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FLOOD HAZARD IDENTIFICATION REPORT
CLEAR CREEK AND SOUTH CLEAR CREEK
GEORGETOWN, COLORADO

February, 1987

Department of Natural Resources
Colorado Water Conservation Board
J. William McDonald, Director

FLOOD HAZARD IDENTIFICATION REPORT

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GEORGETOWN, COLORADO

Prepared for the

Town of Georgetown

by the

Colorado Water Conservation Board

February, 1987

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PREFACE

This floodplain information report presents the results of a study of the floodplain along Clear and South Clear Creeks in the Town of Georgetown, Colorado. It was prepared by William J. Mullen, P.E. under the direction of Larry Lang, Chief, Flood Control and Floodplain Management Section of the Colorado Water Conservation Board at the request of the Town of Georgetown.

Copies of this report are available for public distribution, for a nominal fee, at the offices listed below.

Town of Georgetown
P.O. Box 426
Georgetown, Colorado 80444

Flood Control and Floodplain
Management Section
Colorado Water Conservation Board
721 State Centennial Building
1313 Sherman Street
Denver, Colorado 80203

INTRODUCTION

Authorization

The Colorado Water Conservation Board received funding from the 1985 legislature to implement a "flood hazard identification program". Through this program, the Board is providing Colorado communities with the flood hazard data and information to administer a floodplain management program.

This report was authorized by the Colorado Water Conservation Board in joint sponsorship with the Town of Georgetown, Colorado.

By Section 37-60-106(1)(c) of the Colorado Revised Statutes, the Board has the legislative charge...

> ... "to devise and formulate methods, means and plans for bringing about the greater utilization of the waters of the state and the prevention of flood damages therefrom and to designate and approve storm or floodway runoff channels or basins, and to make such designations available to legislative bodies of cities and incorporated towns; to county planning commissions; and to boards of adjustment of cities; incorporated towns; and counties of this state"...

The Town of Georgetown requested this flood study by letter dated June 2, 1986 from Mr. Lee Woolsey, the Town Administrator for the Town of Georgetown (see Exhibit 1).

Purpose and Scope

This report was prepared to guide local officials in planning and administration of floodplain areas such that flood hazards and future flood damages are minimized.

The report data includes flooded area maps delineating the 100-year flood boundary, 10-year and 100-year flood profiles and a plot of typical cross sections showing the 100-year high water elevations. This report also includes supporting engineering and hydrologic data which may also be used in the location and design of roads, bridges and channel modifications.

Acknowledgements

The assistance and cooperation of Lee Woolsey, Town Administrator, Town of Georgetown is appreciated.

Related Flood Studies

Black and Veatch Consulting Engineers had performed a floodplain analysis for Clear and South Clear Creeks in the Georgetown corporate limits in the 1970's for the Federal Insurance Agency (FIA); however, FIA voided the final report when it was determined that the technical and support data for the water surface profile calculations was incomplete.

STUDY AREA DESCRIPTION

Drainage Basin Characteristics

Clear Creek and South Clear Creek (also known locally as Leavenworth Creek) both flow through Georgetown in narrow channels with fairly steep slopes. Headwaters of Clear Creek are located near the Continental Divide with the highest point in the basin at 14,270 feet (Grays Peak). Clear Creek at Georgetown Lake (at the downstream end of Georgetown) has a water surface elevation of approximately 8445 feet. The creek traverses easterly for most of its length until it reaches Georgetown, where it flows northerly. Clear Creek has no major tributaries with the exception of South Clear Creek, which has its confluence in the Georgetown corporate limits. The drainage area of Clear Creek at the Georgetown Lake spillway, which is near Georgetown's downstream corporate limit, is 81 square miles and upstream of the confluence of South Clear Creek the drainage area is 47.5 square miles (see Basin Map, Plate 1).

Headwaters of South Clear Creek basin are located near the Continental Divide with the highest point in the basin at elevation 13,850 feet (Mount Edwards). South Clear Creek travels northerly from its headwaters to its confluence with Clear Creek within Georgetown's corporate limits. South Clear Creek has one major tributary- Leavenworth Creek which has its confluence with South Clear Creek approximately one mile upstream from Georgetown's upstream corporate limit. The drainage area of South Clear Creek to its confluence with Clear Creek is 30.7 square miles.

Study Reach Description

The study reach along Clear Creek extends from approximately 500 feet downstream from Georgetown's upstream corporate limit to Georgetown's downstream corporate limit (at Georgetown Reservoir). Mapping limitations prevented the study from extending to the upstream corporate limit. This reach covers a length of 1.8 miles. There is extensive development along the creek through town.

The study reach along South Clear Creek extends from approximately 100 feet downstream from Georgetown's upstream corporate limit to its confluence with Clear Creek. This reach covers a length of 0.8 miles of which all is in the corporate limit for Georgetown. There is extensive development along the creek through the town.

The study reaches were included in the Federal Insurance Administration's Flood Hazard Boundary Map (FHBM) for the Town of Georgetown (Community No. 080035, map effective January 2, 1980). The FHBM is shown in Exhibit 2. The FHBM was derived using detailed methods; however, as previously explained, the input to the water surface computer program was lost, and thus FIA voided the results of the detailed study. The corporate boundary shown on the FHBM is incorrect according to Lee Woolsey, the Town Administrator. Exhibit 3 shows the correct corporate limit.

HYDROLOGIC AND HYDRAULIC DETERMINATIONS

Flood History

Major flooding has occurred throughout the study reaches of Georgetown. A flood occurred along Clear Creek at Rose and 10th Streets on June 9, 1864. A levee was constructed the following day to keep the stream within its limits (Ref. 7). Another flood occurred following three days of heavy rainfall ending on July 23, 1965, when water spilled out of its banks at three locations along South Clear Creek and an area from Main to Rose and 8th to 11th Streets was inundated (Ref. 7). A snowmelt flood occurred along Clear and South Clear Creeks in June, 1983. Sandbagging of the creeks took place and Rose Street was cordoned off for 3 blocks during evening hours as a precaution.

Flood Characteristics

Flooding in Georgetown is primarily caused by either spring snowmelt or snowmelt in conjunction with rainfall. An exception to the usual pattern of flooding occurred on July 23,1965 (see above). Heavy hailstorms occasionally cause drifts of hail that block drainage paths and create some flooding.

Hydrologic Analysis

Hydrology for Clear Creek and South Clear Creek was obtained through methods described in "Manual for Estimating Flood Characteristics of Natural-Flow Streams in Colorado", commonly referred to as Technical Manual 1 (see Ref. 5). There are no flood control reservoirs upstream from town on either creek, nor any detention reservoirs.

Hydrology for Clear Creek at the northern corporate limit of Georgetown (downstream from its confluence with South Clear Creek) was derived through a statistical analysis of annual peak flows at USGS gage 06716500, Clear Creek near Lawson. This information was then transferred to the subject location using a procedure detailed in TM-1. The procedure involved a weighting of the computed flood peaks at the gage with flood peaks calculated with regional regression equations (Mountain Region equations). Drainage area ratios are also employed in this method. Data used in establishing peak flows were as follows: 38 years of annual peak flows from the Lawson gage data (water years 1946-84, excluding 1956); drainage area at the gage; drainage area at Georgetown's northern corporate limit; and mean annual precipitation above the gage. The statistical analysis of the 38 years of gage data used a Log-Pearson Type 3 fitting of the data.

Hydrology for South Clear Creek and for Clear Creek upstream from its confluence with South Clear Creek was based on the Mountain Region regression equations. Parameters used in establishing peak flows were: drainage area of Clear Creek upstream from its confluence with South Clear Creek; mean annual precipitation upstream from this point; drainage area of South Clear Creek; and mean annual precipitation upstream from the mouth of the creek.

Results of this analysis are summarized as follows:

Location	Drainage area (square miles)	Peak Discharge 10 yr (cfs)	50 yr (cfs)	100 yr (cfs)	500 yr (cfs)
Clear Cr. at northern corp. limit of Georgetown	81.0	980	1330	1480	1810
Clear Cr. upstream from South Clear Cr.	47.5	600	830	910	1110
South Clear Cr. at mouth	30.7	420	580	640	790

A plot of the frequency-discharge curve for the three locations is shown in Figure 1.

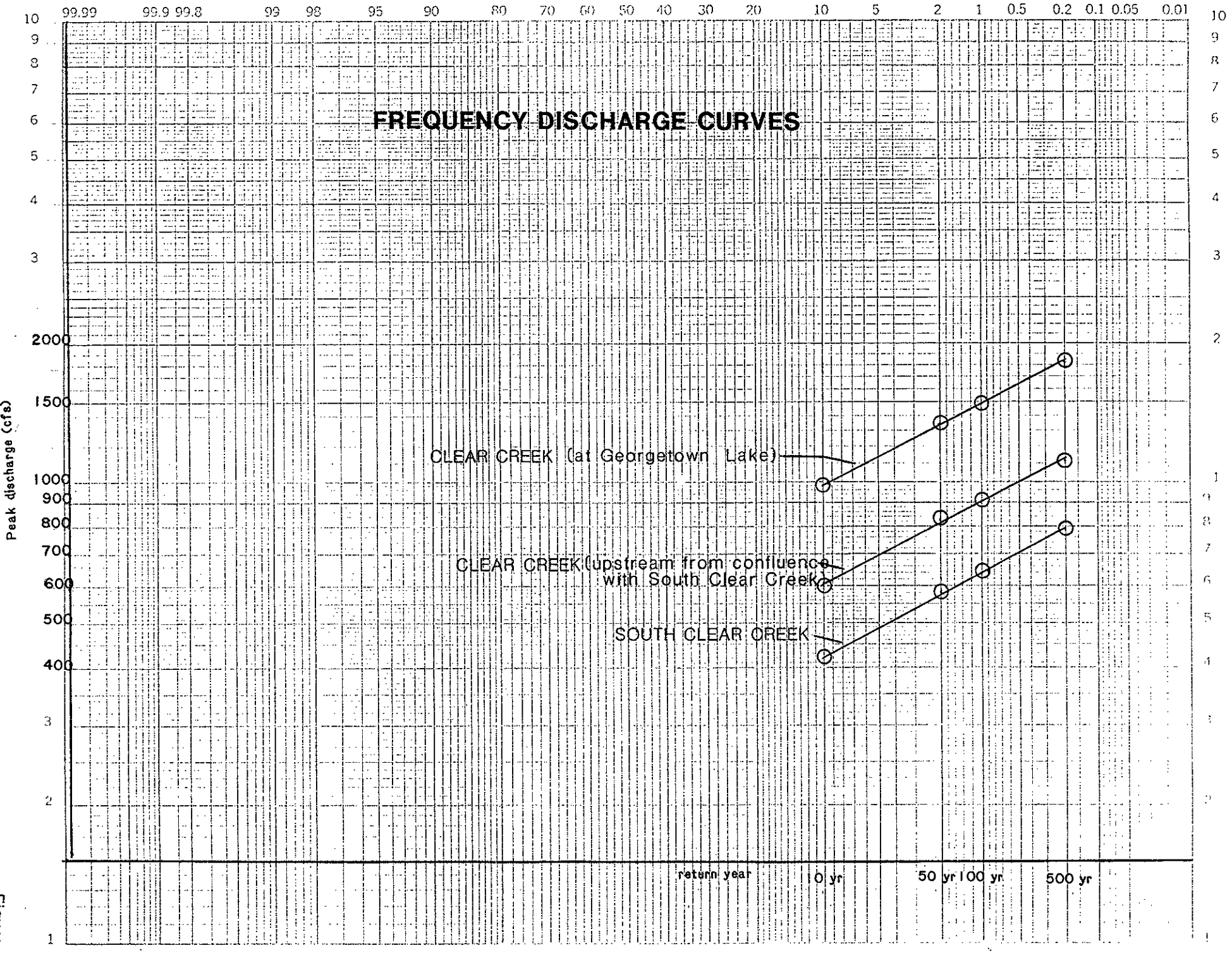

FREQUENCY DISCHARGE CURVES
Peak discharge (cfs)
99.99 99.9 99.8 99 98 95 90 80 70 60 50 40 30 20 10 5 2 1 0.5 0.2 0.1 0.05 0.01
2000
1500
1000
900
800
700
600
500
400
CLEAR CREEK (at Georgetown Lake)
CLEAR CREEK (upstream from confluence with South Clear Creek)
SOUTH CLEAR CREEK
return year
10 yr
50 yr
100 yr
500 yr

Figure 1

Hydraulic Analysis

An analysis of the hydraulic characteristics of Clear and South Clear Creeks was performed in order to determine water surface elevations for the 10-year and 100-year floods on each stream. Cross-section data was taken from a 2-foot contour map of the Town of Georgetown (Ref. 10). Building areas were "blocked out" of the cross-sections to determine the effective flow through the floodplain. This cross-section data became input data for the U.S. Army Corps of Engineers HEC-2 step-backwater computer program (Ref. 13). Bridge elevations and sizes of openings were surveyed and measured in the field by Black and Veatch (B & V) Consulting Engineers (Ref. 1) for the Flood Insurance Study. The data was reviewed and field-checked by the Colorado Water Conservation Board.

A comparison of bridge cross-section elevations surveyed by B & V Consulting Engineers with those obtained from the 2-foot contour map led to the conclusion that there was a significant problem with the datum of one of the two sources. Further study of the datum problem was thus undertaken. Two other sources of elevation data were used in this analysis: 1. a 1-foot contour map of the vicinity of Georgetown Lake (Ref. 11), and 2. field surveys of May, 1979 by Hayes and Soucie of selected cross-sections along Clear Creek (Ref. 9). A total of 60 points from the three described sources were compared with the corresponding points on the 2-foot contour map. From this, it was determined that the 2-foot contour map had a datum that was, on average, 1.5 feet high (it was 1.5 feet higher than the mean sea level datum of 1929). An adjustment was made to the flood profile to make it conform to the 2-foot contour map of the Town of Georgetown since the contour map was the map upon which the flood boundary would be drawn.

The Colorado Water Conservation Board's field surveys (Ref. 4) were used to determine channel bottom elevations in areas where there was recent dredging undertaken by the town. Dredging was done on Clear Creek downstream from the 15th Street Bridge and on South Clear Creek downstream from the Rose Street Bridge. These surveyed values were adjusted to the map datum (by raising the values 1.5 feet).

Roughness coefficients (Manning's "n" values) were selected for the HEC-2 program. They were obtained by the CWCB staff field survey. Roughness values for Clear Creek varied from 0.035 to 0.055 for the channel and from 0.030 to 0.090 for the overbank areas. Roughness values for South Clear Creek varied from 0.040 to 0.050 for the channel and from 0.035 to 0.080 for the overbank areas.

The locations of the cross-sections taken from the 2-foot contour map are shown on the "Flooded Area Maps" (see Plates 2 to 7) and the hydraulic data for the cross-sections is displayed in Tables 1 and 2.

The computed 100-year flood levels are outlined on the "Flooded Area Maps"; plotted on the "Flood Profile" sheets; and tabulated in the "Cross-section and Water Surface Elevation Data" tables.

The bridge capacities were analyzed by a procedure in which bridges were modelled using the HEC-2 computer program and computer calculations were checked by hand calculations. Ten percent blockage of bridge openings due to debris was assumed. The following table summarizes these findings:

Stream	Bridge	Finding
Clear Creek		
	22nd St.	sufficient capacity
	foot bridge	sufficient capacity
	15th St.	low overbank; water bypasses bridge *
	foot bridge	low overbank; water bypasses bridge *
	11th St.	low overbank; water bypasses bridge *
	9th St. foot br.	would wash out
	7th St.	Barely sufficient capacity; insufficient capacity if the low chord is touched. *
	6th St.	Barely sufficient capacity; insufficient capacity if the low chord is touched. *
	foot bridge	sufficient capacity
S. Clear Creek		
	Rose St.	insufficient capacity
	9th St.	insufficient capacity
	Taos St.	insufficient capacity
	8th St.	Barely sufficient capacity; insufficient capacity if the low chord is touched. *
	Main St.	sufficient capacity

* When the water surface of a river touches the low chord of a bridge, the hydraulic capacity of the bridge decreases suddenly and significantly. Because of high channel velocities, the water surface of the flood water is not stable and the bridge's hydraulic capacity may be reached suddenly if the low chord is touched. It is not possible to predict at which of these bridges this may occur.

Flooded Areas

The areas covered by the 100-year flood are shown on Plates 2 through 7. The plates should be used carefully since the scales of the plates change from plate to plate. In addition, the elevations shown on the plates are in map datum. Further information with regards to flood elevations at various locations is given in the following sections of this report.

It has been determined that there is extensive overbank flooding in the town of Georgetown. In general, these flooding depths are shallow. These shallow depths will allow "islands" to be free from flooding, but be surrounded by floodwaters. Some areas will experience sheet flow, i.e. shallow flooding areas characterized by unclear flow patterns. Because of the high channel velocities, water surface elevations are highly unstable. These unstable elevations in conjunction with possible debris and unclear flow patterns make it impossible to predict every area that will get wet by floodwaters. Thus not all sheet flow areas have been identified.

INTERPRETATION AND USE OF REPORT

Flood Frequency and Discharge

Discharges listed in "Hydrologic Analysis" in this report are given for the 10-, 50-, 100-, and 500-year frequencies. This discharge information can be used for planning and engineering of floodplain improvements as well as for floodplain regulations upon official designation by the Colorado Water Conservation Board.

The 100-year flood can be expected to occur at any time in a given area. Based upon recorded historical precipitation, land runoff characteristics and other data, ther is a one percent chance that the 100-year flood will be equalled or exceeded in any one year. The 100-year flood is considered by CWCB and the Federal Insurance Administration as the flood magnitude for which floodplains should be designated for regulatory and improvement purposes. In Colorado, the 100-year floodplain is an area of state interest as defined in House Bill 1041 - Section 24-60-101 of the Colorado Revised Statutes.

Flood events rarer than the 100-year flood event can and will occur. Plans for land improvement adjacent to the 100-year floodplain should consider the probability of flood damage.

Flood Elevations

Plates 8 through 14 show the 10-year and 100-year flood profiles for Clear and South Clear Creeks.

Plate 15 shows a graphical display of some of the cross-sections and the computed 100-year flood elevations at these cross-sections. Tables 1 and 2 give a summary of pertinent data at each cross-section. The actual HEC-2 computer output is in the files of the Colorado Water Conservation Board. In case of any question regarding 100-year flood elevations, the flood profiles should be consulted.

Flood Insurance

The National Flood Insurance Program (NFIP) is a Federal program that enables property owners to buy flood insurance at a reasonable, subsidized cost. In return, communities are required to carry out floodplain management measures to protect lives and new construction from future flooding. Exhibit 4 gives some NFIP rate information. Additional information on the NFIP is available from the following sources:

COMMUNITY INFORMATION:

Federal Emergency Management Agency
Natural & Technological Hazards Division
Bldg. 710, Denver Federal Center
Box 25267
Denver, CO. 80225-0267
(tel. no. 235-4830)

AGENT AND BROKER INFORMATION:

Mr. Jim Quinn
Computer Sciences Corp.
2801 Youngfield, suite 320
Golden, CO. 80401

(tel. no. 231-9911)

TABLE 1. CROSS-SECTION AND WATER SURFACE ELEVATION DATA FOR CLEAR CREEK

X-sec number	Comments	Location* (Station)	Channel bottom elev.**	100-yr flood elev.**	10-yr flood elev.**
1	Georgetown Lake	46+80	8440.8	8446.9	8446.3
2	Georgetown Lake	50+20	8442.0	8446.9	8446.3
3		54+45	8447.9	8452.9	8452.3
4		59+85	8452.8	8457.7	8457.1
5		65+20	8458.0	8463.0	8462.6
6	at 15th St. Bridge	68+31	8462.6	8466.7	8466.1
7		74+05	8466.3	8471.2	8470.8
8		78+25	8471.3	8476.6	8475.5
9		82+00	8475.7	8480.9	8480.6
10	at 11th St. Bridge	84+45	8477.5	8482.9	8482.2
11		88+10	8482.2	8487.9	8486.7
11.1	at confl. Clr/SClr Cr	90+70	8485.9	8491.4	8490.3
12	at 9th St. footbridge	94+85	8491.8	8495.7	8495.7
13		97+30	8495.7	8500.7	8499.5
14		101+10	8501.9	8507.3	8506.4
15	at 6th St. Bridge	102+50	8506.7	8511.4	8510.2
16		106+10	8522.2	8525.9	8525.2
17		110+30	8545.9	8550.1	8549.2
18		112+75	8559.5	8562.6	8562.2
19		116+60	8581.0	8585.7	8584.9
20		118+95	8593.8	8598.0	8597.2

* Distance in hundreds of feet upstream from Georgetown Lake Spillway.

** Elevations for map datum, which is 1.5 feet higher than mean sea level datum of 1929.

TABLE 2. CROSS-SECTION AND WATER SURFACE ELEVATION DATA FOR SOUTH CLEAR CREEK

X-sec number	Comments	Location* (Station)	Channel bottom elev.**	100-yr flood elev.**	10-yr flood elev.**
11.1	at confl. with Clr Cr	0+00	8485.9	8491.4	8490.3
21	at Rose St. Bridge	2+55	8488.3	8493.6	8493.6
22		4+30	8491.3	8495.4	8495.4
23	at 9th St. Bridge	6+00	8494.3	8500.3	8500.2
24		6+50	8495.5	8500.7	8500.6
25	at Taos St. Bridge	7+30	8497.2	8503.5	8500.9
26		8+00	8498.8	8504.3	8502.6
27	at 8th St. Bridge	10+70	8505.5	8508.8	8508.0
28	at Main St. Bridge	13+90	8516.5	8519.9	8519.1
29		16+15	8528.8	8532.2	8531.5
30		20+90	8565.3	8569.8	8569.0
31		23+30	8603.6	8607.0	8606.4
32		27+90	8659.2	8663.2	8662.5

.....

* Distance in hundreds of feet upstream from the confluence with Clear Creek.

** Elevations for map datum, which is 1.5 feet higher than mean sea level datum of 1929.

RECOMMENDATIONS

The findings of the hydrologic and hydraulic investigations can be used for a number of floodplain management activities. These activities include:

Implementation of floodplain zoning.
Floodproofing structures.
Sizing stream crossings and bridges.
Preparation of a flood control feasibility analysis.
Public awareness of flood problems.
Flood Fight Operations.

By authority vested in Section 30-28-111 of the Colorado Revised Statutes for county governments and Section 31-23-201 for municipal governments , the cities, towns, and counties within the study area may enact certain flood-related controls and regulations ...

> "...to establish, regulate, restrict, and limit such uses on or along any storm or floodwater runoff channel or basin, as such storm or floodwater runoff channel or basin has been designated and approved by the Colorado Water Conservation Board, in order to lessen or avoid the hazards to persons and damage to property resulting from the accumulation of storm or floodwaters ..."

Therefore, upon official approval of this report by the Colorado Water Conservation Board, the areas described as being innundated by the 100-year flood can be designated as flood hazard areas and their use regulated accordingly by the local agencies. It is recommended that such regulation be enacted upon such designation.

Following acceptance of this study, the Town of Georgetown may request to be converted from the Emergency Phase of the National Flood Insurance Program (NFIP) to the Regular Phase through the "special conversion provision" of the program using results of this study. It is recommended that the results of this study be incorporated into any new Flood Insurance Rate Maps (FIRM's) put out by the Federal Emergency Management Agency, Federal Insurance Administration for this area. Specifically, the "Flooded Area Maps" in this report could be used to replace the flood hazard boundary as shown in the Federal Emergency Management Agency's Flood Hazard Boundary Map of January 2, 1980. Upon Georgetown's conversion to the regular phase of the National Flood Insurance Program, additional amounts of flood insurance coverage will be available to dwellings within the 100-year floodplain. Exhibit 4 gives some information on National Flood Insurance Program coverage available.

BIBLIOGRAPHY

1. Black and Veatch, field survey of July, 1975 to November, 1977.

2. Black and Veatch Consulting Engineers, letter to Felix Sparks, Director, Colorado Water Conservation Board, including attachments, March 16, 1976.

3. Colorado Game, Fish and Parks Division, Plans for the Georgetown Lake Dam, McAll-Ellison Consulting Engineers, 1971.

4. Colorado Water Conservation Board, field survey of June 23, 1986 and August 26, 1986 by Bill Mullen and assistant.

5. Colorado Water Conservation Board, Manual for Estimating Flood Characteristics of Natural-Flow Streams in Colorado, Technical Manual 1, 1976.

6. Federal Insurance Administration, Flood Hazard Boundary Map, Town of Georgetown, Community Panel No. 0800350001B, effective January 2, 1980.

7. Federal Insurance Administration, Flood Insurance Study, Town of Georgetown, March, 1978 (voided).

8. Federal Insurance Administration, internal memorandum to Charles Lindsay, Studies Supervisor, FIA Region 8, from Jerome Olson, Acting Regional Director, April 15, 1977.

9. Hayes and Soucie, Floodplain Cross-sections, Georgetown, field-surveyed May 4-10, 1979.

10. Kucera and Associates, Inc., Map of Georgetown (two sheets), scale 1"=100', 2-foot contours, December, 1976.

11. McDermid Engineering Associates, Inc., 1-foot contour map, Georgetown Lake vicinity, October, 1984.

12. Town of Georgetown, letter of request to the Colorado Water Conservation Board, from Lee Woolsey, Town Administrator, dated June 2, 1986.

13. U. S. Army Corps of Engineers: HEC-2 Water Surface Profiles, Computer Program, The Hydrologic Engineering Center, Davis, California.

BIBLIOGRAPHY (continued)

14. U.S. Army Corps of Engineers, Statistical Methods in Hydrology, Leo Beard, January, 1962.

15. U.S. Coast and Geodetic Survey, Vertical Control Data.

16. U.S. Geological Survey, 1:24,000 scale map: Georgetown, photorevised 1974.

17. U.S. Geological Survey, 1:50,000 scale map: Clear Creek County, 1980.

18. U.S. Geological Survey, Normal Annual Precipitation for Colorado, in inches, 1931-60, undated.

19. U.S. Geological Survey, Surface Water Supply of the United States, (applicable years).

20. U.S. Geological Survey, Water Resource Data for Colorado, Part 1, Surface Water Records, (applicable years).

21. U.S. Water Resources Council, Bulletin 17 - Guidelines for Determining Flood Flow Frequency, March, 1976.

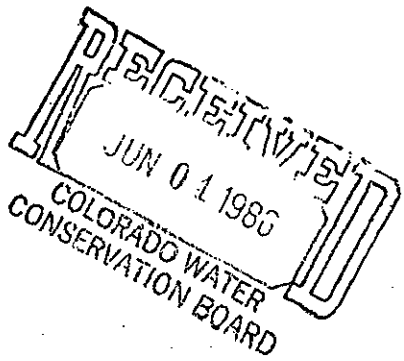
EXHIBIT 1

The Town of Georgetown

P.O. Box 426
Georgetown, Colorado 80444

Local: 569-2555 Denver: 623-6882

June 2, 1986



Colorado Water Conservation Board
Department of Natural Resources
1313 Sherman Street
Denver CO 80203

Attn: Bill Mullen

Dear Bill,

This will confirm our conversation of May 29, 1986 concerning the Floodplain Refinement Study that the CWCB is undertaking in the Georgetown area.

As you know the Board of Selectmen of the Town unanimously approved the study at the time you were here to visit with them and explain the project. Subsequent to that time I have sent you a map with contours of the Town.

We are most anxious that the study proceed since we are faced with the prospect of having to replace at least one and perhaps two bridges. Obviously, the information that you will generate will assist us in the proper design and construction of the structures.

I will be sending the original of the contour map so you may get the channel elvations more accurately.

Please contact me if the Town can be of further assistance.

Sincerely,

Lee R. Woolsey
Town Administrator

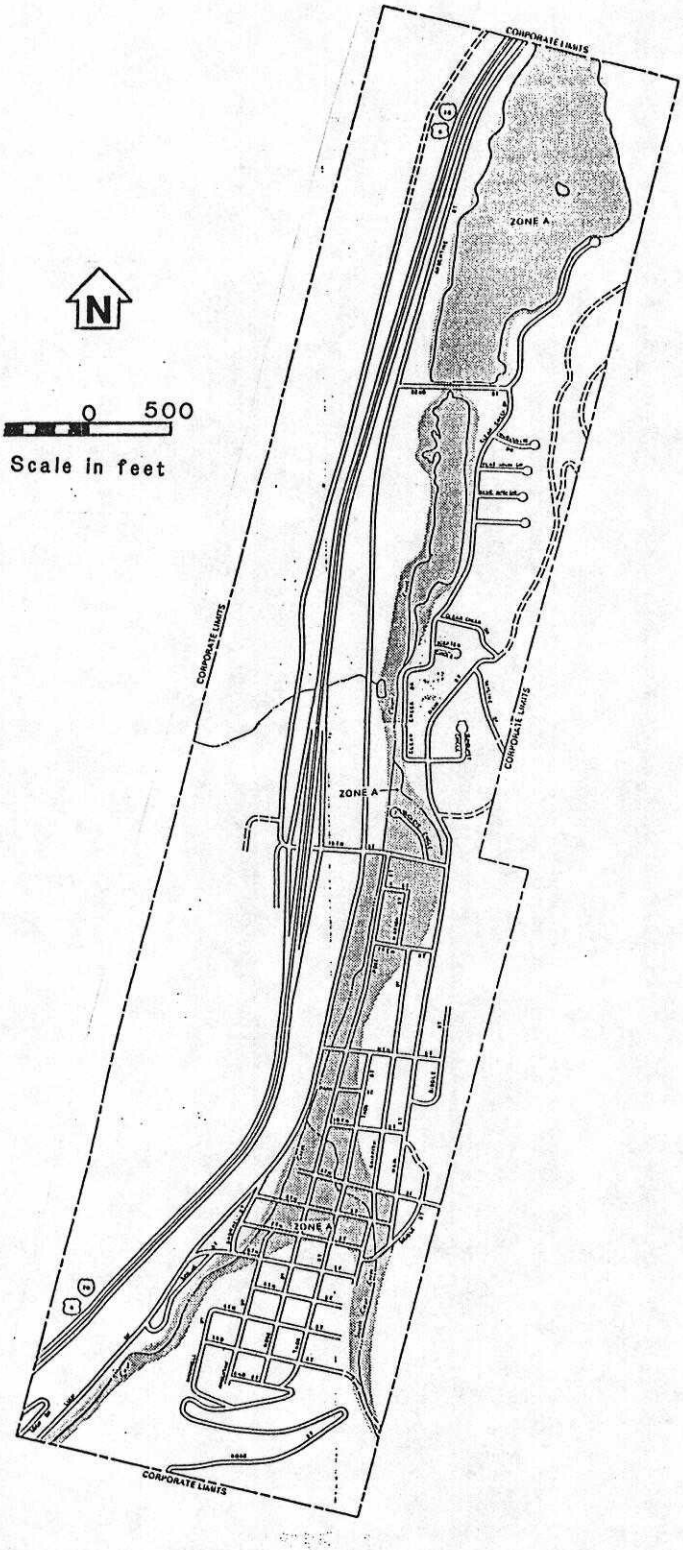


EXHIBIT 2 - Existing Flood Hazard Boundary Map for Georgetown

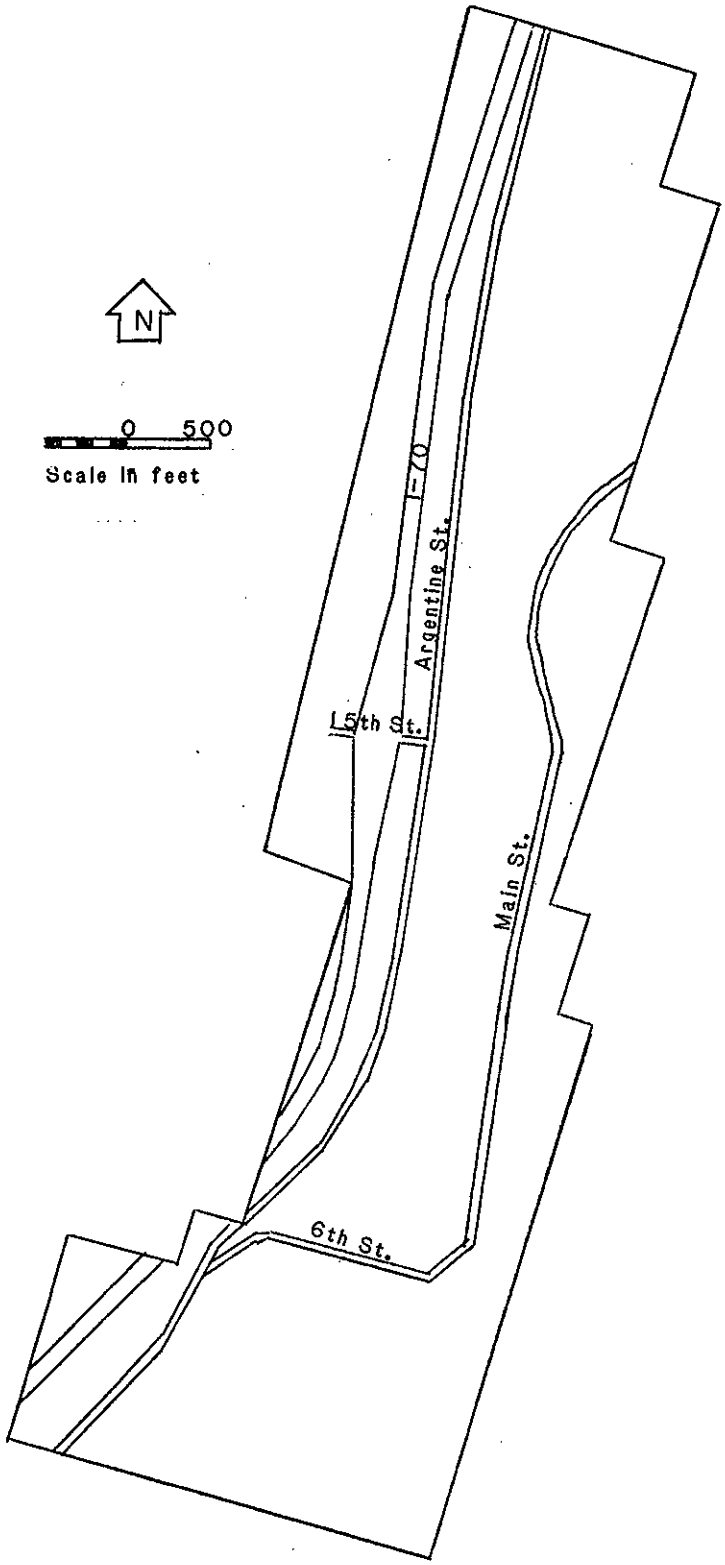


EXHIBIT 3 - Georgetown Corporate Limit Map

EXHIBIT 4 - NFIP Rate Information

NATIONAL FLOOD INSURANCE PROGRAM

Some Examples of Insurance Rates for Existing Structures*

Rates per year per $100 coverage

EMERGENCY PHASE	Structure	Contents
(1) Residential	$0.45	$0.55
(2) All others (including hotels and motels)	.55	1.10

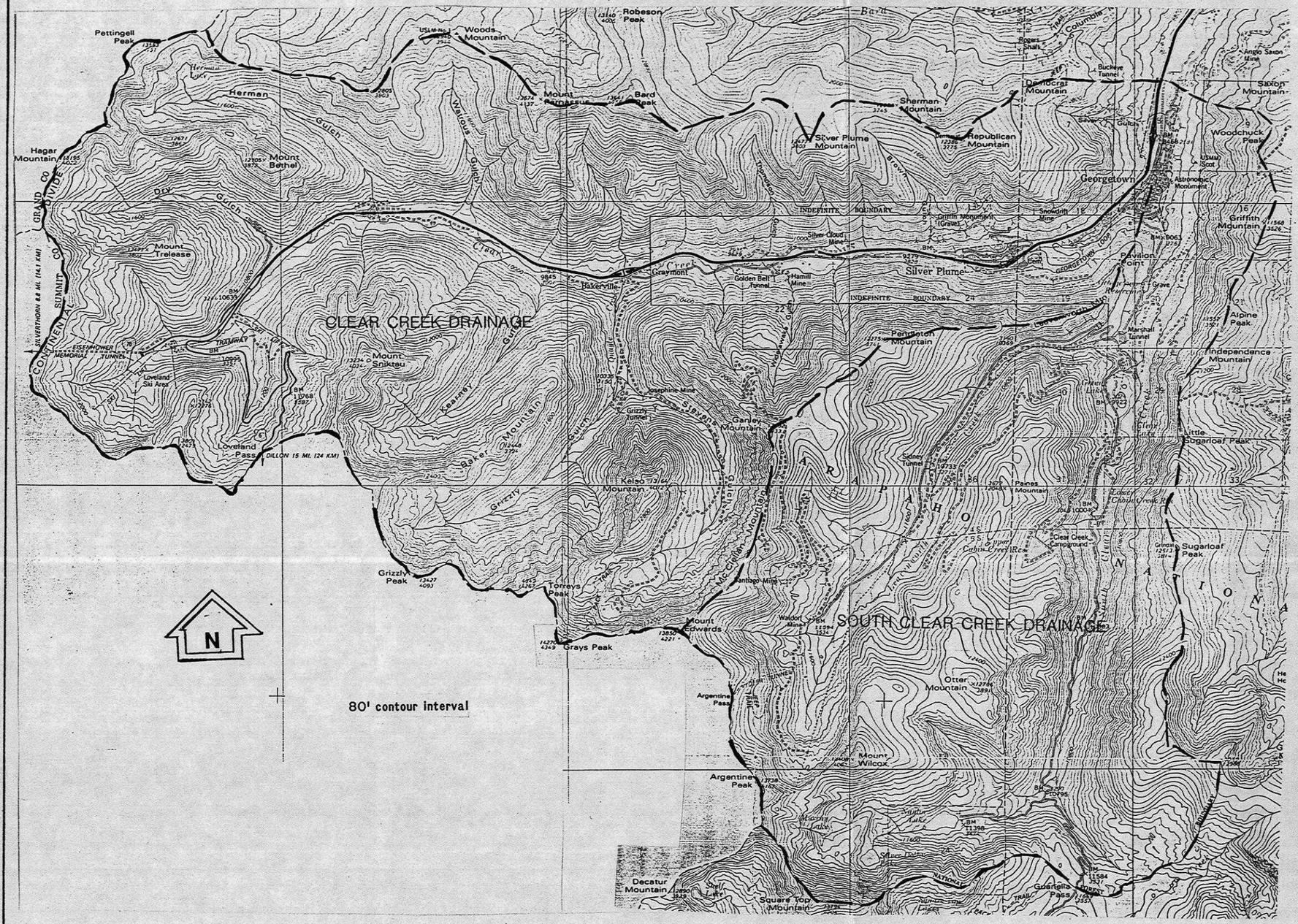
REGULAR PHASE** - Zones A, AO, AH, D, A1-A30

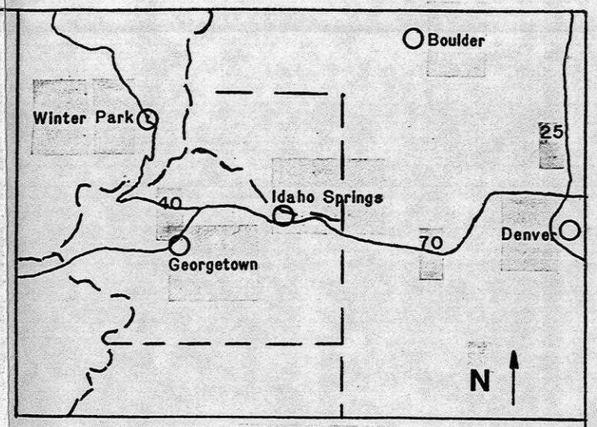
	1st $35,000	Addt'l Coverage	1st $35,000	Addt'l Coverage
(1) Single Family Residential No Basement	$0.45	$0.17	$0.55	$0.28
Finished and Unfinished Basement	0.50	0.35	0.55	0.55
Mobile Home	0.45	0.17	0.55	0.38
(2) All other residential (including hotels and motels)	0.45	0.33	***	***
No Basement	0.50	0.40	0.55	0.55
(3) Non-Residential W/Basement	0.60	0.40	1.10	0.95
No Basement	0.55	0.30	1.10	0.25
Mobile Home	0.55	0.30	1.10	0.25

*As of February, 1987

**For the Emergency Phase Only "First Layer coverage "(up to $35,000 is available; For the Regular Phase "Second Layer Coverage" (up to an additional $150,000) is also available

***Rated on a case-by-case basis.





VICINITY MAP

Scale in miles

5 0 5 10 15 20

LEGEND

Drainage basin boundary

Scale in miles

1 0 1 2 3

Clear Creek County

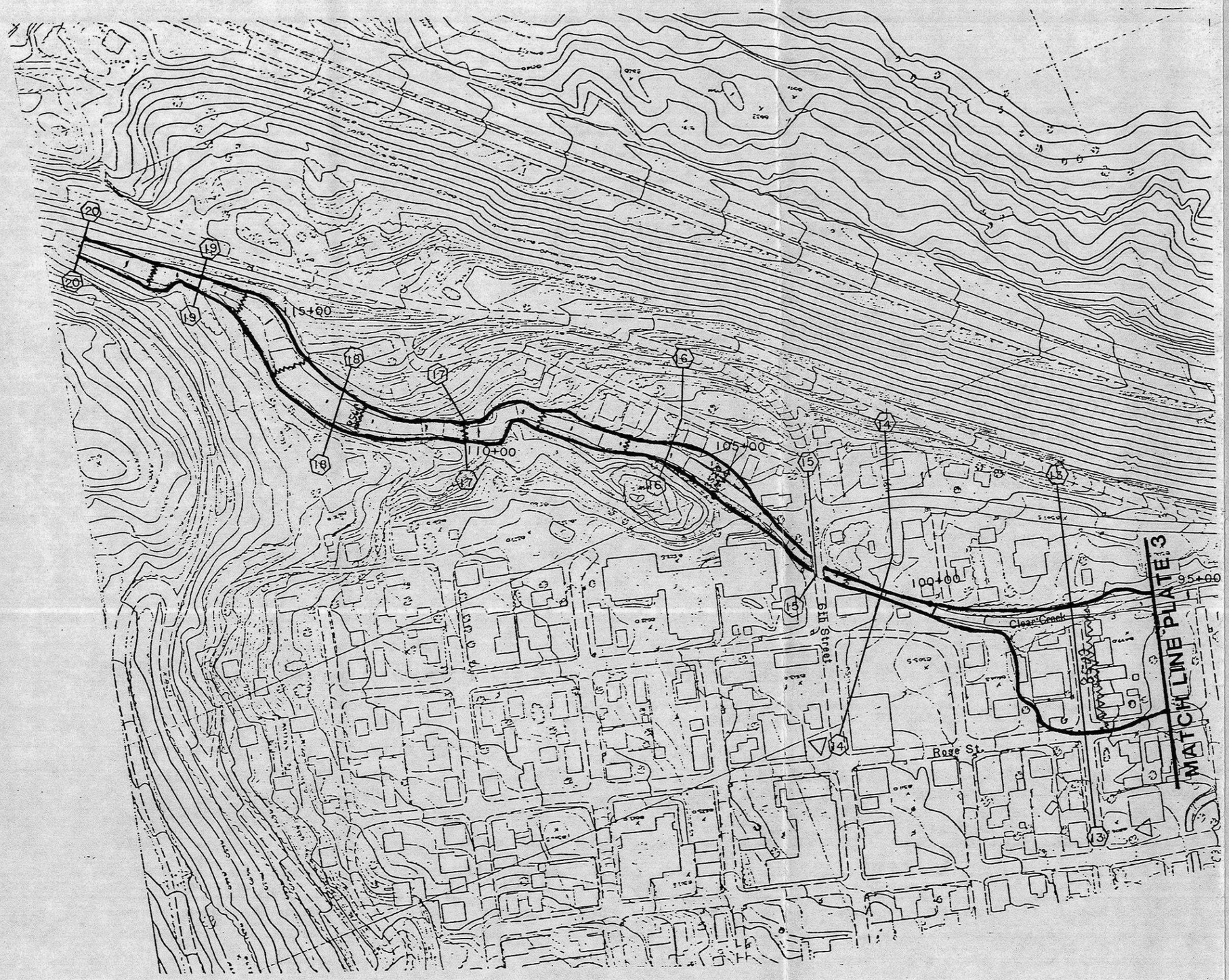
GEORGETOWN

CLEAR CREEK
SOUTH CLEAR CREEK

BASIN MAP

Prepared by

Flood Control and Floodplain Management Section
Colorado Water Conservation Board



LEGEND

100-year flood limits

10+00 Stationing (hundreds of feet)

9 — 9 Cross-section

Benchmark

NOTES

contour interval=2'.

Scale in feet

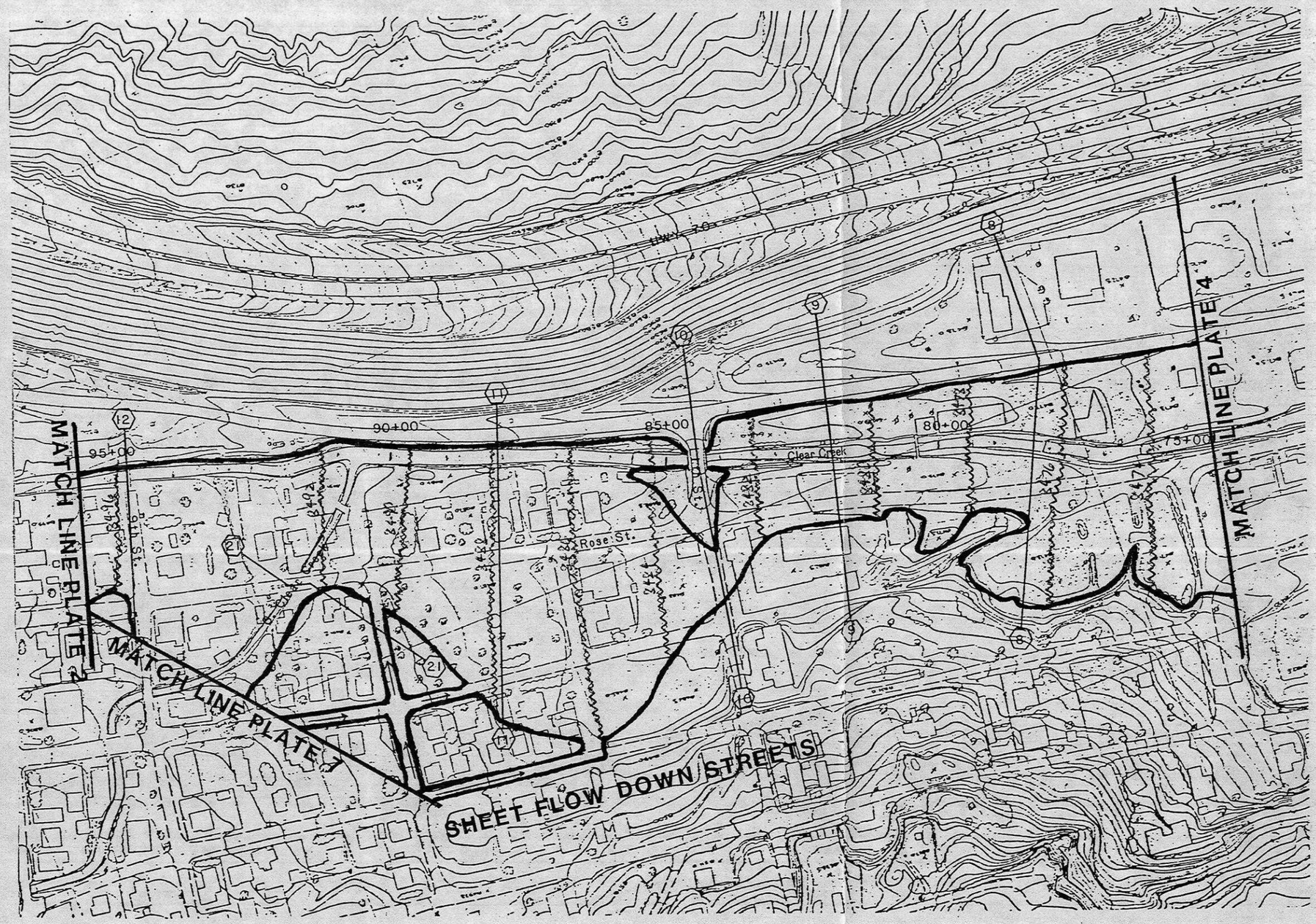
0 100 200 300 400 500

FLOODED AREA MAP

CLEAR CREEK

FEBRUARY 1987

GEORGETOWN, COLORADO



N

LEGEND

100-year flood limits

10+00 Stationing (hundreds of feet)

9 — 9 Cross-section

Benchmark

NOTES

contour interval=2'.

Scale in feet

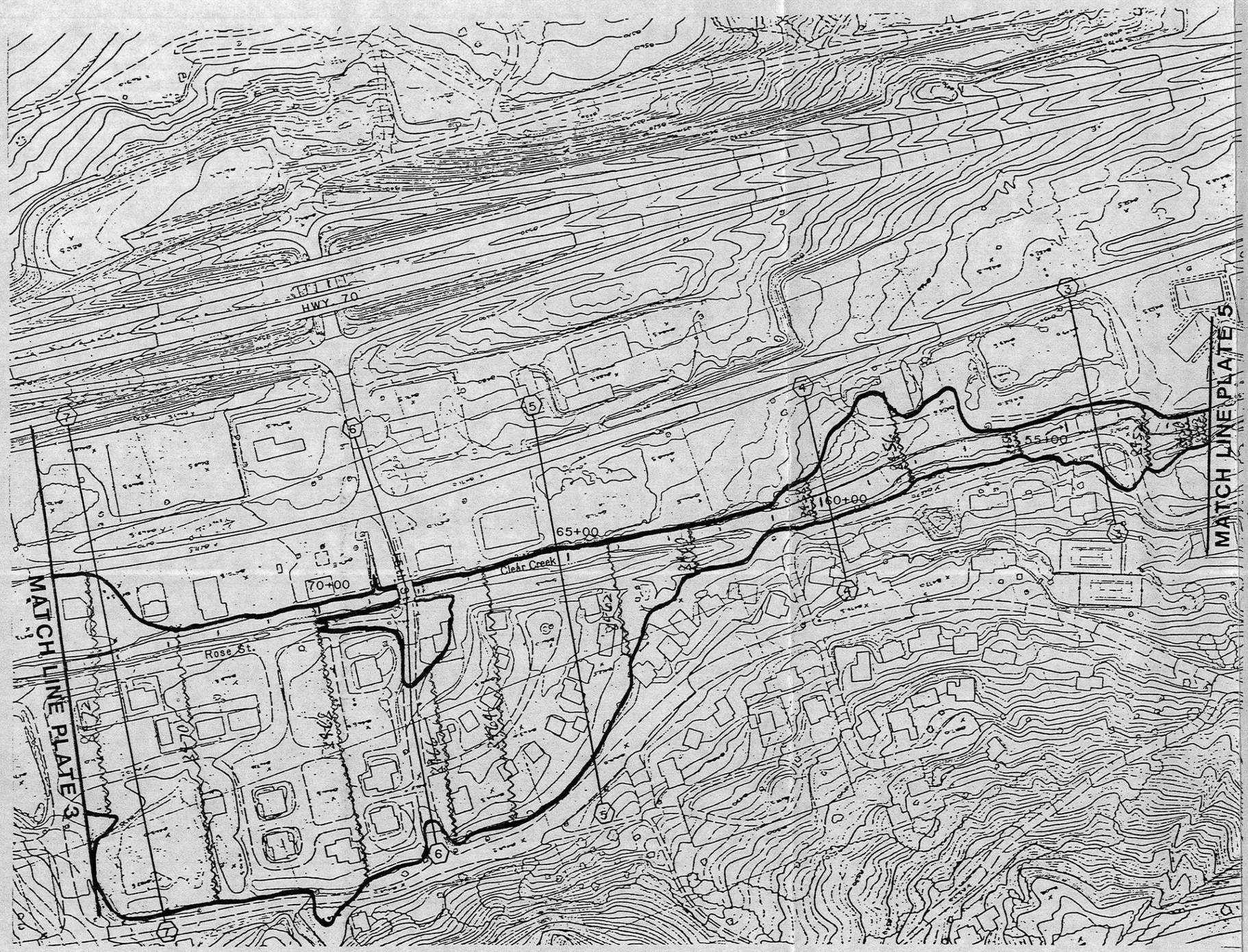
0 100 200 300 400 500

FLOODED AREA MAP

CLEAR CREEK

FEBRUARY 1987

GEORGETOWN, COLORADO



N

LEGEND

100-year flood limits

10+00 Stationing (hundreds of feet)

9 — 9 Cross-section

Benchmark

NOTES

contour interval=2'.

Scale in feet

0 100 200 300 400 500

FLOODED AREA MAP

CLEAR CREEK

FEBRUARY 1987

GEORGETOWN, COLORADO

N

LEGEND

100-year flood limits

10+00 Stationing (hundreds of feet)

9—9 Cross-section

Benchmark

NOTES

contour interval=2'.

Scale in feet

0 100 200 300 400 500

FLOODED AREA MAP

CLEAR CREEK

FEBRUARY 1987

GEORGETOWN, COLORADO

PLATE 5

LEGEND

100-year flood limits

10+00 Stationing (hundreds of feet)

9 — 9 Cross-section

Benchmark

NOTES

contour interval=2'.

Scale in feet

0 100 200 300 400 500

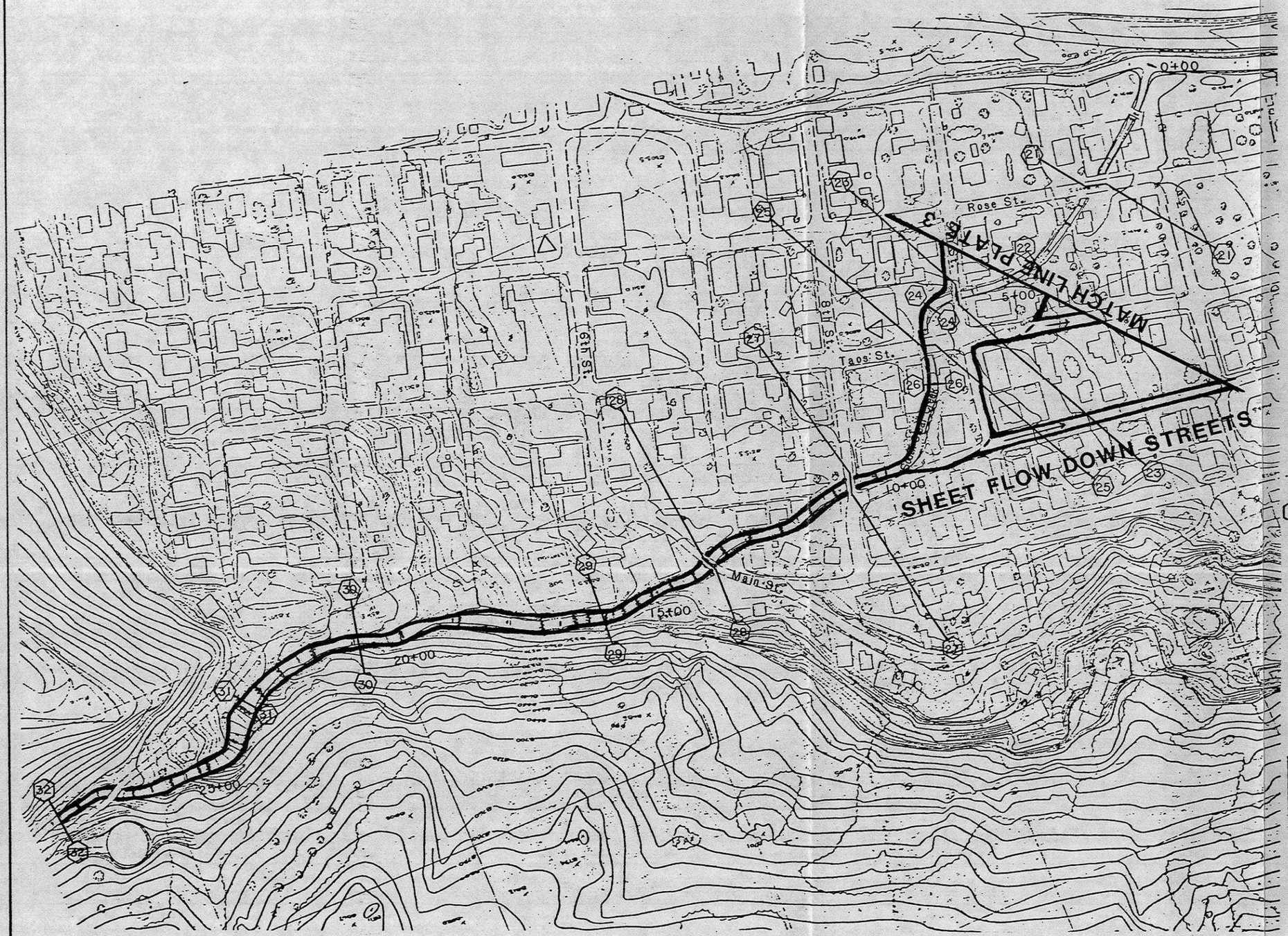
FLOODED AREA MAP

CLEAR CREEK

FEBRUARY 1987

GEORGETOWN, COLORADO

PLATE 6



LEGEND

- 100-year flood limits
- 10+00 Stationing (hundreds of feet)
- 9 — 9 Cross-section
- △ Benchmark

NOTES

contour interval=2'.

Scale in feet

0 100 200 300 400 500

FLOODED AREA MAP

SOUTH CLEAR CREEK

FEBRUARY 1987

GEORGETOWN, COLORADO

C92-5274 STATE OF COLORADO WATER CONSERVATION BOARD --- ENGINEERING DEPARTMENT PLOTTED CHECKED

CLEAR CREEK FLOOD PROFILE

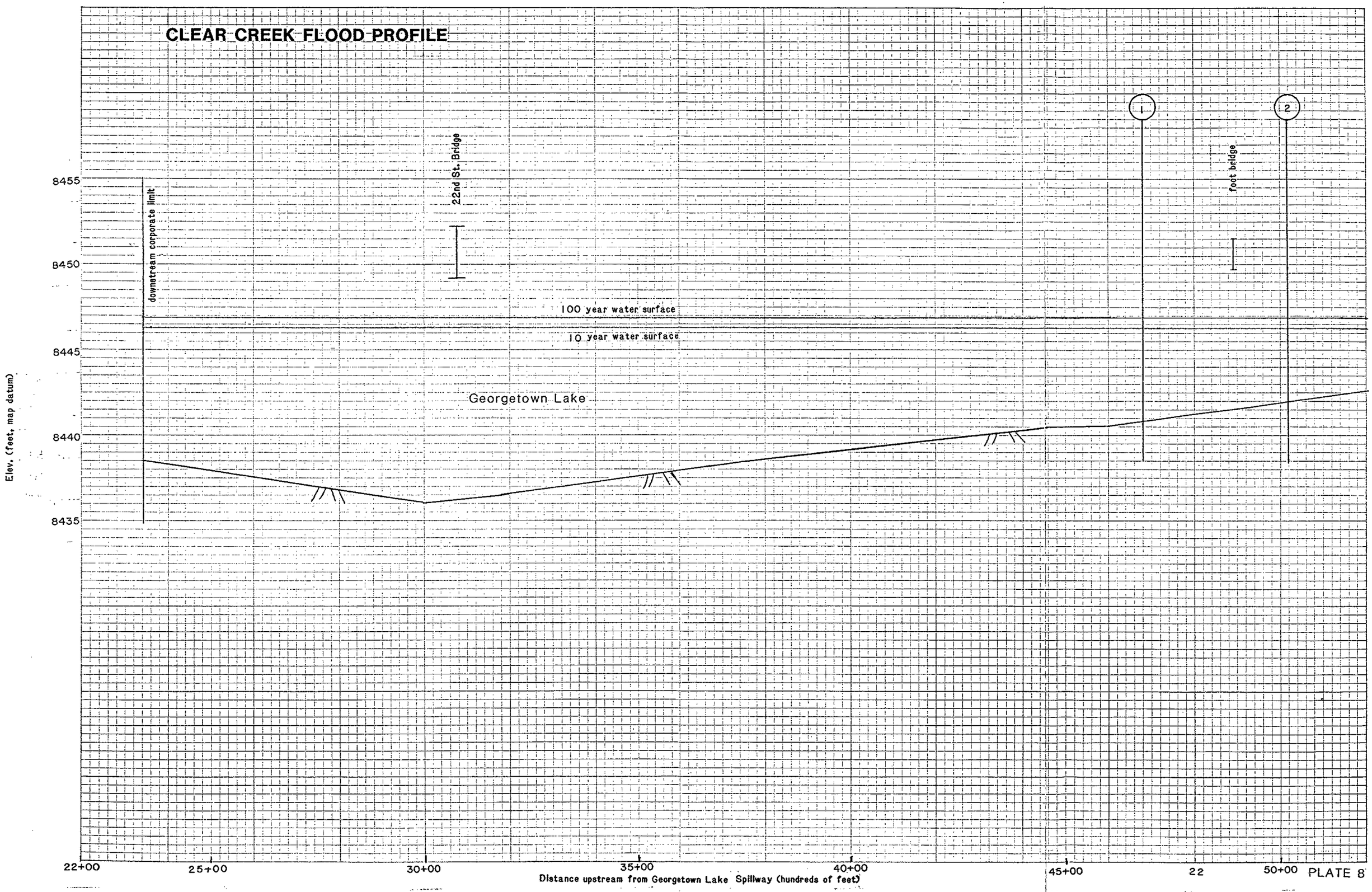
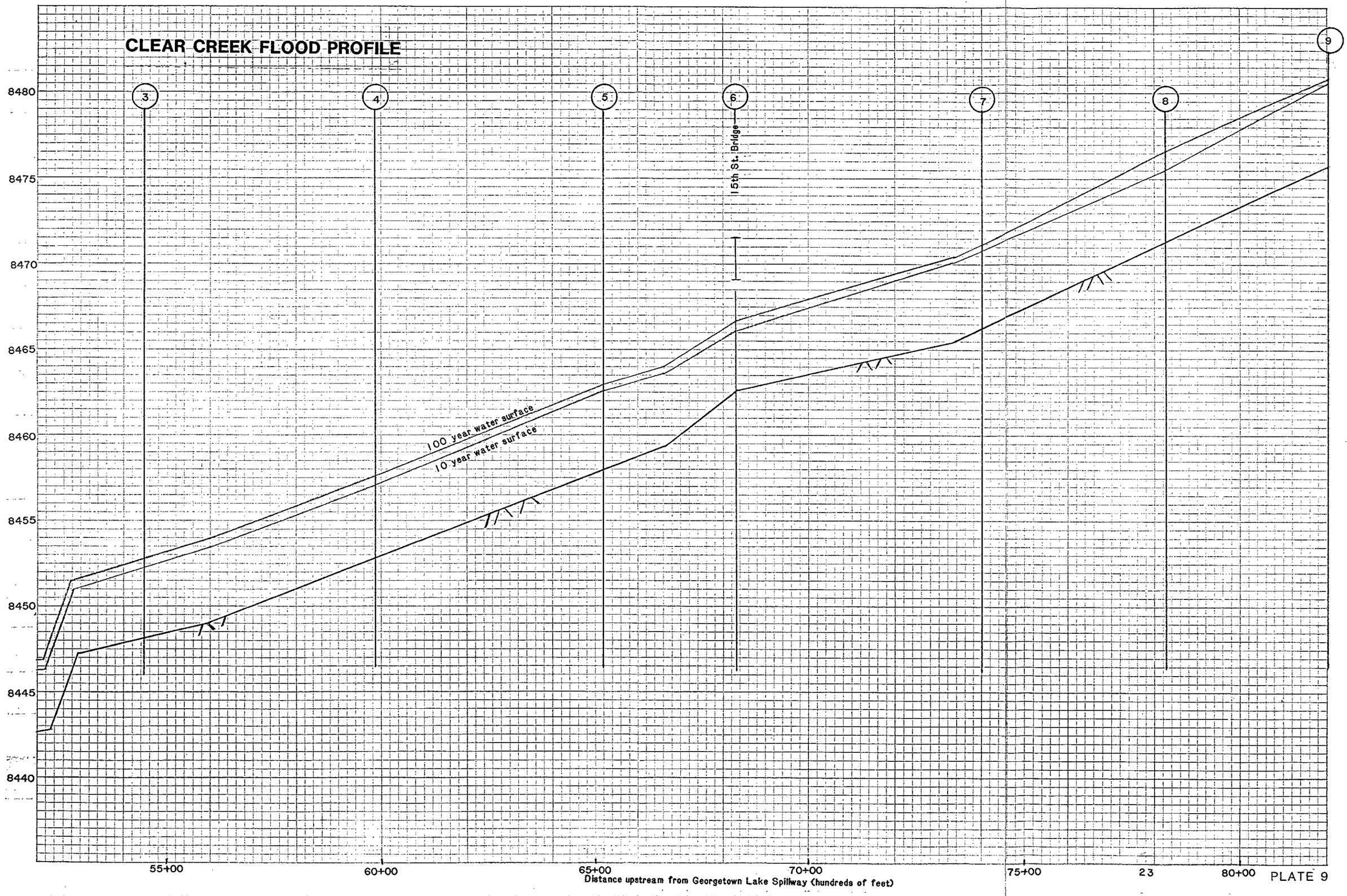


PLATE 8

092-9274 STATE OF COLORADO WATER CONSERVATION BOARD --- ENGINEERING DEPARTMENT

PLOTTED _____ CHECKED _____

CLEAR CREEK FLOOD PROFILE



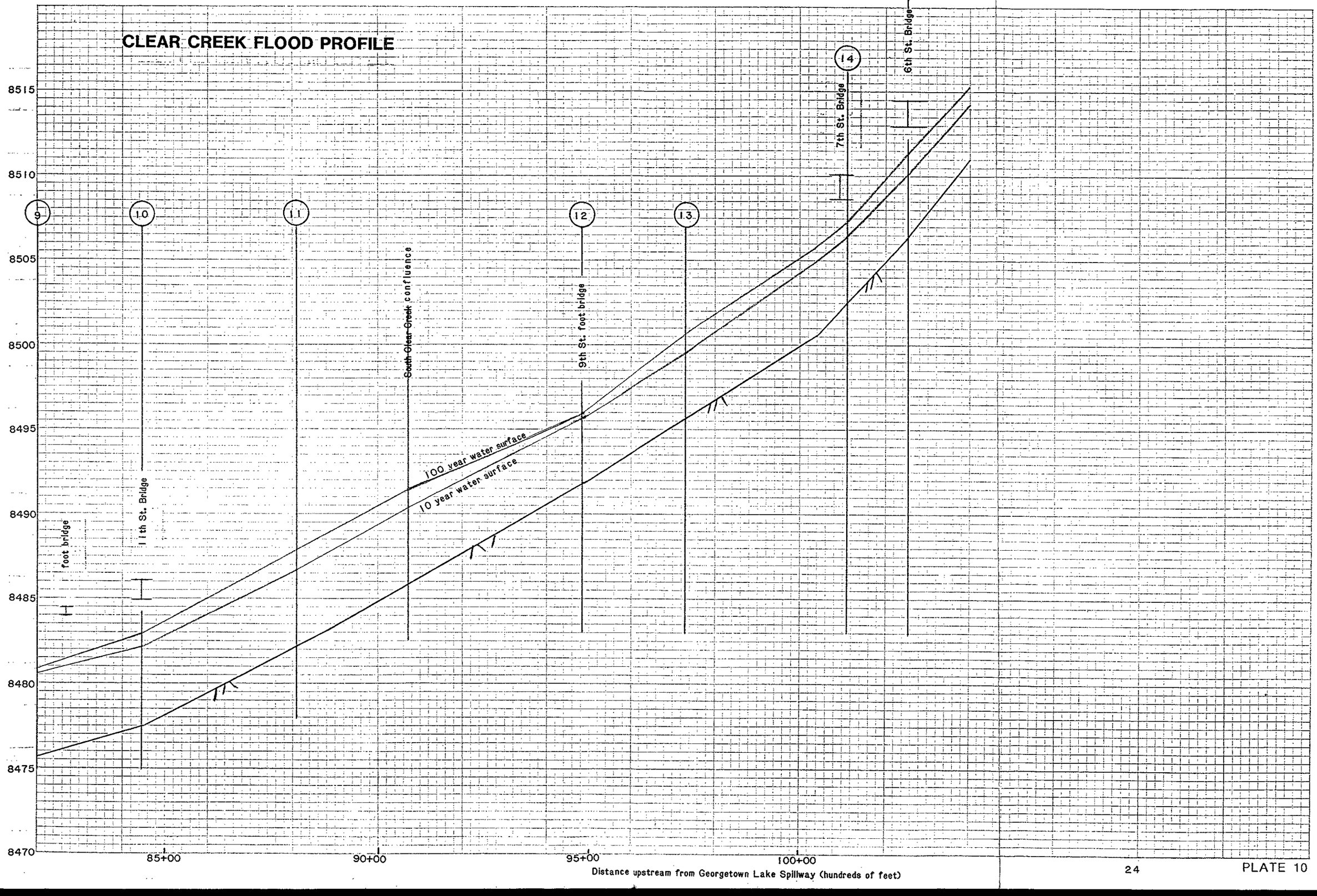
23

PLATE 9

092-5274 STATE OF COLORADO WATER CONSERVATION BOARD --- ENGINEERING DEPARTMENT

PLOTTED_____ CHECKED_____

CLEAR CREEK FLOOD PROFILE



092-9274 STATE OF COLORADO WATER CONSERVATION BOARD --- ENGINEERING DEPARTMENT

PLOTTED_____ CHECKED_____

CLEAR CREEK FLOOD PROFILE

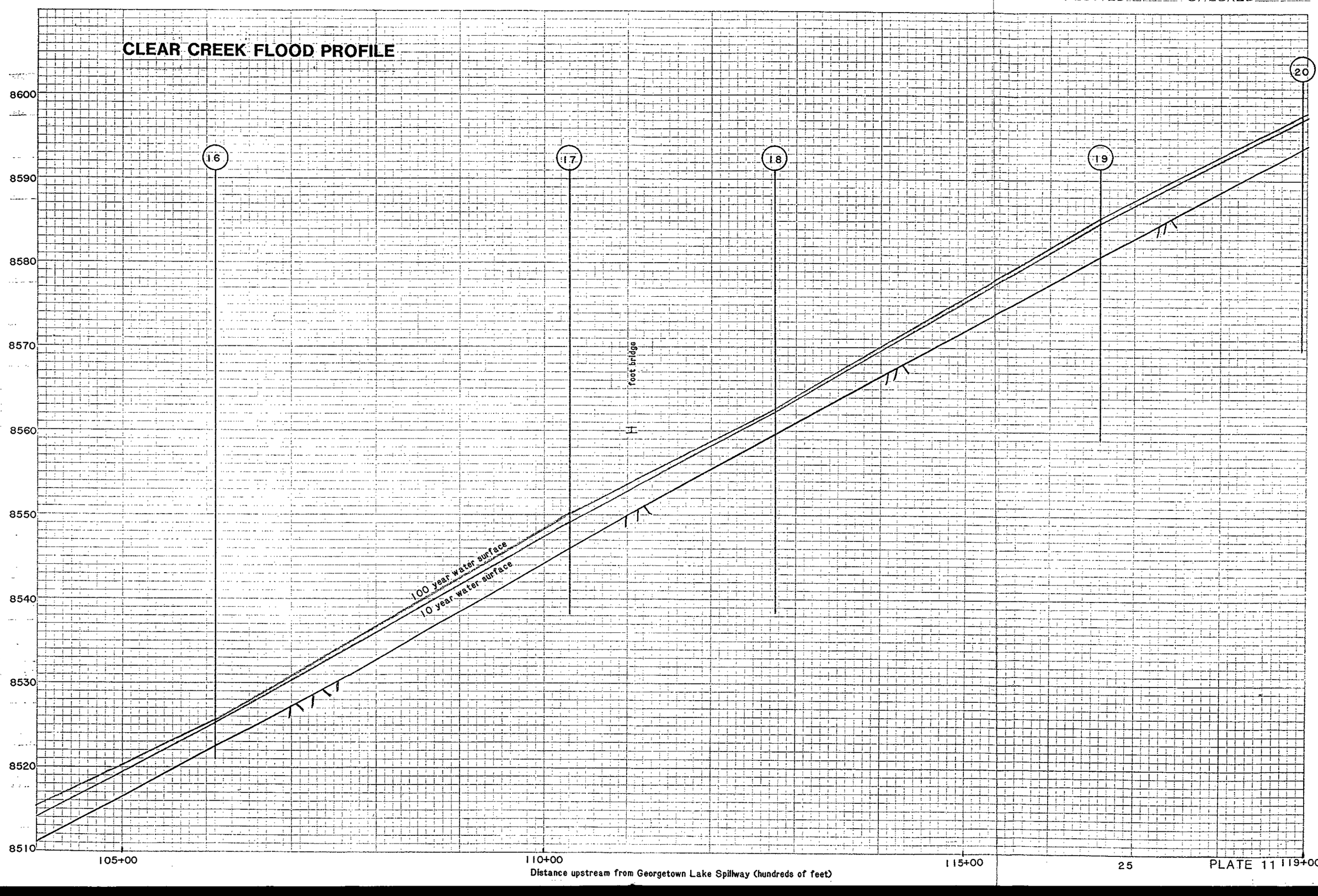


PLATE 11

092-9274 STATE OF COLORADO WATER CONSERVATION BOARD — ENGINEERING DEPARTMENT

PLOTTED _____ CHECKED _____

SOUTH CLEAR CREEK FLOOD PROFILE

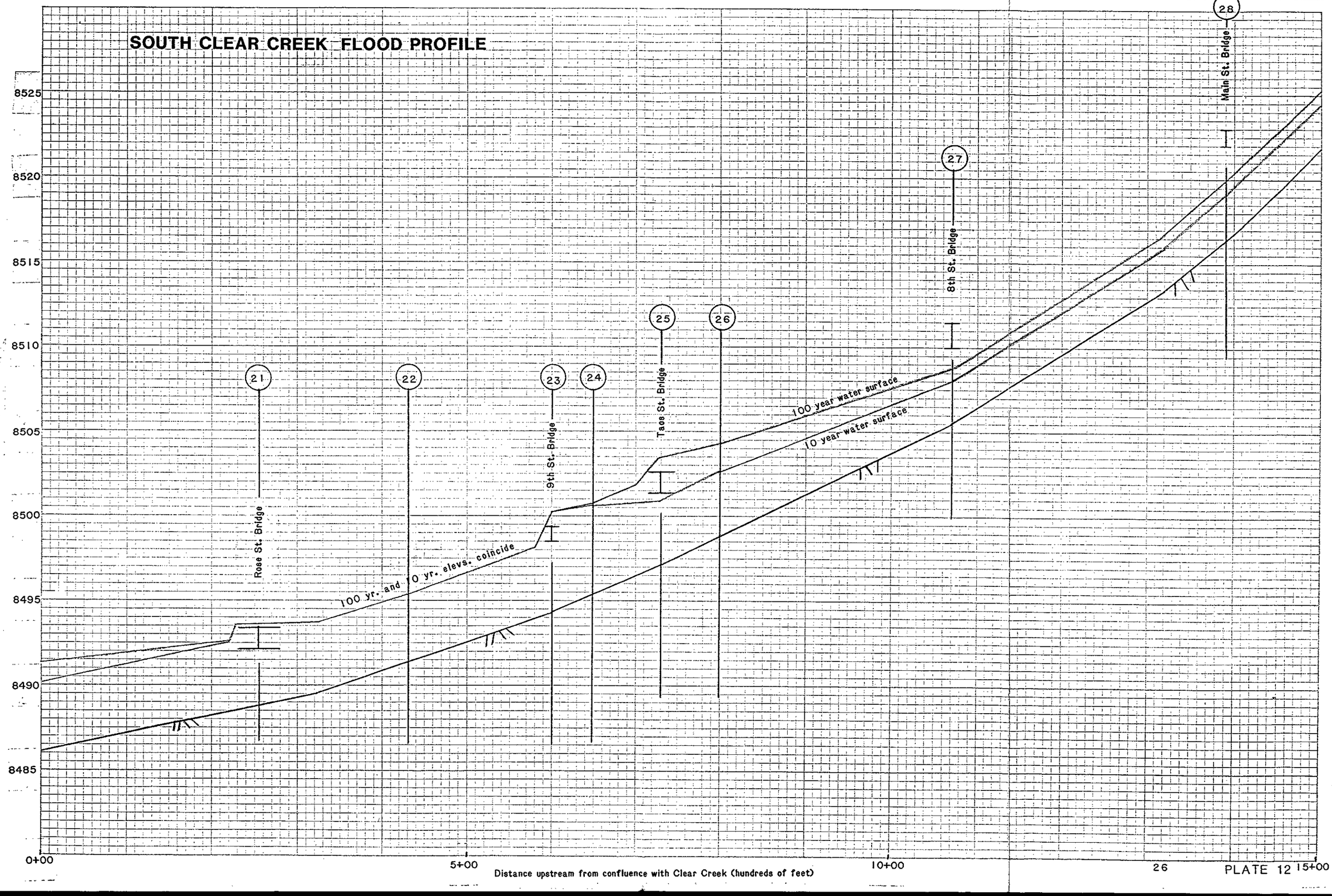


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PLATE 12

092-9274 STATE OF COLORADO WATER CONSERVATION BOARD --- ENGINEERING DEPARTMENT

PLOTTED_____ CHECKED_____

SOUTH CLEAR CREEK FLOOD PROFILE

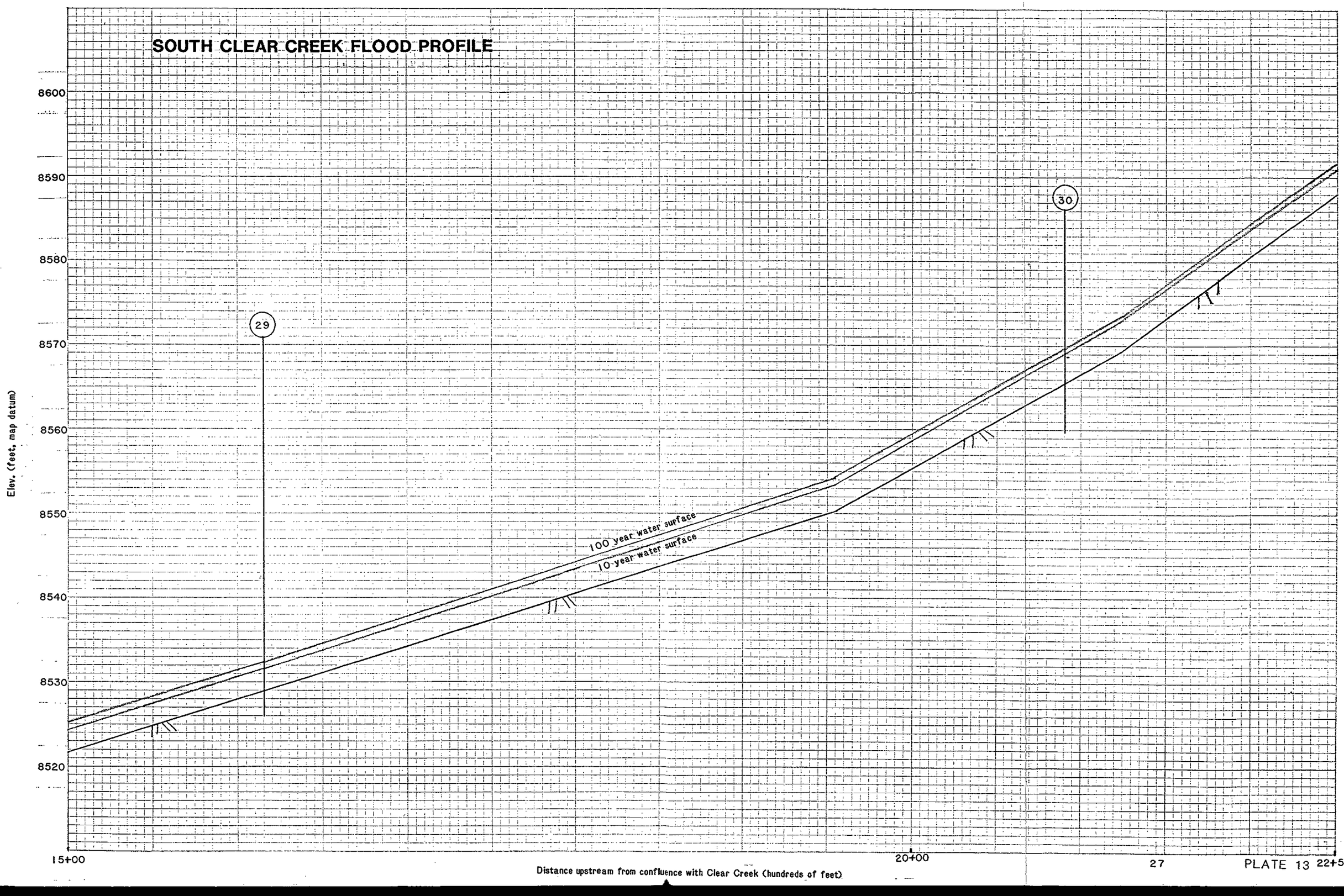


PLATE 13

PLOTTED_____ CHECKED_____

SOUTH CLEAR CREEK FLOOD PROFILE

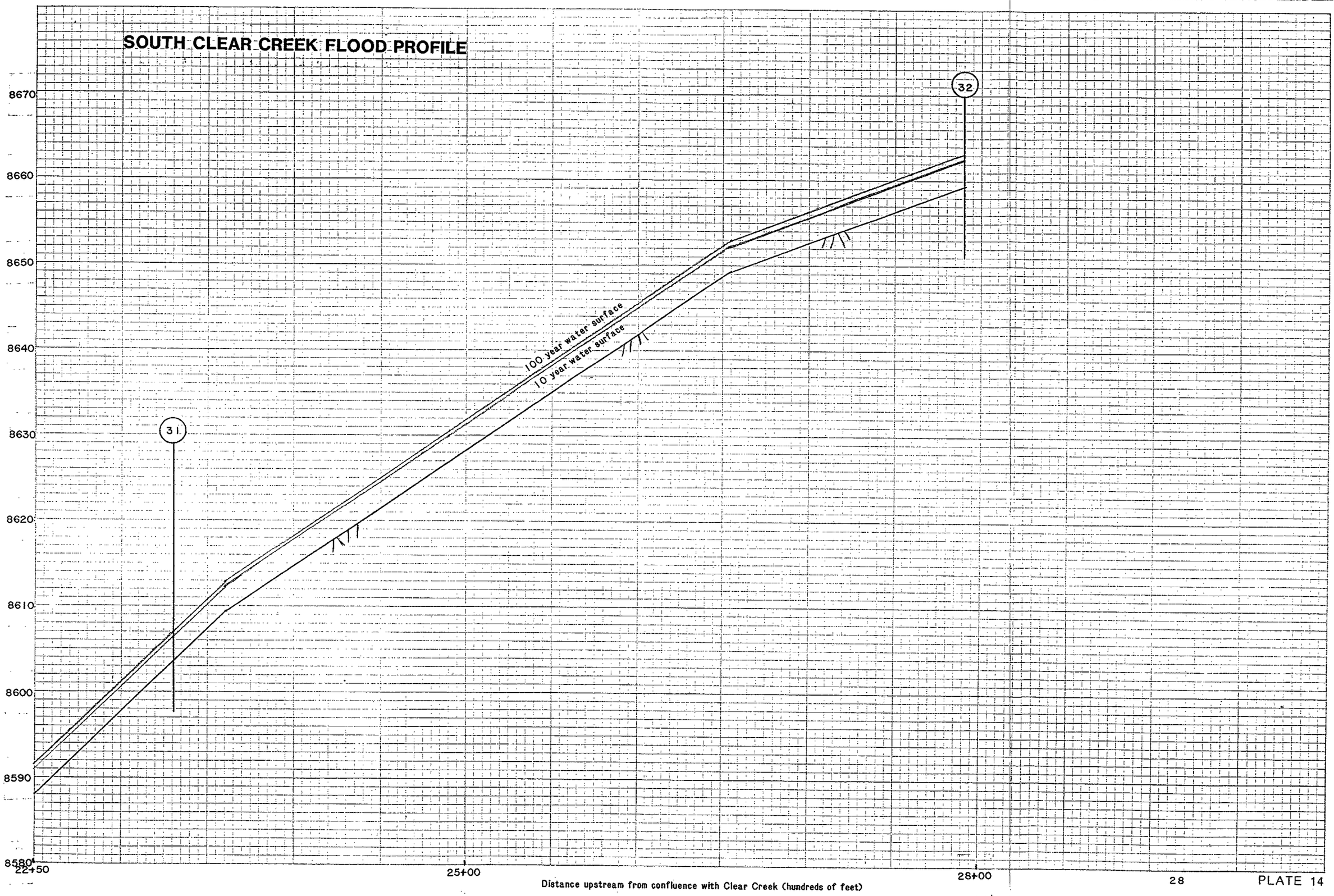


PLATE 14

092-9274 STATE OF COLORADO WATER CONSERVATION BOARD --- ENGINEERING DEPARTMENT PLOTTED _____ CHECKED _____

CROSS-SECTIONS

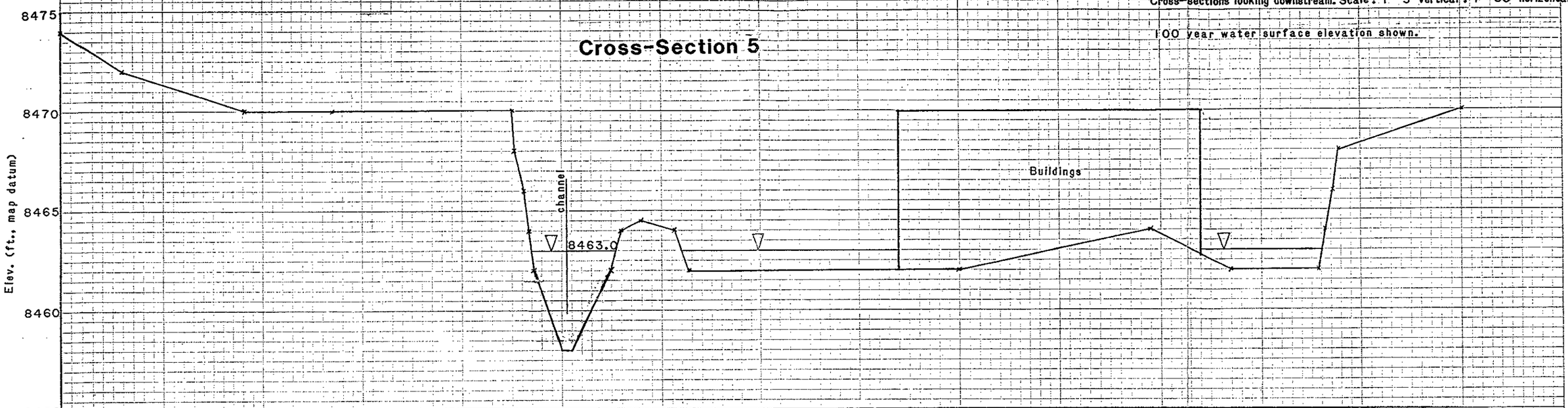
Cross-sections shown from 2' contour map (modified in vicinity of channel).

All elevations in feet above mean sea level. Distances in feet.

Cross-sections looking downstream. Scale: 1"=5' vertical; 1"=50' horizontal.

100 year water surface elevation shown.

Cross-Section 5



Cross-Section 14