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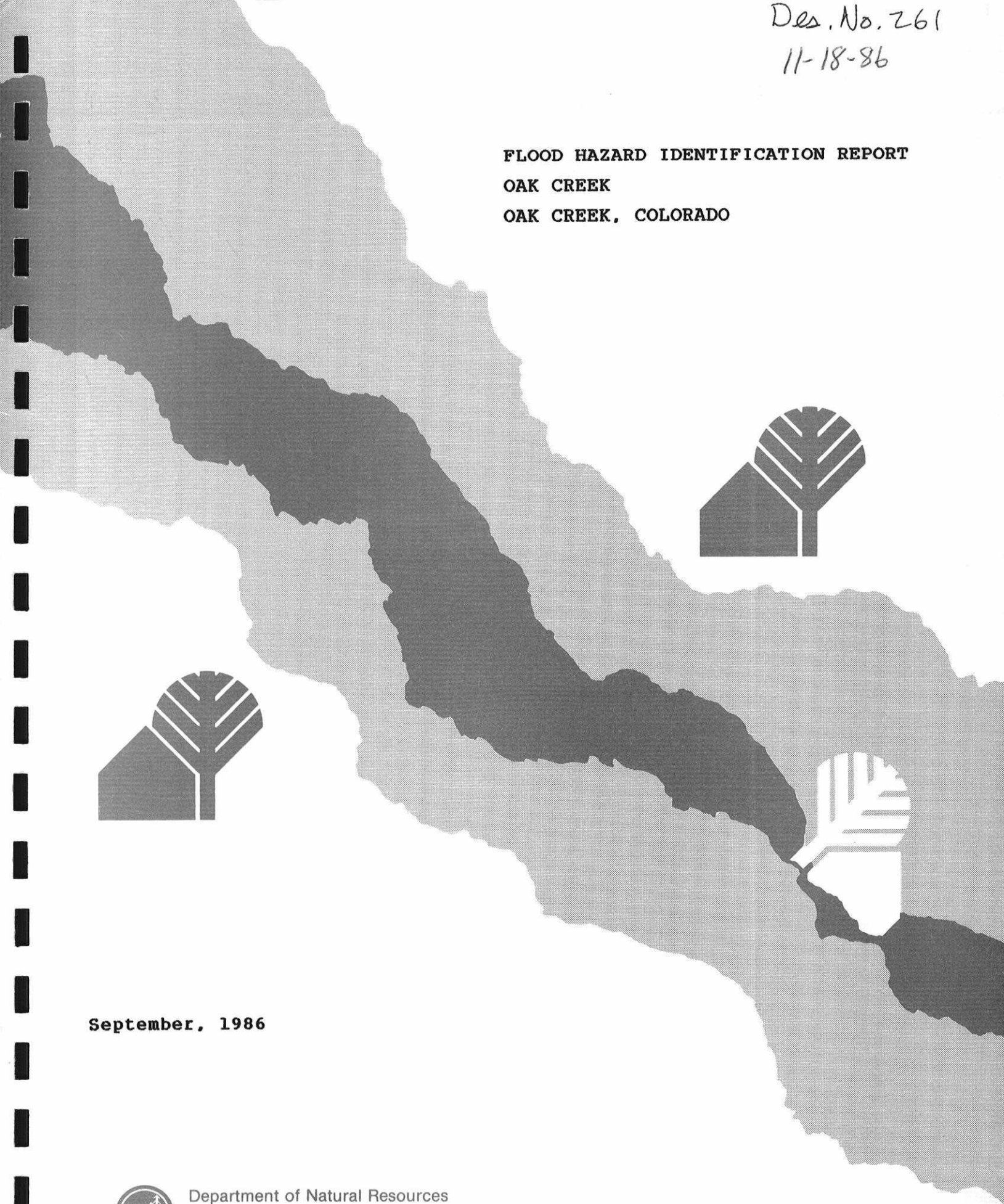
FLOOD HAZARD IDENTIFICATION REPORT
OAK CREEK
OAK CREEK, COLORADO



September, 1986

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

FLOOD HAZARD IDENTIFICATION REPORT

OAK CREEK

OAK CREEK, COLORADO

Prepared for the

Town of Oak Creek

by

The Colorado Water Conservation Board

September, 1986

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PREFACE

This floodplain information report presents the results of a study of the floodplain along Oak Creek in the Town of Oak Creek, 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 Oak Creek.

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

Town of Oak Creek
P.O. Box 128
Oak Creek, Colorado 80467

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.

The Board's power and duty is ...

... "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"...

as stated in Section 37-60-106(1)(c) of the Colorado Revised Statutes.

The Town of Oak Creek requested this flood study per letter of December 13, 1985 from Ms. Nancy Crawford, Clerk for the Mayor and Board of Trustees, Town of Oak Creek (Exhibit 1). This report was authorized by the Colorado Water Conservation Board in joint sponsorship with Oak Creek, Colorado.

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, flood profiles (10-year flood profile included) and floodplain cross sections showing the high water elevations for the 100-year flood at selected reference points. 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 Chuck Wisecup, Public Works Foreman, Town of Oak Creek and Lester Wixom, Public Works crew, is appreciated. Also appreciated is the assistance of Chuck Sundby of D & D Consultants, Inc. of Steamboat Springs.

Related Flood Studies

A report entitled "The 1984 Flood, Commemorative Issue, Oak Creek, Colorado" was written by a local citizen of Oak Creek to explain what occured during the May, 1984 snowmelt runoff and dam failure flood. It also details some flood history and contains numerous pictures showing damages caused by the 1984 flood. (Ref. 14).

The Federal Insurance Administration prepared a Flood Hazard Boundary Map (FHBM) for the Town of Oak Creek in December of 1975 (see Exh. 2). The FHBM was derived using approximate methods. Corporate limits have changed since that time in the southeast end of town (Exh. 4).

STUDY AREA DESCRIPTION

Drainage Basin Characteristics

Oak Creek headwaters are located at approximately elevation 10,240 feet above mean sea level. The highest point in the basin is at 11,182 feet (Sand Point). Oak Creek, at the northern Town of Oak Creek boundary is at 7390 feet. The length of Oak Creek from its headwaters to where it intersects Oak Creek's northern corporate limit is approximately 14.4 miles. The creek travels in a northeasterly direction for this entire distance.

The drainage area of Oak Creek is 22.7 square miles (see Basin Map, Plate 1). There are no major tributaries to Oak Creek.

Study Reach Description

The study reach along Oak Creek covers the area within the Town of Oak Creek's corporate limits. The length of the study reach is approximately one mile. Oak Creek formerly meandered widely through the town. Over the years, it has been rerouted and straightened (Ref. 14).

HYDROLOGIC AND HYDRAULIC DETERMINATIONS

Flood History

It is known that significant flooding occured in 1914, 1939, 1950 and 1984 as well as other years (Ref. 14). The streamflow occuring during the May, 1984 snowmelt flood was estimated by Dismuke and Dismuke Consultants, Inc. at approximately 650 cfs at County Route 27 (at the northern end of town). Local residents have indicated that the May, 1984 flood was the "flood of record". Streamflows for the other flood events are not known.

Flood Characteristics

"Typical" flooding along Oak Creek is caused by snowmelt runoff. However, at frequencies as rare as the 100-year event, flooding can occur from rainfall runoff.

Hydrologic Analysis

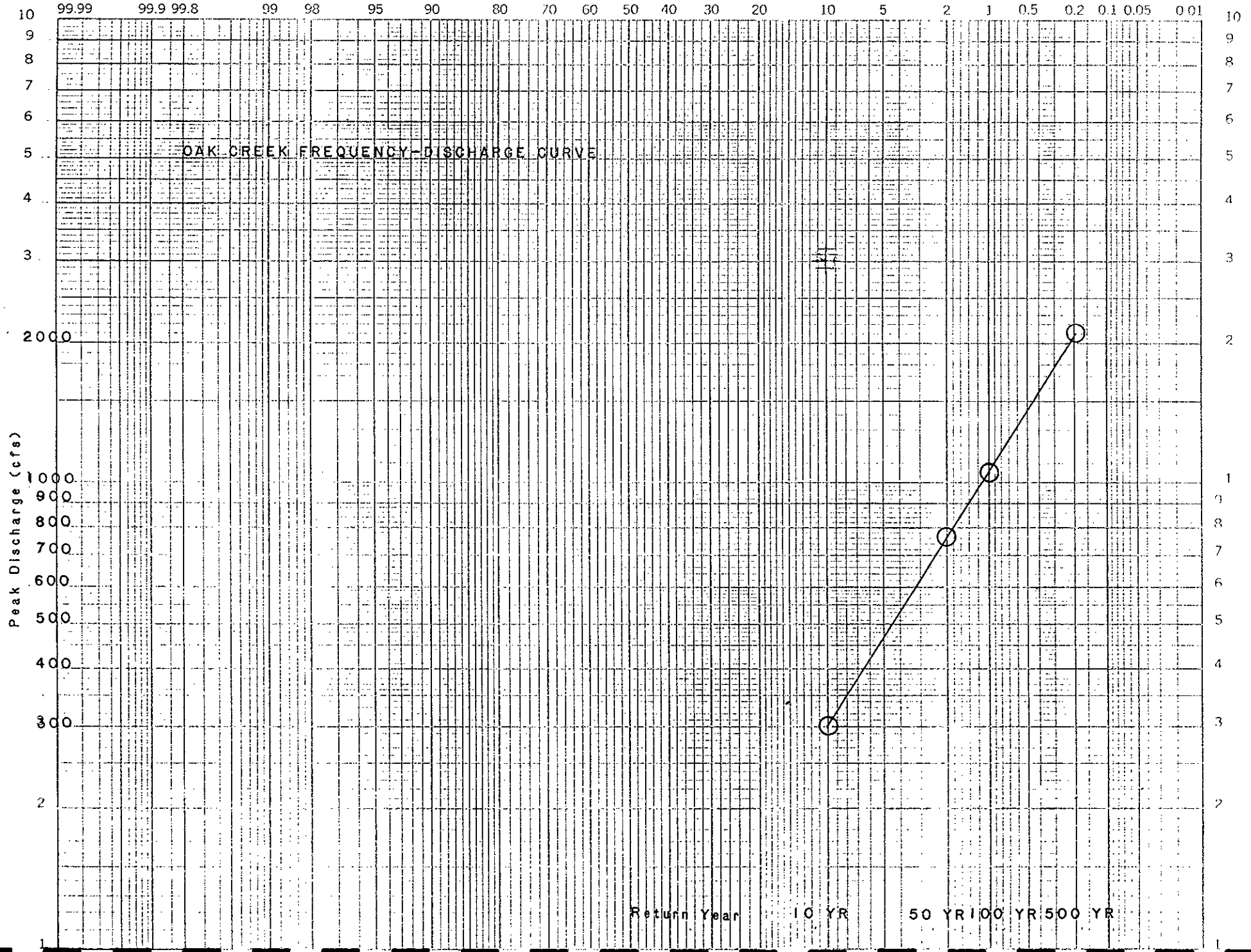
A hydrological analysis of flows in Oak Creek was performed for snowmelt and/or rainfall runoff over the basin. There are no active streamflow gage records on Oak Creek. A gage was formerly existent on Oak Creek for only 5 years (water years 1953 to 1957). It was located 4.5 miles southwest of the Town of Oak Creek. The length of record of this gage was insufficient to be analyzed and provide meaningful results. The Soil Conservation Service's (SCS) unit hydrograph procedure (Ref. 9) was then employed to determine the 100-year peak streamflow. Significant parameters used with this method were a 100-year 24-hour rainfall of 2.8 inches and a SCS curve number of 70.

A 100-year peak flow was computed using the assumed basin parameters and compared with the flow values of other streams in the region (Ref. 4). Through this comparison, the 100-year peak flow was adjusted to reflect the runoff characteristics of the basin.

The 10-year flood event was assumed to be the result of a snowmelt event. This value was obtained from a regional analysis of streams which had acceptable gage records and similar characteristics. A straight line was then drawn between the two "known" points on log-probability paper and flows were extrapolated for the 50- and 500-year events. A plot of the frequency discharge curve for Oak Creek is shown in Figure 1.

Peak flows for Oak Creek at the Town of Oak Creek (drainage area of 22.7 square miles) are as follows:

Recurrence Interval (years)	Peak Flow (cfs)
10	300
50	750
100	1050
500	2100



Figure

Hydraulic Analysis

An analysis of the hydraulic characteristics of Oak Creek was performed in order to determine water surface elevations for the 100-year flood. Bridge elevations and sizes of openings were surveyed and measured in the field on January 21 and 22, 1986. This data was combined with cross-section data on Oak Creek taken from a 2' contour mapping of the Town of Oak Creek (Ref. 3). This cross-section data became the input data in the U.S. Army Corps of Engineers HEC-2 step-backwater computer program.

The locations of the cross-sections are shown on the "Flooded Areas Maps" (see Plates 3 to 13) and the hydraulic data for the cross-sections is displayed in Table 1.

Roughness coefficients (Manning's "n" values) were also used as HEC-2 input. Roughness values for Oak Creek varied from 0.035 for the channel to 0.040 for the overbank areas.

Critical depth was the starting water surface elevation at a location several hundred feet downstream from the study reach. "True" water surface elevations were reached within 3 cross-sections (i.e. by cross-section 0.3, downstream from the study reach) as computer calculations proceeded in the upstream direction.

The computed 100-year flood is outlined on the "Flooded Areas Maps", plotted on the "Flood Profile" sheets, and tabulated in the "Cross-section and Water Surface Elevation Data" table (Table 1).

A significant degree of overtopping would occur at each of the five road crossings during a 100-year flood event. Culvert capacities are insufficient to pass the 100-year flow in each case. Only minor blockage of the culverts was assumed at each creek crossing. Insufficient culvert capacity at the County Road 27 crossing would cause water to back up south of the D & RG railroad tracks nearly to the Bell Ave. bridge crossing of Oak Creek. Several low-lying residences would be flooded due to this backwater effect. Insufficient capacity of the Bell Ave. and Sharp Ave. crossings, in conjunction with adjacent low-lying ground to the north of the creek would cause flooding to some of the buildings in the downtown area. The baseball field area to the east of Moffat Ave. would be flooded due to insufficient capacity of the Moffat Ave. crossing.

Flooded Areas

The areas covered by the 100-year flood are shown on Plates 3 through 13 (Index given on Plate 2). Further information with regards to flood elevations at various locations is given in the following sections of this report. There is widespread flooding damage in the 100-year floodplain of Oak Creek.

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 14 through 17 show the 10-year and 100-year flood profiles for Oak Creek. It should be noted that, for each bridge crossing Oak Creek, "top of road" (shown on the profile sheets) refers to elevation of the road directly above the culvert(s). At each bridge crossing, with the exception of the railroad bridge, the elevation of the ground or roadway approaches to the bridge is lower than the bridge itself. Therefore at most crossings, some of the flood water flows around the bridge.

Plate 18 is a graphical display of some of the cross-sections and the computed 100-year flood elevations at these cross-sections. Table 1 gives 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 3 gives some NFIP rate information. Additional information on the NFIP is available as follows:

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 & 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

X-sec number	Comments	Location* (Station)	Channel bottom elev. (ft,msl)	100-yr flood elev. (ft,msl)	10-yr flood elev. (ft,msl)
0.4		**	7387.7	7393.3	7391.5
-		0+00	7388.0	7394.1	7392.1
1	d/s Co. Rd. 27	1+46	7388.6	7396.6	7394.1
2	u/s Co. Rd. 27	1+94	7389.0	7397.6	7395.0
3		3+26	7389.8	7397.8	7395.8
4		4+92	7390.2	7397.8	7395.8
5		7+68	7391.1	7397.9	7396.1
6		10+71	7391.9	7399.0	7396.7
7		12+88	7392.5	7399.5	7397.5
8	d/s Bell Ave. Br.	13+67	7392.7	7401.0	7397.8
9	u/s Bell Ave. Br.	14+10	7393.3	7403.9	7398.6
10		16+14	7396.5	7404.1	7400.5
11	d/s Sharp Ave Br.	18+14	7399.4	7406.5	7405.3
12	u/s Sharp Ave Br.	18+97	7400.4	7407.7	7405.6

.....

* Distance in hundreds of feet upstream from the Town of Oak Creek's northern corporate limit.

** This station is 43 feet downstream from the Town of Oak Creek's northern corporate limit.

TABLE 1

(continued)

X-sec number	Comments	Location* (Station)	Channel bottom elev. (ft,msl)	100-yr flood elev. (ft,msl)	10-yr flood elev. (ft,msl)
13		19+95	7401.5	7408.0	7406.1
14	RR Bridge	21+64	7403.6	7408.5	7407.3
15	RR Bridge	21+79	7403.8	7409.3	7407.3
16		22+76	7404.7	7409.9	7407.8
17	d/s Moffat Ave Br.	23+32	7405.0	7412.8	7409.6
18	u/s Moffat Ave Br.	24+31	7405.7	7414.0	7411.3
19		28+91	7408.6	7414.4	7412.6
20	d/s Oak-Wms. Br.	30+37	7409.5	7414.6	7413.8
21	u/s Oak-Wms. Br.	30+88	7409.9	7415.3	7414.4
22		34+82	7412.4	7417.0	7415.4
23		41+04	7416.2	7422.2	7420.2
24		45+63	7421.1	7426.1	7424.2
25		49+73	7424.3	7429.1	7427.3
26		56+02	7428.1	7432.3	7430.8

.....

* Distance in hundreds of feet upstream from the Town of Oak Creek's northern corporate limit.

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.

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 Oak Creek may request to be converted from the Emergency Phase of the National Flood Insurance Program to the Regular Phase through the "special conversion provision" of the program. 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 Areas 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 December 19, 1975 (see Exhibit 2). Upon Oak Creek'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 3 gives some information on National Flood Insurance Program coverage available.

Modification of the existing levee between the railroad bridge over Oak Creek and Sharp Street to meet Federal Emergency Management Agency standards would result in a greatly reduced floodplain in the downtown area. In this report, the existing levee was ignored because it fell short of FEMA criteria for levees. A cutoff levee at the upstream end of the existing levee and a widening and raising of the existing levee would make the levee meet the standards. State and Federal aid may be available for such a project.

BIBLIOGRAPHY

1. Colorado Water Conservation Board, field survey of January 21 and 22, 1986.

2. Dismuke and Dismuke Consultants, Inc. hand calculations by Chuck Sundby, May 22, 1984.

3. Dismuke and Dismuke Consultants, Inc., 2' contour maps prepared from aerial photos of June 2, 1981.

4. Federal Insurance Administration, Flood Insurance Study, Town of Hayden, Colorado, December, 1977.

5. Federal Insurance Administration, Flood Hazard Boundary Map, Town of Oak Creek, December 19, 1975, Community No. 080158A

6. Oak Creek, letter of December 13, 1985 from Nancy Crawford, Clerk for the Mayor and Board of Trustees, to Larry Lang, Chief, Flood Control and Floodplain Management Section, Colorado Water Conservation Board

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

8. U.S. Coast and Geodetic Survey, Benchmark Data

9. U.S. Department of Agriculture, Soil Conservation Service, Hydrology, SCS National Engineering Handbook, Section 4, 1964 (Revised 1969).

10. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Precipitation-Frequency Atlas of the Western United States, 1973.

11. U.S. Department of the Interior, U.S. Geological Survey, Compilation of Surface Water Records, Colorado River Basin, 1950-60, Water Supply Paper 1733.

12. U.S. Department of the Interior, U.S. Geological Survey 1:24,000 scale maps: Oak Creek (1969), Rattlesnake Butte (1971), Sand Point (1966), and Yampa (1972).

13. U.S. Department of the Interior, U.S. Geological Survey 1:250,000 scale map: Craig.

14. Y. M., The 1984 Flood - Commemorative Issue, Oak Creek, Colorado

EXHIBIT 1

TOWN OF OAK CREEK

December 13, 1985

Larry Lang, Chief
Colorado Water Conservation Board
Flood Control/ Floodplain Management Section
1313 Sherman St., Room 721
Denver, CO 80203

Dear Mr. Lang:

The Town of Oak Creek would like to request the assistance of the Board in developing a detailed flood hazard area map. We feel that an accurate, up-to-date map is vital to effective flood management.

Thank you for your consideration.

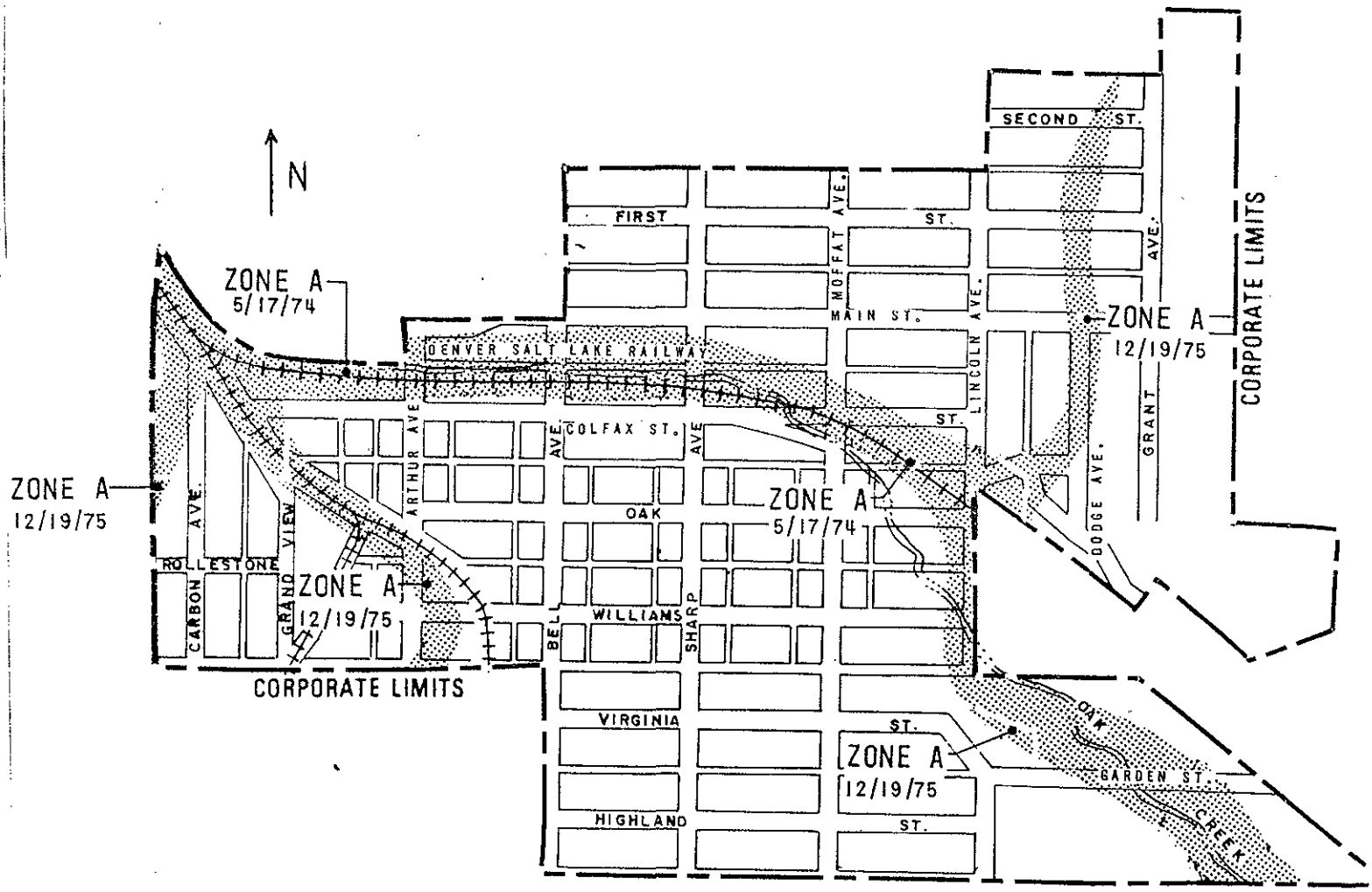
Yours truly,

N. Crawford

Nancy Crawford, Clerk for
the Mayor and Board of Trustees

P.O. Box 128, Oak Creek, CO 80467 ★ (303)736-2422

EXHIBIT 2



01	DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT Federal Insurance Administration TOWN OF OAK CREEK, CO (ROUTT CO.)

APPROXIMATE SCALE

500 0 1000 2000 FEET

FIA FLOOD HAZARD BOUNDARY MAP No. H 01		MAP REVISED 12/19/75

EXHIBIT 3

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 1/8/86

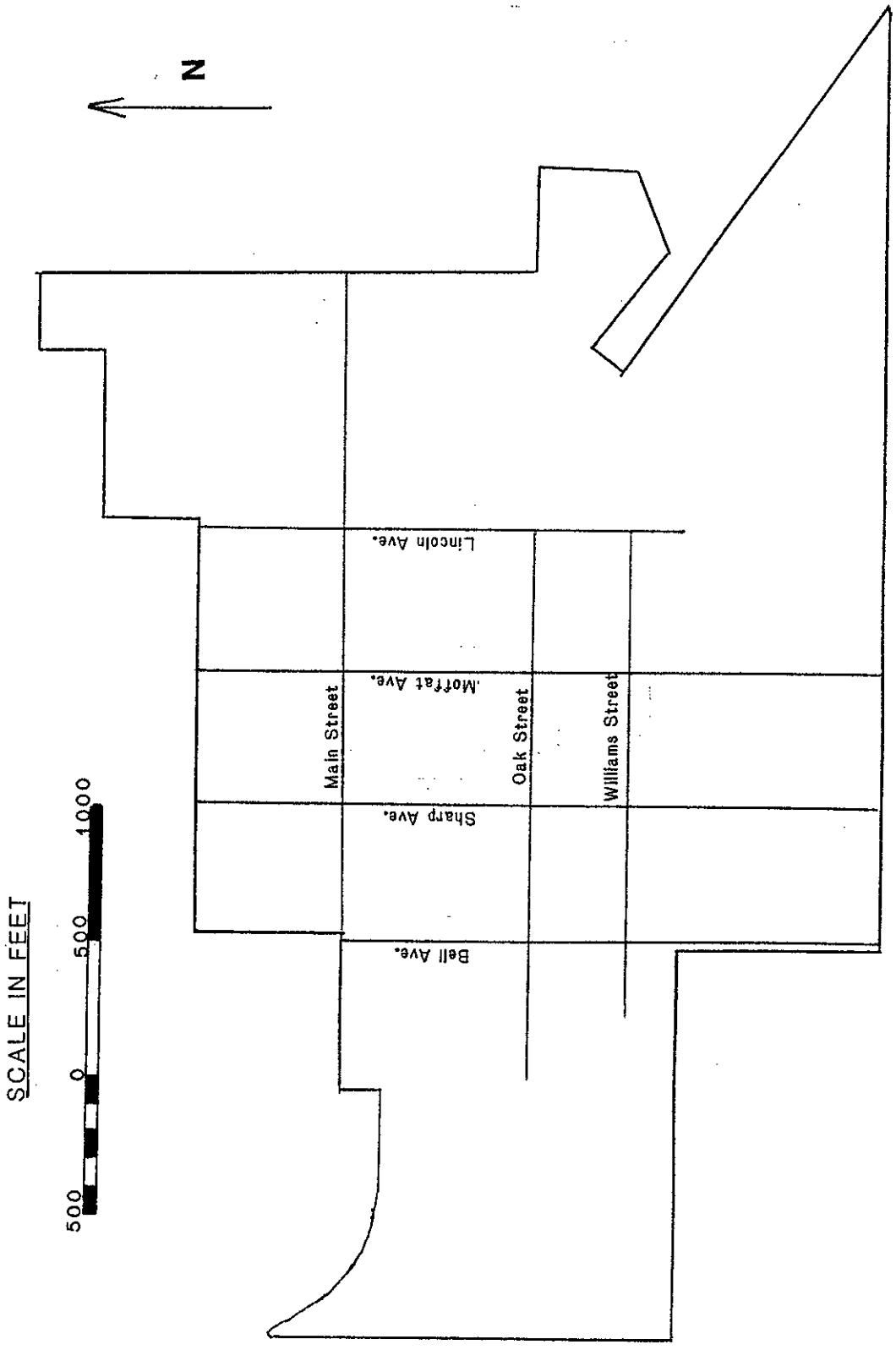
**For the Emergency Phase Only "First Layer coverage "(up to $35,000 is available; For the Regular Phase "Second Layer Coverage" (up to an additional $150,000) is also available

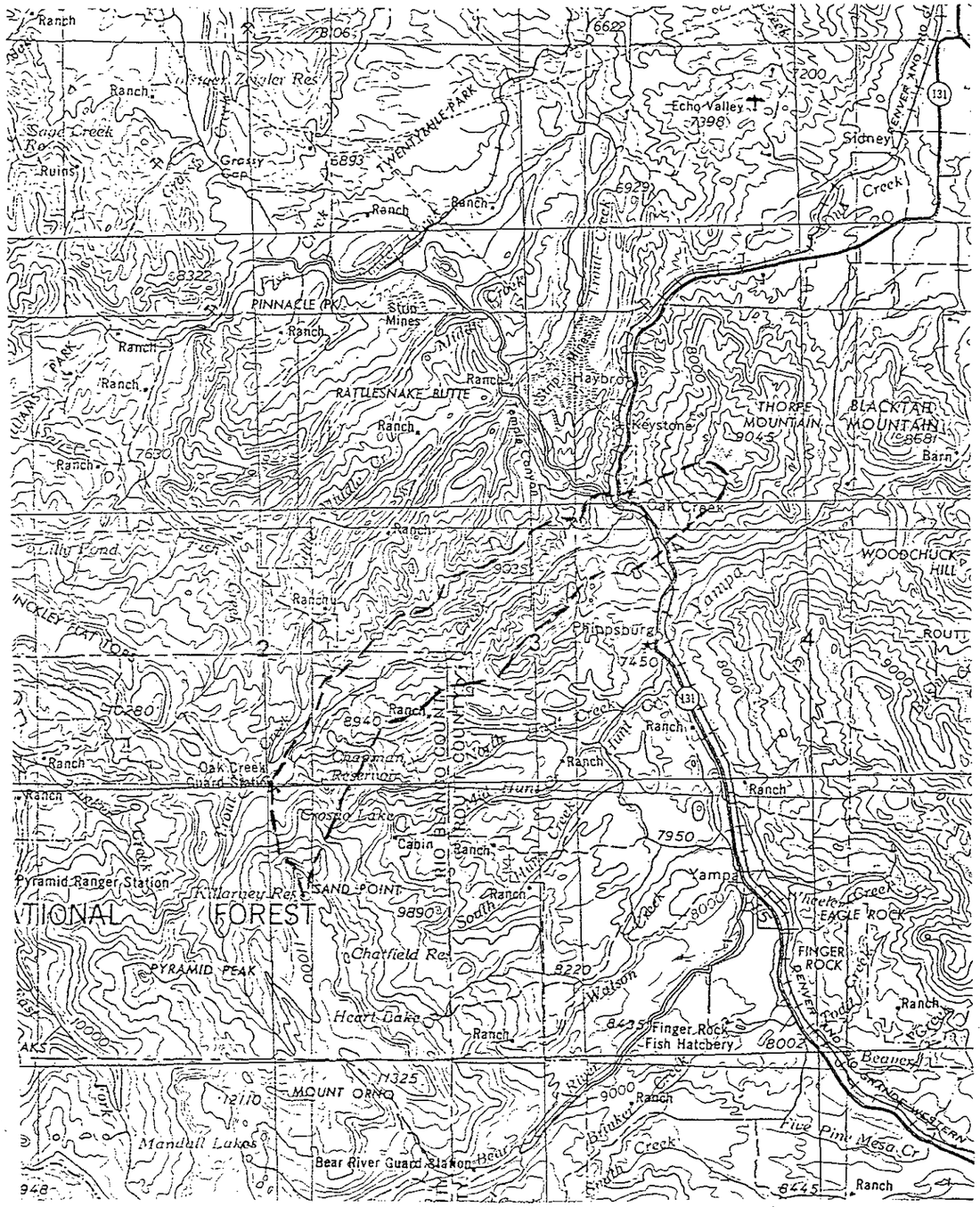
***Rated on a case-by-case basis.

EXHIBIT 4 CORPORATE LIMIT MAP

OAK CREEK, COLORADO

September, 1986





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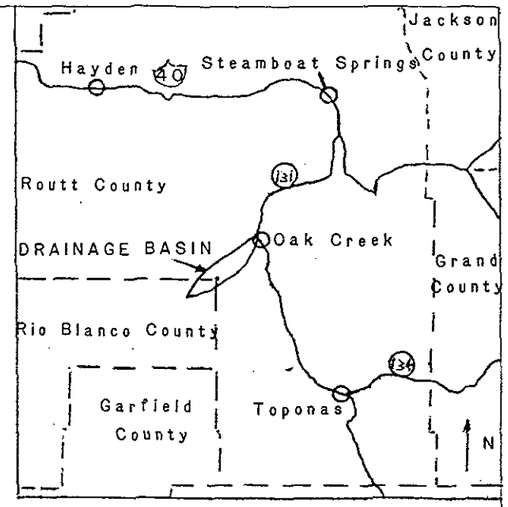
LEGEND

— — — Drainage basin boundary

(131) State road

contour interval=200 feet.



VICINITY MAP

Scale in miles

5 0 5 10 15 20

Scale in miles

5 0 5

Routt County

Town of Oak Creek

OAK CREEK

BASIN MAP

Prepared by

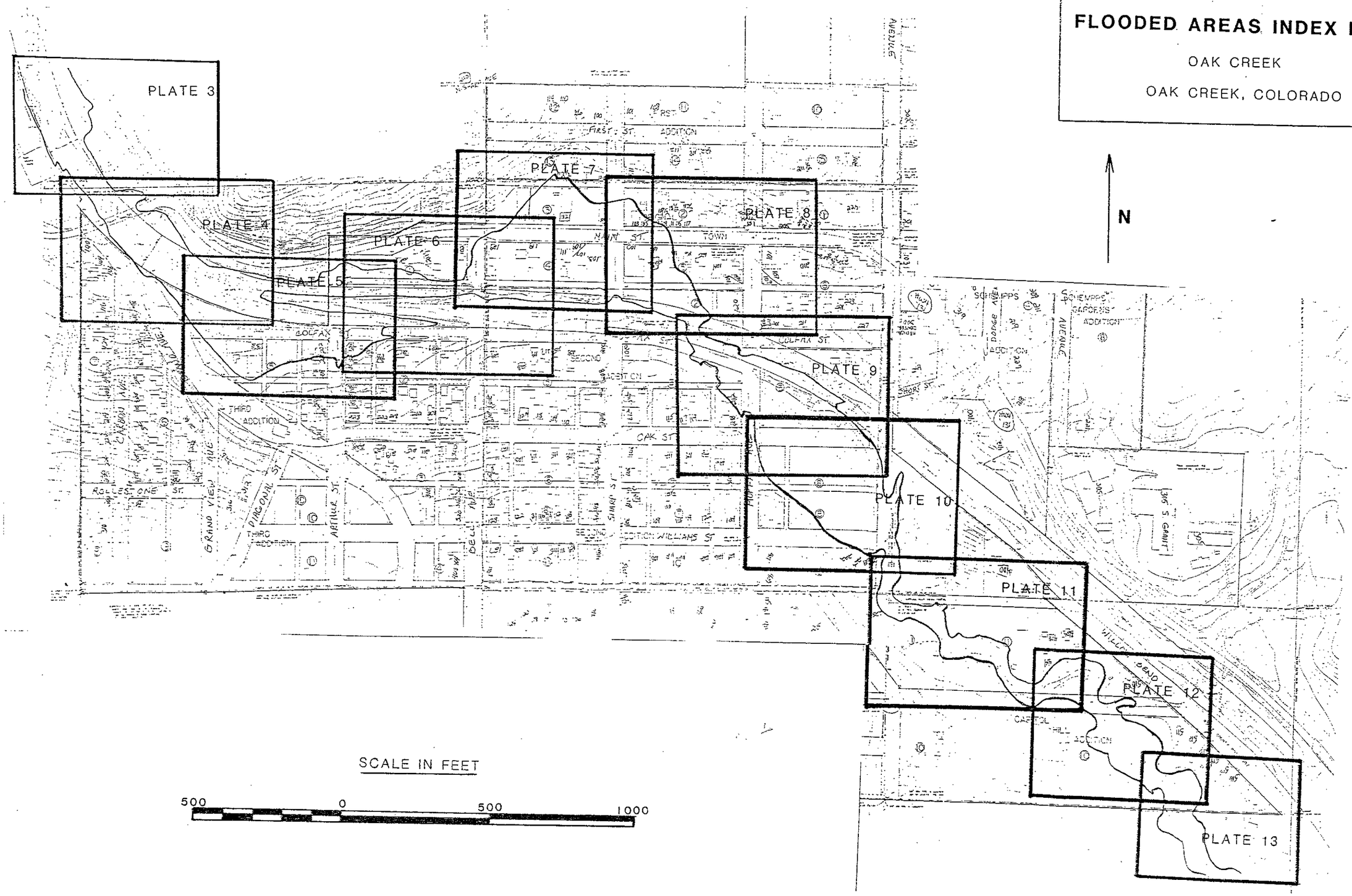
Flood Control and Floodplain Management Section

Colorado Water Conservation Board

FLOODED AREAS INDEX MAP

OAK CREEK

OAK CREEK, COLORADO



N

LEGEND

100-year flood limits

10+00 Stationing from downstream town limit (hundreds of feet)

Cross-section

Benchmark

Flood contour

NOTES

Mapping by Dismuke and Dismuke, June 2, 1981

Elevations based on National Geodetic Vertical Datum of 1929.

Scale in feet

0 100

FLOODED AREAS MAP

OAK CREEK

OAK CREEK COLORADO

September, 1986

N

LEGEND

100-year flood limits

10+00 Stationing from downstream town limit (hundreds of feet)

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Scale in feet

0 100

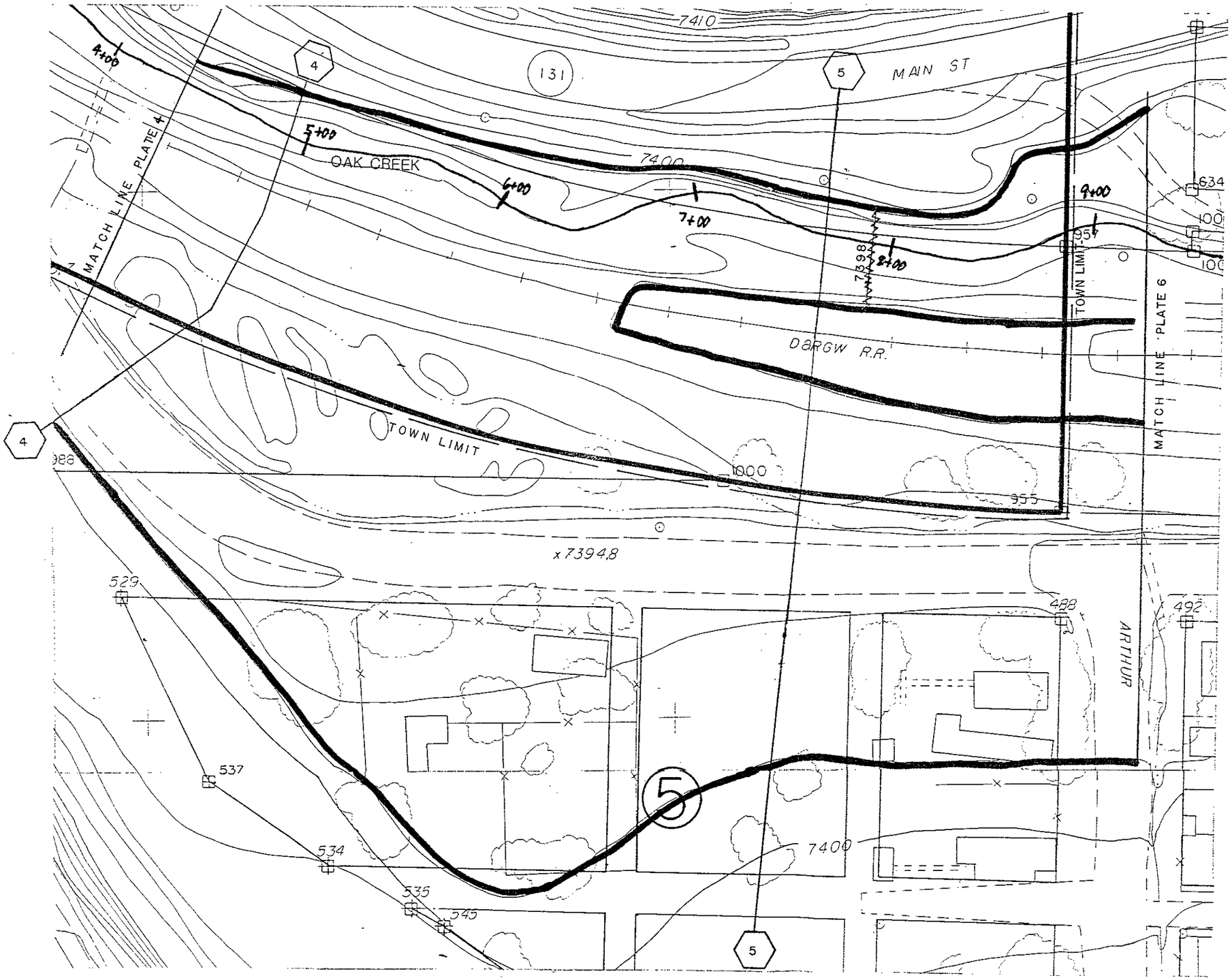
FLOODED AREAS MAP

OAK CREEK

OAK CREEK, COLORADO

September, 1986

PLATE 4



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100-year flood limits

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Cross-section

Benchmark

Flood contour

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Scale in feet

0 100

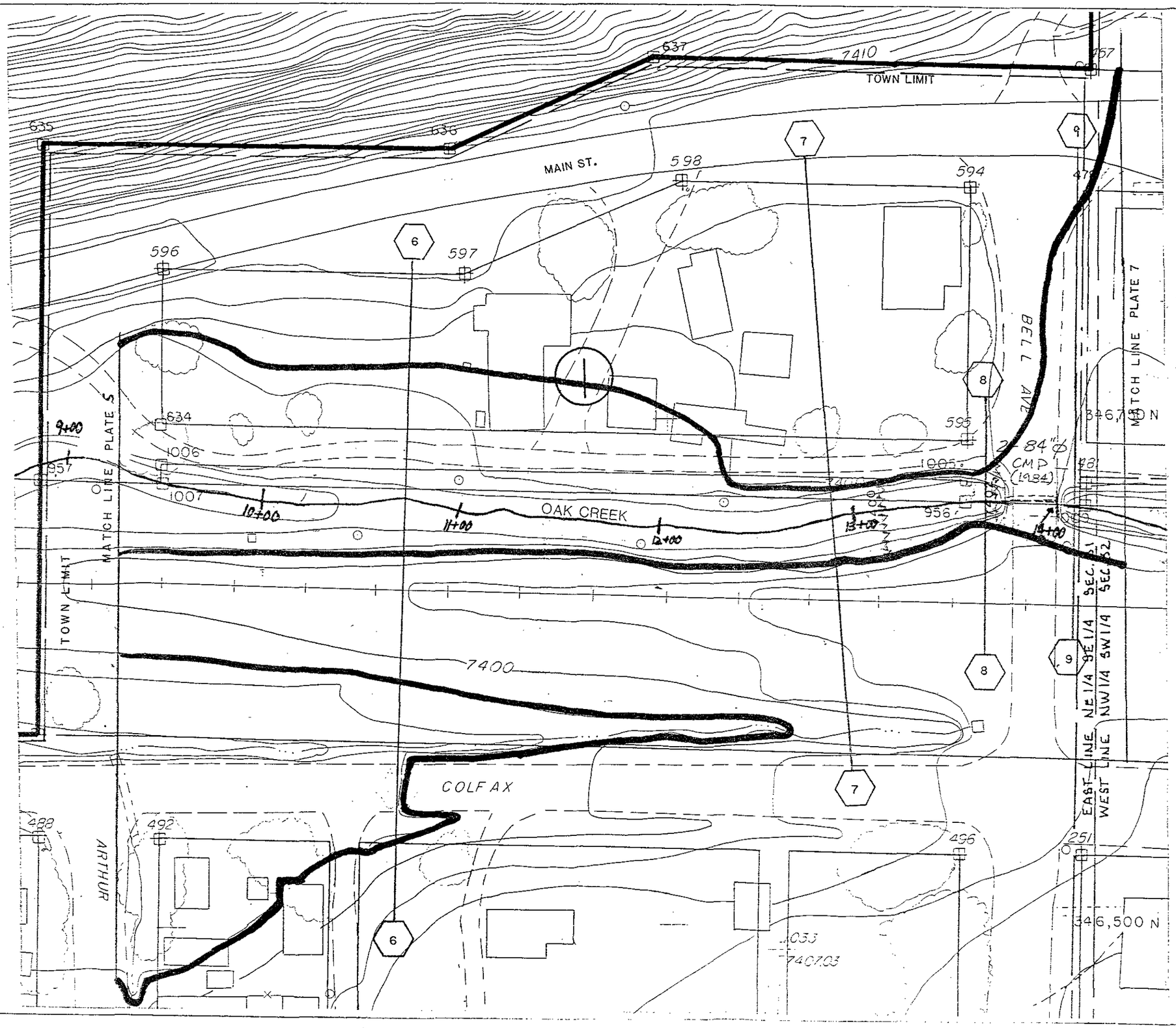
FLOODED AREAS MAP

OAK CREEK

OAK CREEK, COLORADO

September, 1986

PLATE 5



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LEGEND

100-year flood limits

10+00 Stationing from downstream town limit (hundreds of feet)

Cross-section

Benchmark

Flood contour

NOTES

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Scale in feet

0 100

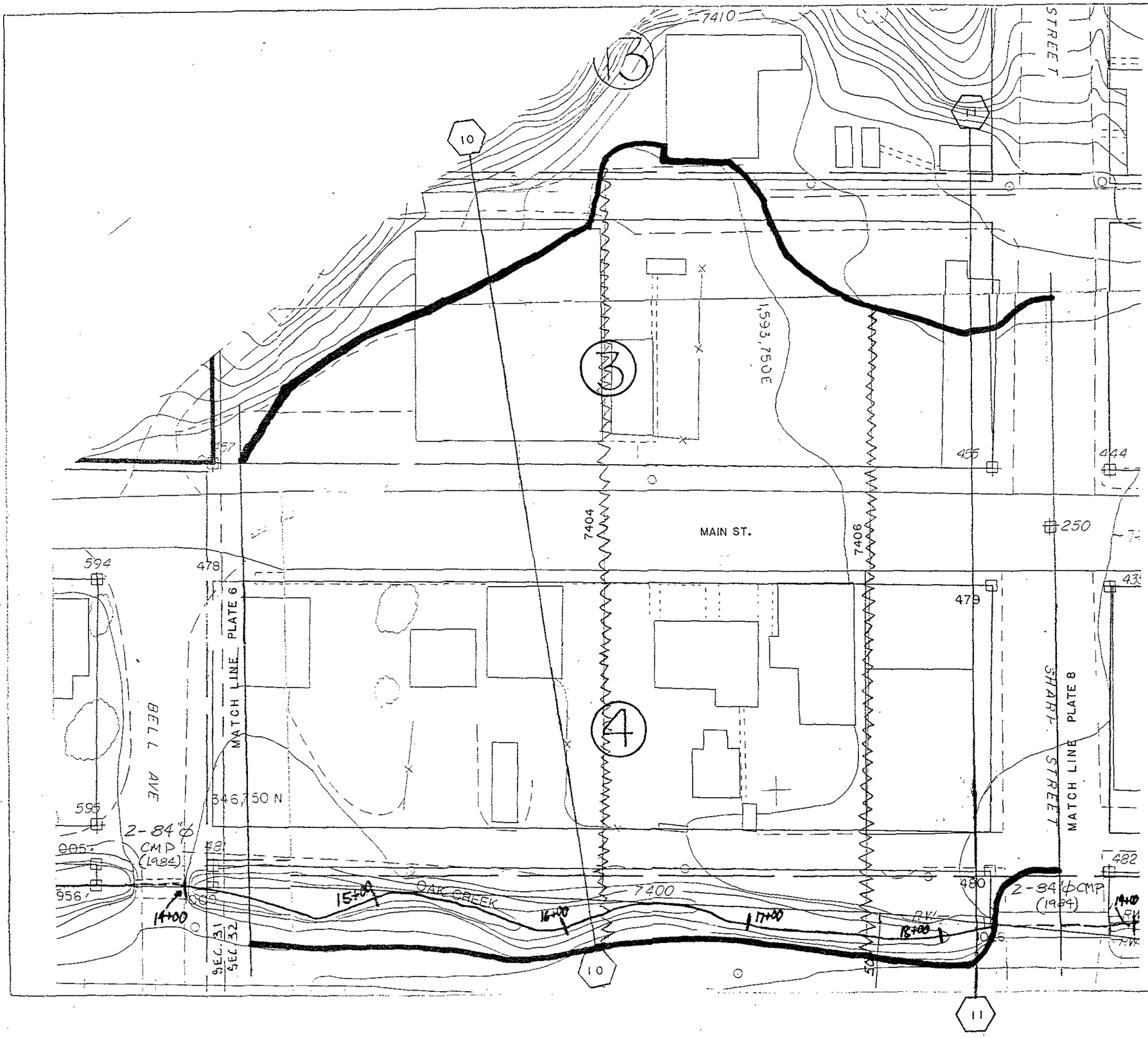
FLOODED AREAS MAP

OAK CREEK

OAK CREEK, COLORADO

September, 1986

PLATE 6



N

LEGEND

- 100-year flood limits
- 10+00 Stationing from downstream town limit (hundreds of feet)
- Cross-section
- Benchmark
- Flood contour

NOTES

Mapping by Dismuke and Dismuke, June 2, 1981

Elevations based on National Geodetic Vertical Datum of 1929.

Scale in feet

0 100

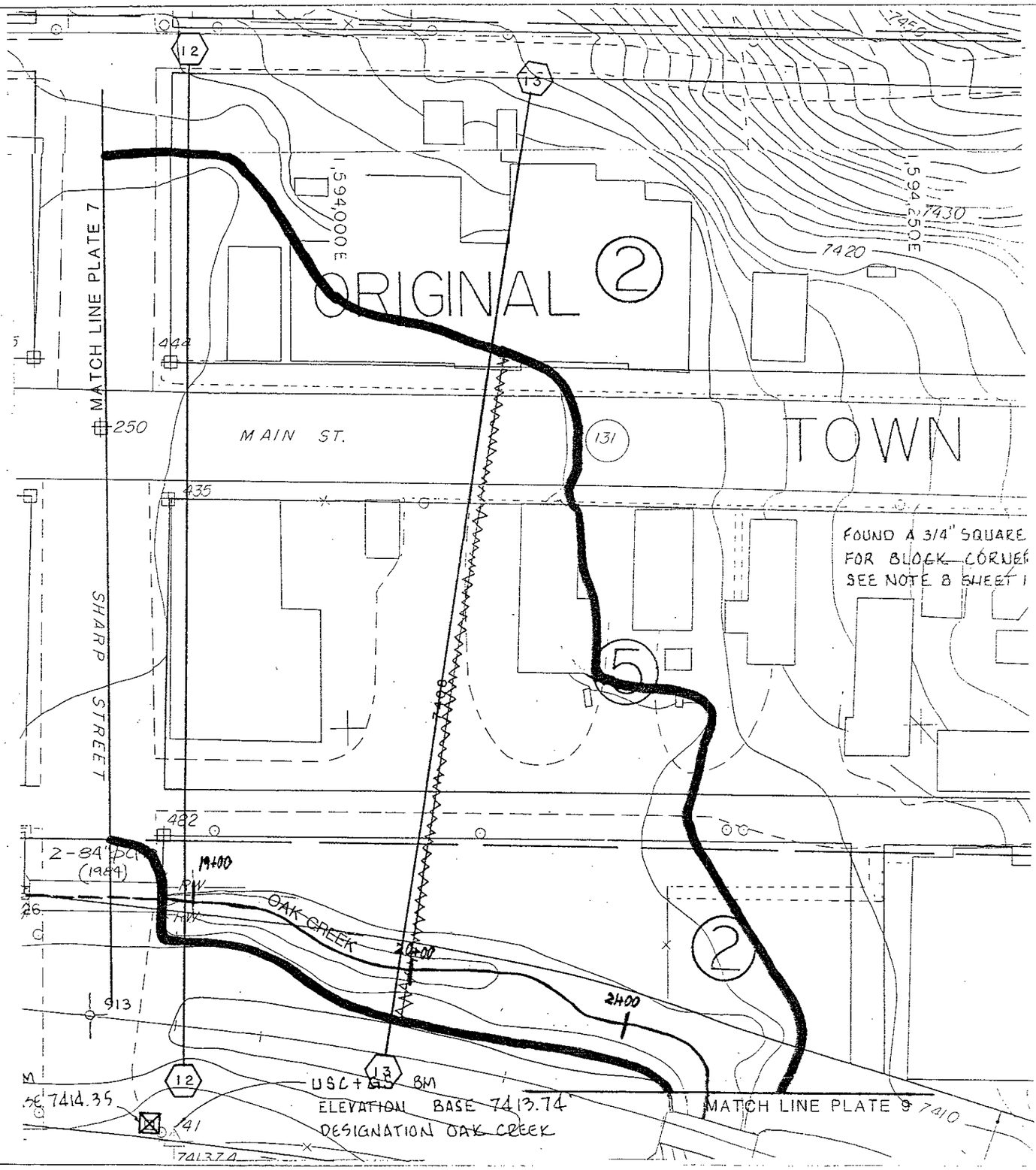
FLOODED AREAS MAP

OAK CREEK

OAK CREEK, COLORADO

September, 1986

PLATE 7



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LEGEND

- 100-year flood limits
- 10+00 Stationing from downstream town limit (hundreds of feet)
- Cross-section
- Benchmark
- Flood contour

NOTES

Mapping by Dismuke and Dismuke, June 2, 1981

Elevations based on National Geodetic Vertical Datum of 1929.

Scale in feet

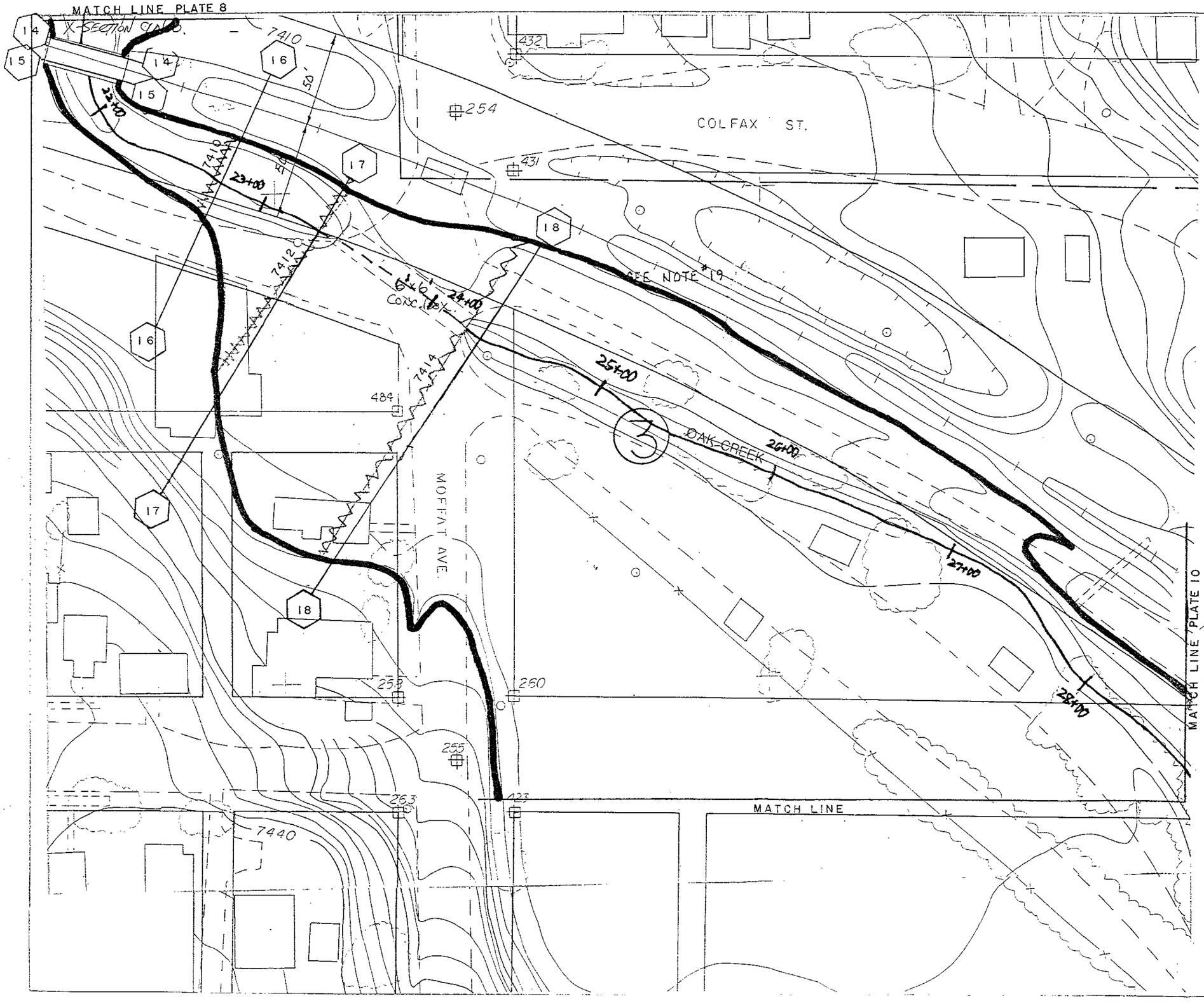
0 100

FLOODED AREAS MAP

OAK CREEK

OAK CREEK, COLORADO

September, 1986



N

LEGEND

- 100-year flood limits
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- Cross-section
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NOTES

Mapping by Dismuke and Dismuke, June 2, 1981

Elevations based on National Geodetic Vertical Datum of 1929.

Scale in feet

0 100

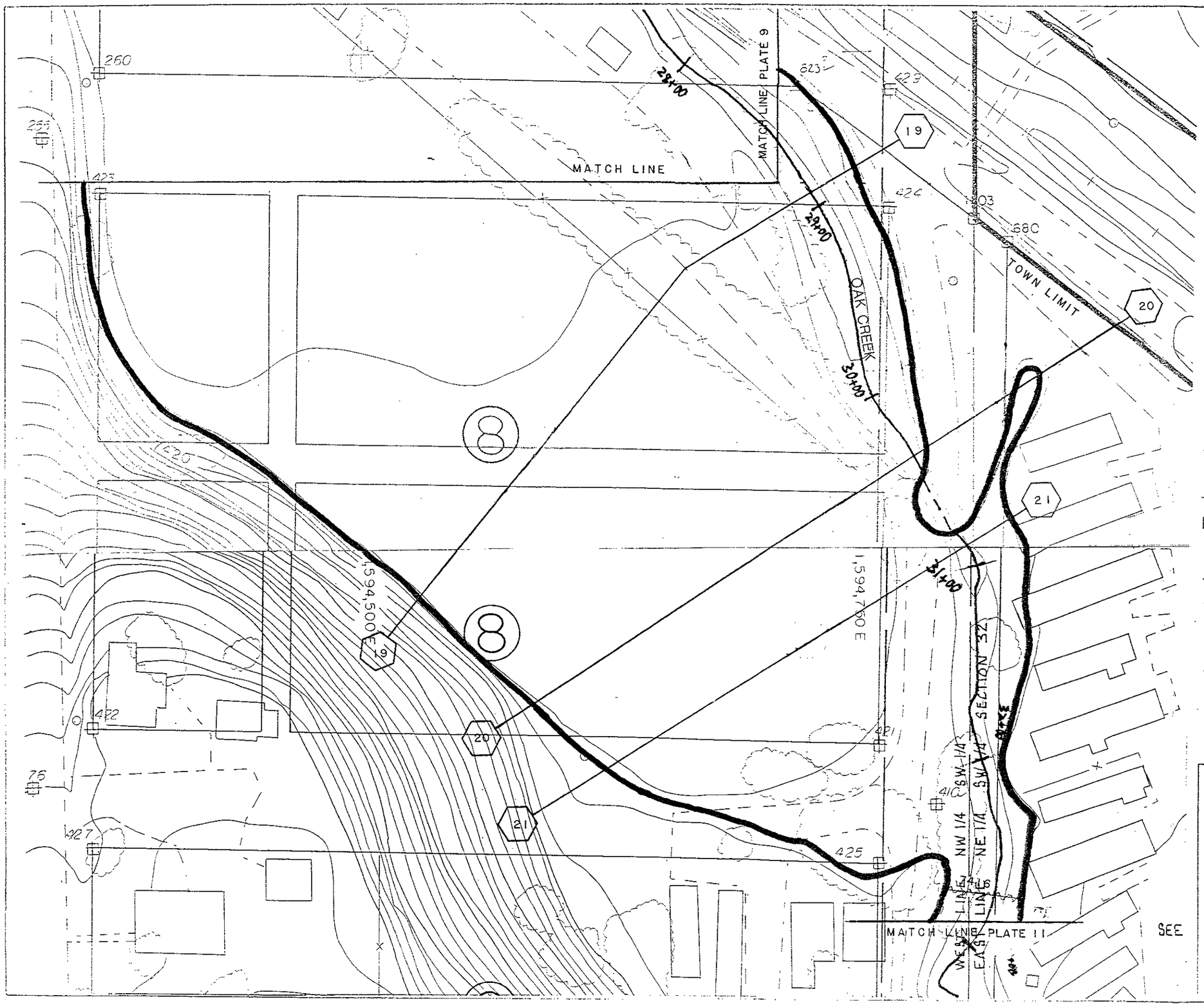
FLOODED AREAS MAP

OAK CREEK

OAK CREEK, COLORADO

September, 1986

PLATE 9



LEGEND

- 100-year flood limits
- 10+00 Stationing from downstream town limit (hundreds of feet)
- Cross-section
- Benchmark
- Flood contour

NOTES

Mapping by Dismuke and Dismuke, June 2, 1981

Elevations based on National Geodetic Vertical Datum of 1929.

Scale in feet

0 100

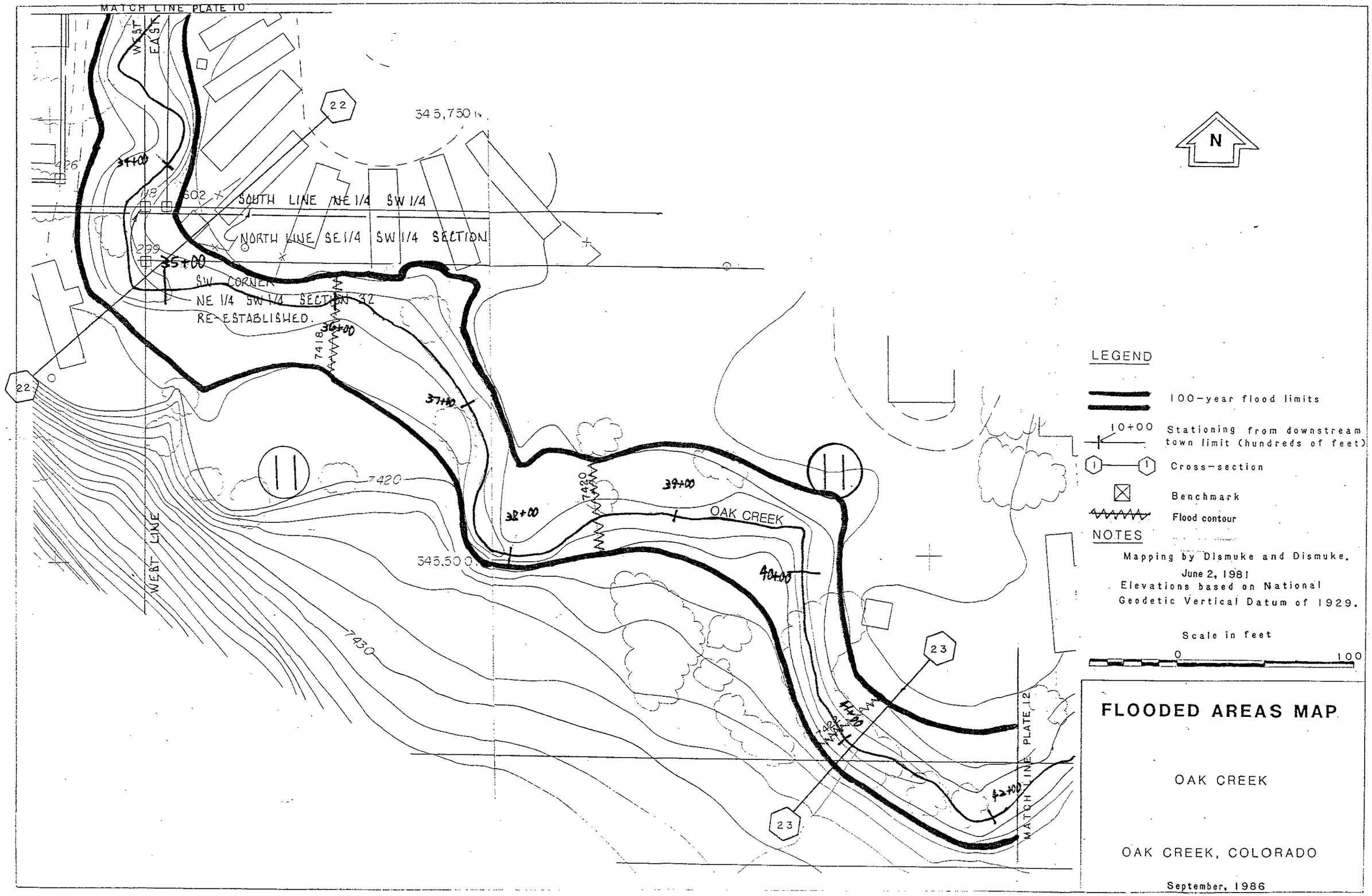
FLOODED AREAS MAP

OAK CREEK

OAK CREEK, COLORADO

September, 1986

PLATE 10

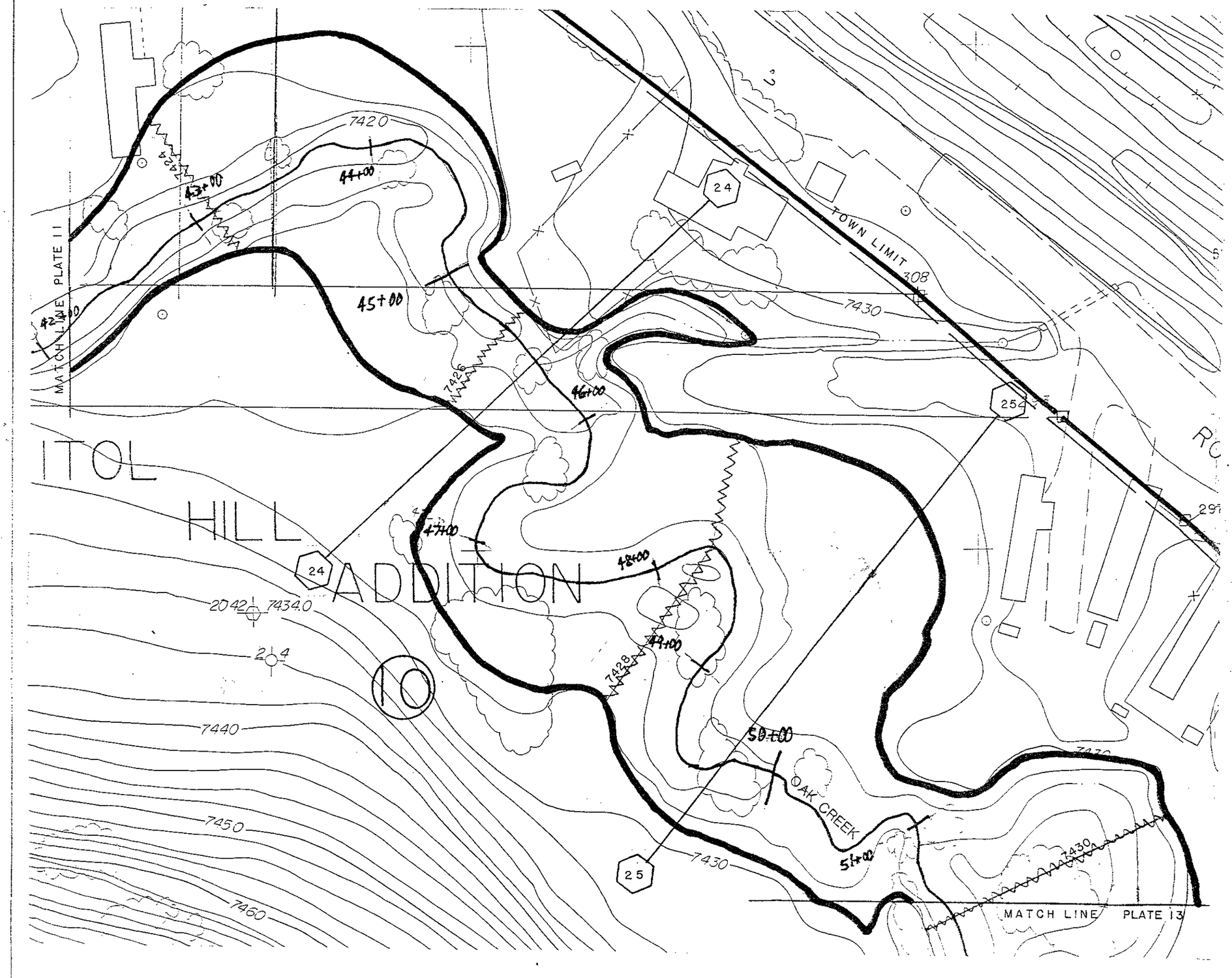


FLOODED AREAS MAP

OAK CREEK

OAK CREEK, COLORADO

September, 1986



LEGEND

- 100-year flood limits
- 10+00 Stationing from downstream town limit (hundreds of feet)
- Cross-section
- Benchmark
- Flood contour

NOTES

Mapping by Dismuke and Dismuke, June 2, 1981

Elevations based on National Geodetic Vertical Datum of 1929.

Scale in feet

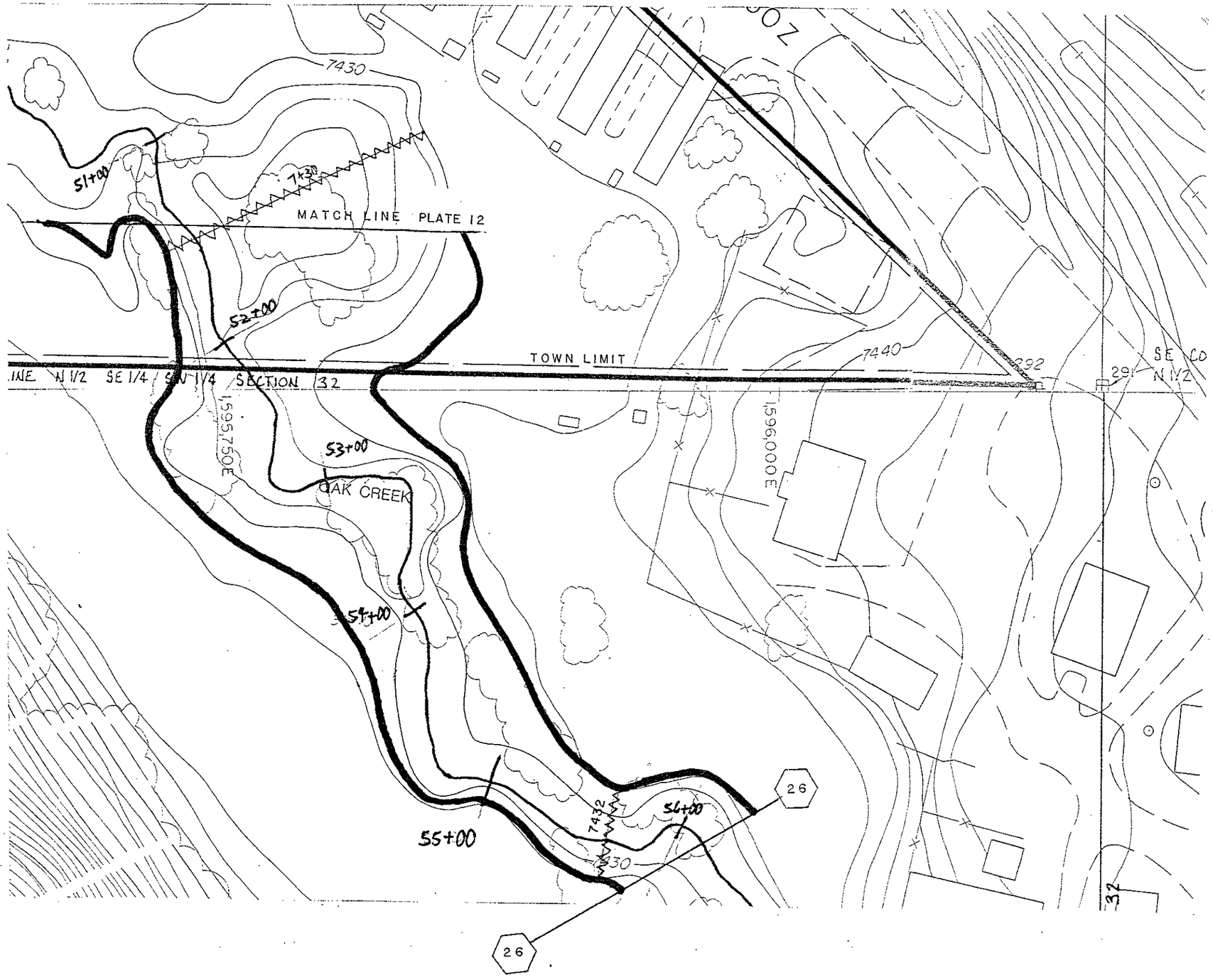
0 100

FLOODED AREAS MAP

OAK CREEK

OAK CREEK, COLORADO

September, 1986



N

LEGEND

100-year flood limits

10+00 Stationing from downstream town limit (hundreds of feet)

Cross-section

Benchmark

Flood contour

NOTES

Mapping by Dismuke and Dismuke, June 2, 1981

Elevations based on National Geodetic Vertical Datum of 1929.

Scale in feet

0 100

FLOODED AREAS MAP

OAK CREEK

OAK CREEK, COLORADO

September, 1986

STATE OF COLORADO WATER CONSERVATION BOARD --- ENGINEERING DEPARTMENT

PLOTTED_____ CHECKED_____

OAK CREEK FLOOD PROFILE

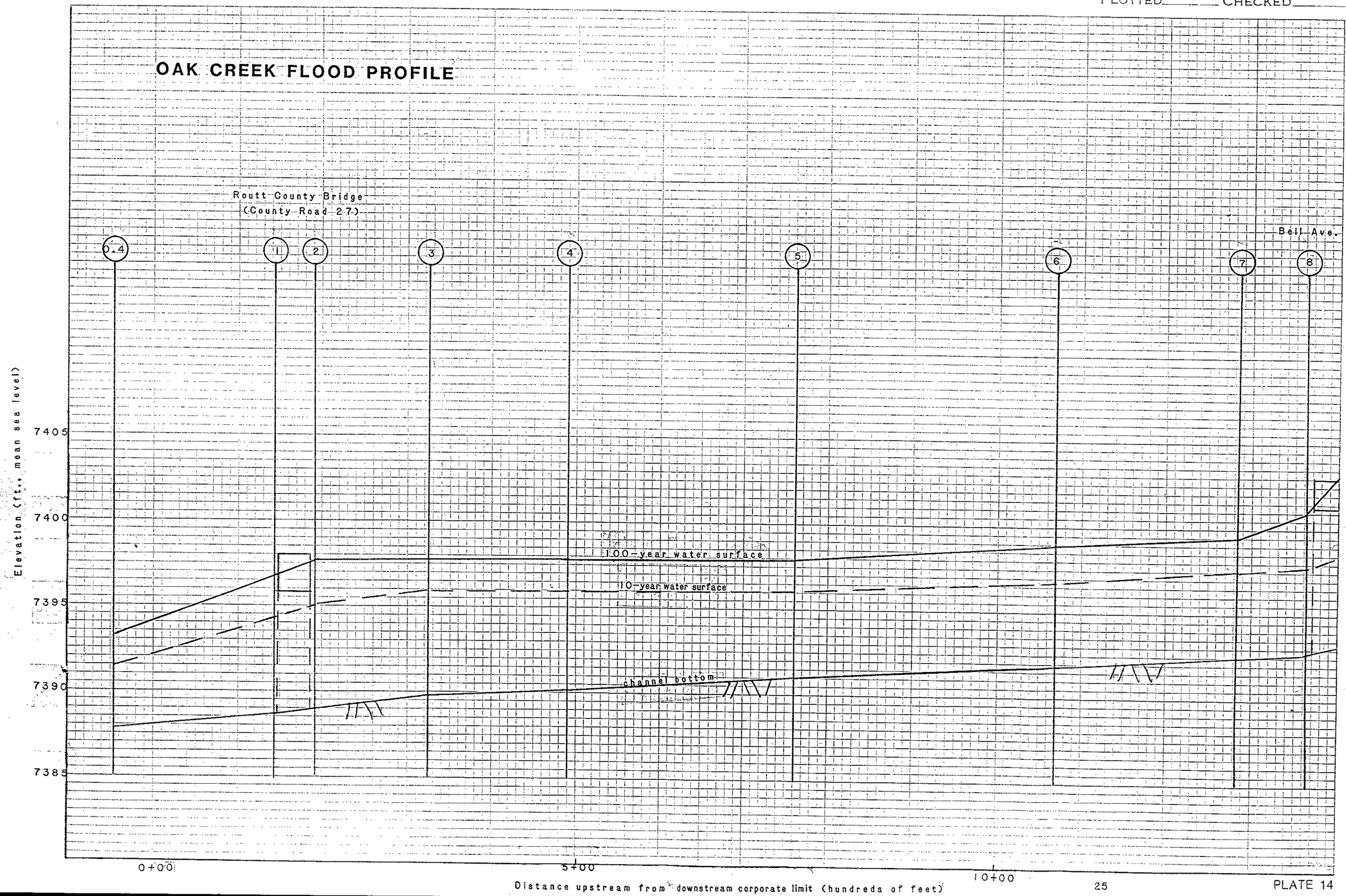
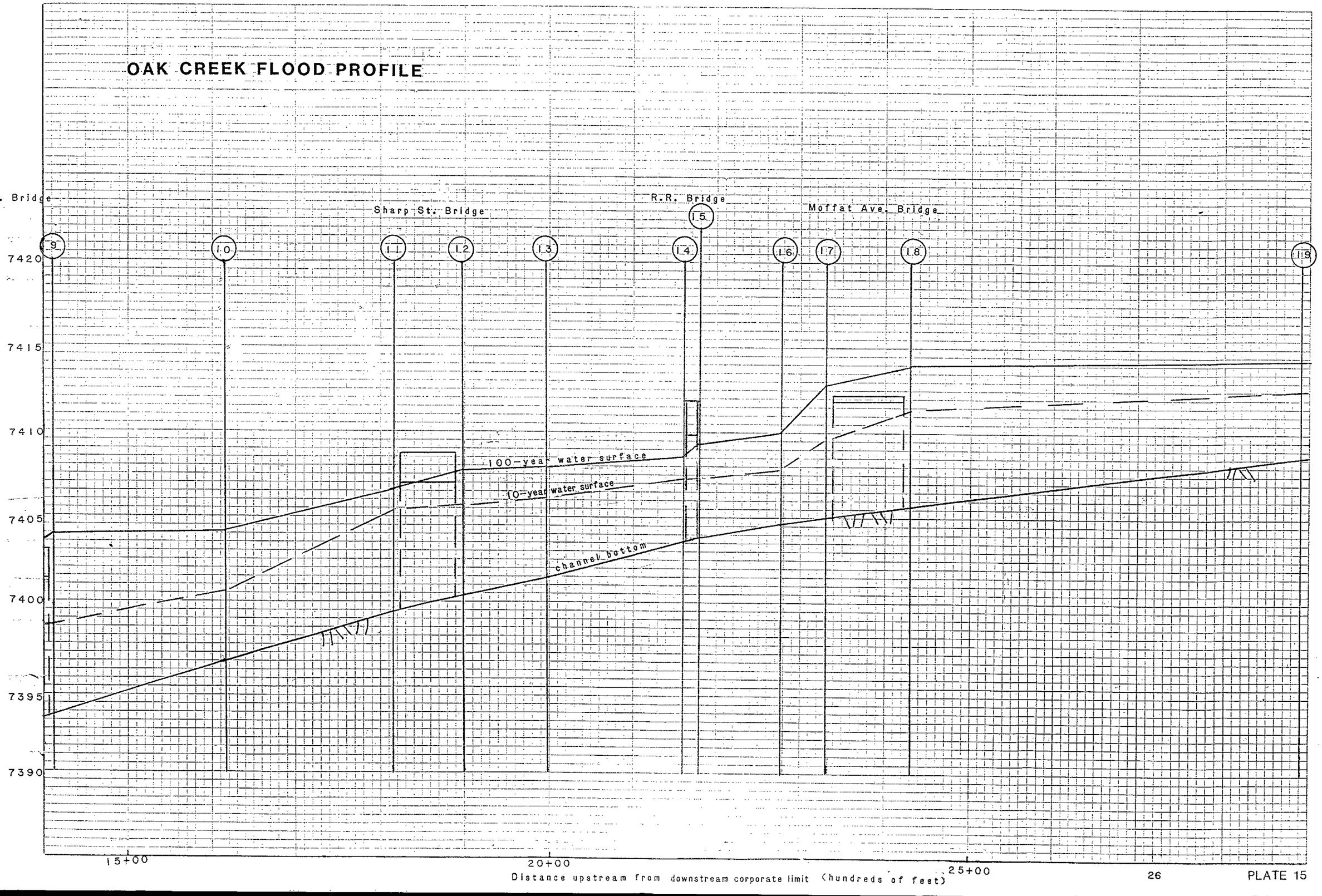


PLATE 14

PLOTTED_____ CHECKED_____

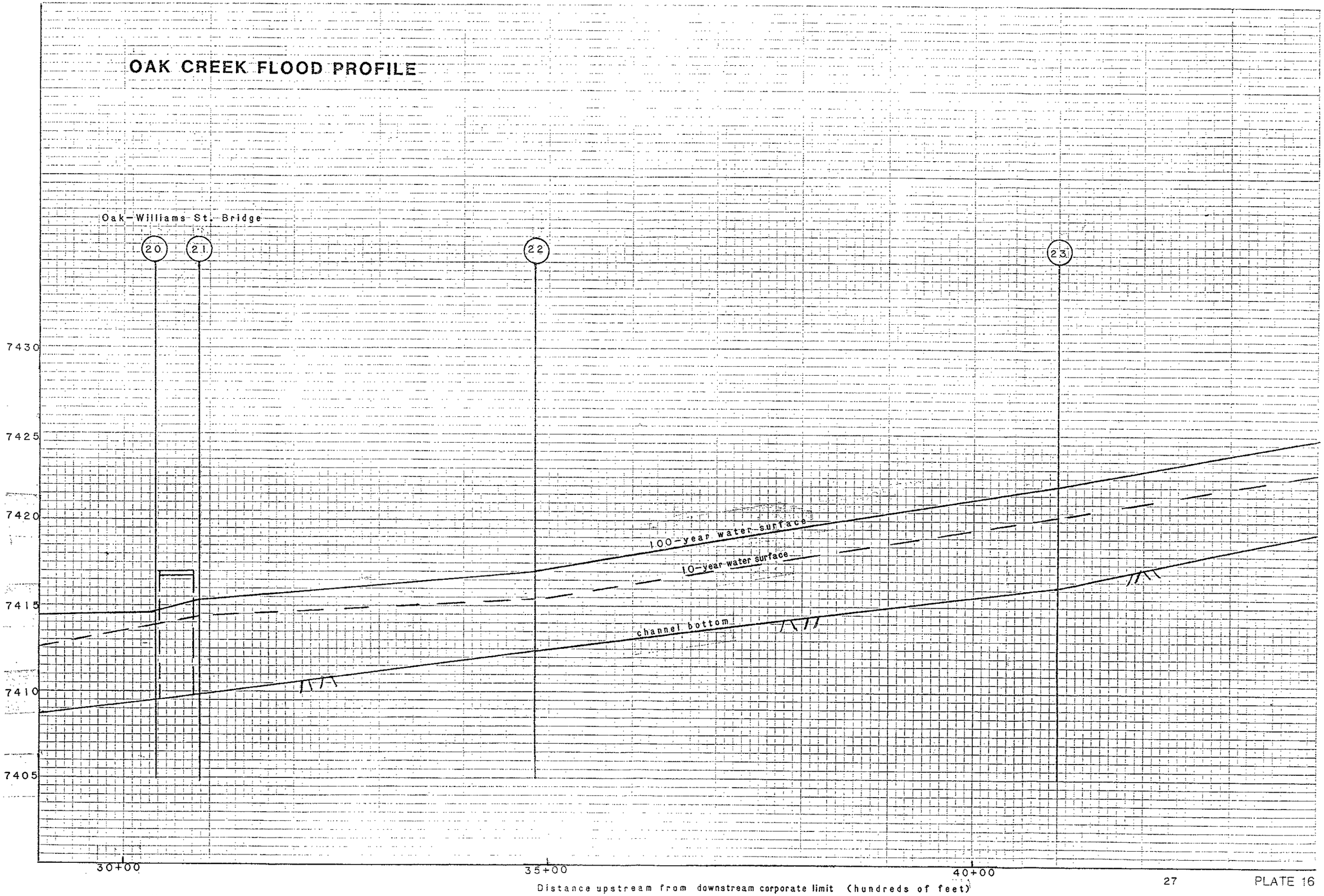
OAK CREEK FLOOD PROFILE



STATE OF COLORADO WATER CONSERVATION BOARD — ENGINEERING DEPARTMENT

PLOTTED_____ CHECKED_____

OAK CREEK FLOOD PROFILE



STATE OF COLORADO WATER CONSERVATION BOARD -- ENGINEERING DEPARTMENT

PLOTTED _____ CHECKED _____

OAK CREEK FLOOD PROFILE

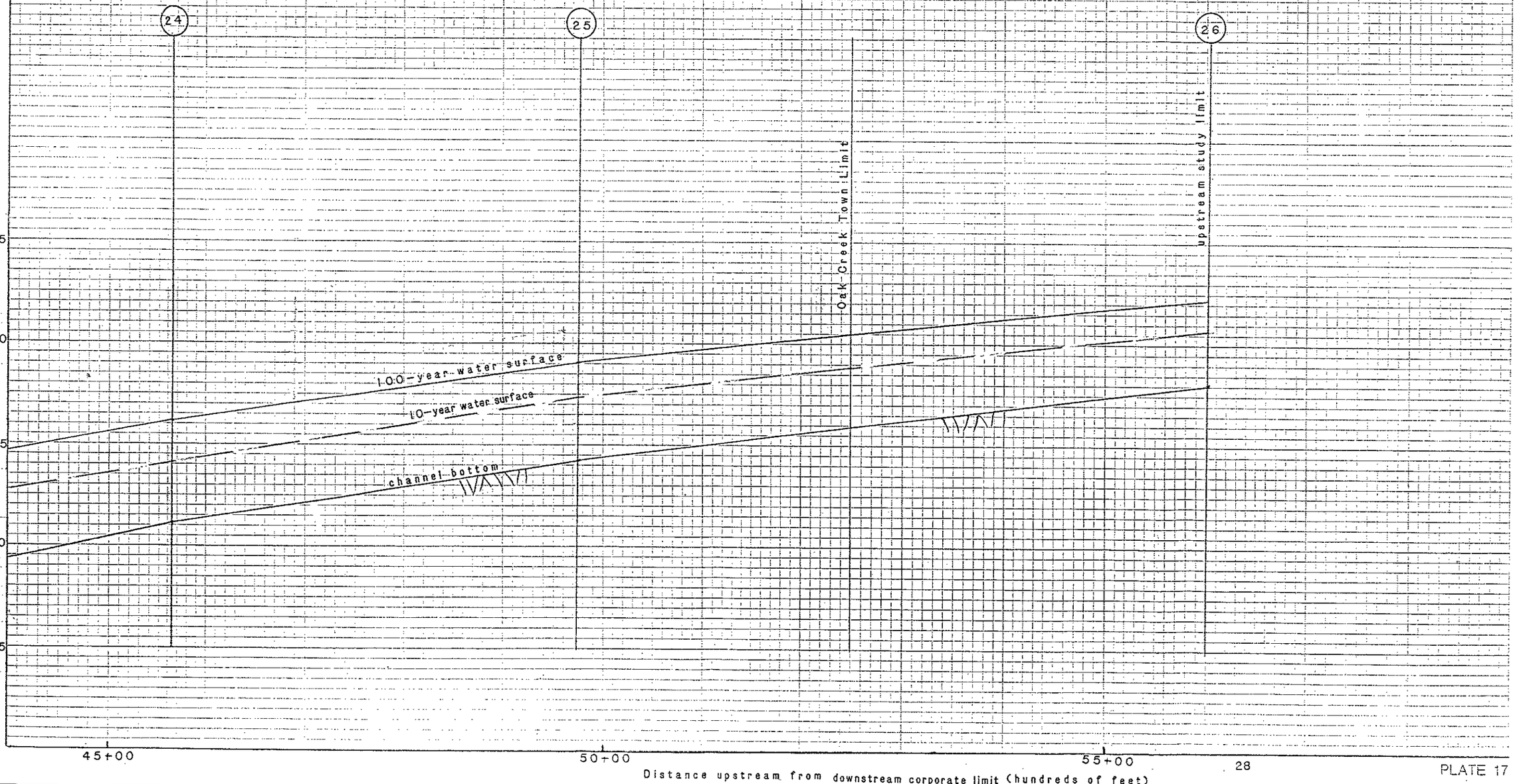


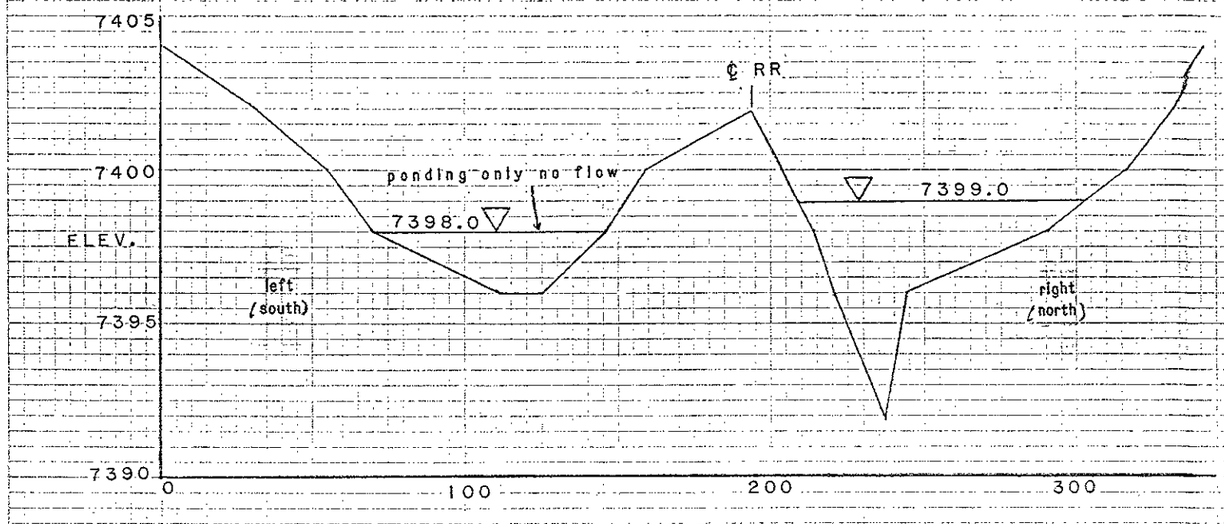
PLATE 17

STATE OF COLORADO WATER CONSERVATION BOARD — ENGINEERING DEPARTMENT PLOTTED CHECKED

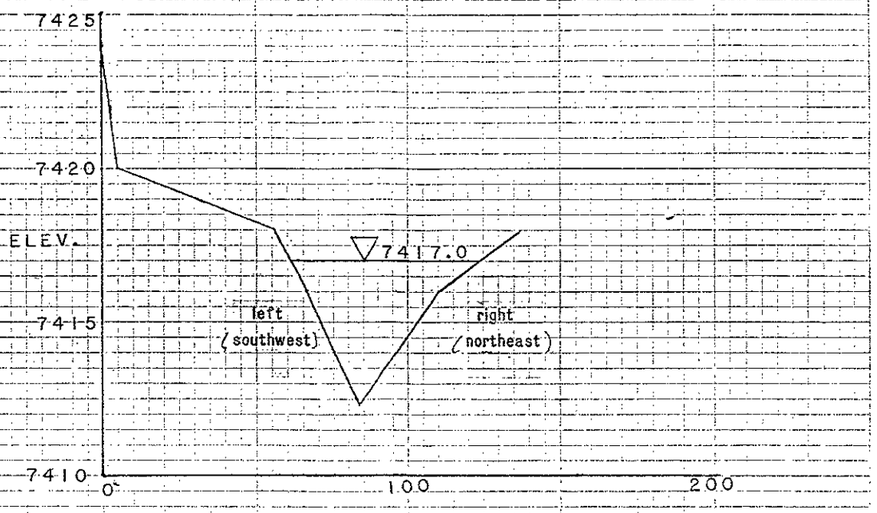
CROSS-SECTIONS

All cross-sections from 2' contour map. All elevations in feet above mean sea level.

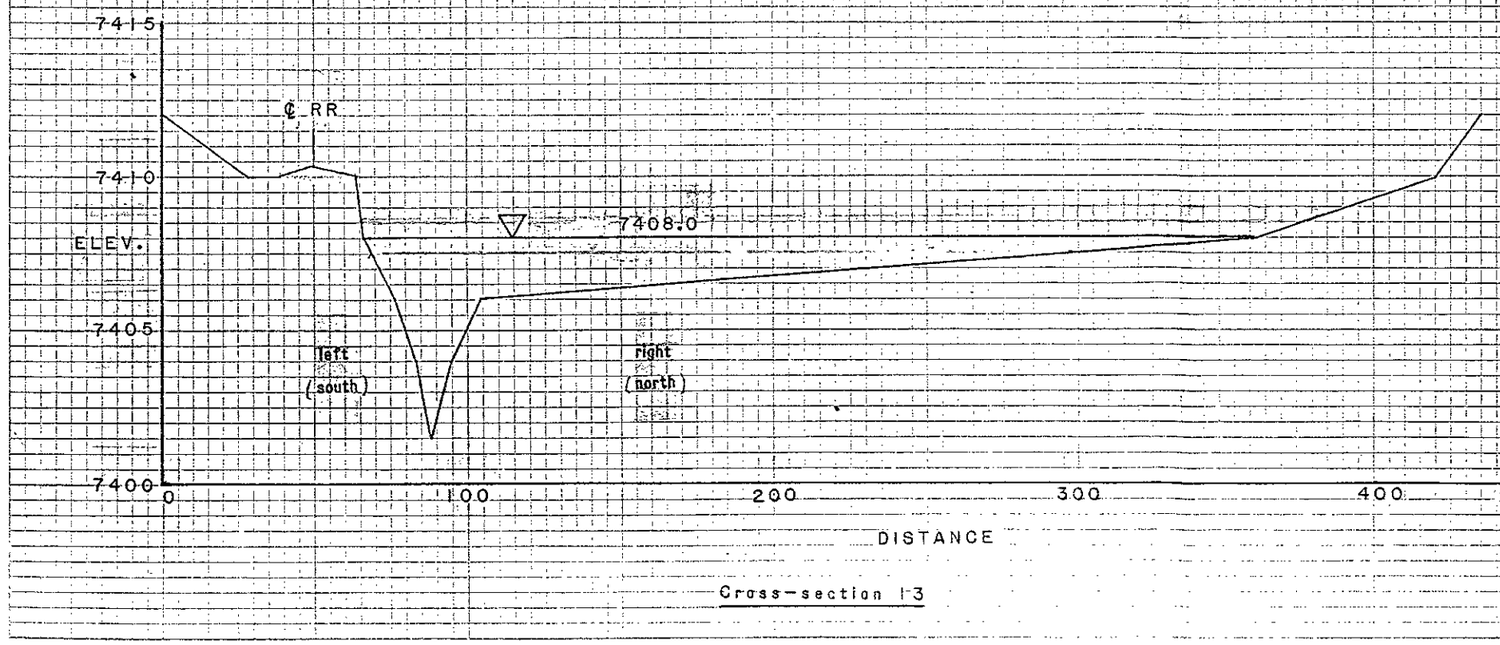
Scale 1"=5' vertical : 1"=50' horizontal. Cross-sections looking downstream.



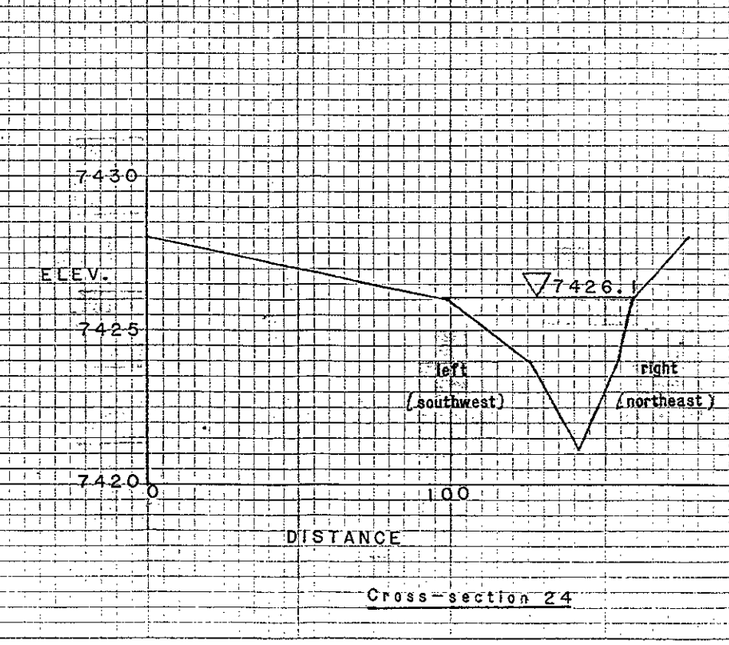
Cross-section 6



Cross-section 22



Cross-section 13



Cross-section 24