FLOOD PLAIN INFORMATION

FARMINGTON RIVER

SIMSBURY, AVON AND FARMINGTON, CONNECTICUT

TECHNICAL REPORT

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

MARCH 1966

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This study, authorized under Section 206, Public Law 86-645, was requested by the three towns.

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INTRODUCTION

1. GENERAL

The towns of Simsbury, Avon and Farmington, Connecticut have requested the assistance of the Corps of Engineers in determining the limits of the flood plain that may be regulated along the Farmington River to reduce future flood damages.

2. AUTHORIZATION

Upon application to the Chief of Engineers, Washington, D. C. authority was granted to the New England Division, Corps of Engineers to prepare this flood plain information report under the general authority conferred on the Chief of Engineers by Section 206, Public Law 86-645 (approved July 1960), which reads:

> "SEC. 206(a) That, in recognition of the increasing use and development of the flood plains of the rivers of the United States and of the need for information on flood hazards to serve as a guide to such development, and as a basis for avoiding future flood hazards by regulation of use by States and municipalities, the Secretary of the Army, through the Chief of Engineers, Department of the Army, is hereby authorized to compile and disseminate information on floods and flood damages, including identification of areas subject to inundation by floods of various magnitudes and frequencies, and general criteria for guidance in the use of flood plain areas; and to provide engineering advice to local interests for their use in planning to ameliorate the flood hazard; Provided, That the necessary surveys and studies will be made and such information and advice will be provided for specific localities only upon the request of a State or a responsible local governmental agency and upon approval by the Chief of Engineers.

This report has been reviewed and approved for release by the Connecticut Water Resources Commission and by the Chief of Engineers, Washington, D.C.

3. PURPOSE OF THE STUDY

The purpose of this study is to describe the flood situation along the Farmington and Pequabuck Rivers in Simsbury, Avon and Farmington and to provide information to aid: (a) in the solution of local flood problems; (b) in the best utilization of lands subject to overflow; and

(c) in establishing a basis for zoning and other regulating measures relative to the development in the flood plain.

4. The Corps of Engineers for many years has been collecting information on existing and prospective flood conditions and hazards on the Farmington River. The dissemination of this information to all interested parties will provide a basis for further study, planning and action by State and local interests in alleviating existing flood problems and in avoiding or reducing future flood problems likely to be associated with increased development of the flood plain areas. It will also provide technical advice to make possible optimum economic use of the flood areas based on carefully considered local judgment and exercise of control of development of such areas. Additional details and basic data are available for inspection at the New England Division office.

5. SCOPE OF STUDY

The flood of August 1955 has been used as a basis for determining the flood damage potential along the Farmington River in the three towns. Lesser floods plus one large one were also analyzed. Profiles and the extent of flooding have been indicated on exhibits included in this report.

6. USE OF STUDY

The depth of flooding may be ascertained from the maps, profiles and cross sections. From this data future development may be planned with due recognition of the chance and hazards of flooding.

7. It is not intended to extend any Federal authority over zoning or other regulation of flood plain use and the report is not to be construed as committing the Federal Government in the future to investigating, planning, designing, constructing, operating or maintaining any facilities discussed, or to imply any intent to undertake such activities unless specifically authorized by Congress.

8. It is the responsibility of the State and local agencies to disseminate the information in this report to planning groups, zoning boards, private citizens, engineering firms, business firms, real estate developers and industries. Additional copies of this report may be obtained at the Planning and Zoning Offices in the towns of Simsbury, Avon and Farmington.

9. ACKNOWLEDGMENT

Appreciation is extended to all of the individuals who privately or

as representatives of the industries in the valleys were helpful in developing the field data. The cooperation and assistance of other Federal and non-Federal agencies in observing, collecting and compiling the information contained herein is also appreciated. Some of these agencies are as follows:

U. S. Geological Survey
U. S. Weather Bureau

State of Connecticut
Water Resources Commission
Highway Department
Farmington River Watershed Assoc., Inc.

Selectmen and Administrative Officers
of the three towns

10. CONTINUED ASSISTANCE OF CORPS OF ENGINEERS

This report was prepared by personnel of the New England Division Corps of Engineers located in Waltham, Massachusetts. Engineers from this office will be available upon request of State and local government agencies to interpret and explain information in this report and to provide other pertinent data which are available.

DESCRIPTION OF PROBLEM

11. LOCATION

This study covers the Farmington River in the towns of Simsbury, Avon and Farmington, all located in Hartford County about 10 miles west of the city of Hartford, Connecticut (see plate 1). The actual study limits extend from the Tariffville "gorge" in Simsbury to the NYNH&H railroad bridge in the River Glen section of the town of Farmington. In addition, the study included that portion of the Farmington River which borders on the "Tunxis Reservation" section of the town of Avon located upstream of the town of Farmington.

12. BASIN DESCRIPTION

An examination of plate 1 will show that the Farmington River basin is about 46 miles long in the north-south direction and about 29 miles wide in the east-west direction. However, its actual water course is more than 80 miles long as it meanders from its source in Becket, Massachusetts to its mouth at Windsor, Connecticut. The main channel from Becket to New Hartford, Connecticut, a distance of about 35 miles, is identified as the West Branch of the Farmington River. As the West Branch

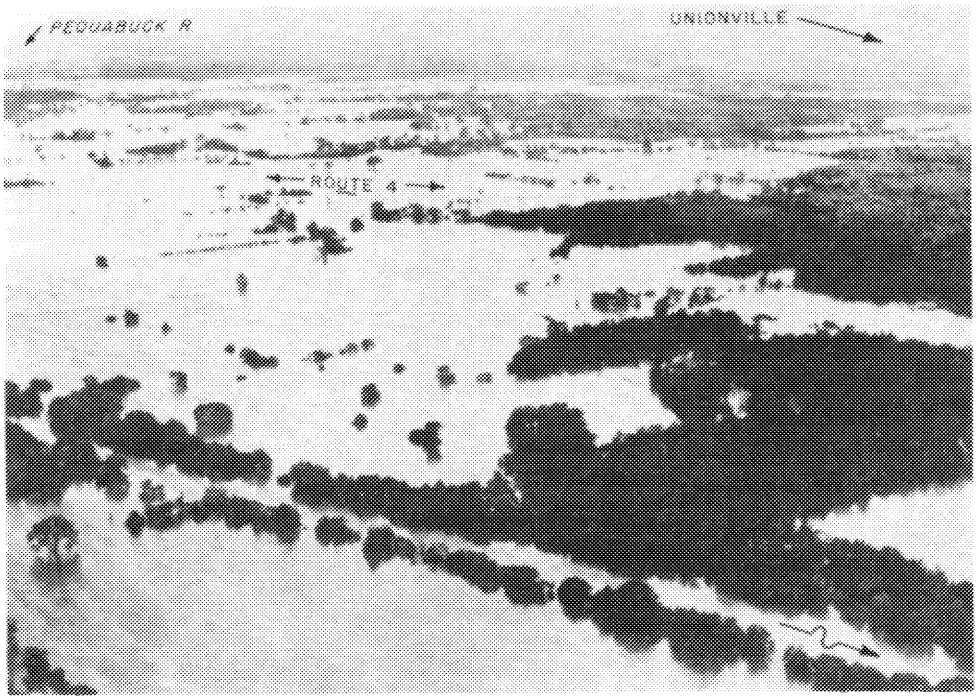
flows in a southerly direction, the average fall in the river represents a slope of about 40 feet per mile. This slope does not reflect the true hydraulic gradient since some of the fall takes place at dams.

13. At New Hartford the Farmington River is formed by the joining of the West Branch and the highly regulated East Branch. From this junction the river continues in a southeasterly direction for a distance of about 15 miles to the River Glen section of the town of Farmington, Connecticut. In this reach of river the main channel has an average slope of about 12 feet per mile.

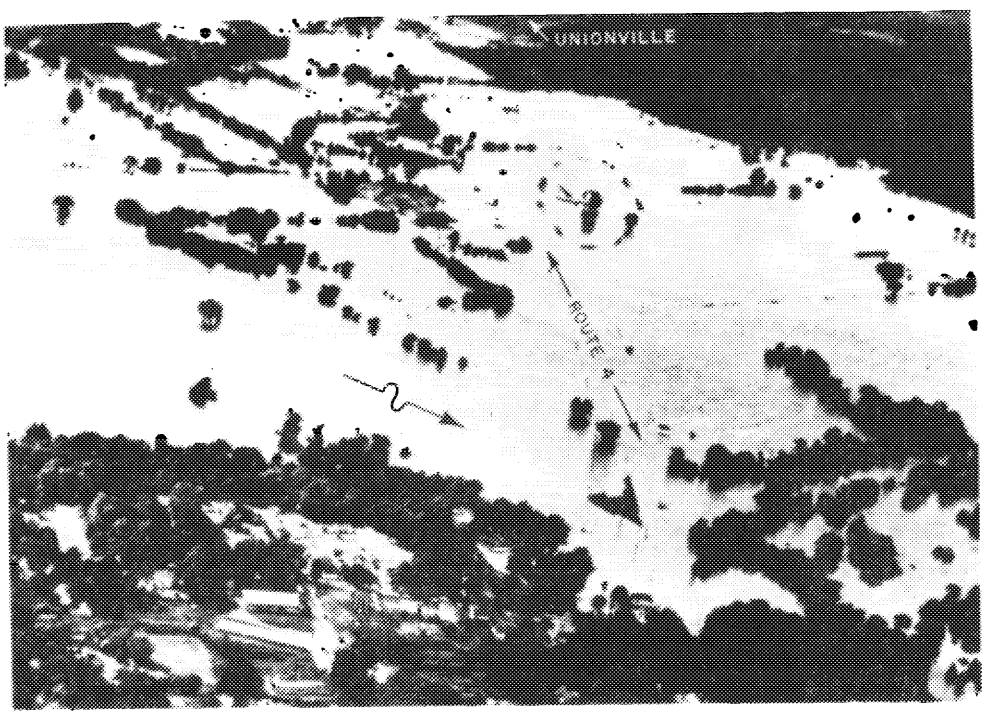
14. Just downstream of River Glen at the mouth of the Pequabuck River the Farmington turns almost 90 degrees into a northerly direction. For the next 20 miles, which is the major subject area of this report, the river flows almost due north to the Tariffville section of the town of Simsbury. In this reach of river the valley broadens into a wide flat flood plain approximately one-half mile wide with an average channel slope of less than 1 foot per mile. Due to the flat gradient and the wide flood plain, this portion of the Farmington River valley becomes a natural flood control reservoir during times of flood (see photos 1 through 4).

15. In the 13 miles from Tariffville to where it joins the Connecticut River in Windsor, the Farmington River channel drops about 125 feet. However about 70 percent of this fall takes place at the Tariffville gorge and the power dam at Rainbow, Connecticut.

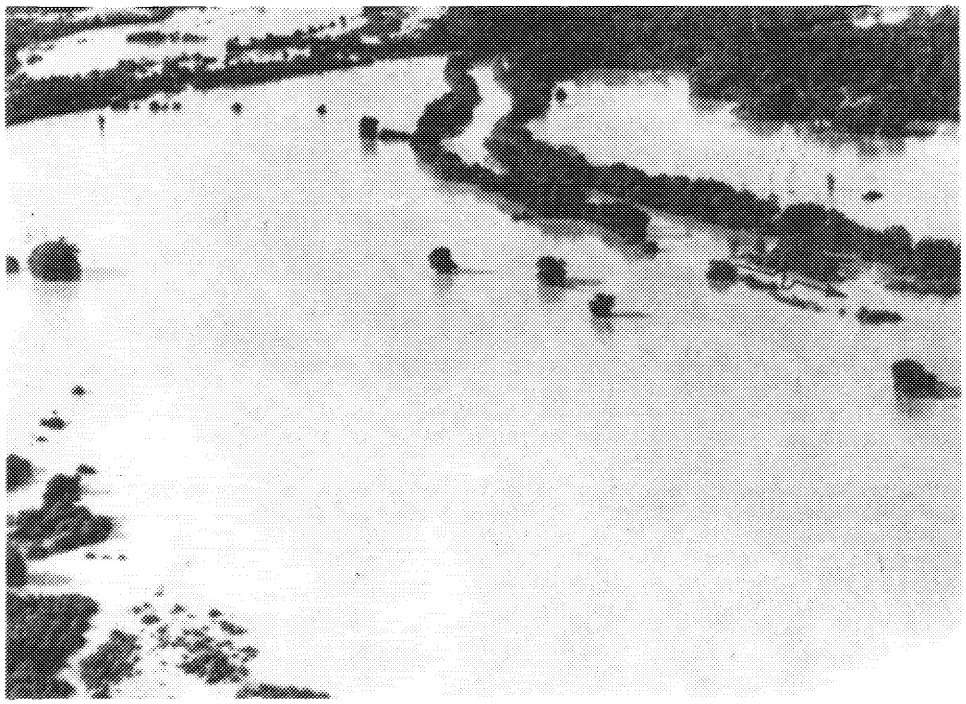
16. Generally characteristic of the drainage in the entire basin are the narrow tributary watersheds with sharply rising hills and steep channel slopes. The steep slopes and short flashy streams are conducive to rapid runoff. The small lakes, ponds and swampy areas in the tributary watersheds have little or no effect on major floods.



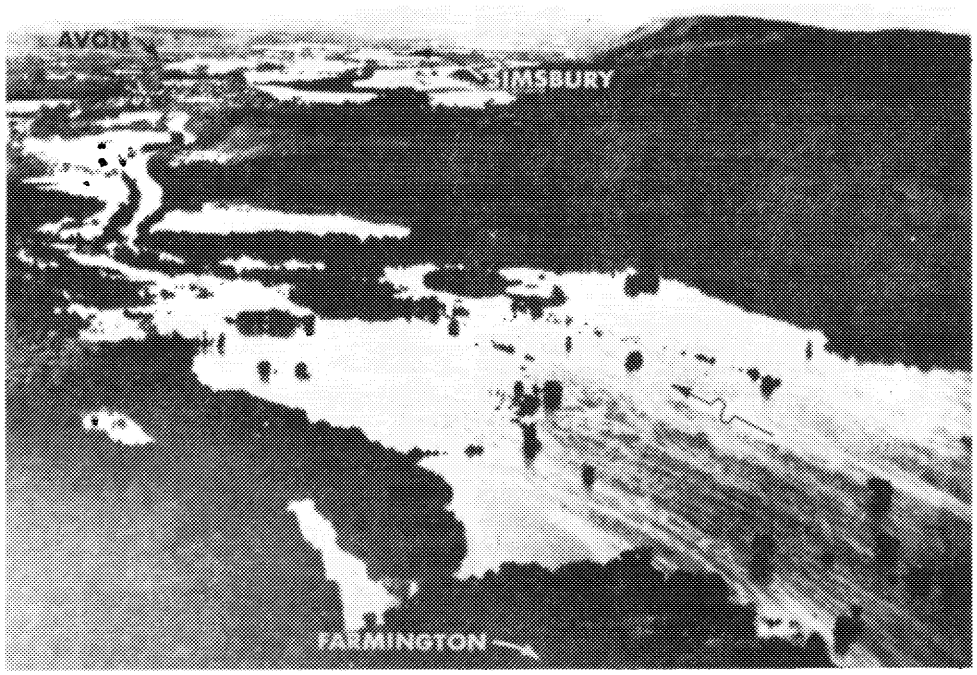
1. Farmington River, Farmington, Connecticut, looking southwest, August 1955 flood.
(Hartford Courant)



2. Farmington River, Farmington, Connecticut, looking northwest, August 1955 flood.
(Hartford Times)



3. Farmington River, Farmington, Connecticut, looking north, August 1955 flood.
(Hartford Courant)



4. Farmington River, Avon, Connecticut, looking north, August 1955 flood.
(Hartford Times)

17. DRAINAGE AREAS

Following is a summary of drainage areas in the Farmington River basin pertinent to this study:

Location	Drainage Area in Square Miles
Farmington River:	
at River Glen railroad bridge	388
at Tariffville gorge	578
at Rainbow (USGS gage)	591
at mouth	602
Pequabuck River at mouth	58.4
Salmon Brook at mouth	67.3

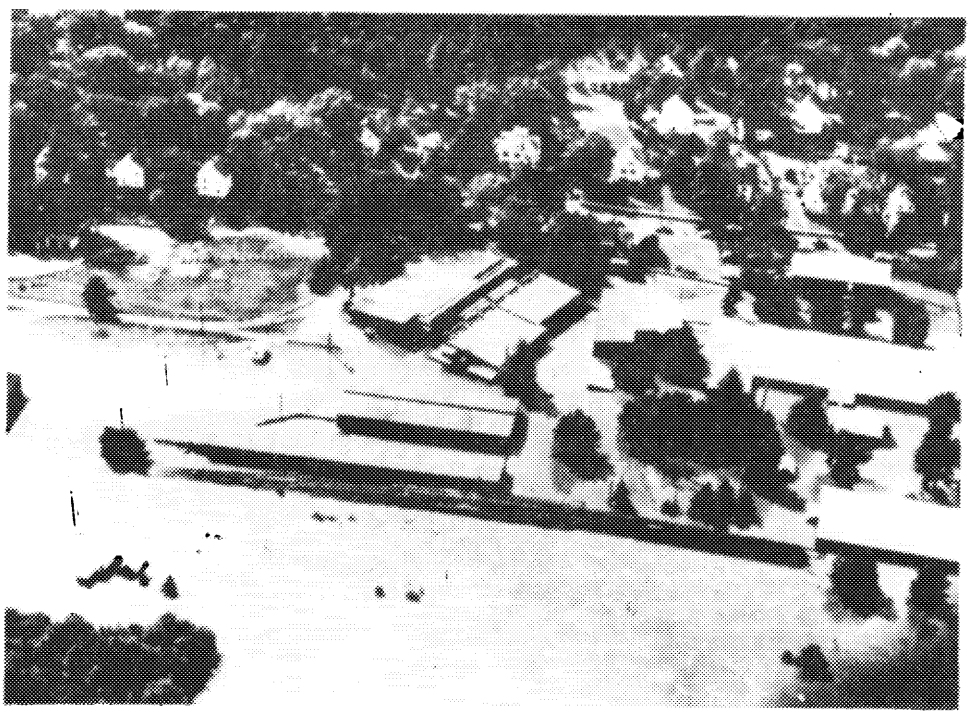
18. DEVELOPMENT IN THE FLOOD PLAIN

To date the inhabitants of the Farmington River valley within the study area have shown prudence in their occupation of the flood plain which indicates a respect for the damaging potential of the river. Most of the area has been retained for agricultural or recreational uses which can survive inundation without severe personal or property losses. However, there are some residences and structures used for industrial or commercial operations that have experienced damage from flooding and will be subject to future flooding (see photo 5). Following is a brief summary of the development in the flood plain:

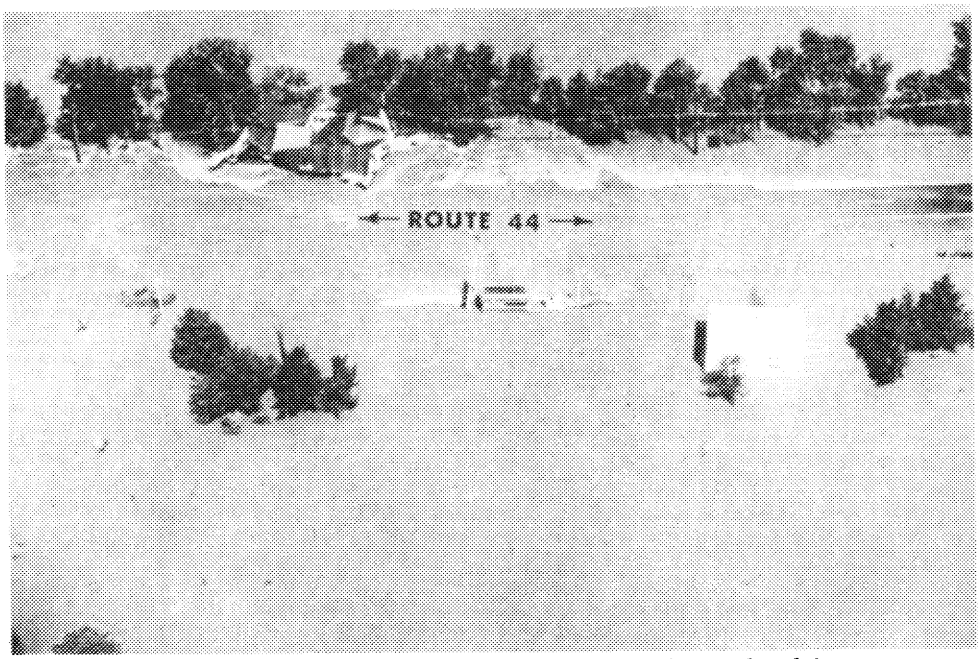
a. Simsbury. The Ensign-Bickford Company located near Drake Hill Road (see photo 6) has experienced flood damages in 6 floods during the period of 1927-1955. However, most of the damages prior to 1955 was basement flooding that did not seriously hamper their operations. The Tariffville Manufacturing Company plant experienced severe flood damages for the first time in August 1955. Due to its elevation in the valley it had been spared in previous floods. The residential development in the flood plain is concentrated in 3 areas, namely, Terry's Plain, Riverside Road and the vicinity of Hartford Road (Route 185). The remainder of the flood plain in Simsbury consists of some isolated homes and large farms.

b. Avon. The major developments in the flood plain in the town of Avon consists of commercial establishments along Route 44 and farms north and south of Route 44 (see photos 7 and 8). In addition, there are some recreation areas and sand and gravel operations.

5. Farmington River, Simsbury, Connecticut, Pettibone Tavern, August 1955 flood.
(Mary Thompson)



6. Farmington River, Simsbury, Connecticut, Ensign Bickford Co., August 1955 flood.
(Hartford Times)



7. Farmington River, Avon, Connecticut, looking north across Route 44, August 1955 flood.
(Hartford Courant)

8. Farmington River, Avon, Connecticut, Alsop Farm looking north, August 1955 flood.
(Hartford Times)

c. Farmington. The flood plain in the town of Farmington is much larger than the areas in either Avon or Simsbury. The major portion of the area is being wisely maintained in "open use", i.e., farming, recreation, conservation and sand and gravel operations. Prior to August 1955 residential development had taken place in the flood plain along Route 202, Town Farm Road, Girard Avenue and Farmington Avenue (Route 4) (see photos 9 and 10). The one industrial plant in the area is located on the north side of the river downstream of the River Glen bridge while most of the commercial development has taken place along Farmington Avenue.

19. FLOOD DAMAGES

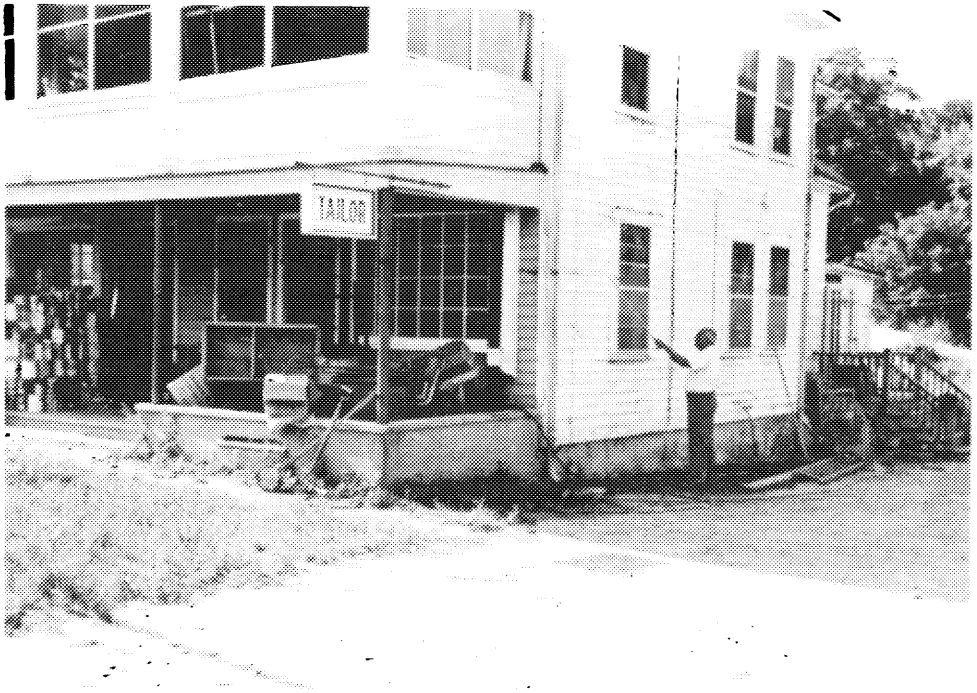
Flooding in August 1955 in the Farmington River area, extending from below Collinsville to Tariffville, resulted in a total loss of over $18 million. This amounts to about 25 percent of the total loss over the entire basin. Thirteen lives were lost in the town of Farmington and two in the town of Simsbury. Industrial losses in Simsbury totaled over $2 million as a detonator-fuse manufacturer and an engineering firm were inundated by the Farmington River. In addition 2 homes were destroyed, 75 buildings and 8 farms were damaged in the Simsbury area. Following is a summary of these losses:

AUGUST 1955 FLOOD LOSSES
LOWER FARMINGTON RIVER BASIN
CONNECTICUT
(Losses in $1,000)

Town	Urban	Rural	Industrial	Utility	Highway	Railroad	Total
Farmington	4,600	50	2,640	2,560	1,520	2,300	13,670
Avon	150	340	-	-	110	40	640
Simsbury	700	290	2,040	540	480	40	4,090
TOTAL	5,450	680	4,680	3,100	2,110	2,380	18,400

20. CHANNEL IMPROVEMENTS

In the "cleanup" operations following the flood of August 1955, channel widening, alignment changes and the removal of piers were accomplished in Simsbury and at the site of the old aqueduct in Farmington. At a later date, the damaged Polychoke Dam in Tariffville was removed. These improvements to the river channel are beneficial in minor floods only.



9. Farmington River, Farmington, Connecticut, high water mark, August 1955 flood, at 30 Farmington Avenue (Route 4) about 500 feet east of river.

10. Farmington River, Farmington, Connecticut, high water mark, August 1955 flood, at 37 Farmington Avenue (Route 4) about 550 feet east of river.

21. FLOOD CONTROL RESERVOIRS

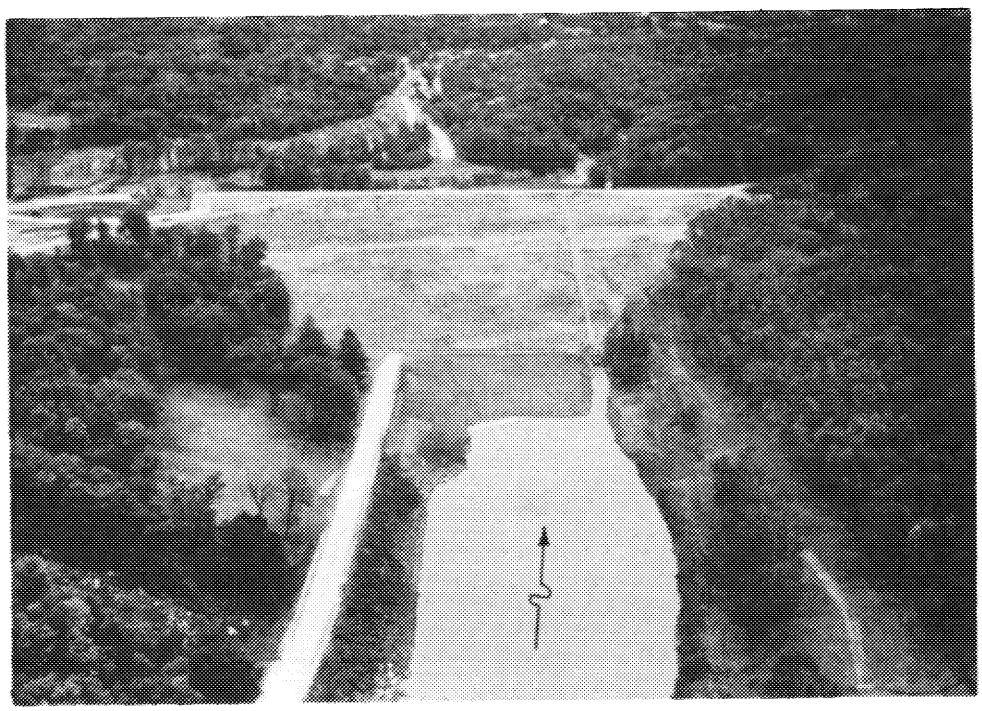
Following the August 1955 flood the Corps of Engineers made a study of the Farmington River basin and recommended 3 flood control dams that will benefit the communities located within the scope of this study. The location of these projects is indicated on plate 1. To date one has been constructed on the Mad River upstream of the city of Winsted (see plate 11). Construction was initiated in June 1961 and completed in August 1963 (see photo 11). The Colebrook River dam presently under construction is located on the West Branch of the Farmington River in the town of Colebrook about 3.9 miles upstream of the mouth of the Still River. The construction of this dam and appurtenant structures is scheduled for completion in the fall of 1968. Plate 12 is a Reservoir Map of the project. The third flood control dam is to be located in the town of Winchester about 2 miles southwest of Winsted, Connecticut on Sucker Brook about 400 feet above its confluence with Highland Lake. It is anticipated that the construction of this project, which is presently under design, will be completed by the fall of 1967. Plate 13 is a Reservoir Map of the proposed dam. Pertinent data for the three projects are summarized in Table 1. For purposes of this report all estimates of future flooding are based on the assumption that the three flood control dams are in operation.

22. FLOOD WARNINGS AND FORECASTING

The U. S. Weather Bureau at Bradley Field is responsible for issuing flood warnings for the inhabitants of the Farmington River basin. A comprehensive network of rainfall and river data reporting stations has been established with cooperative observers. This data is used by the Weather Bureau to forecast river stages at Riverton, Unionville, Simsbury and Rainbow along with general forecasts for other points along the river. The flood warnings are issued by teletype simultaneously to the press services, State Police, Civil Defense, and many other state and local agencies. In the event of communication failures the State Police have an emergency plan for receiving flood warnings and notifying the responsible officials. Heeding a flood warning can reduce hazards such as seen in photos 12 and 14. Photos 13 and 15 were taken from the same general locations, respectively, in 1965.

23. EXISTING REGULATIONS

The towns of Avon and Farmington have maintained some control on the development within the flood plain. In general, permits have been granted subject to special conditions determined by Subdivision Regulations or Planning and Zoning Commissions. The three towns do have the power to adopt additional flood plain ordinances according to authority conferred by Chapter 124 of the 1963 Supplement to the General Statutes. A recent revision dated 20 April 1965 to Flood Plain Regulations for the town of Avon, Connecticut is an example of Flood Plain Ordinance and is included



11 Mad River Dam, Winsted, Connecticut

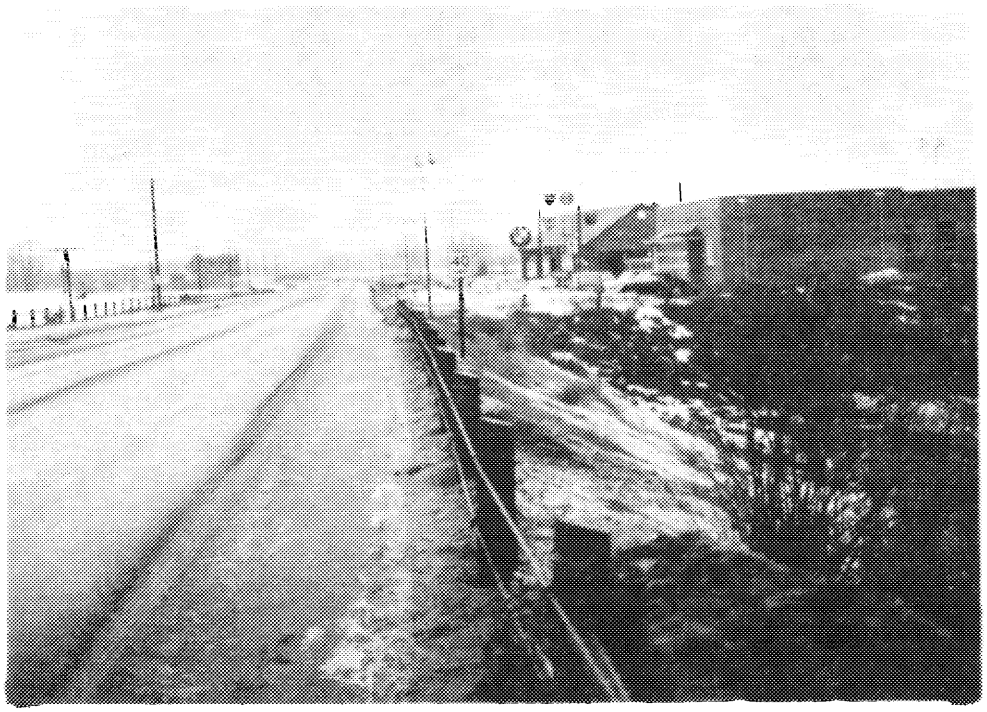
TABLE 1

PERTINENT DATA - DAMS AND RESERVOIRS

	Mad River	Colebrook River	Sucker Brook
Drainage Area, square miles	18.2	118	3.43
General Elevations, ft. msl			
Top of Dam	996	790	949
Flood Control Pool	983	761	935
Outlet Conduit Invert	840	572	881
Streambed	818	575	881
Dam			
Type of Dam	Earth fill	Earth & rock fill	Earth & rock fill
Length of Dam, feet	910	1,300	1,160
Maximum Height, feet	178	223	68
Slope, upstream	1 on 2.5	1 on 2	1 on 2.5
Slope, downstream	1 on 2.5	1 on 2	1 on 3
Top Width, feet	25	30	20
Spillway			
Type	Uncontrolled side channel	Uncontrolled chute	Uncontrolled chute
Crest Length, feet	340	205	60
Maximum Surcharge Head, ft.	8	24	9.2
Design Discharge, cfs	30,000	92,000	6,400
Outlet Conduit			
Type	Concrete	Tunnel in rock	Concrete
Size (I.D.) feet	4	10	3x3
Control	Uncontrolled	3 - 4'x8' hyd. sluice	Uncontrolled
Length, feet	710	774	426
Reservoir Storage Capacity			
Acre-feet	9,700	98,500 (50,800)*	1,482
Inches of Runoff	10	15.5 (8.0)*	8.1
Reservoir Area at Spillway Crest, acres	188	1,210	53.5

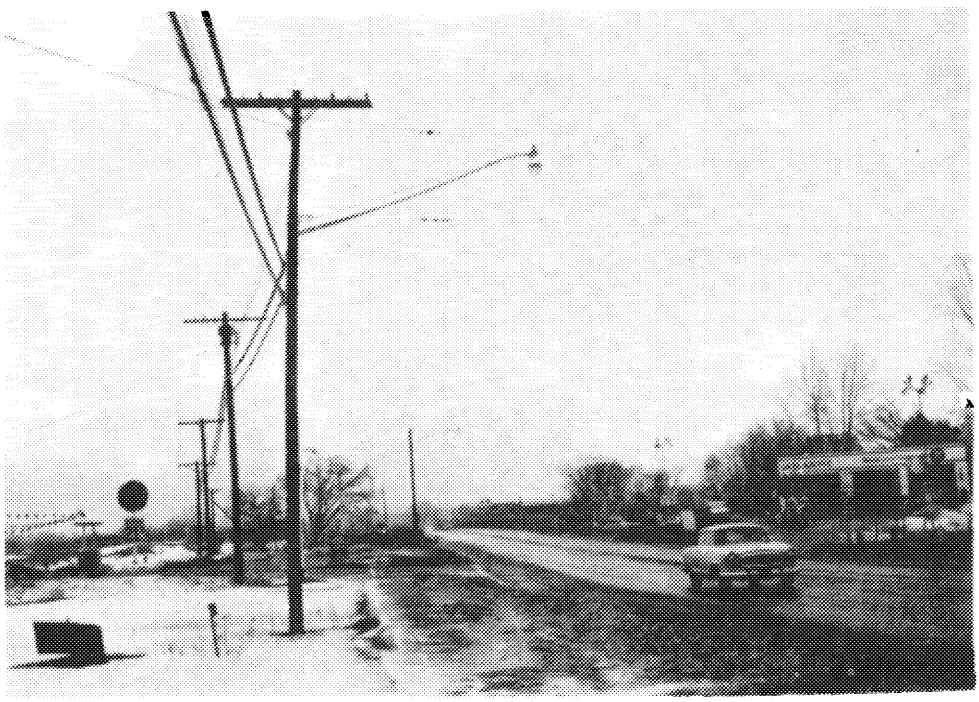
* Net Storage for Flood Control

12. Farmington River, Farmington, Connecticut, looking west from Route 4 bridge, August 1955 flood.
(Hartford Courant)



13. Farmington River, Farmington, Connecticut, same location as above, February 1965.

14. Farmington River, Farmington, Connecticut, looking west towards Route 4 bridge, August 1955 flood.
(Hartford Courant)



15 Farmington River, Farmington, Connecticut, same location as above, February 1965.

in this report as Exhibit "A". The 1963 legislature of the State of Connecticut enacted Public Act No. 435 which directs the Connecticut Water Resources Commission to establish encroachment lines beyond which in the direction of the waterway no obstruction or encroachment may be placed except by permit.

BASIC DATA

24. MAPPING

Photogrammetry with a scale of 1" = 200', 5-foot contour interval, for the areas in Farmington, Avon and portions of Simsbury were made available by the State of Connecticut Highway Department. Comparable data for the remainder of the Simsbury area were obtained by the Corps of Engineers with contract services. The mapping for the "Tunxis Reservation" area was developed from enlargements of the U. S. Geological Survey quadrangle sheets and modified as necessary by field investigations.

25. PROFILES

The basic profile information was developed from Corps of Engineers surveys for high water data obtained following the floods of March 1936, September 1938, December 1948 and August 1955. Current investigations yielded additional data for the flood of August 1955. The necessary surveys to establish the elevations of these marks were supplied by the towns of Simsbury and Avon. The stationing for the river profiles was determined by scaling distances on the final maps.

26. DISCHARGE RECORDS

The U. S. Geological Survey has published records of river stage and streamflow at 9 locations in the Farmington River watershed for various periods since 1913. In addition, flow data from Barkhamsted, East Branch, West Branch, Nepaug and Whigville Reservoirs are published by the U. S. Geological Survey from information furnished by the Water Bureau of the Metropolitan District Commission of Hartford and the New Britain Board of Water Commissioners. These records were used to develop the flood-frequency analyses and the elevation of floods as shown in the maps and profiles included in this report.

PRECIPITATION AND FLOODS

27. PRECIPITATION

a. General. The climate of the Farmington River basin is generally

moderate, but varies from the southern to northern sections. The southern part of the basin reflects the effect of lower elevations and is comparable to the climate of the Connecticut River valley. The headwater and northern section in Massachusetts are affected by more rugged topography and higher elevations which appear to influence the average precipitation and snowfall orographically.

b. Precipitation. The average annual precipitation over the Farmington River watershed is approximately 45 inches and is uniformly distributed throughout the year. At West Otis, Massachusetts, in the headwaters of the Farmington River basin, the average annual precipitation for 49 years of record through 1961 is 45.03 inches. The maximum and minimum annual precipitation for the same period was 61.2 inches in 1938 and 35.06 in 1946. At Hartford near the lower end of the basin, the average annual precipitation for 57 years of record through 1961 is 42.81 inches. The maximum and minimum annual precipitation for the same period was 62.94 inches in 1955 and 33.00 inches in 1941. Table 2 summarizes average, maximum and minimum monthly and annual precipitation at West Otis, Massachusetts, Barkhamsted and Hartford, Connecticut.

c. Snowfall. The average annual snowfall in the Farmington River watershed varies from about 65 inches in the headwaters to approximately 40 inches in the lower portion. The average annual snowfall recorded at West Otis, Massachusetts for the 25 years of record through 1961 is 64.8 inches. At Hartford, Connecticut, representative of the lowland area, the average annual snowfall is 41.5 inches, for 57 years of record through 1961. The snow cover usually reaches a maximum depth in March and has an average water content of about 3 inches over the basin. In the mountainous areas the water content occasionally accumulates to 6 or more inches. Snowmelt alone will not cause flooding but when augmented by a severe storm can result in serious damage.

28. STORMS

a. Types. Storms of 3 general types have occurred in the Farmington River watershed, namely, cyclonic storms of continental origin, hurricanes of tropical origin and thunderstorms. Cyclonic storms of continental origin have occurred at all seasons of the year; however, winter storms are more generally of greater areal extent but do not produce such intense precipitation centers as storms of the other two types. Thunderstorms are usually of the convective type and are therefore generally limited to summertime occurrences. These storms are usually characterized by intense rainfall centers of limited areal extent which often are conducive to tributary flooding. Hurricane type storms generally occur in late summer and fall and have resulted in the most devastating floods in the Farmington River basin.

b. Notable storms. The November 1927 flood in the Farmington River watershed was produced by a storm of cyclonic type. An average rainfall of

TABLE 2-8

CLIMATOLOGICAL DATA - HARTFORD, CONNECTICUT
(Elevation 169 Feet, MSL)

ITEM & DESCRIPTION	YEARS OF RECORD	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	ANNUAL
PRECIPITATION (Inches)														
Average	57	3.58	3.19	3.72	3.72	3.52	3.48	3.71	4.00	3.51	3.07	3.72	3.58	42.81
% of Average Annual	-	8	7	9	9	8	8	9	9	8	7	9	8	100
Maximum	57	7.77	5.72	9.21	7.66	7.04	8.08	11.24	21.87	14.59	11.61	7.36	6.88	62.94
Year of Maximum	-	1923	1916	1953	1929	1940	1937	1938	1955	1938	1955	1951	1936	1955
Minimum	57	0.91	1.54	0.29	0.65	0.73	0.66	0.54	0.93	0.20	0.18	0.87	0.78	33.00
Year of Minimum	-	1955	1957	1915	1942	1959	1912	1924	1935	1914	1924	1933	1955	1941
Ave. Snowfall (unmelted)	57	11.03	11.83	7.54	1.45	T	0	0	0	0	T	1.9	7.77	41.52
TEMPERATURE (Degrees F.)														
Average	57	27.6	28.0	37.0	47.9	58.9	67.6	73.0	70.7	63.7	53.4	42.1	30.8	50.1
Average Maximum	57	35.5	36.3	45.7	57.7	69.4	78.0	83.0	80.7	73.9	63.7	50.5	38.4	59.4
Average Minimum	57	19.7	19.6	28.3	38.0	48.2	57.3	62.9	60.7	53.5	43.1	33.7	23.2	40.7
Absolute Maximum	57	70	72	86	91	94	100	101	101	101	91	83	67	101
Year of Absolute Maximum	-	1932	1954	1945	1938	1914	1952	1926	1955	1953	1927	1950	1946	1955
Absolute Minimum	57	-26	-24	-4	11	28	38	48	38	30	18	6	-18	-26
Year of Absolute Minimum	-	1961	1943	1948	1923	1956	1958	1961	1940	1957	1940	1924	1917	1961
WEST OTIS, MASSACHUSETTS (Elevation 1370 Feet, MSL) PRECIPITATION (Inches)														
Average	49	3.16	2.80	3.58	3.58	3.66	4.18	4.35	4.46	4.08	3.51	3.98	3.21	45.03
% of Average Annual	-	7	6	8	8	8	9	10	10	9	8	9	7	100
Maximum	49	6.43	4.81	8.98	8.77	8.02	9.37	9.27	20.26	13.71	11.93	11.07	8.78	61.20
Year of Maximum	-	1953	1951	1936	1929	1931	1938	1938	1955	1938	1955	1927	1948	1938
Minimum	49	0.86	1.13	0.30	0.80	0.47	0.96	1.13	0.82	0.35	0.05	1.23	0.72	35.06
Year of Minimum	-	1955	1957	1915	1941	1959	1913	1929	1935	1957	1924	1946	1943	1946
Ave. Snowfall (unmelted)	25	15.19	15.20	14.70	4.93	T	0	0	0	0	0.21	6.31	10.03	64.84
BARKHAMSTED, CONNECTICUT (Elevation 420 Feet, MSL) PRECIPITATION (Inches)														
Average	29	3.55	3.15	4.03	4.07	3.64	3.87	3.44	4.04	4.14	3.26	4.38	3.77	45.62
% of Average Annual	-	8	7	9	9	8	8	8	9	9	7	10	8	100
Maximum	29	6.80	5.55	10.06	6.96	7.31	6.53	9.27	25.70	11.21	13.86	7.59	8.74	57.29
Year of Maximum	-	1953	1960	1953	1952	1945	1945	1938	1955	1938	1955	1951	1948	1945
Minimum	29	0.73	1.53	1.15	0.81	0.74	1.02	1.49	0.73	0.63	0.67	0.83	0.71	32.06
Year of Minimum	-	1955	1957	1938	1942	1939	1949	1955	1943	1948	1935	1933	1943	1957

6 inches occurred on 3-4 November, which fell on ground already saturated from rains during the previous month. The flood of March 1936 was caused by 4 distinct storm centers that passed over the northeastern states between 9 and 22 March. Runoff from these storms was augmented by considerable snowmelt. Between 17 and 21 September 1938, a storm culminating with a hurricane, produced over 10 inches of precipitation on ground already saturated by rainfall which had occurred earlier in the month. The flood of December 1948 was typical of the winter type or cyclonic storm of continental origin. This storm moved slowly northeasterly across New England and dropped from 9 to 10 inches of rain on frozen ground. In addition, this runoff was augmented somewhat by snowmelt.

c. Storms of 1955. The hurricanes of August 1955 were the greatest recorded storms to occur over the Farmington River watershed. The rainfall associated with these storms produced the most devastating flood in the history of the basin. On 11-14 August, hurricane Connie produced 5 to 9 inches of rain which saturated the ground. Hurricane Diane, following closely behind Connie, on 17-20 August deposited an additional 11 to 18 inches over the basin. Moist tropical air became stagnated off the coast between 14-17 October 1955 and again produced heavy rainfall, totaling between 6 and 13 inches over the watershed in the Farmington River.

29. FLOOD HISTORY

Major historic floods in the Farmington River watershed date back to January 1770 and include the floods of May 1801, November 1853, May 1854, October 1869, December 1878 and March 1896. There is no reliable information concerning the magnitude of these floods, although records indicate that those of October 1869 and December 1878 were severe and caused considerable damage. The Farmington River watershed has experienced 6 major floods since 1927. The storms that caused these floods have been enumerated in paragraphs 28b and c.

30. FLOOD FREQUENCIES

The frequency or percent chance of occurrence of peak discharge was determined from records of all the gaging stations in the watershed. The method used in the analysis assumes that the logarithmic value of annual peak flows are normally distributed thereby permitting the application of standard statistical analyses. This enables the discharge-frequency curve to be defined by its mean value and standard deviation. Based on a review of New England river basins which included the 1955 flood, a positive skew factor of 1.0 was adopted for the Farmington River watershed. The discharge-frequency curves were modified to reflect the effect of Colebrook River, Mad River and Sucker Brook Reservoirs. These in turn were converted to elevations above mean sea level for use in the profile. Table 3 is a summary of elevation-discharge frequency data modified by reservoirs for selected locations.

TABLE 3

FARMINGTON RIVER IN SIMSBURY, AVON AND FARMINGTON
Frequency Data - As Modified By Reservoirs*

Annual Percent Chance	Discharge at Rainbow (cfs)	Elevation in Feet, MSL			Discharge at River Glen (cfs)	Elevation in Feet, MSL		
		Tariffville Road Upstream	Route 185 Downstream	Route 44 Downstream		Old Farms Road Downstream	Route 4 Downstream	River Glen RR Bridge Downstream
Standard Project Flood	69,500	169.0	171.0	173.2	61,800	175.0	178.9	184.7
August 1955	49,850	168.0	168.2	170.0	59,400	174.6	178.3	184.5
1.0	36,500	161.8	164.3	167.0	40,800	170.4	173.3	182.7
2.0	26,800	157.0	159.8	164.0	30,000	166.9	169.7	181.3
4.0	18,800	152.3	154.4	159.8	21,600	163.3	166.4	179.2
10.0	12,500	148.7	150.6	156.0	13,800	158.3	162.0	176.6
20.0	8,850	146.2	148.2	153.2	9,480	154.8	158.7	174.7

* Modified by Colebrook River, Sucker Brook and Mad River Reservoirs

31. The annual percent chance or annual probability in percent are estimates of relative probabilities of future floods of given magnitudes. They can be used as reasonable guides provided there is no major change in the hydrologic characteristics of the basin or in the hydraulics of the river channel.

32. ANALYSIS OF FLOODS

In 1958 the Corps of Engineers published an Interim Report on Review of Survey, Farmington River Basin which involved a detailed study of the major floods experienced. Following are the general conclusions derived from these studies:

a. The principal flood producing tributaries in the basin are the West Branch Farmington and Still Rivers in the upper part of the basin and Salmon Brook in the lower part. Important streams within these tributaries are:

(1) Clam River entering the West Branch at New Boston.

(2) Mad River and Sandy Brook contributary to the Still River.

b. The analysis also demonstrated that the smaller brooks feeding directly into the Farmington River such as Morgan River and Cherry, Burlington and Hop Brooks must have been substantial contributors to floods.

(1) The East Branch and Nepaug Rivers are effectively controlled during minor and moderate floods by the water supply reservoirs. Large floods, however, like the August 1955 flood, overtax the modifying effect of the reservoirs and high rate of spillway discharge from the water supply reservoirs contribute to the flood crest on the main river.

(2) The Pequabuck River develops reasonably high discharges at Bristol and Forestville but these flows are considerably reduced by the valley storage near its confluence with the Farmington River.

(3) The extensive flood plain between River Glen and Tariffville has been inundated during floods with depths up to 30 feet above normal as illustrated on the Flood Profiles, plates 7 to 9. It has been estimated that the storage utilized in this flood plain during the 1955 flood amounted to 150,000 acre-feet, equivalent to 5 inches of runoff from the watershed. This storage acting as a reservoir is very effective in reducing flood crests as indicated in Table 4.

TABLE 4

EFFECT OF NATURAL STORAGE
UPON FLOOD DISCHARGES

Flood	Peak Discharge in CFS			Percent Reduction
	River Glen	Total Inflow to Storage	Outflow at Tariffville	
Aug 1955	93,900	109,200	68,500	37.2
Sept 1938	32,330	41,090	29,800	27.4
Dec 1948	31,500	36,200	25,800	28.8
Standard Project Flood	85,900	115,750	90,000	22.2

33. STANDARD PROJECT FLOOD

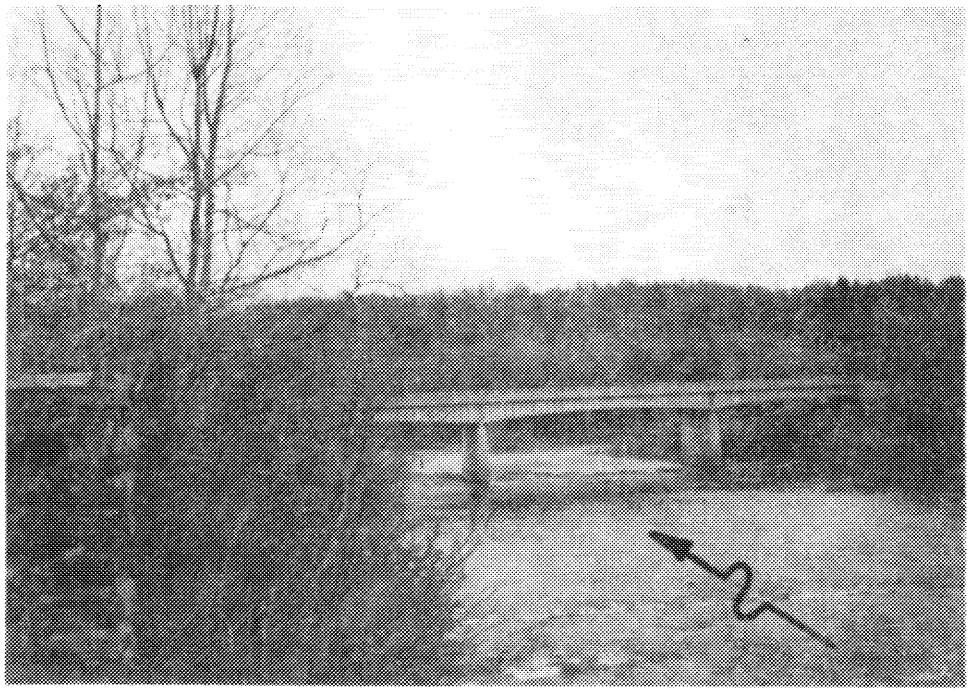
The standard project flood noted in the above table is an event which can be equalled or exceeded on rare occasions. It is the largest flood that can reasonably be expected to develop with the coincidence of the critical conditions that have been experienced in a wide area of New England. The standard project flood is a severe flood generally utilized by the Corps of Engineers as the design flood for local protection measures (i.e. dikes, floodwalls and channel improvement) in highly developed areas, the failure of which might be disastrous. As this flood is in the realm of probability, it is a measure of the flood potential of the Farmington River and included for consideration by users of this report.

34. WATER SURFACE PROFILES

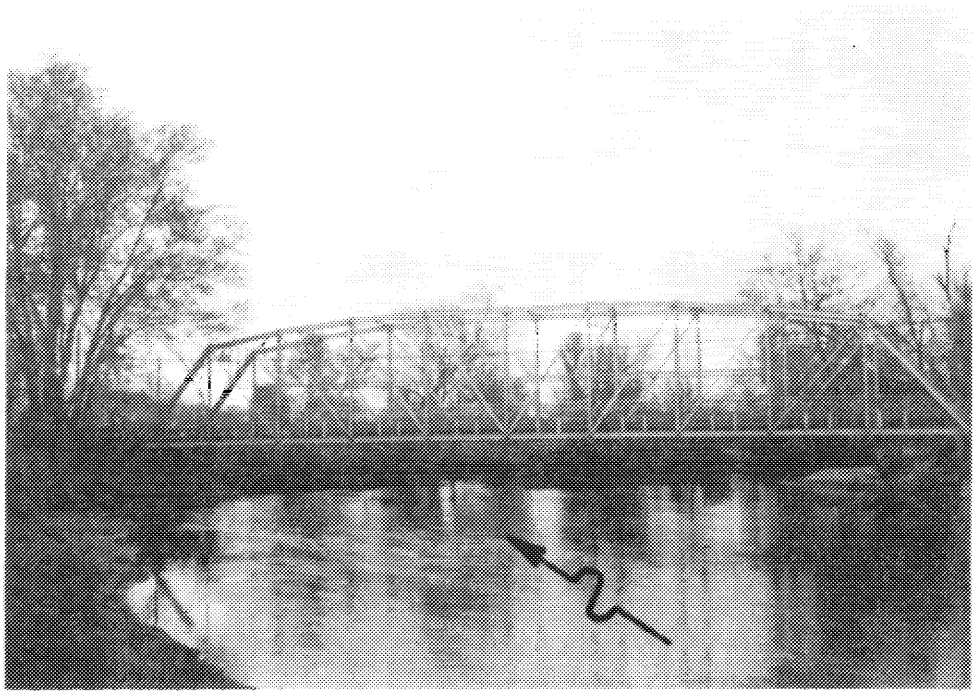
The available high water data within the study area were related to the discharges noted in Table 4, thereby developing a stage-discharge relationship normally referred to as rating curves. These rating curves were used to interpolate for the profiles of floods modified by reservoirs as shown on plates 7 through 10.

35. BRIDGES

An inspection of the profiles indicate that with the exception of Route 189, Route 44 and the River Glen railroad bridge, all bridges (see photos 16 through 23) will become submerged in a recurrence of the 1955 flood as modified by reservoirs. It is also evident that due to the broad flood plain, the bridges do not become restrictions except to a small degree in minor floods. Access during a flood may be the most



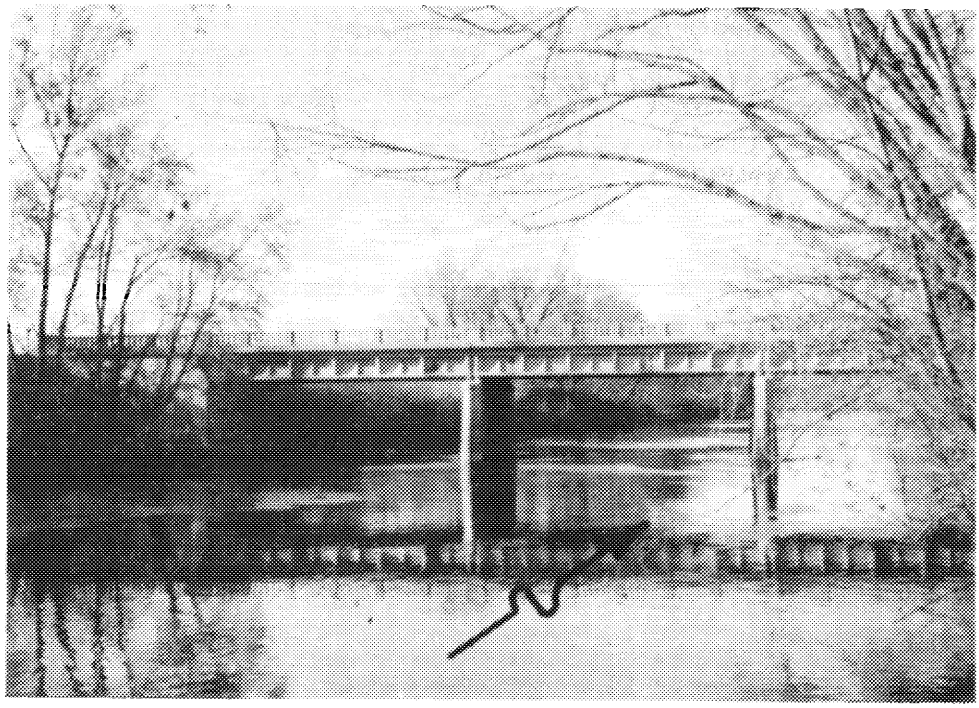
16. Farmington River, Simsbury, Connecticut, Route 9 bridge.



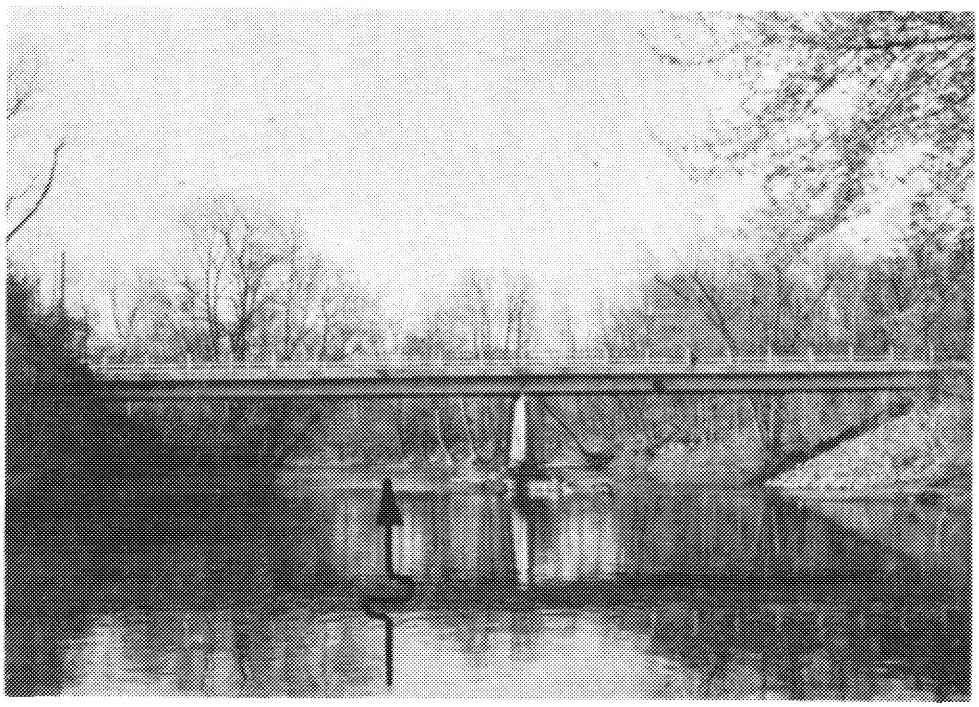
17. Farmington River, Simsbury, Connecticut, Tariffville Road bridge.

18. Farmington River, Simsbury, Connecticut, Drake Hill Road bridge.

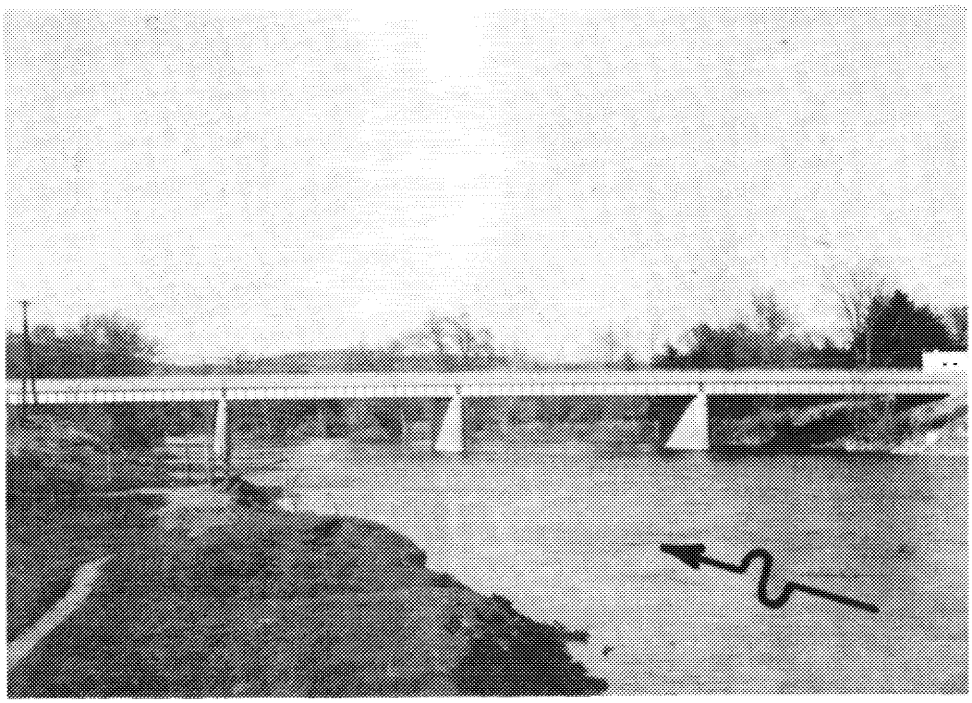
19. Farmington River, Simsbury, Connecticut, Route 185 bridge.



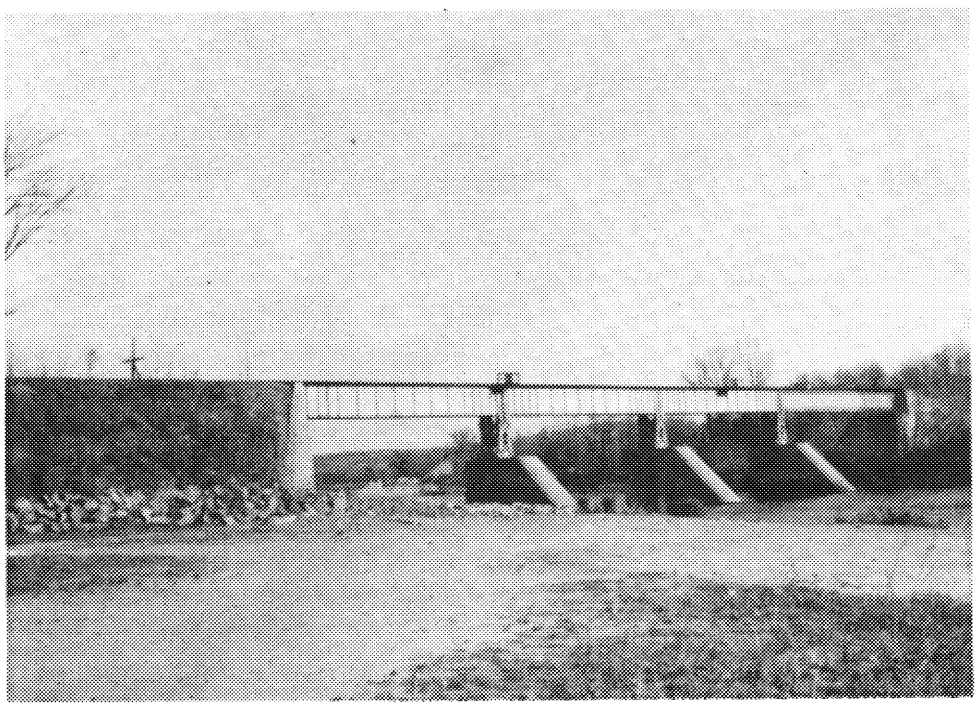
20. Farmington River, Avon, Connecticut,
Route 44 bridge.



21. Farmington River, Avon, Connecticut,
Old Farms Road bridge.



22. Farmington River , Farmington, Connecticut, Route 4 bridge



23. Farmington River, Farmington, Connecticut, River Glen railroad bridge.

critical problem where the approaches are at a lower elevation. Table 5 is a summary of pertinent elevations on the bridges within the study area.

36. LIMITS OF FLOODING

The extent of flooding shown on plates 2 through 6 were established by using the high water data and interpolating between contours as developed on the base maps. An inspection of the profiles indicates that the area flooded by the experienced 1955 flood is comparable to the standard project flood reduced by the reservoir system. Similarly the area flooded by the minor floods of March 1936, September 1938 and December 1948 are comparable to the 2 percent annual probability flood reduced by reservoirs. It should be noted that the maps are only approximate since these flood lines had to be interpolated between 5-foot contour intervals. Therefore to determine the depth of flooding, for a specific piece of property, the profile elevations should be related to the actual ground elevations determined by standard survey methods.

37. USE OF RESULTS

The flood hazards related to individual properties can be determined by the use of the maps and profiles as discussed above. It should be noted that improvement or further restrictions in the flood plain may alter the locations of any established flood line. In this respect, any reduction of existing bridge openings due to pipeline crossings, debris or vegetation should not be permitted without recognizing its effect upstream. There are additional data on intermediate floods available in the New England Division office.

GUIDE LINES FOR USE OF FLOOD PLAIN AND FOR REDUCING FUTURE FLOOD DAMAGE

38. GENERAL

As indicated by the maps and profiles, a major portion of the flood plain in the study area will still be subject to inundation after completion of the flood control reservoir system. Attention must be focused on safeguarding existing structures from flood damages and on regulating the type of future development. Existing structures may warrant protection by structural works of improvement (i.e. walls, dikes, or channel improvement) if economically feasible or by floodproofing measures. Protection of future developments is contingent upon regulations governing the type of development consistent with optimum economic use of land within a community. Regulations administered by a local government should have a sound technical and legal basis so as to preclude misuse of the flood plain which in time of flood could result in damages affecting the economy of an entire community.

TABLE 5

BRIDGE DATA
FARMINGTON RIVER - SIMSBURY, AVON AND FARMINGTON

Identification	Station	Bottom Elevation (msl)	Floor Elevation (msl)	Modified SPF Elevation (msl)	Clearance Above Modified SPF (feet)	Clearance Below Modified SPF (feet)	Modified 1955 Flood Elevation (msl)	Clearance Above Modified 1955 Flood (feet)	Clearance Below Modified 1955 Flood (feet)
Route 189	13.57	167.00	173.00	161.75	5.25		158.50	8.50	
Tariffville Rd.	16.30	153.26	154.46	169.00		15.74	165.50		12.24
Drake Hill Rd.	19.30	156.58	158.78	170.00		13.42	166.75		10.17
Route 185	21.06	164.45	167.87	171.00		6.55	168.50		4.05
Route 44	24.29	165.00	172.20	173.00		8.00	171.00		6.00
Old Farms Rd.	27.25	167.67	171.37	176.25		8.58	174.75		7.08
Route 4	30.50	173.25	179.25	179.50		6.25	179.25		6.00
NYNH&H Railroad	33.75	202.86	213.19	185.00	17.86		184.50	18.36	

39. There is sufficient flood-free land in the three communities to accommodate the residential growth without using the flood plain of the Farmington River. However, the expansion for commercial or industrial lands is generally established by a growth pattern of long standing in the communities, i.e., the more desirable land is adjacent to present developments or major highways bordering on the flood plain. It generally becomes a question of economics as to whether a developer uses the flood plain or uses a nonflood plain site. Too often developers seem to overlook the detrimental factors when estimating the value of a flood plain site. Some of these factors which may not receive proper consideration are: effect of filling, flood losses, cost of protective measures, cost of floodproofing and cost of insurance. It therefore appears that some local guidance or control is desirable to insure that proper consideration is given to developing a flood plain.

40. FILLING OF THE FLOOD PLAIN

Regulations to control the filling of a flood plain are the most difficult to define. This difficulty arises unless a complete long range plan of development for use of the flood plain has been evolved. Too often permits for filling are reviewed by local Boards on piecemeal basis which independently may not appear serious, yet combined could aggravate the flood problem of a community. The Connecticut State Act 435 recognizes the problem and requires that applications be reviewed ". . . with due consideration given to the results of similar encroachments constructed along the reach of waterway."

41. The problems of filling are twofold. First, the filling of a flood plain can reduce the cross section of the valley which can become a restriction and thereby raise the river stages upstream for any given discharge. Second, filling can aggravate conditions downstream. In this case the valley is very broad so it is possible to fill and still leave a waterway area large enough for the passage of a flood without increasing river stages upstream. However, the act of filling has eliminated a natural flood control reservoir which benefited downstream communities. This is the case of the Farmington River in Farmington, Avon and Simsbury as demonstrated in Table 4. Therefore, any potential filling should be coordinated among the three towns to determine its effect on conditions both upstream and downstream.

42. FLOOD PLAIN REGULATION

Both channel encroachment lines and flood plain zoning should be established to reduce future flood damages. As stated in paragraph 23, the three towns and the state have the statutory authority for establishing these regulations. The ultimate goal is to provide for the highest type land use consistent with the flood threat. These controls can be

implemented by the use of specific regulations such as subdivision regulations, building codes and local ordinances. For these controls to be effective, it is necessary that there be a public understanding of the general problem, degree of risk, and the available alternative actions. The regulations must be clearly defined so any land owner involved can evaluate the benefits he will derive along with the rest of the community.

43. CRITERIA FOR ESTABLISHING FLOOD PLAIN USE

a. Channel encroachment lines. The establishment of channel encroachment lines regulates any activity, building, filling or encroachment within such lines which could impede the free discharge of the stream or reduce channel storage, thereby causing harm to others. Under section 7-147 of the General Statutes of Connecticut, 1958 revision, the towns of Simsbury, Avon and Farmington have the authority to establish encroachment lines along the Farmington River. The State of Connecticut through its Water Resources Commission exercises this same authority and in addition, the authority to change lines set by the towns. The program of the Water Resources Commission will eventually cover this area of the Farmington River.

b. Flood plain zoning. Flood plain zoning would be administered locally by Planning and Zoning Commissions in each town. The use of land lying within the flood plain zones would be subject to local interpretations similar to other types of zoning authorized for the general welfare of the community. The aim of such an ordinance would be to establish the best long range use of land and area development. This can be determined through studies by the local planning groups and has been done by Avon and Farmington.

Recognizing the degree of risks involved, consideration may be given to retaining land at lower levels for open use such as parking areas, parks and recreation areas. Any structure permitted should be of the type that would not be a restriction nor be used for normal habitation and could be submerged without serious consequence. In the higher elevations of the flood plain, structures for commercial or industrial uses might be permitted, provided the structure is not a serious encroachment on the cross section of the valley and provided the first usable floor is above a prescribed elevation or floodproofed.

In preparing flood plain zoning, similar to those established by Avon and Farmington, each town must evaluate what its individual requirements will be and then in cooperation with the other towns and the Water Resources Commission, regulations beneficial to all concerned may be determined. Additional engineering surveys and hydraulic studies may be required to analyze all of the proposed developments. The need for close cooperation among all interested agencies cannot be overstressed.

c. Subdivision regulations. With zoning regulating use of the flood plain, subdivision regulations may be amended to minimize the flood hazards to uses permitted in the flood plain.

d. Building codes. Local building codes and planning board regulations can be used to enforce the requirement of minimum elevations for floors or basements. These rules could provide for a minimum requirement concerning the safety of the structure for the preservation of life and health. This can be accomplished by refusing a permit for construction in a flood-prone area unless the hazards are eliminated by providing adequate drainage facilities, by providing a protective wall, by suitable fill, by raising floor levels, by floodproofing or combinations of these methods.

e. Other method of control. Outright purchase of lands by the towns, possibly coupled with open space conservation programs, form an effective means of control in the flood plain. In addition, other agencies such as mortgagors, can assist by denying funds for construction within flood-prone areas. Similarly, insurance companies can limit their coverage of structures proposed for construction in the flood plain.

44. OTHER METHODS OF REDUCING FLOOD LOSSES

As an adjunct to restricted flood plain regulations, flood losses may be reduced by several other means.

a. Floodproofing. There is much that individual owners can do to reduce flood damages to structures presently located in the flood plain. Some of these measures are:

(1) Controlling seepage through walls.

(2) Installing gates and valves on sewer and drainage lines.

(3) Anchoring of structures to the foundations.

(4) Permanently closing unnecessary openings in walls.

(5) Protecting foundations which might be subject to undermining.

(6) Protecting interior contents by elevating, covering or coating.

(7) Regrading of land around the building.

(8) Construction of floodwalls to isolate structures from floodwaters.

b. Flood warnings and evacuation. Effective use may be made of the existing warning network throughout the three towns to provide for evacuation of personnel and installation of temporary flood protection measures. Officials of the towns should make sure that the Weather Bureau warnings are related to local conditions. This can be accomplished by

evacuation schedules indexed to river gages possibly located at bridges. Householders should familiarize themselves with motors and other equipment subject to damage by flooding and the means to be taken to move the critical items to higher elevations. Industrial and commercial plants in addition should maintain a minimum of stock in flood-prone areas and be ready to move this as rapidly as possible.

c. Channel maintenance. Another effort by which the towns can help keep the level of floods down is to maintain a continuous surveillance of the stream to prevent unauthorized dumping, remove fallen trees that may become temporary debris dams and keep bridge openings clear of debris and vegetative growth.

CONCLUSIONS

45. GENERAL

After completion of the proposed flood control reservoirs, an extensive flood plain will still exist in the towns of Simsbury, Avon and Farmington. To date there has been prudent use showing respect for the river. However, with the pressures of community expansions, proper flood plain regulations as have been or are being developed by the towns can be of great value in achieving orderly future growth and preclude the need for additional costly flood control improvements. Where the flood plain acts as an effective flood control reservoir, care will have to be exercised in the control of filling permitted. This can only be accomplished through a coordinated effort by the three towns and the State of Connecticut Water Resources Commission.

REMI O. RENIER
Colonel, Corps of Engineers
Acting Division Engineer

EXHIBIT "A"
AVON, CONNECTICUT
REVISIONS TO FLOOD PLAIN REGULATIONS
20 APRIL 1965

1.04.01 For the purpose of these regulations the flood plain shall be all land adjacent to the Farmington River which falls below the August 1955 flood line, modified to compensate for subsequent flood control measures, as determined by the U. S. Army Corps of Engineers and based on elevations established by the U. S. Coastal & Geodetic Survey. These elevations are incorporated as part of the zoning regulations and are shown on a flood plain graph for both the easterly and westerly reaches of the Farmington River.

In the flood plain no buildings or structures shall be built and no land shall be used or filled except in conformance with these regulations and all other requirements of the applicable zone.

1.04.02 Permitted uses:

Agriculture, farming, forestry and nurseries.

1.04.03 Special Exceptions:

The following special exceptions may be permitted within the flood plain when authorized by the commission as a special exception after a public hearing. In considering the granting of special exceptions the commission shall give due consideration to the effects of such exceptions on persons and property within and without the flood plain area. In addition, the commission shall take into account public safety, the availability of public facilities, services, utilities, and improvements, and whether a traffic or fire hazard will be increased or created, and whether such use will depreciate the value of neighboring property, or alter the neighborhood's essential characteristics, or be detrimental to the neighborhood. A fee of $25.00 must accompany each application.

1.04.04 Public and private open type recreational uses, including golf, tennis, equitation, swimming, boating parks, game farms and athletic fields.

1.04.05 Municipal sewer plant or public utility structures not subject to major flood damage.

1.04.06 Parking areas as an accessory use.

1.04.07 Buildings, structures and signs accessory to a permitted use.

1.04.08 Accessory uses to special exceptions shall be included in the application for approval.

1.04.09 Filling of land within the flood plain subject to the following requirements:

(1) Application for special exceptions within any encroachment lines established by the Connecticut Water Resources Commission shall be considered and approved only with the approval in writing of the said State Water Resources Commissioner.

(2) Applications shall include a plan prepared by an engineer showing the existing and proposed contours and the effect upon flooding and drainage conditions on adjacent properties. The engineering plan shall show the location and elevation of all proposed buildings and building permits shall be issued only for buildings shown on such approval plans.

a. Filling of land for the purpose of building construction shall be logical extensions of land lying at higher elevations.

b. Filling of land shall not retard the flow of the stream or significantly reduce the volume of the storage which alleviates flooding elsewhere.

1.04.10 In a building to be used for human occupancy, no story or floor level to be so used shall be built below the flood plain level established by these regulations and all required principal and fire exits shall have access to ground or a structure leading to ground having continuous elevation above the flood plain level. Any story or level or portion of a building used for parking, storage or mechanical equipment may be built below the flood plain elevation provided the building construction is designed to remove the hazards of flooding.

GLOSSARY

BUILDING CODE. A collection of regulations adopted by a local governing body setting forth standards for the construction of buildings and other structures for the purpose of protecting the health, safety, and general welfare of the public.

CHANNEL. A natural or artificial watercourse with definite bed and banks to confine and conduct continuously or periodically flowing water.

DISCHARGE. (Rate of Flow). The quantity of water passing along a stream per unit of time such as cubic feet per second.

DRAINAGE AREA. The area (acres, square miles, etc.) from which water is carried off by a drainage system.

ENCROACHMENT LINES. Lateral limits or lines along streams or other bodies of water, beyond which in the direction of the stream or other body of water no structure or fill may be added without a permit.

FLOOD. Any temporary rise in streamflow or stage that results in significant adverse effects in the vicinity.

FLOOD OF RECORD. Any flood for which there is reasonably reliable data useful in technical analyses. Ordinarily the term is used to refer to "maximum flood of record."

FLOOD PEAK. The highest value of the stage or discharge attained by a flood; thus, peak stage or peak discharge.

FLOOD PLAIN. The relatively flat lowlands adjoining a watercourse or other body of water subject to overflow therefrom.

FLOOD PLAIN REGULATIONS. A general term applied to the full range of codes, ordinances, and other regulations relating to the use of land and construction within flood plain areas. The term encompasses zoning ordinances, subdivision regulations, building and housing codes, encroachment laws, open area regulations, and other similar methods of control affecting the use and development of flood plain areas.

FLOOD PROFILE (BACKWATER PROFILE). The longitudinal profile assumed by the surface of a stream of water flowing in an open channel.

FLOOD PROOFING. A combination of structural changes and adjustments to properties subject to flooding primarily for the reduction or elimination of flood damages.

FLOOD VOLUME. The total volume of runoff during a flood, which is equal to the average rate of flow multiplied by time (flood duration). The term "inches runoff" is sometimes used to designate flood volume, which means that the flood volume would cover the drainage area above the point of measurement to a uniform depth equal to the number of inches specified.

FLOODWAY.

(1) Designated. The channel of a stream and that portion of the adjoining flood plain designated by a regulatory agency to provide for reasonable passage of floodflows.

(2) Natural. The channel of the stream or body of water and that portion of the flood plain that is used to carry the flow of the flood.

GAGE.

(1) A staff graduated to indicate the elevation of a water surface.

(2) A device for registering water levels.

GAGING STATION. A selected section in a stream equipped with a gage and facilities for measuring the flow of water; a place on a stream where data are gathered by which continuous discharge records may be developed.

HISTORICAL FLOOD. A known flood which occurred before systematic recordkeeping was begun for the stream or area under consideration.

LEVEE. A dike or embankment for the protection of lands from inundation.

MAXIMUM KNOWN FLOOD. The largest known flood which has occurred in a region whether it is an historical flood or a flood of record.

WATERSHED. The area drained by a stream or stream system.

ZONING ORDINANCE. An ordinance adopted by a local governing body, with authority from a state zoning enabling law, which under the police power divides an entire local governmental area into districts and, within each district, regulates the use of land, the height, bulk, and use of buildings or other structures, and the density of population for the purpose of protecting the health, safety and general welfare of the public.

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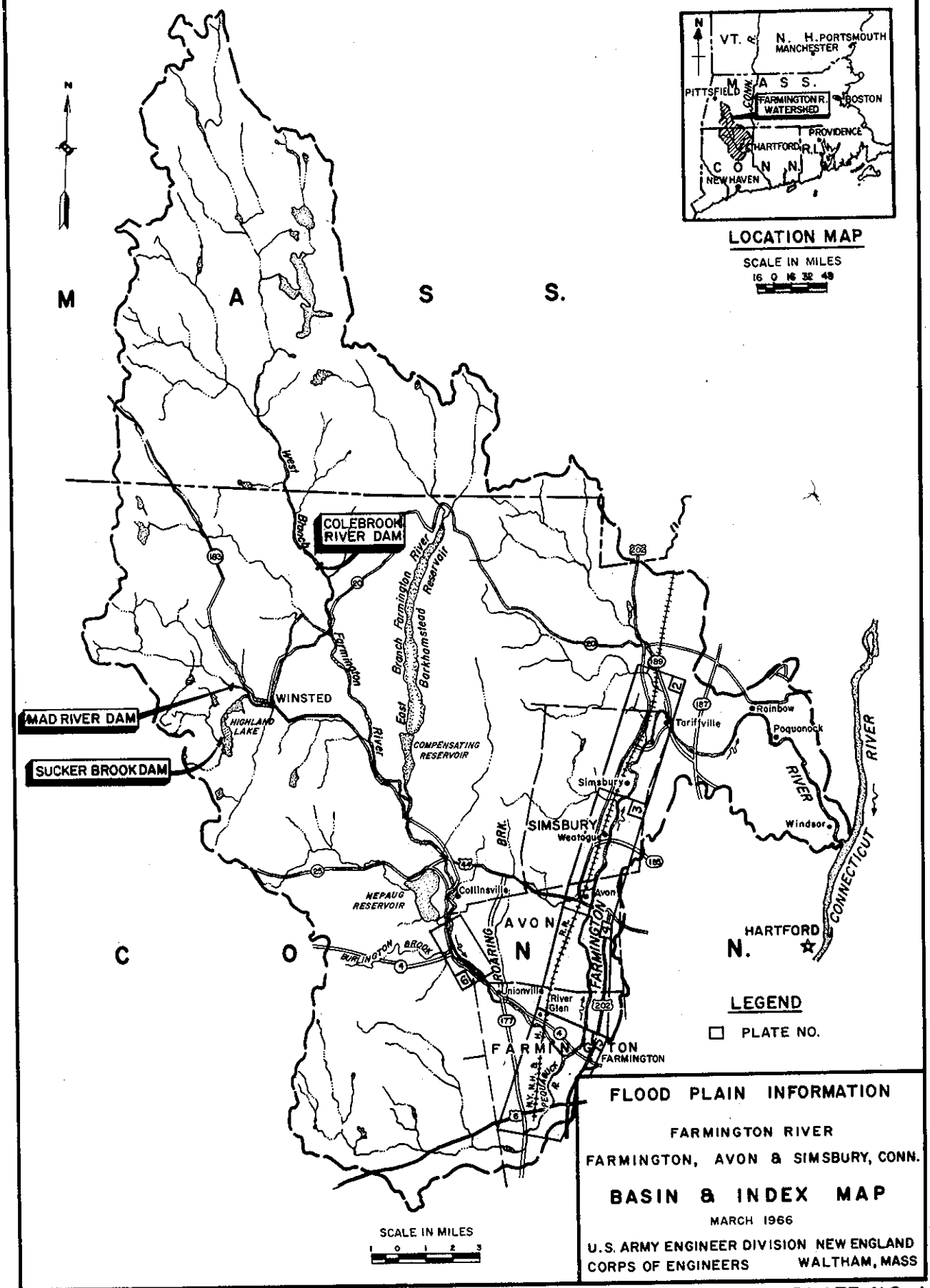
*Contain Detailed Reading Bibliography

CORPS OF ENGINEERS

U. S. ARMY



FLOOD PLAIN INFORMATION

FARMINGTON RIVER

FARMINGTON, AVON & SIMSBURY, CONN.

BASIN & INDEX MAP

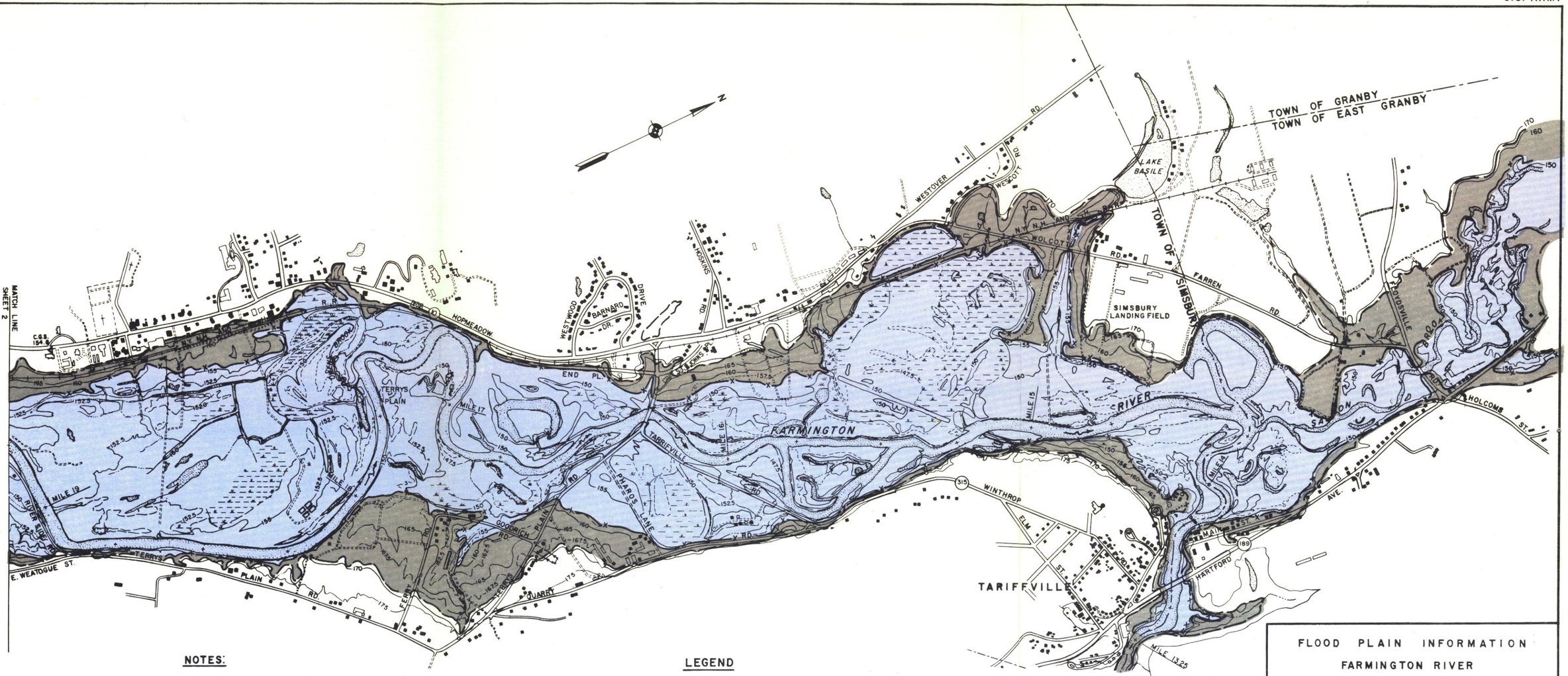
MARCH 1966

U.S. ARMY ENGINEER DIVISION NEW ENGLAND
CORPS OF ENGINEERS WALTHAM, MASS

PLATE NO. 1

CORPS OF ENGINEERS

U.S. ARMY



NOTES:

Mileage on River is measured from confluence with Connecticut River. Tick marks are located at each 1/4 mile. Maps are based on U.S.G.S. Maps and Conn. Hwy. Dept. and U.S. Army Eng. 200 Scale Photogrammetry

LEGEND

Flood of August 1955 (Same as Standard Project Flood Reduced by Reservoirs)

Normal River Area

Flood of March 1936, September 1938, December 1948 (Same as 2% Flood Reduced by Reservoirs)

SCALE IN MILES

1/8 0 1/8 1/4

FLOOD PLAIN INFORMATION

FARMINGTON RIVER

FARMINGTON, AVON & SIMSBURY, CONN.

FLOOD PLAINS

SHEET 1 OF 4 MILE 13.25 TO 19.25

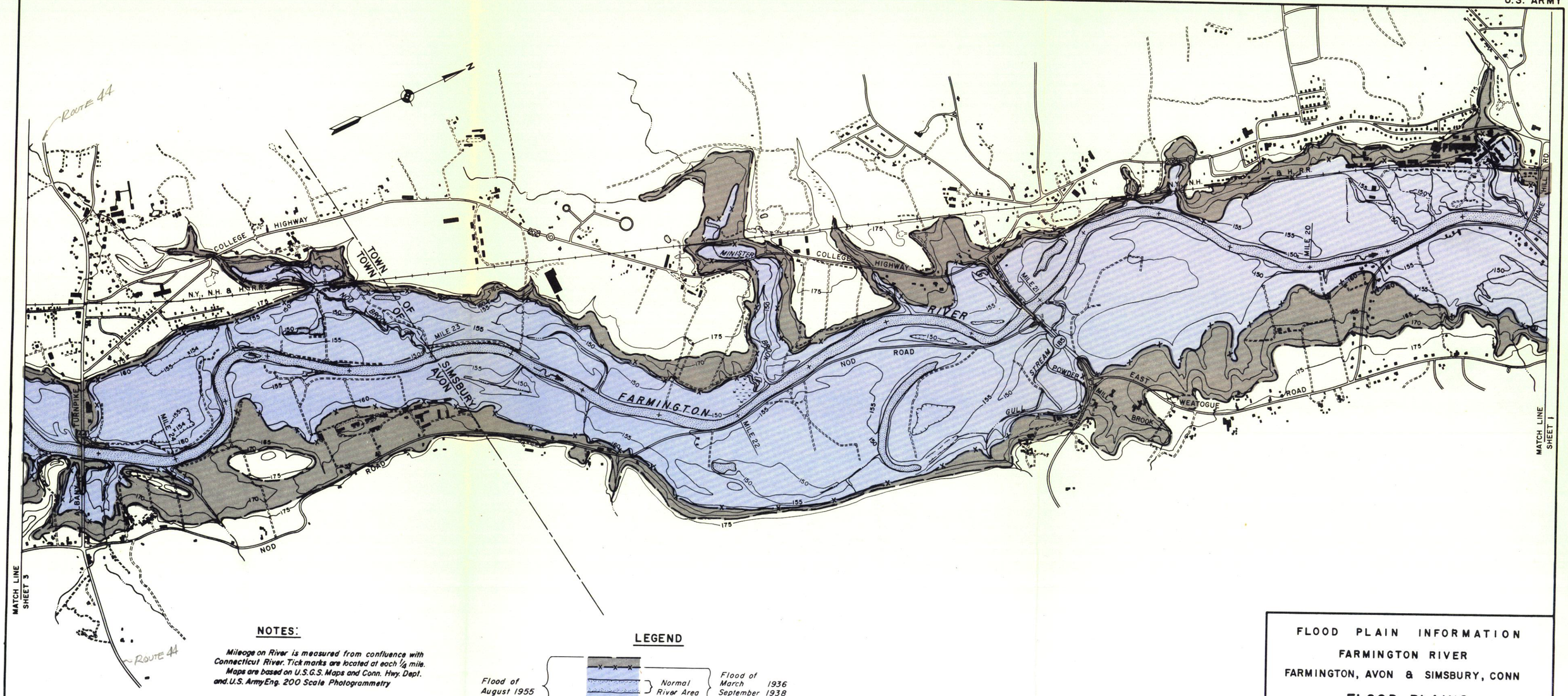
MARCH 1966

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS WALTHAM, MASS.

PLATE NO. 2

CORPS OF ENGINEERS

U.S. ARMY



NOTES:

Mileage on River is measured from confluence with Connecticut River. Tick marks are located at each 1/4 mile. Maps are based on U.S.G.S. Maps and Conn. Hwy. Dept. and U.S. Army Eng. 200 Scale Photogrammetry

LEGEND

SCALE IN MILES

1/8 0 1/8 1/4

FLOOD PLAIN INFORMATION

FARMINGTON RIVER

FARMINGTON, AVON & SIMSBURY, CONN

FLOOD PLAINS

SHEET 2 OF 4

MILE 19.25 TO 24.50

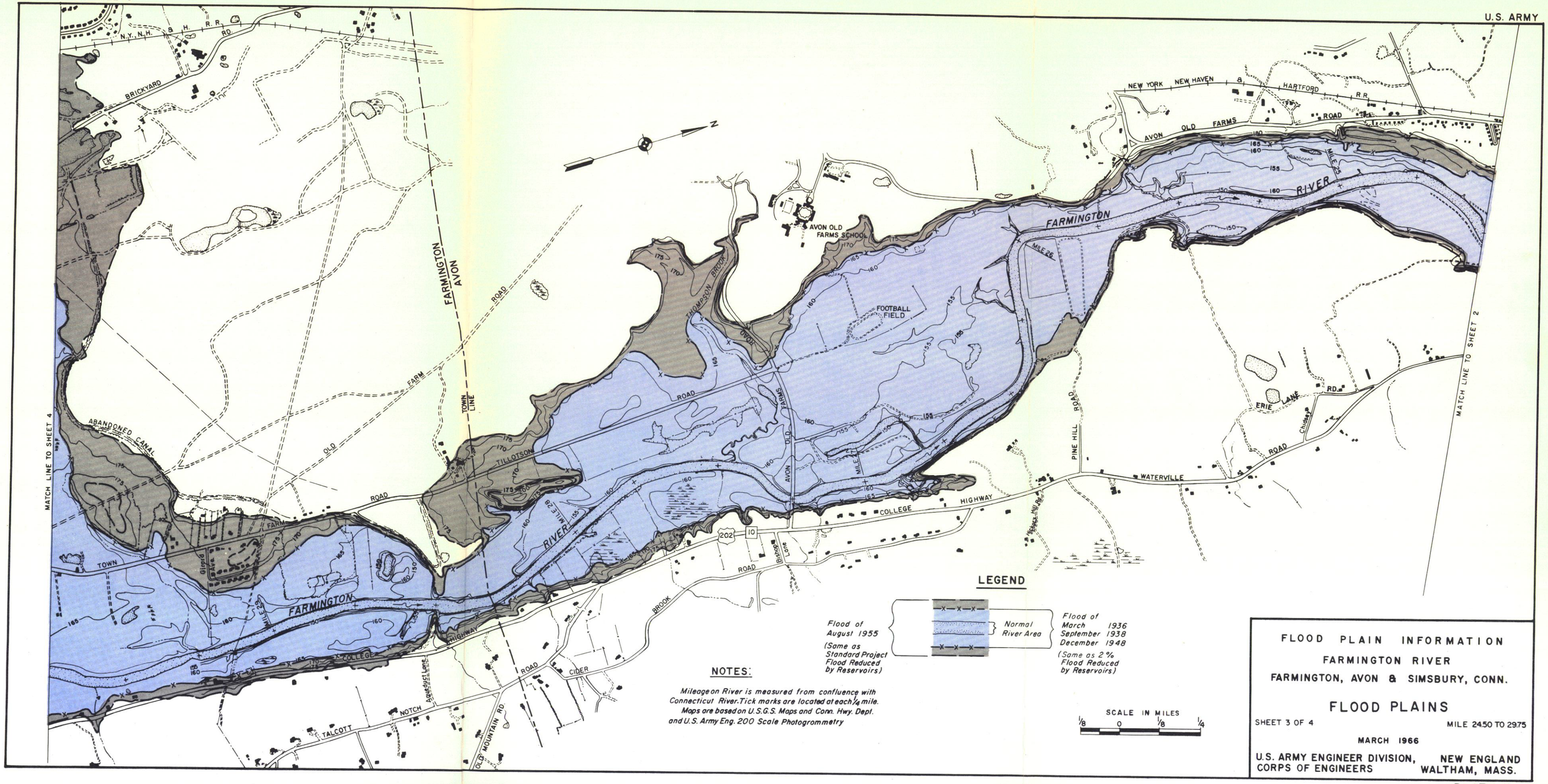
MARCH 1966

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS WALTHAM, MASS.

PLATE NO. 3

CORPS OF ENGINEERS

U.S. ARMY



LEGEND

Flood of August 1955 (Same as Standard Project Flood Reduced by Reservoirs)

Normal River Area

Flood of March 1936, September 1938, December 1948 (Same as 2% Flood Reduced by Reservoirs)

NOTES:

Mileage on River is measured from confluence with Connecticut River. Tick marks are located at each 1/4 mile. Maps are based on U.S.G.S. Maps and Conn. Hwy. Dept. and U.S. Army Eng. 200 Scale Photogrammetry

SCALE IN MILES

1/8 0 1/8 1/4

FLOOD PLAIN INFORMATION

FARMINGTON RIVER

FARMINGTON, AVON & SIMSBURY, CONN.

FLOOD PLAINS

SHEET 3 OF 4

MILE 24.50 TO 29.75

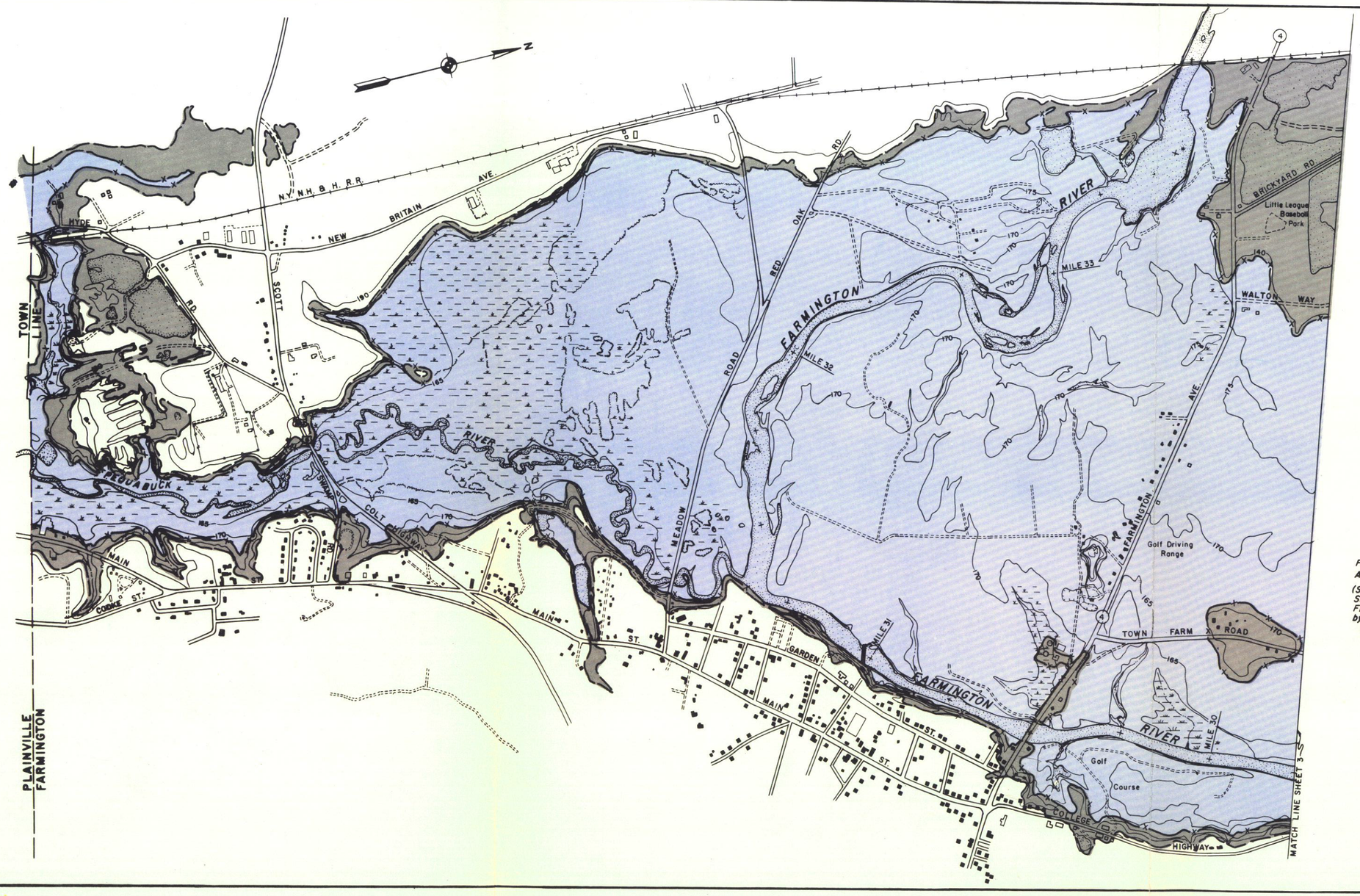
MARCH 1966

U.S. ARMY ENGINEER DIVISION, CORPS OF ENGINEERS — NEW ENGLAND WALTHAM, MASS.

PLATE NO. 4

CORPS OF ENGINEERS

U.S. ARMY



NOTES:

Mileage on River is measured from confluence with Connecticut River. Tick marks are located at each ¼ mile. Maps are based on U.S.G.S. Maps and Conn. Hwy. Dept. and U.S. Army Eng. 200 Scale Photogrammetry.

LEGEND

Flood of August 1955 (Same as Standard Project Flood Reduced by Reservoirs.)

Normal River Area

Flood of March 1936, September 1938, December 1948 (Same as 2% Flood Reduced by Reservoirs)

SCALE IN MILES

⅛ 0 ⅛ ¼

FLOOD PLAIN INFORMATION

FARMINGTON RIVER

FARMINGTON, AVON & SIMSBURY, CONN.

FLOOD PLAINS

SHEET 4 OF 4

MILE 29.75 TO 33.75

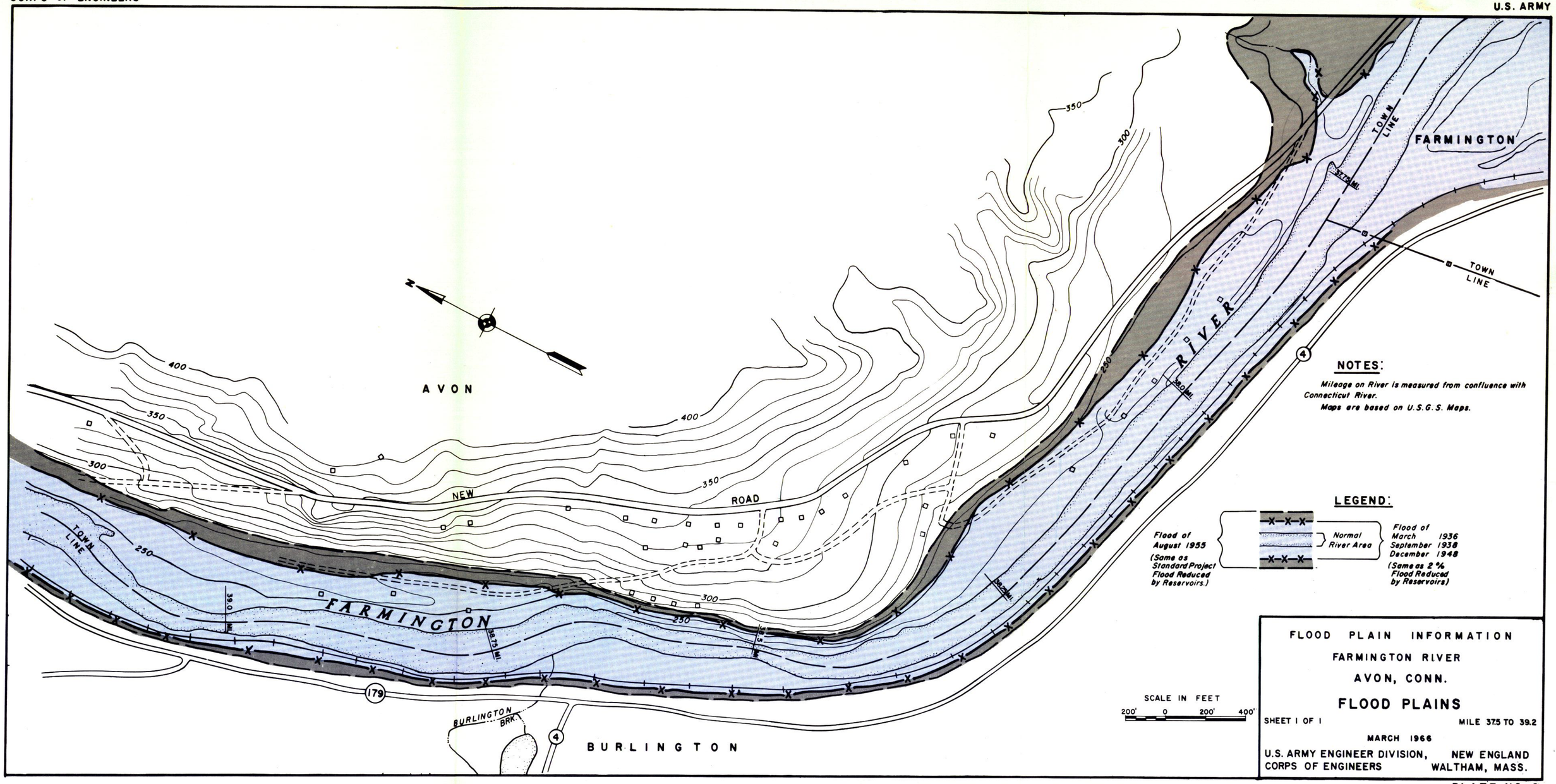
MARCH 1966

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS WALTHAM, MASS.

PLATE NO. 5

CORPS OF ENGINEERS

U.S. ARMY



NOTES:

Mileage on River is measured from confluence with Connecticut River.

Maps are based on U.S.G.S. Maps.

LEGEND:

Flood of August 1955 (Same as Standard Project Flood Reduced by Reservoirs.)

Normal River Area

Flood of March 1936, September 1938, December 1948 (Same as 2% Flood Reduced by Reservoirs)

SCALE IN FEET

200' 0 200' 400'

FLOOD PLAIN INFORMATION

FARMINGTON RIVER

AVON, CONN.

FLOOD PLAINS

SHEET 1 OF 1

MILE 37.5 TO 39.2

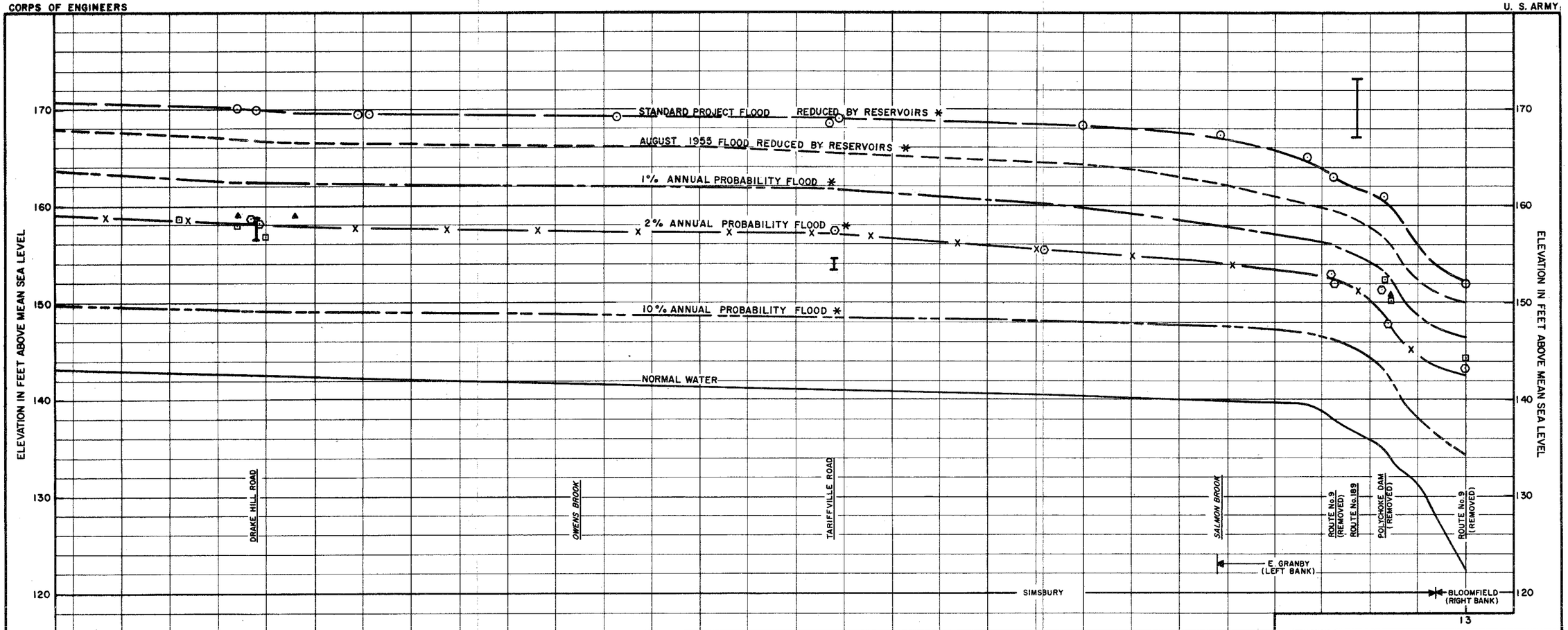
MARCH 1966

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS WALTHAM, MASS.

PLATE NO. 6

CORPS OF ENGINEERS

U. S. ARMY



NOTE:

* *Profile based on assumption that Colebrook River, Mad River and Sucker Brook Dams are in operation.*

LEGEND

EXPERIENCED HIGH WATER

- ⊙ AUGUST 1955
- ▲ SEPTEMBER 1938
- ⊙ DECEMBER 1948
- ⊡ MARCH 1936
- I BRIDGE

FLOOD PLAIN INFORMATION

FARMINGTON RIVER

FARMINGTON, AVON & SIMSBURY, CONN.

FLOOD PROFILES

SHEET 1 OF 3 MILE 13 TO 20

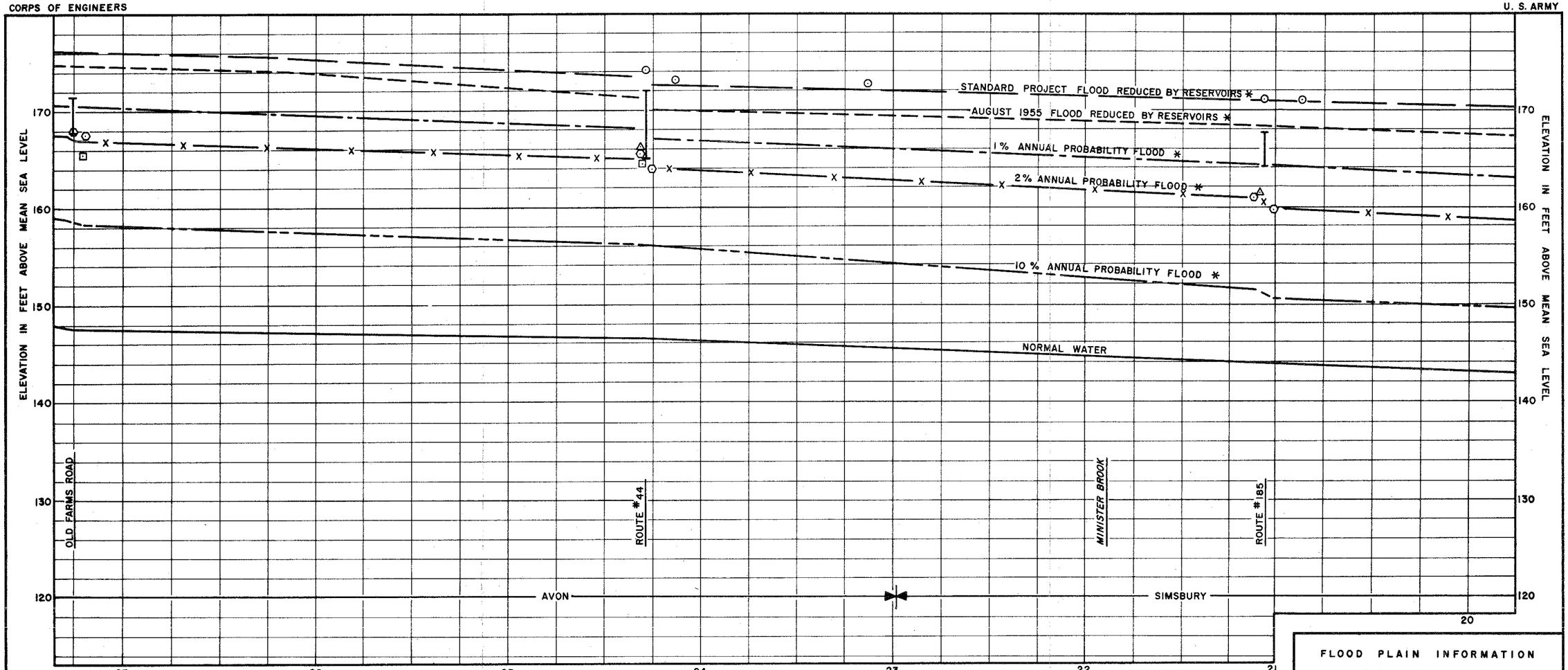
MARCH 1966

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS WALTHAM, MASS.

PLATE NO. 7

CORPS OF ENGINEERS

U. S. ARMY



NOTE:

* *Profile based on assumption that Colebrook River, Mad River and Sucker Brook Dams are in operation*

LEGEND

EXPERIENCED HIGH WATER

- ○ AUGUST 1955
- △ SEPTEMBER 1938
- ○ DECEMBER 1948
- □ MARCH 1936

I BRIDGE

FLOOD PLAIN INFORMATION

FARMINGTON RIVER

FARMINGTON, AVON & SIMSBURY, CONN.

FLOOD PROFILES

SHEET 2 OF 3 MILE 20 TO 27

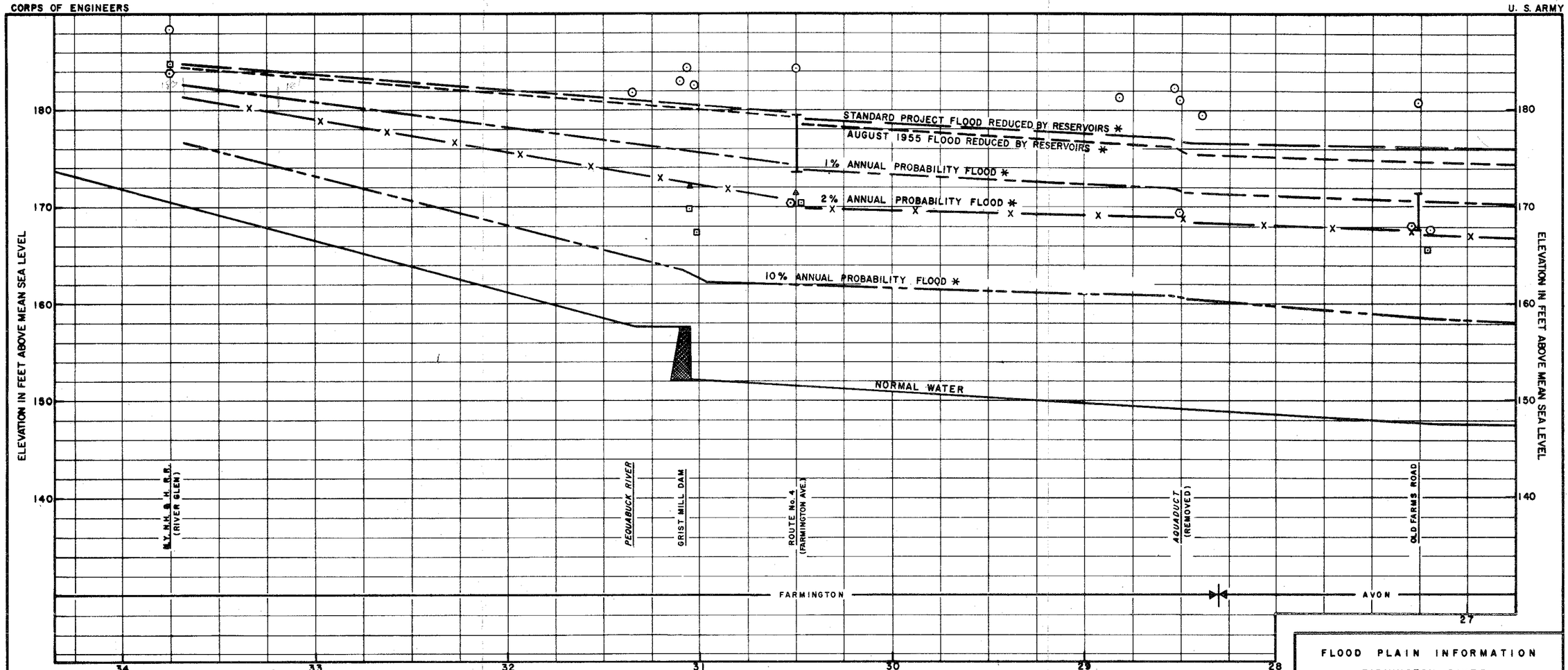
MARCH 1966

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS WALTHAM, MASS.

PLATE NO. 8

CORPS OF ENGINEERS

U. S. ARMY



DISTANCE IN MILES ABOVE CONFLUENCE WITH CONNECTICUT RIVER

NOTE:

* *Profile based on assumption that Colebrook River, Mad River and Suctor Brook Dams are in operation.*

LEGEND

EXPERIENCED HIGH WATER

- ⊙ AUGUST 1955
- ▲ SEPTEMBER 1938
- ⊙ DECEMBER 1948
- ⊡ MARCH 1936

I BRIDGE

FLOOD PLAIN INFORMATION

FARMINGTON RIVER

FARMINGTON, AVON & SIMSBURY, CONN.

FLOOD PROFILES

SHEET 3 OF 3 MILE 27 TO 34

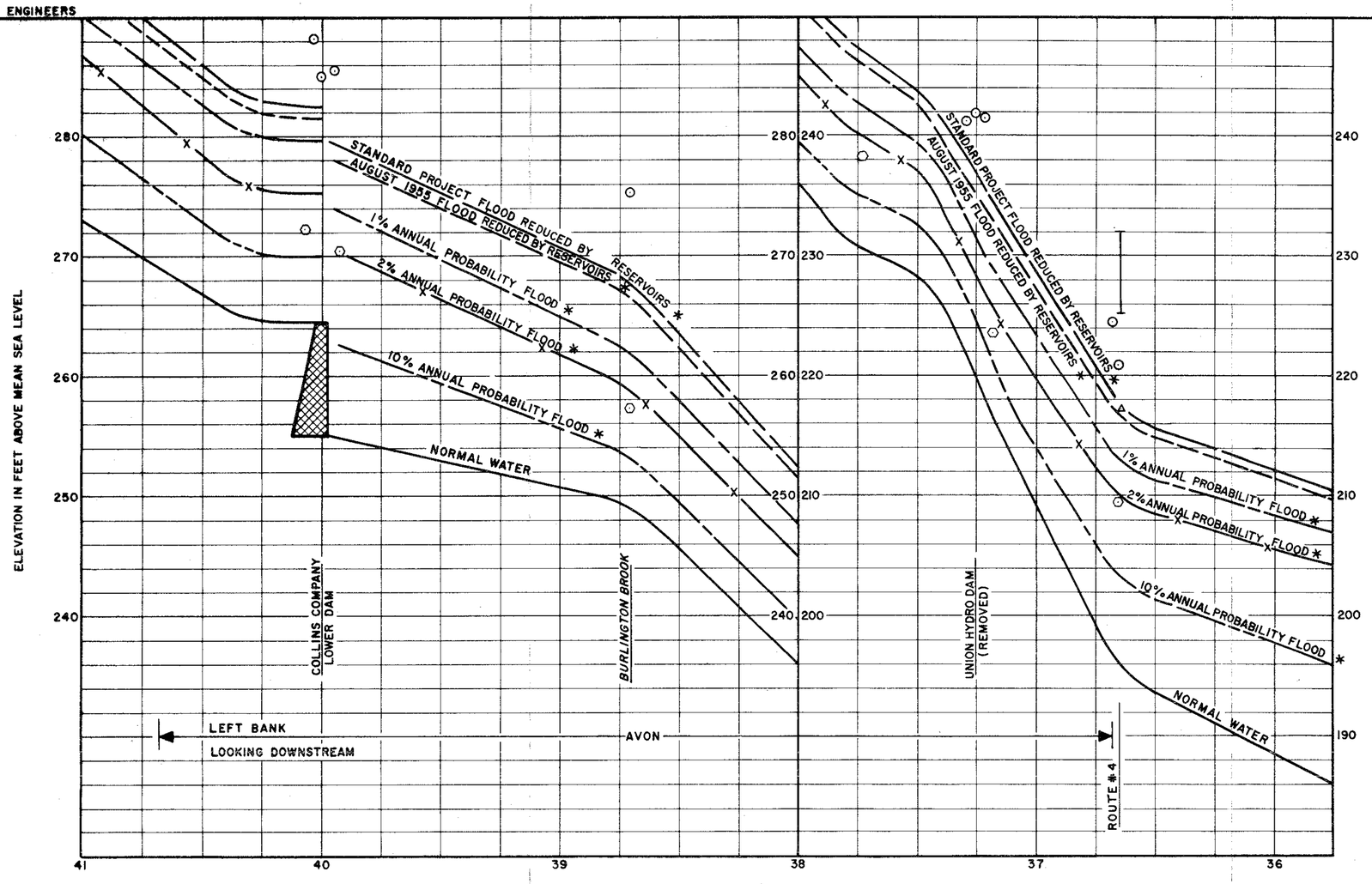
MARCH 1966

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS WALTHAM, MASS.

PLATE NO. 9

CORPS OF ENGINEERS

U. S. ARMY



LEGEND

EXPERIENCED HIGH WATER

- ⊙ AUGUST 1955
- △ SEPTEMBER 1938
- ⊙ DECEMBER 1948
- ⊡ MARCH 1936

I BRIDGE

NOTE:

* *Profile based on assumption that Colebrook River, Mad River and Sucker Brook Dams are in operation.*

FLOOD PLAIN INFORMATION

FARMINGTON RIVER

AVON CONN.

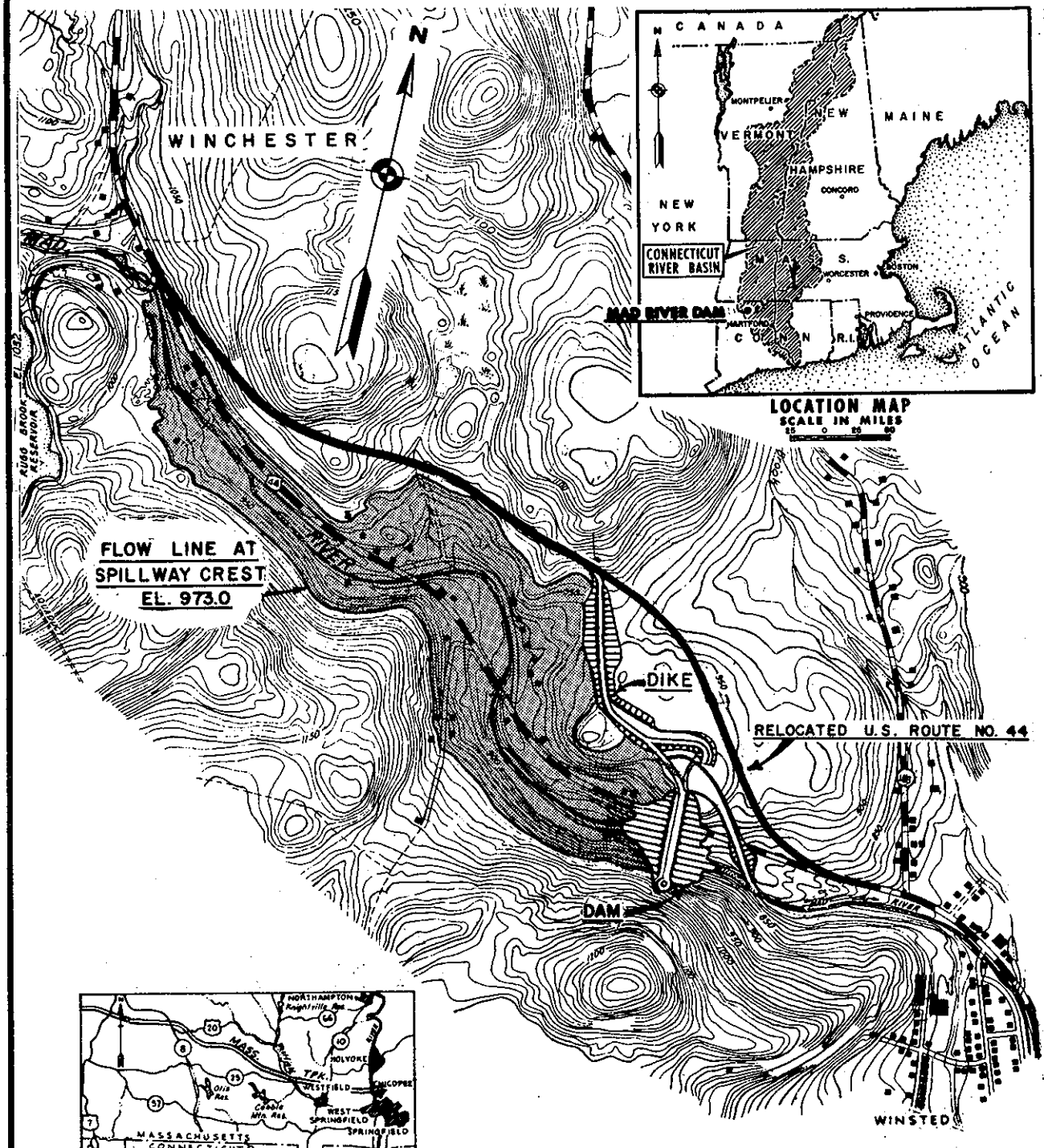
FLOOD PROFILES

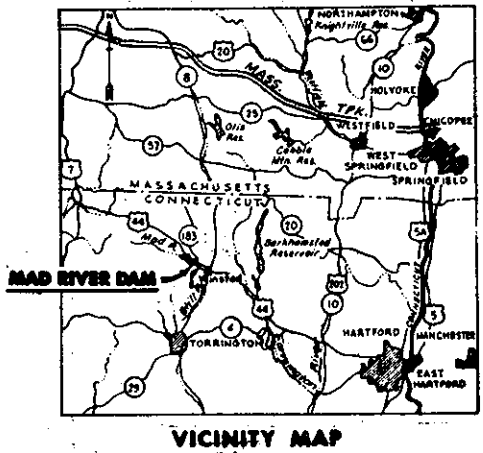
SHEET 1 OF 1 MILE 36 TO 41

MARCH 1966

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS WALTHAM, MASS.

PLATE NO. 10





CONNECTICUT RIVER FLOOD CONTROL

MAD RIVER DAM
RESERVOIR MAP

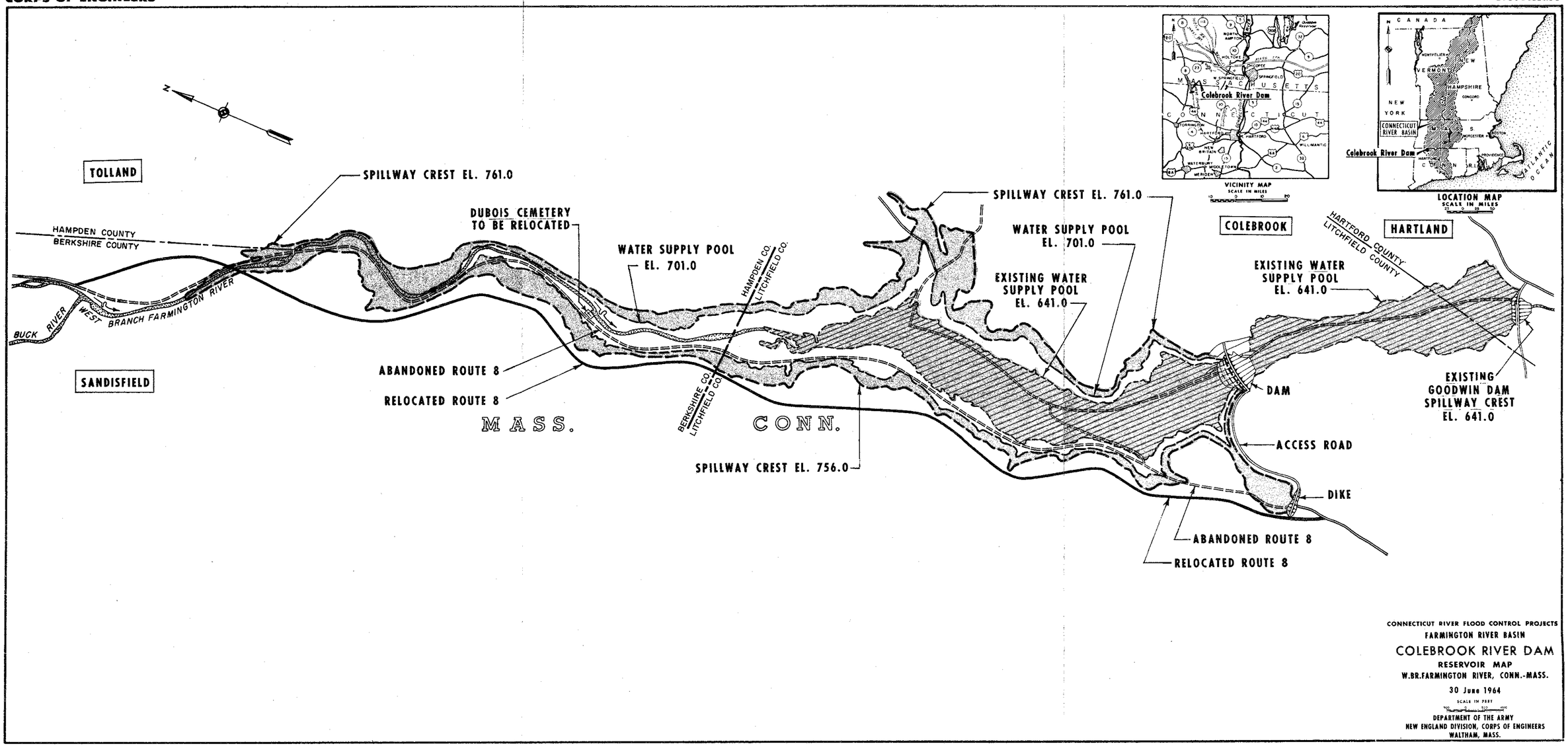
MAD RIVER CONNECTICUT

30 JUNE 1960

SCALE IN FEET

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

PLATE NO. 11



CONNECTICUT RIVER FLOOD CONTROL PROJECTS

FARMINGTON RIVER BASIN

COLEBROOK RIVER DAM

RESERVOIR MAP

W.BR.FARMINGTON RIVER, CONN.-MASS.

30 June 1964

SCALE IN FEET

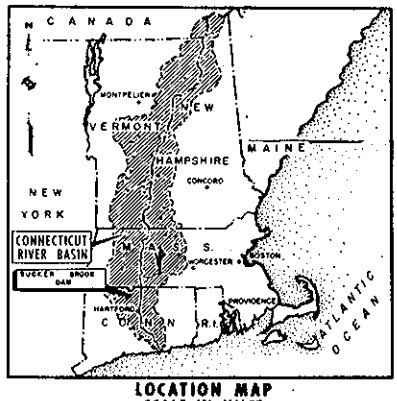
0 500 1000

DEPARTMENT OF THE ARMY

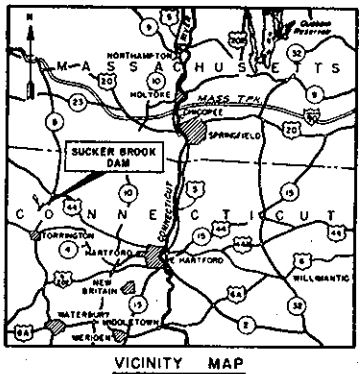
NEW ENGLAND DIVISION, CORPS OF ENGINEERS

WALTHAM, MASS.

PLATE NO. 12



LOCATION MAP
SCALE IN MILES



VICINITY MAP
SCALE IN MILES

CONNECTICUT RIVER FLOOD CONTROL PROJECTS

SUCKER BROOK DAM

RESERVOIR MAP

SUCKER BROOK CONNECTICUT

30 JUNE 1964

SCALE IN FEET

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

PLATE NO. 13