

Continental F.E.M.A. Study

January 3, 1986

Job No. 7016

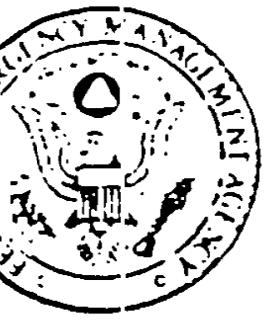
Revised February 14, 1986

Prepared For:

**Colorado Centre Metropolitan District
Suite 680, Century Bank Plaza Building
3300 East First Avenue
Denver, Colorado 80206**

Prepared By:

**JR Developers, Ltd.
2120 Hollowbrook Dr., #201
Colorado Springs, CO 80919**



Federal Emergency Management Agency

Region VIII Denver Federal Center P.O. Box 25267
Denver, CO 80225-0267

REQUEST FOR LETTER OF MAP AMENDMENT

This is to request that a determination be made as to whether or not a certain land area or structure is within a Special Flood Hazard Area.

All documents submitted in support of this appeal are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

15/86

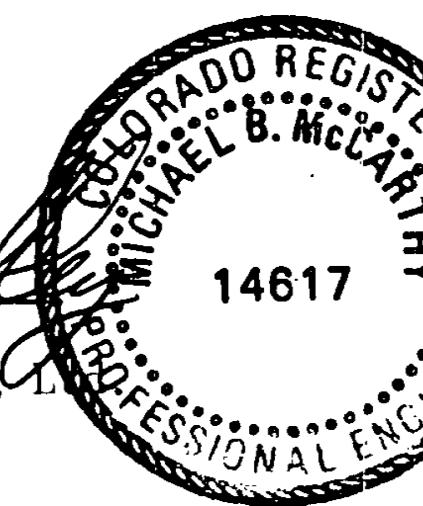
Date

Michael B. McCarthy

Signature of Applicant

For and on Behalf of JR Developers, L.
Michael B. McCarthy, P.E. #14617

14617

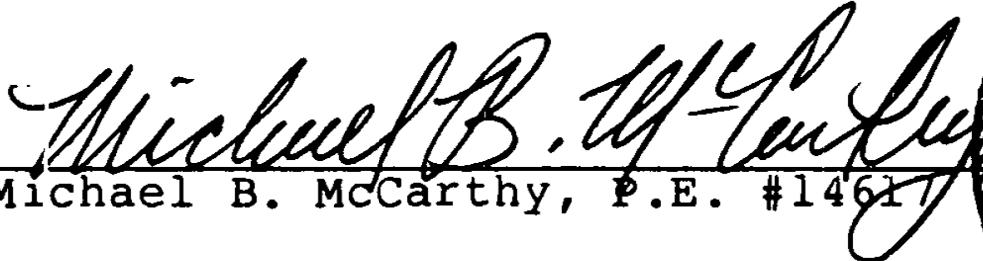


CONTINENTAL F.E.M.A. STUDY

DRAINAGE REPORT STATEMENT

Engineer's Statement:

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by El Paso County for drainage reports. I accept responsibility for any liability caused by the negligent acts, errors or omissions on my part in preparing this report.


Michael B. McCarthy, P.E. #1461



Developer's Statement:

The developer has read and will comply with all the requirements specified in this drainage report.

Colorado Centre Metropolitan District
Business Name

By: James Torres

Title: District Manager

Address: 1250 Academy Park Loop

Suite #214

Colorado Springs, CO 80910

County of El Paso:

Filed in accordance with Section 45-1 of the El Paso County Land Development Code, January, 1980.

County Engineer

Date

Conditions:

TABLE OF CONTENTS

	<u>Page</u>
Purpose	1
General Description	1-2
Drainage Characteristics	2-5
A. Existing	
B. Proposed	
Hydrologic/Hydraulic Calculations	5-6
Summary	6
Opinion of Probable Construction Costs	7

APPENDIX

USGS Map	Exhibit A
SCS Soils Map	Exhibit B
F.E.M.A. Floodplain Map	Exhibit C
F.E.M.A. Map Effective Date	Exhibit D
SCS Floodplain Map	Exhibit E
Hydrologic Analysis (2,553 CFS)	Printout 1-4
Hydrologic Analysis (3,085 CFS)	Printout 4-8
Proposed Channel Profiles - Subcritical	Printout 9-25
Proposed Channel Profiles - Supercritical	Printout 26-42
Capacity Charts	
Construction Plans	Back Cover

Continental F.E.M.A. Study

January, 1986

Purpose:

The purpose of this study is to present hydrologic and hydraulic analysis which indicate upon construction of the proposed drainage improvements, the proposed Continental site will not lie within a Special Flood Hazard Area (S.F.H.A.). At this time, Colorado Centre Metropolitan District is applying to the Federal Emergency Management Agency (F.E.M.A.) for issuance of a Conditional Letter of Map Amendment (Conditional L.O.M.A.). When the proposed drainage improvements are completed, asbuilt plans will be submitted so that a Letter of Map Amendment (L.O.M.A.) may be issued.

General Description:

Continental at Colorado Centre is located in a portion of the southeast quarter of Section 35, Township 14 South, Range 65 West of the Sixth Principal Meridian, El Paso County, Colorado, (Exhibit "A").

The site contains approximately 65 acres and is bordered by unplatte tracts. Access is provided from Drennan Road to the south. Manufactured homes will be constructed on this site.

The proposed subdivision lies within the Jimmy Camp Creek Drainage Basin. More specifically, the Franceville Tributary which originates to the northeast, flows onto the site near the southeast corner. Flood insurance rate maps from F.E.M.A. show a 100-year floodplain traversing the southern portion, affecting approximately 59 lots (see Exhibit "C").

Drainage Characteristics:

A. Existing

The basin under study contains approximately 3.19 square miles, is 25,000 feet in length, and has an average slope of 2.2 percent. The terrain is steeper in the upper most reach, but most of the area is gentle sloped, (Exhibit "A"). The basin is presently undeveloped poor range land with the exception of a few trailer/houses. Runoff from this area, which flows in a natural channel, makes up the Franceville Tributary to Jimmy Camp Creek.

The Soil Conservation Service (SCS) prepared a study entitled "Flood Hazard Analyses, Portions of Jimmy Camp Creek and Tributaries" in October, 1975. Their study estimates the 100-year runoff in the vicinity of Drennan Road from the Franceville Tributary to be 3,100 CFS. The SCS 100-year floodplain map shows nearly all the runoff discharging to the south through culverts and by overtopping Drennan Road, (Exhibit "E"). The map also shows the ponding required for

runoff to overtop the road causing inundation of the area where the proposed Continental site lies and a small amount of runoff to flow westward (north of Drennan Road) to combine with the Corral Tributary. Examination of the runoff quantities calculated at cross-sections up and downstream along the Corral Tributary indicate less than 100 CFS will enter from the Franceville Tributary, north of Drennan Road.

JR Developers, Ltd., with the use of aerial topography (2 foot contours) and field inspection, has prepared a HEC-2 analysis to verify the existing conditions.

The results of this investigation indicate a somewhat larger (500-1,000 CFS) runoff, flowing north of Drennan Road and entering the Corral Tributary. A probable cause for this discrepancy is that earth berms running north/south along the western edge of the Franceville Tributary, present during the SCS study, have eroded during the past 10 years allowing more discharge to the west.

JR Developers, Ltd. has verified the SCS study to be the accepted reference for floodplains in this area, with F.E.M.A. Therefore, the floodplain shown on the drainage plan was obtained from the SCS report which has considerably more profile and flood elevation information.

JR Developers, Ltd. has also prepared a hydrologic analysis using HEC-1 to verify the quantity of runoff, (see Appendix). This study estimates the anticipated amount of runoff in the Franceville Tributary at Drennan Road to be 2,553 CFS. By adjusting the time of concentration from 1.25 hours to 1.0 hour, the calculated runoff amount is 3,086 CFS which agrees with the 3,100 CFS that SCS estimates. It is reasonable to assume higher velocities from a basin yielding this large of a discharge quantity. Therefore, 3,100 CFS will be used as the design runoff quantity.

B. Proposed

The proposed drainage improvements consists of installing 21 culverts under Drennan Road and an earth berm along the west bank of the tributary; in affect, providing a channelization of the floodplain.

A HEC-2 analysis of the proposed drainage improvements is included to show the revised limits of the 100-year floodplain.

The earth berm along the west bank of the channel provides 3 feet of freeboard (4 feet at the culverts) above the 100-year flood elevations as determined by the HEC-2 analysis. The culverts beneath Drennan Road have been sized to discharge the 100-year storm without overtopping the road.

The construction of the earth berm and channel will be completed within the 338 foot wide tract between the Continental site and the Colorado Centre boundary. Since the land to the south of Drennan Road is not in the Colorado Centre Metropolitan District, the proposed culverts were placed to discharge at the existing ground elevation. This requires Drennan Road to be raised as shown on the construction plans. Concrete cradle/headwalls will be provided in addition to rip-rap protection to stabilize the culvert entrance and outfall. A drainage easement is required to install the rip-rap protection on the south side.

Hydrologic/Hydraulic Calculations:

The method used for calculating the anticipated amount of runoff is the SCS method as outlined in "Peak Flows In Colorado" by the U.S. Department of Agriculture, SCS, March, 1984; and "Areawide Urban Runoff Control Manual" prepared for the Pikes Peak Area Council of Governments, 1980.

Computerized hydrologic and hydraulic analysis were calculated using HEC-1 and HEC-2 software from the U.S. Army Corps of Engineers, revised January, 1985.

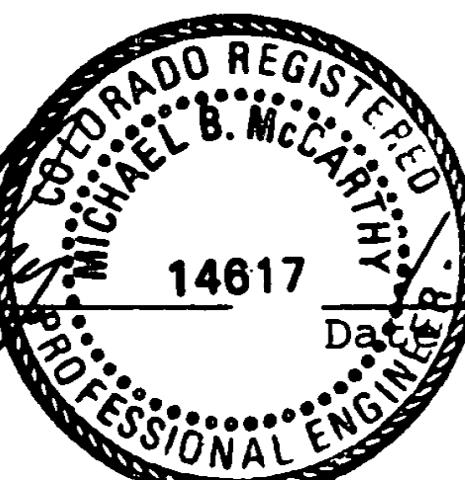
A design storm with 100-year recurrence interval, 24-hour duration, yielding 4.5 inches of precipitation was used in hydrograph generation.

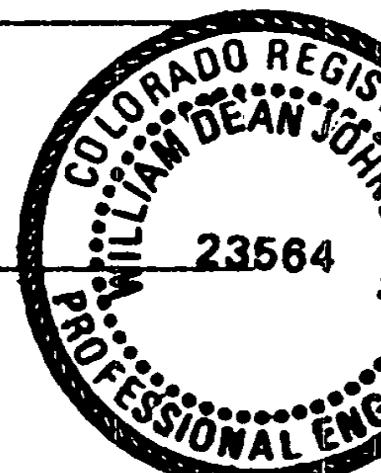
A variety of soil types exist in this area as shown in Exhibit "B". Hydrologic Group B is representative of the soils which indicate moderate to good drainage characteristics.

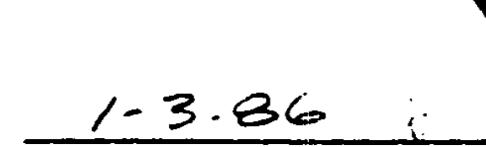
Summary:

The proposed Continental site currently lies within a Special Flood Hazard Area along the Franceville Tributary. Construction of an earth berm and installation of culverts beneath Drennan Road will allow the 100-year runoff to flow southward which is the historic path as determined by SCS. The channelization of runoff will remove the Continental site from the floodplain. Therefore, we are requesting a Conditional Letter of Map Amendment be issued for this area.

Respectfully Submitted By:

Michael B. McCarthy
Michael B. McCarthy 
14617
Date 15-86

William D. Johnston
William D. Johnston 
23564
Date 1-14-86

Joseph W. DesJardin
Joseph W. DesJardin 
1-3-86
Date

For and on Behalf of JR Developers, Ltd.

CONTINENTAL F.E.M.A. STUDY

OPINION OF PROBABLE CONSTRUCTION COST

S T O R M S E W E R DESCRIPTION	UNIT	QUANT	UNIT COST	EXTENSION
--------------------------------------	------	-------	-----------	-----------

CULVERTS

C M P ARCH 77" X 52"	LF	1,260.00	73.98	93,209.76
-------------------------	----	----------	-------	-----------

CULVERT END TREATMENT

CONC HEADWALL FOR CMP CLVRT	CY	74.00	200.00	14,800.00
-----------------------------	----	-------	--------	-----------

OPEN CHANNELS

IMPORT FILL	CY	20,710.00	4.00	82,840.00
-------------	----	-----------	------	-----------

RIP-RAP	CY	1,999.00	30.00	59,970.00
---------	----	----------	-------	-----------

TOTAL				\$250,819.76
-------	--	--	--	--------------

Since JR Developers, Ltd. has no control over the cost of labor, materials, or equipment, or over the contractor's method of determining prices, or over competitive bidding or market conditions, our opinions of probable construction cost provided for herein are made on the basis of our experience and qualifications. These opinions represent our best judgment as a design professional familiar with the construction industry. However, JR Developers, Ltd. cannot and does not guarantee that proposal, bids, or the construction cost will not vary from opinions of probable cost prepared by us. If the owner wishes greater assurance as to the construction cost, he shall employ an independent cost estimator.

APPENDIX

EXHIBIT "A"

USGS MAP

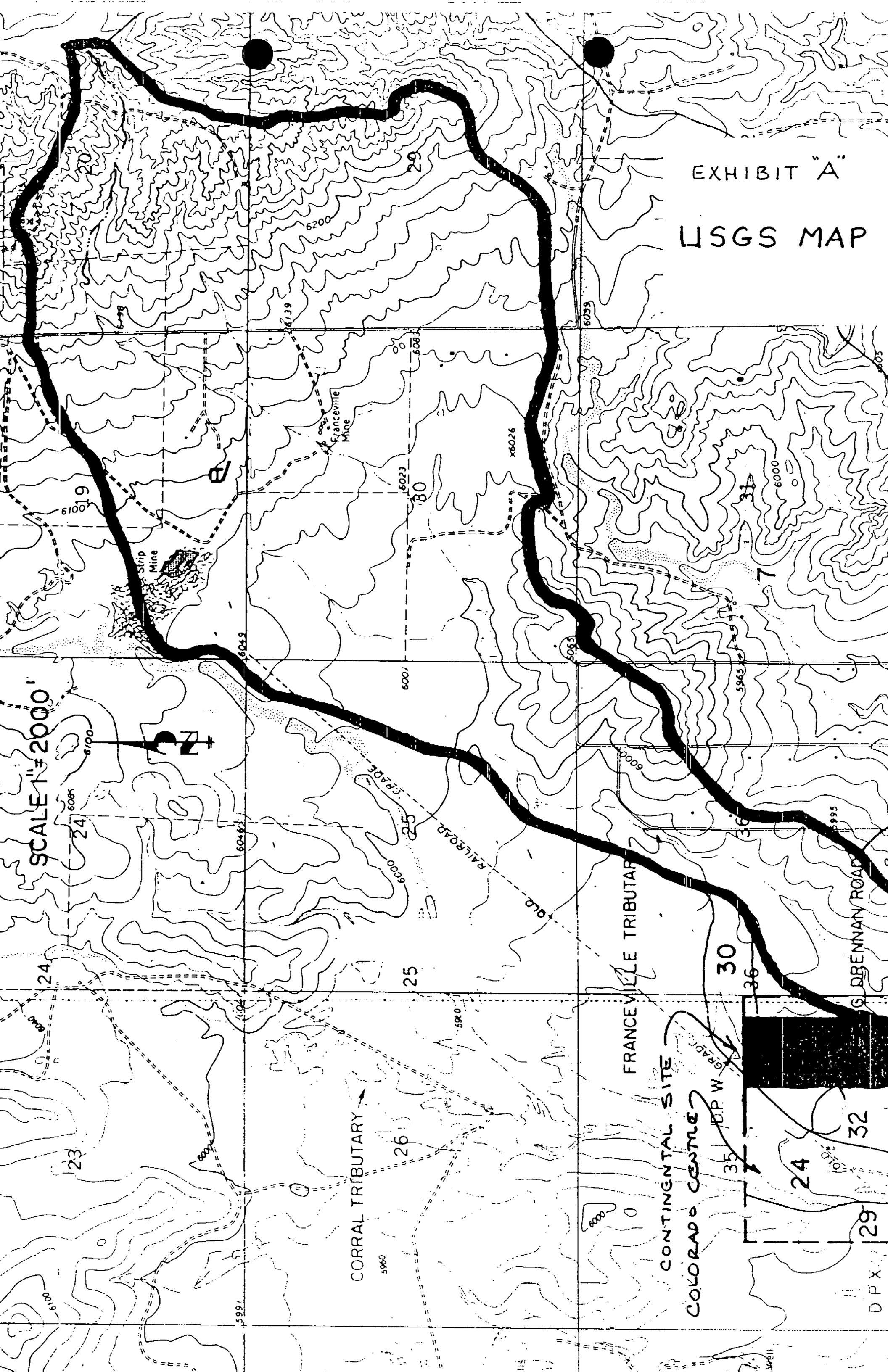
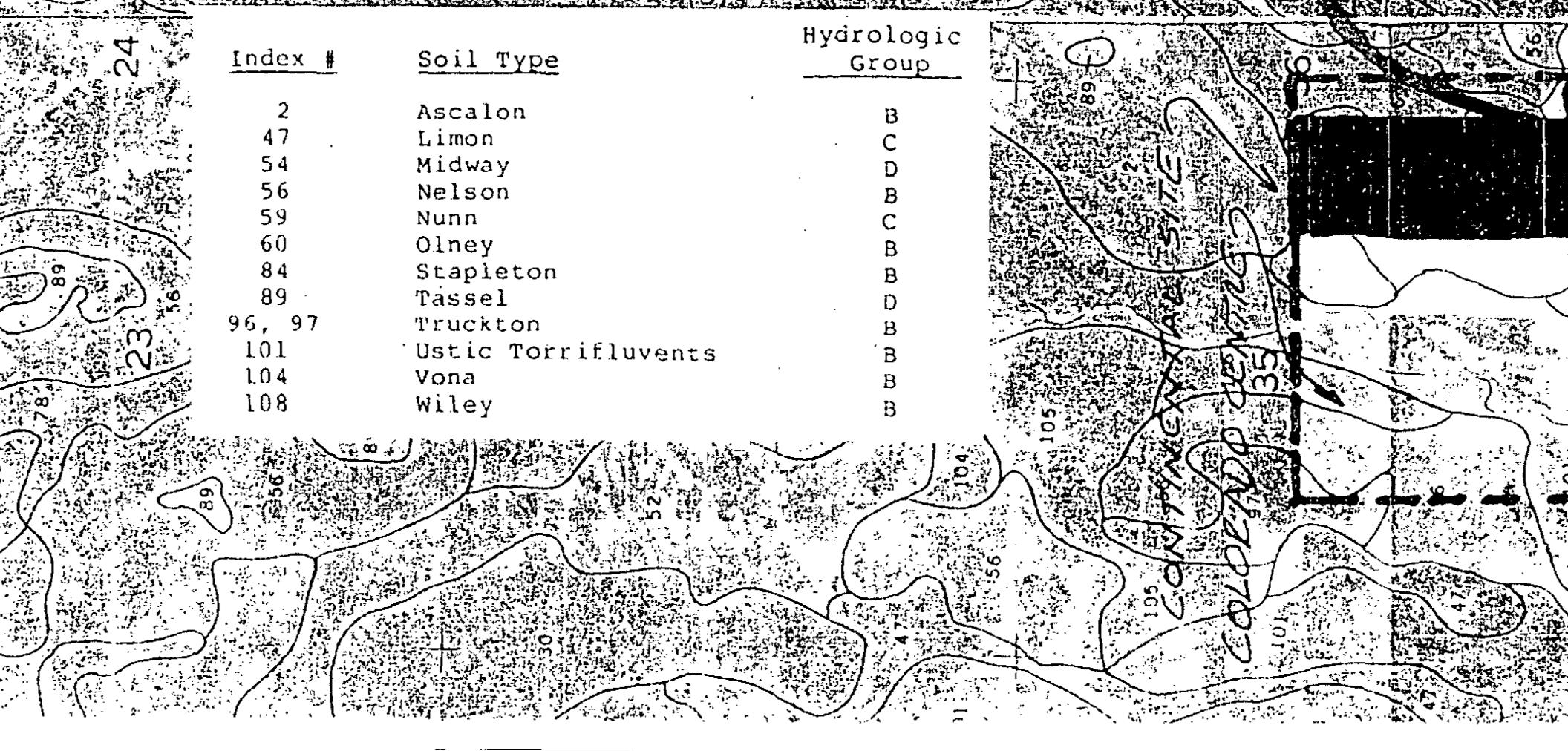
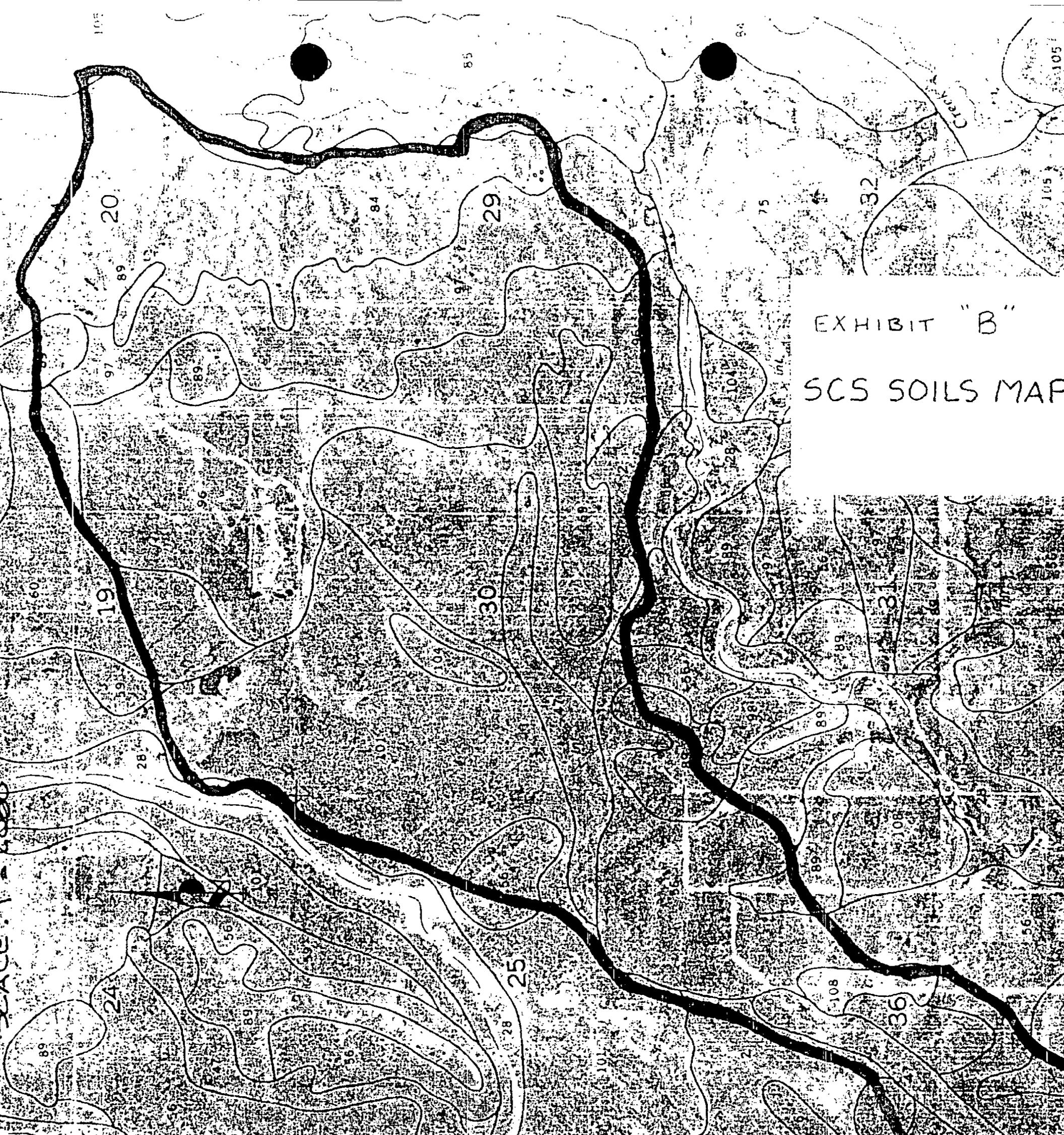


EXHIBIT "B"

SCS SOILS MAP



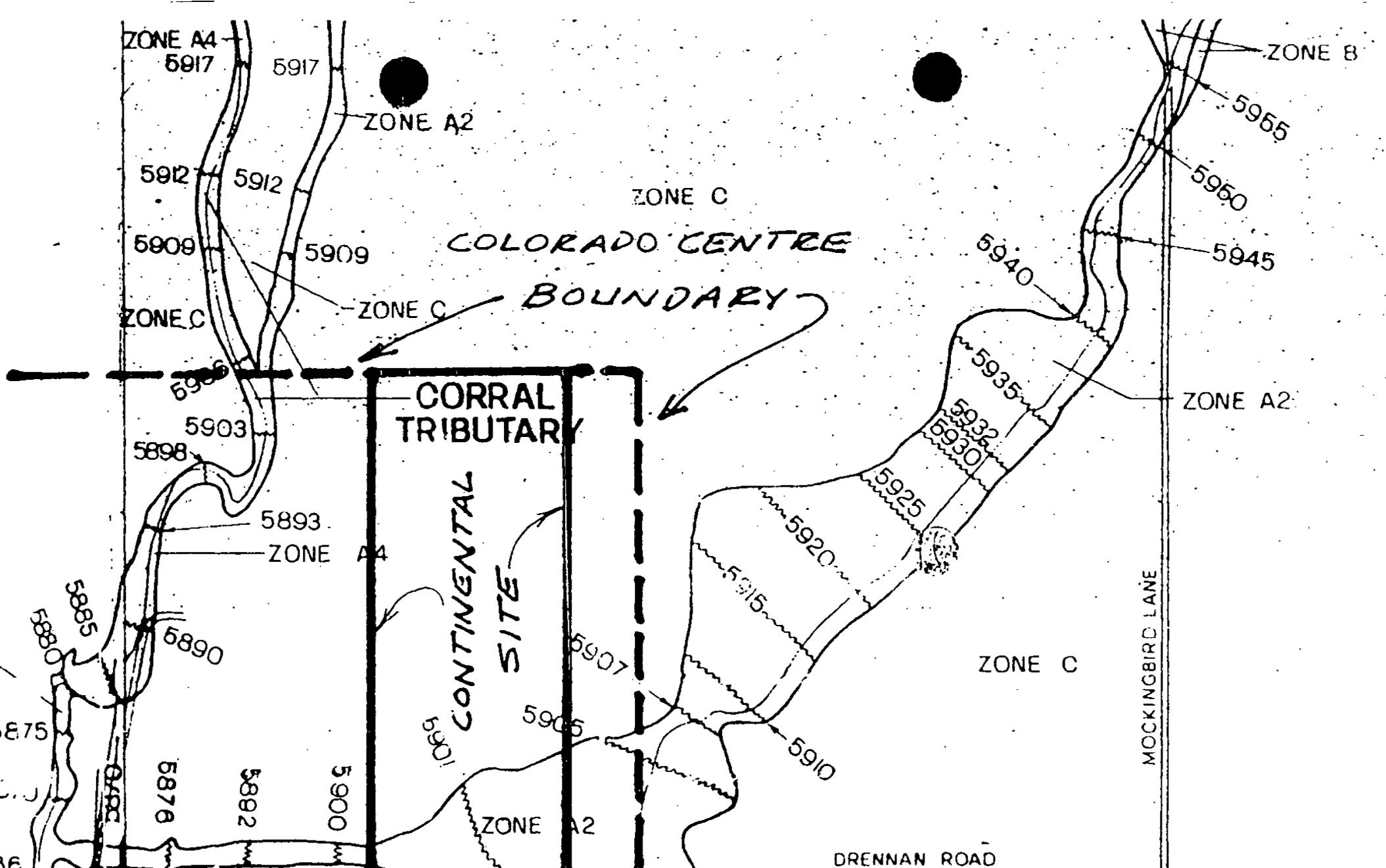
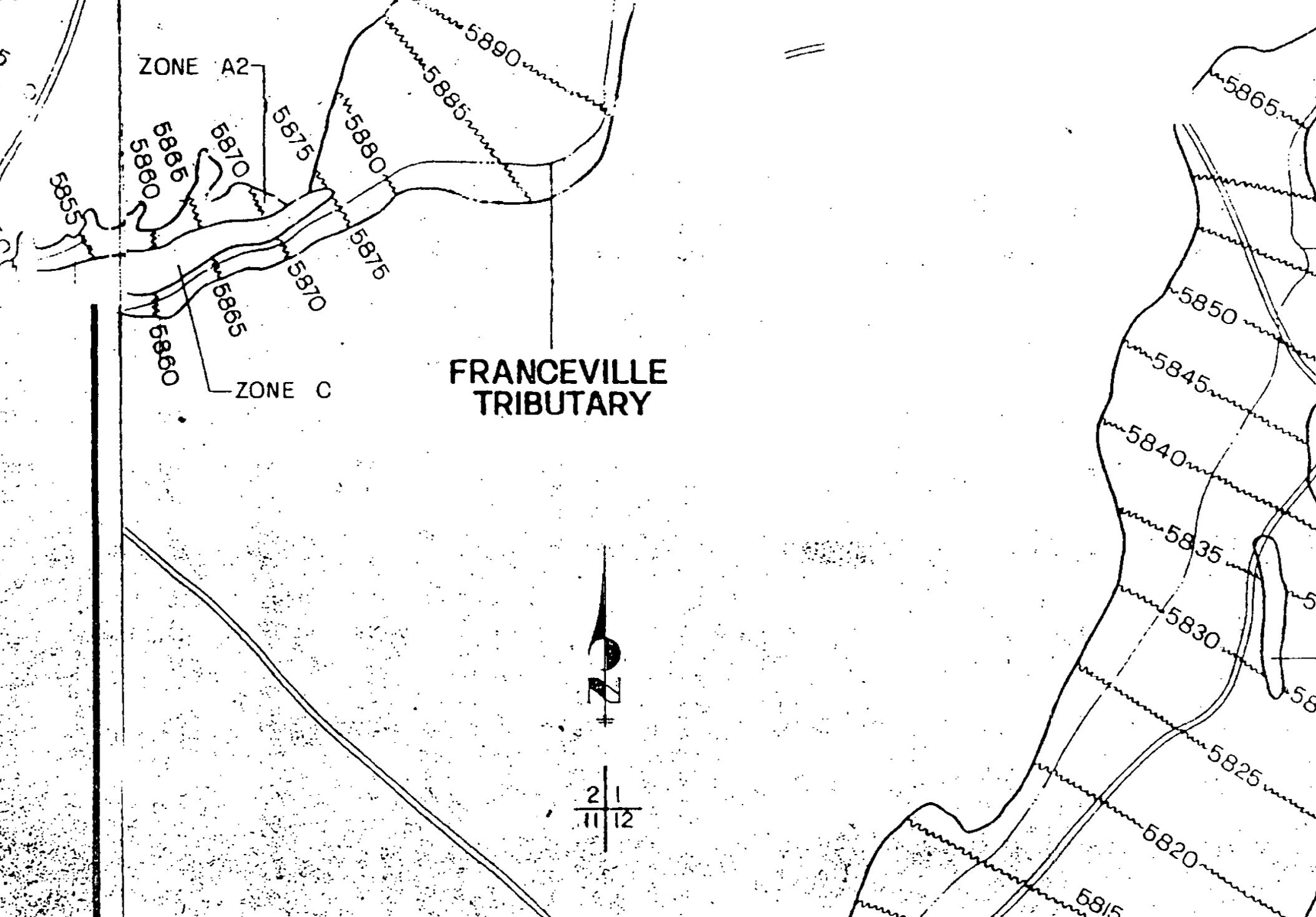
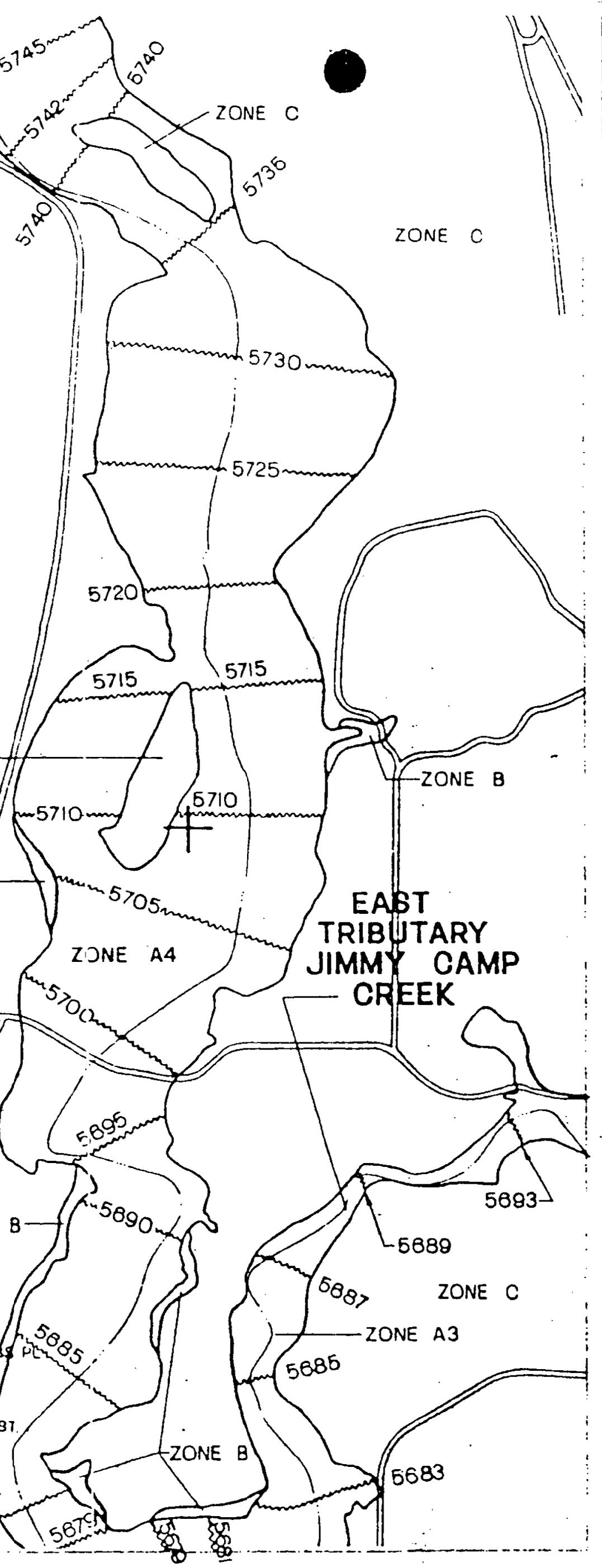


EXHIBIT "C"

F.E.M.A. MAP





APPROXIMATE SCALE

1000 0 1000 FEET



NATIONAL FLOOD INSURANCE PROGRAM

FIRM FLOOD INSURANCE RATE MAP

EL PASO COUNTY,
COLORADO
(UNINCORPORATED AREAS)

PANEL 295 OF 625
(SEE MAP INDEX FOR PANELS NOT PRINTED)

**REVISED
PRELIMINARY**

COMMUNITY-PANEL NUMBER
080059 0295

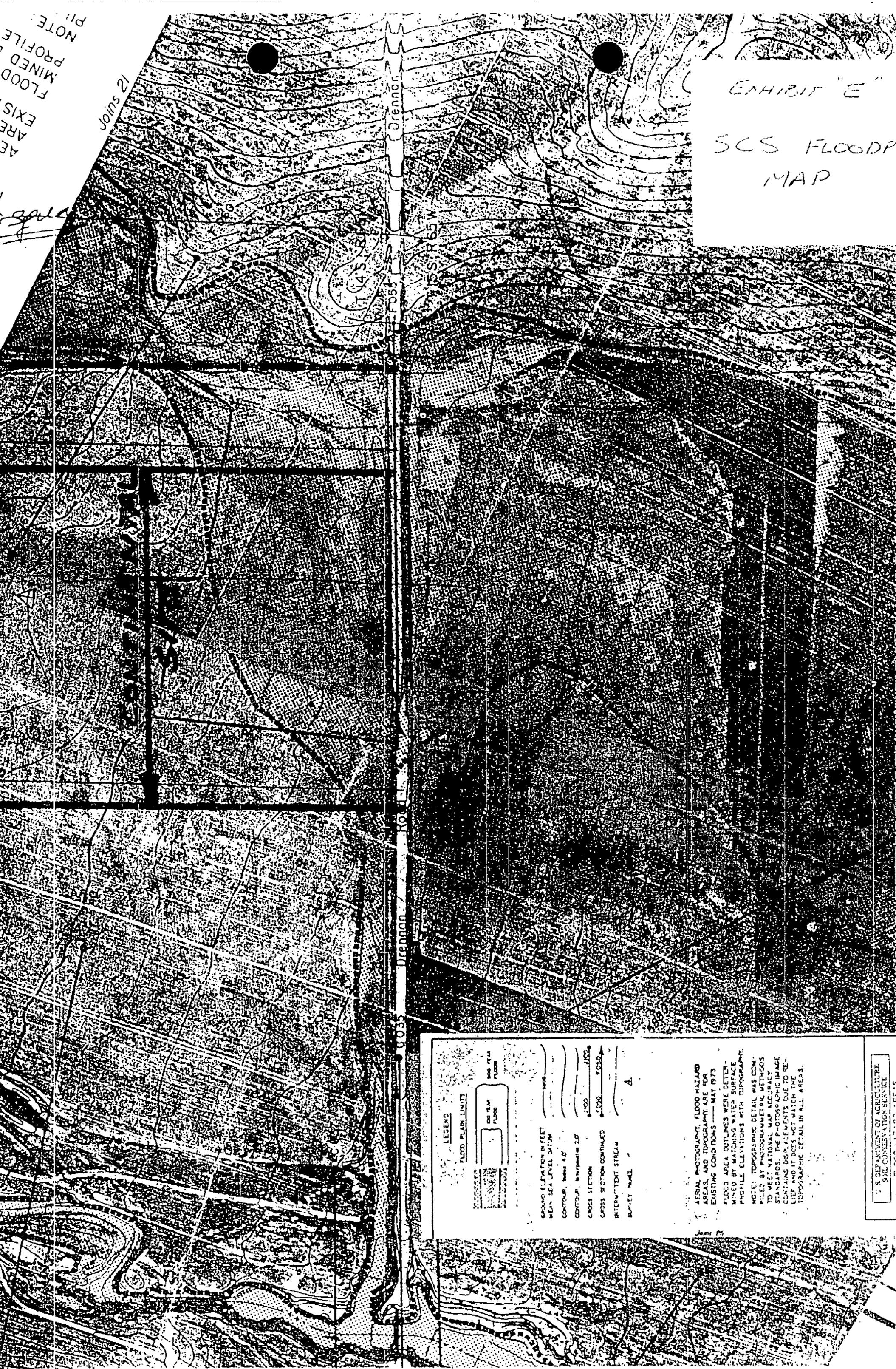
EFFECTIVE DATE:

DEC 21 1984



Federal Emergency Management Agency

EXHIBIT "D"



Franceville Tributary
Hydrologic Analysis
 $Q_{100} = 2,553 \text{ CFS}$
 $T_c = 1.25 \text{ Hr}$

$$T = \left(\frac{11.9 L^3}{H} \right) .385$$

$T = T_c$ in hours

L = Length of longest watercourse in miles

H = Elevation difference in feet

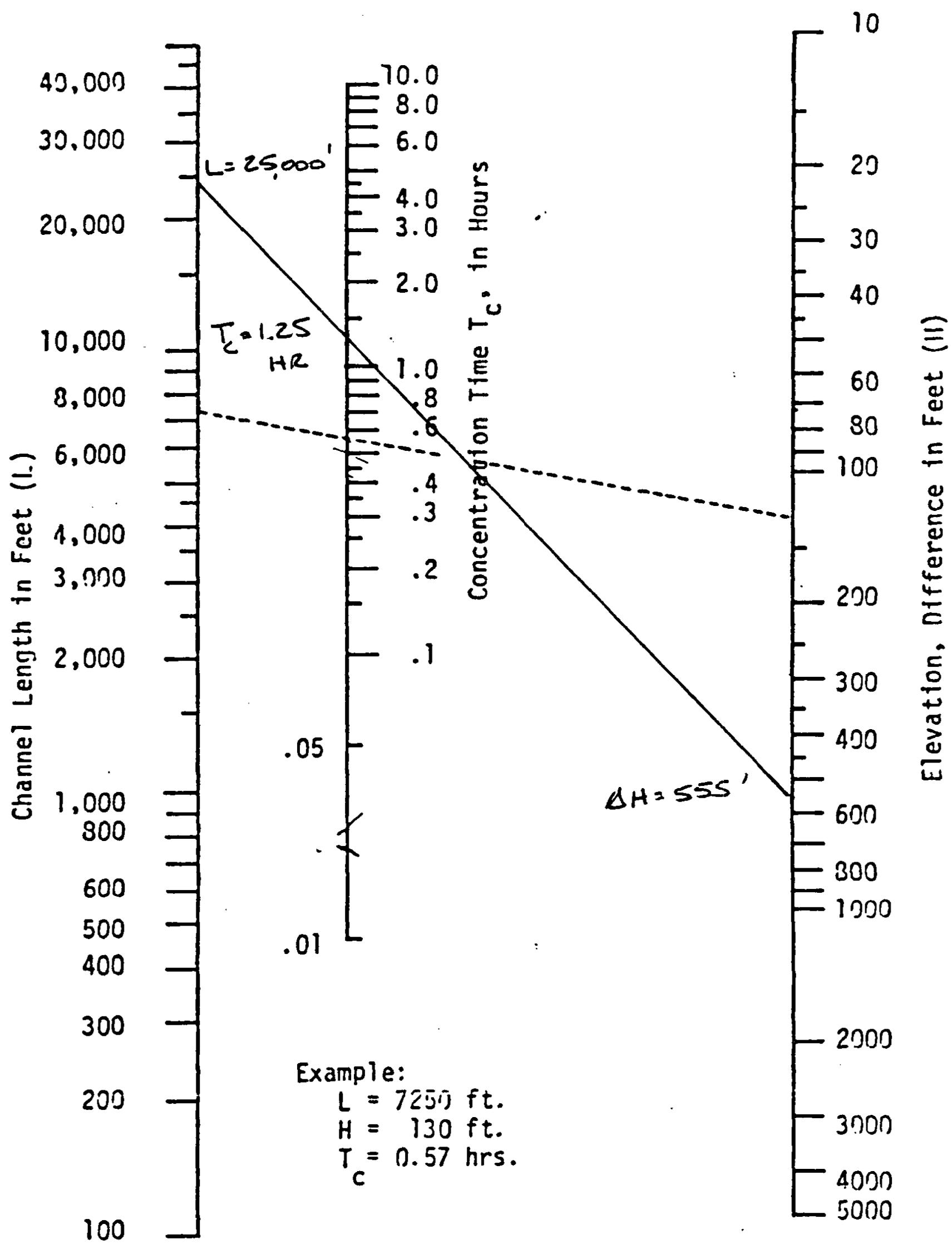


Figure III-6 Estimating T_c from Lengths and Slopes of Natural Channels

FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616

THIS HEC-1 VERSION CONTAINS ALL OPTIONS EXCEPT ECONOMICS, AND THE NUMBER OF PLANS ARE REDUCED TO 3

HEC-1 INPUT

PAGE 1

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1 ID CONTINENTAL FEMA STUDY
2 ID BY JR DEVELOPERS LTD. DECEMBER 1985
3 IT 10 0 0 200
4 IO 5 2
5 PG 2 4.50
6 P6 1 0
7 IN 12
8 PC .001 .002 .003 .004 .005 .006 .007 .008 .009 .010
9 PC .011 .013 .015 .017 .018 .019 .021 .024 .027 .030
10 PC .034 .039 .042 .050 .060 .070 .090 .170 .400 .700
11 PC .720 .740 .755 .767 .780 .790 .798 .808 .814 .820
12 PC .825 .830 .834 .838 .840 .847 .850 .853 .857 .860
13 PC .862 .864 .866 .868 .870 .874 .878 .882 .886 .890
14 PC .893 .896 .899 .902 .905 .907 .909 .911 .913 .915
15 PC .918 .920 .923 .925 .928 .930 .933 .935 .938 .940
16 PC .942 .944 .946 .948 .950 .952 .954 .956 .958 .960
17 PC .962 .964 .966 .968 .970 .972 .974 .976 .978 .980
18 PC .982 .984 .986 .988 .990 .992 .994 .996 .998 1.000

19 KK DRN-RD
20 KM SCS RUNOFF COMPUTATION
21 BA 3.19
22 PR 1
23 PW 1
24 PT 2
25 PW 1
26 LS 79.57
27 UD 0.75
28 ZZ

FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616

CONTINENTAL FEMA STUDY
BY JR DEVELOPERS LTD. DECEMBER 1985

IPRNT 5 PRINT CONTROL
IPLOT 2 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

HYDROGRAPH TIME DATA

NMIN	10	MINUTES IN COMPUTATION INTERVAL
IDATE	1 0	STARTING DATE
ITIME	0000	STARTING TIME
NQ	200	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	2 0	ENDING DATE
NDTIME	0910	ENDING TIME

COMPUTATION INTERVAL .17 HOURS
TOTAL TIME BASE 33.17 HOURS

ENGLISH UNITS

STATION DRN-RD

(0) OUTFLOW

0. 400. 800. 1200. 1600. 2000. 2400. 2800. 0. 0. 0.
 .0 .0 .0 .0 .0 .0 .0 .0 .0 1.2 .8 .4
 HRMN PER
 0000 10-----
 0010 20
 0020 30
 0030 40
 0040 50
 0050 60
 0100 70
 0110 80
 0120 90
 0130 100
 0140 110
 0150 120
 0200 130
 0210 140
 0220 150
 0230 160
 0240 170
 0250 180
 0300 190
 0310 200
 0320 210
 0330 220
 0340 230
 0350 240
 0400 250
 0410 260
 0420 270
 0430 280
 0440 290
 0450 300
 0500 310
 0510 320
 0520 330
 0530 34.0
 0540 35. 0
 0550 36. 0
 0600 37.

610 38.
620 39.
630 40.
640 41.
650 42.
700 43.
710 44.
720 45.
730 46.
740 47.
750 48.
800 49.
810 50.
820 51.
830 52.
840 53.
850 54.
870 55.
880 56.
890 57.
900 58.
910 59.
920 60.
930 61.
940 62.
950 63.
960 64.
970 65.
980 66.
990 67.
010 68.
020 69.
030 70.
040 71.
050 72.
060 73.
070 74.
080 75.
090 76.
100 77.
110 78.
120 79.
130 80.
140 81.
150 82.
160 83.
170 84.
180 85.
190 86.
200 87.
210 88.
220 89.
230 90.
240 91.
250 92.
260 93.
270 94.
280 95.
290 96.
300 97.

0210 1580
0220 1590
0230 1600
0240 1610
0250 1620
0300 1630
0310 1640
0320 1650
0330 1660
0340 1670
0350 1680
0400 1690
0410 1700
0420 1710
0430 1720
0440 1730
0450 1740
0500 1750
0510 1760
0520 1770
0530 1780
0540 1790
0550 1800
0600 1810
0610 1820
0620 1830
0630 1840
0640 1850
0650 1860
0700 1870
0710 1880
0720 1890
0730 1900
0740 1910
0750 1920
0800 1930
0810 1940
0820 1950
0830 1960
0840 1970
0850 1980
0900 1990
0910 2000

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

| OPERATION | STATION | PEAK FLOW | TIME OF PEAK | AVERAGE FLOW FOR MAXIMUM PERIOD | | | BASIN AREA | MAXIMUM STAGE | TIME OF MAX STAGE |
|---------------|---------|-----------|--------------|---------------------------------|---------|---------|------------|---------------|-------------------|
| | | | | 6-HOUR | 24-HOUR | 72-HOUR | | | |
| HYDROGRAPH AT | DRN-RD | 2553. | 6.50 | 661. | 208. | 151. | 3.19 | | |

FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985

U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616

THIS HEC-1 VERSION CONTAINS ALL OPTIONS EXCEPT ECONOMICS, AND THE NUMBER OF PLANS ARE REDUCED TO 3

HEC-1 INPUT

PAGE 1

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1 ID CONTINENTAL FEMA STUDY
2 ID BY JR DEVELOPERS LTD. DECEMBER 1985
3 IT 8 0 0 200
4 IO 5 2
5 PG 2 4.50
6 PG 1 0
7 IN 12
8 PC .001 .002 .003 .004 .005 .006 .007 .008 .009 .010
9 PC .011 .013 .015 .017 .018 .019 .021 .024 .027 .030
10 PC .034 .039 .042 .050 .060 .070 .090 .170 .400 .700
11 PC .720 .740 .755 .767 .780 .790 .798 .808 .814 .820
12 PC .825 .830 .834 .838 .840 .847 .850 .853 .857 .860
13 PC .862 .864 .866 .868 .870 .874 .878 .882 .886 .890
14 PC .893 .896 .899 .902 .905 .907 .909 .911 .913 .915
15 PC .918 .920 .923 .925 .928 .930 .933 .935 .938 .940
16 PC .942 .944 .946 .948 .950 .952 .954 .956 .958 .960
17 PC .962 .964 .966 .968 .970 .972 .974 .976 .978 .980
18 PC .982 .984 .986 .988 .990 .992 .994 .996 .998 1.000

19 KK DRN-RD
20 KM SCS RUNOFF COMPUTATION
21 BA 3.19
22 PR 1
23 PW 1
24 PT 2
25 PW 1
26 LS 79.57
27 UD 0.60
28 ZZ

FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985

U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616

CONTINENTAL FEMA STUDY
BY JR DEVELOPERS LTD. DECEMBER 1985

IPRNT 5 PRINT CONTROL
IPLOT 2 PLOT CONTROL
BSCAL 0. HYDROGRAPH PLOT SCALE

HYDROGRAPH TIME DATA

| | | | |
|--------|---|---------------------------------|--------------------------------|
| NMIN | B | MINUTES IN COMPUTATION INTERVAL | |
| IDATE | 1 | 0 | STARTING DATE |
| ITIME | | 0000 | STARTING TIME |
| NO | | 200 | NUMBER OF HYDROGRAPH ORDINATES |
| NDDATE | 2 | 0 | ENDING DATE |
| NDTIME | | 0232 | ENDING TIME |

COMPUTATION INTERVAL .13 HOURS
TOTAL TIME BASE 26.53 HOURS

ENGLISH UNITS

STATION DRN-RD

(0) OUTFLOW

The figure is a scatter plot with 'HRMN PER' on the Y-axis and various parameters on the X-axis. The X-axis features major tick marks at 0., 400., 800., 1200., 1600., 2000., 2400., 2800., 3200., and 0. (L) PRECIP, (X) EXCE. The Y-axis has major tick marks every 20 units, ranging from 0.0 to 370. The data points are represented by dots. Most points are clustered around HRMN PER values of 0.0, 1.2, and 1.8. There are a few outliers at higher HRMN PER values (e.g., 10, 110, 210, 220, 230, 240, 250, 260, 270, 280, 290, 300, 310, 320, 330, 340, 350, 360, 370) corresponding to specific X-axis values.

456 380
504 390
512 400
520 410
528 42.0
536 43. 0
544 44. 0
552 45. 0
600 46. 0
608 47. 0
616 48. 0
624 49. 0
632 50. 0
640 51. 0
648 52. 0
656 53. 0
704 54. 0
712 55. 0
720 56. 0
728 57. 0
736 58. 0
744 59. 0
752 60. 0
800 61. 0
808 62. 0
816 63. 0
824 64. 0
832 65. 0
840 66. 0
848 67. 0
856 68. 0
904 69. 0
912 70. 0
920 71. 0
928 72. 0
936 73. 0
944 74. 0
952 75. 0
000 76. 0
008 77. 0
016 78. 0
024 79. 0
032 80. 0
040 81. 0
048 82. 0
056 83. 0
104 84. 0
112 85. 0
120 86. 0
128 87. 0
136 88. 0
144 89. 0
152 90. 0
200 91. 0
208 92. 0
216 93. 0
224 94. 0
232 95. 0
240 96. 0
248 97. 0

| | | |
|-------|------|---|
| 12056 | 158. | 0 |
| 12104 | 159. | 0 |
| 12112 | 160. | 0 |
| 12120 | 161. | 0 |
| 12128 | 162. | 0 |
| 12136 | 163. | 0 |
| 12144 | 164. | 0 |
| 12152 | 165. | 0 |
| 12200 | 166. | 0 |
| 12208 | 167. | 0 |
| 12216 | 168. | 0 |
| 12224 | 169. | 0 |
| 12232 | 170. | 0 |
| 12240 | 171. | 0 |
| 12248 | 172. | 0 |
| 12256 | 173. | 0 |
| 12304 | 174. | 0 |
| 12312 | 175. | 0 |
| 12320 | 176. | 0 |
| 12328 | 177. | 0 |
| 12336 | 178. | 0 |
| 12344 | 179. | 0 |
| 12352 | 180. | 0 |
| 20000 | 181. | 0 |
| 20008 | 182. | 0 |
| 20016 | 183. | 0 |
| 20024 | 184. | 0 |
| 20032 | 185. | 0 |
| 20040 | 186. | 0 |
| 20048 | 187. | 0 |
| 20056 | 188. | 0 |
| 20104 | 189. | 0 |
| 20112 | 190. | 0 |
| 20120 | 191. | 0 |
| 20128 | 192. | 0 |
| 20136 | 193. | 0 |
| 20144 | 194. | 0 |
| 20152 | 195. | 0 |
| 20200 | 196. | 0 |
| 20208 | 197. | 0 |
| 20216 | 198. | 0 |
| 20224 | 199. | 0 |
| 20232 | 200. | 0 |

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

| OPERATION | STATION | PEAK | TIME OF | AVERAGE FLOW FOR MAXIMUM PERIOD | | | BASIN | MAXIMUM | TIME OF |
|---------------|---------|-------|---------|---------------------------------|---------|---------|-------|---------|---------|
| | | FLOW | PEAK | 6-HOUR | 24-HOUR | 72-HOUR | | | |
| HYDROGRAPH AT | | | | | | | | | |
| | DRN-RD | 3086. | 6.27 | 665. | 208. | 188. | 3.19 | | |

*** NORMAL END OF HEC-1 ***

* WATER SURFACE PROFILES
* VERSION OF NOVEMBER 1976
* UPDATED MAY 1984
* IBM-PC-XT VERSION
* RUN DATE 01/02/86 TIME 21:15:11

* U.S. ARMY CORPS OF ENGINEERS
* THE HYDROLOGIC ENGINEERING
* 609 SECOND STREET, SUITE D
* DAVIS, CALIFORNIA 95616
* (916) 440-2105 (FTS) 44B-2

| | | | | | |
|--------|------|--------|------|-------|--------|
| X | X | XXXXXX | XXXX | | XXXXX |
| X | X | X | X | X | X |
| X | X | X | X | | X |
| XXXXXX | XXXX | X | | XXXXX | XXXX |
| X | X | X | X | | X |
| X | X | X | X | X | X |
| X | X | XXXXXX | XXXX | | XXXXXX |

01/02/06 21:15:12

PAGE 1

THIS RUN EXECUTED 01/02/86 21:15:13

HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984
ERROR CORR - 01,02,03,04,05,06
MODIFICATION - 50,51,52,53,54,55,56
IBM-PC-XT VERSION APRIL 1985

T1 WATER SURFACE PROFILES FOR FRANCEVILLE TRIBUTARY
T2 BY JR DEVELOPERS LTD, JANUARY, 1986
T3 PROPOSED CHANNEL PROFILES \ SUBCRITICAL

| J1 | ICHECK | INQ | NINV | IDIR | STRT | METRIC | HVINS | Q | WSEL | FQ |
|----|--------|-----|------|-----------|------|--------|-------|---------|-------|----|
| 0. | 2. | 0. | 0. | -1.000000 | .00 | .0 | 3100. | 887.000 | 1.000 | |

| | | | | | | | | | | |
|----|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| GR | 900.000 | .000 | 894.500 | 1.000 | 894.500 | 175.000 | 902.000 | 176.000 | .000 | .000 |
| X1 | 5.000 | 4.000 | .000 | 176.000 | 60.000 | 60.000 | 60.000 | .000 | .000 | 1.000 |
| X5 | 1.000 | 899.900 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| GR | 900.000 | .000 | 895.000 | 1.000 | 895.000 | 175.000 | 902.000 | 176.000 | .000 | .000 |
| X1 | 6.000 | 6.000 | .000 | 340.000 | 205.000 | 140.000 | 180.000 | .000 | .000 | 1.000 |
| GR | 901.000 | .000 | 896.000 | 20.000 | 896.000 | 230.000 | 898.000 | 260.000 | 900.000 | 280.000 |
| GR | 902.000 | 340.000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| X1 | 7.000 | 6.000 | .000 | 460.000 | 200.000 | 200.000 | 200.000 | .000 | .000 | 1.000 |
| GR | 902.000 | .000 | 897.000 | 20.000 | 897.000 | 200.000 | 898.000 | 220.000 | 900.000 | 370.000 |
| GR | 902.000 | 460.000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| X1 | 8.000 | 6.000 | .000 | 520.000 | 230.000 | 180.000 | 200.000 | .000 | .000 | 1.000 |
| GR | 903.000 | .000 | 898.000 | 20.000 | 898.000 | 170.000 | 900.000 | 180.000 | 902.000 | 460.000 |
| GR | 904.000 | 520.000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |

01/02/86 21:15:12

PAGE 2

| | | | | | | | | | | |
|----|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| X1 | 9.000 | 8.000 | .000 | 430.000 | 170.000 | 170.000 | 170.000 | .000 | .000 | 1.000 |
| GR | 905.000 | .000 | 900.000 | 25.000 | 900.000 | 110.000 | 899.500 | 130.000 | 900.000 | 160.000 |
| GR | 902.000 | 200.000 | 904.000 | 340.000 | 906.000 | 430.000 | .000 | .000 | .000 | .000 |
| X1 | 10.000 | 7.000 | .000 | 330.000 | 70.000 | 30.000 | 60.000 | .000 | .000 | 1.000 |
| GR | 906.000 | .000 | 904.000 | 40.000 | 902.000 | 80.000 | 900.100 | 100.000 | 902.000 | 170.000 |
| GR | 904.000 | 240.000 | 906.000 | 330.000 | .000 | .000 | .000 | .000 | .000 | .000 |
| X1 | 11.000 | 9.000 | .000 | 410.000 | 130.000 | 80.000 | 130.000 | .000 | .000 | 1.000 |
| GR | 908.000 | .000 | 906.000 | 40.000 | 904.000 | 140.000 | 902.000 | 200.000 | 901.500 | 220.000 |
| GR | 902.000 | 250.000 | 904.000 | 280.000 | 906.000 | 320.000 | 908.000 | 410.000 | .000 | .000 |
| EJ | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |

01/02/86 21:15:12

PAGE 3

| SECNO | DEPTH | CWSEL | CRIWS | WSELK | E6 | HV | HL | DLOSS | BANK ELEV |
|-------|-------|-------|-------|--------|------|-------|-------|--------|------------|
| Q | QLOB | QCH | QROB | ALOB | ACH | AROB | VOL | TWA | LEFT/RIGHT |
| TIME | YLOB | VCH | VROB | XNL | XNCH | XNR | WTN | ELMIN | SSTA |
| SLOPE | XLOBL | XLCH | XLOBR | ITRIAL | IDC | ICONT | CORAR | TOPWID | ENDST |

*PROF 1

CCHV= .100 CEHV= .300

*SECNO 1.000

3720 CRITICAL DEPTH ASSUMED

| | | | | | | | | | |
|---------|------|--------|--------|--------|--------|------|------|--------|---------|
| 1.00 | 1.54 | 886.54 | 886.54 | 887.00 | 886.98 | .44 | .00 | .00 | 888.00 |
| 3100. | 0. | 3100. | 0. | 0. | 584. | 0. | 0. | 0. | 890.00 |
| .00 | .00 | 5.31 | .00 | .030 | .030 | .030 | .000 | 885.00 | 394.50 |
| .014133 | 0. | 0. | 0. | 0 | 14 | 0 | .00 | 681.66 | 1076.17 |

*SECNO 2.000

| | | | | | | | | | |
|---------|------|--------|------|------|--------|------|------|--------|--------|
| 2.00 | 2.16 | 889.66 | .00 | .00 | 889.88 | .23 | 2.88 | .02 | 890.00 |
| 3100. | 0. | 3100. | 0. | 0. | 811. | 0. | 5. | 6. | 892.00 |
| .02 | .00 | 3.82 | .00 | .030 | .030 | .030 | .000 | 887.50 | 113.01 |
| .005937 | 330. | 330. | 330. | 5 | 0 | 0 | .00 | 809.59 | 922.60 |

0

*SECNO 3.000

| | | | | | | | | | |
|---------|------|--------|------|------|--------|------|------|--------|--------|
| 3.00 | 2.22 | 891.72 | .00 | .00 | 892.10 | .38 | 2.17 | .05 | 892.00 |
| 3100. | 0. | 3100. | 0. | 0. | 627. | 0. | 10. | 10. | 894.00 |
| .04 | .00 | 4.95 | .00 | .030 | .030 | .030 | .000 | 889.50 | 55.12 |
| .009694 | 200. | 290. | 310. | 3 | 0 | 0 | .00 | 613.79 | 668.91 |

0

*SECNO 4.000

| WATER EL=X5 CARD= | | 898.000 | | | | | | | |
|-------------------|------|---------|------|------|--------|------|------|--------|--------|
| 4.00 | 3.50 | 898.00 | .00 | .00 | 898.40 | .40 | .70 | .01 | 900.00 |
| 3100. | 0. | 3100. | 0. | 0. | 611. | 0. | 13. | 12. | 902.00 |
| .05 | .00 | 5.07 | .00 | .030 | .030 | .030 | .000 | 894.50 | .36 |
| .002074 | 160. | 180. | 190. | 0 | 0 | 0 | .00 | 175.10 | 175.47 |

0

*SECNO 5.000

| WATER EL=X5 CARD= | | 899.900 | | | | | | | |
|-------------------|------|---------|-----|------|--------|------|------|--------|--------|
| 5.00 | 4.90 | 899.90 | .00 | .00 | 900.10 | .20 | .07 | .02 | 900.00 |
| 3100. | 0. | 3100. | 0. | 0. | 857. | 0. | 14. | 12. | 902.00 |
| .05 | .00 | 3.62 | .00 | .030 | .030 | .030 | .000 | 895.00 | .02 |
| .000686 | 60. | 60. | 60. | 0 | 0 | 0 | .00 | 175.68 | 175.70 |

0

1

01/02/86 21:15:12

PAGE 4

| SECNO | DEPTH | CWSEL | CRIMS | WSELK | EG | HV | HL | OLOSS | BANK ELEV |
|-------|-------|-------|-------|--------|------|-------|-------|--------|------------|
| Q | QLOB | QCH | QROB | ALOB | ACH | AROB | VOL | TWA | LEFT/RIGHT |
| TIME | VLOB | VCH | VRQB | XNL | XNCH | XNR | WTN | ELMIN | SSTA |
| SLOFE | XLOBL | XLCH | XLOBR | ITRIAL | IDC | ICONT | CORAR | TOPWID | ENDST |

*SECNO 6.000

| | | | | | | | | | |
|---------|------|--------|------|------|--------|------|------|--------|--------|
| 6.00 | 4.09 | 900.09 | .00 | .00 | 900.23 | .15 | .12 | .01 | 901.00 |
| 3100. | 0. | 3100. | 0. | 0. | 1006. | 0. | 17. | 13. | 902.00 |
| .07 | .00 | 3.08 | .00 | .030 | .030 | .030 | .000 | 896.00 | 3.65 |
| .000702 | 205. | 180. | 140. | 2 | 0 | 0 | .00 | 278.94 | 282.59 |

0

*SECNO 7.000

| | | | | | | | | | |
|---------|------|--------|------|------|--------|------|------|--------|--------|
| 7.00 | 3.26 | 900.26 | .00 | .00 | 900.46 | .20 | .21 | .02 | 902.00 |
| 3100. | 0. | 3100. | 0. | 0. | 853. | 0. | 22. | 15. | 902.00 |
| .09 | .00 | 3.63 | .00 | .030 | .030 | .030 | .000 | 897.00 | 6.96 |
| .001798 | 200. | 200. | 200. | 2 | 0 | 0 | .00 | 374.69 | 381.65 |

0

*SECNO 8.000

3301 HV CHANGED MORE THAN HVINS

| | | | | | | | | | |
|---------|------|--------|------|------|--------|------|------|--------|--------|
| 8.00 | 2.55 | 900.55 | .00 | .00 | 901.35 | .80 | .71 | .18 | 903.00 |
| 3100. | 0. | 3100. | 0. | 0. | 433. | 0. | 25. | 16. | 904.00 |
| .09 | .00 | 7.16 | .00 | .030 | .030 | .030 | .000 | 898.00 | 9.78 |
| .009939 | 230. | 200. | 180. | 2 | 0 | 0 | .00 | 247.77 | 257.55 |

0

*SECNO 9.000

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

| | | | | | | | | | |
|---------|------|--------|--------|------|--------|------|------|--------|--------|
| 9.00 | 2.82 | 902.32 | 902.32 | .00 | 903.27 | .95 | 1.75 | .05 | 905.00 |
| 3100. | 0. | 3100. | 0. | 0. | 395. | 0. | 26. | 17. | 906.00 |
| .10 | .00 | 7.84 | .00 | .030 | .030 | .030 | .000 | 899.50 | 13.40 |
| .010718 | 170. | 170. | 170. | 2 | 8 | 0 | .00 | 208.98 | 222.38 |

0

• SECNO 10.000

3685 20 TRIALS ATTEMPTED WSEL,CWSEL

3693 PROBABLE MINIMUM SPECIFIC ENERGY

3873 PROBABLE MINIMUM DEPTH

3/20 CRITICAL DEPTH ASSUMED
 10.00 3.97 904.07 904.07 .00 905.05 .98 .65 .01 906.00
 3100. 0. 3100. 0. 0. 390. 0. 27. 17. 906.00
 .10 .00 7.94 .00 .030 .030 .030 .000 900.10 38.52
 -0108E0 70. 60. 30. 20 14 0 .00 204.81 243.33

01/02/86 21:15:12

PAGE 5

| SECNC | DEPTH | CWSEL | CRWS | WSELK | E6 | HV | HL | OLOSS | BANK | ELEV |
|-------|-------|-------|-------|--------|------|-------|-------|--------|------------|------|
| Q | QLOB | QCH | QROB | ALOB | ACH | AROB | VOL | TWA | LEFT/RIGHT | |
| TIME | VLOB | VCH | VROB | XNL | XNCH | XNR | WTN | ELMIN | SSTA | |
| SLOPE | XLOBL | XLCH | XLOBR | ITRIAL | IDC | ICONT | CORAR | TOPWID | ENDST | |

*SEEN NO 11-200

| | | | | | | | | | |
|---------|------|--------|-----|------|--------|------|------|--------|--------|
| 11.00 | 4.03 | 905.53 | .00 | .00 | 906.13 | .59 | 1.04 | .04 | 908.00 |
| 3100. | 0. | 3100. | 0. | 0. | 501. | 0. | 28. | 18. | 908.00 |
| .11 | .00 | 6.19 | .00 | .030 | .030 | .030 | .000 | 901.50 | 63.00 |
| .006105 | 130. | 130. | 80. | 2 | 0 | 0 | .00 | 247.79 | 310.80 |

CROSS SECTION

STREAM PROPOSED CHANNEL PROFILE

STREAN FROFUSED CHA
DISCHARGE= 3100

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE T=TOP BRIDGE Y=GROUND W=WATERS SURF E=ENERGY GRADIENT C=CRITICAL WSEL

ELEV 855 864 872 888 889 890 891 892 893 894 895

670-5551

| | | | | | | | | | | | |
|--------|---|---|---|---|---|---|---|---|---|---|-------|
| 6100. | . | . | X | . | . | . | . | . | . | . | . |
| 1150. | . | . | . | X | . | . | . | . | . | . | . |
| 1200. | . | . | . | . | X | . | . | . | . | . | . |
| 71250. | . | . | . | . | X | . | . | . | . | . | BANK. |

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(I),STA(I)

| | | | | | | | | | |
|--------|---------|--------|--------|--------|--------|--------|---------|--------|---------|
| 888.00 | .00 | 886.00 | 540.00 | 885.00 | 980.00 | 886.00 | 1060.00 | 888.00 | 1120.00 |
| 890.00 | 1240.00 | | | | | | | | |

1
CROSS SECTION 2.00
STREAM PROPOSED CHANNEL PROFILE
DISCHARGE= 3100.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE,T=TOP BRIDGE,X=GROUNd,W=WATER SUR,E=ENERGY GRADIENT,C=CRITICAL WSEL

| ELEV | 887. | 888. | 889. | 890. | 891. | 892. | 893. | 894. | 895. | 896. | 897. |
|------|------|------|------|------|------|------|------|------|------|------|------|
|------|------|------|------|------|------|------|------|------|------|------|------|

STA-FEET

| | | | | | | | | | | | | |
|---|------|---|---|--------|------|---|---|---|---|---|---|-------|
| 2 | 0. | . | . | X | . | . | . | . | . | . | . | BANK. |
| | 20. | . | . | X. | . | . | . | . | . | . | . | . |
| | 40. | . | . | X. | . | . | . | . | . | . | . | . |
| | 60. | . | . | XE. | . | . | . | . | . | . | . | . |
| | 80. | . | . | XE. | . | . | . | . | . | . | . | . |
| | 100. | . | . | X E. | . | . | . | . | . | . | . | . |
| | 120. | . | . | XW E. | . | . | . | . | . | . | . | . |
| | 140. | . | . | XW E. | . | . | . | . | . | . | . | . |
| | 160. | . | . | XW E. | . | . | . | . | . | . | . | . |
| | 180. | . | . | XW E. | . | . | . | . | . | . | . | . |
| | 200. | . | . | X W E. | . | . | . | . | . | . | . | . |
| | 220. | . | . | X W E. | . | . | . | . | . | . | . | . |
| | 240. | . | . | X W E. | . | . | . | . | . | . | . | . |
| | 260. | . | . | X W E. | . | . | . | . | . | . | . | . |
| | 280. | . | . | X W E. | . | . | . | . | . | . | . | . |
| | 300. | . | . | X W E. | . | . | . | . | . | . | . | . |
| | 320. | . | . | X W E. | . | . | . | . | . | . | . | . |
| | 340. | . | . | X W E. | . | . | . | . | . | . | . | . |
| | 360. | . | . | X W E. | . | . | . | . | . | . | . | . |
| | 380. | . | . | X W E. | . | . | . | . | . | . | . | . |
| | 400. | . | . | X W E. | . | . | . | . | . | . | . | . |
| | 420. | . | . | X W E. | . | . | . | . | . | . | . | . |
| | 440. | . | . | X W E. | . | . | . | . | . | . | . | . |
| | 460. | . | . | X W E. | . | . | . | . | . | . | . | . |
| | 480. | . | . | X W E. | . | . | . | . | . | . | . | . |
| | 500. | . | . | X W E. | . | . | . | . | . | . | . | . |
| | 520. | . | . | X W E. | . | . | . | . | . | . | . | . |
| | 540. | . | . | X W E. | . | . | . | . | . | . | . | . |
| | 560. | . | . | X W E. | . | . | . | . | . | . | . | . |
| | 580. | . | . | X W E. | . | . | . | . | . | . | . | . |
| | 600. | . | . | X W E. | . | . | . | . | . | . | . | . |
| | 620. | . | . | X W E. | . | . | . | . | . | . | . | . |
| | 640. | . | . | X W E. | . | . | . | . | . | . | . | . |
| 3 | 660. | . | X | . | W E. | . | . | . | . | . | . | . |
| | 680. | . | X | . | W E. | . | . | . | . | . | . | . |
| 4 | 700. | . | X | . | W E. | . | . | . | . | . | . | . |
| | 720. | . | X | . | W E. | . | . | . | . | . | . | . |

| | | | | | | | | | | | |
|--------|---|---|---|---|--------|---|---|---|---|---|-------|
| 740. | . | X | . | . | W.E. | . | . | . | . | . | . |
| 760. | . | X | . | . | W.E. | . | . | . | . | . | . |
| 5 780. | . | X | . | . | W.E. | . | . | . | . | . | . |
| 800. | . | . | X | . | W.E. | . | . | . | . | . | . |
| 820. | . | . | X | . | W.E. | . | . | . | . | . | . |
| 840. | . | . | X | . | W.E. | . | . | . | . | . | . |
| 860. | . | . | X | . | W.E. | . | . | . | . | . | . |
| 880. | . | . | . | X | W.E. | . | . | . | . | . | . |
| 900. | . | . | . | . | X W.E. | . | . | . | . | . | . |
| 920. | . | . | . | . | XE. | . | . | . | . | . | . |
| 6 940. | . | . | . | . | X | . | . | . | . | . | . |
| 960. | . | . | . | . | . | X | . | . | . | . | . |
| 7 980. | . | . | . | . | . | . | X | . | . | . | BANK. |

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(I),STA(I)

| | | | | | | | | | | |
|--------|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 890.00 | . | .00 | 888.00 | 660.00 | 887.50 | 710.00 | 888.00 | 790.00 | 890.00 | 950.00 |
| 892.00 | . | 980.00 | | | | | | | | |

1

CROSS SECTION 3.00

STREAM PROPOSED CHANNEL PROFILE

DISCHARGE= 3100.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE,T=TOP BRIDGE,X=GROUNd,W=WATER SUR,E=ENERGY GRADIENT,C=CRITICAL WSEL

| ELEV | 889. | 890. | 891. | 892. | 893. | 894. | 895. | 896. | 897. | 898. | 899. |
|------|------|------|------|------|------|------|------|------|------|------|------|
|------|------|------|------|------|------|------|------|------|------|------|------|

STA-FEET

| | | | | | | | | | | | |
|--------|----|---|----|-----|------|---|---|---|---|---|---|
| 2 | 0. | . | . | . | XE | . | . | . | . | . | . |
| 20. | . | . | . | . | X.E | . | . | . | . | . | . |
| 40. | . | . | . | . | X .E | . | . | . | . | . | . |
| 60. | . | . | . | . | X .E | . | . | . | . | . | . |
| 80. | . | . | . | XW | .E | . | . | . | . | . | . |
| 100. | . | . | . | X W | .E | . | . | . | . | . | . |
| 120. | . | . | . | X W | .E | . | . | . | . | . | . |
| 140. | . | . | . | X W | .E | . | . | . | . | . | . |
| 160. | . | . | . | X W | .E | . | . | . | . | . | . |
| 180. | . | . | . | X W | .E | . | . | . | . | . | . |
| 200. | . | . | . | X W | .E | . | . | . | . | . | . |
| 220. | . | . | X. | W | .E | . | . | . | . | . | . |
| 240. | . | . | X. | W | .E | . | . | . | . | . | . |
| 260. | . | . | X. | W | .E | . | . | . | . | . | . |
| 280. | . | . | X | W | .E | . | . | . | . | . | . |
| 300. | . | . | X | W | .E | . | . | . | . | . | . |
| 320. | . | . | X | W | .E | . | . | . | . | . | . |
| 340. | . | . | X | W | .E | . | . | . | . | . | . |
| 360. | . | . | X | W | .E | . | . | . | . | . | . |
| 3 380. | . | X | . | W | .E | . | . | . | . | . | . |
| 400. | . | X | . | W | .E | . | . | . | . | . | . |
| 4 420. | . | X | . | W | .E | . | . | . | . | . | . |
| 440. | . | X | . | W | .E | . | . | . | . | . | . |
| 460. | . | X | . | W | .E | . | . | . | . | . | . |
| 5 480. | . | X | . | W | .E | . | . | . | . | . | . |
| 500. | . | X | . | W | .E | . | . | . | . | . | . |
| 520. | . | X | . | W | .E | . | . | . | . | . | . |
| 540. | . | X | . | W | .E | . | . | . | . | . | . |

| | | | | | | | | | | | |
|-------|---|---|----|----|----|----|---|---|---|---|-------|
| 560. | . | . | X | . | W | .E | . | . | . | . | . |
| 580. | . | . | X. | . | W | .E | . | . | . | . | . |
| 600. | . | . | .X | . | W | .E | . | . | . | . | . |
| 620. | . | . | . | X | W | .E | . | . | . | . | . |
| 640. | . | . | . | X | W | .E | . | . | . | . | . |
| 660. | . | . | . | XW | .E | . | . | . | . | . | . |
| 680. | . | . | . | X | .E | . | . | . | . | . | . |
| 6700. | . | . | . | . | XE | . | . | . | . | . | . |
| 720. | . | . | . | . | . | X | . | . | . | . | . |
| 7740. | . | . | . | . | . | . | X | . | . | . | BANK. |

MRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(I),STA(I)

| | | | | | | | | | | |
|--------|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 892.00 | . | .00 | 890.00 | 390.00 | 889.50 | 425.00 | 890.00 | 480.00 | 892.00 | 700.00 |
| 894.00 | . | 750.00 | | | | | | | | |

1

CROSS SECTION 4.00

STREAM PROPOSED CHANNEL PROFILE

DISCHARGE= 3100.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE,T=TOP BRIDGE,X=GROUNd,W=WATER SUR,E=ENERGY GRADIENT,C=CRITICAL WSEL

ELEV 894. 895. 896. 897. 898. 899. 900. 901. 902. 903. 904.

STA-FEET

| | | | | | | | | | | | |
|------|----|---|--|---|---|---|---|---|---|---|-------|
| 3 | 0. | . | XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX | | | | | | | | BANK. |
| 5. | X | . | . | W | E | . | . | . | . | . | . |
| 10. | X | . | . | W | E | . | . | . | . | . | . |
| 15. | X | . | . | W | E | . | . | . | . | . | . |
| 20. | X | . | . | W | E | . | . | . | . | . | . |
| 25. | X | . | . | W | E | . | . | . | . | . | . |
| 30. | X | . | . | W | E | . | . | . | . | . | . |
| 35. | X | . | . | W | E | . | . | . | . | . | . |
| 40. | X | . | . | W | E | . | . | . | . | . | . |
| 45. | X | . | . | W | E | . | . | . | . | . | . |
| 50. | X | . | . | W | E | . | . | . | . | . | . |
| 55. | X | . | . | W | E | . | . | . | . | . | . |
| 60. | X | . | . | W | E | . | . | . | . | . | . |
| 65. | X | . | . | W | E | . | . | . | . | . | . |
| 70. | X | . | . | W | E | . | . | . | . | . | . |
| 75. | X | . | . | W | E | . | . | . | . | . | . |
| 80. | X | . | . | W | E | . | . | . | . | . | . |
| 85. | X | . | . | W | E | . | . | . | . | . | . |
| 90. | X | . | . | W | E | . | . | . | . | . | . |
| 95. | X | . | . | W | E | . | . | . | . | . | . |
| 100. | X | . | . | W | E | . | . | . | . | . | . |
| 105. | X | . | . | W | E | . | . | . | . | . | . |
| 110. | X | . | . | W | E | . | . | . | . | . | . |
| 115. | X | . | . | W | E | . | . | . | . | . | . |
| 120. | X | . | . | W | E | . | . | . | . | . | . |
| 125. | X | . | . | W | E | . | . | . | . | . | . |
| 130. | X | . | . | W | E | . | . | . | . | . | . |
| 135. | X | . | . | W | E | . | . | . | . | . | . |
| 140. | X | . | . | W | E | . | . | . | . | . | . |
| 145. | X | . | . | W | E | . | . | . | . | . | . |
| 150. | X | . | . | W | E | . | . | . | . | . | . |

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(I),STALL)

900.00 .00 **894.50** 1.00 **894.50** 175.00 **902.00** 176.00

1

CROSS SECTION 5.00
STREAM PROPOSED CHANNEL PROFILE
DISCHARGE= 3100.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE,T=TOP BRIDGE,X=GROUND,W=WATER SUR.E=ENERGY GRADIENT,C=CRITICAL WSEL

ELEV 895 896 897 898 899 900 901 902 903 904 905

STA-FEEI

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(1),STA(1)

900.00 .00 895.00 1.00 895.00 175.00 902.00 176.00

1

CROSS SECTION 6.00

STREAM PROPOSED CHANNEL PROFILE

DISCHARGE= 3100.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE,T=TOP BRIDGE,X=GROUNd,W=WATER SUR,E=ENERGY GRADIENT,C=CRITICAL WSEL

ELEV 896. 897. 898. 899. 900. 901. 902. 903. 904. 905. 906.

STA-FEET

| | | | | | | | | | | | BANK. |
|---|------|---|---|---|---|-----|---|---|---|---|-------|
| 2 | 0. | . | . | . | . | X | . | . | . | . | . |
| | 10. | . | . | X | . | .WE | . | . | . | . | . |
| 3 | 20. | X | . | . | . | .WE | . | . | . | . | . |
| | 30. | X | . | . | . | .WE | . | . | . | . | . |
| | 40. | X | . | . | . | .WE | . | . | . | . | . |
| | 50. | X | . | . | . | .WE | . | . | . | . | . |
| | 60. | X | . | . | . | .WE | . | . | . | . | . |
| | 70. | X | . | . | . | .WE | . | . | . | . | . |
| | 80. | X | . | . | . | .WE | . | . | . | . | . |
| | 90. | X | . | . | . | .WE | . | . | . | . | . |
| | 100. | X | . | . | . | .WE | . | . | . | . | . |
| | 110. | X | . | . | . | .WE | . | . | . | . | . |
| | 120. | X | . | . | . | .WE | . | . | . | . | . |
| | 130. | X | . | . | . | .WE | . | . | . | . | . |
| | 140. | X | . | . | . | .WE | . | . | . | . | . |
| | 150. | X | . | . | . | .WE | . | . | . | . | . |
| | 160. | X | . | . | . | .WE | . | . | . | . | . |
| | 170. | X | . | . | . | .WE | . | . | . | . | . |
| | 180. | X | . | . | . | .WE | . | . | . | . | . |
| | 190. | X | . | . | . | .WE | . | . | . | . | . |
| | 200. | X | . | . | . | .WE | . | . | . | . | . |
| | 210. | X | . | . | . | .WE | . | . | . | . | . |
| | 220. | X | . | . | . | .WE | . | . | . | . | . |
| 4 | 230. | X | . | . | . | .WE | . | . | . | . | . |
| | 240. | . | X | . | . | .WE | . | . | . | . | . |
| | 250. | . | . | X | . | .WE | . | . | . | . | . |
| 5 | 260. | . | . | X | . | .WE | . | . | . | . | . |
| | 270. | . | . | . | X | .WE | . | . | . | . | . |
| 6 | 280. | . | . | . | . | XWE | . | . | . | . | . |
| | 290. | . | . | . | . | . | X | . | . | . | . |
| | 300. | . | . | . | . | . | . | X | . | . | . |
| | 310. | . | . | . | . | . | . | X | . | . | . |
| | 320. | . | . | . | . | . | . | X | . | . | . |
| | 330. | . | . | . | . | . | . | X | . | . | . |
| 7 | 340. | . | . | . | . | . | . | . | X | . | . |

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(1),STA(1)

901.00 .00 896.00 20.00 896.00 230.00 898.00 260.00 900.00 280.00

902.00 340.00

1 CROSS SECTION 7.00

STREAM PROPOSED CHANNEL PROFILE

DISCHARGE= 3100.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE,T=TOP BRIDGE,X=GROUNd,W=WATER SUR,E=ENERGY GRADIENT,C=CRITICAL WSEL

ELEV 897. 898. 899. 900. 901. 902. 903. 904. 905. 906. 907.

STA-FEET

| | | | | | | | | | | | BANK. |
|---|------|---|---|---|------|----|---|---|---|---|-------|
| 2 | 0. | . | . | . | . | X | . | . | . | . | . |
| | 10. | . | . | X | . | WE | . | . | . | . | . |
| 3 | 20. | X | . | . | . | WE | . | . | . | . | . |
| | 30. | X | . | . | . | WE | . | . | . | . | . |
| | 40. | X | . | . | . | WE | . | . | . | . | . |
| | 50. | X | . | . | . | WE | . | . | . | . | . |
| | 60. | X | . | . | . | WE | . | . | . | . | . |
| | 70. | X | . | . | . | WE | . | . | . | . | . |
| | 80. | X | . | . | . | WE | . | . | . | . | . |
| | 90. | X | . | . | . | WE | . | . | . | . | . |
| | 100. | X | . | . | . | WE | . | . | . | . | . |
| | 110. | X | . | . | . | WE | . | . | . | . | . |
| | 120. | X | . | . | . | WE | . | . | . | . | . |
| | 130. | X | . | . | . | WE | . | . | . | . | . |
| | 140. | X | . | . | . | WE | . | . | . | . | . |
| | 150. | X | . | . | . | WE | . | . | . | . | . |
| | 160. | X | . | . | . | WE | . | . | . | . | . |
| | 170. | X | . | . | . | WE | . | . | . | . | . |
| | 180. | X | . | . | . | WE | . | . | . | . | . |
| | 190. | X | . | . | . | WE | . | . | . | . | . |
| 4 | 200. | X | . | . | . | WE | . | . | . | . | . |
| | 210. | . | X | . | . | WE | . | . | . | . | . |
| 5 | 220. | . | X | . | . | WE | . | . | . | . | . |
| | 230. | . | X | . | . | WE | . | . | . | . | . |
| | 240. | . | X | . | . | WE | . | . | . | . | . |
| | 250. | . | X | . | . | WE | . | . | . | . | . |
| | 260. | . | X | . | . | WE | . | . | . | . | . |
| | 270. | . | X | . | . | WE | . | . | . | . | . |
| | 280. | . | X | . | . | WE | . | . | . | . | . |
| | 290. | . | X | . | . | WE | . | . | . | . | . |
| | 300. | . | X | . | . | WE | . | . | . | . | . |
| | 310. | . | X | . | . | WE | . | . | . | . | . |
| | 320. | . | X | . | . | WE | . | . | . | . | . |
| | 330. | . | X | . | . | WE | . | . | . | . | . |
| | 340. | . | X | . | . | WE | . | . | . | . | . |
| | 350. | . | X | . | . | WE | . | . | . | . | . |
| | 360. | . | X | . | . | WE | . | . | . | . | . |
| 6 | 370. | . | . | X | WE | . | . | . | . | . | . |
| | 380. | . | . | . | XW E | . | . | . | . | . | . |
| | 390. | . | . | . | XE | . | . | . | . | . | . |
| | 400. | . | . | . | X | . | . | . | . | . | . |
| | 410. | . | . | . | X | . | . | . | . | . | . |
| | 420. | . | . | . | . | X | . | . | . | . | . |
| | 430. | . | . | . | . | X | . | . | . | . | . |
| | 440. | . | . | . | . | X | . | . | . | . | . |
| | 450. | . | . | . | . | X | . | . | . | . | . |
| 7 | 460. | . | . | . | . | X | . | . | . | . | BANK. |

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(I),STA(I)

| | | | | | | | | | |
|--------|--------|--------|-------|--------|--------|--------|--------|--------|--------|
| 902.00 | .00 | 897.00 | 20.00 | 897.00 | 200.00 | 898.00 | 220.00 | 900.00 | 370.00 |
| 902.00 | 460.00 | | | | | | | | |

CROSS SECTION 8.00

STREAM PROPOSED CHANNEL PROFILE

DISCHARGE= 3100.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE,T=TOP BRIDGE,X=GROUNd,W=WATER SUR,E=ENERGY GRADIENT,C=CRITICAL WSEL

| | | | | | | | | | | |
|-----------|------|------|------|------|------|------|------|------|------|------|
| ELEV 898. | 899. | 900. | 901. | 902. | 903. | 904. | 905. | 906. | 907. | 908. |
|-----------|------|------|------|------|------|------|------|------|------|------|

STA-FEET

| | | | | | | | | | | BANK. |
|------|------|---|----|----|----|---|---|---|---|-------|
| 2 | 0. | . | . | . | . | X | . | . | . | . |
| 10. | . | . | . | XW | . | E | . | . | . | . |
| 3 | 20. | X | . | . | W | . | E | . | . | . |
| 30. | X | . | . | W | . | E | . | . | . | . |
| 40. | X | . | . | W | . | E | . | . | . | . |
| 50. | X | . | . | W | . | E | . | . | . | . |
| 60. | X | . | . | W | . | E | . | . | . | . |
| 70. | X | . | . | W | . | E | . | . | . | . |
| 80. | X | . | . | W | . | E | . | . | . | . |
| 90. | X | . | . | W | . | E | . | . | . | . |
| 100. | X | . | . | W | . | E | . | . | . | . |
| 110. | X | . | . | W | . | E | . | . | . | . |
| 120. | X | . | . | W | . | E | . | . | . | . |
| 130. | X | . | . | W | . | E | . | . | . | . |
| 140. | X | . | . | W | . | E | . | . | . | . |
| 150. | X | . | . | W | . | E | . | . | . | . |
| 160. | X | . | . | W | . | E | . | . | . | . |
| 4 | 170. | T | . | W | . | E | . | . | . | . |
| 5 | 180. | . | X | W | . | E | . | . | . | . |
| 190. | . | X | W | . | E | . | . | . | . | . |
| 200. | . | . | X | W | . | E | . | . | . | . |
| 210. | . | . | X | W | . | E | . | . | . | . |
| 220. | . | . | X | W | . | E | . | . | . | . |
| 230. | . | . | X | W | . | E | . | . | . | . |
| 240. | . | . | X | W | . | E | . | . | . | . |
| 250. | . | . | XW | . | E | . | . | . | . | . |
| 260. | . | . | X | . | E | . | . | . | . | . |
| 270. | . | . | X | . | E | . | . | . | . | . |
| 280. | . | . | X | . | E | . | . | . | . | . |
| 290. | . | . | X | . | E | . | . | . | . | . |
| 300. | . | . | X | . | E | . | . | . | . | . |
| 310. | . | . | X | . | E | . | . | . | . | . |
| 320. | . | . | X | . | E | . | . | . | . | . |
| 330. | . | . | . | X | E | . | . | . | . | . |
| 340. | . | . | . | X | E | . | . | . | . | . |
| 350. | . | . | . | . | XE | . | . | . | . | . |
| 360. | . | . | . | . | X | . | . | . | . | . |
| 370. | . | . | . | . | X | . | . | . | . | . |
| 380. | . | . | . | . | X | . | . | . | . | . |
| 390. | . | . | . | . | X | . | . | . | . | . |
| 400. | . | . | . | . | X | . | . | . | . | . |
| 410. | . | . | . | . | X | . | . | . | . | . |
| 420. | . | . | . | . | X | . | . | . | . | . |

| | | | | | | | | | | |
|--------|---|---|---|---|---|---|---|---|---|-------|
| 430. | . | . | . | X | . | . | . | . | . | . |
| 440. | . | . | . | X | . | . | . | . | . | . |
| 450. | . | . | . | X | . | . | . | . | . | . |
| 6 460. | . | . | . | X | . | . | . | . | . | . |
| 470. | . | . | . | . | X | . | . | . | . | . |
| 480. | . | . | . | . | X | . | . | . | . | . |
| 490. | . | . | . | . | X | . | . | . | . | . |
| 500. | . | . | . | . | . | X | . | . | . | . |
| 510. | . | . | . | . | . | X | . | . | . | . |
| 7 520. | . | . | . | . | . | X | . | . | . | BANK. |

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(I),STA(I)

| | | | | | | | | | |
|--------|--------|--------|-------|--------|--------|--------|--------|--------|--------|
| 903.00 | .00 | 898.00 | 20.00 | 898.00 | 170.00 | 900.00 | 180.00 | 902.00 | 460.00 |
| 904.00 | 520.00 | | | | | | | | |

1

CROSS SECTION 9.00
STREAM PROPOSED CHANNEL PROFILE
DISCHARGE= 3100.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE,T=TOP BRIDGE,X=GROUNd,W=WATER SUR,E=ENERGY GRADIENT,C=CRITICAL WSEL

| ELEV | 899. | 900. | 901. | 902. | 903. | 904. | 905. | 906. | 907. | 908. | 909. |
|------|------|------|------|------|------|------|------|------|------|------|------|
|------|------|------|------|------|------|------|------|------|------|------|------|

STA-FEET

| | | | | | | | | | | | |
|--------|---|---|---|----|---|---|---|---|---|---|---|
| 2 0. | . | . | . | . | . | . | X | . | . | . | . |
| 10. | . | . | . | . | X | E | . | . | . | . | . |
| 3 20. | X | . | . | W | . | E | . | . | . | . | . |
| 30. | X | . | . | W | . | E | . | . | . | . | . |
| 40. | X | . | . | W | . | E | . | . | . | . | . |
| 50. | X | . | . | W | . | E | . | . | . | . | . |
| 60. | X | . | . | W | . | E | . | . | . | . | . |
| 70. | X | . | . | W | . | E | . | . | . | . | . |
| 80. | X | . | . | W | . | E | . | . | . | . | . |
| 90. | X | . | . | W | . | E | . | . | . | . | . |
| 100. | X | . | . | W | . | E | . | . | . | . | . |
| 4 110. | X | . | . | W | . | E | . | . | . | . | . |
| 120. | X | . | . | W | . | E | . | . | . | . | . |
| 5 130. | X | . | . | W | . | E | . | . | . | . | . |
| 140. | X | . | . | W | . | E | . | . | . | . | . |
| 150. | X | . | . | W | . | E | . | . | . | . | . |
| 6 160. | X | . | . | W | . | E | . | . | . | . | . |
| 170. | . | X | . | W | . | E | . | . | . | . | . |
| 180. | . | X | . | W | . | E | . | . | . | . | . |
| 190. | . | . | X | W | . | E | . | . | . | . | . |
| 7 200. | . | . | . | XW | . | E | . | . | . | . | . |
| 210. | . | . | . | X | . | E | . | . | . | . | . |
| 220. | . | . | . | X | . | E | . | . | . | . | . |
| 230. | . | . | . | X | . | E | . | . | . | . | . |
| 240. | . | . | . | X | . | E | . | . | . | . | . |
| 250. | . | . | . | X | . | E | . | . | . | . | . |
| 260. | . | . | . | X | . | E | . | . | . | . | . |
| 270. | . | . | . | X | . | E | . | . | . | . | . |
| 280. | . | . | . | X | . | E | . | . | . | . | . |
| 290. | . | . | . | X | . | E | . | . | . | . | . |
| 300. | . | . | . | X | . | E | . | . | . | . | . |

| | | | | | | | | | | |
|--------|---|---|---|---|---|---|---|---|---|-------|
| 310. | . | . | . | . | X | . | . | . | . | . |
| 320. | . | . | . | . | X | . | . | . | . | . |
| 330. | . | . | . | . | X | . | . | . | . | . |
| 8 340. | . | . | . | . | X | . | . | . | . | . |
| 350. | . | . | . | . | . | X | . | . | . | . |
| 360. | . | . | . | . | . | X | . | . | . | . |
| 370. | . | . | . | . | . | X | . | . | . | . |
| 380. | . | . | . | . | . | X | . | . | . | . |
| 390. | . | . | . | . | . | X | . | . | . | . |
| 400. | . | . | . | . | . | . | X | . | . | . |
| 410. | . | . | . | . | . | . | X | . | . | . |
| 420. | . | . | . | . | . | . | X | . | . | . |
| 9 430. | . | . | . | . | . | . | X | . | . | BANK. |

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(I),STA(I)

| | | | | | | | | | |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 905.00 | .00 | 900.00 | 25.00 | 900.00 | 110.00 | 899.50 | 130.00 | 900.00 | 160.00 |
| 902.00 | 200.00 | 904.00 | 340.00 | 906.00 | 430.00 | | | | |

1

CROSS SECTION 10.00

STREAM PROPOSED CHANNEL PROFILE

DISCHARGE= 3100.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE,T=TOP BRIDGE,X=GROUNd,W=WATER SUR,E=ENERGY GRADIENT,C=CRITICAL WSEL

ELEV 900. 901. 902. 903. 904. 905. 906. 907. 908. 909. 910.

STA-FEET

| | | | | | | | | | | | |
|--------|---|---|---|---|----|---|----|---|---|---|-------|
| 2 0. | . | . | . | . | . | . | X | . | . | . | BANK. |
| 10. | . | . | . | . | . | . | X | . | . | . | . |
| 20. | . | . | . | . | . | . | XE | . | . | . | . |
| 30. | . | . | . | . | . | X | .E | . | . | . | . |
| 3 40. | . | . | . | . | XW | . | .E | . | . | . | . |
| 50. | . | . | . | X | .W | . | .E | . | . | . | . |
| 60. | . | . | X | . | .W | . | .E | . | . | . | . |
| 70. | . | . | X | . | .W | . | .E | . | . | . | . |
| 4 80. | . | X | . | . | .W | . | .E | . | . | . | . |
| 90. | X | . | . | . | .W | . | .E | . | . | . | . |
| 5 100. | X | . | . | . | .W | . | .E | . | . | . | . |
| 110. | X | . | . | . | .W | . | .E | . | . | . | . |
| 120. | X | . | . | . | .W | . | .E | . | . | . | . |
| 130. | X | . | . | . | .W | . | .E | . | . | . | . |
| 140. | . | X | . | . | .W | . | .E | . | . | . | . |
| 150. | . | X | . | . | .W | . | .E | . | . | . | . |
| 160. | . | X | . | . | .W | . | .E | . | . | . | . |
| 6 170. | . | X | . | . | .W | . | .E | . | . | . | . |
| 180. | . | . | X | . | .W | . | .E | . | . | . | . |
| 190. | . | . | X | . | .W | . | .E | . | . | . | . |
| 200. | . | . | . | X | .W | . | .E | . | . | . | . |
| 210. | . | . | . | X | .W | . | .E | . | . | . | . |
| 220. | . | . | . | X | .W | . | .E | . | . | . | . |
| 230. | . | . | . | X | .W | . | .E | . | . | . | . |
| 7 240. | . | . | . | . | XW | . | .E | . | . | . | . |
| 250. | . | . | . | . | X | . | .E | . | . | . | . |
| 260. | . | . | . | . | X | . | .E | . | . | . | . |
| 270. | . | . | . | . | X | . | .E | . | . | . | . |

280. X.E
290. X
300. X
310. X
320. X
B 330. X BANK.

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(I),STA(I)

906.00 .00 904.00 40.00 902.00 80.00 900.10 100.00 902.00 170.00
904.00 240.00 906.00 330.00

CROSS SECTION 11.00
STREAM PROPOSED CHANNEL PROFILE
DISCHARGE= 3100.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE, T=TOP BRIDGE, X=GROUNd, W=WATER SUR, E=ENERGY GRADIENT, C=CRITICAL WSEL

ELEV 901. 902. 903. 904. 905. 906. 907. 908. 909. 910. 911.

STA-FET

| | BANK. |
|--------|-------|
| 2 0. | . |
| 10. | . |
| 20. | . |
| 30. | . |
| 3 40. | . |
| 50. | . |
| 60. | . |
| 70. | . |
| 80. | . |
| 90. | . |
| 100. | . |
| 110. | . |
| 120. | . |
| 130. | . |
| 4 140. | . |
| 150. | . |
| 160. | . |
| 170. | . |
| 180. | . |
| 190. | . |
| 5 200. | . |
| 210. | . |
| 6 220. | . |
| 230. | . |
| 240. | . |
| 7 250. | . |
| 260. | . |
| 270. | . |
| 8 280. | . |
| 290. | . |
| 300. | . |
| 310. | . |
| 9 320. | . |
| 330. | . |
| 340. | . |

| | | | | | | | | | | |
|---------|---|---|---|---|---|---|---|---|---|-------|
| 350. | . | . | . | . | . | X | . | . | . | . |
| 360. | . | . | . | . | . | X | . | . | . | . |
| 370. | . | . | . | . | . | X | . | . | . | . |
| 380. | . | . | . | . | . | X | . | . | . | . |
| 390. | . | . | . | . | . | X | . | . | . | . |
| 400. | . | . | . | . | . | X | . | . | . | . |
| 10 410. | . | . | . | . | . | X | . | . | . | BANK. |

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(I),STA(I)

| | | | | | | | | | |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 908.00 | .00 | 906.00 | 40.00 | 904.00 | 140.00 | 902.00 | 200.00 | 901.50 | 220.00 |
| 902.00 | 250.00 | 904.00 | 280.00 | 906.00 | 320.00 | 908.00 | 410.00 | | |

1 PROFILE FOR STREAM PROPOSED CHANNEL PROFILE

PLOTTED POINTS (BY PRIORITY)-E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA

| ELEVATION | 885. | 890. | 895. | 900. | 905. | 910. | 915. | 920. | 925. | 930. |
|-----------|--------|------|------|------|------|------|------|------|------|------|
| SECNO | CUMDIS | | | | | | | | | |

| | | | | | | | | | | |
|------|------|------|-----|----|---|---|---|---|---|---|
| 1.00 | 0. | I | WE | L | R | . | . | . | . | . |
| | 20. | I | WE | L | R | . | . | . | . | . |
| | 40. | CI | WEL | R | . | . | . | . | . | . |
| | 60. | CI | WEL | .R | . | . | . | . | . | . |
| | 80. | CI | E L | .R | . | . | . | . | . | . |
| | 100. | C I | WEL | .R | . | . | . | . | . | . |
| | 120. | C I | WEL | .R | . | . | . | . | . | . |
| | 140. | C I | E L | .R | . | . | . | . | . | . |
| | 160. | C I | WEL | .R | . | . | . | . | . | . |
| | 180. | C I | WEL | .R | . | . | . | . | . | . |
| | 200. | C I | E L | .R | . | . | . | . | . | . |
| | 220. | C I | WEL | .R | . | . | . | . | . | . |
| | 240. | C I | E L | .R | . | . | . | . | . | . |
| | 260. | C I | WE | .R | . | . | . | . | . | . |
| | 280. | C I | WE | .R | . | . | . | . | . | . |
| | 300. | C I | E L | R | . | . | . | . | . | . |
| | 320. | C I | WE | R | . | . | . | . | . | . |
| 2.00 | 340. | C I | WE | R | . | . | . | . | . | . |
| | 360. | C I | E | R | . | . | . | . | . | . |
| | 380. | C I | E L | R | . | . | . | . | . | . |
| | 400. | C I | WE | R | . | . | . | . | . | . |
| | 420. | C I | WE | R | . | . | . | . | . | . |
| | 440. | C I | E | R | . | . | . | . | . | . |
| | 460. | C I | WE | R | . | . | . | . | . | . |
| | 480. | C I | WE | R | . | . | . | . | . | . |
| | 500. | C I | E | R | . | . | . | . | . | . |
| | 520. | C I | WE | R | . | . | . | . | . | . |
| | 540. | C I | WE | R | . | . | . | . | . | . |
| | 560. | C I | WE | R | . | . | . | . | . | . |
| | 580. | C I | E | R | . | . | . | . | . | . |
| | 600. | C I | WE | R | . | . | . | . | . | . |
| 3.00 | 620. | C I | WE | R | . | . | . | . | . | . |
| | 640. | C I | WE | R | . | . | . | . | . | . |
| | 660. | C .I | WEL | .R | . | . | . | . | . | . |
| | 680. | C .I | E L | R | . | . | . | . | . | . |
| | 700. | C .I | WEL | R | . | . | . | . | . | . |

| | | | | | | | |
|-------|-------|---|---|----|----------|---|---|
| | 720. | C | . | I | W E L | R | . |
| | 740. | C | . | I | W E L | R | . |
| | 760. | C | . | I | W E L | R | . |
| | 780. | C | . | I | E L | R | . |
| 4.00 | 800. | C | . | I. | W E L | R | . |
| | 820. | C | . | I. | W E L | R | . |
| | 840. | C | . | I | E L | R | . |
| 5.00 | 860. | C | . | I | E E | R | . |
| | 880. | C | . | I | E E | R | . |
| | 900. | C | . | I | E E | R | . |
| | 920. | C | . | .I | E L | R | . |
| | 940. | C | . | .I | E L | R | . |
| | 960. | C | . | .I | E L | R | . |
| | 980. | C | . | .I | E L | R | . |
| | 1000. | C | . | .I | E L R | . | . |
| | 1020. | C | . | .I | E L R | . | . |
| 6.00 | 1040. | C | . | .I | E L R | . | . |
| | 1060. | C | . | .I | W E L R | . | . |
| | 1080. | C | . | .I | W E L R | . | . |
| | 1100. | C | . | .I | W E L R | . | . |
| | 1120. | C | . | .I | W E L R | . | . |
| | 1140. | C | . | .I | W E L R | . | . |
| | 1160. | C | . | .I | W E L R | . | . |
| | 1180. | C | . | .I | W E L R | . | . |
| | 1200. | C | . | .I | W E L | . | . |
| | 1220. | C | . | .I | W E L | . | . |
| 7.00 | 1240. | C | . | .I | .E L | . | . |
| | 1260. | C | . | .I | .E L | . | . |
| | 1280. | C | . | .I | .E L R | . | . |
| | 1300. | C | . | .I | .E L | . | . |
| | 1320. | C | . | .I | .W E L R | . | . |
| | 1340. | C | . | .I | .W E L R | . | . |
| | 1360. | C | . | .I | .W E L R | . | . |
| | 1380. | C | . | .I | .W E L R | . | . |
| | 1400. | C | . | .I | .W E L R | . | . |
| | 1420. | C | . | .I | .W E L R | . | . |
| 8.00 | 1440. | C | . | .I | .W E L R | . | . |
| | 1460. | C | . | .I | .W E L R | . | . |
| | 1480. | C | . | .I | .W E L R | . | . |
| | 1500. | C | . | .I | .W E L R | . | . |
| | 1520. | C | . | .I | .W E L R | . | . |
| | 1540. | C | . | .I | .W E L R | . | . |
| | 1560. | C | . | .I | W E L R | . | . |
| | 1580. | C | . | .I | W E L R | . | . |
| | 1600. | C | . | .I | W E L R | . | . |
| 9.00 | 1620. | C | . | .I | W E L R | . | . |
| | 1640. | C | . | .I | W E L R | . | . |
| | 1660. | C | . | .I | W E L R | . | . |
| 10.00 | 1680. | C | . | .I | W E L | . | . |
| | 1700. | C | . | .I | W E L | . | . |
| | 1720. | C | . | .I | W E L | . | . |
| | 1740. | C | . | .I | W E L | . | . |
| | 1760. | C | . | .I | W E L | . | . |
| | 1780. | C | . | .I | W E L | . | . |
| 11.00 | 1800. | C | . | .I | W E L | . | . |

THIS RUN EXECUTED 01/02/86 21:17:30

HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984

ERROR CORR - 01,02,03,04,05,06

MODIFICATION - 50,51,52,53,54,55,56

IBM-PC-XT VERSION APRIL 1985

* WATER SURFACE PROFILES
* VERSION OF NOVEMBER 1976
* UPDATED MAY 1984
* IBM-PC-XT VERSION
* RUN DATE 01/02/86 TIME 20:57:37

* U.S. ARMY CORPS OF ENGINEERS
* THE HYDROLOGIC ENGINEERING CENTER
* 609 SECOND STREET, SUITE D
* DAVIS, CALIFORNIA 95616
* (916) 440-2105 (FTS) 448-2105

XXXXXX X XXXX
X X X X X X
X X X X X X
XXXXXX XXXX X X XXXX XXXX
X X X X X X X
X X X X X X X
X X XXXXXX XXXX XXXXXX

01/02/86 20:57:39

PAGE 1

THIS RUN EXECUTED 01/02/86 20:57:40

HECZ RELEASE DATED NOV 76 UPDATED MAY 1984
ERROR CORR - 01,02,03,04,05,06
MODIFICATION - 50,51,52,53,54,55,56
IBM-PC-XT VERSION APRIL 1985

T1 WATER SURFACE PROFILES FOR FRANCEVILLE TRIBUTARY
T2 BY JR DEVELOPERS LTD, JANUARY, 1986
T3 PROPOSED CHANNEL PROFILES \ SUPERCRITICAL

| J1 | ICHECK | INQ | NINV | IDIR | STRT | METRIC | HVINS | Q | WSEL | FQ |
|----|---------|---------|---------|---------|--------------|---------|---------|---------|---------|---------|
| | 0. | 2. | 0. | | 1. -1.000000 | .00 | .0 | 3100. | 905.500 | 1.000 |
| NC | .030 | .030 | .030 | .100 | .300 | .000 | .000 | .000 | .000 | .000 |
| X1 | 11.000 | 9.000 | .000 | 410.000 | 130.000 | 80.000 | 130.000 | .000 | .000 | 1.000 |
| GR | 908.000 | .000 | 906.000 | 40.000 | 904.000 | 140.000 | 902.000 | 200.000 | 901.500 | 220.000 |
| GR | 902.000 | 250.000 | 904.000 | 280.000 | 906.000 | 320.000 | 908.000 | 410.000 | .000 | .000 |
| X1 | 10.000 | 7.000 | .000 | 330.000 | 70.000 | 30.000 | 60.000 | .000 | .000 | 1.000 |
| GR | 906.000 | .000 | 904.000 | 40.000 | 902.000 | 80.000 | 900.100 | 100.000 | 902.000 | 170.000 |
| GR | 904.000 | 240.000 | 906.000 | 330.000 | .000 | .000 | .000 | .000 | .000 | .000 |
| X1 | 9.000 | 8.000 | .000 | 430.000 | 170.000 | 170.000 | 170.000 | .000 | .000 | 1.000 |
| GR | 905.000 | .000 | 900.000 | 25.000 | 900.000 | 110.000 | 899.500 | 130.000 | 900.000 | 160.000 |
| GR | 902.000 | 200.000 | 904.000 | 340.000 | 906.000 | 430.000 | .000 | .000 | .000 | .000 |
| X1 | 8.000 | 6.000 | .000 | 520.000 | 230.000 | 180.000 | 200.000 | .000 | .000 | 1.000 |
| GR | 903.000 | .000 | 898.000 | 20.000 | 898.000 | 170.000 | 900.000 | 180.000 | 902.000 | 460.000 |

| | | | | | | | | | | | |
|----|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-------|
| GR | 904.000 | 520.000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| X1 | 7.000 | 6.000 | .000 | 460.000 | 200.000 | 200.000 | 200.000 | .000 | .000 | .000 | 1.000 |
| GR | 902.000 | .000 | 897.000 | 20.000 | 897.000 | 200.000 | 898.000 | 220.000 | 900.000 | 370.000 | |
| GR | 902.000 | 460.000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| X1 | 6.000 | 5.000 | .000 | 280.000 | 205.000 | 140.000 | 180.000 | .000 | .000 | .000 | 1.000 |
| GR | 901.000 | .000 | 896.000 | 20.000 | 896.000 | 230.000 | 898.000 | 260.000 | 900.000 | 280.000 | |
| X1 | 5.000 | 4.000 | .000 | 176.000 | 60.000 | 60.000 | 60.000 | .000 | .000 | .000 | 1.000 |
| X5 | 1.000 | 899.900 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| GR | 900.000 | .000 | 895.000 | 1.000 | 895.000 | 175.000 | 902.000 | 176.000 | .000 | .000 | .000 |
| X1 | 4.000 | 4.000 | .000 | 176.000 | 160.000 | 190.000 | 180.000 | .000 | .000 | .000 | 1.000 |
| X5 | 1.000 | 898.000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| GR | 900.000 | .000 | 894.500 | 1.000 | 894.500 | 175.000 | 902.000 | 176.000 | .000 | .000 | .000 |

1
01/02/86 20:57:39

PAGE 2

| | | | | | | | | | | | |
|----|---------|----------|---------|----------|---------|---------|---------|----------|---------|----------|-------|
| X1 | 3.000 | 6.000 | .000 | 750.000 | 200.000 | 310.000 | 290.000 | .000 | .000 | .000 | 1.000 |
| GR | 892.000 | .000 | 890.000 | 390.000 | 889.500 | 425.000 | 890.000 | 480.000 | 892.000 | 700.000 | |
| GR | 894.000 | 750.000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| X1 | 2.000 | 6.000 | .000 | 980.000 | 330.000 | 330.000 | 330.000 | .000 | .000 | .000 | 1.000 |
| GR | 890.000 | .000 | 888.000 | 660.000 | 887.500 | 710.000 | 888.000 | 790.000 | 890.000 | 950.000 | |
| GR | 892.000 | 980.000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| X1 | 1.000 | 6.000 | .000 | 1240.000 | .000 | .000 | .000 | .000 | .000 | .000 | 1.000 |
| GR | 888.000 | .000 | 886.000 | 540.000 | 885.000 | 980.000 | 886.000 | 1060.000 | 888.000 | 1120.000 | |
| GR | 890.000 | 1240.000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| EJ | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |

1
01/02/86 20:57:39

PAGE 3

| SECNO | DEPTH | CWSEL | CRWS | WSELK | EG | HV | HL | GLOSS | BANK ELEV | |
|-------|-------|-------|-------|--------|------|-------|-------|--------|------------|--|
| Q | QLOB | QCH | QROB | ALOB | ACH | AROB | VOL | TWA | LEFT/RIGHT | |
| TIME | VLOB | VCH | VROB | XNL | XNCH | XNR | WTN | ELMIN | SSTA | |
| SLOPE | XLOBL | XLCH | XLOBR | JTRIAL | IDC | ICONT | CORAR | TOPWID | ENDST | |

*PROF 1

CCHV= .100 DEHV= .300

*SECNO 11.000

3720 CRITICAL DEPTH ASSUMED

| | | | | | | | | | | |
|---------|------|--------|--------|--------|--------|------|------|--------|--------|---|
| 11.00 | 3.60 | 905.10 | 905.10 | 905.50 | 906.04 | .94 | .00 | .00 | 908.00 | . |
| 3100. | 0. | 3100. | 0. | 0. | 399. | 0. | 0. | 0. | 908.00 | |
| .00 | .00 | 7.77 | .00 | .030 | .030 | .030 | .000 | 901.50 | 84.95 | |
| .010930 | 0. | 0. | 0. | 0 | 10 | 0 | .00 | 217.07 | 302.02 | |

*SECNO 10.000

3685 20 TRIALS ATTEMPTED WSEL,CWSEL

3693 PROBABLE MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

| | | | | | | | | | | |
|-------|------|--------|--------|-----|--------|-----|------|-----|--------|---|
| 10.00 | 3.98 | 904.08 | 904.08 | .00 | 905.05 | .97 | 1.41 | .98 | 906.00 | . |
| 3100. | 0. | 3100. | 0. | 0. | 392. | 0. | 1. | 1. | 906.00 | |

| | | | | | | | | | |
|---------|------|------|-----|------|------|------|------|--------|--------|
| .00 | .00 | 7.90 | .00 | .030 | .030 | .030 | .000 | 900.10 | 38.34 |
| .010750 | 130. | 130. | 80. | 20 | 8 | 0 | .00 | 205.40 | 243.74 |

0
*SECNO 9.000

3301 HV CHANGED MORE THAN HVINS

| | | | | | | | | | |
|---------|------|--------|--------|------|--------|------|------|--------|--------|
| 9.00 | 2.08 | 901.58 | 902.32 | .00 | 903.85 | 2.27 | 1.08 | .13 | 905.00 |
| 3100. | 0. | 3100. | 0. | 0. | 256. | 0. | 2. | 1. | 906.00 |
| .01 | .00 | 12.09 | .00 | .030 | .030 | .030 | .000 | 899.50 | 17.12 |
| .035711 | 70. | 60. | 30. | 5 | 19 | 0 | .00 | 174.41 | 191.53 |

0
*SECNO 8.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

| | | | | | | | | | |
|---------|------|--------|--------|------|--------|------|------|--------|--------|
| 8.00 | 2.47 | 900.47 | 900.47 | .00 | 901.35 | .88 | 3.09 | 1.24 | 903.00 |
| 3100. | 0. | 3100. | 0. | 0. | 412. | 0. | 3. | 2. | 904.00 |
| .01 | .00 | 7.53 | .00 | .030 | .030 | .030 | .000 | 898.00 | 10.14 |
| .010961 | 170. | 170. | 170. | 20 | 8 | 0 | .00 | 235.08 | 245.21 |

0
1

01/02/86 20:57:39

PAGE 4

| SECNO | DEPTH | CWSEL | CRINS | WSELK | E6 | HV | HL | LOSS | BANK ELEV |
|-------|-------|-------|-------|--------|------|-------|-------|--------|------------|
| 0 | QLOB | QCH | QRQB | ALOB | ACH | AROB | VOL | TWA | LEFT/RIGHT |
| TIME | VLOB | VCH | VRQB | XNL | XNCH | XNR | WTN | ELMIN | SSTA |
| SLOPE | XLOBL | XLCH | XLOBR | ITRIAL | IDC | ICONT | CORAR | TOPWID | ENDST |

*SECNO 7.000

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

| | | | | | | | | | |
|---------|------|--------|--------|------|--------|------|------|--------|--------|
| 7.00 | 2.01 | 899.01 | 899.01 | .00 | 899.79 | .78 | 2.25 | .98 | 902.00 |
| 3100. | 0. | 3100. | 0. | 0. | 437. | 0. | 5. | 3. | 902.00 |
| .02 | .00 | 7.09 | .00 | .030 | .030 | .030 | .000 | 897.00 | 11.98 |
| .011516 | 230. | 200. | 180. | 20 | 15 | 0 | .00 | 283.47 | 295.44 |

0
*SECNO 6.000

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

| | | | | | | | | | |
|---------|------|--------|--------|------|--------|------|------|--------|--------|
| 6.00 | 1.83 | 897.83 | 897.83 | .00 | 898.69 | .86 | 2.27 | .94 | 901.00 |
| 3100. | 0. | 3100. | 0. | 0. | 416. | 0. | 7. | 4. | 900.00 |
| .03 | .00 | 7.45 | .00 | .030 | .030 | .030 | .000 | 896.00 | 12.68 |
| .011147 | 200. | 200. | 200. | 20 | 11 | 0 | .00 | 244.79 | 257.46 |

0
*SECNO 5.000

WATER EL=X5 CARD= 899.900

7185 MINIMUM SPECIFIC ENERGY

| | | | | | | | | | |
|---------|------|--------|--------|------|--------|------|------|--------|--------|
| 5.00 | 2.12 | 897.12 | 897.14 | .00 | 898.21 | 1.09 | 1.98 | .02 | 900.00 |
| 3100. | 0. | 3100. | 0. | 0. | 370. | 0. | 8. | 5. | 902.00 |
| .03 | .00 | 8.38 | .00 | .030 | .030 | .030 | .000 | 895.00 | .58 |
| .010827 | 205. | 180. | 140. | 0 | 8 | 0 | .00 | 174.73 | 175.30 |

*SECNO 4.000

WATER EL=XS CARD= 898.000

7185 MINIMUM SPECIFIC ENERGY

| | | | | | | | | | |
|---------|------|--------|--------|------|--------|------|------|--------|--------|
| 4.00 | 2.12 | 896.62 | 896.64 | .00 | 897.71 | 1.09 | .65 | .00 | 900.00 |
| 3100. | 0. | 3100. | 0. | 0. | 369. | 0. | 9. | 5. | 902.00 |
| .04 | .00 | 8.39 | .00 | .030 | .030 | .030 | .000 | 894.50 | .61 |
| .010879 | 60. | 60. | 60. | 0 | 5 | 0 | .00 | 174.67 | 175.28 |

0

*SECNO 3.000

3301 HV CHANGED MORE THAN HVINS

| | | | | | | | | | |
|---------|------|--------|--------|------|--------|------|------|--------|--------|
| 3.00 | 1.49 | 890.99 | 891.58 | .00 | 893.18 | 2.19 | 4.42 | .11 | 892.00 |
| 3100. | 0. | 3100. | 0. | 0. | 261. | 0. | 10. | 6. | 894.00 |
| .04 | .00 | 11.89 | .00 | .030 | .030 | .030 | .000 | 889.50 | 197.08 |
| .095070 | 160. | 180. | 190. | 6 | 5 | 0 | .00 | 391.74 | 588.83 |

0

1

01/02/86 20:57:39

PAGE 5

| SECNO | DEPTH | CWSEL | CRWS | WSELK | EG | HV | HL | OLOSS | BANK ELEV |
|-------|-------|-------|-------|--------|------|-------|-------|--------|------------|
| Q | QLOB | QCH | QROB | ALOB | ACH | AROB | VOL | TWA | LEFT/RIGHT |
| TIME | VLOB | VCH | VROB | XNL | XNCH | XNR | WTN | ELMIN | SSTA |
| SLOPE | XLOBL | XLCH | XLOBR | ITRIAL | IDC | ICONT | CORAR | TOPWID | ENDST |

*SECNO 2.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL

3693 PROBABLE MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

| | | | | | | | | | |
|---------|------|--------|--------|------|--------|------|------|--------|--------|
| 2.00 | 1.85 | 889.35 | 889.35 | .00 | 889.79 | .44 | 8.73 | 10.32 | 890.00 |
| 3100. | 0. | 3100. | 0. | 0. | 582. | 0. | 13. | 10. | 892.00 |
| .05 | .00 | 5.33 | .00 | .030 | .030 | .030 | .000 | 887.50 | 214.31 |
| .014334 | 200. | 290. | 310. | 20 | 11 | 0 | .00 | 683.74 | 898.05 |

0

*SECNO 1.000

3685 20 TRIALS ATTEMPTED WSEL,CWSEL

3693 PROBABLE MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

| | | | | | | | | | |
|---------|------|--------|--------|------|--------|------|------|--------|---------|
| 1.00 | 1.54 | 886.54 | 886.54 | .00 | 886.98 | .44 | 4.71 | 2.74 | 888.00 |
| 3100. | 0. | 3100. | 0. | 0. | 583. | 0. | 17. | 15. | 890.00 |
| .07 | .00 | 5.32 | .00 | .030 | .030 | .030 | .000 | 885.00 | 394.90 |
| .014201 | 330. | 330. | 330. | 20 | 15 | 0 | .00 | 681.22 | 1076.12 |

0

1

CROSS SECTION 11.00

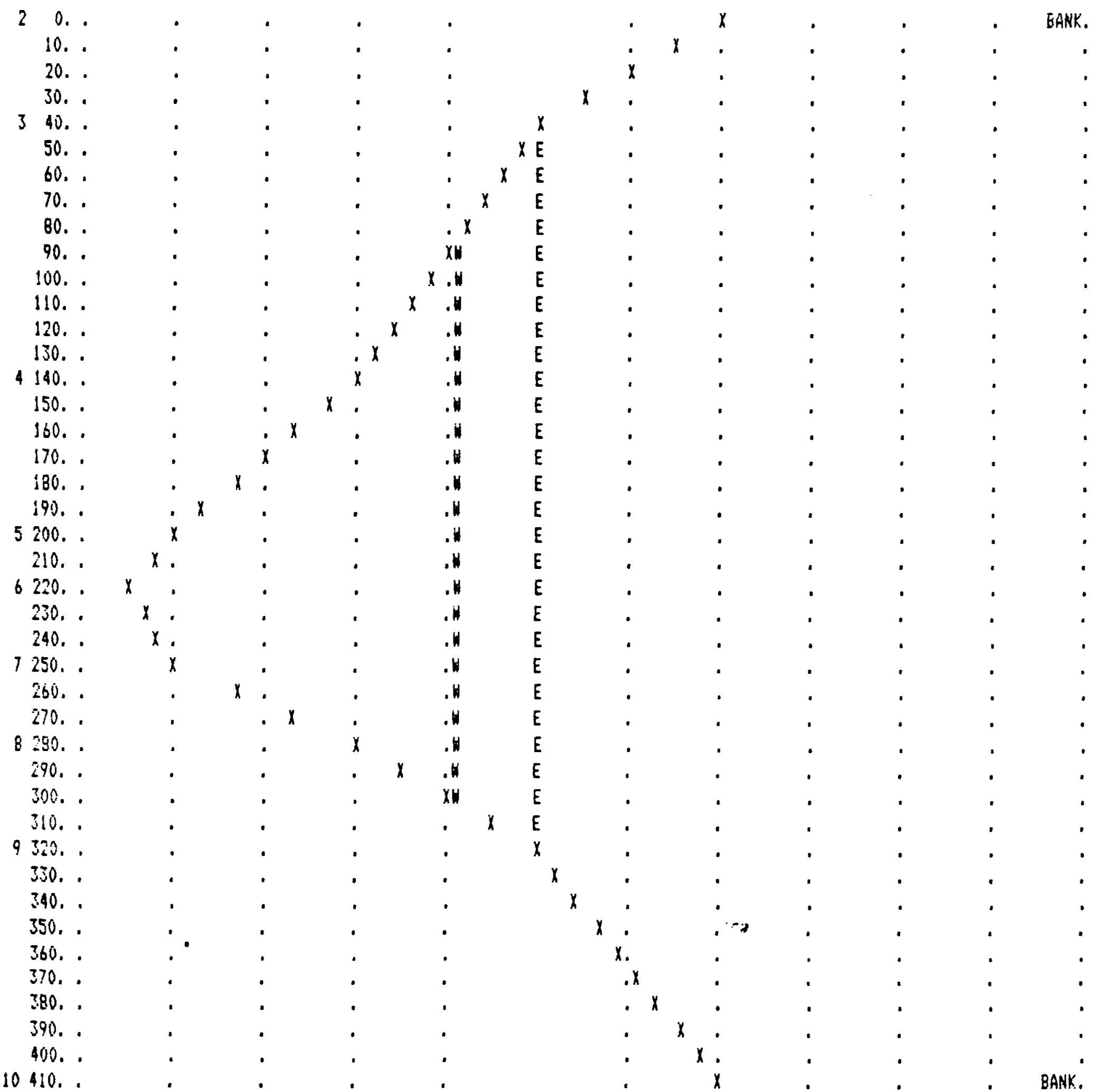
STREAM PROPOSED CHANNEL PROFILE

DISCHARGE= 3100.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE,T=TOP BRIDGE,X=GROUNd,W=WATER SUR,E=ENERGY GRADIENT,C=CRITICAL WSEL

ELEV 901. 902. 903. 904. 905. 906. 907. 908. 909. 910. 911.

STA-FEET



NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(I).STA(I)

| | | | | | | | | | |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 903.00 | .00 | 906.00 | 40.00 | 904.00 | 140.00 | 902.00 | 200.00 | 901.50 | 220.00 |
| 902.00 | 250.00 | 904.00 | 280.00 | 906.00 | 320.00 | 908.00 | 410.00 | | |

CROSS SECTION 10.00

STREAM PROPOSED CHANNEL PROFILE

DISCHARGE= 3100.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE,T=TOP BRIDGE,X=GROUNd,W=WATER SUR,E=ENERGY GRADIENT,C=CRITICAL WSEL

| ELEV | 900. | 901. | 902. | 903. | 904. | 905. | 906. | 907. | 908. | 909. | 910. |
|------|------|------|------|------|------|------|------|------|------|------|------|
|------|------|------|------|------|------|------|------|------|------|------|------|

STA-FEET

| | | | | | | | | | | | |
|---|-------|---|---|---|---|----|-----|---|---|---|-------|
| 2 | 0.. | . | . | . | . | . | X | . | . | . | BANK. |
| | 10.. | . | . | . | . | . | X | . | . | . | . |
| | 20.. | . | . | . | . | . | XE | . | . | . | . |
| | 30.. | . | . | . | . | X | .E | . | . | . | . |
| 3 | 40.. | . | . | . | . | XW | .E | . | . | . | . |
| | 50.. | . | . | . | X | .W | .E | . | . | . | . |
| | 60.. | . | . | . | X | .W | .E | . | . | . | . |
| | 70.. | . | . | X | . | .W | .E | . | . | . | . |
| 4 | 80.. | . | X | . | . | .W | .E | . | . | . | . |
| | 90.. | X | . | . | . | .W | .E | . | . | . | . |
| 5 | 100.. | X | . | . | . | .W | .E | . | . | . | . |
| | 110.. | X | . | . | . | .W | .E | . | . | . | . |
| | 120.. | X | . | . | . | .W | .E | . | . | . | . |
| | 130.. | X | . | . | . | .W | .E | . | . | . | . |
| | 140.. | . | X | . | . | .W | .E | . | . | . | . |
| | 150.. | . | X | . | . | .W | .E | . | . | . | . |
| | 160.. | . | X | . | . | .W | .E | . | . | . | . |
| 6 | 170.. | . | X | . | . | .W | .E | . | . | . | . |
| | 180.. | . | . | X | . | .W | .E | . | . | . | . |
| | 190.. | . | . | X | . | .W | .E | . | . | . | . |
| | 200.. | . | . | . | X | .W | .E | . | . | . | . |
| | 210.. | . | . | . | X | .W | .E | . | . | . | . |
| | 220.. | . | . | . | X | .W | .E | . | . | . | . |
| | 230.. | . | . | . | . | XW | .E | . | . | . | . |
| 7 | 240.. | . | . | . | . | X | .E | . | . | . | . |
| | 250.. | . | . | . | . | X | .E | . | . | . | . |
| | 260.. | . | . | . | . | X | .E | . | . | . | . |
| | 270.. | . | . | . | . | X | .E | . | . | . | . |
| | 280.. | . | . | . | . | . | X.E | . | . | . | . |
| | 290.. | . | . | . | . | . | X | . | . | . | . |
| | 300.. | . | . | . | . | . | X | . | . | . | . |
| | 310.. | . | . | . | . | . | X | . | . | . | . |
| | 320.. | . | . | . | . | . | X | . | . | . | . |
| B | 330.. | . | . | . | . | . | X | . | . | . | BANK. |

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(I),STA(I)

| | | | | | | | | | |
|--------|--------|--------|--------|--------|-------|--------|--------|--------|--------|
| 906.00 | .00 | 904.00 | 40.00 | 902.00 | 80.00 | 900.10 | 100.00 | 902.00 | 170.00 |
| 904.00 | 240.00 | 906.00 | 330.00 | | | | | | |

1

CROSS SECTION 9.00
 STREAM PROPOSED CHANNEL PROFILE
 DISCHARGE= 3100.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE,T=TOP BRIDGE,X=GROUNDSUR,E=ENERGY GRADIENT,C=CRITICAL WSEL

ELEV E99. 900. 901. 902. 903. 904. 905. 906. 907. 908. 909.

STA-FEET

| | | | | | | | | | | | |
|---|------|---|---|---|---|---|---|---|---|---|-------|
| 2 | 0.. | . | . | . | . | . | X | . | . | . | BANK. |
| | 10.. | . | . | . | X | E | . | . | . | . | . |
| 3 | 20.. | X | . | W | C | E | . | . | . | . | . |
| | 30.. | X | . | W | C | E | . | . | . | . | . |
| | 40.. | X | . | W | C | E | . | . | . | . | . |

| | | | | | | | | | | | |
|--------|---|---|----|---|---|---|---|---|---|---|-------|
| 50. | X | . | W | . | C | . | E | . | . | . | . |
| 60. | X | . | W | . | C | . | E | . | . | . | . |
| 70. | X | . | W | . | C | . | E | . | . | . | . |
| 80. | X | . | W | . | C | . | E | . | . | . | . |
| 90. | X | . | W | . | C | . | E | . | . | . | . |
| 100. | X | . | W | . | C | . | E | . | . | . | . |
| 4 110. | X | . | W | . | C | . | E | . | . | . | . |
| 120. | X | . | W | . | C | . | E | . | . | . | . |
| 5 130. | X | . | W | . | C | . | E | . | . | . | . |
| 140. | X | . | W | . | C | . | E | . | . | . | . |
| 150. | X | . | W | . | C | . | E | . | . | . | . |
| 6 160. | X | . | W | . | C | . | E | . | . | . | . |
| 170. | . | X | W | . | C | . | E | . | . | . | . |
| 180. | . | X | W | . | C | . | E | . | . | . | . |
| 190. | . | . | XW | . | C | . | E | . | . | . | . |
| 7 200. | . | . | X | C | . | E | . | . | . | . | . |
| 210. | . | . | X | C | . | E | . | . | . | . | . |
| 220. | . | . | X | . | E | . | . | . | . | . | . |
| 230. | . | . | X | . | E | . | . | . | . | . | . |
| 240. | . | . | X | . | E | . | . | . | . | . | . |
| 250. | . | . | X | . | E | . | . | . | . | . | . |
| 260. | . | . | X | . | E | . | . | . | . | . | . |
| 270. | . | . | X | . | E | . | . | . | . | . | . |
| 280. | . | . | X | . | E | . | . | . | . | . | . |
| 290. | . | . | X | . | E | . | . | . | . | . | . |
| 300. | . | . | X | E | . | . | . | . | . | . | . |
| 310. | . | . | X | E | . | . | . | . | . | . | . |
| 320. | . | . | XE | . | . | . | . | . | . | . | . |
| 330. | . | . | X | . | . | . | . | . | . | . | . |
| 8 340. | . | . | X | . | . | . | . | . | . | . | . |
| 350. | . | . | X | . | . | . | . | . | . | . | . |
| 360. | . | . | X | . | . | . | . | . | . | . | . |
| 370. | . | . | X | . | . | . | . | . | . | . | . |
| 380. | . | . | X | . | . | . | . | . | . | . | . |
| 390. | . | . | X | . | . | . | . | . | . | . | . |
| 400. | . | . | X | . | . | . | . | . | . | . | . |
| 410. | . | . | X | . | . | . | . | . | . | . | . |
| 420. | . | . | X | . | . | . | . | . | . | . | . |
| 9 430. | . | . | X | . | . | . | . | . | . | . | BANK. |

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(I),STA(I)

| | | | | | | | | | |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 905.00 | .00 | 900.00 | 25.00 | 900.00 | 110.00 | 899.50 | 130.00 | 900.00 | 160.00 |
| 902.00 | 200.00 | 904.00 | 340.00 | 906.00 | 430.00 | | | | |

CROSS SECTION 8.00

STREAM PROPOSED CHANNEL PROFILE

DISCHARGE= 3100.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE,T=TOP BRIDGE,X=GROUNDSUR,W=WATER SUR,E=ENERGY GRADIENT,C=CRITICAL WSEL

ELEV 898. 899. 900. 901. 902. 903. 904. 905. 906. 907. 908.

STA-FEET

| | | | | | | | | | | | | |
|------|---|---|---|---|---|---|---|---|---|---|---|-------|
| 2 0. | . | . | X | . | E | . | X | . | . | . | . | BANK. |
| 10. | . | . | X | . | E | . | . | . | . | . | . | . |

| | | | | | | | | |
|---|------|---|---|---|---|---|---|---|
| 3 | 20. | X | . | . | W | . | E | . |
| | 30. | X | . | . | W | . | E | . |
| | 40. | X | . | . | W | . | E | . |
| | 50. | X | . | . | W | . | E | . |
| | 60. | X | . | . | W | . | E | . |
| | 70. | X | . | . | W | . | E | . |
| | 80. | X | . | . | W | . | E | . |
| | 90. | X | . | . | W | . | E | . |
| | 100. | X | . | . | W | . | E | . |
| | 110. | X | . | . | W | . | E | . |
| | 120. | X | . | . | W | . | E | . |
| | 130. | X | . | . | W | . | E | . |
| | 140. | X | . | . | W | . | E | . |
| | 150. | X | . | . | W | . | E | . |
| | 160. | X | . | . | W | . | E | . |
| 4 | 170. | X | . | . | W | . | E | . |
| 5 | 180. | . | . | X | W | . | E | . |
| | 190. | . | . | X | W | . | E | . |
| | 200. | . | . | X | W | . | E | . |
| | 210. | . | . | X | W | . | E | . |
| | 220. | . | . | X | W | . | E | . |
| | 230. | . | . | X | W | . | E | . |
| | 240. | . | . | X | W | . | E | . |
| | 250. | . | . | X | W | . | E | . |
| | 260. | . | . | X | W | . | E | . |
| | 270. | . | . | X | W | . | E | . |
| | 280. | . | . | X | W | . | E | . |
| | 290. | . | . | X | W | . | E | . |
| | 300. | . | . | X | W | . | E | . |
| | 310. | . | . | X | W | . | E | . |
| | 320. | . | . | X | W | . | E | . |
| | 330. | . | . | X | W | . | E | . |
| | 340. | . | . | X | W | . | E | . |
| | 350. | . | . | X | W | . | E | . |
| | 360. | . | . | X | W | . | E | . |
| | 370. | . | . | X | W | . | E | . |
| | 380. | . | . | X | W | . | E | . |
| | 390. | . | . | X | W | . | E | . |
| | 400. | . | . | X | W | . | E | . |
| | 410. | . | . | X | W | . | E | . |
| | 420. | . | . | X | W | . | E | . |
| | 430. | . | . | X | W | . | E | . |
| | 440. | . | . | X | W | . | E | . |
| | 450. | . | . | X | W | . | E | . |
| 6 | 460. | . | . | X | W | . | E | . |
| | 470. | . | . | X | W | . | E | . |
| | 480. | . | . | X | W | . | E | . |
| | 490. | . | . | X | W | . | E | . |
| | 500. | . | . | X | W | . | E | . |
| | 510. | . | . | X | W | . | E | . |
| | 520. | . | . | X | W | . | E | . |

BANK.

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(I),STA(I)

903.00 .00 898.00 20.00 898.00 170.00 900.00 180.00 902.00 460.00
904.00 520.00

S SECTION 7.00
AM PROPOSED CHANNEL PROFILE

DISCHARGE= 3100.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE,T=TOP BRIDGE,X=GROUNd,W=WATER SUR,E=ENERGY GRADIENT,C=CRITICAL WSEL

ELEV 897. 898. 899. 900. 901. 902. 903. 904. 905. 906. 907.

STA-FEET

| | | | | | | | | | | | BANK. |
|---|------|---|----|----|----|---|---|---|---|---|-------|
| 2 | 0. | . | . | . | . | X | . | . | . | . | . |
| | 10. | . | . | . | . | . | . | . | . | . | . |
| 3 | 20. | X | . | W | E. | . | . | . | . | . | . |
| | 30. | X | . | W | E. | . | . | . | . | . | . |
| | 40. | X | . | W | E. | . | . | . | . | . | . |
| | 50. | X | . | W | E. | . | . | . | . | . | . |
| | 60. | X | . | W | E. | . | . | . | . | . | . |
| | 70. | X | . | W | E. | . | . | . | . | . | . |
| | 80. | X | . | W | E. | . | . | . | . | . | . |
| | 90. | X | . | W | E. | . | . | . | . | . | . |
| | 100. | X | . | W | E. | . | . | . | . | . | . |
| | 110. | X | . | W | E. | . | . | . | . | . | . |
| | 120. | X | . | W | E. | . | . | . | . | . | . |
| | 130. | X | . | W | E. | . | . | . | . | . | . |
| | 140. | X | . | W | E. | . | . | . | . | . | . |
| | 150. | X | . | W | E. | . | . | . | . | . | . |
| | 160. | X | . | W | E. | . | . | . | . | . | . |
| | 170. | X | . | W | E. | . | . | . | . | . | . |
| | 180. | X | . | W | E. | . | . | . | . | . | . |
| | 190. | X | . | W | E. | . | . | . | . | . | . |
| 4 | 200. | X | . | W | E. | . | . | . | . | . | . |
| | 210. | . | X | W | E. | . | . | . | . | . | . |
| 5 | 220. | . | X | W | E. | . | . | . | . | . | . |
| | 230. | . | X | W | E. | . | . | . | . | . | . |
| | 240. | . | X | W | E. | . | . | . | . | . | . |
| | 250. | . | X | W | E. | . | . | . | . | . | . |
| | 260. | . | X | W | E. | . | . | . | . | . | . |
| | 270. | . | X | W | E. | . | . | . | . | . | . |
| | 280. | . | X | W | E. | . | . | . | . | . | . |
| | 290. | . | XW | E. | . | . | . | . | . | . | . |
| | 300. | . | X | E. | . | . | . | . | . | . | . |
| | 310. | . | X | E. | . | . | . | . | . | . | . |
| | 320. | . | X | E. | . | . | . | . | . | . | . |
| | 330. | . | X | E. | . | . | . | . | . | . | . |
| | 340. | . | X | E. | . | . | . | . | . | . | . |
| | 350. | . | XE | . | . | . | . | . | . | . | . |
| | 360. | . | X. | . | . | . | . | . | . | . | . |
| 6 | 370. | . | X | . | . | . | . | . | . | . | . |
| | 380. | . | . | X | . | . | . | . | . | . | . |
| | 390. | . | . | X | . | . | . | . | . | . | . |
| | 400. | . | . | . | X | . | . | . | . | . | . |
| | 410. | . | . | . | X. | . | . | . | . | . | . |
| | 420. | . | . | . | . | X | . | . | . | . | . |
| | 430. | . | . | . | . | X | . | . | . | . | . |
| | 440. | . | . | . | . | . | X | . | . | . | . |
| | 450. | . | . | . | . | . | X | . | . | . | . |
| 7 | 460. | . | . | . | . | . | X | . | . | . | BANK. |

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(I),STA(I)

902.00 .00 897.00 20.00 897.00 200.00 898.00 220.00 900.00 370.0
902.00 460.00

1
CROSS SECTION 6.00
STREAM PROPOSED CHANNEL PROFILE
DISCHARGE= 3100.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE,T=TOP BRIDGE,X=GROUND,W=WATER SUR,E=ENERGY GRADIENT,C=CRITICAL WSEL

ELEV 896. 897. 898. 899. 900. 901. 902. 903. 904. 905. 906.

STA-FEET

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(I),STA(I)

901.00 .00 896.00 20.00 896.00 230.00 898.00 260.00 900.00 280.00

CROSS SECTION 5.00
STREAM PROPOSED CHANNEL PROFILE
DISCHARGE= 3100.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE,T=TOP BRIDGE,X=GROUND,W=WATER SUR.E=ENERGY GRADIENT,C=CRITICAL WSEL

ELEV 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405.

STA-EFET

| | 0. | XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX | BANK. |
|------|----|--------------------------------|-------|
| 3 | 0. | XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX | . |
| 5. | X | . | W |
| 10. | X | . | W |
| 15. | X | . | W |
| 20. | X | . | W |
| 25. | X | . | W |
| 30. | X | . | W |
| 35. | X | . | W |
| 40. | X | . | W |
| 45. | X | . | W |
| 50. | X | . | W |
| 55. | X | . | W |
| 60. | X | . | W |
| 65. | X | . | W |
| 70. | X | . | W |
| 75. | X | . | W |
| 80. | X | . | W |
| 85. | X | . | W |
| 90. | X | . | W |
| 95. | X | . | W |
| 100. | X | . | W |
| 105. | X | . | W |
| 110. | X | . | W |
| 115. | X | . | W |
| 120. | X | . | W |
| 125. | X | . | W |
| 130. | X | . | W |
| 135. | X | . | W |
| 140. | X | . | W |

145. X . N . E
150. X . N . E
155. X . N . E
160. X . N . E
165. X . N . E
170. X . N . E
175. XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX BANK.

BANK.

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(I),STA(I)

900.00 .00 895.00 1.00 895.00 175.00 902.00 176.00

,00 895,00

1.00

895,00

175.00

902.00

176.00

CROSS SECTION 4.00
STREAM PROPOSED CHANNEL PROFILE
DISCHARGE= 3100.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE,T=TOP BRIDGE,X=GROUND,W=WATER SUR.E=ENERGY GRADIENT,C=CRITICAL WSEL

ELEV 894. 895. 896. 897. 898. 899. 900. 901. 902. 903. 904.

STA-FFET

5 175. . XXX BANK.

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(I),STA(I)

| | | | | | | | |
|--------|-----|--------|------|--------|--------|--------|--------|
| 900.00 | .00 | 894.50 | 1.00 | 894.50 | 175.00 | 902.00 | 176.00 |
|--------|-----|--------|------|--------|--------|--------|--------|

1

CROSS SECTION 3.00
STREAM PROPOSED CHANNEL PROFILE
DISCHARGE= 3100.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE,T=TOP BRIDGE,X=GROUNd,W=WATER SUR,E=ENERGY GRADIENT,C=CRITICAL WSEL

| | | | | | | | | | | |
|-----------|------|------|------|------|------|------|------|------|------|------|
| ELEV 889. | 890. | 891. | 892. | 893. | 894. | 895. | 896. | 897. | 898. | 899. |
|-----------|------|------|------|------|------|------|------|------|------|------|

STA-FEET

| | | | | | | | | | | | |
|----------|------|---|-----|-------|---|---|---|---|---|---|-------|
| 2 | 0. . | . | X | . | E | . | . | . | . | . | BANK. |
| 20. . | . | . | X. | . | E | . | . | . | . | . | . |
| 40. . | . | . | X . | . | E | . | . | . | . | . | . |
| 60. . | . | . | X . | . | E | . | . | . | . | . | . |
| 80. . | . | . | X . | . | E | . | . | . | . | . | . |
| 100. . | . | . | XC | . | E | . | . | . | . | . | . |
| 120. . | . | . | X C | . | E | . | . | . | . | . | . |
| 140. . | . | . | X C | . | E | . | . | . | . | . | . |
| 160. . | . | . | X C | . | E | . | . | . | . | . | . |
| 180. . | . | . | X C | . | E | . | . | . | . | . | . |
| 200. . | . | . | X C | . | E | . | . | . | . | . | . |
| 220. . | . | . | XW | C | . | E | . | . | . | . | . |
| 240. . | . | . | X W | C | . | E | . | . | . | . | . |
| 260. . | . | . | X W | C | . | E | . | . | . | . | . |
| 280. . | . | . | X W | C | . | E | . | . | . | . | . |
| 300. . | . | . | X W | C | . | E | . | . | . | . | . |
| 320. . | . | . | X W | C | . | E | . | . | . | . | . |
| 340. . | . | . | X W | C | . | E | . | . | . | . | . |
| 360. . | . | . | X W | C | . | E | . | . | . | . | . |
| 380. . | . | X | W | C | . | E | . | . | . | . | . |
| 400. . | X | . | W | C | . | E | . | . | . | . | . |
| 420. . | X | . | W | C | . | E | . | . | . | . | . |
| 440. . | X | . | W | C | . | E | . | . | . | . | . |
| 460. . | X. | . | W | C | . | E | . | . | . | . | . |
| 5 480. . | X | . | W | C | . | E | . | . | . | . | . |
| 500. . | . | X | W | C | . | E | . | . | . | . | . |
| 520. . | . | X | W | C | . | E | . | . | . | . | . |
| 540. . | . | X | W | C | . | E | . | . | . | . | . |
| 560. . | . | X | W | C | . | E | . | . | . | . | . |
| 580. . | . | . | XW | C | . | E | . | . | . | . | . |
| 600. . | . | . | X C | . | E | . | . | . | . | . | . |
| 620. . | . | . | X C | . | E | . | . | . | . | . | . |
| 640. . | . | . | XC | . | E | . | . | . | . | . | . |
| 660. . | . | . | X | . | E | . | . | . | . | . | . |
| 680. . | . | . | X | . | E | . | . | . | . | . | . |
| 6 700. . | . | . | X | . | E | . | . | . | . | . | . |
| 720. . | . | . | . | X . E | . | . | . | . | . | . | . |
| 7 740. . | . | . | . | . | X | . | . | . | . | . | BANK. |

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(I),STA(I)

| | | | | | | | | | |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 892.00 | .00 | 890.00 | 390.00 | 889.50 | 425.00 | 890.00 | 480.00 | 892.00 | 700.00 |
| 894.00 | 750.00 | | | | | | | | |

CROSS SECTION 2.00

STREAM PROPOSED CHANNEL PROFILE

DISCHARGE= 3100.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE,T=TOP BRIDGE,X=GROUNd,W=WATER SUR,E=ENERGY GRADIENT,C=CRITICAL WSEL

LEV 887. 888. 889. 890. 891. 892. 893. 894. 895. 896. 897.

STA-FEET

| | | | | | | | | | | | BANK. |
|------|------|---|---|--------|------|---|---|---|---|---|-------|
| 2 | 0. | . | . | X | . | . | . | . | . | . | . |
| 20. | . | . | . | X. | . | . | . | . | . | . | . |
| 40. | . | . | . | X. | . | . | . | . | . | . | . |
| 60. | . | . | . | X. | . | . | . | . | . | . | . |
| 80. | . | . | . | X. | . | . | . | . | . | . | . |
| 100. | . | . | . | XE. | . | . | . | . | . | . | . |
| 120. | . | . | . | X E. | . | . | . | . | . | . | . |
| 140. | . | . | . | X E. | . | . | . | . | . | . | . |
| 160. | . | . | . | X E. | . | . | . | . | . | . | . |
| 180. | . | . | . | X E. | . | . | . | . | . | . | . |
| 200. | . | . | . | X E. | . | . | . | . | . | . | . |
| 220. | . | . | . | XW E. | . | . | . | . | . | . | . |
| 240. | . | . | . | XW E. | . | . | . | . | . | . | . |
| 260. | . | . | . | XW E. | . | . | . | . | . | . | . |
| 280. | . | . | . | XW E. | . | . | . | . | . | . | . |
| 300. | . | . | . | XW E. | . | . | . | . | . | . | . |
| 320. | . | . | . | XW E. | . | . | . | . | . | . | . |
| 340. | . | . | . | XW E. | . | . | . | . | . | . | . |
| 360. | . | . | . | X W E. | . | . | . | . | . | . | . |
| 380. | . | . | . | X W E. | . | . | . | . | . | . | . |
| 400. | . | . | . | X W E. | . | . | . | . | . | . | . |
| 420. | . | . | . | X W E. | . | . | . | . | . | . | . |
| 440. | . | . | . | X W E. | . | . | . | . | . | . | . |
| 460. | . | . | . | X W E. | . | . | . | . | . | . | . |
| 480. | . | . | . | X W E. | . | . | . | . | . | . | . |
| 500. | . | . | . | X W E. | . | . | . | . | . | . | . |
| 520. | . | . | . | X W E. | . | . | . | . | . | . | . |
| 540. | . | . | . | X W E. | . | . | . | . | . | . | . |
| 560. | . | . | . | X W E. | . | . | . | . | . | . | . |
| 580. | . | . | . | X W E. | . | . | . | . | . | . | . |
| 600. | . | . | . | X W E. | . | . | . | . | . | . | . |
| 620. | . | . | . | X W E. | . | . | . | . | . | . | . |
| 640. | . | . | . | X W E. | . | . | . | . | . | . | . |
| 3 | 660. | . | X | . | W E. | . | . | . | . | . | . |
| 680. | . | X | . | . | W E. | . | . | . | . | . | . |
| 4 | 700. | X | . | . | W E. | . | . | . | . | . | . |
| 720. | X | . | . | W E. | . | . | . | . | . | . | . |
| 740. | X | . | . | W E. | . | . | . | . | . | . | . |
| 760. | X | . | . | W E. | . | . | . | . | . | . | . |
| 5 | 780. | X | . | . | W E. | . | . | . | . | . | . |
| 800. | . | X | . | W E. | . | . | . | . | . | . | . |
| 820. | . | X | . | W E. | . | . | . | . | . | . | . |
| 840. | . | X | . | W E. | . | . | . | . | . | . | . |
| 860. | . | X | W | E. | . | . | . | . | . | . | . |

880. XW E
900. X E
920. X
6 940. X
960. X
7 990. X BANK.

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(I), STA(I)

890.00 .00 888.00 660.00 887.50 710.00 888.00 790.00 890.00 950.00
892.00 980.00

CROSS SECTION 1.00
STREAM PROPOSED CHANNEL PROFILE
DISCHARGE= 3100.

PLOTTED POINTS (BY PRIORITY)-B=BOTTOM BRIDGE,T=TOP BRIDGE,X=GROUND,W=WATER SUR,E=ENERGY GRADIENT,C=CRITICAL WSEL

ELEV 885. 886. 887. 888. 889. 890. 891. 892. 893. 894. 895.

STA-FEET

NRD= 0 ELLC= 9999999.00 ELTRD= 9999999.00

EL(I), STA(I)

888.00 .00 886.00 540.00 885.00 980.00 886.00 1060.00 888.00 1120.00
890.00 1240.00

PROFILE FOR STREAM PROPOSED CHANNEL PROFILE

LOTTED POINTS (BY PRIORITY)-E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA

| ELAVITION
SECNO | 885.
CUMDIS | 890. | 895. | 900. | 905. | 910. | 915. | 920. | 925. | 930. |
|--------------------|----------------|------|------|------|------|------------|------|------|------|------|
| 11.00 | 0. | . | . | . | I | W E L | . | . | . | . |
| | 20. | . | . | . | I | W E L | . | . | . | . |
| | 40. | . | . | . | I | W E L | . | . | . | . |
| | 60. | . | . | . | I | W.E L | . | . | . | . |
| | 80. | . | . | . | I | W.E L | . | . | . | . |
| | 100. | . | . | . | I | W.E L | . | . | . | . |
| | 120. | . | . | . | I | W.E L | . | . | . | . |
| 10.00 | 140. | . | . | . | I | W.E L | . | . | . | . |
| | 160. | . | . | . | I | W C E.L R | . | . | . | . |
| | 180. | . | . | . | I. | W C E.L R | . | . | . | . |
| 9.00 | 200. | . | . | . | I. | W C E L R | . | . | . | . |
| | 220. | . | . | . | I. | W C E L R | . | . | . | . |
| | 240. | . | . | . | I . | W C E L.R | . | . | . | . |
| | 260. | . | . | . | I . | W C E L.R | . | . | . | . |
| | 280. | . | . | . | I . | W C E L R | . | . | . | . |
| | 300. | . | . | . | I . | W E L R | . | . | . | . |
| | 320. | . | . | . | I . | W E L R. | . | . | . | . |
| | 340. | . | . | . | I . | W C E L R. | . | . | . | . |
| 8.00 | 360. | . | . | . | I . | W E L R . | . | . | . | . |
| | 380. | . | . | . | I . | W E L R . | . | . | . | . |
| | 400. | . | . | . | I | W E L R . | . | . | . | . |
| | 420. | . | . | . | I | W E L R . | . | . | . | . |
| | 440. | . | . | . | I | W E L R | . | . | . | . |
| | 460. | . | . | . | I | W.E L R | . | . | . | . |
| | 480. | . | . | . | I | W.E L R | . | . | . | . |
| | 500. | . | . | . | I | W.E L | . | . | . | . |
| | 520. | . | . | . | I | W E L R | . | . | . | . |
| | 540. | . | . | . | I | W E L | . | . | . | . |
| 7.00 | 560. | . | . | . | I | W E L | . | . | . | . |
| | 580. | . | . | . | I | W E . L | . | . | . | . |
| | 600. | . | . | . | I | W E . RL | . | . | . | . |
| | 620. | . | . | . | I | W E . L | . | . | . | . |
| | 640. | . | . | . | I | W E . RL | . | . | . | . |
| | 660. | . | . | . | I | W E . RL | . | . | . | . |
| | 680. | . | . | . | I | W E . RL | . | . | . | . |
| | 700. | . | . | . | I | W E .RL | . | . | . | . |
| | 720. | . | . | . | I | W E .RL | . | . | . | . |
| | 740. | . | . | . | I | W E R L | . | . | . | . |
| 6.00 | 760. | . | . | . | I | W E R L | . | . | . | . |
| | 780. | . | . | . | I | W E R L | . | . | . | . |
| | 800. | . | . | . | I | W E MRL | . | . | . | . |
| | 820. | . | . | . | I | W E ML | . | . | . | . |
| | 840. | . | . | . | I | W E MLR | . | . | . | . |
| | 860. | . | . | . | I | W E MLR | . | . | . | . |
| | 880. | . | . | . | I | W E M L R | . | . | . | . |
| | 900. | . | . | . | I | W E L R | . | . | . | . |
| | 920. | . | . | . | I | W E L R | . | . | . | . |
| 5.00 | 940. | . | . | . | I | W E L R | . | . | . | . |
| | 960. | . | . | . | I | W E L R | . | . | . | . |
| | 980. | . | . | . | I. | W E L R | . | . | . | . |
| 4.00 | 1000. | . | . | . | I. | W E L R | . | . | . | . |
| | 1020. | . | . | . | I. | W E L . R | . | . | . | . |

| | | | | | | | | |
|-------|-------|----------------|---|---|---|---|---|---|
| 1040. | . | I .W E L R | . | . | . | . | . | . |
| 1060. | . | I W C E L R. | . | . | . | . | . | . |
| 1080. | . | I W C.E L R . | . | . | . | . | . | . |
| 1100. | . | I W C E L R . | . | . | . | . | . | . |
| 1120. | . | I W C E. R | . | . | . | . | . | . |
| 1140. | . | I W C E . R | . | . | . | . | . | . |
| 1160. | . | I W C L E R | . | . | . | . | . | . |
| 3.00 | 1180. | I. W C L E R . | . | . | . | . | . | . |
| 1200. | . | I. W C L E R . | . | . | . | . | . | . |
| 1220. | . | I . W C E R . | . | . | . | . | . | . |
| 1240. | . | I .W C L E R . | . | . | . | . | . | . |
| 1260. | . | I .W C L E R . | . | . | . | . | . | . |
| 1280. | . | I .W C L E R . | . | . | . | . | . | . |
| 1300. | . | I .W L E R | . | . | . | . | . | . |
| 1320. | . | I W C L E R | . | . | . | . | . | . |
| 1340. | . | I W C L E R | . | . | . | . | . | . |
| 1360. | . | I W E R | . | . | . | . | . | . |
| 1380. | . | I W L E R | . | . | . | . | . | . |
| 1400. | . | I W C E R | . | . | . | . | . | . |
| 1420. | . | I W .E R | . | . | . | . | . | . |
| 1440. | . | I W E R | . | . | . | . | . | . |
| 1460. | . | I W E R | . | . | . | . | . | . |
| 2.00 | 1480. | I W E R | . | . | . | . | . | . |
| 1500. | . | I W E L R | . | . | . | . | . | . |
| 1520. | . | I W E L R | . | . | . | . | . | . |
| 1540. | . | I W E. R | . | . | . | . | . | . |
| 1560. | . | I W E L. R | . | . | . | . | . | . |
| 1580. | . | I W E L. R | . | . | . | . | . | . |
| 1600. | . | I W E L. R | . | . | . | . | . | . |
| 1620. | . | I W E L . R | . | . | . | . | . | . |
| 1640. | . | I W E L . R | . | . | . | . | . | . |
| 1660. | . | I W E L . R | . | . | . | . | . | . |
| 1680. | . | I W E L . R | . | . | . | . | . | . |
| 1700. | . | I W E L .R | . | . | . | . | . | . |
| 1720. | . | I E L .R | . | . | . | . | . | . |
| 1740. | . | I W E L .R | . | . | . | . | . | . |
| 1760. | . | I W E L .R | . | . | . | . | . | . |
| 1780. | . | I E L R | . | . | . | . | . | . |
| 1.00 | 1800. | I W E L R | . | . | . | . | . | . |

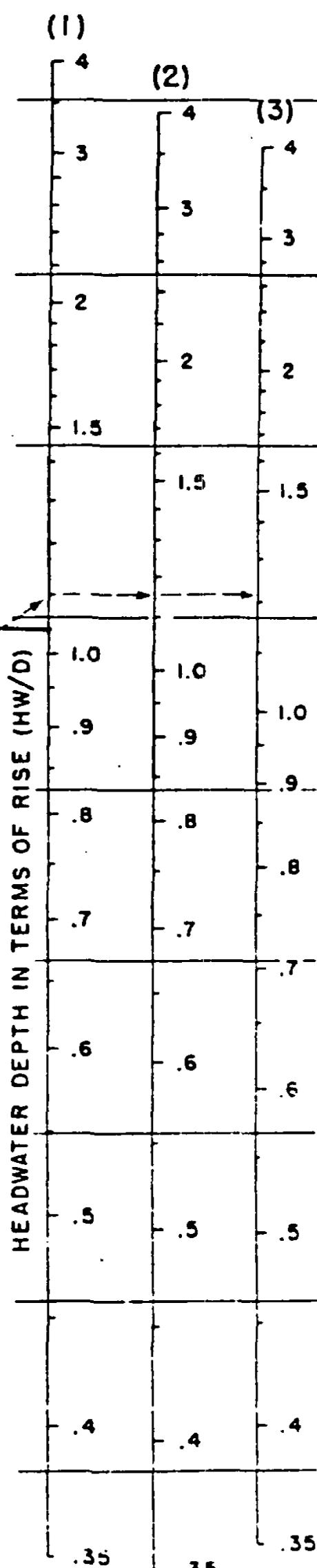
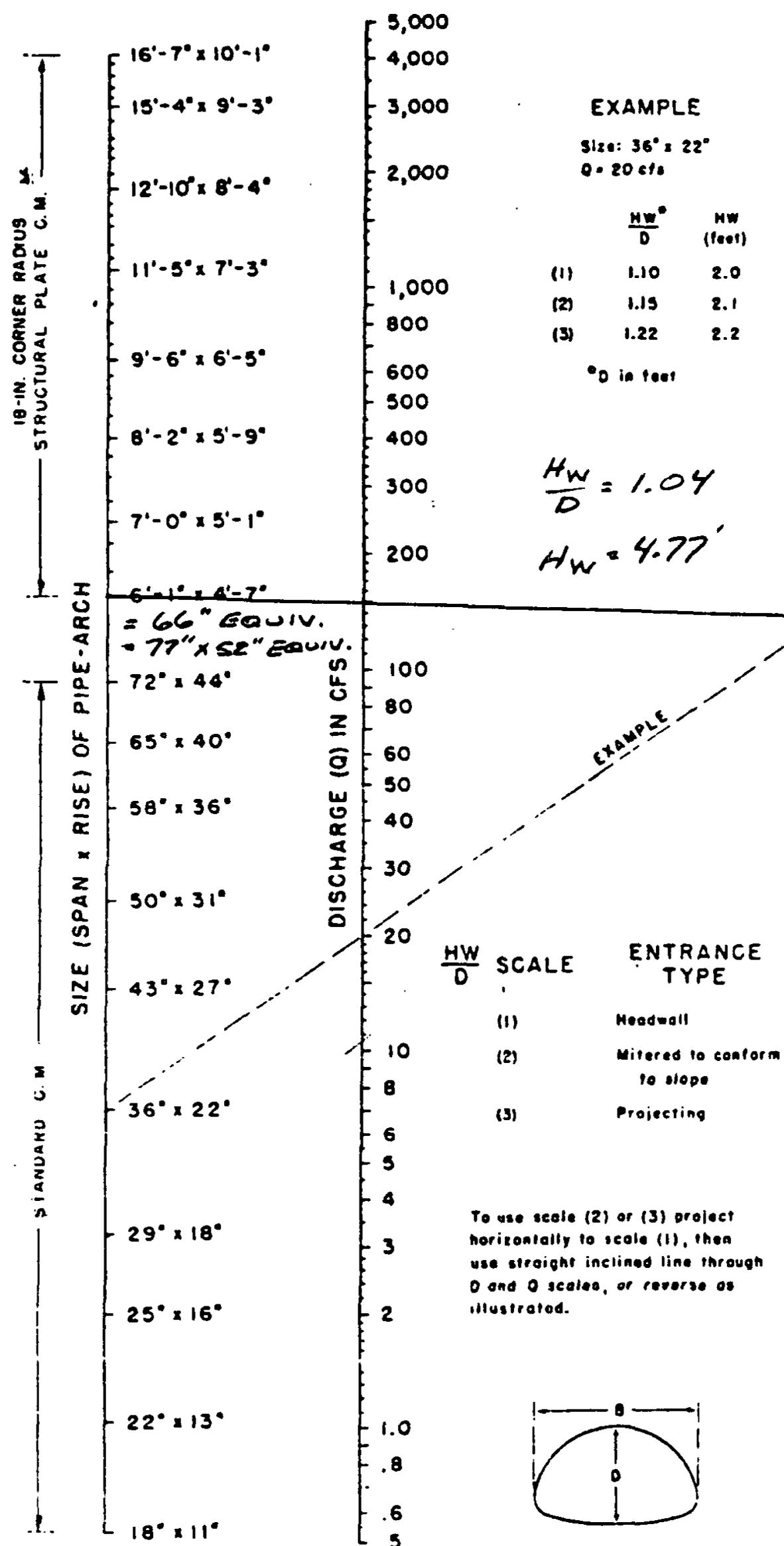
1/02/86 20:57:39

PAGE 6

THIS RUN EXECUTED 01/02/86 20:59:31

HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984
ERROR CORR - 01,02,03,04,05,06
MODIFICATION - 50,51,52,53,54,55,56
IBM-PC-XT VERSION APRIL 1985

CHART 6



*ADDITIONAL SIZES NOT DIMENSIONED ARE
LISTED IN FABRICATOR'S CATALOG

BUREAU OF PUBLIC ROADS JAN. 1963

HEADWATER DEPTH FOR
C. M. PIPE-ARCH CULVERTS
WITH INLET CONTROL

HYDROLOGIC AND CHANNEL INFORMATION

SKETCH

STATION:

DRENWAN
ROAD

ZI CULVERTS

$$Q_1 = \frac{TW_1}{TW_2} = \frac{3100 \text{ cfs}}{3100 \text{ cfs}}$$

(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
 Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

$$TW_1 = \frac{AHW}{L} = \frac{5.6}{60} = 0.093$$

$$MEAN STREAM VELOCITY = \frac{EL. 95.1 - EL. 90.7}{TW 3.50} = 0.245$$

$$MAX. STREAM VELOCITY =$$

| CULVERT
DESCRIPTION
(ENTRANCE TYPE) | A
SIZE | HEADWATER COMPUTATION | | | | | | COMMENTS | | | | | |
|---|-----------|-----------------------|----------------|-----|----------------|----------------|---------------------|----------|----------------|----------------------------|-----|--------------------|--------|
| | | INLET CONT. | OUTLET CONTROL | H | K _e | d _c | $\frac{d_c + D}{2}$ | TW | h _o | L _{S₀} | HW | OUTLET
VELOCITY | COST |
| 77" x 52" CWP 148 | 77" x 52" | 1.04 | 4.77' | 0.5 | 1.8 | 2.85 | 3.6 | 3.5 | 3.6 | 0.6 | 4.3 | 4.8 | ✓ b.k. |

SUMMARY & RECOMMENDATIONS:

LSCE 21 - 77" x 52" CWP ARCH currents

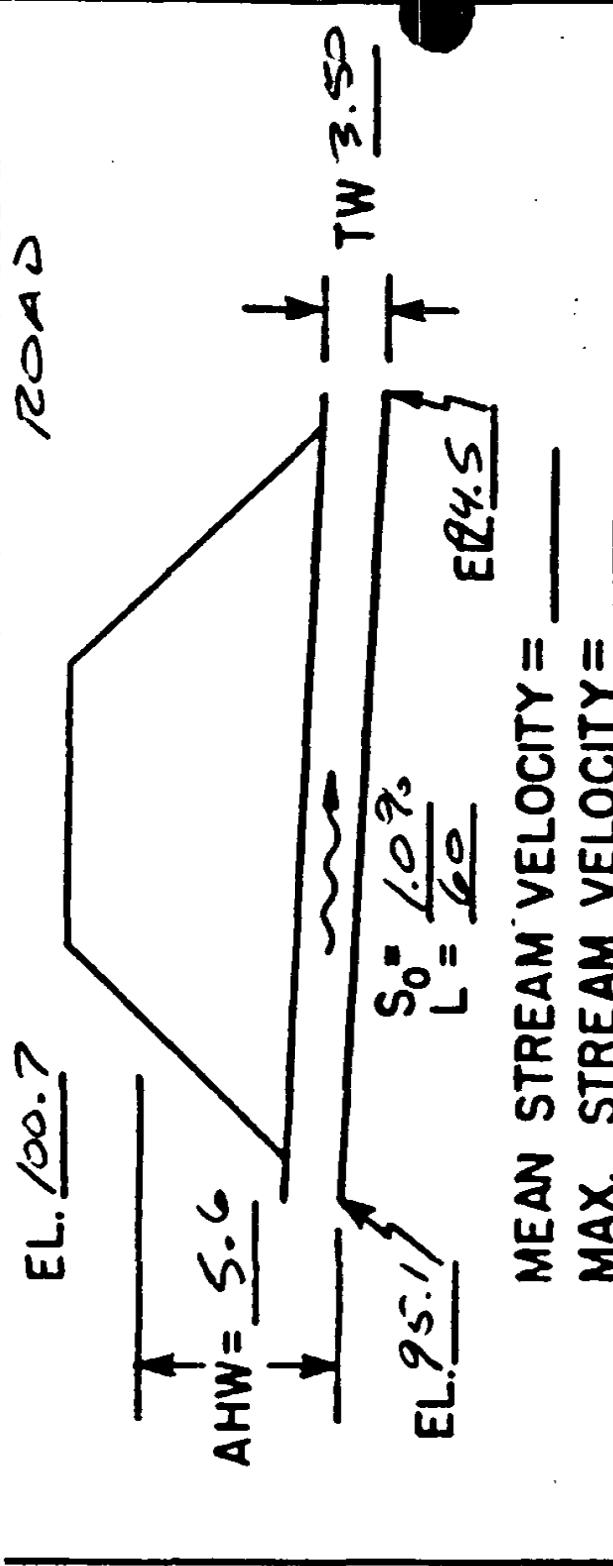


Figure 7