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(UNITED STATES
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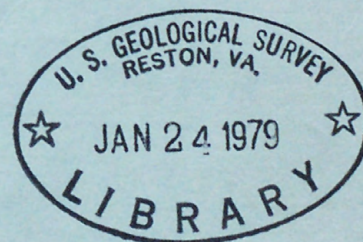
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FLOOD-PLAIN DELINEATION

For

OCCOQUAN RIVER, WOLF RUN,
SANDY RUN, ELK HORN RUN,
GILES RUN, KANES CREEK,
RACoon CREEK, AND THOMPSON CREEK

FAIRFAX COUNTY, VIRGINIA



Open-File Report 79-215

Prepared in cooperation with the

County of Fairfax

1978

U.S. DEPARTMENT OF THE INTERIOR, GEOLOGICAL SURVEY, WATER RESOURCES DIVISION

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11. Abstract

Water-surface profiles of the 25-, 50-, and 100-year recurrence interval discharges have been computed for all streams and reaches of channels in Fairfax County, Virginia having a drainage area greater than 1 square mile (2.59 km²) except for Dogue Creek, Little Hunting Creek, and that portion of Cameron Run above Lake Barcroft. Maps having a 2-foot (0.60 m) contour interval and a horizontal scale of 1 inch (2.54 cm) equals 100 feet (30.5 m) were used for base on which flood boundaries were delineated for 25-, 50-, and 100-year floods to be expected in each basin under ultimate development conditions. This report is one of a series and presents a discussion of techniques employed in computing discharges and profiles as well as the flood profiles and maps on which flood boundaries have been delineated for the Occoquan River and its tributaries within Fairfax County and those streams on Mason Neck within Fairfax County tributary to the Potomac River.

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RACoon CREEK, AND THOMPSON CREEK

FAIRFAX COUNTY, VIRGINIA

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Pat L. Soule

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UNITED STATES DEPARTMENT OF THE INTERIOR

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CONVERSION FACTORS

Factors for converting English units to metric units are shown to four significant figures. However, in the text the metric equivalents are shown only to the number of significant figures consistent with the values for the English units.

<u>English</u>	<u>Multiply by</u>	<u>Metric</u>
acres	4.047×10^{-3}	km ² (square kilometers)
ft ³ /s (cubic feet per second)	2.832×10^{-2}	m ³ /s (cubic meters per second)
ft (feet)	3.048×10^{-1}	m (meters)
in (inches)	$2.540 \times 10^{+1}$	mm (millimeters)
mi (miles)	1.609	km (kilometers)
mi ² (square miles)	2.590	km ² (square kilometers)

Flood-Plain Delineation for Occoquan River, Wolf Run,
Sandy Run, Elk Horn Run, Giles Run, and Kanes Creek, Racoon
Creek, and Thompson Creek

Fairfax County, Virginia

Pat L. Soule

ABSTRACT

Water-surface profiles of the 25-year and 100-year floods and maps on which the 25-, 50-, and 100-year flood boundaries are delineated for streams in southwestern Fairfax County tributary to the Occoquan River, that part of the Occoquan River within Fairfax County and those streams on Mason Neck tributary to the Potomac River are presented in this report.

The techniques used in the computation of the flood profiles and delineation of flood boundaries are presented, and specific hydraulic problems encountered within the study area are also included.

INTRODUCTION

Suburban areas in many parts of the United States have experienced remarkable growth over the last decade or so. Much of this growth, which replaced farms and woodlands with streets, housing developments and shopping centers, caused serious environmental problems. Continued growth and increased competition for desirable space have required careful guidance and planning of future development to insure optimum land use.

Fairfax County began to experience such growth during the early 1950's. In 1959 much of Fairfax County was still rural, but the desirability of regulating encroachment into the flood hazard areas became apparent and appropriate local legislation was enacted by Fairfax County. For the legislation to be effective, it was necessary to quantify the effect of development on floods and to delineate the boundaries of flood inundation.

Data collection in these southwestern basins began in 1961 and continued through the release of maps and letter reports to the County of Fairfax. The Occoquan River within Fairfax County was completed and released to the county in November 1971; Wolf Run and Elk Horn Run in April 1973; Sandy Run in September 1973; Giles Run in February 1973; and Kanes Creek, Racoon Creek and Thompson Creek in August 1974.

This report is one of a series summarizing the results of the hydraulic analysis done under the cooperative program between the County of Fairfax and the Geological Survey. The hydrologic analysis has been published separately (Anderson, 1970).

Purpose and scope

The purpose of the study was to determine the boundaries of floods having recurrence intervals of 25-, 50-, and 100-years under conditions of ultimate development. The flood boundaries were to be delineated on large scale maps that would become a part of the zoning ordinance documents for Fairfax County. The maps also could be used for management, design and land-use planning.

To achieve the objective of the study, it was necessary to analyze the effects of urbanization upon floodflows and to develop techniques to compute the flood magnitude from measurable basin parameters for any given recurrence interval and for any degree of development. Reasonably accurate methods were available for estimating the magnitude and frequency of floods expected from rural or undeveloped drainage basins. However, as a drainage basin is changed from rural to a suburban or an urban condition the magnitude and frequency of flooding also is changed. Changes in flood frequency and magnitude resulting from basin development had received only scant study because of the sparse data available.

The cooperative agreement between U.S. Geological Survey and Fairfax County established a project to study the effects of basin development on floods and to delineate flood boundaries on specially prepared maps of stream valleys. The scope of the project included all of the basins in Fairfax County having a drainage area greater than 1 square mile (2.59 square kilometers). Excepted were the Dogue Creek and Little Hunting Creek basins, the upper tributaries of Cameron Run basin and Tripps Run and Holmes Run above Lake Barcroft. Studies of these basins were made by a private consulting firm. The maps were to have 2 foot (0.60 m) contours and be at a scale of 1 inch (2.54 cm) equals 100 feet (30.5 m). The project allowed for collection of basic data, for analytical investigation, and for definition of flood-prone areas.

Anderson (1970) described the procedure used and the results obtained in the analysis of the effect of urbanization on flooding. He presented mathematical and graphical relations that may be used to estimate the flood discharge at a given recurrence interval up to 100 years for sites in the Washington metropolitan area having various degrees of development.

The purpose of this report is to provide a consolidated reference containing a summary of the techniques used in computation of flood profiles, a discussion of specific hydraulic problems encountered within the study area, a graphical presentation and listing of flood profiles, and the maps showing the area inundated by floods having recurrence intervals of 25-, 50-, and 100-years.

Description of Study Area

Fairfax County is situated in northern Virginia adjacent to and just west of Washington, D.C. (fig. 1). Fairfax County was formed by the division of the County of Prince William in 1742. From colonial days until World War II Fairfax County remained primarily rural. Following World War II, with the tremendous growth of Federal Government and influx of light industry, the county lost its primary agricultural character and has become largely residential. The population grew from 41,000 in 1940 to 564,000 in 1974 and it is estimated that by the year 2000 Fairfax County will have a population between 1 and 1.5 million. More than 50 percent of the land area had been developed by 1974. (written comm., Fairfax County, 1974).

The Occoquan River and its tributary basins and those streams on Mason Neck Tributary to the Potomac River covered in this report are in the southwest part of Fairfax County between latitudes $38^{\circ}37'N$ and $38^{\circ}47'30"N$ and longitudes $77^{\circ}07'30"W$ and $77^{\circ}22'30"W$ (fig. 2).

The study area consists of Occoquan River from Occoquan Bay to the mouth of Bull Run. The river itself is the boundary between Fairfax County and Prince William County. The streams Wolf Run, Sandy Run, Elk Horn Run, and Giles Run drain that area within Fairfax County tributary to the Occoquan River. Mason Neck is drained by Thompson Creek and Kanes Creek which are tributary to Belmont Bay and in turn the Potomac River and Racoon Creek which discharges directly to the Potomac River.

The area is bounded on the northwest by the Bull Run basin, the north by Popes Head Creek basin, the northeast by Pohick Creek basin, the south by the Potomac River and the southwest by the Occoquan River itself.

The area discussed in this report includes 35.0 square miles (90.7 km^2); Wolf Run basin includes 5.9 square miles (15.3 km^2); Sandy Run basin 8.2 square miles (21.2 km^2); Mill Branch basin drained by Giles Run-Massex Creek 6.0 square miles (15.5 km^2); that part of Mason Neck referred to as Kanes Creek and vicinity basins, which includes Thompson Creek,

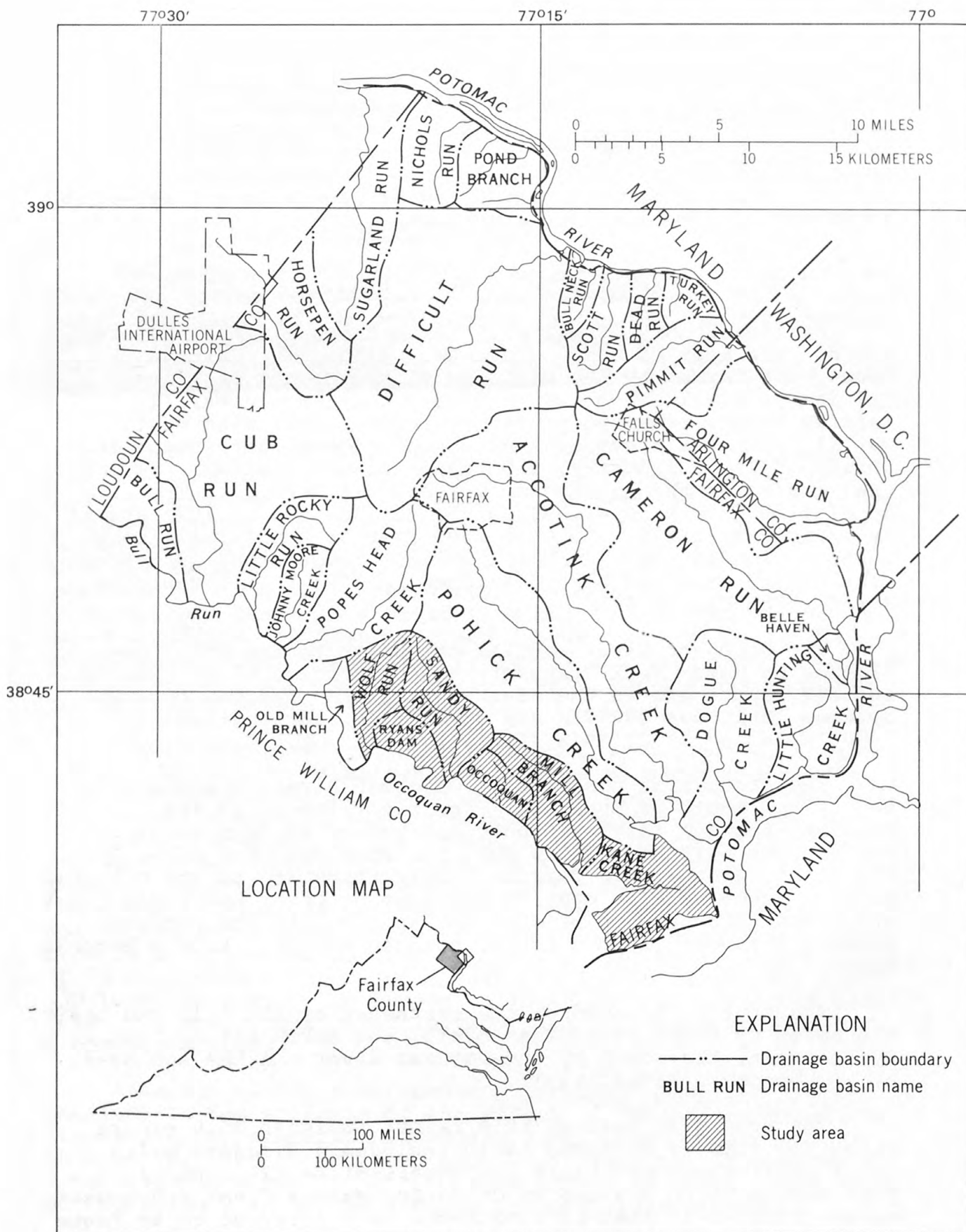


Figure 1. Location map of study area.

Kanes Creek and Racoon Creek 5.4 square miles (14.0 km²); and Occoquan River within Fairfax County, which includes the small basin drained by Elk Horn Run, 5.8 square miles (15.0 km²); and another drainage area of 3.7 square miles (9.6 km²) referred to as Ryans Dam.

Wolf Run basin, Sandy Run basin, part of Mills Branch Basin, and that part of the Occoquan River basin included in Fairfax County falls within the Piedmont Upland Physiographic Province. The Piedmont Upland is well dissected by streams. The interstream divides are fairly wide, undulating and rolling except in places along the lower tributaries of large streams. This Piedmont Upland relief is typical of these basins with significant entrenchments of the Occoquan River tributaries and the Occoquan itself, which has resulted in a high bluff adjacent to the Occoquan River and deep V-shaped valleys with steep slopes along the tributaries.

The southern part of Mill Branch basin and Kanes Creek and vicinity basins are in the Lower Coastal Plain Physiographic Province. This area's elevation is low and the topography is mostly level or gently rolling, with some relief and hilly terrain near the larger streams. Stream gradients in this area are low, and tidal effects extend far up into drainages.

There is little development, except for some residential development, within the basins discussed in this report. The Occoquan River does have two dams, High Dam and Low Dam and Occoquan Reservoir, which are operated for municipal water supply for Fairfax County. Future development along the Occoquan River and its tributaries and on Mason Neck should be moderate and mostly scattered residential.

FLOOD-PLAIN MAPPING

Maps

The base maps on which flood limits are delineated have a 2-foot (0.60 m) contour interval and a horizontal scale of 1 inch (2.54 cm) equals 100 feet (30.5 m). Natural and man-made features along the stream are shown. The maps were compiled by the U.S. Geological Survey for Occoquan River and Giles Run from aerial photographs taken in 1966, and for Wolf Run, Sandy Run, Elk Horn, Kanawha Creek, and vicinity from photographs taken in 1971. The maps include a 250-foot (76.2 m) grid based on the Virginia coordinate system, north zone. Field work was done in the southwest basins in 1971, 1972, and 1973.

Discharge

The flood areas delineated are those determined using ultimate-development discharges. Highly developed basins differ from natural basins in that for a given storm (1) runoff is greater (2) discharge time is much shorter and (3) floods of comparable magnitude have a higher frequency of occurrence. These factors were analyzed through a study of streamflow and precipitation records, most of which were collected in the vicinity of Washington, D.C. The report, "Effects of Urban Development of Floods in Northern Virginia," (Anderson, 1970) describes the analysis used and summarizes the conclusions of that analysis. The effect of imperviousness with respect to runoff volumes was evaluated by comparing typical runoff coefficients for natural and highly developed basins. Regression analysis was used; first to derive the relation of lag time (the time lapse from the centroid of precipitation excess to the centroid of runoff) as a function of length-slope parameter; and second, to derive the relation of mean annual flood (2.33-year recurrence interval), adjusted for effects of imperviousness, as a function of drainage-basin area and lag time. An analysis of flood and rainfall frequencies was made to derive ratios of 25-, 50-, and 100-year floods to the mean annual flood for any percentage of imperviousness. Using the available information for a basin in the project area, the magnitude of the 2.33, 25-, 50-, and 100-year flood peaks can be computed from measurable basin parameters for any percentage of imperviousness in the ultimate development plan.

The term "recurrence interval," as used here, is the average interval of time within which a given flood discharge will be equaled or exceeded once. The recurrence interval is inversely related to the chance of a given flood being equaled or exceeded in any one year. Thus, the 100-year flood has a 1 percent chance of being equaled or exceeded in any one year. No periodicity is implied.

Profile Computation

Having computed the 25-, 50-, and 100-year floods at selected points by the method set forth by Anderson (1970), the corresponding water-surface profiles were computed by the standard step method of backwater analysis. The method is based on a balance of energy between successive pairs of stream cross-sections. For tranquil flow the computations start at the farthest downstream section, or at a control section, and proceed upstream; but for supercritical flow the computations start at the most upstream section, or critical section, and proceed downstream until flow again becomes tranquil. Peak-discharge magnitudes varied with size of drainage area and were changed at selected points, such as above the confluence of a major tributary. The water-surface profile elevations are available for each cross-section. The cross-sections are referenced to an arbitrary base line, drawn to an approximate centroid of flow, and measured in an upstream direction from an arbitrary starting point. Profiles were computed in accordance with accepted methods of the U.S. Geological Survey. Following are several general items pertaining to the profile computations:

1. Discharge magnitudes greater than that of the 100-year flood may occur. However, the rate of change of stage per unit discharge generally becomes comparatively less as the discharge increases.
2. No factors of safety were used in the computations. Bridges and culverts were assumed to be free of debris. Roughness coefficients (Manning's "n") were selected based on summer vegetation.
3. New construction and channelization work may modify hydraulic properties, thus changing the flood profiles in the future.

Delineation of Flood Boundaries

The first step in the delineation of flood areas was to transpose the flood profile elevation, computed at each cross section, onto the base maps on which channel cross-sections had initially been located. Delineation was then completed by interpreting elevation between these cross sections and between map contours on a straight-line basis.

The maps show the 25- and 100-year flood boundaries generally, and include the 50-year flood boundary in some places. In areas where topography is steep, there was insufficient space to show both the 25- and 100-year flood boundaries, and only the 100-year flood was delineated.

The delineation represents the average water-surface elevation. During actual floods, the water-surface may not be level across the stream.

FLOOD PROFILES

Flood-profile data for Occoquan River, Wolf Run, Sandy Run, Elk Horn Run, Giles Run, Kanes Creek, Racoon Creek, and Thompson Creek basins are given in the following tables:

Table 1.	Water-surface profile data for Occoquan River
Table 2.	Water-surface profile data for Wolf Run
Table 3.	Water-surface profile data for Sandy Run
Table 4.	Water-surface profile data for Elk Horn Run
Table 5.	Water-surface profile data for Giles Run
Table 6.	Water-surface profile data for Kanes Creek
Table 7.	Water-surface profile data for Racoon Creek
Table 8.	Water-surface profile data for Thompson Creek

The tables were prepared so that the reader can locate the position for which information is desired on the flood-plain maps included in this report, determine base-line stationing from the map by projection to the base line, and use the station number to find in the table the nearest section for which information was determined.

For each cross section used in profile computation, tables 1 to 8 summarize: (1) The base-line reference stationing of that section, (2) the imperviousness used for computing discharge for the different recurrence-interval flood at that point, (3) the resulting discharge and corresponding water-surface profile elevations for 25-, 50-, and 100-year floods.

OCCOQUAN RIVER BASIN
Table 1: Water-surface profile data for Occoquan River

Section number	Base-Line Station (feet)	Impervi- ousness (per cent)	Discharge, in cubic feet per second			Elevation, in feet			Remarks
			25-year ^a	50-year ^a	100-year ^a	25-year ^a	50-year ^a	100-year ^a	
	0+00								Occoquan Bay
2	20+00	<1	31,000	36,000	41,000	6.4	7.7	9.5	Belmont Bay
3	29+31	<1	31,000	36,000	41,000	6.5	7.8	9.6	
4	34+62	<1	31,000	36,000	41,000	6.6	7.8	9.6	
5	35+00								Richmond, Fredricksburg, & Potomac Railroad
7	38+00								Jefferson Davis Highway (U.S. 1)
8	39+30	<1	31,000	36,000	41,000	6.8	7.9	9.8	
9	45+30	<1	31,000	36,000	41,000	6.9	8.0	9.9	
10	50+89	<1	31,000	36,000	41,000	7.0	8.2	10.0	
11	57+83	<1	31,000	36,000	41,000	7.1	8.3	10.1	
12	62+00								Henry Shirley Memorial Highway (Interstate 95)
14	64+83	<1	31,000	36,000	41,000	7.2	8.4	10.2	
15	70+17	<1	31,000	36,000	41,000	7.4	8.5	10.3	
16	76+36	<1	31,000	36,000	41,000	7.5	8.8	10.5	
17	83+41	<1	31,000	36,000	41,000	7.7	8.9	10.8	
18	92+35	<1	31,000	36,000	41,000	7.8	9.1	10.9	
19	101+08	<1	31,000	36,000	41,000	8.0	9.2	11.0	
20	109+23	<1	31,000	36,000	41,000	8.1	9.4	11.1	
21	117+33	<1	31,000	36,000	41,000	8.3	9.6	11.3	
22	123+35	<1	31,000	36,000	41,000	8.3	9.6	11.3	
23	128+32	<1	31,000	36,000	41,000	8.5	9.8	11.4	
24	132+40	<1	31,000	36,000	41,000	8.8	10.0	11.6	
25	134+00								Ox Road (State 123)
26	134+49	<1	31,000	36,000	41,000	8.9	10.1	11.7	
27	136+55	<1	31,000	36,000	41,000	9.1	10.3	11.8	
28	138+56	<1	31,000	36,000	41,000	9.3	10.5	12.0	
29	140+96	<1	31,000	36,000	41,000	14.0	15.3	16.4	

^a Recurrence interval

OCOCOQUAN RIVER BASIN

Table 1: Water-surface profile data for Occoquan River - Continued

Section Number	Base-line Station (feet)	Impervi- ousness (per cent)	Discharge, in cubic feet per second			Elevation, in feet			Remarks
			25-year ^a	50-year ^a	100-year ^a	25-year ^a	50-year ^a	100-year ^a	
30	142+43	<1	31,000	36,000	41,000	17.0	18.0	19.1	
31	144+01	<1	31,000	36,000	41,000	24.2	25.4	26.6	
32	145+87	<1	31,000	36,000	41,000	30.6	32.1	33.6	
33	147+42	<1	31,000	36,000	41,000	31.1	32.5	34.0	
34	149+30	<1	31,000	36,000	41,000	32.6	34.0	35.5	
35	152+26	<1	31,000	36,000	41,000	36.6	37.7	38.8	
36	154+66	<1	31,000	36,000	41,000	40.3	41.4	42.4	
37	155+00								Low Dam
38	156+25	<1	31,000	36,000	41,000	60.0	60.7	61.3	
39	162+47	<1	31,000	36,000	41,000	60.0	60.7	61.3	
40	168+72	<1	31,000	36,000	41,000	60.4	61.1	61.8	
41	173+59	<1	31,000	36,000	41,000	61.8	62.5	63.3	
42	178+22	<1	31,000	36,000	41,000	63.9	64.6	65.4	
43	181+51	<1	31,000	36,000	41,000	65.9	66.6	67.2	
44	183+44	<1	31,000	36,000	41,000	70.8	72.2	73.5	
45	184+90								High Dam
46	185+06	<1	31,000	36,000	41,000	126.2	126.8	127.4	
48	225+83	<1	31,000	36,000	41,000	126.2	126.8	127.4	
50	262+70	<1	31,000	36,000	41,000	126.2	126.8	127.5	
52	308+04	<1	31,000	36,000	41,000	126.2	126.8	127.6	
54	353+68	<1	31,000	36,000	41,000	126.3	126.8	127.6	
56	400+46	<1	31,000	36,000	41,000	126.4	126.9	127.8	
58	433+67	<1	31,000	36,000	41,000	126.5	127.0	127.9	
60	477+03	<1	31,000	36,000	41,000	126.6	127.1	128.0	
62	508+60	<1	31,000	36,000	41,000	126.6	127.1	128.0	
63	515+00								Ryans Dam
64	518+90	<1	31,000	36,000	41,000	126.8	127.4	128.3	
66	561+98	<1	31,000	36,000	41,000	126.8	127.5	128.5	
68	602+60	<1	31,000	36,000	41,000	127.0	127.7	128.7	

^a Recurrence interval

OCCOQUAN RIVER BASIN

Table 1: Water-surface profile data for Occoquan River - Continued

Section Number	Base-line Station (feet)	Impervi- ousness (per cent)	Discharge, in cubic feet per second			Elevation, in feet			Remarks
			25-year ^a	50-year ^a	100-year ^a	25-year ^a	50-year ^a	100-year ^a	
70	640+52	<1	31,000	36,000	41,000	127.2	127.9	128.9	Bull Run
71	660+00								
72	664+05	<1	31,000	36,000	41,000	127.3	128.1	129.2	

^a Recurrence interval

WOLF RUN BASIN

Table 2: Water-surface profile data for Wolf Run

Section Number	Base-Line Station (feet)	Impervi- ousness (per cent)	Discharge, in cubic feet per second			Elevation, in feet			Remarks
			25-year ^a	50-year ^a	100-year ^a	25-year ^a	50-year ^a	100-year ^a	
1	0+00	20	3600	4600	5700	126.8	127.5	128.5	Confluence with Occoquan River
2	6+43	20	3600	4600	5700	126.8	127.5	128.5	
3	16+55	20	3600	4600	5700	126.8	127.6	128.6	
4	19+34	20	3600	4600	5700	126.9	127.7	128.8	
5	21+95	20	3600	4600	5700	130.3	131.2	131.6	
6	25+23	20	3600	4600	5700	132.5	133.4	134.1	
7	27+98	20	3600	4600	5700	133.8	134.5	135.2	
8	31+41	20	3600	4600	5700	135.9	136.5	137.0	
9	34+95	20	3600	4600	5700	137.9	138.5	139.1	
10	37+73	20	3600	4600	5700	140.0	140.8	141.6	Henderson Rd. (State 643)
11	40+46	20	3600	4600	5700	142.4	142.9	143.4	
12	43+72	20	3600	4600	5700	144.2	144.7	145.1	
13	47+30	20	3600	4600	5700	146.0	146.6	147.2	
14	50+50	20	3600	4600	5700	147.4	147.9	148.5	
15	53+64	20	3600	4600	5700	149.3	149.7	150.1	
16	56+55	20	3600	4600	5700	150.5	150.9	151.3	
17	59+82	20	3600	4600	5700	153.1	153.5	153.9	
18	63+04	20	3600	4600	5700	155.0	155.5	156.0	
19	66+20	20	3600	4600	5700	158.4	158.9	159.3	
20	66+56	20	3600	4600	5700	158.6	159.1	159.6	
21	66+80	20	3600	4600	5700	158.6	159.1	159.6	
22	68+78	20	3600	4600	5700	159.9	160.4	160.8	
23	71+02	20	3600	4600	5700	162.3	162.9	163.3	
24	73+50	20	3600	4600	5700	164.0	164.6	165.0	
25	76+59	20	3600	4600	5700	165.8	166.6	167.3	
26	78+94	20	3600	4600	5700	167.7	168.4	169.2	
27	82+01	20	3600	4600	5700	169.4	169.9	170.7	
28	85+00	20	3600	4600	5700	171.0	171.7	172.5	
29	87+42	20	3600	4600	5700	172.7	173.5	174.3	

^a Recurrence interval

WOLF RUN BASIN

Table 2: Water-surface profile data for Wolf Run Basin - Continued

Section Number	Base-Line Station (feet)	Impervi- ousness (per cent)	Discharge, in cubic feet per second			Elevation, in feet			Remarks
			25-year ^a	50-year ^a	100-year ^a	25-year ^a	50-year ^a	100-year ^a	
30	89+85	20	3600	4600	5700	174.0	174.8	175.7	
31	92+55	20	3600	4600	5700	177.0	177.7	178.0	
32	94+90	20	3600	4600	5700	177.5	178.2	178.7	
33	97+52	20	3300	4200	5200	180.0	180.8	181.4	
34	99+51	20	3300	4200	5200	180.6	181.3	182.0	
35	102+33	20	3300	4200	5200	182.0	182.5	182.9	
36	105+04	20	3300	4200	5200	182.5	183.0	183.5	
37	107+95	20	3300	4200	5200	184.2	184.7	185.1	
38	109+97	20	3300	4200	5200	185.3	185.8	186.4	
39	111+65	20	3300	4200	5200	186.8	187.4	187.9	
40	113+78	20	3300	4200	5200	187.6	188.2	188.6	
41	116+87	20	3300	4200	5200	189.2	189.8	190.3	
42	120+05	20	3300	4200	5200	190.3	190.7	191.1	
43	122+51	20	3300	4200	5200	192.0	192.3	192.5	
44	125+18	20	3300	4200	5200	193.9	194.2	194.5	
45	127+67	20	3300	4200	5200	195.6	196.0	196.3	
46	129+77	20	3300	4200	5200	197.8	198.2	198.7	
47	132+23	20	3300	4200	5200	198.7	199.1	199.6	
48	135+25	20	2600	3300	4000	199.9	200.3	200.8	
49	138+32	20	2600	3300	4000	202.7	203.2	203.7	
50	140+59	20	2600	3300	4000	205.1	205.7	206.1	
51	142+70	20	2600	3300	4000	206.9	207.4	207.8	
52	144+81	20	2600	3300	4000	207.6	208.1	208.5	
53	148+09	20	2600	3300	4000	209.7	210.3	210.7	
54	151+18	20	2600	3300	4000	211.2	211.7	212.0	
55	153+70	20	2600	3300	4000	212.8	213.5	214.1	
56	156+47	20	2400	3100	3800	214.5	215.0	215.5	
57	159+93	20	2400	3100	3800	218.2	218.8	219.1	
58	162+93	20	2400	3100	3800	218.9	219.6	220.1	

^a Recurrence interval

WOLF RUN BASIN

Table 2: Water-surface profile data for Wolf Run Basin - Continued

Section Number	Base-line Station (feet)	Impervi- ousness (per cent)	Discharge, in cubic feet per second			Elevation, in feet			Remarks
			25-year ^a	50-year ^a	100-year ^a	25-year ^a	50-year ^a	100-year ^a	
59	165+76	20	2400	3100	3800	220.9	221.5	222.0	
60	168+16	20	2400	3100	3800	222.1	222.6	223.0	
61	171+04	20	2000	2500	3000	223.9	224.4	224.9	
62	174+12	20	2000	2500	3000	226.2	226.6	226.9	
63	175+07	20	1800	2300	2800	227.3	227.8	228.1	Clifton Rd(State 645)
64	175+50	20	1800	2300	2800	228.0	228.2	228.4	
65	178+14	20	1800	2300	2800	230.0	230.7	231.2	
66	180+14	20	1800	2300	2800	232.3	232.9	233.4	
67	181+89	20	1800	2300	2800	233.2	233.7	234.2	
68	184+29	20	1800	2300	2800	235.4	235.8	236.1	
69	187+40	20	1800	2300	2800	238.4	238.9	239.3	
70	190+14	20	1600	2100	2600	241.1	241.7	242.1	
71	191+91	20	1600	2100	2600	242.5	243.0	243.4	
72	193+65	20	1600	2100	2600	243.8	244.3	244.7	
73	195+74	20	1600	2100	2600	245.6	246.0	246.4	
74	197+61	20	1600	2100	2600	247.9	248.4	248.8	
75	199+70	20	1600	2100	2600	249.3	249.8	250.2	
76	202+50	20	1600	2100	2600	251.9	252.4	252.8	
77	204+15	20	1600	2100	2600	253.4	253.9	254.3	
78	205+93	20	1600	2100	2600	255.1	255.7	256.1	
79	207+85	20	1600	2100	2600	256.8	257.3	257.8	
80	209+65	20	1600	2100	2600	258.4	259.0	259.4	
81	211+44	20	1600	2100	2600	260.2	260.6	260.9	
82	213+31	20	1600	2100	2600	261.8	262.3	262.6	
83	213+64	20	1400	1800	2300	262.3	262.8	263.2	
84	213+87	20	1400	1800	2300	262.3	262.8	263.2	
85	215+44	20	1400	1800	2300	263.4	263.9	264.3	
86	217+18	20	1400	1800	2300	265.6	266.1	266.6	
87	219+05	20	1400	1800	2300	267.1	267.5	267.9	

^a Recurrence interval

SANDY RUN BASIN

Table 3: Water-surface profile data for Sandy Run

Section Number	Base-line Station (feet)	Impervi- ousness (per cent)	Discharge, in cubic feet per second			Elevation, in feet			Remarks
			25-year ^a	50-year ^a	100-year ^a	25-year ^a	50-year ^a	100-year ^a	
1	5+80	20	4600	5900	7200	126.2	126.8	217.5	Confluence with Occoquan River
2	14+75	20	4600	5900	7200	126.2	126.8	127.5	
3	22+96	20	4600	5900	7200	126.2	126.8	127.5	
4	33+36	20	4600	5900	7200	126.2	126.8	127.5	
5	40+33	20	4600	5900	7200	126.2	126.8	127.5	
6	50+30	20	4600	5900	7200	126.2	126.8	127.5	
	55+00								Hampton Rd (State 647)
7	57+78	20	4400	5600	6800	134.0	136.0	136.8	
8	64+75	20	4000	5100	6300	134.0	136.0	136.8	
9	69+91	20	4000	5100	6300	134.0	136.0	136.8	
10	74+54	20	4000	5100	6300	134.1	136.0	136.9	
11	77+18	20	4000	5100	6300	134.3	136.2	137.2	
12	81+17	20	4000	5100	6300	135.0	136.6	137.6	
13	83+83	20	4000	5100	6300	136.6	137.5	138.4	
14	87+00	20	3700	4700	5700	138.4	139.0	139.7	
15	91+08	20	3700	4700	5700	140.6	141.1	141.7	
16	94+13	20	3700	4700	5700	143.0	143.6	144.1	
17	97+12	20	3700	4700	5700	144.8	145.3	145.7	
18	100+24	20	3700	4700	5700	146.5	147.1	147.5	
19	104+92	20	3700	4700	5700	149.4	150.0	150.4	
20	108+14	20	3700	4700	5700	151.7	152.4	153.0	
21	110+74	20	3700	4700	5700	152.8	153.5	154.1	
22	113+22	20	3700	4700	5700	154.4	155.1	155.7	
23	116+47	20	3700	4700	5700	158.7	159.3	160.0	
24	121+11	20	3400	4300	5200	161.0	161.7	162.4	
25	124+14	20	3100	3900	4800	162.6	163.4	164.0	
26	126+38	20	3100	3900	4800	163.9	164.6	165.4	
27	129+89	20	3100	3900	4800	166.3	166.9	167.5	
28	132+92	20	3100	3900	4800	168.4	169.1	169.7	
29	135+41	20	3100	3900	4800	170.4	171.2	172.0	
30	137+31	20	3100	3900	4800	172.2	172.9	173.8	

^a Recurrence interval

SANDY RUN BASIN
Table 3: Water-surface profile data for Sandy Run - Continued

Section Number	Base-Line Station (feet)	Impervi- ousness (per cent)	Discharge, in cubic feet per second			Elevation, in feet			Remarks
			25-year ^a	50-year ^a	100-year ^a	25-year ^a	50-year ^a	100-year ^a	
31	139+11	20	3100	3900	4800	174.7	175.6	176.2	
32	141+84	20	3100	3900	4800	177.1	177.7	178.4	
33	146+20	20	3100	3900	4800	180.7	181.1	181.5	
34	148+09	20	3100	3900	4800	181.7	182.1	182.5	
35	150+14	20	3100	3900	4800	183.4	184.2	184.9	
36	153+18	20	3100	3900	4800	185.7	186.2	186.8	
37	156+18	20	3100	3900	4800	188.3	188.9	189.5	
38	158+33	20	3100	3900	4800	189.1	189.6	190.3	
39	160+22	20	3100	3900	4800	192.5	193.3	193.7	
40	161+57	20	3100	3900	4800	193.2	194.0	194.5	
41	163+69	20	3100	3900	4800	195.2	196.0	196.7	
42	165+69	20	3100	3900	4800	196.7	197.2	197.8	
43	168+85	20	3100	3900	4800	201.1	201.6	201.8	
44	171+88	20	3100	3900	4800	202.8	203.4	204.0	
45	175+48	20	2500	3200	4000	206.3	206.8	207.3	
46	178+23	20	2500	3200	4000	208.8	209.2	209.8	
47	182+19	20	2500	3200	4000	211.0	211.4	212.0	
48	185+08	20	2500	3200	4000	213.8	214.3	214.8	
49	187+62	20	2500	3200	4000	215.3	215.9	216.4	
50	190+50	20	2500	3200	4000	217.9	218.6	219.0	
51	193+44	20	2500	3200	4000	219.1	219.8	220.4	
52	195+90	20	2500	3200	4000	220.0	220.5	221.1	
53	198+63	20	2500	3200	4000	221.7	222.2	222.7	
54	201+99	20	2500	3200	4000	224.5	224.9	225.3	
55	205+95	20	2400	3000	3700	227.0	227.3	227.6	
56	208+87	20	2200	2800	3400	229.3	229.7	230.0	
57	209+65								Henderson Rd (State 643)
58	209+93	20	2200	2800	3400	230.7	231.0	231.3	
59	211+96	20	2200	2800	3400	231.9	232.3	232.6	
60	214+62	20	2200	2800	3400	233.1	233.5	233.9	

^a Recurrence interval

SANDY RUN BASIN

Table 3: Water-surface profile data for Sandy Run - Continued

Section Number	Base-Line Station (feet)	Impervi- ousness (per cent)	Discharge, in cubic feet per second			Elevation, in feet			Remarks
			25-year ^a	50-year ^a	100-year ^a	25-year ^a	50-year ^a	100-year ^a	
61	217+66	20	2200	2800	3400	235.0	235.4	235.8	
62	220+80	20	2200	2800	3400	237.1	237.5	237.8	
63	223+69	20	2200	2800	3400	239.4	239.8	240.1	
64	225+96	20	1600	2000	2500	241.0	241.4	241.7	
65	229+30	20	1600	2000	2500	243.6	243.9	244.3	
66	232+59	20	1600	2000	2500	246.4	246.8	247.2	
67	235+90	20	1600	2000	2500	249.6	250.0	250.5	
68	239+36	20	1600	2000	2500	252.7	253.1	253.5	
69	241+76	20	1600	2000	2500	254.2	254.6	255.0	
70	244+41	20	1600	2000	2500	256.2	256.6	257.0	
71	246+74	20	1600	2000	2500	258.0	258.4	258.8	
72	249+59	20	1600	2000	2500	261.5	262.1	262.7	
73	251+82	20	1600	2000	2500	263.2	263.8	264.3	
74	253+50	20	1600	2000	2500	265.4	265.9	266.4	
75	255+85	20	1300	1600	2000	268.3	268.7	269.0	
76	258+44	20	1300	1600	2000	271.6	272.2	272.7	
77	260+52	20	1300	1600	2000	273.6	274.0	274.4	
78	262+77	20	1300	1600	2000	275.8	276.2	276.5	
79	264+70	20	1300	1600	2000	277.4	277.7	278.0	
80	266+68	20	1300	1600	2000	279.4	279.8	280.1	
81	268+99	20	1300	1600	2000	281.2	281.5	281.9	
82	272+02	20	1300	1600	2000	283.8	284.1	284.5	
83	274+05	20	1300	1600	2000	285.8	286.2	286.6	
84	275+71	20	1300	1600	2000	286.9	287.2	287.6	
85	276+12								Clifton Rd (State 645)
86	276+44	20	1300	1600	2000	289.0	289.2	289.5	
87	279+03	20	1300	1600	2000	292.1	292.6	293.1	
88	281+19	20	1300	1600	2000	294.3	294.6	295.0	
89	283+34	20	1300	1600	2000	296.5	296.9	297.3	
90	285+07	20	1300	1600	2000	298.4	298.7	299.1	

^a Recurrence interval

OCCOQUAN BASIN

Table 4: Water-surface profile data for Elk Horn Run

Section Number	Base-Line Station (feet)	Impervi- ousness (per cent)	Discharge, in cubic feet per second			Elevation, in feet			Remarks
			25-year ^a	50-year ^a	100-year ^a	25-year ^a	50-year ^a	100-year ^a	
1	0+00	20	1600	2100	2600	81.9	82.3	82.7	Dam at mouth
2	1+97	20	1600	2100	2600	84.4	84.9	85.3	
3	3+09	20	1600	2100	2600	86.1	86.7	87.3	
4	4+08	20	1600	2100	2600	90.4	90.9	91.4	
5	4+47	20	1600	2100	2600	93.3	93.8	94.3	
6	4+90	20	1600	2100	2600	95.4	96.0	96.5	
7	5+68	20	1600	2100	2600	97.2	97.8	98.4	
8	6+68	20	1600	2100	2600	100.2	100.9	101.6	
9	7+60	20	1600	2100	2600	101.8	102.6	103.4	
10	8+30	20	1600	2100	2600	103.4	104.4	105.3	
11	9+39	20	1600	2100	2600	104.8	105.8	106.7	
12	10+48	20	1600	2100	2600	107.5	108.4	109.1	
13	11+45								Power Line Access Road
14	11+70	20	1600	2100	2600	111.0	111.6	112.1	
15	12+78	20	1600	2100	2600	111.3	111.9	112.5	
16	14+20	20	1600	2100	2600	112.4	113.2	113.9	
17	16+37	20	1600	2100	2600	113.2	114.0	114.7	
18	18+63	20	1600	2100	2600	116.0	117.0	117.9	
19	20+66	20	1600	2100	2600	117.0	118.0	118.8	
20	22+26	20	1600	2100	2600	119.2	119.8	120.3	
21	24+23	20	1600	2100	2600	120.0	120.6	121.2	
22	25+98	20	1400	1800	2100	122.0	122.8	123.6	
23	27+33	20	1400	1800	2100	124.1	124.7	125.1	
24	28+41	20	1400	1800	2100	126.4	127.2	127.6	
25	29+50	20	1400	1800	2100	127.7	128.3	128.6	
26	30+65	20	1400	1800	2100	129.9	130.8	131.5	
27	31+53	20	1400	1800	2100	130.9	131.7	132.3	
28	33+34	20	1400	1800	2100	133.3	134.0	134.5	
29	34+79	20	1400	1800	2100	134.7	135.3	135.6	

^a Recurrence interval

OCCOQUAN BASIN

Table 4: Water-surface profile data for Elk Horn Run - Continued

Section Number	Base-Line Station (feet)	Impervi- ousness (per cent)	Discharge, in cubic feet per second			Elevation, in feet			Remarks
			25-year ^a	50-year ^a	100-year ^a	25-year ^a	50-year ^a	100-year ^a	
30	35+96	20	1400	1800	2100	136.8	137.6	138.2	
31	37+38	20	1400	1800	2100	137.5	138.2	138.6	
32	39+07	20	1400	1800	2100	140.0	140.9	141.4	
33	40+39	20	1400	1800	2100	142.3	143.0	143.5	
34	41+86	20	1400	1800	2100	144.3	145.0	145.6	
35	43+31	20	1400	1800	2100	144.9	145.7	146.2	
36	44+79	20	1400	1800	2100	145.9	146.6	147.2	

^a Recurrence interval

MILL BRANCH
Table 5: Water-surface profile data for Giles Run

Section Number	Base-Line Station (feet)	Impervi- ousness (per cent)	Discharge, in cubic feet per second			Elevation, in feet			Remarks
			25-year ^a	50-year ^a	100-year ^a	25-year ^a	50-year ^a	100-year ^a	
1001	4+40	30	3800	4700	5700	6.4	7.7	9.5	Massey Creek
1	14+88	30	3800	4700	5700	6.4	7.7	9.5	
2	20+69	30	3800	4700	5700	6.4	7.7	9.5	
3	28+25	30	3800	4700	5700	6.4	7.7	9.5	
4	34+88	30	3800	4700	5700	6.4	7.7	9.5	
5	38+81	30	2800	4700	5700	6.4	7.7	9.5	
6	42+33	30	3800	4700	5700	7.7	8.4	9.9	Mouth of Giles Run
7	45+40	30	3800	4700	5700	8.1	8.6	10.0	
8	49+31	30	3800	4700	5700	10.2	10.4	10.9	
9	53+72	30	3300	4100	5000	13.3	13.7	13.9	
10	58+38	30	3300	4100	5000	14.7	15.0	15.3	
11	62+22	30	3300	4100	5000	16.1	16.4	16.8	
12	65+33	30	3300	4100	5000	19.0	19.3	19.6	
13	69+82	30	3300	4100	5000	21.5	21.9	22.3	
14	73+08	30	3300	4100	5000	22.4	22.8	23.2	
15	75+69	30	3300	4100	5000	23.6	23.8	24.1	
16	76+40	30	3300	4100	5000	23.9	24.1	24.4	Old Colchester Rd (State 611)
17	76+83	30	3300	4100	5000	24.9	25.4	25.8	
18	80+27	30	3300	4100	5000	28.8	29.1	29.6	
19	83+48	30	2950	3400	3700	29.7	30.1	30.5	Flow Bypassing Sect.
20									Jefferson Davis Highway (U.S. 1)
21	84+99	25	2950	3400	3700	36.4	36.7	37.0	Flow Bypassing Sect.
22	87+31	25	3240	4000	4600	36.5	36.9	37.2	Flow Bypassing Sect.
23	90+02	25	3300	4100	5000	36.8	37.2	37.5	
24	92+77	25	3300	4100	5000	37.7	38.2	38.7	
25	96+83	25	3300	4100	5000	41.2	41.6	42.2	
26	98+52								Richmond Fredericksburg and Potomac Railroad
28	102+50								Henry Shirley Memorial Highway (Interstate 95)
30	104+95	25	3000	3800	4700	56.8	60.0	63.5	

^a Recurrence interval

MILL BRANCH
Table 5: Water-surface profile data for Giles Run - Continued

Section Number	Base-Line Station (feet)	Impervi- ousness (per cent)	Discharge, in cubic feet per second			Elevation, in feet			Remarks
			25-year ^a	50-year ^a	100-year ^a	25-year ^a	50-year ^a	100-year ^a	
31	107+56	25	3000	3800	4700	57.0	60.2	63.6	
32	110+29	25	3000	3800	4700	57.2	60.3	63.7	
33	113+74	25	3000	3800	4700	57.4	60.4	63.8	
34	115+93	25	3000	3800	4700	57.5	60.4	63.8	
35	119+14	25	3000	3800	4700	57.7	60.6	63.9	
36	122+12	25	3000	3800	4700	58.1	60.8	64.0	
37	123+81	25	3000	3800	4700	58.4	60.9	64.0	
38	126+60	25	2900	3700	4500	59.8	61.4	64.2	
39	128+81	25	2800	3600	4300	61.4	62.2	64.4	
40	131+31	25	2800	3600	4300	63.0	63.5	65.0	
41	134+09	25	2800	3600	4300	64.5	65.0	65.9	
42	136+12	25	2800	3600	4300	65.8	66.1	66.8	
43	139+55	25	2700	3400	4100	67.8	68.2	68.7	
44	142+31	25	2700	3400	4100	69.4	69.8	70.2	
45	144+41	25	2700	3400	4100	70.2	70.5	70.9	
46	146+13	25	2700	3400	4100	71.2	71.6	71.9	
47	147+83	25	2700	3400	4100	72.9	73.1	73.4	
48	150+36	25	2700	3400	4100	75.3	75.6	75.8	
49	152+59	25	2700	3400	4100	76.4	76.8	77.0	
50	155+00	25	2700	3400	4100	77.6	78.0	78.3	
51	157+82	25	2700	3400	4100	79.8	80.1	80.4	Dixon Street
52	160+39	25	2700	3400	4100	82.2	82.7	83.1	
53	163+57	25	2700	3400	4100	83.1	83.5	83.9	
54	166+61	25	2700	3400	4100	85.2	85.4	85.6	
55	170+82	25	2700	3400	4100	87.8	88.2	88.6	
56	171+62								Fourth Place Street
57	172+14	25	2700	3400	4100	89.6	90.0	90.3	
58	175+20	25	2700	3400	4100	90.4	90.8	91.2	
59	177+47	25	2700	3400	4100	91.8	92.2	92.6	
60	180+00	25	2700	3400	4100	94.2	94.6	95.1	

^a Recurrence interval

MILL BRANCH
Table 5: Water-surface profile data for Giles Run - Continued

Section Number	Base-Line Station (feet)	Impervi- ousness (per cent)	Discharge, in cubic feet per second			Elevation, in feet			Remarks
			25-year ^a	50-year ^a	100-year ^a	25-year ^a	50-year ^a	100-year ^a	
61	183+71	25	2500	3200	3900	96.4	96.9	97.4	
62	186+73	25	2500	3200	3900	99.0	99.6	100.0	
63	189+43	25	2400	3000	3700	100.0	100.6	101.1	
64	192+24	25	2400	3000	3700	102.3	102.9	103.5	Private Road
65	193+48	25	2400	3000	3700	106.1	106.6	106.7	
66	194+97	25	2400	3000	3700	107.0	107.4	107.9	
67	195+57								Lorton Road (State 642)
68	196+00	25	2400	3000	3700	112.9	113.5	114.0	
69	197+37	25	2400	3000	3700	113.5	114.1	114.8	
70	198+00	25	2400	3000	3700	113.7	114.4	115.1	
71	198+85	25	2400	3000	3700	114.9	115.7	116.5	
171	199+12	25	2400	3000	3700	115.8	116.3	116.8	
72	199+65	25	2400	3000	3700	117.9	118.3	118.7	
73	200+74	25	2400	3000	3700	120.2	120.8	121.4	
74	201+88	25	2400	3000	3700	121.6	122.1	122.7	
75	203+14	25	2400	3000	3800	122.5	123.0	123.8	
76	205+00	25	2400	3000	3700	124.4	124.9	125.5	
77	207+03	25	2400	3000	3700	126.7	127.2	127.8	
78	210+22	25	2400	3000	3700	128.5	129.1	129.7	
79	212+11	25	2200	2800	3400	130.2	130.8	131.4	
80	214+06	25	2200	2800	3400	132.0	132.4	132.8	
81	215+80	25	2200	2800	3400	134.4	134.7	135.1	
82	217+58	25	2200	2800	3400	136.2	136.7	137.0	
83	220+17	25	2200	2800	3400	138.2	138.6	138.9	
84	221+44	25	2200	2800	3400	140.0	140.7	141.3	
85	222+28	25	2200	2800	3400	141.8	142.4	143.0	
86	223+11	25	2200	2800	3400	144.6	145.2	145.6	
87	224+39	25	2200	2800	3400	147.2	147.8	148.3	
88	225+22	25	2200	2800	3400	149.2	149.8	150.3	
89	226+58								Government Railroad
1090	227+68	25	2200	2800	3400	171.0	175.1	176.6	

^a Recurrence interval

MILL BRANCH

Table 5: Water-surface profile data for Giles Run - Continued

Section Number	Base-Line Station (feet)	Impervi- ousness (per cent)	Discharge, in cubic feet per second			Elevation, in feet			Remarks
			25-year ^a	50-year ^a	100-year ^a	25-year ^a	50-year ^a	100-year ^a	
91	228+38	25	2200	2800	3400	171.0	175.1	176.6	
92	229+95	25	2200	2800	3400	171.0	175.1	176.6	
93	230+81	25	2200	2800	3400	171.2	175.2	176.6	Government Road
94	231+48	25	2200	2800	3400	171.2	175.2	176.6	
95	233+13	25	2000	2600	3100	171.3	175.2	176.6	
96	235+43	25	2000	2600	3100	171.6	175.3	176.7	
97	238+03	25	2000	2600	3100	172.8	175.6	177.0	
98	239+96	25	2000	2600	3100	173.7	176.0	177.4	
99	242+31	25	2000	2600	3100	175.2	176.8	177.9	
100	244+51	25	2000	2600	3100	176.6	177.7	178.6	
101	247+82	25	2000	2600	3100	178.3	178.9	179.6	
102	250+81	25	2000	2600	3100	181.6	182.0	182.4	
103	252+39	25	2000	2600	3100	182.4	183.0	183.5	
104	252+88	25	2000	2600	3100	182.6	183.0	183.6	Government Road
105	253+30	25	2000	2600	3100	183.8	184.0	184.3	
106	254+62	25	1900	2400	3000	183.9	184.2	184.6	
107	256+53	25	1900	2400	3000	185.1	185.7	186.3	
108	258+26	25	1900	2400	3000	186.4	187.0	187.7	
109	260+36	25	1700	2100	2600	188.2	188.8	189.5	
110	261+90	25	1700	2100	2600	188.9	189.4	190.0	
111	264+42	25	1700	2100	2600	192.5	192.9	193.2	
112	265+90	25	1700	2100	2600	194.0	194.5	195.0	
113	267+79	25	1700	2100	2600	195.5	196.0	196.4	
114	269+16	25	1700	2100	2600	196.3	196.9	197.4	
115	270+94	25	1700	2100	2600	198.0	198.5	199.0	
116	272+42	25	1700	2100	2600	199.2	199.6	200.0	
117	272+85								Hooes Road (State 636)
118	273+20	20	1700	2100	2600	201.1	201.6	202.0	
119	274+65	20	1700	2100	2600	201.5	202.0	202.5	
120	276+59	20	1700	2100	2600	202.3	202.9	203.4	
121	279+26	20	1700	2100	2600	203.0	203.5	204.1	

^a Recurrence interval

MILL BRANCH

Table 5: Water-surface profile data for Giles Run - Continued

Section Number	Base-Line Station (feet)	Impervi- ousness (per cent)	Discharge, in cubic feet per second			Elevation, in feet			Remarks
			25-year ^a	50-year ^a	100-year ^a	25-year ^a	50-year ^a	100-year ^a	
122	281+54	20	1500	1900	2400	204.4	204.9	205.4	
123	283+08	20	1500	1900	2400	206.7	207.2	207.6	
124	285+40	20	1500	1900	2400	208.3	208.8	209.3	
125	286+87	20	1500	1900	2400	209.5	210.0	210.6	
126	289+07	20	1500	1900	2400	212.0	212.4	212.9	
127	291+55	20	1500	1900	2400	214.4	214.8	215.1	
128	294+23	20	1500	1900	2400	216.7	217.0	217.5	
129	297+21	20	1300	1700	2100	219.4	219.9	220.5	
130	299+58	20	1300	1700	2100	220.9	221.5	222.0	
131	301+41	20	1300	1700	2100	222.7	223.2	223.7	
132	302+79	20	1300	1700	2100	223.7	224.2	224.7	
133	304+30	20	1300	1700	2100	224.6	225.1	225.6	
134	305+80	20	1300	1700	2100	225.9	226.5	227.0	
135	307+09	20	1300	1700	2100	226.8	227.4	227.8	
136	309+30	20	1200	1500	1800	229.0	229.4	229.8	
137	311+81	20	1200	1500	1800	233.0	233.4	233.7	
138	313+85	20	1200	1500	1800	234.6	235.0	235.4	
139	316+00	20	1200	1500	1800	236.4	236.7	237.1	
140	317+60	20	1200	1500	1800	237.5	237.8	238.2	
141	319+63	20	1200	1500	1800	239.4	239.8	240.2	

^a Recurrence interval

Table 6: Water-surface profile data for Kanes Creek

Section Number	Base-Line Station (feet)	Impervi- ousness (per cent)	Discharge, in cubic feet per second			Elevation, in feet			Remarks
			25-year ^a	50-year ^a	100-year ^a	25-year ^a	50-year ^a	100-year ^a	
101	0+00	20	2300	3000	3700	6.4	7.7	9.5	Mouth at Belmont Bay
102	6+65	20	2300	3000	3700	6.4	7.7	9.5	
103	11+16	20	2300	3000	3700	6.4	7.7	9.5	
104	15+90	20	2300	3000	3700	6.4	7.7	9.5	
105	21+07	20	2300	3000	3700	6.4	7.7	9.5	
106	25+98	20	2300	3000	3700	6.4	7.7	9.5	
107	30+88	20	2300	3000	3700	6.4	7.7	9.5	
108	34+40	20	2300	3000	3700	6.4	7.7	9.5	
109	39+05	20	2300	3000	3700	6.4	7.7	9.5	
110	46+85	20	2300	3000	3700	6.4	7.7	9.5	
111	49+15	15	1600	2100	2600	6.4	7.7	9.5	
112	53+49	15	1600	2100	2600	6.4	7.7	9.5	
113	57+38	15	1600	2100	2600	6.4	7.7	9.5	
114	60+67	15	1600	2100	2600	6.4	7.7	9.5	
115	63+57	15	1300	1600	2000	6.4	7.7	9.5	
116	66+40	15	1300	1600	2000	6.4	7.7	9.5	
117	68+15	15	1300	1600	2000	6.4	7.7	9.5	
118	69+26	15	1300	1600	2000	6.4	7.7	9.5	
119	70+50	15	1300	1600	2000	6.4	7.7	9.5	
120	72+33	15	1300	1600	2000	6.4	7.7	9.5	
121	76+28	15	1300	1600	2000	6.7	8.0	9.6	
Northern Branch Kanes Creek									
201	7+82	20	1100	1400	1700	6.4	7.7	9.5	Confluence with Kanes Creek
202	12+83	20	1100	1400	1700	6.4	7.7	9.5	
203	16+53	20	1100	1400	1700	6.4	7.7	9.5	
204	20+28	20	1100	1400	1700	6.4	7.7	9.5	

^a Recurrence interval

KANES CREEK & VICINITY BASINS

Table 6: Water-surface profile data for Kanes Creek - Continued

Section Number	Base-Line Station (feet)	Impervi- ousness (per cent)	Discharge, in cubic feet per second			Elevation, in feet			Remarks
			25-year ^a	50-year ^a	100-year ^a	25-year ^a	50-year ^a	100-year ^a	
Southern Branch Kanes Creek									
301	2+30	15	500	700	800	6.4	7.7	9.5	Confluence with Kanes Creek
302	5+60	15	500	700	800	6.4	7.7	9.5	
303	8+24	15	500	700	800	6.4	7.7	9.5	
304	10+38	15	500	700	800	6.4	7.7	9.5	

^a Recurrence interval

Table 7: Water-surface profile data for Racoon Creek

Section Number	Base-Line Station (feet)	Impervi- ousness (per cent)	Discharge, in cubic feet per second			Elevation, in feet			Remarks
			25-year ^a	50-year ^a	100-year ^a	25-year ^a	50-year ^a	100-year ^a	
1	4+00	15	1300	1600	2000	6.4	7.7	9.5	Mouth at Potomac River
2	8+05	15	1300	1600	2000	6.4	7.7	9.5	
3	11+73	15	1300	1600	2000	6.4	7.7	9.5	
4	14+93	15	1300	1600	2000	6.4	7.7	9.5	
5	18+63	15	1300	1600	2000	6.6	7.8	9.5	
6	21+29	15	1300	1600	2000	7.0	8.0	9.6	
7	24+25	15	1300	1600	2000	8.4	9.0	10.2	
8	25+68	15	1300	1600	2000	9.3	9.8	10.7	
9	27+57	15	1300	1600	2000	10.0	10.4	11.2	
10	29+41	15	1300	1600	2000	11.2	11.6	12.3	
11	31+10	15	1300	1600	2000	12.0	12.4	12.9	
12	31+95	15	700	900	1200	12.3	12.7	13.2	
13	34+67	15	700	900	1200	13.1	13.5	14.0	
Racoon Creek tributary									
101	0+46	15	600	800	1000	12.3	12.7	13.2	Confluence with Racoon Creek
102	1+78	15	600	800	1000	12.5	12.9	13.4	
103	3+60	15	600	800	1000	13.4	13.8	14.2	
104	5+45	15	600	800	1000	14.7	15.2	15.6	

^a Recurrence interval

KANES CREEK & VICINITY
Table 8: Water-surface profile data for Thompson Creek

Section Number	Base-Line Station (feet)	Impervi- ousness (per cent)	Discharge, in cubic feet per second			Elevation, in feet			Remarks
			25-year ^a	50-year ^a	100-year ^a	25-year ^a	50-year ^a	100-year ^a	
1	0+00	15	1600	2100	2500	6.4	7.7	9.5	Mouth at Belmont Bay
2	6+14	15	1600	2100	2500	6.4	7.7	9.5	
3	11+62	15	1600	2100	2500	6.4	7.7	9.5	
4	16+75	15	1600	2100	2500	6.4	7.7	9.5	
5	21+20	15	1600	2100	2500	6.8	7.9	9.6	
6	25+90	15	1500	1800	2300	8.7	8.9	9.9	
7	29+50	15	1500	1800	2300	9.7	9.9	10.4	
8	32+52	15	1500	1800	2300	10.7	10.9	11.2	
9	35+52	15	1500	1800	2300	13.1	13.3	13.6	
10	37+84	15	1500	1800	2300	14.8	15.0	15.3	
11	40+25	15	1500	1800	2300	16.0	16.2	16.5	
12	42+42	15	1500	1800	2300	17.9	18.2	18.5	
13	44+75	15	1500	1800	2300	20.3	20.6	20.9	
14	46+65	15	1500	1800	2300	22.2	22.4	22.8	

^a Recurrence interval

Special Hydraulic Conditions

Special hydraulic conditions are discussed, beginning with the Occoquan River.

1. Occoquan River flood-profile computations were begun at Occoquan Bay using stage elevations interpreted from historic data for 25-, 50-, and 100-year peak discharges on the Potomac River.
2. Flood-profile computations were begun at Belmont Bay using stage elevations interpreted from historic data for 25-, 50-, and 100-year peak discharges on the Potomac River. Step backwater computations indicated a level profile for Massey Creek.
3. Service station was constructed on fill placed on left bank below U.S. Route 1 and was considered in profile computations; the area was not remapped.
4. The effect of storage above U.S. 95 and above the U.S. Government Railroad was considered. The flood discharges were routed through considering the storage, and upstream flood profile elevations were reduced accordingly. No discharge reductions were made below either impoundment.
5. Profiles for the June 21-22, 1972 flood were compared with computed profiles for 25-, 50-, and 100-year recurrence interval floods, and was found generally to lie between the computed 25- and 50-year profiles. No significant channel changes resulted from the flood, with the exception of the U.S. Government Railroad where the partial collapse of the arch culvert reduced the culvert capacity.

Flood profiles (figs. 3-11) are included in this report presenting graphically those water-surface profiles computed for the 25-year and 100-year floods and the channel bed profile along the thalweg of the stream. The 25-year flood profile was omitted in cases where it is very close to the 100-year profile and showing both would cause confusion. No profile was drawn for Kanes Creek because the profile is flat throughout the reach of channel studied.

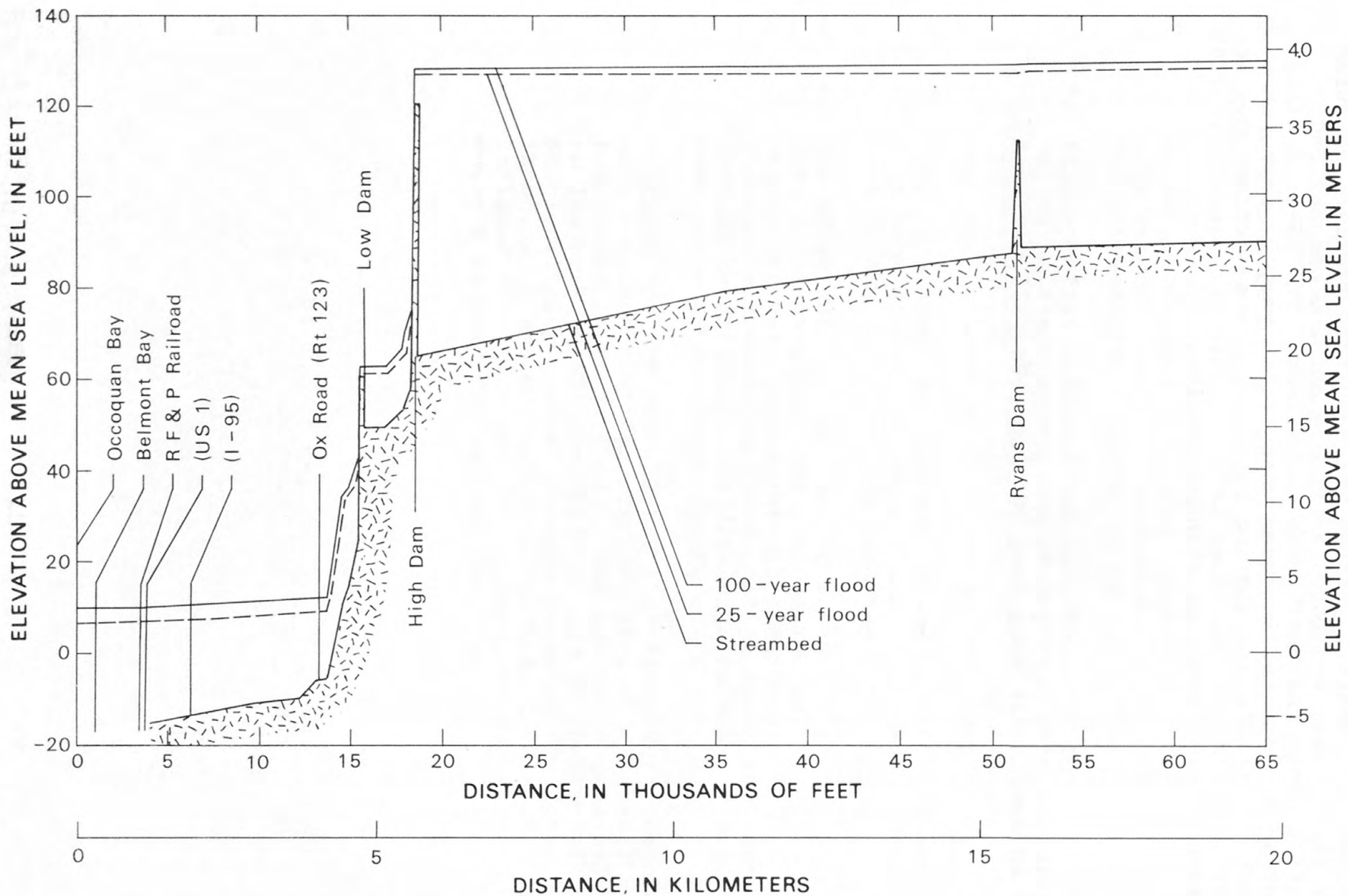


Figure 3. Flood profiles for 25-year and 100-year recurrence interval discharges, Occoquan River, mouth to Bull Run.

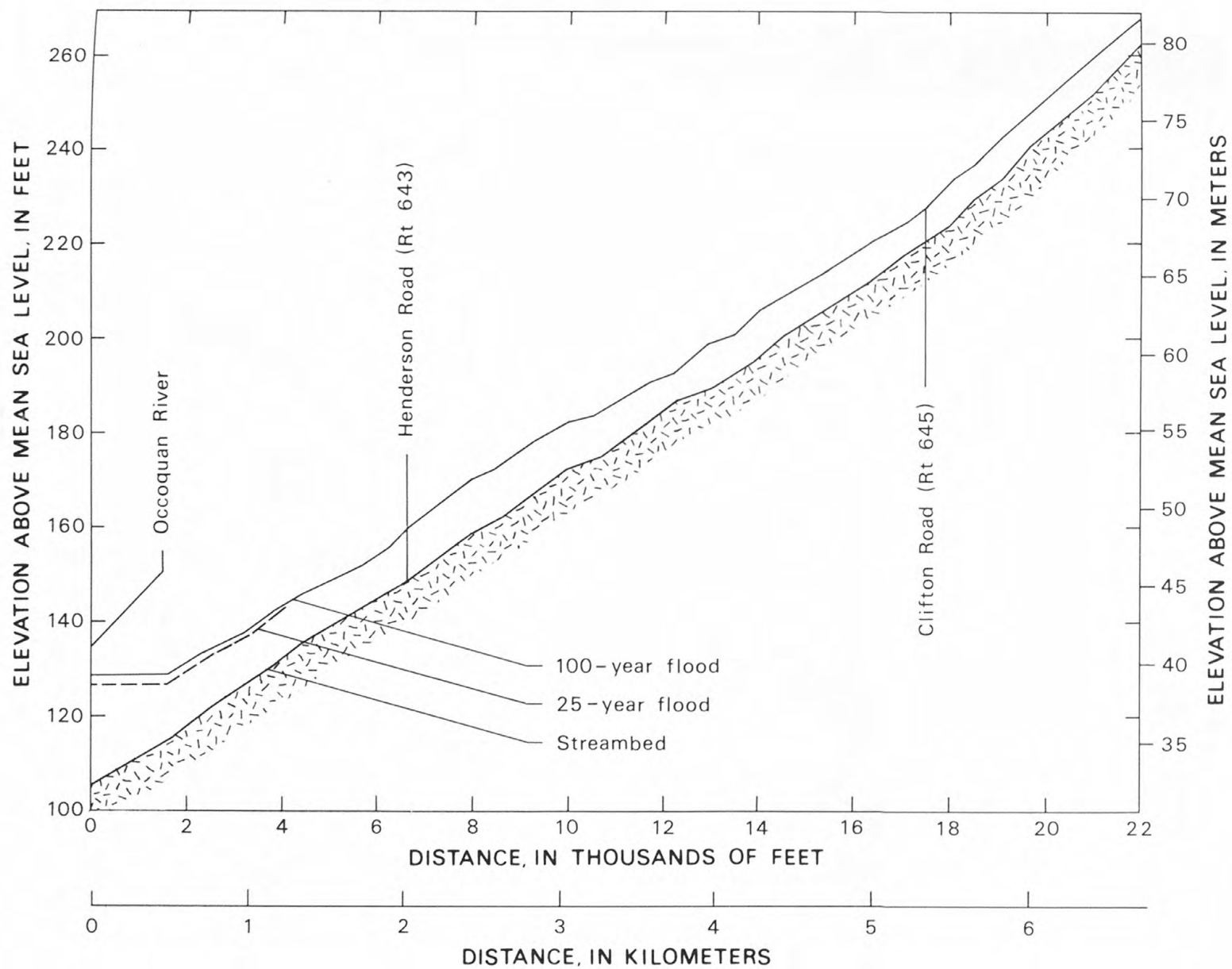
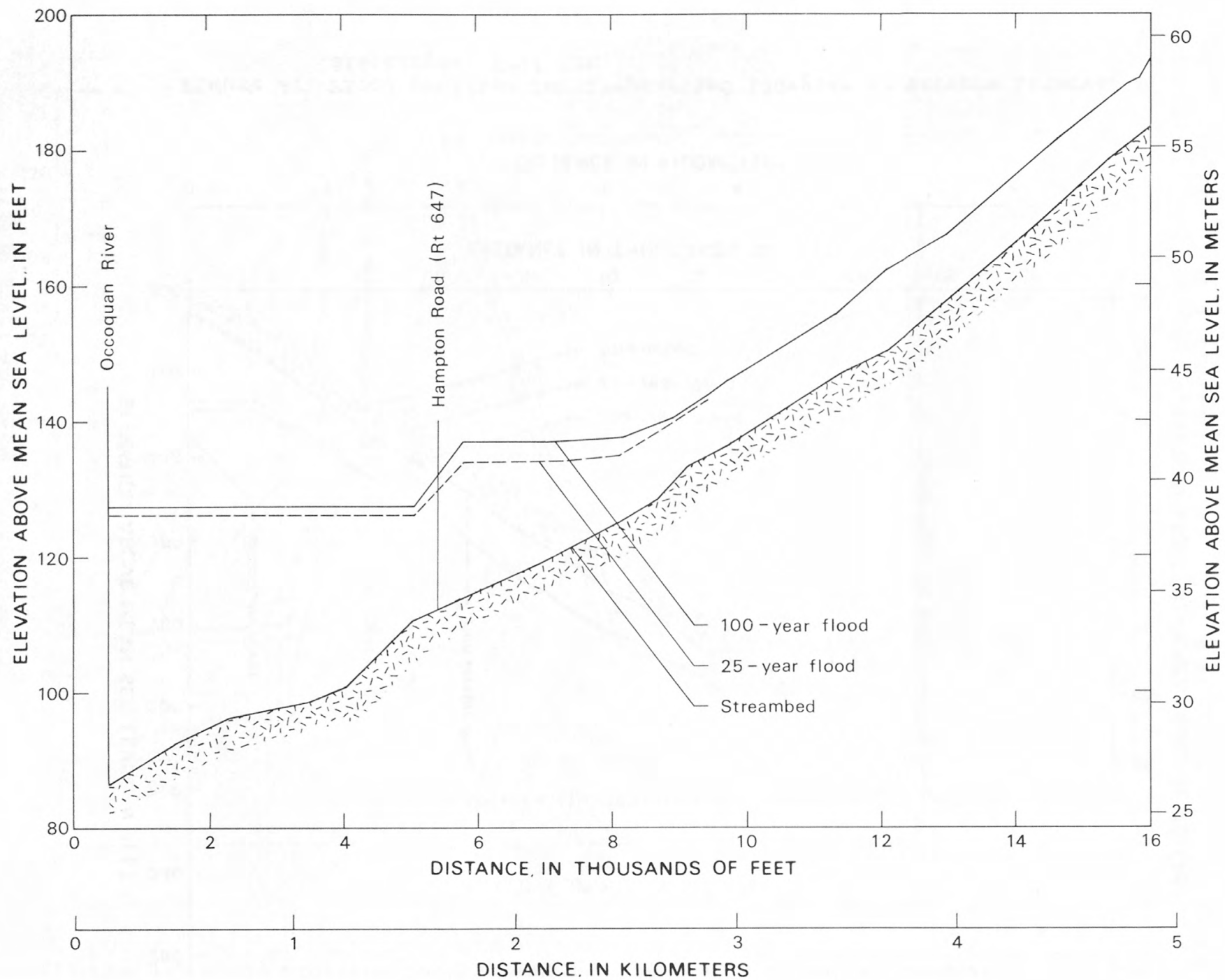


Figure 4. Flood profiles for 25-year and 100-year recurrence interval discharges, Wolf Run.



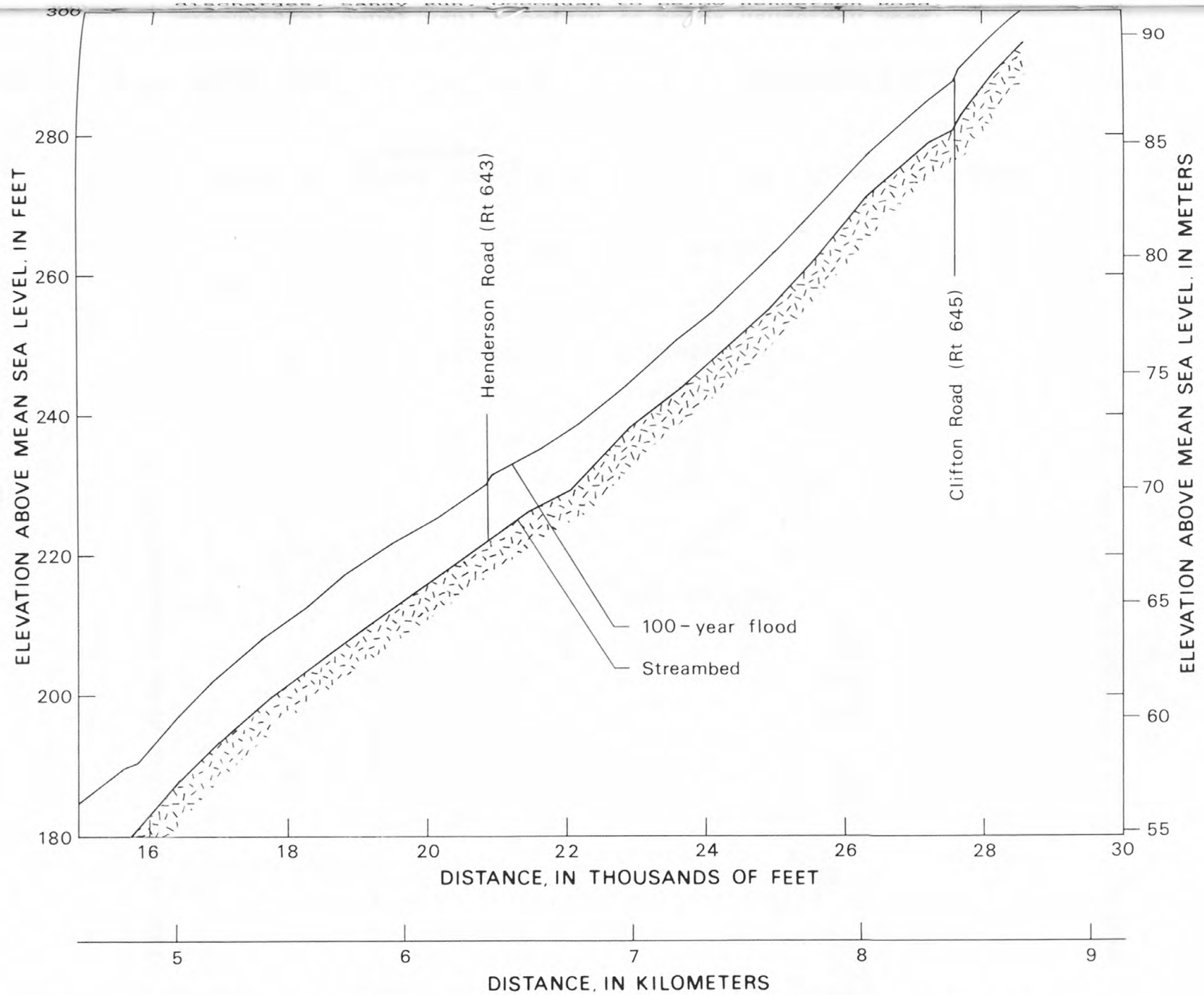


Figure 6. Flood profiles for 25-year and 100-year recurrence interval discharges, Sandy Run, below Henderson Road to above Clifton Road.

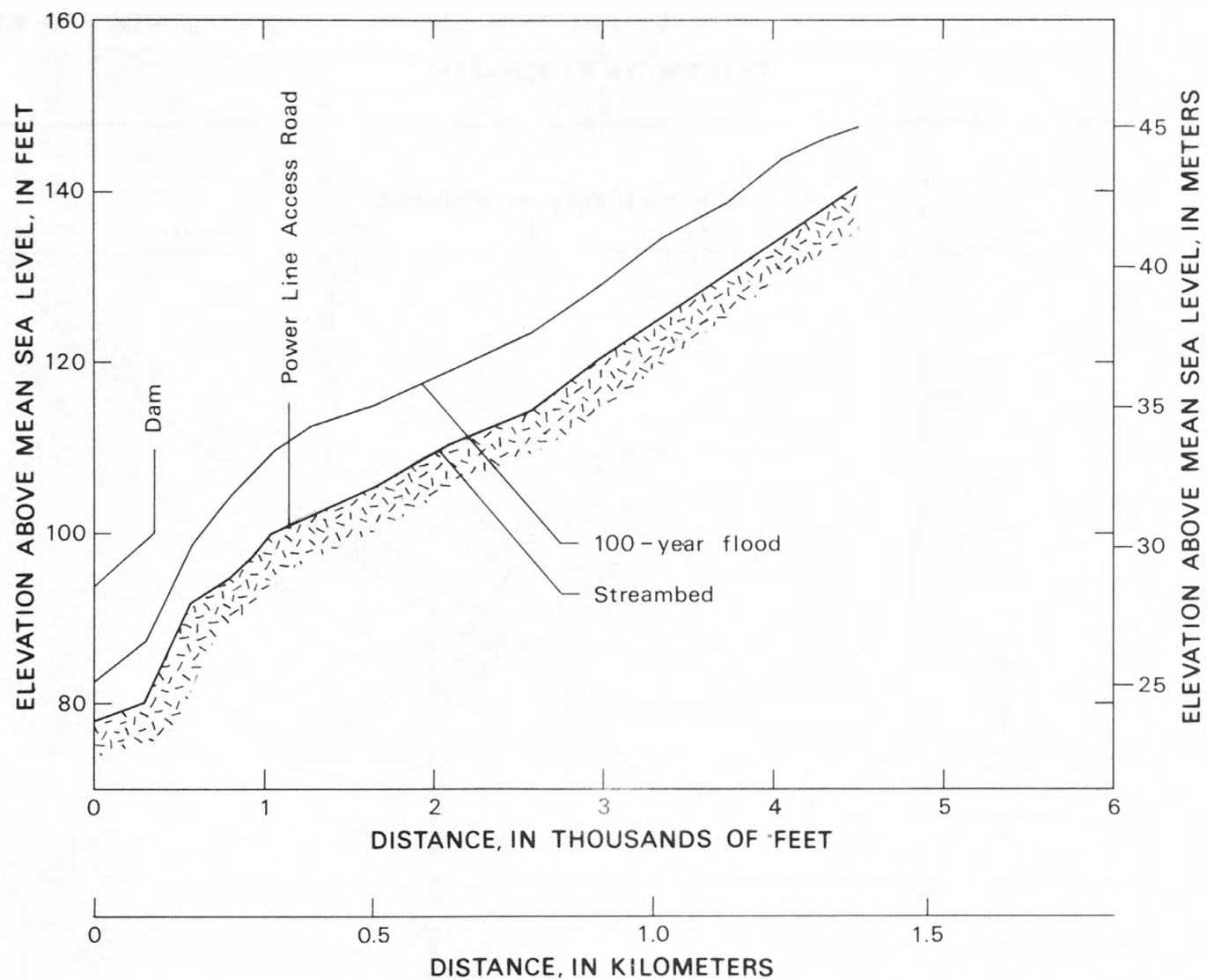


Figure 7. Flood profiles for 25-year and 100-year recurrence interval discharges, Elk Horn Run.

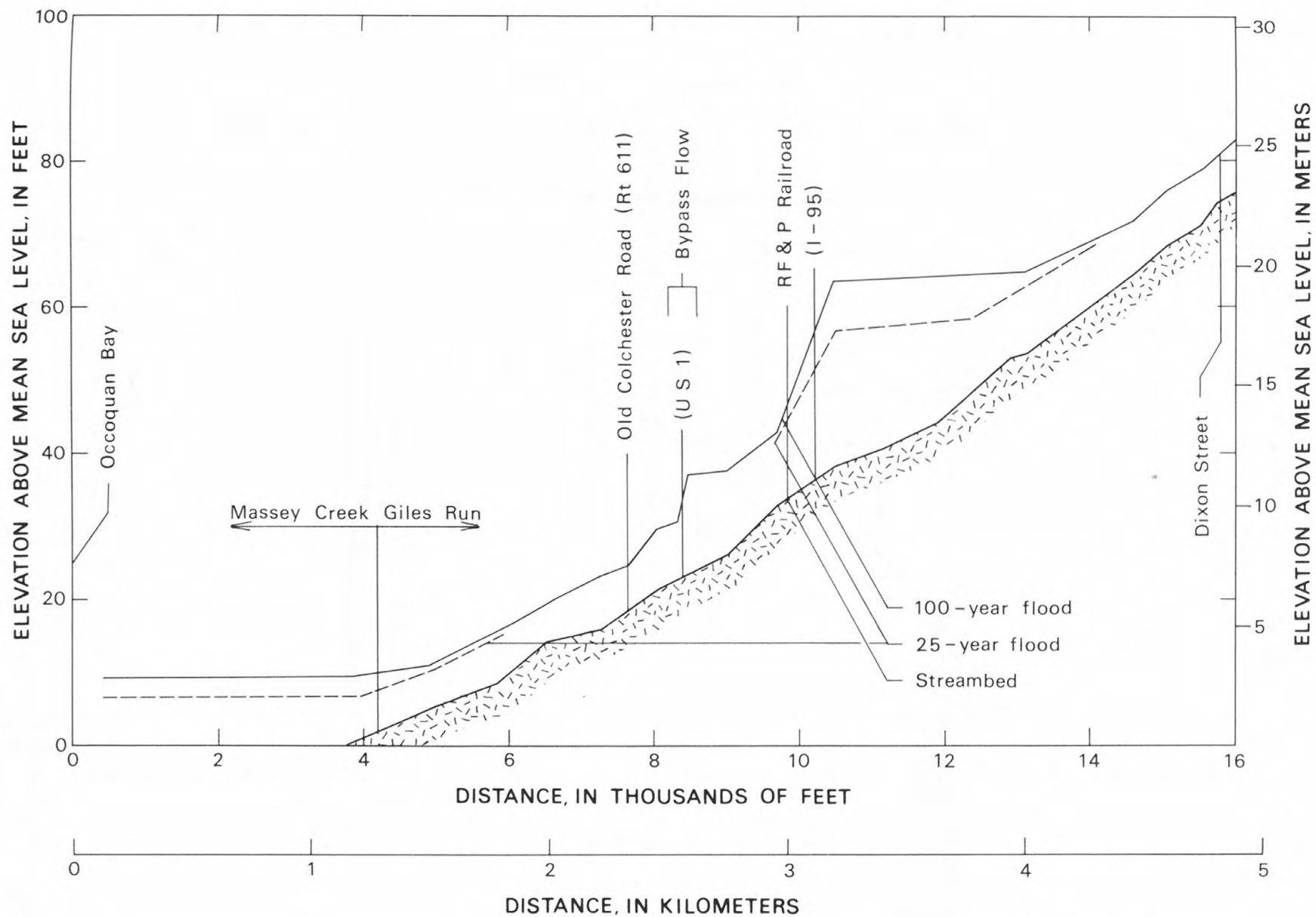


Figure 8. Flood profiles for 25-year and 100-year recurrence interval discharges, Giles Run, Occoquan Bay to Dixon Street.

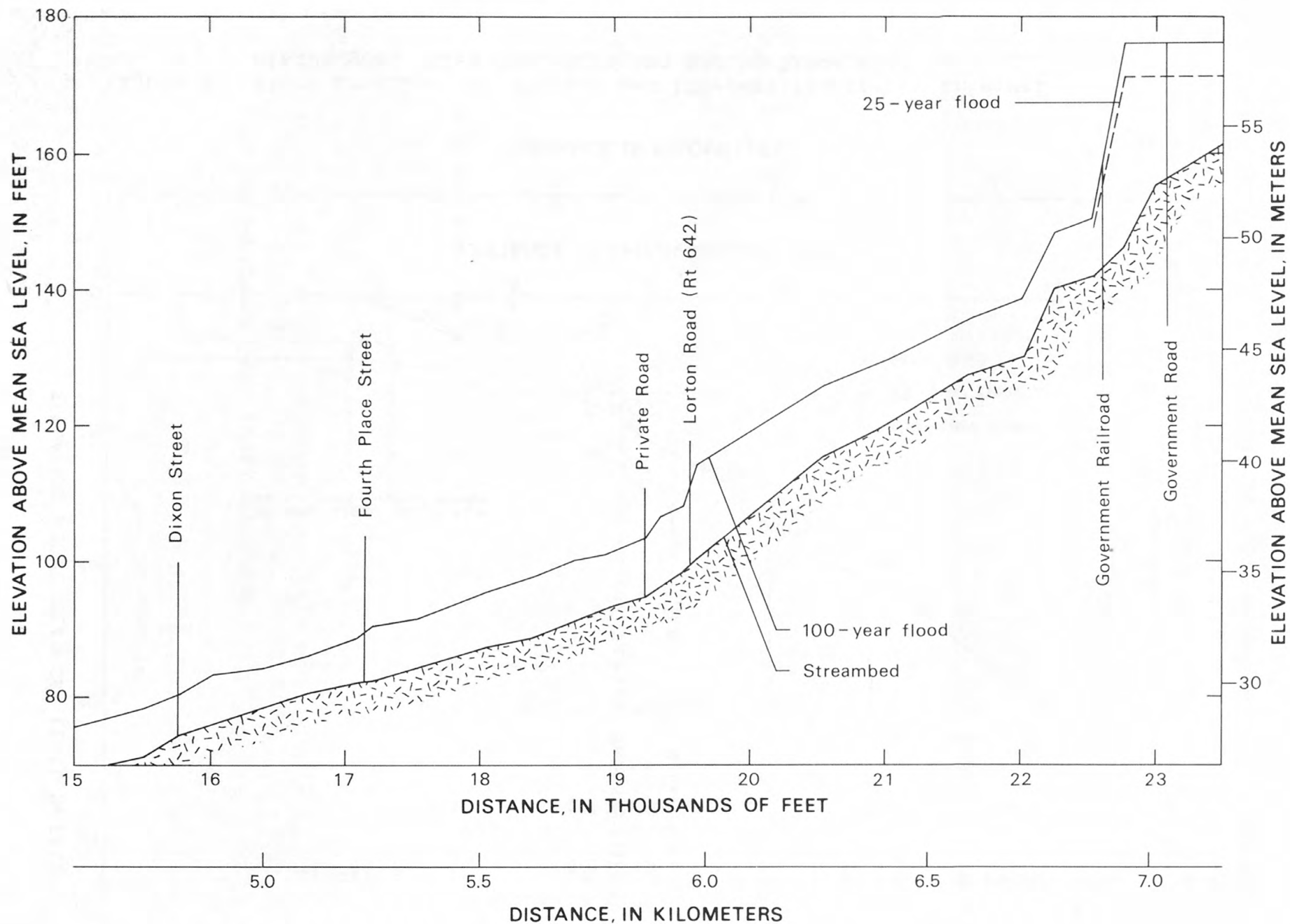


Figure 9. Flood profiles for 25-year and 100-year recurrence interval discharges, Giles Run, Dixon Street to Government Road.

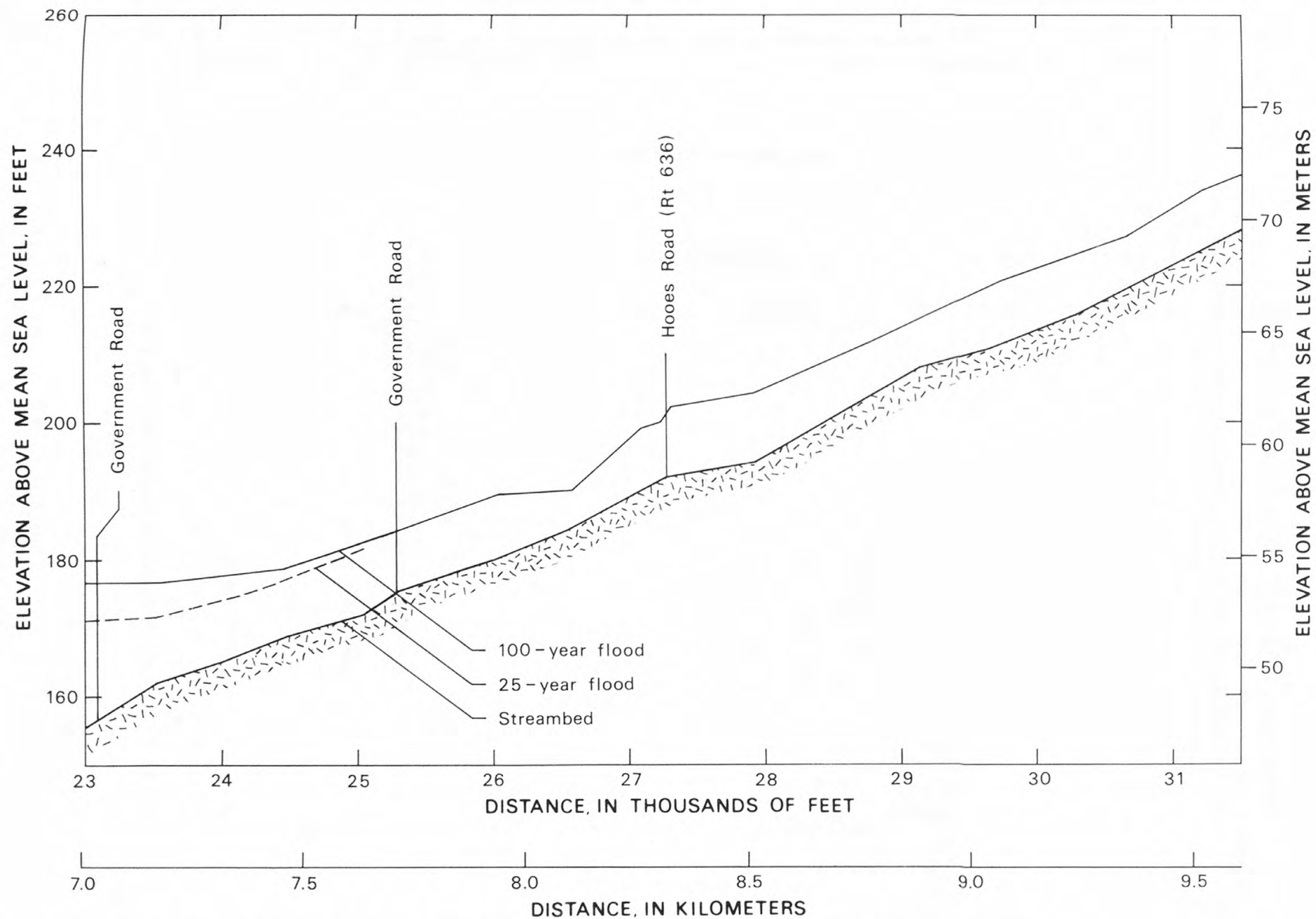


Figure 10. Flood profiles for 25-year and 100-year recurrence interval discharges, Giles Run, Government Road to above Hooes Road.

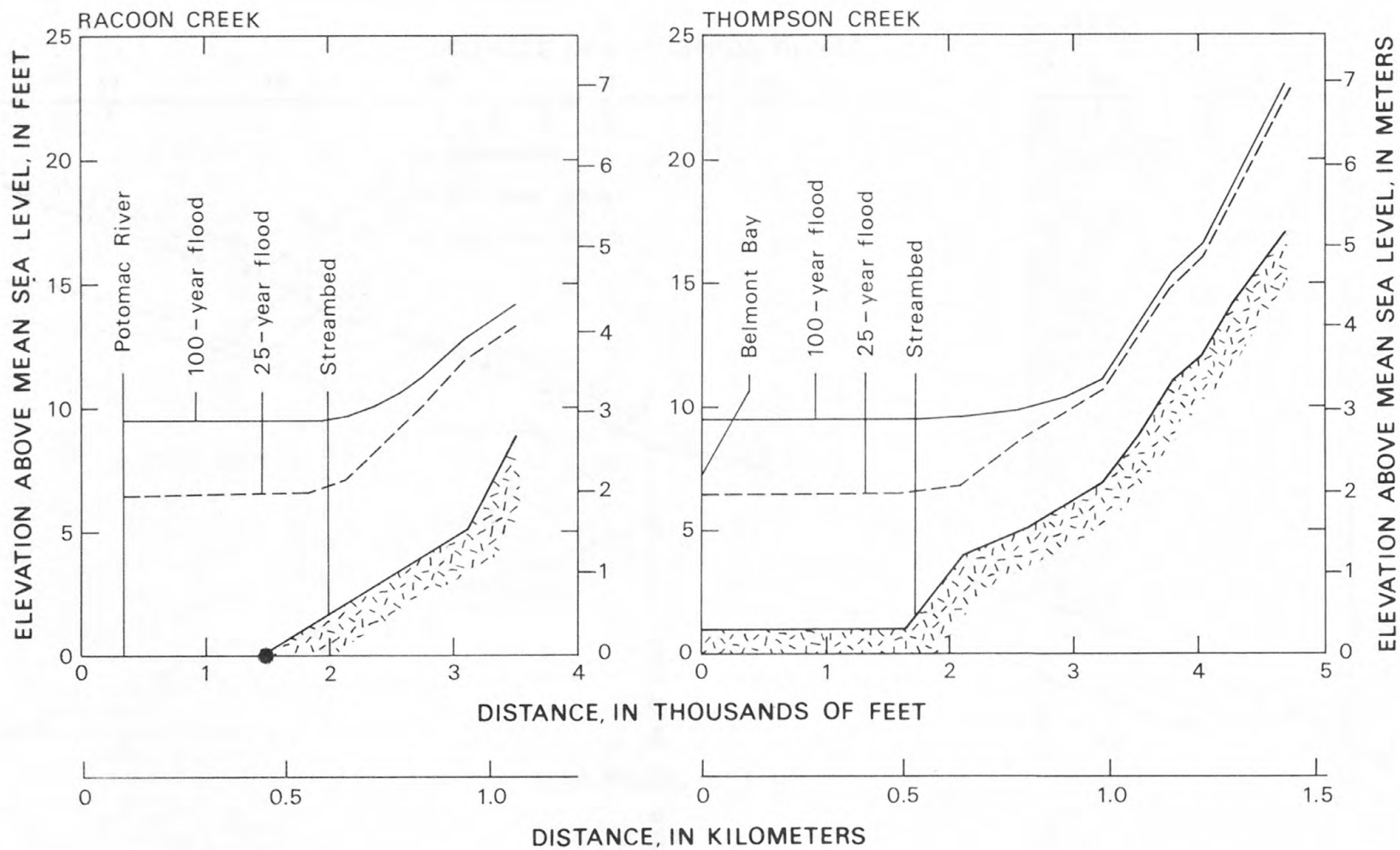


Figure 11. Flood profiles for 25-year and 100-year recurrence interval discharges, Racoon Creek and Thompson Creek.

FLOOD-PLAIN DELINEATION

Boundaries for 25-year, 50-year, and 100-year floods, assuming ultimate development, are delineated on 74 special large scale maps that were reduced to page size for this report (figs. 13-86). Copies of the maps at original scale of 1 inch (2.54 cm) equals 100 feet (30.5 m) can be obtained from Fairfax County. Figure 12 is the index of sheets for southwestern basins.

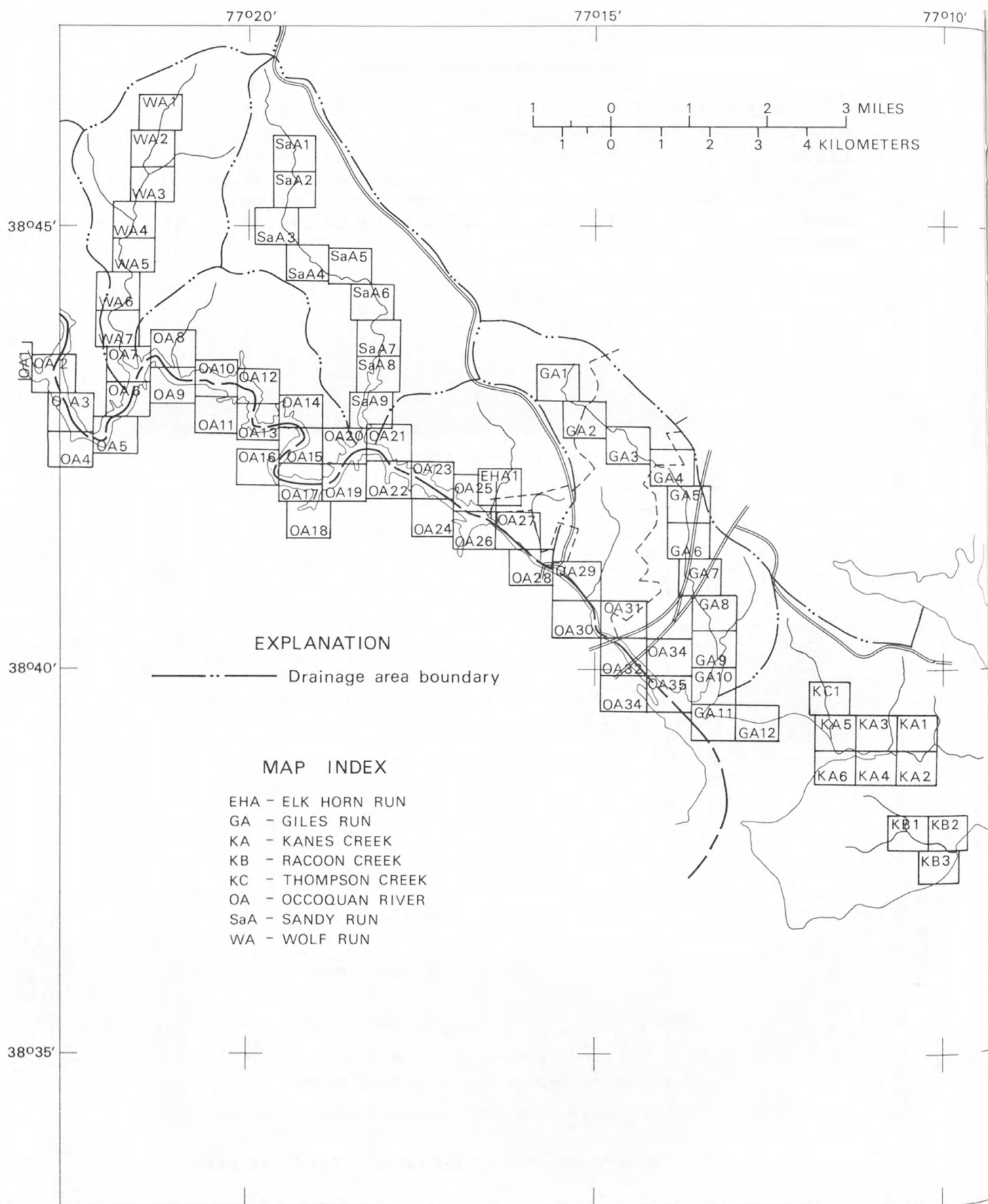


Figure 12. Index of flood maps.

DELINEATION OF FLOOD AREAS

Flood-plain delineation by U.S. Geological Survey in cooperation with the County of Fairfax as a part of a study of urbanization effects upon flood discharges.

Topography from aerial photographs, taken in 1963 and 1970, have a 250-foot grid based on Virginia coordinate system north zone.

Maps compiled by photogrammetric methods. Control and photogrammetric surveys are in accordance with National Map Accuracy Standards.

SYMBOLS

●	MANHOLE
—●—	UTILITY POLE
—X—X—X—	FENCE
— · — · — · —	STREAM
⊠	TRANSMISSION TOWER
---25---	FLOOD-DELINEATION LINE AND RECURRENCE INTERVAL

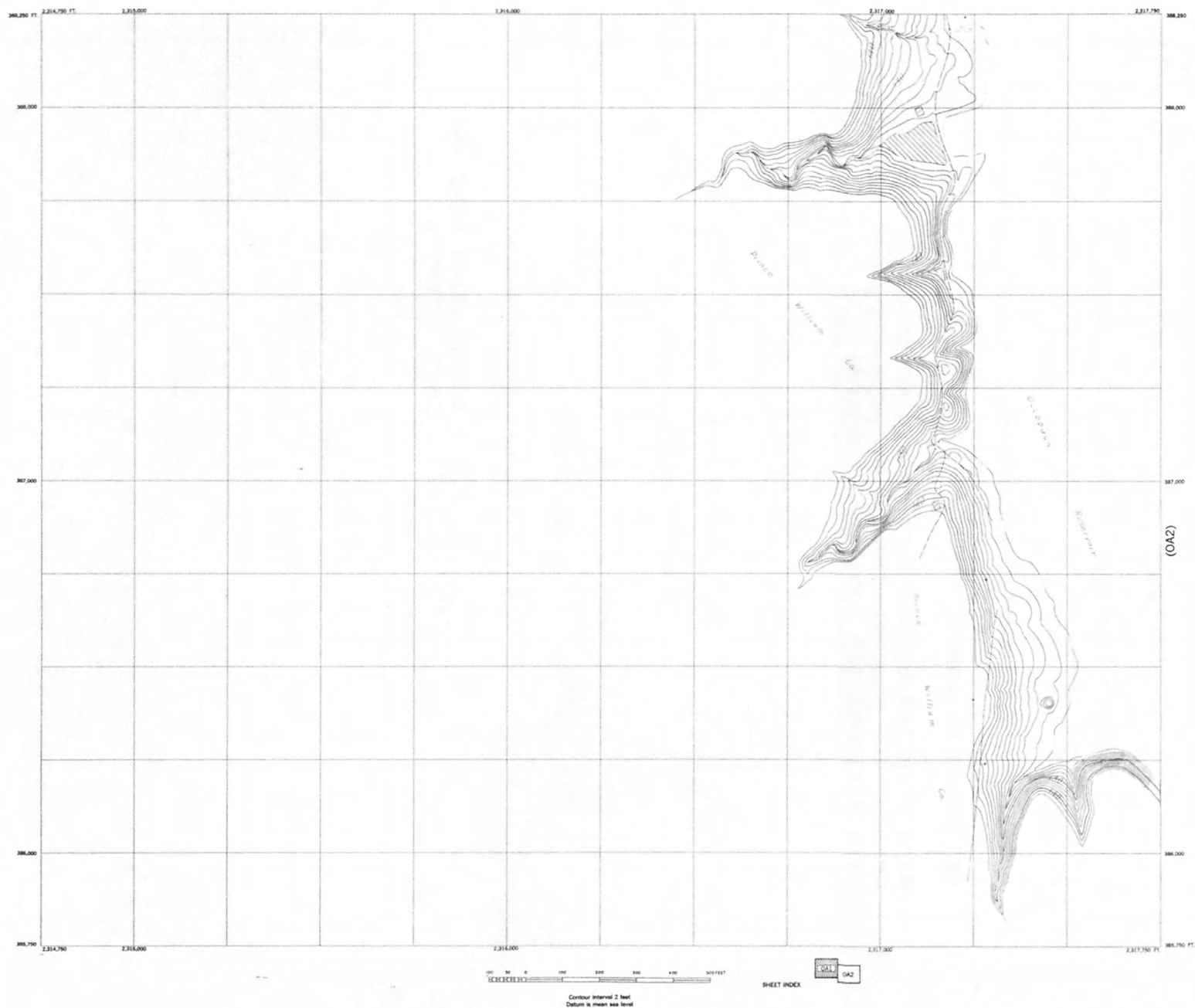


Figure 13. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-1

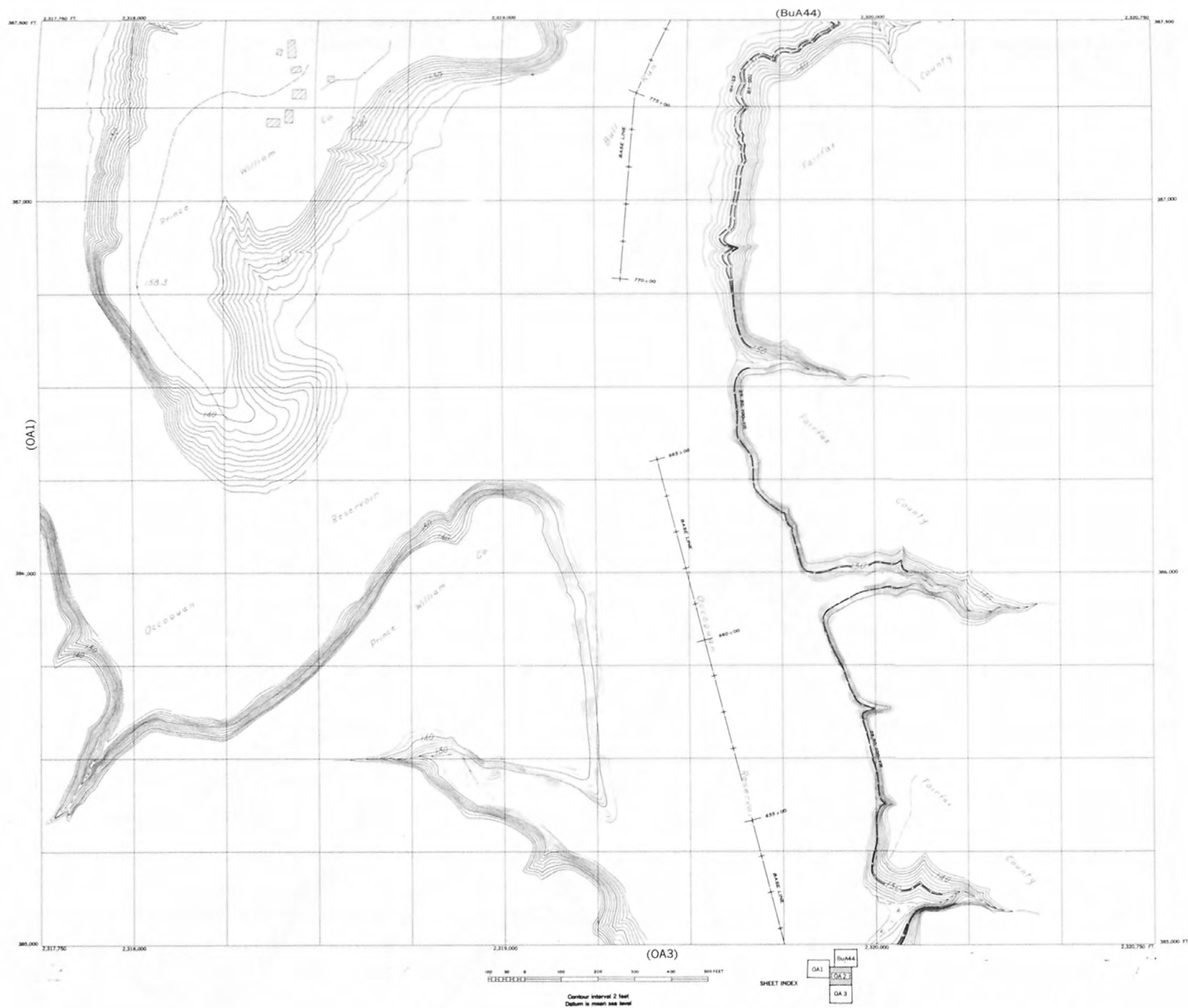


Figure 14. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-2

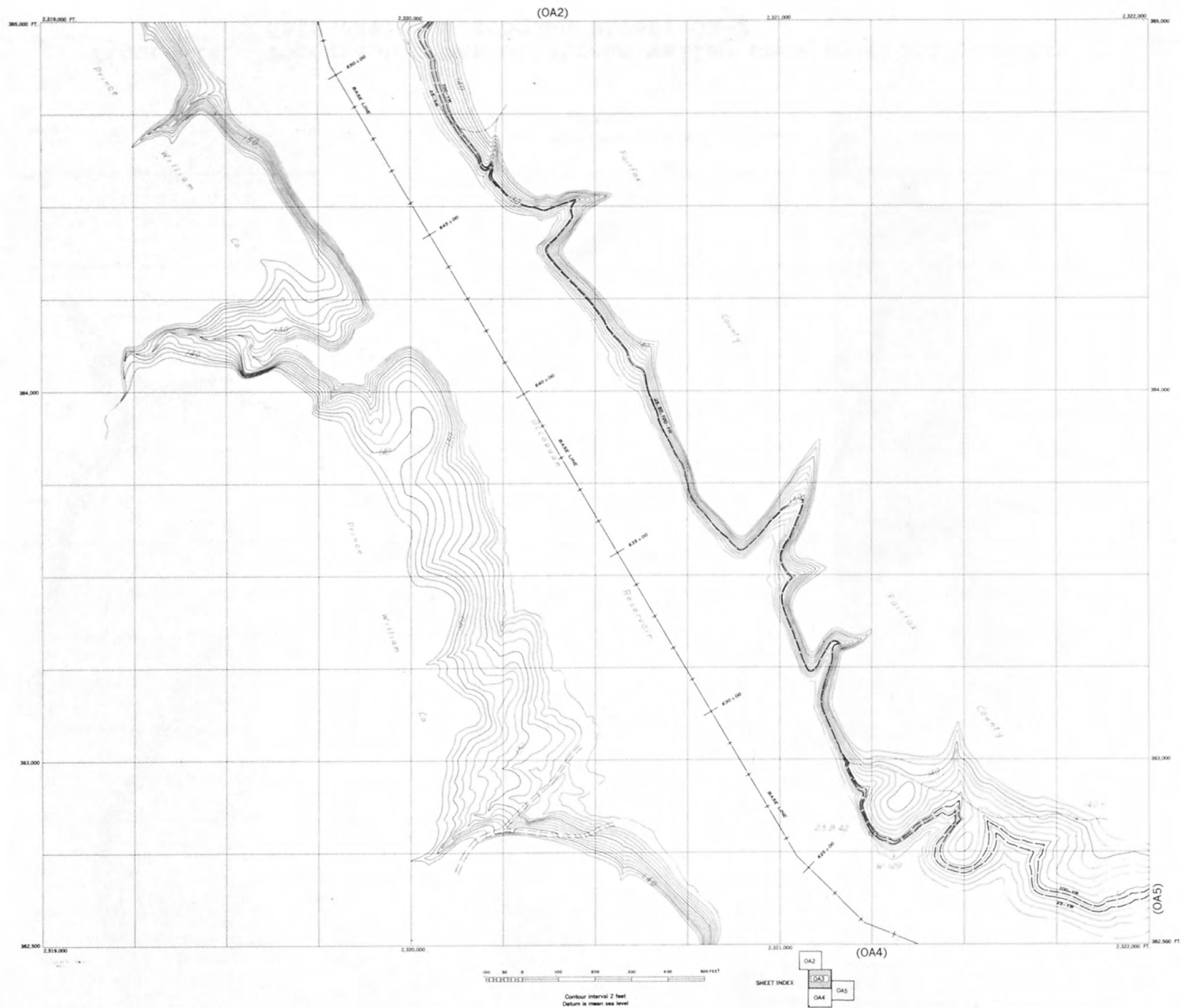


Figure 15. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-3

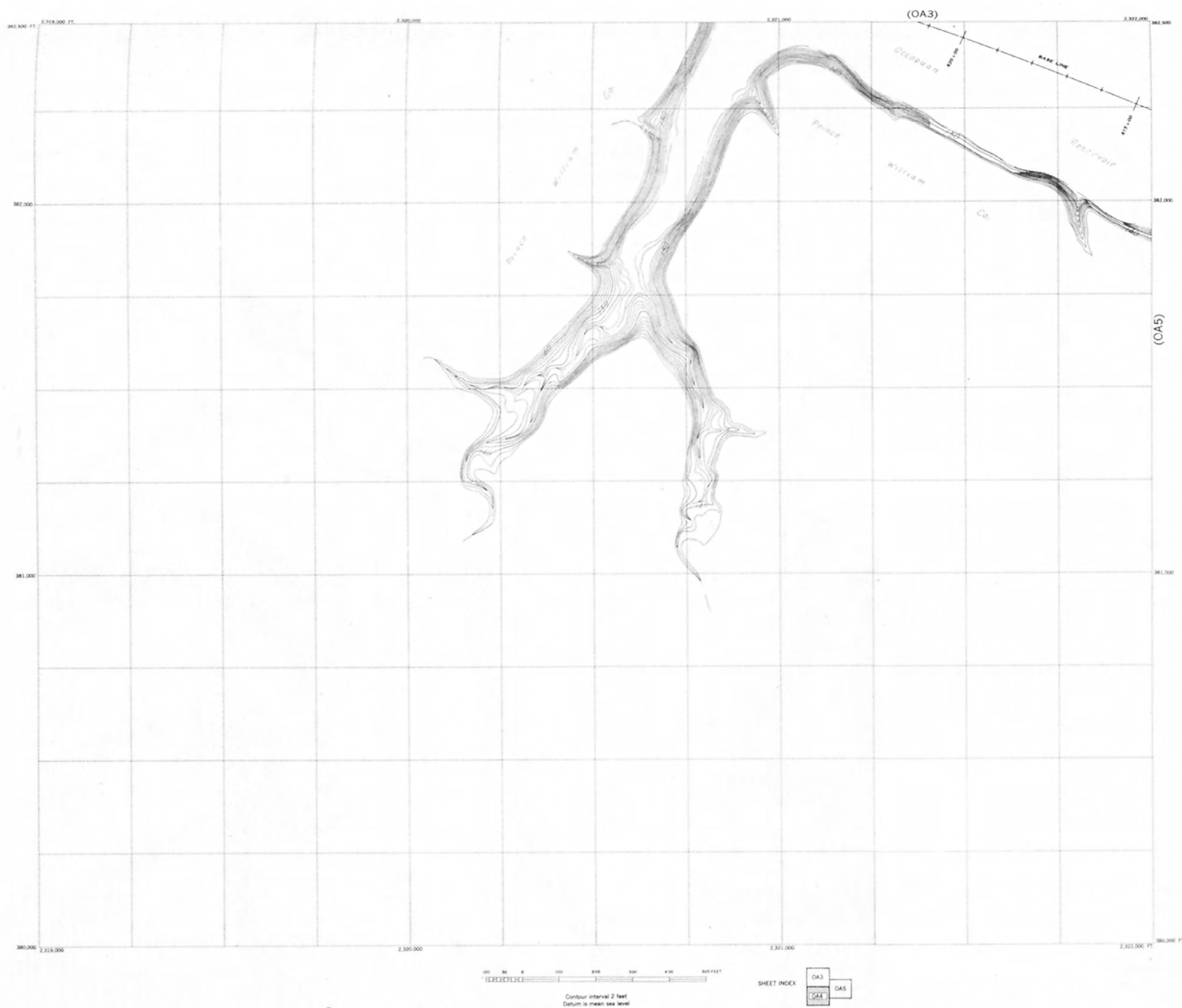
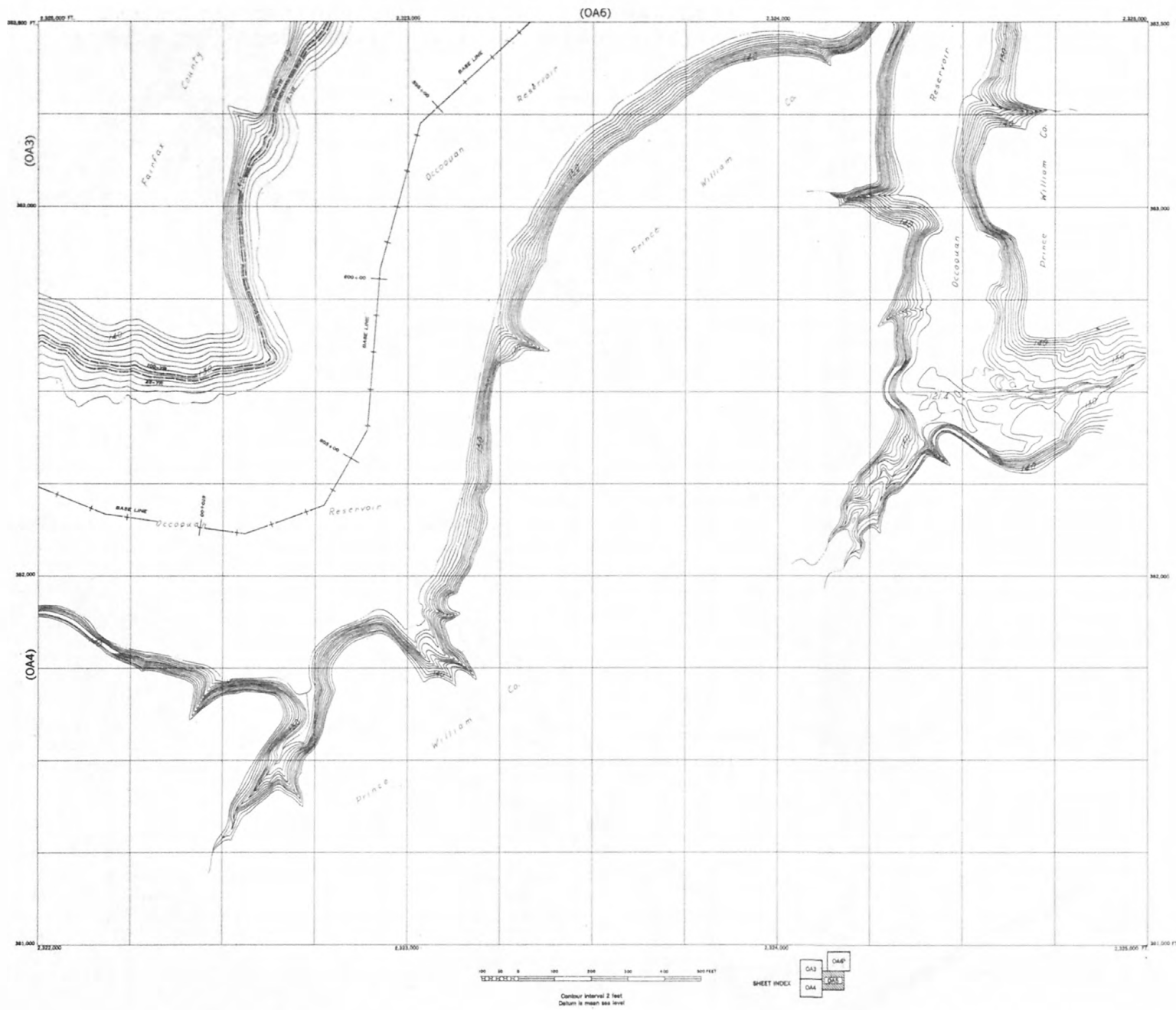


Figure 16. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-4



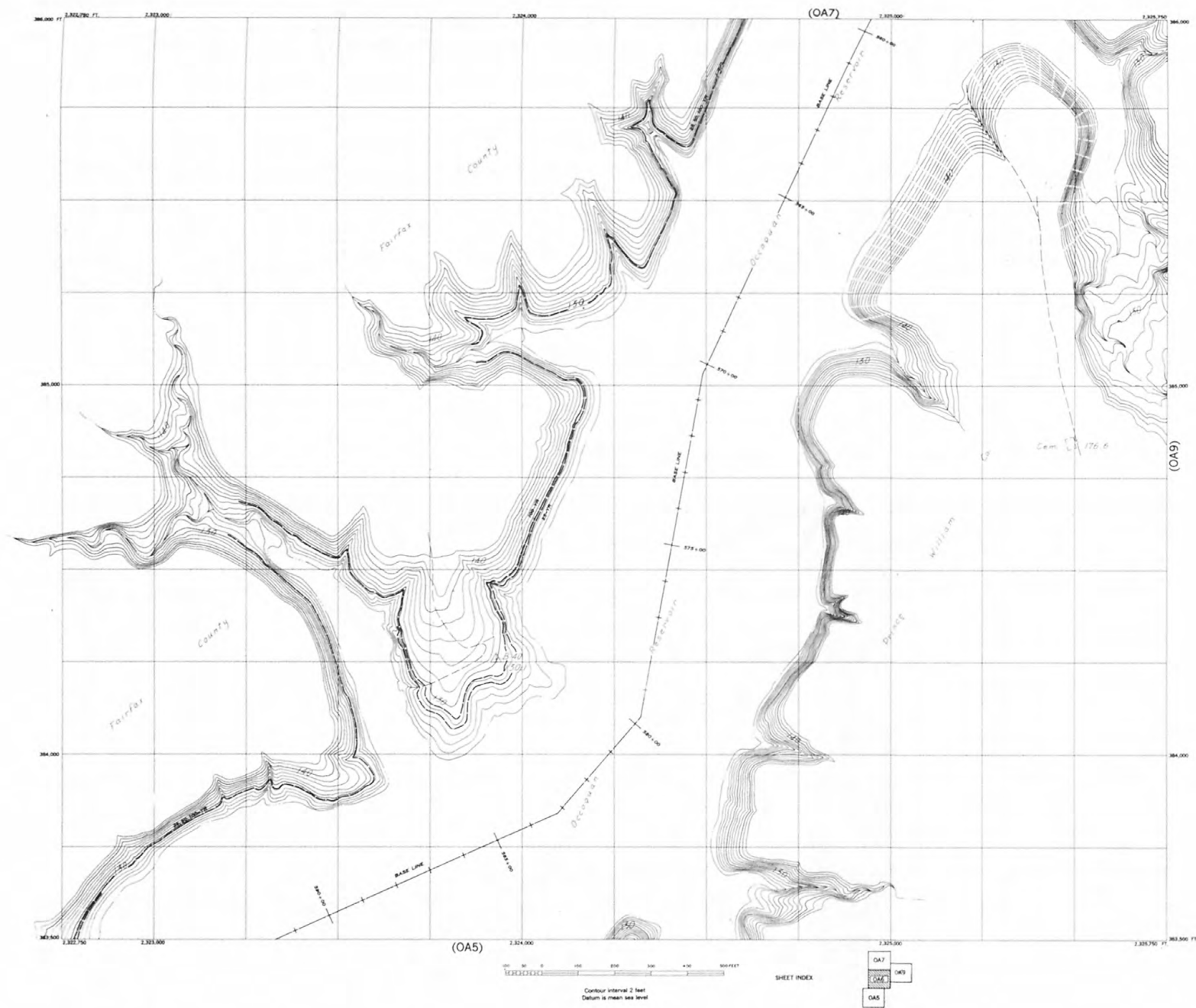


Figure 18. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-6

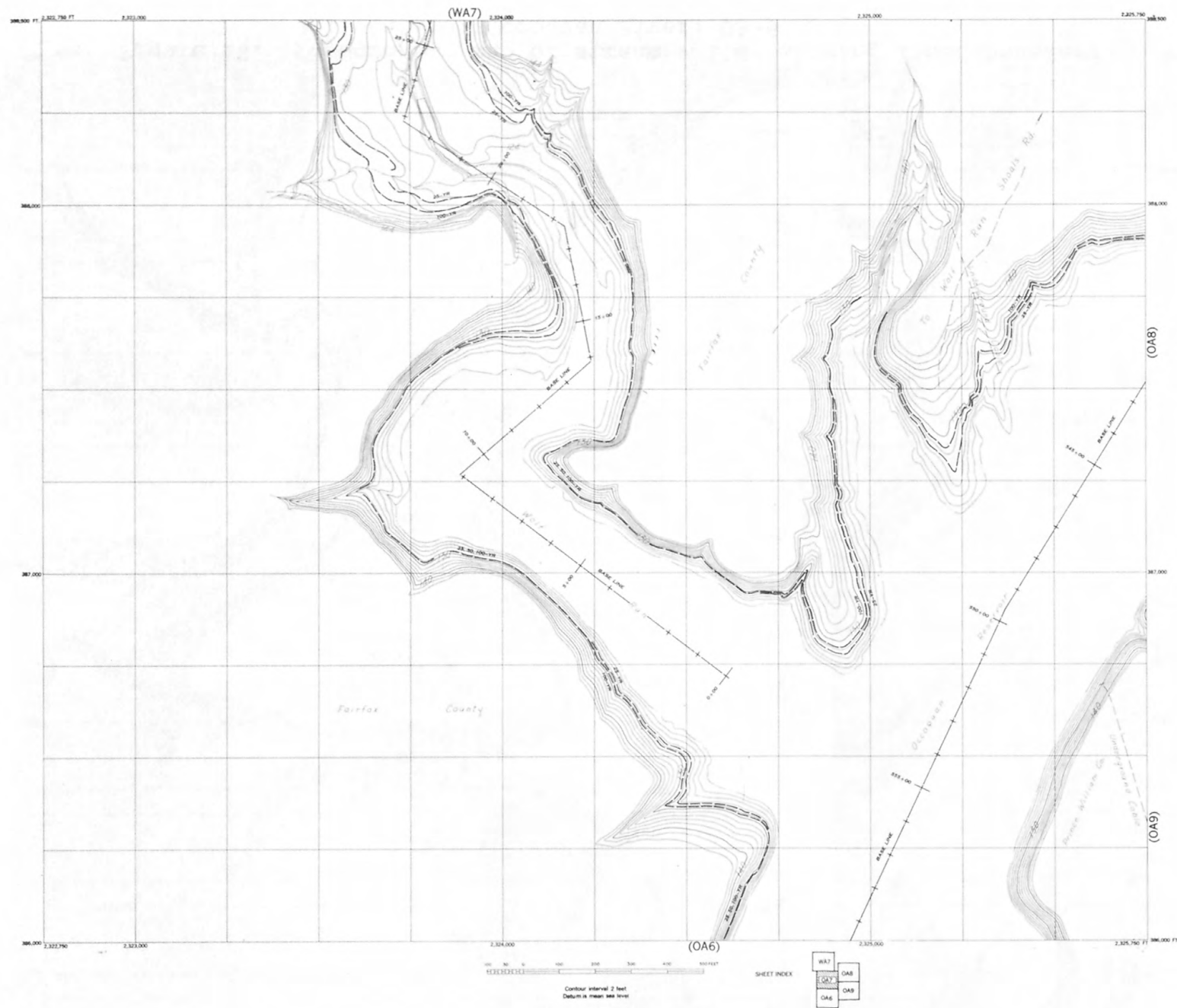


Figure 19. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-7

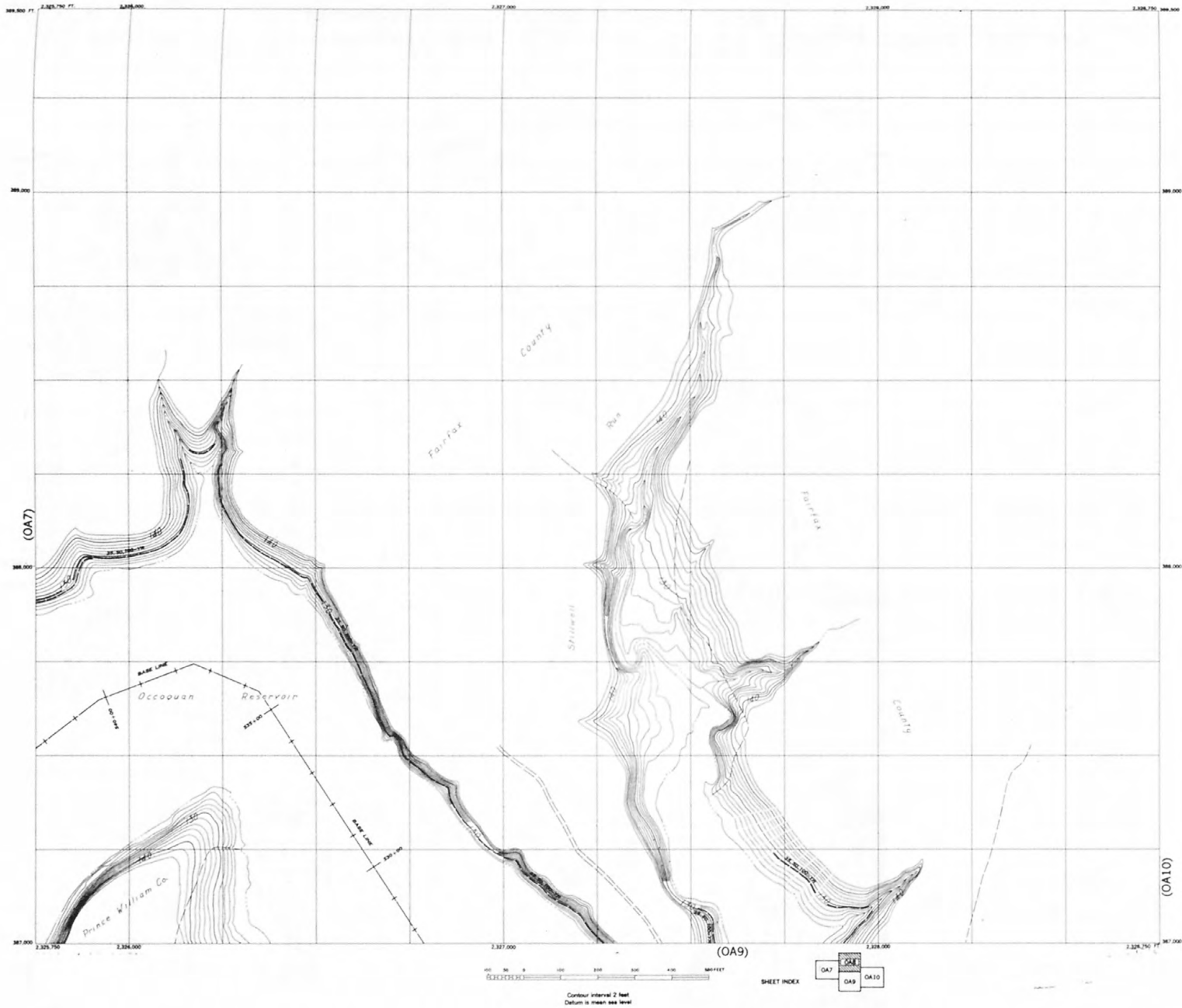


Figure 20. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-8

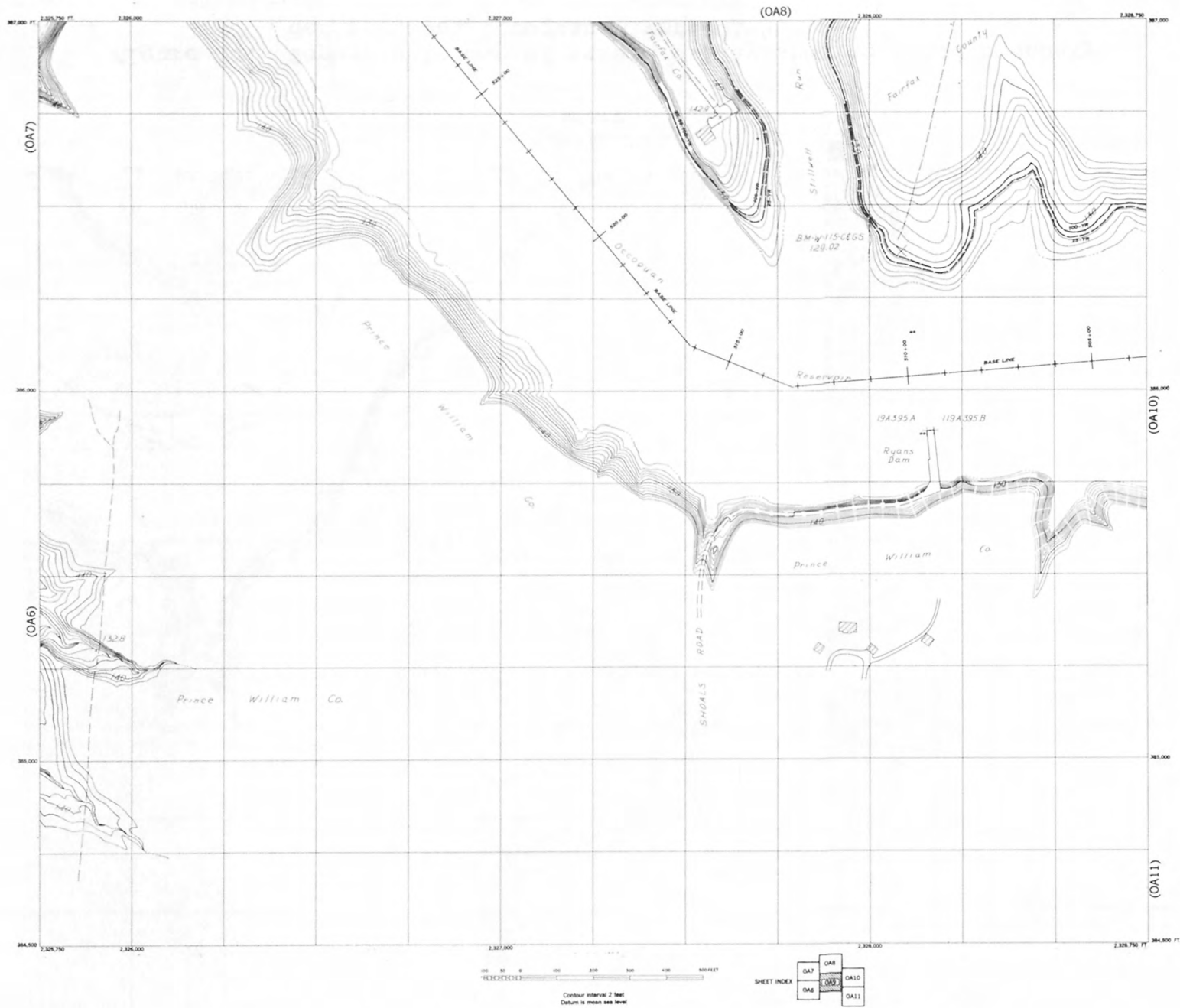


Figure 21. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-9

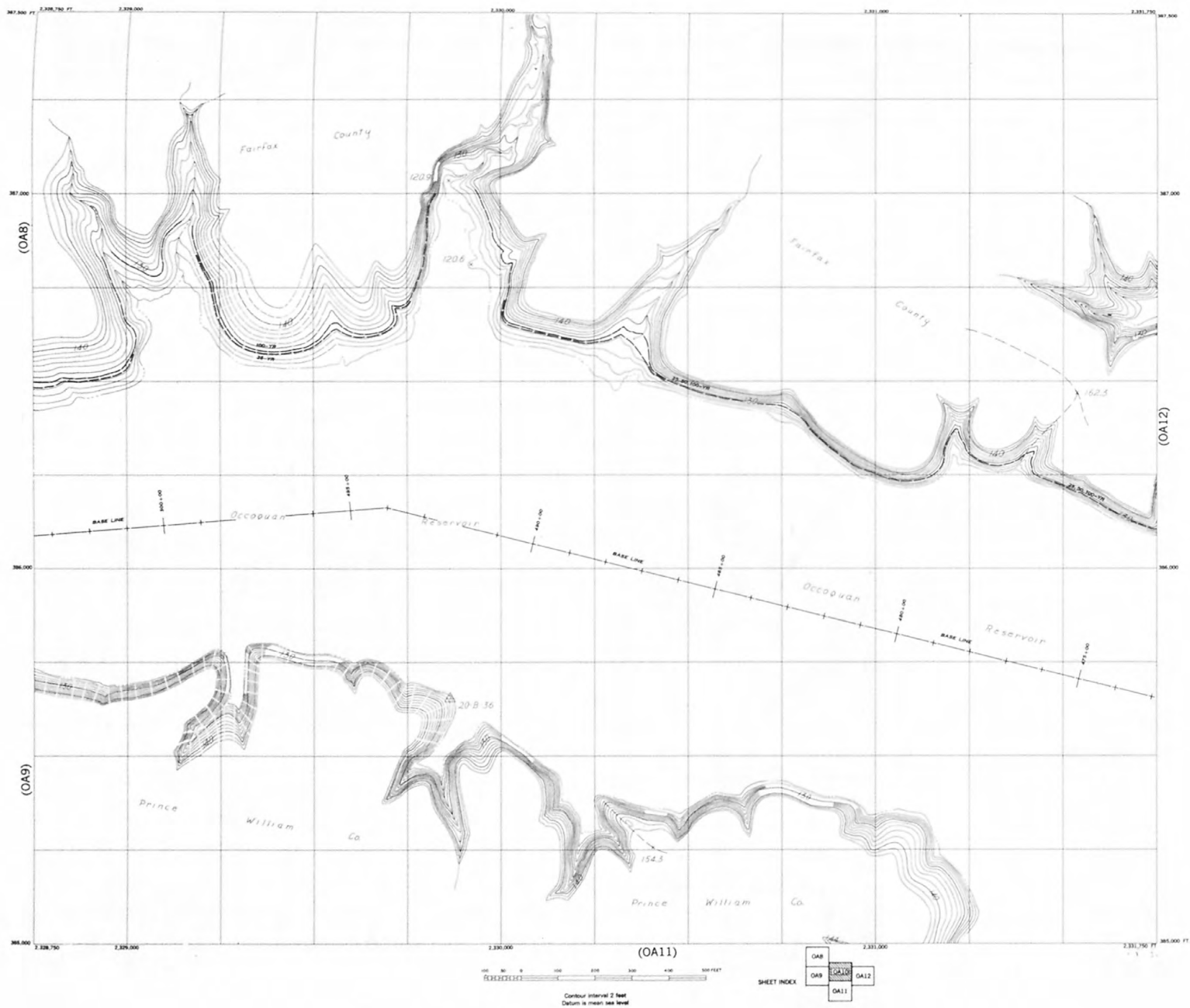


Figure 22. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-10

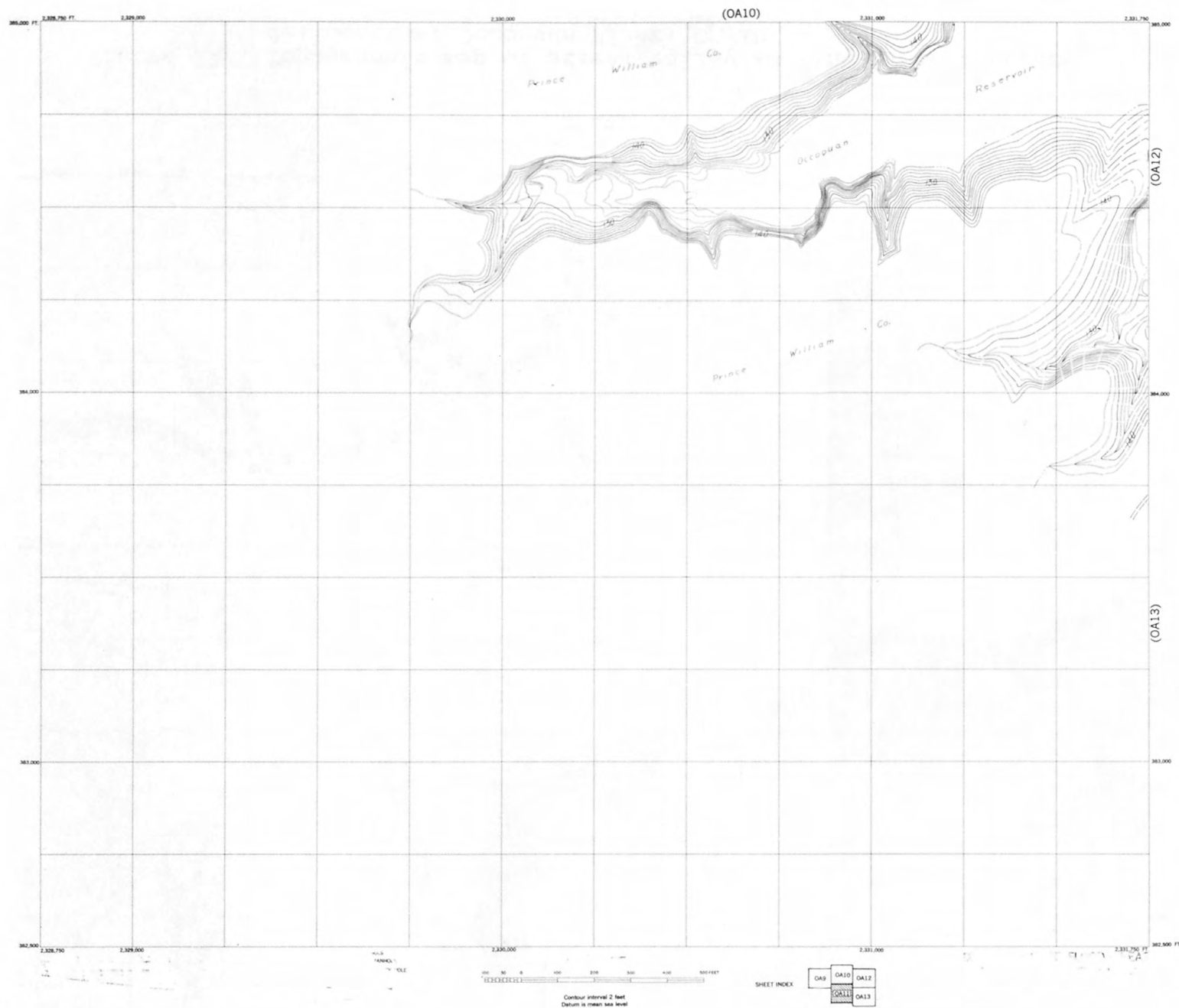


Figure 23. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-11

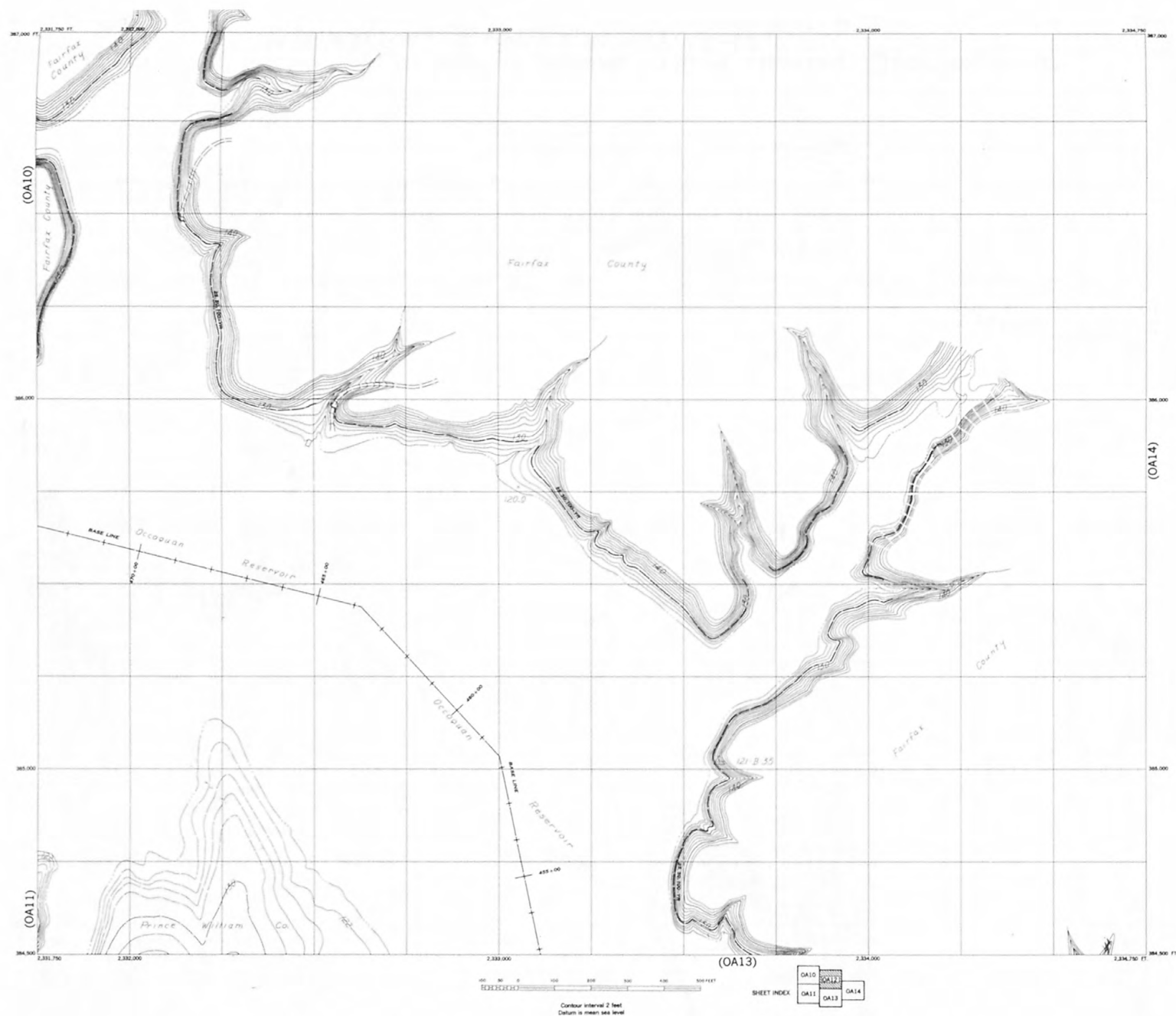


Figure 24. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-12

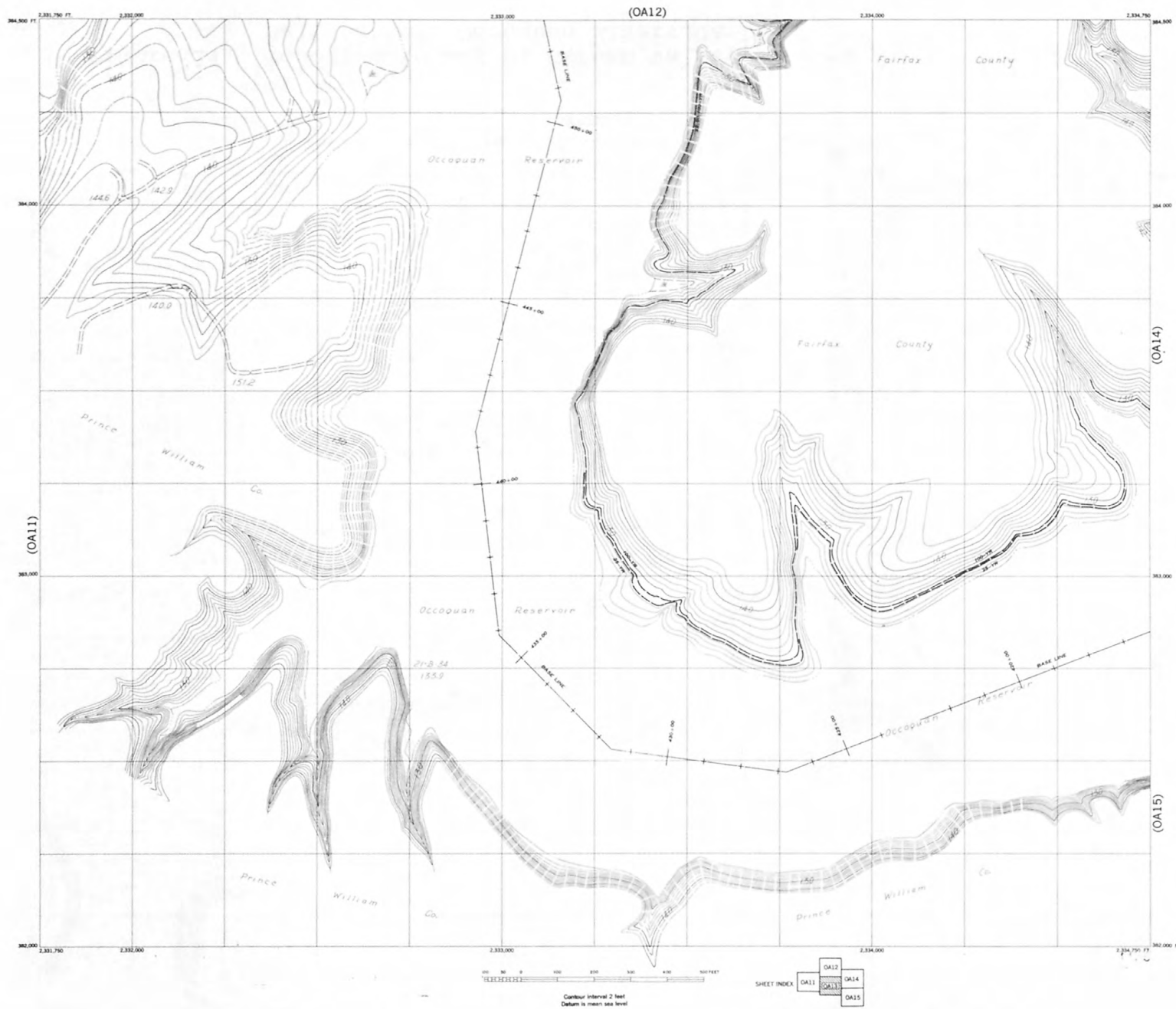


Figure 25. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-13

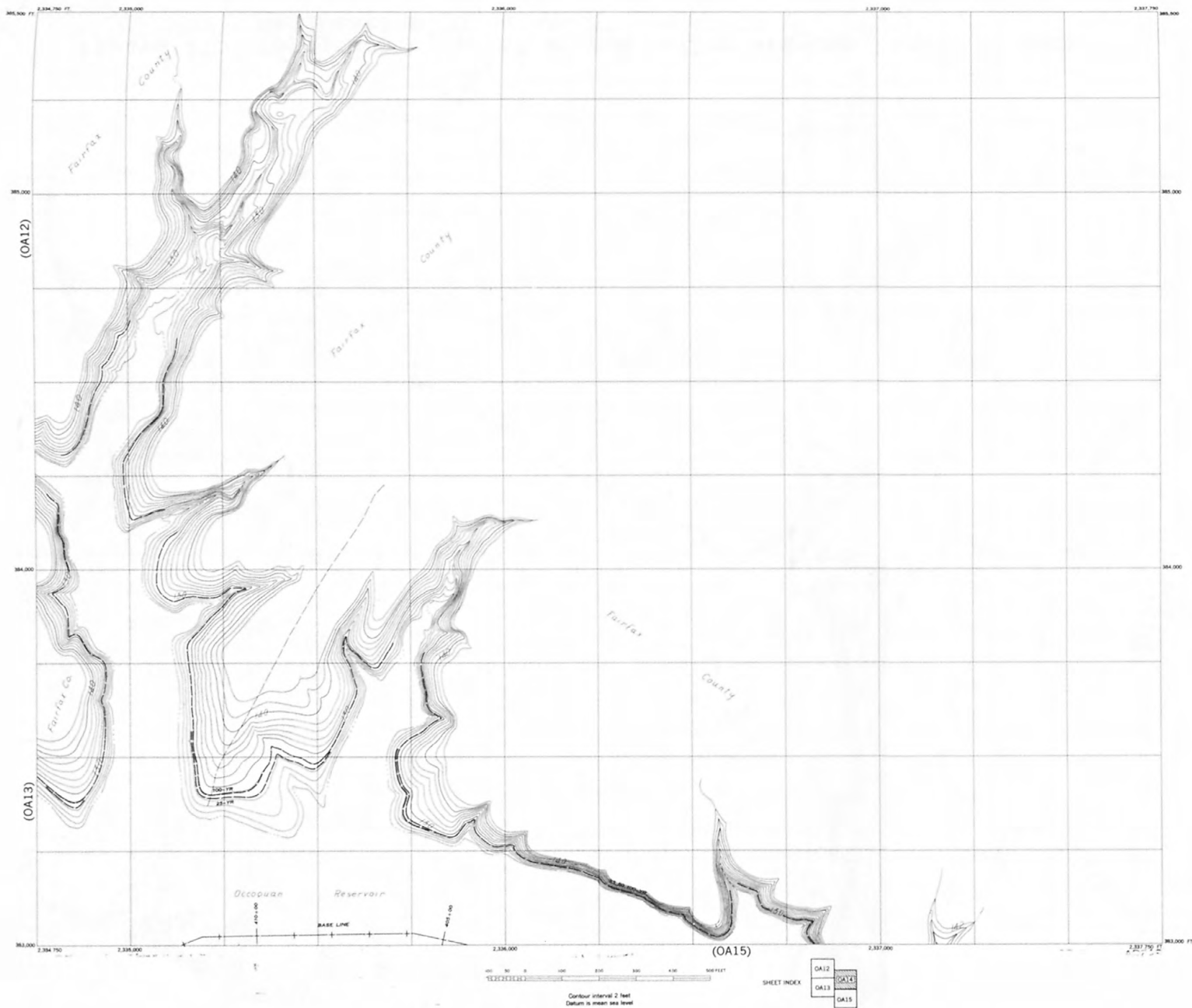


Figure 26. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-14

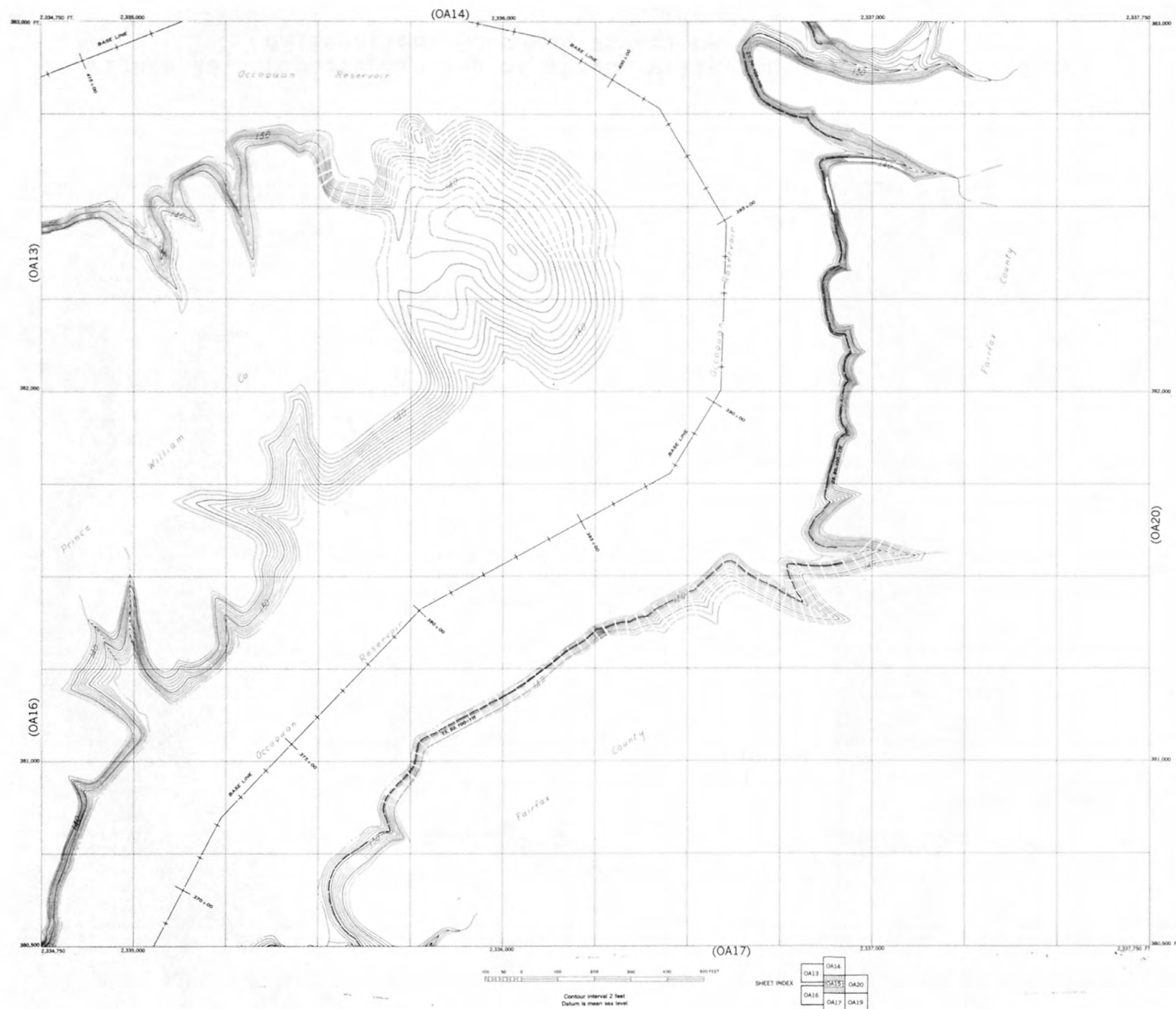


Figure 27. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-15

Figure 28. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-16

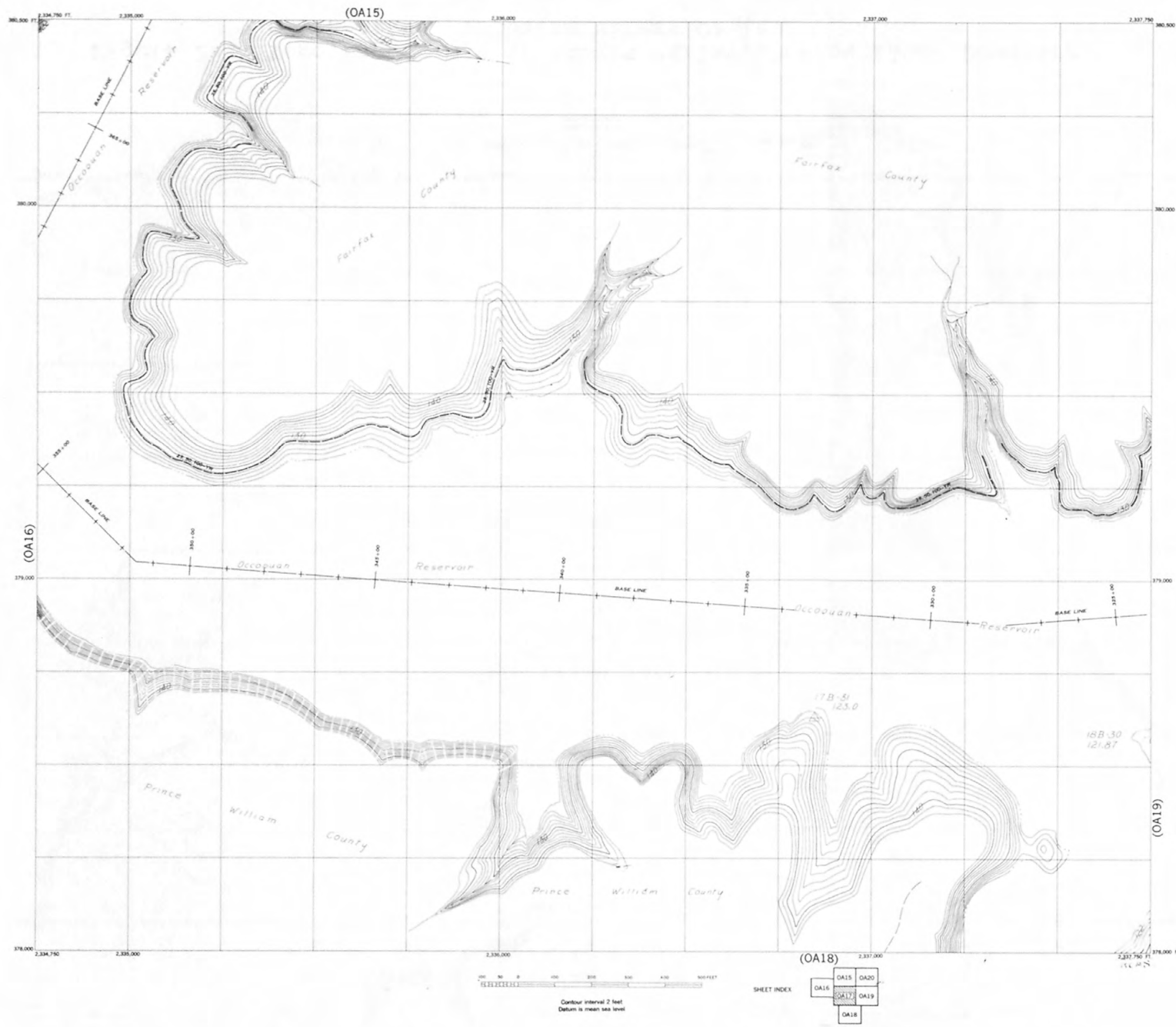


Figure 29. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-17

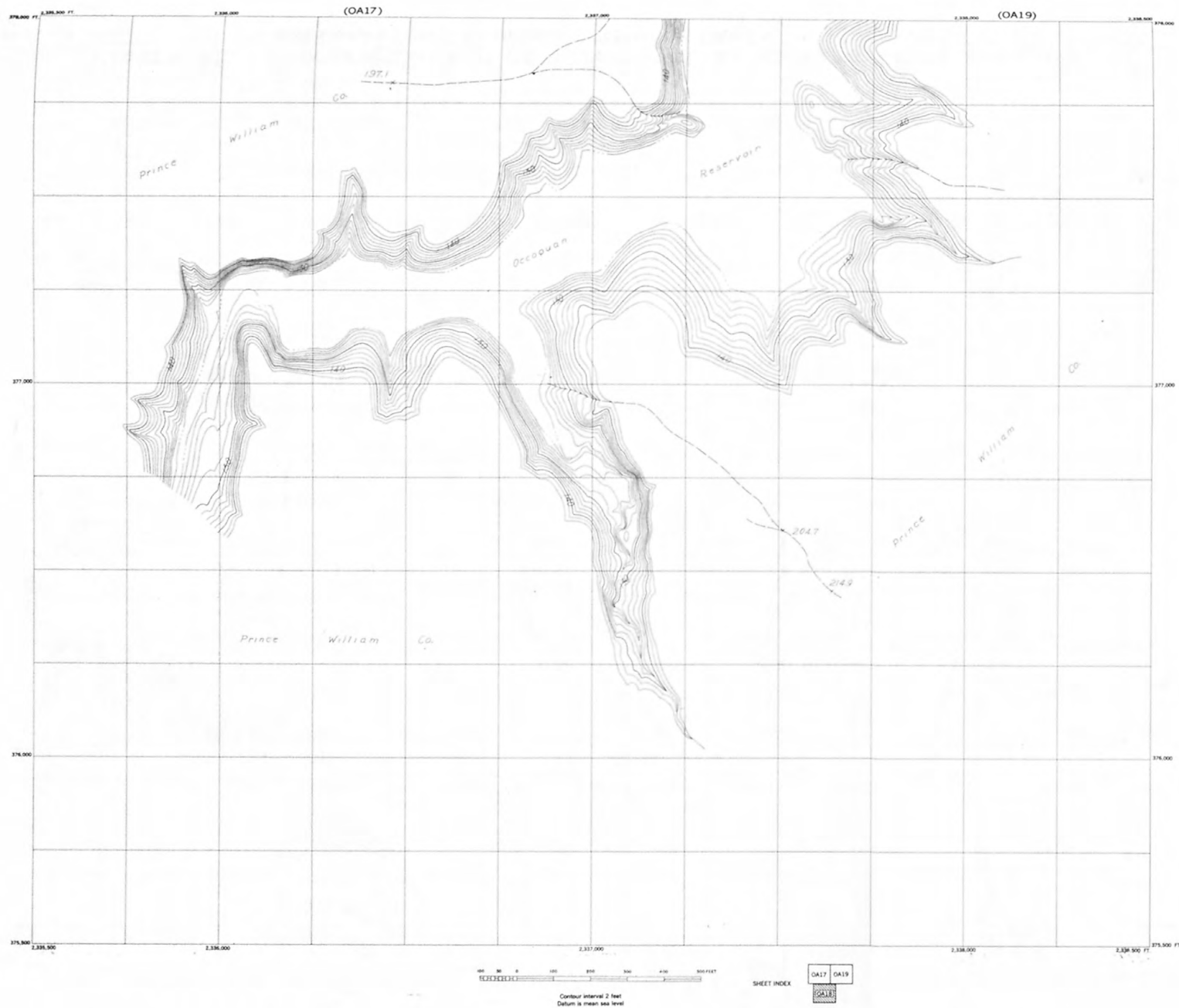


Figure 30. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-18

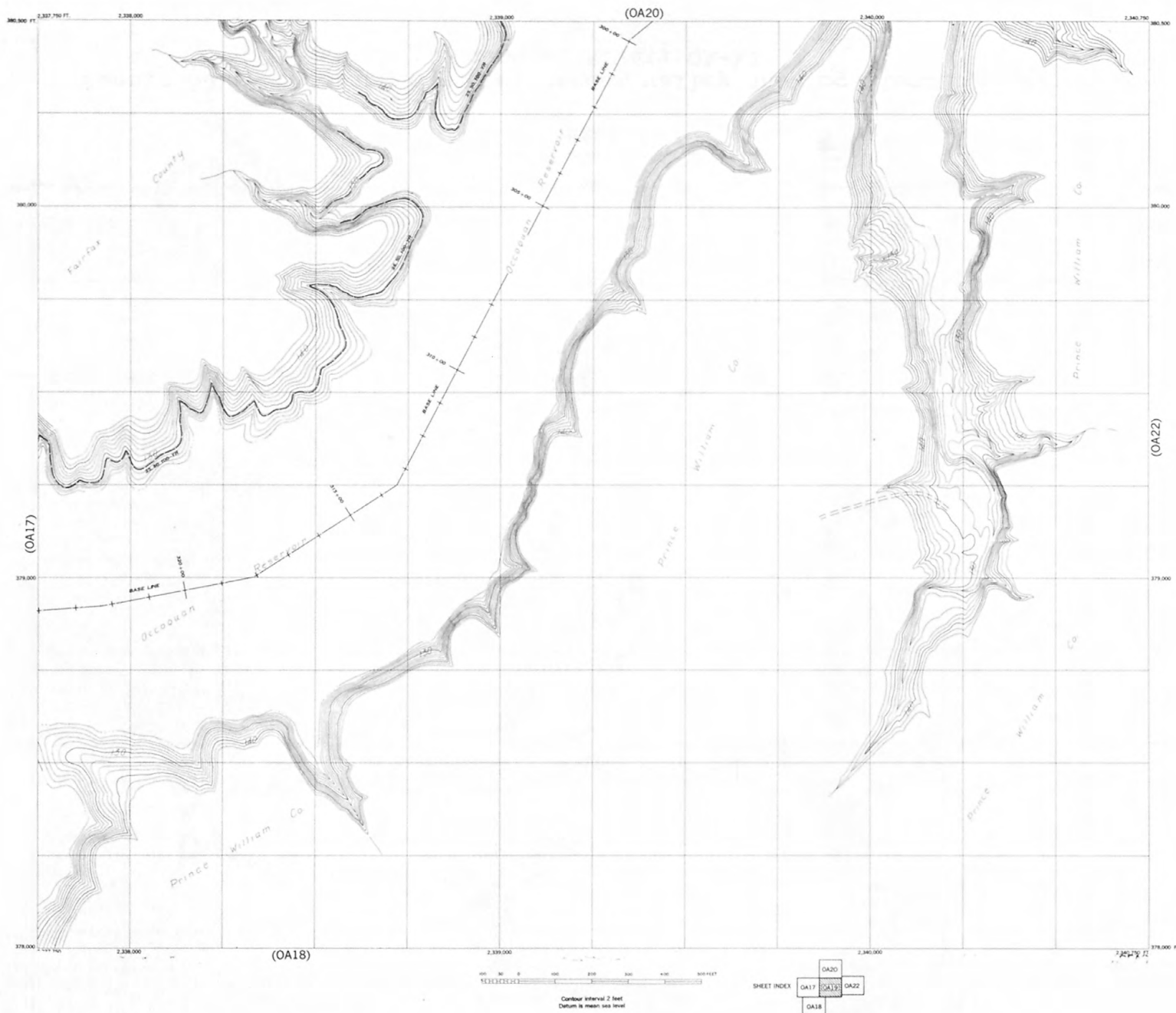


Figure 31. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-19

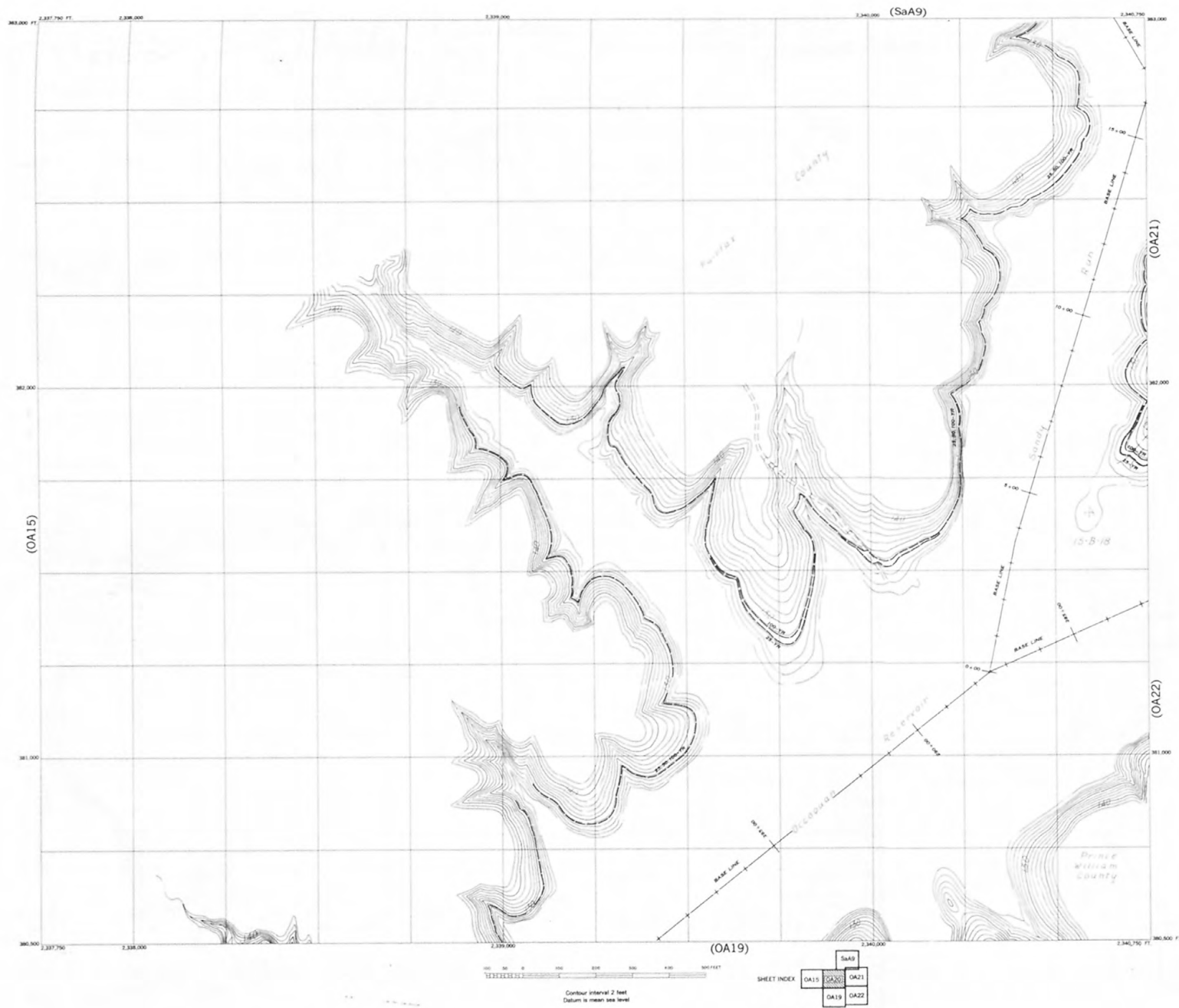


Figure 32. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-20

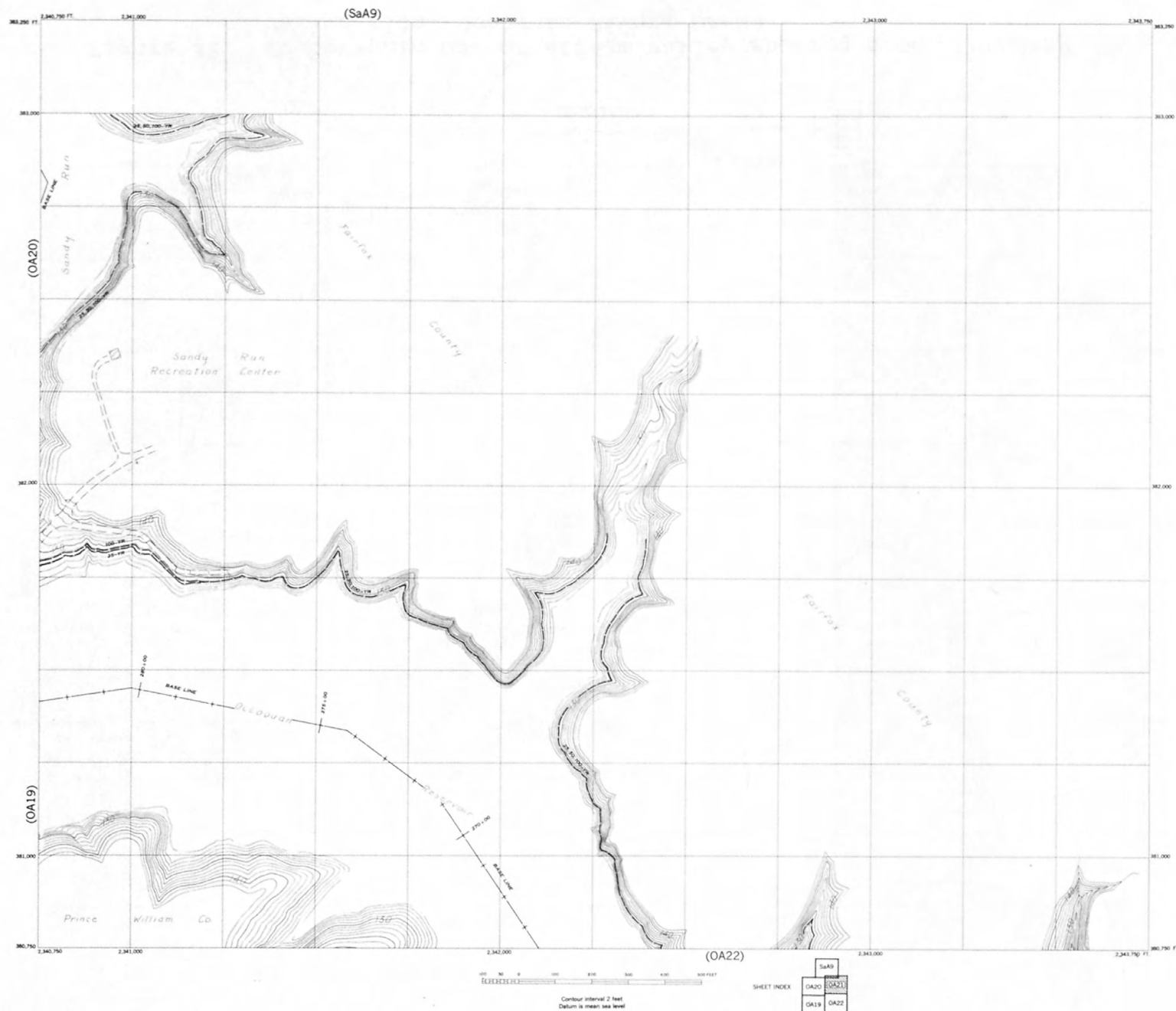


Figure 33. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-21

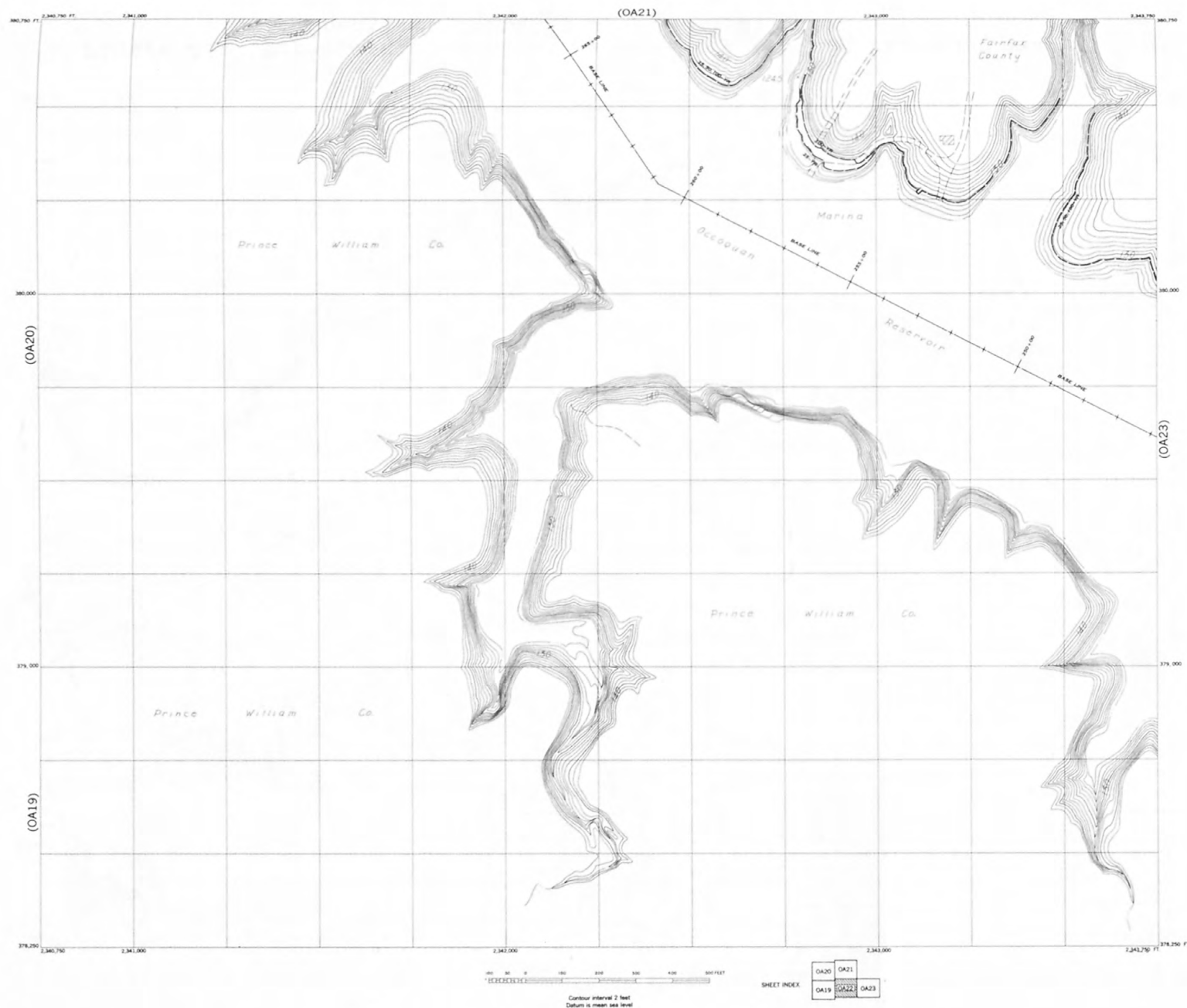


Figure 34. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-22

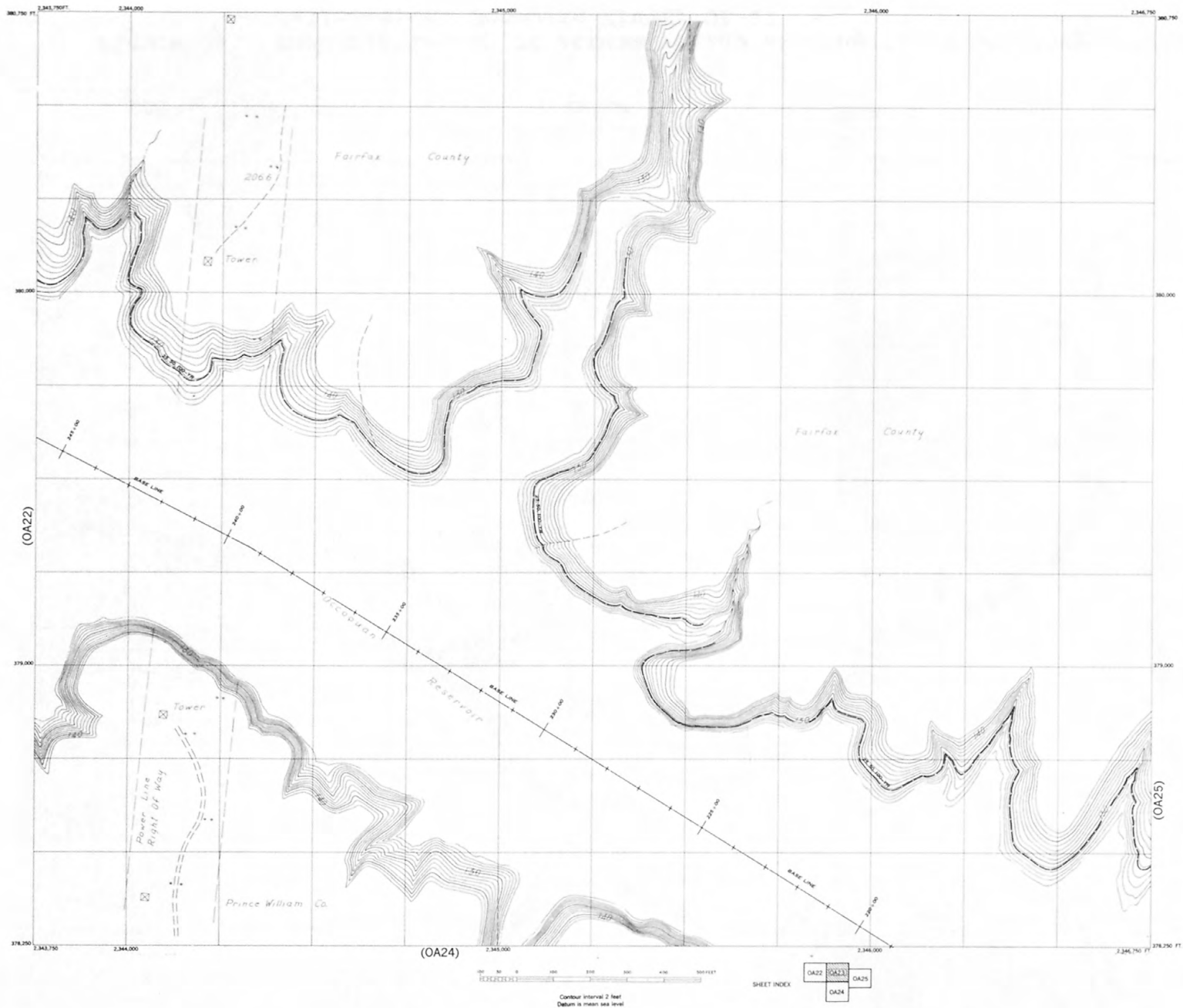


Figure 35. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-23

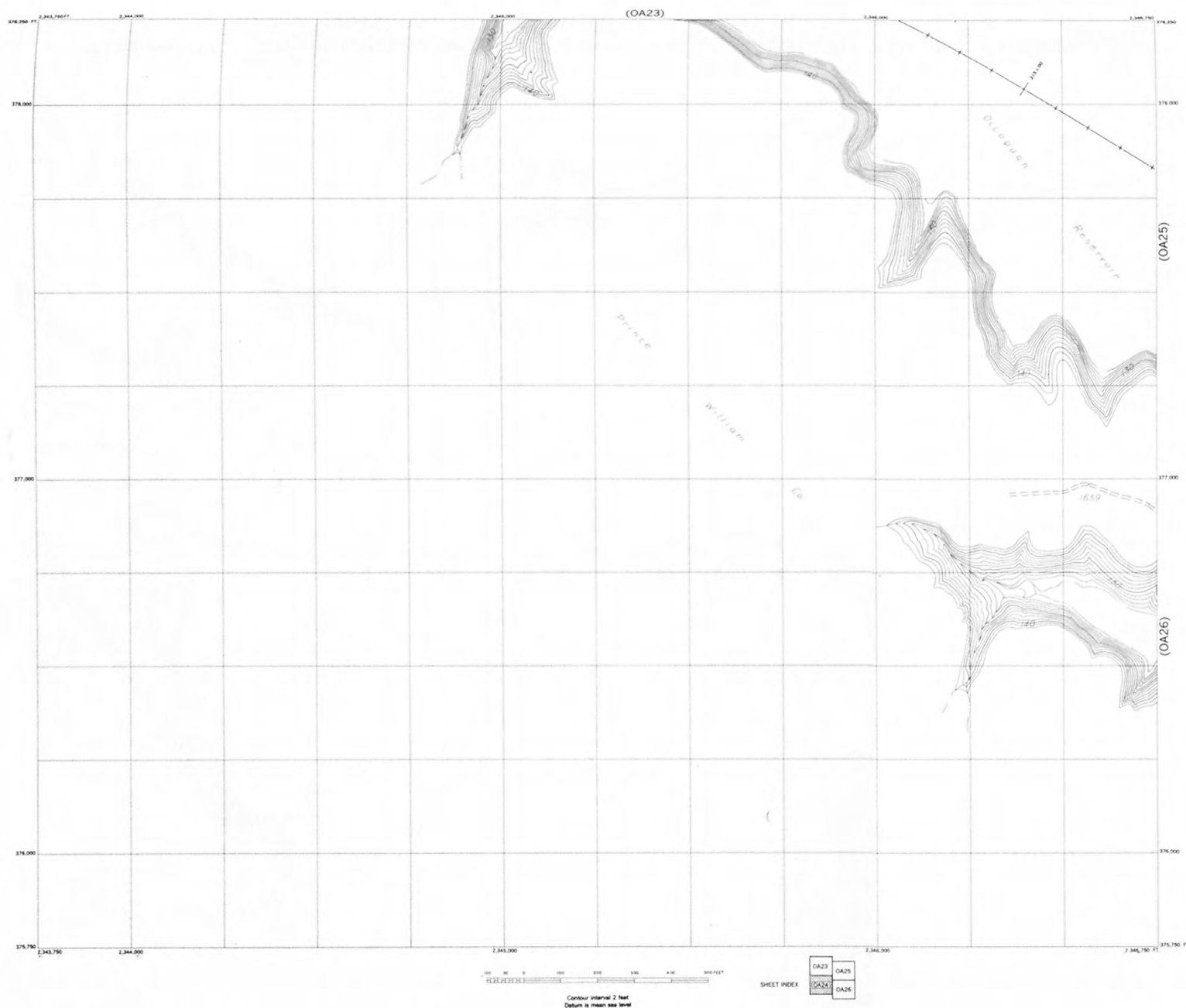


Figure 36. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-24

Figure 37. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-25

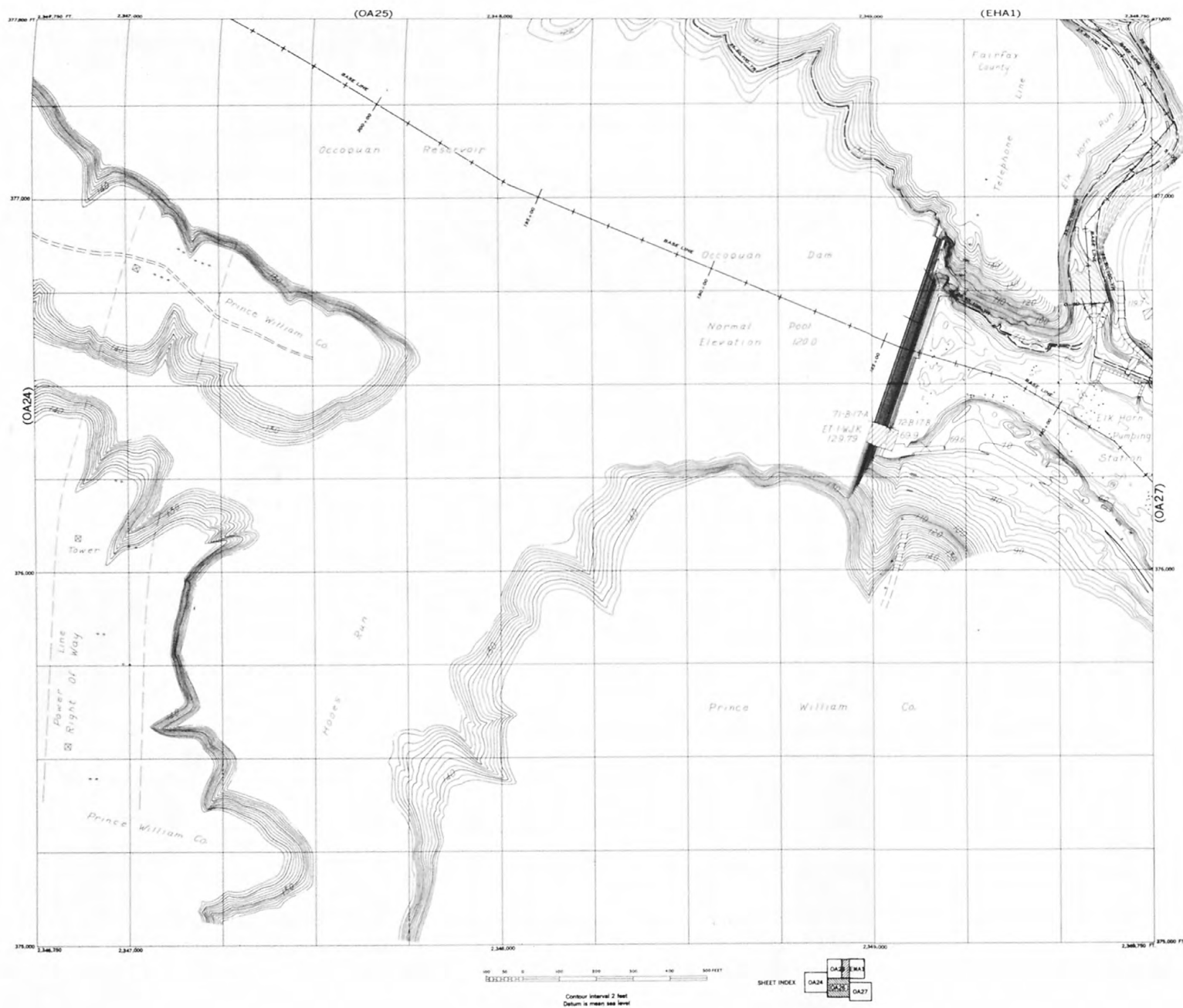


Figure 38. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-26

Figure 39. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-27

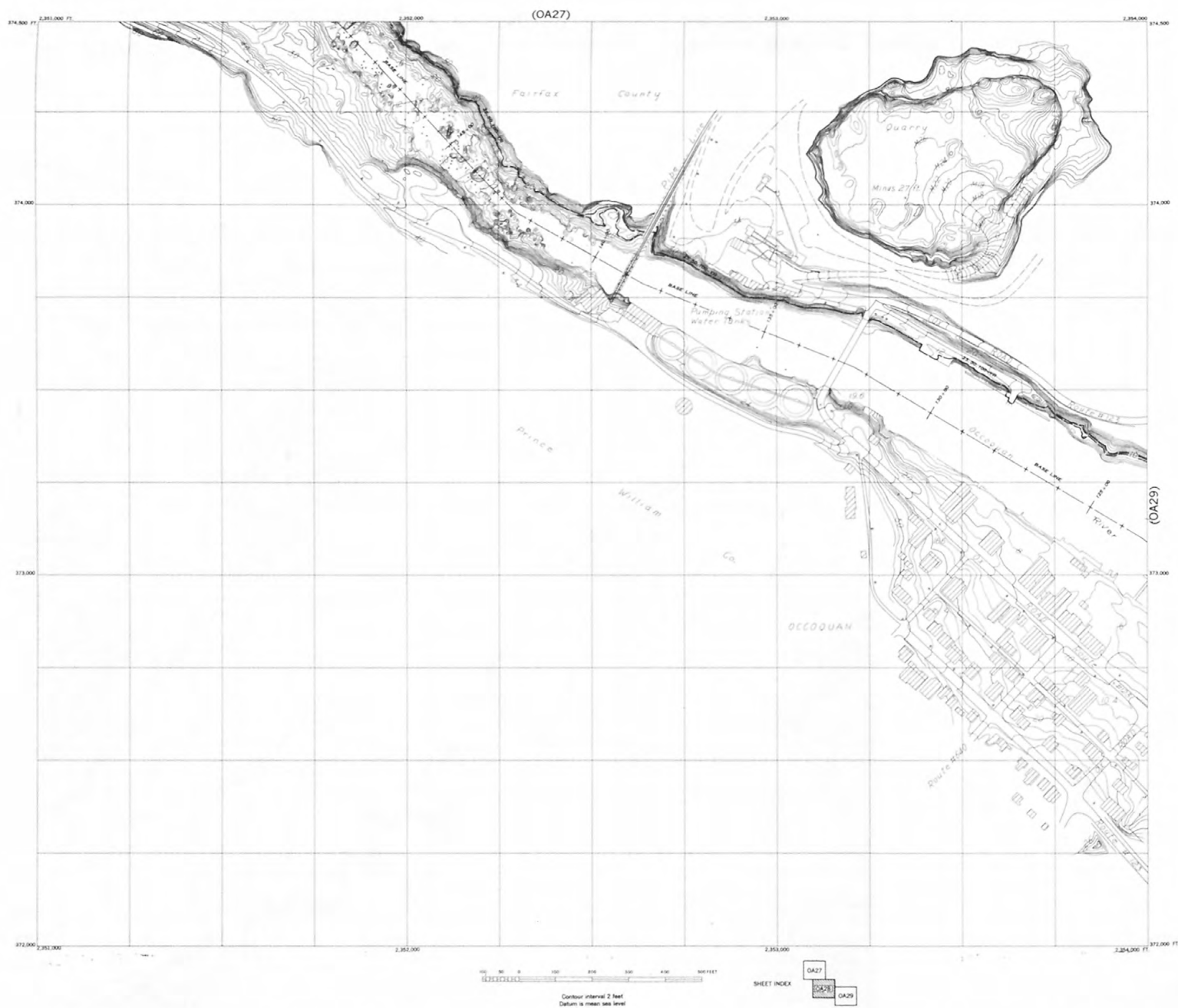


Figure 40. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-28

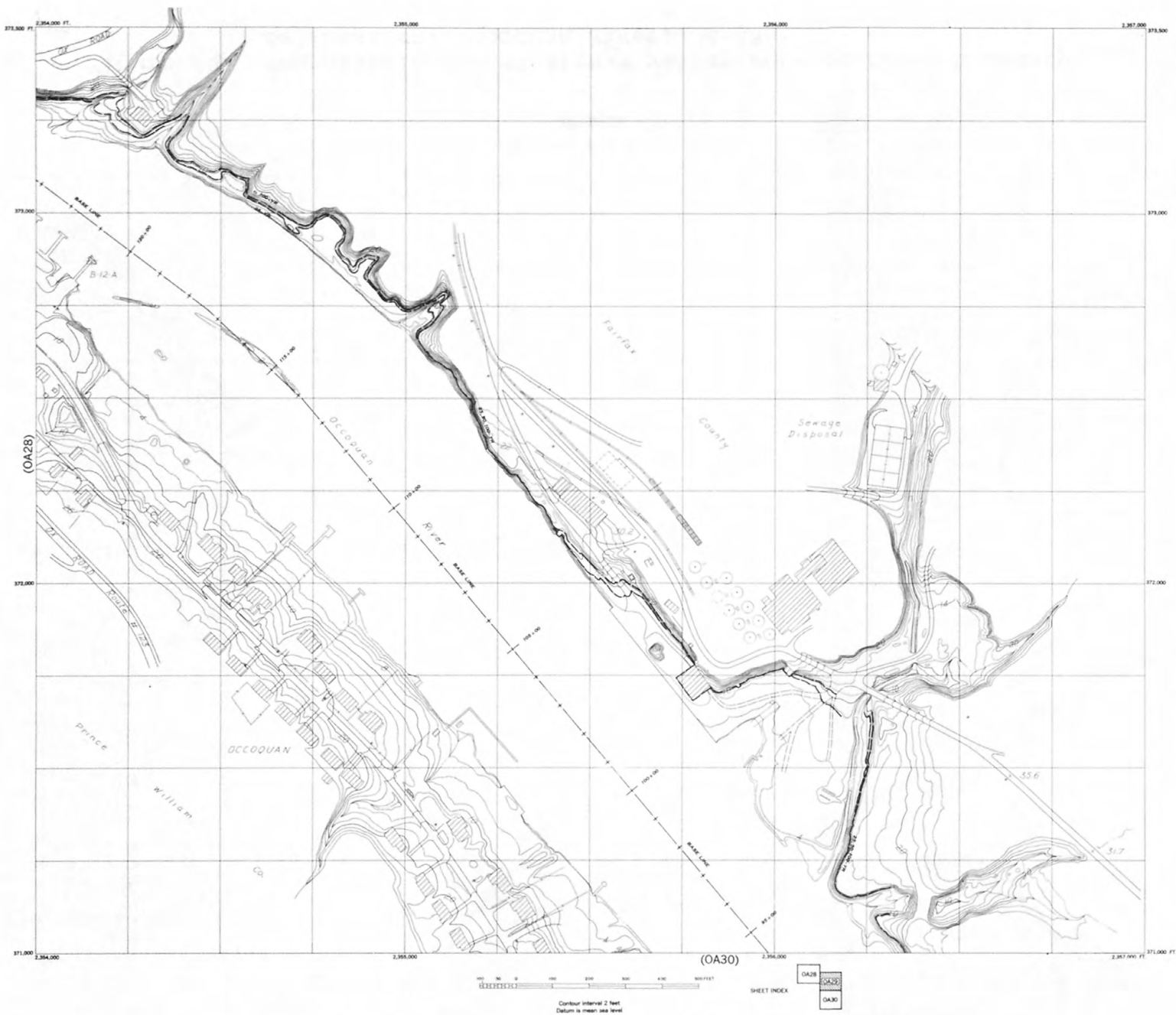


Figure 41. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-29

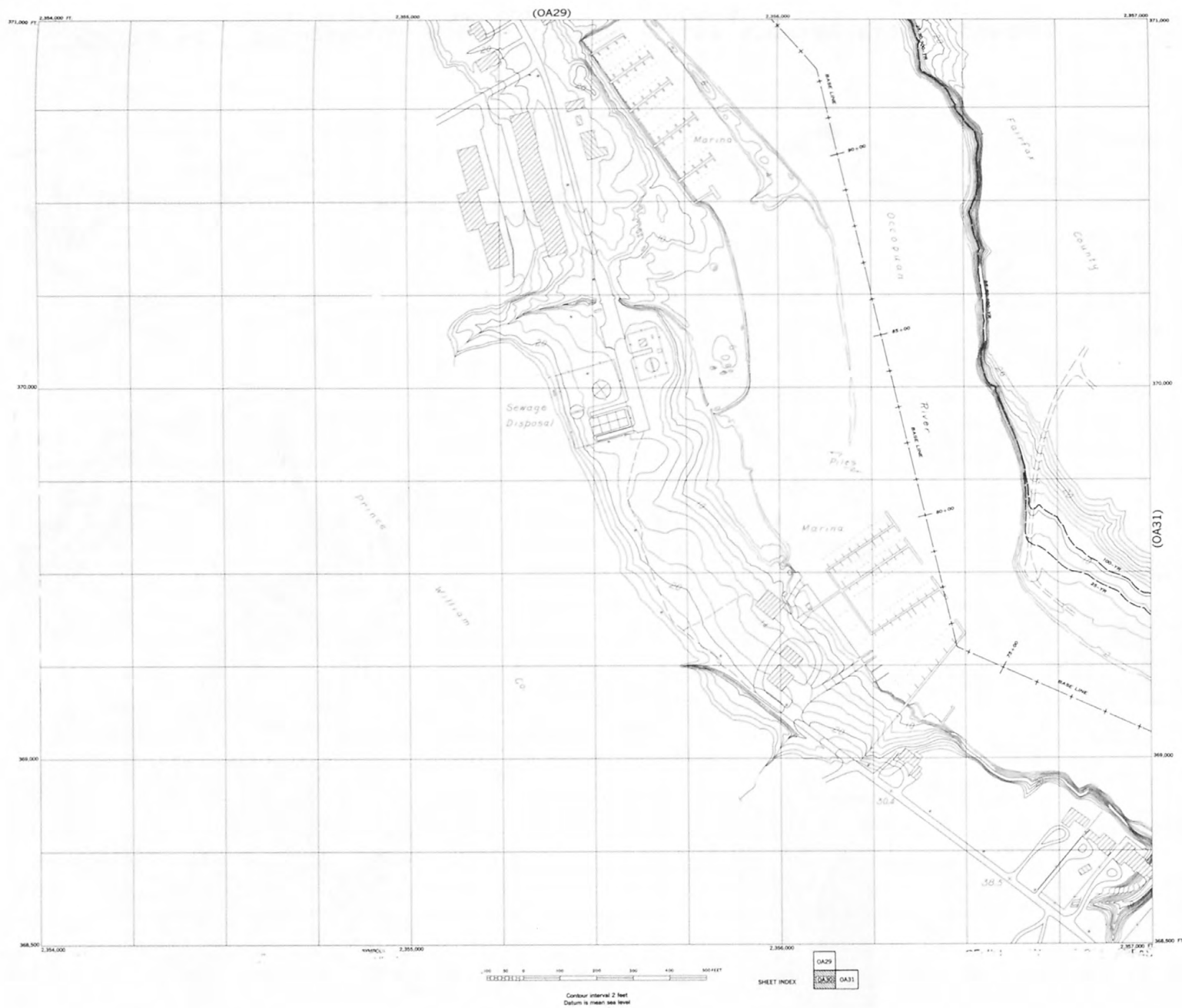


Figure 42. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-30

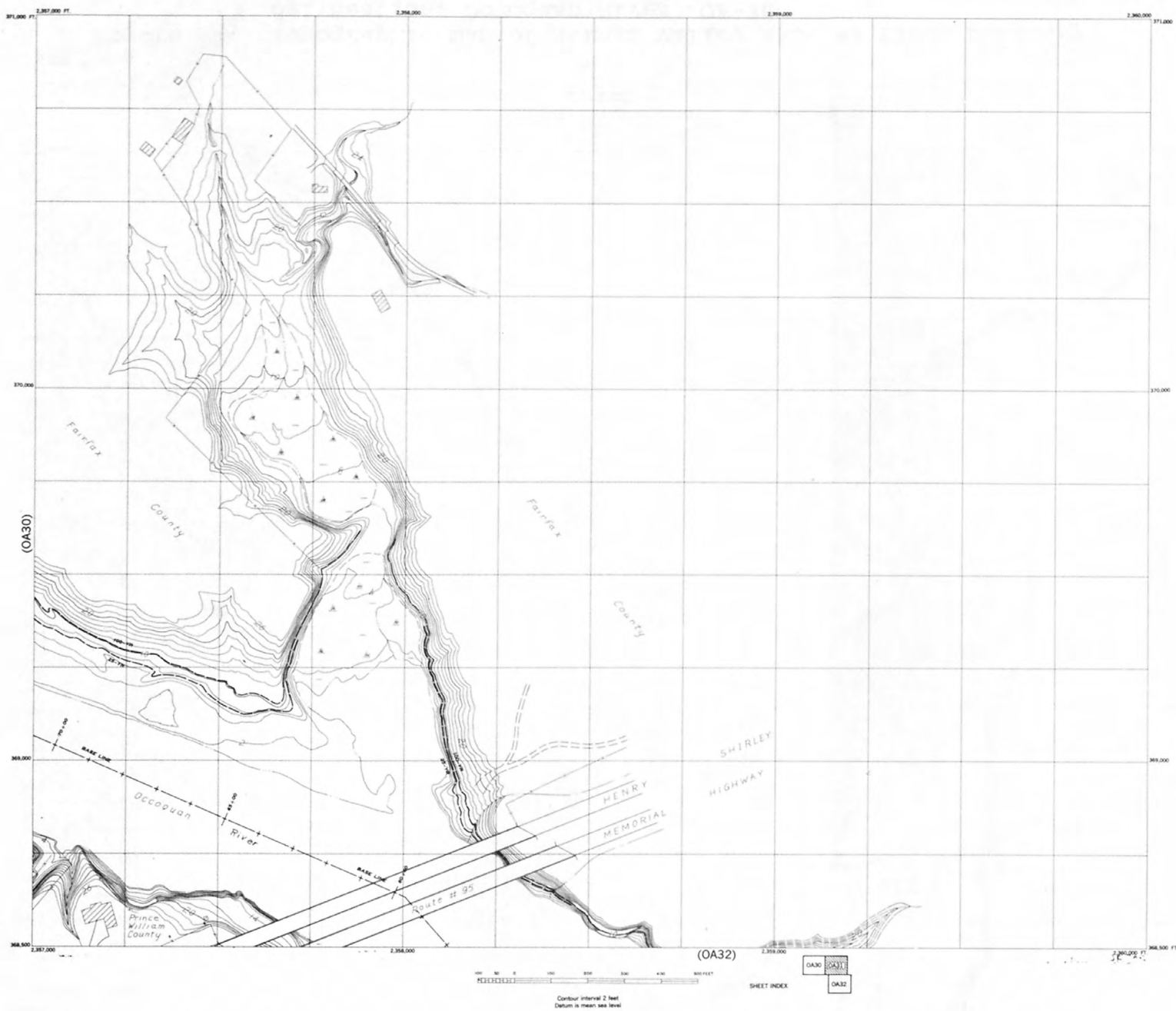


Figure 43. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-31

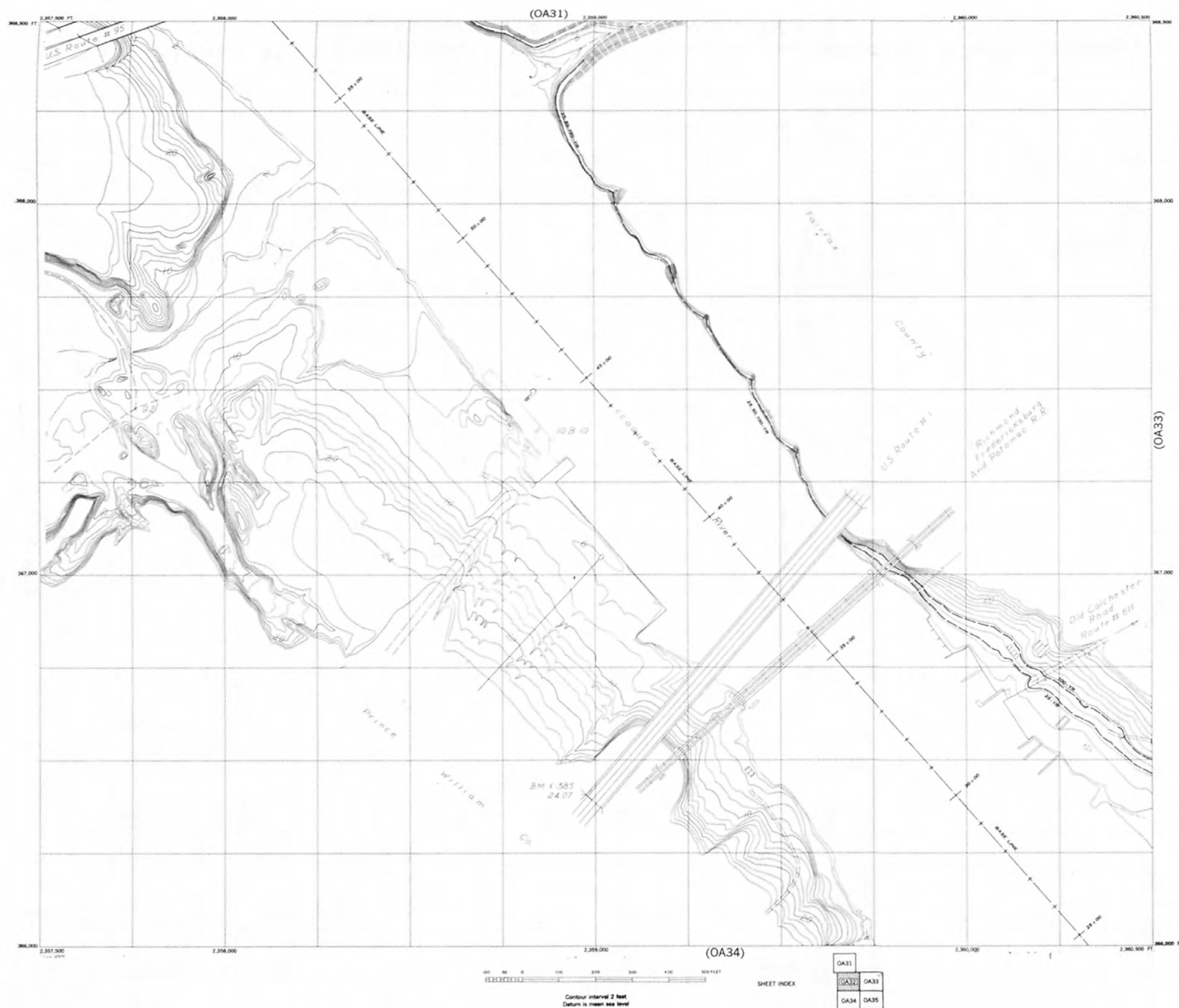


Figure 44. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-32

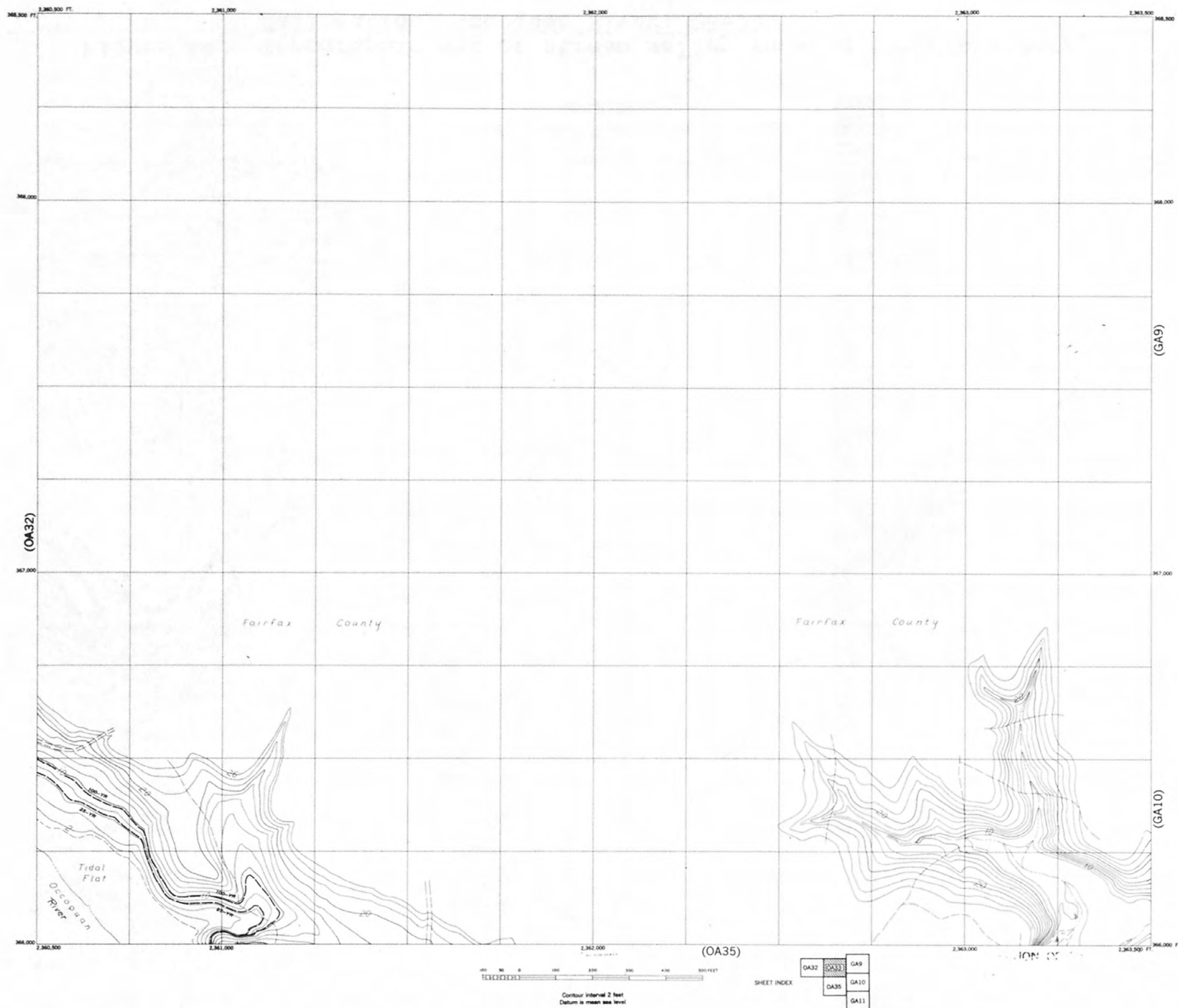


Figure 45. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-33

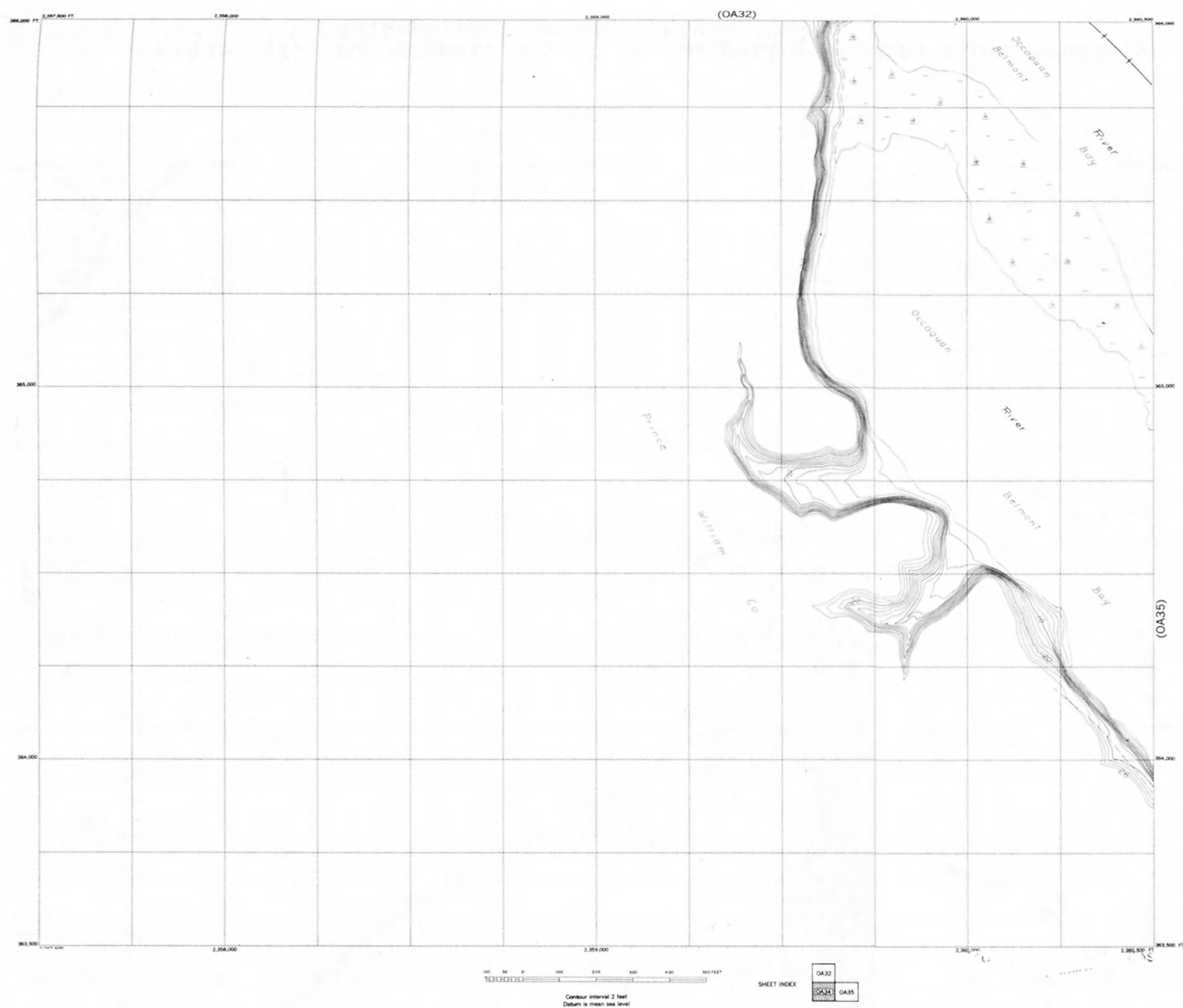


Figure 46. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-34

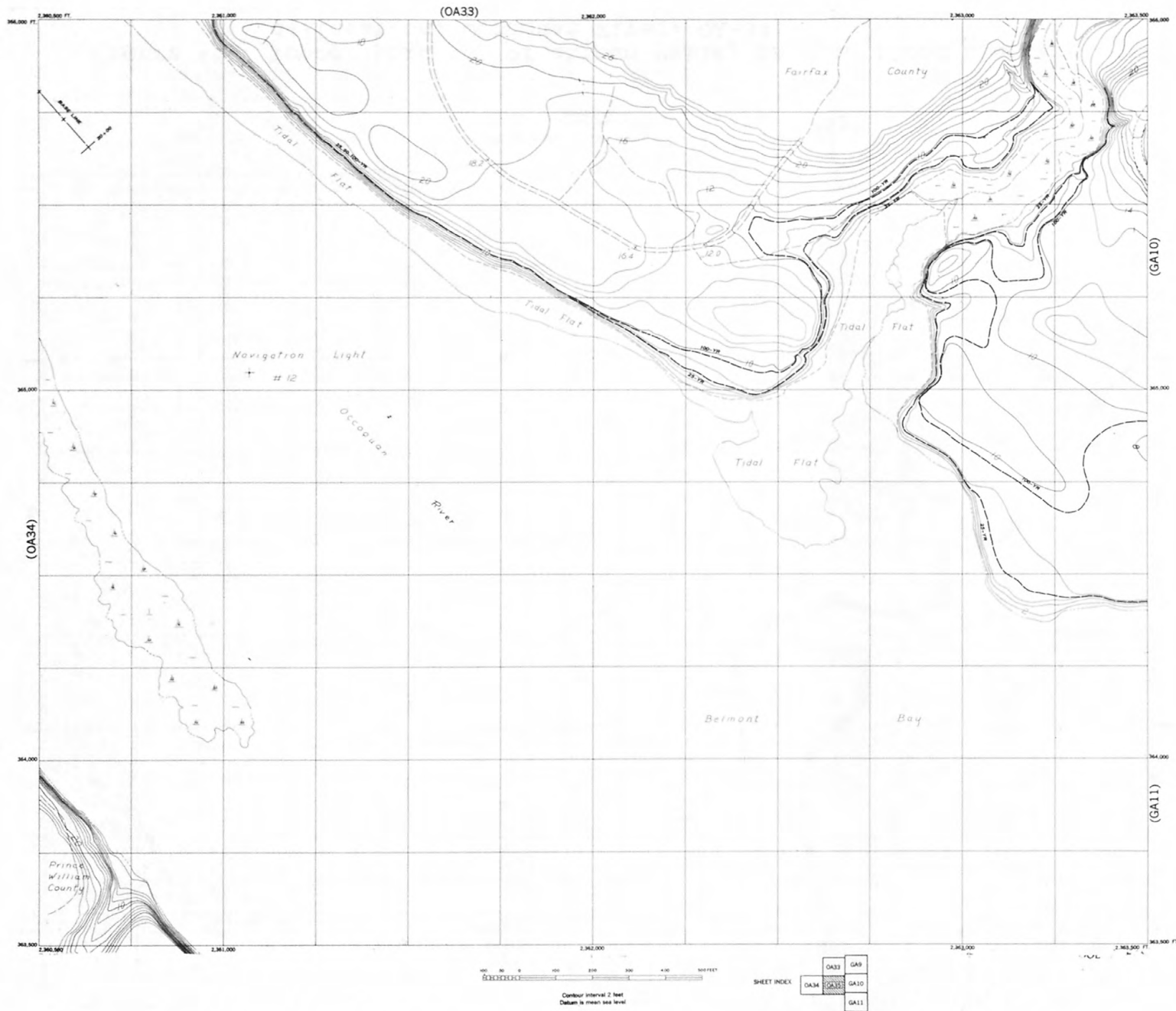


Figure 47. Topographic map of stream valley showing flood boundary delineation, Occoquan River; OA-35

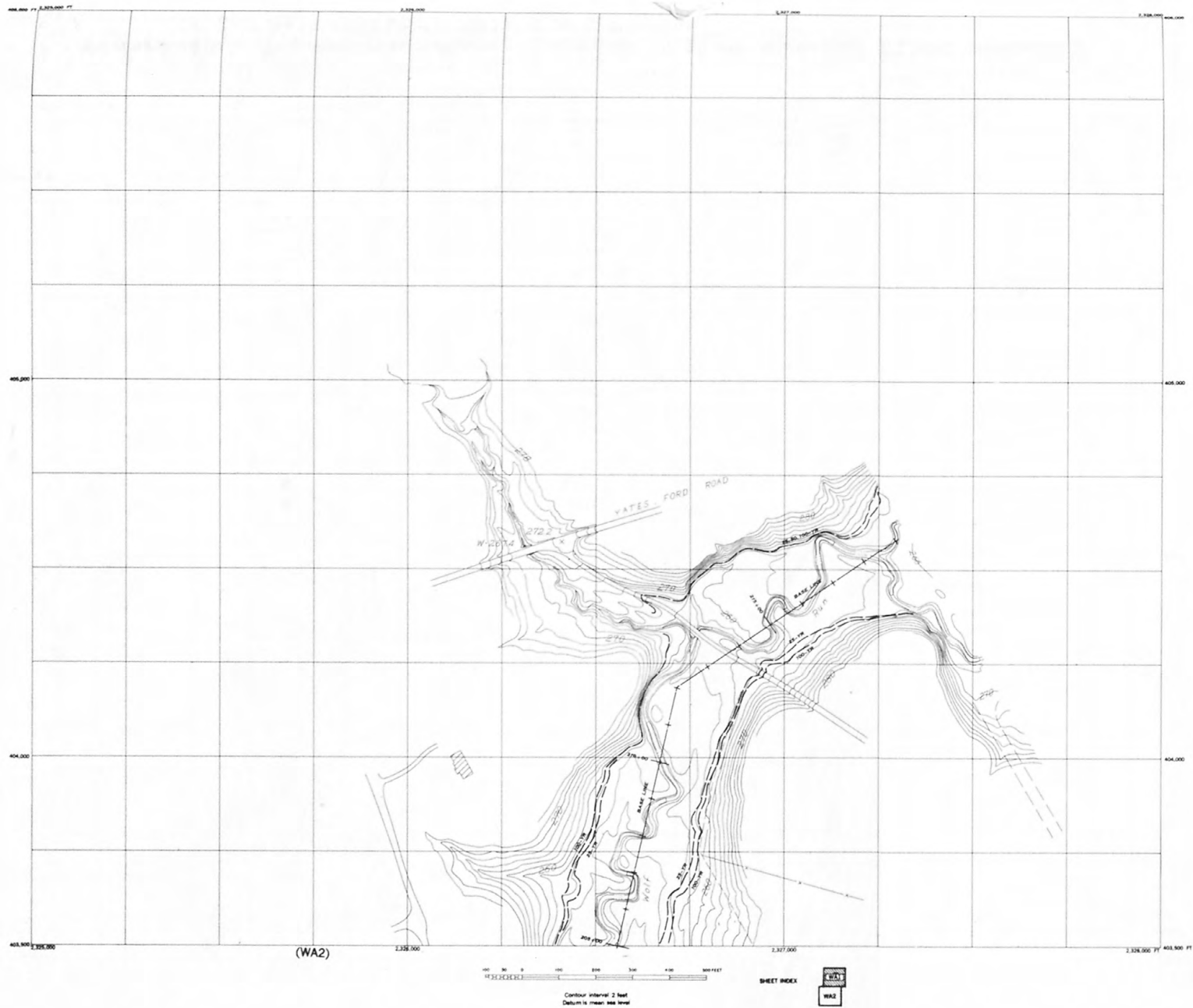


Figure 48. Topographic map of stream valley showing flood boundary delineation, Wolf Run; WA-1



Figure 49. Topographic map of stream valley showing flood boundary delineation, Wolf Run; WA-2

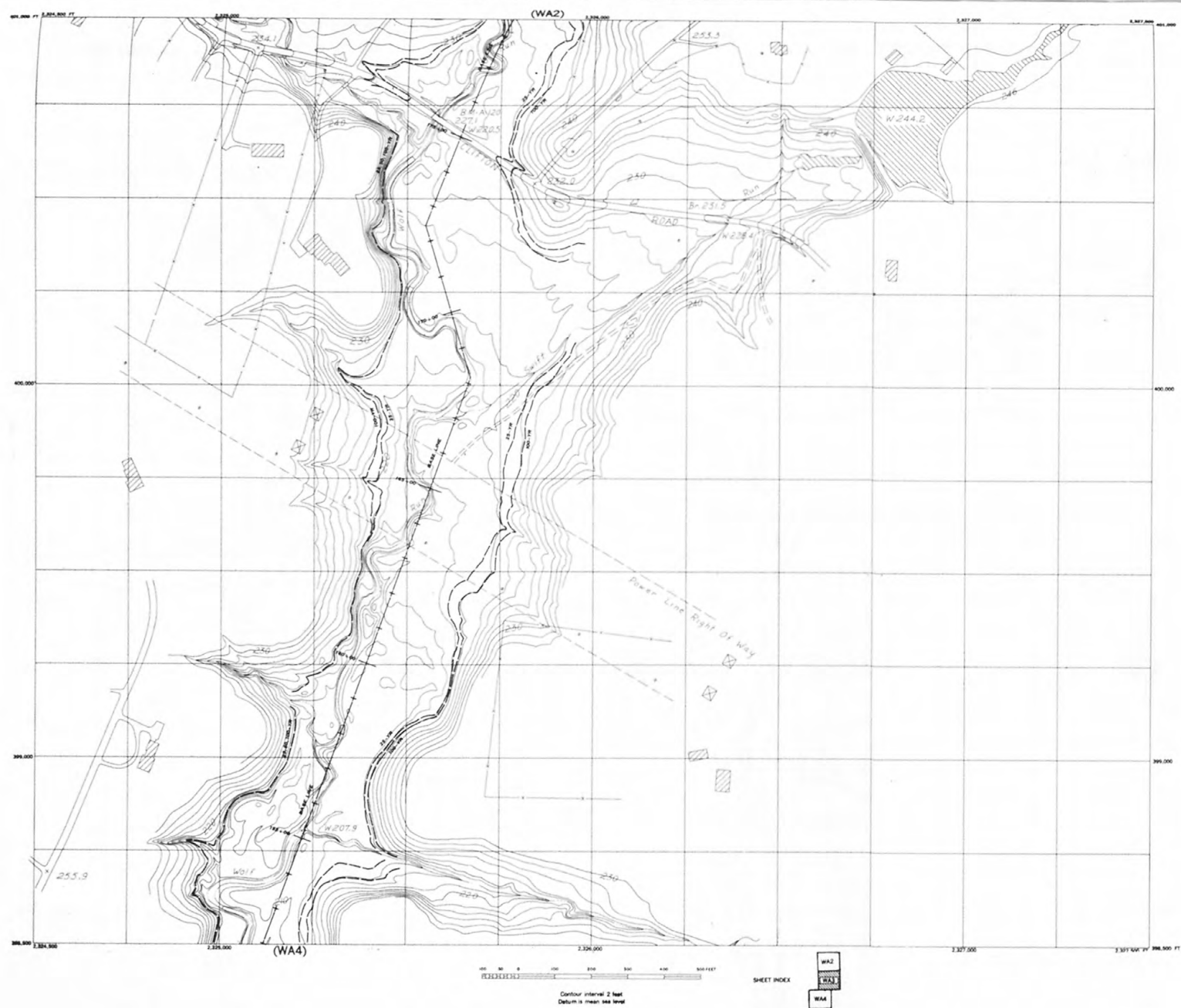


Figure 50. Topographic map of stream valley showing flood boundary delineation, Wolf Run; WA-3

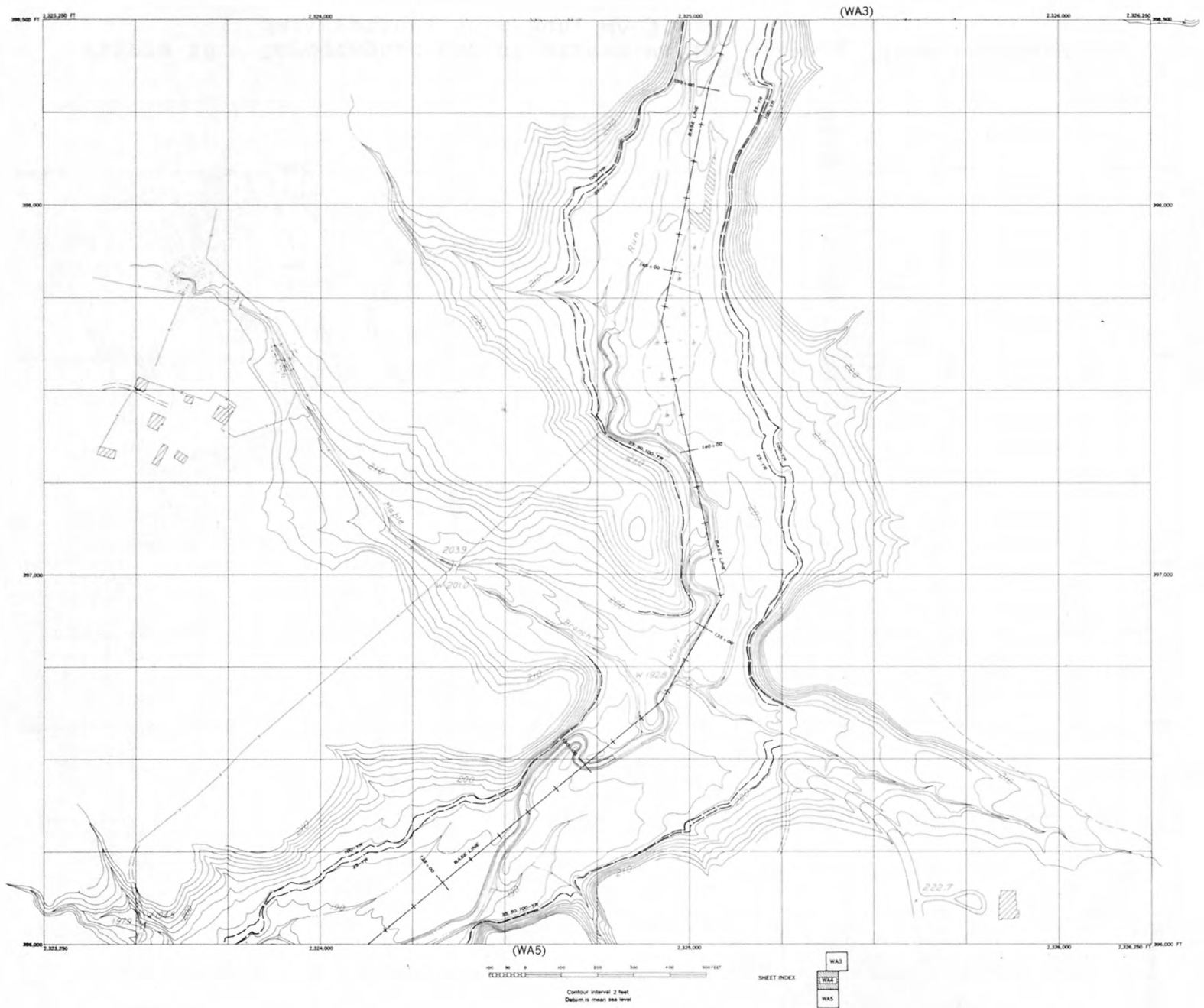


Figure 51. Topographic map of stream valley showing flood boundary delineation, Wolf Run; WA-4

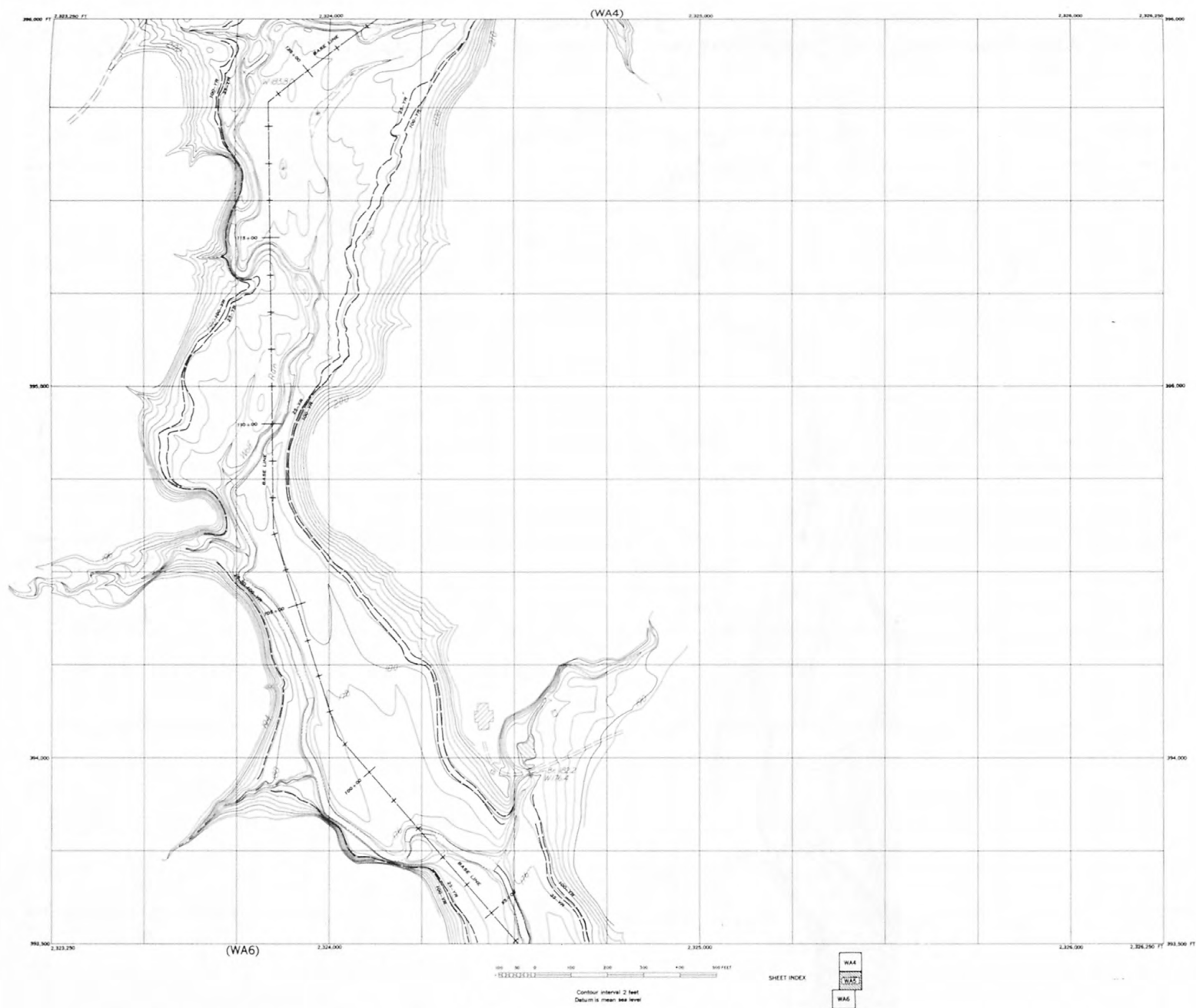


Figure 52. Topographic map of stream valley showing flood boundary delineation, Wolf Run; WA-5

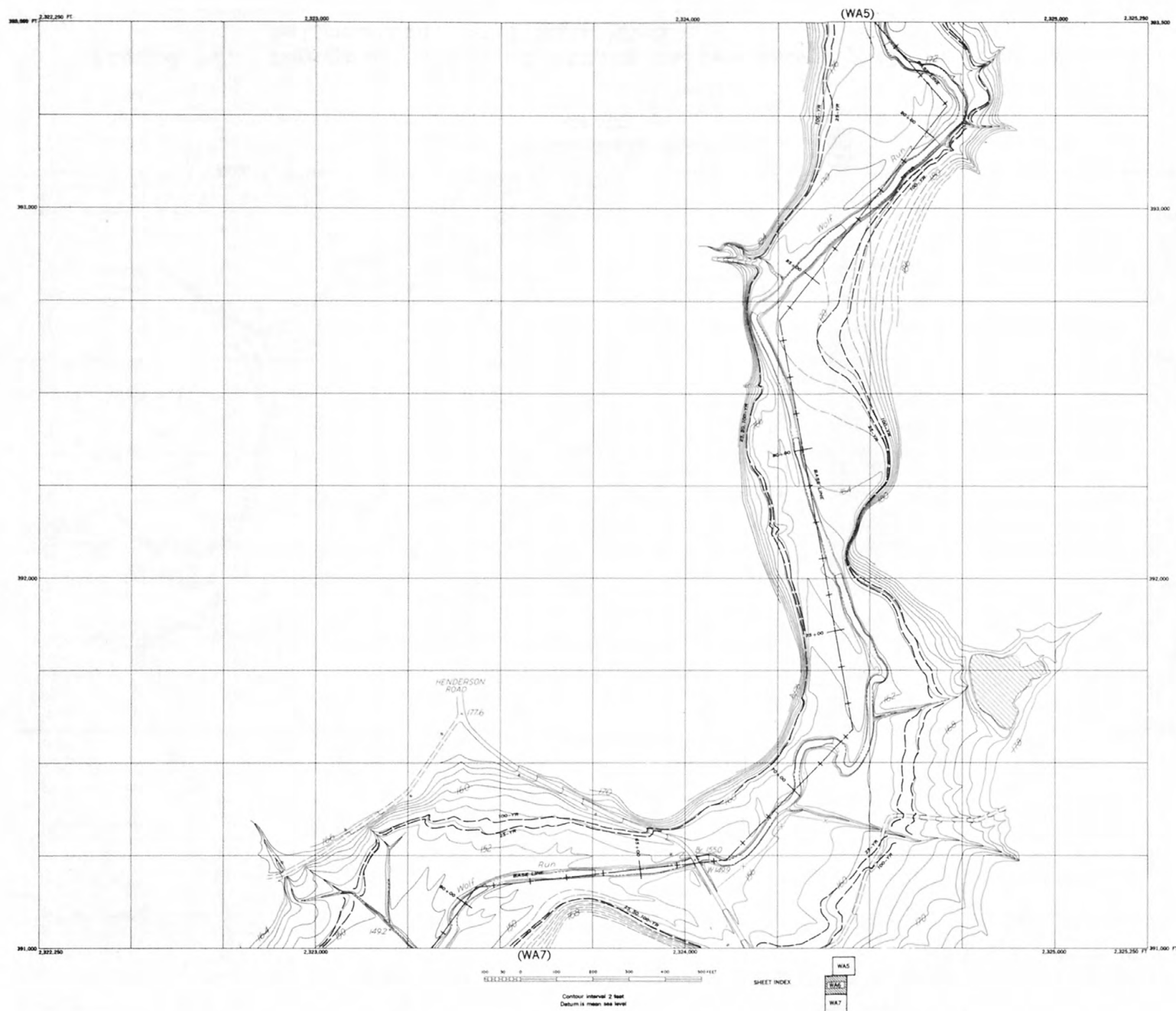


Figure 53. Topographic map of stream valley showing flood boundary delineation, Wolf Run; WA-6

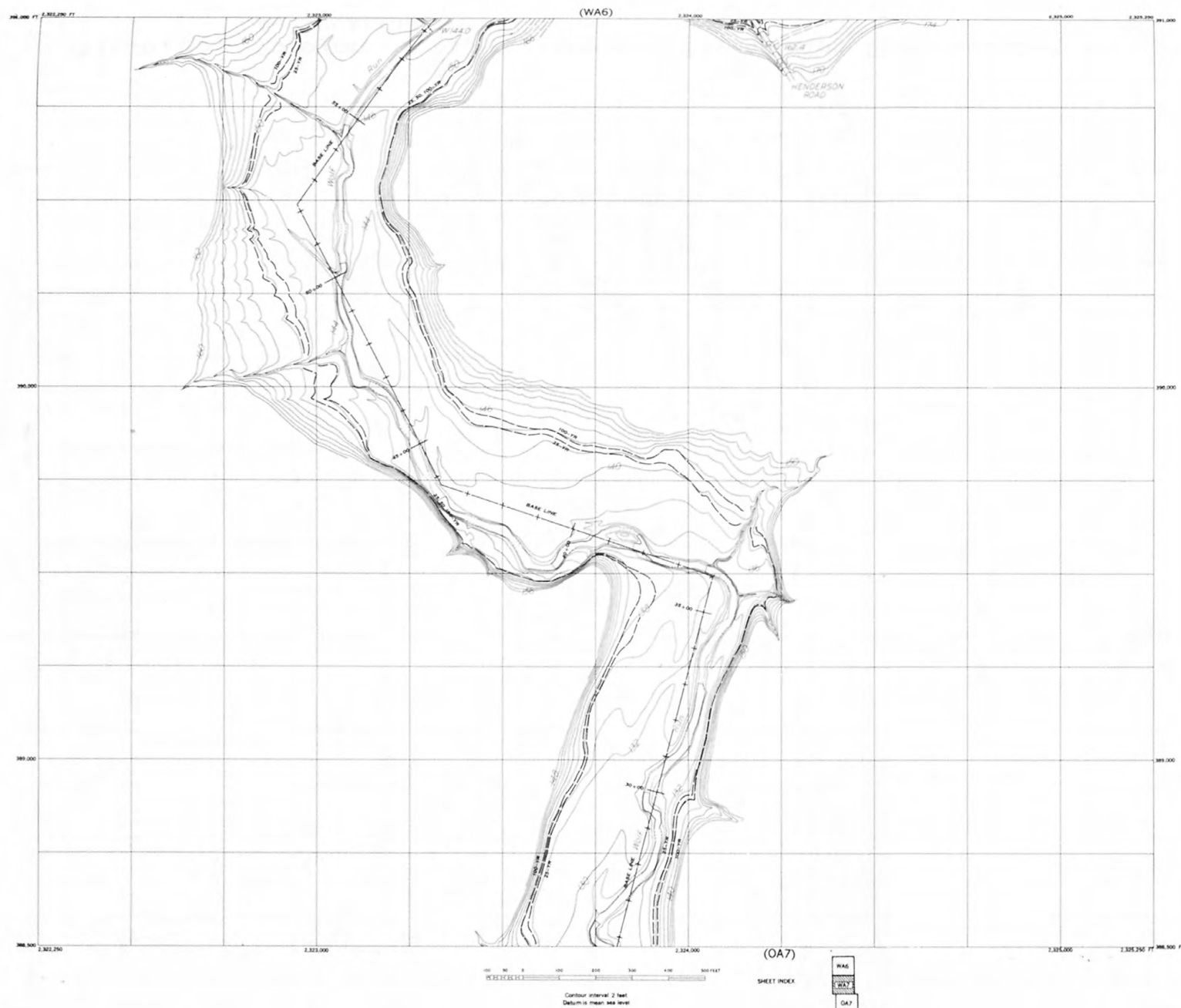


Figure 54. Topographic map of stream valley showing flood boundary delineation, Wolf Run; WA-7

Figure 55. Topographic map of stream valley showing flood boundary delineation, Sandy Run; SaA-1

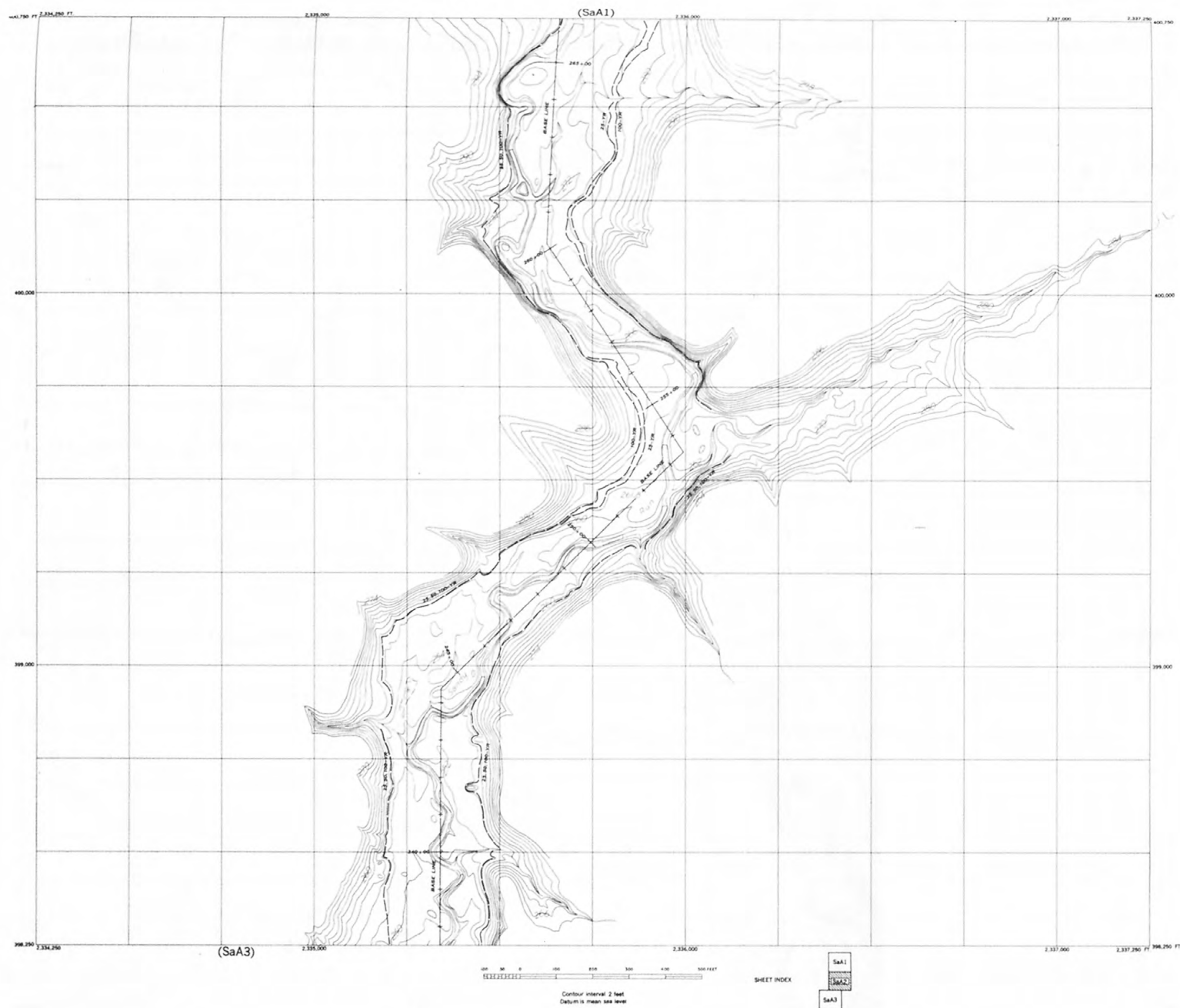


Figure 56. Topographic map of stream valley showing flood boundary delineation, Sandy Run; SaA-2

Figure 57. Topographic map of stream valley showing flood boundary delineation, Sandy Run; SaA-3

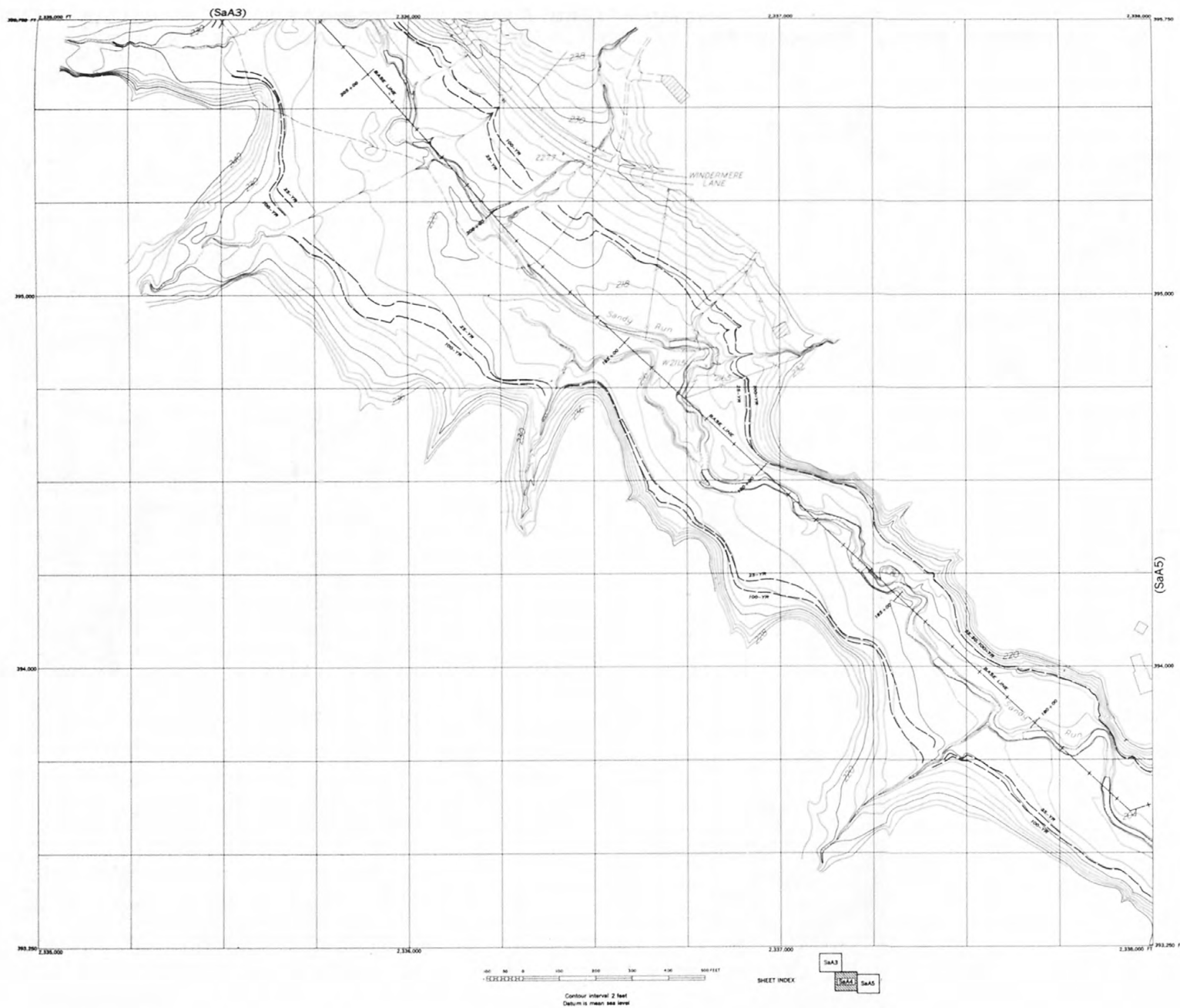


Figure 58. Topographic map of stream valley showing flood boundary delineation, Sandy Run; SaA-4

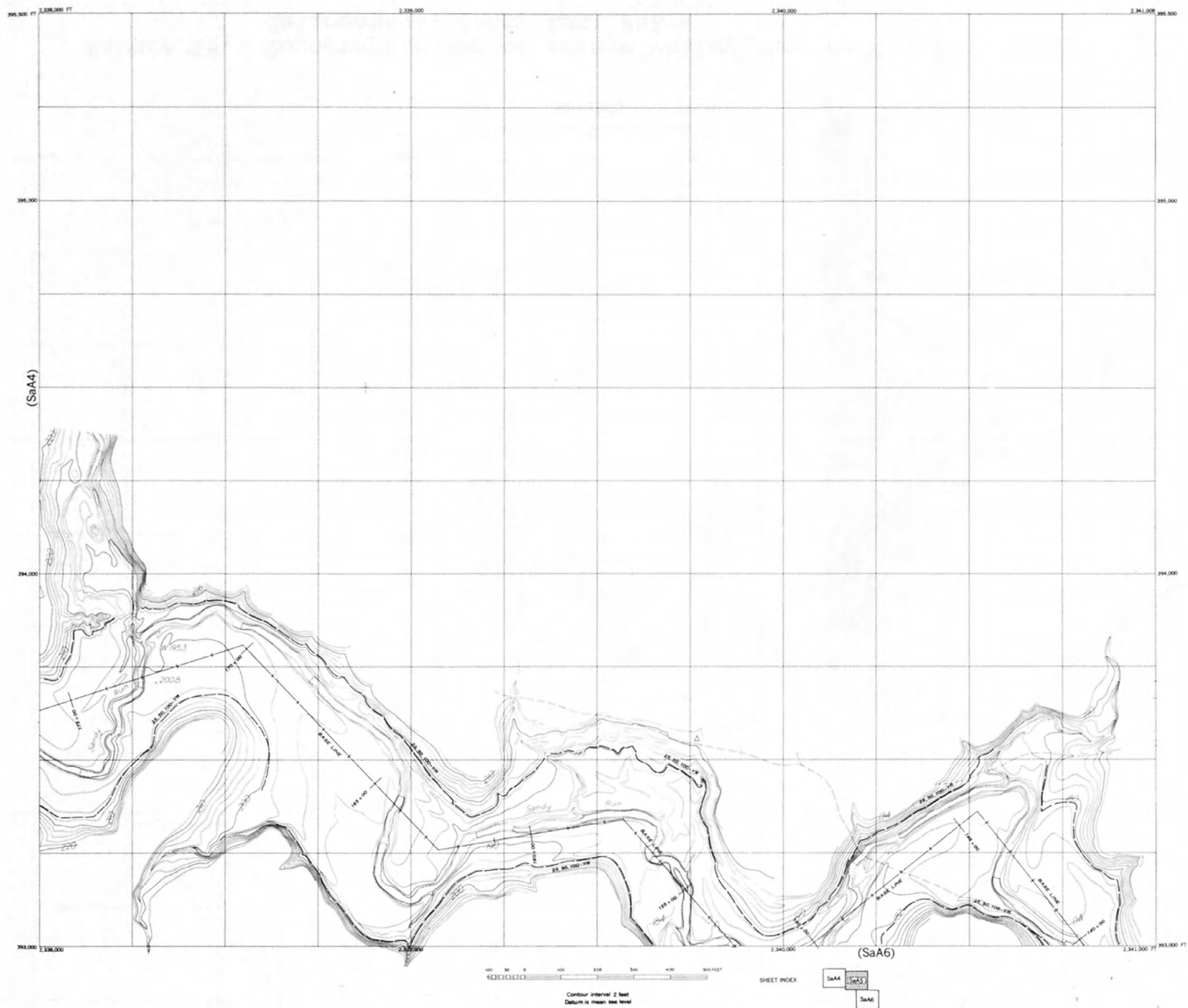


Figure 59. Topographic map of stream valley showing flood boundary delineation, Sandy Run; SaA-5

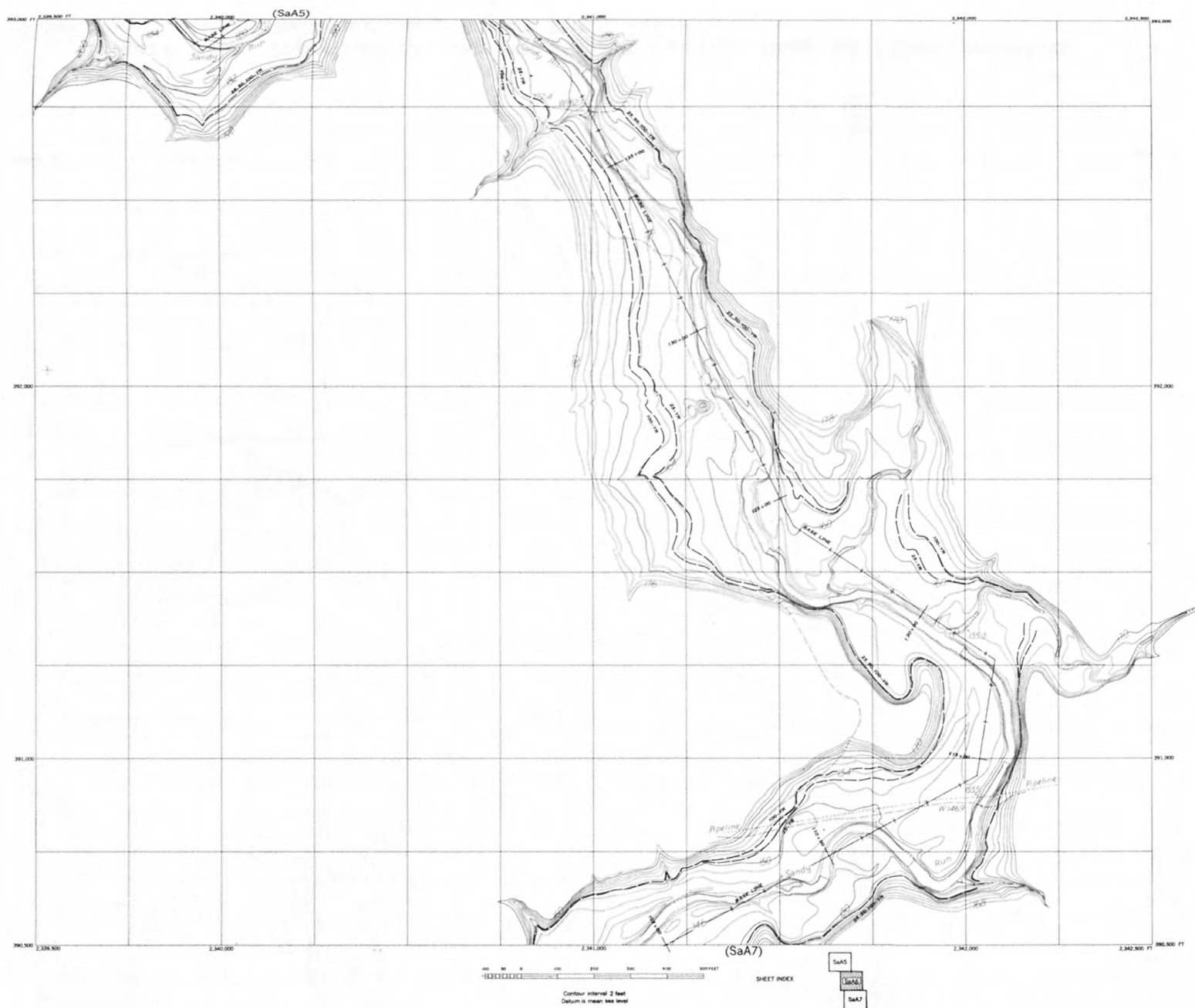


Figure 60. Topographic map of stream valley showing flood boundary delineation, Sandy Run; SaA-6

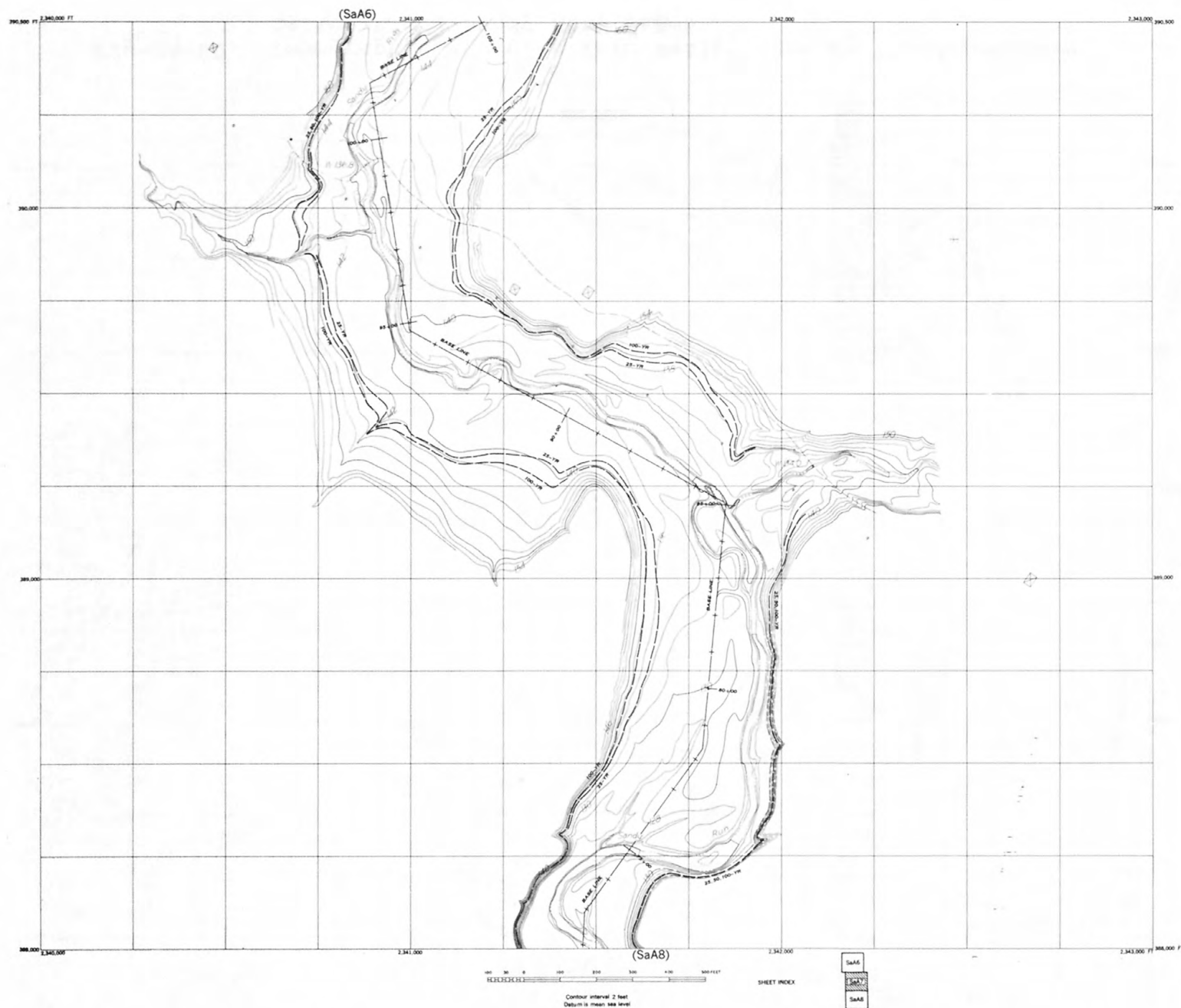


Figure 61. Topographic map of stream valley showing flood boundary delineation, Sandy Run; SaA-7

Figure 62. Topographic map of stream valley showing flood boundary delineation, Sandy Run; SaA-8

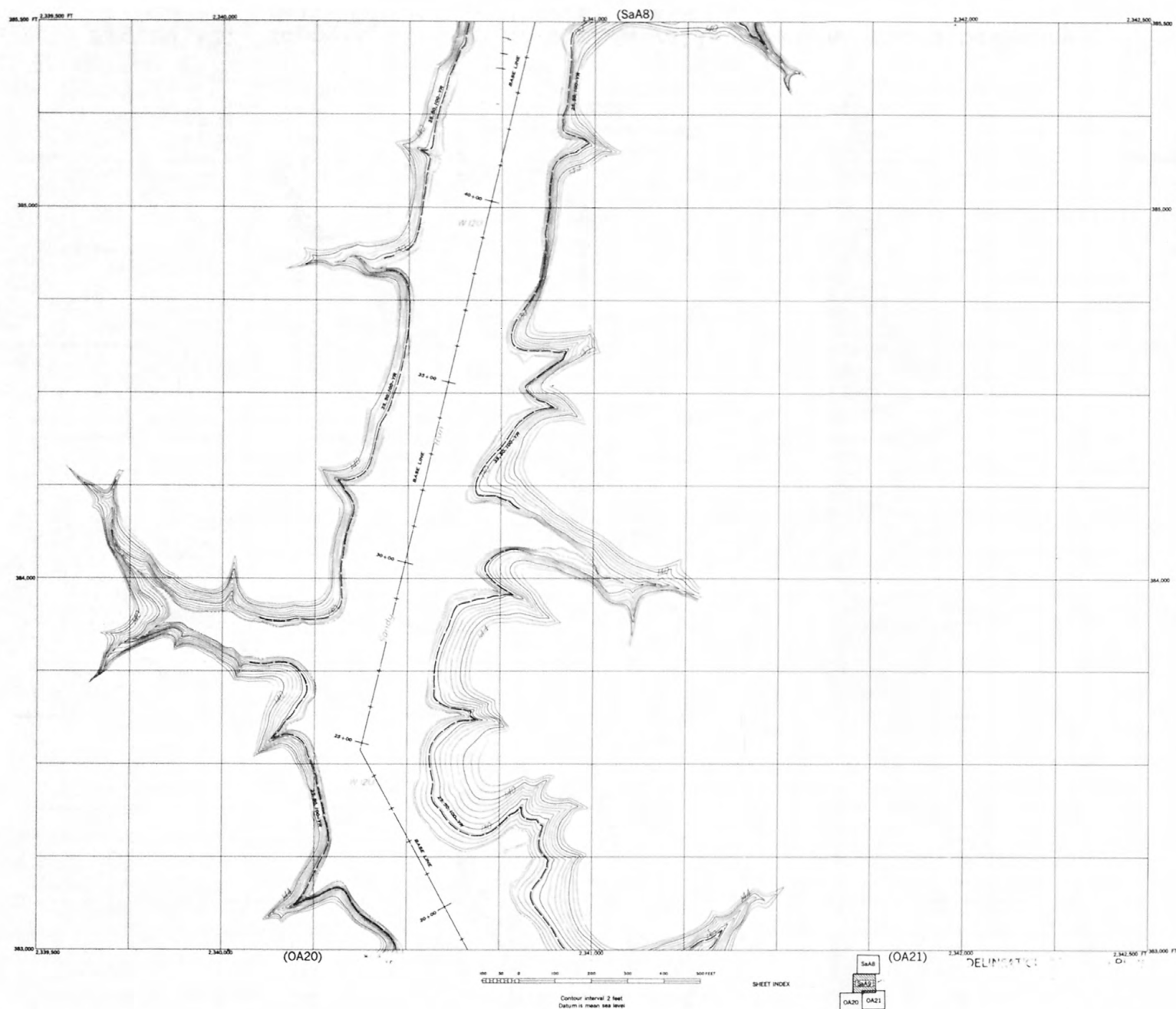


Figure 63. Topographic map of stream valley showing flood boundary delineation, Sandy Run; SaA-9

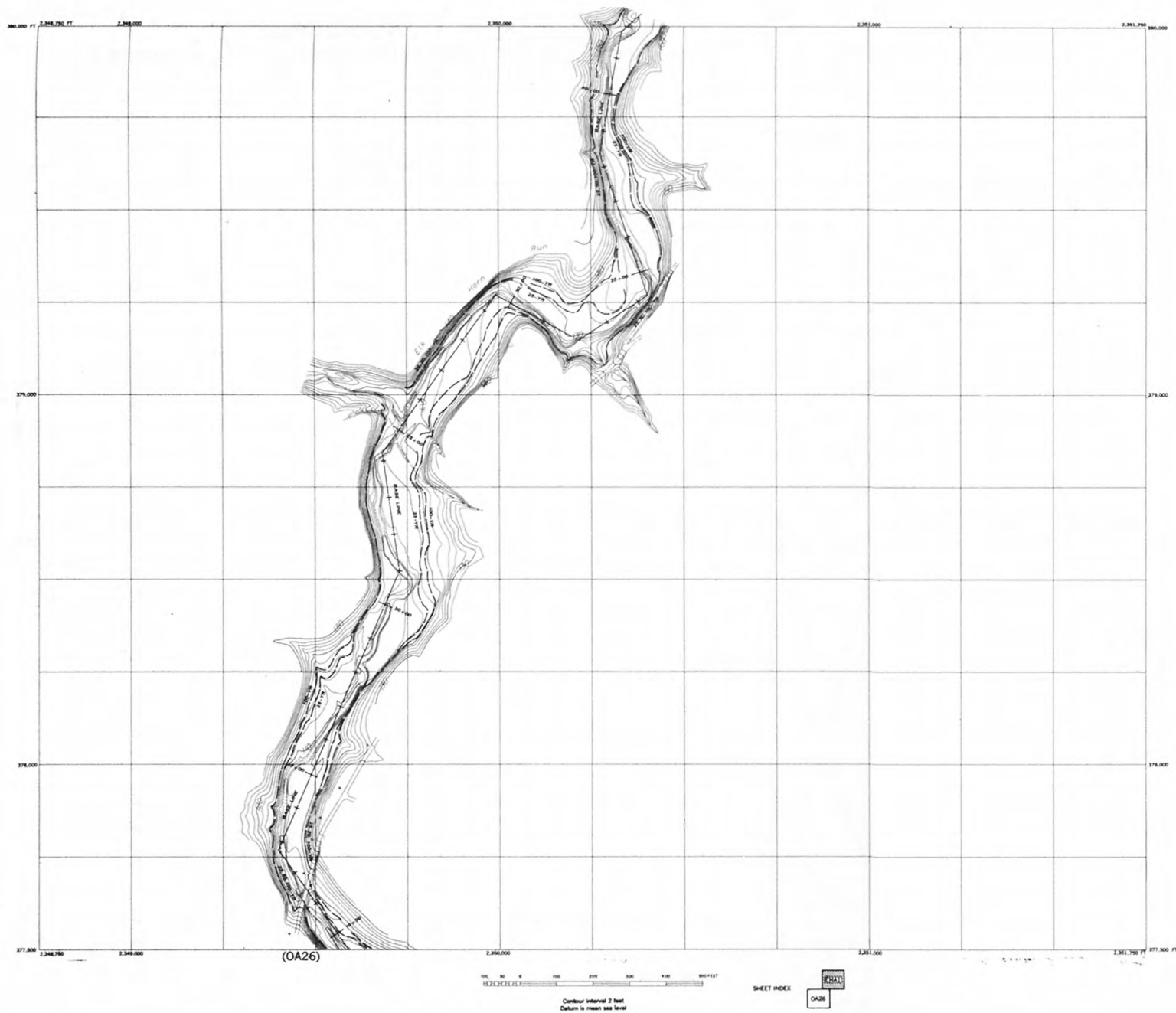


Figure 64. Topographic map of stream valley showing flood boundary delineation, Elk Horn Run; EHA-1

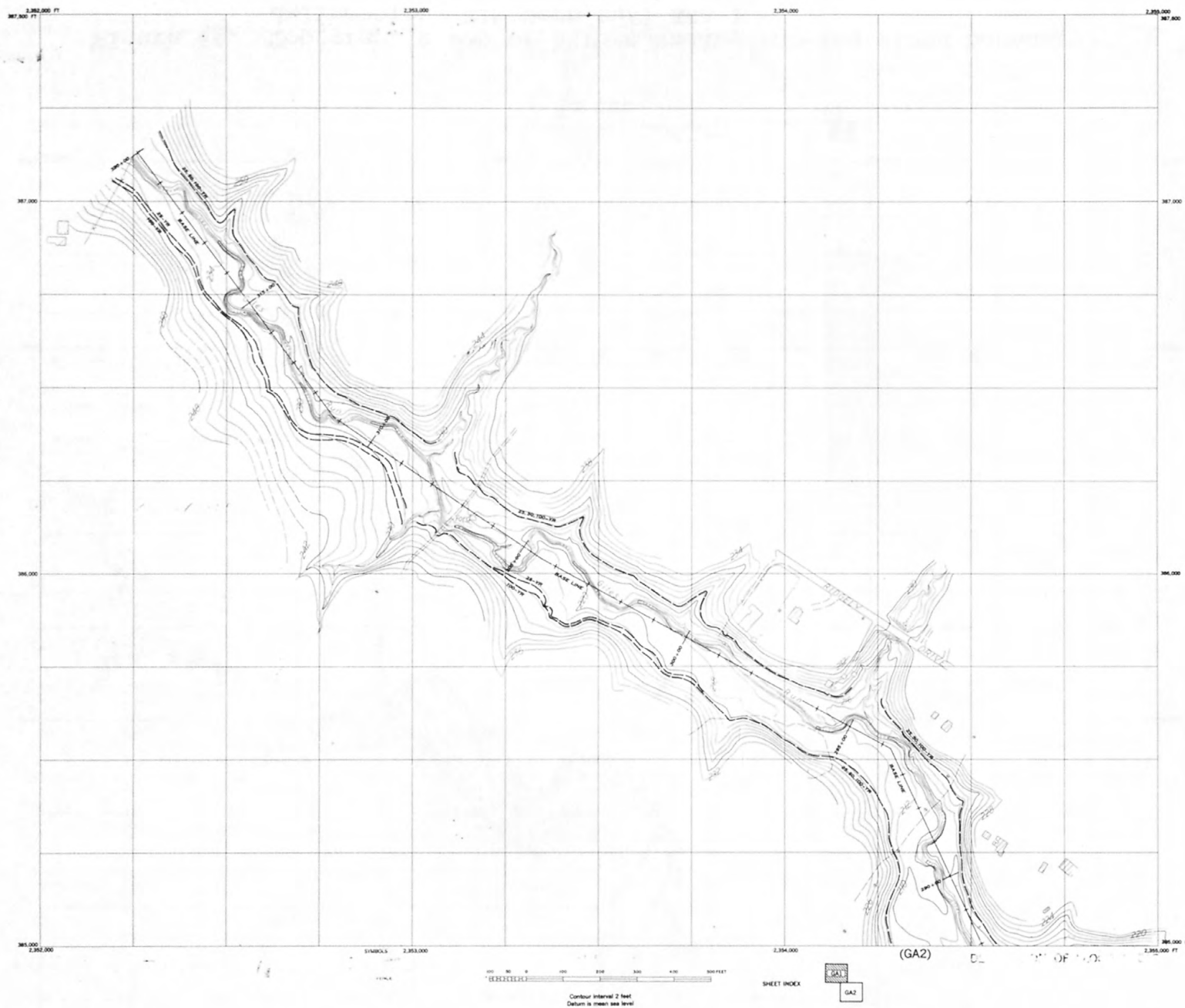


Figure 65. Topographic map of stream valley showing flood boundary delineation, Giles Run; GA-1

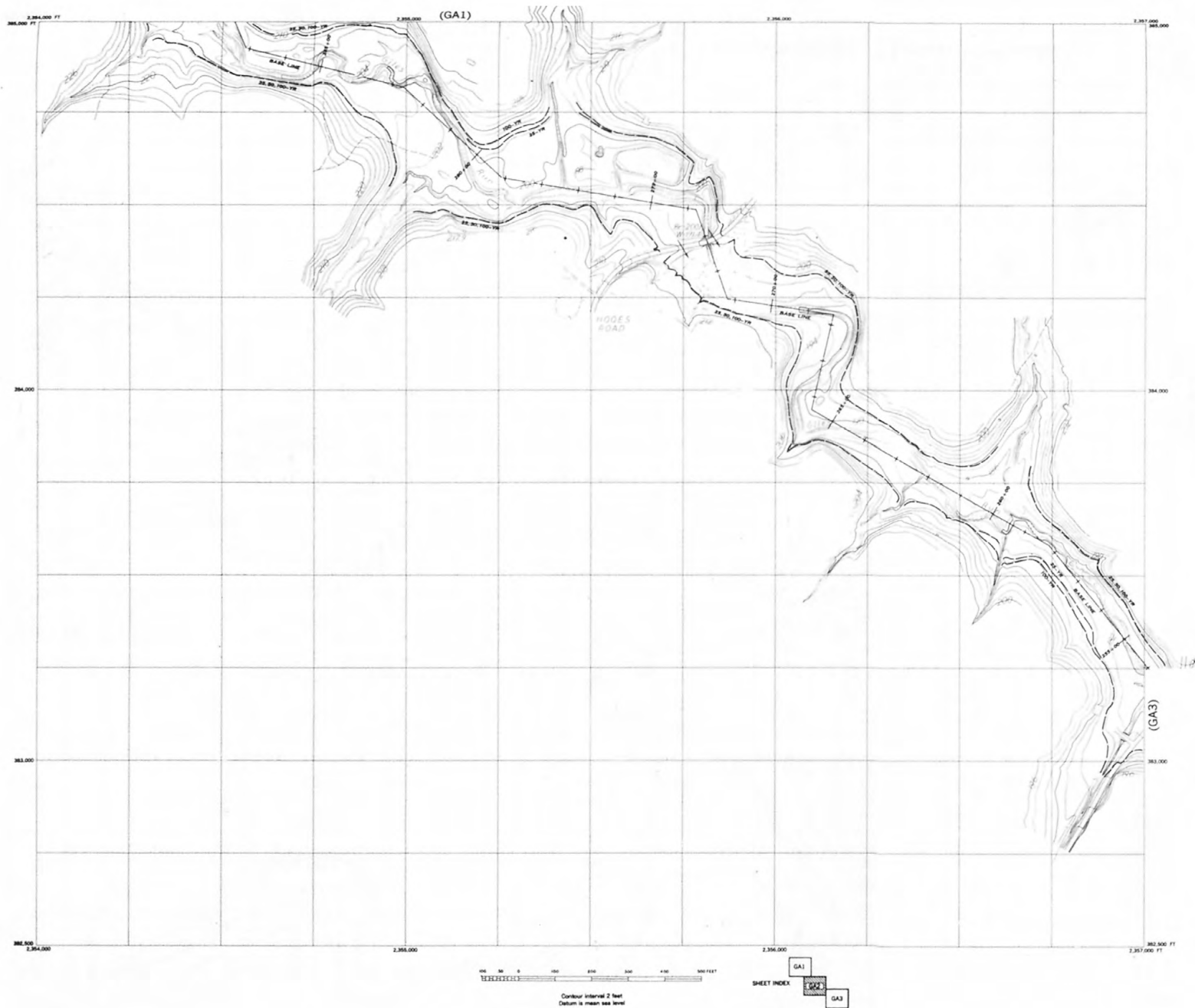


Figure 66. Topographic map of stream valley showing flood boundary delineation, Giles Run; GA-2

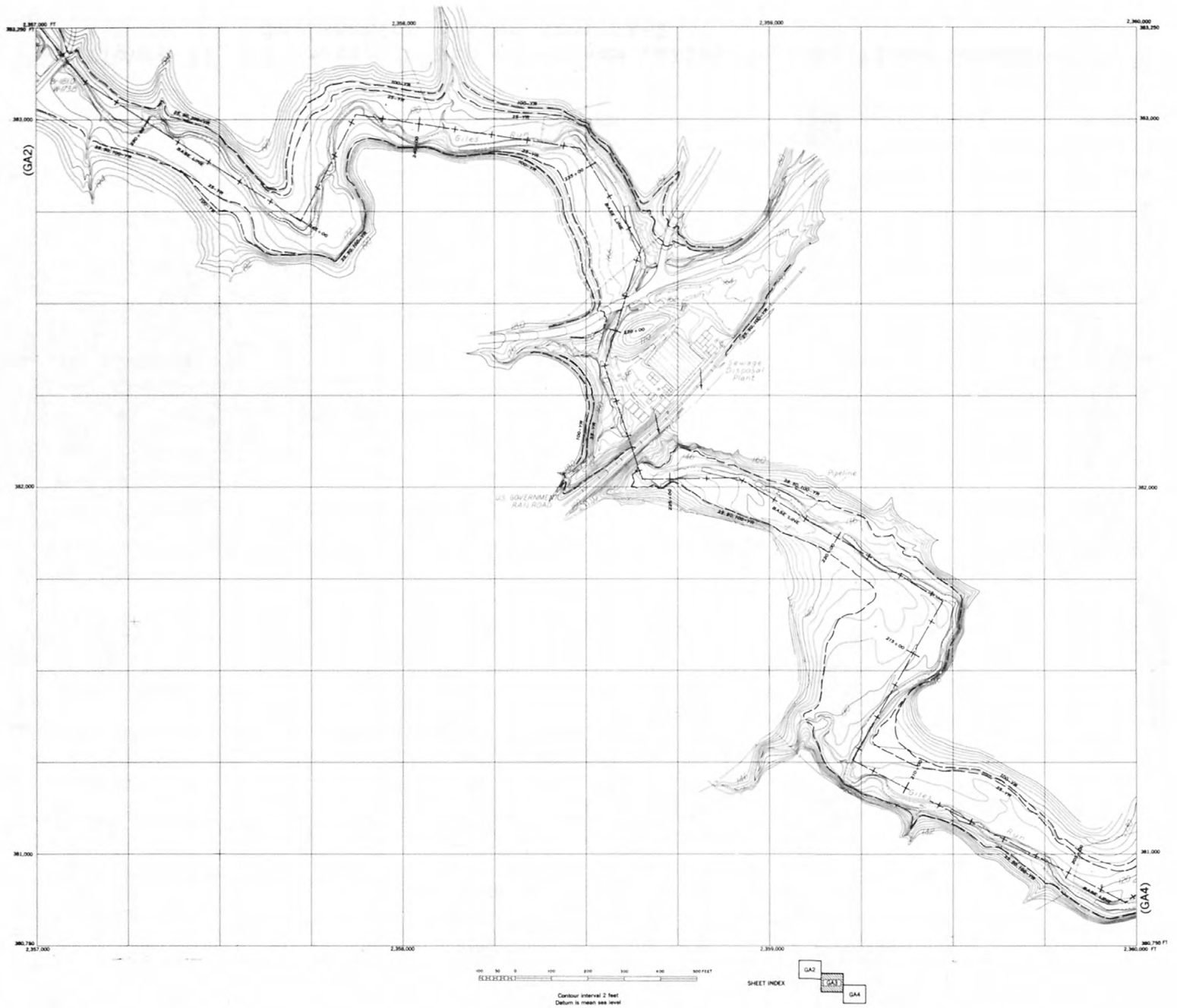


Figure 67. Topographic map of stream valley showing flood boundary delineation, Giles Run; GA-3

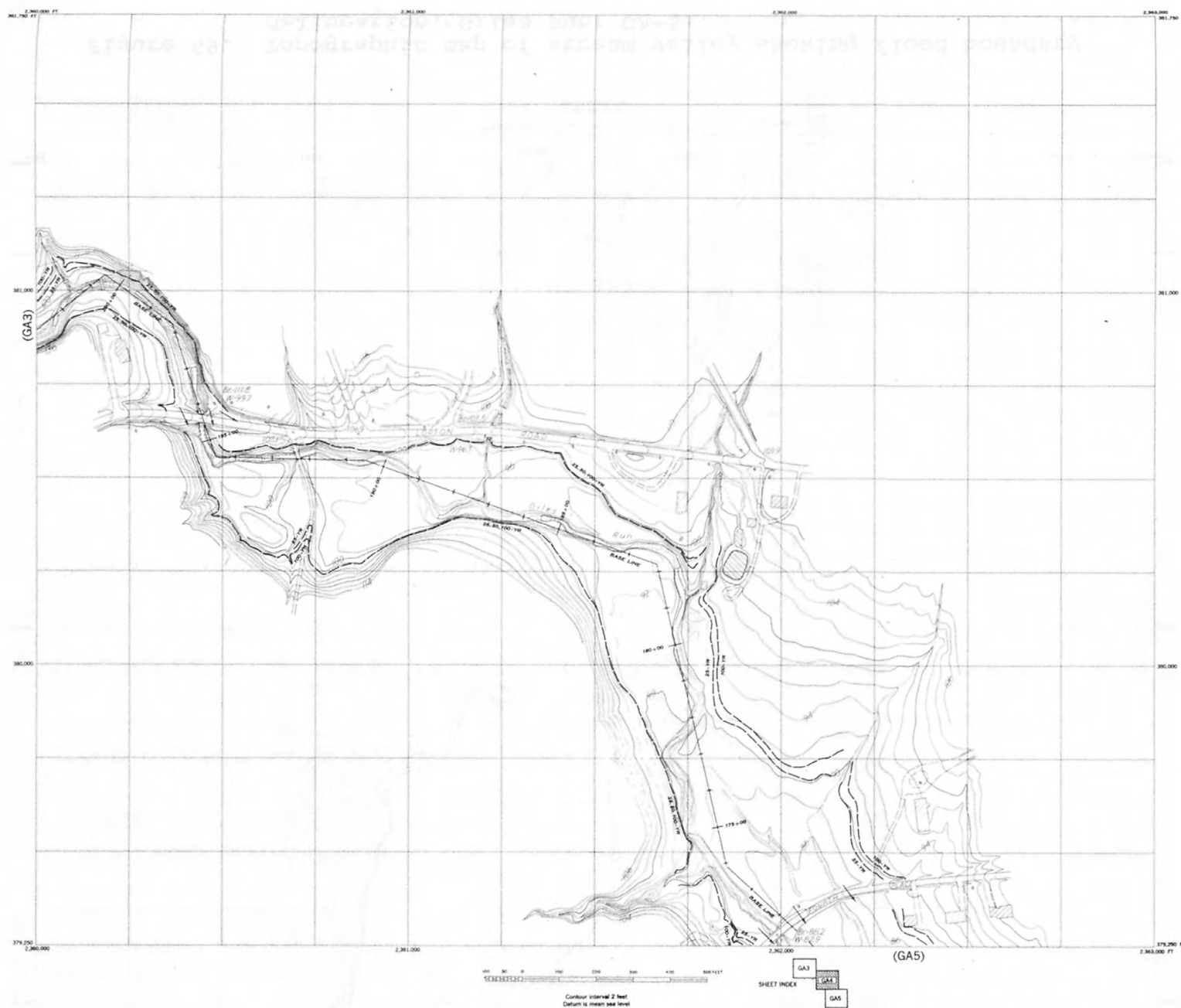


Figure 68. Topographic map of stream valley showing flood boundary delineation, Giles Run; GA-4

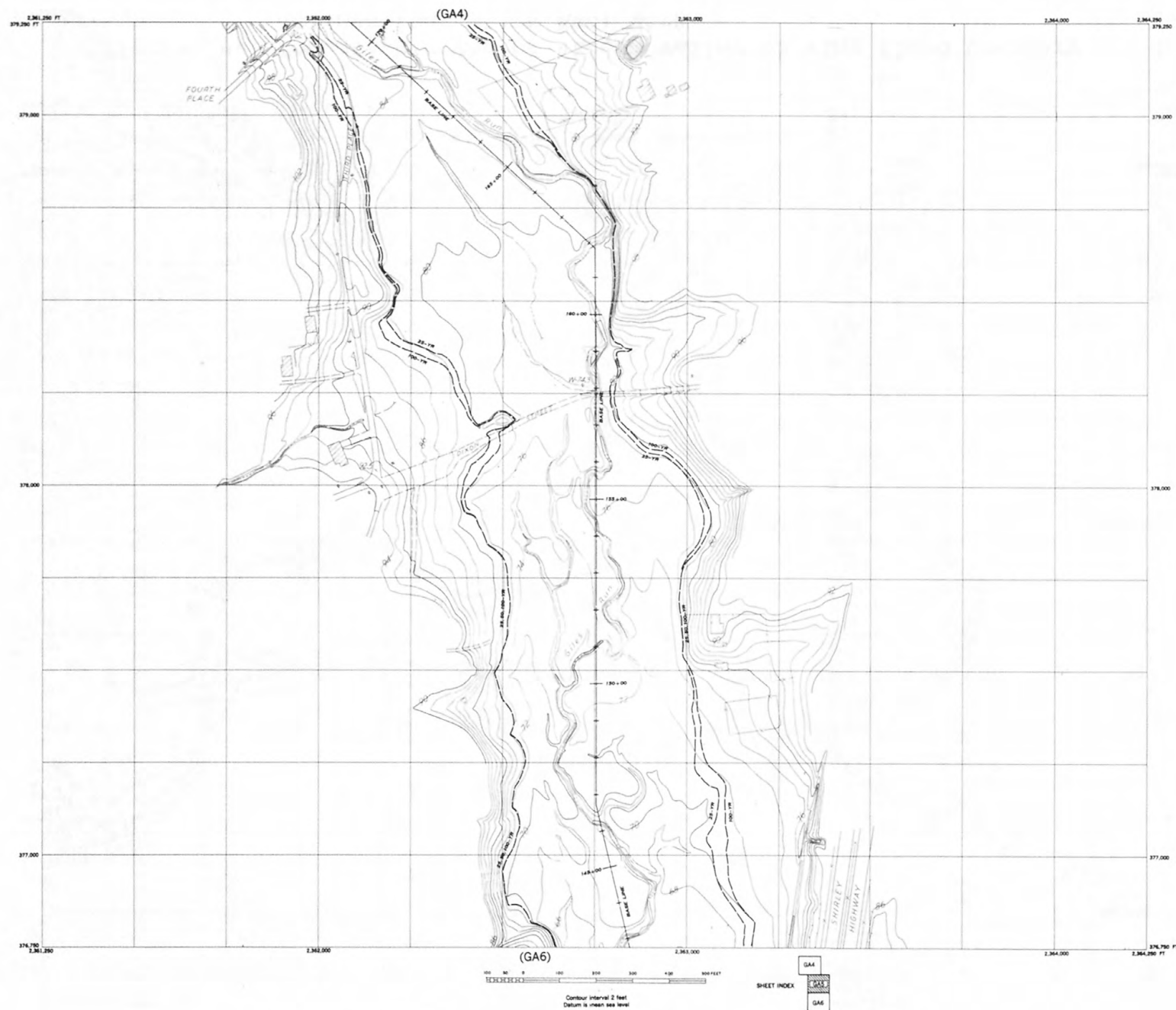


Figure 69. Topographic map of stream valley showing flood boundary delineation, Giles Run; GA-5

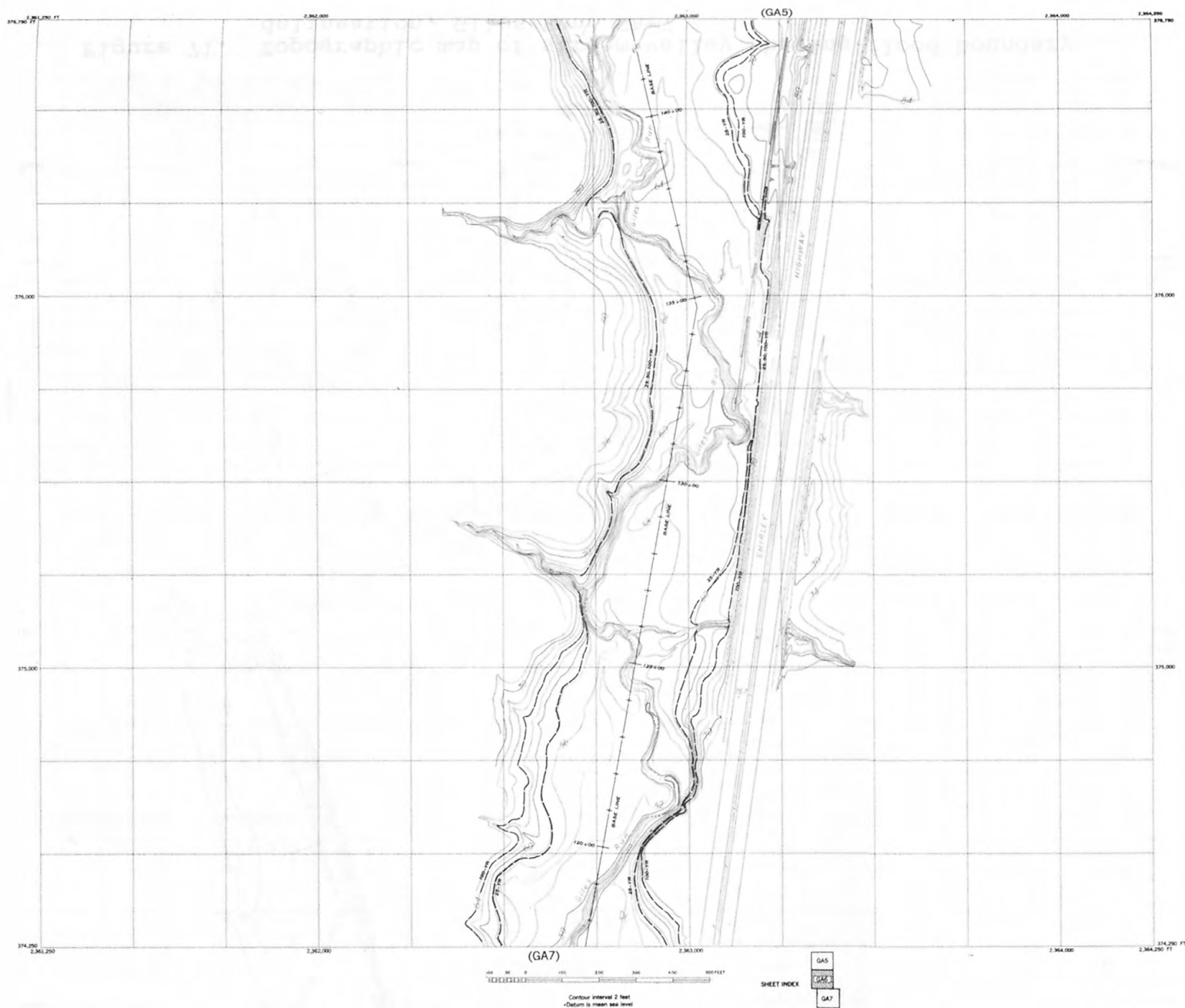


Figure 70. Topographic map of stream valley showing flood boundary delineation, Giles Run; GA-6

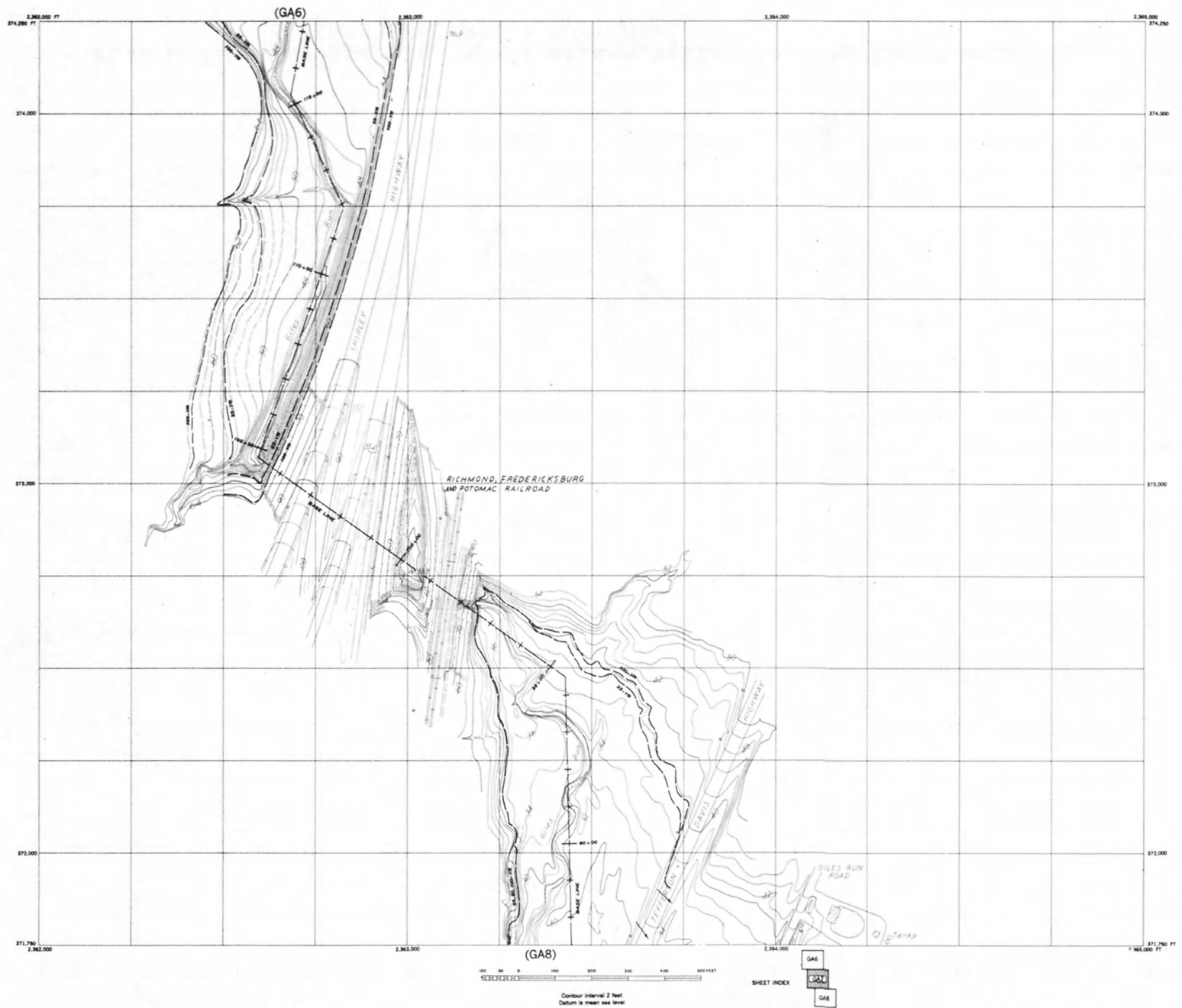


Figure 71. Topographic map of stream valley showing flood boundary delineation, Giles Run; GA-7

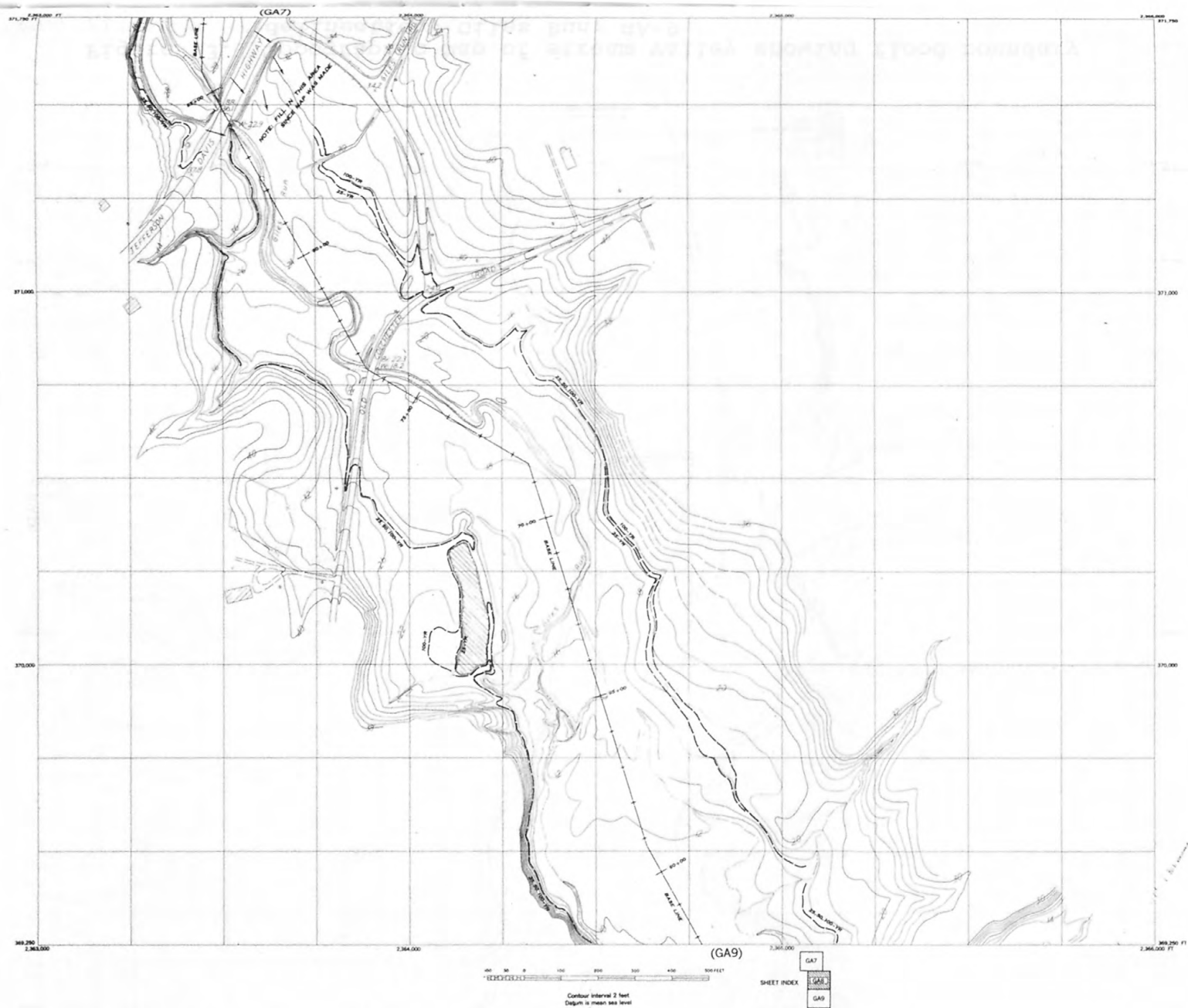


Figure 72. Topographic map of stream valley showing flood boundary delineation, Giles Run; GA-8

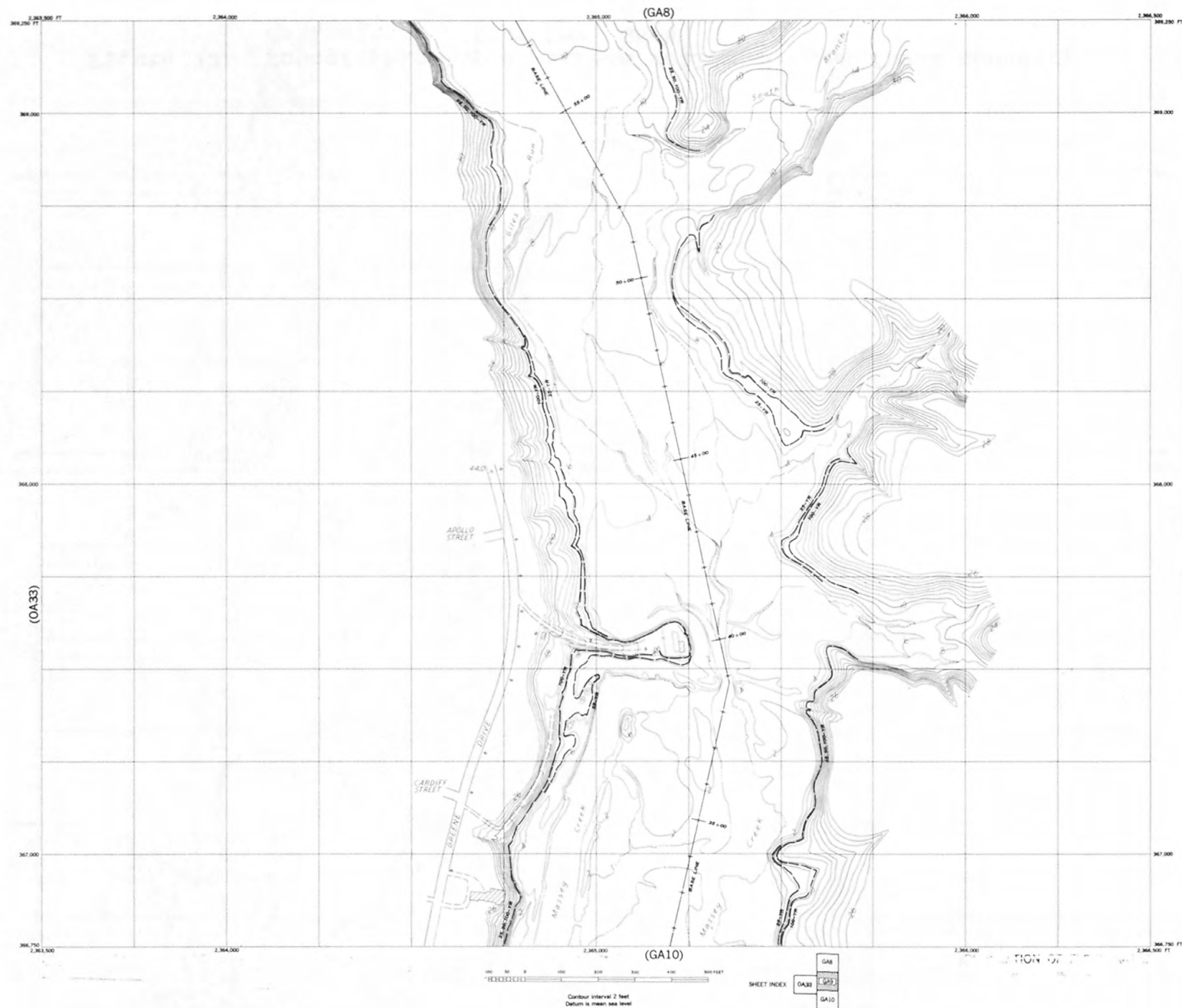


Figure 73. Topographic map of stream valley showing flood boundary delineation, Giles Run; GA-9

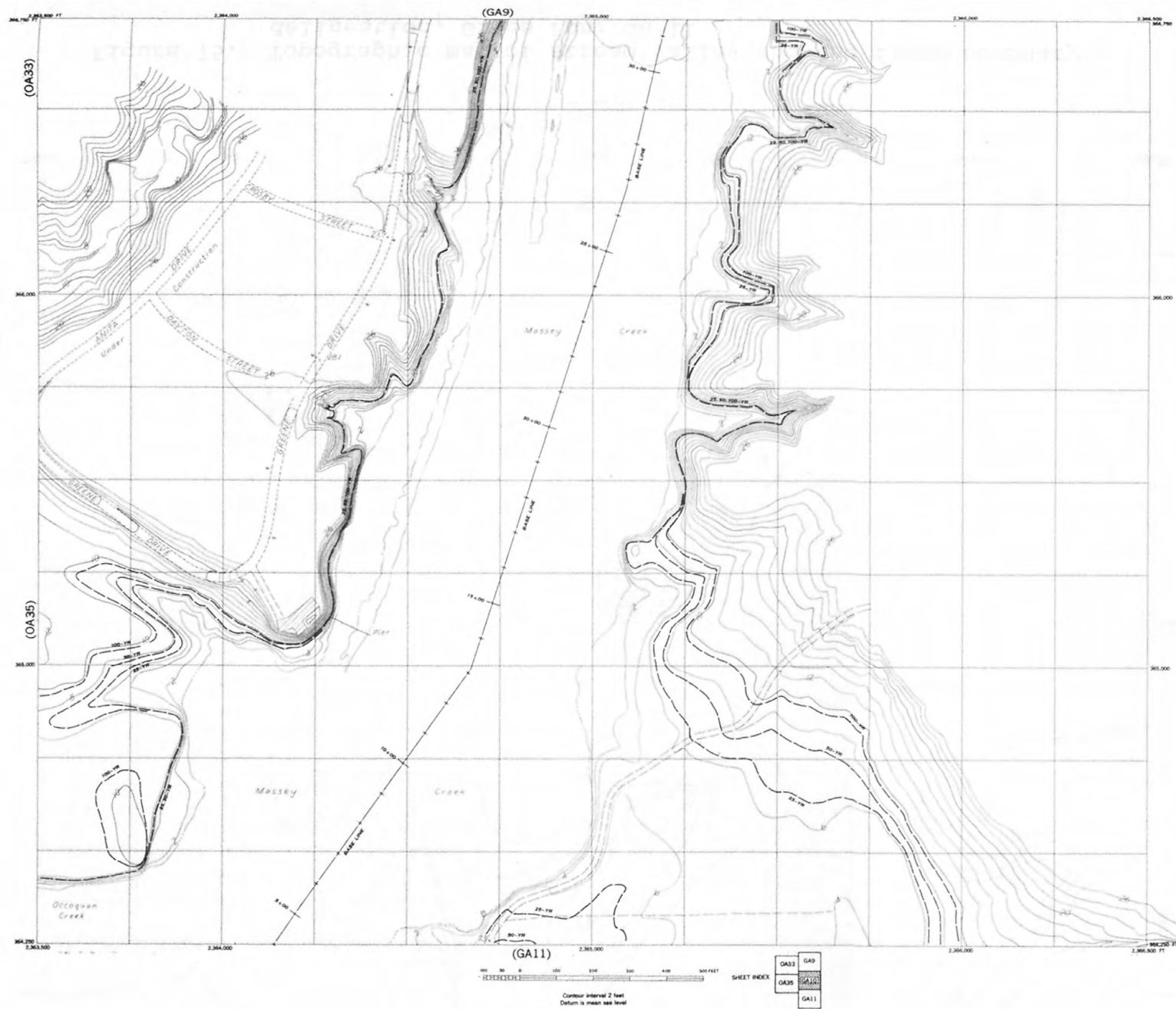


Figure 74. Topographic map of stream valley showing flood boundary delineation, Giles Run; GA-10

Figure 75. Topographic map of stream valley showing flood boundary delineation, Giles Run; GA-11

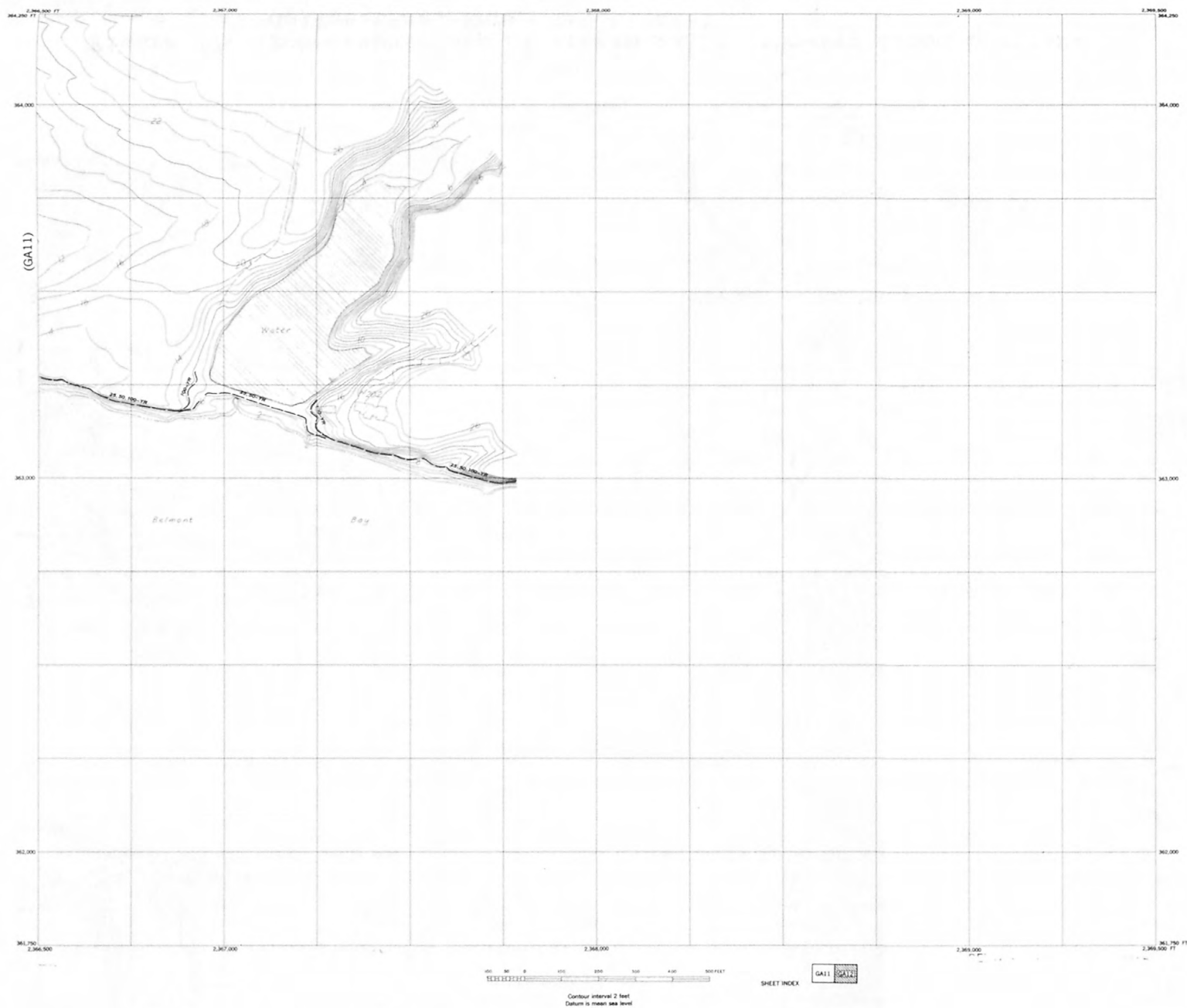


Figure 76. Topographic map of stream valley showing flood boundary delineation; Giles Run; GA-12

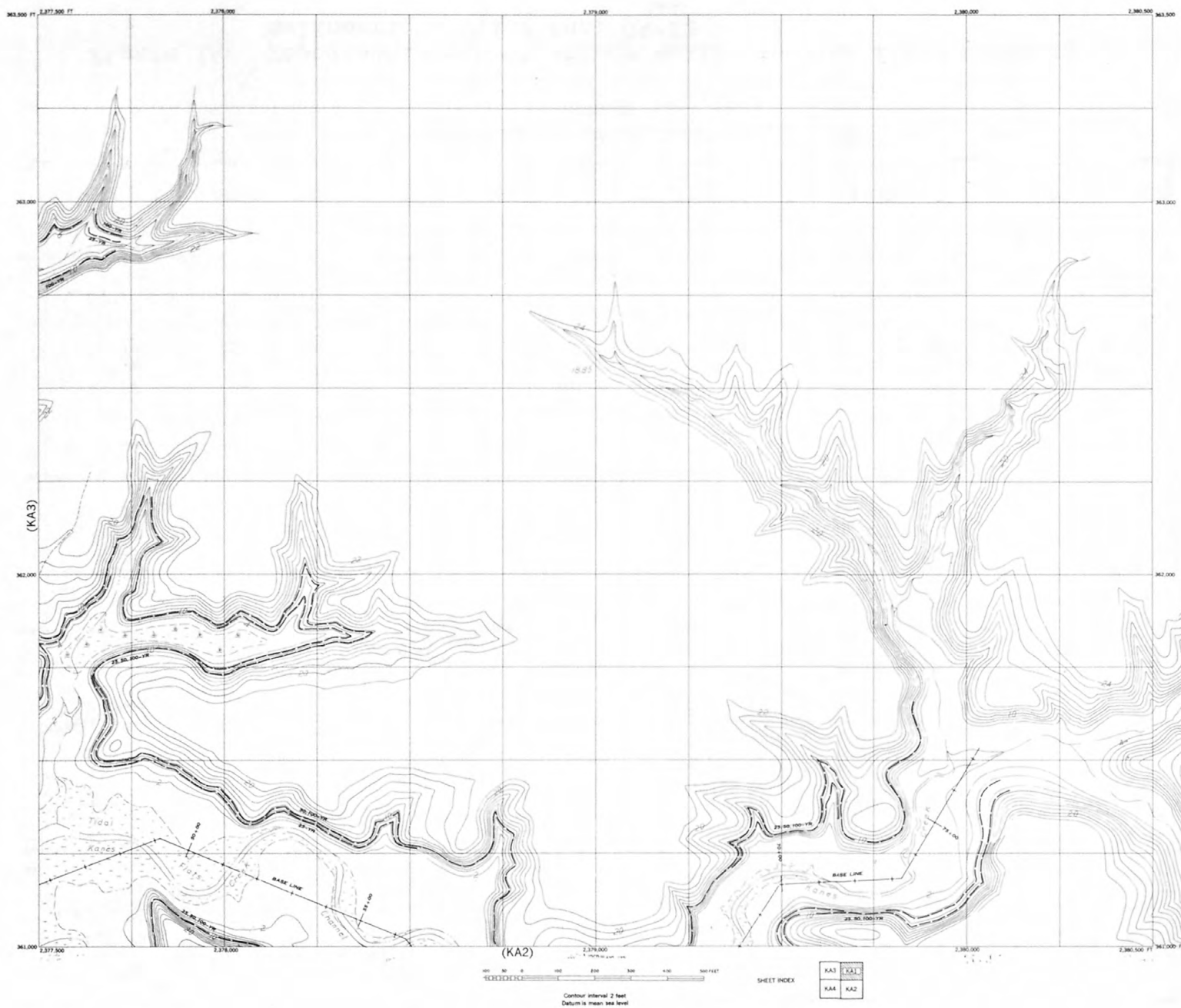


Figure 77. Topographic map of stream valley showing flood boundary delineation, Kanes Creek; KA-1

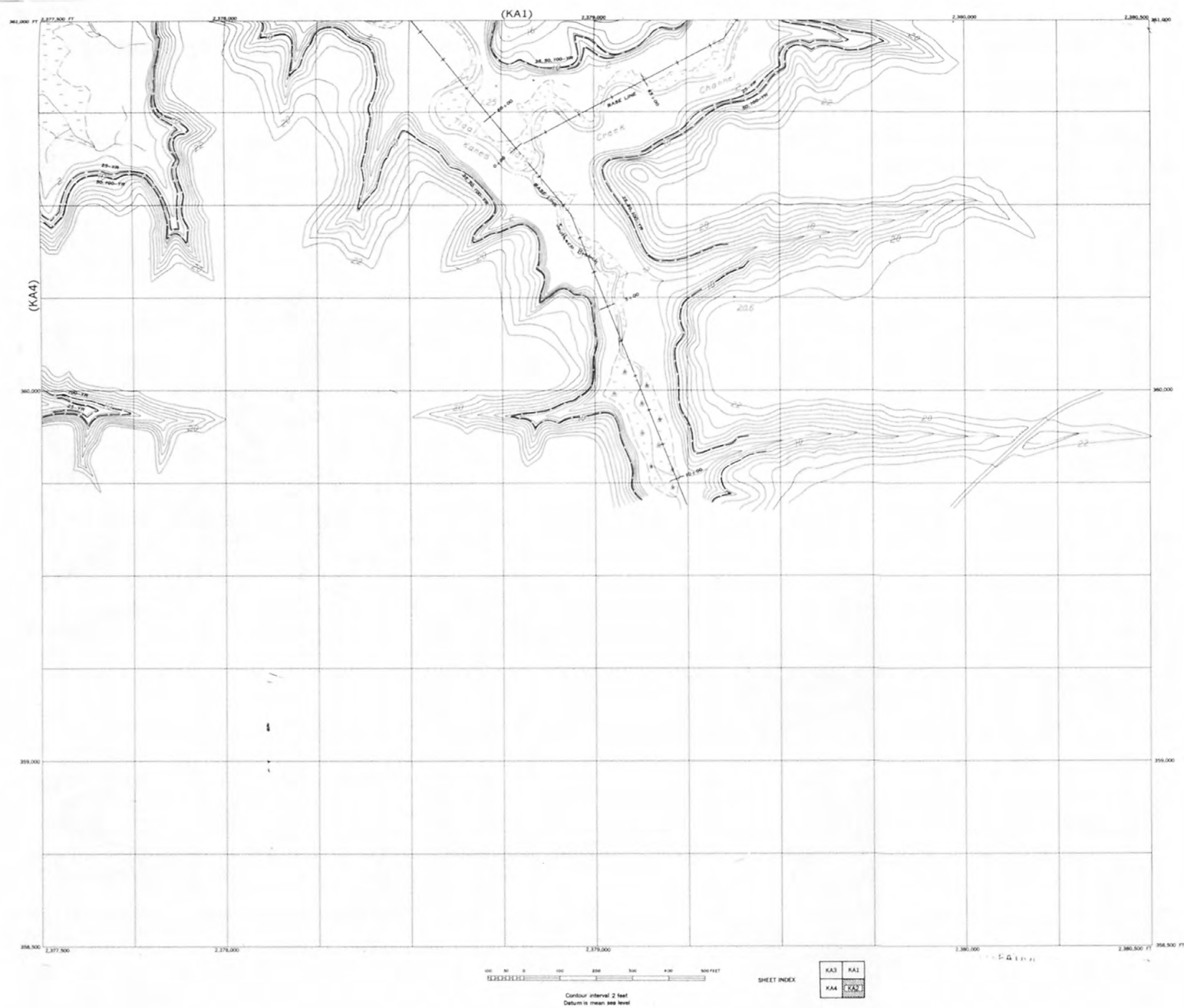


Figure 78. Topographic map of stream valley showing flood boundary delineation, Kanes Creek; KA-2

Figure 79. Topographic map of stream valley showing flood boundary delineation, Kanab Creek; KA-3

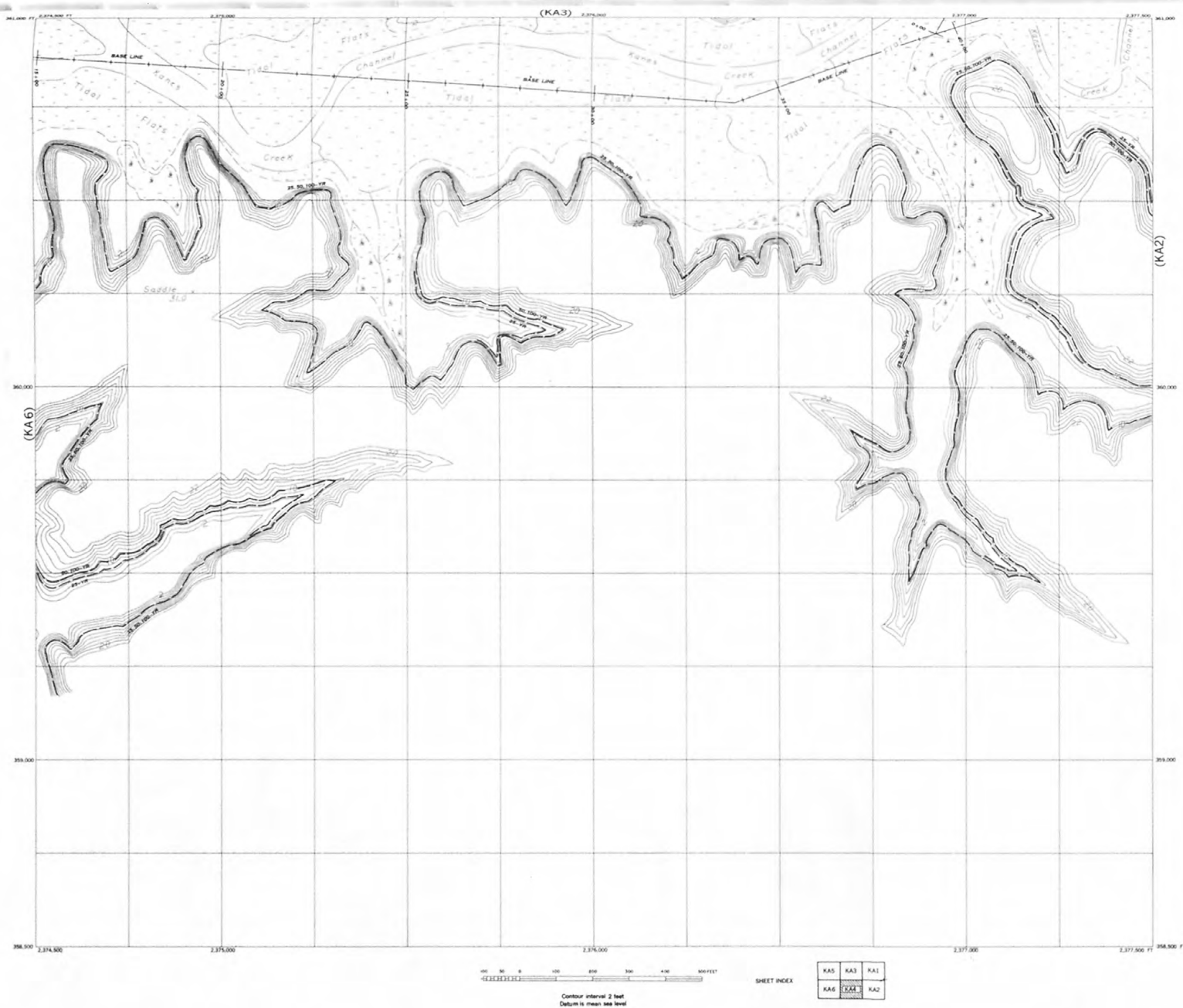


Figure 80. Topographic map of stream valley showing flood boundary delineation, Kanes Creek; KA-4

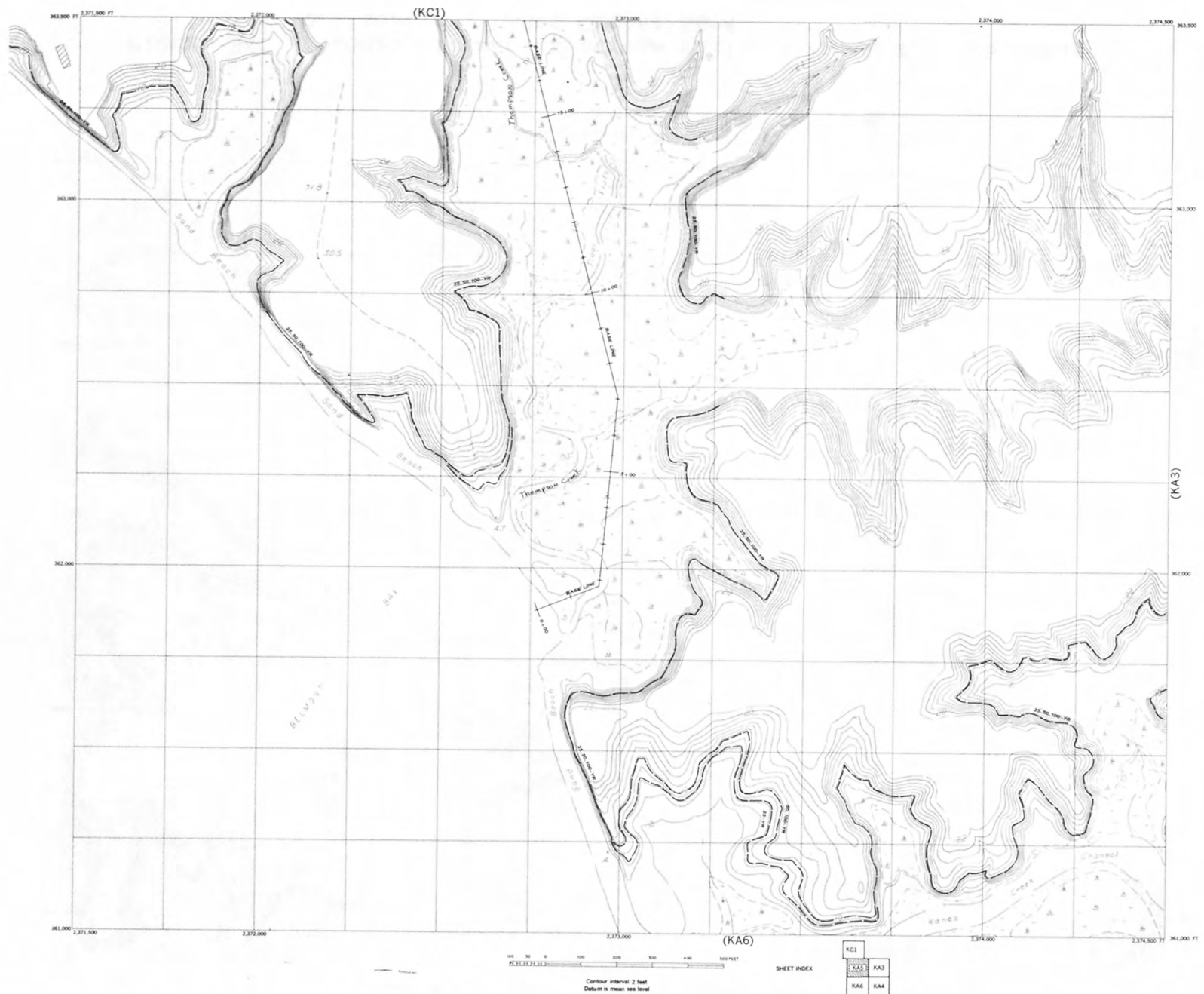


Figure 81. Topographic map of stream valley showing flood boundary delineation, Kanes Creek; KA-5

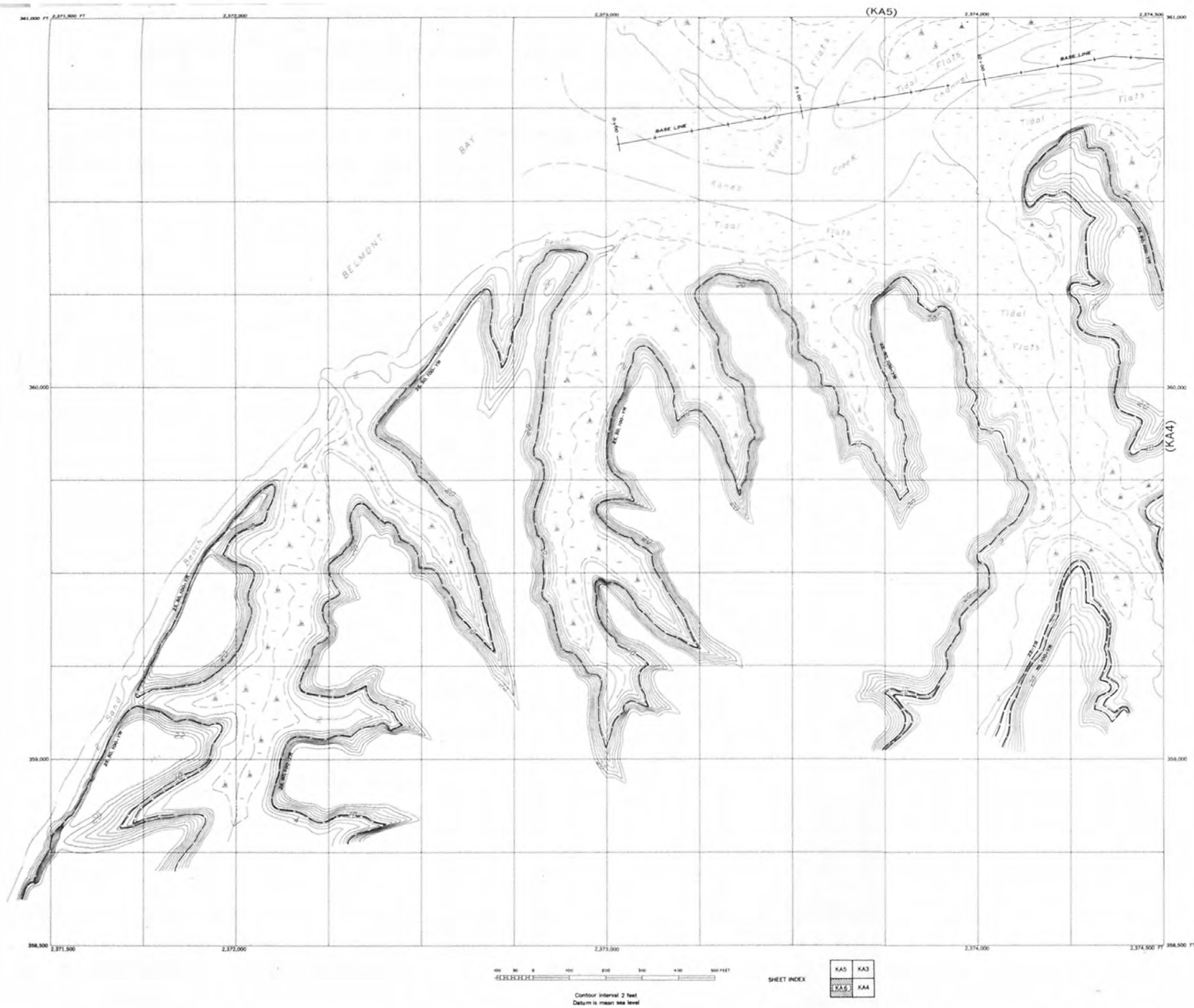


Figure 82. Topographic map of stream valley showing flood boundary delineation, Kanes Creek; KA-6

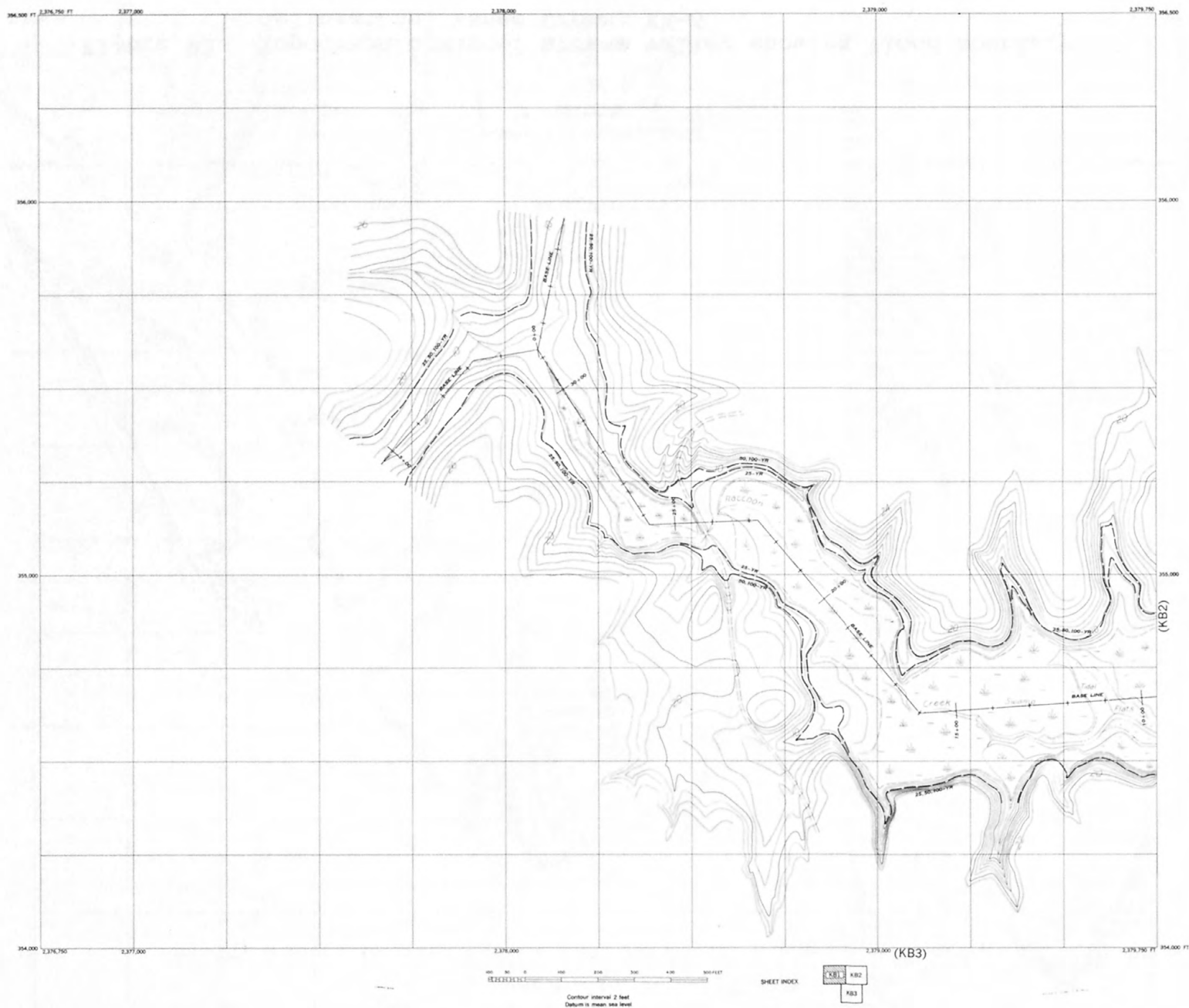


Figure 83. Topographic map of stream valley showing flood boundary delineation, Racoon Creek; KB-1

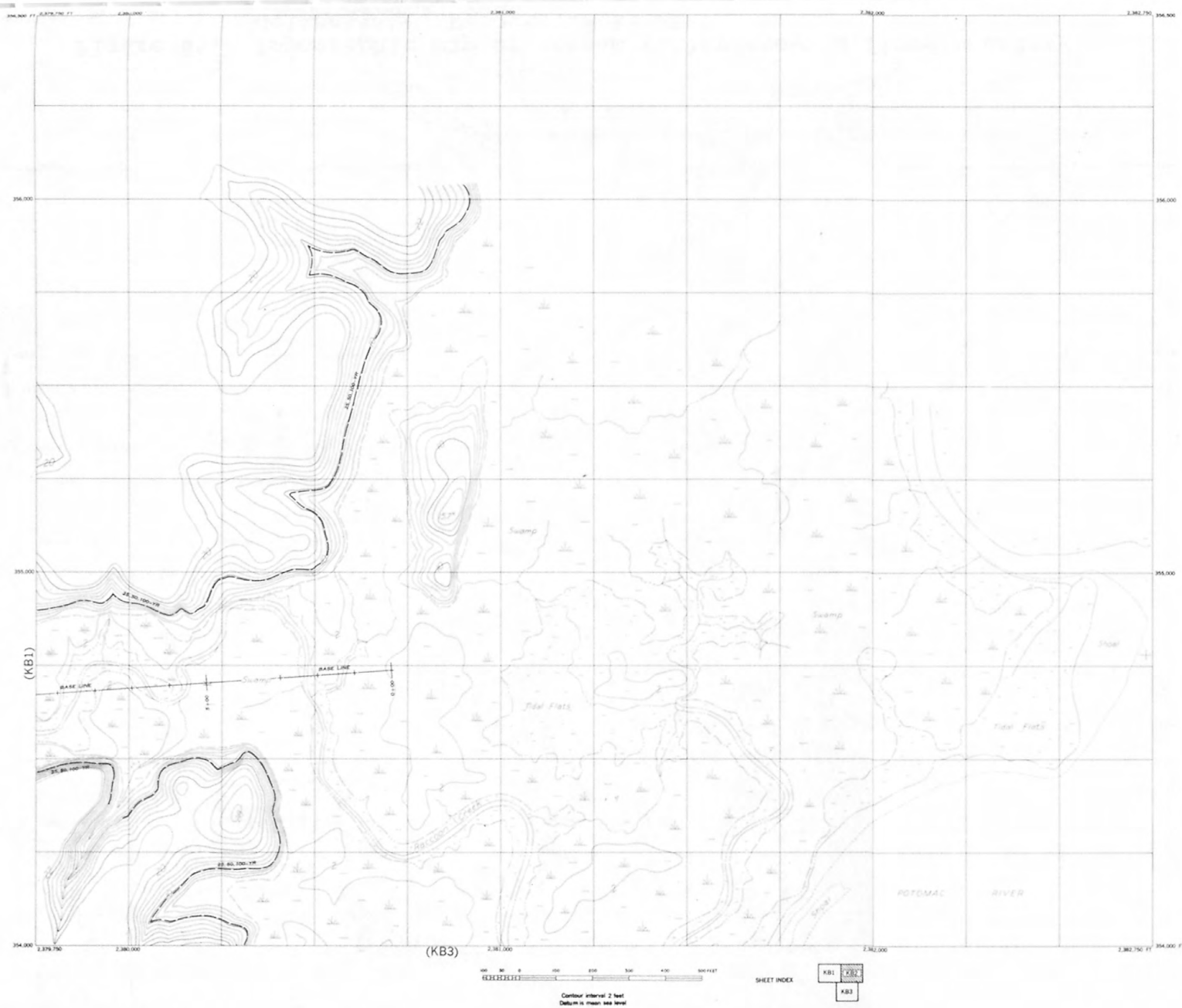


Figure 84. Topographic map of stream valley showing flood boundary delineation, Racoon Creek; KB-2

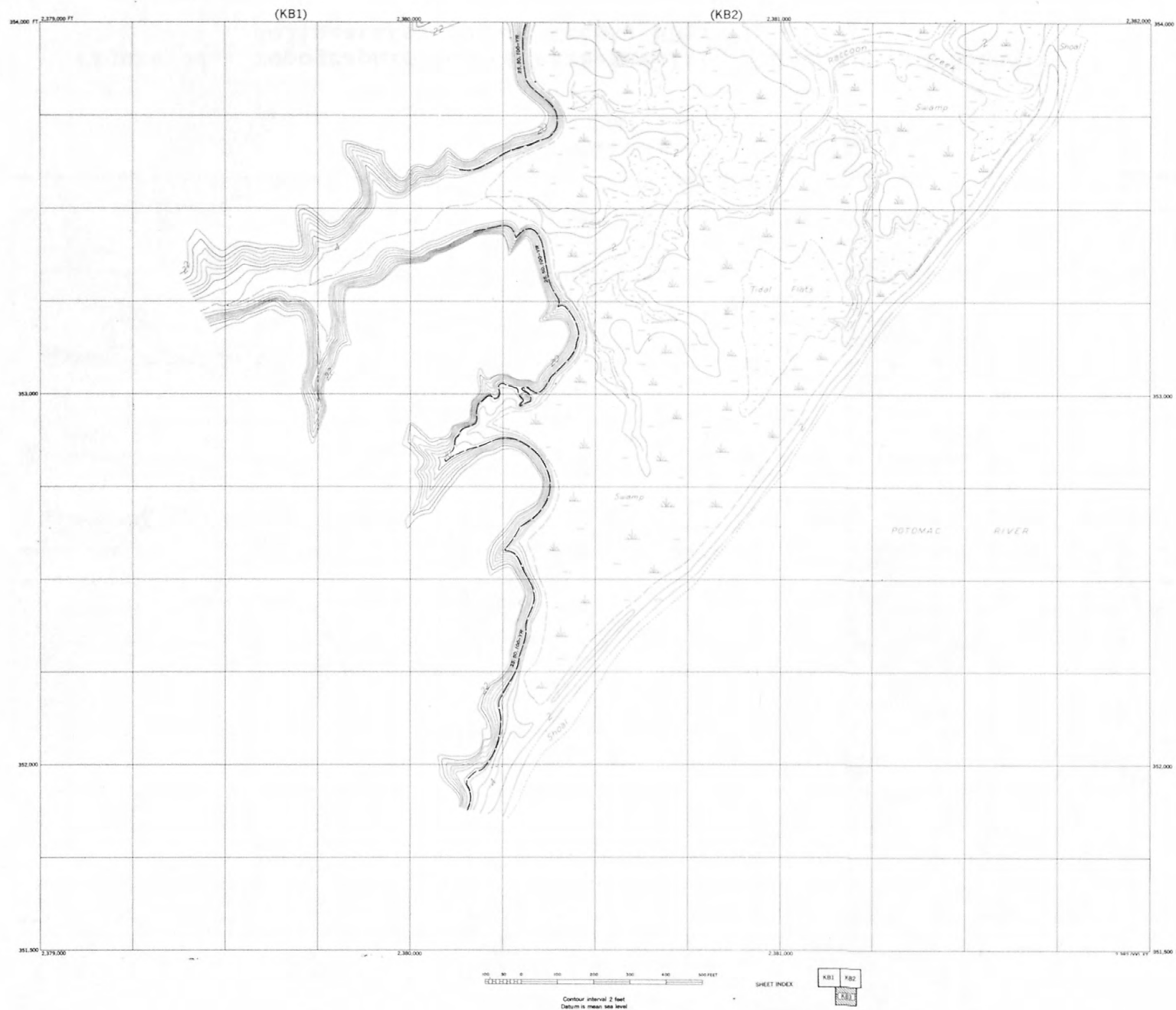


Figure 85. Topographic map of stream valley showing flood boundary delineation, Racoon Creek; KB-3

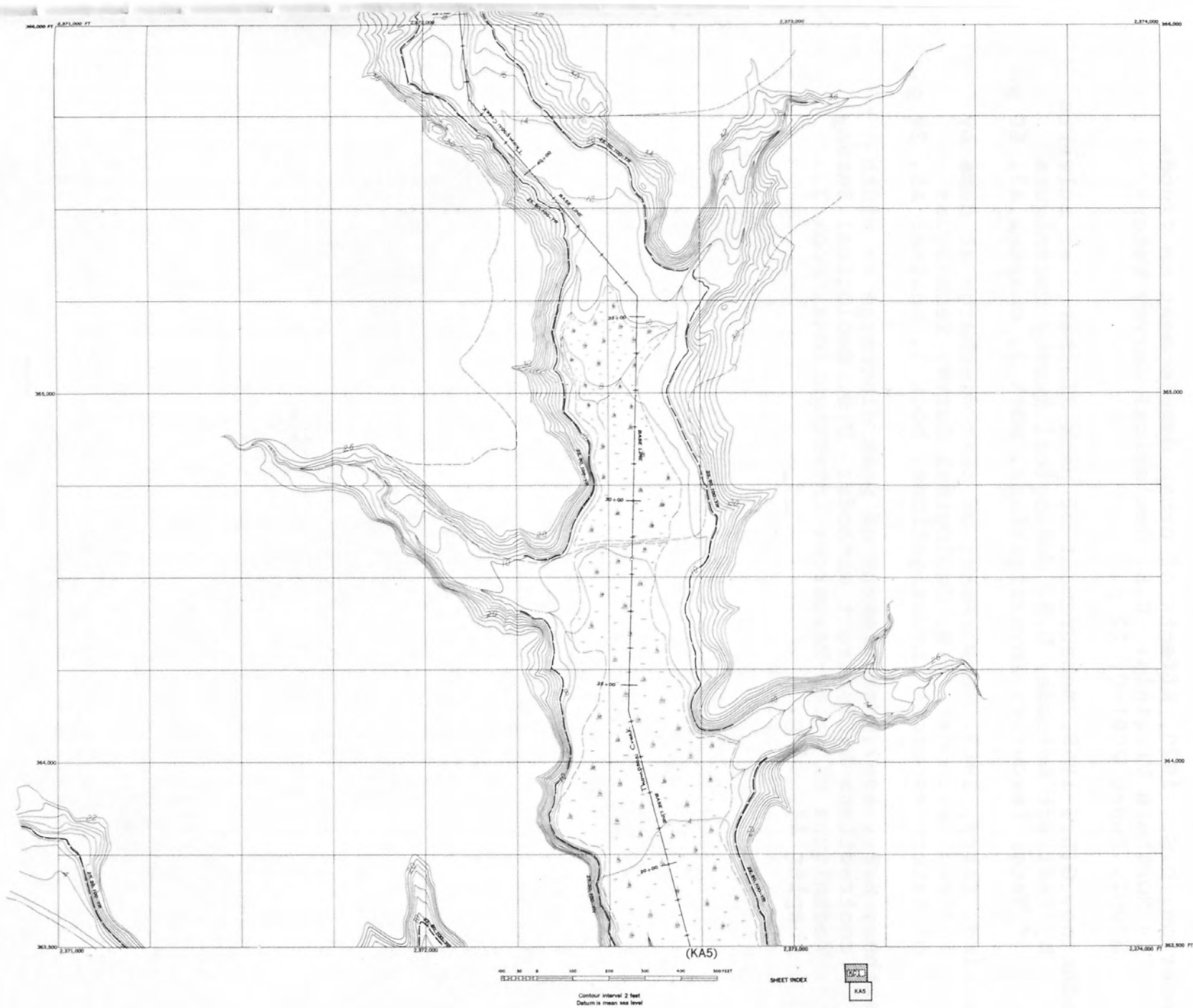


Figure 86. Topographic map of stream valley showing flood boundary delineation, Thompson Creek; KC-1

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