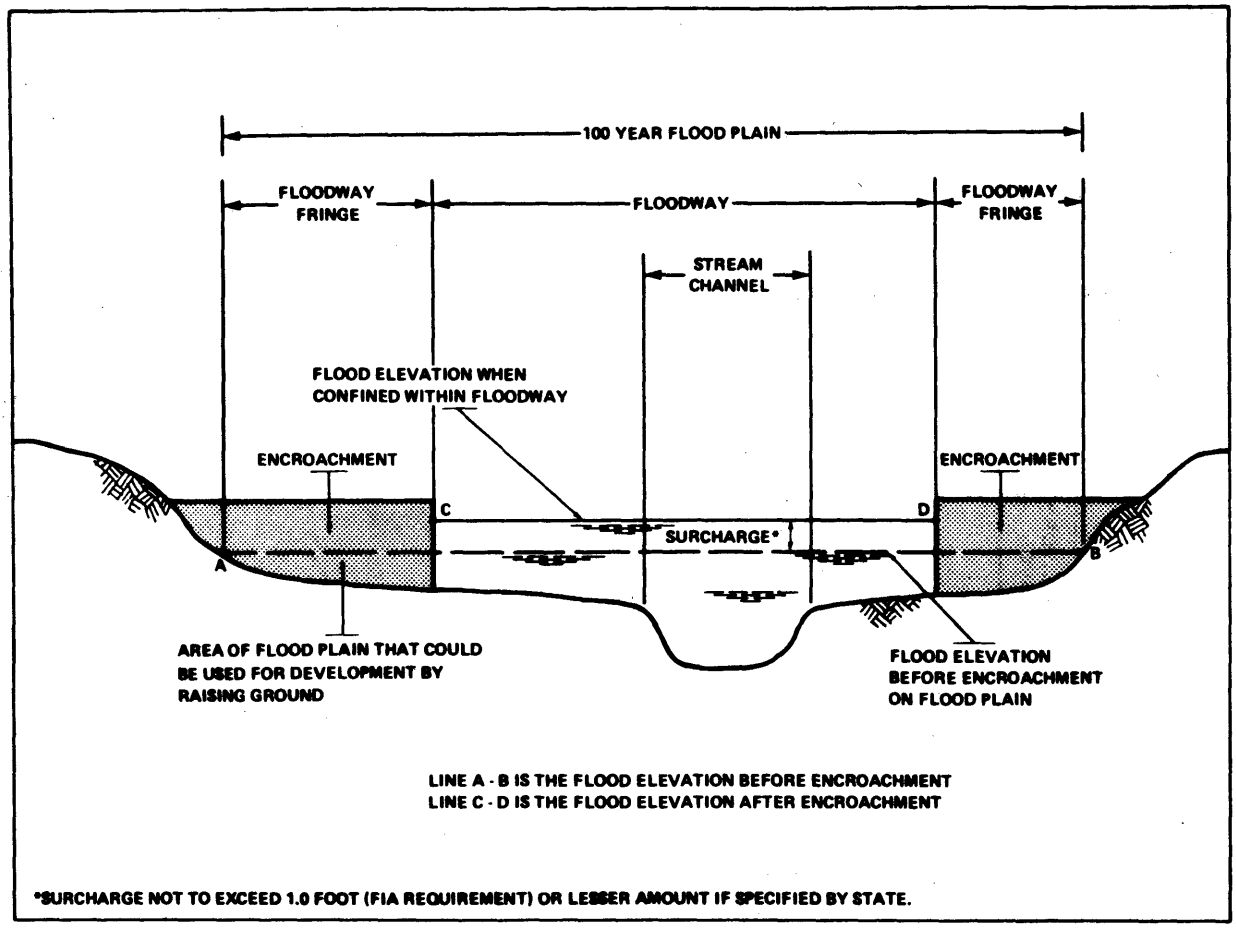
TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWN OF ASHFORD, CT
(WINDHAM CO.)

FLOODWAY DATA

MOUNT HOPE RIVER AND EAST BRANCH MOUNT HOPE RIVER



FLOODWAY SCHEMATIC Figure 2

5.1 Reach Determinations

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

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

The locations of the reaches determined for the flooding sources of the Town of Ashford are shown on the Flood Profiles (Exhibit 1) and are summarized in the Flood Insurance Zone Data Table (Table 3).

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Mount Hope River							
Reach 1	21,23	-3.2	-1.1	+2.7	030	A6	Varies
Reach 2	21	-1.7	-0.5	+1.4	015	A3	Varies
East Branch Mount Hope River							
Reach 1	21	-3.2	-0.6	+1.4	030	A6	Varies

[1]Flood Insurance Rate Map Panel
[2]Weighted Average
[3]Rounded to the nearest foot - see map

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWN OF ASHFORD, CT
(WINDHAM CO.)

FLOOD INSURANCE ZONE DATA

MOUNT HOPE RIVER AND EAST BRANCH MOUNT HOPE RIVER

5.2 Flood Hazard Factors

The FHF is the FIA device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest 0.5 foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire incorporated area of the Town of Ashford was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

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

Zones A3 and A6: Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to FHF.

Zone B: Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; also, areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.

Zone C: Areas of minimal flooding.

Table 3, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevations for the flooding sources studied in detail in the Town of Ashford.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Town of Ashford is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FIA.

6.0 OTHER STUDIES

Flood Insurance Studies for the Towns of Mansfield, Eastford, Chaplin, and Willington are currently being prepared (References 2, 7, 8, and 9). The results of those studies will be in exact agreement with the results of this study.

This study is authoritative for purposes of the Flood Insurance Program, and the data presented here either supersede or are compatible with previous determinations.

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study can be obtained by contacting the office of the Insurance and Mitigation Division of the Federal Emergency Management Agency, Regional Director, Region I Office, J. W. McCormack Post Office and Courthouse Building, Room 462, Boston, Massachusetts 02109.

8.0 BIBLIOGRAPHY AND REFERENCES

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4. U. S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Computer Program 723-X6-L202A, Davis, California, November 1976.

5. Quinn and Associates of Horsham, Pennsylvania, Topographic Maps compiled from aerial photographs, Scale 1"=200', Contour Interval 5 Feet: Ashford, Connecticut, April 1979.

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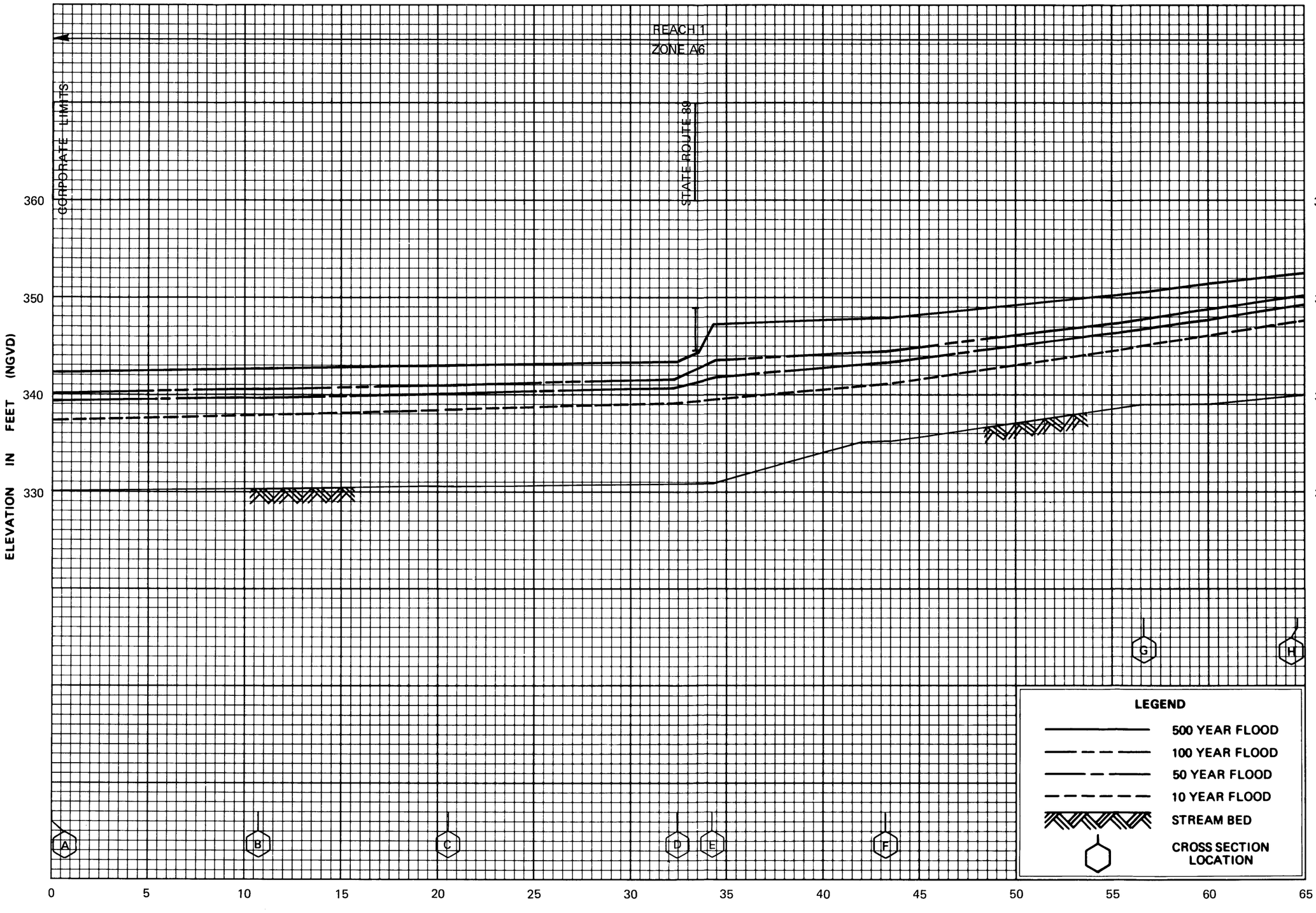
7. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Town of Eastford, Windham County, Connecticut (Unpublished).

8. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Town of Chaplin, Windham County, Connecticut (Unpublished).

9. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Town of Willington, Tolland County, Connecticut (Unpublished).



FLOOD PROFILES

MOUNT HOPE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWN OF ASHFORD, CT
(WINDHAM CO.)

01P

REACH 1
ZONE A6

ELEVATION IN FEET (NGVD)

390
380
370
360
350
340

65 70 75 80 85 90 95 100 105 110 115 120 125 130

STREAM DISTANCE IN HUNDREDS OF FEET ABOVE CORPORATE LIMITS

I J K L M N

LEGEND

- 500 YEAR FLOOD
- 100 YEAR FLOOD
- 50 YEAR FLOOD
- 10 YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION

FLOOD PROFILES

MOUNT HOPE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWN OF ASHFORD, CT
(WINDHAM CO.)

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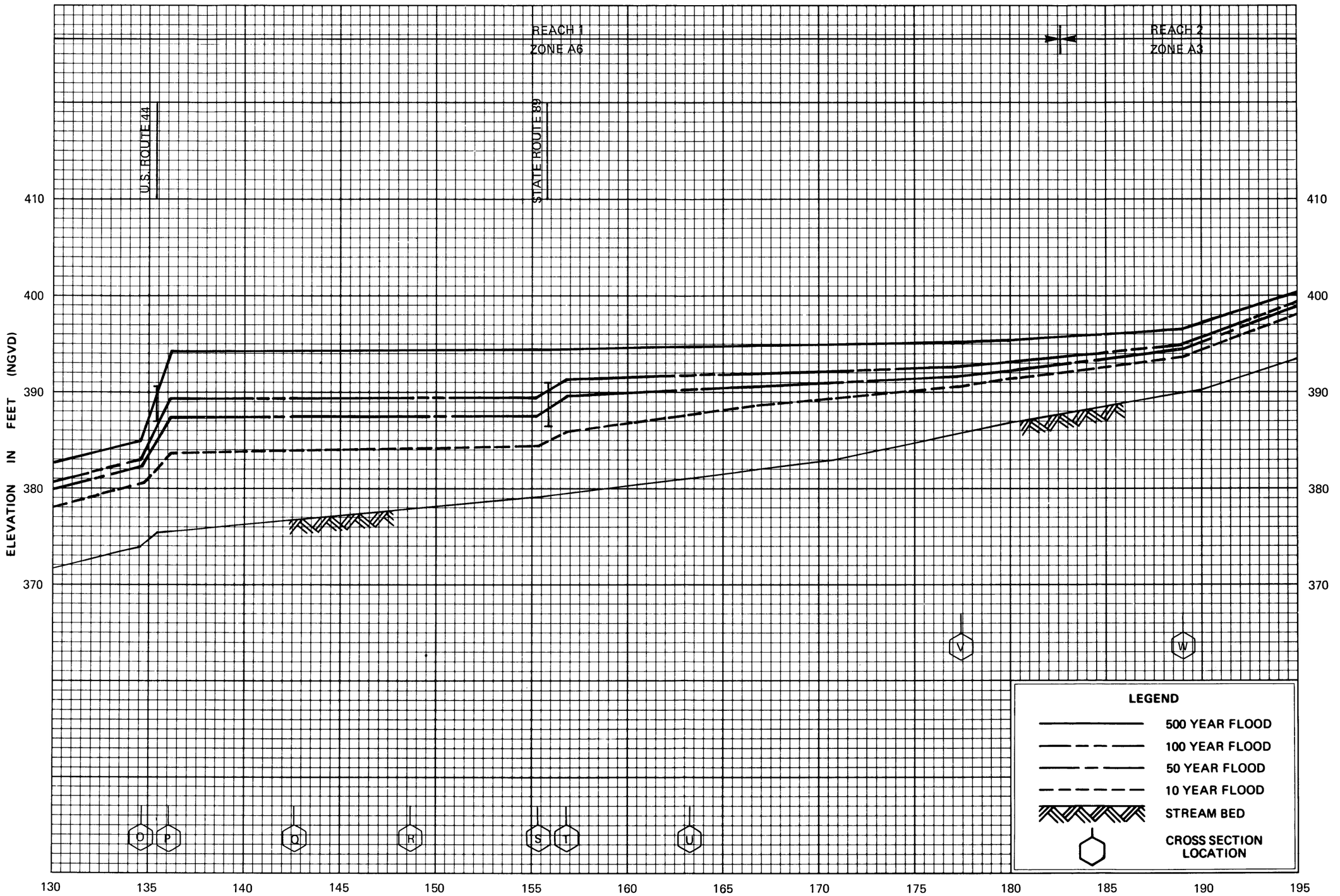

FLOOD PROFILES

MOUNT HOPE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWN OF ASHFORD, CT
(WINDHAM CO.)

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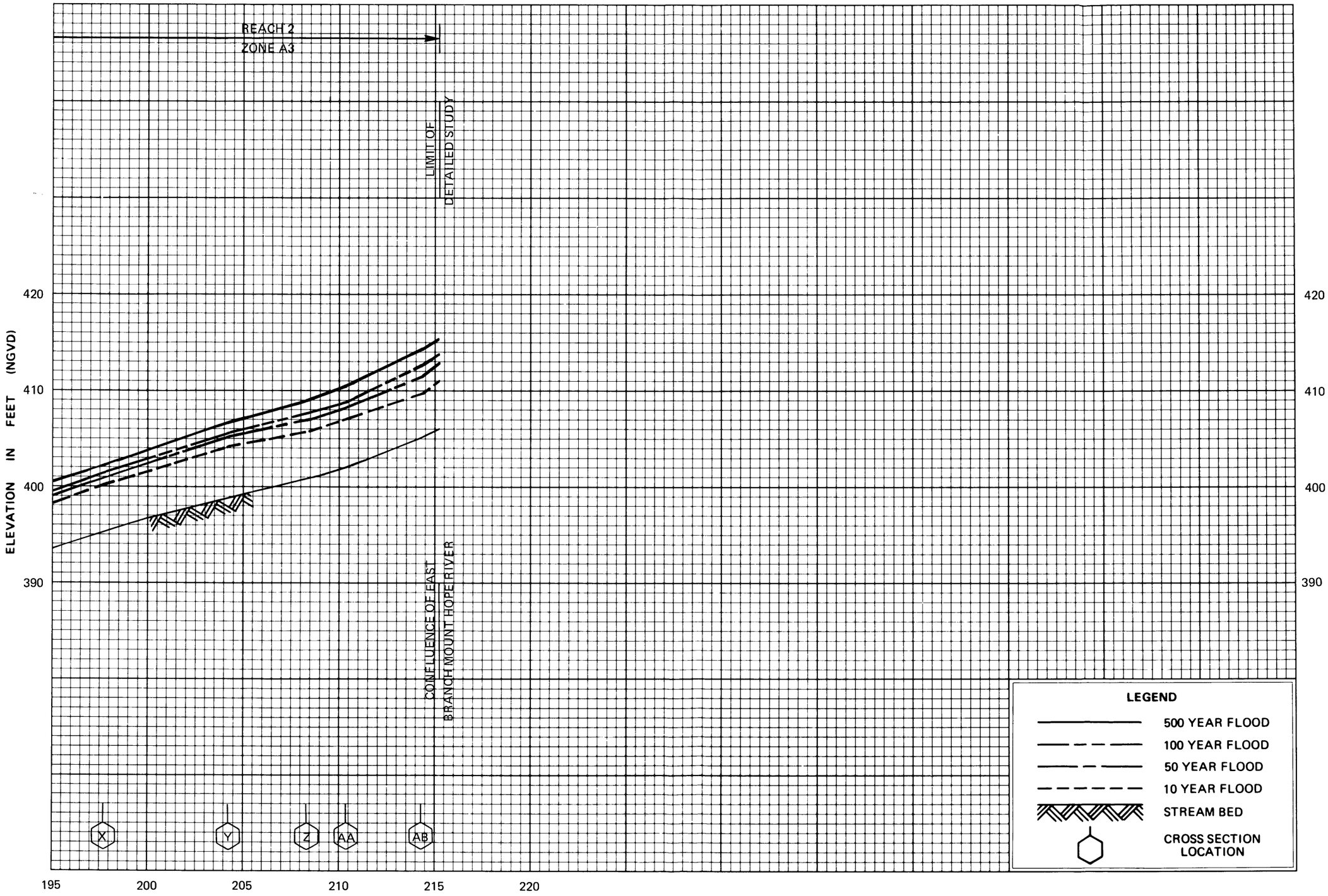

FLOOD PROFILES

MOUNT HOPE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWN OF ASHFORD,CT
(WINDHAM CO.)

04P

FLOOD PROFILES

EAST BRANCH MOUNT HOPE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWN OF ASHFORD, CT
(WINDHAM CO.)

05P