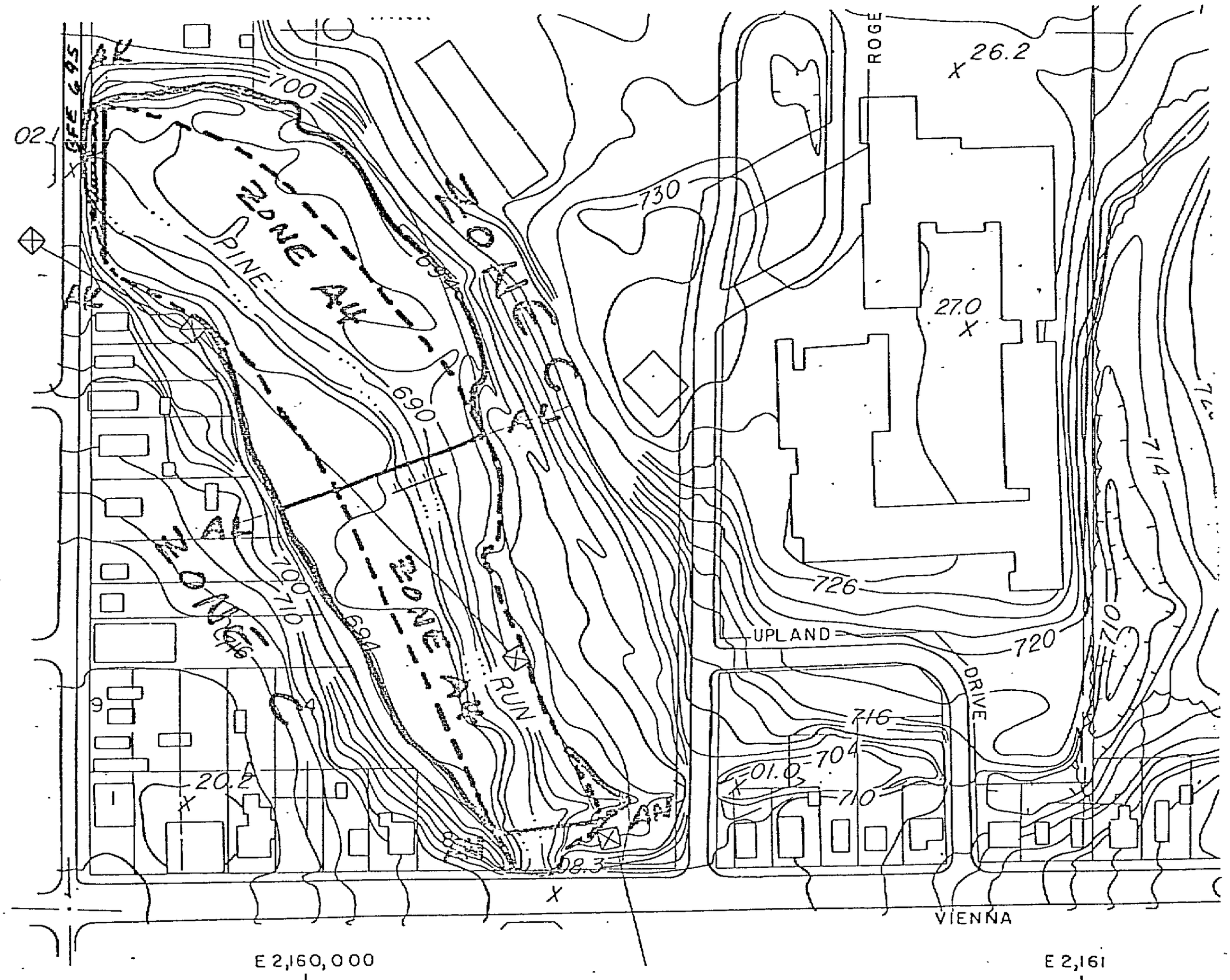
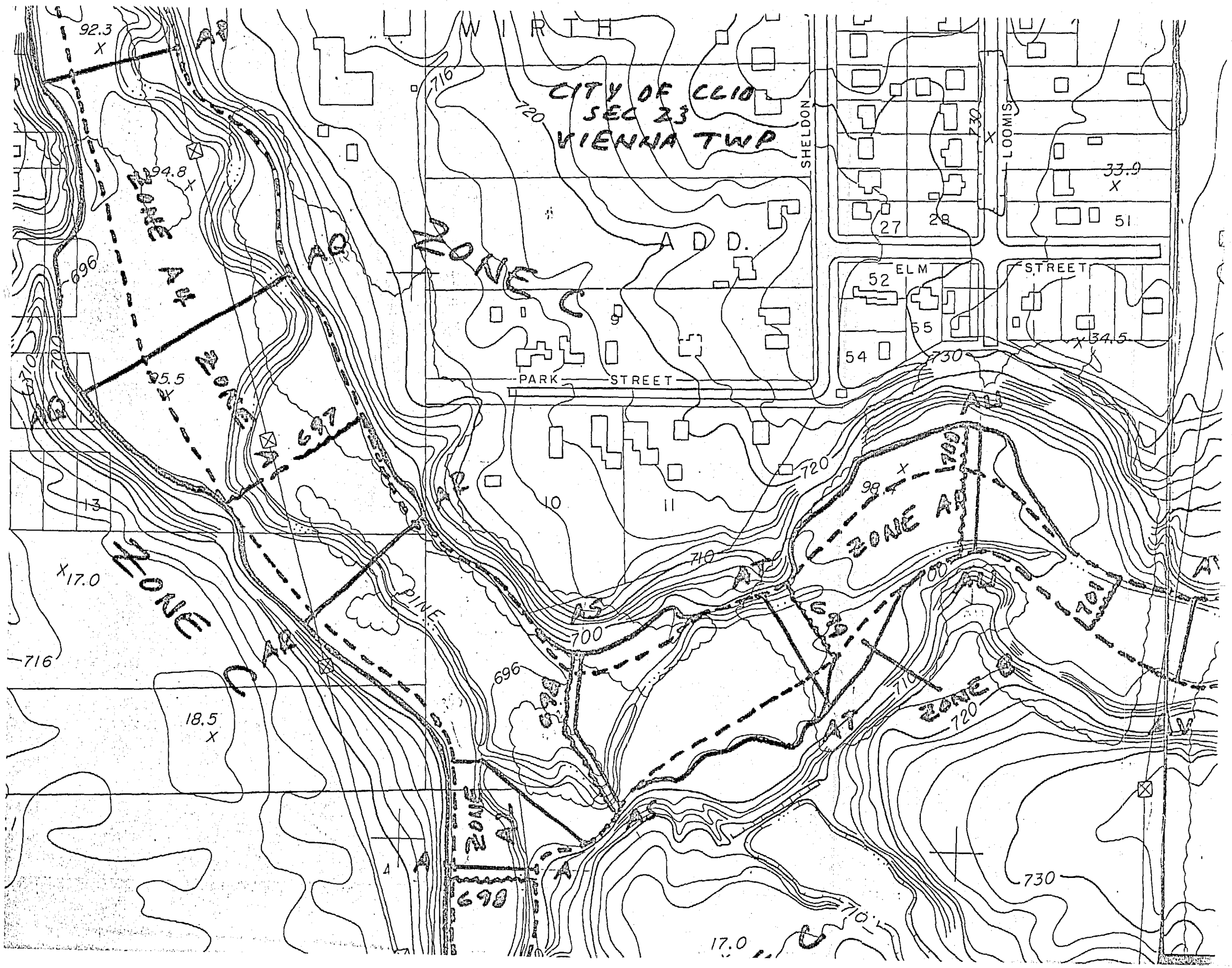
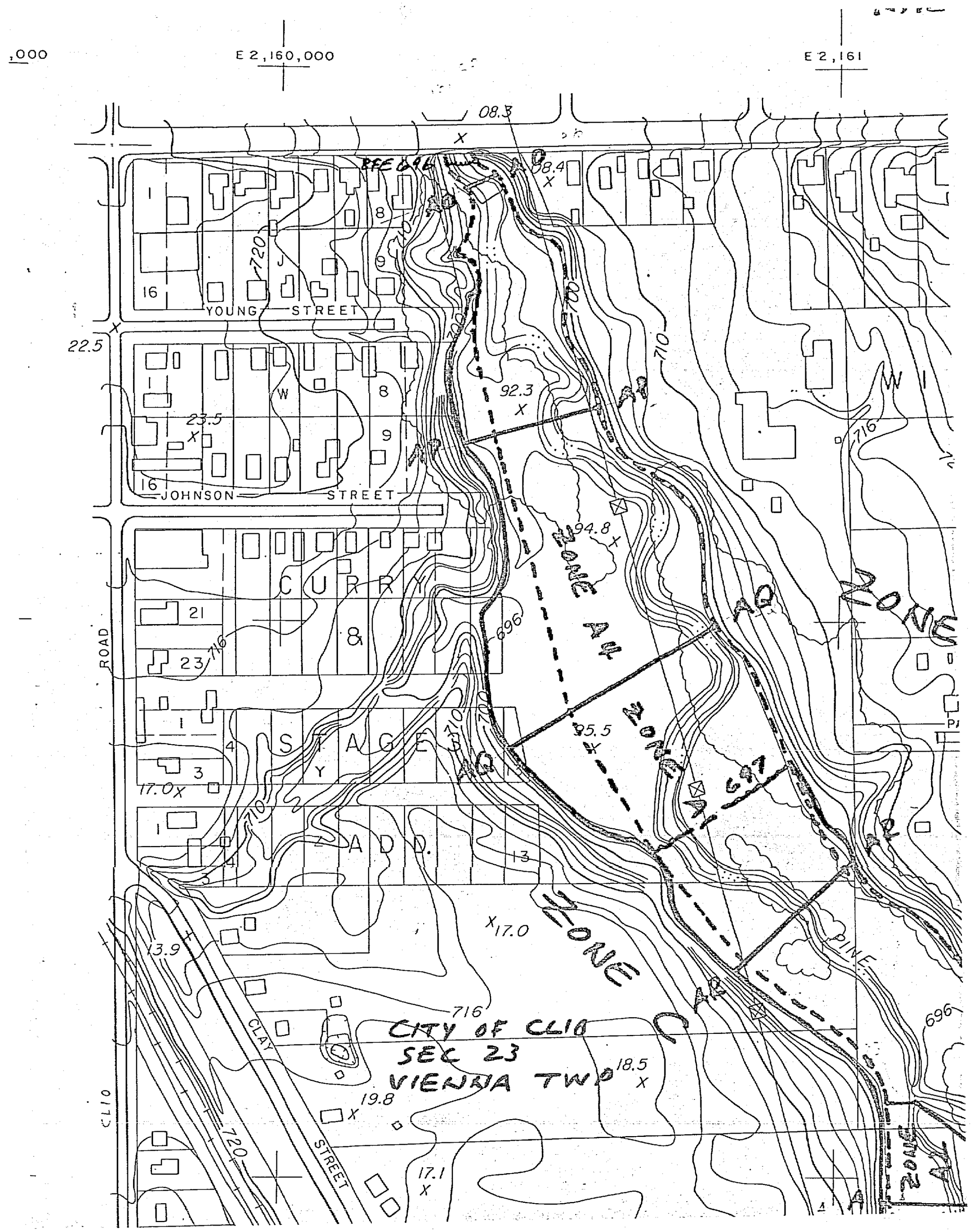


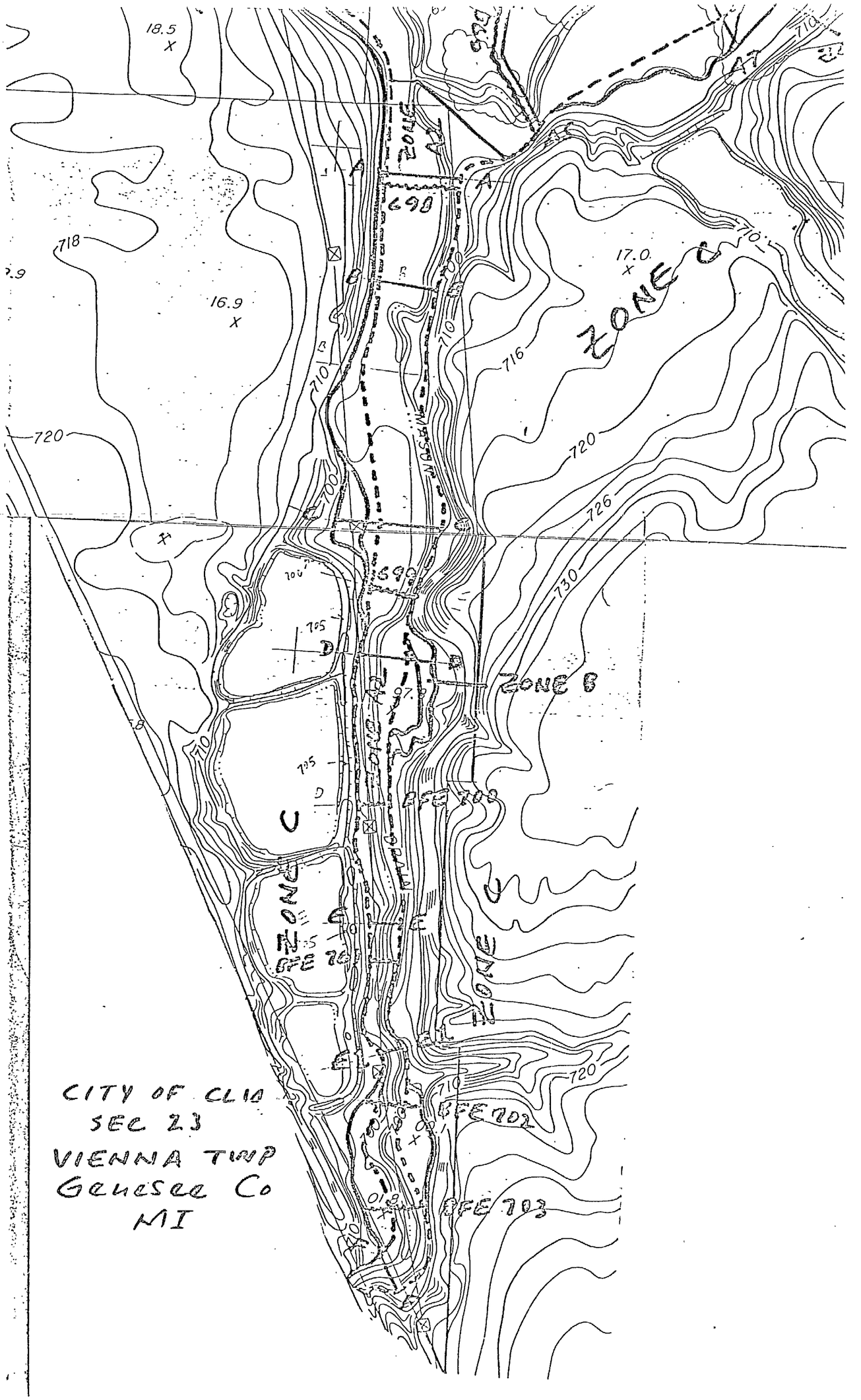
Sec. 14, T. 9 N., R. 6 E.,
Vienna Twp. Genesee Co.
Mich.

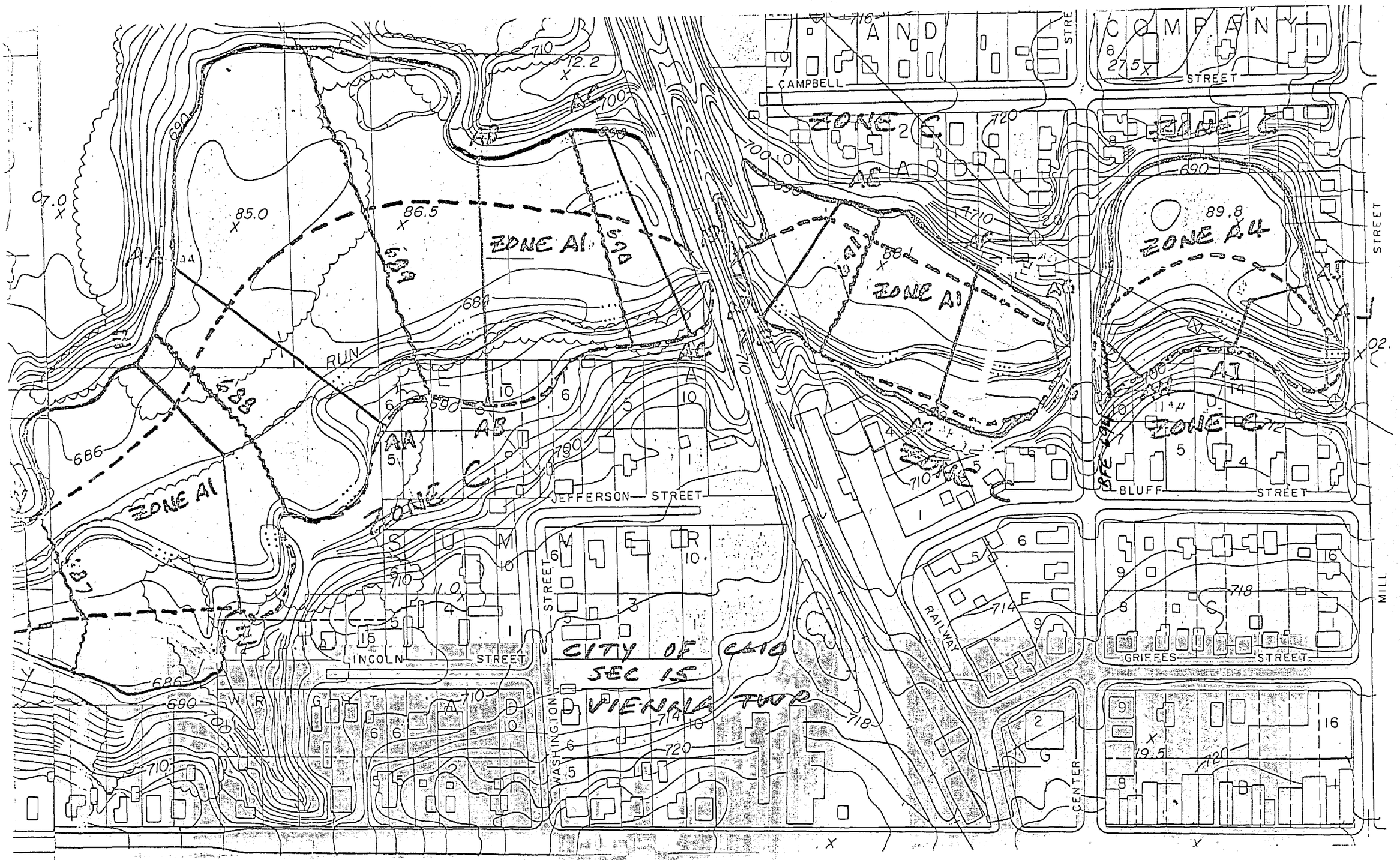
ICHIGAN PLANE COORDINATE
CT 9, P.A. 1964.

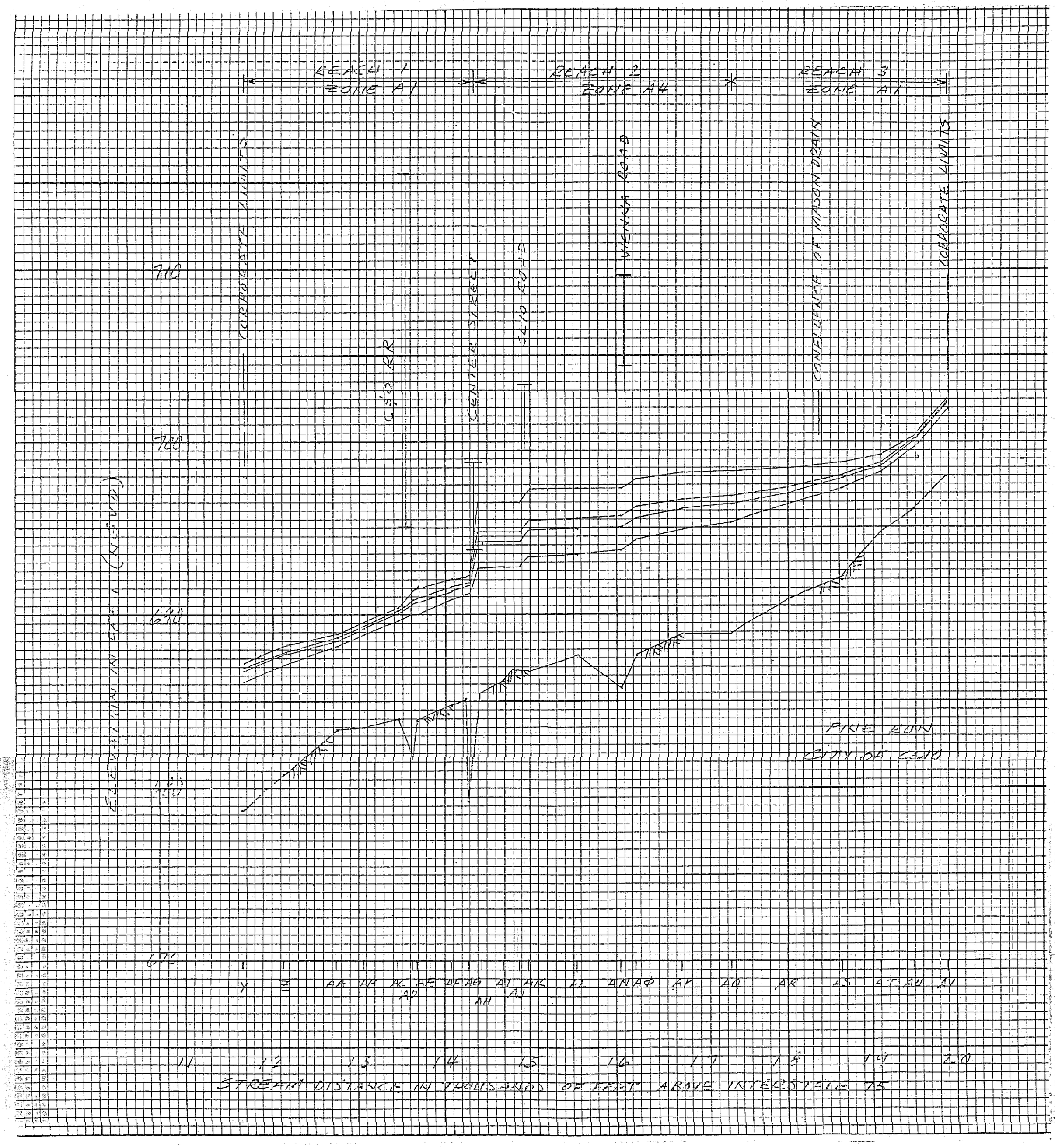
IETRIC METHODS

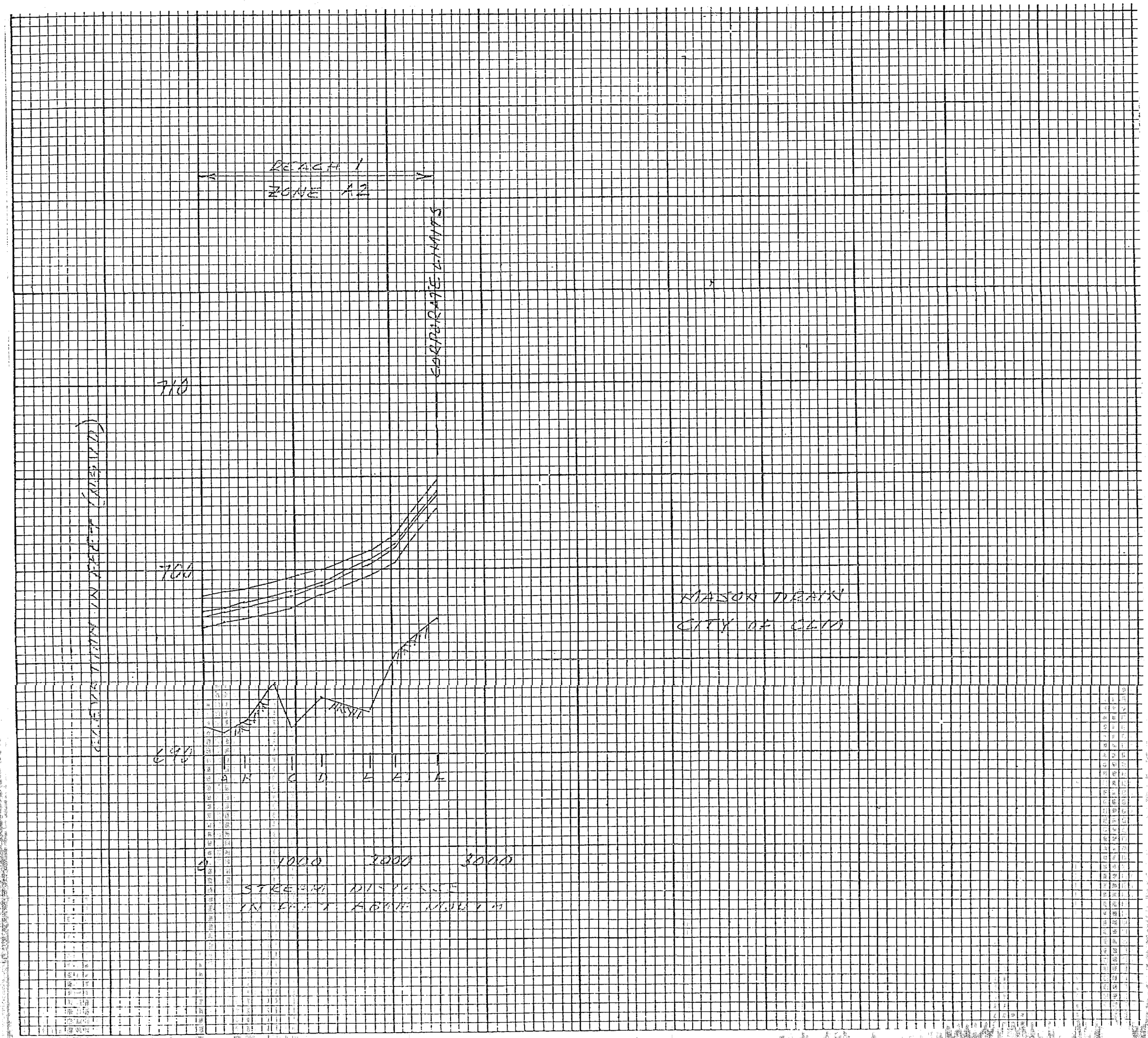

CITY OF CLIO
SEC 23
VIENNA TWP
ADD.
ZONE C
ZONE A4
ZONE A2
ZONE A1
ZONE A3
ZONE C
ZONE D
ZONE E
WIRTH
SHELDON
LOOMIS
ELM
STREET
PARK
STREET
PINE
92.3
94.8
95.5
17.0
18.5
33.9
34.5
98.4
716
720
730
710
700
696
27
28
51
52
55
54
9
10
11
13
4

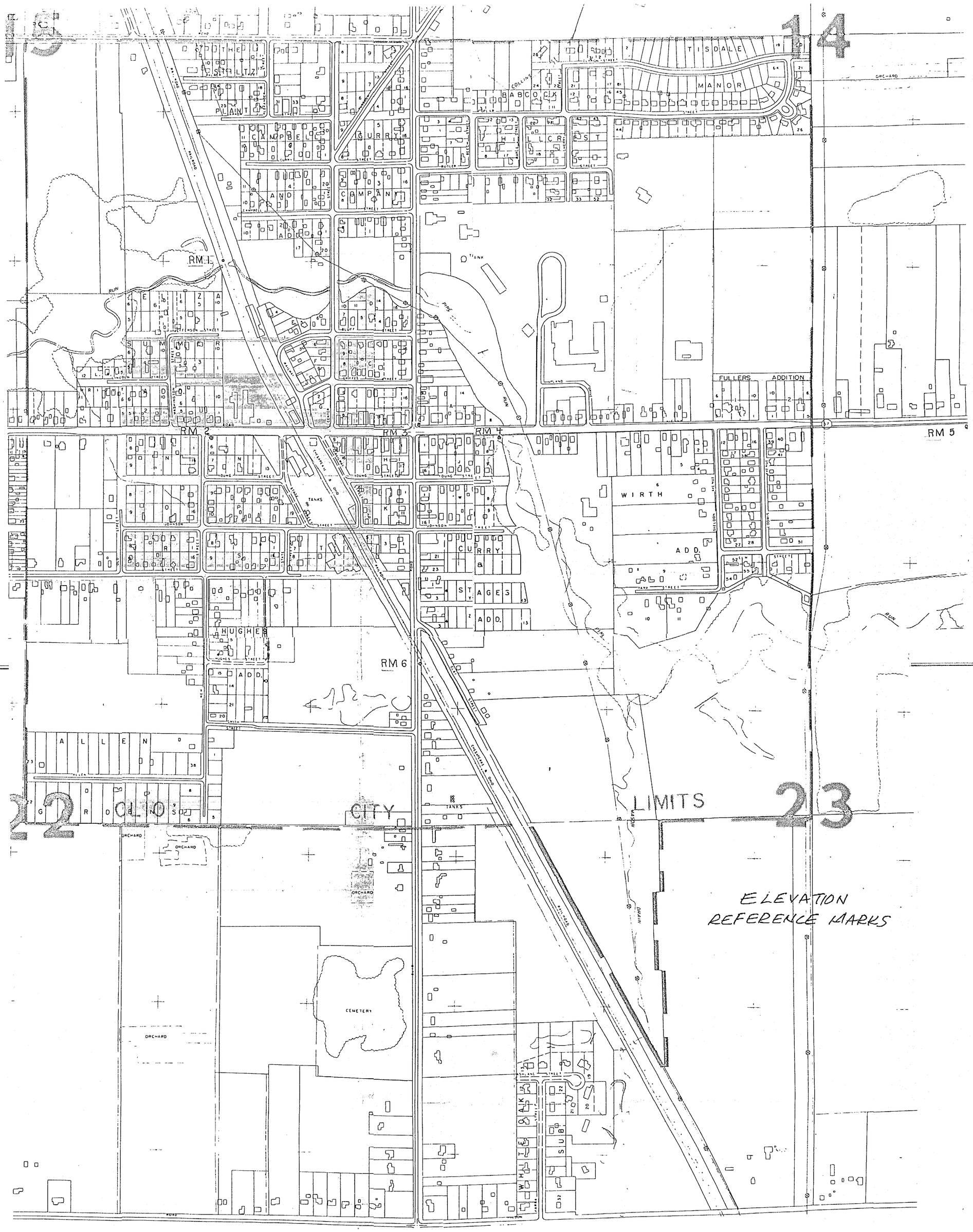

E 2,160,000
E 2,161
YOUNG STREET
JOHNSON STREET
CURRY
STAGE ADD.
CLAY STREET
PINE
ZONE AE
ZONE AQ
ZONE AR
CITY OF CLIO
SEC 23
VIENNA TWP
08.3
08.4
22.5
23.5
92.3
94.8
95.5
17.0
13.9
18.5
19.8
17.1
720
716
710
700
696


18.5
718
16.9
720
710
716
17.0
ZONE C
720
726
730
ZONE B
BFE 703
ZONE E
BFE 702
BFE 703
CITY OF CLIO
SEC 23
VIENNA TWP
Genesee Co
MI


CAMPBELL
STREET
ZONE C
ZONE A1
ZONE A4
ZONE A1
ZONE A1
ZONE C
ZONE C
ZONE A1
RUN
JEFFERSON STREET
SUMMER
STREET
INCOLN STREET
WASHINGTON
CITY OF
SEC 15
VIENNA TWP
RAILWAY
CENTER
BLUFF STREET
GRIFFES STREET
MILL
STREET


REACH 1
ZONE A1
REACH 2
ZONE A4
REACH 3
ZONE A1
CORPORATE LIMITS
RR
CENTER STREET
SR 10 EXIT 5
WIENKA ROAD
CONVERGENCE AT MASON DRIVE
CORPORATE LIMITS
ELEVATION IN FEET (USGS DVR)
700
680
660
640
PIKE ZONE
CITY OF COLD
Y Z AA AB AC AD AE AF AG AH AI AJ AK AL AM AN AP AQ AR AS AT AU AV
11 12 13 14 15 16 17 18 19 20
STREAM DISTANCE IN THOUSANDS OF FEET ABOVE INTERSTATE 75


BENCH 1
ZONE 12
SEDIMENTARY ROCKS
710
700
690
680
MASON DAM
CITY OF CALIF
0
1000
2000
3000
STREAM DISTANCE
IN FEET FROM MOUTH


14
23
22
THE PLAINT
CAMPBELL AND COMPANY ADD.
CURRY
BABCOCK
TISDALE MANOR
ORCHARD
RM 1
RM 2
RM 3
RM 4
RM 5
RM 6
FULLERS ADDITION
WIRTH ADD.
CURRY STAGES ADD.
HUGHES ADD.
ALLEN
GRADON
CITY LIMITS
ELEVATION REFERENCE MARKS
CEMETERY
TANKS
RUN
PINE RUN
RAILROAD
CHESAPEAKE & OHIO
NICKEL PLATE
WALNUT DRAIN
OAK HILL SUB.

CITY OF CLIO

00BREAK00

1) COUNTY: Genesee

2) STUDY NAME: City of Clio

3) WATERCOURSE: Pine Run & Mason Drain

4) DOCUMENT TYPE: 100yr Natural & 100yr Encroached

00BREAK00

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1  PINE RUN SECS P TO AC                        LES      14  4  2  5 12
2      2  68089  68134  68148  68183
3  1800 P      1  11  3  676     7330 99 99
4      4    740   1010   1110   1350
**SEQUENCE**
5  1850      150  1  6860  190  1  6800  370  1  6780  385  1  6769  391  2  6767
5  1851      398  2  6741  406  2  6745  418  3  6767  429  3  6772  880  3  6800
5  1852      930  3  6860
6  1870  1  2 075 075  1  2 030 030  1  2 100 100
3  1900 Q      0  11  2  676     7860 99 99
5  1950        0  1  6860   30  1  6800   80  1  6790  110  1  6800  280  1  6800
5  1951      340  2  6780  345  2  6760  350  2  6733  360  2  6733  365  2  6800
5  1952      385  2  6900
6  1970  1  2 065 065  1  2 055 055
3  2000 R      0  15  3  677     8360 99 99
5  2050        0  1  6900   60  1  6800  130  1  6800  320  1  6800  348  2  6802
5  2051      358  2  6765  365  2  6744  371  2  6758  375  3  6797  380  3  6800
5  2052      390  3  6820  400  3  6840  440  3  6860  480  3  6880  520  3  6900
6  2070  1  2 080 080  1  2 045 045  1  2 070 070
3  2100 S      0  16  3  678     8860 99 99
5  2150        0  1  6900  130  1  6880  200  1  6860  310  1  6840  400  1  6820
5  2151      630  2  6800  630  2  6780  635  2  6757  645  2  6757  650  2  6780
5  2152      655  3  6800  710  3  6820  730  3  6840  750  3  6860  780  3  6880
5  2153      800  3  6900
6  2170  1  2 075 075  1  2 045 045  1  2 075 075
3  2200 T      0  12  3  678     9420 99 99
5  2250        0  1  6900   70  1  6880  270  1  6860  310  1  6840  450  1  6820
5  2251      614  2  6810  617  2  6772  628  2  6761  634  2  6769  639  3  6816
5  2252      675  3  6820  710  3  6900
6  2270  1  2 080 080  1  2 050 050  1  2 080 080
3  2300 U      0  12  3  680     9870 99 99
5  2350        0  1  6900   40  1  6880   90  1  6860  170  2  6840  180  2  6840
5  2351      185  2  6800  190  2  6779  205  2  6779  215  3  6800  460  3  6820
5  2352      470  3  6840  490  3  6900
6  2370  1  2 080 080  1  2 050 050  1  2 080 080
3  2400 V      0   9  3  681    10380 99 99
5  2450        0  1  6900   30  1  6840  141  2  6835  150  2  6785  160  2  6773
5  2451      168  2  6786  174  3  6827  390  3  6840  420  3  6900
6  2470  1  2 080 080  1  2 045 045  1  2 080 080
3  2500 W      0  14  3  681    10830 99 99
5  2550        0  1  6900   20  1  6880   30  1  6860  170  1  6860  180  2  6860
5  2551      190  2  6800  190  2  6784  205  2  6784  215  2  6800  220  3  6820
5  2552      310  3  6840  350  3  6860  450  3  6880  510  3  6900
6  2570  1  2 070 070  1  2 045 045  1  2 080 080
3  2600 X      0  18  3  682    11110 99 99
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  2650        0  1  6900   20  1  6880   30  1  6860   50  1  6860  110  1  6860
5  2651      140  1  6860  160  1  6860  189  1  6839  197  2  6841  201  2  6803
5  2652      212  2  6790  222  2  6790  230  3  6837  236  3  6839  290  3  6840
5  2653      330  3  6860  350  3  6880  360  3  6900
6  2670  1  2 065 065  1  2 040 040  1  2 075 075
3  2700 Y      0  13  3  682   11660 99 99
5  2750      -90  1  7000    0  1  6900   40  1  6880   60  1  6860  190  2  6850
5  2751      200  2  6787  210  2  6787  220  3  6850  310  3  6860  320  3  6880
5  2752      340  3  6900  710  3  6920  800  3  6940
6  2770  1  2 070 070  1  2 045 045  1  2 075 075
3  2800 Z      0  14  3  688   12120 99 99
5  2850      -60  1  6940    0  1  6900   80  1  6880  123  1  6860  130  2  6862
5  2851      141  2  6826  148  2  6808  152  2  6812  165  3  6860  173  3  6860
5  2852      580  3  6860  650  3  6880  670  3  6900  750  3  7000
6  2870  1  2 065 065  1  2 050 050  1  2 080 080
3  2900 AA     0  11  3  686   12740 99 99
5  2950     -170  1  6960 -140  1  6920    0  1  6900   20  1  6880  125  2  6870
5  2951      135  2  6834  145  2  6834  160  3  6870  530  3  6880  560  3  6900
5  2952      640  3  7000
6  2970  1  2 070 070  1  2 040 040  1  2 065 065
3  3000 AB     0  12  3  686   13070 99 99
5  3050     -160  1  7000  -60  1  6920    0  1  6900   20  1  6880  178  2  6875
5  3051      182  2  6851  190  2  6835  195  2  6837  210  3  6876  490  3  6880
5  3052      500  3  6900  590  3  7000
6  3070  1  2 070 070  1  2 050 050  1  2 080 080
3  3100 AC     0  20  3  686   13530 99 99
5  3150        0  1  6960   20  1  6940   40  1  6920   50  1  6900  123  1  6886
5  3151      129  1  6890  133  2  6885  134  2  6863  137  2  6850  141  2  6846
5  3152      147  2  6841  153  2  6841  157  2  6840  160  2  6848  164  2  6863
5  3153      166  3  6876  173  3  6880  188  3  6888  480  3  6900  530  3  7000
6  3170  1  2 075 075  1  2 045 045  1  2 080 080
```

*** INPUT CARD PRINTOUT ***

```
          1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1  PINE/RUN SECS AD TO AG                    LES      5  4  2  5 12
2      2  68999  69062  69082  69140
3   3400 AD     1  15  3  687   13610 99 99
4      4    740   1010   1110   1350
**SEQUENCE**
5   3450        0  1  7000   56  2  6907   60  2  6883   61  2  6878   61  2  6864
5   3451       64  2  6829   70  2  6822   78  2  6816   86  2  6817   94  2  6833
5   3452      100  2  6860  106  3  6887  113  3  6890  140  3  6900  160  3  7000
6   3470  1  2 070 070  1  2 045 045  1  2 070 070
3   3500 AF     0  15  3  687   13690 99 99
5   3550        0  1  7000   20  1  6900   40  1  6879   47  1  6885   51  2  6883
5   3551       53  2  6870   55  2  6862   59  2  6846   63  2  6839   67  2  6839
5   3552       72  2  6854   76  3  6891   89  3  6886  290  3  6900  320  3  7000
6   3570  1  2 080 080  1  2 040 040  1  2 065 065
3   3600 AF     0  15  3  688   14080 99 99
5   3650        0  1  7000   40  1  6900  136  1  6891  141  2  6891  146  2  6872
5   3651      156  2  6871  162  2  6863  168  2  6847  170  2  6858  173  3  6896
5   3652      178  3  6903  188  3  6903  198  3  6899  330  3  6900  380  3  7000
6   3670  1  2 080 080  1  2 040 040  1  2 065 065
3   3700 AF1    0  13  3  688   14220 99 99
5   3750        0  1  7000   40  1  6900  122  1  6900  133  2  6897  143  2  6863
5   3751      150  2  6859  156  2  6858  165  2  6851  172  3  6894  197  3  6903
5   3752      247  3  6896  320  3  6900  380  3  7000
6   3770  1  2 050 050  1  2 035 035  1  2 060 060
3   3800 AG     0  14  3  689   14290 99 99
5   3850        0  1  7000   30  1  6904   43  2  6886   44  2  6860   50  2  6812
5   3851       58  2  6795   66  2  6793   74  2  6796   80  2  6843   85  2  6858
5   3852       87  3  6894   94  3  6900  120  3  6896  240  3  7000
6   3870  1  2 035 035  1  2 035 035  1  2 060 060
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 8/25/78

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1  PINE RUN CENTER ST TO MILL ST  AH TO AJ   LFS     3  4  2  5 12
2      2  69264  69416  69479  69650
3  3400 AH     1  13  3  688   14400 99 99
4      4    740   1010   1110   1350
**SEQUENCE**
5  3950        0  1  7000   28  1  6910   66  1  6899   86  2  6885   90  2  6859
5  3951       97  2  6859  100  2  6855  104  2  6863  109  3  6891  138  3  6895
5  3952      275  3  6895  370  3  6980  390  3  7000
5  3970  1  2 060 060  1  2 040 040  1  2 045 045
3  4000 AI     0  15  3  688   14690 99 99
5  4050      -25  1  7000   -6  1  6899   24  2  6892   32  2  6869   42  2  6861
5  4051       46  2  6871   54  3  6902   80  3  6899  132  3  6896  200  3  6920
5  4052      220  3  6940  240  3  6960  250  3  6980  260  3  7000  270  3  7020
6  4070  1  2 070 070  1  2 050 050  1  2 035 035
3  4100 AI     0  14  3  690   14920 99 99
5  4150        0  1  7100   40  1  7000   50  1  6980   75  1  6960  100  1  6906
5  4151      118  2  6913  124  2  6880  142  2  6862  148  2  6868  158  3  6928
5  4152      186  3  6928  210  3  6960  220  3  6980  230  3  7000
5  4170  1  2 070 070  1  2 048 048  1  2 030 030
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 9/13/78

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 PINE CLIO RD TO VIENNA RD   SEC AK TO AN   LES      3  4  2  5 12
2      2  69331  69487  69550  69727
3  4300 AK     1  13  3  688   14990 99 99
4      4    695    950   1040   1270
**SEQUENCE**
5  4350        0  1  7040   15  1  7000   35  1  6903   78  1  6903   89  1  6896
5  4351      105  2  6873  115  2  6867  123  3  6873  135  3  6895  173  3  6906
5  4352      220  3  6920  280  3  7020  310  3  7040
6  4370  1  2 040 040  1  2 042 042  1  2 040 040
3  4400 AL     0  15  3  689   15540 99 99
5  4450       45  1  7000   50  1  6980   65  1  6940  166  1  6922  195  1  6922
5  4451      214  2  6918  238  2  6882  245  2  6877  251  2  6876  264  3  6919
5  4452      306  3  6930  330  3  6940  350  3  6960  360  3  6980  410  3  7000
6  4470  1  2 038 038  1  2 038 038  1  2 040 040
3  4500 AN     0  13  3  688   16090 99 99
5  4550       60  1  7000   73  1  6942  101  2  6920  107  2  6883  120  2  6867
5  4551      130  2  6857  147  2  6872  153  3  6907  178  3  6930  205  3  6940
5  4552      225  3  6960  280  3  6980  320  3  7000
6  4570  1  2 040 040  1  2 035 035  1  2 040 040
```

```
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      [illegible]INE RUN - MASON DR VIENNA RD TO C&O RR [illegible]LES      11  4  2  5 12
2      2  69433  69558  69616  69764
3  4800 AD     1    8  1  692   16230 99 99
4      4    695    950   1040   1270
**SEQUENCE**
5  4850       74  1  7067   82  1  7022   98  1  6993  120  1  6888  132  1  6875
5  4851      140  1  6884  200  1  7061  210  1  7079
6  4870  1  2 055 055
3  4900 AD     0    8  3  691   16780 99 99
5  4950       50  1  7000   70  1  6940  200  2  6920  210  2  6862  225  2  6862
5  4951      230  3  6920  300  3  6940  325  3  7000
6  4970  1  2 080 080  1  2 045 045  1  2 080 080
3  5000 AD     0   14  3  692   17330 99 99
5  5050        0  1  7100   20  1  7060   30  1  7040   50  1  7020   70  1  7000
5  5051      100  1  6960  470  1  6940  478  2  6933  490  2  6900  498  2  6889
5  5052      506  2  6898  510  3  6937  555  3  7049  690  3  7100
6  5070  1  2 075 075  1  2 042 042  1  2 075 075
3  5100 AD     0   11  3  693   18000 99 99
5  5150        0  1  7100   50  1  6960  200  2  6940  205  2  6920  210  2  6908
5  5151      225  2  6908  225  3  6940  330  3  6960  375  3  7060  390  3  7080
5  5152      410  3  7100
6  5170  1  2 080 080  1  2 045 045  1  2 080 080
3  5200 A      1   18  3  693   18600 99 99
4      4    480    655    720    875
**SEQUENCE**
5  5250        0  1  7100   40  1  7060   60  1  7000   80  1  6960  131  1  6950
5  5251      146  1  6946  153  1  6929  163  1  6958  177  1  6956  191  2  6960
5  5252      196  2  6917  200  2  6912  205  2  6919  210  3  6963  216  3  6966
5  5253      250  3  7000  310  3  7040  340  3  7100
6  5270  1  2 080 080  1  2 042 042  1  2 065 065
3  5300 A      0    9  3  693   18820 99 99
5  5350        0  1  7100   20  1  7000   65  1  6960  155  2  6940  160  2  6918
5  5351      170  2  6916  175  3  6940  190  3  7000  230  3  7100
6  5370  1  2 080 080  1  2 042 042  1  2 065 065
3  5400 C      0   17  3  694   19340 99 99
5  5450        0  1  7100   25  1  7080   60  1  7000  166  1  6987  190  1  6959
5  5451      210  1  6956  230  1  6958  250  1  6959  263  2  6963  270  2  6933
5  5452      275  2  6915  278  2  6947  285  3  6965  295  3  6965  310  3  7000
5  5453      340  3  7020  370  3  7100
6  5470  1  2 100 100  1  2 048 048  1  2 080 080
3  5500 D      0   10  3  695   19630 99 99
5  5550        0  1  7050   20  1  7000   40  2  6960   50  2  6931   55  2  6931
5  5551       65  2  6960   75  3  6980  170  3  7000  210  3  7020  240  3  7100
6  5570  1  2 090 090  1  2 040 040  1  2 090 090
3  5600 E      0   10  3  696   20160 99 99
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

5  5650        0  1  7050   20  1  7020   25  1  6987   41  2  6984   47  2  6941
5  5651       55  2  6923   64  2  6933   67  3  6978   95  3  7020  120  3  7100
6  5670  1  2 120 120  1  2 055 055  1  2 090 090
3  5700 E1     0  11  3  697   20410 99 99
5  5750        0  1  7100   10  1  7060   55  1  7002   62  1  6995   67  2  6984
5  5751       69  2  6971   75  2  6955   84  2  6974   90  3  7016  104  3  7073
5  5752      125  3  7100
6  5770  1  2 120 120  1  2 050 050  1  2 100 100
3  5800 F      0  14  3  701   20940 99 99
5  5850        0  1  7100   20  1  7080   52  1  7061   61  1  7050   73  1  7032
5  5851       79  2  7006   67  2  6985   95  2  6973   99  2  6978  106  3  7017
5  5852      140  3  7040  165  3  7060  180  3  7080  190  3  7100
6  5870  1  2 100 100  1  2 045 045  1  2 090 090
```

```
1      [illegible]INE RUN SEC 9 MASON DR TO VIENNA RD BD [illegible]ES      15  4  2  5 12
2      2  69638  69700  69730  69848
3  5100 AR     1  11  3  693   18000 99 99
4      4    695    950   1040   1270
**SEQUENCE**
5  5150       0  1  7100   50  1  6960  200  2  6940  205  2  6920  210  2  6908
5  5151     225  2  6908  225  3  6940  330  3  6960  375  3  7060  390  3  7080
5  5152     410  3  7100
6  5170  1  2 080 030  1  2 045 045  1  2 080 080
3  5200 AS     1  14  3  695   18630 99 99
4  5220    325    440    485    590
5  5250       0  1  7120   15  1  7100   70  1  6980   84  1  6960   90  2  6959
5  5251      96  2  6923   97  2  6921  102  2  6927  110  3  6950  118  3  6957
5  5252     127  3  6953  360  3  6980  390  3  7000  440  3  7120
6  5270  1  2 080 080  1  2 050 050  1  2 090 090
3  5300 AT     0  11  3  697   19100 99 99
5  5350       0  1  7100   25  1  7000  120  1  6980  235  2  6974  239  2  6957
5  5351     254  2  6954  260  2  6946  266  2  6964  274  3  6986  300  3  7000
5  5352     350  3  7100
6  5370  1  2 070 070  1  2 048 048  1  2 080 080
3  5400 AU     0  11  3  697   19490 99 99
5  5450       0  1  7120   40  1  7100   90  1  7000  100  2  6980  105  2  6960
5  5451     115  2  6960  115  3  6980  310  3  7000  340  3  7020  380  3  7100
5  5452     420  3  7200
6  5470  1  2 080 080  1  2 060 060  1  2 090 090
3  5500 AV     0  18  3  700   19890 99 99
5  5550       0  1  7200   25  1  7100   45  1  7040  100  1  7020  137  1  7010
5  5551     157  1  7013  187  1  7011  212  2  7016  216  2  6986  220  2  6980
5  5552     225  2  6985  231  3  7012  247  3  7042  250  3  7100  265  3  7140
5  5553     310  3  7160  350  3  7180  400  3  7200
6  5570  1  2 070 070  1  2 055 055  1  2 100 100
3  5600 AW     0  11  3  701   20240 99 99
5  5650       0  1  7200   10  1  7100   30  1  7040   70  1  7020  240  1  7020
5  5651     295  2  7020  300  2  6993  310  2  6993  315  2  7020  320  3  7100
5  5652     420  3  7200
6  5670  1  2 080 080  1  2 050 050  1  2 100 100
3  5675 AW1    0  10  3  705   20590 99 99
5  5680       0  1  7200   50  1  7100   60  1  7060  220  2  7040  225  2  7015
5  5681     235  2  7015  240  3  7040  290  3  7060  310  3  7100  330  3  7200
6  5690  1  2 080 080  1  2 060 060  1  2 100 100
3  5700 AX     0  12  3  707   20840 99 99
5  5750       0  1  7200   40  1  7100   63  2  7068   66  2  7033   70  2  7030
5  5751      75  2  7039   87  3  7070  105  3  7080  140  3  7080  240  3  7080
5  5752     250  3  7100  280  3  7200
6  5770  1  2 080 080  1  2 065 065  1  2 100 100
```

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....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
3  5775 AX1    0  10  3  707   21050 99 99
5  5780        0  1  7200   30  1  7100   50  1  7080   75  2  7060   85  2  7040
5  5781       95  2  7040  100  3  7060  260  3  7080  270  3  7100  315  3  7200
6  5790  1  2 080 080  1  2 060 060  1  2 085 085
3  5800 AY     0   9  3  716   21310 99 99
5  5850        0  1  7200   40  1  7100   50  2  7060   55  2  7051   65  2  7051
5  5851       70  3  7060  180  3  7080  210  3  7100  300  3  7200
6  5870  1  2 080 080  1  2 055 055  1  2 070 070
3  5900 A7     0  13  3  708   21760 99 99
5  5950        0  1  7200   28  2  7104   31  2  7101   34  2  7067   37  2  7063
5  5951       45  2  7071   49  3  7088   57  3  7097   70  3  7100  190  3  7120
5  5952      220  3  7140  240  3  7160  260  3  7200
6  5970  1  2 080 080  1  2 050 050  1  2 075 075
3  6000 AA     0  11  3  708   22280 99 99
5  6050        0  1  7200   30  1  7120  150  2  7100  160  2  7080  165  2  7069
5  6051      175  2  7069  180  3  7080  210  3  7100  240  3  7120  270  3  7140
5  6052      330  3  7200
6  6070  1  2 100 100  1  2 055 055  1  2 100 100
3  6100 AB     1  13  3  711   22640 99 99
4  6120    290    400    435    530
5  6150        0  1  7240   30  1  7200   70  1  7120  133  2  7104  139  2  7102
5  6151      142  2  7096  147  2  7092  150  2  7096  156  2  7112  162  3  7110
5  6152      175  3  7200  180  3  7220  210  3  7240
6  6170  1  2 100 100  1  2 050 050  1  2 100 100
3  6200 AC     0  11  3  711   22800 99 99
5  6250        0  1  7240   25  1  7200   50  1  7120  130  1  7120  170  1  7120
5  6251      250  2  7100  255  2  7091  265  2  7091  270  3  7100  290  3  7200
5  6252      320  3  7240
6  6270  1  2 100 100  1  2 050 050  1  2 100 100
3  6300 AD     0  16  3  714   23420 99 99
5  6350        0  1  7240   15  1  7220   70  1  7200  180  1  7182  207  1  7153
5  6351      237  1  7146  246  2  7138  251  2  7114  255  2  7107  258  2  7109
5  6352      259  2  7123  271  2  7140  277  3  7170  281  3  7175  330  3  7200
5  6353      370  3  7220
6  6370  1  2 100 100  1  2 050 050  1  2 100 100
```

WAT[illegible]-SURFACE PROFILE FOR: PINE RUN SECS P[illegible] AC LES
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*
P	AT	7330	0	1110.	2071.	89469.	5.14	180.	892.
	681.48	0.02			681.50	0.54	0.04		*IS*
Q	AT	7860	530	1110.	795.	36134.	1.58	22.	368.
	681.67	0.05	0.20	0.01	681.72	1.40	0.14	0.000	*XS*
R	AT	8360	500	1110.	805.	34019.	2.39	47.	391.
	682.17	0.07	0.50	0.01	682.24	1.38	0.12	0.010	*XS*
S	AT	8860	500	1110.	670.	28954.	2.93	365.	718.
	682.77	0.13	0.63	0.03	682.90	1.66	0.28	0.001	*XS*
T	AT	9420	560	1110.	675.	27546.	2.80	335.	682.
	683.65	0.12	0.87	0.0	683.76	1.64	0.26	0.004	*XS*
U	AT	9870	450	1110.	979.	45157.	1.30	163.	471.
	684.19	0.03	0.45	0.0	684.21	1.13	0.10	0.000	*XS*
V	AT	10380	510	1110.	562.	25165.	3.25	27.	393.
	684.65	0.20	0.55	0.09	684.85	1.98	0.32	0.000	*XS*
W	AT	10830	450	1110.	458.	28224.	1.91	181.	339.
	685.46	0.18	0.78	0.0	685.63	2.43	0.29	0.000	*XS*
X	AT	11110	280	1110.	380.	26177.	2.17	162.	327.
	685.87	0.29	0.47	0.06	686.15	2.92	0.35	0.000	*XS*
Y	AT	11660	550	1110.	502.	26916.	2.63	51.	315.
	686.92	0.20	0.96	0.0	687.12	2.21	0.30	0.000	*XS*
Z	AT	12120	460	1110.	962.	32910.	2.38	86.	640.
	687.71	0.05	0.64	0.0	687.76	1.15	0.12	0.001	*XS*
AA	AT	12740	620	1110.	666.	24982.	3.11	14.	539.
	688.60	0.13	0.93	0.04	688.74	1.67	0.36	0.007	*XS*
AB	AT	13070	330	1110.	801.	26988.	2.25	7.	496.
	689.28	0.07	0.60	0.0	689.34	1.39	0.27	0.003	*XS*
AC	AT	13530	460	1110.	502.	22129.	3.59	49.	481.
	690.12	0.27	0.95	0.10	690.40	2.21	0.37	0.002	*XS*

100 yr

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE= 6/27/78

WATER-SURFACE PROFILE FOR: PINE RUN SECS AD TO AG LES
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID	AT DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*	
AD	AT 13610	0	1110.	395.	40161.	1.19	55.	142.	
690.82	0.15			690.97	2.81	0.21		*IS*	
AE	AT 13690	80	1110.	555.	28029.	2.66	18.	293.	
690.90	0.16	0.09	0.01	691.06	2.00	0.32	0.001	*XS*	
AF	AT 14080	390	1110.	608.	28410.	2.53	34.	338.	100 yr.
691.54	0.13	0.60	0.0	691.67	1.83	0.31	0.001	*XS*	180
AF1	AT 14220	140	1110.	648.	41666.	2.27	33.	330.	
691.71	0.10	0.15	0.0	691.81	1.71	0.25	-0.001	*XS*	60
AG	AT 14290	70	1110.	567.	84118.	1.36	26.	145.	
691.76	0.08	0.02	0.0	691.84	1.96	0.13	-0.000	*XS*	40 119

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 11.DATE= 8/25/78

WATER-SURFACE PROFILE FOR: PINE RUN CENTER ST TO MILL ST AH TO AJ LES
PAGE 1 OF 1. PROFILE NUMBER 3. UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	HF	AREA / FG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW *ID*
AH AT 14400 / 694.79	0 / 0.01	1110. /	1530. / 694.80	142823. / 0.73	1.19 / 0.06	16. /	334.	*IS*
AT AT 14690 / 694.79	290 / 0.02	1110. / 0.02	1094. / 0.00	108842. / 694.81	1.09 / 1.01	-15. / 0.10	228. / -0.020	*XS*
AJ AT 14920 / 694.79	230 / 0.12	1110. / 0.07	449. / 0.05	38119. / 694.91	1.28 / 2.47	81. / 0.21	201. / -0.016	*XS*

318

100 yr.

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 11,DATE= 9/13/78

WATER-SURFACE PROFILE FOR: PINE CLIO RD TO VIENNA RD SEC AK TO AN LES
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

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==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HE  /    HE  /    EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
AK     AT   14990 /     0 /   1040. /  1105. /  123002. / 1.06 /   24. /  241.
   695.50 /   0.01 /                 /  695.51 /    0.94 /  0.07/          *IS*
----------------------------------------------------------------------------------
AL     AT   15540 /   550 /   1040. /   918. /   84546. / 1.29 /   59. /  346.
   695.55 /   0.03 /   0.06 /   0.01 /  695.58 /    1.13 /  0.11 / -0.000  *XS*
----------------------------------------------------------------------------------
AN     AT   16090 /   550 /   1040. /   666. /   88099. / 1.38 /   70. /  221.
   695.62 /   0.05 /   0.08 /   0.01 /  695.67 /    1.56 /  0.12 /  0.000  *XS*
----------------------------------------------------------------------------------
```

100 yr.

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 18,DATE=11/ 7/78

WATER-SURFACE PROFILE FOR: PINE RUN - MASON DR VIENNA RD TO C&O RR LES
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECTO	AT DISTANCE/	LENGTH/	DISCHARGE/	AREA /	CONVEYANCE/	ALPHA/	LEW /	REW
WS ELEV /	HV /	HF /	HE /	EG /	V /	FN /	ACC	*ID*
AO AT	16230 /	0 /	1040. /	321. /	25263. /	1.00 /	105. /	166.
696.16 /	0.16 /			/ 696.32 /	3.24 /	0.25/		*IS*
AP AT	16780 /	550 /	1040. /	1023. /	67199. /	2.29 /	61. /	311.
696.64 /	0.04 /	0.35 /	0.0 /	696.67 /	1.02 /	0.12 /	-0.000	*XS*
AQ AT	17330 /	550 /	1040. /	923. /	44652. /	3.16 /	94. /	523.
696.82 /	0.06 /	0.20 /	0.01 /	696.89 /	1.13 /	0.19 /	0.000	*XS*
AR AT	18000 /	670 /	1040. /	742. /	33605. /	2.37 /	45. /	336.
697.30 /	0.07 /	0.48 /	0.01 /	697.37 /	1.40 /	0.22 /	0.000	*XS*
A AT	18500 /	600 /	720. /	427. /	20550. /	2.06 /	70. /	230.
697.97 /	0.09 /	0.67 /	0.01 /	698.06 /	1.68 /	0.13 /	0.001	*XS*
B AT	18820 /	220 /	720. /	453. /	25258. /	2.27 /	40. /	185.
698.19 /	0.09 /	0.22 /	0.0 /	698.28 /	1.59 /	0.23 /	0.001	*XS*
C AT	19340 /	520 /	720. /	395. /	15808. /	2.22 /	154. /	305.
698.85 /	0.11 /	0.68 /	0.01 /	698.97 /	1.82 /	0.30 /	-0.000	*XS*
D AT	19630 /	290 /	720. /	222. /	15795. /	1.72 /	23. /	139.
699.35 /	0.28 /	0.60 /	0.08 /	699.63 /	3.24 /	0.37 /	-0.020	*XS*
E AT	20160 /	530 /	720. /	228. /	15553. /	1.46 /	22. /	85.
700.52 /	0.23 /	1.12 /	0.0 /	700.75 /	3.16 /	0.27 /	0.000	*XS*
EI AT	20410 /	250 /	720. /	123. /	7254. /	1.42 /	46. /	90.
701.41 /	0.76 /	1.15 /	0.27 /	702.17 /	5.86 /	0.62 /	0.000	*XS*
F AT	20940 /	530 /	720. /	214. /	15866. /	1.65 /	66. /	143.
704.27 /	0.29 /	2.39 /	0.0 /	704.56 /	3.37 /	0.34 /	0.002	*XS*

100 yr

END OF THIS PROFILE

PAGE 1 OF 1. PROFILE NUMBER 3. UPSTREAM MP TIONS

SECTIO AT DISTANCE/ LENGTH/DISCHARGE/ AREA /						NCE/ ALPHA/ LEW / REW			
WS ELEV /	HV /	HF /	HE /	EG	V	V /	FN /	ACC	*ID*
AR AT 18000 /		0 /	1040. /	742. /		0. /	2.37 /	45. /	336.
697.30 /	0.07 /			/ 697.3		.40 /	0.22/		*IS*
AS AT 18630 /		630 /	485. /	483. /		4. /	2.97 /	70. /	360.
698.03 /	0.05 /	0.70 /	0.0	/ 698.0		.00 /	0.10 /	-0.000	*XS*
AT AT 19100 /		470 /	485. /	245. /		0. /	1.89 /	84. /	277.
698.76 /	0.12 /	0.76 /	0.03	/ 698.8		.98 /	0.33 /	0.001	*XS*
AU AT 19490 /		390 /	485. /	290. /		8. /	2.31 /	89. /	312.
700.14 /	0.10 /	1.35 /	0.0	/ 700.2	/	.67 /	0.20 /	0.015	*XS*
AV AT 19890 /		400 /	485. /	179. /		4. /	1.90 /	91. /	237.
702.33 /	0.22 /	2.24 /	0.06	/ 702.5	/	.72 /	0.46 /	0.014	*XS*
AW AT 20240 /		350 /	485. /	450. /		8. /	1.89 /	39. /	316.
703.57 /	0.03 /	1.05 /	0.0	/ 703.6		.08 /	0.12 /	0.002	*XS*
AWJ AT 20590 /		350 /	485. /	113. /		0. /	2.11 /	138. /	266.
705.03 /	0.60 /	1.74 /	0.28	/ 705.6		.28 /	0.71 /	0.002	*XS*
AX AT 20840 /		250 /	485. /	171. /		4. /	2.27 /	51. /	242.
708.40 /	0.28 /	3.05 /	0.0	/ 708.6		.83 /	0.41 /	0.010	*XS*
AX1 AT 21050 /		210 /	485. /	517. /		5. /	1.69 /	39. /	266.
709.13 /	0.02 /	0.47 /	0.0	/ 709.1		.94 /	0.09 /	0.000	*XS*
AY AT 21310 /		260 /	485. /	364. /		7. /	1.40 /	42. /	200.
709.34 /	0.04 /	0.21 /	0.01	/ 709.3		.33 /	0.14 /	0.000	*XS*
A7 AT 21760 /		450 /	485. /	100. /		4. /	1.71 /	27. /	111.
710.69 /	0.62 /	1.64 /	0.29	/ 711.3		.83 /	0.68 /	0.004	*XS*
BA AT 22280 /		520 /	485. /	519. /		3. /	2.44 /	27. /	251.
712.70 /	0.03 /	1.43 /	0.0	/ 712.7		.93 /	0.15 /	0.001	*XS*
BB AT 22640 /		360 /	435. /	214. /		3. /	1.82 /	64. /	165.
713.14 /	0.12 /	0.47 /	0.04	/ 713.2		.03 /	0.34 /	0.002	*XS*
BC AT 22800 /		160 /	435. /	472. /		6. /	2.72 /	45. /	277.
713.47 /	0.04 /	0.25 /	0.0	/ 713.5		.92 /	0.08 /	0.000	*XS*
BD AT 23420 /		620 /	435. /	87. /		. /	1.34 /	213. /	273.
715.17 /	0.52 /	1.93 /	0.24	/ 715.6		.98 /	0.64 /	0.004	*XS*

100 yr

WATER-SURFACE PROFILE FOR: PINE RUN SECS P TO AC FW LES
PAGE 1 OF 1. PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
	WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
P	AT	7330	0	1110.	1703.	81427.	4.76	320.	820.	
	681.55	0.03			681.58	0.65	0.04			*IS*
Q	AT	7860	530	1110.	739.	35126.	1.55	68.	368.	
	681.77	0.05	0.23	0.01	681.82	1.50	0.14	0.000		*XS*
R	AT	8360	500	1110.	753.	33463.	2.31	91.	391.	
	682.27	0.08	0.52	0.01	682.35	1.47	0.12	-0.013		*XS*
S	AT	8860	500	1110.	665.	30707.	2.58	418.	718.	
	682.85	0.11	0.60	0.02	682.96	1.67	0.26	0.001		*XS*
T	AT	9420	560	1110.	610.	27817.	2.30	432.	682.	
	683.66	0.12	0.81	0.00	683.78	1.82	0.26	0.003		*XS*
U	AT	9870	450	1110.	863.	42232.	1.26	163.	413.	
	684.22	0.03	0.47	0.0	684.25	1.29	0.10	0.001		*XS*
V	AT	10380	510	1110.	465.	24141.	2.61	27.	277.	
	684.72	0.23	0.62	0.10	684.95	2.39	0.34	-0.017		*XS* FW
W	AT	10830	450	1110.	472.	29755.	1.85	181.	331.	
	685.56	0.16	0.77	0.0	685.72	2.35	0.27	0.000		*XS*
X	AT	11110	280	1110.	385.	27155.	2.08	162.	312.	
	685.94	0.27	0.43	0.05	686.20	2.89	0.34	0.000		*XS*
Y	AT	11660	550	1110.	439.	25795.	2.30	115.	315.	
	686.94	0.23	0.97	0.0	687.16	2.53	0.31	-0.007		*XS*
Z	AT	12120	460	1110.	869.	32144.	2.21	84.	533.	A
	687.79	0.06	0.68	0.0	687.85	1.28	0.12	0.003		*XS*
AA	AT	12740	620	1110.	611.	25491.	2.68	15.	415.	
	688.69	0.14	0.93	0.04	688.83	1.82	0.35	0.005		*XS*
AB	AT	13070	330	1110.	724.	26316.	2.10	10.	410.	
	689.36	0.08	0.61	0.0	689.44	1.53	0.27	0.002		*XS*
AC	AT	13530	460	1110.	417.	22433.	2.53	50.	280.	
	690.22	0.28	0.96	0.10	690.50	2.66	0.36	0.001		*XS*

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 10,DATE=11/17/78

WATER-SURFACE PROFILE FOR: PINE RUN SECS AD TO AG FW LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
AD AT 13610	0	1110.	398.	41154.	1.17	55.	135.	
690.92	0.14			691.06	2.79	0.20		*IS*
AE AT 13690	80	1110.	534.	28740.	2.42	20.	250.	
690.99	0.16	0.08	0.01	691.16	2.08	0.32	0.000	*XS*
AF AT 14080	390	1110.	517.	26814.	2.28	80.	310.	
691.62	0.16	0.62	0.00	691.79	2.15	0.33	0.006	*XS*
AF1 AT 14220	140	1110.	592.	41121.	2.11	60.	300.	
691.83	0.12	0.16	0.0	691.94	1.87	0.26	-0.001	*XS*
AG AT 14290	70	1110.	565.	86208.	1.31	26.	126.	
691.89	0.08	0.02	0.0	691.97	1.97	0.13	-0.000	*XS*

FW

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 10,DATE=11/17/78

WATER-SURFACE PROFILE FOR: PINE RUN CENTER ST TO MILL ST AH-AJ FW LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
AH	AT	14400	0	1110.	1136.	111857.	1.22	16.	226.
694.89	0.02				694.91	0.98	0.07		*IS*
AT	AT	14690	290	1110.	1035.	110092.	1.12	-15.	185.
694.92	0.02	0.03	0.00		694.94	1.07	0.10	0.000	*XS*
AJ	AT	14920	230	1110.	465.	40031.	1.27	81.	201.
694.92	0.11	0.06	0.05		695.03	2.39	0.20	-0.018	*XS*

FW

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 10,DATE=11/17/78

WATER-SURFACE PROFILE FOR: PINE CLIO RD TO VIENNA RD SEC AK-AN FW LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
AK	AT	14990	0	1040.	1101.	127072.	1.05	24.	224.
695.60	0.01				695.61	0.94	0.07		*IS*
AL	AT	15540	550	1040.	752.	75649.	1.23	145.	345.
695.65	0.04	0.06	0.01		695.69	1.38	0.13	-0.000	*XS*
AN	AT	16090	550	1040.	662.	90860.	1.31	75.	205.
695.73	0.05	0.09	0.01		695.78	1.57	0.12	-0.000	*XS*

FW

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 15,DATE=11/20/78

WATER-SURFACE PROFILE FOR: PINE RUN-MASON DR SEC AO TO SEC F FW LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
AO	AT	16230	0	1040.	326.	26300.	1.00	105.	165.
696.26	0.16				696.42	3.19	0.24		*IS*
AP	AT	16780	550	1040.	911.	64342.	2.13	110.	310.
696.73	0.04	0.35	0.0		696.77	1.14	0.12	-0.000	*XS*
AQ	AT	17330	550	1040.	812.	44605.	2.60	220.	520.
696.92	0.07	0.21	0.01		696.99	1.28	0.19	0.000	*XS*
AR	AT	18000	670	1040.	716.	34339.	2.19	70.	320.
697.39	0.07	0.47	0.00		697.47	1.45	0.22	0.000	*XS*
A	AT	18600	600	720.	427.	21101.	1.98	80.	230.
698.03	0.09	0.64	0.01		698.12	1.69	0.13	0.001	*XS*
B	AT	18820	220	720.	432.	25734.	2.04	65.	185.
698.24	0.09	0.21	0.00		698.33	1.67	0.23	0.001	*XS*
C	AT	19340	520	720.	373.	16246.	1.91	185.	305.
698.87	0.11	0.64	0.01		698.98	1.93	0.29	0.001	*XS*
D	AT	19630	290	720.	222.	16004.	1.67	23.	123.
699.37	0.27	0.58	0.08		699.65	3.25	0.37	0.003	*XS*
E	AT	20160	530	720.	228.	15559.	1.46	22.	85.
700.52	0.23	1.10	0.0		700.75	3.16	0.27	0.000	*XS*
E1	AT	20410	250	720.	123.	7259.	1.42	46.	90.
701.41	0.76	1.15	0.27		702.17	5.86	0.62	0.001	*XS*
F	AT	20940	530	720.	214.	15856.	1.64	66.	143.
704.26	0.29	2.39	0.0		704.55	3.37	0.34	0.001	*XS*

FW

END OF THIS PROFILE

SECID	A	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS	FLEV	HV	HF	HE	EG	V	FN	ACC	*ID*
AR	AT	18000	0	1040.	715.	34282.	2.19	70.	320.
697.39		0.07			697.46	1.45	0.22		*IS*
AS	AT	18630	630	485.	483.	16537.	2.59	70.	320.
698.07		0.04	0.65	0.0	698.11	1.00	0.09	0.002	*XS*
AT	AT	19100	470	485.	227.	9238.	1.68	125.	275.
698.76		0.12	0.72	0.04	698.88	2.13	0.34	0.004	*XS*
AU	AT	19490	390	485.	255.	7364.	1.84	90.	240.
700.13		0.10	1.35	0.0	700.24	1.90	0.20	0.011	*XS*
AV	AT	19890	400	485.	176.	5729.	1.86	97.	237.
702.32		0.22	2.23	0.06	702.54	2.75	0.46	0.017	*XS*
AW	AT	20240	350	485.	371.	12465.	1.78	115.	315.
703.65		0.05	1.15	0.0	703.70	1.31	0.14	0.006	*XS*
AW1	AT	20590	350	485.	126.	3891.	2.07	140.	260.
705.14		0.47	1.70	0.21	705.61	3.84	0.63	0.001	*XS*
AX	AT	20840	250	485.	138.	5008.	1.86	55.	205.
708.28		0.36	3.02	0.0	708.64	3.52	0.46	0.006	*XS*
AX1	AT	21050	210	485.	412.	17123.	1.51	40.	190.
709.18		0.03	0.58	0.0	709.22	1.18	0.10	0.001	*XS*
AY	AT	21310	260	485.	372.	16008.	1.35	45.	195.
709.41		0.04	0.22	0.00	709.44	1.30	0.13	0.000	*XS*
AZ	AT	21760	450	485.	97.	4248.	1.71	30.	109.
710.66		0.67	1.56	0.32	711.32	5.01	0.67	0.009	*XS*
BA	AT	22280	520	485.	452.	19968.	1.97	80.	230.
712.73		0.04	1.44	0.0	712.77	1.07	0.15	0.003	*XS*
BB	AT	22640	360	435.	216.	8158.	1.81	65.	165.
713.16		0.11	0.47	0.04	713.28	2.01	0.33	0.002	*XS*
BC	AT	22800	160	435.	392.	13759.	2.48	105.	275.
713.50		0.05	0.27	0.0	713.55	1.11	0.09	0.001	*XS*
BD	AT	23420	620	435.	89.	4279.	1.35	220.	270.
715.27		0.50	1.99	0.23	715.77	4.89	0.59	0.002	*XS*

FW

00BREAK00

1) COUNTY: Genesee

2) STUDY NAME: City of Clio

3) WATERCOURSE: Pine Run & Mason Drain

4) DOCUMENT TYPE: Cross section Data & Bridge Data

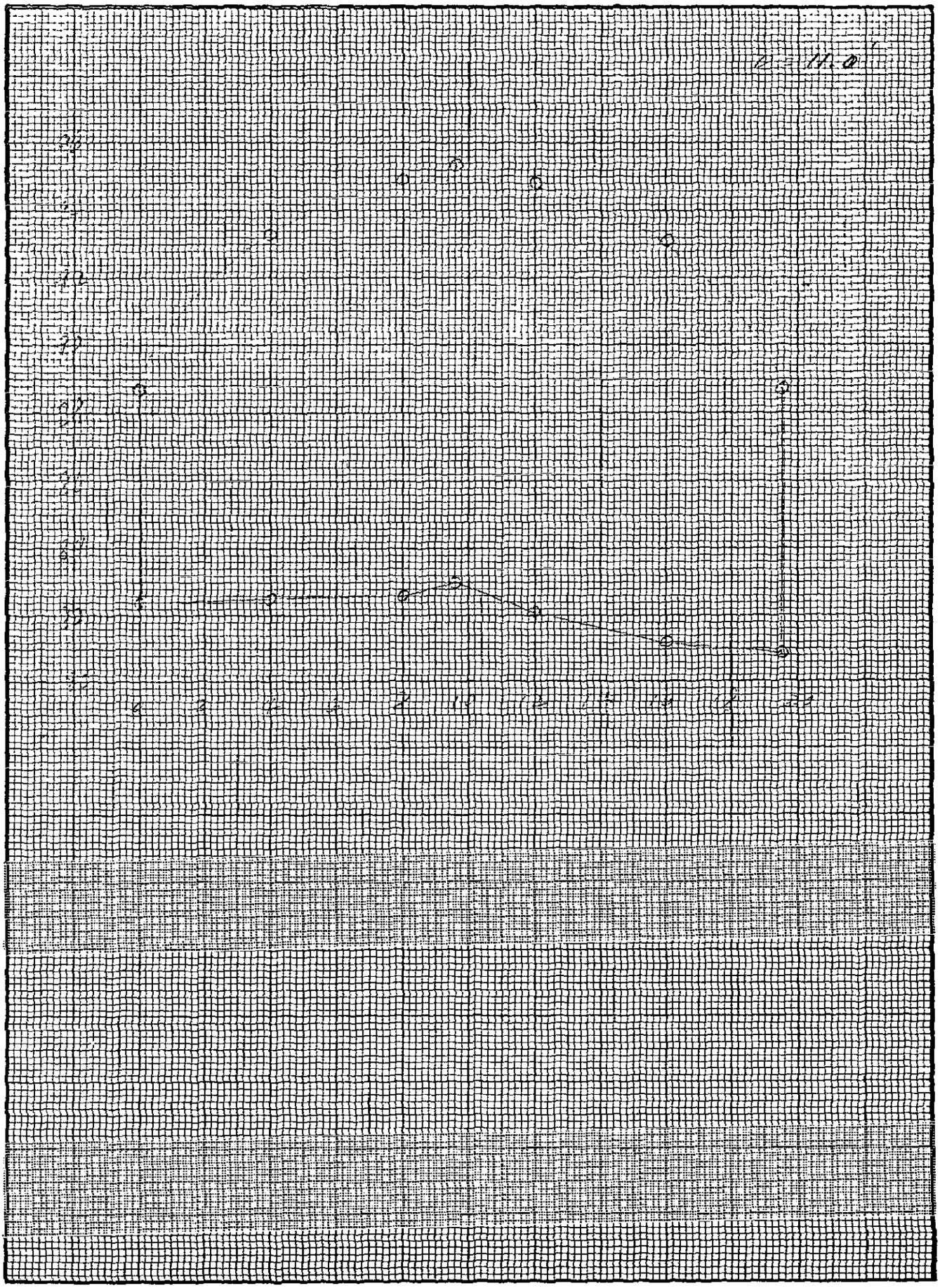
00BREAK00

(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....

PINE RUN DS end culvert SEC 4C



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(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
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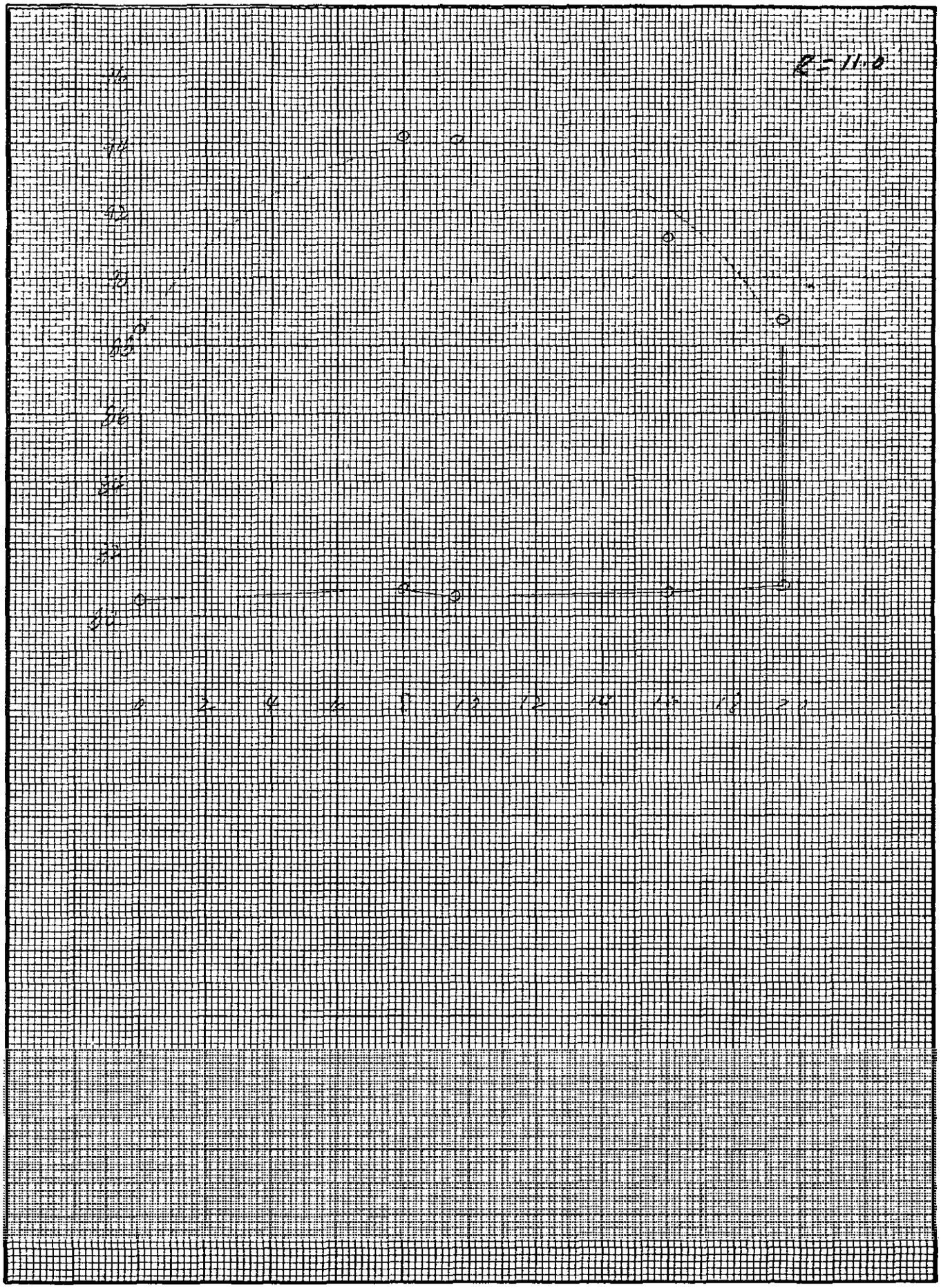
File .....

PINE RUN US END culvert SEC AC



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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....

PINE RUN SEC AC CUM. Properties.

DS END

El.	A	WP	R
88	115	32.7	3.52
88.7	129	34.1	3.78
89	135	34.8	3.88
90	154	37.1	4.15
91	172	39.5	4.35
92	188	42.2	4.45

US END

88	142	34.1	4.16
88.4	150	34.9	4.30
89	161	36.5	4.41
90	179	39.1	4.58
91	195	41.8	4.67
92	209	45.1	4.63
93	215	49.1	4.38

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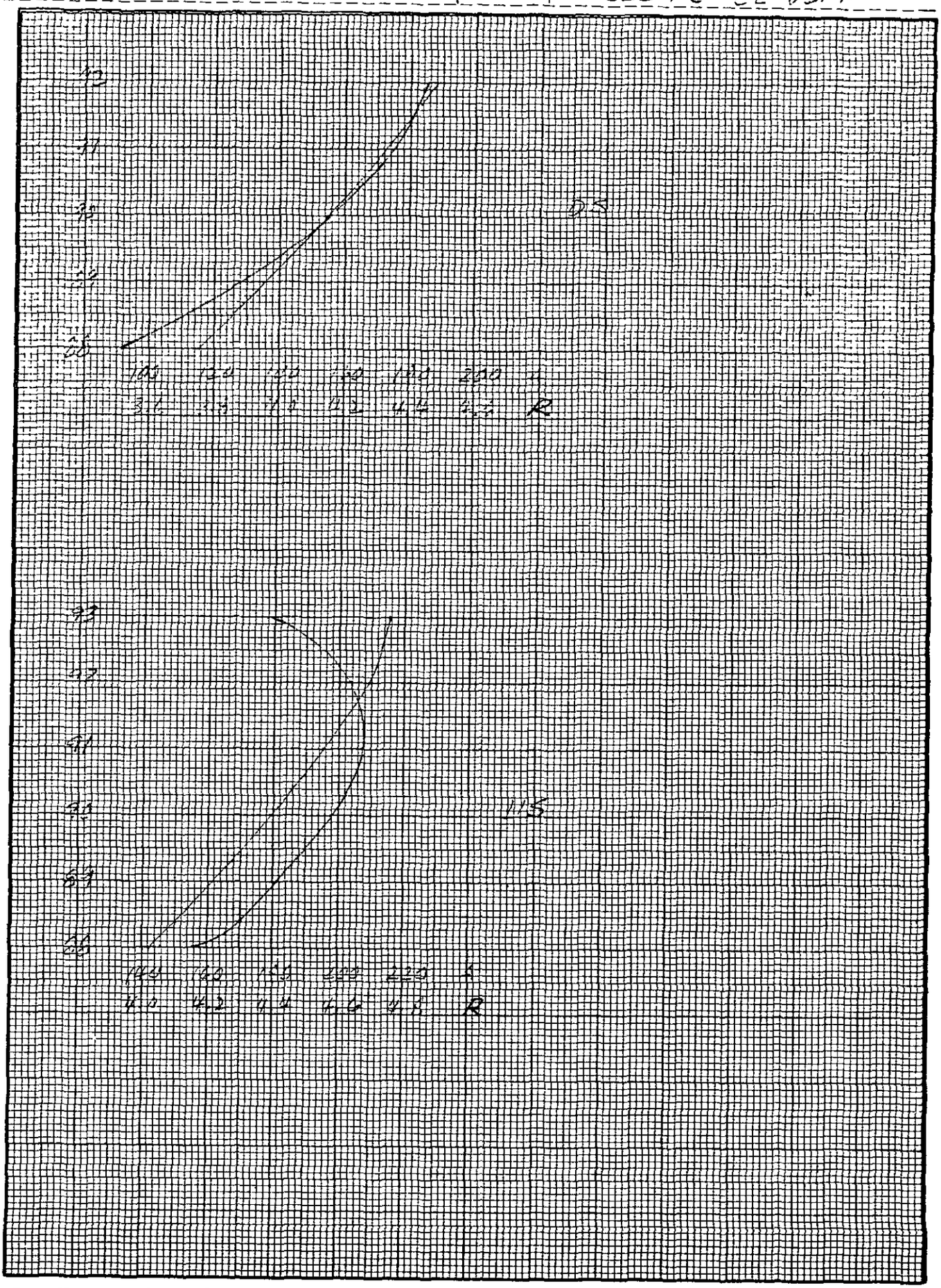
(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....

PINE RUN SEC AC CULVERT



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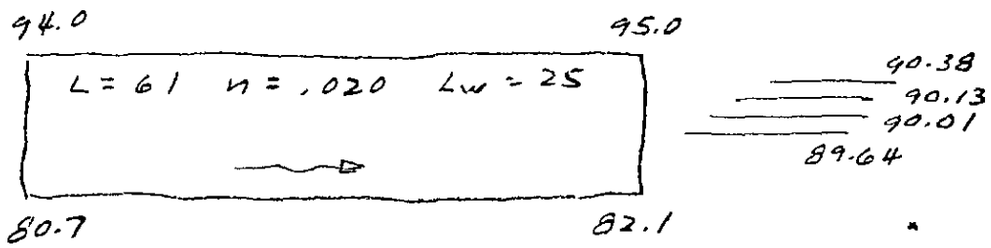
PINE RUN SEC AC CULVERT



$\frac{Q_{10}}{740}$

Assume III

1. 89.64 $A = 149$ $V = 4.97$
2. + .38

Assume $d_2 = 9.1$ or el 89.8 $K_3 = \frac{1.486}{.02}(1.49)(4.07)^{2/3} = 28,200$

3. + .04 $A_2 = 176$
3a. − .27 $R_2 = 4.55$ $K_2 = (\quad)(176)(4.55)^{2/3} = 30,400$

89.79 ok

$$hf_{2.3} = \frac{(61)(740)^2}{(28,200)(30,400)} = .04 \quad V_2 = 4.20 \quad d = 9.0$$

$$V/\sqrt{gd} = 4.20/\sqrt{(9.0)(32.15)} = .25 \quad C = .82(1.21) = .99$$

4. + .01 $\left[\frac{1}{(.99)^2} - 1\right](.38) = .01$

5. + .01 Assume $h_1 = 90.1$ $A_1 = 310$ $K_1 = 32,800$
6. − .09 $hf_{1.2} = \frac{(25)(740)^2}{(32,800)(30,400)} = .01$

89.99

Assume $h_1 = 90.0$ $A_1 = 305$ $K_1 = 32,050$

$$hf_{1.2} = \frac{(25)(740)^2}{(32,800)(30,400)} = .01$$

5. + .01
6. − .09

89.99 ok

PINE RUN AT SEC AC CULVERT

$Q_{50} = 1010$

1. 90.01
2. + .67

$A_3 = 154 \quad K_3 = \frac{1.486}{(.02)}(154)(4.15)^{2/3} = 29{,}500$

Assume $h_2 = 90.2 \quad A_2 = 183$

3. + .06

$K_2 = (74.3)(183)(4.60)^{2/3} = 37{,}600$

3a − .47

90.27

$hf_{2\cdot3} = \frac{(61)(1010)^2}{(29{,}500)(37{,}600)} = .06$

Assume $h_2 = 90.27 \quad A_2 = 184 \quad R_2 = 4.62$

3. + .06

$K_2 = (74.3)(184)(4.62)^{2/3} = 37{,}900$

3a − .47

90.27 ok

$hf_{2\cdot3} = \frac{(61)(1010)^2}{(29{,}500)(37{,}900)} = .06$

4. + .01

$\left[\frac{1}{(.99)^2} - 1\right](.67) =$

5. + .02

Assume $h_1 = 90.4 \quad K_1 = 35{,}250 \quad A_1 = 325$

6. − .15

90.62

$hf_{1\cdot2} = \frac{(25)(1010)^2}{(37{,}900)(35{,}250)} = .02$

Assume $h_1 = 90.6 \quad K_1 = 36{,}900 \quad A_1 = 334$

5. + .02

6. − .14

90.62 ok

$hf_{1\cdot2} = \frac{(25)(1010)^2}{(37{,}900)(36{,}900)} = .02$

PINE RUN AT SEC AC CULVERT

$Q_{100} = 1110$

1. 90.13 $\quad A_3 = 158 \quad K_3 = (74.3)(158)(4.19)^{2/3} = 30,500$
2. +.76 $\quad$ Assume $h_2 = 90.5 \quad A_2 = 188$
3. +.06 $\quad K_2 = (74.3)(188)(4.64)^{2/3} = 38,850$
3a −.54 $\quad hf_{2\cdot3} = \dfrac{(61)(1110)^2}{(30,500)(38,850)} = .06$

90.41

Assume $h_2 = 90.41 \quad A_2 = 186 \quad R_2 = 4.63$

$K_2 = (74.3)(186)(4.63)^{2/3} = 38,400$

$hf_{2\cdot3} = \dfrac{(61)(1110)^2}{(30,500)(38,400)} = .06$

3. +.06
3a −.55

90.40 OK

4. +.02 h_e
5. +.02 h_f $\quad$ Assume $h_1 = 90.7 \quad K_1 = 37,700 \quad A_1 = 334$
6. −.17 h_v $\quad hf_{1\cdot2} = \dfrac{(25)(1110)^2}{(38,400)(37,700)} = .02$

90.80

ws SEC

Assume $h_1 = 90.8 \quad K_1 = 38,600 \quad A_1 = 344$

5. +.02 $\quad hf_{1\cdot2} = \dfrac{(25)(1110)^2}{(38,400)(38,600)} = .02$
6. −.16

90.82 OK

PINE RUN AT SEC 4C Culvert

$Q_{500} = 1350$

1. 90.38 $A_3 = 162$ $K_3 = (74.3)(162)(4.23)^{2/3} = 31,500$
2. + 1.08 Assume $h_2 = 90.7$ $A_2 = 181$
3. + .09 $K_2 = (74.3)(181)(4.66)^{2/3} = 37,500$
3a − .87 $hf_{2\cdot3} = \frac{(61)(1350)^2}{(31,500)(37,500)} = .09$
90.68 ok

4. + .02
5. + .03 Assume $h_1 = 91.4$ $K_1 = 44,400$ $A_1 = 376$
6. − .20 $hf_{1\cdot2} = \frac{(25)(1350)^2}{(37,500)(44,400)} = .03$
91.40 ok

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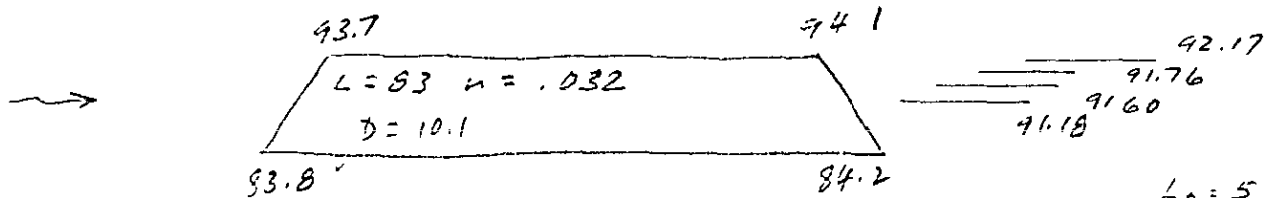
WATER RESOURCES DIVISION

File .....

PINE RUN SEC 4G CULVERT



			K_w	L_p/D	K_L	$L_p = 5$ $w/D = .01$ C
II	D + El	= 583.80	.93 × 1.04		× .90	.87
III	.7 D + "	= 590.37	.92 × 1.04	.7	× .91	.87
	1.1 D + "	= 594.91	.87 × 1.04	.5	× .91	.82
	1.5 D + "	= 598.75	.81 × 1.04	.5	× .91	.77
	1.5 D + "	= 598.75	.48 × .91 =	.44		
IV	2 D + "	= 604.00	.54 "	.49		
	3 D + "	= 614.10	.58 "	.53		
	5 D + "	= 634.30	.62 "	.56		

IV & VI, C = .67

$Q_{10} = 740$ $h_4 - h_3 = 91.18$

1. 91.18
2. + 1.14
3. + .41
   − .72
   92.0

$d/D = 5.88/10.1 = .58$ $A = .849(10.1)^2 = 86.6$

$\frac{LQ^2}{K_2 K_3} = \frac{(83)(740)^2}{(9130)(12{,}100)} = .41$ $(.613)\frac{(10.1)^{8/3}}{.032} = 9130 = K_3$

Assume $d_2 = 7.6$ $K_2 = \frac{(.814)(10.1)^{8/3}}{.032} = 12{,}100$ $d_2 = El.\ 91.4$

$A_2 = (1.073)(10.1)^2 = 109$ $V_2 = 6.79$ $d_2/D = \frac{7.6}{10.1} = .75$

Assume $d_2 = 8.2$ $d_2/10.1 = .81$ $d_2\ El = 92.0$

3. + .39
   − .63
   92.08 OK

$\frac{(83)(740)^2}{9130(12{,}800)} = .39$ $K_3 = .258(14{,}900) = 12{,}800$

$A_3 = 1.136 D^2 = 116$ $\frac{V_2^2}{2g} = .63$

4. + .56
5. + .01
6. − 0
   93.28

Assume $h_1 = 94.9$ $c = .82 \cdot \left(\frac{1}{.82^2} - 1\right) V_3^2/2g =$

$\frac{(20)(740)^2}{(12{,}100)(147{,}000)} =$ $V_1 = \frac{740}{1560}$ $L_w = 20$

GPO 1971 OF - 413-014

PINE RU'N SEC AG CULVERT

$Q_{500} = 1350$ $h_4 = h_3 = 92.17$

1. 92.17 $d_3/D = 7.97/10.1 = .79$ $A_3 = 114$ $K_3 = 12,600$
2. +2.18
3. ~~+.90~~ Assume $d_2 = 9.4$ $d_2/D = .93$ $K_2 = 13,400$ $d_2 = El\ 93.2$
   −1.76 $\frac{(83)(1350)^2}{(12,600)(13,400)} = .90$ $A_2 = 127$
   93.49
3. +.91 Assume $d_2 = 9.7$ $d_2/D = .96$ $K_2 = 13,200$ $d_2 = El\ 93.5$
   −1.73 $\frac{(83)(1350)^2}{(12,600)(13,200)} = .91$ $A_2 = 128$
   93.53 ok
4. +1.14 Assume $h_1 = 95.3$ $c = .81$ $\frac{1}{c^2} - 1 (2.18) = 1.14$
5. ~~+.02~~ $\frac{(20)(1350)^2}{(13,200)(170,000)} = .02$ $K_1 = 170,000$
6. ~~−.01~~ $A_1 = 1680$
   ~~96.44~~

Assume $h_1 = 96.4$ $c = .80$ $\frac{1}{c^2} - 1 (2.18) = 1.23$

4. +1.23
5. .01 (est)
6. 0 (est)
   96.50 USE

$\frac{h_1 - z}{D} = 1.25 < 1.5$ ok

$h_c/D = .66$ $h_c = 6.7$

PINE RUN .EC AS CULVERT

4. +.63 Assume $h_1 = 94.2$ $c = .83$ $\frac{1}{c^2} - 1 (1.39) = .63$
5. +.01 $K_1 = 117,000$ $\frac{(20)(1010)^2}{(13,200)(117,000)} = .01$
6. −.01 $A_1 = 1340$
94.16 USE

$\frac{h_1 - z}{D} = \frac{9.96 + 0.4}{10.1} = 1.0 < 1.5$ ok.
$d_c/D = .62$ $d_c = 6.3$

$Q_{100} = 1110$ $h_4 = h_3 = 91.76$

1. 91.76 $d_3/D = 7.56/10.1 = .75$ $A_3 = 109$
2. + 1.61
~~3. + .64~~ Assume $d_2 = 8.8$ $d_2/D = .87$ $K_2 = 13,300$ $d_2 = El. 92.6$
~~− 1.29~~ $K_3 = 12,100$ $\frac{(83)(1110)^2}{(12,100)(13,300)} = .64$ $A_2 = 122$
~~92.72~~

3. + .64 Assume $d_2 = 8.9$ $d_2/D = .88$ $K_2 = 13,300$ $d_2 = El\ 92.7$
− 1.27 $\frac{(83)(1110)^2}{(12,100)(13300)} = .64$ $A_2 = 123$
92.74 ok

~~4. + .73~~ Assume $h_1 = 94.5$ $c = .83$ $\frac{1}{c^2} - 1 (1.61) =$
~~5. + .01~~ $K_1 = 128,000$ $\frac{(20)(1110)^2}{(13,300)(128,000)} = .01$
~~6 − .01~~ $A_1 = 1440$
~~94.74~~

4. + .78 Assume $h_1 = 94.75$ $c = .82$
5. + .01 $K_1 = 139,000$
6. − .01
94.79 use

$\frac{h_1 - z}{D} = \frac{10.59 + 0.4}{10.1} = 1.1 < 1.5$ ok

$d_c/D = .63$ $d_c = 6.4$

PINE RUN SEC CULVERT AG LES BASE ELEVATION = 684.20 Z = -0.40

APPROACH ELEVATION	AREA	CONVEYANCE	ALPHA	TOP WIDTH	QC
683.70	0.0	0.0	0.0	0.0	0.0
684.60	0.0	0.0	0.0	0.0	0.0
685.50	0.0	0.0	0.0	0.0	0.0
686.40	7.8	185.8	1.000	14.9	31.94
687.30	22.6	953.8	1.000	17.9	143.85
688.20	40.1	2212.6	1.000	20.9	314.71
689.10	62.5	4075.5	1.065	31.6	499.66
690.00	186.9	8884.7	2.283	218.0	981.74
690.90	401.6	21093.5	1.831	259.1	2836.49
691.80	643.2	40106.7	1.485	275.2	5580.67
692.70	896.7	64894.5	1.325	288.0	8977.39
693.60	1161.7	95030.6	1.246	300.9	12952.00
694.50	1438.2	130317.7	1.201	313.8	17473.12
695.40	1726.3	170649.9	1.173	326.6	22521.91
696.30	2026.0	215975.9	1.154	339.5	28086.87
697.20	2337.3	266279.4	1.141	352.3	34161.19
698.10	2660.1	321633.4	1.132	365.1	40747.60
699.00	2994.0	382513.2	1.124	376.9	47886.09
699.90	3338.4	448406.2	1.119	388.7	55520.75
700.80	3694.1	518580.9	1.117	402.0	63546.92
701.70	4061.9	593808.0	1.116	415.5	72069.94
702.60	4441.9	674252.6	1.116	429.0	81107.94
703.50	4834.0	759983.6	1.116	442.5	90665.62
704.40	5238.6	849583.6	1.119	457.9	100540.69

Checks hand computations closely. Check sum comp.

Note.-- The computer was down at the time I was working on this culvert. I computed it by hand. Later I ran this as a check, and got good agreement with hand computations.

CES

PINE RUN SEC CULVERT AG LES BASE ELEVATION = 684.20 Z = -0.40

BARREL DEPTH	AREA	CONVEYANCE	TOP WIDTH	WETTED PERIMETER
0.0	0.0	0.0	0.0	
0.404	2.55	49.2	9.43	9.48
0.808	7.18	219.7	13.29	13.42
1.212	13.07	537.0	15.41	15.71
1.616	19.46	997.0	16.13	16.80
2.020	26.06	1567.2	16.47	17.68
2.424	32.74	2134.4	16.60	19.68
2.828	39.43	2832.8	16.52	20.49
3.232	46.08	3578.8	16.40	21.31
3.636	52.68	4360.8	16.24	22.13
4.040	59.20	5168.2	16.04	22.96
4.444	65.63	5991.2	15.79	23.81
4.848	71.95	6820.1	15.49	24.67
5.252	78.14	7645.9	15.15	25.55
5.656	84.18	8459.2	14.76	26.45
6.060	90.06	9250.7	14.30	27.37
6.464	95.73	10011.0	13.79	28.33
6.868	101.19	10729.9	13.21	29.33
7.272	106.40	11396.6	12.55	30.37
7.676	111.32	11999.2	11.79	31.48
8.080	115.91	12524.0	10.93	32.66
8.484	120.13	12954.0	9.93	33.95
8.888	123.91	13266.9	8.73	35.39
9.292	127.15	13428.7	7.26	37.07
9.696	129.71	13371.1	5.28	39.21
10.100	131.20	12759.2	1.29	43.29

PINE RUN SEC CULVERT AG LES BASE ELEVATION = 684.20 Z = -0.40

Q	ELEV H1	ELEV H4	D2	D3	TYPE	C	C ADJUSTED
700.0	691.82	********	6.50	4.23	2	0.86	0.86
700.0	692.36	691.00	7.66	6.80	3	0.85	0.85
700.0	692.48	691.18	7.81	6.98	3	0.85	0.85
700.0	692.79	691.60	8.17	7.40	3	0.85	0.85
700.0	692.91	691.76	8.32	7.56	3	0.84	0.84
700.0	693.10	692.00	8.53	7.80	3	0.84	0.84
700.0	693.24	692.17	8.69	7.97	3	0.84	0.84
700.0	693.96	693.00	9.47	8.80	3	0.83	0.83
700.0	694.91	694.00	10.10	9.80	3	0.82	0.82
700.0	696.23	695.00	10.10	10.10	4	0.67	0.67
740.0	692.12	********	6.69	4.37	2	0.85	0.85
740.0	692.53	691.00	7.72	6.80	3	0.85	0.85
740.0	692.64	691.18	7.87	6.98	3	0.85	0.85
740.0	692.93	691.60	8.22	7.40	3	0.84	0.84
740.0	693.05	691.76	8.36	7.56	3	0.84	0.84
740.0	693.23	692.00	8.58	7.80	3	0.84	0.84
740.0	693.37	692.17	8.73	7.97	3	0.84	0.84
740.0	694.07	693.00	9.50	8.80	3	0.83	0.83
740.0	695.02	694.00	10.10	9.80	3	0.82	0.82
740.0	696.38	695.00	10.10	10.10	4	0.67	0.67
800.0	692.56	********	6.98	4.57	2	0.85	0.85
800.0	692.79	691.00	7.82	6.80	3	0.85	0.85
800.0	692.90	691.18	7.96	6.98	3	0.84	0.84
800.0	693.16	691.60	8.30	7.40	3	0.84	0.84
800.0	693.27	691.76	8.44	7.56	3	0.84	0.84
800.0	693.45	692.00	8.64	7.80	3	0.84	0.84
800.0	693.58	692.17	8.79	7.97	3	0.84	0.84
800.0	694.26	693.00	9.56	8.80	3	0.83	0.83
800.0	695.20	694.00	10.10	9.80	3	0.82	0.82
800.0	696.61	695.00	10.10	10.10	4	0.67	0.67
900.0	693.30	********	7.44	4.91	2	0.84	0.84
900.0	693.28	691.00	8.01	6.80	3	0.84	0.84
900.0	693.37	691.18	8.14	6.98	3	0.84	0.84
900.0	693.59	691.60	8.45	7.40	3	0.84	0.84
900.0	693.69	691.76	8.58	7.56	3	0.84	0.84
900.0	693.85	692.00	8.78	7.80	3	0.83	0.83
900.0	693.96	692.17	8.92	7.97	3	0.83	0.83
900.0	694.61	693.00	9.66	8.80	3	0.82	0.82
900.0	695.53	694.00	10.10	9.80	3	0.81	0.81
900.0	697.04	695.00	10.10	10.10	4	0.67	0.67
1000.0	694.04	********	7.88	5.23	2	0.83	0.83

PINE RUN SEC CULVERT AG LES BASE ELEVATION = 684.20 Z = -0.40

Q	ELEV H1	ELEV H4	D2	D3	TYPE	C	C-ADJUSTED
1010.0	694.11	********	7.93	5.26	2	0.83	0.83
1010.0	693.90	691.00	8.26	6.80	3	0.83	0.83
1010.0	693.96	691.18	8.37	6.98	3	0.83	0.83
1010.0	694.14	691.60	8.65	7.40	3	0.83	0.83
1010.0	694.22	691.76	8.76	7.56	3	0.83	0.83
1010.0	694.35	692.00	8.95	7.80	3	0.83	0.83
1010.0	694.45	692.17	9.08	7.97	3	0.83	0.83
1010.0	695.05	693.00	9.79	8.80	3	0.82	0.82
1010.0	695.94	694.00	10.10	9.80	3	0.81	0.81
1010.0	697.57	695.00	10.10	10.10	4	0.67	0.67
1100.0	694.81	********	8.32	5.53	2	0.82	0.82
1100.0	694.48	691.00	8.50	6.80	3	0.83	0.83
1100.0	694.51	691.18	8.59	6.98	3	0.82	0.82
1100.0	694.64	691.60	8.83	7.40	3	0.82	0.82
1100.0	694.70	691.76	8.94	7.56	3	0.82	0.82
1100.0	694.81	692.00	9.11	7.80	3	0.82	0.82
1100.0	694.90	692.17	9.23	7.97	3	0.82	0.82
1100.0	695.46	693.00	9.92	8.80	3	0.81	0.81
1100.0	696.32	694.00	10.10	9.80	3	0.80	0.80
1100.0	698.05	695.00	10.10	10.10	4	0.67	0.67
1110.0	694.88	********	8.37	5.56	2	0.82	0.82
1110.0	694.54	691.00	8.53	6.80	3	0.82	0.82
1110.0	694.57	691.18	8.61	6.98	3	0.82	0.82
1110.0	694.70	691.60	8.86	7.40	3	0.82	0.82
1110.0	694.76	691.76	8.96	7.56	3	0.82	0.82
1110.0	694.87	692.00	9.13	7.80	3	0.82	0.82
1110.0	694.96	692.17	9.25	7.97	3	0.82	0.82
1110.0	695.51	693.00	9.94	8.80	3	0.81	0.81
1110.0	696.37	694.00	10.10	9.80	3	0.80	0.80
1110.0	698.10	695.00	10.10	10.10	4	0.67	0.67
1200.0	695.59	********	8.75	5.82	2	0.81	0.81
1200.0	695.19	691.00	8.80	6.80	3	0.82	0.82
1200.0	695.19	691.18	8.87	6.98	3	0.82	0.82
1200.0	695.26	691.60	9.07	7.40	3	0.82	0.82
1200.0	695.31	691.76	9.16	7.56	3	0.82	0.82
1200.0	695.39	692.00	9.31	7.80	3	0.81	0.81
1200.0	695.47	692.17	9.43	7.97	3	0.81	0.81
1200.0	695.98	693.00	10.08	8.80	3	0.81	0.81
1200.0	696.79	694.00	10.10	9.80	3	0.80	0.80
1200.0	698.63	695.00	10.10	10.10	4	0.67	0.67
1300.0	696.40	********	9.17	6.11	2	0.80	0.80

PINE RUN SEC CULVERT AG LES BASE ELEVATION = 684.20 Z = -0.40

Q	ELEV H1	ELEV H4	D2	D3	TYPE	C	C ADJUSTED
1350.0	696.83	********	9.38	6.24	2	0.80	0.80
1350.0	696.46	691.00	9.33	6.80	3	0.80	0.80
1350.0	696.40	691.18	9.36	6.98	3	0.80	0.80
1350.0	696.35	691.60	9.48	7.40	3	0.80	0.80
1350.0	696.36	691.76	9.55	7.56	3	0.80	0.80
1350.0	696.40	692.00	9.67	7.80	3	0.80	0.80
1350.0	696.45	692.17	9.77	7.97	3	0.80	0.80
1350.0	696.85	693.00	10.10	8.80	3	0.80	0.80
1350.0	697.60	694.00	10.10	9.80	3	0.79	0.79
1350.0	699.59	695.00	10.10	10.10	4	0.67	0.67
1400.0	697.26	********	9.59	6.38	2	0.79	0.79
1400.0	696.94	691.00	9.53	6.80	3	0.79	0.79
1400.0	696.86	691.18	9.55	6.98	3	0.80	0.80
1400.0	696.76	691.60	9.64	7.40	3	0.80	0.80
1400.0	696.76	691.76	9.70	7.56	3	0.80	0.80
1400.0	696.79	692.00	9.81	7.80	3	0.80	0.80
1400.0	696.83	692.17	9.90	7.97	3	0.80	0.80
1400.0	697.17	693.00	10.10	8.80	3	0.79	0.79
1400.0	697.90	694.00	10.10	9.80	3	0.78	0.78
1400.0	699.94	695.00	10.10	10.10	4	0.67	0.67

S-191
(July 1952)
Cross-section
properties

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File

[illegible] FLOOD OF

SECTION — AH [illegible] SEC AG culv

STA.	DIST.	W S ELEV.	ELEV.	DEPTH	MEAN DEPTH	AREA		W. P.		
L. B										
0			700.0							n = .060
										S = .15
28	—	691.0	691.0	—	—	—		—		R^2/3 = .7
										K = 1100
56	38		689.9	1.1	.55	20.9		38.0		
							[illegible]		[illegible]	
86	20		688.5	2.5	1.8	36.0	/	[illegible]	/	
90	4		685.9	5.1	3.8	15.2		4.8		n = .040
										R = 4.22
97	7		685.9	5.1	5.1	35.7		7.0		R^2/3 = 2.61
										K = 10,000
100	3		685.5	5.5	5.3	15.9		3.0		
104	4		686.3	4.7	5.1	20.4		4.1		
							123.7		24.6	
109	5		689.1	1.9	3.3	16.5	/	5.7	/	
										n = .045
138	29		689.5	1.5	1.7	49.3		29.0		R = [illegible]
										R^2/3 = [illegible]
275	137		689.5	1.5	1.5	205.5	[illegible]	[illegible]	[illegible]	K = [illegible]
290	15	691.0	691.0	0	.75	11.2	/	15.1	/	
370			698.0							
390			700.0							
	262					426.6	426.6	233.7	233.7	L+ = 19,030

Sheet No. ____ of ____ sheets. Prepared by ____ Date ____ Checked by ____ Date ____

U. S. GOVERNMENT PRINTING OFFICE 16—66957-1

9-191
(July 1922)
Cross-section
pro,[illegible]

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File

FLOOD OF

SECTION — AH [illegible] = SEC AG culv

STA.	DIST.	W. S. ELEV.	ELEV.	DEPTH	MEAN DEPTH	AREA		W. P.		
L B.										
0			700.0							
24	—	692.0	692.0	—	—			—		n = .060
28	4		691.0	1.0	0.5	2.0		4.1		Q = 1.88
										Q^2/3 = 1.52
50	28		689.9	3.1	1.55	58.9		38.0		K = 4400
86	20		688.5	3.5	3.7	53.0		20.0		
										n = .040
90	4		685.9	6.1	7.8	19.2		4.8		Q = 5.15
										Q^2/3 = 2.98
97	7		685.9	6.1	6.1	42.7		7.0		K = 14,000
100	3		685.5	6.5	6.3	17.9		3.0		
104	4		686.3	5.7	6.1	22.4		4.1		
109	5		689.1	2.9	4.3	21.5		5.7		n = .035
										Q = 2.39
138	29		689.5	2.5	2.7	78.3		29.0		Q^2/3 = 1.79
										K = 26,400
275	137		689.5	2.5	2.5	342.5		137.0		
296	21	692.0	692.0	0	1.25	26.2		21.2		
370			698.0							
390			700.0							
						600.6	692.5	275.9	273.9	K_T = 44,800

Sheet No. ____ of ____ sheets. Prepared by ____ Date ____ Checked by ____ Date ____

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9-191
(July 1952)
Cross-section
profiles

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File _____

FLOOD OF _____

SECTION — 2H / 2A [illegible] + SEC AG only

STA.	DIST.	W. S. ELEV.	ELEV.	DEPTH	MEAN DEPTH	AREA		W. P.		
L. B.										
9			700.0							n = .060
[illegible]	—	693.0	693.0	—	—	—				R = 2.73
28	8		691.0	2.0	1.0	8.0		7.2		R^2/3 = 1.95
										K = 8700
60	28		689.9	3.1	2.55	[illegible]		38.1		
							[illegible]		16.3	
86	20		688.5	[illegible]	3.9	76.0		[illegible]		
										n = .040
90	4		685.9	7.1	5.8	23.2		4.8		R = 6.09
										R^2/3 = 3.33
97	7		685.9	7.1	7.1	49.7		7.0		K = 18,500
100	3		685.5	7.5	7.5	21.9		3.0		
104	4		686.3	6.7	7.1	28.4		4.1		
							19.7			
109	5		689.1	[illegible]	[illegible]	[illegible]		5.7		n = .045
										R = [illegible]
138	29		689.5	[illegible]	3.7	107.3		29.0		R^2/3 = 2.35
										K = 50,700
275	137		689.5	3.5	3.5	479.5	23.3	137.0	[illegible]	
313	38	693.0	693.0	0	1.75	66.5		15.1		
370			698.0							
390			700.0							
						983.9	983.9	372	372	KT = 77,900

Sheet No. ____ of ____ sheets. Prepared by ____ Date ____ Checked by ____ Date ____

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S-191
(July 1952)
Cross-section
profiles

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File

FLOOD OF

SECTION — [illegible] + SEC AG culv

STA.	DIST.	W. S. ELEV.	ELEV.	DEPTH	MEAN DEPTH	AREA		W. P.		
L. B.										
0			700.0							n = .060
20	—	694.0	694.0	—	—	—				R = 3.65
28	8		691.0	3.0	1.5	12.0		8.5		$R^{2/3}$ = 2.37
										K = 14,300
66	38		689.9	4.1	3.55	154.9		38.0		
							12.9		4.5	
86	20		685	5.5	1.8	[illegible]	[illegible]	20.0	[illegible]	
90	4		685.9	8.1	6.8	27.2		4.8		n = .040
										R = 7.02
97	7		685.9	8.1	8.1	56.7		7.0		$R^{2/3}$ = 3.67
										K = 23,500
100	3		685.5	8.5	8.3	24.9		3.0		
104	4		686.3	7.7	8.1	32.4		4.1		
							12.7		2.3	
109	5		689.1	4.9	6.3	31.5		5.7		n = .045
										R = 4.00
138	29		689.5	4.5	4.7	136.3		29.0		$R^{2/3}$ = 2.52
										K = 72,000
275	137		689.5	4.5	4.5	616.5	85.3	137.0	16.2	
325	50	694.0	694.0	0	2.25	112.5		50.2		
370			698.0							
390			700.0							
						1280.9	1280.9	307.3	307.3	K_T = 109,200

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U. S. GOVERNMENT PRINTING OFFICE 16—80957-1

5-191
(July 1952)
Cross-section
projection

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File

FLOOD OF

SECTION — 24 / 25 [illegible] + SEC AG culv.

STA.	DIST.	W. S. ELEV.	ELEV.	DEPTH	MEAN DEPTH	AREA		W. P.		
L. B.										
0			700.0							
10	—	695.0	695.0	—	—					n = .060
28	12		691.0	4.0	2.0	24.0		12.6		R = 1.43
										R^2/3 = 2.70
56	28		689.9	5.1	2.55	172.4		37.0		K = 20,950
							12.9		10.9	
76	20		688.5	6.5	5.8	[illegible]		29.0		
90	4		685.9	9.1	7.8	31.2		4.8		n = .040
										R = 7.46
97	7		685.9	9.1	9.1	63.7		7.0		R^2/3 = 3.94
										K = 29,000
100	3		685.5	9.5	9.3	27.9		3.0		
104	4		686.3	8.7	9.1	36.4		4.1		
							10.5		10.0	
109	5		689.1	5.9	7.3	36.5		5.7		n = .045
										R = 6.38
138	29		689.5	5.5	5.7	165.3		29.0		R^2/3 = 3.34
										K = 101,900
275	137		689.5	5.5	5.5	753.5	137.0	137.0	137.2	
336	61	695.0	695.0	0	2.75	168		61.2		
370			698.0							
390			700.0							
						1595.2	1595.4	322.4	322.4	K_T = 151,800

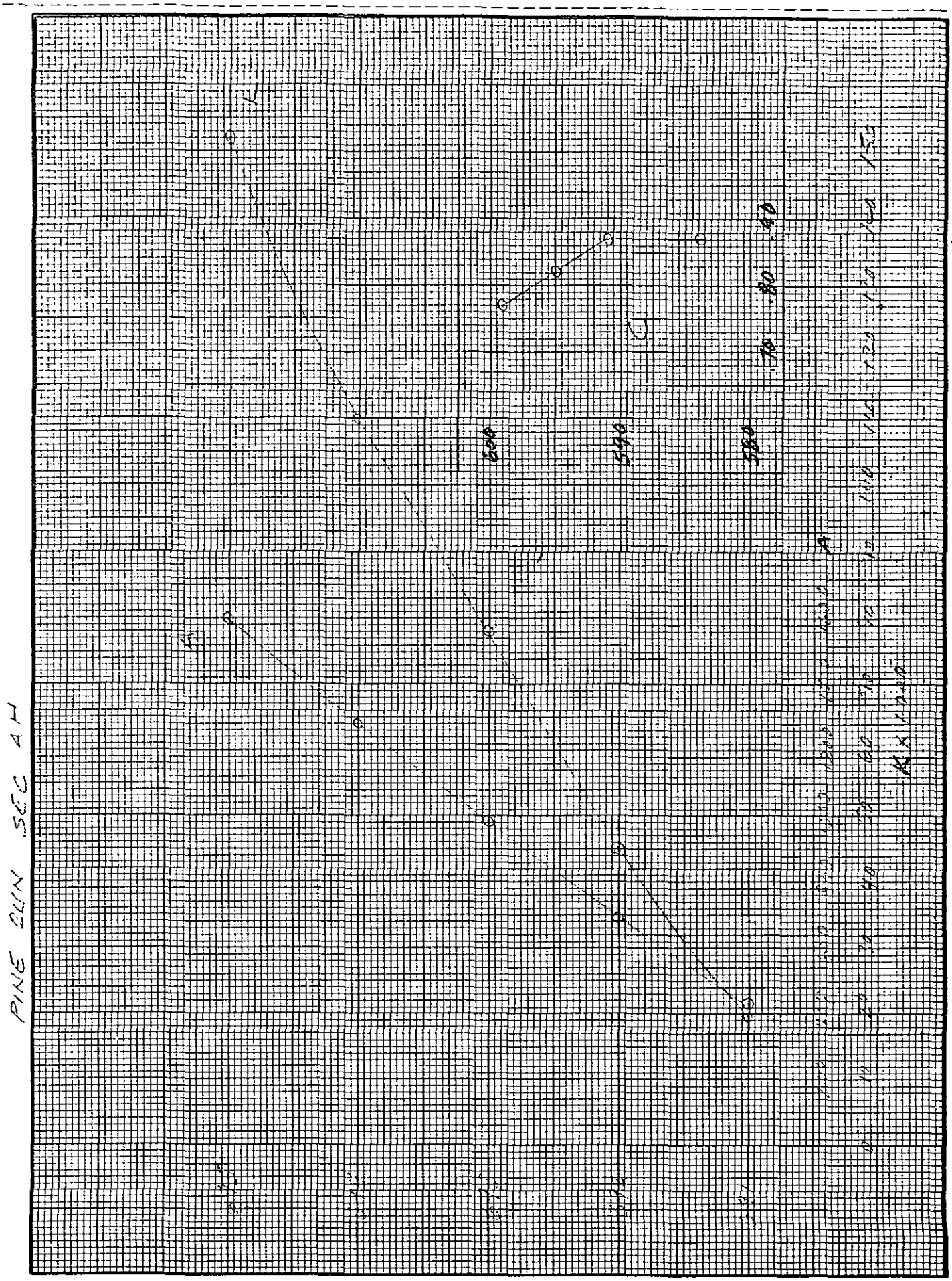
Sheet No. ____ of ____ sheets. Prepared by ____ Date ____ Checked by ____ Date ____

U. S. GOVERNMENT PRINTING OFFICE 16—66957-1

(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....



Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

PINE RUN SEC 43 CULVERT $Z = -0.4$

$Q_{10} = 740$ $h_4 = h_3 = 91.18$

1. 91.18 $d/D = 6.93/10.1 = .69$ $A_3 = .998 D^2 = 102$
2. +.82
3. +.32 Assume $d_2 = 8.3$ $8.3/10.1 = .82$ $d_2 = El\ 92.1$
   $K_3 = .746(14,900) = 11,100$ $K_2 = .864(\ ) = 12,900$
   91.70 $\frac{(83)(740)^2}{(11,100)(12,900)} = .32$ $A_2 = 1.147(10.1)^2 = 117$
3. +.33
   −.67 Assume $d_2 = 7.9$ $7.9/10.1 = .78$ $K_2 = .837(\ ) = 12,500$ $d_2 = El\ 91.70$
   91.66 ok $\frac{(83)(740)^2}{(11,150)(12,500)} = .33$ $A_2 = (1.105) D^2 = 113$
4. +.31 Assume $h_1 = 92.6$ $c = .85$ $\frac{1}{c^2} - 1 (.82) = .31$
5. +.01 $K_1 = 64,000$ $\frac{(20)(740)^2}{(12,500)(64,500)} = .01$ $A_1 = 860$
6. −.01
   92.64 USE $\frac{8.44 + 0.4}{10.1} = .88 < 1.5$ ok
   $d_c/D = d_c = 6.0$

$Q_{50} = 1010$ $h_4 = h_3 = 91.60$

1. 91.60 $d_3/D = 7.4/10.1 = .73$ $A_3 = 1.049 D^2 = 107$
2. +1.39
3. +.57 Assume $d_2 = 8.0$ $d_2/D = .79$ $K_2 = .845(\ ) = 12,600$ $d_2 = El\ 91.8$
   −1.22 $K_3 = .793(\ ) = 11,800$ $\frac{(83)(1010)^2}{(11,800)(12,600)} = .57$ $A_2 = 114$
   92.34
3. +.55 Assume $d_2 = 8.5$ $d_2/D = .84$ $K_2 = 13,100$ $d_2 = El\ 92.3$
   −1.12 $\frac{(83)(1010)^2}{(11,850)(13,100)} = .55$ $A_2 = 119$
   92.42
3. +.54 Assume $d_2 = 8.6$ $d_2/D = .85$ $K_2 = 13,200$ $d_2 = El\ 92.4$
   −1.10 $\frac{(83)(1010)^2}{(11,800)(13,200)} = .54$ $A_2 = 120$
   92.43 ok
4. +.58 Assume $h_1 = 93.5$ $c = .84$ $\frac{1}{c^2} - 1 (1.39) = .58$
5. +.02 $K_1 = 93,500$ $\frac{(20)(1010)^2}{(13,200)(93,500)} = .02$
6. −.01 $A_1 = 1130$
   94.12

(March 1949)
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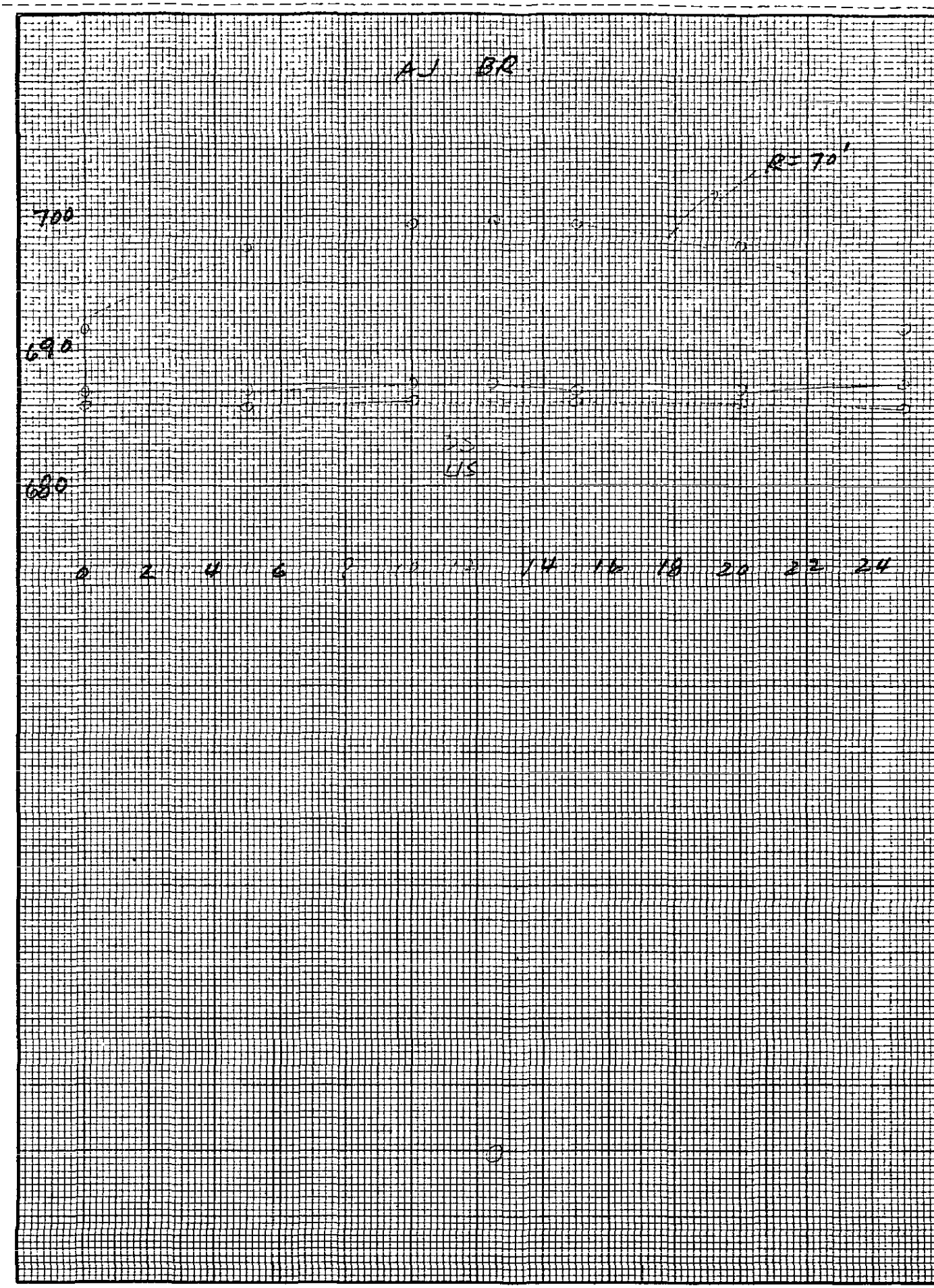
File .....

PINE RUN



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9-213-E
(March 1949)
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UNITED STATES DEPARTMENT OF THE INTERIOR
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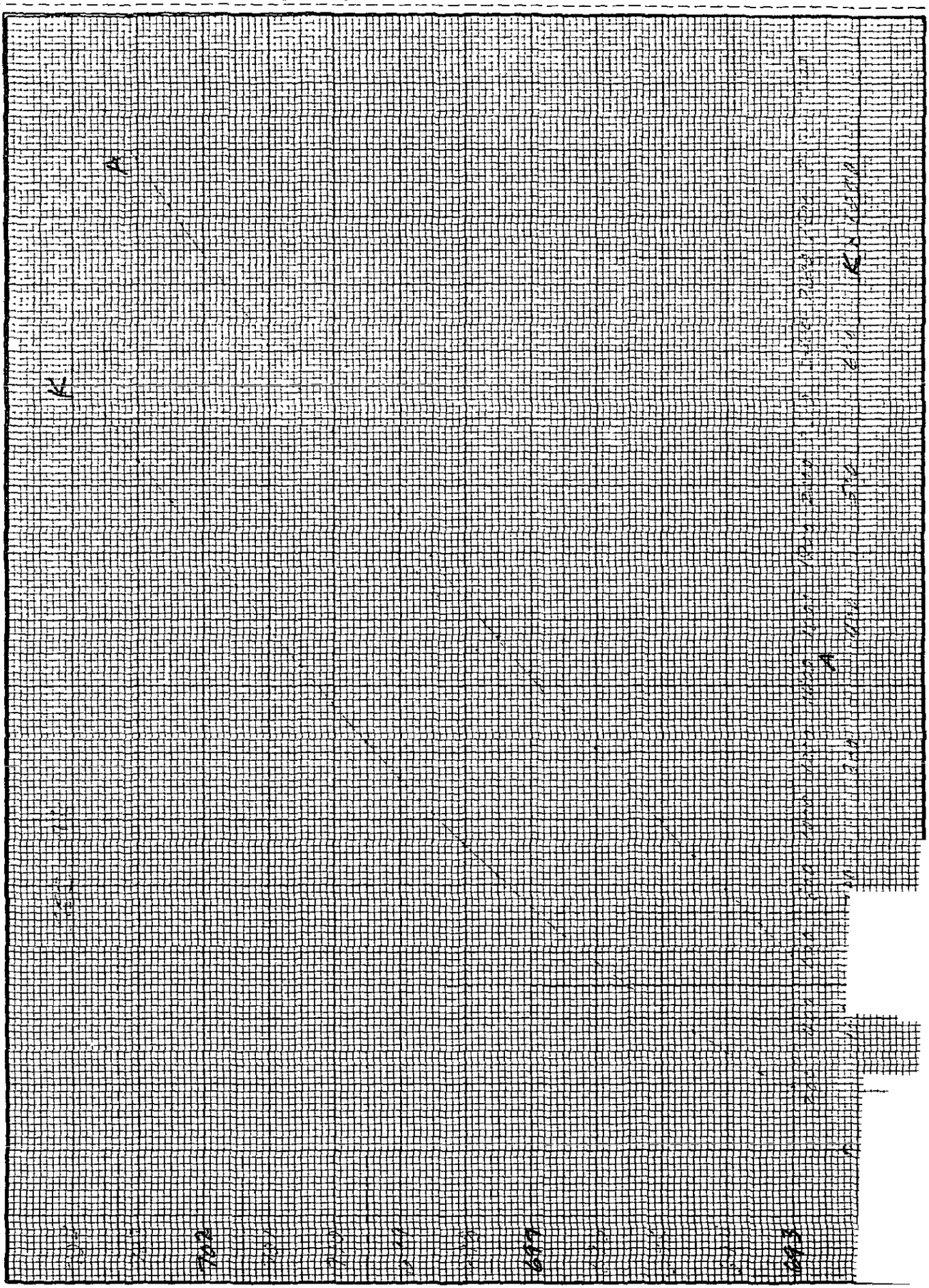
WATER RESOURCES DIVISION

File .....

THE DUN PEAK



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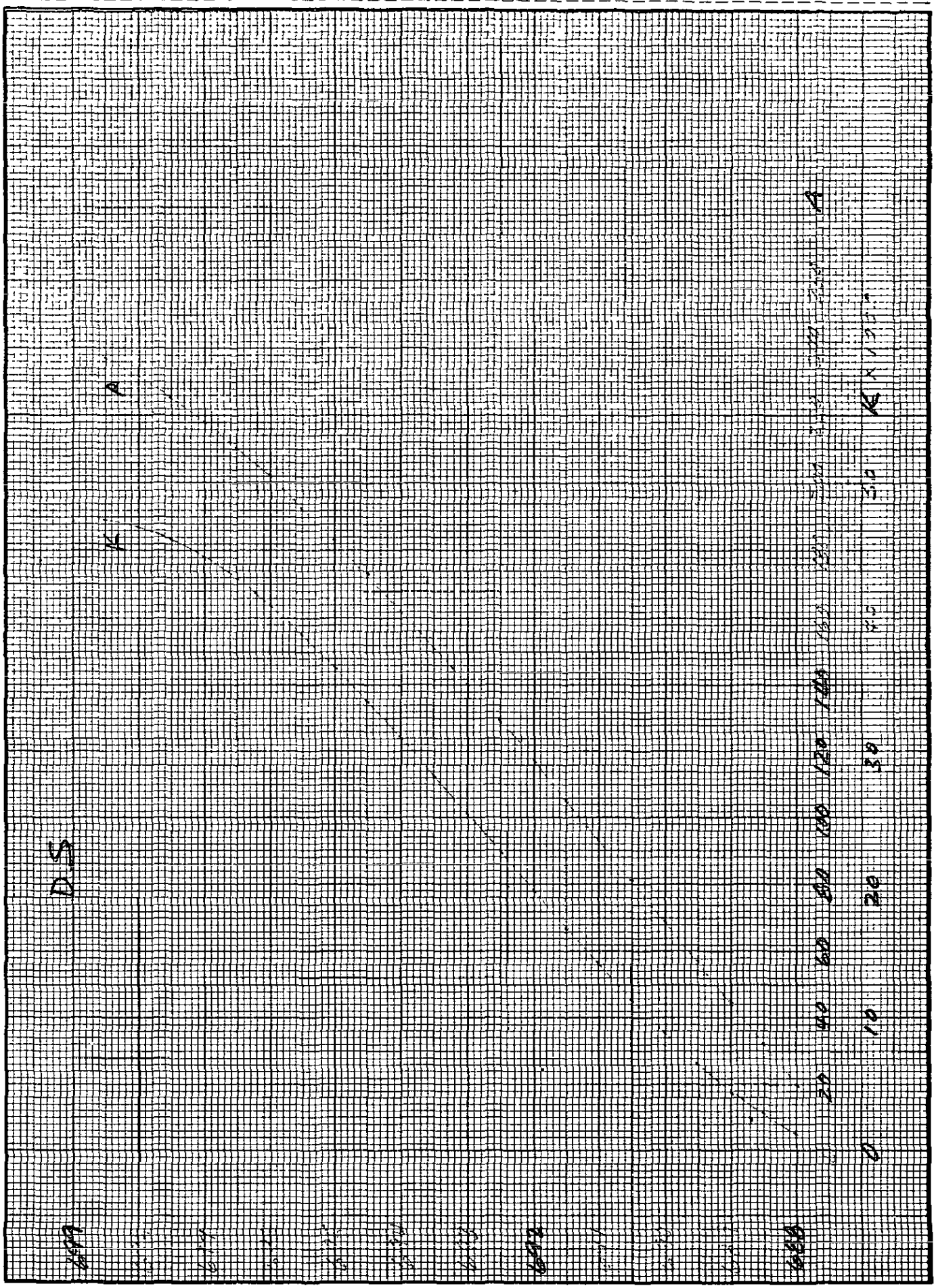
File .....

PINE RUN AJ CULVERT DS 240



(March 1949)
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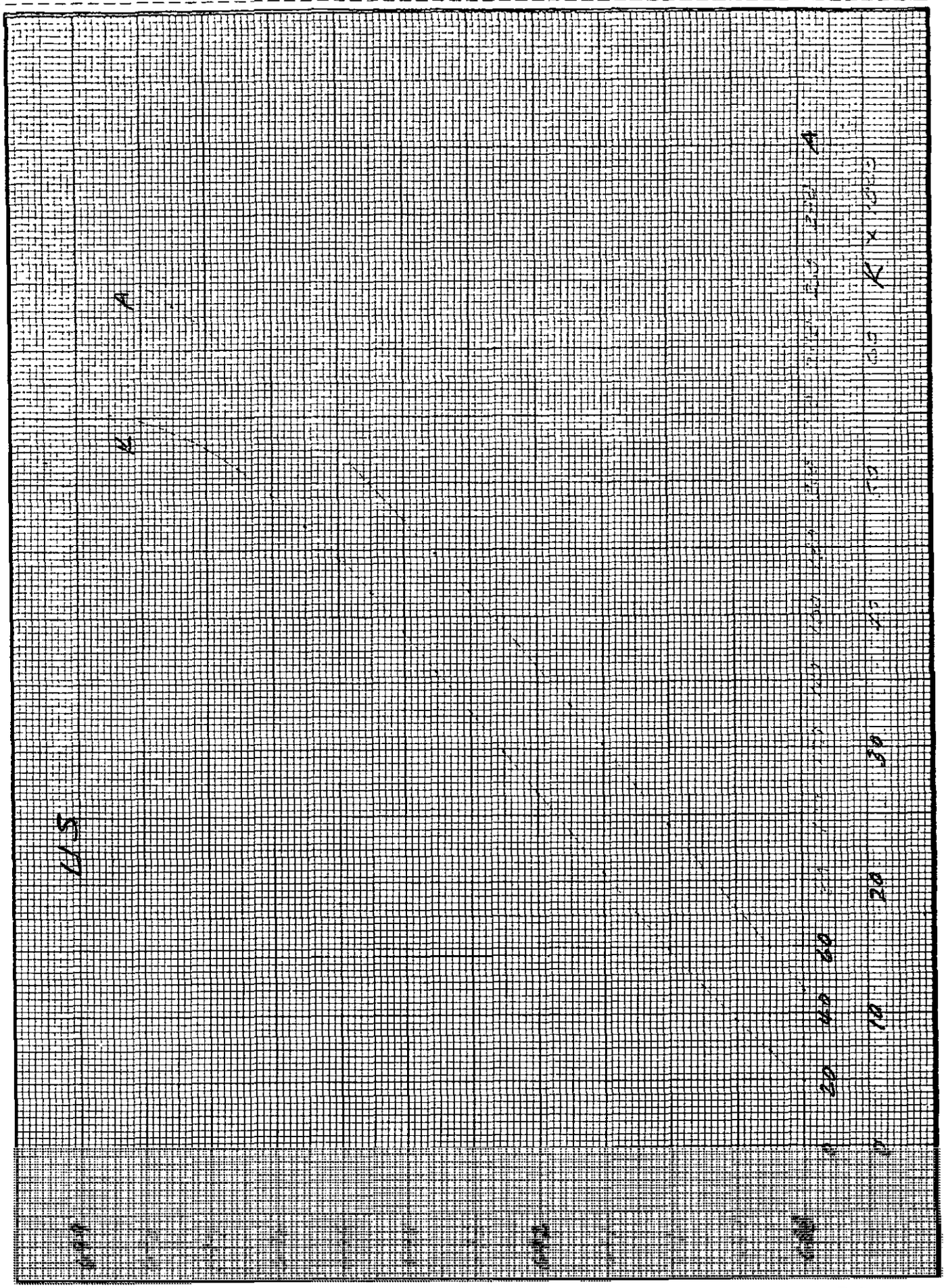
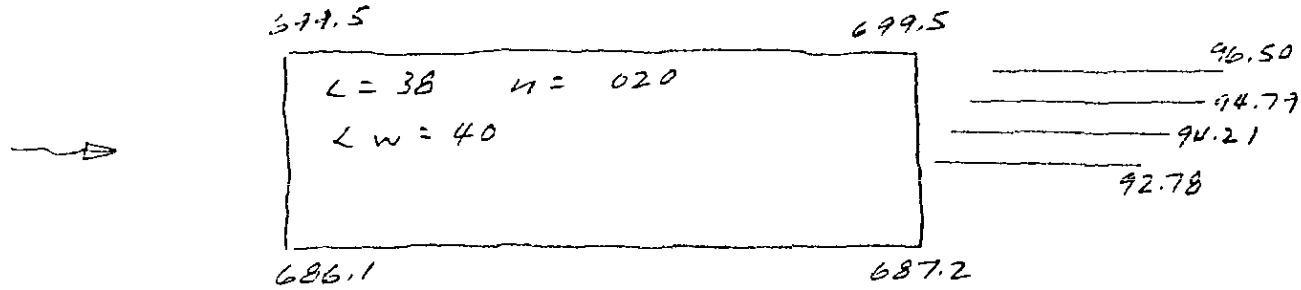
UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....

PINE RUN AT CLINGAN US 202



PINE RUN SEC 34 CULVERT



$Q_{10} = 695$ $h_4 = h_3 = 92.78$ $A_3 = 135$ $K_3 = 24{,}000$ $V_3 = 5.15$

1. 92.78
2. + .41
3. + .02 Assume $h_2 = 93.00$ $K_2 = 32{,}800$ $A_2 = 167$
   — .27 $\frac{LQ^2}{K_2 K_3} = \frac{(38)(695)^2}{(32{,}800)(24{,}000)} = .02$
   92.94 Try $h_2 = 92.94$ $K_2 = 32{,}500$ $A_2 = 166$

3. + .02 $\frac{(38)(695)^2}{(32{,}500)(24{,}000)} = .02$
   — .27
   92.94 OK

4. + .11 $F = V/\sqrt{gd} = 5.15/\sqrt{32.2(5.55)} = .38$ $c = 84$
   $K_\theta = 1.06$ $c = (1.06)(.84) = .89$
   $\frac{1}{c^2} - 1 (.41) = .11$

5. + .01 Assume $h_1 = 93.2$ $K_1 = 50{,}000$ $A_1 = 620$
6. — .02 $\frac{(40)(695)^2}{(50{,}000)(32{,}500)} = .01$
   93.31 Assume $h_1 = 93.30$ $K_1 = 55{,}000$ $A_1 = 640$

5 + .01 $\frac{(40)(695)^2}{(55{,}000)(32{,}500)} =$
6 — .02
93.31 OK Use 93.31

$\frac{h_1 - z}{D} = \frac{6.11 + 11}{13} = .6 < 1.5$ $Q_c > 1900$ OK

PINE GLEN SEC AJ CULVERT

$Q_{50} = 950$ $h_3 = h_4 = 94.21$ $A_3 = 166$ $K_3 = 32,400$ $V_3 = 5.72$

1. 94.21
2. + .51
3. + .03 Assume $h_2 = 94.50$ $K_2 = 41,800$ $A_2 = 200$

$$\frac{(950)^2(38)}{(32,400)(41,800)} = .03$$

— .35
94.40

3. + .03 Try $h_2 = 94.40$ $K_2 = 41,200$ $A_2 = 197$

$$\frac{(950)^2(38)}{32,400)(41,200)} = .03$$

— .36
94.39 ok

$F = 5.72/\sqrt{32.2(7.01)} = .38$ $C = .84$

4. + .13 $C = (1.06)(.84) = .89$

$\frac{1}{C^2} - 1 (.51) = .13$

5. + .01 Assume $h_1 = 94.9$ $K_1 = 103,000$ $A_1 = 960$

$$\frac{(950)^2(40)}{(103,000)(41,200)} =$$

6. — .02
94.87 ok USE

$\frac{h_1 - Z}{D} = \frac{7.67}{13} = .6 < 1.5$ ok $Q_c > 2500$ ok

UNITED STATES DEPARTMENT OF THE INTERIOR
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File .....

PIKE RUN SEC AJ Culvert

$Q_{100} = 1040$ $h_4 = h_3 = 94.79$ $K_3 = 35,300$ $A_3 = 178$ $V_3 = 5.84$

1. 94.79
2. + .53 hv_3
3. + .03 hf Assume $h_2 = 95.00$ $K_2 = 44,300$ $A_2 = 210$

$$\frac{.38}{94.97} \frac{(38)(1040)^2}{(35,300)(44,300)} = .03$$

OK

hv_2 $F = 5.84 / (32.2(7.59)) = .37$

4. + .15 $c = .83 \times 1.06 = .88$ $\frac{1}{c^2} - 1 (.53) = .02$
5. + .01 Assume $h_1 = 95.6$ $K_1 = 128,000$ $A_1 = 1120$
6. $-.01$ hv_1

$$\frac{-.01}{95.50} \frac{(40)(1040)^2}{(128,000)(44,300)} = .01$$

Try $h_1 = 95.50$ $K_1 = 124,000$ $A_1 = 1100$

5. + .01
6. $-.01$

$$\frac{(40)(1040)^2}{(124,000)(44,300)} =$$

95.50 OK USE

Sheet No. 3 of 4 Sheets. Prepared by ..... Date ... Checked by .. . Date .....

PINE RUN SEC 4J Culvert

$Q_{500} = 1270$ $h_4 = h_3 = 96.50$ $K_3 = 42,900$ $A_3 = 210$ $V_3 = 6.05$

1. 96.50
2. + .57
3. + .03 Assume $h_2 = 96.70$ $K_2 = 51,800$ $A_2 = 241$
   — .43 $\frac{(38)(1270)^2}{(51,800)(42,900)} = .03$
   96.67 OK $F = 6.05 / \sqrt{32.2(9.3)} = .35$
4. + .17 $c = (.83)(1.06) = .88$ $\frac{1}{c^2} - 1(.57) =$
5. ~~+ .01~~
6. ~~— .01~~ Assume $h_1 = 97.20$ $K_1 = 193,000$ $A_1 = 1470$
   97.27 $\frac{(42)(1270)^2}{(193,000)(51,800)} = .01$
5. + .01 Try $h_1 = 97.27$ $K_1 = 196,000$ $A_1 = 1490$
6. — .01 $\frac{(40)(1270)^2}{(196,000)(51,800)} = .01$
   97.27
   USE

Sheet No. 4 of 4 Sheets. Prepared by . . . . Date 8-15-78 Checked by . . . . Date . . . .

(March 1949)
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PIKE 2L N

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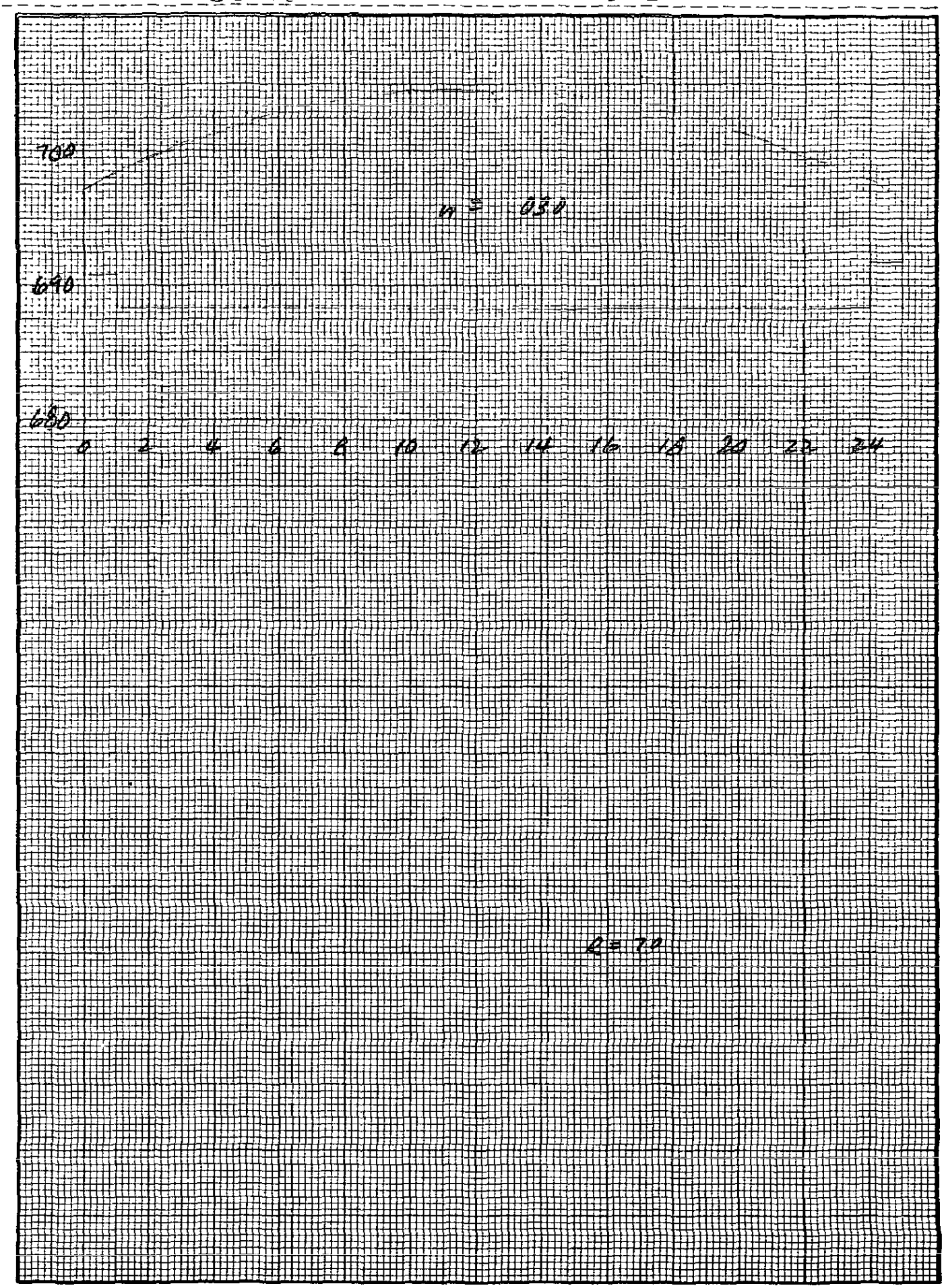
File .....

SEC 4N CONVENT

DSS



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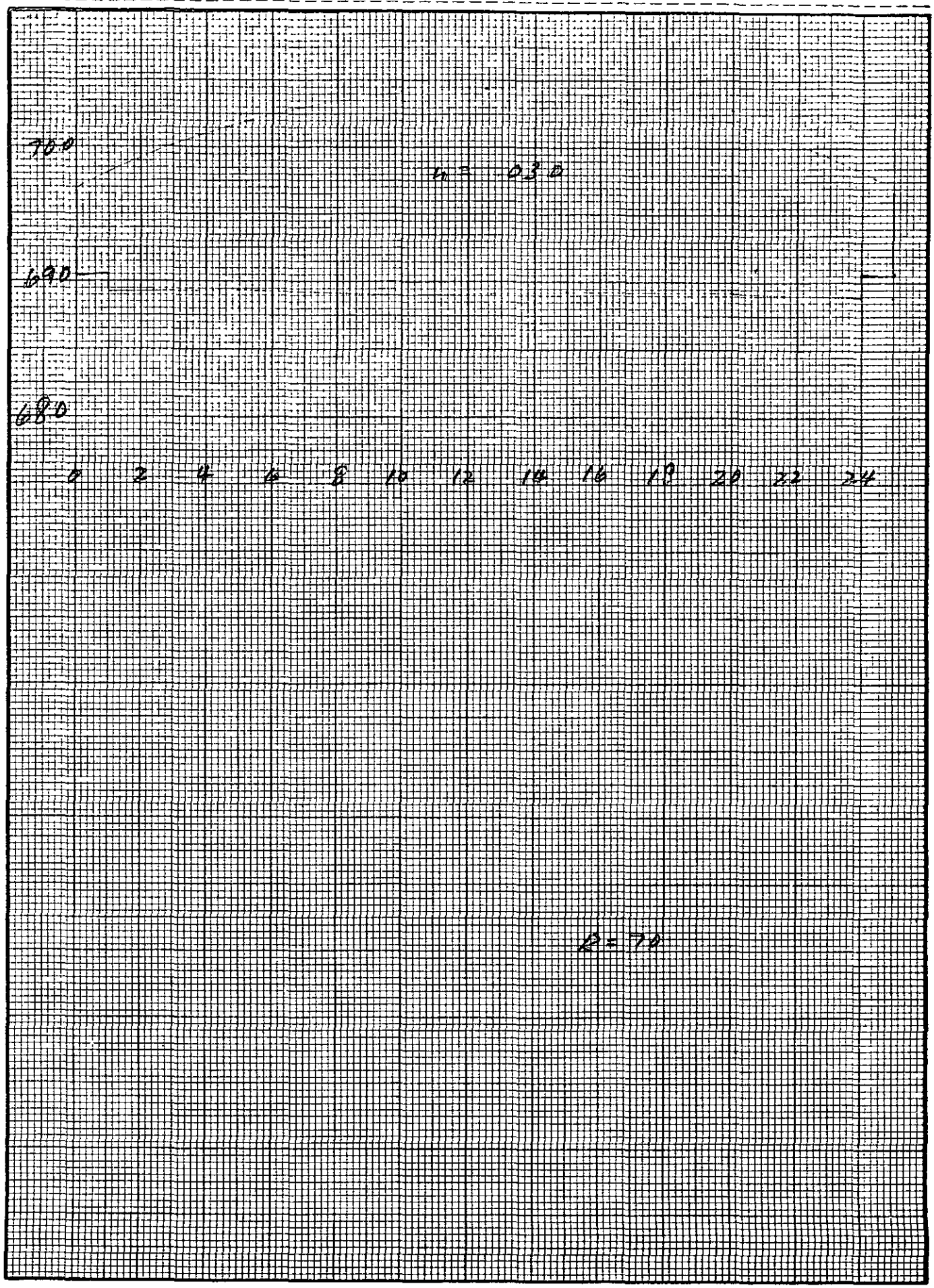
9-213-E
(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....



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(March 1949)
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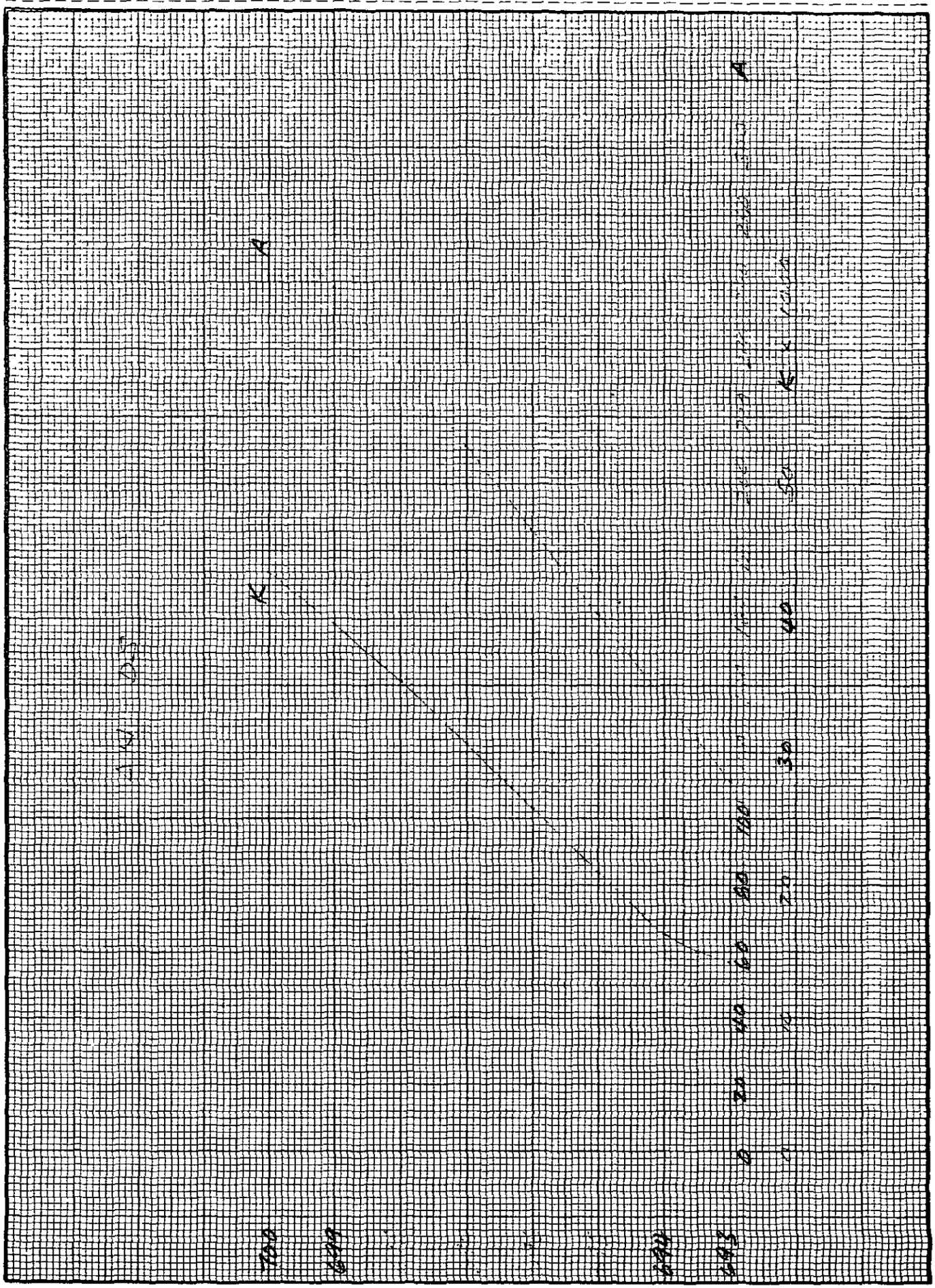
PINE RUN SEC AA only D.S end



(March 1949)
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UNITED STATES DEPARTMENT OF THE INTERIOR
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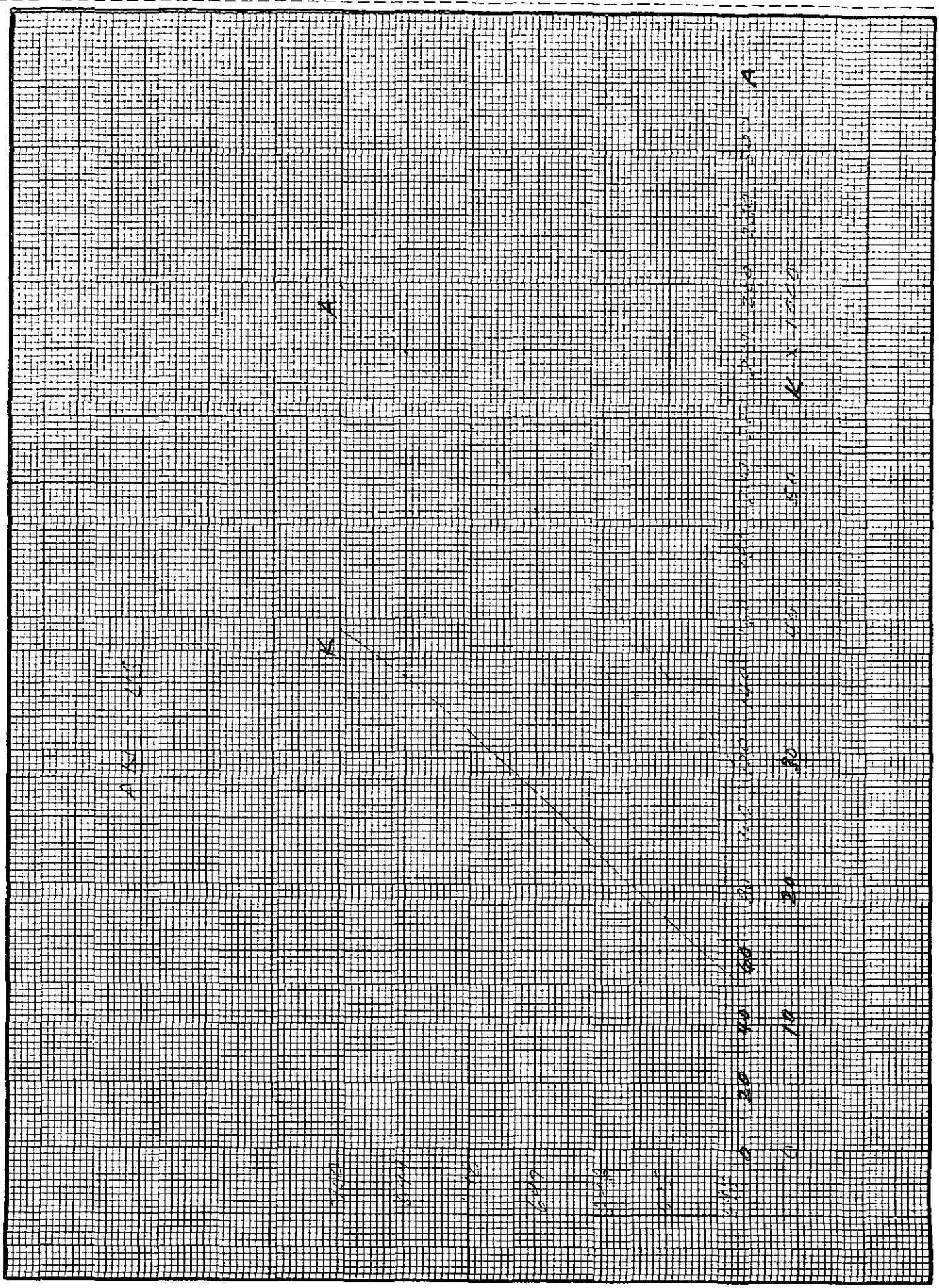
WATER RESOURCES DIVISION

File .....

PIKE RUN SEC AN CUV. US and



9-213-E
(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
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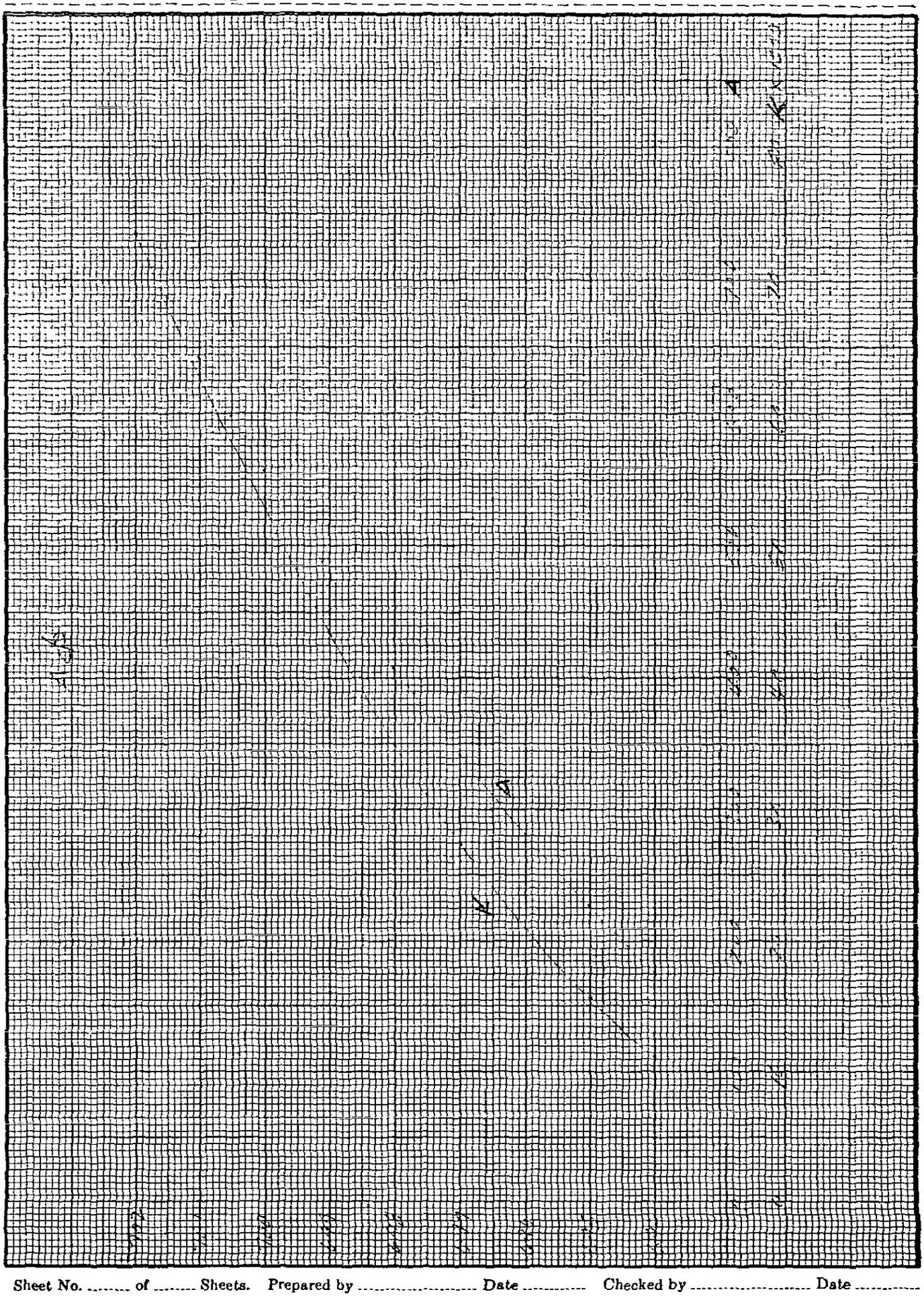
WATER RESOURCES DIVISION

File .....

PINE RUN SEC A-A'



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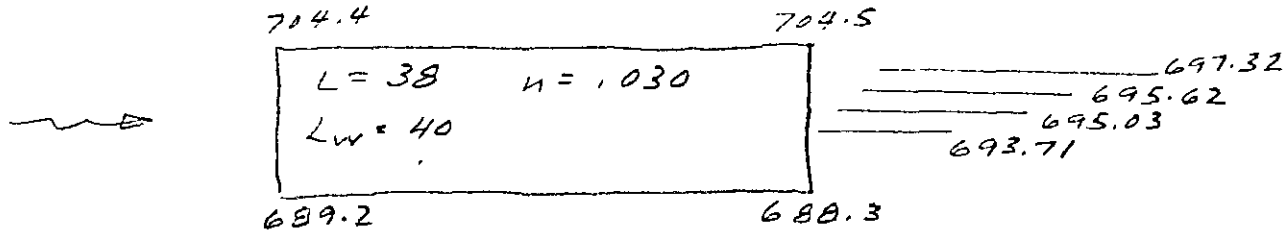
DINE RUN SEC AN CULVERT



$Q_{10} = 695$ $h_4 = h_3 = 93.71$ $A_3 = 129$ $K_3 = 10{,}550$ $V_3 = 5.39$

1. 93.71
2. + .45
~~3. + .17~~ Assume $h_2 = 93.85$ $K_2 = 10{,}250$ $A_2 = 113$
~~.59~~ $\frac{L Q^2}{K_2 K_3} = \frac{(38)(695)^2}{(10{,}550)(10{,}250)} = .17$
93.70

Assume $h_2 = 93.70$ $K_2 = 10{,}200$ $A_2 = 110$
$\frac{(38)(695)^2}{(10{,}550)(10{,}200)} =$

3 + .17
~~− .62~~
93.71 ok

4. + .02 $F = V/\sqrt{gd} = 5.39/\sqrt{32.2(5.41)} = .41$ $C = .84$
$K_9 = 121$ $C = (1.21)(.84) = \cancel{1.02}$ use .98
$\frac{1}{C^2} - 1 (.45) = .02$

~~5 + .19~~ Assume $h_1 = 94.00$ $K_1 = 10{,}100$ $A_1 = 175$
~~6. − .25~~ $\frac{L_w Q^2}{K_1 K_2} = \frac{(40)(695)^2}{(10{,}200)(10{,}100)} = .19$
~~94.29~~

5. + .19 Assume $h_1 = 94.30$ $K_1 = 10{,}230$ $A_1 = 190$
6. − .21 $\frac{(40)(695)^2}{(10{,}200)(10{,}230)} =$
94.33 ok

$\frac{h_1 - Z}{D} = \frac{6.03 - 0.9}{15.7} = .3 < 1.5$ ok

Qc ok

PINE RUN SEC 4N CULVERT

$Q_{50} = 950$ $h_4 = h_3 = 95.03$ $A_3 = 161$ $K_3 = 21{,}000$ $V_3 = 5.90$

1. 95.03
2. +.54
3. ~~+.09~~ Assume $h_2 = 95.10$ $K_2 = 18{,}000$ $A_2 = 145$

~~-.67~~ $\frac{(38)(950)^2}{(21{,}000)(18{,}000)} = .09$

~~94.99~~

Assume $h_2 = 94.99$ $K_2 = 17{,}500$ $A_2 = 142$

3. +.09

-.69

94.97 OK

4. +.02 $F = V/\sqrt{gd} = 5.90/\sqrt{g(6.73)} = .40$ $c = .84$

$K_\theta = 1.21$ $c = (1.21)(.84) = 1.02$ use .98

$\frac{1}{c^2} - 1 (.54) = .02$

5. +.11 Assume $h_1 = 95.6$ $K_1 = 18{,}500$ $A_1 = 258$
6. -.21 $\frac{(40)(950)^2}{(17{,}500)(18{,}500)} =$

95.58 OK

$\frac{h_1 - z}{D} = \frac{7.28 - .9}{15.7} = .41 < 1.5$ OK

Q_c OK

PINE RUN SEC AN culvert

$Q_{100} = 1040$ $h_4 = h_3 = 95.62$ $K_3 = 24{,}000$ $A_3 = 177$
$V_3 = 5.88$

1. 95.62
2. + .54
3. + .08 Assume $h_2 = 95.60$ $K_2 = 20{,}200$ $A_2 = 158$
— .67 — $\frac{(38)(1040)^2}{(24{,}000)(20{,}200)} = .08$
95.57 ok

~~Assume $h_2 = 95.58$ $K_2 =$ $A_2 =$~~

4. + .02 $F = 5.88/\sqrt{g(7.32)} = .38$ $C = .84$

$K_\theta = 1.21$ use $C = .98$ $\frac{1}{C^2} - 1 (.54) = .02$

~~5. + .11~~ Assume $h_1 = 96.28$ $K_1 = 22{,}500$ $A_1 = 296$
~~6. — .19~~ $\frac{(40)(1040)^2}{(20{,}200)(22{,}500)} = .11$
96.18

Assume $h_1 = 96.18$ $K_1 = 22{,}000$ $A_1 = 290$

5. + .10
6 — .20
96.16 ok

$\frac{h_1 - z}{D} = \frac{7.86 - .9}{15.7} = .44 < 1.5$ ok

Q_c ok

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....

PINE RUN SEC AN CULVERT

$Q_{500} = 1270$ $h_4 = h_3 = 97.32$ $K_3 = 32,200$ $A_3 = 220$ $V_3 = 5.77$

1. 97.32
2. + .52
3. + .07 Assume $h_2 = 97.30$ $K_2 = 28,400$ $A_2 = 200$

$$\frac{(38)(1270)^2}{(32,200)(28,400)} = .07$$

— .63 —
97.28 ok

4. + .02 Use $C = .98$ $\frac{1}{C^2} - 1 (.52) = .02$

5. + .07 Assume $h_1 = 97.90$ $K_1 = 34,100$ $A_1 = 400$

$$\frac{(40)(1270)^2}{(28,400)(34,100)} = .05$$

6. — .16 —
97.84 Assume $h_1 = 97.82$ $K_1 = 33,500$ $A_1 = 395$

5. + .07 $\frac{(40)(1270)^2}{(28,400)(33,500)} = .07$
6. — .16
97.84 ok

$$\frac{h_1 - z}{D} = \frac{9.54 - .9}{15.7} = .55 < 1.5 \text{ ok}$$

Q_c ok

Sheet No. . . . of . . . Sheets. Prepared by . . . . . Date . . Checked by . . . . . Date . . .

00BREAK00

1) COUNTY: ~~Eaton~~ Genesee

2) STUDY NAME: City of Fenton

3) WATERCOURSE: Shiawassee River

4) DOCUMENT TYPE: 100 yr Encroached

00BREAK00

*** INPUT CARD PRINTOUT ***

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3  5500    6C 1  14  3  884  113310  1  3
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6  5629  1  2 070 070  1  2 045 045  1  2 055 055
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5  5712     121  2  8840  124  2  8850  143  3  8860  146  3  8880  157  3  8900
5  5713     184  3  8920
6  5729  1  2 060 060  1  2 048 048  1  2 070 070
3  5800    6F 0  10  3  885  114170 99 99
5  5811       0  1  8920    3  1  8880   10  2  8870   12  2  8866   16  2  8844
5  5812      36  2  8844   39  3  8866   40  3  8880   48  3  8900   56  3  8920
6  5829  1  2 060 060  1  2 046 046  1  2 060 060
```

GN

GO

GP

GQ

```
WATER-SURFACE PROFILE FOR:  SHIAWASSEE RIVER  M-23 TO FENTON MOD    HOLTSLAG
PAGE  1 OF  2, PROFILE NUMBER  5,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HORIZONTAL CONTROL
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
   4V AT   99100 /     0 /    450. /   201. /   22886. / 1.08 /    12. /   61.
   872.55 /   0.08 /                 / 872.63 /   2.24 /   0.19/          *IS*
============================ BEGIN BRIDGE ANALYSIS ===========================
BP 4V AT   99100 /       /    450. /   191. /   26245. / 1.00 /     0. /   37.
   872.55 /   0.09 /       ...1...  (-.001)    /   2.35 /   0.18 /          *BO*
----------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
----------------------------------------------------------------------------------
   4W AT   99180 /    80 /    450. /   191. /   24014. / 1.00 /     0. /   37.
   872.58 /   0.09 /   0.03 /   0.00 / 872.67 /   2.36 /   0.18 /  0.000  *AS*
----------------------------------------------------------------------------------
   M = 0.0  / F = 1.00 / K* = 0.01 /   191. /   24014. / 1.00 /     0. /   37.
   872.58 /   0.09 /                 / 872.67 /   2.36 /   0.18 /          *AS*
============================ END BRIDGE ANALYSIS =============================
  4WW AT   99190 /    10 /    450. /   191. /   24014. / 1.00 /     0. /   37.
   872.58 /   0.09 /   0.00 /   0.0  / 872.67 /   2.36 /   0.18 / -0.004  *XS*
============================ BEGIN BRIDGE ANALYSIS ===========================
BR4WW AT   99190 /       /    450. /   193. /   27099. / 1.00 /     0. /   37.
   872.58 /   0.08 /       ...1...  (-.001)    /   2.33 /   0.18 /          *BO*
----------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
----------------------------------------------------------------------------------
 4WWW AT   99240 /    50 /    450. /   202. /   25831. / 1.04 /    10. /   50.
   872.60 /   0.08 /   0.02 /   0.0  / 872.68 /   2.23 /   0.18 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = 0.01 / E = 0.27 / K* = 0.01 /   202. /   25831. / 1.04 /    10. /   50.
   872.60 /   0.08 /                 / 872.68 /   2.23 /   0.18 /          *AS*
============================ END BRIDGE ANALYSIS =============================
   4X AT   99280 /    40 /    450. /   202. /   20283. / 1.05 /    10. /   50.
   872.60 /   0.08 /   0.02 /   0.00 / 872.68 /   2.23 /   0.18 / -0.016  *XS*
============================ BEGIN BRIDGE ANALYSIS ===========================
BR 4X AT   99280 /       /    450. /   181. /   18738. / 1.00 /     0. /   37.
   872.60 /   0.10 /       ...1...  (-.001)    /   2.48 /   0.19 /          *BO*
----------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
----------------------------------------------------------------------------------
   4Y AT   99320 /    40 /    450. /   209. /   18660. / 1.06 /     0. /   40.
   872.63 /   0.08 /   0.02 /   0.0  / 872.70 /   2.15 /   0.17 /  0.000  *AS*
----------------------------------------------------------------------------------
   M = 0.01 / E = 0.0  / K* = 0.03 /   209. /   18676. / 1.06 /     0. /   40.
   872.63 /   0.08 /                 / 872.71 /   2.15 /   0.17 /          *AS*
                                   END BRIDGE ANALYSIS ==========================
```

FA

FB

FC

FD

FE

FF

100 yr - encroachment used for F/S

FW

FW

```
  872.58 /   0.08 /        ...1...  (-.001)    /   2.33 /   0.18 /          *BO*
-----------------------------------------------------------------------------
    NO EMBANKMENT CROSS SECTION
-----------------------------------------------------------------------------
 4WWW AT   99240 /    50 /    450. /   202. /   25831. / 1.04 /   10. /   50.
  872.60 /   0.08 /   0.02 /   0.0  /  872.68 /   2.23 /   0.18 / -0.000  *AS*
-----------------------------------------------------------------------------
  M = 0.01 / E = 0.27 / K* = 0.01 /   202. /   25831. / 1.04 /   10. /   50.
  872.60 /   0.08 /                 /  872.68 /   2.23 /   0.18 /         *AS*
============================ END BRIDGE ANALYSIS ============================
  4X AT   99280 /    40 /    450. /   202. /   20283. / 1.05 /   10. /   50.
  872.60 /   0.08 /   0.02 /   0.00 /  872.68 /   2.23 /   0.18 / -0.016  *XS*
============================ BEGIN BRIDGE ANALYSIS ==========================
BR 4X AT   99280 /        /    450. /   181. /   18738. / 1.00 /    0. /   37.
  872.60 /   0.10 /        ...1...  (-.001)    /   2.48 /   0.19 /          *BO*
-----------------------------------------------------------------------------
    NO EMBANKMENT CROSS SECTION
-----------------------------------------------------------------------------
  4Y AT   99320 /    40 /    450. /   209. /   18660. / 1.06 /    0. /   40.
  872.63 /   0.08 /   0.02 /   0.0  /  872.70 /   2.15 /   0.17 /  0.000  *AS*
-----------------------------------------------------------------------------
  M = 0.01 / E = 0.0  / K* = 0.03 /   209. /   18676. / 1.06 /    0. /   40.
  872.63 /   0.08 /                 /  872.71 /   2.15 /   0.17 /         *AS*
============================ END BRIDGE ANALYSIS ============================
  4Z AT   99800 /   480 /    450. /   430. /   22634. / 1.61 /  200. /  400.
  872.91 /   0.03 /   0.23 /   0.0  /  872.94 /   1.05 /   0.13 /  0.000  *XS*
-----------------------------------------------------------------------------
  5A AT  100430 /   630 /    450. /   469. /   30810. / 1.54 /  325. /  525.
  873.10 /   0.02 /   0.18 /   0.0  /  873.12 /   0.96 /   0.10 / -0.000  *XS*
-----------------------------------------------------------------------------
  5B AT  101220 /   790 /    450. /   557. /   26364. / 2.17 /  275. /  575.


  873.30 /   0.02 /   0.20 /   0.00 /  873.32 /   0.81 /   0.11 /  0.000  *XS*
-----------------------------------------------------------------------------
```

FD

FE

FF

FG

FH

FI

FW

*** FLOODWAY ANALYSIS *** HORIZONTAL CONTROL

	SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
	WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
FJ	5C	AT	101760	540	450.	325.	18424.	1.66	115.	265.	
	873.51		0.05	0.23	0.01	873.56	1.39	0.16	-0.000	*XS*	
FK	5D	AT	102620	860	450.	228.	8573.	3.26	40.	390.	
	874.54		0.20	1.10	0.07	874.73	1.97	0.33	0.001	*XS*	
FL	5DD	AT	102770	150	450.	559.	18648.	4.51	40.	440.	
	874.88		0.05	0.19	0.0	874.92	0.81	0.17	-0.000	*XS*	FW
FM	5E	AT	103250	480	450.	475.	26235.	2.21	200.	500.	
	875.09		0.03	0.20	0.0	875.12	0.95	0.13	0.000	*XS*	
FN	5F	AT	103810	560	450.	221.	11405.	1.74	80.	220.	
	875.43		0.11	0.38	0.04	875.54	2.04	0.28	0.001	*XS*	
FO	5G	AT	104480	670	450.	282.	11851.	2.30	40.	290.	→ Floodway delineated @ 365 ft. per phone call w/ D. Hartzlog @ USGS S.E.
	876.46		0.09	1.00	0.0	876.55	1.60	0.25	0.001	*XS*	
FP	5H	AT	105190	710	450.	359.	17309.	1.92	90.	260.	
	877.21		0.05	0.70	0.0	877.26	1.25	0.15	0.005	*XS*	
FQ	5I	AT	105800	610	450.	292.	13086.	1.72	345.	545.	
	877.75		0.06	0.55	0.01	877.81	1.54	0.20	0.001	*XS*	
FR	5J	AT	106280	480	450.	289.	15455.	2.01	420.	620.	
	878.22		0.08	0.48	0.01	878.30	1.55	0.21	-0.001	*XS*	FW
FS	5JJ	AT	106800	520	450.	527.	27219.	1.68	280.	580.	
	878.53		0.02	0.25	0.0	878.55	0.85	0.10	0.000	*XS*	
FT	5K	AT	107100	300	450.	412.	17551.	1.48	150.	350.	
	878.65		0.03	0.13	0.00	878.68	1.09	0.15	0.000	*XS*	
FU	5L	AT	107360	260	450.	274.	15988.	1.19	40.	140.	
	878.83		0.05	0.19	0.01	878.88	1.64	0.16	-0.000	*XS*	
FV	5M	AT	108070	710	450.	168.	10758.	1.00	250.	300.	
	879.64		0.11	0.84	0.03	879.75	2.68	0.26	0.002	*XS*	

END OF THIS PROFILE

FW

```
      SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
        WS ELEV /    HV  /    HF  /    HE  /    EG  /     V  /    FN  /  ACC   *ID*
      ==========================================================================
FW      5N AT  108160 /     0 /    450. /   217. /   18028. / 1.89 /  -20. /   34.
        881.12 /   0.13 /                  / 881.25 /    2.07 /  0.23/          *IS*
      --------------------------------------------------------------------------
FX      50 AT  108480 /   320 /    450. /   558. /   44384. / 2.21 /  100. /  350.
        881.30 /   0.02 /   0.08 /   0.0  / 881.33 /    0.81 /  0.11 / 0.000  *XS*
      --------------------------------------------------------------------------
FY     500 AT  108770 /   290 /    450. /   639. /   35399. / 2.52 /   20. /  320.
        881.34 /   0.02 /   0.04 /   0.0  / 881.36 /    0.70 /  0.11 / -0.000 *XS*
      --------------------------------------------------------------------------
FZ      5P AT  109280 /   510 /    450. /   455. /   26566. / 2.21 /  300. /  500.
        881.45 /   0.03 /   0.11 /   0.01 / 881.48 /    0.99 /  0.14 / -0.000 *XS*
      --------------------------------------------------------------------------
GA      5Q AT  109630 /   350 /    450. /   296. /   20918. / 1.42 /  480. /  630.
        881.57 /   0.05 /   0.13 /   0.01 / 881.62 /    1.52 /  0.18 / 0.000  *XS*
      --------------------------------------------------------------------------
GB      5R AT  110120 /   490 /    450. /   202. /   13285. / 1.38 /  270. /  370.
        881.90 /   0.11 /   0.36 /   0.03 / 882.00 /    2.23 /  0.27 / 0.001  *XS*
      --------------------------------------------------------------------------
GC      5S AT  110570 /   450 /    450. /   260. /   11088. / 2.75 /  310. /  560.
        882.51 /   0.13 /   0.62 /   0.01 / 882.64 /    1.73 /  0.26 / 0.002  *XS*   FW
      --------------------------------------------------------------------------
GD      5T AT  111250 /   680 /    450. /   298. /   21864. / 1.60 /  410. /  560.
        883.15 /   0.06 /   0.57 /   0.0  / 883.21 /    1.51 /  0.19 / 0.002  *XS*
      --------------------------------------------------------------------------
GE     5TT AT  111630 /   380 /    450. /   175. /   12819. / 1.30 /  155. /  245.
        883.40 /   0.13 /   0.27 /   0.04 / 883.53 /    2.58 /  0.30 / 0.014  *XS*
      --------------------------------------------------------------------------
GF      5U AT  111840 /   210 /    450. /   246. /   19176. / 1.17 /   15. /  100.
        883.65 /   0.06 /   0.17 /   0.0  / 883.71 /    1.83 /  0.19 / 0.003  *XS*
      --------------------------------------------------------------------------
GG      5Y AT  112060 /   220 /    450. /    93. /    6214. / 1.09 /   23. /   63.
        883.85 /   0.40 /   0.37 /   0.17 / 884.25 /    4.85 /  0.55 / -0.000 *XS*
      ========================== BEGIN BRIDGE ANALYSIS ==========================
      BR 5Y AT  112060 /       /    450. /    74. /    4521. / 1.00 /   17. /   50.
        883.85 /   0.58 /       ...1...  (-.001)    /    6.11 /  0.72 /         *BO*
      --------------------------------------------------------------------------
          NO EMBANKMENT CROSS SECTION
      --------------------------------------------------------------------------
GH      5W AT  112100 /    40 /    450. /    76. /    4887. / 1.00 /    0. /   31.
        884.05 /   0.54 /   0.27 /   0.07 / 884.59 /    5.90 /  0.66 / -0.000 *AS*
      --------------------------------------------------------------------------
        M = 0.0  / E = 1.00 / K* = 0.01 /    76. /    4902. / 1.00 /    0. /   31.
        884.05 /   0.54 /                  / 884.59 /    5.89 /  0.66 /         *AS*
      ========================== END BRIDGE ANALYSIS ============================
GI      5X AT  112530 /   430 /    450. /   134. /   11334. / 1.03 /   18. /   56.
        885.98 /   0.18 /   1.57 /   0.0  / 886.16 /    3.36 /  0.31 / 0.002  *XS*
```

FW

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 57,DATE= 6/12/79

WATER-SURFACE PROFILE FOR: SHIAWASSEE RIVER NORTH RD TO STUDY END RWL DJH
PAGE 2 OF 3, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HORIZONTAL CONTROL

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
   5Z AT  112730 /   200 /    450. /    86. /    6420. / 1.01 /   19. /   48.
   886.41 /   0.43 /   0.56 /   0.13 / 886.85 /    5.25 /   0.52 / 0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ===============================
BR 5Z AT  112730 /       /    450. /    63. /    4065. / 1.00 /    0. /   24.
   886.41 /   0.78 /       ...I...  (-.001)    /    7.10 /   0.78 /         *BO*
----------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
----------------------------------------------------------------------------------
   6A AT  112810 /    80 /    450. /    90. /    6331. / 1.13 /   23. /   59.
   886.81 /   0.44 /   0.40 /   0.01 / 887.26 /    5.02 /   0.53 / 0.006  *AS*
----------------------------------------------------------------------------------
   M = 0.04 / E = 0.28 / K* = 0.06 /    92. /    6573. / 1.14 /   23. /   59.
   886.88 /   0.42 /                  / 887.30 /    4.89 /   0.52 /         *AS*
============================ END BRIDGE ANALYSIS =================================
  6AA AT  112970 /   160 /    450. /   165. /   12586. / 1.17 /    7. /   60.
   887.56 /   0.13 /   0.39 /   0.0  / 887.70 /    2.72 /   0.26 / 0.000  *XS*
----------------------------------------------------------------------------------
   6B AT  113210 /   240 /    450. /   117. /    8177. / 1.05 /    6. /   52.
   887.98 /   0.24 /   0.47 /   0.06 / 888.22 /    3.86 /   0.42 / -0.001 *XS*
============================ BEGIN BRIDGE ANALYSIS =================================
BR 6B AT  113210 /       /    450. /    78. /    4432. / 1.00 /    0. /   27.
   887.98 /   0.52 /       ...I...  (-.001)    /    5.79 /   0.60 /         *BO*
----------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
----------------------------------------------------------------------------------
   6C AT  113310 /   100 /    450. /   128. /    9283. / 1.17 /    8. /   51.
   888.26 /   0.23 /   0.27 /   0.0  / 888.49 /    3.53 /   0.35 / -0.000 *AS*
----------------------------------------------------------------------------------
   M = 0.08 / E = 0.85 / K* = 0.13 /   131. /    9625. / 1.18 /    7. /   52.
   888.34 /   0.22 /                  / 888.56 /    3.43 /   0.34 /         *AS*
============================ END BRIDGE ANALYSIS =================================
  6CC AT  113540 /   230 /    450. /   253. /   19438. / 1.14 /   10. /   90.
   888.75 /   0.06 /   0.25 /   0.0  / 888.81 /    1.78 /   0.17 / 0.000  *XS*
----------------------------------------------------------------------------------
  6D AT  113850 /   310 /    450. /   213 /   15698 / 1.11 /   75 / 1.5
```

6J

6K

6L

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 18,DATE= 6/15/79

WATER-SURFACE PROFILE FOR: SHIAWASSEE RIVER CAROLINE - LEROY ST HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HORIZONTAL CONTROL

	SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
GN ~~GM~~	6C AT 113310	0	450.	174.	14412.	1.20	7.		52.
	889.30	0.12			889.42	2.58	0.24		*IS*
GO ~~GN~~	6CC AT 113540	230	450.	313.	26610.	1.15	10.		90.
	889.51	0.04	0.12	0.0	889.55	1.44	0.13	-0.000	*XS*
GP ~~GO~~	6D AT 113850	310	450.	260.	20723.	1.14	75.		145.
	889.62	0.05	0.11	0.01	889.67	1.73	0.15	-0.000	*XS*
GQ ~~GP~~	6E AT 114170	320	450.	170.	14075.	1.16	2.		45.
	889.80	0.13	0.22	0.04	889.93	2.65	0.23	0.000	*XS*

END OF THIS PROFILE

FW

00BREAK00

1) COUNTY: Genesee

2) STUDY NAME: City of Fenton

3) WATERCOURSE: Shiawassee River

4) DOCUMENT TYPE: 100 yr profile

00BREAK00

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=  32,DATE= 5/23/79

WATER-SURFACE PROFILE FOR:  SHIAWASSEE RIVER  M-23 TO FENTON MOD     HOLTSLAG
PAGE  1 OF  2, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
   4V AT   99100 /     0 /    450. /   198. /  22398. / 1.08 /   12. /   61.
FA 872.49 /   0.09 /                 /  872.58 /   2.28 /   0.19/          *IS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR 4V AT   99100 /       /    450. /   189. /  25785. / 1.00 /    0. /   37.
   872.49 /   0.09 /       ...1...  (-.001)    /   2.38 /   0.19 /          *BO*
----------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
----------------------------------------------------------------------------------
   4W AT   99180 /    80 /    450. /   189. /  23604. / 1.00 /    0. /   37.
FB 872.52 /   0.09 /   0.03 /   0.00 /  872.61 /   2.38 /   0.19 / 0.000  *AS*
----------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /   189. /  23604. / 1.00 /    0. /   37.
   872.52 /   0.09 /                 /  872.61 /   2.38 /   0.19 /          *AS*  100-YR
============================ END BRIDGE ANALYSIS ================================
FC 4WW AT   99190 /    10 /    450. /   189. /  23604. / 1.00 /    0. /   37.
   872.52 /   0.09 /   0.00 /   0.0  /  872.61 /   2.38 /   0.19 / -0.004  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR4WW AT   99190 /       /    450. /   191. /  26644. / 1.00 /    0. /   37.
   872.52 /   0.09 /       ...1...  (-.001)    /   2.36 /   0.18 /          *BO*
----------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
----------------------------------------------------------------------------------
 4WWW AT   99240 /    50 /    450. /   254. /  27309. / 1.37 /   -3. /   73.
   872.56 /   0.07 /   0.02 /   0.0  /  872.62 /   1.77 /   0.17 / -0.000  *AS*
----------------------------------------------------------------------------------
FD M = 0.07 / E = 0.62 / K* = 0.07 /   255. /  27371. / 1.37 /   -3. /   73.
   872.56 /   0.07 /                 /  872.63 /   1.77 /   0.17 /          *AS*
============================ END BRIDGE ANALYSIS ================================
FE 4X AT   99280 /    40 /    450. /   257. /  22121. / 1.30 /   -3. /   73.
   872.56 /   0.06 /   0.01 /   0.0  /  872.63 /   1.75 /   0.16 / -0.018  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR 4X AT   99280 /       /    450. /   180. /  18532. / 1.00 /    0. /   37.
   872.56 /   0.10 /       ...1...  (-.001)    /   2.50 /   0.20 /          *BO*
----------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
----------------------------------------------------------------------------------  100-YR
   4X AT   99320 /     0 /    450. /   211. /  [illegible]
```

```
872.49 /   0.09 /        ...1...  (-.001)    /   2.55 /   0.17 /
-----------------------------------------------------------------------------
   NO EMBANKMENT CROSS SECTION
-----------------------------------------------------------------------------
   4W AT   99180 /    80 /    450. /   189. /   23604. / 1.00 /    0. /   37.
FB 872.52 /   0.09 /   0.03 /   0.00 / 872.61 /   2.38 /   0.19 /  0.000  *AS*
-----------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /   189. /   23604. / 1.00 /    0. /   37.
   872.52 /   0.09 /                 / 872.61 /   2.38 /   0.19 /         *AS*  100-YR
============================ END BRIDGE ANALYSIS ============================
FC 4WW AT   99190 /    10 /    450. /   189. /   23604. / 1.00 /    0. /   37.
   872.52 /   0.09 /   0.00 /   0.0  / 872.61 /   2.38 /   0.19 / -0.004  *XS*
============================ BEGIN BRIDGE ANALYSIS ==========================
BR4WW AT   99190 /        /    450. /   191. /   26644. / 1.00 /    0. /   37.
   872.52 /   0.09 /       ...1...  (-.001)    /   2.36 /   0.18 /         *BO*
-----------------------------------------------------------------------------
   NO EMBANKMENT CROSS SECTION
-----------------------------------------------------------------------------
 4WWW AT   99240 /    50 /    450. /   254. /   27309. / 1.37 /   -3. /   73.
   872.56 /   0.07 /   0.02 /   0.0  / 872.62 /   1.77 /   0.17 / -0.000  *AS*
-----------------------------------------------------------------------------
TD M = 0.07 / E = 0.62 / K* = 0.07 /   255. /   27371. / 1.37 /   -3. /   73.
   872.56 /   0.07 /                 / 872.63 /   1.77 /   0.17 /         *AS*
============================ END BRIDGE ANALYSIS ============================
FE 4X AT   99280 /    40 /    450. /   257. /   22121. / 1.30 /   -3. /   73.
   872.56 /   0.06 /   0.01 /   0.0  / 872.63 /   1.75 /   0.16 / -0.018  *XS*
============================ BEGIN BRIDGE ANALYSIS ==========================
BR 4X AT   99280 /        /    450. /   180. /   18532. / 1.00 /    0. /   37.
   872.56 /   0.10 /       ...1...  (-.001)    /   2.50 /   0.20 /         *BO*
-----------------------------------------------------------------------------
   NO EMBANKMENT CROSS SECTION
-----------------------------------------------------------------------------
   4Y AT   99320 /    40 /    450. /   311. /   26208. / 1.20 /   -4. /   76.  100-YR
   872.60 /   0.04 /   0.01 /   0.0  / 872.64 /   1.45 /   0.13 / -0.000  *AS*
-----------------------------------------------------------------------------
F  M = 0.24 / E = 0.06 / K* = 0.55 /   316. /   26728. / 1.20 /   -4. /   76.
   872.65 /   0.04 /                 / 872.69 /   1.43 /   0.13 /         *AS*
============================ END BRIDGE ANALYSIS ============================
FG 4Z AT   99800 /   480 /    450. /   520. /   22768. / 2.13 /   81. /  440.
   872.83 /   0.02 /   0.16 /   0.0  / 872.85 /   0.87 /   0.13 / -0.000  *XS*
-----------------------------------------------------------------------------
FH 5A AT  100430 /   630 /    450. /   538. /   30448. / 1.98 /  201. /  543.
   873.02 /   0.02 /   0.18 /   0.0  / 873.04 /   0.84 /   0.11 /  0.001  *XS*
-----------------------------------------------------------------------------
FI 5B AT  101220 /   790 /    450. /   578. /   25779. / 2.37 /  224. /  600.
   873.22 /   0.02 /   0.20 /   0.00 / 873.24 /   0.78 /   0.11 /  0.000  *XS*
```

WATER-SURFACE PROFILE FOR: SHIAWASSEE RIVER M-23 TO FENTON DD HULTSLAG

	SECID / WS ELEV	AT DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*	
FJ	5C	101760	540	450.	325.	17751.	1.77	107.	294.	
	873.44	0.05	0.24	0.02	873.50	1.39	0.17	0.000	*XS*	
FK	5D	102620	860	450.	285.	8825.	4.88	36.	700.	
	874.49	0.19	1.11	0.07	874.67	1.58	0.32	-0.003	*XS*	
FL	5DD	102770	150	450.	779.	20760.	6.09	36.	745.	
	874.81	0.03	0.17	0.0	874.84	0.58	0.16	-0.000	*XS*	
FM	5E	103250	480	450.	451.	24700.	2.23	179.	514.	100-YR
	875.00	0.03	0.19	0.00	875.03	1.00	0.13	0.000	*XS*	
FN	5F	103810	560	450.	214.	10982.	1.74	77.	225.	
	875.37	0.12	0.42	0.04	875.49	2.11	0.29	0.001	*XS*	
FØ	5G	104480	670	450.	332.	12017.	2.87	37.	408.	
	876.44	0.08	1.03	0.0	876.53	1.35	0.24	0.004	*XS*	
FP	5H	105190	710	450.	502.	18938.	2.65	82.	390.	
	877.13	0.03	0.63	0.0	877.16	0.90	0.14	0.002	*XS*	
FQ	5I	105800	610	450.	274.	12096.	1.75	331.	554.	
	877.65	0.07	0.54	0.02	877.72	1.64	0.22	0.000	*XS*	
FR	5J	106280	480	450.	329.	15036.	2.74	373.	886.	
	878.18	0.08	0.53	0.00	878.26	1.37	0.21	0.001	*XS*	
FS	5JJ	106800	520	450.	605.	27237.	2.15	269.	760.	100-YR
	878.50	0.02	0.26	0.0	878.52	0.74	0.10	0.000	*XS*	
FT	5K	107100	300	450.	493.	18448.	1.74	58.	364.	
	878.62	0.02	0.12	0.00	878.64	0.91	0.14	0.001	*XS*	
FU	5L	107360	260	450.	270.	15678.	1.19	40.	142.	
	878.79	0.05	0.18	0.01	878.84	1.67	0.16	0.000	*XS*	
FV	5M	108070	710	450.	171.	10301.	1.00	244.	302.	
	879.65	0.11	0.89	0.03	879.76	2.62	0.27	0.001	*XS*	

END OF THIS PROFILE

```
                                                                                                                  ----------
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================================
FW   5N AT  108160 /     0 /    450. /   217. /   18028. / 1.89 /  -20. /   34.
     881.12 /   0.13 /                  / 881.25 /    2.07 /   0.23/          *IS*
--------------------------------------------------------------------------------------------------
FX   50 AT  108480 /   320 /    450. /   918. /   53395. / 3.44 /   28. /  626.
     881.30 /   0.01 /   0.07 /   0.0  / 881.31 /    0.49 /   0.09 / 0.000  *XS*
--------------------------------------------------------------------------------------------------
FY  500 AT  108770 /   290 /    450. /   634. /   35089. / 2.52 /   18. /  320.
     881.33 /   0.02 /   0.03 /   0.00 / 881.35 /    0.71 /   0.11 / -0.000 *XS*
--------------------------------------------------------------------------------------------------
FZ   5P AT  109280 /   510 /    450. /   599. /   28161. / 3.16 /  240. /  601.
     881.43 /   0.03 /   0.10 /   0.00 / 881.46 /    0.75 /   0.13 / 0.000  *XS*
--------------------------------------------------------------------------------------------------
GA   5Q AT  109630 /   350 /    450. /   300. /   20588. / 1.49 /  453. /  639.
     881.54 /   0.05 /   0.12 /   0.01 / 881.59 /    1.50 /   0.18 / 0.000  *XS*
--------------------------------------------------------------------------------------------------
GB   5R AT  110120 /   490 /    450. /   205. /   13090. / 1.46 /  269. /  389.
     881.88 /   0.11 /   0.37 /   0.03 / 881.99 /    2.19 /   0.27 / 0.004  *XS*
--------------------------------------------------------------------------------------------------
GC   5S AT  110570 /   450 /    450. /   338. /   12279. / 3.64 /  132. /  571.
     882.46 /   0.10 /   0.57 /   0.0  / 882.56 /    1.33 /   0.24 / 0.003  *XS*
--------------------------------------------------------------------------------------------------
GD   5T AT  111250 /   680 /    450. /   287. /   20444. / 1.66 /  401. /  565.
     883.05 /   0.06 /   0.55 /   0.0  / 883.11 /    1.57 /   0.21 / 0.001  *XS*
--------------------------------------------------------------------------------------------------
GE  5TT AT  111630 /   380 /    450. /   167. /   12168. / 1.31 /  151. /  249.
     883.30 /   0.15 /   0.31 /   0.04 / 883.45 /    2.69 /   0.31 / =0.018 *XS*
--------------------------------------------------------------------------------------------------
GF   5U AT  111840 /   210 /    450. /   241. /   18415. / 1.18 /   13. /  102.
     883.57 /   0.06 /   0.19 /   0.0  / 883.64 /    1.87 /   0.20 / -0.000 *XS*
--------------------------------------------------------------------------------------------------
GG   5Y AT  112060 /   220 /    450. /    91. /    6002. / 1.09 /   23. /   63.
     883.80 /   0.42 /   0.40 /   0.18 / 884.22 /    4.96 /   0.57 / 0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
     RR 5Y AT  112060 /       /    450. /    72. /    4356. / 1.00 /   17. /   50.
     883.80 /   0.61 /       ...1...  (-.001)    /    6.26 /   0.75 /         *BO*
--------------------------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
--------------------------------------------------------------------------------------------------
     5W AT  112100 /    40 /    450. /    75. /    4776. / 1.00 /    0. /   31.
     884.01 /   0.56 /   0.28 /   0.07 / 884.57 /    5.99 /   0.68 / -0.001 *AS*
--------------------------------------------------------------------------------------------------
GH   M = 0.0  / E = 1.00 / K* = 0.01 /    75. /    4791. / 1.00 /    0. /   31.
     884.02 /   0.55 /                  / 884.57 /    5.97 /   0.67 /         *AS*
========================== END BRIDGE ANALYSIS ============================
GT   5X AT  112530 /   430 /    450. /   134. /   11380. / 1.03 /   18. /   56.
     885.99 /   0.18 /   1.60 /   0.0  / 886.17 /    3.35 /   0.31 / 0.001  *XS*
```

100 Year

100 YR

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 38,DATE= 6/12/79

WATER-SURFACE PROFILE FOR: SHIAWASSEE RIVER NORTH RD TO STUDY END RWL DJH
PAGE 2 OF 3, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

```
==========================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==========================================================================
GJ  5Z AT  112730 /   200 /    450. /    86. /    6413. / 1.01 /   19. /   48.
   886.42 /   0.43 /   0.55 /   0.12 / 886.85 /    5.23 /   0.52 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ========================
BR 5Z AT  112730 /       /    450. /    64. /    4085. / 1.00 /    0. /   24.
   886.42 /   0.78 /       ...1...  (-.001)    /    7.08 /   0.77 /          *BO*
--------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
--------------------------------------------------------------------------
GK  6A AT  112810 /    80 /    450. /    90. /    6356. / 1.13 /   23. /   59.
   886.82 /   0.44 /   0.40 /   0.01 / 887.26 /    5.01 /   0.53 /  0.006  *AS*
--------------------------------------------------------------------------
   M = 0.04 / E = 0.28 / K* = 0.06 /    92. /    6599. / 1.14 /   22. /   59.
   886.89 /   0.42 /                 / 887.31 /    4.87 /   0.51 /          *AS*
============================ END BRIDGE ANALYSIS ==========================
  6AA AT  112970 /   160 /    450. /   166. /   12601. / 1.17 /    7. /   60.
GL 887.56 /   0.13 /   0.39 /   0.0  / 887.70 /    2.72 /   0.26 / -0.000  *XS*
--------------------------------------------------------------------------
   6B AT  113210 /   240 /    450. /   117. /    8184. / 1.05 /    6. /   52.
GM 887.98 /   0.24 /   0.47 /   0.05 / 888.22 /    3.86 /   0.42 / -0.001  *XS*
============================ BEGIN BRIDGE ANALYSIS ========================
BR 6B AT  113210 /       /    450. /    78. /    4434. / 1.00 /    0. /   27.
   887.98 /   0.52 /       ...1...  (-.001)    /    5.79 /   0.60 /          *BO*
--------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
--------------------------------------------------------------------------
   6C AT  113310 /   100 /    450. /   128. /    9288. / 1.17 /    8. /   51.
   888.26 /   0.23 /   0.27 /   0.0  / 888.49 /    3.53 /   0.35 / -0.000  *AS*
--------------------------------------------------------------------------
   M = 0.08 / E = 0.85 / K* = 0.13 /   131. /    9630. / 1.18 /    7. /   52.
   888.34 /   0.22 /                 / 888.56 /    3.43 /   0.34 /          *AS*
============================ END BRIDGE ANALYSIS ==========================
  6CC AT  113540 /   230 /    450. /   254. /   19415. / 1.15 /    8. /   94.
   888.75 /   0.06 /   0.25 /   0.0  / 888.81 /    1.77 /   0.17 /  0.000  *XS*
--------------------------------------------------------------------------
   6D AT  113850 /   310 /    450. /   217. /   15766. / 1.13 /   74. /  151.
   888.95 /   0.08 /   .21 /   0.01 / 889.02 /    2.07 /   0.20 / 0.000  *XS*
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 13,DATE= 6/15/79

WATER-SURFACE PROFILE FOR: SHIAWASSEE RIVER CAROLINE - LEROY ST HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

	SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
GN	6C AT 113310	0	450.	177.	14352.	1.25	5.	56.	
	889.30	0.13			889.43	2.54	0.24		*IS*
GO	6CC AT 113540	230	450.	322.	26675.	1.20	6.	101.	
	889.51	0.04	0.12	0.0	889.55	1.40	0.13	-0.000	*XS*
GP	6D AT 113850	310	450.	274.	20916.	1.23	62.	155.	
	889.62	0.05	0.11	0.01	889.67	1.64	0.15	-0.000	*XS*
GQ	6E AT 114170	320	450.	170.	14057.	1.17	2.	47.	
	889.80	0.13	0.22	0.04	889.93	2.64	0.23	0.000	*XS*

END OF THIS PROFILE

100 - Year

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
    1     1 SHIAWASSFE RIVER  M-23 TO FENTON MOD     HOLTSLAG 50 05 02 05 12
    2     2  87158  87223  87297  87249  87255
FA  3   700    4V 1  11  3  868   99100 99 99
    4   704    290     400     560     450     450
    5   711       0  1  8760    6  1  8740   14  1  8720   19  2  8700   22  2  8680
    5   712      24  2  8672   38  2  8670   52  2  8680   58  3  8700   60  3  8720
    5   713      65  3  8740
    6   729  1  2 060 060  1  2 035 035  1  2 055 055
FB  3   800 RR 4V 2  11  1  868   99100        0  8756 1 1
    5   811       0  1  8756    0  1  8680    5  1  8671   10  1  8672   15  1  8673
    5   812      20  1  8675   25  1  8671   30  1  8673   37  1  8681   37  1  8756
    5   813       0 -9  8756
    6   829  1  2 028 028
    3   900    4W 5  10  1  868   99180 99 99
    5   911       0  1  8750    0  1  8671    5  1  8672   10  1  8674   15  1  8675
    5   912      20  1  8674   25  1  8675   30  1  8675   37  1  8676   37  1  8750
    6   929  1  2 030 030
FC  3  1000   4WW 0  10  1  868   99190 99 99
    5  1011       0  1  8750    0  1  8671    5  1  8672   10  1  8674   15  1  8675
    5  1012      20  1  8674   25  1  8675   30  1  8675   37  1  8676   37  1  8750
    6  1029  1  2 030 030
    3  1100 -R4WW 2  11  1  868   99190        0  8754 1 1
    5  1101       0  1  8754    0  1  8684    5  1  8670   10  1  8672   15  1  8670
    5  1102      20  1  8670   25  1  8670   30  1  8672   37  1  8692   37  1  8754
    5  1103       0 -9  8754
    6  1129  1  2 028 028
FD  3  1200  4WWW 5  18  3  867   99240  1  3
    5  1211     -10  1  8740    0  1  8718    5  1  8714   10  1  8708   12  2  8705
    5  1212      15  2  8698   18  2  8682   20  2  8668   25  2  8668   30  2  8668
    5  1213      35  2  8668   40  2  8668   46  2  8662   49  3  8695   50  3  8702
    5  1214      60  3  8708   70  3  8708   75  3  8740
    6  1229  1  2 035 035  1  2 033 033  1  2 075 075
FE  3  1300    4X 0  15  3  867   99280 99 99
    5  1311     -12  1  8760   -8  1  8740    0  1  8718    5  1  8714   10  1  8708
    5  1312      12  2  8705   15  2  8698   18  2  8682   20  2  8668   40  2  8668
    5  1313      46  2  8662   49  3  8695   50  3  8702   70  3  8708   75  3  8740
    6  1329  1  2 060 060  1  2 042 042  1  2 060 060
    3  1400 -R 4X 2  11  1  868   99280       15  8751 3 1
    5  1411       0  1  8751    0  1  8686    5  1  8676   10  1  8674   15  1  8672
    5  1412      20  1  8674   25  1  8674   30  1  8670   37  1  8686   37  1  8751
    5  1413       0 -9  8751
    6  1429  1  2 037 037
FF  3  1500    4Y 5  19  3  868   99320  1  3
    5  1511     -12  1  8760   -2  1  8720    0  1  8708    3  2  8678    5  2  8670
    5  1512      10  2  8672   15  2  8670   20  2  8670   25  2  8672   30  2  8678
```

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    5  1513      35  2  8674   40  3  8672   45  3  8682   50  3  8694   55  3  8698
    5  1514      60  3  8698   71  3  8710   80  3  8740   88  3  8760
    6  1529  1  2 075 075  1  2 045 045  1  2 050 050
FG  3  1600    4Z 0  13  3  867   99800 99 99
    5  1611       0  1  8750   24  1  8740  122  1  8720  237  1  8720  245  2  8708
    5  1612     258  2  8685  262  2  8662  278  2  8685  280  2  8685  287  3  8705
    5  1613     416  3  8720  473  3  8740  508  3  8760
    6  1629  1  2 080 080  1  2 050 050  1  2 060 060
FH  3  1700    5A 0  13  3  867  100430 99 99
    5  1711       0  1  8780   23  1  8760  112  1  8740  292  1  8720  402  2  8715
    5  1712     412  2  8687  423  2  8660  450  2  8687  470  3  8712  480  3  8720
    5  1713     605  3  8740  634  3  8760  646  3  8780
    6  1729  1  2 080 080  1  2 047 047  1  2 050 050
FI  3  1800    5B 0  16  3  868  101220 99 99
    5  1811       0  1  8780   12  1  8760  150  1  8740  340  1  8720  342  2  8720
    5  1812     353  2  8700  365  2  8680  372  2  8672  394  2  8680  396  2  8700
    5  1813     406  3  8720  600  3  8720  600  3  8740  972  3  8740 1008  3  8760
    5  1814    1034  3  8780
    6  1829  1  2 100 100  1  2 050 050  1  2 090  90
FJ  3  1900    5C 0  16  3  869  101760 99 99
    5  1911       0  1  8800   24  1  8780   68  1  8760  103  1  8740  118  1  8720
    5  1912     127  2  8700  129  2  8686  145  2  8681  166  2  8700  178  3  8720
    5  1913     338  3  8740  442  3  8740  954  3  8740  995  3  8760 1020  3  8780
    5  1914    1046  3  8800
    6  1929  1  2 090  90  1  2 050 050  1  2 100 100
FK  3  2000    5D 0  15  3  870  102620 99 99
    5  2011       0  1  8800   19  1  8780   28  1  8760   38  1  8740   40  2  8734
    5  2012      44  2  8708   54  2  8693   65  2  8707   67  3  8727   95  3  8740
    5  2013     390  3  8745  700  3  8740  700  3  8800 1326  3  8800 1334  3  8800
    6  2029  1  2 080  80  1  2 050  50  1  2 120 120
FL  3  2100   5DD 0  15  3  870  102770 99 99
    5  2111       0  1  8800   16  1  8780   28  1  8760   42  1  8738   47  2  8730
    5  2112      48  2  8706   60  2  8692   73  2  8710   75  3  8720   83  3  8726
    5  2113     202  3  8740  745  3  8740  745  3  8800 1018  3  8800 1034  3  8800
    6  2129  1  2 090  90  1  2 045  45  1  2 100 100
FM  3  2200    5E 0  15  3  870  103250 99 99
    5  2211       0  1  8820   10  1  8800   22  1  8780   38  1  8760  235  1  8746
    5  2212     389  2  8740  402  2  8720  404  2  8700  426  2  8698  446  2  8700
    5  2213     448  3  8720  477  3  8740  700  3  8800  950  3  8800  969  3  8800
    6  2229  1  2 090  90  1  2 045 045  1  2 100 100
FN  3  2300    5F 0  12  3  871  103810 99 99
    5  2311       0  1  8820   22  1  8800   58  1  8780   72  1  8760   89  1  8740
    5  2312     110  2  8757  121  2  8719  133  2  8707  144  2  8717  156  3  8739
    5  2313     442  3  8800  458  3  8820
    6  2329  1  2 090  90  1  2 045 045  1  2 100 100
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    ....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
FO  3  2400    5G 0  14  3  872  104480 99 99
    5  2411       0  1  8900   22  1  8800   32  2  8782   47  2  8728   81  2  8728
    5  2412      88  3  8751  156  3  8760  266  3  8760  408  3  8760  410  3  8800
    5  2413     900  3  8800  912  3  8800  922  3  8800  933  3  8900
    6  2429  1  2 080  80  1  2 048 048  1  2 110 110
FP  3  2500    5H 0  14  3  871  105190 99 99
    5  2511       0  1  8840   36  1  8820   48  1  8800   72  1  8780   83  2  8770
    5  2512      93  2  8731  108  2  8708  128  2  8732  138  3  8763  180  3  8760
    5  2513     390  3  8760  390  3  8800  590  3  8800  650  3  8820
    6  2529  1  2 075 075  1  2 055 055  1  2 120 120
FQ  3  2600    5I 0  12  3  873  105800 99 99
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    6  2829  1  2 070  70  1  2 055 055  1  2 120 120
FT  3  2900    5K 0  15  3  875  107100 99 99
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```

```
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GJ   3  4900    5Z 0  10  3  883  112730 99 99
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GL   3  5200   6AA 0   8  3  883  112970 99 99
```

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3  6000    6F 5  12  3  885  114240  1  3
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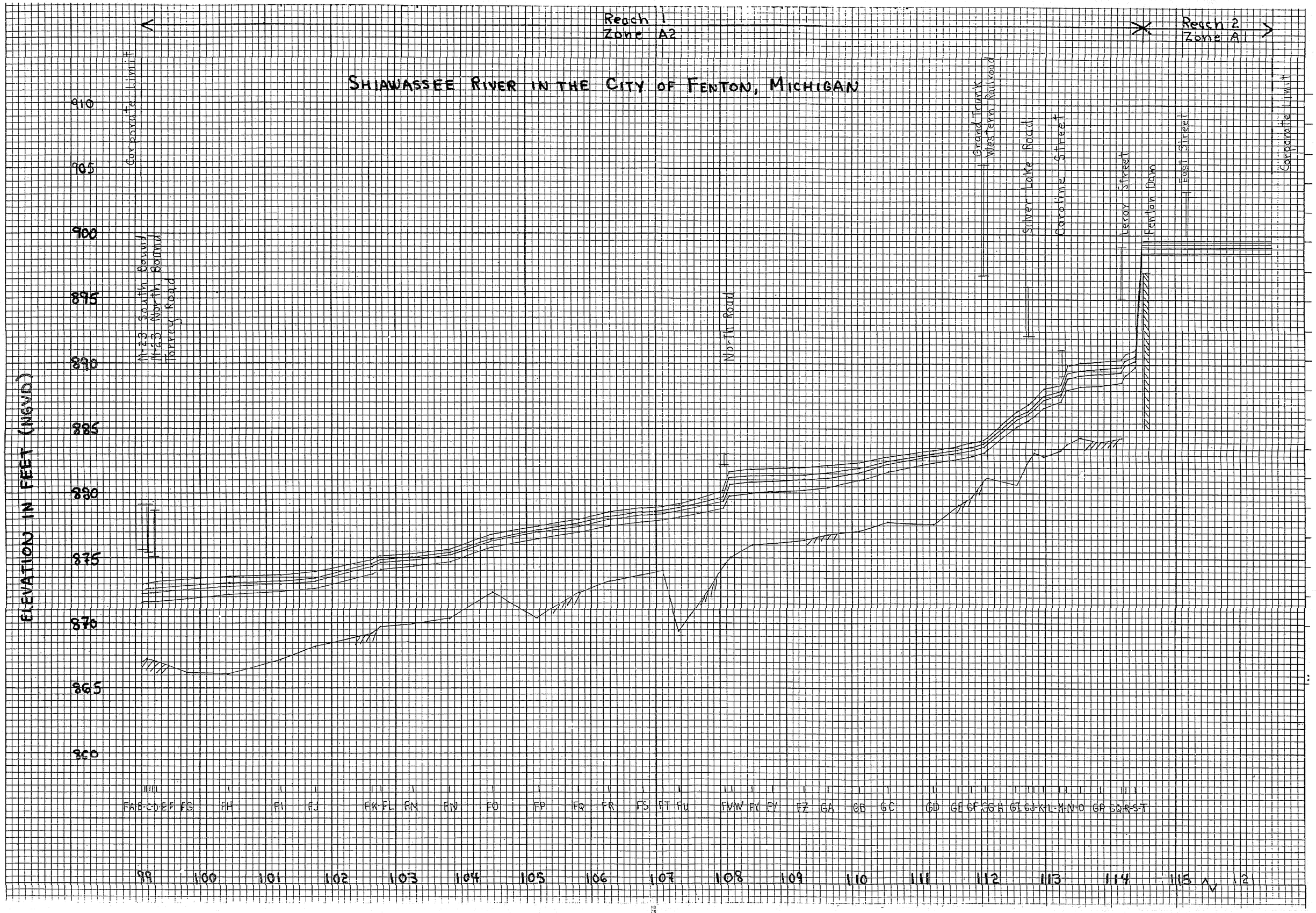

SHIAWASSEE RIVER IN THE CITY OF FENTON, MICHIGAN
Reach 1
Zone A2
Reach 2
Zone A1
ELEVATION IN FEET (NGVD)
910
905
900
895
890
885
880
875
870
865
860
Corporate Limit
M-23 South Bound
M-23 North Bound
Torrey Road
North Road
Grand Trunk Western Railroad
Silver Lake Road
Caroline Street
Leroy Street
Fenton Road
East Street
Corporate Limit
FA FB FC FD FE FF FG FH FI FJ FK FL FM FN FO FP FQ FR FS FT FU FV FW FX FY FZ GA GB GC GD GE GF GG GH GI GJ GK GL GM GN GO GP GQ GR GS GT
99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115

00BREAK00

1) COUNTY: Genesee

2) STUDY NAME: City of Fenton

3) WATERCOURSE: Shiawassee River

4) DOCUMENT TYPE: report

00BREAK00

FLOOD
INSURANCE
STUDY

CITY OF FENTON, MICHIGAN GENESEE COUNTY

JUNE 1979

U.S. DEPARTMENT OF HOUSING & URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

TABLE OF CONTENTS

Page

1.0 INTRODUCTION 1

1.1 Purpose of Study 1

1.2 Authority and Acknowledgments 1

1.3 Coordination 2

2.0 AREA STUDIED 2

2.1 Scope of Study 2

2.2 Community Description 4

2.3 Principal Flood Problems 6

2.4 Flood Protection Measures on Shiawassee River 6

3.0 ENGINEERING METHODS 7

3.1 Hydrologic Analyses 3

3.2 Hydraulic Analyses 9

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS 11

4.1 Flood Boundaries 12

4.2 Floodways 12

5.0 INSURANCE APPLICATION 16

5.1 Reach Determinations 17

5.2 Flood Hazard Factors 18

5.3 Flood Insurance Zones 18

5.4 Flood Insurance Rate Map Description 21

6.0 OTHER STUDIES 21

7.0 LOCATION OF DATA 22

8.0 BIBLIOGRAPHY AND REFERENCES 23

TABLE OF CONTENTS--Continued

FIGURES

Page

Figure 1 - Vicinity Map 3

2 - Floodway Schematic 17

TABLES

Table 1 - Summary of Discharges 9

2 - Summary of Elevations 11

3 - Floodway Data 14

4 - Flood Insurance Zone Data 20

EXHIBITS

Exhibit 1 - Flood Profiles

Shiawassee River . . . . . .

2 - Flood Boundary and Floodway Map Index . . . . . .

Flood Boundary and Floodway Map . . . . . .

3 - Elevation Reference Marks 25

PUBLISHED SEPARATELY:

Flood Insurance Rate Map Index

Flood Insurance Rate Map

FLOOD INSURANCE STUDY
CITY OF FENTON, MICHIGAN

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the City of Fenton, Genesee County, Michigan, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert the City of Fenton to the regular program of flood insurance by the Federal Insurance Administration (FIA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these Federally-supported studies are based. These criteria take precedence over the minimum Federal Criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 24 CFR, 1910.1(d). In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgments

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by the U.S. Geological Survey, for the Federal Insurance Administration, under Inter-Agency Agreement No. IAA-H-8-76, Project Order No. 11. This study was completed in June 1979.

1.3 Coordination

Streams requiring detailed study were identified at a meeting attended by representatives of the U.S. Geological Survey (USGS), the FIA, and representatives of the City of Fenton in January 1976. Results of the hydrologic and hydraulic analyses were coordinated with the Michigan Department of Natural Resources and the Genesee County Drain Commission.

On _____ the results of the study were reviewed and accepted at the final coordination meeting attended by personnel of the USGS, the FIA, and community officials.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the City of Fenton, Genesee County, Michigan. The area of study is shown on the Vicinity Map (Figure 1).

The areas studied by detailed methods were selected with priority given to all known flood hazard areas, and areas of projected development or proposed construction for the next five years, through June 1984. Approximate methods of analysis were used to study those areas having a low development potential or a minimal flood hazard. The scope and methods of study were proposed to and agreed upon by the FIA and the City of Fenton. Although development is occurring, there probably will not be any significant effect on peak flows or lake stages through June 1984.

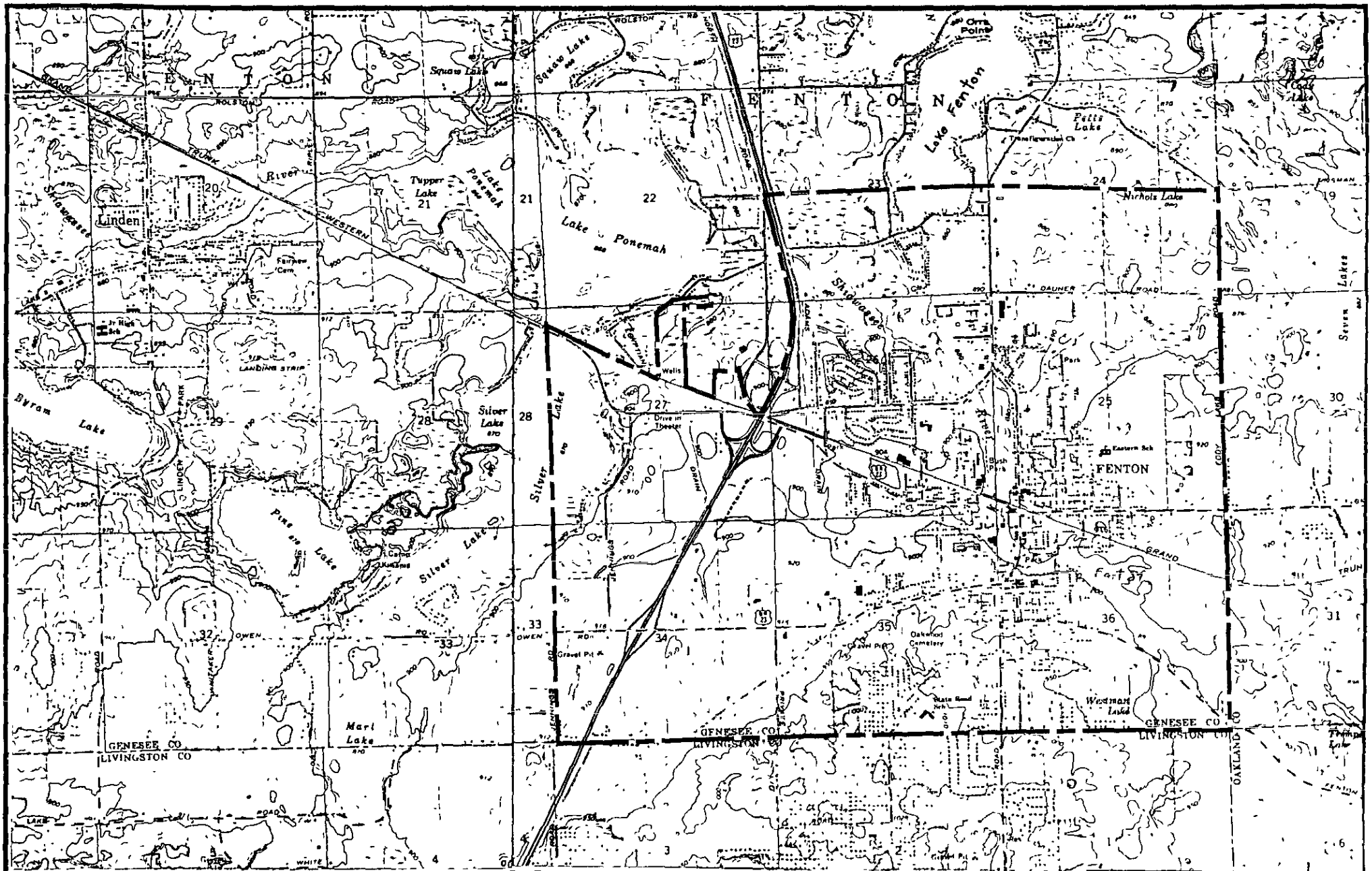


Figure 1

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

CITY OF FENTON, MI
(GENESEE CO)

APPROXIMATE SCALE
1000 0 1000 2000 4000 6000 FEET

VICINITY MAP

Shiawassee River, Silver Lake, and Lake Ponemah were studied in detail and Lake Fenton was studied by approximate methods within the corporate limits of the community.

2.2 Community Description

The City of Fenton is located in the southeast part of Michigan's Lower Peninsula in southern Genesee County. It is approximately 50 miles northwest of Detroit, and 15 miles south of Flint.

Total land area within the corporate limits is 7.7 square miles According to U.S Census Bureau figures, the population of the City of Fenton has increased from 6,142 in 1960 to 8,284 in 1970, an increase of 34.9 percent (Reference 1). Some of this increase occurred because parts of the city were annexed from the Township of Fenton.

Transportation facilities serving the area include Interstate Highways 96, 75, and 69, and U.S. Highway 23. Bishop Airport, the major airport in the area, is located eight miles to the north. The Grand Trunk Western Railroad also serves the area.

The climate of this area is modified somewhat by its proximity to the Great Lakes, which have a cooling effect during the summer and a warming effect during the winter. The mean annual temperature of the area is about 47°F. The maximum recorded temperature, 108°F, occurred on July 13, 1936; the miniumu, -28°F, occurred on February 16, 1916. Average annual precipitation is about 30 inches, about 65 percent of which occurs during the period of April through September. Annual snowfall for the area averages about 45 inches (Reference 2).

The area is under the influence of atmospheric disturbances that move eastward across the country causing violent windstorms associated with thunderstorms and squall lines. Twenty-four-hour rainfalls in excess of 6 inches have been recorded. Monthly rainfall of more than 11 inches occurred in August 1975, and more than 8 inches has occurred several times.

The land surface of the City of Fenton ranges from level to gently undulating. Surface deposits in most of the city are glacial outwash composed of sand and gravel and having high permeability. In the southern part of the city, however, moraines, composed of tight clay and silt loam and generally having low permeability, cover an area of about 1 square mile (Reference 3).

Natural drainage along the Shiawassee River is poorly developed. Drains have been dug and portions of some streams channelized to improve drainage.

2.3 Principal Flood Problems

Flooding is principally the result of overbank flow from the Shiawassee River and high lake levels. Major flooding occurred in April 1947 and April 1975. Based on gaging station analysis and a field survey of areas inundated, these storms are believed to have had an equal magnitude and approached a 100-year event. Extensive property damage and transportation interruptions resulted from the flood in 1975 due to development in the flood plain.

2.4 Flood Protection Measures on Shiawassee River

There are no flood protection structures on the Shiawassee River in the City of Fenton. However, a proposed project downstream could affect flooding in Fenton. In the Village of Linden, the Linden Mill Pond Dam was constructed in 1967 as part of a flood control project. The design for the new dam included channelization of the Shiawassee River from the dam upstream to Lake Ponemah (References 16 and 18) to allow for regulation of lake levels on Ponemah, Squaw and Tupper lakes.

This portion of the flood control project has not been completed. If it were completed at some future date, the channelization would provide the increased channel conveyance needed to lower the levels of Ponemah, Squaw, and Tupper lakes during periods of severe flooding. thereby reducing flooding on the Shiawassee River in the northwestern part of the City of Fenton.

The Shiawassee River basin is studded with numerous small lakes and ponds. This natural storage reduces flood peaks.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10, 50, 100, or 500 year period (recurrence intervals), have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10, 50, 100, and 500 year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equalled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (one percent chance of annual occurrence) in any 50 year period is about 40 percent (four in ten) and for any 90 year period, the risk increases to about 60 percent (six in ten). The analyses reported here reflect flooding potnetials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationship for floods on the Shiawassee River, which was the only stream studied by detailed methods in the community.

Peak discharge estimates were developed using the following hydrologic analysis: (1) a log-Pearson Type III distribution analysis of annual peak flow data for the Shiawassee River at the Linden USGS gage No. 04143900 on Hogan Road in Fenton Township, with 11 years of record (References 4 and 5); (2) application of regional relations between basin characteristics and streamflow characteristics (Reference 6); (3) flood magnitude-frequency relations developed by the U.S. Geological Survey (Reference 7); (4) regional relationships of streamflow to drainage area and population density developed by Brater (Reference 8); (5) ratios between the mean annual peak discharge and the 50-year and 100-year discharges (Reference 9); and (6) discharge computations for flow over the Fenton Mill Pond Dam for the 1947 and 1975 floods.

Peak discharges for the 10-, 50-, 100-, and 500-year floods on the Shiawassee River are shown in Table 1.

TABLE 1 SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGE (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
SHIAWASSEE RIVER					
At Torrey Road	62.4	290	400	450	560

3.2 Hydraulic Analysis

Analysis of the hydraulic characteristics of the Shiawassee River, studied in detail in the City of Fenton, were carried out to compute elevations of floods of the selected recurrence interval.

Cross section data for the backwater analyses of Shiawassee River were obtained by field survey and from 2-foot interval contour maps having a scale of 1:2400 (Reference 10). All bridges, dams, and culverts were field surveyed to obtain elevation data and structural geometry.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles. For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the Flood Boundary and Floodway Map.

Channel roughness factors (Manning's "n") used in the hydraulic computations, were chosen by engineering judgment and based on field observations of the channel and flood plain areas. Roughness values for the main channel of the Shiawassee River ranged from 0.030 to 0.120 for all sections. The acceptability of all assumed hydraulic factors, cross sections and hydraulic structure data was checked by computations that duplicated historic flood water records.

Water-surface elevations of floods of the selected recurrence intervals were computed through the use of the U.S. Geological Survey's E-431 step-backwater computer program (Reference 11). Flood profiles were drawn for floods of the selected recurrence intervals. Starting water-surface elevations for the Shiawassee River at the west corporate limit were obtained from the portion of the Shiawassee River in the adjacent Township of Fenton where a flood insurance study is also being prepared (Reference 20). Starting elevations for the step-backwater analysis above the Fenton Mill Pond Dam were flood elevations obtained by flow over dam computations (Reference 12).

A summary of the frequency-elevation relationships for Lake Ponemah, Silver Lake, and Fenton Mill Pond, in the community are presented in Table 2, "Summary of Elevations".

TABLE 2: SUMMARY OF ELEVATIONS

FLOODING SOURCE AND LOCATION	ELEVATION ABOVE NGVD 10-YEAR	50-YEAR	100-YEAR	500-YEAR
Shiawassee River				
Lake Ponemah	871.0	871.6	871.9	872.3
Fenton Mill Pond	898.7	899.1	899.3	899.6
Silver Lake	871.6	872.1	872.4	873.0

Design frequency-elevations for Fenton Mill Pond shown above represent conditions when all flows are confined to flow over the spillway. During the April 1975 flood, it was necessary to sandbag along the north bank of the dam to prevent overflow. Since that time an earth-fill embankment has been constructed which will prevent overflow during a 500-year flood event.

Approximate methods were used to determine the 100-year flood boundaries for Lake Fenton. Boundaries for the 100-year flood were based on analysis of historic flood information.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced from the National Geodetic Vertical Datum of 1929 (NGVD), formerly referred to as Sea Level Datum of 1929. Elevation reference marks used in this study are shown on the maps.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study includes a Flood Boundary and Floodway map designed to

assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the FIA as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100- and the 500-year floods have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:2,400 with a contour interval of two feet (Reference 10).

The boundaries of the 100- and 500-year floods are shown on the Flood Boundary and Floodway Map (Exhibit 2). Small areas within the flood boundaries may lie above the flood elevations, and therefore, may not be subject to flooding. Owing to limitations of the map scale and/or lack of detailed topographic data, such areas are not shown. In cases where the 100- and the 500-year flood boundaries are close together, only the 100-year boundary has been shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program,

the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood may be carried without substantial increases in flood heights. Minimum standards of the FIA limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. In Michigan though, under Michigan Act 245, Public Acts of 1929, as amended by Act 167, Public Acts of 1968, encroachment in the flood plain is limited to that which will cause only an insignificant increase in flood heights. Thus, at the recommendation of the Bureau of Water Management, a floodway having no more than a 0.1 foot surcharge has been delineated for this study.

The floodways presented in this study were computed on the basis of equal conveyance reduction from each side of the flood plain. No encroachment was permitted within the low-water channel. Additionally, attempts were made to obtain uniform floodway widths along the stream channels. The results of these computations were tabulated at selected cross sections for each stream segment for which a floodway was computed (Table 3).

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
Cross Section	Distance	Width (ft.)	Section Area (Sq. ft)	Mean Velocity (F.P.S.)	With Floodway (M.S.L.)	Without Floodway (M.S.L.)	Difference (ft.)
Shiawassee River							
FA	99100	49	201	2.24	872.55	872.49	0.06
FB	99180	37	191	2.36	872.58	872.52	0.06
FC	99190	37	191	2.36	872.58	872.52	0.06
FD	99240	40	202	2.23	872.60	872.56	0.04
FE	99280	40	202	2.23	872.60	872.56	0.04
FF	99320	40	209	2.15	872.65	872.65	0.00
FG	99800	200	430	1.05	872.91	872.83	0.08
FH	100430	200	469	0.96	873.10	873.02	0.08
FI	101220	300	557	0.81	873.30	873.22	0.08
FJ	101760	150	325	1.39	873.51	873.44	0.07
FK	102620	350	228	1.97	874.54	874.49	0.05
FL	102770	400	559	0.81	874.88	874.81	0.07
FM	103250	~~300~~	475	0.95	875.09	875.00	0.09
FN	103810	140	221	2.04	875.43	875.37	0.06
FO	104480	~~250~~	282	1.60	876.46	876.44	0.02
FP	105190	170	359	1.25	877.21	877.13	0.08
FQ	105800	~~200~~	292	1.54	877.75	877.65	0.10
FR	106280	200	289	1.55	878.22	878.18	0.04
FS	106800	300	527	0.85	878.53	878.50	0.03
FT	107100	200	412	1.09	878.65	878.62	0.03
FU	107360	100	274	1.64	878.83	878.79	0.04
FV	108070	50	168	2.68	879.65	879.65	0.00

TABLE 3

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration
CITY OF FENTON, MICHIGAN
(GENESEE COUNTY)

FLOODWAY DATA

SHIAWASSEE RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
Cross Section	Distance	Width (ft.)	Section Area (Sq. ft)	Mean Velocity (F.P.S.)	With Floodway (M.S.L.)	Without Floodway (M.S.L.)	Difference (ft.)
Shiawassee River (Continued)							
FW	108160	54	217	2.07	881.12	881.12	0.00
FX	108480	250	558	0.81	881.30	881.30	0.00
FY	108770	300	639	0.70	881.34	881.33	0.01
FZ	109280	200	455	0.99	881.45	881.43	0.02
GA	109630	150	296	1.52	881.57	881.54	0.03
GB	110120	100	202	2.23	881.90	881.88	0.02
GC	110570	250	260	1.73	882.51	882.46	0.05
GD	111250	150	298	1.51	883.15	883.05	0.10
GE	111630	90	175	2.58	883.40	883.30	0.10
GF	111840	85	246	1.83	883.65	883.57	0.08
GG	112060	40	93	4.85	883.85	883.80	0.05
GH	112100	31	76	5.89	884.05	884.02	0.03
GI	112530	38	134	3.36	885.99	885.99	0.00
GJ	112730	29	86	5.25	886.42	886.42	0.00
GK	112810	36	92	4.89	886.89	886.89	0.00
GL	112970	53	165	2.72	887.56	887.56	0.00
GM	113210	46	117	3.86	887.98	887.98	0.00
GN	113310	45	174	2.58	889.30	889.30	0.00
GO	113540	80	313	1.44	889.51	889.51	0.00
GP	113850	70	260	1.73	889.62	889.62	0.00
GQ	114170	43	170	2.65	889.80	889.80	0.00
GR	114240	37	199	2.26	890.36	890.36	0.00
GS	114390	47	202	2.23	890.66	890.66	0.00

TABLE 3

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration
CITY OF FENTON, MICHIGAN
(GENESEE COUNTY)

FLOODWAY DATA

SHIAWASSEE RIVER

As shown on the Flood Boundary and Floodway Map (Exhibit 2), the floodway boundaries were determined at cross sections; between cross sections, the boundaries were interpolated. In cases where the boundaries of the floodway and the 100-year flood are either close together or collinear, only the floodway boundary has been shown. Along Fenton Mill Pond the proposed floodway is at the normal water level.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water surface elevation of the 100-year flood more than 0.1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.

The floodways in this report are presented to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FIA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHFs), and corresponding flood insurance zone designations for each significant flooding source affecting the City of Fenton.

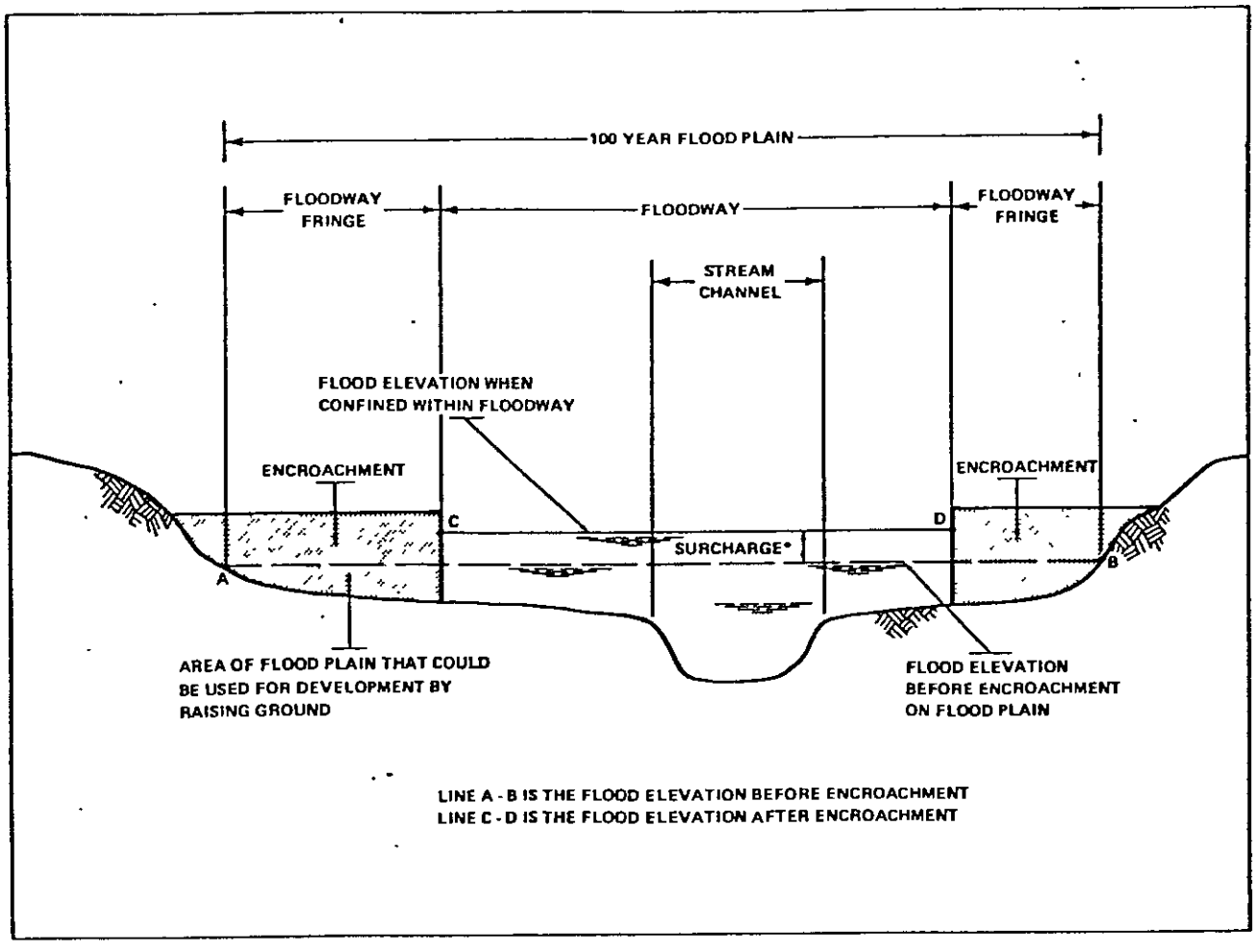


Figure 2. FLOODWAY SCHEMATIC

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than 0.5 foot for more than 20 percent of the reach.

Two reaches meeting the above criteria were required for the Shiawassee River in the City of Fenton. The locations of the reaches are shown on the Flood Profiles (Exhibit 1).

5.2 Flood Hazard Factors (FHFs)

The Flood Hazard Factor is used to correlate flood information with insurance rate tables. Correlations between property damages from floods and their assigned FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three-digit code. For example, if the difference between the water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year flood water-surface elevations is greater than 10.0 feet, the accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire incorporated area of City of Fenton was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zone A.:	Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods, no base flood elevations shown or FHFs determined.

Zone A1, A2:	Special Flood Hazard Areas inundated by 100-year floods, determined by detailed methods; base flood elevations shown, and zones assigned according to FHFs.
Zone B:	Areas between the Special Flood Hazard Areas and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected form the 100-year flood by dike, levee, or other water control structure; areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; or, areas subject to 100-year flooding from sources with drainage areas of less than one square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flood hazard.

Table 4, "Flood Insurance Zone Data," summarizes the flood elevation difference, FHFs, flood insurance zones, and base flood elevations for each flooding source studies in detail in the community.

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCES[2] BETWEEN 1.0% (100-year) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3]
		10% (10-year)	2% (50-year)	0.2% (500-year			
Shiawassee River							
Reach 1		-0.8	-0.2	0.4	010	A2	Varies--See map
Reach 2		-0.6	-0.2	0.3	005	A1	899

1/ Flood insurance rate map panel
2/ Weighted average
3/ Rounded to the nearest foot

TABLE 4

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

CITY OF FENTON, MICHIGAN

(GENESEE CO)

FLOOD INSURANCE ZONE DATA

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the City of Fenton is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FIA.

6.0 OTHER STUDIES

Flood insurance studies are currently being conducted for the following adjacent communities: Township of Argentine (Reference 14), Township of Mundy (Reference 13), Village of Linden (Reference 19), and Township of Fenton (Reference 20).

In 1947, the State of Michigan prepared a report entitled "Ponemah Lake Level Control" (Reference 15). In 1960, a consulting firm produced a report called "Preliminary Report on Regulation of Water Levels on Certain Lakes in Fenton Township" (Reference 16). In 1966, the U.S. Army Corps of Engineers prepared a report entitled "Flood Control of Lake Ponemah" (Reference 17). And in 1975, a consulting firm prepared a paper entitled "Report on Shiawassee River Flood Control" (Reference 18).

This report either supersedes or is compatible with all previous studies published on streams studied in this report and should be considered authoritative for the purposes of the National Flood Insurance Program.

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study can be obtained by contacting the office of the Federal Insurance Administration, Regional Director, 1 North Dearborn, Chicago, Illinois, 60602.

8.0 BIBLIOGRAPHY AND REFERENCES

1. U.S. Department of Commerce, Bureau of Census, 1970 Census of Population, Number of Inhabitants, Michigan, Washington, D.C., 1971.
2. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Environmental Data Service, Monthly Averages of Temperature and Precipitation for State (MI) Climatic Divisions 1941-77, 1978.
3. Martin, H.M., 1955, Map of the surface formations of the Southern Peninsula of Michigan: Michigan Geological Survey Publication 49.
4. U.S. Water Resources Council, Guidelines for Determining Flood Flow Frequency, Bulletin No. 17, Hydrology Committee, March 1976.
5. U.S. Geological Survey, "Water Resources Data for Michigan," (undated).
6. Bent, P.C., A Proposed Streamflow Data Program for Michigan, U.S. Geological Survey Open-File Report, 1970.
7. Wiitala, S.W., 1965, Magnitude and Frequency of Floods in United States, Part 4, St. Lawrence River Basin, U.S. Geological Survey Water-Supply Paper 1677.
8. Brater, E.F., Rainfall-Runoff Relations on Urban and Rural Areas, University of Michigan, 1975.
9. Hardison, C.H., Estimation of 100-year Flood Magnitudes at Ungaged Sites, U.S. Geological Survey Open-File Report, 1973.
10. United Aerial Mapping, Topographic Maps of Genesee County, Michigan, Township of Fenton, 1970.
11. Shearman, J.O., 1976, Computer Applications for Step-backwater and Floodway Analyses, U.S. Geological Survey Open-File Report No. 76-499.
12. Hulsing, H., 1968, Techniques of Water-Resources Investigations of the United States Geological Survey, Measurement of Peak Discharge at Dams by Indirect Method, Book 3, Chapter 5.

13. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, Township of Mundy, Michigan. (In progress).

14. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, Township of Argentine, Michigan. (In progress).

15. Hayes, H.J., "Ponemah Lake Level Control", Michigan Department of Natural Resources, 1947.

16. Ayres, Lewis, Norris and May, "Preliminary Report on Regulation of Water Levels on Certain Lakes in Fenton Township", Ann Arbor, Michigan, 1960.

17. U.S. Army, Corps of Engineers, "Flood Control of Lake Ponemah", Detroit, Michigan, 1966.

18. Carlson, Hohloch, Mitchell, and Piotrowski, Inc., "Report on Shiawassee River Flood Control", Flint, Michigan, 1975.

19. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, Village of Linden, Michigan. (In progress).

20. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, Township of Fenton, Michigan. (In progress).

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION IN FEET (NGVD)	DESCRIPTION OF LOCATION
RM1	884.91	Fenton Township, Silver Lake Road, painted square on crown at northwest end of culvert at private drive to residence at abandoned cement plant.
RM2	876.40	City of Fenton, Silver Lake Road, cut box on southwest corner of bridge abutment at Silver Lake outlet and dam.
RM3	884.21	City of Fenton, Silver Lake Road, railroad spike in power pole at south side of road, about 150 east of intersection with Jennings Road.
RM5	899.40	City of Fenton, Silver Lake Road, railroad spike in power pole at south side of road, about 200 feet east of ramp for U.S.-23.
RM6	877.22	Fenton Township, Ponemah Road, extreme northeast edge of manhole rim, at center of roadway, between residences at 3309,3317.
RM7	872.42	Fenton Township, Ponemah Road, extreme north edge of manhole rim, 1.2 feet south of south edge of black top, opposite entrance to Fisherman's Landing.
RM9	880.60	Fenton Township, North Road, cut box on north abutment, northeast corner, right upstream guardrail, at bridge at Shiawassee River.
RM10	879.13	City of Fenton, Torrey Road, cut box on southwest concrete wingwall of bridge at Shiawassee River.
RM11	886.35	Fenton Township, Torrey Road, extreme east edge of manhole rim at east side of road, just north of drive to Masonic Temple.
RM12	877.72	City of Fenton, South Long Lake Road, railroad spike driven horizontally into south side of power pole, just east of drive to residence at 2426.
RM13	876.89	City of Fenton, South Long Lake Road, painted cross on extreme south edge of manhole rim, in front of residence at 2351.

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION IN FEET (NGVD)	DESCRIPTION OF LOCATION
RM14	884.92	City of Fenton, Torrey Road, railroad spike in power pole at east side of roadway, about 4 feet lower than road, about 200 feet south of Baptist Church.
RM15	898.38	City of Fenton, North Road, top of directional arrow at northeast corner of intersection with Charlene Drive.
RM16	900.35	City of Fenton, North Road, cut "X" on northwest hexnut on flange of fire hydrant, northwest corner of intersection with Elmwood Street.
RM17	903.18	City of Fenton, North Road, top of directional arrow on fire hydrant, northeast corner of intersection with Oak Park Drive.
RM18	895.38	City of Fenton, Mary Court, top of directional arrow on fire hydrant, southeast corner of intersection with Oak Park Drive.
RM19	883.12	City of Fenton, Shiawassee River, 3/8 bolt set horizontally in southeast limb of 4 branched box-elder just southwest of Shiawassee River, and just north of dirt trail.
RM20	885.38	City of Fenton, Mary Court, top of directional arrow on fire hydrant, southeast corner of intersection with Forest Drive.
RM21	881.43	City of Fenton, Mary Court, top of directional arrow on fire hydrant at end of circle drive at east end.
RM22	902.57	City of Fenton, North Road, top of directional arrow on fire hydrant, northeast corner of intersection with Forest Drive.
RM23	900.44	City of Fenton, North Road, cut "X" on southwest hexnut on fire hydrant at north side of road, at residence at 524.
RM24	879.49	City of Fenton, Shiawassee River, painted "X" on landward rim of manhole, on the west bank, about 2500 feet northwest of two-story brown brick home.

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION IN FEET (NGVD)	DESCRIPTION OF LOCATION
RM25	882.90	City of Fenton, North Road, cut box on northwest corner of concrete abutment, at north side of culvert headwall at Shiawassee River.
RM26	894.25	City of Fenton, North Road, top of directional arrow on fire hydrant, east side of intersection with LeRoy Street.
RM27	897.44	City of Fenton, LeRoy Street, cut "X" on northwest hexnut of fire hydrant, east side of road, at residence at 868.
RM28	883.33	City of Fenton, Shiawassee River, painted box on outside edge of concrete walkway at second quardrail post at left downstream side of footbridge, at Fifth Street projection.
RM29	894.36	City of Fenton, LeRoy Street, painted top of east hexnut on fire hydrant, northeast corner of intersection with Third Street.
RM30	906.24	City of Fenton, LeRoy Street, top of directional arrow on fire hydrant, northeast corner of intersection with First Street at Fenton House.
RM31	906.38	City of Fenton, LeRoy street, painted box on extreme west edge of concrete base for traffic signal for Grand Trunk Western Railroad, at west side of crossing.
RM32	896.36	City of Fenton, Grand Trunk Western Railroad, painted box on top of first vertical concrete abutment support for lower steel chord, at northeast side of railroad bridge at Shiawassee River.
RM33	885.23	City of Fenton, Shiawassee River, painted square on northwest corner at edge of retuining steel, at left downstream end of concrete walkway bridge.
RM34	899.10	City of Fenton, Silver Lake Road, cut box on top of concrete guardrail at right downstream side of bridge crossing Shiawassee River.

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION IN FEET (NGVD)	DESCRIPTION OF LOCATION
RM35	893.94	City of Fenton, Caroline Street, top of first vertical guardrail post at left downstream side of bridge at Shiawassee River.
RM36	898.64	City of Fenton, Caroline Street, top of directional arrow on hydrant, southeast corner of bridge approach at Shiawassee River.
RM37	891.43	City of Fenton, Shiawassee River, top of ball of first vertical guardrail post at right upstream side of concrete walkway bridge.
RM38	898.96	City of Fenton, LeRoy Street, cut box on top step of steps at right upstream side of bridge at Shiawassee River, adjacent to Fenton Fire Hall.
RM39	891.64	City of Fenton, Shiawassee River, top of 8-inch well casing cap of well at north bank of river, above LeRoy Street, behind Fenton Fire Hall.
RM40	899.72	City of Fenton, Shiawassee River, painted box on top of concrete at left abutment at upstream edge at edge of fixed crest spillway of Fenton Mill Pond Dam.
RM41	930.73	City of Fenton, LeRoy Street, cut "X" on west hexnut of fire hydrant, at northeast corner of intersection with Holly Road.
RM42	912.75	City of Fenton, Holly Road, cut "X" on northwest hexnut of fire hydrant, at south side of "T" intersection with Lemen Street.
RM43	901.90	City of Fenton, Holly Road, railroad spike in power pole at north side of road, about 75 feet east of driveway at 720.
RM44	903.28	City of Fenton, Holly Road, railroad spike in power pole on south side of road, about 125 feet west of 1007 residence.

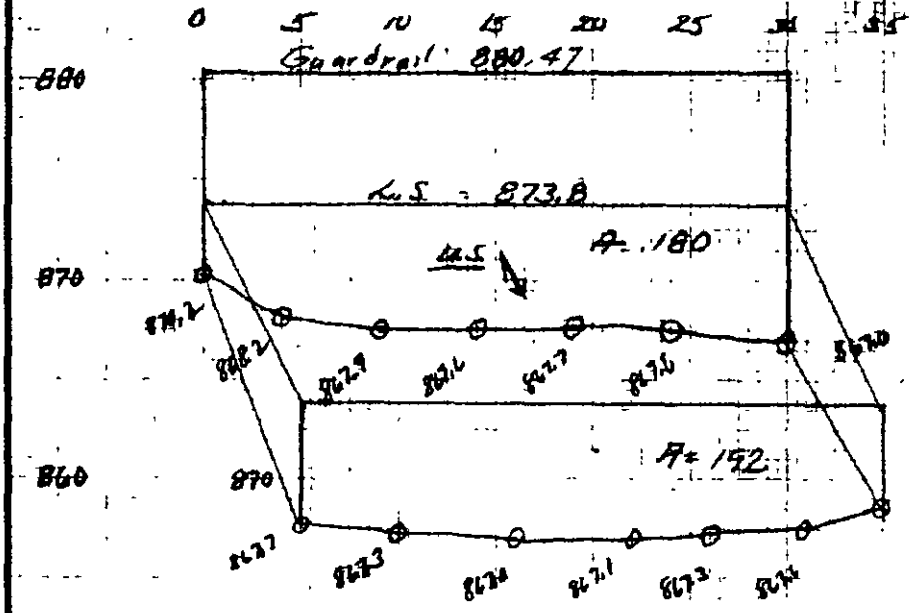
Shiawassee R. North Road (Corr.)

DM Top of 8" upper rod set vertically in American asphalt near sand and gravel 873.85

DM Same as above L.H.S. 873.87

DM on set top w.s. guardrail N side at corner 880.60

Top of staff gage L.H.D.S. about 873.32 See other sheets for zero of gage & HWMs

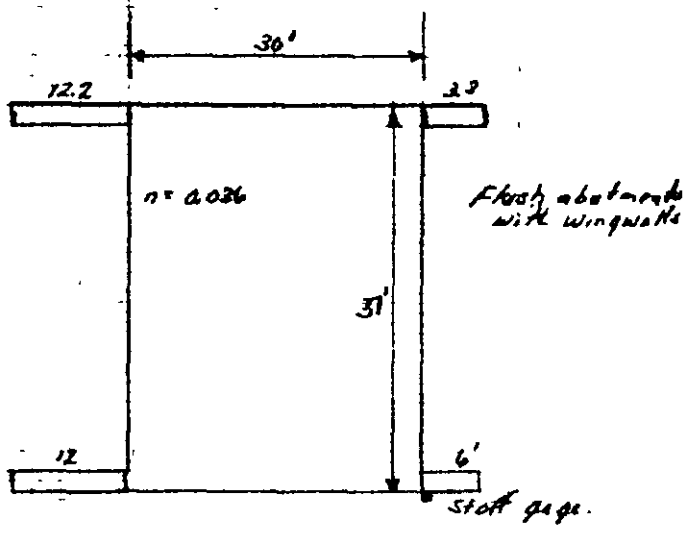


℄ Br. dgn = 877.0

Br. dgn opening 180 ft

Water surface 868.28

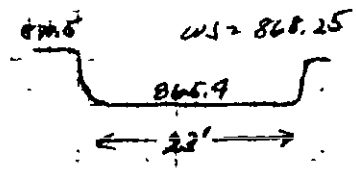
No road overflow lake conditions d.s.



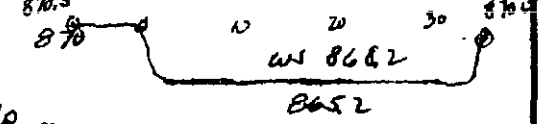
Flush abutments with wingwalls

(98430) 4.55

Section d.s.



HWM about 872.6 - 872.1
Road overflow entire left & right bank lake actual

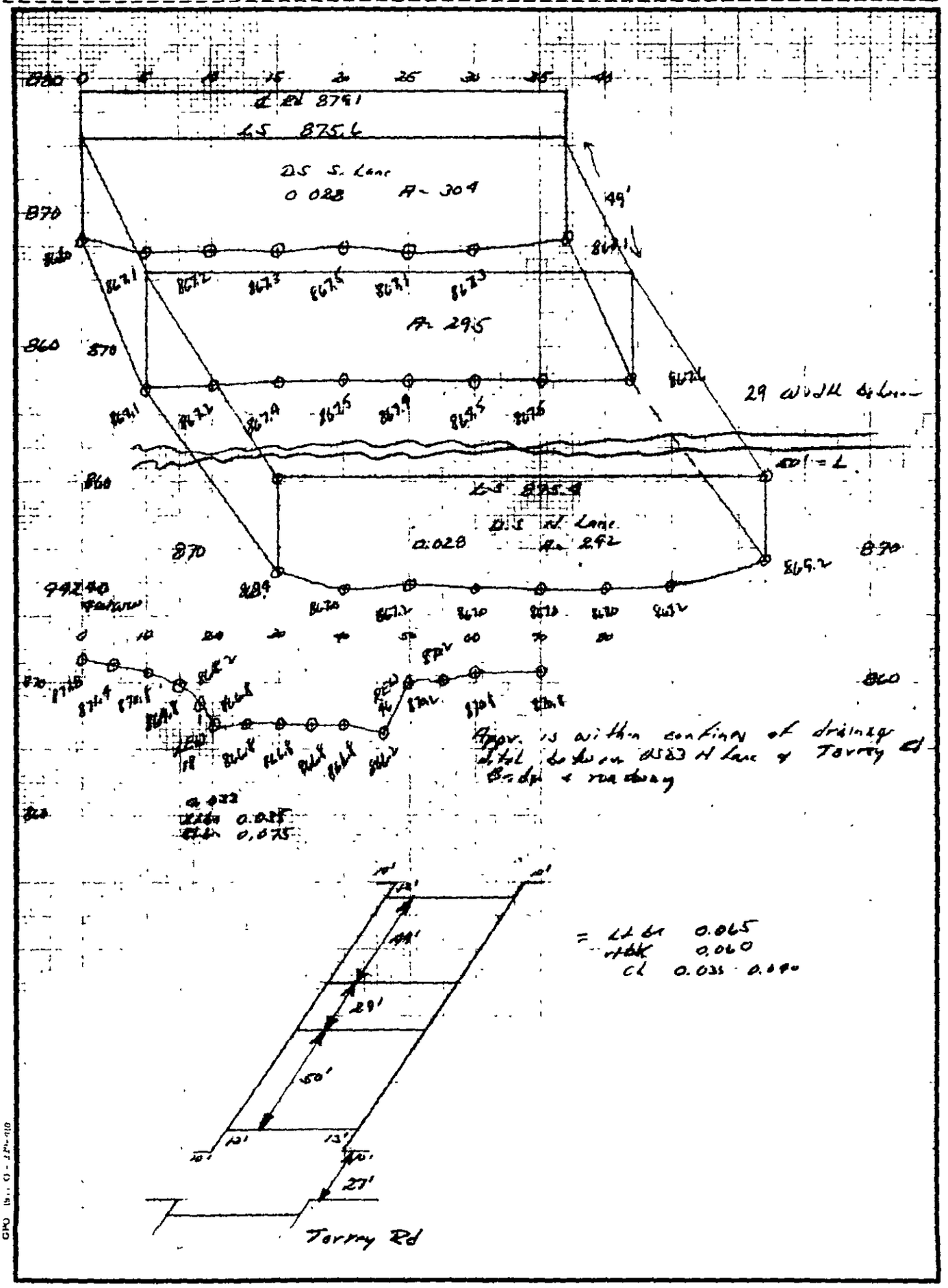


Section mouth 860

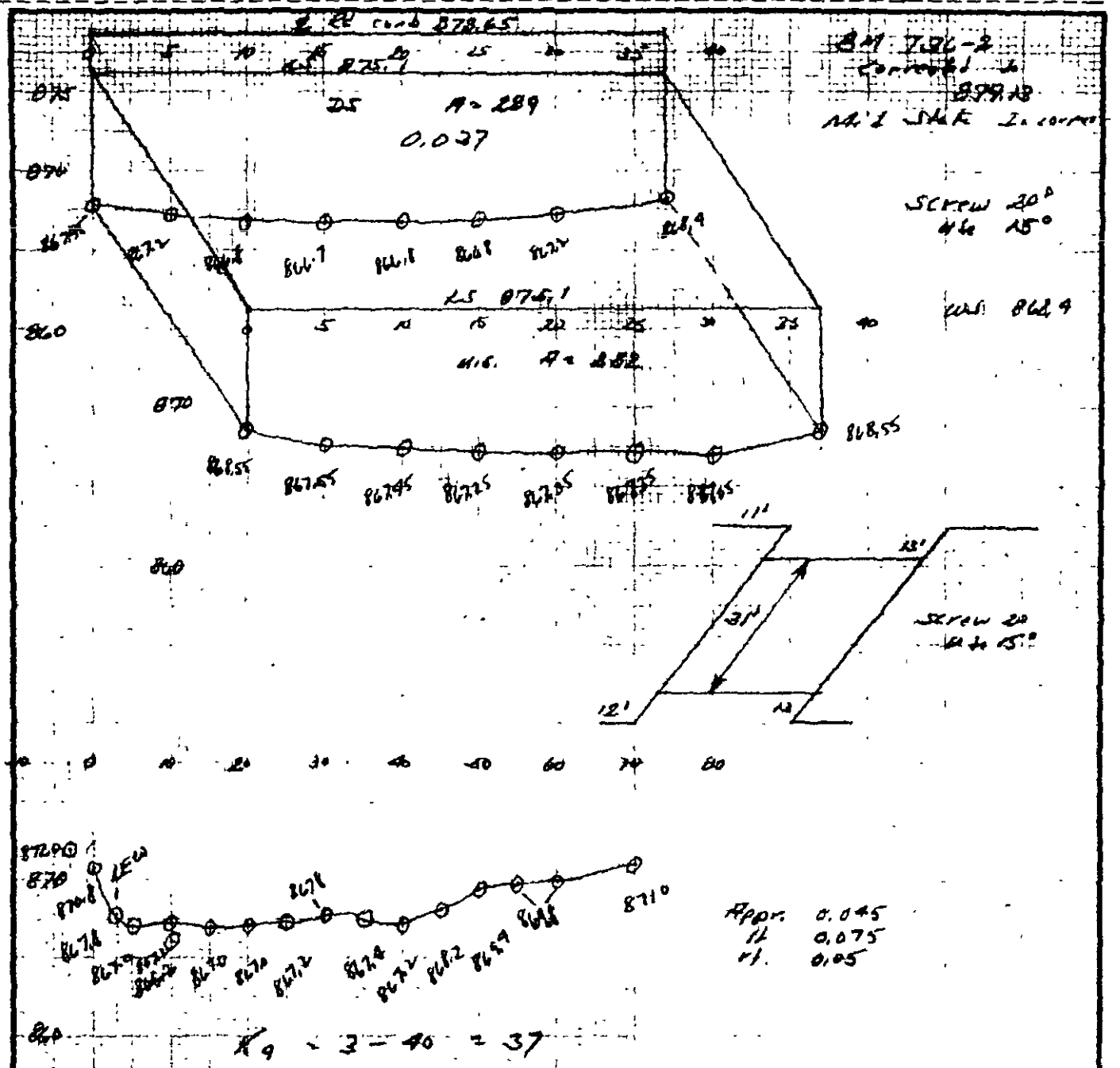
HWM 872.2 - 0.2 - 0.3
872.9 872.0
Use entire width for flood plain

(97730) 4.5

Shiawassee River U.S. 23



Shiawassee River — Torrey Road



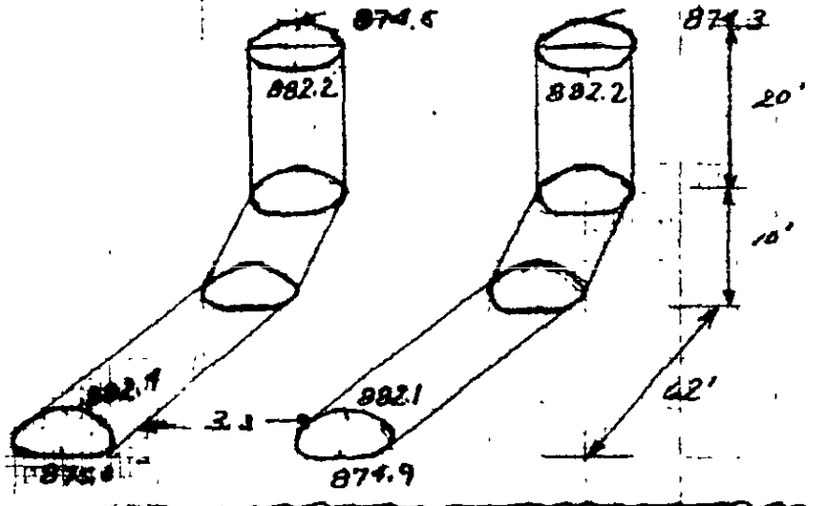
A cursory review of data provided by the DNR indicates that the HWM 12 below LS @ Torrey Rd 875.1 / 1.3 / 873.8 is probably incorrect. If the state had the nomenclature incorrect and this applies to North Rd 873.8 / 1.3 / 872.5 then this would about 0.5 higher than known HWM. HWM by Hayes 1947 872 seems more correct than the 872.5 or 872.7 reported for 1975. CH MAP of 872.7 could not occur.

9-213-E
(March 1949)
Cross-Section

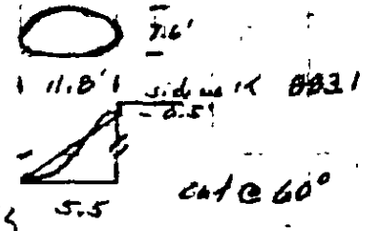
108070 EM UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

Shiawassee R — North Road

874.739 Changed from 882.65 to 882.90 (Wind State)
1975 Flood was the highest known, according to the Hydrographer, as it apparently came at rt. and. side of culvert.



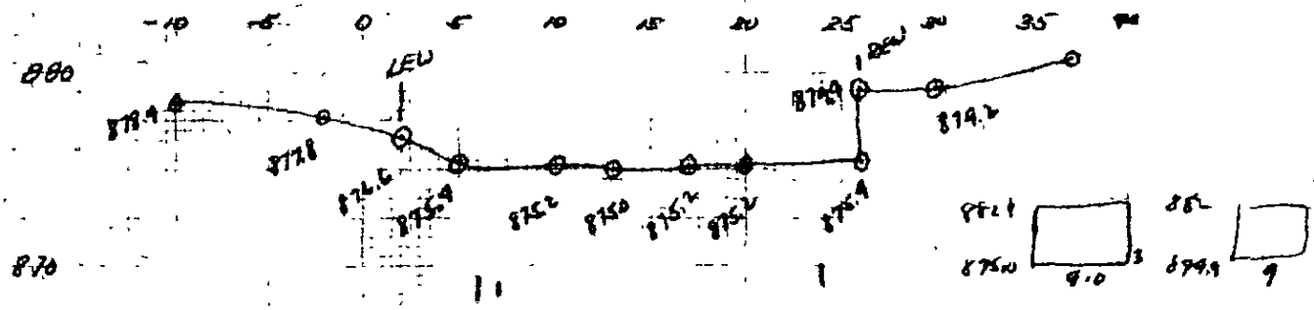
Flow angular to roadway about 50° use 75°
Use 11'-5" x 7'-3"

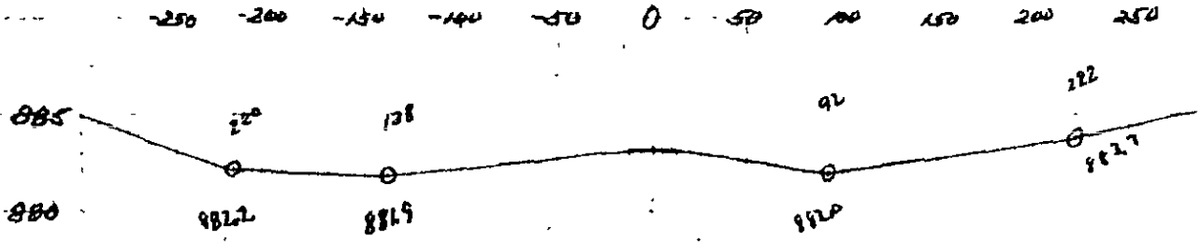


Flag At Base of Flag pole 879.28 Preliminary
0.00 on Gage staff @ Flag pole 881.23 -0.1 1975
881.13 1975
Hole @ Drive @ garage direct 881.16
DNR. RLR US. ws. 18" below crown 878.5 882.1-1.5=880.6
ds ws 2' below crown 882.2 - 880.2

WS = 877.11

← See additional data on this.





According to old time residents North Road has never overflowed. Roadway & culverts have been changed, but approach & exit areas have not been inundated any higher than 75

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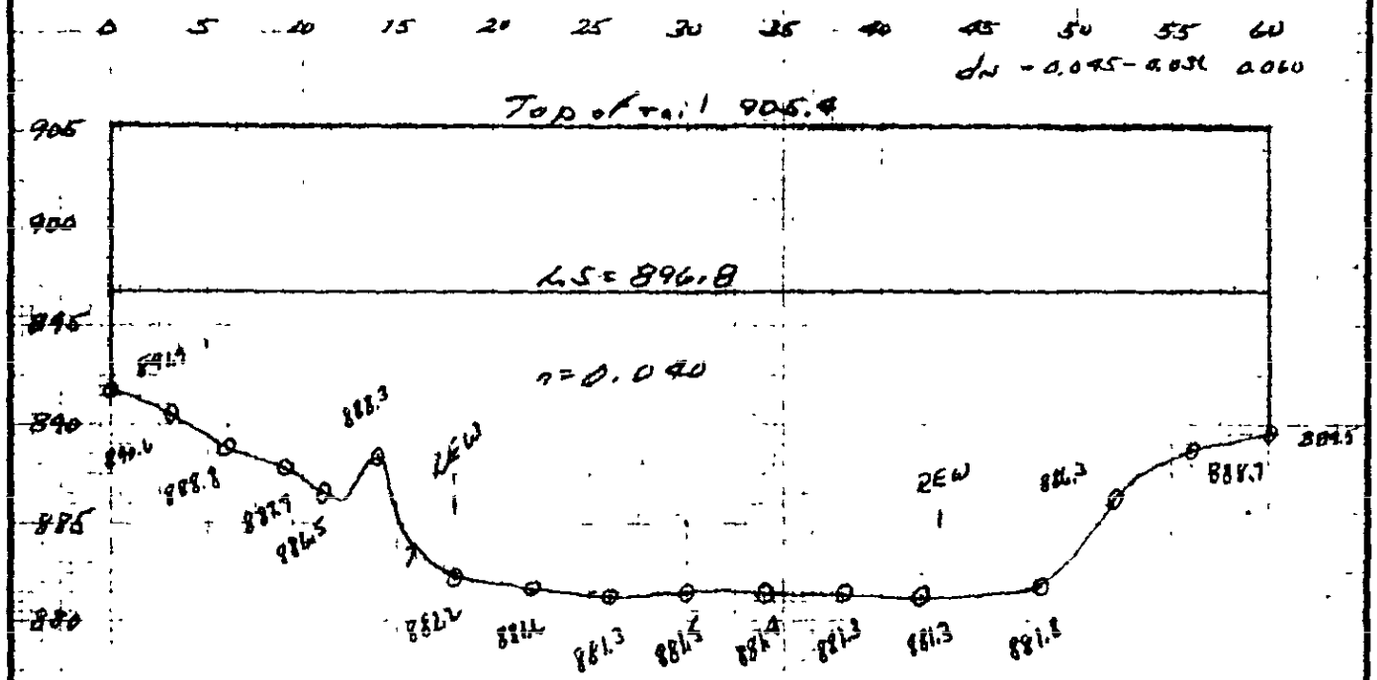
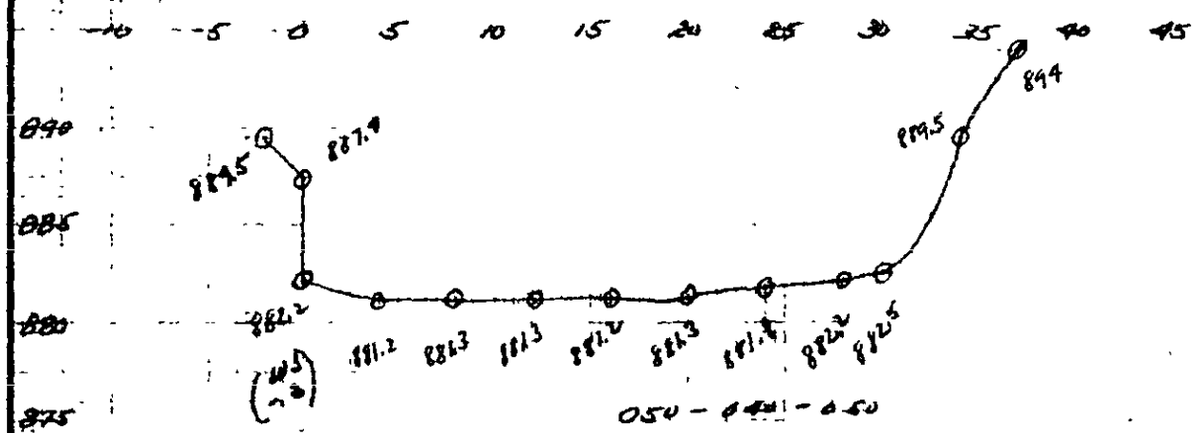
(March 1949)
Cross Section #

GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

Shiawassee R GTW RR Fenton

Ref: at the edge of concrete about the horizontal wheel at the side of bridge at east abutment at first vertical concrete support 896.79 (Use for BM)





HWM - hard to come by in this reach
None available, most people didn't see river

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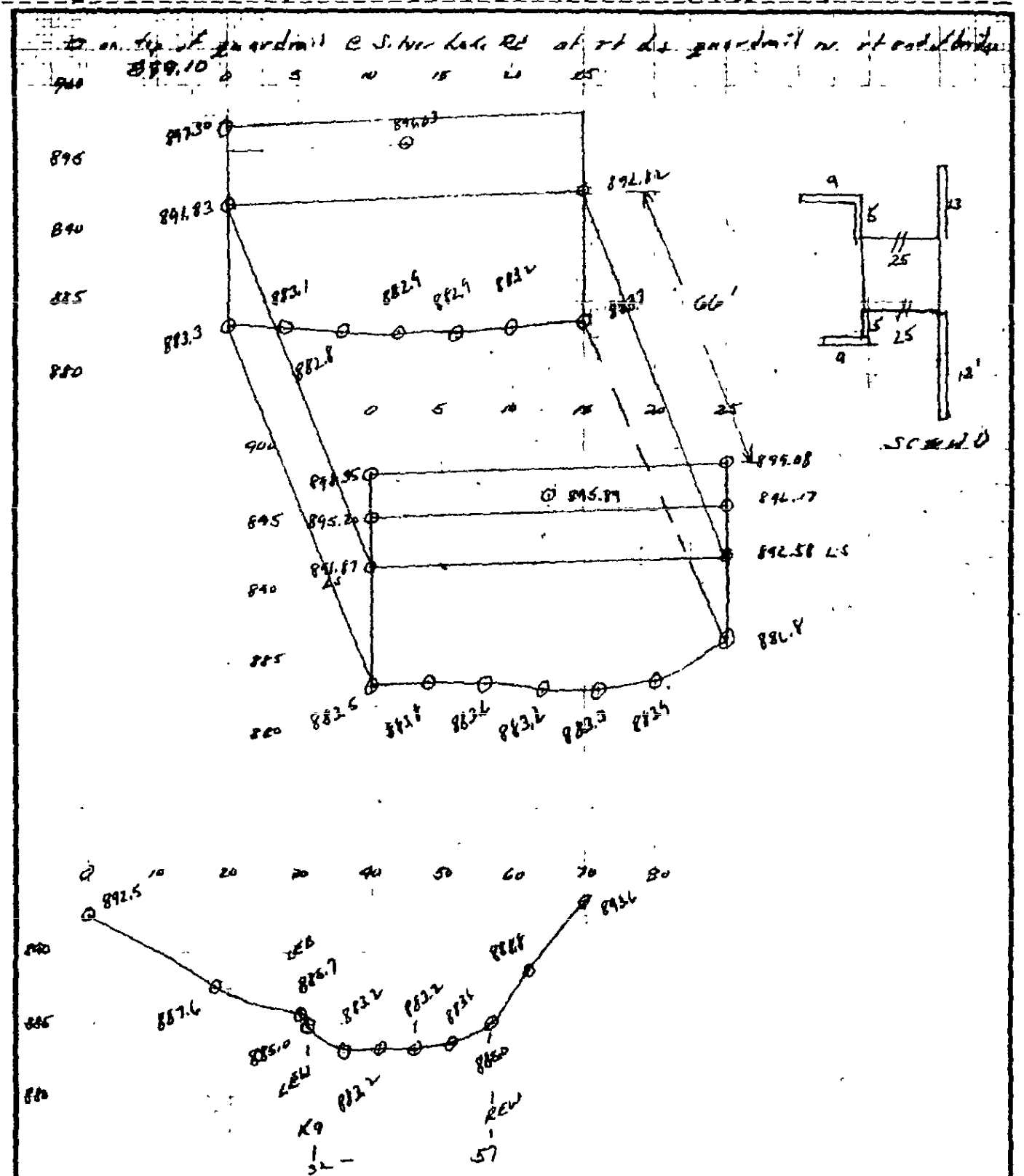
UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

Silver Lake Rd — Skiawassee River



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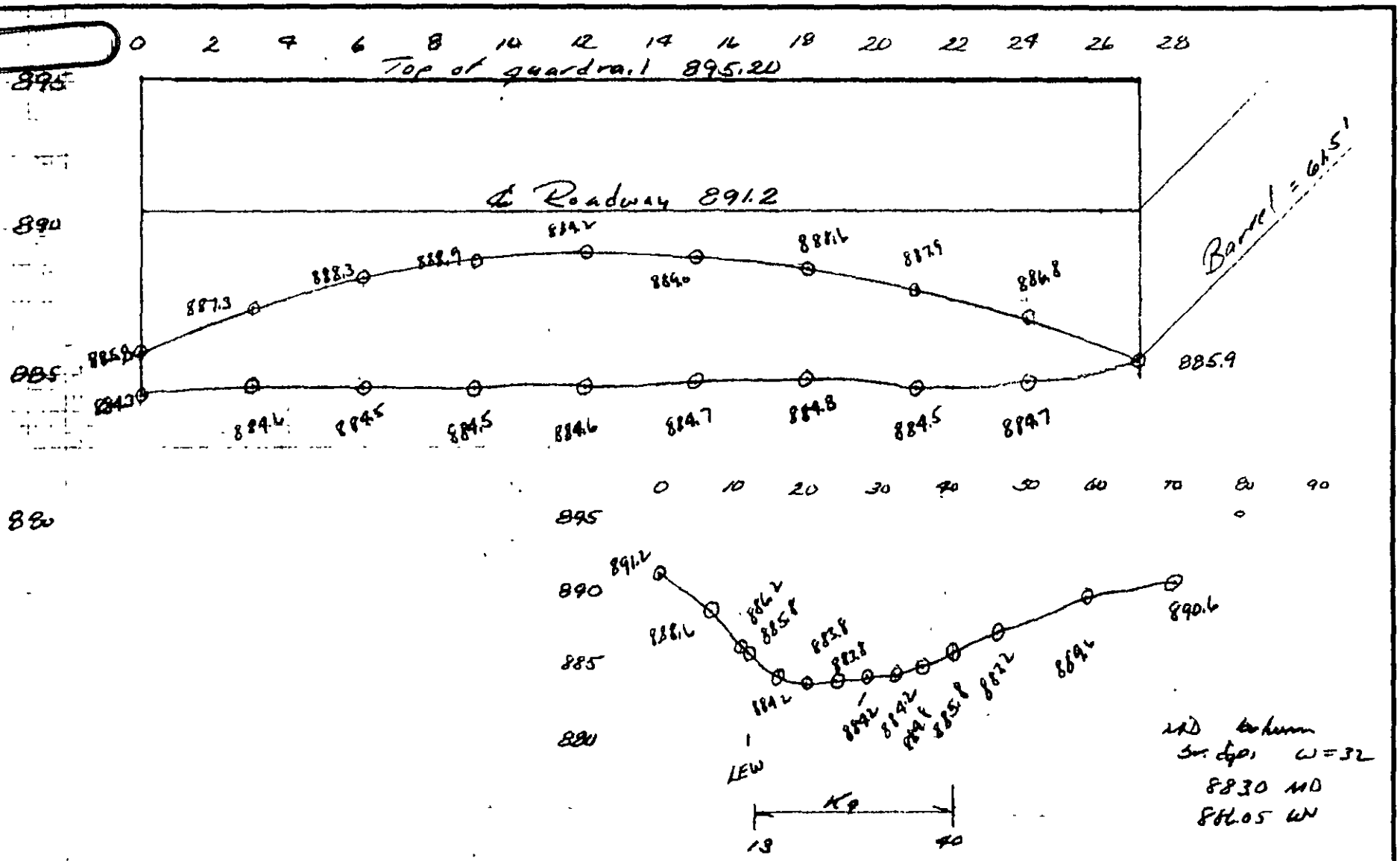
Shiawassee R. Cargline Bridge



RM Top of first vertical guardrail post at left downstream side of Carolina St. Bridge 89294

GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

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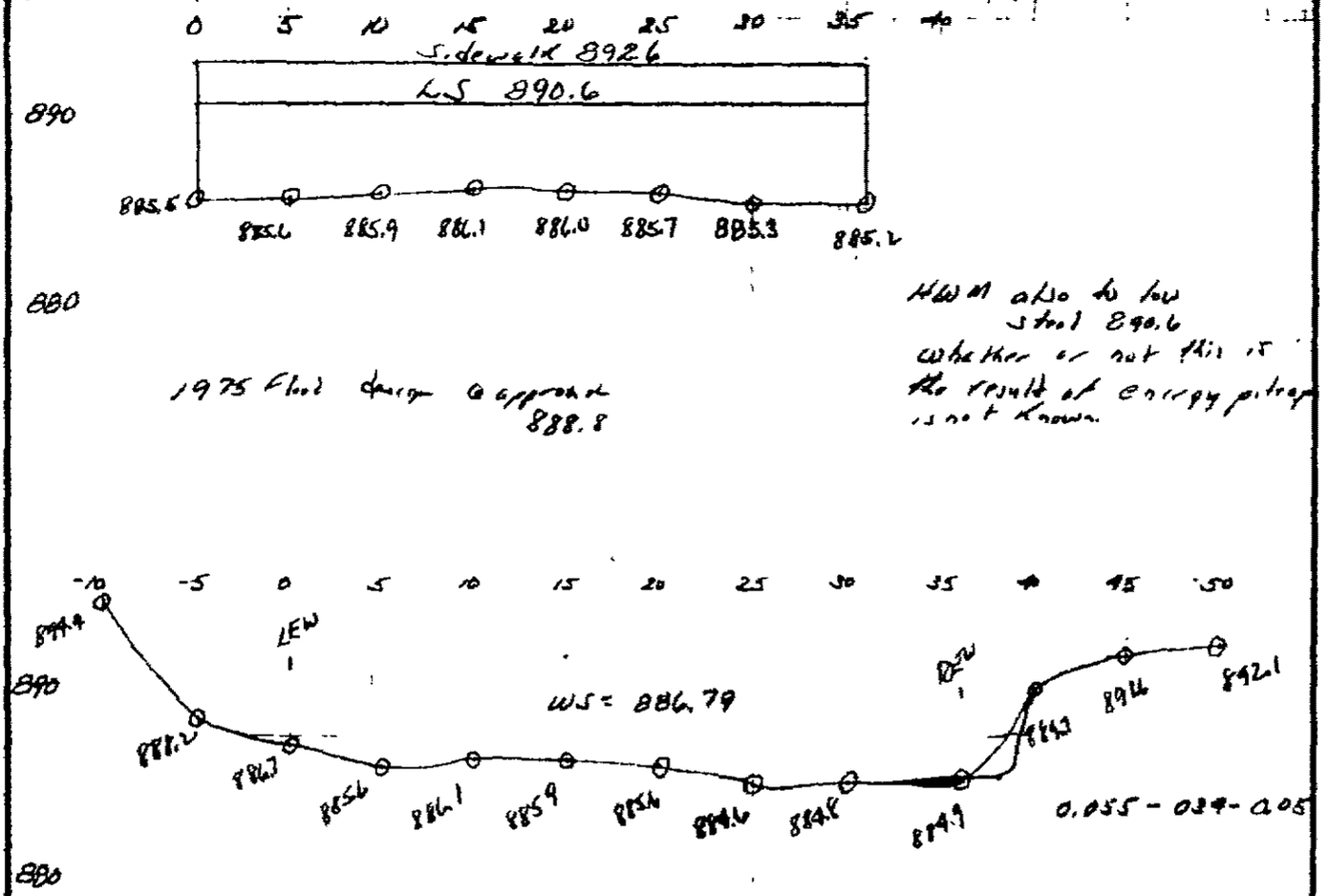
(March 1949)
10-3 Revision

GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

Shiawassee R. Foot bridge below Fenton Dam

Note - Super critical flow @ Q50 & above



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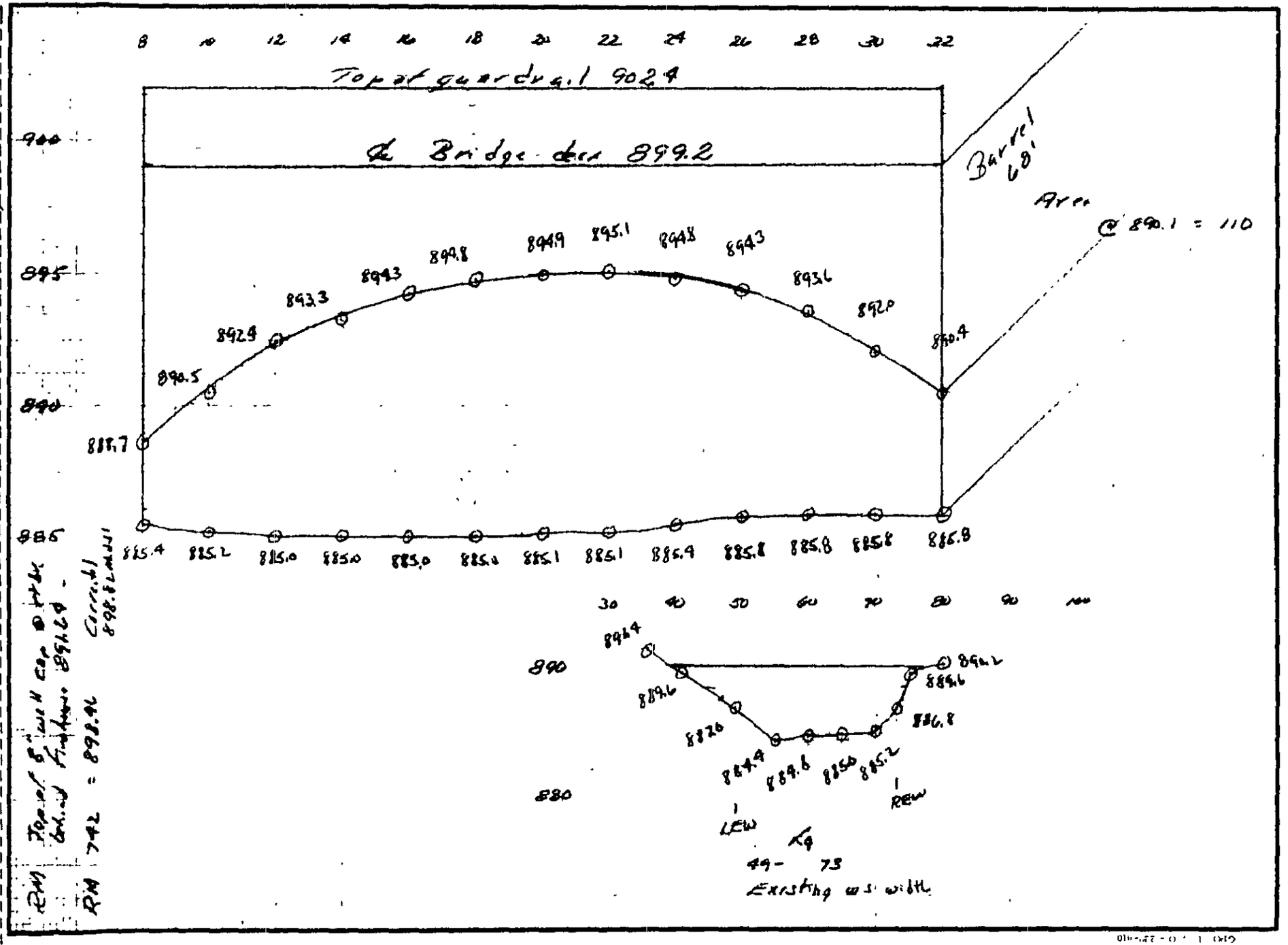
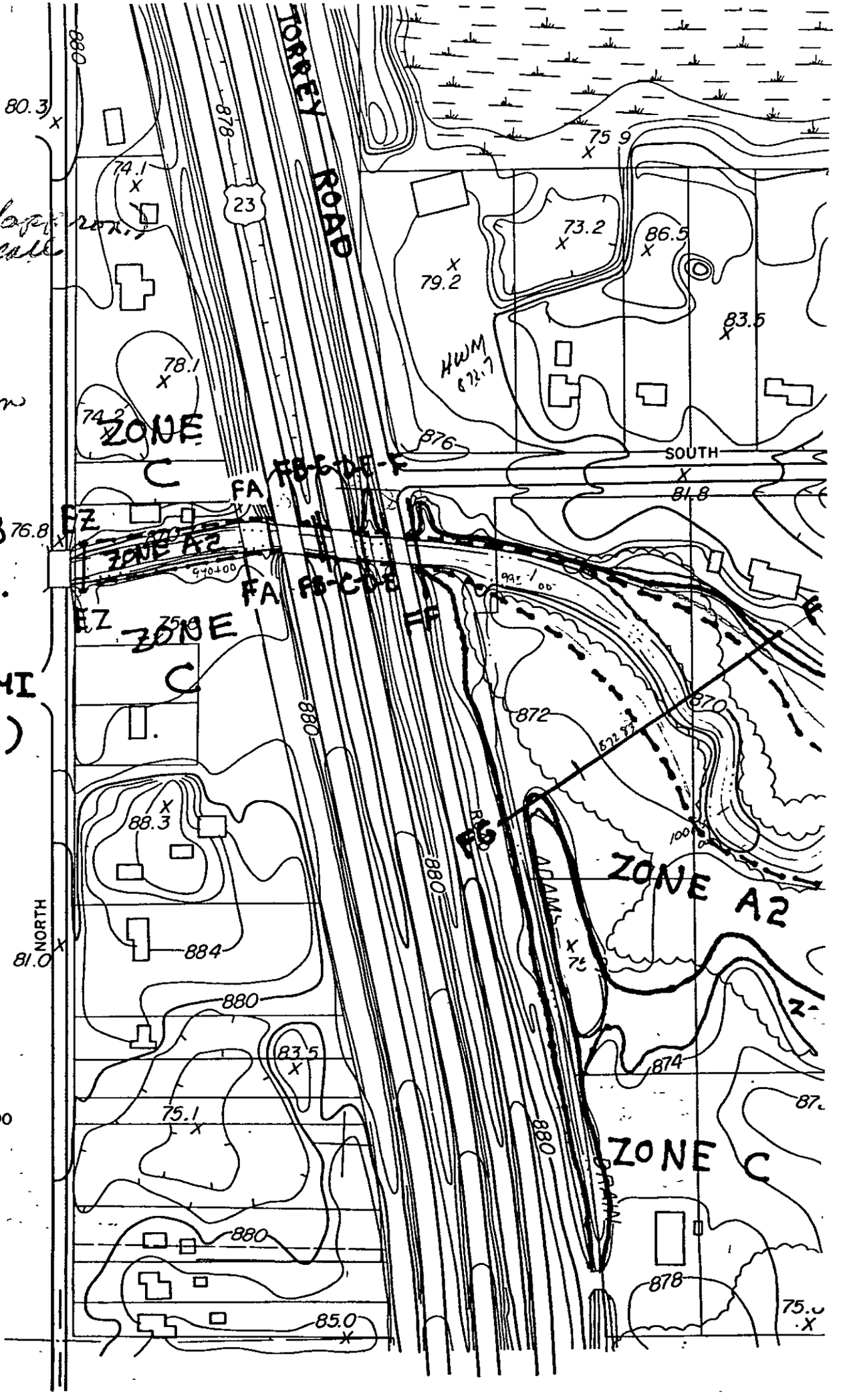


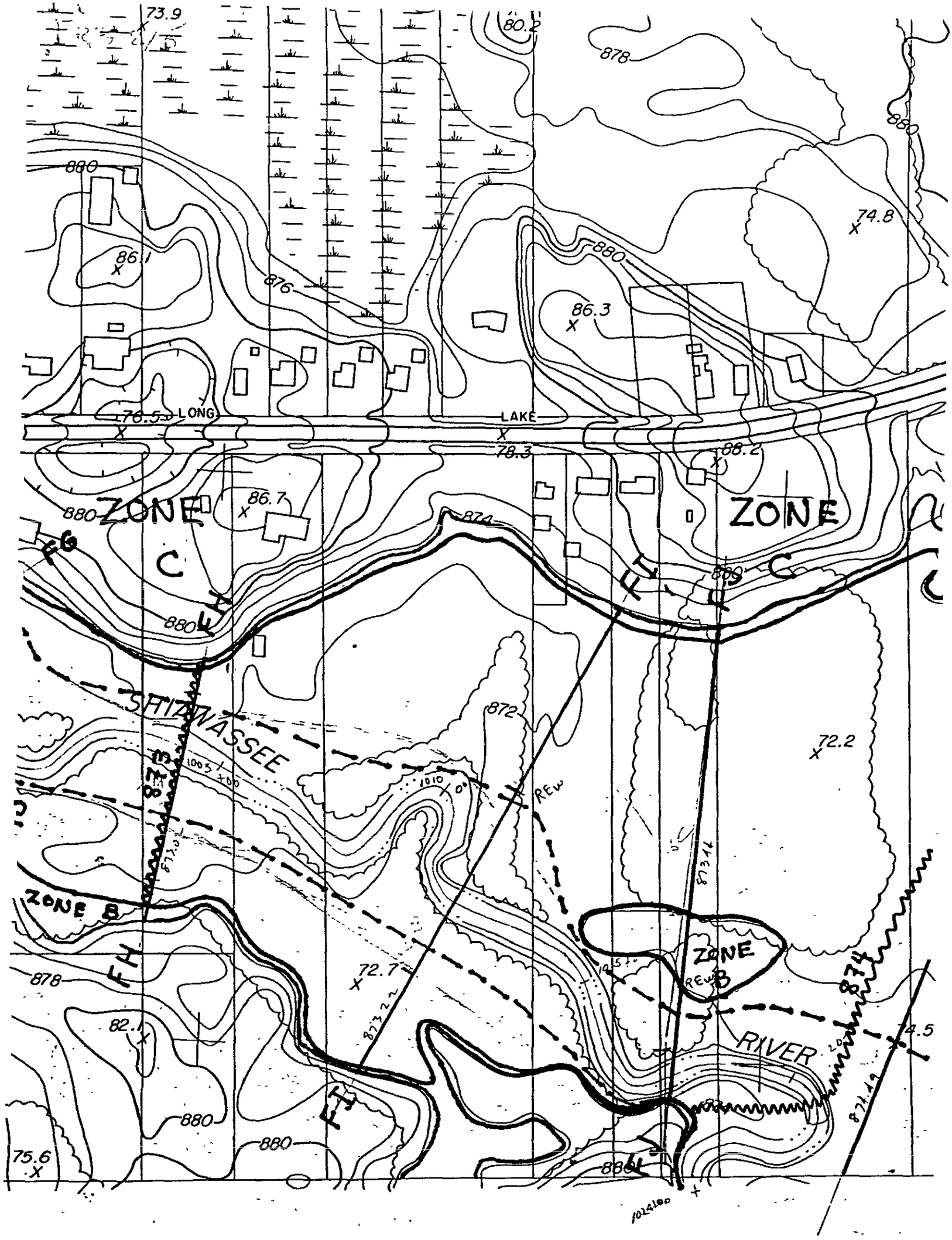
Sheet No. ..... of ..... Sheets Prepared by ..... Date ..... Checked by ..... Date .....

— Change overlap zone per phone call w/ U.S.G.S 9/11/79

Ignore green marks.

SECTION 23
T.5N., R6E.
FENTON
TOWNSHIP, MI
(GENESEE Co.)

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80.2
878
880
880
74.8
86.1
876
880
86.3
76.5
LONG
LAKE
78.3
88.2
ZONE
86.7
ZONE
880
874
C
C
880
872
SHIAWASSEE
72.2
REW
ZONE B
ZONE
B
878
72.7
82.1
RIVER
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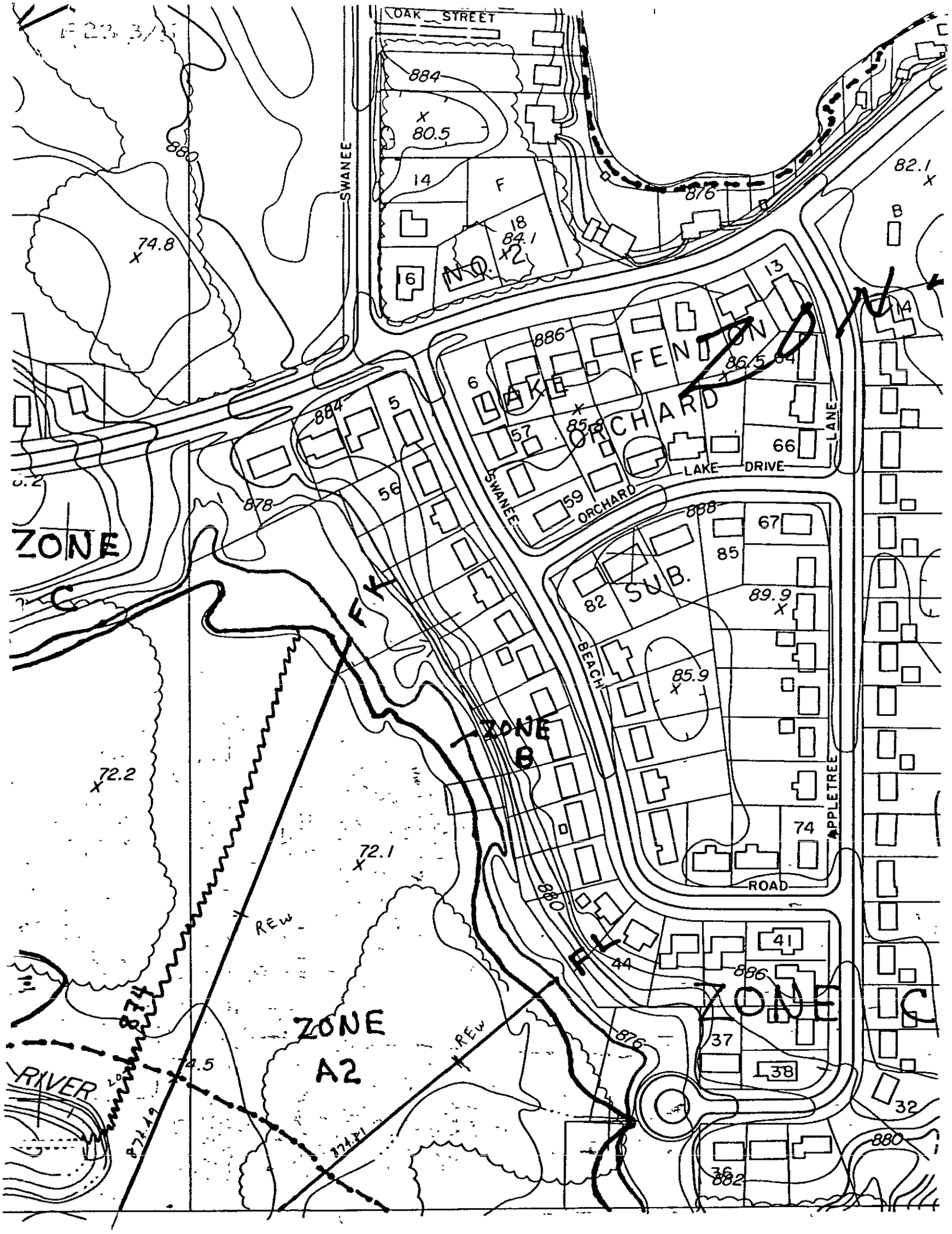
880
880
75.6
880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SWANEE
NO. 2
FENTON
LAKE
ORCHARD
LAKE DRIVE
LANE
SWANEE
ORCHARD
SUB.
BEACH
APPLETREE
ROAD
ZONE C
ZONE B
ZONE A2
ZONE C
RIVER
REW
REW
884
80.5
14
F
18
84.1
16
880
74.8
876
82.1
B
13
14
886
6
5
884
57
85
86.5
64
66
56
878
59
888
67
85
82
89.9
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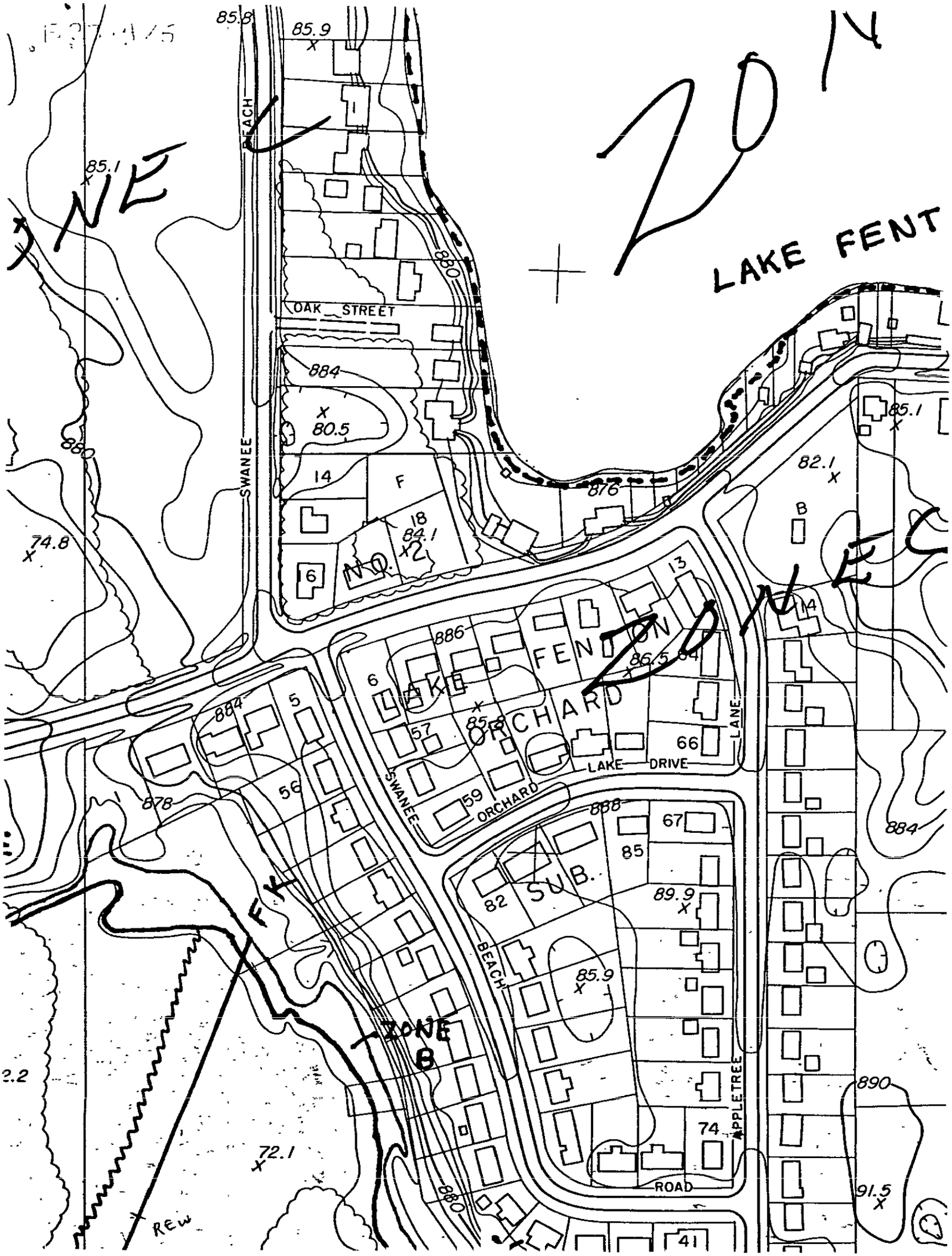
874.81
74.5


LAKE FENT
ZONE
ZONE
ZONE
B
OAK STREET
SWANEE BEACH
FENTON LAKE ORCHARD NO. 2
LAKE DRIVE
SWANEE ORCHARD
BEACH
APPLETREE LANE
ROAD
SUB.
85.8
85.9
85.1
880
884
80.5
14
F
18
84.1
6
876
82.1
B
74.8
886
5
4
57
85.8
86.5
64
13
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74
41
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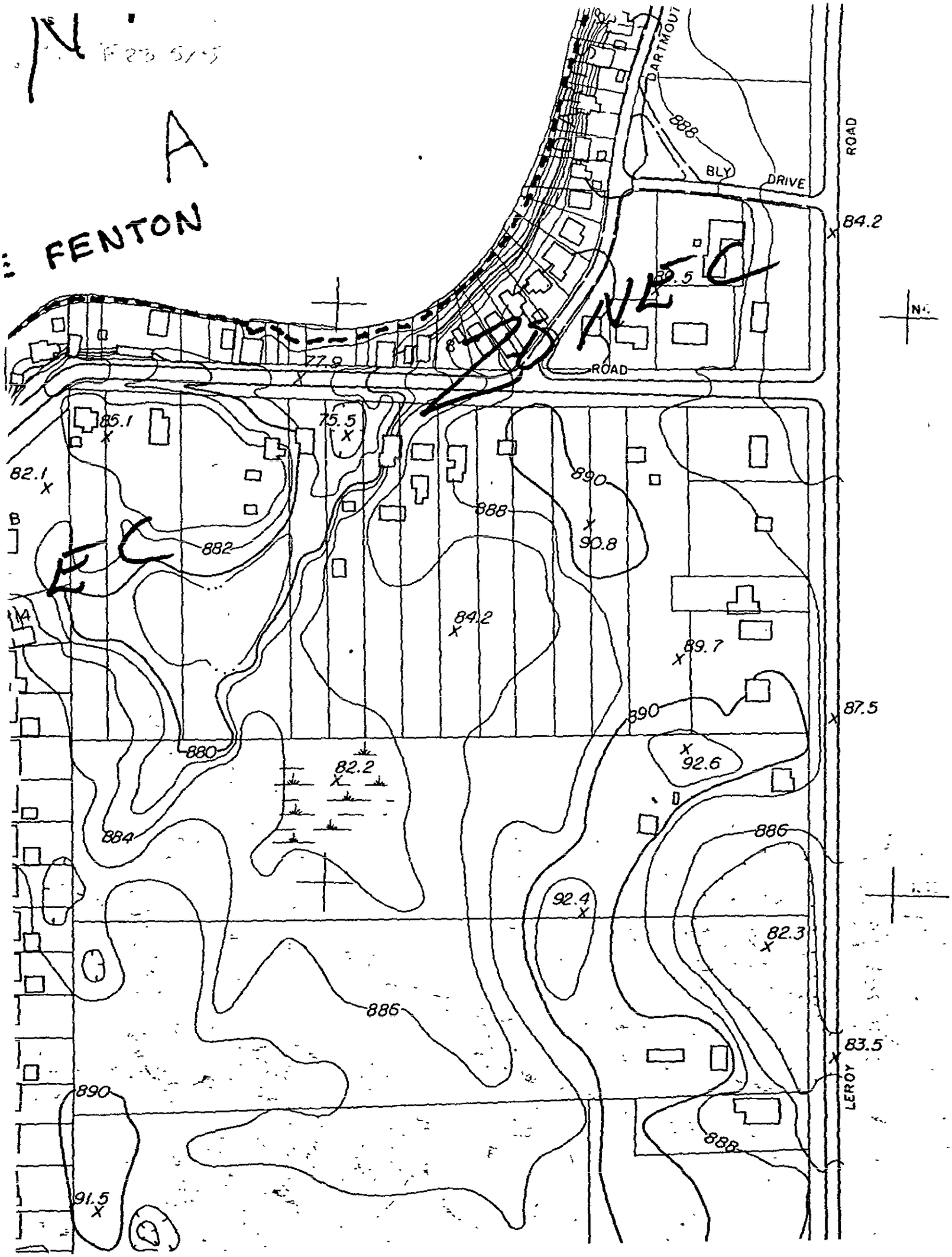
91.5
72.1
REW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DARTMOUT
BLY
DRIVE
ROAD
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89.5
77.9
ROAD
85.1
75.5
82.1
890
888
90.8
882
84.2
89.7
87.5
890
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92.6
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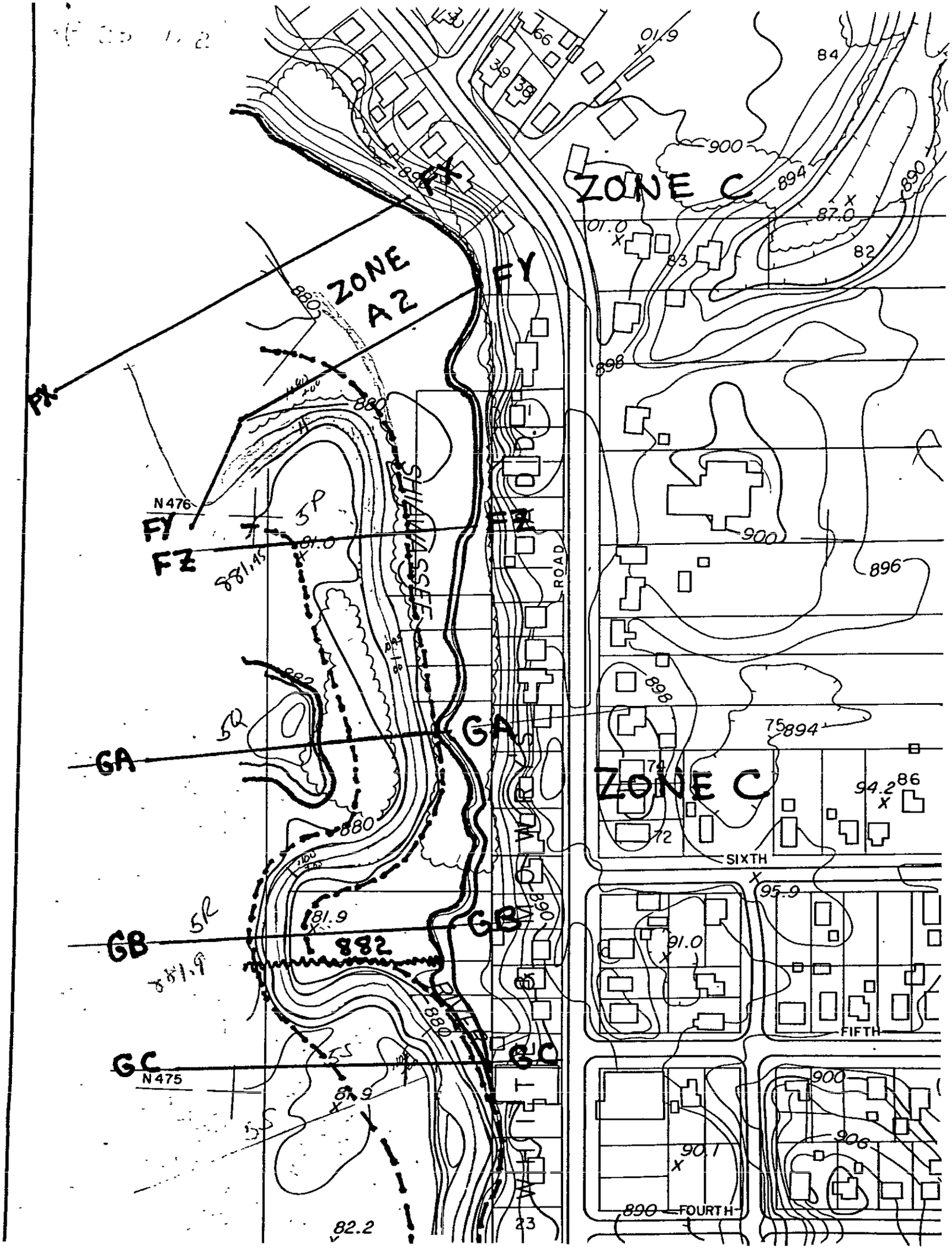
92.4
82.3
886
83.5
LEROY
890
888
91.5


ZONE C
ZONE A2
FY
FZ
GA
GB
GC
N476
N475
ROAD
SIXTH
FIFTH
FOURTH
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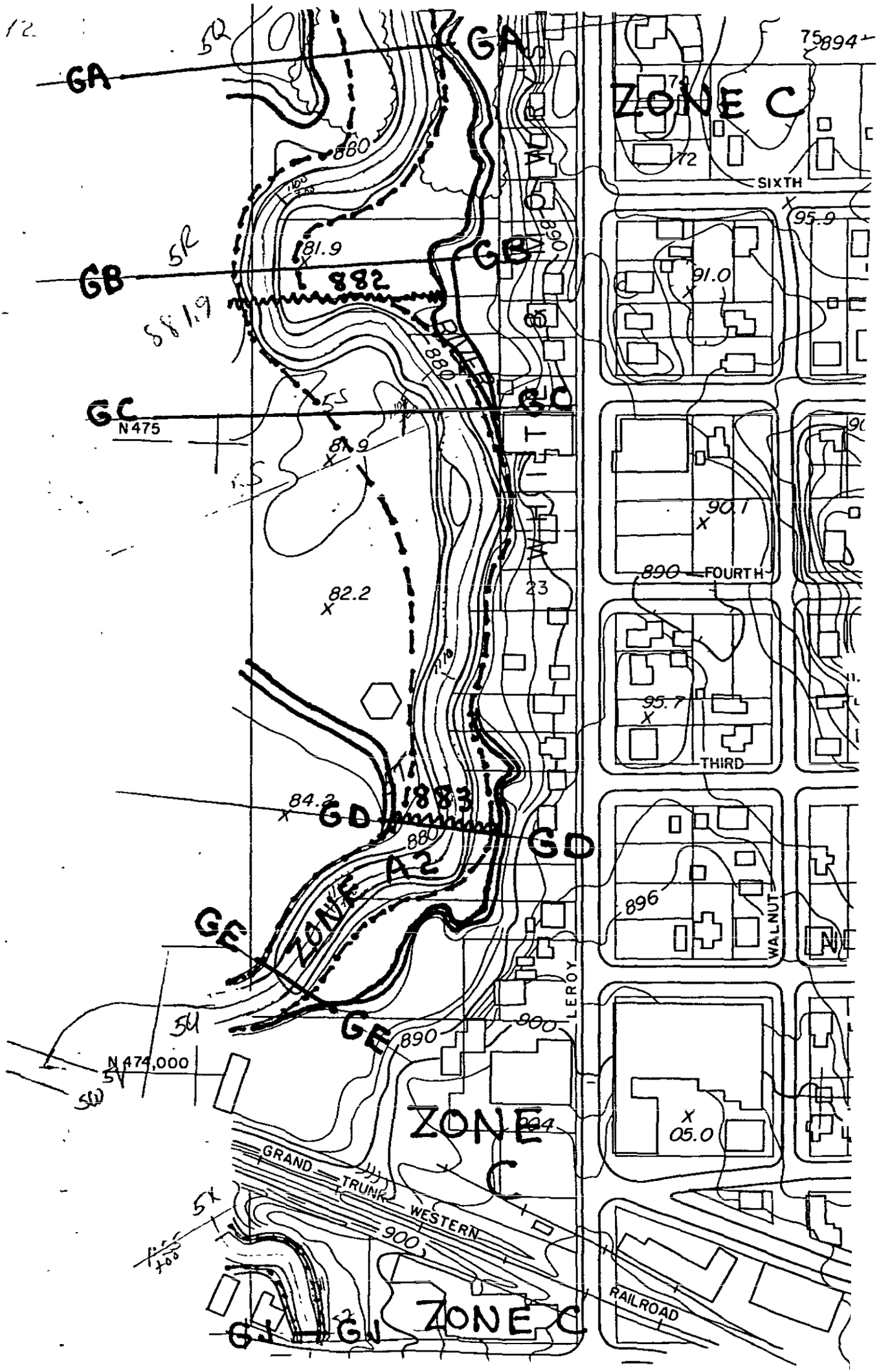
82.2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GC
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GD
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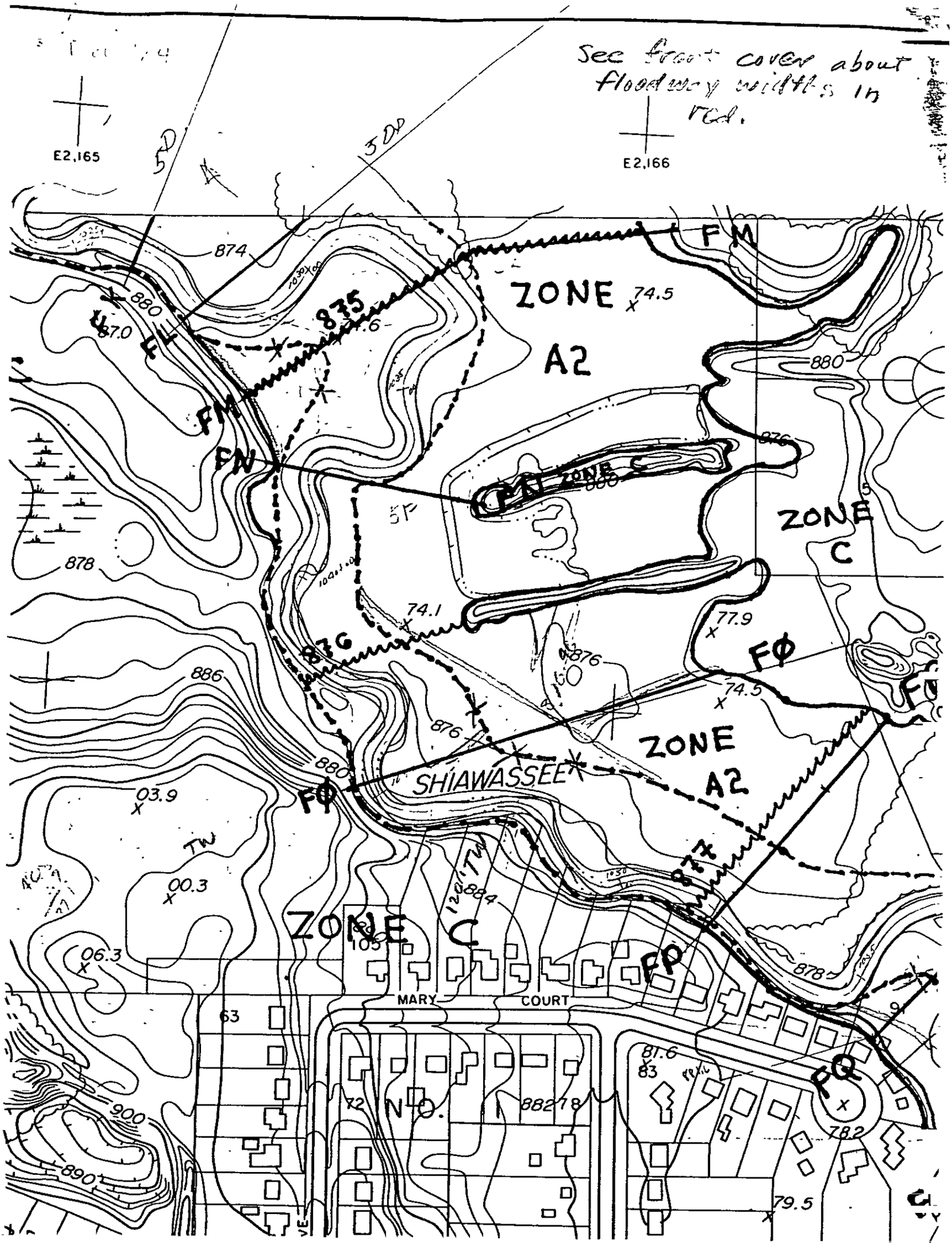
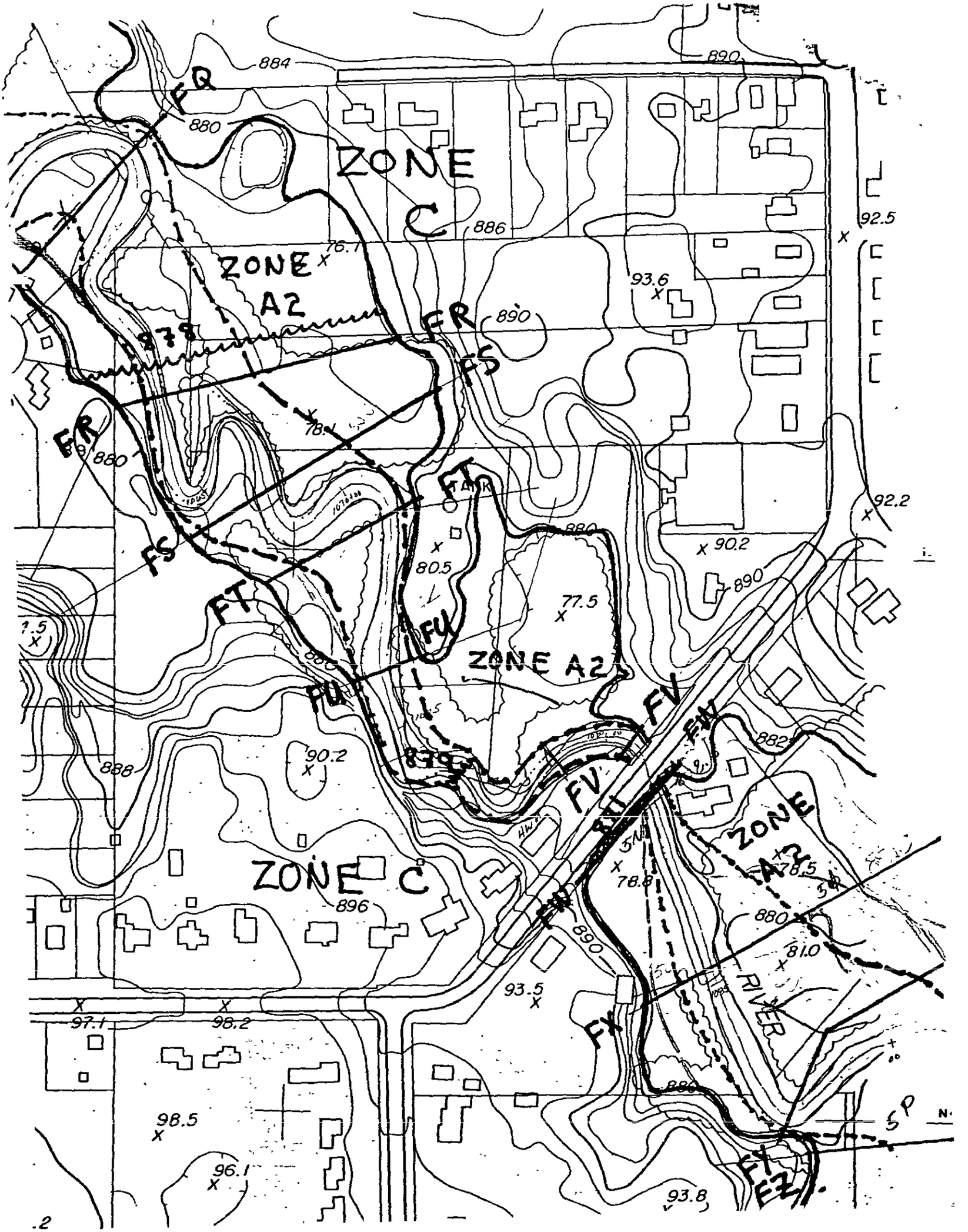
GE
GE
GJ
GJ
ZONE C
ZONE A2
ZONE C
ZONE C
SIXTH
FOURTH
THIRD
WALNUT
LEROY
GRAND TRUNK WESTERN RAILROAD
N475
N474,000
880
881.9
882
883
890
896
900
894
81.9
91.0
90.1
95.7
82.2
84.2
05.0

See front cover about floodway widths in red.




ZONE C
ZONE A2
ZONE A2
ZONE C
ZONE A2
RIVER
FQ
FR
FS
FT
FU
FV
FW
FX
FZ
884
890
880
886
890
92.5
76.1
93.6
78.1
92.2
90.2
80.5
77.5
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97.1
98.2
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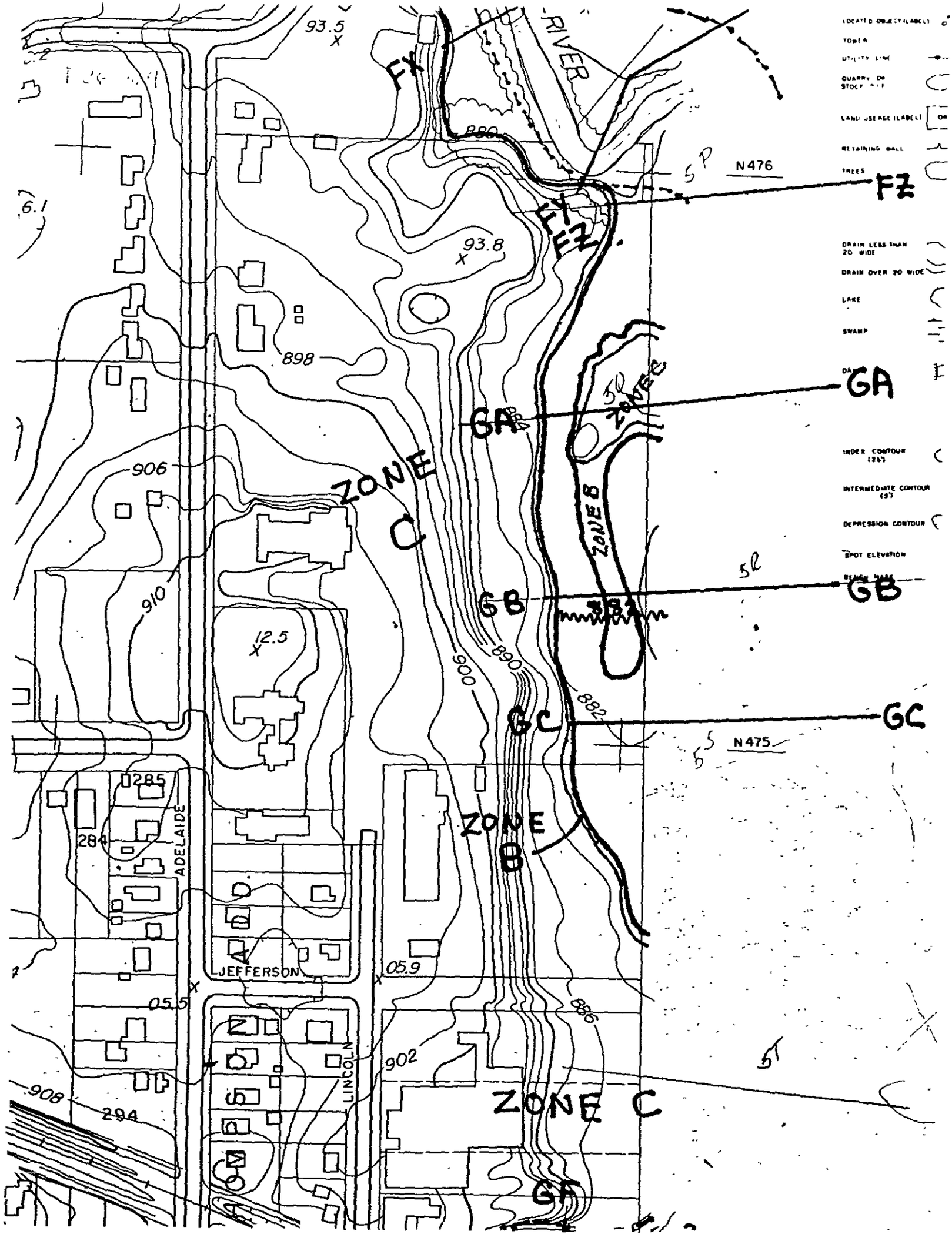
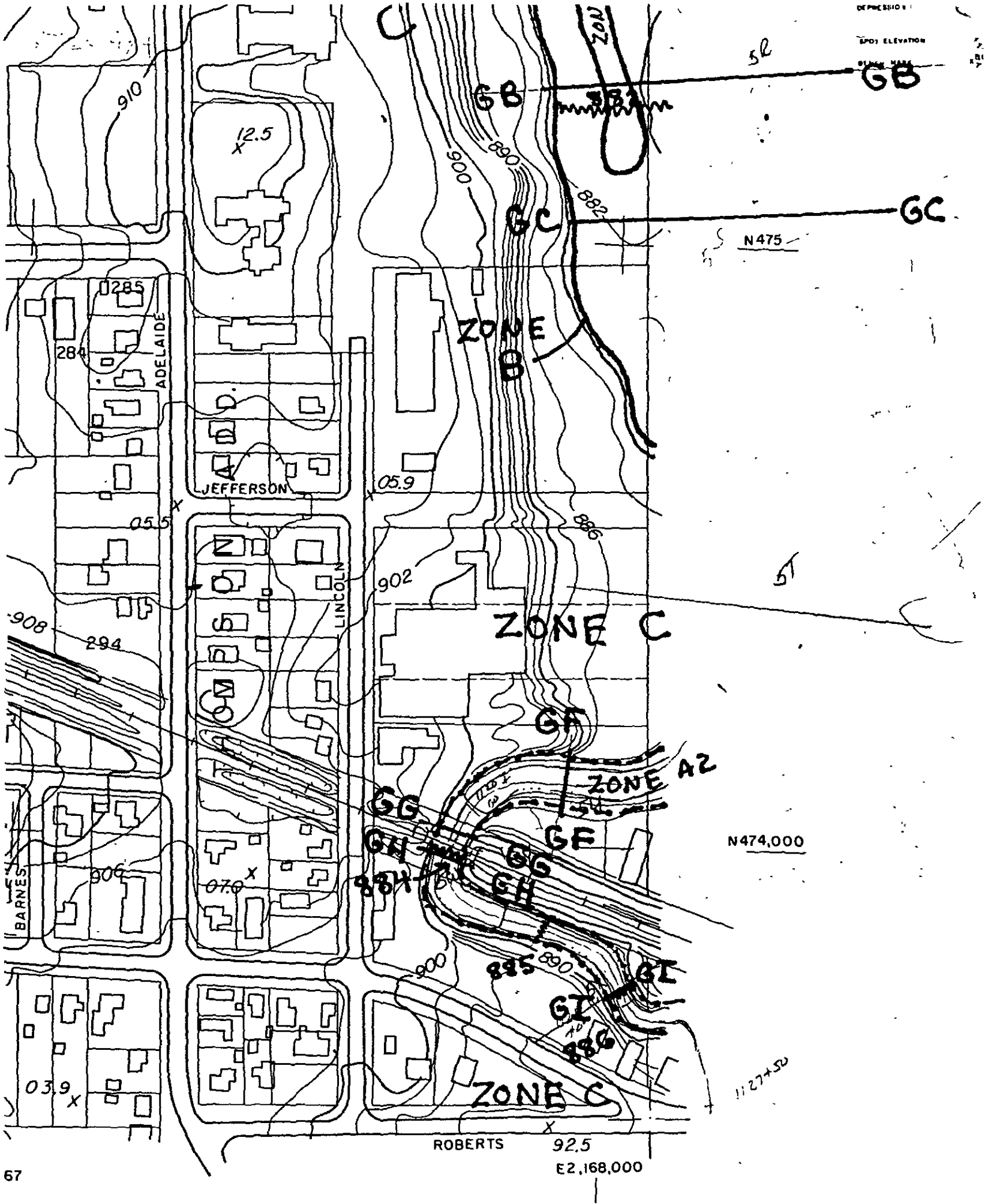
96.1
93.8


93.5
RIVER
FX
880
N476
FZ
FY
FZ
93.8
898
GA
GA
ZONE E
906
ZONE C
ZONE B
910
GB
GB
12.5
900
890
882
GC
GC
N475
285
284
ADELAIDE
ZONE B
JEFFERSON
05.9
05.5
886
902
LINCOLN
908
294
ZONE C
GF
LOCATED OBJECT (LABEL)
TOWER
UTILITY LINE
QUARRY OR STOCKPILE
LAND USE AGE (LABEL)
RETAINING WALL
TREES
DRAIN LESS THAN 20' WIDE
DRAIN OVER 20' WIDE
LAKE
SWAMP
INDEX CONTOUR (25')
INTERMEDIATE CONTOUR (5')
DEPRESSION CONTOUR
SPOT ELEVATION
BENCH MARK


DEPRESSION
SPOT ELEVATION
BENCH MARK
GB
GC
N475
ZONE B
ZONE C
GF
ZONE A2
GE
GG
GH
GI
N474,000
ADELAIDE
JEFFERSON
LINCOLN
BARNES
ROBERTS
E2,168,000
910
900
890
882
886
902
908
894
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885
12.5
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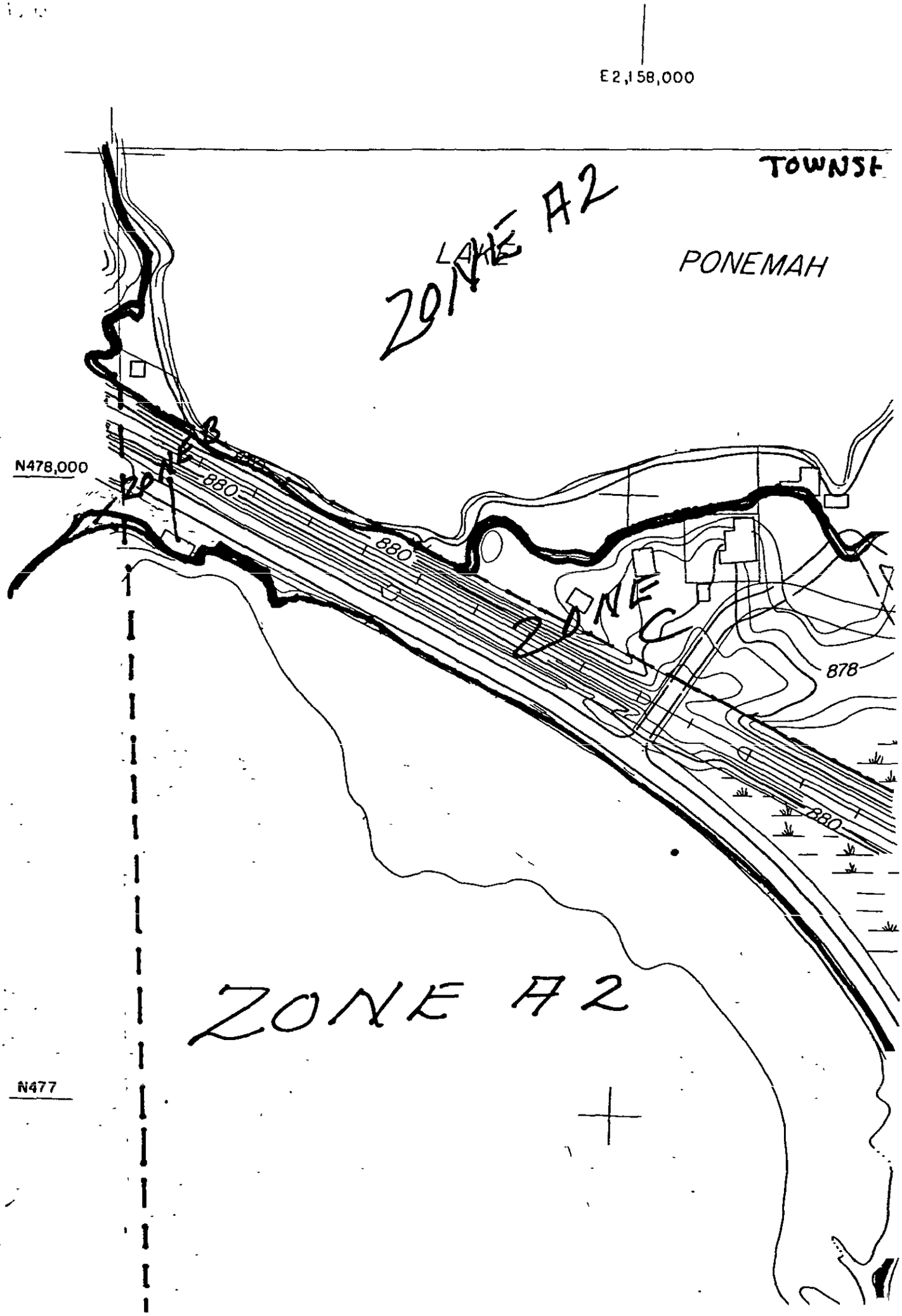
03.9
92.5


E2,158,000
TOWNSH
LAKE
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PONEMAH
N478,000
B
B
880
880
ZONE C
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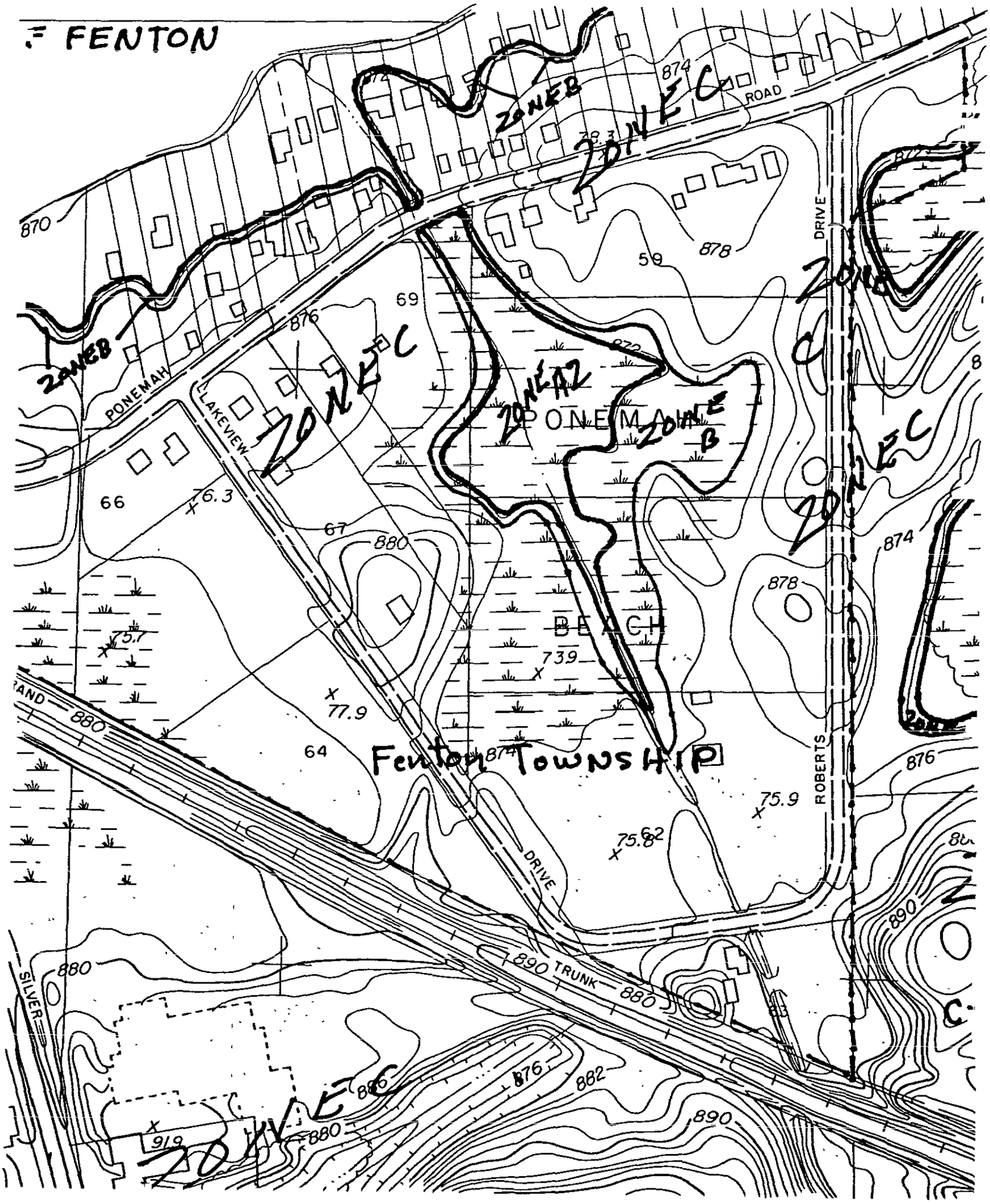
ZONE A2
N477


F FENTON
ZONE B
ZONE C
ROAD
DRIVE
PONEMAH
LAKEVIEW
ZONE A2
PONEMAH
ZONE B
BEACH
Fenton TOWNSHIP
ROBERTS
DRIVE
TRUNK
SILVER
874
870
878
59
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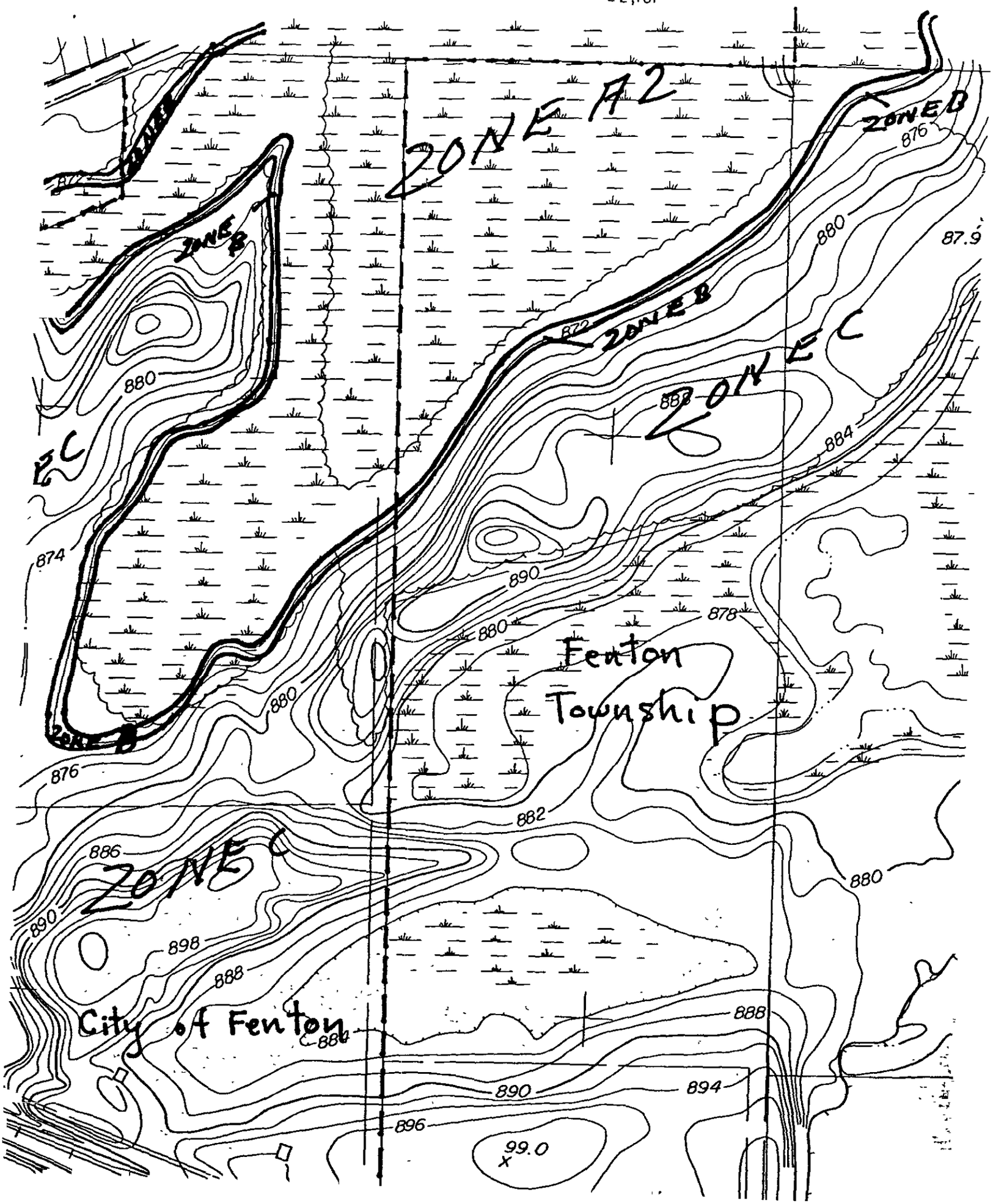
2,160
E 2,161
ZONE A2
ZONE B
ZONE B
ZONE B
ZONE B
ZONE C
ZONE C
ZONE C
Fenton Township
City of Fenton
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880
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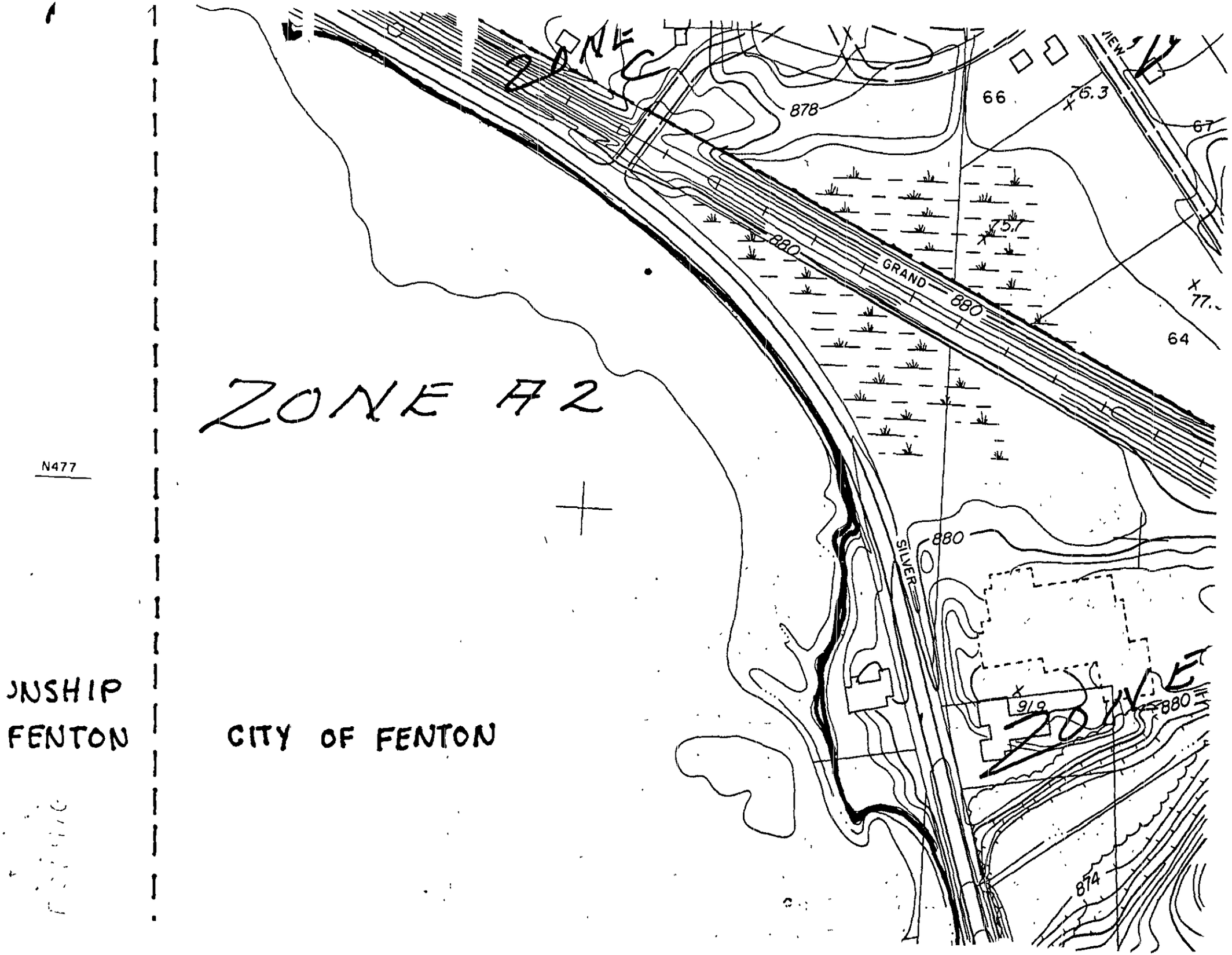
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75.7
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GRAND
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77.
64
ZONE A2
N477
SILVER
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919
ZONE E
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874
JNSHIP
FENTON
CITY OF FENTON

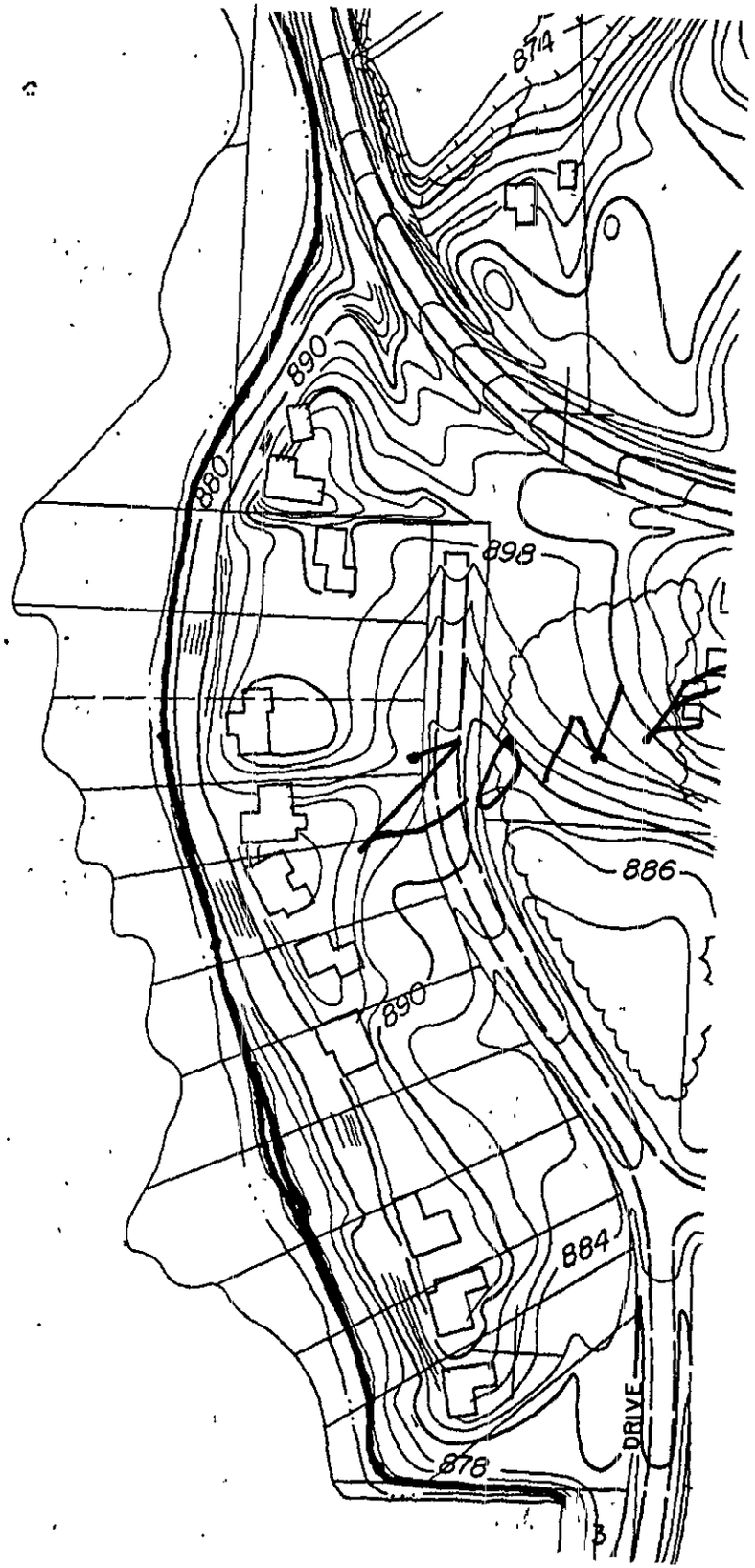
N476

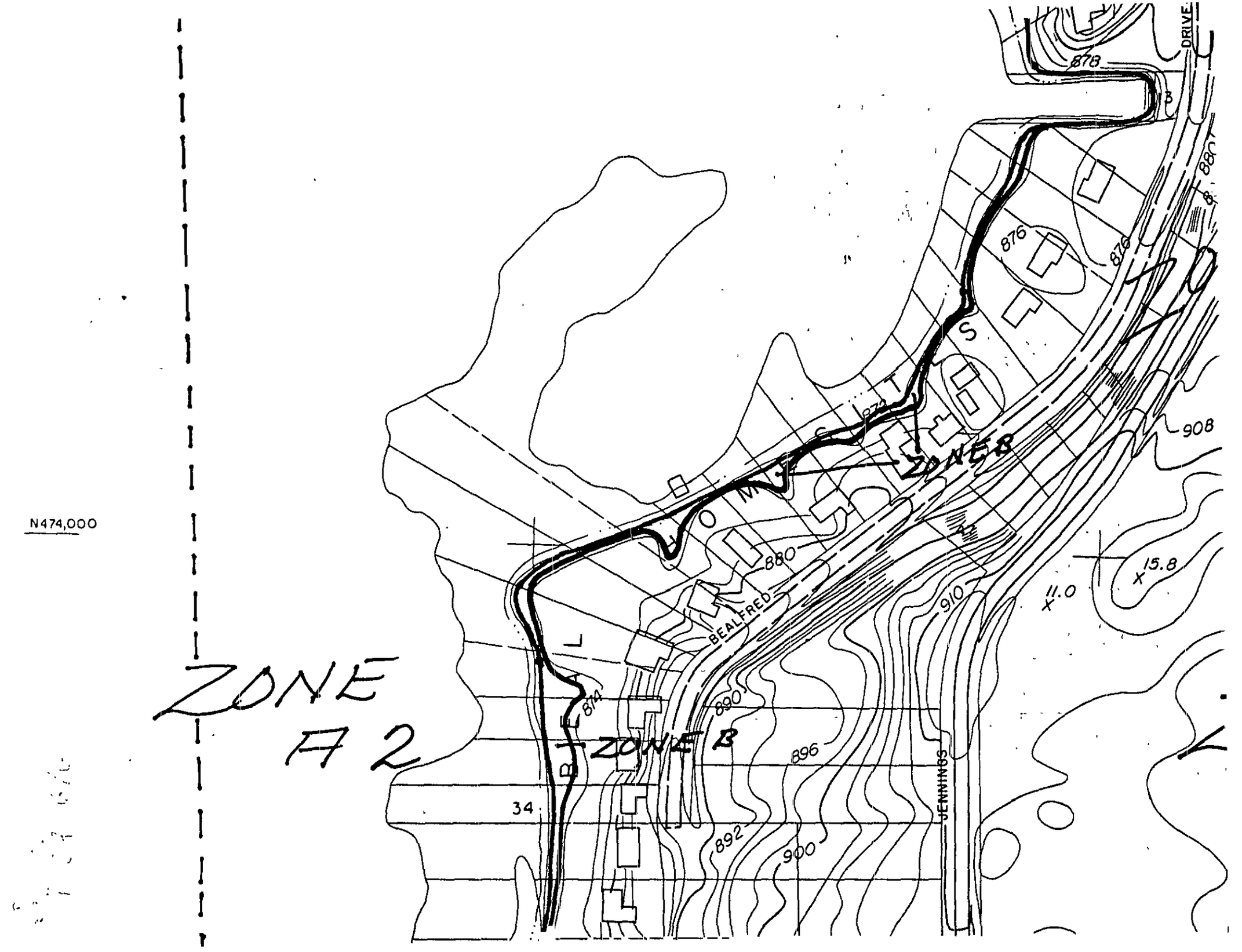
SILVER

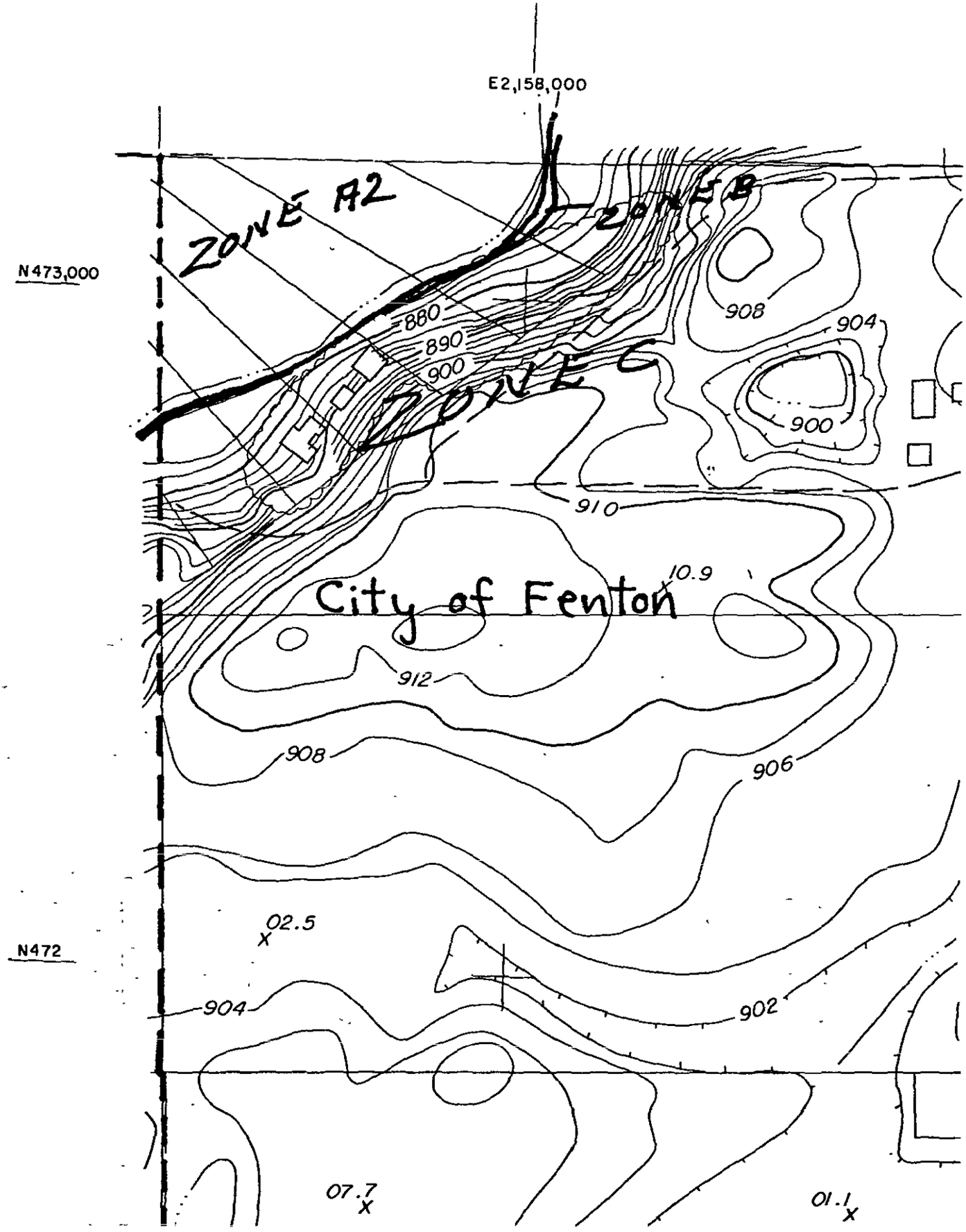
LAKE

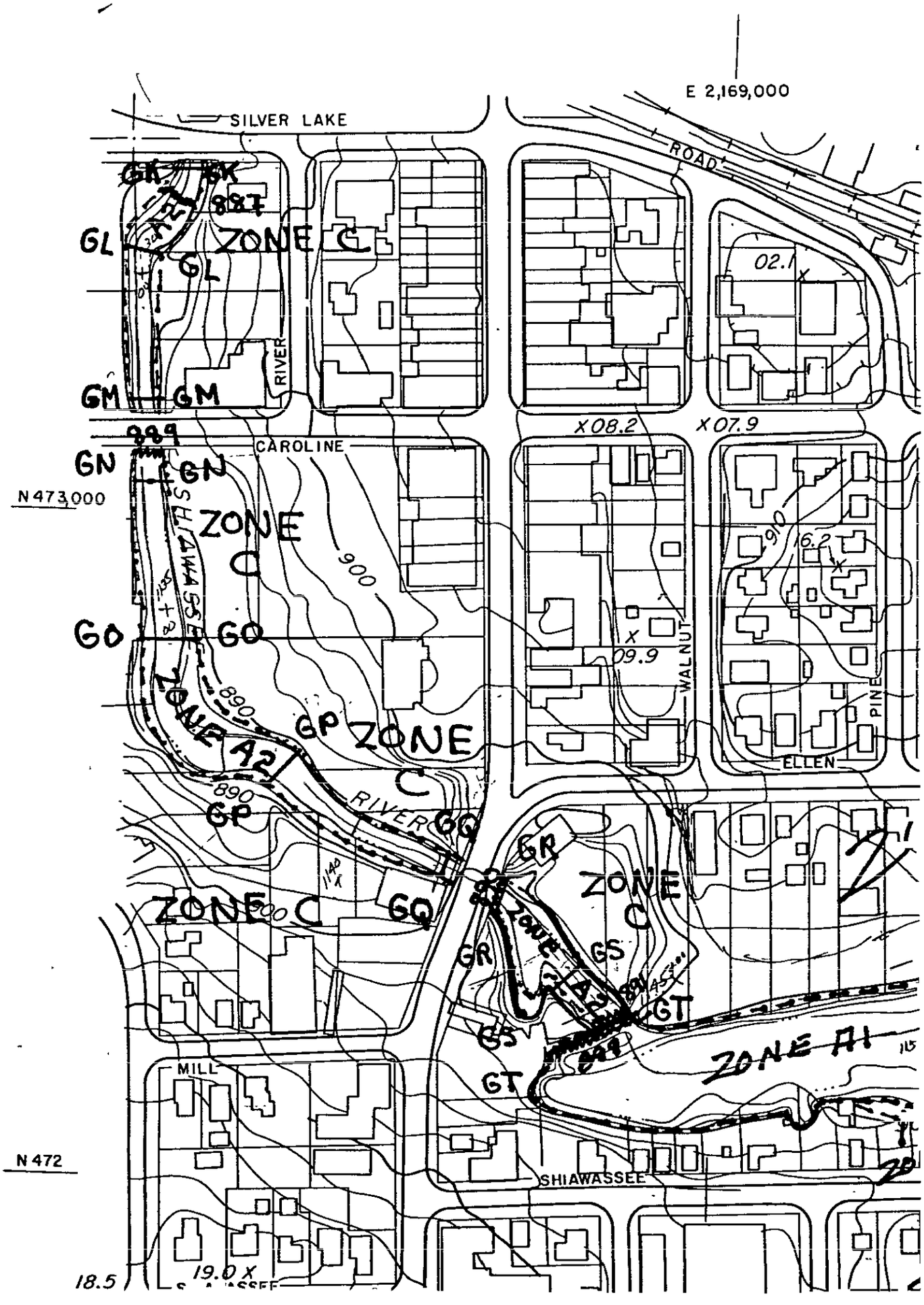
ZONE A2

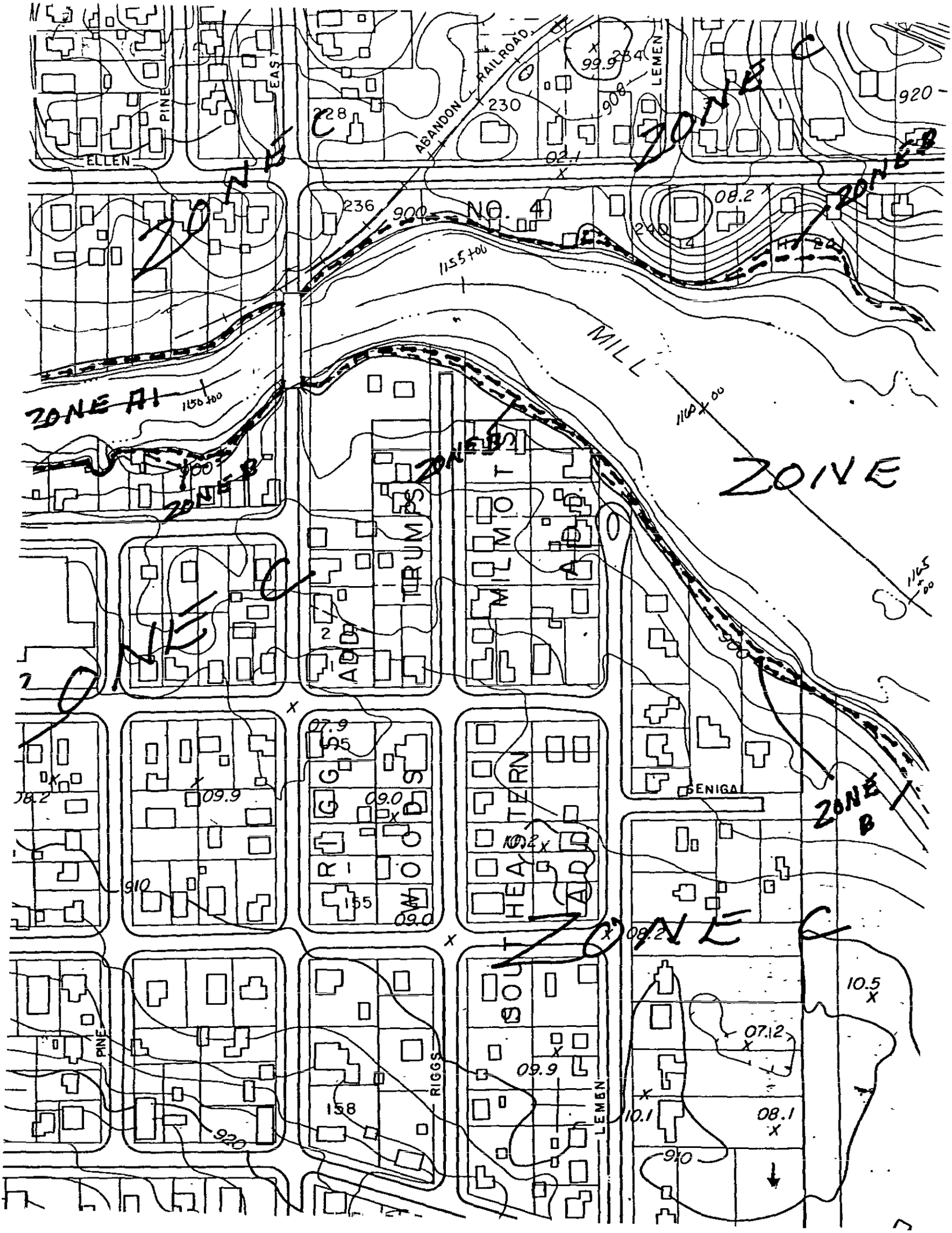
N475

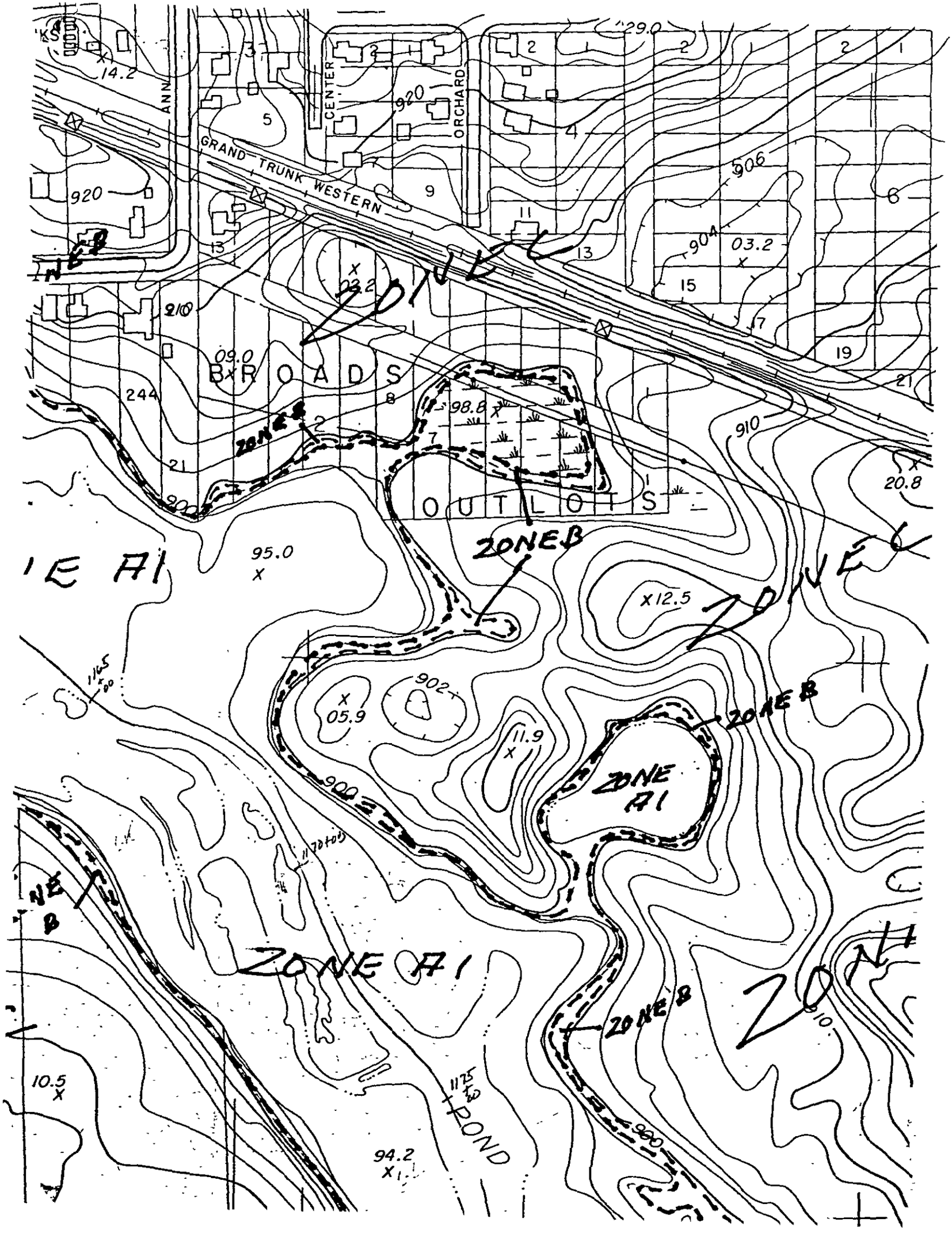


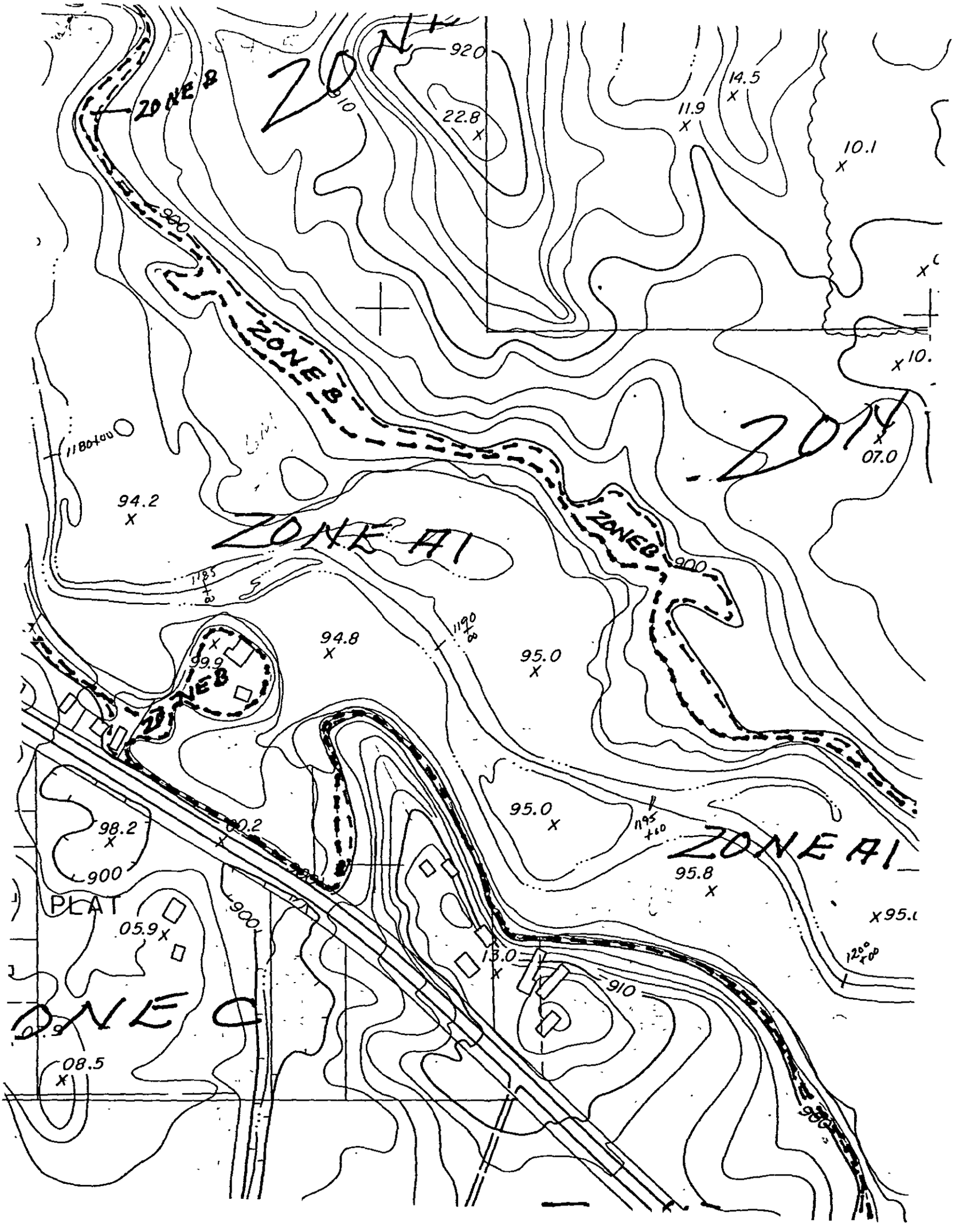

N474,000
ZONE A2
ZONE B
ZONE B
BEALFRED
JENNINGS
DRIVE
34
878
876
876
880
908
910
896
892
900
890
880
874
814
15.8
11.0

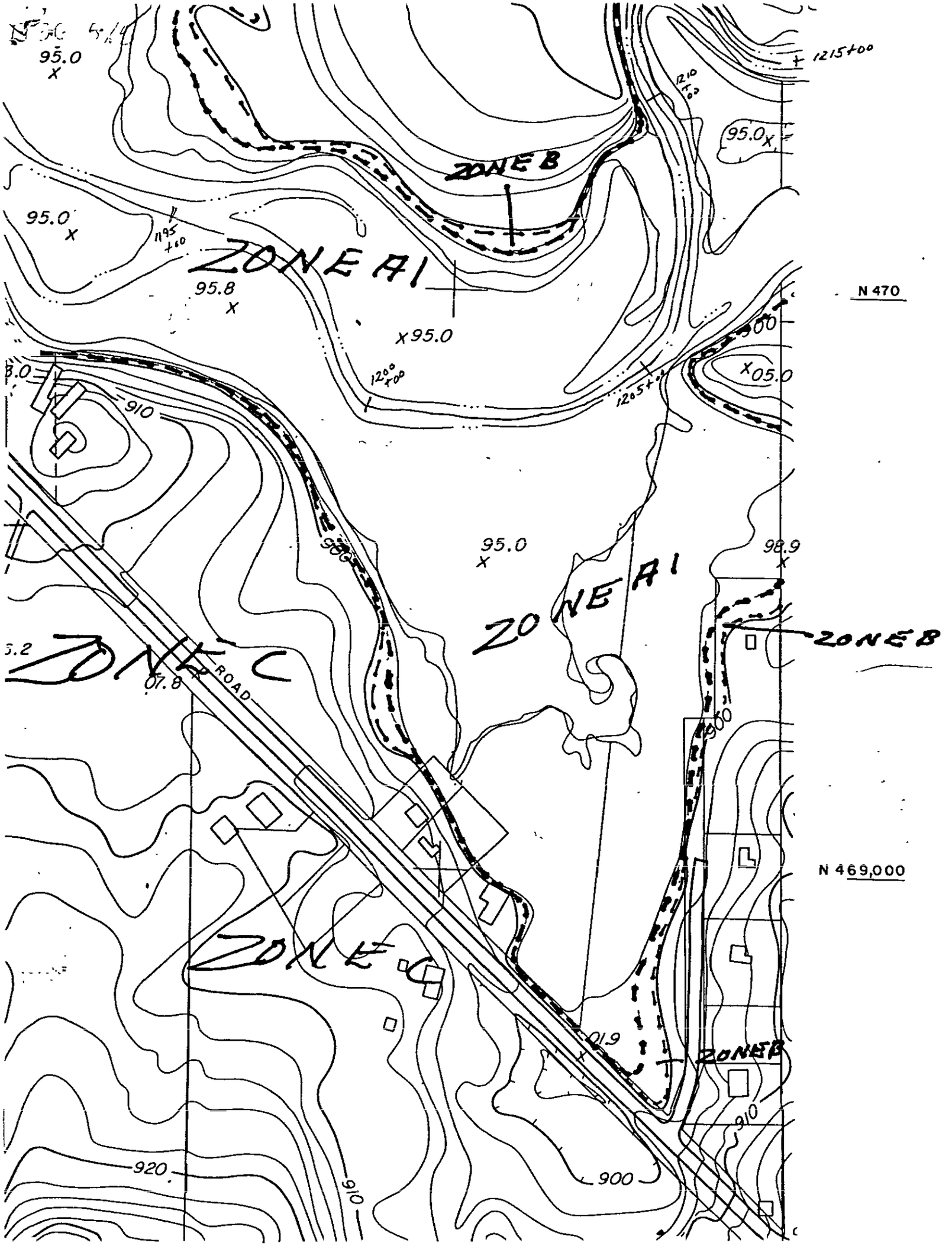

E2,158,000
N473,000
N472
ZONE A2
ZONE B
ZONE C
880
890
900
908
904
900
910
10.9
City of Fenton
912
908
906
02.5
904
902
07.7
01.1


E 2,169,000
SILVER LAKE
ROAD
GK
GK
887
GL
ZONE C
GL
02.1
RIVER
GM
GM
889
CAROLINE
X08.2
X07.9
GN
GN
N473,000
ZONE
C
900
910
16.2
SHIAWASSEE
GO
GO
X
09.9
WALNUT
PINE
ZONE A2
890
GP
ZONE
C
ELLEN
890
GP
RIVER
GQ
GR
ZONE
C
ZONE C
GQ
GR
GS
ZONE A2
GT
GS
ZONE A1
GT
MILL
N472
SHIAWASSEE
18.5
19.0 X


ZONE C
ZONE B
ZONE A1
ZONE
ABANDON RAILROAD
EAST
PINE
ELLEN
LEMEN
NO. 4
MILL
ADDITION
SOUTH
HEATERN
RIGGS
GENIGA
228
230
236
240
155
158
910
920
900
908
1155+00
1160+00
1165+00


GRAND TRUNK WESTERN
ANN
CENTER
ORCHARD
BROADS
OUTLOTS
ZONE B
ZONE A1
POND
920
910
906
904
902
900
244
14.2
09.0
98.8
95.0
12.5
20.8
05.9
11.9
03.2
10.5
94.2


ZONE B
ZONE A1
ZONE C
PLAT
920
910
900
22.8
14.5
11.9
10.1
94.2
94.8
95.0
95.0
95.8
99.9
98.2
90.2
05.9
08.5
13.0
07.0
1180+00
1185 +00
1190 +00
1195 +00
1200 +00


ZONE B
ZONE A1
ZONE A1
ZONE C
ZONE C
ZONE B
ZONE B
ROAD
95.0
95.8
95.0
95.0
95.0
98.9
91.8
91.9
1215+00
1210+00
1195+00
1200+00
1205+00
N 470
N 469,000
910
900
920
910
900
910

00BREAK00

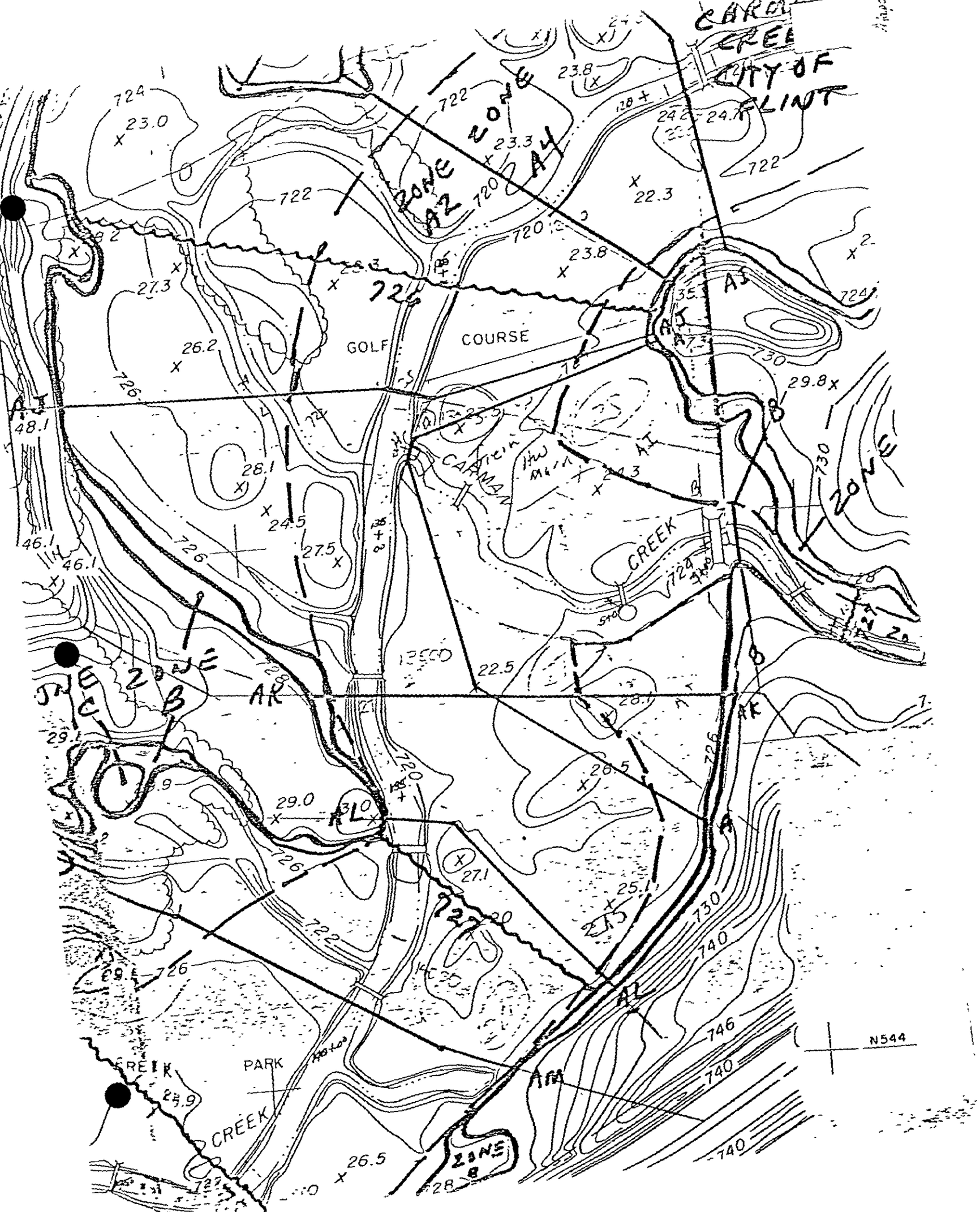
1) COUNTY: Genesee

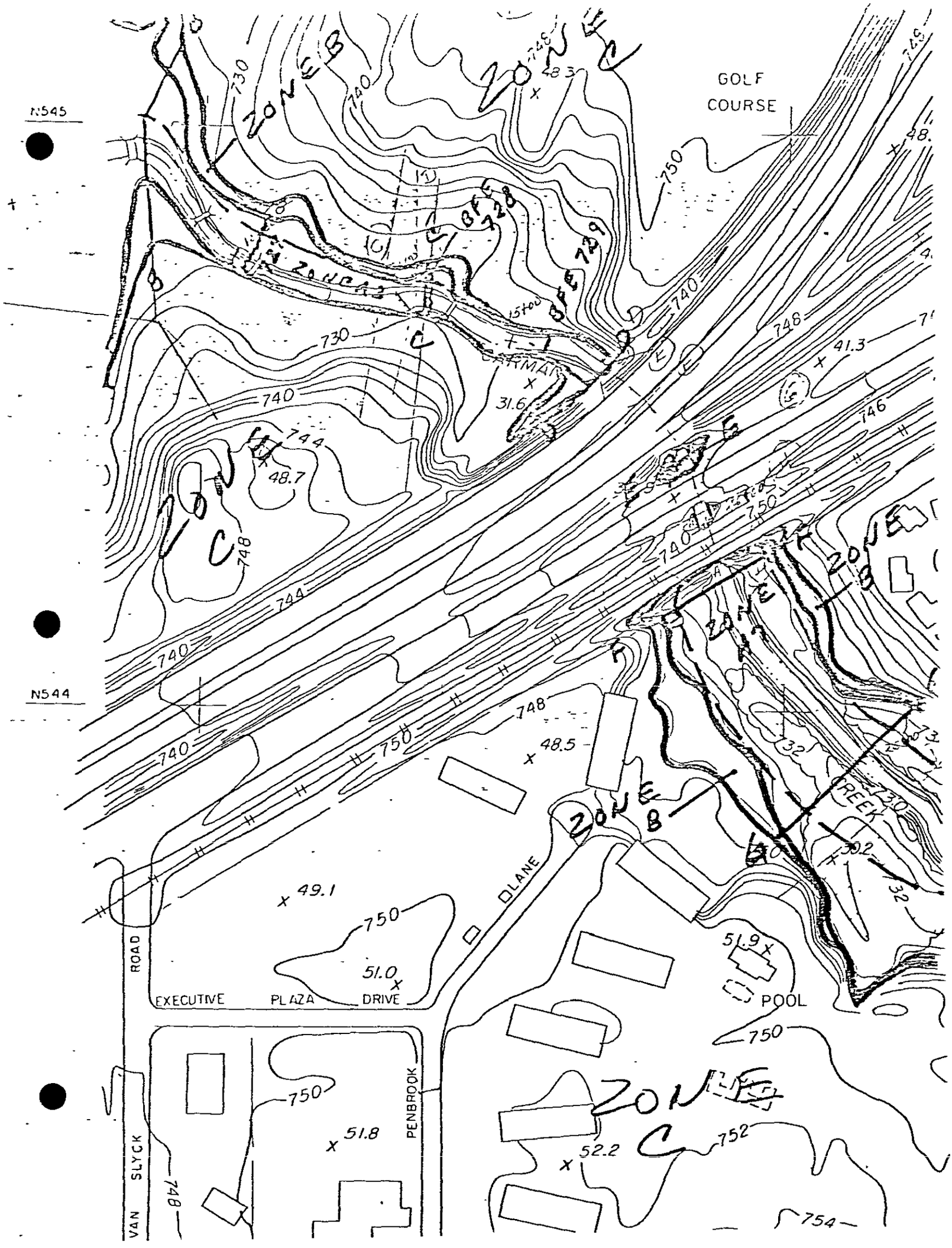
2) STUDY NAME: city of Flint

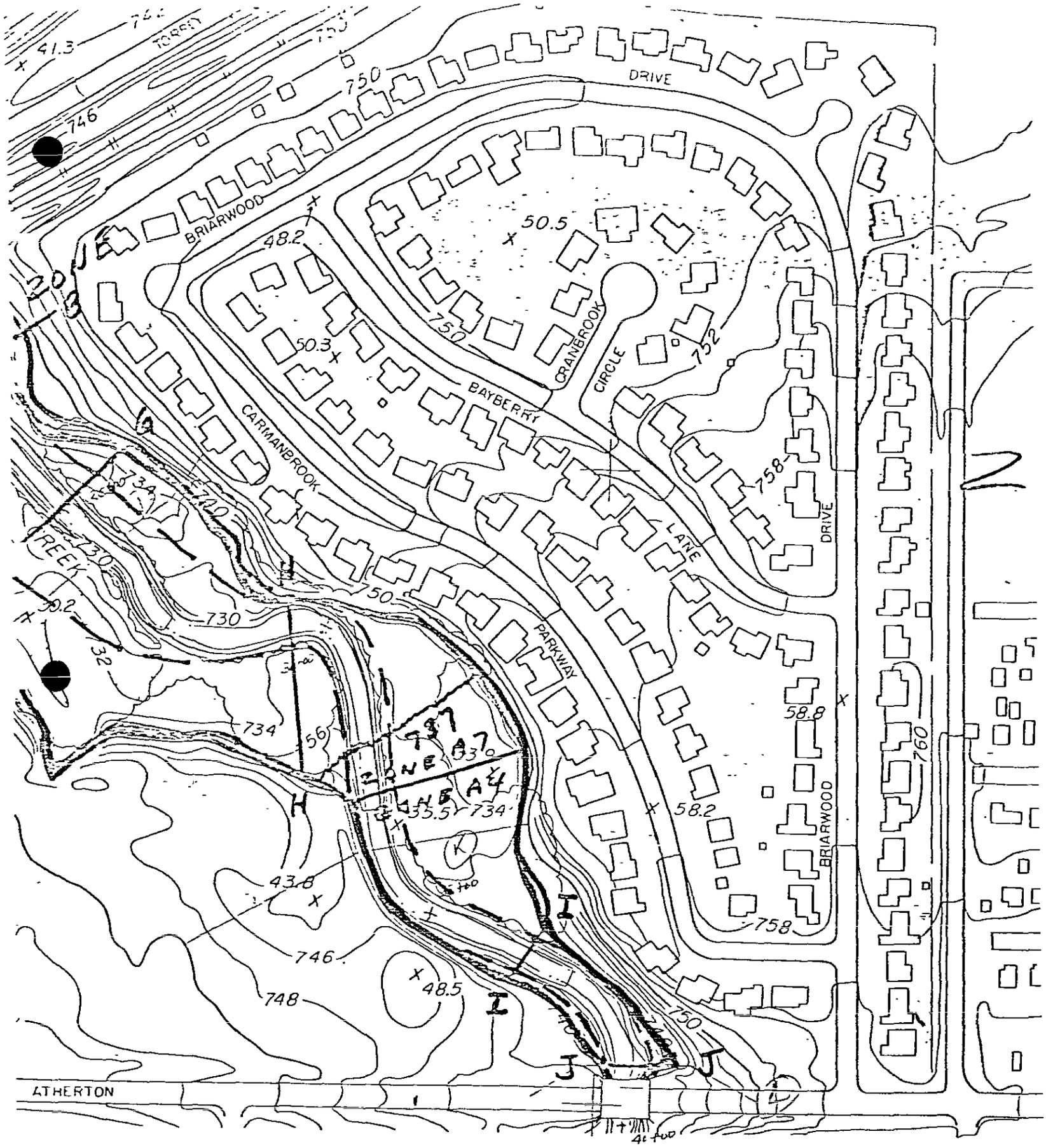
3) WATERCOURSE: Carmen Creek

4) DOCUMENT TYPE: Maps

00BREAK00

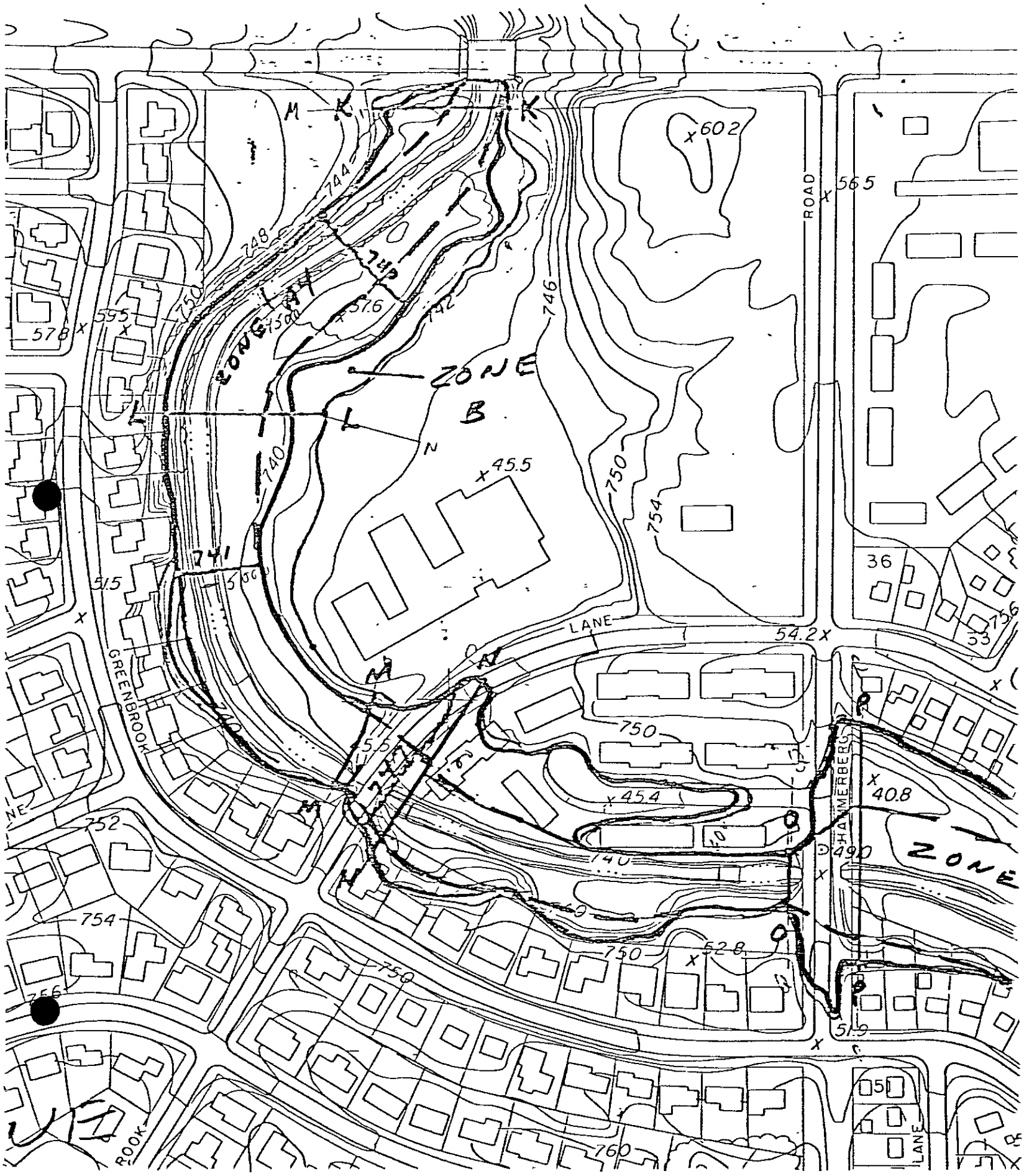

CITY OF FLINT
GOLF
COURSE
CREEK
PARK
CREEK
ZONE A2
ZONE B
ZONE C
ZONE B
N544


N545
N544
GOLF
COURSE
ZONE B
ZONE C
ZONE E
ZONE F
ZONE G
ZONE B
ZONE C
ZONE E
ZONE B
ZONE C
ZONE E
ZONE B
ZONE C
ZONE E


DRIVE
BRIARWOOD
CRANBROOK
CIRCLE
BAYBERRY
CARMANBROOK
LANE
PARKWAY
DRIVE
BRIARWOOD
ATHERTON
CREEK
TORREY
750
746
748
730
734
732
758
760
752
50.5
48.2
50.3
50
58.8
58.2
43.8
48.5
55.5
56
32
50.2
41.3
H
I
J
K

E2,168

E2.168


ZONE
B
ZONE
ROAD
LANE
GREENBROOK
HAMMERBERG
LANE
ROOK
LONGLAY
602
565
45.5
54.2
45.4
40.8
52.8
57.6
595
578
51.5
55
36
33
744
748
746
750
754
752
756
760
742
740
741
743
749
750
754
756
750
750
750
750
760
750
750
750
750

BERRYWOOD
LANE
MULBERRY
LANE
BLUEBERRY
LANE
CRESTBROOK
HAMERBERG
ZONE A4
CARMAN
LANE
HUCKLEBERRY
LANE
LANE
57.0
63.8
760
758
756
54.2
53.8
52.8
51.9
61.2
61.7
46.2
750
740
730
754
454
408
490
36
33
23
25
17
19
11
5
52
30
18
14
42

LELAND
LANE
CRAWFORD
AVENUE
BERRY
HARGOTT
ALVORD
HURON
TUXEDO
INGLESIDE
PINEHURST
MARKHAM
STREET
ROAD
ZONE C
ZONE
634
612
609
478
49.8
61.5
54

00BREAK00

1) COUNTY: Genesee

2) STUDY NAME: City of Flint

3) WATERCOURSE: Crampton Drain

4) DOCUMENT TYPE: 100 yr. natural & Encroached

00BREAK00

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 5/ 3/7

*** INPUT CARD PRINTOUT ***

```
          1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 CRAMPTON DRAIN   CAUSEWAY NUMBER 1       HOLTSLAG  5 05 02 05 12
2      2  73570  73610  73650  73620  73620
3    100 CR  A 1   9  3  730        0  1  3
4      4    270    450    760    540    540
**SEQUENCE**
5    110        0  1  7500   70  1  7450  120  1  7400  175  2  7350  200  2  7300
5    111      330  2  7290  460  2  7300  510  3  7350  680  3  7400
6    119  1  2 065 065  1  2 038 038  1  2 070 070
3    200 CAUS1 2   5  1  731        0         0  7344 3 0
5    210        0  1  7344    0  1  7304    5  1  7304    5  1  7344    0  1  7344
6    219  1  1 020 020
3    300 CAUS1 4  19  2   40          1  2          2 2                  1
5    310     -400  1  7500 -300  1  7450 -260  1  7400 -250  1  7392 -200  1  7390
5    311     -150  1  7388 -100  1  7386  -80  1  7385  -60  1  7383  -40  1  7381
5    312      -20  1  7379    0  2  7377   35  2  7376   55  2  7376   75  2  7375
5    313      105  2  7379  150  2  7385  170  2  7390  340  2  7400
3    200 CR  B 5   8  3  731       50  1  3
**SEQUENCE**
5    210        0  1  7450   40  1  7400  100  2  7350  130  2  7300  360  2  7300
5    211      385  2  7350  400  3  7380  420  3  7400
6    219  1  2 040 040  1  2 038 038  1  2 040 040
```

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B

```
CR  B 1   8  3  731      50  1  3
   270    450    760    540    540
      0  1  7450   40  1  7400  100  2  7350  130  2  7300  360  2  7300
    385  2  7350  400  3  7380  420  3  7400
 1  2 040 040  1  2 038 038  1  2 040 040
CR  C 0  10  3  731     500  1  3
      0  1  7400  170  1  7380  190  1  7360  210  2  7350  230  2  7300
    410  2  7300  440  2  7350  450  3  7380  460  3  7400  480  3  7420
 1  2 040 040  1  2 038 038  1  2 040 040
CR  D 0  12  3  731     710  1  3
      0  1  7400   90  1  7380  150  1  7360  160  2  7350  180  2  7300
    350  2  7300  370  2  7350  390  3  7360  525  3  7380  550  3  7400
    590  3  7420  650  3  7440
 1  2 040 040  1  2 038 038  1  2 040 040
2 CWY 2  10  2  731     710        0  7350 3 0
      0  1  7352    0  1  7303    4  1  7303    4  1  7352    0 -9  7352
      5  2  7350    5  2  7293   10  2  7294   10  2  7350    5  2  7350
 1  2 028 028  1  2 032 032
2 CWY 4  10  2   15          1  2          2 2                 1
      0  1  7400   20  1  7388   48  1  7361   86  1  7360  146  1  7357
    294  2  7358  412  2  7359  450  2  7392  510  2  7400  550  2  7420
CR  E 5  13  5  731     750  2  4
      0  1  7440   25  1  7360   30  2  7350   50  2  7300  120  3  7300
    130  4  7300  230  4  7300  250  5  7350  280  5  7360  410  5  7380
    435  5  7400  480  5  7420  550  5  7440
 1  2 040 040  1  2 038 038  1  2 038 038  1  2 038 038  1  2 040 040
CR  F 0  10  4  733    1370  1  4
    -30  1  7500    0  2  7400   10  2  7325   52  3  7333  136  3  7342
    198  3  7349  242  4  7379  250  4  7400  410  4  7420  510  4  7440
 1  2 040 040  1  2 038 038  1  2 045 045  1  2 040 040
CR BR 2  11  1  733    1370        0  7388 3 0
      0  1  7396    0  1  7350    5  1  7300   12  1  7329   20  1  7321
     25  1  7321   31  1  7325   36  1  7333   45  1  7333   45  1  7380
      0  1  7396
 1  2 040 040
CR PR 3   2                                  8
      6     7330    6     7380
CR RD 4  10  2   15          1  2          2 2                 1
    -30  1  7500    0  1  7421   20  1  7400   36  1  7384   62  1  7371
    156  2  7376  250  2  7372  270  2  7389  290  2  7400  390  2  7420
CR  G 5  19  4  733    1430  1  3
    -30  1  7500    0  1  7407    8  2  7348   12  2  7330   15  2  7304
     18  2  7299   25  2  7289   32  2  7322   47  3  7330   62  3  7341
```

B

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```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   14,DATE= 5/ 3/78

WATER-SURFACE PROFILE FOR:  CRAMPTON DRAIN   CAUSEWAY NUMBER 1        HOLTSLAG
PAGE  1 OF  1, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
=================================================================================
CR  A AT      0 /      0 /     540. /  2052. /  262392. / 1.03 /  162. /  551.
   736.20 /  0.00 /                  /  736.20 /    0.26 /   0.02/          *IS*
========================== BEGIN BRIDGE ANALYSIS ==============================
CAUS1 AT      0 /        /     196. /    20. /    1598. / 1.00 /    0. /    5.
   734.40 /  1.50 /        ...3...  (-.001)    /    9.82 /   0.87 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       69. / RIGHT      278. /                *RG*
---------------------------------------------------------------------------------
CR  B AT     50 /     50 /     540. /  1645. /  202540. / 1.01 /   85. /  391.
   736.21 /  0.00 /   0.00 /    0.02 /  736.21 /    0.33 /   0.02 / -0.011  *AS*
---------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  2404. /  360692. / 1.03 /   58. /  405.
 * 738.54 /  0.00 /                  /  738.54 /    0.22 /   0.01 /          *AS*
========================== END BRIDGE ANALYSIS ================================
                                  END OF THIS PROFILE
```

A

B

*culvert computation used

73865

100 YR

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   19,DATE= 5/ 3/78

WATER-SURFACE PROFILE FOR:  CRAMPTON DRAIN  1ST CWY - GENESEE RD     HOLTSLAG
PAGE  1 OF  2, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
CR  B AT      50 /     0 /    540. /  2442. /  369511. / 1.03 /   56. /  406.
   738.65 /   0.00 /                 /  738.65 /    0.22 /   0.01/          *IS*
----------------------------------------------------------------------------------
CR  C AT     500 /   450 /    540. /  2001. /  295905. / 1.07 /  115. /  453.
   738.65 /   0.00 /   0.00 /   0.00 /  738.65 /    0.27 /   0.02 / -0.001  *XS*
----------------------------------------------------------------------------------
CR  D AT     710 /   210 /    540. /  2145. /  289869. / 1.21 /   61. /  533.
   738.65 /   0.00 /   0.00 /   0.0  /  738.65 /    0.25 /   0.02 / -0.001  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
2 CWY AT     710 /       /      0. /    48. /    2700. / 1.00 /    0. /   10.
   735.20 /   0.0  /       ...3...  (-.001)    /    0.0  /   0.0  /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     873. / RIGHT     440. /                *RG*
----------------------------------------------------------------------------------
CR  E AT     750 /    40 /    540. /  2145. /  306124. / 1.17 /   17. /  418.
   738.66 /   0.00 /   0.00 /   0.02 /  738.66 /    0.25 /   0.02 / -0.011  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  2145. /  306124. / 1.17 /   17. /  418.
   738.66 /   0.00 /                 /  738.66 /    0.25 /   0.02 /          *AS*
========================== END BRIDGE ANALYSIS ============================
CR  F AT    1370 /   620 /    540. /  1035. /   95427. / 1.08 /    2. /  245.
   738.66 /   0.00 /   0.01 /   0.00 /  738.66 /    0.52 /   0.04 / -0.005  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
CR BR AT    1370 /       /    177. /   272. /   24044. / 1.00 /    0. /   45.
   738.66 /   0.01 /       ...1...  (0.110)    /    0.65 /   0.05 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     191. / RIGHT     170. /                *RG*
----------------------------------------------------------------------------------
CR  G AT    1430 /    60 /    540. /   989. /   65473. / 2.51 /    3. /  287.
   738.67 /   0.01 /   0.00 /   0.02 /  738.68 /    0.55 /   0.07 / -0.011  *AS*
----------------------------------------------------------------------------------
                                      [illegible]  /  65596  / [illegible].51 /    3. /  287.
```

10YR

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```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   19,DATE= 5/ 3/78

WATER-SURFACE PROFILE FOR:  CRAMPTON DRAIN   CAUSEWAY NUMBER 1        HOLTSLAG
PAGE  1 OF  1, PROFILE NUMBER  5,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
=================================================================================
CR  A AT        0 /      0 /     540. /  2029. /  261920. / 1.01 /  180. /  530.
   736.20 /  0.00 /                    /  736.20 /    0.27 /  0.02/          *IS*
============================ BEGIN BRIDGE ANALYSIS ==============================
CAUS1 AT        0 /        /     196. /    20. /    1598. / 1.00 /    0. /    5.
   734.40 /  1.50 /        ...3...  (-.001)    /    9.82 /  0.87 /           *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      69. / RIGHT     278. /                 *RG*
---------------------------------------------------------------------------------
CR  B AT       50 /     50 /     540. /  1645. /  202540. / 1.01 /   85. /  391.
   736.21 /  0.00 /   0.00 /    0.02 /  736.21 /    0.33 /  0.02 / -0.011  *AS*
---------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  2404. /  360692. / 1.03 /   58. /  405.
*  738.54 /  0.00 /                    /  738.54 /    0.22 /  0.01 /          *AS*
============================ END BRIDGE ANALYSIS ================================
```

FW

A

B

* Culvert computation used END OF THIS PROFILE

738.67

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   26,DATE= 5/ 3/78

WATER-SURFACE PROFILE FOR:  CRAMPTON DRAIN -1ST CWY - GENESEE RD     HOLTSLAG
PAGE  1 OF  2, PROFILE NUMBER  5,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
=================================================================================
CR  B AT      50 /     0 /    540. / 2442. / 369513. / 1.03 /   56. /  406.
   738.65 /   0.00 /                 / 738.65 /   0.22 /   0.01/          *IS*  B
---------------------------------------------------------------------------------
CR  C AT     500 /   450 /    540. / 1920. / 292971. / 1.01 /  200. /  450.
   738.65 /   0.00 /   0.00 /   0.00 / 738.65 /   0.28 /   0.02 / -0.001  *XS*  C
---------------------------------------------------------------------------------
CR  D AT     710 /   210 /    540. / 1886. / 277149. / 1.08 /   80. /  380.
   738.65 /   0.00 /   0.00 /   0.00 / 738.65 /   0.29 /   0.02 / -0.001  *XS*  D
============================ BEGIN BRIDGE ANALYSIS ==============================
2 CWY AT     710 /       /      0. /   48. /   2700. / 1.00 /    0. /   10.
   735.20 /   0.0  /       ...3...  (-.001)    /   0.0  /   0.0  /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     877. / RIGHT     442. /               *RG*
---------------------------------------------------------------------------------
CR  E AT     750 /    40 /    540. / 1892. / 293066. / 1.04 /   18. /  268.
   738.66 /   0.00 /   0.00 /   0.02 / 738.66 /   0.29 /   0.02 / -0.011  *AS*
---------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** / 1892. / 293066. / 1.04 /   18. /  268.
   738.66 /   0.00 /                 / 738.66 /   0.29 /   0.02 /          *AS*  E
============================ END BRIDGE ANALYSIS ================================
CR  F AT    1370 /   620 /    540. /  750. /  75465. / 1.04 /    2. /  152.
   738.66 /   0.01 /   0.01 /   0.00 / 738.67 /   0.72 /   0.05 / -0.005  *XS*  F
============================ BEGIN BRIDGE ANALYSIS ==============================
CR BR AT    1370 /       /    151. /  272. /  24044. / 1.00 /    0. /   45.
   738.66 /   0.00 /       ...1...  (0.110)    /   0.55 /   0.04 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     206. / RIGHT     183. /               *RG*
---------------------------------------------------------------------------------
CR  G AT    1430 /    60 /    540. /  688. /  56979. / 1.83 /    3. /  153.
   738.67 /   0.02 /   0.00 /   0.03 / 738.69 /   0.78 /   0.08 / -0.011  *AS*
---------------------------------------------------------------------------------
   M = 0.0  / E = 0.0  / K* = 0.82 /  689. /  57046. / 1.83 /    3. /  153.
   738.67 /   0.02 /                 / 738.69 /   0.78 /   0.08 /          *AS*  G
---------------------------------------------------------------------------------
```

FW

00BREAK00

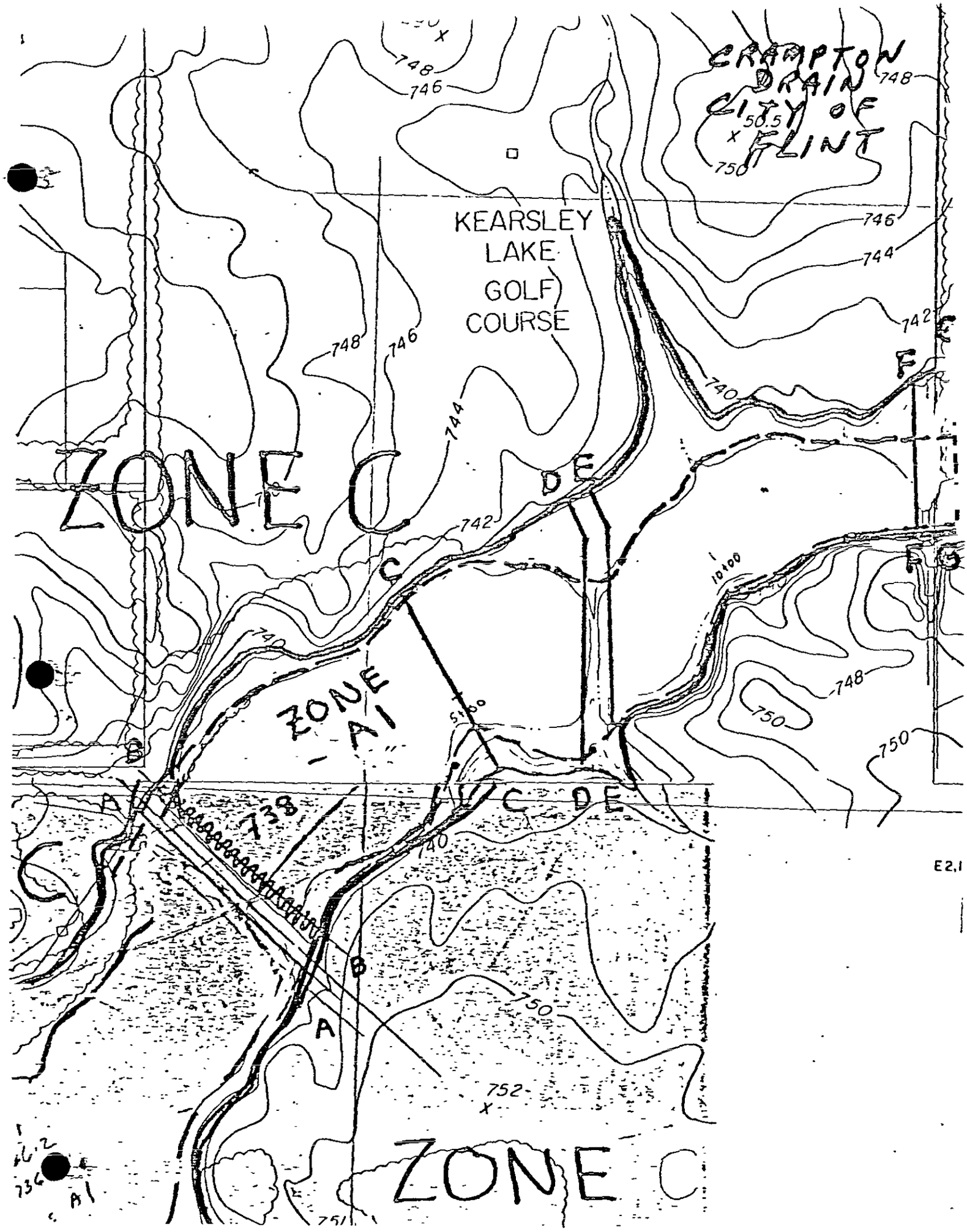
1) COUNTY: Genesee

2) STUDY NAME: City of Flint

3) WATERCOURSE: Crampton Drain

4) DOCUMENT TYPE: maps

00BREAK00


CRAMPTON DRAIN
CITY OF FLINT
KEARSLEY LAKE GOLF COURSE
ZONE C
ZONE A1
ZONE C
748
746
744
742
740
750
752
A
B
C
D
E
F
G
A1
E2.1

00BREAK00

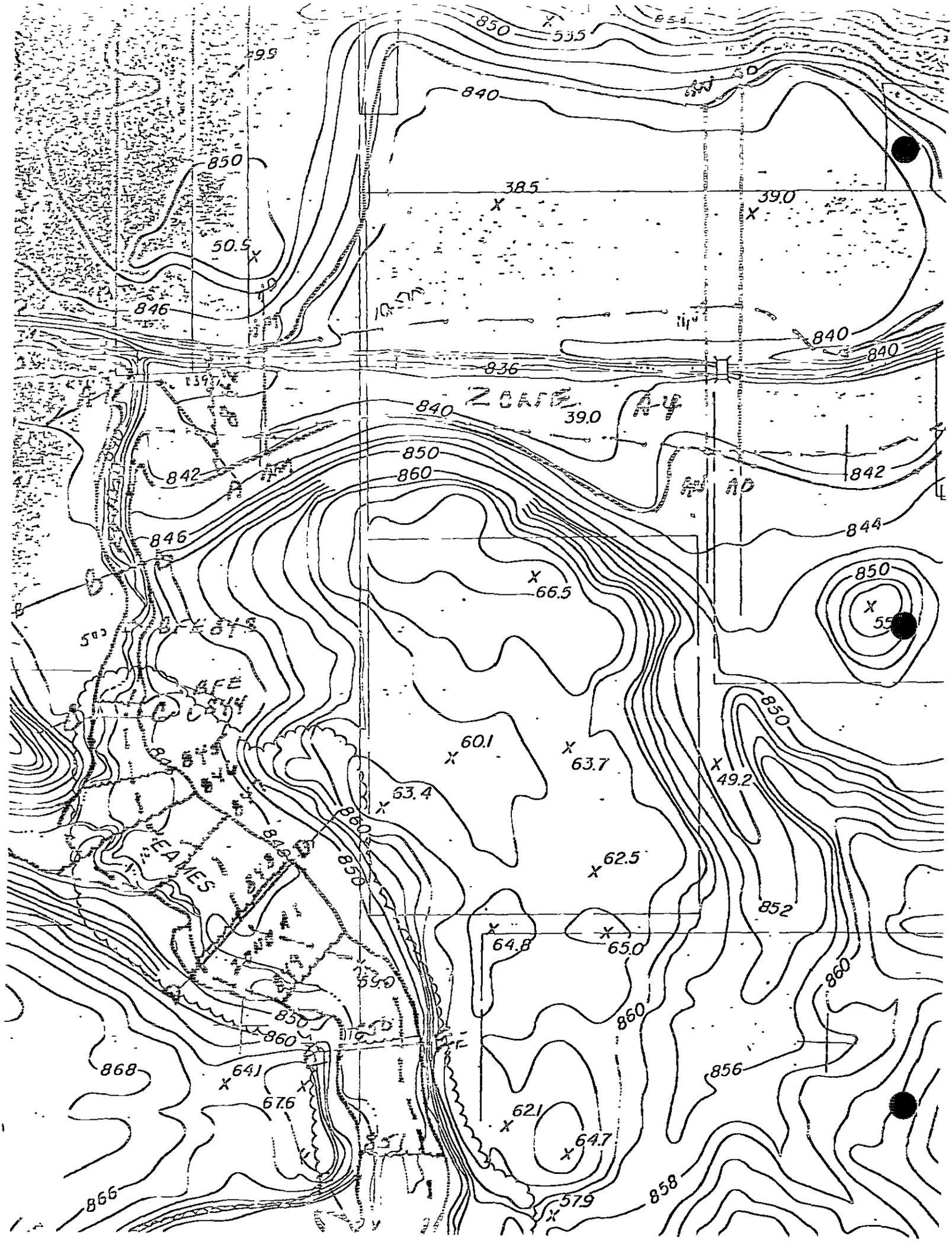
1) COUNTY: Genesee

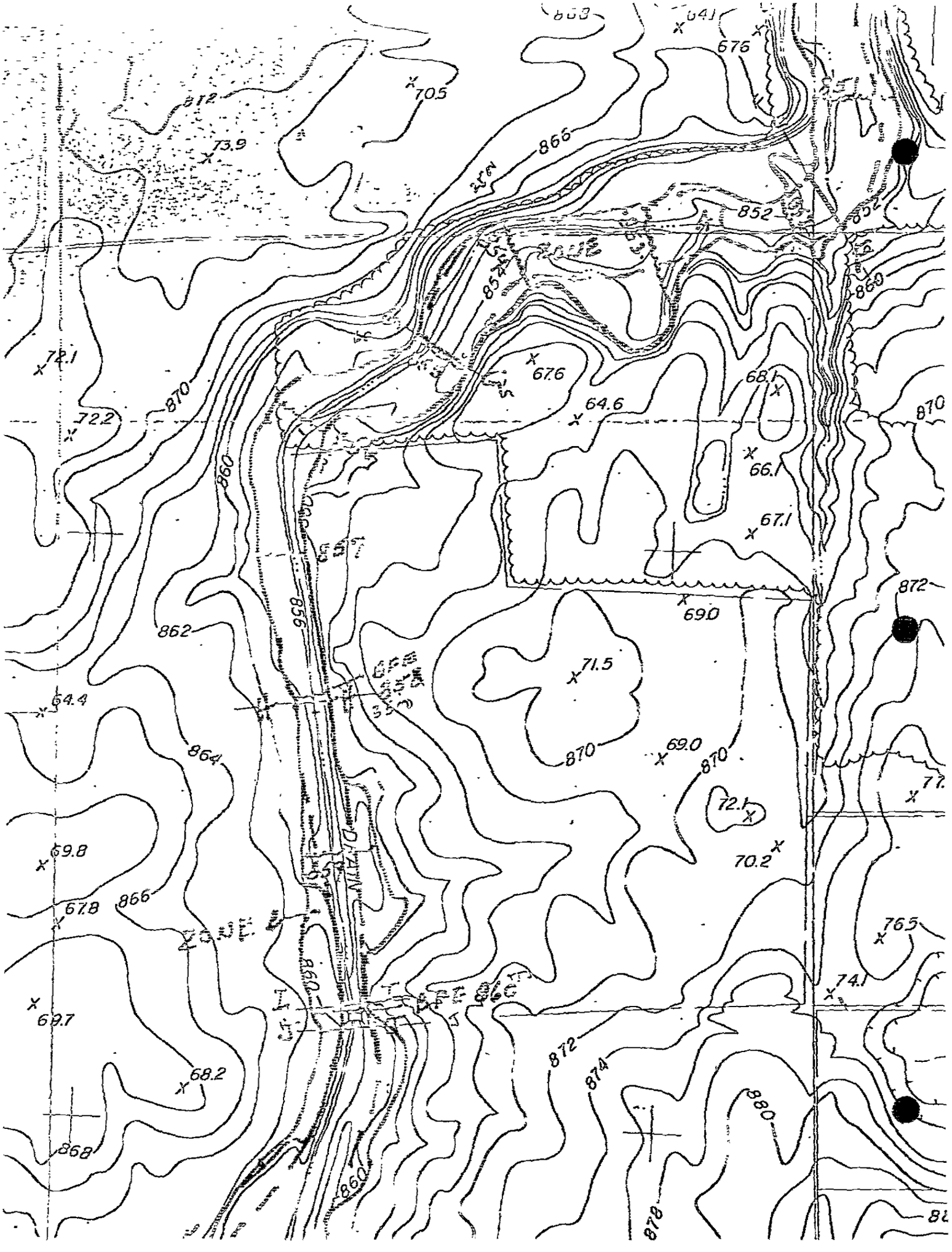
2) STUDY NAME: City of Flint

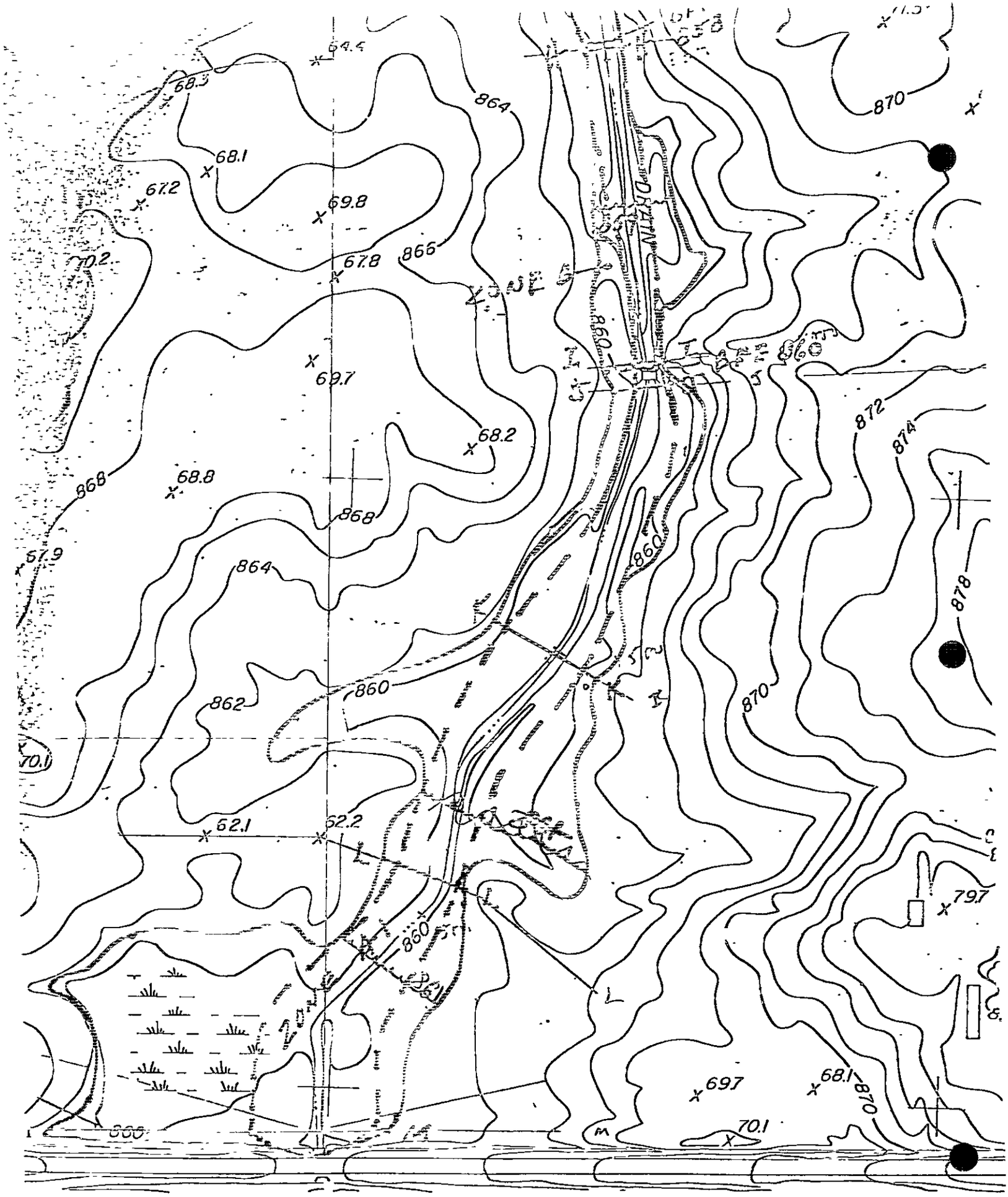
3) WATERCOURSE: Eames Drain

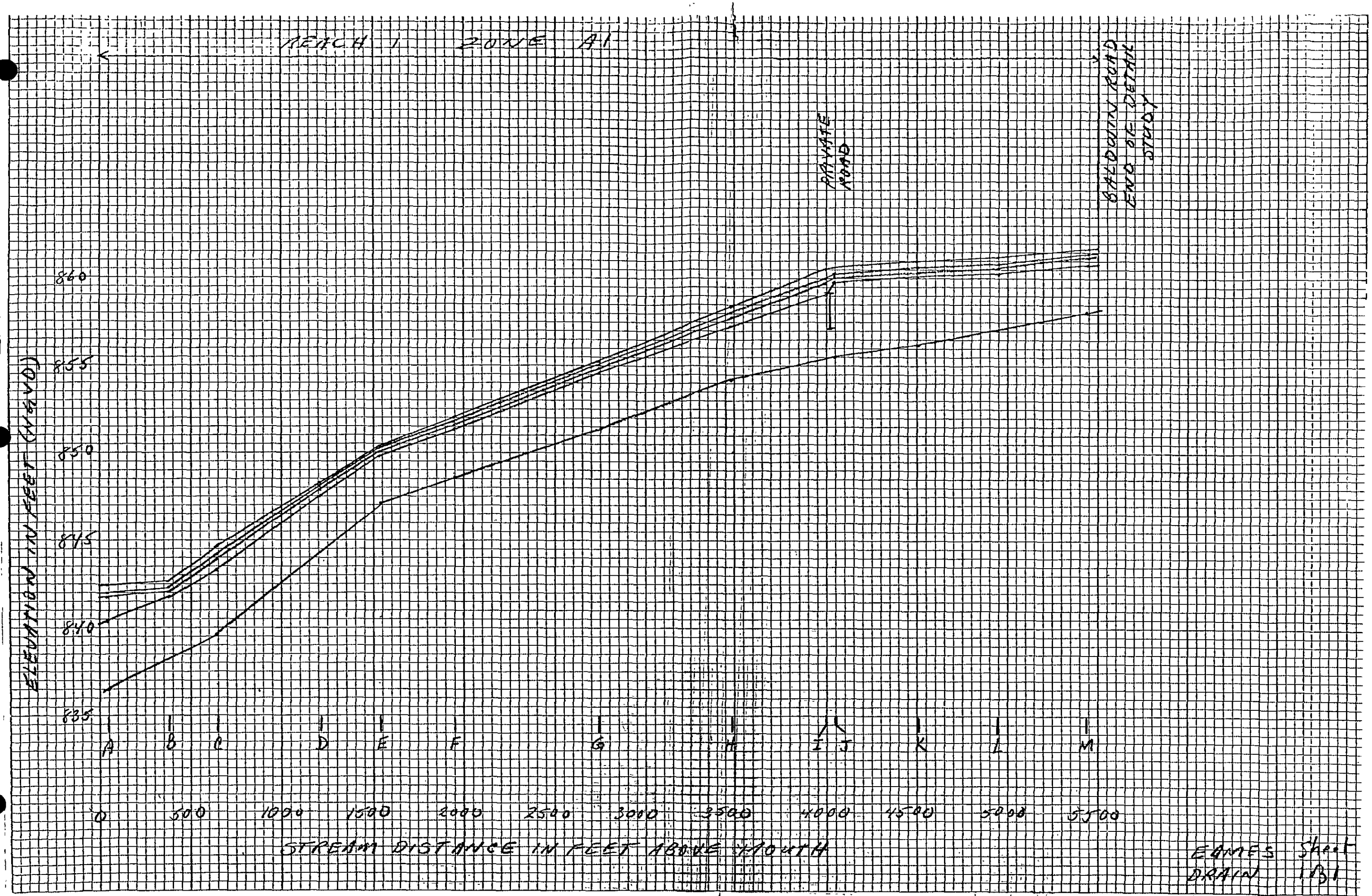
4) DOCUMENT TYPE: maps

00BREAK00


850
840
850
846
842
844
836
840
860
868
866
858
856
852
860
850
38.5
39.0
50.5
66.5
60.1
63.7
49.2
63.4
62.5
64.8
65.0
64.1
67.6
62.1
64.7
57.9
EAMES


868
64.1
67.6
70.5
812
73.9
866
852
854
860
72.1
870
72.2
67.6
68.1
64.6
870
66.1
860
67.1
858
872
69.0
862
71.5
64.4
870
69.0
870
864
72.1
70.2
69.8
67.8
866
76.5
74.1
69.7
872
874
68.2
880
868
860
878


64.4
68.3
864
870
68.1
67.2
69.8
866
70.2
67.8
860
69.7
872
874
68.2
868
68.8
868
67.9
864
860
878
870
862
860
70.1
62.1
62.2
79.7
860
69.7
68.1
870
70.1



EAMES DRAIN

Sheet 1B1

00BREAK00

1) COUNTY: Genesee

2) STUDY NAME: city of Flint

3) WATERCOURSE: Eames Drain

4) DOCUMENT TYPE: input + 100 natural + 100 yr Encroachment

00BREAK00

```
1     1 EAMES DRAIN MOUTH TO CULVERT AT SEC I   KNUTILLA  9  5  2  5 12
2       84029  84179  84249  84202  84202
3   100 A     1  10  3  838      50  1  3
4   105     110    160    250    185    185
5   110    -220  1  8440  -60  2  8419  -52  2  8381  -50  2  8365  -48  2  8374   A
5   111     -40  3  8408    0  3  8397  100  3  8400  175  3  8420  215  3  8440
6   120  1  2 050 050  1  2 050 050  1  2 050 050
3   200 B     0   9  3  840     380  1  3
5   210       0  1  8500   20  1  8480   50  1  8460  245  1  8440  265  2  8420   B
5   211     280  2  8380  300  3  8460  320  3  8480  350  3  8500
6   220  1  2 100 100  1  2 075 075  1  2 100 100
3   300 C   B 0   9  3  841     650  1  3
5   310       0  1  8500   10  1  8480   65  1  8460   90  2  8440  100  2  8396   C
5   311     125  3  8440  190  3  8460  305  3  8480  340  3  8500
6   320  1  2 100 100  1  2 080 080  1  2 100 100
3   400 D     0   9  3  847    1220  1  3
5   410       0  1  8550   20  1  8500   30  1  8480   65  2  8460   80  2  8460   D
5   411      95  3  8480  285  3  8480  355  3  8500  385  3  8550
6   420  1  2 100 100  1  2 070 070  1  2 100 100
3   500 E   C 0   6  3  848    1540  1  3
5   510       0  1  8600   20  2  8500   25  2  8471   50  3  8490  150  3  8500   E
5   511     180  3  8600
6   520  1  2 100 100  1  2 070 070  1  2 100 100
3   600 F   D 0  10  3  850    1950  1  3
5   610    -260  1  8600 -230  1  8560 -144  1  8544 -124  1  8521  -82  2  8506
5   611     -76  2  8486  -70  3  8491  -56  3  8509    0  3  8511   60  3  8600   F
6   620  1  2 080 080  1  2 070 070  1  2 050 050
3   700 G   E 0  11  3  852    2740  1  3
5   710    -165  1  8640 -150  1  8620 -130  1  8565 -104  1  8554  -86  2  8551
5   711     -74  2  8514  -68  3  8550  -40  3  8543    0  3  8540   32  3  8546   G
5   712      60  3  8640
6   720  1  2 080 080  1  2 060 060  1  2 050 050
3   800 H   F 0  11  3  856    3480  1  3
5   810    -275  1  8640 -145  1  8620 -122  1  8595  -76  1  8574  -50  2  8592
5   811     -42  2  8548  -36  2  8542  -30  2  8547  -16  3  8631    0  3  8632   H
5   812      20  3  8640
6   820  1  2 060 060  1  2 055 055  1  2 050 050
3   900 I   G 0   9  3  857    4000  1  3
5   910    -220  1  8640 -140  1  8607  -78  2  8604  -68  2  8560  -64  2  8555
5   911     -56  2  8563  -45  3  8606    0  3  8606   60  3  8640   I
6   920  1  2 060 060  1  2 080 080  1  2 050 050
```

Input

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 4/ 3/78

*** INPUT CARD PRINTOUT ***

```
          1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 EAMES DRAIN SEC I TO BALDWIN RD          KNUTILLA  4  5  2  5 12
2      2  85990  86010  86060  86020  86020
3   1000 J   H 1    9  3  857    4050  1  3
4   1005    100    145    230    170    170
5   1010    -220  1  8640 -140  1  8607  -78  2  8604  -68  2  8560  -64  2  8555   J
5   1011     -56  2  8563  -45  3  8606    0  3  8606   60  3  8640
6   1020  1  2 060 060  1  2 080 080  1  2 050 050
3   1100 K   I 0  10  3  859    4510  1  3
5   1110    -190  1  8620 -160  1  8600 -138  1  8586  -68  2  8580  -60  2  8562
5   1111     -52  2  8571  -44  3  8580  -22  3  8586    0  3  8595   50  3  8620   K
6   1120  1  2 060 060  1  2 080 080  1  2 050 050
3   1200 L      0    8  3  859    4940  1  3
5   1210        0  1  8622   35  1  8620  190  2  8600  205  2  8572  215  2  8572   L
5   1211     225  3  8600  270  3  8620  300  3  8622
6   1220  1  2 070 070  1  2 080 080  1  2 050 050
3   1300 M   J 0    9  3  859    5430  1  3
5   1310        0  1  8640   55  1  8620  285  1  8620  445  2  8600  455  2  8581   M
5   1311     465  2  8581  475  3  8600  740  3  8620  850  3  8640
6   1320  1  2 080 080  1  2 080 080  1  2 050 050
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 19,DATE= 3/24/78

WATER-SURFACE PROFILE FOR: EAMES DRAIN MOUTH TO CULVERT AT SEC I KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
A	AT	50	0	185.	424.	18782.	1.05	-69.	175.		A
		842.02	0.00		842.02	0.44	0.06			*IS*	
B	AT	380	330	185.	57.	1855.	1.01	262.	291.		B
		842.27	0.16	0.32	0.08	842.43	3.23	0.39	0.006	*XS*	
C	B AT	650	270	185.	85.	2727.	1.02	88.	131.		C
		844.19	0.08	1.83	0.0	844.27	2.19	0.25	0.008	*XS*	
D	AT	1220	570	185.	89.	1861.	1.43	30.	286.		D
		848.03	0.10	3.84	0.01	848.13	2.08	0.40	0.007	*XS*	
E	C AT	1540	320	185.	128.	2812.	1.78	20.	151.		E
		850.17	0.06	2.09	0.0	850.23	1.44	0.27	0.003	*XS*	
F	D AT	1950	410	185.	114.	3218.	1.24	-114.	4.		F
		851.73	0.05	1.55	0.0	851.78	1.62	0.30	0.001	*XS*	
G	E AT	2740	790	185.	98.	2578.	1.15	-86.	33.		G
		854.99	0.06	3.26	0.01	855.06	1.90	0.35	0.012	*XS*	
H	F AT	3480	740	185.	70.	3170.	1.17	-91.	-24.		H
		858.07	0.12	3.10	0.03	858.19	2.62	0.31	0.006	*XS*	
I	G AT	4000	520	185.	85.	3026.	1.00	-77.	-47.		I
		859.98	0.07	1.86	0.0	860.05	2.18	0.23	0.004	*XS*	

END OF THIS PROFILE

100-70

100j

WATER-SURFACE PROFILE FOR: EAMES DRAIN SEC I TO BALDWIN RD KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID / WS ELEV	AT DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW *ID*	
J H AT / 860.20	4050 / 0.05	0	170. /	92. / 860.25	3361. / 1.85	1.00 / 0.19	-78. /	-46. *IS*	J
K I AT / 860.54	4510 / 0.00	460 / 0.28	170. / 0.0	361. / 860.54	13940. / 0.47	1.01 / 0.06	-168. / 0.001	21. *XS*	K
L AT / 860.79	4940 / 0.04	430 / 0.25	170. / 0.02	121. / 860.82	3520. / 1.40	1.29 / 0.18	129. / 0.014	243. *XS*	L
M J AT / 861.40	5430 / 0.01	490 / 0.57	170. / 0.0	288. / 861.41	7041. / 0.59	1.31 / 0.12	333. / 0.011	660. *XS*	M

END OF THIS PROFILE

100-1

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 PAGE COUNT= 27,DATE= 3/24/78

WATER-SURFACE PROFILE FOR: EAMES DRAIN MOUTH TO CULVERT AT SEC I KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
A	AT	50	0	185.	329.	16330.	1.02	-58.	92.	A
842.02		0.01			842.02	0.56	0.07		*IS*	
B	AT	380	330	185.	58.	1903.	1.01	262.	291.	B
842.31		0.16	0.36	0.08	842.47	3.17	0.38	0.001	*XS*	
C	B AT	650	270	185.	84.	2715.	1.02	88.	131.	C
844.19		0.08	1.79	0.0	844.26	2.19	0.25	0.009	*XS*	
D	AT	1220	570	185.	84.	1861.	1.28	30.	130.	D
848.04		0.10	3.66	0.01	848.13	2.21	0.40	-0.001	*XS*	
E	C AT	1540	320	185.	119.	2807.	1.56	20.	120.	E
850.18		0.06	2.10	0.0	850.23	1.55	0.27	0.002	*XS*	
F	D AT	1950	410	185.	110.	3231.	1.16	-100.	0.	F
851.73		0.05	1.55	0.0	851.78	1.68	0.30	0.001	*XS*	
G	E AT	2740	790	185.	91.	2522.	1.15	-80.	20.	G
855.04		0.07	3.32	0.01	855.11	2.04	0.36	0.001	*XS*	
H	F AT	3480	740	185.	72.	3252.	1.18	-92.	-24.	H
858.11		0.12	3.09	0.02	858.23	2.55	0.30	0.006	*XS*	
I	G AT	4000	520	185.	85.	3017.	1.00	-77.	-47.	I
859.97		0.07	1.81	0.0	860.05	2.18	0.23	0.004	*XS*	

END OF THIS PROFILE

FW

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 17,DATE= 4/ 3/78

WATER-SURFACE PROFILE FOR: EAMES DRAIN SEC I TO BALDWIN RD KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
J H AT 4050 / 860.20	0 / 0.05	170. /	92. /	3361. / 860.25	1.00 / 1.85	-78. / 0.19	-46.	*IS*	J
K I AT 4510 / 860.55	460 / 0.00	170. / 0.30	318. / 0.0	13078. / 860.56	1.01 / 0.53	-130. / 0.06	20. / 0.001	*XS*	K
L AT 4940 / 860.80	430 / 0.04	170. / 0.26	122. / 0.02	3611. / 860.84	1.25 / 1.39	140. / 0.18	240. / 0.003	*XS*	L
M J AT 5430 / 861.41	490 / 0.01	170. / 0.57	243. / 0.0	6852. / 861.42	1.24 / 0.70	350. / 0.10	550. / 0.009	*XS*	M

END OF THIS PROFILE

FW

00BREAK00

1) COUNTY: Genesee

2) STUDY NAME: City of Flint

3) WATERCOURSE: Flint River

4) DOCUMENT TYPE: 100 yr natural & Encroached

00BREAK00

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1     1 FLINT RIVER SEC CC TO 3RD AVE.          KNUTTILLA 22  5  2 99 12
2     2  69571  69810  69906  70057  69910
3  9800 CC     1  25  3  684    80525  1  3
4  9805  -9100 -12750 -14400 -17200 -14400
5  9810     -50  1  7081     0  1  7069   38  2  7044   74  2  6848   86  2  6829
5  9811      98  2  6824   110  2  6816  120  2  6810  130  2  6807  140  2  6804   CC
5  9812     150  2  6814   160  2  6811  170  2  6819  180  2  6848  200  3  6893
5  9813     230  3  6940   255  3  6960  330  3  6960  360  3  6980  400  3  7000
5  9814     440  3  7020   645  3  7040  710  3  7060  762  3  7080  815  3  7100
5  9820  1  2 055 055  1  2 030 030  1  2 055 055
3   100 CD     0  20  3  684    81430  1  3
**SEQUENCE**
5   110        0  1  7100    60  1  7080   90  1  7060  130  1  7020  190  1  6960   CD
5   111      240  1  6940   270  1  6920  280  2  6900  290  2  6880  310  2  6840
5   112      310  2  6816   410  2  6816  410  2  6840  420  3  6900  440  3  6940
6   120  1  2 055 055  1  2 032 032  1  2 042 042
3   200 CE     0  18  3  686    82450  1  3
5   210        0  1  7100    40  1  7000   70  2  6900   80  2  6880  100  2  6841   CE
5   211      100  2  6806   190  2  6806  190  2  6880  210  3  6900  230  3  6940
5   212      250  3  6960   330  3  6960  350  3  6980  380  3  7000  430  3  7020
5   213      490  3  7060   530  3  7080  550  3  7100
6   220  1  2 060 060  1  2 033 033  1  2 042 042
3   300 CF     0  19  3  684    83300  1  3
5   310        0  1  7100    20  1  7000   60  1  6900   80  2  6880  100  2  6860   CF
5   311      100  2  6817   200  2  6817  200  2  6860  210  3  6900  240  3  6940
5   312      290  3  6960   450  3  6960  490  3  6980  650  3  6980  700  3  7000
5   313      800  3  7040   950  3  7060  980  3  7080 1100  3  7100
6   320  1  2 060 060  1  2 032 032  1  2 040 040
3   400 CG     0  15  3  683    84180  1  3
5   410        0  1  7100    25  1  7000   55  2  6900   60  2  6880   70  2  6845   CG
5   411       70  2  6816   180  2  6816  180  2  6845  190  3  6880  215  3  6960
5   412      250  3  6980   480  3  7000  670  3  7040  790  3  7060  860  3  7100
6   420  1  2 060 060  1  2 033 033  1  2 040 040
3   500 CH     0  17  3  685    85090  1  3
5   510        0  1  7100    30  1  7060  230  1  7040  245  1  7020  260  1  7000   CH
5   511      310  1  6900   320  2  6880  335  2  6847  335  2  6834  425  2  6834
5   512      425  2  6847   435  2  6880  445  3  6900  490  3  7000  540  3  7040
5   513      590  3  7060   660  3  7100
6   520  1  2 060 060  1  2 033 033  1  2 040 040
3   600 CI     0  18  3  690    86080  1  3
5   610        0  1  7100    50  1  7080  150  1  7060  200  1  7040  280  1  7020
5   611      600  1  7020   630  1  7000  695  1  6900  700  2  6880  710  2  6849   CI
5   612      710  2  6831   820  2  6831  820  2  6849  830  2  6880  835  3  6900
```

Input

```
...5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
    620  1  2 050 050  1  2 035 035  1  2 040 040
    700 CJ     0  10  3  686   86660  1  3
    710        0  1  7100   20  1  7000  110  1  6920  120  2  6900  140  2  6858   <J
    711      140  2  6842  250  2  6842  250  2  6858  270  3  6900  295  3  7100
    720  1  2 060 060  1  2 033 033  1  2 042 042
    800 CK     0  12  3  685   87820  1  3
    810        0  1  7100   30  1  7000   60  1  6960  100  1  6940  125  2  6900   <K
    811      140  2  6869  140  2  6821  240  2  6821  240  2  6869  260  3  6900
    812      290  3  7000  340  3  7100
    820  1  2 040 040  1  2 032 032  1  2 040 040
    900 BR CK 2  24  1  685   87820        30  7064 3 1
    910        1  1  7064    1  1  6996   35  1  6882   50  1  6895   61  1  6866
    911       61  1  7055    1 -9  7064   64  1  7055   64  1  6866   80  1  6844
    912      100  1  6734  115  1  6736  126  1  6739  126  1  7049   64 -9  7055
    913      129  1  7049  129  1  6739  135  1  6734  150  1  6857  170  1  6881
    914      180  1  6934  193  1  6971  193  1  7043  129 -9  7049
    920  1  2 030 030
   1000 RD CK 4   6  2   60          1  2          1 1                1
   1010     -200  1  7120 -100  1  7101    0  2  7099  220  2  7082  370  2  7100
   1011      400  2  7120
   1100 CL     5  17  4  687   88140  2  4
   1110        0  1  7100  100  1  7080  150  1  7000  170  1  6960  380  2  6960
   1111      420  2  6940  440  2  6920  455  3  6900  465  3  6870  465  3  6838
   1112      550  3  6838  550  3  6870  572  4  6900  600  4  7000  615  4  7080
   1113      790  4  7080  800  4  7100
   1120  1  2 055 055  1  2 033 033  1  2 033 033  1  2 040 040
   1100 CL     0  17  4  687   88150  2  4
**SEQUENCE**
   1110        0  1  7100  100  1  7080  150  1  7000  170  1  6960  380  2  6960   <L
   1111      420  2  6940  440  2  6920  455  3  6900  465  3  6870  465  3  6838
   1112      550  3  6838  550  3  6870  572  4  6900  600  4  7000  615  4  7080
   1113      790  4  7080  800  4  7100
   1120  1  2 055 055  1  2 033 033  1  2 033 033  1  2 040 040
   1200 CM     0  14  3  686   88800  1  3
   1210        0  1  7100   50  1  7020   80  1  7000   90  1  6980  330  1  6980   <M
   1211      370  1  6960  400  2  6900  420  2  6870  420  2  6841  530  2  6841
   1212      530  2  6870  540  3  6900  605  3  7000  645  3  7100
   1220  1  2 055 055  1  2 030 030  1  2 050 050
   1300 CN     0  16  3  686   89350  1  3
   1310        0  1  7100  130  1  7080  160  1  7000  170  1  6980  195  1  6960   <N
   1311      210  2  6900  230  2  6870  230  2  6843  335  2  6843  335  2  6870
   1312      355  3  6940  360  3  6960  480  3  6980  670  3  6980  830  3  7000
   1313      870  3  7100
   1320  1  2 040 040  1  2 030 030  1  2 040 040
   1400 CO     0  19  3  685   90320  1  3
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  1410      0  1  7200   20  1  7180   65  1  7160  110  1  7000  140  2  6900
5  1411    160  2  6870  160  2  6838  260  2  6838  260  2  6870  275  3  6900
5  1412    305  3  6960  440  3  6960  500  3  6980  630  3  6960  700  3  6960
5  1413    950  3  6980  970  3  7000 1005  3  7100 1055  3  7200
6  1420  1  2 035 035  1  2 031 031  1  2 035 035
3  1500 CP    0  21  3  689   91330  1  3
5  1510      0  1  7100   50  1  7080  140  1  7060  195  1  7040  210  1  7020
5  1511    230  1  7000  300  1  6960  355  1  6940  370  2  6920  380  2  6900
5  1512    400  2  6870  400  2  6856  530  2  6856  530  2  6870  550  3  6940
5  1513    565  3  6980  685  3  7000  860  3  7000 1040  3  7020 1140  3  7040
5  1514   1230  3  7180
6  1520  1  2 035 035  1  2 030 030  1  2 035 035
3  1600 CQ    0  16  3  686   92340  1  3
5  1610      0  1  7200  100  1  7100  130  1  7060  165  1  7040  235  1  7020
5  1611    245  1  7000  470  1  6980  600  1  6960  635  1  6940  645  2  6900
5  1612    665  2  6871  665  2  6848  750  2  6848  750  2  6871  765  3  6980
5  1613    825  3  7200
6  1620  1  2 035 035  1  2 030 030  1  2 035 035
3  1700 CR    0  26  3  688   93300  1  3
5  1710      0  1  7140   40  1  7120   90  1  7100  140  1  7100  140  1  7140
5  1711    260  1  7140  260  1  7070  280  1  7060  370  1  7040  430  1  7040
5  1712    460  1  7020  470  1  7000  570  1  7000  600  1  6980  610  1  6960
5  1713    615  2  6940  650  2  6874  650  2  6860  750  2  6860  750  2  6874
5  1714    775  3  6900  795  3  6920  860  3  6940  895  3  7000  980  3  7100
5  1715   1080  3  7140
6  1720  1  2 035 035  1  2 030 030  1  2 035 035
3  1800 CR BR 2  25  1  690   93300        0  7048 3 0
5  1810      0  1  7042    0  1  7035   32  1  6877   48  1  6860   48  1  7044
5  1811      0 -9  7042   51  1  7044   51  1  6860   75  1  6858  101  1  6862
5  1812    101  1  7046   51 -9  7044  104  1  7046  104  1  6862  140  1  6877
5  1813    153  1  6889  153  1  7048  104 -9  7046  156  1  7048  156  1  6889
5  1814    170  1  6939  186  1  6950  203  1  7034  203  1  7048  156 -9  7048
6  1820  1  2 018 018
3  1900 CR RD 4   5  2   60          1  2          1 1                1
5  1910   -600  1  7060 -248  1  7049    0  2  7079  306  2  7053  450  2  7060
3  2000 2+00 5   7  3  688   93500  1  3
5  2010   -240  1  7100 -170  1  7060 -107  2  7055  -66  2  6854   64  2  6854
5  2011    104  3  7055  140  3  7100
6  2020  1  2 018 018  1  2 018 018  1  2 045 045
```

CO

CP

CQ

CR

CS

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 FLINT RIVER 3RD AVE TO CHEV AVE          KNUTILLA 12  5  2 99 12
2      2  70015  70261  70359  70563  70369
3   2000  2+00 1    7  3  688      200  1  3
4   2005   9100  12750  14400  17200  14400
5   2010    -240  1  7100 -170  1  7060 -107  2  7055  -66  2  6854   64  2  6854  CS
5   2011     104  3  7055  140  3  7100
6   2020 `1  2 024 024  1  2 024 024  1  2 045 045
3   2100  7+00 0  10  3  690      700  1  3
5   2110    -100  1  7100  -90  1  7055  -85  2  7055  -45  2  6857   55  2  6857  CT
5   2111      95  3  7055  110  3  7055  180  3  7060  500  3  7080  750  3  7100
6   2120  1  2 024 024  1  2 024 024  1  2 040 040
3   2200 `10+00 0  11  3  690     1000  1  3
5   2210    -170  1  7100 -130  1  7080 -105  1  7055  -90  2  7055  -50  2  6858  CU
5   2211      50  2  6858   90  3  7055  105  3  7055  200  3  7060  400  3  7080
5   2212     650  3  7100
6   2220  1  2 024 024  1  2 024 024  1  2 040 040
3   2300 `15+00 0  14  3  690     1500  1  3
5   2310    -130  1  7100 -114  1  7020 -105  1  7055  -90  2  7055  -50  2  6860  CV
5   2311      50  2  6860   89  3  7055   97  3  7055   97  3  7030  140  3  7040
5   2312     160  3  7100  200  3  7060  340  3  7080  460  3  7100
6   2320  1  2 024 024  1  2 024 024  1  2 040 040
3   2400 20+00 0  15  3  690     2000  1  3
5   2410    -120  1  7180  -95  1  7055  -90  2  7055  -50  2  6862   50  2  6862
5   2411      89  3  7055  130  3  7055  210  3  7020  280  3  7045  320  3  7060  CW
5   2412     340  3  7100  360  3  7060  480  3  7080  560  3  7100  780  3  7140
6   2420  1  2 024 024  1  2 024 024  1  2 050 050
3   2500 25+00 0  10  3  690     2515  1  3
5   2510    -140  1  7300  -92  1  7055  -87  2  7055  -50  2  6864   50  2  6864  CX
5   2511      83  2  7035   85  2  7035   85  3  7055  134  3  7055  134  3  7300
6   2520  1  2 024 024  1  2 024 024  1  2 050 050
3   2600 29+00 0  10  3  690     2900  1  3
5   2610    -130  1  7200  -97  1  7055  -88  2  7055  -50  2  6866   50  2  6866  CY
5   2611      83  2  7035   85  2  7035   85  3  7055  170  3  7050  170  3  7200
6   2620  1  2 024 024  1  2 024 024  1  2 050 050
3   2700 30+00 0  11  3  690     3000  1  3
5   2710     -70  1  7200  -70  1  7050  -65  2  7050  -65  2  6910  -55  2  6866
5   2711      45  2  6866   78  2  7035   80  2  7035   80  3  7055  170  3  7050
5   2712     170  3  7200
6   2720  1  2 024 024  1  2 024 024  1  2 050 050
3   2800 35+00 0  12  3  690     3500  1  3
5   2810    -152  1  7200 -152  1  7050  -73  2  7050  -73  2  6920  -55  2  6867  CZ
5   2811      45  2  6867   78  2  7035   80  2  7035   80  3  7055   94  3  7055
5   2812     123  3  7050  123  3  7200
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
3  2900 CHEV  2  17  1  690     3500        0  7061 3 0
5  2910      -68  1  6960  -50  1  6869   -8  1  6869   -8  1  6980  -20 -9  7030
5  2911      -40 -9  7061  -50 -9  7040  -68 -9  6960   -3  1  6980   -3  1  6869
5  2912       50  1  6869   65  1  6944   65  1  6980   43 -9  7050   30 -9  7070
5  2913       15 -9  7040   -3 -9  6980
6  2920  1  2 024 024
3  2950 CH RD 4   7  2   50          1  2          1 1                  1
5  2960     -100  1  7200 -100  1  7075    0  1  7075   75  2  7096  145  2  7075
5  2961      165  2  7075  165  2  7200
3  3000 37000 5  10  3  690     3700  1  3
5  3010     -150  1  7200 -150  1  7053  -80  2  7050  -80  2  7020  -50  2  6869
5  3011       50  2  6869   68  2  6960   69  3  7060  120  3  7060  120  3  7200
6  3020  1  2 024 024  1  2 024 024  1  2 024 024
```

DA

```
1      1 FLOOT RIVER  CHEV AVE TO STEVENSON ST    KNUTILLA 12  5  2  5 12
2      2  70494  70348  70452  70651  70459
3   3000 37+00 1  10  3  690    3700  1  3
4   3005   9100  12750  14400  17200  14400
5   3010    -150  1  7200 -150  1  7053  -80  2  7050  -80  2  7020  -50  2  6869   DA
5   3011      50  2  6869   68  2  6960   69  3  7060  120  3  7060  120  3  7200
6   3020  1  2 024 024  1  2 024 024  1  2 024 024
3   3100 40+10 0  12  3  690    4010  1  3
5   3110    -124  1  7200 -124  1  7030  -82  1  7030  -82  2  7054  -80  2  7054   DB
5   3111     -80  2  7020  -50  2  6871   50  2  6871   72  2  6970   72  3  7061
5   3112      92  3  7061   92  3  7200
6   3120  1  2 024 024  1  2 024 024  1  2 024 024
3   3200 46+60 0  14  3  700    4700  1  3
5   3210    -120  1  7200 -120  1  7040  -70  1  7040  -70  2  7056  -68  2  7056   DC
5   3211     -68  2  6990  -45  2  6873   45  2  6873   67  2  6970   67  2  7071
5   3212      69  3  7071   69  3  7050  170  3  7050  170  3  7200
6   3220  1  2 025 025  1  2 024 024  1  2 025 025
3   3300 RR    2  12  1  690    4700        0  7068 3 0
5   3310     -68  1  7068  -68  1  6980  -45  1  6874   -2  1  6874   -2  1  7068
5   3311     -68  1  7068    3  1  7068    3  1  6874   45  1  6874   68  1  6980
5   3312      68  1  7068    3 -9  7068
6   3320  1  2 022 022
3   3400 RD    4   5  2  100          1  2          2 2                1
5   3410       0  1  7100    0  1  7079  200  2  7079  400  2  7079  400  2  7100
3   3500 48+80 5  11  3  700    4880  1  3
5   3510    -120  1  7200 -120  1  7080  -71  2  7073  -71  2  7020  -46  2  6875   DD
5   3511      44  2  6875   65  2  6970   65  3  7060   67  3  7060  140  3  7060
5   3512     140  3  7200
6   3520  1  2 025 025  1  2 024 024  1  2 025 025
3   3600 50+50 0  13  3  700    5050  1  3
5   3610     -93  1  7200  -93  1  7070  -70  2  7070  -68  2  7070  -68  2  7000   DE
5   3611     -43  2  6875   43  2  6875   59  2  6930   59  2  7055   61  3  7055
5   3612      62  3  7050  160  3  7050  160  3  7200
6   3620  1  2 025 025  1  2 024 024  1  2 025 025
3   3700 RR RR 2  12  1  700    5050        0  7056 3 0
5   3710     -69  1  7074  -69  1  7010  -43  1  6875  -12  1  6875  -12  1  7074
5   3711     -69 -9  7074   -7  1  7074   -7  1  6875   25  1  6875   45  1  6980
5   3712      45  1  7074   -7 -9  7074
6   3720  1  2 022 022
3   3800 RR RD 4   5  2   50          1  2          2 2      1         1
5   3810       0  1  7100    0  1  7073   94  2  7073  350  2  7073  350  2  7100
3   3900 52+50 5   9  3  700    5250  1  3
5   3910    -125  1  7200 -125  1  7080  -75  2  7080  -75  2  7010  -48  2  6876   DF
5   3911      47  3  6876   87  3  7070   92  3  7070  140  3  7330
```

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 2,DATE= 8/ 6/77

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

6  3920  1  2 025 025  1  2 024 024  1  2 025 025
3  4000 55+00 0  10  3  702    5500  1  3
5  4010    -200  1  7200 -200  1  7070  -98  1  7070  -88  2  7070  -50  2  6844   D G
5  4011      50  2  6877   89  2  7070   94  3  7070  116  3  7080  144  3  7360
6  4020  1  2 025 025  1  2 024 024  1  2 030 030
3  4100 59+50 0  10  3  702    5950  1  3
5  4110    -300  1  7200 -300  1  7040 -105  1  7040 -100  1  7070  -90  2  7070   D H
5  4111     -50  2  6879   50  2  6879   88  2  7070   93  3  7070  149  3  9310
6  4120  1  2 025 025  1  2 024 024  1  2 030 030
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

     1 FLINT RIVER STEVENSON AVE TO HARRISON ST KNUTILLA 22  5 02 99 12
     2  70185  70458  70574  70770  70577
  4100 59+50 1  10  3  702    5950  1  3
  4105   9100  12750  14400  17200  14400
  4110    -300  1  7200 -300  1  7040 -105  1  7040 -100  1  7070  -90  2  7070   D H
  4111     -50  2  6879   50  2  6879   88  2  7070   93  3  7070  149  3  7310
  4120  1  2 025 025  1  2 024 024  1  2 030 030
  4200 STEV  2  22  1  702    5950       15  7185 1 1
  4210       0  1  7067    5  1  7067   42  1  6890   42  1  7100    0 -9. 7067
  4211      45  1  7100   45  1  6879   94  1  6879   94  1  7125   45 -9  7100
  4212      97  1  7127   97  1  6879  153  1  6879  153  1  7155   97 -9  7127
  4213     156  1  7157  156  1  6879  186  1  7068  208  1  7146  213  1  7146
  4214     213  1  7185  156 -9  7157
  4220  1  2 024 024
  4300 61+00 5   9  3  702    6100  1  3
  4310    -300  1  7200 -300  1  7075  -92  2  7075  -88  2  7075  -50  2  6880   D I
  4311      50  2  6880   88  2  7075   93  3  7075  135  3  7280
  4320  1  2 040 040  1  2 024 024  1  2 040 040
  4400 65+00 0   9  3  702    6500  1  3
  4410    -130  1  7200 -130  1  7070  -70  2  7070  -70  2  6970  -50  2  6882   D J
  4411      50  2  6882   88  2  7075   93  3  7075  147  3  7350
  4420  1  2 040 040  1  2 024 024  1  2 040 040
  4500 71+00 0   9  3  702    7100  1  3
  4510     -90  1  7200  -90  1  7084  -69  2  7084  -69  2  6980  -50  2  6884   D K
  4512      50  2  6884   88  2  7072   93  3  7072  132  3  7271
  4520  1  2 040 040  1  2 024 024  1  2 040 040
  4600 74+50 0  10  3  702    7450  1  3
  4610    -175  1  7200 -175  1  7084 -155  2  7084 -137  2  7079 -100  2  6886   D L
  4611      42  2  6886   80  2  7079   83  3  7079  118  3  7079  130  3  7200
  4620  1  2 040 040  1  2 024 024  1  2 040 040
  4700 76+70 1   9  3  702    7670  1  3
  4705   7200  10300  11800  14400  11800
  4710    -100  1  7200 -100  1  7086  -64  2  7010  -40  2  6887   40  2  6887   D M
  4711      79  2  7080   82  3  7080  130  3  7080  130  3  7200
  4720  1  2 040 040  1  2 024 024  1  2 040 040
  4800 GTWRR 2  12  1  702    7670       15  7086 3 1
  4810       0  1  7086    0  1  7020   26  1  6887   64  1  6887   64  1  7086
  4811       0 -9  7086   72  1  7086   72  1  6887  106  1  6887  137  1  7040
  4812     137  1  7086   72 -9  7086
  4820  1  2 024 024
  4900 77+65 5   8  3  702    7765  1  3
  4910    -100  1  7200 -100  1  7110  -82  2  7080
```

```
4411        50  2  6882    88  2  7075    93  3  7075   147  3  7350
4420  1  2 040 040  1  2 024 024  1  2 040 040
4500 71+00 0    9  3  702     7100  1  3
4510       -90  1  7200   -90  1  7084   -69  2  7084   -69  2  6980   -50  2  6884   DK
4512        50  2  6884    88  2  7072    93  3  7072   132  3  7271
4520  1  2 040 040  1  2 024 024  1  2 040 040
4600 74+50 0   10  3  702     7450  1  3
4610      -175  1  7200  -175  1  7084  -155  2  7084  -137  2  7079  -100  2  6886   DL
4611        42  2  6886    80  2  7079    83  3  7079   118  3  7079   130  3  7200
4620  1  2 040 040  1  2 024 024  1  2 040 040
4700 76+70 1    9  3  702     7670  1  3
4705      7200  10300  11800  14400  11800
4710      -100  1  7200  -100  1  7086   -64  2  7010   -40  2  6887    40  2  6887   DM
4711        79  2  7080    82  3  7080   130  3  7080   130  3  7200
4720  1  2 040 040  1  2 024 024  1  2 040 040
4800 GTWRR 2  12  1  702     7670        15  7086 3 1
4810         0  1  7086     0  1  7020    26  1  6887    64  1  6887    64  1  7086
4811         0 -9  7086    72  1  7086    72  1  6887   106  1  6887   137  1  7040
4812       137  1  7086    72 -9  7086
4820  1  2 024 024
4900 77+65 5    8  3  702     7765  1  3
4910      -100  1  7200  -100  1  7110   -82  2  7080   -40  2  6887    40  2  6887   DN
4911        84  3  7110   150  3  7110   150  3  7200
4912  1  2 040 040  1  2 024 024  1  2 040 040
```

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 2.DATE= 8/ 8/77

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
    0    5    0    5....0....5....0....5....0....5....0....5....0....5....0....5....0
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
3  5000 80+00 0   8  1  702    8000 99 99
5  5010     -83  1  7200  -83  1  7081  -78  1  7081  -40  1  6888   40  1  6888   D O
5  5011      78  1  7081   83  1  7081   83  1  7200
6  5020  1  2 024 024
3  5100 83+50 0   7  1  702    8350 99 99
5  5110     -54  1  7200  -54  1  6990  -34  1  6890   40  1  6890   79  1  7083   D P
5  5111      85  1  7083  110  1  7200
6  5120  1  2 024 024
3  5200 GR TR 2  15  1  702    8350       15  7096 3 1
5  5210       0  1  7096    0  1  6890   40  1  6890   40  1  7096    0 -9  7096
5  5211      44  1  7096   44  1  6890   83  1  6890   83  1  7096   44 -9  7096
5  5212      87  1  7096   87  1  6890  130  1  6890  130  1  7096   87 -9  7096
6  5220  1  2 024 024
3  5400 85+50 5  10  3  704    8550  1  3
5  5410    -425  1  7200 -300  1  7120 -150  1  7119  -71  1  7119  -43  2  7090   D Q
5  5411     -43  2  6891   39  2  6891   39  3  7090   66  3  7100   66  3  7200
6  5420  1  2 040 040  1  2 024 024  1  2 040 040
3  5500 87+00 0  11  3  704    8700  1  3
5  5510    -275  1  7200 -275  1  7170 -175  1  7120 -125  1  7100  -85  1  7100   D R
5  5511     -49  2  7060  -49  2  6891   44  2  6891   44  3  7090   70  3  7100
5  5512      70  3  7200
6  5520  1  2 040 040  1  2 024 024  1  2 040 040
3  5600 90+00 0  10  3  704    9000  1  3
5  5610    -140  1  7200 -140  1  7160 -120  1  7100  -77  2  7060  -65  2  7060   D S
5  5611     -65  2  6892   62  2  6892   62  3  7090   86  3  7100   86  3  7200
6  5620  1  2 040 040  1  2 024 024  1  2 040 040
3  5700 95+00 0  10  3  704    9500  1  3
5  5710    -190  1  7200 -190  1  7115 -160  1  7110  -75  2  7020  -64  2  7020   D T
5  5711     -64  2  6895   64  2  6895   64  3  7090   84  3  7110   84  3  7200
6  5720  1  2 040 040  1  2 024 024  1  2 040 040
3  5800 96+50 0   9  3  704    9650  1  3
5  5810    -163  1  7200 -163  1  7100  -60  2  7100  -60  2  6895   64  2  6895   D U
5  5811      64  3  7090   85  3  7120  180  3  7140  260  3  7200
6  5820  1  2 040 040  1  2 024 024  1  2 040 040
3  5900 GARLA 2  28  1  704    9650         0  7114 3 1
5  5910       0  1  6977    0  1  6896   56  1  6896   56  1  7046   55  1  7073
                     [illegible]  42  1  7108   35  1  7114   28  1  7111   21  1  7102
```

```
5100 83+50 0    7  1  702     8350 99 99
5110       -54  1  7200  -54  1  6990  -34  1  6890   40  1  6890   79  1  7083
5111        -5  1  7083  110  1  7200
5120  1  2 024 024
5200 GR TR 2  15  1  702     8350        15  7096 3 1
5210         0  1  7096    0  1  6890   40  1  6890   40  1  7096    0 -9  7096
5211        44  1  7096   44  1  6890   83  1  6890   83  1  7096   44 -9  7096
5212        87  1  7096   87  1  6890  130  1  6890  130  1  7096   87 -9  7096
5220  1  2 024 024
5400 85+50 5  10  3  704     8550  1  3
5410      -425  1  7200 -300  1  7120 -150  1  7119  -71  1  7119  -43  2  7090
5411       -43  2  6891   39  2  6891   39  3  7090   66  3  7100   66  3  7200
5420  1  2 040 040  1  2 024 024  1  2 040 040
5500 87+00 0  11  3  704     8700  1  3
5510      -275  1  7200 -275  1  7170 -175  1  7120 -125  1  7100  -85  1  7100
5511       -49  2  7060  -49  2  6891   44  2  6891   44  3  7090   70  3  7100
5512        70  3  7200
5520  1  2 040 040  1  2 024 024  1  2 040 040
5600 90+00 0  10  3  704     9000  1  3
5610      -140  1  7200 -140  1  7160 -120  1  7100  -77  2  7060  -65  2  7060
5611       -65  2  6892   62  2  6892   62  3  7090   86  3  7100   86  3  7200
5620  1  2 040 040  1  2 024 024  1  2 040 040
5700 95+00 0  10  3  704     9500  1  3
5710      -190  1  7200 -190  1  7115 -160  1  7110  -75  2  7020  -64  2  7020
5711       -64  2  6895   64  2  6895   64  3  7090   84  3  7110   84  3  7200
5720  1  2 040 040  1  2 024 024  1  2 040 040
5800 96+50 0   9  3  704     9650  1  3
5810      -163  1  7200 -163  1  7100  -60  2  7100  -60  2  6895   64  2  6895
5811        64  3  7090   85  3  7120  180  3  7140  260  3  7200
5820  1  2 040 040  1  2 024 024  1  2 040 040
5900 GARLA 2  28  1  704     9650         0  7114 3 1
5910         0  1  6977    0  1  6896   56  1  6896   56  1  7046   55  1  7073
5911        49  1  7092   42  1  7108   35  1  7114   28  1  7111   21  1  7102
5912        14  1  7083    7  1  7049    4  1  7025    0 -9  6977   64  1  7046
5913        64  1  6896  120  1  6896  120  1  6977  117  1  7025  113  1  7049
5914       106  1  7083   99  1  7102   92  1  7111   85  1  7114   78  1  7108
5915        71  1  7092   65  1  7073   64 -9  7046
5920  1  2 030 030
6100 99+00 5   9  3  704     9900  1  3
6110      -245  1  7200 -245  1  7100  -64  2  7020  -64  2  6896   64  2  6896
6111        64  3  7020  140  3  7120  150  3  7120  150  3  7200
```

DP

DQ

DR

DS

DT

DU

DV

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
...5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
  6112  1  2 040 040  1  2 024 024  1  2 040 040
  6200 10550 0  10  3  704   10550  1  3
  6210     -204  1  7150 -204  1  7105 -190  1  7105  -80  1  7020  -68  2  7020    DW
  6211      -68  2  6899   70  2  6899   70  3  7120  170  3  7120  170  3  7150
  6220  1  2 040 040  1  2 024 024  1  2 040 040
  6300 NORTH 2  15  1  704   10550       15  7101 3 1
  6310      -66  1  7101  -66  1  6899  -30  1  6899  -30  1  7101  -66 -9  7101
  6311      -26  1  7101  -26  1  6899   32  1  6899   32  1  7101  -26 -9  7101
  6312       36  1  7101   36  1  6899   72  1  6899   72  1  7101   36 -9  7101
  6320  1  2 024 024
  6350 10700 5  11  3  704   10700  1  3
  6370     -240  1  7150 -240  1  7112 -185  1  7112  -80  1  7020  -70  2  7020    DX
  6371      -70  2  6900   70  2  6900   70  3  7020   80  3  7020  250  3  7125
  6372      250  3  7150
  6380  1  2 040 040  1  2 024 024  1  2 040 040
  6200 10950 0   8  1  704   10950 99 99
**SEQUENCE**
  6210     -130  1  7145 -130  1  6928   97  1  6928   97  1  7020  106  1  7020    DY
  6211      106  1  7100  200  1  7120  200  1  7145
  6220  1  2 024 024
```

```
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 LINT RIVER DAM TO CARPENTER RD                    UTILLA 51  5  2 10 12
2      5  70850  70890  70930  71035  70930
3    100      1 1    8  2  708       80 99 99
4    105   7200  10300  11800  14400  11800
5    110        0  1. 7151     0  1  6984  173  1  6984  173  1  7081  220  2  7100   D. 2
5    111      255  2  7120  390  2  7120  390  2  7151
6    120  1  2 032 032  1  2 032 032
3    200      2 0  11  3  708       350  1  3
5    210        0  1  7177   70  1  7160   85  2  7100   90  2  7080   90  2  6991   E A
5    211      280  2  6991  290  2  7080  295  3  7100  320  3  7140  335  3  7160
5    212      350  3  7177
6    220  1  2 033 033  1  2 032 032  1  2 034 034
3    300 STEV. 2  34  1  708       350        30  7146 1 1
5    310        0  1  7142    0  1  7094   20  1  7060   52  1  7024   52  1  7144
5    311        0 -9  7142   55  1  7144   55  1  7014   80  1  6968  100  1  6971
5    312      110  1  6971  110  1  7146   55 -9  7144  113  1  7146  113  1  6971
5    313      130  1  6948  150  1  6952  163  1  6967  163  1  7145  113 -9  7146
5    314      166  1  7145  166  1  6967  180  1  6983  200  1  6992  220  1  7012
5    315      220  1  7144  166 -9  7145  223  1  7144  223  1  7012  240  1  7022
5    316      260  1  7049  283  1  7086  283  1  7143  223 -9  7144
6    320  1  2 030 030
3    400      3 5  12  3  708       730  1  3
5    410        0  1  7200   35  1  7180  145  1  7180  165  2  7160  185  2  7080   E B
5    411      185  2  6983  370  2  6983  370  2  7080  390  2  7120  398  3  7140
5    412      425  3  7160  425  3  7200
6    420  1  2 032 032  1  2 032 032  1  2 033 033
3    500      4 0  12  3  708      1720  1  3
5    510        0  1  7180  170  1  7160  180  2  7100  190  2  7080  190  2  6999   E C
5    511      350  2  6999  350  2  7080  370  3  7140  500  3  7155  540  3  7160
5    512      630  3  7160  630  3  7180
6    520  1  2 040 040  1  2 032 032  1  2 033 033
3    600 RTLBR 2  31  1  708      1720        30  7150 1 1
5    610        0  1  7146    0  1  7124   20  1  7073   39  1  7051   39  1  7149
5    611        0 -9  7146   42  1  7149   42  1  7051   60  1  7026   85  1  7022
5    612       85  1  7150   42 -9  7149   88  1  7150   88  1  7022  110  1  6987
5    613      135  1  6984  135  1  7150   88 -9  7150  138  1  7150  138  1  6984
5    614      160  1  6961  180  1  7002  180  1  7145  138 -9  7150  183  1  7145
5    615      183  1  7002  200  1  7046  216  1  7108  222  1  7110  222  1  7142
5    616      183 -9  7145
6    620  1  2 030 030
3    700      5 5  12  3  708      2050  1  3
5    710        0  1  7180  100  1  7161  220  1  7160  245  2  7080  245  2  7007   E D
5    711      425  2  7007  425  3  7080  440  3  7100  450  3  7120  500  3  7140
5    712      630  3  7140  630  3  7180
```

```
         1         2         3         4
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
6   720  1  2 047 047  1  2 032 032  1  2 038 038
3   800     6 0  14  3  708     3170  1  3
5   810       0  1  7200     0  1  7120  100  2  7100  110  2  7080  115  2  6983   EE
5   811     285  2  6983  290  2  7080  300  3  7100  315  3  7120  400  3  7134
5   812     530  3  7140  540  3  7160  620  3  7180  700  3  7200
6   820  1  2 035 035  1  2 032 032  1  2 036 036
3   900     7 0  13  3  708     4030  1  3
5   910       0  1  7200   50  1  7140  400  2  7120  430  2  7080  430  2  6985   EF
5   911     590  2  6985  590  2  7080  605  3  7100  690  3  7120  740  3  7140
5   912     800  3  7160  950  3  7180  975  3  7200
6   920  1  2 040 040  1  2 032 032  1  2 040 040
3  1000     8 0  13  3  708     5120  1  3
5  1010       0  1  7200   20  1  7160  160  1  7140  540  2  7140  560  2  7080   EG
5  1011     580  2  7003  745  2  7003  760  2  7080  780  3  7100  920  3  7120
5  1012    1010  3  7140 1050  3  7160 1050  3  7200
6  1020  1  2 040 040  1  2 030 030  1  2 033 033
3  1100     9 1  13  3  708     5580  1  3
4  1105   7100  10100  11500  14100  11500
5  1110       0  1  7200    0  1  7160   60  2  7160   70  2  7100   80  2  7080   EH
5  1111      90  2  6984  250  2  6984  255  2  7080  305  3  7100  540  3  7120
5  1112     685  3  7140  720  3  7160  720  3  7200
6  1120  1  2 042 042  1  2 032 032  1  2 032 032
3  1200    10 0  12  3  708     6240  1  3
5  1210       0  1  7200    0  1  7180   20  1  7180   70  1  7160  520  1  7146   EI
5  1211     600  2  7100  615  2  7080  615  2  6978  745  2  6978  750  2  7100
5  1212     770  3  7180  840  3  7200
6  1220  1  2 040 040  1  2 032 032  1  2 032 032
3  1300 HAMIL 2  21  1  708     6240       0  7162 3 0
5  1310       2  1  7154    2  1  7088   20  1  7025   40  1  6999   54  1  6993
5  1311      54  1  7156    2 -9  7154   58  1  7156   58  1  7002   70  1  6993
5  1312      90  1  7005  108  1  7002  108  1  7158   58 -9  7154  112  1  7158
5  1313     112  1  7023  125  1  7010  145  1  7060  164  1  7105  164  1  7162
5  1314     112 -9  7158
6  1320  1  2 030 030
3  1400 10 RD 4   6  2   60          1  2          1 1                1
5  1410       0  1  7180  140  1  7160  300  1  7151  540  1  7146  760  2  7206
5  1411     930  2  7220
3  1500    11 5  10  4  708     6470  2  4
5  1510       0  1  7180   50  1  7160  190  1  7140  500  2  7140  510  3  7100   EJ
5  1512     520  3  7080  520  3  7004  664  4  7004  670  4  7080  700  4  7200
6  1520  1  2 042 042  1  2 032 032  1  2 030 030  1  2 040 040
3  1600    12 0  13  3  708     7150  1  3
5  1610       0  1  7200    0  1  7140   55  1  7120   75  2  7100   95  2  7080   EK
5  1611     100  2  6975  245  2  6975  245  2  7080  255  2  7100  270  3  7120
5  1612     290  3  7160  360  3  7180  420  3  7200
```

```
6 1620  1  2 042 042  1  2 032 032  1  2 040 040
3 1700    13 0  12  2  708    8040 99 99
5 1710       0  1  7200  120  1  7180  160  1  7160  200  1  7140  370  1  7140   EL
5 1711     560  2  7120  565  2  7080  565  2  6987  700  2  6987  700  2  7080
5 1712     710  2  7120  710  2  7200
6 1720  1  2 045 045  1  2 032 032
3 1800    14 0  13  3  708    8700  1  3
5 1810       0  1  7200    0  1  7180   40  1  7160  100  1  7140  150  2  7120   EM
5 1811     170  2  7080  170  2  6989  315  2  6989  315  2  7080  320  3  7120
5 1812     400  3  7155  520  3  7160  520  3  7200
6 1820  1  2 050 050  1  2 032 032  1  2 043 043
3 1900    15 0  11  3  708    9540  1  3
5 1910       0  1  7200   20  2  7100   30  2  7080   30  2  7006  170  2  7006   EN
5 1911     170  2  7080  180  3  7120  420  3  7140  480  3  7160  560  3  7180
5 1912     700  3  7200
6 1920  1  2 050 050  1  2 032 032  1  2 042 042
3 2000 DAKOT 2  13  1  708    9540        0  7171 3 0
5 2010       4  1  7171    4  1  7110   20  1  7058   40  1  6979   60  1  6934
5 2011      75  1  6981   95  1  6978  120  1  6987  140  1  7011  155  1  7052
5 2012     165  1  7072  165  1  7144    4 -9  7171
6 2020  1  2 030 030
3 2100 15 RO 4   6  2   20          1  2          2 2                1
5 2110    -200  1  7200 -170  1  7194  -10  2  7162    0  2  7149  142  2  7111
5 2111     200  2  7200
3 2200    16 5  12  3  708    9780  1  3
5 2210       0  1  7200   40  2  7100   55  2  7080   55  2  7005  200  2  7005   EO
5 2211     200  2  7080  201  3  7100  215  3  7120  360  3  7140  370  3  7160
5 2212     400  3  7180  400  3  7200
6 2220  1  2 050 050  1  2 032 032  1  2 042 042
3 2300    17 0  12  3  708   10120  1  3
5 2310       0  1  7200   30  1  7120   65  2  7100   90  2  7080   90  2  6993   EP
5 2311     230  2  6993  230  2  7080  235  3  7120  270  3  7140  285  3  7160
5 2312     300  3  7180  305  3  7200
6 2320  1  2 050 050  1  2 032 032  1  2 045 045
3 2400 LEITH 2  31  1  708   10120        0  7210 1 0
5 2410       0  1  7278    0  1  7156   16  1  7128   17  1  7105   39  1  7700
5 2411      39  1  7278    0 -9  7278   43  1  7210   43  1  7100   60  1  7050
5 2412      75  1  7024  100  1  6977  120  1  7003  130  1  7042  130  1  7210
5 2413      43 -9  7210  134  1  7210  134  1  7042  140  1  7012  160  1  6993
5 2414     180  1  7021  200  1  7076  208  1  7112  208  1  7210  134  1  7210
5 2415     212  1  7278  212  1  7127  240  1  7126  250  1  7132  250  1  7278
5 2416     212 -9  7278
6 2420  1  2 028 028
3 2500    21 5  12  4  708   10320  1  4
5 2510       0  1  7200   50  2  7120   80  3  7100  105  3  7080  105  3  6993   GQ
```

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                                  2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  2511     240  3  6995  240  3  7080  250  4  7100  260  4  7140  320  4  7160   EQ
5  2512     330  4  7180  350  4  7200
6  2520  1  2 043 043  1  2 043 043  1  2 032 032  1  2 040 040
3  2600    22 0  12  3  708   11160  1  3
5  2610       0  1  7200   35  2  7120   40  2  7100   50  2  7080   50  2  6999   ER
5  2611     195  2  6995  195  2  7080  200  3  7100  230  3  7160  420  3  7160
5  2612     540  3  7180  600  3  7200
6  2620  1  2 043 043  1  2 032 032  1  2 040 040
3  2700    23 0  12  3  708   11770  1  3
5  2710       0  1  7200   15  2  7100   20  2  7080   20  2  7013  215  2  7013   ES
5  2711     215  2  7080  220  3  7100  240  3  7140  265  3  7160  420  3  7160
5  2712     475  3  7180  600  3  7200
6  2720  1  2 046 046  1  2 032 032  1  2 042 042
3  2800 GATE  2  37  1  708   11770       0  7131 3 0
5  2810       0  1  7131    0  1  7021   12  1  7027   25  1  7018   25  1  7131
5  2811       0 -9  7131   30  1  7131   30  1  7017   42  1  7032   55  1  7017
5  2812      55  1  7131   30 -9  7131   60  1  7131   60  1  7018   72  1  7013
5  2813      85  1  6987   85  1  7131   60 -9  7131   90  1  7131   90  1  6979
5  2814      98  1  6994  106  1  6998  115  1  6981  115  1  7131   90 -9  7131
5  2815     120  1  7131  120  1  6974  132  1  6974  145  1  6974  145  1  7131
5  2816     120 -9  7131  150  1  7131  150  1  6974  162  1  6973  175  1  6980
5  2817     175  1  7131  150 -9  7131
6  2820  1  2 030 030
3  2900 23 RD 4  11  2   60          1  2          2 2                  1
5  2910    -200  1  7200 -188  1  7196 -160  1  7178 -160  1  7200    0  2  7200
5  2911     100  2  7200  100  2  7173  182  2  7140  340  2  7145  400  2  7140
5  2912     450  2  7200
3  3000    24 5  13  4  708   12030  1  3
5  3010       0  1  7220   15  1  7200   50  1  7120  130  2  7100  150  2  7080   ET
5  3011     150  2  7013  300  3  7013  330  3  7013  330  3  7080  350  4  7140
5  3012     480  4  7160  600  4  7180  650  4  7220
6  3020  1  2 044 044  1  2 032 032  1  2 032 032  1  2 046 046
3  3100    25 0  14  3  708   12870  1  3
5  3110       0  1  7220   20  1  7200   70  1  7120  170  2  7100  180  2  7080   EU
5  3111     180  2  7002  340  2  7002  340  2  7080  360  3  7120  380  3  7160
5  3112     490  3  7160  620  3  7180  630  3  7200  670  3  7220
6  3120  1  2 044 044  1  2 032 032  1  2 050 050
3  3200    26 0  13  3  708   13540  1  3
5  3210       0  1  7220   65  1  7200  140  2  7120  160  2  7080  160  2  6997   EV
5  3211     290  2  6997  290  2  7080  320  3  7140  400  3  7160  500  3  7160
5  3212     520  3  7180  650  3  7200  700  3  7220
6  3220  1  2 065 065  1  2 032 032  1  2 045 045
3  3300    27 0  15  3  710   14250  1  3
5  3310       0  1  7220  150  1  7200  240  1  7180  300  1  7160  330  2  7120   EW
5  3311     355  2  7100  380  2  7080  380  2  7009  535  2  7009  535  2  7080
```

```
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  3312      550  3  7140  580  3  7160  730  3  7180  800  3  7200  820  3  7220
6  3320  1  2 042 042  1  2 032 032  1  2 040 040
3  3400 DORT  2  38  1  710  14250        0  7181 3 0
5  3410        0  1  7108   10  1  7082   30  1  7064   50  1  7032   57  1  7034
5  3411       57  1  7105   50  1  7146   30  1  7172   10  1  7143    0 -9  7108
5  3412       62  1  7105   62  1  7023   80  1  6995   90  1  6993  100  1  6996
5  3413      110  1  6999  122  1  7006  122  1  7101  110  1  7159  100  1  7176
5  3414       90  1  7181   80  1  7172   70  1  7150   62 -9  7105  127  1  7101
5  3415      127  1  7014  140  1  7004  150  1  7024  160  1  7037  170  1  7052
5  3416      183  1  7081  183  1  7084  170  1  7152  160  1  7170  150  1  7174
5  3417      140  1  7161  130  1  7125  127 -9  7101
6  3420  1  2 030 030
3  3500    28 5  13  3  710   14500  1  3
5  3510        0  1  7200    0  1  7195  220  1  7180  250  2  7140  290  2  7100   EK
5  3511      300  2  7080  300  2  7006  415  2  7006  415  2  7080  423  3  7120
5  3512      460  3  7160  590  3  7180  600  3  7200
6  3520  1  2 040 040  1  2 032 032  1  2 050 050
3  3600    29 1  14  3  710   15150  1  3
4  3605   6000   8600  10000  12500  10000
5  3610        0  1  7240   70  1  7220  160  1  7200  220  1  7181  470  1  7180   EY
5  3612      500  2  7140  550  2  7080  550  2  7008  670  2  7008  670  2  7080
5  3613      675  2  7100  690  3  7200  720  3  7220  730  3  7240
6  3620  1  2 040 040  1  2 032 032  1  2 050 050
3  3700    30 0  11  3  710   15820  1  3
5  3710        0  1  7300   50  1  7200  100  2  7180  115  2  7100  120  2  7080   EZ
5  3711      120  2  6989  240  2  6989  240  2  7080  270  3  7140  305  3  7200
5  3712      340  3  7300
6  3720  1  2 040 040  1  2 032 032  1  2 050 050
3  3800 CRORR 2  29  1  710   15820        15  7312 1 1
5  3810        0  1  7312    0  1  7214   15  1  7182   43  1  7180   57  1  7150
5  3811       57  1  7312    0 -9  7312   64  1  7312   64  1  7090   80  1  7060
5  3812      100  1  6998  120  1  6996  127  1  6995  127  1  7312   64 -9  7312
5  3813      135  1  7312  135  1  6995  150  1  6970  170  1  7002  190  1  7060
5  3814      198  1  7074  198  1  7312  127 -9  7312  205  1  7312  205  1  7096
5  3815      220  1  7140  243  1  7232  243  1  7312  205 -9  7312
6  3820  1  2 030 030
3  3900    31 5  11  3  710   16050  1  3
5  3910        0  1  7240   40  1  7200  130  2  7180  160  2  7100  190  2  7080   FA
5  3911      190  2  7003  310  2  7003  310  2  7080  351  3  7160  380  3  7200
5  3912      400  3  7240
6  3920  1  2 045 045  1  2 032 032  1  2 048 048
3  3950    32 0  13  3  710   16700  1  3
5  3960        0  1  7240   20  1  7200  290  1  7180  360  1  7160  400  1  7140   FB
5  3961      600  1  7120  640  2  7100  680  2  7080  680  2  7017  800  2  7017
5  3962      820  3  7140  860  3  7200  950  3  7240
```

```
6  3980  1  2 045 045  1  2 032 032  1  2 046 046
3  4000    33 0  19  3  710   17600  1  3
5  4010      0  1  7240  100  1  7220  140  1  7200  230  1  7180  350  1  7175
5  4011    375  1  7160  390  2  7140  420  2  7100  440  2  7080  440  2  7003
5  4012    560  2  7003  560  2  7080  570  3  7100  760  3  7100  980  3  7120
5  4013   1050  3  7140 1150  3  7200 1180  3  7220 1230  3  7240
6  4020  1  2 046 046  1  2 032 032  1  2 055 055
3  4100    34 0  16  3  710   18680  1  3
5  4110      0  1  7240  190  1  7220  200  2  7200  215  2  7100  250  2  7080
5  4111    250  2  7004  415  2  7004  415  2  7080  425  3  7100  580  3  7120
5  4112   1000  3  7140 1110  3  7160 1165  3  7180 1320  3  7180 1350  3  7220
5  4113   1400  3  7240
6  4120  1  2 050 050  1  2 032 032  1  2 060 060
3  4200    35 0  19  3  710   19770  1  3
5  4210      0  1  7260   20  1  7240   85  1  7220  140  1  7200  170  1  7180
5  4211    280  1  7160  500  1  7160  520  2  7140  550  2  7080  550  2  7007
5  4212    670  2  7007  670  2  7080  690  3  7120  710  3  7140 1000  3  7160
5  4213   1120  3  7180 1280  3  7200 1500  3  7200 1600  3  7260
6  4220  1  2 050 050  1  2 032 032  1  2 060 060
3  4300    36 0  19  3  710   20740  1  3
5  4310      0  1  7260  100  1  7240  140  1  7220  150  1  7200  200  1  7160
5  4311    330  1  7160  540  1  7180  720  1  7180  810  1  7120  840  1  7100
5  4312   1170  2  7100 1180  2  7080 1180  2  7030 1305  2  7030 1305  2  7080
5  4313   1330  3  7180 1500  3  7200 1550  3  7220 1600  3  7260
6  4320  1  2 065 065  1  2 032 032  1  2 055 055
3  4400    37 0  17  3  710   21950  1  3
5  4410      0  1  7260   75  1  7200  140  1  7180  330  1  7180  350  1  7160
5  4411    430  1  7160  580  1  7180  860  1  7180  955  2  7160  965  2  7100
5  4412    980  2  7080  980  2  7003 1095  2  7003 1095  2  7080 1110  2  7100
5  4413   1120  3  7200 1200  3  7260
6  4420  1  2 070 070  1  2 032 032  1  2 050 050
3  4500    38 0  16  3  710   22340  1  3
5  4510      0  1  7260  160  1  7240  175  1  7220  240  2  7200  260  2  7100
5  4511    290  2  7080  290  2  6981  430  2  6981  430  2  7080  450  3  7100
5  4512    525  3  7120  530  3  7140  550  3  7160  560  3  7180  600  3  7200
5  4513    700  3  7260
6  4520  1  2 080 080  1  2 032 032  1  2 050 050
3  4600    39 0  14  3  710   23000  1  3
5  4610      0  1  7260   40  1  7240   60  1  7200  120  2  7120  140  2  7080
5  4611    140  2  7004  245  2  7004  245  2  7080  260  3  7100  330  3  7120
5  4612    350  3  7160  420  3  7200  500  3  7220  600  3  7260
6  4620  1  2 040 040  1  2 032 032  1  2 050 050
3  4700    40 0  15  3  710   23830  1  3
5  4710      0  1  7300   40  2  7200   50  2  7100   60  2  7080   60  2  6983
5  4711    190  2  6983  190  2  7080  200  3  7100  350  3  7120  620  3  7120
```

FC

FD

FE

FF

FG

FH

FI

FJ

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  4712     650  3  7140  665  3  7160  740  3  7180  830  3  7200  900  3  7260
6  4720  1  2 050 050  1  2 032 032  1  2 065 065
3  4800    41 0  20  3  710   24880  1  3
5  4810       0  1  7280   55  1  7160   85  1  7140  125  1  7120  400  1  7110
5  4811     760  1  7120  950  1  7120 1010  2  7100 1025  2  7080 1025  2  6986   FK
5  4812    1130  2  6986 1130  2  7080 1140  3  7100 1170  3  7160 1240  3  7180
5  4813    1430  3  7180 1450  3  7200 1470  3  7220 1670  3  7240 1720  3  7280
6  4820  1  2 065 065  1  2 032 032  1  2 045 045
3  4900    42 0  20  3  710   25740  1  3
5  4910       0  1  7260    0  1  7240  240  1  7220  285  1  7200  320  1  7140
5  4911     460  1  7120  470  1  7100  880  2  7100  920  2  7080  920  2  7010   FL
5  4912    1045  2  7030 1045  2  7080 1055  3  7100 1120  3  7100 1130  3  7120
5  4913    1150  3  7160 1430  3  7180 1450  3  7220 1490  3  7240 1700  3  7260
6  4920  1  2 060 060  1  2 032 032  1  2 055 055
3  5000    43 0  18  3  710   26460  1  3
5  5010       0  1  7260    0  1  7240   90  1  7220  200  1  7200  250  1  7180
5  5011     270  1  7160  440  1  7140  600  1  7120  670  2  7100  695  2  7080   FM
5  5012     695  2  7026  820  2  7026  820  2  7080  830  3  7120 1130  3  7120
5  5013    1200  3  7200 1370  3  7240 1520  3  7260
6  5020  1  2 060 060  1  2 032 032  1  2 055 055
```

```
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /    EG  /     V  /    FN  /   ACC   *
==========================================================================
CC     AT   80525 /      0 /  14400. /  2875. /  697119. / 1.38 /   48. /  381.
   699.06 /   0.54 /                 /  699.60 /    5.01 /  0.28 /        *IS*
--------------------------------------------------------------------------
CD     AT   81430 /    905 /  14400. /  3003. /  723163. / 1.35 /  155. /  440.
   699.49 /   0.48 /   0.37 /    0.0 /  699.97 /    4.79 /  0.25 / 0.000  *XS*
--------------------------------------------------------------------------
CE     AT   82450 /   1020 /  14400. /  3153. /  725835. / 1.36 /   40. /  379.
   699.93 /   0.44 /   0.40 /    0.0 /  700.37 /    4.57 /  0.24 / -0.000 *XS*
--------------------------------------------------------------------------
CF     AT   83300 /    850 /  14400. /  4492. /  869240. / 1.88 /   19. /  709.
   700.35 /   0.30 /   0.28 /    0.0 /  700.65 /    3.21 /  0.21 / -0.000 *XS*
--------------------------------------------------------------------------
CG     AT   84180 /    880 /  14400. /  3298. /  788264. / 1.48 /   24. /  506.
   700.55 /   0.44 /   0.27 /   0.07 /  700.99 /    4.37 /  0.23 / -0.000 *XS*
--------------------------------------------------------------------------
CH     AT   85090 /    910 /  14400. /  2735. /  649652. / 1.33 /  254. /  501.
   700.86 /   0.57 /   0.37 /   0.07 /  701.43 /    5.27 /  0.28 / -0.000 *XS*
--------------------------------------------------------------------------
CI     AT   86080 /    990 /  14400. /  3263. /  761295. / 1.31 /  608. /  901.
   701.45 /   0.40 /   0.42 /    0.0 /  701.84 /    4.41 /  0.22 / -0.000 *XS*
--------------------------------------------------------------------------
CJ     AT   86660 /    580 /  14400. /  3170. /  766612. / 1.31 /   17. /  285.
   701.64 /   0.42 /   0.21 /   0.01 /  702.06 /    4.54 /  0.23 / -0.000 *XS*
--------------------------------------------------------------------------
CK     AT   87820 /   1160 /  14400. /  3957. /  873145. / 1.26 /   24. /  300.
   702.06 /   0.36 /   0.36 /    0.0 /  702.42 /    4.29 /  0.21 / 0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR CK AT   87820 /       /  14400. /  2694. /  747565. / 1.00 /    1. /  193.
   702.06 /   0.44 /       ...1...  (-.001)  /    5.34 /  0.23 /        *BO*
--------------------------------------------------------------------------
 NO ROAD OVERFLOW
                                                                        *RG*
--------------------------------------------------------------------------
CL     AT   88140 /    320 /  14400. /  4262. /  847919. / 1.60 /  136. /  604.
   702.23 /   0.28 /   0.09 /    0.0 /  702.51 /    3.38 /  0.21 / -0.000 *AS*
--------------------------------------------------------------------------
   M = 0.33 / E = 0.10 / K* = 0.67 /  4410. /  885684. / 1.60 /  134. /  605.
   702.54 /   0.27 /                 /  702.81 /    3.27 /  0.20 /        *AS*
========================== END BRIDGE ANALYSIS ============================
CL     AT   88150 /     10 /  14400. /  4410. /  885684. / 1.60 /  134. /  605.
   702.54 /   0.27 /   0.00 /    0.0 /  702.81 /    3.27 /  0.20 / -0.003 *XS*
--------------------------------------------------------------------------
CM     AT   88800 /    650 /  14400. /  4715. /  995763. / 1.97 /   46. /   61
   702.68 /   0.29 /   0.15 /   0.01 /  702.97 /    3.05 /  0.20 / 0.000
--------------------------------------------------------------------------
```

CC
CD
CE
CF
CG
CH
CI 100'
CJ
CK
CL
CL
M

1004

```
==================================================================================
WATER-SURFACE PROFILE FOR: FLINT RIVER SEC CC TO 3RD AVE              KNUTILLA
PAGE  2 OF  2
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /    EG  /     V  /    FN  /  ACC   *ID*
==================================================================================
CN    AT   89350 /  550 /  14400. /  5130. / 1076131. / 1.79 /  149. /  841.
   702.86 /  0.22 /  0.11 /   0.0  /  703.08 /   2.81 /  0.18 / -0.000  *XS*
----------------------------------------------------------------------------------
CO    AT   90320 /  970 /  14400. /  7245. / 1488804. / 1.52 /  101. /  981.
   703.11 /  0.09 /  0.13 /   0.0  /  703.20 /   1.99 /  0.13 / -0.001  *XS*
----------------------------------------------------------------------------------
CP    AT   91330 / 1010 /  14400. /  5564. / 1213283. / 1.68 /  201. / 1099.
   703.18 /  0.17 /  0.12 /  0.04  /  703.36 /   2.59 /  0.16 / -0.000  *XS*
----------------------------------------------------------------------------------
CQ    AT   92340 / 1010 /  14400. /  4321. /  916225. / 1.62 /  189. /  780.
   703.32 /  0.28 /  0.19 /  0.05  /  703.60 /   3.33 /  0.21 / -0.000  *XS*
----------------------------------------------------------------------------------
CR    AT   93300 /  960 /  14400. /  4448. / 1079850. / 1.34 /  436. /  925.
   703.57 /  0.22 /  0.20 /   0.0  /  703.79 /   3.24 /  0.18 / -0.012  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
CR BR AT   93300 /        /  14400. /  2591. /  902308. / 1.00 /    0. /  203.
   703.57 /  0.48 /        ...1...  (-.001)  /   5.56 /  0.27 /          *BO*
----------------------------------------------------------------------------------
 NO ROAD OVERFLOW
                                                                          *RG*
----------------------------------------------------------------------------------
 2+00 AT   93500 /  200 /  14400. /  3029. / 1477459. / 1.00 / -103. /  100.
   703.58 /  0.35 /  0.03 /  0.13  /  703.93 /   4.75 /  0.22 / -0.011  *AS*
----------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /  3032. / 1479432. / 1.00 / -103. /  100.
   703.59 /  0.35 /                /  703.94 /   4.75 /  0.22 /          *AS*
============================ END BRIDGE ANALYSIS ================================

                          END OF THIS PROFILE
```

CN
CO
CP
CQ
CR
CS
CS

```
==================================================================================
WATER-SURFACE PROFILE FOR: FLINT RIVER 3RD AVE TO CHEV AVE          KNUTTILLA
PAGE  1 OF  1
==================================================================================
SECTD AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HF  /     FG  /     V  /    FN  /  ACC   *ID*
==================================================================================
 2+00 AT     200 /     0 /  14400. /  3031. / 1109283. / 1.00 / -103. /  100.
   703.59 /   0.35 /                 /  703.94 /    4.75 /   0.22/          *IS*
----------------------------------------------------------------------------------
 7+00 AT     700 /   500 /  14400. /  2436. /  856523. / 1.00 /  -81. /   91.
   703.59 /   0.54 /   0.11 /   0.10 /  704.13 /    5.91 /   0.28 / -0.013  *XS*
----------------------------------------------------------------------------------
10+00 AT    1000 /   300 /  14400. /  2437. /  856324. / 1.00 /  -86. /   86.
   703.68 /   0.54 /   0.08 /   0.0  /  704.22 /    5.91 /   0.28 /  0.002  *XS*
----------------------------------------------------------------------------------
15+00 AT    1500 /   500 /  14400. /  2469. /  852523. / 1.03 / -118. /  142.
   703.82 /   0.55 /   0.14 /   0.00 /  704.37 /    5.83 /   0.28 /  0.002  *XS*
----------------------------------------------------------------------------------
20+00 AT    2000 /   500 /  14400. /  2521. /  851012. / 1.07 /  -87. /  265.
   703.97 /   0.54 /   0.14 /   0.0  /  704.51 /    5.71 /   0.28 /  0.002  *XS*
----------------------------------------------------------------------------------
25+00 AT    2515 /   515 /  14400. /  2377. /  829728. / 1.00 /  -84. /   85.
   704.10 /   0.57 /   0.15 /   0.01 /  704.68 /    6.06 /   0.28 / -0.000  *XS*
----------------------------------------------------------------------------------
29+00 AT    2900 /   385 /  14400. /  2379. /  827473. / 1.00 /  -85. /   85.
   704.22 /   0.57 /   0.12 /   0.0  /  704.79 /    6.05 /   0.29 /  0.002  *XS*
----------------------------------------------------------------------------------
30+00 AT    3000 /   100 /  14400. /  2221. /  783502. / 1.00 /  -65. /   80.
   704.22 /   0.65 /   0.03 /   0.04 /  704.88 /    6.48 /   0.29 /  0.010  *XS*
----------------------------------------------------------------------------------
35+00 AT    3500 /   500 /  14400. /  2361. /  842776. / 1.00 /  -73. /   80.
   704.47 /   0.58 /   0.16 /   0.0  /  705.05 /    6.10 /   0.27 /  0.017  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
CHEV  AT    3500 /       /  14400. /  1998. /  590952. / 1.00 /  -68. /   65.
   704.47 /   0.81 /       ...1...  (-.001)  /    7.21 /   0.33 /          *BO*
----------------------------------------------------------------------------------
 NO ROAD OVERFLOW
                                                                            *RG*
----------------------------------------------------------------------------------
37000 AT    3700 /   200 /  14400. /  2303. /  829293. / 1.00 /  -80. /   69.
   704.52 /   0.61 /   0.06 /   0.01 /  705.13 /    6.25 /   0.28 / -0.000  *AS*
----------------------------------------------------------------------------------
```

```
USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT=   22,DATE= 8/ 6/77


==================================================================================
WATER-SURFACE PROFILE FOR: FLINT RIVER  CHEV AVE TO STEVENSON ST    KNUTILLA
PAGE  1 OF  1
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
37+00 AT    3700 /      0 /  14400. /  2303. /  829373. / 1.00 /  -80. /   69.
   704.52 /   0.61 /                 /  705.13 /   6.25 /   0.28/          *IS*
----------------------------------------------------------------------------------
40+10 AT    4010 /    310 /  14400. /  2402. /  843138. / 1.04 / -124. /   72.
   704.64 /   0.58 /   0.09 /   0.0  /  705.22 /   5.99 /   0.28 / -0.000  *XS*
----------------------------------------------------------------------------------
46+60 AT    4700 /    690 /  14400. /  2161. /  760353. / 1.03 / -120. /   67.
   704.80 /   0.71 /   0.22 /   0.07 /  705.51 /   6.66 /   0.30 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ===============================
BR     AT    4700 /        /  14400. /  2035. /  684196. / 1.00 /  -68. /   68.
   704.80 /   0.78 /       ...1...  (-.001)    /   7.08 /   0.32 /          *BO*
----------------------------------------------------------------------------------
 NO ROAD OVERFLOW
                                                                             *RG*
----------------------------------------------------------------------------------
48+80 AT    4880 /    180 /  14400. /  2078. /  735597. / 1.00 /  -71. /   65.
   704.85 /   0.75 /   0.07 /   0.02 /  705.59 /   6.93 /   0.31 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /  2079. /  735922. / 1.00 /  -71. /   65.
   704.85 /   0.75 /                 /  705.60 /   6.93 /   0.31 /          *AS*
============================ END BRIDGE ANALYSIS =================================
50+50 AT    5050 /    170 /  14400. /  2009. /  710581. / 1.00 /  -68. /   59.
   704.89 /   0.80 /   0.07 /   0.03 /  705.69 /   7.17 /   0.32 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ===============================
BR BR AT    5050 /        /  14400. /  1615. /  510026. / 1.00 /  -69. /   45.
   704.89 /   1.24 /       ...1...  (-.001)    /   8.92 /   0.42 /          *BO*
----------------------------------------------------------------------------------
 NO ROAD OVERFLOW
                                                                             *RG*
----------------------------------------------------------------------------------
52+50 AT    5250 /    200 /  14400. /  2271. /  816697. / 1.05 /  -75. /   83.
   705.10 /   0.66 /   0.07 /   0.0  /  705.76 /   6.34 /   0.29 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = 0.09 / E = 0.0  / K* = 0.22 /  2317. /  841712. / 1.05 /  -75. /   84.
   705.40 /   0.63 /                 /  706.03 /   6.21 /   0.29 /          *AS*
```

DA

DB

DC

101-1

DD

DE

DF

```
                                                                                                                  D B
   704.64 /    0.58 /    0.09 /    0.0  /  705.22 /    5.99 /    0.28 / -0.000   *XS*
-------------------------------------------------------------------------------------------------------------
46+60 AT     4700 /    690 /  14400. /  2161. /  760353. / 1.03 / -120. /    67.      DC
   704.80 /    0.71 /    0.22 /    0.07 /  705.51 /    6.66 /    0.30 / -0.000   *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR     AT     4700 /        /  14400. /  2035. /  684196. / 1.00 /  -68. /    68.
   704.80 /    0.78 /        ...1...  (-.001)     /    7.08 /    0.32 /          *BO*
-------------------------------------------------------------------------------------------------------------
 NO ROAD OVERFLOW                                                                                            101
                                                                                                            *RG*
-------------------------------------------------------------------------------------------------------------
48+80 AT     4880 /    180 /  14400. /  2078. /  735597. / 1.00 /  -71. /    65.
   704.85 /    0.75 /    0.07 /    0.02 /  705.59 /    6.93 /    0.31 / -0.000   *AS*
-------------------------------------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /  2079. /  735922. / 1.00 /  -71. /    65.      DD
   704.85 /    0.75 /                 /  705.60 /    6.93 /    0.31 /          *AS*
========================== END BRIDGE ANALYSIS ==========================
50+50 AT     5050 /    170 /  14400. /  2009. /  710581. / 1.00 /  -68. /    59.      DE
   704.89 /    0.80 /    0.07 /    0.03 /  705.69 /    7.17 /    0.32 /  0.000   *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
RR BR AT     5050 /        /  14400. /  1615. /  510026. / 1.00 /  -69. /    45.
   704.89 /    1.24 /        ...1...  (-.001)     /    8.92 /    0.42 /          *BO*
-------------------------------------------------------------------------------------------------------------
 NO ROAD OVERFLOW
                                                                                                            *RG*
-------------------------------------------------------------------------------------------------------------
52+50 AT     5250 /    200 /  14400. /  2271. /  816697. / 1.05 /  -75. /    83.
   705.10 /    0.66 /    0.07 /    0.0  /  705.76 /    6.34 /    0.29 / -0.000   *AS*
-------------------------------------------------------------------------------------------------------------
   M = 0.09 / E = 0.0  / K* = 0.22 /  2317. /  841712. / 1.05 /  -75. /    84.      DF
   705.40 /    0.63 /                 /  706.03 /    6.21 /    0.29 /          *AS*
========================== END BRIDGE ANALYSIS ==========================
55+00 AT     5500 /    250 /  14400. /  2665. /  989903. / 1.00 /  -86. /    86.      DG
   705.65 /    0.45 /    0.06 /    0.0  /  706.10 /    5.40 /    0.24 /  0.009   *XS*
-------------------------------------------------------------------------------------------------------------
59+50 AT     5950 /    450 /  14400. /  2774. /  882656. / 1.18 / -300. /    85.      DH
   705.74 /    0.49 /    0.11 /    0.02 /  706.23 /    5.19 /    0.27 / -0.000   *XS*
-------------------------------------------------------------------------------------------------------------
```

END OF THIS PROFILE

```
USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT=   21,DATE= 8/ 8/77

==================================================================================
WATER-SURFACE PROFILE FOR: FLINT RIVER STEVENSON AVE TO HARRISON ST KNUTILLA
PAGE  1 OF  3
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
59+50 AT    5950 /      0 /  14400. /  2776. /  883160. / 1.18 / -300. /   85.
   705.74 /   0.49 /                 /  706.23 /    5.19 /  0.27/          *IS*
============================ BEGIN BRIDGE ANALYSIS ===============================
STEV  AT    5950 /        /  14400. /  2336. /  627405. / 1.00 /    7. /  184.
   705.74 /   0.59 /       ...1...  (-.001)    /    6.16 /  0.29 /          *BO*
----------------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                            *RG*
----------------------------------------------------------------------------------
61+00 AT    6100 /    150 /  14400. /  2389. /  838361. / 1.00 /  -85. /   85.
   705.75 /   0.57 /   0.04 /    0.05 /  706.31 /    6.03 /  0.28 / -0.011  *AS*
----------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /  2391. /  839629. / 1.00 /  -85. /   85.
   705.76 /   0.56 /                 /  706.33 /    6.02 /  0.28 /          *AS*
============================ END BRIDGE ANALYSIS =================================
65+00 AT    6500 /    400 /  14400. /  2340. /  835158. / 1.00 /  -70. /   85.
   705.87 /   0.59 /   0.12 /    0.01 /  706.46 /    6.15 /  0.28 / -0.000  *XS*
----------------------------------------------------------------------------------
71+00 AT    7100 /    600 /  14400. /  2324. /  827440. / 1.00 /  -69. /   86.
   706.05 /   0.60 /   0.18 /    0.00 /  706.64 /    6.20 /  0.28 /  0.000  *XS*
----------------------------------------------------------------------------------
74+50 AT    7450 /    350 /  14400. /  3142. / 1149045. / 1.00 / -134. /   77.
   706.39 /   0.33 /   0.08 /    0.0  /  706.72 /    4.58 /  0.21 /  0.000  *XS*
----------------------------------------------------------------------------------
76+70 AT    7670 /    220 /  11800. /  2069. /  713946. / 1.05 /  -89. /   76.
   706.34 /   0.53 /   0.05 /    0.10 /  706.87 /    5.70 /  0.27 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS =================================
GTWRR AT    7670 /        /  11800. /  1802. /  555138. / 1.00 /    0. /  137.
   706.34 /   0.67 /       ...1...  (-.001)    /    6.55 /  0.31 /          *BO*
```

DH

DI

DJ

DK

DL

DM

WATER-SURFACE PROFILE FOR: FLINT RIVER STEVENSON AVE TO HARRISON ST ANDTILLA


```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
59+50 AT    5950 /     0 /  14400. /  2776. /  883160. / 1.18 / -300. /   85.
   705.74 /   0.49 /                 /  706.23 /    5.19 /   0.27/          *IS*
============================ BEGIN BRIDGE ANALYSIS ===============================
STEV  AT    5950 /       /  14400. /  2336. /  627405. / 1.00 /    7. /  184.
   705.74 /   0.59 /       ...1...  (-.001)    /    6.16 /   0.29 /          *BO*
----------------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                            *RG*
----------------------------------------------------------------------------------
61+00 AT    6100 /   150 /  14400. /  2389. /  838361. / 1.00 /  -85. /   85.
   705.75 /   0.57 /   0.04 /    0.05 /  706.31 /    6.03 /   0.28 / -0.011  *AS*
----------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /  2391. /  839629. / 1.00 /  -85. /   85.
   705.76 /   0.56 /                 /  706.33 /    6.02 /   0.28 /          *AS*
============================ END BRIDGE ANALYSIS =================================
65+00 AT    6500 /   400 /  14400. /  2340. /  835158. / 1.00 /  -70. /   85.
   705.87 /   0.59 /   0.12 /    0.01 /  706.46 /    6.15 /   0.28 / -0.000  *XS*
----------------------------------------------------------------------------------
71+00 AT    7100 /   600 /  14400. /  2324. /  827440. / 1.00 /  -69. /   86.
   706.05 /   0.60 /   0.18 /    0.00 /  706.64 /    6.20 /   0.28 /  0.000  *XS*
----------------------------------------------------------------------------------
74+50 AT    7450 /   350 /  14400. /  3142. / 1149045. / 1.00 / -134. /   77.
   706.39 /   0.33 /   0.08 /    0.0  /  706.72 /    4.58 /   0.21 /  0.000  *XS*
----------------------------------------------------------------------------------
76+70 AT    7670 /   220 /  11800. /  2069. /  713946. / 1.05 /  -89. /   76.
   706.34 /   0.53 /   0.05 /    0.10 /  706.87 /    5.70 /   0.27 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS =================================
GTWRR AT    7670 /       /  11800. /  1802. /  555138. / 1.00 /    0. /  137.
   706.34 /   0.67 /       ...1...  (-.001)    /    6.55 /   0.31 /          *BO*
----------------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                            *RG*
----------------------------------------------------------------------------------
77+65 AT    7765 /    95 /  11800. /  2064. /  700459. / 1.00 /  -78. /   75.
   706.39 /   0.51 /   0.03 /    0.0  /  706.90 /    5.72 /   0.27 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /  2065. /  700764. / 1.00 /  -78. /   75.
   706.39 /   0.51 /                 /  706.90 /    5.72 /   0.27 /          *AS*
============================ END BRIDGE ANALYSIS =================================
80+00 AT    8000 /   235 /  11800. /  2025. /  688792. / 1.00 /  -75. /   75.
   706.45 /   0.53 /   0.07 /    0.01 /  706.98 /    5.83 /   0.28 /  0.000  *XS*
----------------------------------------------------------------------------------
```

```
---------------------------------------------------------------------------------
83+50 AT     8350 /    350 /  11800. /  1856. / 635198. / 1.00 /  -54. /    75.
   706.51 /    0.63 /    0.11 /    0.05 /  707.14 /    6.36 /    0.30 / -0.000  *X*
---------------------------------------------------------------------------------
```

DP

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 22,DATE= 8/ 8/77

```
=================================================================================
WATER-SURFACE PROFILE FOR: FLINT RIVER STEVENSON AVE TO HARRISON ST KNUTILLA
PAGE  2 OF  3
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HF  /     FG  /     V  /    FN  /   ACC   *ID*
=================================================================================
============================ BEGIN BRIDGE ANALYSIS ==============================
GR TR AT     8350 /        /  11800. /  2063. / 591062. / 1.00 /    0. /  130.
   706.51 /    0.51 /        ...1...  (-.001)    /    5.72 /    0.25 /          *BO*
---------------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                                *RG*
---------------------------------------------------------------------------------
85+50 AT     8550 /    200 /  11800. /  1428. / 470641. / 1.00 /  -43. /    39.
   706.52 /    1.06 /    0.09 /    0.36 /  707.58 /    8.26 /    0.35 / -0.011  *AS*
---------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /  1430. /  471222. / 1.00 /  -43. /    39.
   706.53 /    1.06 /                 /  707.59 /    8.25 /    0.35 /          *AS*
============================ END BRIDGE ANALYSIS ================================
87+00 AT     8700 /    150 /  11800. /  1657. / 566256. / 1.00 /  -57. /    44.
   706.88 /    0.79 /    0.08 /    0.0  /  707.67 /    7.12 /    0.30 / -0.000  *XS*
---------------------------------------------------------------------------------
90+00 AT     9000 /    300 /  11800. /  2336. / 813468. / 1.01 /  -92. /    62.
   707.38 /    0.40 /    0.09 /    0.0  /  707.78 /    5.05 /    0.22 /  0.017  *XS*
---------------------------------------------------------------------------------
95+00 AT     9500 /    500 /  11800. /  2509. / 861655. / 1.08 / -127. /    64.
   707.51 /    0.37 /    0.10 /    0.0  /  707.88 /    4.70 /    0.21 / -0.000  *XS*
---------------------------------------------------------------------------------
96+50 AT     9650 /    150 /  11800. /  2233. / 803468. / 1.00 /  -60. /    64.
```

10170

DQ

DR

DS

DT

DU

```
 708.51 /   0.51 /          ...1...  (-.001)     /   5.72 /   0.25 /          *BO*
-------------------------------------------------------------------------------
 NO ROAD-GRADE DATA                                                           *RG*
-------------------------------------------------------------------------------
85+50 AT     8550 /   200 /  11800. /  1428. /  470641. / 1.00 /  -43. /   39.
   706.52 /   1.06 /   0.09 /   0.36 /  707.58 /   8.26 /   0.35 / -0.011  *AS*
-------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /  1430. /  471222. / 1.00 /  -43. /   39.
   706.53 /   1.06 /                 /  707.59 /   8.25 /   0.35 /          *AS*
============================ END BRIDGE ANALYSIS ============================
87+00 AT     8700 /   150 /  11800. /  1657. /  566256. / 1.00 /  -57. /   44.
   706.88 /   0.79 /   0.08 /   0.0  /  707.67 /   7.12 /   0.30 / -0.000  *XS*
-------------------------------------------------------------------------------
90+00 AT     9000 /   300 /  11800. /  2336. /  813468. / 1.01 /  -92. /   62.
   707.38 /   0.40 /   0.09 /   0.0  /  707.78 /   5.05 /   0.22 /  0.017  *XS*
-------------------------------------------------------------------------------
95+00 AT     9500 /   500 /  11800. /  2509. /  861655. / 1.08 / -127. /   64.
   707.51 /   0.37 /   0.10 /   0.0  /  707.88 /   4.70 /   0.21 / -0.000  *XS*
-------------------------------------------------------------------------------
96+50 AT     9650 /   150 /  11800. /  2233. /  803468. / 1.00 /  -60. /   64.
   707.51 /   0.43 /   0.03 /   0.03 /  707.94 /   5.28 /   0.22 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==========================
GARLA AT     9650 /        /  11800. /  1910. /  430282. / 1.00 /    0. /  120.
   707.51 /   0.59 /        ...1...  (-.001)     /   6.18 /   0.27 /          *BO*
-------------------------------------------------------------------------------
 NO ROAD-GRADE DATA                                                           *RG*
-------------------------------------------------------------------------------
99+00 AT     9900 /   250 /  11800. /  2786. /  910724. / 1.30 / -191. /  107.
   707.63 /   0.36 /   0.05 /   0.0  /  707.99 /   4.24 /   0.20 / -0.000  *AS*
-------------------------------------------------------------------------------
   M = 0.04 / E = 0.33 / K* = 0.10 /  2804. /  916583. / 1.30 / -193. /  107.
   707.69 /   0.36 /                 /  708.05 /   4.21 /   0.20 /          *AS*
============================ END BRIDGE ANALYSIS ============================
10550 AT    10550 /   650 /  11800. /  2762. /  946107. / 1.16 / -155. /   70.
   707.82 /   0.33 /   0.10 /   0.0  /  708.15 /   4.27 /   0.19 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==========================
NORTH AT    10550 /        /  11800. /  2250. /  662784. / 1.00 /  -66. /   72.
   707.82 /   0.43 /        ...1...  (-.001)     /   5.24 /   0.22 /          *BO*
-------------------------------------------------------------------------------
 NO ROAD-GRADE DATA                                                           *RG*
-------------------------------------------------------------------------------
```

```
USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT=   23,DATE= 8/ 8/77

==================================================================================
WATER-SURFACE PROFILE FOR: FLINT RIVER STEVENSON AVE TO HARRISON ST KNUTILLA
PAGE  3 OF  3
==================================================================================
SECTD AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
10700 AT   10700 /   150 /  11800. /  3096. / 1004209. / 1.32 / -147. /  175.
   707.87 /   0.30 /   0.02 /   0.0  /  708.17 /   3.81 /   0.19 /  0.000   *AS*
----------------------------------------------------------------------------------
   M = 0.05 / E = 0.77 / K* = 0.08 /  3107. / 1007994. / 1.32 / -147. /  176.
   707.91 /   0.30 /                /  708.21 /   3.80 /   0.19 /          *AS*
============================ END BRIDGE ANALYSIS ==================================
10950 AT   10950 /   250 /  11800. /  3518. / 1220037. / 1.00 / -130. /  106.
   708.06 /   0.17 /   0.03 /   0.0  /  708.23 /   3.35 /   0.15 / -0.000  *XS*
----------------------------------------------------------------------------------

                          END OF THIS PROFILE
```

DX

DY

```
==============================================================================
SECTD AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /  ACC   *ID*
==============================================================================
    1 AT      80 /     0 /  11800. /  1903. /  369847. / 1.00 /    0. /  203.
  709.30 /   0.60 /                 /  709.90 /    6.20 /   0.36/          *IS*
------------------------------------------------------------------------------
    2 AT     350 /   270 /  11800. /  2068. /  427492. / 1.00 /   86. /  294.
  709.63 /   0.51 /   0.24 /    0.0 /  710.14 /    5.71 /   0.32 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
STEV. AT     350 /        /  11800. /  2127. /  440911. / 1.00 /    0. /  283.
  709.63 /   0.48 /       ...1...  (-.001)    /    5.55 /   0.33 /          *BO*
------------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                           *RG*
------------------------------------------------------------------------------
    3 AT     730 /   380 /  11800. /  2168. /  464578. / 1.00 /  180. /  380.
  709.94 /   0.46 /   0.27 /    0.0 /  710.40 /    5.44 /   0.29 / -0.000  *AS*
------------------------------------------------------------------------------
  M = 0.0  / E = 1.00 / K* = 0.01 /  2168. /  464740. / 1.00 /  180. /  380.
  709.94 /   0.46 /                 /  710.40 /    5.44 /   0.29 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
    4 AT    1720 /   990 /  11800. /  1751. /  351395. / 1.00 /  179. /  359.
  710.67 /   0.71 /   0.84 /   0.12 /  711.37 /    6.74 /   0.38 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
RTLBR AT    1720 /        /  11800. /  1470. /  284629. / 1.00 /    7. /  216.
  710.67 /   1.00 /       ...1...  (-.001)    /    8.03 /   0.50 /          *BO*
------------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                           *RG*
------------------------------------------------------------------------------
    5 AT    2050 /   330 /  11800. /  1920. /  396390. / 1.03 /  235. /  445.
  711.09 /   0.61 /   0.33 /    0.0 /  711.70 /    6.14 /   0.34 / -0.000  *AS*
------------------------------------------------------------------------------
  M = 0.01 / E = 0.32 / K* = 0.01 /  1922. /  396836. / 1.03 /  235. /  446.
  711.10 /   0.61 /                 /  711.71 /    6.14 /   0.34 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
    6 AT    3170 /  1120 /  11800. /  2599. /  600186. / 1.07 /    0. /  316.
  712.02 /   0.34 /   0.65 /    0.0 /  712.36 /    4.54 /   0.24 /  0.000  *XS*
------------------------------------------------------------------------------
    7 AT    4030 /   860 /  11800. /  2474. /  526329. / 1.08 /  334. /  699.
  712.38 /   0.38 /   0.38 /   0.02 /  712.76 /    4.77 /   0.26 / -0.000  *XS*
------------------------------------------------------------------------------
    8 AT    5120 /  1090 /  11800. /  2794. /  611874. / 1.14 /  544. /  961.
  712.92 /   0.32 /   0.47 /    0.0 /  713.23 /    4.22 /   0.25 / -0.000  *XS*
------------------------------------------------------------------------------
    9 AT    5580 /   460 /  11500. /  3329. /  677105. / 1.22 /   65. /  625
```

```
-----------------------------------------------------------------------------
SECTD AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HE  /    HF  /     FG  /     V  /    FN  /   ACC   *TO*
=============================================================================
   10 AT    6240 /   660 /  11500. /  2236. /  529423. / 1.06 /  543. /  758.
  713.31 /   0.44 /   0.24 /   0.10 /  713.74 /   5.14 /   0.25 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
HAMTL AT    6240 /        /  11500. /  1679. /  328321. / 1.00 /    2. /  164.
  713.31 /   0.73 /        ...1...  (-.001)    /   6.85 /   0.37 /          *BO*
-----------------------------------------------------------------------------
 NO ROAD OVERFLOW
                                                                            *RG*
-----------------------------------------------------------------------------
   11 AT    6470 /   230 /  11500. /  2017. /  501619. / 1.06 /  502. /  683.
  713.37 /   0.53 /   0.11 /   0.05 /  713.91 /   5.70 /   0.30 / -0.000  *AS*
-----------------------------------------------------------------------------
   M = 0.02 / E = 0.11 / K* = 0.03 /  2022. /  503444. / 1.06 /  502. /  683.
  713.40 /   0.53 /                  /  713.93 /   5.69 /   0.29 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
   12 AT    7150 /   680 /  11500. /  2740. /  657813. / 1.06 /    3. /  279.
  713.90 /   0.29 /   0.27 /   0.0  /  714.19 /   4.20 /   0.21 / -0.012  *XS*
-----------------------------------------------------------------------------
   13 AT    8040 /   890 /  11500. /  2391. /  542481. / 1.20 /  197. /  710.
  714.15 /   0.43 /   0.33 /   0.07 /  714.58 /   4.81 /   0.25 / -0.010  *XS*
-----------------------------------------------------------------------------
   14 AT    8700 /   660 /  11500. /  2522. /  600302. / 1.10 /   85. /  377.
  714.49 /   0.36 /   0.27 /   0.0  /  714.85 /   4.56 /   0.23 / -0.000  *XS*
-----------------------------------------------------------------------------
   15 AT    9540 /   840 /  11500. /  2564. /  532827. / 1.31 /   10. /  444.
  714.81 /   0.41 /   0.35 /   0.03 /  715.22 /   4.49 /   0.26 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
OAKOT AT    9540 /        /   9321. /  2249. /  560991. / 1.00 /    4. /  165.
  714.81 /   0.27 /        ...1...  (-.001)    /   4.14 /   0.20 /          *BO*
-----------------------------------------------------------------------------
 ROAD OVERFLOW (CFS) / LEFT        0. / RIGHT     1657. /
                                                                            *RG*
-----------------------------------------------------------------------------
   16 AT    9780 /   240 /  11500. /  2578. /  566797. / 1.23 /   20. /  365.
  714.95 /   0.38 /   0.11 /   0.0  /  715.33 /   4.46 /   0.24 / -0.000  *AS*
-----------------------------------------------------------------------------
   M = 0.0  / E = 0.0  / K* = 0.01 /  2579. /  566939. / 1.23 /   20. /  365.
  714.95 /   0.38 /                  /  715.33 /   4.46 /   0.24 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
   17 AT   10120 /   340 /  11500. /  2635. /  620792. / 1.13 /   18. /  278.
  715.12 /   0.33 /   0.13 /   0.0  /  715.46 /   4.36 /   0.22 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
LEITH AT   10120 /        /  11500. /  2155. /  469642. / 1.00 /    3. /  250.
  715.12 /   0.44 /        ...1...  (-.001)    /   5.34 /   0.32 /          *BO*
```

EI

EJ

EK

EL

EM

EN

EO

EP

```
==================================================================================
SECTO AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     FG  /     V  /    FN  /   ACC   *ID*
==================================================================================
 NO ROAD-GRADE DATA
                                                                              *RG*
----------------------------------------------------------------------------------
   21 AT   10320 /   200 /  11500. /  2558. /  604387. / 1.10 /   30. /  296.
   715.19 /   0.35 /   0.07 /   0.01 /  715.53 /   4.50 /   0.23 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = 0.01 / E = 0.69 / K* = 0.01 /  2558. /  604523. / 1.10 /   30. /  296.
   715.19 /   0.35 /                  /  715.53 /   4.50 /   0.23 /          *AS*
============================ END BRIDGE ANALYSIS ==================================
   22 AT   11160 /   840 /  11500. /  2510. /  632602. / 1.05 /   20. /  227.
   715.48 /   0.34 /   0.29 /   0.0  /  715.83 /   4.58 /   0.22 / -0.000  *XS*
----------------------------------------------------------------------------------
   23 AT   11770 /   610 /  11500. /  3005. /  756512. / 1.05 /    6. /  262.
   715.75 /   0.24 /   0.17 /   0.0  /  715.99 /   3.83 /   0.19 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ================================
GATE  AT   11770 /       /   9770. /  1978. /  258254. / 1.00 /    0. /  175.
   713.10 /   0.38 /       ...3...  (-.001)    /   4.94 /   0.26 /          *BO*
----------------------------------------------------------------------------------
 ROAD OVERFLOW (CFS) / LEFT       0. / RIGHT    1675. /
                                                                              *RG*
----------------------------------------------------------------------------------
   24 AT   12030 /   260 /  11500. /  3378. /  749917. / 1.22 /   33. /  469.
   715.83 /   0.22 /   0.06 /   0.0  /  716.05 /   3.40 /   0.19 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  3514. /  783545. / 1.24 /   32. /  488.
   716.14 /   0.21 /                  /  716.35 /   3.27 /   0.18 /          *AS*
============================ END BRIDGE ANALYSIS ==================================
   25 AT   12870 /   840 /  11500. /  3452. /  789547. / 1.24 /   43. /  511.
   716.32 /   0.21 /   0.18 /   0.00 /  716.53 /   3.33 /   0.18 /  0.000  *XS*
----------------------------------------------------------------------------------
   26 AT   13540 /   670 /  11500. /  2721. /  627134. / 1.17 /   98. /  504.
   716.44 /   0.32 /   0.18 /   0.05 /  716.76 /   4.23 /   0.22 /  0.000  *XS*
----------------------------------------------------------------------------------
BL 27 AT   14250 /   710 /  11500. /  3038. /  717297. / 1.08 /  278. /  635.
   716.73 /   0.24 /   0.21 /   0.0  /  716.97 /   3.78 /   0.19 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ================================
DORT  AT   14250 /       /  11500. /  2035. /  333904. / 1.00 /    0. /  183.
   716.73 /   0.50 /       ...1...  (-.001)    /   5.65 /   0.30 /          *BO*
----------------------------------------------------------------------------------
 NO ROAD-GRADE DATA
          716.8                                                               *RG*
----------------------------------------------------------------------------------
   28 AT   14500 /   250 /  11500  /  2325. /  522569  / 1.10 /  229. /  508.
```

FQ
FR
FS
100-1'
ET
EU
EV
EW

```
==================================================================================
SECTD AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HF  /     FG  /     V  /    FN  /   ACC    *ID*
==================================================================================
  M = 0.01 / E = 0.29 / K* = 0.02 /  2331. /  524080. / 1.10 /  229. /  510.
  716.76 /   0.42 /                 /  717.18 /    4.93 /   0.26 /          *AS*
============================ END BRIDGE ANALYSIS ==================================
  29 AT   15150 /   650 /  10000. /  2387. /  561691. / 1.02 /  476. /  686.
  717.16 /   0.28 /   0.26 /   0.0  /  717.44 /    4.19 /   0.21 / -0.000  *XS*
----------------------------------------------------------------------------------
  30 AT   15820 /   670 /  10000. /  2534. /  650780. / 1.02 /  101. /  290.
  717.37 /   0.25 /   0.18 /   0.0  /  717.62 /    3.95 /   0.18 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ================================
CRORR AT   15820 /       /  10000. /  1999. /  446122. / 1.00 /   46. /  228.
  717.37 /   0.39 /        ...1...  (-.001)   /    5.00 /   0.26 /          *BO*
----------------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                            *RG*
----------------------------------------------------------------------------------
  31 AT   16050 /   230 /  10000. /  2647. /  614682. / 1.00 /  132. /  362.
  717.45 /   0.22 /   0.06 /   0.0  /  717.68 /    3.78 /   0.19 / -0.000  *AS*
----------------------------------------------------------------------------------
  M = 0.00 / E = 0.0  / K* = 0.01 /  2648. /  614835. / 1.00 /  132. /  362.
  717.46 /   0.22 /                 /  717.68 /    3.78 /   0.19 /          *AS*
============================ END BRIDGE ANALYSIS ==================================
  32 AT   16700 /   650 /  10000. /  3856. /  746248. / 1.52 /  302. /  844.
  717.66 /   0.16 /   0.14 /   0.0  /  717.82 /    2.59 /   0.16 / -0.000  *XS*
----------------------------------------------------------------------------------
  33 AT   17600 /   900 /  10000. /  6108. /  982292. / 1.83 /  262. / 1114.
  717.87 /   0.08 /   0.12 /   0.0  /  717.94 /    1.64 /   0.12 / -0.000  *XS*
----------------------------------------------------------------------------------
  34 AT   18680 /  1080 /  10000. /  6898. / 1155467. / 2.07 /  203. / 1164.
  717.97 /   0.07 /   0.10 /   0.0  /  718.04 /    1.45 /   0.11 / -0.001  *XS*
----------------------------------------------------------------------------------
  35 AT   19770 /  1090 /  10000. /  4188. /  717580. / 2.06 /  169. / 1123.
  718.04 /   0.18 /   0.13 /   0.06 /  718.23 /    2.39 /   0.17 /  0.000  *XS*
----------------------------------------------------------------------------------
  36 AT   20740 /   970 /  10000. /  6048. /  755924. / 2.88 /  171. / 1355.
  718.29 /   0.12 /   0.18 /   0.0  /  718.42 /    1.65 /   0.16 /  0.010  *XS*
----------------------------------------------------------------------------------
  37 AT   21950 /  1210 /  10000. /  3284. /  664139. / 1.64 /  124. / 1118.
  718.48 /   0.24 /   0.24 /   0.06 /  718.71 /    3.05 /   0.18 / -0.000  *XS*
----------------------------------------------------------------------------------
  38 AT   22340 /   390 /  10000. /  4134. / 1038407. / 1.20 /  243. /  573.
  718.66 /   0.11 /   0.06 /   0.0  /  718.77 /    2.42 /   0.12 / -0.000  *XS*
----------------------------------------------------------------------------------
  39 AT   23000 /   660 /  10000. /  3105. /  692258. / 1.38 /   70. /  397.
```

WATER-SURFACE PROFILE FOR: FLINT RIVER DAM TO CARPENTER RD KNUTILLA

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HF	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
40 AT 23830	830	10000.	6395.	1126507.	2.21	41.	783.		
718.95	0.08	0.11	0.0	719.03	1.56	0.11	0.005	*XS*	FJ
41 AT 24880	1050	10000.	9941.	1338542.	2.17	41.	1441.		
719.06	0.04	0.07	0.0	719.10	1.01	0.09	-0.000	*XS*	FK
42 AT 25740	860	10000.	8637.	1228609.	2.10	290.	1436.		
719.11	0.04	0.05	0.00	719.15	1.16	0.10	-0.000	*XS*	FL
43 AT 26460	720	10000.	7106.	1051804.	2.22	221.	1193.		
719.15	0.07	0.06	0.01	719.22	1.41	0.12	-0.000	*XS*	FM

END OF THIS PROFILE

IN-1

```
CD    AT   81450 /   905 /  14400. /  2723. /  708501. / 1.18 /   240. /   440.
   699.51 /   0.51 /   0.38 /    0.0 /  700.03 /    5.29 /   0.26 / -0.000   *XS*
-----------------------------------------------------------------------------
CE    AT   82450 /  1020 /  14400. /  2920. /  714296. / 1.23 /    40. /   290.
   699.98 /   0.47 /   0.42 /    0.0 /  700.45 /    4.93 /   0.24 /  0.000   *XS*
-----------------------------------------------------------------------------
CF    AT   83300 /   850 /  14400. /  3115. /  765357. / 1.31 /    20. /   270.
   700.33 /   0.44 /   0.32 /    0.0 /  700.77 /    4.62 /   0.24 / -0.000   *XS*
-----------------------------------------------------------------------------
CG    AT   84180 /   880 /  14400. /  3015. /  786457. / 1.24 /    25. /   275.
   700.63 /   0.44 /   0.30 /   0.00 /  701.07 /    4.78 /   0.23 /  0.001   *XS*
-----------------------------------------------------------------------------
CH    AT   85090 /   910 /  14400. /  2755. /  656008. / 1.33 /   253. /   500.
   700.94 /   0.56 /   0.37 /   0.06 /  701.50 /    5.23 /   0.27 / -0.000   *XS*
-----------------------------------------------------------------------------
CI    AT   86080 /   990 /  14400. /  3204. /  770718. / 1.24 /   650. /   900.
   701.52 /   0.39 /   0.41 /    0.0 /  701.91 /    4.49 /   0.22 / -0.000   *XS*
-----------------------------------------------------------------------------
CJ    AT   86660 /   580 /  14400. /  3149. /  772505. / 1.28 /    35. /   285.
   701.71 /   0.42 /   0.20 /   0.01 /  702.12 /    4.57 /   0.23 / -0.000   *XS*
-----------------------------------------------------------------------------
CK    AT   87820 /  1160 /  14400. /  3328. /  881019. / 1.22 /    40. /   290.
   702.12 /   0.35 /   0.35 /    0.0 /  702.48 /    4.33 /   0.21 / -0.000   *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR CK AT   87820 /       /  14400. /  2704. /  751426. / 1.00 /     1. /   193.
   702.12 /   0.44 /       ...1...  (-.001)   /    5.33 /   0.23 /          *BO*
-----------------------------------------------------------------------------
 NO ROAD OVERFLOW
                                                                           *RG*
-----------------------------------------------------------------------------
CL    AT   88140 /   320 /  14400. /  4289. /  854800. / 1.60 /   136. /   604.
   702.28 /   0.28 /   0.09 /    0.0 /  702.57 /    3.36 /   0.21 /  0.000   *AS*
-----------------------------------------------------------------------------
   M = 0.33 / E = 0.10 / K* = 0.67 /  4436. /  892511. / 1.60 /   134. /   605.
   702.60 /   0.26 /                  /  702.86 /    3.25 /   0.20 /          *AS*
========================== END BRIDGE ANALYSIS ============================
CL    AT   88150 /    10 /  14400. /  4119. /  868147. / 1.50 /   200. /   600.
   702.60 /   0.28 /   0.00 /   0.01 /  702.88 /    3.50 /   0.20 /  0.008   *XS*
-----------------------------------------------------------------------------
CM    AT   88800 /   650 /  14400. /  4104. /  963741. / 1.66 /   200. /   600.
   702.74 /   0.32 /   0.16 /   0.02 /  703.06 /    3.51 /   0.20 / -0.000   *XS*
-----------------------------------------------------------------------------
```

FW

Floodway

```
==================================================================================
WATER-SURFACE PROFILE FOR: FLINT RIVER SEC CC TO 3RD AVE              KNUTILLA
PAGE  2 OF  2
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
 WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
CN    AT   89350 /   550 / 14400. / 4921. / 1074271. / 1.68 /  160. /  760.
   702.95 /  0.22 /  0.11 /  0.0  / 703.17 /   2.93 /  0.18 / -0.000  *XS*
----------------------------------------------------------------------------------
CO    AT   90320 /   970 / 14400. / 5717. / 1288259. / 1.42 /  110. /  710.
   703.18 /  0.14 /  0.15 /  0.0  / 703.32 /   2.52 /  0.15 / -0.000  *XS*
----------------------------------------------------------------------------------
CP    AT   91330 /  1010 / 14400. / 5056. / 1208862. / 1.44 /  230. /  830.
   703.29 /  0.18 /  0.13 /  0.02 / 703.47 /   2.85 /  0.16 / -0.000  *XS*
----------------------------------------------------------------------------------
CQ    AT   92340 /  1010 / 14400. / 4387. /  932380. / 1.61 /  185. /  780.
   703.43 /  0.27 /  0.19 /  0.04 / 703.70 /   3.28 /  0.21 / -0.000  *XS*
----------------------------------------------------------------------------------
CR    AT   93300 /   960 / 14400. / 4106. / 1052578. / 1.27 /  450. /  850.
   703.68 /  0.24 /  0.20 /  0.0  / 703.92 /   3.51 /  0.19 /  0.019  *XS*
============================ BEGIN BRIDGE ANALYSIS ================================
CR BR AT   93300 /       / 14400. / 2612. /  913121. / 1.00 /    0. /  203.
   703.68 /  0.47 /       ...1...  (-.001)  /   5.51 /  0.27 /         *BO*
----------------------------------------------------------------------------------
 NO ROAD OVERFLOW
                                                                          *RG*
----------------------------------------------------------------------------------
 2+00 AT   93500 /   200 / 14400. / 3052. / 1493638. / 1.00 / -103. /  100.
   703.69 /  0.35 /  0.03 /  0.10 / 704.04 /   4.72 /  0.21 / -0.011  *AS*
----------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /  3055. / 1495657. / 1.00 / -103. /  100.
   703.70 /  0.35 /                / 704.05 /   4.71 /  0.21 /         *AS*
============================ END BRIDGE ANALYSIS ==================================

                          END OF THIS PROFILE
```

```
-----------------------------------------------------------------------------------------------------
 7+00 AT     700 /   500 /  14400. /  2453. /  865227. / 1.00 /  -81. /   91.
.10 703.69 /   0.54 /   0.11 /   0.09 /  704.23 /   5.87 /   0.27 / -0.013  *XS*
-----------------------------------------------------------------------------------------------------
10+00 AT    1000 /   300 /  14400. /  2454. /  864887. / 1.00 /  -86. /   86.
.10 703.78 /   0.54 /   0.08 /   0.0  /  704.31 /   5.87 /   0.27 /  0.002  *XS*
-----------------------------------------------------------------------------------------------------
15+00 AT    1500 /   500 /  14400. /  2441. /  859046. / 1.00 /  -87. /   86.
.09 703.91 /   0.54 /   0.14 /   0.00 /  704.45 /   5.90 /   0.28 /  0.001  *XS*
-----------------------------------------------------------------------------------------------------
20+00 AT    2000 /   500 /  14400. /  2438. /  855844. / 1.00 /  -87. /   86.
.09 704.06 /   0.54 /   0.14 /   0.00 /  704.60 /   5.91 /   0.28 /  0.002  *XS*
-----------------------------------------------------------------------------------------------------
25+00 AT    2515 /   515 /  14400. /  2393. /  837704. / 1.00 /  -84. /   85.
.09 704.19 /   0.56 /   0.15 /   0.01 /  704.76 /   6.02 /   0.28 / -0.000  *XS*
-----------------------------------------------------------------------------------------------------
29+00 AT    2900 /   385 /  14400. /  2394. /  835251. / 1.00 /  -86. /   85.
.09 704.31 /   0.56 /   0.11 /   0.0  /  704.87 /   6.02 /   0.28 /  0.002  *XS*
-----------------------------------------------------------------------------------------------------
30+00 AT    3000 /   100 /  14400. /  2232. /  795929. / 1.00 /  -65. /   78.
.09 704.31 /   0.65 /   0.03 /   0.04 /  704.96 /   6.45 /   0.29 /  0.011  *XS*
-----------------------------------------------------------------------------------------------------
35+00 AT    3500 /   500 /  14400. /  2368. /  853478. / 1.00 /  -73. /   78.
.07 704.54 /   0.57 /   0.15 /   0.0  /  705.11 /   6.08 /   0.27 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
CHEV  AT    3500 /       /  14400. /  2004. /  593474. / 1.00 /  -68. /   65.
   704.54 /   0.80 /       ....1...  (-.001)  /   7.19 /   0.33 /          *BO*
-----------------------------------------------------------------------------------------------------
 NO ROAD OVERFLOW                                                                                *RG*
-----------------------------------------------------------------------------------------------------
37000 AT    3700 /   200 /  14400. /  2312. /  834421. / 1.00 /  -80. /   69.
   704.58 /   0.60 /   0.06 /   0.01 /  705.18 /   6.23 /   0.28 / -0.000  *AS*
-----------------------------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /  2313. /  834825. / 1.00 /  -80. /   69.
.07 704.59 /   0.60 /                /  705.19 /   6.23 /   0.28 /          *AS*
============================ END BRIDGE ANALYSIS ==============================

                          END OF THIS PROFILE
```

```
==================================================================================
SECTD AT  DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /  ACC   *ID*
==================================================================================
37+00 AT    3700 /     0 /  14400. /  2313. /  835170. / 1.00 /  -80. /   69.
   704.59 /   0.60 /                 / 705.19 /    6.22 /   0.28/          *IS*
----------------------------------------------------------------------------------
40+10 AT    4010 /   310 /  14400. /  2342. /  842285. / 1.00 /  -80. /   72.
   704.70 /   0.59 /   0.09 /   0.0  / 705.28 /    6.15 /   0.28 / -0.000  *XS*
----------------------------------------------------------------------------------
46+60 AT    4700 /   690 /  14400. /  2129. /  762794. / 1.00 /  -68. /   67.
   704.86 /   0.71 /   0.22 /   0.06 / 705.57 /    6.76 /   0.30 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR    AT    4700 /        /  14400. /  2043. /  688011. / 1.00 /  -68. /   68.
   704.86 /   0.77 /        ...1...  (-.001)    /    7.05 /   0.32 /          *BO*
----------------------------------------------------------------------------------
 NO ROAD OVERFLOW
                                                                            *RG*
----------------------------------------------------------------------------------
48+80 AT    4880 /   180 /  14400. /  2087. /  740216. / 1.00 /  -71. /   65.
   704.91 /   0.74 /   0.07 /   0.01 / 705.65 /    6.90 /   0.31 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /  2087. /  740522. / 1.00 /  -71. /   65.
   704.91 /   0.74 /                 / 705.65 /    6.90 /   0.31 /          *AS*
============================ END BRIDGE ANALYSIS ================================
50+50 AT    5050 /   170 /  14400. /  2016. /  714781. / 1.00 /  -68. /   59.
   704.95 /   0.79 /   0.07 /   0.03 / 705.75 /    7.14 /   0.32 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR BR AT    5050 /        /  14400. /  1622. /  513023. / 1.00 /  -69. /   45.
   704.95 /   1.23 /        ...1...  (-.001)    /    8.88 /   0.41 /          *BO*
----------------------------------------------------------------------------------
 NO ROAD OVERFLOW
                                                                            *RG*
----------------------------------------------------------------------------------
52+50 AT    5250 /   200 /  14400. /  2280. /  821750. / 1.05 /  -75. /   83.
   705.16 /   0.65 /   0.07 /   0.0  / 705.82 /    6.32 /   0.29 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = 0.09 / E = 0.0  / K* = 0.22 /  2326. /  846680. / 1.05 /  -75. /   84.
   705.46 /   0.63 /                 / 706.08 /    6.19 /   0.28 /          *AS*
============================ END BRIDGE ANALYSIS ================================
55+00 AT    5500 /   250 /  14400. /  2675. /  995188. / 1.00 /  -86. /   86.
   705.71 /   0.45 /   0.06 /   0.0  / 706.16 /    5.38 /   0.24 /  0.012  *XS*
----------------------------------------------------------------------------------
59+50 AT    5950 /   450 /  14400. /  2439. /  856700. / 1.00 /  -87. /   86.
   705.77 /   0.54 /   0.11 /   0.05 / 706.31 /    5.90 /   0.28 /  0.000  *XS*
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   34,DATE= 8/20/77

==================================================================================
WATER-SURFACE PROFILE FOR: FLINT RIVER STEVENSON AVE TO HARRISON ST KNUTILLA
PAGE  1 OF  3
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECTN AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HF  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
59+50 AT    5950 /     0 /  14400. /  2439. /  856637. / 1.00 /  -87. /   86.
   705.77 /   0.54 /                 /  706.31 /    5.90 /   0.28/          *IS*
============================ BEGIN BRIDGE ANALYSIS ===============================
STEV  AT    5950 /       /  14400. /  2341. /  629125. / 1.00 /    7. /  184.
   705.77 /   0.59 /       ...1...  (-.001)    /    6.15 /   0.29 /          *BO*
----------------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                             *RG*
----------------------------------------------------------------------------------
61+00 AT    6100 /   150 /  14400. /  2398. /  842941. / 1.00 /  -85. /   85.
   705.80 /   0.56 /   0.04 /   0.01 /  706.36 /    6.00 /   0.28 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /  2399. /  843254. / 1.00 /  -85. /   85.
   705.81 /   0.56 /                 /  706.37 /    6.00 /   0.28 /          *AS*
============================ END BRIDGE ANALYSIS =================================
65+00 AT    6500 /   400 /  14400. /  2346. /  838545. / 1.00 /  -70. /   85.
   705.91 /   0.59 /   0.12 /   0.01 /  706.50 /    6.14 /   0.28 /  0.000  *XS*
----------------------------------------------------------------------------------
71+00 AT    7100 /   600 /  14400. /  2330. /  830693. / 1.00 /  -69. /   86.
   706.09 /   0.59 /   0.18 /   0.00 /  706.68 /    6.18 /   0.28 / -0.000  *XS*
----------------------------------------------------------------------------------
74+50 AT    7450 /   350 /  14400. /  3150. / 1153342. / 1.00 / -134. /   77.
   706.43 /   0.33 /   0.08 /   0.0  /  706.76 /    4.57 /   0.21 / -0.000  *XS*
----------------------------------------------------------------------------------
76+70 AT    7670 /   220 /  11800. /  2006. /  694881. / 1.00 /  -64. /   76.
   706.37 /   0.54 /   0.05 /   0.11 /  706.91 /    5.88 /   0.27 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS =================================
GTWRR AT    7670 /       /  11800. /  1806. /  557027. / 1.00 /    0. /  137.
   706.37 /   0.66 /       ...1...  (-.001)    /    6.53 /   0.31 /          *BO*
----------------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                             *RG*
                                                  ---------------------------------
```

DH

DI

DJ

DK

FW

DL

DM

```
============================ BEGIN BRIDGE ANALYSIS ============================
STEV AT    5950 /        / 14400. / 2341. / 629125. / 1.00 /    [illegible]  [illegible]
   705.77 /   0.59 /        ...1...  (-.001)        6.15 /   0.29 /          *BO*
-----------------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                                *RG*
-----------------------------------------------------------------------------------
61+00 AT    6100 /   150 / 14400. / 2398. / 842941. / 1.00 /  -85. /   85.
   705.80 /   0.56 /   0.04 /   0.01 / 706.36 /   6.00 /   0.28 / -0.000  *AS*
-----------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 / 2399. / 843254. / 1.00 /  -85. /   85.
   705.81 /   0.56 /                / 706.37 /   6.00 /   0.28 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
65+00 AT    6500 /   400 / 14400. / 2346. / 838545. / 1.00 /  -70. /   85.
   705.91 /   0.59 /   0.12 /   0.01 / 706.50 /   6.14 /   0.28 /  0.000  *XS*
-----------------------------------------------------------------------------------
71+00 AT    7100 /   600 / 14400. / 2330. / 830693. / 1.00 /  -69. /   86.
   706.09 /   0.59 /   0.18 /   0.00 / 706.68 /   6.18 /   0.28 / -0.000  *XS*
-----------------------------------------------------------------------------------
74+50 AT    7450 /   350 / 14400. / 3150. / 1153342. / 1.00 / -134. /   77.
   706.43 /   0.33 /   0.08 /   0.0  / 706.76 /   4.57 /   0.21 / -0.000  *XS*
-----------------------------------------------------------------------------------
76+70 AT    7670 /   220 / 11800. / 2006. / 694881. / 1.00 /  -64. /   76.
   706.37 /   0.54 /   0.05 /   0.11 / 706.91 /   5.88 /   0.27 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
GTWBR AT    7670 /        / 11800. / 1806. / 557027. / 1.00 /    0. /  137.
   706.37 /   0.66 /        ...1...  (-.001)        6.53 /   0.31 /          *BO*
-----------------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                                *RG*
-----------------------------------------------------------------------------------
77+65 AT    7765 /    95 / 11800. / 2071. / 703870. / 1.00 /  -79. /   75.
   706.43 /   0.50 /   0.03 /   0.0  / 706.94 /   5.70 /   0.27 / -0.000  *AS*
-----------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 / 2072. / 704139. / 1.00 /  -79. /   75.
   706.44 /   0.50 /                / 706.94 /   5.70 /   0.27 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
80+00 AT    8000 /   235 / 11800. / 2032. / 692043. / 1.00 /  -75. /   75.
   706.49 /   0.52 /   0.07 /   0.01 / 707.02 /   5.81 /   0.28 /  0.000  *XS*
-----------------------------------------------------------------------------------
83+50 AT    8350 /   350 / 11800. / 1861. / 638038. / 1.00 /  -54. /   75.
   706.55 /   0.62 /   0.11 /   0.05 / 707.18 /   6.34 /   0.29 / -0.000  *XS*
-----------------------------------------------------------------------------------
```

DZ

DJ

DK FW

DL

DM

DN

DO

DP

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   35.DATE= 8/20/77

==================================================================================
WATER-SURFACE PROFILE FOR: FLINT RIVER STEVENSON AVE TO HARRISON ST KNUTILLA
PAGE  2 OF  3
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECTD AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HE  /    HE  /     EG  /     V  /    EN  /   ACC    *ID*
==================================================================================
============================ BEGIN BRIDGE ANALYSIS ===============================
GR TR AT     8350 /        /  11800. /  2069. /  593088. / 1.00 /     0. /  130.
   706.55 /   0.51 /        ...1...  (-.001)   /   5.70 /   0.25 /          *BO*
----------------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                            *RG*
----------------------------------------------------------------------------------
85+50 AT     8550 /   200 /  11800. /  1432. /  472394. / 1.00 /  -43. /    39.
   706.56 /   1.06 /   0.09 /   0.36 /  707.62 /   8.24 /   0.35 / -0.011  *AS*
----------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K** = 0.01 /  1433. /  472976. / 1.00 /  -43. /    39.
   706.58 /   1.05 /                /  707.63 /   8.23 /   0.35 /          *AS*
============================ END BRIDGE ANALYSIS =================================
87+00 AT     8700 /   150 /  11800. /  1658. /  522368. / 1.00 /  -49. /    44.
   706.93 /   0.79 /   0.08 /   0.0  /  707.72 /   7.12 /   0.30 / -0.000  *XS*
----------------------------------------------------------------------------------
90+00 AT     9000 /   300 /  11800. /  2315. /  776702. / 1.00 /  -65. /    62.
   707.43 /   0.40 /   0.10 /   0.0  /  707.83 /   5.10 /   0.21 /  0.013  *XS*
----------------------------------------------------------------------------------
95+00 AT     9500 /   500 /  11800. /  2310. /  771767. / 1.00 /  -64. /    64.
   707.55 /   0.41 /   0.12 /   0.00 /  707.95 /   5.11 /   0.21 /  0.001  *XS*
----------------------------------------------------------------------------------
96+50 AT     9650 /   150 /  11800. /  2241. /  745615. / 1.00 /  -60. /    64.
   707.57 /   0.43 /   0.04 /   0.01 /  708.00 /   5.27 /   0.22 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS =================================
GARLA AT     9650 /        /  11800. /  1915. /  431240. / 1.00 /     0. /  120.
   707.57 /   0.59 /        ...1...  (-.001)   /   6.16 /   0.27 /          *BO*
----------------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                            *RG*
----------------------------------------------------------------------------------
99+00 AT     9900 /   250 /  11800. /  2311. /  772434. / 1.00 /  -64. /    64.
   707.66 /   0.41 /   0.06 /   0.0  /  708.06 /   5.11 /   0.21 / -0.000  *AS*
----------------------------------------------------------------------------------
```

```
------
   M = 0.0  / E = 1.00 / K* = 0.01 /  1433. /  472976. / 1.00 /
   706.58 /   1.05 /                  /  707.63 /   8.23 /   0.35 /          *AS*
============================ END BRIDGE ANALYSIS ============================
87+00 AT    8700 /   150 /  11800. /  1658. /  522368. / 1.00 /  -49. /   44.
   706.93 /   0.79 /   0.08 /   0.0  /  707.72 /   7.12 /   0.30 / -0.000  *XS*
-----------------------------------------------------------------------------
90+00 AT    9000 /   300 /  11800. /  2315. /  776702. / 1.00 /  -65. /   62.
   707.43 /   0.40 /   0.10 /   0.0  /  707.83 /   5.10 /   0.21 /  0.013  *XS*
-----------------------------------------------------------------------------
95+00 AT    9500 /   500 /  11800. /  2310. /  771767. / 1.00 /  -64. /   64.
   707.55 /   0.41 /   0.12 /   0.00 /  707.95 /   5.11 /   0.21 /  0.001  *XS*
-----------------------------------------------------------------------------
96+50 AT    9650 /   150 /  11800. /  2241. /  745615. / 1.00 /  -60. /   64.
   707.57 /   0.43 /   0.04 /   0.01 /  708.00 /   5.27 /   0.22 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==========================
GARLA AT    9650 /       /  11800. /  1915. /  431240. / 1.00 /    0. /  120.
   707.57 /   0.59 /       ...1...  (-.001)    /   6.16 /   0.27 /          *BO*
-----------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                            *RG*
-----------------------------------------------------------------------------
99+00 AT    9900 /   250 /  11800. /  2311. /  772434. / 1.00 /  -64. /   64.
   707.66 /   0.41 /   0.06 /   0.0  /  708.06 /   5.11 /   0.21 / -0.000  *AS*
-----------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /  2312. /  772641. / 1.00 /  -64. /   64.
   707.66 /   0.41 /                  /  708.06 /   5.10 /   0.21 /          *AS*
============================ END BRIDGE ANALYSIS ============================
10550 AT   10550 /   650 /  11800. /  2477. /  834370. / 1.00 /  -68. /   70.
   707.85 /   0.35 /   0.14 /   0.0  /  708.21 /   4.76 /   0.20 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==========================
NORTH AT   10550 /       /  11800. /  2254. /  664350. / 1.00 /  -66. /   72.
   707.85 /   0.43 /       ...1...  (-.001)    /   5.23 /   0.22 /          *BO*
-----------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                            *RG*
-----------------------------------------------------------------------------
```

```
==================================================================================
WATER-SURFACE PROFILE FOR: FLINT RIVER STEVENSON AVE TO HARRISON ST KNUTILLA
PAGE  3 OF  3
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECTD AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HE  /    HE  / !   EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
10700 AT   10700 /   150 /  11800. /  2505. /  843597. / 1.00 /  -70. /   70.
   707.89 /   0.35 /   0.03 /    0.0 / 708.24 /    4.71 /   0.20 / -0.000  *AS*
----------------------------------------------------------------------------------
   H = 0.0  / E = 1.00 / K* = 0.01 /  2505. /  843755. / 1.00 /  -70. /   70.   DX
   707.89 /   0.35 /                 /  708.24 /    4.71 /   0.20 /          *AS*
============================ END BRIDGE ANALYSIS ==================================
10950 AT   10950 /   250 /  11800. /  3528. / 1131183. / 1.00 / -130. /  106.   DY
   708.10 /   0.17 /   0.04 /    0.0 /  708.27 /    3.34 /   0.15 / -0.000  *XS*
----------------------------------------------------------------------------------

                          END OF THIS PROFILE
```

```
SECTN AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    H  /     FG  /     V  /    FN  /   ACC    D*
==========================================================================
    1 AT      80 /     0 /  11800. /  1903. /  369847. / 1.00 /    0. /  203.
  709.30 /   0.60 /                 /  709.90 /    6.20 /   0.36/          *IS*
--------------------------------------------------------------------------
    2 AT     350 /   270 /  11800. /  2060. /  432003. / 1.00 /   90. /  290.
  709.62 /   0.51 /   0.24 /    0.0 /  710.13 /    5.73 /   0.31 / 0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
STEV. AT     350 /        /  11800. /  2125. /  440449. / 1.00 /    0. /  283.
  709.62 /   0.48 /       ...1...  (-.001)    /    5.55 /   0.33 /          *BO*
--------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                          *RG*
--------------------------------------------------------------------------
    3 AT     730 /   380 /  11800. /  2167. /  464239. / 1.00 /  180. /  380.
  709.94 /   0.46 /   0.26 /    0.0 /  710.40 /    5.45 /   0.29 / -0.000  *AS*
--------------------------------------------------------------------------
  M = 0.0  / E = 1.00 / K* = 0.01 /  2167. /  464401. / 1.00 /  180. /  380.
  709.94 /   0.46 /                 /  710.40 /    5.44 /   0.29 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
    4 AT    1720 /   990 /  11800. /  1750. /  351150. / 1.00 /  179. /  359.
  710.66 /   0.71 /   0.85 /   0.12 /  711.37 /    6.74 /   0.38 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
RTLBR AT    1720 /        /  11800. /  1469. /  284432. / 1.00 /    7. /  216.
  710.66 /   1.00 /       ...1...  (-.001)    /    8.03 /   0.50 /          *BO*
--------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                          *RG*
--------------------------------------------------------------------------
    5 AT    2050 /   330 /  11800. /  1913. /  396046. / 1.03 /  240. /  440.
  711.09 /   0.61 /   0.33 /    0.0 /  711.70 /    6.17 /   0.34 / -0.000  *AS*
--------------------------------------------------------------------------
  M = 0.01 / E = 0.27 / K* = 0.01 /  1914. /  396474. / 1.03 /  240. /  440.
  711.10 /   0.61 /                 /  711.70 /    6.16 /   0.34 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
    6 AT    3170 /  1120 /  11800. /  2482. /  587938. / 1.00 /  100. /  300.
  712.02 /   0.35 /   0.67 /    0.0 /  712.37 /    4.75 /   0.24 / 0.000  *XS*
--------------------------------------------------------------------------
    7 AT    4030 /   860 /  11800. /  2331. /  519343. / 1.00 /  400. /  600.
  712.39 /   0.40 /   0.39 /   0.02 /  712.79 /    5.06 /   0.26 / -0.000  *XS*
--------------------------------------------------------------------------
    8 AT    5120 /  1090 /  11800. /  2561. /  605901. / 1.02 /  550. /  800.
  712.93 /   0.34 /   0.48 /    0.0 /  713.27 /    4.61 /   0.25 / -0.000  *XS*
--------------------------------------------------------------------------
    9 AT    5580 /   460 /  11500. /  2813. /  646904. / 1.02 /   70. /  320.
  713.18 /   0.26 /   0.16 /    0.0 /  713.45 /    4.09 /   0.21 / 0.017  *XS*
--------------------------------------------------------------------------
```

```
*** FLOODWAY ANALYSIS *** HOR FW
==========================================================================
SECTD AT DISTANCE/ LENGTH/DISCHARGE/ AREA  /CONVEYANCE/ ALPHA/  LEW  / REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    EN  /  ACC   *ID*
==========================================================================
   10 AT    6240 /   660 /  11500. /  2229. /  538074. / 1.06 /  550. /  750.
   713.35 /   0.44 /   0.25 /   0.09 /  713.79 /   5.16 /   0.25 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
HAMTL AT    6240 /        /  11500. /  1686. /  330162. / 1.00 /    2. /  164.
   713.35 /   0.72 /        ...1...  (-.001)     /   6.82 /   0.37 /         *BO*
--------------------------------------------------------------------------
 NO ROAD OVERFLOW
                                                                          *RG*
--------------------------------------------------------------------------
   11 AT    6470 /   230 /  11500. /  2025. /  504561. / 1.06 /  501. /  684.
   713.41 /   0.53 /   0.11 /   0.05 /  713.94 /   5.68 /   0.29 / -0.000  *AS*
--------------------------------------------------------------------------
   M = 0.02 / E = 0.11 / K* = 0.03 /  2029. /  506357. / 1.06 /  501. /  684.
   713.44 /   0.53 /                 /  713.97 /   5.67 /   0.29 /         *AS*
============================ END BRIDGE ANALYSIS ==========================
   12 AT    7150 /   680 /  11500. /  2647. /  665143. / 1.03 /   55. /  255.
   713.94 /   0.30 /   0.27 /   0.0  /  714.24 /   4.35 /   0.21 /  0.007  *XS*
--------------------------------------------------------------------------
   13 AT    8040 /   890 /  11500. /  2250. /  543676. / 1.06 /  510. /  710.
   714.19 /   0.43 /   0.33 /   0.07 /  714.62 /   5.11 /   0.25 / -0.011  *XS*
--------------------------------------------------------------------------
   14 AT    8700 /   660 /  11500. /  2380. /  587291. / 1.00 /  150. /  320.
   714.53 /   0.36 /   0.27 /   0.0  /  714.89 /   4.83 /   0.23 / -0.000  *XS*
--------------------------------------------------------------------------
   15 AT    9540 /   840 /  11500. /  2126. /  507872. / 1.02 /   10. /  180.
   714.85 /   0.46 /   0.37 /   0.05 /  715.32 /   5.41 /   0.27 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
DAKOT AT    9540 /        /   9345. /  2255. /  558548. / 1.00 /    4. /  165.
   714.85 /   0.27 /        ...1...  (-.001)     /   4.14 /   0.20 /         *BO*
--------------------------------------------------------------------------
 ROAD OVERFLOW (CFS) / LEFT        0. / RIGHT      1787. /
                                                                          *RG*
--------------------------------------------------------------------------
   16 AT    9780 /   240 /  11500. /  2241. /  551325. / 1.02 /   35. /  205.
   715.01 /   0.42 /   0.11 /   0.0  /  715.43 /   5.13 /   0.25 / -0.000  *AS*
--------------------------------------------------------------------------
   M = 0.0  / E = 0.0  / K* = 0.01 /  2241. /  551440. / 1.02 /   35. /  205.
   715.01 /   0.42 /                 /  715.43 /   5.13 /   0.25 /         *AS*
============================ END BRIDGE ANALYSIS ==========================
   17 AT   10120 /   340 /  11500. /  2525. /  620694. / 1.06 /   50. /  250.
   715.22 /   0.34 /   0.13 /   0.0  /  715.56 /   4.56 /   0.22 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
LEITH AT   10120 /        /  11500. /  2176. /  475940. / 1.00 /    2. /  250.
```

```
*** FLOOD AT ANALYSIS *** HOR F .
==================================================================================
SECTD AT DISTANCE/ LENGTH/DISCHARGE/ AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     FG  /     V  /    FN  /   ACC    *TD*
==================================================================================
 NO ROAD-GRADE DATA
                                                                              *RG*
----------------------------------------------------------------------------------
   21 AT   10320 /   200 /  11500. /  2490. /  607016. / 1.06 /   60. /  260.
   715.29 /   0.35 /   0.07 /   0.00 /  715.64 /   4.62 /   0.23 /  0.000  *AS*
----------------------------------------------------------------------------------
   M = 0.00 / E = 0.0  / K* = 0.01 /  2491. /  607126. / 1.06 /   60. /  260.
   715.29 /   0.35 /                 /  715.64 /   4.62 /   0.23 /          *AS*
============================ END BRIDGE ANALYSIS ==================================
   22 AT   11160 /   840 /  11500. /  2527. /  640800. / 1.05 /   25. /  225.
   715.59 /   0.34 /   0.29 /   0.0  /  715.93 /   4.55 /   0.22 / -0.000  *XS*
----------------------------------------------------------------------------------
   23 AT   11770 /   610 /  11500. /  3022. /  764213. / 1.05 /   10. /  260.
   715.84 /   0.24 /   0.16 /   0.0  /  716.07 /   3.81 /   0.18 / -0.016  *XS*
============================ BEGIN BRIDGE ANALYSIS ================================
GATE  AT   11770 /       /  9766. /  1978. /  258254. / 1.00 /    0. /  175.
   713.10 /   0.38 /       ...3...  (-.001)    /   4.94 /   0.26 /          *BO*
----------------------------------------------------------------------------------
 ROAD OVERFLOW (CFS) / LEFT      0. / RIGHT    1788. /
                                                                              *RG*
----------------------------------------------------------------------------------
   24 AT   12030 /   260 /  11500. /  3105. /  733830. / 1.11 /  100. /  400.
   715.90 /   0.24 /   0.06 /   0.00 /  716.14 /   3.70 /   0.19 /  0.000  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  3197. /  764167. / 1.12 /  100. /  400.
   716.20 /   0.22 /                 /  716.43 /   3.60 /   0.19 /          *AS*
============================ END BRIDGE ANALYSIS ==================================
   25 AT   12870 /   840 /  11500. /  3246. /  781841. / 1.15 /  100. /  400.
   716.39 /   0.22 /   0.19 /   0.0  /  716.62 /   3.54 /   0.18 /  0.001  *XS*
----------------------------------------------------------------------------------
   26 AT   13540 /   670 /  11500. /  2701. /  634172. / 1.13 /  100. /  400.
   716.52 /   0.32 /   0.18 /   0.05 /  716.84 /   4.26 /   0.22 / -0.000  *XS*
----------------------------------------------------------------------------------
   27 AT   14250 /   710 /  11500. /  3046. /  725867. / 1.07 /  290. /  590.
   716.81 /   0.24 /   0.20 /   0.0  /  717.05 /   3.78 /   0.19 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ================================
DORT  AT   14250 /       /  11500. /  2039. /  332982. / 1.00 /    0. /  183.
   716.81 /   0.49 /       ...1...  (-.001)    /   5.64 /   0.30 /          *BO*
----------------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                              *RG*
----------------------------------------------------------------------------------
   28 AT   14500 /   250 /  11500. /  2281. /  522814. / 1.05 /  250. /  450.
```

```
*** FLOODWAY ANALYSIS
==================================================================================
SECTO AT DISTANCE/ LENGTH/DISCHARGE/ AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    EN  /  ACC    *ID
==================================================================================
   M = 0.01 / E = 0.0  / K* = 0.03 /  2286. /  524499. / 1.05 /  250. /  450.
   716.84 /   0.41 /                 / 717.26 /    5.03 /   0.26 /          *AS*
============================ END BRIDGE ANALYSIS ==================================
   29 AT   15150 /   650 / 10000. /  2390. /  568430. / 1.02 /  480. /  680.
   717.23 /   0.28 /   0.25 /   0.0  / 717.51 /    4.18 /   0.21 / -0.000  *XS*
----------------------------------------------------------------------------------
   30 AT   15820 /   670 / 10000. /  2547. /  655765. / 1.02 /  101. /  290.
   717.44 /   0.24 /   0.18 /   0.0  / 717.69 /    3.93 /   0.18 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ================================
CROSS AT   15820 /       / 10000. /  2010. /  449012. / 1.00 /   46. /  229.
   717.44 /   0.38 /      ...1...  (-.001)    /    4.97 /   0.26 /          *BO*
----------------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                            *RG*
----------------------------------------------------------------------------------
   31 AT   16050 /   230 / 10000. /  2608. /  625314. / 1.00 /  150. /  350.
   717.52 /   0.23 /   0.06 /   0.0  / 717.74 /    3.83 /   0.19 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /  2608. /  625463. / 1.00 /  150. /  350.
   717.52 /   0.23 /                 / 717.75 /    3.83 /   0.19 /          *AS*
============================ END BRIDGE ANALYSIS ==================================
   32 AT   16700 /   650 / 10000. /  3608. /  739296. / 1.34 /  420. /  820.
   717.73 /   0.16 /   0.14 /   0.0  / 717.89 /    2.77 /   0.16 / -0.000  *XS*
----------------------------------------------------------------------------------
   33 AT   17600 /   900 / 10000. /  4814. /  892985. / 1.52 /  350. /  850.
   717.92 /   0.10 /   0.14 /   0.0  / 718.02 /    2.08 /   0.14 / -0.000  *XS*
----------------------------------------------------------------------------------
   34 AT   18680 /  1080 / 10000. /  5712. / 1109486. / 1.56 /  210. /  810.
   718.05 /   0.08 /   0.11 /   0.0  / 718.13 /    1.75 /   0.11 / -0.000  *XS*
----------------------------------------------------------------------------------
   35 AT   19770 /  1090 / 10000. /  3757. /  714720. / 1.71 /  400. / 1000.
   718.14 /   0.19 /   0.14 /   0.05 / 718.32 /    2.66 /   0.17 / -0.000  *XS*
----------------------------------------------------------------------------------
   36 AT   20740 /   970 / 10000. /  5409. /  830286. / 1.85 /  750. / 1350.
   718.39 /   0.10 /   0.16 /   0.0  / 718.48 /    1.85 /   0.15 / -0.004  *XS*
----------------------------------------------------------------------------------
   37 AT   21950 /  1210 / 10000. /  2724. /  630311. / 1.10 /  500. / 1100.
   718.53 /   0.27 /   0.23 /   0.09 / 718.80 /    3.67 /   0.18 /  0.000  *XS*
----------------------------------------------------------------------------------
   38 AT   22340 /   390 / 10000. /  4150. / 1054628. / 1.20 /  250. /  575.
   718.75 /   0.11 /   0.06 /   0.0  / 718.86 /    2.41 /   0.12 / -0.000  *XS*
----------------------------------------------------------------------------------
   39 AT   23000 /   660 / 10000. /  3133. /  700693. / 1.38 /   75. /  399.
   [illegible] /   0.33 /   0.09 /   0.05 / 719.01 /    3.19 /   0.17 /  0.000  *XS*
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 83,DATE= 8/20/77

```
==================================================================================
WATER-SURFACE PROFILE FOR: FLINT RIVER DAM TO CARPENTER RD          KNUTILLA
PAGE  5 OF  5
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECTD AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HF  /     FG  /     V  /    FN  /   ACC   *ID*
==================================================================================
   40 AT   23830 /   830 /  10000. /  5510. / 1089302. / 1.84 /   50. /  550.
   719.04 /   0.09 /   0.11 /   0.0  /  719.13 /   1.81 /   0.11 /  0.017  *XS*
----------------------------------------------------------------------------------
   41 AT   24880 /  1050 /  10000. /  6950. / 1106397. / 2.37 /  450. / 1250.
   719.14 /   0.08 /   0.09 /   0.0  /  719.22 /   1.44 /   0.11 / -0.000  *XS*
----------------------------------------------------------------------------------
   42 AT   25740 /   860 /  10000. /  6989. / 1142231. / 1.75 /  500. / 1200.
   719.23 /   0.06 /   0.07 /   0.0  /  719.29 /   1.43 /   0.11 /  0.000  *XS*
----------------------------------------------------------------------------------
   43 AT   26460 /   720 /  10000. /  4727. /  866368. / 1.75 /  400. /  900.
   719.27 /   0.12 /   0.07 /   0.03 /  719.39 /   2.12 /   0.14 / -0.000  *XS*
----------------------------------------------------------------------------------
```

FW

.09 FJ

.08 FK

.10 FL

.10 FM

END OF THIS PROFILE

00BREAK00

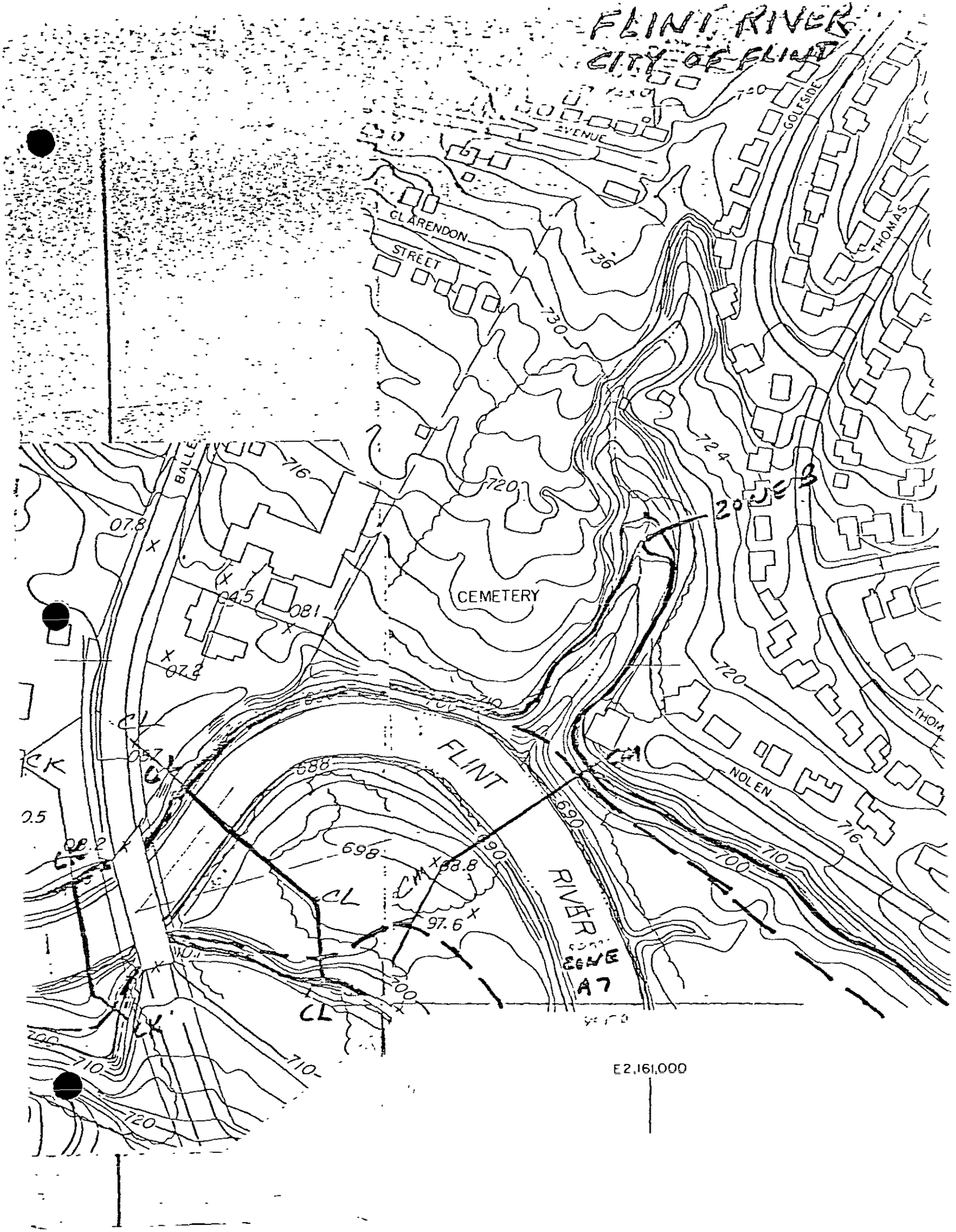
1) COUNTY: Genesee

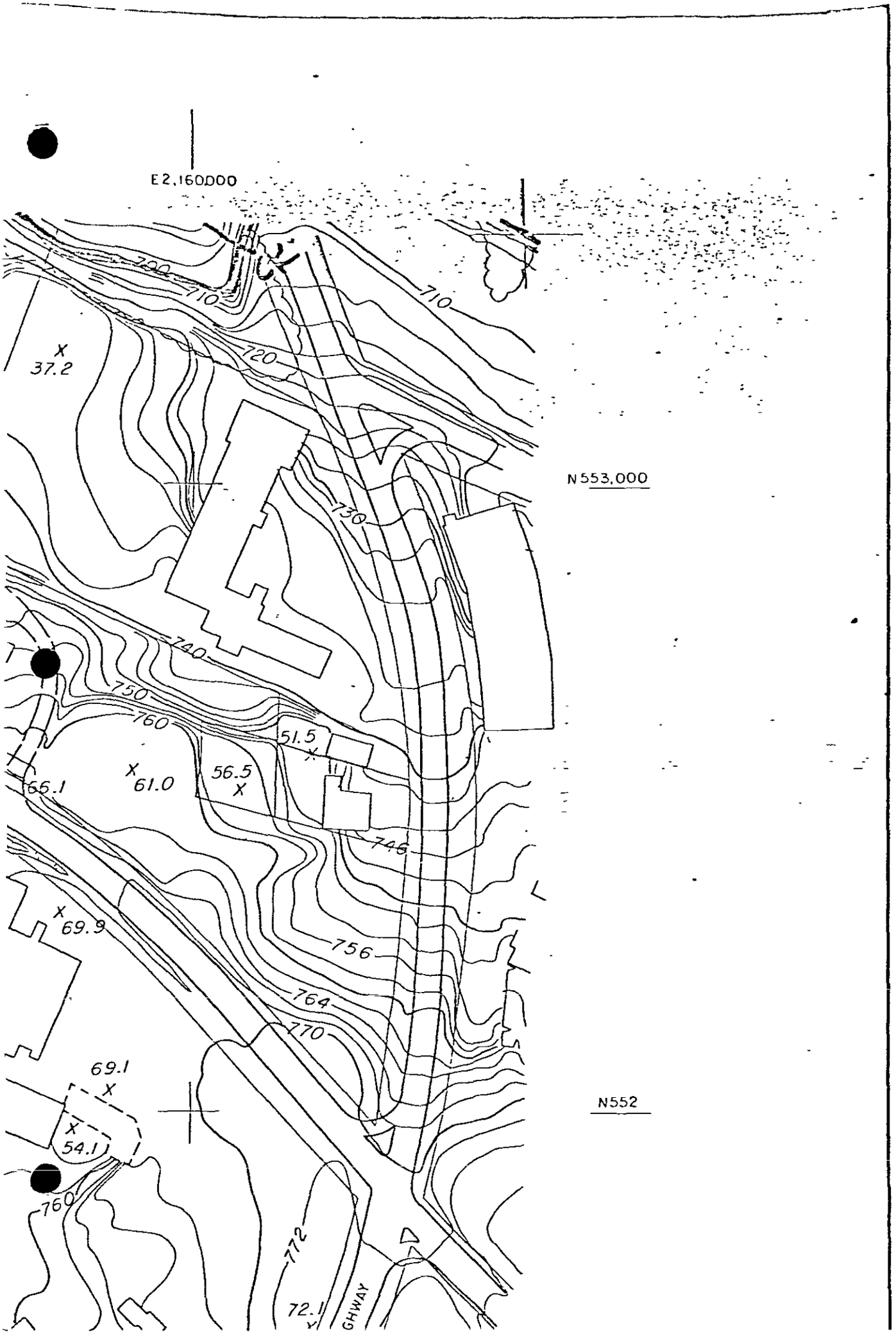
2) STUDY NAME: city of Flint

3) WATERCOURSE: Flint River

4) DOCUMENT TYPE: maps

00BREAK00


FLINT RIVER
CITY OF FLINT
AVENUE
GOLFSIDE
THOMAS
CLARENDON
STREET
736
730
724
720
716
BALLE
07.8
CEMETERY
081
720
FLINT
NOLEN
716
710
700
690
698
688
RIVER
97.6
710
720
E2,161,000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700
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710
720
730
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750
760
746
756
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770
760
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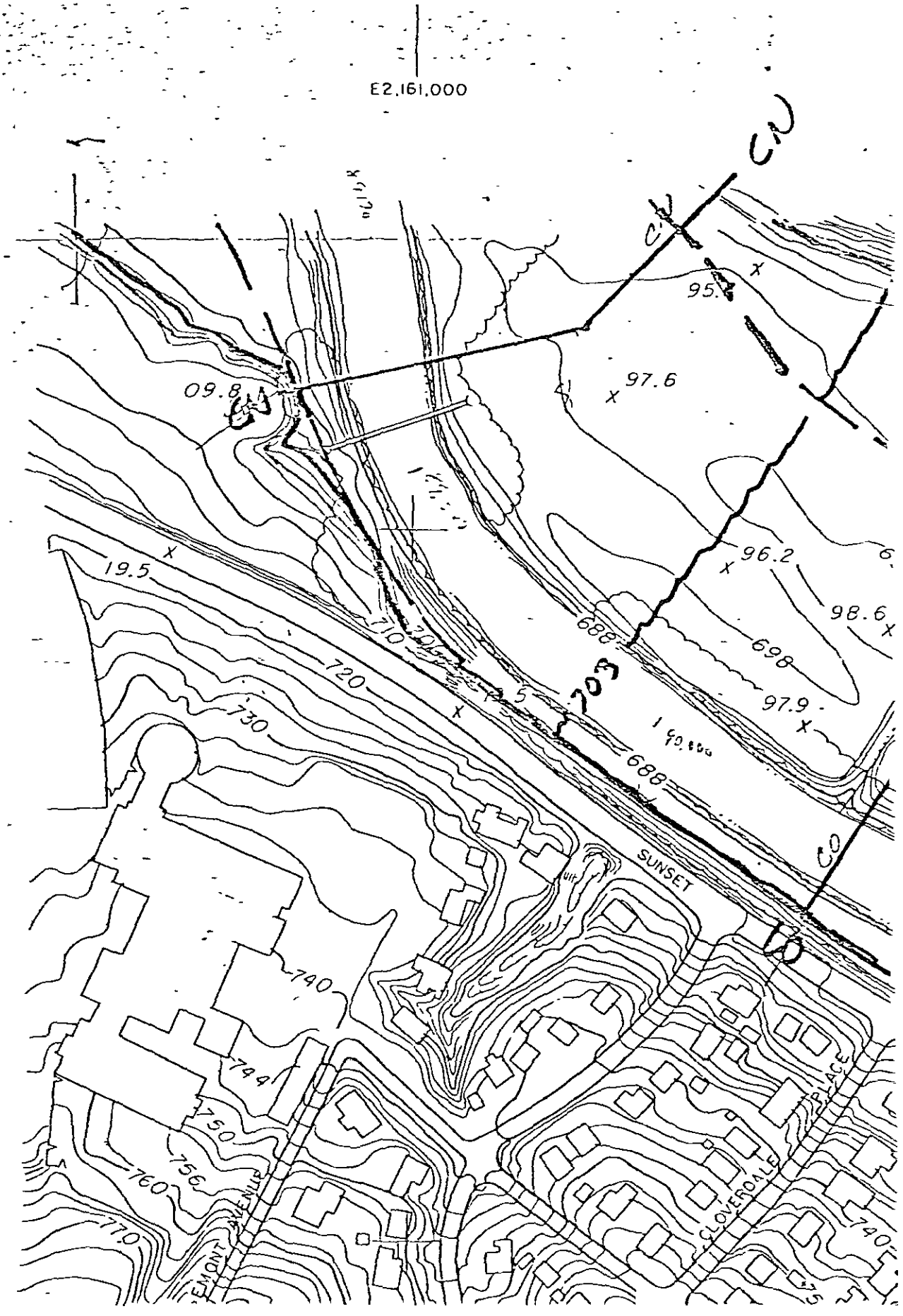
51.5
56.5
61.0
66.1
69.9
69.1
54.1
72.1
GHWAY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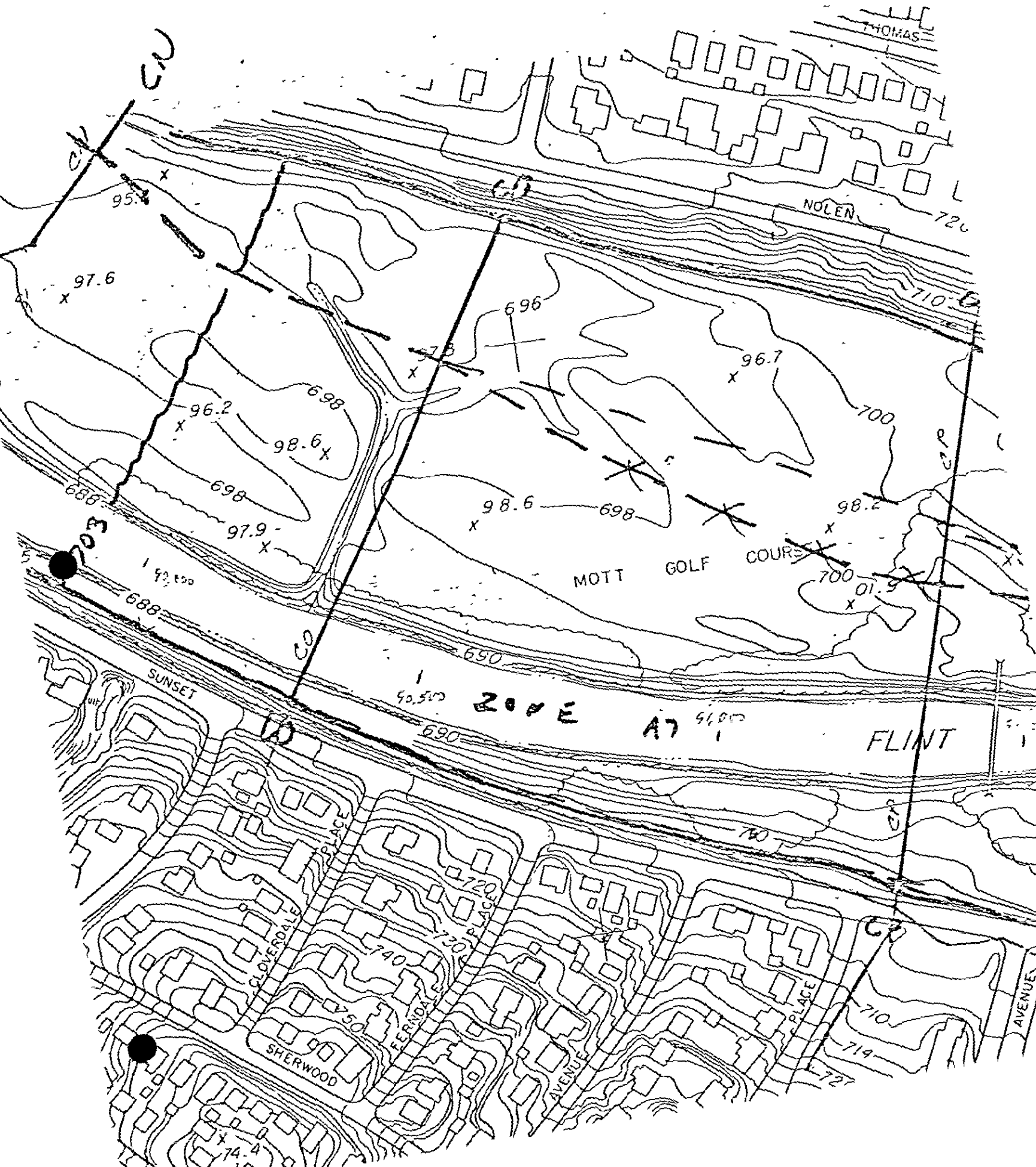
N553,000
N552
CW
CW
CW
CW
CW
95.
97.6
09.8
96.2
98.6
19.5
710
720
730
688
698
703
97.9
688
740
744
750
756
760
770
740
SUNSET
CLOVERDALE
PLACE
EMONT AVENUE

E 2.162


THOMAS
NOLEN
MOTT GOLF COURSE
SUNSET
FLINT
CLOVERDALE PLACE
FERNDALE PLACE
SHERWOOD AVENUE
PLACE
AVENUE
95.4
97.6
96.2
98.6
698
688
97.9
696
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700
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98.2
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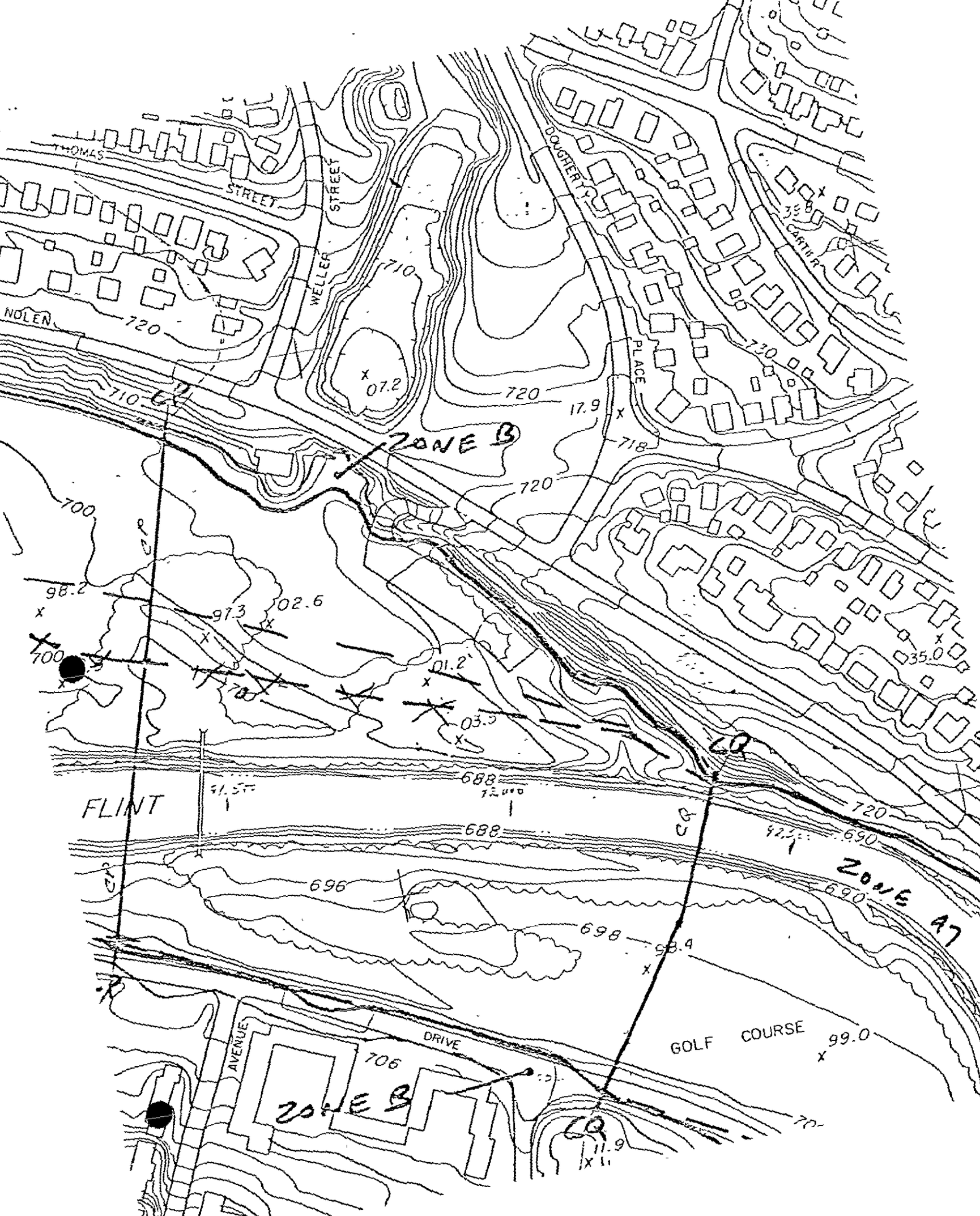
710
720
730
740
750
714
727
74.4


THOMAS
STREET
WELLER
STREET
DOUGHERTY
CARTER
NOLEN
PLACE
ZONE B
FLINT
GOLF COURSE
DRIVE
AVENUE
ZONE A7
ZONE B
LQ
710
720
718
700
698
696
688
690
706
99.0
35.0
17.9
07.2
98.2
97.3
02.6
01.2
03.3
98.4

GOLF COURSE
ZONE A
ZONE B
ZONE B
GLENWOOD CEMETERY
RIVER
CONC.
CONC.
WEST
THIRD
DRIVE
STREET
STREET
ATLETIC FIELD
CR
CR
CR
CS
CS
CY
CY
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700
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710
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690
99.0
94.4
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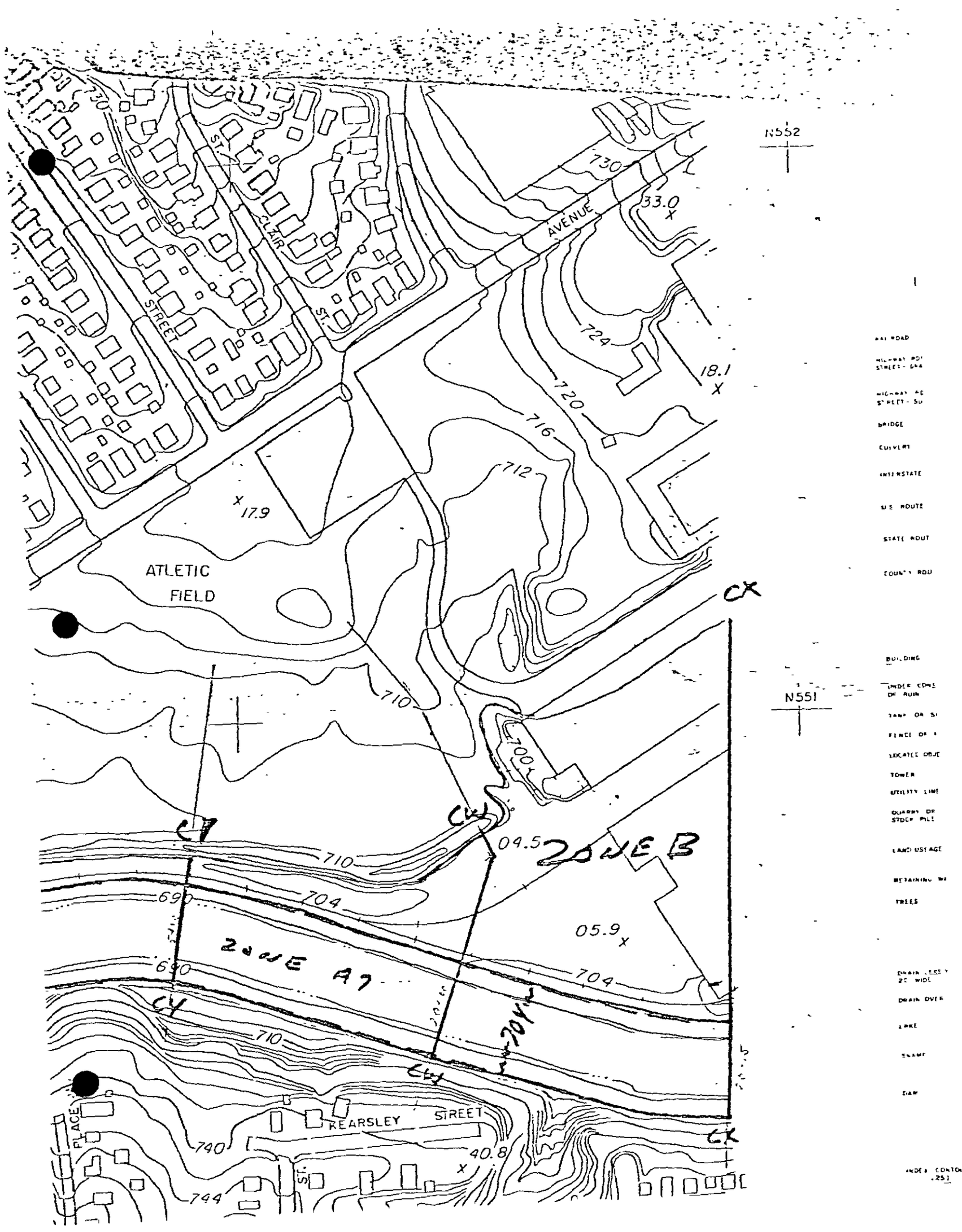
730
730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N551
730
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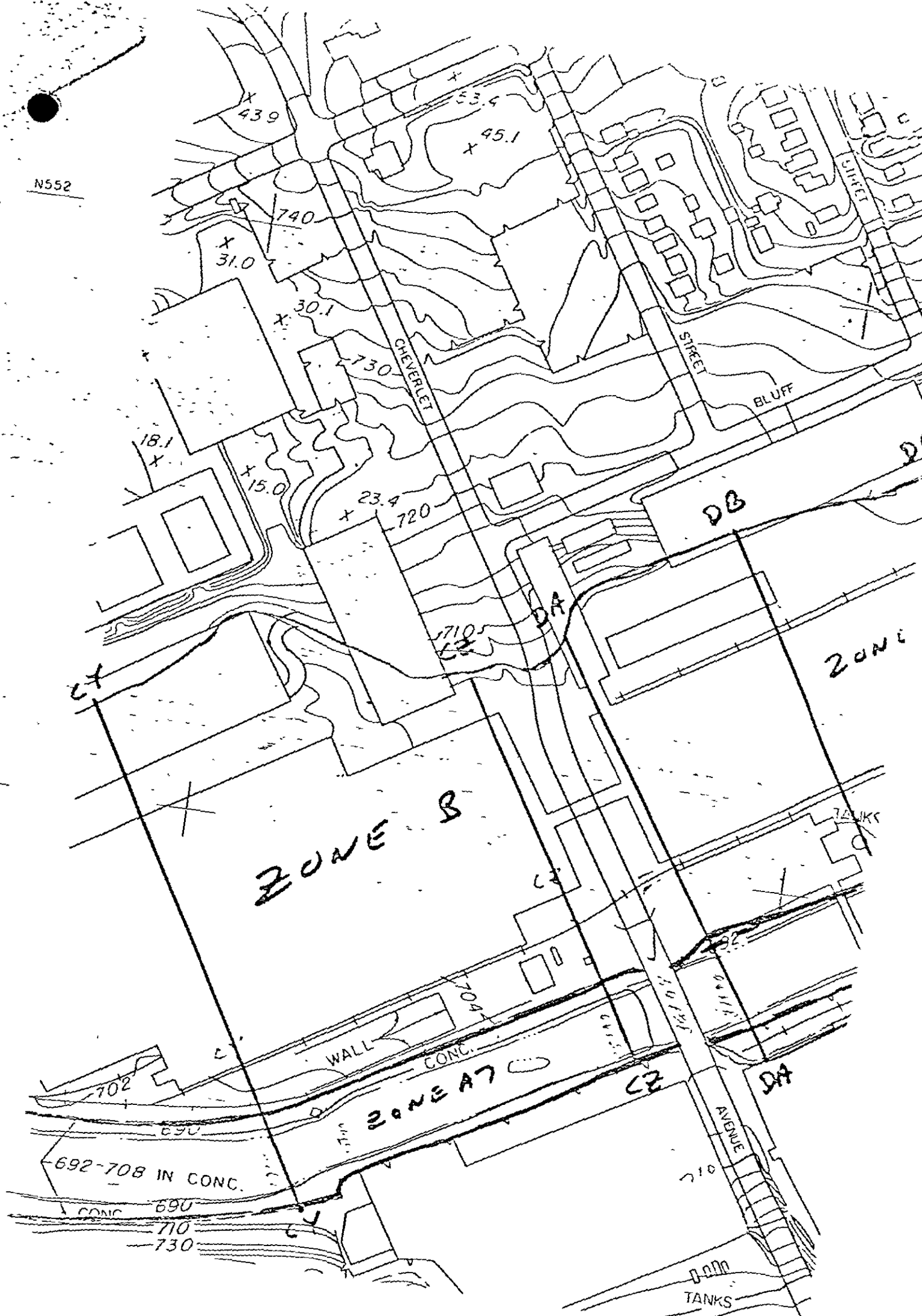
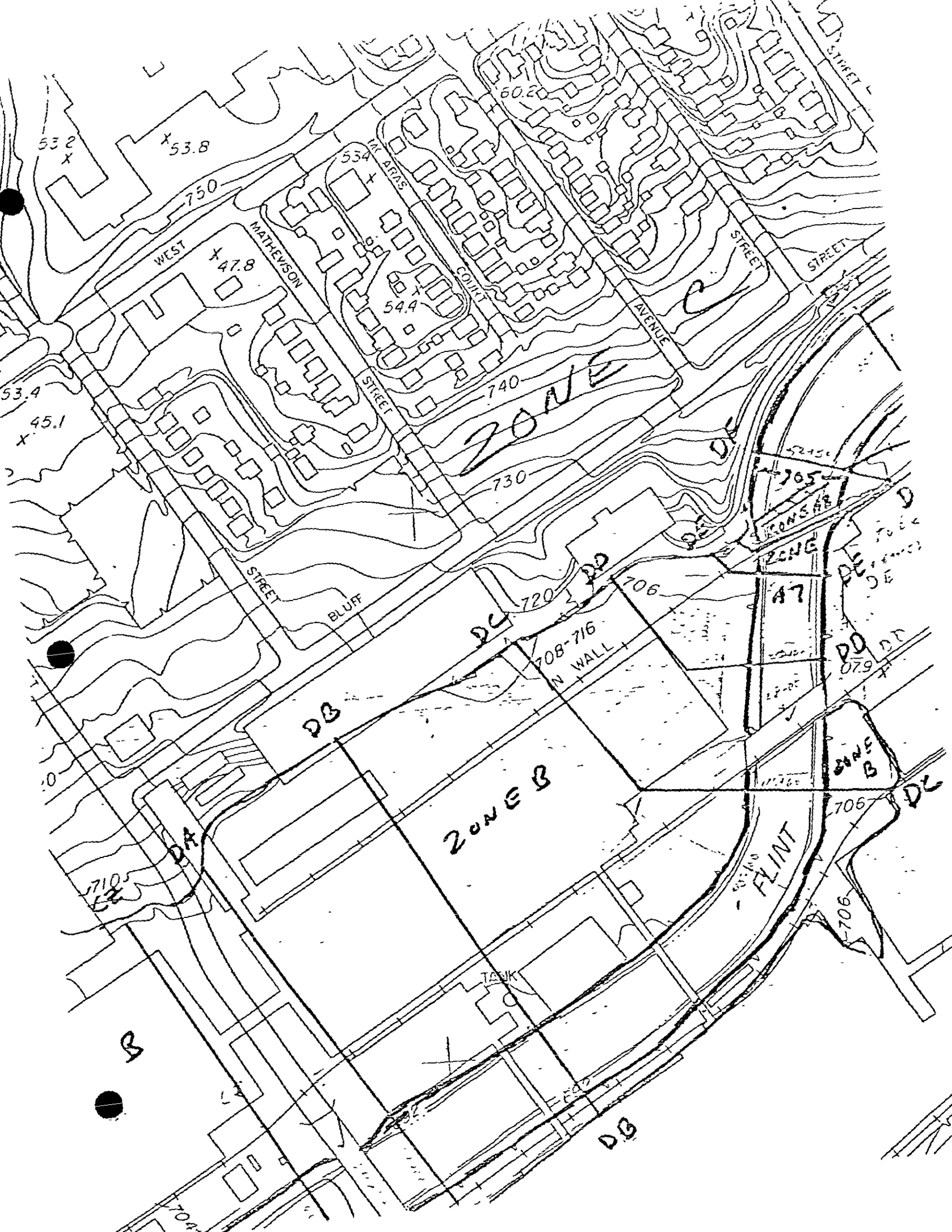
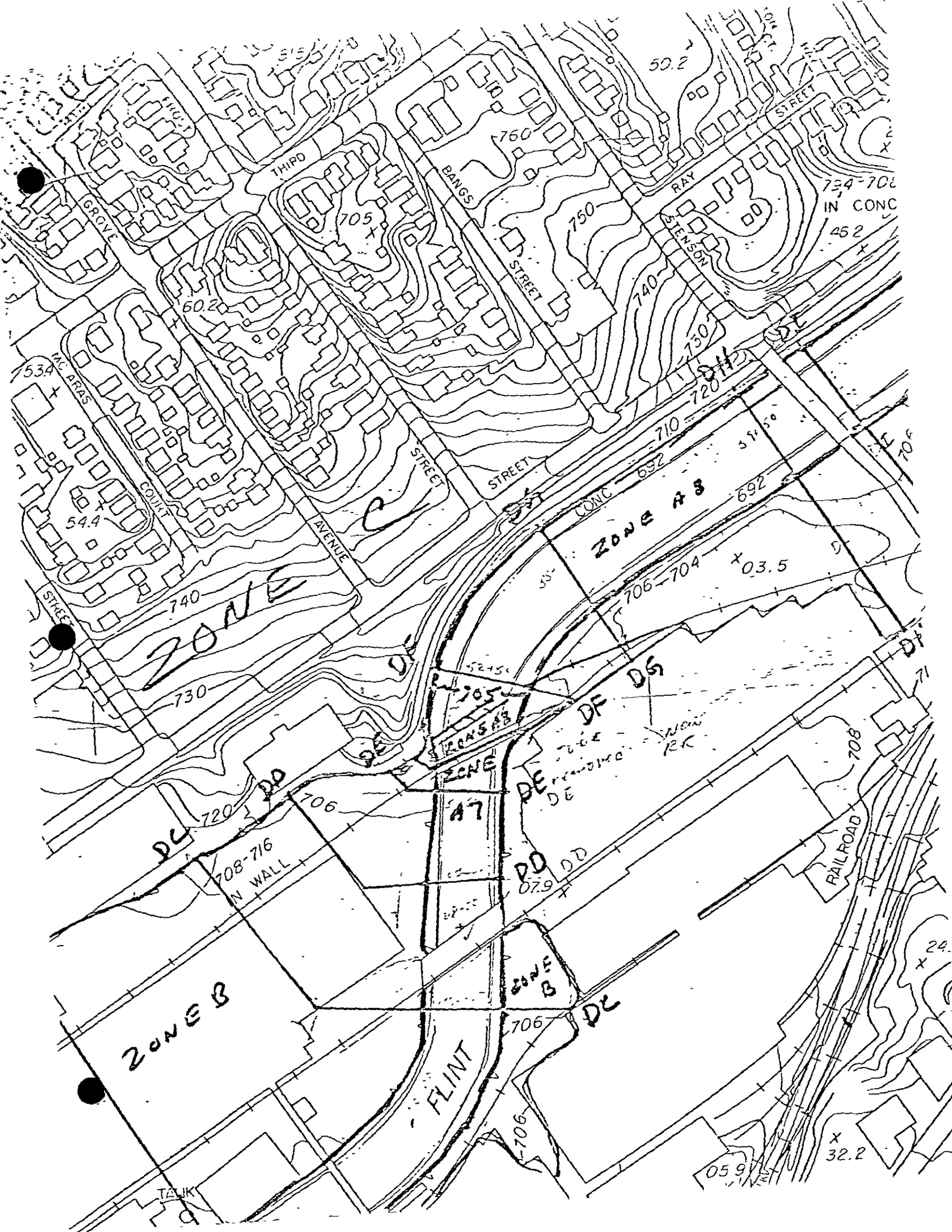
AVENUE
ST.
CLAIR
STREET
ST.
724
18.1
720
716
712
17.9
ATLETIC
FIELD
CX
710
700
CY
CY
04.5
ZONE B
710
690
704
05.9
ZONE A7
690
704
CY
710
CY
PLACE
KEARSLEY
STREET
740
40.8
ST.
744
CX
RAILROAD
HIGHWAY
STREET
BRIDGE
CULVERT
INTERSTATE
U.S. ROUTE
STATE ROUT
COUNTY ROU
BUILDING
UNDER CONS
OF RUIN
TANK OR SI
FENCE OR
LOCATED OBJE
TOWER
UTILITY LINE
QUARRY OR
STOCK PILE
LAND USE AGE
RETAINING WA
TREES
DRAIN LESS
20' WIDE
DRAIN OVER
LAKE
SWAMP
DAM
INDEX CONTO
.25


N552
N551
43.9
53.9
45.1
740
31.0
30.1
730
18.1
15.0
23.4
720
710
CHEVERLET
STREET
BLUFF
STREET
DB
DA
CZ
CY
ZONE B
ZONE A7
WALL
CONC.
702
690
692-708 IN CONC.
CONC
690
710
730
704
AVENUE
TANKS


WEST
MATHEVSON
STREET
TAC ARAS
COURT
AVENUE
STREET
STREET
STREET
BLUFF
ZONE
ZONE
ZONE
ZONE B
ZONE B
A7
DA
DB
DC
DD
DE
DF
750
740
730
720
710
706
705
708-716
N WALL
FLINT
TANK
53.2
53.8
53.4
45.1
47.8
54.4
60.2
B


THIRD
GROVE
BANGS
STREET
RAY
STENSON
STREET
IN CONC
FAC PRAS
COURT
STREET
AVENUE
STREET
STREET
CONC
ZONE A8
ZONE
ZONE A7
ZONE B
ZONE B
FLINT
RAILROAD
708-716
N WALL
TALK
760
750
740
730
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692
706-704
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707.9
05.9
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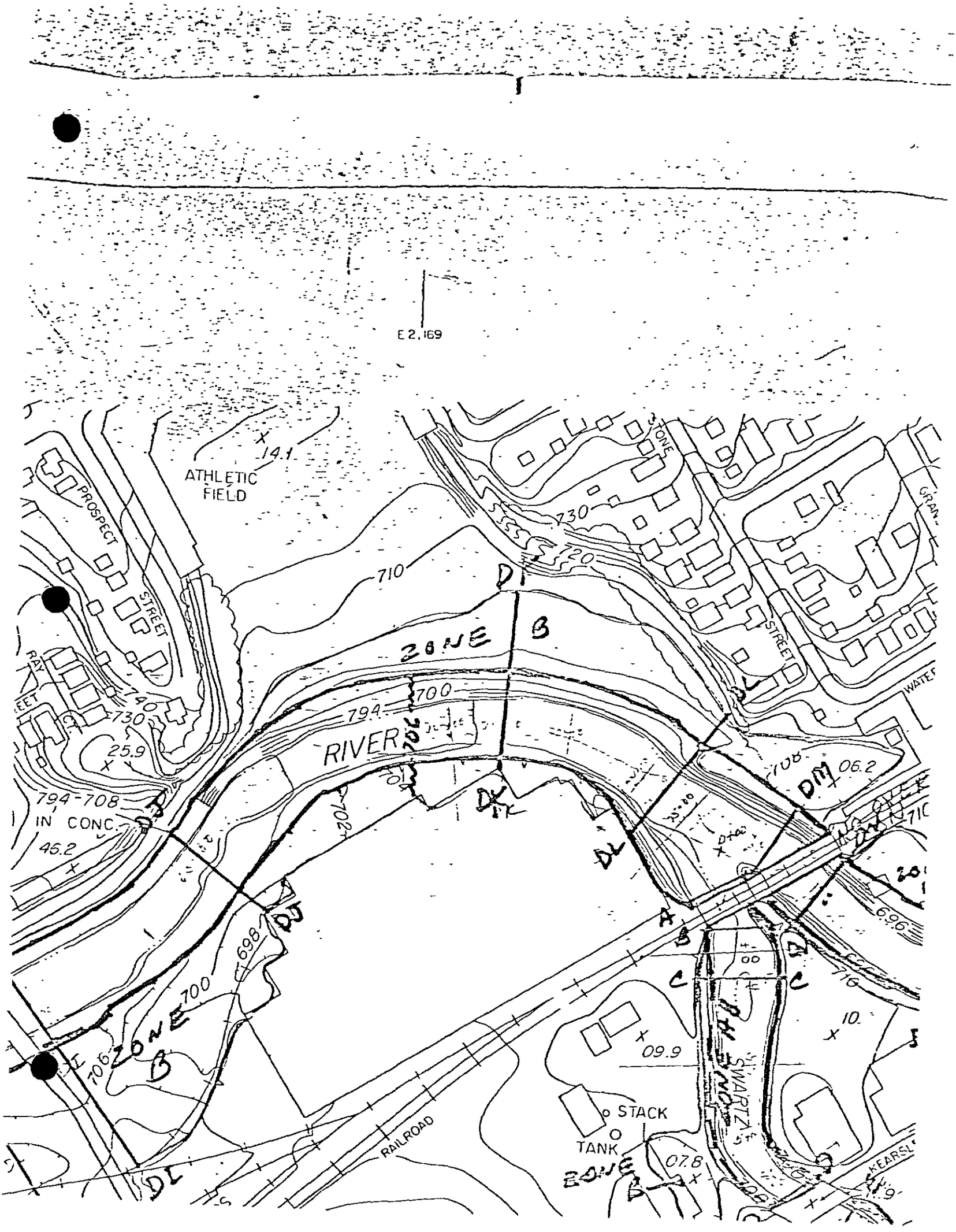
54.4
53.4
45.2


E 2,169
ATHLETIC FIELD
14.1
PROSPECT
STREET
730
720
710
D1
ZONE B
700
794
RIVER
702
25.9
740
730
794-708
IN CONC.
46.2
DL
DL
DL
06.2
706
702
698
700
706
ZONE B
A
B
C
C
09.9
10.
STACK
TANK
07.8
RAILROAD
SWARTZ
KEARSL
6.96
716
ZONE B

E 2,170
E 2,175
GRAND
STREET
WATER
TANK
RAILROAD
NO OVER FLOW
TRAVERSE
ZONE B
ZONE AB
ZONE B
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STREET
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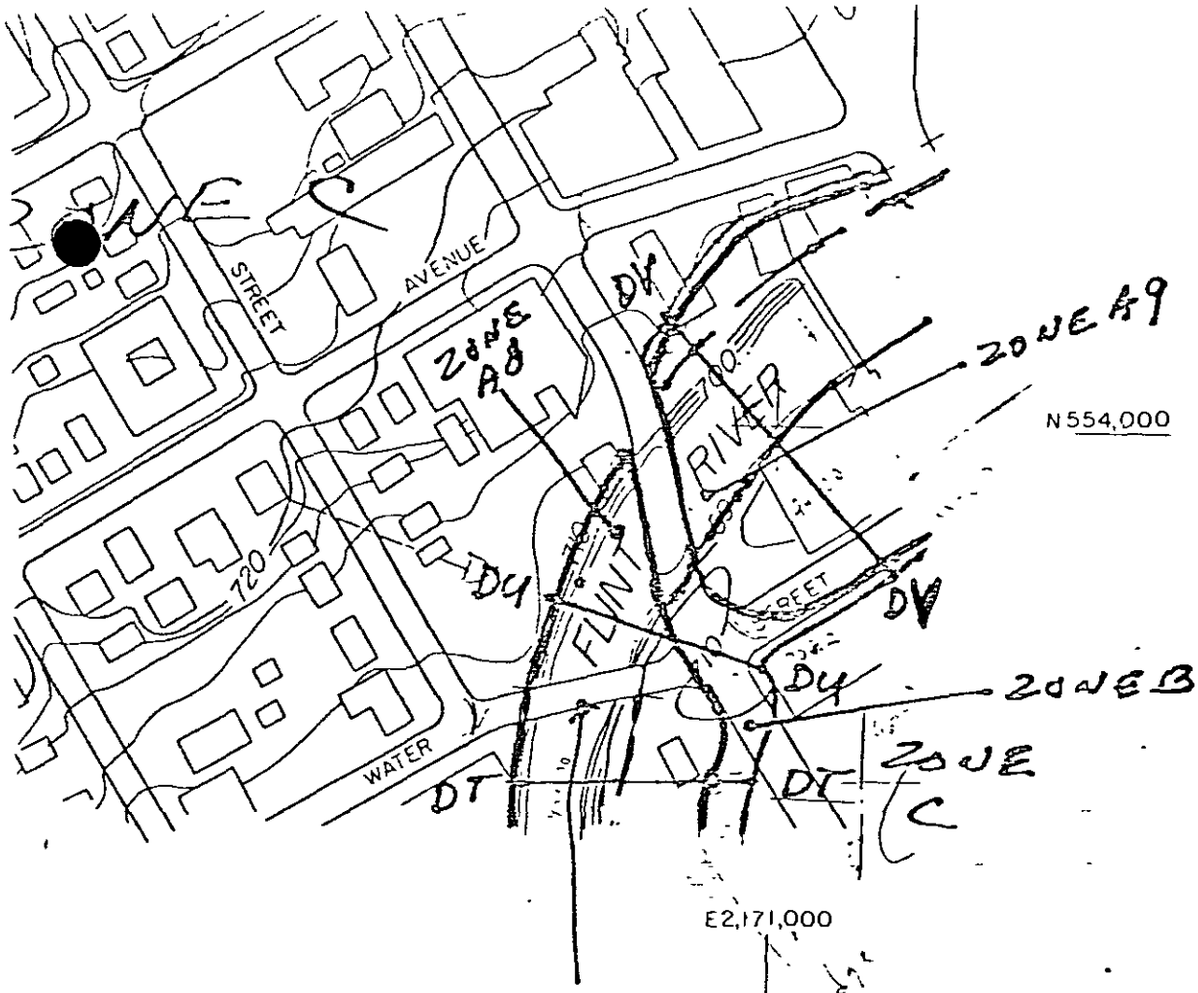
KEARSLEY
WEST
FIRST
STREET
YARDS
MARQUETTE
TANK
STREET



This Bridge has been removed

COMPOSITE

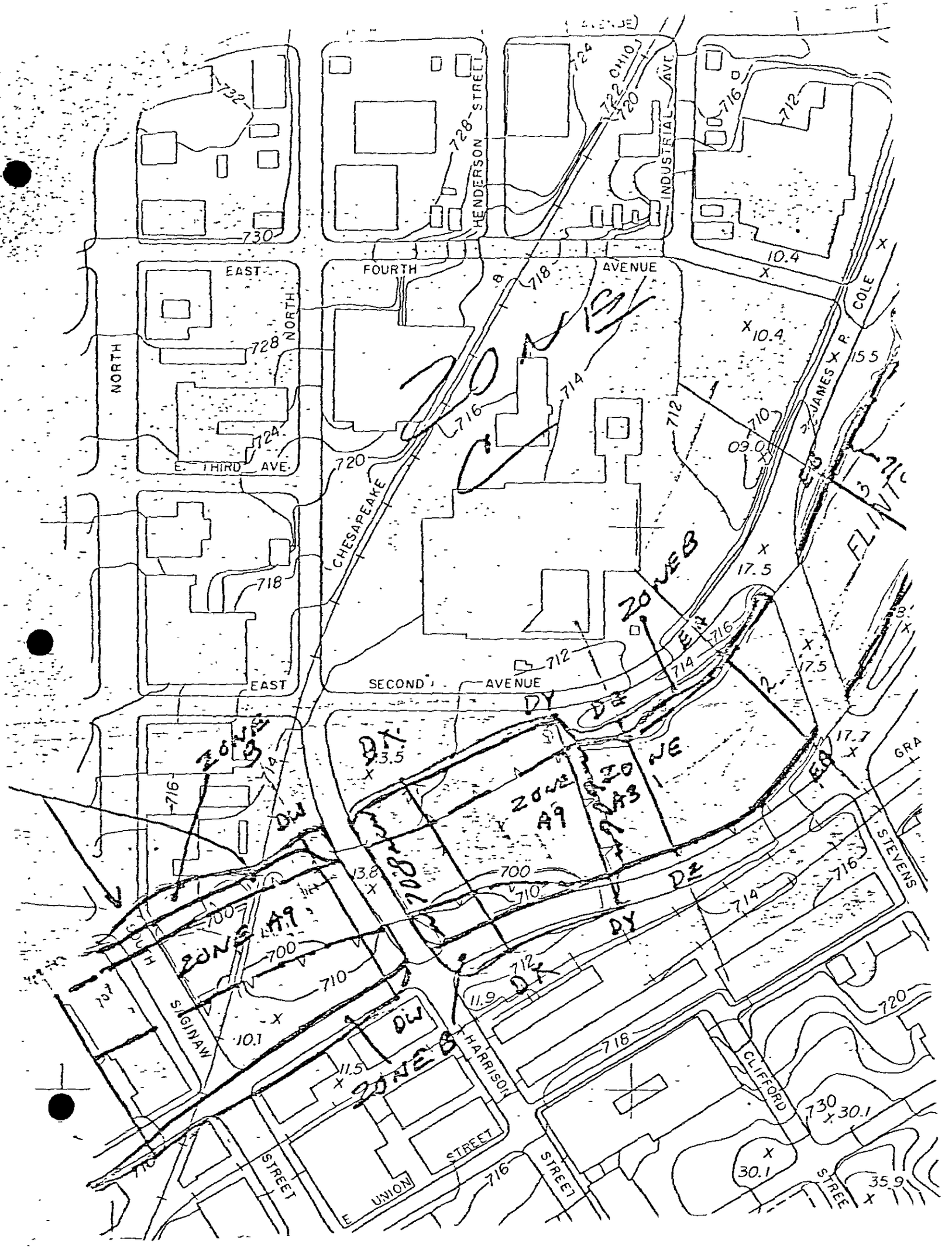
OF

Section 12, T.7N. R.6E., Flint Twp., Genesee Co., Mich.

GENESEE COUNTY DRAIN COMMISSIONER

ANTHONY RAGNONE

FLINT 20


EAST
NORTH
NORTH
FOURTH
AVENUE
HENDERSON
STREET
INDUSTRIAL
AVE
OHIO
COLE
JAMES R
E. THIRD AVE.
CHESAPEAKE
EAST
SECOND
AVENUE
ZONE B
ZONE A9
ZONE A3
ZONE
DY
DZ
DX
DW
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HARRISON
CLIFFORD
STEVENS
STREET
E UNION
STREET
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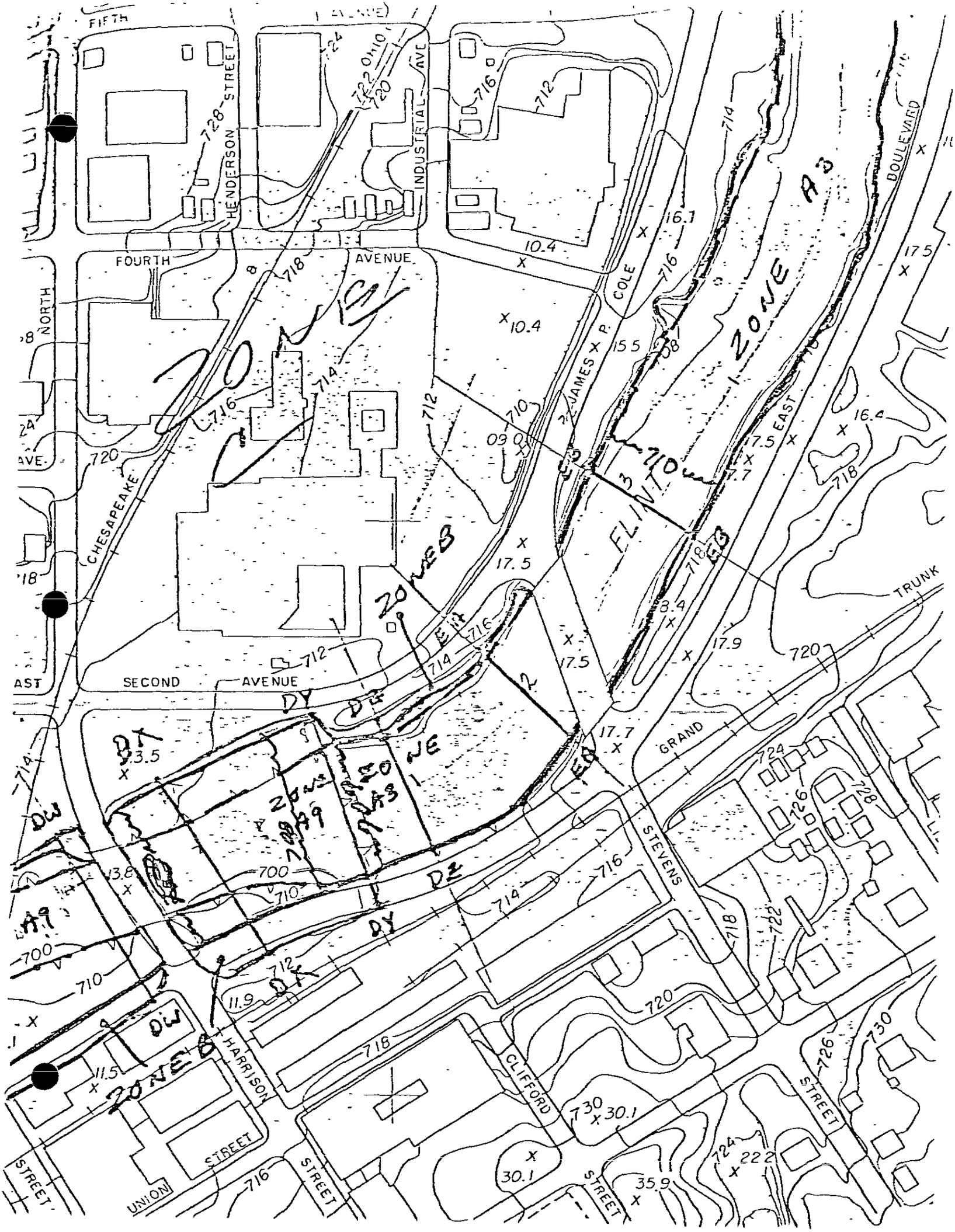
STREE
GRA
FLINT


FIFTH
STREET
HENDERSON
INDUSTRIAL
AVE
FOURTH
AVENUE
NORTH
CHESAPEAKE
COLE
JAMES
EAST
FLINT
BOULEVARD
TRUNK
SECOND
AVENUE
GRAND
STEVENS
HARRISON
CLIFFORD
STREET
UNION
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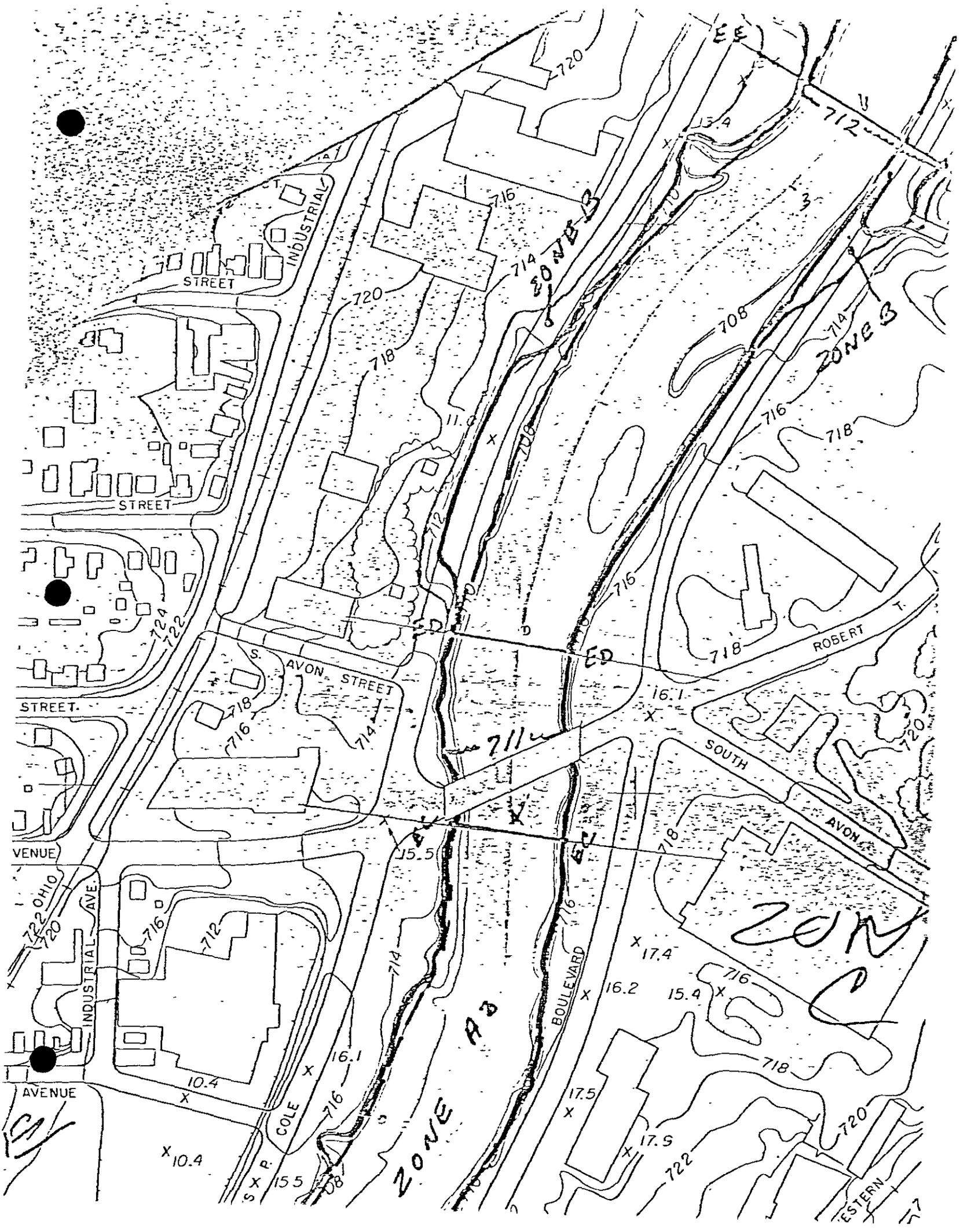
DY
DZ
DX
DW
EB
EA


INDUSTRIAL
STREET
STREET
S. AVON STREET
STREET
ROBERT
SOUTH
AVON
VENUE
OHIO
INDUSTRIAL AVE.
AVENUE
COLE
BOULEVARD
ZONE B
ZONE B
ZONE A3
ZONE C
EE
ED
ED
EC
EA
712
711
708
714
716
718
720
722
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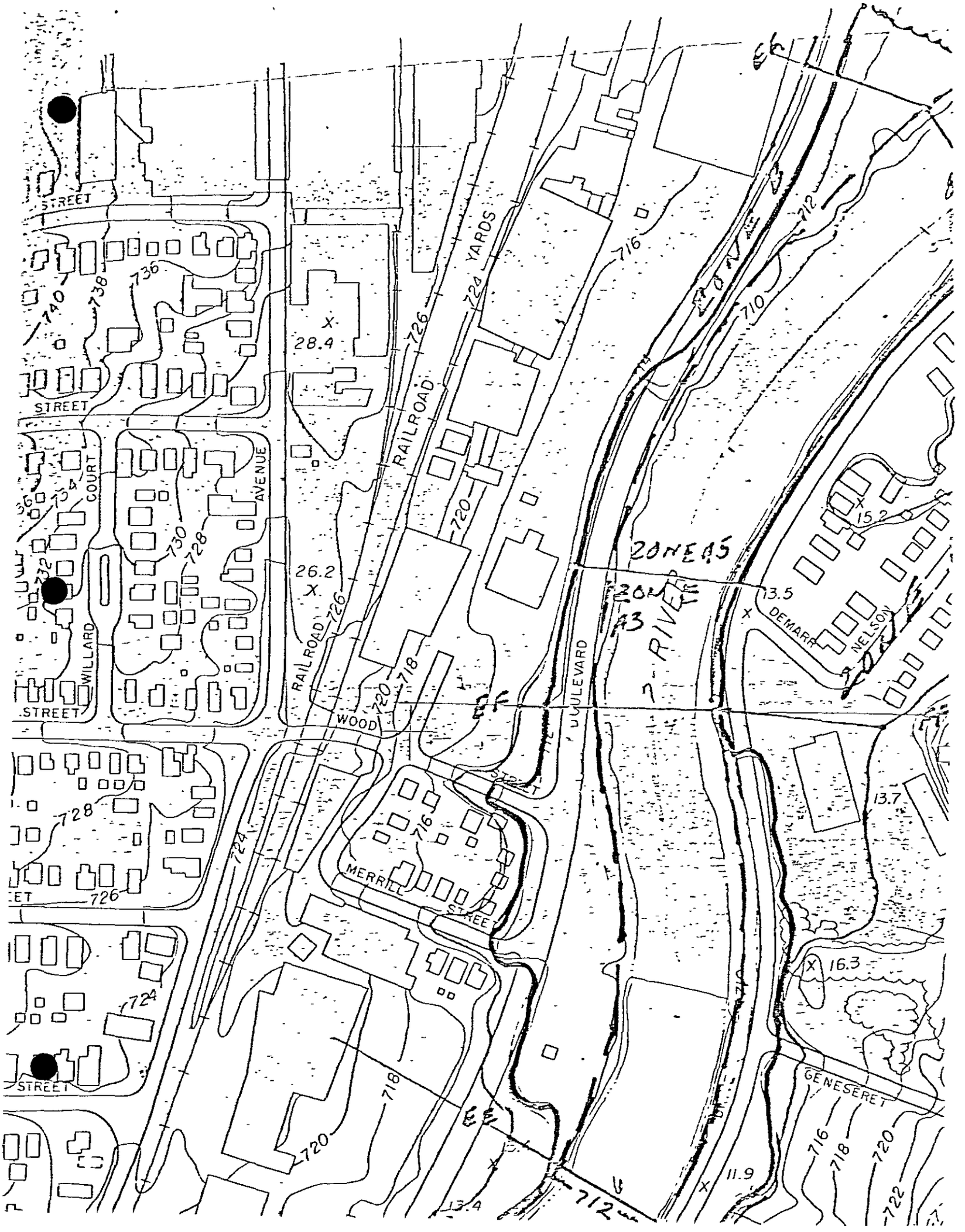
10.4
10.4
15.5


STREET
STREET
STREET
STREET
WILLARD
COURT
AVENUE
RAILROAD
YARDS
RAILROAD
WOOD
STREET
BOULEVARD
MERRILL
STREET
DEMARR
NELSON
GENESERET
ZONE A5
ZONE A3
RIVER
28.4
26.2
15.2
13.5
13.7
16.3
11.9
13.4
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726
724
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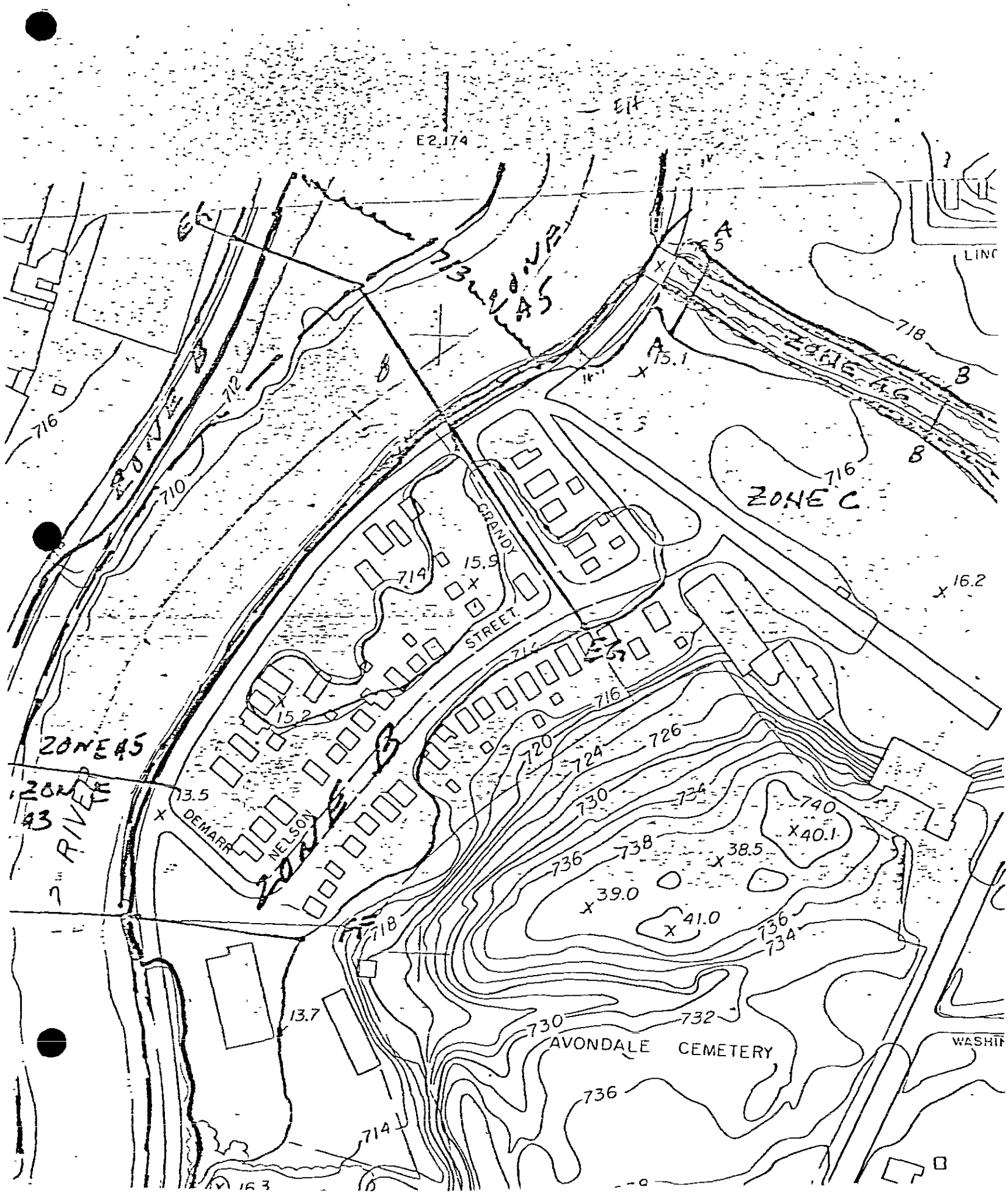
720
718
716
712
710


E2,174
ZONE A5
ZONE C
ZONE A5
ZONE A3
RIVER
GRANDY
STREET
DEMARR
NELSON
AVONDALE CEMETERY
WASHIN
LINC
718
716
714
712
710
720
724
726
730
732
734
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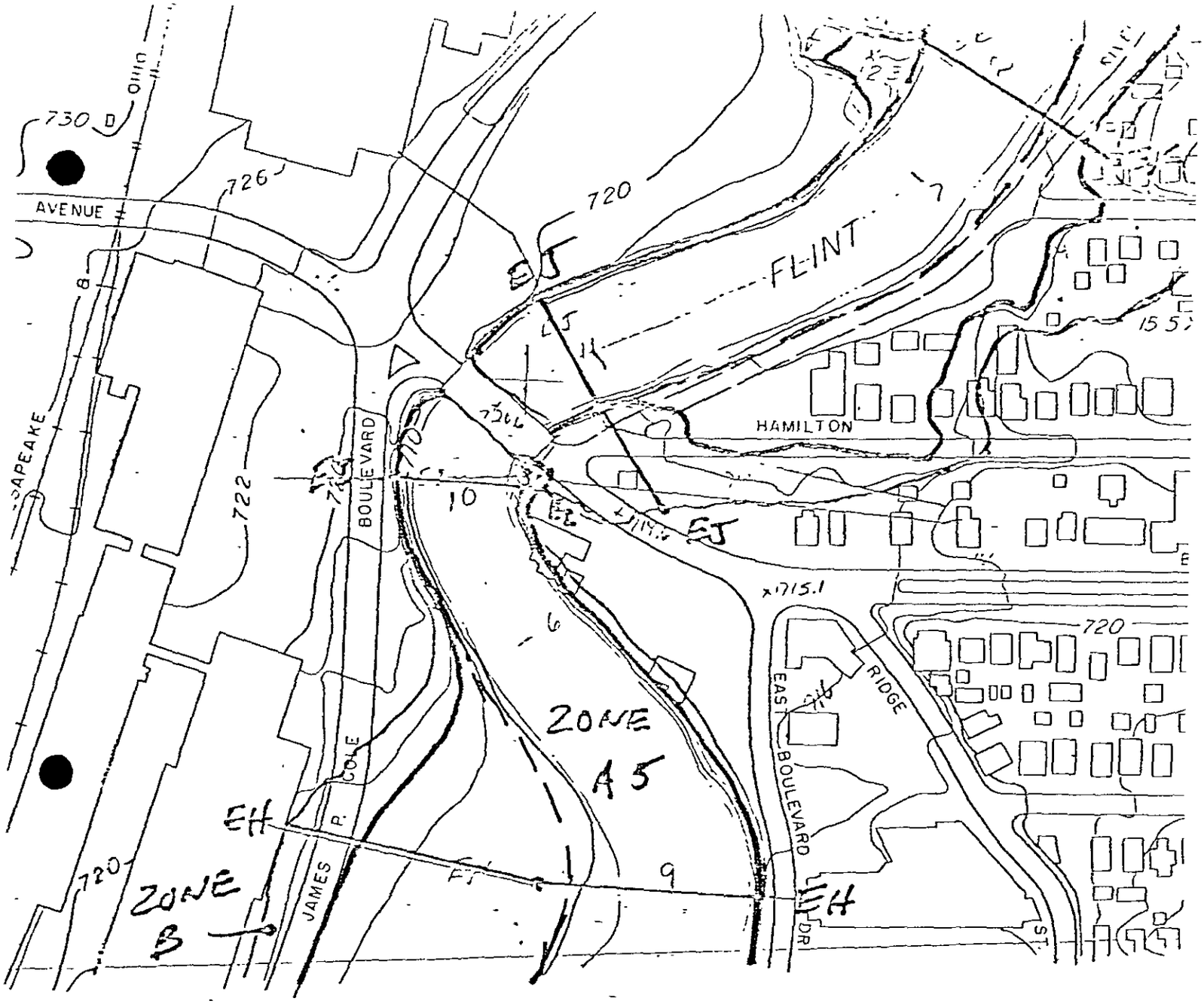
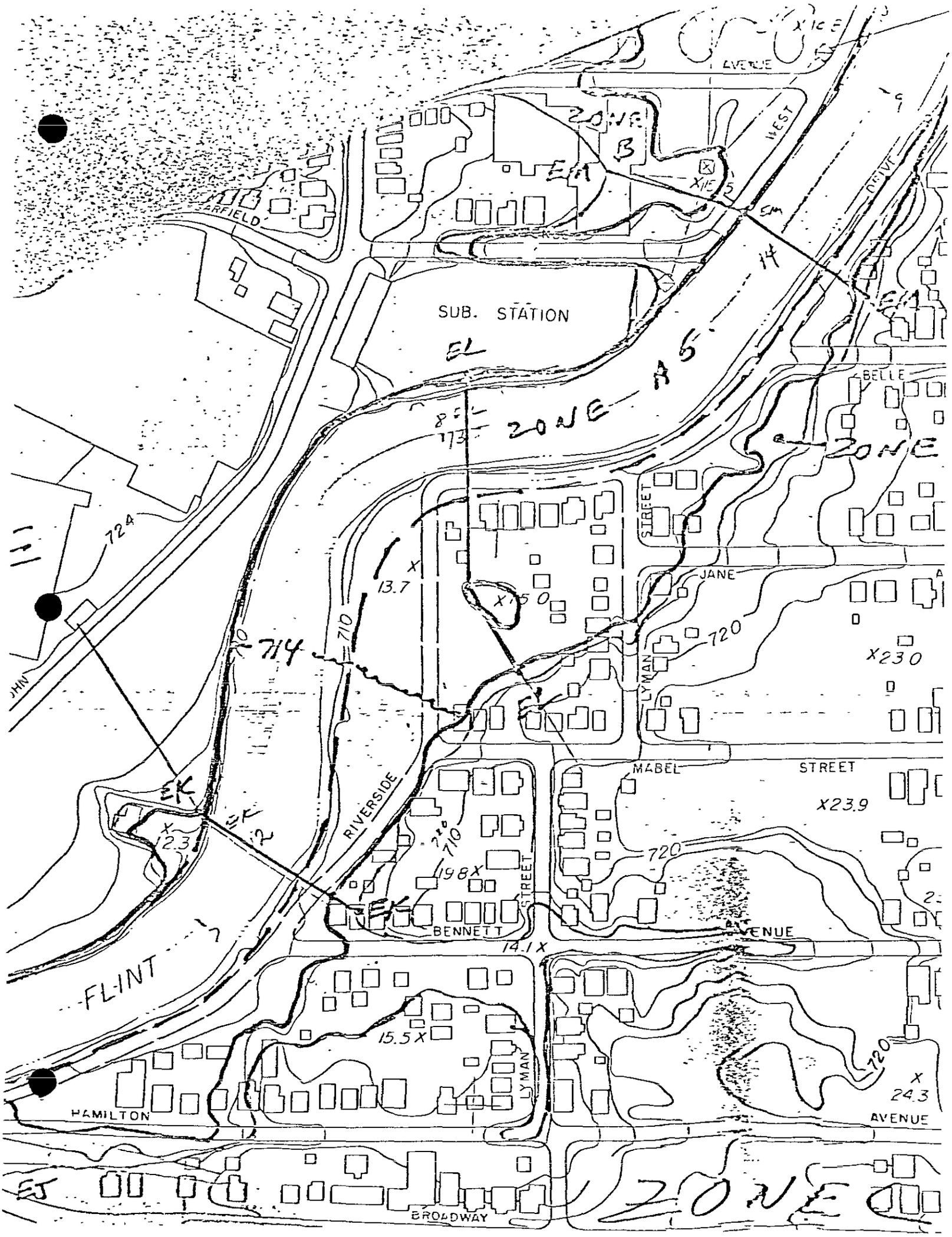


E2,174

SECTION

6	5	4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ZONE B
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ARFIELD
SUB. STATION
EL
ZONE A6
ZONE
BELLE
STREET
JANE
LYMAN
MABEL
STREET
RIVERSIDE
STREET
BENNETT
AVENUE
FLINT
HAMILTON
AVENUE
BROADWAY
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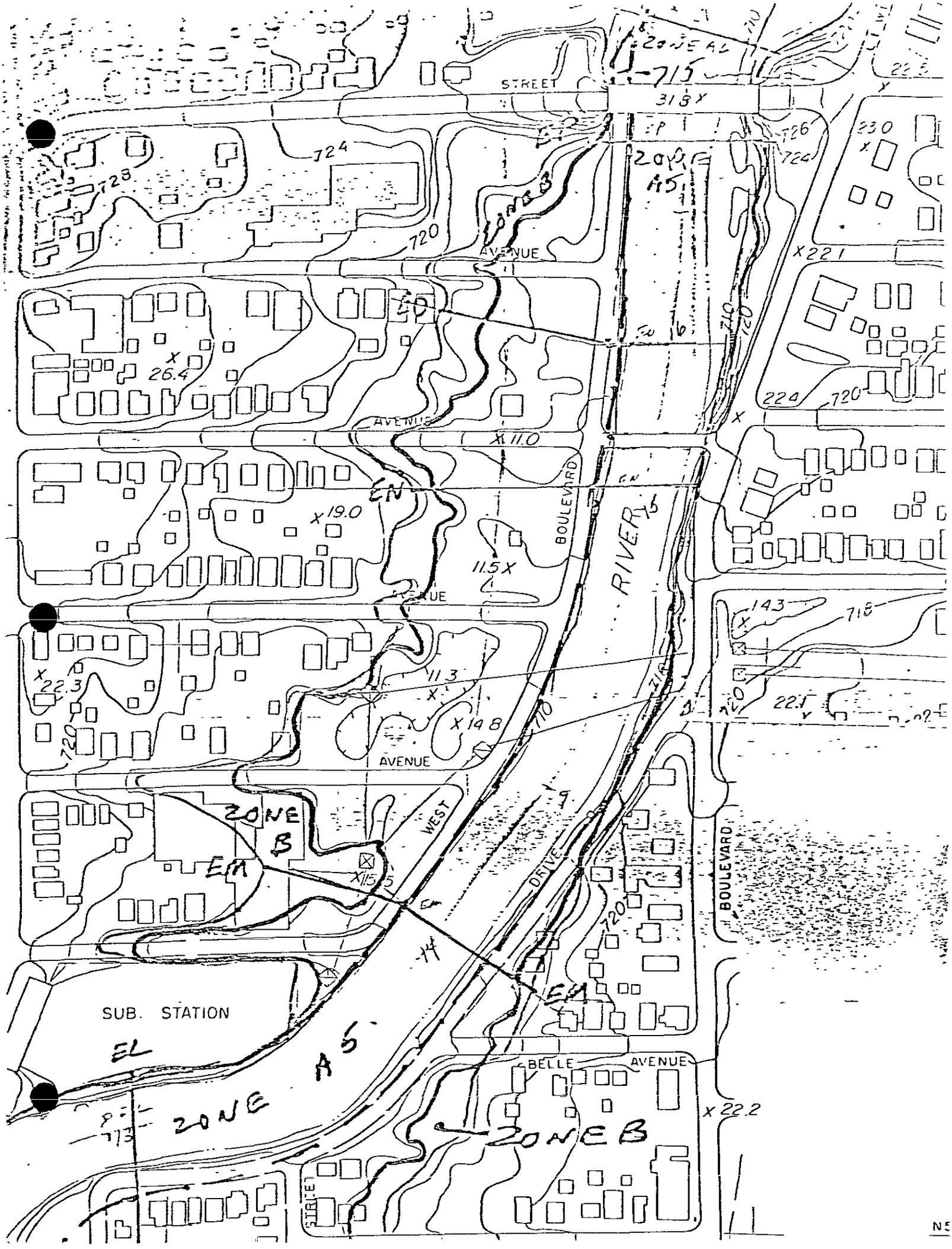
24.3


STREET
AVENUE
AVENUE
AVENUE
BOULEVARD
RIVER
WEST
DRIVE
BOULEVARD
BELLE
AVENUE
STREET
SUB. STATION
ZONE A5
ZONE B
ZONE B
ZONE A5
ZONE A5
EN
EN
EN
EN
EL
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STREET
STREET
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FLINT
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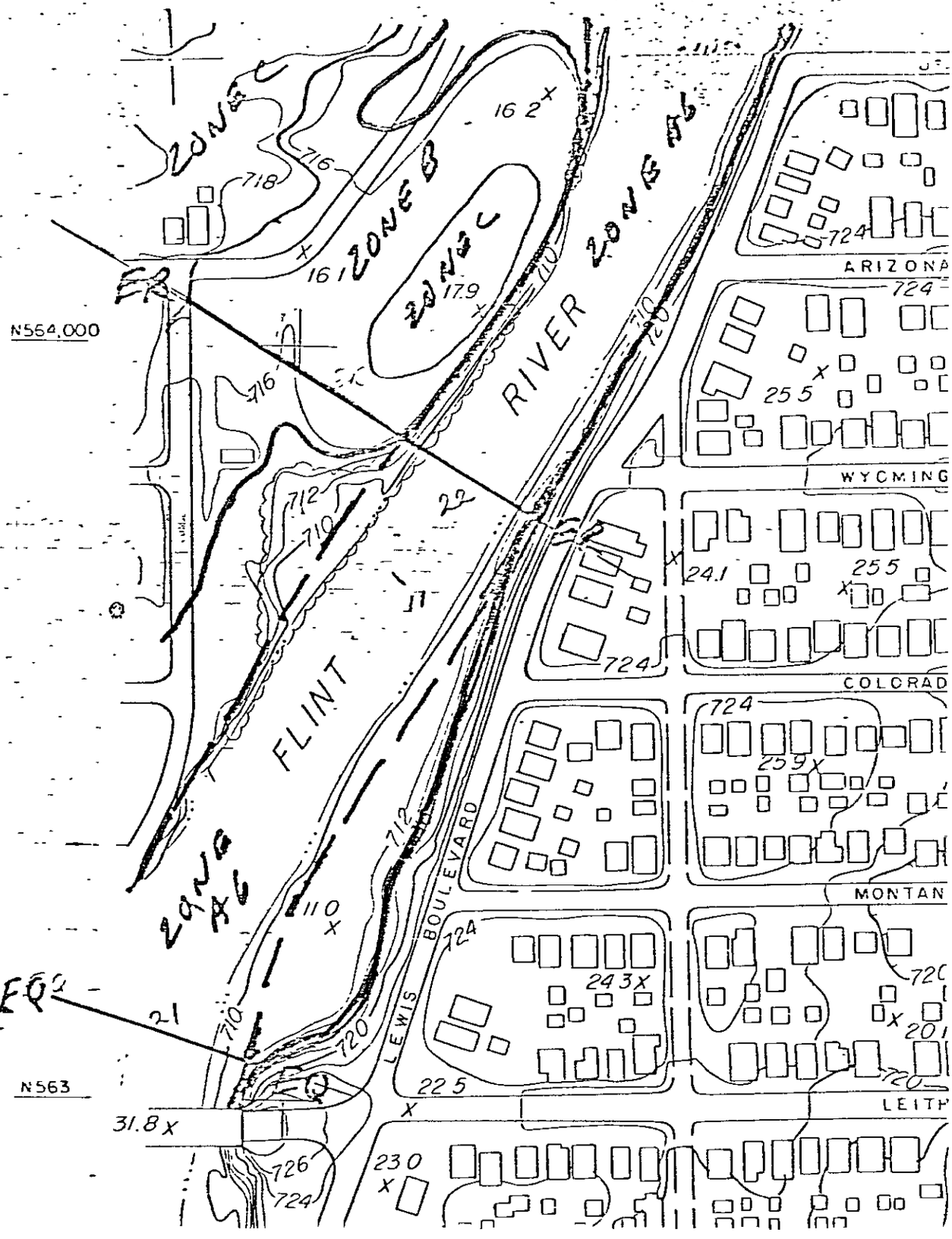
243 X
225
230 X
221 X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ZONE B
ZONE C
RIVER
ZONE A6
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FQ
N564,000
N563
ARIZONA
WYOMING
COLORAD
MONTAN
LEITH
LEWIS BOULEVARD
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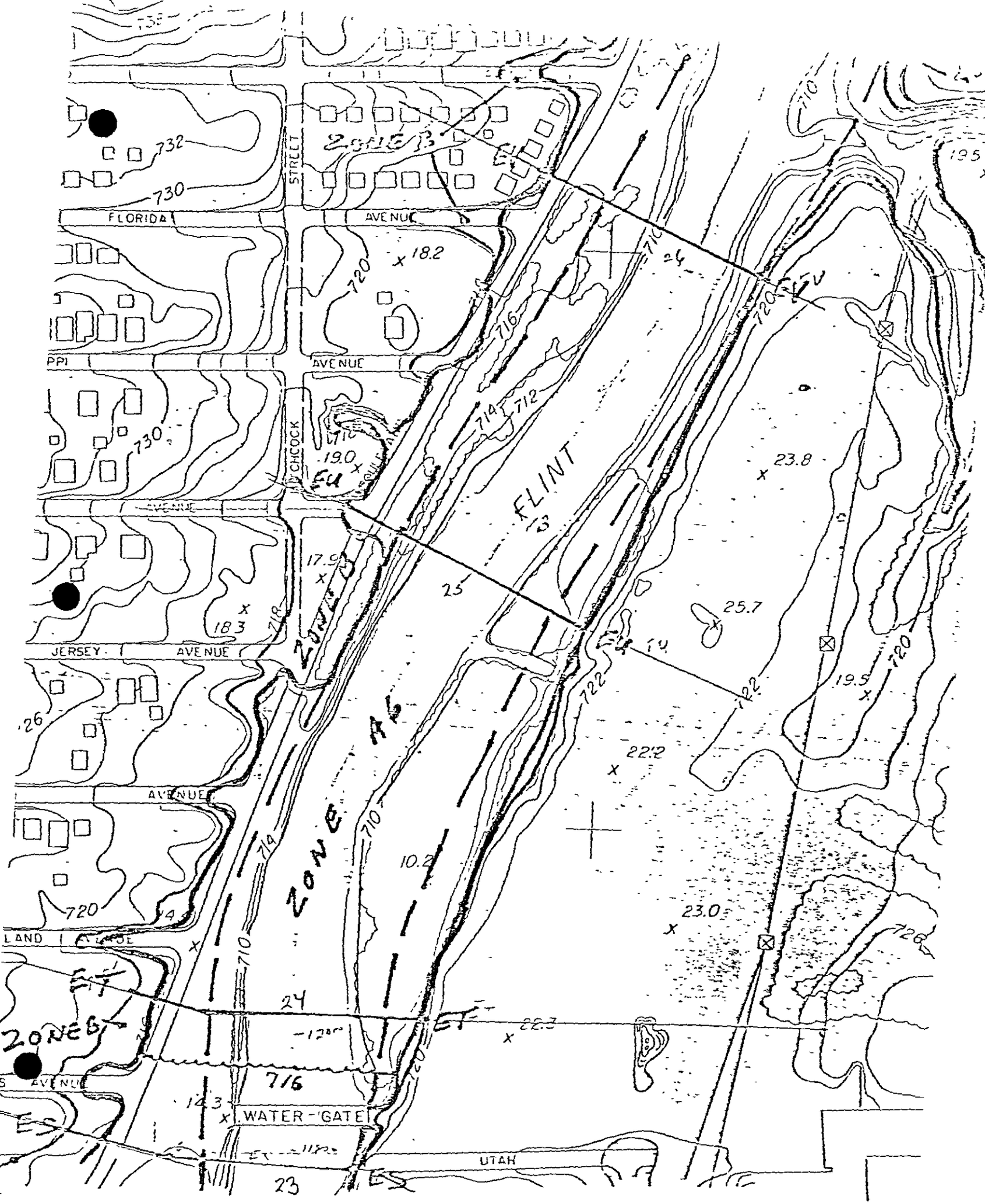
ZONE B
FLORIDA
AVENUE
STREET
CHICOCK
FLINT
ZONE A6
ZONE B
JERSEY
AVENUE
WATER GATE
UTAH
732
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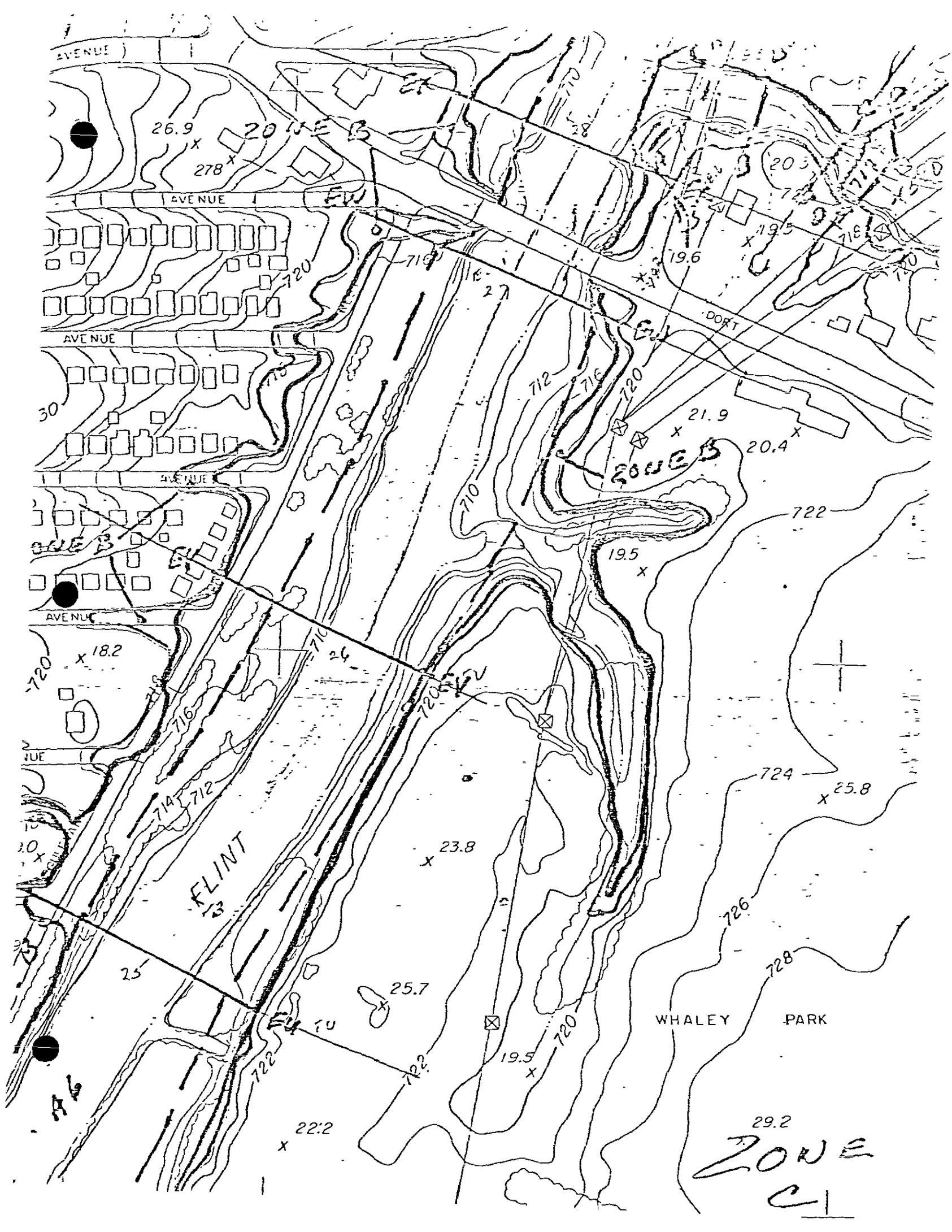
AVENUE
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AVENUE
DORT
FLINT
WHALEY
PARK
ZONE B
ZONE B
ZONE B
ZONE C
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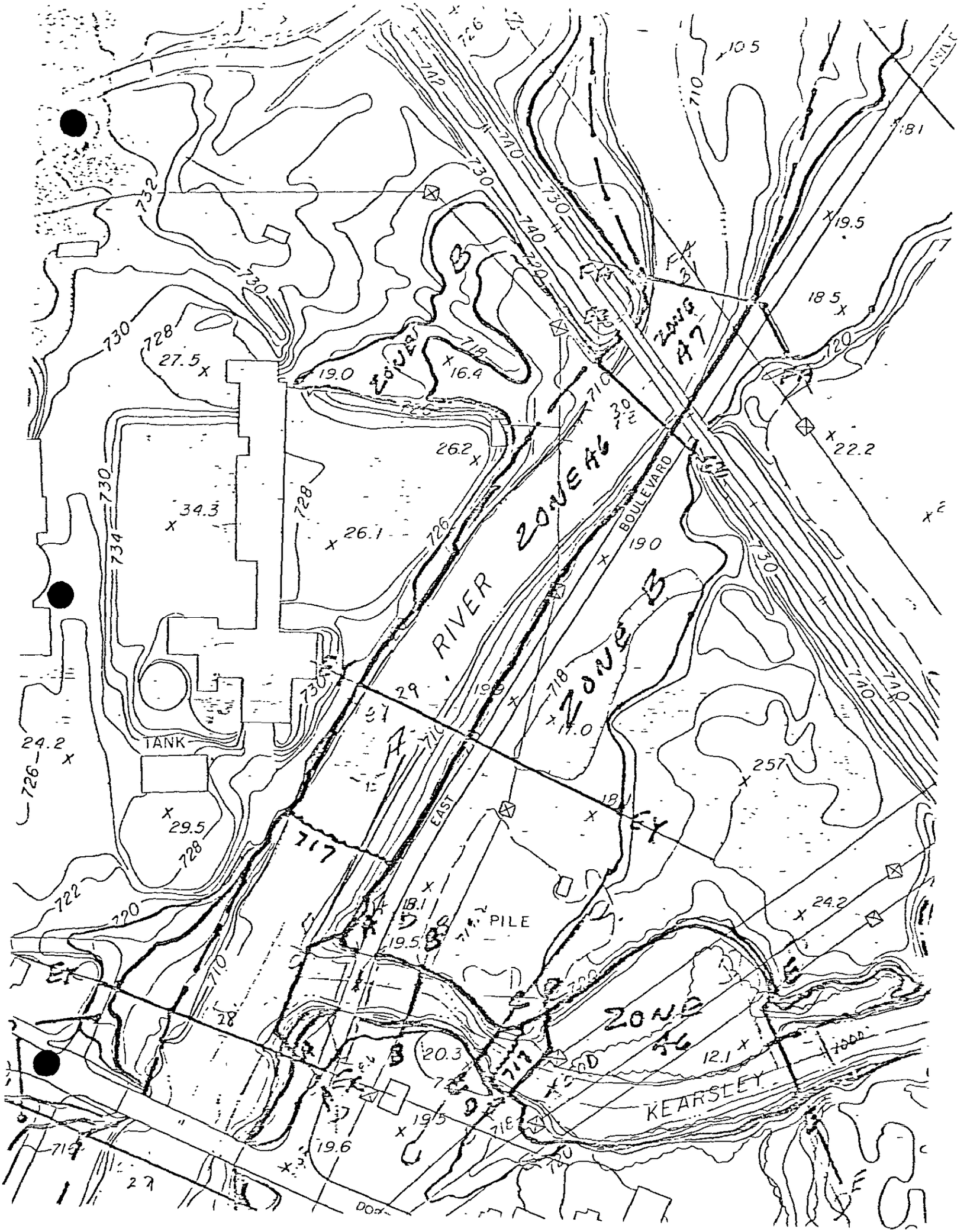
RIVER
ZONE A
ZONE B
ZONE A7
BOULEVARD
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PILE
KEARSLEY
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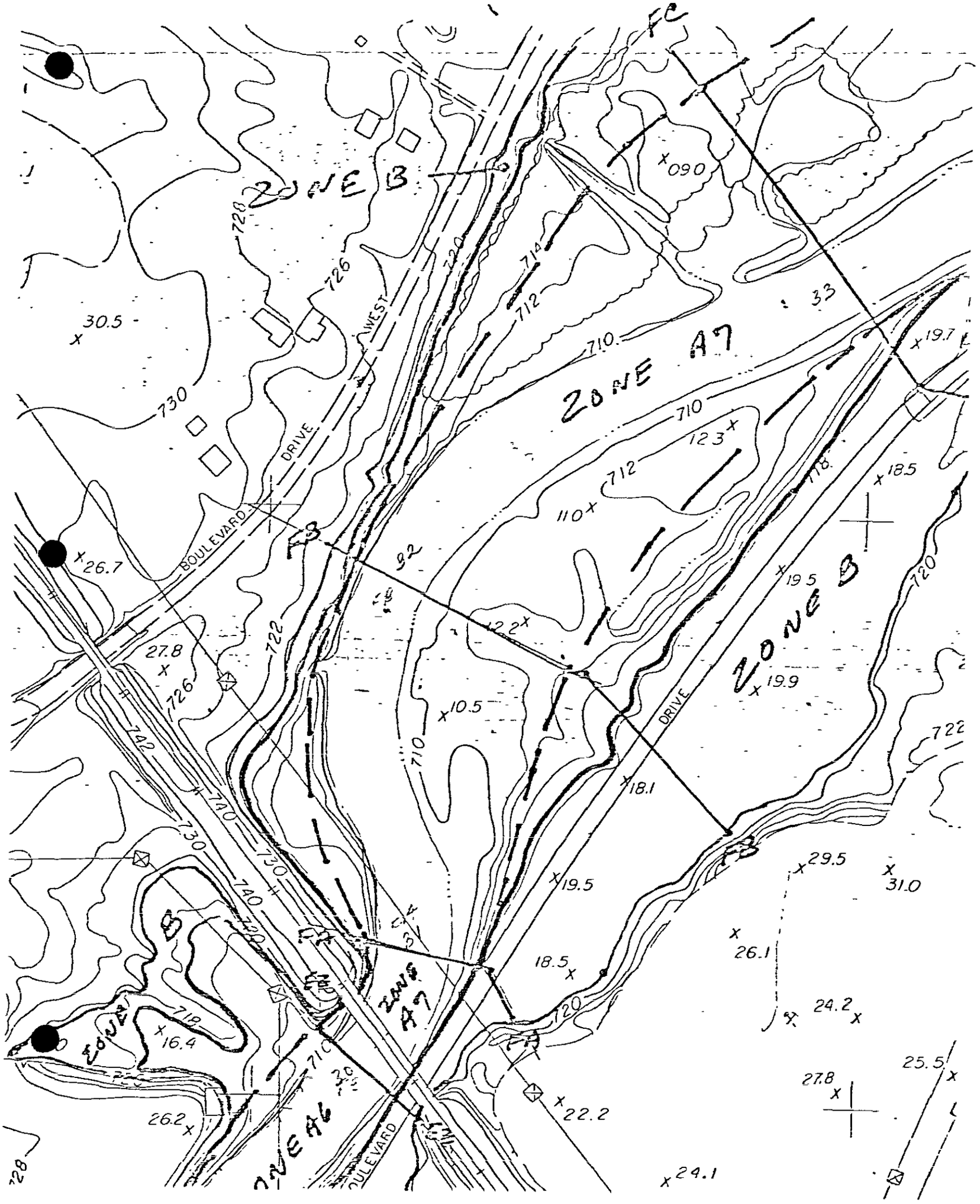
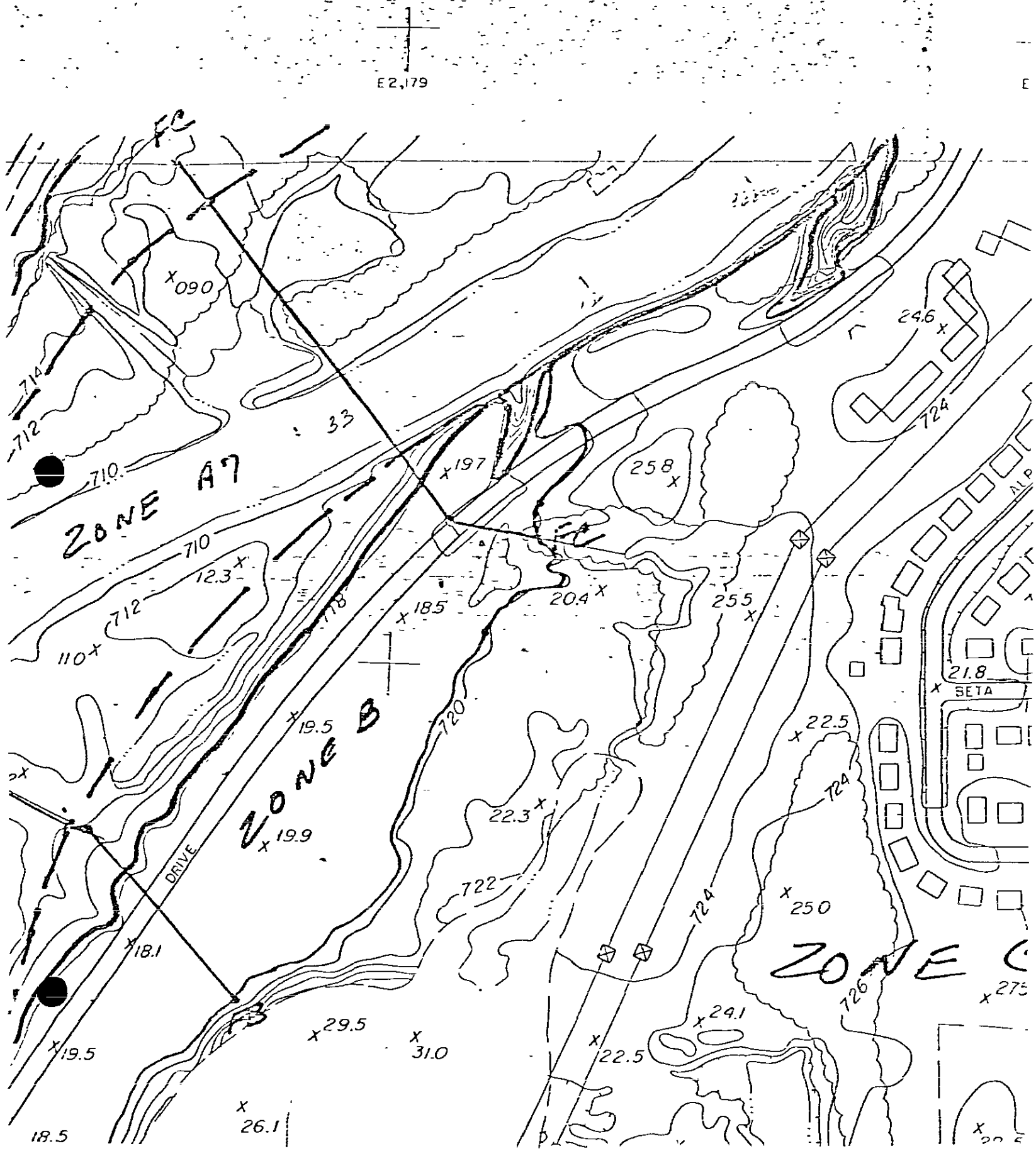
25.7


ZONE B
ZONE A7
ZONE B
ZONE A7
ZONE A6
ZONE B
WEST
DRIVE
BOULEVARD
DRIVE
BOULEVARD
FC
FB
FB
FB


E2,179
ZONE A7
ZONE B
ZONE C
DRIVE
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197
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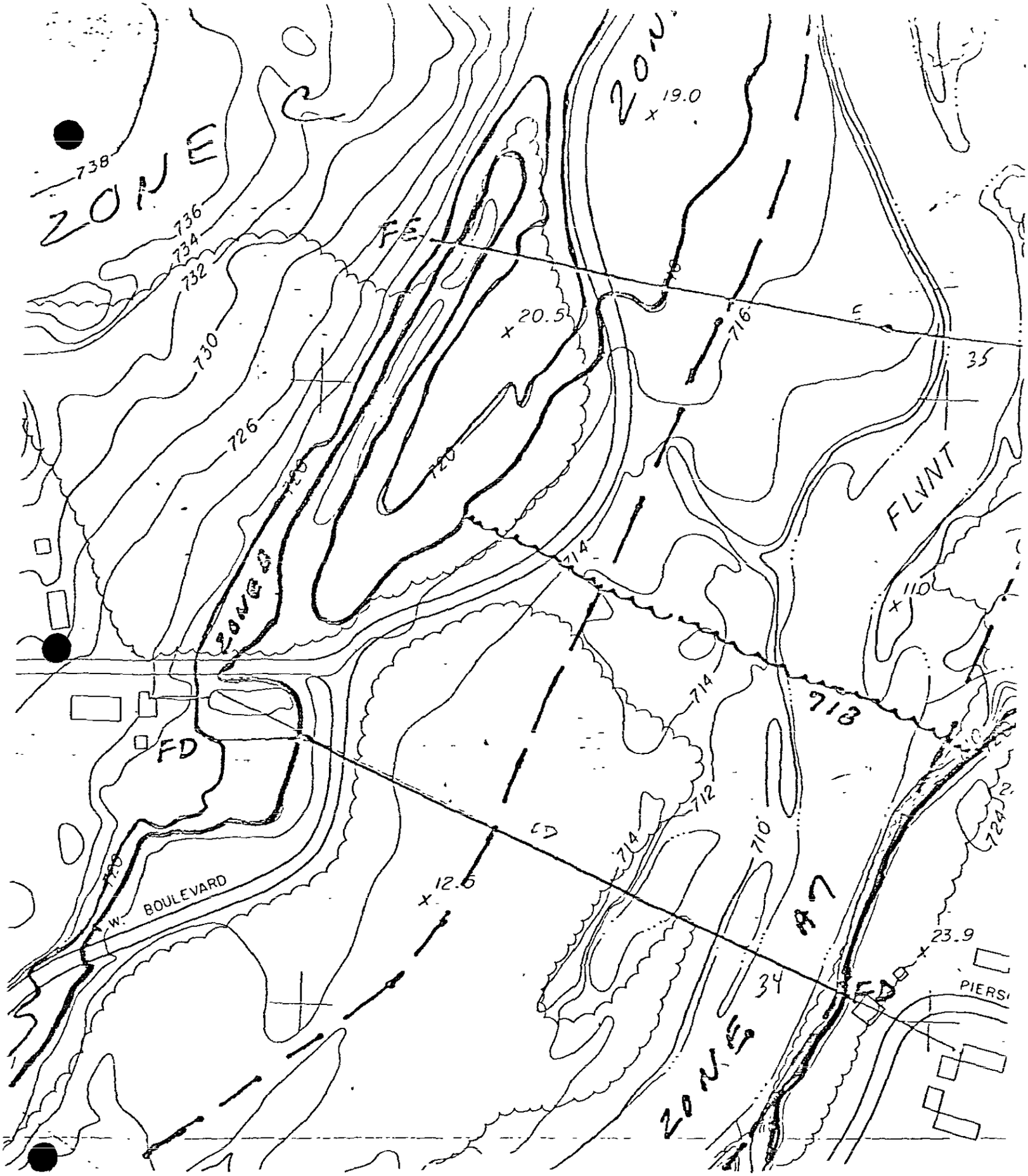
ZONE
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PIERS
ZONE A
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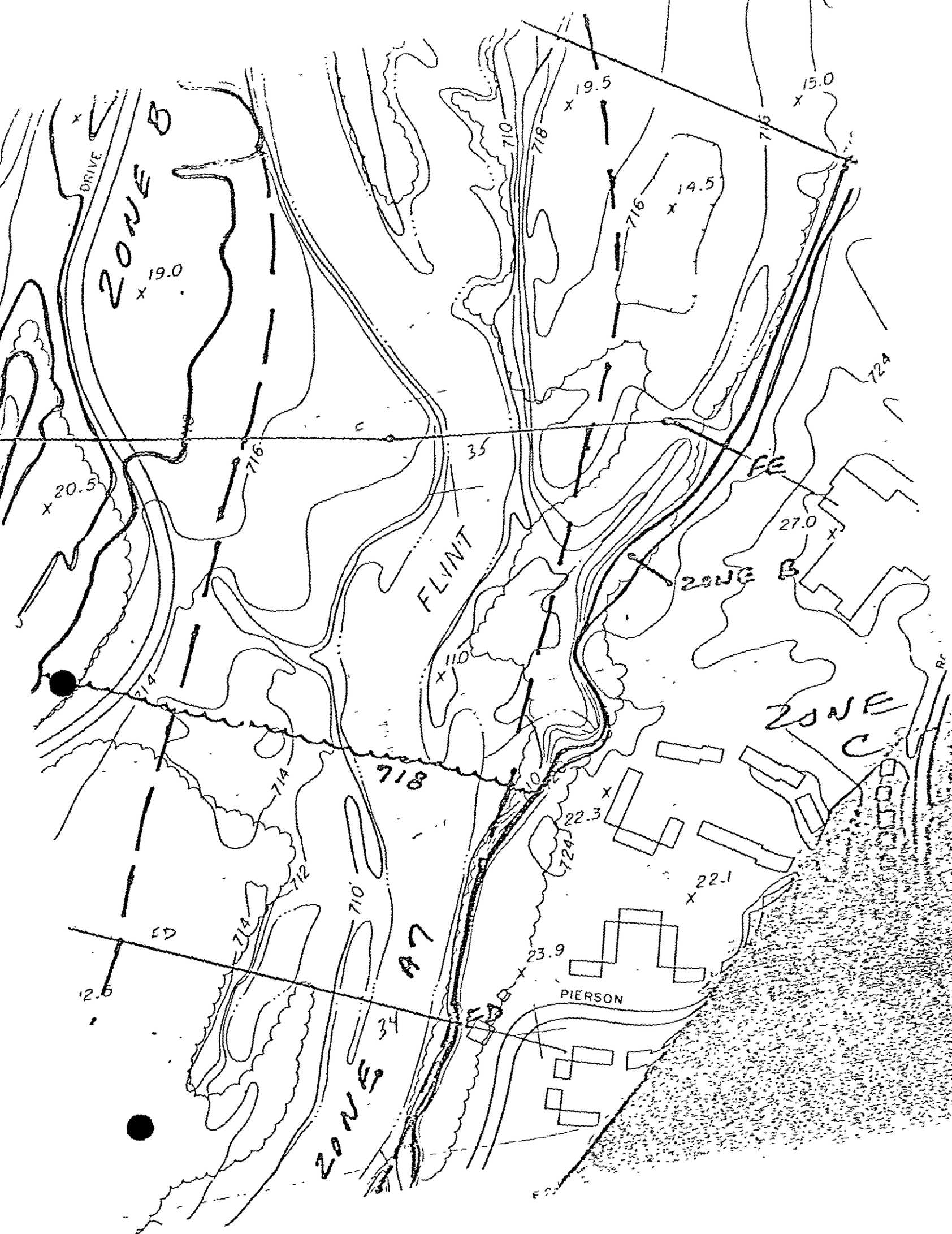
ZONE B
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ZONE A

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FLINT
ZONE B
ZONE B
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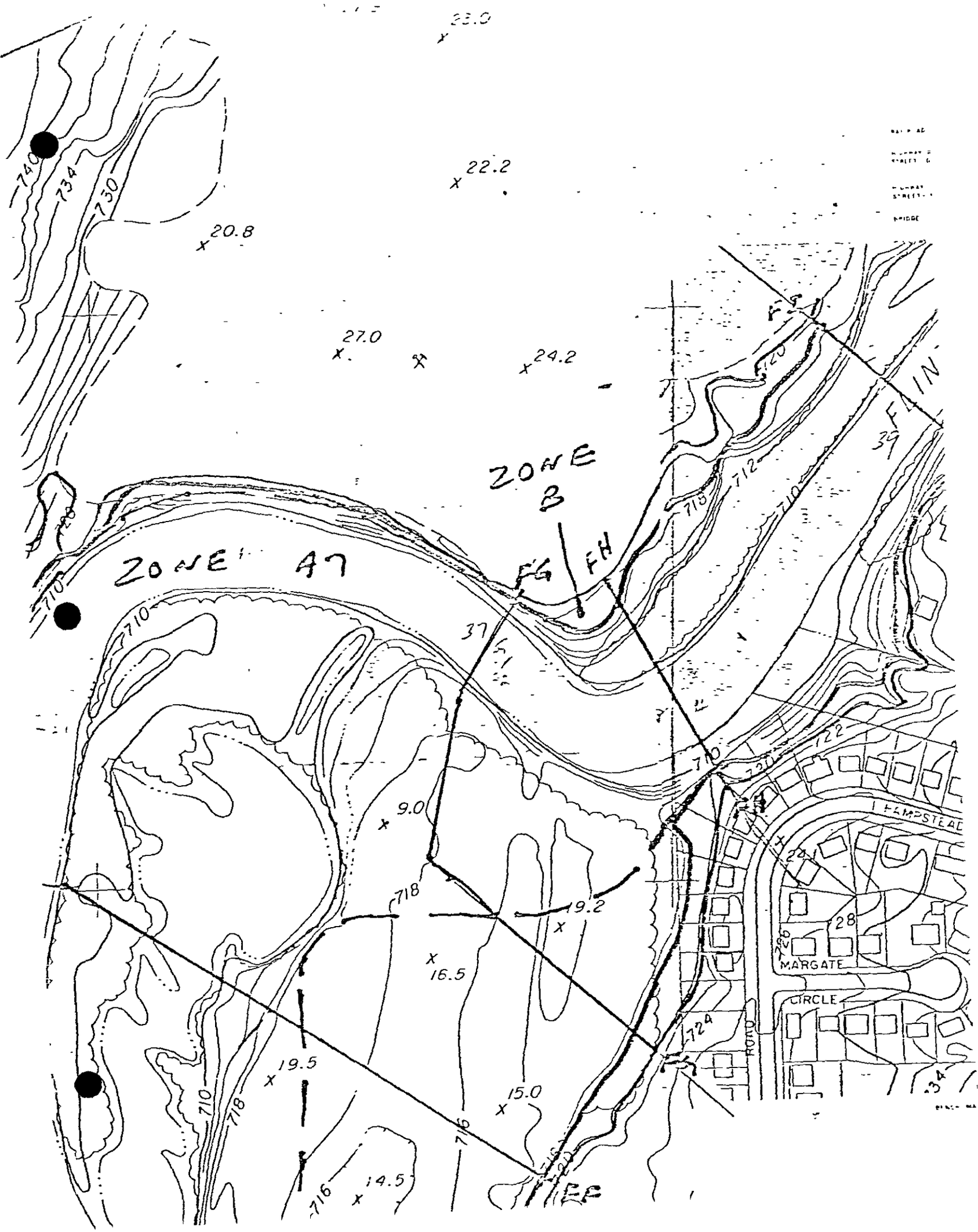
ZONE B
ZONE A7
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FH
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HAMPSTEAD
MARGATE
CIRCLE
ROAD
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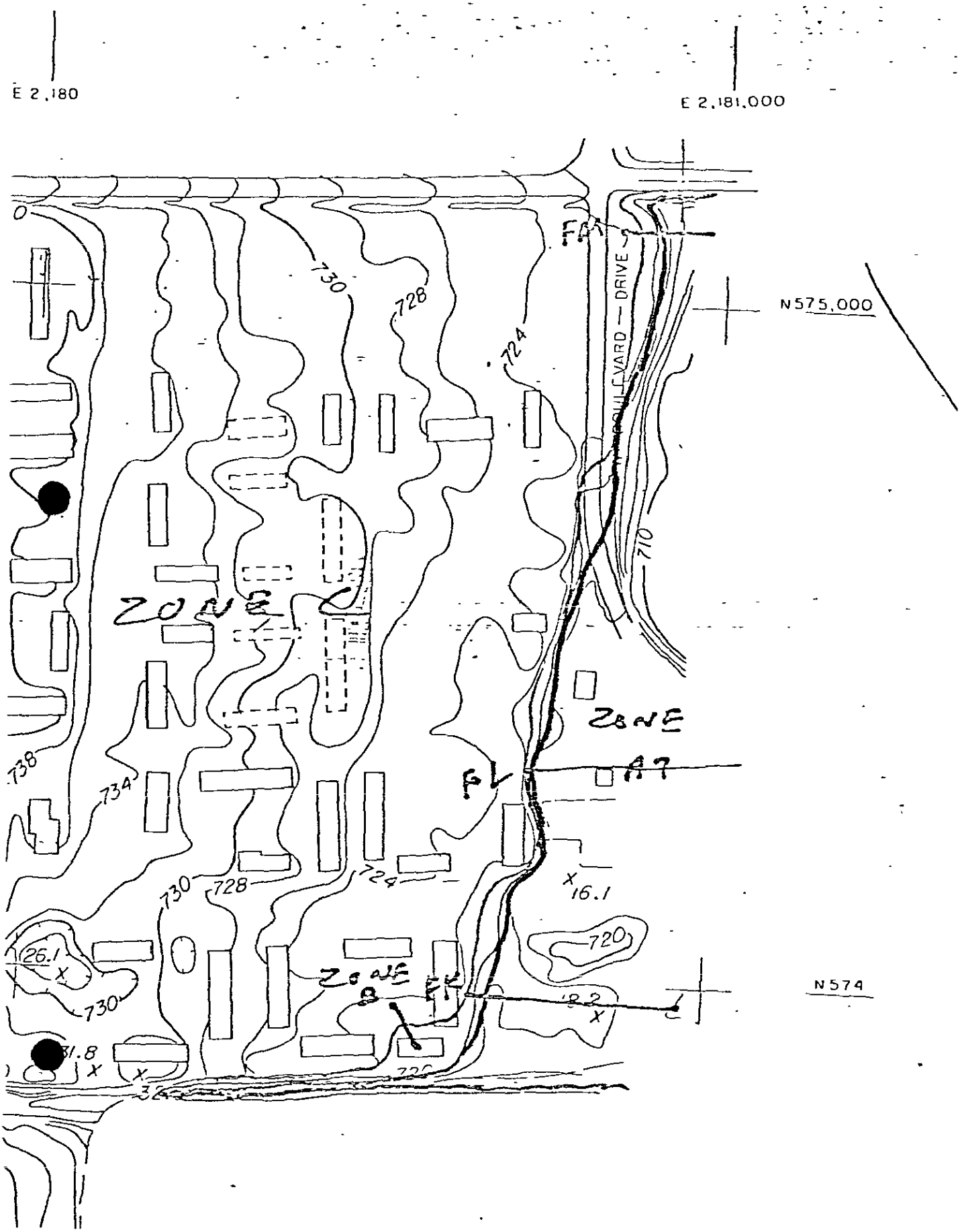
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N574
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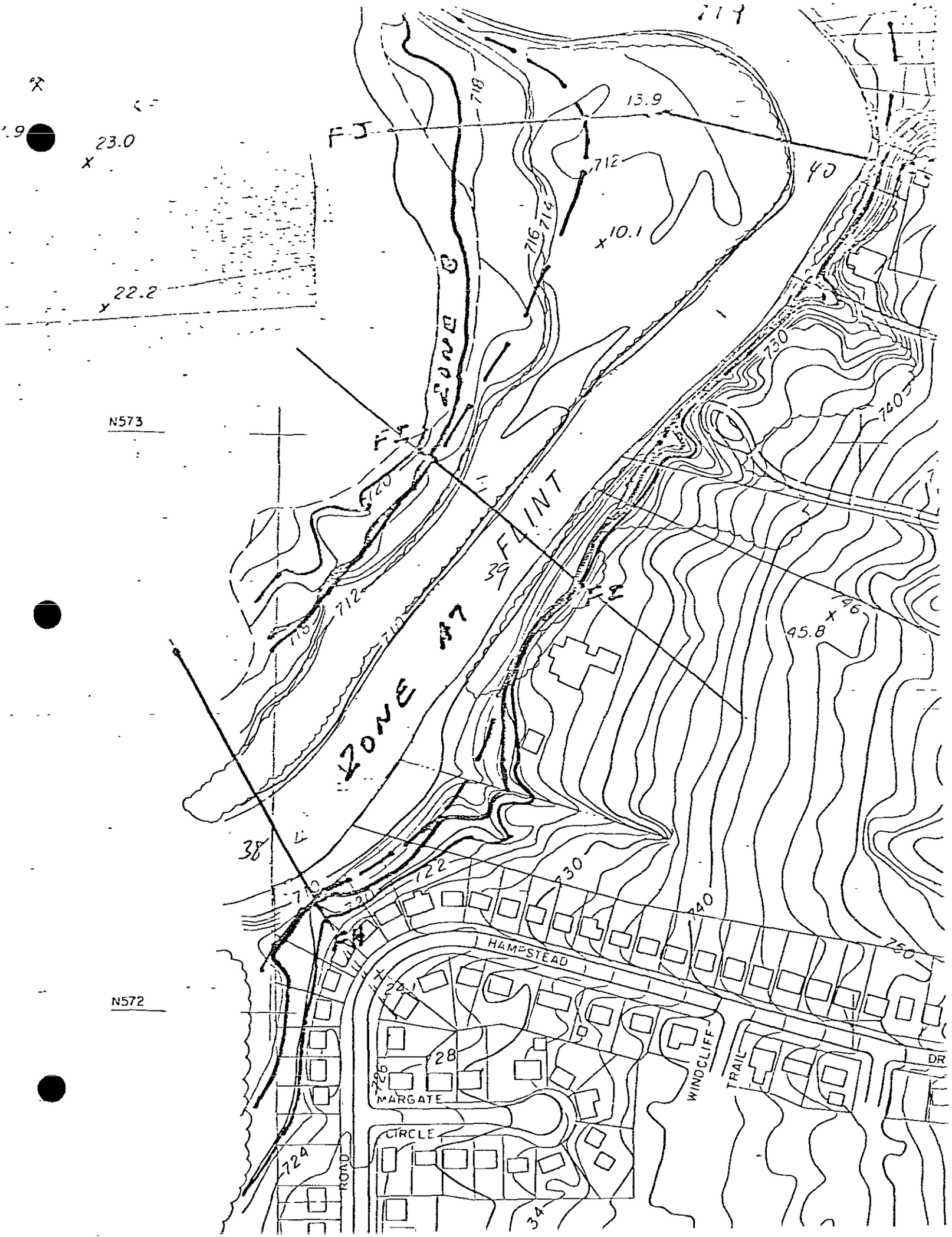
ZONE A7
FLINT
POND
N573
N572
HAMPSTEAD
MARGATE
CIRCLE
ROAD
WINDCLIFF
TRAIL
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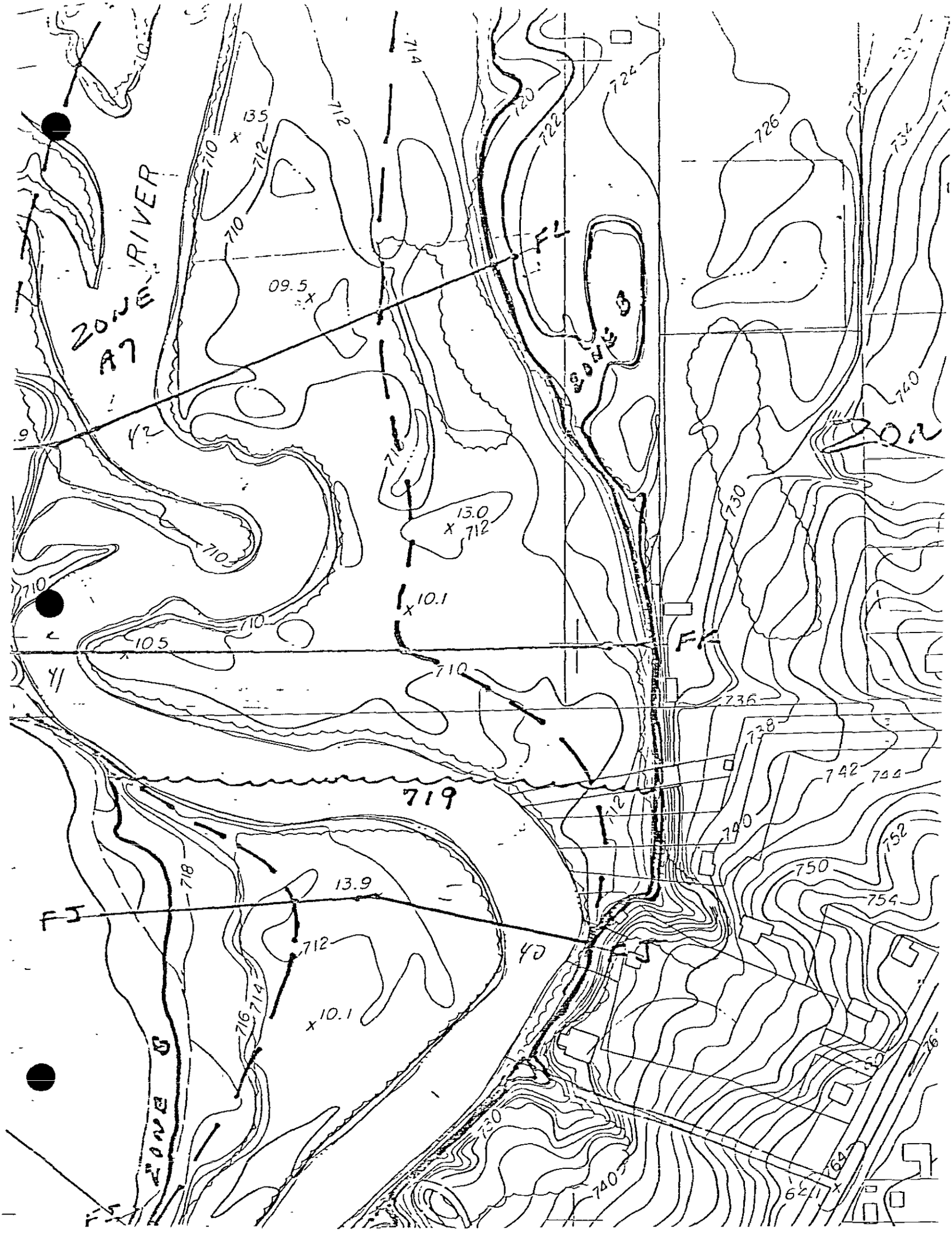
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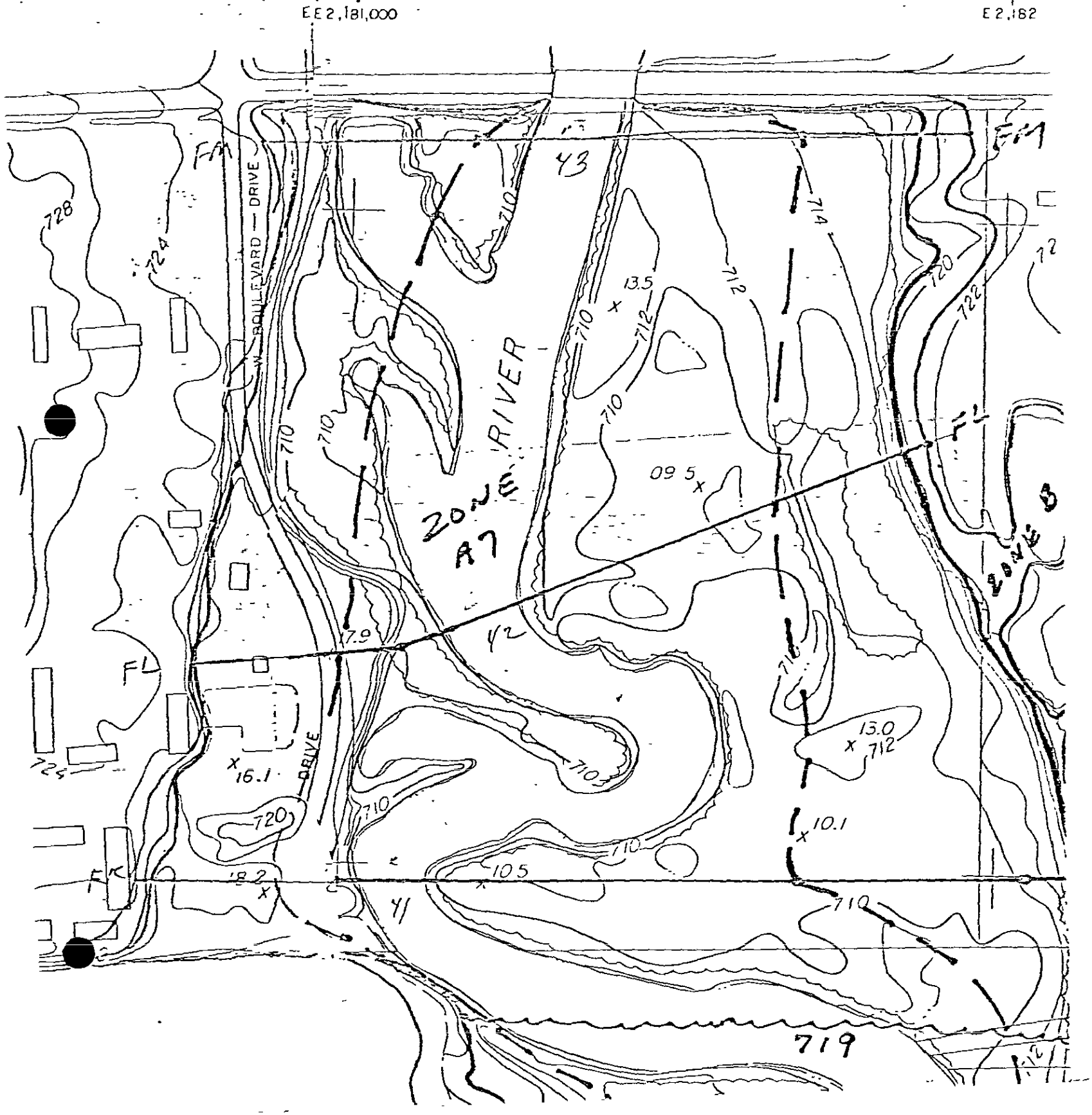
F998
F999
F1000


E 2,181,000
E 2,182
W. BOULEVARD — DRIVE
DRIVE
RIVER
ZONE A7
ZONE B
43
42
41
719
728
724
720
722
714
712
710
13.5
09 5
17.9
16.1
13.0
10.1
10.5
FM
FL
FK

00BREAK00

1) COUNTY: Genesee

2) STUDY NAME: City of Flint

3) WATERCOURSE: Gibson Drain
(maple Rd To maple brook)

4) DOCUMENT TYPE: input + 100 yr natural
+ 100 yr. encroachment

00BREAK00

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE=11/22/

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
                                 100-YR
1 00001 GIBSON DR MAPLE RD TO MAPLEBROOK AW-AX   KNUTILLA 03 05 02 12 05
2 00002 077065  77280  77370  77490  77371
3 04600    AW 1 012 03 0767 0018470 01 03 — identification
4 04605 000390 000560 000660 000840 000660
5 04610    -210 01 07760 -130 01 07750 0000 01 07739 0022 02 07707 0036 02 07650   AT
5 04611    0040 02 07644 0044 02 07651 0054 03 07704 0106 03 07706 0200 03 07750
5 04612    0220 03 07750 0300 03 07760
6 04620 01 02 035 035 01 02 040 040 01 02 040 040
3  4650 AW+1  0  12  3  767  18770  1  3
5  4660       0  1  7780   20  1  7760   70  1  7740   80  1  7720  100  2  7700   AU
5  4661     110  2  7648  120  2  7648  135  3  7700  250  3  7720  280  3  7740
5  4662     300  3  7760  380  3  7780
6  4680  1  2 035 035  1  2 040 040  1  2 040 040
3 04700    AX 0 008 03 0768 0019200 01 03
5 04710    0000 01 07760 0000 01 07740 0065 02 07720 0075 02 07656 0085 02 07656   AV
5 04711    0090 03 07700 0120 03 07740 0190 03 07760
6 04720 01 02 035 035 01 02 040 040 01 02 050 050
```

each 300

Input

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE=11/28/

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 GIBSON DR MAPLEBROOK TO I-475  AY-AY+1   KNUTILLA  2  5  2  5 12
2      2  77220  77425  77480  77550  77487
3 04800    AY 1 010 03 0770 0019275 01 03
4  4805    360    520    600    770    600
5 04810    -120 01 07780 -120 01 07740  -92 02 07719  -70 02 07670  -65 02 07665
5 04811     -60 02 07670  -36 03 07730 0000 03 07746 0100 03 07760 0200 03 07780
6 04820 01 02 035 035 01 02 035 035 01 02 035 035
3  4900 AY+1  0  10  3  770   19430  1  3
5  4910      0  1  7780    0  1  7750   30  1  7740   60  2  7720   75  2  7670
5  4911     85  2  7670  110  3  7720  230  3  7740  290  3  7760  330  3  7780
6  4912  1  2 035 035  1  2 035 035  1  2 035 035
```

AW

AX

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE=12/ 6/7

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1 00001 GIBSON DR  I-475 TO PRIVATE RD  AZ-BA-1  KNUTILLA 04 05 02 05 12
2 00002  77300  77570  77690  77875  77696
3  5000    AZ 1   9  3  770   19775  1  3
4 05005 000350    500    600    750    600
5  5010    -220  1  7800 -170  1  7760  115  1  7740  130  2  7720  135  2  7670   AY
5  5011     145  2  7670  165  3  7720  320  3  7740  400  3  7800
6  5020  1  2 040 040  1  2 040 040  1  2 060 060
3  5100 BA-1  0  10  3  770   20350  1  3
5  5110       0  1  7800   20  1  7780   80  1  7760  155  2  7740  160  2  7690   AZ
5  5111     165  2  7690  180  3  7740  290  3  7760  340  3  7780  500  3  7800
6  5120  1  2 060 060  1  2 050 050  1  2 060 060
3  5150 RD CR 0  6  2  776   20380  1  3
5  5160    -310  1  7800 -296  1  7794 -238  1  7763 -172  2  7756    0  2  7775
5  5161     266  2  7816
6  5170  1  2 060 060  1  2 060 060
3  5200    BA 0  12  3  772   20420  1  3
5  5210    -100  1  7800  -70  1  7780  -30  1  7760    0  1  7759   34  2  7761   BA
5  5211      38  2  7692   48  2  7686   50  2  7692   62  3  7750  100  3  7760
5  5212     150  3  7780  350  3  7800
6  5220  1  2 060 060  1  2 050 050  1  2 060 060
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1 00001 GIBSON DRAIN PRIVATE RD TO WISHINGWELL   KNUTILLA  8  5 02 05 12
2 00002 077580  77675  77750  77875  77755
3  5200     BA 1  12  3  772   20420  1  3
4 05205 000350    500    600    750    600
5  5210    -100  1  7800  -70  1  7780  -30  1  7760    0  1  7759   34  2  7761   BA
5  5211      38  2  7692   48  2  7686   50  2  7692   62  3  7750  100  3  7760
5  5212     150  3  7780  350  3  7800
6  5220  1  2 060 060  1  2 050 050  1  2 060 060
3  5300     BB 0  13  3  772   20930  1  3
5  5310       0  1  7840   50  1  7820   90  1  7800  290  1  7780  295  1  7760   BB
5  5311     315  2  7740  320  2  7698  325  2  7698  340  3  7740  350  3  7760
5  5312     460  3  7780  480  3  7800  570  3  7840
6  5320  1  2 080 080  1  2 055 055  1  2 070 070
3  5400     BC 0  10  3  772   21430  1  3
5  5410       0  1  7840   30  1  7820   50  1  7800   90  1  7780  220  2  7760   BC
5  5411     245  2  7709  265  3  7780  450  3  7800  480  3  7820  495  3  7840
6  5420  1  2 080 080  1  2 050 050  1  2 070 070
3  5500     BD 0  10  3  774   21810  1  3
5  5510       0  1  7860   55  1  7840   70  1  7820  125  1  7820  235  2  7800   BD
5  5511     260  2  7717  290  3  7780  420  3  7800  480  3  7820  540  3  7860
6  5520  1  2 070 070  1  2 050 050  1  2 070 070
3  5600     BE 0  13  3  775   22220  1  3
5  5610       0  1  7880  120  1  7860  150  1  7840  180  1  7840  190  1  7820   BE
5  5611     285  1  7800  300  2  7760  320  2  7726  335  3  7780  350  3  7800
5  5612     370  3  7820  415  3  7840  470  3  7880
6  5620  1  2 060 060  1  2 050 050  1  2 060 060
3  5700     BF 1  10  3  776   22470  1  3
4 05705 000340 000480 000550 000700 000550
5  5710       0  1  7880   80  1  7860  195  1  7860  200  1  7840  280  1  7820   BF
5  5711     315  2  7800  340  2  7732  360  3  7780  420  3  7800  500  3  7880
6  5720  1  2 050 050  1  2 050 050  1  2 050 050
3 05750 BG-1  0 009 03 0776 0022770 01 03
5 05760     0000 01 07840 0015 01 07820 0195 01 07820 0200 02 07800 0220 02 07760   BG
5 05761     0230 02 07745 0235 02 07760 0260 03 07840 0280 03 07860
6 05770 01 02 050 050 01 02 050 050 01 02 050 050
3 05800     BG 0 008 03 0778 0023160 01 03
5 05810     0000 01 07880 0080 01 07860 0130 01 07840 0350 01 07840 0350 02 07820   BH
5 05811     0390 03 07760 0410 03 07840 0430 03 07880
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 GIBSON DR WISHINGWELL TO RUSSELL          KNUTILLA  5  5  2  5 12
2      2  78155  78260  78330  78440  78330
3 05900 BG+1  1 014 03 0778 0023240 01 03
4  5905    330    460    550    690    550
5 05910    -200 01 07880 -150 01 07860 -140 01 07840  -20 01 07840 0000 01 07847   BE
5 05911    0018 02 07840 0026 02 07783 0038 02 07766 0044 02 07764 0048 02 07766
5 05912    0052 02 07782 0060 03 07850 0068 03 07870 0080 03 07880
6 05920 01 02 040 040 01 02 040 040 01 02 040 040
3 06000    BH 0 008 03 0780 0023620 01 03
5 06010    0000 01 07900 0120 01 07880 0165 01 07860 0320 01 07840 0330 02 07820   BJ
5 06011    0335 02 07770 0350 03 07840 0380 03 07900
6 06012 01 02 050 050 01 02 040 040 01 02 050 050
3  6050 BH+1  0   7  3  780   23790  1  3
5  6060       0  1  7860   90  1  7840  110  2  7820  120  2  7772  120  2  7820   BK
5  6061     140  3  7840  185  3  7860
6  6070  1  2 050 050  1  2 040 040  1  2 050 050
3 06100    BI 0 013 03 0780 0023950 01 03
5 06110    -100 01 07900  -32 01 07872 0000 01 07877 0040 01 07885 0088 01 07869
5 06111    0114 01 07822 0136 02 07829 0142 02 07781 0148 02 07775 0150 02 07780   BL
5 06112    0162 03 07832 0204 03 07885 0390 03 07900
6 06120 01 02 050 050 01 02 040 040 01 02 050 050
3  6200 BJ-1  0   9  3  782   24680  1  3
5  6210       0  1  7900   10  1  7880   60  1  7870  200  2  7860  215  2  7820   BM
5  6211     220  2  7795  230  2  7820  250  3  7880  260  3  7900
6  6220  1  2 045 045  1  2 040 040  1  2 045 045
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 IBSON DR RUSSELL ST TO DRAIN  BJ-BO      KNUTILLA  6  5  2  5 12
2      2  78565  78671  78744  78845  78749
3  6300    BJ 1  10  3  782   24770  1  3
4  6305    280    400    480    610    480
5  6310     -70  1  7900  -40  1  7880  142  2  7882  152  2  7817  162  2  7800   BN
5  6311     166  2  7797  170  2  7800  176  2  7808  186  3  7886  226  3  7916
6  6320  1  2 045 045  1  2 040 040  1  2 045 045
3  6400    BK 0   8  3  782   25110  1  3
5  6410       0  1  7900   60  1  7880  110  2  7860  120  2  7840  125  2  7808   BO
5  6411     130  2  7840  155  3  7880  190  3  7900
6  6420  1  2 040 040  1  2 040 040  1  2 040 040
3  6500    BL 0  11  3  784   25700  1  3
5  6510       0  1  7940   20  1  7920  220  1  7920  240  2  7900  255  2  7860   BP
5  6511     260  2  7826  265  2  7840  280  3  7900  290  3  7920  470  3  7922
5  6512     630  3  7940
6  6520  1  2 050 050  1  2 050 050  1  2 040 040
3  6600    BM 0  11  3  787   26300  1  3
5  6610       0  1  7980   30  1  7960   50  1  7940  150  1  7920  190  2  7920   BQ
5  6611     205  2  7880  210  2  7844  220  2  7860  230  3  7920  295  3  7920
5  6612     350  3  7980
6  6620  1  2 070 070  1  2 045 045  1  2 040 040
3  6700    BN 0  11  3  786   26630  1  3
5  6710       0  1  7980   60  1  7960  130  1  7940  215  1  7940  225  2  7920   BR
5  6711     235  2  7900  245  2  7860  255  2  7880  275  3  7940  330  3  7960
5  6712     350  3  7980
6  6720  1  2 060 060  1  2 045 045  1  2 040 040
3  6800    BO 0   8  3  790   26900  1  3
5  6810       0  1  7980   90  1  7960  125  2  7940  135  2  7900  140  2  7874   BS
5  6811     160  3  7940  175  3  7960  275  3  7980
6  6820  1  2 060 060  1  2 045 045  1  2 050 050
```

*** INPUT CARD PRINTOUT ***

```
          1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 GIBSON DR ABOVE HILL ST DRAIN  BP-BS     KNUTILLA  6  5  2  5 12
2      2  79694  80005  80079  80680  80079
3   6900    BP 1  11  3  795   29610  1  3
4   6905    190    275    315    400    315
5   6910    -104  1  8080 -104  1  8009  -88  2  8003  -72  2  7935  -64  2  7925   BT
5   6911     -58  2  7935  -48  3  8007    0  3  8029   25  3  8040  110  3  8060
5   6912    150  3  8080
6   6920  1  2 060 060  1  2 055 055  1  2 060 060
3   7000    BQ 0  10  3  796   29930  1  3
5   7010       0  1  8140    0  1  8020   20  2  8000   25  2  7960   35  2  7937   BU
5   7011      40  2  7960   60  3  8000  120  3  8020  225  3  8100  310  3  8140
6   7020  1  2 060 060  1  2 050 050  1  2 070 070
3   7100 BQ+1  0  10  3  796   30200  1  3
5   7110       0  1  8080    0  1  8020   20  2  8000   30  2  7960   40  2  7946   BV
5   7111      50  2  7960   65  3  8020  130  3  8040  200  3  8060  350  3  8080
6   7112  1  2 060 060  1  2 050 050  1  2 070 070
3   7200 BR-1  0  12  3  798   30620  1  3
5   7210       0  1  8080  100  1  8060  130  1  8040  530  2  8040  540  2  8000   BW
5   7211     550  2  7960  555  2  7958  565  2  7970  570  3  8000  585  3  8020
5   7212     615  3  8040  650  3  8080
6   7220  1  2 070 070  1  2 050 050  1  2 070 070
3   7300    BR 0  11  3  800   31060  1  3
5   7310       0  1  8100   40  1  8080   85  1  8060  245  2  8060  265  2  8000   BX
5   7311     270  2  7969  275  2  7969  300  3  8040  335  3  8060  375  3  8080
5   7312     440  3  8100
6   7320  1  2 070 070  1  2 050 050  1  2 070 070
3   7400 BS-1  0  10  3  800   31580  1  3
5   7410       0  1  8100    0  1  8080   50  2  8060   55  2  8000   60  2  7982   BY
5   7411      70  2  8000   75  3  8040  210  3  8060  260  3  8080  420  3  8100
6   7420  1  2 070 070  1  2 050 050  1  2 070 070
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1 00001 GIBSON DR DRAIN TO PORTER RD                KNUTILLA  8  5  2  5 12
2 00002 080430  80610  80720  80780  80720
3 10000 BS+1  1   9  3  802   31970  1  3
4 10005    190    275    315    400    315
5 10010    -150  1  8100  -80  1  8080    0  1  8067   32  2  8062   46  2  7994   BZ
5 10011      56  2  7997   68  3  8072  210  3  8080  370  3  8100
6 10020  1  2 070 070  1  2 045 045  1  2 080 080
3 10100    BT 0  10  3  802   32470  1  3
5 10110       0  1  8140   75  1  8120  200  2  8100  210  2  8040  215  2  8003   CA
5 10111     225  2  8040  230  3  8080  305  3  8100  330  3  8120  355  3  8140
6 10120  1  2 070 070  1  2 040 040  1  2 070 070
3 10200 BU-1  0  10  3  802   32820  1  3
5 10210       0  1  8160  155  1  8140  200  2  8140  210  2  8100  215  2  8040   CB
5 10211     225  2  8009  235  3  8080  310  3  8100  370  3  8120  430  3  8160
6 10220  1  2 070 070  1  2 050 050  1  2 070 070
3 10300 BU+1  0  10  3  804   33220  1  3
5 10310       0  1  8160  110  1  8140  210  2  8120  220  2  8100  230  2  8040   CC
5 10311     235  2  8016  240  2  8040  255  3  8100  320  3  8120  380  3  8160
6 10320  1  2 070 070  1  2 050 050  1  2 070 070
3 10400    BV 1  12  3  804   33470  1  3
4 10405    100    145    175    220    175
5 10410       0  1  8160   50  1  8140  110  1  8120  220  2  8120  225  2  8100
5 10411     240  2  8040  245  2  8020  250  2  8040  260  3  8100  270  3  8120   CD
5 10412     370  3  8140  420  3  8160
6 10420  1  2 070 070  1  2 055 055  1  2 070 070
3 10500    BW 0  12  3  804   33730  1  3
5 10510       0  1  8160  160  1  8140  220  1  8120  320  2  8120  330  2  8080   CE
5 10511     345  2  8040  350  2  8026  355  2  8040  365  3  8100  420  3  8120
5 10512     525  3  8140  560  3  8160
6 10520  1  2 070 070  1  2 055 055  1  2 070 070
3 10600    BX 0  10  3  805   34020  1  3
5 10610       0  1  8160   70  1  8140  160  2  8120  170  2  8100  175  2  8050   CF
5 10611     185  2  8033  190  2  8050  200  3  8120  355  3  8120  440  3  8160
6 10620  1  2 050 050  1  2 040 040  1  2 060 060
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE=12/12/

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 GIBSON DR PORTER RD TO PRIVATE RD BY-BY1 KNUTILLA  2  5  2  5 12
2      2  80892  81080  81197  81354  81197
3 10700     BY 1    9  3  806   34100  1  3
4 10705     100     145     170     215     170
5 10710     =200  1  8160     0  1  8126    14  2  8105    24  2  8041    28  2  8044   C6
5 10711       42  3  8114    94  3  8118   185  3  8140   220  3  8160
6 10720  1  2 040 040  1  2 040 040  1  2 050 050
3 10800 BY+1  0    9  3  806   34290  1  3
5 10810        0  1  8160   140  1  8140   160  2  8120   165  2  8060   170  2  8040   C4
5 10811      185  2  8080   200  3  8140   400  3  8140   510  3  8160
6 10820  1  2 040 040  1  2 040 040  1  2 050 050
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE=12/13/7

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 GIBSON DR BETWEEN PRIVATE BRIDGES  TO BZ KNUTILLA  2  5  2  5 12
2      2  81022  81200  81225  81360  81225
3 10900 BY+2  1  10  3  805   34340  1  3
4 10905    100    145    170    215    170
5 10910    -150  1  8160  -10  1  8140    0  2  8118    4  2  8112   12  2  8047   CI
5 10911      16  2  8038   22  2  8047   34  3  8113  280  3  8140  400  3  8160
6 10920  1  2 040 040  1  2 040 040  1  2 050 050
3 11000    BZ 0  12  3  806   34760  1  3
5 11010       0  1  8180   20  1  8160  100  1  8160  125  2  8140  135  2  8060   CJ
5 11011     140  2  8046  145  2  8060  160  2  8120  180  3  8140  275  3  8140
5 11012     310  3  8160  370  3  8180
6 11020  1  2 100 100  1  2 050 050  1  2 070 070
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE=12/14/7

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 GIBSON DR PRIVATE BR TO PRIV BR BZ TO CE KNUTILLA  6  5  2  5 12
2      2  81152  81290  81305  81370  81306
3 11100 BZ+1  1  13  3  806   34800  1  3
4 11105    100   145   170    215    170
5 11110    -160  1  8180 -110  1  8160  -98  1  8136  -76  2  8130  -58  2  8049   CK
5 11111     -52  2  8046  -50  2  8049  -36  3  8133    0  3  8130   20  3  8140
5 11112      80  3  8140  100  3  8160  180  3  8180
6 11120  1  2 070 070  1  2 050 050  1  2 070 070
3 11200 CA+1  0  10  3  810   35200  1  3
5 11210       0  1  8140   60  1  8120  270  1  8100  485  2  8100  490  2  8060   CL
5 11211     500  2  8051  505  2  8060  520  3  8120  685  3  8120  730  3  8140
6 11220  1  2 200 200  1  2 050 050  1  2 200 200
3 11300    CB 0  10  3  810   35530  1  3
5 11310       0  1  8140   50  1  8120  410  1  8100  600  1  8087  700  2  8070   CM
5 11311     710  2  8055  720  3  8080  940  3  8100  975  3  8120  995  3  8140
6 11320  1  3 300 100  1  2 050 050  1  3 300 100
3 11400    CC 1  12  3  810   36270  1  3
4 11405     50   75   90   120    90
5 11410       0  1  8160   30  1  8140   45  1  8120  125  1  8100  140  2  8080   CN
5 11411     145  2  8065  155  3  8080  765  3  8100  890  3  8100  940  3  8120
5 11412     960  3  8140  975  3  8160
6 11420  1  3 300 100  1  2 055 055  1  3 300 100
3 11500    CD 0  10  3  810   37020  1  3
5 11510       0  1  8160   80  1  8140  150  1  8120  260  2  8120  270  2  8100   CO
5 11511     280  2  8076  290  3  8100  530  3  8120  560  3  8140  620  3  8160
6 11520  1  3 300 100  1  2 060 060  1  3 300 100
3 11600 CE-1  0  12  3  810   37270  1  3
5 11610       0  1  8180   45  1  8160   85  1  8140  170  1  8120  440  2  8120   CP
5 11611     450  2  8100  455  2  8079  465  2  8100  470  3  8120  490  3  8140
5 11612     550  3  8160  660  3  8180
6 11620  1  2 080 080  1  2 060 060  1  2 080 080
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 11.DATE=11/22/77

```
==================================================================================
WATER-SURFACE PROFILE FOR: GIBSON DR MAPLE RD TO MAPLEBROOK AW-AX   KNUTILLA
PAGE  1 OF  1
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
   AW AT   18470 /     0 /    660. /   513. /   45772. / 1.37 /    1. /  172.
   773.70 /   0.04 /                 /  773.73 /   1.29 /   0.12/          *IS*
----------------------------------------------------------------------------------
AW+1  AT   18770 /   300 /    660. /   652. /   60183. / 1.37 /   71. /  276.
   773.76 /   0.02 /   0.05 /   0.0  /  773.78 /   1.01 /   0.10 / -0.000  *XS*
----------------------------------------------------------------------------------
   AX AT   19200 /   430 /    660. /   272. /   24075. / 1.50 /    5. /  119.
   773.83 /   0.14 /   0.13 /   0.06 /  773.97 /   2.42 /   0.23 / -0.000  *XS*
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

```
==================================================================================
WATER-SURFACE PROFILE FOR: GIBSON DR MARLEBROOK TO I-475  AY-AY+1   KNUTILLA
PAGE  1 OF  1
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
   AY AT   19275 /     0 /    600. /   403. /   45965. / 1.23 / -120. /    14.
   774.80 /   0.04 /                 /  774.84 /   1.49 /   0.13/          *IS*
----------------------------------------------------------------------------------
AY+1  AT   19430 /   155 /    600. /   589. /   56190. / 1.53 /   5. /   255.
   774.84 /   0.02 /   0.02 /   0.0  /  774.86 /   1.02 /   0.11 / -0.000  *XS*
----------------------------------------------------------------------------------
```

AW

AX

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 13,DATE=12/ 6/77

WATER-SURFACE PROFILE FOR: GIBSON DR I-475 TO PRIVATE RD AZ-BA-1 KNUTILLA
PAGE 1 OF 1

SECID AT DISTANCE / WS ELEV	HV	HF	HE	LENGTH / EG	DISCHARGE / V	AREA / FN	CONVEYANCE / ALPHA	LEW / ACC	REW *ID*	
AZ AT 19775 / 776.90	0.00	0	600.	1550. / 776.90	112905. / 0.39	1.78 / 0.05	-181.	359. *IS*		AY
BA-1 AT 20350 / 776.95	0.04	575 / 0.07	600. / 0.02	535. / 776.99	26814. / 1.12	1.90 / 0.15	51. / -0.000	314. *XS*		AZ
RD CR AT 20380 / 776.97	0.23	30 / 0.12	600. / 0.10	157. / 777.21	3338. / 3.81	1.03 / 0.77	-251. / -0.001	-48. *XS*		N.Y
BA AT 20420 / 777.33	0.07	40 / 0.19	600. / 0.0	378. / 777.40	22377. / 1.59	1.89 / 0.17	-57. / 0.000	133. *XS*		

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE=12/ 6/77

WATER-SURFACE PROFILE FOR: GIBSON DRAIN PRIVATE RD TO WISHINGWELL KNUTILLA

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
BA AT 20420	0	600.	412.	24339.	1.90	-60.	138.		BA
777.50	0.06			777.56	1.46	0.16		*IS*	
BB AT 20930	510	600.	348.	19141.	1.98	290.	453.		BB
777.88	0.09	0.39	0.01	777.97	1.72	0.19	0.000	*XS*	
BC AT 21430	500	600.	389.	20044.	1.92	82.	300.		BC
778.38	0.07	0.47	0.0	778.45	1.54	0.20	0.010	*XS*	
BD AT 21810	380	600.	218.	14172.	1.17	239.	344.		BD
778.83	0.14	0.48	0.03	778.97	2.75	0.27	0.000	*XS*	
BE AT 22220	410	600.	199.	14866.	1.16	287.	346.		BE
779.52	0.16	0.70	0.01	779.68	3.01	0.27	0.000	*XS*	
BF AT 22470	250	550.	230.	13954.	1.24	315.	419.		BF
779.97	0.11	0.40	0.0	780.08	2.39	0.25	-0.000	*XS*	
BG-1 AT 22770	300	550.	163.	10584.	1.00	199.	249.		BG
780.55	0.18	0.61	0.03	780.73	3.37	0.33	0.001	*XS*	
BG AT 23160	390	550.	147.	8773.	1.00	351.	402.		BH
781.80	0.22	1.27	0.02	782.02	3.73	0.39	-0.001	*XS*	

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE=12/ 6/77

```
==================================================================================
WATER-SURFACE PROFILE FOR: GIBSON DR WISHINGWELL TO RUSSELL          KNUTILLA
PAGE  1 OF  1
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
BG+1  AT   23240 /     0 /   550. /   195. /   19863. / 1.00 /   19. /   58.
   783.30 /   0.12 /                 / 783.42 /   2.83 /   0.22/         *IS*
----------------------------------------------------------------------------------
   BH AT   23620 /   380 /   550. /    83. /    6123. / 1.12 /  320. /  350.
   783.92 /   0.77 /   0.95 /   0.32 / 784.69 /   6.65 /   0.66 / -0.001  *XS*
----------------------------------------------------------------------------------
BH+1  AT   23790 /   170 /   550. /   206. /   10760. / 1.57 /   32. /  169.
   785.30 /   0.17 /   0.78 /   0.0  / 785.47 /   2.67 /   0.36 /  0.001  *XS*
----------------------------------------------------------------------------------
   BI AT   23950 /   160 /   550. /   273. /   23224. / 1.41 /   95. /  181.
   785.58 /   0.09 /   0.19 /   0.0  / 785.67 /   2.01 /   0.19 /  0.000  *XS*
----------------------------------------------------------------------------------
BJ-1  AT   24680 /   730 /   550. /   155. /   12104. / 1.07 /  158. /  244.
   786.30 /   0.21 /   0.79 /   0.06 / 786.51 /   3.54 /   0.35 /  0.000  *XS*
----------------------------------------------------------------------------------
```

BI

BJ

BK 10'-4'

BL

Bm

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 14,DATE=12/ 6/77

WATER-SURFACE PROFILE FOR: IBSON DR RUSSELL ST TO DRAIN BJ-BO KNUTILLA

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*		
BJ	AT	24770	0	480.	222.	23856.	1.00	143.	185.	
787.44	0.07			787.51	2.16	0.16		*IS*		BN
BK	AT	25110	340	480.	160.	10180.	1.18	67.	153.	
787.72	0.16	0.32	0.05	787.88	2.99	0.36	-0.000	*XS*		BO
BL	AT	25700	590	480.	118.	7277.	1.00	242.	279.	
789.51	0.26	1.84	0.05	789.76	4.07	0.40	0.001	*XS*		BP
BM	AT	26300	600	480.	136.	10114.	1.00	192.	229.	
791.45	0.19	1.88	0.0	791.64	3.53	0.33	0.001	*XS*		BQ
BN	AT	26630	330	480.	138.	9468.	1.00	224.	269.	
792.25	0.19	0.79	0.0	792.44	3.48	0.35	0.001	*XS*		BR
BO	AT	26900	270	480.	89.	5656.	1.00	127.	158.	
793.28	0.45	1.16	0.13	793.74	5.41	0.56	0.001	*XS*		BS

END OF THIS PROFILE

IN-4

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 14,DATE=12/ 8/77

WATER-SURFACE PROFILE FOR: GIBSON DR ABOVE HILL ST DRAIN BP-BS KNUTILLA

PAGE 1 OF 1

SECID	AT DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*	
BP AT	29610	0	315.	211.	15964.	1.03	-101.	-46.	BT
800.79	0.04			800.82	1.49	0.12		*IS*	
BQ AT	29930	320	315.	183.	12363.	1.16	11.	88.	BU
800.94	0.05	0.16	0.01	801.00	1.72	0.16	0.000	*XS*	
BQ+1 AT	30200	270	315.	186.	13657.	1.05	9.	63.	BV 100-4
801.11	0.05	0.16	0.0	801.15	1.69	0.15	0.000	*XS*	
BR-1 AT	30620	420	315.	137.	9221.	1.08	536.	581.	BW
801.42	0.09	0.33	0.02	801.51	2.31	0.22	0.000	*XS*	
BR AT	31060	440	315.	102.	5922.	1.00	258.	294.	BX
802.19	0.15	0.80	0.03	802.34	3.08	0.32	0.000	*XS*	
BS-1 AT	31580	520	315.	84.	5465.	1.00	52.	75.	BY
803.75	0.22	1.59	0.03	803.97	3.73	0.34	0.001	*XS*	

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 14,DATE=12/ 9/77

WATER-SURFACE PROFILE FOR: GIBSON DR DRAIN TO PORTER RD KNUTILLA

PAGE 1 OF 1

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
BS+1 AT 31970 / 807.20	0 / 0.04	315. /	215. / 807.24	17221. / 1.47	1.28 / 0.13	-31. /	68.	*IS*	BZ
BT AT 32470 / 807.49	500 / 0.16	315. / 0.35	98. / 0.06	8166. / 807.65	1.00 / 3.22	-204. / 0.29	229. / 0.000	*XS*	CA
BU-1 AT 32820 / 808.11	350 / 0.15	315. / 0.61	101. / 0.0	6982. / 808.27	1.00 / 3.13	212. / 0.27	239. / 0.001	*XS*	CB
BU+1 AT 33220 / 808.92	400 / 0.12	315. / 0.77	111. / 0.0	7349. / 809.04	1.00 / 2.83	222. / 0.26	252. / 0.000	*XS*	CC
BV AT 33470 / 809.28	250 / 0.03	175. / 0.27	121. / 0.0	7450. / 809.31	1.00 / 1.45	227. / 0.13	259. / 0.000	*XS*	CD
BW AT 33730 / 809.41	260 / 0.02	175. / 0.12	139. / 0.0	8631. / 809.44	1.00 / 1.26	326. / 0.12	364. / -0.000	*XS*	CE
BX AT 34020 / 809.52	290 / 0.04	175. / 0.11	105. / 0.01	9119. / 809.56	1.00 / 1.66	170. / 0.15	196. / -0.000	*XS*	CF

10V-1'

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 8,DATE=12/12/77

WATER-SURFACE PROFILE FOR: GIBSON DR PORTER RD TO PRIVATE RD BY-BY1 KNUTILLA
PAGE 1 OF 1

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
BY AT 34100 / 811.97	0 / 0.02	170. /	162. / 811.99	13689. / 1.05	1.29 / 0.10	4. /	101.	*IS*	cG
BY+1 AT 34290 / 812.00	190 / 0.02	170. / 0.03	160. / 0.0	15153. / 812.02	1.00 / 1.06	160. / 0.09	195. / -0.000	*XS*	cH

END OF THIS PROFILE

IW-4

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 11,DATE=12/13/77

WATER-SURFACE PROFILE FOR: GIBSON DR BETWEEN PRIVATE BRIDGES TO BZ KNUTILLA,
PAGE 1 OF 1

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
BY+2 AT 34340 / 812.25	0 / 0.01	170. /	210. / 812.26	17614. / 0.81	1.37 / 0.08	-2. /	121.	*IS*	CE
BZ AT 34760 / 812.31	420 / 0.02	170. / 0.07	145. / 0.00	10260. / 812.33	1.00 / 1.17	127. / 0.10	163. / -0.000	*XS*	CJ IN-T

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 13,DATE=12/14/77

WATER-SURFACE PROFILE FOR: GIBSON DR PRIVATE BR TO PRIV BR BZ TO CE KNUTILLA
PAGE 1 OF 1

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
BZ+1	AT	34800	0	170.	196.	15847.	1.00	-78.	1.	CK
813.05		0.01			813.06	0.87	0.07		*IS*	
CA+1	AT	35200	400	170.	1508.	34605.	8.29	28.	709.	CL
813.08		0.00	0.02	0.0	813.08	0.11	0.03	-0.000	*XS*	
CB	AT	35530	330	170.	3104.	106352.	1.90	23.	986.	CM
813.08		0.00	0.00	0.0	813.08	0.05	0.00	-0.004	*XS*	
CC	AT	36270	740	90.	3304.	118299.	1.29	37.	951.	CN
813.08		0.00	0.00	0.0	813.08	0.03	0.00	-0.001	*XS*	
CD	AT	37020	750	90.	754.	12642.	5.72	112.	546.	CO
813.08		0.00	0.00	0.00	813.08	0.12	0.04	-0.004	*XS*	
CE-1	AT	37270	250	90.	416.	10780.	2.04	124.	481.	CP
813.08		0.00	0.01	0.00	813.08	0.22	0.03	-0.015	*XS*	

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 17,DATE=11/22/77

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==================================================================================
WATER-SURFACE PROFILE FOR: GIBSON DR MAPLE RD TO MAPLEBROOK AW-AX   KNUTILLA
PAGE  1 OF  1
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
   AW AT   18470 /     0 /    660. /   393. /   40045. / 1.19 /    1. /  100.
.01 773.71 /   0.05 /                 / 773.76 /   1.68 /  0.14/          *IS*  AT
----------------------------------------------------------------------------------
AW+1  AT   18770 /   300 /    660. /   435. /   47535. / 1.18 /   71. /  170.
.03 773.79 /   0.04 /   0.07 /   0.0  / 773.83 /   1.52 /  0.12 /  0.000  *XS*  AW FW
----------------------------------------------------------------------------------
   AX AT   19200 /   430 /    660. /   256. /   23942. / 1.40 /    3. /  100.
.07 773.90 /   0.14 /   0.16 /  0.05 / 774.05 /   2.58 /  0.23 / -0.000  *XS*  AY
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

Floodway

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 11,DATE=11/28/77

```
==================================================================================
WATER-SURFACE PROFILE FOR: GIBSON DR MAPLEBROOK TO I-475  AY-AY+1   KNUTILLA
PAGE  1 OF  1
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
   AY AT  19275 /     0 /    600. /   395. /   47024. / 1.15 / -120. /  -20.
   774.87 /  0.04 /                 /  774.91 /   1.52 /   0.13/          *IS*
----------------------------------------------------------------------------------
AY+1  AT  19430 /   155 /    600. /   406. /   48081. / 1.17 /   30. /  130.
   774.90 /  0.04 /   0.02 /   0.0  /  774.94 /   1.48 /   0.12 / -0.000  *XS*
----------------------------------------------------------------------------------
```

.07 AW

FW

.06 AX

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 21,DATE=12/ 6/77

```
==================================================================================
WATER-SURFACE PROFILE FOR: GIBSON DR  I-475 TO PRIVATE RD  AZ-BA-1  KNUTILLA
PAGE 1 OF 1
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV / HV / HF / HE / EG / V / FN / ACC  *ID*
==================================================================================
   AZ AT  19775 /    0 /   600. /   943. /   82259. / 1.62 /  120. /  320.
.06 776.96 / 0.01 /          / 776.97 /   0.64 /   0.06/          *IS*   AY
----------------------------------------------------------------------------------
   BA-1  AT  20350 /  575 /   600. /   516. /   28571. / 1.61 /   80. /  280.
.09 777.04 / 0.03 /  0.09 /  0.01 / 777.07 /   1.16 /   0.14 / 0.000  *XS*   AZ
----------------------------------------------------------------------------------
   RD CR AT  20380 /   30 /   600. /   159. /    3609. / 1.07 / -230. /  -42.
   777.04 / 0.24 /  0.10 /  0.10 / 777.27 /   3.77 /   0.69 / -0.004  *XS*   FW
----------------------------------------------------------------------------------
   BA AT   20420 /   40 /   600. /   387. /   22931. / 1.90 /  -58. /  134.
.05 777.38 / 0.07 /  0.17 /  0.0  / 777.45 /   1.55 /   0.17 / -0.000  *XS*
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 22,DATE=12/ 6/77

WATER-SURFACE PROFILE FOR: GIBSON DRAIN PRIVATE RD TO WISHINGWELL KNUTILLA
PAGE 1 OF 1
*** FLOODWAY ANALYSIS *** HOR FW

	SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
.05	BA AT 20420 / 777.55	0 / 0.06	600. /	421. / 777.61	24948. / 1.42	1.90 / 0.15	-60. /	139. /	*IS*	BA
.03	BB AT 20930 / 777.91	510 / 0.09	600. / 0.38	348. / 0.01 / 778.00	19495. / 1.72	1.91 / 0.19	295. /	445. / 0.000	*XS*	BB
.01	BC AT 21430 / 778.39	500 / 0.07	600. / 0.46	351. / 0.0 / 778.47	19931. / 1.71	1.61 / 0.20	140. /	290. / 0.000	*XS*	BC
.01	BD AT 21810 / 778.84	380 / 0.14	600. / 0.48	219. / 0.03 / 778.98	14392. / 2.74	1.17 / 0.27	240. /	340. / 0.000	*XS*	BD FW
0	BE AT 22220 / 779.52	410 / 0.16	600. / 0.69	199. / 0.01 / 779.68	14863. / 3.01	1.16 / 0.27	287. /	346. / 0.001	*XS*	BE
0	BF AT 22470 / 779.97	250 / 0.11	550. / 0.40	229. / 0.0 / 780.08	14006. / 2.40	1.22 / 0.25	315. /	415. / -0.000	*XS*	BF
0	BG-1 AT 22770 / 780.55	300 / 0.18	550. / 0.62	163. / 0.03 / 780.73	10502. / 3.38	1.00 / 0.33	200. /	249. / 0.001	*XS*	BG
0	BG AT 23160 / 781.80	390 / 0.22	550. / 1.28	147. / 0.02 / 782.02	8772. / 3.74	1.00 / 0.39	351. /	402. / =0.011	*XS*	BH

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 20,DATE=12/ 6/77

WATER-SURFACE PROFILE FOR: GIBSON DR WISHINGWELL TO RUSSELL KNUTILLA

PAGE 1 OF 1

*** FLOODWAY ANALYSIS *** HOR FW

	SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
	BG+1 AT 23240	0	550.	195.	19863.	1.00	19.	58.		
0	783.30	0.12			783.42	2.83	0.22		*IS*	BI
	BH AT 23620	380	550.	83.	6124.	1.12	320.	350.		
0	783.92	0.77	0.94	0.32	784.69	6.65	0.66	-0.001	*XS*	BS
	BH+1 AT 23790	170	550.	150.	9905.	1.08	90.	140.		
.01	785.31	0.23	0.85	0.0	785.54	3.67	0.39	0.001	*XS*	BK FW
	BI AT 23950	160	550.	278.	24138.	1.37	100.	181.		
.08	785.66	0.08	0.20	0.0	785.74	1.98	0.19	-0.000	*XS*	BL
	BJ-1 AT 24680	730	550.	151.	12219.	1.00	200.	244.		
.05	786.35	0.21	0.75	0.06	786.55	3.65	0.35	0.001	*XS*	Bm

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 23,DATE=12/ 6/77

WATER-SURFACE PROFILE FOR: IBSON DR RUSSELL ST TO DRAIN -BJ-BO KNUTILLA
PAGE 1 OF 1
*** FLOODWAY ANALYSIS *** HOR FW

	SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
.05	BJ AT 24770	0	480.	223.	24323.	1.00	145.	185.		BN
	787.49	0.07			787.56	2.15	0.16		*IS*	
.02	BK AT 25110	340	480.	150.	10504.	1.08	90.	150.		BO
	787.74	0.17	0.31	0.05	787.91	3.19	0.35	-0.007	*XS*	
0	BL AT 25700	590	480.	117.	7226.	1.00	242.	279.		BP
	789.49	0.26	1.79	0.04	789.75	4.09	0.40	0.003	*XS*	
0	BM AT 26300	600	480.	136.	10110.	1.00	192.	229.		BQ
	791.45	0.19	1.89	0.0	791.64	3.54	0.33	0.001	*XS*	
0	BN AT 26630	330	480.	133.	9528.	1.00	230.	269.		BR
	792.24	0.20	0.79	0.00	792.44	3.60	0.34	0.002	*XS*	
0	BO AT 26900	270	480.	88.	5627.	1.00	127.	158.		BS
	793.27	0.46	1.16	0.13	793.73	5.43	0.57	0.001	*XS*	

FW

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 23,DATE=12/ 8/77

WATER-SURFACE PROFILE FOR: GIBSON DR ABOVE HILL ST DRAIN BP-BS KNUTILLA
PAGE 1 OF 1
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
BP	AT	29610	0	315.	211.	15965.	1.03	-100.	-46.	BT
800.79		0.04			800.82	1.49	0.12		*IS*	
BQ	AT	29930	320	315.	182.	12371.	1.14	15.	85.	BU
800.94		0.05	0.16	0.01	801.00	1.74	0.16	0.000	*XS*	
BQ+1	AT	30200	270	315.	184.	13840.	1.05	10.	60.	BV
801.10		0.05	0.16	0.0	801.15	1.71	0.15	0.000	*XS*	FW
BR-1	AT	30620	420	315.	134.	9306.	1.08	540.	580.	BW
801.41		0.09	0.32	0.02	801.50	2.36	0.21	-0.000	*XS*	
BR	AT	31060	440	315.	101.	5882.	1.00	258.	293.	BX
802.16		0.15	0.80	0.03	802.31	3.11	0.32	-0.019	*XS*	
BS-1	AT	31580	520	315.	84.	5438.	1.00	52.	75.	BY
803.74		0.22	1.61	0.03	803.96	3.75	0.34	0.002	*XS*	

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 24,DATE=12/ 9/77

WATER-SURFACE PROFILE FOR: GIBSON DR DRAIN TO PORTER RD KNUTILLA

PAGE 1 OF 1

*** FLOODWAY ANALYSIS *** HOR FW

	SECID AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*	
	BS+1 AT	31970	0	315.	187.	15403.	1.21	0.	60.	BZ
0	807.20	0.05			807.25	1.68	0.14		*IS*	
	BT AT	32470	500	315.	99.	8313.	1.00	204.	229.	CA
.05	807.54	0.16	0.39	0.05	807.69	3.18	0.28	-0.000	*XS*	
	BU-1 AT	32820	350	315.	100.	6989.	1.01	213.	238.	CB
.03	808.14	0.16	0.60	0.0	808.29	3.15	0.26	0.002	*XS*	
	BU+1 AT	33220	400	315.	112.	7447.	1.00	222.	252.	CC FW
.01	808.93	0.12	0.76	0.0	809.06	2.81	0.26	0.000	*XS*	
	BV AT	33470	250	175.	121.	7607.	1.00	228.	258.	CD
.01	809.29	0.03	0.26	0.0	809.32	1.45	0.13	0.000	*XS*	
	BW AT	33730	260	175.	139.	8799.	1.00	328.	363.	CE
.01	809.42	0.02	0.12	0.0	809.44	1.26	0.11	0.000	*XS*	
	BX AT	34020	290	175.	105.	9172.	1.00	170.	195.	CF
0	809.52	0.04	0.11	0.01	809.56	1.67	0.14	0.000	*XS*	

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 13,DATE=12/12/77

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==================================================================================
WATER-SURFACE PROFILE FOR: GIBSON DR PORTER RD TO PRIVATE RD BY-BY1 KNUTILLA
PAGE  1 OF  1
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
   BY AT   34100 /     0 /    170. /   162. /   13692. / 1.29 /    4. /  100.
0  811.97 /   0.02 /                 /  811.99 /   1.05 /   0.10/          *IS*
----------------------------------------------------------------------------------
BY+1 AT   34290 /   190 /    170. /   160. /   15153. / 1.00 /  160. /  195.
0  812.00 /   0.02 /   0.03 /   0.0  /  812.02 /   1.06 /   0.09 / -0.000  *XS*
----------------------------------------------------------------------------------
```

CG

FW

CH

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 18,DATE=12/13/77

WATER-SURFACE PROFILE FOR: GIBSON DR BETWEEN PRIVATE BRIDGES TO BZ KNUTILLA
PAGE 1 OF 1
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
BY+2 AT 34340	0	170.	174.	16872.	1.04	0.	40.		CI FW
812.25	0.02		812.27	0.98	0.08			*IS*	
BZ AT 34760	420	170.	145.	10269.	1.00	127.	163.		CS
812.32	0.02	0.07	0.00	812.34	1.17	0.10	0.000	*XS*	

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 21,DATE=12/14/77

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==================================================================================
WATER-SURFACE PROFILE FOR: GIBSON DR PRIVATE BR TO PRIV BR BZ TO CE KNUTILLA
PAGE  1 OF  1
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
BZ+1  AT   34800 /     0 /    170. /   196. /   16001. / 1.00 /  -75. /    -7.
   813.06 /   0.01 /                 / 813.07 /    0.87 /   0.07/          *IS*
----------------------------------------------------------------------------------
CA+1  AT   35200 /   400 /    170. /   452. /   20918. / 3.34 /  450. /   650.
   813.10 /   0.01 /  0.03 /   0.0  / 813.11 /    0.38 /   0.05 / -0.000  *XS*
----------------------------------------------------------------------------------
   CB AT   35530 /   330 /    170. /  1036. /   51960. / 1.64 /  600. /   800.
   813.10 /   0.00 /  0.01 /   0.0  / 813.10 /    0.16 /   0.01 / -0.016  *XS*
----------------------------------------------------------------------------------
   CC AT   36270 /   740 /     90. /   924. /   41254. / 1.37 /  100. /   300.
   813.10 /   0.00 /  0.01 /   0.0  / 813.10 /    0.10 /   0.01 / -0.007  *XS*
----------------------------------------------------------------------------------
   CD AT   37020 /   750 /     90. /   399. /   11076. / 2.64 /  150. /   350.
   813.10 /   0.00 /  0.01 /   0.00 / 813.10 /    0.23 /   0.04 / -0.013  *XS*
----------------------------------------------------------------------------------
CE-1  AT   37270 /   250 /     90. /   258. /    8117. / 1.80 /  300. /   481.
   813.12 /   0.00 /  0.02 /   0.00 / 813.12 /    0.35 /   0.06 / -0.000  *XS*
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END OF THIS PROFILE

00BREAK00

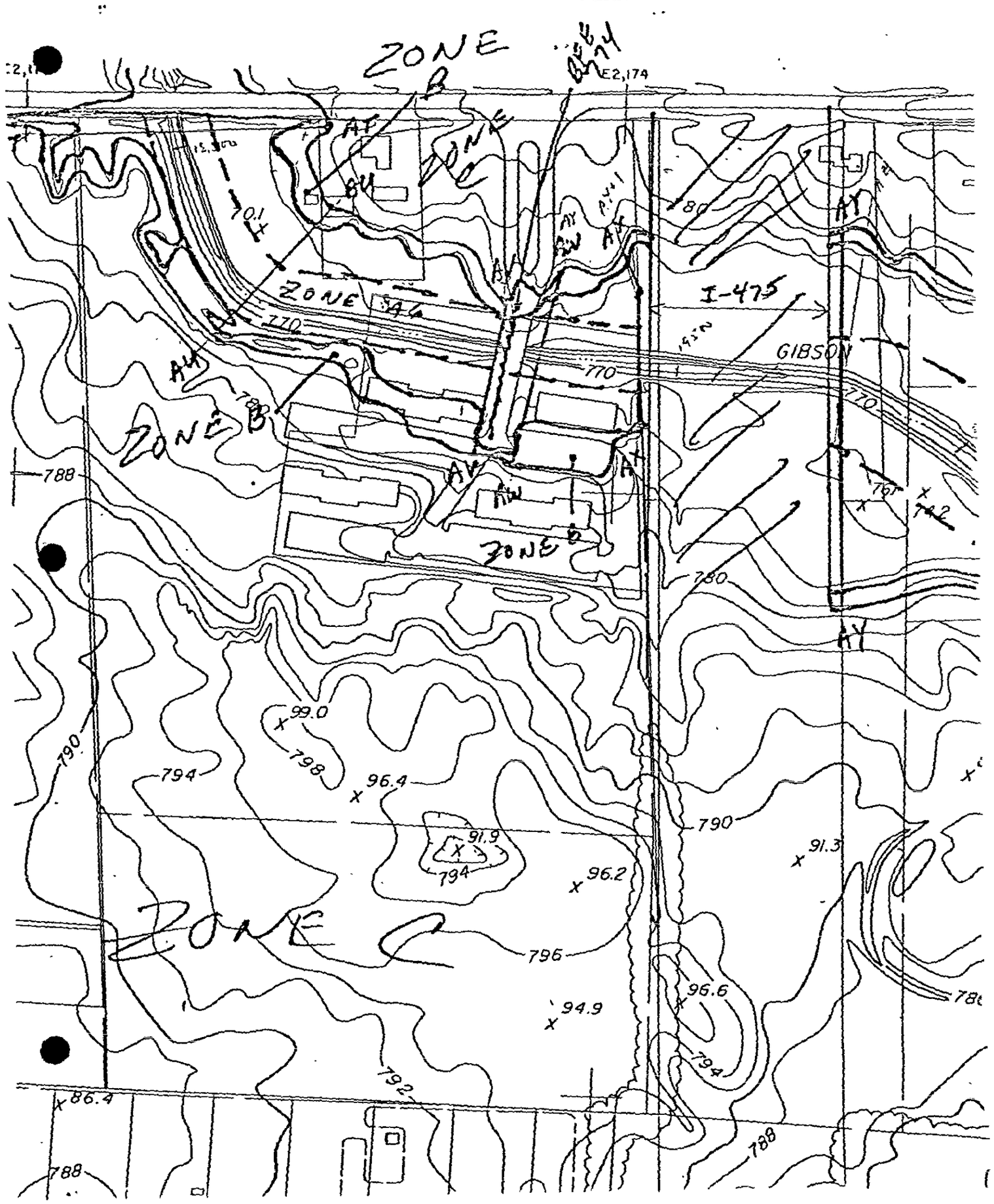
1) COUNTY: Genesee

2) STUDY NAME: city of Flint

3) WATERCOURSE: Gibson Drain

4) DOCUMENT TYPE: Maps

00BREAK00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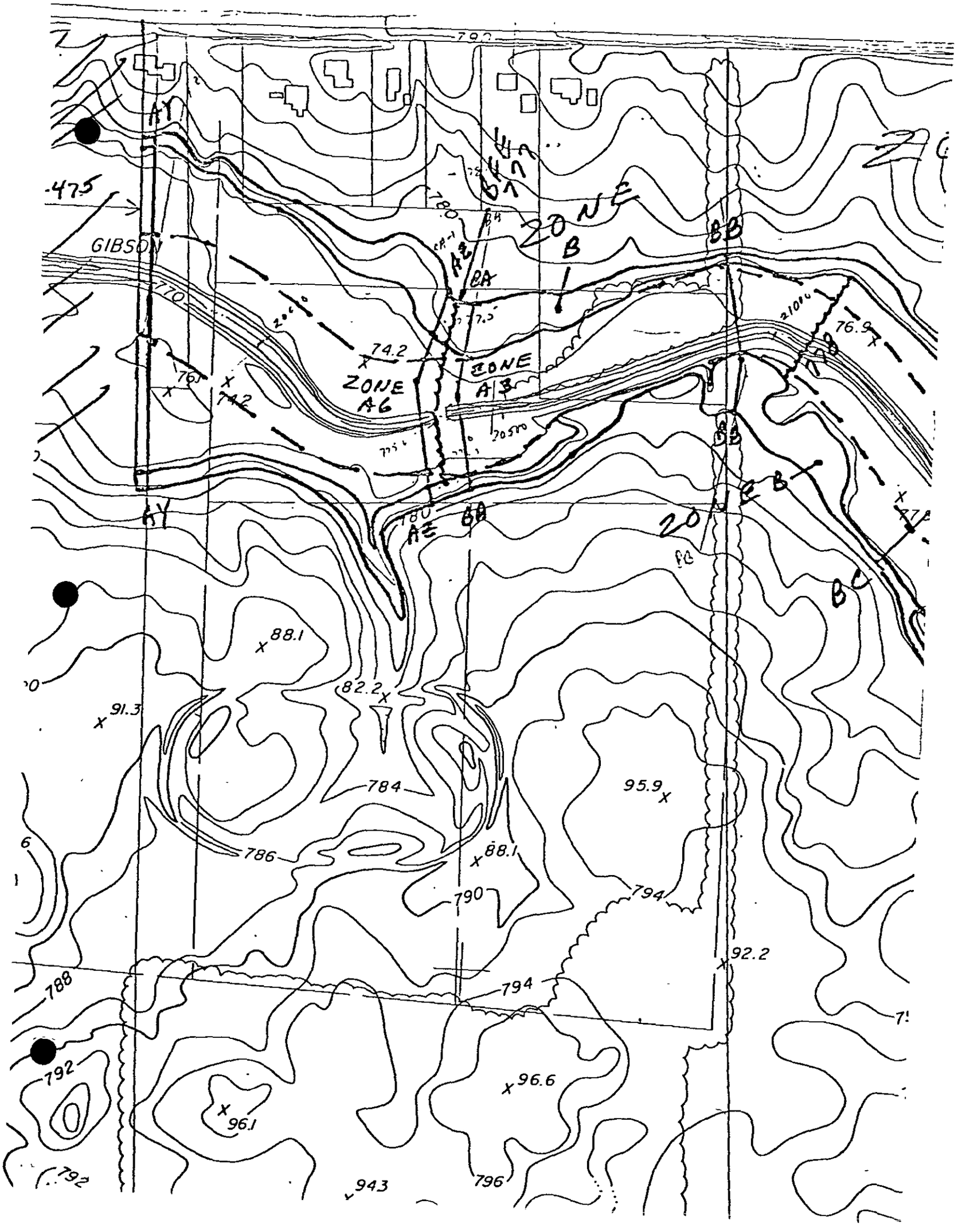
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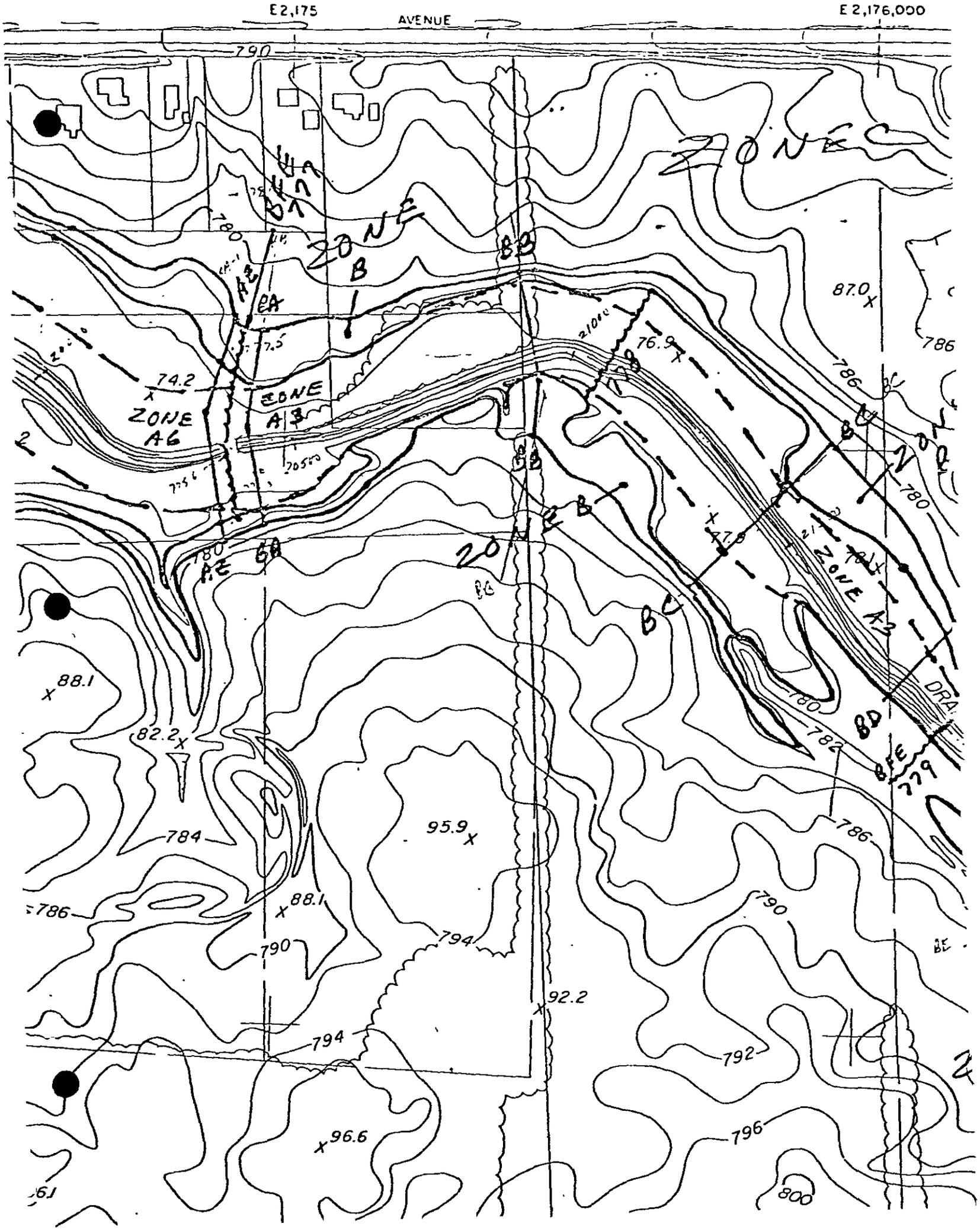
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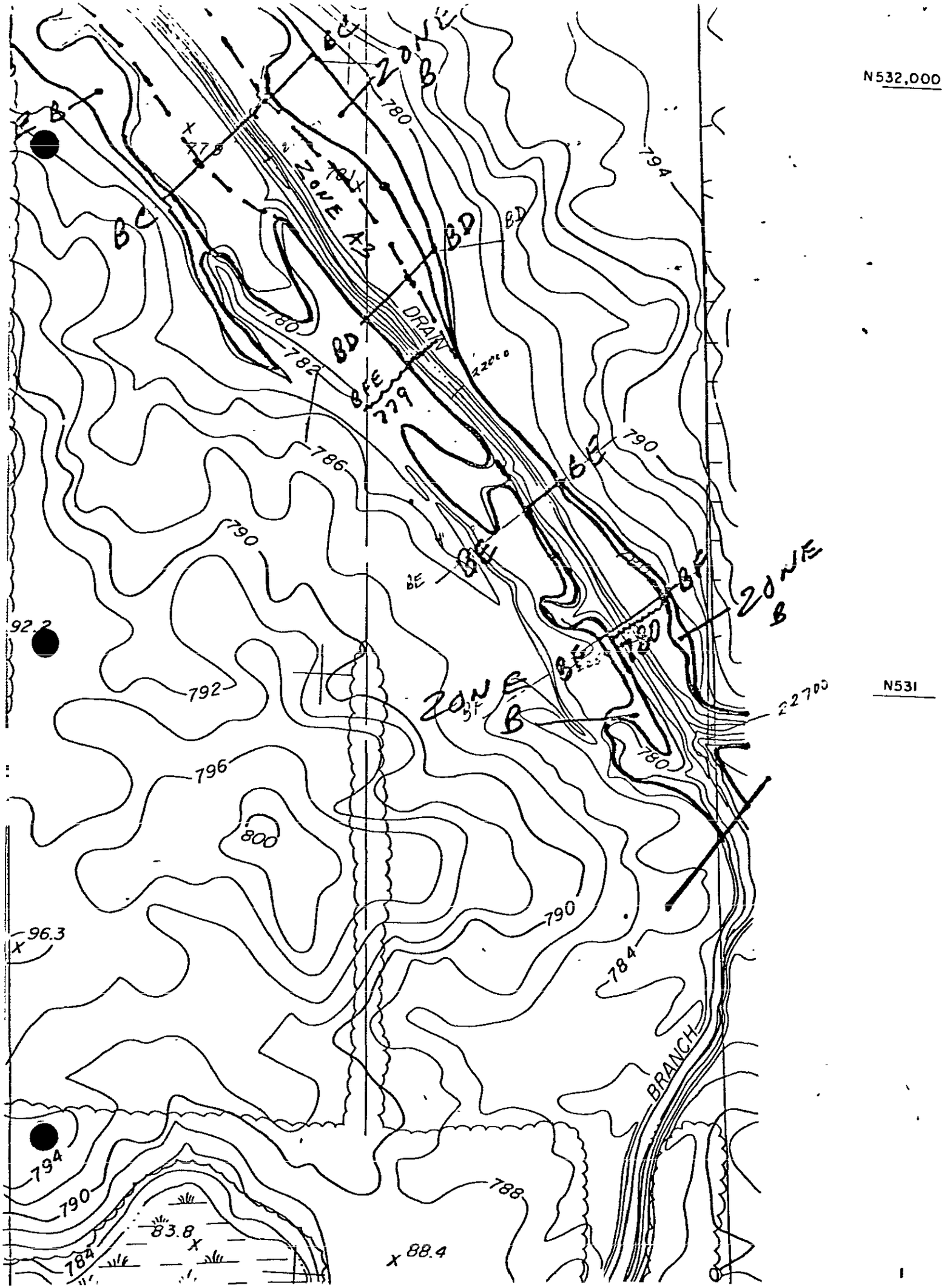
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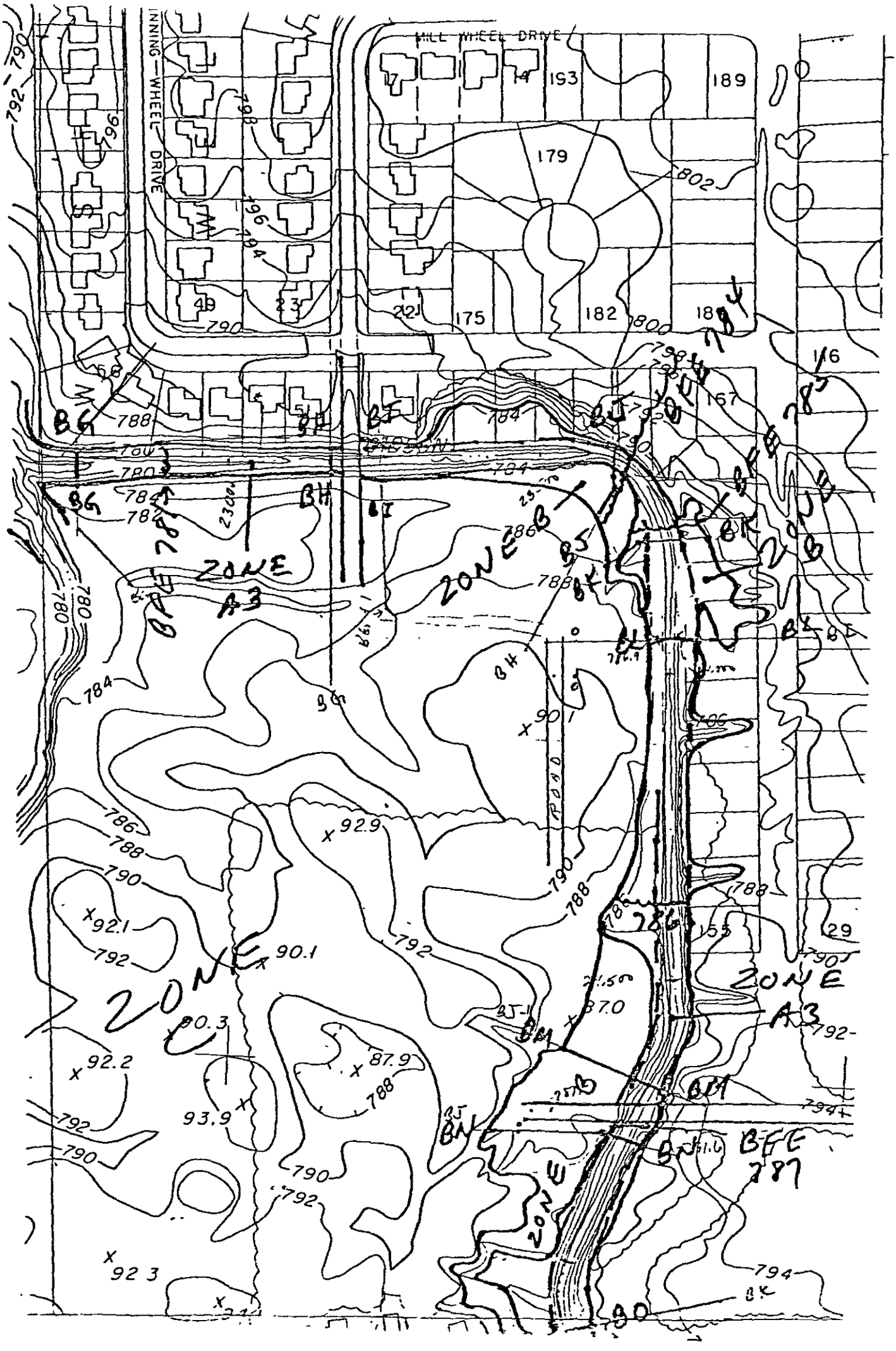
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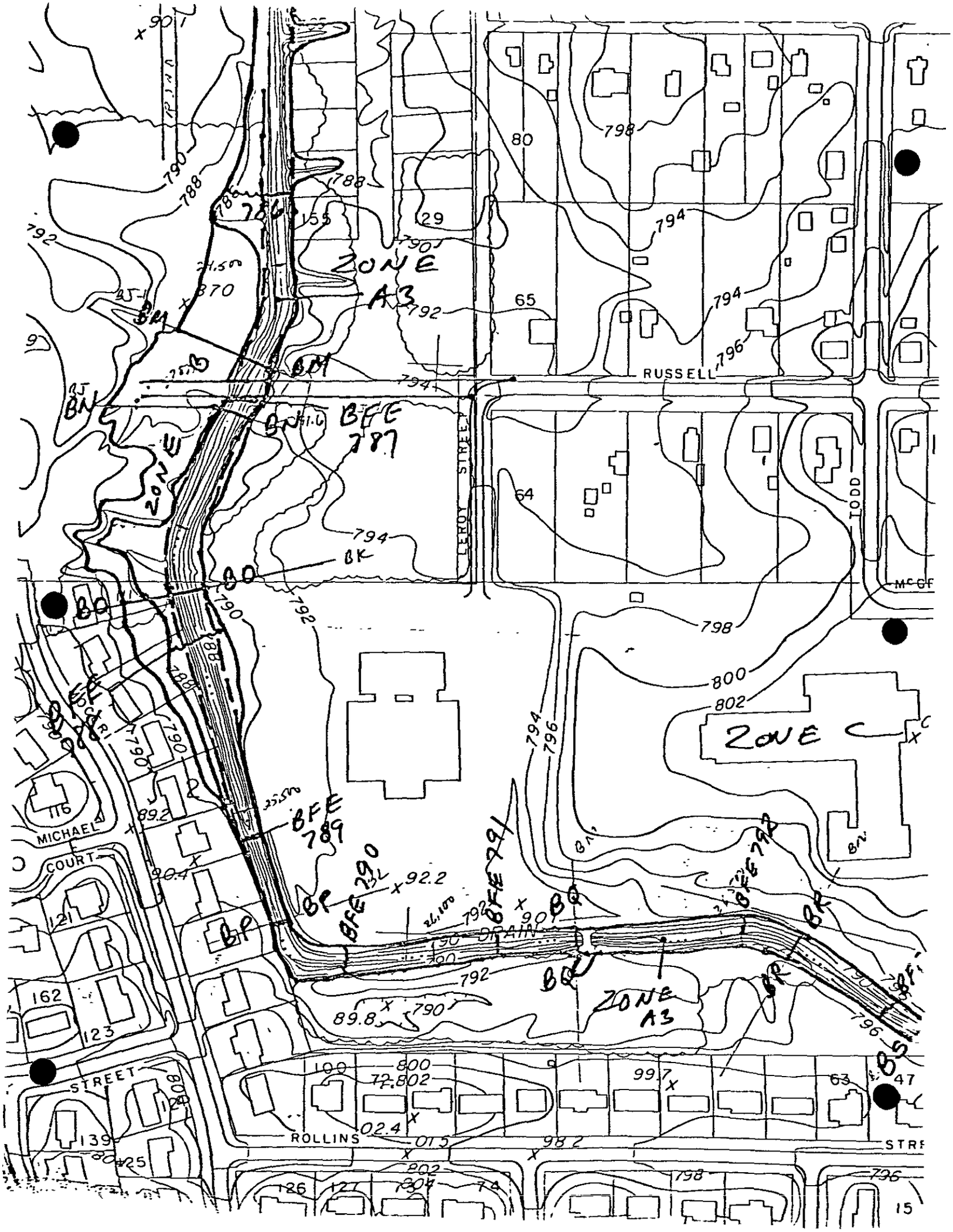
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TODD
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ROLLINS STREET
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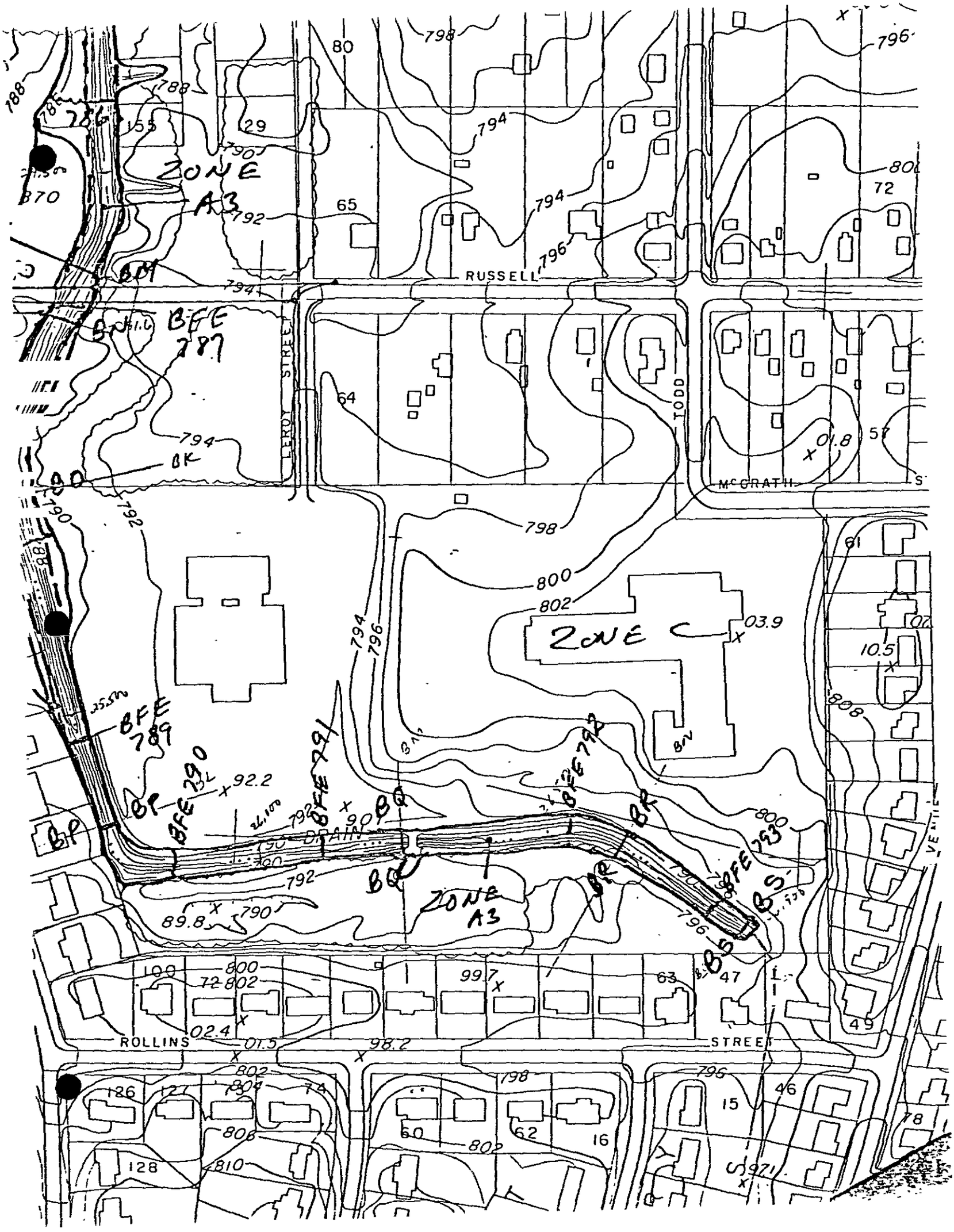
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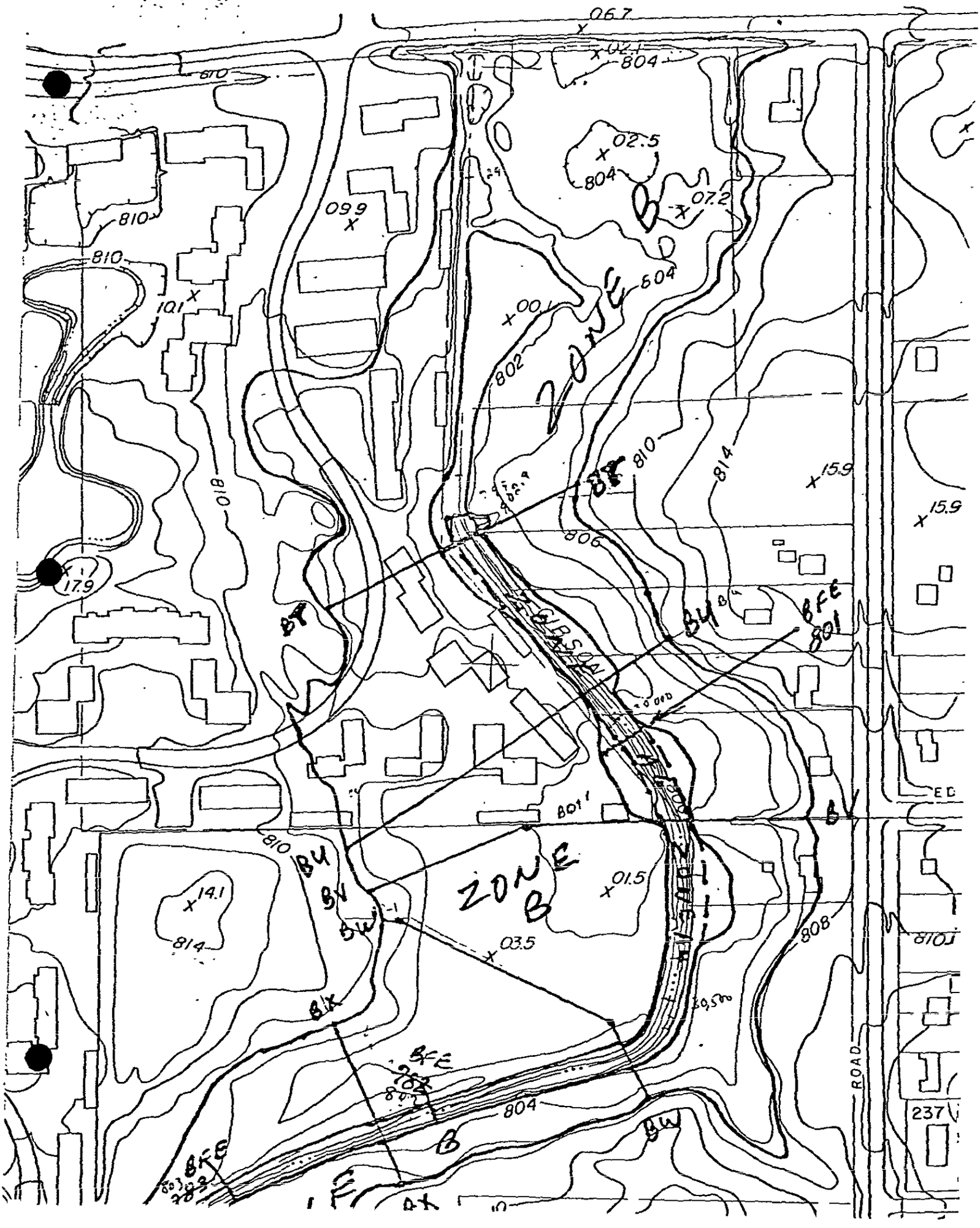
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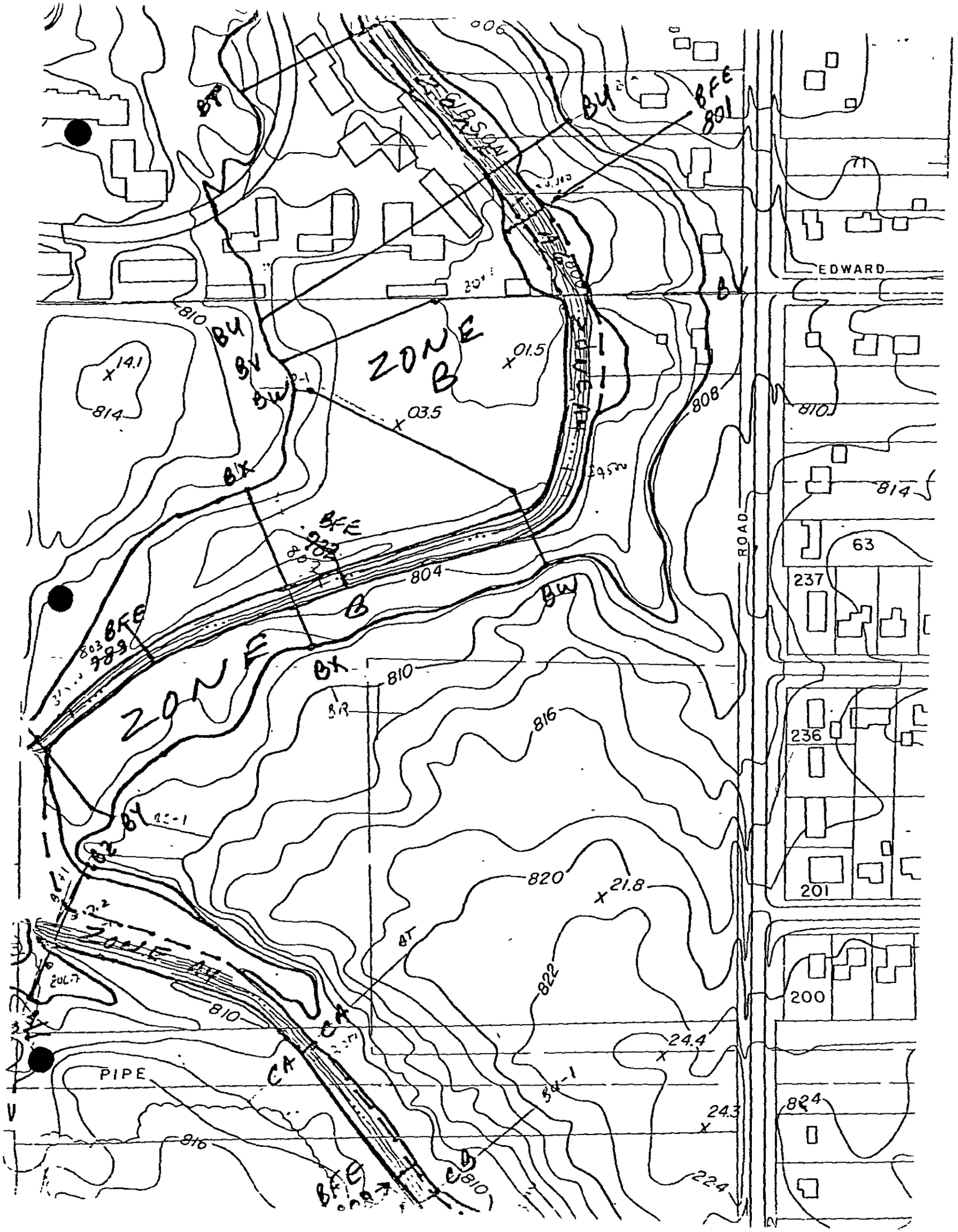
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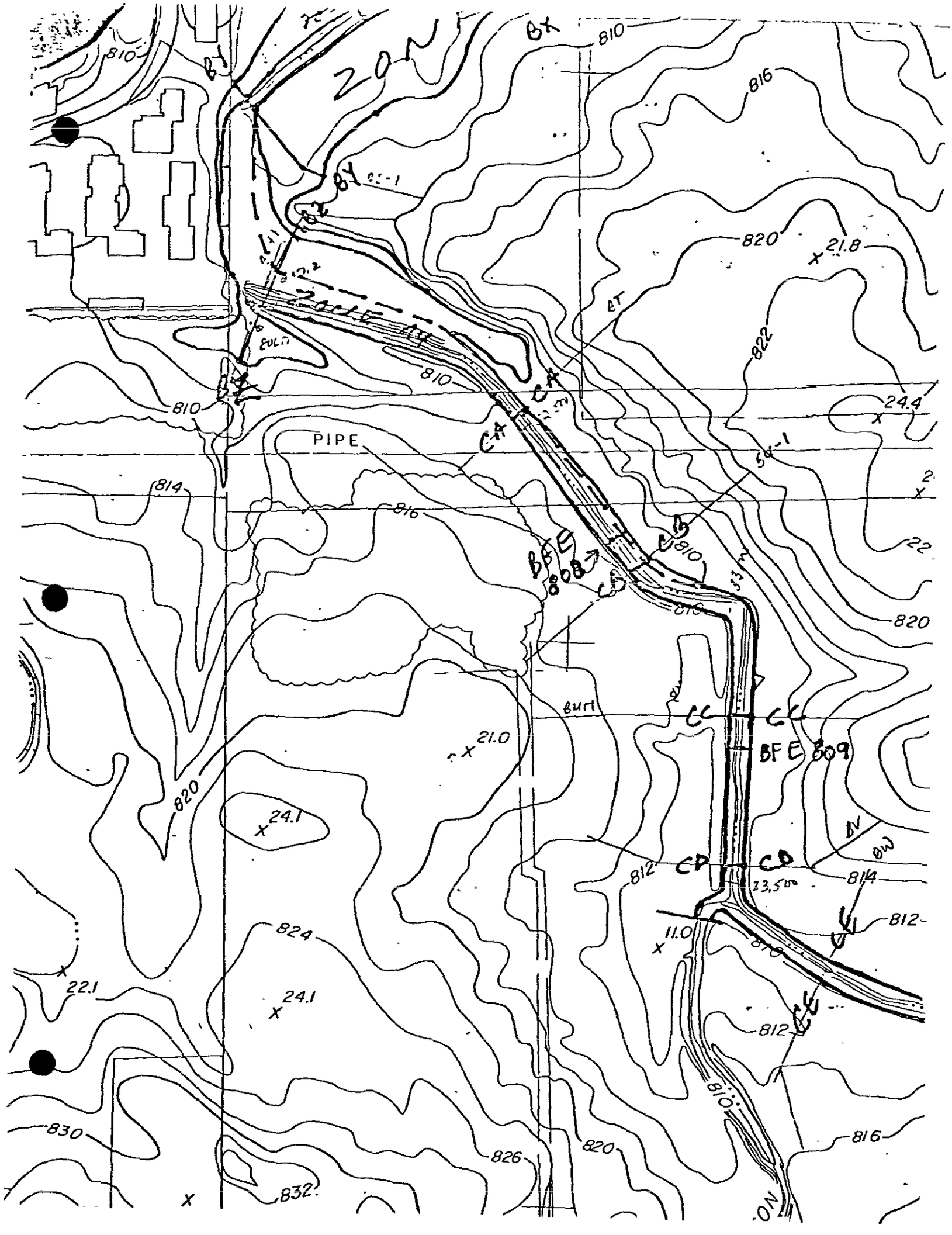
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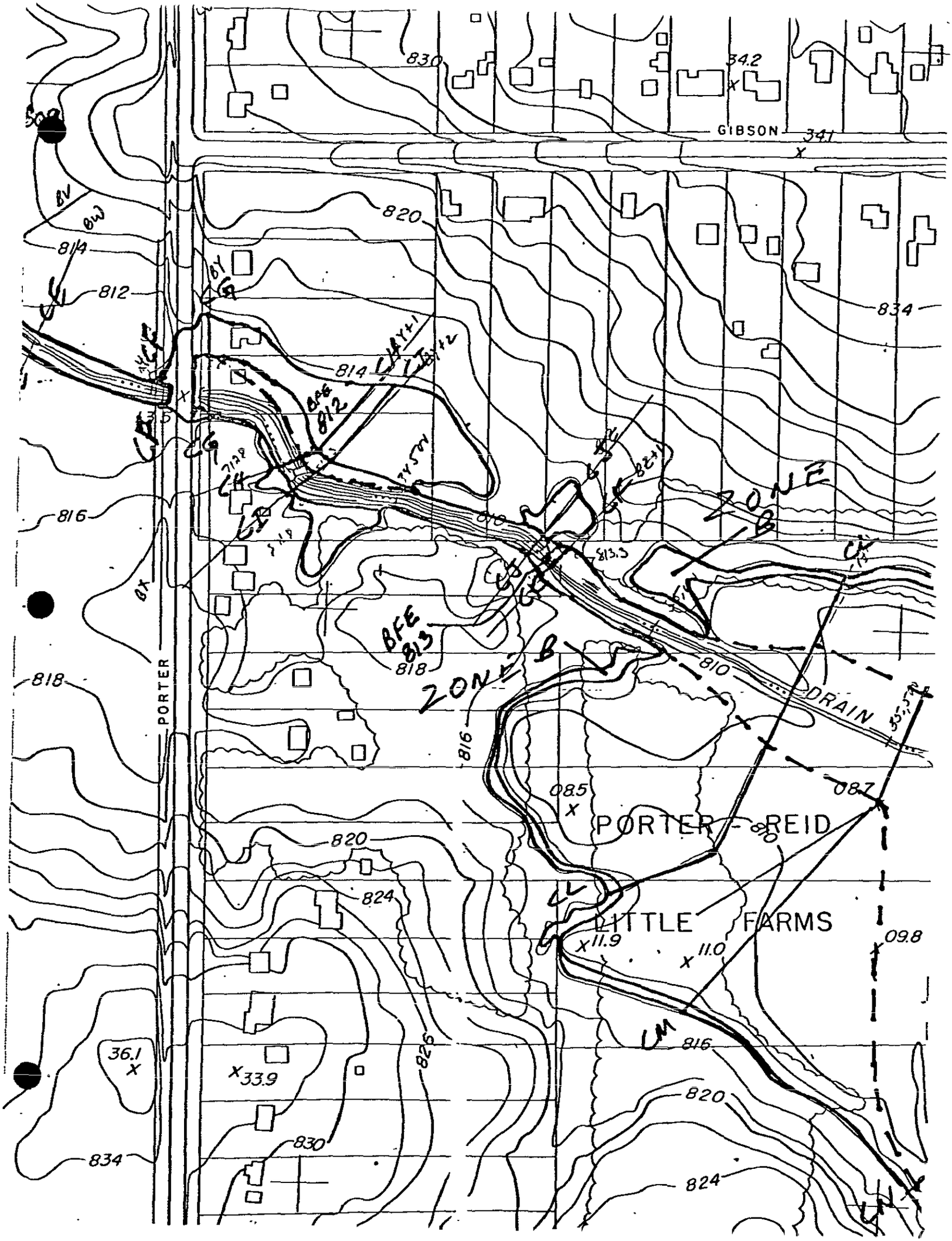
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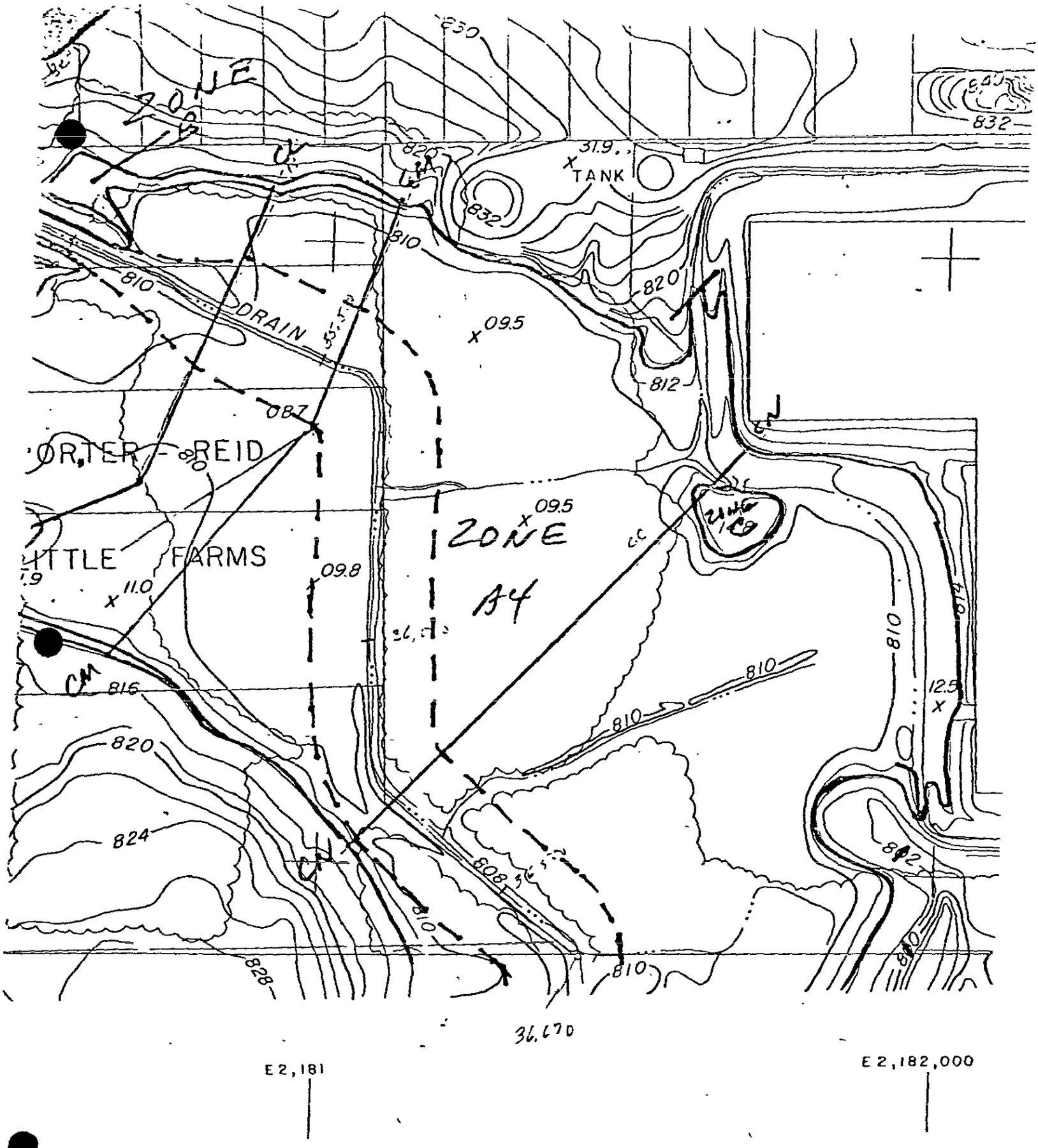
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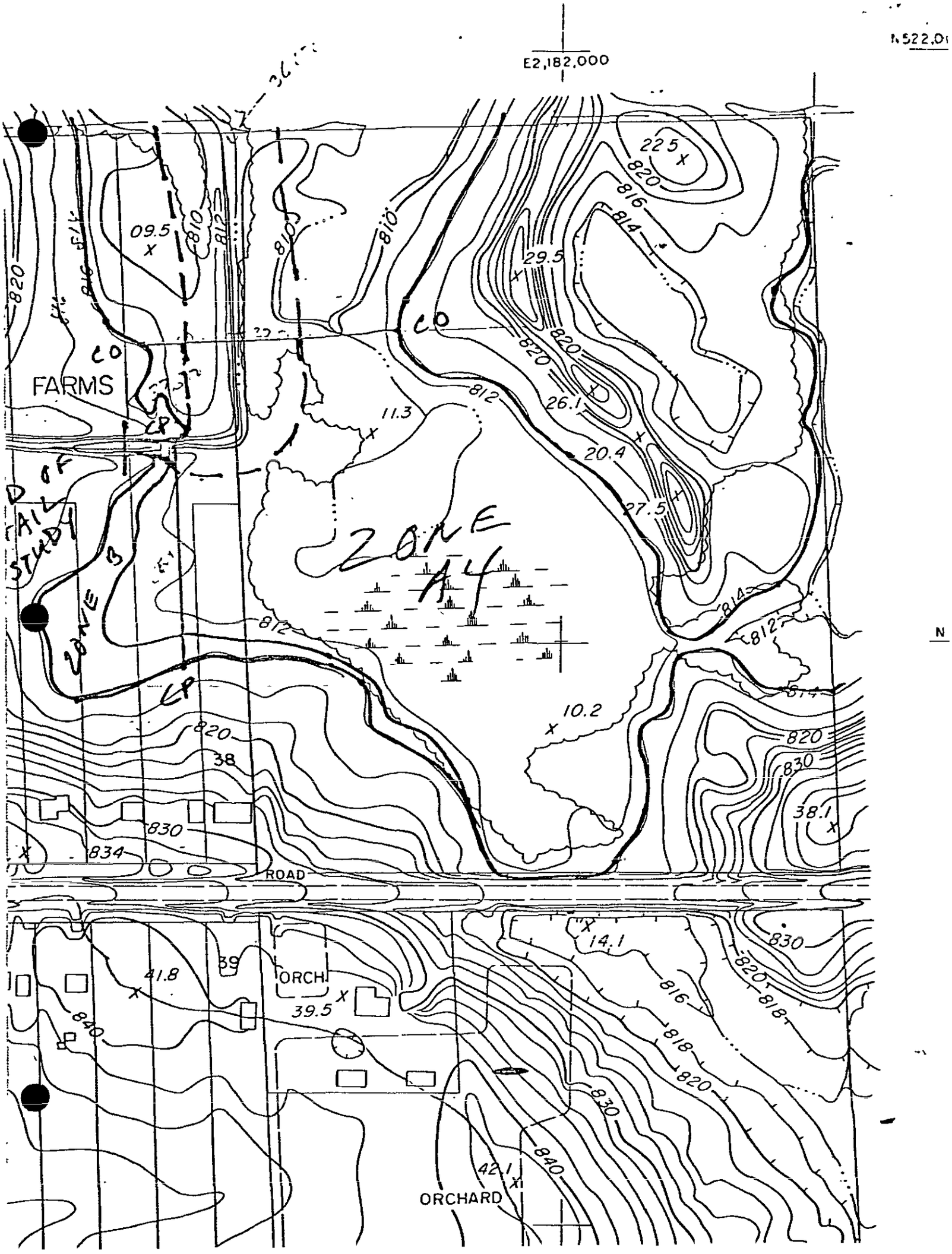
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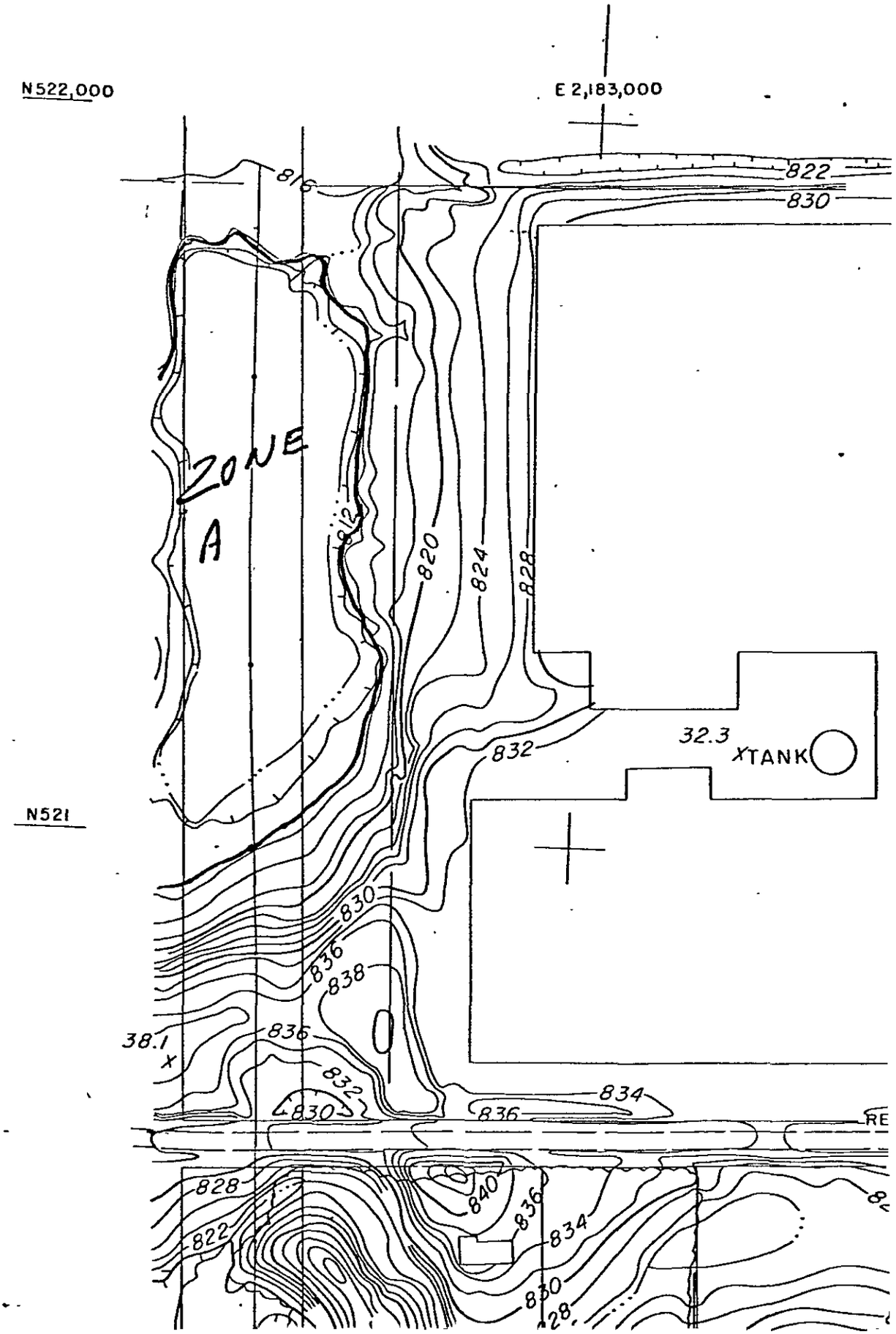
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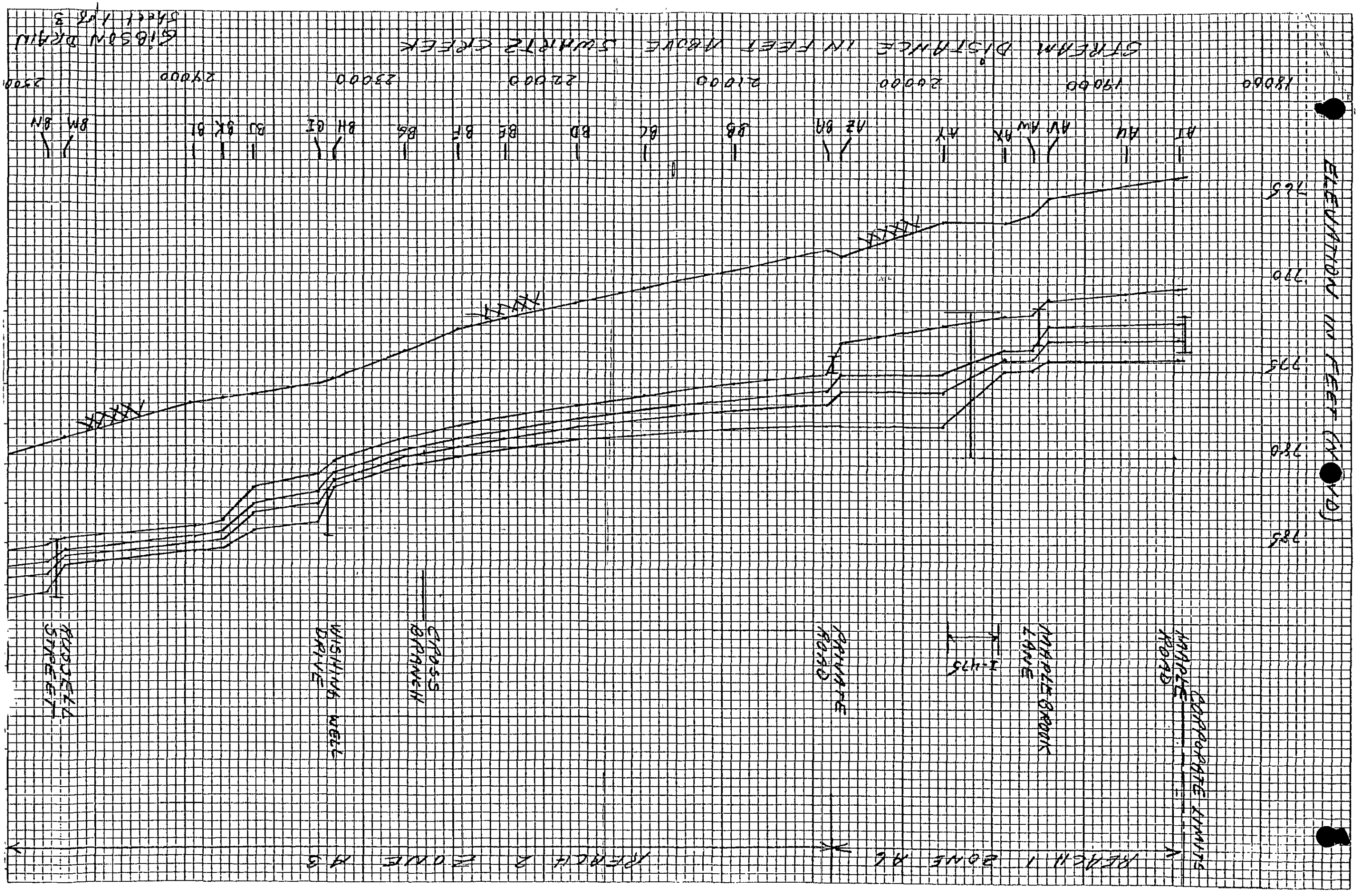
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22000
23000
24000
25000
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770
775
780
785
790
795
800
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A2
A3
A4
A5
A6
A7
A8
A9
B1
B2
B3
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B7
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B9
B10
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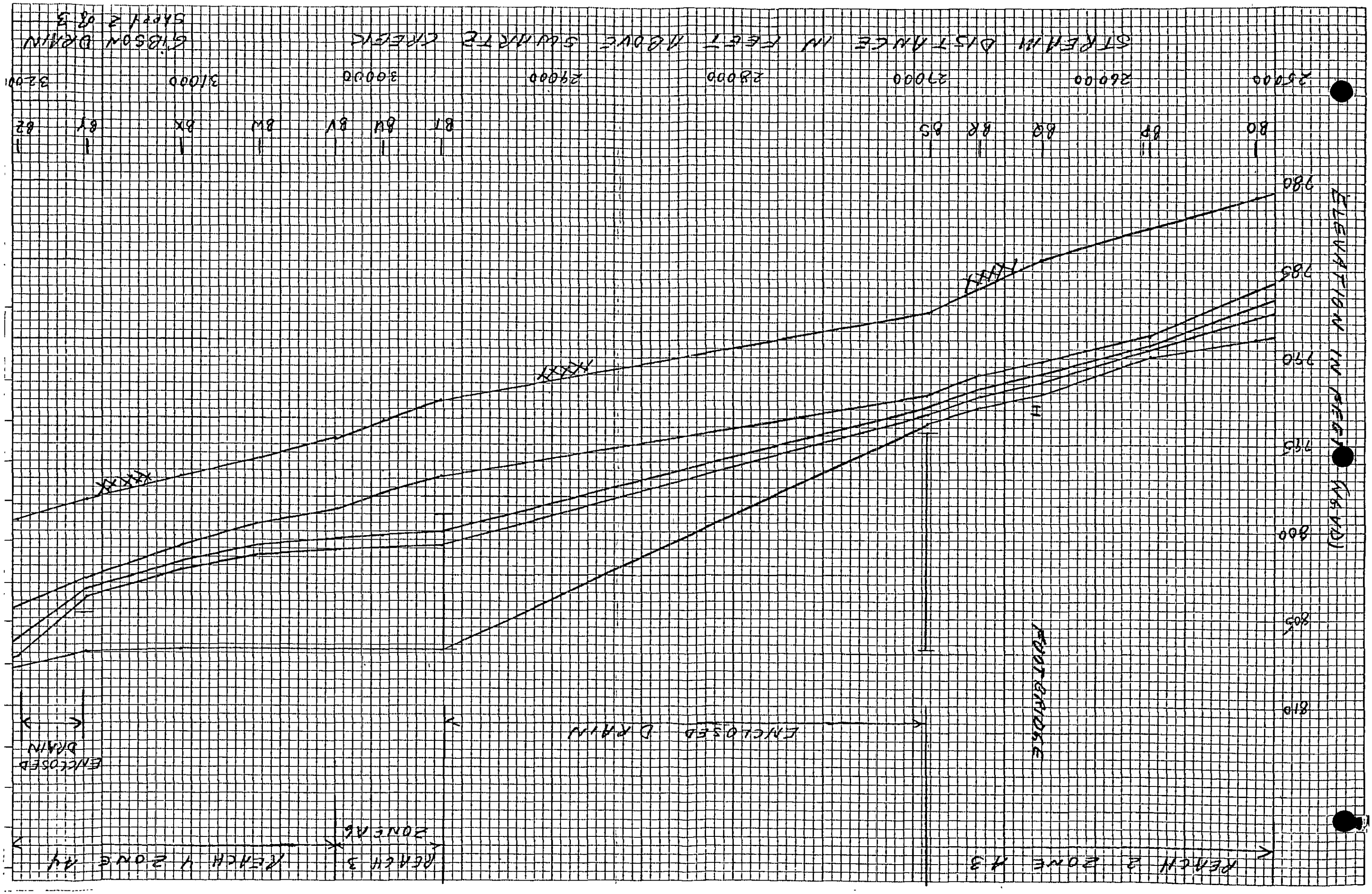
B38
B39
B40


STREAM DISTANCE IN FEET ABOVE SWARTZ CREEK
GIBSON DRAIN
Sheet 2 of 3
25000
26000
27000
28000
29000
30000
31000
32000
B0
B1
B2
B3
B4
B5
B6
B7
B8
B9
B10
B11
B12
B13
B14
B15
B16
B17
B18
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B21
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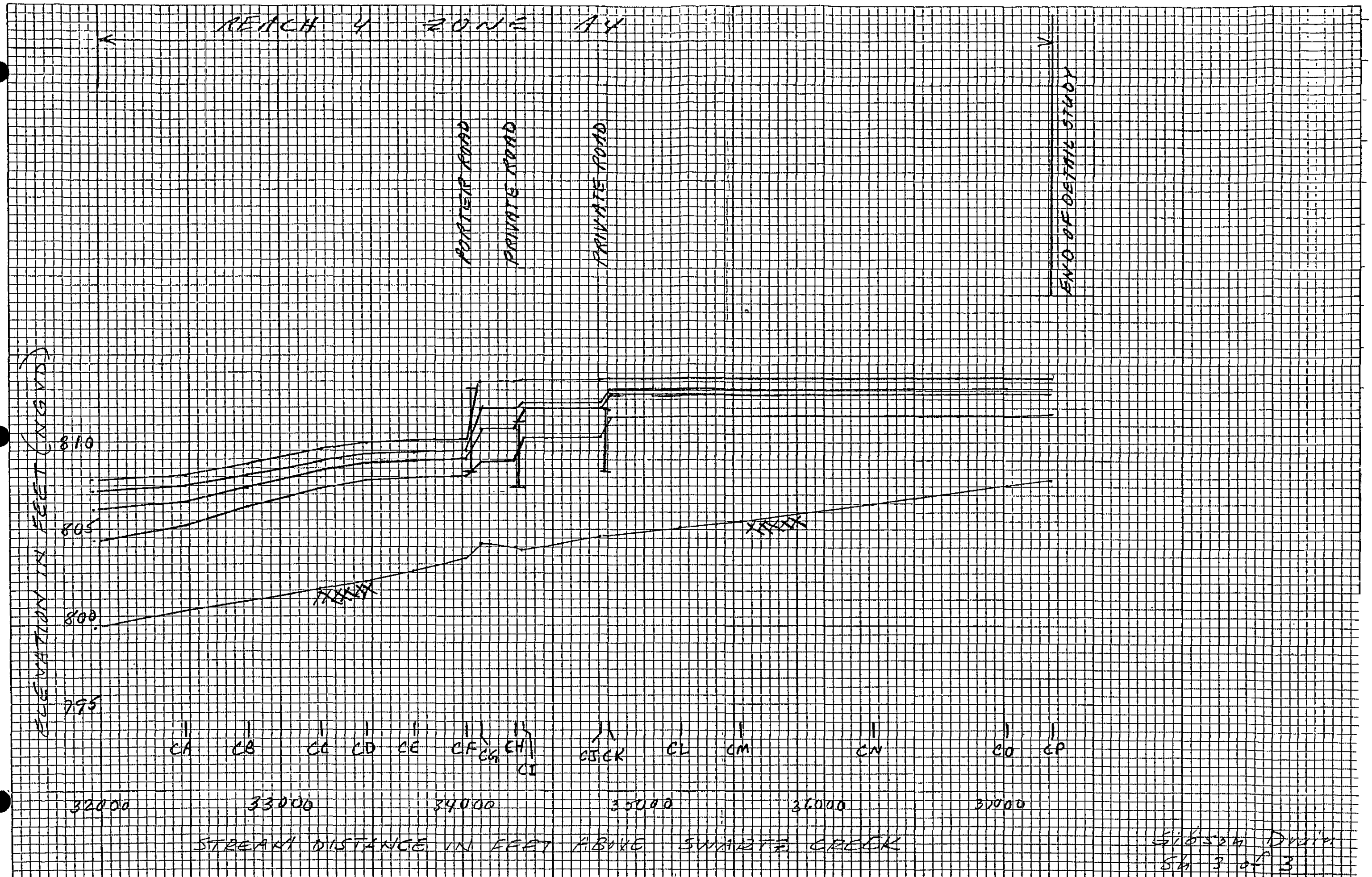
B65
B66
B67
B68
B69
B70
B71
B72
B73
B74
B75
B76
B77
B78
B79
B80
ELEVATION IN FEET (MSL)
800
805
810
815
820
825
830
835
840
845
850
855
860
865
870
875
880
885
890
895
900
905
910
915
920
925
930
935
940
945
950
955
960
965
970
975
980
985
990
995


REACH 4 ZONE A4
PARTIES ROAD
PRIVATE ROAD
PRIVATE ROAD
END OF DETAIL STUDY
ELEVATION IN FEET (NGS)
810
805
800
795
CA
CB
CC
CD
CE
CF
CG
CH
CI
CJ
CK
CL
CM
CN
CO
CP
32000
33000
34000
35000
36000
37000
STREAM DISTANCE IN FEET ABOVE SWAMPY CREEK
Sidson Drain
Sh 3 of 3

00BREAK00

1) COUNTY: Genesee

2) STUDY NAME: City of Flint

3) WATERCOURSE: Gibson Drain
(mouth to M21)

4) DOCUMENT TYPE: input + 100 yr natural + 100 Encroachment

00BREAK00

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE=12/13/7

*** INPUT CARD PRINTOUT ***

```
          1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 GIBSON DRAIN MOUTH TO M-21            A-F KNUTILLA  4  5  2  5 12
2      2  72450  72550  72600  72670  72600
3    100      A 1  15  3  720        0  1  3
4    105   1000   1500   1700   2200   1700
5    110        0  1  7265   40  1  7260  200  1  7260  350  1  7240  680  2  7220
5    111      690  2  7200  700  2  7191  720  2  7191  725  3  7200  735  3  7220   A
5    112      740  3  7240  780  3  7260  900  3  7260  970  3  7240 1210  3  7265
6    120  1  2 035 035  1  2 035 035  1  2 035 035
3    200      C 0  13  3  722      775  1  3
5    210        0  1  7340   40  1  7320  100  1  7300  125  1  7280  330  1  7260   B
5    211      350  2  7240  360  2  7209  390  2  7209  400  3  7240  500  3  7260
5    212      580  3  7280  660  3  7300  725  3  7340
6    220  1  2 035 035  1  2 035 035  1  2 035 035
3    300      D 0  13  3  725     1360  1  3
5    310        0  1  7400   20  1  7380   50  1  7360  100  1  7320  170  1  7300   C
5    311      190  2  7280  190  2  7225  225  2  7225  230  3  7260  265  3  7280
5    312      340  3  7300  400  3  7340  470  3  7400
6    320  1  2 035 035  1  2 035 035  1  2 035 035
3    400      E 0   9  3  725     1680  1  3
5    410        0  1  7400   40  1  7320  250  1  7300  310  2  7280  315  2  7260   D
5    411      315  2  7233  330  2  7233  350  3  7300  375  3  7400
6    420  1  2 040 040  1  2 035 035  1  2 040 040
```

Input

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 GIBSON DR GTW RR TO ATHERTON RD      H-K KNUTILLA  5  5  2  5 12
2      2  73260  73530  73630  73840  73630
3    500      H 1  12  3  728    2120  1  3
4    505   1000   1500   1700   2200   1700
5    510       0  1  7400   40  1  7360   70  1  7320  120  1  7300  135  2  7240   F
5    511     145  2  7250  170  2  7250  180  2  7280  190  3  7300  205  3  7320
5    512     240  3  7340  280  3  7400
6    520  1  2 100 100  1  2 040 040  1  2 060 060
3    600      I 0  14  3  728    2520  1  3
5    610       0  1  7400   30  1  7380   45  1  7360   80  1  7340  150  1  7320   G
5    611     200  2  7320  210  2  7280  215  2  7260  240  2  7260  260  3  7320
5    612     310  3  7320  340  3  7340  380  3  7360  390  3  7400
6    620  1  2 080 080  1  2 045 045  1  2 060 060
3    700      J 0   8  3  730    2950  1  3
5    710       0  1  7460   20  1  7440   30  1  7420  190  2  7400  210  2  7277   H
5    711     245  2  7277  270  3  7420  310  3  7480
6    720  1  2 080 080  1  2 050 050  1  2 050 050
3    800      K 0   9  3  732    3670  1  3
5    810       0  1  7460   40  1  7440   50  1  7420   60  2  7400  100  2  7305   I
5    811     120  2  7305  140  3  7360  170  3  7400  230  3  7500
6    820  1  2 060 060  1  2 045 045  1  2 080 080
3    900      L 0   8  3  734    3920  1  3
5    910       0  1  7440  150  1  7420  180  2  7400  200  2  7319  220  2  7319   J
5    911     240  3  7340  270  3  7400  320  3  7440
6    920  1  2 070 070  1  2 040 040  1  2 100 100
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 GIBSON DR ATHERTON RD-CRESTBROOK LANEM-O KNUTILLA  3  5  2  5 12
2      2  73740  73880  73950  74120  73951
3   1000     M 1  11  3  733    4030  1  3
4   1005    970   1450   1630   2100   1630
5   1010    -300  1  7480 -200  1  7460 -170  1  7440    0  1  7417   36  2  7409
5   1011      68  2  7328   84  2  7319   96  2  7325  118  3  7426  130  3  7440
5   1012     200  3  7480
6   1020  1  2 070 070  1  2 040 040  1  2 100 100
3   1100     N 0  12  3  735    4730  1  3
5   1110       0  1  7500   25  1  7400   35  1  7380   45  2  7360   50  2  7340
5   1111      60  2  7333   85  2  7333  100  3  7380  210  3  7400  275  3  7420
5   1112     430  3  7440  500  3  7460
6   1120  1  2 070 070  1  2 040 040  1  2 070 070
3   1200     0 0  11  3  736    5380  1  3
5   1210       0  1  7500   20  1  7480   40  1  7460   70  2  7440   80  2  7380
5   1211      85  2  7347  105  2  7347  120  3  7400  230  3  7420  250  3  7440
5   1212     300  3  7500
6   1220  1  2 045 045  1  2 040 040  1  2 040 040
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE=11/15.

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 GIBSON DR CRESTBROOK-HAMMERBERG      P-Q KNUTILLA  2  5  2  5 12
2      2  74510  74690  74710  74740  74713
3  1300      P 1  11  3  737    5480  1  3
4  1305    970   1450   1630   2100   1630
5  1310     -40  1  7500  -40  1  7480    0  1  7466   26  2  7456   38  2  7397
5  1311      42  2  7357   64  2  7358   67  2  7350   70  3  7456  120  3  7460
5  1312     120  3  7500
6  1320  1  2 045 045  1  2 035 035  1  2 050 050
3  1400     Q 0   9  3  740    6120  1  3
5  1410       0  1  7520   45  1  7500   90  1  7480  110  2  7420  130  2  7375
5  1412     150  2  7375  160  3  7420  175  3  7480  200  3  7500
6  1420  1  2 060 060  1  2 045 045  1  2 060 060
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 GIBSON DR HAMMERBERG-BLACKBERRY SEC R-S  KNUTILLA  2  5  2  5 12
2      2  74800  75060  75080  75130  75083
3   1600      R 1  12  3  740    6220  1  3
4   1605    970   1450   1630   2100   1630
5   1610    -190  1  7520 -165  1  7500 -120  1  7440  -56  1  7422  -42  2  7404
5   1611     -37  2  7378  -30  2  7377  -22  2  7379  -12  3  7434    0  3  7451
5   1612     190  3  7460  210  3  7520
6   1620  1  2 050 050  1  2 040 040  1  2 050 050
3   1700     S 0    8  3  740    6960  1  3
5   1710       0  1  7520   60  1  7500  160  2  7480  180  2  7385  195  2  7305
5   1711     210  3  7460  250  3  7500  330  3  7520
6   1720  1  2 035 035  1  2 042 042  1  2 045 045
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 GIBSON DR BLACKBERRY TO HEMPHILL SEC T-V FNUTILLA  3  5  2  5 12
2      2  75020  75160  75175  75205  75182
3  1800      T 1  11  3  748    7060  1  3
4 01805 000970 001450 001630 002100 001630
5  1810    -100  1  7600  -40  1  7540    0  1  7502   70  2  7482   80  2  7393
5  1811      88  2  7389   92  2  7393  114  3  7482  200  3  7500  250  3  7520
5  1812     300  3  7600
6  1820  1  2 050 050  1  2 040 040  1  2 045 045
3  1900     U 0  14  3  748    7590  1  3
5  1910       0  1  7600   10  1  7560   45  1  7540   60  1  7520   75  1  7500
5  1911      90  1  7480  135  1  7460  150  2  7440  160  2  7400  175  2  7399
5  1912     190  2  7399  200  3  7460  220  3  7480  280  3  7600
6  1920  1  2 050 050  1  2 040 040  1  2 060 060
3  2000     V 0  11  3  748    8280  1  3
5  2010       0  1  7560  120  1  7540  180  1  7520  230  1  7500  450  1  7500
5  2011     460  2  7480  470  2  7420  480  2  7412  490  2  7412  500  3  7500
5  2012     580  3  7560
6  2020  1  2 070 070  1  2 035 035  1  2 070 070
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE=12/13/77

WATER-SURFACE PROFILE FOR: GIBSON DRAIN MOUTH TO M-21 A-F KNUTILLA

SECID AT DISTANCE / WS ELEV	HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW *ID*	
A AT 0 / 726.00	0.02	0	1700.	1792. / 726.02	144868. / 0.95	1.48 / 0.10	200.	1162. *IS*	A
C AT 775 / 726.25	0.43	775 / 0.44	1700. / 0.21	391. / 726.68	34782. / 4.35	1.48 / 0.47	304. / 0.012	510. *XS*	B
D AT 1360 / 727.93	0.88	585 / 1.91	1700. / 0.22	241. / 728.82	25501. / 7.04	1.14 / 0.60	190. / 0.001	264. *XS*	C
E AT 1680 / 729.63	1.30	320 / 1.91	1700. / 0.21	208. / 730.93	19035. / 8.17	1.25 / 0.80	261. / 0.000	349. *XS*	D

END OF THIS PROFILE

IW-4

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 13,DATE=11/14/77

WATER-SURFACE PROFILE FOR: GIBSON DR GTW RR TO ATHERTON RD H-K KNUTILLA

PAGE 1 OF 1

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
H AT 2120 / 736.30	0 / 0.07	1700. /	1208. /	123902. / 736.37	2.16 / 1.41	37. / 0.13	255.	*IS*	F
I AT 2520 / 736.40	400 / 0.05	1700. / 0.08	1406. / 0.0	111605. / 736.45	2.01 / 1.21	42. / 0.12	381. / -0.000	*XS*	G
J AT 2950 / 736.56	430 / 0.23	1700. / 0.25	442. / 0.09	45185. / 736.79	1.00 / 3.84	196. / 0.26	260. / -0.000	*XS*	H
K AT 3670 / 737.86	720 / 0.35	1700. / 1.36	366. / 0.06	33840. / 738.21	1.05 / 4.64	69. / 0.38	154. / 0.001	*XS*	I
L AT 3920 / 738.44	250 / 0.47	1700. / 0.64	343. / 0.06	33593. / 738.91	1.22 / 4.96	184. / 0.43	262. / 0.000	*XS*	J

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE=11/15/77

WATER-SURFACE PROFILE FOR: GIBSON DR ATHERTON RD-CRESTBROOK LANEM-O KNUTILLA
PAGE 1 OF 1

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
M AT 4030	0	1630.	344.	36317.	1.00	42.	111.	
739.50	0.35			739.85	4.74	0.38		*IS*
N AT 4730	700	1630.	592.	52189.	1.83	23.	230.	
740.62	0.22	0.98	0.0	740.83	2.75	0.28	0.000	*XS*
O AT 5380	650	1630.	311.	28041.	1.31	74.	209.	
741.62	0.56	1.18	0.17	742.18	5.24	0.48	-0.008	*XS*

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 8,DATE=11/15/77

```
==================================================================================
WATER-SURFACE PROFILE FOR: GIBSON DR CRESTBROOK-HAMMERBERG      P-Q KNUTILLA
PAGE  1 OF  1
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
    P AT    5480 /     0 /   1630. /   491. /   65869. / 1.33 /  -14. /  120.
   747.10 /   0.23 /                 / 747.33 /   3.32 /   0.23/          *IS*
----------------------------------------------------------------------------------
    Q AT    6120 /   640 /   1630. /   525. /   64041. / 1.20 /   91. /  174.
   747.55 /   0.18 /   0.40 /   0.0  / 747.73 /   3.10 /   0.21 / -0.000  *XS*
----------------------------------------------------------------------------------
```

N 1 0 4 - 4

O

END OF THIS PROFILE

```
==================================================================================
WATER-SURFACE PROFILE FOR: GIBSON DR HAMMERBERG-BLACKBERRY SEC R-S  KNUTILLA
PAGE  1 OF  1
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
    R AT    6220 /     0 /   1630. /  2271. /  242882. / 1.36 / -175. /  206.    P
   750.80 /   0.01 /                 /  750.81 /    0.72 /   0.05/          *IS*
----------------------------------------------------------------------------------
    S AT    6960 /   740 /   1630. /   790. /   86981. / 1.52 /   35. /  284.    Q
   750.85 /   0.10 /   0.09 /   0.04 /  750.95 /    2.06 /   0.16 / -0.000  *XS*
----------------------------------------------------------------------------------

                          END OF THIS PROFILE
```

10V-1

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 11,DATE=11/15/77

WATER-SURFACE PROFILE FOR: GIBSON DR BLACKBERRY TO HEMPHILL SEC T-V FNUTILLA
PAGE 1 OF 1

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
T	AT	7060	0	1630.	865.	86157.	1.77	-16.	244.	R
751.75		0.10			751.85	1.88	0.17		*IS*	
U	AT	7590	530	1630.	1067.	135253.	1.52	61.	240.	S 100-1
751.91		0.06	0.12	0.0	751.97	1.53	0.11	-0.000	*XS*	
V	AT	8280	690	1630.	908.	75769.	3.07	179.	527.	T
752.04		0.15	0.18	0.05	752.20	1.80	0.21	-0.000	*XS*	

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 20,DATE=12/13/77

WATER-SURFACE PROFILE FOR: GIBSON DRAIN MOUTH TO M-21 A-F KNUTILLA

PAGE 1 OF 1

*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
A AT 0 / 726.00	0 / 0.03	1700. /	1282. / 726.03	129647. / 1.33	1.18 / 0.12	360. /	730.	*IS*	A
C AT 775 / 726.30	775 / 0.48	1700. / 0.52	329. / 0.22	33202. / 726.78	1.16 / 5.17	350. / 0.48	450. / -0.000	*XS*	B
D AT 1360 / 728.05	585 / 0.83	1700. / 1.92	243. / 0.18	26551. / 728.88	1.09 / 7.01	190. / 0.57	250. / 0.008	*XS*	C
E AT 1680 / 729.66	320 / 1.85	1700. / 2.12	174. / 0.51	16404. / 731.51	1.25 / 9.76	275. / 0.86	335. / -0.001	*XS*	D

END OF THIS PROFILE

Floodway

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 22,DATE=11/14/77

WATER-SURFACE PROFILE FOR: GIBSON DR GTW RR TO ATHERTON RD H-K KNUTILLA
PAGE 1 OF 1
*** FLOODWAY ANALYSIS *** HOR FW

	SECID AT	DISTANCE /	LENGTH /	DISCHARGE /	AREA /	CONVEYANCE /	ALPHA /	LEW /	REW	
	WS ELEV /	HV /	HF /	HE /	EG /	V /	FN /	ACC	*ID*	
	H AT	2120 /	0 /	1700. /	1145. /	123894. /	1.95 /	60. /	235.	
0	736.30 /	0.07 /		/	736.37 /	1.48 /	0.13/		*IS*	F
	I AT	2520 /	400 /	1700. /	1099. /	100447. /	1.07 /	100. /	300.	
0	736.40 /	0.06 /	0.09 /	0.0 /	736.46 /	1.55 /	0.14 /	-0.000	*XS*	G
	J AT	2950 /	430 /	1700. /	444. /	45566. /	1.00 /	196. /	260.	
.03	736.59 /	0.23 /	0.27 /	0.08 /	736.81 /	3.83 /	0.26 /	-0.000	*XS*	H FW
	K AT	3670 /	720 /	1700. /	355. /	33533. /	1.00 /	70. /	140.	
.03	737.89 /	0.36 /	1.36 /	0.06 /	738.24 /	4.79 /	0.37 /	0.001	*XS*	I
	L AT	3920 /	250 /	1700. /	336. /	33987. /	1.22 /	190. /	260.	
.01	738.45 /	0.49 /	0.63 /	0.07 /	738.94 /	5.07 /	0.42 /	0.000	*XS*	J

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 20,DATE=11/15/77

```
==================================================================================
WATER-SURFACE PROFILE FOR: GIBSON DR ATHERTON RD-CRESTBROOK LANEM-O KNUTILLA
PAGE  1 OF  1
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
    M AT    4030 /     0 /   1630. /   345. /   36416. / 1.00 /   41. /  111.
.01  739.51 /  0.35 /                 /  739.86 /   4.73 /  0.37/         *IS*
----------------------------------------------------------------------------------
    N AT    4730 /   700 /   1630. /   539. /   51256. / 1.61 /   40. /  190.
.01  740.63 /  0.23 /   1.00 /   0.0  /  740.85 /   3.02 /  0.28 / 0.000  *XS*
----------------------------------------------------------------------------------
    O AT    5380 /   650 /   1630. /   315. /   28602. / 1.29 /   74. /  199.
.03  741.65 /  0.54 /   1.18 /   0.16 /  742.19 /   5.18 /  0.47 / 0.000  *XS*
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

```
==================================================================================
WATER-SURFACE PROFILE FOR: GIBSON DR CRESTBROOK-HAMMERBERG      P-Q KNUTILLA
PAGE  1 OF  1
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
    P AT    5480 /     0 /   1630. /   493. /   66420. / 1.33 /   -5. /  120.
.03  747.13 /   0.23 /                 / 747.35 /   3.31 /   0.23/          *IS*
----------------------------------------------------------------------------------
    Q AT    6120 /   640 /   1630. /   522. /   64422. / 1.17 /   95. /  170.
.03  747.58 /   0.18 /   0.40 /   0.0  / 747.75 /   3.12 /   0.21 /  0.000  *XS*
----------------------------------------------------------------------------------
```

N FW

0

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 18,DATE=11/15/77

```
==================================================================================
WATER-SURFACE PROFILE FOR: GIBSON DR HAMMERBERG-BLACKBERRY SEC R-S  KNUTILLA
PAGE  1 OF  1
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
     R AT    6220 /      0 /   1630. /  1470. /  178447. / 1.32 / -100. /  100.    P
.03   750.83 /   0.03 /                / 750.85 /    1.11 /   0.09/          *IS*
----------------------------------------------------------------------------------
     S AT    6960 /    740 /   1630. /   786. /   90845. / 1.38 /   50. /  250.    Q
.07   750.92 /   0.09 /   0.12 /   0.03 / 751.01 /    2.07 /   0.15 / -0.000  *XS*
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

F.W

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   18,DATE=11/15/77

==================================================================================
WATER-SURFACE PROFILE FOR: GIBSON DR BLACKBERRY TO HEMPHILL SEC T-V FNUTILLA
PAGE  1 OF  1
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
    T AT    7060 /      0 /   1630. /   828. /   88151. / 1.58 /    0. /  200.
.07  751.82 /   0.10 /                 / 751.91 /    1.97 /   0.16/          *IS*
----------------------------------------------------------------------------------
    U AT    7590 /    530 /   1630. /  1077. /  137819. / 1.50 /   65. /  240.
.07  751.98 /   0.05 /   0.12 /   0.0  / 752.03 /    1.51 /   0.11 / -0.000  *XS*
----------------------------------------------------------------------------------
    V AT    8280 /    690 /   1630. /   696. /   68972. / 2.23 /  300. /  500.
.06  752.10 /   0.19 /   0.19 /  0.07 / 752.29 /    2.34 /   0.23 / -0.000  *XS*
----------------------------------------------------------------------------------

                              END OF THIS PROFILE
```

R

S FW

T

00BREAK00

1) COUNTY: Genesee

2) STUDY NAME: City of Flint

3) WATERCOURSE: Kearsley Creek

4) DOCUMENT TYPE: 100 yr natural & Encroached

00BREAK00

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 KEARSLEY CREEK MOUTH TO DAM                KNUTILLA 14  5  2 99 12
2      2  71366  71597  71686  71898  71694
3    100      A 1  10  3  710        0  1  3
4    505   1350   1900   2200   2800   2200
5    110        0  1  7200   60  1  7180  120  1  7100  150  2  7080  200  2  7020
**SEQUENCE**                                                                          A
5    111      260  2  7020  265  2  7080  275  3  7100  330  3  7140  380  3  7200
6    120  1  2 070 070  1  2 035 035  1  2 070 070
3    150 A+1    0   8  3  710       75  1  3
5    160        0  1  7200   60  1  7180   90  2  7100  100  2  7030  180  2  7030
5    161      185  3  7140  190  3  7160  250  3  7200
6    170  1  2 070 070  1  2 035 035  1  2 070 070
3    200 BR A  2  16  1  704       75         0  7166 3 0
5    210        0  1  7166    0  1  7134   10  1  7088   20  1  7066   26  1  7036
5    211       29  1  7032   35  1  7030   45  1  7032   55  1  7038   66  1  7024
5    212       69  1  7020   80  1  7032   88  1  7072   95  1  7094   95  1  7166
5    213        0 -9  7166
6    259  1  2 030 030
3    300 RD A  4   5  2   40           1  2           1 1                   1
5    311        0  1  7192  206  1  7186  366  1  7192  367  2  7192  966  2  7199
3    400 B    B 5  14  3  705      195  1  3
5    410        0  1  7190   50  1  7180   52  1  7160   54  1  7140   58  1  7100
5    411       60  2  7100   65  2  7060   70  2  7020  135  2  7020  145  2  7060
5    412      155  2  7100  155  3  7120  160  3  7140  180  3  7190                B
6    459  1  2 060 060  1  2 035 035  1  2 100 100
3    500 C    C 0  11  3  707      360 99 99
5    510        0  1  7191   34  1  7185   35  2  7160   36  2  7094   37  2  7065   C
5    511       62  2  7065   64  2  7100   66  2  7160   78  2  7181   80  3  7190
5    512      114  3  7202
6    559  1  2 060 060  1  2 055 055  1  2 100 100
3    600 D    D 0  12  3  703      450 99 99
5    610        0  1  7190   50  1  7160   52  2  7120   65  2  7100   70  2  7020
5    611      120  2  7020  124  2  7060  150  3  7120  170  3  7130  210  3  7140   D
5    612      225  3  7180  250  3  7200
6    659  1  2 080 080  1  2 040 040  1  2 080 080
3    700 E    E 0  14  3  704      920 99 99
5    710        0  1  7260   30  1  7200   38  2  7180   60  2  7080   70  2  7060   E
5    711       72  2  7030  150  2  7030  155  2  7050  160  2  7121  190  2  7140
5    712      220  3  7180  230  3  7200  240  3  7220  310  3  7240
6    759  1  2 070 070  1  2 032 070  1  2 070 070
3    800 F    F 0  10  3  707     1470  1  3
5    810        0  1  7320   20  1  7300   45  2  7280   50  2  7160   54  2  7060
5    811      125  2  7060  135  2  7200  140  3  7220  160  3  7300  170  3  7400   F
6    859  1  2 070 070  1  2 032 032  1  2 150 150
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
...5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
   900 BR E  2  23  1  710    1470       15  7343 3 0
   910       3  1  7343    3  1  7282   20  1  7220   40  1  7164   57  1  7126
   911      57  1  7343    3 -9  7343   63  1  7323   63  1  7099   70  1  7085
   912      90  1  7083  110  1  7067  120  1  7058  141  1  7058  141  1  7323
   913      63 -9  7323  147  1  7338  147  1  7120  160  1  7135  180  1  7226
   914     197  1  7272  197  1  7338  147 -9  7338
   959  1  2 030 030
  1100 G   G 5  20  3  707    1670  1  3
  1110       0  1  7400   20  1  7300   50  1  7200   75  2  7180  125  2  7160
  1111     155  2  7140  165  2  7120  175  2  7100  177  2  7065  235  2  7065   G
  1112     238  2  7100  240  2  7120  275  2  7130  280  3  7140  335  3  7150
  1113     400  3  7160  560  3  7160  580  3  7180  600  3  7200  620  3  7300
  1114
  1159  1  2 080 080  1  2 032 032  1  2 070 070
  1200 H   H 0  19  3  708    2550 99 99
  1210       0  1  7400   18  1  7300   35  1  7200   40  1  7180   42  2  7170
  1211      45  2  7120   55  2  7100   60  2  7070  110  2  7070  111  2  7100   H
  1212     112  2  7120  120  2  7140  122  3  7145  250  3  7145  340  3  7140
  1213     370  3  7160  375  3  7180  385  3  7200  420  3  7300
  1259  1  2 080 080  1  2 040 040  1  2 080 080
  1250 I     0  13  3  710    3100  1  3
**SEQUENCE**
  1260       0  1  7360   60  1  7359  185  1  7340  210  1  7200  245  2  7120   I
  1261     250  2  7078  290  2  7078  295  2  7120  310  3  7140  410  3  7160
  1262     450  3  7300  480  3  7320  550  3  7335
  1265  1  2 080 080  1  2 040 040  1  2.080 080
  1300 I   I 0  18  3  710    3740 99 99
  1310       0  1  7300   18  1  7200   30  1  7180   34  1  7160   45  2  7140
  1311      55  2  7120   88  2  7100   88  2  7085  180  2  7085  182  2  7100   J
  1312     202  2  7120  216  3  7160  232  3  7200  240  3  7220  245  3  7240
  1313     255  3  7260  265  3  7280  274  3  7300
  1359  1  2 080 080  1  2 037 037  1  2 060 060
```

```
==========================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /      V  /    FN  /   ACC    *ID*
==========================================================================================
    A AT        0 /      0 /   2200. /  2336. /  416187. / 1.52 /    69. /  354.
  716.86 /   0.02 /                  /  716.88 /    0.94 /   0.06/          *IS*
------------------------------------------------------------------------------------------
A+1   AT       75 /     75 /   2200. /  1357. /  284709. / 1.12 /    64. /  203.
  716.86 /   0.05 /   0.00 /    0.01 /  716.91 /    1.62 /   0.08 /  0.009  *XS*
============================ BEGIN BRIDGE ANALYSIS ==========================
BR A  AT       75 /        /   2200. /  1095. /  166697. / 1.00 /     0. /   95.
  716.60 /   0.06 /       ...3...  (-.001)    /    2.01 /   0.10 /          *BO*
------------------------------------------------------------------------------------------
 NO ROAD OVERFLOW
                                                                            *RG*
------------------------------------------------------------------------------------------
B   B AT      195 /    120 /   2200. /  1366. /  303272. / 1.09 /    51. /  171.
  716.87 /   0.04 /   0.01 /    0.01 /  716.91 /    1.61 /   0.08 / -0.011  *AS*
------------------------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /  1371. /  304952. / 1.09 /    51. /  172.
  716.91 /   0.04 /                  /  716.96 /    1.60 /   0.08 /          *AS*
============================ END BRIDGE ANALYSIS ============================
C   C AT      360 /    165 /   2200. /   290. /   25815. / 1.00 /    35. /   69.
  716.59 /   0.90 /   0.10 /    0.43 /  717.49 /    7.60 /   0.46 / -0.000  *XS*
------------------------------------------------------------------------------------------
D   D AT      450 /     90 /   2200. /  1503. /  238200. / 1.34 /    25. /  223.
  717.51 /   0.04 /   0.07 /    0.0  /  717.56 /    1.46 /   0.09 / -0.000  *XS*
------------------------------------------------------------------------------------------
E   E AT      920 /    470 /   2200. /  1669. /  153298. / 1.00 /    39. /  217.
  717.59 /   0.03 /   0.06 /    0.0  /  717.62 /    1.32 /   0.08 / -0.000  *XS*
------------------------------------------------------------------------------------------
F   F AT     1470 /    550 /   2200. /   903. /  184976. / 1.00 /    49. /  133.
  717.65 /   0.09 /   0.09 /    0.03 /  717.75 /    2.44 /   0.13 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==========================
BR E  AT     1470 /        /   2200. /   917. /  158719. / 1.00 /    36. /  169.
  717.65 /   0.09 /       ...1...  (-.001)    /    2.40 /   0.16 /          *BO*
------------------------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                            *RG*
------------------------------------------------------------------------------------------
G   G AT     1670 /    200 /   2200. /  1766. /  191431. / 1.67 /    82. /  577.
  717.73 /   0.04 /   0.03 /    0.0  /  717.77 /    1.25 /   0.12 / -0.000  *AS*
------------------------------------------------------------------------------------------
  M = 0.11 / E = 0.0  / K* = 0.29 /  1779. /  192744. / 1.67 /    81. /  578.
  717.76 /   0.04 /                  /  717.80 /    1.24 /   0.12 /          *AS*
============================ END BRIDGE ANALYSIS ============================
H   H AT     2550 /    880 /   2200. /  1589. /  1485[illegible] / [illegible] /
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 17,DATE= 2/ 7/78

WATER-SURFACE PROFILE FOR: KEARSLEY CREEK MOUTH TO DAM KNUTILLA

SECID	AT	DISTANCE/	LENGTH/	DISCHARGE/	AREA	/CONVEYANCE/	ALPHA/	LEW	/ REW	
WS ELEV /	HV /	HF /	HE /	EG /	V /	FN /	ACC	*ID*		
I	AT	3100 /	550 /	2200. /	955. /	101208. /	1.79 /	219. /	416.	I
718.03 /	0.15 /	0.18 /	0.04 /	718.18 /	2.30 /	0.20 /	-0.000	*XS*		
I	I AT	3740 /	640 /	2200. /	1468. /	232582. /	1.05 /	28. /	225.	J
718.28 /	0.04 /	0.13 /	0.0 /	718.32 /	1.50 /	0.09 /	0.007	*XS*		

END OF THIS PROFILE

*** FLOODWAY ANALYSIS *** HOR FW

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /  ACC   *ID*
==================================================================================
    A AT        0 /     0 /   2200. /  2359. /  421065. / 1.53 /   68. /  354.
.08  716.94 /  0.02 /                 /  716.96 /    0.93 /  0.06/          *IS*   A
----------------------------------------------------------------------------------
A+1   AT       75 /    75 /   2200. /  1328. /  286297. / 1.07 /   80. /  190.
   716.94 /  0.05 /  0.00 /    0.01 /  716.99 /    1.66 /  0.08 / 0.009   *XS*
============================ BEGIN BRIDGE ANALYSIS ================================
BR A  AT       75 /       /   2200. /  1095. /  166697. / 1.00 /    0. /   95.
   716.60 /  0.06 /      ...3...  (-.001)    /    2.01 /  0.10 /          *BO*
----------------------------------------------------------------------------------
 NO ROAD OVERFLOW
                                                                            *RG*
----------------------------------------------------------------------------------
B   B AT      195 /   120 /   2200. /  1362. /  305774. / 1.07 /   55. /  165.
   716.95 /  0.04 /  0.01 /    0.01 /  716.99 /    1.62 /  0.08 / -0.011  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  1367. /  307459. / 1.07 /   55. /  165.
.08 716.99 /  0.04 /                 /  717.04 /    1.61 /  0.08 /          *AS*   B
============================ END BRIDGE ANALYSIS ==================================
C   C AT      360 /   165 /   2200. /   293. /   26086. / 1.00 /   35. /   70.   C   FW
.09 716.68 /  0.88 /  0.10 /    0.42 /  717.56 /    7.52 /  0.46 / 0.000   *XS*
----------------------------------------------------------------------------------
D   D AT      450 /    90 /   2200. /  1207. /  219279. / 1.01 /   50. /  150.
.07 717.58 /  0.05 /  0.08 /    0.0  /  717.63 /    1.82 /  0.09 / -0.000  *XS*   D
----------------------------------------------------------------------------------
E   E AT      920 /   470 /   2200. /  1233. /  124664. / 1.00 /   40. /  140.
.08 717.67 /  0.05 /  0.08 /    0.0  /  717.71 /    1.78 /  0.09 / -0.000  *XS*   E
----------------------------------------------------------------------------------
F   F AT     1470 /   550 /   2200. /   903. /  186277. / 1.00 /   50. /  130.
.10 717.76 /  0.09 /  0.11 /    0.02 /  717.85 /    2.44 /  0.13 / -0.000  *XS*   F
============================ BEGIN BRIDGE ANALYSIS ================================
BR F  AT     1470 /       /   2200. /   929. /  161564. / 1.00 /   35. /  169.
   717.76 /  0.09 /      ...1...  (-.001)    /    2.37 /  0.16 /          *BO*
----------------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                            *RG*
----------------------------------------------------------------------------------
G   G AT     1670 /   200 /   2200. /  1234. /  186618. / 1.07 /  100. /  300.
   717.83 /  0.05 /  0.03 /    0.0  /  717.88 /    1.78 /  0.13 / 0.000   *AS*
----------------------------------------------------------------------------------
   M = 0.02 / E = 0.0  / K* = 0.04 /  1234. /  186771. / 1.07 /  100. /  300.
.07 717.83 /  0.05 /                 /  717.88 /    1.78 /  0.13 /          *AS*   G
============================ END BRIDGE ANALYSIS ==================================
H   H AT     2550 /   880 /   2200. /  1325. /  133682. / 1.08 /   50. /  300.
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 27,DATE= 2/ 7/78

```
==================================================================================
WATER-SURFACE PROFILE FOR: KEARSLEY CREEK MOUTH TO DAM                KNUTILLA
PAGE  2 OF  2
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
I      AT    3100 /   550 /   2200. /   978. /  104060. / 1.80 /  218. /  416.
.10   718.15 /  0.14 /  0.19 /  0.03 /  718.29 /   2.25 /  0.19 /  0.000  *XS*  I   FW
----------------------------------------------------------------------------------
I    I AT   3740 /   640 /   2200. /  1337. /  217981. / 1.00 /   50. /  200.
.10   718.40 /  0.04 /  0.14 /  0.0  /  718.44 /   1.65 /  0.10 /  0.014  *XS*  J
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

00BREAK00

1) COUNTY: Genesee

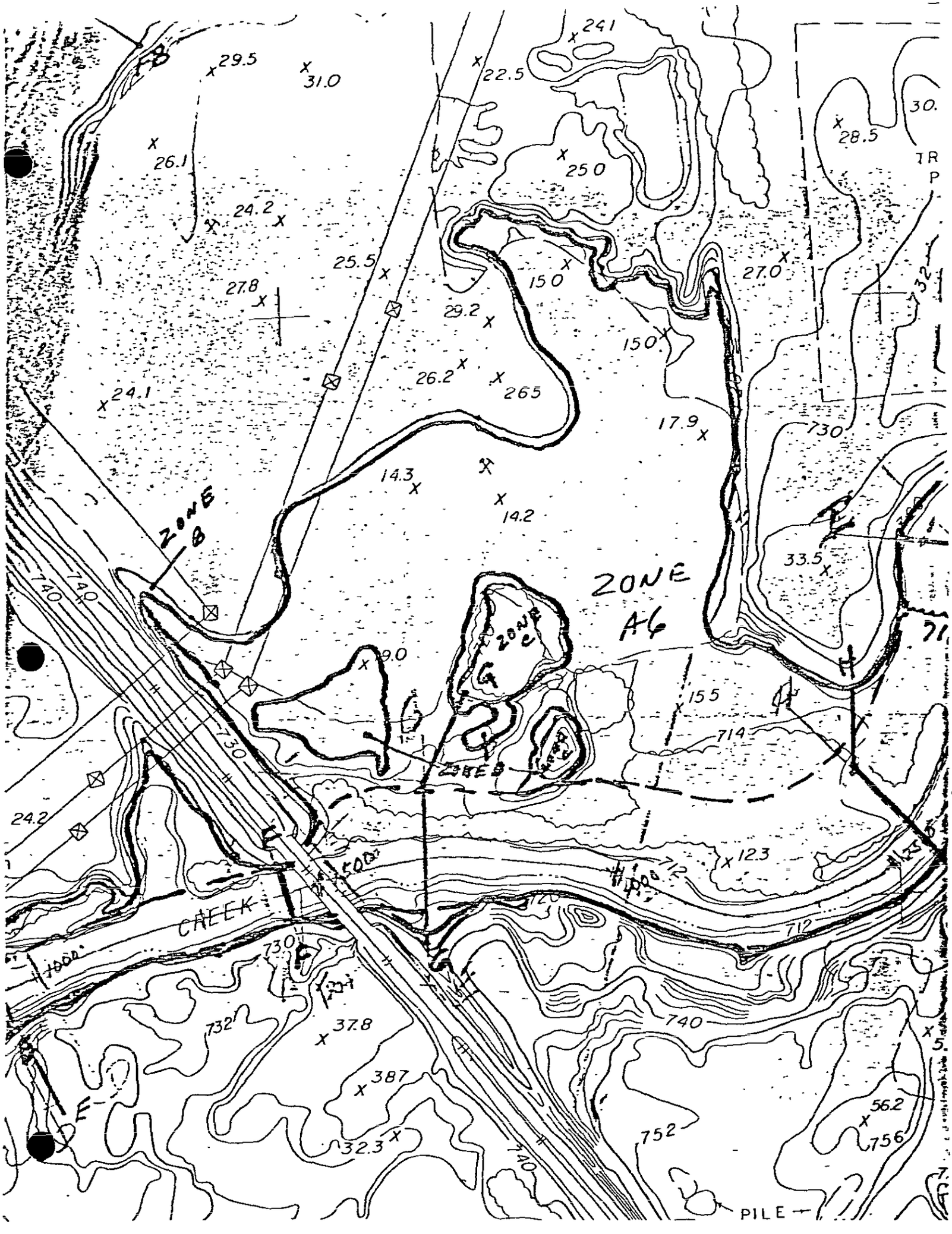
2) STUDY NAME: city of Flint

3) WATERCOURSE: kearsley creek

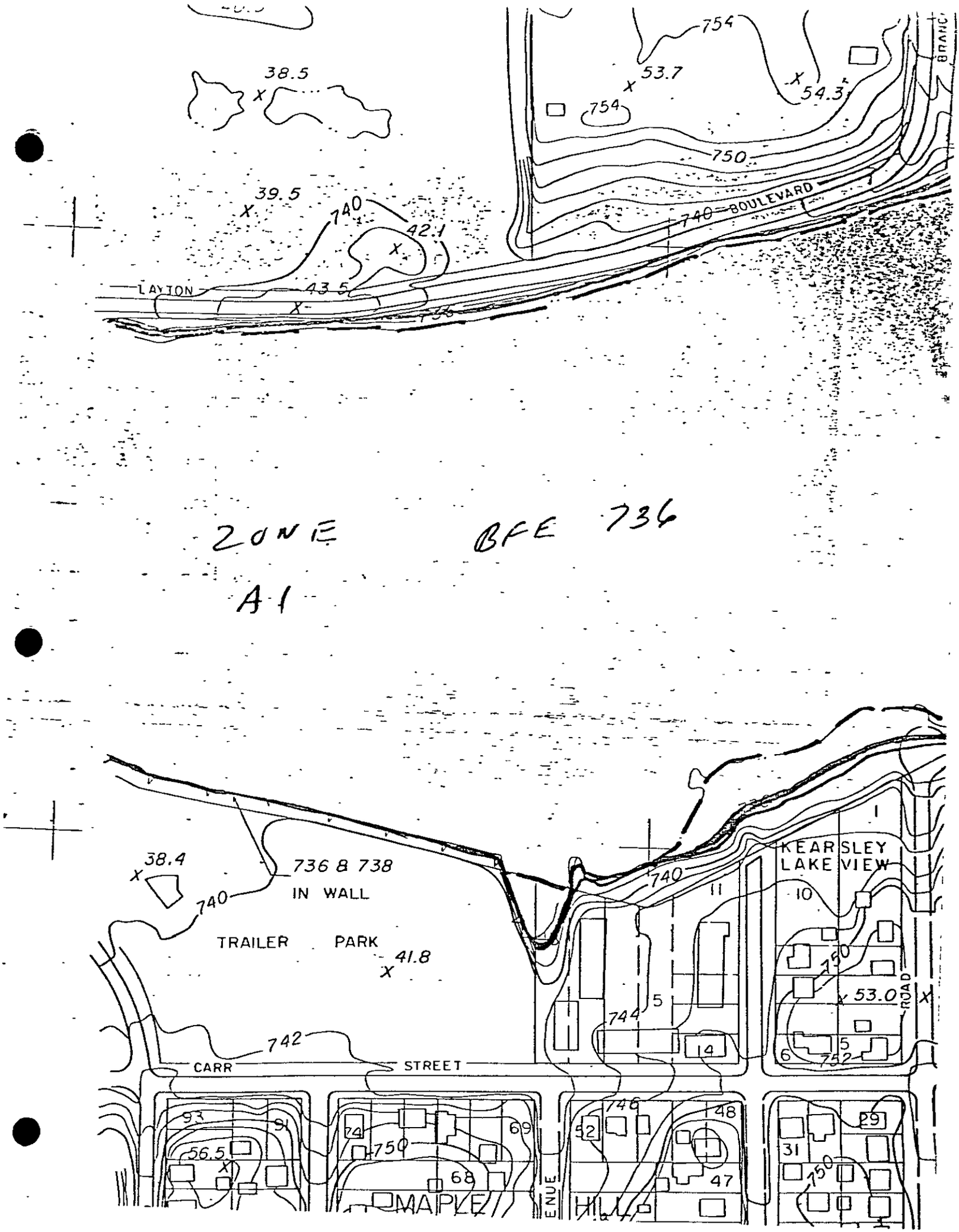
4) DOCUMENT TYPE: maps

00BREAK00

KEARSLEY CREEK
CITY OF FLINT
RIVER
EAST
TANK
PILE
ZONE A
ZONE B
ZONE C
ZONE D
KEARSLEY
DORT
HIGHWAY
54


ZONE B
ZONE A6
ZONE C
ZONE B
CREEK
PILE
29.5
31.0
22.5
241
28.5
26.1
25.0
24.2
25.5
27.8
15.0
27.0
29.2
15.0
26.2
26.5
24.1
17.9
14.3
14.2
33.5
9.0
15.5
12.3
24.2
37.8
38.7
32.3
56.2
75.6
740
730
714
712
732
752

TRAILER PARK
30.1
28.5
736
740
738
730
35.6
32
30
ZONE A6
BFE 736
KEARSLEY RESERVOIR
ZONE A1
36.1
35.9
35.5
718
WESTERN
EVARD
N568
N567
58.2
34.4
TRAILER PARK
38.4
28.7
740
PILE
52.3
59.9
56.2
756
750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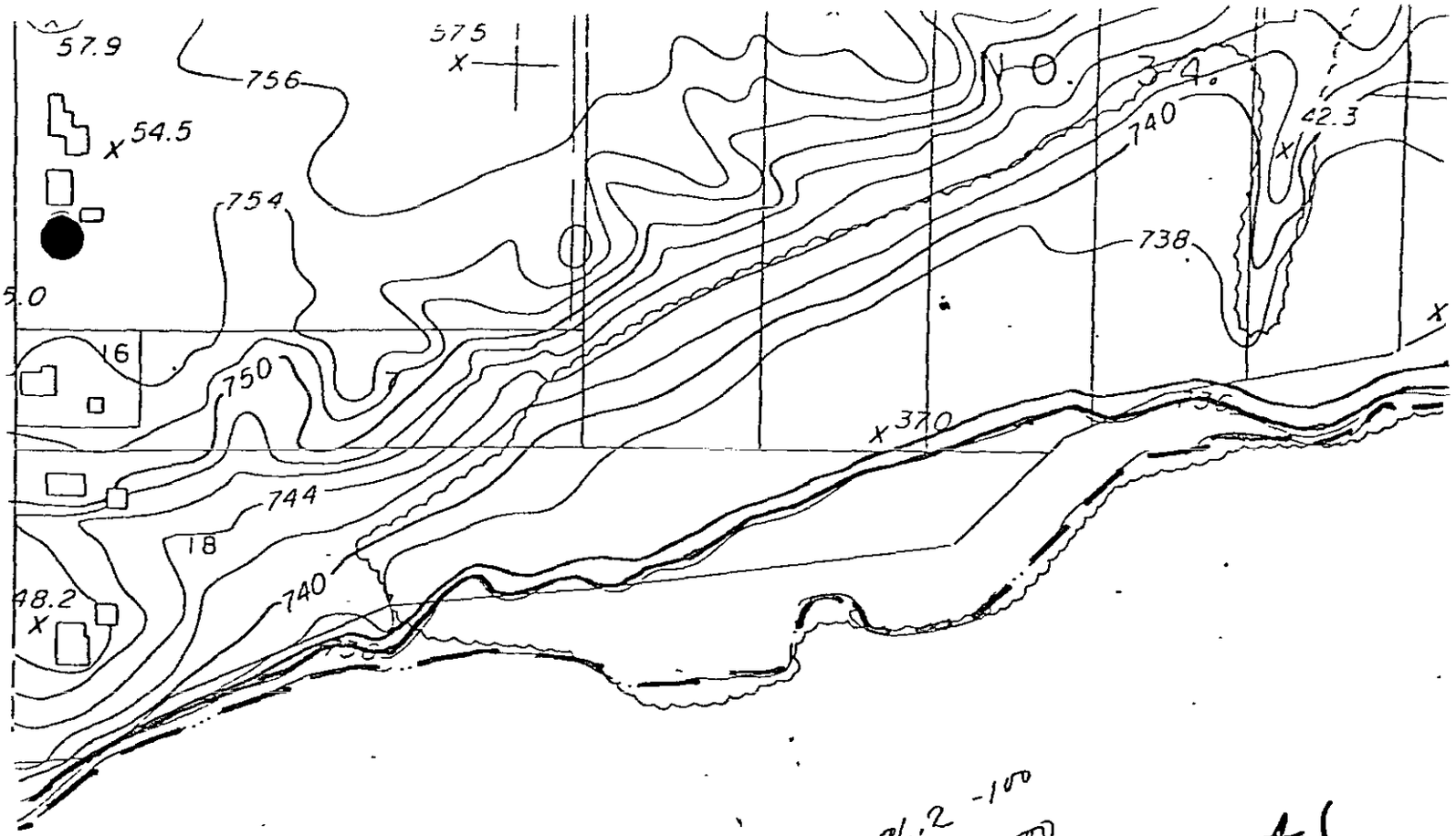
53.7
54.3
754
750
38.5
39.5
740
42.1
740
BOULEVARD
LAYTON
43.5
736
ZONE
BFE 736
A1
38.4
736 & 738
IN WALL
740
TRAILER PARK
41.8
742
CARR
STREET
740
KEARSLEY
LAKE VIEW
11
10
1
750
53.0
ROAD
744
5
14
6
752
746
48
52
93
91
74
69
56.5
750
68
47
31
29
750
MAPLE
ENUE
HILL



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736.5 -500

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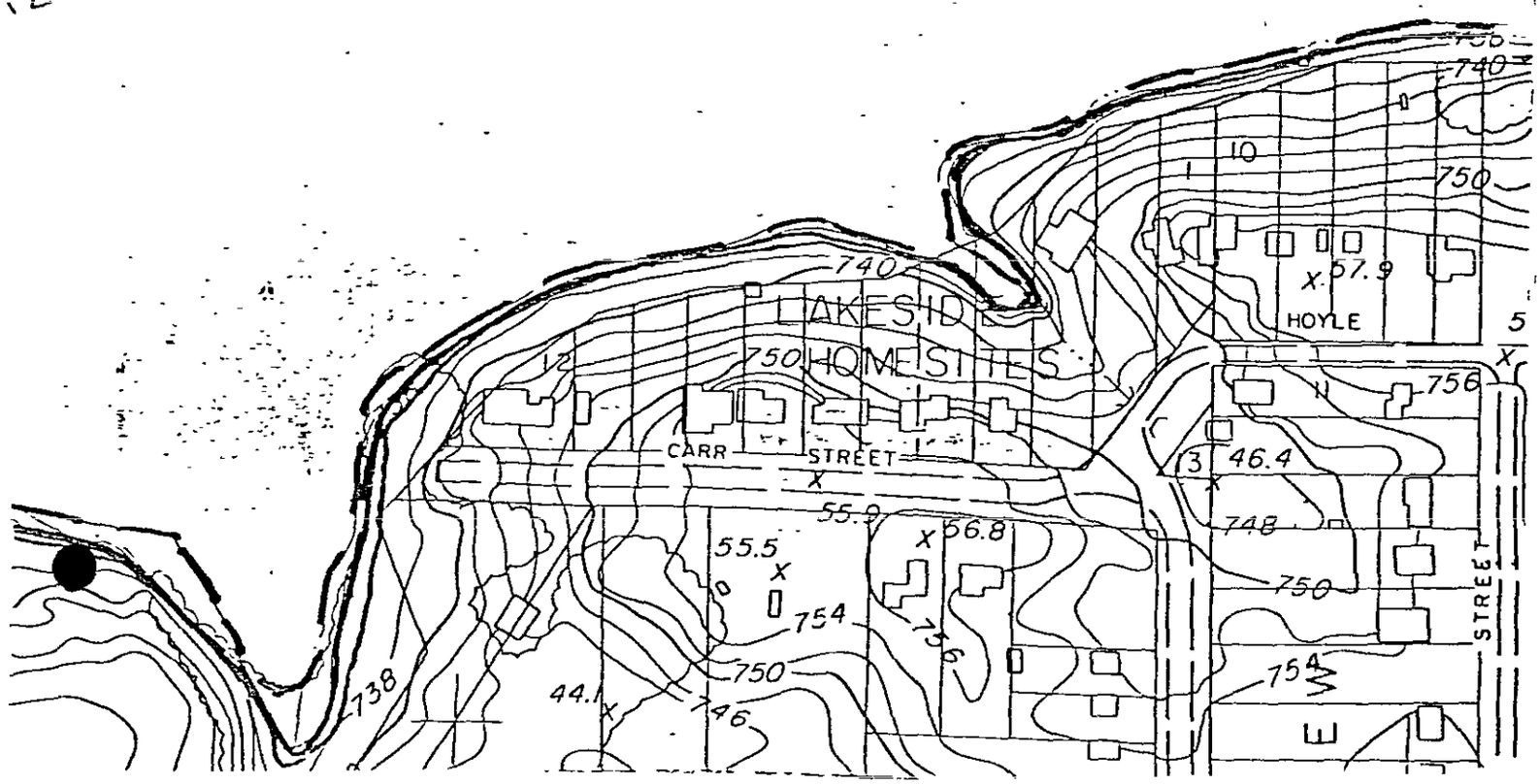

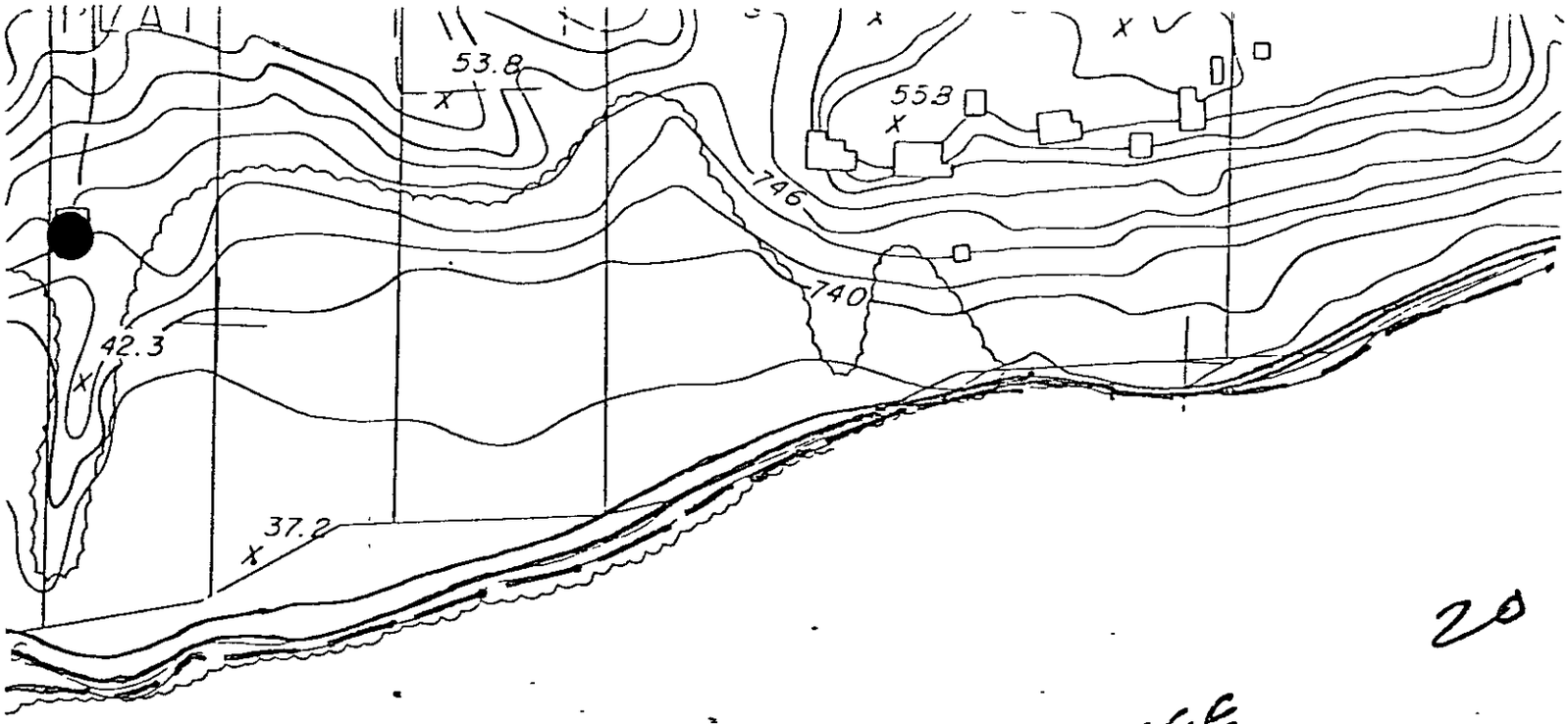

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736

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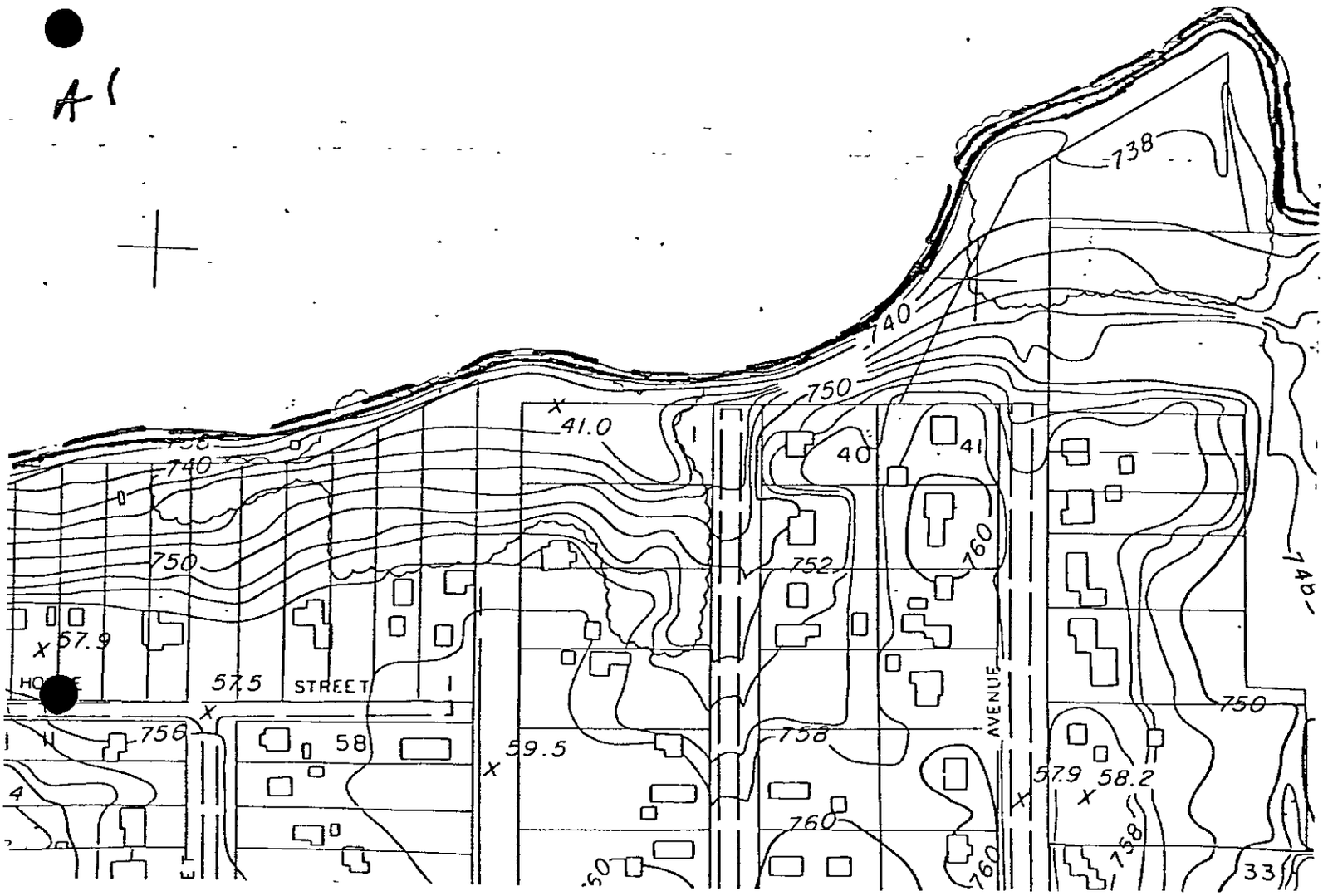
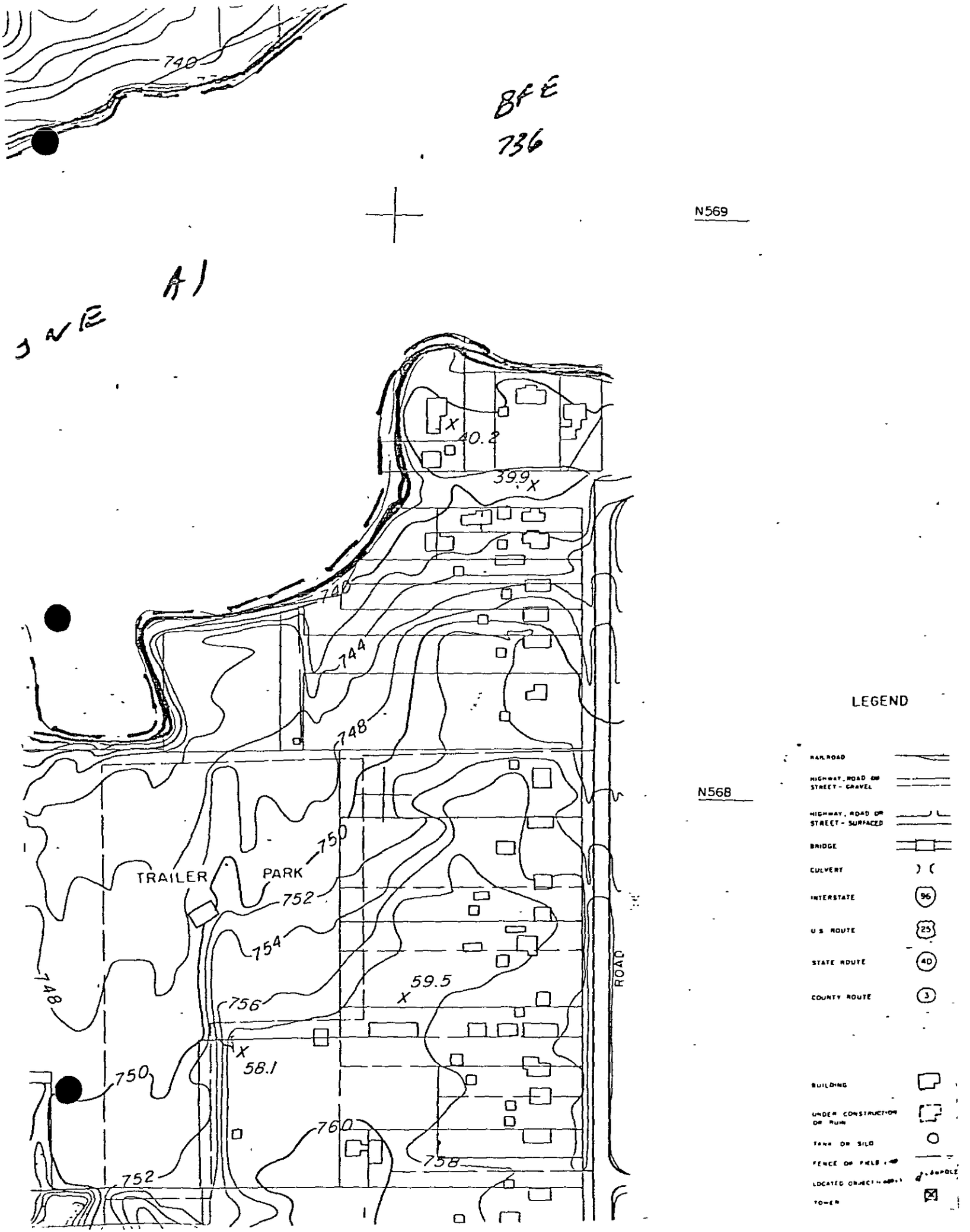
A1

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59.5
ROAD
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756
58.1
750
760
758
752
LEGEND
RAILROAD
HIGHWAY, ROAD OR STREET - GRAVEL
HIGHWAY, ROAD OR STREET - SURFACED
BRIDGE
CULVERT
INTERSTATE
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U S ROUTE
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STATE ROUTE
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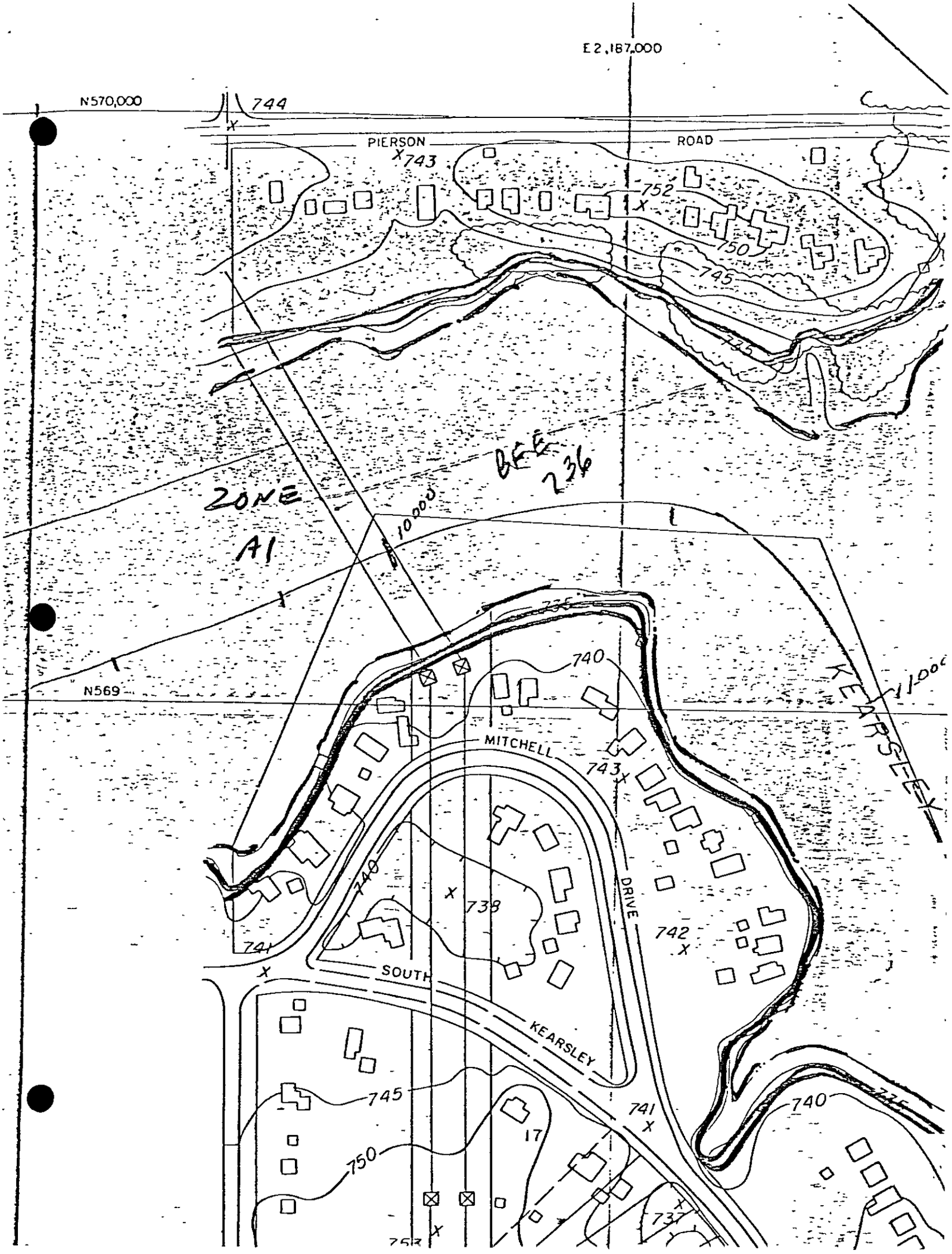
BUILDING
UNDER CONSTRUCTION OR RUIN
TANK OR SILO
TOWER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BEE
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N569
11,000
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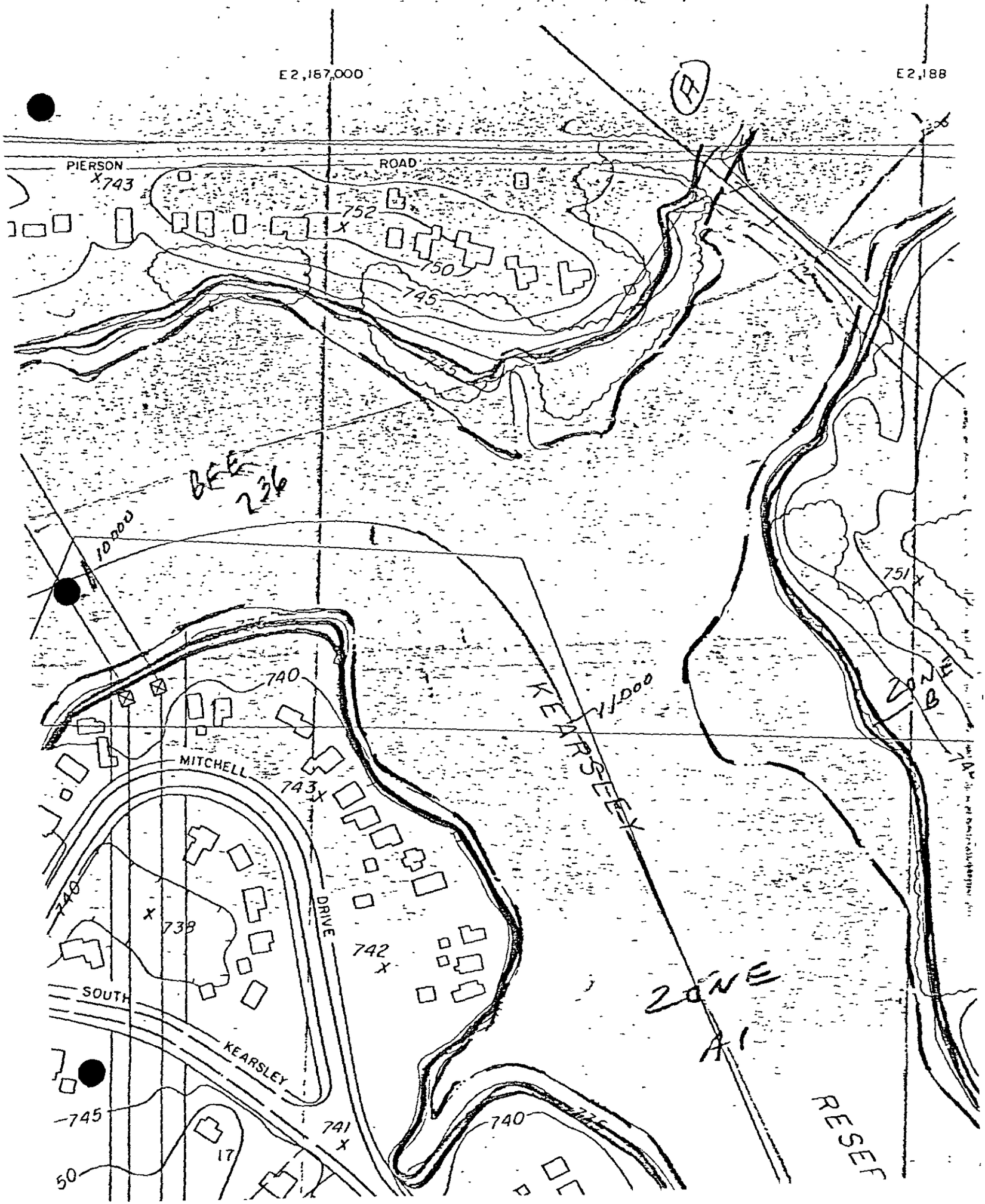
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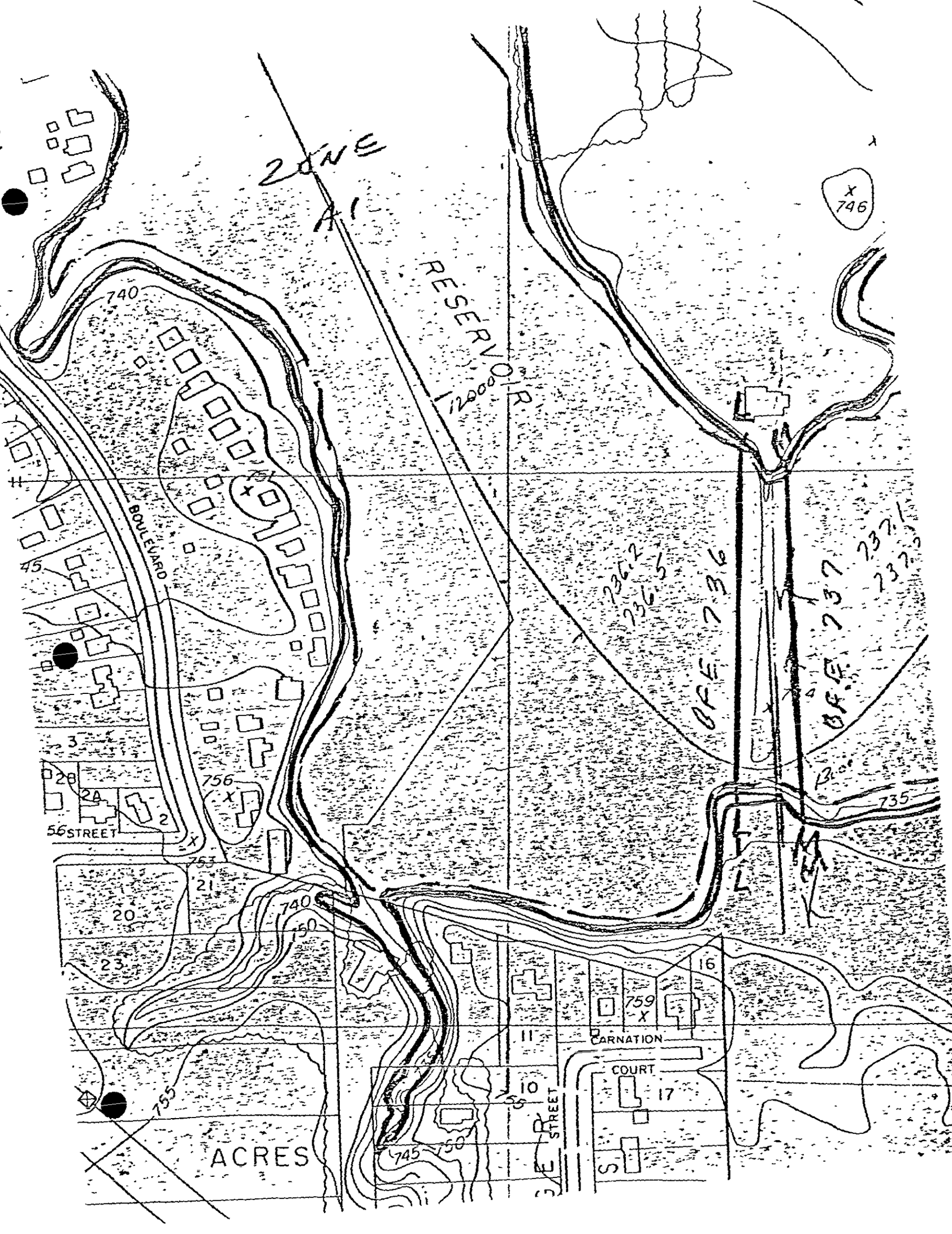
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750
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ACRES
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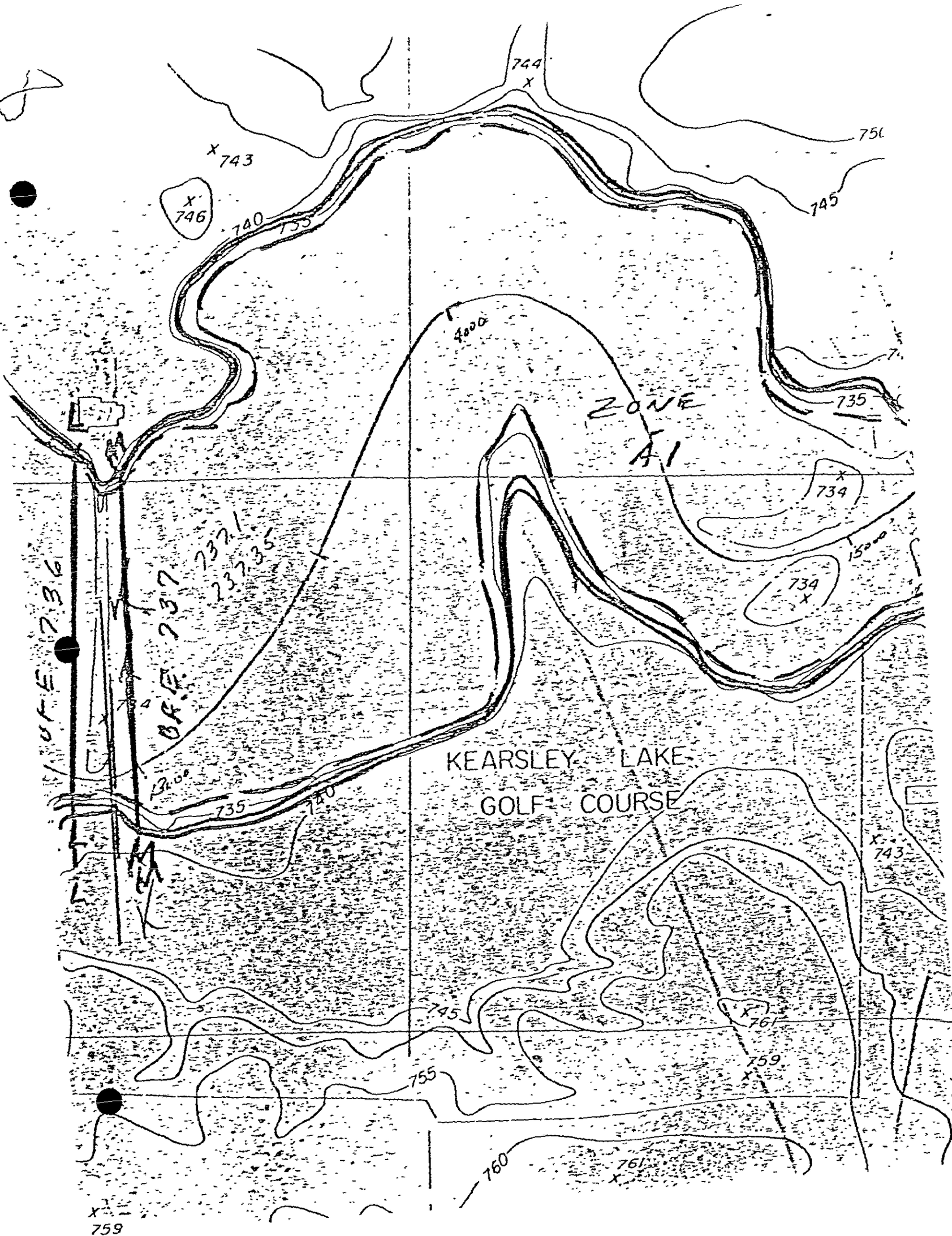
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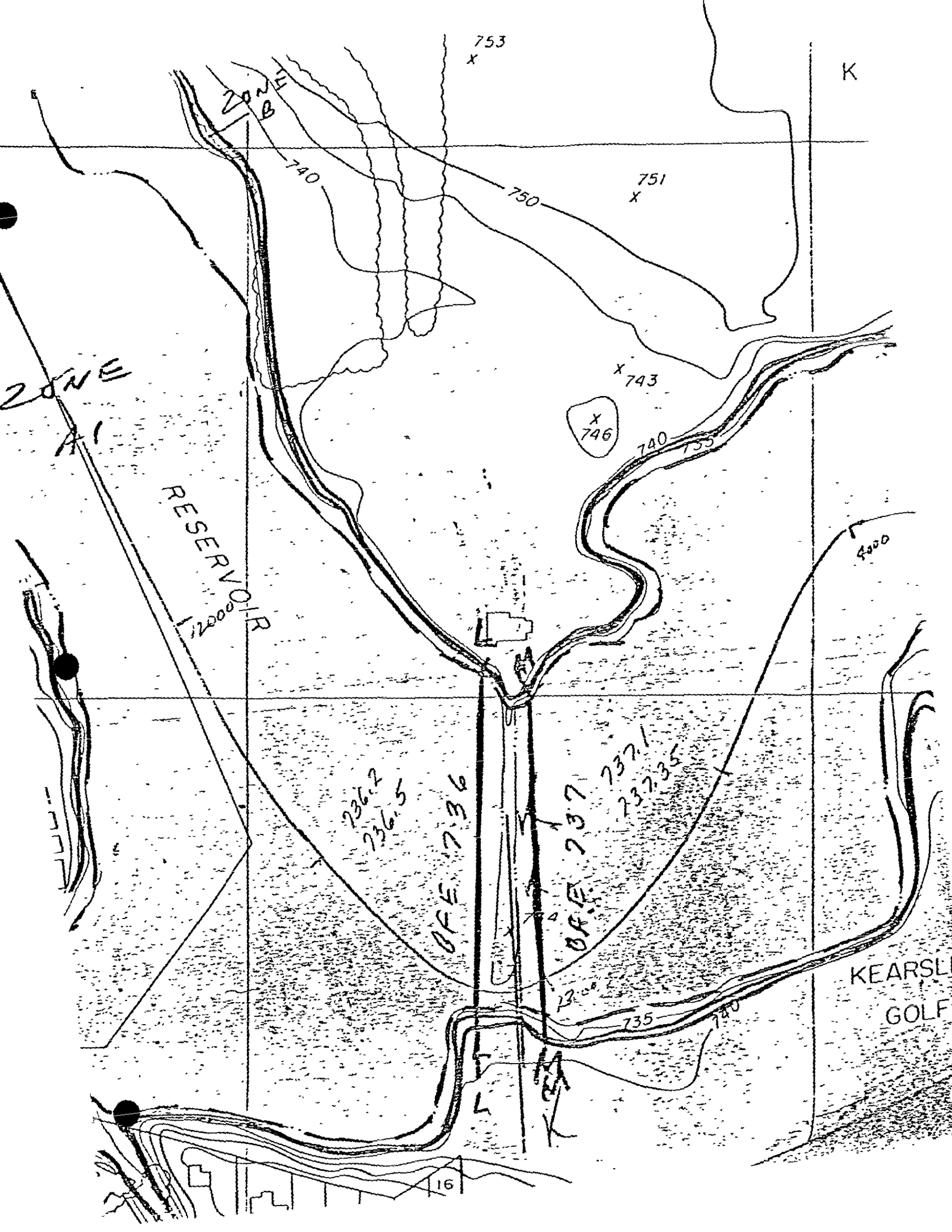
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12000
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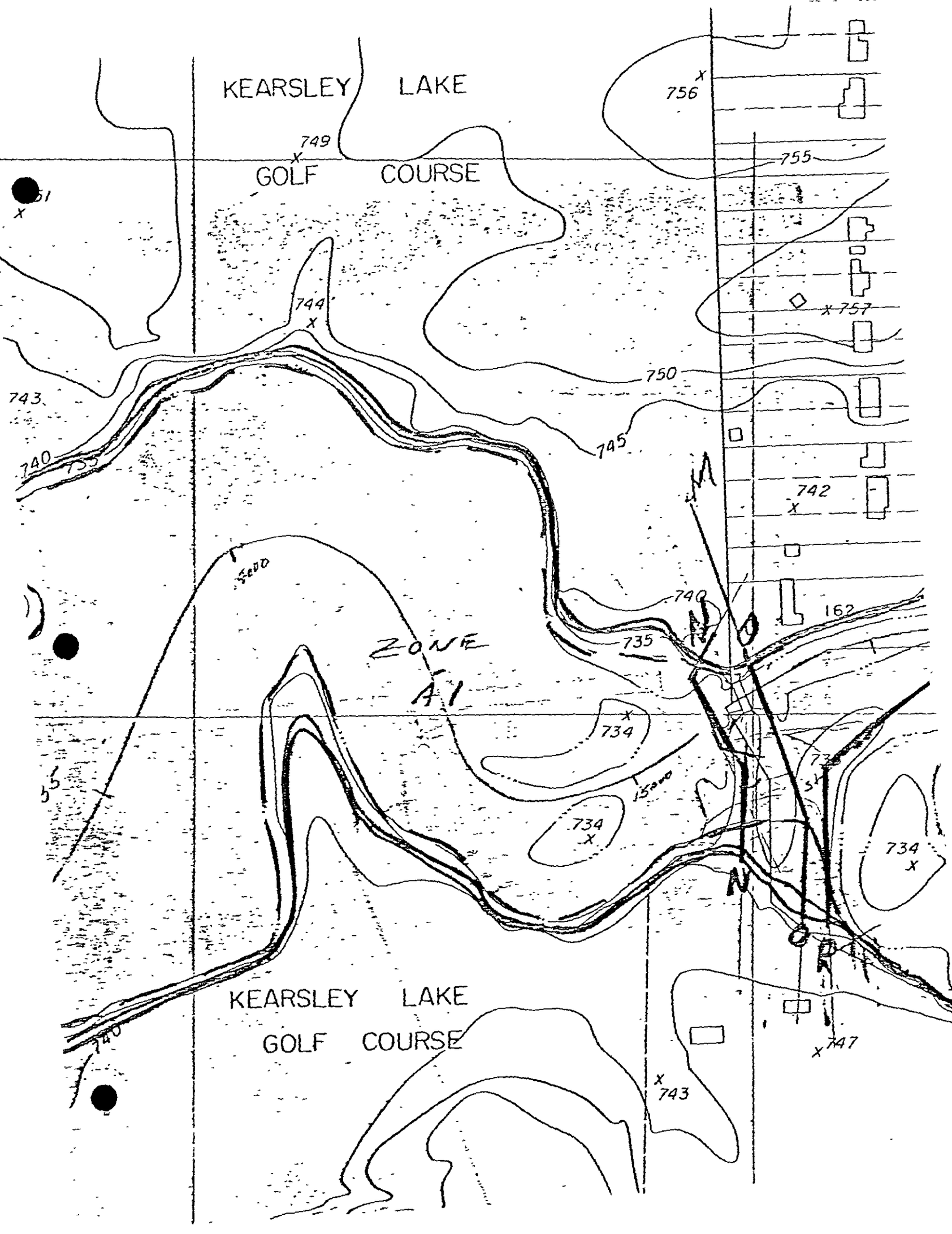
KEARSL
GOLF
16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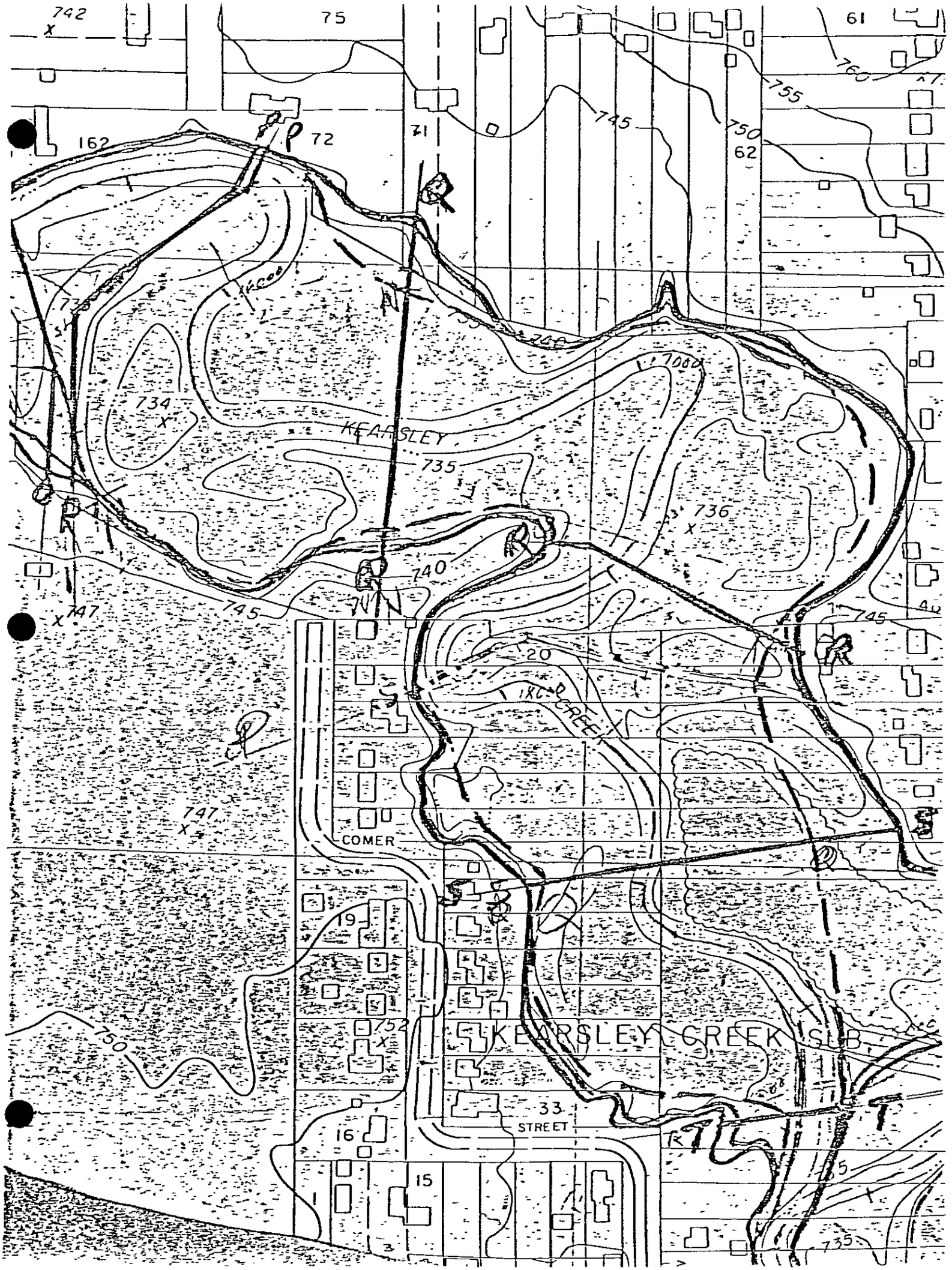
KEARSLEY LAKE
GOLF COURSE
740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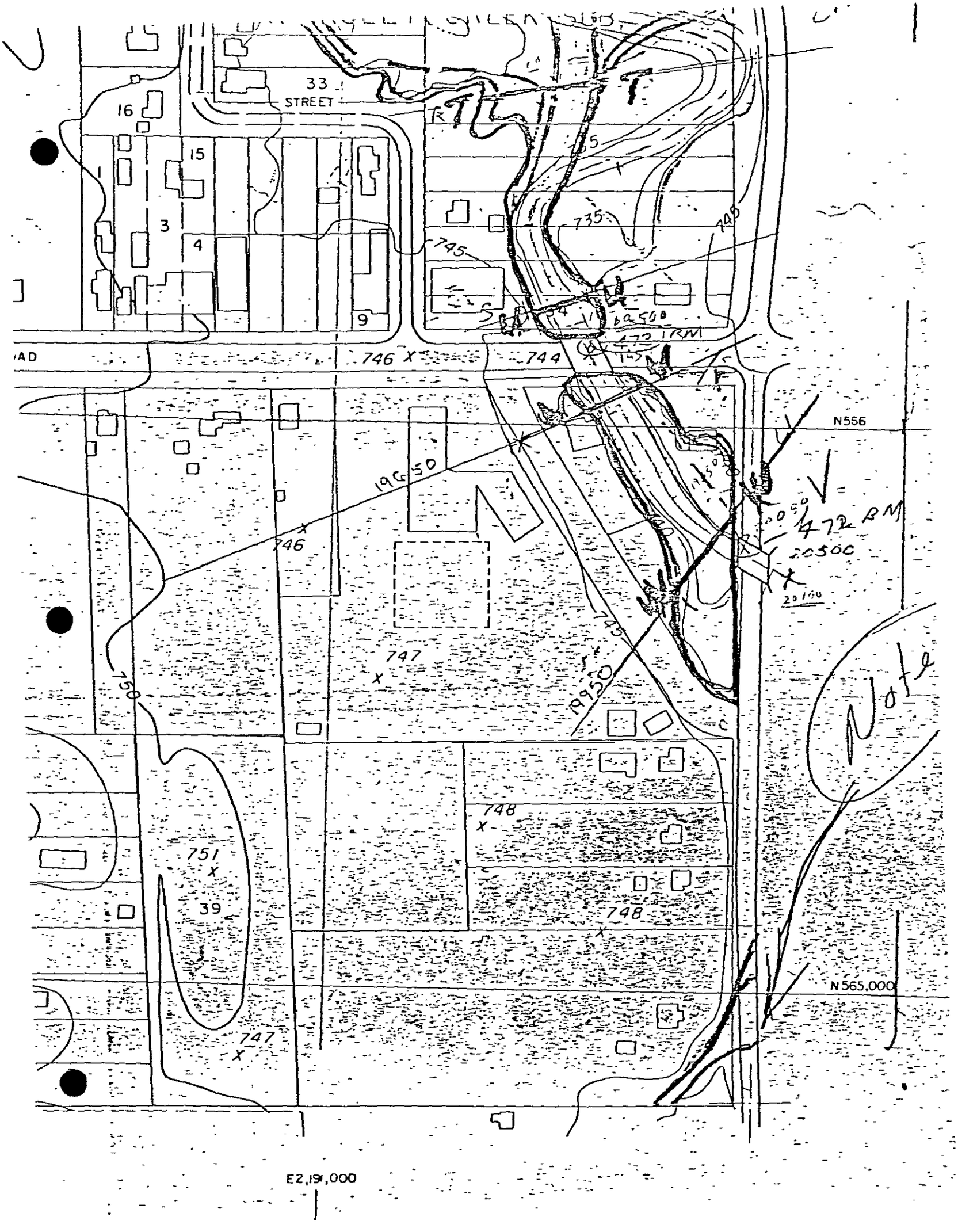
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747
N566
472 BM
20500
20100
N565,000
E2,191,000

00BREAK00

1) COUNTY: Genesee

2) STUDY NAME: City of Flint

3) WATERCOURSE: Robinson Dr.

4) DOCUMENT TYPE: 100 yr natural & ~~Encroa~~ Encroached

00BREAK00

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1      1  ROBINSON SECS A, A1, B                        LES     3  4  2  5 12
2      2  73795  73912  74005  74018
3    400 A      1  12  3  737      140 99 99
4    420     400     550    600     700
5    450     -80  1  7420     0  1  7400  138  1  7394  155  2  7394  157  2  7344   A
5    451     160  2  7343  168  2  7347  171  3  7390  178  3  7393  220  3  7395
5    452     290  3  7400  370  3  7420
6    470  1  2 040 040  1  2 042 042  1  2 065 065
3    500 A1     0  10  3  737      240 99 99
5    550       0  1  7440   15  1  7420  170  2  7400  174  2  7355  180  2  7350   B
5    551     186  2  7355  190  3  7380  220  3  7400  285  3  7420  300  3  7440
6    570  1  2 040 040  1  2 046 046  1  2 050 050
3    600 B      0   9  3  739      410 99 99
5    650       0  1  7460   10  1  7440   75  2  7420   83  2  7365   90  2  7362   C
5    651      97  2  7365  105  3  7420  115  3  7440  165  3  7460
6    670  1  2 040 040  1  2 050 050  1  2 040 040
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USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 2/22/7

*** INPUT CARD PRINTOUT ***

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1      1  ROBINSON SECS C, C1, D                        LES     3  4  2  5 12
2      2  74153  74328  74353  74388
3    900 C      1  14  3  740     520 99 99
4    920     400     550     600     700
GR5  950        0  1  7480   40  1  7460   61  1  7436   81  1  7420   99  2  7411   D
5    951      101  2  7384  105  2  7368  110  2  7369  115  2  7368  129  3  7422
5    952      137  3  7426  170  3  7440  190  3  7460  220  3  7480
NC6  970  1  2 045 045  1  2 060 060  1  2 035 035
3   1000 C1     0  12  3  740     680 99 99
5   1050        0  1  7460    5  1  7440   55  2  7420   60  2  7400   70  2  7365  E
5   1051       75  2  7363   80  2  7365   85  2  7400   90  3  7420  190  3  7440
5   1052      200  3  7460  220  3  7480
6   1070  1  2 040 040  1  2 055 055  1  2 055 055
3   1100 D      0   8  2  741     760 99 99
5   1150        0  1  7460   12  1  7400   20  1  7360   30  1  7360   35  1  7400  F
5   1151       40  2  7420   60  2  7440   70  2  7460
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USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 6/ 9/78

*** INPUT CARD PRINTOUT ***

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1      1  ROBINSON SECS E TO G                      LES      4  4  2  5 12
2      2  74300  74489  74534  74619
3  1400 E      1  10  3  742      830 99 99
4  1420    400     550     600     700
5  1450     -50  1  7480    -5  1  7424   13  2  7421   18  2  7391   19  2  7379  G
5  1451      20  2  7376   25  2  7380   37  3  7410   70  3  7449  230  3  7480
6  1470  1  2 070 070  1  2 045 045  1  2 080 080
3  1500 F1     0   9  2  742     1150 99 99
5  1550        0  1  7480   15  1  7460   90  2  7440  105  2  7420  108  2  7375  H
5  1551      116  2  7375  120  2  7420  130  2  7440  145  2  7480
6  1570  1  2 075 075  1  2 050 050
1  1600 F      0   8  3  743     1380 99 99
5  1650        0  1  7500    0  1  7470   30  2  7460   45  2  7420   50  2  7380  I
5  1651       60  2  7374   80  3  7480  130  3  7500
6  1670  1  2 080 080  1  2 055 055  1  2 070 070
3  1700 G      0   8  1  743     1930 99 99
5  1750        0  1  7500    0  1  7480   25  1  7420   30  1  7400   38  1  7394  J
5  1751       45  1  7400   55  1  7420   75  1  7500
6  1770  1  2 045 045
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*** INPUT CARD PRINTOUT ***

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         1         2         3         4         5         6         7         8
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1      1 ROBINSON   SECS H, T, J                    LES      3  4  2  5 12
2      2 74648  74843  74912  75057
3  1900 H      1  12  3  745    2440 99 99
4  1920    400    550    600    700
5  1950        0  1  7557   80  1  7523   95  2  7508  115  2  7452  125  2  7428  K
5  1951      135  2  7405  138  2  7405  145  2  7410  155  2  7438  160  2  7450
5  1952      185  3  7530  250  3  7530
6  1970  1  2 060 060  1  2 045 045  1  2 060 060
3  2000 I      0  10  3  746    2930 99 99
5  2050        0  1  7553   82  2  7544  107  2  7440  130  2  7411  140  2  7445  L
5  2051      150  3  7479  200  3  7496  280  3  7521  310  3  7530  310  3  7570
6  2070  1  2 060 060  1  2 050 050  1  2 060 060
3  2100 J      0  10  3  747    3450 99 99
5  2150        0  1  7583   63  2  7569   80  2  7516  100  2  7458  109  2  7440  M
5  2151      119  2  7430  142  2  7450  150  2  7484  162  3  7548  200  3  7558
6  2170  1  2 060 060  1  2 065 065  1  2 060 060
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USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 9,DATE= 2/15/78

WATER-SURFACE PROFILE FOR: ROBINSON SECS A, A1, B LES
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
A	AT	140	0	600.	191.	8316.	2.85	-2.	292.	
740.05		0.44			740.49	3.13	0.48		*IS*	A
A1	AT	240	100	600.	159.	9339.	1.58	124.	239.	
740.60		0.35	0.46	0.0	740.95	3.78	0.43	-0.001	*XS*	B
B	AT	410	170	600.	107.	7187.	1.00	76.	28' width 104.	
741.44		0.49	0.91	0.07	741.93	5.62	0.51	0.001	*XS*	C

100-yr

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 8,DATE= 2/22/78

WATER-SURFACE PROFILE FOR: ROBINSON SECS C, C1, D LES
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*	
C	AT	520	0	600.	224.	13452.	1.17	62.	159. (97' topwidth)	D
	743.53	0.13			743.66	2.68	0.24		*IS*	
C1	AT	680	160	600.	308.	18100.	1.50	10.	180.	E
	743.81	0.09	0.24	0.0	743.90	1.95	0.20	-0.000	*XS*	
D	AT	760	80	600.	202.	15760.	1.12	4.	59. (55' topwidth)	F
	743.88	0.15	0.10	0.03	744.03	2.97	0.25	-0.000	*XS*	

IN-7

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 10,DATE= 6/ 9/78

WATER-SURFACE PROFILE FOR: ROBINSON SECS E TO G LES
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECTN	AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	V	ALPHA / FN	LEW / ACC	REW / *ID*	
E	AT 830 /	0 /	600. /	320. /	20587. /	2.05 /	-29. /		93.	
	745.34 /	0.11 /		/ 745.45 /	1.87 /		0.22/		*IS*	G
E1	AT 1150 /	320 /	600. /	239. /	13615. /	1.37 /	25. /		137.	
	745.74 /	0.13 /	0.41 /	0.01 / 745.87 /	2.51 /		0.27 /	0.000	*XS*	H
F	AT 1380 /	230 /	600. /	220. /	15806. /	1.00 /	26. /		76.	
	746.14 /	0.12 /	0.38 /	0.0 / 746.26 /	2.73 /		0.22 /	0.000	*XS*	I
G	AT 1930 /	550 /	600. /	266. /	22848. /	1.00 /	5. /		67.	
	746.73 /	0.08 /	0.55 /	0.0 / 746.81 /	2.26 /		0.19 /	0.000	*XS*	J

100 yr.

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 8,DATE= 6/ 9/78

WATER-SURFACE PROFILE FOR: ROBINSON SECS H, I, J LES
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	FG	V	FN	ACC	*ID*	
H	AT	2440	0	600.	355.	33408.	1.00	101.	173.	
749.12		0.04			749.16	1.69	0.13		*IS*	K
I	AT	2930	490	600.	316.	25250.	1.14	94.	192.	
749.32		0.06	0.21	0.01	749.38	1.90	0.16	0.000	*XS*	L
J	AT	3450	520	600.	291.	17564.	1.00	86.	153.	
749.74		0.07	0.42	0.00	749.81	2.06	0.17	0.000	*XS*	M

END OF THIS PROFILE

101-yr.

PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS

*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
A	AT	140 / 740.10	0 / 0.46	600. /	162. /	8263. / 740.56	2.17 / 3.70	110. / 0.48	260.	*IS*	A
A1	AT	240 / 740.68	100 / 0.31	600. / 0.43	154. / 0.0	10021. / 740.99	1.32 / 3.89	150. / 0.40	220. / -0.001	*XS*	B
B	AT	410 / 741.43	170 / 0.49	600. / 0.85	107. / 0.09	7195. / 741.93	1.00 / 5.63	76. / 0.51	104. / -0.008	*XS*	C

.05

.08

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END OF THIS PROFILE

FW

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 8,DATE= 2/23/78

WATER-SURFACE PROFILE FOR: ROBINSON SECS C, C1, D FW LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HDR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*	
C	AT	520	0	600.	205.	13180.	1.07	75.	135.	D
	743.53	0.14			743.67	2.93	0.25		*IS*	
C1	AT	680	160	600.	255.	17324.	1.19	40.	120.	E
	743.82	0.10	0.25	0.0	743.92	2.36	0.21	-0.000	*XS*	
D	AT	760	80	600.	202.	15907.	1.11	4.	54.	F
	743.90	0.15	0.10	0.02	744.05	2.97	0.24	-0.000	*XS*	

END OF THIS PROFILE

FW

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 10,DATE= 6/ 9/78

WATER-SURFACE PROFILE FOR: ROBINSON SECS E TO G FW LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECTO	AT	DISTANCE/	LENGTH/	DISCHARGE/	AREA	/CONVEYANCE/	ALPHA/	LEW	/ REW	
WS ELEV /		HV /	HF /	HE /	EG /	V /	FN /	ACC	*ID*	
E	AT	830 /	0 /	600. /	285. /	20902. /	1.61 /	-10. /	60.	G
745.37 /		0.11 /			/ 745.48 /	2.10 /	0.22/		*IS*	
F1	AT	1150 /	320 /	600. /	190. /	12962. /	1.04 /	86. /	136.	H
745.77 /		0.16 /	0.43 /	0.03 /	745.93 /	3.15 /	0.29 /	0.001	*XS*	
F	AT	1380 /	230 /	600. /	223. /	16189. /	1.00 /	30. /	76.	I
746.21 /		0.11 /	0.39 /	0.0 /	746.33 /	2.70 /	0.22 /	-0.000	*XS*	
G	AT	1930 /	550 /	600. /	269. /	23182. /	1.00 /	5. /	67.	J
746.78 /		0.08 /	0.53 /	0.0 /	746.85 /	2.23 /	0.19 /	-0.001	*XS*	

FW

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 10,DATE= 6/ 9/78

WATER-SURFACE PROFILE FOR: ROBINSON SECS H, I, J FW LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*	
H AT	2440	0	600.	359.	33917.	1.00	101.	173.	K
749.17	0.04			749.21	1.67	0.13		*IS*	
I AT	2930	490	600.	320.	25619.	1.14	94.	193.	L
749.36	0.06	0.20	0.01	749.43	1.87	0.16	-0.000	*XS*	
J AT	3450	520	600.	293.	17753.	1.00	86.	153.	M
749.77	0.07	0.41	0.00	749.84	2.05	0.17	0.001	*XS*	

END OF THIS PROFILE FW

S[illegible]D	AT	DISTANCE/	LENGTH/	DISCHARGE/	AREA	CONVEYANCE/	ALPHA/	LEW /	REW	
WS ELEV /		HV /	HF /	HE /	EG /	V /	FN /	ACC	*ID*	
A	AT	140 /	0 /	400. /	45. /	2815. /	1.00 /	156. /	170.	
737.95 /		1.25 /			/ 739.20 /	8.97 /	0.91/		*IS*	A
A1	AT	240 /	100 /	400. /	100. /	6139. /	1.26 /	170. /	217.	
739.81 /		0.31 /	0.93 /	0.0 /	740.13 /	4.00 /	0.43 /	0.000	*XS*	B
B	AT	410 /	170 /	400. /	85. /	5244. /	1.00 /	77. /	103.	
740.65 /		0.34 /	0.84 /	0.02 /	740.99 /	4.70 /	0.46 /	0.001	*XS*	C

10-7v

END OF THIS PROFILE

Bruce Stan

Discard 10, 50, 500 yr
unless needed for review

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 6,DATE= 2/22/78

WATER-SURFACE PROFILE FOR: ROBINSON SECS C, C1, D LES
PAGE 1 OF 1, PROFILE NUMBER 1, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
C	AT	520	0	400.	97.	5026.	1.03	90.	127.		
		741.53	0.27		741.80	4.13	0.40			*IS*	D
C1	AT	680	160	400.	135.	8307.	1.04	48.	104.		
		742.28	0.14	0.61	0.0	742.42	2.96	0.27	0.006	*XS*	E
D	AT	760	80	400.	136.	9736.	1.01	7.	44.		
		742.45	0.14	0.16	0.0	742.58	2.93	0.26	0.001	*XS*	F

END OF THIS PROFILE

10-1

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 6,DATE= 6/ 9/78

WATER-SURFACE PROFILE FOR: ROBINSON SECS E TO G LES
PAGE 1 OF 1, PROFILE NUMBER 1, UPSTREAM COMPUTATIONS

SECTO AT DISTANCE/ LENGTH/DISCHARGE/	AREA	/CONVEYANCE/	ALPHA/	LEW /	REW
WS ELEV / HV / HF / HE /	EG /	V /	FN /	ACC	*ID*
E AT 830 / 0 / 400. /	122. /	7372. /	1.46 /	-10. /	54.
743.00 / 0.25 / /	743.25 /	3.29 /	0.38/		*IS*
E1 AT 1150 / 320 / 400. /	114. /	6236. /	1.01 /	84. /	131.
744.17 / 0.19 / 1.11 / 0.0 /	744.36 /	3.51 /	0.37 /	0.002	*XS*
F AT 1380 / 230 / 400. /	162. /	10619. /	1.00 /	34. /	74.
744.82 / 0.09 / 0.56 / 0.0 /	744.92 /	2.46 /	0.21 /	0.000	*XS*
G AT 1930 / 550 / 400. /	191. /	14593. /	1.00 /	11. /	64.
745.42 / 0.07 / 0.57 / 0.0 /	745.49 /	2.09 /	0.19 /	0.000	*XS*

END OF THIS PROFILE

G

H

I

J

10 yr

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 5,DATE= 6/ 9/78

WATER-SURFACE PROFILE FOR: ROBINSON SECS H, I, J LES
PAGE 1 OF 1, PROFILE NUMBER 1, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*	
H	AT	2440	0	400.	189.	14095.	1.00	110.	165.	
	746.48	0.07			746.55	2.12	0.20		*IS*	K
I	AT	2930	490	400.	163.	10840.	1.00	100.	147.	
	746.98	0.09	0.51	0.01	747.07	2.45	0.23	-0.002	*XS*	L
J	AT	3450	520	400.	177.	8643.	1.00	93.	149.	
	747.88	0.08	0.89	0.0	747.96	2.26	0.22	0.002	*XS*	M

:

END OF THIS PROFILE

10 yr.

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 10,DATE= 2/15/78

WATER-SURFACE PROFILE FOR: ROBINSON SECS A, A1, B LES
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE/ WS ELEV	LENGTH/ HV	DISCHARGE/ HF	AREA / HE	CONVEYANCE/ EG	ALPHA/ V	LEW / FN	REW / ACC	*ID*	
A	AT	140	0	700.	230.	9680.	2.88	-7.	297.		
		740.18	0.41		740.59	3.04	0.48			*IS*	A
A1	AT	240	100	700.	168.	9815.	1.62	117.	242.		
		740.68	0.44	0.52	0.01	741.11	4.16	0.48	-0.005	*XS*	B
B	AT	410	170	700.	114.	7835.	1.00	75.	105.		
		741.68	0.59	1.08	0.08	742.27	6.16	0.55	-0.006	*XS*	C

500-4

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 9,DATE= 2/22/78

WATER-SURFACE PROFILE FOR: ROBINSON SECS C, C1, D LES
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
C	AT 520	0	700.	260.	16082.	1.17	59.	167.		
	743.88	0.13			744.01	2.69	0.24		*IS*	D
C1	AT 680	160	700.	370.	21946.	1.50	5.	191.		
	744.15	0.08	0.22	0.0	744.23	1.89	0.19	-0.000	*XS*	E
D	AT 760	80	700.	221.	17434.	1.15	4.	61.		
	744.20	0.18	0.10	0.05	744.38	3.17	0.26	-0.000	*XS*	F

END OF THIS PROFILE

5TV-7

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE= 6/ 9/78

WATER-SURFACE PROFILE FOR: ROBINSON SECS E TO G LES
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / FG	V	ALPHA / FN	LEW / ACC	REW / *ID*	
E	AT 830 / 746.19	0 / 0.09	700. /	445. / 746.28	27955. / 1.57	2.37 / 0.19	-35. /	137. *IS*		G
F1	AT 1150 / 746.48	320 / 0.10	700. / 0.29	329. / 0.01	19126. / 746.58	1.45 / 2.13	11. / 0.23	139. 0.000 *XS*		H
F	AT 1380 / 746.77	230 / 0.12	700. / 0.31	258. / 0.01	19283. / 746.90	1.06 / 2.71	7. / 0.22	78. -0.000 *XS*		I
G	AT 1930 / 747.32	550 / 0.08	700. / 0.51	304. / 0.0	27339. / 747.41	1.00 / 2.30	3. / 0.19	68. 0.000 *XS*		J

500 yr.

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 10,DATE= 6/ 9/78

WATER-SURFACE PROFILE FOR: ROBINSON SECS H, I, J LES
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
H AT 2440 / 750.57	0 / 0.04	700. /	466. / 750.60	48309. / 1.50	1.00 / 0.11	96. /	177.	*IS*	K
I AT 2930 / 750.69	490 / 0.04	700. / 0.13	481. / 0.00	39121. / 750.74	1.32 / 1.45	91. / 0.12	235. / -0.000	*XS*	L
J AT 3450 / 750.94	520 / 0.05	700. / 0.26	374. / 0.01	25064. / 751.00	1.00 / 1.87	82. / 0.15	155. / -0.005	*XS*	M

500 yr.

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 8,DATE= 2/15/78

WATER-SURFACE PROFILE FOR: ROBINSON SECS A, A1, B LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
A	AT	140	0	550.	63.	4544.	1.00	155.	174.	
739.12		1.20			740.32	8.77	0.78		*IS*	A
A1	AT	240	100	550.	174.	10102.	1.64	114.	244.	
740.73		0.25	0.66	0.0	740.98	3.15	0.37	-0.001	*XS*	B
B	AT	410	170	550.	105.	6995.	1.00	76.	104.	
741.37		0.43	0.73	0.09	741.80	5.25	0.48	0.000	*XS*	C

END OF THIS PROFILE

50-7

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 7,DATE= 2/22/78

WATER-SURFACE PROFILE FOR: ROBINSON SECS C, C1, D LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS

SECID	AT DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*	
C	AT 520	0	550.	201.	11851.	1.16	65.	153.	D
743.28	0.14			743.42	2.74	0.25		*IS*	
C1	AT 680	160	550.	271.	15988.	1.45	16.	169.	E
743.58	0.09	0.26	0.0	743.67	2.03	0.21	-0.000	*XS*	
D	AT 760	80	550.	190.	14702.	1.10	5.	57.	F
743.66	0.14	0.10	0.02	743.80	2.89	0.24	-0.000	*XS*	

END OF THIS PROFILE

50-7

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 8,DATE= 6/ 9/78

WATER-SURFACE PROFILE FOR: ROBINSON SECS E TO G LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
E AT 830 / 744.89	0 / 0.12	550. /	272. /	17696. / 745.01	1.84 / 2.03	-25. / 0.23	70.	*IS*	G
F1 AT 1150 / 745.36	320 / 0.15	550. / 0.48	199. / 0.02	11358. / 745.51	1.27 / 2.77	39. / 0.29	135. / 0.000	*XS*	H
F AT 1380 / 745.82	230 / 0.11	550. / 0.43	205. / 0.0	14329. / 745.93	1.00 / 2.69	31. / 0.22	76. / 0.000	*XS*	I
G AT 1930 / 746.42	550 / 0.08	550. / 0.56	247. / 0.0	20693. / 746.50	1.00 / 2.23	7. / 0.19	66. / 0.000	*XS*	J

50 yr

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 6,DATE= 6/ 9/78

WATER-SURFACE PROFILE FOR: ROBINSON SECS H, I, J LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW *ID*	
H	AT	2440 / 748.43	0 / 0.05	550. /		307. / 748.48	27430. / 1.79	1.00 / 0.15	103. /	171. *IS*	K
I	AT	2930 / 748.68	490 / 0.07	550. / 0.27	0.01	260. / 748.75	20323. / 2.12	1.05 / 0.18	96. / -0.005	173. *XS*	L
J	AT	3450 / 749.21	520 / 0.07	550. / 0.53	0.0	256. / 749.28	14681. / 2.14	1.00 / 0.19	88. / 0.000	152. *XS*	M

END OF THIS PROFILE

50-yr.

00BREAK00

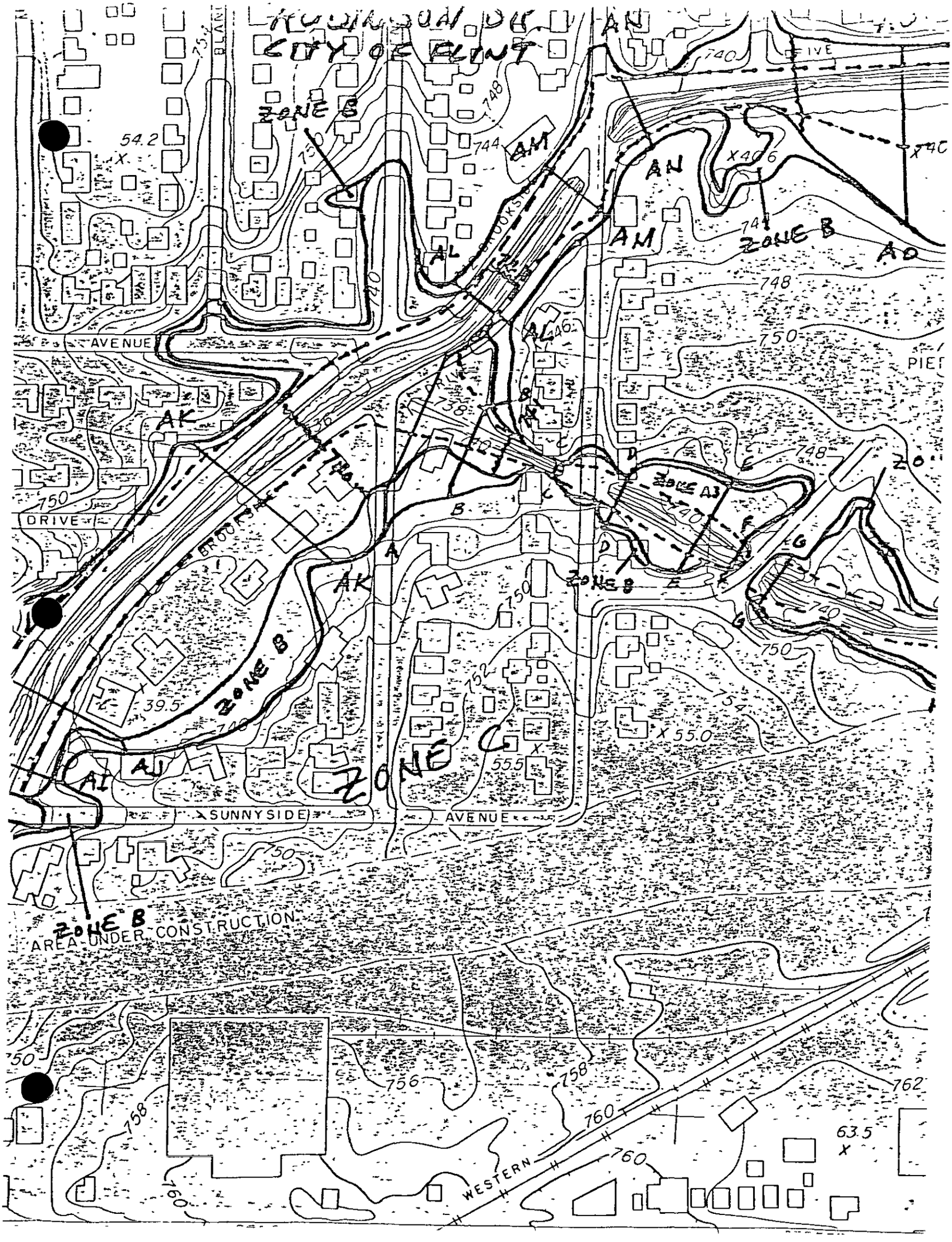
1) COUNTY: Genesee

2) STUDY NAME: City of Flint

3) WATERCOURSE: Robinson Dr

4) DOCUMENT TYPE: Maps

00BREAK00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ZONE B
ZONE C
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DRIVE
SUNNYSIDE AVENUE
AREA UNDER CONSTRUCTION
WESTERN
BROOKS
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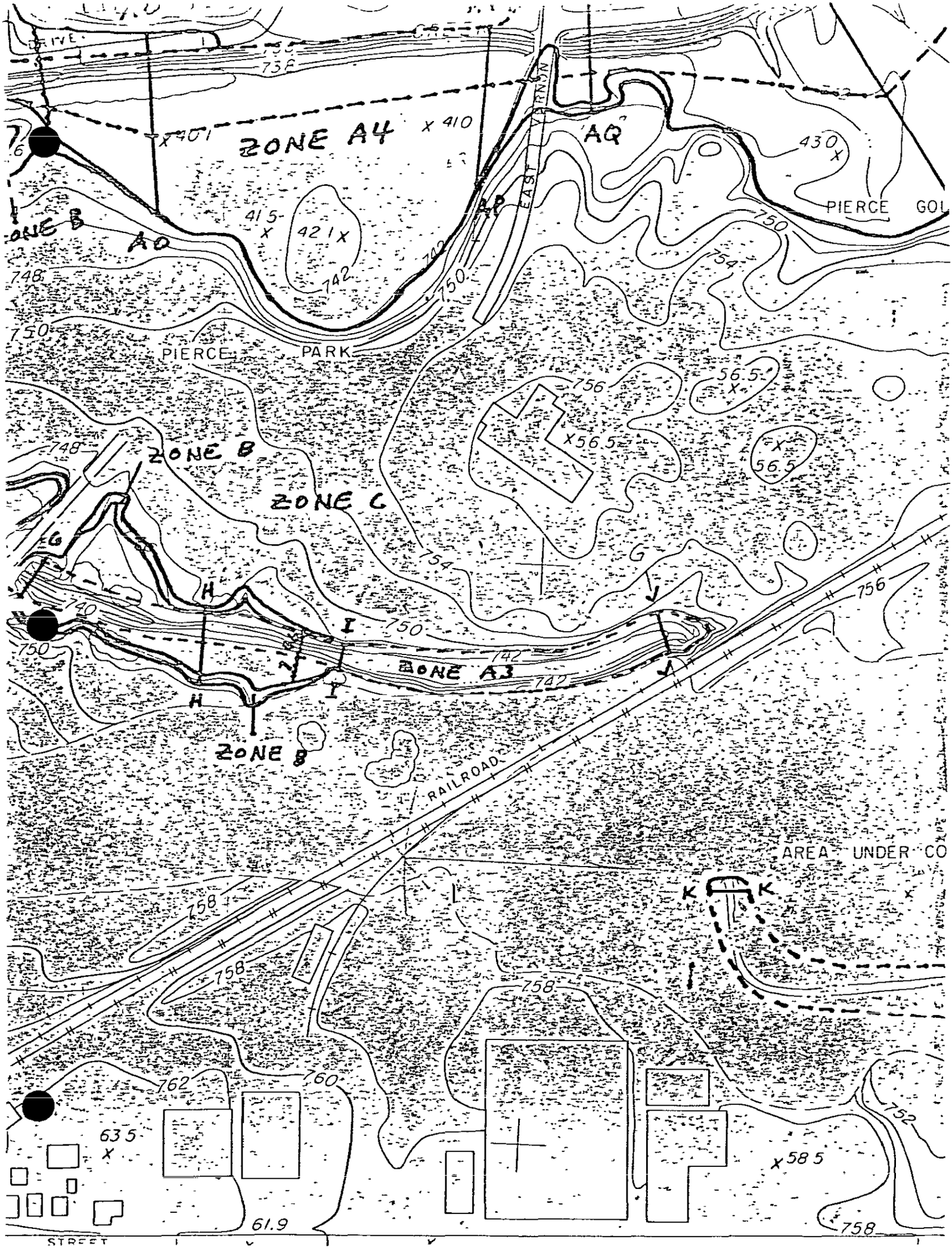
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PIERCE GOL
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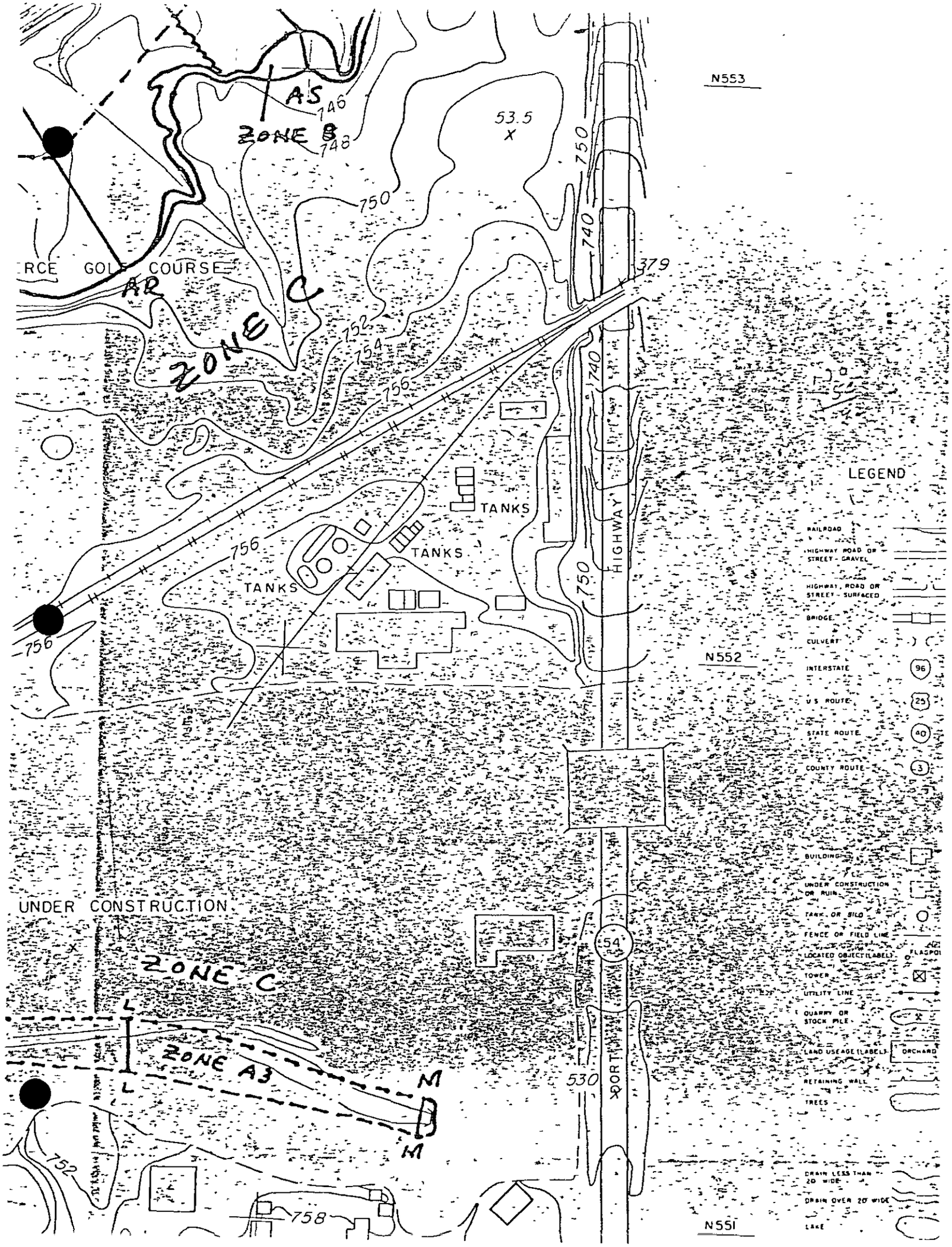
AREA UNDER CO
EAST
STREET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ERCE GOLF COURSE
AR
ZONE C
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754
756
740
TANKS
TANKS
TANKS
HIGHWAY
750
756
N552
UNDER CONSTRUCTION
ZONE C
L
L
ZONE A3
M
M
530
PORT
54
752
758
N551
LEGEND
RAILROAD
HIGHWAY ROAD OR STREET - GRAVEL
HIGHWAY, ROAD OR STREET - SURFACED
BRIDGE
CULVERT
INTERSTATE
96
U.S. ROUTE
25
STATE ROUTE
40
COUNTY ROUTE
3
BUILDING
UNDER CONSTRUCTION OR RUIN
TANK OR SILO
FENCE OR FIELD LINE
LOCATED OBJECT (LABELED)
FLAGPOLE
TOWER
UTILITY LINE
QUARRY OR STOCK PILE
LAND USE AGE (LABELED)
ORCHARD
RETAINING WALL
TREES
DRAIN LESS THAN 20' WIDE
DRAIN OVER 20' WIDE
LAKE

00BREAK00

1) COUNTY: Genesee

2) STUDY NAME: city of Flint

3) WATERCOURSE: Seaver Drain

4) DOCUMENT TYPE: input + 100 yr natural
+ 100 yr. Encroachment

00BREAK00

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 3/13/78

*** INPUT CARD PRINTOUT ***

```
          1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 SEAVER DR FENTON RD TO PRIV CULV  E TO G KNUTILLA  4  5  2  5 12
2      2  82310  82488  82670  82560  82567
3    700 E     1  12  3  820     900  1  3
4    705    280    475    750    550    550
5    710     -80  1  8300  -74  1  8281    0  1  8258   22  2  8240   38  2  8182
5    711      40  2  8177   50  2  8195   58  3  8250  136  3  8252  180  3  8260
5    712     220  3  8280  220  3  8300
6    720  1  2 040 040  1  2 040 040  1  2 030 030
3    800 E+1   0  10  2  821    1230 99 99
5    810       0  1  8320   35  1  8200   40  1  8182   45  1  8182   50  2  8220
5    811     200  2  8240  260  2  8260  270  2  8280  295  2  8300  325  2  8320
6    820  1  2 045 045  1  2 040 040
3    900 F     0  11  3  821    1370  1  3
5    910       0  1  8300   30  1  8280   70  1  8260  120  2  8240  130  2  8200
5    911     135  2  8186  140  2  8186  160  3  8220  280  3  8260  300  3  8280
5    912     350  3  8300
6    920  1  2 040 040  1  2 045 045  1  2 040 040
3   1000 G     0  10  3  822    1730  1  3
5   1010     -25  1  8300    0  1  8242   86  2  8257   94  2  8206   98  2  8197
5   1011     106  2  8206  114  3  8255  134  3  8260  215  3  8280  250  3  8300
6   1020  1  2 035 035  1  2 040 040  1  2 040 040
```

E

F Seaver

G Drain

H

Input

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1     + SEVER DR SEC G TO BRIARFIELD CIRCLE      KNUTILLA  4  5  2  5 12
2     2  82455  82575  82695  82615  82620
3  1000 G      1  10  3  822     1770  1  3
4  1005     280   475   750    550    550
5  1010     -25  1  8300     0  1  8242   86  2  8257   94  2  8206   98  2  8197
5  1011      106  2  8206  114  3  8255  134  3  8260  215  3  8280  250  3  8300
6  1020  1  2.035 035  1  2 040 040  1  2.040 040
3  1100 H      0   8  3  824     2030  1  3
5  1110     -34  1  8347     0  1  8341    7  2  8336   30  2  8228   34  2  8215
5  1111      44  2  8228   64  3  8310   80  3  8347
6  1120  1  2.050 050  1  2 042 042  1  2 040 040
3  1200 I      0   6  2  825     2540 99 99
5  1210       0  1  8340   15  1  8300   35  1  8221   50  1  8221   85  2  8320
5  1211      105  2  8340
6  1220  1  2 040 040  1  2.040 040
3  1300 J      0   8  3  825     2860  1  3
5  1310       0  1  8360   60  1  8340   85  2  8300   85  2  8225   92  2  8224
5  1311      98  2  8230  120  3  8320  120  3  8360
6  1320  1  2.040 040  1  2 045 045  1  2.040 040
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 SEAVER DR BRIARFIELD CIRCLE TO COOK RD   KNUTILLA  8  5  2  5 12
2      2  82750  82920  83180  83010  83012
3  1400 K      1  10  3  825    2980  1  3
4  1405    280   475    750    550    550
5  1410     -80  1  8380  -34  1  8347    0  2  8341    7  2  8336   30  2  8228   11
5  1411      34  2  8215   44  2  8228   64  3  8310  120  3  8360  120  3  8380
6  1420  1  2 035 035  1  2 050 050  1  2 040 040
3  1500 L      1  10  3  826    3290  1  3
4  1505    220    340    550    390    390
5  1510       0  1  8400   30  2  8300   50  2  8240   60  2  8323   70  2  8323   N
5  1511      90  3  8300  100  3  8320  185  3  8340  260  3  8360  310  3  8380
6  1520  1  2 040 040  1  2 045 045  1  2 040 040
3  1600 M      0  10  2  826    3750 99 99
5  1610    -130  1  8400 -100  1  8360  -50  1  8340    0  1  8313   32  2  8316   O
5  1611      38  2  8238   46  2  8230   48  2  8235   60  2  8332  100  2  8400
6  1620  1  2 035 035  1  2 045 045
3  1700 N      0  12  3  830    4150  1  3
5  1810    -150  1  8400 -100  1  8340  -90  1  8333  -40  2  8308  -32  2  8285   P
5  1811     -30  2  8261  -26  2  8248  -20  2  8260   -8  3  8321    0  3  8332
5  1812      18  3  8358   40  3  8400
6  1820  1  2 040 040  1  2 045 045  1  2 040 040
3  1800 BR N  2   7  1  830    4150        0  8312 3 0
**SEQUENCE**
5  1810       0  1  8312    0  1  8250    3  1  8246    6  1  8245    9  1  8256
5  1811       9  1  8312    0 -9  8312
6  1820  1  2 035 035
3  1900 RD N  4   6  2   10          1  2        2 2              1
5  1910       0  1  8400   50  1  8340   85  1  8320  120  2  8319  145  2  8320
5  1910     175  2  8400
**SEQUENCE**
3  2000 N+05  5  12  5  830    4190  2  4
5  2010    -150  1  8400 -100  1  8340  -90  1  8333  -40  2  8308  -32  2  8285   Q
5  2011     -30  3  8261  -26  3  8248  -19  4  8260   -8  5  8321    0  5  8332
5  2012      18  5  8358   40  5  8400
6  2020  1  2 040 040  1  2 045 045  1  2 045 045  1  2 045 045  1  2 040 040
3  2100 0      0  10  3  829    4530  1  3
5  2110       0  1  8380   30  1  8360   55  1  8340   70  2  8320   80  2  8280   R
5  2111      90  2  8255  100  2  8280  120  3  8320  135  3  8360  180  3  8380
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 SEAVER DRAIN COOK RD TO PRIVATE CULV P-Q KNUTILLA  2  5  2  5 12
2      2  83135  83338  83523  83415  83415
3  2200 P      1  14  3  829    4660  1  3
4  2205    220    340    550    390    390
5  2210    -115  1  8380  -80  1  8360  -70  1  8340  -50  1  8320    0  1  8319    S
5  2211      44  2  8312   62  2  8261   66  2  8261   68  2  8261   82  3  8342
5  2212      84  3  8344  150  3  8350  200  3  8360  250  3  8380
6  2220  1  2 040 040  1  2 045 045  1  2 070 070
3  2300 Q      0  14  3  830    5330  1  3
5  2310    -150  1  8400 -115  1  8360  -75  1  8340    0  1  8333   14  2  8336    T
5  2311      20  2  8316   32  2  8268   33  2  8266   34  2  8266   46  3  8319
5  2312     205  3  8340  255  3  8360  275  3  8380  335  3  8400
6  2320  1  2 050 050  1  2 060 060  1  2 070 070
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1     1 SEAVER DRAIN BETWEEN CULVERTS Q AND R    KNUTILLA  2  5  2  5 12
2     2 83250  83385  83540  83435  83438
3  2300 Q     1  14  3  830    5370  1  3
4  2305    220    340    550    390    390
5  2310    -150  1  8400 -115  1  8360  -75  1  8340    0  1  8333   14  2  8336
5  2311      20  2  8316   32  2  8268   33  2  8266   34  2  8266   46  3  8319
5  2312     205  3  8340  255  3  8360  275  3  8380  335  3  8400
6  2320  1  2 050 050  1  2 060 060  1  2 070 070
3  2400 R     0  12  3  830    5820  1  3
5  2410     -40  1  8440    0  1  8368   28  2  8353   42  2  8274   43  2  8273
5  2411      44  2  8274   54  2  8293   60  3  8346  132  3  8336  190  3  8340
5  2412     240  3  8420  350  3  8440
6  2420  1  2 060 060  1  2 055 055  1  2 060 060
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 3/22/78

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 SEAVER DR BETWEEN CULVERTS R TO S        KNUTILLA  2  5  2  5 12
2      2  83332  83471  83570  83500  83505
3  2400 R      1  12. 3  830    5860  1  3
4  2405     220    340    550    390    390
5  2410     -40  1  8440     0  1  8368   28  2  8353   42  2  8274   43  2  8273
5  2411      44  2  8274   54  2  8293   60  3  8346  132  3  8336  190  3  8340
5  2412     240  3  8420  350  3  8440
6  2420  1  2 060 060  1  2 055 055  1  2 060 060
3  2500 S      0   9  3. 830    6350  1  3
5  2510    -180  1  8380 -116  1  8359 -102  2  8357  -94  2  8294  -86  2  8284
5  2511     -78  2  8287  -68  3  8338    0  3  8375   25  3  8380
6  2520  1  2. 080 080  1  2 050 050  1  2 060 060
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 5/22/78

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 SEAVER DR SECS S TO CULVERT AT SEC W     KNUTILLA  2  5  2  5 12
2      2  83390  83535  83630  83567  83577
3  2500 S      1   9  3  830    6390  1  3
4  2505     210    320    500    370    370
5  2510    -180  1  8380 -116  1  8359 -102  2  8357  -94  2  8294  -86  2  8284   Y
5  2511     -78  2  8287  -68  3  8338    0  3  8375   25  3  8380
6  2520  1  2 080 080  1  2 050 050  1  2 060 060
3  2600 5+1    0  10  3  830    6500  1  3
5  2610    -220  1  8400 -210  1  8380 -112  1  8362  -92  2  8356  -80  2  8300   Z
5  2611     -76  2  8287  -67  2  8297  -60  3  8344    0  3  8364   20  3  8400
6  2620  1  2 080 080  1  2 050 050  1  2 060 060
3  2700 5 BR  2   8  1  830    6500         0  8346 2 0
5  2710       0  1  8346    0  1  8299    3  1  8287    6  1  8284   9  1  8287
5  2711      13  1  8309   13  1  8346    0 -9  8346
6  2720  1  2 035 035
3  2800 S RD  4   6  2   20           1  2           2 2                  1
5  2810    -220  1  8400 -210  1  8380  -92  1  8356  -38  2  8360    0  2  8362
5  2811      20  2  8400
3  2900 S+2   5  10  5  830    6550  2  4
5  2910    -220  1  8400 -210  1  8380 -112  1  8362  -92  2  8356  -80  3  8300   AA
5  2911     -76  3  8287  -67  4  8297  -60  5  8344    0  5  8364   20  5  8400
6  2912  1  2 080 080  1  2 050 050  1  2 050 050  1  2 050 050  1  2 060 060
3  3000 T      0   8  3  832    7080  1  3
5  3010     -20  1  8420    0  1  8403   96  2  8370  106  2  8312  114  2  8292   AB
5  3011     116  2  8301  130  3  8402  140  3  8420
6  3020  1  2 060 060  1  2 060 060  1  2 060 060
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 SEAVER DR BETWEEN CULVERTS U TO V        KNUTILLA  2  5  2  5 12
2      2  83560  83775  83862  83811  83814
3  3000 T      0   8  3  832    7120  1  3
4  3005    210    320    500    370    370
5  3010     -20  1  8420    0  1  8403   96  2  8370  106  2  8312  114  2  8292  A C
5  3011     116  2  8301  130  3  8402  140  3  8420
6  3020  1  2 060 060  1  2 060 060  1  2 060 060
3  3100 V      0  10  3  835    7480  1  3
5  3110     -45  1  8440  -30  1  8420    0  1  8405   70  2  8391   84  2  8311  A D
5  3111      88  2  8303   94  2  8311  104  3  8378  140  3  8420  180  3  8440
6  3120  1  2 050 050  1  2 055 055  1  2 060 060
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 SEAVER DRAIN BETWEEN CULVERTS V TO W     KNUTILLA  2  5  2  5 12
2      2  83674  83882  83950  83908  83910
3  3100 V      1  10  3  835    7520  1  3
4  3105    210    320    500    370    370
5  3110     -45  1  8440  -30  1  8420    0  1  8405   70  2  8391   84  2  8311   AE
5  3111      88  2  8303   94  2  8311  104  3  8378  140  3  8420  180  3  8440
6  3120  1  2 050 050  1  2 055 055  1  2 060 060
3  3200 W      0  10  3  836    7950  1  3
5  3210       0  1  8433   70  2  8399   76  2  8341   82  2  8316   87  2  8308   AF
5  3211      92  2  8317  100  3  8390  120  3  8400  170  3  8420  200  3  8440
6  3220  1  2 050 050  1  2 055 055  1  2 060 060
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 SEAVER DR BETWEEN CULVERTS X AND Y       KNUTILLA  2  5  2  5 12
2      2  83777  84020  84108  84053  84054
3  3200 X      1  10  3  836    8000  1  3
4  3209    200    305    475    355    355
5  3210        0  1  8433   70  2  8399   76  2  8341   82  2  8316   87  2  8308   AG
5  3211       92  2  8317  100  3  8390  120  3  8400  170  3  8420  200  3  8440
6  3220  1  2 050 050  1  2 055 055  1  2 060 060
3  3300 Y      0  10  3  836    8600  1  3
5  3310      -50  1  8440  -20  1  8420    0  1  8417   60  2  8392   66  2  8336   AH
5  3311       70  2  8322   76  2  8326   86  3  8394  135  3  8420  180  3  8440
6  3320  1  2 050 050  1  2 050 050  1  2 070 070
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1     1 SEAVER DR BETWEEN CULVERTS Z TO AB       KNUTILLA  2  5  2  5 12
2     2  83895  84073  84160  84101  84102
3  3300 Z    1  10  3  836   8650  1  3
4  3305    200   305   475    355   355
5  3310    -50  1  8440  -20  1  8420    0  1  8417   60  2  8392   66  2  8336   AE
5  3311     70  2  8322   76  2  8326   86  3  8394  135  3  8420  180  3  8440
6  3320  1  2 050 050  1  2 050 050  1  2 070 070
3  3400 AA   0  14  3  836   9030  1  3
5  3410   -150  1  8480 -130  1  8460 -110  1  8440  -35  1  8420    0  1  8408   AJ
5  3411     56  2  8399   66  2  8338   70  2  8331   74  2  8341   86  3  8417
5  3412    104  3  8433  140  3  8440  270  3  8460  300  3  8480
6  3420  1  2 050 050  1  2 050 050  1  2 070 070
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 SEAVER DR CULVERTS FROM AB TO AF          KNUTILLA  4  5  2  5 12
2      2  83970  84147  84207  84166  84167
3  3400 AB     1  14  3  836     9080  1  3
4  3305    200     305     475     355     355
**SEQUENCE**
5  3410    -150  1  8480 -130  1  8460 -110  1  8440  -35  1  8420    0  1  8408   AK
5  3411      56  2  8399   66  2  8338   70  2  8331   74  2  8341   86  3  8417
5  3412     104  3  8433  140  3  8440  270  3  8460  300  3  8480
6  3420  1  2 050 050  1  2 050 050  1  2 070 070
3  3500 AC     0   8  3  836     9470  1  3
5  3510       0  1  8440   35  1  8420  425  2  8420  430  2  8400  440  2  8333   AL
5  3511     450  2  8333  480  3  8440  520  3  8460
6  3520  1  2 050 050  1  2 055 055  1  2 060 060
3  3600 AD     1  10  3  836    10270  1  3
4  3605    100     150     230     170     170
5  3610    -130  1  8440 -100  1  8420  -60  1  8400    0  1  8397   50  2  8399   AM
5  3611      62  2  8353   68  2  8347   70  2  8353   80  3  8418  100  3  8440
6  3620  1  2 050 050  1  2 070 070  1  2 100 100
3  3700 AF     0  13  3  838    11030  1  3
5  3710    -410  1  8460 -260  1  8440  -70  1  8400    0  1  8411   20  2  8409   AN
5  3711      32  2  8405   38  2  8405   42  2  8405   52  3  8405   60  3  8402
5  3712     108  3  8379  150  3  8420  580  3  8460
6  3720  1  2 060 060  1  2 060 060  1  2 100 100
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 SEAVER DR FRPOM CULVERT AF TO MC WAIN RD KNUTILLA  3  5  2  5 12
2      2  84060  84185  84255  84208  84218
3  3700 AF     1  13  3  838   11080  1  3
4  3705     100    150    230    170    170
5  3710    -410  1  8460 -260  1  8440  -70  1  8400    0  1  8411   20  2  8409   A6
5  3711      32  2  8352   38  2  8346   42  2  8351   52  3  8398   60  3  8402
5  3712     108  3  8379  150  3  8420  580  3  8460
6  3720  1  2 060 060  1  2 060 060  1  2 100 100
3  3800 AG     0  10  3  838   11550  1  3
5  3810     -90  1  8440  -20  1  8420    0  1  8411   28  2  8399   38  2  8353   AP
5  3811      42  2  8350   44  2  8351   56  3  8419  125  3  8420  175  3  8440
6  3820  1  2 040 040  1  2 032 032  1  2 040 040
3  3900 AH     0   7  3  838   11790  1  3
5  3910       0  1  8440   40  1  8420   95  2  8400  115  2  8355  125  2  8355   AQ
5  3911     150  3  8420  190  3  8440
6  3920  1  2 040 040  1  2 055 055  1  2 040 040
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 3/24/7

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 SEAVER DRAIN ABOVE MC WAIN ROAD          KNUTILLA  4  5  2  5 12
2      2  84100  84239  84287  84255  84264
3  4000 AI     1  12  3  840   11870  1  3
4  4005      60     90    140    105    105
5  4010    -350  1  8480 -290  1  8460 -180  1  8440 -130  1  8420  -48  2  8403   AR
5  4011     -40  2  8362  -24  2  8374  -18  3  8416  154  3  8419  240  3  8440
5  4012     330  3  8460  370  3  8480
6  4020  1  2 040 040  1  2 050 050  1  2 100 100
3  4100 AJ     0   8  3  838   12270  1  3
5  4110       0  1  8460  135  1  8440  150  2  8400  160  2  8357  175  2  8357   AS
5  4111     195  3  8420  200  3  8440  220  3  8460
6  4120  1  2 050 050  1  2 050 050  1  2 060 060
3  4200 AK     0   9  3  838   12710  1  3
5  4210     -85  1  8460    0  1  8443   68  2  8429   76  2  8376   82  2  8365   AT
5  4211      88  2  8370   96  3  8426  116  3  8436  160  3  8460
6  4220  1  2 050 050  1  2 060 060  1  2 060 060
3  4300 AL     0  10  3  840   13250  1  3
5  4310    -400  1  8460 -375  1  8440 -310  1  8420 -104  2  8398  -96  2  8381   AU
5  4311     -90  2  8365  -82  2  8364  -74  3  8392    0  3  8419   50  3  8460
6  4320  1  2 060 060  1  2 070 070  1  2 060 060
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 14,DATE= 3/13/78

WATER-SURFACE PROFILE FOR: SEAVER DR FENTON RD TO PRIV CULV E TO G KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*	
E	AT	900	0	550.	243.	21051.	1.36	2.	158.	E
	825.60	0.11			825.71	2.26	0.21		*IS*	
E+1	AT	1230	330	550.	619.	43573.	1.06	18.	254.	F
	825.80	0.01	0.11	0.0	825.82	0.89	0.10	0.000	*XS*	
F	AT	1370	140	550.	479.	35862.	1.30	74.	275.	G
	825.82	0.03	0.03	0.01	825.85	1.15	0.12	0.000	*XS*	
G	AT	1730	360	550.	216.	14556.	1.38	-8.	133.	H
	825.98	0.14	0.21	0.06	826.12	2.55	0.29	-0.000	*XS*	

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: SEVER DR SEC G TO BRIARFIELD CIRCLE KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*	
G	AT	1770	0	550.	241.	16573.	1.36	-8.	140.	I
826.15	0.11				826.26	2.29	0.26		*IS*	
H	AT	2030	260	550.	97.	6974.	1.00	22.	53.	J
826.65	0.50	0.68	0.20		827.15	5.68	0.57	0.015	*XS*	
I	AT	2540	510	550.	206.	18658.	1.00	19.	72.	K
828.23	0.11	1.19	0.0		828.34	2.67	0.24	0.001	*XS*	
J	AT	2860	320	550.	119.	9062.	1.00	85.	112.	L
828.69	0.33	0.57	0.11		829.02	4.61	0.39	-0.000	*XS*	

100-YV

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: SEAVER DR BRIARFIELD CIRCLE TO COOK RD KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
K     AT    2980 /     0 /    550. /   233. /   19195. / 1.00 /   14. /   62.
   830.10 /   0.09 /                  /  830.19 /    2.36 /  0.19/         *IS*
----------------------------------------------------------------------------------
L     AT    3290 /   310 /    390. /   100. /    6436. / 1.02 /   28. /   93.
   830.58 /   0.24 /   0.55 /   0.08 /  830.82 /    3.88 /  0.40 / -0.000  *XS*
----------------------------------------------------------------------------------
M     AT    3750 /   460 /    390. /   148. /   12977. / 1.04 /   -4. /   58.
   831.54 /   0.11 /   0.84 /   0.0  /  831.65 /    2.63 /  0.20 / -0.000  *XS*
----------------------------------------------------------------------------------
N     AT    4150 /   400 /    390. /   143. /   10533. / 1.11 /  -64. /   -8.
   831.98 /   0.13 /   0.45 /   0.01 /  832.11 /    2.73 /  0.26 /  0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR N  AT    4150 /        /    296. /    58. /    3786. / 1.00 /    0. /    9.
   831.20 /   0.41 /        ...3...  (-.001)   /    5.15 /  0.36 /         *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      55. / RIGHT      37. /                *RG*
----------------------------------------------------------------------------------
N+05  AT    4190 /    40 /    390. /   148. /   12472. / 1.40 /  -64. /   -8.
   832.02 /   0.15 /   0.05 /   0.01 /  832.17 /    2.63 /  0.25 /  0.000  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   180. /   15277. / 1.44 /  -74. /   -5.
   832.52 /   0.11 /                  /  832.62 /    2.17 /  0.20 /         *AS*
========================== END BRIDGE ANALYSIS ============================
O     AT    4530 /   340 /    390. /   205. /   18757. / 1.02 /   64. /  123.
   832.75 /   0.06 /   0.18 /   0.0  /  832.80 /    1.90 /  0.17 /  0.000  *XS*
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 13,DATE= 3/22/78

WATER-SURFACE PROFILE FOR: SEAVER DRAIN COOK RD TO PRIVATE CULV P-Q KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*
P	AT	4660	0	390.	451.	35019.	1.15	-71.	82.
834.15		0.01			834.16	0.87	0.08		*IS*
Q	AT	5330	670	390.	430.	16744.	1.83	-81.	213.
834.32		0.02	0.17	0.00	834.34	0.91	0.13	0.001	*XS*

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 11,DATE= 3/22/78

WATER-SURFACE PROFILE FOR: SEAVER DRAIN BETWEEN CULVERTS Q AND R KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*	
Q	AT	5370	0	390.	439.	17154.	1.81	-82.	214.	
	834.35	0.02			834.37	0.89	0.12		*IS*	4
R	AT	5820	450	390.	234.	11498.	1.67	29.	194.	
	834.67	0.07	0.35	0.02	834.74	1.66	0.19	0.000	*XS*	V

END OF THIS PROFILE

10-4

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 9,DATE= 3/22/78

WATER-SURFACE PROFILE FOR: SEAVER DR BETWEEN CULVERTS R TO S KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*	
R	AT	5860	0	390.	289.	14177.	1.65	29.	196.	W
	835.00	0.05			835.05	1.35	0.16		*IS*	
S	AT	6350	490	390.	192.	14419.	1.16	-102.	-39.	X
	835.35	0.07	0.36	0.01	835.43	2.04	0.17	-0.000	*XS*	

END OF THIS PROFILE

IN-4

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   15,DATE= 3/22/78

WATER-SURFACE PROFILE FOR:  SEAVER DR SECS S TO CULVERT AT SEC W     KNUTILLA
PAGE  1 OF  1, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
=====================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
=====================================================================================
S      AT    6390 /      0 /    370. /   212. /   16085. / 1.20 / -102. /  -34.
   835.67 /   0.06 /                  /  835.73 /   1.74 /   0.15/          *IS*
-------------------------------------------------------------------------------------
S+1    AT    6500 /    110 /    370. /   172. /   11713. / 1.23 /  -96. /  -20.
   835.73 /   0.09 /   0.08 /   0.02 /  835.82 /   2.15 /   0.20 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==========================
5 BR  AT    6500 /        /    318. /    71. /    4868. / 1.00 /    0. /   13.
   834.60 /   0.31 /       ...3...  (-.001)    /   4.46 /   0.34 /          *BO*
-------------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      49. / RIGHT       3. /                 *RG*
-------------------------------------------------------------------------------------
S+2    AT    6550 /     50 /    370. /   175. /   12965. / 1.49 /  -98. /  -19.
   835.77 /   0.10 /   0.05 /   0.01 /  835.88 /   2.11 /   0.20 / -0.000  *AS*
-------------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   208. /   15020. / 1.63 / -110. /   -8.
   836.14 /   0.08 /                  /  836.22 /   1.78 /   0.18 /          *AS*
============================ END BRIDGE ANALYSIS ============================
T      AT    7080 /    530 /    370. /   124. /    7457. / 1.00 /   96. /  125.
   836.76 /   0.14 /   0.65 /   0.03 /  836.89 /   2.98 /   0.25 /  0.000  *XS*
-------------------------------------------------------------------------------------

                                 END OF THIS PROFILE
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USGS STEP-BACKWATER PROGRAM - VERSION 77.[illegible] *** PAGE COUNT= 9,DATE= 3/23/78

WATER-SURFACE PROFILE FOR: SEAVER DR BETWEEN CULVERTS U TO V KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
T	AT	7120	0	370.	183.	11645.	1.14	64.	127.	AC
838.11		0.07			838.18	2.03	0.17		*IS*	
V	AT	7480	360	370.	167.	12133.	1.02	71.	110.	AD
838.46		0.08	0.35	0.00	838.53	2.22	0.18	0.000	*XS*	

END OF THIS PROFILE

10-4

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 7,DATE= 3/23/78

WATER-SURFACE PROFILE FOR: SEAVER DRAIN BETWEEN CULVERTS V TO W KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*
V	AT	7520	0	370.	193.	14568.	1.05	70.	115.
	839.08	0.06			839.14	1.92	0.15		*IS*
W	AT	7950	430	370.	169.	12888.	1.01	71.	108.
	839.39	0.08	0.31	0.01	839.46	2.19	0.16	-0.000	*XS*

AE

AF

END OF THIS PROFILE

10V-4

USC STEP-BACKWATER PROGRAM - VERSION 77.180 ** PAGE COUNT= 7,DATE= 3/23/78

WATER-SURFACE PROFILE FOR: SEAVER DR BETWEEN CULVERTS X AND Y KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
X	AT	8000	0	355.	230.	17841.	1.19	57.	133.	A4
840.53		0.04			840.57	1.54	0.12		*IS*	
Y	AT	8600	600	355.	206.	14961.	1.38	22.	112.	A1
840.80		0.06	0.28	0.01	840.87	1.72	0.15	-0.000	*XS*	

END OF THIS PROFILE

10-4

USC STEP-BACKWATER PROGRAM - VERSION 77.180 ** PAGE COUNT= 8,DATE= 3/23/78

WATER-SURFACE PROFILE FOR: SEAVER DR BETWEEN CULVERTS Z TO AB KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
Z AT 8650 / 841.01	0 / 0.06	355. /	226. /	16203. / 841.07	1.45 / 1.57	17. / 0.14	116. /	*IS* AI
AA AT 9030 / 841.23	380 / 0.07	355. / 0.23	198. / 0.01	12921. / 841.30	1.36 / 1.79	-13. / 0.17	85. / 0.000	*XS* AS

END OF THIS PROFILE

107

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 11,DATE= 3/24/78

WATER-SURFACE PROFILE FOR: SEAVER DR CULVERTS FROM AB TO AF KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*	
AB	AT 9080	0	355.	242.	15717.	1.41	-25.	86.	AK
841.66	0.05			841.71	1.46	0.14		*IS*	
AC	AT 9470	390	355.	244.	18420.	1.00	425.	474.	AL
841.84	0.03	0.17	0.0	841.88	1.46	0.11	-0.000	*XS*	
AD	AT 10270	800	170.	426.	20944.	1.04	-100.	82.	AM
842.02	0.00	0.14	0.0	842.02	0.40	0.05	0.000	*XS*	
AF	AT 11030	760	170.	644.	24855.	1.86	-168.	157.	AN
842.06	0.00	0.04	0.0	842.06	0.26	0.04	0.000	*XS*	

END OF THIS PROFILE

10-7

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 ** PAGE COUNT= 9,DATE= 3/24/78

WATER-SURFACE PROFILE FOR: SEAVER DR FRPOM CULVERT AF TO MC WAIN RD KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
AF	AT	11080	0	170.	650.	25081.	1.87	-169.	159.		
		842.08	0.00		842.08	0.26	0.04			*IS*	A0
AG	AT	11550	470	170.	197.	18157.	1.54	-24.	128.		
		842.10	0.02	0.03	0.01	842.12	0.86	0.09	-0.000	*XS*	AP
AH	AT	11790	240	170.	301.	19384.	1.11	37.	153.		
		842.13	0.01	0.02	0.0	842.14	0.56	0.05	-0.000	*XS*	AQ

END OF THIS PROFILE

100-1

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE= 3/24/78

WATER-SURFACE PROFILE FOR: SEAVER DRAIN ABOVE MC WAIN ROAD KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALpHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
AI	AT	11870	0	105.	410.	18574.	2.26	-144.	181.	AR
842.55		0.00			842.55	0.26	0.04		*IS*	
AJ	AT	12270	400	105.	236.	19329.	1.05	140.	196.	AS
842.55		0.00	0.01	0.00	842.55	0.44	0.04	-0.012	*XS*	
AK	AT	12710	440	105.	109.	6298.	1.00	68.	96.	AT
842.58		0.01	0.04	0.01	842.60	0.96	0.08	-0.000	*XS*	
AL	AT	13250	540	105.	670.	27478.	1.23	-331.	9.	AU
842.63		0.00	0.03	0.0	842.63	0.16	0.02	-0.000	*XS*	

END OF THIS PROFILE

1 MV

USGS STEP-BACKWATER PROGRAM - VERSION 77.18 *** PAGE COUNT= 20,DATE= 3/14/78

WATER-SURFACE PROFILE FOR: SEAVER DR FENTON RD TO PRIV CULV E TO G KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*	
E	AT	900	0	550.	232.	21428.	1.23	10.	110.	E
.07	825.67	0.11			825.78	2.37	0.21		*IS*	
E+1	AT	1230	330	550.	519.	42281.	1.02	20.	170.	F
.07	826.87	0.02	0.11	0.0	825.89	1.06	0.10	-0.000	*XS*	FW
F	AT	1370	140	550.	647.	37215.	1.17	75.	225.	G
.07	825.89	0.03	0.03	0.00	825.92	1.23	0.11	-0.000	*XS*	
G	AT	1730	360	550.	215.	14862.	1.35	0.	125.	H
.05	826.03	0.14	0.20	0.05	826.17	2.56	0.29	-0.000	*XS*	

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 18,DATE= 3/22/78

WATER-SURFACE PROFILE FOR: SEVER DR SEC G TO BRIARFIELD CIRCLE KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*	
G	AT	1770	0	550.	211.	15132.	1.36	15.	140.	
826.20	0.14			826.34	2.60	0.28			*IS*	I
H	AT	2030	260	550.	100.	7289.	1.00	22.	54.	
826.75	0.47	0.71	0.16	827.22	5.50	0.55		0.000	*XS*	J
I	AT	2540	510	550.	207.	18807.	1.00	19.	72.	
828.25	0.11	1.13	0.0	828.36	2.66	0.24		0.014	*XS*	K
J	AT	2860	320	550.	120.	9107.	1.00	85.	112.	
828.71	0.33	0.57	0.11	829.03	4.60	0.38		-0.000	*XS*	L

.05 .16 .02 .02

FW

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 18,DATE= 3/22/78

WATER-SURFACE PROFILE FOR: SEAVER DR BRIARFIELD CIRCLE TO COOK RD KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
K     AT    2980 /     0 /    550. /   234. /   19300. / 1.00 /   14. /   62.
   830.12 /   0.09 /                 /  830.21 /    2.35 /  0.19/         *IS*
----------------------------------------------------------------------------------
L     AT    3290 /   310 /    390. /   101. /    6473. / 1.02 /   28. /   93.
   830.59 /   0.24 /   0.55 /   0.08 /  830.83 /    3.86 /  0.40 / -0.000  *XS*
----------------------------------------------------------------------------------
M     AT    3750 /   460 /    390. /   149. /   13000. / 1.04 /   -5. /   58.
   831.55 /   0.11 /   0.83 /   0.0  /  831.66 /    2.62 /  0.20 / -0.000  *XS*
----------------------------------------------------------------------------------
N     AT    4150 /   400 /    390. /   143. /   10555. / 1.11 /  -64. /   -8.
   831.98 /   0.13 /   0.44 /   0.01 /  832.11 /    2.73 /  0.26 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR N  AT    4150 /       /    296. /    58. /    3786. / 1.00 /    0. /    9.
   831.20 /   0.41 /       ...3...  (-.001)    /    5.15 /  0.36 /         *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      56. / RIGHT      37. /                *RG*
----------------------------------------------------------------------------------
N+05  AT    4190 /    40 /    390. /   149. /   12495. / 1.40 /  -64. /   -8.
   832.02 /   0.15 /   0.05 /   0.01 /  832.17 /    2.62 /  0.24 /  0.000  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   180. /   15307. / 1.44 /  -74. /   -5.
   832.52 /   0.11 /                 /  832.63 /    2.17 /  0.20 /         *AS*
============================ END BRIDGE ANALYSIS ================================
0     AT    4530 /   340 /    390. /   206. /   18786. / 1.02 /   64. /  123.
   832.75 /   0.06 /   0.18 /   0.0  /  832.81 /    1.90 /  0.17 / -0.000  *XS*
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: SEAVER DRAIN COOK RD TO PRIVATE CULV P-Q KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
P	AT	4660	0	390.	358.	29986.	1.09	-18.	82.	
834.15		0.02			834.17	1.09	0.10		*IS*	
Q	AT	5330	670	390.	391.	16810.	1.57	-25.	175.	
834.35		0.02	0.20	0.00	834.38	1.00	0.13	0.000	*XS*	

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: SEAVER DRAIN BETWEEN CULVERTS Q AND R KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
Q	AT	5370	0	390.	397.	17146.	1.56	-25.	175.	
834.38		0.02			834.40	0.98	0.12		*IS*	
R	AT	5820	450	390.	185.	10654.	1.36	30.	130.	
834.72		0.09	0.37	0.04	834.81	2.11	0.21	0.000	*XS*	

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: SEAVER DR BETWEEN CULVERTS R TO S KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
R	AT 5860 / 835.05	0 / 0.07	390. /	218. / 835.12	12550. / 1.79	1.40 / 0.18	30. /	130.	*IS*	W
S	AT 6350 / 835.45	490 / 0.07	390. / 0.40	198. / 0.00	14916. / 835.52	1.17 / 1.97	-102. / 0.17	-38. / 0.001	*XS*	X

FW

END OF THIS PROFILE

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   21,DATE= 3/22/78

WATER-SURFACE PROFILE FOR:  SEAVER DR SECS S TO CULVERT AT SEC W     KNUTILLA
PAGE  1 OF  1, PROFILE NUMBER  5,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
S      AT    6390 /      0 /    370. /   220. /   16670. / 1.22 / -107. /  -32.
   835.77 /   0.05 /                  /  835.82 /    1.69 /   0.14/          *IS*
----------------------------------------------------------------------------------
5+1    AT    6500 /    110 /    370. /   180. /   12209. / 1.26 / -100. /  -17.
   835.83 /   0.08 /   0.07 /   0.01 /  835.91 /    2.06 /   0.19 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
5 BR  AT    6500 /        /    304. /    71. /    4868. / 1.00 /    0. /   13.
   834.60 /   0.28 /        ...3...  (-.001)    /    4.25 /   0.32 /         *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       60. / RIGHT        6. /                *RG*
----------------------------------------------------------------------------------
S+2    AT    6550 /     50 /    370. /   183. /   13452. / 1.52 / -101. /  -16.
   835.86 /   0.10 /   0.04 /   0.01 /  835.96 /    2.02 /   0.20 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   214. /   15354. / 1.65 / -112. /   -6.
   836.19 /   0.08 /                  /  836.27 /    1.73 /   0.17 /         *AS*
============================ END BRIDGE ANALYSIS ================================
T      AT    7080 /    530 /    370. /   125. /    7551. / 1.00 /   96. /  125.
   836.79 /   0.14 /   0.63 /   0.03 /  836.92 /    2.96 /   0.25 /  0.001  *XS*
----------------------------------------------------------------------------------

                          END OF THIS PROFILE
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 10,DATE= 3/23/78

WATER-SURFACE PROFILE FOR: SEAVER DR BETWEEN CULVERTS U TO V KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*	
T	AT	7120	0	370.	185.	11763.	1.14	63.	127.	AC
.03	838.14	0.07			838.21	2.00	0.17		*IS*	
V	AT	7480	360	370.	168.	12220.	1.02	71.	110.	AD
.02	838.48	0.08	0.34	0.00	838.56	2.21	0.17	0.000	*XS*	

END OF THIS PROFILE

EW

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 8,DATE= 3/23/78

WATER-SURFACE PROFILE FOR: SEAVER DRAIN BETWEEN CULVERTS V TO W KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*	
V	AT	7520	0	370.	194.	14651.	1.05	70.	115.	AE
839.10	0.06				839.16	1.91	0.15		*IS*	
W	AT	7950	430	370.	170.	12947.	1.02	71.	108.	AF
839.40	0.08	0.31	0.01		839.48	2.18	0.16	-0.000	*XS*	

END OF THIS PROFILE

FW

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 8,DATE= 3/23/78

WATER-SURFACE PROFILE FOR: SEAVER DR BETWEEN CULVERTS X AND Y KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS

SECID / WS ELEV	AT / HV	DISTANCE / HF	LENGTH / HE	DISCHARGE / EG	AREA / V	CONVEYANCE / FN	ALPHA / ACC	LEW / REW	*ID*
X	AT	8000	0	355.	231.	17895.	1.19	57.	133.
840.54	0.04			840.58	1.54	0.12			*IS*
Y	AT	8600	600	355.	207.	15009.	1.39	21.	113.
840.81	0.06	0.28	0.01	840.88	1.72	0.15	-0.000		*XS*

AG

AH

FW

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 9,DATE= 3/23/78

WATER-SURFACE PROFILE FOR: SEAVER DR BETWEEN CULVERTS Z TO AB KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / LENGTH / DISCHARGE / AREA / CONVEYANCE / ALPHA / LEW / REW										
WS ELEV /	HV /	HF /	HE /	EG /	V /	FN /	ACC	*ID*		
Z AT	8650 /	0 /	355. /	227. /	16266. /	1.45 /	16. /	117.		AF
841.02 /	0.06 /		/	841.08 /	1.57 /	0.14/		*IS*		
AA AT	9030 /	380 /	355. /	199. /	12971. /	1.36 /	-13. /	85.		AJ
841.24 /	0.07 /	0.23 /	0.01 /	841.31 /	1.79 /	0.17 /	0.000	*XS*		

END OF THIS PROFILE

FW

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 16,DATE= 3/24/78

WATER-SURFACE PROFILE FOR: SEAVER DR CULVERTS FROM AB TO AF KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*	
AB	AT	9080	0	355.	232.	15176.	1.42	-20.	80.	
841.67	0.05			841.72	1.53	0.14			*IS*	AK
AC	AT	9470	390	355.	245.	18518.	1.00	425.	474.	
841.86	0.03	0.17	0.0	841.90	1.45	0.11	0.000		*XS*	AL
AD	AT	10270	800	170.	296.	13745.	1.00	-100.	50.	
842.11	0.01	0.22	0.0	842.12	0.57	0.07	0.005		*XS*	AM
AF	AT	11030	760	170.	621.	26687.	1.59	-125.	125.	
842.18	0.00	0.06	0.0	842.18	0.27	0.04	-0.000		*XS*	AN

END OF THIS PROFILE

FW

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 14,DATE= 3/24/78

~~WATER-SURFACE~~ PROFILE FOR: SEAVER DR FRPOM CULVERT AF TO MC WAIN RD KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
AF	AT	11080	0	170.	622.	26725.	1.59	-125.	125.	AO
.10 842.18		0.00			842.18	0.27	0.04		*IS*	
AG	AT	11550	470	170.	164.	17387.	1.28	20.	120.	AP
.08 842.18		0.02	0.03	0.01	842.20	1.04	0.10	-0.020	*XS*	
AH	AT	11790	240	170.	295.	20079.	1.12	40.	140.	AQ
.09 842.22		0.01	0.02	0.0	842.22	0.58	0.05	-0.000	*XS*	

END OF THIS PROFILE

FW

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 17,DATE= 3/24/78

WATER-SURFACE PROFILE FOR: SEAVER DRAIN ABOVE MC WAIN ROAD KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*	
AI	AT	11870	0	105.	352.	18723.	1.81	-100.	100.	
	842.64	0.00			842.64	0.30	0.04		*IS*	AR
AJ	AT	12270	400	105.	241.	19946.	1.05	140.	197.	
	842.64	0.00	0.01	0.00	842.64	0.44	0.04	-0.012	*XS*	AS
AK	AT	12710	440	105.	112.	6506.	1.00	68.	97.	
	842.67	0.01	0.04	0.01	842.69	0.94	0.08	-0.000	*XS*	AT
AL	AT	13250	540	105.	544.	26204.	1.10	-200.	0.	
	842.72	0.00	0.03	0.0	842.72	0.19	0.02	0.000	*XS*	AU

END OF THIS PROFILE

00BREAK00

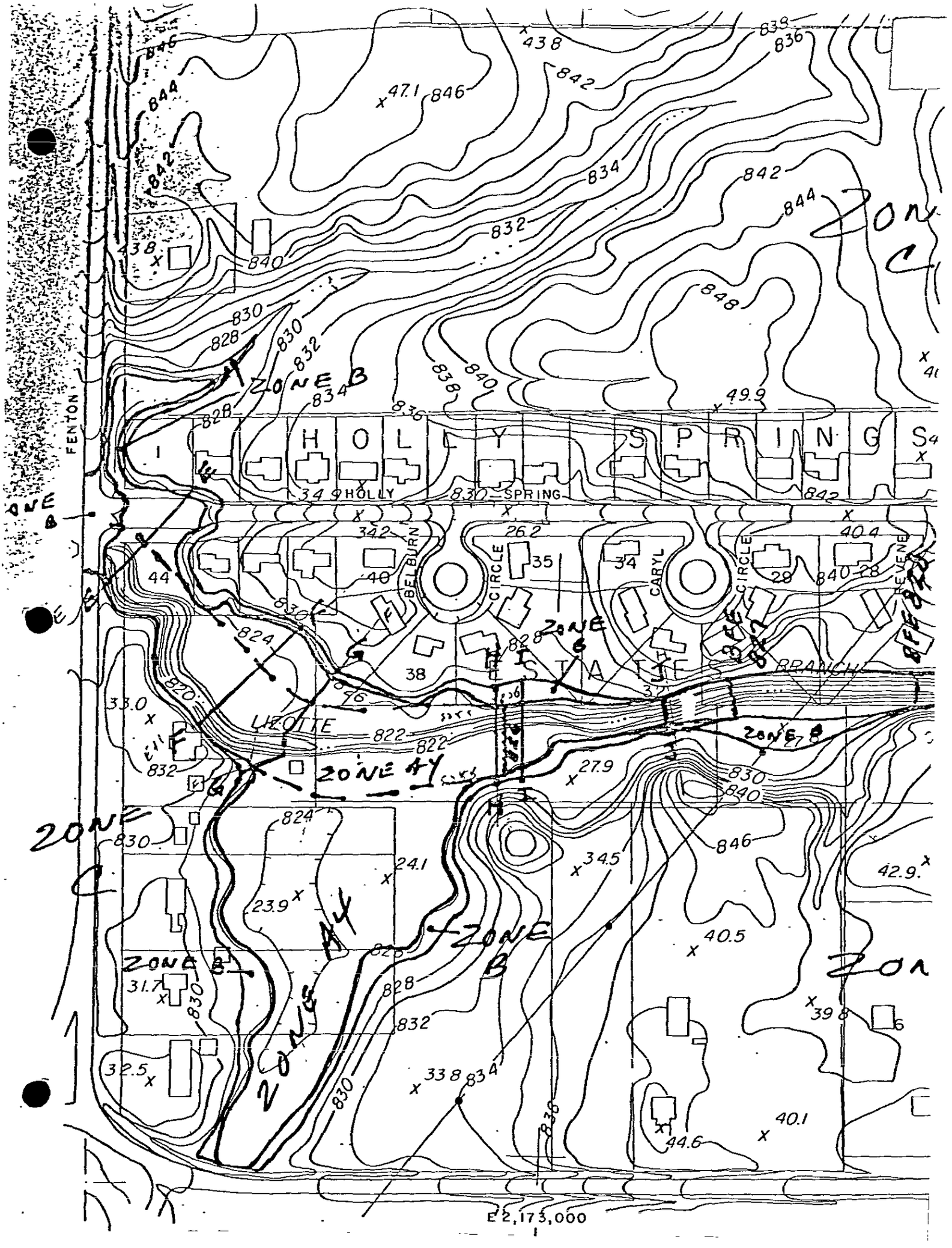
1) COUNTY: Genesee

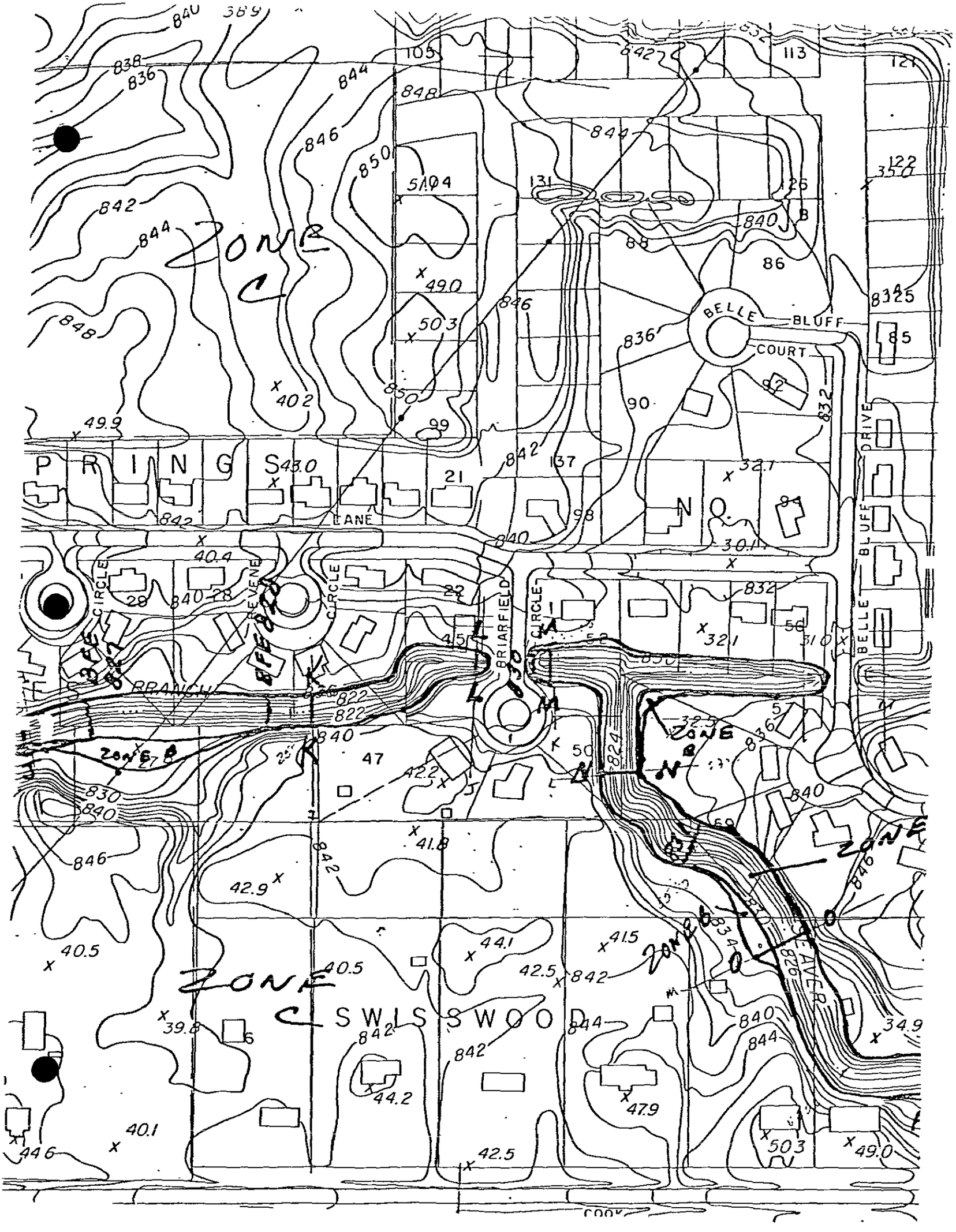
2) STUDY NAME: City of Flint

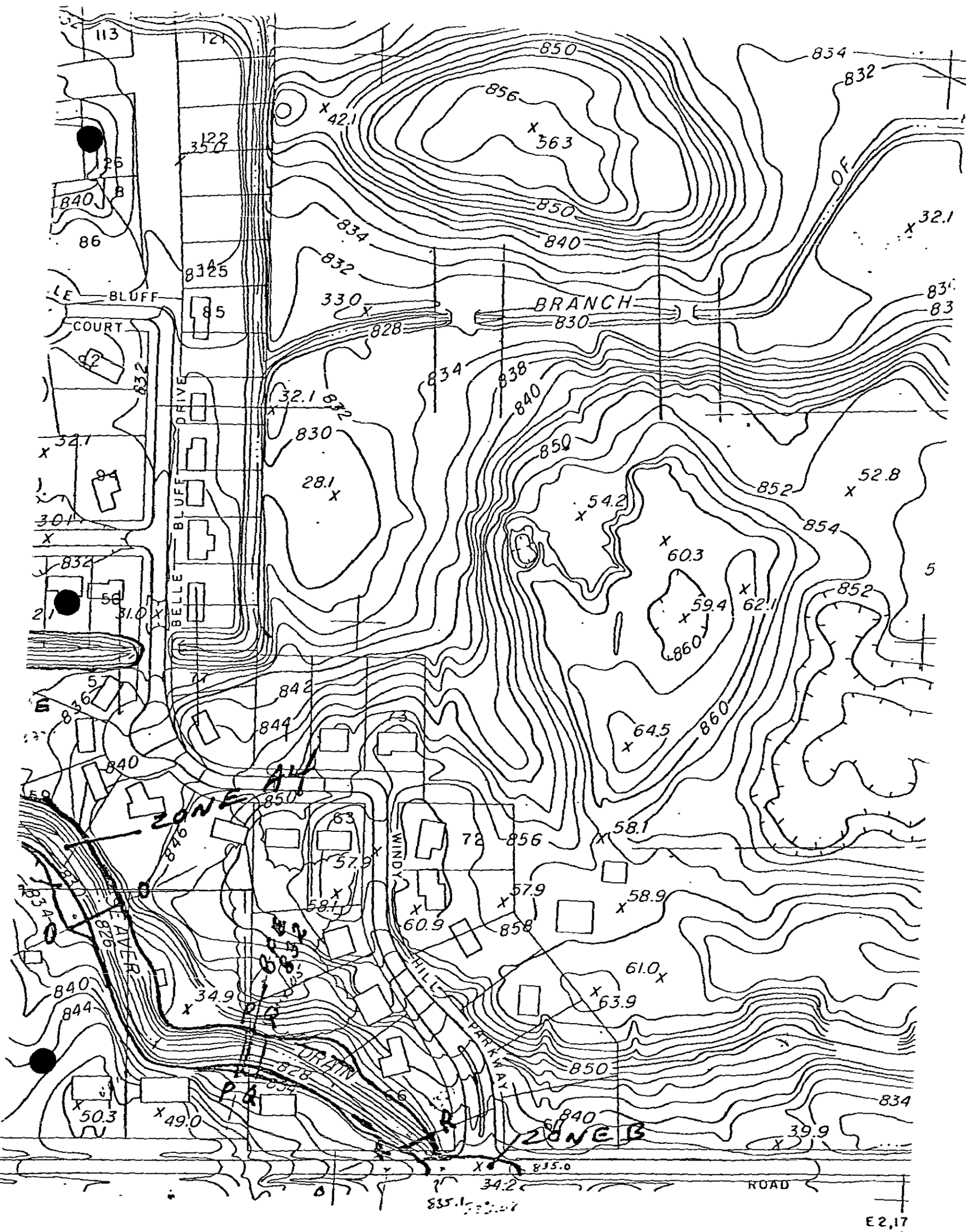
3) WATERCOURSE: Seaver Drain

4) DOCUMENT TYPE: maps

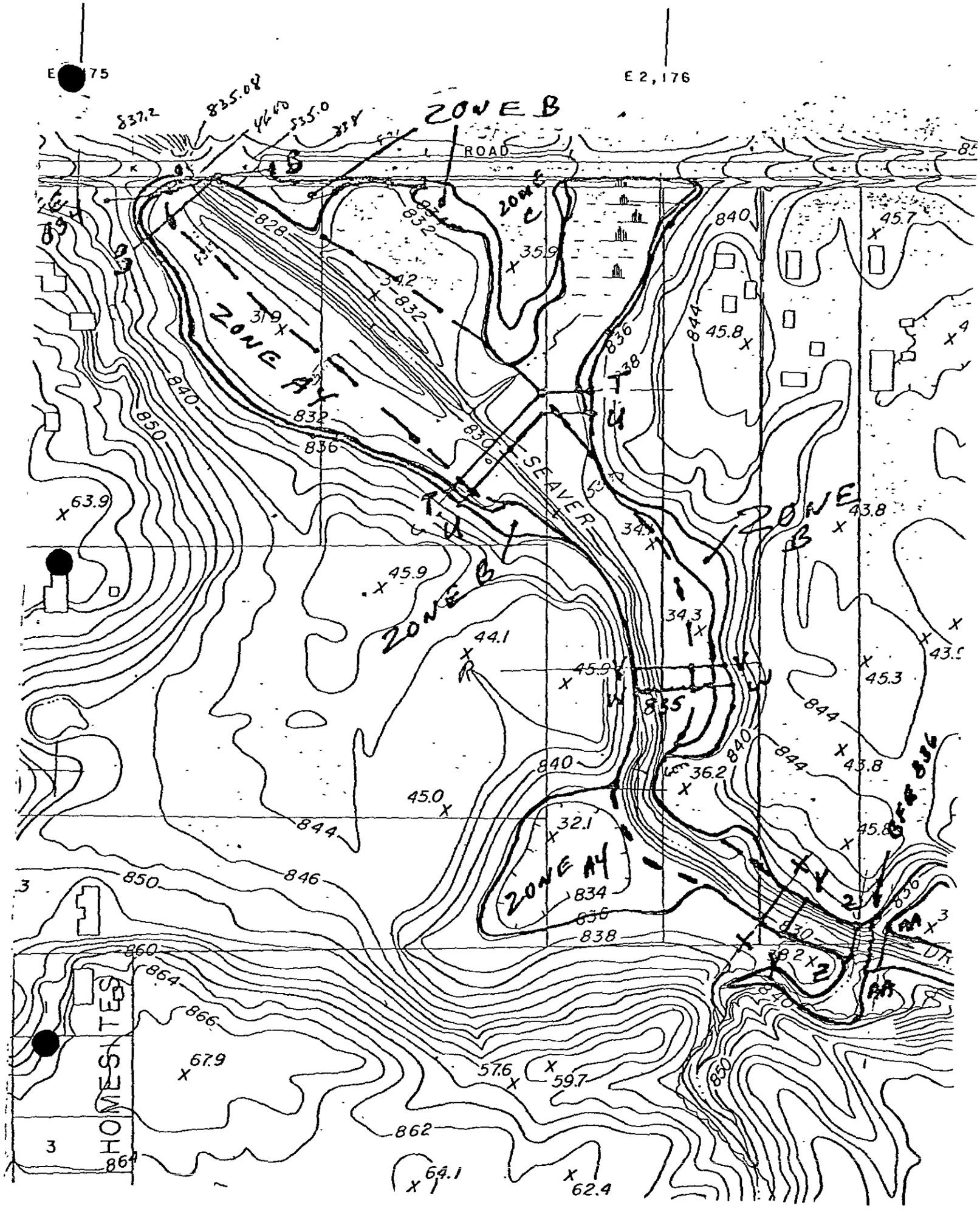
00BREAK00


FENTON
HOLLY SPRING
HOLLY SPRING
BELBURN CIRCLE
CARYL CIRCLE
ESTATES
BRANCH
LAFOTTE
ZONE A
ZONE B
ZONE C
E 2,173,000

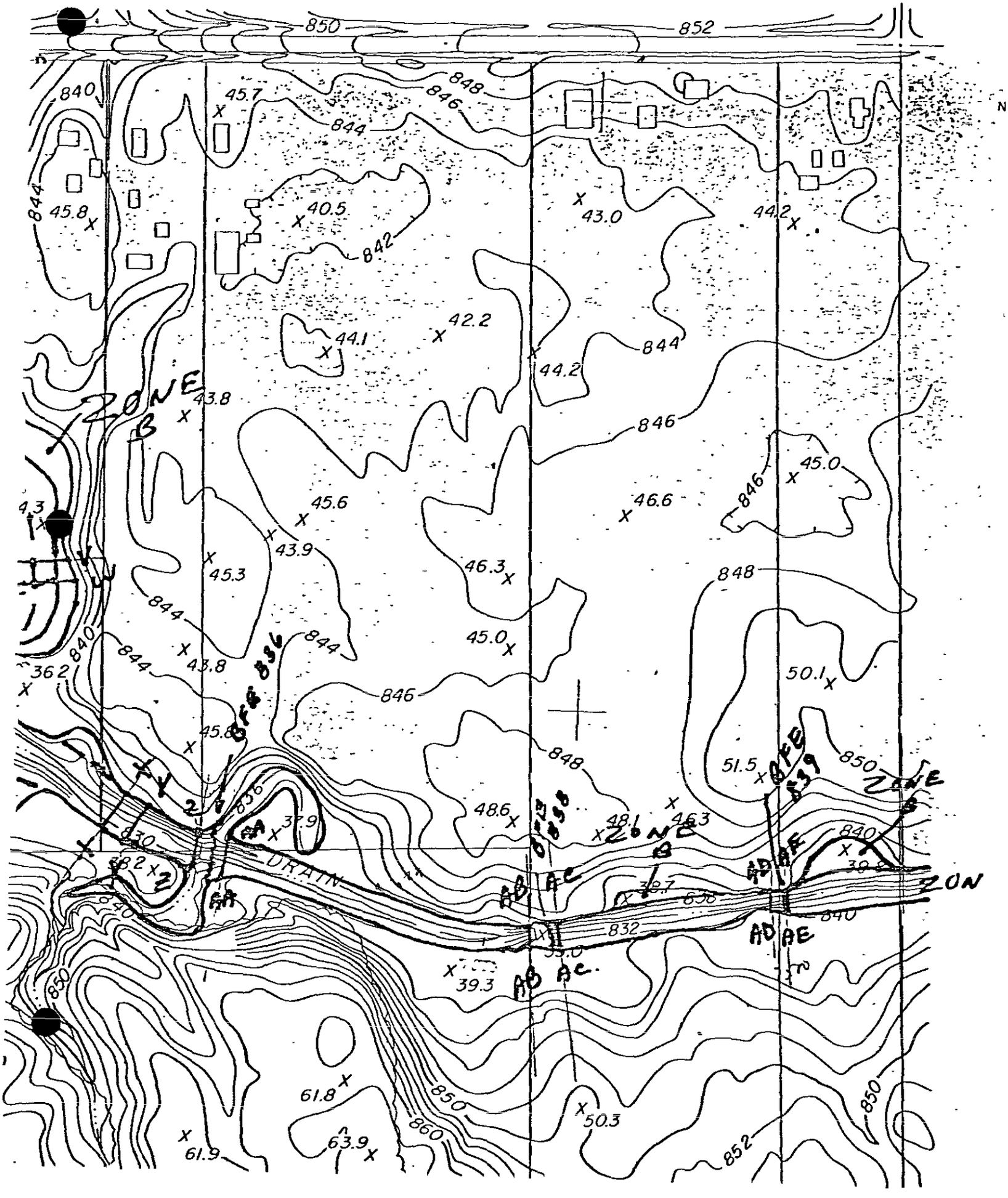

ZONE C
BELLE BLUFF COURT
BELLE BLUFF DRIVE
P R I N G S
LANE
CIRCLE
BRIARFIELD
BRANCH
ZONE B
ZONE
S W I S S W O O D
AVE
COOK

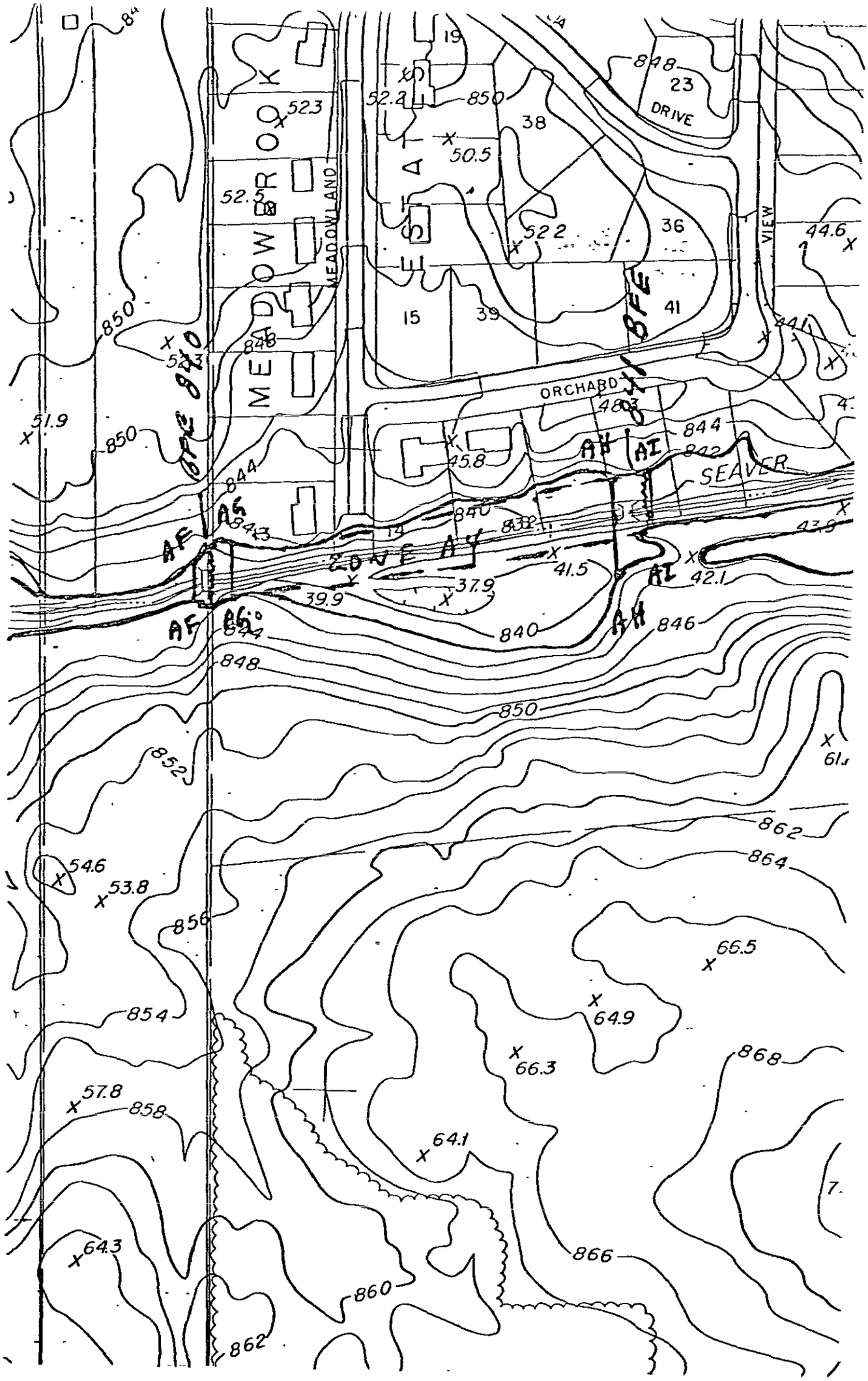

BLUFF
COURT
BELLE BLUFF DRIVE
BRANCH
WINDY HILL PARKWAY
ZONE A
ZONE B
ROAD

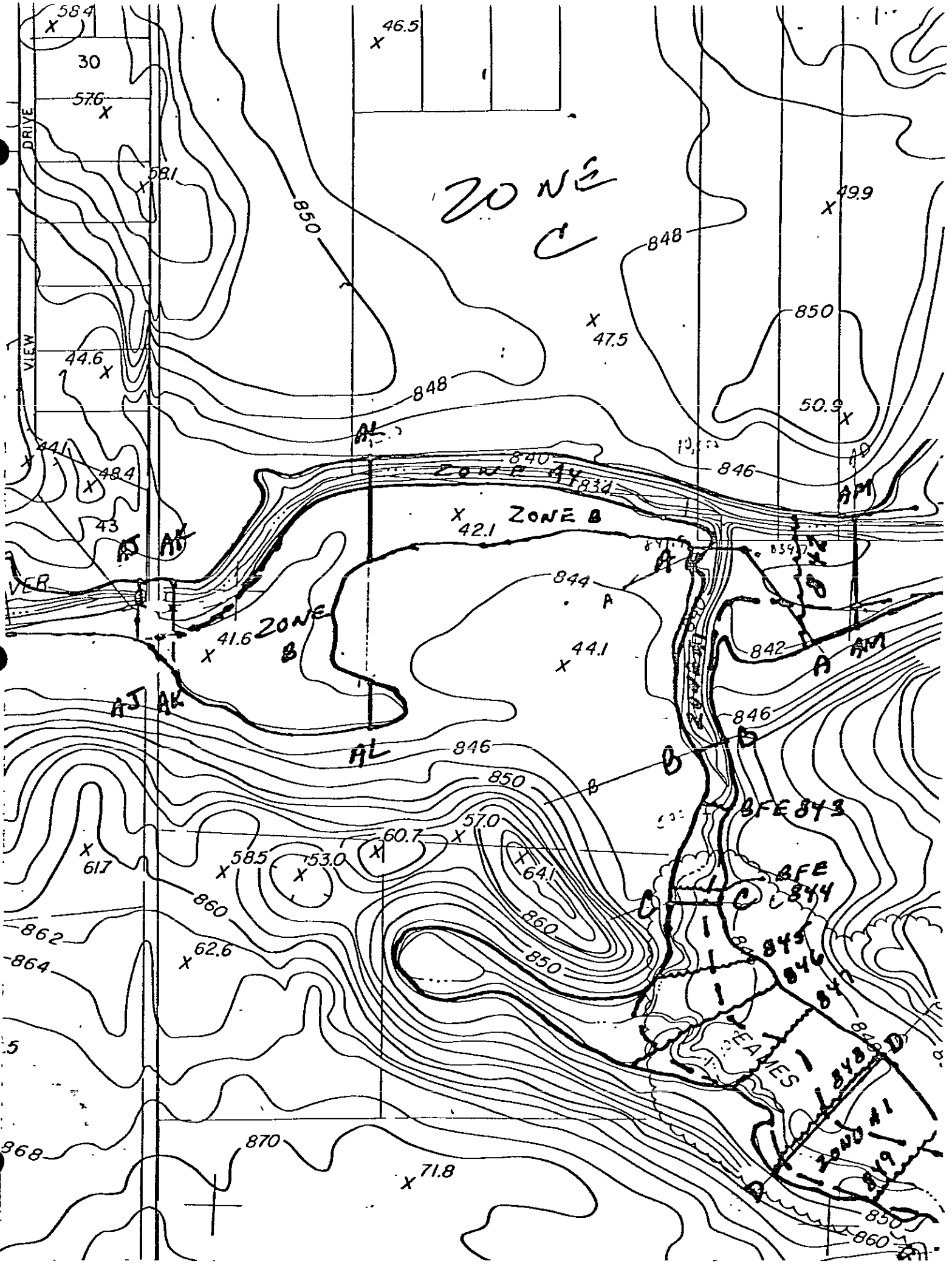
E2.17

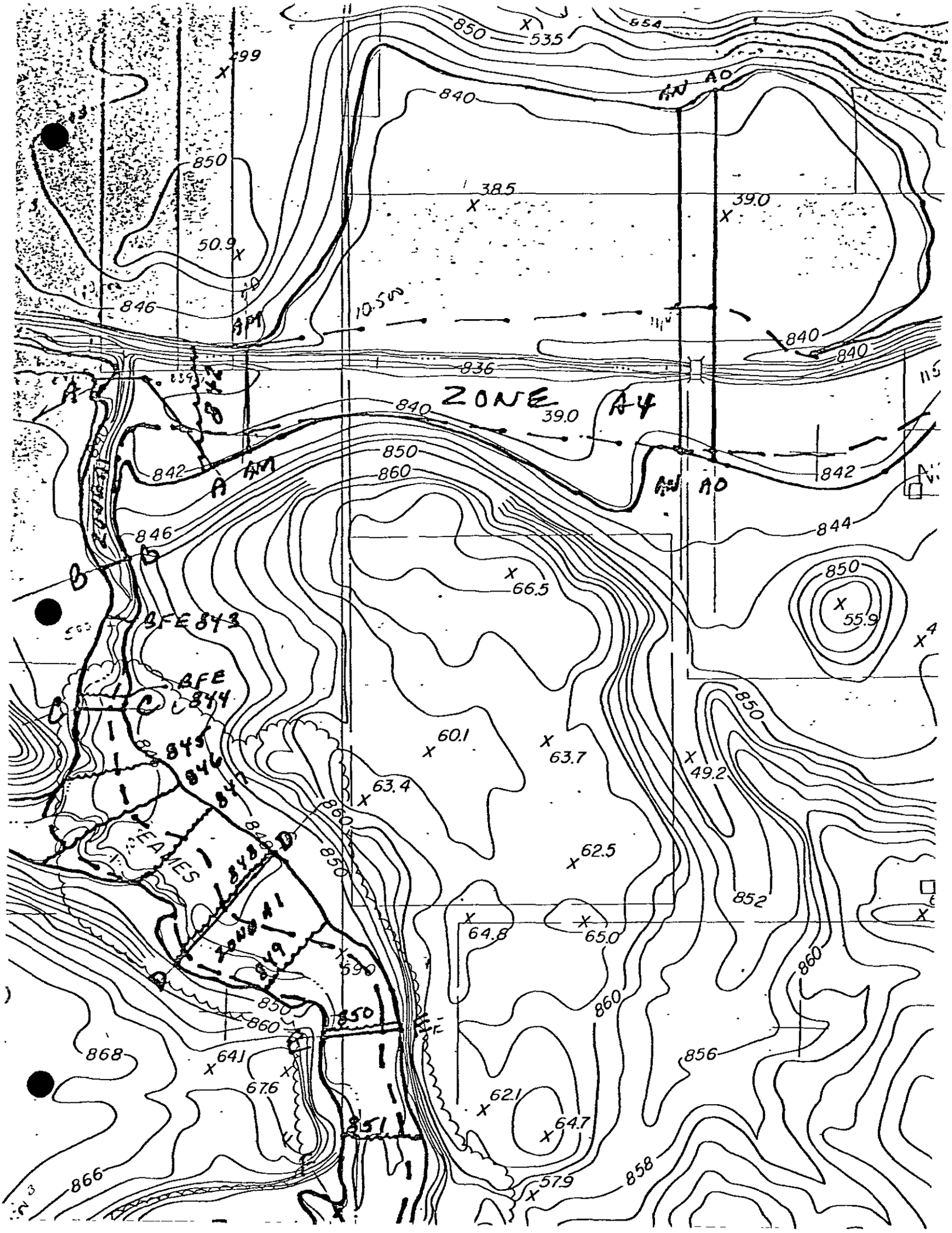

E 2,176
ZONE B
ZONE C
ZONE A
ZONE B
ZONE B
ZONE A
ROAD
SEAVER
HOMESITES
835.08
837.2
835.0
828
832
840
850
836
830
844
845.7
45.8
43.8
45.9
44.1
45.3
43.8
45.0
32.1
36.2
34.3
35.9
34.2
31.9
63.9
67.9
57.6
59.7
64.1
62.4
860
864
866
862
846
838
834

E 2,177,000


850
852
840
845.7
848
846
844
45.8
40.5
43.0
44.2
842
42.2
44.1
44.2
844
ZONE B
43.8
846
45.0
45.6
46.6
846
43.9
45.3
46.3
848
844
45.0
844
43.8
840
844
50.1
846
45.8
848
51.5
850
ZONE B
48.6
48.1
46.3
ZONE B
840
DRAIN
AD AC
AD AE
ZON
832
39.3
AD AC
850
61.8
850
50.3
850
860
852
61.9
63.9


MEADOWBROOK
MEADOWLAND
ESTATES
DRIVE
VIEW
ORCHARD
SEAVER
ZONE AY
N510
N509
19
23
38
36
41
15
39
14
52.3
52.5
52.2
50.5
52.2
44.6
44.1
45.8
43.8
41.5
42.1
37.9
39.9
51.9
54.6
53.8
57.8
64.3
64.1
66.3
64.9
66.5
850
848
844
842
840
838
846
852
854
856
858
860
862
864
866
868


ZONE C
ZONE A
ZONE B
ZONE B
ZONE B
BFE 843
BFE 844
DRIVE
VIEW
58.4
46.5
30
57.6
58.1
850
848
49.9
47.5
850
44.6
848
50.9
44.1
48.4
840
846
43
42.1
844
41.6
44.1
842
846
846
850
57.0
60.7
61.7
58.5
53.0
64.1
860
862
62.6
864
860
850
868
870
71.8
850
860


ZONE A4
AN
AO
BFE 843
BFE 844
845
846
847
848
849
ZONE A1
EAMES
850
860
840
842
844
846
836
868
866
856
858
852
535
854
38.5
39.0
50.9
66.5
55.9
60.1
63.7
49.2
63.4
62.5
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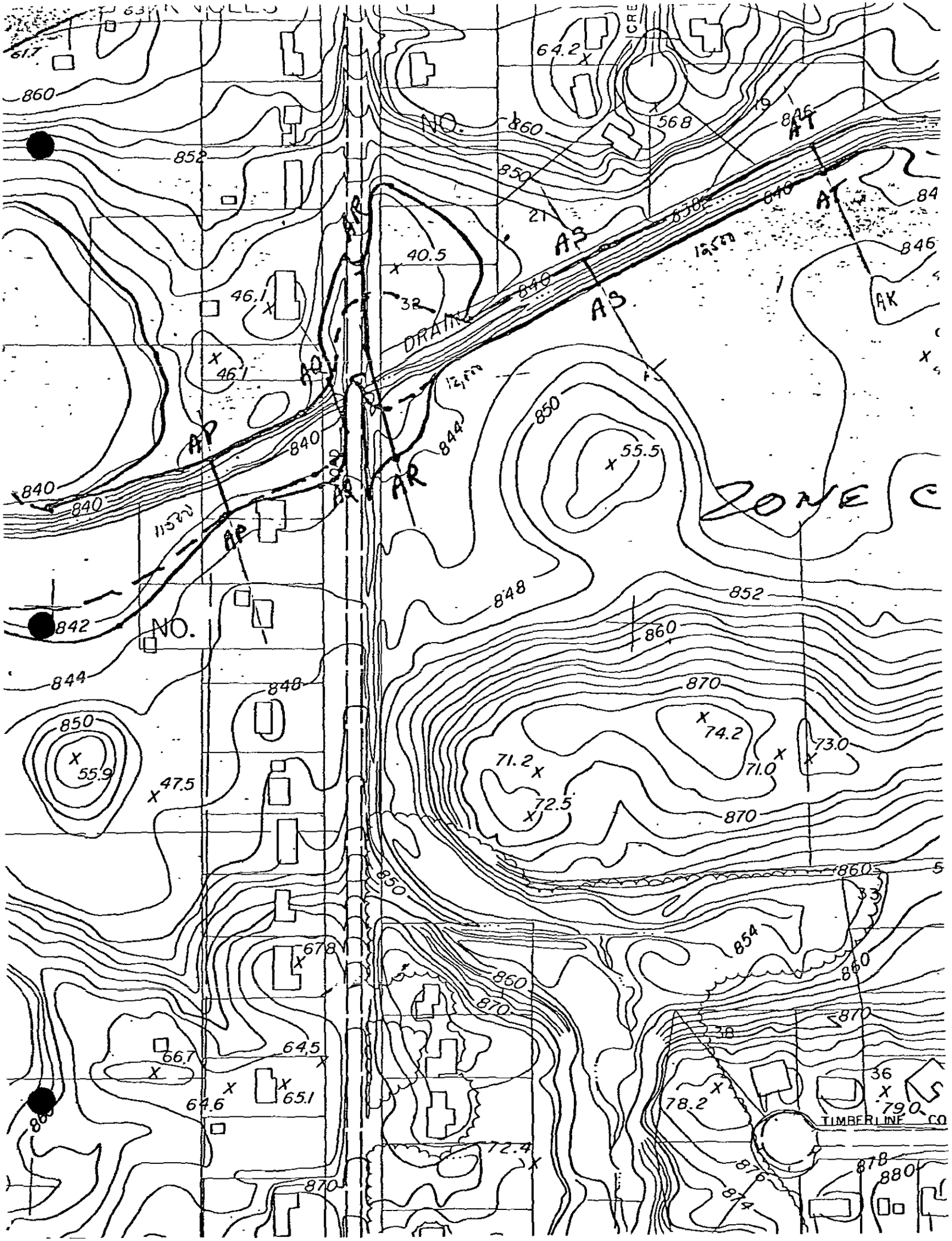
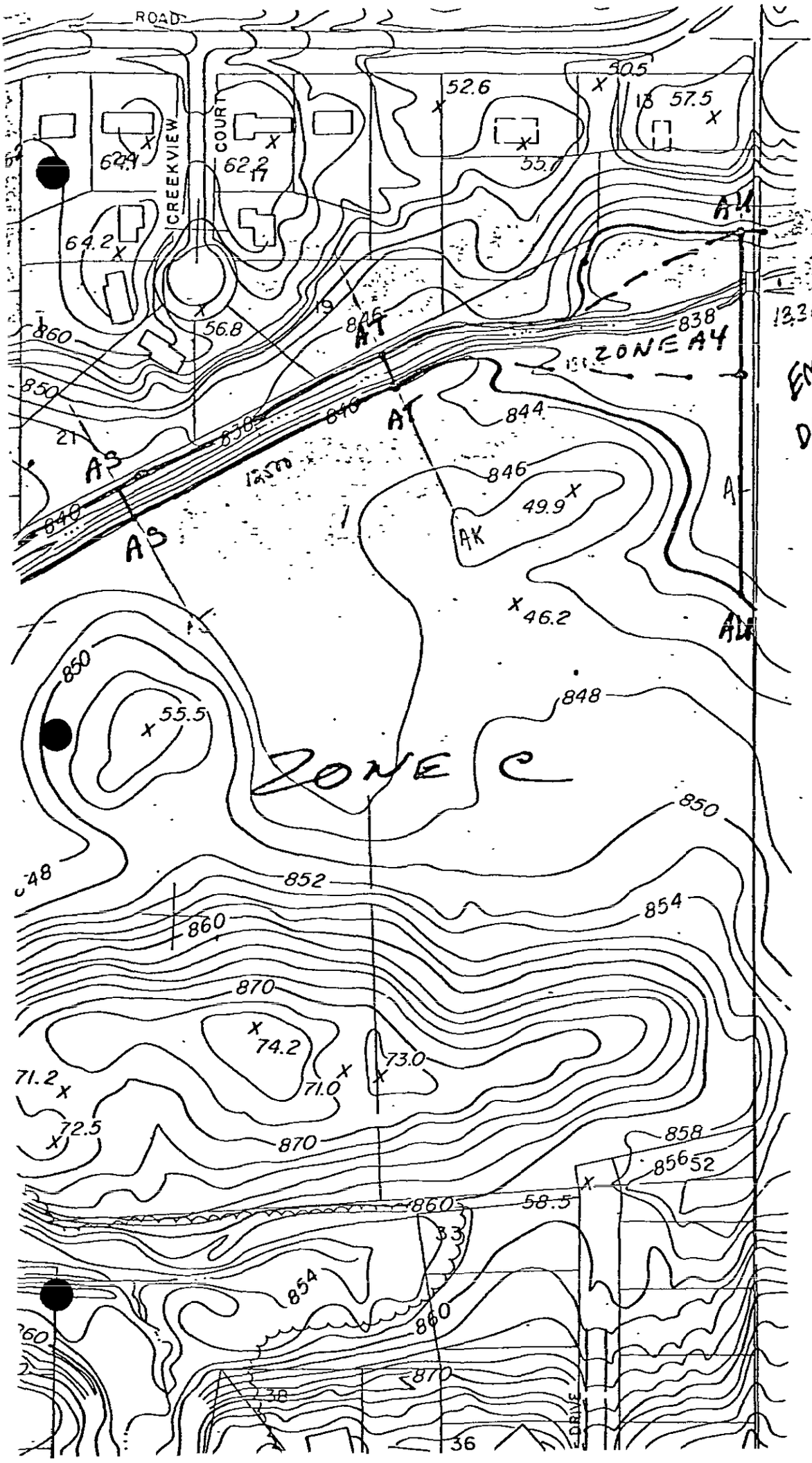
65.0
59.0
64.1
67.6
62.1
64.7
57.9


NO.
DRAIN
AP
AQ
AR
AS
AT
AK
ZONE C
TIMBERLINE CO
860
852
850
840
842
844
848
870
854
880
64.2
56.8
40.5
46.1
55.5
55.9
47.5
74.2
73.0
71.2
71.0
72.5
67.8
66.7
64.5
64.6
65.1
78.2
79.0
72.4



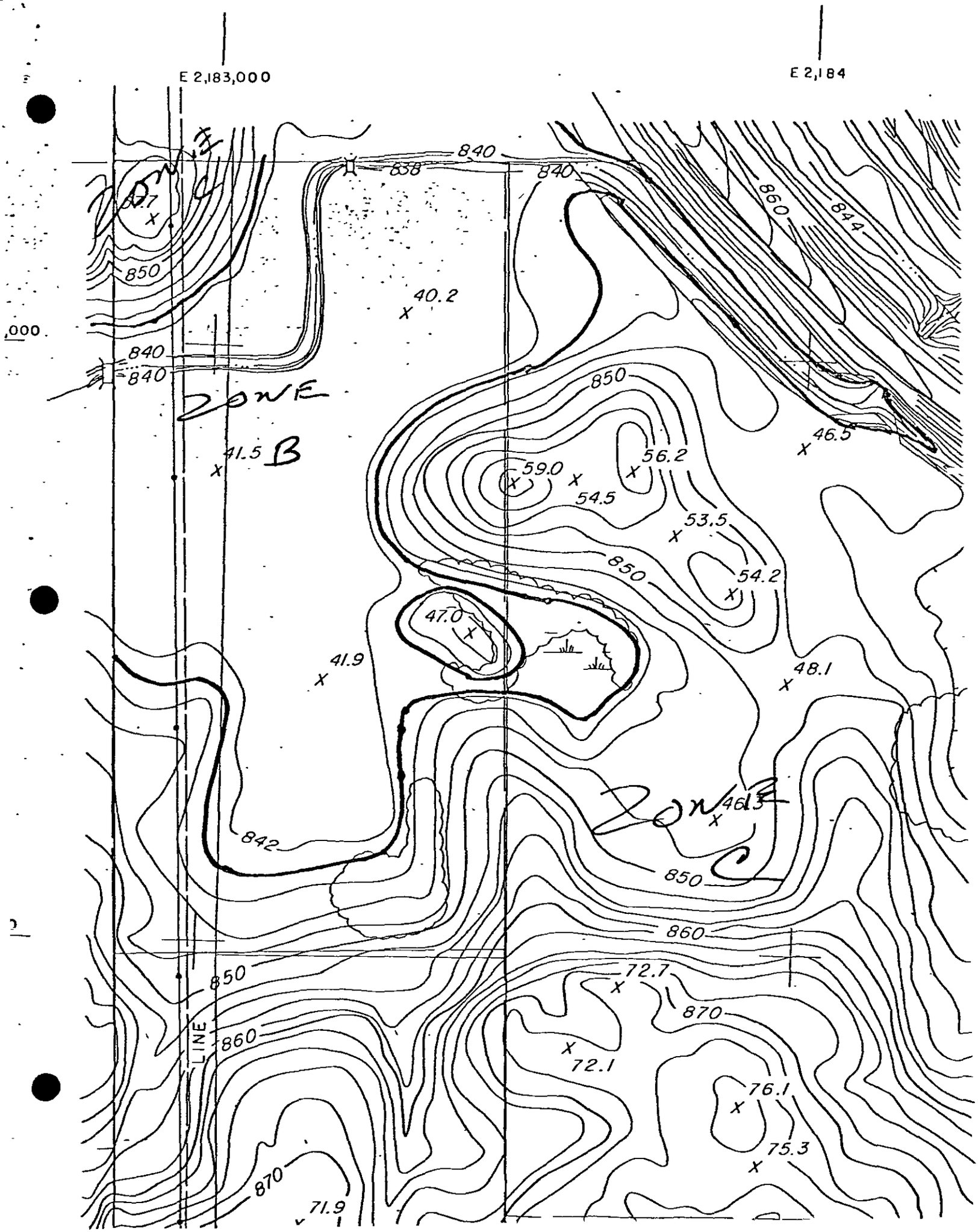
LEGEND

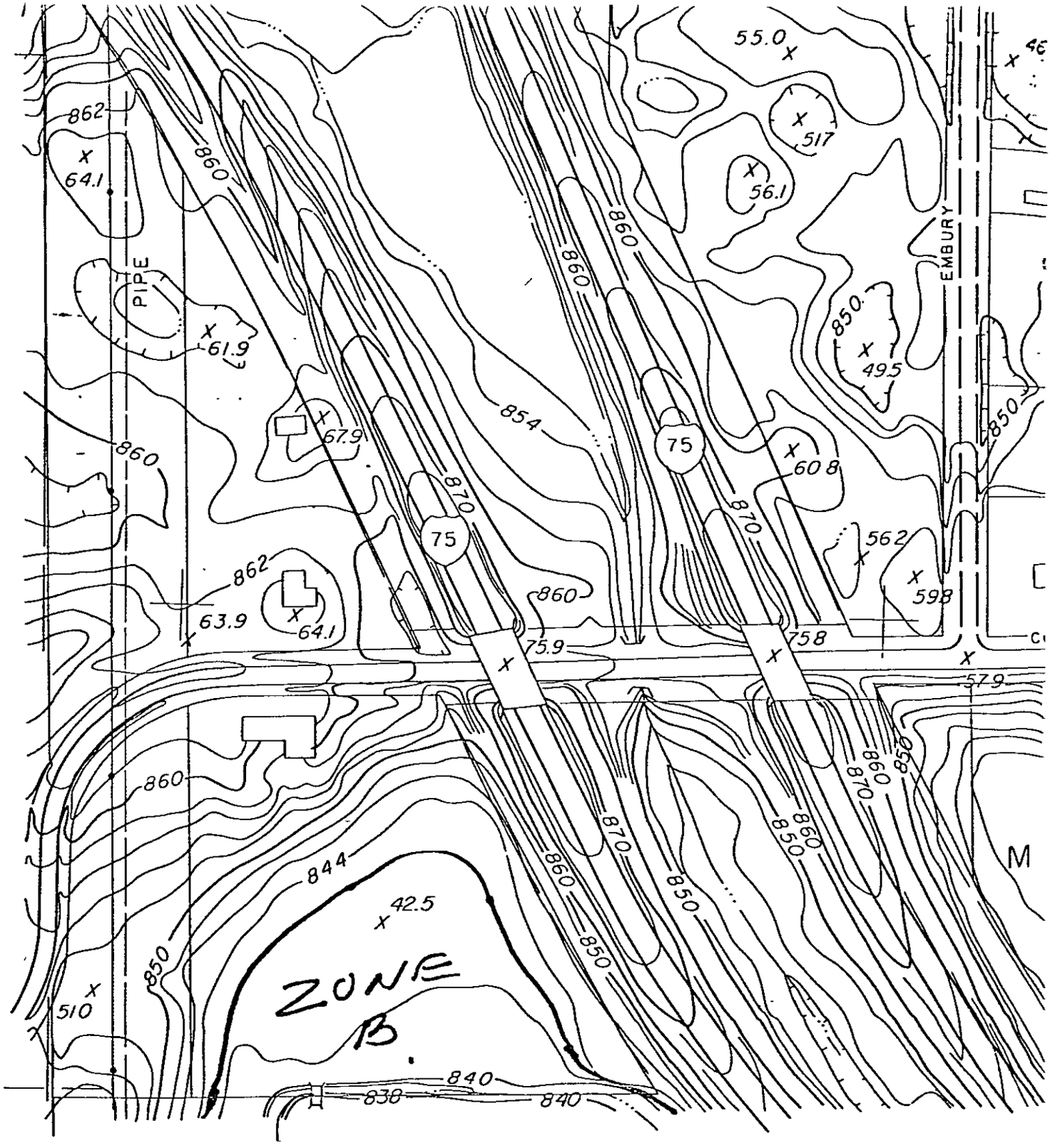
RAILROAD

HIGHWAY, ROAD OR STREET - GRAVEL

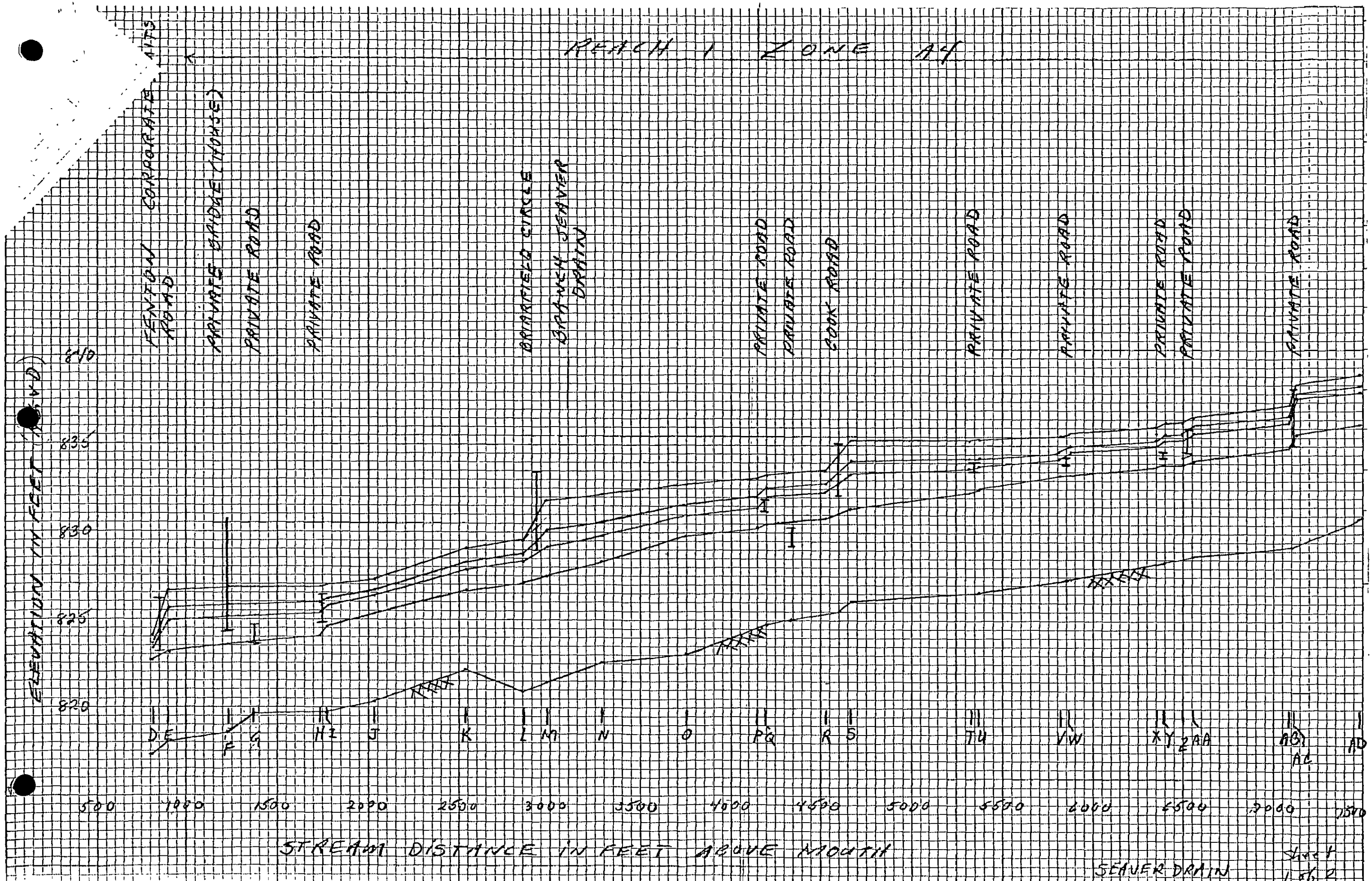
HIGHWAY ROAD OR STREET - SURFACED

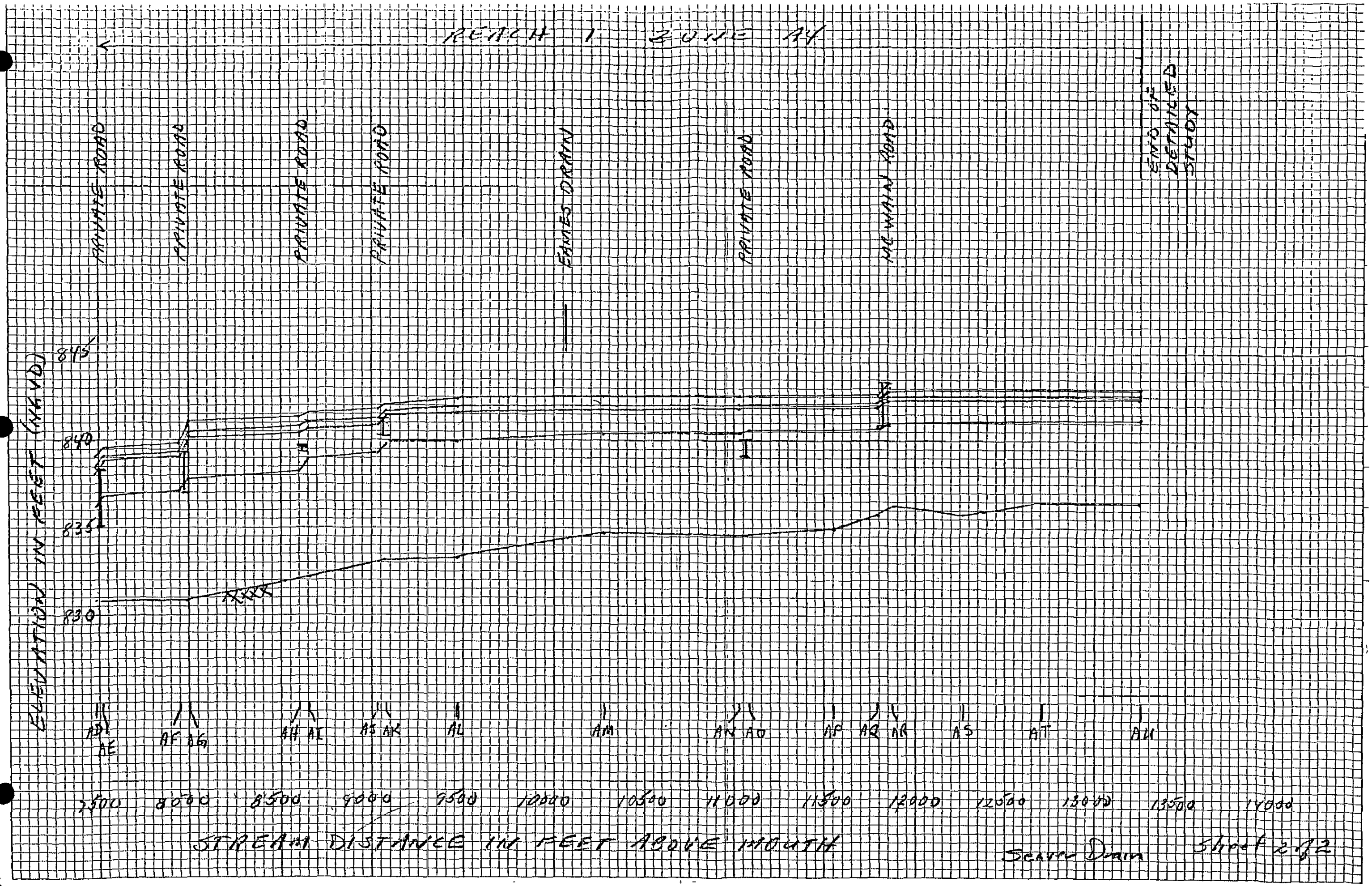
BRIDGE


E 2,183,000
E 2,184
,000
840
838
840
860
844
850
40.2
840
840
ZONE
41.5
B
850
46.5
56.2
59.0
54.5
53.5
850
54.2
47.0
41.9
48.1
ZONE
46.3
842
850
860
850
72.7
870
860
72.1
76.1
75.3
870
71.9
LINE



ED ON MICHIGAN PLANE COORDINATE
ACT 9 P.A. 1964


REACH 1 ZONE A4
FENTON ROAD
CORRUGATED PIPE
PRIVATE GARAGE (HOUSE)
PRIVATE ROAD
PRIVATE ROAD
BRIARFIELD CIRCLE
BRANCH SEWER DRAIN
PRIVATE ROAD
PRIVATE ROAD
COOK ROAD
PRIVATE ROAD
PRIVATE ROAD
PRIVATE ROAD
PRIVATE ROAD
ELEVATION IN FEET
840
835
830
825
820
D E F G H I J K L M N O P Q R S T U V W X Y Z AA AB AC AD
500 1000 1500 2000 2500 3000 3500 4000 4500 5000 5500 6000 6500 7000 7500
STREAM DISTANCE IN FEET ABOVE MOUTH
SEWER DRAIN
Sheet 1 of 2


REACH 1 ZONE A4
PRIVATE ROAD
PRIVATE ROAD
PRIVATE ROAD
PRIVATE ROAD
EAMES DRAIN
PRIVATE ROAD
MC WHAI ROAD
END OF DETAILED STUDY
ELEVATION IN FEET (NAVD)
845
840
835
830
AD AE
AF AG
AH AI
AJ AK
AL
AM
AN AO
AP
AQ AR
AS
AT
AU
7500
8000
8500
9000
9500
10000
10500
11000
11500
12000
12500
13000
13500
14000
STREAM DISTANCE IN FEET ABOVE MOUTH
Sewer Drain
Sheet 2 of 2

00BREAK00

1) COUNTY: Genesee

2) STUDY NAME: city of Flint

3) WATERCOURSE: Thread creek (A-Bk)

4) DOCUMENT TYPE: input

00BREAK00

```
          2         3         4
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....
 READ CR MOUTH TO M-21  A TO E          KNUTILLA  7   2  5 12
 0662  70936  71052  71404  71054
   A 1  16  3  697        0 99 99
 1300   1950   2280   2800   2200
      0  1  7200    8  1  7180   25  1  7120   28  1  7100   36  1  7080
     38  1  7060  110  2  7040  150  2  7040  160  2  7020  180  2  6967   A
    192  2  7020  198  2  7040  232  3  7060  260  3  7080  480  3  7100
    518  3  7200
 1  2 036 036  1  2 035 035  1  2 036 036
   B 0  10  3  702      100 99 99
    -90  1  7300  -40  1  7120    0  2  7111   60  2  7013   80  2  6994   B
    100  2  7015  120  2  7105  310  3  7101  405  3  7100  434  3  7200
 1  2 060 060  1  2 027 027  1  2 060 060
   C 0   8  3  705      750  1  3
    -50  1  7160  -40  2  7140  -18  2  7032    0  2  7007   16  2  7032   C
     30  3  7100   45  3  7050   70  3  7230
 1  2 060 060  1  2 027 027  1  2 060 060
C+01  0   7  2  705      840 99 9
                                M
    -40  1  7140  -18  1  7035    0  1  7010   17  1  7035   27  2  7080
     42  2  7080   80  2  7160
 1  2 027 027  1  2 060 060
C+05  0   6  1  705      940 99 99
    -40  1  7180  -38  1  7140  -18  1  7039    0  1  7014   17  1  7039
     47  1  7189
 1  2 027 027
C+1   0   5  1  706     1040 99 99
    -38  1  7142  -18  1  7042    0  1  7017   17  1  7042   47  1  7192   D
 1  2 027 027
C+2   0   5  1  710     1140 99 99
    -35  1  7185  -15  1  7085    0  1  7060   17  1  7085   17  1  7185
 1  2 027 027
BR  0 2  25  1  706     1140        45  7229 3 1
      0  1  7078    5  1  7076   10  1  7070   15  1  7062   20  1  7057
     25  1  7056   30  1  7055   35  1  7051   40  1  7056   45  1  7062
     50  1  7067   55  1  7073   60  1  7089   55  1  7141   50  1  7170
     45  1  7197   40  1  7215   35  1  7225   30  1  7229   25  1  7225
     20  1  7215   15  1  7196   10  1  7169    5  1  7131    0 -9  7078
 1  2 030 030
   E 5  11  3  705     1270  1  3
    -10  1  7280    0  1  7265   19  1  7172   20  2  7163   40  2  7062   E
     50  2  7048   60  2  7061   80  3  7156   81  3  7165  100  3  7252
    128  3  7270
 1  2 060 060  1  2 027 027  1  2 060 060
```

Input Cards
Thread Cr.
City of Flint.

**ERROR(S)

Input

```
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
                                  [redacted]S. TO 12[redacted] ST.
    1 THREAD CR M-21 TO [redacted]      KNUTILLA 17  5  2  5 12
    2  71258  71396  71458  71551  71458
  600      E 1  11  3  705     1270  1  3
  605   1300    1950    2280    2800    2280
  610      -10  1  7280     0  1  7265    19  1  7172    20  2  7163    40  2  7062   E
  611       50  2  7048    60  2  7061    80  3  7156    81  3  7165   100  3  7252
  612      128  3  7270
  659  1  2 060 060  1  2 027 027  1  2 060 060
  700      F 0  10  3  707     1820 99 99
  710      -10  1  7280     0  1  7270    20  1  7165    40  2  7083    52  2  7069   F
  711       64  2  7083    80  2  7155    85  3  7180   100  3  7258   110  3  7268
  759  1  2 060 060  1  2 027 027  1  2 060 060
  800 BR   F 2  13  1  710     1820          0  7221 1 1
  810        0  1  7221     0  1  7155    10  1  7119    15  1  7095    20  1  7099
  811       25  1  7095    30  1  7099    35  1  7105    40  1  7106    45  1  7137
  812       53  1  7157    53  1  7221     0 -9  7221
  859  1  2 055 055
  900      G 5  12  3  711     1950  1  3
  910      -10  1  7260     0  1  7249    16  1  7136    17  1  7130    20  2  7110   G
  911       40  2  7104    60  2  7109    71  2  7136    73  3  7138    90  3  7162
  912      110  3  7230   130  3  7275
  959  1  2 055 055  1  2 065 065  1  2 055 055
  970 G+1    0   5  1  716     2080 99 99
  975      -35  1  7253   -18  1  7168     0  1  7143    17  1  7168    37  1  7268   H
  980  1  2 030 030
 1000      H 0   9  3  716     2480 99 99
 1010        0  1  7269    15  1  7200    16  2  7198    24  2  7162    40  2  7150   I
 1011       58  2  7161    65  2  7200    69  3  7210    80  3  7272
 1059  1  2 032 032  1  2 028 028  1  2 032 032
 1100      I 0  10  3  716     2920 99 99
 1110        0  1  7268     6  1  7268    21  1  7205    22  2  7200    30  2  7166   J
 1111       46  2  7151    62  2  7166    69  2  7200    71  3  7205    90  3  7298
 1159  1  2 033 033  1  2 028 028  1  2 033 033
 1200      J 0   9  3  717     3400 99 99
 1210        0  1  7302    16  1  7210    18  2  7205    24  2  7177    44  2  7168   K
 1211       58  2  7178    65  2  7210    67  3  7220    76  3  7280
 1259  1  2 033 033  1  2 028 028  1  2 033 033
 1300      K 0  10  3  718     4370 99 99
 1310        0  1  7300    15  1  7230    17  2  7220    24  2  7194    45  2  7179   L
 1311       59  2  7193    63  2  7230    64  3  7240    65  3  7258    72  3  7320
 1359  1  2 033 033  1  2 028 028  1  2 035 035
 1400      L 0   9  3  719     4600 99 99
 1410        0  1  7312    14  1  7225    16  2  7220    20  2  7193    42  2  7185   M
 1411       63  2  7217    65  3  7222    74  3  7288    81  3  7295
 1459  1  2 040 040  1  2 035 035  1  2 040 040
```

```
                                    ....5....0....5....0....5....0....5....0
500 BR  L [illegible] 11  1  719     4600          0  7310 3 1 [illegible]
510       [illegible] 1  7316     0  1  7231    10  1  7193    15  1  7184    20  1  7187
511      25  1  7188    30  1  7188    35  1  7193    43  1  7227    43  1  7299
512       0 -9  7316
559  1  2 045 045
600 RD  L 4  10  3   60            1  3            1 1 1                  1
610     -70  1  7362     1  1  7351     2  2  7350    43  2  7335    44  3  7334
611     140  3  7316   308  3  7320   373  3  7325   406  3  7340   475  3  7360
700     M 5  10  3  721     4680  1  3
710       0  1  7368    20  1  7277    33  1  7215    34  2  7214    60  2  7202  N
711      77  3  7220    78  3  7221    82  3  7226   100  3  7318   120  3  7360
759  1  2 038 038  1  2 065 065  1  2 038 038
800     N 0  11  1  726     4720 99 99
810       0  1  7368    20  1  7278    33  1  7220    40  1  7260    50  1  7220  O
811      60  1  7260    70  1  7220    78  1  7224    82  1  7230   100  1  7320
812     120  1  7360                          " PRINTOUT"
820  1  2 075 075
900     0 0  14  3  723     5050 99 99
910       0  1  7360     2  1  7340    20  1  7320    42  1  7300    56  1  7280  P
911      60  2  7260    68  2  7240    85  2  7223    98  2  7240   105  3  7280
912     113  3  7300   142  3  7320   174  3  7340   180  3  7350
959  1  2 050 050  1  2 040 040  1  2 055 055
100 BR  0 2   9  1  723     5050          30  7312 3 1
110       0  1  7312     0  1  7256    10  1  7252    20  1  7239    30  1  7226
111      35  1  7224    42  1  7223    42  1  7300     0 -9  7312
159  1  2 035 035
00      P 5  18  3  723     5140  1  3
10      -46  1  7360   -42  1  7340   -20  1  7320     0  1  7307    20  1  7278
11       30  2  7264    32  2  7261    38  2  7288    42  2  7227    48  2  7234
12       72  3  7266    74  3  7270    80  3  7270    82  3  7280    88  3  7300
13      108  3  7320   162  3  7340   255  3  7360
59  1  2 040 040  1  2 040 040  1  2 035 035
```

```
    1 THREAD CR 12TH ST DAM TO HEACH MONROE ST KNUTALA 18  5 02 05 12
    2  72[illegible]0  73000  73040  73095  73040
 1850 0 + 1 1    5  1  725     4750 99 99
 1855   1250    1900    2200    2700    2200
 1860      -44  1  7346  -18  1  7216   17  1  7235   27  1  7240   48  1  7346
 1865  1  2 040 040
 1900      0 0  14  3  723     5050 99 99
 1910        0  1  7360    2  1  7340   20  1  7320   42  1  7300   56  1  7280   P
 1911       60  2  7260   68  2  7240   85  2  7223   98  2  7240  105  3  7280
 1912      113  3  7300  142  3  7320  174  3  7340  180  3  7350
 1959  1  2 050 050  1  2 040 040  1  2 055 055
 2000 BR  0 2   9  1  723     5050        30  7312 3 1
 2010        0  1  7326    0  1  7256   10  1  7252   20  1  7239   30  1  7226
 2011       35  1  7224   42  1  7223   42  1  7300    0 -9  7326
 2059  1  2 040 040
 2100      P 5  18  3  723     5140  1  3
 2110      -46  1  7360  -42  1  7340  -20  1  7320    0  1  7307   20  1  7278   Q
 2111       30  2  7264   32  2  7261   38  2  7288   42  2  7227   48  2  7234
 2112       72  3  7266   74  3  7270   80  3  7270   82  3  7280   88  3  7300
 2113      108  3  7320  162  3  7340  255  3  7360
 2159  1  2 040 040  1  2 040 040  1  2 035 035
 2200      Q 0  20  3  725     5380 99 99
 2210        0  1  7400   95  1  7380  112  1  7360  118  1  7340  124  1  7320
 2211      130  1  7300  140  2  7280  142  2  7260  144  2  7250  162  2  7243   R
 2212      172  2  7250  178  2  7260  182  2  7280  200  3  7300  300  3  7300
 2213      300  3  7400  450  3  7400  450  3  7300  480  3  7300  500  3  7420
 2259  1  2 045 045  1  2 040 040  1  2 035 035
 2300      R 0  15  3  726     5630 99 99
 2310        0  1  7500   10  1  7400   25  1  7300   34  2  7280   46  2  7260   S
 2311       55  2  7253   64  2  7260   70  2  7280   74  2  7300   82  3  7320
 2312       84  3  7340   92  3  7360   94  3  7380  102  3  7400  750  3  7500
 2359  1  2 038 038  1  2 035 035  1  2 038 038
 2400 BR  R 2  10  1  725     5630         0  7506 1 1
 2410        0  1  7506    0  1  7328   10  1  7307   20  1  7289   30  1  7246
 2411       40  1  7252   50  1  7261   64  1  7295   64  1  7506    0 -9  7506
 2459  1  2 027 027
 2500      S 5  11  3  725     5700 99 99
 2510       -5  1  7400   -1  1  7365    0  2  7363    5  2  7340   20  2  7260   T
 2511       32  2  7240   47  2  7263   57  2  7322   64  3  7354   65  3  7362
 2512       70  3  7400
 2559  1  2 045 045  1  2 035 035  1  2 040 040
 2560 S+1    0  10  3  728     5800  1  3
 2565        0  1  7400   10  1  7340   20  1  7320   50  2  7300   60  2  7255   U
 2566       85  2  7255  100  3  7320  230  3  7340  250  3  7360  330  3  7400
 2570  1  2 045 045  1  2 035 035  1  2 040 040
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
3  2600      T 0  17  3  729    6360 99 99
5  2610        0  1  7440   20  1  7400   30  1  7380   38  1  7360   48  1  7340
5  2611      116  1  7320  120  2  7300  128  2  7283  151  2  7283  155  2  7300
5  2612      162  3  7320  320  3  7340  486  3  7360  500  3  7380  512  3  7400
5  2613      522  3  7420  528  3  7440
6  2659  1  2 045 045  1  2 035 035  1  2 035 035
3  2660 T+1    0   9  3  730    6770  1  3
5  2665        0  1  7400   15  2  7320   25  2  7287   45  2  7287   55  3  7320
5  2666      150  3  7340  350  3  7360  420  3  7380  470  3  7400
6  2670  1  2 045 045  1  2 035 035  1  2 040 040
3  2700      U 0  12  3  730    7040 99 99
5  2710        0  1  7500   18  1  7400   32  2  7320   42  2  7300   52  2  7291
5  2711       64  2  7300   65  2  7320   70  3  7320  108  3  7360  195  3  7360
5  2712      248  3  7360  380  3  7380
6  2759  1  2 045 045  1  2 035 035  1  2 038 038
3  2760 4+05   0   6  2  735    7390 99 99
5  2760        0  1  7400   20  1  7295   45  1  7295   60  2  7360  260  2  7380
**SEQUENCE**
5  2761      500  2  7400
6  2765  1  2 035 035  1  2 045 045
3  2760 U+1    0   7  2  732    7740 99 99
**SEQUENCE**
5  2765        0  1  7440   20  1  7360   30  1  7300   55  1  7300   80  2  7380
5  2766      310  2  7400  350  2  7440
6  2770  1  2 035 035  1  2 040 040
3  2800      V 0  12  3  731    8060 99 99
5  2810        0  1  7460   18  1  7440   36  1  7420   44  1  7400   52  2  7340
5  2811       58  2  7320   80  2  7309   93  2  7320  102  2  7340  106  3  7360
5  2812      112  3  7380  226  3  7400
6  2859  1  2 050 050  1  2 035 035  1  2 028 028
3  2900 BR   Y 2  10  1  732    8060         0  7384 1 1
5  2910        0  1  7386    0  1  7309    5  1  7308   10  1  7316   15  1  7313
5  2911       20  1  7316   25  1  7317   32  1  7320   32  1  7382    0 -9  7386
6  2959  1  2 032 032
3  2960 RD VW 4   5  2   47          1  2          1 1          1
5  2965        0  1  7440  100  2  7406  150  2  7393  220  2  7387  350  2  7400
3  3000      W 5  14  3  732    8150 99 99
5  3010        0  1  7460   30  1  7440   76  1  7440   82  1  7420   86  1  7400
5  3011       87  2  7398   88  2  7310   99  2  7310  110  2  7310  119  3  7350
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 THREAD CR MONROE ST TO BARTON ST          KNUTILLA  7  5  2  5 12
2      2  73712  73839  73908  73955  73908
3   2900 W      1  14  3  735     8150. 1  3
4          1250   1900   2200   2700   2200
       M
**SEQUENCE**
5   2910        0  1  7460    30  1  7440    76  1  7440    82  1  7420    86  1  7400
5   2911       87  2  7398    88  2  7320    99  2  7318   110  2  7323   119  3  7378
5   2912      120  3  7380   150  3  7393   340  3  7400   400  3  7460
6   2920  1  2 050 050  1  2 032 032  1  2 040 040
3   3000 W+.05 0  11  3  735     8240  1  3
5   3010        0  1  7466    15  2  7400    20  2  7320    45  2  7320    60  2  7360   AA
5   3011       65  3  7380   140  3  7400   280  3  7400   330  3  7420   350  3  7460
5   3012      360  3  7466
6   3020  1  2 050 050  1  2 032 032  1  2 040 040
3   3060 W+1    0   9  2  734     8460 99 99
5   3065        0  1  7440    15  1  7360    30  1  7325    60  1  7325    65  2  7360   AB
5   3066      150  2  7380   200  2  7400   350  2  7400   450  2  7440
6   3070  1  2 035 035  1  2 045 045
3   3100      X 0  18  3  734     8890 99 99
5   3110      -22  1  7500   -16  1  7480    -6  1  7460    -2  1  7440     0  1  7400   AC
5   3111        1  2  7354     6  2  7353    11  2  7346    16  2  7337    21  2  7333
5   3112       26  2  7329    31  2  7337    35  2  7341    36  3  7360    38  3  7380
5   3113       52  3  7400   150  3  7400   240  3  7500
6   3159  1  2 050 050  1  2 035 035  1  2 045 045
3   3200 BR   X 2  11  1  734     8890         0  7443 3 1
5   3210        0  1  7443     0  1  7353     5  1  7355    10  1  7348    15  1  7340
5   3211       20  1  7338    25  1  7335    30  1  7335    34  1  7337    34  1  7443
5   3212        0 -9  7443
6   3259  1  2 032 032
3   3300      Y 5  15  3  734     8980 99 99
5   3310      -80  1  7500   -48  1  7480   -28  1  7460   -14  1  7440    -2  1  7420
5   3311        0  1  7403     3  2  7398    10  2  7350    20  2  7337    31  2  7351   AD
5   3312       37  3  7398    38  3  7400    50  3  7472    52  3  7480   135  3  7500
6   3359  1  2 045 045  1  2 035 035  1  2 045 045
```

*** INPUT CARD PRINTOUT ***

```
 1         2         3         4         5         6         7         8
.0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

THREAD CR BARTON ST TO SAGINAW ST        KNUTILLA  5  5  2  5 12
 73938  74081  74138  74225  74137
    Y 1  15  3  734    8980 99 99
  1250   1900   2200   2700   2200
    -80  1  7500  -48  1  7480  -28  1  7460  -14  1  7440   -2  1  7420
      0  1  7403    3  2  7398   10  2  7350   20  2  7337   31  2  7351
     37  3  7398   38  3  7400   50  3  7472   52  3  7480  135  3  7500
 1  2 045 045  1  2 035 035  1  2 045 045
Y+1   0   8  3  736    9040  1  3
      0  1  7480   15  2  7400   30  2  7345   60  2  7345   65  2  7400   AD
     95  3  7420  130  3  7430  130  3  7480
 1  2 045 045  1  2 035 035  1  2 045 045
    Z 0  23  3  736    9240 99 99
      0  1  7490   20  1  7480   38  1  7460   40  1  7440   46  2  7420
     52  2  7400   58  2  7380   60  2  7360   62  2  7356   67  2  7353   AE
     72  2  7353   82  2  7358   87  2  7361   92  2  7362   98  2  7369
    100  2  7380  110  2  7400  112  3  7400  120  3  7420  126  3  7440
    135  3  7460  142  3  7480  180  3  7490
 1  2 040 040  1  2 035 035  1  2 045 045
 1  2 2  11  1  736    9240       15  7451 1 1
      0  1  7451    0  1  7356    5  1  7353   10  1  7353   15  1  7353
     20  1  7358   25  1  7361   30  1  7362   36  1  7369   36  1  7451
      0 -9  7451
 1  2 032 032
   1A 5   8  3  735    9380 99 99
      0  1  7503    0  1  7421   14  1  7357   15  2  7350   51  3  7349   AF
     52  3  7369   66  3  7489   67  3  7510
 1  2 032 032  1  2 035 035  1  2 030 030
```

```
1      1 THREAT CR SAGINAW ST DAM TO THREAD LAKE  KNUTILLA  6  5  2  5 12
2      2  74320  74440  74510  74630  74510
3   3600 1AA 1   8  3  735    9410 99 99
4   3605   1250   1900   2200   2700   2200
5   3610       0  1  7503     0  1  7421    14  1  7357    15  2  7350    51  3  7349   AG
5   3611      52  3  7369    66  3  7489    67  3  7510
6   3659  1  2 032 032  1  2 035 035  1  2 030 030
3   3660 1AA+1 0   6  1  740    9470 99 99
5   3665       0  1  7480    18  1  7375    50  1  7365    51  1  7375    60  1  7435
5   3666      70  1  7480
6   3670  1  2 035 035
3   3800  1AAA 0  12  3  739    9530 99 99
5   3810     -20  1  7480    -4  1  7415     0  2  7397     5  2  7394    10  2  7393   AH
5   3811      15  2  7393    20  2  7389    25  2  7389    30  2  7385    36  2  7388
5   3812      38  3  7402    58  3  7480
6   3859  1  2 038 038  1  2 033 033  1  2 038 038
3   3900 BRAAA 2  11  1  739    9530        30  7468 3 1
5   3910       0  1  7472     0  1  7383     5  1  7382    10  1  7387    15  1  7392
5   3911      20  1  7392    25  1  7390    30  1  7391    36  1  7391    36  1  7464
5   3912       0 -9  7472
6   3959  1  2 035 035
3   4000  AAAA 5  11  3  738    9690 99 99
5   4010     -20  1  7480     0  1  7463    11  1  7404    12  2  7396    16  2  7374
5   4011      30  2  7373    45  2  7376    48  3  7402    49  3  7404    65  3  7473   AI
5   4012      72  3  7490
6   4059  1  2 037 037  1  2 035 035  1  2 038 038
3   4100    1B 0  11  3  740    9970 99 99
5   4110       0  1  7500    10  1  7480    18  1  7460    80  1  7440    98  2  7420   AJ
5   4111     111  2  7400   114  2  7390   180  2  7390   192  2  7400   201  3  7440
5   4112     218  3  7500
6   4159  1  2 045 045  1  2 036 036  1  2 040 040
```

```
1      1 THREAD CREEK  MOUTH THREAD L TO DORT HWY HOLTSLAG 10  5 02 99 12
2      2  4920  75050  75170  75100  75100
3   4300   1CC 1  17  3  747   12100 99 99
4   4305   1200  1800   2600   2100   2100
5   4310        0  1  7560   92  1  7540  124  1  7520  156  1  7500  328  1  7500
5   4311      417  1  7505  453  1  7600  574  1  7500  608  1  7507  632  2  7480
5   4312      635  2  7465  950  2  7465  956  2  7480 1000  3  7500 1028  3  7520
5   4313     1030  3  7540 1130  3  7560
6   4359  1  2 060 060  1  2 028 028  1  2 055 055
3   4350 1CCR  0  20  5  748   12500  1  5
**SEQUENCE**
5   4360        0  1  7660    0  1  7560   20  1  7560   25  1  7540   30  1  7520
5   4361       40  2  7500   50  2  7465  170  2  7465  190  3  7490  210  3  7500
5   4362      230  3  7513  250  3  7500  280  4  7490  300  4  7465  620  4  7465
5   4363      650  5  7490  660  5  7500  850  5  7500 1000  5  7520 1030  5  7540
6   4369  1  2 055 055  1  2 028 028  1  2 065 065  1  2 028 028  1  2 060 060
3   4400  1CCC 0   9  3  747   13140 99 99
5   4410        0  1  7600   22  1  7500   24  2  7480   28  2  7465  332  2  7465
5   4411      334  2  7480  342  3  7500  372  3  7524  440  3  7540
5   4412
6   4459  1  2 050 050  1  2 028 028  1  2 060 060
3   4500 1CCCC 0  14  5  747   14060  1  5
5   4510        0  1  7600   22  1  7500   32  2  7480   38  2  7465  118  2  7465
5   4511      120  3  7500  390  3  7482  600  4  7480  605  4  7465  680  4  7465
5   4512      680  4  7480  695  5  7500  810  5  7520  900  5  7540
6   4559  1  2 070 070  1  2 030 030  1  2 070 070  1  2 030 030  1  2 060 060
3   4550 1CCDC 0  11  3  747   14290  1  3
**SEQUENCE**
5   4560        0  1  7560   22  1  7540   55  1  7520   85  1  7490  370  1  7490
5   4561      770  2  7490  810  2  7465  840  2  7465  860  3  7500  865  3  7520
5   4562     1050  3  7540
6   4569  1  2 050 050  1  2 030 030  1  2 065 065
3   4600 1CCCD 0  15  3  747   15160 99 99
5   4610        0  1  7560   58  1  7540  427  1  7520  473  1  7500  504  1  7480
5   4611      506  1  7465  542  1  7465  546  1  7480  663  2  7465  694  2  7465
5   4612      698  3  7480  906  3  7500  914  3  7520  925  3  7540  970  3  7560
6   4659  1  2 070 070  1  2 035 035  1  2 070 070
3   4700     1D 0  12  3  747   15990 99 99
5   4710        0  1  7580   82  1  7560  166  1  7540  332  1  7520  682  1  7490
5   4711      725  2  7480  727  2  7465  762  2  7465  764  2  7480  772  3  7500
5   4712      782  3  7560  820  3  7580
6   4759  1  2 080 080  1  2 038 038  1  2 070 070
3   4750 1DD   0  14  3  748   16560  1  3
**SEQUENCE**
5   4760        0  1  7580   30  1  7560  125  1  7540  225  1  7520  250  2  7500
```

AK

AL

AM

AN

AO

AP

AQ

AR

```
4762      320  3  7500  625  3  7500  660  3  7520  720  3  7600
4769    1  2 080 080  1  2 038 038  1  2 070 070
4800        0  15  3  747   17040 99 99
4810        0  1  7580   45  1  7560   58  1  7540   67  1  7520   74  1  7500
4811       88  2  7480   90  2  7462  110  2  7462  112  2  7480  122  3  7500  AS
4812      152  3  7520  169  3  7620  202  3  7540  258  3  7560  321  3  7580
4859    1  2 070 070  1  2 038 038  1  2 070 070
4900     1F 0  17  3  746   17630 99 99
4910        0  1  7600   38  1  7580   66  1  7560   92  1  7540  108  1  7520
4911      121  2  7500  129  2  7476  131  2  7460  142  2  7447  154  2  7460  AT
4912      156  2  7480  163  3  7500  178  3  7520  392  3  7540  398  3  7560
4913      408  3  7580  412  3  7600
4959    1  2 040 040  1  2 040 040  1  2 060 060
5000     1FF 0  17  3  747   18150 99 99
5010        0  1  7600    7  1  7580   34  1  7560   42  1  7540   54  1  7520
5011       76  2  7500   88  2  7480   90  2  7470  100  2  7466  112  2  7470  AU
5012      113  2  7480  126  3  7500  128  3  7520  130  3  7540  139  3  7560
5013      146  3  7580  167  3  7600
5059    1  2 055 055  1  2 038 038  1  2 060 060
5100     1G 0  17  3  747   18350 99 99
5110        0  1  7604   22  1  7600   27  1  7580   47  1  7560   52  1  7500
5111       62  2  7478   67  2  7474   72  2  7467   77  2  7463   82  2  7462  AV
5112       87  2  7472   92  2  7475   97  2  7476  100  3  7500  107  3  7540
5113      137  3  7600  152  3  7605
5159    1  2 055 055  1  2 038 038  1  2 060 060
5200  DORTH 2  11  1  747   18350        30  7567 3 0
5210        0  1  7567    0  1  7488    5  1  7479   10  1  7472   15  1  7468
5211       20  1  7469   25  1  7470   30  1  7471   35  1  7481   35  1  7567
5212        0 -9  7567
5259    1  2 036 036
5300  DORTR 4   6  3   80          1  3          1 1 1          1
5310        0  1  7619   60  1  7604   61  2  7620  106  2  7620  107  3  7604
5311     1200  3  7620
5400     1H 5  14  3  747   18460  1  3
5410      -10  1  7620    0  1  7604   30  1  7582   40  1  7567   50  1  7543  AW
5411       54  2  7523   60  2  7479   74  2  7463   88  2  7483   89  3  7568
5412      130  3  7580  149  3  7580  250  3  7600  270  3  7620
5459    1  2 038 038  1  2 033 033  1  2 030 030
5500     1HH 0  13  4  747   18790 99 99
5510        0  1  7680    2  1  7500   10  2  7480   12  2  7479   22  2  7469
5511       38  2  7479   40  2  7522   42  3  7525   64  3  7560   90  3  7560  AX
5512      100  4  7580  110  4  7600  120  4  7620
5559    1  2 040 040  1  2 033 033  1  2 030 030  1  2 060 060
5600     1J 0  16  4  750   19230 99 99
```

```
....0....5....0....5....0....5....0....5....0....5....0....5....0
5  5610      0  1  7620    2  1  7560   26  1  7550   40  1  7550   42  2  7540
5  5611     42  2  7485   57  2  7484   72  2  7485   72  2  7530   78  3  7550   AY
5  5612     85  3  7540   90  3  7540  100  3  7560  110  4  7580  120  4  7600
5  5613    125  4  7620
6  5659  1  2 030 030  1  2 028 028  1  2 035 035  1  2 060 060
3  5700 BR 1J 2  11  1  748   19230        0  7538 1 1
5  5710      0  1  7541    0  1  7495    5  1  7484   10  1  7478   15  1  7480
5  5711     20  1  7479   25  1  7480   30  1  7482   35  1  7482   35  1  7535
5  5712      0 -9  7541
5  5759  1  2 035 035
3  5800 RO 1J 4  14  3   30          1  3          1 1 1                1
5  5810      0  1  7620    2  1  7560   26  1  7550   40  1  7550   42  1  7550
5  5811     44  2  7557   79  2  7557   80  3  7550   85  3  7540   90  3  7540
5  5812    100  3  7560  110  3  7580  120  3  7600  125  3  7620
3  5900    1K 5  17  3  749   19290  1  3
5  5910      0  1  7620    2  1  7560   26  1  7550   40  1  7550   42  2  7534
5  5911     42  2  7485   57  2  7484   72  2  7484   72  2  7522   74  3  7530   AZ
5  5912     78  3  7550   85  3  7540   90  3  7540  100  3  7560  110  3  7580
5  5913    120  3  7600  125  3  7620
5  5912  1  2 030 030  1  2 035 035  1  2 030 030
**SEQUENCE**
   6000    1L 0  14  4  750   19780 99 99
   6010      0  1  7620   50  1  7600   64  1  7580   72  1  7560   80  2  7550
   6011     80  2  7493   85  2  7494  100  2  7498  101  2  7540  108  3  7550   BA
   6012    130  3  7550  138  3  7560  142  4  7580  150  4  7620
   6059  1  2 040 040  1  2 035 035  1  2 030 030  1  2 060 060
   6100 BR 1L 2  11  1  750   19780        0  7644 3 0
   6110      0  1  7644    0  1  7497    5  1  7498   10  1  7500   15  1  7496
   6111     20  1  7495   25  1  7497   30  1  7498   35  1  7502   35  1  7644
   6112      0 -9  7644
   6129  1  2 032 032
   6200    1M 5  16  5  750   19850  2  4
   6210    -28  1  7700  -18  1  7680   -8  1  7660   -4  1  7640   -2  1  7620
   6211      0  1  7571   15  2  7557   16  2  7508   20  3  7505   41  3  7497   BB
   6212     56  4  7502   58  4  7670   70  5  7575   75  5  7580   85  5  7600
   6213     97  5  7620
   6229  1  2 055 055  1  2 034 034  1  2 034 034  1  2 034 034  1  2 045 045
   6300    1N 0  18  3  750   20050 99 99
   6310      0  1  7620  158  1  7600  180  1  7580  210  1  7560  220  1  7540
   6311    222  2  7520  224  2  7500  226  2  7498  265  2  7497  292  2  7498   BC
   6312    298  2  7500  300  2  7520  310  3  7540  314  3  7560  345  3  7580
   6313    710  3  7580  775  3  7600  810  3  7620
   6329  1  2 050 050  1  2 035 035  1  2 045 045
```

```
1 THREAD CREEK  CHAMBERS RD TO ATHERTON RD HOLTSLAG 20  3 02 99 12
2  75[illegible]4  75910  76029  75956  75959
6600  [illegible] 1  15  3  750  20110  1  3
6604  1200  1800  2600  2100  2100
6610  0  1  7610  24  1  7600  105  1  7580  117  1  7560  120  1  7545
6611  130  2  7503  150  2  7490  160  2  7503  171  3  7522  192  3  7530   BD
6612  203  3  7540  262  3  7560  635  3  7560  642  3  7580  650  3  7600
6629  1  2 045 045  1  2 035 035  1  2 043 043
6700  1P 0  15  3  751  20610 99 99
6710  0  1  7680  0  1  7590  14  1  7580  42  1  7560  45  1  7540
6711  52  2  7520  63  2  7500  80  2  7498  94  2  7500  100  3  7540   BE
6712  345  3  7560  353  3  7580  360  3  7600  368  3  7620  412  3  7640
6729  1  2 045 045  1  2 035 035  1  2 040 040
6800  1Q 0  14  3  751  21000 99 99
6810  0  1  7680  0  1  7540  8  1  7520  15  2  7510  22  2  7500
6811  40  2  7498  60  2  7500  62  2  7520  72  3  7540  166  3  7560   BF
6812  181  3  7580  187  3  7600  194  3  7620  240  3  7640
6829  1  2 045 045  1  2 035 035  1  2 050 050
6900  1R 0  15  3  751  21240 99 99
6910  0  1  7700  0  1  7600  26  1  7580  33  1  7560  46  1  7540
6911  54  2  7520  63  2  7510  72  2  7503  82  2  7510  83  2  7520   BG
6912  93  3  7580  96  3  7600  102  3  7620  110  3  7640  118  3  7660
6929  1  2 045 045  1  2 040 040  1  2 050 050
7000  1RR 0  15  3  751  21510 99 99
7010  0  1  7700  0  1  7560  8  1  7540  14  2  7520  22  2  7510
7011  41  2  7504  54  2  7510  58  2  7520  65  2  7540  70  3  7540   BH
7012  175  3  7560  184  3  7580  212  3  7600  304  3  7620  358  3  7640
7029  1  2 045 045  1  2 040 040  1  2 050 050
7100  1S 0  15  3  751  21900 99 99
7110  0  1  7700  0  1  7580  3  1  7560  9  2  7540  18  2  7520
7111  20  2  7518  32  2  7506  44  2  7509  46  2  7520  54  3  7580   BI
7112  56  3  7589  58  3  7600  171  3  7610  190  3  7620  510  3  7640
7129  1  2 050 050  1  2 040 040  1  2 055 055
7200  1SS 0  13  3  752  22350 99 99
7210  0  1  7700  0  1  7620  24  1  7600  30  1  7580  34  2  7560
7211  38  2  7540  45  2  7520  62  2  7515  72  2  7520  81  3  7580   BJ
7212  94  3  7600  240  3  7620  610  3  7640
7229  1  2 050 050  1  2 040 040  1  2 050 050
7300  1T 0  14  3  753  22780 99 99
7310  0  1  7700  0  1  7620  22  1  7600  26  2  7580  28  2  7540
7311  32  2  7525  52  2  7523  68  2  7525  74  2  7540  84  3  7560   BK
7312  102  3  7580  310  3  7600  510  3  7620  710  3  7640
7329  1  2 050 050  1  2 040 040  1  2 050 050
7400  1TT 0  20  3  754  23170 99 99
7410  0  1  7700  70  1  7680  104  1  7660  184  1  7640  248  1  7620   BL
```

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5  7411    277  1  7600  294  1  7580  306  2  75[illegible]  314  2  7540  329  2  7535
5  7412    342  2  7532  354  2  7535  364  2  7540  380  3  7540  452  3  7560
5  7413    537  3  7560  550  3  7580  580  3  7600  950  3  7620 1150  3  7640
6  7429  1  2 055 055  1  2 045 045  1  2 060 060
3  7500    10 0  15  3  754   23480 99 99
5  7510      0  1  7672   45  1  7640  330  1  7620  430  1  7600  455  1  7580
5  7511    505  2  7560  515  2  7550  523  2  7543  543  2  7543  553  2  7543   BM
5  7512    555  2  7560  563  3  7580 1110  3  7600 1150  3  7620 1495  3  7640
6  7529  1  2 055 055  1  2 045 045  1  2 060 060
3  7600 BR 10 2  12  1  755   23480        0  7623 3 1
5  7610      0  1  7649    0  1  7555    5  1  7551   10  1  7546   15  1  7547
5  7611     20  1  7545   25  1  7543   30  1  7538   35  1  7534   42  1  7546
5  7612     42  1  7623    0 -9  7649
6  7659  1  2 035 035
3  7700 RD 10 4  12  3   34          1  3          2 2 2                1
5  7710      0  1  7672   42  1  7640  164  1  7620  408  1  7633  520  2  7649
5  7711    520  2  7658  570  2  7658  571  3  7649  800  3  7629  972  3  7602
5  7712   1130  3  7620 1700  3  7640
3  7800   1V 5  16  3  754   23560  1  3
5  7810      0  1  7672  180  1  7640  378  1  7620  498  1  7600  514  2  7586
5  7811    516  2  7575  518  2  7548  532  2  7533  546  2  7546  550  2  7580   BN
5  7812    556  3  7593  590  3  7600  950  3  7620 1140  3  7620 1340  3  7620
5  7813   1540  3  7640
6  7829  1  2 050 050  1  2 038 038  1  2 060 060
3  7900   1W 0  18  3  756   24490  1  3
5  7910      0  1  7672   50  1  7640  230  1  7640  500  1  7620  580  1  7612
5  7911    734  2  7600  754  2  7580  768  2  7560  778  2  7551  786  2  7560   BØ
5  7912    792  2  7580  806  3  7600 1080  3  7610 1178  3  7620 1206  3  7640
5  7913   1222  3  7660 1236  3  7680 1268  3  7700
6  7929  1  2 060 060  1  2 040 040  1  2 065 065
3  8000   1X 1  17  3  756   25110 99 99
4  8004  1000   1150   1300   1200   1200
5  8010      0  1  7672   90  1  7660  620  1  7660  700  1  7640  750  1  7620
5  8011    900  1  7610 1030  2  7600 1042  2  7580 1044  2  7557 1068  2  7557   BP
5  8012   1070  2  7580 1075  3  7600 1245  3  7620 1272  3  7640 1302  3  7660
5  8013   1342  3  7680 1390  3  7700
6  8029  1  2 080 080  1  2 040 040  1  2 070 070
3  8050  1XX 0  13  3  757   25380  1  3
5  8060      0  1  7660   80  1  7640  120  1  7620  430  2  7600  442  2  7580
5  8061    444  2  7557  468  2  7557  470  2  7580  475  3  7600  480  3  7620   BQ
5  8062    490  3  7640  510  3  7660  535  3  7680
6  8069  1  2 080 080  1  2 040 040  1  2 070 070
3  8100   1Y 0  22  3  757   25710 99 99
5  8110      0  1  7670   50  1  7660   60  1  7640  440  1  7640  450  1  7660
5  8111    580  1  7640  723  1  7660  812  1  7662  960  1  7660 1008  1  7640   BR
```

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8112     1025  1  7620 1220  2  7620 1232  2  7600 1236  2  7580 1246  2  7562
8113     12[illegible]  2  7562 1254  2  7580 1256  2  7600 12[illegible]  2  7620 1268  3  7640
8114     1276  3  7700 1282  3  7720
8129  1  2 080 080  1  2 040 040  1  2 070 070
8150 1YY    0  12  3  758   26070  1  3
8160        0  1  7800     0  1  7700   10  2  7640   15  2  7620   30  2  7602
8161       32  2  7562   38  2  7562   40  2  7600   50  3  7610  120  3  7620
8162      170  3  7640  420  3  7660
8169  1  2 090 090  1  2 040 040  1  2 065 065
8200     1Z 0.' 17  3  757   26430 99 99
8210        0  1  7680   30  1  7680   83  1  7680  170  1  7680  272  1  7662
8211      388  2  7660  398  2  7640  412  2  7620  418  2  7600  420  2  7569
8212      452  2  7569  454  2  7600  464  2  7620  470  2  7640  483  3  7660
8213      742  3  7680  780  3  7700
8229  1  2 080 080  1  2 040 040  1  2 060 060
8300     2A 1  15  3  755   26640 99 99
8304    1200   1800   2600   2100   2100
8310      250  1  7660  510  1  7640  760  1  7640  772  2  7620  776  2  7600
8311      778  2  7580  780  2  7576  792  2  7571  806  2  7579  808  2  7600
8312      822  2  7620  838  3  7640  884  3  7660 1233  3  7680 1270  3  7700
8329  1  2 075 075  1  2 040 040  1  2 055 055
8400 BR 2A 2  12  1  758   26640          0  7634 3 1
8410        0  1  7634    0  1  7580    5  1  7576   10  1  7576   15  1  7573
8411       20  1  7571   25  1  7572   30  1  7576   35  1  7576   41  1  7579
8412       41  1  7634    0 -9  7634
8429  1  2 035 035
8500 RD 2A 4  33  2   66            1  2            1 1                    1
8511     -993  1  7680 -992  1  7680 -991  1  7680 -990  1  7680 -640  1  7660
8512     -390  1  7643 -358  1  7645 -328  1  7647 -298  1  7649 -270  1  7651
8513     -244  1  7654 -224  1  7656 -174  1  7658 -120  2  7662 -100  2  7663
8514      -36  2  7664  -36  2  7670   30  2  7670   30  2  7665   68  2  7664
8515       98  2  7662  128  2  7661  156  2  7659  184  2  7659  216  2  7658
8516      252  2  7657  276  2  7656  316  2  7656  364  2  7657  384  2  7659
8517      424  2  7661  500  2  7680  630  2  7700
8600     2B 5  25  3  757   26790  1  3
8611        0  1  7690   40  1  7680  470  1  7660  580  1  7642  850  1  7642
8612      855  1  7700  970  1  7700  975  1  7661 1000  1  7660 1020  1  7655
8613     1034  1  7650 1039  2  7595 1040  2  7580 1050  2  7572 1058  2  7566
8614     1065  2  7572 1078  2  7583 1080  3  7598 1085  3  7634 1092  3  7644
8615     1130  3  7660 1360  3  7660 1438  3  7660 1605  3  7680 1642  3  7700
8629  1  2 040 040  1  2 040 040  1  2 050 050
```

BS

BT

BU

BV

```
1     1 THREAD CREEK  ATHERTON - BRISTOL ROAD    HOLTSLAG 25 05 02 99 12
2       76501  76545  76582  76561  76562
3  8600   2B 1  25  3  757   26790  1  3
4  8604  1200  1800  2600   2100   2100
5  8611     0  1  7690   40  1  7680  470  1  7660  580  1  7642  850  1  7642
5  8612   855  1  7700  970  1  7700  975  1  7661 1000  1  7660 1020  1  7655
5  8613  1034  1  7650 1039  2  7595 1040  2  7580 1050  2  7572 1058  2  7566  BV
5  8614  1065  2  7572 1078  2  7583 1080  3  7598 1085  3  7634 1092  3  7644
5  8615  1130  3  7660 1360  3  7660 1438  3  7660 1605  3  7680 1642  3  7700
6  8629  1  2 040 040  1  2 040 040  1  2 050 050
3  8700   2C 0  19  3  758   27310 99 99
5  8710     0  1  7740   40  1  7720  150  1  7700  538  1  7680  749  1  7660
5  8711  1014  1  7640 1020  1  7626 1025  2  7588 1054  2  7574 1079  2  7588  BW
5  8712  1084  2  7638 1106  3  7640 1218  3  7640 1260  3  7620 1370  3  7640
5  8713  1516  3  7660 1587  3  7680 1638  3  7700 1682  3  7720
6  8729  1  2 045 045  1  2 040 040  1  2 050 050
3  8800   2D 0  17  3  759   27920 99 99
5  8810     0  1  7740   98  1  7700  150  1  7680  240  1  7660  402  1  7640
5  8811   492  2  7620  500  2  7600  502  2  7590  518  2  7584  530  2  7590  BX
5  8812   532  2  7600  546  2  7620  558  3  7640  984  3  7660 1026  3  7680
5  8813  1088  3  7700 1126  3  7720
6  8829  1  2 050 050  1  2 040 040  1  2 060 060
3  8900   2E 1  18  3  760   28670 99 99
4  8904  1150  1700  2500   1950   1950
5  8910     0  1  7740   40  1  7700  128  1  7680  172  1  7660  218  1  7640
5  8911   276  1  7640  382  1  7640  390  2  7628  394  2  7598  410  2  7598  BY
5  8912   426  2  7598  428  2  7612  432  3  7649  570  3  7650  692  3  7660
5  8913   743  3  7680  784  3  7700  908  3  7720
6  8929  1  2 065 065  1  2 035 035  1  2 060 060
3  9000   2F 0  17  3  761   29150 99 99
5  9010     0  1  7740   30  1  7720   84  1  7700  107  1  7680  171  1  7660
5  9011   320  1  7655  596  2  7640  612  2  7620  614  2  7602  640  2  7602  BZ
5  9012   642  2  7620  647  3  7640  662  3  7660  806  3  7680  921  3  7700
5  9013   980  3  7720 1024  3  7740
6  9029  1  2 070 070  1  2 035 035  1  2 050 050
3  9100   2G 0  21  3  761   29860 99 99
5  9110     0  1  7800   36  1  7780   84  1  7760  240  1  7740  508  1  7720
5  9111   516  1  7700  518  1  7680  522  1  7660  528  2  7640  539  2  7620  CA
5  9112   541  2  7605  562  2  7605  564  2  7620  594  2  7640  596  3  7640
5  9113   853  3  7660  952  3  7660  978  3  7680 1107  3  7700 1171  3  7720
5  9114  1312  3  7740
6  9129  1  2 060 060  1  2 040 040  1  2 100 100
3  9200   2H 0  20  3  762   30520 99 99
5  9210     0  1  7800   48  1  7780  190  1  7760  534  1  7740  589  1  7720
5  9211   602  1  7700  611  1  7680  618  1  7660  652  1  7660  863  2  7660  CB
```

```
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  9210     875  2  7640  878  2  7612  894  2  7612  898  2  7640  902  3  7640
5  9213     932  3  7660  983  3  7680 1106  3  7700 1145  3  7720 1177  3  7740
6  9229  1  2 055 055  1  2 040 040  1  2 090 090
3  9300    2I 0  21  3  762   31230 99 99
5  9310       0  1  7800   90  1  7780  212  1  7760  486  1  7740  514  1  7720
5  9311     526  1  7700  546  1  7680  554  2  7660  567  2  7640  569  2  7617   CC
5  9312     581  2  7617  583  2  7640  603  3  7660  868  3  7680  877  3  7700
5  9313     900  3  7700 1088  3  7700 1146  3  7720 1174  3  7740 1203  3  7760
5  9314    1224  3  7780
6  9329  1  2 065 065  1  2 040 040  1  2 080 080
3  9400    2J 0  20  3  763   31820 99 99
5  9410       0  1  7800  137  1  7780  329  1  7760  434  1  7740  533  1  7720
5  9411     622  1  7700  632  1  7680 1050  1  7680 1076  2  7660 1078  2  7640   CD
5  9412    1080  2  7622 1108  2  7622 1110  2  7640 1114  2  7660 1122  3  7680
5  9413    1130  3  7700 1272  3  7720 1323  3  7740 1352  3  7760 1376  3  7780
6  9429  1  2 080 080  1  2 037 037  1  2 090 090
3  9500    2K 0  19  3  763   32630 99 99
5  9510       0  1  7800  137  1  7780  343  1  7760  563  1  7740  747  1  7720
5  9511     916  2  7700  929  2  7680  941  2  7660  943  2  7628  949  2  7628   CE
5  9512     950  2  7660  958  3  7660 1272  3  7680 1288  3  7700 1313  3  7720
5  9513    1424  3  7740 1518  3  7760 1547  3  7780 1554  3  7800
6  9529  1  2 080 080  1  2 037 037  1  2 060 060
3  9600    2L 0  20  3  765   33230 99 99
5  9610       0  1  7800   83  1  7780  322  1  7760  442  1  7740  563  1  7720
5  9611     733  1  7700  780  2  7700  789  2  7680  795  2  7654  807  2  7646
5  9612     818  2  7652  828  2  7660  838  3  7680  994  3  7680 1030  3  7680   CF
5  9613    1058  3  7700 1066  3  7720 1078  3  7740 1162  3  7760 1180  3  7780
6  9629  1  2 060 060  1  2 036 036  1  2 045 045
3  9700   2LL 0  17  3  764   33630 99 99
5  9710       0  1  7800  124  1  7780  263  1  7760  406  1  7740  487  1  7720
5  9711     613  1  7700  627  2  7680  643  2  7660  645  2  7636  650  2  7636   CG
5  9712     652  2  7660  666  3  7680  717  3  7700  724  3  7720  732  3  7740
5  9713     772  3  7760  790  3  7780
6  9729  1  2 060 060  1  2 036 036  1  2 050 050
3  9800    2M 0  21  3  764   34000 99 99
5  9810       0  1  7800   98  1  7780  190  1  7760  278  1  7740  292  1  7720
5  9811     300  1  7700  304  2  7683  309  2  7664  314  2  7640  319  2  7638
5  9812     324  2  7640  329  2  7643  334  2  7648  339  2  7664  343  2  7666   CH
5  9813     345  3  7700  348  3  7720  353  3  7740  450  3  7760  636  3  7780
5  9814     750  3  7800
6  9829  1  2 055 055  1  2 035 035  1  2 050 050
3  9900 BR 2M 2  12  1  765   34000        0  7721 3 1
5  9910       0  1  7721    0  1  7664    5  1  7659   10  1  7659   15  1  7647
5  9911      20  1  7642   25  1  7639   30  1  7641   35  1  7646   40  1  7659
5  9912      40  1  7721    0 -9  7721
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

6  9929  1  2 032 032
3 10000 RD 2M 4  11  3  75          1  3          1 1 1                1
5 10010      0  1  7800  104  1  7780  126  1  7766  302  2  7753  302  2  7761
5 10011    344  2  7761  344  3  7753  434  3  7760  538  3  7758  622  3  7780
5 10012    748  3  7800
3 10100   2N 5  24  3  764   34070  1  3
5 10110     16  1  7800   77  1  7780  107  1  7760  162  1  7740  210  1  7720
5 10111    300  1  7703  310  1  7699  313  2  7690  320  2  7672  323  2  7656
5 10112    330  2  7640  335  2  7637  341  2  7658  345  2  7671  350  2  7682
5 10113    354  3  7690  355  3  7693  360  3  7705  365  3  7705  380  3  7720
5 10114    396  3  7740  600  3  7760  670  3  7780  775  3  7800
6 10129  1  2 060 060  1  2 037 037  1  2 065 065
```

CI

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 THREAD CREEK  BRISTOL ROAD - MAPLE ROAD  HOLTSLAG 27  5 02 99 12
2      2  77145  77256  77447  77312  77313
3 10100    2N 1  24  3  764   34070  1  3
4 10105   1150   1700   2500   1950   1950
5 10110      16  1  7800   77  1  7780  107  1  7760  162  1  7740  210  1  7720
5 10111     300  1  7703  310  1  7699  313  2  7690  320  2  7672  323  2  7656   CI
5 10112     330  2  7640  335  2  7637  341  2  7658  345  2  7671  350  2  7682
5 10113     354  3  7690  355  3  7693  360  3  7705  365  3  7705  380  3  7720
5 10114     396  3  7740  600  3  7760  670  3  7780  775  3  7800
6 10129  1  2 060 060  1  2 037 037  1  2 065 065
3 10200    20 0  15  3  765   34440 99 99
5 10210       0  1  7800   82  1  7780  146  1  7760  156  1  7740  162  1  7720   CJ
5 10211     360  1  7710  472  2  7700  480  2  7680  483  2  7649  493  2  7649
5 10212     496  2  7680  508  3  7700  516  3  7760  526  3  7780  627  3  7800
6 10229  1  2 070 070  1  2 035 035  1  2 055 055
3 10300    2P 0  18  3  766   35280 99 99
5 10310       0  1  7820   52  1  7800   97  1  7780  152  1  7760  176  1  7740   CK
5 10311     202  1  7720  252  1  7720  380  2  7720  392  2  7700  395  2  7658
5 10312     419  2  7658  422  3  7700  442  3  7720  443  3  7740  450  3  7760
5 10313     471  3  7780  495  3  7800  622  3  7820
6 10329  1  2 070 070  1  2 033 033  1  2 055 055
3 10400    2Q 0  18  3  767   35830 99 99
5 10410       0  1  7820   37  1  7800   72  1  7780   88  1  7760  100  1  7740
5 10411     110  1  7720  160  1  7720  212  2  7720  222  2  7700  225  2  7668   CL
5 10412     240  2  7668  243  2  7700  252  3  7720  393  3  7740  406  3  7760
5 10413     422  3  7780  476  3  7800  634  3  7820
6 10429  1  2 065 065  1  2 038 038  1  2 070 070
3 10500    2R 0  19  3  768   36380 99 99
5 10510       0  1  7860   10  1  7840   70  1  7820   88  1  7800  100  1  7780
5 10511     122  1  7760  178  1  7740  470  2  7720  474  2  7700  477  2  7675   CM
5 10512     491  2  7675  493  2  7700  501  3  7720  508  3  7740  514  3  7760
5 10513     528  3  7780  592  3  7800  650  3  7820  832  3  7840
6 10529  1  2 070 070  1  2 045 045  1  2 070 070
3 10600    2S 0  18  3  769   36930 99 99
5 10610       0  1  7860   60  1  7840  224  1  7820  284  1  7800  293  1  7780
5 10611     303  1  7760  321  1  7740  363  2  7720  370  2  7683  374  2  7683   CN
5 10612     378  2  7720  387  3  7740  662  3  7760  682  3  7780  703  3  7800
5 10613     712  3  7820  722  3  7840  755  3  7860
6 10629  1  2 060 060  1  2 040 040  1  2 070 070
3 10700   2SS 0  17  3  770   37390 99 99
5 10710       0  1  7840  175  1  7820  214  1  7820  257  1  7800  280  1  7780
5 10711     313  1  7760  534  2  7738  540  2  7707  550  2  7691  560  2  7708   CO
5 10712     566  2  7721  572  3  7740  612  3  7760  683  3  7780  733  3  7800
5 10713     757  3  7820  780  3  7840
6 10729  1  2 070 070  1  2 040 040  1  2 060 060
```

```
3 10800    2T 0  17  3  770   37880 99 99
5 10810       0  1  7840  130  1  7830  387  1  7820  532  1  7800  573  1  7780
5 10811     593  1  7760  673  2  7740  675  2  7697  692  2  7697  695  3  7740
5 10812     815  3  7754  907  3  7760  962  3  7780  982  3  7800 1003  3  7820
5 10813    1022  3  7840 1060  3  7860
6 10829  1  2 070 070  1  2 040 040  1  2 070 070
3 10900    2U 0  15  3  771   38630 99 99
5 10911       0  1  7840  130  1  7830  310  1  7820  572  1  7800  598  1  7780
5 10912     848  2  7760  850  2  7708  864  2  7708  868  2  7760  888  3  7780
5 10913     894  3  7800  904  3  7820  928  3  7840 1003  3  7860 1133  3  7880
6 10929  1  2 080 080  1  2 045 045  1  2 070 070
3 11000    2V 0  16  3  772   39220 99 99
5 11010       0  1  7840  135  1  7830  312  1  7820  496  1  7800  552  1  7780
5 11011     764  1  7770 1113  2  7771 1116  2  7743 1126  2  7717 1136  2  7743
5 11012    1141  3  7755 1151  3  7780 1157  3  7800 1178  3  7820 1210  3  7840
5 11013    1257  3  7860
6 11029  1  2 090 090  1  2 042 042  1  2 070 070
3 11100    2W 0  13  3  773   39800 99 99
5 11110       0  1  7840  270  1  7820  404  1  7800  453  1  7780  770  1  7770
5 11111     897  2  7760  900  2  7723  919  2  7723  922  2  7760  930  3  7770
5 11112     947  3  7780  958  3  7800  979  3  7900
6 11129  1  2 090 090  1  2 045 045  1  2 050 050
3 11200    2X 1  13  3  774   40660 99 99
4 11204   1150   1700   2500   1950   1950
5 11210       0  1  7840  174  1  7820  372  1  7800  398  1  7780  480  2  7760
5 11211     483  2  7732  503  2  7732  506  3  7760  534  3  7780  633  3  7800
5 11212     653  3  7820  672  3  7840  693  3  7860
6 11229  1  2 090 090  1  2 045 045  1  2 065 065
3 11300    2Y 1  17  3  774   41180 99 99
4 11304   1100   1625   2400   1850   1850
5 11310       0  1  7840   12  1  7820   21  1  7800   48  1  7780   95  1  7780
5 11311     118  1  7800  141  1  7800  158  1  7780  168  2  7760  170  2  7738
5 11312     197  2  7738  200  2  7760  213  3  7780  267  3  7800  313  3  7820
5 11313     370  3  7840  580  3  7860
6 11329  1  2 080 080  1  2 045 045  1  2 070 070
3 11400    2Z 0  14  3  775   41850 99 99
5 11410       0  1  7860   48  1  7860   64  1  7840   77  1  7820  128  1  7800
5 11411     139  2  7780  144  2  7746  165  2  7746  171  3  7800  341  3  7800
5 11412     377  3  7800  407  3  7820  543  3  7840  614  3  7860
6 11429  1  2 080 080  1  2 047 047  1  2 090 090
3 11500   2ZZ 0  15  3  776   42280 99 99
5 11510       0  1  7900    7  1  7800   18  2  7780   22  2  7751   45  2  7751
5 11511      48  2  7780   52  3  7780   78  3  7800  230  3  7815  320  3  7800
5 11512     372  3  7800  392  3  7820  453  3  7840  518  3  7860  750  3  7870
6 11529  1  2 060 060  1  2 045 045  1  2 090 090
```

CP

CQ

CR

CS

CT

CU

CV

CW

```
3 11600    3A 0  20  3  776   42650 99 99
5 11[illegible]      0  1  7900    8  1  7880   12  1  [illegible]860   16  1  7840   18  1  7820
5 11611     28  1  7800   48  2  7780   52  2  7755   67  2  7755   71  2  7780
5 11612     76  3  7780   94  3  7800  168  3  7800  208  3  7800  318  3  7800
5 11613    348  3  7800  372  3  7820  386  3  7840  437  3  7860  535  3  7875
6 11629  1  2 055 055  1  2 042 042  1  2 090 090
3 11700   3AA 0  13  3  776   42860 99 99
5 11710      0  1  7900   16  1  7800   18  2  7780   20  2  7758   40  2  7758
5 11711     43  2  7780   45  3  7780   74  3  7800  310  3  7810  378  3  7820
5 11712    388  3  7840  407  3  7860  506  3  7875
6 11729  1  2 055 055  1  2 045 045  1  2 090 090
3 11800    3B 0  16  3  777   43320 99 99
5 11810      0  1  7900   23  1  7880   33  1  7860   42  1  7840   52  1  7820
5 11811    113  1  7800  178  2  7780  181  2  7762  195  2  7762  198  2  7780
5 11812    206  3  7780  285  3  7800  457  3  7820  484  3  7840  655  3  7847
5 11813    700  3  7860
6 11829  1  2 070 070  1  2 046 046  1  2 090 090
3 11900    3C 0  17  3  777   44030 99 99
5 11910      0  1  7900   36  1  7880   68  1  7860  140  1  7840  266  1  7820
5 11911    374  1  7820  452  1  7820  621  2  7800  623  2  7764  644  2  7764
5 11912    648  2  7780  651  3  7800  662  3  7820  750  3  7840  878  3  7847
5 11913   1063  3  7860 1120  3  7862
6 11929  1  2 100 100  1  2 050 050  1  2 080 080
3 12000    3D 0  19  3  778   44540 99 99
5 12010      0  1  7960   12  1  7940   37  1  7920   67  1  7900  112  1  7880
5 12011    136  1  7860  170  1  7840  470  1  7820  528  2  7800  539  2  7780
5 12012    543  2  7776  559  2  7776  562  2  7780  570  3  7780  634  3  7800
5 12013    718  3  7820  742  3  7840  876  3  7860  916  3  7875
6 12029  1  2 110 110  1  2 050 050  1  2 090 090
3 12100    3E 0  17  3  779   45150 99 99
5 12110      0  1  7934   20  1  7920   45  1  7900   82  1  7880  110  1  7860
5 12111    140  1  7840  322  2  7820  332  2  7800  334  2  7783  342  2  7783
5 12112    345  2  7800  352  3  7800  373  3  7820  412  3  7840  520  3  7860
5 12113    680  3  7880  720  3  7900
6 12129  1  2 100 100  1  2 050 050  1  2 065 065
3 12200   3EE 0  16  3  779   45370 99 99
5 12210      0  1  7936   18  1  7920   72  1  7900  131  1  7880  152  1  7860
5 12211    206  1  7840  442  1  7820  460  2  7800  462  2  7787  476  2  7787
5 12212    478  2  7800  493  3  7820  522  3  7840  560  3  7860  734  3  7880
5 12213    768  3  7900
6 12229  1  2 100 100  1  2 050 050  1  2 055 055
3 12300    3F 0  14  3  780   45740 99 99
5 12310      0  1  7940   12  1  7920   82  1  7900  152  1  7880  170  1  7860
5 12311    251  1  7840  337  2  7820  340  2  7791  353  2  7791  357  2  7800
5 12312    366  3  7820  554  3  7840  583  3  7860  590  3  7879
```

CX

CY

CZ

DA

DB

DC

DD

DE

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
...5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
12329  1  2 100 100  1  2 050 050  1  2 080 080
12400   3FF 0  17  3  780   46100 99 99
12410       0  1  7940   11  1  7920   21  1  7900   43  1  7880   75  1  7860
12411     242  1  7840  294  2  7820  298  2  7794  320  2  7794  324  2  7820   DF
12412     330  3  7820  412  3  7840  478  3  7855  590  3  7840  614  3  7860
12413     630  3  7880  650  3  7880
12429  1  2 110 110  1  2 050 050  1  2 070 070
12500    3G 0  21  3  781   46470 99 99
12510       0  1  7960    4  1  7940   12  1  7920   20  1  7900   98  1  7880
12511     117  1  7860  252  1  7840  300  1  7840  362  1  7840  490  1  7853   DG
12512     598  1  7840  617  2  7820  620  2  7801  640  2  7801  643  2  7820
12513     650  3  7820  686  3  7840  698  3  7860  707  3  7880  714  3  7900
12514     734  3  7920
12529  1  2 090 090  1  2 048 048  1  2 070 070
12600    3H 0  25  3  781   46660 99 99
12610       0  1  7960    2  1  7940   62  1  7920  111  1  7900  156  1  7880
12611     228  1  7860  318  1  7860  360  1  7876  361  1  7960  461  1  7960   DH
12612     462  1  7860  580  1  7840  620  1  7840  650  1  7840  668  2  7820
12613     670  2  7803  690  2  7803  692  2  7820  700  3  7820  768  3  7840
12614     773  3  7860  784  3  7880  790  3  7900  793  3  7920  803  3  7940
12629  1  2 075 075  1  2 045 045  1  2 070 070
12700   3HH 0  20  3  782   47150 99 99
12710      15  1  7940   40  1  7920  150  1  7900  253  1  7880  304  1  7860
12711     370  1  7860  486  1  7860  556  1  7840  568  1  7840  624  2  7840   DI
12712     636  2  7820  638  2  7810  658  2  7810  660  2  7820  663  3  7840
12713     678  3  7860  690  3  7880  696  3  7900  705  3  7920  716  3  7940
12729  1  2 080 080  1  2 045 045  1  2 055 055
12800    3I 1  18  3  782   47510 99 99
12804   1100   1625   2400   1850   1850
12810       0  1  7940   30  1  7920  250  1  7900  400  1  7880  705  1  7880
12811     720  1  7860  741  2  7840  752  2  7820  768  2  7817  772  2  7815   DJ
12812     773  2  7820  775  2  7840  780  3  7860  784  3  7880  786  3  7900
12813     793  3  7920  812  3  7940  830  3  7960
12829  1  2 060 060  1  2 043 043  1  2 050 050
12900 BR 3I 2  12  1  782   47510        0  7921 3 1
12910       0  1  7921    0  1  7851    5  1  7853   10  1  7850   15  1  7843
12911      20  1  7833   25  1  7827   30  1  7821   35  1  7817   40  1  7815
12912      40  1  7921    0 -9  7921
12929  1  2 040 040
13000 RD 3I 4   7  3   36          1  3          1 1 1                1
13010       0  1  7960  533  1  7941  740  1  7958  741  2  7988  787  2  7988
13011     788  3  7958  842  3  7980
13100    3J 5  13  3  782   47590  1  3
13111     640  1  7960  650  1  7890  700  1  [illegible]
```

```
1      ‡ THREAD CREEK  MAPLE ROAD - HILL ROAD     HOLTSLAG 30  5 02 99 12
2      2  78790  78950  79120  78995  79004
3 13100     1  13  3  782   47590  1  3
4 13105   1050   1550   2300   1750   1750
5 13111     640  1  7960  650  1  7890  700  1  7880  791  2  7872  800  2  7872   DK
5 13112     805  2  7834  810  2  7819  815  2  7821  820  2  7823  825  2  7833
5 13113     830  2  7853  832  3  7914  835  3  7998
6 13129  1  2 070 070  1  2 045 045  1  2 050 050
3 13150 3J+1  0  10  3  786   47800  1  3
5 13160       0  1  7940   20  1  7900  140  1  7880  190  2  7860  200  2  7840   DL
5 13161     215  2  7822  235  2  7822  250  2  7880  260  3  7900  360  3  7940
6 13170  1  2 070 070  1  2 045 045  1  2 060 060
3 13200    3K 0  17  3  783   48160 99 99
5 13210       0  1  7960  144  1  7940  313  1  7920  350  1  7900  358  1  7880   DM
5 13211     362  1  7860  428  2  7840  430  2  7827  446  2  7827  448  2  7840
5 13212     452  3  7850  486  3  7860  654  3  7880  713  3  7900  743  3  7920
5 13213     770  3  7940  800  3  7960
6 13229  1  2 070 070  1  2 046 046  1  2 065 065
3 13300    3L 0  15  3  784   48780 99 99
5 13310       0  1  7960  113  1  7940  175  1  7920  205  1  7900  240  1  7880
5 13311     313  2  7860  315  2  7837  330  2  7837  332  2  7860  340  3  7860   DN
5 13312     562  3  7880  663  3  7900  672  3  7920  675  3  7940  680  3  7960
6 13329  1  2 070 070  1  2 046 046  1  2 075 075
3 13400   3LL 0  15  3  785   49180 99 99
5 13410       5  1  8000   14  1  7920  180  1  7900  233  1  7880  408  2  7860
5 13411     411  2  7844  438  2  7844  442  2  7860  456  3  7880  492  3  7900   DO
5 13412     500  3  7920  504  3  7940  510  3  7960  514  3  7980  521  3  8000
  13429  1  2 070 070  1  2 044 044  1  2 065 065
3 13500    3M 0  14  3  786   49540 99 99
  13510    -200  1  8000   24  1  7900   34  1  7880   52  2  7860   57  2  7850   DP
  13511      72  2  7856   77  2  7864   80  2  7880   86  3  7900   92  3  7920
  13512      95  3  7940  106  3  7960  116  3  7980  124  3  8000
5 13529  1  2 075 075  1  2 044 044  1  2 060 060
3 13600 BR 3M 2  11  1  786   49540        0  8011 1 1
  13610       4  1  8011    4  1  7881   10  1  7870   13  1  7860   20  1  7852
  13611      25  1  7855   30  1  7855   35  1  7857   42  1  7871   42  1  8011
  13612       4 -9  8011
  13629  1  2 030 030
3 13700    3N 5  15  3  785   49610  1  3
  13710      50  1  8000   76  1  7900  100  1  7885  110  1  7876  118  2  7861
  13711     125  2  7855  130  2  7852  135  2  7850  140  2  7847  145  2  7845   DQ
  13712     150  2  7848  156  3  7856  158  3  7862  170  3  7909  185  3  7982
  13729  1  2 075 075  1  2 044 044  1  2 055 055
  13800   3NN 0  18  3  786   50080 99 99
  13810       0  1  8000    8  1  7980   16  1  7960   22  1  7940   28  1  7920   DR
```

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5 13812     278  2  7860   282  2  7880   297  3  7900   320  3  7920   332  3  [illegible]
5 13[illegible]     383  3  7960   412  3  7980   440  3  8000
6 138[illegible]  1  2 070 070  1  2 042 042  1  2 060 [illegible]0
3 13900    30 0  15  3  787   50530 99 99
5 13910       0  1  8000    24  1  7980    43  1  7900   128  1  7890   163  1  7896
5 13911     218  1  7890   329  2  7880   331  2  7861   350  2  7861   353  2  7880   DS
5 13912     362  3  7890   427  3  7910   576  3  7940   657  3  7960   687  3  7960
6 13929  1  2 050 050  1  2 044 044  1  2 045 045
3 14000    3P 0  15  3  787   50920 99 99
5 14010       0  1  8100    26  1  8000    41  1  7930   220  1  7910   274  2  7890
5 14011     288  2  7880   290  2  7865   312  2  7865   314  2  7880   322  3  7890   DT
5 14012     510  3  7910   650  3  7940   697  3  7960   752  3  7980   790  3  8000
6 14029  1  2 050 050  1  2 045 045  1  2 040 040
3 14100   3PP 0  18  3  787   51320 99 99
5 14110       0  1  8100    11  1  8000    19  1  7960    31  1  7930   150  1  7910
5 14111     171  2  7890   191  2  7880   193  2  7869   214  2  7869   216  2  7880   DY
5 14112     227  3  7890   378  3  7910   428  3  7910   473  3  7920   595  3  7940
5 14113     649  3  7960   692  3  7980   739  3  8000
6 14129  1  2 045 045  1  2 045 045  1  2 040 040
3 14200    3Q 0  17  3  788   51980 99 99
5 14210       0  1  8000    62  1  7980   123  1  7960   187  1  7930   408  1  7910
5 14211     537  1  7910   611  1  7910   618  2  7890   633  2  7880   662  2  7875   DV
5 14212     678  2  7880   686  3  7900   701  3  7920   711  3  7940   714  3  7960
5 14213     725  3  7980   736  3  8000
6 14229  1  2 040 040  1  2 043 043  1  2 050 050
3 14300    3R 0  16  3  789   52290 99 99
5 14310       0  1  8000   147  1  7980   192  1  7960   297  1  7930   486  1  7910
5 14311     512  1  7910   720  1  7910   740  2  7890   742  2  7880   760  2  7880   DW
5 14312     763  2  7900   772  3  7910   868  3  7930   883  3  7960   893  3  7980
5 14313     906  3  8000
6 14329  1  2 040 040  1  2 042 042  1  2 045 045
3 14400    3S 0  17  3  788   53060 99 99
5 14410       0  1  8000    20  1  7980    93  1  7960   152  1  7960   220  1  7960
5 14411     683  1  7930   818  2  7910   828  2  7900   830  2  7880   841  2  7872   DX
5 14412     852  2  7880   854  2  7900   857  3  7920   860  3  7940   906  3  7960
5 14413     922  3  7980   932  3  8000
6 14429  1  2 045 045  1  2 038 038  1  2 045 045
3 14500    3T 0  15  3  791   53580 99 99
5 14510       0  1  8020    20  1  8000    50  1  7980   423  1  7960   436  2  7930
5 14511     448  2  7910   450  2  7902   460  2  7902   462  2  7910   470  3  7910   DY
5 14512     645  3  7930   843  3  7960   870  3  7980   885  3  8000   912  3  8020
6 14529  1  2 055 055  1  2 042 042  1  2 065 065
3 14600    3U 0  17  3  792   54380 99 99
5 14610       0  1  8040    93  1  [illegible]   [illegible]  1  8000   152  1  7970   249  1  7940   DZ
```

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5 14611      530  1  7940  578  1  7950  613  2  7940  630  2  7920  632  2  7910   D2
5 14612      640  2  7910  642  2  7920  653  3  7940  667  3  7960  697  3  7980
5 14[illegible]      698  3  8000  738  3  8020
6 14629  1  2 070 070  1  2 045 045  1  2 070 070
3 14700    3V 0. 14  3  792   54940 99 99
5 14710        0  1  8040   96  1  8020  131  1  8000  150  1  7970  520  1  7950   E1
5 14711      676  2  7930  678  2  7918  700  2  7918  702  2  7940  704  2  7960
5 14712      706  3  7980  713  3  8000  723  3  8020  731  3  8040
6 14729  1  2 060 060  1  2 040 040  1  2 070 070
3 14800    3W 0  18  3  793   55330 99 99
5 14810        0  1  8080   58  1  8060  126  1  8040  176  1  8020  234  1  8000
5 14811      270  1  7970  516  1  7950  542  2  7940  544  2  7921  558  2  7921   EB
5 14812      570  2  7940  576  3  7950  665  3  7960  722  3  7980  748  3  8000
5 14813      766  3  8020  806  3  8040  844  3  8060
6 14829  1  2 065 065  1  2 042 042  1  2 060 060
3 14900   3WW 0  16  3  793   55910 99 99
5 14910        0  1  8060   12  1  8040   98  1  8020  393  1  8000  432  1  7980
5 14911      502  1  7950  513  2  7940  515  2  7927  526  2  7927  528  2  7940   FC
5 14912      533  3  7950  712  3  7970  732  3  8000  748  3  8020  778  3  8040
5 14913      827  3  8060
6 14929  1  2 065 065  1  2 040 040  1  2 055 055
3 15000    3X 0  15  3  794   56230 99 99
5 15010        0  1  8060   28  1  8040  312  1  8020  362  1  8000  412  1  7970
5 15011      554  2  7961  556  2  7931  571  2  7930  584  2  7937  589  3  7952   ED
5 15012      832  3  7970  929  3  7990  978  3  8020 1028  3  8040 1057  3  8060
6 15029  1  2 065 065  1  2 040 040  1  2 055 055
3 15100    3Y 0  18  3  793   56650 99 99
5 15110        0  1  8080   62  1  8060   90  1  8040  178  1  8020  270  1  8000
5 15111      302  1  7980  322  2  7960  332  2  7924  342  2  7920  350  2  7940   EE
5 15112      352  2  7960  355  3  7980  500  3  8000  920  3  8000  970  3  8020
5 15113     1042  3  8040 1132  3  8060 1200  3  8080
6 15129  1  2 055 055  1  2 040 040  1  2 055 055
3 15200 BR 3Y 2  12  1  793   56650         0  7988 3 1
5 15210        0  1  7988    0  1  7945    5  1  7933   10  1  7924   15  1  7920
5 15211       20  1  7920   25  1  7927   30  1  7932   35  1  7962   40  1  7954
5 15212       40  1  7988    0 -9  7988
6 15229  1  2 035 035
3 15300 RD 3Y 4  15  3   40            1  3            1 1 1                1
5 15310     -346  1  8100 -287  1  8080 -202  1  8060  -96  1  8040  -82  1  8041
5 15311        0  2  8024    0  2  8056   60  2  8056   60  2  8024   61  3  8024
5 15312      328  3  8024  570  3  8025  730  3  8040  823  3  8060  884  3  8080
3 15400    3Z 5  25  3  793   56700  1  3
5 15410        0  1  8100   19  1  8080   58  1  8060   74  1  8040  116  1  8020
5 15411      131  1  8000  220  1  8000  238  1  7980  250  1  7965  260  2  7963   EF
5 15412      263  2  7962  267  2  7951  275  2  7926  280  2  7921  290  2  7937
```

```
1      1 THREAD CREEK  HILL ROAD - CENTER ROAD    HOLTSLAG 21  5 02 99 12
2      2  79903  80037  80243  80092  80097
3 15400    3Z 1  25  3  793   56700  1  3
4 15404   1050   1550   2300   1750   1750
5 15410       0  1  8100   19  1  8080   58  1  8060   74  1  8040  116  1  8020
5 15411     131  1  8000  220  1  8000  238  1  7980  250  1  7965  255  2  7963   EF
5 15412     263  2  7962  267  2  7951  275  2  7926  280  2  7921  290  2  7937
5 15413     292  2  7952  297  2  7958  300  3  7958  318  3  7980  400  3  8000
5 15414     710  3  8000  820  3  8020 1005  3  8020 1066  3  8040 1110  3  8060
6 15429  1  2 070 070  1  2 042 042  1  2 060 060
3 15500   3ZZ 0  13  3  794   57150 99 99
5 15510       0  1  8060   31  1  8040   41  1  8020   68  1  8000  198  1  7980   EG
5 15511     224  2  7960  226  2  7938  240  2  7938  241  3  7960  305  3  7980
5 15512     463  3  8000  660  3  8020  710  3  8040
6 15529  1  2 060 060  1  2 045 045  1  2 080 080
3 15600    3A 0  18  3  795   57530 99 99
5 15610       0  1  8080   34  1  8060  102  1  8060  104  1  8040  111  1  8020
5 15611     120  2  8000  130  2  7980  132  2  7960  134  2  7940  144  2  7940   EH
5 15612     146  2  7960  150  3  7960  197  3  7980  280  3  7981  590  3  8000
5 15613     880  3  8020  890  3  8040  951  3  8060
6 15629  1  2 060 060  1  2 045 045  1  2 090 090
3 15700    48 0  14  3  795   58100 99 99
5 15710       0  1  8100   71  1  8080  112  1  8060  258  1  8040  288  1  8020   EI
5 15711     297  1  8000  309  2  7971  311  2  7956  316  2  7947  322  2  7951
5 15712     324  2  7960  330  3  7980  740  3  8000  752  3  8100
6 15729  1  2 055 055  1  2 042 042  1  2 090 090
3 15800    4C 0  12  3  794   58460 99 99
5 15810       0  1  8100   40  1  8040   75  1  8020   82  1  8000   97  2  7980   EJ
5 15811     102  2  7960  104  2  7938  120  2  7938  123  2  7960  133  3  7980
5 15812     156  3  8000  167  3  8100
6 15829  1  2 055 055  1  2 042 042  1  2 090 090
3 15900 BR 4C 2   8  1  794   58460        0  8041 1 1
5 15910      24  1  8041   24  1  7960   30  1  7940   40  1  7930   50  1  7949.
5 15911      58  1  7980   58  1  8041    0 -9  8041
6 15929  1  2 037 037
3 16000    4D 5  13  3  795   58520  1  3
5 16010       0  1  8100    8  1  8080   17  1  8060   40  1  8000   50  1  7980   EK
5 16011      65  2  7967   66  2  7957   80  2  7942   90  2  7943   99  3  7959
5 16012     102  3  7983  115  3  8040  130  3  8037
6 16029  1  2 060 060  1  2 040 040  1  2 060 060
3 16100   4DD 0  15  3  796   59110 99 99
5 16110       0  1  8100   16  1  8040   50  1  8040  207  1  8040  237  1  8020   EL
5 16111     275  1  8000  450  1  7999  718  1  7980  728  2  7960  730  2  7952
5 16112     741  2  7952  744  2  7960  758  3  7980  773  3  8000  805  3  8100
6 16129  1  2 090 090  1  2 040 040  1  2 060 060
```

```
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
3 16200     4E 0  15  3  796   59400 99 99
5 16210        0  1  8100   13  1  8060  235  1  8060  335  1  8040  486  1  8020
5 16211      680  1  8000  948  2  7980  956  2  7960  958  2  7953  980  2  7953
5 16212      982  2  7960  990  3  7970 1002  3  7980 1021  3  8000 1046  3  8100
6 16229  1  2 080 080  1  2 038 038  1  2 050 050
3 16300     4F 0  17  3  797   60040 99 99
5 16310        0  1  8100   12  1  8060   22  1  8060   36  1  8060  310  1  8060
5 16311      400  1  8040  500  1  8020  600  1  8025  783  1  8000  795  2  7980
5 16312      797  2  7961  824  2  7961  827  3  7980  952  3  8000 1097  3  8020
5 16313     1124  3  8040 1128  3  8060
6 16329  1  2 080 080  1  2 042 042  1  2 080 080
3 16400     4G 0  10  3  798   60680  1  3
5 16410        0  1  8060  100  1  8040  200  2  8020  210  2  7990  235  2  7970
5 16411      260  3  7990  275  3  8010  565  3  8020  575  3  8040  600  3  8080
6 16419  1  2 080 080  1  2 045 045  1  2 080 080
3 16500    4GG 0  22  3  800   61050 99 99
5 16510        0  1  8100    5  1  8100   22  1  8100   26  1  8100   70  1  8100
5 16511       75  1  8100   80  1  8080  120  1  8020  300  1  8020  375  1  8040
5 16512      390  1  8080  398  1  8040  405  2  8020  407  2  8000  409  2  7980
5 16513      428  2  7980  452  3  8000  495  3  8020  560  3  8040  678  3  8060
5 16514      768  3  8080  793  3  8100
6 16529  1  2 080 080  1  2 045 045  1  2 070 070
3 16600     4H 0  15  3  799   61660 99 99
5 16610       50  1  8100  100  1  8040  150  1  8030  270  1  8030  350  1  8030
5 16611      550  1  8030  760  2  8020  768  2  8000  770  2  7981  792  2  7981
5 16612      795  2  8000  802  3  8020  816  3  8040  820  3  8060  828  3  8100
6 16629  1  2 120 120  1  2 040 040  1  2 060 060
3 16650 4H+1  0   9  3  802   62050  1  3
5 16660        0  1  8080   40  1  8060  240  2  8040  260  2  7982  280  2  7982
5 16661      290  2  8020  300  3  8040  580  3  8040  610  3  8100
6 16670  1  2 080 080  1  2 040 040  1  2 060 060
3 16700     4I 0  14  3  799   62300 99 99
5 16710        0  1  8100  115  1  8080  160  1  8060  273  1  8040  282  2  8020
5 16711      286  2  8000  288  2  7982  311  2  7982  314  2  8000  326  2  8020
5 16712      329  3  8040  619  3  8060  643  3  8080  661  3  8100
6 16729  1  2 080 080  1  2 040 040  1  2 045 045
3 16800    4II 0  15  3  800   62600 99 99
5 16810        2  1  8110   80  1  8100  137  1  8080  259  1  8060  404  1  8040
5 16811      418  2  8020  421  2  8000  423  2  7993  450  2  7993  453  2  8000
5 16812      453  3  8020  463  3  8040  471  3  8060  498  3  8080  508  3  8110
6 16829  1  2 080 080  1  2 040 040  1  2 045 045
3 16900     4J 0  17  3  801   62830 99 99
5 16910        0  1  8110   30  1  8100   55  1  8080  300  1  8080  330  1  8060
5 16911      454  1  8040  457  2  8020  466  2  8000  474  2  8010  482  2  8001
5 16912      488  2  8010  490  2  8020  500  3  8040  518  3  8060  530  3  8050
```

EM

EN

EO

EP

EQ

ER

ES

ET

EU

*** INPUT CARD PRINTOUT ***

```
    1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

 1 THREED CREEK CENTER RD TO RUST PARK DR.  KNUTILLA 11  5  2  5 12
 2  80571  80654  80746  80681  80681
00    4J 1  17  3  801   62830 99 99
05   1050   1550   2300   1750   1750
10       0  1  8110   30  1  8100   55  1  8080  220  1  8060  330  1  8060
11     454  1  8040  457  2  8020  466  2  8000  474  2  8010  482  2  8001   EU
12     488  2  8010  490  2  8020  500  3  8040  518  3  8060  530  3  8080
13     572  3  8100  652  3  8120
29  1  2 080 080  1  2 045 045  1  2 055 055
00 RP 4J 2  12  1  800   62830        0  8064 3 1
10       0  1  8064    0  1  8030    5  1  8032   10  1  8035   15  1  8016
11      20  1  8002   25  1  8002   30  1  7999   35  1  8002   40  1  8007
12      40  1  8064    0 -9  8064
29  1  2 036 036
00 RD 4J 4  11  3   40          1  3          1 1 1              2
10       0  1  8120  150  1  8105  278  1  8100  585  1  8090  628  1  8085
11     857  2  8102  857  2  8130  923  2  8130  923  3  8102  970  3  8120
12    1036  3  8128
00    4K 5  15  3  800   62920  1  3
10       0  1  8110   50  1  8100  173  1  8080  257  1  8060  489  1  8040
11     510  1  8036  531  2  8031  544  2  8026  546  2  8013  556  2  7996   EV
12     570  2  8011  571  3  8030  581  3  8084  602  3  8100  628  3  8120
29  1  2 070 070  1  2 045 045  1  2 080 080
00    4KK 0  21  3  800   63390 99 99
10       0  1  8180   50  1  8100  104  1  8080  135  1  8080  148  1  8060
11     157  1  8040  163  2  8020  172  2  8000  182  2  7998  192  2  8000
12     196  2  8020  207  3  8040  236  3  8040  250  3  8040  285  3  8040   EW
13     306  3  8040  341  3  8060  372  3  8080  394  3  8100  423  3  8120
14     443  3  8140
29  1  2 075 075  1  2 050 050  1  2 080 080
00    4L 0  18  3  801   63600 99 99
10       0  1  8180    0  1  8100   70  1  8100  125  1  8080  136  1  8060
11     146  2  8040  154  2  8020  156  2  8000  166  2  8000  168  2  8020   EX
12     178  3  8040  300  3  8050  336  3  8050  393  3  8060  416  3  8080
13     430  3  8100  444  3  8120  473  3  8140
29  1  2 075 075  1  2 045 045  1  2 080 080
00    4M 0  20  3  801   64050 99 99
10       0  1  8120   70  1  8120  400  1  8120  400  1  8065  425  2  8060
11     431  2  8040  438  2  8020  440  2  8002  460  2  8002  463  2  8020   EY
12     476  2  8040  479  3  8060  498  3  8060  582  3  8060  610  3  8060
13     653  3  8060  728  3  8060  748  3  8080  770  3  8100  812  3  8120
29  1  2 070 070  1  2 045 045  1  2 080 080
00   4MM 0  18  3  801   64270 99 99
10       0  1  8160    1  1  8120   83  1  8120  340  1  8120  343  1  8060   EZ
11     386  1  8060  402  1  8060  412  1  8040  422  2  8020  424  2  8003
```

*** INPUT CARD PRINTOUT ***

```
     1         2         3         4         5         6         7         8
5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
7612     440  2  8003  443  2  8020  452  2  8040  460  3  8060  553  3  8080
7613     572  3  8100  587  3  8120  500  3  8140
7629  1  2 065 065  1  2 050 050  1  2 075 075
7700    4N 0  16  3  801   64550 99 99
7710       0  1  8120  350  1  8120  350  1  8080  480  1  8080  500  1  8060
7711     518  2  8060  527  2  8040  532  2  8020  534  2  8009  543  2  8009
7712     545  2  8020  560  3  8040  567  3  8060  583  3  8080  588  3  8100
7713     590  3  8120
7729  1  2 065 065  1  2 050 050  1  2 070 070
```

FA

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

 1 THREAD CREEK RUST PARK DR TO BRIDGE ROAD KNUTILLA 11  5  2  5 12
 2  80822  80915  81053  80962  80971
00    4N 1  16  3  801   64550 99 99
04   1050   1550   2300   1750   1750
10       0  1  8120  350  1  8120  350  1  8080  430  1  8080  500  1  8060
11     518  2  8060  527  2  8040  532  2  8020  534  2  8009  543  2  8009  FA
12     545  2  8020  560  3  8040  567  3  8060  583  3  8080  588  3  8100
13     590  3  8120
29  1  2 065 065  1  2 050 050  1  2 070 070
00 5R 4N 2  12  1  801   64550       15  8084 2 1
10       0  1  8084    0  1  8036    1  1  8020    5  1  8022   10  1  8022
11      15  1  8009   20  1  8018   26  1  8016   26  1  8043   28  1  8043
12      28  1  8084    0 -9  8084
29  1  2 040 040
00 RP 4N 4  10  2   24          1  2          1 1                  1
11     250  1  8200  430  1  8200  430  1  8082  516  1  8085  578  1  8101
12     578  2  8130  628  2  8130  628  2  8103  629  2  8103  652  2  8120
00    40 5  17  5  802   64650  3  5
10      40  1  8120   40  1  8120  115  1  8120  210  1  8120  260  2  8119
11     360  2  8100  410  2  8090  520  3  8083  540  4  8039  542  4  8024  FB
12     553  4  8017  564  4  8026  566  4  8040  567  5  8046  590  5  8079
13     600  5  8100  608  5  8120
29  1  2 050 050  1  2 080 080  1  2 042 042  1  2 042 042  1  2 050 050
00 4400 0  18  5  801   64710 99 99
10      80  1  8120  120  2  8120  191  3  8120  260  3  8119  330  3  8100
11     343  3  8080  355  3  8060  357  3  8040  372  3  8060  454  3  8060  FC
12     463  4  8040  465  4  8020  467  4  8000  496  4  8000  498  4  8020
13     508  5  8040  516  5  8100  533  5  8200
29  1  2 055 055  1  2 050 050  1  2 070 070  1  2 045 045  1  2 050 050
50 4000  0  10  3  802   64950  1  3
60       0  1  8120  100  1  8100  150  1  8090  170  1  8060  190  2  8040
61     195  2  8000  210  2  8000  220  3  8060  235  3  8080  265  3  8120  FD
70  1  2 070 070  1  2 050 050  1  2 060 060
00    4P 0  13  3  800   65180 99 99
10      53  1  8130  145  1  8120  210  1  8120  230  1  8120  292  1  8120
11     308  2  8108  314  2  8071  326  2  8055  333  2  7997  338  2  8040  FE
12     346  2  8060  358  3  8100  381  3  8200
29  1  2 060 060  1  2 050 050  1  2 060 060
49 4P+1  0  10  3  808   65430  1  3
50       0  1  8160  110  1  8140  300  1  8120  610  1  8120  670  2  8100
51     675  2  8005  690  2  8005  710  2  8080  720  3  8100  740  3  8160
60  1  2 075 075  1  2 050 050  1  2 060 060
00   4PP 0  15  3  802   65560 99 99
10       0  1  8160   39  1  8140  325  1  8130  426  1  8125  442  1  8120  FF
11     571  1  8120  579  1  8100  600  2  8080  612  2  8040  614  2  8013
```

*** INPUT CARD PRINTOUT ***

```
    1         2         3         4         5         6         7         8
....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
12      621  2  8013  624  2  8040  630  3  8080  634  3  8100  650  3  8200
29  1  2 075 075  1  2 045 045  1  2 065 065
00     40 0  14  3  802   65760 99 99
10       0  1  8160   62  1  8140  252  1  8130  433  1  8130  674  1  8120
11     690  1  8100  692  2  8080  702  2  8040  704  2  8017  720  2  8017   F6
12     722  2  8040  736  3  8060  742  3  8100  760  3  8200
29  1  2 080 080  1  2 045 045  1  2 065 065
00     48 0  18  4  803   66130 99 99
10       0  1  8160   34  1  8140  203  1  8120  288  2  8120  410  2  8130
11     500  2  8120  562  2  8120  572  2  8100  575  3  8090  580  3  8080   FH
12     582  3  8060  589  3  8021  602  3  8027  606  3  8057  612  3  8060
13     623  4  8080  638  4  8100  659  4  8200
29  1  2 070 070  1  2 075 075  1  2 045 045  1  2 065 065
00     49 0  15  3  803   66480 99 99
10       0  1  8160   54  1  8140  113  1  8120  121  2  8100  122  2  8080
11     124  2  8060  128  2  8040  130  2  8028  148  2  8028  157  2  8060   FI
12     161  3  8100  176  3  8120  188  3  8140  211  3  8180  212  3  8200
29  1  2 070 070  1  2 050 050  1  2 070 070
00 CU 49 2   7  1  803   66480       15  8103 3 1
10       0  1  8103    0  1  8034    5  1  8031   10  1  8029   15  1  8034
11      15  1  8103    0 -9  8103
29  1  2 028 028
00 RD 49 4  39  3   27          1  3          1 1 1                3
10    -384  1  8280 -384  1  8138 -354  1  8133 -354  1  8230 -292  1  8230
11    -292  1  8124 -270  1  8121 -270  1  8220 -187  1  8220 -187  1  8119
12    -160  1  8119 -130  1  8121 -100  1  8117  -40  1  8117  -30  1  8119
13     -22  2  8121  -20  2  8131  -15  2  8135  -10  2  8140   -5  2  8143
14       0  2  8146    7  2  8145   12  2  8146   17  2  8140   25  3  8125
15      35  3  8131   47  3  8134   57  3  8135   67  3  8137   77  3  8140
16      87  3  8142   97  3  8143   97  3  8343  133  3  8343  133  3  8150
17     199  3  8157  213  3  8158  225  3  8159  230  3  8180
00     4T 5  17  3  803   66550  1  3
10       0  1  8180   24  1  8160  127  1  8140  200  1  8140  205  1  8120
11     210  1  8107  226  1  8062  228  2  8043  231  2  8028  243  3  8032   FJ
12     251  3  8038  252  3  8058  268  3  8103  274  3  8120  310  3  8140
13     310  3  8160  400  3  8180
29  1  2 040 040  1  2 037 037  1  2 040 040
```

*** INPUT CARD PRINTOUT ***

```
        1         2         3         4         5         6         7         8
...5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

    1 THREAD CREEK BUSH DRAIN TO BELSAY ROAD   KNUTILLA 11  5  2  5 12
    2  82164  82208  82285  82236  82238
22900  5MMM 1  16  3  812   75590  1  3
22905    800   1130   1700   1300   1300
22910      0  1  8280   16  1  8260   32  1  8240  195  1  8220  213  1  8200
22911    232  1  8180  233  1  8140  234  1  8120  236  2  8111  242  2  8111   GL
22912    244  3  8140  246  3  8180  262  3  8200  470  3  8220  582  3  8240
22913    583  3  8260
22929  1  2 045 045  1  2 046 046  1  2 040 040
23000    5N 0  13  3  817   75980 99 99
23010      0  1  8300   10  1  8240   16  1  8220   19  1  8200   28  2  8180   GM
23011     30  2  8165   43  2  8165   45  2  8180   57  3  8200  318  3  8220
23012    403  3  8240  442  3  8260  514  3  8280
23029  1  2 040 040  1  2 045 045  1  2 038 038
23100    50 0  12  3  819   76450 99 99
23110      0  1  8300   16  1  8240   22  1  8220   27  2  8200   30  2  8182   GN
23111     43  2  8182   55  3  8200  218  3  8220  330  3  8240  413  3  8260
23112    472  3  8280  628  3  8300
23129  1  2 050 050  1  2 045 045  1  2 050 050
23200    5P 0  20  3  820   76950 99 99
23210      0  1  8300    6  1  8280   14  1  8260   20  1  8240   23  2  8220
23211     28  2  8200   30  2  8182   46  2  8182   48  2  8200   70  3  8210
23212    122  3  8220  144  3  8240  172  3  8242  193  3  8240  212  3  8220   GO
23213    248  3  8220  282  3  8240  338  3  8260  424  3  8280  547  3  8300
23229  1  2 055 055  1  2 040 040  1  2 045 045
23300    5Q 0  12  3  821   77480 99 99
23310      0  1  8300   28  1  8280   68  1  8260  142  1  8240  417  2  8220   GP
23311    428  2  8201  442  2  8201  445  3  8220  462  3  8240  474  3  8260
23312    513  3  8280  576  3  8300
23329  1  2 065 065  1  2 045 045  1  2 055 055
23400   5QQ 0  14  3  821   77850 99 99
23410      0  1  8320   47  1  8300  118  1  8280  202  1  8260  339  1  8240   GQ
23411    568  2  8220  570  2  8205  584  2  8205  586  3  8220  599  3  8240
23412    612  3  8260  619  3  8280  680  3  8300  730  3  8320
23429  1  2 065 065  1  2 050 050  1  2 070 070
23500    5R 0  13  3  822   78760 99 99
23510      0  1  8320   50  1  8300  120  1  8280  137  1  8260  146  2  8240   GR
23511    147  2  8220  149  2  8214  167  2  8214  169  3  8220  343  3  8240
23512    427  3  8260  446  3  8280  550  3  8290
23529  1  2 060 060  1  2 050 050  1  2 070 070
```

```
23512      427  3  8260   446  3  8280   550  3  8290
23529  1  2 060 060  1  2 050 050  1  2 070 070
23600     5S    15  3  820    79280 99 99
23610        0  1  8340     7  1  8320    20  1  8300    26  1  8280    36  1  8260
23611       52  2  8240    62  2  8220    68  2  8200    70  2  8196    82  2  8200
23612       84  2  8220    92  3  8240   248  3  8260   337  3  8280   402  3  8290
23629  1  2 050 050  1  2 045 045  1  2 060 060
```

GS

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 2,DATE= 6/ 5/78

*** INPUT CARD PRINTOUT ***

```
       1         2         3         4         5         6         7         8
..5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

23700 BR 5S 2  10  1  820    79280          0  8290 3 1
23710        0  1  8295     0  1  8196     5  1  8204    10  1  8208    15  1  8204
23711       20  1  8205    25  1  8210    28  1  8203    28  1  8285     0 -9  8295
23729  1  2 036 036
23800 RD 5S 4  15  3   40            1  3            1 1 1                 1
23810        0  1  8400    73  1  8380   117  1  8360   136  1  8356   200  1  8324
23811      200  2  8360   232  2  8350   233  3  8314   275  3  8300   342  3  8280
23812      394  3  8281   410  3  8279   602  3  8282   695  3  8300   983  3  8300
23900     5T 5  14  3  821    79330  1  3
23910      -20  1  8340   -10  1  8320     0  1  8303    34  1  8225    37  2  8221
23911       50  2  8209    65  3  8220    67  3  8222    75  3  8251   100  3  8267
23912      200  3  8260   666  3  8260   710  3  8280   770  3  8300
23929  1  2 055 055  1  2 040 040  1  2 050 050
```

GT

*** INPUT CARD PRINTOUT ***

```
      1         2         3         4         5         6         7         8
.5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

    1 THREAD CREEK BELSAY RD TO END OF STUDY   KNUTILLA 25  5  2 99 12
    2  82670  82780  82865  82810  82810
 3900    5T 1  14  3  821   79330  1  3
 3905    800   1130   1700   1300   1300
 3910     -20  1  8340  -10  1  8320    0  1  8303   34  1  8225   37  2  8221
 3911      50  2  8209   65  3  8220   67  3  8222   75  3  8251  100  3  8267
 3912     200  3  8260  666  3  8260  710  3  8280  770  3  8300
 3929  1  2 055 055  1  2 040 040  1  2 100 100
 4000    5U 0  15  3  823   80100 99 99
 4010       0  1  8390    8  1  8320   83  1  8300  182  1  8280  223  1  8260
 4011     377  1  8248  648  1  8259  748  2  8240  752  2  8220  770  2  8220
 4012     774  3  8240  872  3  8260  932  3  8280  943  3  8300 1068  3  8320
 4029  1  2 150 150  1  2 045 045  1  2 150 150
 4100    5V 0  27  3  822   80780 99 99
 4110       0  1  8340   77  1  8320  392  1  8300  447  1  8300  548  1  8280
 4111     648  1  8260  668  1  8280  770  1  8290 1003  1  8280 1080  1  8280
 4112    1122  1  8260 1153  2  8240 1155  2  8217 1170  2  8217 1173  3  8240
 4113    1237  3  8260 1258  3  8262 1268  3  8260 1312  3  8258 1355  3  8260
 4114    1373  3  8260 1398  3  8259 1424  3  8280 1496  3  8300 1547  3  8300
 4115    1588  3  8320 1624  3  8340
 4129  1  2 150 150  1  2 050 050  1  2 150 150
 4200    5W 0  16  3  824   82210 99 99
 4210       0  1  8340  167  1  8320  241  1  8300  403  1  8280  445  1  8272
 4211     676  1  8270  837  2  8260  842  2  8240  844  2  8235  863  2  8235
 4212     865  2  8240  874  3  8260 1054  3  8280 1098  3  8300 1138  3  8320
 4213    1178  3  8340
 4229  1  2 150 150  1  2 050 050  1  2 150 150
 4300    5Y 0  15  3  825   83140 99 99
 4310       0  1  8360   37  1  8340   82  1  8320  134  1  8300  182  1  8280
 4311     310  1  8270  465  2  8260  474  2  8247  484  2  8247  493  3  8260
 4312     733  3  8280  776  3  8300  822  3  8320  853  3  8340  903  3  8360
 4359  1  2 120 120  1  2 050 050  1  2 120 120
 4400    5Z 0  16  3  826   83900 99 99
 4410       0  1  8360    7  1  8340   16  1  8320   22  1  8300   40  1  8280
 4411     470  1  8280  480  2  8260  485  2  8257  502  2  8257  510  3  8260
 4412     548  3  8280  614  3  8300  675  3  8318  750  3  8320  798  3  8340
 4413     868  3  8360
```

5T

5U

5V

5W

5X

5Y

```
3 24000    5U 0  15  3  823   80100 99 99
5 24010       0  1  8390    8  1  8320   83  1  8300  182  1  8280  223  1  8260
5 24011     377  1  8248  648  1  8259  748  2  8240  752  2  8220  770  2  8220
5 24012     774  3  8240  872  3  8260  932  3  8280  943  3  8300 1068  3  8320
6 24029  1  2 150 150  1  2 045 045  1  2 150 150
3 24100    5V 0  27  3  822   80780 99 99
5 24110       0  1  8340   77  1  8320  392  1  8300  447  1  8300  548  1  8280
5 24111     648  1  8260  668  1  8280  770  1  8290 1003  1  8280 1080  1  8280
5 24112    1122  1  8260 1153  2  8240 1155  2  8217 1170  2  8217 1173  3  8240
5 24113    1237  3  8260 1258  3  8262 1268  3  8260 1312  3  8258 1355  3  8260
5 24114    1373  3  8260 1398  3  8259 1424  3  8280 1496  3  8300 1547  3  8300
5 24115    1588  3  8320 1624  3  8340
6 24129  1  2 150 150  1  2 050 050  1  2 150 150
3 24200    5W 0  16  3  824   82210 99 99
5 24210       0  1  8340  167  1  8320  241  1  8300  403  1  8280  445  1  8272
5 24211     676  1  8270  837  2  8260  842  2  8240  844  2  8235  863  2  8235
5 24212     865  2  8240  874  3  8260 1054  3  8280 1098  3  8300 1138  3  8320
5 24213    1178  3  8340
6 24229  1  2 150 150  1  2 050 050  1  2 150 150
3 24300    5Y 0  15  3  825   83140 99 99
5 24310       0  1  8360   37  1  8340   82  1  8320  134  1  8300  182  1  8280
5 24311     310  1  8270  465  2  8260  474  2  8247  484  2  8247  493  3  8260
5 24312     733  3  8280  776  3  8300  822  3  8320  853  3  8340  903  3  8360
6 24359  1  2 120 120  1  2 050 050  1  2 120 120
3 24400    5Z 0  16  3  826   83900 99 99
5 24410       0  1  8360    7  1  8340   16  1  8320   22  1  8300   40  1  8280
5 24411     470  1  8280  480  2  8260  485  2  8257  502  2  8257  510  3  8260
5 24412     548  3  8280  614  3  8300  675  3  8318  750  3  8320  798  3  8340
5 24413     868  3  8360
6 24429  1  2 120 120  1  2 050 050  1  2 100 100
3 24500    6A 0  20  3  827   84470 99 99
5 24510       0  1  8380   18  1  8360   38  1  8340   82  1  8320  150  1  8300
5 24511     190  1  8280  411  1  8280  490  1  8285  542  1  8280  574  2  8270
5 24512     575  2  8257  598  2  8257  600  2  8270  605  3  8260  660  3  8280
5 24513     692  3  8300  743  3  8320  811  3  8340  870  3  8360 1040  3  8380
6 24529  1  2 150 150  1  2 055 055  1  2 075 075
3 24600    6B 0  17  3  827   84880 99 99
```

G4

GV

GW

GX

GY

GZ

*** INPUT CARD PRINTOUT ***

```
      1         2         3         4         5         6         7         8
=5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
610        6  1  8400   70  1  8380  122  1  8360  264  1  8340  460  1  8340
611      520  1  8320  563  1  8300  790  1  8299  910  2  8280  922  2  8269   HA
612      940  2  8269  942  3  8280  952  3  8300  954  3  8320  958  3  8360
613      962  3  8380  965  3  8400
629  1  2 100 100  1  2 055 055  1  2 075 075
650 6H+1  0  10  3  830   85240  1  3
660        0  1  8340   35  1  8320   60  1  8300  135  2  8280  150  2  8270
661      170  2  8270  175  3  8280  230  3  8300  295  3  8320  305  3  8340   HB
670  1  2 100 100  1  2 055 055  1  2 075 075
700    6C 0  21  3  828   85470 99 99
710       15  1  8420   56  1  8400  132  1  8380  196  1  8360  378  1  8360
711      600  1  8360  633  1  8360  638  1  8340  642  2  8320  646  2  8300
712      653  2  8280  658  2  8275  682  2  8275  684  2  8280  692  3  8300   HC
713      820  3  8318  935  3  8320  975  3  8340 1026  3  8360 1038  3  8380
714     1050  3  8400
729  1  2 065 065  1  2 055 055  1  2 080 080
800    6D 0  20  3  829   85970 99 99
810        0  1  8420   32  1  8400  101  1  8380  229  1  8380  283  1  8390
811      338  1  8390  428  1  8380  508  1  8360  638  1  8340  658  1  8320
812      800  1  8296  829  2  8282  851  2  8282  858  2  8300  867  3  8320   HD
813      888  3  8340  897  3  8360  908  3  8380  923  3  8400  938  3  8420
829  1  2 075 075  1  2 055 055  1  2 070 070
900    6F 0  21  3  827   86670 99 99
910        0  1  8460   26  1  8440   61  1  8420  117  1  8400  139  1  8380
911      220  1  8360  280  1  8340  300  1  8320  402  1  8300  418  2  8300
912      423  2  8280  425  2  8261  462  2  8261  464  2  8280  471  3  8300   HE
913      478  3  8320  565  3  8340  590  3  8360  747  3  8380  828  3  8400
914      858  3  8420
929  1  2 080 080  1  2 055 055  1  2 050 050
000   6EE 0  18  3  828   87150 99 99
010        0  1  8440   26  1  8420   49  1  8400   67  1  8380   88  1  8360
011      122  1  8340  152  1  8320  164  2  8300  172  2  8280  174  2  8272
012      222  2  8272  224  2  8280  233  3  8320  360  3  8340  411  3  8360   HF
013      430  3  8360  464  3  8380  554  3  8400
029  1  2 080 080  1  2 055 055  1  2 070 070
100    6F 0  19  3  828   87680 99 99
110        0  1  8440    7  1  8420   14  1  8400   24  1  8380   31  1  8360
111       40  1  8340   46  1  8320   53  2  8300   64  2  8280   80  2  8277
112      164  2  8277  173  2  8280  182  3  8300  192  3  8320  201  3  8340   HG
```

```
6 24829  1  2 075 075  1  2 055 055  1  2 070 070
3 24900    6F 0  21  3  827   86670 99 99
5 24910       0  1  8460   26  1  8440   61  1  8420  117  1  8400  139  1  8380
5 24911     220  1  8360  280  1  8340  300  1  8320  402  1  8300  418  2  8300   HE
5 24912     423  2  8280  425  2  8261  462  2  8261  464  2  8280  471  3  8300
5 24913     478  3  8320  565  3  8340  590  3  8360  747  3  8380  828  3  8400
5 24914     858  3  8420
6 24929  1  2 080 080  1  2 055 055  1  2 050 050
3 25000    6EE 0  18  3  828   87150 99 99
5 25010       0  1  8440   26  1  8420   49  1  8400   67  1  8380   88  1  8360
5 25011     122  1  8340  152  1  8320  164  2  8300  172  2  8280  174  2  8272   HF
5 25012     222  2  8272  224  2  8280  233  3  8320  360  3  8340  411  3  8360
5 25013     430  3  8360  464  3  8380  554  3  8400
6 25029  1  2 080 080  1  2 055 055  1  2 070 070
3 25100     6F 0  19  3  828   87680 99 99
5 25110       0  1  8440    7  1  8420   14  1  8400   24  1  8380   31  1  8360
5 25111      40  1  8340   46  1  8320   53  2  8300   64  2  8280   80  2  8277   HG.
5 25112     164  2  8277  173  2  8280  182  3  8300  192  3  8320  201  3  8340
5 25113     437  3  8360  502  3  8360  572  3  8380  588  3  8400
6 25129  1  2 080 080  1  2 055 055  1  2 070 070
3 25150 6F+1  0   7  3  832   88030  1  3
5 25160       0  1  8380   35  2  8300   45  2  8280  160  2  8280  180  3  8340   HH
5 25161     205  3  8360  270  3  8368
6 25170  1  2 080 080  1  2 055 055  1  2 060 060
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USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 3,DATE= 6/12/78

*** INPUT CARD PRINTOUT ***

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5 25210       0  1  8460   45  1  8440   71  1  8425  111  1  8415  177  1  8395
5 25211      [illegible]
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*** INPUT CARD PRINTOUT ***

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25210        0  1  8460   43  1  8440   71  1  8420  111  1  8400  177  1  8380
25211      221  1  8360  360  2  8340  361  2  8284  373  2  8280  394  2  8300
25212      402  3  8320  404  3  8340  428  3  8360  448  3  8360  492  3  8360
25213      546  3  8380  581  3  8400
25229  1  2 080 080  1  2 050 050  1  2 050 050
25250 6G+1  0   9  3  830   88310  1  3
25260        0  1  8380   30  1  8360  100  1  8340  120  2  8320  130  2  8285
25291      180  2  8285  190  3  8320  230  3  8360  270  3  8380
25270  1  2 080 080  1  2 050 050  1  2 055 055
SEQUENCE**
25300     6H 0  22  3  829   88700 99 99
25310        0  1  8440   27  1  8420   37  1  8400   48  1  8380   53  1  8360
25311       63  1  8340   73  2  8320   88  2  8300   92  2  8287  120  2  8287
25312      123  2  8300  138  3  8320  170  3  8340  270  3  8360  412  3  8360
25313      521  3  8360  552  3  8380  552  3  8480  598  3  8480  598  3  8399
25314      630  3  8399  710  3  8400
25329  1  2 080 080  1  2 050 050  1  2 055 055
25400     6I 0  16  3  829   89330 99 99
25410        0  1  8446   43  1  8440   92  1  8420   98  1  8400  113  1  8340
25411      125  2  8320  135  2  8300  137  2  8288  183  2  8288  186  2  8300
25412      192  3  8320  202  3  8340  232  3  8360  282  3  8380  324  3  8400
25413      384  3  8420
25429  1  2 080 080  1  2 050 050  1  2 055 055
25500    6II 0  17  3  830   89730 99 99
25510        0  1  8460   46  1  8440   87  1  8420  208  1  8400  273  1  8380
25511      295  1  8360  324  1  8340  338  2  8320  340  2  8294  426  2  8294
25512      428  2  8320  442  3  8340  457  3  8360  482  3  8380  502  3  8400
25513      519  3  8420  545  3  8440
25529  1  2 080 080  1  2 050 050  1  2 050 050
25600     6J 0  17  3  831   90260 99 99
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25611      532  2  8360  541  2  8340  553  2  8320  562  2  8307  570  2  8305
25612      573  3  8320  583  3  8340  611  3  8360  647  3  8380  672  3  8400
25613      688  3  8420  706  3  8440
25629  1  2 080 080  1  2 042 042  1  2 070 070
25700 BR 6J 2  12  1  831   90260        30  8365 3 1
25710        0  1  8395    0  1  8342    5  1  8313   10  1  8307   15  1  8307
25711       20  1  8322   25  1  8318   30  1  8308   35  1  8305   41  1  8323
25712       41  1  8395    0  0  8365
```

HI

HJ

HK

HL

HM

HN

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5212      402  3  8320  404  3  8340  428  3  8360  448  3  8360  492  3  8360
5213      546  3  8380  581  3  8400
5229  1  2 080 080  1  2 050 050  1  2 050 050
5250 6G+1  0   9  3  830   88310  1  3
5260        0  1  8380   30  1  8360  100  1  8340  120  2  8320  130  2  8285   HJ
5291      180  2  8285  190  3  8320  230  3  8360  270  3  8380
5270  1  2 080 080  1  2 050 050  1  2 055 055
SEQUENCE**
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5312      123  2  8300  138  3  8320  170  3  8340  270  3  8360  412  3  8360
5313      521  3  8360  552  3  8380  552  3  8480  598  3  8480  598  3  8399
5314      630  3  8399  710  3  8400
5329  1  2 080 080  1  2 050 050  1  2 055 055
5400    6I 0  16  3  829   89330 99 99
5410        0  1  8446   43  1  8440   92  1  8420   98  1  8400  113  1  8340   HL
5411      125  2  8320  135  2  8300  137  2  8288  183  2  8288  186  2  8300
5412      192  3  8320  202  3  8340  232  3  8360  282  3  8380  324  3  8400
5413      384  3  8420
5429  1  2 080 080  1  2 050 050  1  2 055 055
5500   6II 0  17  3  830   89730 99 99
5510        0  1  8460   46  1  8440   87  1  8420  208  1  8400  273  1  8380   HM
5511      295  1  8360  324  1  8340  338  2  8320  340  2  8294  426  2  8294
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5529  1  2 080 080  1  2 050 050  1  2 050 050
5600    6J 0  17  3  831   90260 99 99
5610        0  1  8440   38  1  8420   98  1  8400  152  1  8380  478  1  8380   HN
5611      532  2  8360  541  2  8340  553  2  8320  562  2  8307  570  2  8305
5612      573  3  8320  583  3  8340  611  3  8360  647  3  8380  672  3  8400
5613      688  3  8420  706  3  8440
629  1  2 080 080  1  2 042 042  1  2 070 070
700 AR 6J 2  12  1  831   90260        30  8365 3 1
710        0  1  8395    0  1  8342    5  1  8313   10  1  8307   15  1  8307
711       20  1  8322   25  1  8318   30  1  8308   35  1  8305   41  1  8323
712       41  1  8395    0 -9  8395
729  1  2 032 032
800 RD 6J 4  10  3   50            1  3            1 1 1                1
810        0  1  8440   77  1  8420  440  1  8424  510  2  8429  510  2  8463
811      545  2  8463  545  3  8429  589  3  8420  724  3  8441  756  3  8460
900    6K 5  14  3  831   90330  1  3
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USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 4,DATE= 6/12/78

*** INPUT CARD PRINTOUT ***

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5911       81  1  8343    82  2  8313   102  2  8304   123  3  8307   126  3  8346
5912      160  3  8357   195  3  8380   252  3  8400   298  3  8420
5929  1  2 070 070  1  2 045 045  1  2 085 085
6000 61.     0  10  3  834   90570  1  3
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6030  1  2 070 070  1  2 045 045  1  2 085 085
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00BREAK00

1) COUNTY: Genesee

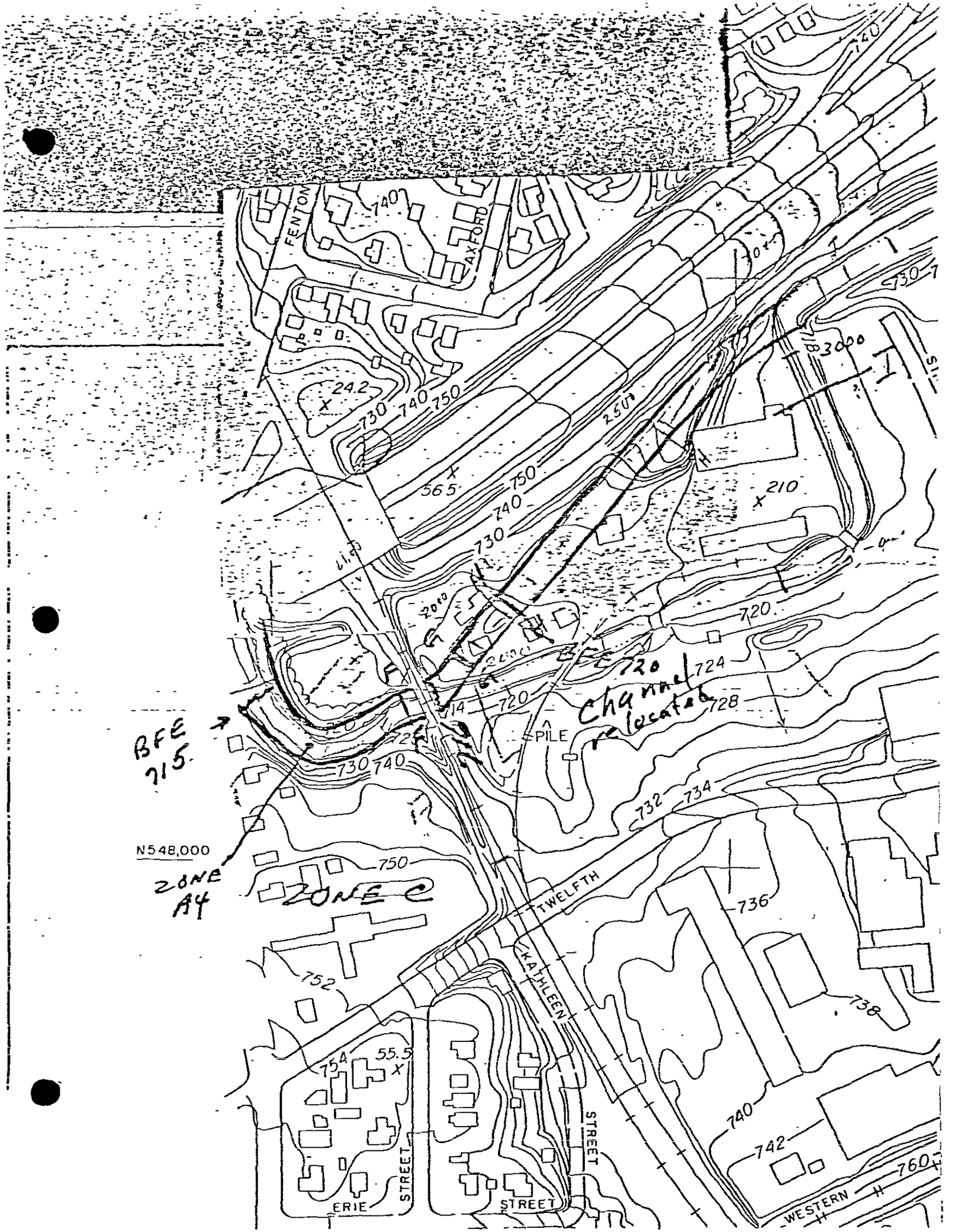
2) STUDY NAME: City of Flint

3) WATERCOURSE: Thread Creek

4) DOCUMENT TYPE: ~~report~~ maps

00BREAK00

THREAD CREEK CITY OF FLINT
STREET
THREAD
CREEK
CEDAR
STREET
748-760
IN WALL
60.4
60.2
56.4
N545
E2,171,000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OXFORD
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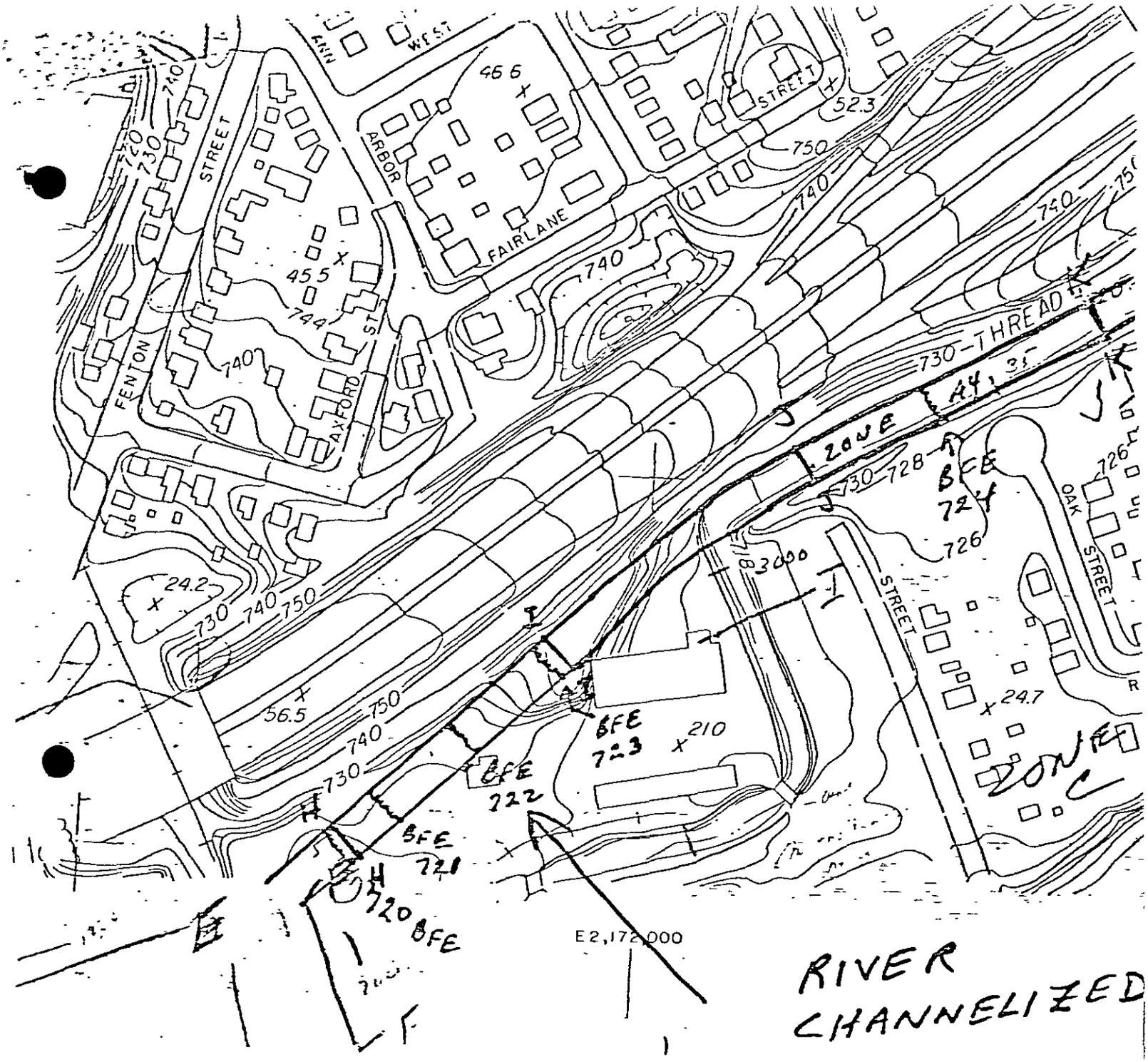
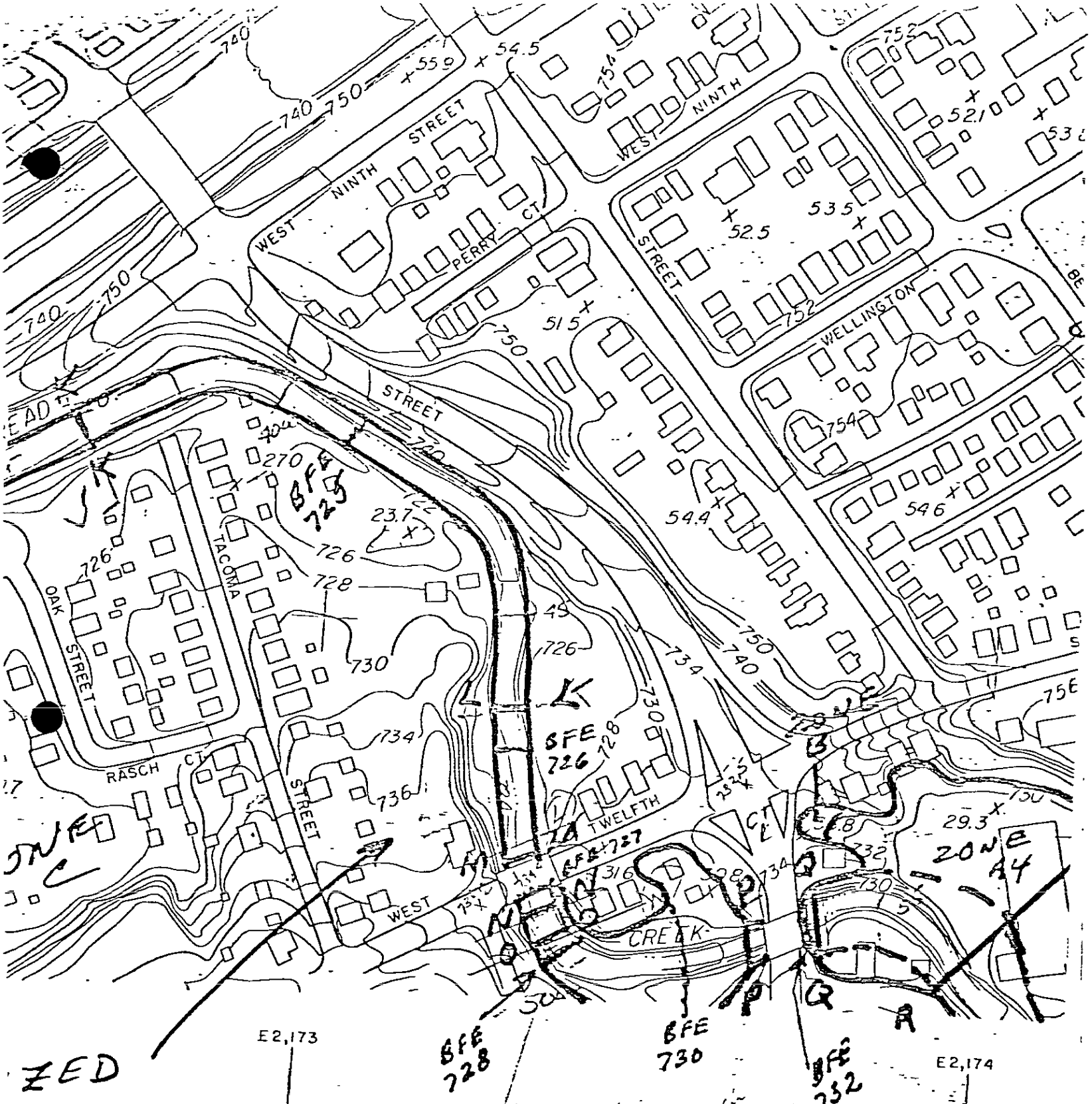
24.2
730
740
750
250
565
750
740
730
210
3000
720
724
728
720
Channel relocated
PILE
BFE 715
730
740
732
734
N548,000
ZONE A4
ZONE C
750
TWELFTH
736
752
KATHLEEN
738
754
55.5
STREET
ERIE
STREET
STREET
740
742
760
WESTERN



HIGAN PLANE COORDINATE
T 9, P.A. 1964.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WEST NINTH
PERRY CT
STREET
WELLINGTON
TACOMA
OAK STREET
RASCH CT
STREET
TWELFTH
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CREEK
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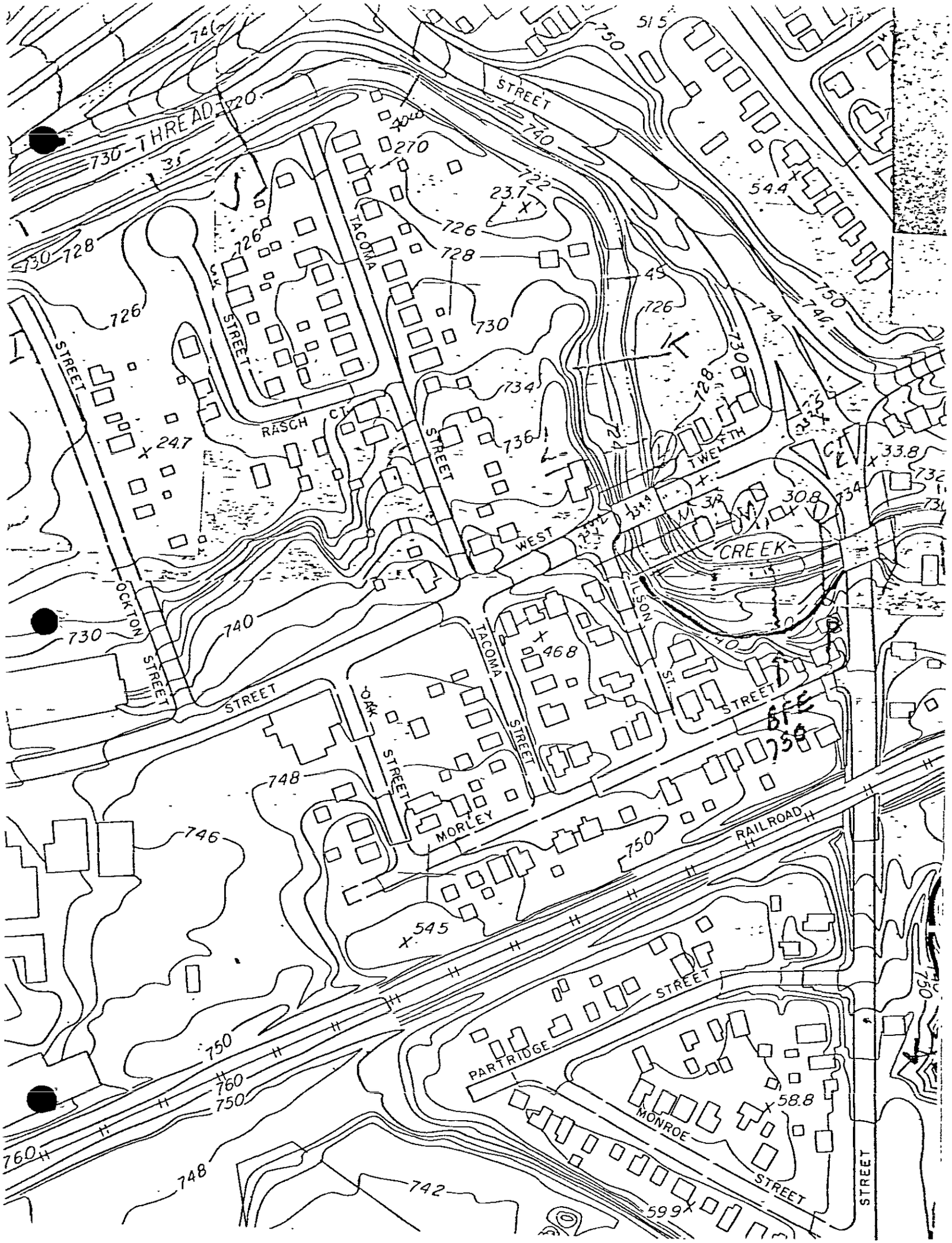
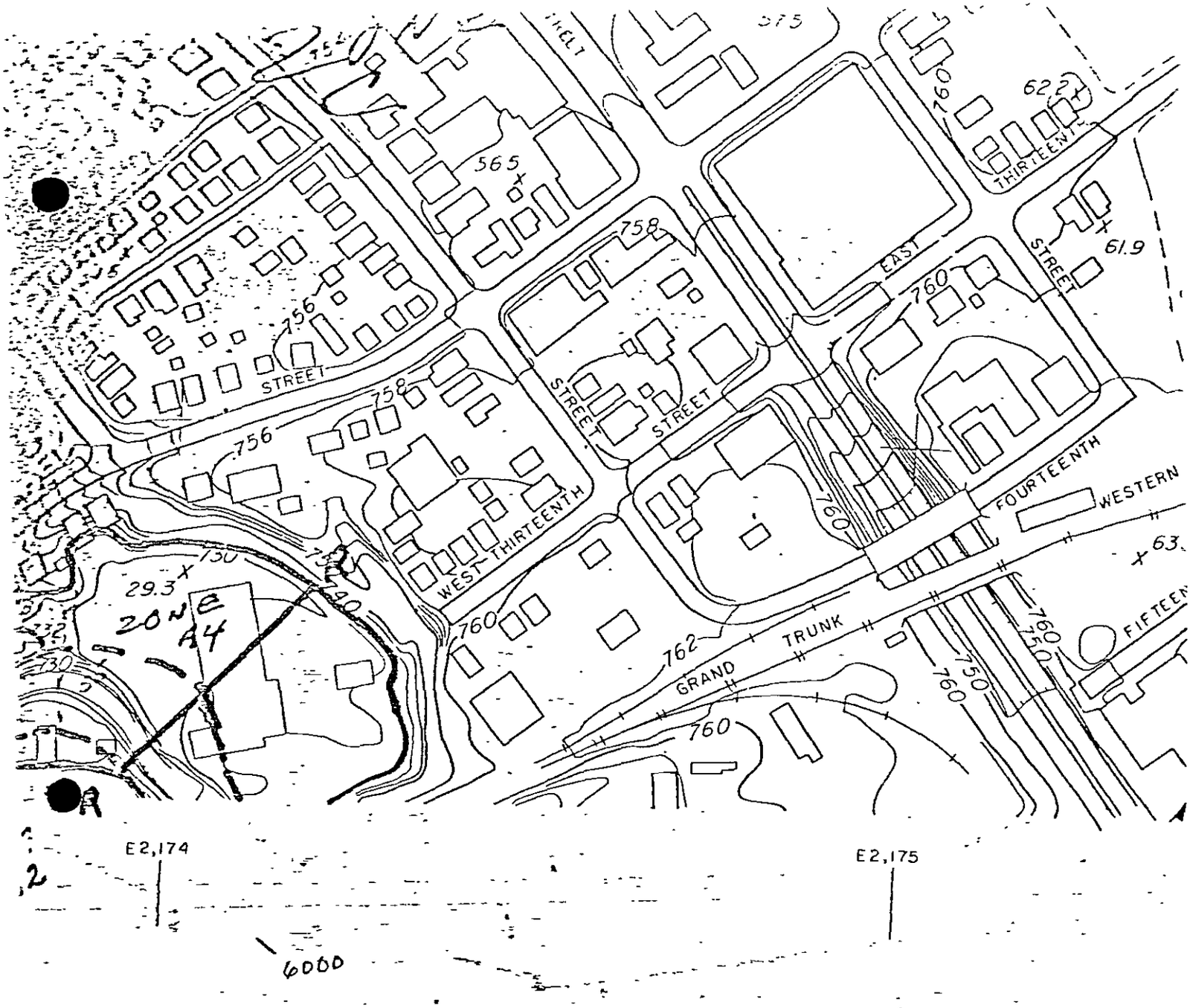
BFE 732
BFE 726
BFE 727
ZONE AH
E2,173
E2,174


THREAD
STREET
TACOMA
STREET
RASCH
CT
STREET
OCKTON
STREET
WEST
TWELFTH
CREEK
ILSON
ST
TACOMA
STREET
OAK
STREET
MORLEY
RAILROAD
STREET
PARTRIDGE
MONROE
STREET
STREET



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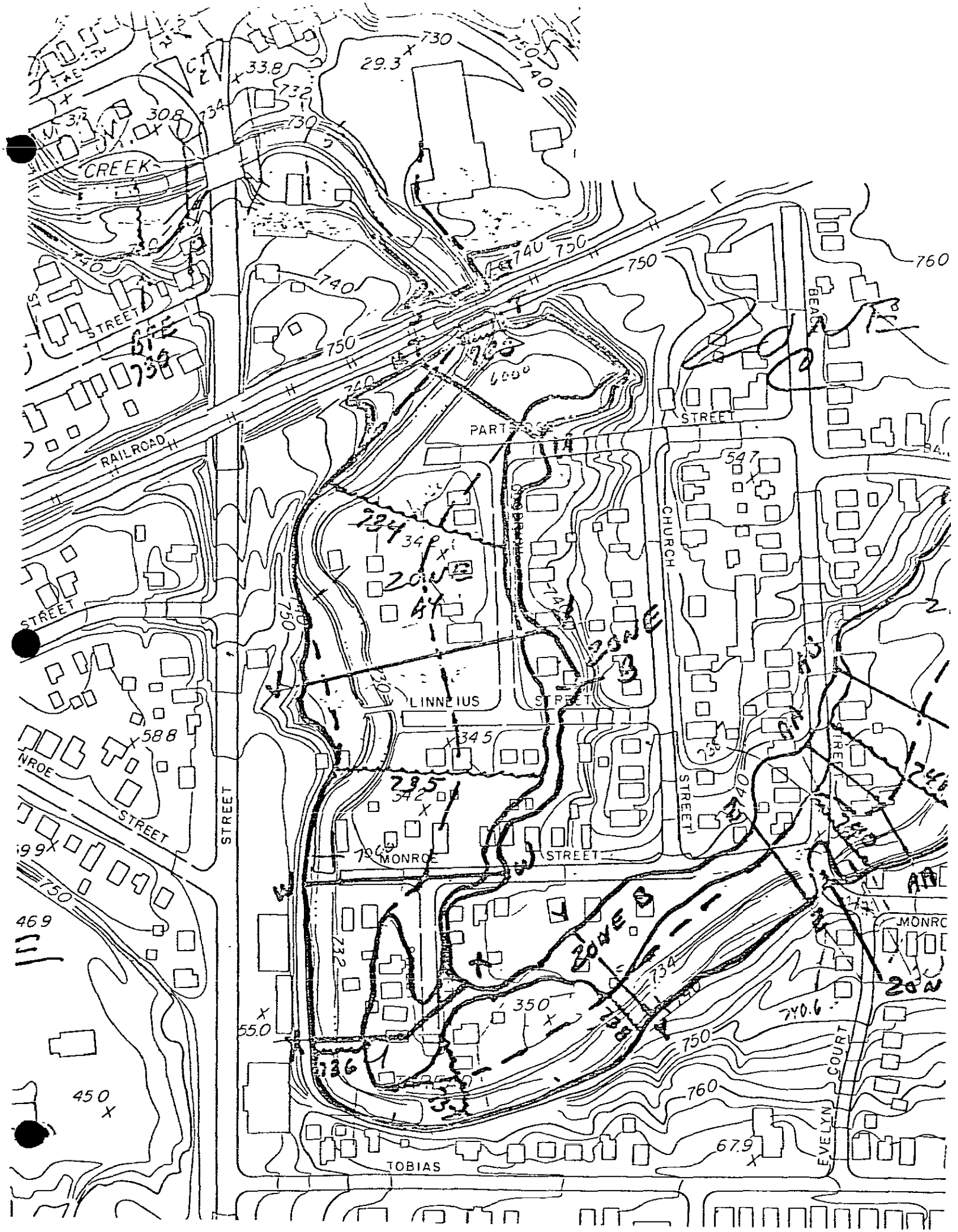
7	8	9	10	11
18	17	16	15	14
19	20	21	22	23
30	29	28	27	26
31	32	33	34	35

200 400 600

CONTOUR INTERVAL 2'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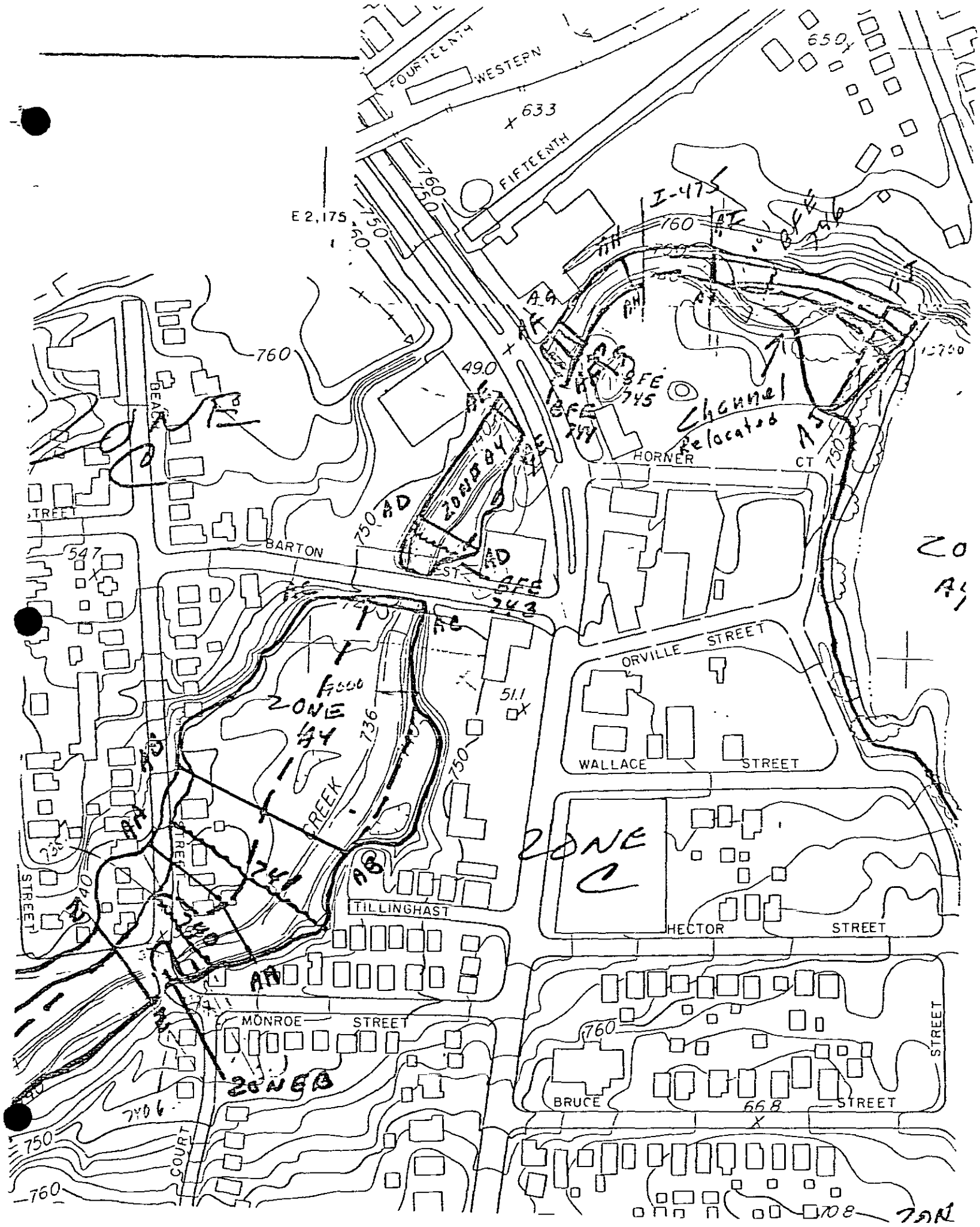
STREET
RAILROAD
PARTRIDGE
STREET
CHURCH
STREET
LINNEIUS
STREET
MONROE
STREET
STREET
TOBIAS
EVELYN
COURT
ZONE B
ZONE B
ZONE B
ZONE B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WESTERN
633
FIFTEENTH
650
E 2,175
760
750
I-475
160
AE
AH
AG
AF
BFE
745
BFE
744
Channel
Relocated
HORNER
CT
49.0
BEACH
STREET
547
BARTON
ST
750
AD
ZONE AH
BFE
743
AE
ORVILLE
STREET
ZONE
AH
736
51.1
WALLACE
STREET
CREEK
ZONE
C
741
AB
TILLINGHAST
HECTOR
STREET
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MONROE
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ZONE AB
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BRUCE
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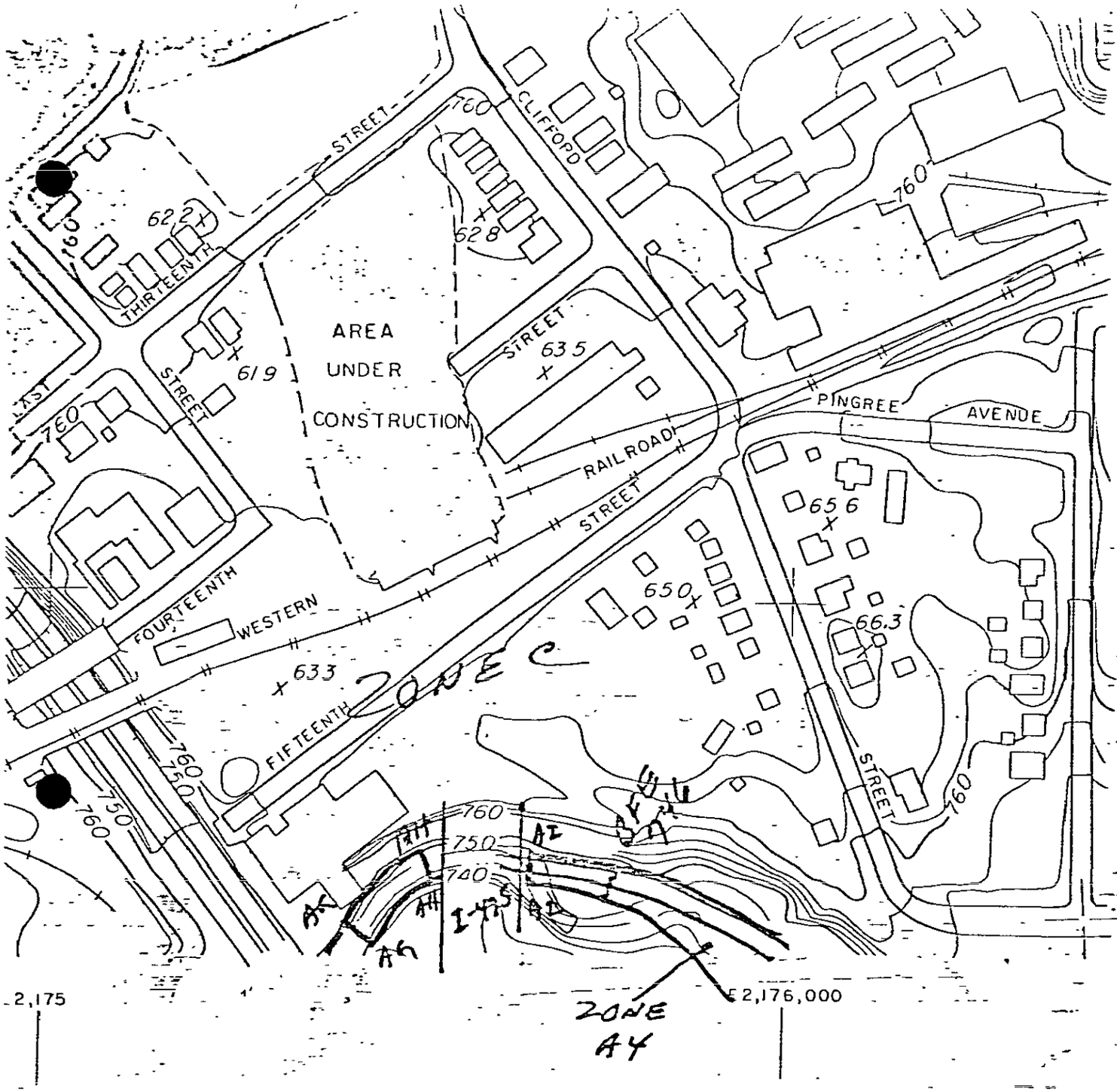
STREET
706
COURT
750
760
708



SECTION INDEX

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24

COMPOS

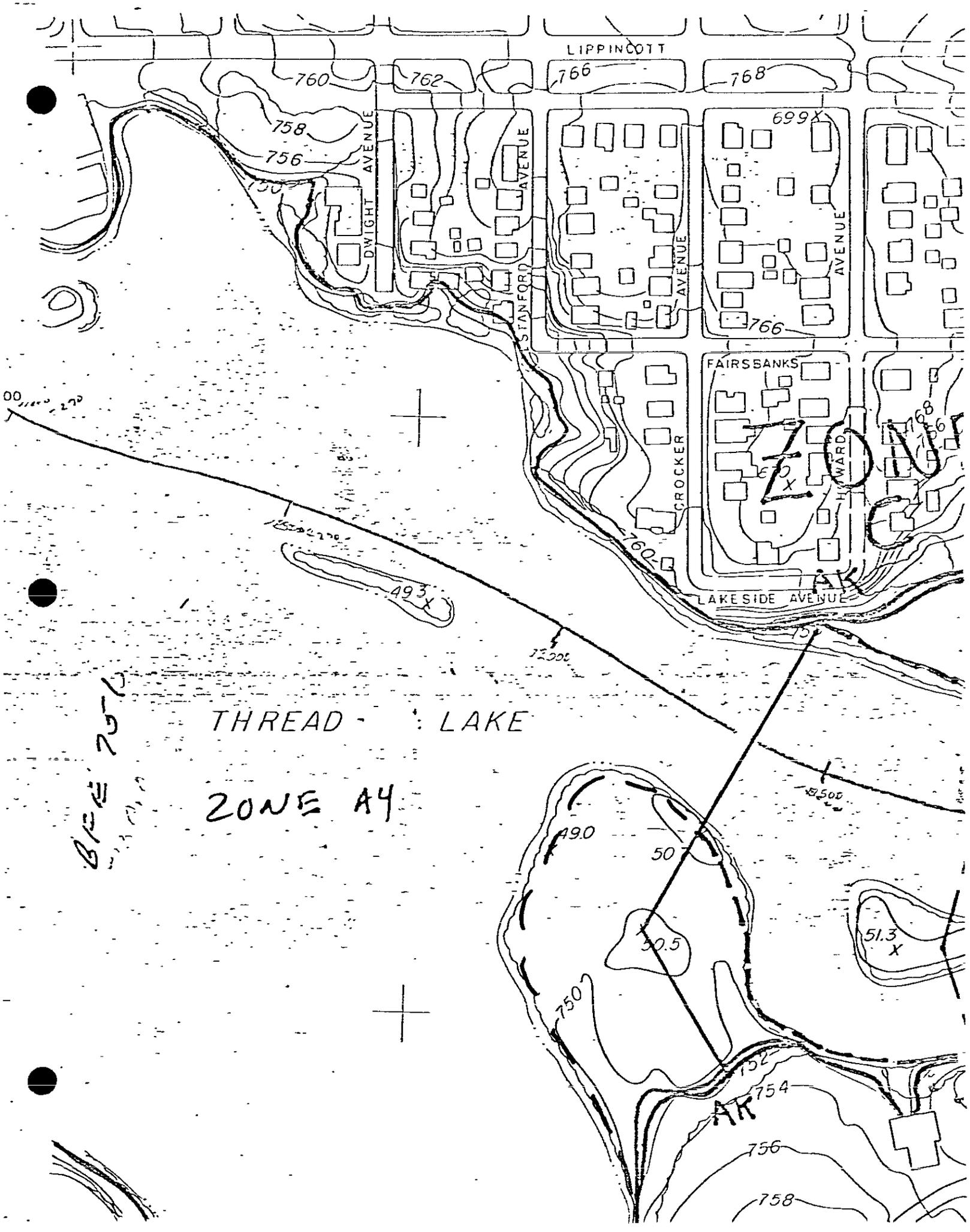
OF

Section 18, T.7

Burton Twp., Genes

GENESEE COUNTY DRAIN

E 2,177,000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762
766
768
758
756
750
DWIGHT AVENUE
STANFORD AVENUE
699X
AVENUE
766
FAIRSBANKS
ZONE
CROCKER
HOWARD
760
493 X
LAKESIDE AVENUE
THREAD LAKE
ZONE A4
49.0
50
50.5
51.3 X
750
752
754
756
758

THREAD - LAKE

ZONE A4

NAVAL RESERVE
ZONE A4
LAKEWOOD
DRAIN
POND
758
713
69.8
718
69.5
69.5
73.7
69.9
713
71.1
74.8
70.6
49.6
49.0
484
522
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772
770
760
750
756
754
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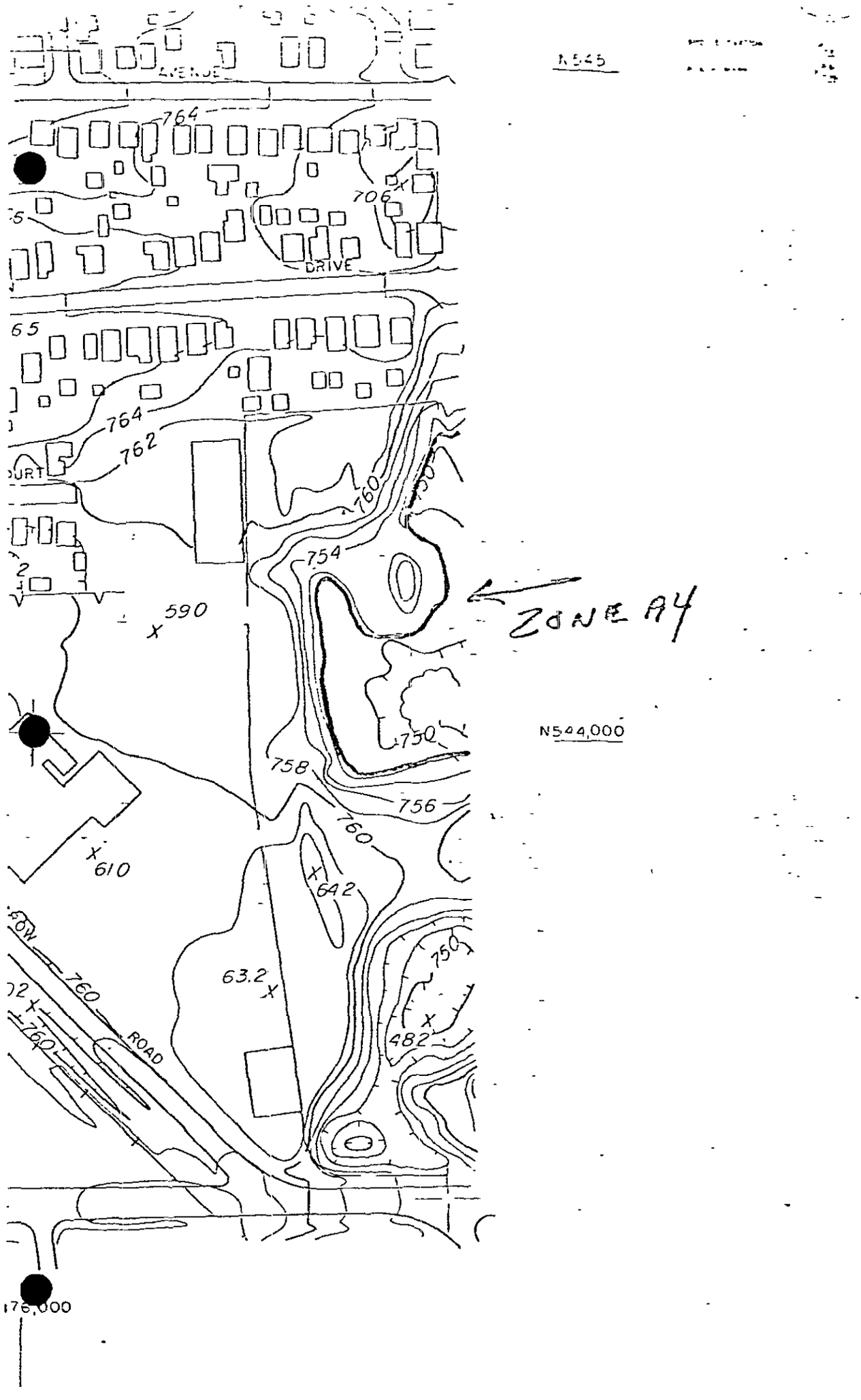
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706
DRIVE
764
762
760
754
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750
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756
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610
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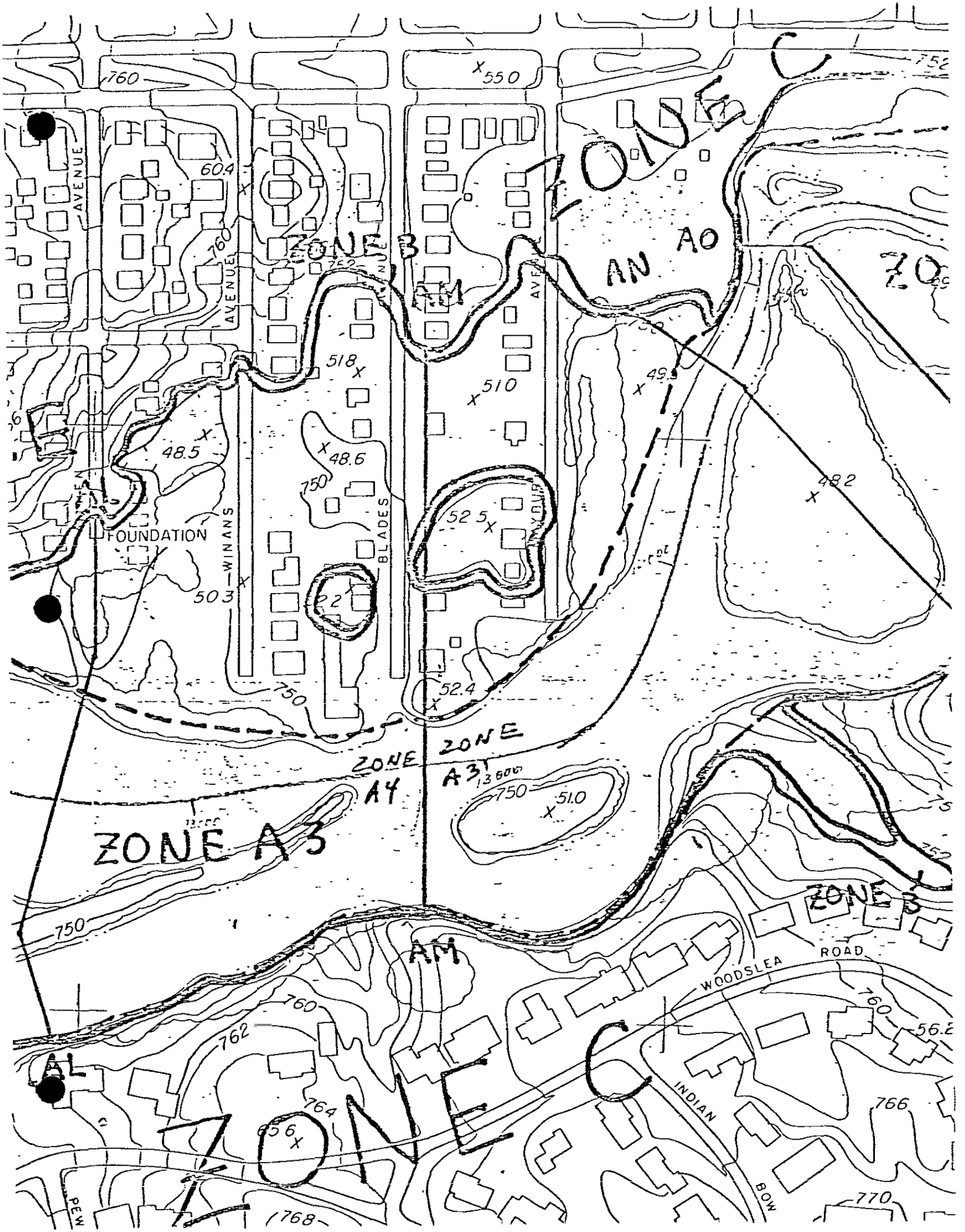
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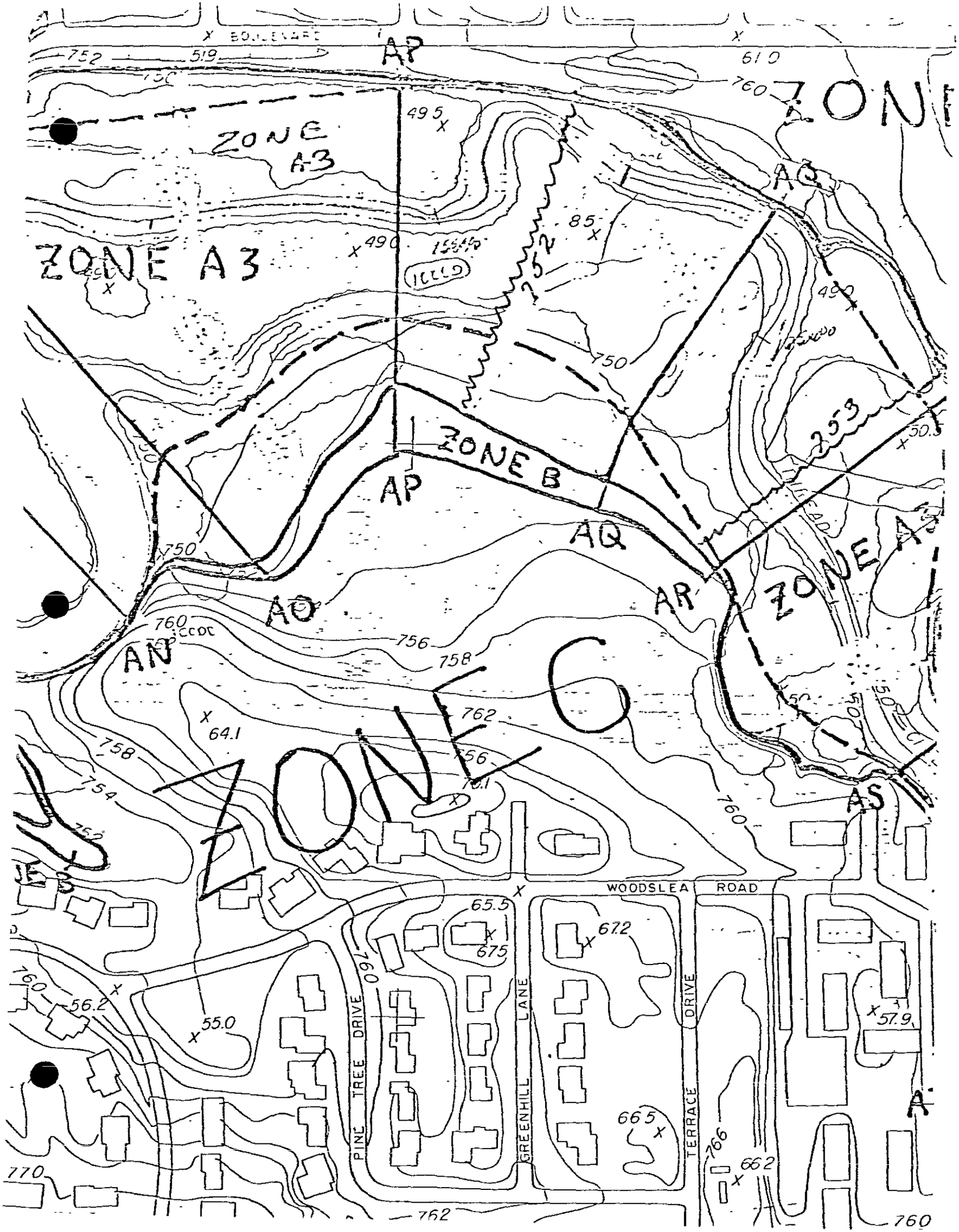
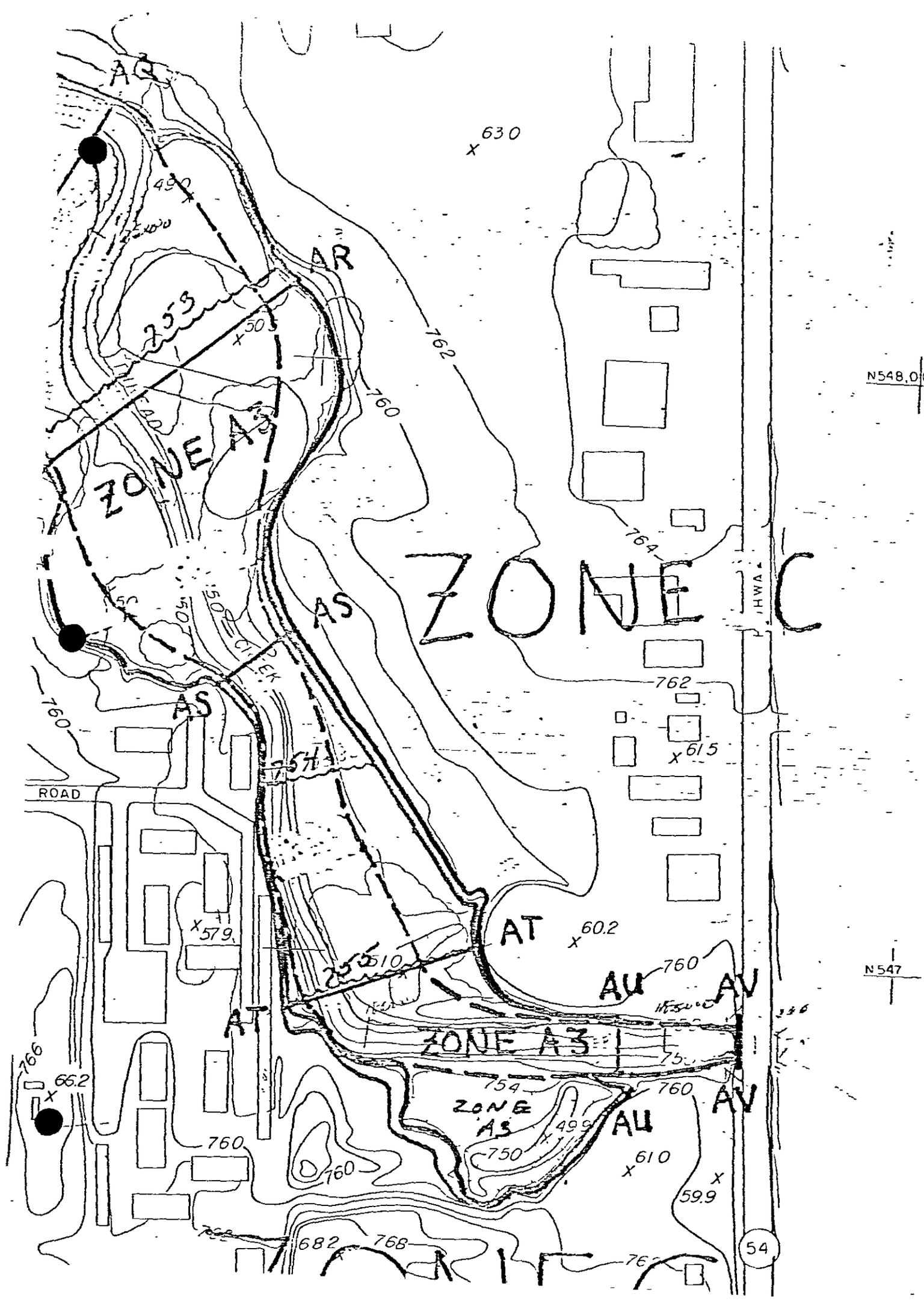
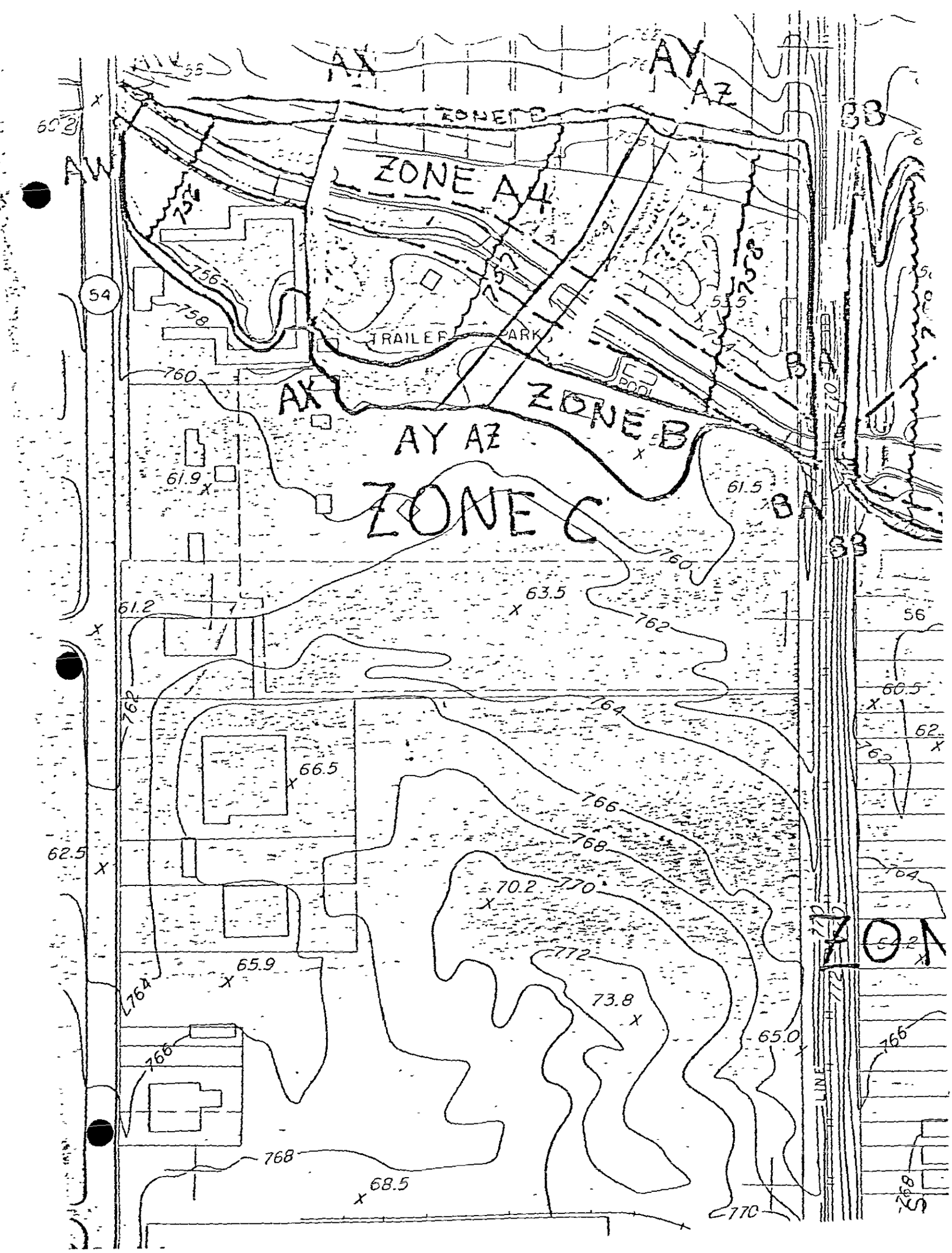
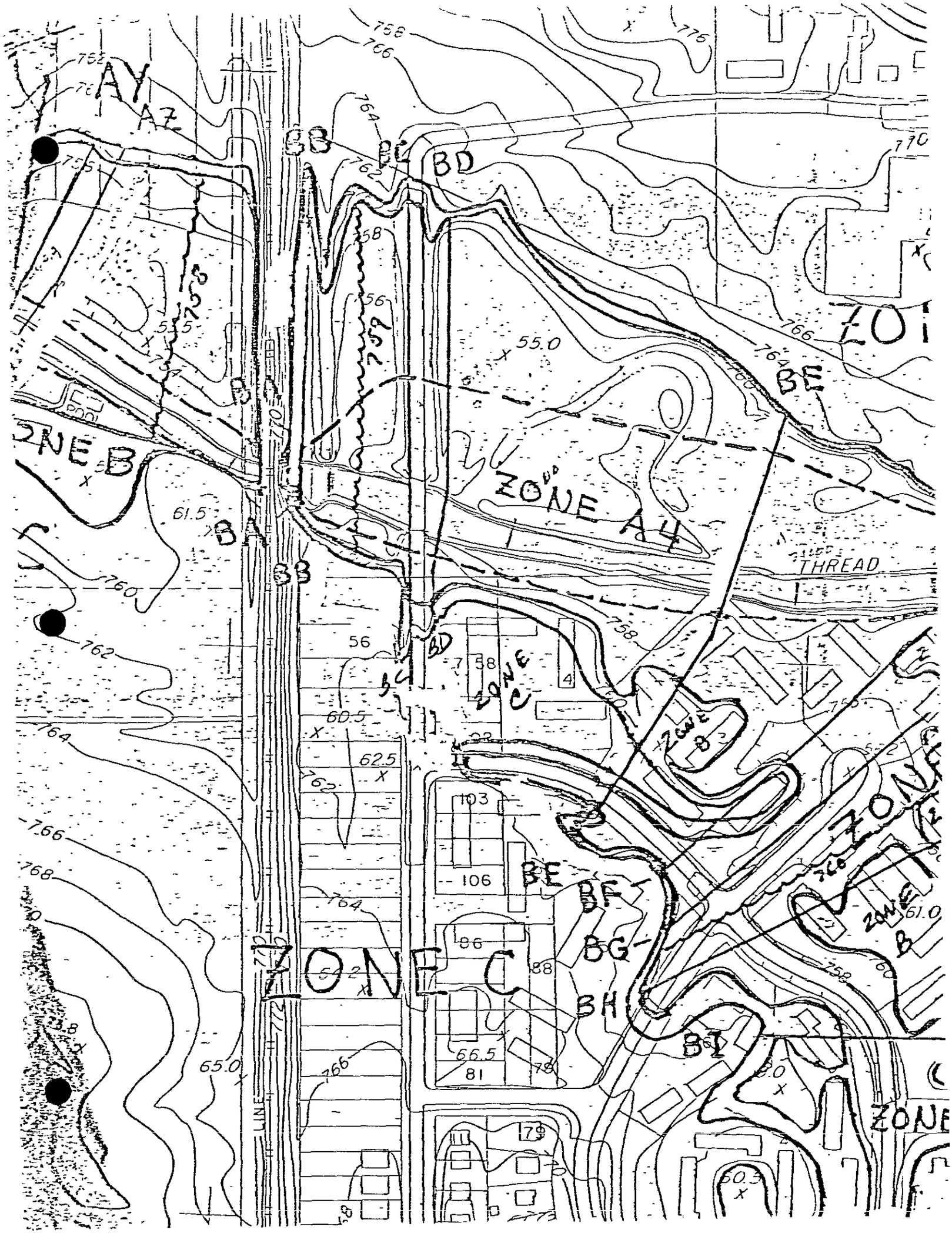
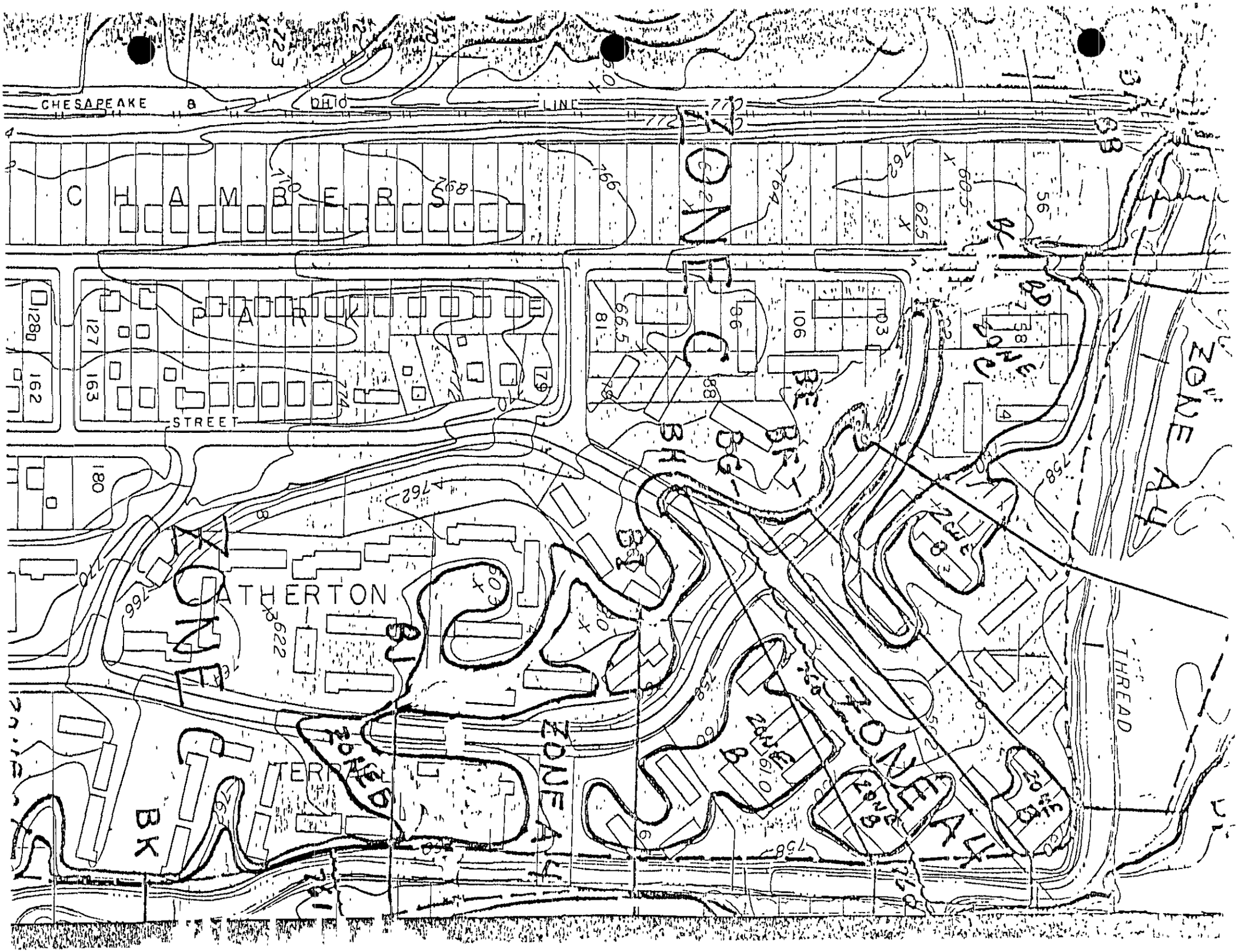
ZONE B
AM
AN
AO
ZONE
ZONE
A4
A3
ZONE A3
ZONE B
AM
AL
ZONE C
AVENUE
AVENUE
WINANS
BLADES
FOUNDATION
WOODSLEA ROAD
INDIAN BOW
760
550
60.4
760
762
518
510
49.9
48.5
48.6
750
52.5
48.2
503
52.4
750
750
51.0
750
760
762
764
656
766
768
770

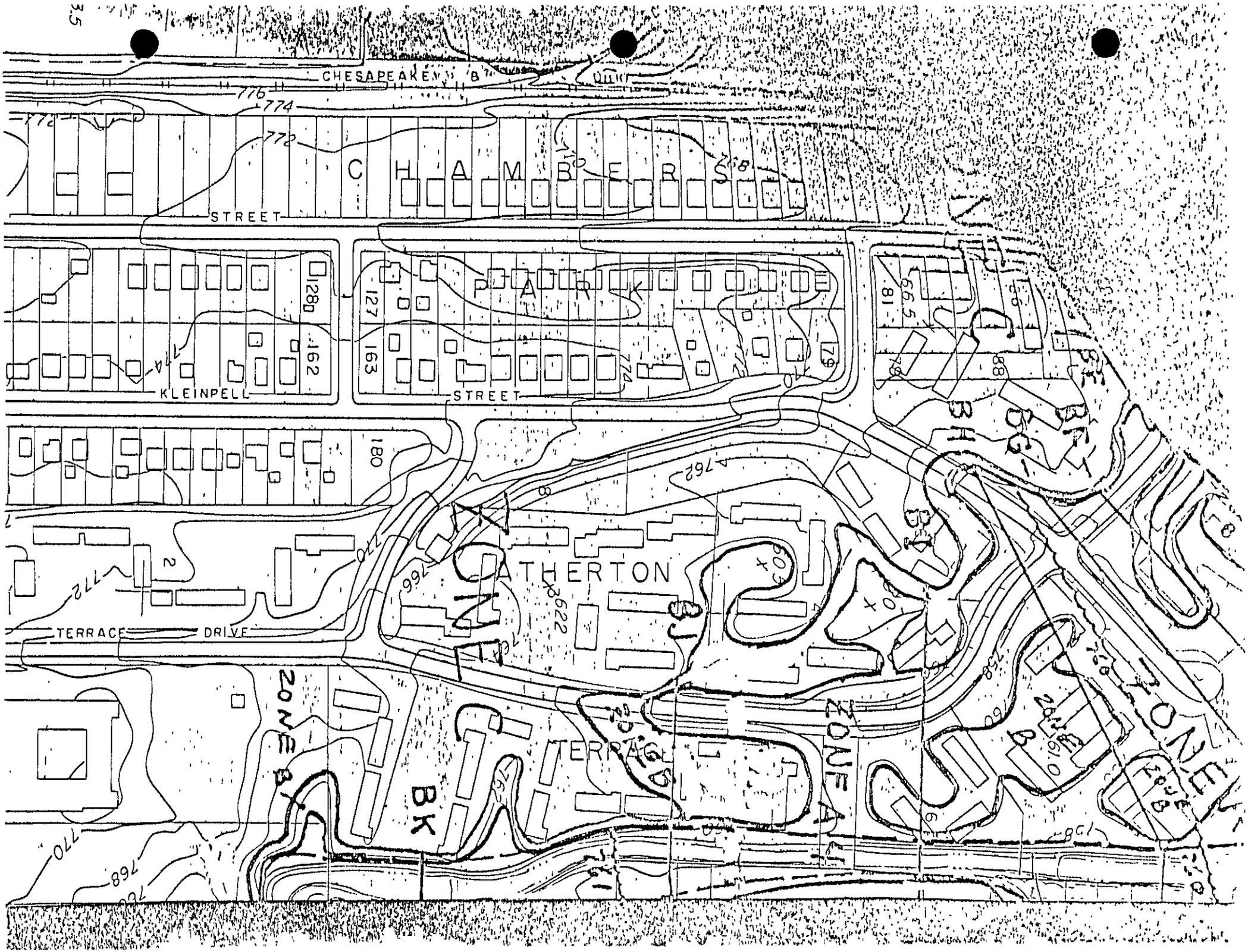

BOULEVARD
AP
ZONE A3
ZONE A3
ZONE B
AP
AQ
AQ
AR
ZONE A3
AO
AN
ZONE C
AS
WOODSLEA ROAD
PINE TREE DRIVE
GREENHILL LANE
TERRACE DRIVE

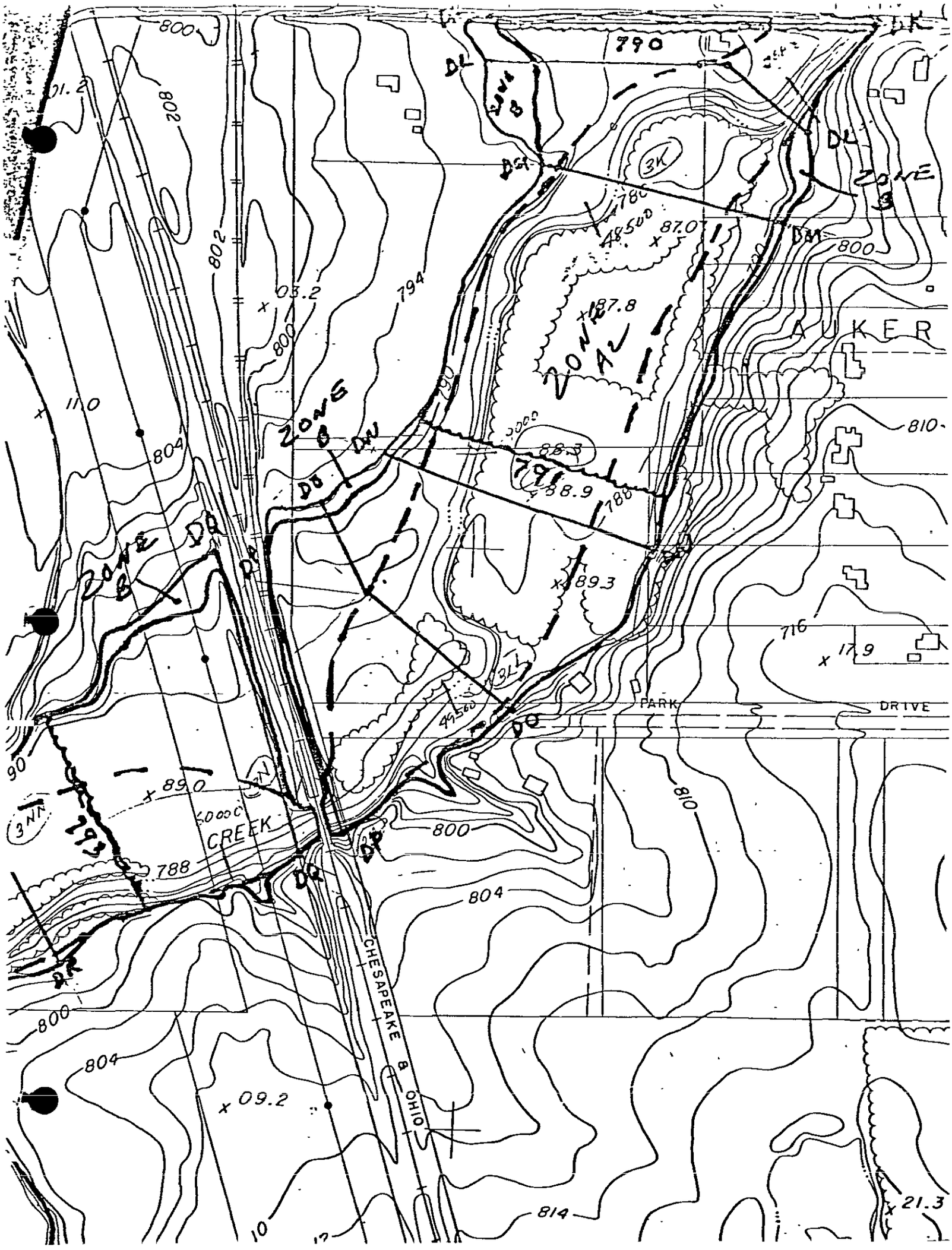

AQ
AR
AS
AS
AT
AT
AU
AU
AV
AV
ZONE A3
ZONE A3
ZONE A3
ZONE C
630
490
500
762
760
764
762
615
579
510
60.2
760
754
750
499
610
59.9
682
768
66.2
766
760
760
760
ROAD
CREEK
HWY
N548,000
N547
54

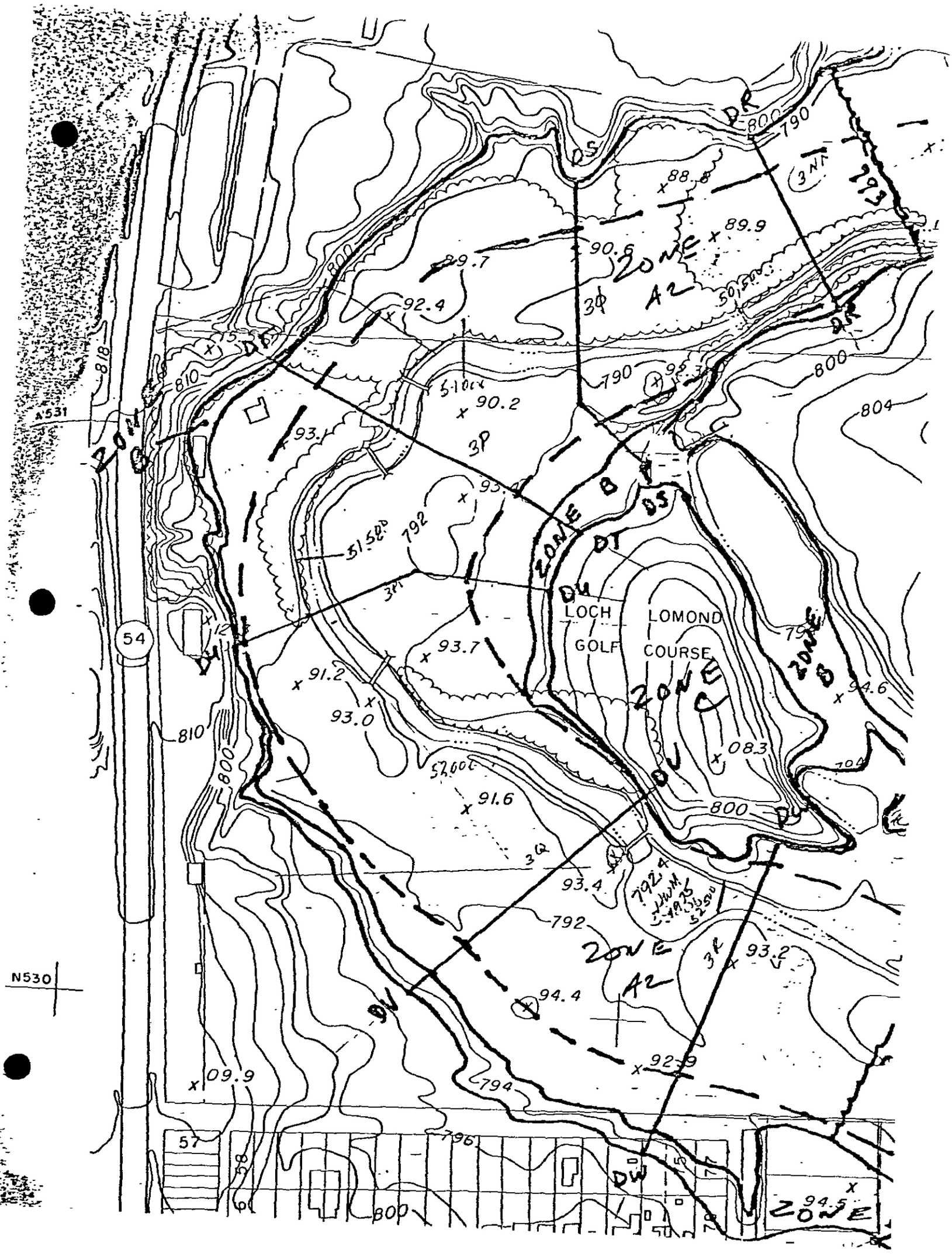

AX
AY
AZ
ZONE B
ZONE A4
AW
BB
54
TRAILER PARK
POOL
AX
ZONE B
AY AZ
ZONE C
BA
BB
LINE
ZONE

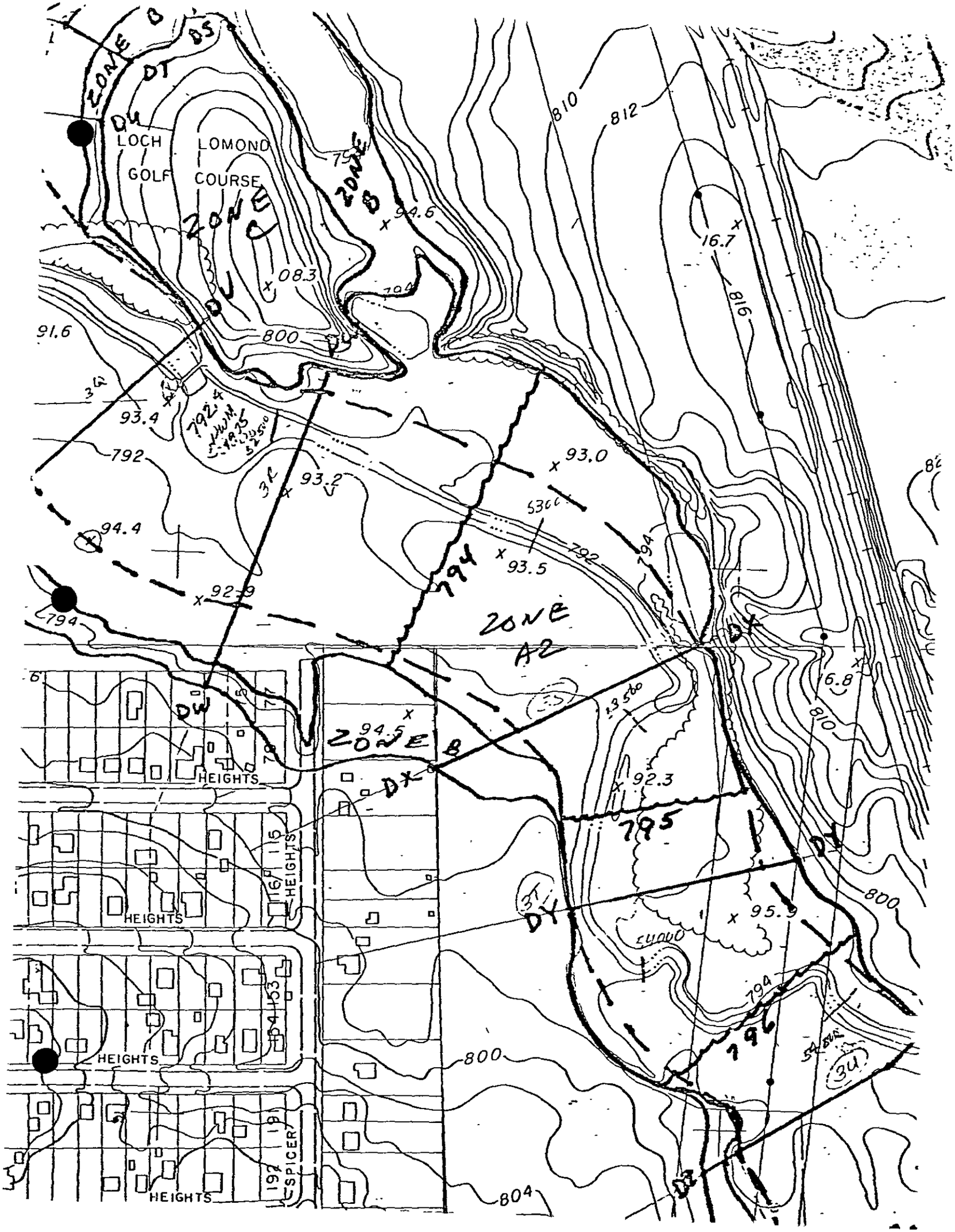

AY
AZ
BB
BC
BD
BE
BF
BG
BH
BI
ZONE A4
ZONE C
ZONE B
THREAD
POOL
755
759
758
766
764
762
760
768
770
772
55.0
61.5
60.5
62.5
65.0
66.5
61.0
60.3
56
58
103
106
86
88
81
79

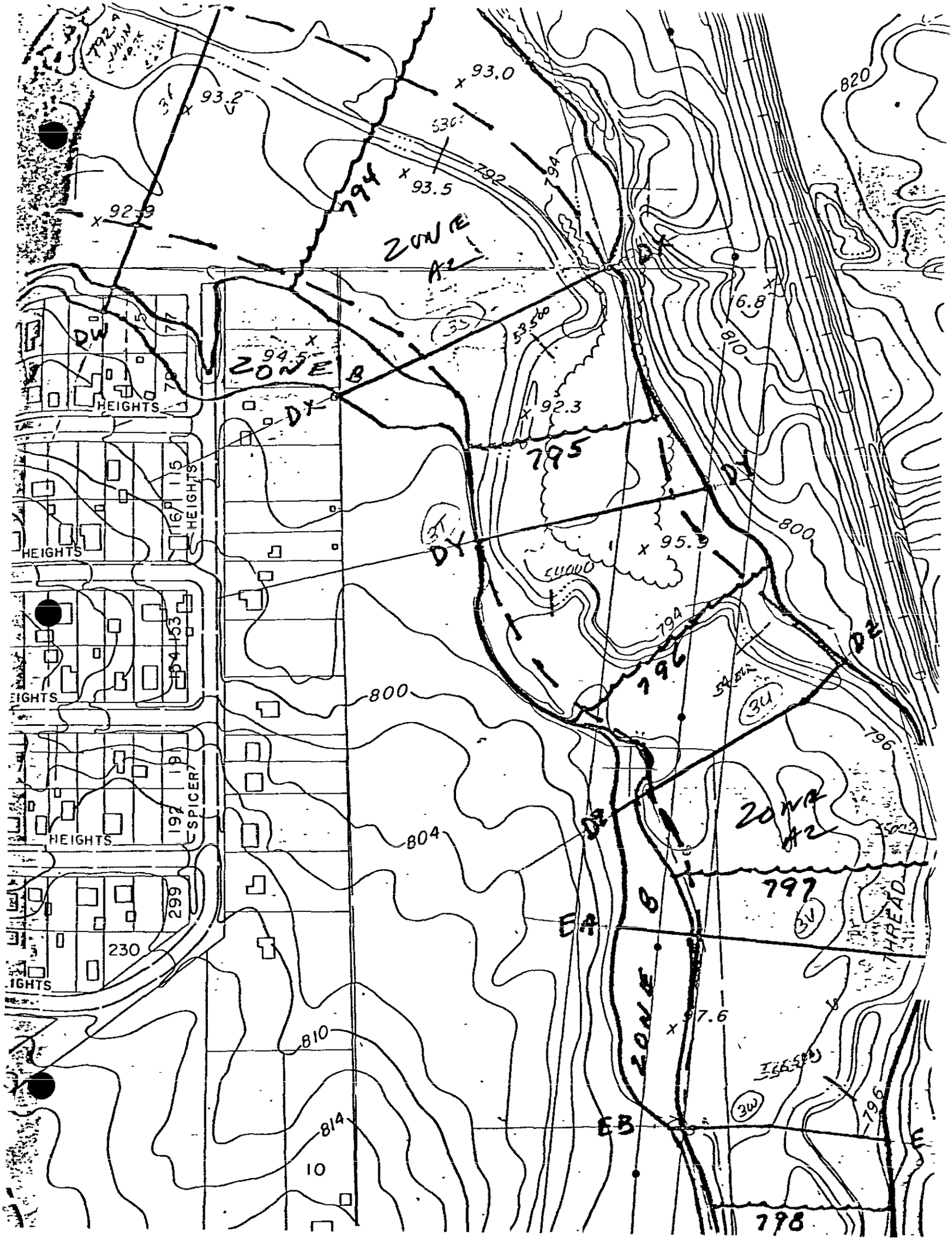

CHESAPEAKE & OHIO LINE
CHAMBERS
PARK
STREET
ATHERTON
TERRACE
ZONE A
ZONE B
ZONE C
THREAD

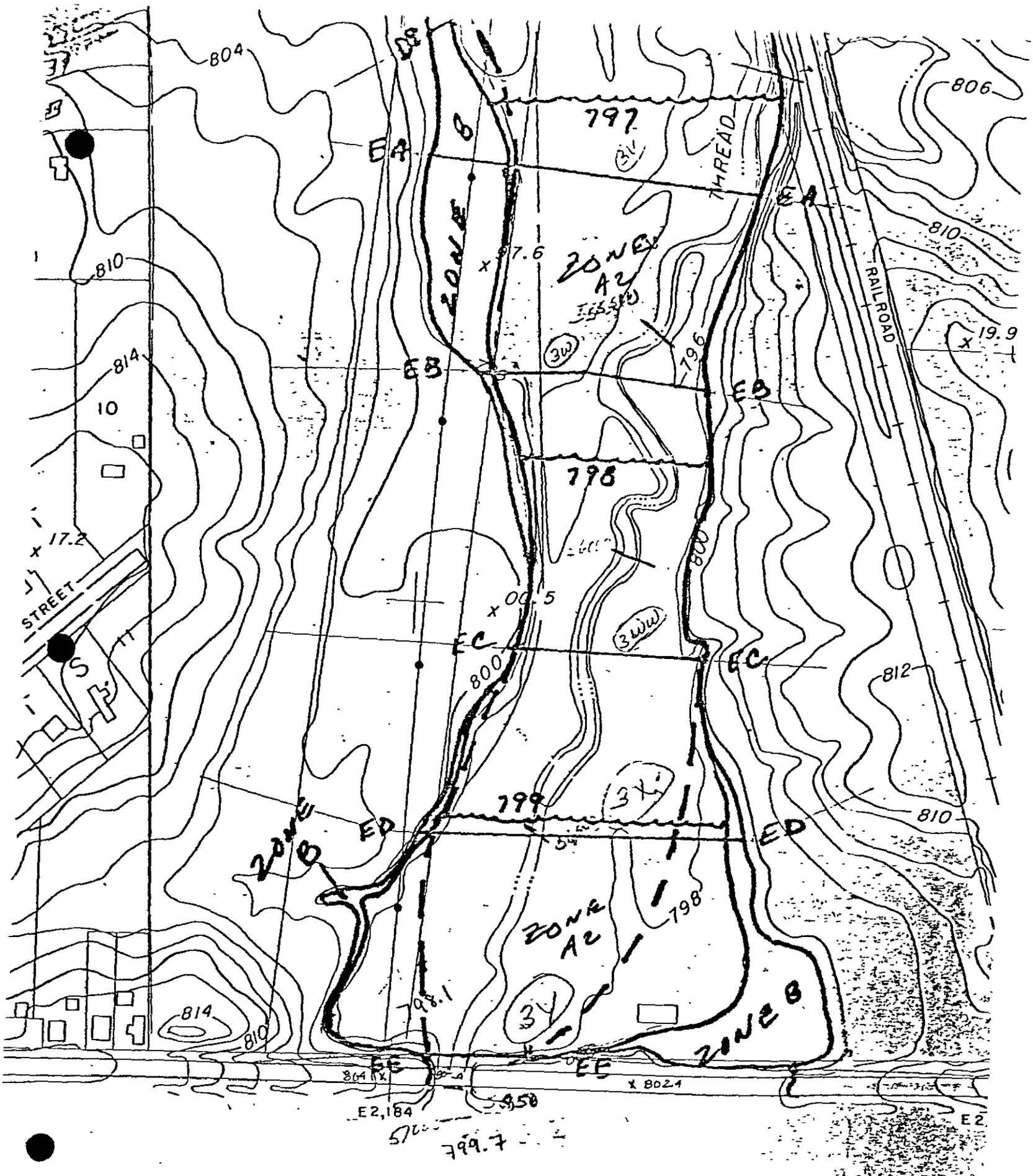

CHESAPEAKE
CHAMBERS
STREET
PARK
KLEINPELL
STREET
ATHERTON
TERRACE
DRIVE
TERRACE
ZONE B
ZONE A
ZONE B
ZONE B
BK
776
774
772
770
768
766
762
128
127
163
162
180
181
165
88
76
2622
2610

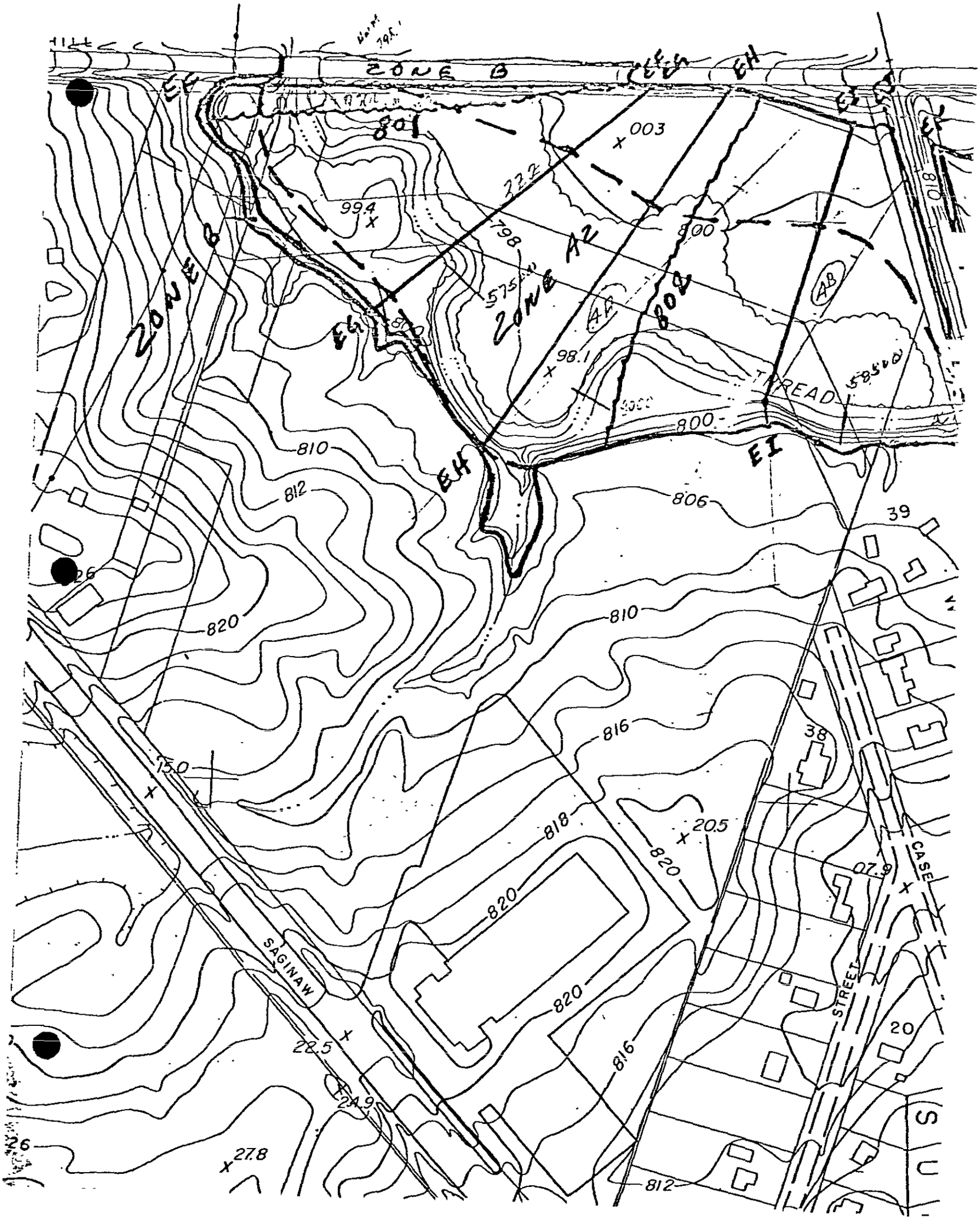

ZONE B
ZONE A2
ZONE B
ZONE B
ZONE B
ZONE B
ZONE B
ZONE B
ZONE B
PARK DRIVE
CREEK
CHESAPEAKE & OHIO
DL
DM
DN
DO
DP
DQ
DR
DK
3K
3NN
3L
790
791
793
788
786
794
802
804
800
810
814
716

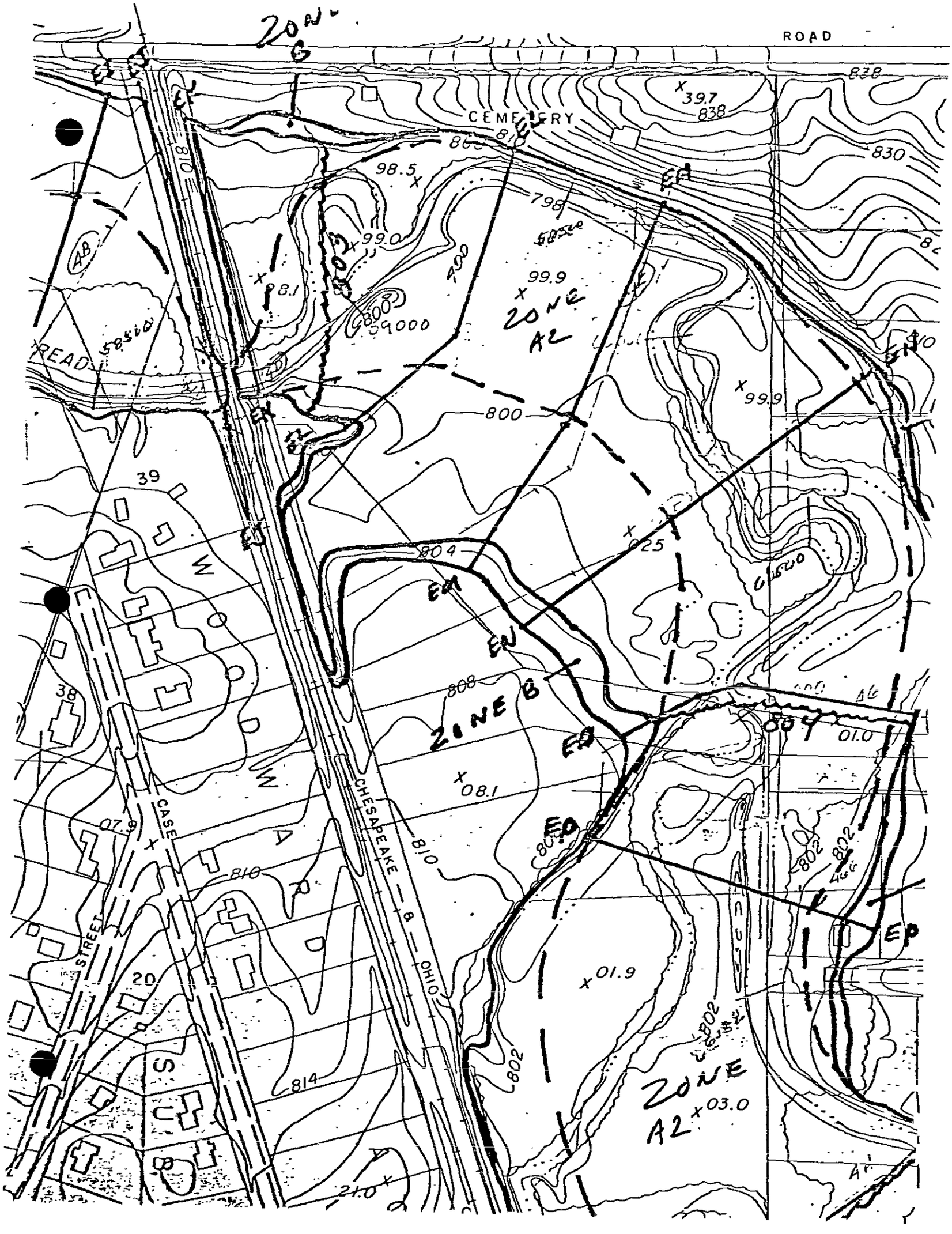

LOCH LOMOND GOLF COURSE
ZONE A2
ZONE B
ZONE D
ZONE E
DR
DS
DT
DU
DV
DW
54
57
N530
A531
3NT
3P
3Q
3R
3S
792
794
796
800
810
818
804
88.8
89.9
90.6
89.7
92.4
90.2
93.1
93.4
93.7
91.2
93.0
91.6
93.4
93.2
94.4
92.9
94.6
09.9
94.5

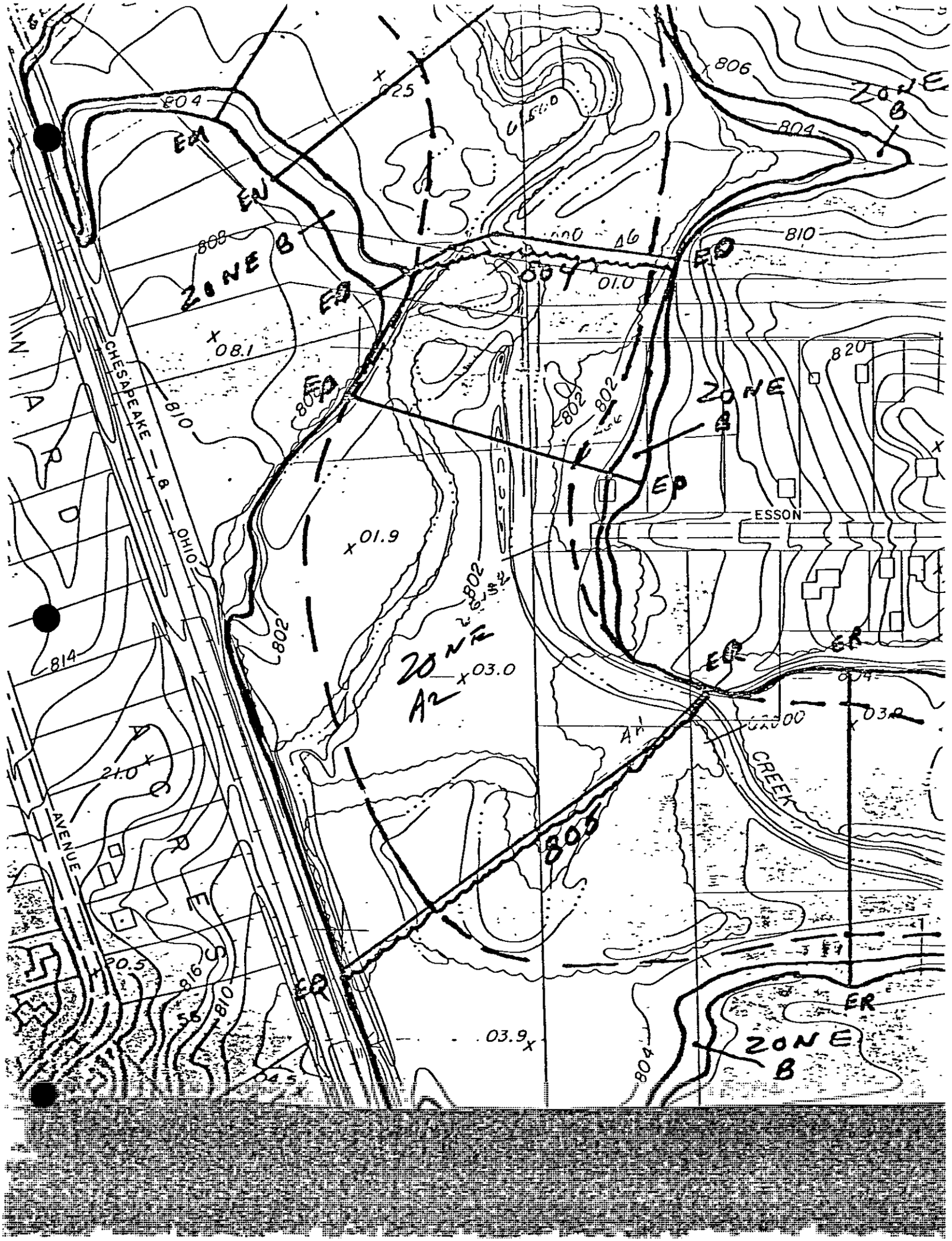

ZONE B
DS
DT
DU
LOCH
LOMOND
GOLF
COURSE
ZONE C
ZONE B
94.6
83.3
810
812
816
16.7
91.6
800
93.4
792
93.2
93.0
94.4
93.5
794
ZONE A2
DX
6.8
ZONE B
94.5
92.3
795
DY
95.9
800
796
804
HEIGHTS
HEIGHTS
HEIGHTS
HEIGHTS
SPICER


93.0
93.2
93.5
92.9
792
794
ZONE A2
ZONE B
DW
DY
DZ
94.5
92.3
795
95.9
820
810
800
804
797
796
798
814
ZONE B
ZONE A2
EA
EB
97.6
HEIGHTS
SPICER
THREAD
230
299
10

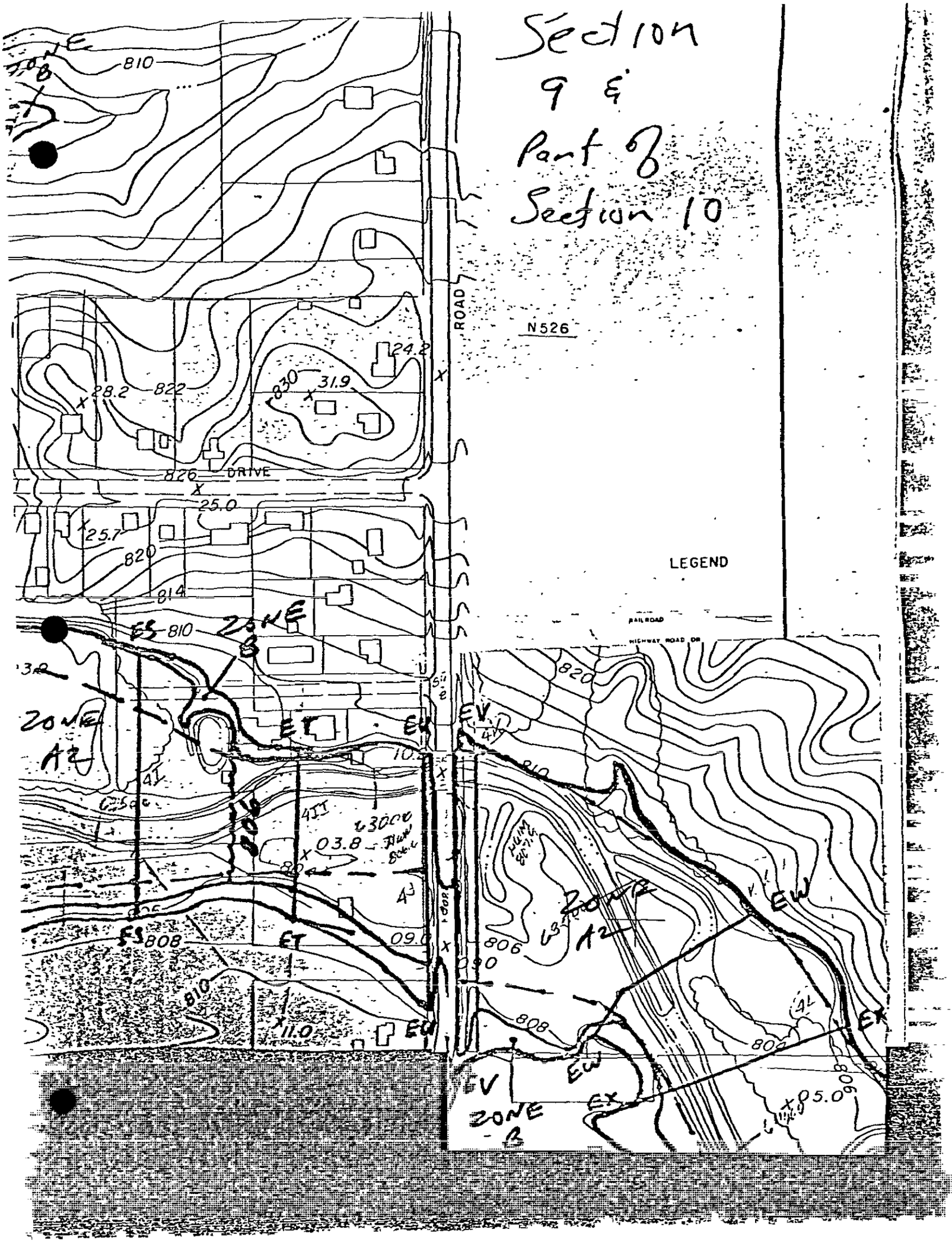

804
806
797
EA
ZONE B
THREAD
810
ZONE A2
RAILROAD
19.9
814
EB
796
10
798
17.2
STREET
800
EC
812
799
ED
ZONE B
ZONE A2
798
814
810
EE
E2,184
799.7

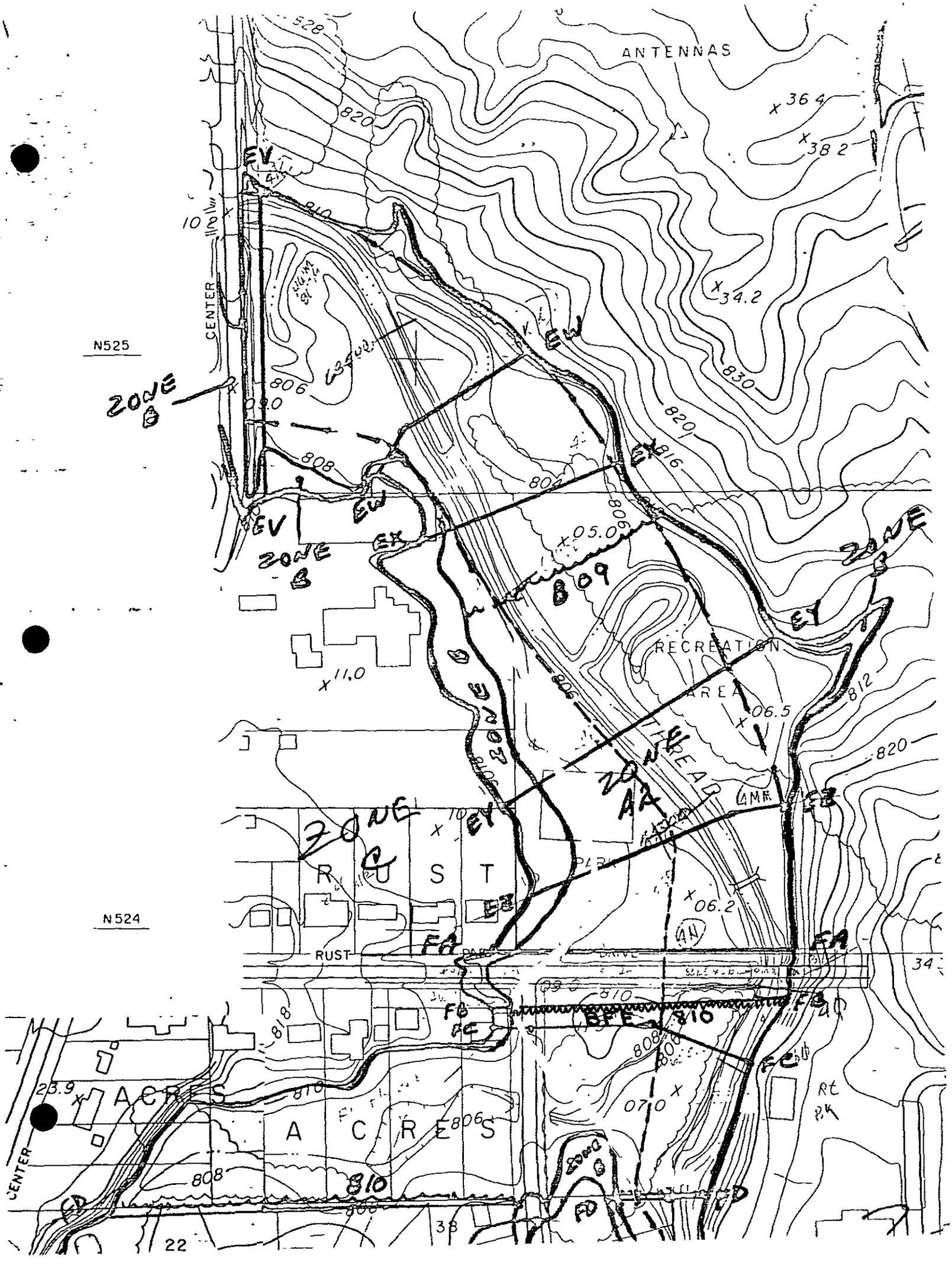

ZONE B
ZONE B
ZONE A2
EH
EH
EH
EH
EI
AB
AB
801
802
003
22.2
99.4
798
575
98.1
810
800
TREAD
585
800
810
812
806
39
820
810
816
38
15.0
818
20.5
820
820
820
CASE
07.9
STREET
SAGINAW
20
28.5
816
24.9
27.8
812

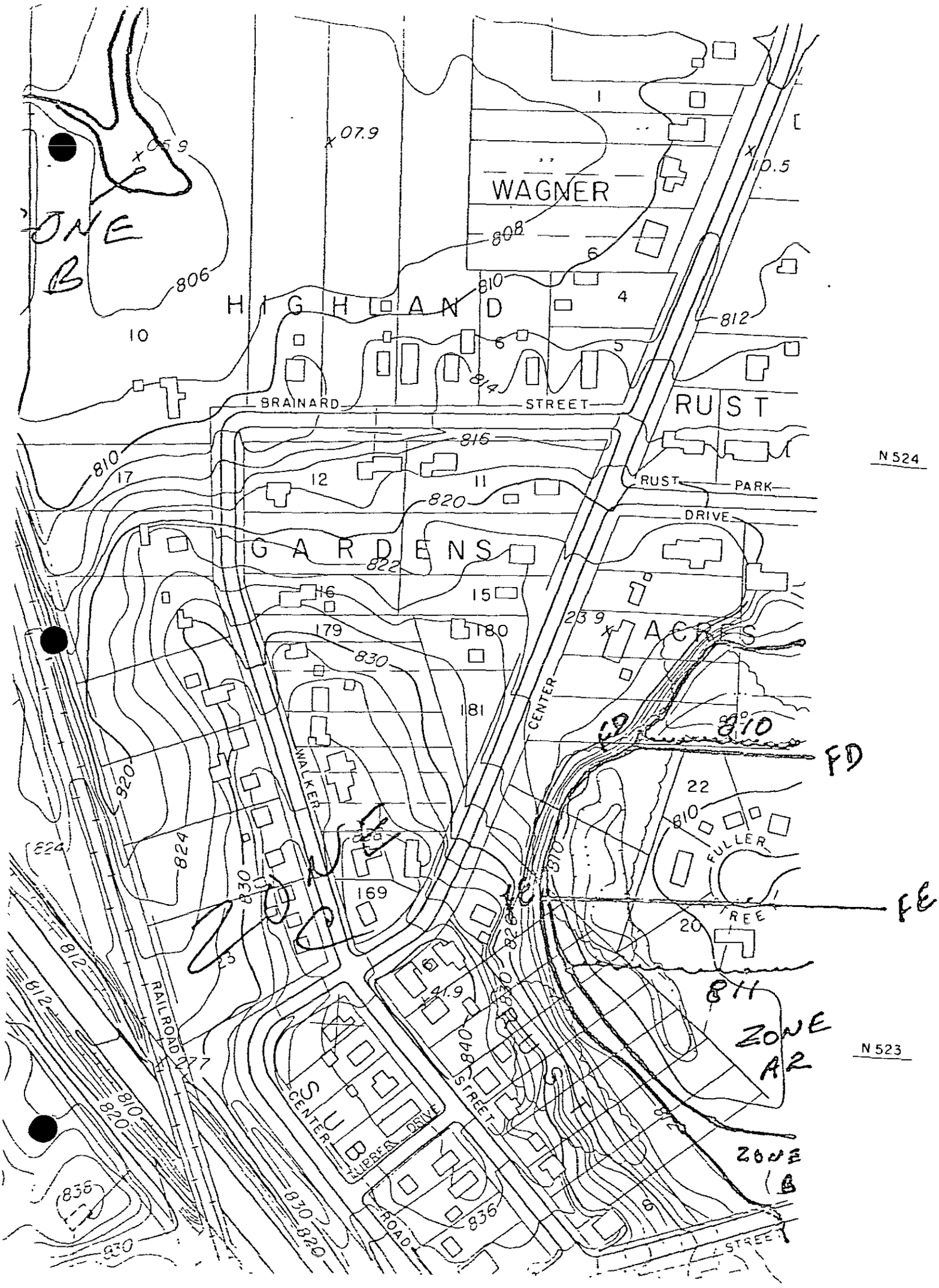

ROAD
CEMETERY
ZONE A2
ZONE B
ZONE A2
CASE STREET
CHESAPEAKE — 8 — OHIO
EP
EN
AB


CHESAPEAKE — 8 — OHIO
AVENUE
ESSON
CREEK
ZONE B
ZONE A2
EP
ER
804
806
808
810
814
816
820
802

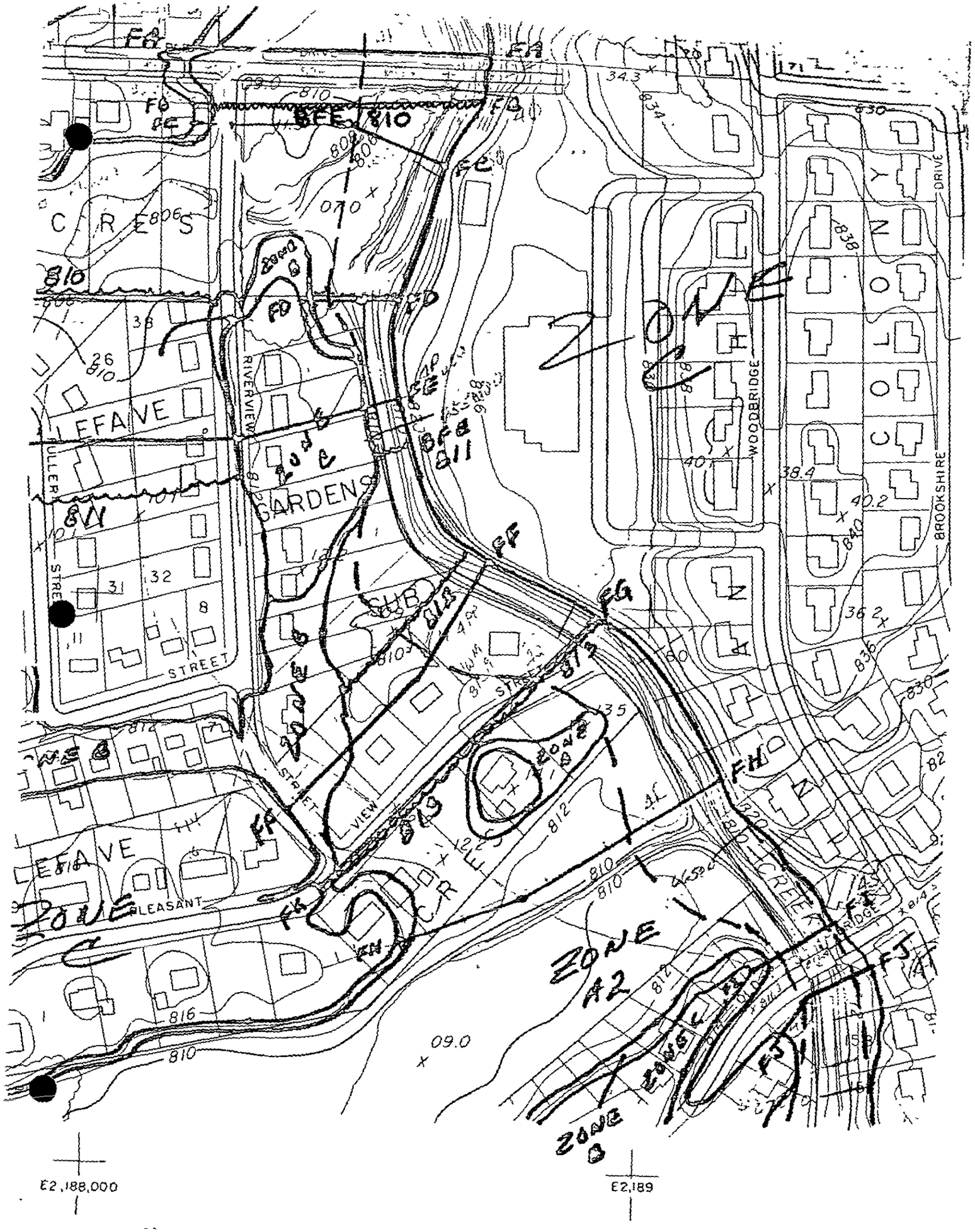
Section 9 & Part 8 Section 10

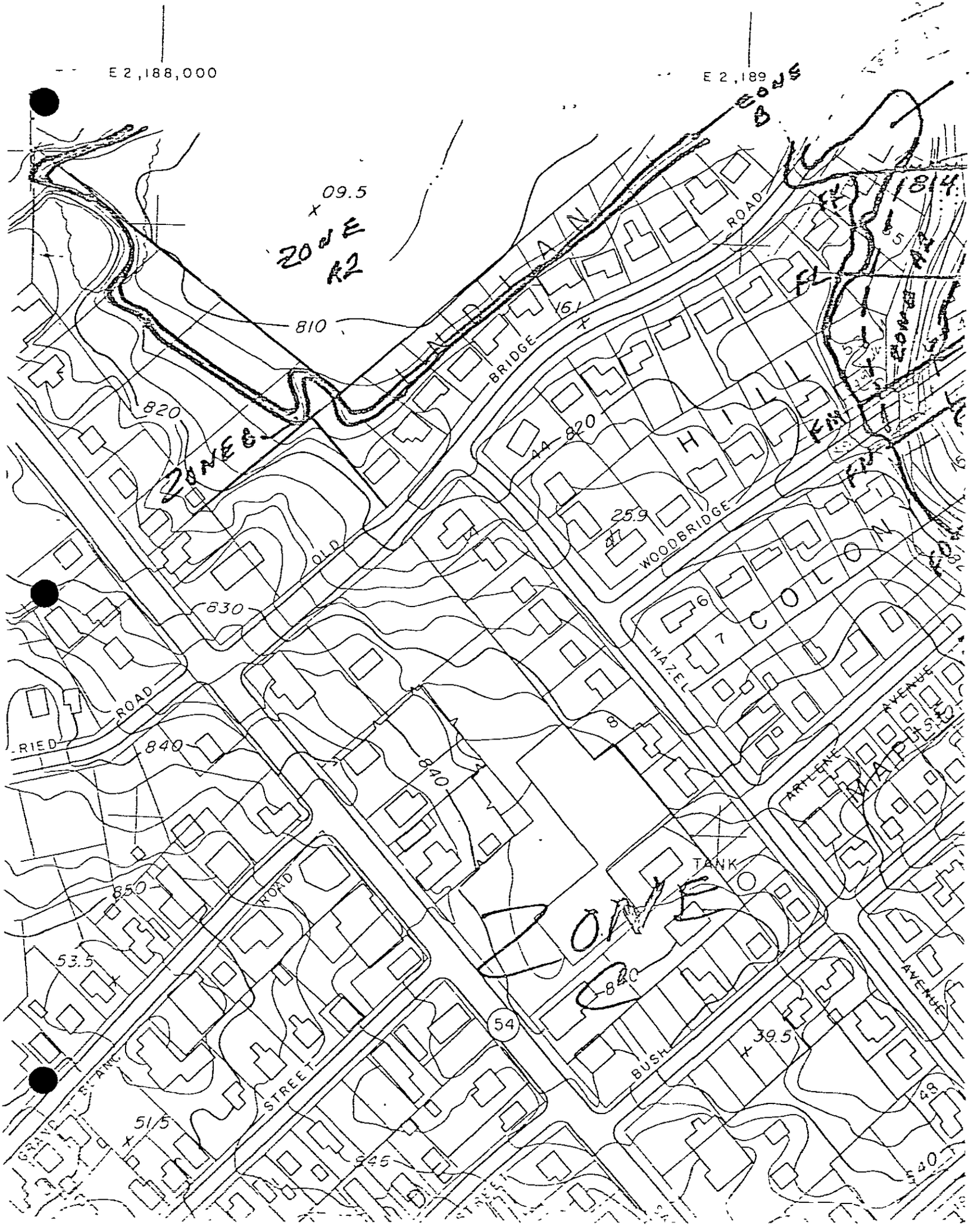


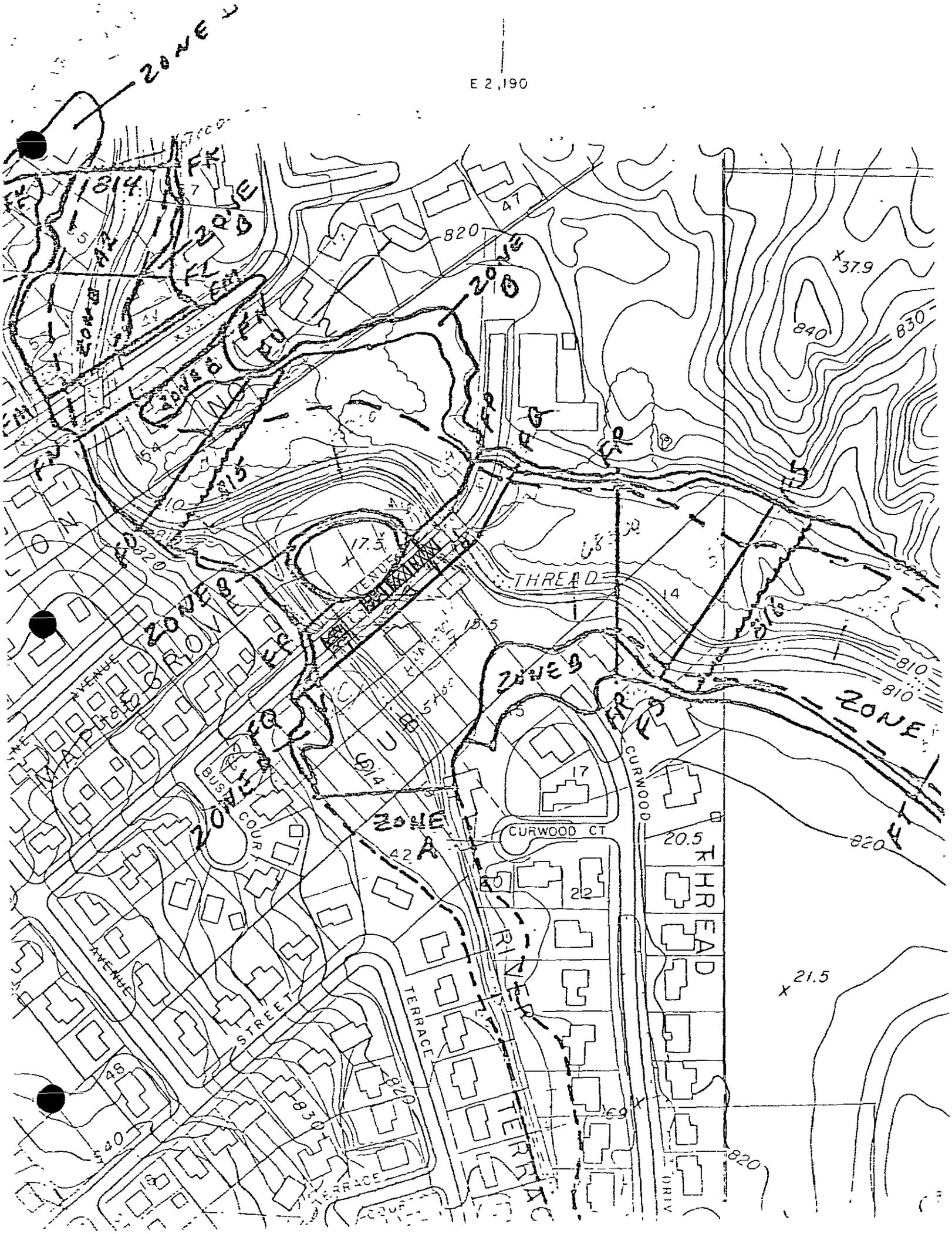

ANTENNAS
CENTER
N525
N524
ZONE B
ZONE C
ZONE A2
RECREATION
AREA
RUST
ACRES
RUST
ACRES
CENTER
EV
EW
EX
EY
EZ
FA
FB
FC
FD
BFE 810
810
808
806
804
816
820
830
812
818
22
38

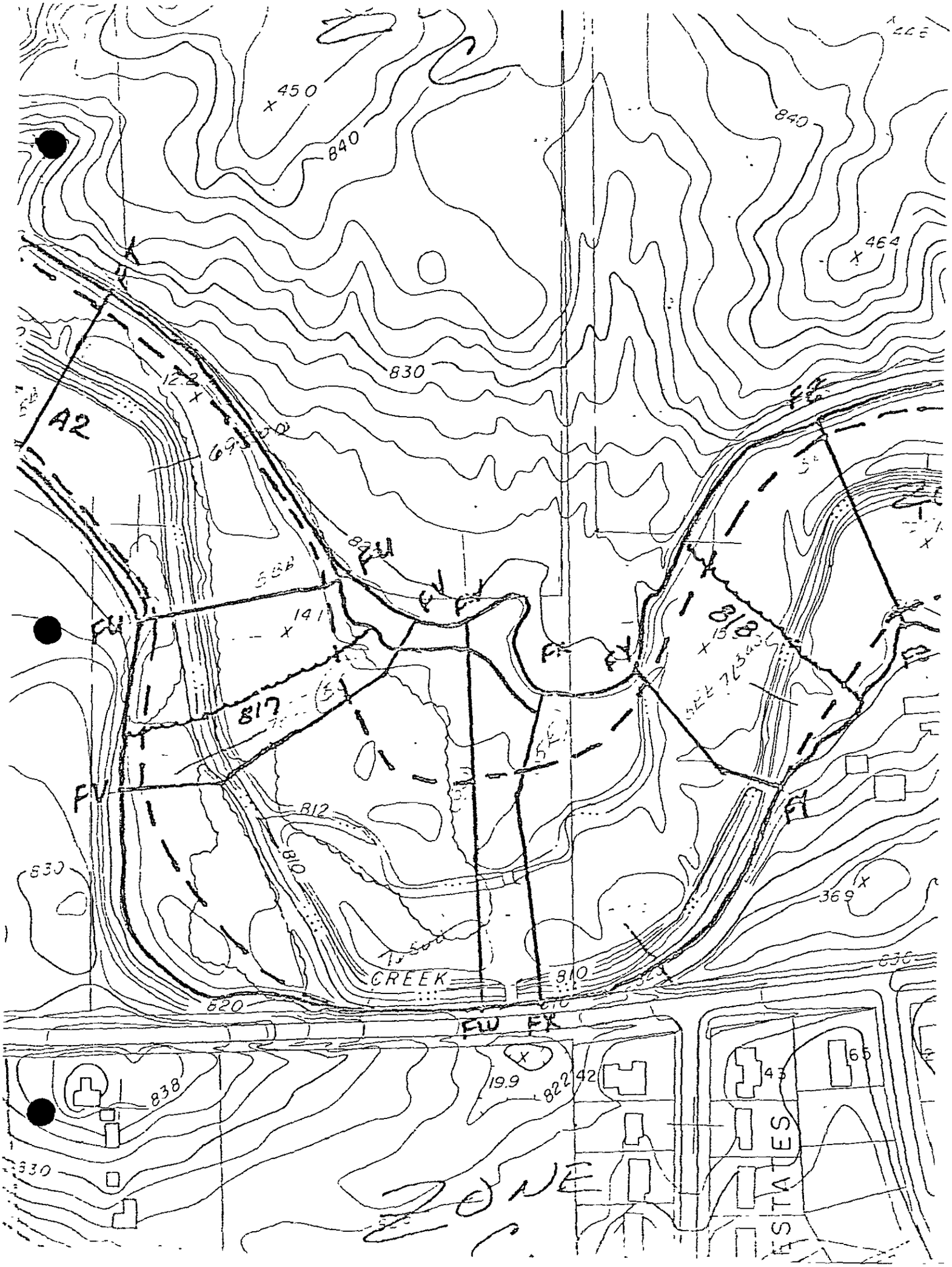

WAGNER
HIGHLAND
GARDENS
RUST
ACRES
BRAINARD STREET
RUST PARK DRIVE
WALKER
CENTER
FULLER
REE
RAILROAD
SUB CENTER
TURBEA DRIVE
ROAD
STREET
ZONE B
ZONE A2
ZONE B
FD
FE
N 524
N 523
807.9
805.9
810.5
808
806
810
812
814
816
820
822
824
830
836
840
841.9
839.9
811

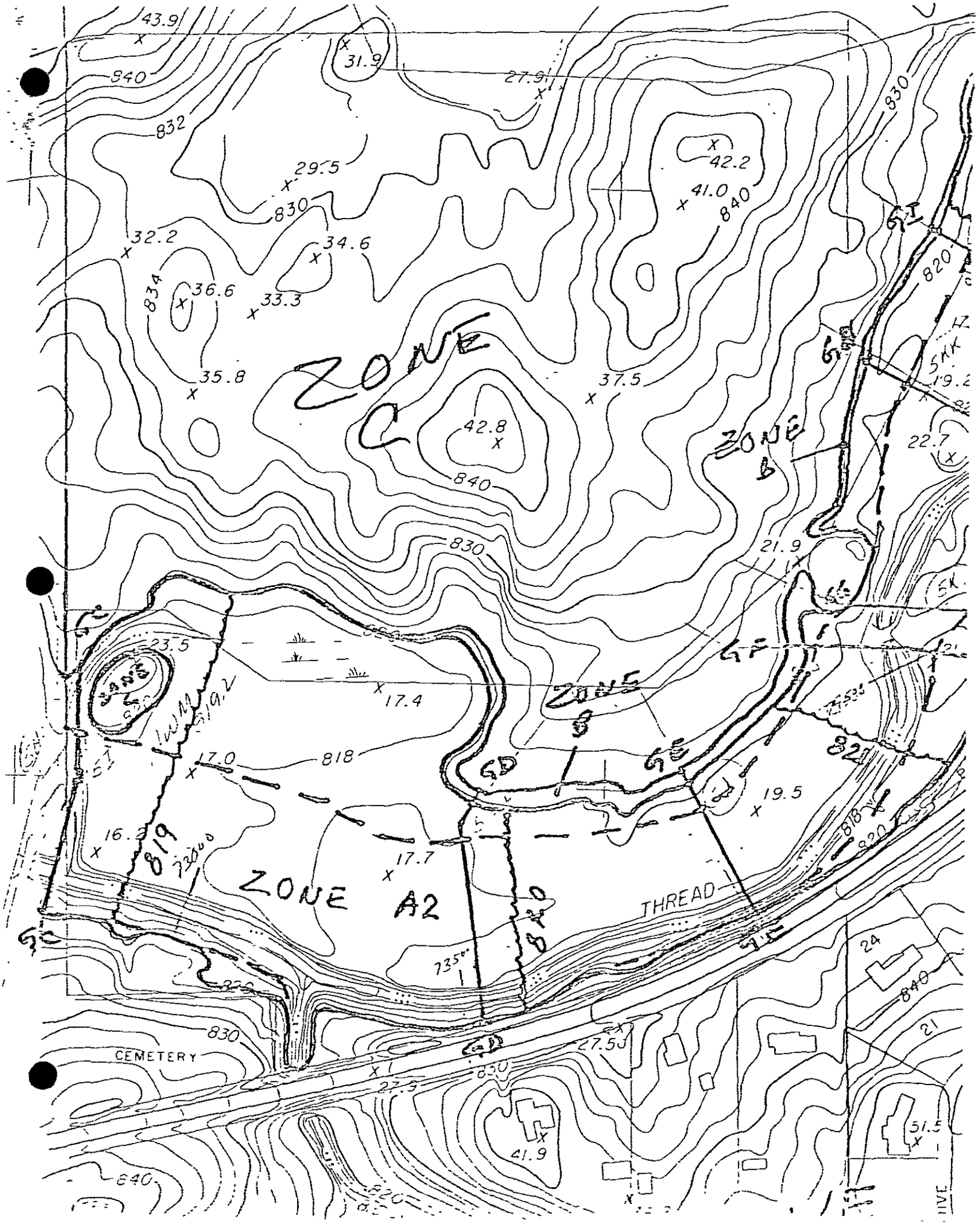
N524
RUST
ACRES
FULLER
TREE
LEFAVE
RIVERVIEW
GARDENS
STREET
FARLAND
ZONE B
PLEASANT
VIEW
STREET
ZONE C
ZONE D
ZONE E
ZONE F
ZONE G
ZONE H
ZONE I
ZONE J
ZONE K
ZONE L
ZONE M
ZONE N
ZONE O
ZONE P
ZONE Q
ZONE R
ZONE S
ZONE T
ZONE U
ZONE V
ZONE W
ZONE X
ZONE Y
ZONE Z


BFE 810
ZONE A
ZONE A2
ZONE B
ZONE C
RIVERVIEW
WOODBRIDGE
BROOKSHIRE
DRIVE
GARDENS
STREET
PLEASANT
E2,188,000
E2,189

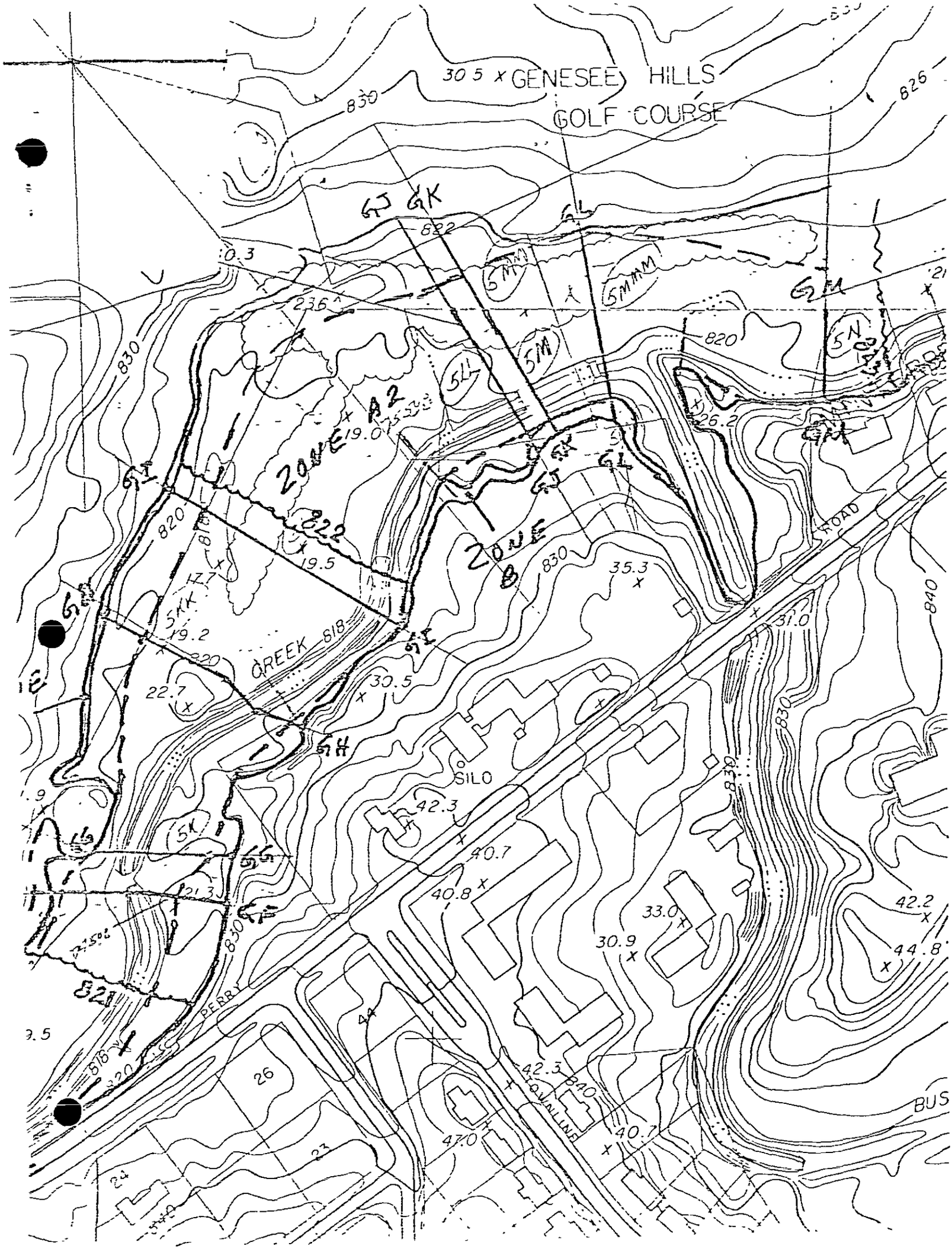

E 2,188,000
E 2,189
ZONE B
ZONE A2
ZONE B
ZONE C
ZONE E
810
820
830
840
850
845
840
820
09.5
16.1
25.9
53.5
51.5
39.5
BRIDGE
ROAD
OLD
WOODBRIDGE
HAZEL
AVENUE
ARTLENE
MAPLE
TANK
BUSH
STREET
ROAD
RIED
ROAD
54
49
FL
FW
FP
FL
FL
FL

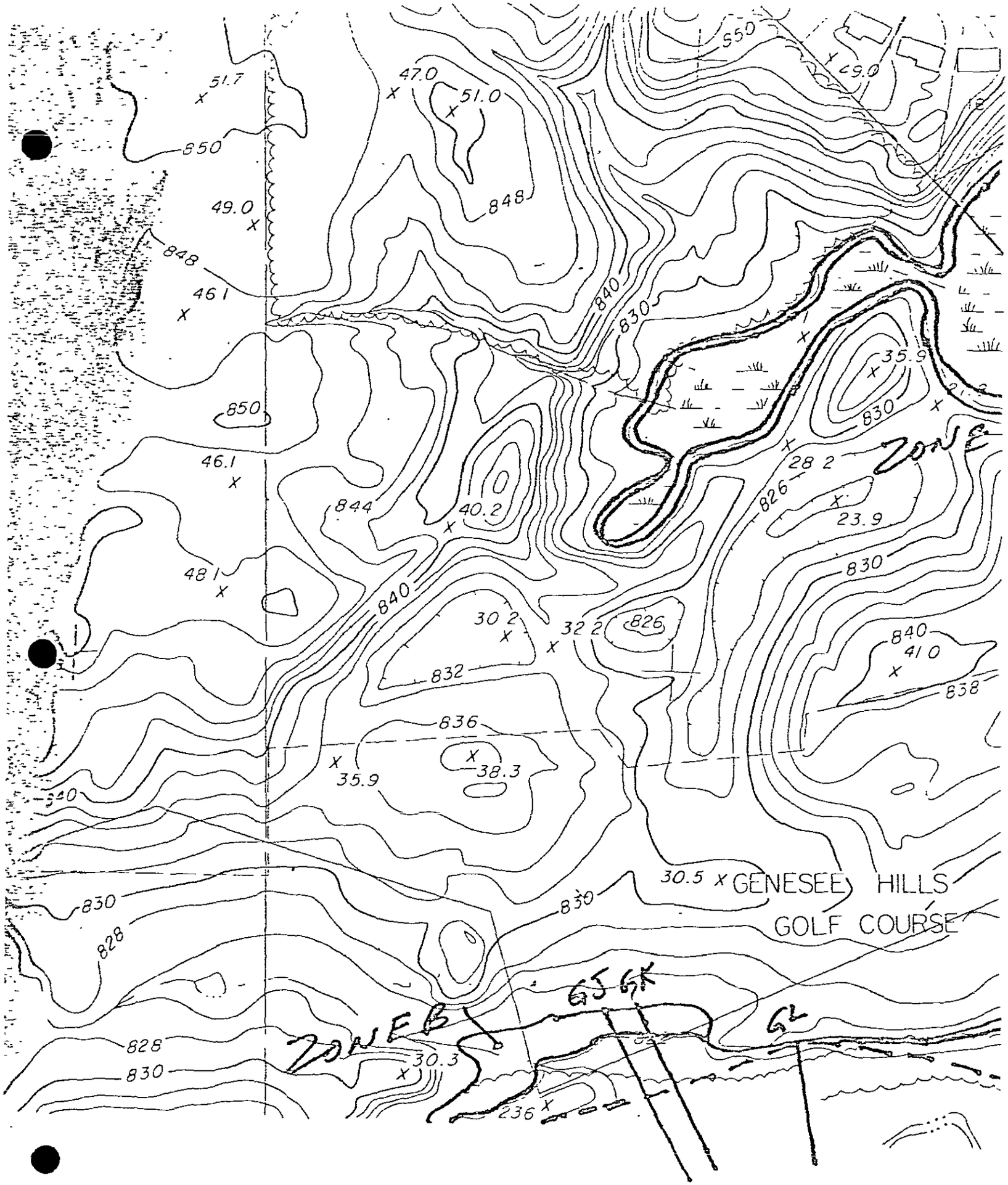

E 2,190
ZONE D
ZONE E
ZONE B
ZONE A
ZONE 9
ZONE
THREAD
CURWOOD CT
CURWOOD
MAPLE GROVE
AVENUE
STREET
TERRACE
COURT
RIVER
820
815
810
840
830
37.9
21.5
20.5
17.5
14
17
22
42
48
540


450
840
840
464
830
A2
818
817
812
810
830
369
CREEK
810
820
FW FX
19.9
822
42
43
65
838
830
ESTATES
ONE

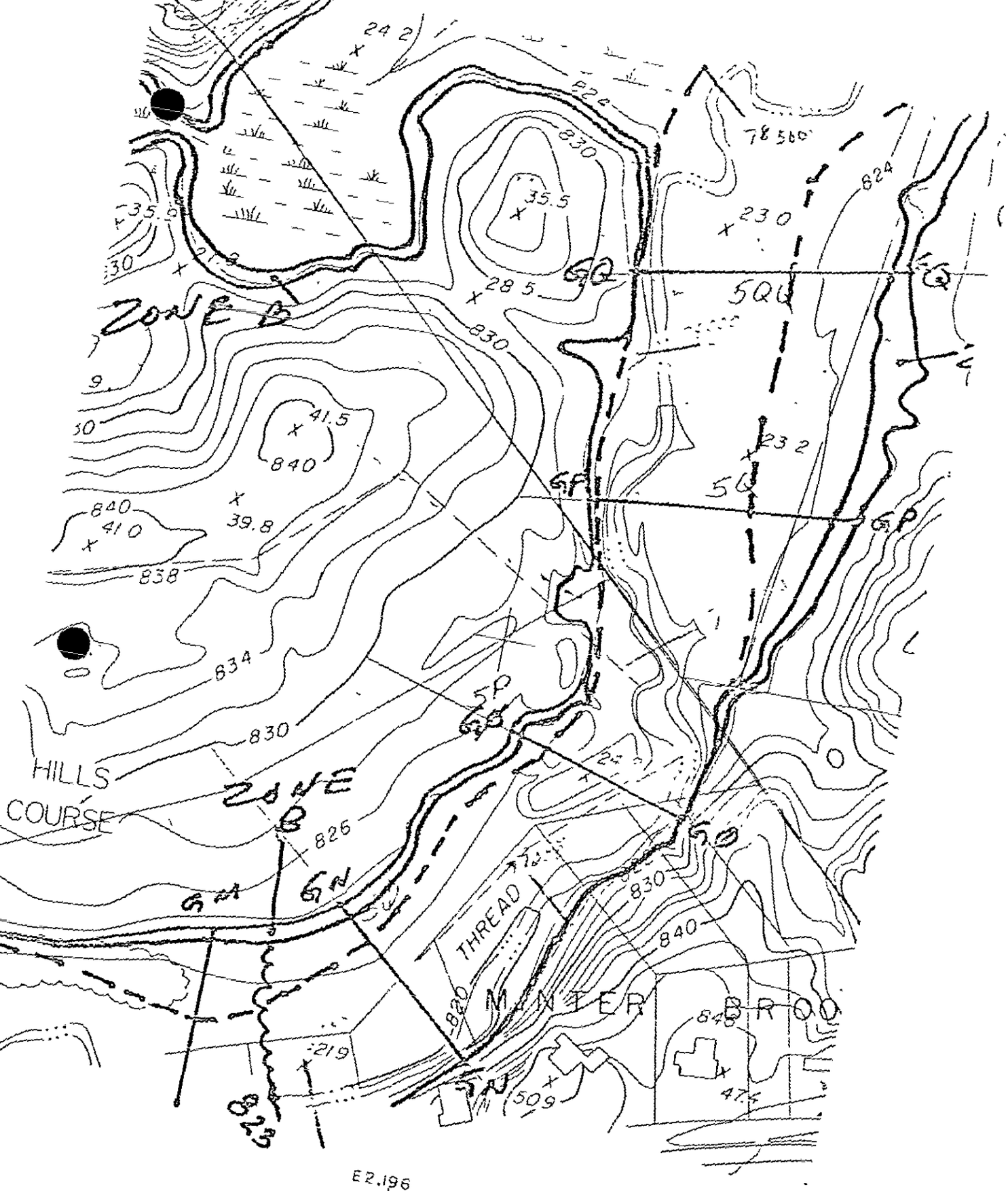

ZONE C
ZONE B
ZONE B
ZONE A2
THREAD
CEMETERY
SAND
43.9
31.9
27.9
29.5
32.2
34.6
36.6
33.3
35.8
42.8
37.5
42.2
41.0
21.9
23.5
17.4
17.0
16.3
17.7
19.5
22.7
27.5
41.9
51.5
840
832
830
834
820
818
819
735

840
846
488
846
840
464
830
GA
820
F2
142
187
816
158
GC
167
A2
56
318
F1
148
812
SILOS
830
369
834
810
830
ROAD
308
391
242
43
65
221
836
840
226
220
215
GPAFF
COURT
ESTATES
208


GENESEE HILLS
GOLF COURSE
ZONE A2
ZONE B
CREEK
SILO
ROAD
PERRY
BUS
GJ
GK
GL
GM
GN
GI
GH
5M
5L
5N
5K
830
820
822
818
840
826
30.5
19.0
19.5
19.2
22.7
35.3
31.0
26.2
42.3
40.7
40.8
33.0
30.9
42.2
44.8
47.0
26
23
24


GENESEE HILLS
GOLF COURSE
ZONE E
ZONE B
G5
G4
G2
E2,194
E 2,195

ZONE B
GENESEE HILLS
GOLF COURSE
ZONE B
THREAD
E 2,195
E 2,196


ZONE B
ZONE B
HILLS
COURSE
THREAD
MINTER BROO
GQ
5Q
GP
5P
GN
5N
GM
5M
GO
5O
830
840
824
826
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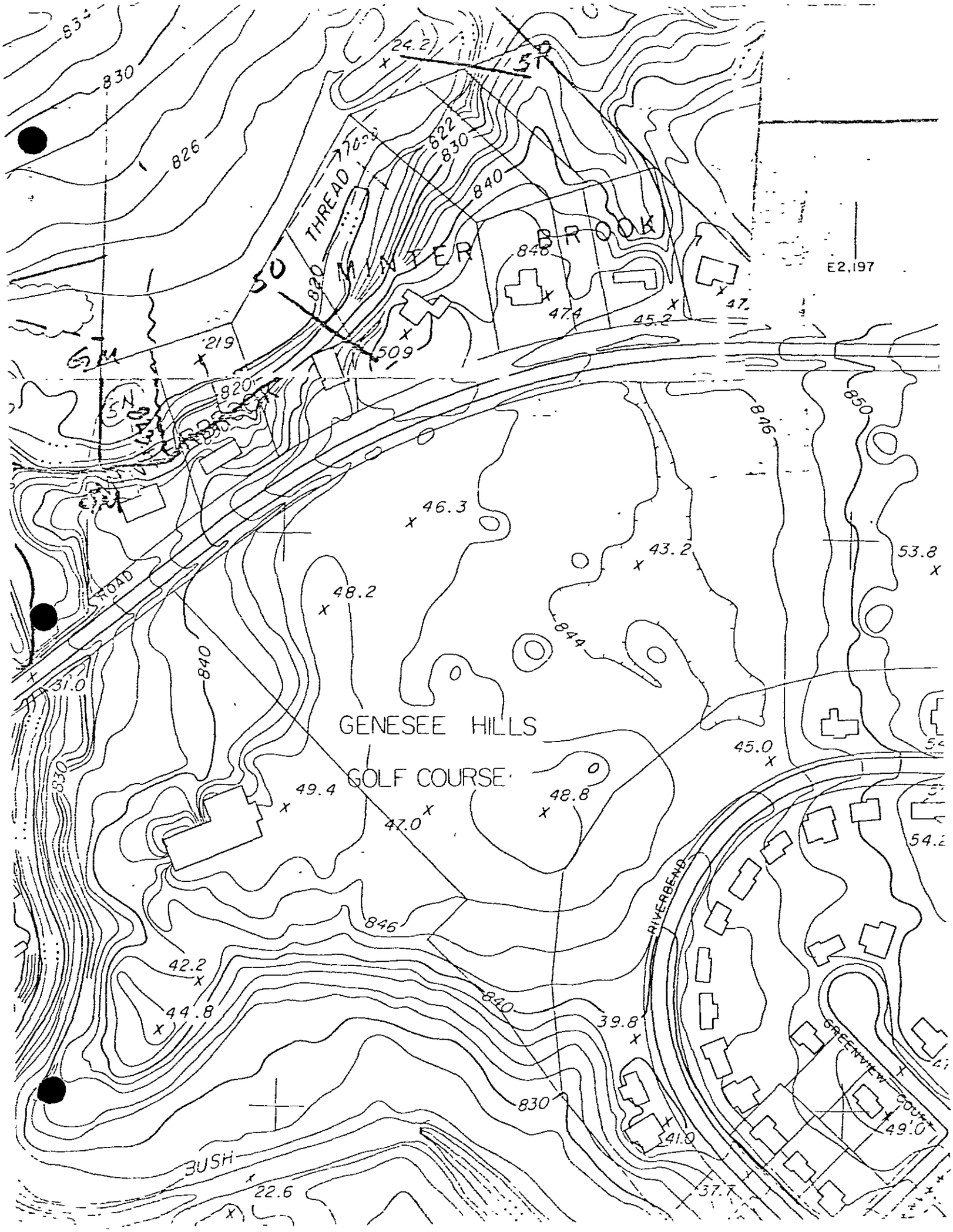
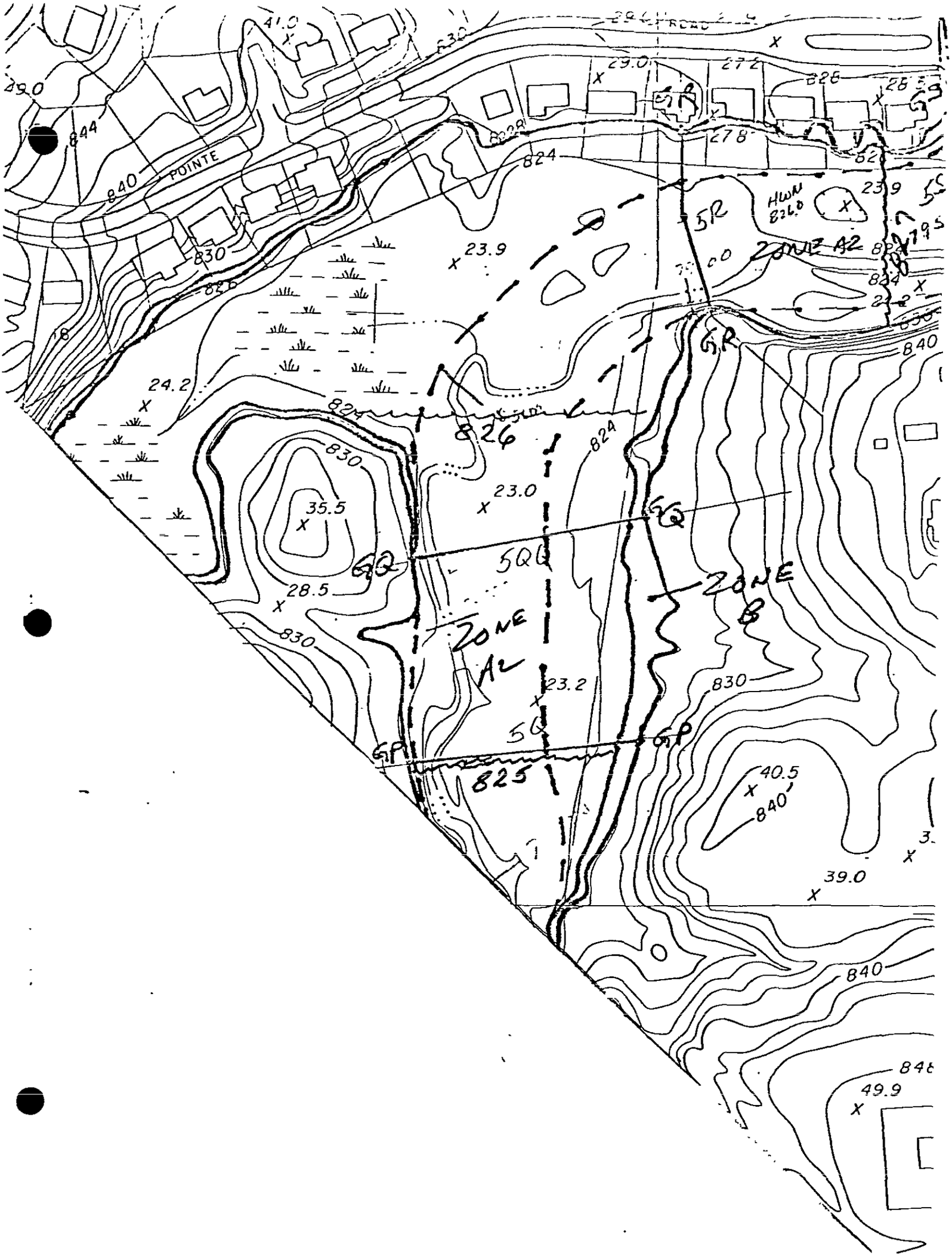
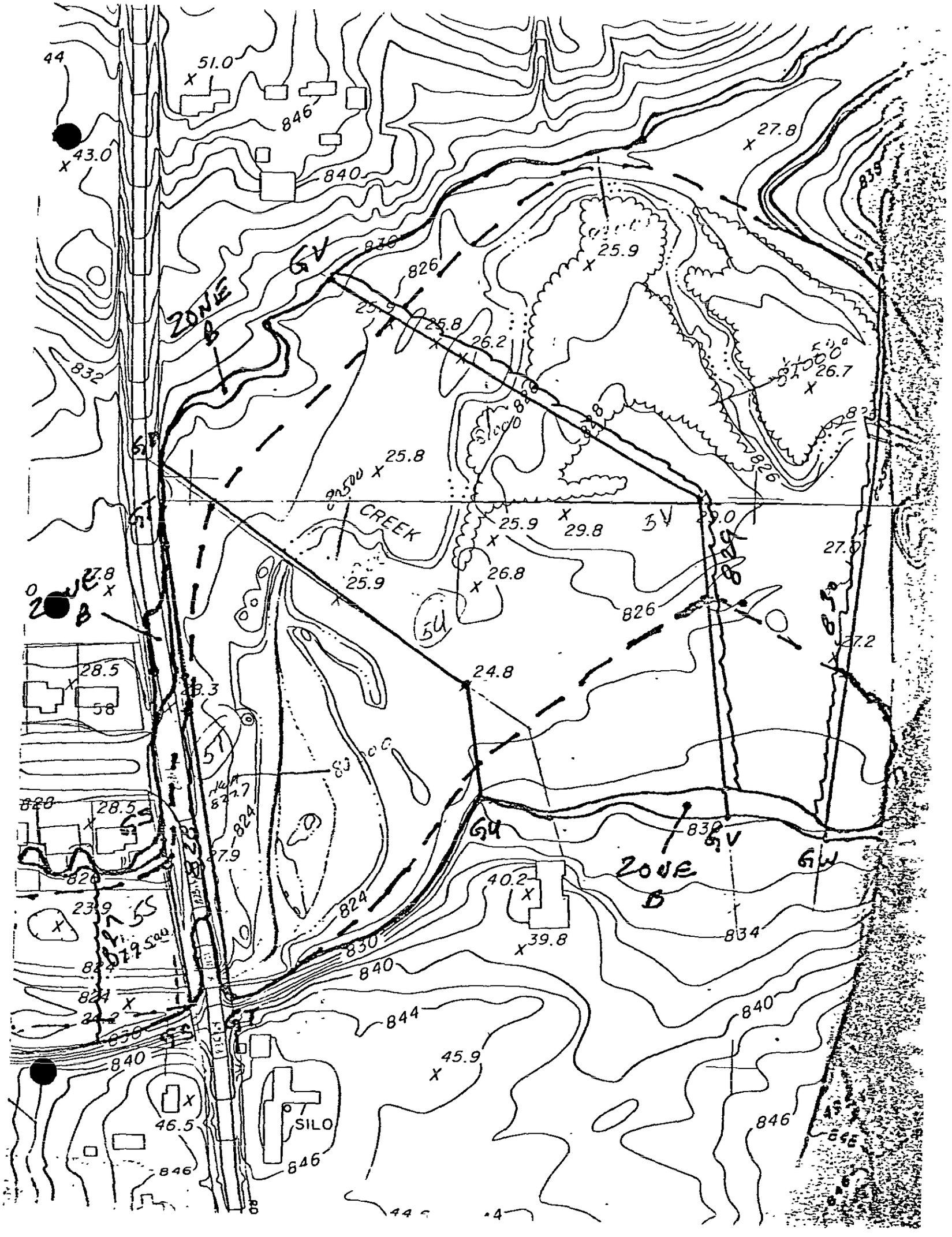
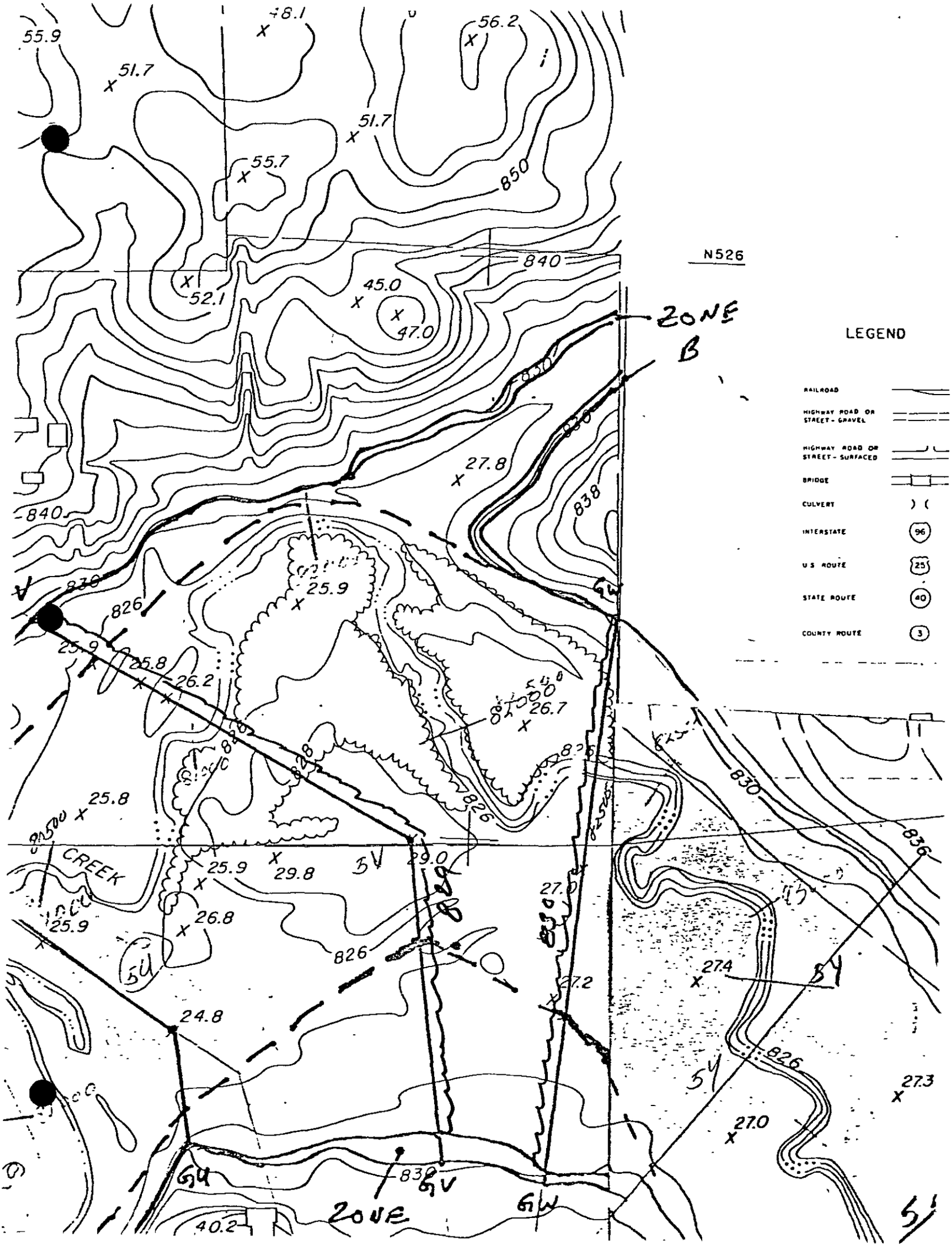
858
820
823

E2.196


GENESEE HILLS
GOLF COURSE
WINTER BROOK
THREAD
ROAD
BUSH
RIVERBEND
GREENVIEW
COURT
E2,197
830
826
840
846
844
850
24.2
46.3
43.2
53.8
48.2
31.0
45.0
49.4
48.8
47.0
42.2
44.8
39.8
41.0
49.0
22.6
37.7
45.2
47.4
509
219


POINTE
ZONE A2
ZONE B
5R
6R
5Q
6Q
5P
6P
826
825
HWM 826.0
35.5
28.5
23.9
23.0
23.2
24.2
40.5
39.0
49.9


ZONE B
GV
CREEK
SILO
51.0
43.0
27.8
25.9
25.8
26.2
26.7
29.8
26.8
24.8
28.5
28.3
27.9
40.2
39.8
45.9
46.5
27.2
27.0
846
840
836
834
830
826
824
844


N526
LEGEND
RAILROAD
HIGHWAY ROAD OR STREET - GRAVEL
HIGHWAY ROAD OR STREET - SURFACED
BRIDGE
CULVERT
INTERSTATE
U.S. ROUTE
STATE ROUTE
COUNTY ROUTE
ZONE B
ZONE
CREEK
55.9
51.7
48.1
56.2
51.7
55.7
850
840
52.1
45.0
47.0
27.8
838
830
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25.9
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26.2
26.7
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27.0
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24.8
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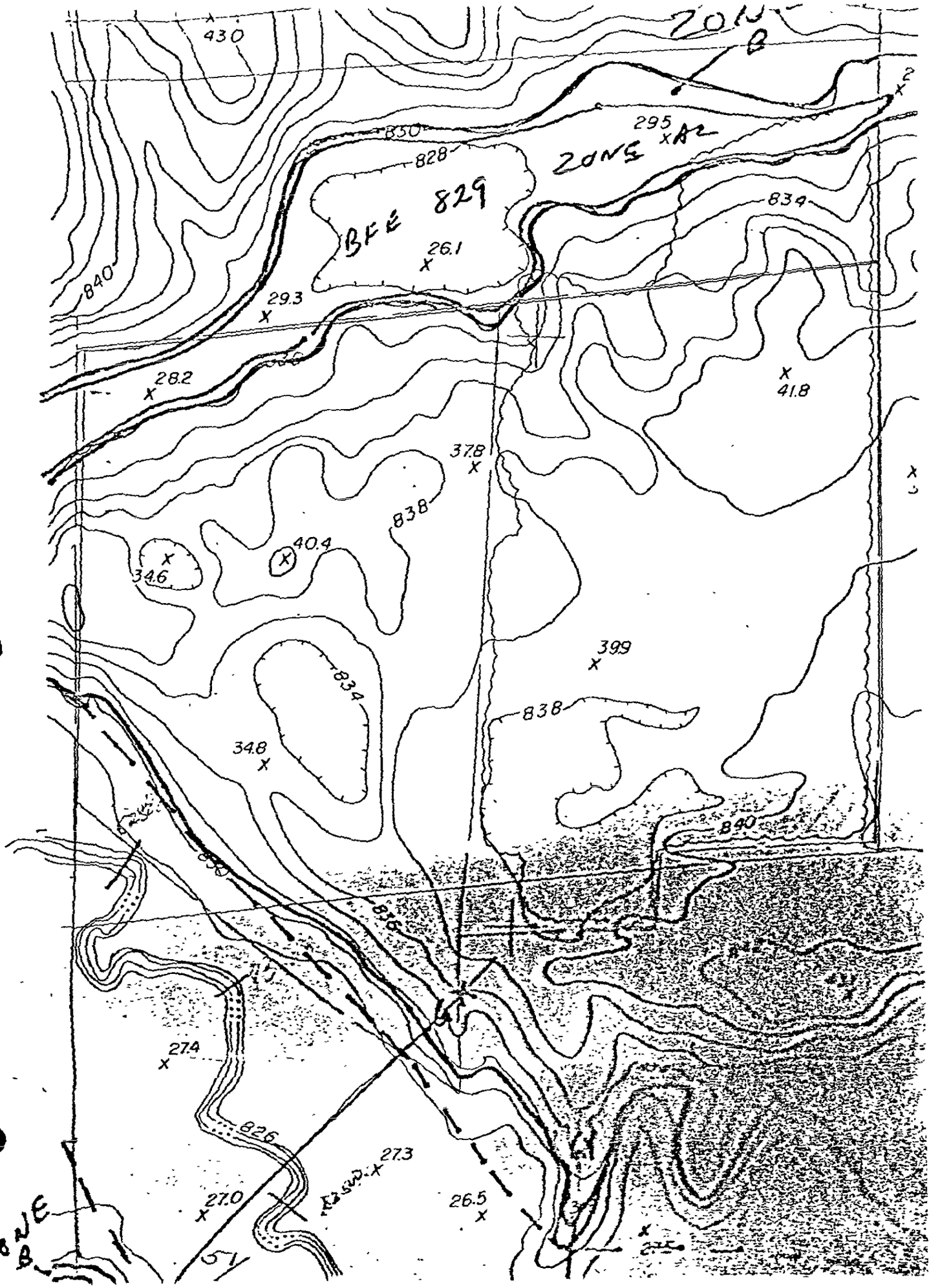
27.2
27.3
27.0
40.2
GW
SV


ZONE B
ZONE A2
BFE 829
830
828
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840
838
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26.1
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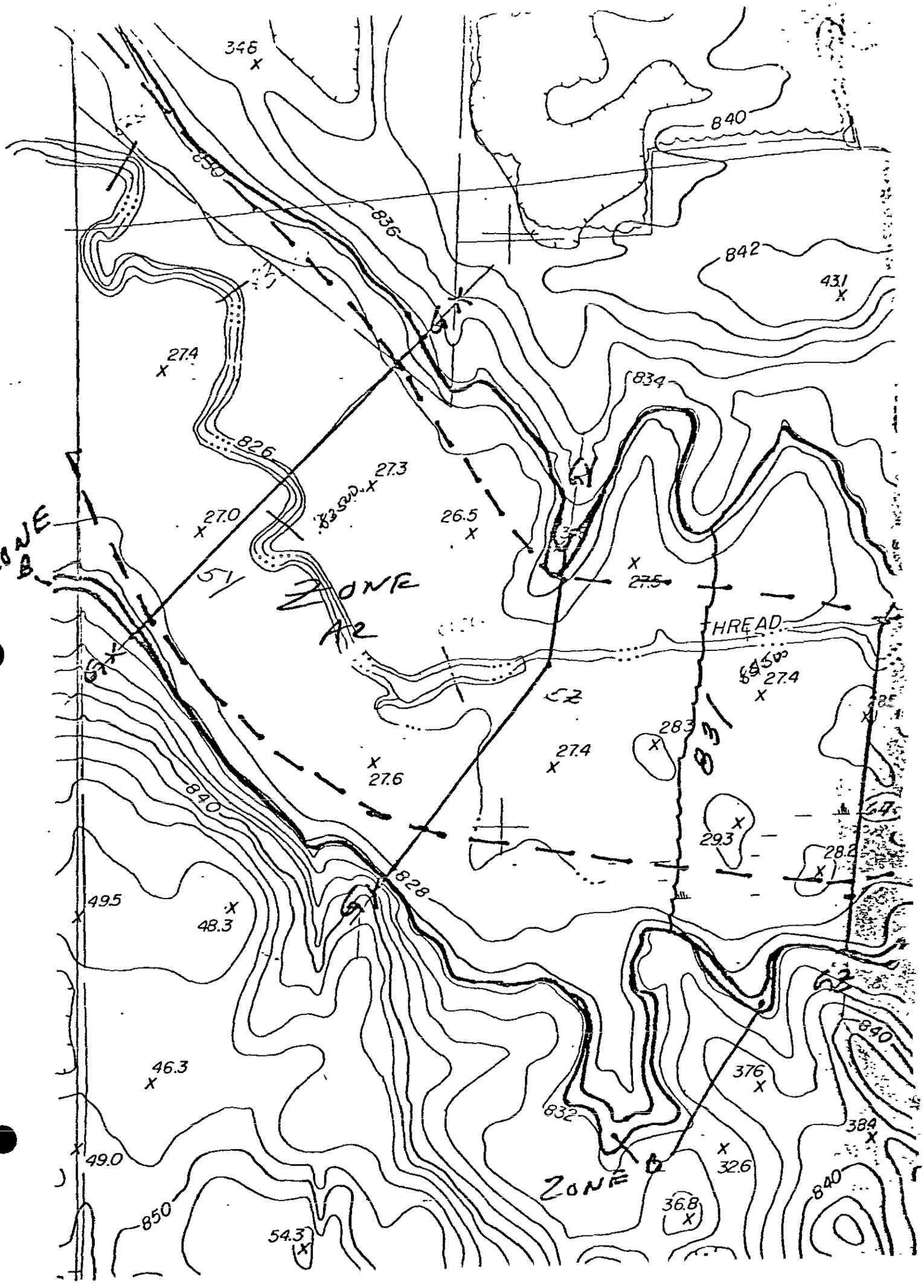
26.5
ZONE B


346
840
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ZONE B
ZONE A2
27.5
HREAD
27.4
283
27.4
27.6
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29.3
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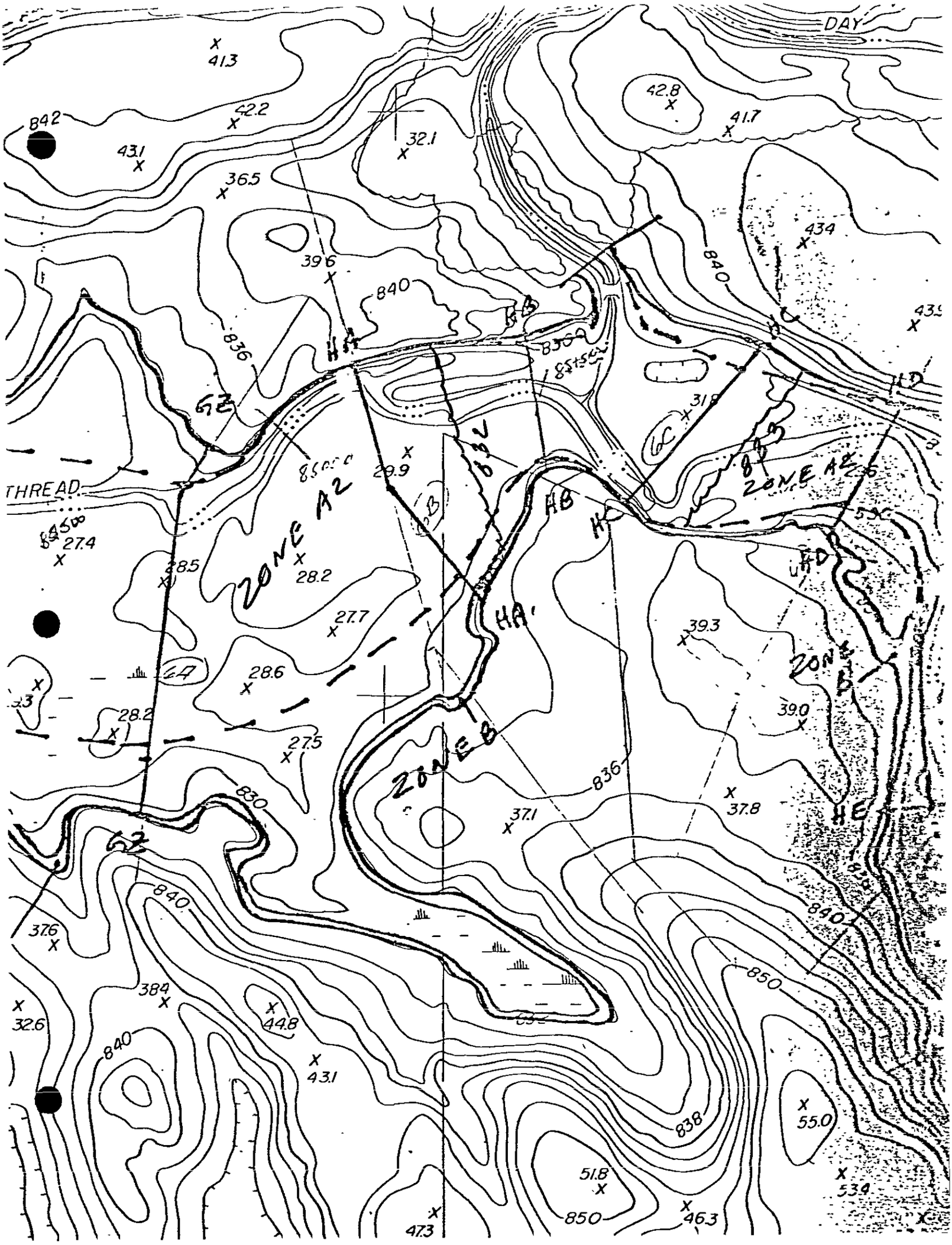
49.0
32.6
ZONE B
36.8
850
54.3
840


DAY
THREAD
ZONE A2
ZONE B
ZONE A1
ZONE B1
HA
HB
HC
HD
HE
GA
GB
GC
GZ
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42.2
842
43.1
36.5
32.1
42.8
41.7
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27.4
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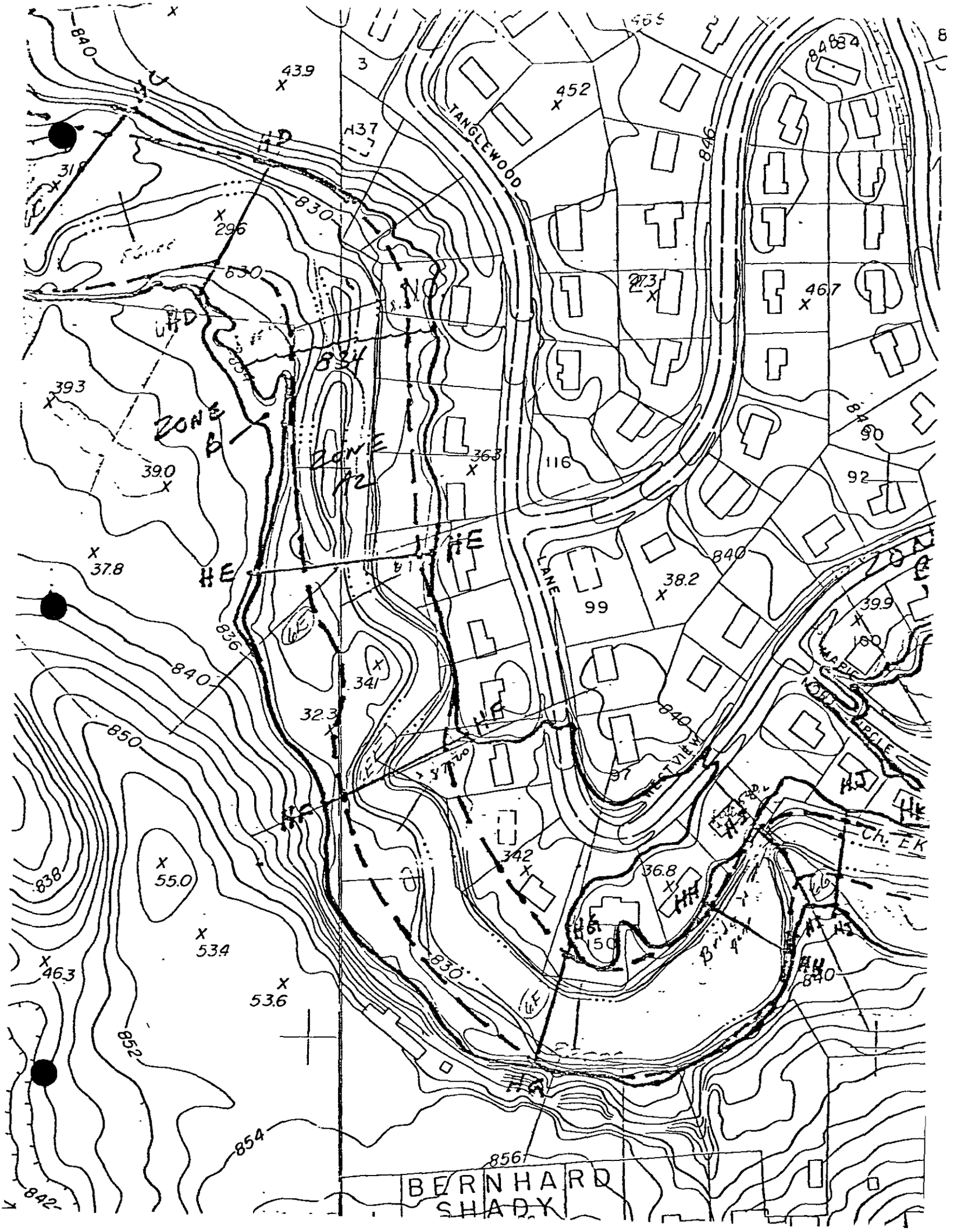
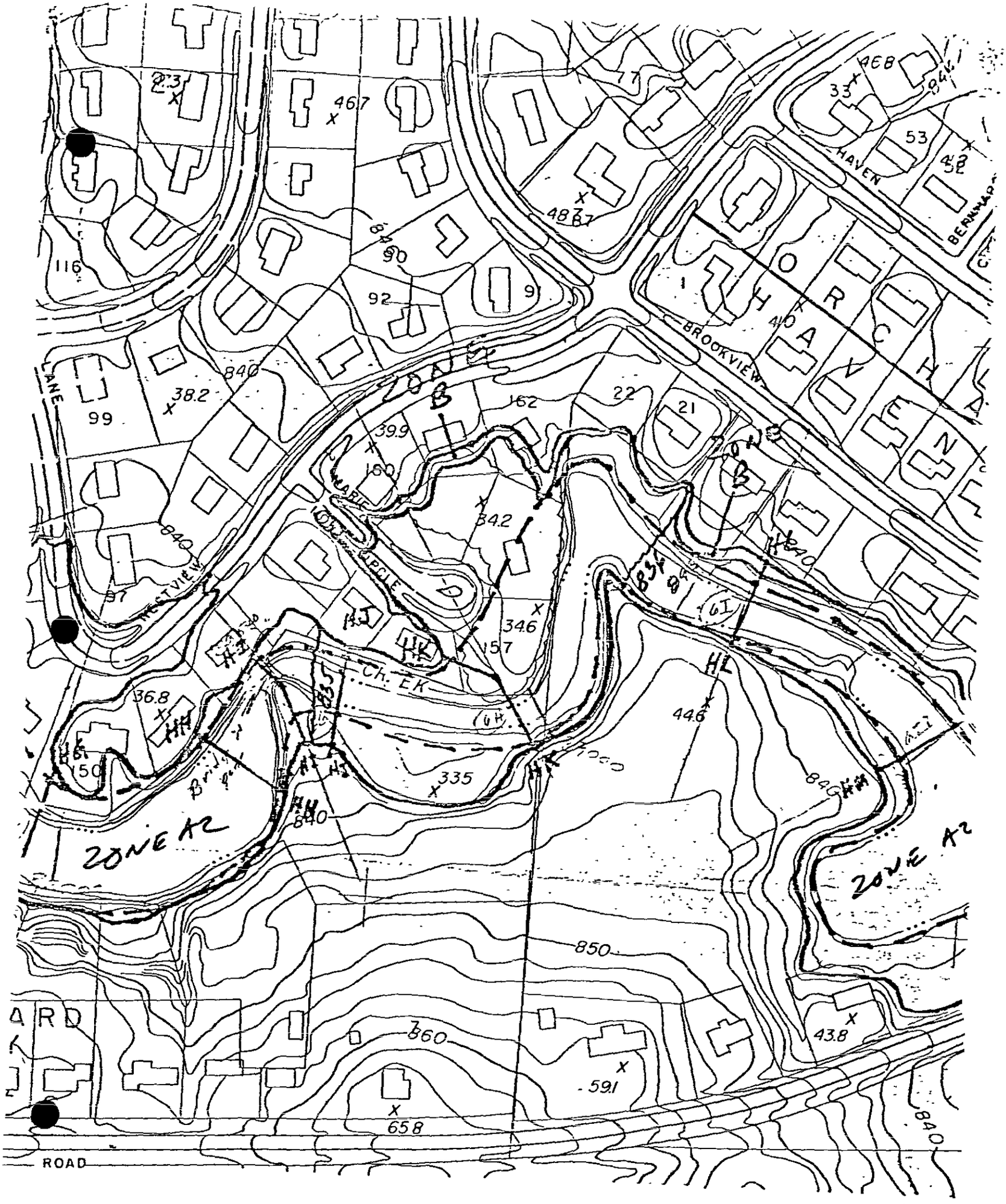
47.3


TANGLEWOOD
LANE
WESTVIEW
ZONE B
ZONE A2
BERNHARD
SHADY


BROOKVIEW
HAVEN
BERKMAR
LANE
WESTVIEW
CHERRY
CREEK
ZONE A2
ZONE A2
ROAD
850
860
840
835
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46.7
48.7
38.2
39.9
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59.1
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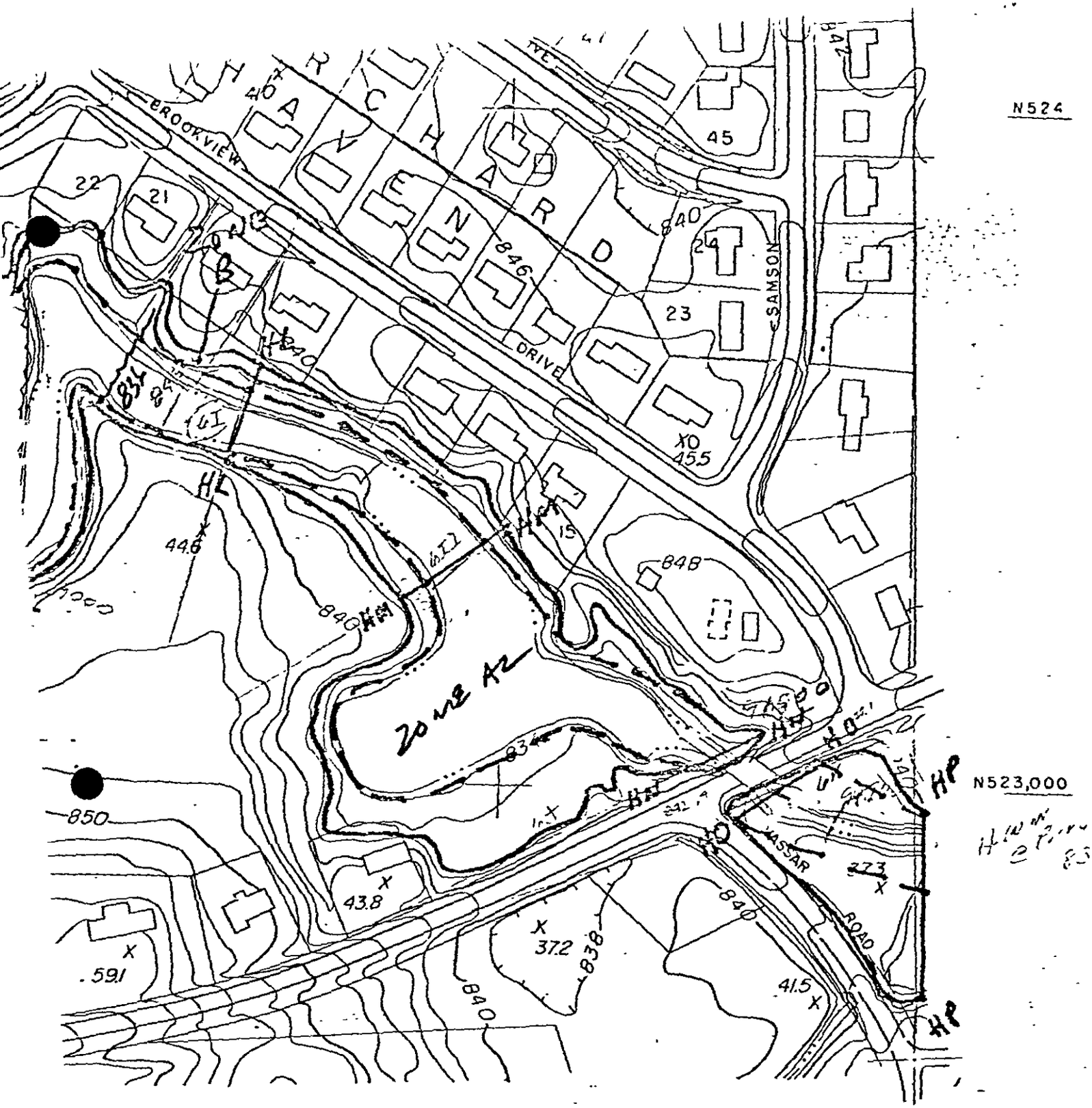
(6I)

E2,202

E2,203


N524
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E2,203,000
BROOKVIEW
DRIVE
SAMSON
ROAD
Zone A2
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850
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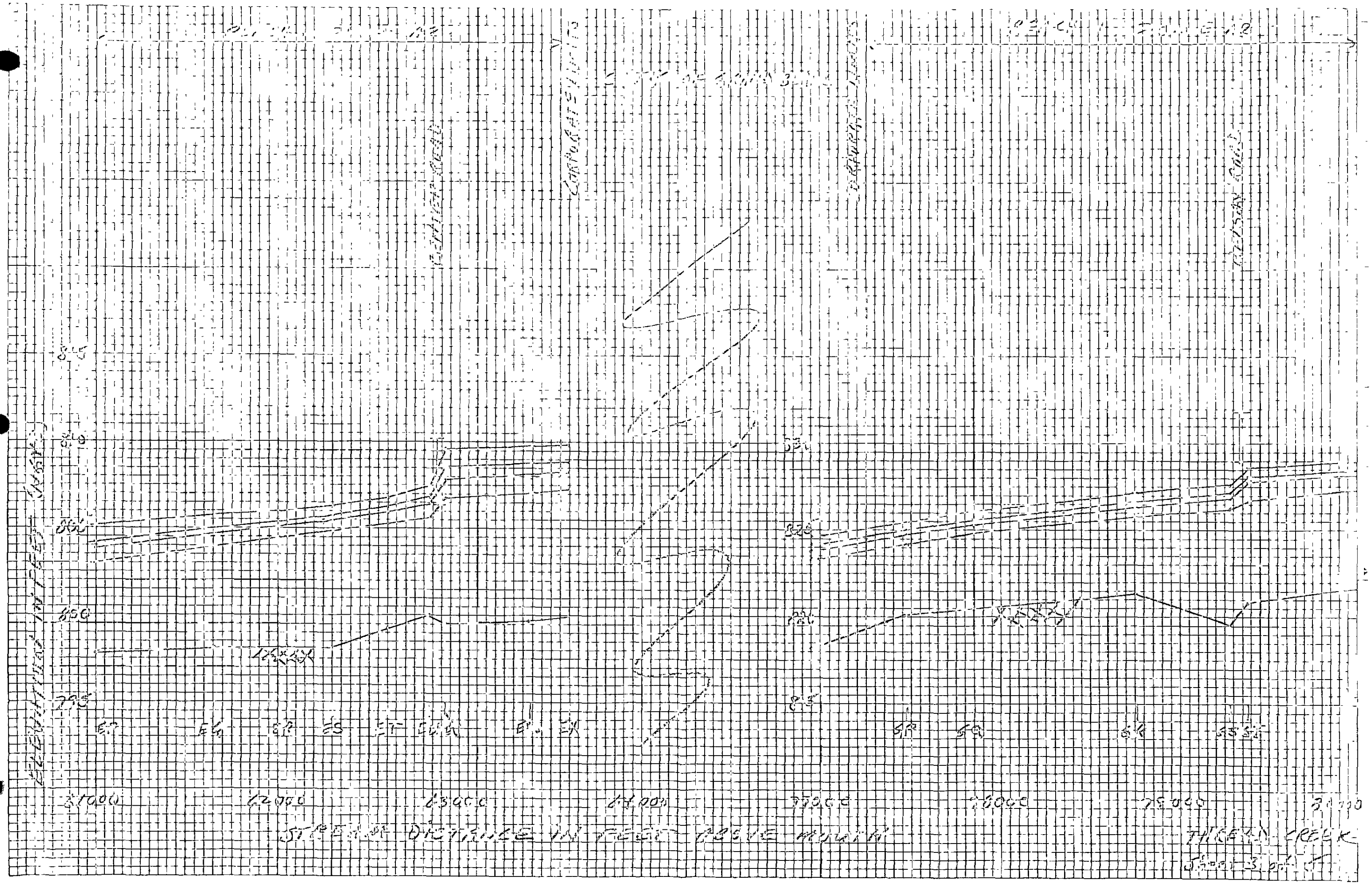
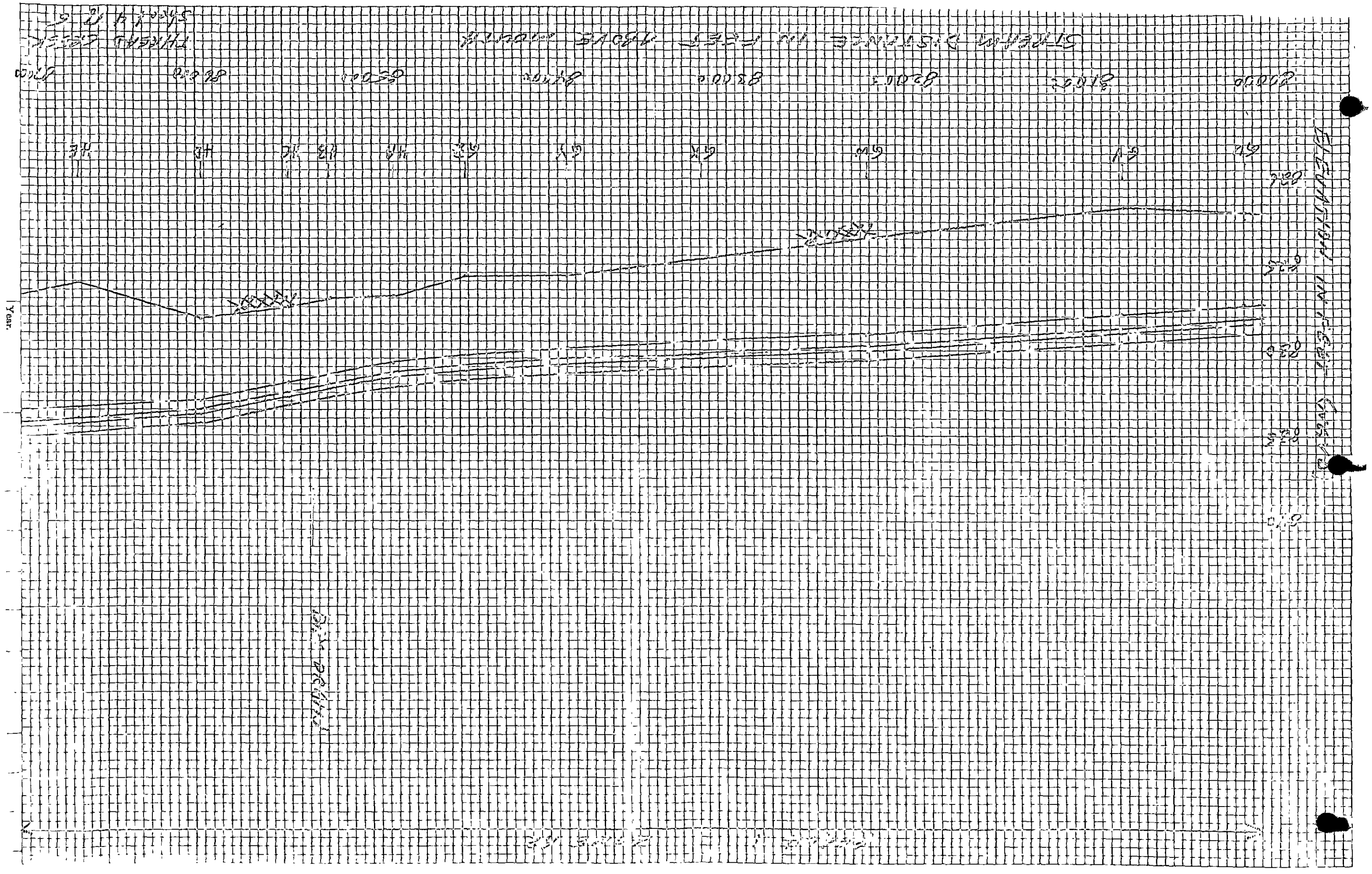
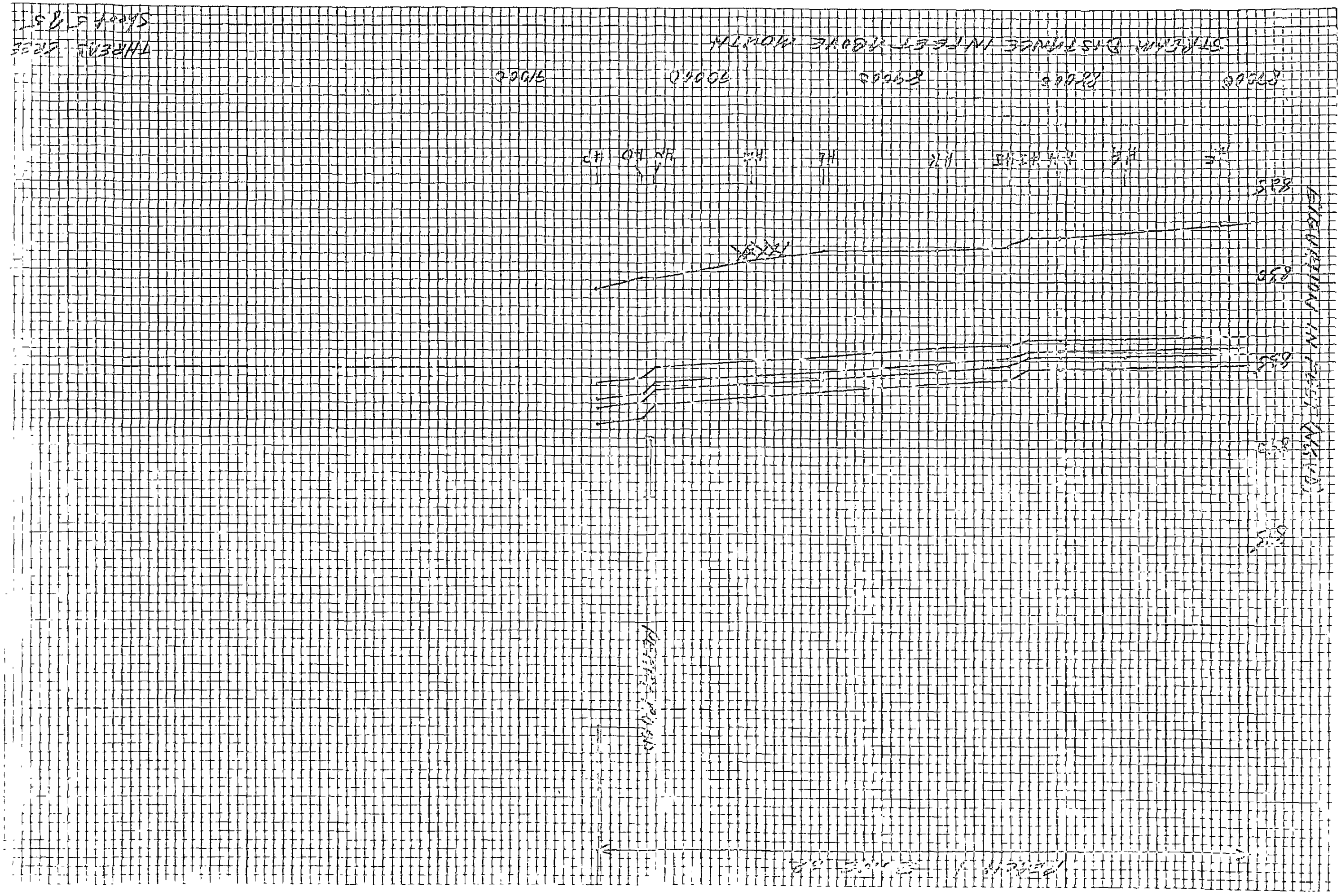
45.5
15

ELEVATION IN FEET ABOVE MEAN SEA LEVEL
STATION DISTANCE IN FEET ABOVE MOUTH
CREEK


ELEVATION IN FEET ABOVE MEAN
850
800
750
EX
EX
EX

Stream Distance in feet


Year.


STREAM DISTANCE INTERMEDIATE MONTH
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00BREAK00

1) COUNTY: Genesee

2) STUDY NAME: City of Flint

3) WATERCOURSE: Thread Creek A-BK

4) DOCUMENT TYPE: 100 yr natural

00BREAK00

WATER-SURFACE PROFILE FOR: THREAD CR MOUTH TO [illegible]21 A TO E KNUTILLA
PAGE [illegible] OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

Thread Cr - City of Flint
A - BK
100 Yr.

```
==============================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /    EG  /     V  /    FN  /   ACC   *ID*
==============================================================================
    A AT       0 /     0 /  2280. /  1776. / 226408. / 1.30 /   27. /  482.
  710.52 /   0.03 /                 /  710.55 /   1.28 /  0.10/          *IS*
------------------------------------------------------------------------------
    B AT     100 /   100 /  2280. /   842. /  83371. / 1.09 /    4. /  407.
  710.52 /   0.12 /   0.03 /   0.05 /  710.64 /   2.71 /  0.31 / 0.017  *XS*
------------------------------------------------------------------------------
    C AT     750 /   650 /  2280. /   498. /  83244. / 1.21 /  -34. /   53.
  710.87 /   0.39 /   0.49 /   0.14 /  711.27 /   4.58 /  0.35 / -0.000 *XS*
------------------------------------------------------------------------------
C+01  AT     840 /    90 /  2280. /   477. /  82054. / 1.21 /  -34. /   56.
  710.92 /   0.43 /   0.07 /   0.02 /  711.35 /   4.78 /  0.36 / -0.000 *XS*
------------------------------------------------------------------------------
C+05  AT     940 /   100 /  2280. /   390. /  69832. / 1.00 /  -32. /   31.
  710.96 /   0.53 /   0.09 /   0.05 /  711.49 /   5.84 /  0.41 / -0.001 *XS*
------------------------------------------------------------------------------
C+1   AT    1040 /   100 /  2280. /   378. /  66684. / 1.00 /  -32. /   31.
  711.06 /   0.57 /   0.11 /   0.02 /  711.62 /   6.04 /  0.43 / -0.000 *XS*
------------------------------------------------------------------------------
C+2   AT    1140 /   100 /  2280. /   187. /  26445. / 1.00 /  -23. /   17.
  712.57 /   2.31 /******* /******* /  714.89 /  12.19 /  1.00 /******* *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR  D AT    1140 /       /  2280. /   250. /  34684. / 1.00 /    0. /   60.
  712.57 /   1.30 /      ...1...  (-.001)    /   9.13 /  0.66 /          *BO*
------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
------------------------------------------------------------------------------
    E AT    1270 /   130 /  2280. /   327. /  56839. / 1.00 /   23. /   78.
  714.57 /   0.76 /   0.45 /   0.0  /  715.33 /   6.97 /  0.50 / -0.006 *AS*
------------------------------------------------------------------------------
  M = 0.0  / E = 1.00 / K* = 0.01 /   328. /  56967. / 1.00 /   23. /   78.
  714.58 /   0.75 /                 /  715.34 /   6.96 /  0.50 /          *AS*
============================ END BRIDGE ANALYSIS ==============================

                          END OF THIS PROFILE
```

A
B
C
D
E

100 Yr.

100 Yr.

100 Yr.

```
USGS: STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   27,DATE= 2/15/78

WATER-SURFACE PROFILE FOR:  THREAD CR M-21 TO GR TRAVERSE E TO P     KNUTILLA
PAGE  1 OF  2, PROFILE NUMBER  3,   UPSTREAM COMPUTATIONS
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
    E AT    1270 /      0 /   2280. /   327. /   56908. / 1.00 /   23. /   78.
   714.58 /   0.75 /                 /  715.33 /    6.97 /  0.50/          *IS*
----------------------------------------------------------------------------------
    F AT    1820 /    550 /   2280. /   309. /   47839. / 1.27 /   23. /   80.
   715.47 /   1.07 /   1.05 /   0.16 /  716.54 /    7.39 /  0.61 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ===============================
BR  F AT    1820 /       /   2280. /   202. /   13124. / 1.00 /    0. /   52.
   715.47 /   1.98 /       ...1...  (-.001)    /   11.29 /  1.01 /          *BO*
----------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
----------------------------------------------------------------------------------
    G AT    1950 /    130 /   2280. /   325. /   21154. / 1.07 /   12. /   91.
   716.39 /   0.82 /   0.67 /   0.0  /  717.21 /    7.01 /  0.57 / -0.001  *AS*
----------------------------------------------------------------------------------
   M = 0.09 / E = 0.89 / K* = 0.09 /   348. /   23377. / 1.07 /   12. /   91.
   716.68 /   0.71 /                 /  717.40 /    6.55 /  0.52 /          *AS*
============================ END BRIDGE ANALYSIS =================================
G+1   AT    2080 /    130 /   2280. /   200. /   24472. / 1.00 /  -25. /   24.
   720.49 /   2.02 /******* /******* /  722.51 /   11.39 /  1.00 /******* *XS*
----------------------------------------------------------------------------------
    H AT    2480 /    400 /   2280. /   366. /   64312. / 1.05 /    8. /   73.
   723.19 /   0.64 /   1.32 /   0.0  /  723.83 /    6.23 /  0.44 /  0.000  *XS*
----------------------------------------------------------------------------------
    I AT    2920 /    440 /   2280. /   367. /   66129. / 1.08 /   13. /   78.
   723.73 /   0.65 /   0.54 /   0.01 /  724.38 /    6.21 /  0.44 /  0.002  *XS*
----------------------------------------------------------------------------------
    J AT    3400 /    480 /   2280. /   332. /   56970. / 1.06 /   10. /   70.
   724.32 /   0.78 /   0.66 /   0.06 /  725.10 /    6.86 /  0.50 /  0.000  *XS*
----------------------------------------------------------------------------------
    K AT    4370 /    970 /   2280. /   327. /   57298. / 1.05 /    9. /   65.
   725.86 /   0.80 /   1.54 /   0.01 /  726.66 /    6.97 /  0.49 /  0.003  *XS*
----------------------------------------------------------------------------------
    L AT    4600 /    230 /   2280. /   362. /   51056. / 1.08 /    8. /   71.
   726.40 /   0.67 /   0.41 /   0.0  /  727.07 /    6.30 /  0.45 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ===============================
```

```
 [illegible] /   [illegible] /        ...1...  (-.001)     /  11.29 /   1.01 /                 *BO*
-----------------------------------------------------------------------------------------------------
   NO EMBANKMENT CROSS SECTION                                                                      G
-----------------------------------------------------------------------------------------------------
   G AT     1950 /    130 /   2280. /    325. /   21154. / 1.07 /    12. /    91.
  716.39 /   0.82 /   0.67 /    0.0  /  717.21 /    7.01 /   0.57 / -0.001   *AS*
-----------------------------------------------------------------------------------------------------
  M = 0.09 / E = 0.89 / K* = 0.09 /    348. /   23377. / 1.07 /    12. /    91.
  716.68 /   0.71 /                  /  717.40 /    6.55 /   0.52 /           *AS*
========================== END BRIDGE ANALYSIS ==========================
G+1   AT     2080 /    130 /   2280. /    200. /   24472. / 1.00 /   -25. /    24.
  720.49 /   2.02 /******* /******* /  722.51 /   11.39 /   1.00 /*******   *XS*
-----------------------------------------------------------------------------------------------------
   H AT     2480 /    400 /   2280. /    366. /   64312. / 1.05 /     8. /    73.
  723.19 /   0.64 /   1.32 /    0.0  /  723.83 /    6.23 /   0.44 /  0.000   *XS*
-----------------------------------------------------------------------------------------------------
   I AT     2920 /    440 /   2280. /    367. /   66129. / 1.08 /    13. /    78.
  723.73 /   0.65 /   0.54 /   0.01  /  724.38 /    6.21 /   0.44 /  0.002   *XS*
-----------------------------------------------------------------------------------------------------
   J AT     3400 /    480 /   2280. /    332. /   56970. / 1.06 /    10. /    70.
  724.32 /   0.78 /   0.66 /   0.06  /  725.10 /    6.86 /   0.50 /  0.000   *XS*
-----------------------------------------------------------------------------------------------------
   K AT     4370 /    970 /   2280. /    327. /   57298. / 1.05 /     9. /    65.
  725.86 /   0.80 /   1.54 /   0.01  /  726.66 /    6.97 /   0.49 /  0.003   *XS*
-----------------------------------------------------------------------------------------------------
   L AT     4600 /    230 /   2280. /    362. /   51056. / 1.08 /     8. /    71.
  726.40 /   0.67 /   0.41 /    0.0  /  727.07 /    6.30 /   0.45 / -0.000   *XS*
========================== BEGIN BRIDGE ANALYSIS =========================
BR  L AT     4600 /        /   2280. /    285. /   29557. / 1.00 /     0. /    43.
  726.40 /   0.99 /        ...1...  (-.001)     /    7.99 /   0.55 /           *BO*
-----------------------------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                          *RG*
-----------------------------------------------------------------------------------------------------
   M AT     4680 /     80 /   2280. /    320. /   23622. / 1.00 /    22. /    90.
  726.68 /   0.79 /   0.34 /   0.06  /  727.48 /    7.13 /   0.52 / -0.000   *AS*
-----------------------------------------------------------------------------------------------------
  M = 0.25 / E = 0.84 / K* = 0.52 /    369. /   29545. / 1.00 /    21. /    91.
  727.40 /   0.59 /                  /  727.99 /    6.17 /   0.42 /           *AS*
========================== END BRIDGE ANALYSIS ==========================
   N AT     4720 /     40 /   2280. /    260. /   11609. / 1.00 /    20. /    91.
  727.70 /   1.20 /   0.61 /   0.30  /  728.90 /    8.78 /   0.81 / -0.000   *XS*
-----------------------------------------------------------------------------------------------------
```

```
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF        HE  /     EG  /      V  /    FN  /      *ID*
==========================================================================
0 + 1 AT    4750 /     0 /   2200. /   459. /   55337. / 1.00 /  -36. /   40.
   730.40 /   0.36 /                 / 730.76 /    4.79 /   0.34/          *IS*
--------------------------------------------------------------------------
    O AT    5050 /   300 /   2200. /   377. /   43689. / 1.24 /   33. /  125.
   730.85 /   0.66 /  0.60 /   0.15 / 731.51 /    5.83 /   0.45 /  0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR  O AT    5050 /       /   2200. /   250. /   23765. / 1.00 /    0. /   42.
   730.85 /   1.20 /       ...1...  (-.001)    /    8.79 /   0.59 /          *BO*
--------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
--------------------------------------------------------------------------
    P AT    5140 /    90 /   2200. /   396. /   38608. / 1.17 /   -8. /  100.
   731.20 /   0.56 /  0.26 /   0.0  / 731.77 /    5.56 /   0.47 / -0.001  *AS*
--------------------------------------------------------------------------
   M = 0.29 / E = 0.86 / K* = 0.54 /   495. /   50738. / 1.22 /  -20. /  109.
   732.04 /   0.37 /                 / 732.42 /    4.44 /   0.37 /          *AS*
========================== END BRIDGE ANALYSIS ============================
    Q AT    5380 /   240 /   2200. /   760. /   75375. / 1.19 /  122. /  484.
   732.56 /   0.15 /  0.30 /   0.0  / 732.72 /    2.89 /   0.26 / -0.000  *XS*
--------------------------------------------------------------------------
    R AT    5630 /   250 /   2200. /   293. /   35312. / 1.06 /   21. /   83.
   732.63 /   0.93 /  0.45 /   0.39 / 733.56 /    7.51 /   0.61 / -0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR  R AT    5630 /       /   2200. /   311. /   47237. / 1.00 /    1. /   64.
   732.63 /   0.78 /       ...1...  (-.001)    /    7.08 /   0.56 /          *BO*
--------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
--------------------------------------------------------------------------
    S AT    5700 /    70 /   2200. /   295. /   38261. / 1.00 /    7. /   59.
   732.95 /   0.86 /  0.25 /   0.0  / 733.81 /    7.46 /   0.55 / -0.001  *AS*
--------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /   295. /   38314. / 1.00 /    7. /   59.
   732.95 /   0.86 /                 / 733.81 /    7.45 /   0.55 /          *AS*
========================== END BRIDGE ANALYSIS ============================
S+1   AT    5800 /   100 /   2200. /   498. /   55986. / 1.50 /   12. /  203.
   733.58 /   0.45 /  0.23 /   0.0  / 734.04 /    4.41 /   0.39 / -0.001  *XS*
--------------------------------------------------------------------------
    T AT    6360 /   560 /   2200. /   641. /   51671. / 1.82 /   45. /  373.
   734.64 /   0.33 /  0.94 /   0.0  / 734.98 /    3.43 /   0.42 / -0.000  *XS*
--------------------------------------------------------------------------
T+1   AT    6770 /   410 /   2200. /   570. /   47394. / 1.90 /    9. /  289.
   735.39 /   0.44 /  0.81 /   0.05 / 735.83 /    3.86 /   0.46 / -0.007  *XS*
--------------------------------------------------------------------------
    U AT    7040 /   270 /   2200. /   300. /   33194. / 1.24 /   25. /  107.
   735.92 /   1.03 /  0.83 /   0.30 / 736.96 /    7.32 /   0.65 / -0.005  *XS*
--------------------------------------------------------------------------
```

WATER-SURFACE PROFILE FOR: THREAD CR 12TH ST DAM TO BEACH MONROE ST KNUTILLA
PAGE 2 OF 2, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
U+1   AT    7740 /   350 /   2200. /   371. /   48031. / 1.01 /   14. /  104.
   738.21 /   0.55 /   0.74 /   0.0  / 738.76 /    5.93 /   0.44 / -0.017  *XS*
----------------------------------------------------------------------------------
   V AT    8060 /   320 /   2200. /   406. /   55457. / 1.15 /   46. /  159.
   738.82 /   0.53 /   0.58 /   0.0  / 739.34 /    5.42 /   0.40 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ===============================
BR  Y AT    8060 /   [illegible] /   1793. /   223. /   20895. / 1.00 /    0. /   32.
   738.60 /   1.01 /   ...3...  (-.001)    /   8.05 /   0.54 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       0. / RIGHT     392. /                *RG*
----------------------------------------------------------------------------------
    W AT    8150 /    90 /   2200. /   238. /   34282. / 1.07 /   87. /  139.
   738.83 /   1.42 /   0.23 /   0.68 / 740.24 /    9.23 /   0.63 / -0.011  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   252. /   36388. / 1.10 /   87. /  145.
   739.08 /   1.30 /                 / 740.39 /    8.71 /   0.60 /          *AS*
============================ END BRIDGE ANALYSIS =================================
```

END OF THIS PROFILE

```
WATER-SURFACE PROFILE FOR:  THREAD CR MONROE ST TO BARTON ST          KNUTILLA
PAGE  1 OF  1, PROFILE NUMBER  3,   UPSTREAM COMPUTATIONS
=================================================================================
SECTO AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /    EG  /     V  /    FN  /   ACC    *ID*
=================================================================================
W      AT    8150 /      0 /   2200. /   210. /   26787. / 1.11 /   87. /  145.
   739.08 /   1.88 /                  / 740.96 /  10.45 /   0.79/          *IS*
---------------------------------------------------------------------------------
W+.05 AT    8240 /     90 /   2200. /   629. /   70661. / 1.84 /   13. /  301.
   740.83 /   0.35 /   0.23 /   0.0  / 741.18 /   3.50 /   0.33 / -0.014  *XS*
---------------------------------------------------------------------------------
W+1    AT    8460 /    220 /   2200. /  1094. /  101652. / 1.86 /    5. /  380.
   741.21 /   0.12 /   0.15 /   0.0  / 741.33 /   2.01 /   0.22 / -0.000  *XS*
---------------------------------------------------------------------------------
    X AT    8890 /    430 /   2200. /   442. /   47574. / 1.78 /   -1. /  162.
   741.36 /   0.69 /   0.43 /   0.28 / 742.04 /   4.98 /   0.47 / -0.001  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR  X AT    8890 /       /   2200. /   242. /   33136. / 1.00 /    0. /   34.
   741.36 /   1.29 /       ...1...  (-.001)    /   9.10 /   0.60 /          *BO*
---------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
---------------------------------------------------------------------------------
    Y AT    8980 /     90 /   2200. /   206. /   25908. / 1.05 /   -1. /   40.
   741.37 /   1.87 /   0.35 /   0.85 / 743.23 /  10.70 /   0.80 / -0.011  *AS*
---------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /   206. /   26009. / 1.05 /   -1. /   40.
   741.38 /   1.86 /                  / 743.24 /  10.67 /   0.80 /          *AS*
============================ END BRIDGE ANALYSIS ================================

                                END OF THIS PROFILE
```

AA

AB

AC

100.4

AD

```
WATER-SURFACE PROFILE FOR:  THREAD CR BARR ST TO SAGINAW ST          KNUTILLA
PAGE  1 OF  1. PROFILE NUMBER  3.   UPSTREAM COMPUTATIONS
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
    Y AT    8980 /     0 /   2200. /   206. /   26015. / 1.05 /   -1. /   40.
   741.38 /   1.86 /                 / 743.24 /  10.67 /   0.80/          *IS*
----------------------------------------------------------------------------------
Y+1   AT    9040 /    60 /   2200. /   462. /   56279. / 1.09 /    9. /  130.
   743.05 /   0.38 /   0.20 /   0.0  / 743.44 /   4.76 /   0.38 / -0.000  *XS*
----------------------------------------------------------------------------------
    Z AT    9240 /   200 /   2200. /   424. /   56526. / 1.06 /   42. /  124.
   743.33 /   0.45 /   0.30 /   0.03 / 743.77 /   5.19 /   0.39 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR  Z AT    9240 /       /   2200. /   263. /   37458. / 1.00 /    0. /   36.
   743.33 /   1.09 /       ...1...(-.001)    /   8.38 /   0.54 /          *BO*
----------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
----------------------------------------------------------------------------------
   1A AT    9380 /   140 /   2200. /   413. /   66315. / 1.09 /    0. /   60.
   743.49 /   0.48 /   0.18 /   0.02 / 743.97 /   5.33 /   0.36 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /   413. /   66420. / 1.09 /    0. /   60.
   743.49 /   0.48 /                 / 743.98 /   5.33 /   0.36 /          *AS*
============================ END BRIDGE ANALYSIS ================================

                          END OF THIS PROFILE
```

AD

AC

IN-7

```
ATER-SURFACE PROFILE FOR:  THREAT CR SAGINAW ST DAM TO THREAD LAKE  KNUTILLA
PAGE  1 OF  1, PROFILE NUMBER  3,   UPSTREAM COMPUTATIONS
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
  1AA AT    9410 /     0 /   2200. /   510. /   91222. / 1.10 /     0. /   62.
   745.10 /   0.32 /                 /  745.42 /   4.31 /   0.27/          *IS*
----------------------------------------------------------------------------------
1AA+1 AT    9470 /    60 /   2200. /   357. /   48329. / 1.00 /     5. /   63.
   745.03 /   0.59 /   0.07 /   0.14 /  745.62 /   6.16 /   0.44 / -0.000  *XS*
----------------------------------------------------------------------------------
 1AAA AT    9530 /    60 /   2200. /   283. /   36497. / 1.16 /   -12. /   50.
   744.94 /   1.09 /   0.16 /   0.25 /  746.03 /   7.77 /   0.64 / -0.001  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BRAAA AT    9530 /       /   2200. /   189. /   21374. / 1.00 /     0. /   36.
   744.94 /   2.10 /       ...1...  (-.001)    /  11.63 /   0.83 /          *BO*
----------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
----------------------------------------------------------------------------------
 AAAA AT    9690 /   160 /   2200. /   364. /   54266. / 1.16 /     1. /   61.
   745.77 /   0.66 /   0.39 /   0.0  /  746.42 /   6.05 /   0.42 / -0.001  *AS*
----------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /   365. /   54461. / 1.16 /     1. /   61.
   745.78 /   0.65 /                 /  746.44 /   6.03 /   0.42 /          *AS*
============================ END BRIDGE ANALYSIS ================================
   1B AT    9970 /   280 /   2200. /   883. /  115469. / 1.22 /    16. /  208.
   746.53 /   0.12 /   0.22 /   0.0  /  746.65 /   2.49 /   0.19 / -0.003  *XS*
----------------------------------------------------------------------------------
```

AG

AH

10-7

AI

AJ

END OF THIS PROFILE

```
      SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
        WS ELEV /    HV  /    HF  /    HE        EG  /     V  /    FN  /   ACC    *ID*
      ==========================================================================
AK      1CC AT   12100 /     0 /   2100. / 2003. / 223314. / 1.46 /  140. / 1014.
         751.00 /   0.02 /                / 751.02 /   1.05 /  0.11/          *IS*
      --------------------------------------------------------------------------
AL      1CCB AT  12500 /   400 /   2100. / 2603. / 326772. / 1.24 /   35. /  928.
         751.04 /   0.01 /   0.02 /   0.0  / 751.05 /   0.81 /  0.08 / -0.000  *XS*
      --------------------------------------------------------------------------
AM      1CCC AT  13140 /   640 /   2100. / 1441. / 206710. / 1.01 /   20. /  355.
         751.07 /   0.03 /   0.04 /   0.01 / 751.10 /   1.46 /  0.12 / -0.000  *XS*
      --------------------------------------------------------------------------
AN      1CCCC AT 14060 /   920 /   2100. / 2089. / 156393. / 2.22 /   19. /  764.
         751.19 /   0.03 /   0.13 /   0.00 / 751.23 /   1.01 /  0.15 /  0.001  *XS*
      --------------------------------------------------------------------------
AØ      1CCDC AT 14290 /   230 /   2100. / 1912. / 120752. / 1.67 /   62. /  863.
         751.25 /   0.03 /   0.05 /   0.0  / 751.28 /   1.10 /  0.10 / -0.000  *XS*
      --------------------------------------------------------------------------
AP      1CCCD AT 15160 /   870 /   2100. / 1556. /  85636. / 1.85 /  436. /  912.
         751.61 /   0.05 /   0.37 /   0.01 / 751.66 /   1.35 /  0.11 /  0.001  *XS*
      --------------------------------------------------------------------------
AQ        1D AT  15990 /   830 /   2100. / 1071. /  53338. / 3.27 /  304. /  776.
         752.34 /   0.20 /   0.80 /   0.07 / 752.54 /   1.96 /  0.35 /  0.000  *XS*
      --------------------------------------------------------------------------
AR      1DD    AT 16560 /   570 /   2100. / 1416. /  80942. / 1.92 /  172. /  668.
         753.06 /   0.07 /   0.58 /   0.0  / 753.12 /   1.48 /  0.12 /  0.001  *XS*
      --------------------------------------------------------------------------
AS        1E AT  17040 /   480 /   2100. /  415. /  35077. / 1.92 /   60. /  193.
         753.45 /   0.77 /   0.75 /   0.35 / 754.22 /   5.06 /  0.55 / -0.000  *XS*
      --------------------------------------------------------------------------
AT        1F AT  17630 /   590 /   2100. /  929. /  76699. / 2.21 /   79. /  395.
         755.01 /   0.18 /   0.97 /   0.0  / 755.19 /   2.26 /  0.25 /  0.001  *XS*
      --------------------------------------------------------------------------
AU       1FF AT  18150 /   520 /   2100. /  521. /  63423. / 1.31 /   36. /  136.
         755.40 /   0.33 /   0.47 /   0.08 / 755.74 /   4.03 /  0.32 /  0.000  *XS*
      --------------------------------------------------------------------------
AV        1G AT  18350 /   200 /   2100. /  432. /  58303. / 1.26 /   47. /  115.
         755.58 /   0.46 /   0.24 /   0.07 / 756.04 /   4.87 /  0.35 / -0.000  *XS*
      ========================== BEGIN BRIDGE ANALYSIS ==========================
      DORTB AT 18350 /       /   2100. /  250. /  32488. / 1.00 /    0. /   35.
         755.58 /   1.10 /      ...1...  (-.001)     /   8.41 /  0.52 /          *BO*
      --------------------------------------------------------------------------
      EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /              *RG*
      --------------------------------------------------------------------------
        1H AT  18460 /   110 /   2100. /  283. /  42289. / 1.05 /   45. /   89.
         755.59 /   0.90 /   0.20 /   0.26 / 756.48 /   7.41 /  0.48 / -0.011  *AS*
      --------------------------------------------------------------------------
AW      M = 0.01 / E = 0.0  / K* = 0.04 /  286. /  42791. / 1.05 /   44. /   89.
         755.64 /   0.88 /                / 756.53 /   7.34 /  0.48 /          *AS*
```

100-YR

100-Y1

WATER-SURFACE PROFILE FOR: THREAD CREEK MOUTH THREAD L TO DORT HWY HOLTSLAG
PAGE 2 OF 2, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
  1HH AT   18790 /   330 /  2100. /   406. /  59737. / 1.29 /    1. /   93.
  756.56 /   0.54 /   0.57 /   0.0  /  757.10 /   5.18 /   0.38 / -0.001  *XS*
----------------------------------------------------------------------------------
  1J AT    19230 /   440 /  2100. /   411. /  58535. / 1.32 /    2. /  106.
  757.12 /   0.54 /   0.55 /   0.0  /  757.66 /   5.11 /   0.40 /  0.005  *XS*
============================ BEGIN BRIDGE ANALYSIS ================================
BR 1J AT   19230 /        /        /   197. / 15316. / 1.00 /    0. /   35.
  754.10 /   0.53 /        ...3...  (-.001)  /   5.84 /   0.43 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     541. / RIGHT    392. /                *RG*
----------------------------------------------------------------------------------
  1K AT    19290 /    60 /  2100. /   434. /  54842. / 1.20 /    2. /  106.
  757.30 /   0.44 /   0.08 /   0.0  /  757.74 /   4.84 /   0.35 / -0.001  *AS*
----------------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /   462. /  59514. / 1.19 /    1. /  108.
  757.56 /   0.38 /                /  757.95 /   4.55 /   0.32 /          *AS*
============================ END BRIDGE ANALYSIS ==================================
  1L AT    19780 /   490 /  2100. /   343. /  40123. / 1.13 /   62. /  143.
  758.31 /   0.66 /   0.90 /   0.14 /  758.97 /   6.13 /   0.45 / -0.018  *XS*
============================ BEGIN BRIDGE ANALYSIS ================================
BR 1L AT   19780 /        /  2100. /   299. /  44870. / 1.00 /    0. /   35.
  758.31 /   0.77 /        ...1...  (-.001)  /   7.02 /   0.42 /          *BO*
----------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
----------------------------------------------------------------------------------
  1M AT    19850 /    70 /  2100. /   407. /  63149. / 1.27 /   -1. /   78.
  758.56 /   0.53 /   0.12 /   0.0  /  759.09 /   5.16 /   0.37 / -0.003  *AS*
----------------------------------------------------------------------------------
  M = 0.12 / E = 0.30 / K* = 0.21 /   422. /  65950. / 1.29 /   -1. /   79.
  758.75 /   0.49 /                /  759.25 /   4.97 /   0.35 /          *AS*
============================ END BRIDGE ANALYSIS ==================================
  1N AT    20050 /   200 /  2100. /  1499. / 174807. / 2.06 /  166. /  751.
  759.25 /   0.06 /   0.08 /   0.0  /  759.32 /   1.40 /   0.13 / -0.009  *XS*
----------------------------------------------------------------------------------
```

AX AY BA BB BC

100-YR

Elms

CHAMBERS

END OF THIS PROFILE

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   21,DATE= 4/ 7/78

WATER-SURFACE PROFILE FOR: THREAD CREEK  ATHERTON - BRISTOL ROAD   HOLTSLAG
PAGE 2 OF 2, PROFILE NUMBER 4,   UPSTREAM COMPUTATIONS
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
=================================================================================
CM  M = **** / E = **** / K* = **** /   582. /   51004. / 2.11 /  183. /  389.   100 YR
    773.12 /   0.37 /                 /  773.49 /   3.35 /   0.36 /          *AS*
=============================.END BRIDGE ANALYSIS ============================

                              END OF THIS PROFILE
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 20, DATE= 4/ 7/78

WATER-SURFACE PROFILE FOR: THREAD CREEK ATHERTON - BRISTOL ROAD HOLTSLAG
PAGE 1 OF 2, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

	SECID AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*
BV	2B AT / 765.61	26790 / 0.22	0 /	2100. /	847. / 765.83	70244. / 2.48	2.27 / 0.27	494. /	1121. / *IS*
BW	2C AT / 766.06	27310 / 0.05	520 / 0.28	2100. / 0.0	1679. / 766.11	114882. / 1.25	1.96 / 0.16	742. / 0.000	1518. / *XS*
BX	2D AT / 766.31	27920 / 0.08	610 / 0.26	2100. / 0.01	1471. / 766.39	88657. / 1.43	2.44 / 0.21	226. / 0.000	991. / *XS*
BY	2E AT / 766.76	28670 / 0.12	750 / 0.46	1950. / 0.02	1249. / 766.87	74966. / 1.56	3.04 / 0.25	155. / 0.000	711. / *XS*
BZ	2F AT / 767.11	29150 / 0.13	480 / 0.35	1950. / 0.01	1238. / 767.26	68753. / 1.57	3.32 / 0.28	136. / 0.002	742. / *XS* 100-YR
CA	2G AT / 767.70	29860 / 0.12	710 / 0.58	1950. / 0.0	1279. / 767.82	67378. / 1.52	3.19 / 0.25	519. / 0.000	974. / *XS*
CB	2H AT / 768.37	30520 / 0.12	660 / 0.67	1950. / 0.00	978. / 768.49	55902. / 1.99	1.98 / 0.19	609. / 0.002	1006. / *XS*
CC	2I AT / 769.32	31230 / 0.18	710 / 0.98	1950. / 0.03	906. / 769.50	49276. / 2.15	2.51 / 0.33	533. / 0.001	874. / *XS*
CD	2J AT / 770.02	31820 / 0.14	590 / 0.66	1950. / 0.0	1244. / 770.16	68974. / 1.57	3.63 / 0.26	621. / 0.001	1132. / *XS*
CE	2K AT / 770.66	32630 / 0.04	810 / 0.53	1950. / 0.0	1366. / 770.70	83532. / 1.43	1.17 / 0.13	860. / 0.001	1296. / *XS*
CF	2L AT / 771.00	33230 / 0.08	600 / 0.36	1950. / 0.02	1000. / 771.08	75810. / 1.95	1.42 / 0.18	648. / 0.001	1062. / *XS*
CG	2LL AT / 771.37	33630 / 0.63	400 / 0.64	1950. / 0.27	412. / 772.00	31280. / 4.73	1.82 / 0.57	527. / -0.001	722. / *XS* 100 YR
CH	AT	34000	370	1950					

```
SECTD AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==========================================================================
   10 AT   20110 /     0 /   2100. /  2386. / 237522. / 1.61 /   42. /  648.
BD 759.56 /   0.02 /                 / 759.58 /   0.88 /   0.07/          *IS*
--------------------------------------------------------------------------
   1P AT   20610 /   500 /   2100. /  1741. / 206494. / 1.35 /    0. /  359.
BE 759.60 /   0.03 /   0.04 /   0.01 / 759.63 /   1.21 /   0.09 / 0.000  *XS*
--------------------------------------------------------------------------
   1Q AT   21000 /   390 /   2100. /  1106. / 142699. / 1.47 /    0. /  186.
BF 759.63 /   0.08 /   0.06 /   0.03 / 759.71 /   1.90 /   0.16 / -0.000 *XS*
--------------------------------------------------------------------------
   1R AT   21240 /   240 /   2100. /   447. /  51514. / 1.24 /    5. /   95.
BG 759.60 /   0.43 /   0.14 /   0.17 / 760.03 /   4.70 /   0.36 / -0.000 *XS*
--------------------------------------------------------------------------
  1RR AT   21510 /   270 /   2100. /  1171. / 129029. / 1.39 /    0. /  218.
BH 760.14 /   0.07 /   0.18 /   0.0  / 760.21 /   1.79 /   0.15 / -0.000 *XS*
--------------------------------------------------------------------------
   1S AT   21900 /   390 /   2100. /   409. /  54849. / 1.11 /    0. /   80.
BI 760.19 /   0.45 /   0.24 /   0.19 / 760.64 /   5.13 /   0.34 / 0.000  *XS*
--------------------------------------------------------------------------
  1SS AT   22350 /   450 /   2100. /   459. /  56674. / 1.31 /   14. /  157.
BJ 760.86 /   0.43 /   0.64 /   0.0  / 761.28 /   4.57 /   0.33 / 0.000  *XS*
--------------------------------------------------------------------------
   1T AT   22780 /   430 /   2100. /  1224. / 105556. / 2.11 /    5. /  460.
BK 761.50 /   0.10 /   0.32 /   0.0  / 761.60 /   1.72 /   0.18 / -0.000 *XS*
--------------------------------------------------------------------------
  1TT AT   23170 /   390 /   2100. /  2071. / 147256. / 1.97 /  253. /  891.
BL 761.68 /   0.03 /   0.11 /   0.0  / 761.71 /   1.01 /   0.12 / -0.000 *XS*
--------------------------------------------------------------------------
   1U AT   23480 /   310 /   2100. /  2317. / 137805. / 1.74 /  342. / 1145.
BM 761.76 /   0.02 /   0.07 /   0.0  / 761.78 /   0.91 /   0.08 / -0.000 *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 1U AT   23480 /       /   1367. /   309. /  41164. / 1.00 /    0. /   42.
   761.76 /   0.31 /       ...1...  (-.001)    /   4.43 /   0.29 /          *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT     741. /              *RG*
--------------------------------------------------------------------------
   1V AT   23560 /    80 /   2100. /   762. /  49289. / 3.08 /  392. /  908.
   761.77 /   0.36 /   0.05 /   0.31 / 762.13 /   2.75 /   0.38 / -0.011 *AS*
--------------------------------------------------------------------------
   M = 0.0  / E = 0.0  / K* = 0.01 /   764. /  49371. / 3.09 /  392. /  908.
BN 761.77 /   0.36 /                 / 762.13 /   2.75 /   0.38 /          *AS*
========================== END BRIDGE ANALYSIS ============================
   1W AT   24490 /   930 /   2100. /  1755. /  93068. / 2.42 /  369. / 1192.
BØ 762.97 /   0.05 /   0.89 /   0.0  / 763.03 /   1.20 /   0.19 / 0.001  *XS*
--------------------------------------------------------------------------
   1X AT   25110 /   620 /   1200. /  1316. /  67011. / 3.06 /  719. / 1262.
BP 763.26 /   0.04 /   0.27 /   0.0  / 763.30 /   0.91 /   0.15 / 0.000  *XS*
```

100-Y

100-

```
==========================================================================
 CID AT DISTANCE/ LENGTH/DISCHARGE/   AREA /CONVEYANCE/ ALPHA/  LEW  /  REW
 WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==========================================================================
  1XX AT   25380 /   270 /   1200. /  1045. /   58648. / 2.94 /   93. /  487.
  763.35 /   0.06 /   0.10 /   0.01 /  763.41 /    1.15 /   0.18 / -0.000  *XS*
--------------------------------------------------------------------------
  1Y AT   25710 /   330 /   1200. /   522. /   26905. / 2.43 / 1012. / 1267.
  763.60 /   0.20 /   0.30 /   0.07 /  763.80 /    2.30 /   0.36 /  0.018  *XS*
--------------------------------------------------------------------------
1YY   AT   26070 /   360 /   1200. /   451. /   24247. / 1.87 /    9. /  219.
  764.39 /   0.21 /   0.79 /   0.00 /  764.60 /    2.66 /   0.38 /  0.002  *XS*
--------------------------------------------------------------------------
  1Z AT   26430 /   360 /   1200. /   394. /   39924. / 1.00 /  393. /  476.
  764.99 /   0.14 /   0.54 /   0.0  /  765.13 /    3.04 /   0.25 /  0.000  *XS*
--------------------------------------------------------------------------
  2A AT   26640 /   210 /   2100. /   793. /   47994. / 2.77 /  353. /  866.
  765.21 /   0.30 /   0.30 /   0.08 /  765.51 /    2.65 /   0.37 / -0.001  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 2A AT   26640 /        /   1224. /   242. /   19484. / 1.00 /    0. /   41.
  763.40 /   0.40 /        ...3...  (-.001)    /    5.06 /   0.37 /          *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     862. / RIGHT       9. /               *RG*
--------------------------------------------------------------------------
  2B AT   26790 /   150 /   2100. /   778. /   65070. / 2.26 /  503. / 1117.
  765.46 /   0.26 /   0.21 /   0.0  /  765.71 /    2.70 /   0.29 / -0.008  *AS*
--------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /   848. /   70347. / 2.27 /  494. / 1121.
  765.61 /   0.22 /                 /  765.83 /    2.48 /   0.27 /          *AS*
========================== END BRIDGE ANALYSIS ============================

                          END OF THIS PROFILE
```

BQ

BR

BS

BT

BU

BV

100-YR

```
2O AT   34440 /   370 /   1950. /   1058. /   64871. / 2.69 /   157. /   513.
773.77 /    [illegible].14 /   0.43 /   0.0  /  773.91 /   1.84[illegible]   0.13 / -0.000   *XS*
-----------------------------------------------------------------------------
2P AT   35280 /   840 /   1950. /    842. /   66041. / 2.63 /   170. /   445.
774.48 /   0.22 /   0.75 /   0.04 /  774.70 /   2.32 /   0.30 /  0.001   *XS*
-----------------------------------------------------------------------------
2Q AT   35830 /   550 /   1950. /    882. /   55894. / 2.25 /    93. /   400.
775.09 /   0.17 /   0.57 /   0.0  /  775.27 /   2.21 /   0.31 /  0.000   *XS*
-----------------------------------------------------------------------------
2R AT   36380 /   550 /   1950. /   1098. /   58255. / 2.10 /   127. /   513.
775.80 /   0.10 /   0.64 /   0.0  /  775.91 /   1.78 /   0.15 /  0.000   *XS*
-----------------------------------------------------------------------------
2S AT   36930 /   550 /   1950. /    786. /   38532. / 2.48 /   300. /   669.
776.67 /   0.24 /   0.93 /   0.07 /  776.91 /   2.48 /   0.42 /  0.002   *XS*
-----------------------------------------------------------------------------
2SS AT  37390 /   460 /   1950. /    988. /   58949. / 2.57 /   288. /   666.
777.52 /   0.16 /   0.77 /   0.0  /  777.68 /   1.97 /   0.29 /  0.000   *XS*
-----------------------------------------------------------------------------
2T AT   37880 /   490 /   1950. /   1128. /   60616. / 2.48 /   571. /   963.
778.09 /   0.12 /   0.52 /   0.0  /  778.20 /   1.73 /   0.14 / -0.000   *XS*
-----------------------------------------------------------------------------
2U AT   38630 /   750 /   1950. /    800. /   36812. / 2.04 /   581. /   892.
779.34 /   0.19 /   1.28 /   0.04 /  779.52 /   2.44 /   0.20 /  0.008   *XS*
-----------------------------------------------------------------------------
2V AT   39220 /   590 /   1950. /   1991. /   81095. / 2.82 /   474. /  1159.
780.23 /   0.04 /   0.75 /   0.0  /  780.28 /   0.98 /   0.08 /  0.001   *XS*
-----------------------------------------------------------------------------
2W AT   39800 /   580 /   1950. /   1873. /   83082. / 2.41 /   366. /   959.
780.56 /   0.04 /   0.33 /   0.0  /  780.60 /   1.04 /   0.08 /  0.001   *XS*
-----------------------------------------------------------------------------
2X AT   40660 /   860 /   1950. /   1035. /   52536. / 3.00 /   248. /   646.
781.25 /   0.17 /   0.75 /   0.06 /  781.42 /   1.88 /   0.29 /  0.000   *XS*
-----------------------------------------------------------------------------
2Y AT   41180 /   520 /   1850. /    984. /   62438. / 2.22 /    13. /   310.
781.87 /   0.12 /   0.57 /   0.0  /  781.99 /   1.88 /   0.23 /  0.000   *XS*
-----------------------------------------------------------------------------
2Z AT   41850 /   670 /   1850. /    956. /   45985. / 3.18 /    73. /   449.
782.62 /   0.18 /   0.80 /   0.03 /  782.80 /   1.93 /   0.29 / -0.018   *XS*
-----------------------------------------------------------------------------
2ZZ AT  42280 /   430 /   1850. /   1242. /   62135. / 3.16 /     5. /   429.
783.21 /   0.11 /   0.52 /   0.0  /  783.32 /   1.49 /   0.23 /  0.000   *XS*
-----------------------------------------------------------------------------
```

CJ
CK
CL
CM
CN
CO
CP
CQ
CR
CS
CT
CU
CV
CW

10'4'

```
 S ELEV /          /     TW /     HL /     EG /      V /     FR /    ACC     IE
==================================================================================
  3A AT   [redacted]2650 /   370 /  1850. /  1366. /  726[redacted] / 2.49 /   16. /  383.
  783.53 /   0.07 /   0.28 /   0.0  /  783.60 /   1.35 /   0.09 /  0.000  *XS*
----------------------------------------------------------------------------------
 3AA AT   42860 /   210 /  1850. /  1264. /  61818. / 2.79 /   10. /  386.
  783.68 /   0.09 /   0.16 /   0.01 /  783.77 /   1.46 /   0.11 / -0.000  *XS*
----------------------------------------------------------------------------------
  3B AT   43320 /   460 /  1850. /  1669. /  85440. / 1.98 /   42. /  492.
  784.03 /   0.04 /   0.30 /   0.0  /  784.07 /   1.11 /   0.08 /  0.002  *XS*
----------------------------------------------------------------------------------
  3C AT   44030 /   710 /  1850. /  1655. /  61978. / 3.60 /  123. /  837.
  784.48 /   0.07 /   0.46 /   0.02 /  784.55 /   1.12 /   0.09 /  0.000  *XS*
----------------------------------------------------------------------------------
  3D AT   44540 /   510 /  1850. /  1847. /  76609. / 2.98 /  155. /  800.
  784.87 /   0.05 /   0.37 /   0.0  /  784.91 /   1.00 /   0.17 /  0.000  *XS*
----------------------------------------------------------------------------------
  3E AT   45150 /   610 /  1850. /   911. /  37605. / 2.52 /  117. /  495.
  785.54 /   0.16 /   0.72 /   0.06 /  785.70 /   2.03 /   0.34 /  0.001  *XS*
----------------------------------------------------------------------------------
 3EE AT   45370 /   220 /  1850. /  1182. /  50256. / 2.48 /  152. /  560.
  786.00 /   0.09 /   0.40 /   0.0  /  786.10 /   1.57 /   0.11 /  0.000  *XS*
----------------------------------------------------------------------------------
  3F AT   45740 /   370 /  1850. /  1301. /  58354. / 2.12 /  166. /  585.
  786.46 /   0.07 /   0.43 /   0.0  /  786.53 /   1.42 /   0.13 /  0.000  *XS*
----------------------------------------------------------------------------------
 3FF AT   46100 /   360 /  1850. /  1464. /  64233. / 2.50 /   62. /  620.
  786.80 /   0.06 /   0.33 /   0.0  /  786.86 /   1.26 /   0.13 /  0.001  *XS*
----------------------------------------------------------------------------------
  3G AT   46470 /   370 /  1850. /  1671. /  69756. / 2.46 /  107. /  703.
  787.09 /   0.05 /   0.28 /   0.0  /  787.14 /   1.11 /   0.09 / -0.000  *XS*
----------------------------------------------------------------------------------
  3H AT   46660 /   190 /  1850. /  1231. /  60739. / 2.33 /  184. /  780.
  787.23 /   0.08 /   0.15 /   0.02 /  787.31 /   1.50 /   0.24 /  0.000  *XS*
----------------------------------------------------------------------------------
 3HH AT   47150 /   490 /  1850. /  1079. /  51622. / 2.56 /  260. /  688.
  787.73 /   0.12 /   0.53 /   0.02 /  787.85 /   1.72 /   0.13 / -0.017  *XS*
----------------------------------------------------------------------------------
  3I AT   47510 /   360 /  1850. /   409. /  26896. / 2.39 /  378. /  784.
  788.30 /   0.76 /   0.89 /   0.32 /  789.06 /   4.52 /   0.55 / -0.002  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 3I AT   47510 /       /  1850. /   193. /  17688. / 1.00 /    0. /   40.
  788.30 /   1.42 /       ...1...  (-.001)    /   9.57 /   0.77 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /              *RG*
----------------------------------------------------------------------------------
  3J AT   47590 /    80 /  1850. /   295. /  17489. / 1.77 /  664. /  831.
  788.72 /   1.08 /   0.58 /   0.16 /  789.80 /   6.27 /   0.74 / -0.002  *AS*
----------------------------------------------------------------------------------
```

CK
CY
CZ
DA
DB
DC
DD 10.4
DE
DF
DG
DH
DI
DJ

```
  3J AT   47590 /     0 /   1750. /   518. /   32129. / 1.80 /   649. /   832.
789.95 /   0.32 /                   / 7[illegible].27 /   3.38 /   0.39/          *IS*
-----------------------------------------------------------------------------------
3J+1  AT   47800 /   210 /   1750. /   781. /   58472. / 1.72 /    18. /   272.
790.48 /   0.13 /   0.34 /    0.0  / 790.61 /    2.24 /   0.23 / -0.000  *XS*
-----------------------------------------------------------------------------------
  3K AT   48160 /   360 /   1750. /  1525. /   94499. / 1.52 /   336. /   725.
790.78 /   0.03 /   0.20 /    0.0  / 790.81 /    1.15 /   0.09 /  0.000  *XS*
-----------------------------------------------------------------------------------
  3L AT   48780 /   620 /   1750. /  1651. /   84496. / 1.56 /   190. /   668.
791.03 /   0.03 /   0.24 /    0.0  / 791.06 /    1.06 /   0.09 /  0.008  *XS*
-----------------------------------------------------------------------------------
 3LL AT   49180 /   400 /   1750. /  1284. /   72961. / 1.91 /    79. /   497.
791.22 /   0.06 /   0.20 /   0.01  / 791.27 /    1.36 /   0.11 /  0.000  *XS*
-----------------------------------------------------------------------------------
  3M AT   49540 /   360 /   1750. /   315. /   22469. / 1.65 /   -10. /    91.
791.52 /   0.79 /   0.67 /   0.37  / 792.31 /    5.55 /   0.60 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR 3M AT   49540 /       /   1750. /   207. /   27849. / 1.00 /    4. /    42.
791.52 /   1.11 /       ...1...  (-.001)    /    8.46 /   0.64 /          *BO*
-----------------------------------------------------------------------------------
    NO EMBANKMENT CROSS SECTION
-----------------------------------------------------------------------------------
  3N AT   49610 /    70 /   1750. /   491. /   44459. / 1.52 /    70. /   173.
792.23 /   0.30 /   0.21 /    0.0  / 792.53 /    3.56 /   0.33 / -0.000  *AS*
-----------------------------------------------------------------------------------
  M = 0.26 / E = 0.47 / K* = 0.37 /   539. /   50426. / 1.52 /    69. /   174.
792.69 /   0.25 /                   / 792.94 /    3.25 /   0.29 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
 3NN AT   50080 /   470 /   1750. /  1469. /  102906. / 1.32 /    24. /   339.
793.19 /   0.03 /   0.28 /    0.0  / 793.22 /    1.19 /   0.08 /  0.002  *XS*
-----------------------------------------------------------------------------------
  3O AT   50530 /   450 /   1750. /  1784. /  136488. / 1.15 /    35. /   541.
793.30 /   0.02 /   0.10 /    0.0  / 793.31 /    0.98 /   0.09 / -0.000  *XS*
-----------------------------------------------------------------------------------
  3P AT   50920 /   390 /   1750. /  1479. /  102814. / 1.29 /    40. /   621.
793.38 /   0.03 /   0.09 /   0.01  / 793.41 /    1.18 /   0.13 / -0.000  *XS*
-----------------------------------------------------------------------------------
 3PP AT   51320 /   400 /   1750. /  1380. /   99605. / 1.22 /    29. /   564.
793.50 /   0.03 /   0.12 /   0.00  / 793.53 /    1.27 /   0.13 /  0.000  *XS*
-----------------------------------------------------------------------------------
  3Q AT   51980 /   660 /   1750. /  1382. /  102903. / 1.28 /   172. /   709.
793.69 /   0.03 /   0.20 /   0.00  / 793.73 /    1.27 /   0.13 /  0.000  *XS*
-----------------------------------------------------------------------------------
  3R AT   52290 /   310 /   1750. /  1414. /   94493. / 1.13 /   269. /   672.
793.80 /   0.03 /   0.10 /    0.0  / 793.82 /    1.24 /   0.14 /  0.000  *XS*
-----------------------------------------------------------------------------------
```

```
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
WS ELEV /    HV  /    HF  /    HE  /    EG  /     V  /    FN  /   ACC   *ID*
==========================================================================
  3S AT   53060 /   770 /  1750. /   654. /  42665. / 2.09 /  486. /  866.
  794.28 /   0.23 /  0.58 /   0.10 / 794.51 /   2.68 /   0.36 / 0.000  *XS*
--------------------------------------------------------------------------
  3T AT   53580 /   520 /  1750. /   899. /  43099. / 1.59 /  426. /  795.
  795.26 /   0.09 /  0.87 /   0.0  / 795.37 /   1.95 /   0.19 / -0.006  *XS*
--------------------------------------------------------------------------
  3U AT   54380 /   800 /  1750. /  1153. /  48542. / 1.59 /  169. /  674.
  796.49 /   0.06 /  1.17 /   0.0  / 796.55 /   1.52 /   0.15 / 0.003  *XS*
--------------------------------------------------------------------------
  3V AT   54940 /   560 /  1750. /  1087. /  48947. / 1.94 /  149. /  705.
  797.20 /   0.08 /  0.72 /   0.01 / 797.28 /   1.61 /   0.17 / 0.002  *XS*
--------------------------------------------------------------------------
  3W AT   55330 /   390 /  1750. /   927. /  43075. / 2.10 /  261. /  715.
  797.75 /   0.12 /  0.57 /   0.02 / 797.87 /   1.89 /   0.18 / 0.001  *XS*
--------------------------------------------------------------------------
 3WW AT   55910 /   580 /  1750. /   799. /  44584. / 1.62 /  419. /  723.
  798.68 /   0.12 /  0.92 /   0.00 / 798.80 /   2.19 /   0.22 / 0.003  *XS*
--------------------------------------------------------------------------
  3X AT   56230 /   320 /  1750. /  1400. /  76871. / 1.73 /  378. /  930.
  799.04 /   0.04 /  0.29 /   0.0  / 799.08 /   1.25 /   0.13 / 0.000  *XS*
--------------------------------------------------------------------------
  3Y AT   56650 /   420 /  1750. /   307. /  24[illegible]. / 1.76 /  281. /  449.
  799.29 /   0.89 /  0.68 /   0.42 / 800.18 /   5.69 /   0.60 / -0.008  *XS*
========================= BEGIN BRIDGE ANALYSIS ==========================
BR 3Y AT   56650 /       /  1750. /   218. /  16907. / 1.00 /    0. /   40.
  798.80 /   1.00 /       ...3...  (-.001)  /  8.02 /   0.60 /          *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /          *RG*
--------------------------------------------------------------------------
  3Z AT   56700 /    50 /  1750. /   441. /  32360. / 1.86 /  221. /  396.
  799.90 /   0.46 /  0.19 /   0.0  / 800.36 /   3.97 /   0.44 / -0.014  *AS*
--------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /   814. /  43933. / 3.55 /  127. /  743.
  800.60 /   0.25 /                / 800.85 /   2.15 /   0.33 /          *AS*
========================= END BRIDGE ANALYSIS ============================
```

END OF THIS PROFILE

```
SECTID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
 WS ELEV /    HV  /    HF  /    HE  /       /     V  /    FN  /   ACC   *   *
==========================================================================
  3Z AT   56700 /     0 /   1750. /  1018. /   55530. / 3.29 /  124. /  761.
  800.92 /   0.15 /                 /  801.07 /   1.72 /   0.26/          *IS*
--------------------------------------------------------------------------
 3ZZ AT   57150 /   450 /   1750. /  1334. /   58435. / 2.32 /   49. /  603.
  801.42 /   0.06 /   0.42 /   0.0  /  801.48 /   1.31 /   0.11 / -0.014  *XS*
--------------------------------------------------------------------------
  3A AT   57530 /   380 /   1750. /  1771. /   62343. / 2.47 /  112. /  846.
  801.76 /   0.04 /   0.32 /   0.0  /  801.80 /   0.99 /   0.09 / 0.000  *XS*
--------------------------------------------------------------------------
  4B AT   58100 /   570 /   1750. /  1500. /   65316. / 2.34 /  285. /  743.
  802.19 /   0.05 /   0.43 /   0.01 /  802.24 /   1.17 /   0.09 / 0.001  *XS*
--------------------------------------------------------------------------
  4C AT   58460 /   360 /   1750. /   403. /   38252. / 1.54 /   67. /  159.
  802.44 /   0.45 /   0.44 /   0.20 /  802.89 /   4.34 /   0.38 / 0.009  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR 4C AT   58460 /       /   1750. /   267. /   34677. / 1.00 /   24. /   58.
  802.44 /   0.67 /       ...1...  (-.001)    /   6.56 /   0.54 /          *BO*
--------------------------------------------------------------------------
   NO EMBANKMENT CROSS SECTION
--------------------------------------------------------------------------
  4D AT   58520 /    60 /   1750. /   432. /   47669. / 1.43 /   30. /  112.
  802.62 /   0.37 /   0.10 /   0.0  /  802.99 /   4.05 /   0.34 / -0.000  *AS*
--------------------------------------------------------------------------
  M = 0.20 / E = 0.24 / K* = 0.25 /   447. /   49949. / 1.44 /   29. /  112.
  802.81 /   0.34 /                 /  803.16 /   3.91 /   0.32 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
 4DD AT   59110 /   590 /   1750. /  2294. /  116559. / 2.48 /  215. /  784.
  803.44 /   0.02 /   0.31 /   0.0  /  803.47 /   0.76 /   0.05 / 0.000  *XS*
--------------------------------------------------------------------------
  4E AT   59400 /   290 /   1750. /  2268. /  131754. / 2.88 /  373. / 1030.
  803.50 /   0.03 /   0.06 /   0.00 /  803.53 /   0.77 /   0.05 / 0.000  *XS*
--------------------------------------------------------------------------
  4F AT   60040 /   640 /   1750. /  1928. /   92269. / 2.95 /  417. / 1119.
  803.66 /   0.04 /   0.16 /   0.01 /  803.69 /   0.91 /   0.08 / -0.000  *XS*
--------------------------------------------------------------------------
  4G AT   60680 /   640 /   1750. /  1217. /   63164. / 2.34 /  101. /  575.
  803.97 /   0.08 /   0.34 /   0.02 /  804.05 /   1.44 /   0.21 / 0.000  *XS*
--------------------------------------------------------------------------
 4GG AT   61050 /   370 /   1750. /  1037. /   50088. / 2.60 /  105. /  578.
  804.31 /   0.12 /   0.36 /   0.02 /  804.43 /   1.69 /   0.27 / 0.000  *XS*
--------------------------------------------------------------------------
  4H AT   61660 /   610 /   1750. /  1662. /   57180. / 5.74 /   92. /  818.
  804.98 /   0.10 /   0.65 /   0.0  /  805.08 /   1.05 /   0.08 / 0.002  *XS*
--------------------------------------------------------------------------
4H+1 AT   62050 /   390 /   1750. /   795. /   46613. / 2.51 /  101. /  587.
  805.39 /   0.19 /   0.45 /   0.04 /  805.57 /   2.20 /   0.32 / 0.000  *XS*
--------------------------------------------------------------------------
```

WATER-SURFACE PROFILE FOR: THREAD CREEK HOL ROAD - CENTER ROAD HOLTSLAG
PAGE 2 OF 2, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID AT	DISTANCE/	LENGTH/	DISCHARGE/	AREA /	CONVEYANCE/	ALPHA/	LEW /	REW	
WS ELEV /	HV /	HF /	HE /	EG /	V /	FN /	ACC	*ID*	
4I AT	62300 /	250 /	1750. /	608. /	43283. /	2.36 /	176. /	577.	
805.71 /	0.30 /	0.38 /	0.06 /	806.01 /	2.88 /	0.35 /	-0.000	*XS*	ES
4II AT	62600 /	300 /	1750. /	498. /	36659. /	2.41 /	246. /	474.	
806.21 /	0.46 /	0.58 /	0.08 /	806.67 /	3.51 /	0.41 /	-0.001	*XS*	ET
4J AT	62830 /	230 /	1750. /	515. /	35571. /	2.21 /	318. /	523.	
806.81 /	0.40 /	0.54 /	0.0 /	807.21 /	3.40 /	0.42 /	-0.001	*XS*	EU

END OF THIS PROFILE

100-4

WATER-SURFACE PROFILE FOR: THREAD CREEK CENTER RD TO RUST PARK DR. KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 4. UPSTREAM COMPUTATIONS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
   4J AT   62830 /     0 /   1750. /   626. /   32984. / 2.87 /  153. /  523.
   806.81 /   0.35 /                 /  807.16 /   2.80 /   0.41/          *IS*
============================ BEGIN BRIDGE ANALYSIS ===========================
BR 4J AT   62830 /       /   1750. /   203. /   14453. / 1.00 /    0. /   40.
   806.40 /   1.16 /       ...3...  (-.001)    /   8.63 /   0.68 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       1. / RIGHT       0. /                *RG*
----------------------------------------------------------------------------------
   4K AT   62920 /    90 /   1750. /   948. /   49858. / 2.21 /  206. /  579.
   807.21 /   0.12 /   0.17 /   0.0  /  807.33 /   1.85 /   0.27 / -0.001  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  1502. /   88343. / 2.01 /  138. /  583.
   808.58 /   0.04 /                 /  808.62 /   1.17 /   0.09 /          *AS*
============================ END BRIDGE ANALYSIS =============================
  4KK AT   63390 /   470 /   1750. /  1132. /   73133. / 1.94 /   83. /  381.
   808.78 /   0.07 /   0.22 /   0.01 /  808.86 /   1.55 /   0.17 /  0.000  *XS*
----------------------------------------------------------------------------------
   4L AT   63600 /   210 /   1750. /  1221. /   70175. / 1.96 /  100. /  422.
   808.92 /   0.06 /   0.13 /   0.0  /  808.98 /   1.43 /   0.10 / -0.000  *XS*
----------------------------------------------------------------------------------
   4M AT   64050 /   450 /   1750. /  1293. /   80262. / 2.20 /  400. /  761.
   809.17 /   0.06 /   0.24 /   0.00 /  809.23 /   1.35 /   0.17 /  0.005  *XS*
----------------------------------------------------------------------------------
  4MM AT   64270 /   220 /   1750. /   800. /   53619. / 1.70 /  341. /  565.
   809.29 /   0.13 /   0.16 /   0.03 /  809.42 /   2.19 /   0.23 / -0.000  *XS*
----------------------------------------------------------------------------------
   4N AT   64550 /   280 /   1750. /   691. /   44830. / 1.85 /  350. /  587.
   809.62 /   0.18 /   0.36 /   0.03 /  809.81 /   2.53 /   0.28 / -0.000  *XS*
----------------------------------------------------------------------------------
```

EU

100-YR

EV

EW

EX

EY

EZ

FA

END OF THIS PROFILE

```
** AT   64550 /      0 /   1750. /   691. /   44798. / 1.85 /  350. /  587.
809.62 /   0.18 /                  /  809.80 /    2.53 /   0.28/          *IS*
=========================== BEGIN BRIDGE ANALYSIS ============================
BR 4N AT   64550 /       /    933. /   174. /   12214. / 1.00 /    0. /   28.
808.40 /   0.45 /        ...3...  (-.001)    /    5.37 /   0.37 /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     821. / RIGHT        0. /               *RG*
-----------------------------------------------------------------------------
   4O AT   64650 /   100 /   1750. /   482. /   38842. / 1.96 /  376. /  599.
809.69 /   0.40 /   0.18 /    0.11 /  810.09 /    3.63 /   0.38 / -0.000  *AS*
-----------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   553. /   43585. / 2.10 /  360. /  600.
809.99 /   0.33 /                  /  810.32 /    3.16 /   0.34 /          *AS*
=========================== END BRIDGE ANALYSIS ==============================
  400 AT   64710 /    60 /   1750. /   995. /   89544. / 1.77 /  320. /  516.
810.28 /   0.09 /   0.05 /    0.0  /  810.37 /    1.76 /   0.16 /  0.000  *XS*
-----------------------------------------------------------------------------
4000  AT   64950 /   240 /   1750. /   591. /   44975. / 1.92 /   81. /  253.
810.38 /   0.26 /   0.18 /    0.09 /  810.64 /    2.96 /   0.28 / -0.000  *XS*
-----------------------------------------------------------------------------
   4P AT   65180 /   230 /   1750. /   253. /   20555. / 1.01 /  307. /  360.
810.90 /   0.75 /   0.76 /    0.24 /  811.64 /    6.92 /   0.54 / -0.000  *XS*
-----------------------------------------------------------------------------
4P+1  AT   65430 /   250 /   1750. /   545. /   45311. / 1.66 /  281. /  727.
812.20 /   0.27 /   0.82 /    0.0  /  812.47 /    3.21 /   0.26 / -0.000  *XS*
-----------------------------------------------------------------------------
  4PP AT   65560 /   130 /   1750. /   373. /   31206. / 1.92 /  433. /  638.
812.29 /   0.66 /   0.28 /    0.20 /  812.94 /    4.69 /   0.42 / -0.000  *XS*
-----------------------------------------------------------------------------
   4Q AT   65760 /   200 /   1750. /   620. /   59897. / 1.96 /  245. /  747.
813.04 /   0.24 /   0.33 /    0.0  /  813.28 /    2.82 /   0.24 /  0.007  *XS*
-----------------------------------------------------------------------------
   4P AT   66130 /   370 /   1750. /  1002. /   67245. / 2.97 /   83. /  645.
813.42 /   0.14 /   0.28 /    0.0  /  813.56 /    1.75 /   0.21 / -0.001  *XS*
-----------------------------------------------------------------------------
   4S AT   66480 /   350 /   1750. /   486. /   48861. / 1.39 /   64. /  186.
813.67 /   0.28 /   0.33 /    0.07 /  813.95 /    3.60 /   0.25 / -0.006  *XS*
=========================== BEGIN BRIDGE ANALYSIS ============================
CU 4S AT   66480 /       /      0. /   104. /    9974. / 1.00 /    0. /   15.
810.30 /   0.0  /        ...3...  (-.001)    /    0.0  /   0.0  /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT    1724. / RIGHT       83. /               *RG*
-----------------------------------------------------------------------------
   4T AT   66550 /    70 /   1750. /   501. /   60826. / 1.52 /  201. /  305.
813.74 /   0.29 /   0.07 /    0.00 /  814.03 /    3.49 /   0.30 /  0.001  *AS*
-----------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   501. /   60826. / 1.52 /  201. /  305.
813.74 /   0.29 /                  /  814.03 /    3.49 /   0.30 /          *AS*
=========================== END BRIDGE ANALYSIS ==============================
```

FA

100-YR

FB

FC

FD

FE

FF

FG

FH

FI

100-YR

FJ

WATER-SURFACE PROFILE FOR: THREAD CREEK OLD BR RD WOODBRIDGE RD KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
4T AT 66550	0	1750.	503.	60974.	1.52	201.	306.		FJ
813.75	0.29			814.04	3.48	0.30		*IS*	
4U AT 66740	190	1750.	611.	72354.	1.30	110.	252.		FK
814.00	0.17	0.13	0.0	814.17	2.86	0.22	-0.004	*XS*	
4UU AT 66950	210	1750.	656.	57699.	1.38	69.	244.		FL
814.17	0.15	0.15	0.0	814.32	2.67	0.23	0.000	*XS*	
4V AT 67120	170	1750.	388.	39576.	1.46	46.	147.		FM
814.24	0.46	0.23	0.16	814.70	4.51	0.37	0.000	*XS*	

END OF THIS PROFILE

100-1

```
WATER-SURFACE PROFILE FOR:  THREAD CR WOODBRIDGE DR  BUSH AVE      KNUTILLA
PAGE  1 OF  1, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
=================================================================================
   4W AT   67220 /     0 /   1630. /   452. /   48054. / 2.08 /   72. /  185.
   814.53 /   0.42 /                 /  814.95 /   3.61 /   0.32/          *IS*
---------------------------------------------------------------------------------
   4X AT   67380 /   160 /   1630. /   781. /   57531. / 2.30 /   71. /  363.
   814.95 /   0.16 /   0.15 /   0.0  /  815.10 /   2.09 /   0.22 / -0.000  *XS*
---------------------------------------------------------------------------------
   4Y AT   67950 /   570 /   1630. /   669. /   47925. / 2.42 /   64. /  506.
   815.45 /   0.22 /   0.55 /   0.03 /  815.67 /   2.44 /   0.27 / -0.015  *XS*
========================== BEGIN BRIDGE ANALYSIS ==============================
CU 4Y AT   67950 /       /    460. /   130. /   12607. / 1.00 /    0. /   16.
   814.60 /   0.20 /       ...3...  (-.001)    /   3.55 /   0.22 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     720. / RIGHT     525. /                *RG*
---------------------------------------------------------------------------------
   4Z AT   68010 /    60 /   1630. /   711. /   51015. / 3.18 /   -1. /  527.
   815.50 /   0.26 /   0.07 /   0.02 /  815.75 /   2.29 /   0.29 / -0.001  *AS*
---------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   711. /   51015. / 3.18 /   -1. /  527.
   815.50 /   0.26 /                 /  815.75 /   2.29 /   0.29 /          *AS*
========================== END BRIDGE ANALYSIS ================================
```

EN

FO

FP

10.7

FQ

END OF THIS PROFILE

```
==========================================================================================
ECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
 WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==========================================================================================
  4Z AT   68010 /     0 /   1630. /   713. /   49511. / 3.47 /   -1. /  527.      FQ
  815.50 /   0.28 /                 / 815.78 /    2.29 /   0.30/          *IS*
------------------------------------------------------------------------------------------
4Z+1  AT   68300 /   290 /   1630. /   962. /   83630. / 2.05 /  142. /  398.      FR
  815.88 /   0.09 /   0.19 /    0.0  / 815.97 /    1.69 /   0.16 / -0.000  *XS*
------------------------------------------------------------------------------------------
  5A AT   68450 /   150 /   1630. /  1325. /   90025. / 2.21 /   24. /  388.      FS
  815.97 /   0.05 /   0.05 /    0.0  / 816.02 /    1.23 /   0.15 /  0.000  *XS*
------------------------------------------------------------------------------------------
  5B AT   68980 /   530 /   1630. /   784. /   46594. / 3.14 /  116. /  432.      FT
  816.22 /   0.21 /   0.34 /   0.08  / 816.43 /    2.08 /   0.28 / -0.006  *XS*
------------------------------------------------------------------------------------------
 5BB AT   69480 /   500 /   1630. /   898. /   54961. / 3.42 /   48. /  375.      FU
  816.77 /   0.18 /   0.52 /    0.0  / 816.95 /    1.82 /   0.24 / -0.000  *XS*
------------------------------------------------------------------------------------------
  5C AT   69790 /   310 /   1630. /  1373. /   58906. / 3.48 /   27. /  601.      FV
  817.13 /   0.08 /   0.25 /    0.0  / 817.20 /    1.19 /   0.10 / -0.000  *XS*
------------------------------------------------------------------------------------------
  5D AT   70480 /   690 /   1630. /  1648. /   92853. / 3.22 /   13. /  636.      FW
  817.49 /   0.05 /   0.34 /    0.0  / 817.54 /    0.99 /   0.14 /  0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 5D AT   70480 /       /      0. /   148. /   10865. / 1.00 /    0. /   16.
  817.49 /   0.0  /       ...1...  (-.001)    /    0.0  /   0.0  /          *BO*
------------------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT    2749. /                *RG*
------------------------------------------------------------------------------------------
  5E AT   70540 /    60 /   1630. /  1073. /   58893. / 4.09 /    9. /  469.
  817.50 /   0.15 /   0.03 /   0.09  / 817.65 /    1.52 /   0.23 / -0.011  *AS*
------------------------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /  1073. /   58893. / 4.09 /    9. /  469.      FX
  817.50 /   0.15 /                 / 817.65 /    1.52 /   0.23 /          *AS*
========================== END BRIDGE ANALYSIS ============================
```

END OF THIS PROFILE

```
==========================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==========================================================================
   5E AT   70540 /     0 /  1630. /  1082. /  59400. / 4.08 /    9. /  471.
   817.52 /   0.14 /                 /  817.66 /   1.51 /   0.23/          *IS*
--------------------------------------------------------------------------
  5EE AT   71080 /   540 /  1630. /  1464. /  85941. / 2.73 /   24. /  356.
   817.89 /   0.05 /   0.28 /   0.0  /  817.95 /   1.11 /   0.07 / 0.000  *XS*
--------------------------------------------------------------------------
   5F AT   71600 /   520 /  1630. /   914. /  55112. / 3.61 /  138. /  482.
   818.12 /   0.18 /   0.29 /   0.06 /  818.30 /   1.78 /   0.26 / -0.000  *XS*
--------------------------------------------------------------------------
   5G AT   72130 /   530 /  1630. /  1348. /  60378. / 5.93 /  115. /  700.
   818.59 /   0.13 /   0.42 /   0.0  /  818.72 /   1.21 /   0.24 / -0.000  *XS*
--------------------------------------------------------------------------
   5H AT   72430 /   300 /  1630. /  1081. /  69515. / 3.37 /   90. /  420.
   818.79 /   0.12 /   0.19 /   0.0  /  818.91 /   1.51 /   0.21 / -0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
CU 5H AT   72430 /       /    648. /   131. /  13024. / 1.00 /    0. /   15.
   818.79 /   0.38 /       ...1...  (-.001)    /   4.95 /   0.30 /          *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT    1001. /              *RG*
--------------------------------------------------------------------------
   5I AT   72500 /    70 /  1630. /   887. /  44600. / 5.95 /  -24. /  371.
   818.80 /   0.31 /   0.06 /   0.15 /  819.12 /   1.84 /   0.35 / -0.011  *AS*
--------------------------------------------------------------------------
   M = 0.0  / E = 0.0  / K* = 0.01 /   888. /  44666. / 5.95 /  -24. /  372.
   818.81 /   0.31 /                 /  819.12 /   1.84 /   0.35 /          *AS*
========================== END BRIDGE ANALYSIS ============================
```

END OF THIS PROFILE

```
==================================================================================
CID AT DISTANCE/ LENGTH/DISCHARGE/  AREA /CONVEYANCE/ ALPHA/  LEW  /  REW
 WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
  5I AT   72500 /     0 /   1630. /   897. /   45109. / 5.94 /  -24. /  373.
  818.83 /   0.30 /                 /  819.13 /   1.82 /   0.34/          *IS*
----------------------------------------------------------------------------------
 5II AT   73260 /   760 /   1630. /   821. /   45410. / 3.47 /   22. /  404.
  819.91 /   0.21 /   0.99 /   0.0  /  820.12 /   1.99 /   0.30 / 0.000  *XS*
----------------------------------------------------------------------------------
  5J AT   73740 /   480 /   1630. /   568. /   44096. / 2.00 /   26. /  270.
  820.52 /   0.26 /   0.64 /   0.02 /  820.78 /   2.87 /   0.31 / -0.000 *XS*
----------------------------------------------------------------------------------
 5JJ AT   74280 /   540 /   1630. /   672. /   53719. / 1.87 /  126. /  348.
  821.21 /   0.17 /   0.61 /   0.0  /  821.39 /   2.43 /   0.24 / 0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
CU5JJ AT   74280 /       /      0. /    37. /    1535. / 1.00 /    0. /   12.
  816.00 /   0.0  /       ...3...  (-.001)    /    0.0  /   0.0  /         *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     1739. / RIGHT      683. /              *RG*
----------------------------------------------------------------------------------
  5K AT   74340 /    60 /   1630. /   506. /   33551. / 2.12 /  113. /  332.
  821.22 /   0.34 /   0.09 /   0.10 /  821.57 /   3.22 /   0.37 / -0.011  *AS*
----------------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /   506. /   33551. / 2.12 /  113. /  332.
  821.22 /   0.34 /                 /  821.57 /   3.22 /   0.37 /         *AS*
============================ END BRIDGE ANALYSIS ================================
```

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: THREAD CREEK PRIVATE BRIDGE TO BUSH DR. KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
5K AT 74340	0	1580.	505.	33479.	2.13	113.	332.		GG
821.22	0.32		821.54	3.13	0.36			*IS*	
5KK AT 74680	340	1580.	832.	66228.	2.51	56.	447.		GH
821.79	0.14	0.38	0.0	821.93	1.90	0.22	-0.000	*XS*	
5L AT 74950	270	1580.	1332.	106697.	1.86	102.	563.		GI
821.98	0.04	0.10	0.0	822.02	1.19	0.10	-0.000	*XS*	
5LL AT 75400	450	1580.	846.	59059.	2.03	178.	679.		GJ
822.12	0.11	0.18	0.03	822.23	1.87	0.21	-0.000	*XS*	
5LLL AT 75430	30	1580.	553.	32540.	1.75	-55.	348.		
822.12	0.22	0.04	0.06	822.35	2.86	0.33	0.017	*XS*	
5M AT 75460	30	1580.	778.	48730.	1.27	-34.	354.		GK
822.31	0.08	0.05	0.0	822.39	2.03	0.23	-0.001	*XS*	
5MM AT 75560	100	1580.	726.	50313.	1.24	147.	458.		100-yr
822.41	0.09	0.10	0.01	822.50	2.18	0.20	0.000	*XS*	
5MMM AT 75590	30	1580.	573.	35336.	2.23	165.	490.		GL
822.36	0.26	0.04	0.09	822.63	2.76	0.31	-0.001	*XS*	

END OF THIS PROFILE

```
==========================================================================================
CID AT DISTANCE/ LENGTH/DISCHARGE/  AREA /CONVEYANCE/ ALPHA/  LEW  /  REW
 WS ELEV /    HV  /    HF  /    HE  /    EG  /     V  /    FN  /   ACC    *ID*
==========================================================================================
 5MMM AT   75590 /     0 /   1300. /   571. /   35239. / 2.23 /  166. /  490.
  822.36 /   0.18 /                  / 822.54 /    2.28 /  0.26/          *IS*
------------------------------------------------------------------------------------------
  5N AT   75980 /   390 /   1300. /   701. /   46126. / 1.22 /   13. /  355.
  822.88 /   0.07 /   0.41 /   0.0  / 822.95 /    1.85 /  0.21 / 0.001   *XS*
------------------------------------------------------------------------------------------
  5O AT   76450 /   470 /   1300. /   588. /   32347. / 1.44 /   18. /  295.
  823.38 /   0.11 /   0.53 /   0.02 / 823.49 /    2.21 /  0.23 / -0.011  *XS*
------------------------------------------------------------------------------------------
  5P AT   76950 /   500 /   1300. /   515. /   33978. / 1.54 /   20. /  286.
  824.13 /   0.15 /   0.77 /   0.02 / 824.28 /    2.53 /  0.31 / 0.002   *XS*
------------------------------------------------------------------------------------------
  5Q AT   77480 /   530 /   1300. /   737. /   32109. / 1.81 /  104. /  468.
  825.02 /   0.09 /   0.82 /   0.0  / 825.11 /    1.76 /  0.18 / 0.003   *XS*
------------------------------------------------------------------------------------------
 5QQ AT   77850 /   370 /   1300. /   822. /   34157. / 1.49 /  228. /  610.
  825.62 /   0.06 /   0.57 /   0.0  / 825.68 /    1.58 /  0.17 / 0.001   *XS*
------------------------------------------------------------------------------------------
  5R AT   78760 /   910 /   1300. /   911. /   44408. / 1.31 /  131. /  433.
  826.65 /   0.04 /   1.01 /   0.0  / 826.69 /    1.43 /  0.13 / 0.001   *XS*
------------------------------------------------------------------------------------------
  5S AT   79280 /   520 /   1300. /   625. /   37768. / 1.90 /   30. /  298.
  827.13 /   0.13 /   0.52 /   0.04 / 827.26 /    2.08 /  0.26 / 0.000   *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR 5S AT   79280 /       /   1152. /   186. /   20539. / 1.00 /    0. /   28.
  827.13 /   0.60 /       ...1...  (-.001)    /    6.20 /  0.42 /          *BO*
------------------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       0. / RIGHT     145. /                *RG*
------------------------------------------------------------------------------------------
  5T AT   79330 /    50 /   1300. /   976. /   47723. / 2.73 /   13. /  693.
  827.23 /   0.08 /   0.05 /   0.0  / 827.31 /    1.33 /  0.15 / -0.002  *AS*
------------------------------------------------------------------------------------------
  M = 0.73 / E = 0.09 / K* = 1.78 /  1756. /  106412. / 1.75 /    8. /  721.
  828.35 /   0.01 /                  / 828.37 /    0.74 /  0.07 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
```

GL
GM
GN
GO
GP
GQ
GR
GS
100-4
GT

END OF THIS PROFILE

SECTD AT	DISTANCE / ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EC	ALPHA / V	LEW / FN	REW / ACC	*ID*	
5T AT	79330	0	1300.	1576.	60196.	5.14	10.	713.		G T
	828.10	0.05		828.15	0.82	0.06			*IS*	
5U AT	80100	770	1300.	2334.	61372.	5.30	158.	935.		G U
	828.48	0.03	0.35	0.0	828.51	0.56	0.04	0.001	*XS*	
5V AT	80780	680	1300.	1633.	37432.	8.00	500.	1458.		G V
	828.96	0.08	0.50	0.03	829.03	0.80	0.07	0.000	*XS*	
5W AT	82210	1430	1300.	2354.	61347.	5.15	239.	1099.		G W
	830.06	0.02	1.05	0.0	830.09	0.55	0.04	0.002	*XS*	
5Y AT	83140	930	1300.	2116.	65352.	2.37	122.	787.		G X
	830.47	0.01	0.39	0.0	830.48	0.61	0.05	0.001	*XS*	
5Z AT	83900	760	1300.	1726.	52228.	2.66	19.	643.		G Y
	830.84	0.02	0.38	0.00	830.86	0.75	0.06	0.001	*XS*	
6A AT	84470	570	1300.	1808.	52019.	2.67	109.	723.		G Z 101-7
	831.20	0.02	0.35	0.0	831.22	0.72	0.05	0.000	*XS*	
6B AT	84880	410	1300.	907.	28457.	2.39	528.	954.		H A
	831.64	0.08	0.47	0.03	831.72	1.43	0.13	0.001	*XS*	
6B+1 AT	85240	360	1300.	746.	32842.	1.84	30.	296.		H B
	832.29	0.09	0.65	0.01	832.38	1.74	0.25	0.001	*XS*	
6C AT	85470	230	1300.	563.	23800.	2.10	641.	950.		H C
	832.74	0.17	0.50	0.04	832.92	2.31	0.33	0.001	*XS*	
6D AT	85970	500	1300.	779.	38488.	1.30	640.	886.		H D
	833.78	0.06	0.92	0.0	833.84	1.67	0.14	0.001	*XS*	
6E AT	86670	700	1300.	961.	61200.	1.75	271.	569.		H E
	834.28	0.05	0.50	0.0	834.33	1.35	0.14	-0.009	*XS*	
6EE AT	87150	480	1300.	754.	52111.	1.64	113.	374.		H F
	834.53	0.08	0.25	0.01	834.61	1.72	0.16	0.008	*XS*	
6F AT	87680	530	1300.	1013.	89124.	1.19	36.	294.		H G
	834.78	0.03	0.19	0.0	834.81	1.28	0.10	0.012	*XS*	
6F+1 AT	88030	350	1300.	981.	87536.	1.06	14.	191.		H H
	834.86	0.03	0.08	0.0	834.89	1.32	0.10	-0.000	*XS*	

WA[illegible]-SURFACE PROFILE FOR: THREAD CREEK BELS[illegible] RD TO END OF STUDY KNUTILLA
PAGE 2 OF 2, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
 WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
   6G AT   88200 /   170 /  1300. /   266. /  20913. / 1.20 /  304. /  414.
   834.81 /   0.45 /   0.16 /   0.21 /  835.26 /   4.89 /   0.40 / 0.000  *XS*
----------------------------------------------------------------------------------
6G+1  AT   88310 /   110 /  1300. /   577. /  48459. / 1.34 /   53. /  223.
   835.34 /   0.11 /   0.18 /   0.0  /  835.44 /   2.25 /   0.19 / -0.000  *XS*
----------------------------------------------------------------------------------
   6H AT   88700 /   390 /  1300. /   565. /  42152. / 1.44 /   55. /  253.
   835.65 /   0.12 /   0.32 /   0.01 /  835.77 /   2.30 /   0.22 / 0.000  *XS*
----------------------------------------------------------------------------------
   6I AT   89330 /   630 /  1300. /   564. /  51830. / 1.24 /  108. /  236.
   836.15 /   0.10 /   0.49 /   0.0  /  836.25 /   2.30 /   0.18 / -0.004  *XS*
----------------------------------------------------------------------------------
  6II AT   89730 /   400 /  1300. /   784. /  71619. / 1.19 /  291. /  462.
   836.40 /   0.05 /   0.18 /   0.0  /  836.45 /   1.66 /   0.13 / 0.017  *XS*
----------------------------------------------------------------------------------
   6J AT   90260 /   530 /  1300. /   281. /  19581. / 1.54 /  510. /  626.
   836.81 /   0.51 /   0.64 /   0.23 /  837.32 /   4.62 /   0.52 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ===============================
BR 6J AT   90260 /       /  1300. /   192. /  23769. / 1.00 /    0. /   41.
   836.81 /   0.71 /       ...1...  (-.001)    /   6.77 /   0.51 /         *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /              *RG*
----------------------------------------------------------------------------------
   6K AT   90330 /    70 /  1300. /   435. /  35359. / 1.80 /   41. /  183.
   837.24 /   0.25 /   0.17 /   0.0  /  837.49 /   2.99 /   0.29 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = 0.13 / E = 0.70 / K* = 0.22 /   461. /  37435. / 1.84 /   39. /  186.
   837.42 /   0.23 /                  /  837.65 /   2.82 /   0.28 /         *AS*
============================ END BRIDGE ANALYSIS =================================
6L     AT   90570 /   240 /  1300. /   472. /  29927. / 2.11 /   11. /  248.
   837.77 /   0.25 /   0.36 /   0.01 /  838.02 /   2.75 /   0.33 / 0.002  *XS*
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

00BREAK00

1) COUNTY: Genesee

2) STUDY NAME: City of Flint

3) WATERCOURSE: Thread creek

4) DOCUMENT TYPE: encroachment

00BREAK00

Thread Cr
City of Flint
Floodway Compa

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 29,DATE= 6/ 8/78

WATER-SURFACE PROFILE FOR: THREAD CR MOUTH TO M-21 A TO E KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
    A AT        0 /     0 /   2280. /  1562. /  215714. / 1.16 /   50. /  350.
.02   710.54 /  0.04 /                 /  710.58 /    1.46 /  0.11/          *IS*
----------------------------------------------------------------------------------
    B AT      100 /   100 /   2280. /   800. /   84063. / 1.00 /   10. /  310.
.02   710.54 /  0.13 /  0.03 /   0.04 /  710.67 /    2.85 /  0.31 /  0.015  *XS*
----------------------------------------------------------------------------------
    C AT      750 /   650 /   2280. /   499. /   83570. / 1.21 /  -34. /   53.
.12   710.89 /  0.39 /  0.48 /   0.13 /  711.28 /    4.57 /  0.35 / -0.000  *XS*
----------------------------------------------------------------------------------
C+01  AT      840 /    90 /   2280. /   479. /   82359. / 1.21 /  -34. /   56.
      710.94 /  0.43 /  0.07 /   0.02 /  711.37 /    4.76 /  0.36 / -0.000  *XS*
----------------------------------------------------------------------------------
C+05  AT      940 /   100 /   2280. /   391. /   70081. / 1.00 /  -32. /   31.
      710.98 /  0.53 /  0.09 /   0.05 /  711.51 /    5.83 /  0.41 / -0.000  *XS*
----------------------------------------------------------------------------------
C+1   AT     1040 /   100 /   2280. /   379. /   66917. / 1.00 /  -32. /   31.
.01   711.07 /  0.56 /  0.11 /   0.02 /  711.64 /    6.02 /  0.43 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR  D AT     1040 /       /   2280. /   193. /   23648. / 1.00 /    0. /   60.
      711.07 /  2.17 /       ...1...  (-.001)    /  11.82 /  0.98 /          *BO*
----------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
----------------------------------------------------------------------------------
    E AT     1270 /   230 /   2280. /   191. /   27270. / 1.00 /   29. /   72.
      711.78 /  2.22 /******* /******* /  714.00 /   11.95 /  1.00 /******* *AS*
----------------------------------------------------------------------------------
    M = 0.0  / E = 1.00 / K* = 0.01 /   197. /   28446. / 1.00 /   29. /   72.
      711.92 /  2.09 /                 /  714.00 /   11.59 /  0.96 /          *AS*
============================ END BRIDGE ANALYSIS ================================
```

END OF THIS PROFILE

FW

Floodway

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   27,DATE= 2/15/78

WATER-SURFACE PROFILE FOR:  THREAD CR M-21 TO GR TRAVERSE E TO P     KNUTILLA
PAGE  1 OF  2, PROFILE NUMBER  3,   UPSTREAM COMPUTATIONS
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV/   HV  /   HF  /   HE  /    EG  /     V   /    FN  /  ACC   *ID*
=================================================================================
    E AT   1270 /    0 /   2280. /   327. /   56908. / 1.00 /   23. /   78.
  714.58 /  0.75 /                 / 715.33 /   6.97 /  0.50/         *IS*
---------------------------------------------------------------------------------
    F AT   1820 /  550 /   2280. /   309. /   47839. / 1.27 /   23. /   80.
  715.47 /  1.07 /  1.05 /  0.16 / 716.54 /   7.39 /  0.61 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR  F AT   1820 /      /   2280. /   202. /   13124. / 1.00 /    0. /   52.
  715.47 /  1.98 /      ...1...  (-.001)    / 11.29 /  1.01 /         *BO*
---------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
---------------------------------------------------------------------------------
    G AT   1950 /  130 /   2280. /   325. /   21154. / 1.07 /   12. /   91.
  716.39 /  0.82 /  0.67 /  0.0  / 717.21 /   7.01 /  0.57 / -0.001  *AS*
---------------------------------------------------------------------------------
  M = 0.09 / E = 0.89 / K* = 0.09 /   348. /   23377. / 1.07 /   12. /   91.
  716.68 /  0.71 /                 / 717.40 /   6.55 /  0.52 /         *AS*
============================ END BRIDGE ANALYSIS ================================
G+1  AT   2080 /  130 /   2280. /   200. /   24472. / 1.00 /  -25. /   24.
  720.49 /  2.02 /******* /******* / 722.51 /  11.39 /  1.00 /******* *XS*
---------------------------------------------------------------------------------
    H AT   2480 /  400 /   2280. /   366. /   64312. / 1.05 /    8. /   73.
  723.19 /  0.64 /  1.32 /  0.0  / 723.83 /   6.23 /  0.44 /  0.000  *XS*
---------------------------------------------------------------------------------
    I AT   2920 /  440 /   2280. /   367. /   66129. / 1.08 /   13. /   78.
  723.73 /  0.65 /  0.54 /  0.01 / 724.38 /   6.21 /  0.44 /  0.002  *XS*
---------------------------------------------------------------------------------
    J AT   3400 /  480 /   2280. /   332. /   56970. / 1.06 /   10. /   70.
  724.32 /  0.78 /  0.66 /  0.06 / 725.10 /   6.86 /  0.50 /  0.000  *XS*
---------------------------------------------------------------------------------
    K AT   4370 /  970 /   2280. /   327. /   57298. / 1.05 /    9. /   65.
  725.86 /  0.80 /  1.54 /  0.01 / 726.66 /   6.97 /  0.49 /  0.003  *XS*
---------------------------------------------------------------------------------
    L AT   4600 /  230 /   2280. /   362. /   51056. / 1.08 /    8. /   71.
  726.40 /  0.67 /  0.41 /  0.0  / 727.07 /   6.30 /  0.45 / -0.000  *XS*
---------------------------------------------------------------------------------
```

E

F

100-YR FW

G

H

I

J

K

L

M

```
NO EMBANKMENT CROSS SECTION
G AT   1950 /  130 /  2280. /  325. /  21154. / 1.07 /  12. /  91.
716.39 /  0.82 /  0.67 /  0.0  /  717.21 /  7.01 /  0.57 / -0.001  *AS*
M = 0.09 / E = 0.89 / K* = 0.09 /  348. /  23377. / 1.07 /  12. /  91.
716.68 /  0.71 /                 /  717.40 /  6.55 /  0.52 /        *AS*
============================ END BRIDGE ANALYSIS ============================
G+1  AT  2080 /  130 /  2280. /  200. /  24472. / 1.00 / -25. /  24.
720.49 /  2.02 /******* /******* /  722.51 /  11.39 /  1.00 /******* *XS*
H AT   2480 /  400 /  2280. /  366. /  64312. / 1.05 /  8. /  73.
723.19 /  0.64 /  1.32 /  0.0  /  723.83 /  6.23 /  0.44 /  0.000  *XS*
I AT   2920 /  440 /  2280. /  367. /  66129. / 1.08 /  13. /  78.
723.73 /  0.65 /  0.54 /  0.01 /  724.38 /  6.21 /  0.44 /  0.002  *XS*
J AT   3400 /  480 /  2280. /  332. /  56970. / 1.06 /  10. /  70.
724.32 /  0.78 /  0.66 /  0.06 /  725.10 /  6.86 /  0.50 /  0.000  *XS*
K AT   4370 /  970 /  2280. /  327. /  57298. / 1.05 /  9. /  65.
725.86 /  0.80 /  1.54 /  0.01 /  726.66 /  6.97 /  0.49 /  0.003  *XS*
L AT   4600 /  230 /  2280. /  362. /  51056. / 1.08 /  8. /  71.
726.40 /  0.67 /  0.41 /  0.0  /  727.07 /  6.30 /  0.45 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==========================
BR  L AT   4600 /      /  2280. /  285. /  29557. / 1.00 /  0. /  43.
726.40 /  0.99 /  ...1...  (-.001)  /  7.99 /  0.55 /        *BO*
EMBANKMENT OVERFLOW (CFS) / LEFT      0. / RIGHT      0. /          *RG*
M AT   4680 /  80 /  2280. /  320. /  23622. / 1.00 /  22. /  90.
726.68 /  0.79 /  0.34 /  0.06 /  727.48 /  7.13 /  0.52 / -0.000  *AS*
M = 0.25 / E = 0.84 / K* = 0.52 /  369. /  29545. / 1.00 /  21. /  91.
727.40 /  0.59 /                 /  727.99 /  6.17 /  0.42 /        *AS*
============================ END BRIDGE ANALYSIS ============================
N AT   4720 /  40 /  2280. /  260. /  11609. / 1.00 /  20. /  91.
727.70 /  1.20 /  0.61 /  0.30 /  728.90 /  8.78 /  0.81 / -0.000  *XS*
```

```
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
0 + 1 AT    4750 /     0 /   2200. /   459. /   55337. / 1.00 /  -36. /   40.
  730.40 /   0.36 /                 / 730.76 /    4.79 /   0.34/          *IS*
----------------------------------------------------------------------------------
    0 AT    5050 /   300 /   2200. /   377. /   43689. / 1.24 /   33. /  125.
  730.85 /   0.66 /   0.60 /   0.15 / 731.51 /    5.83 /   0.45 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ===============================
BR  0 AT    5050 /        /   2200. /   250. /   23765. / 1.00 /    0. /   42.
  730.85 /   1.20 /       ...1...  (-.001)    /    8.79 /   0.59 /          *BO*
----------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
----------------------------------------------------------------------------------
    P AT    5140 /    90 /   2200. /   395. /   39324. / 1.13 /    0. /  100.
  731.21 /   0.55 /   0.25 /   0.0  / 731.76 /    5.57 /   0.47 / -0.001  *AS*
----------------------------------------------------------------------------------
  M = 0.31 / E = 0.85 / K* = 0.60 /   486. /   53748. / 1.10 /    0. /  100.
  732.13 /   0.35 /                 / 732.48 /    4.52 /   0.35 /          *AS*
============================ END BRIDGE ANALYSIS =================================
    Q AT    5380 /   240 /   2200. /   673. /   69864. / 1.15 /  130. /  300.
  732.59 /   0.19 /   0.31 /   0.0  / 732.79 /    3.27 /   0.28 / -0.000  *XS*
----------------------------------------------------------------------------------
    R AT    5630 /   250 /   2200. /   298. /   36320. / 1.06 /   21. /   83.
  732.72 /   0.89 /   0.48 /   0.35 / 733.61 /    7.38 /   0.59 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ===============================
BR  R AT    5630 /        /   2200. /   316. /   48393. / 1.00 /    0. /   64.
  732.72 /   0.75 /       ...1...  (-.001)    /    6.95 /   0.55 /          *BO*
----------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
----------------------------------------------------------------------------------
    S AT    5700 /    70 /   2200. /   298. /   38831. / 1.00 /    7. /   59.
  733.01 /   0.85 /   0.24 /   0.0  / 733.85 /    7.38 /   0.54 / -0.001  *AS*
----------------------------------------------------------------------------------
  M = 0.0  / E = 1.00 / K* = 0.01 /   299. /   38880. / 1.00 /    7. /   59.
  733.01 /   0.84 /                 / 733.86 /    7.37 /   0.54 /          *AS*
============================ END BRIDGE ANALYSIS =================================
S+1   AT    5800 /   100 /   2200. /   506. /   57440. / 1.47 /   15. /  190.
  733.64 /   0.43 /   0.22 /   0.0  / 734.07 /    4.35 /   0.38 / -0.001  *XS*
----------------------------------------------------------------------------------
    T AT    6360 /   560 /   2200. /   545. /   50226. / 1.49 /   50. /  250.
  734.64 /   0.38 /   0.94 /   0.0  / 735.02 /    4.03 /   0.43 /  0.005  *XS*
----------------------------------------------------------------------------------
T+1   AT    6770 /   410 /   2200. /   544. /   49814. / 1.58 /   10. /  210.
  735.[illegible] /   0.40 /   0.79 /   0.01 / 735.83 /    4.04 /   0.44 /  0.003  *XS*
```

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   43,DATE= 3/ 8/78

WATER-SURFACE PROFILE FOR:  THREAD CR 12TH ST DAM TO BEACH MONROE ST KNUTILLA
PAGE  2 OF  2, PROFILE NUMBER  5,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW
==============================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==============================================================================
U+1   AT    7740 /   350 /   2200. /   371. /   47992. / 1.01 /   14. /  104.
   738.20 /   0.55 /   0.75 /   0.0  /  738.76 /   5.93 /   0.44 / -0.018  *XS*
------------------------------------------------------------------------------
    V AT    8060 /   320 /   2200. /   405. /   55422. / 1.15 /   46. /  158.
   738.81 /   0.53 /   0.58 /   0.0  /  739.34 /   5.43 /   0.40 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR  Y AT    8060 /       /   1793. /   223. /   20895. / 1.00 /    0. /   32.
   738.60 /   1.01 /       ...3...  (-.001)    /   8.05 /   0.54 /          *BO*
------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT     389. /               *RG*
------------------------------------------------------------------------------
    W AT    8150 /    90 /   2200. /   238. /   34265. / 1.07 /   87. /  139.
   738.82 /   1.42 /   0.23 /   0.68 /  740.24 /   9.24 /   0.63 / -0.011  *AS*
------------------------------------------------------------------------------
   M = ****/ E = **** / K* = **** /   252. /   36367. / 1.10 /   87. /  145.
   739.08 /   1.30 /                 /  740.39 /   8.72 /   0.60 /          *AS*
============================ END BRIDGE ANALYSIS ==============================

                              END OF THIS PROFILE
```

Y

Z

FW

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   25,DATE= 3/ 9/78

WATER-SURFACE PROFILE FOR:  THREAD CR MONROE ST TO BARTON ST          KNUTILLA
PAGE  1 OF  1, PROFILE NUMBER  5,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
W     AT    8150 /     0 /   2200. /   210. /   26787. / 1.11 /   87. /  145.
   739.08 /   1.88 /                 /  740.96 /  10.45 /  0.79/          *IS*
----------------------------------------------------------------------------------
W+.05 AT    8240 /    90 /   2200. /   471. /   65473. / 1.24 /   15. /  115.
   740.79 /   0.42 /   0.25 /   0.0  /  741.21 /   4.67 /  0.36 / -0.000  *XS*
----------------------------------------------------------------------------------
W+1   AT    8460 /   220 /   2200. /   811. /   98360. / 1.27 /   10. /  160.
   741.23 /   0.15 /   0.17 /   0.0  /  741.38 /   2.71 /  0.22 / -0.000  *XS*
----------------------------------------------------------------------------------
    X AT    8890 /   430 /   2200. /   367. /   44848. / 1.46 /    0. /  100.
   741.37 /   0.82 /   0.47 /   0.34 /  742.19 /   6.00 /  0.50 / -0.001  *XS*
============================ BEGIN BRIDGE ANALYSIS ===============================
BR  X AT    8890 /       /   2200. /   242. /   33206. / 1.00 /    0. /   34.
   741.37 /   1.28 /       ...1...  (-.001)    /   9.09 /  0.60 /          *BO*
----------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
----------------------------------------------------------------------------------
    Y AT    8980 /    90 /   2200. /   206. /   25986. / 1.05 /   -1. /   40.
   741.38 /   1.86 /   0.37 /   0.69 /  743.24 /  10.67 /  0.80 / -0.011  *AS*
----------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /   207. /   26086. / 1.05 /   -1. /   40.
   741.39 /   1.85 /                 /  743.24 /  10.65 /  0.80 /          *AS*
============================ END BRIDGE ANALYSIS =================================

                              END OF THIS PROFILE
```

0 AA

0 AB AA

.02 AC AB

.01 FW

.01 AD

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 20,DATE= 3/ 9/78

WATER-SURFACE PROFILE FOR: THREAD CR BARTON ST TO SAGINAW ST KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HE  /    HE  /     EG  /      V  /    FN  /  ACC   *ID*
==================================================================================
    Y AT    8980 /      0 /   2200. /   206. /   25938. / 1.05 /   -1. /   40.
   741.37 /   1.86 /                 / 743.23 /   10.69 /  0.80/          *IS*
----------------------------------------------------------------------------------
   Y+1  AT    9040 /     60 /   2200. /   447. /   55857. / 1.04 /   10. /  100.
   743.04 /   0.39 /   0.20 /    0.0  / 743.43 /    4.92 /  0.38 / -0.000  *XS*
----------------------------------------------------------------------------------
    Z AT    9240 /    200 /   2200. /   424. /   56490. / 1.06 /   42. /  124.
   743.32 /   0.45 /   0.31 /   0.03 / 743.77 /    5.19 /  0.39 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR  Z AT    9240 /        /   2200. /   263. /   37442. / 1.00 /    0. /   36.
   743.32 /   1.09 /       ...1...  (-.001)   /    8.38 /  0.54 /          *BO*
----------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
----------------------------------------------------------------------------------
   1A AT    9380 /    140 /   2200. /   413. /   66287. / 1.09 /    0. /   60.
   743.49 /   0.48 /   0.18 /   0.02 / 743.97 /    5.33 /  0.36 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /   413. /   66392. / 1.09 /    0. /   60.
   743.49 /   0.48 /                 / 743.98 /    5.33 /  0.36 /          *AS*
============================ END BRIDGE ANALYSIS ================================
```

END OF THIS PROFILE

.01

0

0

AD AC

AE AD

FW

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 20,DATE= 3/ 9/78

WATER-SURFACE PROFILE FOR: THREAT CR SAGINAW ST DAM TO THREAD LAKE KNUTILLA
PAGE 1 OF 1. PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

```
==================================================================================
SECTN AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
  1AA AT    9410 /     0 /   2200. /   510. /   91222. / 1.10 /     0. /   62.
0  745.10 /   0.32 /                 /  745.42 /    4.31 /  0.27/          *IS*
----------------------------------------------------------------------------------
1AA+1 AT    9470 /    60 /   2200. /   357. /   48329. / 1.00 /     5. /   63.
   745.03 /   0.59 /   0.07 /   0.14 /  745.62 /    6.16 /  0.44 / -0.000  *XS*
----------------------------------------------------------------------------------
 1AAA AT    9530 /    60 /   2200. /   283. /   36497. / 1.16 /   -12. /   50.
0  744.94 /   1.09 /   0.16 /   0.25 /  746.03 /    7.77 /  0.64 / -0.001  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BRAAA AT    9530 /       /   2200. /   189. /   21374. / 1.00 /     0. /   36.
   744.94 /   2.10 /       ...1...  (-.001)   /   11.63 /  0.83 /          *BO*
----------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
----------------------------------------------------------------------------------
 AAAA AT    9690 /   160 /   2200. /   364. /   54266. / 1.16 /     1. /   61.
   745.77 /   0.66 /   0.39 /   0.0  /  746.42 /    6.05 /  0.42 / -0.001  *AS*
----------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /   365. /   54461. / 1.16 /     1. /   61.
0  745.78 /   0.65 /                 /  746.44 /    6.03 /  0.42 /          *AS*
============================ END BRIDGE ANALYSIS ================================
   1B AT    9970 /   280 /   2200. /   715. /  102343. / 1.00 /    98. /  201.
0  746.53 /   0.15 /   0.24 /   0.0  /  746.68 /    3.08 /  0.21 / -0.001  *XS*
----------------------------------------------------------------------------------
```

AG

AH

FW

AI AH

AJ AI

END OF THIS PROFILE

```
*** FLOODWAY ANALYSIS *** HOR F   ANALYSIS
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AR   /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /    EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
  1CC AT   12100 /     0 /   2100. /  1582. /  213299. / 1.04 /  600. / 1000.
  751.00 /   0.03 /                 /  751.03 /    1.33 /   0.12/          *IS*
----------------------------------------------------------------------------------
1CCB  AT   12500 /   400 /   2100. /  2325. /  318124. / 1.06 /   40. /  640.
  751.04 /   0.01 /   0.03 /   0.0  /  751.05 /    0.90 /   0.08 / -0.000  *XS*
----------------------------------------------------------------------------------
 1CCC AT   13140 /   640 /   2100. /  1442. /  207185. / 1.01 /   20. /  350.
  751.07 /   0.03 /   0.04 /   0.01 /  751.11 /    1.46 /   0.12 / -0.000  *XS*
----------------------------------------------------------------------------------
1CCCC AT   14060 /   920 /   2100. /  2066. /  156198. / 2.18 /   30. /  730.
  751.20 /   0.04 /   0.13 /   0.00 /  751.23 /    1.02 /   0.15 / -0.000  *XS*
----------------------------------------------------------------------------------
1CCDC AT   14290 /   230 /   2100. /  1494. /   99916. / 1.66 /  260. /  860.
  751.26 /   0.05 /   0.06 /   0.01 /  751.31 /    1.41 /   0.13 / -0.000  *XS*
----------------------------------------------------------------------------------
1CCCD AT   15160 /   870 /   2100. /  1476. /   88274. / 1.70 /  500. /  900.
  751.69 /   0.05 /   0.44 /   0.00 /  751.74 /    1.42 /   0.11 /  0.001  *XS*
----------------------------------------------------------------------------------
  1D AT    15990 /   830 /   2100. /  1085. /   55134. / 3.12 /  325. /  775.
  752.38 /   0.18 /   0.75 /   0.06 /  752.56 /    1.93 /   0.34 /  0.001  *XS*
----------------------------------------------------------------------------------
1DD   AT   16560 /   570 /   2100. /  1303. /   77522. / 1.87 /  171. /  610.
  753.08 /   0.08 /   0.59 /   0.0  /  753.15 /    1.61 /   0.12 /  0.001  *XS*
----------------------------------------------------------------------------------
  1E AT    17040 /   480 /   2100. /   417. /   36097. / 1.84 /   66. /  186.
  753.51 /   0.73 /   0.76 /   0.33 /  754.23 /    5.04 /   0.53 / -0.000  *XS*
----------------------------------------------------------------------------------
  1F AT    17630 /   590 /   2100. /   771. /   73044. / 1.78 /   90. /  290.
  755.01 /   0.21 /   0.99 /   0.0  /  755.21 /    2.73 /   0.26 / -0.009  *XS*
----------------------------------------------------------------------------------
 1FF AT    18150 /   520 /   2100. /   518. /   64101. / 1.27 /   40. /  130.
  755.44 /   0.33 /   0.49 /   0.06 /  755.76 /    4.06 /   0.31 / -0.000  *XS*
----------------------------------------------------------------------------------
  1G AT    18350 /   200 /   2100. /   426. /   58382. / 1.23 /   50. /  110.
  755.60 /   0.47 /   0.24 /   0.07 /  756.07 /    4.92 /   0.35 / -0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
DORTB AT   18350 /       /   2100. /   251. /   32633. / 1.00 /    0. /   35.
  755.60 /   1.09 /       ...1...  (-.001)    /    8.38 /   0.51 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT      0. /                *RG*
----------------------------------------------------------------------------------
  1H AT    18460 /   110 /   2100. /   280. /   41751. / 1.04 /   48. /   88.
  755.61 /   0.91 /   0.20 /   0.27 /  756.52 /    7.50 /   0.48 / -0.011  *AS*
----------------------------------------------------------------------------------
```

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100 - FW

100 - FW

WATER-SURFACE PROFILE FOR: THREAD CREEK MOUTH THREAD L TO DORT HWY HOLTSLAG
PAGE 2 OF 2, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
  1HH AT   18790 /   330 /   2100. /   389. /   60417. / 1.18 /    2. /   62.
  756.60 /   0.53 /   0.57 /   0.0  /  757.14 /    5.39 /   0.37 / -0.000  *XS*
----------------------------------------------------------------------------------
  1J AT   19230 /   440 /   2100. /   413. /   59339. / 1.31 /    2. /  102.
  757.16 /   0.52 /   0.54 /   0.0  /  757.68 /    5.08 /   0.39 /  0.001  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR 1J AT   19230 /       /   1143. /   197. /   15316. / 1.00 /    0. /   35.
  754.10 /   0.52 /       ...3...  (-.001)  /    5.79 /   0.43 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     549. / RIGHT     397. /                *RG*
----------------------------------------------------------------------------------
  1K AT   19290 /    60 /   2100. /   435. /   55562. / 1.19 /    2. /  102.
  757.33 /   0.43 /   0.08 /   0.0  /  757.76 /    4.83 /   0.35 / -0.001  *AS*
----------------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /   461. /   60259. / 1.17 /    2. /  102.
  757.59 /   0.38 /                /  757.97 /    4.55 /   0.32 /          *AS*
============================ END BRIDGE ANALYSIS ================================
  1L AT   19780 /   490 /   2100. /   336. /   40264. / 1.09 /   70. /  140.
  758.34 /   0.66 /   0.89 /   0.14 /  759.01 /    6.24 /   0.45 /  0.002  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR 1L AT   19780 /       /   2100. /   300. /   45100. / 1.00 /    0. /   35.
  758.34 /   0.76 /       ...1...  (-.001)  /    6.99 /   0.42 /          *BO*
----------------------------------------------------------------------------------
    NO EMBANKMENT CROSS SECTION
----------------------------------------------------------------------------------
  1M AT   19850 /    70 /   2100. /   390. /   62684. / 1.20 /   10. /   78.
  758.59 /   0.54 /   0.12 /   0.0  /  759.14 /    5.39 /   0.37 /  0.009  *AS*
----------------------------------------------------------------------------------
  M = 0.10 / E = 0.36 / K* = 0.18 /   400. /   64891. / 1.21 /   10. /   79.
  758.75 /   0.52 /                /  759.27 /    5.24 /   0.36 /          *AS*
============================ END BRIDGE ANALYSIS ================================
  1N AT   20050 /   200 /   2100. /  1179. /  164230. / 1.55 /  170. /  470.
  759.28 /   0.08 /   0.08 /   0.0  /  759.35 /    1.78 /   0.14 / -0.000  *XS*
----------------------------------------------------------------------------------
```

AX

AY

AZ

BA

BB

BC

100-F

100-F

END OF THIS PROFILE

```
==========================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
 WS ELEV /    HV  /    HF  /    HE  /    EG  /     V  /    FN  /   ACC   *ID*
==========================================================================
BD  10 AT   20110 /     0 /   2100. /  1357. /  157275. / 1.58 /   50. /  350.
    759.59 /   0.06 /                 /  759.65 /    1.55 /   0.10/          *IS*
--------------------------------------------------------------------------
BE  1P AT   20610 /   500 /   2100. /  1571. /  194908. / 1.33 /    0. /  300.
    759.68 /   0.04 /   0.07 /   0.0  /  759.72 /    1.34 /   0.09 / -0.000  *XS*
--------------------------------------------------------------------------
BF  1Q AT   21000 /   390 /   2100. /  1015. /  138998. / 1.38 /    0. /  150.
    759.72 /   0.09 /   0.06 /   0.03 /  759.81 /    2.07 /   0.16 /  0.000  *XS*
--------------------------------------------------------------------------
BG  1R AT   21240 /   240 /   2100. /   457. /   53191. / 1.24 /    5. /   95.
    759.72 /   0.41 /   0.14 /   0.16 /  760.13 /    4.59 /   0.35 /  0.014  *XS*
--------------------------------------------------------------------------
BH  1RR AT  21510 /   270 /   2100. /  1013. /  123844. / 1.23 /    0. /  150.
    760.22 /   0.08 /   0.18 /   0.0  /  760.30 /    2.07 /   0.16 / -0.004  *XS*
--------------------------------------------------------------------------
BI  1S AT   21900 /   390 /   2100. /   414. /   56057. / 1.10 /    0. /   62.
    760.29 /   0.44 /   0.25 /   0.18 /  760.73 /    5.07 /   0.34 / -0.000  *XS*
--------------------------------------------------------------------------
BJ  1SS AT  22350 /   450 /   2100. /   465. /   58033. / 1.28 /   18. /  138.
    760.93 /   0.41 /   0.61 /   0.0  /  761.34 /    4.52 /   0.32 / -0.000  *XS*
--------------------------------------------------------------------------
BK  1T AT   22780 /   430 /   2100. /  1034. /  105515. / 1.58 /   10. /  260.
    761.55 /   0.10 /   0.31 /   0.0  /  761.65 /    2.03 /   0.18 / -0.000  *XS*
--------------------------------------------------------------------------
BL  1TT AT  23170 /   390 /   2100. /  1876. /  166403. / 1.34 /  280. /  630.
    761.72 /   0.03 /   0.10 /   0.0  /  761.75 /    1.12 /   0.07 / -0.000  *XS*
--------------------------------------------------------------------------
BM  1U AT   23480 /   310 /   2100. /  1844. /  127659. / 1.50 /  450. /  950.
    761.78 /   0.03 /   0.06 /   0.00 /  761.81 /    1.14 /   0.09 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR 1U AT    23480 /       /   1372. /   310. /   41393. / 1.00 /    0. /   42.
    761.78 /   0.31 /      ...1...  (-.001)    /    4.43 /   0.29 /          *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      0. / RIGHT    747. /                  *RG*
--------------------------------------------------------------------------
    1V AT   23560 /    80 /   2100. /   736. /   50819. / 2.68 /  450. /  850.
    761.79 /   0.34 /   0.05 /   0.27 /  762.13 /    2.85 /   0.37 / -0.011  *AS*
--------------------------------------------------------------------------
BN  M = 0.0  / E = 0.0  / K* = 0.01 /   737. /   50899. / 2.68 /  450. /  850.
    761.80 /   0.34 /                 /  762.13 /    2.85 /   0.37 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
BØ  1W AT   24490 /   930 /   2100. /  1144. /   78968. / 1.76 /  650. / 1000.
    763.05 /   0.09 /   1.02 /   0.0  /  763.14 /    1.84 /   0.23 / -0.016  *XS*
--------------------------------------------------------------------------
    1X AT   25110 /   620 /   1200. /  1290. /   71137. / 2.68 /  780. / 1230.
```

100 - F

100 - F

WATER-SURFACE PROFILE FOR: THREAD CREEK CHAMBERS RD TO ATHERTON RD HOLTSLAG
PAGE 1 OF 2. PROFILE NUMBER 5. UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS

```
==================================================================================
SECTD AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *TD*
==================================================================================
BD  10 AT   20110 /     0 /   2100. /  1357. /  157275. / 1.58 /    50. /  350.
    759.59 /   0.06 /                 /  759.65 /    1.55 /   0.10/          *IS*
----------------------------------------------------------------------------------
BE  1P AT   20610 /   500 /   2100. /  1571. /  194908. / 1.33 /     0. /  300.
    759.68 /   0.04 /   0.07 /   0.0  /  759.72 /    1.34 /   0.09 / -0.000  *XS*
----------------------------------------------------------------------------------
BF  1Q AT   21000 /   390 /   2100. /  1015. /  138998. / 1.38 /     0. /  150.
    759.72 /   0.09 /   0.06 /   0.03 /  759.81 /    2.07 /   0.16 /  0.000  *XS*
----------------------------------------------------------------------------------
BG  1R AT   21240 /   240 /   2100. /   457. /   53191. / 1.24 /     5. /   95.
    759.72 /   0.41 /   0.14 /   0.16 /  760.13 /    4.59 /   0.35 /  0.014  *XS*
----------------------------------------------------------------------------------
BH 1PR AT   21510 /   270 /   2100. /  1013. /  123844. / 1.23 /     0. /  150.
    760.22 /   0.08 /   0.18 /   0.0  /  760.30 /    2.07 /   0.16 / -0.004  *XS*
----------------------------------------------------------------------------------
BI  1S AT   21900 /   390 /   2100. /   414. /   56057. / 1.10 /     0. /   62.
    760.29 /   0.44 /   0.25 /   0.18 /  760.73 /    5.07 /   0.34 / -0.000  *XS*
----------------------------------------------------------------------------------
BJ 1SS AT   22350 /   450 /   2100. /   465. /   58033. / 1.28 /    18. /  138.
    760.93 /   0.41 /   0.61 /   0.0  /  761.34 /    4.52 /   0.32 / -0.000  *XS*
----------------------------------------------------------------------------------
BK  1T AT   22780 /   430 /   2100. /  1034. /  105515. / 1.58 /    10. /  260.
    761.55 /   0.10 /   0.31 /   0.0  /  761.65 /    2.03 /   0.18 / -0.000  *XS*
----------------------------------------------------------------------------------
BL 1TT AT   23170 /   390 /   2100. /  1876. /  166403. / 1.34 /   280. /  630.
    761.72 /   0.03 /   0.10 /   0.0  /  761.75 /    1.12 /   0.07 / -0.000  *XS*
----------------------------------------------------------------------------------
BM  1U AT   23480 /   310 /   2100. /  1844. /  127659. / 1.50 /   450. /  950.
    761.78 /   0.03 /   0.06 /   0.00 /  761.81 /    1.14 /   0.09 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR 1U AT   23480 /       /   1372. /   310. /   41393. / 1.00 /     0. /   42.
    761.78 /   0.31 /       ...1...  (-.001)    /    4.43 /   0.29 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT      747. /                *RG*
----------------------------------------------------------------------------------
    1V AT   23560 /    80 /   2100. /   736. /   50819. / 2.68 /   450. /  850.
    761.79 /   0.34 /   0.05 /   0.27 /  762.13 /    2.85 /   0.37 / -0.011  *AS*
----------------------------------------------------------------------------------
BN  M = 0.0  / E = 0.0  / K* = 0.01 /   737. /   50899. / 2.68 /   450. /  850.
    761.80 /   0.34 /                 /  762.13 /    2.85 /   0.37 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
```

100-FW

100-FW

```
BH  1DR AT   21510 /   270 /   2100. /  1013. /  123844. / 1.23 /    0. /  150.
    760.22 /   0.08 /   0.18 /   0.0  /  760.[illegible] /   2.07 /   0.16 / -0.004  *XS*
-----------------------------------------------------------------------------------
BI  1S AT   21900 /   390 /   2100. /   414. /   56057. / 1.10 /    0. /   62.
    760.29 /   0.44 /   0.25 /   0.18 /  760.73 /   5.07 /   0.34 / -0.000  *XS*
-----------------------------------------------------------------------------------
BJ  1SS AT   22350 /   450 /   2100. /   465. /   58033. / 1.28 /   18. /  138.
    760.93 /   0.41 /   0.61 /   0.0  /  761.34 /   4.52 /   0.32 / -0.000  *XS*
-----------------------------------------------------------------------------------
BK  1T AT   22780 /   430 /   2100. /  1034. /  105515. / 1.58 /   10. /  260.
    761.55 /   0.10 /   0.31 /   0.0  /  761.65 /   2.03 /   0.18 / -0.000  *XS*
-----------------------------------------------------------------------------------
BL  1TT AT   23170 /   390 /   2100. /  1876. /  166403. / 1.34 /  280. /  630.
    761.72 /   0.03 /   0.10 /   0.0  /  761.75 /   1.12 /   0.07 / -0.000  *XS*
-----------------------------------------------------------------------------------
BM  1U AT   23480 /   310 /   2100. /  1844. /  127659. / 1.50 /  450. /  950.
    761.78 /   0.03 /   0.06 /   0.00 /  761.81 /   1.14 /   0.09 / -0.000  *XS*
================================ BEGIN BRIDGE ANALYSIS ==============================
    BR 1U AT   23480 /        /   1372. /   310. /   41393. / 1.00 /    0. /   42.
    761.78 /   0.31 /        ...1...  (-.001)    /   4.43 /   0.29 /          *BO*
-----------------------------------------------------------------------------------
    EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT     747. /                *RG*
-----------------------------------------------------------------------------------
    1V AT   23560 /    80 /   2100. /   736. /   50819. / 2.68 /  450. /  850.
    761.79 /   0.34 /   0.05 /   0.27 /  762.13 /   2.85 /   0.37 / -0.011  *AS*
-----------------------------------------------------------------------------------
BN  M = 0.0  / E = 0.0  / K* = 0.01 /   737. /   50899. / 2.68 /  450. /  850.
    761.80 /   0.34 /                 /  762.13 /   2.85 /   0.37 /          *AS*
================================ END BRIDGE ANALYSIS ================================
BØ  1W AT   24490 /   930 /   2100. /  1144. /   78968. / 1.76 /  650. / 1000.
    763.05 /   0.09 /   1.02 /   0.0  /  763.14 /   1.84 /   0.23 / -0.016  *XS*
-----------------------------------------------------------------------------------
BP  1X AT   25110 /   620 /   1200. /  1290. /   71137. / 2.68 /  780. / 1230.
    763.40 /   0.04 /   0.30 /   0.0  /  763.44 /   0.93 /   0.15 /  0.000  *XS*
-----------------------------------------------------------------------------------
```

100 - FW

WATER-SURFACE PROFILE FOR: THREAD CREEK CHAMBERS RD TO ATHERTON RD HOLTSLAG
PAGE 2 OF 2, PROFILE NUMBER, 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS

```
==================================================================================
SECTO AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
  1XX AT   25380 /   270 /   1200. /  1096. /   62676. / 2.84 /  100. /  485.
BQ 763.48 /   0.05 /   0.09 /   0.01 / 763.54 /    1.09 /   0.16 / -0.000  *XS*
----------------------------------------------------------------------------------
   1Y AT   25710 /   330 /   1200. /   542. /   28551. / 2.42 / 1015. / 1265.
BR 763.68 /   0.18 /   0.27 /   0.07 / 763.87 /    2.21 /   0.34 / -0.000  *XS*
----------------------------------------------------------------------------------
1YY   AT   26070 /   360 /   1200. /   460. /   24607. / 1.89 /   10. /  224.
BS 764.43 /   0.20 /   0.74 /   0.01 / 764.63 /    2.61 /   0.37 /  0.019  *XS*   100-FW
----------------------------------------------------------------------------------
   1Z AT   26430 /   360 /   1200. /   396. /   40192. / 1.00 /  393. /  477.
BT 765.01 /   0.14 /   0.52 /   0.0  / 765.16 /    3.03 /   0.25 / -0.001  *XS*
----------------------------------------------------------------------------------
   2A AT   26640 /   210 /   2100. /   789. /   48256. / 2.73 /  350. /  840.
BU 765.23 /   0.30 /   0.29 /   0.08 / 765.53 /    2.66 /   0.37 / -0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 2A AT   26640 /       /   1207. /   242. /   19484. / 1.00 /    0. /   41.
   763.40 /   0.39 /       ...3...  (-.001)    /    4.99 /   0.36 /         *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      871. / RIGHT       10. /               *RG*
----------------------------------------------------------------------------------
   2B AT   26790 /   150 /   2100. /   781. /   65963. / 2.21 /  502. / 1100.
   765.48 /   0.25 /   0.21 /   0.0  / 765.73 /    2.69 /   0.29 / -0.011  *AS*
----------------------------------------------------------------------------------
BV M = **** / F = **** / K* = **** /   843. /   71026. / 2.19 /  500. / 1100.
   765.62 /   0.21 /                 / 765.83 /    2.49 /   0.27 /         *AS*
========================== END BRIDGE ANALYSIS ============================
```

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: THREAD CREEK ATHERTON - BRISTOL ROAD HOLTSLAG
PAGE 1 OF 2, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR.FW ANALYSIS

	SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
	WS.ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
BV	2B	AT	26790	0	2100.	842.	70954.	2.19	500.	1100.	
	765.62		0.21			765.83	2.50	0.27		*IS*	
BW	2C	AT	27310	520	2100.	1296.	103611.	1.61	850.	1300.	
	766.08		0.07	0.31	0.0	766.14	1.62	0.18	0.000	*XS*	
BX	2D	AT	27920	610	2100.	1312.	90987.	1.91	300.	800.	
	766.36		0.08	0.29	0.01	766.44	1.60	0.20	0.000	*XS*	
BY	2E	AT	28670	750	1950.	1215.	76178.	2.81	200.	700.	
	766.79		0.11	0.44	0.02	766.90	1.60	0.25	0.001	*XS*	100 FW
BZ	2F	AT	29150	480	1950.	1137.	68103.	2.93	245.	743.	
	767.13		0.13	0.35	0.01	767.26	1.71	0.28	0.000	*XS*	
CA	2G	AT	29860	710	1950.	1174.	66447.	2.86	520.	895.	
	767.74		0.12	0.60	0.0	767.86	1.66	0.25	0.000	*XS*	
CB	2H	AT	30520	660	1950.	967.	56230.	1.95	625.	1000.	
	768.41		0.12	0.67	0.00	768.53	2.02	0.19	0.004	*XS*	
CC	2I	AT	31230	710	1950.	900.	49812.	2.44	535.	860.	
	769.35		0.18	0.96	0.03	769.53	2.17	0.33	0.001	*XS*	
CD	2J	AT	31820	590	1950.	1245.	69458.	3.59	630.	1130.	
	770.04		0.14	0.65	0.0	770.18	1.57	0.26	0.000	*XS*	
CE	2K	AT	32630	810	1950.	1294.	82558.	1.13	910.	1260.	
	770.67		0.04	0.54	0.0	770.71	1.51	0.13	0.001	*XS*	
CF	2L	AT	33230	600	1950.	925.	74823.	1.29	740.	1040.	
	771.02		0.09	0.37	0.02	771.11	2.11	0.18	0.001	*XS*	100 FW
CG	2LL	AT	33630	400	1950.	417.	31928.	1.79	535.	720.	
	771.40		0.61	0.64	0.26	772.00	4.68	0.56	-0.001	*XS*	
CH	2M	AT	34000	370	1950.	320.	44591.	1.13	289.	349.	
	772.36		0.65	0.99	0.02	773.02	6.10	0.43	0.000	*XS*	

```
                                                  HE  /    EG  /    V  /   FN  /   ACC    *ID*
==================================================================================================
CI  M = **** / E = **** / K* = ****      582. /  51249. / 2.08 /  188. /  388.                  100
    773.12 /   0.36 /                  / 773.49 /   3.35 /  0.36 /                    *AS*
==================================================================================================
                                   END BRIDGE ANALYSIS
```

END OF THIS PROFILE

```
2P AT   35280 /   840 /   1950. /   830. /   66880. / 2.52 /  190. /  440.
774.52 /   0.22 /   0.77 /   0.03 / 774.74 /   2.05 /   0.30 /  0.005  *XS*
-----------------------------------------------------------------------------
2Q AT   35830 /   550 /   1950. /   801. /   53908. / 2.09 /  120. /  370.
775.12 /   0.19 /   0.58 /   0.0  / 775.32 /   2.44 /   0.32 /  0.000  *XS*
-----------------------------------------------------------------------------
2R AT   36380 /   550 /   1950. /  1010. /   58599. / 1.86 /  210. /  510.
775.87 /   0.11 /   0.66 /   0.0  / 775.98 /   1.93 /   0.15 /  0.002  *XS*
-----------------------------------------------------------------------------
2S AT   36930 /   550 /   1950. /   745. /   39349. / 2.20 /  305. /  605.
776.72 /   0.23 /   0.91 /   0.06 / 776.95 /   2.62 /   0.41 /  0.002  *XS*
-----------------------------------------------------------------------------
2SS AT  37390 /   460 /   1950. /   895. /   57963. / 2.21 /  360. /  660.
777.55 /   0.17 /   0.77 /   0.0  / 777.72 /   2.18 /   0.29 /  0.000  *XS*
-----------------------------------------------------------------------------
2T AT   37880 /   490 /   1950. /  1030. /   60713. / 2.15 /  600. /  900.
778.13 /   0.12 /   0.53 /   0.0  / 778.25 /   1.89 /   0.14 /  0.000  *XS*
-----------------------------------------------------------------------------
2U AT   38630 /   750 /   1950. /   802. /   37440. / 1.98 /  590. /  890.
779.36 /   0.18 /   1.25 /   0.03 / 779.54 /   2.43 /   0.20 /  0.002  *XS*
-----------------------------------------------------------------------------
2V AT   39220 /   590 /   1950. /  1688. /   76004. / 2.53 /  650. / 1150.
780.28 /   0.05 /   0.79 /   0.0  / 780.33 /   1.16 /   0.09 /  0.001  *XS*
-----------------------------------------------------------------------------
2W AT   39800 /   580 /   1950. /  1545. /   78200. / 2.09 /  550. /  950.
780.65 /   0.05 /   0.37 /   0.0  / 780.70 /   1.26 /   0.09 /  0.001  *XS*
-----------------------------------------------------------------------------
2X AT   40660 /   860 /   1950. /  1017. /   57334. / 2.39 /  340. /  640.
781.34 /   0.14 /   0.73 /   0.04 / 781.47 /   1.92 /   0.26 /  0.001  *XS*
-----------------------------------------------------------------------------
2Y AT   41180 /   520 /   1850. /   986. /   62705. / 2.21 /   13. /  308.
781.87 /   0.12 /   0.52 /   0.0  / 782.00 /   1.88 /   0.23 / -0.000  *XS*
-----------------------------------------------------------------------------
2Z AT   41850 /   670 /   1850. /   901. /   46629. / 2.75 /   80. /  380.
782.62 /   0.18 /   0.78 /   0.03 / 782.80 /   2.05 /   0.29 / -0.005  *XS*
-----------------------------------------------------------------------------
2ZZ AT  42280 /   430 /   1850. /  1121. /   59672. / 2.91 /    5. /  355.
783.21 /   0.12 /   0.53 /   0.0  / 783.33 /   1.65 /   0.24 / -0.000  *XS*
-----------------------------------------------------------------------------
```

```
.02  3A AT   42350 /   370 /   1850. /   1359. /   73437. / 2.43 /   20. /   370.
     783.[illegible]5 /   0.07 /   0.29 /   0.0  /  783.62 [illegible] 1.36 /   0.09 /  0.000  *XS*  CX
-----------------------------------------------------------------------------------------------------
     3AA AT   42860 /   210 /   1850. /   1232. /   61827. / 2.69 /   10. /   360.
.02  783.70 /   0.09 /   0.16 /   0.01 /  783.79 /   1.50 /   0.11 / -0.000  *XS*  CY
-----------------------------------------------------------------------------------------------------
     3B AT   43320 /   460 /   1850. /   1626. /   87037. / 1.85 /   60. /   460.
.02  784.05 /   0.04 /   0.29 /   0.0  /  784.09 /   1.14 /   0.08 /  0.000  *XS*  CZ
-----------------------------------------------------------------------------------------------------
     3C AT   44030 /   710 /   1850. /   1409. /   60729. / 2.85 /  275. /   725.
.01  784.49 /   0.08 /   0.46 /   0.02 /  784.57 /   1.31 /   0.10 /  0.000  *XS*  DA
-----------------------------------------------------------------------------------------------------
     3D AT   44540 /   510 /   1850. /   1554. /   77584. / 2.22 /  300. /   700.
.02  784.89 /   0.05 /   0.37 /   0.0  /  784.94 /   1.19 /   0.09 /  0.000  *XS*  DB
-----------------------------------------------------------------------------------------------------
     3E AT   45150 /   610 /   1850. /    865. /   38862. / 2.18 /  130. /   430.
0    785.53 /   0.16 /   0.69 /   0.05 /  785.69 /   2.14 /   0.33 /  0.001  *XS*  DC
-----------------------------------------------------------------------------------------------------
     3EE AT   45370 /   220 /   1850. /   1049. /   48861. / 2.18 /  220. /   520.
0    785.98 /   0.11 /   0.40 /   0.0  /  786.08 /   1.76 /   0.12 / -0.000  *XS*  DD  FW
-----------------------------------------------------------------------------------------------------
     3F AT   45740 /   370 /   1850. /   1286. /   58701. / 2.06 /  170. /   570.
0    786.46 /   0.07 /   0.44 /   0.0  /  786.52 /   1.44 /   0.13 / -0.000  *XS*  DE
-----------------------------------------------------------------------------------------------------
     3FF AT   46100 /   360 /   1850. /   1410. /   64000. / 2.36 /  100. /   600.
0    786.79 /   0.06 /   0.33 /   0.0  /  786.85 /   1.31 /   0.13 /  0.001  *XS*  DF
-----------------------------------------------------------------------------------------------------
     3G AT   46470 /   370 /   1850. /   1244. /   58170. / 2.32 /  300. /   700.
.03  787.12 /   0.08 /   0.34 /   0.01 /  787.20 /   1.49 /   0.11 /  0.000  *XS*  DG
-----------------------------------------------------------------------------------------------------
     3H AT   46660 /   190 /   1850. /   1074. /   62203. / 1.80 /  470. /   770.
.07  787.30 /   0.08 /   0.18 /   0.00 /  787.38 /   1.72 /   0.23 /  0.000  *XS*  DH
-----------------------------------------------------------------------------------------------------
     3HH AT   47150 /   490 /   1850. /   1014. /   52271. / 2.30 /  330. /   680.
.07  787.80 /   0.12 /   0.52 /   0.02 /  787.92 /   1.82 /   0.13 /  0.002  *XS*  DI
-----------------------------------------------------------------------------------------------------
     3I AT   47510 /   360 /   1850. /    391. /   25421. / 2.26 /  475. /   775.
.09  788.39 /   0.79 /   0.93 /   0.33 /  789.18 /   4.73 /   0.54 / -0.002  *XS*  DJ
=================================== BEGIN BRIDGE ANALYSIS ==========================
BR 3I AT   47510 /       /   1850. /    197. /   18229. / 1.00 /    0. /    40.
   788.39 /   1.37 /       ...1...  (-.001)     /   9.38 /   0.74 /          *BO*
-----------------------------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                  *RG*
-----------------------------------------------------------------------------------------------------
     3J AT   47590 /    80 /   1850. /    194. /   15535. / 1.08 /  782. /   831.
   788.71 /   1.53 /   0.69 /   0.37 /  790.24 /   9.54 /   0.83 / -0.001  *AS*
-----------------------------------------------------------------------------------------------------
```

```
   [illegible] /      0 /    1750. /    524. /   32816. / 1.75 /   655. /   830.
   79[illegible]04 /   0.30 /                  /  790.34[illegible]  3.34 /   0.38/          *IS*
-----------------------------------------------------------------------------------------------
3J+1  AT   47800 /   210 /   1750. /    758. /   60690. / 1.60 /    55. /   255.
   790.54 /   0.13 /   0.32 /   0.0  /  790.67 /   2.31 /   0.22 / 0.006  *XS*
-----------------------------------------------------------------------------------------------
  3K AT   48160 /   360 /   1750. /   1413. /   96722. / 1.36 /   350. /   650.
   790.83 /   0.03 /   0.19 /   0.0  /  790.86 /   1.24 /   0.09 / 0.000  *XS*
-----------------------------------------------------------------------------------------------
   3L AT   48780 /   620 /   1750. /   1310. /   77167. / 1.39 /   250. /   550.
   791.08 /   0.04 /   0.25 /   0.00 /  791.12 /   1.34 /   0.10 / -0.002  *XS*
-----------------------------------------------------------------------------------------------
  3LL AT   49180 /   400 /   1750. /   1221. /   79812. / 1.52 /   190. /   490.
   791.27 /   0.05 /   0.20 /   0.00 /  791.32 /   1.43 /   0.10 / 0.000  *XS*
-----------------------------------------------------------------------------------------------
   3M AT   49540 /   360 /   1750. /    315. /   22528. / 1.64 /    -9. /    91.
   791.52 /   0.78 /   0.61 /   0.37 /  792.31 /   5.55 /   0.60 / 0.004  *XS*
================================ BEGIN BRIDGE ANALYSIS ================================
BR 3M AT   49540 /        /   1750. /    207. /   27858. / 1.00 /     4. /    42.
   791.52 /   1.11 /        ...1...  (-.001)    /   8.46 /   0.64 /          *BO*
-----------------------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
-----------------------------------------------------------------------------------------------
   3N AT   49610 /    70 /   1750. /    489. /   44453. / 1.51 /    70. /   170.
   792.22 /   0.30 /   0.21 /   0.0  /  792.52 /   3.58 /   0.33 / -0.000  *AS*
-----------------------------------------------------------------------------------------------
   M = 0.26 / E = 0.47 / K* = 0.37 /    535. /   50468. / 1.50 /    70. /   170.
   792.68 /   0.25 /                  /  792.93 /   3.27 /   0.29 /          *AS*
================================ END BRIDGE ANALYSIS ==================================
  3NN AT   50080 /   470 /   1750. /   1214. /   89356. / 1.31 /    90. /   339.
   793.21 /   0.04 /   0.32 /   0.0  /  793.25 /   1.44 /   0.10 / -0.000  *XS*
-----------------------------------------------------------------------------------------------
   3O AT   50530 /   450 /   1750. /   1365. /  110238. / 1.14 /   150. /   500.
   793.36 /   0.03 /   0.14 /   0.0  /  793.39 /   1.28 /   0.11 / 0.000  *XS*
-----------------------------------------------------------------------------------------------
   3P AT   50920 /   390 /   1750. /   1347. /  108533. / 1.15 /   130. /   530.
   793.46 /   0.03 /   0.10 /   0.00 /  793.50 /   1.30 /   0.13 / 0.000  *XS*
-----------------------------------------------------------------------------------------------
  3PP AT   51320 /   400 /   1750. /   1289. /  105216. / 1.13 /    50. /   450.
   793.57 /   0.03 /   0.11 /   0.00 /  793.60 /   1.36 /   0.13 / -0.000  *XS*
-----------------------------------------------------------------------------------------------
   3Q AT   51980 /   660 /   1750. /   1249. /  102583. / 1.17 /   310. /   710.
   793.76 /   0.04 /   0.19 /   0.00 /  793.79 /   1.40 /   0.13 / 0.000  *XS*
-----------------------------------------------------------------------------------------------
   3R AT   52290 /   310 /   1750. /   1164. /   88506. / 1.09 /   450. /   850.
   793.86 /   0.04 /   0.10 /   0.00 /  793.90 /   1.50 /   0.15 / 0.000  *XS*
-----------------------------------------------------------------------------------------------
```

```
-ID AT DIST/NCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
WS ELEV /  HV  /    HF  /    HE  /     EG  /     V   /    FN  /   ACC   *ID*
=================================================================================
3S AT   53060 /   770 /  1750. /   680. /  45906. / 1.94 /  510. /  860.
794.36 /   0.20 /   0.58 /   0.08 / 794.56 /   2.57 /   0.34 /  0.000   *XS*
---------------------------------------------------------------------------------
3T AT   53580 /   520 /  1750. /   892. /  43637. / 1.53 /  430. /  780.
795.27 /   0.09 /   0.79 /   0.0  / 795.36 /   1.96 /   0.19 /  0.003   *XS*
---------------------------------------------------------------------------------
3U AT   54380 /   800 /  1750. /   999. /  45009. / 1.52 /  275. /  675.
796.52 /   0.07 /   1.25 /   0.0  / 796.59 /   1.75 /   0.17 / -0.017   *XS*
---------------------------------------------------------------------------------
3V AT   54940 /   560 /  1750. /  1008. /  51222. / 1.52 /  300. /  700.
797.27 /   0.07 /   0.74 /   0.0  / 797.34 /   1.74 /   0.17 /  0.004   *XS*
---------------------------------------------------------------------------------
3W AT   55330 /   390 /  1750. /   835. /  42680. / 1.85 /  360. /  710.
797.79 /   0.13 /   0.55 /   0.03 / 797.91 /   2.09 /   0.19 /  0.000   *XS*
---------------------------------------------------------------------------------
WW AT   55910 /   580 /  1750. /   809. /  45683. / 1.59 /  423. /  723.
798.71 /   0.12 /   0.91 /   0.0  / 798.83 /   2.16 /   0.21 /  0.003   *XS*
---------------------------------------------------------------------------------
3X AT   56230 /   320 /  1750. /  1225. /  75057. / 1.55 /  400. /  800.
799.06 /   0.05 /   0.29 /   0.0  / 799.11 /   1.43 /   0.13 /  0.000   *XS*
---------------------------------------------------------------------------------
3Y AT   56650 /   420 /  1750. /   316. /  25119. / 1.79 /  280. /  452.
799.34 /   0.86 /   0.68 /   0.40 / 800.20 /   5.54 /   0.58 / -0.000   *XS*
========================= BEGIN BRIDGE ANALYSIS ==========================
3Y AT   56650 /       /  1750. /   218. /  16907. / 1.00 /    0. /   40.
798.80 /   1.00 /       ...3...  (-.001)  /   8.02 /   0.60 /          *BO*
---------------------------------------------------------------------------------
ANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /            *RG*
---------------------------------------------------------------------------------
3Z AT   56700 /    50 /  1750. /   444. /  32605. / 1.87 /  221. /  397.
99.92 /   0.45 /   0.19 /   0.0  / 800.37 /   3.94 /   0.44 / -0.012   *AS*
---------------------------------------------------------------------------------
= **** / E = **** / K* = **** /   789. /  45302. / 3.15 /  150. /  650.
00.66 /   0.24 /                 / 800.90 /   2.22 /   0.32 /          *AS*
========================= END BRIDGE ANALYSIS ==========================

                    END OF THIS PROFILE
```

DX
DY
DZ
EA
EB
EC
ED
EE
EF

```
 ...../ 0.20 /                    / 801.17 /   2.50 /   0.29/          *IS*
-----------------------------------------------------------------------------
 3ZZ AT   57150 /   450 /   1750. /  1260. /   63342. / 1.88 /  100. /  500.
 801.54 /   0.06 /   0.42 /   0.0  /  801.59 /   1.39 /   0.11 /  0.000  *XS*
-----------------------------------------------------------------------------
 3A AT   57530 /   380 /   1750. /  1624. /   67012. / 1.80 /  120. /  620.
 801.84 /   0.03 /   0.27 /   0.0  /  801.87 /   1.08 /   0.09 /  0.000  *XS*
-----------------------------------------------------------------------------
 4B AT   58100 /   570 /   1750. /  1282. /   60501. / 2.22 /  295. /  645.
 802.25 /   0.06 /   0.43 /   0.02 /  802.32 /   1.36 /   0.10 /  0.000  *XS*
-----------------------------------------------------------------------------
 4C AT   58460 /   360 /   1750. /   410. /   39253. / 1.53 /   67. /  157.
 802.53 /   0.43 /   0.46 /   0.18 /  802.97 /   4.27 /   0.37 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR 4C AT   58460 /       /   1750. /   270. /   35273. / 1.00 /   24. /   58.
 802.53 /   0.65 /       ...1...  (-.001)    /   6.48 /   0.53 /          *BO*
-----------------------------------------------------------------------------
   NO EMBANKMENT CROSS SECTION
-----------------------------------------------------------------------------
 4D AT   58520 /    60 /   1750. /   438. /   48759. / 1.42 /   30. /  110.
 802.71 /   0.35 /   0.10 /   0.0  /  803.06 /   4.00 /   0.33 / -0.000  *AS*
-----------------------------------------------------------------------------
 M = 0.20 / E = 0.24 / K* = 0.26 /   453. /   51166. / 1.42 /   30. /  110.
 802.90 /   0.33 /                 / 803.23 /   3.86 /   0.31 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
 4DD AT   59110 /   590 /   1750. /  1855. /  105012. / 2.29 /  380. /  780.
 803.53 /   0.03 /   0.34 /   0.0  /  803.57 /   0.94 /   0.06 /  0.000  *XS*
-----------------------------------------------------------------------------
 4E AT   59400 /   290 /   1750. /  1912. /  133521. / 2.15 /  625. / 1025.
 803.60 /   0.03 /   0.06 /   0.0  /  803.63 /   0.92 /   0.05 / -0.000  *XS*
-----------------------------------------------------------------------------
 4F AT   60040 /   640 /   1750. /  1573. /   90487. / 2.25 /  650. / 1050.
 803.76 /   0.04 /   0.16 /   0.01 /  803.80 /   1.11 /   0.08 /  0.000  *XS*
-----------------------------------------------------------------------------
 4G AT   60680 /   640 /   1750. /  1195. /   65157. / 2.18 /  150. /  550.
 804.08 /   0.07 /   0.33 /   0.01 /  804.15 /   1.46 /   0.21 /  0.000  *XS*
-----------------------------------------------------------------------------
 4GG AT   61050 /   370 /   1750. /  1008. /   52326. / 2.31 /  110. /  510.
 804.39 /   0.11 /   0.33 /   0.02 /  804.50 /   1.74 /   0.25 /  0.000  *XS*
-----------------------------------------------------------------------------
 4H AT   61660 /   610 /   1750. /  1486. /   55140. / 5.27 /  215. /  815.
 805.04 /   0.11 /   0.65 /   0.00 /  805.15 /   1.18 /   0.27 /  0.003  *XS*
-----------------------------------------------------------------------------
4H+1  AT   62050 /   390 /   1750. /   757. /   46891. / 2.33 /  140. /  540.
 805.46 /   0.19 /   0.46 /   0.04 /  805.65 /   2.31 /   0.32 /  0.000  *XS*
-----------------------------------------------------------------------------
```

	D AT DISTANCE/ ELEV	LENGTH/DISCHARGE/ HV	HF	HE	AREA /CONVEYANCE/ EG	V	ALPHA/ FN	LEW / ACC	REW *ID*	
I AT	62300 /	250 /	1750. /	604. /	45600. /	2.08 /	200. /	500.		ES
	05.78 /	0.27 /	0.36 /	0.04 /	806.05 /	2.90 /	0.33 /	-0.000	*XS*	
I AT	62600 /	300 /	1750. /	498. /	37568. /	2.28 /	270. /	470.		ET FW
	06.23 /	0.44 /	0.54 /	0.08 /	806.67 /	3.51 /	0.40 /	-0.000	*XS*	
J AT	62830 /	230 /	1750. /	512. /	35517. /	2.19 /	321. /	521.		EU
	06.80 /	0.40 /	0.53 /	0.0 /	807.20 /	3.42 /	0.42 /	-0.001	*XS*	

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: THREAD CREEK CENTER RD TO RUST PARK DR. KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS FLEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
   4J AT   62830 /     0 /   1750. /   517. /   32428. / 2.07 /  321. /  521.
   806.81 /   0.37 /                 /  807.18 /   3.39 /   0.41/          *IS*   EU
============================ BEGIN BRIDGE ANALYSIS ===============================
BP 4J AT   62830 /       /   1750. /   203. /   14453. / 1.00 /    0. /   40.
   806.40 /   1.16 /       ...3...  (-.001)    /   8.63 /   0.68 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       0. / RIGHT       0. /                *RG*    FW
----------------------------------------------------------------------------------
   4K AT   62920 /    90 /   1750. /   795. /   34710. / 1.30 /  250. /  550.
   807.31 /   0.10 /   0.24 /   0.0  /  807.41 /   2.20 /   0.22 / -0.017  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  1176. /   64543. / 1.14 /  250. /  550.
   808.58 /   0.04 /                 /  808.62 /   1.49 /   0.13 /          *AS*   EV
============================ END BRIDGE ANALYSIS =================================
  4KK AT   63390 /   470 /   1750. /  1155. /   75093. / 1.93 /   81. /  380.
   808.86 /   0.07 /   0.30 /   0.01 /  808.93 /   1.52 /   0.17 /  0.000  *XS*   EW
----------------------------------------------------------------------------------
   4L AT   63600 /   210 /   1750. /  1230. /   72759. / 1.87 /  110. /  410.
   808.99 /   0.06 /   0.12 /   0.0  /  809.05 /   1.42 /   0.10 / -0.000  *XS*   EX
----------------------------------------------------------------------------------
   4M AT   64050 /   450 /   1750. /  1013. /   71049. / 1.96 /  400. /  650.
   809.24 /   0.09 /   0.27 /   0.02 /  809.33 /   1.73 /   0.19 / -0.001  *XS*   EY
----------------------------------------------------------------------------------
  4MM AT   64270 /   220 /   1750. /   795. /   55156. / 1.62 /  343. /  543.
   809.40 /   0.12 /   0.17 /   0.02 /  809.52 /   2.20 /   0.23 / -0.000  *XS*   EZ
----------------------------------------------------------------------------------
   4N AT   64550 /   280 /   1750. /   690. /   45765. / 1.80 /  350. /  575.
   809.71 /   0.18 /   0.34 /   0.03 /  809.89 /   2.54 /   0.27 / -0.000  *XS*   FA
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

```
==========================================================================
   4P AT   64550 /     0 /   1750. /   691. /   5833. / 1.80 /  350. /  575.
   80[illegible].71 /   0.18 /                 / 809.89 /   2.53 /   0.27/          *IS*   FA
============================ BEGIN BRIDGE ANALYSIS ============================
BR 4N AT   64550 /       /    901. /   174. /   12214. / 1.00 /    0. /   28.
   808.40 /   0.42 /        ...3...  (-.001)     /   5.19 /   0.36 /          *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     860. / RIGHT        0. /                 *RG*   FW
--------------------------------------------------------------------------
   40 AT   64650 /   100 /   1750. /   501. /   40409. / 1.97 /  371. /  595.
   809.78 /   0.37 /   0.17 /   0.10 / 810.15 /   3.49 /   0.37 / -0.000  *AS*
--------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   564. /   44980. / 2.05 /  370. /  595.
   810.06 /   0.31 /                 / 810.36 /   3.10 /   0.33 /          *AS*   FB
============================ END BRIDGE ANALYSIS ==============================
  400 AT   64710 /    60 /   1750. /   979. /   90640. / 1.68 /  335. /  510.
   810.31 /   0.08 /   0.05 /   0.0  / 810.39 /   1.79 /   0.16 / -0.020  *XS*   FC
--------------------------------------------------------------------------
4000  AT   64950 /   240 /   1750. /   568. /   46859. / 1.62 /  125. /  250.
   810.40 /   0.24 /   0.17 /   0.08 / 810.64 /   3.08 /   0.27 / -0.000  *XS*   FD
--------------------------------------------------------------------------
   4P AT   65180 /   230 /   1750. /   252. /   20439. / 1.01 /  307. /  360.
   810.88 /   0.75 /   0.74 /   0.26 / 811.63 /   6.94 /   0.55 / -0.001  *XS*   FE
--------------------------------------------------------------------------
4P+1  AT   65430 /   250 /   1750. /   496. /   45163. / 1.39 /  525. /  725.
   812.19 /   0.27 /   0.83 /   0.0  / 812.46 /   3.53 /   0.26 / -0.000  *XS*
--------------------------------------------------------------------------
  4PP AT   65560 /   130 /   1750. /   358. /   28495. / 1.83 /  433. /  630.
   812.30 /   0.68 /   0.31 /   0.21 / 812.98 /   4.89 /   0.43 / -0.000  *XS*   FF
--------------------------------------------------------------------------
   40 AT   65760 /   200 /   1750. /   549. /   60333. / 1.53 /  590. /  740.
   813.09 /   0.24 /   0.36 /   0.0  / 813.33 /   3.19 /   0.23 / -0.000  *XS*   FG
--------------------------------------------------------------------------
   4R AT   66130 /   370 /   1750. /   670. /   61328. / 1.77 /  445. /  645.
   813.45 /   0.19 /   0.31 /   0.0  / 813.64 /   2.61 /   0.23 / -0.000  *XS*   FH
--------------------------------------------------------------------------
   4S AT   66480 /   350 /   1750. /   488. /   50092. / 1.34 /   80. /  180.
   813.76 /   0.27 /   0.35 /   0.04 / 814.03 /   3.59 /   0.25 / -0.000  *XS*   FI
============================ BEGIN BRIDGE ANALYSIS ============================
CU 4S AT   66480 /       /      0. /   104. /    9974. / 1.00 /    0. /   15.
   810.30 /   0.0  /        ...3...  (-.001)     /   0.0  /   0.0  /          *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT    1809. / RIGHT       97. /                 *RG*   FW
--------------------------------------------------------------------------
   4T AT   66550 /    70 /   1750. /   510. /   63278. / 1.47 /  201. /  301.
   813.83 /   0.27 /   0.07 /   0.0  / 814.10 /   3.43 /   0.29 / 0.003  *AS*
--------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   510. /   [illegible]278. / 1.47 /  201. /  301.
   81[illegible]83 /   0.27 /                 / 814.10 /   3.43 /   0.29 /          *AS*   FJ
============================ END BRIDGE ANALYSIS ==========
```

SECTID AT	DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
4T AT	66550	0	1750.	496.	61591.	1.49	210.		307.	FJ
,10	813.85	0.29			814.14	3.53	0.29		*IS*	
4U AT	66740	190	1750.	625.	74258.	1.31	106.		250.	FK
,10	814.10	0.16	0.13	0.0	814.26	2.80	0.21	-0.007	*XS*	
4UU AT	66950	210	1750.	640.	58632.	1.31	75.		225.	FL
,09	814.26	0.15	0.15	0.0	814.41	2.73	0.23	0.001	*XS*	
4V AT	67120	170	1750.	396.	40902.	1.44	50.		150.	FM
,09	814.33	0.44	0.22	0.14	814.77	4.41	0.36	0.000	*XS*	

END OF THIS PROFILE

FW

```
FLOODWAY ANALYSIS *** HOR FW
==================================================================================
D AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
 ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
W AT   67220 /      0 /   1630. /   462. /   48947. / 2.11 /   72. /  188.
14.62 /   0.41 /                  /  815.03 /   3.53 /   0.32/          *IS*
----------------------------------------------------------------------------------
X AT   67380 /    160 /   1630. /   726. /   58700. / 1.93 /   75. /  275.
15.02 /   0.15 /   0.15 /   0.0  /  815.18 /   2.24 /   0.22 / -0.000  *XS*
----------------------------------------------------------------------------------
Y AT   67950 /    570 /   1630. /   687. /   49098. / 2.45 /   64. /  509.
15.52 /   0.21 /   0.53 /   0.03 /  815.74 /   2.37 /   0.26 /  0.005  *XS*
======================== BEGIN BRIDGE ANALYSIS ==================================
Y AT   67950 /       /    454. /   130. /   12607. / 1.00 /    0. /   16.
14.60 /   0.19 /       ...3...  (-.001)    /   3.50 /   0.21 /          *BO*
----------------------------------------------------------------------------------
NKMENT OVERFLOW (CFS) / LEFT     770. / RIGHT     571. /                  *RG*
----------------------------------------------------------------------------------
Z AT   68010 /     60 /   1630. /   741. /   51625. / 3.39 /   -2. /  531.
15.57 /   0.25 /   0.06 /   0.02 /  815.82 /   2.20 /   0.29 /  0.000  *AS*
----------------------------------------------------------------------------------
 = **** / E = **** / K* = **** /   741. /   51625. / 3.39 /   -2. /  531.
15.57 /   0.25 /                  /  815.82 /   2.20 /   0.29 /          *AS*
======================== END BRIDGE ANALYSIS ====================================

                          END OF THIS PROFILE
```

FN

FO

FP

FW

FQ

```
 SECTION/STA.DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /   HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
 ==========================================================================
   42 AT   68010 /      0 /   1630. /   734. /   51359. / 3.37 /     0. /  500.
   815.57 /   0.26 /                 /  815.83 /   2.22 /   0.29/          *IS*
 --------------------------------------------------------------------------
 42+1  AT   68300 /    290 /   1630. /   971. /   84891. / 2.03 /   145. /  395.
   815.92 /   0.09 /   0.18 /   0.0  /  816.01 /   1.68 /   0.15 / -0.000  *XS*
 --------------------------------------------------------------------------
   5A AT   68450 /    150 /   1630. /  1094. /   83377. / 1.92 /    25. /  275.
   816.00 /   0.07 /   0.06 /   0.0  /  816.06 /   1.49 /   0.16 / -0.000  *XS*
 --------------------------------------------------------------------------
   5B AT   68980 /    530 /   1630. /   775. /   48089. / 2.87 /   145. /  420.
   816.28 /   0.20 /   0.35 /   0.07 /  816.48 /   2.10 /   0.27 / =0.000  *XS*
 --------------------------------------------------------------------------
  5BB AT   69480 /    500 /   1630. /   899. /   57158. / 3.13 /    60. /  360.
   816.80 /   0.16 /   0.48 /   0.0  /  816.96 /   1.81 /   0.23 / -0.000  *XS*
 --------------------------------------------------------------------------
   5C AT   69790 /    310 /   1630. /  1190. /   57784. / 2.85 /    50. /  450.
   817.13 /   0.08 /   0.25 /   0.0  /  817.21 /   1.37 /   0.11 / -0.000  *XS*
 --------------------------------------------------------------------------
   5D AT   70480 /    690 /   1630. /  1433. /   88724. / 2.77 /    20. /  420.
   817.51 /   0.06 /   0.36 /   0.0  /  817.57 /   1.14 /   0.15 / -0.000  *XS*
 ========================== BEGIN BRIDGE ANALYSIS ==========================
 BR 5D AT   70480 /        /      0. /   148. /   10833. / 1.00 /     0. /   16.
   817.51 /   0.0  /       ...1...  (-.001)    /    0.0  /   0.0  /          *BO*
 --------------------------------------------------------------------------
 EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT    2748. /              *RG*
 --------------------------------------------------------------------------
   5E AT   70540 /     60 /   1630. /  1058. /   59851. / 3.83 /    10. /  410.
   817.52 /   0.14 /   0.03 /   0.08 /  817.66 /   1.54 /   0.23 / -0.011  *AS*
 --------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  1058. /   59851. / 3.83 /    10. /  410.
   817.52 /   0.14 /                 /  817.66 /   1.54 /   0.23 /          *AS*
 ========================== END BRIDGE ANALYSIS ============================

                          END OF THIS PROFILE
```

```
 AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA /  LE   /  HE
ELEV /    HV   /    HF   /    HE   /     EG   /     V    /    FN   /   ACC    *ID*
==========================================================================
 AT   70540 /      0 /   1630. /  1056. /   59760. / 3.83 /   10. /  410.
7.52 /   0.14 /                 /  817.66 /   1.54 /   0.23/          *IS*
--------------------------------------------------------------------------
 AT   71080 /    540 /   1630. /  1366. /   82035. / 2.71 /   25. /  325.
7.89 /   0.06 /   0.29 /   0.0  /  817.95 /   1.19 /   0.07 / -0.000  *XS*
--------------------------------------------------------------------------
 AT   71600 /    520 /   1630. /   916. /   55982. / 3.50 /  150. /  475.
8.14 /   0.17 /   0.30 /   0.06 /  818.32 /   1.78 /   0.26 /  0.005  *XS*
--------------------------------------------------------------------------
 AT   72130 /    530 /   1630. /   995. /   55578. / 4.20 /  240. /  540.
8.60 /   0.18 /   0.45 /   0.00 /  818.77 /   1.64 /   0.26 /  0.001  *XS*
--------------------------------------------------------------------------
 AT   72430 /    300 /   1630. /  1089. /   72300. / 3.13 /  100. /  400.
8.85 /   0.11 /   0.20 /   0.0  /  818.96 /   1.50 /   0.20 / -0.015  *XS*
========================= BEGIN BRIDGE ANALYSIS ==========================
 AT   72430 /        /    497. /   131. /   10116. / 1.00 /    0. /   15.
18.80 /   0.22 /        ...3...  (-.001)    /   3.79 /   0.23 /          *BO*
--------------------------------------------------------------------------
NKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT    1112. /                *RG*
--------------------------------------------------------------------------
I AT   72500 /     70 /   1630. /   908. /   45622. / 5.93 /  -25. /  374.
18.86 /   0.30 /   0.06 /   0.15 /  819.15 /   1.80 /   0.34 / -0.011  *AS*
--------------------------------------------------------------------------
= **** / E = **** / K* = **** /    931. /   46767. / 5.90 /  -26. /  376.
18.91 /   0.28 /                 /  819.20 /   1.75 /   0.33 /          *AS*
========================= END BRIDGE ANALYSIS ============================
```

FX

FY

FZ

GA

GB

FW

END OF THIS PROFILE

```
   WS ELEV /     HV  /     HF  /     HE  /     EG  /     V  /    FN  /   ACC    *ID*
==========================================================================================
   5I AT    72500 /      0 /   1630. /   830. /   46419. / 4.80 /     0. /  300.
   818.88 /   0.29 /                  /  819.17 /    1.96 /   0.34/          *IS*
------------------------------------------------------------------------------------------
   5II AT   73260 /    760 /   1630. /   753. /   44924. / 3.04 /    25. /  325.
   819.91 /   0.22 /    0.97 /    0.0  /  820.14 /    2.17 /   0.31 /  0.000  *XS*
------------------------------------------------------------------------------------------
   5J AT    73740 /    480 /   1630. /   552. /   44666. / 1.84 /    30. /  230.
   820.54 /   0.25 /    0.64 /    0.01 /  820.79 /    2.95 /   0.31 /  0.000  *XS*
------------------------------------------------------------------------------------------
   5JJ AT   74280 /    540 /   1630. /   668. /   54776. / 1.76 /   130. /  330.
   821.21 /   0.16 /    0.59 /    0.0  /  821.37 /    2.44 /   0.24 /  0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
CU5JJ AT    74280 /        /      0. /    37. /    1535. / 1.00 /     0. /   12.
   816.00 /   0.0  /        ...3...  (-.001)    /    0.0  /   0.0  /          *BO*
------------------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     1743. / RIGHT      685. /                *RG*
------------------------------------------------------------------------------------------
   5K AT    74340 /     60 /   1630. /   489. /   33724. / 2.00 /   120. /  320.
   821.22 /   0.35 /    0.09 /    0.12 /  821.57 /    3.33 /   0.37 / -0.011  *AS*
------------------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   489. /   33724. / 2.00 /   120. /  320.
   821.22 /   0.35 /                  /  821.57 /    3.33 /   0.37 /          *AS*
========================== END BRIDGE ANALYSIS ============================

                          END OF THIS PROFILE
```

```
==================================================================================
D AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ALPHA/  LEW  /  REW
 ELEV /  ARV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
( AT   74340 /      0 /   1580. /    489. /   33724. / 2.00 /  120. /  320.     GH
21.22 /   0.32 /                  /  821.54 /    3.23 /   0.36/          *IS*
----------------------------------------------------------------------------------
( AT   74680 /    340 /   1580. /    725. /   63149. / 2.20 /   75. /  375.     GH
21.78 /   0.16 /   0.40 /    0.0  /  821.94 /    2.18 /   0.23 / -0.000  *XS*
----------------------------------------------------------------------------------
 AT   74950 /    270 /   1580. /   1266. /  106447. / 1.75 /  110. /  510.     GI
2.00 /   0.04 /   0.10 /    0.0  /  822.04 /    1.25 /   0.10 /  0.000  *XS*
----------------------------------------------------------------------------------
 AT   75400 /    450 /   1580. /    780. /   60490. / 1.68 /  180. /  480.     GJ
2.14 /   0.11 /   0.17 /    0.03 /  822.25 /    2.02 /   0.21 / -0.001  *XS*
----------------------------------------------------------------------------------
 AT   75430 /     30 /   1580. /    525. /   33882. / 1.52 /  -25. /  275.
2.14 /   0.21 /   0.04 /    0.05 /  822.36 /    3.01 /   0.33 /  0.016  *XS*
----------------------------------------------------------------------------------
 AT   75460 /     30 /   1580. /    733. /   49880. / 1.15 /  -30. /  270.     GK
2.32 /   0.08 /   0.04 /    0.0  /  822.40 /    2.15 /   0.23 / -0.001  *XS*
----------------------------------------------------------------------------------
 AT   75560 /    100 /   1580. /    725. /   50764. / 1.23 /  150. /  450.
2.41 /   0.09 /   0.10 /    0.00 /  822.50 /    2.18 /   0.20 /  0.001  *XS*
----------------------------------------------------------------------------------
 AT   75590 /     30 /   1580. /    574. /   36733. / 2.06 /  175. /  475.     GL
2.38 /   0.24 /   0.04 /    0.08 /  822.62 /    2.75 /   0.30 / -0.001  *XS*
----------------------------------------------------------------------------------
```

FW

END OF THIS PROFILE

```
FLOOD AY ANALYSIS *** HOR FW
==========================================================================
ID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
S ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /  ACC   *ID*
==========================================================================
4M AT   75590 /     0 /   1300. /   574. / . 36815. / 2.06 /  175. /  475.
322.38 /   0.16 /                 /  822.54 /   2.26 /   0.25/         *IS*
--------------------------------------------------------------------------
5N AT   75980 /   390 /   1300. /   592. /   44031. / 1.11 /   15. /  240.
322.88 /   0.08 /   0.41 /   0.0  /  822.96 /   2.20 /   0.23 / 0.012  *XS*
--------------------------------------------------------------------------
5O AT   76450 /   470 /   1300. /   569. /   34089. / 1.29 /   20. /  245.
323.40 /   0.10 /   0.53 /   0.01 /  823.50 /   2.29 /   0.23 / 0.000  *XS*
==========================================================================
5P AT   76950 /   500 /   1300. /   469. /   32415. / 1.46 /   20. /  245.
324.13 /   0.17 /   0.76 /   0.03 /  824.30 /   2.77 /   0.33 / 0.001  *XS*
--------------------------------------------------------------------------
5Q AT   77480 /   530 /   1300. /   601. /   30653. / 1.53 /  225. /  450.
325.10 /   0.11 /   0.90 /   0.0  /  825.21 /   2.16 /   0.20 / 0.001  *XS*
--------------------------------------------------------------------------
5Q AT   77850 /   370 /   1300. /   685. /   34773. / 1.25 /  375. /  600.
325.73 /   0.07 /   0.59 /   0.0  /  825.80 /   1.90 /   0.18 / 0.002  *XS*
--------------------------------------------------------------------------
R AT    78760 /   910 /   1300. /   835. /   45485. / 1.20 /  140. /  365.
326.73 /   0.05 /   0.97 /   0.0  /  826.77 /   1.56 /   0.13 / 0.003  *XS*
--------------------------------------------------------------------------
S AT    79280 /   520 /   1300. /   628. /   38908. / 1.82 /   40. /  290.
327.19 /   0.12 /   0.50 /   0.04 /  827.31 /   2.07 /   0.25 / 0.000  *XS*
======================= BEGIN BRIDGE ANALYSIS ============================
S AT    79280 /       /   1173. /   187. /   20771. / 1.00 /    0. /   28.
27.19 /   0.61 /       ...1...  (-.001)    /   6.26 /   0.43 /         *BO*
--------------------------------------------------------------------------
NKMENT OVERFLOW (CFS) / LEFT.       0. / RIGHT      120. /              *RG*
--------------------------------------------------------------------------
T AT    79330 /    50 /   1300. /   774. /   41361. / 2.60 /   13. /  510.
27.25 /   0.11 /   0.05 /   0.0  /  827.36 /   1.68 /   0.28 / =0.000  *AS*
--------------------------------------------------------------------------
 = 0.66 / E = 0.12 / K* = 1.59 /  1302. /   83639. / 1.79 /   10. /  510.
28.30 /   0.03 /                 /  828.33 /   1.00 /   0.09 /         *AS*
======================= END BRIDGE ANALYSIS ==============================

                        END OF THIS PROFILE
```

6L
6M
6N
6O
6P
6Q
6R
6S
FW
6T

```
ST AT   79330 /     0 /   1300. /  1200. /  1759. / 4.65 /   10. /  510.
828.10 /  0.08 /                  / 828.18 /   1.08 /  0.23/          *IS*
-----------------------------------------------------------------------------
5U AT   80100 /   770 /   1300. /  2328. /  64499. / 4.76 /  200. /  900.
828.55 /  0.02 /  0.39 /   0.0  / 828.57 /   0.56 /  0.04 / 0.000  *XS*
-----------------------------------------------------------------------------
5V AT   80780 /   680 /   1300. /  1505. /  37392. / 7.01 /  600. / 1400.
829.00 /  0.08 /  0.48 /   0.03 / 829.08 /   0.86 /  0.07 / -0.001  *XS*
-----------------------------------------------------------------------------
5W AT   82210 /  1430 /   1300. /  2183. /  61698. / 4.49 /  300. / 1000.
830.11 /  0.02 /  1.05 /   0.0  / 830.13 /   0.60 /  0.04 / 0.002  *XS*
-----------------------------------------------------------------------------
5Y AT   83140 /   930 /   1300. /  2086. /  67678. / 2.18 /  150. /  750.
830.49 /  0.01 /  0.38 /   0.0  / 830.51 /   0.62 /  0.05 / 0.001  *XS*
-----------------------------------------------------------------------------
5Z AT   83900 /   760 /   1300. /  1512. /  48847. / 2.55 /  100. /  600.
830.88 /  0.03 /  0.39 /   0.01 / 830.91 /   0.86 /  0.07 / 0.001  *XS*
-----------------------------------------------------------------------------
6A AT   84470 /   570 /   1300. /  1575. /  49864. / 2.57 /  200. /  650.
831.27 /  0.03 /  0.40 /   0.0  / 831.30 /   0.83 /  0.06 / 0.001  *XS*
-----------------------------------------------------------------------------
6B AT   84880 /   410 /   1300. /   922. /  29948. / 2.26 /  550. /  950.
831.72 /  0.07 /  0.46 /   0.02 / 831.79 /   1.41 /  0.13 / 0.001  *XS*
-----------------------------------------------------------------------------
6B+1  AT   85240 /   360 /   1300. /   693. /  33617. / 1.59 /   50. /  250.
832.32 /  0.09 /  0.60 /   0.01 / 832.40 /   1.88 /  0.24 / 0.001  *XS*
-----------------------------------------------------------------------------
6C AT   85470 /   230 /   1300. /   551. /  22806. / 2.14 /  650. /  950.
832.77 /  0.19 /  0.51 /   0.05 / 832.96 /   2.36 /  0.33 / 0.000  *XS*
-----------------------------------------------------------------------------
6D AT   85970 /   500 /   1300. /   738. /  39087. / 1.22 /  675. /  875.
833.85 /  0.06 /  0.95 /   0.0  / 833.91 /   1.76 /  0.14 / 0.002  *XS*
-----------------------------------------------------------------------------
6E AT   86670 /   700 /   1300. /   805. /  58440. / 1.47 /  350. /  550.
834.37 /  0.06 /  0.52 /   0.00 / 834.43 /   1.62 /  0.14 / 0.000  *XS*
-----------------------------------------------------------------------------
6FE AT   87150 /   480 /   1300. /   718. /  53078. / 1.47 /  150. /  350.
834.62 /  0.07 /  0.26 /   0.01 / 834.69 /   1.81 /  0.16 / -0.004  *XS*
-----------------------------------------------------------------------------
6F AT   87680 /   530 /   1300. /  1016. /  91586. / 1.15 /   40. /  240.
834.87 /  0.03 /  0.18 /   0.0  / 834.90 /   1.28 /  0.09 / 0.020  *XS*
-----------------------------------------------------------------------------
6F+1  AT   88030 /   350 /   1300. /   958. /  87936. / 1.02 /   30. /  180.
834.94 /  0.03 /  0.07 /   0.00 / 834.97 /   1.36 /  0.10 / 0.000  *XS*
-----------------------------------------------------------------------------
```

```
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==========================================================================
   6G [illegible]  88200 /   170 /  1300. /   274. /  [illegible]576. / 1.22 /  312. /  412.
   834.89 /   0.43 /   0.15 /   0.20 /  835.32 /   4.75 /   0.39 / -0.000  *XS*
--------------------------------------------------------------------------
6G+1  AT   88310 /   110 /  1300. /   524. /  48597. / 1.14 /  110. /  210.
   835.39 /   0.11 /   0.18 /   0.0  /  835.50 /   2.48 /   0.19 /  0.003  *XS*
--------------------------------------------------------------------------
   6H AT   88700 /   390 /  1300. /   573. /  43060. / 1.43 /   60. /  255.
   835.71 /   0.11 /   0.31 /   0.00 /  835.82 /   2.27 /   0.21 /  0.001  *XS*
--------------------------------------------------------------------------
   6I AT   89330 /   630 /  1300. /   549. /  52500. / 1.16 /  110. /  210.
   836.21 /   0.10 /   0.47 /   0.0  /  836.31 /   2.37 /   0.18 /  0.015  *XS*
--------------------------------------------------------------------------
  6II AT   89730 /   400 /  1300. /   670. /  67183. / 1.05 /  330. /  430.
   836.46 /   0.06 /   0.19 /   0.0  /  836.52 /   1.94 /   0.13 /  0.019  *XS*
--------------------------------------------------------------------------
   6J AT   90260 /   530 /  1300. /   286. /  20415. / 1.50 /  525. /  625.
   836.90 /   0.48 /   0.65 /   0.21 /  837.38 /   4.54 /   0.50 /  0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 6J AT   90260 /       /  1300. /   195. /  24367. / 1.00 /    0. /   41.
   836.90 /   0.69 /       ...1...  (-.001)    /   6.66 /   0.50 /         *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /            *RG*
--------------------------------------------------------------------------
   6K AT   90330 /    70 /  1300. /   443. /  36023. / 1.81 /   40. /  184.
   837.30 /   0.24 /   0.16 /   0.0  /  837.54 /   2.93 /   0.29 /  0.000  *AS*
--------------------------------------------------------------------------
   M = 0.14 / E = 0.72 / K* = 0.23 /   470. /  38246. / 1.85 /   40. /  187.
   837.48 /   0.22 /                 /  837.70 /   2.77 /   0.27 /         *AS*
========================== END BRIDGE ANALYSIS ============================
6L    AT   90570 /   240 /  1300. /   340. /  27609. / 1.42 /  135. /  235.
   837.82 /   0.32 /   0.38 /   0.05 /  838.14 /   3.82 /   0.36 /  0.000  *XS*
--------------------------------------------------------------------------
```

END OF THIS PROFILE

00BREAK00

1) COUNTY: Genesee

2) STUDY NAME: city of Flint

3) WATERCOURSE: Thread creek

4) DOCUMENT TYPE: report

00BREAK00

Thread Lake Dam

The control at Thread Lake Dam consists of two vertical lift gate that operate manually. During the 1975 flood, only the right gate openned. According to Mr. Dick Collins, in charge of water treatment operation and the gates on the dam, it is unlikely that the left gate will be repaired. Also, due to age, deterioration and difficulty in finding replacement parts, there is some possibility that the right gate will also be inoperable. However, a spare piece may serve the right gate in case of emergency.[2]

Comp. Sheets

Imp. With the preceeding information, it was assumed that the right gate will function and the left gate will not for the purpose of the flood insurance study.

[2] Mr. Collins indicated that a crane could be used to lift the gates in case of emergency.
Telephone communication 3-9-78

Thread Lake Dam

3 control structures considered

1 right gate raised
2 left gate lowered
3 road overflow

$Q_{100} = 2200$ cfs, $h_{100} = 746.5$

try $h_1 = 751.0$

1 Right Raised gate - Broad Crested Weir

$c = f(h/L)$ use 2:1 slope of upstream face

$h = WS_{USS} - \text{Crest Elevation}$

$= 751.0 - 741.8 = 9.20'$

$c = f(9.2/10) = 3.28$

$b = 15.8$

$Q = 3.28 * 15.8 * 9.2^{3/2}$

$= 1450$ cfs

Submergence $= \frac{746.5 - 741.8}{751.0 - 741.8} = \frac{4.7}{9.2} = 0.51$

2. Left closed gate - Sharp crested weir (orifice flow ignored under gate)

$c = f(h/p, \text{orientation})$

$c = f\left(\frac{751.0 - 747.2}{5.40}, \text{vertical}\right)$

$c = 3.5$

$b = 22.7$

Thread Lake Dam (cont.)

$Q = 3.5 * 22.7 * 3.8^{3/2}$

$Q = 589$ cfs no submergence

3. Embankment Overflow

$Q = CbH^{3/2}$

$C = f(H/L) = \frac{751.0 - 747.6}{8'} = \frac{2.4}{8} = 0.30 = 3.08$

$b = 15$

$H \approx h = 2.4$

$Q = 3.08 * 15 * 2.4^{1.5}$

$Q = 172$ no submergence

$Q_T = Q_B + Q_S + Q_R$

$Q_T = 1450 + 589 + 172$

$= 2211$

$Q_T/Q_D = 2211/2200 = 1.00$ ✓ $h_{1(100)} = 751.0$

Thread Lake Dam (cont.)

$Q_{10} = 1250$; $h_4 = 744.47$

try $h_1 = 749.20$

$Q_B = c\,b\,H^{3/2}$

$c = f\left(\frac{h}{L}\right) = \frac{749.2 - 741.8}{10} = f(0.74,\ 2:1) = 3.2$

$b = 15.8$

$= 3.2 * 15.8 * 7.4^{3/2}$

$= 1020$

$Q_S = c\,b\,H^{3/2}$

$c = f\left(\frac{h}{p}\right) = \left(\frac{749.2 - 747.2}{5.4}\right) = \frac{2.0}{5.4} = f(0.37,\ \text{vertical}) = 3.4$

$b = 23.5$

$H = h = 2.0$

$= 3.4 * 23.5 * 2.0^{3/2}$

$= 226$ cfs

$Q_R = c\,b\,H^{3/2}$

$c = f\left(\frac{h}{L}\right) = \left(\frac{749.2 - 748.6}{8}\right) = \frac{0.6}{8} = f(0.075) = 2.72$

$b = 14$ feet

$= 2.72 * 14 * 0.6^{1.5}$

$= 18$ cfs

$Q_T = Q_B + Q_S + Q_R$

$= 1020 + 226 + 18$

$= 1264$

$Q_R = Q_T / Q_D = 1264 / 1250 = 1.01$ ✓

Thread Lake Dam (cont.)

$Q_{50} = 1900$, $h_4 = 745.87$

try $h_4 = 750.5$ feet

$Q_B = C b H^{3/2}$

$C = f(\frac{h}{L}, \text{slope}) = f(\frac{750.5 - 741.8}{10}, 2:1) = (\frac{8.7}{10}, 2:1) = 3.25$

$b = 15.8$

$= 3.25 * 15.8 * 8.7^{3/2}$

$= 1318$

$Q_S = C b H^{3/2}$

$C = f(\frac{h}{L}, \text{slope}) = (\frac{750.5 - 747.2}{5.4}, \text{vertical}) = (\frac{3.3}{5.4}, \text{vertical}) = 3.48$

$b = 23.5$

$H = 3.3$

$= 3.48 * 23.5 * 3.3^{1.5}$

$= 490$

$Q_R = C b H^{3/2}$

$C = f(\frac{h}{L}, \text{surface}) = f(\frac{750.5 - 748.6}{8}, \text{gravel}) = f(\frac{1.9}{8}, G) = 3.04$

$b = 14$

$H = 1.9$

$= 3.04 * 14 * 1.9^{3/2}$

$= 111$

$Q_T = Q_B + Q_S + Q_R$

$= 1318 + 490 + 111 = 1919$ ✓

$Q_V = \frac{1919}{1900} = 1.01$ ✓

Thread Lake Dam (cont.)

$Q_{50} = 1900$, $h_4 = 745.87$

try $h_4 = 750.5$ feet

$Q_B = C b H^{3/2}$

$C = f(\frac{h}{L}, \text{slope}) = f(\frac{750.5 - 741.8}{10}, 2:1) = (\frac{8.7}{10}, 2:1) = 3.25$

$b = 15.8$

$= 3.25 * 15.8 * 8.7^{3/2}$

$= 1318$

$Q_S = C b H^{3/2}$

$C = f(\frac{h}{\rho}, \text{slope}) = (\frac{750.5 - 747.2}{5.4}, \text{vertical}) = (\frac{3.3}{5.4}, \text{vertical}) = 3.48$

$b = 23.5$

$H = 3.3$

$= 3.48 * 23.5 * 3.3^{1.5}$

$= 490$

$Q_R = C b H^{3/2}$

$C = f(\frac{h}{L}, \text{surface}) = f(\frac{750.5 - 748.6}{8}, \text{gravel}) = f(\frac{1.9}{8}, G) = 3.04$

$b = 14$

$H = 1.9$

$= 3.04 * 14 * 1.9^{3/2}$

$= 111$

$Q_T = Q_B + Q_S + Q_R$

$= 1318 + 490 + 111 = 1919$ ✓

$Q_R = Q_T / Q_D = 1919 / 1900 = 1.01$ ✓

Thread Lake Dam (cont.)

$Q_{500} = 2700$, $h_4 = 747.59$

try $h_1 = 751.7$

$Q_B = CbH^{3/2}$

$C = f(\frac{h}{L}, \text{slope}) = f(\frac{751.7 - 741.8}{10}, 2:1) = f(\frac{9.9}{10}, 2:1) = 3.33$

$b = 15.8$

$H \approx h = 9.9$

$= 3.33 * 15.8 * 9.9^{1.5}$

$= 1640$

$Q_S = CbH^{3/2}$

$C = f(\frac{h}{D}, \text{slope}) = f(\frac{751.7 - 747.2}{5.4}, V) = f(\frac{4.5}{5.4}, V) = 3.57$

$b = 23.5$

$H \approx h = 4.5$

$= 3.57 * 23.5 * 4.5^{1.5}$

$= 801$

$Q_R = CbH^{3/2}$

$C = f(h/L, G) = f(\frac{751.7 - 748.6}{8}, G) = f(\frac{3.1}{8}, G) = 3.08$

$b = 16'$

$H \approx h = 3.1$

$= 3.08 * 16 * 3.1^{1.5}$

$= 269$

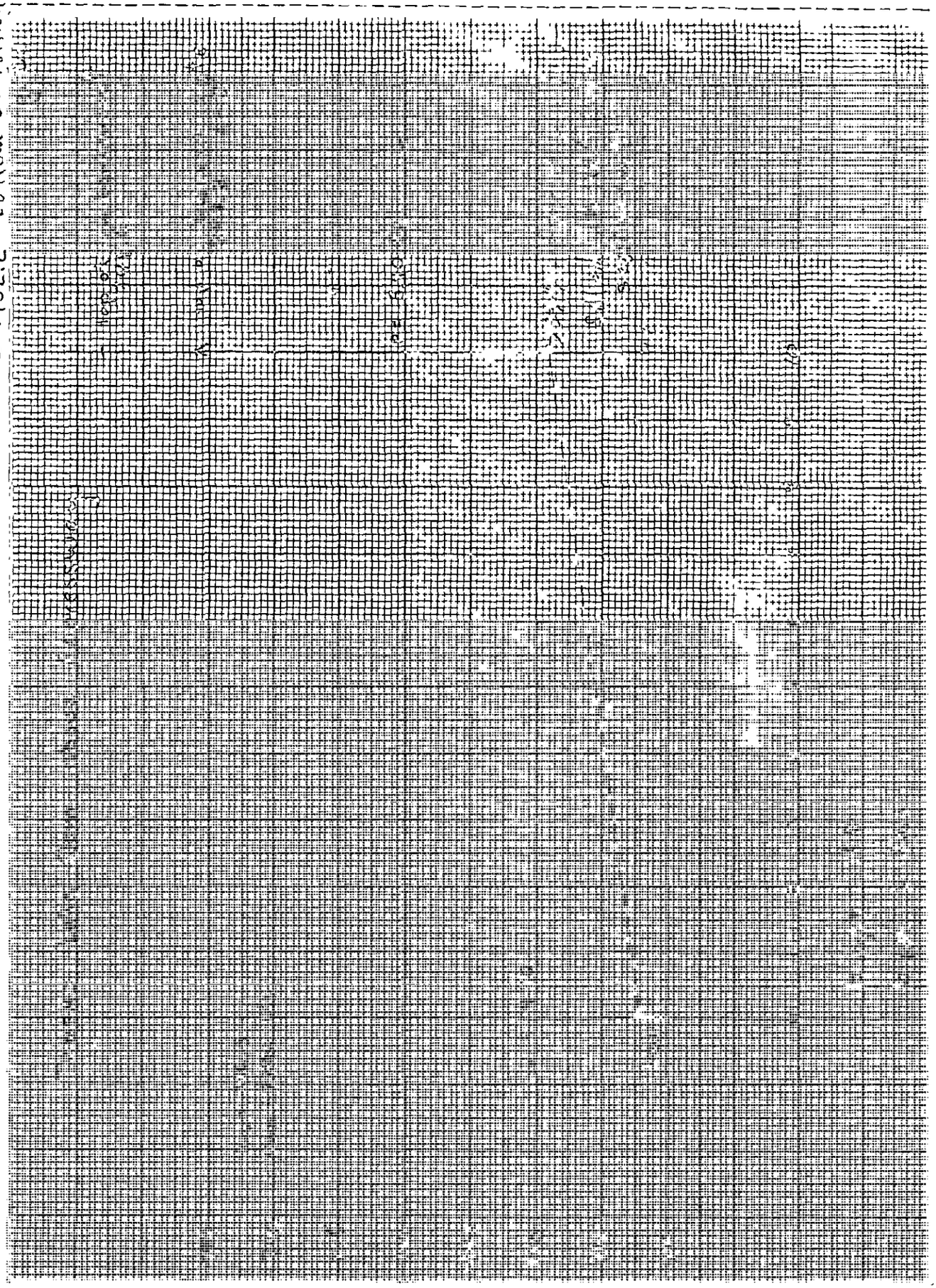
$Q_T = 1690 + 801 + 269 = 2710$ ✓

$Q_R = 1100$ ✓

(March 1940)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....

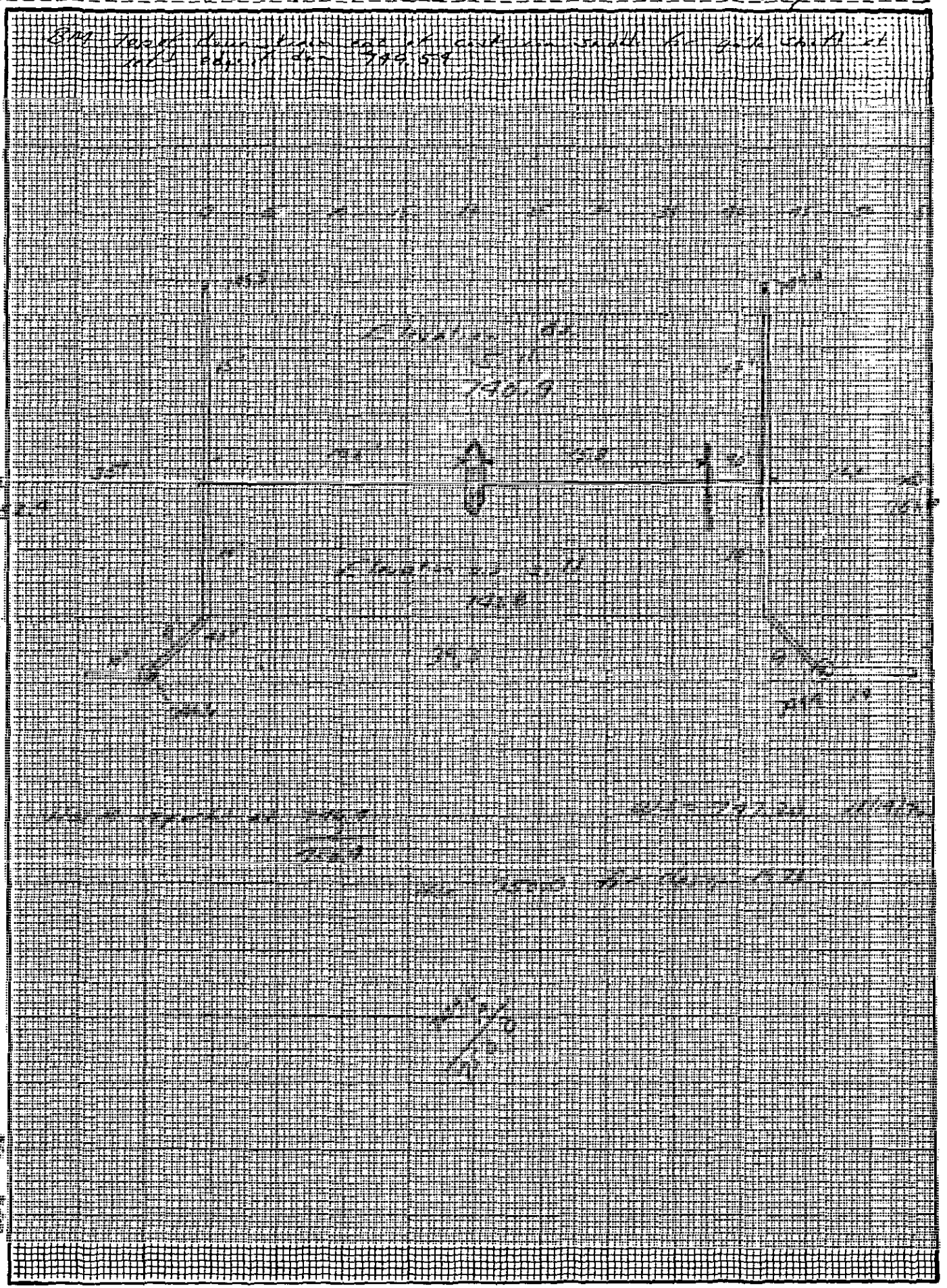

- ~752.2 bottom of vessel
Hoop
Hoop
Hoop

(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File Thread

Thread Lake Dam above X Ray



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9-213H

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File 3 D Dam

Thread Creek

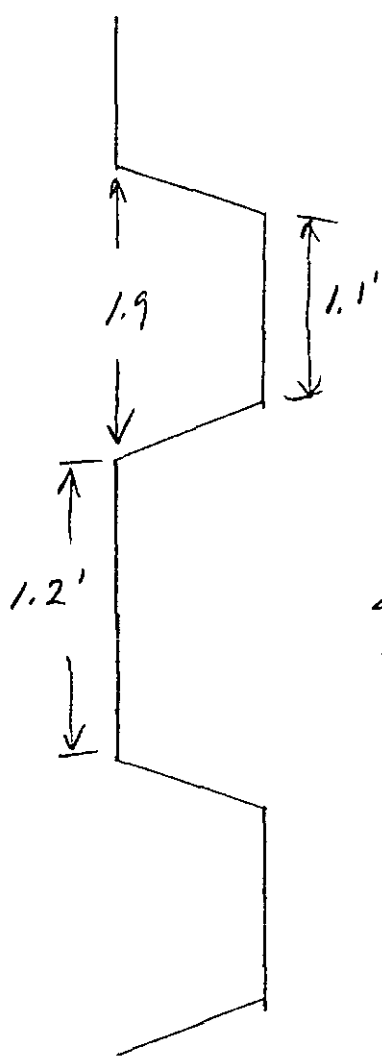
Top of steel sheet piling 726.05

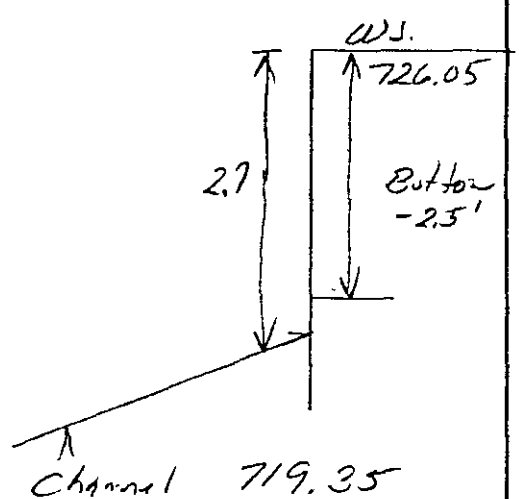
Bottom of channel between dam and 12th Street Bridge 719.35

Assumed approach w.s. elevation the same from below Grand Traverse Bridge & Dam.

739.9
13.3 ws
726.1 ws @ G.T.St

Dam width 58'





Use as fixed crest dam, run elevations to top of dam then recompute w.s. above dam.

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GPO 1971 OF - 413-014

1

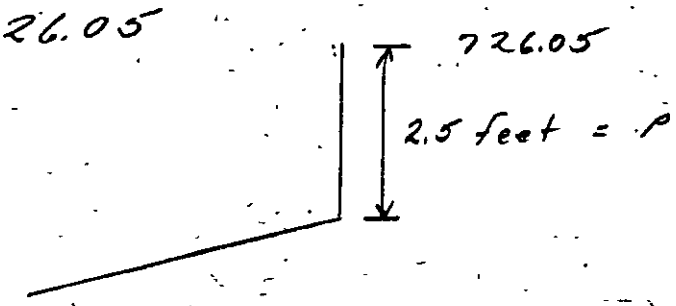
C

Sheet Pile Dam above 12th Street

Crest 726.05

$b = 58$ feet

use $b/B = 0.90$



$Q_{10} = 1300$

$h_4 = 725.91$

$h_1 = 727.05$ $\quad h/p = 1/2.5 = 0.4$ $\quad c' = 3.43$

$b/B = 0.9$ $\quad K_c = 0.98$ $\quad C = 3.36$

$Q = cbh^{3/2}$

$= 3.36 \times 62 \times 1^{3/2}$

$= 208$

$h_1 = 728.05$ $\quad h/p = 2/2.5 = 0.8$ $\quad c' = 3.58$

$K_c = 0.98$ $\quad C = 3.51$

$Q = 3.51 \times 66 \times 2^{3/2}$

$= 656$

$h_1 = 729.05$ $\quad h/p = 3/2.5 = 1.2$ $\quad c' = 3.72$

$K_c = 0.975$ $\quad C = 3.63$

$Q = 3.63 \times 78 \times 3^{3/2}$

$= 1320$

$h_1 = \underline{730.05}$ $\quad h/p = 4/2.5 = 1.6$ $\quad C' = 3.82$

$k_c = 0.97 \quad C = 3.70$

$Q = 3.70 \times 74 \times 4^{3/2}$

$= \underline{2190}$

$h_1 = \underline{731.05}$ $\quad h/p = 5/2.5 = 2.0$ $\quad C' = 3.93$

$k_c = 0.965 \quad C = 3.79$

$Q = 3.79 \times 88 \times 5^{3/2}$

$= \underline{3305}$

$h_1 = 732.05$ $\quad h/p = 6/2.5 = 2.4$ $\quad C' = 4.0$

$k_c = 0.945 \quad 3.86$

$Q = 3.86 \times 62 \times 6^{3/2}$

$= 3517$

9-213-E
(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

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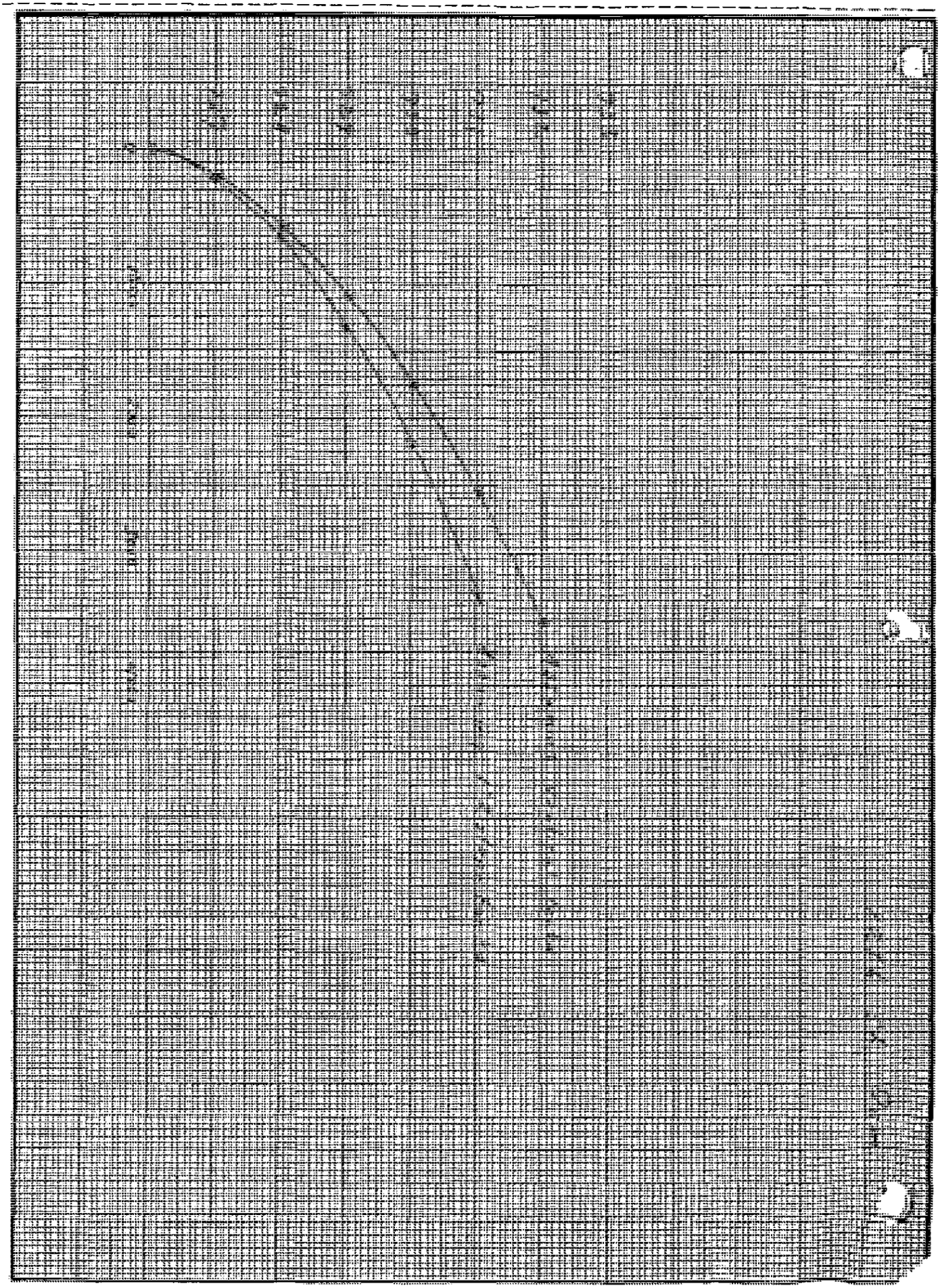

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9-213H

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

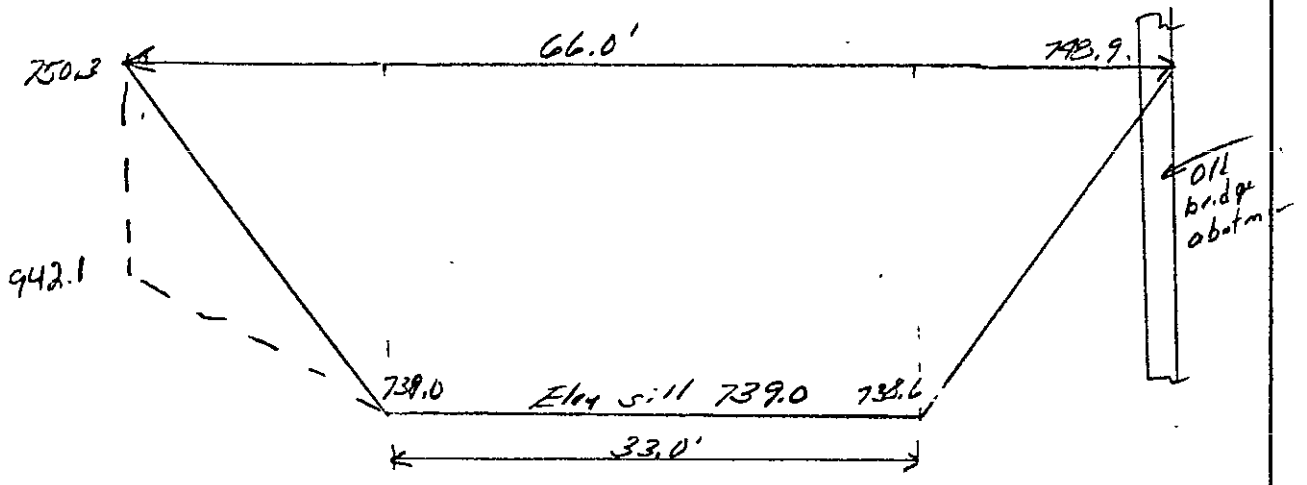
File 8 Dam

Thread Creek 0 Dam above S. Saginaw

Low head dam above S. Saginaw Street

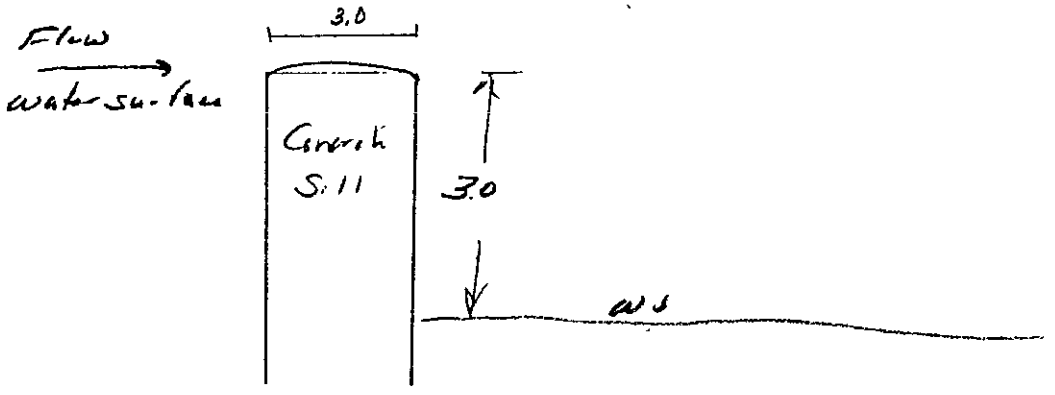
Dam located 420' ft above br. dge

Plan



River bottom below dam rt bk 739.9
" " " " lft bk 735.0

River bottom 40' u.s.
River bottom d.s. br. dge



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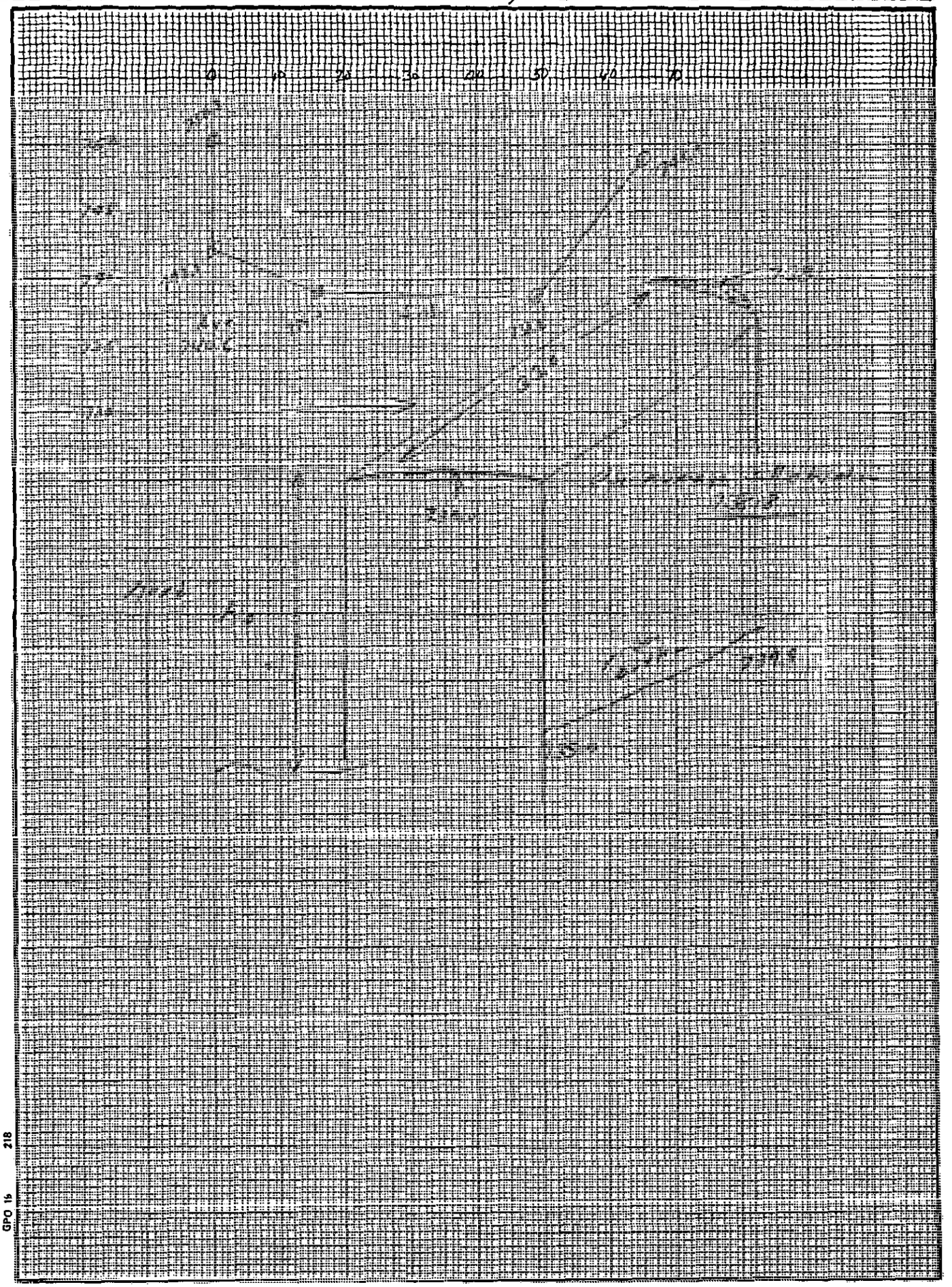
GPO 1971 OF - 413-014

(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File Threed
8 Dam

Low Head Dam at South Saginaw Street



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GPO 16 218

1

$Q_{10} = 1,250$

$h_4 = 741.95$ Top of dam = 738.8

$P = 3.0$

$L = 3.0$

$b = 33$

try $h_1 = 743.4$ $h = 4.6$ $h/L = 4.6/3.0 = 1.53$

$C = 3.30$

$Q = 3.30 \times 33 \times 4.6^{3/2} = \underline{1,074}$ over dam

right side $h = 2.4$ $h/L = 2.4/3 = 0.80$

$C = 2.85$

$Q = 2.85 \times 7 \times 2.4^{3/2} = \underline{74}$ right side

left side $h = 2.8$ $h/L = 2.8/3 = 0.93$

$C = 2.93$

$Q = 2.93 \times 16 \times 2.8^{3/2} = 220$

$Q_T = 1368$

try $h_1 = 743.20$ $4.4/3 = 1.47$ $C = 3.27$

$Q = 3.27 \times 33 \times 4.40^{3/2} = \underline{996}$ over dam

right side $h = 2.3$ $2.3/3 = 0.77$ $C = 2.82$

$Q = 2.82 \times 7 \times 2.3^{3/2} = \underline{69}$

left side $h = 2.6$ $2.6/3 = 0.87$ $C = 2.89$

$Q = 2.89 \times 16 \times 2.6^{3/2} = 194$

$Q_T = 1259 \approx 1250$ use $\underline{h_1 = 743.2}$ Q_{10}

$Q_{50} = 1,900$

$h_4 = 743.70$

try $h_1 = 744.30$ $\quad h = 5.5 \quad h/L = 5.5/3 = 1.83 \quad C = 3.45$

$h_t = 4.9 \quad h_t/h = 4.9/5.5 = 0.89 \quad k_t = 0.90 \quad C = 3.10$

$Q = 3.1 \times 33 \times 5.5^{3/2} = 1,320$

right side $\quad h = 2.85 \quad h/L = 0.95 \quad C = 2.95$

$h_t = 2.25 \quad h_t/h = 0.79$

$Q = 2.95 \times 9 \times 2.85^{3/2} = 128$

left side $\quad h = 3.7 \quad h/L = 1.23 \quad C = 3.03$

$h_t = 3.1 \quad h_t/h = 0.84 \quad k_t = 0.96 \quad C = 2.91$

$Q = 2.91 \times 16 \times 3.7^{3/2} = 331$

$Q_T = 1779$

try $h_1 = 744.4$ $\quad h = 5.6 \quad h/L = 1.87 \quad C = 3.46$

$h_t/h = 4.9/5.6 = 0.88 \quad k_t = 0.92 \quad C = 3.18$

$Q = 3.18 \times 33 \times 5.6^{3/2} = Q = 1,390$

left side $\quad h = 2.9 \quad h/L = 0.97 \quad C = 2.97$

$h_t = 2.2 \quad h_t/h = 0.76$

$Q = 2.97 \times 9 \times 2.9^{3/2} = 132$

right side $\quad h = 3.8 \quad h/L = 1.27 \quad C = 3.16$

$h_t = 3.1 \quad h_t/h = 0.815 \quad k_t = 0.97 \quad C = 3.06$

$Q = 3.06 \times 16 \times 3.8^{3/2} = 363$

$Q = 1,885 \approx 1,900$ $\quad$ <u>use $h_1 = 744.4$ $\quad Q_{50}$</u>

$Q_{low} = 2,200$

$h_y = 744.50$

try $h_1 = 745.0$ $\quad h = 6.2 \quad h/L = 2.06 \quad C = 3.50$

$h_t = 5.7 \quad h_t/h = 0.92 \quad k_t = 0.82 \quad C = 2.87$

$Q = 2.87 \times 33 \times 6.2^{3/2} = \underline{1,462}$

right side $\quad h = 3.2 \quad h/L = 1.07 \quad C = 3.02$

$h_t = 2.7 \quad h_t/h = 0.84 \quad k_t = 0.96 \quad C = 2.90$

$Q = 2.9 \times 10 \times 3.2^{3/2} = \underline{166}$

left side $\quad h = 4.4 \quad h/L = 1.47 \quad C = 3.28$

$h_t = 3.9 \quad h_t/h = 0.89 \quad k_t = 0.9 \quad C = 2.95$

$Q = 2.95 \times 16 \times 4.4^{3/2} = \underline{436}$

$Q_T = 2064$

try $h_1 = 745.1$ $\quad h = 6.3 \quad C = 3.50$

$h_t = 5.7 \quad h_t/h = 0.90 \quad k_t = 0.88 \quad C = 3.08$

$Q = 3.08 \times 33 \times 6.3^{3/2} = \underline{1,607}$

right side $\quad h = 3.3 \quad h/L = 1.1 \quad C = 3.05$

$h_t = 2.7 \quad h_t/h = 0.82 \quad k_t = 0.97 \quad C = 2.96$

$Q = 2.96 \times 10 \times 3.3^{3/2} = \underline{177}$

left side $\quad h = 4.5 \quad h/L = 1.5 \quad C = 3.30$

$h_t = 3.9 \quad h_t/h = 0.87 \quad k_t = 0.93 \quad C = 3.07$

$Q = 3.07 \times 16 \times 4.5^{3/2} = \underline{469}$

$Q_T = 2253 \approx 2200$ $\quad$ <u>use $h_1 = 745.10$ $\quad Q_{low}$</u>

$Q_{500} = 2,700$

$h_4 = 745.80$

try $h_1 = 746.30$ $\quad h = 7.5 \quad h/L = \quad C = 3.50$

$h_t = 7 \quad h_t/h = 0.93 \quad k_t = 0.78 \quad C = 2.73$

$Q = 2.73 \times 33 \times 7.5^{3/2} = \underline{1,850}$

right side $\quad h = 3.85 \quad h/L = 1.28 \quad C = 3.17$

$h_t = 3.35 \quad h_t/h = 0.87 \quad k_t = 0.93 \quad C = 2.95$

$Q = 2.95 \times 12 \times 3.85^{3/2} = \underline{267}$

left side $\quad h = 5.7 \quad h/L = 1.9 \quad C = 3.47$

$h_t = 5.2 \quad h_t/h = 0.91 \quad k_t = 0.85 \quad C = 2.95$

$Q = 2.95 \times 16 \times 5.7^{3/2} = \underline{642}$

$Q_T = 2759 \approx 2700$

use $\underline{h_1 = 746.30 \quad Q_{500}}$

00BREAK00

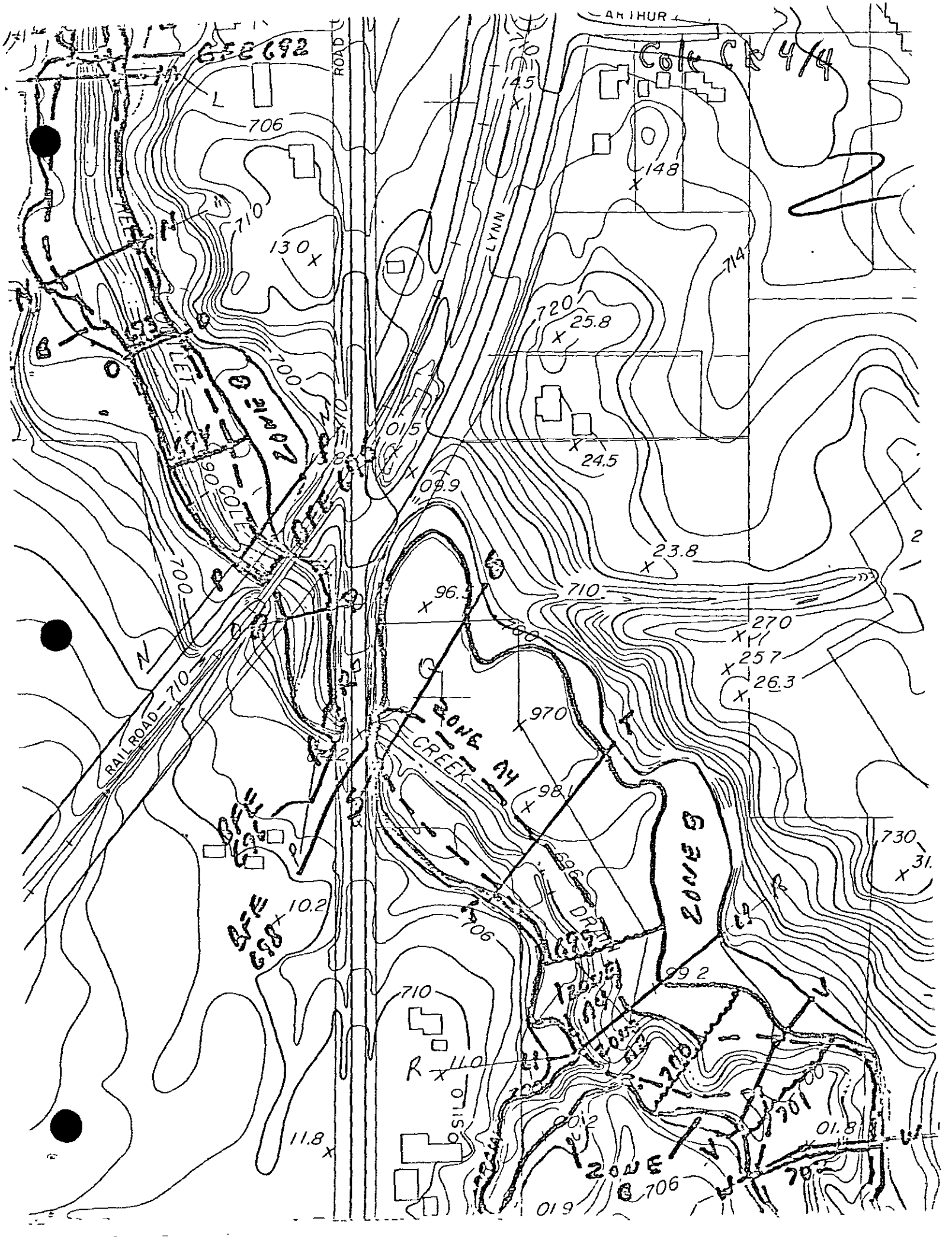
1) COUNTY: Genesee

2) STUDY NAME: City of Flushing

3) WATERCOURSE: Cole creek

4) DOCUMENT TYPE: report

00BREAK00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ROAD
LYNN
COLE
RAIL ROAD
CREEK
ZONE A
ZONE B
ZONE C
ZONE D
SILO
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710
700
714
720
730
25.8
24.5
23.8
26.3
25.7
27.0
14.5
14.8
13.0
11.8
10.2
9.9
9.6
9.8
9.2
9.0
9.1
9.7
9.9
10.1
10.2
11.0
11.8
01.8
01.9
70.1

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 2.DATE= 4/26/78

*** INPUT CARD PRINTOUT ***

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3  3300 W     0  19  3  701    8980  1  3
5  3310       0  1  7200   55  1  7180  160  1  7160  225  1  7140  235  1  7120   AB
5  3311     248  1  7100  257  1  7080  267  1  7060  375  1  7040  450  2  7020
5  3312     460  2  6997  473  3  7020  485  3  7040  495  3  7100  510  3  7120
5  3313     535  3  7140  560  3  7160  610  3  7180  680  3  7200
6  3320  1  2 120 120  1  2 055 055  1  2 120 120
3  3400 X     0  27  3  702    9465  1  3
5  3410    -375  1  7220 -325  1  7200 -255  1  7180 -182  1  7160 -125  1  7140
5  3411    -100  1  7120  -90  1  7100  -55  1  7080  -10  1  7060    0  2  7051   AC
5  3412       4  2  7049    6  2  7030    8  2  7017   13  2  7008   18  2  7018
5  3413      20  2  7024   20  3  7042   24  3  7058   30  3  7068   42  3  7066
5  3414     150  3  7080  200  3  7100  210  3  7120  220  3  7140  230  3  7160
5  3415     242  3  7180  310  3  7200
6  3420  1  2 120 120  1  2 055 055  1  2 090 090
3  3450 X+1   0  10  3  704    9715  1  3
5  3460       5  1  7100   50  2  7040   60  2  7020   70  3  7040   80  3  7060   AD
5  3461     100  3  7080  255  3  7080  260  3  7080  370  3  7080  400  3  7100
6  3480  1  2 120 120  1  2 060 060  1  2 100 100
3  3500 Y     0  18  3  705   10270  1  3
5  3510       0  1  7220   60  1  7200  110  1  7180  130  1  7160  140  1  7140   AE
5  3511     148  1  7120  153  1  7100  160  1  7080  170  2  7060  185  2  7040
5  3512     190  2  7060  205  3  7080  270  3  7100  400  3  7100  500  3  7120
5  3513     710  3  7160  780  3  7180  815  3  7200
6  3520  1  2 100 100  1  2 065 065  1  2 090 090
3  3550 Y+1   0   9  3  708   10700  1  3
5  3551       0  1  7140   45  1  7120   55  1  7100   75  2  7080  100  2  7050   AF
5  0552     110  3  7080  160  3  7100  230  3  7120  240  3  7140
**SEQUENCE**
6  3560  1  2 100 100  1  2 065 065  1  2 090 090
3  3600 Z     0  11  3  706   10850  1  3
5  3610       0  1  7180   20  1  7160   42  1  7140   52  1  7120   80  1  7100   AG
5  3611     200  2  7080  225  2  7055  245  3  7080  385  3  7100  450  3  7120
5  3612     450  3  7180
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 4/27/78

*** INPUT CARD PRINTOUT ***

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 COLE CREEK  MCKINLEY RD TO POTTER RD     KNUTILLA  8  5  2  5 12
2      5  71178  71292  71307  71328  71309
3   3700 AA     1  13  3  705   10970  1  3
4   3705     480     700     790    1050     790
5   3710       0  1  7160   50  1  7140   58  1  7120  200  1  7100  250  1  7080   AG
5   3711     260  2  7045  265  2  7040  270  2  7045  285  3  7080  300  3  7100
5   3712     420  3  7120  518  3  7140  600  3  7160
6   3720  1  2 100 100  1  2 070 070  1  2 100 100
3   3800 AB     0  17  3  707   11650  1  3
5   3810       0  1  7180   15  1  7160   20  1  7140   30  1  7120   90  1  7100   AH
5   3811     100  1  7085  105  2  7070  110  2  7060  115  2  7070  120  3  7085
5   3812     135  3  7100  350  3  7120  390  3  7140  405  3  7160  415  3  7180
5   3813     430  3  7200  440  3  7220
6   3820  1  2 100 120  1  2 070 070  1  2 100 100
3   3850 AB+1  0  12  3  708   11910  1  3
5   3860       0  1  7160   10  1  7140   15  1  7120  300  1  7120  315  2  7110
5   3861     325  2  7090  330  2  7070  340  2  7090  345  3  7110  360  3  7120
5   3862     390  3  7140  410  3  7160
6   3870  1  2 100 100  1  2 060 060  1  2 100 100
3   3900 AC     0  15  3  708   12380  1  3
5   3910       0  1  7178   80  1  7160  100  1  7140  110  1  7120  130  1  7110
5   3911     138  2  7085  145  2  7075  155  2  7085  170  3  7110  300  3  7120   AE
5   3912     320  3  7140  340  3  7160  360  3  7180  375  3  7200  400  3  7220
6   3920  1  2 100 100  1  2 070 070  1  2 100 100
3   4000 AD     0  15  3  708   12720  1  3
5   4010       0  1  7178   20  1  7160   30  1  7140  190  1  7120  210  1  7110
5   4011     290  1  7110  292  2  7085  300  2  7083  320  3  7085  328  3  7110   AJ
5   4012     350  3  7120  435  3  7140  440  3  7160  445  3  7180  460  3  7200
6   4020  1  2 150 100  1  2 065 065  1  2 120 070
3   4100 AD BR 2   8  1  708   12720        0  7133 3 0
5   4110       0  1  7133    0  1  7075    5  1  7063   10  1  7069   15  1  7078
5   4111      16  1  7078   17  1  7133    0 -9  7133
6   4120  1  2 030 030
3   4200 AD RD 4   8  2   42          1  2          1 1                  1
5   4210       0  1  7200  110  1  7180  240  1  7160  375  1  7141  470  2  7158
5   4211     490  2  7160  550  2  7180  600  2  7200
3   4300 AE     5  13  3  709   12825  1  3
5   4310    -205  1  7160 -190  1  7140 -180  1  7120    0  1  7126   16  2  7114
5   4311      27  2  7085   32  2  7076   40  2  7085   46  3  7118   60  3  7127   AK
5   4312     120  3  7140  140  3  7160  155  3  7200
```

WATER-SURFACE PROFILE FOR: COLE CREEK SEYMOUR RD TO MCKINLEY RD KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 1, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
Q	AT	5120 / 695.90	0 / 0.36	650. /	161. / 696.26	11253. / 4.03	1.41 / 0.44	13. /	97.	*IS*	S
Q+1	AT	5410 / 696.79	290 / 0.15	650. / 0.69	258. / 0.0 / 696.94	15895. / 2.52	1.55 / 0.28	70. /	161. / 0.001	*XS*	T
R	AT	5780 / 697.65	370 / 0.17	650. / 0.87	194. / 0.01 / 697.83	11272. / 3.35	1.00 / 0.35	197. /	267. / 0.002	*XS*	U
R+1	AT	6180 / 699.58	400 / 0.46	550. / 2.06	129. / 0.14 / 700.03	6201. / 4.27	1.61 / 0.49	185. /	260. / 0.003	*XS*	V
S	AT	6450 / 701.08	270 / 0.11	550. / 1.16	250. / 0.0 / 701.18	11337. / 2.20	1.41 / 0.24	294. /	448. / -0.011	*XS*	W
S+1	AT	6950 / 702.22	500 / 0.12	550. / 1.15	252. / 0.01 / 702.34	11597. / 2.18	1.66 / 0.24	295. /	417. / 0.001	*XS*	X
T	AT	7670 / 703.39	720 / 0.04	550. / 1.08	548. / 0.0 / 703.42	17398. / 1.00	2.35 / 0.16	137. /	410. / 0.002	*XS*	Y
U	AT	8210 / 704.11	540 / 0.08	550. / 0.75	422. / 0.02 / 704.19	12492. / 1.30	3.16 / 0.22	160. /	491. / -0.005	*XS*	Z
V	AT	8550 / 704.64	340 / 0.03	550. / 0.47	704. / 0.0 / 704.66	17620. / 0.78	2.19 / 0.07	98. /	483. / 0.001	*XS*	AA
W	AT	8980 / 705.25	430 / 0.13	550. / 0.66	340. / 0.05 / 705.38	11190. / 1.62	3.17 / 0.30	308. /	487. / 0.001	*XS*	AB
X	AT	9465 / 707.05	485 / 0.44	550. / 1.96	143. / 0.16 / 707.49	6703. / 3.84	1.93 / 0.46	-34. /	77. / 0.001	*XS*	AC
X+1	AT	9715 / 708.35	250 / 0.16	550. / 1.03	335. / 0.0 / 708.52	10999. / 1.64	3.87 / 0.29	17. /	375. / 0.000	*XS*	AD
Y	AT	10270 / 709.92	555 / 0.13	550. / 1.52	238. / 0.0 / 710.05	10031. / 2.31	1.57 / 0.28	153. /	267. / 0.014	*XS*	AE
Y+1	AT	10700 / 710.98	430 / 0.08	550. / 1.01	314. / 0.0 / 711.06	12879. / 1.75	1.75 / 0.22	50. /	194. / 0.001	*XS*	~~AF~~
Z	AT	10850 /	150 /	550. /	799. /	26007. / 1.95	/	63. /	423.		AF

10-

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 11,DATE= 4/27/78

WATER-SURFACE PROFILE FOR: COLE CREEK MCKINLEY RD TO POTTER RD KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 1, UPSTREAM COMPUTATIONS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
AA    AT   10970 /     0 /    480. /   602. /   19944. / 2.84 /   74. /  407.
   711.78 /   0.03 /                 / 711.81 /    0.80 /   0.12/          *IS*
----------------------------------------------------------------------------------
AB    AT   11650 /   680 /    480. /   551. /   14071. / 2.72 /   28. /  357.
   712.34 /   0.03 /   0.56 /   0.00 / 712.37 /    0.87 /   0.09 / 0.003  *XS*
----------------------------------------------------------------------------------
AB+1  AT   11910 /   260 /    480. /   368. /    9797. / 3.31 /   13. /  371.
   712.75 /   0.09 /   0.43 /   0.03 / 712.84 /    1.30 /   0.26 / 0.002  *XS*
----------------------------------------------------------------------------------
AC    AT   12380 /   470 /    480. /   491. /   16604. / 1.83 /  103. /  315.
   713.48 /   0.03 /   0.67 /   0.0  / 713.50 /    0.98 /   0.14 / 0.001  *XS*
----------------------------------------------------------------------------------
AD    AT   12720 /   340 /    480. /   683. /   19810. / 3.23 /   52. /  423.
   713.73 /   0.02 /   0.24 /   0.0  / 713.75 /    0.70 /   0.13 / 0.009  *XS*
============================ BEGIN BRIDGE ANALYSIS ===============================
AD BR AT   12720 /       /    480. /   103. /    9004. / 1.00 /    0. /   17.
   713.30 /   0.33 /       ...3...  (-.001)   /    4.64 /   0.33 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        1. / RIGHT        0. /               *RG*
----------------------------------------------------------------------------------
AE    AT   12825 /   105 /    480. /   487. /   28278. / 1.39 / -189. /  109.
   713.77 /   0.02 /   0.04 /   0.0  / 713.79 /    0.98 /   0.12 / -0.000 *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   630. /   40317. / 1.27 / -192. /  122.
   714.24 /   0.01 /                 / 714.25 /    0.76 /   0.09 /          *AS*
============================ END BRIDGE ANALYSIS =================================
```

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: COLE CREEK SEYMOUR RD TO MCKINLEY RD KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
Q	AT	5120	0	950.	414.	27749.	1.94	5.	202.	
697.70		0.16			697.86	2.29	0.28		*IS*	S
Q+1	AT	5410	290	950.	402.	24741.	1.99	40.	177.	
698.07		0.17	0.38	0.01	698.25	2.36	0.27	0.000	*XS*	T
R	AT	5780	370	950.	311.	19722.	1.20	191.	358.	
698.76		0.17	0.68	0.00	698.94	3.06	0.31	0.003	*XS*	U
R+1	AT	6180	400	800.	219.	8976.	2.48	103.	287.	
700.32		0.52	1.73	0.17	700.84	3.66	0.50	0.001	*XS*	V
S	AT	6450	270	800.	399.	17135.	1.81	228.	458.	
701.85		0.11	1.12	0.0	701.96	2.00	0.24	0.001	*XS*	W
S+1	AT	6950	500	800.	368.	16179.	2.06	244.	425.	
702.99		0.15	1.15	0.02	703.14	2.17	0.26	0.001	*XS*	X
T	AT	7670	720	800.	794.	26413.	2.23	77.	411.	
704.18		0.04	1.08	0.0	704.22	1.01	0.09	0.002	*XS*	Y
U	AT	8210	540	800.	661.	19875.	2.95	157.	495.	
704.83		0.07	0.66	0.02	704.89	1.21	0.20	0.002	*XS*	Z
V	AT	8550	340	800.	952.	26852.	2.33	97.	485.	
705.28		0.03	0.41	0.0	705.30	0.84	0.07	0.001	*XS*	AA
W	AT	8980	430	800.	463.	15509.	3.34	274.	488.	
705.87		0.15	0.66	0.06	706.03	1.73	0.32	0.000	*XS*	AB
X	AT	9465	485	800.	248.	9809.	2.85	-50.	132.	
707.76		0.46	2.04	0.15	708.23	3.23	0.47	0.002	*XS*	AC
X+1	AT	9715	250	800.	576.	17793.	3.93	12.	385.	
709.01		0.12	0.92	0.0	709.13	1.39	0.26	-0.012	*XS*	AD
Y	AT	10270	555	800.	368.	13525.	2.25	152.	423.	
710.47		0.17	1.48	0.02	710.63	2.17	0.30	0.002	*XS*	AE
Y+1	AT	10700	430	800.	423.	17964.	1.83	47.	218.	
711.67		0.10	1.13	0.0	711.77	1.89	0.23	0.001	*XS*	~~AF~~
Z	AT	10850	150	800.	1066.	38060.	1.83	54.	446.	
711.89		0.02	0.14	0.0	711.91	0.75	[illegible]	[illegible]	[illegible]	~~AG~~ AF

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE= 4/27/78

WATER-SURFACE PROFILE FOR: COLE CREEK MCKINLEY RD TO POTTER RD KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS

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==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
AA     AT   10970 /     0 /    700. /  1034. /   36772. / 2.41 /   54. /  465.
   712.92 /   0.02 /                  /  712.94 /    0.68 /   0.06/          *IS*
----------------------------------------------------------------------------------
AB     AT   11650 /   680 /    700. /   868. /   25903. / 2.03 /   24. /  375.
   713.27 /   0.02 /   0.35 /   0.00 /  713.29 /    0.81 /   0.08 /  0.001  *XS*
----------------------------------------------------------------------------------
AB+1   AT   11910 /   260 /    700. /   649. /   19036. / 2.64 /   11. /  383.
   713.52 /   0.05 /   0.26 /   0.01 /  713.57 /    1.08 /   0.10 /  0.005  *XS*
----------------------------------------------------------------------------------
AC     AT   12380 /   470 /    700. /   620. /   22702. / 1.71 /   99. /  321.
   714.07 /   0.03 /   0.53 /   0.0  /  714.10 /    1.13 /   0.15 /  0.001  *XS*
----------------------------------------------------------------------------------
AD     AT   12720 /   340 /    700. /   918. /   31326. / 2.25 /   28. /  436.
   714.32 /   0.02 /   0.23 /   0.0  /  714.34 /    0.76 /   0.07 /  0.002  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
AD BR AT   12720 /       /    574. /   103. /    9004. / 1.00 /    0. /   17.
   713.30 /   0.48 /       ...3...  (-.001)   /    5.55 /   0.40 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     127. / RIGHT        0. /                *RG*
----------------------------------------------------------------------------------
AE     AT   12825 /   105 /    700. /   668. /   43794. / 1.24 / -193. /  124.
   714.35 /   0.02 /   0.04 /   0.00 /  714.38 /    1.05 /   0.12 /  0.000  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   893. /   67068. / 1.15 / -198. /  131.
   715.05 /   0.01 /                  /  715.06 /    0.78 /   0.08 /          *AS*
============================ END BRIDGE ANALYSIS ================================

                          END OF THIS PROFILE
```

ATER SURFACE PROFILE FOR: COLE CREEK SEYMOUR RD TO MCKINLEY RD KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
Q	AT	5120	0	1050.	568.	38536.	1.97	2.	244.	S
698.40		0.10			698.50	1.85	0.22		*IS*	
Q+1	AT	5410	290	1050.	499.	28605.	2.55	37.	235.	T
698.65		0.18	0.29	0.04	698.83	2.11	0.26	-0.005	*XS*	
R	AT	5780	370	1050.	405.	25064.	1.44	189.	413.	U
699.24		0.15	0.57	0.0	699.40	2.59	0.28	0.000	*XS*	
R+1	AT	6180	400	900.	261.	10360.	2.64	98.	302.	V
700.54		0.49	1.46	0.17	701.03	3.45	0.49	0.001	*XS*	
S	AT	6450	270	900.	442.	18831.	1.88	215.	461.	W
702.03		0.12	1.12	0.0	702.15	2.04	0.25	0.000	*XS*	
S+1	AT	6950	500	900.	412.	17860.	2.16	229.	427.	X
703.21		0.16	1.20	0.02	703.38	2.19	0.26	0.001	*XS*	
T	AT	7670	720	900.	876.	30127.	2.11	73.	412.	Y
704.43		0.03	1.08	0.0	704.46	1.03	0.09	0.001	*XS*	
U	AT	8210	540	900.	738.	22658.	2.82	156.	496.	Z
705.05		0.07	0.64	0.02	705.12	1.22	0.20	0.002	*XS*	
V	AT	8550	340	900.	1036.	30371.	2.22	96.	486.	AA
705.49		0.03	0.40	0.0	705.52	0.87	0.08	0.001	*XS*	
W	AT	8980	430	900.	511.	17325.	3.32	267.	488.	AB
706.09		0.16	0.66	0.07	706.25	1.76	0.32	0.001	*XS*	
X	AT	9465	485	900.	290.	11089.	3.08	-55.	149.	AC
707.98		0.46	2.04	0.15	708.45	3.10	0.47	-0.000	*XS*	
X+1	AT	9715	250	900.	659.	20641.	3.72	11.	389.	AD
709.23		0.11	0.88	0.0	709.34	1.36	0.26	0.012	*XS*	
Y	AT	10270	555	900.	417.	15181.	2.30	151.	432.	AE
710.64		0.17	1.43	0.03	710.81	2.16	0.31	0.004	*XS*	
Y+1	AT	10700	430	900.	458.	19679.	1.84	46.	225.	~~AF~~
711.87		0.11	1.17	0.0	711.98	1.96	0.24	0.001	*XS*	
Z	AT	10850	150	900.	1156.	42590.	1.78	51.	450.	AG AF

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USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   14,DATE= 4/27/78

WATER-SURFACE PROFILE FOR:  COLE CREEK  MCKINLEY RD TO POTTER RD     KNUTILLA
PAGE  1 OF  1, PROFILE NUMBER  3,   UPSTREAM COMPUTATIONS
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
 WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
=================================================================================
AA    AT   10970 /     0 /    790. /  1096. /   39532. / 2.35 /   54. /  472.
  713.07 /   0.02 /                  /  713.09 /    0.72 /   0.06/          *IS*
---------------------------------------------------------------------------------
AB    AT   11650 /   680 /    790. /   930. /   28559. / 1.94 /   23. /  379.
  713.45 /   0.02 /   0.38 /   0.00 /  713.47 /    0.85 /   0.08 /  0.001  *XS*
---------------------------------------------------------------------------------
AB+1  AT   11910 /   260 /    790. /   715. /   21611. / 2.50 /   11. /  385.
  713.70 /   0.05 /   0.26 /   0.01 /  713.74 /    1.10 /   0.10 / -0.000  *XS*
---------------------------------------------------------------------------------
AC    AT   12380 /   470 /    790. /   661. /   24790. / 1.68 /   97. /  323.
  714.25 /   0.04 /   0.55 /   0.0  /  714.29 /    1.19 /   0.16 /  0.001  *XS*
---------------------------------------------------------------------------------
AD    AT   12720 /   340 /    790. /   994. /   35899. / 2.03 /   27. /  436.
  714.50 /   0.02 /   0.24 /   0.0  /  714.52 /    0.79 /   0.07 / -0.006  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
AD BR AT   12720 /       /    585. /   103. /    9004. / 1.00 /    0. /   17.
  713.30 /   0.50 /       ...3...  (-.001)    /    5.65 /   0.40 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     212. / RIGHT        0. /                *RG*
---------------------------------------------------------------------------------
AE    AT   12825 /   105 /    790. /   727. /   49515. / 1.21 / -194. /  125.
  714.54 /   0.02 /   0.04 /   0.00 /  714.56 /    1.09 /   0.12 /  0.000  *AS*
---------------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /   964. /   75181. / 1.13 / -200. /  133.
  715.27 /   0.01 /                  /  715.28 /    0.82 /   0.08 /          *AS*
============================ END BRIDGE ANALYSIS ================================

                                END OF THIS PROFILE
```

WA [illegible] PROFILE FOR: COLE CREEK SE MOOR RD TO HORINEK RD [illegible]NOTILLA
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
Q	AT	5120	0	1400.	1072.	78778.	1.83	-5.	341.	
700.10		0.05			700.15	1.31	0.11		*IS*	S
Q+1	AT	5410	290	1400.	935.	50457.	3.12	29.	372.	
700.21		0.11	0.14	0.03	700.32	1.50	0.21	-0.000	*XS*	T
R	AT	5780	370	1400.	785.	46323.	1.96	162.	504.	
700.54		0.10	0.31	0.0	700.63	1.78	0.21	-0.000	*XS*	U
R+1	AT	6180	400	1200.	438.	16716.	2.72	81.	352.	
701.29		0.32	0.87	0.11	701.60	2.74	0.42	-0.012	*XS*	V
S	AT	6450	270	1200.	549.	23564.	1.93	207.	471.	
702.45		0.14	0.99	0.0	702.59	2.19	0.27	0.001	*XS*	W
S+1	AT	6950	500	1200.	552.	22085.	2.76	114.	433.	
703.80		0.20	1.38	0.03	704.00	2.17	0.29	-0.002	*XS*	X
T	AT	7670	720	1200.	1109.	41620.	1.87	61.	413.	
705.10		0.03	1.13	0.0	705.13	1.08	0.09	0.001	*XS*	Y
U	AT	8210	540	1200.	953.	31394.	2.48	154.	500.	
705.68		0.06	0.60	0.01	705.74	1.26	0.10	0.001	*XS*	Z
V	AT	8550	340	1200.	1272.	[illegible]	2.00	95.	488.	
706.10		0.03	0.38	0.0	706.12	[illegible]	0.08	0.001	*XS*	AA
W	AT	8980	430	1200.	642.	23205.	3.07	264.	489.	
706.68		0.17	0.65	0.07	706.84	1.87	0.33	0.001	*XS*	AB
X	AT	9465	485	1200.	408.	15200.	3.19	-64.	163.	
708.53		0.43	1.98	0.13	708.96	2.94	0.46	0.004	*XS*	AC
X+1	AT	9715	250	1200.	842.	27650.	3.26	7.	396.	
709.71		0.10	0.86	0.0	709.82	1.42	0.13	0.001	*XS*	AD
Y	AT	10270	555	1200.	554.	20269.	2.30	150.	456.	
711.11		0.17	1.43	0.03	711.28	2.17	0.31	0.004	*XS*	AE
Y+1	AT	10700	430	1200.	555.	24677.	1.85	36.	232.	
712.38		0.13	1.24	0.0	712.52	2.16	0.26	0.000	*XS*	[illegible]
Z	AT	10850	150	1200.	1372.	54860.	1.66	49.	450.	
712.66		0.02	0.16	0.0	712.68	0.87	0.12	0.000	*XS*	AF

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 16,DATE= 4/27/78

WATER-SURFACE PROFILE FOR: COLE CREEK MCKINLEY RD TO POTTER RD KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
AA     AT   10970 /     0 /   1050. /  1185. /   43593. / 2.27 /   53. /  483.
   713.28 /   0.03 /                 /  713.31 /    0.89 /   0.08/          *IS*
----------------------------------------------------------------------------------
AB     AT   11650 /   680 /   1050. /  1050. /   33942. / 1.82 /   21. /  386.
   713.78 /   0.03 /   0.51 /   0.00 /  713.81 /    1.00 /   0.10 / -0.007  *XS*
----------------------------------------------------------------------------------
AB+1   AT   11910 /   260 /   1050. /   858. /   27684. / 2.26 /   10. /  391.
   714.07 /   0.05 /   0.31 /   0.01 /  714.13 /    1.22 /   0.11 /  0.000  *XS*
----------------------------------------------------------------------------------
AC     AT   12380 /   470 /   1050. /   764. /   30150. / 1.63 /   93. /  327.
   714.70 /   0.05 /   0.62 /   0.0  /  714.75 /    1.38 /   0.11 /  0.001  *XS*
----------------------------------------------------------------------------------
AD     AT   12720 /   340 /   1050. /  1195. /   46822. / 1.82 /   25. /  437.
   714.99 /   0.02 /   0.27 /   0.0  /  715.01 /    0.88 /   0.07 /  0.000  *XS*
================================ BEGIN BRIDGE ANALYSIS ============================
AD BR AT   12720 /       /    572. /   103. /    9004. / 1.00 /    0. /   17.
   713.30 /   0.48 /       ...3...  (-.001)   /    5.53 /   0.39 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     482. / RIGHT        0. /                *RG*
----------------------------------------------------------------------------------
AE     AT   12825 /   105 /   1050. /   885. /   66174. / 1.15 / -198. /  130.
   715.03 /   0.03 /   0.04 /   0.00 /  715.05 /    1.19 /   0.12 /  0.000  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  1115. /   93583. / 1.10 / -203. /  137.
   715.72 /   0.02 /                 /  715.73 /    0.94 /   0.09 /          *AS*
================================ END BRIDGE ANALYSIS ==============================
```

END OF THIS PROFILE

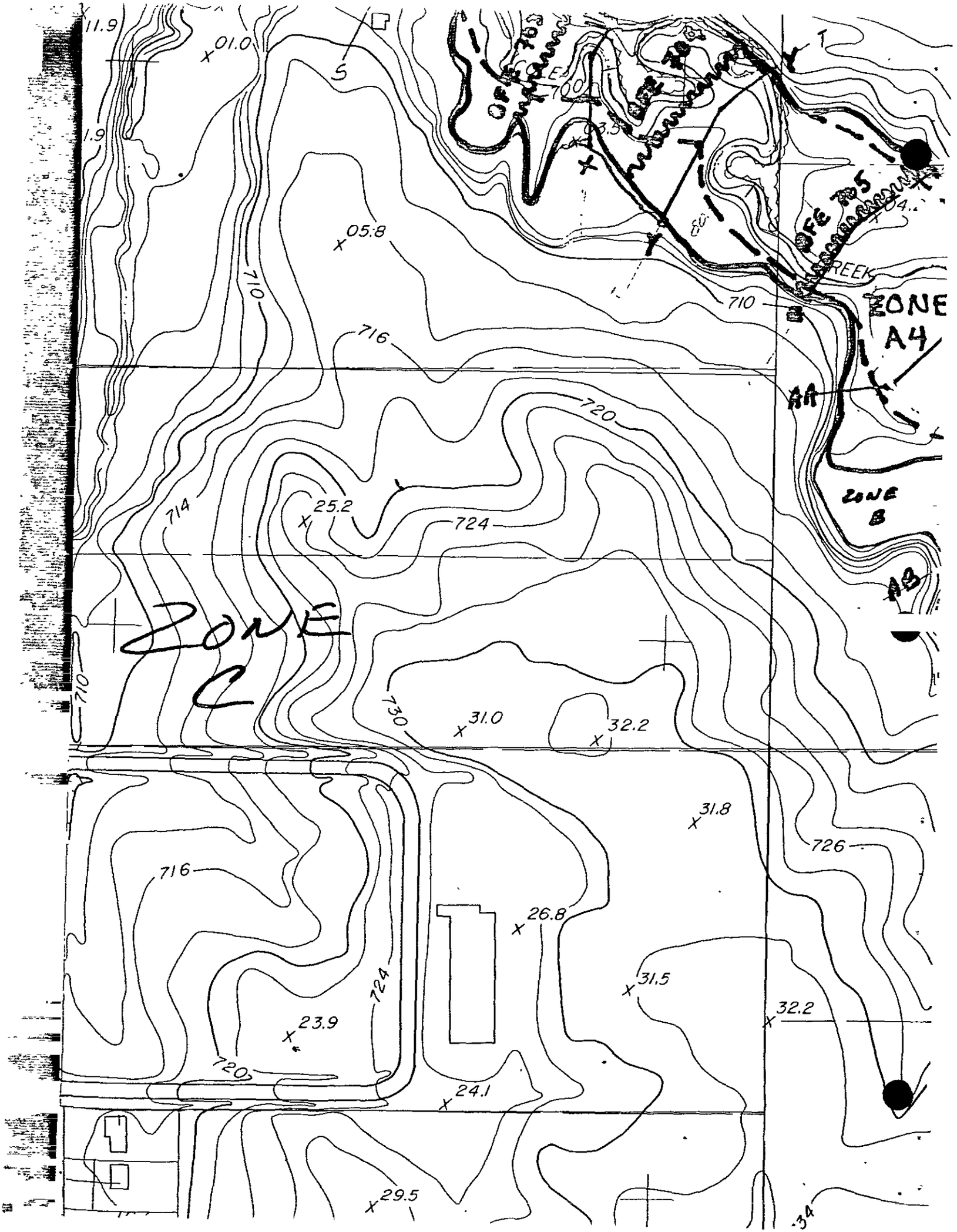
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

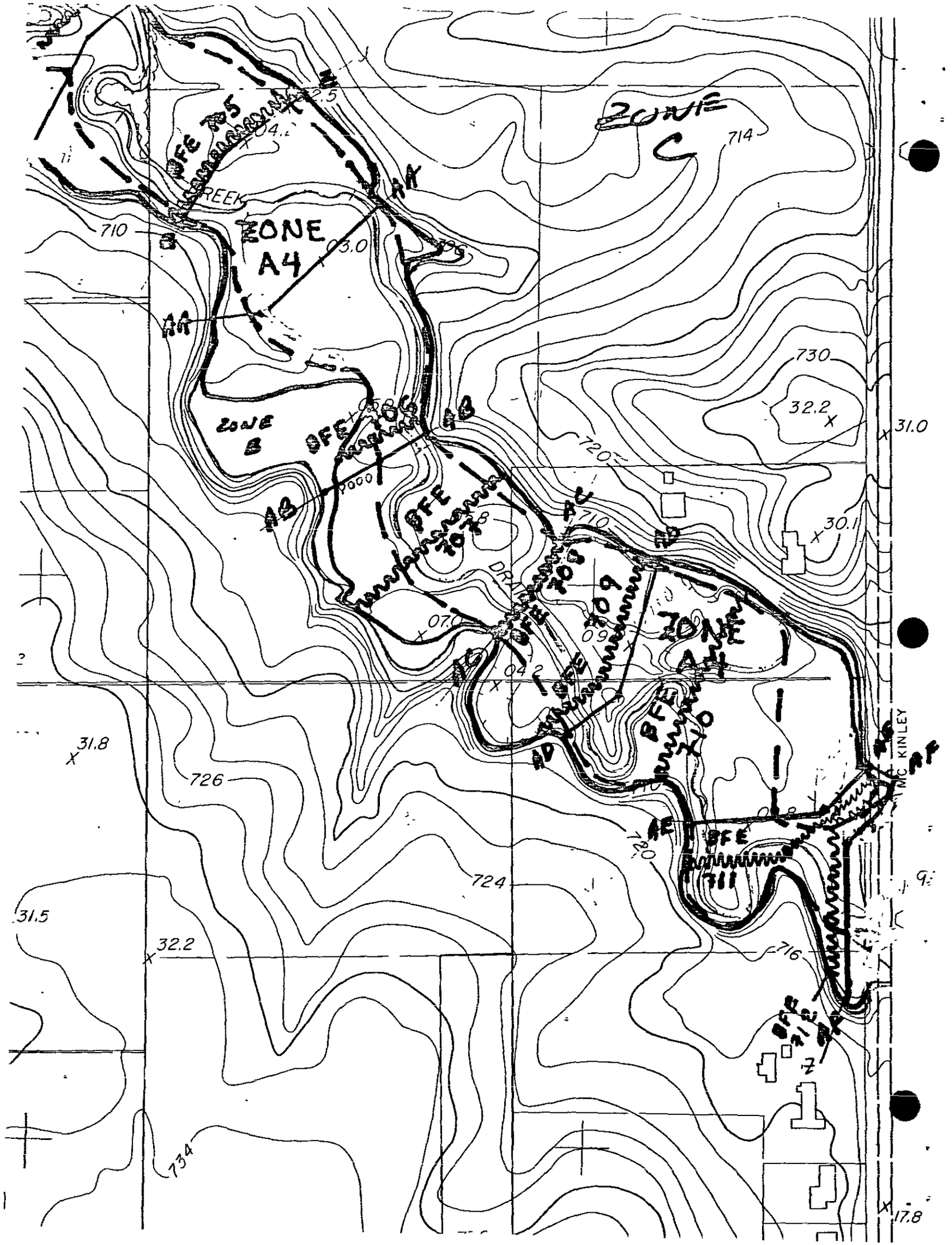
	SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
	WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
0	Q	AT	5120	0	1050.	400.	34918.	1.38	3.	103.	S
	698.40		0.15			698.55	2.63	0.25		*IS*	
.05	Q+1	AT	5410	290	1050.	439.	30216.	1.80	40.	150.	T
	698.70		0.16	0.30	0.01	698.86	2.39	0.25	0.000	*XS*	
.02	R	AT	5780	370	1050.	338.	24052.	1.14	200.	300.	U
	699.26		0.17	0.56	0.01	699.43	3.10	0.28	0.001	*XS*	
.05	R+1	AT	6180	400	900.	223.	10659.	1.85	165.	265.	V
	700.59		0.47	1.48	0.15	701.06	4.03	0.48	0.002	*XS*	
.04	S	AT	6450	270	900.	412.	18018.	1.80	220.	430.	W
	702.07		0.13	1.14	0.0	702.20	2.18	0.25	0.000	*XS*	
.06	S+1	AT	6950	500	900.	380.	18466.	1.74	285.	410.	X FW
	703.27		0.15	1.22	0.01	703.43	2.37	0.26	0.001	*XS*	
.01	T	AT	7670	720	900.	729.	30115.	1.61	210.	410.	Y
	704.44		0.04	1.05	0.0	704.48	1.23	0.09	0.002	*XS*	
.05	U	AT	8210	540	900.	644.	21324.	2.64	170.	445.	Z
	705.10		0.08	0.68	0.02	705.18	1.40	0.21	0.001	*XS*	
.10	V	AT	8550	340	900.	923.	29681.	2.03	180.	480.	AA
	705.60		0.03	0.44	0.0	705.63	0.98	0.08	0.014	*XS*	
.10	W	AT	8980	430	900.	379.	16871.	2.17	380.	480.	AB
	706.22		0.19	0.70	0.08	706.41	2.38	0.33	0.001	*XS*	
.10	X	AT	9465	485	900.	309.	11833.	3.05	-50.	150.	AC
	708.08		0.40	1.97	0.11	708.48	2.91	0.44	0.003	*XS*	
0	X+1	AT	9715	250	900.	635.	20440.	3.54	20.	370.	AD
	709.21		0.11	0.84	0.0	709.32	1.42	0.26	0.002	*XS*	
.04	Y	AT	10270	555	900.	341.	14663.	1.76	160.	310.	AE
	710.68		0.19	1.50	0.04	710.87	2.64	0.32	0.002	*XS*	
.09	Y+1	AT	10700	430	900.	384.	19590.	1.42	50.	150.	~~AF~~
	711.96		0.12	1.21	0.0	712.08	2.35	0.24	0.001	*XS*	
	Z	AT	10850	150	900.	937.	40172.	1.51	80.	330.	~~AG~~ AF

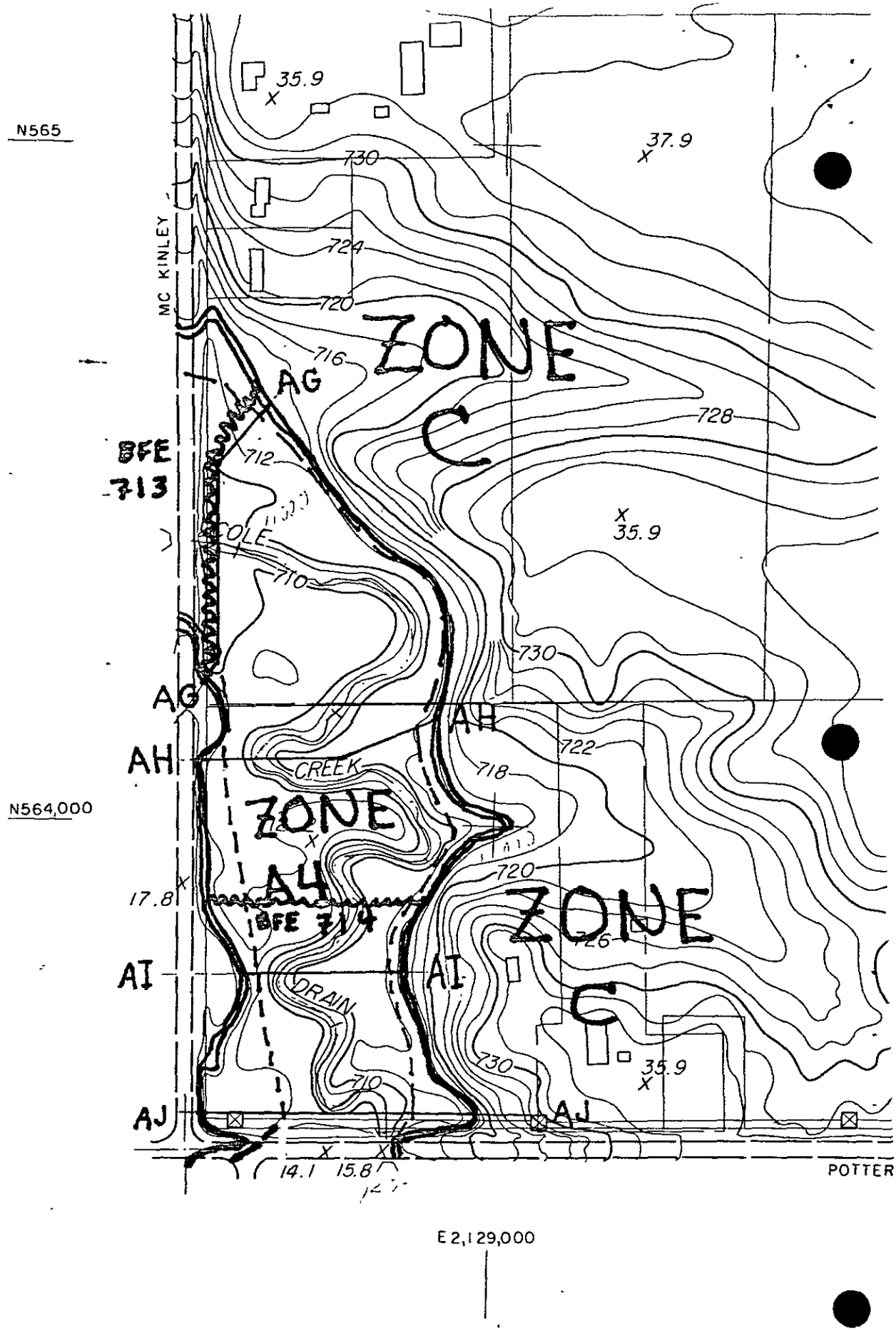
```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   23,DATE= 4/27/78

WATER-SURFACE PROFILE FOR:  COLE CREEK  MCKINLEY RD TO POTTER RD     KNUTILLA
PAGE  1 OF  1, PROFILE NUMBER  5,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
=================================================================================
AA    AT   10970 /      0 /     790. /  1098. /   40281. / 2.26 /   60. /  460.
   713.09 /   0.02 /                  /  713.11 /    0.72 /  0.06/          *IS*
---------------------------------------------------------------------------------
AB    AT   11650 /    680 /     790. /   872. /   28532. / 1.79 /   50. /  350.
   713.46 /   0.02 /    0.37 /    0.00 /  713.48 /    0.91 /  0.08 / 0.001  *XS*
---------------------------------------------------------------------------------
AB+1  AT   11910 /    260 /     790. /   615. /   19858. / 2.40 /   75. /  375.
   713.73 /   0.06 /    0.29 /    0.02 /  713.79 /    1.28 /  0.22 / 0.000  *XS*
---------------------------------------------------------------------------------
AC    AT   12380 /    470 /     790. /   655. /   25742. / 1.58 /  110. /  310.
   714.33 /   0.04 /    0.57 /    0.0  /  714.36 /    1.21 /  0.15 / 0.001  *XS*
---------------------------------------------------------------------------------
AD    AT   12720 /    340 /     790. /   730. /   32545. / 1.01 /  150. /  350.
   714.58 /   0.03 /    0.25 /    0.0  /  714.61 /    1.08 /  0.08 / -0.010 *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
AD BR AT   12720 /        /     566. /   103. /    9004. / 1.00 /    0. /   17.
   713.30 /   0.47 /        ...3...  (-.001)    /    5.47 /  0.39 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     220. / RIGHT       0. /                 *RG*
---------------------------------------------------------------------------------
AE    AT   12825 /    105 /     790. /   517. /   37665. / 1.21 / -100. /  100.
   714.62 /   0.04 /    0.05 /    0.01 /  714.67 /    1.53 /  0.16 / -0.000 *AS*
---------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   648. /   53099. / 1.13 / -100. /  100.
   715.28 /   0.03 /                  /  715.30 /    1.22 /  0.11 /          *AS*
============================ END BRIDGE ANALYSIS ================================

                          END OF THIS PROFILE
```


ZONE A4
ZONE B
ZONE C
AA
AB
CREEK
710
716
720
724
726
730
714
01.0
05.8
25.2
31.0
32.2
31.8
26.8
31.5
32.2
23.9
24.1
29.5


ZONE C
ZONE A4
ZONE B
ZONE A4
BFE 705
BFE 706
BFE 708
BFE 709
BFE 710
BFE 711
AA
AB
AD
AE
AF
AG
AH
AU
CREEK
DRAIN
MC KINLEY
710
714
720
724
726
730
734
716
31.0
30.1
31.8
31.5
32.2
17.8


N565
N564,000
E 2,129,000
MC KINLEY
POTTER
COLE
CREEK
DRAIN
ZONE C
ZONE A4
ZONE C
BFE 713
BFE 714
AG
AH
AI
AJ
730
724
720
716
712
710
728
722
718
726
35.9
37.9
17.8
14.1
15.8

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
Cross Section	Distance	Width (ft.)	Section Area (Sq. ft)	Mean Velocity (F.P.S.)	With Floodway (M.S.L.)	Without Floodway (M.S.L.)	Difference (ft.)
A	0+00	--	--	--	--	--	--
B	2+80	34	149	7.41	667.93	667.93	0
C	4+55	100	515	2.13	671.40	671.40	0
D	6+00	100	387	2.84	671.47	671.40	.07
E	7+20	125	511	2.15	673.87	673.80	.07
F	12+40	75	255	4.32	674.91	674.88	.03
G	16+60	75	245	4.50	676.54	676.53	.01
H	22+95	50	197	5.58	681.32	681.31	.01
I	29+25	70	228	4.81	684.32	684.25	.07
J	30+30	125	654	1.68	690.17	690.10	.07
K	33+00	63	205	5.37	690.35	690.26	.09
L	36+65	50	289	3.81	691.63	691.56	.07
M	37+55	100	391	2.81	692.43	692.41	.02
N	40+65	150	523	2.10	692.85	692.84	.01
O	42+20	100	314	3.50	693.03	693.01	.02

TABLE 3

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration
CITY OF FLUSHING, MI
(Genesee Co.)

FLOODWAY DATA

COLE CREEK

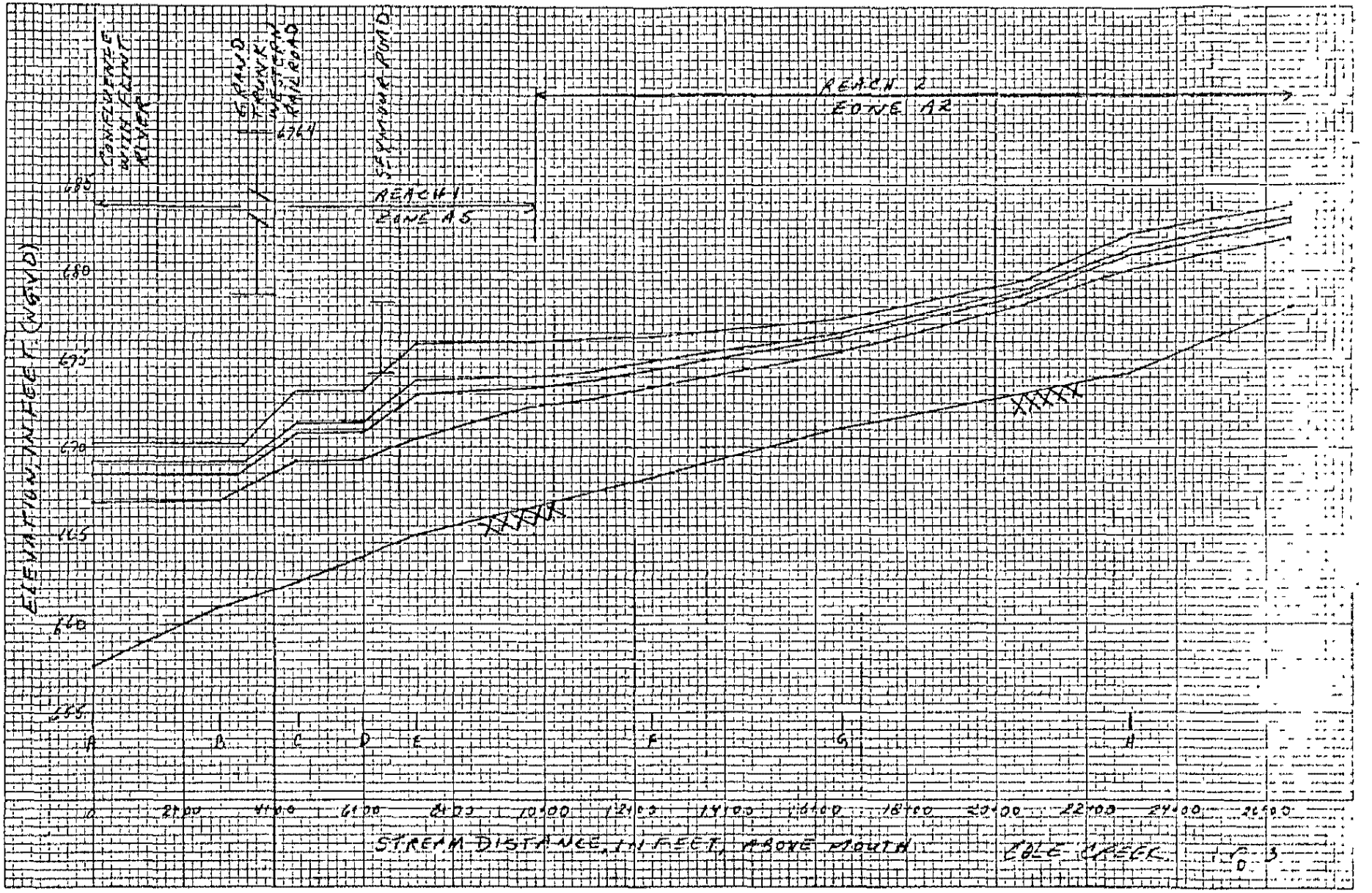
FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
Cross Section	Distance	Width (ft.)	Section Area (Sq. ft)	Mean Velocity (F.P.S.)	With Floodway (M.S.L.)	Without Floodway (M.S.L.)	Difference (ft.)
P	46+15	50	209	5.27	694.78	694.76	0.02
Q	47+85	75	358	3.08	695.54	695.49	.05
R	50+00	48	164	6.69	695.95	695.86	.09
S	51+20	100	400	2.63	698.40	698.40	0
T	54+10	110	439	2.39	698.70	698.65	.05
U	57+80	100	338	3.10	699.26	699.24	.02
V	61+80	100	223	4.03	700.59	700.54	.05
W	64+50	210	400	2.25	702.01	701.98	.03

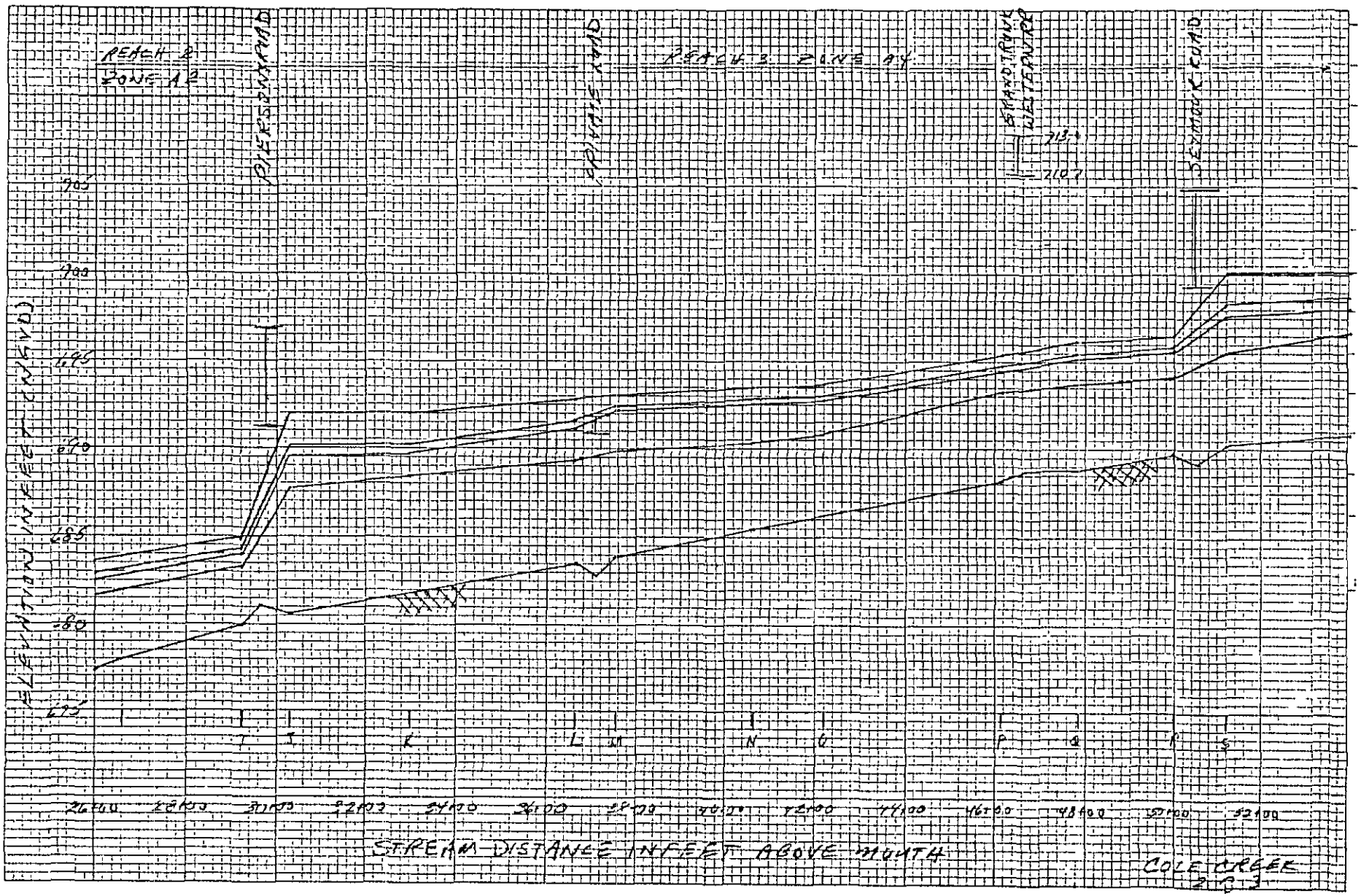
TABLE 3

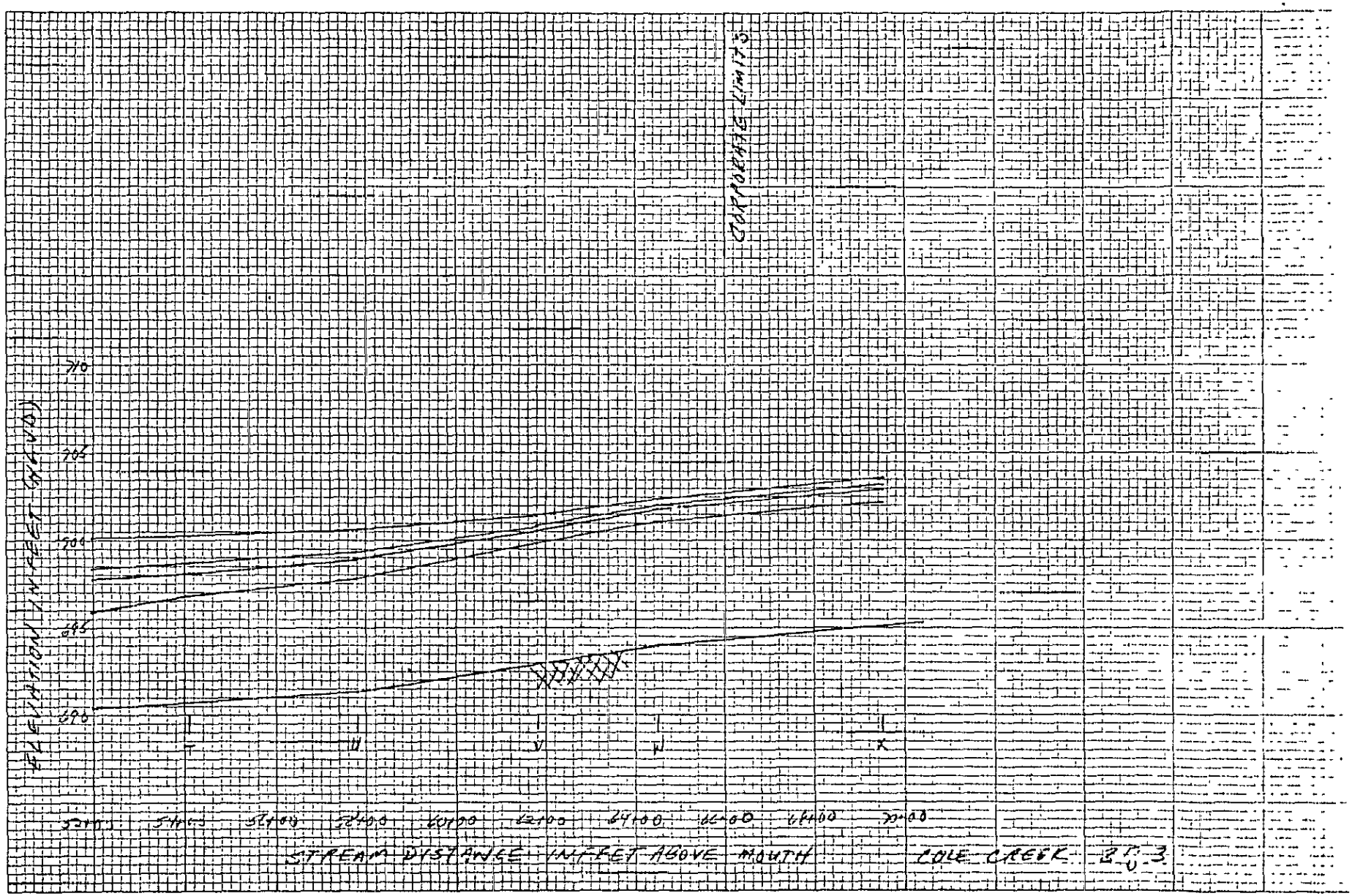
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration
CITY OF FLUSHING, MI
(Genesee Co.)

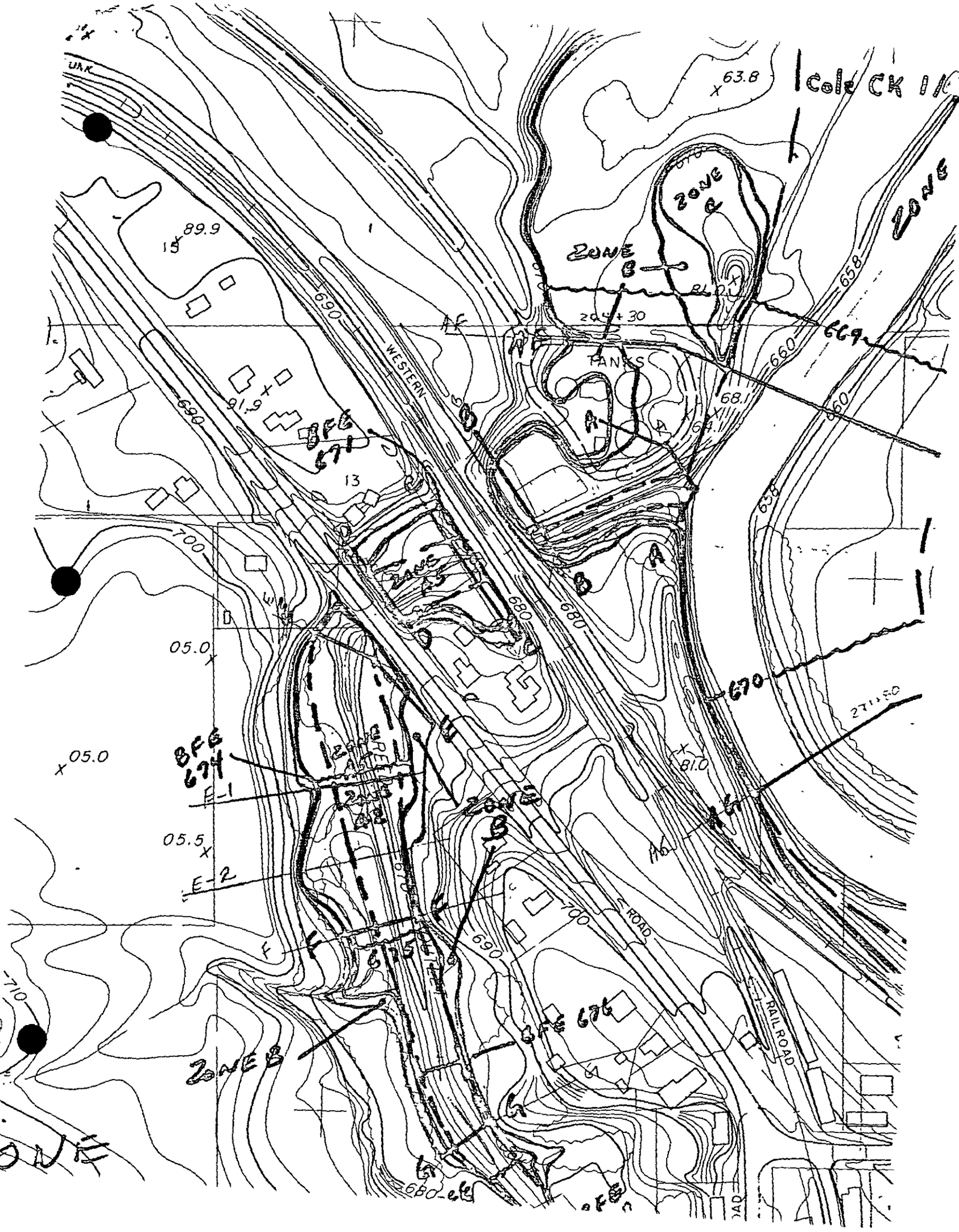
FLOODWAY DATA

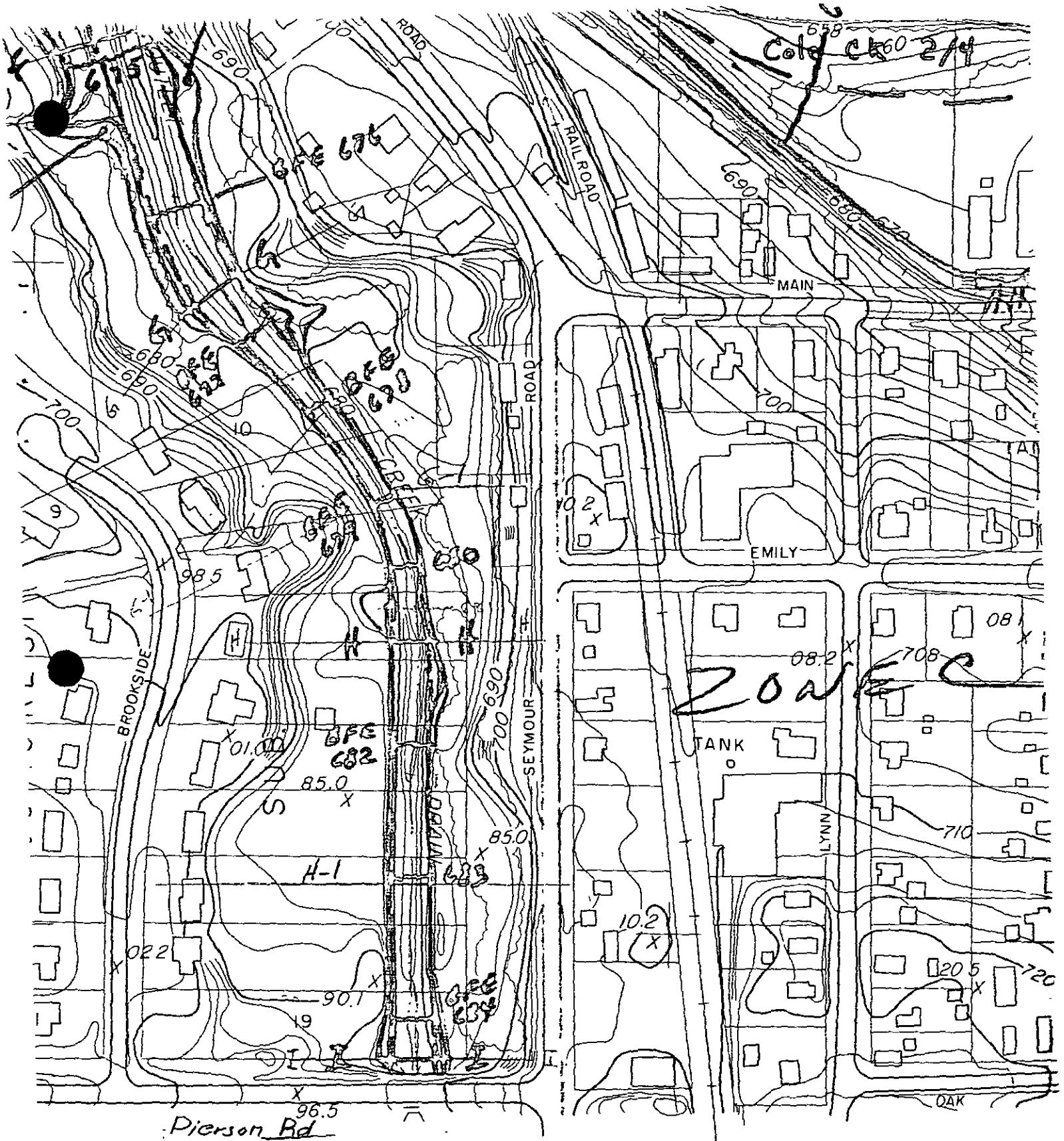
COLE CREEK

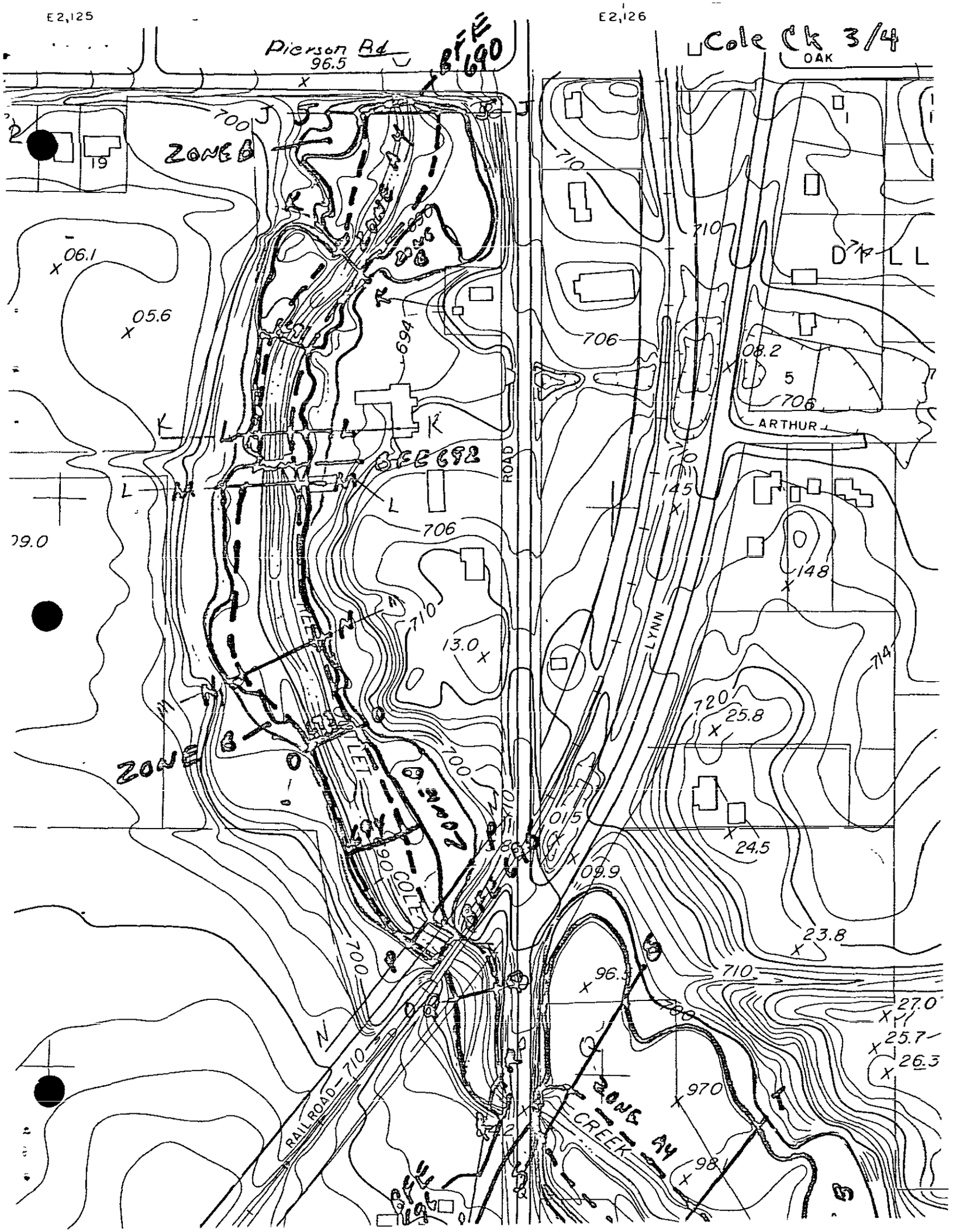

CONFLUENCE WITH CHINIT RIVER
GRAND TRUNK WESTERN RAILROAD
SYMMUR POND
REACH 2
ZONE A2
REACH 1
ZONE A5
ELEVATION IN FEET (NGVD)
685
680
675
670
665
660
655
A
B
C
D
E
F
G
H
0
2+00
4+00
6+00
8+00
10+00
12+00
14+00
16+00
18+00
20+00
22+00
24+00
26+00
STREAM DISTANCE IN FEET, ABOVE MOUTH
COLE CREEK
FIG. 3


REACH 2
ZONE A2
PIERSON ROAD
REACH 3 ZONE A4
STAXOTRUNK WETLANDS
SEYMOUR ROAD
ELEVATION IN FEET (NGVD)
STREAM DISTANCE IN FEET ABOVE MOUTH
COLE CREEK


CORPORATE LIMITS
ELEVATION (FEET-NGVD)
710
705
700
695
690
T
U
V
W
X
52+00
54+00
56+00
58+00
60+00
62+00
64+00
66+00
68+00
70+00
STREAM DISTANCE INFEET ABOVE MOUTH
COLE CREEK
E.C.-3


Cole CK
ZONE C
ZONE B
ZONE A
ZONE E
ZONE F
ZONE B
BFE 671
BFE 674
BFE 676
BFE 670
E-1
E-2
WESTERN
TANKS
RAILROAD
ROAD
63.8
89.9
91.9
68.1
64.1
81.0
204+30
690
700
680
670
660
658
669
05.0
05.5
710


Cold Ck
RAIL ROAD
MAIN
EMILY
TANK
LYNN
OAK
SEYMOUR
ROAD
BROOKSIDE
H-1
Pierson Rd
BFE 676
BFE 682
BFE 683
BFE 684
E 2,126


E2,125
E2,126
Pierson Rd
96.5
Cole Ck 3/4
OAK
ZONE B
ZONE B
ZONE B
ZONE A4
ARTHUR
ROAD
LYNN
COLE
CREEK
RAILROAD
DRILL
700
710
706
694
714
720
06.1
05.6
08.2
145
148
13.0
25.8
24.5
09.9
23.8
96.5
27.0
25.7
26.3
970
98
19
5

00BREAK00

1) COUNTY: Genesee

2) STUDY NAME: City of Swartz creek

3) WATERCOURSE: West Br. Swartz Creek

4) DOCUMENT TYPE: 100 yr natural & Encroached

00BREAK00

```
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      W BR SWARTZ CK BRISTOL RD - LINDEN RD   HOLTSLAG  6  1 02 99 12
2     2  74956
3  1000 CS  H 1  15  3  742    2890  1  3
4  1005   1400
5  1010      -50  1  7600    0  1  7498   10  1  7493   20  1  7470   29  2  7459
5  1020       32  2  7417   38  2  7404   44  2  7396   48  2  7399   57  2  7417
5  1030       58  2  7435   65  3  7453   70  3  7488   90  3  7549  100  3  7580
6  1090  1  2 065 065  1  2 040 040  1  2 060 060
3  1100 SC  I 0  14  3  742    3240  1  3
5  1110      100  1  7600  120  1  7560  145  1  7500  190  2  7480  205  2  7440
5  1112      210  2  7419  210  2  7407  250  2  7407  250  2  7419  252  2  7460
5  1114      255  3  7480  360  3  7500  385  3  7600  400  3  7660
6  1190  1  2 100 100  1  2 060 060  1  2 100 100
3  1200 SC  J 1  17  3  742    3460  1  3
4 01205 001200
5  1210        0  1  7620   20  1  7600   35  1  7580   60  1  7560   90  1  7540
5  1212      125  1  7520  160  2  7500  170  2  7460  180  2  7440  185  2  7419
5  1214      185  2  7406  205  2  7406  205  2  7419  210  2  7440  225  3  7480
5  1216      360  3  7500  390  3  7600
6  1219  1  2 100 100  1  2 060 060  1  2 100 100
3 01250 SC J5 0 019 03 0743 0003780 01 03
5 01260     0000 01 07600 0025 01 07580 0050 01 07560 0065 01 07540 0090 01 07520
5 01261     0115 01 07500 0125 02 07480 0130 02 07460 0135 02 07440 0150 02 07420
5 01262     0155 02 07417 0160 02 07420 0170 02 07440 0185 03 07480 0300 03 07500
5 01263     0320 03 07520 0370 03 07540 0375 03 07560 0380 03 07580
6 01269 01 02 075 075 01 02 050 050 01 02 075 075
3 01270 SC J7 0 019 03 0743 0004000 01 03
5 01280     0000 01 07600 0025 01 07580 0050 01 07560 0065 01 07540 0090 01 07520
5 01282     0115 01 07500 0125 02 07480 0130 02 07460 0135 02 07440 0150 02 07430
5 01284     0155 02 07425 0160 02 07430 0170 02 07440 0185 03 07480 0210 03 07500
5 01286     0230 03 07520 0280 03 07540 0285 03 07560 0290 03 07580
6 01289 01 02 075 075 01 02 050 050 01 02 075 075
3 01300 SC  K 0 013 03 0744 0004080 01 03
5 01310     0000 01 07580 0012 02 07560 0015 02 07520 0020 02 07480 0025 02 07440
5 01312     0035 02 07428 0045 02 07428 0050 02 07440 0060 02 07480 0065 02 07500
5 01314     0070 02 07520 0080 03 07560 0090 03 07580
6 01319 01 02 070 070 01 02 045 045 01 02 075 075
```

H

I

J

K

Swartz Creek - Genesee Co. Rec'd 4/14/78

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE=10/15/7

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0      NP   10

1      1 W BR SWARTZ DYE RD TO DSS TOP GULF CR BR HOLTSLAG 17  5 02 99 12
2      2  75383  75522  75690  75578  75586
3  2500 SC  S 1  20  3  747    7410  1  3
4  2505   1200   1720   2320   1890   1890
5  2510     -360  1  7640 -310  1  7620 -285  1  7600 -270  1  7580 -235  1  7560
5  2512 S   -120  1  7560    0  1  7587   23  1  7589   30  2  7539   42  2  7400
5  2514      48  2  7450   55  2  7453   63  2  7462   64  2  7480   70  3  7507
5  2516      80  3  7567  100  3  7585  150  3  7600  220  3  7620  340  3  7640
6  2590  1  2 055 055  1  2 040 040  1  2 060 060
3  2550 SC S3 0  19  3  747    7570  1  3
**SEQUENCE**
5  2560       0  1  7640   10  1  7620   20  1  7600   40  1  7580   60  1  7500
5  2562 T   130  1  7560  140  2  7560  200  2  7500  208  2  7480  212  2  7400
5  2564     220  2  7457  225  2  7460  240  2  7480  250  3  7500  325  3  7580
5  2566     365  3  7600  415  3  7620  575  3  7640  680  3  7660
6  2569  1  2 060 060  1  2 048 048  1  2 065 065
3  2600 SC  T 0  19  3  747    7890  1  3
5  2610       0  1  7640  120  1  7620  190  1  7600  250  1  7560  320  1  7540
5  2612 U   330  2  7520  340  2  7500  350  2  7480  355  2  7467  355  2  7454
5  2614     380  2  7454  380  2  7467  385  3  7480  395  3  7500  425  3  7000
5  2616     430  3  7620  500  3  7620  730  3  7640  850  3  7660
6  2690  1  2 050 050  1  2 050 060  1  2 060 060
3  2700 SC  U 0  24  3  748    8500  1  3
5  2710      50  1  7660   80  1  7640  105  1  7620  135  1  7600  140  1  7580
5  2712     155  1  7560  210  1  7560  240  1  7540  255  1  7520  262  2  7500
5  2714 V   270  2  7480  285  2  7464  285  2  7462  295  2  7462  295  2  7464
5  2716     300  2  7480  310  3  7500  330  3  7520  355  3  7580  370  3  7600
5  2718     400  3  7620  485  3  7640  580  3  7660  740  3  7680
6  2790  1  2 050 050  1  2 050 050  1  2 055 055
3  2800 SC  W 0  22  3  749    8960  1  3
5  2810       0  1  7660  140  1  7640  245  1  7620  290  1  7600  310  1  7580
5  2812 W   390  1  7560  415  1  7540  440  2  7520  440  2  7480  450  2  7470
5  2814     465  2  7470  470  2  7480  475  3  7500  480  3  7520  490  3  7540
5  2816     520  3  7560  550  3  7580  605  3  7600  620  3  7620  640  3  7640
5  2818     660  3  7660  760  3  7680
```

A-K preceding 2 sheets, approved w/ Flint Twp

Input

```
3  2550 SC S3 H  19  3  747     7570  1  3
**SEQUENCE**
5  2550          0  1  7640    10  1  7620    20  1  7600    40  1  7580    60  1  7500
5  2562 T      130  1  7560   190  2  7560   200  2  7500   208  2  7480   212  2  7460  T
5  2564       220  2  7457   225  2  7460   240  2  7480   250  3  7500   325  3  7580
5  2566       365  3  7600   415  3  7620   575  3  7640   680  3  7660
6  2569  1  2 060 060  1  2 048 048  1  2 065 065
3  2600 SC T 0  19  3  747     7890  1  3
5  2610          0  1  7640   120  1  7620   190  1  7600   250  1  7560   320  1  7540
5  2612 U      330  2  7520   340  2  7500   350  2  7480   355  2  7467   355  2  7454  U
5  2614       380  2  7454   380  2  7467   385  3  7480   395  3  7500   425  3  7600
5  2616       430  3  7620   500  3  7620   730  3  7640   850  3  7660
6  2690  1  2 050 050  1  2 050 060  1  2 060 060
3  2700 SC U 0  24  3  748     8500  1  3
5  2710        50  1  7660    80  1  7640   105  1  7620   135  1  7600   140  1  7580
5  2712       155  1  7560   210  1  7560   240  1  7540   255  1  7520   262  2  7500
5  2714 V     270  2  7480   285  2  7464   285  2  7462   295  2  7462   295  2  7464  V
5  2716       300  2  7480   310  3  7500   330  3  7520   355  3  7580   370  3  7600
5  2718       400  3  7620   485  3  7640   580  3  7660   740  3  7680
6  2790  1  2 050 050  1  2 050 050  1  2 055 055
3  2800 SC W 0  22  3  749     8960  1  3
5  2810          0  1  7660   140  1  7640   245  1  7620   290  1  7600   310  1  7580
5  2812 W      390  1  7560   415  1  7540   440  2  7520   440  2  7480   450  2  7470  W
5  2814       465  2  7470   470  2  7480   475  3  7500   480  3  7520   490  3  7540
5  2816       520  3  7560   550  3  7580   605  3  7600   620  3  7620   640  3  7640
5  2818       660  3  7660   760  3  7680
6  2890  1  2 038 038  1  2 050 050  1  2 038 038
3  2900 SC X 0  19  3  749     9250  1  3
5  2910          0  1  7660   200  1  7640   330  1  7620   425  1  7600   450  1  7580
5  2912       460  2  7540   470  2  7480   475  2  7470   495  2  7470   500  2  7480  X
5  2914       510  3  7540   555  3  7560   575  3  7580   635  3  7600   690  3  7600
5  2916       700  3  7580   710  3  7580   720  3  7600   765  3  7680
6  2920  1  2 038 038  1  2 045 045  1  2 038 038
3  3000 BR Y 2  12  1  749     9250          0  7563 1 0
5  3010          0  1  7565     0  1  7505     1  1  7487     4  1  7480     7  1  7474  Y
5  3012         11  1  7470    15  1  7473    19  1  7479    20  1  7512    21  1  7512
```

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  3014      21  1  7561   0 -9  7565
6  3090  1  2 044 044
3  3100 RD  Y 4   9  2   20          1  2          2 2                  1
5  3110     -244  1  7594 -210  1  7575 -180  1  7589 -120  1  7570  -80  1  7554
5  3112       20  1  7580   40  2  7586  100  2  7590  160  2  7607
3  3200 SC  Y 5  19  3  749    9340  1  3
5  3210     -460  1  7660 -320  1  7640 -150  1  7620  -76  1  7601    0  1  7575
5  3212       13  1  7563   44  2  7477   50  2  7470   56  2  7477   64  3  7500
5  3214       78  3  7565  126  3  7552  150  3  7560  175  3  7580  240  3  7600
5  3216      315  3  7640  330  3  7660  350  3  7680  610  3  7700
6  3290  1  2 038 038  1  2 045 045  1  2 038 038
3  3300 SC  7 0  22  3  750    9420  1  3
5  3310        0  1  7660  127  1  7640  270  1  7620  300  1  7600  355  1  7580
5  3312      400  2  7560  402  2  7500  410  2  7482  415  2  7480  433  2  7480
5  3314      445  2  7482  470  2  7500  485  3  7540  500  3  7560  550  3  7560
5  3316      585  3  7580  600  3  7600  635  3  7620  655  3  7640  700  3  7660
5  3318      760  3  7680  965  3  7700
6  3390  1  2 038 039  1  2 045 045  1  2 038 038
3  3400 DAMAA 0  31  3  753    9460  1  3
5  3410     -440  1  7660 -225  1  7640 -155  1  7620 -125  1  7600  -90  1  7580
5  3412      -45  1  7560  -25  2  7560    0  2  7560    1  2  7565    9  2  7542
5  3414       10  2  7542   12  2  7527   25  2  7523   25  2  7518   30  2  7517
5  3416       33  2  7517   34  2  7523   39  2  7524   44  2  7527   50  2  7546
5  3418       56  2  7557   56  3  7572   64  3  7577   64  3  7573   75  3  7581
5  3420      100  3  7599  115  3  7620  140  3  7640  170  3  7660  250  3  7680
5  3422      560  3  7700
6  3490  1  2 035 035  1  2 050 050  1  2 035 035
3  3500 SC AA 0  21  3  752    9500  1  3
5  3510        0  1  7660  170  1  7660  230  1  7640  275  1  7620  310  1  7600
5  3512      350  1  7580  410  1  7560  435  2  7540  440  2  7520  445  2  7519
5  3514      445  2  7500  500  2  7500  500  2  7519  505  2  7540  515  3  7580
5  3516      560  3  7600  600  3  7620  640  3  7640  700  3  7660  725  3  7680
5  3518      930  3  7700
6  3590  1  2 038 038  1  2 035 035  1  2 038 038
3  3600 SC AB 0  22  3  752    9710  1  3
5  3610        0  1  7660   35  1  7640   95  1  7620  125  1  7600  180  1  7580
5  3612      230  1  7580  250  1  7560  260  2  7540  275  2  7520  280  2  7519
5  3614      280  2  7500  320  2  7500  320  2  7519  330  3  7540  350  3  7560
5  3616      360  3  7580  370  3  7600  460  3  7620  490  3  7640  520  3  7660
5  3618      545  3  7680  690  3  7700
6  3690  1  2 038 038  1  2 035 035  1  2 038 038
3  3700 SC AC 0  24  3  752    9890  1  3
5  3710        0  1  7
```

Y

Z

AA

AB

AC

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

5  3716      540  3  7560  550  3  7580  565  3  7600  600  3  7620  635  3  7640
5  3718      700  3  7660  775  3  7680  875  3  7700  950  3  7720
6  3790  1  2 038 038  1  2 035 035  1  2 038 038
3  3900 AC AD 0  23  3  752   10100  1  3
5  3810        0  1  7680  130  1  7660  265  1  7640  280  1  7620  295  1  7600
5  3812      310  1  7580  320  2  7560  330  2  7540  335  2  7520  340  2  7519
5  3814      345  2  7500  545  2  7500  545  2  7519  550  3  7540  560  3  7560
5  3816      570  3  7580  575  3  7600  585  3  7620  595  3  7640  650  3  7660
5  3818      700  3  7680  840  3  7700  900  3  7720
6  3820  1  2 038 038  1  2 035 035  1  2 038 038
3  3900 SC AE 0  19  3  752   10240  1  3
5  3910        0  1  7680  190  1  7660  290  1  7640  305  1  7620  310  1  7600
5  3912      320  1  7580  330  2  7560  340  2  7520  340  2  7500  380  2  7500
5  3914      380  2  7520  410  3  7560  510  3  7580  585  3  7600  590  3  7620
5  3916      600  3  7640  620  3  7660  655  3  7680  680  3  7700
6  3918  1  2 038 038  1  2 035 035  1  2 038 038
3  4000 SC AF 0  20  3  752   10380  1  3
5  4010        0  1  7700  200  1  7680  390  1  7660  460  1  7640  480  1  7620
5  4012      490  1  7600  505  2  7580  520  2  7550  530  2  7520  535  2  7507
5  4014      570  2  7507  570  2  7520  590  3  7560  600  3  7580  770  3  7600
5  4015      790  3  7620  810  3  7640  825  3  7660  910  3  7680 1050  3  7700
6  4090  1  2 038 038  1  2 040 040  1  2 038 038
3  4100 SC AH 0  23  3  752   10880  1  3
5  4110        0  1  7700   10  1  7680   50  1  7660  120  1  7660  135  1  7640
5  4112      150  1  7620  170  1  7600  225  1  7580  240  2  7560  260  2  7540
5  4114      265  2  7519  265  2  7507  297  2  7507  297  2  7519  305  3  7560
5  4116      315  3  7580  420  3  7600  525  3  7620  545  3  7640  560  3  7660
5  4118      600  3  7680  790  3  7700  830  3  7720
6  4190  1  2 035 035  1  2 040 040  1  2 035 035
```

AE

AF

AG

AH

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE=10/17/7

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1 00001 W BR SWARTZ CK  SEC AG TO AH.            HOLTSLAG 03 04 02 05 12
2 00002 075716 075826 075855 075915
3  3900 SC AE 1  19  3  752   10240  1  3
4 03905 001200 001720 001890 002320
5  3910        0  1  7680  190  1  7660  290  1  7640  305  1  7620  310  1  7600
5  3912      320  1  7580  330  2  7560  340  2  7520  340  2  7500  380  2  7500
5  3914      380  2  7520  410  3  7560  510  3  7580  585  3  7600  590  3  7620
5  3916      600  3  7640  620  3  7660  655  3  7680  680  3  7700
6  3918  1  2 038 038  1  2 035 035  1  2 038 038
3  4000 SC AF 0  20  3  752   10380  1  3
5  4010        0  1  7700  200  1  7680  390  1  7660  460  1  7640  480  1  7620
5  4012      490  1  7600  505  2  7580  520  2  7550  530  2  7520  535  2  7507
5  4014      570  2  7507  570  2  7520  590  3  7560  600  3  7580  770  3  7600
5  4016      790  3  7620  810  3  7640  825  3  7660  910  3  7680 1050  3  7700
6  4090  1  2 038 038  1  2 035 035  1  2 038 038
3  4100 SC AH 0  23  3  752   10880  1  3
5  4110        0  1  7700   10  1  7680   50  1  7660  120  1  7660  135  1  7640
5  4112      150  1  7620  170  1  7600  225  1  7580  240  2  7560  260  2  7540
5  4114      265  2  7519  265  2  7507  297  2  7507  297  2  7519  305  3  7560
5  4116      315  3  7580  420  3  7600  525  3  7620  545  3  7640  560  3  7660
5  4118      600  3  7680  790  3  7700  830  3  7720
6  4190  1  2 035 035  1  2 035 035  1  2 035 035
```

AF

AG

AH

```
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 W BR SWARTZ CK GOLF C BR TO ELMS RD      HOLTSLAG 21  4 02  5 12
2      2  75763  75873  75901  75962
3  4100 SC AH 1  23  3  752   10880  1  3
4  4105   1200   1720   1890   2320
5  4110       0  1  7700   10  1  7680   50  1  7660  120  1  7660  135  1  7640
5  4112     150  1  7620  170  1  7600  225  1  7580  240  2  7560  260  2  7540
5  4114     265  2  7519  265  2  7507  297  2  7507  297  2  7519  305  3  7560
5  4116     315  3  7580  420  3  7600  525  3  7620  545  3  7640  560  3  7660
5  4118     600  3  7680  790  3  7700  830  3  7720
6  4190  1  2 035 035  1  2 040 040  1  2 035 035
3  4200 SC AI 0  17  3  751   11090  1  3
5  4208       0  1  7700   20  1  7620   30  1  7600   80  1  7580   90  1  7560
5  4210     100  2  7540  110  2  7515  115  2  7495  135  2  7495  140  2  7515
5  4212     150  2  7550  160  3  7580  225  3  7600  260  3  7620  310  3  7640
5  4214     375  3  7660  420  3  7680
6  4290  1  2 035 035  1  2 035 035  1  2 035 035
3  4300 SC AJ 0  12  3  751   11240  1  3
5  4310       0  1  7700   30  1  7600   40  1  7560   45  2  7540   50  2  7515
5  4312      55  2  7495   75  2  7495   80  2  7515   85  3  7540   90  3  7560
5  4314     100  3  7600  120  3  7700
6  4390  1  2 045 045  1  2 038 038  1  2 045 045
3  4400 BR AJ 2  23  1  750   11240        0  7644 1 0
5  4410       0  1  7659    0  1  7625    5  1  7599    9  1  7581   10  1  7544
5  4412      15  1  7510   19  1  7508   23  1  7500   27  1  7489   31  1  7491
5  4414      35  1  7492   39  1  7499   43  1  7539   47  1  7552   51  1  7590
5  4416      55  1  7601   58  1  7609   58  1  7659   45  1  7659   45  1  7628
5  4418      15  1  7628   15  1  7659    0 -9  7659
6  4490  1  2 040 040
3  4500 RD AJ 4   5  2   45          1  2          2 2                  1
5  4500       0  1  7700    0  1  7692  500  2  7692 1000  2  7692 1000  2  7700
**SEQUENCE**
3  4600 SC AK 5  14  3  751   11380  1  3
5  4610    -250  1  7640 -200  1  7620 -120  1  7919 -104  1  7605  -70  2  7593
5  4612     -60  2  7515  -54  2  7492  -48  2  7489  -38  2  7497  -34  2  7514
5  4614     -30  2  7558  -18  3  7622   -8  3  7677    0  3  7680
6  4690  1  2 050 050  1  2 036 036  1  2 150 150
3  4650 SCAK5 0  19  3  750   11790  1  3
**SEQUENCE**
5  4660       0  1  7660  100  1  7640  130  1  7620  150  1  7600  430  1  7600
5  4662     470  2  7600  480  2  7540  490  2  7520  495  2  7490  505  2  7485
5  4664     515  2  7490  520  2  7520  530  2  7580  535  3  7600  620  3  7600
5  4666     630  3  7620  642  3  7640  650  3  7660  660  3  7680
6  4669  1  2 060 060  1  2 035 035  1  2 100 100
```

AH

AI

AJ

AK

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  4712      620  2  7600  630  2  7540  640  2  7515  645  2  7483  665  2  7483
5  4714      670  2  7515  680  3  7560  720  3  7560  760  3  7580  770  3  7600
5  4716      830  3  7700
6  4790  1  2 070 070  1  2 035 035  1  2 100 100
3  4800 SC AM 0  20  3  750   12410  1  3
5  4810        0  1  7660  300  1  7640  380  1  7620  440  1  7600  500  1  7600
5  4812      580  2  7600  590  2  7540  600  2  7516  605  2  7484  625  2  7484   AM
5  4814      625  2  7484  630  3  7516  635  3  7540  640  3  7560  670  3  7580
5  4816      680  3  7600  695  3  7620  795  3  7640  940  3  7660 1000  3  7680
6  4890  1  2 070 070  1  2 035 035  1  2 060 060
3  4900 BR AM 2  17  1  750   12410        0  7622 1 0
5  4910     -100  1  7622  -96  1  7592  -94  1  7592  -94  1  7587  -91  1  7563
5  4912      -90  1  7563  -86  1  7516  -84  1  7516  -84  1  7480  -80  1  7482
5  4914      -79  1  7485  -78  1  7525  -74  1  7566  -74  1  7599  -66  1  7593
5  4916      -66  1  7625 -100 -9  7622
6  4919  1  2 035 035
3  4950 RD AM 4  10  2   40          1  2          2 2                  1
5  4960     -690  1  7660 -410  1  7640 -300  1  7620 -240  1  7600 -180  1  7600
5  4962     -100  1  7623  -66  2  7627    0  2  7632   46  2  7638  215  2  7660
3  5000 SC AN 5  16  3  750   12710  1  3
5  5010        0  1  7680   90  1  7660  350  1  7640  410  1  7620  480  1  7600
5  5012      680  1  7600  735  2  7600  750  2  7516  755  2  7484  755  2  7484   AN
5  5014      780  2  7516  790  3  7540  885  3  7560  900  3  7600  915  3  7620
5  5016      935  3  7640
6  5090  1  2 070 070  1  2 035 035  1  2 060 060
```

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 W BR SWARTZ CK  SEC AN TO ELMS RD        HOLTSLAG 15  5 02 99 12
2      2  76002  76107  76177  76128  76138
3   5000 SC AN 1  16  3  750   12710  1  3
4   5005   1200   1720   2320   1890   1890
5   5010        0  1  7680   90  1  7660  350  1  7640  410  1  7620  480  1  7600
5   5012      680  1  7600  735  2  7600  750  2  7516  755  2  7484  755  2  7484
5   5014      780  2  7516  790  3  7540  885  3  7560  900  3  7600  915  3  7620
5   5016      935  3  7640
6   5090  1  2 070 070  1  2 035 035  1  2 060 060
3   5100 SC AO 0  18  3  751   13010  1  3
5   5110        0  1  7660   75  1  7660  100  1  7640  225  1  7640  260  1  7620
5   5112      410  1  7620  440  1  7620  450  2  7600  465  2  7560  480  2  7516
5   5114      485  2  7492  500  2  7492  505  2  7516  540  3  7600  790  3  7620
5   5116      830  3  7640  925  3  7660 1000  3  7680
6   5190  1  2 070 070  1  2 035 035  1  2 060 060
3   5200 SC AP 0  14  3  752   13650  1  3
5   5210        0  1  7800   60  1  7700  100  1  7680  110  1  7660  125  1  7600
5   5212      140  2  7540  150  2  7516  155  2  7500  175  2  7500  175  2  7516
5   5214      180  3  7540  195  3  7600  220  3  7640  240  3  7700
6   5290  1  2 060 060  1  2 040 040  1  2 060 060
3   5300 BR AP 2  12  1  752   13650        0  7800 1 0
5   5310        0  1  7800   25  1  7700   40  1  7600   50  1  7540   60  1  7516
5   5312       60  1  7500   75  1  7500   75  1  7515   90  1  7600  115  1  7700
5   5314      190  1  7800    0 -9  7800
6   5390  1  2 040 040
3   5400 RD AP 4   5  2  200           1  2           1 1                  1
5   5410        0  1  8000    0  1  7980  500  2  7980 1000  2  7980 1000  2  8000
3   5500 SC AQ 5  13  3  752   14010  1  3
5   5510        0  1  7800   40  1  7700   55  2  7600   70  2  7540   75  2  7517
5   5512       75  2  7507   95  2  7507   95  2  7517  100  2  7540  110  3  7600
5   5514      135  3  7700  155  3  7740  290  3  7800
6   5590  1  2 040 040  1  1 040 040  1  2 040 040
3   5600 SC AR 0  15  3  752   14500  1  3
5   5610        0  1  7800   15  1  7700   35  1  7660  200  1  7660  230  1  7600
5   5612      240  2  7580  250  2  7516  250  2  7506  270  2  7506  270  2  7516
5   5614      275  2  7580  290  3  7600  320  3  7700  440  3  7700  460  3  7740
6   5690  1  2 065 065  1  2 040 040  1  2 065 065
3   5700 SC AS 1  15  3  752   14620  1  3
4  05705 001110 001590 002140 001750   1750
5   5710        0  1  7800   15  1  7700   35  1  7660  200  1  7660  230  1  7600
5   5712      240  2  7580  250  2  7516  250  2  7506  270  2  7506  270  2  7516
5   5714      275  2  7580  290  3  7600  320  3  7700  440  3  7700  460  3  7740
```

AN

AO

AP

AQ

AR

AS

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  5812     120  2  7580  125  2  7520  125  2  7510  145  2  7510  145  2  7520
5  5814     155  3  7580  170  3  7600  195  3  7680  270  3  7680  350  3  7700
5  5816     520  3  7700  600  3  7720  615  3  7740
6  5890  1  2 060 060  1  2 043 043  1  2 100 100
3  5900 SC AU 0  14  3  753   15500  1  3
5  5910       0  1  7800   40  1  7700  105  2  7600  115  2  7540  120  2  7525
5  5912     120  2  7513  145  2  7513  145  2  7525  150  2  7540  160  2  7600
5  5914     175  3  7640  285  3  7660  610  3  7680  630  3  7700
6  5990  1  2 065 065  1  2 045 045  1  2 100 100
3  6000 SC AV 0  15  3  753   16280  1  3
5  6010       0  1  7660   50  1  7660  100  1  7640  375  1  7640  520  2  7640
5  6012     535  2  7600  540  2  7540  545  2  7525  545  2  7518  575  2  7518
5  6014     575  2  7525  585  2  7600  600  3  7640  745  3  7660 1000  3  7660
6  6090  1  2 050 050  1  2 045 045  1  2 100 100
3  6100 SC AW 0  14  3  755   17000  1  3
5  6110       0  1  7660  490  1  7660  545  2  7660  560  2  7600  575  2  7540
5  6112     585  2  7530  585  2  7523  605  2  7523  605  2  7530  610  3  7600
5  6114     630  3  7660  700  3  7660  810  3  7680  960  3  7700
6  6190  1  2 040 040  1  2 045 045  1  2 100 100
3  6200 BR AW 2  14  1  754   17000        30  7650 3 1
5  6210       0  1  7650    0  1  7548    3  1  7549    4  1  7540    8  1  7530
5  6212      12  1  7525   16  1  7527   20  1  7529   24  1  7530   28  1  7550
5  6214      32  1  7547   36  1  7558   36  1  7650    0 -9  7650
6  6290  1  2 035 035
3  6300 RD AW 4   7  2   50           1  2           1 1                  1
5  6310    -980  1  7680 -635  1  7660 -216  1  7654    0  2  7677  104  2  7680
5  6312     240  2  7680  750  2  7700
3  6400 SC AX 5  18  3  754   17110  1  3
5  6410    -770  1  7700 -700  1  7680 -240  1  7660    0  1  7638   22  2  7637
5  6412      38  2  7550   40  2  7531   46  2  7524   53  2  7524   54  2  7530
5  6414      59  2  7550   63  2  7565   68  2  7595   73  3  7643   85  3  7643
5  6416     150  3  7660  290  3  7680  790  3  7700
6  6490  1  2 040 040  1  2 042 042  1  2 040 040
```

AU

AV

AW

AX

```
1     1 W BR SWARTZ CK  ELMS RD TO RAUBINIGER RD WOLTSLAG 10  4 02 99 12
2     2 76250  76416  76580  76463
3  6400 SC AX 1  18  3  754   17110  1  3
4  6405   1110   1590   2140   1750
5  6410    -770  1  7700 -700  1  7680 -240  1  7660    0  1  7638   22  2  7637
5  6412      38  2  7550   40  2  7531   46  2  7524   53  2  7524   54  2  7530   AX
5  6414      59  2  7550   63  2  7565   68  2  7595   73  3  7643   85  3  7643
5  6416     150  3  7660  290  3  7680  790  3  7700
6  6490  1  2 040 040  1  2 042 042  1  2 040 040
3  6500 SC AY 0  13  3  755   17770  1  3
5  6510       0  1  7720   80  1  7700  125  1  7680  460  1  7660  630  1  7640
5  6512     640  2  7600  650  2  7560  660  2  7530  675  2  7530  680  2  7560   AY
5  6514     690  2  7600  700  3  7640  720  3  7680
6  6590  1  2 050 050  1  2 038 038  1  2 070 070
3  6600 SC AZ 0  13  3  755   18400  1  3
5  6610       0  1  7740   90  1  7720  140  1  7700  215  1  7680  320  1  7660
5  6612     580  2  7660  600  2  7600  610  2  7560  620  2  7533  635  2  7533   AZ
5  6614     645  2  7560  655  3  7600  700  3  7680
6  6690  1  2 070 070  1  2 038 038  1  2 070 070
3  6700 SC BA 0  15  3  754   18965  1  3
5  6708    -470  1  7740 -410  1  7720 -305  1  7700 -210  1  7680 -120  1  7660
5  6710       0  1  7665   16  2  7610   26  2  7561   34  2  7546   35  2  7532
5  6712      40  2  7533   48  2  7536   56  2  7573   68  3  7635   82  3  7665   BA
6  6790  1  2 070 070  1  2 042 042  1  2 070 070
3  6800 SC BB 0  14  3  755   19575  1  3
5  6810       0  1  7740  100  1  7720  190  1  7700  240  1  7680  330  1  7660
5  6812     500  2  7660  510  2  7600  515  2  7580  520  2  7535  540  2  7535   BB
5  6814     545  2  7580  555  2  7600  580  3  7680  590  3  7680
6  6890  1  2 070 070  1  2 042 042  1  2 070 070
3  6900 SC BC 0  20  3  756   20200  1  3
5  6910       0  1  7720  135  1  7700  220  1  7680  470  1  7660  650  1  7660
5  6912     655  2  7600  660  2  7557  664  2  7548  668  2  7547  672  2  7545
5  6914     676  2  7541  680  2  7542  684  2  7544  688  2  7542  692  2  7551   BC
5  6916     697  2  7552  700  2  7580  710  2  7600  720  3  7640  740  3  7680
6  6990  1  2 050 050  1  2 042 042  1  2 070 070
3  7000 BR BC 2  13  1  755   20200        0  7655 3 0
5  7010       0  1  7655    0  1  7557    4  1  7558    8  1  7553   12  1  7550
5  7012      16  1  7543   20  1  7539   24  1  7541   28  1  7542   32  1  7559
5  7014      35  1  7561   35  1  7655    0 -9  7655
6  7090  1  2 030 030
3  7100 RD BC 4  10  2   50          1  2          1 1                  1
5  7110    -610  1  7700 -500  1  7680 -260  1  7657  -70  1  7672    0  2  7686
5  7112      28  2  7684  140  2  7671  240  2  7665  350  2  7680  450  2  7700   BD
3  7200 SC BD 5  21  3  756   20300  1  3
5  7210    -590  1  7740 -575  1  7720 -450  1  7700 -310  1  7680 -270  1  7660
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 2.DATE=10/21/77

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  7212      0  1  7658   26  2  7565   28  2  7617   34  2  7581   42  2  7551
5  7214     48  2  7545   55  2  7543   60  2  7548   63  2  7573   70  2  7596
5  7216     83  3  7661  100  3  7665  430  3  7660  560  3  7680  585  3  7700
5  7218    600  3  7740
6  7290  1  2 050 050  1  2 040 040  1  2 070 070
```

BD

*** INPUT CARD PRINTOUT ***

```
     1         2         3         4         5         6         7         8
5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

  1 W BR SWARTZ CK PAUBINGER TO FAIRCHILD RD HOLTSLAG  8  4 02 05 12
002 076431 076630 076750 076675
200 SC BD 1  21  3  756   20300  1  3                                        BD
205 001110 001590 002140 001750
210    -590  1  7740 -575  1  7720 -450  1  7700 -310  1  7680 -270  1  7660
212       0  1  7658   26  2  7656   28  2  7617   34  2  7581   42  2  7551
214      48  2  7545   55  2  7543   60  2  7548   63  2  7573   70  2  7596
216      83  3  7661  100  3  7665  430  3  7660  560  3  7680  585  3  7700
218     600  3  7740
290  1  2 050 050  1  2 040 040  1  2 070 070
300 SC BE 0  20  3  756   21030  1  3                                        BE
310    -340  1  7720 -280  1  7700 -240  1  7680 -130  1  7660  -30  1  7640
312       0  1  7633   10  2  7632   18  2  7599   22  2  7566   26  2  7551
314      34  2  7550   42  2  7548   46  2  7567   54  2  7581   60  3  7637
316      74  3  7648  190  3  7660  270  3  7680  400  3  7700  480  3  7720
390  1  2 070 070  1  2 050 050  1  2 070 070
400 SC BF 0  15  3  757   21700  1  3                                        BF
410       0  1  7740   80  1  7720  160  1  7700  210  1  7680  350  1  7660
412     430  2  7660  450  2  7600  458  2  7580  460  2  7555  480  2  7555
414     490  2  7580  495  2  7600  520  3  7660  530  3  7680  540  3  77[illegible]
490  1  2 055 055  1  2 045 045  1  2 070 070
500 SC BG 0  18  3  758   22490  1  3                                        BG
510       0  1  7740   70  1  7720  130  1  7700  150  1  7680  340  1  7660
512     460  2  7660  465  2  7600  465  2  7580  467  2  7560  490  2  7560
514     500  2  7580  510  2  7600  520  3  7660  530  3  7670  540  3  7680
516     890  3  7700  970  3  7720 1030  3  7740
590  1  2 045 045  1  2 047 047  1  2 065 065
600 SC BH 0  15  3  758   23180  1  3                                        BH
610       0  1  7740   90  1  7720  180  1  7700  510  1  7700  530  2  7660
612     540  2  7600  545  2  7580  555  2  7563  570  2  7563  575  2  7580
614     585  2  7600  595  3  7680  675  3  7700  880  3  7720  990  3  7740
690  1  2 045 045  1  2 045 045  1  2 045 045
700 BR BH 2  15  1  758   23180        0  7682 3 0
710       0  1  7682    0  1  7653    4  1  7625    4  1  7604    8  1  7578
712      12  1  7566   16  1  7563   20  1  7565   24  1  7566   28  1  7577
714      32  1  7603   36  1  7630   40  1  7638   40  1  7682    0 -9  7682
790  1  2 045 045
800 RD BH 4   7  2   50          1  2          1 1                  1
810    -600  1  7740 -475  1  7720 -124  1  7705    0  2  7711  134  2  7705
812     250  2  7720  440  2  7740
900 SC BI 5  17  3  758   23260  1  3                                        BI
910    -550  1  7740 -420  1  7720 -360  1  7700 -170  1  7700    0  1  7700
912      16  2  7702   36  2  7570   40  2  7564   44  2  7564   48  2  7563
914      55  2  7568   57  2  7591   71  3  7686   80  3  7700  250  3  7700
916     325  3  7720  460  3  7740
```

*** INPUT CARD PRINTOUT ***

```
          1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 W BR SWARTZ CK  MORRISH TO FAIRCHILD RD  HOLTSLAG  7 05 02 99 12
2      2  76637  76818  77057  76865  76875
3  7900 SC BI 1  17  3  758   23260  1  3
4  7905   1110   1590   2140   1750   1750
5  7910    -550  1  7740 -420  1  7720 -360  1  7700 -170  1  7700    0  1  7700
5  7912      16  2  7702   36  2  7570   40  2  7564   44  2  7564   48  2  7563
5  7914      55  2  7568   57  2  7591   71  3  7686   80  3  7700  250  3  7700
5  7916     325  3  7720  460  3  7740
6  7949  1  2 050 050  1  2 045 045  1  2 040 040
3  7950 SCBI2 0  17  3  758  23360  1  3
5  7960    -550  1  7740 -420  1  7720 -360  1  7700 -170  1  7700    0  1  7700
5  7962      16  2  7702   36  2  7570   40  2  7564   44  2  7564   48  2  7563
5  7964      55  2  7568   57  2  7591   71  3  7686   80  3  7700  250  3  7700
5  7966     325  3  7720  460  3  7740
6  7969  1  2 050 050  1  2 045 045  1  2 040 040
3  8000 SC BJ 0  19  3  758   23500  1  3
5  8010       0  1  7740   45  1  7720   90  1  7700  500  1  7700  540  1  7680
5  8012     560  2  7640  570  2  7620  585  2  7600  590  2  7570  590  2  7564
5  8013     610  2  7546  610  2  7570  620  2  7600  630  3  7660  730  3  7660
5  8014     820  3  7680  900  3  7700 1050  3  7720 1160  3  7740
6  8090  1  2 055 055  1  2 045 045  1  2 045 045
3  8100 SC BK 0  18  3  758   24220  1  3
5  8110       0  1  7740  100  1  7720  200  1  7720  400  1  7720  450  1  7700
5  8112     570  1  7680  650  1  7660  700  2  7640  720  2  7600  725  2  7561
5  8114     735  2  7561  745  2  7600  770  3  7660  915  3  7660  975  3  7680
5  8116    1120  3  7700 1140  3  7720 1340  3  7720
6  8190  1  2 060 060  1  2 047 047  1  2 045 045
3  8200 SC BL 0  18  3  758   24385  1  3
5  8210       0  1  7740  100  1  7720  200  1  7720  400  1  7720  450  1  7700
5  8212     570  1  7680  650  1  7660  700  2  7640  720  2  7600  725  2  7561
5  8214     735  2  7561  745  2  7600  770  3  7660  915  3  7660  975  3  7680
5  8216    1120  3  7700 1140  3  7720 1340  3  7720
6  8290  1  2 060 060  1  2 047 047  1  2 045 045
3  8250 SCBL4 0  15  3  758   24680  1  3
**SEQUENCE**
5  8260       0  1  7740   10  1  7700   30  1  7680  175  1  7680  220  2  7680
5  8262     235  2  7600  240  2  7580  250  2  7565  260  2  7580  270  2  7600
5  8264     280  3  7660  500  3  7680  515  3  7700  700  3  7720  710  3  7740
6  8269  1  2 055 055  1  2 046 046  1  2 042 042
```

BI

BJ

BK

BL

```
6  8190  1  2 060 060  1  2 047 047  1  2 045 045
3  8200 SC BL 0  18  3  758   24385  1  3
5  821[illegible]      0  1  7740  100  1  7720  200  1  [illegible]20  400  1  7720  450  1  7700
5  8212      570  1  7680  650  1  7660  700  2  7640  720  2  7600  725  2  7561
5  8214      735  2  7561  745  2  7600  770  3  7660  915  3  7660  975  3  7680
5  8216     1120  3  7700 1140  3  7720 1340  3  7720
6  8290  1  2 060 060  1  2 047 047  1  2 045 045
3  8250 SCBL4 0  15  3  758   24680  1  3
**SEQUENCE**
5  8260        0  1  7740   10  1  7700   30  1  7680  175  1  7680  220  2  7680
5  8262      235  2  7600  240  2  7580  250  2  7565  260  2  7580  270  2  7600
5  8264      280  3  7660  500  3  7680  515  3  7700  700  3  7720  710  3  7740
6  8269  1  2 055 055  1  2 046 046  1  2 042 042
3  8300 SC BM 0  16  3  759   25185  1  3
5  8310     -615  1  7740 -500  1  7720 -250  1  7700  -80  1  7680  -30  1  7680
5  8312      -20  1  7700    0  1  7689   14  2  7668   34  2  7577   40  2  7570
5  8314       46  2  7578   62  3  7669  275  3  7680  340  3  7700  380  3  7720
5  8316      430  3  7760
6  8390  1  2 050 050  1  2 045 045  1  2 040 040
```

BL

BM

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 2,DATE= 1/20/78

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

3  8400 SC BN 0  16  3  758   25650  1  3
5  8410        0  1  7740  100  1  7720  300  1  7700  450  1  7685  580  2  7680
5  8412      600  2  7660  605  2  7588  610  2  7564  620  2  7564  625  2  7588
5  8414      650  3  7660  715  3  7680  800  3  7700 1065  3  7700 1120  3  7720
5  8416     1150  3  7740
6  8429  1  2 050 050  1  2 043 046  1  2 040 040
```

BN

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 ALGER CREEK  FAIRCHILD BRIDGE            HOLTSLAG  5  4 02 05 12
2      2  76798  76928  77110  76966
3   8400 SC BN 1  16  3  758   25650  1  3
4   8404   1110  1590   2140  1750
5   8410      0  1  7740  100  1  7720  300  1  7700  450  1  7685  580  2  7680   BN
5   8412    600  2  7660  605  2  7588  610  2  7564  620  2  7564  625  2  7588
5   8414    650  3  7660  715  3  7680  800  3  7700 1065  3  7700 1120  3  7720
5   8416   1150  3  7740
6   8429  1  2 050 050  1  2 043 046  1  2 040 040
3   8500 FAIRC 2  31  1  760   25650        0  7689 3 0
5   8510      0  1  7587    3  1  7588    4  1  7589    5  1  7591    6  1  7593
5   8512      7  1  7597    8  1  7598    8  1  7637    7  1  7651    6  1  7664
5   8514      5  1  7672    4  1  7679    3  1  7683    2  1  7686    1  1  7688
5   8516      0  1  7689   -1  1  7688   -2  1  7686   -3  1  7683   -4  1  7679
5   7518     -5  1  7672   -6  1  7664   -7  1  7651   -8  1  7637   -8  1  7598
**SEQUENCE**
5   8520     -7  1  7597   -6  1  7593   -5  1  7591   -4  1  7589   -3  1  7588
5   8522      0  1  7587
6   8529  1  2 034 034
3   8530 FAIRD 4  15  2   30          1  2          2 2                1
5   8532   -610  1  7740 -515  1  7720 -325  1  7720 -310  1  7700 -130  1  7673
5   8534    -40  1  7713    0  2  7717    0  2  7717   12  2  7717   12  2  7717
5   8536    130  2  7694  160  2  7700  500  2  7700  520  2  7720  540  2  7740
3   8700 SC BO 5  14  5  760   25725  2  4
5   8710   -220  1  7740 -180  1  7720 -165  1  7700 -140  1  7680    0  1  7677   BO
5   8712     22  2  7676   30  2  7625   40  2  7595   44  3  7586   50  3  7584
5   8714     59  4  7593   73  5  7674  100  5  7674  100  5  7710
6   8790  1  2 050 050  1  2 050 050  1  2 045 045  1  2 045 045  1  2 040 040
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 1/22/78

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 W BR SWARTZ CK FAIRCHILD TO SEYMOUR RD   HOLTSLAG 12  5 02 99 12
2      2  76871  76971  77111  76993  77003
3   8700 SC BO 1  14  5  760   25725  2  4
4   8704   1110   1590   2140   1750   1750
5   8710    -220  1  7740 -180  1  7720 -165  1  7700 -140  1  7680    0  1  7677   BO
5   8712      22  2  7676   30  2  7625   40  2  7595   44  3  7586   50  3  7584
5   8714      59  4  7593   73  5  7674  100  5  7674  100  5  7710
6   8790  1  2 050 050  1  2 050 050  1  2 045 045  1  2 045 045  1  2 040 040
3   8800 SC BP 0  13  3  760   26190  1  3
5   8810       0  1  7740  225  1  7720  330  1  7700  400  2  7680  445  2  7594   BP
5   8812     445  2  7585  470  2  7585  470  2  7594  480  2  7660  500  3  7700
5   8814     525  3  7700  535  3  7680  565  3  7700
6   8890  1  2 045 045  1  2 040 040  1  2 070 070
3   8900 SC BQ 0  12  3  760   26700  1  3
5   8910    -300  1  7740 -240  1  7720 -210  1  7700  -50  1  7700  -20  1  7680   BQ
5   8912       0  1  7667   14  2  7642   22  2  7592   32  2  7586   42  2  7593
5   8914      56  3  7678   78  3  7700
6   8990  1  2 040 040  1  2 040 040  1  2 070 070
3   9000 SC BR 0  13  3  760   27365  1  3
5   9010    -400  1  7760 -370  1  7740 -320  1  7720 -220  1  7700  -70  1  7680   BR
5   9012    .-10  1  7680    0  1  7670   20  2  7666   34  2  7593   44  2  7581
5   9014      54  2  7594   72  3  7687   88  3. 7706
6   9090  1  2 040 040  1  2 035 035  1  2 070 070
3   9100 SC BS 0  13  3  760   28260  1  3
5   9110    -380  1  7760 -350  1  7740 -275  1  7720 -200  1  7700 -140  1  7680   BS
5   9112     -40  1  7680    0  1  7675   10  2  7662   24  2  7598   30  2  7582
5   9114      46  2  7596   60  3  7703   75  3  7720
6   9190  1  2 035 035  1  2 037 037  1  2 080 080
3   9200 SC BT 0  13  3  762   29150  1  3
5   9210    -550  1  7740 -450  1  7720 -335  1  7700 -200  1  7690    0  1  7697   BT
5   9212      24  2  7691   34  2  7618   58  2  7604   64  2  7601   72  2  7606
5   9214      90  3  7692  102  3  7696  120  3  7700
6   9229  1  2 040 040  1  2 037 037  1  2 070 070
3   9300 SC BU 1  11  3  762   29300  1  3
4   9305      50      70      95      80      80
5   9310    -550  1  7740 -430  1  7720 -330  1  7700    0  1  7679   20  2  7673   BU
5   9312      30  2  7615   40  2  7608   50  2  7618   58  3  7677   70  3  7719
5   9314     100  3  7760
6   9390  1  2 035 035  1  2 050 050  1  2 070 070
```

```
3  9400 SC BV 0  18  3  763   29610  1  3
5  9410       0  1  7740  100  1  7740  220  1  7720  335  1  7720  420  1  7700
5  9412     605  1  7680  665  1  7680  682  2  7660  695  2  7640  700  2  7620
5  9414     715  2  7609  735  2  7620  745  3  7700  900  3  7700  905  3  7680
5  9416     930  3  7680  940  3  7700  950  3  7800
6  9429  1  2 040 040  1  2 050 050  1  2 070 070
```

BV

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 2,DATE= 1/22/78

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

3  9500 SC BW 0  16  3  762   30150  1  3
5  9510    -400  1  7740 -350  1  7720 -280  1  7700  -50  1  7700    0  1  7676
5  9512      34  2  7667   42  2  7617   46  2  7608   58  2  7609   62  2  7618
5  9514      78  3  7690   88  3  7709  100  3  7720  110  3  7700  140  3  7700
5  9516     150  3  7760
6  9590  1  2 040 040  1  2 050 050  1  2 080 080
3  9600 SC BX 0  16  3  764   30770  1  3
5  9610    -500  1  7780 -440  1  7760 -325  1  7740 -250  1  7720 -100  1  7700
5  9612     -20  1  7700    0  1  7682   14  2  7673   28  2  7625   36  2  7619
5  9614      50  2  7620   60  3  7689   82  3  7715  120  3  7720  200  3  7720
5  9616     230  3  7760
6  9690  1  2 040 040  1  2 060 060  1  2 070 070
3  9700 SC BY 0  14  3  763   31300  1  3
5  9710       0  1  7740  360  1  7740  400  1  7720  410  2  7700  440  2  7620
5  9712     445  2  7610  455  2  7610  460  2  7620  500  3  7700  510  3  7720
5  9714     720  3  7720  730  3  7700  920  3  7700  935  3  7760
6  9790  1  2 050 050  1  2 050 050  1  2 070 070
```

BW

BX

BY

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 13,DATE= 1/10/78

WATER-SURFACE PROFILE FOR: W BR SWARTZ CK MOUTH TO BRISTOL RD CSG HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HF	CONVEYANCE / FG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
SC A AT 0 / 751.20	0 / 0.02	2200. /	2887. / 751.22	239420. / 0.76	1.90 / 0.08	459. /	884.	*IS*	A
SC B AT 500 / 751.25	500 / 0.04	2200. / 0.06	1884. / 0.01	156611. / 751.30	2.05 / 1.17	157. / 0.11	564. / 0.000	*XS*	B
SC C AT 690 / 751.28	190 / 0.07	2200. / 0.05	1222. / 0.02	128244. / 751.36	1.47 / 1.80	414. / 0.13	603. / -0.000	*XS*	C
SC D AT 1250 / 751.43	560 / 0.01	2200. / 0.09	2969. / 0.0	239392. / 751.44	1.61 / 0.74	79. / 0.07	491. / 0.000	*XS*	D
SC E AT 1910 / 751.51	660 / 0.05	2200. / 0.10	1766. / 0.02	137157. / 751.56	2.08 / 1.25	48. / 0.12	393. / -0.000	*XS*	E
SC F AT 2490 / 751.67	580 / 0.05	2200. / 0.16	1776. / 0.00	130609. / 751.72	2.20 / 1.24	228. / 0.13	576. / -0.000	*XS*	F
SC G AT 2790 / 751.74	300 / 0.27	2200. / 0.19	563. / 0.11	59558. / 752.02	1.15 / 3.91	33. / 0.27	126. / 0.000	*XS*	G

END OF THIS PROFILE

100-Y

100 yr NP

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 14,DATE=10/12/77

WATER-SURFACE PROFILE FOR: W BR SWARTZ CK BRISTOL RD - LINDEN RD HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
CS H AT 2890 / 752.11	0 / 0.37	2200. /	551. / 752.48	71646. / 3.99	1.48 / 0.28	-11. /	81.	*IS*	H 92 100.
SC I AT 3240 / 752.65	350 / 0.09	2200. / 0.26	1231. / 0.0	91377. / 752.73	1.76 / 1.79	134. / 0.15	367. -0.000	*XS*	I 33
SC J AT 3460 / 752.79	220 / 0.07	1890. / 0.13	1162. / 0.0	77057. / 752.87	1.78 / 1.63	111. / 0.15	368. -0.000	*XS*	J [illegible]
SC J5 AT 3780 / 752.95	320 / 0.08	1890. / 0.16	1132. / 0.00	91650. / 753.03	1.83 / 1.67	78. / 0.15	344. 0.000	*XS*	[illegible]
SC J7 AT 4000 / 753.04	220 / 0.15	1890. / 0.12	770. / 0.03	72102. / 753.18	1.55 / 2.45	77. / 0.19	256. -0.000	*XS*	144
SC K AT 4080 / 753.04	80 / 0.35	1890. / 0.09	400. / 0.10	45067. / 753.38	1.00 / 4.73	14. / 0.32	73. 0.013	*XS*	K [illegible]

END OF THIS PROFILE

100 yr NP

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   21,DATE=10/15/77

WATER-SURFACE PROFILE FOR:  W BR SWARTZ DYE RD TO DSS TOP GULF CR BR HOLTSLAG
PAGE  1 OF  2, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HF  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
SC  S AT    7410 /     0 /   1890. /   358. /   48794. / 1.08 /   27. /   78.
   755.78 /   0.47 /                 / 756.25 /   5.29 /   0.34/          *IS*
----------------------------------------------------------------------------------
SC S3 AT    7570 /   160 /   1890. /   697. /   66447. / 1.39 /   57. /  309.
   756.28 /   0.16 /   0.18 /   0.0  / 756.44 /   2.71 /   0.21 /  0.011  *XS*
----------------------------------------------------------------------------------
SC  T AT    7890 /   320 /   1890. /   793. /   68461. / 1.24 /  241. /  415.
   756.58 /   0.11 /   0.25 /   0.0  / 756.69 /   2.38 /   0.17 / -0.000  *XS*
----------------------------------------------------------------------------------
SC  U AT    8500 /   610 /   1890. /   836. /   79899. / 1.45 /  148. /  351.
   756.98 /   0.11 /   0.40 /   0.00 / 757.09 /   2.26 /   0.18 / -0.000  *XS*
----------------------------------------------------------------------------------
SC  W AT    8960 /   460 /   1890. /   692. /   65700. / 1.31 /  339. /  539.
   757.27 /   0.15 /   0.31 /   0.02 / 757.42 /   2.73 /   0.20 / -0.000  *XS*
----------------------------------------------------------------------------------
SC  X AT    9250 /   290 /   1890. /   577. /   67717. / 1.19 /  451. /  570.
   757.48 /   0.20 /   0.23 /   0.02 / 757.68 /   3.28 /   0.22 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR  Y AT    9250 /       /    975. /   176. /   12693. / 1.00 /    0. /   21.
   756.50 /   0.48 /       ...3...  (-.001)    /   5.54 /   0.34 /         *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     919. / RIGHT       0. /                *RG*
----------------------------------------------------------------------------------
SC  Y AT    9340 /    90 /   1890. /   575. /   57981. / 1.40 /   -1. /  169.
   757.55 /   0.23 /   0.08 /   0.02 / 757.78 /   3.28 /   0.27 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   667. /   66478. / 1.42 /  -16. /  177.
   758.05 /   0.18 /                 / 758.23 /   2.84 /   0.24 /         *AS*
============================ END BRIDGE ANALYSIS ================================
SC  Z AT    9420 /    80 /   1890. /  1013. /  118474. / 1.23 /  350. /  586.
   758.20 /   0.07 /   0.04 /   0.0  / 758.26 /   1.87 /   0.13 / -0.000  *XS*
----------------------------------------------------------------------------------
DAMAA AT    9460 /    40 /   1890. /   422. /   28358. / 1.06 /  -92. /   75.
   758.11 /   0.33 /   0.04 /   0.13 / 758.44 /   4.47 /   0.43 / -0.001  *XS*
----------------------------------------------------------------------------------
SC AA AT    9500 /    40 /   1890. /   717. /   95460. /
```

A-K preceding 2 sheets, approved w/ Flint Twp.

S T U V W X Y Z AA

T50 100

100 ft

A

100 ft

```
U  SC  T AT     7890 /    320 /    1890. /    793. /    68461. / 1.24 /   241. /   415.
   756.58 /    0.11 /    0.25 /    0.0  /   79[illegible]69 /    2.38 /    0.17 / -0.000  *XS*  U
-------------------------------------------------------------------------------------------
V  SC  U AT     8500 /    610 /    1890. /    836. /    79899. / 1.45 /   148. /   351.
   756.98 /    0.11 /    0.40 /    0.00 /   757.09 /    2.26 /    0.18 / -0.000  *XS*  V
-------------------------------------------------------------------------------------------
W  SC  W AT     8960 /    460 /    1890. /    692. /    65700. / 1.31 /   339. /   539.
   757.27 /    0.15 /    0.31 /    0.02 /   757.42 /    2.73 /    0.20 / -0.000  *XS*  W
-------------------------------------------------------------------------------------------
   SC  X AT     9250 /    290 /    1890. /    577. /    67717. / 1.19 /   451. /   570.
   757.48 /    0.20 /    0.23 /    0.02 /   757.68 /    3.28 /    0.22 /  0.000  *XS*  X
============================ BEGIN BRIDGE ANALYSIS ============================
   BR  Y AT     9250 /         /     975. /    176. /    12693. / 1.00 /     0. /    21.
   756.50 /    0.48 /        ...3...  (-.001)     /    5.54 /    0.34 /           *BO*
-------------------------------------------------------------------------------------------
   EMBANKMENT OVERFLOW (CFS) / LEFT      919. / RIGHT        0. /                  *RG*
-------------------------------------------------------------------------------------------
   SC  Y AT     9340 /     90 /    1890. /    575. /    57981. / 1.40 /    -1. /   169.
   757.55 /    0.23 /    0.08 /    0.02 /   757.78 /    3.28 /    0.27 / -0.000  *AS*
-------------------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /    667. /    66478. / 1.42 /   -16. /   177.
   758.05 /    0.18 /                     /   758.23 /    2.84 /    0.24 /          *AS*  Y
============================ END BRIDGE ANALYSIS ==============================
Z  SC  Z AT     9420 /     80 /    1890. /   1013. /   118474. / 1.23 /   350. /   586.
   758.20 /    0.07 /    0.04 /    0.0  /   758.26 /    1.87 /    0.13 / -0.000  *XS*  Z
-------------------------------------------------------------------------------------------
AA DAMAA AT     9460 /     40 /    1890. /    422. /    28358. / 1.06 /   -92. /    75.
   758.11 /    0.33 /    0.04 /    0.13 /   758.44 /    4.47 /    0.43 / -0.001  *XS*  AA
-------------------------------------------------------------------------------------------
AB SC AA AT     9500 /     40 /    1890. /    737. /    95469. / 1.24 /   343. /   523.
   758.36 /    0.13 /    0.05 /    0.0  /   758.48 /    2.56 /    0.20 / -0.007  *XS*  AB
-------------------------------------------------------------------------------------------
AC SC AB AT     9710 /    210 /    1890. /    676. /    86896. / 1.29 /   168. /   362.
   758.43 /    0.16 /    0.09 /    0.02 /   758.59 /    2.79 /    0.22 / -0.000  *XS*  AC
-------------------------------------------------------------------------------------------
AD SC AC AT     9890 /    180 /    1890. /   1680. /   275305. / 1.04 /   317. /   554.
   758.59 /    0.02 /    0.03 /    0.0  /   758.61 /    1.13 /    0.07 / -0.000  *XS*  AD
-------------------------------------------------------------------------------------------
AE AC AD AT    10100 /    210 /    1890. /   1952. /   326866. / 1.03 /   306. /   571.
   758.59 /    0.02 /    0.01 /    0.0  /   758.61 /    0.97 /    0.06 / -0.014  *XS*  AE
-------------------------------------------------------------------------------------------
```

100 yr NP

100 yr

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 8,DATE=10/17/77

WATER-SURFACE PROFILE FOR: W BR SWARTZ CK SEC AG TO AH HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

	SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
AF	SC AE AT 10240 / 758.55	0 / 0.15	1890. /	701. / 758.70	83338. / 2.70	1.32 / 0.22	317. /	531.	*IS*	AF
AG	SC AF AT 10380 / 758.60	140 / 0.23	1890. / 0.09	520. / 0.04 / 758.83	65985. / 3.63	1.10 / 0.28	500. / -0.000	651.	*XS*	AG
AH	SC AH AT 10880 / 759.01	500 / 0.27	1890. / 0.43	509. / 0.02 / 759.28	62558. / 3.72	1.25 / 0.30	197. / -0.000	368.	*XS*	AH

END OF THIS PROFILE

100 yr NP

100 yr NP

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   20,DATE=10/20/77

WATER-SURFACE PROFILE FOR:  W BR SWARTZ CK GOLF C BR TO ELMS RD      HOLTSLAG
PAGE  1 OF  1, PROFILE NUMBER  1,   UPSTREAM COMPUTATIONS
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
=================================================================================
SC AE AT   10240 /     0 /   1890. /   701. /   83338. / 1.32 /  317. /  531.
   758.55 /   0.15 /                 /  758.70 /   2.70 /   0.22/          *IS*
---------------------------------------------------------------------------------
SC AF AT   10380 /   140 /   1890. /   520. /   65985. / 1.10 /  500. /  651.
   758.60 /   0.23 /   0.09 /   0.04 /  758.83 /   3.63 /   0.28 / -0.000  *XS*
---------------------------------------------------------------------------------
SC AH AT   10880 /   500 /   1890. /   509. /   62558. / 1.25 /  197. /  368.
   759.01 /   0.27 /   0.43 /   0.02 /  759.28 /   3.72 /   0.30 / -0.000  *XS*
---------------------------------------------------------------------------------
SC AI AT   11090 /   210 /   1890. /   539. /   72779. / 1.23 /   50. /  199.
   759.21 /   0.24 /   0.16 /   0.0  /  759.45 /   3.51 /   0.26 / -0.000  *XS*
---------------------------------------------------------------------------------
SC AJ AT   11240 /   150 /   1890. /   417. /   60112. / 1.17 /   32. /   98.
   759.27 /   0.37 /   0.12 /   0.07 /  759.64 /   4.53 /   0.30 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR AJ AT   11240 /       /   1890. /   323. /   39950. / 1.00 /    6. /   52.
   759.27 /   0.53 /       ...1...  (-.001)    /   5.85 /   0.39 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       0. / RIGHT       0. /                *RG*
---------------------------------------------------------------------------------
SC AK AT   11380 /   140 /   1890. /   327. /   45505. / 1.00 /  -72. /  -23.
   759.38 /   0.52 /   0.18 /   0.07 /  759.89 /   5.78 /   0.38 / -0.000  *AS*
---------------------------------------------------------------------------------
   M = 0.00 / E = 0.0  / K* = 0.01 /   327. /   45535. / 1.00 /  -72. /  -23.
   759.38 /   0.52 /                 /  759.90 /   5.78 /   0.38 /          *AS*
============================ END BRIDGE ANALYSIS ================================
SCAK5 AT   11790 /   410 /   1890. /   520. /   73817. / 1.16 /  149. /  620.
   760.09 /   0.24 /   0.44 /   0.0  /  760.33 /   3.64 /   0.25 / -0.000  *XS*
---------------------------------------------------------------------------------
SC AL AT   12000 /   210 /   1890. /   919. /   99518. / 2.19 /  318. /  772.
   760.29 /   0.14 /   0.10 /   0.0  /  760.44 /   2.06 /   0.19 / -0.000  *XS*
---------------------------------------------------------------------------------
SC AM AT   12410 /   410 /   1890. /   702. /   91528. / 1.64 /  427. /  683.
   760.43 /   0.18 /   0.16 /   0.02 /  760.62 /   2.69 /   0.21 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
```

AF
AG
AH
AI
AJ
AK
AL
AM

```
BR AJ AT   11240 /        /   1890. /   323. /   39950. / 1.00 /    6. /   52.
  759.27 /   0.53 /        ...1...  (-.001)    /   5.85 /   0.39 /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /              *RG*
-----------------------------------------------------------------------------
SC AK AT   11380 /   140 /   1890. /   327. /   45505. / 1.00 /  -72. /  -23.
  759.38 /   0.52 /   0.18 /   0.07 / 759.89 /   5.78 /   0.38 / -0.000  *AS*
-----------------------------------------------------------------------------
  M = 0.00 / E = 0.0  / K* = 0.01 /   327. /   45535. / 1.00 /  -72. /  -23.
  759.38 /   0.52 /                 / 759.90 /   5.78 /   0.38 /          *AS*  AK
============================ END BRIDGE ANALYSIS ============================
SCAK5 AT   11790 /   410 /   1890. /   520. /   73817. / 1.16 /  149. /  620.
  760.09 /   0.24 /   0.44 /   0.0  / 760.33 /   3.64 /   0.25 / -0.000  *XS*
-----------------------------------------------------------------------------
SC AL AT   12000 /   210 /   1890. /   919. /   99518. / 2.19 /  318. /  772.
  760.29 /   0.14 /   0.10 /   0.0  / 760.44 /   2.06 /   0.19 / -0.000  *XS*  AL
-----------------------------------------------------------------------------
SC AM AT   12410 /   410 /   1890. /   702. /   91528. / 1.64 /  427. /  683.
  760.43 /   0.18 /   0.16 /   0.02 / 760.62 /   2.69 /   0.21 / -0.000  *XS*  AM
============================ BEGIN BRIDGE ANALYSIS ==========================
BR AM AT   12410 /        /   1524. /   162. /   15329. / 1.00 /  -98. /  -66.
  760.43 /   1.38 /        ...1...  (-.001)    /   9.43 /   0.74 /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      383. / RIGHT        0. /              *RG*
-----------------------------------------------------------------------------
SC AN AT   12710 /   300 /   1890. /  1216. /  124641. / 1.95 /  458. /  905.
  760.64 /   0.07 /   0.09 /   0.0  / 760.71 /   1.55 /   0.16 /  0.000  *AS*
-----------------------------------------------------------------------------
  M = 0.24 / E = 0.0  / K* = 0.46 /  1516. /  149173. / 2.22 /  435. /  910.
  761.29 /   0.05 /                 / 761.34 /   1.25 /   0.13 /          *AS*  AN
============================ END BRIDGE ANALYSIS ============================
```

END OF THIS PROFILE

100 yr NP

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= [illegible]

*** INPUT CARD DIRECTORY ***

```
WATER-SURFACE PROFILE FOR:  W BR SWARTZ CK  SEC AN TO ELMS RD        HOLTSLAG
PAGE  1 OF  1, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
=================================================================================
SC AN AT   12710 /      0 /   1890. /  1512. /  148894. / 2.22 /  435. /  910.
   761.28 /   0.05 /                  /  761.33 /    1.25 /   0.13/          *IS*
---------------------------------------------------------------------------------
SC AO AT   13010 /    300 /   1890. /   759. /  102135. / 1.30 /  443. /  704.
   761.31 /   0.12 /   0.07 /   0.04 /  761.44 /    2.49 /   0.19 / -0.000  *XS*
---------------------------------------------------------------------------------
SC AP AT   13650 /    640 /   1890. /   563. /   78550. / 1.35 /  121. /  205.
   761.54 /   0.24 /   0.28 /   0.06 /  761.78 /    3.36 /   0.22 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR AP AT   13650 /        /   1890. /   398. /   49960. / 1.00 /   38. /   94.
   761.54 /   0.35 /        ...1...  (-.001)   /    4.75 /   0.31 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                *RG*
---------------------------------------------------------------------------------
SC AQ AT   14010 /    360 /   1890. /   438. /   59478. / 1.02 /   52. /  114.
   761.79 /   0.30 /   0.28 /   0.03 /  762.09 /    4.32 /   0.27 /  0.004  *AS*
---------------------------------------------------------------------------------
   M = 0.00 / E = 0.56 / K* = 0.01 /   438. /   59503. / 1.02 /   52. /  114.
   761.80 /   0.30 /                  /  762.09 /    4.32 /   0.27 /          *AS*
============================ END BRIDGE ANALYSIS ================================
SC AR AT   14500 /    490 /   1890. /   450. /   55515. / 1.16 /  219. /  297.
   762.30 /   0.32 /   0.53 /   0.01 /  762.62 /    4.20 /   0.29 / -0.018  *XS*
---------------------------------------------------------------------------------
SC AS AT   14620 /    120 /   1750. /   464. /   57858. / 1.18 /  218. /  297.
   762.48 /   0.26 /   0.12 /   0.0  /  762.74 /    3.77 /   0.26 / -0.000  *XS*
---------------------------------------------------------------------------------
SC AT AT   15000 /    380 /   1750. /   467. /   55475. / 1.38 /  106. /  179.
   762.82 /   0.30 /   0.36 /   0.02 /  763.12 /    3.75 /   0.25 / -0.000  *XS*
---------------------------------------------------------------------------------
SC AU AT   15500 /    500 /   1750. /   588. /   70670. / 1.08 /   83. /  173.
   763.36 /   0.15 /   0.39 /   0.0  /  763.51 /    2.98 /   0.19 / -0.000  *XS*
---------------------------------------------------------------------------------
SC AV AT   16280 /    780 /   1750. /   581. /   68354. / 1.00 /  521. /  599.
   763.86 /   0.14 /   0.49 /   0.0  /  764.01 /    3.01 /   0.20 / -0.003  *XS*
---------------------------------------------------------------------------------
SC AW AT   17000 /    720 /   1750. /   552. /   67927. / 1.09 /  549. /  624.
```

AN

AØ

AP

AQ

AR 100 yr NP

AS

AT

AU

AV

AW

```
SC AO AT   13010 /   300 /   1890. /   139. /   102100. / 1.00 /   [illegible] /   [illegible]
   761.31 /   0.12 /   0.07 /   0.04 /   761.44 /   2.49 /   0.19 / -0.000   *XS*
-----------------------------------------------------------------------------------------
SC AP AT   13650 /   640 /   1890. /   563. /   78550. / 1.35 /   121. /   205.
   761.54 /   0.24 /   0.28 /   0.06 /   761.78 /   3.36 /   0.22 / -0.000   *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR AP AT   13650 /       /   1890. /   398. /   49960. / 1.00 /   38. /   94.
   761.54 /   0.35 /       ...1...  (-.001)     /   4.75 /   0.31 /           *BO*
-----------------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                 *RG*
-----------------------------------------------------------------------------------------
SC AQ AT   14010 /   360 /   1890. /   438. /   59478. / 1.02 /   52. /   114.
   761.79 /   0.30 /   0.28 /   0.03 /   762.09 /   4.32 /   0.27 /   0.004   *AS*
-----------------------------------------------------------------------------------------
   M = 0.00 / E = 0.56 / K* = 0.01 /   438. /   59503. / 1.02 /   52. /   114.
   761.80 /   0.30 /                   /   762.09 /   4.32 /   0.27 /           *AS*
============================ END BRIDGE ANALYSIS ==============================
SC AR AT   14500 /   490 /   1890. /   450. /   55515. / 1.16 /   219. /   297.
   762.30 /   0.32 /   0.53 /   0.01 /   762.62 /   4.20 /   0.29 / -0.018   *XS*
-----------------------------------------------------------------------------------------
SC AS AT   14620 /   120 /   1750. /   464. /   57858. / 1.18 /   218. /   297.
   762.48 /   0.26 /   0.12 /   0.0  /   762.74 /   3.77 /   0.26 / -0.000   *XS*
-----------------------------------------------------------------------------------------
SC AT AT   15000 /   380 /   1750. /   467. /   55475. / 1.38 /   106. /   179.
   762.82 /   0.30 /   0.36 /   0.02 /   763.12 /   3.75 /   0.25 / -0.000   *XS*
-----------------------------------------------------------------------------------------
SC AU AT   15500 /   500 /   1750. /   588. /   70670. / 1.08 /   83. /   173.
   763.36 /   0.15 /   0.39 /   0.0  /   763.51 /   2.98 /   0.19 / -0.000   *XS*
-----------------------------------------------------------------------------------------
SC AV AT   16280 /   780 /   1750. /   581. /   68354. / 1.00 /   521. /   599.
   763.86 /   0.14 /   0.49 /   0.0  /   764.01 /   3.01 /   0.20 / -0.003   *XS*
-----------------------------------------------------------------------------------------
SC AW AT   17000 /   720 /   1750. /   552. /   67927. / 1.09 /   549. /   624.
   764.33 /   0.17 /   0.47 /   0.01 /   764.49 /   3.17 /   0.20 / -0.000   *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR AW AT   17000 /       /   1750. /   331. /   49274. / 1.00 /   0. /   36.
   764.33 /   0.44 /       ...1...  (-.001)     /   5.29 /   0.29 /           *BO*
-----------------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                 *RG*
-----------------------------------------------------------------------------------------
SC AX AT   17110 /   110 /   1750. /   428. /   51421. / 1.13 /   -61. /   87.
   764.36 /   0.29 /   0.10 /   0.06 /   764.65 /   4.09 /   0.28 /   0.000   *AS*
-----------------------------------------------------------------------------------------
   M = 0.01 / E = 0.01 / K* = 0.02 /   429. /   51569. / 1.13 /   -62. /   88.
   764.37 /   0.29 /                   /   764.66 /   4.08 /   0.28 /           *AS*
============================ END BRIDGE ANALYSIS ==============================
```

AO

AP

AQ

AR 100 yr NP

AS

AT

AU

AV

AW

AX

164.63

100 yr NP

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 14,DATE=10/21/77

WATER-SURFACE PROFILE FOR: W BR SWARTZ CK ELMS RD TO RAUBINIGER RD HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
SC AX AT   17110 /     0 /   1750. /   473. /   55244. / 1.23 /  -91. /   98.
   764.63 /   0.26 /                 /  764.89 /    3.70 /   0.26/          *IS*
----------------------------------------------------------------------------------
SC AY AT   17770 /   660 /   1750. /   610. /   84390. / 1.28 /  531. /  706.
   765.16 /   0.16 /   0.43 /   0.0  /  765.33 /    2.87 /   0.20 / 0.000  *XS*
----------------------------------------------------------------------------------
SC AZ AT   18400 /   630 /   1750. /   680. /   95596. / 1.17 /  582. /  686.
   765.44 /   0.12 /   0.24 /   0.0  /  765.56 /    2.57 /   0.17 / -0.000 *XS*
----------------------------------------------------------------------------------
SC BA AT   18965 /   565 /   1750. /   512. /   69972. / 1.12 /    2. /   78.
   765.66 /   0.20 /   0.26 /   0.04 /  765.86 /    3.41 /   0.21 / -0.000 *XS*
----------------------------------------------------------------------------------
SC BB AT   19575 /   610 /   1750. /   565. /   70273. / 1.05 /  326. /  574.
   766.09 /   0.16 /   0.38 /   0.0  /  766.24 /    3.10 /   0.21 / -0.000 *XS*
----------------------------------------------------------------------------------
SC BC AT   20200 /   625 /   1750. /   741. /   98831. / 1.32 /  419. /  732.
   766.41 /   0.11 /   0.28 /   0.0  /  766.52 /    2.36 /   0.16 / -0.000 *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR BC AT   20200 /       /   1439. /   371. /   47464. / 1.00 /    0. /   35.
   765.50 /   0.23 /       ...3...  (-.001)   /    3.88 /   0.21 /          *BO*
----------------------------------------------------------------------------------
FMBANKMENT OVERFLOW (CFS) / LEFT     293. / RIGHT       8. /                *RG*
----------------------------------------------------------------------------------
SC BD AT   20300 /   100 /   1750. /   832. /   76218. / 2.12 / -279. /  458.
   766.43 /   0.15 /   0.04 /   0.02 /  766.58 /    2.10 /   0.20 / -0.000 *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   995. /   83757. / 2.48 / -283. /  472.
   766.65 /   0.12 /                 /  766.77 /    1.76 /   0.18 /          *AS*
============================ END BRIDGE ANALYSIS ================================
```

766.96
w/o rd overflow

END OF THIS PROFILE

766.75 w/ rd overflow

100 yr NP

AX

AY

AZ

100 yr NP
BA

BB

BC

BD

100 yr NP

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   18,DATE=10/21/77

                                                                  Morrish
WATER-SURFACE PROFILE FOR:  W BR SWARTZ CK RAUBINGER TO ~~FAIRCHILD~~ RD HOLTSLAG
PAGE  1 OF  1, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
=================================================================================
SC BD AT   20300 /     0 /   1750. /   942. /   80196. / 2.56 / -285. /  479.
   766.75 /   0.14 /                 / 766.89 /    1.86 /   0.19/          *IS*  BD
---------------------------------------------------------------------------------
SC BE AT   21030 /   730 /   1750. /  1143. /   81581. / 2.41 / -193. /  236.
   767.14 /   0.09 /   0.34 /   0.0  / 767.23 /    1.53 /   0.15 / -0.000  *XS*  BE
---------------------------------------------------------------------------------
SC BF AT   21700 /   670 /   1750. /   866. /   88634. / 1.37 /  250. /  527.
   767.43 /   0.09 /   0.28 /   0.0  / 767.51 /    2.02 /   0.16 /  0.001  *XS*  BF
---------------------------------------------------------------------------------
SC BG AT   22490 /   790 /   1750. /   926. /   85898. / 1.66 /  174. /  537.
   767.74 /   0.09 /   0.32 /   0.00 / 767.83 /    1.89 /   0.15 /  0.001  *XS*  BG
---------------------------------------------------------------------------------
SC BH AT   23180 /   690 /   1750. /   576. /   75496. / 1.02 /  520. /  597.
   768.04 /   0.15 /   0.33 /   0.03 / 768.19 /    3.04 /   0.18 / -0.000  *XS*  BH
============================ BEGIN BRIDGE ANALYSIS ==============================
BR BH AT   23180 /       /   1750. /   358. /   42582. / 1.00 /    0. /   40.
   768.04 /   0.37 /       ...1...  (-.001)    /    4.88 /   0.29 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /              *RG*
---------------------------------------------------------------------------------
SC BI AT   23260 /    80 /   1750. /   391. /   46160. / 1.00 /   19. /   70.
   768.05 /   0.31 /   0.07 /   0.12 / 768.36 /    4.47 /   0.28 / -0.011  *AS*
---------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /   391. /   46176. / 1.00 /   19. /   70.
   768.05 /   0.31 /                 / 768.36 /    4.47 /   0.28 /          *AS*  BI
============================ END BRIDGE ANALYSIS ================================
```

~~PAGE 5~~

END OF THIS PROFILE

100 yr NP

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 14,DATE= 1/20/78

WATER-SURFACE PROFILE FOR: W BR SWARTZ CK MORRISH TO FAIRCHILD RD HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*	
SC BI AT	23260	0	1750.	422.	51215.	1.00	18.	71.	BI
768.65	0.27			768.92	4.15	0.26		*IS*	
SCBI2 AT	23360	100	1750.	429.	52396.	1.00	18.	72.	
768.77	0.26	0.11	0.0	769.03	4.08	0.25	-0.000	*XS*	
SC BJ AT	23500	140	1750.	1254.	126110.	1.55	519.	862.	BJ
769.05	0.05	0.06	0.0	769.10	1.40	0.11	-0.000	*XS*	
SC BK AT	24220	720	1750.	1675.	130880.	1.77	498.	1062.	BK
769.20	0.03	0.13	0.0	769.23	1.05	0.10	-0.000	*XS*	
SC BL AT	24385	165	1750.	1691.	132278.	1.77	496.	1064.	BL
769.23	0.03	0.03	0.0	769.26	1.03	0.10	-0.000	*XS*	
SCBL4 AT	24680	295	1750.	1297.	109945.	1.75	17.	510.	
769.28	0.05	0.06	0.01	769.33	1.35	0.12	-0.000	*XS*	
SC BM AT	25185	505	1750.	1049.	81936.	1.87	-202.	322.	BM
769.44	0.08	0.17	0.02	769.52	1.67	0.17	-0.000	*XS*	
SC BN AT	25650	465	1750.	1004.	81247.	1.67	334.	785.	BN
769.66	0.08	0.21	0.0	769.73	1.74	0.16	0.000	*XS*	

END OF THIS PROFILE

100 yr NP

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   14,DATE= 1/20/78

WATER-SURFACE PROFILE FOR:  ALGER CREEK  FAIRCHILD BRIDGE            HOLTSLAG
PAGE  1 OF  1, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
==========================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==========================================================================
SC BN AT   25650 /     0 /   1750. /  1006. /   81410. / 1.67 /  334. /  786.
   769.66 /   0.08 /                 /  769.74 /   1.74 /   0.16/          *IS*
============================ BEGIN BRIDGE ANALYSIS ============================
FAIRC AT   25650 /       /    530. /   132. /   12035. / 1.00 /   -8. /    8.
   768.90 /   0.25 /       ...3...  (-.001)    /   4.01 /   0.25 /          *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT    1182. / RIGHT      31. /               *RG*
--------------------------------------------------------------------------
SC BO AT   25725 /    75 /   1750. /   797. /   71203. / 1.86 / -161. /  100.
   769.67 /   0.14 /   0.04 /   0.04 /  769.81 /   2.20 /   0.21 / -0.011  *AS*
--------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   866. /   78183. / 1.83 / -164. /  100.
   769.93 /   0.12 /                 /  770.05 /   2.02 /   0.20 /          *AS*
============================ END BRIDGE ANALYSIS ==============================

                              END OF THIS PROFILE
```

BN

BO

100 yr NP

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 15,DATE= 1/22/78

WATER-SURFACE PROFILE FOR: W BR SWARTZ CK FAIRCHILD TO SEYMOUR RD HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
SC BO AT 25725 / 769.93	0 / 0.12	1750. /	865. / 770.05	78070. / 2.02	1.83 / 0.20	-164. /	100.	*IS*	BO
SC BP AT 26190 / 770.15	465 / 0.09	1750. / 0.19	830. / 0.0	95785. / 770.24	1.26 / 2.11	322. / 0.16	565. / 0.000	*XS*	BP
SC BQ AT 26700 / 770.32	510 / 0.21	1750. / 0.23	643. / 0.06	69781. / 770.53	1.81 / 2.72	-215. / 0.23	78. / -0.001	*XS*	BQ
SC BR AT 27365 / 770.70	665 / 0.08	1750. / 0.26	1025. / 0.0	113734. / 770.79	1.86 / 1.71	-255. / 0.16	88. / -0.000	*XS*	BR
SC BS AT 28260 / 770.92	895 / 0.06	1750. / 0.20	1052. / 0.0	121051. / 770.99	1.45 / 1.66	-235. / 0.14	66. / -0.000	*XS*	BS
SC BT AT 29150 / 771.11	890 / 0.06	1750. / 0.18	1250. / 0.0	122943. / 771.17	2.01 / 1.40	-399. / 0.14	120. / 0.001	*XS*	BT
SC BU AT 29300 / 771.18	150 / 0.00	80. / 0.01	1179. / 0.0	95529. / 771.18	1.23 / 0.07	-389. / 0.01	68. / -0.000	*XS*	BU
SC BV AT 29610 / 771.18	310 / 0.00	80. / 0.00	1505. / 0.0	112322. / 771.18	1.60 / 0.05	370. / 0.01	941. / -0.000	*XS*	BV
SC BW AT 30150 / 771.18	540 / 0.00	80. / 0.00	957. / 0.00	68572. / 771.18	1.56 / 0.08	-321. / 0.01	142. / -0.001	*XS*	BW
SC BX AT 30770 / 771.18	620 / 0.00	80. / 0.00	605. / 0.00	41982. / 771.18	1.40 / 0.13	-189. / 0.01	79. / -0.002	*XS*	BX
SC BY AT 31300 / 771.18	530 / 0.00	80. / 0.00	798. / 0.0	61337. / 771.18	1.53 / 0.10	404. / 0.01	923. / -0.002	*XS*	BY

END OF THIS PROFILE

100 yr NP

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 18,DATE= 1/10/78

WATER-SURFACE PROFILE FOR: W BR SWARTZ CK MOUTH TO BRISTOL RD CSG HOLTSLAG
PAGE 1 OF 1. PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HDR FW ANALYSIS I

SECTD AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
SC A AT 0 / 751.30	0 / 0.02	2200. /	2891. /	246225. / 751.32	1.83 / 0.76	480. / 0.07	880. /	*IS*	A
SC B AT 500 / 751.35	500 / 0.04	2200. / 0.06	1843. / 0.01	160711. / 751.39	1.89 / 1.19	210. / 0.11	560. / -0.000	*XS*	B
SC C AT 690 / 751.38	190 / 0.07	2200. / 0.04	1240. / 0.01	130694. / 751.45	1.47 / 1.77	414. / 0.13	603. / -0.000	*XS*	C
SC D AT 1250 / 751.52	560 / 0.02	2200. / 0.09	2760. / 0.0	229171. / 751.54	1.59 / 0.80	80. / 0.07	450. / 0.000	*XS*	D
SC E AT 1910 / 751.61	660 / 0.05	2200. / 0.10	1796. / 0.02	140736. / 751.66	2.06 / 1.22	50. / 0.12	390. / -0.000	*XS*	E
SC F AT 2490 / 751.76	580 / 0.05	2200. / 0.15	1774. / 0.00	133687. / 751.81	2.11 / 1.24	245. / 0.12	570. / -0.000	*XS*	F
SC G AT 2790 / 751.83	300 / 0.27	2200. / 0.18	570. / 0.11	60770. / 752.09	1.15 / 3.86	35. / 0.26	125. / -0.000	*XS*	G

FW

END OF THIS PROFILE

100 yr FW

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE=10/13/77

WATER-SURFACE PROFILE FOR: W BR SWARTZ CK BRISTOL RD - LINDEN RD HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
CS H AT 2890 / 752.20	0 / 0.36	2200. /	559. /	72964. / 752.56	1.48 / 3.93	-11. / 0.27	81.	*IS*	H
SC I AT 3240 / 752.72	350 / 0.09	2200. / 0.25	1181. / 0.0	91320. / 752.81	1.06 / 1.86	150. / 0.15	350. / -0.000	*XS*	I
SC J AT 3460 / 752.86	220 / 0.08	1890. / 0.13	1052. / 0.0	74993. / 752.94	1.62 / 1.80	125. / 0.15	325. / -0.000	*XS*	J
SC J5 AT 3780 / 753.03	320 / 0.08	1890. / 0.16	1062. / 0.0	92986. / 753.11	1.61 / 1.78	90. / 0.15	290. / 0.001	*XS*	
SC J7 AT 4000 / 753.12	220 / 0.14	1890. / 0.11	770. / 0.03	74312. / 753.25	1.46 / 2.45	90. / 0.19	240. / -0.000	*XS*	
SC K AT 4080 / 753.12	80 / 0.34	1890. / 0.08	404. / 0.10	45779. / 753.45	1.00 / 4.67	14. / 0.31	73. / 0.017	*XS*	K

END OF THIS PROFILE

100 yr FW

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   17,DATE=10/18/77

WATER-SURFACE PROFILE FOR:  W BR SWARTZ DYE RD TO DSS TOP GULF CR BR HOLTSLAG
PAGE  1 OF  1, PROFILE NUMBER  2,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS/
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
SC  S AT    7410 /     0 /   1890. /   362. /   49723. / 1.09 /   27. /   78.
   755.87 /   0.46 /                 / 756.33 /    5.22 /  0.33/          *IS*
----------------------------------------------------------------------------------
SC S3 AT    7570 /   160 /   1890. /   648. /   67263. / 1.19 /  190. /  290.
   756.34 /   0.16 /   0.17 /   0.0  / 756.50 /    2.92 /  0.21 / 0.000  *XS*
----------------------------------------------------------------------------------
SC  T AT    7890 /   320 /   1890. /   706. /   66730. / 1.09 /  310. /  410.
   756.63 /   0.12 /   0.25 /   0.0  / 756.76 /    2.68 /  0.17 / -0.000 *XS*
----------------------------------------------------------------------------------
SC  U AT    8500 /   610 /   1890. /   713. /   78846. / 1.16 /  240. /  340.
   757.05 /   0.13 /   0.41 /   0.00 / 757.17 /    2.65 /  0.18 / 0.000  *XS*
----------------------------------------------------------------------------------
SC  W AT    8960 /   460 /   1890. /   587. /   65225. / 1.08 /  390. /  490.
   757.34 /   0.17 /   0.32 /   0.02 / 757.52 /    3.22 /  0.21 / 0.000  *XS*
----------------------------------------------------------------------------------
SC  X AT    9250 /   290 /   1890. /   477. /   60030. / 1.03 /  460. /  520.
   757.57 /   0.25 /   0.26 /   0.04 / 757.82 /    3.96 /  0.24 / 0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ===============================
BR  Y AT    9250 /       /    940. /   176. /   12693. / 1.00 /    0. /   21.
   756.50 /   0.44 /       ...3...  (-.001)   /    5.34 /  0.33 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     948. / RIGHT        0. /                *RG*
----------------------------------------------------------------------------------
SC  Y AT    9340 /    90 /   1890. /   526. /   57351. / 1.28 /    0. /  125.
   757.66 /   0.26 /   0.09 /   0.00 / 757.92 /    3.59 /  0.28 / 0.003  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   575. /   64876. / 1.24 /    0. /  125.
   758.05 /   0.21 /                 / 758.26 /    3.29 /  0.25 /          *AS*
============================ END BRIDGE ANALYSIS =================================
SC  Z AT    9420 /    80 /   1890. /   900. /  113563. / 1.11 /  370. /  52
```

A thru K
2 pages preceding
previously checked

S
T
U
V
W
X
Y

Floodway

Floodway

```
756.34 /   0.16 /   0.17 /   0.0  /  756.50 /   2.92 /   0.21 /  0.000  *XS*
-----------------------------------------------------------------------------
SC  T AT    7890 /   320 /   1890. /   706. /   66730. / 1.09 /  310. /  410.
756.63 /   0.12 /   0.25 /   0.0  /  756.76 /   2.68 /   0.17 / -0.000  *XS*
-----------------------------------------------------------------------------
SC  U AT    8500 /   610 /   1890. /   713. /   78846. / 1.16 /  240. /  340.
757.05 /   0.13 /   0.41 /   0.00 /  757.17 /   2.65 /   0.18 /  0.000  *XS*
-----------------------------------------------------------------------------
SC  W AT    8960 /   460 /   1890. /   587. /   65225. / 1.08 /  390. /  490.
757.34 /   0.17 /   0.32 /   0.02 /  757.52 /   3.22 /   0.21 /  0.000  *XS*
-----------------------------------------------------------------------------
SC  X AT    9250 /   290 /   1890. /   477. /   60030. / 1.03 /  460. /  520.
757.57 /   0.25 /   0.26 /   0.04 /  757.82 /   3.96 /   0.24 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR  Y AT    9250 /        /    940. /   176. /   12693. / 1.00 /    0. /   21.
756.50 /   0.44 /        ...3...  (-.001)    /   5.34 /   0.33 /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      948. / RIGHT        0. /              *RG*
-----------------------------------------------------------------------------
SC  Y AT    9340 /    90 /   1890. /   526. /   57351. / 1.28 /    0. /  125.
757.66 /   0.26 /   0.09 /   0.00 /  757.92 /   3.59 /   0.28 /  0.003  *AS*
-----------------------------------------------------------------------------
M = **** / E = **** / K* = **** /   575. /   64876. / 1.24 /    0. /  125.
758.05 /   0.21 /                  /  758.26 /   3.29 /   0.25 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
SC  Z AT    9420 /    80 /   1890. /   900. /  113563. / 1.11 /  370. /  520.
758.22 /   0.08 /   0.04 /   0.0  /  758.30 /   2.10 /   0.13 / -0.000  *XS*
-----------------------------------------------------------------------------
DAMAA AT    9460 /    40 /   1890. /   423. /   29093. / 1.04 /  -85. /   65.
758.14 /   0.32 /   0.04 /   0.12 /  758.46 /   4.47 /   0.42 / -0.001  *XS*
-----------------------------------------------------------------------------
SC AA AT    9500 /    40 /   1890. /   727. /   97120. / 1.17 /  370. /  520.
758.39 /   0.12 /   0.05 /   0.0  /  758.52 /   2.60 /   0.19 / -0.000  *XS*
-----------------------------------------------------------------------------
SC AB AT    9710 /   210 /   1890. /   663. /   88118. / 1.22 /  205. /  355.
758.46 /   0.15 /   0.09 /   0.02 /  758.62 /   2.85 /   0.22 / -0.000  *XS*
-----------------------------------------------------------------------------
SC AC AT    9890 /   180 /   1890. /  1479. /  245898. / 1.00 /  348. /  523.
758.62 /   0.03 /   0.03 /   0.0  /  758.65 /   1.28 /   0.08 / -0.000  *XS*
-----------------------------------------------------------------------------
AC AD AT   10100 /   210 /   1890. /  1716. /  291171. / 1.00 /  338. /  538.
758.62 /   0.02 /   0.01 /   0.0  /  758.64 /   1.10 /   0.07 / -0.017  *XS*
-----------------------------------------------------------------------------
```

END OF THIS PROFILE 100 yr FW

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 15,DATE=10/18/77

WATER-SURFACE PROFILE FOR: W BR SWARTZ DYE RD TO DSS TOP GULF CR BR HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS/

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
SC Y AT 9340 / 758.05	0 / 0.24	1890. /	525. / 758.29	63355. / 3.60	1.18 / 0.25	10. /	110.	*IS*	Y
SC Z AT 9420 / 758.25	80 / 0.08	1890. / 0.04	905. / 0.0 / 758.33	114334. / 2.09	1.11 / 0.13	370. / -0.000	520.	*XS*	Z
OAMAA AT 9460 / 758.17	40 / 0.31	1890. / 0.04	428. / 0.12 / 758.49	29608. / 4.42	1.04 / 0.41	-85. / -0.001	65.	*XS*	AA
SC AA AT 9500 / 758.42	40 / 0.12	1890. / 0.05	732. / 0.0 / 758.55	98014. / 2.58	1.17 / 0.19	370. / 0.007	520.	*XS*	AB
SC AB AT 9710 / 758.50	210 / 0.15	1890. / 0.09	668. / 0.02 / 758.65	88904. / 2.83	1.22 / 0.21	205. / -0.000	355.	*XS*	AC
SC AC AT 9890 / 758.65	180 / 0.03	1890. / 0.03	1484. / 0.0 / 758.68	247224. / 1.27	1.00 / 0.08	348. / -0.000	523.	*XS*	AD
AC AD AT 10100 / 758.65	210 / 0.02	1890. / 0.01	1722. / 0.0 / 758.67	292723. / 1.10	1.00 / 0.07	338. / -0.017	538.	*XS*	AE
SC AE AT 10240 / 758.61	140 / 0.15	1890. / 0.02	665. / 0.07 / 758.76	84273. / 2.84	1.19 / 0.22	320. / -0.000	470.	*XS*	
SC AF AT 10380 / 758.66	140 / 0.22	1890. / 0.09	529. / 0.04 / 758.88	67233. / 3.57	1.10 / 0.28	500. / -0.000	650.	*XS*	
SC AH AT 10880 / 759.06	500 / 0.26	1890. / 0.42	511. / 0.02 / 759.32	63807. / 3.70	1.22 / 0.29	210. / -0.000	360.	*XS*	

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   34,DATE=10/20/77

WATER-SURFACE PROFILE FOR:  W BR SWART7 CK GOLF C BR TO ELMS RD      HOLTSLAG
PAGE  1 OF  1, PROFILE NUMBER  2,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
SC AE AT   10240 /      0 /   1890. /   577. /   77772. / 1.06 /  330. /  430.
   758.61 /   0.18 /                  / 758.79 /    3.28 /  0.24/          *IS*
----------------------------------------------------------------------------------
SC AF AT   10380 /    140 /   1890. /   515. /   67313. / 1.04 /  505. /  605.
   758.68 /   0.22 /   0.10 /   0.02 / 758.90 /    3.67 /  0.28 / -0.000  *XS*
----------------------------------------------------------------------------------
SC AH AT   10880 /    500 /   1890. /   483. /   63705. / 1.11 /  225. /  325.
   759.08 /   0.26 /   0.42 /   0.02 / 759.34 /    3.91 /  0.29 / -0.000  *XS*
----------------------------------------------------------------------------------
SC AI AT   11090 /    210 /   1890. /   521. /   74753. / 1.11 /   80. /  180.
   759.27 /   0.23 /   0.16 /   0.0  / 759.50 /    3.63 /  0.26 / -0.000  *XS*
----------------------------------------------------------------------------------
SC AJ AT   11240 /    150 /   1890. /   421. /   60866. / 1.17 /   32. /   98.
   759.32 /   0.37 /   0.12 /   0.07 / 759.69 /    4.49 /  0.30 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR AJ AT   11240 /        /   1890. /   326. /   40303. / 1.00 /    6. /   52.
   759.32 /   0.52 /        ...1...  (-.001)    /    5.80 /  0.38 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                *RG*
----------------------------------------------------------------------------------
SC AK AT   11380 /    140 /   1890. /   330. /   46009. / 1.00 /  -74. /  -23.
   759.43 /   0.51 /   0.18 /   0.07 / 759.94 /    5.73 /  0.38 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = 0.00 / E = 0.0  / K* = 0.01 /   330. /   46040. / 1.00 /  -74. /  -23.
   759.43 /   0.51 /                  / 759.94 /    5.73 /  0.38 /          *AS*
============================ END BRIDGE ANALYSIS ================================
SCAK5 AT   11790 /    410 /   1890. /   482. /   75023. / 1.02 /  430. /  530.
   760.12 /   0.24 /   0.42 /   0.0  / 760.37 /    3.92 /  0.25 / -0.000  *XS*
----------------------------------------------------------------------------------
SC AL AT   12000 /    210 /   1890. /   690. /   94280. / 1.45 /  620. /  720.
   760.30 /   0.17 /   0.11 /   0.0  / 760.47 /    2.74 /  0.20 / -0.000  *XS*
----------------------------------------------------------------------------------
```

AF

AG

AH

AI

AJ

AK

AL

```
759.08 /   0.26 /   0.42 /   0.02 /  759.34 /   3.91 /   0.29 / -0.000   *XS*  AH
-----------------------------------------------------------------------------
SC AI AT   11090 /   210 /   1890. /   521. /   74753. / 1.11 /   80. /  180.  AI
759.27 /   0.23 /   0.16 /   0.0  /  759.50 /   3.63 /   0.26 / -0.000   *XS*
-----------------------------------------------------------------------------
SC AJ AT   11240 /   150 /   1890. /   421. /   60866. / 1.17 /   32. /   98.  AJ
759.32 /   0.37 /   0.12 /   0.07 /  759.69 /   4.49 /   0.30 / -0.000   *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR AJ AT   11240 /        /   1890. /   326. /   40303. / 1.00 /    6. /   52.
759.32 /   0.52 /        ...1...  (-.001)    /   5.80 /   0.38 /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /             *RG*
-----------------------------------------------------------------------------
SC AK AT   11380 /   140 /   1890. /   330. /   46009. / 1.00 /  -74. /  -23.  AK
759.43 /   0.51 /   0.18 /   0.07 /  759.94 /   5.73 /   0.38 / -0.000   *AS*
-----------------------------------------------------------------------------
M = 0.00 / E = 0.0  / K* = 0.01 /   330. /   46040. / 1.00 /  -74. /  -23.
759.43 /   0.51 /                 /  759.94 /   5.73 /   0.38 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
SCAK5 AT   11790 /   410 /   1890. /   482. /   75023. / 1.02 /  430. /  530.
760.12 /   0.24 /   0.42 /   0.0  /  760.37 /   3.92 /   0.25 / -0.000   *XS*
-----------------------------------------------------------------------------
SC AL AT   12000 /   210 /   1890. /   690. /   94280. / 1.45 /  620. /  720.  AL
760.30 /   0.17 /   0.11 /   0.0  /  760.47 /   2.74 /   0.20 / -0.000   *XS*
-----------------------------------------------------------------------------
SC AM AT   12410 /   410 /   1890. /   642. /   91275. / 1.37 /  580. /  680.  AM
760.47 /   0.19 /   0.17 /   0.01 /  760.65 /   2.95 /   0.21 / -0.000   *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR AM AT   12410 /        /   1529. /   163. /   15479. / 1.00 /  -98. /  -66.
760.47 /   1.38 /        ...1...  (-.001)    /   9.41 /   0.73 /          *RO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      342. / RIGHT        0. /             *RG*
-----------------------------------------------------------------------------
SC AN AT   12710 /   300 /   1890. /  1010. /  121218. / 1.46 /  735. /  885.
760.67 /   0.08 /   0.10 /   0.0  /  760.75 /   1.87 /   0.16 / -0.000   *AS*
-----------------------------------------------------------------------------
M = 0.21 / E = 0.0  / K* = 0.38 /  1091. /  135775. / 1.44 /  735. /  885.  AN
761.21 /   0.07 /                 /  761.27 /   1.73 /   0.14 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
```

END OF THIS PROFILE

100 yr FW

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   15,DATE=10/21/77


WATER-SURFACE PROFILE FOR:  W BR SWARTZ CK  SEC AN TO ELMS RD        HOLTSLAG
PAGE  1 OF  1, PROFILE NUMBER  2,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
SC AN AT   12710 /     0 /   1890. /  1108. /  138923. / 1.44 /  735. /  885.
   761.32 /   0.07 /                 /  761.38 /    1.71 /   0.14/          *IS*
----------------------------------------------------------------------------------
SC AO AT   13010 /   300 /   1890. /   664. /  100576. / 1.03 /  450. /  550.
   761.36 /   0.13 /   0.08 /   0.03 /  761.49 /    2.85 /   0.19 / -0.000  *XS*
----------------------------------------------------------------------------------
SC AP AT   13650 /   640 /   1890. /   563. /   79935. / 1.31 /  125. /  200.
   761.61 /   0.23 /   0.28 /   0.05 /  761.84 /    3.36 /   0.22 /  0.015  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR AP AT   13650 /       /   1890. /   402. /   50623. / 1.00 /   38. /   94.
   761.61 /   0.34 /       ...1...  (-.001)    /    4.71 /   0.31 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /               *RG*
----------------------------------------------------------------------------------
SC AQ AT   14010 /   360 /   1890. /   439. /   59105. / 1.01 /   55. /  115.
   761.86 /   0.29 /   0.27 /   0.03 /  762.16 /    4.30 /   0.27 /  0.008  *AS*
----------------------------------------------------------------------------------
   M = 0.00 / E = 0.0  / K* = 0.01 /   439. /   59128. / 1.01 /   55. /  115.
   761.87 /   0.29 /                 /  762.16 /    4.30 /   0.27 /          *AS*
============================ END BRIDGE ANALYSIS ================================
SC AR AT   14500 /   490 /   1890. /   435. /   54719. / 1.09 /  230. /  290.
   762.39 /   0.32 /   0.54 /   0.01 /  762.71 /    4.35 /   0.29 /  0.000  *XS*
----------------------------------------------------------------------------------
SC AS AT   14620 /   120 /   1750. /   446. /   56809. / 1.09 /  230. /  290.
   762.58 /   0.26 /   0.13 /   0.0  /  762.84 /    3.93 /   0.26 / -0.000  *XS*
----------------------------------------------------------------------------------
SC AT AT   15000 /   380 /   1750. /   456. /   56007. / 1.31 /  110. /  170.
   762.93 /   0.30 /   0.37 /   0.02 /  763.23 /    3.84 /   0.25 / -0.000  *XS*
----------------------------------------------------------------------------------
SC AU AT   15500 /   500 /   1750. /   549. /   72708. / 1.03 /  100. /  160.
   763.43 /   0.16 /   0.38 /   0.0  /  763.59 /    3.19 /   0.18 / -0.014  *XS*
----------------------------------------------------------------------------------
SC AV AT   16380 /   700 /   1750. /   550. /   [illegible]
```

AN

AØ

AP

AQ

AR

AS

AT

AU

```
[illegible] / [illegible] / [illegible] (-.001) / 4.71 / 0.31 /                    *HO*
-----------------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                     *RG*
-----------------------------------------------------------------------------------------
SC AQ AT   14010 /   360 /   1890. /   439. /   59105. / 1.01 /   55. /  115.
   761.86 /   0.29 /   0.27 /   0.03 /  762.16 /   4.30 /   0.27 /  0.008  *AS*
-----------------------------------------------------------------------------------------
   M = 0.00 / E = 0.0  / K* = 0.01 /   439. /   59128. / 1.01 /   55. /  115.
   761.87 /   0.29 /                 /  762.16 /   4.30 /   0.27 /          *AS*
============================ END BRIDGE ANALYSIS ============================
SC AR AT   14500 /   490 /   1890. /   435. /   54719. / 1.09 /  230. /  290.
   762.39 /   0.32 /   0.54 /   0.01 /  762.71 /   4.35 /   0.29 /  0.000  *XS*
-----------------------------------------------------------------------------------------
SC AS AT   14620 /   120 /   1750. /   446. /   56809. / 1.09 /  230. /  290.
   762.58 /   0.26 /   0.13 /   0.0  /  762.84 /   3.93 /   0.26 / -0.000  *XS*
-----------------------------------------------------------------------------------------
SC AT AT   15000 /   380 /   1750. /   456. /   56007. / 1.31 /  110. /  170.
   762.93 /   0.30 /   0.37 /   0.02 /  763.23 /   3.84 /   0.25 / -0.000  *XS*
-----------------------------------------------------------------------------------------
SC AU AT   15500 /   500 /   1750. /   549. /   72708. / 1.03 /  100. /  160.
   763.43 /   0.16 /   0.38 /   0.0  /  763.59 /   3.19 /   0.18 / -0.014  *XS*
-----------------------------------------------------------------------------------------
SC AV AT   16280 /   780 /   1750. /   559. /   72323. / 1.00 /  530. /  590.
   763.89 /   0.15 /   0.45 /   0.0  /  764.04 /   3.13 /   0.18 /  0.000  *XS*
-----------------------------------------------------------------------------------------
SC AW AT   17000 /   720 /   1750. /   522. /   65035. / 1.00 /  550. /  610.
   764.35 /   0.17 /   0.47 /   0.01 /  764.52 /   3.35 /   0.20 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==========================
BR AW AT   17000 /       /   1750. /   331. /   49430. / 1.00 /    0. /   36.
   764.35 /   0.43 /       ...1...  (-.001)   /   5.28 /   0.29 /          *BO*
-----------------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                     *RG*
-----------------------------------------------------------------------------------------
SC AX AT   17110 /   110 /   1750. /   400. /   51171. / 1.01 /   20. /   80.
   764.39 /   0.30 /   0.10 /   0.06 /  764.69 /   4.38 /   0.28 / -0.000  *AS*
-----------------------------------------------------------------------------------------
   M = 0.00 / E = 0.14 / K* = 0.01 /   400. /   51198. / 1.01 /   20. /   80.
   764.39 /   0.30 /                 /  764.69 /   4.38 /   0.28 /          *AS*
============================ END BRIDGE ANALYSIS ============================
```

AQ

AR

AS

AT

AU

AV

AW

AX

100 YR FW

END OF THIS PROFILE

SURFACE PROFILE FOR: W BR SWARTZ CK ELMS RD TO RAUBINIGER RD HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
SC AX AT   17110 /      0 /   1750. /   415. /   54129. / 1.02 /   20. /   80.
   764.65 /   0.28 /                  / 764.93 /    4.21 /  0.26/          *IS*
----------------------------------------------------------------------------------
SC AY AT   17770 /    660 /   1750. /   558. /   83735. / 1.08 /  625. /  700.
   765.21 /   0.16 /   0.45 /   0.0  / 765.38 /    3.13 /  0.20 / -0.000  *XS*
----------------------------------------------------------------------------------
SC AZ AT   18400 /    630 /   1750. /   623. /   95512. / 1.05 /  585. /  660.
   765.49 /   0.13 /   0.24 /   0.0  / 765.62 /    2.81 /  0.17 / -0.000  *XS*
----------------------------------------------------------------------------------
SC BA AT   18965 /    565 /   1750. /   516. /   70632. / 1.12 /    2. /   77.
   765.71 /   0.20 /   0.26 /   0.04 / 765.91 /    3.39 /  0.21 / -0.000  *XS*
----------------------------------------------------------------------------------
SC BB AT   19575 /    610 /   1750. /   553. /   70826. / 1.00 /  499. /  574.
   766.13 /   0.16 /   0.37 /   0.0  / 766.28 /    3.16 /  0.20 / -0.000  *XS*
----------------------------------------------------------------------------------
SC BC AT   20200 /    625 /   1750. /   656. /   98494. / 1.05 /  650. /  725.
   766.44 /   0.12 /   0.27 /   0.0  / 766.56 /    2.67 /  0.16 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR BC AT   20200 /        /   1418. /   371. /   47464. / 1.00 /    0. /   35.
   765.50 /   0.23 /        ...3...  (-.001)  /    3.82 /  0.21 /         *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      309. / RIGHT       10. /              *RG*
----------------------------------------------------------------------------------
SC BD AT   20300 /    100 /   1750. /   630. /   78124. / 1.20 /  -20. /   80.
   766.47 /   0.14 /   0.04 /   0.01 / 766.61 /    2.78 /  0.19 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   649. /   81422. / 1.20 /  -20. /   80.
   766.66 /   0.14 /                  / 766.80 /    2.70 /  0.18 /         *AS*
============================ END BRIDGE ANALYSIS ==============================
```

AX
AY
AZ
BA
BB
BC
BD

END OF THIS PROFILE

```
ATER-SURFACE PROFILE FOR:  W BR SWARTZ CK RAUBINGER TO FAIRCHILD RD HOLTSLAG
AGE  1 OF  1, PROFILE NUMBER  2,   UPSTREAM COMPUTATIONS
** FLOODWAY ANALYSIS *** HOR FW ANALYSIS
==================================================================================
FCTN AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
 WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
C BD AT   20300 /     0 /   1750. /   582. /   73329. / 1.26 /  -67. /   83.
  766.78 /   0.18 /                 /  766.96 /    3.01 /   0.21/          *IS*
----------------------------------------------------------------------------------
C BE AT   21030 /   730 /   1750. /   914. /   80186. / 1.69 /  -80. /  120.
  767.24 /   0.10 /   0.38 /   0.0  /  767.34 /    1.91 /   0.16 / -0.000  *XS*
----------------------------------------------------------------------------------
C BF AT   21700 /   670 /   1750. /   847. /   91039. / 1.27 /  325. /  525.
  767.53 /   0.08 /   0.28 /   0.0  /  767.62 /    2.07 /   0.15 / -0.000  *XS*
----------------------------------------------------------------------------------
C BG AT   22490 /   790 /   1750. /   815. /   85433. / 1.36 /  330. /  530.
  767.84 /   0.10 /   0.31 /   0.01 /  767.94 /    2.15 /   0.15 / -0.000  *XS*
----------------------------------------------------------------------------------
C BH AT   23180 /   690 /   1750. /   584. /   76848. / 1.02 /  520. /  595.
  768.14 /   0.14 /   0.32 /   0.02 /  768.28 /    3.00 /   0.18 / -0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
P BH AT   23180 /       /   1750. /   362. /   43245. / 1.00 /    0. /   40.
  768.14 /   0.36 /       ...1...  (-.001)    /    4.83 /   0.28 /          *BO*
----------------------------------------------------------------------------------
MBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /               *RG*
----------------------------------------------------------------------------------
C BI AT   23260 /    90 /   1750. /   396. /   47244. / 1.00 /   20. /   70.
  768.15 /   0.30 /   0.07 /   0.11 /  768.45 /    4.42 /   0.28 / -0.011  *AS*
----------------------------------------------------------------------------------
  M = 0.0  / E = 1.00 / K* = 0.01 /   396. /   47261. / 1.00 /   20. /   70.
  768.15 /   0.30 /                 /  768.45 /    4.42 /   0.28 /          *AS*
========================== END BRIDGE ANALYSIS ============================
```

BD

BE

BF

BG

BH

BI

END OF THIS PROFILE

100 yr FWD analysis

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 19,DATE= 1/20/78

WATER-SURFACE PROFILE FOR: W BR SWARTZ CK MORRISH TO FAIRCHILD RD HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS

SECID AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*	
SC BI AT	23260	0	1750.	426.	52653.	1.00	20.	70.	
768.75	0.26			769.01	4.11	0.25		*IS*	BI
SCBI2 AT	23360	100	1750.	432.	53706.	1.00	20.	70.	
768.87	0.26	0.11	0.0	769.12	4.05	0.24	-0.000	*XS*	BJ
SC BJ AT	23500	140	1750.	1079.	122786.	1.29	540.	740.	
769.12	0.05	0.07	0.0	769.17	1.62	0.11	-0.018	*XS*	BJ
SC BK AT	24220	720	1750.	1395.	131282.	1.33	625.	925.	
769.27	0.03	0.14	0.0	769.30	1.25	0.10	-0.000	*XS*	BK
SC BL AT	24385	165	1750.	1404.	132499.	1.33	625.	925.	
769.30	0.03	0.03	0.0	769.33	1.25	0.10	0.000	*XS*	BL
SCBL4 AT	24680	295	1750.	1086.	105655.	1.42	200.	500.	
769.35	0.06	0.06	0.01	769.41	1.61	0.13	-0.000	*XS*	
SC BM AT	25185	505	1750.	871.	79298.	1.48	-50.	250.	
769.52	0.09	0.18	0.02	769.61	2.01	0.17	-0.000	*XS*	BM
SC BN AT	25650	465	1750.	816.	80033.	1.24	525.	725.	
769.75	0.09	0.22	0.0	769.84	2.14	0.17	-0.000	*XS*	BN

END OF THIS PROFILE

100 yr FW

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 21,DATE= 1/22/78

WATER-SURFACE PROFILE FOR: W BR SWARTZ CK FAIRCHILD TO SEYMOUR RD HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	HF	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW *ID*	
SC BO AT 25725 / 770.03	0 / 0.13	1750. /		783. / 770.16	76313. / 2.23	1.65 / 0.20	-100. /	100. *IS*	BO
SC BP AT 26190 / 770.28	465 / 0.08	1750. / 0.19	0.0	812. / 770.36	98618. / 2.15	1.17 / 0.16	330. / 0.017	530. *XS*	BP
SC BQ AT 26700 / 770.44	510 / 0.18	1750. / 0.21	0.05	616. / 770.62	74665. / 2.84	1.44 / 0.21	-72. / -0.000	78. *XS*	BQ
SC BR AT 27365 / 770.78	665 / 0.09	1750. / 0.24	0.0	873. / 770.87	112113. / 2.00	1.48 / 0.16	-112. / 0.000	88. *XS*	BR
SC BS AT 28260 / 771.00	895 / 0.06	1750. / 0.19	0.0	1039. / 771.06	126641. / 1.68	1.32 / 0.13	-186. / 0.000	64. *XS*	BS
SC BT AT 29150 / 771.18	890 / 0.07	1750. / 0.18	0.01	1081. / 771.25	118645. / 1.62	1.72 / 0.14	-230. / 0.000	120. *XS*	BT
SC BU AT 29300 / 771.27	150 / 0.00	80. / 0.02	0.0	531. / 771.27	56486. / 0.15	1.05 / 0.01	-40. / -0.000	60. *XS*	BU
SC BV AT 29610 / 771.27	310 / 0.00	80. / 0.00	0.0	617. / 771.27	67832. / 0.13	1.08 / 0.01	665. / -0.001	765. *XS*	BV
SC BW AT 30150 / 771.27	540 / 0.00	80. / 0.00	0.00	563. / 771.27	58534. / 0.14	1.06 / 0.01	-20. / -0.001	80. *XS*	BW
SC BX AT 30770 / 771.27	620 / 0.00	80. / 0.00	0.00	471. / 771.27	39592. / 0.17	1.09 / 0.01	-25. / -0.002	75. *XS*	BX
SC BY AT 31300 / 771.27	530 / 0.00	80. / 0.00	0.0	577. / 771.27	57286. / 0.14	1.02 / 0.01	405. / -0.002	505. *XS*	BY

100 yr FW

END OF THIS PROFILE

00BREAK00

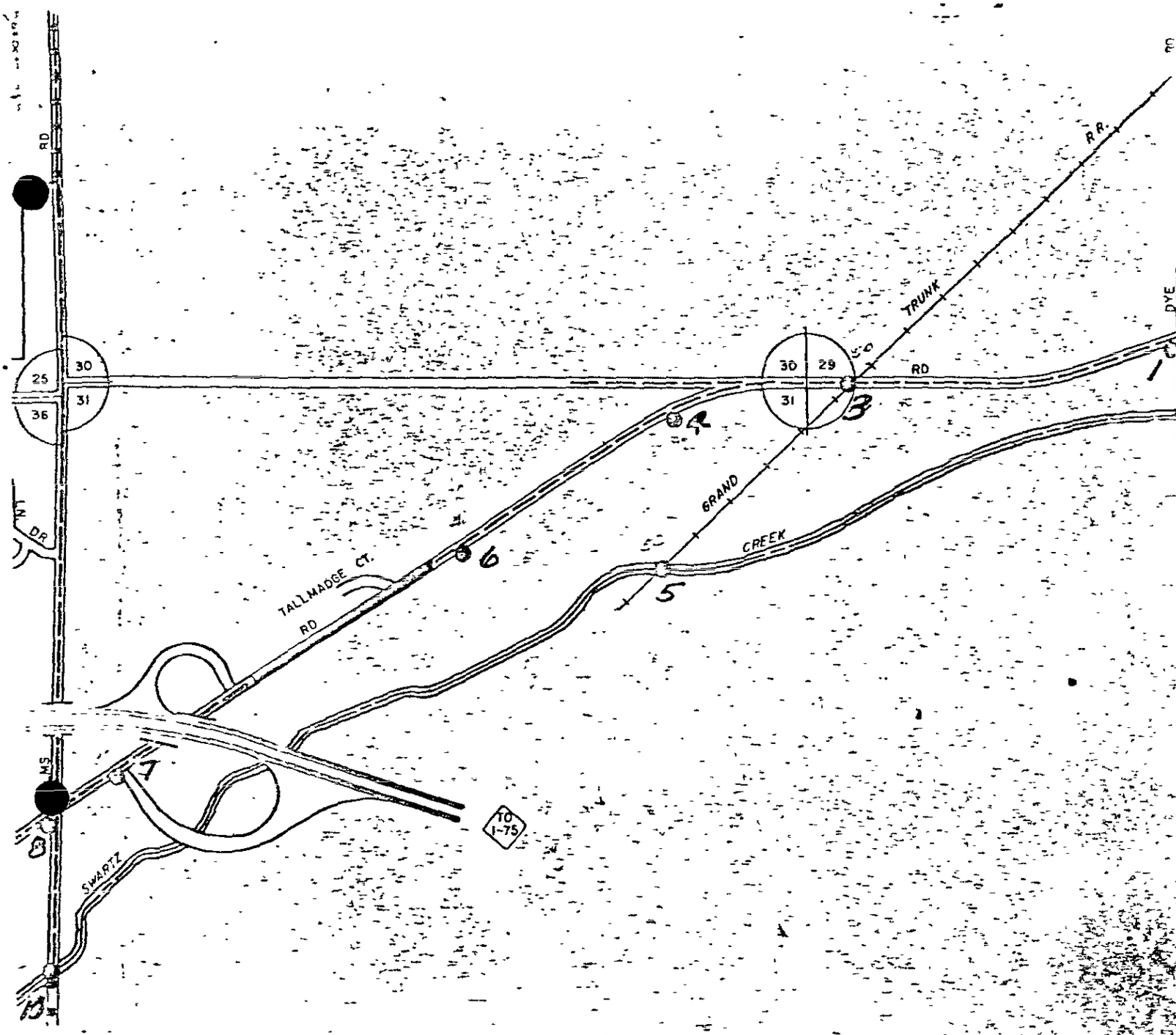
1) COUNTY: Genesee

2) STUDY NAME: City of Swartz creek

3) WATERCOURSE: West Br. Swartz Creek

4) DOCUMENT TYPE: Maps

00BREAK00


RD
25
30
36
31
30
29
31
RD
TRUNK
R.R.
DYE
DR
TALLMADGE
CT.
RD
GRAND
CREEK
MS
SWARTZ
TO
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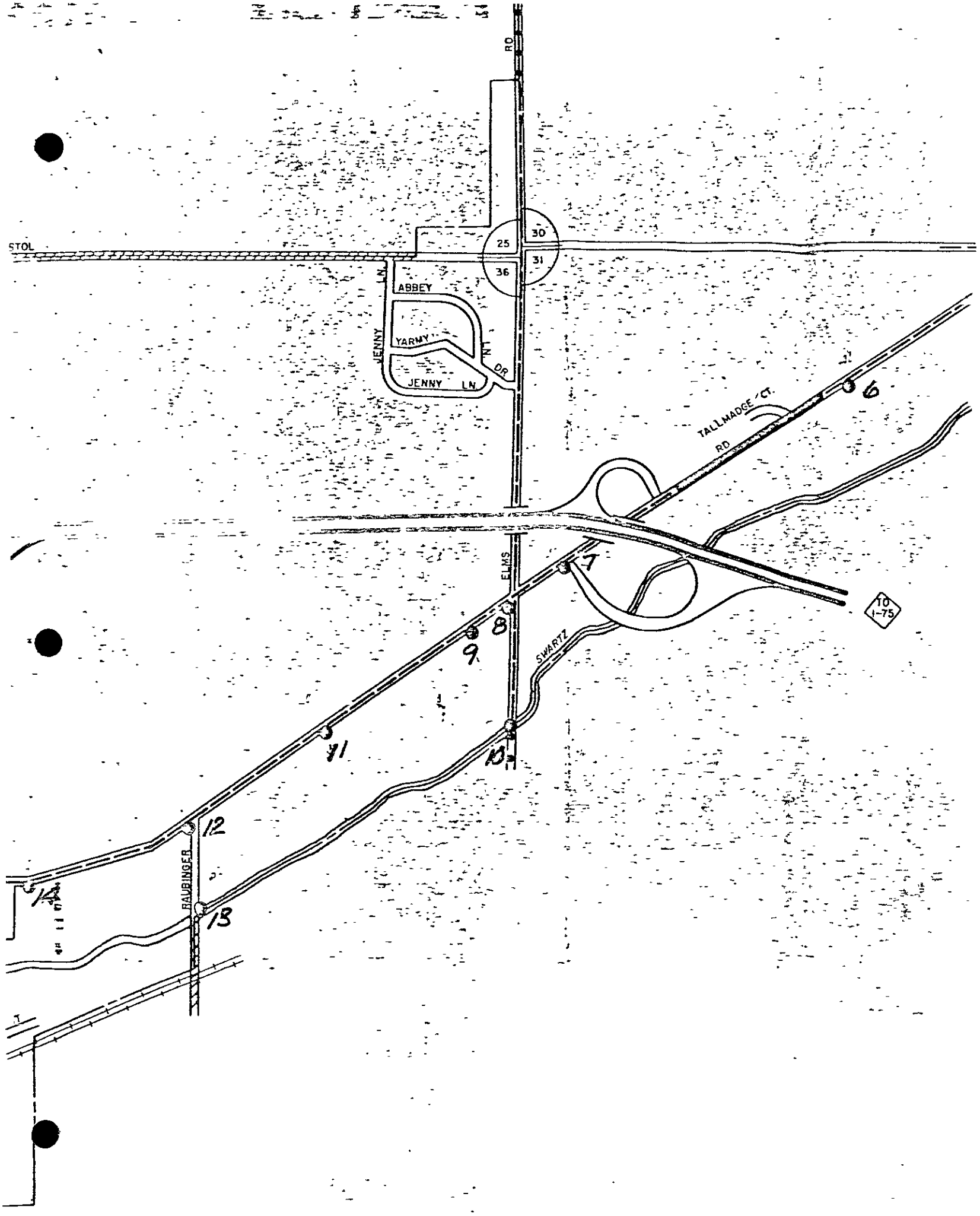
2
3
4
5
6
7
8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STOL
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36
ABBEY
YARMY
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JENNY LN
DR
TALLMADGE CT.
RD
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ELMS
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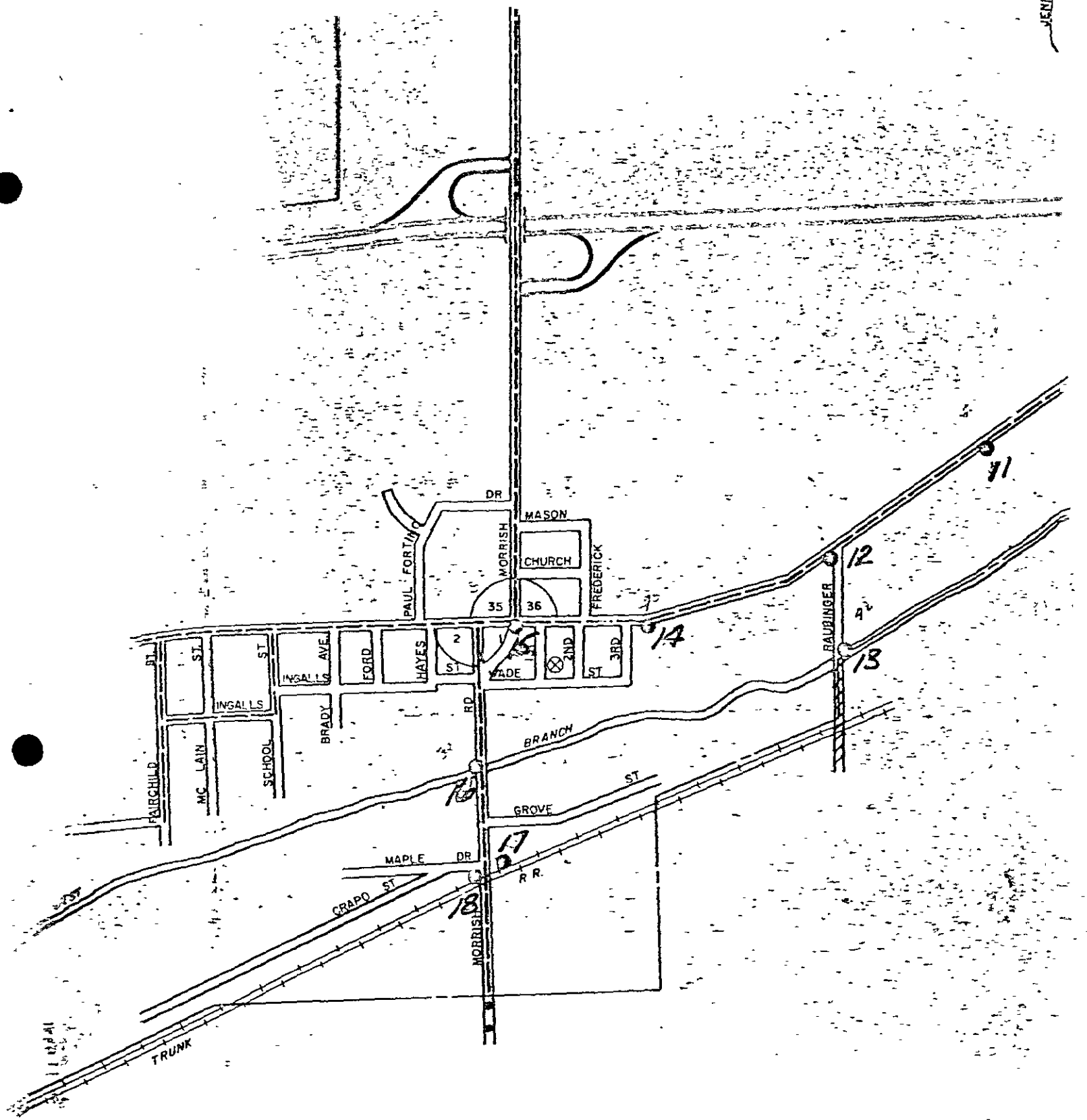
9
SWARTZ
11
10
12
RAUBINGER
13
14
TO I-75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DR
MASON
MORRISH
CHURCH
FREDERICK
PAUL FORTIN
35
36
2
ST
WADE
2ND
3RD
ST
HAYES
FORD
INGALLS AVE.
ST
ST
INGALLS
BRADY
RD
BRANCH
MC LAIN
SCHOOL
FAIRCHILD
ST
GROVE
ST
MAPLE
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R R.
CRAPO ST
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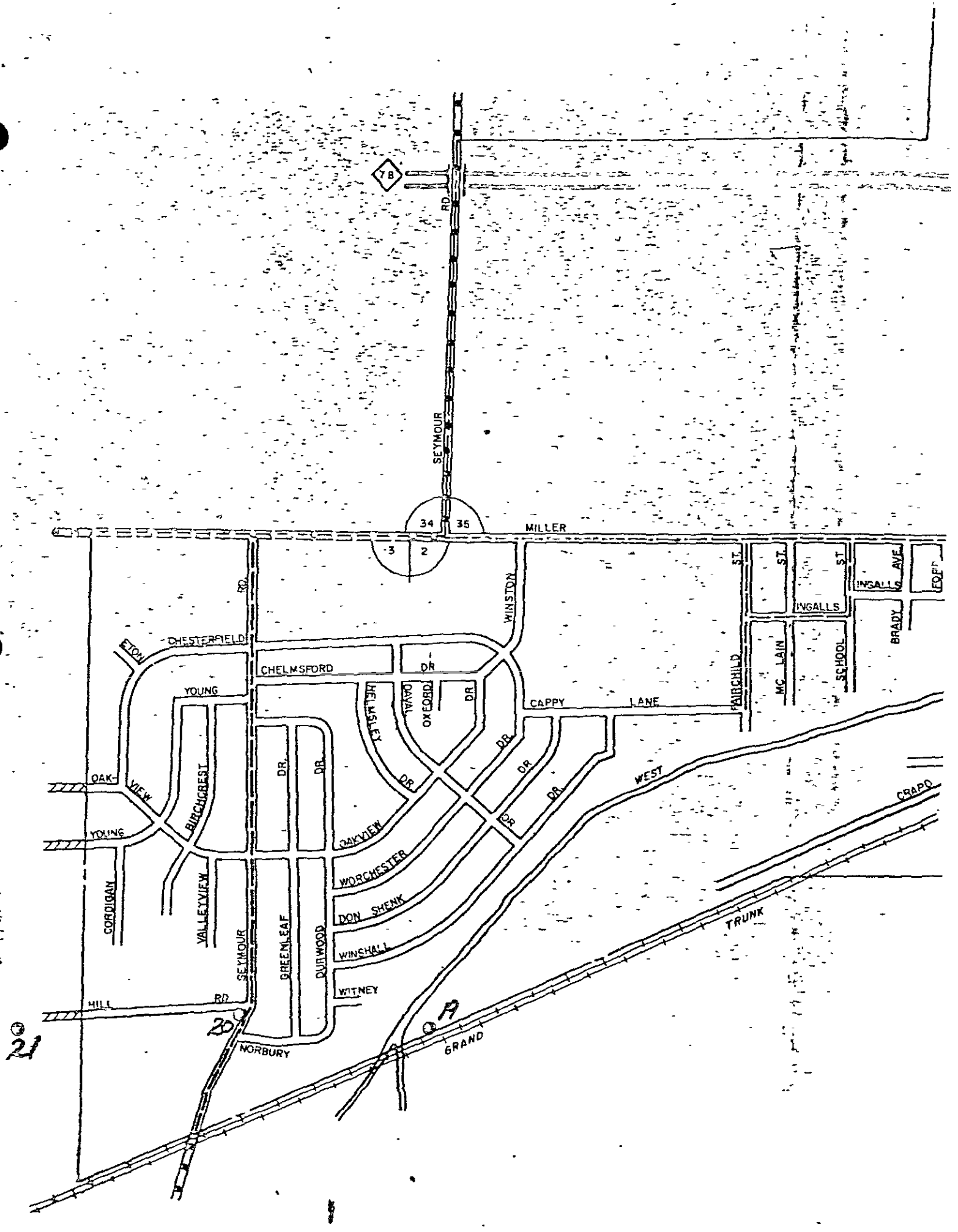
78
RD
SEYMOUR
34
35
MILLER
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2
RD
WINSTON
ST
ST
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INGALLS
AVE
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BRADY
CHESTERFIELD
ETON
CHELMSFORD
DR
YOUNG
WELMSLEY
OXFORD
DR
CAPPY
LANE
FAIRCHILD
MC LAIN
SCHOOL
OAK-
VIEW
BIRCHCREST
DR
DR
DR
DR
DR
DR
DR
WEST
CRAPO
YOUNG
OAKVIEW
WORCHESTER
DON SHENK
WINSHALL
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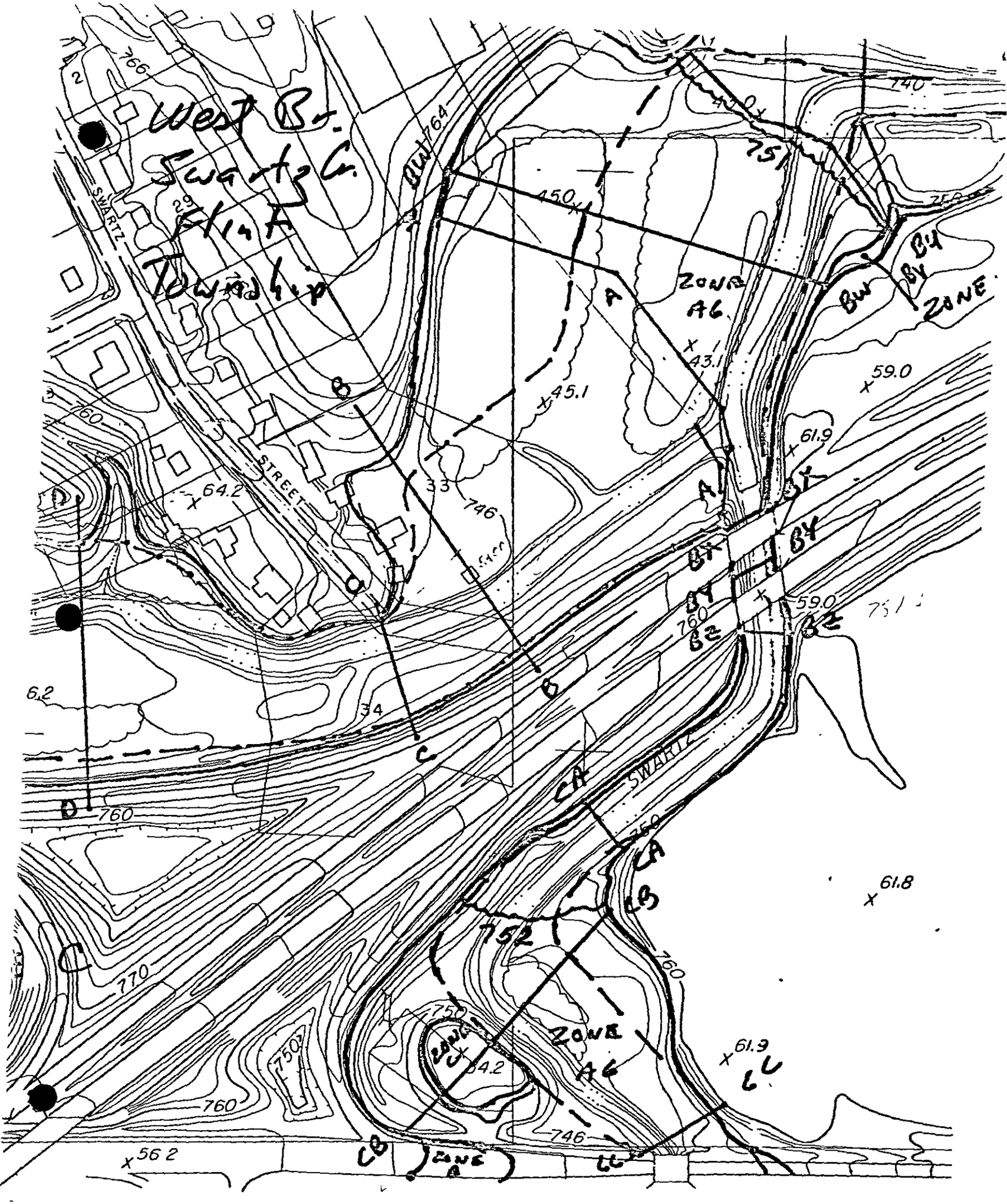
GRAND
21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Swartz Cr.
Flint
Township
SWARTZ
STREET
SWARTZ
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ZONE
ZONE A6
ZONE
ZONE A
A
B
C
D
766
764
760
770
750
752
751
746
740
45.0
45.1
43.1
59.0
61.9
64.2
61.8
61.3
56.2
6.2
33
34
29
2

ACRES
SPRY
STREET
ROAD
STREET
SWARTZ
STREET
RADCLIFF
ZONE C
ZONE A6
A3
ZONE C
74.2
69.2
64.2
46.2
47.0
58.5
59.4
56.2
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Qw 764

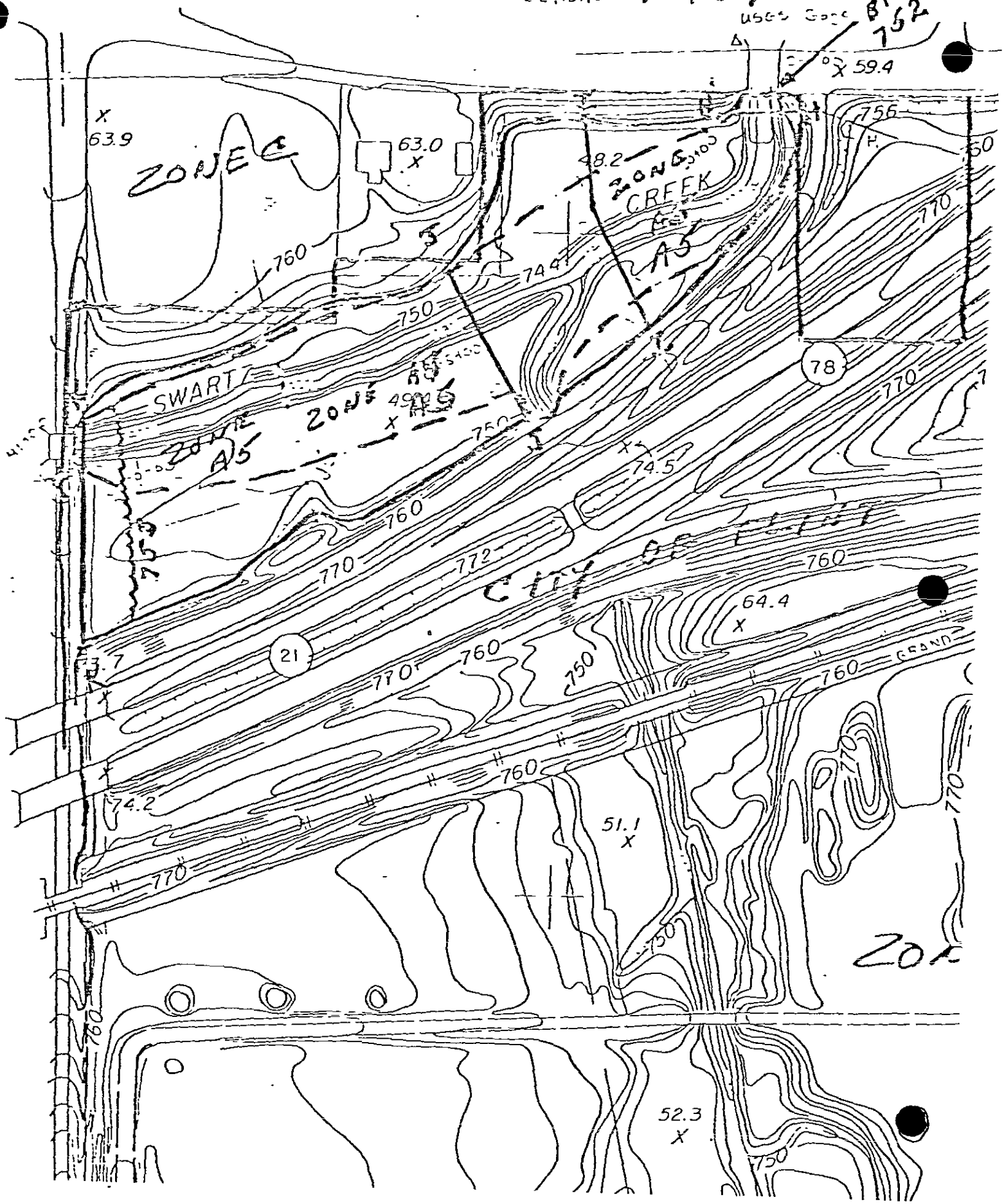
E2,152

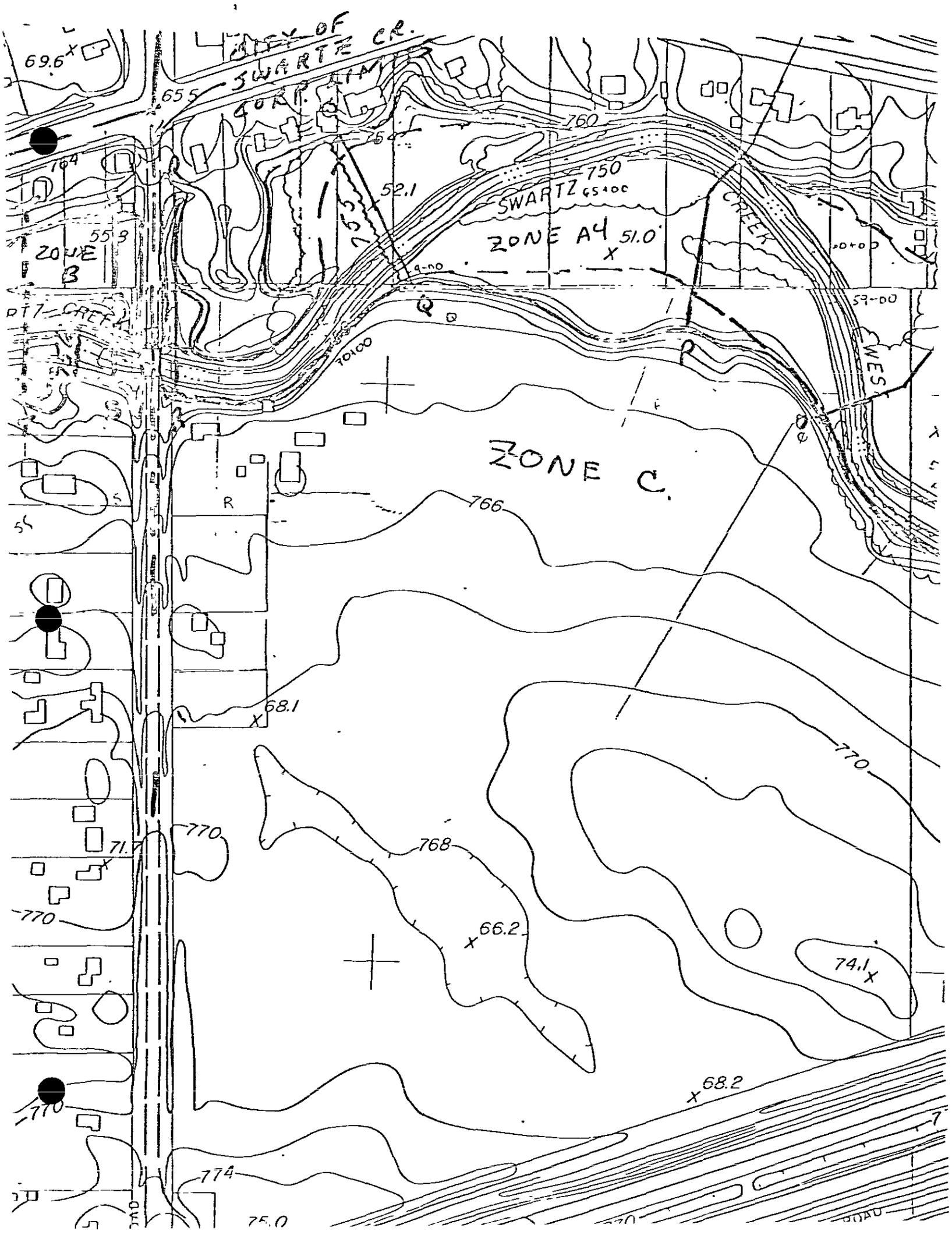
City of FLINT

E 2,151,000

USGS Gage

BFE 752

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655
760
750
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ZONE B
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ZONE C.
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66.2
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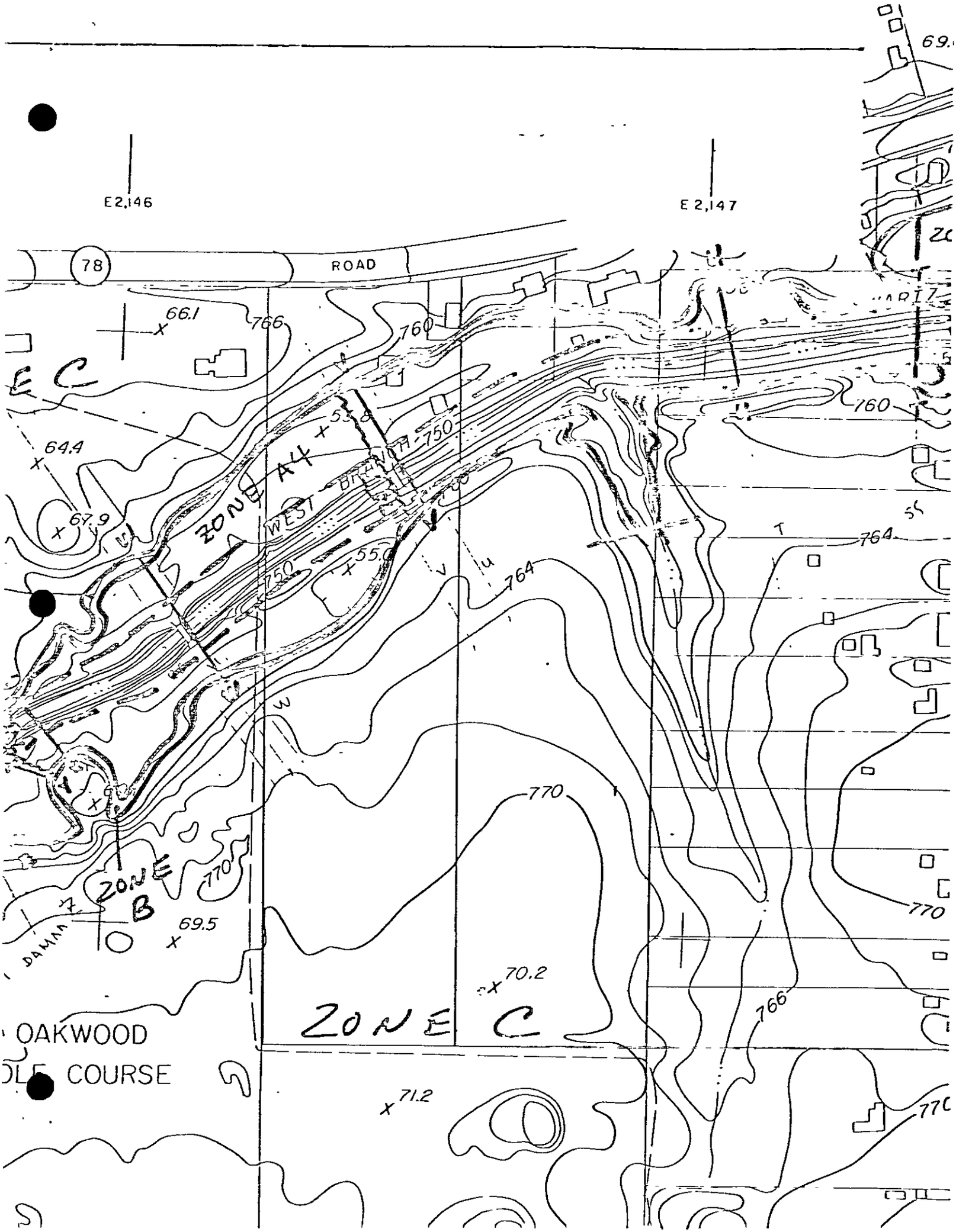
E2,146
E 2,147
78
ROAD
66.1
766
760
64.4
67.9
ZONE A
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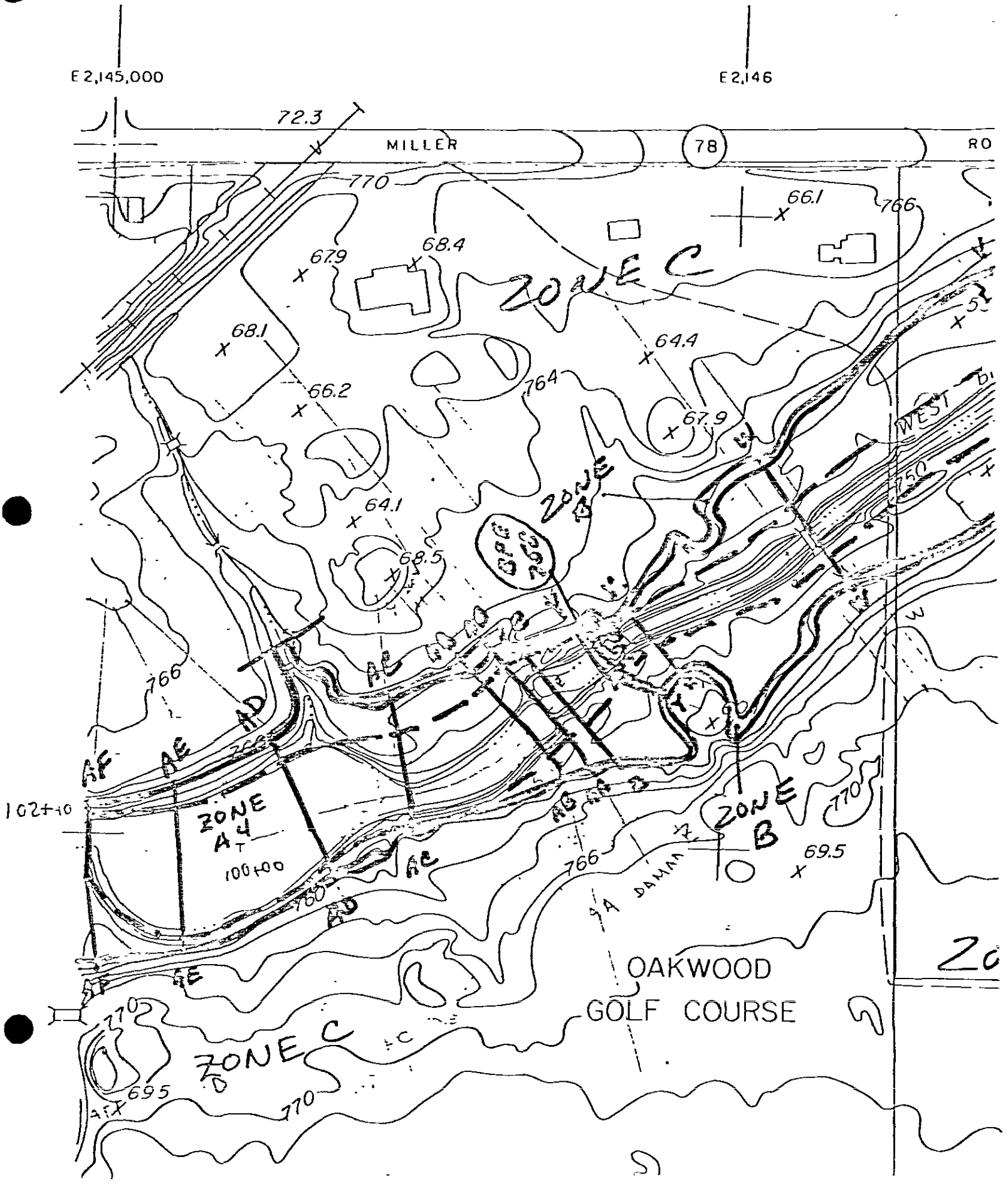
764
770
ZONE B
69.5
70.2
ZONE C
OAKWOOD
COURSE
71.2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E 2,146
MILLER
78
RO
72.3
770
66.1
766
67.9
68.4
ZONE C
68.1
64.4
66.2
764
67.9
WEST
ZONE B
64.1
68.5
766
AF
AE
AD
ZONE A
102+10
100+00
ZONE B
69.5
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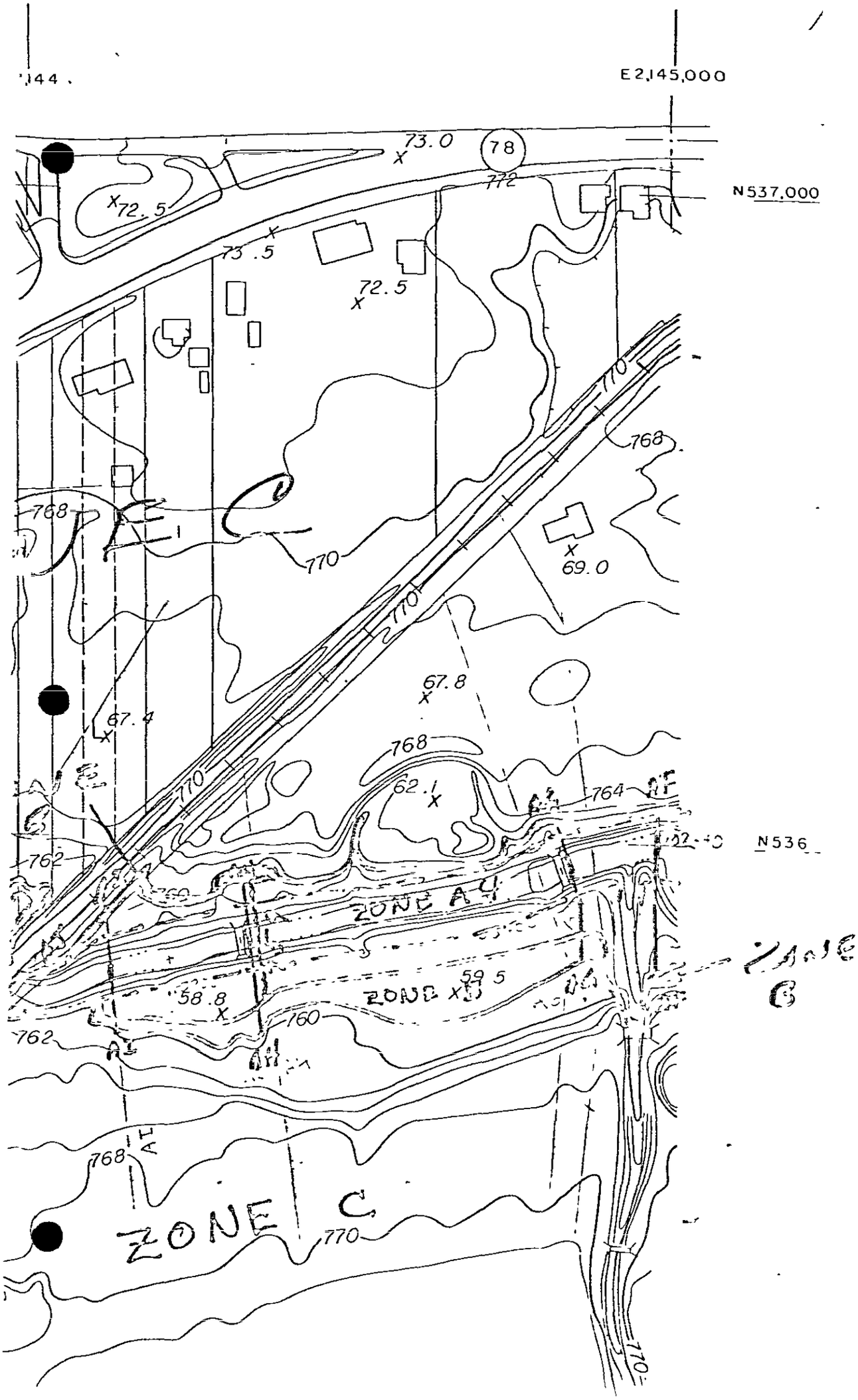
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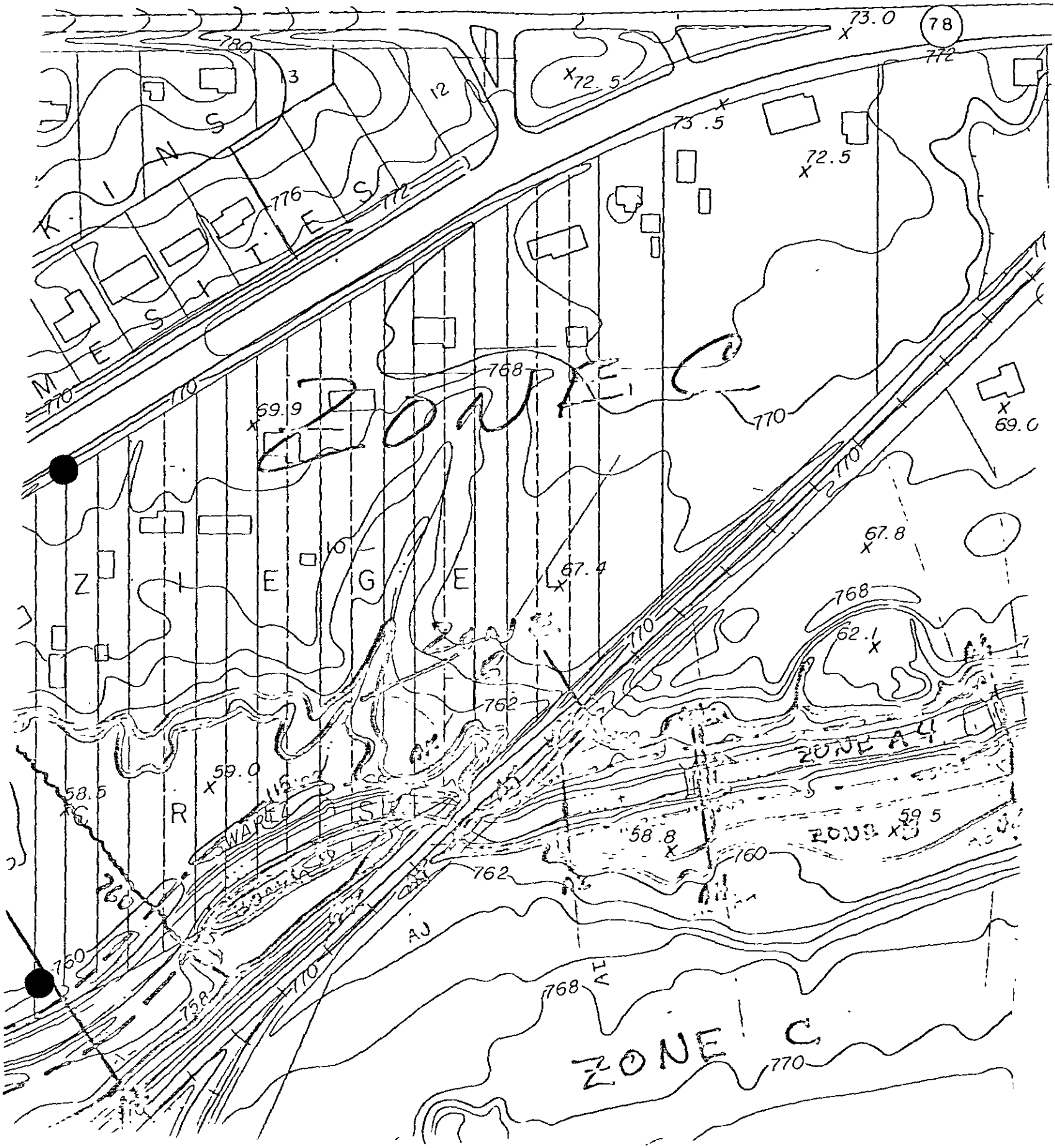
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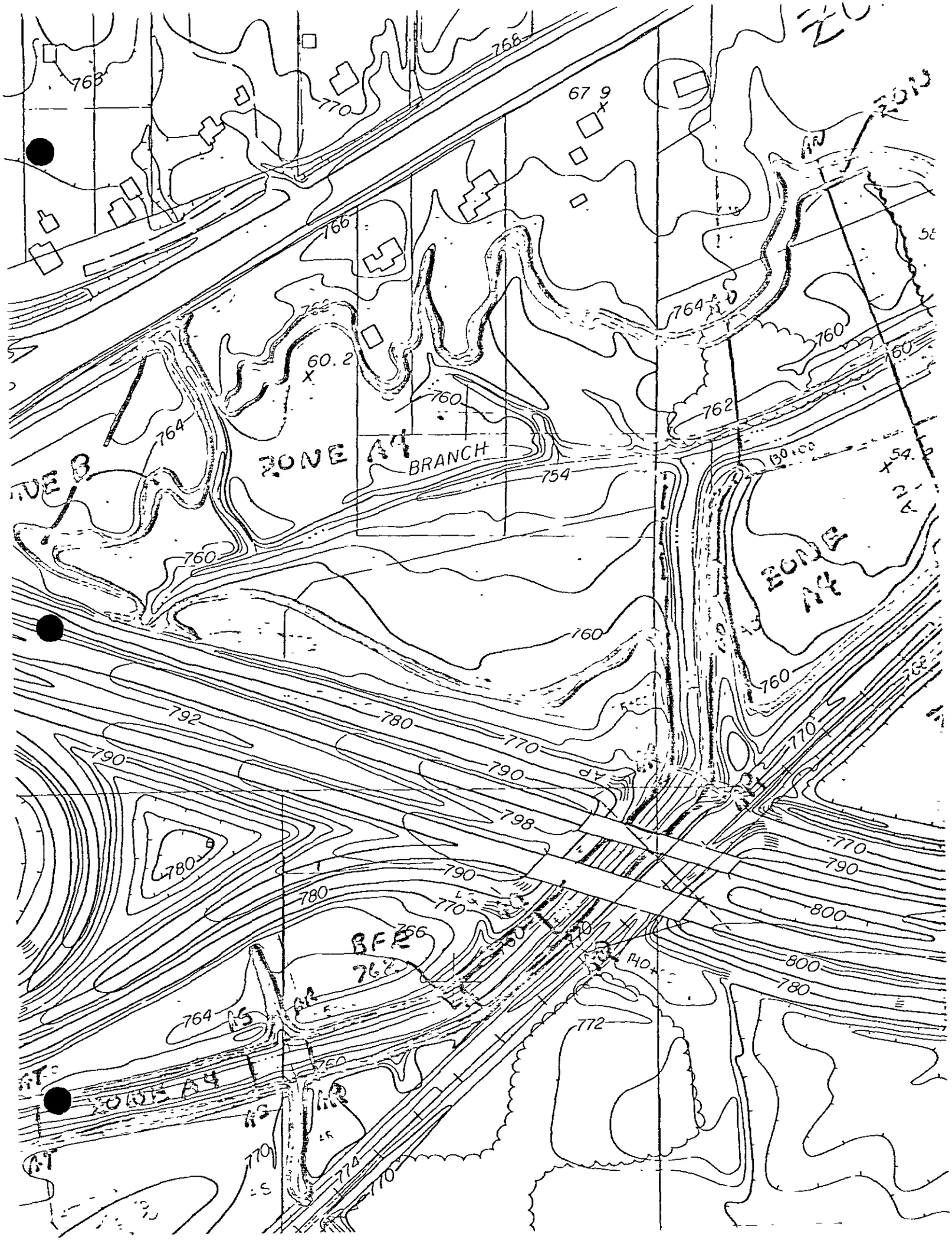
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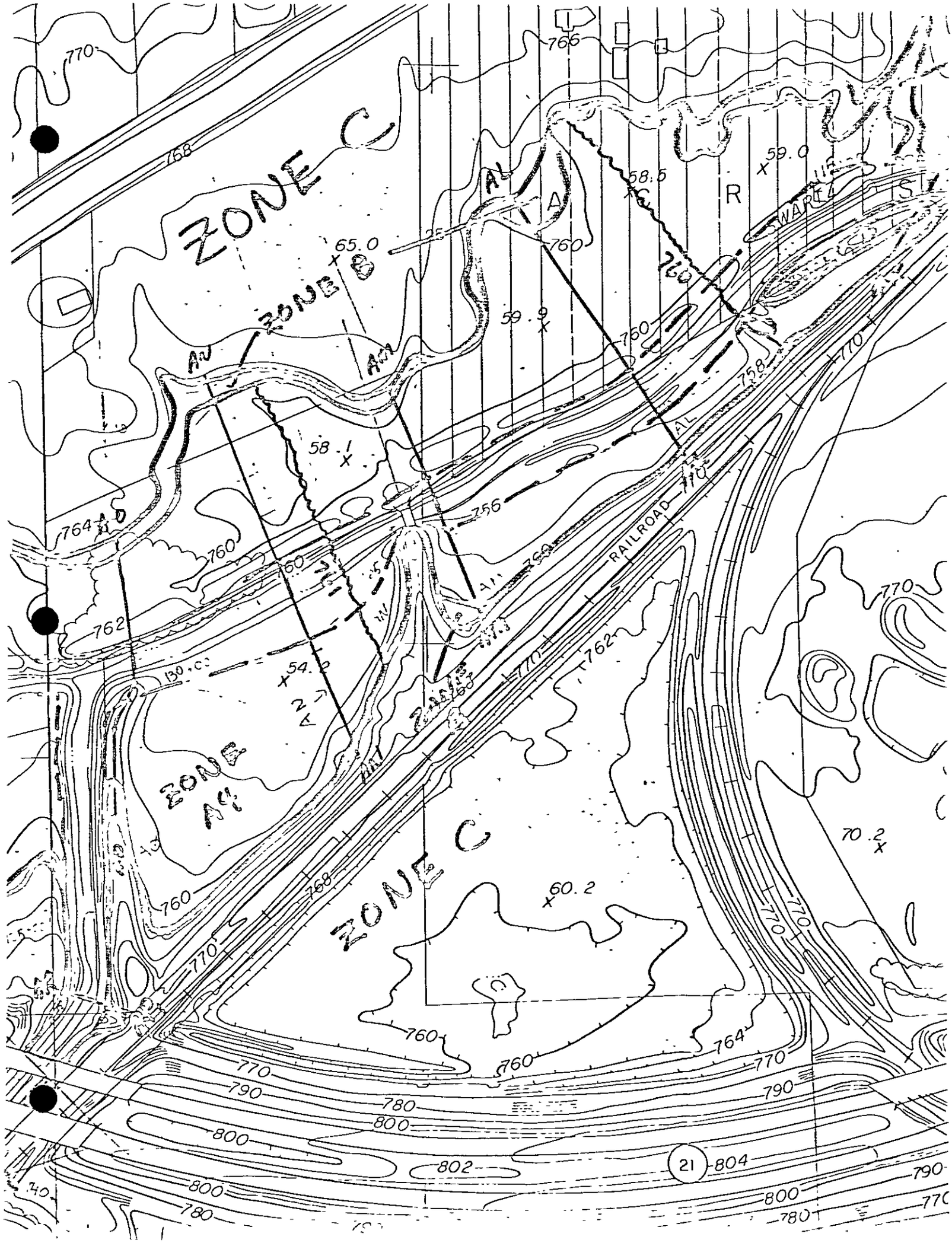
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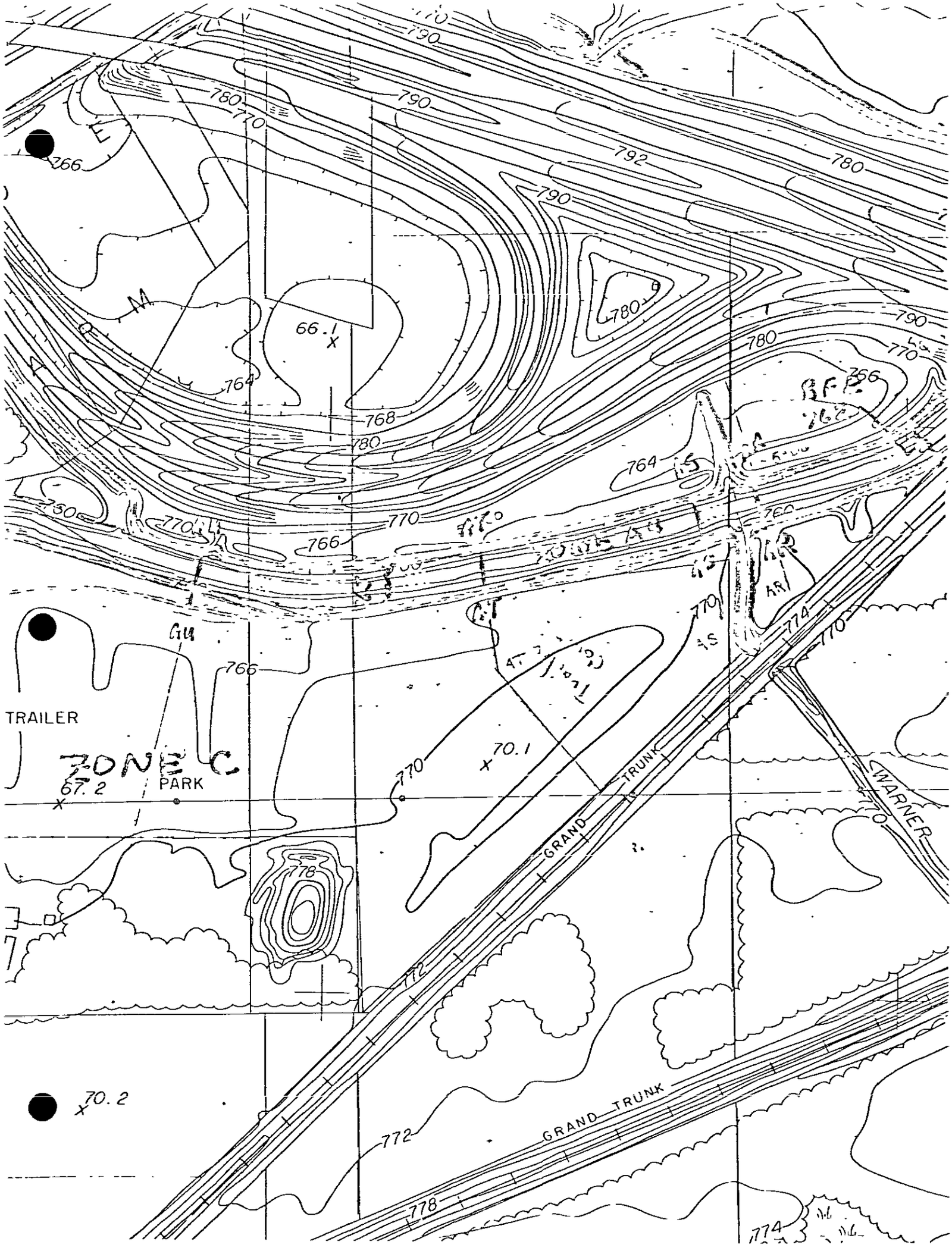
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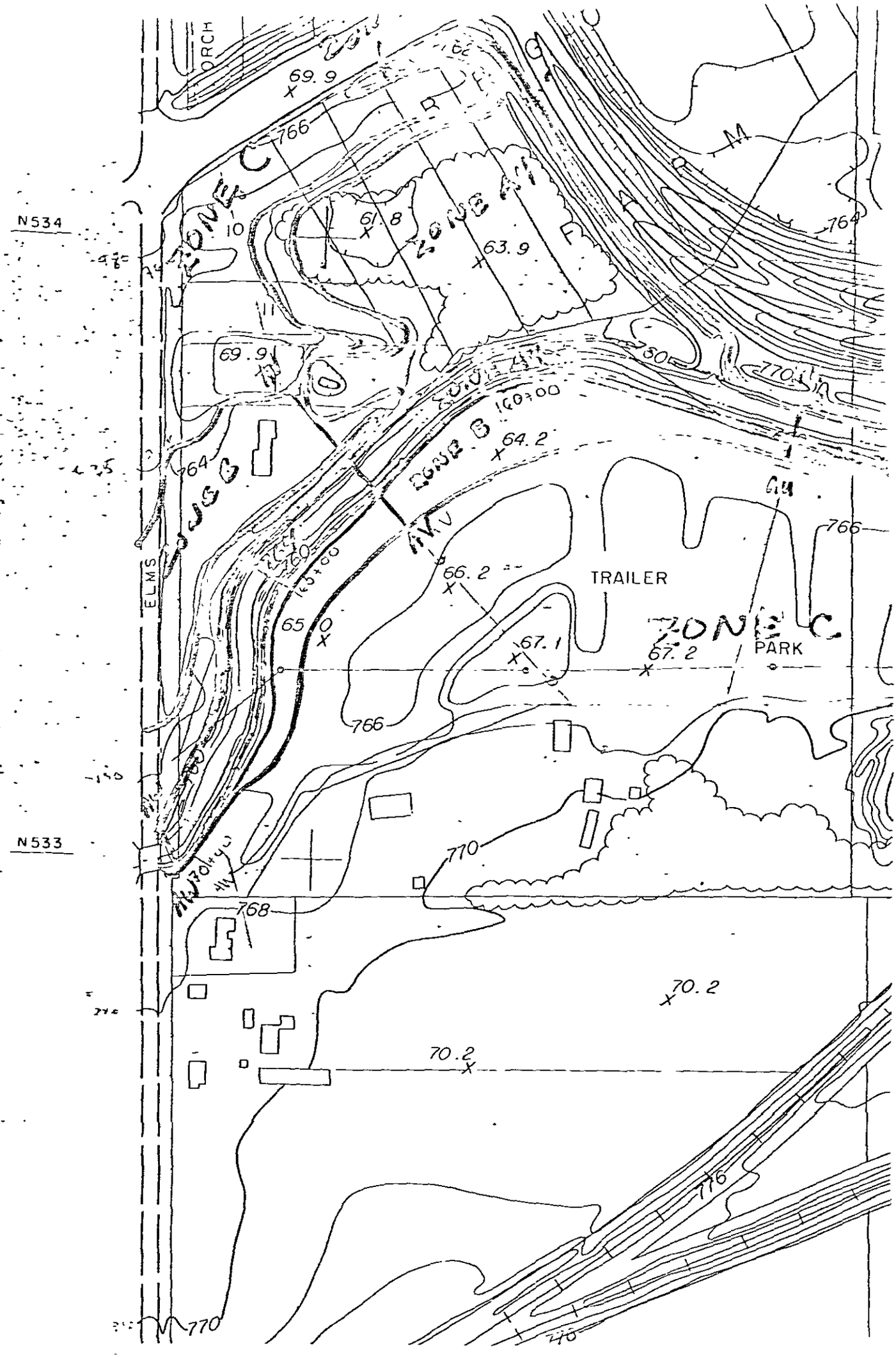
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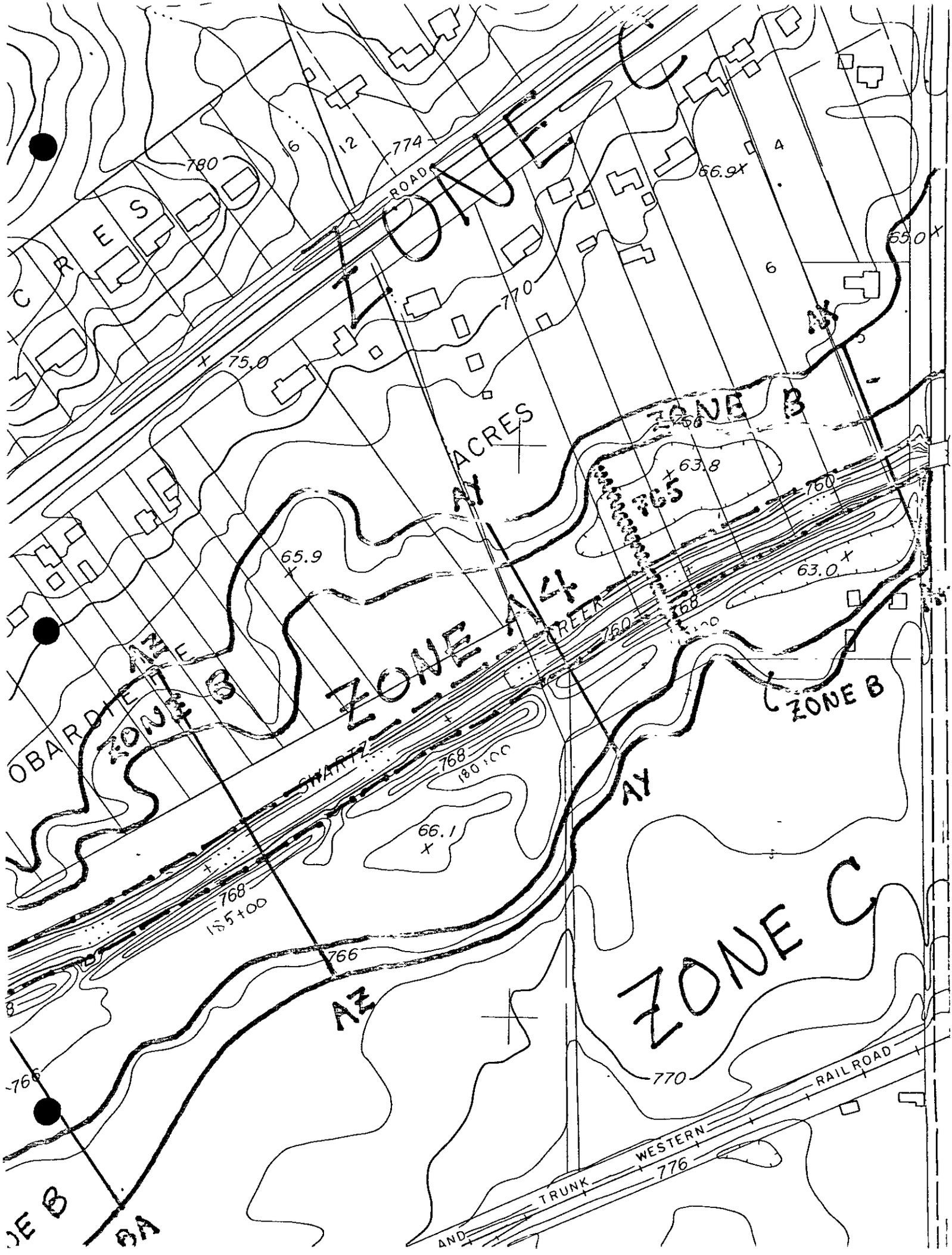
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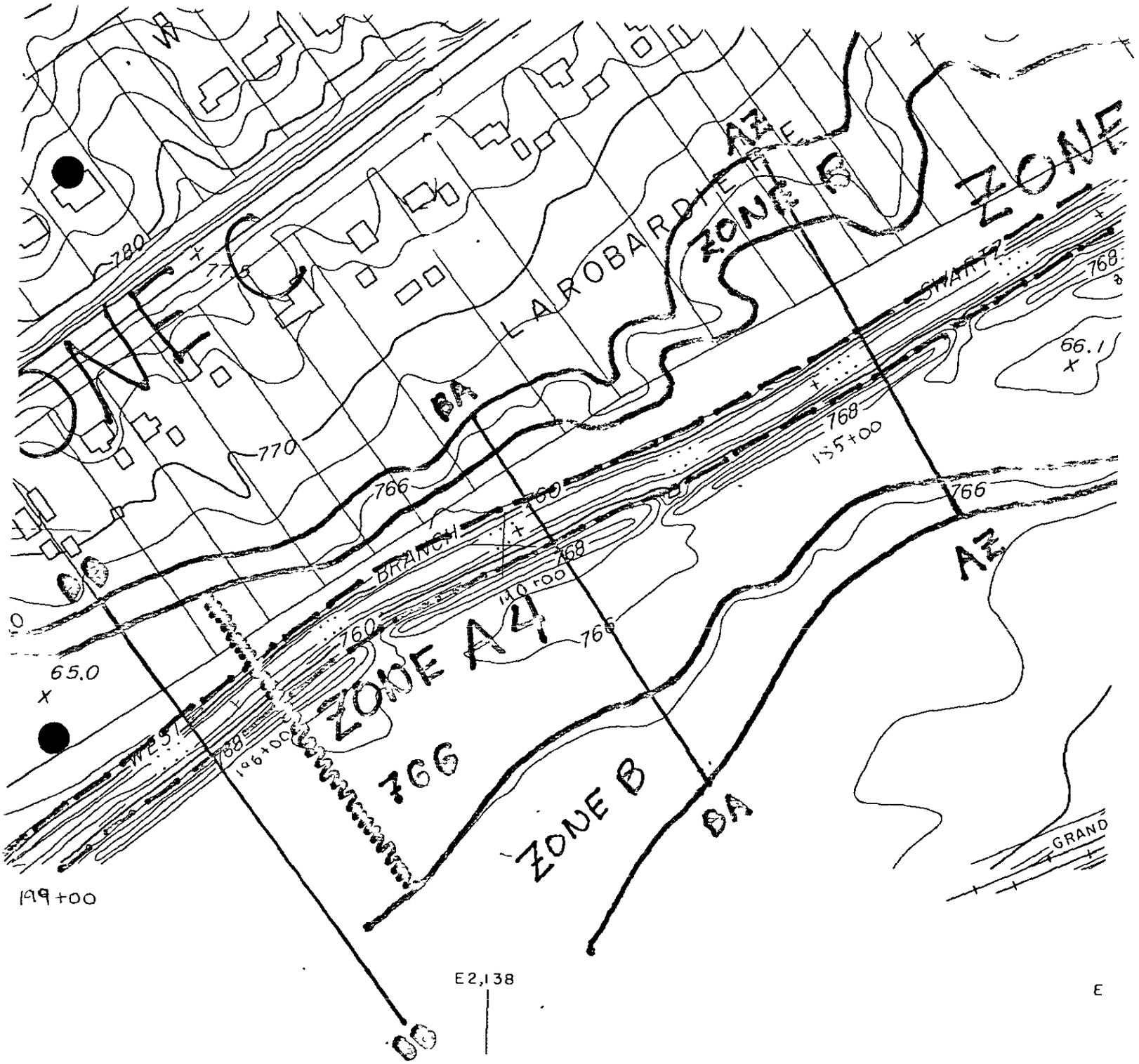

SECTION INDEX

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19	20	21	22	23	24

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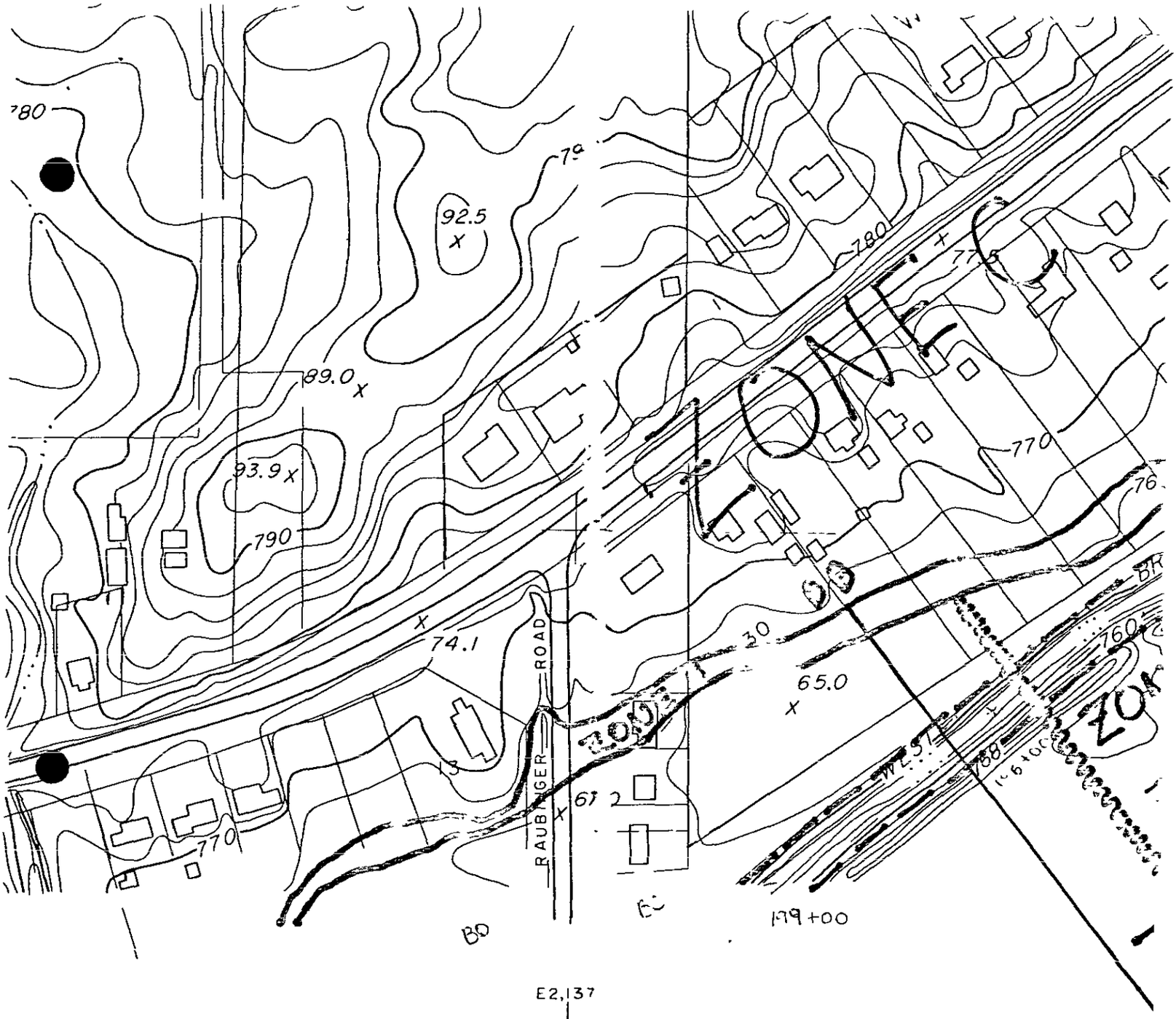

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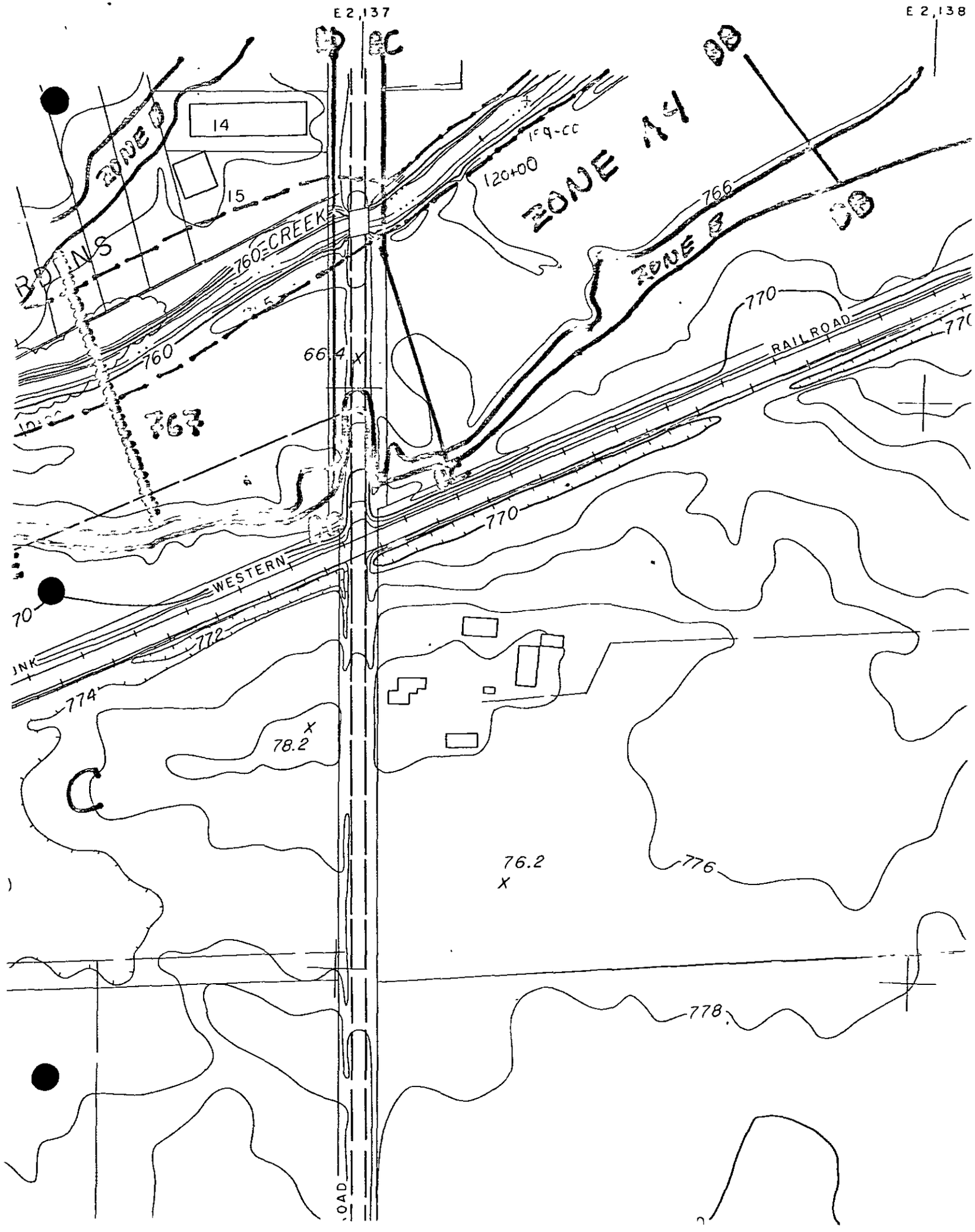
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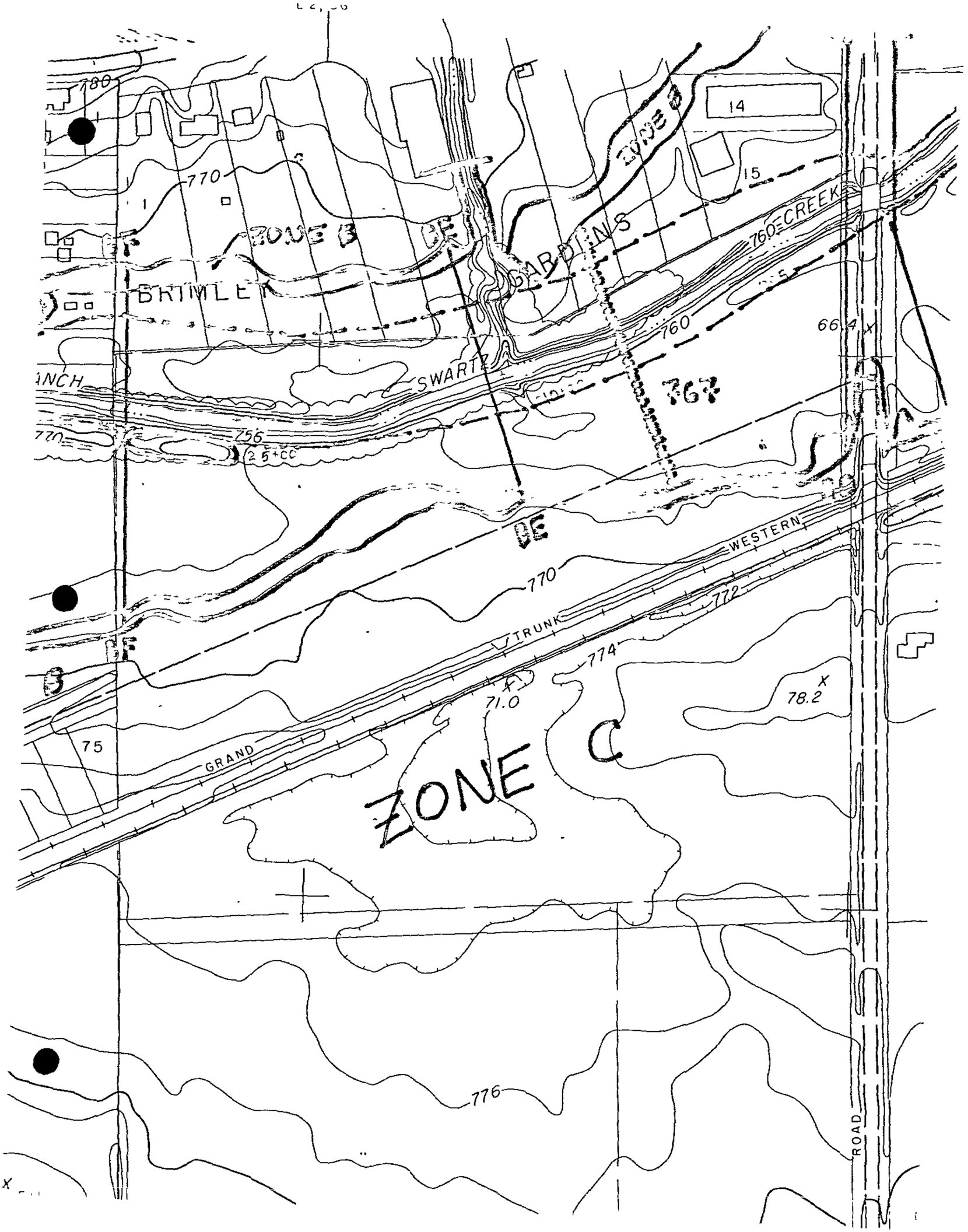
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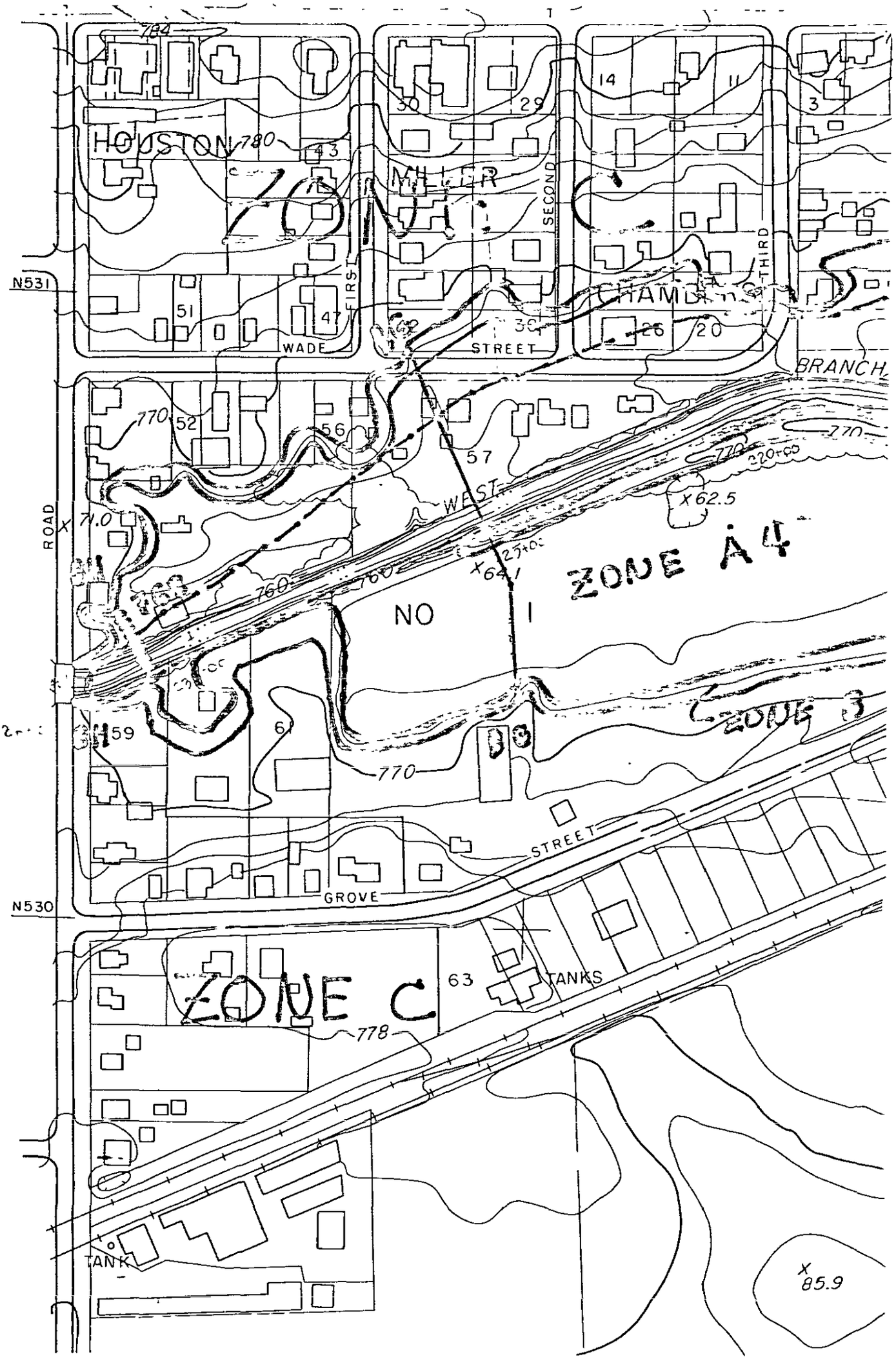
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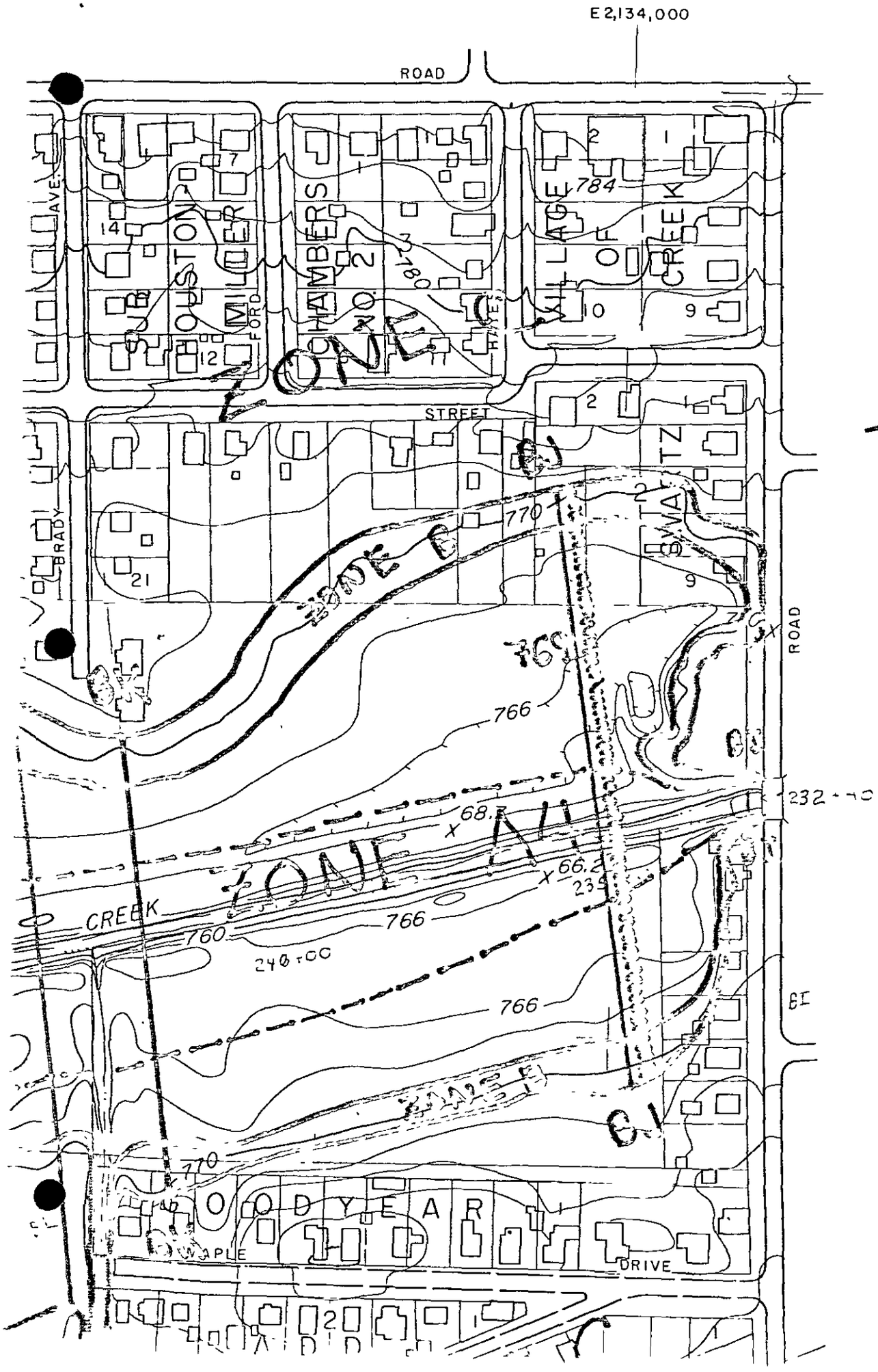

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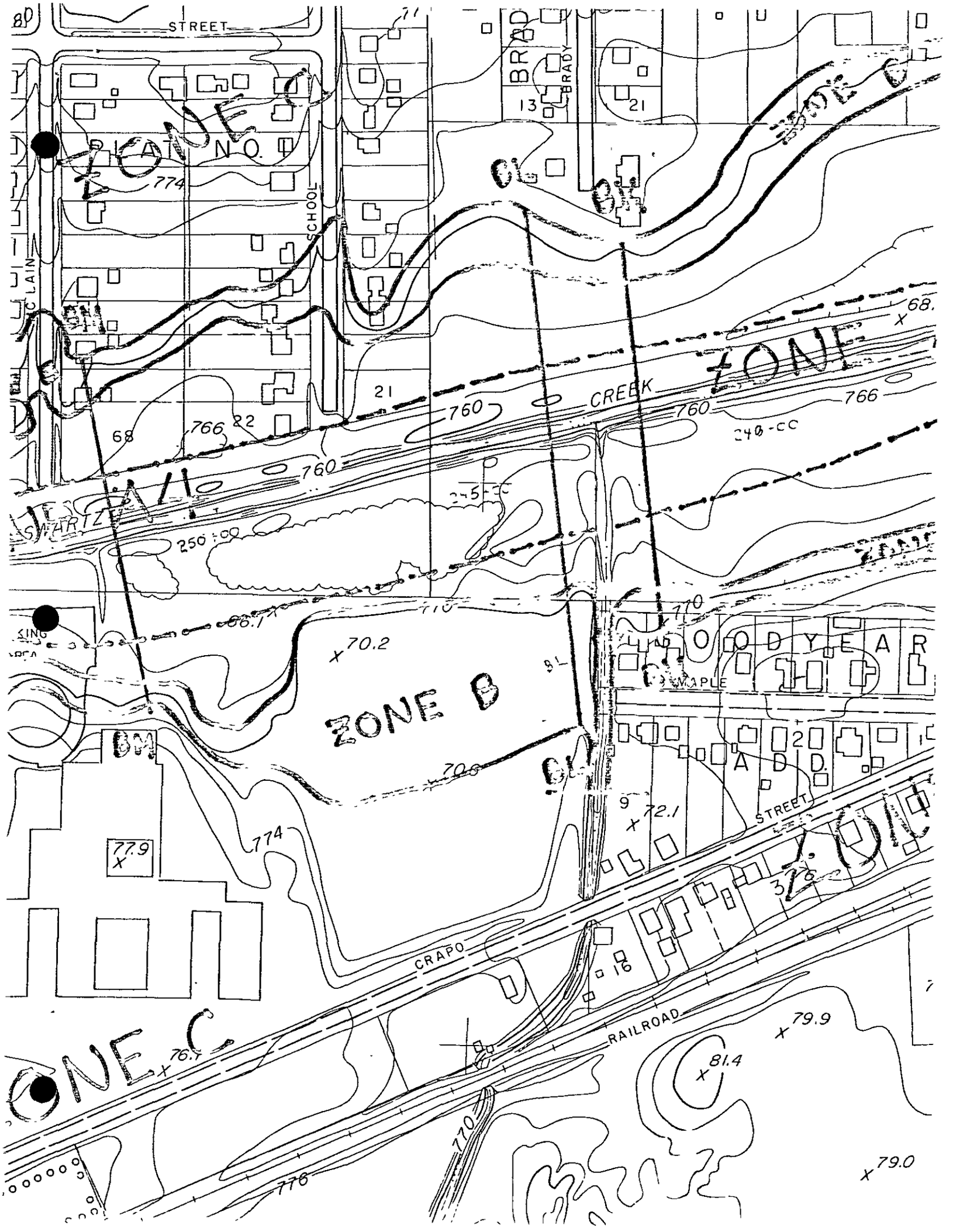
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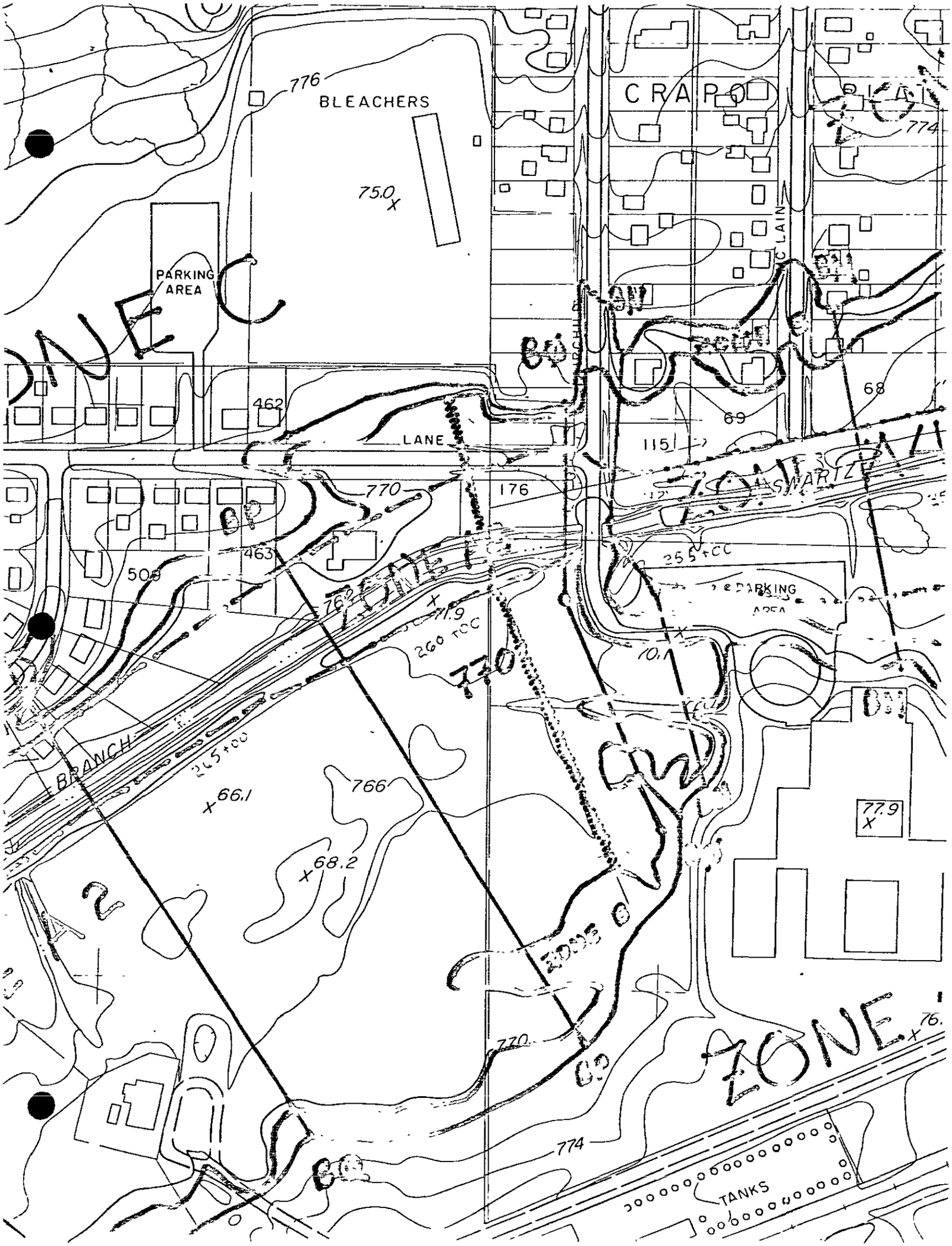
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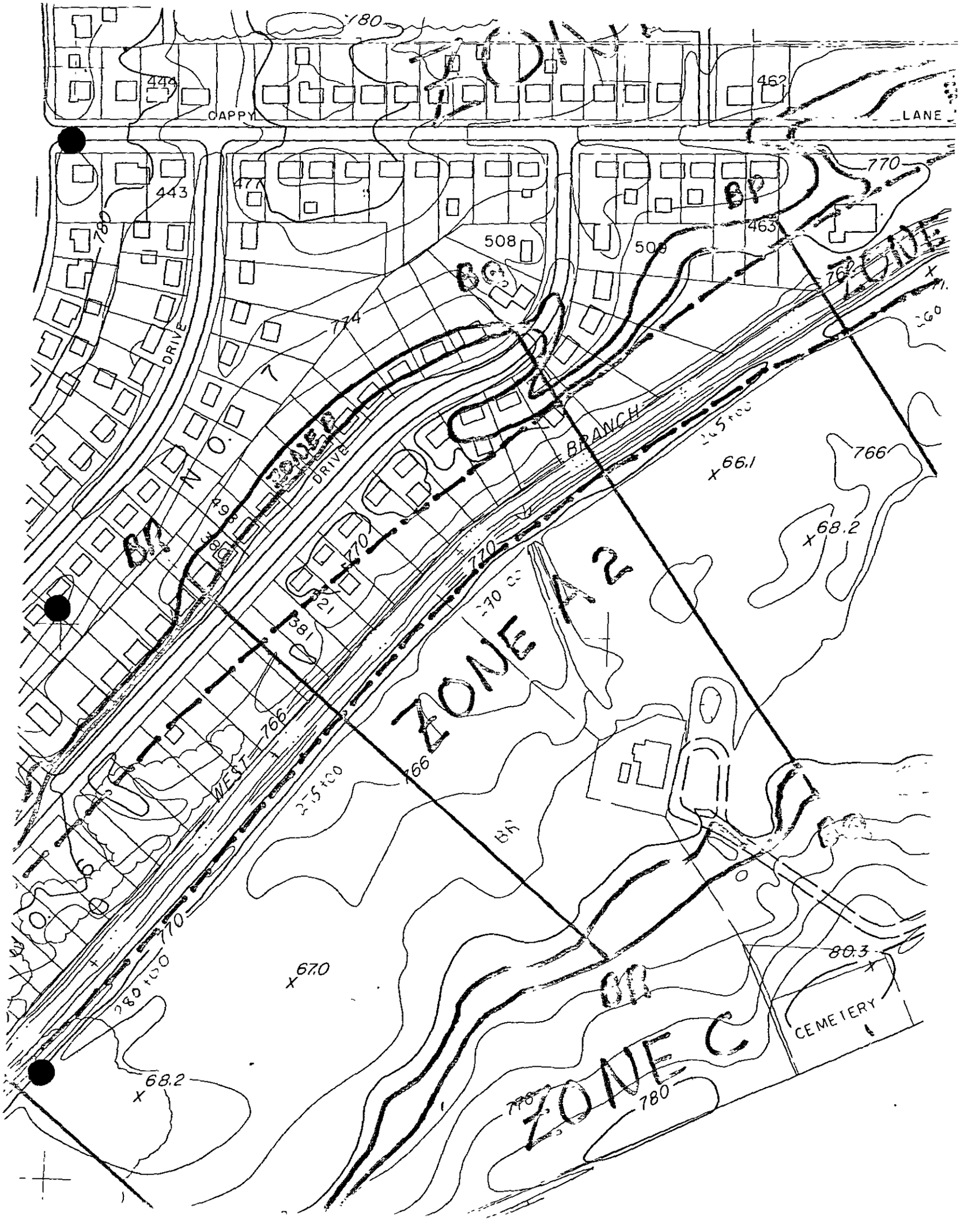
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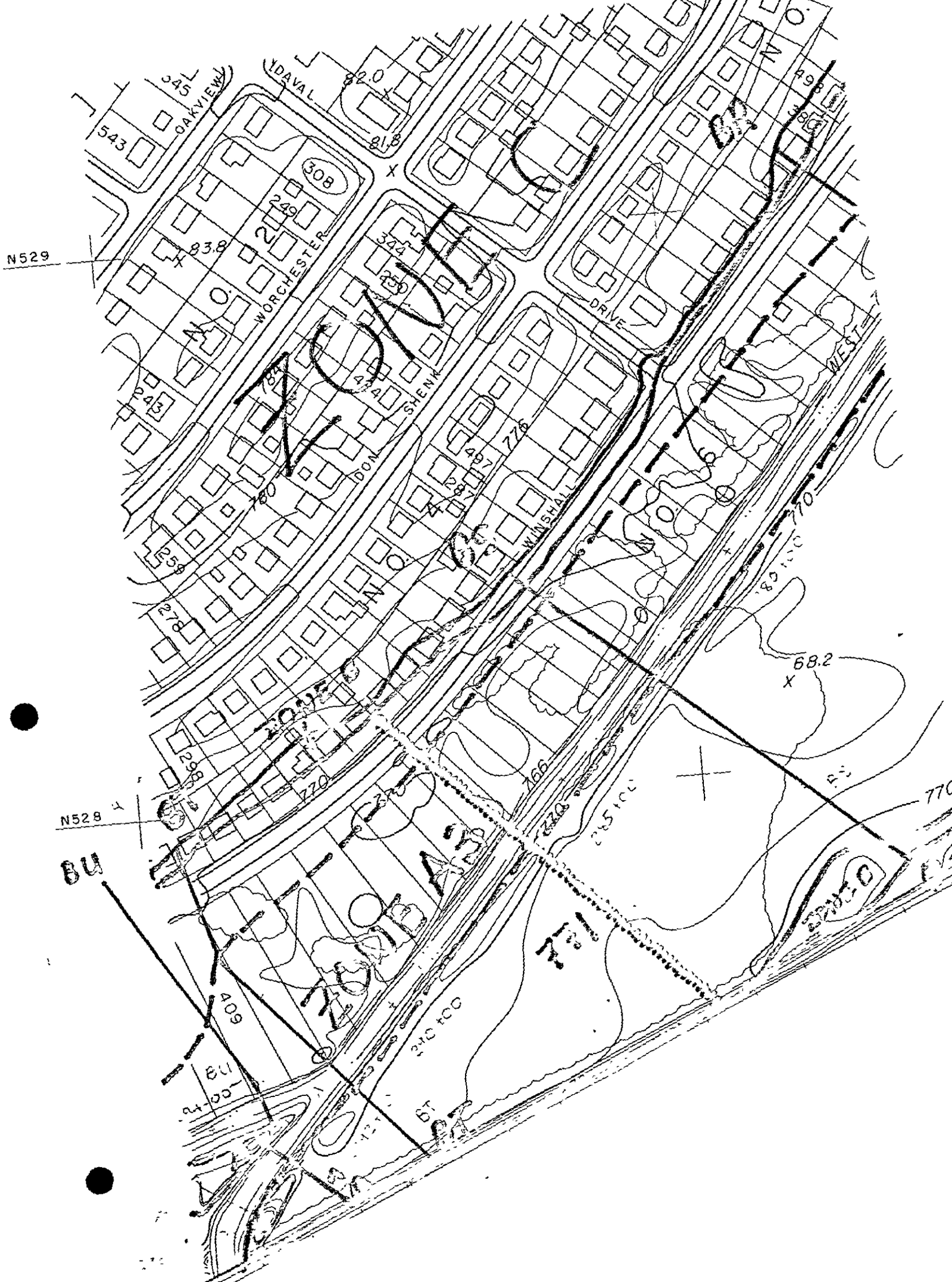
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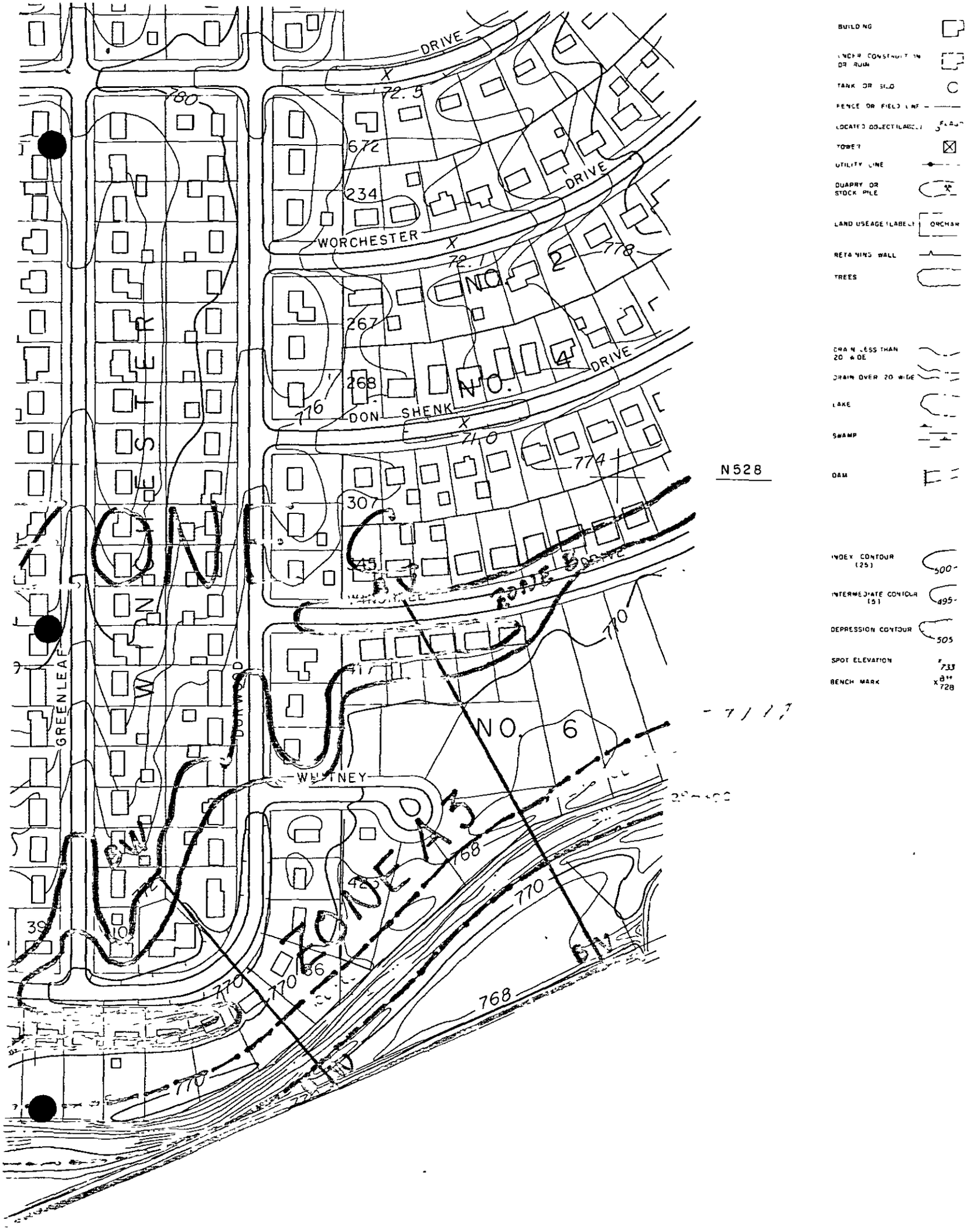
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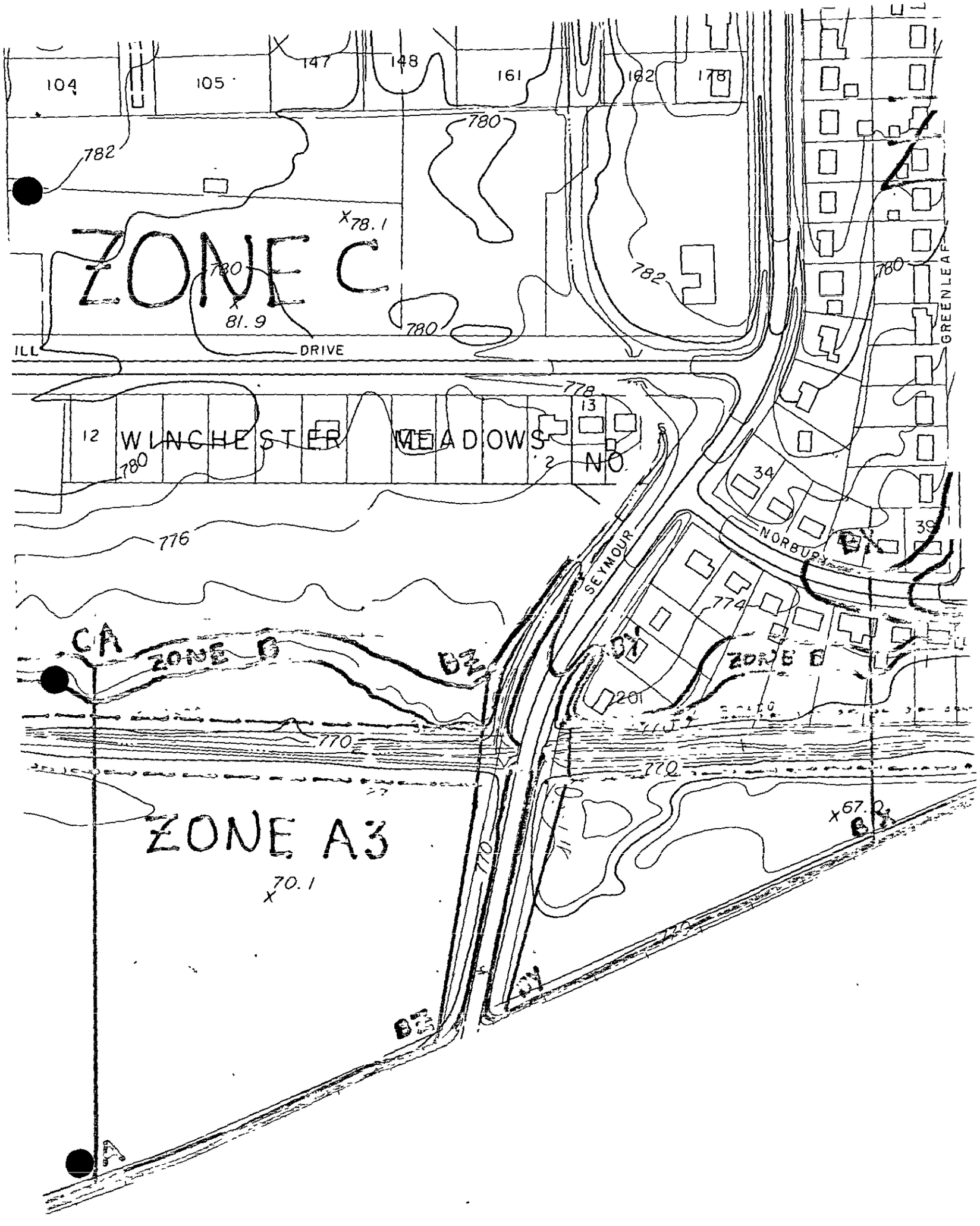
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1) COUNTY: Genesee

2) STUDY NAME: City of Swartz Creek

3) WATERCOURSE: West Br. Swartz Creek

4) DOCUMENT TYPE: Report

00BREAK00

FLOOD INSURANCE STUDY
CITY OF SWARTZ CREEK
MICHIGAN
GENESEE COUNTY

Prepared by

U.S. Geological Survey
Water Resources Division
Okemos, Michigan

April 1978

for

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

TABLE OF CONTENTS

Page

1.0 INTRODUCTION

1.1 Purpose of Study

1.2 Authority and Acknowledgements

1.3 Coordination

2.0 AREA STUDIED

2.1 Scope of Study

2.2 Community Description

2.3 Principal Flood Problems

2.4 Flood Protection Measures

3.0 ENGINEERING METHODS

3.1 Hydrologic Analyses

3.2 Hydraulic Analyses

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

4.1 Flood Boundaries

4.2 Floodways

5.0 INSURANCE APPLICATION

5.1 Reach Determinations

5.2 Flood Hazard Factors

5.3 Flood Insurance Zones

5.4 Flood Insurance Rate Map Description

6.0 OTHER STUDIES

7.0 LOCATION OF DATA

8.0 BIBLIOGRAPHY AND REFERENCES

FIGURES

Figure 1 - Vicinity Map

Figure 2 - Floodway Schematic

TABLES

Table 1 - Summary of Discharges

Table 2 - Floodway Data

Table 3 - Flood Insurance Zone Data

EXHIBITS

Flood Profiles

West Branch Swartz Creek

Alger Creek

Flood Boundary and Floodway Map Index

Flood Boundary and Floodway Map

PUBLISHED SEPARATELY:

Flood Insurance Rate Map Index

Flood Insurance Rate Map

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the City of Swartz Creek, Genesee County, Michigan, and aids in the administration of the Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert the City of Swartz Creek to the regular program of flood insurance by the Federal Insurance Administration (FIA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these Federally-supported studies are based. These criteria take precedence over the minimum Federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 24 CFR, 1910.1(d). In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgements

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by the U.S. Geological Survey for the Federal Insurance Administration under Inter-Agency Agreement No. IAA-H-8-76, Project Order No. 11. This study, completed in March 1978, covered all significant flooding sources affecting the City of Swartz Creek.

1.3 Coordination

Streams requiring detailed study were identified at a meeting attended by representatives of the U.S. Geological Survey, the FIA, and representatives of the City of Swartz Creek in February 1975. Results of the hydrologic and hydraulic analyses were coordinated with the Michigan Department of Natural Resources, the Genesee County Drain Commission and the City of Swartz Creek.

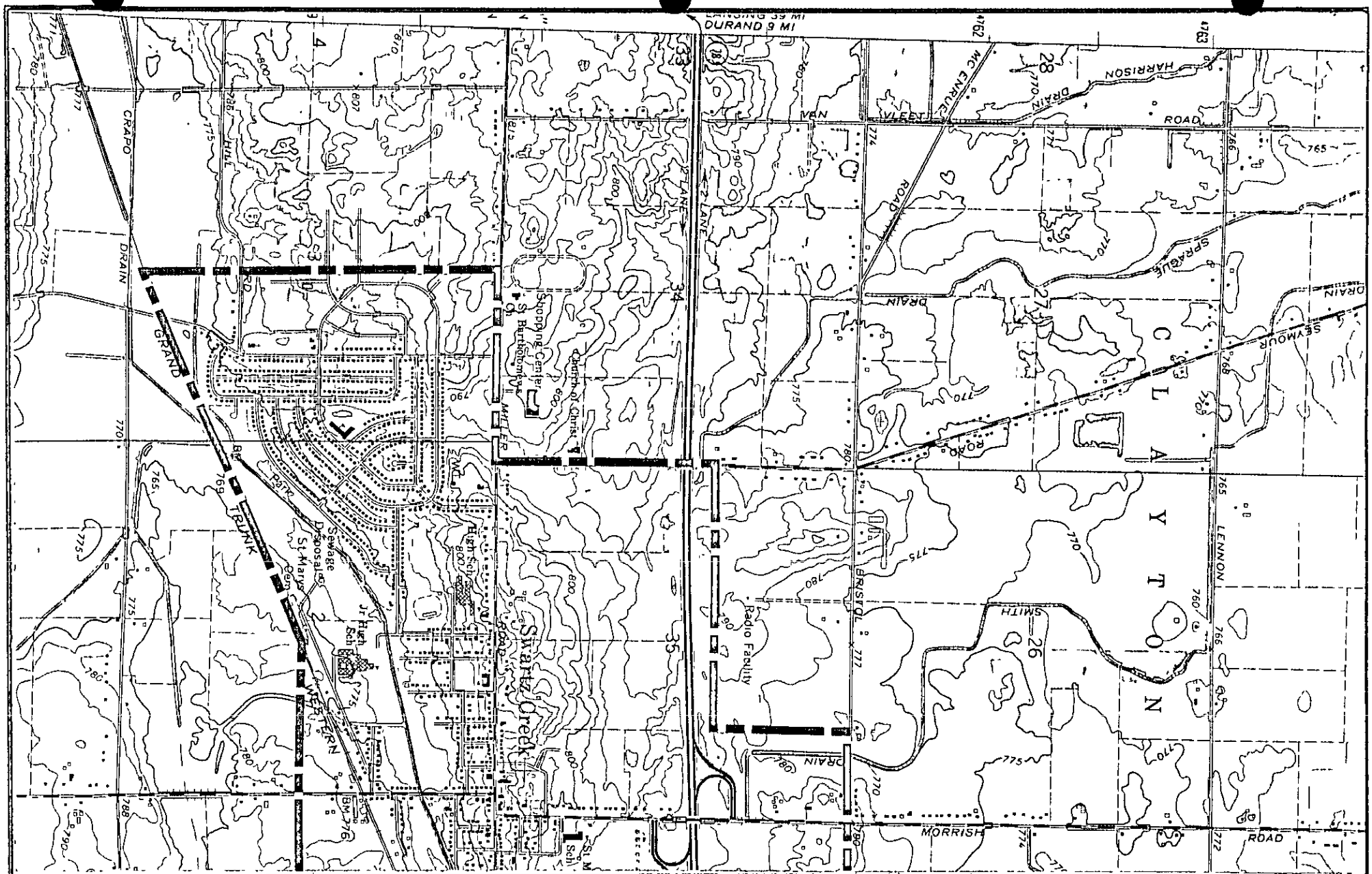
On _____, the results of the study were presented at the final community meeting attended by personnel of the U.S. Geological Survey, FIA, and community officials.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the City of Swartz Creek, Michigan. The area of study is shown on the Vicinity Map (Figure 1).

Overflow of the West Branch Swartz Creek and Alger Creek are the primary sources of flooding in the city. Therefore, it was agreed among representatives from the City of Swartz Creek, FIA, and the U.S. Geological Survey that West Branch Swartz Creek and Alger Creek would be studied in detail.



DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

CITY OF SWARTZ CREEK, MI.
(GENESEE CO.)

APPROXIMATE SCALE
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VICINITY MAP

FIGURE 1

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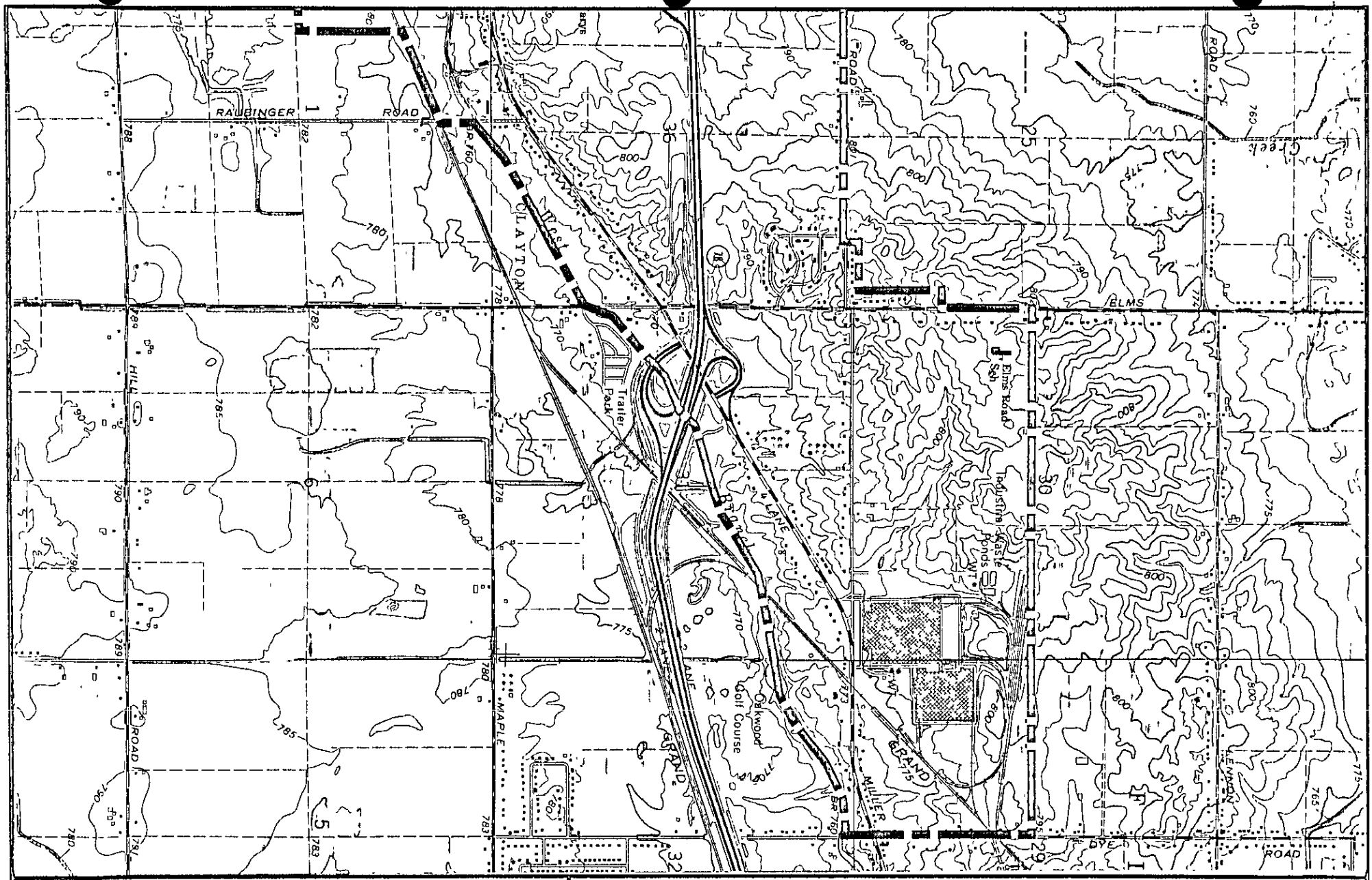


FIGURE 1

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

CITY OF SWARTZ CREEK, MI.
(GENESEE CO.)

APPROXIMATE SCALE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

VICINITY MAP

The areas studied by detailed methods were selected with priority given to all known flood hazard areas, and areas of projected development or proposed construction for the next five years, through March 1983.

2.2 Community Description

The City of Swartz Creek is located in the southeastern portion of Michigan's Lower Peninsula in the southwestern portion of Genesee County. It is situated approximately 50 miles northwest of Detroit, Michigan and 50 miles northeast of Lansing, Michigan.

The total land area of the city if 2.5 square miles. According to U.S. Census Bureau figures, the population of the City of Swartz Creek increased from 3,006 in 1960 to 4,928 in 1970, an increase of 64 percent (reference 1).

Approximately 60 percent of the land area in the city has been developed. The remaining land is vacant or in agricultural use. Sixty-five percent of the developed area is in residential housing, 15 percent is in institutional use, 15 percent is in industrial use, and 5 percent is in commercial use.

The economy of the area is dependent upon the automotive industry and other diversified manufacturing plants in Swartz Creek and the nearby communities of Flint, Burton and Grand Blanc.

Transportation facilities serving the area include Interstate I-69 (an east-west route within the city) and I-75, U.S. Highways 10 and 23 and State Highways 21 and 78. Bishop Airport, the major airport in the area, is located 3 miles northeast of the city. The Grand Trunk Western Railroad runs along the southern boundary of the city.

The climate of the City of Swartz Creek is modified somewhat by its proximity to the Great Lakes, which cause a cooling effect during the summer months and a warming influence during the winter months. The mean annual temperature is about 47°F, the maximum recorded temperature is 108°F occurring on July 13, 1936, and the minimum is -28°F occurring on Feb. 16, 1916. The area receives about 30 inches of precipitation annually, about 65 percent of which occurs during the period April through September. Annual snowfall for the area averages about 45 inches (Reference 2).

The topography of the City of Swartz Creek is undulating. Ground elevations range from 760 feet to 820 feet above mean sea level. The surface deposits for the City of Swartz Creek were laid down during periods of glaciation. Lake bed deposits occur along the southern corporate limits and ground moraines occur along the northern corporate limits. The soils are Conover, Celina, and Miami loams that are moderately well drained and have a clay loam subsoil.

Some development has occurred on the flood plains of West Branch Swartz Creek and Alger Creek. Continued economic growth is expected and pressures leading to use of the flood plain may result in additional development.

2.3 Principal Flood Problems

Flooding is principally the result of overbank flow from West Branch Swartz Creek and Alger Creek. Major flooding occurred in April 1947 and April 1975. Discharge data are not available for the 1947 flood, however, based upon the areas inundated in 1947, that flood is believed to approach a 100-year event. The 1975 flood had a recurrence interval of about once in 50 years. Interruptions to transportation and considerable property damage resulted from the floods in 1947 and 1975.

2.4 Flood Protection Measures

There are no flood protection facilities along West Branch Swartz Creek or Alger Creek in the city. The upper portion of the stream has been channelized, however, the channelization has not alleviated problems of flooding from major storms.

3.0 ENGINEERING METHODS

For flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10, 50, 100 or 500 year period (recurrence intervals), have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10, 50, 100 and 500 year floods, have a 10, 2, 1, and 0.2 percent chance, respectively of being equalled or exceeded during any year. Although the recurrence interval represents the long term, average period between floods of a specific magnitude,

rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood, which equals or exceeds the 100-year flood (one percent chance of annual occurrence) in any 50 year period is about 40 percent (four in ten), and for any 90 year period, the risk increases to about 60 percent (six in ten). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study.

3.1 Hydrologic Analysis

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for floods of the selected recurrence intervals for each flooding source studied in detail in the community.

Peak discharge estimates were developed using the following hydrologic analyses: (1) a log-Pearson Type III distribution of the 7 years of annual peak flow data available on West Branch Swartz Creek at Bristol Road one mile downstream from the city (Reference 3); (2) application of regional relations between basin characteristics and streamflow characteristics (Reference 4); (3) application of flood magnitude-frequency relations developed for the St. Lawrence River basin (Reference 5); (4) application of regional relationships of streamflow, drainage area, and population density (Reference 6); (5) application of ratios between the mean annual flood and the 50-year and 100-year peak discharge (Reference 7); and (6) confirmation of flood profiles by high-water marks obtained from field survey.

A summary of drainage area-peak discharge relationships for West Branch Swartz Creek and Alger Creek is shown in Table 1.

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
WEST BRANCH SWARTZ CREEK					
Downstream corporate limit	32.8	1,200	1,720	1,890	2,320
M-78	29.3	1,110	1,590	1,750	2,140
Confluence of Alger Creek	1	50	70	80	95
(ALGER CREEK) KIMBALL DRAIN					
Confluence of West Branch Swartz Creek	21.1	1,110	1,590	1,750	2,140

3.2 Hydraulic Analysis

Analyses of the hydraulic characteristics of the flooding sources studied in detail in the city were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross sections for the step-backwater analyses of West Branch Swartz Creek and Alger Creek were obtained from field survey conducted in 1977 and from two-foot contour maps having a scale of 1 inch equals 200 feet (Reference 8). All bridges and culverts were surveyed to obtain elevation data and structural geometry.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles and the Flood Boundary and Floodway Map.

Channel roughness factors (Manning's "n") used in the hydraulic computations, were chosen by engineering judgement and based on field observations of the stream and flood plain areas. Roughness values for the main channel of the West Branch Swartz Creek range from 0.030 to 0.060 and flood plain roughness values range from 0.035 to 0.150 for all floods. Roughness values for the main channel of Alger Creek were 0.045 and flood plain roughness values were 0.060 for all floods. The acceptability of all assumed hydraulic factors, cross section, and hydraulic structure data was checked by computations that verified historic flood information.

Water surface elevations of floods of the selected recurrence intervals were computed through use of the U.S. Geological Survey E-431 step-backwater computer program (Reference 9). Starting water surface elevations for West Branch Swartz Creek were those obtained from the portion of West Branch Swartz Creek in the adjacent community of Flint Township (Reference 10). Starting elevations for Alger Creek were the elevations obtained for West Branch Swartz Creek at the confluence of the two streams. All elevations are referenced from the National Geodetic Vertical Datum of 1929, (NGVD) formerly referred to as Sea Level Datum of 1929; elevation reference marks used in this study are shown on the maps.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the FIA as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail the boundaries of the 100- and 500-year floods have been delineated using the flood elevations determined at each cross section; between cross sections the boundaries were determined by using topographic maps at a scale of 1 inch = 200 feet with a contour interval of two feet (Reference 8). In cases where the 100-year and the 500-year flood boundaries are close together, only the 100-year boundary has been shown.

The boundaries of the 100- and 500-year floods are shown on the Flood Boundary and Floodway Map. Small areas within the flood boundaries may lie above the flood elevations and therefore, not be subject to flooding. Owing to limitations of the map scale, such areas are not shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway-fringe. The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood may be carried without substantial increases in flood heights. Minimum standards of the FIA limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. In Michigan though, under Michigan Act 245, Public Act of 1929, as amended by Act 167, Public Acts of 1968, encroachment in the flood plain is limited to that which will cause only an insignificant increase in flood heights. Thus, at the recommendation of the Bureau of Water Management, a floodway having no more than a 0.1-foot surcharge has been delineated for this study.

The floodways presented in this study were computed on the basis of equal conveyance reduction from each side of the flood plain. No encroachments were allowed within the low water channel. Additionally, attempts were made to obtain uniform floodway

widths along the stream channel. The results of these computations are tabulated at selected cross sections for each stream segment for which a floodway is computed (Table 2).

As shown on the Flood Boundary and Floodway Map, the floodway widths were determined at cross sections; between cross sections, the boundaries were interpolated. In cases where the boundaries of the floodway and the 100-year flood are either close together or collinear, only the floodway boundary has been shown. A portion of the floodway of the West Branch Swartz Creek is outside of the corporate limits.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water surface elevation of the 100-year flood more than 0.1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FIA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHFs), and flood insurance zone designations for each significant flooding source affecting the City of Swartz Creek.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
Cross Section	Distance 1/	Width 2/ (ft.)	Section Area (Sq. ft)	Mean Velocity (F.P.S.)	With Floodway (M.S.L.)	Without Floodway (M.S.L.)	Difference (ft.)
West Branch Swartz Creek							
S	7,410	51 2	362	5.22	755.87	755.78	0.09
T	7,570	100 2	648	2.92	756.34	756.28	.06
U	7,890	100 2	706	2.68	756.63	756.58	.05
V	8,500	100 2	713	2.65	757.05	756.98	.07
W	8,960	100 2	587	3.22	757.34	757.27	.07
X	9,250	60 2	477	3.96	757.57	757.48	.09
Y	9,340	100 2	525	3.60	758.05	758.05	0
Z	9,420	150 2	905	2.09	758.25	758.20	.05
AA	9,460	150 2	428	4.42	758.17	758.11	.06
AB	9,500	150 2	732	2.58	758.42	758.36	.06
AC	9,710	150 2	668	2.83	758.50	758.43	.07
AD	9,890	175 2	1,484	1.27	758.65	758.59	.06
AE	10,100	200 2	1,722	1.10	758.65	758.59	.06
AF	10,240	100 2	577	3.28	758.61	758.55	.06

1/ Feet above mouth. 2/ This width extends beyond corporate limits.

TABLE 2

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

CITY OF SWARTZ CREEK, MI
(GENESEE CO.)

FLOODWAY DATA

WEST BRANCH SWARTZ CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
Cross Section	Distance 1/	Width 2/ (ft.)	Section Area (Sq. ft)	Mean Velocity (F.P.S.)	With Floodway (M.S.L.)	Without Floodway (M.S.L.)	Difference (ft.)
West Branch Swartz Creek (Continued)							
AG	10,380	100	515	3.67	758.68	758.60	0.08
AH	10,880	100	483	3.91	759.08	759.01	.07
AI	11,090	100	521	3.63	759.27	759.23	.04
AJ	11,240	66	421	4.49	759.32	759.28	.04
AK	11,380	51	330	5.73	759.43	759.39	.04
AL	12,000	100	690	2.74	760.30	760.30	0
AM	12,410	100	642	2.95	760.47	760.44	.03
AN	12,710	150	1,108	1.71	761.32	761.28	.04
AO	13,010	100	664	2.85	761.36	761.31	.05
AP	13,650	75	563	3.36	761.61	761.54	.07
AQ	14,010	60	439	4.30	761.87	761.80	.07
AR	14,500	60	435	4.35	762.39	762.30	.09
AS	14,620	60	446	3.93	762.58	762.48	.10

1/ Feet above mouth. 2/ This width extends beyond corporate limits.

TABLE 2

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration
CITY OF SWARTZ CREEK, MI
(GENESEE CO.)

FLOODWAY DATA

WEST BRANCH SWARTZ CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
Cross Section	Distance 1/	Width 2/ (ft.)	Section Area (Sq. ft)	Mean Velocity (F.P.S.)	With Floodway (M.S.L.)	Without Floodway (M.S.L.)	Difference (ft.)
West Branch Swartz Creek (Continued)							
AT	15,000	60 2	456	3.84	762.92	762.82	0.10
AU	15,500	60 2	549	3.19	763.43	763.36	.07
AV	16,280	60 2	559	3.13	763.89	763.86	.03
AW	17,000	60 2	522	3.35	764.35	764.33	.02
AX	17,110	60 2	415	4.21	764.65	764.63	.02
AY	17,770	75 2	558	3.13	765.21	765.16	.05
AZ	18,400	75 2	623	2.81	765.49	765.44	.05
BA	18,965	75 2	516	3.39	765.71	765.66	.05
BB	19,575	75 2	553	3.16	766.13	766.09	.04
BC	20,200	75 2	656	2.67	766.44	766.41	.03

1/ Feet above mouth. 2/ This width extends beyond corporate limits.

TABLE 2

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration
CITY OF SWARTZ CREEK, MI
(GENESEE CO.)

FLOODWAY DATA

WEST BRANCH SWARTZ CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
Cross Section	Distance 1/	Width (ft.)	Section Area (Sq. ft)	Mean Velocity (F.P.S.)	With Floodway (M.S.L.)	Without Floodway (M.S.L.)	Difference (ft.)
West Branch Swartz Creek (Continued)							
BD	20,300	150	582	3.01	766.78	766.75	0.03
BE	21,030	200	914	1.91	767.24	767.14	.10
BF	21,700	200	847	2.07	767.53	767.43	.10
BG	22,490	200	815	2.15	767.84	767.74	.10
BH	23,180	75	584	3.00	768.14	768.04	.10
BI	23,260	50	426	4.11	768.75	768.65	.10
BJ	23,500	200	1,079	1.62	769.12	769.05	.07
BK	24,220	300	1,395	1.25	769.27	769.20	.07
BL	24,385	300	1,404	1.25	769.30	769.23	.07
BM	25,185	300	871	2.01	769.52	769.44	.08
BN	25,650	200	816	2.14	769.75	769.66	.09

1/ Feet above mouth.

TABLE 2

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

CITY OF SWARTZ CREEK, MI
(GENESEE CO.)

FLOODWAY DATA

WEST BRANCH SWARTZ CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
Cross Section	Distance 1/	Width (ft.)	Section Area (Sq. ft)	Mean Velocity (F.P.S.)	With Floodway (M.S.L.)	Without Floodway (M.S.L.)	Difference (ft.)
West Branch Swartz Creek (Continued)							
BO	25,725	200	783	2.23	770.03	769.93	0.10
BP	26,190	200	812	2.15	770.25	770.15	.10
BQ	26,700	150	616	2.84	770.42	770.32	.10
BR	27,365	200	873	2.00	770.78	770.70	.08
BS	28,260	250	1,039	1.68	771.00	770.92	.08
BT	29,150	350	1,081	1.62	771.18	771.11	.07
BU	29,300	200	531	0.15	771.27	771.18	.09
BV	29,610	100	617	0.13	771.27	771.18	.09
BW	30,150	100	563	0.14	771.27	771.18	.09
BX	30,770	100	471	0.17	771.27	771.18	.09
BY	31,300	100	577	0.14	771.27	771.18	.09
BZ	31,460	100	217	0.37	771.73	771.64	.09

1/ Feet above mouth.

TABLE 2

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration
CITY OF SWARTZ CREEK, MI
(GENESEE CO.)

FLOODWAY DATA

WEST BRANCH SWARTZ CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
Cross Section	Distance 1/	Width (ft.)	Section Area (Sq. ft)	Mean Velocity (F.P.S.)	With Floodway (M.S.L.)	Without Floodway (M.S.L.)	Difference (ft.)
West Branch Swartz Creek (Continued)							
CA	32,130	100	241	0.33	771.75	771.66	0.09
Alger Creek							
A	0	115	425	4.11	771.18	771.11	.07
B	240	110	610	2.87	771.55	771.49	.06

TABLE 2

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

CITY OF SWARTZ CREEK, MI
(GENESEE CO.)

FLOODWAY DATA

WEST BRANCH SWARTZ CREEK - ALGER CREEK

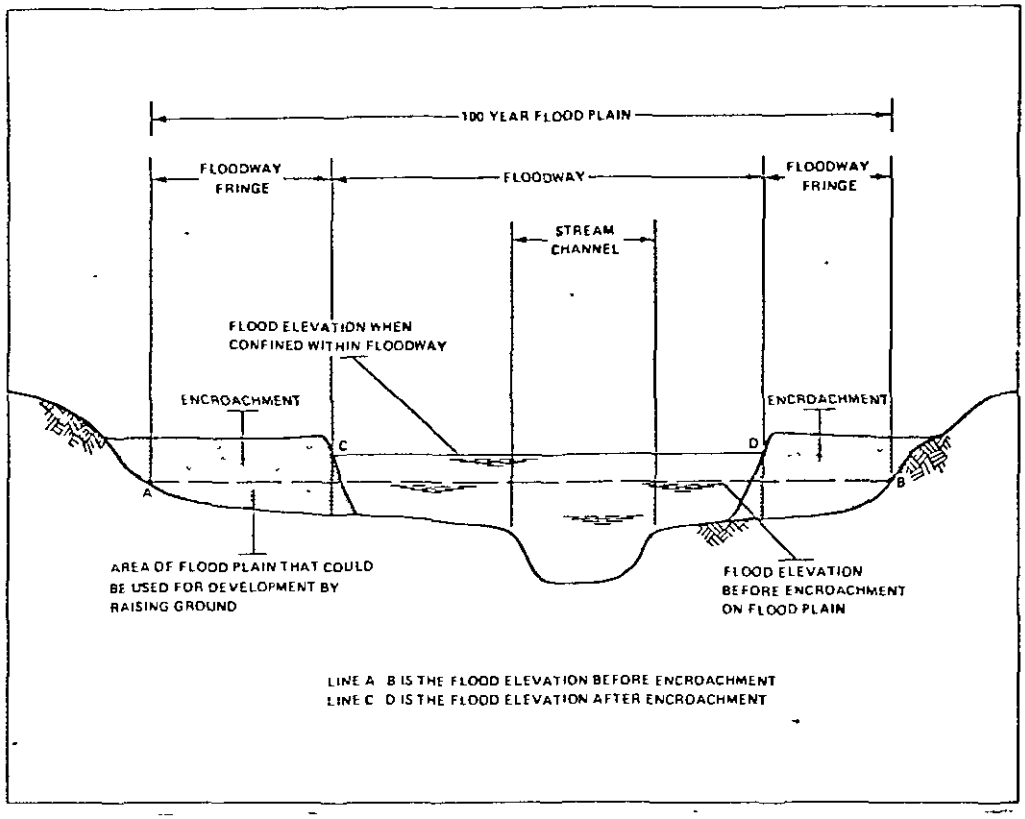


Figure 2. Floodway Schematic

5.1 Reach Determinations

Reaches are defined as lengths of watercourses or waterbodies having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

Average Difference Between 10- and 100-year floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot

Three reaches meeting the above criteria were required for the flooding sources in the City of Swartz Creek. These include two on West Branch Swartz Creek and one on Alger Creek. The locations of the reaches are shown on the Flood Profiles.

5.2 Flood Hazard Factors (FHFs)

The Flood Hazard Factor is used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their assigned FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods if 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, the accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire incorporated area of Swartz Creek was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zone A3, A4:	Special Flood Hazard Areas inundated by 100-year flood, determined by detailed methods; base flood elevations shown, and zones assigned according to FHFs.
Zone B:	Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; or, areas subject to 100-year flooding from sources with drainage areas of less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding.

Table 3, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevations for each flooding source studied in detail in the community.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the City of Swartz Creek is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FIA.

6.0 OTHER STUDIES

In 1974, a consulting firm made a flood study of West Branch Swartz Creek and Alger Creek for the Genesee County Drain Commission. Flood Insurance Studies are being done for adjacent Flint and Gaines Townships by the U.S. Geological Survey. Flood profiles at the corporate limits of Swartz Creek used for this study are continuations of those for Flint Township.

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study can be obtained by contacting the office of the Federal Insurance Administration, Regional Director, 1 North Dearborn Street, Chicago, Illinois, 60602.

8.0 BIBLIOGRAPHY AND REFERENCES

1. U.S. Department of Commerce, Bureau of the Census; 1970 Census of Population, Number of Inhabitants - Michigan, July 1971.
2. U.S. Department of Commerce, National Weather Service: Climate of Michigan by Stations, December 1971.
3. Water Resources Council, "Guidelines for Determining Flood Flow Frequencies," Bulletin 17, March 1976.
4. U.S. Geological Survey, Open-File Report, A Proposed Streamflow Data Program for Michigan, P.C. Bent, 1970.
5. _____, Water-Supply Paper 1677, Magnitude and Frequency of Floods in the United States, Part 4, St. Lawrence River Basin, S.W. Wiitala, 1965.
6. E.F. Brater, Rainfall-Runoff Relations on Urban and Rural Areas, University of Michigan, 1975.
7. U.S. Geological Survey, Open-File Report, Estimation of 100-Year Flood Magnitude of Ungaged Sites, C.H. Hardison, 1973.

8. United Aerial Mapping, Topographic Maps of Genesee County, Scale 1:2400; Townships of Clayton, Flint and Gaines.

9. U.S. Geological Survey, Open File Report, Computer Applications for Step-Backwater and Floodway Analyses, J.O. Shearman, 1976.

10. Federal Insurance Administration, Flood Insurance Study, Township of Flint, Genesee County, Michigan, 1978.

11. U.S. Geological Survey, Annual Reports on Water Resource Data for Michigan: Part 1, Surface Water Records.

12. Flint Area Chamber of Commerce, "Frontiers Unlimited," 1975.

ELEVATION REFERENCE MARKS

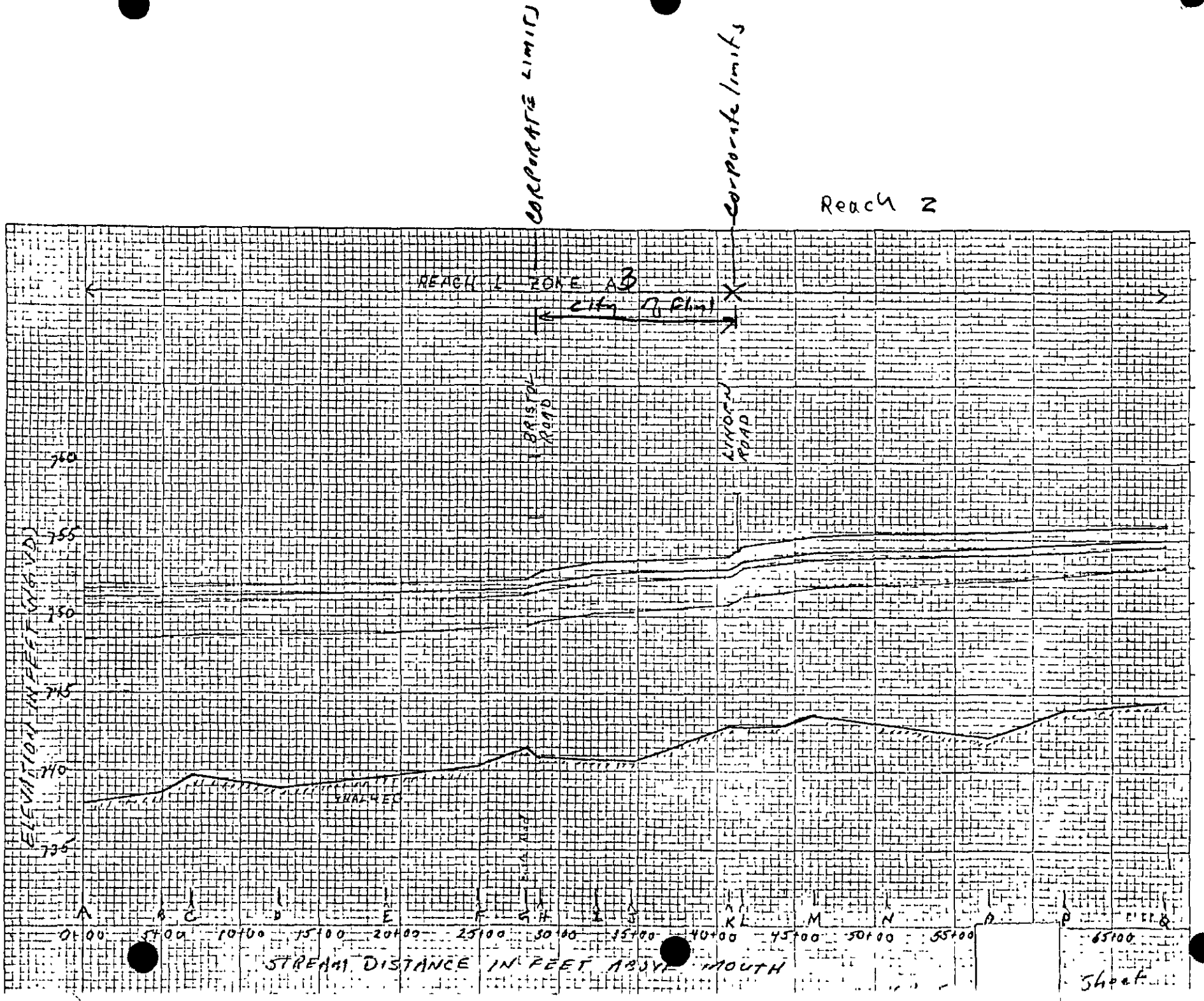
REFERENCE MARKS	ELEVATION IN FEET (MSL)	DESCRIPTION OF LOCATION
RM 1	766.46	City of Swartz Creek, cut box on triangle shape right-of-way monument, 15 feet west of east drive to 5323 Miller Road, 325 feet southwest of Dye Road.
RM 2	763.26	Township of Flint, painted box on top of right upstream guardrail post (southwest corner) of Dye Road bridge over West Branch Swartz Creek.
RM 3	773.75	City of Swartz Creek, cut box on northwest corner of concrete base for railroad traffic signal, 4.8 feet south of edge of Miller Road, 11 feet northwest of northwest rail Grand Trunk Western Railroad.
RM 4	771.57	City of Swartz Creek, cut "X" on west bolt at base of post for street light, 34 feet southwest of driveway to 6103 Miller Road, 12 feet southeast of Miller Road.
RM 5	769.26	Township of Flint, cut "X" on square bolt 5 feet south of northend of bridge and 2.8 feet east of east rail of railroad bridge over West Branch Swartz Creek.
RM 6	767.83	City of Swartz Creek, cut "X" on south-southeast hexnut of fire hydrant, 21 feet southeast of Miller Road, 110 feet northeast of driveway to 6299 Miller Road.
RM 7	768.06	City of Swartz Creek, cut box on southwest end on top of curb at tip of radius at traffic island of Miller Road, 90 feet northeast of centerline of intersection of Miller Road and entrance to I-69 West.
RM 8	769.24	City of Swartz Creek, cut "X" on hexnut of fire hydrant, 18 feet southeast of Miller Road, 50 feet west of centerline of Elms Road.
RM 9	777.45	City of Swartz Creek, cut "X" on south-southeast hexnut of fire hydrant, 6 feet southeast of Miller Road, 15 feet southwest of driveway to 7115 Miller Road.

ELEVATION REFERENCE MARKS--Continued

REFERENCE MARKS	ELEVATION IN FEET (MSL)	DESCRIPTION OF LOCATION
RM 10	768.24	City of Swartz Creek, cut box on northwest corner of headwall at Elms Road bridge over West Branch Swartz Creek.
RM 11	775.95	City of Swartz Creek, cut "X" on east hexnut of fire hydrant, 28 feet southeast of centerline of Miller Road, in front of house at 7215 Miller Road.
RM 12	767.44	City of Swartz Creek, cut box on catch basin at top of curb, at west edge of Raubinger Road, 250 feet south of Miller Road.
RM 13	768.62	City of Swartz Creek, cut box at northend of concrete headwall at concrete rail support at east edge of Raubinger Road bridge over West Branch Swartz Creek.
RM 14	776.38	City of Swartz Creek, cut box on center of 6 foot headwall over culvert under Miller Road at southside, 150 feet northwest of Swartz Creek Lodge.
RM 15	784.64	City of Swartz Creek, cut box on catch basin at top of curb, 25 feet east of centerline of Morrish Road, 58 feet south of centerline of Miller Road.
RM 16	771.23	City of Swartz Creek, cut box on west wingwall of north abutment at Morrish Road bridge over West Branch Swartz Creek.
RM 17	775.99	City of Swartz Creek, USGS copper bolt stamped "261-1/2" set in top of concrete post, 40.5 feet north of north rail of north track, 120 feet east of intersection of Morrish Road and Grand Trunk Western Railroad, about 300 feet east of railroad station.
RM 18	779.95	City of Swartz Creek, cut "X" on southeast bolt at base of railroad traffic signal at northwest corner of intersection of Morrish Road and Grand Trunk Western Railroad.

ELEVATION REFERENCE MARKS--Continued

REFERENCE MARKS	ELEVATION IN FEET (MSL)	DESCRIPTION OF LOCATION
RM 19	768.80	City of Swartz Creek, USGS copper bolt stamped "260-1/2" set in top of concrete post, 28.7 feet north of north rail of north track, about 300 feet east of semaphore, about 370 feet east of railroad bridge crossing West Branch Swartz Creek.
RM 20	778.21	City of Swartz Creek, cut "X" on top of concrete curb, 3 feet east of west edge of curb at south edge of Hill Road, 60 feet west of centerline of Seymour Road.
RM 21	778.06	Township of Gaines, bolt spike in north side of 32-inch cottonwood tree, at center of curve in Hill Road at south side, about 2,000 feet east of Van Vleet Road.


Corporate Limits
Corporate limits
Reach 2
REACH 1 ZONE AB
City of Flint
BRISTOL ROAD
LINDEN ROAD
760
755
750
745
740
735
ELEVATION IN FEET (NGVD)
WALKER
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
0+00
5+00
10+00
15+00
20+00
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STREAM DISTANCE IN FEET ABOVE MOUTH
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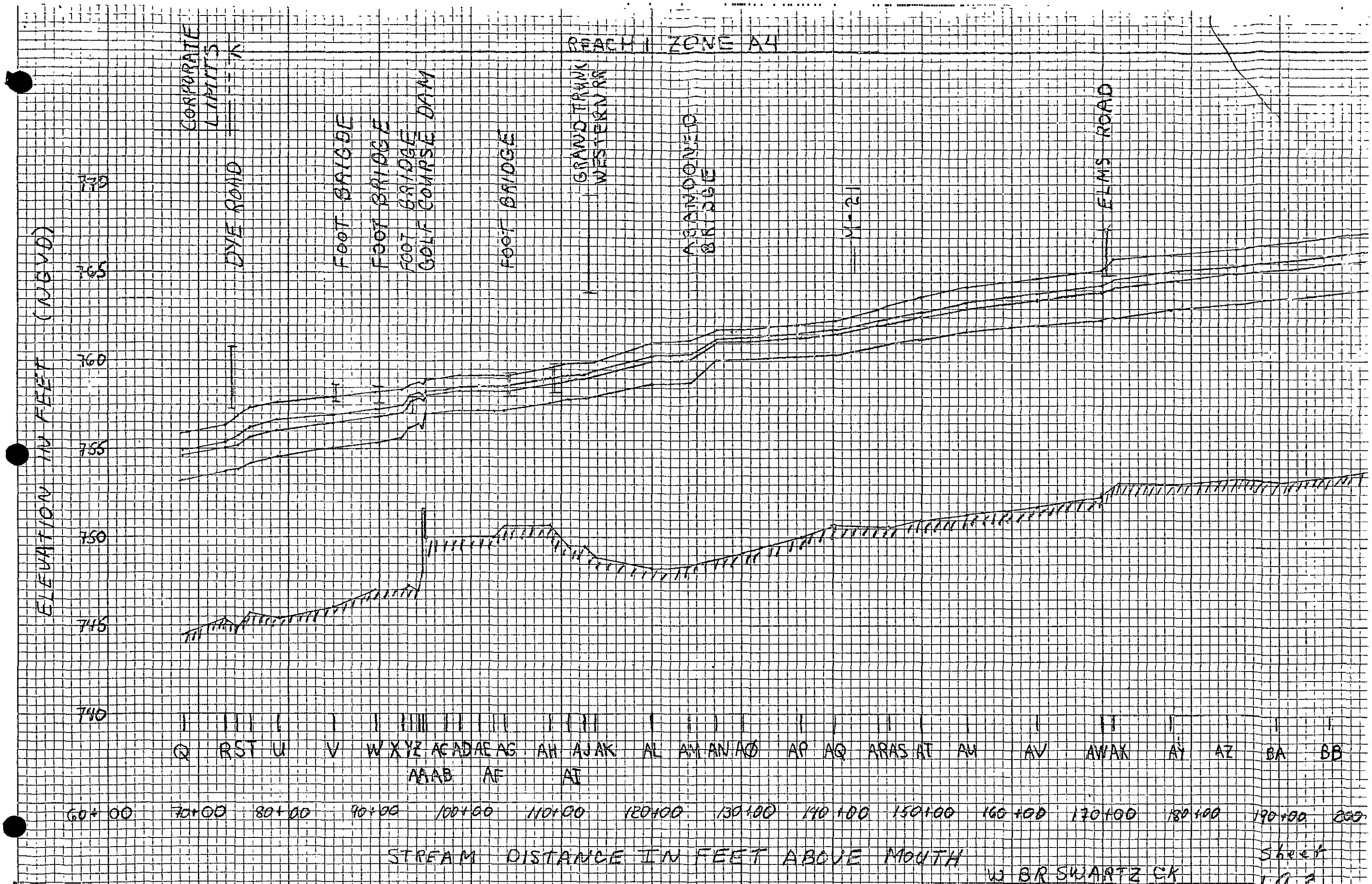
Profiles


REACH II ZONE A4
CORPORATE LIMITS
DYE ROAD
FOOT BRIDGE
FOOT BRIDGE
FOOT BRIDGE
GOLF COURSE DAM
FOOT BRIDGE
GRAND TRUNK WESTERN RR
ABANDONED BRIDGE
U-21
ELMS ROAD
ELEVATION IN FEET (NGVD)
770
765
760
755
750
745
740
Q RST U V WXYZ AC AD AE AG AH AJ AK AL AM AN AO AP AQ ARAS AT AU AV AWAX AY AZ BA BB
AAAB AF AI
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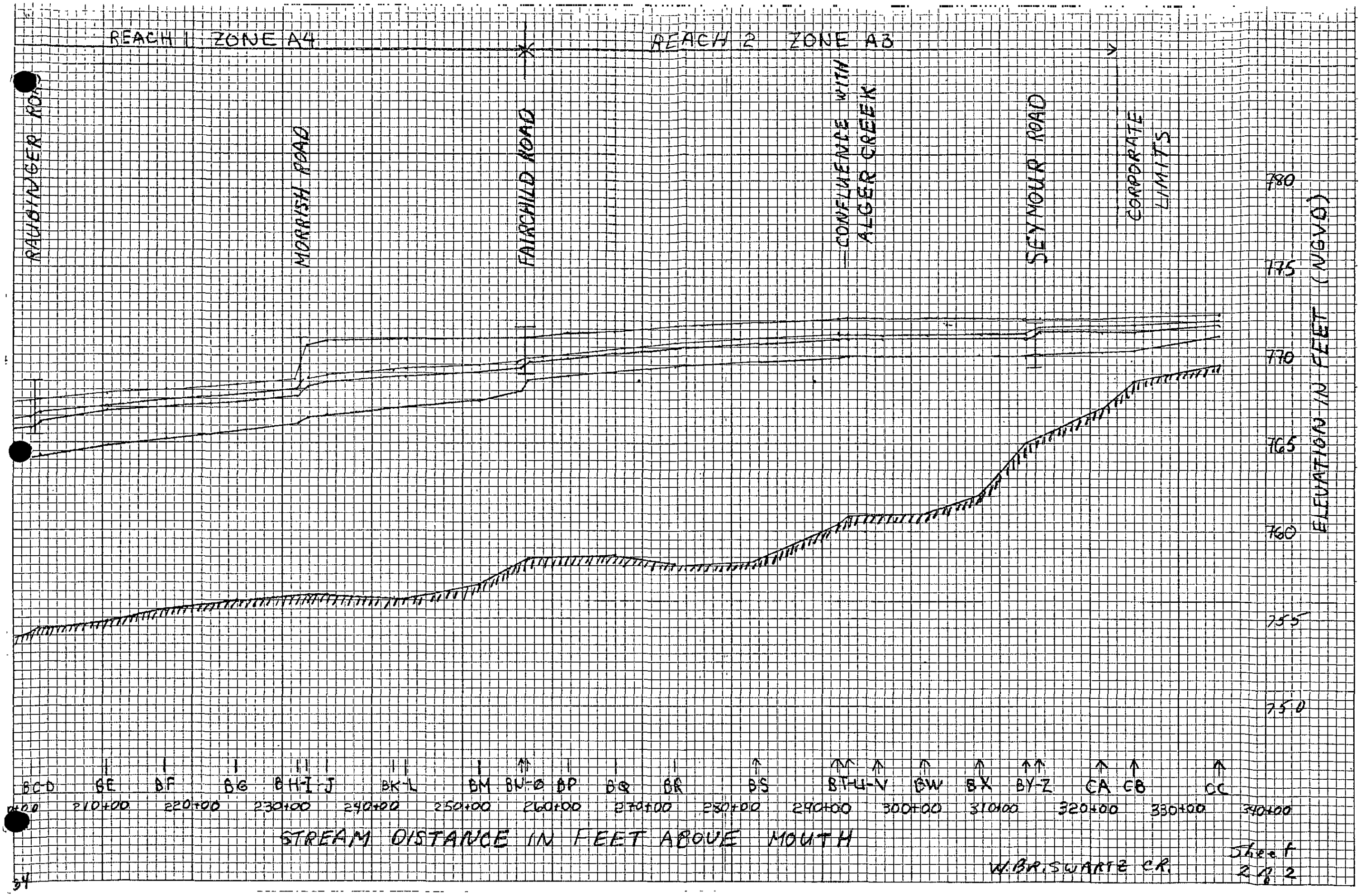
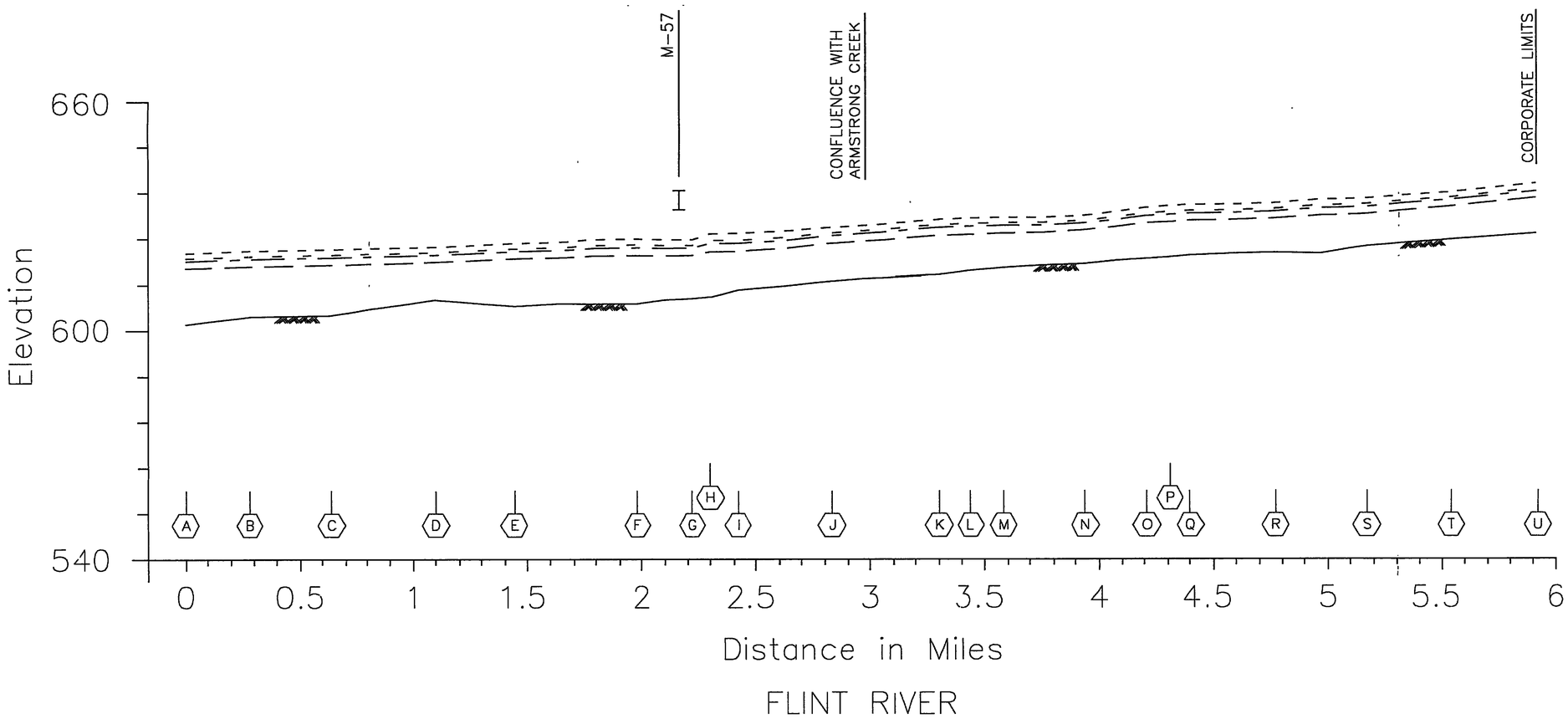
W BR SWARTZ CK
Sheet 1 of 2


REACH 1 ZONE A4
REACH 2 ZONE A3
RAUBINGER ROAD
MORRISH ROAD
FAIRCHILD ROAD
CONFLUENCE WITH ALGER CREEK
SEYMOUR ROAD
CORPORATE LIMITS
780
775
770
765
760
755
750
ELEVATION IN FEET (NGVD)
BCD
BE
BF
BG
BH-I
BJ
BK-L
BM
BN-O
BP
BQ
BR
BS
BT-U-V
BW
BX
BY-Z
CA
CB
CC
200
210+00
220+00
230+00
240+00
250+00
260+00
270+00
280+00
290+00
300+00
310+00
320+00
330+00
340+00
STREAM DISTANCE IN FEET ABOVE MOUTH
W.BR. SWARTZ CR.
Sheet 2 of 2

COMPOSITE
OF
Section 35, T.8N. R.5E.,
Flushing Twp., Genesee Co., Mich
GENESEE COUNTY
METROPOLITAN PLANNING COMMISSION
FLINT, MICHIGAN
FR1
SECTION INDEX
CONTOUR INTERVAL 5
IN PLANE COORDINATE
P.A. 1964.
COMP
Section 34,
Flushing Twp., Ge
METROPOLITAN PLANNING
FLINT, M
FLINT RIVER
WILDWILL POINTE
MARYDALE ESTATES
BONNIEBROOK ESTATES
SUNNY SLOPE SUB
PLEASANT RIDGE ESTATES
SOMERSET
FLUSHING
PARK VIEW
SCHROEDER
SPRING
MEADOWS
GREEN
BONNIE VIEW
GARDENS
FLUSHING GARDENS
ORCHARD
CARPENTER
SCHAEBER DRIVE
POLICE
ROAD
LEGEND

COMP
Section 34
Flushing Twp. Ge
GENESEE
METROPOLITAN PLANNING
FLINT, MI
SECTION INDEX
6 5 4 3 2 1
7 8 9 10 11 12
18 17 16 15 14 13
19 20 21 22 23 24
30 29 28 27 26 25
31 32 33 34 35 36
SCALE 1" = 800'
CONTOUR INTERVAL 5'
GRID PLANE COORDINATE
SYSTEM PROJECTED ON ACT 9 P.A. 1964
The preparation of this Mapping was financed in part through a grant provided by the Department of Planning, Housing and Urban Development, pursuant to Section 701 of the Housing Act of 1954, as amended and through the Metropolitan Planning Commission, Genesee County, Michigan.
COMPILED BY PHOTOGRAMMETRIC METHODS
BY
UNITED AERIAL MAPPING
FLINT, MICHIGAN
FLINT RIVER
GREEN MEADOWS
FLUSHING
PARK VIEW
VALLEY VIEW SUB.
DILLONDALE
SUNNY POINTE
SOMERSET
BROOKCREST
COLE CREEK
FERGUSON PLAT
FAIR ACRES
FAIRLIEIGH
GRANDWITCH
Section 1, DVR project, Flushing
Section 2, Lake Porter
Section 3, Lake Pontiac
RED OUTLET
ORCHARD
TRAILER PARK
CARPENTER
POTTER
ROAD



FLINT RIVER

LEGEND

- ------ 500-YEAR FLOOD
- - - - 100-YEAR FLOOD
- — - — 50-YEAR FLOOD
- — — — 10-YEAR FLOOD
- STREAM BED
- (A) CROSS SECTION LOCATION

BR02AX36 FEB 89

DRAWN: CAD
DESIGN:
CHECKED:

DATE COMPLETED: FINAL: PRELIMINARY:

SCALE: VERT. 1" = 15' HORZ. 1" = 0.25 MILES

REVISIONS	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE

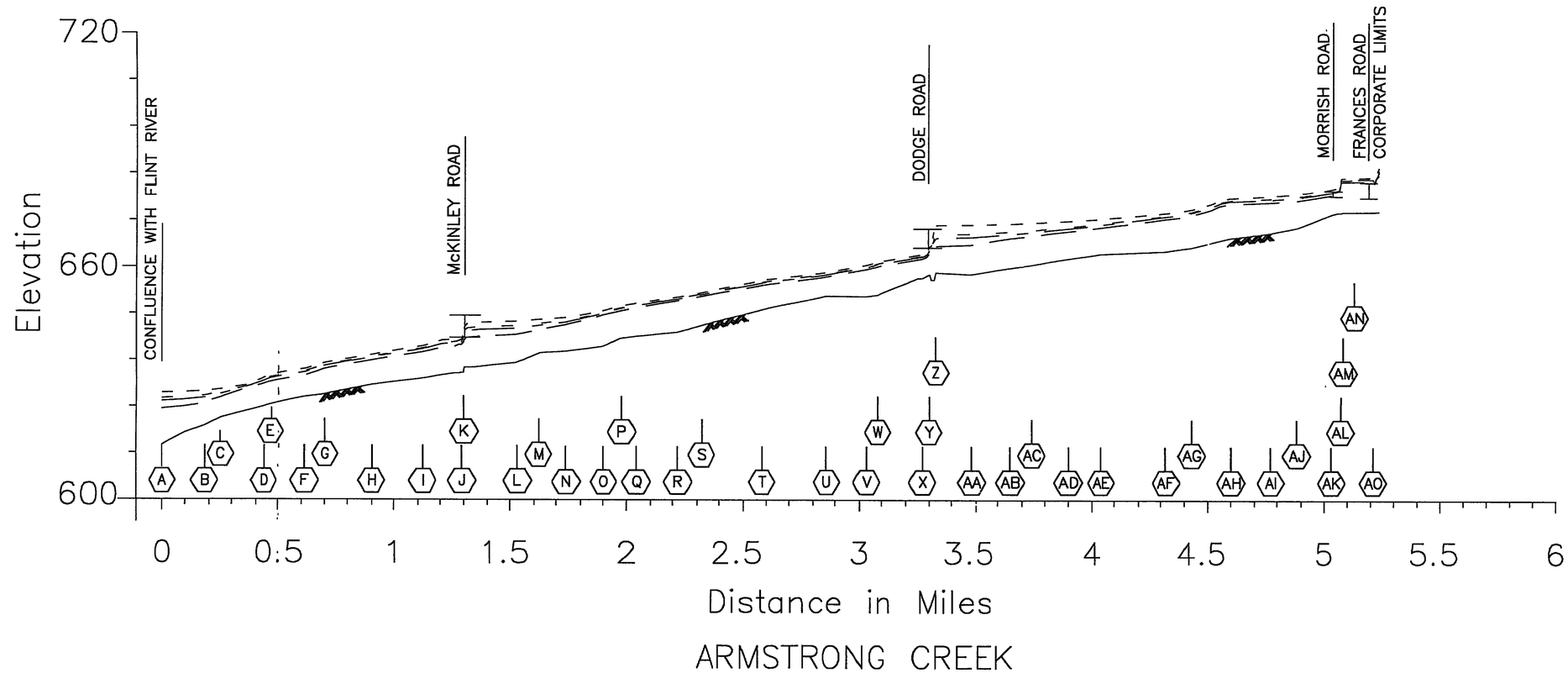
FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON, D.C. 20472
CONTRACT NO. EMW-89-C-2829

Johnson & Anderson, Inc.
CONSULTING ENGINEERS
4479 DIXIE HIGHWAY
WATERFORD, MICHIGAN 48329
(313) - 334-9901

TOWNSHIP OF MONTROSE
FLOOD INSURANCE STUDY
GENESEE COUNTY, MICHIGAN

FLINT RIVER PROFILE

JOB NO. 13039-01
DATE ISSUED
SHEET NO. 1



LEGEND

- ------ 500–YEAR FLOOD
- - - - 100–YEAR FLOOD
- — - — 50–YEAR FLOOD
- — — — 10–YEAR FLOOD
- STREAM BED
- (A) CROSS SECTION LOCATION

BRD24X36 FEB 89

DRAWN: CAD
DESIGN:
CHECKED:
DATE COMPLETED
FINAL:
PRELIMINARY

SCALE. VERT. 1" = 15'
HORZ 1" = 0.25 MILES

REVISIONS	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE
		Ground & water surface edit	4/9/92						

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON, D.C. 20472
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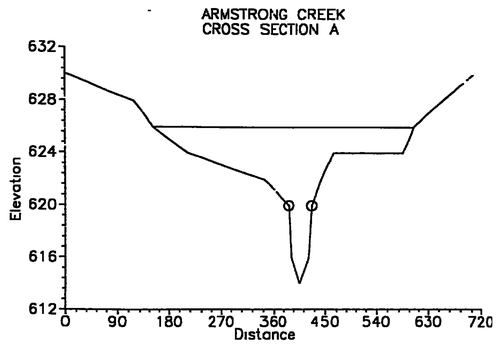
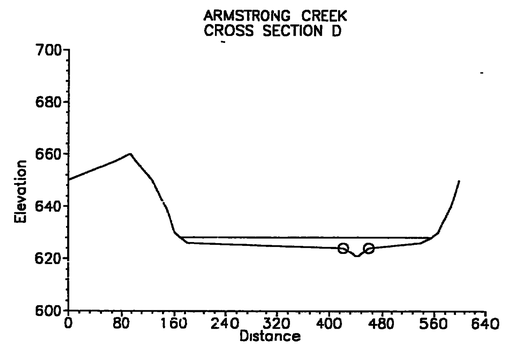
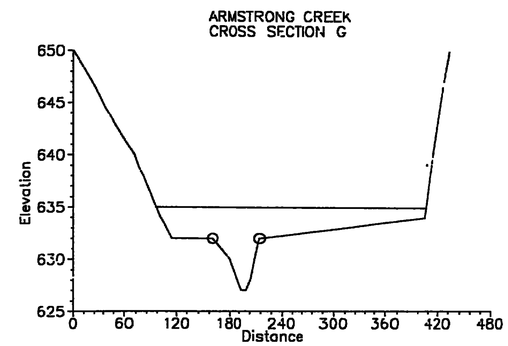
TOWNSHIP OF MONTROSE
FLOOD INSURANCE STUDY
GENESEE COUNTY, MICHIGAN

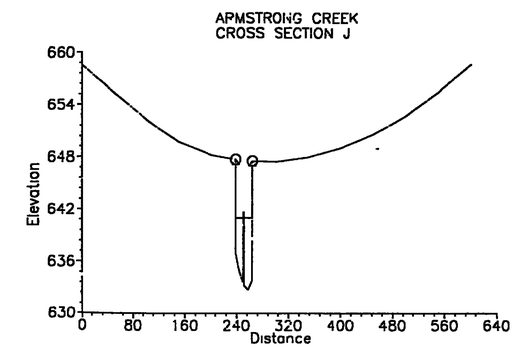
ARMSTRONG CREEK PROFILE

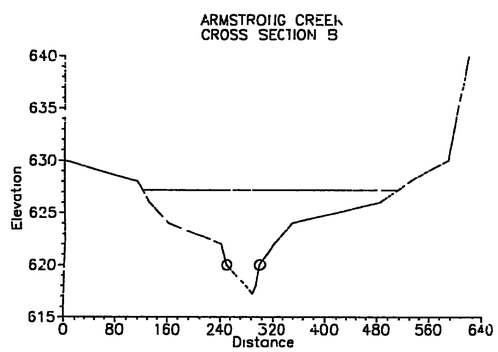
JOB NO 13039–01
DATE ISSUED
SHEET NO 2

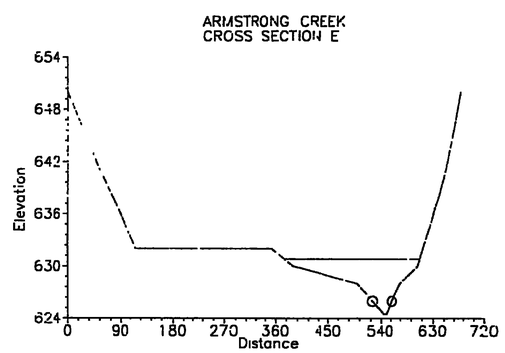


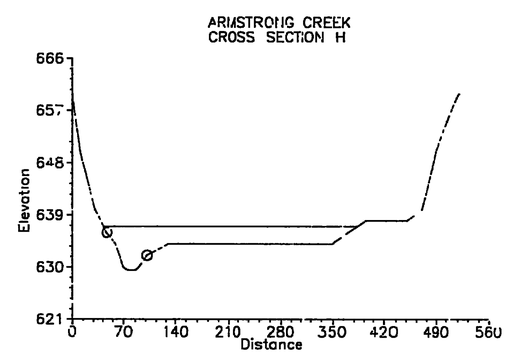


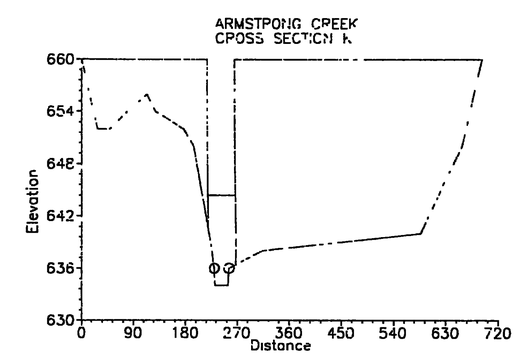


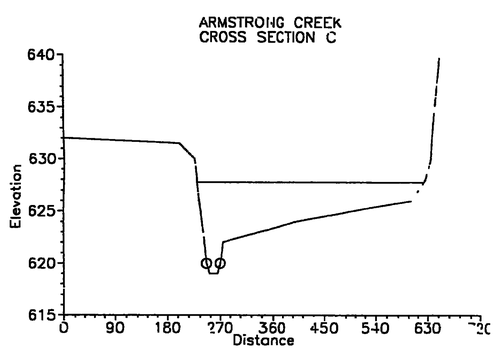


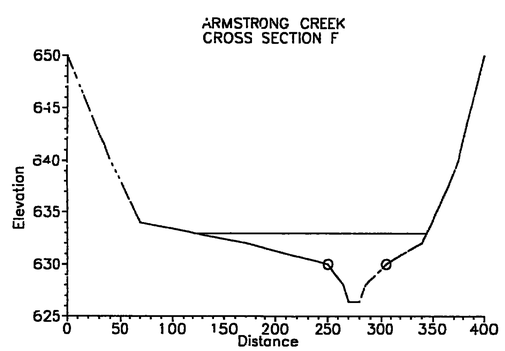


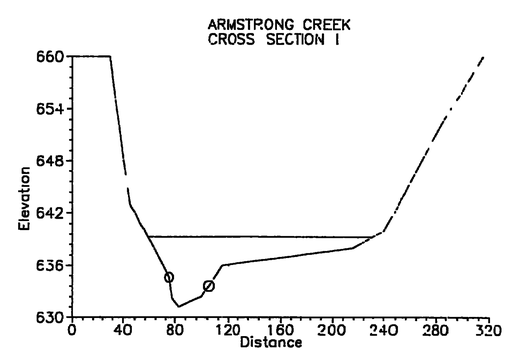


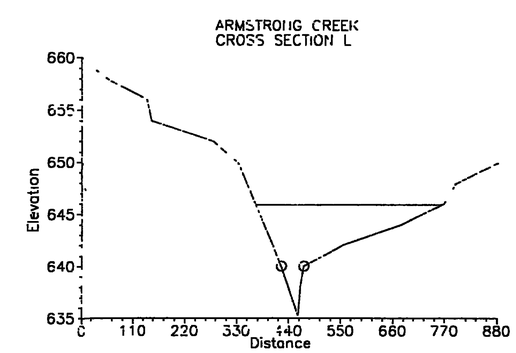












BR024X36 FEB 89

DRAWN: CAD
DESIGN:
CHECKED:

DATE COMPLETED: FINAL: PRELIMINARY:

SCALE: VERT. VARIES HORZ. VARIES

REVISIONS	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE

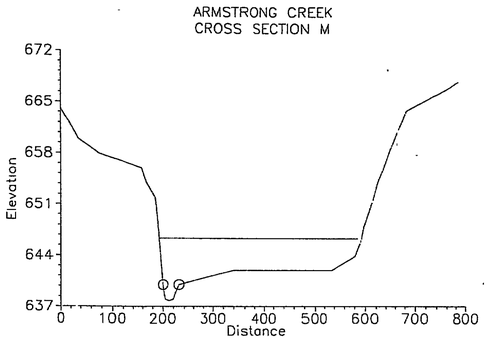
FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON, D.C. 20472
CONTRACT NO. EMW-89-C-2829

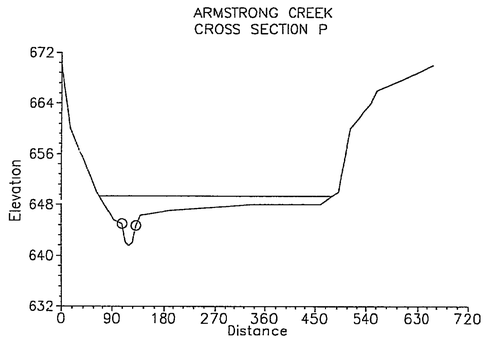
Johnson & Anderson, Inc.
CONSULTING ENGINEERS
4479 DIXIE HIGHWAY
WATERFORD, MICHIGAN 48329
(313) – 334-8901

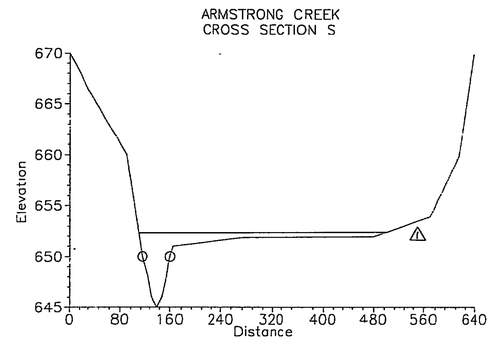
TOWNSHIP OF MONTROSE
FLOOD INSURANCE STUDY
GENESEE COUNTY, MICHIGAN

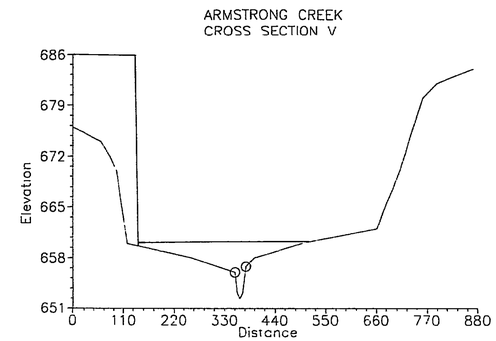
ARMSTRONG CREEK CROSS SECTIONS
A THROUGH L

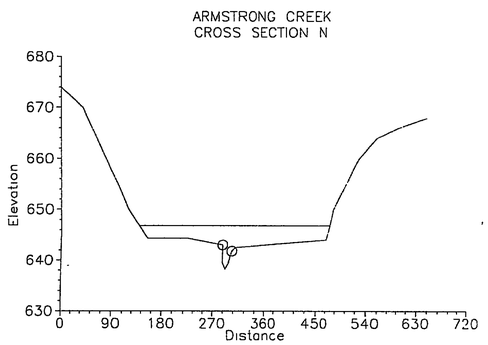
JOB NO. 13039-01
DATE ISSUED
SHEET NO. 3

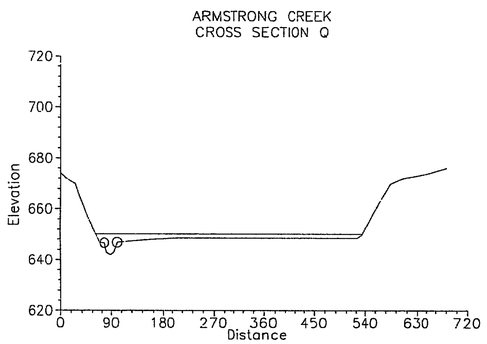


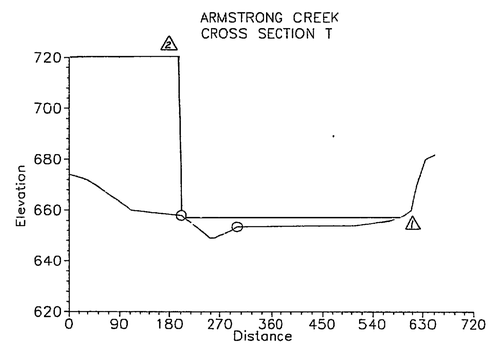


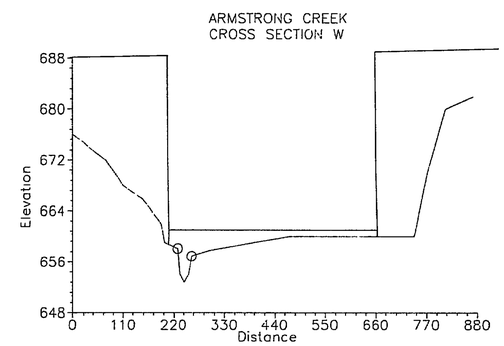


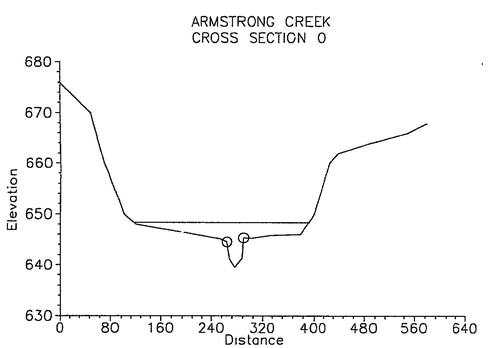


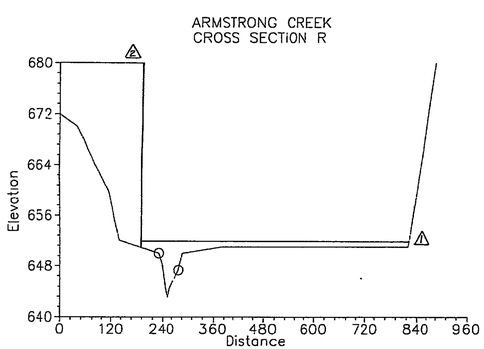


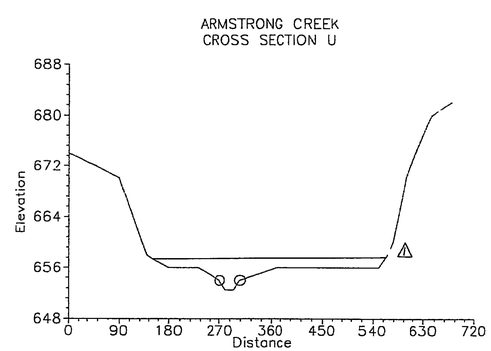


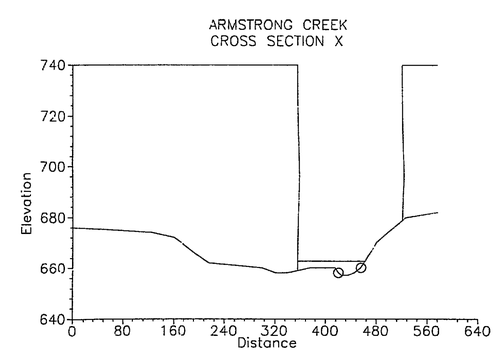












BR024X36 FEB 89

DRAWN: CAD
DESIGN:
CHECKED:

DATE COMPLETED: FINAL: PRELIMINARY:

SCALE: VERT. VARIES HORZ. VARIES

REVISIONS	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE
	1	W.S EL. LONGERED	5/18/92						
	2	ENCROACHMENT STATION MOVED	5/18/92						

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON, D.C. 20472
CONTRACT NO. EMW-89-C-2829

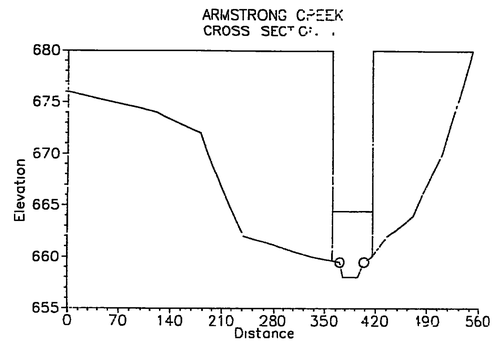
Johnson & Anderson, Inc.
CONSULTING ENGINEERS
4479 DIXIE HIGHWAY
WATERFORD, MICHIGAN 48329
(313) - 334-9901

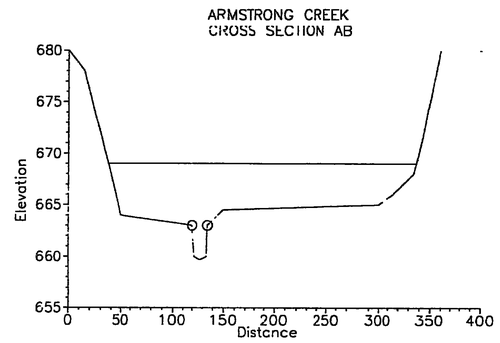
TOWNSHIP OF MONTROSE
FLOOD INSURANCE STUDY
GENESEE COUNTY, MICHIGAN

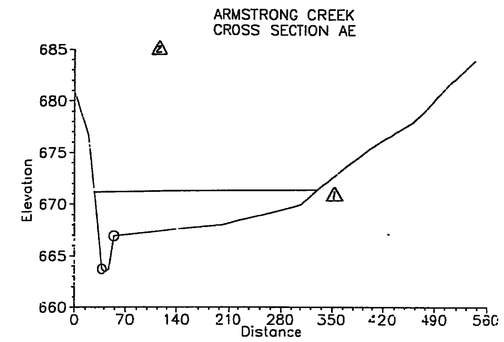
ARMSTRONG CREEK CROSS SECTIONS
M THROUGH X

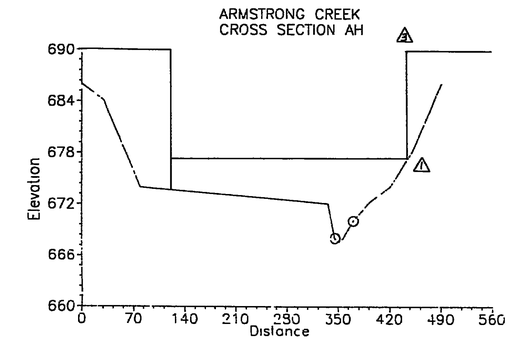
JOB NO. 13039-01
DATE ISSUED
SHEET NO. 4

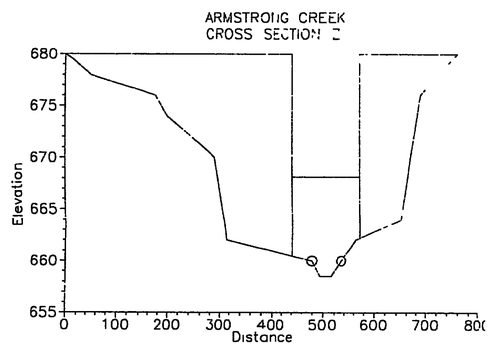
FLOATER LAYER VARIOUSTEXT
FLOATER LAYER TEXT

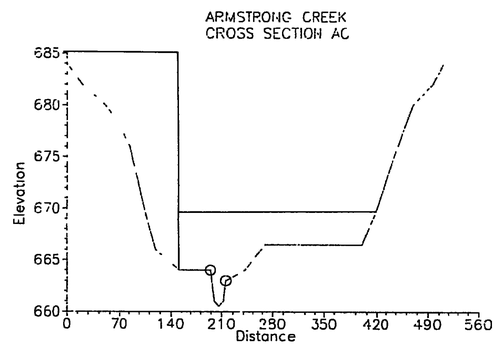


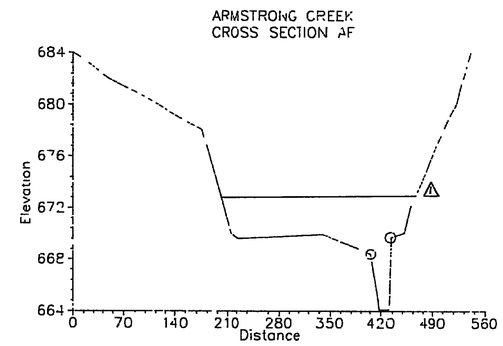


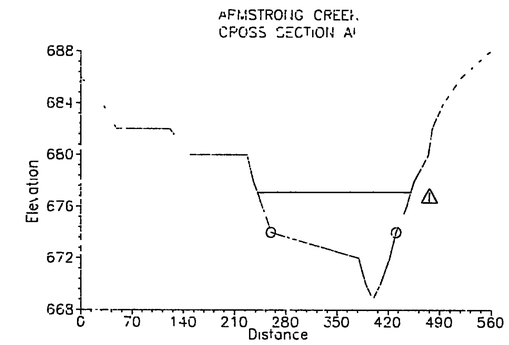


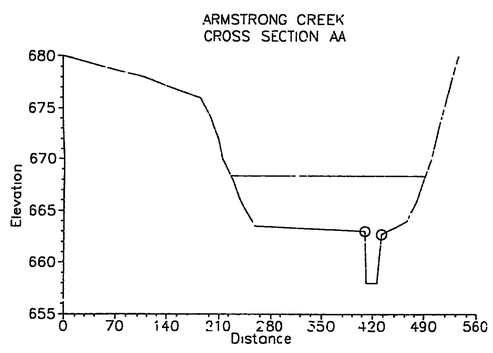


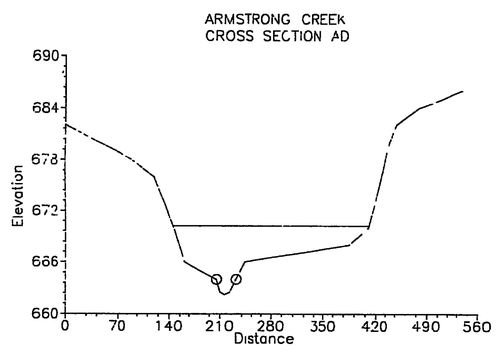


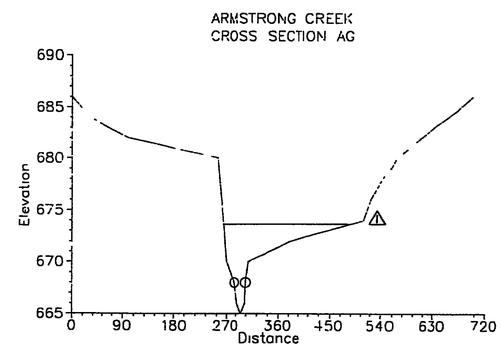


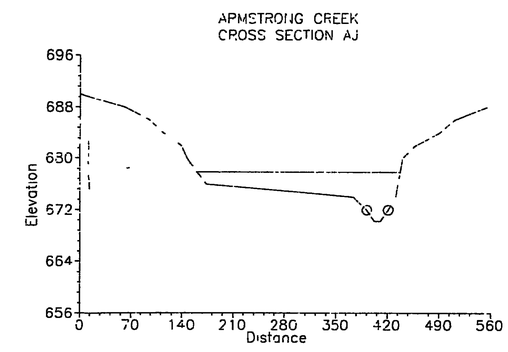












BRD24X36 FEB 89

DRAWN: CAD
DESIGN:
CHECKED:
DATE COMPLETED:
FINAL:
PRELIMINARY.

SCALE. VERT. VARIES HORZ. VARIES

REVISIONS	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE
	1	N S EL. LOWERED	11/16/92						
	2	EXCESSIVELY BEVELED	"						
	3	EXCESSIVELY MOVED	"						

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON, D.C. 20472
CONTRACT NO. EMW-89-C-2829

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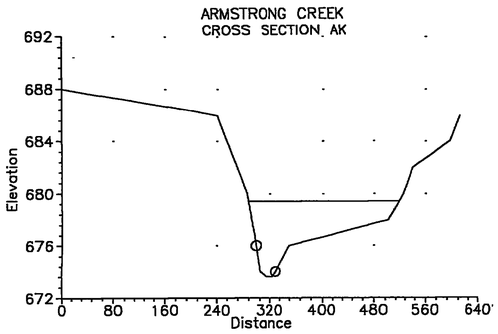
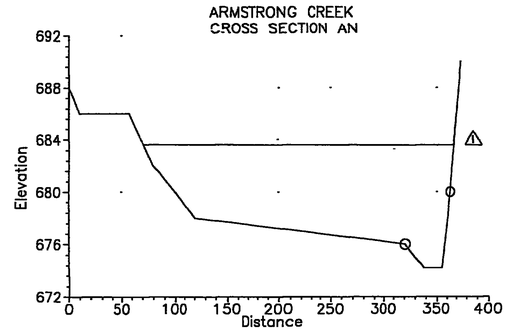
TOWNSHIP OF MONTROSE
FLOOD INSURANCE STUDY
GENESEE COUNTY, MICHIGAN

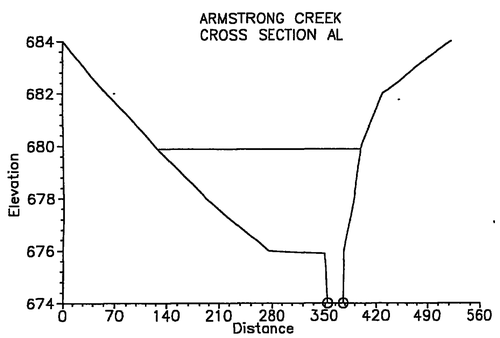
ARMSTRONG CREEK CROSS SECTIONS
Y THROUGH AJ

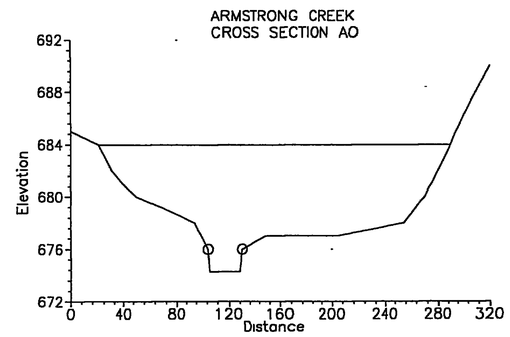
JOB NO. 13039-01
DATE ISSUED
SHEET NO. 5

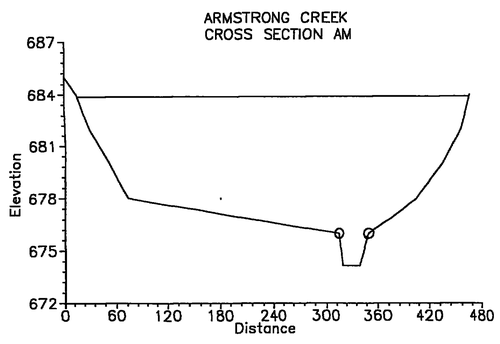
L:\WORK\13039\ORIGINALS\Y
PLOT DATE 4 MARCH 1994











DRAWN: CAD
DESIGN:
CHECKED:

DATE COMPLETED: FINAL: PRELIMINARY:

SCALE: VERT. VARIES HORZ. VARIES

REVISIONS MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE
1	W.S. EL. LOWERED	7/16/92						

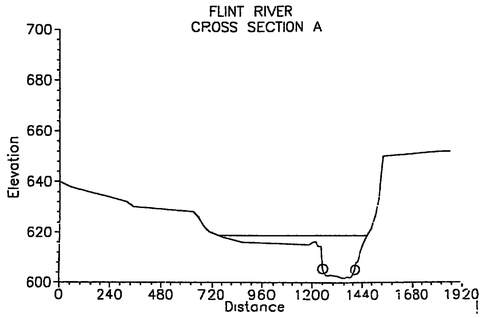
FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON, D.C. 20472
CONTRACT NO. EMW-89-C-2829

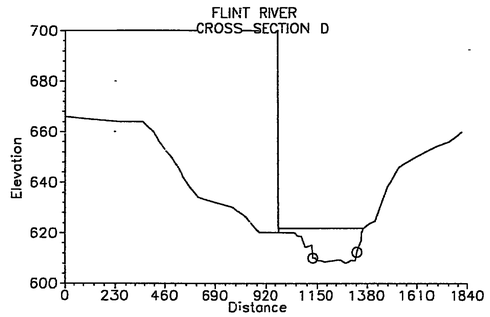
Johnson & Anderson, Inc.
CONSULTING ENGINEERS
4479 DIXIE HIGHWAY
WATERFORD, MICHIGAN 48329
(313) - 334-9901

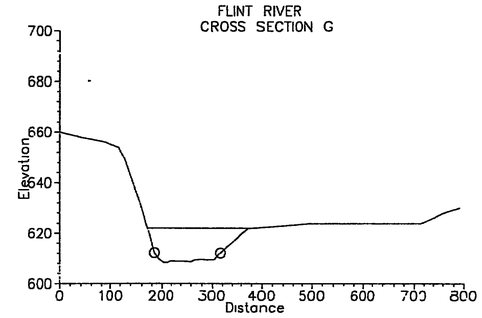
TOWNSHIP OF MONTROSE
FLOOD INSURANCE STUDY
GENESEE COUNTY, MICHIGAN

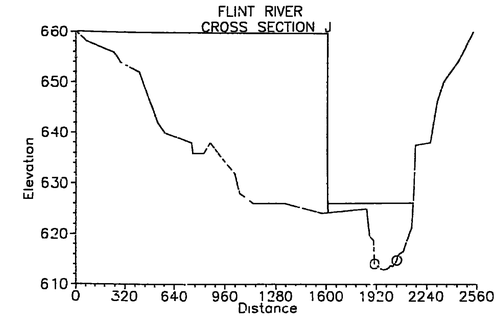
ARMSTRONG CREEK CROSS SECTIONS
AK THROUGH AO

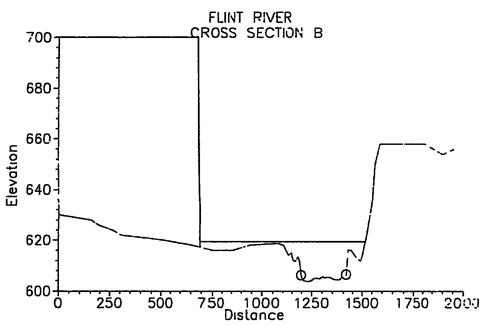
JOB NO. 13039-01
DATE ISSUED
SHEET NO. 6

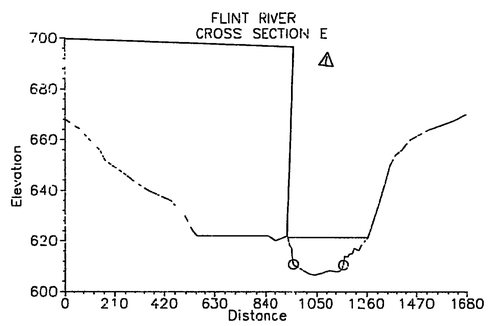


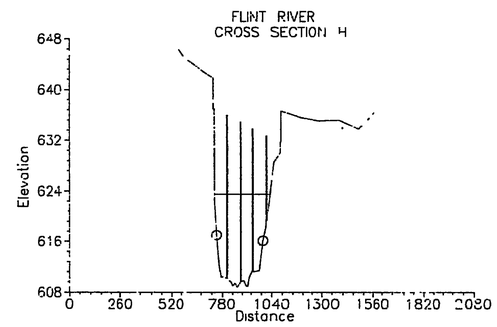


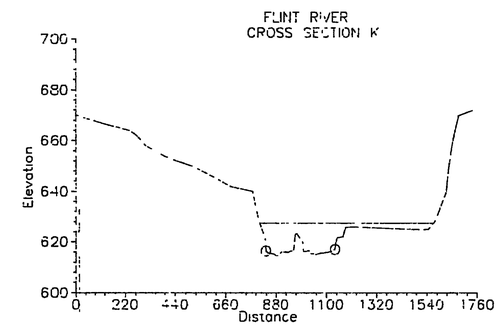


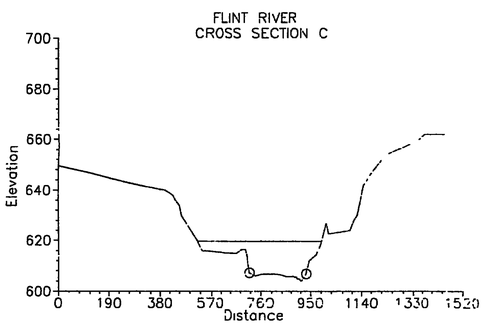


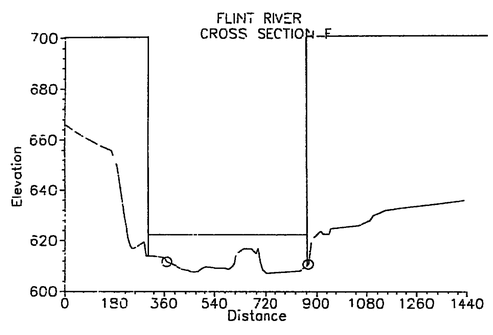


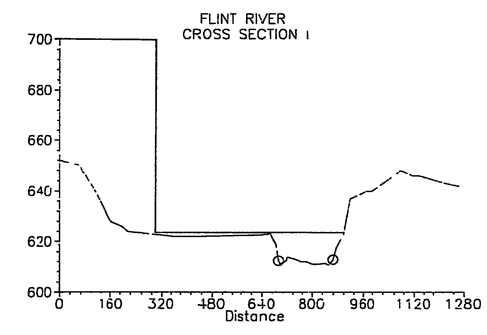


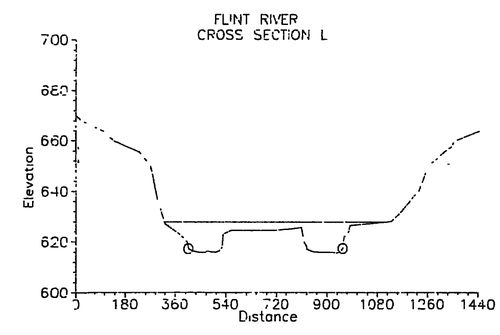












BRD24X36 FEB 89

DRAWN: CAD
DESIGN:
CHECKED:

DATE COMPLETED:

FINAL:
PRELIMINARY:

SCALE: VERT. VARIES HORZ. VARIES

REVISIONS	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE
	1	ENCROACHMENT ADDED	6/26/92						

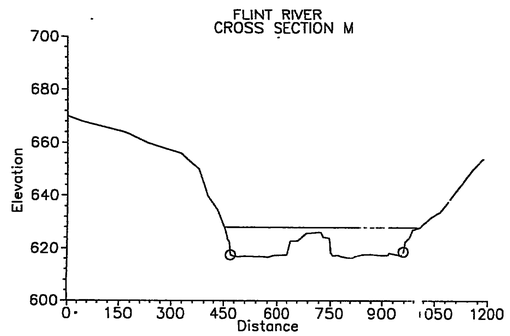
FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON, D.C. 20472
CONTRACT NO EMW-89-C-2829

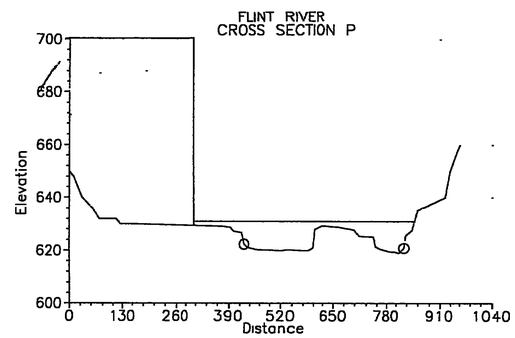
Johnson & Anderson, Inc.
CONSULTING ENGINEERS
4479 DIXIE HIGHWAY
WATERFORD, MICHIGAN 48329
(313) – 334-9901

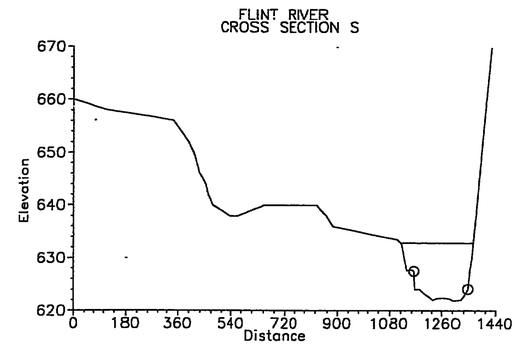
TOWNSHIP OF MONTROSE
FLOOD INSURANCE STUDY
GENESEE COUNTY, MICHIGAN

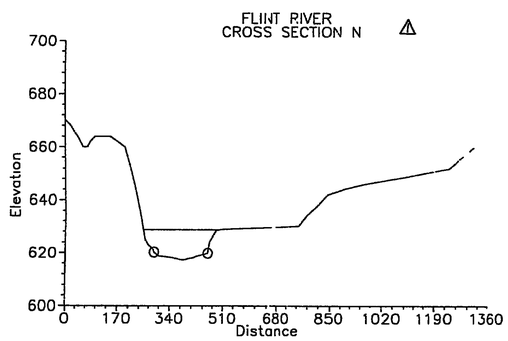
FLINT RIVER CROSS SECTIONS
A THROUGH L

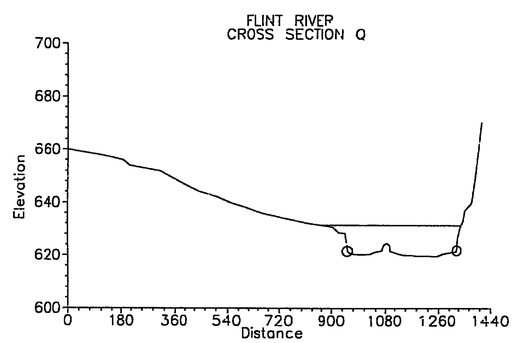
JOB NO. 13039-01
DATE ISSUED
SHEET NO. 7

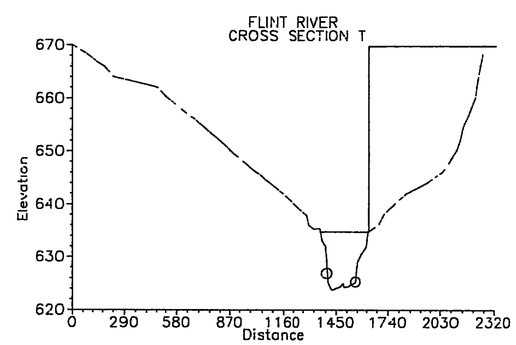


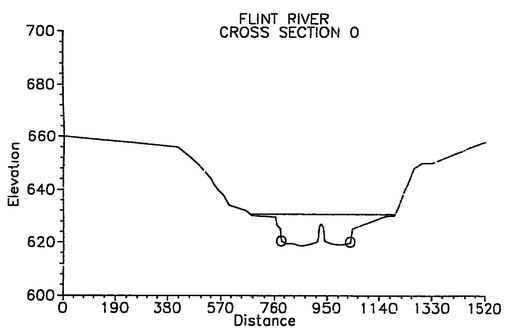


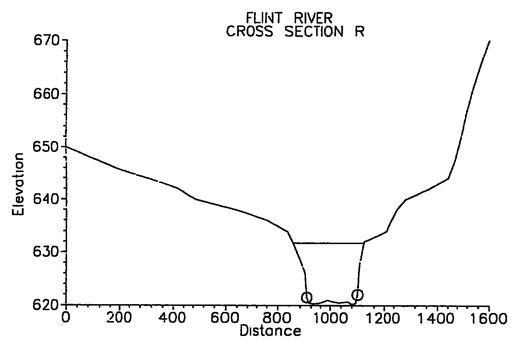


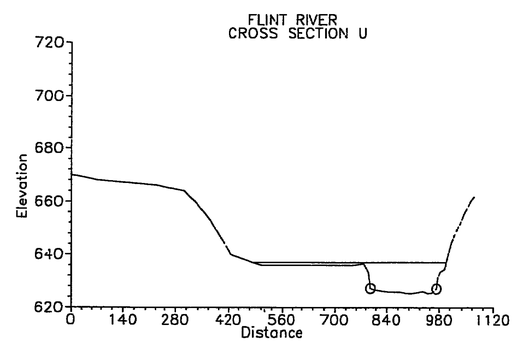












BRD24X36 FEB 89

DRAWN: CAD
DES.GN:
CHECKED:

DATE COMPLETED: FINAL / PRELIMINARY

SCALE: VERT. VARIES HORZ. VARIES

REV'S'ONS	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE	MARK	ADDENDUM/CHANGE ORDER	DATE
	1	ENCROACHMENT REVISED	9/96					

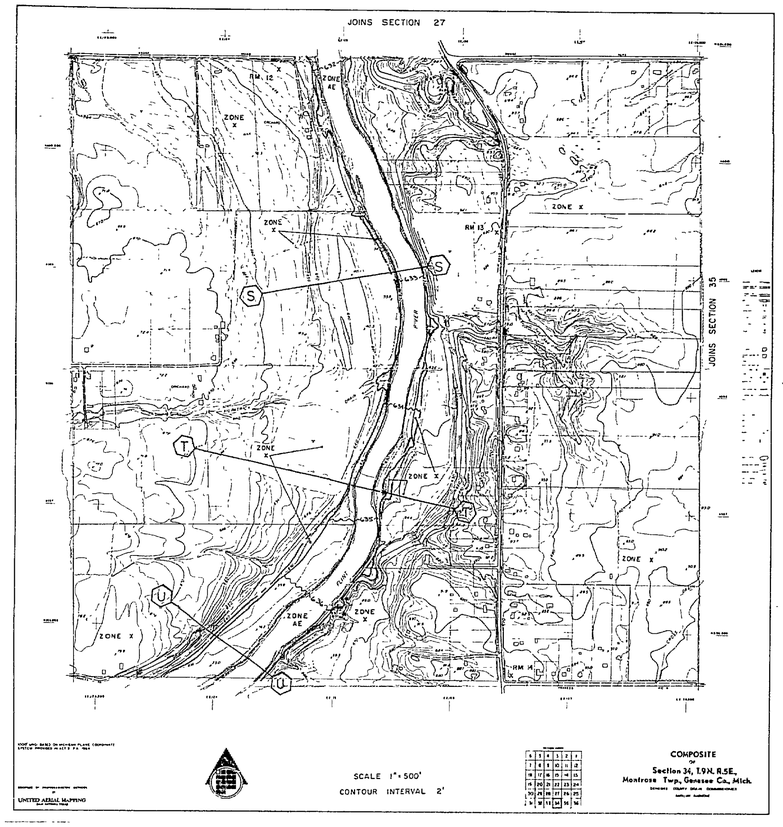
FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON, D.C. 20472
CONTRACT NO. EMW-89-C-2829

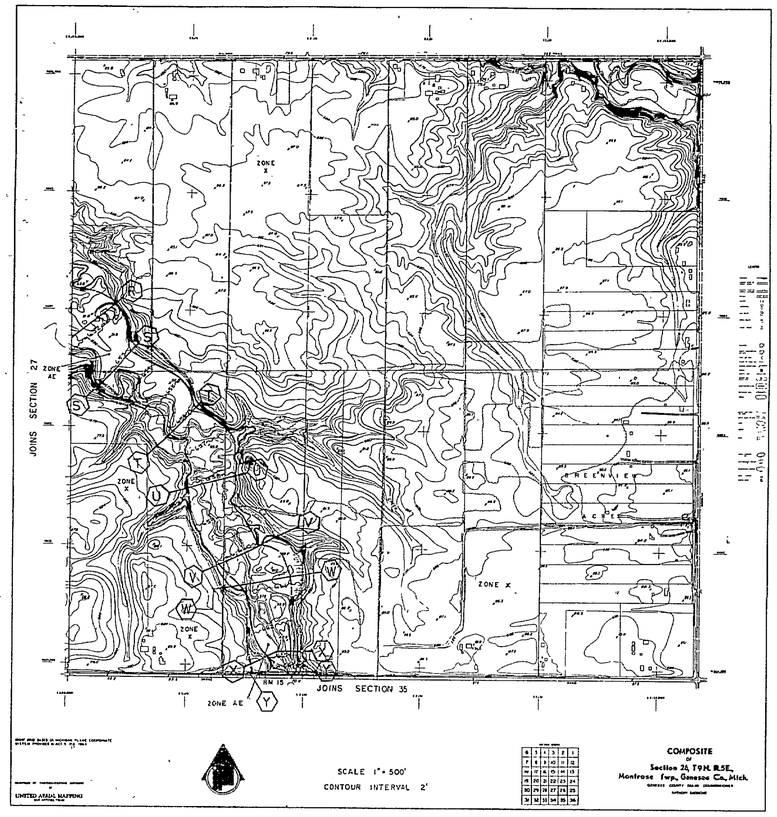
Johnson & Anderson, Inc.
CONSULTING ENGINEERS
4479 DIXIE HIGHWAY
WATERFORD, MICHIGAN 48329
(313) 334-9301

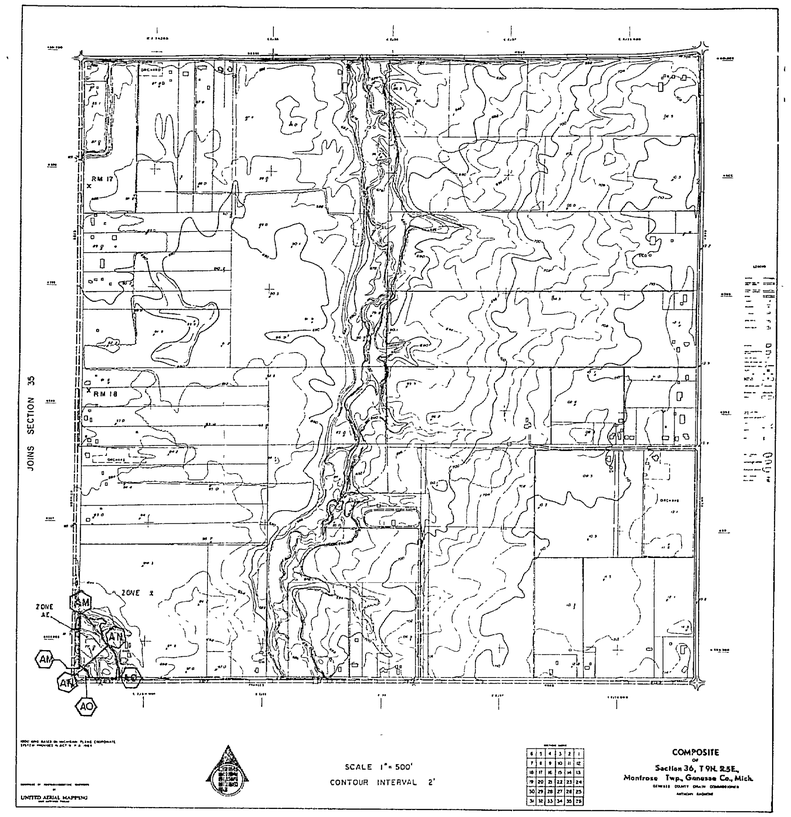
TOWNSHIP OF MONTROSE
FLOOD INSURANCE STUDY
GENESEE COUNTY, MICHIGAN

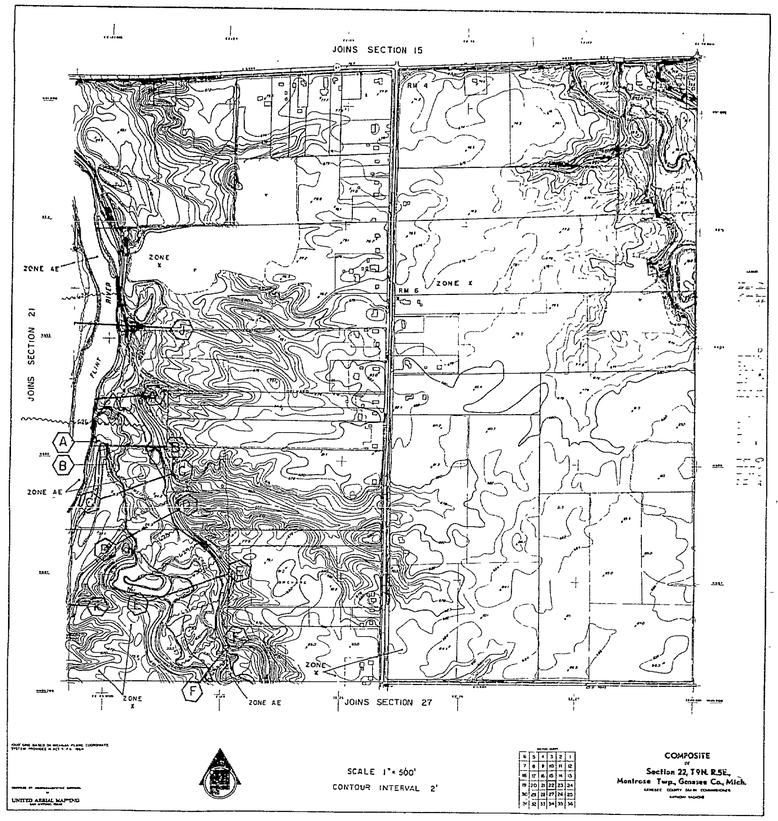
FLINT RIVER CROSS SECTIONS
M THROUGH U

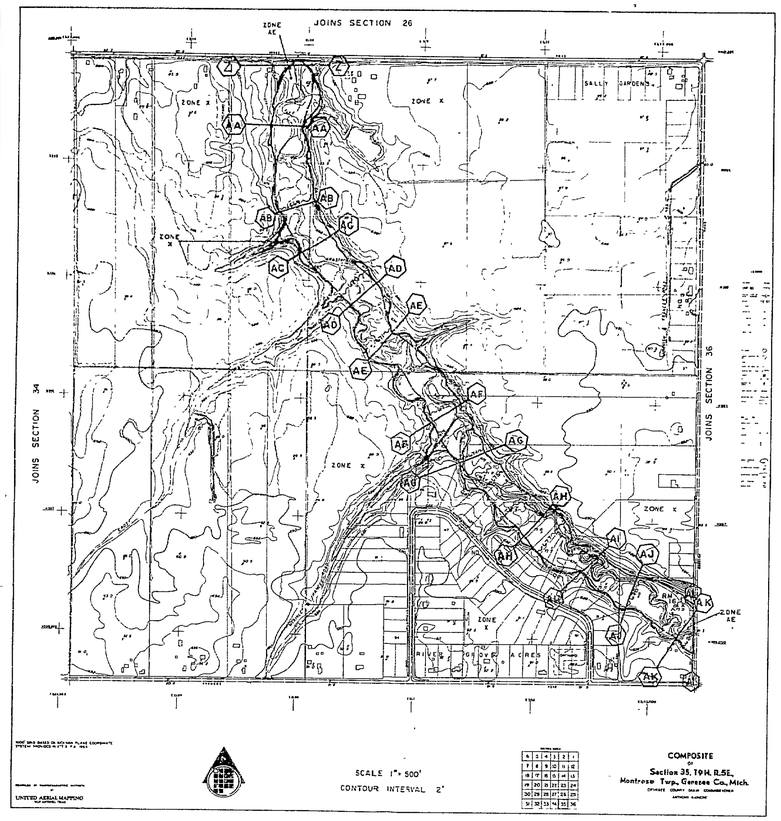
JOB NO. 13039-01
DATE SSUED
SHEET NO. 8



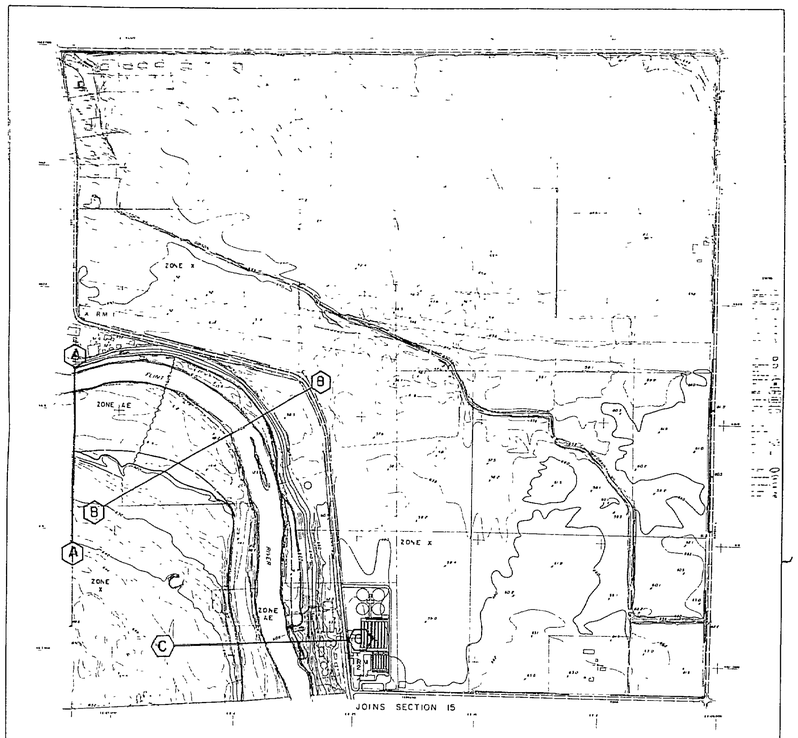








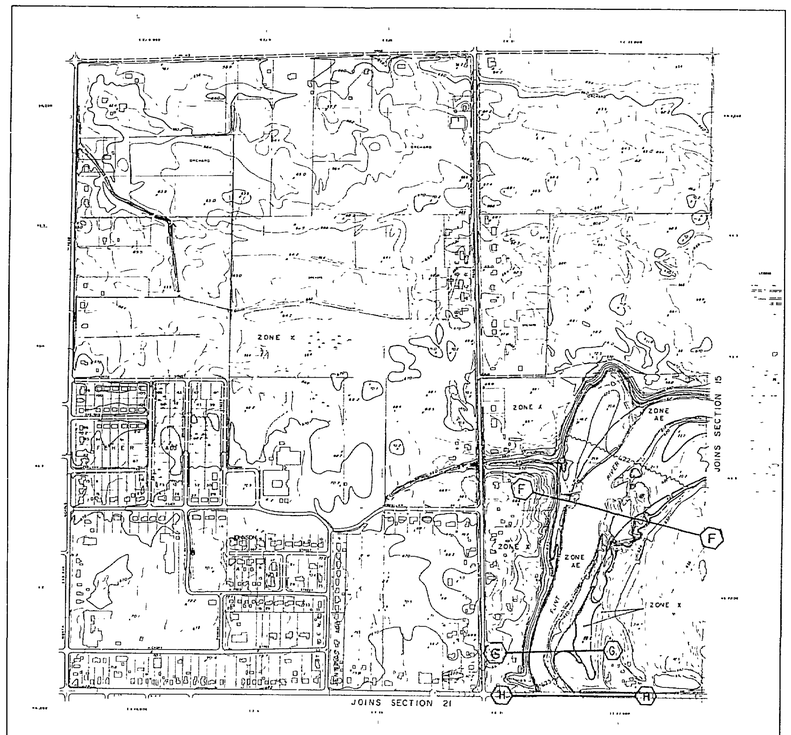
REVISED JUNE 18, 1992



SCALE 1" = 500'
CONTOUR INTERVAL 2'

UNITED AERIAL MAPPING

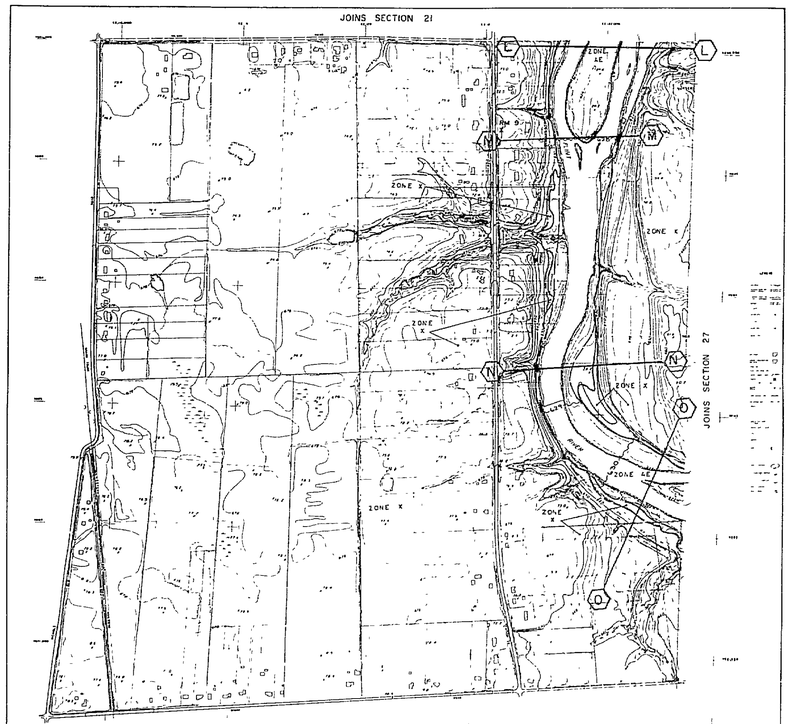
COMPOSITE
OF
Section 10, T9N. R5E.
Montrose Twp., Genesee Co., Mich.
GENESEE COUNTY ONLY COMMISSIONERS
ANTHONY WAGNONE



SCALE 1" = 500'
CONTOUR INTERVAL 2'

UNITED AERIAL MAPPING

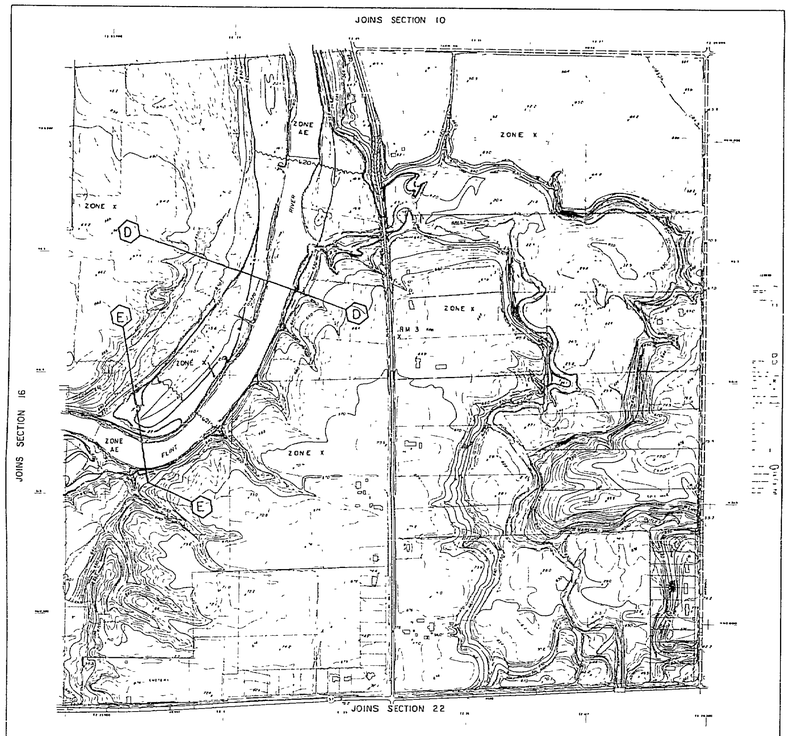
COMPOSITE
OF
Section 16, T9N. R5E.
Montrose Twp., Genesee Co., Mich.
GENESEE COUNTY ONLY COMMISSIONERS
ANTHONY WAGNONE



SCALE 1" = 500'
CONTOUR INTERVAL 2'

UNITED AERIAL MAPPING

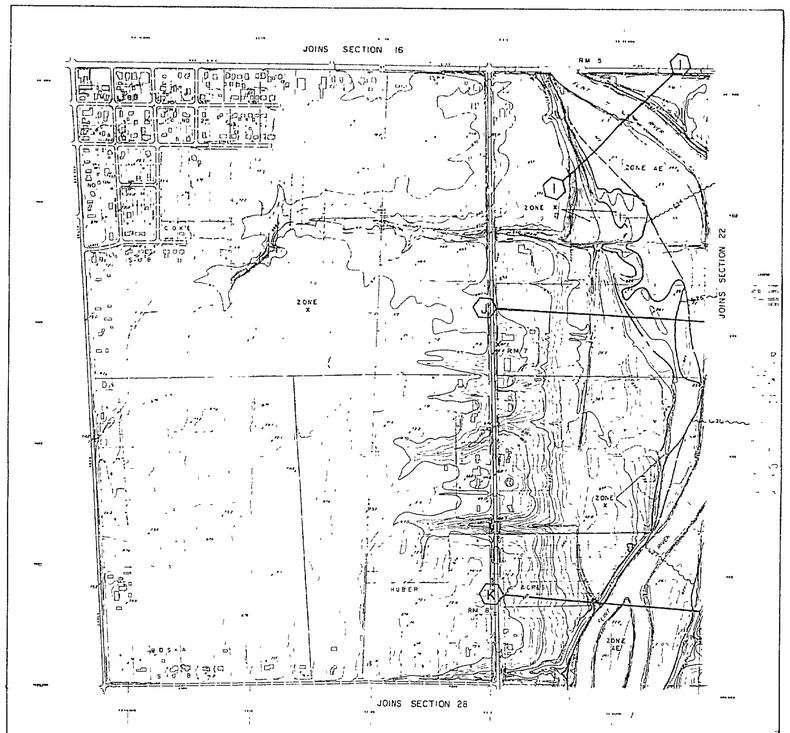
COMPOSITE
OF
Section 28, T9N R5E.
Montrose Twp., Genesee Co., Mich.
GENESEE COUNTY ONLY COMMISSIONERS
ANTHONY WAGNONE



SCALE 1" = 500'
CONTOUR INTERVAL 2'

UNITED AERIAL MAPPING

COMPOSITE
OF
Section 15, T9N. R5E.
Montrose Twp., Genesee Co., Mich.
GENESEE COUNTY ONLY COMMISSIONERS
ANTHONY WAGNONE



SCALE 1" = 500'
CONTOUR INTERVAL 2'

UNITED AERIAL MAPPING

COMPOSITE
OF
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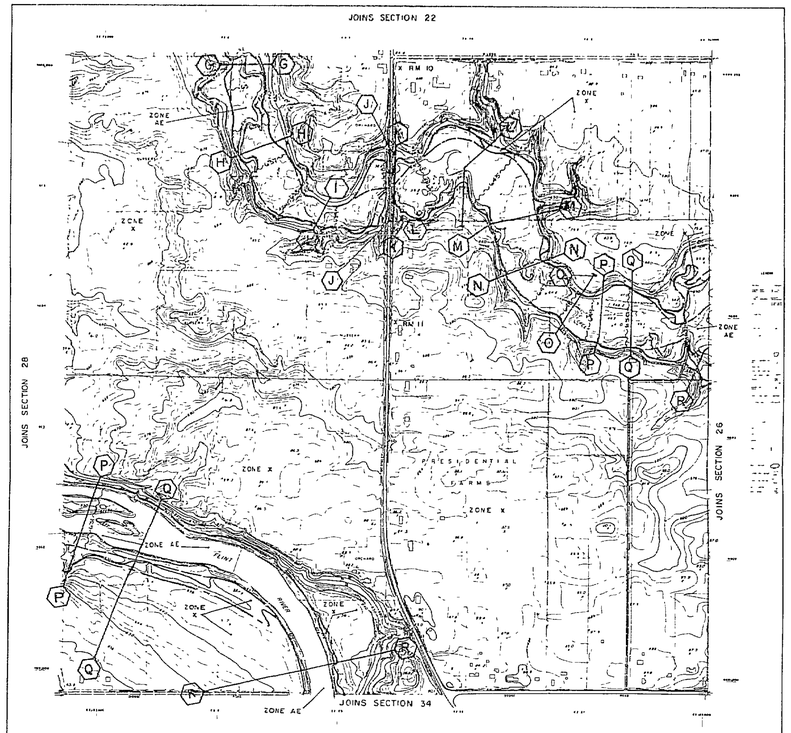
Montrose Twp., Genesee Co., Mich.
GENESEE COUNTY ONLY COMMISSIONERS
ANTHONY WAGNONE



SCALE 1" = 500'
CONTOUR INTERVAL 2'

UNITED AERIAL MAPPING

COMPOSITE
OF
Section 22, T9N. R5E.
Montrose Twp., Genesee Co., Mich.
GENESEE COUNTY ONLY COMMISSIONERS
ANTHONY WAGNONE

REVISED JUNE 18, 1982

00BREAK00

1) COUNTY: Genesee

2) STUDY NAME: Twp of Argentine

3) WATERCOURSE: Shiawassee River

4) DOCUMENT TYPE: 100 yr natural & Encroached

00BREAK00

```
1     1 SHIAWASSEE BYRON TO MC CASLIN RD          RWL DJH 68  5  2  5 12
2     2  [illegible]870  82940  82970  82950  82960
3   100     C 1   8  3  821    3800 99 99
4   105   1530   2120   2900   2370   2370
5   110       0  1  8350  120  1  8318  148  1  8318  150  2  8208  350  2  8201
5   111     450  2  8208  460  3  8288  480  3  8388
6   129  1  2 060 060  1  2 055 055  1  2 080 080
3   200     D 0   8  3  822    4800 99 99
5   210       0  1  8358   70  1  8300  110  2  8215  220  2  8218  220  2  8215
5   211     225  3  8308  330  3  8308  880  3  8400
6   229  1  2 058 058  1  2 060 060  1  2 058 058
3   300     E 0   9  3  823    5800 99 99
5   310     -20  1  8400  100  1  8338  120  1  8300  122  2  8224  190  2  8219
5   311     240  2  8224  245  3  8273  440  3  8300  580  3  8400
6   329  1  2 060 060  1  2 057 057  1  2 100 100
3   400     F 0   8  3  823    6240 99 99
5   410       0  1  8400   30  1  8300   34  2  8228   84  2  8224  110  2  8228   A
5   411     115  3  8288  420  3  8300  480  3  8400
6   429  1  2 055 055  1  2 050 050  1  2 120 120
3   500     G 0  15  3  822    6690 99 99
5   510       0  1  8360   28  1  8340   36  1  8300   43  1  8280   53  2  8260
5   511      55  2  8218   78  2  8210   92  2  8218   93  2  8240   96  3  8250   B
5   512     100  3  8260  412  3  8280  424  3  8300  514  3  8320  548  3  8340
6   529  1  2 090 090  1  2 050 050  1  2 130 130
3   600     H 0  15  3  823    7290 99 99
5   610       0  1  8340   72  1  8320   74  1  8300   76  1  8280   83  2  8260
5   611      88  2  8240   90  2  8223  110  2  8225  112  2  8240  120  3  8260   C
5   612     150  3  8260  163  3  8280  168  3  8300  174  3  8320  203  3  8340
6   629  1  2 055 055  1  2 050 050  1  2 120 120
3   700    HH 0  18  3  822    7870 99 99
5   710       0  1  8400   28  1  8300   41  1  8280  102  1  8280  188  1  8280
5   711     208  1  8260  214  2  8240  218  2  8221  250  2  8216  273  2  8221   D
5   712     275  2  8240  280  3  8240  288  3  8260  560  3  8280  573  3  8300
5   713     600  3  8320  640  3  8340  700  3  8400
6   729  1  2 100 100  1  2 055 055  1  2 120 120
3   800     J 0  17  3  819    8360 99 99
5   810       0  1  8380   10  1  8360   42  1  8340   55  1  8320   62  1  8300
5   811      72  2  8280   79  2  8260   82  2  8240   85  2  8220  106  2  8186   E
5   812     126  2  8220  128  3  8240  134  3  8260  420  3  8280  506  3  8300
5   813     540  3  8320  560  3  8340
6   829  1  2 055 055  1  2 050 050  1  2 090 090
3   900 BR  I 2  14  1  822    8360        0  8324 1 1
5   910       0  1  8324    0  1  8270    5  1  8253   10  1  8222   15  1  8220   BRIDGE
5   911      20  1  8213   25  1  8209   30  1  8220   35  1  8225   40  1  8231
5   912      45  1  8253   47  1  8254   47  1  8324    0 -9  8324
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3  1000 RD   1 4    9  3   25          1  3          2 2 2                1
5  1010      -80  1  8347  -50  2  8335    0  2  8334    1  3  8333   60  3  8310
5  1011       86  3  8298  240  3  8297  290  3  8297  290  3  8350
3  1100      J 5  21  3  822    8410  1  3
5  1110        0  1  8400   28  1  8300   40  1  8258   44  2  8245   51  2  8223
5  1111       55  2  8220   59  2  8218   63  2  8220   67  2  8220   71  2  8222   F
5  1112       75  2  8225   79  2  8231   83  2  8234   87  2  8238   91  2  8250
5  1113       92  3  8260  570  3  8280  580  3  8300  612  3  8320  770  3  8340
5  1114      780  3  8360
6  1129  1  2 060 060  1  2 050 050  1  2 090 090
3  1200     JJ 0  14  3  823    8940 99 99
5  1210        0  1  8400   12  1  8300   28  1  8280   93  2  8260   98  2  8240
5  1211      100  2  8230  130  2  8227  151  2  8230  161  3  8260  306  3  8280   G
5  1213      533  3  8300  568  3  8320  733  3  8340  955  3  8360
6  1229  1  2 090 090  1  2 050 050  1  2 100 100
3  1300      K 0  18  3  825    9630 99 99
5  1310        0  1  8400   12  1  8380   31  1  8360   64  1  8340  154  1  8320
5  1311      283  1  8300  295  1  8280  344  1  8260  402  2  8260  412  2  8243   H
5  1312      466  2  8243  470  3  8260  482  3  8280  522  3  8300  542  3  8320
5  1313      566  3  8340  700  3  8360  810  3  8380
6  1329  1  2 080 080  1  2 040 040  1  2 070 070
3  1400      L 0  19  3  825   10430 99 99
5  1410        0  1  8400   22  1  8380   48  1  8360   77  1  8340  133  1  8320
5  1411      151  1  8300  168  2  8280  172  2  8260  174  2  8248  220  2  8248   I
5  1412      232  2  8260  282  3  8260  312  3  8280  325  3  8300  351  3  8320
5  1413      398  3  8340  426  3  8360  443  3  8380  458  3  8400
6  1429  1  2 060 060  1  2 040 040  1  2 070 070
3  1500     LL 0  16  3  825   10740 99 99
5  1510        0  1  8400   13  1  8380   33  1  8300   38  2  8280   49  2  8260
5  1511       51  2  8248  103  2  8248  106  2  8260  122  2  8280  130  3  8280   J
5  1512      217  3  8300  247  3  8320  302  3  8340  333  3  8360  358  3  8380
5  1513      368  3  8400
6  1529  1  2 060 060  1  2 040 040  1  2 080 080
3  1600      M 0  18  3  825   11130 99 99
5  1610        0  1  8400   32  1  8380   68  1  8360  142  1  8340  149  2  8320
5  1611      156  2  8295  170  2  8280  178  2  8260  180  2  8247  230  2  8247   K
5  1612      236  2  8260  253  3  8280  283  3  8300  297  3  8320  304  3  8340
5  1613      323  3  8360  338  3  8380  354  3  8400
6  1629  1  2 060 060  1  2 045 045  1  2 065 065
3  1700     MM 0  15  3  827   11610 99 99
5  1710        0  1  8400   42  1  8380   54  1  8360   92  1  8340  172  1  8320
5  1711      182  1  8300  260  1  8300  283  1  8300  293  2  8280  302  2  8260   L
5  1712      342  2  8260  346  2  8280  353  2  8300  355  3  8320  373  3  8400
6  1729  1  2 060 060  1  2 048 048  1  2 050 050
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3  1800     N 0  16  3  827   11960 99 99
5  1810       0  1  8400     3  1  8380   18  1  8300   53  2  8300   63  2  8300
5  1811      72  2  8299    78  2  8262  119  2  8262  122  2  8270  129  2  8286   M
5  1812     200  3  8300   314  3  8320  343  3  8340  396  3  8360  420  3  8380
5  1813     504  3  8400
5  1829  1  2 070 070  1  2 045 045  1  2 090 090
3  1900    NN 0  15  3  827   12380 99 99
5  1910       0  1  8400     8  2  8300   13  2  8280   15  2  8260   18  2  8258
5  1911      64  2  8258    66  2  8260   67  2  8280  102  3  8300  163  3  8300   N
5  1912     173  3  8320   202  3  8340  385  3  8360  492  3  8380  603  3  8400
5  1929  1  2 060 060  1  2 050 050  1  2 080 080
3  2000     O 0  14  3  826   12810 99 99
5  2010       0  1  8464     8  1  8400   20  2  8300   22  2  8280   24  2  8255
5  2011      61  2  8255    68  2  8260   98  3  8280  153  3  8300  180  3  8320   Ø
5  2012     285  3  8340   442  3  8360  536  3  8380  733  3  8400
6  2029  1  2 090 090  1  2 047 047  1  2 120 120
3  2100     P 0  15  3  826   13630 99 99
5  2110       0  1  8420    28  1  8400   52  1  8380   90  1  8360  210  2  8363
5  2111     219  2  8290   221  2  8260  246  2  8250  273  2  8280  290  3  8300   P
5  2112     370  3  8320   398  3  8340  428  3  8360  447  3  8380  472  3  8400
6  2129  1  2 080 080  1  2 046 046  1  2 100 100
3  2200    PP 0  18  3  826   14720 99 99
5  2210       0  1  8400    17  1  8380   78  1  8360  414  1  8340  427  1  8300
5  2211     432  2  8280   442  2  8260  448  2  8256  486  2  8256  488  2  8260   Q
5  2212     498  3  8280   630  3  8300  768  3  8300  830  3  8320  837  3  8340
5  2213     846  3  8360   851  3  8380  862  3  8400
6  2229  1  2 080 080  1  2 050 050  1  2 120 120
3  2300     Q 0  15  3  826   15180 99 99
5  2310       0  1  8400    15  1  8380   52  1  8360  341  1  8340  370  1  8320
5  2311     450  2  8300   464  2  8280  466  2  8259  506  2  8259  508  2  8280   R
5  2312     526  2  8300   554  3  8320  600  3  8340  640  3  8360  900  3  8395
6  2329  1  2 070 070  1  2 050 050  1  2 120 120
3  2400     R 0  13  3  827   15990 99 99
5  2410       2  1  8400    23  2  8300   32  2  8280   34  2  8263   70  2  8263
5  2411      72  2  8280    85  2  8300  256  3  8320  355  3  8340  445  3  8360   S
5  2412     752  3  8361   886  3  8380 1038  3  8400
6  2429  1  2 060 060  1  2 050 050  1  2 120 120
3  2500     S 0  20  3  828   17180 99 99
5  2510       0  1  8400     4  1  8380   38  1  8360   55  1  8340   65  1  8320
5  2511     213  1  8300   240  1  8280  310  1  8280  320  1  8300  930  2  8300   T
5  2512     944  2  8280   947  2  8270  997  2  8270 1000  2  8280 1010  3  8300
5  2513    1014  3  8320  1026  3  8340 1032  3  8360 1040  3  8380 1058  3  8400
6  2529  1  2 100 100  1  2 050 050  1  2 100 100
3  2600    SS 0  25  3  828   18100 99 99
5  2610      20  1  8400    32  1  8380   52  1  8360   67  1  8340   76  1  8320   U
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5  2611      50  1  8320  172  1  8340  178  1  8360  193  1  8362  224  1  8360
5  2612     228  1  8340  242  1  8320  283  1  8300  308  1  8300  512  2  8300
5  2613     520  2  8280  522  2  8276  570  2  8276  576  2  8280  586  2  8300   U
5  2614     650  3  8320 1060  3  8340 1110  3  8360 1168  3  8380 1204  3  8400
6  2629  1  2 100 100  1  2 049 049  1  2 060 060
3  2700     T 0  14  3  829   19040 99 99
5  2710       0  1  8400  120  1  8380  198  1  8360  388  1  8340  440  2  8320   V
5  2711     478  2  8320  495  2  8300  498  2  8282  547  2  8282  562  2  8340
5  2712     567  2  8360  586  3  8380  626  3  8400  671  3  8420
6  2729  1  2 048 048  1  2 045 045  1  2 043 043
3  2750    TT 0  14  3  829   19330 99 99
5  2761     -23  1  8400  102  1  8380  142  1  8360  177  1  8340  186  1  8320
5  2762     196  2  8300  198  2  8282  244  2  8282  246  2  8300  256  3  8320   W
5  2763     284  3  8340  288  3  8360  297  3  8380  313  3  8400
6  2770  1  2 060 060  1  2 045 045  1  2 070 070
3  2780   TTT 0  13  3  829   19840 99 99
5  2781       0  1  8400   14  1  8380   22  1  8360   43  1  8340   51  2  8320
5  2782      60  2  8300   62  2  8282   96  2  8282   97  2  8300  107  3  8320   X
5  2783     178  3  8360  196  3  8380  232  3  8400
6  2789  1  2 060 060  1  2 045 045  1  2 060 060
3  2800     U 0  14  3  829   19920 99 99
5  2810       0  1  8400   17  1  8380   26  1  8360   30  1  8340   34  1  8320
5  2811      40  2  8300   42  2  8282   80  2  8282   82  2  8300   90  2  8320   Y
5  2812      98  3  8340  102  3  8360  115  3  8380  122  3  8400
6  2829  1  2 050 050  1  2 044 044  1  2 050 050
3  2900 HR  U 2  12  1  829   19920        0  8360 3 1
5  2910       0  1  8360    0  1  8298    5  1  8295   10  1  8293   15  1  8292
5  2911      20  1  8287   25  1  8288   30  1  8298   35  1  8291   40  1  8288
5  2912      40  1  8360    0 -9  8360
6  2929  1  2 042 042
3  3000     V 5  19  3  828   19970  1  3
5  3011     -40  1  8400  -30  1  8380  -25  1  8360  -18  1  8348    1  2  8305
5  3012       5  2  8293    9  2  8289   15  2  8282   17  2  8279   23  2  8279   Z
5  3013      29  2  8279   35  2  8281   41  3  8295   43  3  8303   53  3  8334
5  3014      63  3  8354   73  3  8350   80  3  8380   90  3  8400
6  3029  1  2 050 050  1  2 045 045  1  2 060 060
3  3050   VIV 0  13  3  829   20050 99 99
5  3061       0  1  8420    7  1  8380   12  1  8360   24  1  8340   32  2  8300
5  3062      33  2  8280   72  2  8280   74  2  8300   78  3  8320  140  3  8340   AA
5  3063     173  3  8360  207  3  8380  222  3  8420
6  3069  1  2 050 050  1  2 045 045  1  2 060 060
3  3100    VV 0  15  3  829   20640 99 99
5  3110       0  1  8460   44  1  8440   52  1  8400   61  2  8320   72  2  8300
5  3111      75  2  8285  108  2  8285  110  2  8300  122  3  8320  266  3  8340   AB
5  3112     288  3  8360  351  3  8380  392  3  8400  427  3  8420  478  3  8440
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6  3129  1   060 060  1  2 050 050  1  2 070 070
3  3200     W 0  17  3  830   21290 99 99
5  3210       0  1  8420  220  1  8400  232  1  8380  236  1  8360  245  1  8340
5  3211     276  1  8340  283  2  8360  324  2  8332  328  2  8306  354  2  8291   AC
5  3212     380  2  8306  388  3  8337  390  3  8340  396  3  8360  406  3  8380
5  3213     412  3  8400  415  3  8420
6  3229  1  2 080 080  1  2 050 050  1  2 080 080
3  3300    WW 0  15  3  830   22090 99 99
5  3310     100  1  8420  140  1  8400  193  1  8380  264  1  8360  330  1  8360
5  3311     338  2  8340  348  2  8320  352  2  8300  375  2  8290  390  2  8306   AD
5  3312     406  3  8320  577  3  8340  693  3  8360  712  3  8400  732  3  8440
6  3329  1  2 080 080  1  2 050 050  1  2 100 100
3  3400     X 0  12  3  829   22420 99 99
5  3410       0  1  8430   28  1  8409   38  2  8380   52  2  8308   78  2  8289
5  3411     110  2  8308  118  3  8327  200  3  8340  510  3  8360  553  3  8400   AE
5  3412     582  3  8420  593  3  8440
6  3429  1  2 100 100  1  2 050 050  1  2 070 070
3  3500    XX 0  15  3  830   23340 99 99
5  3510       0  1  8430   52  1  8420  180  1  8400  328  1  8380  548  1  8360
5  3511     552  2  8340  608  2  8320  610  2  8310  656  2  8295  690  2  8310   AF
5  3512     695  3  8320  736  3  8340  918  3  8360  926  3  8400  939  3  8500
6  3529  1  2 120 120  1  2 050 050  1  2 080 080
3  3600     Y 0  16  3  831   23900 99 99
5  3610       0  1  8455   23  1  8440   82  1  8420   94  1  8400  122  1  8380
5  3611     234  1  8360  238  2  8340  256  2  8320  258  2  8300  290  2  8300   AG
5  3612     293  2  8320  333  3  8340  657  3  8360  691  3  8380  700  3  8400
5  3613     713  3  8500
6  3629  1  2 100 100  1  2 050 050  1  2 100 100
3  3700    YY 0  17  3  831   24650 99 99
5  3710       0  1  8440   48  1  8420   92  1  8400  134  1  8380  152  1  8360
5  3711     265  1  8340  318  2  8340  363  2  8320  365  2  8304  412  2  8304   AH
5  3712     416  2  8320  426  3  8340  662  3  8340  700  3  8360  712  3  8380
5  3713     724  3  8400  747  3  8500
6  3729  1  2 090 090  1  2 050 050  1  2 100 100
3  3800     Z 0  18  3  831   25100 99 99
5  3810       0  1  8460   28  1  8440   67  1  8420  119  1  8400  157  1  8380
5  3811     184  1  8360  583  2  8340  594  2  8320  597  2  8309  656  2  8309   AI
5  3812     658  2  8320  670  2  8340  673  3  8360  682  3  8380  692  3  8400
5  3813     706  3  8420  722  3  8440  758  3  8500
6  3829  1  2 100 100  1  2 048 048  1  2 060 060
3  3900    1A 0  18  3  832   25910 99 99
5  3910       0  1  8460   26  1  8420   47  1  8400   59  1  8360   76  1  8340
5  3911      79  2  8333   99  2  8326  122  2  8316  136  2  8326  143  2  8339   AJ
5  3912     157  3  8350  300  3  8360  500  3  8360  560  3  8380  610  3  8400
5  3913     660  3  8420  760  3  8420  772  3  8440
```

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6  3929  1  2 054 054  1  2 048 048  1  2 090 090
3  4000    1E 0  21  3  832   26820 99 99
5  4010       0  1  8440   30  1  8420  100  1  8400  110  1  8380  118  1  8360
5  4011     124  1  8360  180  1  8350  192  2  8340  194  2  8316  254  2  8316
5  4012     258  2  8340  262  3  8340  347  3  8360  640  3  8370  680  3  8360   AK
5  4013     800  3  8360  880  3  8380  930  3  8400  950  3  8420  975  3  8420
5  4014    1020  3  8420
6  4029  1  2 100 100  1  2 048 048  1  2 090 090
3  4100    1H 0  13  3  832   27490 99 99
5  4110       0  1  8420   77  1  8400  138  1  8380  572  1  8360  574  2  8360
5  4111     592  2  8340  594  2  8316  640  2  8316  642  2  8340  646  2  8360   AL
5  4112     662  3  8400  668  3  8420  760  3  8440
6  4129  1  2 090 090  1  2 050 050  1  2 060 060
3  4200    1C 0  13  3  832   28330 99 99
5  4210       0  1  8440  120  1  8420  202  1  8400  298  1  8380  318  1  8360
5  4211     333  2  8340  336  2  8319  422  2  8319  425  2  8340  436  3  8380   AM
5  4212     446  3  8400  458  3  8420  474  3  8440
6  4229  1  2 070 070  1  2 048 048  1  2 080 080
3  4300    1D 0  14  3  833   29100 99 99
5  4310       0  1  8440  178  1  8420  253  1  8400  300  1  8380  310  1  8360
5  4311     316  2  8347  342  2  8334  374  2  8314  407  2  8334  408  2  8340   AN
5  4312     432  3  8359  440  3  8400  450  3  8420  474  3  8440
6  4329  1  2 090 090  1  2 047 047  1  2 050 050
3  4400    1F 0  15  3  833   29900 99 99
5  4410       0  1  8462  165  1  8460  188  1  8440  200  1  8420  210  1  8400
5  4411     224  2  8340  260  2  8320  288  2  8340  303  3  8360  342  3  8360   AØ
5  4412     368  3  8360  436  3  8380  474  3  8400  540  3  8420  638  3  8440
6  4429  1  2 060 060  1  2 045 045  1  2 070 070
3  4440   1EE 0  15  3  833   30270 99 99
5  4451       0  1  8460   23  1  8440   32  1  8420   41  1  8400   50  1  8380
5  4452      58  2  8360   60  2  8320  102  2  8320  104  3  8330  178  3  8340   AP
5  4453     180  3  8360  198  3  8380  216  3  8400  304  3  8420  512  3  8440
6  4459  1  2 060 060  1  2 045 045  1  2 070 070
3  4500    1F 0  15  3  832   30390 99 99
5  4510       0  1  8440   22  1  8420   31  1  8400   42  1  8380   51  2  8360
5  4511      53  2  8340   55  2  8318  104  2  8318  106  2  8340  108  3  8380   AQ
5  4512     165  3  8380  208  3  8400  222  3  8400  314  3  8420  540  3  8440
6  4529  1  2 050 050  1  2 045 045  1  2 065 065
3  4600 BR 1F 2  11  1  832   30390          0  8397 3 1
5  4610       0  1  8397    0  1  8316    5  1  8316   10  1  8324   15  1  8330
5  4611      20  1  8330   25  1  8328   30  1  8324   32  1  8324   32  1  8397
5  4612       0 -9  8397
6  4629  1  2 043 043
3  4700 RD 1F 4   9  3   30          1  3          2 2 2                1
5  4710    -300  1  8452 -174  1  8439  -84  1  8429  -20  2  8423   18  2  8421
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5  4711     19  3  8421  138  3  8410  302  3  8432  426  3  8451
3  4800     G 5  21  3  832   30460  1  3
5  4810    -35  1  8440   -5  1  8410   15  1  8364   26  1  8338   35  1  8325
5  4811     36  2  8325   45  2  8321   50  2  8319   55  2  8318   60  2  8322
5  4812     65  2  8323   69  2  8325   70  3  8325   75  3  8326   80  3  8338
5  4813     90  3  8345  110  3  8371  170  3  8380  200  3  8400  220  3  8420
5  4814    235  3  8440
6  4829  1  2 070 070  1  2 045 045  1  2 065 065
3  4850   1GG 0  14  3  833   30610 99 99
5  4851      0  1  8460   34  1  8440   78  1  8420  106  1  8400  116  1  8380
5  4852    124  1  8340  136  2  8320  196  2  8320  200  3  8340  238  3  8360
5  4853    282  3  8380  304  3  8400  373  3  8420  424  3  8440
6  4859  1  2 070 070  1  2 046 046  1  2 065 065
3  4900   1H 0  17  3  833   31380 99 99
5  4910      0  1  8460   72  1  8440   98  1  8420  113  1  8400  124  1  8380
5  4911    132  2  8360  142  2  8340  144  2  8327  174  2  8327  176  2  8340
5  4912    188  3  8360  250  3  8360  322  3  8380  334  3  8400  361  3  8420
5  4913    462  3  8440  488  3  8460
6  4929  1  2 060 060  1  2 047 047  1  2 070 070
3  5000   1T 0  15  3  834   32210 99 99
5  5010      0  1  8460   76  1  8440  216  1  8420  282  1  8400  298  1  8380
5  5011    310  2  8360  322  2  8351  360  2  8333  392  2  8351  417  2  8373
5  5012    427  2  8380  444  3  8400  458  3  8420  472  3  8440  491  3  8460
6  5029  1  2 070 070  1  2 045 045  1  2 050 050
3  5100   1J 0  16  3  834   33220 99 99
5  5110      0  1  8458   63  1  8440  116  1  8420  202  1  8400  272  1  8380
5  5111    282  1  8360  354  2  8340  356  2  8334  420  2  8334  423  2  8340
5  5112    436  3  8360  452  3  8380  480  3  8400  498  3  8420  520  3  8440
5  5113    550  3  8460
6  5129  1  2 100 100  1  2 055 055  1  2 070 070
3  5200   1K 0  20  3  834   34320 99 99
5  5210     16  1  8460   33  1  8440   51  1  8420  102  1  8420  147  1  8440
5  5211    216  1  8440  225  1  8420  232  1  8400  243  2  8360  262  2  8340
5  5212    264  2  8334  322  2  8334  326  2  8340  337  3  8360  700  3  8365
5  5213    700  3  8450 1040  3  8450 1062  3  8450 1085  3  8450 1100  3  8460
6  5229  1  2 060 060  1  2 055 055  1  2 120 120
3  5300   1L 0  20  3  834   35040 99 99
5  5310      0  1  8480   18  1  8460   67  1  8440  275  1  8440  338  1  8420
5  5311    353  1  8400  404  1  8380  421  2  8380  444  2  8360  448  2  8340
5  5312    450  2  8336  508  2  8336  510  2  8340  533  3  8360  543  3  8380
5  5313    597  3  8400  606  3  8420  612  3  8440  642  3  8460  660  3  8480
6  5329  1  2 100 100  1  2 060 060  1  2 080 080
3  5400   1M 0  15  3  835   35520 99 99
5  5410      0  1  8500    8  1  8400   21  1  8380   37  2  8360   38  2  8358
5  5411     42  2  8340   65  2  8340   73  2  8358  102  3  8380  164  3  8400
```

AR

AS

AT

AU

AV

AW

AX

AY

```
5412     93  3  8420  232  3  8440  260  3  8460  283  3  8480  303  3  8500
5429  1  2 090 090  1  2 050 050  1  2 070 070
5500   1MM 0  13  3  834   35890 99 99
5510       0  1  8500   23  1  8480   38  1  8460   63  1  8440  102  1  8420
5511     112  1  8400  188  2  8380  253  2  8362  274  2  8339  292  2  8361
5512     322  3  8380  372  3  8400  393  3  8500
5529  1  2 090 090  1  2 050 050  1  2 065 065
5600  1MMM 0  14  3  835   36450 99 99
5610       0  1  8500   18  1  8480   33  1  8460   53  1  8440   93  1  8420
5611     118  1  8400  480  1  8390  722  1  8380  752  2  8362  782  2  8341
5612     800  2  8360  802  2  8380  808  3  8400  830  3  8500
5629  1  2 100 100  1  2 050 050  1  2 060 060
5700    1N 0  15  3  835   37140 99 99
5710      15  1  8500   32  1  8480   48  1  8460   68  1  8440  113  1  8420
5711     123  1  8400  160  2  8380  175  2  8363  190  2  8342  208  2  8363
5712     232  3  8380  372  3  8400  388  3  8420  397  3  8440  416  3  8500
5729  1  2 080 080  1  2 050 050  1  2 070 070
5800    1O 0  14  3  835   37400 99 99
5810       0  1  8500    6  1  8400   14  2  8380   27  2  8364   53  2  8343
5811      78  2  8364   88  2  8380   90  3  8380  196  3  8400  292  3  8420
5812     303  3  8440  314  3  8460  323  3  8480  334  3  8500
5829  1  2 070 070  1  2 050 050  1  2 070 070
5900    1P 0  13  3  835   37790 99 99
5910       0  1  8500    9  1  8480   18  1  8460   43  1  8440   72  1  8420
5911     102  1  8400  258  2  8380  274  2  8366  297  2  8344  320  2  8366
5912     324  3  8380  341  3  8400  348  3  8500
5929  1  2 080 080  1  2 046 046  1  2 060 060
6000    1Q 0  14  3  835   38290 99 99
6010       0  1  8500    7  1  8400   13  2  8380   27  2  8367   56  2  8346
6011      92  2  8367   95  3  8370  125  3  8380  192  3  8400  218  3  8420
6012     258  3  8440  307  3  8460  367  3  8480  388  3  8500
6029  1  2 090 090  1  2 050 050  1  2 150 150
6100    1R 0  18  3  835   38980 99 99
6110       0  1  8500    4  1  8480   24  1  8460   42  1  8440   62  1  8420
6111      72  2  8400   89  2  8380   91  2  8369  102  2  8349  130  2  8369
6112     132  3  8380  276  3  8380  291  3  8400  308  3  8420  314  3  8440
6113     325  3  8460  343  3  8480  358  3  8500
6129  1  2 100 100  1  2 050 050  1  2 180 180
6200   1RR 0  25  3  836   39460 99 99
6210       0  1  8500   11  1  8480   22  1  8460   36  1  8440   46  1  8420
6211      78  1  8420   86  1  8440  128  1  8440  148  1  8420  167  1  8400
6212     252  1  8390  254  1  8390  264  1  8390  370  1  8390  558  2  8390
6213     563  2  8369  584  2  8349  602  2  8369  604  3  8380  642  3  8400
6214     650  3  8420  666  3  8490  673  3  8460  678  3  8480  683  3  8500
6229  1  2 150 150  1  2 050 050  1  2 120 120
```

AZ

BA

BB

BC

BD

BE

BF

BG

```
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 SAWASSEE RIVER  MCCASLIN RD - HOGAN RD HOSLAG 50  5 02 05 12
2      2  84380  84505  84629  84548  84558
3   6300    1S 1  10  3  835   39950 99 99
4   6304   1530   2120   2900   2370   2370
5   6311     500  1  8500  500  1  8390  952  2  8390  962  2  8376  980  2  8344
5   6312     994  2  8376  998  2  8380 1010  3  8400 1018  3  8420 1045  3  8500   BH
6   6329  1  2 150 150  1  2 055 055  1  2 065 065
3   6350 1SS   1   9  3  836   40250  1  3
4   6354    550    580    790    650    650
5   6361       0  1  8500    0  1  8390  155  2  8390  160  2  8344  180  2  8344   BI
5   6362     183  3  8380  215  3  8400  250  3  8480  270  3  8500
6   6369  1  2 150 150  1  2 050 050  1  2 065 065
3   6400    1T 0  23  3  835   40690 99 99
5   6410       0  1  8500   24  1  8480   38  1  8460   52  1  8440  104  1  8420
5   6411     120  1  8400  136  2  8380  142  2  8370  147  2  8355  152  2  8346
5   6412     157  2  8346  162  2  8346  167  2  8344  172  2  8344  177  2  8346   BJ
5   6413     182  2  8380  197  3  8400  360  3  8400  388  3  8420  420  3  8440
5   6414     434  3  8460  448  3  8480  458  3  8500
6   6429  1  2 090 090  1  2 050 050  1  2 080 080
3   6500 RR 1T 2  12  1  835   40690        15  8425 3 1
5   6510       0  1  8425    0  1  8366    5  1  8355   10  1  8346   15  1  8346
5   6511      20  1  8346   25  1  8344   30  1  8344   35  1  8346   40  1  8376
5   6512      40  1  8425    0 -9  8425
6   6529  1  2 046 046
3   6600 RD 1T 4  20  3   30           1  3           1 1 1                  1
5   6610     -90  1  8500  -75  1  8458  -26  1  8450  -25  2  8449    0  2  8450
5   6611      25  2  8453   26  3  8452   40  3  8450   60  3  8448   80  3  8445
5   6612      98  3  8443  120  3  8442  140  3  8441  160  3  8440  170  3  8439
5   6613     180  3  8441  200  3  8445  220  3  8450  236  3  8453  270  3  8480
3   6700    1U 5  22  3  834   40750  1  3
5   6710     -50  1  8500  -46  1  8480  -34  1  8460    0  1  8429   12  1  8401
5   6711      28  2  8376   32  2  8362   36  2  8352   40  2  8348   44  2  8344
5   6712      56  2  8339   66  2  8348   68  3  8350   70  3  8353   75  3  8367   BK
5   6713     105  3  8400  125  3  8391  280  3  8400  292  3  8420  300  3  8440
5   6714     310  3  8460  316  3  8480
6   6729  1  2 050 050  1  2 045 045  1  2 090 090
3   6800   1UU 0  15  3  836   41240 99 99
5   6810     205  1  8500  228  1  8420  242  1  8400  320  1  8394  448  1  8380
5   6811     458  2  8360  482  2  8350  510  2  8360  515  3  8380  532  3  8400   BL
5   6812     552  3  8420  562  3  8440  573  3  8460  584  3  8480  592  3  8500
6   6829  1  2 150 150  1  2 055 055  1  2 080 080
3   6900    1V 0  14  3  836   41690 99 99
5   6911     300  1  8500  300  1  8400  470  1  8399  472  2  8380  475  2  8360
5   6912     503  2  8354  512  2  8360  526  3  8380  564  3  8400  580  3  8420   BM
5   6913     634  3  8440  692  3  8460  712  3  8480  728  3  8500
```

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6  6929  1  2 150 150  1  2 055 055  1  2 080 080
3  6950 1VW  1  15  3  838   41820  1  3
4  6954     420    580    790    650    650
5  6960       0  1  8490  115  1  8480  130  1  8460  140  1  8440  170  1  8420
5  6961     190  1  8400  220  2  8380  225  2  8355  260  2  8355  265  3  8380
5  6962     360  3  8400  390  3  8420  440  3  8440  500  3  8460  515  3  8480
6  6963  1  2 150 150  1  2 055 055  1  2 080 080
3  7000    1W 0  10  3  837   42400 99 99
5  7012    1300  1  8408 1700  1  8406 1710  2  8400 1718  2  8380 1742  2  8365
5  7013    1762  2  8380 1772  3  8400 1800  3  8500 1815  3  8520 1828  3  8540
6  7029  1  2 150 150  1  2 060 060  1  2 070 070
3  7100    1Y 0  15  3  837   43520 99 99
5  7111     600  1  8420  750  1  8408 1020  1  8408 1028  2  8400 1033  2  8380
5  7112    1053  2  8365 1073  2  8385 1090  3  8400 1108  3  8420 1138  3  8440
5  7113    1200  3  8460 1378  3  8480 1415  3  8500 1432  3  8520 1451  3  8540
6  7129  1  2 150 150  1  2 060 060  1  2 150 150
3  7200    1Y 0  17  3  838   45200 99 99
5  7210      24  1  8540   40  1  8520   52  1  8500   60  1  8480   64  1  8460
5  7211      82  1  8440  148  1  8420  253  1  8400  254  2  8400  268  2  8380
5  7212     288  2  8372  313  2  8380  330  3  8400  482  3  8460  492  3  8500
5  7213     563  3  8500  600  3  8520
6  7229  1  2 150 150  1  2 050 050  1  2 120 120
3  7300    1Z 0  18  3  838   45890 99 99
5  7310       0  1  8520   90  1  8500  116  1  8480  118  1  8460  126  1  8440
5  7311     132  1  8420  141  2  8400  148  2  8380  172  2  8376  188  3  8380
5  7312     200  3  8400  250  3  8410  402  3  8420  408  3  8440  418  3  8460
5  7313     428  3  8480  448  3  8500  454  3  8520
6  7359  1  2 090 090  1  2 055 055  1  2 070 070
3  7400    2A 0  17  3  838   46530 99 99
5  7410       0  1  8560   27  1  8540  122  1  8520  282  1  8500  287  2  8400
5  7411     298  2  8392  326  2  8379  342  2  8392  358  3  8400  648  3  8420
5  7412     675  3  8440  688  3  8460  702  3  8480  723  3  8500  732  3  8520
5  7413     739  3  8540  753  3  8560
6  7429  1  2 080 080  1  2 060 060  1  2 150 150
3  7500    2B 0  22  3  839   47130 99 99
5  7510       0  1  8540    8  1  8520   13  1  8500   23  2  8480   53  2  8420
5  7511      56  2  8395   60  2  8380   94  2  8395   96  3  8400  246  3  8420
5  7512     318  3  8440  336  3  8460  363  3  8480  378  3  8500  420  3  8518
5  7513     468  3  8500  497  3  8480  522  3  8460  702  3  8460  767  3  8480
5  7514     838  3  8500  854  3  8520
6  7529  1  2 060 060  1  2 055 055  1  2 120 120
3  7600 80 28 2  13  1  838   47130      30  8442 3 1
5  7610       0  1  8445    0  1  8378    1  1  8379    3  1  8379    6  1  8381
5  7611       9  1  8382   12  1  8381   15  1  8381   18  1  8383   21  1  8385
5  7612      24  1  8386   24  1  8441    0 -9  8445
```

BN

BØ

BP

BQ

BR

BS

BT

```
6  7629  1  042 042
3  7700 RD 2B 4  10  3   34          1  3          1 1 1                1
5  7710    -108  1  8520  -68  1  8498  -12  1  8480  -12  2  8507   24  2  8503
5  7711      25  3  8474   76  3  8455  160  3  8443  180  3  8443  180  3  8500
3  7800    2C 5  20  3  837   47220  1  3
5  7810     -82  1  8520  -27  1  8500  -23  1  8480  -15  1  8472   -5  1  8453
5  7811       6  1  8415    8  1  8390   10  2  8386   12  2  8382   18  2  8372
5  7812      22  2  8369   26  2  8368   30  2  8373   34  2  8386   35  3  8399
5  7813      36  3  8393   40  3  8425   46  3  8440  195  3  8440  205  3  8480
6  7829  1  2 080 080  1  2 055 055  1  2 100 100
3  7900   2CC 0  18  3  839   47840 99 99
5  7910     203  1  8540  222  1  8520  259  1  8500  263  1  8480  272  1  8460
5  7911     315  1  8440  380  1  8430  510  1  8420  608  2  8399  630  2  8383
5  7912     653  2  8399  656  3  8400  712  3  8420  748  3  8440  750  3  8460
5  7913     764  3  8480  768  3  8500  988  3  8520
6  7929  1  2 120 120  1  2 055 055  1  2 080 080
3  8000    2D 0  17  3  839   48020 99 99
5  8010     500  1  8540  500  1  8520  500  1  8520  500  1  8520  600  1  8520
5  8011     600  1  8430  825  1  8420  835  2  8410  848  2  8399  872  2  8383
5  8012     893  2  8399  908  3  8420 1016  3  8440 1058  3  8460 1065  3  8480
5  8013    1078  3  8500 1260  3  8520
6  8029  1  2 120 120  1  2 055 055  1  2 070 070
3  8100    2E 0  15  3  839   48800 99 99
5  8110       0  1  8500   12  1  8480   20  1  8460   27  1  8440   32  1  8420
5  8111      47  2  8400   49  2  8398   73  2  8387  107  2  8399  116  3  8420
5  8112     200  3  8440  270  3  8460  400  3  8460  418  3  8480  432  3  8500
6  8129  1  2 065 065  1  2 050 050  1  2 100 100
3  8200    2F 0  16  3  839   49440 99 99
5  8210       0  1  8500   22  1  8500   42  1  8500  126  1  8500  242  1  8500
5  8211     253  1  8440  286  2  8420  298  2  8398  324  2  8386  342  2  8399
5  8212     344  3  8420  350  3  8440  410  3  8440  448  3  8460  460  3  8480
5  8213     676  3  8500
6  8229  1  2 065 065  1  2 055 055  1  2 100 100
3  8300 RR 2F 2  10  1  839   49440        0  8459 3 1
5  8310       0  1  8459    0  1  8384    5  1  8385   10  1  8388   15  1  8386
5  8311      20  1  8388   25  1  8392   32  1  8396   32  1  8459    0 -9  8459
6  8329  1  2 038 038
3  8400 RD 2F 4  10  3   38          1  3          2 2 2                1
5  8410    -288  1  8483 -224  1  8461 -148  1  8459  -84  1  8470  -20  2  8482
5  8411      16  2  8482   17  3  8481   50  3  8473  106  3  8457  106  3  8500
3  8500    2G 5  20  3  839   49500  1  3
5  8511     -22  1  8480   -8  1  8460    0  1  8431   85  1  8422   88  1  8396
5  8512      94  2  8387  100  2  8382  105  2  8381  110  2  8380  115  2  8380
5  8513     120  2  8382  126  3  8386  130  3  8396  135  3  8413  140  3  8453
5  8514     145  3  8470  200  3  8480  222  3  8500  270  3  8500  298  3  8480
```

BU

BV

BW

BX

BY

BZ

```
6  8529  1   060 060  1  2 050 050  1  2 100 100
3  8600   2GG 0  12  3  839   49720 99 99
5  8610       0  1  8520   33  1  8500   48  1  8480  104  1  8460  168  1  8440
5  8611     222  2  8420  233  2  8399  260  2  8389  278  2  8399  285  3  8420   CA
5  8612     310  3  8500  318  3  8520
6  8629  1  2 060 060  1  2 050 050  1  2 080 080
3  8700   2H 0  14  3  840   50000 99 99
5  8710       0  1  8540   11  1  8500   18  1  8480   26  1  8460   32  1  8440
5  8711      39  2  8420   52  2  8399   82  2  8391  112  2  8399  118  2  8420   CB
5  8712     120  3  8440  142  3  8500  146  3  8520  162  3  8560
6  8729  1  2 060 060  1  2 055 055  1  2 100 100
3  8800   2I 0  17  3  840   50360 99 99
5  8810       0  1  8540    6  1  8520   32  1  8500   47  1  8480   58  1  8460
5  8811      68  1  8440   78  2  8420   93  2  8400  140  2  8391  176  2  8400
5  8812     183  2  8420  188  3  8440  196  3  8460  199  3  8480  207  3  8500   CC
5  8813     238  3  8520  288  3  8540
6  8829  1  2 055 055  1  2 050 050  1  2 080 080
3  8900   2II 0  15  3  840   50820 99 99
5  8910     300  1  8540  312  1  8520  322  1  8500  358  1  8480  373  1  8460
5  8911     382  1  8440  436  2  8420  457  2  8400  512  2  8393  553  2  8400
5  8912     592  3  8420  706  3  8420  900  3  8420 1000  3  8420 1000  3  8500   CD
6  8929  1  2 100 100  1  2 050 050  1  2 120 120
3  9000   2J 0  20  3  840   51810 99 99
5  9010       0  1  8540   12  1  8520   18  1  8500  130  1  8480  158  1  8460
5  9011     206  1  8440  235  1  8420  395  2  8400  412  2  8393  432  2  8400
5  9012     438  3  8400  506  3  8420  536  3  8440  552  3  8460  568  3  8480   CE
5  9013     577  3  8500  593  3  8520  660  3  8540  672  3  8600  687  3  8600
6  9029  1  2 120 120  1  2 050 050  1  2 120 120
3  9100   2K 0  15  3  840   52260 99 99
5  9113    1108  1  8600 1158  1  8500 1183  1  8440 1294  1  8420 1398  2  8400
5  9114    1420  2  8394 1448  2  8400 1460  3  8400 1535  3  8420 1655  3  8420
5  9115    1750  3  8440 1780  3  8460 1818  3  8480 1853  3  8500 1884  3  8520   CF
6  9129  1  2 120 120  1  2 050 050  1  2 120 120
3  9200   2L 0  15  3  840   53160 99 99
5  9213    1010  1  8600 1106  1  8600 1300  1  8500 1305  1  8440 1306  1  8420
5  9214    1358  2  8400 1555  2  8396 1674  3  8400 2000  3  8420 2000  3  8480
5  9215    2458  3  8480 2472  3  8480 2488  3  8500 2500  3  8520 2508  3  8540   CG
6  9229  1  2 120 120  1  2 050 050  1  2 120 120
3  9300   2M 0  19  3  840   55230 99 99
5  9310       0  1  8540   17  1  8520   42  1  8500   90  1  8480  111  1  8460
5  9311     222  1  8440  612  1  8420  614  2  8420  632  2  8400  650  2  8398
5  9312     668  2  8400  690  3  8420  900  3  8420 1060  3  8440 1132  3  8460   CH
5  9313    1158  3  8480 1190  3  8500 1203  3  8520 1216  3  8540
6  9329  1  2 120 120  1  2 050 050  1  2 120 120
3  9400   2N 0  17  3  840   56280 99 99
```

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5  9410     0  1  8540   10  1  8520   98  1  8500   29  1  8480  137  1  8460
5  9411   144  1  8440  152  2  8420  161  2  8400  182  2  8399  208  2  8400   CI
5  9412   224  3  8420  488  3  8440  523  3  8460  540  3  8480  550  3  8500
5  9413   574  3  8520  612  3  8540
6  9429  1  2 080 080  1  2 050 050  1  2 080 080
3  9500   20 0  20  3  841   57000 99 99
5  9510   -26  1  8540    0  1  8520    8  1  8500   38  1  8480   48  1  8455
5  9511    82  1  8456  116  2  8466  118  2  8433  126  2  8407  136  2  8402
5  9512   141  2  8407  145  2  8415  146  3  8432  147  3  8452  178  3  8443   CJ
5  9513   200  3  8460  215  3  8480  228  3  8500  247  3  8560  263  3  8580
6  9529  1  2 080 080  1  2 050 050  1  2 080 080
3  9600   2P 0  15  3  841   57260 99 99
5  9610     0  1  8540   32  1  8520   57  1  8500  146  1  8480  160  1  8460
5  9611   208  1  8440  310  1  8440  321  2  8434  328  2  8420  345  2  8404
5  9612   363  2  8420  374  3  8440  378  3  8460  386  3  8500  393  3  8540   CK
6  9629  1  2 110 110  1  2 055 055  1  2 080 080
3  9700   2U 0  22  3  840   58340 99 99
5  9710     0  1  8560   37  1  8540   82  1  8520  138  1  8500  198  1  8480
5  9711   216  1  8460  223  2  8434  233  2  8422  257  2  8399  292  2  8422
5  9712   295  3  8424  309  3  8439  428  3  8440  453  3  8460  458  3  8480   CL
5  9713   504  3  8500  534  3  8503  634  3  8480  755  3  8480  778  3  8500.
5  9714   788  3  8520  820  3  8540
6  9729  1  2 090 090  1  2 050 050  1  2 100 100
3  9800   2R 0  17  3  841   58750 99 99
5  9810    42  1  8560   72  1  8540  122  1  8520  213  1  8500  232  1  8480
5  9811   248  1  8460  418  1  8440  420  2  8440  442  2  8420  468  2  8403
5  9812   492  2  8420  506  3  8440  510  3  8460  526  3  8500  544  3  8520   CM
5  9813   562  3  8540  572  3  8560
6  9829  1  2 120 120  1  2 060 060  1  2 070 070
3  9900   2S 0  21  3  841   59330 99 99
5  9910  -202  1  8560 -166  1  8540 -113  1  8520  -58  1  8498  -28  1  8467
5  9911   -17  2  8467  -15  2  8420    0  2  8409   16  2  8420   18  2  8460
5  9912    20  3  8463   26  3  8463  114  3  8440  184  3  8438  200  3  8440   CN
5  9913   266  3  8460  295  3  8480  308  3  8500  334  3  8520  357  3  8540
5  9914   365  3  8560
6  9929  1  2 080 080  1  2 060 060  1  2 140 140
3 10000   2T 0  22  3  841   59750 99 99
5 10010     0  1  8560   30  1  8540   47  1  8520  112  1  8500  123  1  8480
5 10011   146  1  8460  220  1  8440  280  1  8430  282  2  8426  318  2  8407
5 10012   340  2  8426  360  3  8430  375  3  8440  436  3  8460  472  3  8499   CØ
5 10013   506  3  8460  587  3  8460  602  3  8480  622  3  8500  637  3  8520
5 10014   648  3  8540  673  3  8560
6 10029  1  2 090 090  1  2 060 060  1  2 120 120
3 10100   2U 0  20  3  843   61080 99 99
5 10110     0  1  8560   32  1  8540   47  1  8520  122  1  8500  148  1  8480
```

```
10111     290  1  8480   550  1  8480   629  1  8460   666  1  8460   682  2  8440
10112       2  2  8420   719  2  8420   736  3  8440     2  3  8440   984  3  8440
10113    1024  3  8460  1092  3  8480  1116  3  8500  1160  3  8520  1174  3  8540
10129  1  2 100 100  1  2 060 060  1  2 100 100
10200    2v 0  20  3  843   61950 99 99
10210       0  1  8560    15  1  8540    46  1  8520   164  1  8500   182  1  8480
10211     483  1  8480   520  1  8485   559  1  8480   572  1  8460   735  1  8450
10212     738  2  8440   753  2  8424   798  2  8424   805  3  8440  1126  3  8460
10213    1136  3  8480  1158  3  8500  1172  3  8520  1193  3  8540  1203  3  8560
10229  1  2 100 100  1  2 055 055  1  2 120 120
10300    2w 0  17  3  844   62600 99 99
10310       0  1  8560    15  1  8540    27  1  8520    49  1  8500    66  1  8480
10311      93  1  8480   250  1  8480   300  1  8460   305  2  8460   316  2  8434
10312     364  2  8434   370  3  8440   886  3  8460   950  3  8460   986  3  8480
10313    1023  3  8500  1038  3  8600
10329  1  2 090 090  1  2 055 055  1  2 140 140
10400   2ww 0  18  3  845   63030 99 99
10410      14  1  8560    26  1  8540   111  1  8520   122  1  8500   150  1  8480
10411     204  1  8480   273  1  8480   282  2  8460   302  2  8440   304  2  8438
10412     343  2  8438   348  3  8440   479  3  8460   486  3  8480   722  3  8500
10413     736  3  8520   753  3  8540   768  3  8560
10429  1  2 090 090  1  2 050 050  1  2 100 100
10500    2x 0  15  3  845   63660 99 99
10510       0  1  8560    11  1  8540    18  1  8520    37  1  8500    42  1  8480
10511     180  1  8461   263  1  8460   280  2  8460   284  2  8445   313  2  8445
10512     320  3  8450   368  3  8460   382  3  8480   392  3  8500   421  3  8600
10529  1  2 090 090  1  2 050 050  1  2 100 100
10600    2Y 0  11  3  845   64190 99 99
10610       0  1  8600    12  1  8500    21  2  8460    27  2  8447    58  2  8447
10611      62  3  8460   162  3  8480   203  3  8500   246  3  8520   303  3  8540
10612     362  3  8560
10629  1  2 070 070  1  2 045 045  1  2 100 100
10700   2YY 0  12  3  845   64450 99 99
10710       0  1  8600    22  1  8500    30  2  8463    41  2  8438    61  2  8438
10711      65  3  8440    70  3  8460   118  3  8480   142  3  8500   183  3  8520
10712     224  3  8540   290  3  8560
10729  1  2 080 080  1  2 050 050  1  2 120 120
10800 R02YY 2   9  1  845   64450          0  8503 1 1
10810       0  1  8503     0  1  8453     3  1  8447     6  1  8441     9  1  8441
10811      12  1  8443    13  1  8453    13  1  8503     0 -9  8503
10829  1  2 040 040
10900 R02YY 4  11  3   16          1  3          2 2 2                1
10910     -50  1  8589    -4  1  8510     0  2  8509    14  2  8505    16  3  8502
10911      36  3  8493    60  3  8478    94  3  8502   124  3  8518   163  3  8540
10912     223  3  8560
```

CP

CQ

CR

CS

CT

CU

CV

```
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
3 11000  2Y  5  16  3  845   64490  1  3
5 11010     -16  1  8560   -9  1  8519    0  1  8463    2  2  8460    5  2  8451
5 11011      10  2  8449   15  3  8451   20  3  8451   25  3  8462   26  3  8468
5 11012      36  3  8469   78  3  8480  119  3  8500  139  3  8520  171  3  8540
5 11013     224  3  8560
6 11029  1  2 070 070  1  2 045 045  1  2 100 100
3 11100    27 0  13  3  846   65040 99 99
5 11110       0  1  8560   67  1  8540  107  1  8520  117  1  8500  158  2  8479
5 11111     168  2  8465  170  2  8451  206  2  8466  216  3  8478  358  3  8500
5 11112     372  3  8520  378  3  8540  386  3  8560
6 11129  1  2 080 080  1  2 050 050  1  2 100 100
3 11200    3A 0  12  3  846   65360 99 99
5 11210       0  1  8560   53  1  8540   84  1  8520   97  1  8500  146  1  8490
5 11211     150  2  8488  156  2  8471  165  2  8453  178  2  8471  186  2  8486
5 11212     191  3  8500  202  3  8600
6 11229  1  2 100 100  1  2 047 047  1  2 080 080
3 11300    3B 0  10  3  846   65810 99 99
5 11310       0  1  8590    8  2  8540   17  2  8489   32  2  8459   47  2  8486
5 11311      49  3  8490   70  3  8500   86  3  8520   98  3  8540  114  3  8560
6 11329  1  2 100 100  1  2 055 055  1  2 080 080
3 11400    3C 0  16  3  847   66480 99 99
5 11410       0  1  8600   12  1  8560   22  1  8540   33  1  8520   45  1  8500
5 11411      84  1  8480   90  2  8480   94  2  8476   96  2  8469  120  2  8465
5 11412     150  2  8476  155  3  8480  177  3  8500  338  3  8520  422  3  8540
5 11413     506  3  8560
6 11429  1  2 110 110  1  2 055 055  1  2 080 080
3 11500    3D 0  16  3  848   67050 99 99
5 11510       0  1  8580   35  1  8560   85  1  8540  132  1  8520  140  2  8500
5 11511     148  2  8480  153  2  8478  163  2  8476  173  2  8475  178  2  8469
5 11512     182  2  8480  193  3  8500  213  3  8520  236  3  8540  248  3  8560
5 11513     258  3  8580
6 11529  1  2 090 090  1  2 050 050  1  2 100 100
3 11600 BR 3D 2  10  1  848   67050        0  8541 3 1
5 11610       0  1  8541    0  1  8485    5  1  8478   10  1  8475   15  1  8476
5 11611      20  1  8476   25  1  8474   32  1  8469   32  1  8541    0 -9  8541
6 11629  1  2 042 042
3 11700 BD 3D 4  12  3   30          1  3          2 2 2                1
5 11710    -230  1  8598 -174  1  8578 -122  1  8565  -72  1  8562  -18  1  8564
5 11711     -17  2  8564   17  2  8565   18  3  8565   74  3  8565  126  3  8566
5 11712     180  3  8575  253  3  8588
3 11800    3F 5  21  3  847   67130  1  3
5 11810    -148  1  8580 -129  1  8560  -89  1  8540  -68  1  8520    0  1  8502
5 11811       5  1  8496   10  1  8491   15  1  8480   18  2  8472   25  2  8468
5 11812      30  2  8467   35  2  8465   40  2  8463   45  2  8464   50  3  8471
5 11813      55  3  8477   75  3  8498   88  3  8520  122  3  8540  142  3  8560
```

CW

CX

CY

CZ

```
  WS ELEV /     HV  /     HF  /     HE  /     EG  /     V  /     FN  /    ACC    *ID*
==========================================================================================
   C AT     3800 /      0 /   2370. /  2769. /  319817. / 1.00 /   148. /   461.
  829.50 /   0.01 /                  /  829.51 /    0.86 /   0.05/           *IS*
------------------------------------------------------------------------------------------
   D AT     4800 /   1000 /   2370. /  1054. /   95580. / 1.04 /    72. /   224.
  829.65 /   0.08 /   0.18 /   0.04 /  829.73 /    2.25 /   0.15 /  0.000   *XS*
------------------------------------------------------------------------------------------
   E AT     5800 /   1000 /   2370. /  1289. /  106815. / 1.46 /   119. /   443.
  830.20 /   0.08 /   0.55 /   0.0  /  830.28 /    1.84 /   0.14 / -0.000   *XS*
------------------------------------------------------------------------------------------
   F AT     6240 /    440 /   2370. /   959. /   74949. / 1.97 /    29. /   423.
  830.45 /   0.19 /   0.31 /   0.06 /  830.64 /    2.47 /   0.23 / -0.004   *XS*
------------------------------------------------------------------------------------------
   G AT     6690 /    450 /   2370. /  1739. /   84067. / 3.82 /    34. /   466.
  830.93 /   0.11 /   0.40 /   0.0  /  831.04 /    1.36 /   0.20 / -0.000   *XS*
------------------------------------------------------------------------------------------
   H AT     7290 /    600 /   2370. /   589. /   46528. / 1.77 /    72. /   173.
  831.63 /   0.45 /   0.86 /   0.17 /  832.07 /    4.02 /   0.37 / -0.000   *XS*
------------------------------------------------------------------------------------------
  HH AT     7870 /    580 /   2370. /  3165. /  179408. / 2.64 /    21. /   609.
  832.44 /   0.02 /   0.39 /   0.0  /  832.46 /    0.75 /   0.09 /  0.000   *XS*
------------------------------------------------------------------------------------------
   I AT     8360 /    490 /   2370. /  2637. /  181089. / 2.27 /    52. /   545.
  832.52 /   0.03 /   0.08 /   0.00 /  832.55 /    0.90 /   0.05 / -0.000   *XS*  100-YR
========================== BEGIN BRIDGE ANALYSIS ==========================
BR I AT     8360 /        /    779. /   445. /   37784. / 1.00 /     0. /    47.
  832.40 /   0.05 /        ...3...  (-.001)   /    1.75 /   0.10 /           *BO*
------------------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT    1577. /                 *RG*
------------------------------------------------------------------------------------------
   J AT     8410 /     50 /   2370. /  3307. /  198997. / 2.00 /    21. /   655.
  832.54 /   0.02 /   0.01 /   0.0  /  832.56 /    0.72 /   0.05 /  0.000   *AS*
------------------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  3332. /  200718. / 2.00 /    21. /   658.
  832.58 /   0.02 /                  /  832.60 /    0.71 /   0.04 /           *AS*
========================== END BRIDGE ANALYSIS ============================
  JJ AT     8940 /    530 /   2370. /  2799. /  167001. / 2.65 /     9. /   623.
  832.66 /   0.03 /   0.09 /   0.01 /  832.69 /    0.85 /   0.11 /  0.000   *XS*
------------------------------------------------------------------------------------------
   K AT     9630 /    690 /   2370. /  1803. /  139686. / 2.51 /   118. /   552.
  832.81 /   0.07 /   0.17 /   0.02 /  832.88 /    1.31 /   0.16 / -0.000   *XS*
==========================================================================================
   L AT    10430 /    800 /   2370. /  1280. /  141256. / 1.48 /   104. /   375.
  833.03 /   0.08 /   0.23 /   0.01 /  833.11 /    1.85 /   0.15 /  0.000   *XS*
------------------------------------------------------------------------------------------
  LL AT    10740 /    310 /   2370. /  1151. /  113405. / 1.72 /    25. /   278.
  833.12 /   0.11 /   0.11 /   0.02 /  833.24 /    2.06 /   0.19 / -0.001   *XS*
------------------------------------------------------------------------------------------
```

A
B
C
D
E
F
G
H
I
J

	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*
K	M AT 11130	390	2370.	903[illegible]	97273.	1.17	144.	302.	
	833.32	0.13	0.20	0.01	833.44	2.63	0.20	-0.000	*XS*
L	MM AT 11610	480	2370.	939.	72221.	1.52	104.	359.	
	833.69	0.15	0.38	0.01	833.84	2.52	0.24	-0.000	*XS*
M	N AT 11960	350	2370.	1365.	106933.	1.51	10.	344.	
	834.02	0.07	0.25	0.0	834.09	1.74	0.17	-0.000	*XS*
N	NN AT 12380	420	2370.	1005.	83807.	1.46	5.	227.	
	834.27	0.13	0.26	0.03	834.40	2.36	0.20	0.014	*XS*
O	O AT 12810	430	2370.	1243.	96998.	2.33	15.	330.	
	834.57	0.13	0.30	0.00	834.70	1.91	0.19	0.000	*XS*
P	P AT 13030	820	2370.	1009.	88455.	1.72	211.	414.	
	835.10	0.15	0.54	0.01	835.24	2.35	0.21	0.000	*XS*
Q	PP AT 14720	1090	2370.	2897.	167741.	2.91	141.	844.	
	835.63	0.03	0.41	0.0	835.66	0.82	0.11	0.000	*XS* 100-YR
R	Q AT 15180	460	2370.	1614.	112474.	2.07	89.	635.	
	835.74	0.07	0.14	0.02	835.81	1.47	0.15	0.000	*XS*
S	R AT 15990	810	2370.	1845.	145516.	1.48	10.	606.	
	836.05	0.04	0.28	0.0	836.09	1.28	0.11	-0.002	*XS*
T	S AT 17180	1190	2370.	6211.	358390.	1.66	34.	1033.	
	836.21	0.00	0.13	0.0	836.22	0.38	0.02	0.000	*XS*
U	SS AT 18100	920	2370.	4509.	266409.	1.73	49.	1118.	
	836.27	0.01	0.05	0.00	836.27	0.53	0.07	-0.000	*XS*
V	T AT 19040	940	2370.	1225.	103072.	1.35	181.	571.	
	836.42	0.08	0.19	0.04	836.50	1.93	0.18	-0.000	*XS*
W	TT AT 19330	290	2370.	722.	71267.	1.46	131.	291.	
	836.56	0.25	0.22	0.08	836.81	3.28	0.27	-0.000	*XS*
X	837.14	0.23	0.30	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Y	U AT 19920	80	2370.	535.	64484.	1.12	21.	110.	
	837.18	0.34	0.10	0.06	837.52	4.43	0.30	-0.000	*XS*

100-YR

```
  WS ELEV /    HV  /    HF  /    HE  /    EG  /    V  /    FN  /   ACC   *ID*
==========================================================================
========================== BEGIN BRIDGE ANALYSIS ==========================
BR  U AT   19920 /       /   2370. /   272. /   19591. / 1.00 /    0. /   40.
   836.00 /   1.19 /       ...3...  (-.001)    /   8.73 /   0.59 /         *BO*
--------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
--------------------------------------------------------------------------
    V AT   19970 /    50 /   2370. /   576. /   62523. / 1.37 /  -28. /   78.
   837.24 /   0.36 /   0.07 /   0.01 /  837.60 /   4.12 /   0.32 /  0.000  *AS*
--------------------------------------------------------------------------
Z   M = **** / E = **** / K* = **** /   751. /   88199. / 1.39 /  -34. /   84.
   838.81 /   0.22 /                  /  839.03 /   3.16 /   0.23 /         *AS*
========================== END BRIDGE ANALYSIS ============================
AA  VIV AT   20050 /    80 /   2370. /  1174. /  121653. / 1.54 /    5. /  211.
   838.97 /   0.10 /   0.04 /   0.0  /  839.07 /   2.02 /   0.16 / -0.000  *XS*
--------------------------------------------------------------------------
AB  VV AT   20640 /   590 /   2370. /  1766. /  147178. / 1.62 /   53. /  376.
   839.22 /   0.05 /   0.19 /   0.0  /  839.27 /   1.34 /   0.12 /  0.012  *XS*
--------------------------------------------------------------------------
AC   W AT   21290 /   650 /   2370. /  1106. /  103489. / 1.28 /  223. /  410.
   839.44 /   0.09 /   0.24 /   0.02 /  839.53 /   2.14 /   0.17 / -0.000  *XS*
--------------------------------------------------------------------------
AD  WW AT   22090 /   800 /   2370. /  2880. /  181898. / 2.15 /  147. /  711.
   839.75 /   0.02 /   0.24 /   0.0  /  839.77 /   0.82 /   0.05 / -0.000  *XS*  100-YR
--------------------------------------------------------------------------
AE   X AT   22420 /   330 /   2370. /  2817. /  218173. / 1.47 /   32. /  551.
   839.80 /   0.02 /   0.05 /   0.0  /  839.82 /   0.84 /   0.05 /  0.000  *XS*
--------------------------------------------------------------------------
AF  XX AT   23340 /   920 /   2370. /  3198. /  233327. / 2.04 /  187. /  926.
   839.90 /   0.02 /   0.10 /   0.00 /  839.92 /   0.74 /   0.08 / -0.000  *XS*
--------------------------------------------------------------------------
AG   Y AT   23900 /   560 /   2370. /  2871. /  173972. / 2.22 /   94. /  700.
   839.97 /   0.02 /   0.08 /   0.00 /  840.00 /   0.83 /   0.10 / -0.000  *XS*
--------------------------------------------------------------------------
AH  YY AT   24650 /   750 /   2370. /  3579. /  232738. / 1.91 /   90. /  724.
   840.09 /   0.01 /   0.10 /   0.0  /  840.10 /   0.66 /   0.08 / -0.000  *XS*
--------------------------------------------------------------------------
AI   Z AT   25100 /   450 /   2370. /  2988. /  190768. / 2.29 /  115. /  693.
   840.14 /   0.02 /   0.06 /   0.00 /  840.16 /   0.79 /   0.10 / -0.000  *XS*
--------------------------------------------------------------------------
AJ  1A AT   25910 /   810 /   2370. /  2528. /  152588. / 2.03 /   44. /  617.
   840.30 /   0.03 /   0.16 /   0.00 /  840.32 /   0.94 /   0.06 /  0.000  *XS*
--------------------------------------------------------------------------
AK  1AA AT  26820 /   910 /   2370. /  3705. /  204494. / 2.40 /   83. /  935.
   840.47 /   0.02 /   0.16 /   0.0  /  840.49 /   0.64 /   0.04 /  0.000  *XS*
--------------------------------------------------------------------------
AL  1B AT   27490 /   670 /   2370. /  2292. /  125420. / 2.14 /   54. /  664.
   840.61 /   0.04 /   0.15 /   0.01 /  840.64 /   1.03 /   0.13 /  0.000  *
```

```
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
 ==========================================================================
AM  1C AT   28330 /   840 /  2370. /  1259. /  124912. / 1.49 /  166. /  451.
    840.89 /   0.08 /   0.30 /   0.02 /  840.97 /   1.88 /   0.15 / -0.000  *XS*
 --------------------------------------------------------------------------
AN  1D AT   29100 /   770 /  2370. /  1146. /  120628. / 1.34 /  209. /  446.
    841.17 /   0.09 /   0.29 /   0.00 /  841.26 /   2.07 /   0.15 /  0.000  *XS*
 --------------------------------------------------------------------------
AØ  1E AT   29900 /   800 /  2370. /  1500. /  128445. / 1.73 /  203. /  523.
    841.48 /   0.07 /   0.29 /   0.0  /  841.55 /   1.58 /   0.15 /  0.000  *XS*
 --------------------------------------------------------------------------
AP  1EE AT  30270 /   370 /  2370. /  1305. /  111211. / 1.78 /   34. /  287.
    841.62 /   0.09 /   0.15 /   0.01 /  841.71 /   1.82 /   0.17 / -0.000  *XS*
 --------------------------------------------------------------------------
AQ  1F AT   30390 /   120 /  2370. /  1027. /   96092. / 1.82 /   24. /  298.
    841.65 /   0.15 /   0.06 /   0.03 /  841.80 /   2.31 /   0.20 / -0.000  *XS*
 ========================== BEGIN BRIDGE ANALYSIS ==========================
BR  1F AT   30390 /       /  1570. /   232. /   16367. / 1.00 /    0. /   32.
    839.70 /   0.71 /       ...3...  (-.001)    /   6.78 /   0.44 /          *BO*
 --------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      14. / RIGHT     767. /                *RG*
 --------------------------------------------------------------------------
    1G AT   30460 /    70 /  2370. /  1179. /   99563. / 1.78 /  -12. /  217.
    841.73 /   0.11 /   0.04 /   0.0  /  841.84 /   2.01 /   0.20 / -0.000  *AS*  100-YR
 --------------------------------------------------------------------------
AR  M = **** / E = **** / K* = **** /  1407. /  125002. / 1.75 /  -22. /  225.
    842.69 /   0.08 /                 /  842.76 /   1.68 /   0.16 /          *AS*
 ========================== END BRIDGE ANALYSIS ============================
AS  1GG AT  30610 /   150 /  2370. /  1706. /  163198. / 1.87 /   61. /  392.
    842.75 /   0.06 /   0.04 /   0.0  /  842.81 /   1.39 /   0.12 / -0.000  *XS*
 --------------------------------------------------------------------------
AT  1H AT   31380 /   770 /  2370. /  1628. /  134491. / 1.72 /   86. /  409.
    842.95 /   0.06 /   0.20 /   0.00 /  843.00 /   1.46 /   0.14 / -0.000  *XS*
 --------------------------------------------------------------------------
AU  1I AT   32210 /   830 /  2370. /  1396. /  143574. / 1.43 /  132. /  466.
    843.20 /   0.06 /   0.24 /   0.00 /  843.26 /   1.70 /   0.13 /  0.012  *XS*
 --------------------------------------------------------------------------
AV  1J AT   33220 /  1010 /  2370. /  2317. /  163155. / 2.03 /   77. /  514.
    843.47 /   0.03 /   0.24 /   0.0  /  843.50 /   1.02 /   0.10 /  0.000  *XS*
 --------------------------------------------------------------------------
AW  1K AT   34320 /  1100 /  2370. /  3812. /  244667. / 1.96 /   36. /  700.
    843.65 /   0.01 /   0.15 /   0.0  /  843.66 /   0.62 /   0.03 / -0.000  *XS*
 --------------------------------------------------------------------------
AX  1L AT   35040 /   720 /  2370. /  1803. /  141455. / 1.54 /  283. /  611.
    843.75 /   0.04 /   0.12 /   0.01 /  843.79 /   1.31 /   0.11 /  0.000  *XS*
 --------------------------------------------------------------------------
AY  1M AT   35520 /   480 /  2370. /  1153. /   96259. / 1.60 /    5. /  230.
    843.92 /   0.11 /   0.20 /   0.03 /  844.02 /   2.05 /   0.18 / -0.000  *XS*
 --------------------------------------------------------------------------
```

	SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
	WS ELEV		HV	HF	HE	G	V	FN	ACC	*ID*
AZ	1MM	AT	35890	370	2370.	1761.	153648.	1.43	61.	381.
	844.12		0.04	0.14	0.0	844.16	1.35	0.11	-0.000	*XS*
BA	1MMM	AT	36450	560	2370.	3960.	209701.	2.03	51.	817.
	844.25		0.01	0.10	0.0	844.26	0.60	0.04	-0.000	*XS*
BB	1N	AT	37140	690	2370.	1696.	131654.	1.52	64.	398.
	844.37		0.05	0.14	0.02	844.42	1.40	0.13	0.000	*XS*
BC	1O	AT	37400	260	2370.	1619.	134035.	1.50	3.	305.
	844.45		0.05	0.08	0.00	844.50	1.46	0.13	-0.000	*XS*
BD	1P	AT	37790	390	2370.	1689.	135362.	1.77	36.	344.
	844.57		0.05	0.12	0.00	844.63	1.40	0.14	-0.000	*XS*
BE	1Q	AT	38290	500	2370.	1535.	112587.	2.42	4.	276.
	844.74		0.09	0.18	0.02	844.83	1.54	0.16	-0.000	*XS*
BF	1R	AT	38980	690	2370.	1781.	95535.	3.21	32.	320.
	845.10		0.09	0.36	0.0	845.19	1.33	0.18	0.001	*XS*
BG	1RR	AT	39460	480	2370.	3493.	148419.	3.69	27.	658.
	845.35		0.03	0.19	0.0	845.38	0.68	0.04	-0.002	*XS*
BH	1S	AT	39950	490	2370.	3468.	155948.	2.44	500.	1030.
	845.48		0.02	0.12	0.0	845.50	0.68	0.04	0.000	*XS*

100-YR

END OF THIS PROFILE

100-YR

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
 S ELEV /    HV  /    HF  /    HE  /     S  /     V  /    FN  /   ACC   *ID*
==================================================================================
  1S AT   39950 /     0 /   2370. /  3469. /  156012. / 2.44 /  500. / 1030.
  845.48 /   0.02 /                 /  845.50 /    0.68 /   0.04/          *IS*
----------------------------------------------------------------------------------
1SS   AT   40250 /   300 /    650. /  1585. /   91483. / 2.63 /    0. /  239.
  845.54 /   0.01 /   0.05 /    0.0  /  845.55 /    0.41 /   0.05 / -0.000  *XS*
----------------------------------------------------------------------------------
  1T AT   40690 /   440 /    650. /  2004. /  144346. / 1.89 /   41. /  431.
  845.54 /   0.00 /   0.01 /    0.0  /  845.54 /    0.32 /   0.03 / -0.018  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR 1T AT   40690 /       /    261. /   291. /   20712. / 1.00 /    0. /   40.
  842.50 /   0.01 /       ...3...  (-.001)    /    0.90 /   0.06 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       14. / RIGHT     376. /                *RG*
----------------------------------------------------------------------------------
  1U AT   40750 /    60 /    650. /  2040. /  158160. / 2.15 /  -29. /  308.
  845.55 /   0.00 /   0.00 /    0.02 /  845.55 /    0.32 /   0.02 / -0.011  *AS*
----------------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /  2042. /  158397. / 2.15 /  -29. /  308.
  845.56 /   0.00 /                 /  845.56 /    0.32 /   0.02 /          *AS*
============================ END BRIDGE ANALYSIS ================================
 1UU AT   41240 /   490 /    650. /  2302. /  132253. / 2.69 /  218. /  571.
  845.56 /   0.00 /   0.01 /    0.0  /  845.56 /    0.28 /   0.03 / -0.010  *XS*
----------------------------------------------------------------------------------
  1V AT   41690 /   450 /    650. /  1971. /  110908. / 2.68 /  300. /  679.
  845.56 /   0.00 /   0.01 /    0.00 /  845.56 /    0.33 /   0.04 / -0.013  *XS*
----------------------------------------------------------------------------------
1VV   AT   41820 /   130 /    650. /  1734. /  107661. / 2.18 /  132. /  487.
  845.56 /   0.00 /   0.00 /    0.00 /  845.56 /    0.37 /   0.04 / -0.005  *XS*
----------------------------------------------------------------------------------
  1W AT   42400 /   580 /    650. /  2533. /  105843. / 2.68 / 1300. / 1788.
  845.58 /   0.00 /   0.02 /    0.0  /  845.58 /    0.26 /   0.01 / -0.000  *XS*
----------------------------------------------------------------------------------
  1X AT   43520 /  1120 /    650. /  2652. /  102402. / 2.95 /  600. / 1188.
  845.62 /   0.00 /   0.04 /    0.00 /  845.63 /    0.25 /   0.01 /  0.000  *XS*
----------------------------------------------------------------------------------
  1Y AT   45200 /  1680 /    650. /  1673. /   91864. / 3.13 /   67. /  474.
  845.70 /   0.01 /   0.08 /    0.00 /  845.70 /    0.39 /   0.05 /  0.000  *XS*
----------------------------------------------------------------------------------
  1Z AT   45890 /   690 /    650. /  1439. /   98395. / 1.35 /  119. /  417.
  845.73 /   0.00 /   0.03 /    0.0  /  845.74 /    0.45 /   0.03 / -0.000  *XS*
----------------------------------------------------------------------------------
  2A AT   46530 /   640 /    650. /  1959. /   82826. / 2.51 /  284. /  686.
  845.77 /   0.00 /   0.03 /    0.00 /  845.77 /    0.33 /   0.05 /  0.000  *XS*
----------------------------------------------------------------------------------
  2B AT   47130 /   600 /    650. /  1273. /   56260. / 1.89 /   34. /  334.
  845.82 /   0.01 /   0.05 /    0.00 /  845.83 /    0.51 /   0.03 /  0.002  *XS*
```

BH
BI
BJ
BK
BL
BM
BN
BØ
BP
BQ
BR
BS
BT

100-YR

```
============================ BEGIN BRIDGE ANALYSIS ============================
BR 2B AT   47130 /        /    291. /   127. /    8010. / 1.00 /    0. /   24.
   844.50 /   0.08 /        ...3...  (-.001)  /   2.29 /   0.16 /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT     354. /               *RG*
-----------------------------------------------------------------------------
   2C AT   47220 /    90 /    650. /   579. /   31711. / 2.84 /   -8. /  200.
   845.83 /   0.06 /   0.02 /   0.05 /  845.89 /   1.12 /   0.14 / -0.011  *AS*
-----------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   592. /   32449. / 2.84 /   -8. /  200.
   845.89 /   0.05 /                  /  845.95 /   1.10 /   0.13 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
  2CC AT   47840 /   620 /    650. /  1893. /   84523. / 2.26 /  272. /  750.
   846.04 /   0.00 /   0.10 /   0.0  /  846.04 /   0.34 /   0.02 / -0.000  *XS*
-----------------------------------------------------------------------------
   2D AT   48020 /   180 /    650. /  1675. /   81311. / 2.11 /  600. / 1058.
   846.04 /   0.00 /   0.01 /   0.00 /  846.04 /   0.39 /   0.05 / -0.011  *XS*
-----------------------------------------------------------------------------
   2E AT   48800 /   780 /    650. /   905. /   58770. / 2.16 /   20. /  401.
   846.10 /   0.02 /   0.07 /   0.01 /  846.12 /   0.72 /   0.08 / -0.000  *XS*
-----------------------------------------------------------------------------
   2F AT   49440 /   640 /    650. /   688. /   45367. / 1.67 /  249. /  449.
   846.20 /   0.02 /   0.10 /   0.00 /  846.22 /   0.94 /   0.09 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR 2F AT   49440 /        /    586. /   226. /   17968. / 1.00 /    0. /   32.
   845.90 /   0.10 /        ...3...  (-.001)  /   2.60 /   0.17 /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       53. / RIGHT      12. /               *RG*
-----------------------------------------------------------------------------
   2G AT   49500 /    60 /    650. /   704. /   54914. / 1.52 /   -9. /  143.
   846.21 /   0.02 /   0.01 /   0.01 /  846.23 /   0.92 /   0.09 / -0.011  *AS*
-----------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   724. /   57111. / 1.52 /  -10. /  143.
   846.35 /   0.02 /                  /  846.36 /   0.90 /   0.08 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
  2GG AT   49720 /   220 /    650. /   714. /   54669. / 1.49 /   93. /  299.
   846.38 /   0.02 /   0.03 /   0.00 /  846.39 /   0.91 /   0.08 /  0.000  *XS*
-----------------------------------------------------------------------------
   2H AT   50000 /   280 /    650. /   569. /   50536. / 1.08 /   24. /  129.
   846.42 /   0.02 /   0.04 /   0.00 /  846.44 /   1.14 /   0.08 / -0.000  *XS*
-----------------------------------------------------------------------------
   2I AT   50360 /   360 /    650. /   774. /   75818. / 1.07 /   55. /  197.
   846.47 /   0.01 /   0.04 /   0.0  /  846.48 /   0.84 /   0.06 / -0.000  *XS*
-----------------------------------------------------------------------------
  2II AT   50820 /   460 /    650. /  3022. /  168294. / 2.14 /  369. / 1000.
   846.49 /   0.00 /   0.02 /   0.0  /  846.49 /   0.22 /   0.03 / -0.000  *XS*
-----------------------------------------------------------------------------
   2J AT   51810 /   990 /    650. /  1860. /   83024. / 2.52 /  151. /  556.
   846.52 /   0.00 /   0.03 /   0.00 /  846.53 /   0.35 /   0.02 / -0.000  *XS*
```

BU

BV

BW

BX

BY

BZ

CA

CB

CC

CD

CE

100-YR

	SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
		ELEV	HV	HF	HE		V	FN	ACC	*ID*
CF	2K	AT	52260	450	650.	2750.	120108.	2.58	1172.	1790.
	846.54		0.00	0.02	0.0	846.54	0.24	0.04	-0.000	*XS*
CG	2L	AT	53160	900	650.	4232.	307103.	1.66	1303.	2000.
	846.54		0.00	0.01	0.0	846.54	0.15	0.02	-0.012	*XS*
CH	2M	AT	55230	2070	650.	3680.	135757.	2.82	105.	1139.
	846.56		0.00	0.02	0.00	846.56	0.18	0.01	-0.000	*XS*
CI	2N	AT	56280	1050	650.	1501.	88770.	1.74	135.	528.
	846.60		0.01	0.04	0.00	846.60	0.43	0.05	-0.000	*XS*
CJ	2O	AT	57000	720	650.	328.	17674.	2.04	43.	205.
	846.73		0.12	0.19	0.06	846.86	1.98	0.24	-0.000	*XS*
CK	2P	AT	57260	260	650.	731.	34270.	2.08	153.	380.
	847.01		0.03	0.18	0.0	847.04	0.89	0.12	-0.000	*XS*
CL	2Q	AT	58340	1080	650.	962.	58324.	1.91	205.	456.
	847.26		0.01	0.23	0.0	847.28	0.68	0.08	0.009	*XS*
CM	2R	AT	58750	410	650.	887.	44491.	1.88	237.	515.
	847.33		0.02	0.07	0.00	847.34	0.73	0.08	-0.000	*XS*
CN	2S	AT	59330	580	650.	926.	29010.	2.72	-36.	288.
	847.52		0.02	0.19	0.00	847.54	0.70	0.05	0.000	*XS*
CØ	2T	AT	59750	420	650.	1301.	58828.	2.01	127.	599.
	847.63		0.01	0.10	0.0	847.64	0.50	0.06	0.000	*XS*
CP	2U	AT	61080	1330	650.	1569.	60424.	1.78	558.	1085.
	847.80		0.00	0.16	0.0	847.80	0.41	0.03	0.000	*XS*
CQ	2V	AT	61950	870	650.	1702.	62656.	2.49	560.	1135.
	847.90		0.01	0.10	0.00	847.90	0.38	0.07	0.003	*XS*
CR	2W	AT	62600	650	650.	2037.	56684.	2.72	251.	986.
	847.98		0.00	0.08	0.0	847.98	0.32	0.03	0.000	*XS*
CS	2WW	AT	63030	430	650.	685.	31136.	1.76	149.	494.
	848.07		0.02	0.10	0.01	848.09	0.95	0.14	-0.000	*XS*
CT	2X	AT	63660	630	650.	734.	25526.	2.14	41.	384.
	848.40		0.03	0.33	0.00	848.43	0.89	0.17	0.002	*XS*

100-YR

```
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
WS ELEV /    HV  /    HF  /    HE  /     G  /     V  /    FN  /   ACC   *ID*
==========================================================================
   C AT    3800 /     0 /   2370. /  2801. / 325816. / 1.00 /  148. /  462.
 829.60 /   0.01 /                 /  829.61 /   0.85 /  0.05/          *IS*
--------------------------------------------------------------------------
   D AT    4800 /  1000 /   2370. /  1068. /  97550. / 1.04 /   71. /  224.
 829.74 /   0.08 /   0.18 /   0.03 /  829.82 /   2.22 /  0.15 / 0.000  *XS*
--------------------------------------------------------------------------
   E AT    5800 /  1000 /   2370. /  1312. / 108821. / 1.47 /  119. /  444.
 830.28 /   0.07 /   0.53 /   0.0  /  830.35 /   1.81 /  0.14 / -0.000 *XS*
--------------------------------------------------------------------------
   F AT    6240 /   440 /   2370. /   962. /  76470. / 1.92 /   30. /  380.
 830.53 /   0.18 /   0.30 /   0.05 /  830.71 /   2.46 /  0.22 / 0.006  *XS*
--------------------------------------------------------------------------
   G AT    6690 /   450 /   2370. /  1634. /  85032. / 3.34 /   35. /  385.
 830.99 /   0.11 /   0.39 /   0.0  /  831.10 /   1.45 /  0.20 / -0.000 *XS*
--------------------------------------------------------------------------
   H AT    7290 /   600 /   2370. /   593. /  46974. / 1.77 /   73. /  173.
 831.67 /   0.44 /   0.84 /   0.17 /  832.11 /   4.00 /  0.37 / 0.000  *XS*
--------------------------------------------------------------------------
  HH AT    7870 /   580 /   2370. /  2498. / 160429. / 2.32 /   75. /  475.
 832.51 /   0.03 /   0.43 /   0.0  /  832.54 /   0.95 /  0.10 / 0.000  *XS*
--------------------------------------------------------------------------
   I AT    8360 /   490 /   2370. /  2228. / 171568. / 1.97 /   52. /  402.
 832.61 /   0.03 /   0.10 /   0.00 /  832.64 /   1.06 /  0.10 / -0.000 *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR I AT    8360 /        /    781. /   445. /  37784. / 1.00 /    0. /   47.
 832.40 /   0.05 /        ...3...  (-.001)    /   1.75 /  0.10 /          *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT    1609. /            *RG*
==========================================================================
   J AT    8410 /    50 /   2370. /  2268. / 161612. / 1.76 /   25. /  375.
 832.62 /   0.03 /   0.01 /   0.01 /  832.65 /   1.05 /  0.06 / -0.011 *AS*
--------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  2280. / 162968. / 1.75 /   25. /  375.
 832.65 /   0.03 /                 /  832.68 /   1.04 /  0.06 /          *AS*
========================== END BRIDGE ANALYSIS ============================
  JJ AT    8940 /   530 /   2370. /  2706. / 173920. / 2.31 /   10. /  510.
 832.76 /   0.03 /   0.11 /   0.0  /  832.79 /   0.88 /  0.10 / -0.000 *XS*
--------------------------------------------------------------------------
   K AT    9630 /   690 /   2370. /  1680. / 148003. / 1.95 /  240. /  540.
 832.89 /   0.06 /   0.15 /   0.02 /  832.95 /   1.41 /  0.15 / 0.000  *XS*
--------------------------------------------------------------------------
   L AT   10430 /   800 /   2370. /  1269. / 145953. / 1.36 /  120. /  345.
 833.09 /   0.07 /   0.21 /   0.01 /  833.17 /   1.87 /  0.15 / -0.000 *XS*
--------------------------------------------------------------------------
  LL AT   10740 /   310 /   2370. /  1149. / 116512. / 1.63 /   25. /  250.
 833.18 /   0.11 /   0.10 /   0.02 /  833.29 /   2.06 /  0.19 / -0.000 *XS*
```

A
B
C
D
E
F
G
H
I
J

FW

SECID	AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*
M	11130 / 833.36	390 / 0.12	2370. / 0.19	905. / 0.01	97823. / 833.49	1.15 / 2.62	150. / 0.19	300. / -0.000 *XS*
MM	11610 / 833.73	480 / 0.15	2370. / 0.37	949. / 0.01	73563. / 833.87	1.50 / 2.50	108. / 0.24	358. / 0.000 *XS*
N	11960 / 834.05	350 / 0.07	2370. / 0.25	1336. / 0.0	107803. / 834.12	1.44 / 1.77	10. / 0.17	310. / -0.000 *XS*
NN	12380 / 834.30	420 / 0.12	2370. / 0.26	1012. / 0.03	84635. / 834.43	1.45 / 2.34	5. / 0.20	225. / 0.018 *XS*
O	12810 / 834.60	430 / 0.13	2370. / 0.30	1240. / 0.00	94838. / 834.73	2.25 / 1.91	20. / 0.19	320. / 0.001 *XS*
P	13630 / 835.14	820 / 0.15	2370. / 0.54	1016. / 0.01	89627. / 835.28	1.72 / 2.33	213. / 0.20	413. / -0.000 *XS*
PP	14720 / 835.68	1090 / 0.04	2370. / 0.44	2427. / 0.0	154636. / 835.72	2.63 / 0.98	240. / 0.12	740. / -0.000 *XS*
Q	15180 / 835.81	460 / 0.06	2370. / 0.14	1641. / 0.01	116805. / 835.88	1.97 / 1.44	125. / 0.15	625. / -0.000 *XS*
R	15990 / 836.10	810 / 0.04	2370. / 0.26	1846. / 0.0	150935. / 836.14	1.37 / 1.28	12. / 0.11	412. / 0.000 *XS*
S	17180 / 836.27	1190 / 0.01	2370. / 0.14	5311. / 0.0	322943. / 836.27	1.65 / 0.45	230. / 0.03	1030. / -0.000 *XS*
SS	18100 / 836.33	920 / 0.01	2370. / 0.07	3363. / 0.00	234068. / 836.35	1.47 / 0.70	250. / 0.07	850. / 0.000 *XS*
T	19040 / 836.51	940 / 0.07	2370. / 0.21	1241. / 0.03	108063. / 836.59	1.29 / 1.91	220. / 0.17	570. / 0.000 *XS*
TT	19330 / 836.64	290 / 0.23	2370. / 0.21	732. / 0.08	73231. / 836.87	1.43 / 3.24	140. / 0.26	290. / -0.000 *XS*
TTT	19840 / 837.18	510 / 0.22	2370. / 0.54	762. / 0.0	72991. / 837.41	1.49 / 3.11	18. / 0.26	188. / -0.000 *XS*
U	19920 / 837.22	80 / 0.34	2370. / 0.09	539. / 0.06	65119. / 837.56	1.12 / 4.40	21. / 0.30	110. / -0.000 *XS*

K L M N Ø P Q R S T U V W X Y

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SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
 WS ELEV /    HV  /    HF  /    HE  /     EC  /     V  /    FN  /   ACC   *ID*
==========================================================================
============================ BEGIN BRIDGE ANALYSIS ============================
BR  U AT   19920 /        /   2370. /   272. /   19591. / 1.00 /    0. /   40.
   836.00 /   1.19 /        ...3...  (-.001)    /   8.73 /   0.59 /          *BO*
--------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
--------------------------------------------------------------------------
    V AT   19970 /    50 /   2370. /   580. /   63179. / 1.37 /  -28. /   78.
   837.28 /   0.35 /   0.07 /   0.01 /  837.64 /   4.08 /   0.31 /  0.001  *AS*
--------------------------------------------------------------------------
Z   M = **** / E = **** / K* = **** /   750. /   89014. / 1.39 /  -34. /   84.
   838.86 /   0.21 /                  /  839.07 /   3.13 /   0.23 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
AA  V1V AT   20050 /    80 /   2370. /  1180. /  123321. / 1.53 /    8. /  208.
   839.02 /   0.10 /   0.04 /   0.0  /  839.11 /   2.01 /   0.16 / -0.000  *XS*
--------------------------------------------------------------------------
AB  VV AT   20640 /   590 /   2370. /  1767. /  151413. / 1.54 /   55. /  355.
   839.27 /   0.04 /   0.18 /   0.0  /  839.31 /   1.34 /   0.12 /  0.020  *XS*
--------------------------------------------------------------------------
AC   W AT   21290 /   650 /   2370. /  1112. /  104582. / 1.28 /  225. /  410.
   839.47 /   0.09 /   0.23 /   0.02 /  839.56 /   2.13 /   0.16 / -0.000  *XS*
--------------------------------------------------------------------------
AD  WW AT   22090 /   800 /   2370. /  2389. /  167703. / 1.91 /  200. /  600.
   839.79 /   0.03 /   0.26 /   0.0  /  839.82 /   0.99 /   0.11 / -0.000  *XS*
--------------------------------------------------------------------------
AE   X AT   22420 /   330 /   2370. /  2827. /  223203. / 1.43 /   32. /  532.
   839.85 /   0.02 /   0.05 /   0.0  /  839.87 /   0.84 /   0.05 /  0.000  *XS*
--------------------------------------------------------------------------
AF  XX AT   23340 /   920 /   2370. /  2653. /  209894. / 1.92 /  250. /  800.
   839.96 /   0.02 /   0.11 /   0.00 /  839.98 /   0.89 /   0.08 / -0.000  *XS*
--------------------------------------------------------------------------
AG   Y AT   23900 /   560 /   2370. /  2679. /  172418. / 2.05 /  150. /  650.
   840.05 /   0.02 /   0.09 /   0.00 /  840.07 /   0.88 /   0.10 /  0.000  *XS*
--------------------------------------------------------------------------
AH  YY AT   24650 /   750 /   2370. /  3206. /  225295. / 1.75 /  150. /  650.
   840.17 /   0.01 /   0.11 /   0.0  /  840.18 /   0.74 /   0.08 / -0.000  *XS*
--------------------------------------------------------------------------
AI   Z AT   25100 /   450 /   2370. /  2424. /  175620. / 1.98 /  290. /  690.
   840.22 /   0.03 /   0.06 /   0.01 /  840.25 /   0.98 /   0.10 /  0.000  *XS*
--------------------------------------------------------------------------
AJ  1A AT   25910 /   810 /   2370. /  2481. /  158810. / 1.86 /   50. /  550.
   840.39 /   0.03 /   0.16 /   0.0  /  840.42 /   0.96 /   0.06 /  0.000  *XS*
--------------------------------------------------------------------------
AK  1AA AT  26820 /   910 /   2370. /  3732. /  212747. / 2.26 /  100. /  900.
   840.55 /   0.01 /   0.15 /   0.0  /  840.57 /   0.64 /   0.04 /  0.000  *XS*
--------------------------------------------------------------------------
AL  1B AT   27490 /   670 /   2370. /  2162. /  127223. / 1.93 /  160. /  660.
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SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
WS ELEV /    HV  /    HF  /    HE  /     G  /      V  /    FN  /  ACC   *ID*
==========================================================================
  1C AT   28330 /   840 /  2370. /  1260. /  128008. / 1.42 /  200. /  450.
  840.95 /   0.08 /   0.29 /   0.02 /  841.03 /    1.88 /   0.14 / 0.000  *XS*
--------------------------------------------------------------------------
  1D AT   29100 /   770 /  2370. /  1138. /  122761. / 1.28 /  245. /  445.
  841.22 /   0.09 /   0.28 /   0.00 /  841.31 /    2.08 /   0.15 / -0.000 *XS*
--------------------------------------------------------------------------
  1E AT   29900 /   800 /  2370. /  1256. /  124134. / 1.39 /  205. /  405.
  841.53 /   0.08 /   0.29 /   0.0  /  841.60 /    1.89 /   0.16 / -0.000 *XS*
--------------------------------------------------------------------------
 1EE AT   30270 /   370 /  2370. /  1284. /  119987. / 1.49 /   35. /  235.
  841.66 /   0.08 /   0.14 /   0.00 /  841.74 /    1.85 /   0.16 / 0.000  *XS*
--------------------------------------------------------------------------
  1F AT   30390 /   120 /  2370. /   977. /   98116. / 1.58 /   25. /  225.
  841.69 /   0.14 /   0.06 /   0.03 /  841.83 /    2.43 /   0.19 / -0.000 *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 1F AT   30390 /       /  1558. /   232. /   16367. / 1.00 /    0. /   32.
  839.70 /   0.70 /       ...3...  (-.001)   /    6.73 /   0.44 /         *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      16. / RIGHT     790. /              *RG*
--------------------------------------------------------------------------
  1G AT   30460 /    70 /  2370. /  1122. /  100325. / 1.63 /  -13. /  180.
  841.76 /   0.11 /   0.04 /   0.0  /  841.87 /    2.11 /   0.20 / -0.000 *AS*
--------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /  1308. /  124210. / 1.60 /  -20. /  180.
  842.71 /   0.08 /                 /  842.79 /    1.81 /   0.16 /         *AS*
========================== END BRIDGE ANALYSIS ============================
 1GG AT   30610 /   150 /  2370. /  1531. /  169560. / 1.43 /  100. /  300.
  842.77 /   0.05 /   0.04 /   0.0  /  842.83 /    1.55 /   0.12 / -0.000 *XS*
--------------------------------------------------------------------------
  1H AT   31380 /   770 /  2370. /  1385. /  133252. / 1.37 /  100. /  300.
  842.96 /   0.06 /   0.19 /   0.00 /  843.02 /    1.71 /   0.14 / -0.000 *XS*
--------------------------------------------------------------------------
  1I AT   32210 /   830 /  2370. /  1271. /  143922. / 1.19 /  250. /  450.
  843.21 /   0.06 /   0.24 /   0.00 /  843.27 /    1.86 /   0.13 / 0.008  *XS*
--------------------------------------------------------------------------
  1J AT   33220 /  1010 /  2370. /  2077. /  165647. / 1.62 /  200. /  500.
  843.48 /   0.03 /   0.24 /   0.0  /  843.51 /    1.14 /   0.10 / -0.000 *XS*
--------------------------------------------------------------------------
  1K AT   34320 /  1100 /  2370. /  3172. /  219189. / 1.86 /  230. /  630.
  843.67 /   0.02 /   0.17 /   0.0  /  843.68 /    0.75 /   0.08 / 0.000  *XS*
--------------------------------------------------------------------------
  1L AT   35040 /   720 /  2370. /  1486. /  131320. / 1.30 /  350. /  550.
  843.79 /   0.05 /   0.14 /   0.02 /  843.84 /    1.60 /   0.11 / -0.000 *XS*
--------------------------------------------------------------------------
  1M AT   35520 /   480 /  2370. /  1140. /   98376. / 1.52 /   10. /  210.
  843.97 /   0.10 /   0.21 /   0.03 /  844.08 /    2.08 /   0.18 / -0.000 *XS*
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	SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
	WS ELEV		HV	HF	HE	[illegible]	V	FN	ACC	*ID*
AZ	1MM	AT	35890	370	2370.	1403.	139999.	1.20	150.	350.
	844.17		0.05	0.15	0.0	844.23	1.69	0.12	-0.000	*XS*
BA	1MMM	AT	36450	560	2370.	3685.	206228.	1.92	160.	810.
	844.32		0.01	0.11	0.0	844.34	0.64	0.04	-0.000	*XS*
BB	1N	AT	37140	690	2370.	1642.	131965.	1.47	70.	370.
	844.45		0.05	0.14	0.02	844.50	1.44	0.13	-0.000	*XS*
BC	1O	AT	37400	260	2370.	1324.	123342.	1.32	5.	205.
	844.53		0.07	0.09	0.01	844.60	1.79	0.14	0.000	*XS*
BD	1P	AT	37790	390	2370.	1359.	124536.	1.52	140.	340.
	844.67		0.07	0.14	0.00	844.74	1.74	0.15	-0.000	*XS*
BE	1Q	AT	38290	500	2370.	1439.	116055.	2.03	5.	205.
	844.86		0.09	0.19	0.01	844.94	1.65	0.15	-0.000	*XS*
BF	1R	AT	38980	690	2370.	1731.	97210.	3.00	45.	295.
	845.20		0.09	0.34	0.00	845.29	1.37	0.18	0.000	*XS*
BG	1RR	AT	39460	480	2370.	3249.	150765.	3.20	140.	640.
	845.45		0.03	0.18	0.0	845.48	0.73	0.04	0.005	*XS*
BH	1S	AT	39950	490	2370.	3402.	147388.	2.21	500.	1000.
	845.58		0.02	0.12	0.0	845.60	0.70	0.04	0.000	*XS*

FW

END OF THIS PROFILE

FW

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==========================================================================
SECTD AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
 WS ELEV /    HV  /    HF  /    HE  /       /     V  /    FN  /   ACC   *ID*
==========================================================================
  1S AT   39950 /     0 /   2370. /  3399. /  147240. / 2.21 /  500. / 1000.
  845.58 /   0.02 /                 /  845.60 /    0.70 /   0.04/          *IS*
--------------------------------------------------------------------------
1SS   AT   40250 /   300 /    650. /  1573. /   92917. / 2.58 /    5. /  235.
  845.64 /   0.01 /   0.05 /   0.0  /  845.65 /    0.41 /   0.05 / 0.000  *XS*
--------------------------------------------------------------------------
  1T AT   40690 /   440 /    650. /  1348. /  111414. / 1.43 /  140. /  340.
  845.64 /   0.01 /   0.02 /   0.0  /  845.65 /    0.48 /   0.04 / -0.020  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 1T AT   40690 /       /    233. /   291. /   20712. / 1.00 /    0. /   40.
  842.50 /   0.01 /       ...3...  (-.001)    /    0.80 /   0.05 /          *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       18. / RIGHT     394. /              *RG*
--------------------------------------------------------------------------
  1U AT   40750 /    60 /    650. /  1439. /  131684. / 1.87 /  -10. /  190.
  845.65 /   0.01 /   0.00 /   0.02 /  845.66 /    0.45 /   0.04 / -0.011  *AS*
--------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /  1439. /  131684. / 1.87 /  -10. /  190.
  845.65 /   0.01 /                 /  845.66 /    0.45 /   0.04 /          *AS*
========================== END BRIDGE ANALYSIS ============================
 1UU AT   41240 /   490 /    650. /  2334. /  135276. / 2.67 /  220. /  570.
  845.65 /   0.00 /   0.01 /   0.0  /  845.65 /    0.28 /   0.03 / -0.014  *XS*
--------------------------------------------------------------------------
  1V AT   41690 /   450 /    650. /  1892. /  110855. / 2.55 /  320. /  670.
  845.65 /   0.00 /   0.01 /   0.00 /  845.65 /    0.34 /   0.04 / -0.012  *XS*
--------------------------------------------------------------------------
1VV   AT   41820 /   130 /    650. /  1715. /  113994. / 1.92 /  150. /  450.
  845.65 /   0.00 /   0.00 /   0.0  /  845.65 /    0.38 /   0.04 / -0.005  *XS*
--------------------------------------------------------------------------
  1W AT   42400 /   580 /    650. /  2421. /  104144. / 2.65 / 1330. / 1780.
  845.67 /   0.00 /   0.02 /   0.0  /  845.67 /    0.27 /   0.01 / 0.000  *XS*
--------------------------------------------------------------------------
  1X AT   43520 /  1120 /    650. /  2546. /  103087. / 2.77 /  600. / 1100.
  845.72 /   0.00 /   0.04 /   0.0  /  845.72 /    0.26 /   0.01 / -0.000  *XS*
--------------------------------------------------------------------------
  1Y AT   45200 /  1680 /    650. /  1490. /   91980. / 2.57 /  150. /  450.
  845.79 /   0.01 /   0.07 /   0.00 /  845.80 /    0.44 /   0.05 / -0.000  *XS*
--------------------------------------------------------------------------
  1Z AT   45890 /   690 /    650. /  1433. /  100491. / 1.32 /  120. /  400.
  845.82 /   0.00 /   0.03 /   0.0  /  845.83 /    0.45 /   0.03 / -0.000  *XS*
--------------------------------------------------------------------------
  2A AT   46530 /   640 /    650. /  1428. /   71735. / 2.11 /  285. /  535.
  845.86 /   0.01 /   0.04 /   0.00 /  845.87 /    0.46 /   0.05 / -0.000  *XS*
--------------------------------------------------------------------------
  2B AT   47130 /   600 /    650. /  1049. /   54238. / 1.70 /   40. /  240.
  845.93 /   0.01 /   0.07 /   0.00 /  845.93 /    0.62 /   0.07 / 0.000  *XS*
```

BH BT B! BK BL BM BN BØ BP BQ BR BS BT FW

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---------------------------------------------------------------------------
============================ BEGIN BRIDGE ANALYSIS ============================
BR 2B AT   47130 /        /    271. /   127[illegible]    8010. / 1.00 /    0. /   24.
   844.50 /   0.07 /        ...3...  (-.001)     /   2.13 /   0.15 /          *BO*
---------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT     377. /                *RG*
---------------------------------------------------------------------------
   2C AT   47220 /    90 /    650. /   595. /   32971. / 2.78 /   -5. /  195.
   845.93 /   0.05 /   0.02 /   0.04 /  845.99 /   1.09 /   0.13 / -0.011  *AS*
---------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   605. /   33567. / 2.78 /   -5. /  195.
   845.98 /   0.05 /                  /  846.03 /   1.07 /   0.13 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
  2CC AT   47840 /   620 /    650. /  1800. /   86282. / 2.03 /  350. /  750.
   846.12 /   0.00 /   0.09 /   0.0  /  846.12 /   0.36 /   0.02 / -0.000  *XS*
---------------------------------------------------------------------------
   2D AT   48020 /   180 /    650. /  1629. /   82546. / 2.02 /  600. / 1000.
   846.12 /   0.01 /   0.01 /   0.00 /  846.13 /   0.40 /   0.05 / -0.010  *XS*
---------------------------------------------------------------------------
   2E AT   48800 /   780 /    650. /   911. /   62909. / 1.86 /   20. /  270.
   846.18 /   0.01 /   0.06 /   0.00 /  846.19 /   0.71 /   0.07 /  0.000  *XS*
---------------------------------------------------------------------------
   2F AT   49440 /   640 /    650. /   631. /   45207. / 1.46 /  250. /  400.
   846.27 /   0.02 /   0.10 /   0.00 /  846.29 /   1.03 /   0.09 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR 2F AT   49440 /        /    566. /   226. /   17968. / 1.00 /    0. /   32.
   845.90 /   0.10 /        ...3...  (-.001)     /   2.51 /   0.17 /          *BO*
---------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       67. / RIGHT      15. /                *RG*
---------------------------------------------------------------------------
   2G AT   49500 /    60 /    650. /   713. /   56168. / 1.51 /  -10. /  140.
   846.28 /   0.02 /   0.01 /   0.01 /  846.30 /   0.91 /   0.09 / -0.011  *AS*
---------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   731. /   58322. / 1.50 /  -10. /  140.
   846.40 /   0.02 /                  /  846.42 /   0.89 /   0.08 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
  2GG AT   49720 /   220 /    650. /   675. /   55963. / 1.30 /  140. /  290.
   846.43 /   0.02 /   0.03 /   0.00 /  846.45 /   0.96 /   0.08 / -0.000  *XS*
---------------------------------------------------------------------------
   2H AT   50000 /   280 /    650. /   573. /   51314. / 1.07 /   25. /  125.
   846.47 /   0.02 /   0.04 /   0.00 /  846.49 /   1.13 /   0.08 / -0.000  *XS*
---------------------------------------------------------------------------
   2I AT   50360 /   360 /    650. /   771. /   76877. / 1.05 /   60. /  190.
   846.52 /   0.01 /   0.04 /   0.0  /  846.53 /   0.84 /   0.06 / -0.000  *XS*
---------------------------------------------------------------------------
  2II AT   50820 /   460 /    650. /  2239. /  143378. / 1.90 /  370. /  820.
   846.55 /   0.00 /   0.02 /   0.0  /  846.55 /   0.29 /   0.03 / -0.000  *XS*
---------------------------------------------------------------------------
   2J AT   51810 /   990 /    650. /  1818. /   86570. / 2.25 /  200. /  550.
   846.58 /   0.00 /   0.03 /   0.00 /  846.59 /   0.[illegible] /   0.02 / [illegible]
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	SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / G	ALPHA / V	LEW / FN	REW / ACC	*ID*
CF	2K AT 52260	450	650.	2138.	107452.	2.24	1300.	1700.	
	846.60	0.00	0.02	0.0	846.61	0.10	0.04	-0.000	*XS*
CG	2L AT 53160	900	650.	3697.	268308.	1.63	1400.	2000.	
	846.60	0.00	0.01	0.0	846.60	0.18	0.02	-0.016	*XS*
CH	2M AT 55230	2070	650.	3043.	128629.	2.39	300.	1000.	
	846.63	0.00	0.03	0.00	846.63	0.21	0.04	-0.000	*XS*
CI	2N AT 56280	1050	650.	1315.	85063.	1.58	135.	435.	
	846.67	0.01	0.04	0.00	846.67	0.49	0.05	-0.000	*XS*
CJ	2O AT 57000	720	650.	332.	18312.	1.96	45.	195.	
	846.81	0.12	0.20	0.06	846.92	1.96	0.23	0.000	*XS*
CK	2P AT 57260	260	650.	647.	33202.	1.84	205.	380.	
	847.06	0.03	0.18	0.0	847.09	1.00	0.12	-0.019	*XS*
CL	2Q AT 58340	1080	650.	768.	53063.	1.63	210.	385.	
	847.31	0.02	0.26	0.0	847.32	0.85	0.09	-0.020	*XS*
CM	2R AT 58750	410	650.	856.	42749.	1.84	250.	500.	FW
	847.39	0.02	0.08	0.0	847.40	0.76	0.09	0.000	*XS*
CN	2S AT 59330	580	650.	925.	29980.	2.57	-35.	265.	
	847.58	0.02	0.19	0.00	847.59	0.70	0.05	-0.000	*XS*
CO	2T AT 59750	420	650.	1071.	53925.	1.82	220.	570.	
	847.69	0.01	0.11	0.0	847.70	0.61	0.07	0.000	*XS*
CP	2U AT 61080	1330	650.	1463.	62418.	1.56	600.	1000.	
	847.87	0.00	0.17	0.0	847.87	0.44	0.03	0.000	*XS*
CQ	2V AT 61950	870	650.	1343.	56539.	2.18	570.	970.	
	847.97	0.01	0.10	0.00	847.98	0.48	0.07	0.000	*XS*
CR	2W AT 62600	650	650.	1341.	46382.	2.27	250.	650.	
	848.08	0.01	0.10	0.00	848.08	0.48	0.03	0.000	*XS*
CS	2WW AT 63030	430	650.	688.	33348.	1.61	280.	480.	
	848.19	0.02	0.12	0.01	848.21	0.94	0.13	0.000	*XS*
CT	2X AT 63660	630	650.	731.	27022.	1.95	80.	380.	
	848.48	0.02	0.30	0.00	848.51	0.89	0.16	0.001	*XS*

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
WS ELEV /    HV  /    HF  /    HE  /     G  /     V  /    FN  /   ACC    *ID*
==================================================================================
  2Y AT   64190 /   530 /    650. /   335. /   16595. / 1.98 /    25. /  150.
  848.94 /   0.12 /   0.50 /   0.05 /  849.05 /   1.94 /   0.27 /  0.001  *XS*
----------------------------------------------------------------------------------
 2YY AT   64450 /   260 /    650. /   325. /   18775. / 1.94 /    25. /  125.
  849.29 /   0.12 /   0.35 /   0.00 /  849.41 /   2.00 /   0.24 /  0.001  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
HR2YY AT   64450 /       /    437. /    63. /    4784. / 1.00 /     0. /    13.
  849.29 /   0.75 /        ...1...  (-.001)    /   6.95 /   0.56 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT     209. /                *RG*
----------------------------------------------------------------------------------
 2YYY AT   64490 /    40 /    650. /   221. /    8429. / 2.91 /     0. /   100.
  849.30 /   0.39 /   0.11 /   0.18 /  849.69 /   2.94 /   0.57 / -0.011  *AS*
----------------------------------------------------------------------------------
  M = 0.25 / E = 0.11 / K* = 0.39 /   264. /   10735. / 2.74 /     0. /   100.
  849.73 /   0.26 /                 /  849.98 /   2.46 /   0.45 /          *AS*
============================ END BRIDGE ANALYSIS ================================
  2Z AT   65040 /   550 /    650. /   475. /   26542. / 1.64 /   130. /   280.
  850.75 /   0.05 /   0.82 /   0.0  /  850.80 /   1.37 /   0.16 /  0.001  *XS*
----------------------------------------------------------------------------------
  3A AT   65360 /   320 /    650. /   238. /   13651. / 1.63 /    97. /   187.
  851.06 /   0.19 /   0.37 /   0.07 /  851.24 /   2.73 /   0.32 /  0.000  *XS*
----------------------------------------------------------------------------------
  3B AT   65810 /   450 /    650. /   234. /   13303. / 1.30 /    12. /    87.
  852.14 /   0.16 /   1.05 /   0.0  /  852.29 /   2.78 /   0.29 /  0.001  *XS*
----------------------------------------------------------------------------------
  3C AT   66480 /   670 /    650. /   780. /   45954. / 1.60 /    50. /   250.
  852.74 /   0.02 /   0.46 /   0.0  /  852.76 /   0.83 /   0.09 /  0.000  *XS*
----------------------------------------------------------------------------------
  3D AT   67050 /   570 /    650. /   323. /   23024. / 1.34 /   120. /   220.
  852.93 /   0.08 /   0.23 /   0.03 /  853.02 /   2.01 /   0.19 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
HR 3D AT   67050 /       /    650. /   172. /   15423. / 1.00 /     0. /    32.
  852.93 /   0.22 /        ...1...  (-.001)    /   3.79 /   0.29 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT       0. /                *RG*
----------------------------------------------------------------------------------
  3E AT   67130 /    80 /    650. /   539. /   30000. / 2.40 /   -60. /    90.
  853.01 /   0.05 /   0.05 /   0.0  /  853.07 /   1.20 /   0.15 / -0.000  *AS*
----------------------------------------------------------------------------------
  M = 0.32 / E = 0.75 / K* = 0.70 /   563. /   31738. / 2.39 /   -60. /    90.
  853.17 /   0.05 /                 /  853.22 /   1.15 /   0.15 /          *AS*
============================ END BRIDGE ANALYSIS ================================
```

CU

CV

CW

CX

CY

CZ

FW

END OF THIS PROFILE

00BREAK00

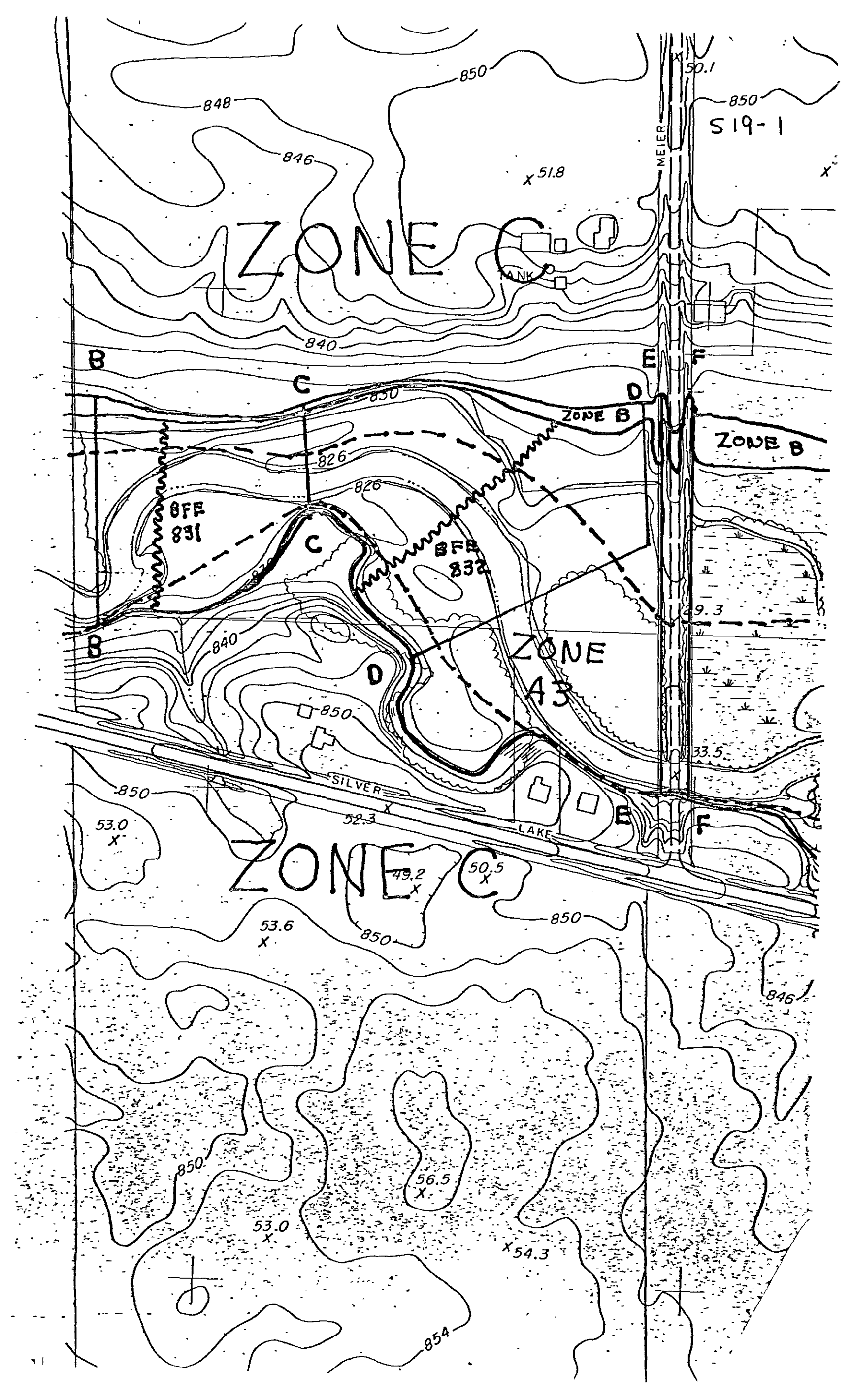
1) COUNTY: Genesee

2) STUDY NAME: Twp of Argentine

3) WATERCOURSE: Shiawassee River

4) DOCUMENT TYPE: maps

00BREAK00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ZONE B
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BFE
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C
BFE
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B
840
D
ZONE
A3
850
33.5
SILVER
LAKE
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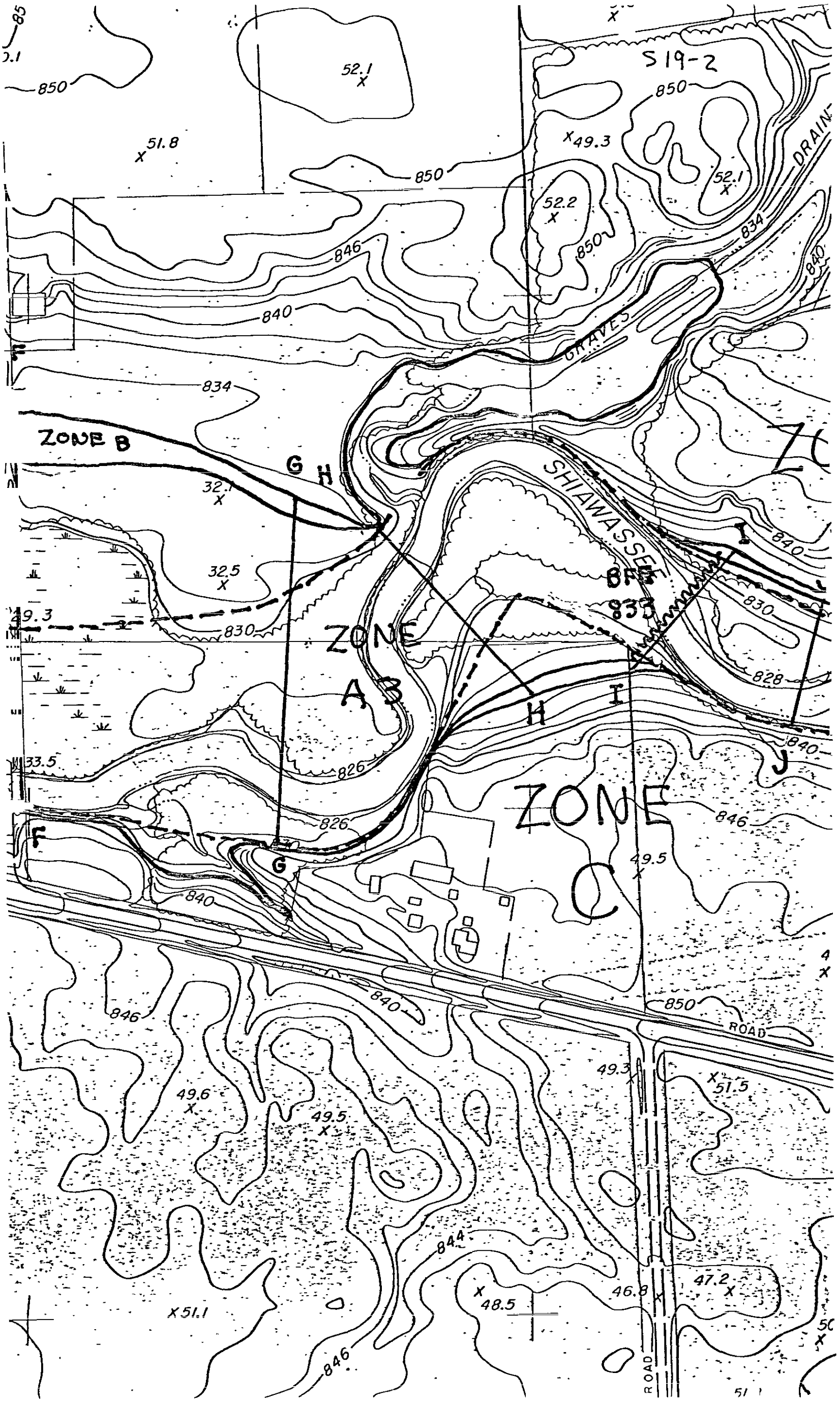
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32.5
SHIAWASSEE
BFE
833
830
828
ZONE
A B
H I
J
826
ZONE
C
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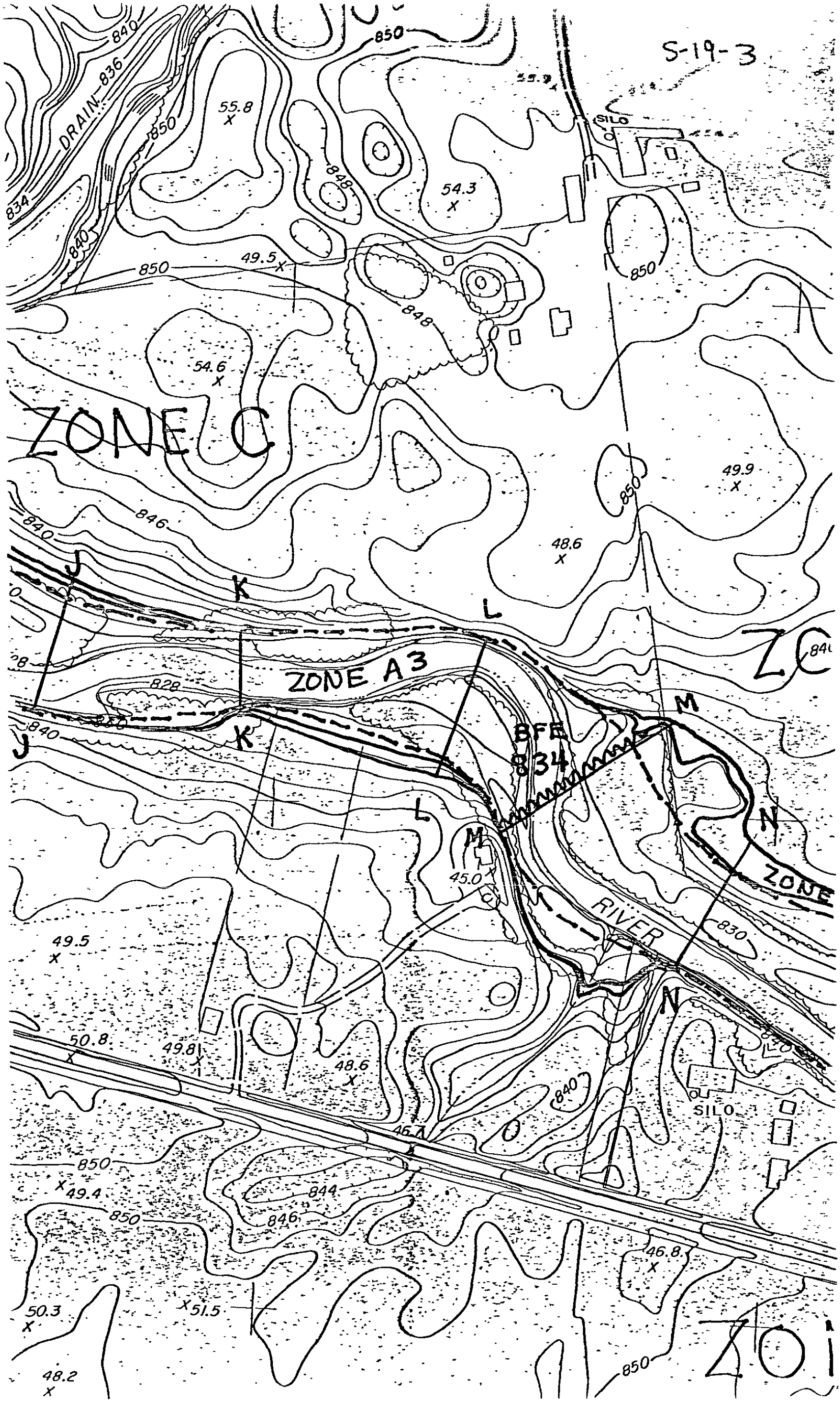
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49.9
846
840
48.6
J
K
L
ZONE A3
828
840
BFE
834
M
N
45.0
RIVER
830
ZONE
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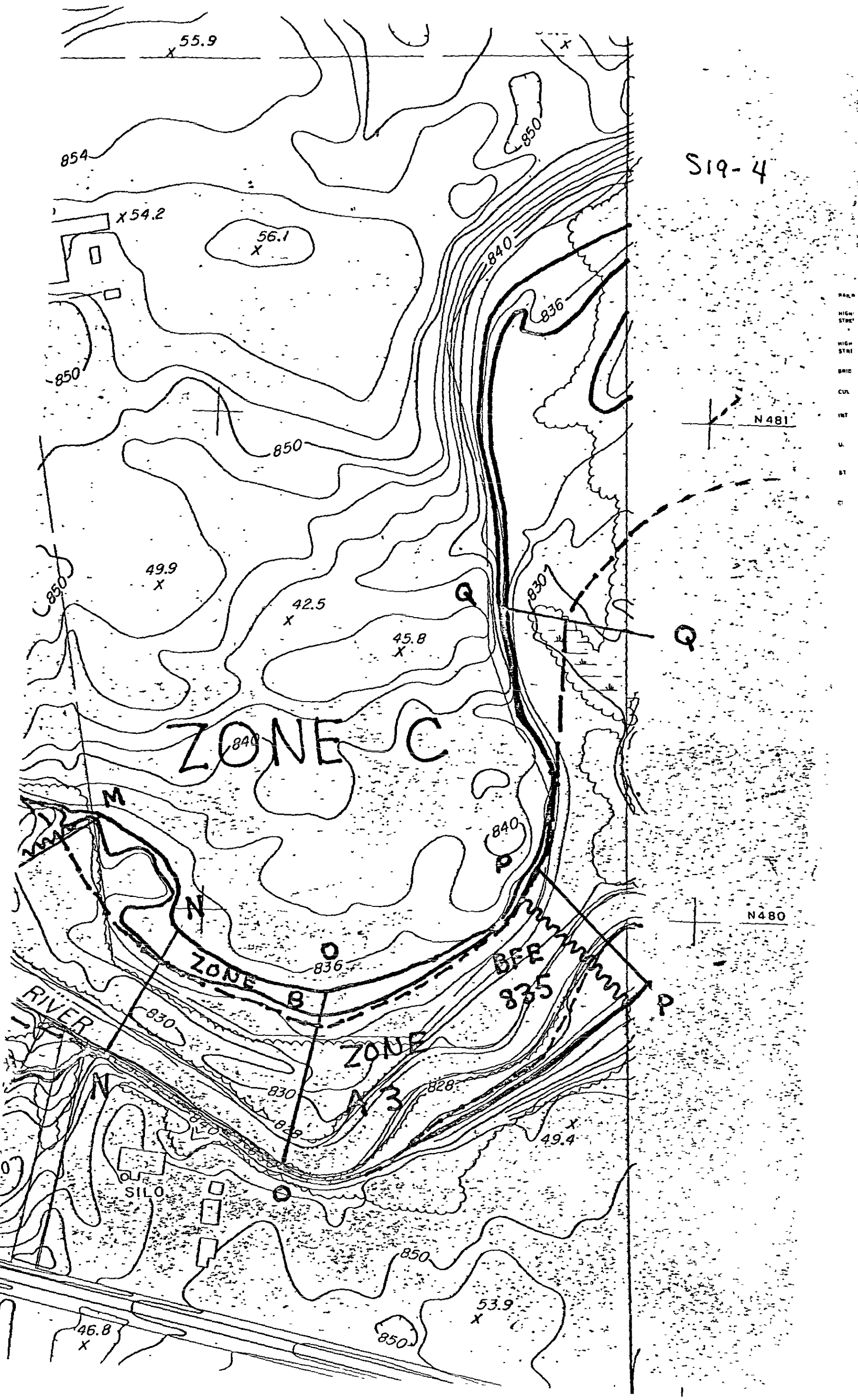
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Q
Q
ZONE C
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M
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P
N
N480
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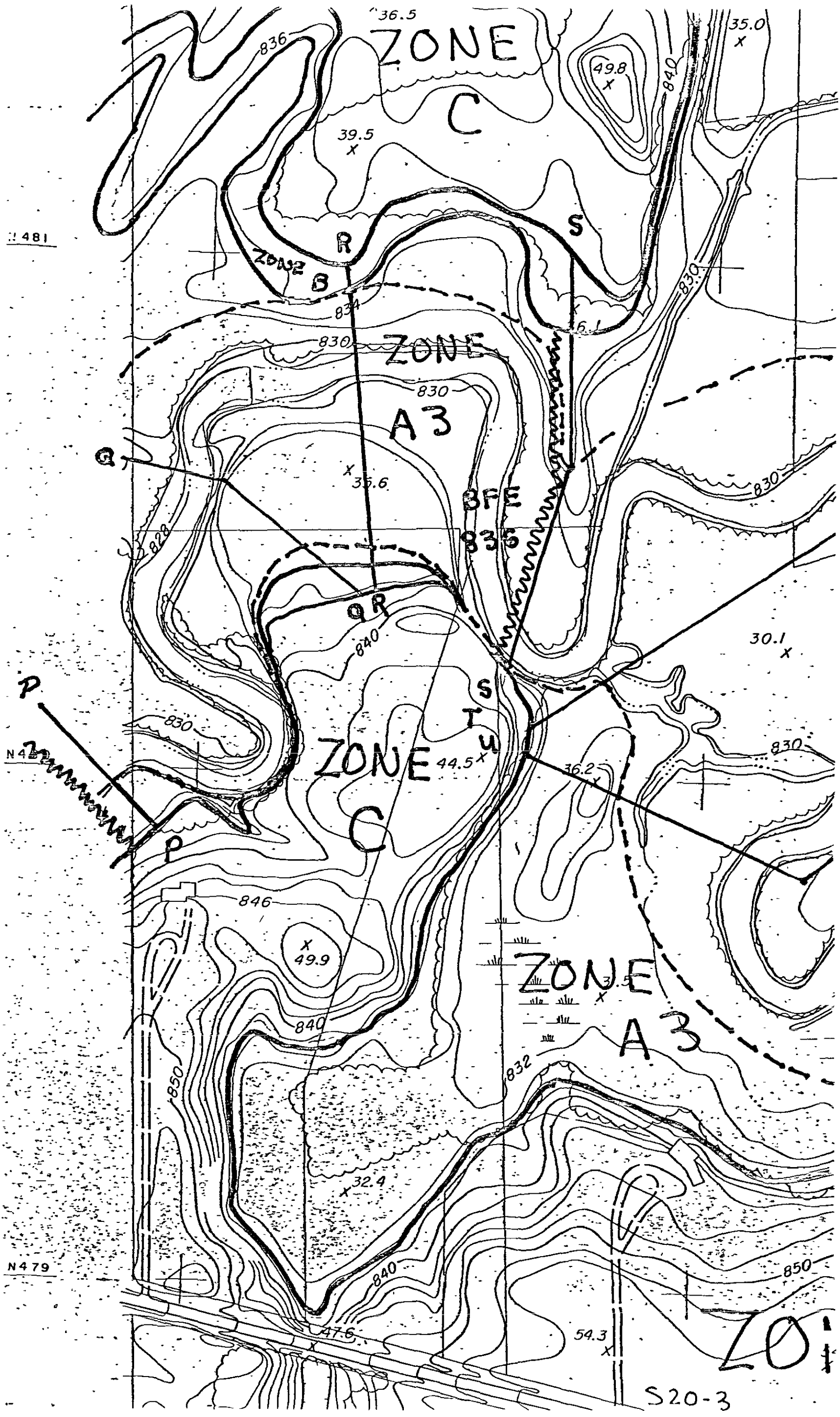
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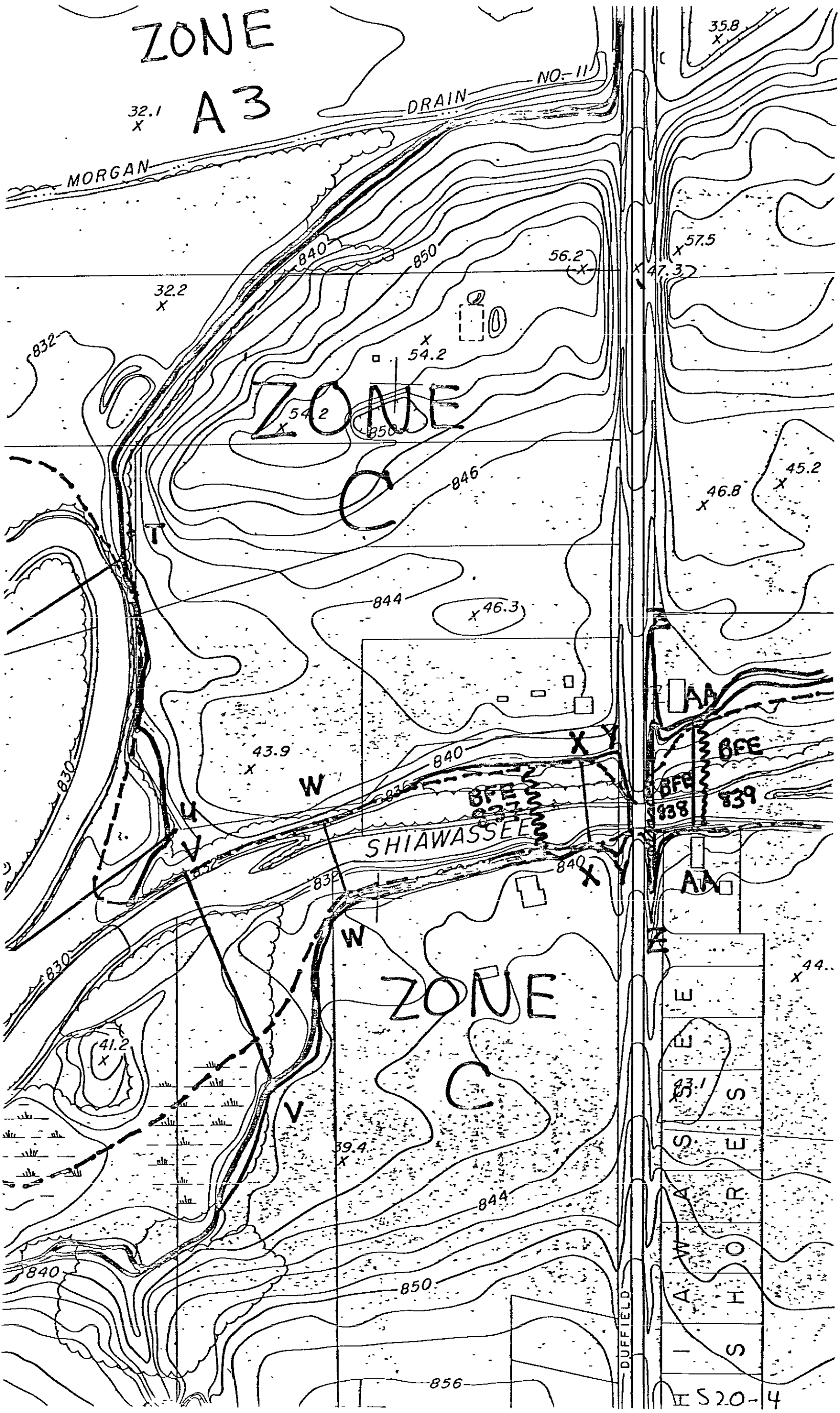
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43.9
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BFE
835
838
839
SHIAWASSEE
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838
830
W
X
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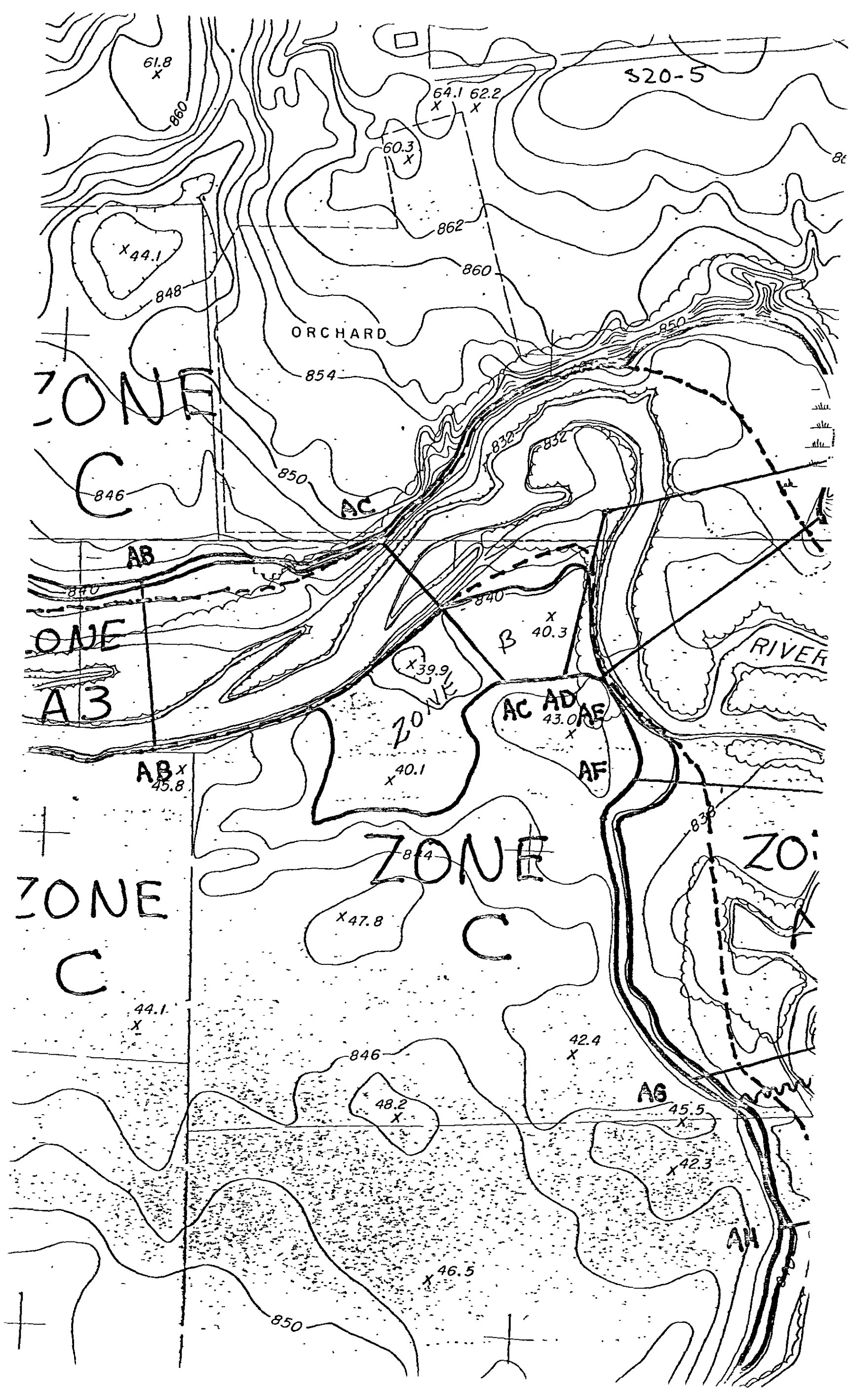
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AC
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AF
AB
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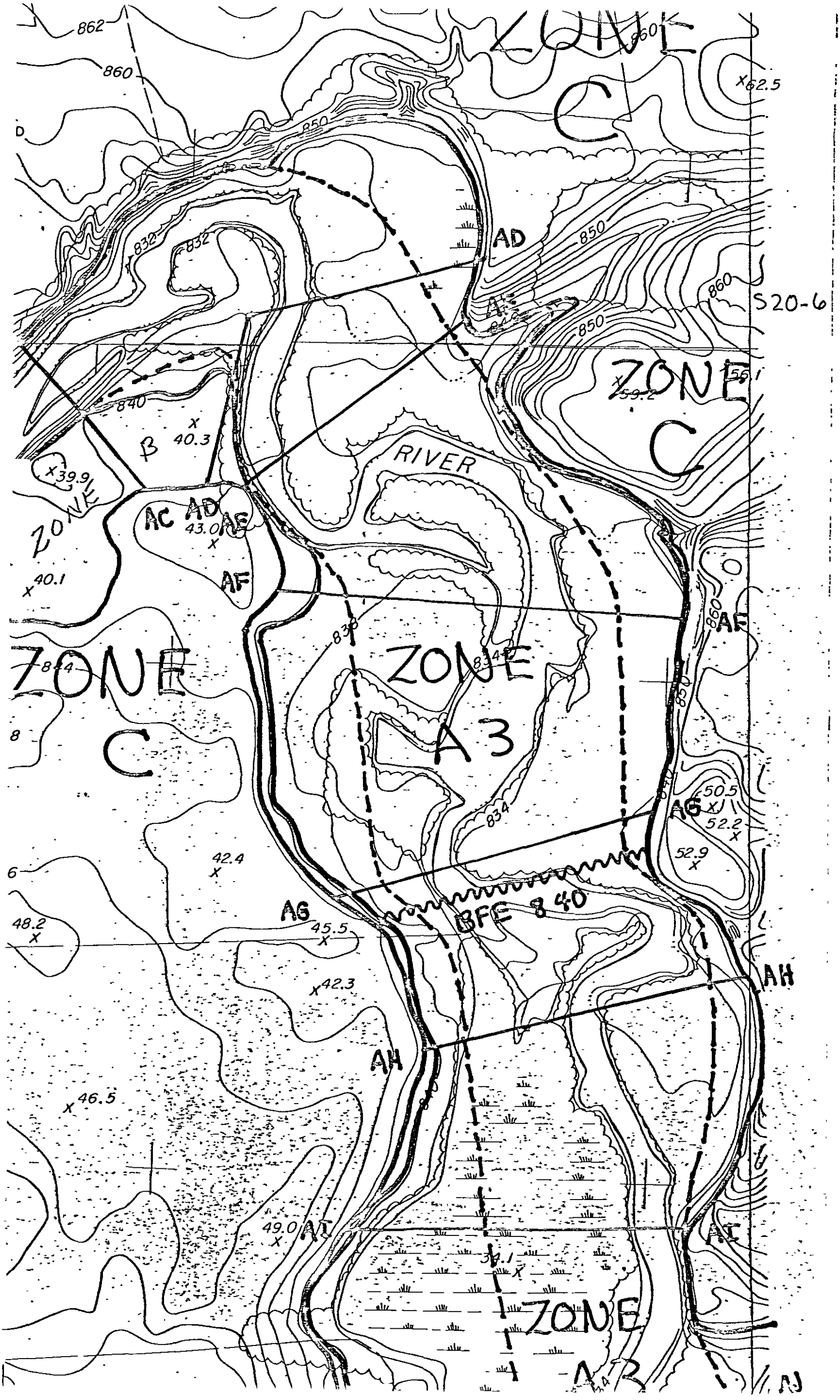
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A3
ZONE
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BFE 840
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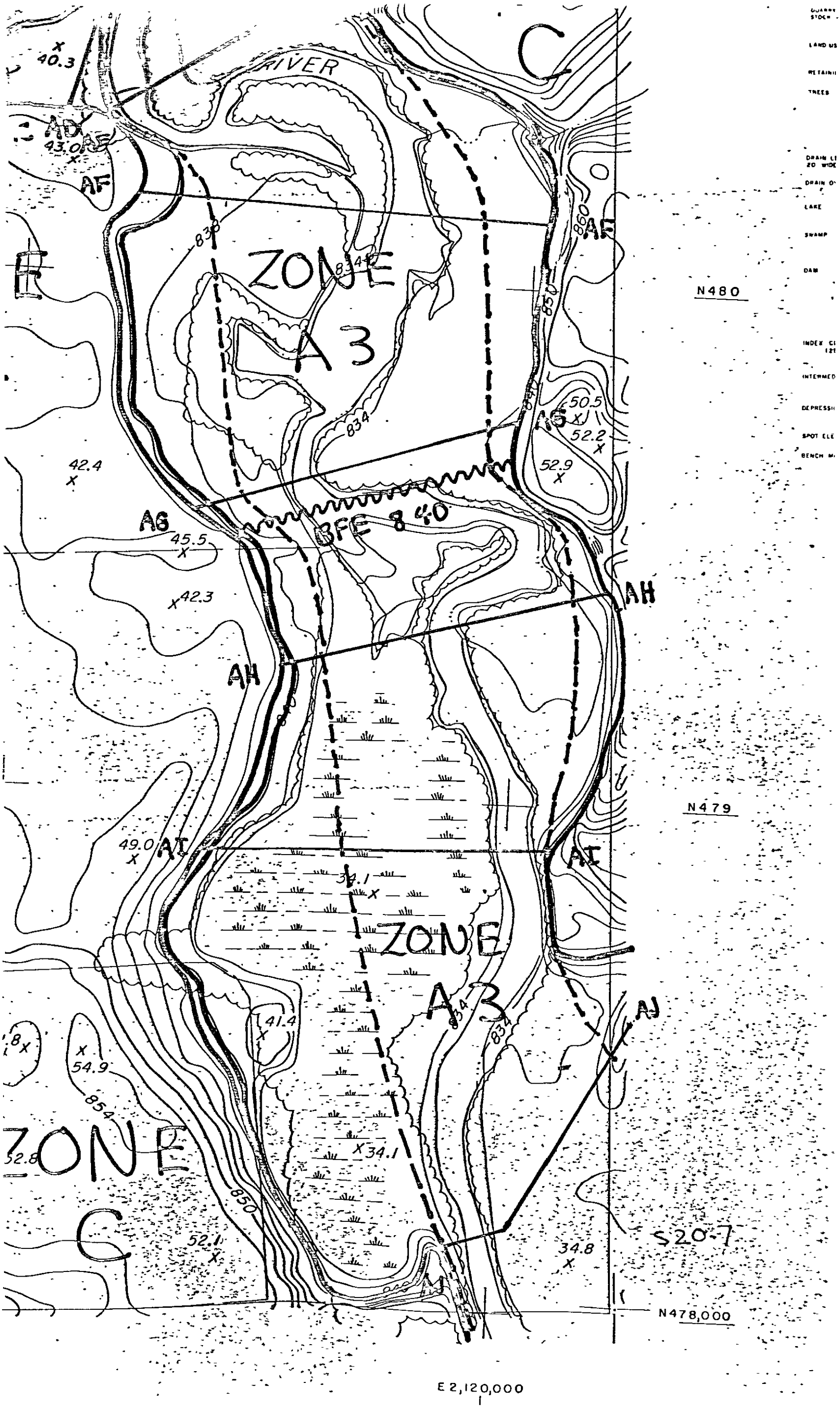
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N479
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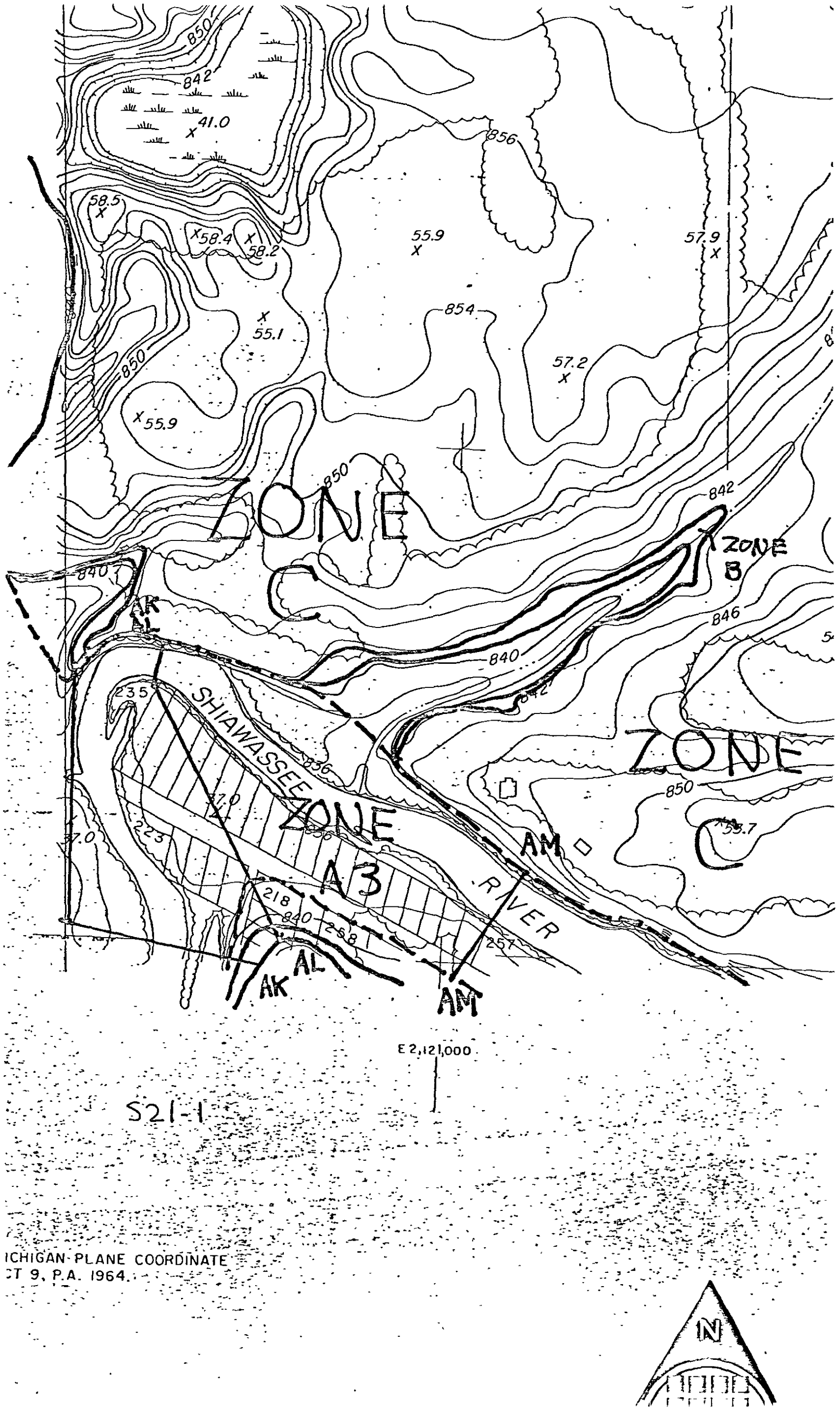
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AL
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SHIAWASSEE
842
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A3
ZONE
C
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AM
RIVER
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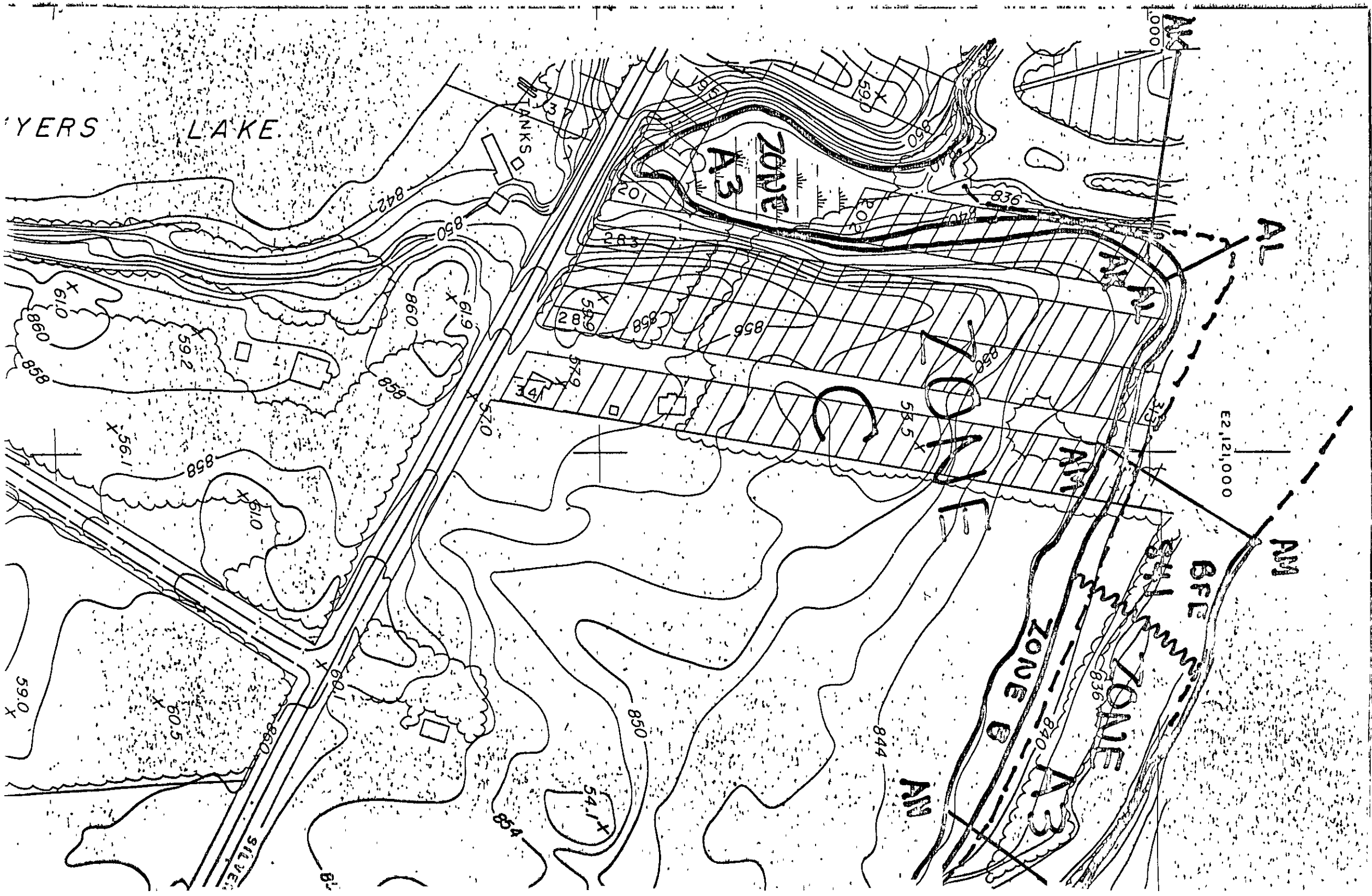
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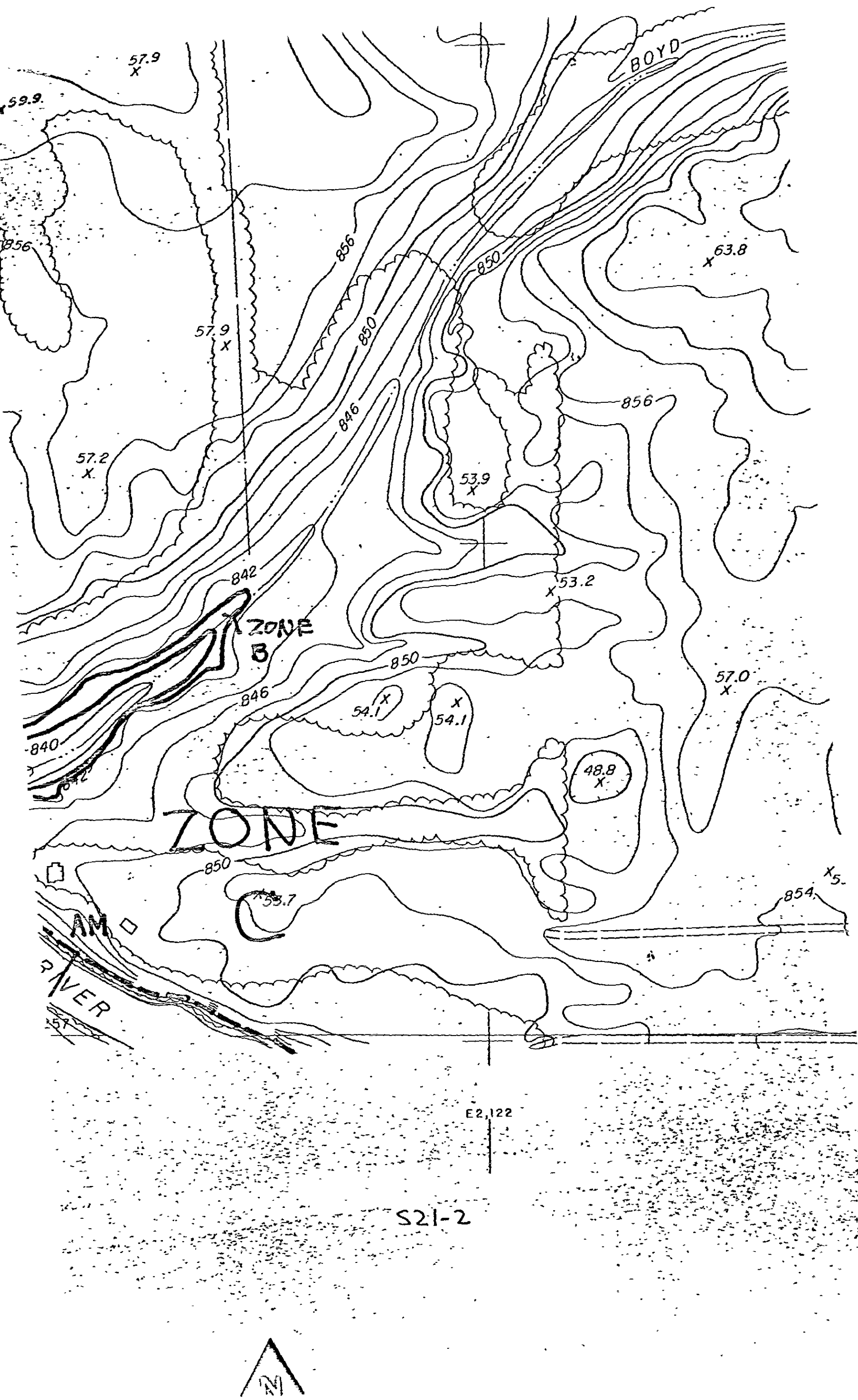
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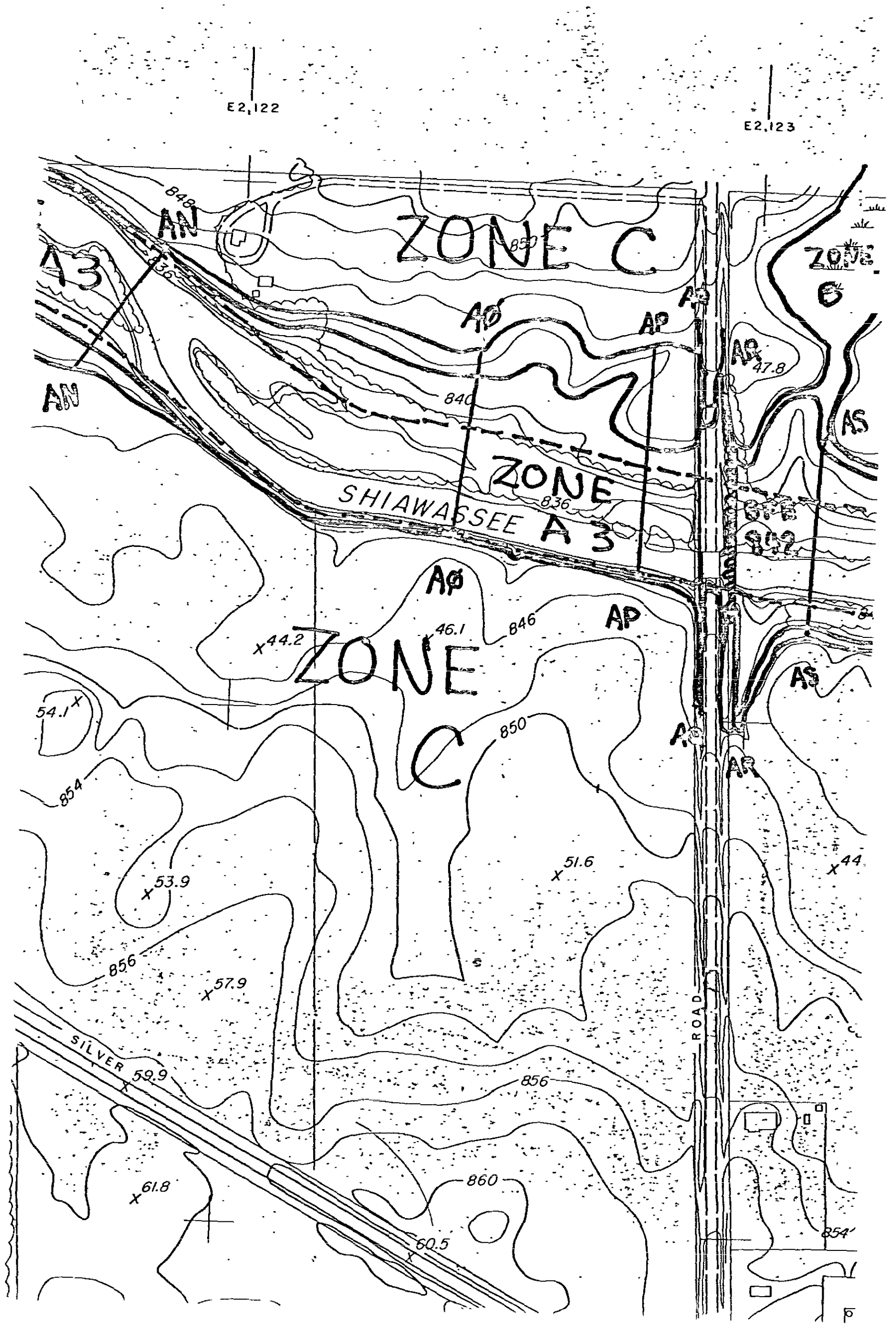
N

S-28-2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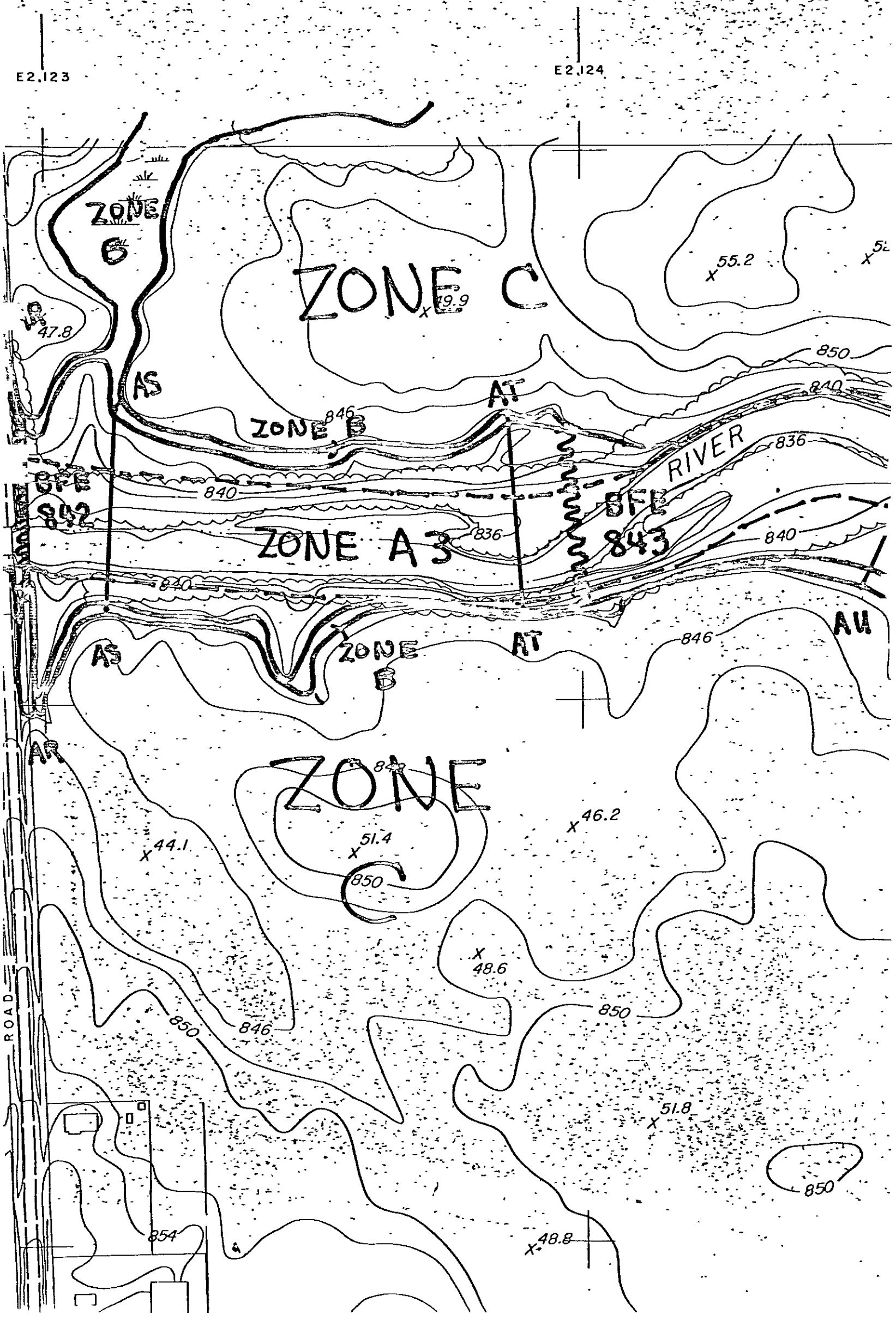
S 28-3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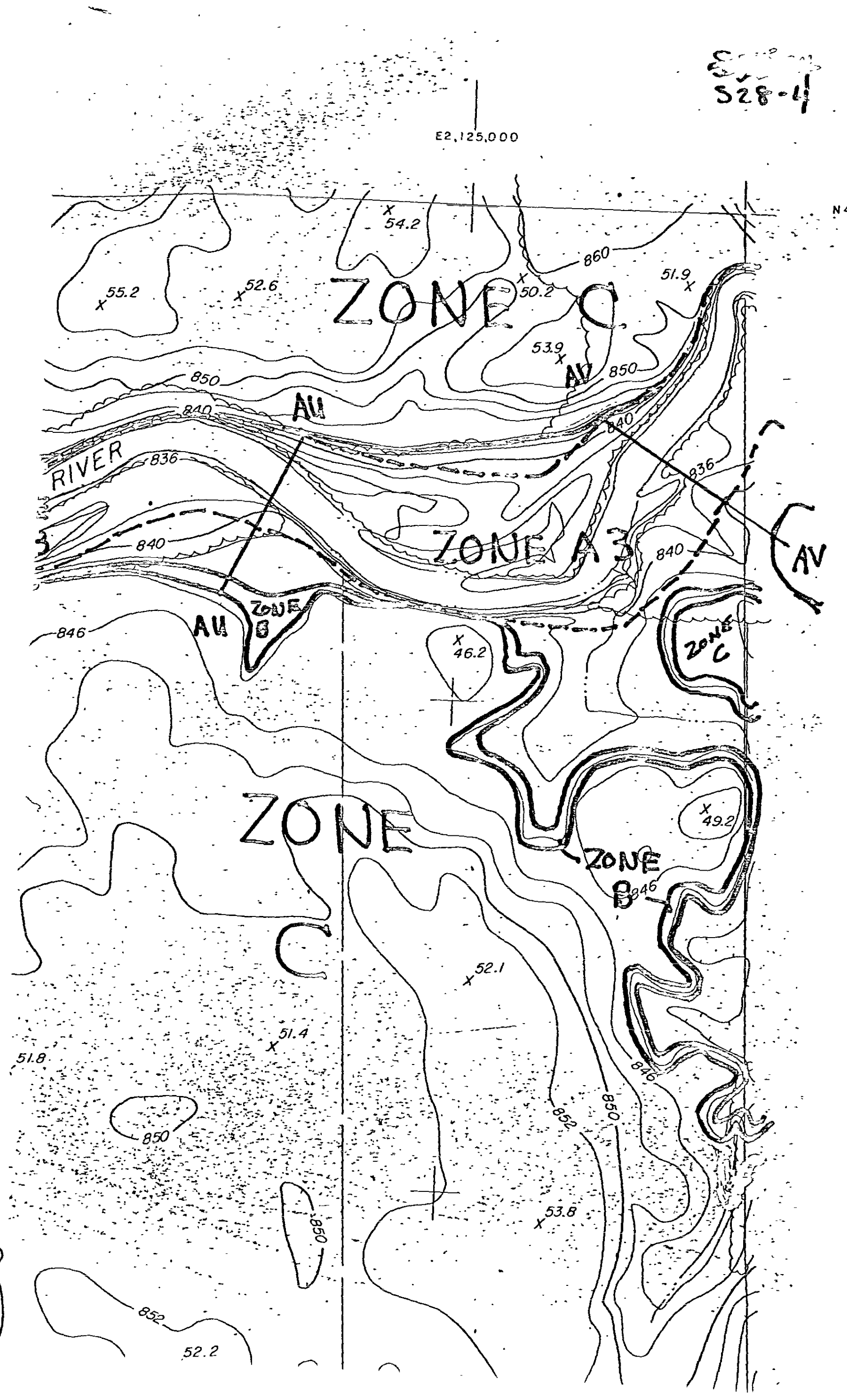
S28-4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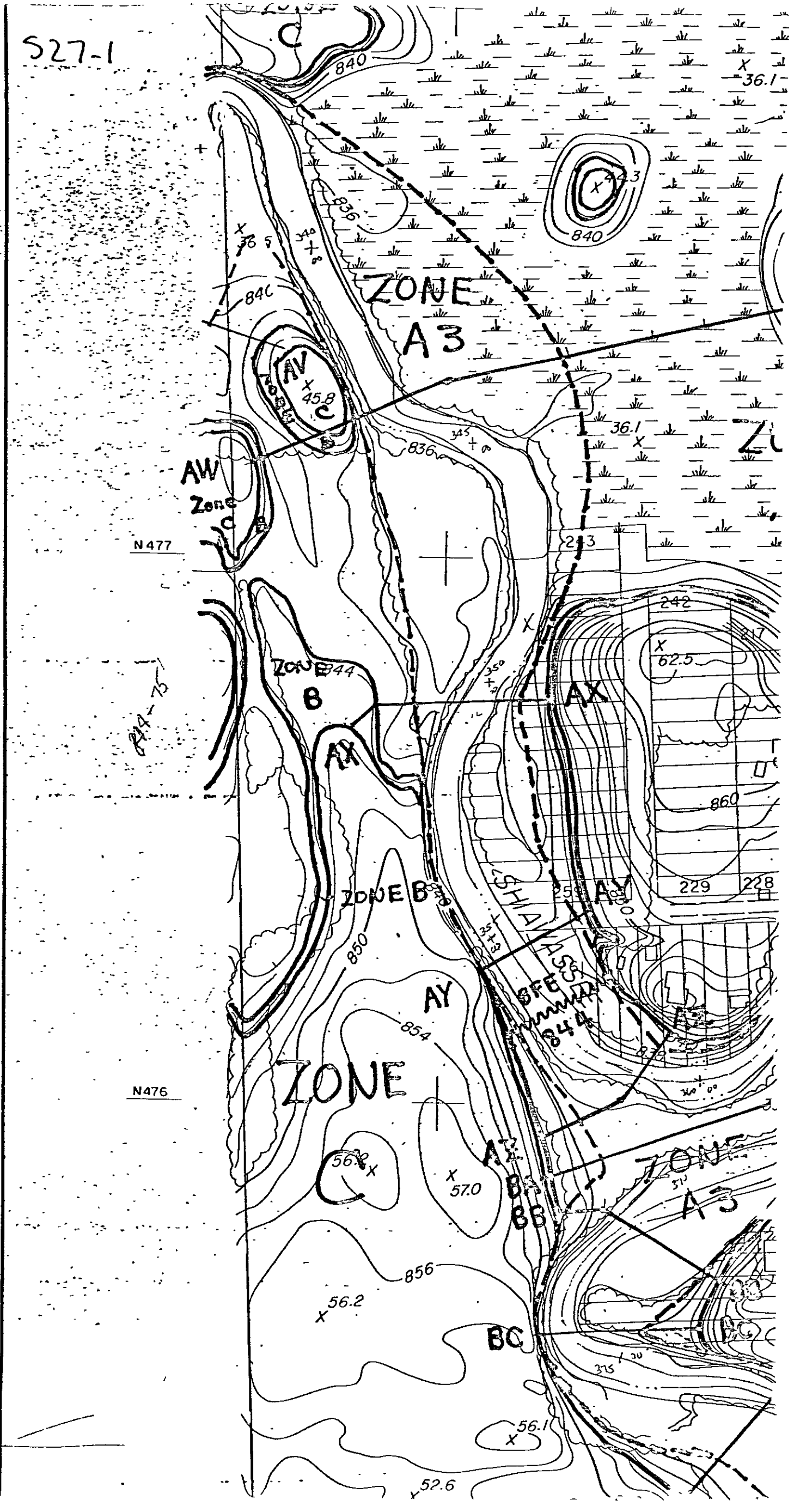
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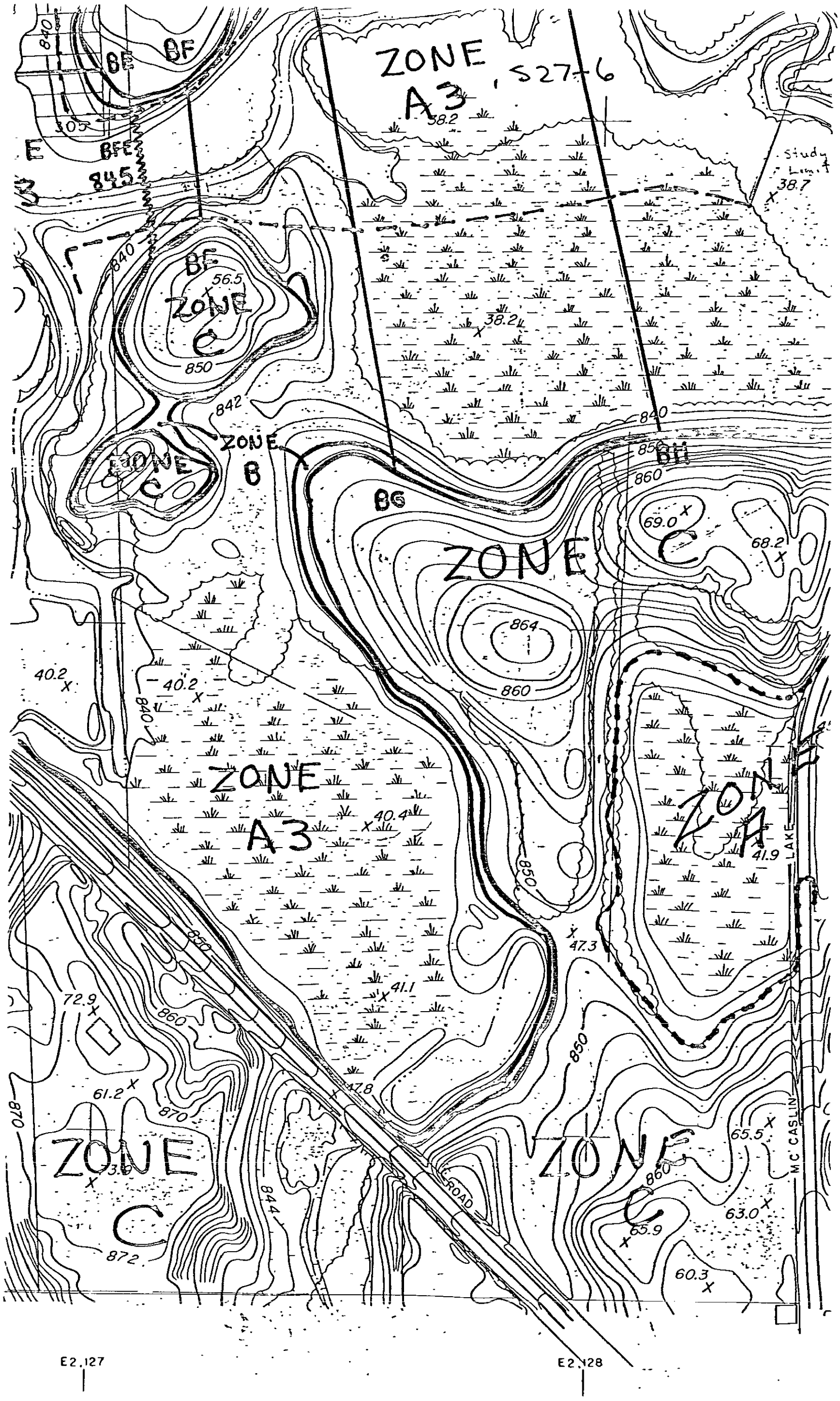
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BF
BG
BH
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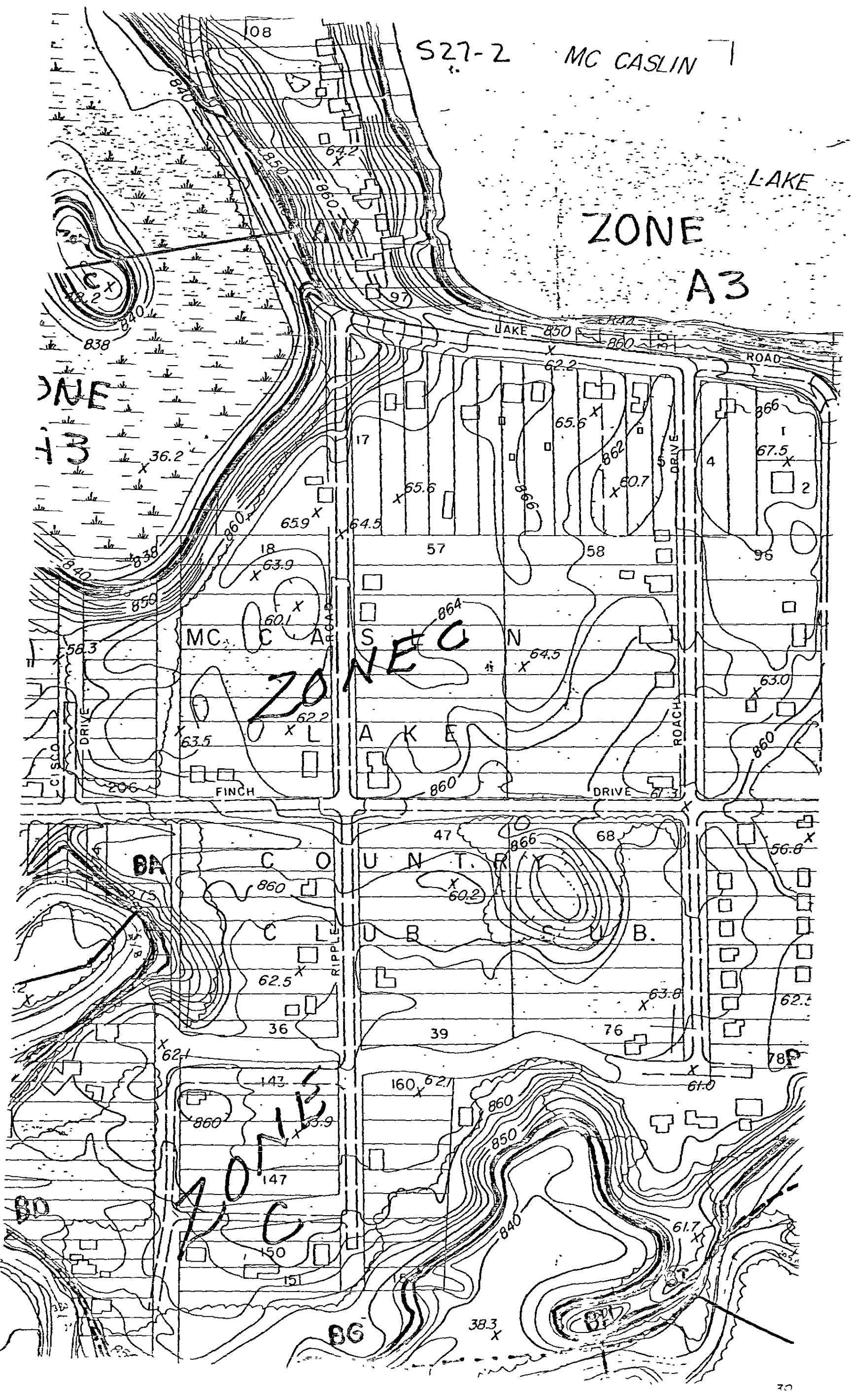
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LAKE ROAD
ZONE
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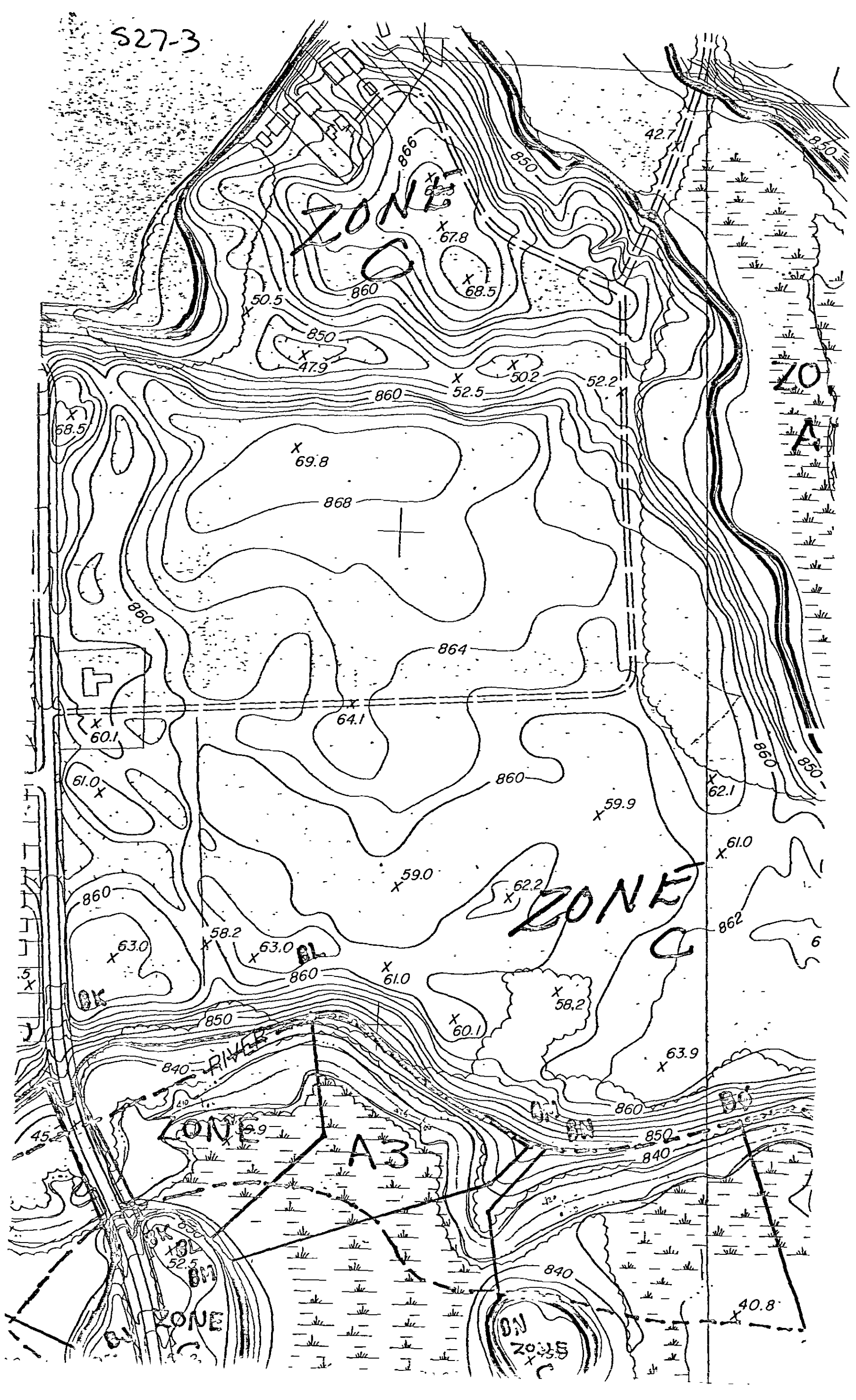
ZONE C
FINCH DRIVE
ROACH DRIVE
BA COUNTRY CLUB SUB.
RIPPLE ROAD
BD
BG
BF
ZONE C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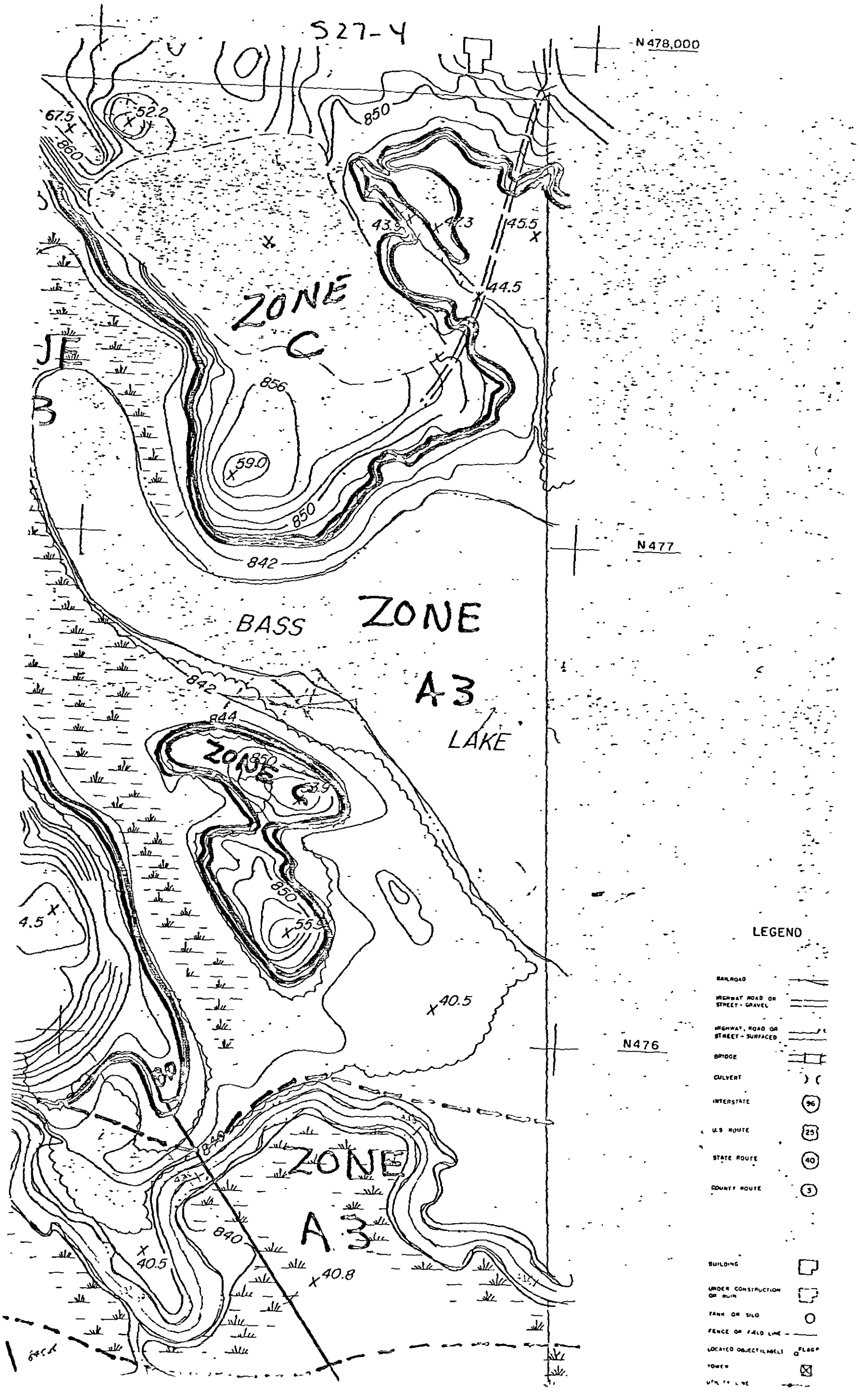
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A3
LAKE
842
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850
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4.5
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ZONE
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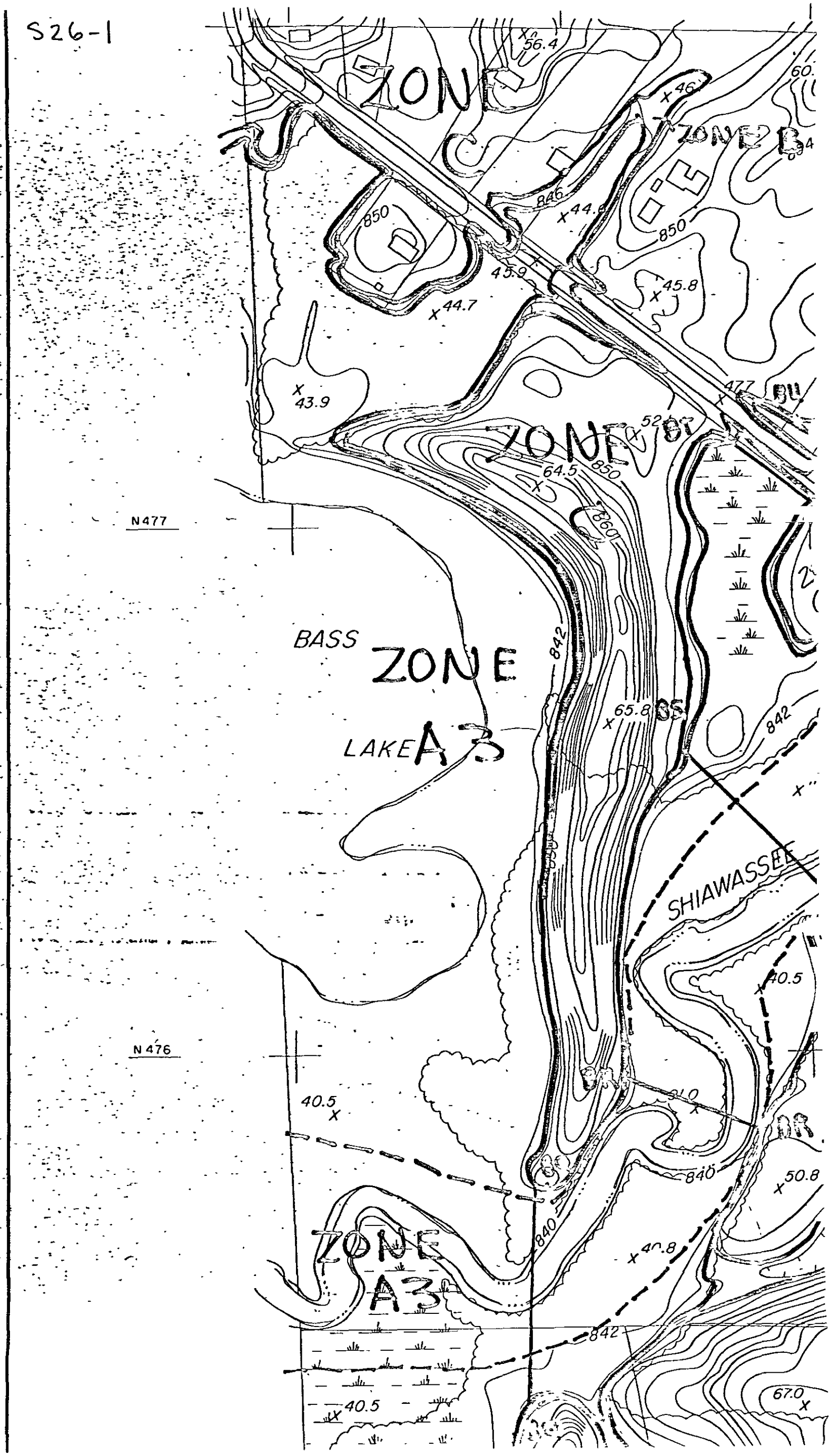
840
40.5
40.8
LEGEND
RAILROAD
HIGHWAY ROAD OR STREET - GRAVEL
HIGHWAY, ROAD OR STREET - SURFACED
BRIDGE
CULVERT
INTERSTATE
96
U.S. ROUTE
25
STATE ROUTE
40
COUNTY ROUTE
3
BUILDING
UNDER CONSTRUCTION OR RUIN
TANK OR SILO
FENCE OR FIELD LINE
LOCATED OBJECT (LABELED)
FLAGP
TOWER
UTILITY LINE

S26-1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850
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N477
BASS
ZONE
LAKE A3
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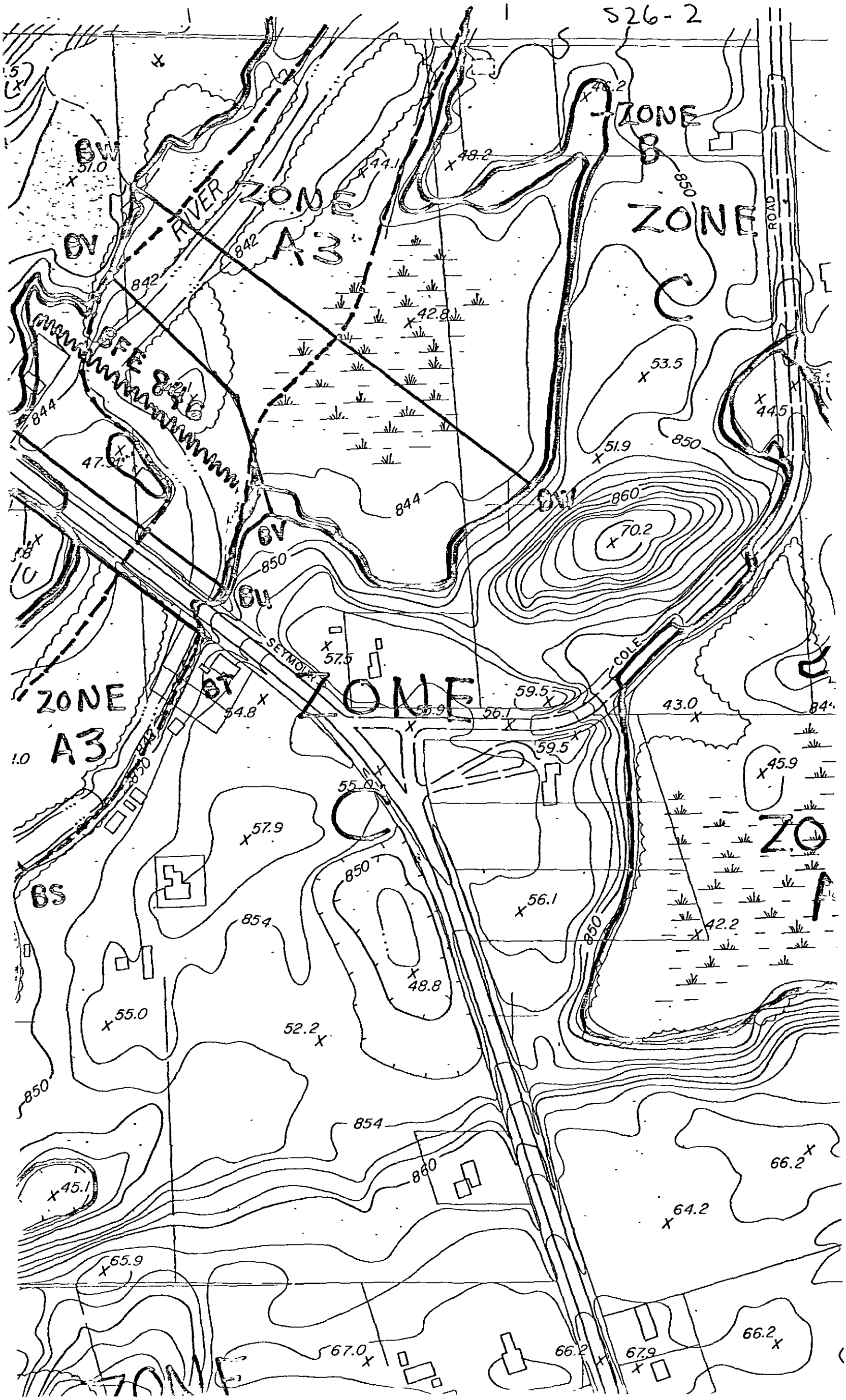
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ROAD
SEYMOUR
COLE
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A3
ZONE
BW
BV
BU
BT
BS
BFE 846
842
844
850
854
860
51.0
44.1
48.2
46.2
42.8
53.5
44.5
51.9
70.2
47.9
57.5
54.8
55.9
56.1
59.5
43.0
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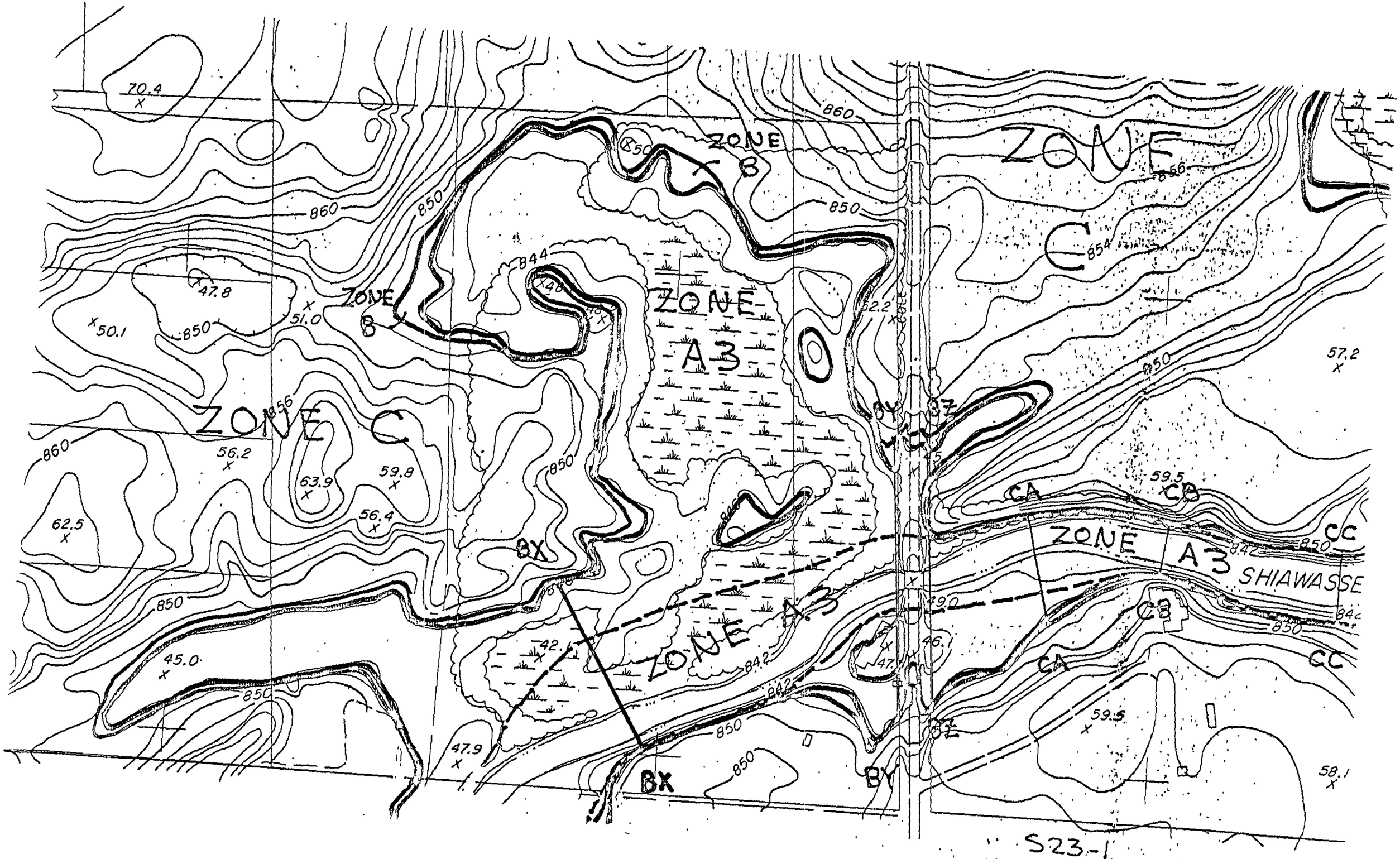
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856
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50.1
51.0
52.2
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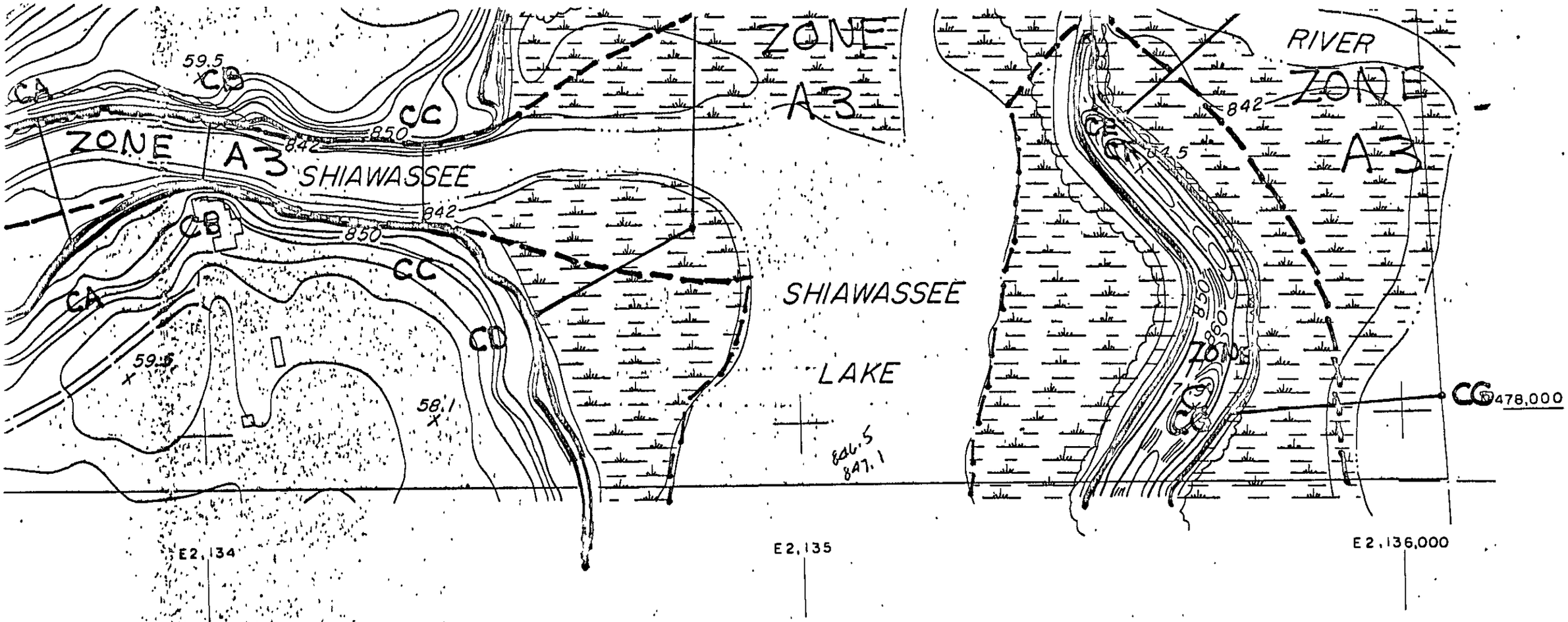
S23-1

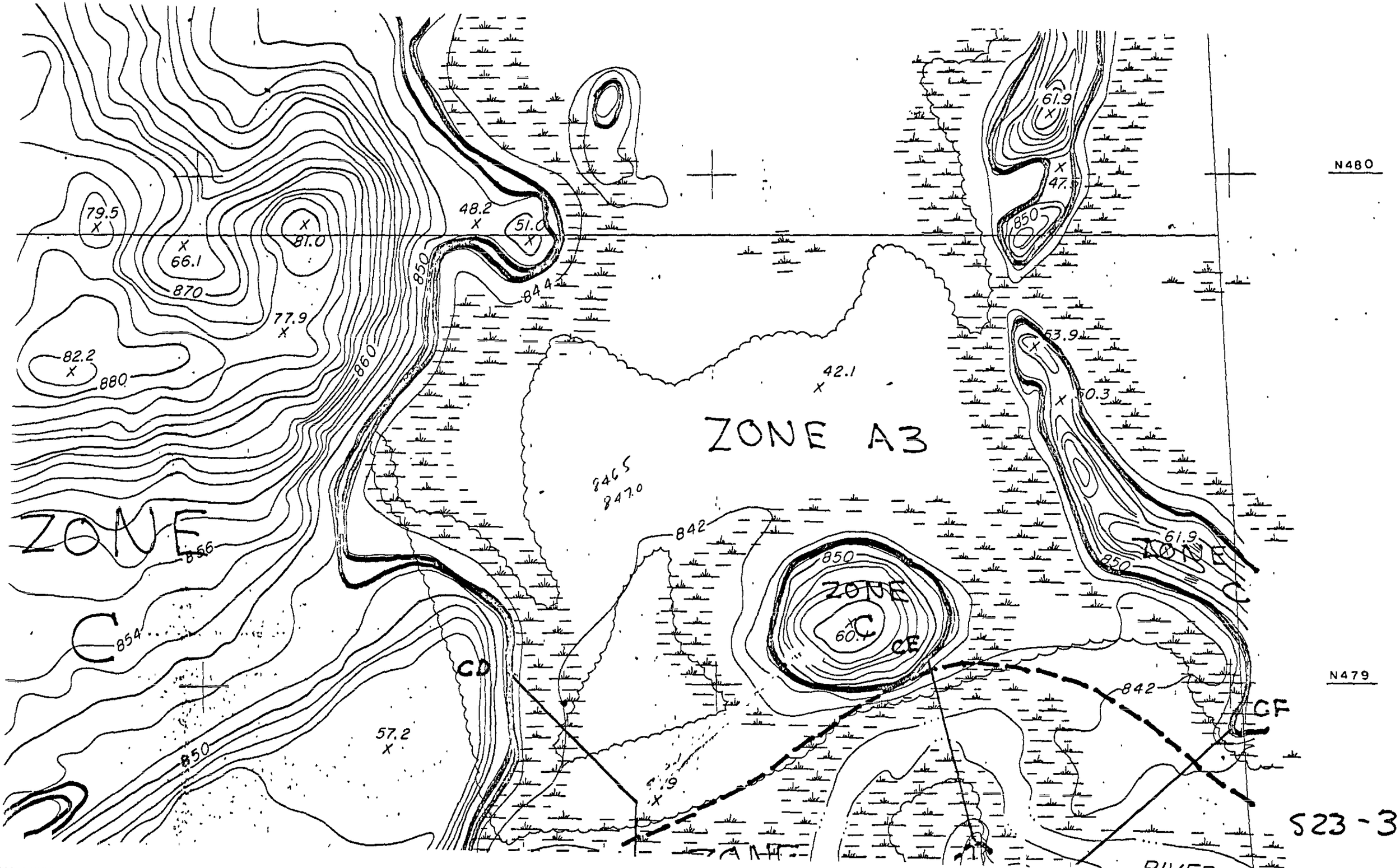


S23-2

SECTION INDEX

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24

COMPOSITE
OF
Section 23, T.5 N. R.5E., Argentine Twp., Genesee Co., MI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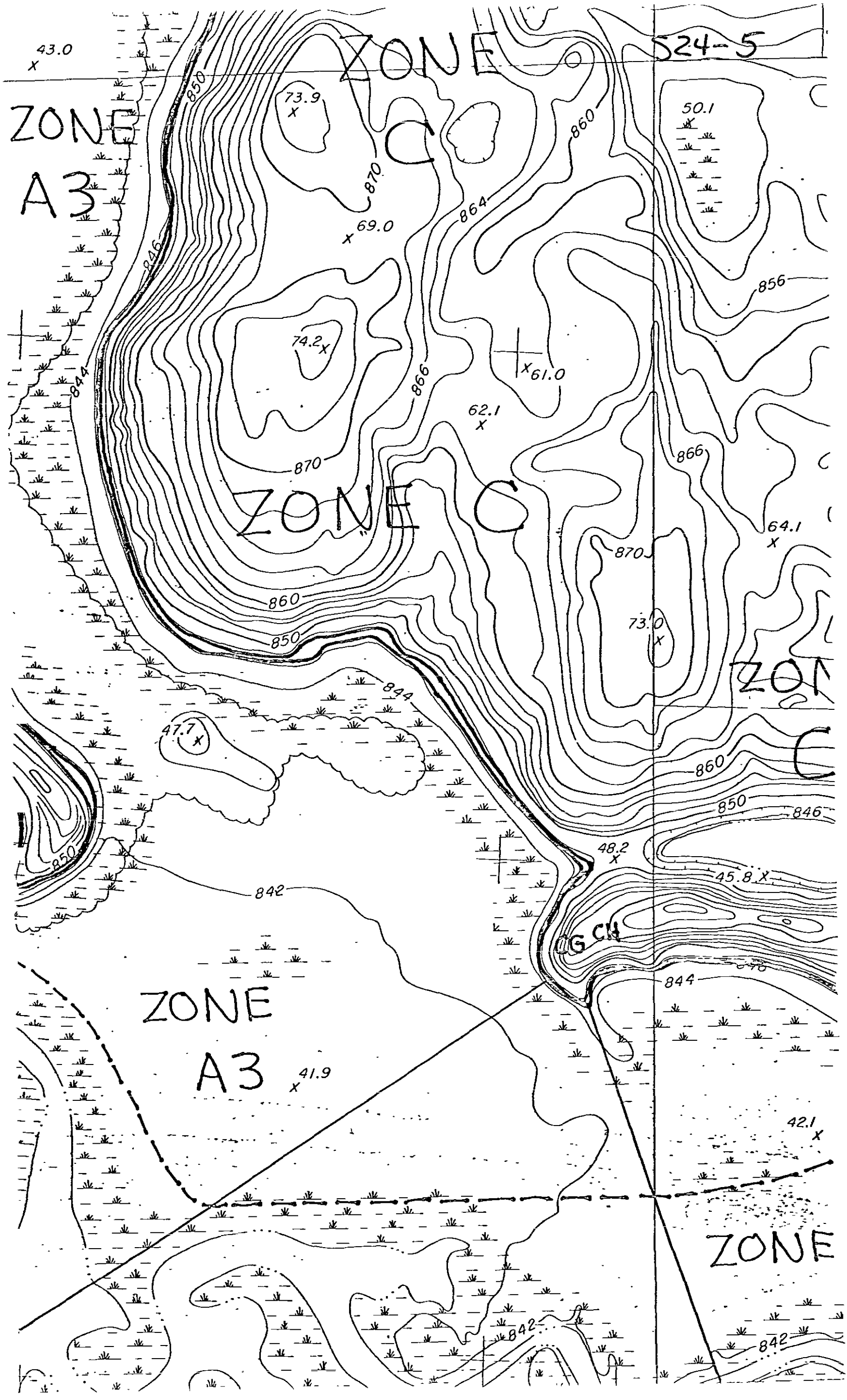
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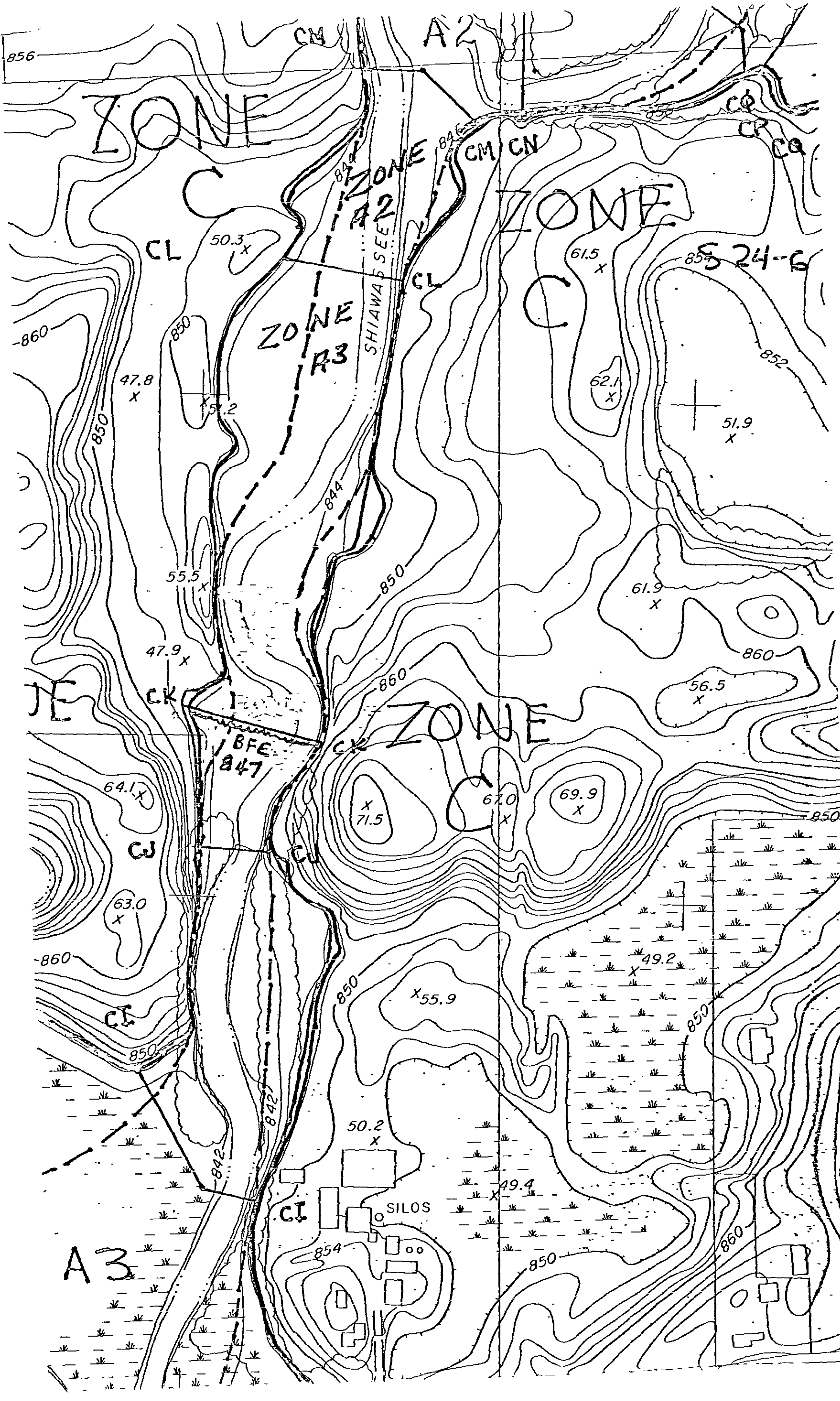
OG CH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SHIAWASSEE
BFE
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56.5

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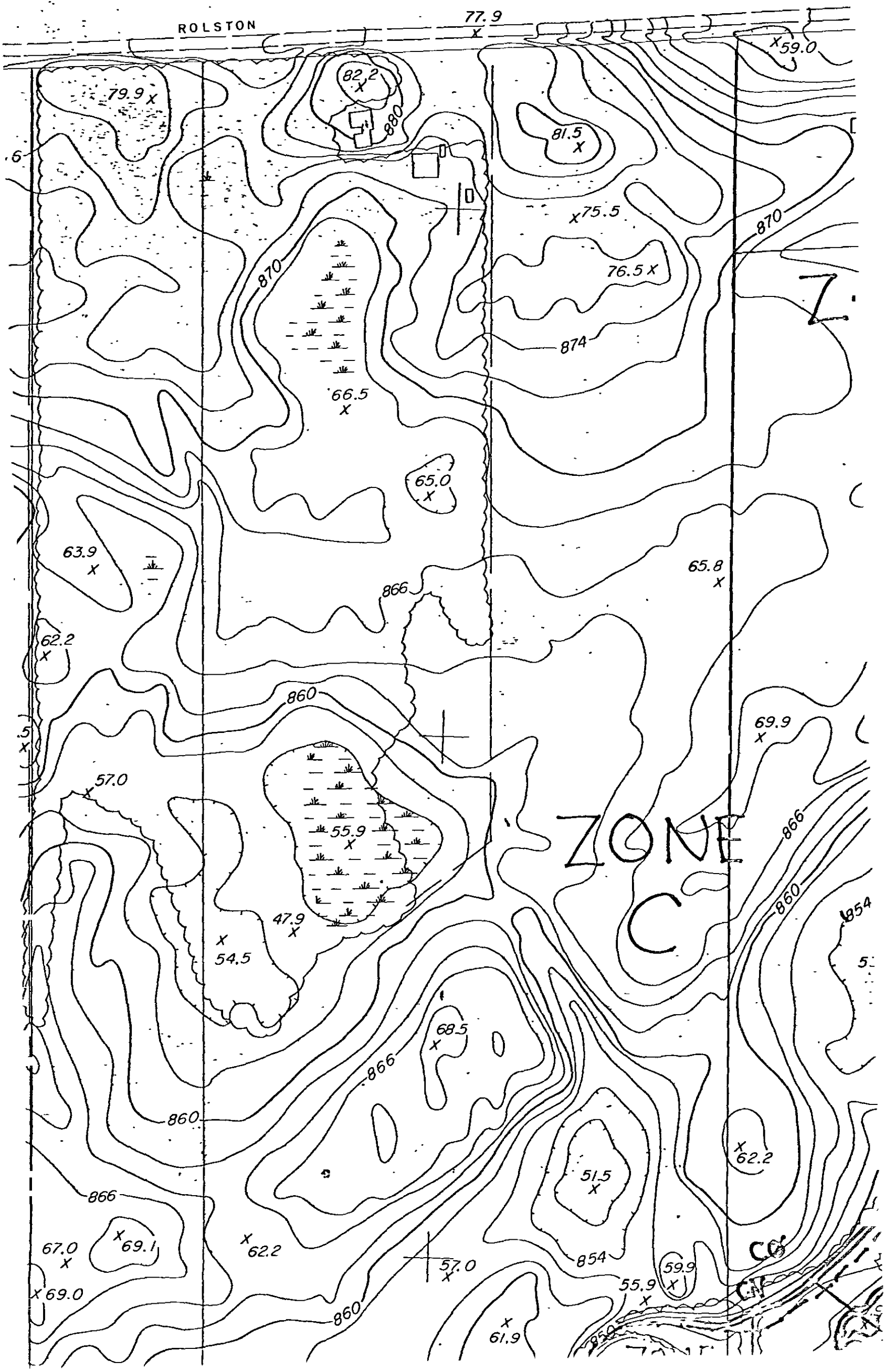
24-2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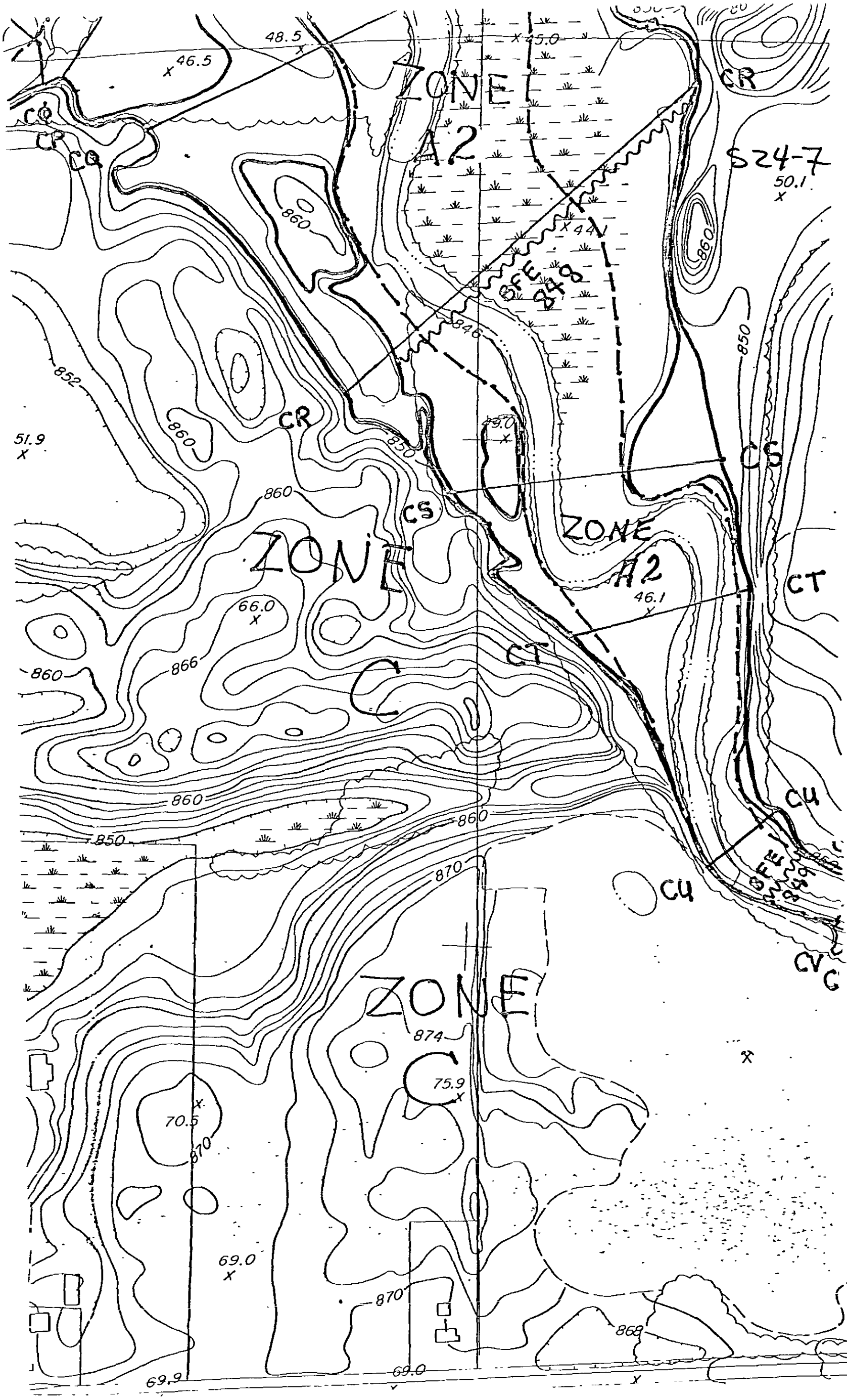
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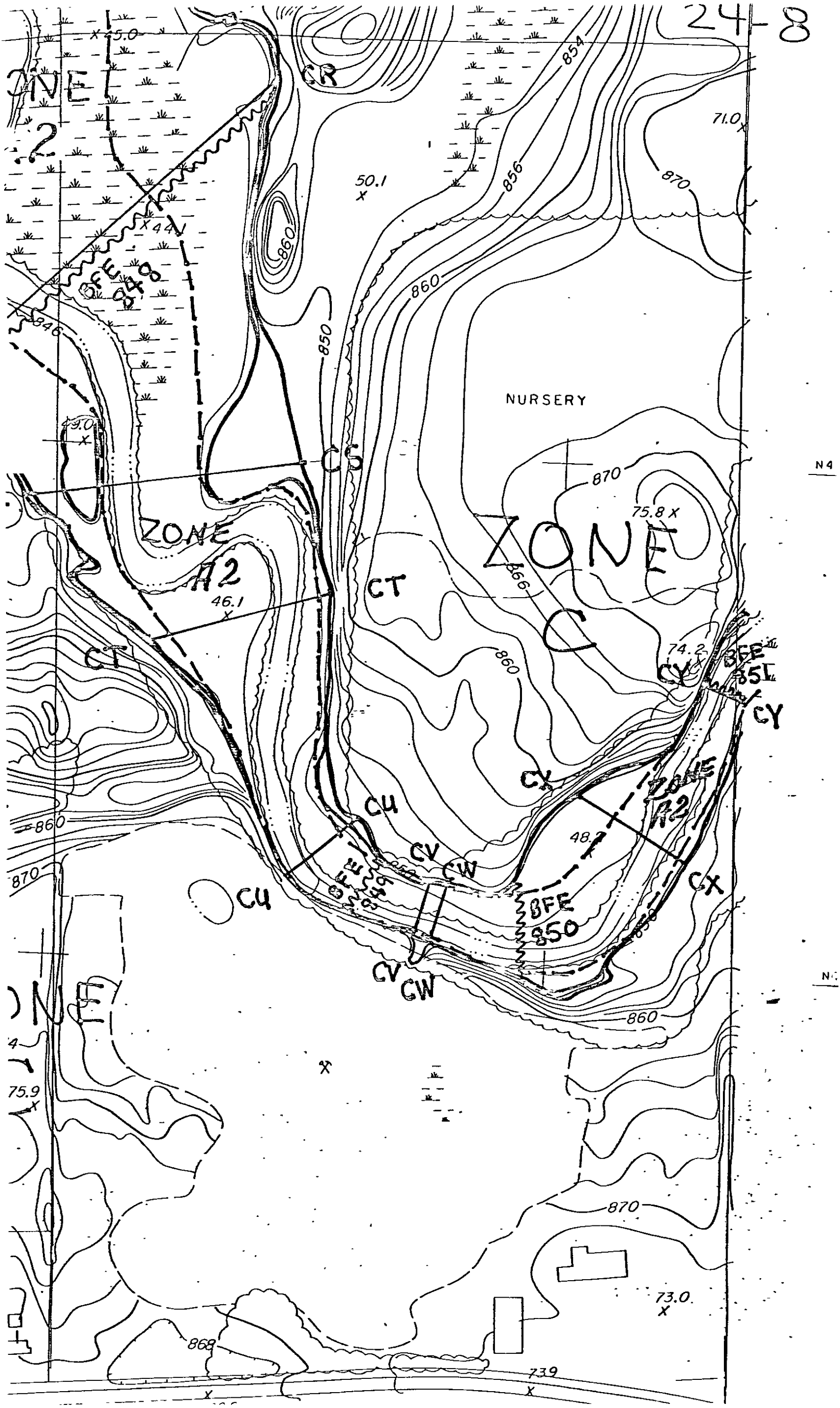
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BFE
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CY
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CX
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CX
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BFE
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CV
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739

ZONE
A2
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C
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C
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DV
DW
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DZ
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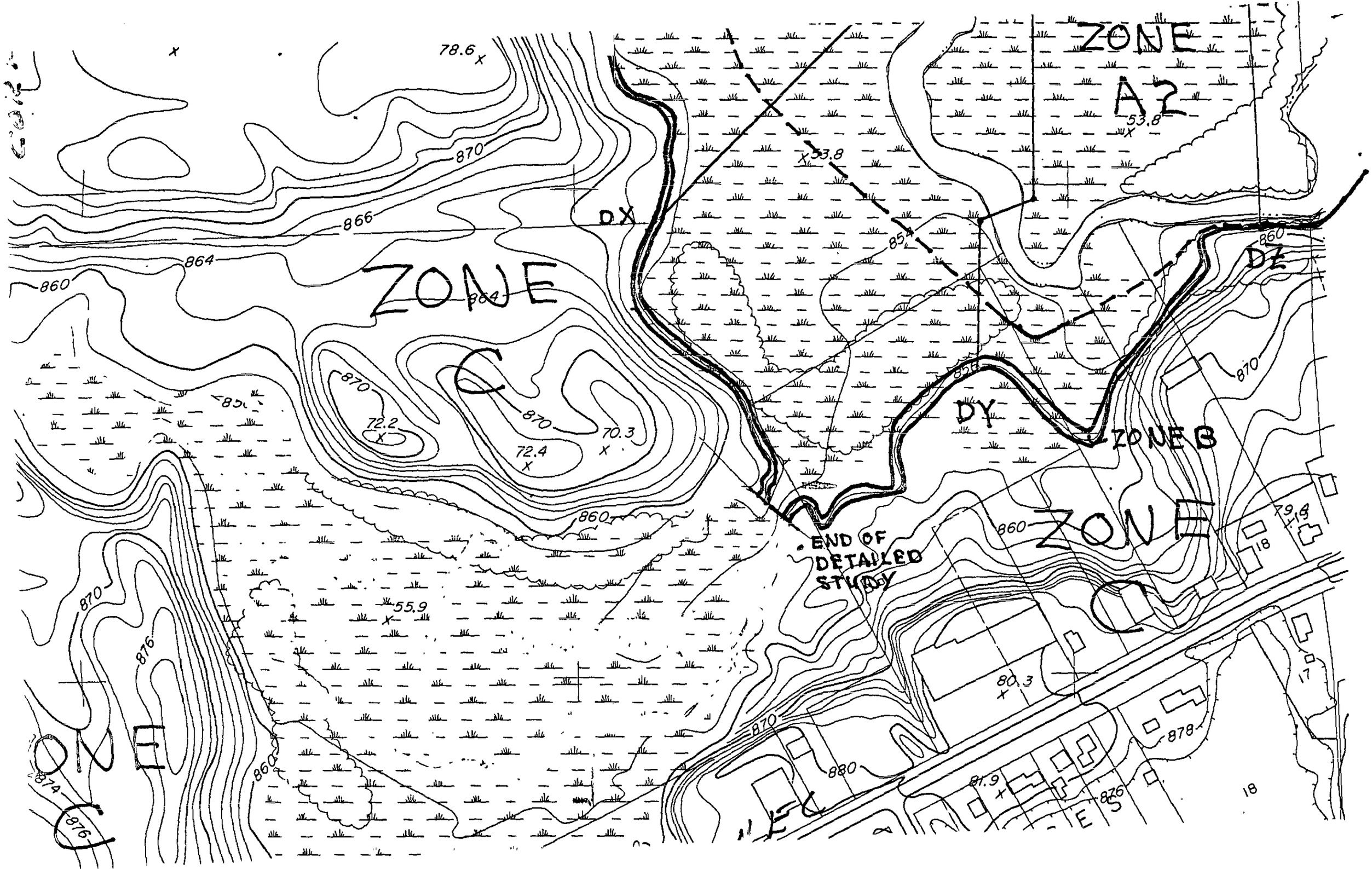
ZONE 119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ZONE B
DZ
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870
ZONE
C
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DETAILED
STUDY
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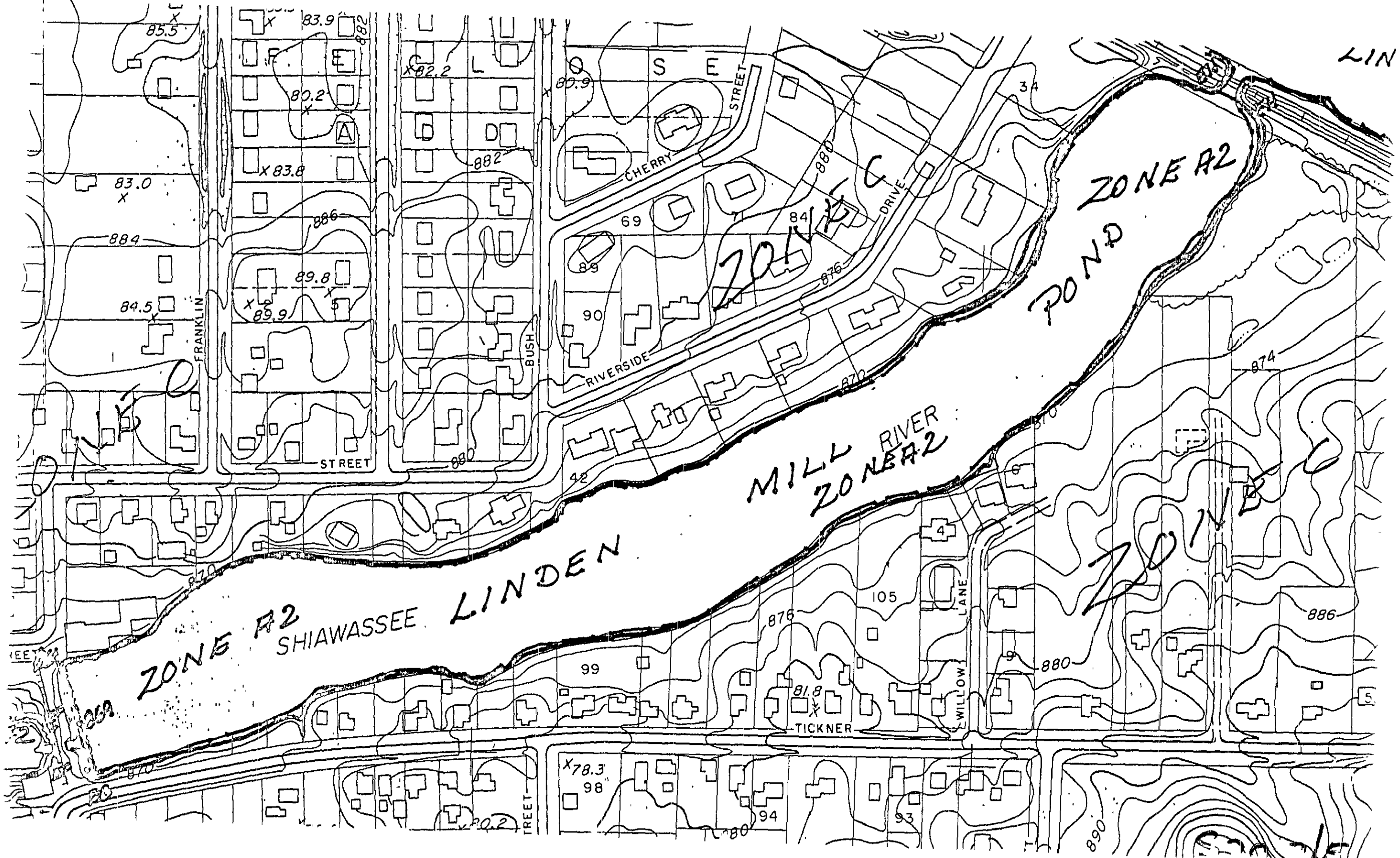
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CHERRY DRIVE
RIVERSIDE
FRANKLIN STREET
BUSH STREET
WILLOW LANE
TICKNER
MILL RIVER
SHIAWASSEE
LINDEN
POND
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ZONE A2
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ZONE C
ZONE C
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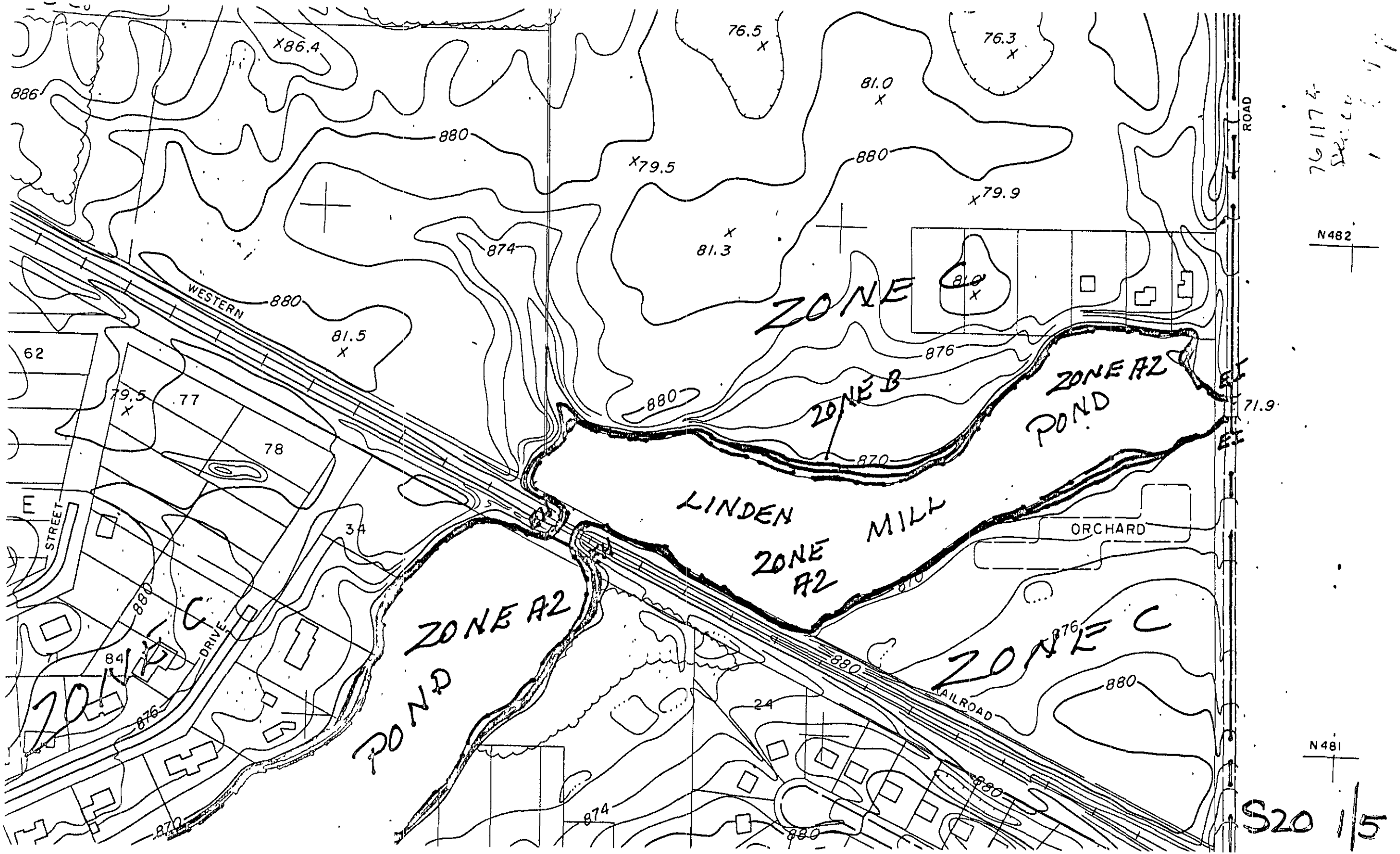
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WESTERN
RAILROAD
STREET
DRIVE
ORCHARD
LINDEN MILL
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POND
ZONE B
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POND
ZONE C
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POND
ZONE A2
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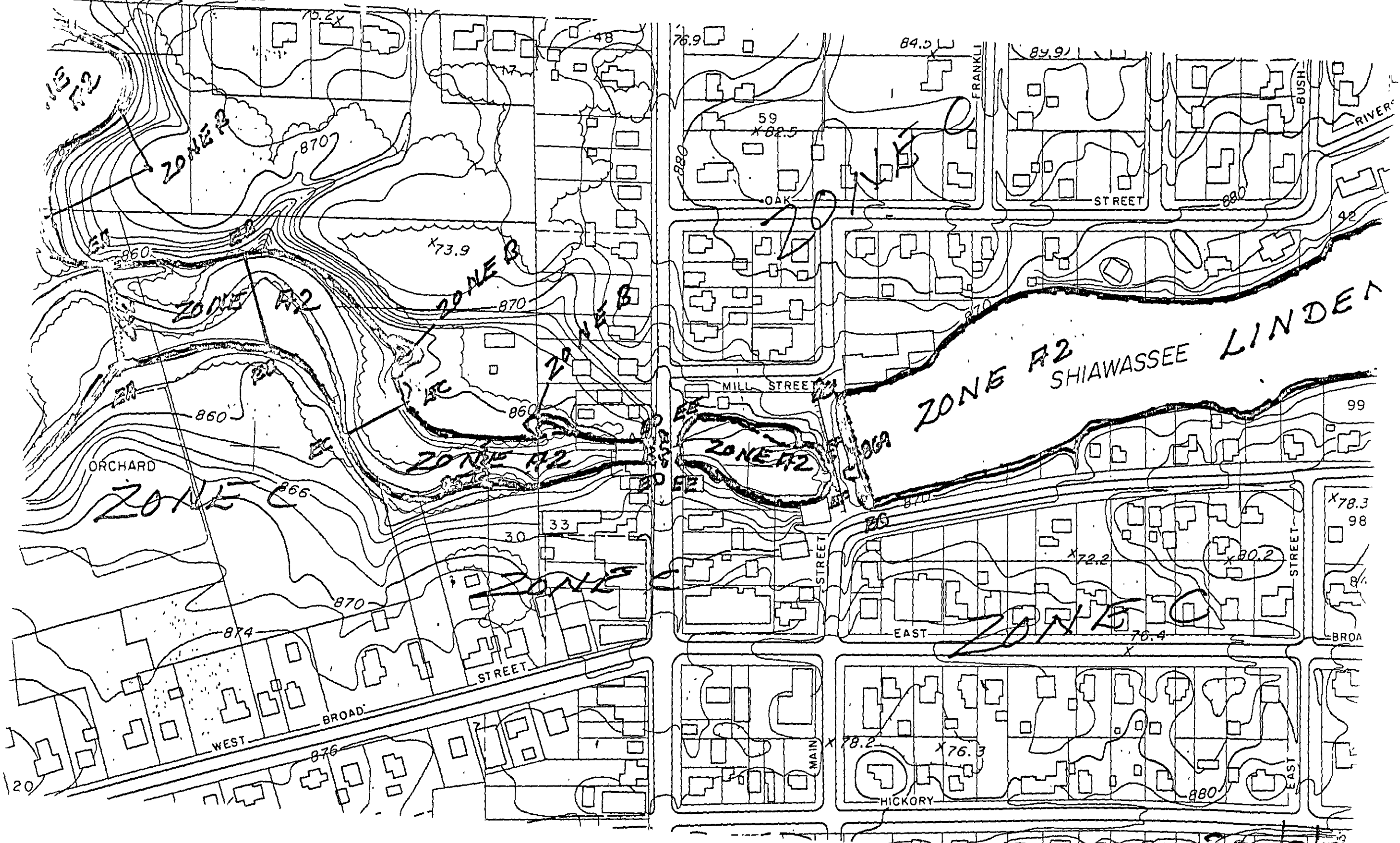
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STREET
FRANKLIN
BUSH
RIVER
MILL STREET
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WEST
STREET
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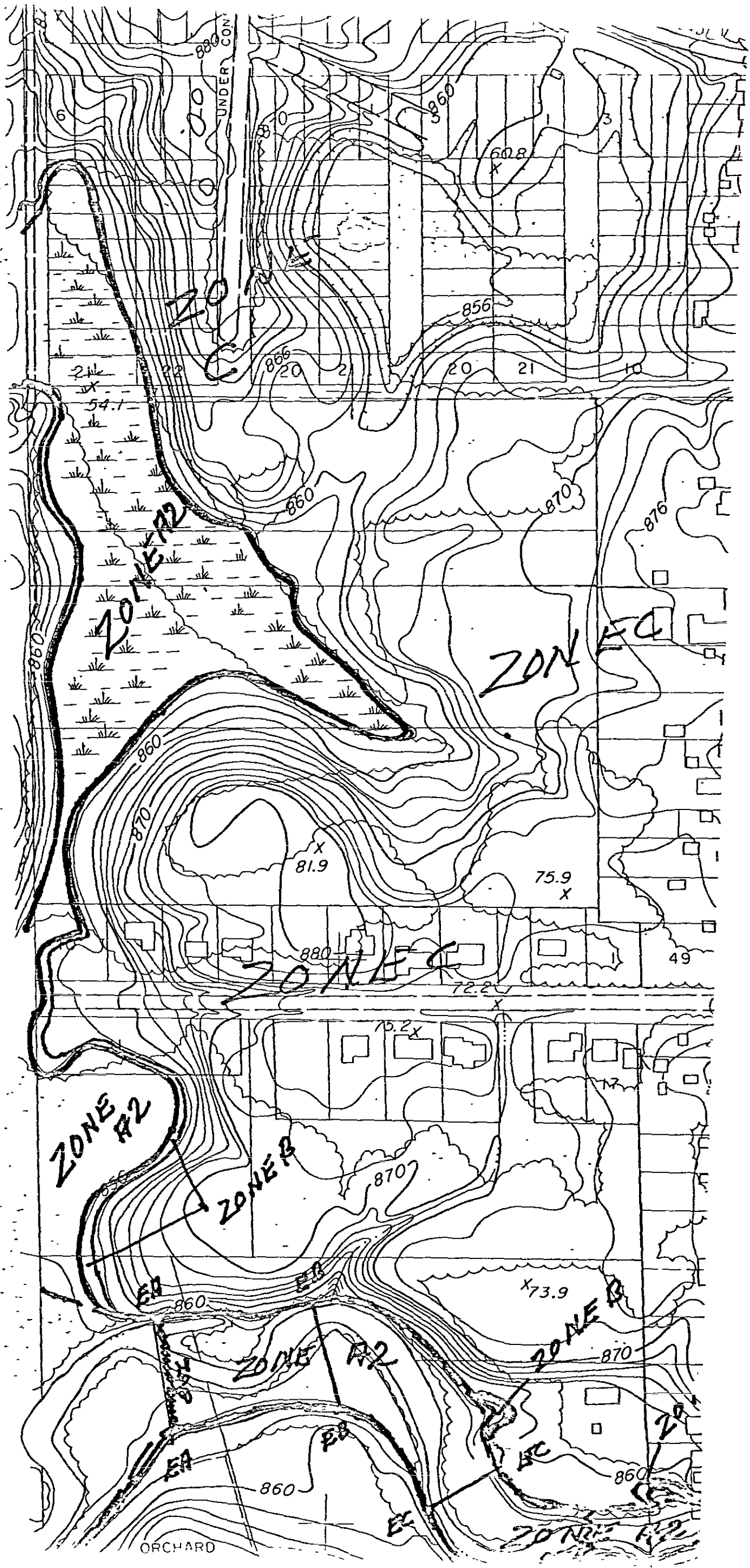
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ZONE B
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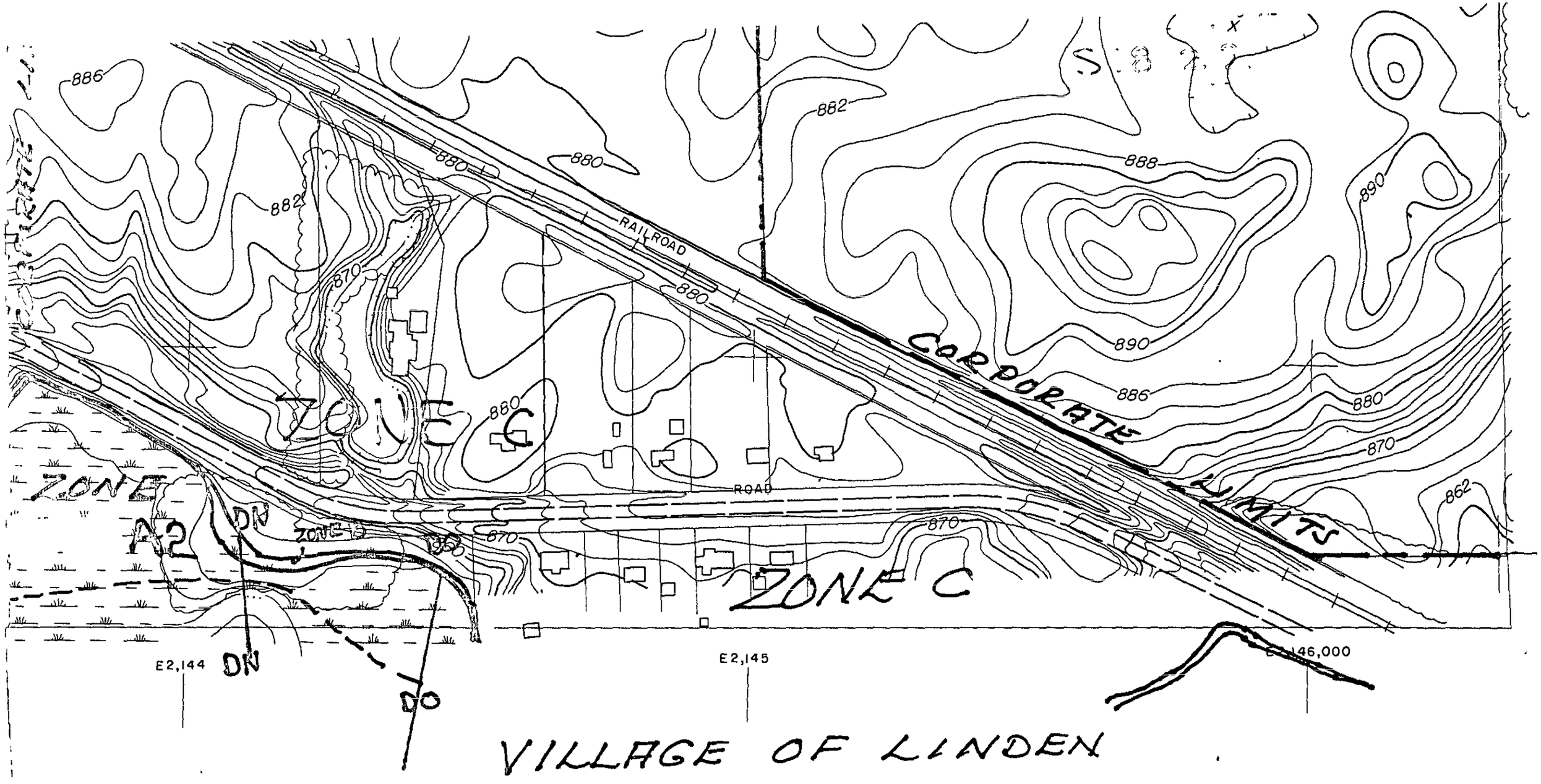
S20 4/5

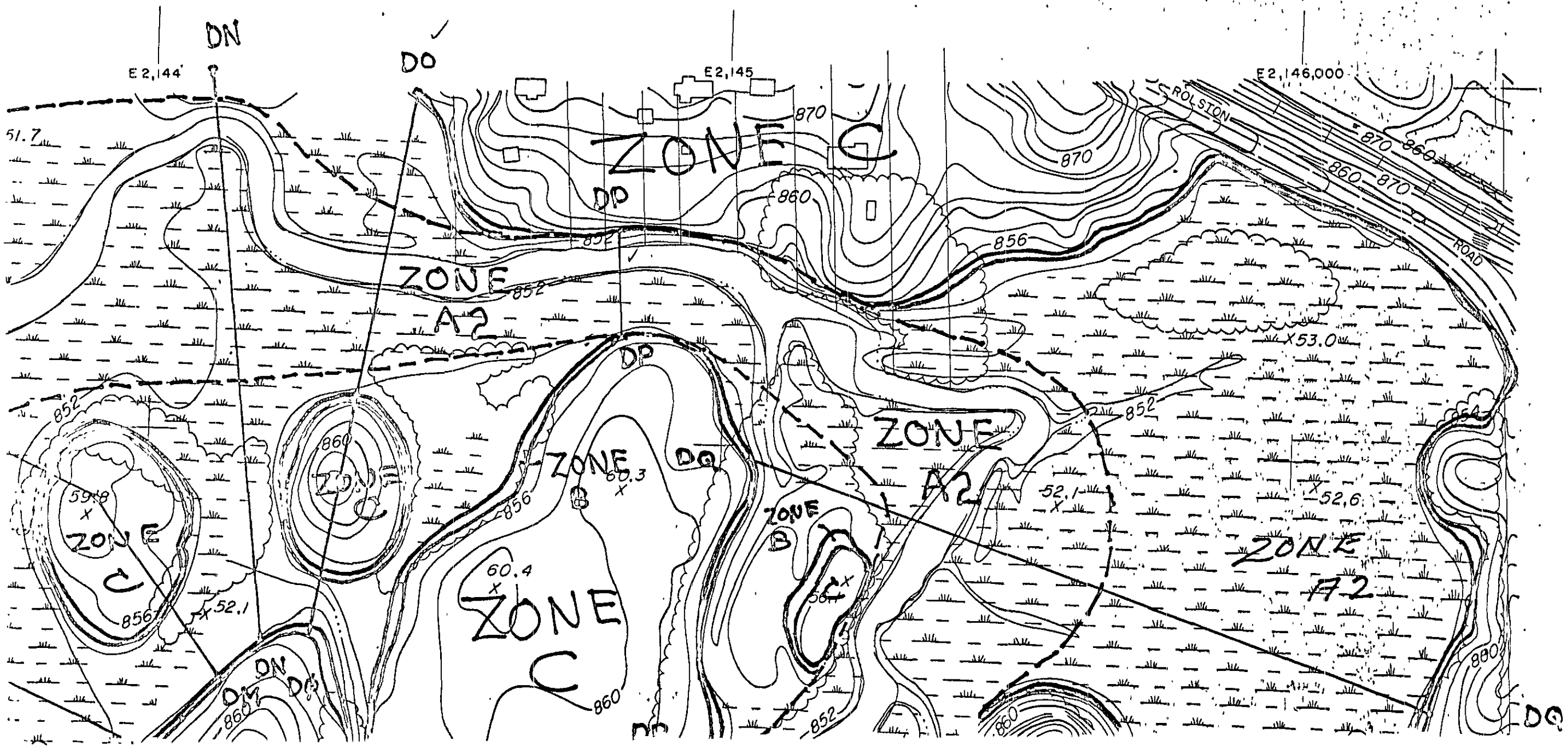


SECTION INDEX

6	5	4	3	2	1

CO

519 5/5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DO
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ROAD
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ZONE A2
ZONE A2
ZONE C
ZONE B
ZONE C
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DN
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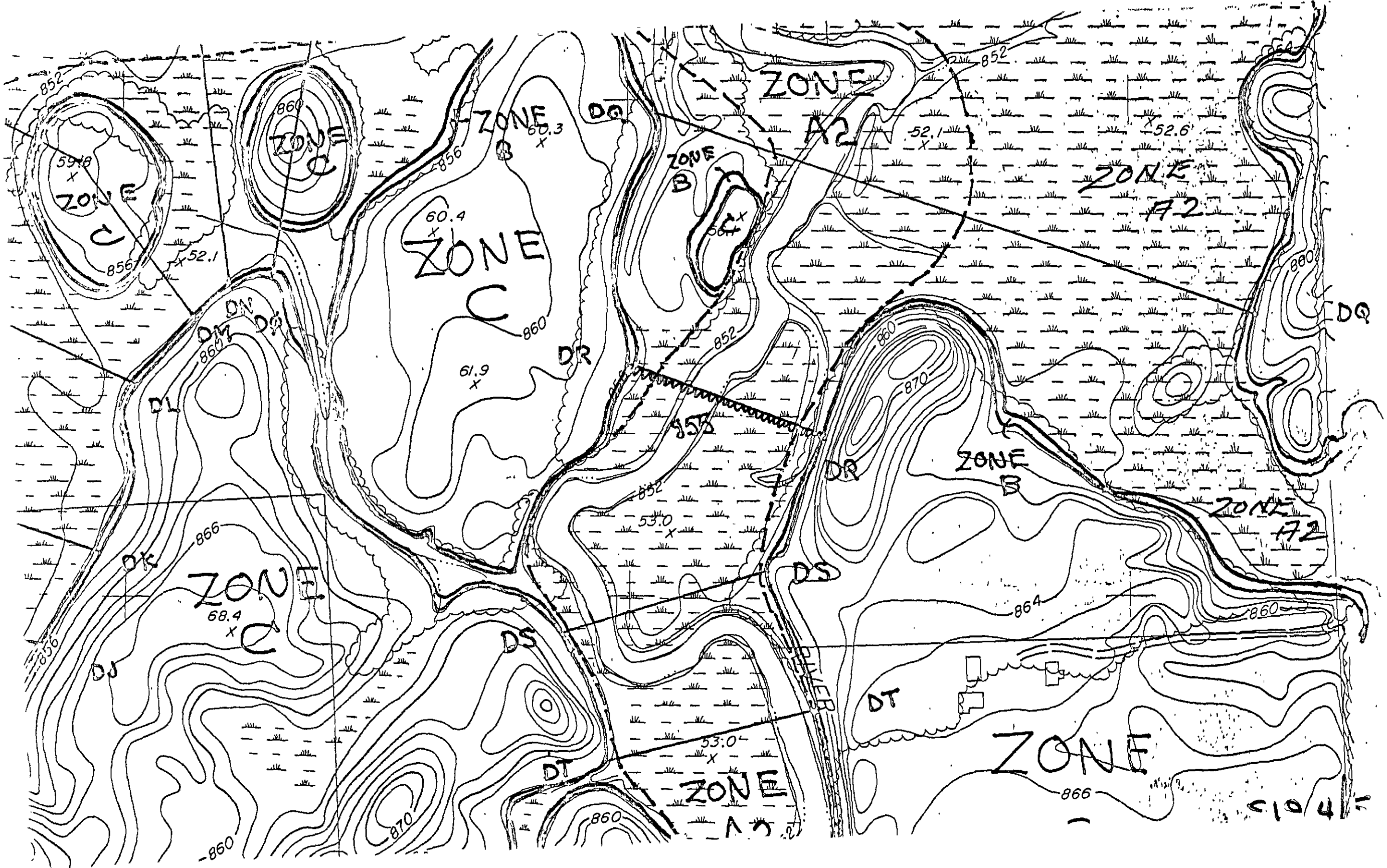
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DT
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DN
DN
DK
RIVER
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864
866
870
880
59.8
52.1
60.3
60.4
61.9
53.0
53.0
68.4
52.1
52.6
C10/4

00BREAK00

1) COUNTY: Genesee

2) STUDY NAME: Twp of Argentine

3) WATERCOURSE: Shiawassee River

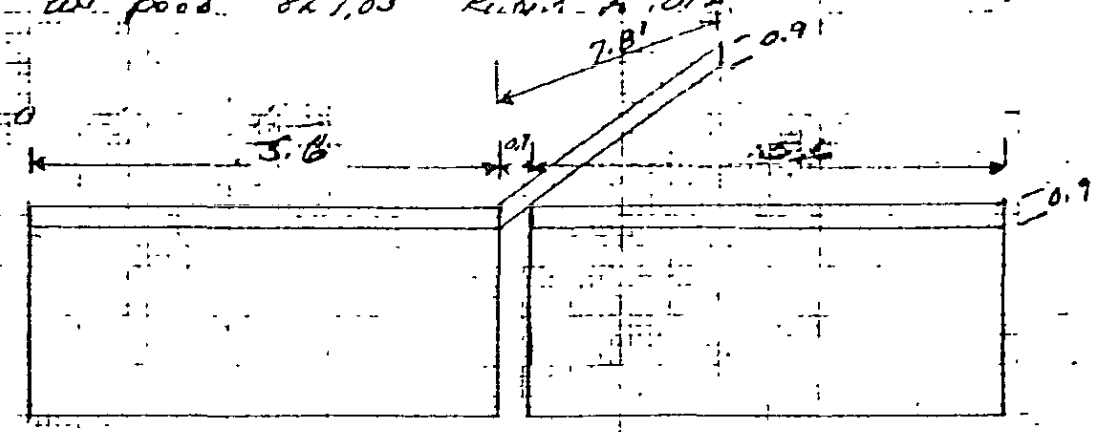
4) DOCUMENT TYPE: report

00BREAK00

Lan @ Byron Mill Pond

Bill @ dam 829.03

w. pool 827.03 Relief h .01 ft



Using peak stage 829.5 (829.63) Upstream bottom flat here bottom of sand & silt 823.1
830.28

Using 829.5
829.0
.5 over flow

depth of silt 822.8 below stop logs.

$P = 8.6$ 829.0
.6
829.9

$\frac{h}{L} = \frac{0.6}{7.8} = 0.08$

$\frac{h}{P} = \frac{0.6}{8.7} = 0.06$

$C = 2.62$ $Q = CLH^{3/2}$
$= 2.62 \times 14.9 \times .6^{1.5}$
$= 14.5$ cfs over top @ peak.

Q $h = 829.6 - 822.8 = 6.8$ $H = 829.1 - 822.8 = 6.3$ $P = 829.9 - 822.8 = 7.1$

$L = 29'$

$\frac{h}{P} = \frac{5.3}{2.9} = 2.2$

$\frac{h}{L} = \frac{5.3}{29} = .18$

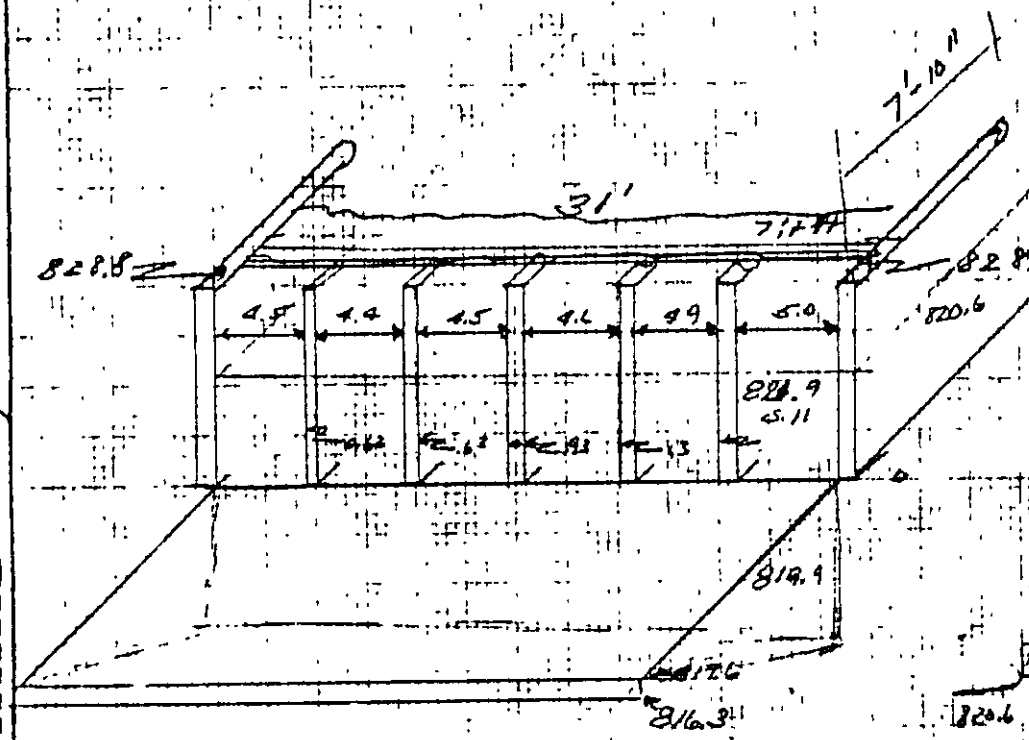
$C = 2.9$

$Q = 2.9 \times 11.2 \times 5.3^{1.5}$
$= 396$ cfs

396 + 14.5
411 cfs total

Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

Total 3880 cfs



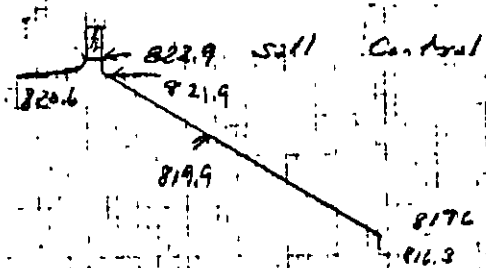
6 Bays with approach wingwall @ outside edge

Thirteen 18

Approach sill 822.9

Max d. = 820.6

D = 820.6 WS = 826.9



Using h = 829.4 822.9

D = 23'

h = 6.5 2.8

L = Approx 10' Very narrow

Effective width = 27.9'
use without contraction for trial. Use C = 3.12

$Q = 3.12 \times 27.9 \times 6.5^{1.5}$
$= 1442$

$\frac{6.5}{900} = 0.0006$

$\frac{6.5}{10}$

829.4

827.6
822.9
4.3 ft

Tail 811.97
6.25
827.22

$\frac{4.5}{4} = 1.66$

828.12 Drop 1.3 ft

$\frac{4}{4}$ $\frac{6.5}{2.3}$

Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

WATER RESOURCES DIVISION

Dyken

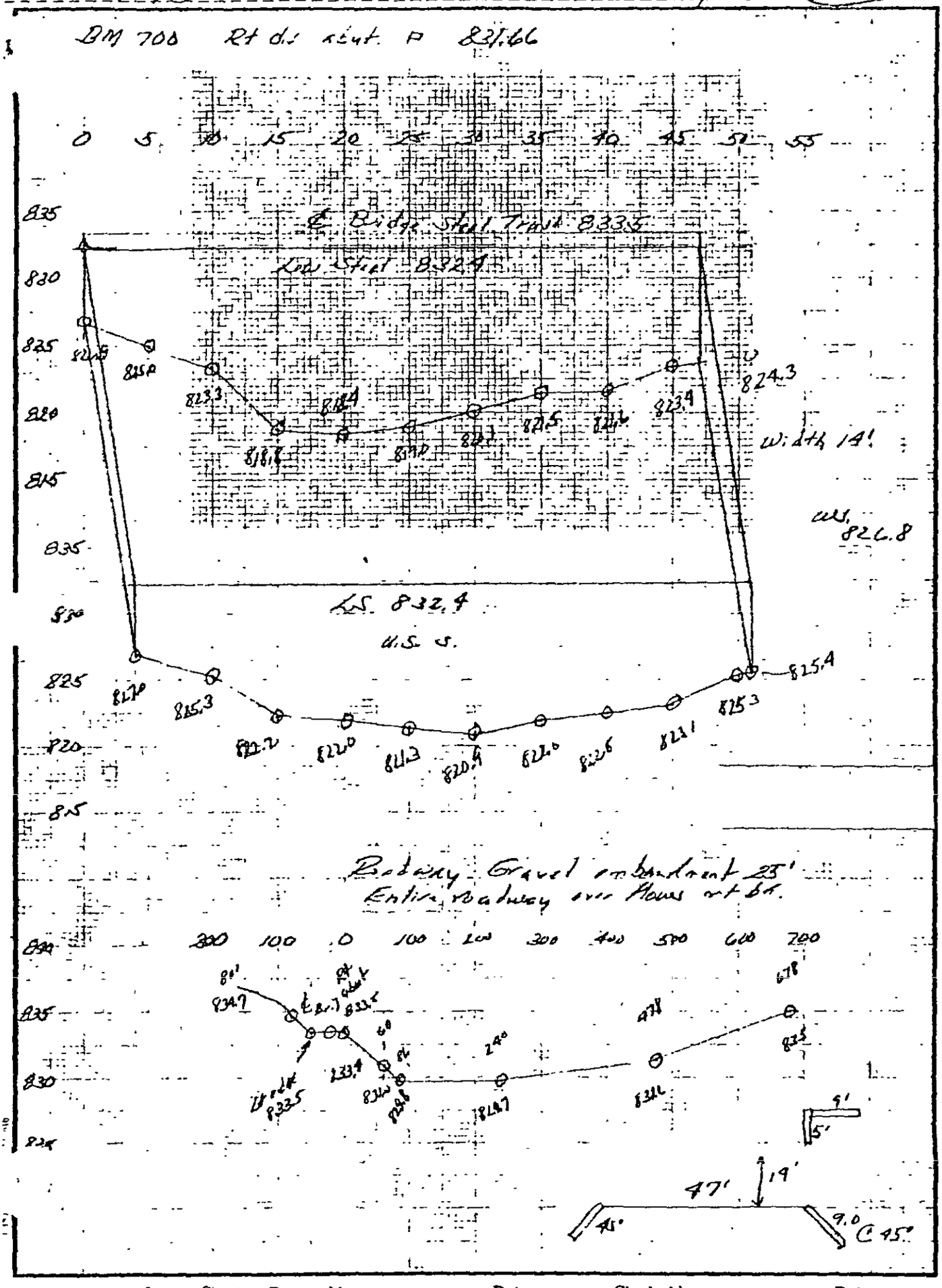
Mill Creek

9-213-E
(March 1940)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File 8360 ①

Meier Road Bridge



Prepared by ..... Date ..... Checked by ..... Date .....

9-213-E
(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File ..... (2)

Shiawassee River at Duffield Rd.

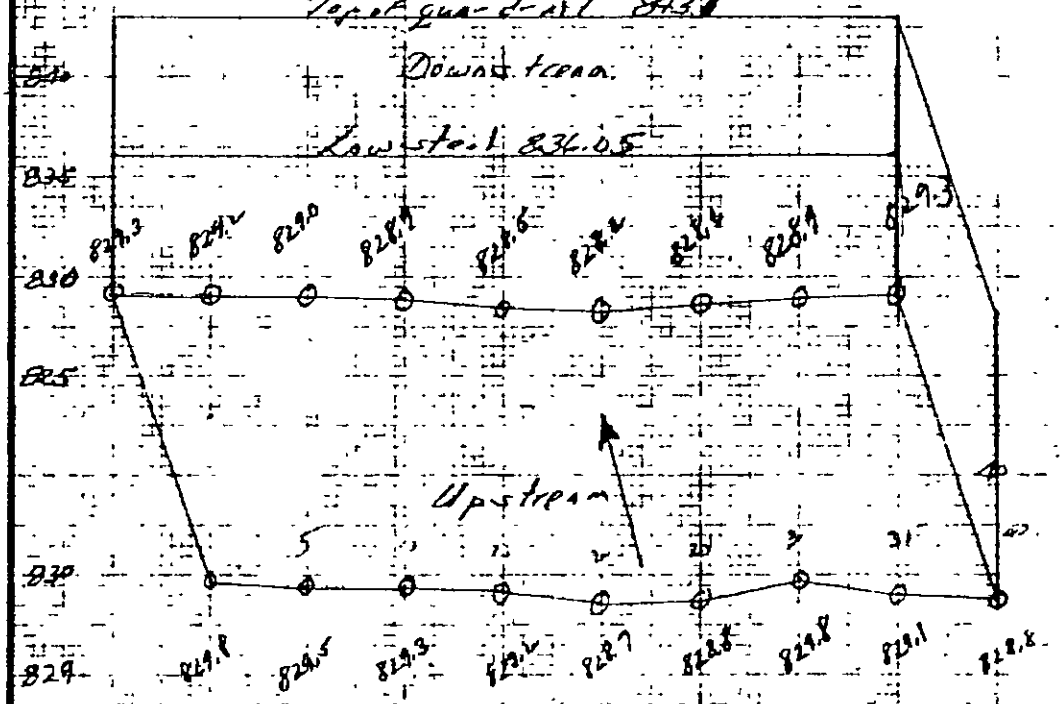
BM - 704-1 Cut box on SE wingwall of Duffield Rd bridge at south side of Bridge crossing Shiawassee River 839.03

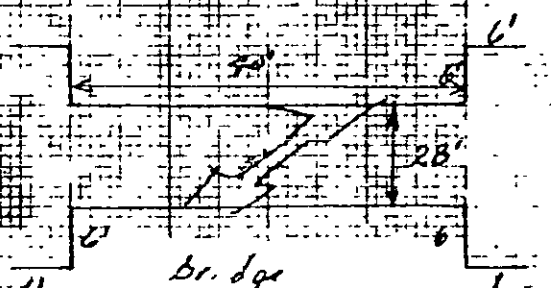
Meas. from Top of concrete parapet wall to bridge deck 14.0

Top of guardrail 843.03

Lt u.s. guardrail 843.05
rt do 843.12
rt ds do 843.13
lt ds do 842.96

Apr. 1975 HWM 838.7
℄ Bridge 839.4
50 ft left from edge 840.1
50 ft Rt from edge 839.7





Use U.S. side for control Sec. U 19930

Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... / Date .....

9-213-E
(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File 30390

Skiguawsee River at Bird Road

BM 707-1 845.85 Cut box on top of guardrail at south end at west side of Bird Road bridge crossing Skiguawsee R.

Upstream and downstream length

Top of curb 845.85
3
842.85 RP for bridge dimensions

91' 4' 1' 91'

Barrel 33'

22.5'

WS 5/18/78

Bridge = 0.042

845.85
10.2
835.65

0 5 10 15 20 25 30 35

$\phi = 0$

Top of guardrail 845.85

Top of curb 842.85

WS WS 839.7 u.s.

WS 839.9 d.s.

Appr. Hbr. 0.070
Ch 0.045
rtbk 0.060-0.070

Exit Hbr. 050
Ch 045
rtbk 065

HWM 840.5 ± .5

Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

9-213-E
(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....

Shiawassee River at McCaslin Road

BM 711-2 845.32 Cut box on concrete bridge abutment at northend; at west side of McCaslin Lake Road Bridge

Barrel 29'

40'

4' 10' 10'

W.S. 5/18/78

845.32
6.4
838.92

Vertical CMP deducted from effective bridge width

bridge n = 049-047

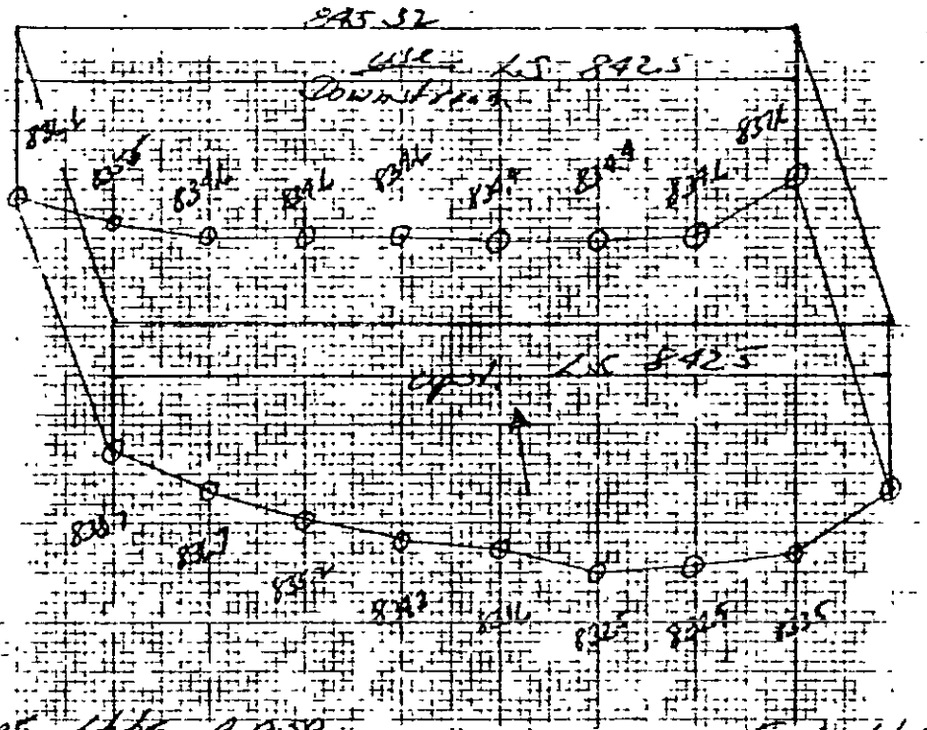
L.R. 845.0

Top of curb
rt w.s. 843.4
lt w.s. 845.50

0 5 10 15 20 25 30 35 40

850
845
840
835
830

Low steel
842.5



Approach
Lt bk. 0.030
Ch. 0.045
rt bk. 0.090

Exit
Lt bk 0.090
Ch. 0.050
rt bk. 0.080

Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

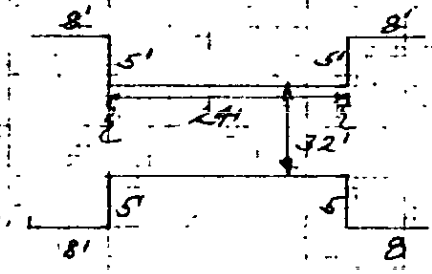
Skiawassee River WATER RESOURCES DIVISION at Seymour Road

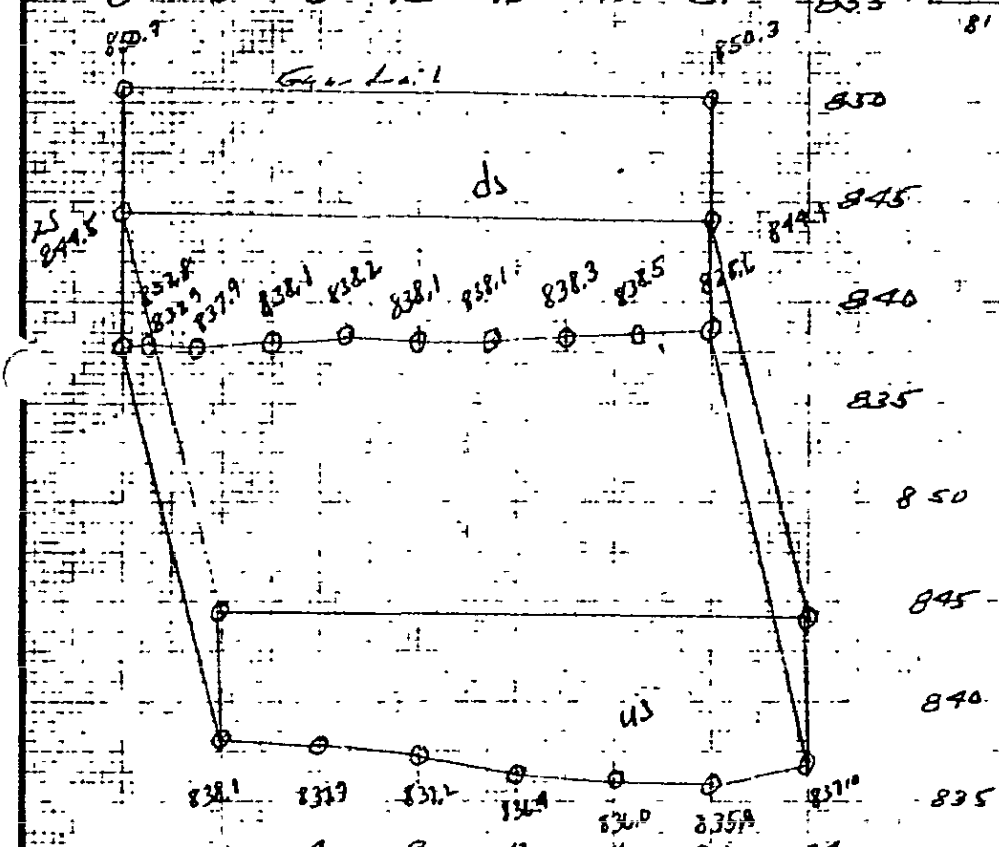
RM 715-3 850.67 Cut box on concrete guardrail at southend, at west side of Seymour Road 3' higher than road.

Low steel ft. ds. 850.7 / 6.2 / 844.5

US 5/18/78 850.67 / 9.7 / 841.0

Steep guardrail





Screw 30°

US 839.5

LS 2.4 bk

844

℄ Rd 847.9

LS 1.4 bk

849.5

Use Avg 849.2

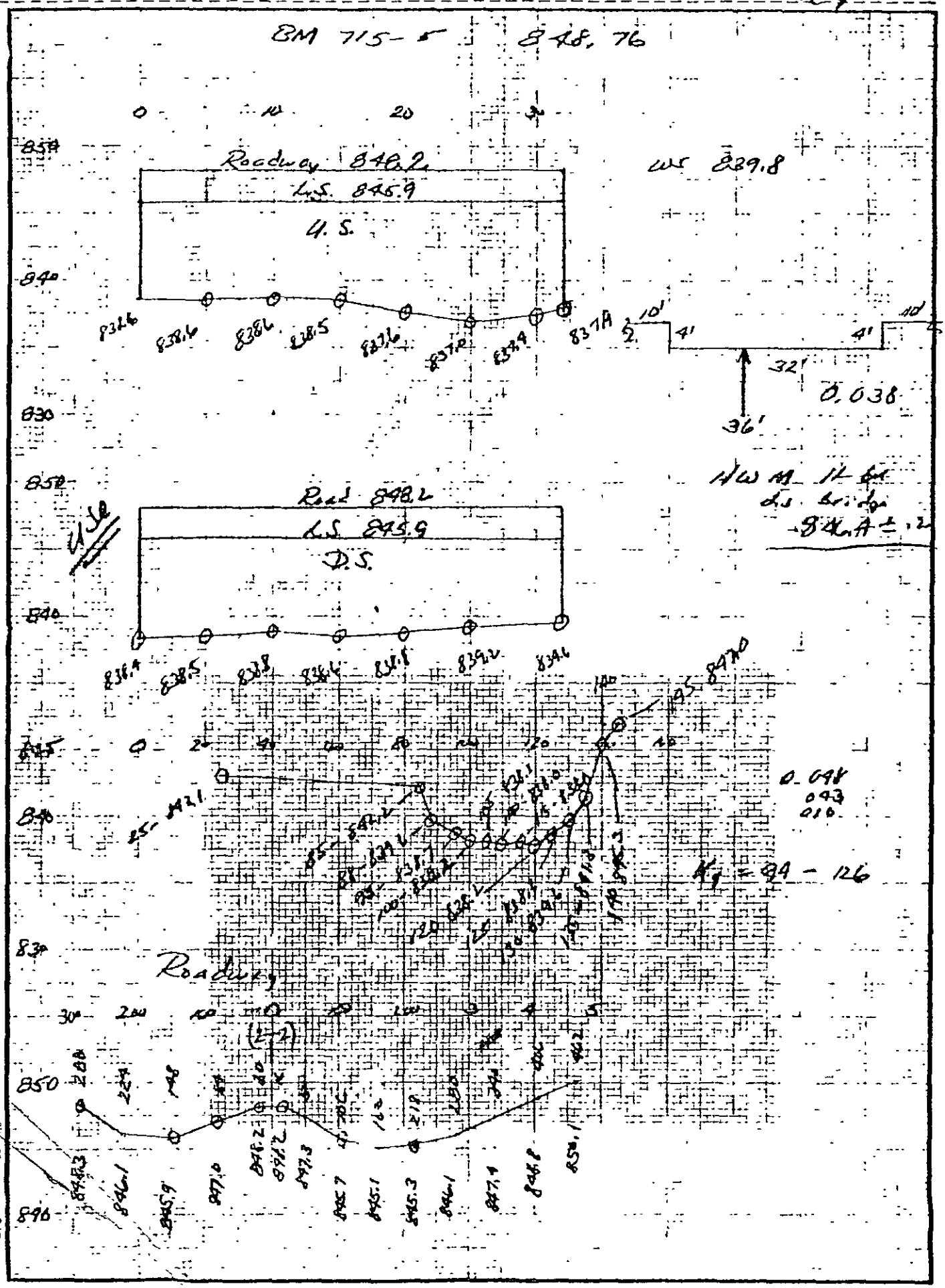
Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

9-913-E
(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....

Shiawassee R. Cole Bridge

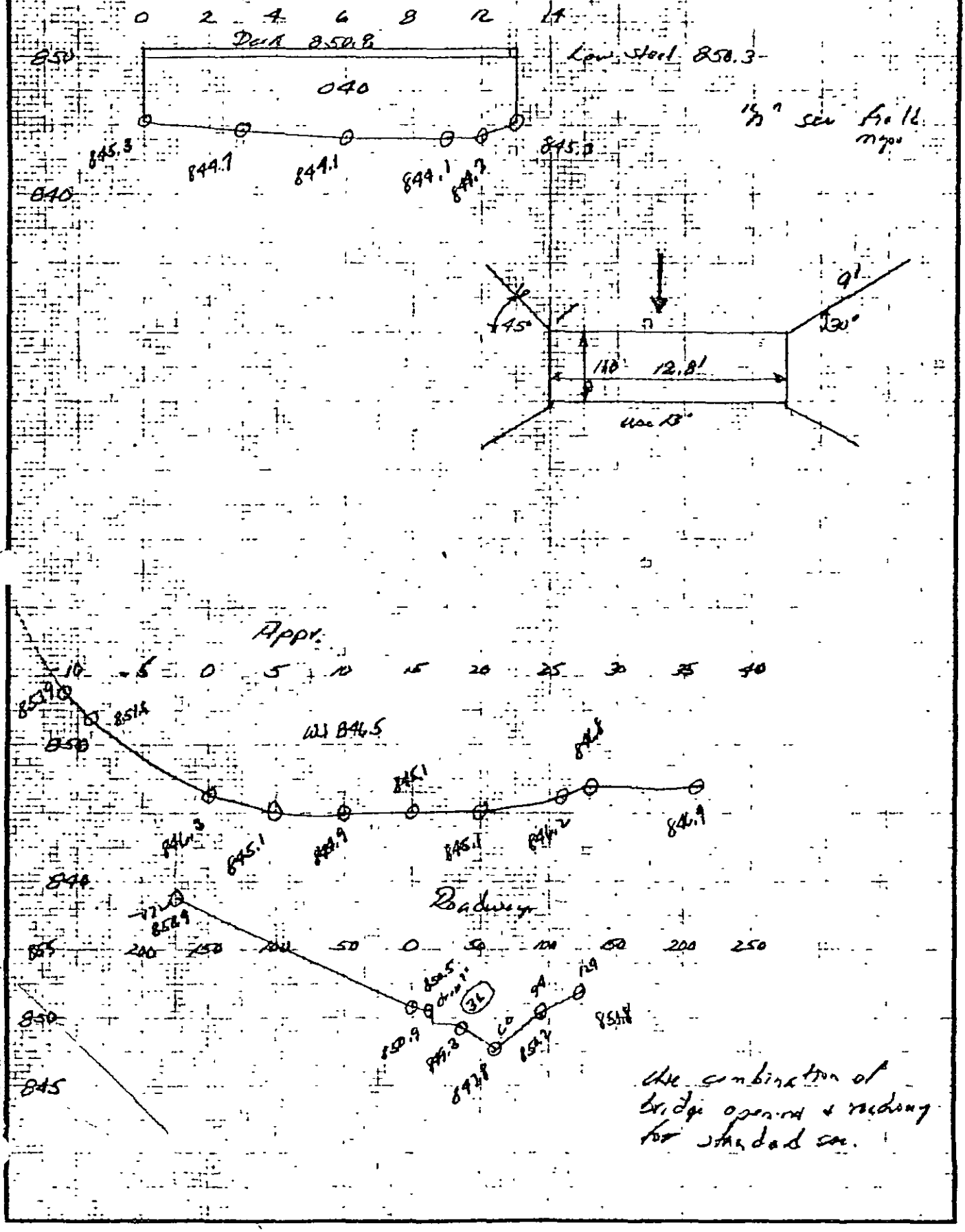


Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

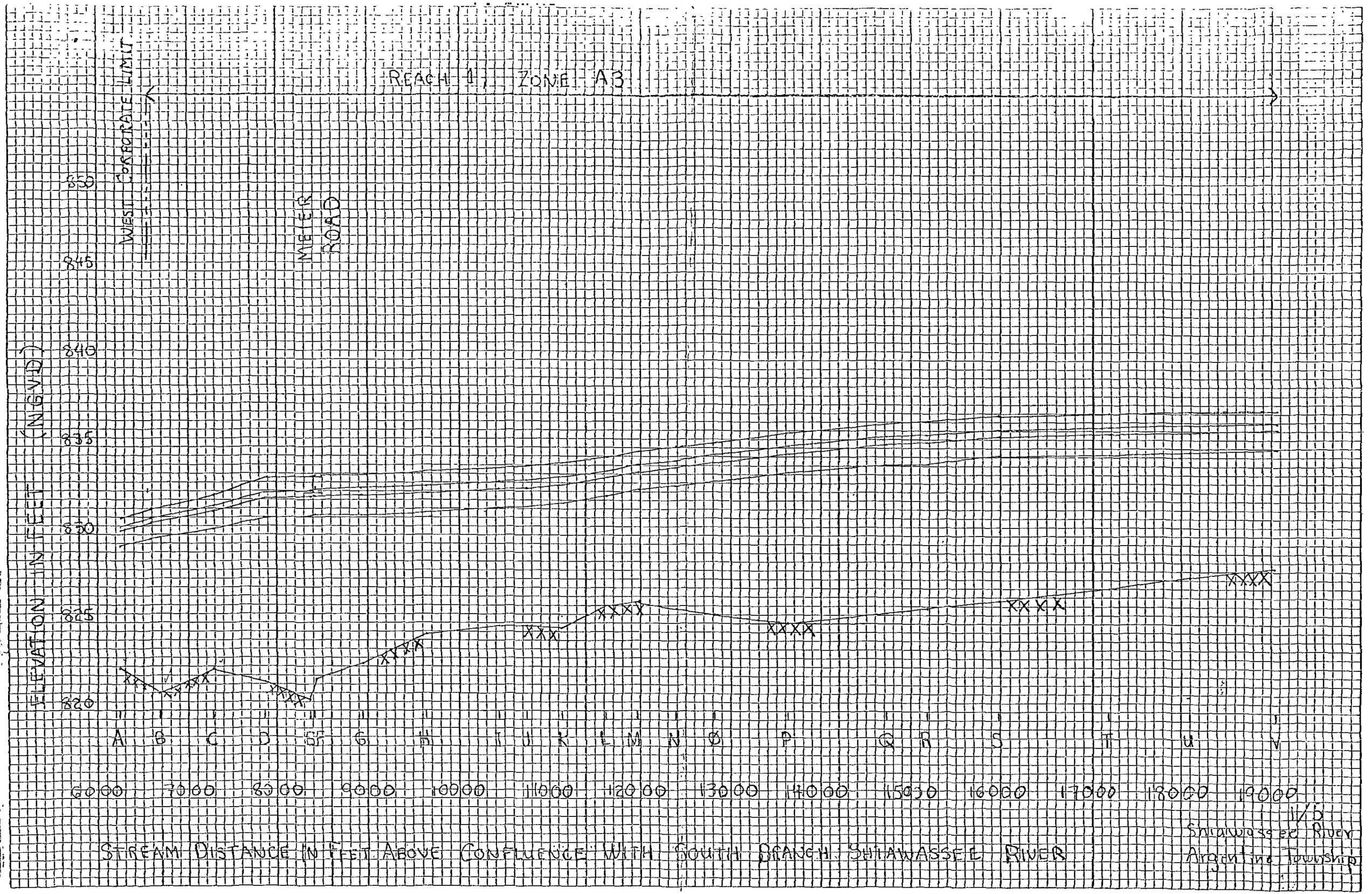
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

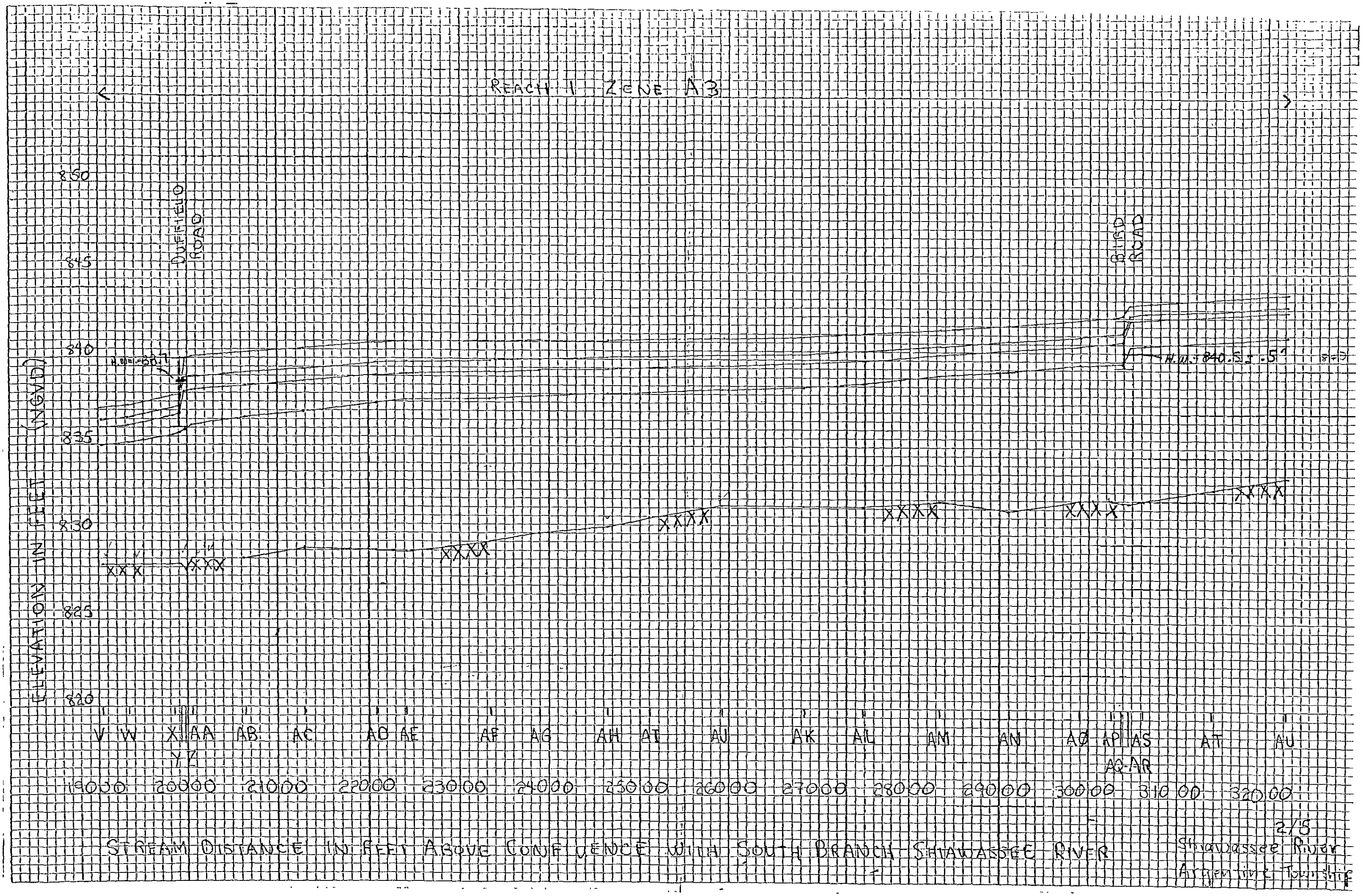
Shiawassee River — Abandoned Bridge @ 2YV

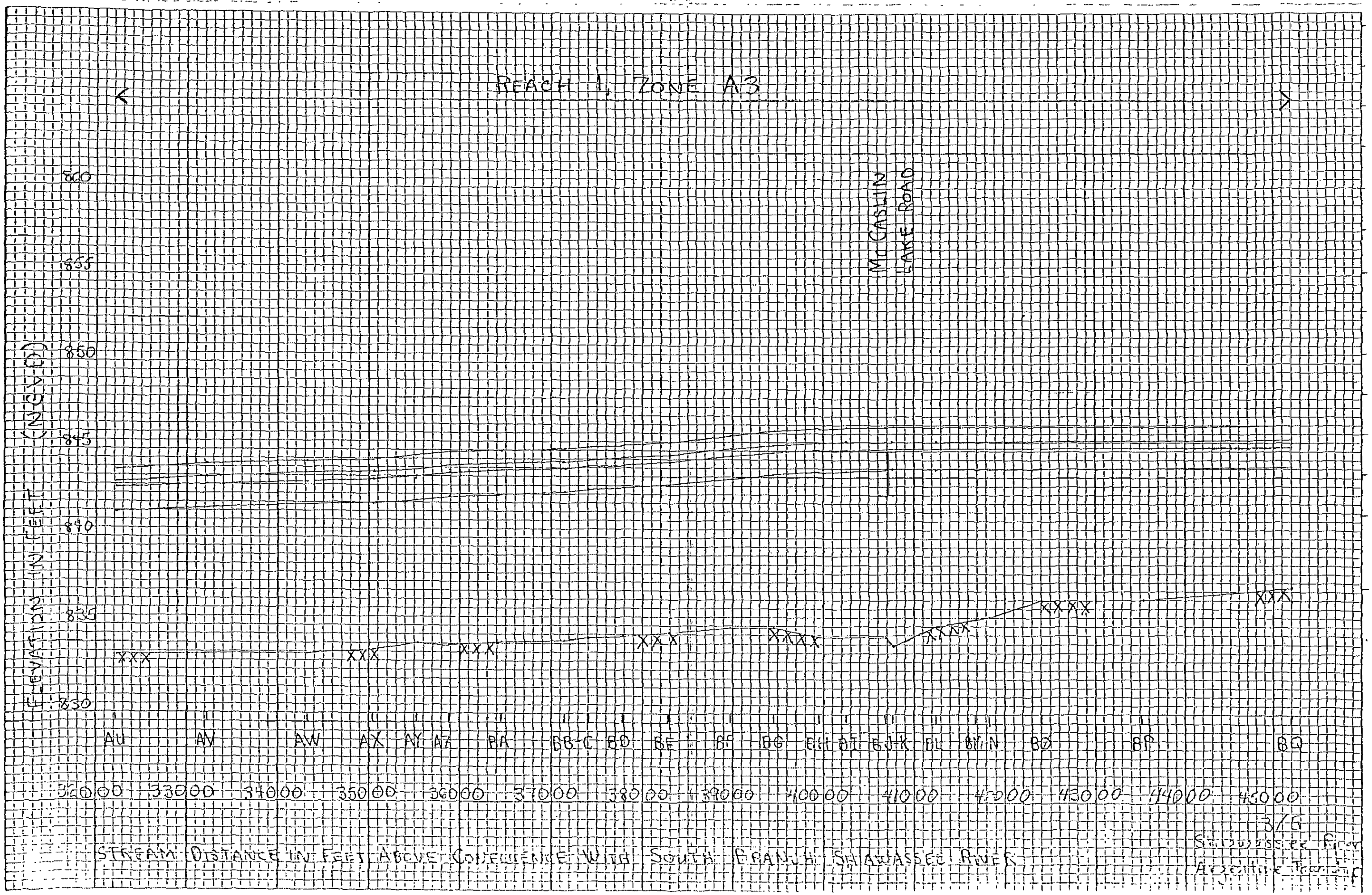
RM sch Point P on highpoint of left dist. abut. (XW) at edge of bridge deck and edge of flowline 850.32

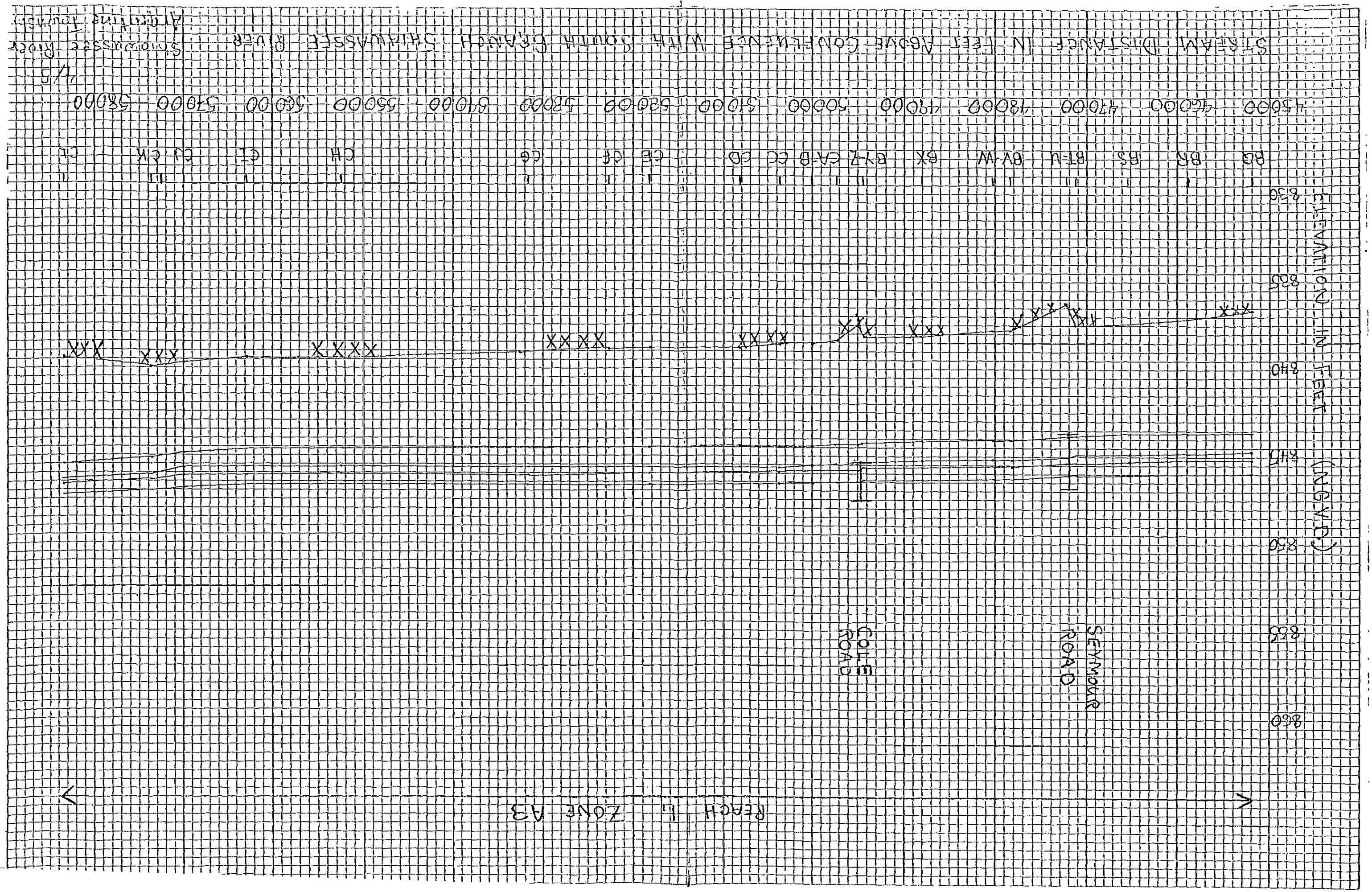


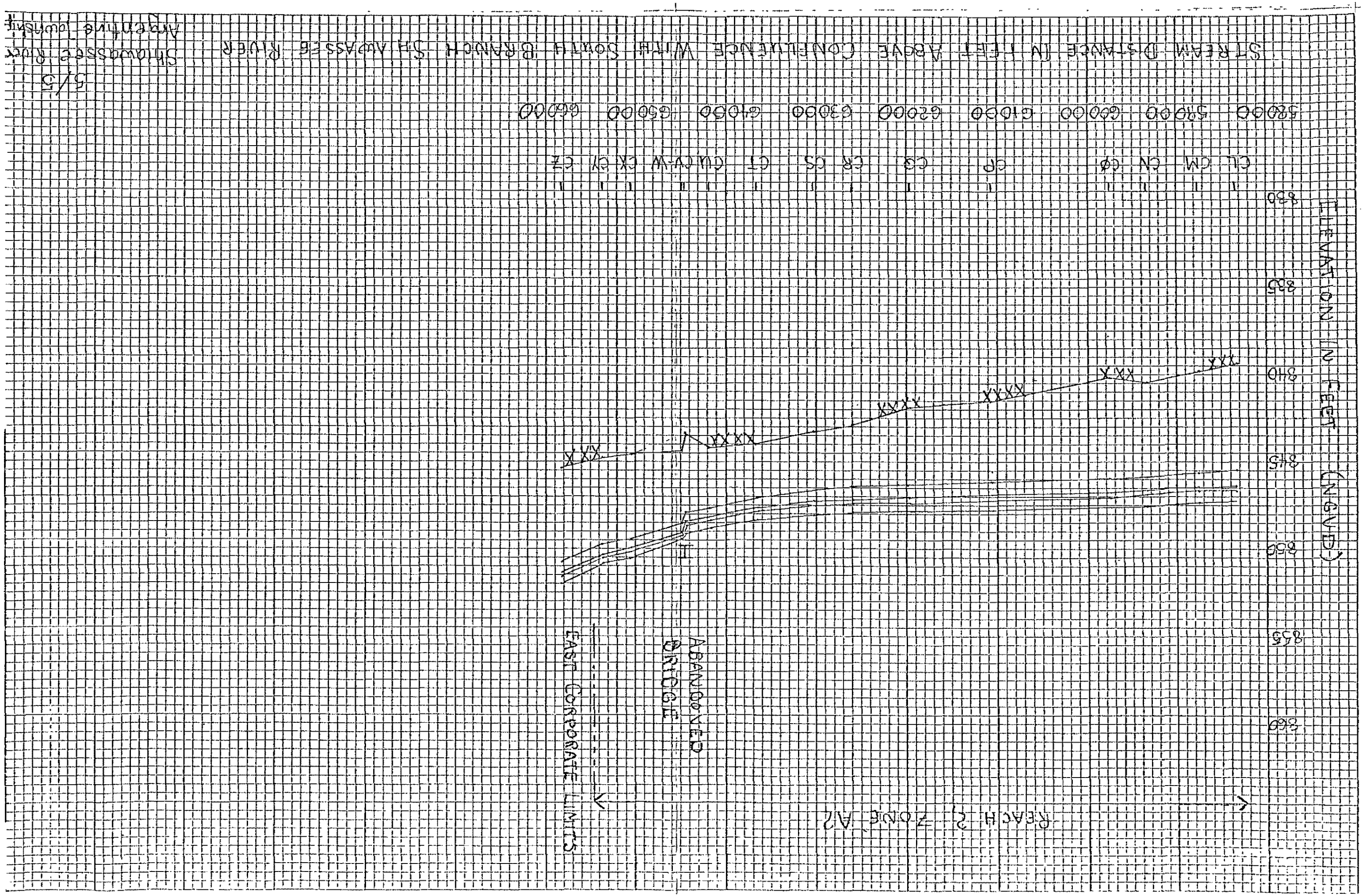
Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....


REACH 1, ZONE A3
WEST CORPORATE LIMIT
MEIER ROAD
ELEVATION IN FEET (NGVD)
850
845
840
835
830
825
820
A B C D E F G H I J K L M N O P Q R S T U V
6000 7000 8000 9000 10000 11000 12000 13000 14000 15000 16000 17000 18000 19000
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH SOUTH BRANCH SHIAWASSEE RIVER
11/6
Shiawassee River
Argentine Township


REACH 1 ZONE A3
DUFFIELD ROAD
BIRD ROAD
H.W. 840.5 = .5'
ELEVATION IN FEET (NGVD)
850
845
840
835
830
825
820
V W X Y Z AA AB AC AD AE AF AG AH AI AJ AK AL AM AN AO AP AQ AR AS AT AU
19000 20000 21000 22000 23000 24000 25000 26000 27000 28000 29000 30000 31000 32000
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH SOUTH BRANCH SHIAWASSEE RIVER
2/8
Shiawassee River
Argentine Township


REACH 1, ZONE A3
MC CASLIN LAKE ROAD
ELEVATION IN FEET (NGVD)
860
855
850
845
840
835
830
AU
AV
AW
AX
AY
AZ
BA
BB-C
BD
BE
BF
BG
BH
BJ
BJ-K
BL
BM-N
BO
BP
BQ
32000
33000
34000
35000
36000
37000
38000
39000
40000
41000
42000
43000
44000
45000
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH SOUTH BRANCH SHIAWASSEE RIVER
3/6
Shiawassee River
Active Tower


REACH L ZONE A3
SEYMOUR ROAD
COHEN ROAD
(INGYD)
LEVEL IN FEET
840
835
830
825
820
BB BR BS BT-U BV-W BX BY-Z CA-B CC CD CE CF CG CH CJ CK CL
44500 46000 47000 48000 49000 50000 51000 52000 53000 55000 56000 57000 58000
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH SOUTH BRANCH SHIWASSEE RIVER
Shiawassee River
1/5
Aerotine Towers



5/5

Shiawassee River

Argentine Township

00BREAK00

1) COUNTY: Genesee

2) STUDY NAME: Twp of Gaines

3) WATERCOURSE: Crapo Drain

4) DOCUMENT TYPE: 100 yr Natural & Encroached

00BREAK00

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 CRAPO DRAIN  MOUTH - SEYMOUR ROAD        HOLTSLAG 10  5 02 99 12
2      2  77030  77172  77331  77212  77216
3 15100 CD  B 1   9  3  764   29730  1  3
4 15104     50    85    130    100    100
5 15110     -94  1  7748  -76  2  7734  -50  2  7629  -44  2  7621  -38  2  7628   A
5 15112     -28  3  7690    0  3  7699  300  3  7699  300  3  7750
6 15190  1  2 065 065  1  2 080 080  1  2 065 065
3 15200 CD  C 0  16  3  767   30420  1  3
5 15210       0  1  7748   25  1  7700   45  1  7680  100  1  7680  225  1  7680
5 15212     265  2  7680  280  2  7660  285  2  7635  300  2  7635  310  2  7680
5 15214     313  3  7700  340  3  7700  500  3  7700  635  3  7700  800  3  7700   B
5 15216     800  3  7750
6 15290  1  2 065 065  1  2 080 080  1  2 065 065
3 15300 CD  D 0  18  3  768   30910  1  3
5 15310    -600  1  7748 -580  1  7700 -565  1  7680 -540  1  7680 -400  1  7680
5 15312    -180  1  7700  -76  2  7710  -64  2  7684  -60  2  7630  -54  2  7635   C
5 15314     -34  3  7709    0  3  7711  100  3  7700  190  3  7720  340  3  7720
5 15316     475  3  7700  600  3  7700  600  3  7750
6 15390  1  2 065 065  1  2 080 080  1  2 065 065
3 15400 CD  E 0  17  3  766   31560  1  3
5 15410    -780  1  7748 -770  1  7700 -750  1  7680 -730  1  7680 -500  1  7700
5 15412    -150  1  7700  -88  1  7706  -44  2  7718  -28  2  7646  -26  2  7639   D
5 15414     -14  2  7644  -10  3  7679    0  3  7696   14  3  7700   90  3  7720
5 15416     400  3  7720  400  3  7750
6 15490  1  2 065 065  1  2  80  80  1  2 065 065
3 15500 CD  F 0  18  3  766   32170  1  3
5 15510       0  1  7748   50  1  7700  120  1  7700  450  1  7700  470  1  7720
5 15512     510  1  7720  520  2  7700  540  2  7680  545  2  7660  550  2  7642   E
5 15514     555  2  7660  560  2  7700  565  3  7720  605  3  7700  725  3  7700
5 15516     980  3  7720 1190  3  7720 1190  3  7750
6 15590  1  2 065 065  1  2 080 080  1  2 060 060
3 15600 CHORB 2  19  1  765   32170  0  7700 3 0
5 15610       0  1  7644    2  1  7645    3  1  7646    4  1  7650    5  1  7660
5 15611       4  1  7678    3  1  7689    2  1  7695    1  1  7699    0  1  7700
5 15612      -1  1  7699   -2  1  7695   -3  1  7689   -4  1  7678   -5  1  7660
5 15613      -4  1  7650   -3  1  7649   -2  1  7645    0  1  7644
6 15621  1  2 023 023
3 15650 CHORB 4  6  2  30        1  2        1 1        1
5 15660    -550  1  7750 -380  1  7740 -100  1  7729    0  2  7731  240  2  7729
5 15661    1080  2  7760
3 15700 CD  G 5  20  5  766   32300  2  4
5 15710    -450  1  7748 -420  1  7720 -200  1  7720  -20  1  7720    0  1  7713
5 15712      -16  2  7703   24  3  7645   30  3  7642   33  4  7647   38  4  7657
5 15714      48  5  7719   86  5  7705  120  5  7720  180  5  7700  235  5  7710   F
```

```
5 15610        0  1  7644     2  1  7645     3  1  7646     4  1  7650     5  1  7660
5 15611        4  1  7678     3  1  7689     2  1  7695     1  1  7699     0  1  7700
5 15612       -1  1  7699    -2  1  7695    -3  1  7689    -4  1  7678    -5  1  7660
5 15613       -4  1  7650    -3  1  7649    -2  1  7645     0  1  7644
6 15621  1  2 023 023
3 15650 CMORR 4   6  2   30          1  2          1 1                    1
5 15660     -550  1  7750 -380  1  7740 -100  1  7729     0  2  7731   240  2  7729
5 15661     1080  2  7760
3 15700 CD  G 5  20  5  766   32300  2  4
5 15710     -450  1  7748 -420  1  7720 -200  1  7720   -20  1  7720     0  1  7713
5 15712       16  2  7703   24  3  7645   30  3  7642    33  4  7647    38  4  7657
5 15714       48  5  7719   86  5  7709  120  5  7720   180  5  7700   235  5  7700
5 15716      370  5  7720  940  5  7720 1350  5  7740  1450  5  7760  1580  5  7780
```

F

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 2.DATE= 2/13/78

*** INPUT CARD PRINTOUT ***

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         1         2         3         4         5         6         7         8
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6 15790  1  2 065 065  1  2 070 070  1  2 070 070  1  2 070 070  1  2 080 080
3 15800 CD  H 1  15  3  766   33200  1  3
4 15804      40      68     105      80      80
5 15810    -100  1  7748  -65  1  7740  -45  1  7700   10  1  7742   14  2  7728
5 15812      24  2  7670   34  2  7653   42  2  7643   50  2  7652   60  3  7732
5 15814     100  3  7723  250  3  7720 1130  3  7720 1230  3  7740 1420  3  7760
6 15890  1  2 065 065  1  2 070 070  1  2 075 075
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USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1.DATE= 2/15/78

*** INPUT CARD PRINTOUT ***

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          1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 CRAPD DRAIN USS SEYMOUR RD  DSS GTWRR    HOLTSLAG 2  5 02 99 12
2      2  77035  77186  77332  77231  77237
3 15700 CD  G 1  15  5  766   32300  2  4
4 15704      50      85     130     100     100
5 15710     -150  1  7748 -120  1  7720 -100  1  7720  -20  1  7720    0  1  7713
5 15712       16  2  7703   24  3  7645   30  3  7642   33  4  7647   38  4  7657
5 15714       48  5  7719   86  5  7709  120  5  7720  180  5  7730  235  5  7740
6 15790 1  2 065 065  1  2 070 070  1  2 070 070  1  2 070 070  1  2 080 080
3 15800 CD  H 0  10  3  766  33200  1  3
5 15810     -100  1  7748  -65  1  7740  -45  1  7700    0  1  7742   14  2  7728
5 15812       24  2  7670   34  2  7653   42  2  7643   50  2  7652   60  3  7732
6 15890 1  2 065 065  1  2 070 070  1  2 075 075
```

F 2510

G 3470

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 14,DATE= 2/15/78

*** INPUT CARD PRINTOUT ***

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          1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 CRAPO DRAIN  USS GTWRR TO NICHLOS ROAD   HOLTSLAG 15  5 02 99 12
2      2  77047  77211  77385  77264  77271
3 16100 CD  1 1  11  3  757   33540  1  3
4 16104     40      68     105     80     80
5 16110    -900  1  7750 -900  1  7740 -235  1  7740 -115  1  7740  -66  1  7757
5 16112     -42  2  7751  -32  2  7659  -24  2  7650  -20  2  7658    0  3  7747
5 16114       8  3  7764
6 16190  1  2 070  70  1  2 065  65  1  2 070  70
3 16200 CD  J 0  13  3  768   34240  1  3
5 16210    -900  1  7760 -900  1  7720 -700  1  7740 -450  1  7740 -218  2  7733
5 16212    -208  2  7676 -196  2  7657 -192  2  7667 -178  3  7729 -144  3  7724
5 16214     -65  3  7720   70  3  7740   80  3  7760
6 16290  1  2 075  75  1  2 065  65  1  2 075  75
3 16300 CD  K 0  13  3  767   34920  1  3
5 16310       0  1  7750    0  1  7725  300  1  7725  600  2  7720  610  2  7700
5 16312     615  2  7680  620  2  7654  630  2  7680  640  2  7700  660  3  7720
5 16314    1000  3  7721 1145  3  7740 1165  3  7760
6 16390  1  2 075  75  1  2 065  65  1  2 075  075
3 16400 CD  L 0  14  3  767   35500  1  3
5 16410       0  1  7750    0  1  7720  300  1  7721  000  1  7720  610  2  7700
5 16412     620  2  7680  630  2  7648  640  2  7680  650  2  7700  660  3  7720
5 16414     730  3  7720 1100  3  7720 1350  3  7720 1370  3  7760
6 16490  1  2 070 070  1  2 065 065  1  2 070 070
3 16400 VANVB 2  10  1  766   35500          0  7720  3  0
**SEQUENCE**
5 16410       0  1  7720    0  1  7685    1  1  7685    1  1  7655    5  1  7650
5 16412      10  1  7650   11  1  7685   12  1  7685   12  1  7720    0  1  7720
6 16429  1  2 025 025
3 16450 VANVR 4   8  2   25          1  2          2  2          1
5 16452    -180  1  7800 -110  1  7780  -20  1  7760  200  1  7740  958  1  7739
5 16454    1000  2  7737 1078  2  7733 1750  2  7760
3 16500 CD  M 5  17  5  767   35610  2  4
5 16510    -990  1  7760 -980  1  7740 -970  1  7720 -450  1  7720  -86  1  7742
5 16512     -62  2  7737  -48  2  7664  -47  3  7662  -42  3  7659  -36  4  7663
5 16514     -34  4  7666  -24  5  7734    0  5  7730   50  5  7720  300  5  7720
5 16516     700  5  7720  735  5  7770
6 16529  1  2 070 070  1  2 065 065  1  2 065 065  1  2 065 075  1  2 070 070
3 16600 CD  N 0  14  3  768   36380  1  3
5 16610    -420  1  7740 -360  1  7740 -330  1  7720 -160  1  7720  -72  2  7739
```

```
5 16614      210  3  7720  770  3  7720  780  3  7740  790  3  7760
6 16690  1  2 070 070  1  2 065 065  1  2 070 070
3 16700 CD  0 0  16  3  768   37150  1  3
5 16710       0  1  7760   20  1  7740   70  1  7720  220  1  7720  310  2  7720
5 16712      315  2  7700  320  2  7680  325  2  7661  340  2  7661  345  2  7680
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N

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 15,DATE= 2/15/78

*** INPUT CARD PRINTOUT ***

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5 16714      350  2  7700  360  3  7720  600  3  7720 1200  3  7720 1230  3  7740
5 16716     1280  3  7760
6 16790  1  2 075 075  1  2 060 060  1  2 075 075
3 16800 CD  P 0  15  3  768   37950  1  3
5 16810     -700  1  7740 -600  1  7720 -430  1  7720 -125  1  7720  -42  2  7741
5 16812      -28  2  7671  -22  2  7668  -12  2  7672   -6  2  7708    0  3  7715
5 16814       20  3  7717  590  3  7720  740  3  7740 1060  3  7760 1070  3  7780
6 16890  1  2 070 070  1  2 060 060  1  2 070 070
```

0 220

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   15,DATE= 2/13/78

WATER-SURFACE PROFILE FOR:  CRAPO DRAIN  MOUTH - SEYMOUR ROAD        HOLTSLAG
PAGE  1 OF  1, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
==========================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
 WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==========================================================================
CD  B AT   29730 /      0 /    100. /  1024. /   46204. / 1.14 /  -73. /  300.
  772.12 /   0.00 /                  /  772.12 /    0.10 /   0.01/          *IS*  A
--------------------------------------------------------------------------
CD  C AT   30420 /    690 /    100. /  2329. /  114676. / 1.14 /   14. /  800.
  772.12 /   0.00 /   0.00 /    0.0  /  772.12 /    0.04 /   0.00 / -0.002  *XS*  B
--------------------------------------------------------------------------
CD  D AT   30910 /    490 /    100. /  2567. /  109994. / 1.20 / -589. /  600.
  772.12 /   0.00 /   0.00 /    0.0  /  772.12 /    0.04 /   0.00 / -0.001  *XS*  C
--------------------------------------------------------------------------
CD  E AT   31560 /    650 /    100. /  2153. /   86532. / 1.15 / -779. /  400.
  772.12 /   0.00 /   0.00 /    0.00 /  772.12 /    0.05 /   0.01 / -0.001  *XS*  D
--------------------------------------------------------------------------
CD  F AT   32170 /    610 /    100. /  1704. /   54731. / 1.13 /   28. / 1190.
  772.12 /   0.00 /   0.00 /    0.00 /  772.12 /    0.06 /   0.01 / -0.002  *XS*  E
========================== BEGIN BRIDGE ANALYSIS ==========================
CMORB AT   32170 /        /    100. /    40. /    3645. / 1.00 /   -5. /    5.
  770.00 /   0.10 /      ...3...  (-.001)  /     2.48 /   0.22 /          *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /            *RG*
--------------------------------------------------------------------------
CD  G AT   32300 /    130 /    100. /   722. /   17526. / 5.49 / -421. /  967.
  772.13 /   0.00 /   0.00 /    0.02 /  772.13 /    0.14 /   0.03 / -0.011  *AS*
--------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /   915. /   21502. / 5.16 / -423. /  995.
  772.27 /   0.00 /                  /  772.27 /    0.11 /   0.01 /          *AS*  F
========================== END BRIDGE ANALYSIS ============================
CD  H AT   33200 /    900 /     80. /   532. /   17531. / 2.92 /  -56. / 1143.
  772.27 /   0.00 /   0.02 /    0.00 /  772.27 /    0.15 /   0.02 / -0.020  *XS*  G
--------------------------------------------------------------------------

                          END OF THIS PROFILE
```

100-4-

USGS STEP-BACKWATER PROGRAM -- VERSION 77.180 *** PAGE COUNT= 9,DATE= 2/15/78

WATER-SURFACE PROFILE FOR: CRAPO DRAIN USS SEYMOUR RD DSS GTWRR HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*	
CD G AT	32,90	0	100.	317.	14020.	2.23	-123.	139.	P
772.31	0.00			772.31	0.32	0.04		*IS*	
CD H AT	33200	900	100.	283.	15952.	1.14	-57.	59.	6
772.35	0.00	0.04	0.0	772.35	0.35	0.03	-0.000	*XS*	

END OF THIS PROFILE

100-7

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 28,DATE= 2/15/78

100 yr NP

WATER-SURFACE PROFILE FOR: CRAPO DRAIN USS GTWRR TO NICHLOS ROAD HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *IO*
==================================================================================
CD  I AT   33540 /     0 /     80. /   164. /    9783. / 1.00 /  -39. /    -5.
   772.64 /   0.00 /                 / 772.64 /    0.49 /   0.04/          *IS*
----------------------------------------------------------------------------------
CD  J AT   34240 /   700 /     80. /   242. /   10028. / 1.74 / -900. /   -19.
   772.69 /   0.00 /   0.05 /   0.0  / 772.69 /    0.33 /   0.04 /  0.000  *XS*
----------------------------------------------------------------------------------
CD  K AT   34920 /   680 /     80. /   644. /   15319. / 2.91 /    0. / 1047.
   772.72 /   0.00 /   0.03 /   0.0  / 772.72 /    0.12 /   0.03 / -0.000  *XS*
----------------------------------------------------------------------------------
CD  L AT   35500 /   580 /     80. /  1132. /   28395. / 2.86 /    0. / 1354.
   772.72 /   0.00 /   0.01 /   0.0  / 772.72 /    0.07 /   0.01 / -0.009  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
VANVB AT   35500 /        /     80. /    74. /    7083. / 1.00 /    0. /   12.
   772.00 /   0.02 /        ...3...  (-.001)   /    1.08 /   0.08 /         *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /              *RG*
----------------------------------------------------------------------------------
CD  M AT   35610 /   110 /     80. /  1069. /   24811. / 3.81 / -974. /   705.
   772.73 /   0.00 /   0.00 /   0.02 / 772.73 /    0.07 /   0.01 / -0.011  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  1093. /   25484. / 3.73 / -974. /   705.
   772.74 /   0.00 /                 / 772.74 /    0.07 /   0.01 /         *AS*
========================== END BRIDGE ANALYSIS ============================
CD  N AT   36380 /   770 /     80. /   939. /   23571. / 2.62 / -329. /   774.
   772.74 /   0.00 /   0.01 /   0.0  / 772.74 /    0.09 /   0.01 / -0.008  *XS*
----------------------------------------------------------------------------------
CD  O AT   37150 /   770 /     80. /  1036. /   27495. / 3.29 /   51. / 1211.
   772.74 /   0.00 /   0.01 /   0.00 / 772.74 /    0.08 /   0.02 / -0.008  *XS*
----------------------------------------------------------------------------------
CD  P AT   37950 /   800 /     80. /  1088. /   26333. / 2.55 / -637. /   646.
   772.74 /   0.00 /   0.01 /   0.0  / 772.74 /    0.07 /   0.01 / -0.007  *XS*
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

100 yr NP

USGS STEP-BACKWATER PROGRAM - VERSION [illegible] *** PAGE COUNT= 20.DATE= 2/13/78 Floodway Run

WATER-SURFACE PROFILE FOR: CRAPO DRAIN SOUTH - SEYMOUR ROAD HOLTSLAG
PAGE 1 OF 1. PROFILE NUMBER 5. UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR. FW ANALYSIS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / WIDTH	CONVEYANCE / SEG.	ALPHA / V	LEW / FN	REW / ACC	*ID*	
CD B AT 29730 / 772.16	0 / 0.00		100. / 653. / 772.16	32362. / 0.15	1.15 / 0.01	-70. /	130.	*IS*	A
CD C AT 30420 / 772.16	690 / 0.00	100. / 0.00	796. / 0.0 / 772.16	44342. / 0.13	1.09 / 0.01	190. / -0.005	390.	*XS*	B
CD D AT 30910 / 772.16	490 / 0.00	100. / 0.01	382. / 0.00 / 772.16	10200. / 0.26	1.10 / 0.04	-50. / -0.011	250.	*XS*	C
CD E AT 31560 / 772.19	650 / 0.00	100. / 0.03	590. / 0.0 / 772.19	23078. / 0.17	1.37 / 0.02	-180. / -0.000	120.	*XS*	D
CD F AT 32170 / 772.19	610 / 0.00	100. / 0.01	595. / 0.0 / 772.19	22170. / 0.17	1.11 / 0.02	390. / -0.012	690.	*XS*	E
BEGIN BRIDGE ANALYSIS									
CHORD AT 32170 / 770.00	/ 0.10	100. / ...3...	40. / (-.001)	3645. / 2.48	1.00 / 0.22	-5. /	5.	*BO*	
EMBANKMENT OVERFLOW (CFS) / LEFT 0. / RIGHT 0. /								*RG*	FW
CD G AT 32300 / 772.20	130 / 0.00	100. / 0.00	358. / 0.02 / 772.20	14596. / 0.26	2.42 / 0.04	-120. / -0.011	180.	*AS*	
M = **** / E = **** / K* = **** / 772.33	/ 0.00		399. / 772.34	16034. / 0.25	2.43 / 0.03	-120. /	180.	*AS*	F
END BRIDGE ANALYSIS									
CD H AT 33200 / 772.36	900 / 0.00	80. / 0.03	312. / 0.0 / 772.36	16155. / 0.26	1.34 / 0.02	-50. / -0.000	250.	*XS*	G

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12.DATE= 2/15/78

WATER-SURFACE PROFILE FOR: CRAPO DRAIN USS SEYMOUR RD DSS GTWRR HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS

SECID AT DISTANCE/ WS ELEV	LENGTH/DISCHARGE/ HV	HF	HE	AREA /CONVEYANCE/ EG	V	ALPHA/ FN	LEW / ACC	REW *ID*	
CD G AT 32300 / 772.37	0 / 0.00	100. /	295. / 772.3/	14387. / J.34	1.04 / 0.04/	-30. /	120. *IS*		F
CD H AT 33200 / 772.42	900 / 0.00	100. / 0.05	251. / 0.0	13732. / 772.42	1.13 / 0.40	-50. / 0.03	50. 0.000 *XS*		G

END OF THIS PROFILE

FW

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   33,DATE= 2/15/78

WATER-SURFACE PROFILE FOR:  CRAPO DRAIN  USS GTWRR TO NICHLOS ROAD   HOLTSLAG
PAGE  1 OF  1, PROFILE NUMBER  5,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
=================================================================================
CD  I AT   33540 /      0 /      80. /   166. /   10033. / 1.00 /  -39. /   -5.
   772.71 /   0.00 /                  /  772.71 /    0.48 /   0.04/          *IS*
---------------------------------------------------------------------------------
CD  J AT   34240 /    700 /      80. /   231. /   10178. / 1.56 / -217. /  -20.
   772.75 /   0.00 /   0.04 /    0.0  /  772.76 /    0.35 /   0.04 / -0.000  *XS*
---------------------------------------------------------------------------------
CD  K AT   34920 /    680 /      80. /   377. /   13001. / 1.72 /  480. /  780.
   772.79 /   0.00 /   0.03 /    0.0  /  772.79 /    0.21 /   0.03 / -0.000  *XS*
---------------------------------------------------------------------------------
CD  L AT   35500 /    580 /      80. /   427. /   17221. / 1.80 /  485. /  785.
   772.79 /   0.00 /   0.02 /    0.0  /  772.79 /    0.19 /   0.02 / -0.017  *XS*
========================== BEGIN BRIDGE ANALYSIS ==============================
VANVB AT   35500 /        /      80. /    74. /    7083. / 1.00 /    0. /   12.
   772.00 /   0.02 /        ...3...  (-.001)    /    1.08 /   0.08 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                *RG*
---------------------------------------------------------------------------------
CD  M AT   35610 /    110 /      80. /   325. /   12692. / 2.54 /  -55. /  245.
   772.80 /   0.00 /   0.00 /    0.02 /  772.80 /    0.25 /   0.03 / -0.011  *AS*
---------------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /    329. /   12834. / 2.54 /  -55. /  245.
   772.81 /   0.00 /                  /  772.82 /    0.24 /   0.03 /          *AS*
========================== END BRIDGE ANALYSIS ================================
CD  N AT   36380 /    770 /      80. /   432. /   15644. / 1.89 /  -70. /  230.
   772.84 /   0.00 /   0.02 /    0.0  /  772.84 /    0.19 /   0.02 / -0.000  *XS*
---------------------------------------------------------------------------------
CD  O AT   37150 /    770 /      80. /   435. /   18532. / 1.95 /  185. /  485.
   772.84 /   0.00 /   0.02 /    0.00 /  772.84 /    0.16 /   0.02 / -0.017  *XS*
---------------------------------------------------------------------------------
CD  P AT   37950 /    800 /      80. /   443. /   16107. / 1.90 /  -35. /  265.
   772.84 /   0.00 /   0.02 /    0.0  /  772.84 /    0.18 /   0.03 / -0.018  *XS*
---------------------------------------------------------------------------------

                          END OF THIS PROFILE
```

H

I

J

K

FW

L

M

N

O

00BREAK00

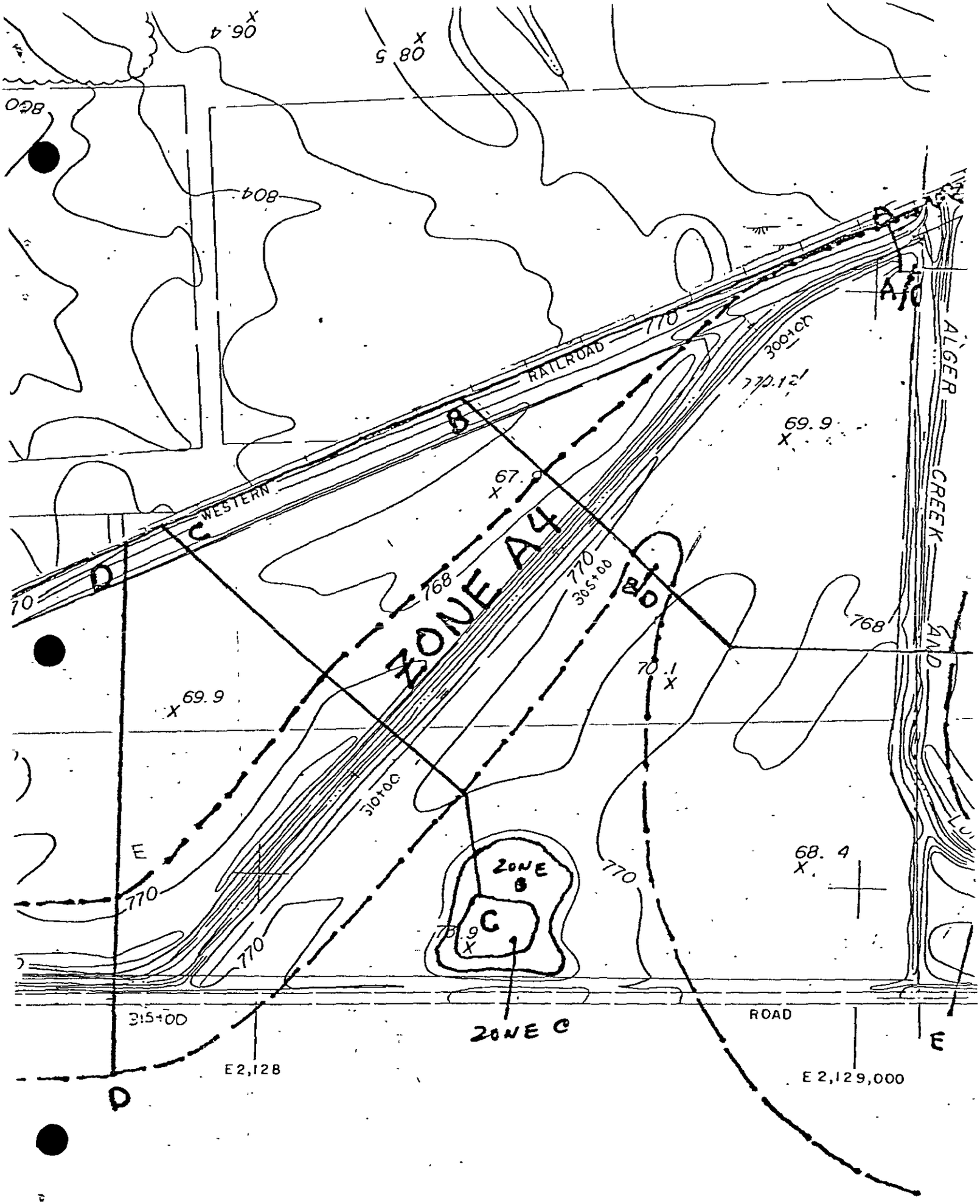
1) COUNTY: Genesee

2) STUDY NAME: Twp of Gaines

3) WATERCOURSE: Crapo Drain

4) DOCUMENT TYPE: Maps and profile

00BREAK00



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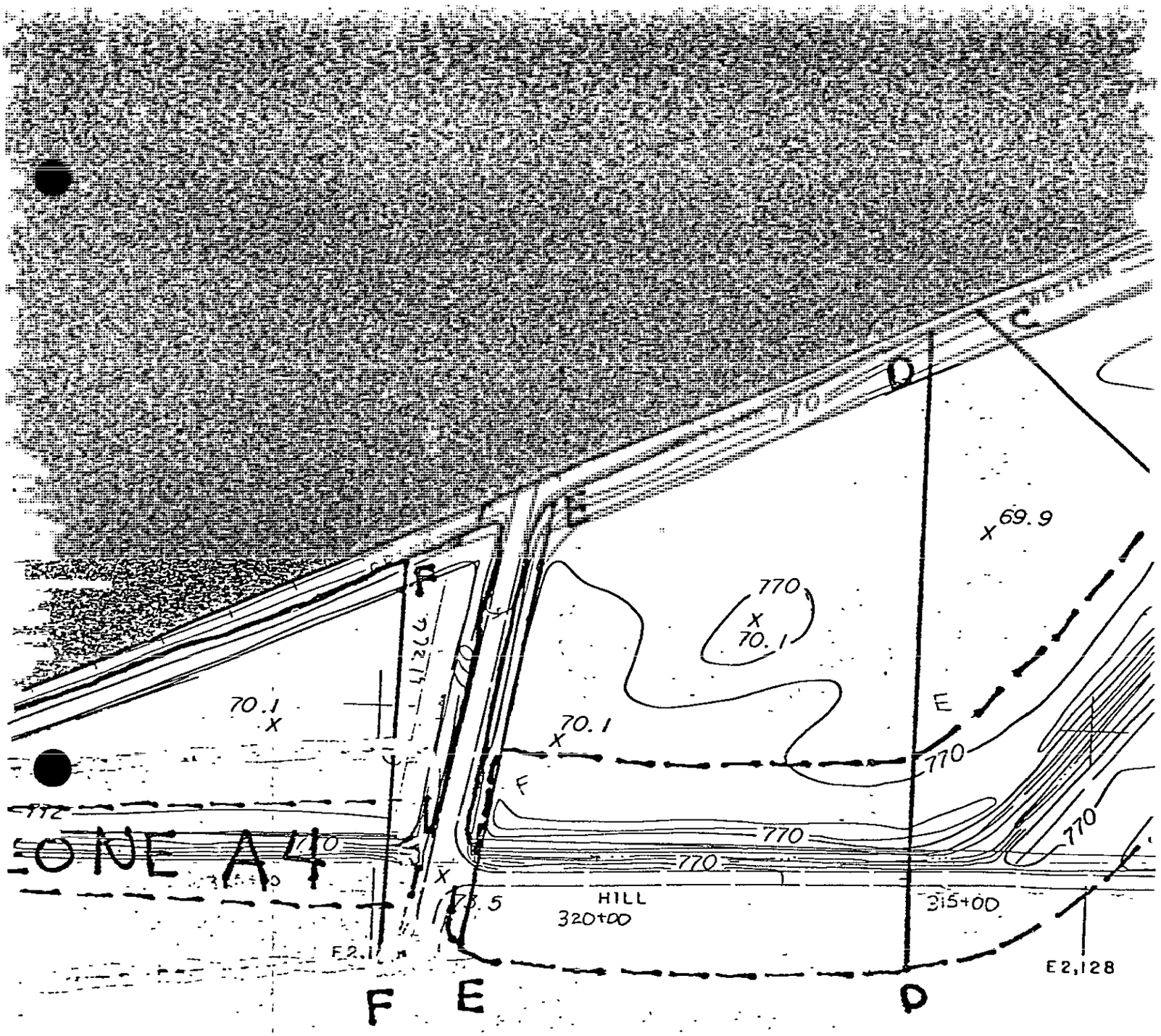

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18	17	16	15	14	13
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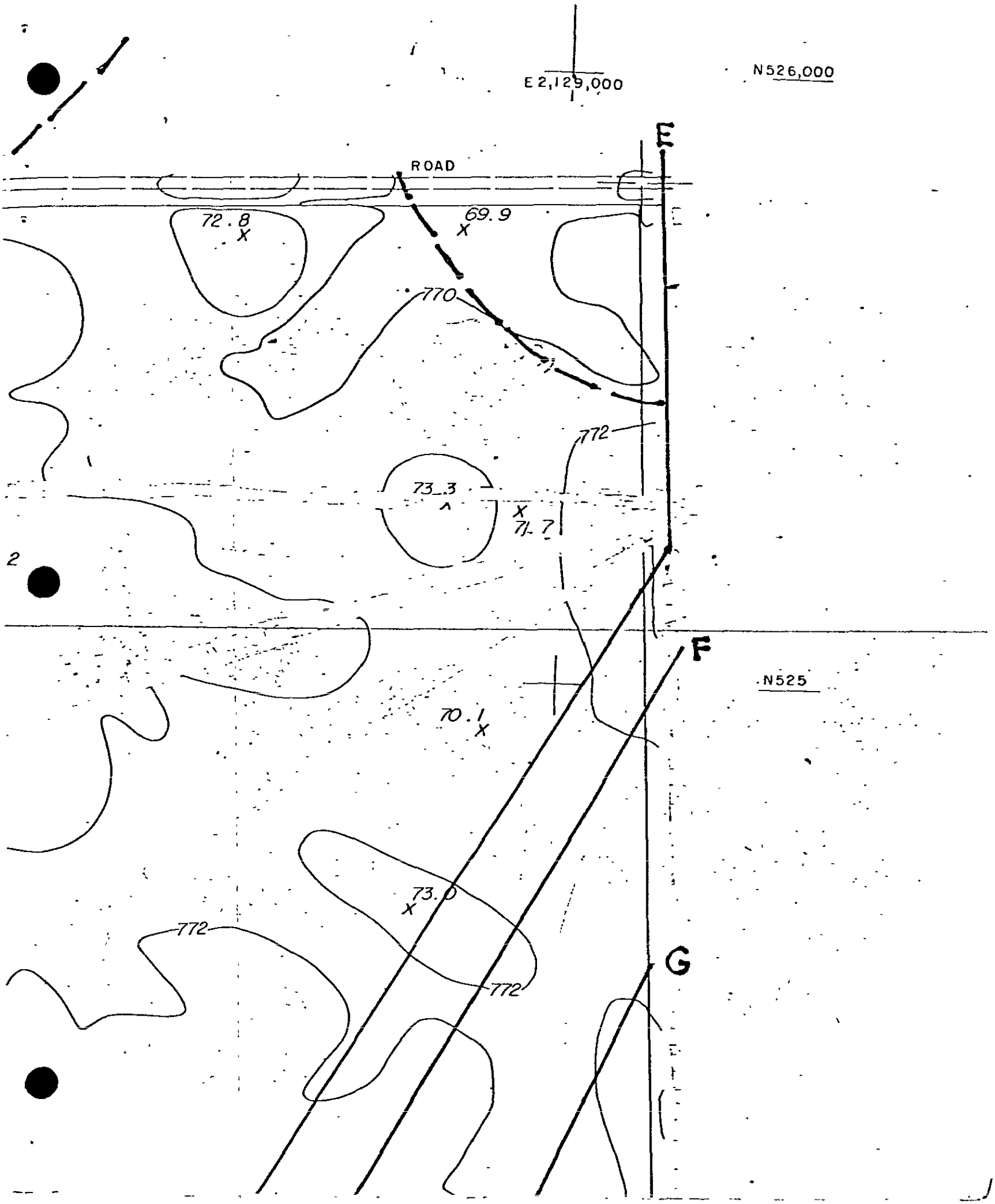
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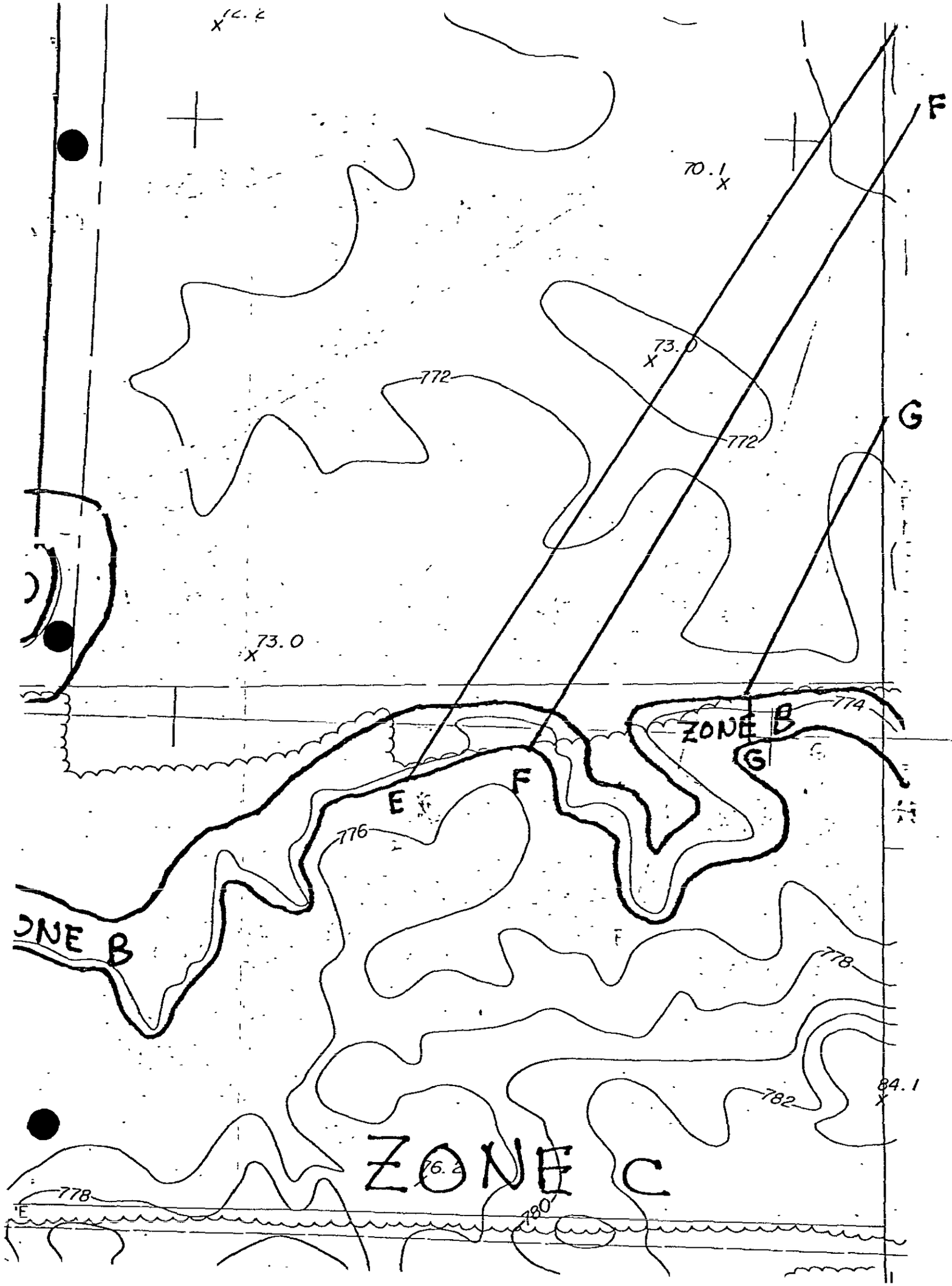
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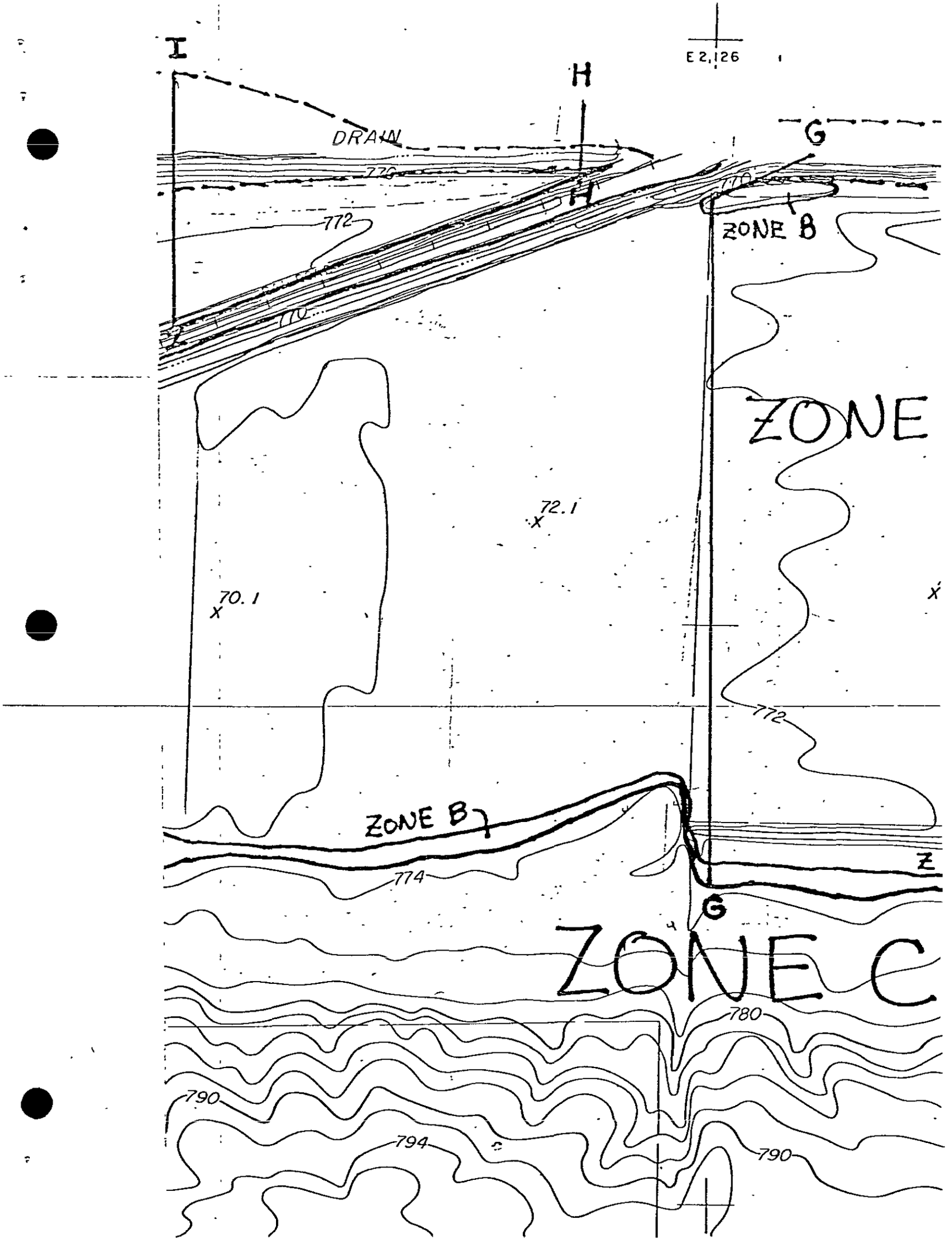
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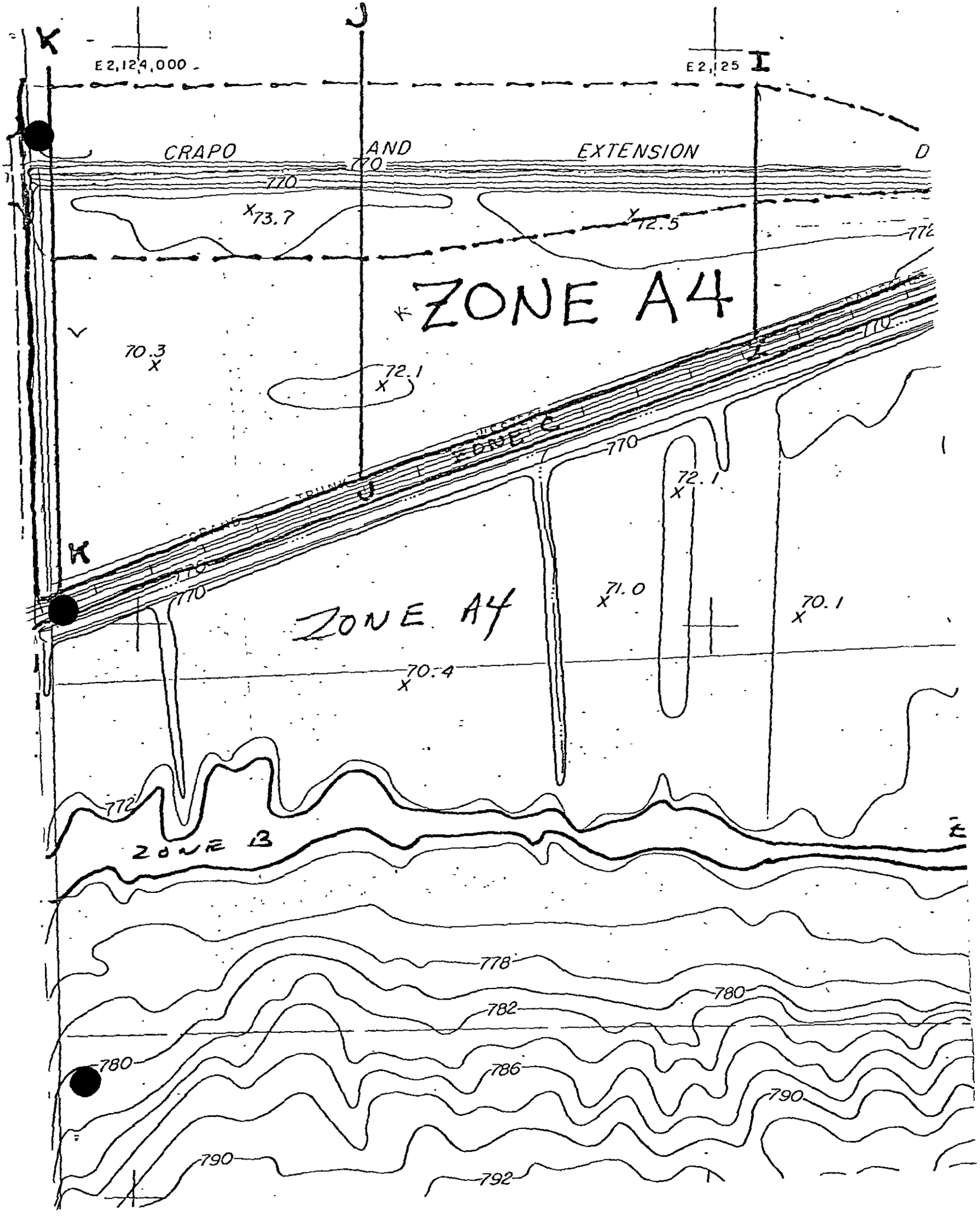
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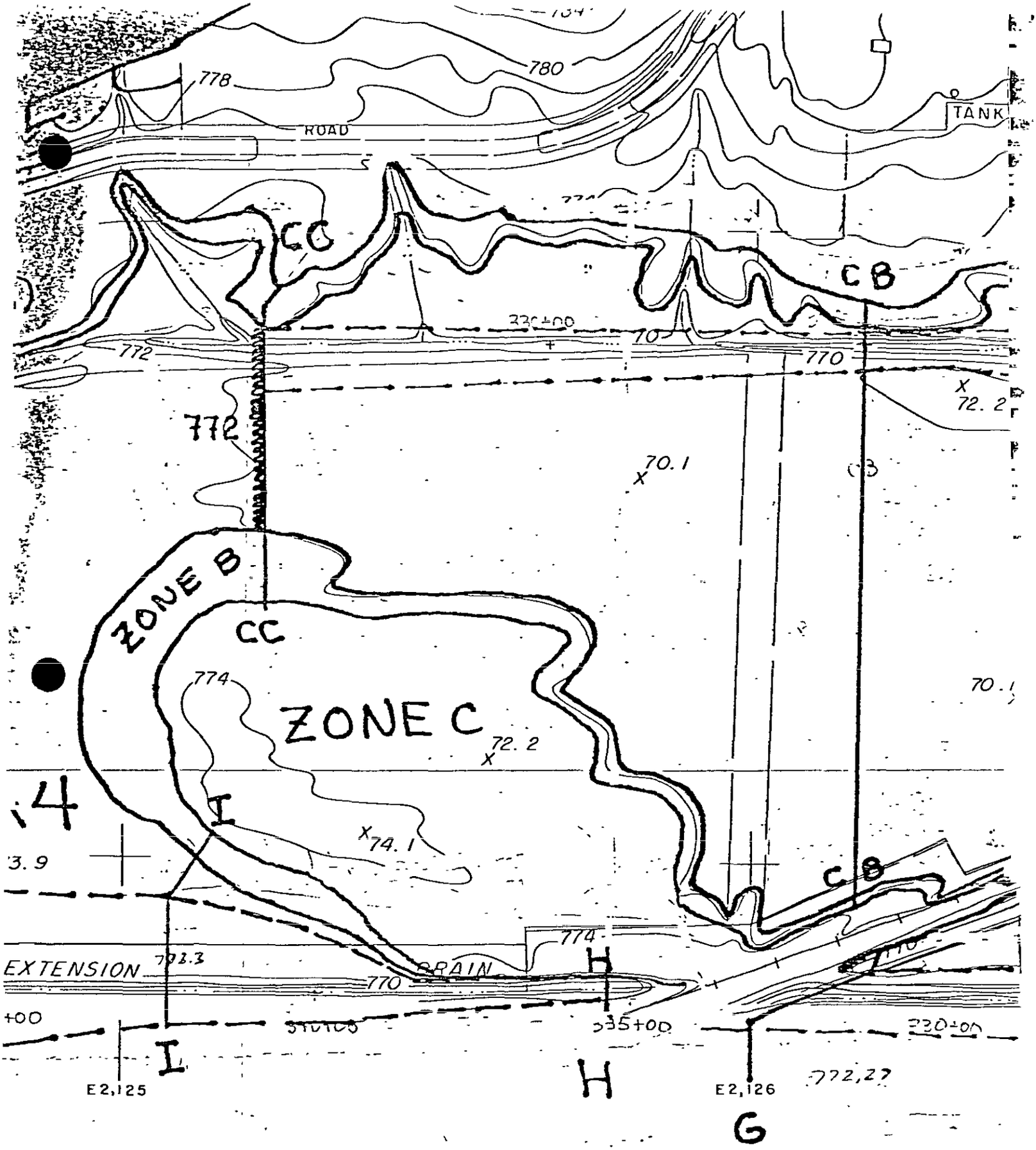
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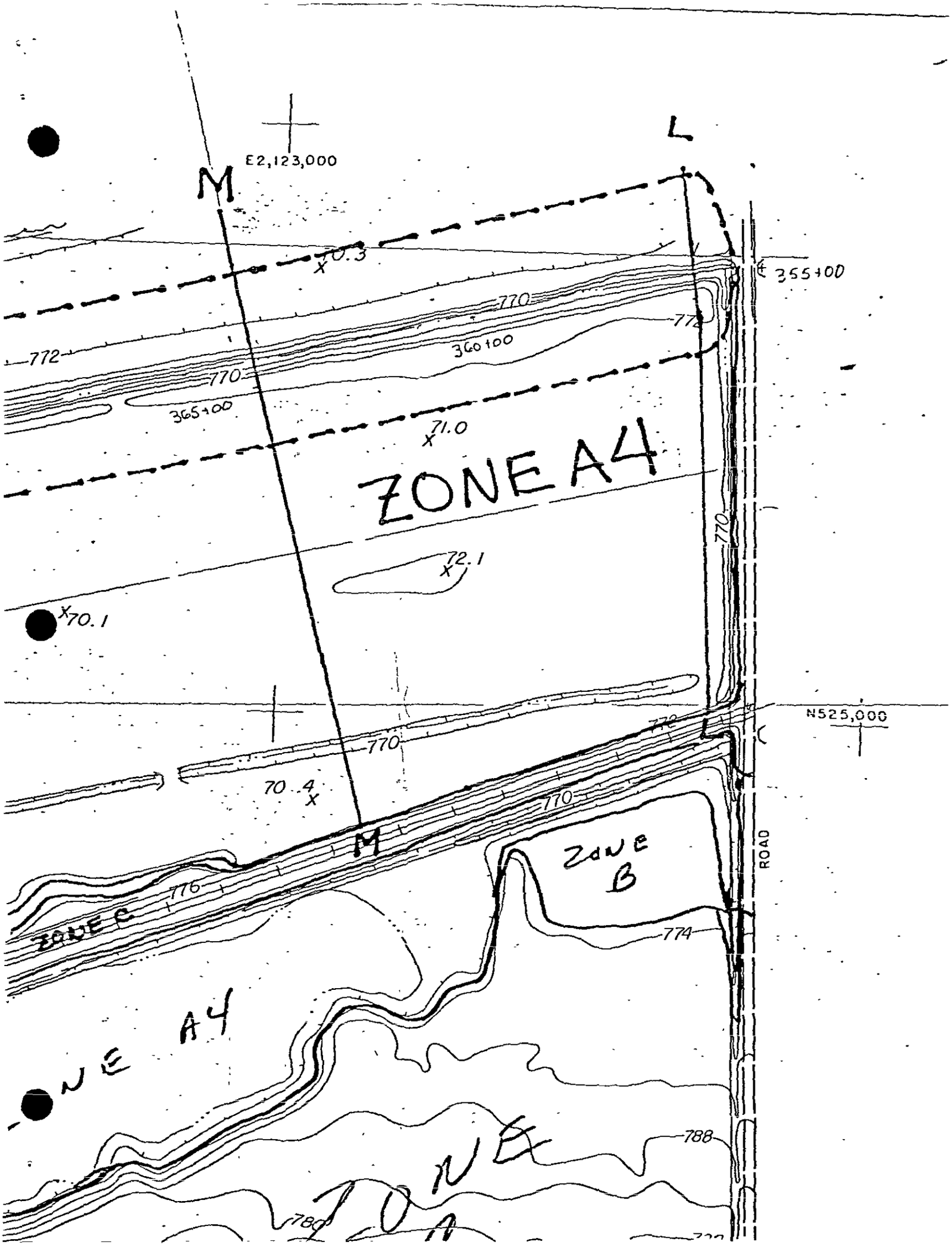
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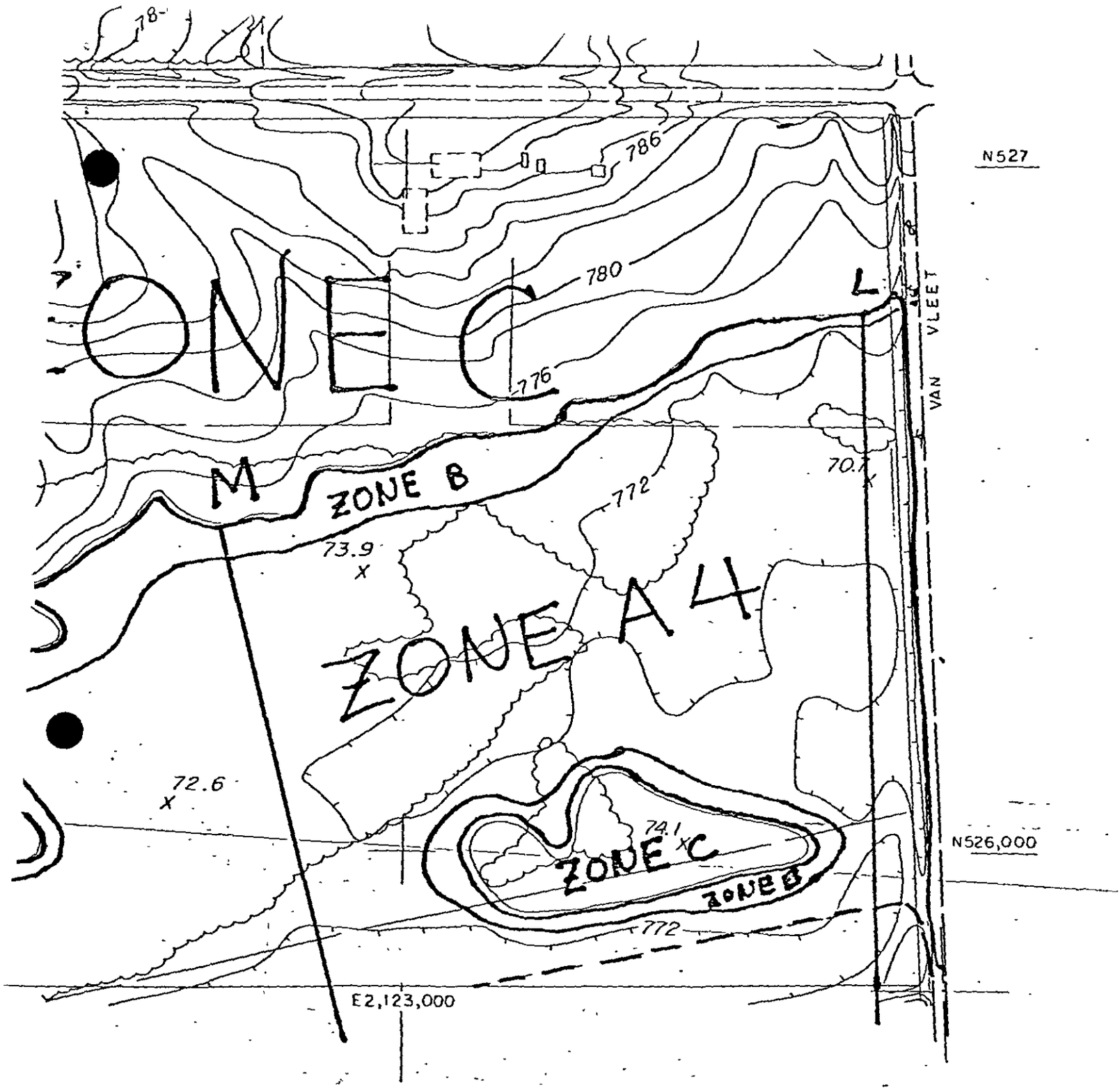

ECT INDEX

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16	15	14	13

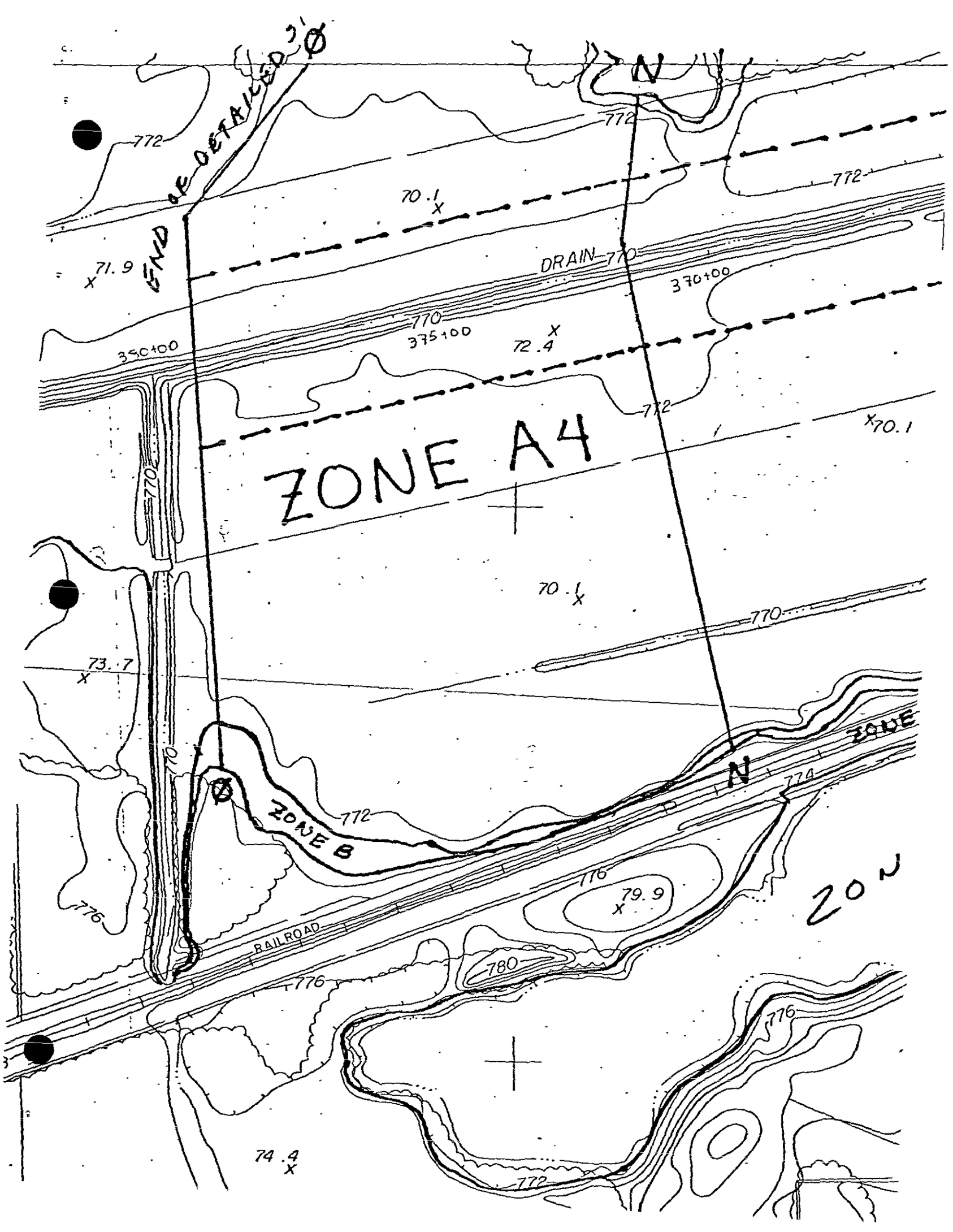
COMPOSITE

OF

Section 4, T.6N. R.5E

Gaines Twp., Genesee Co.,

COMMISSION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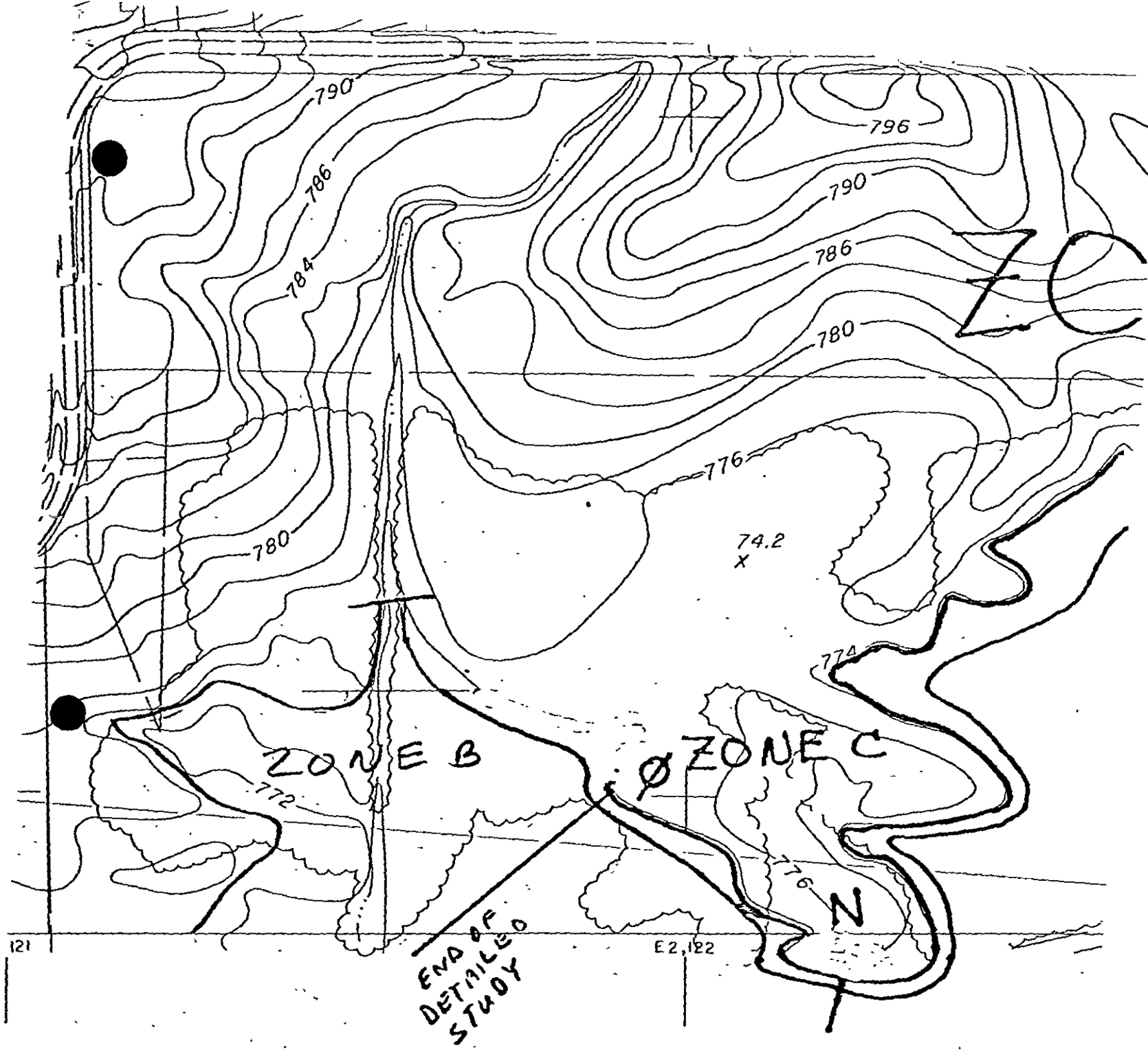

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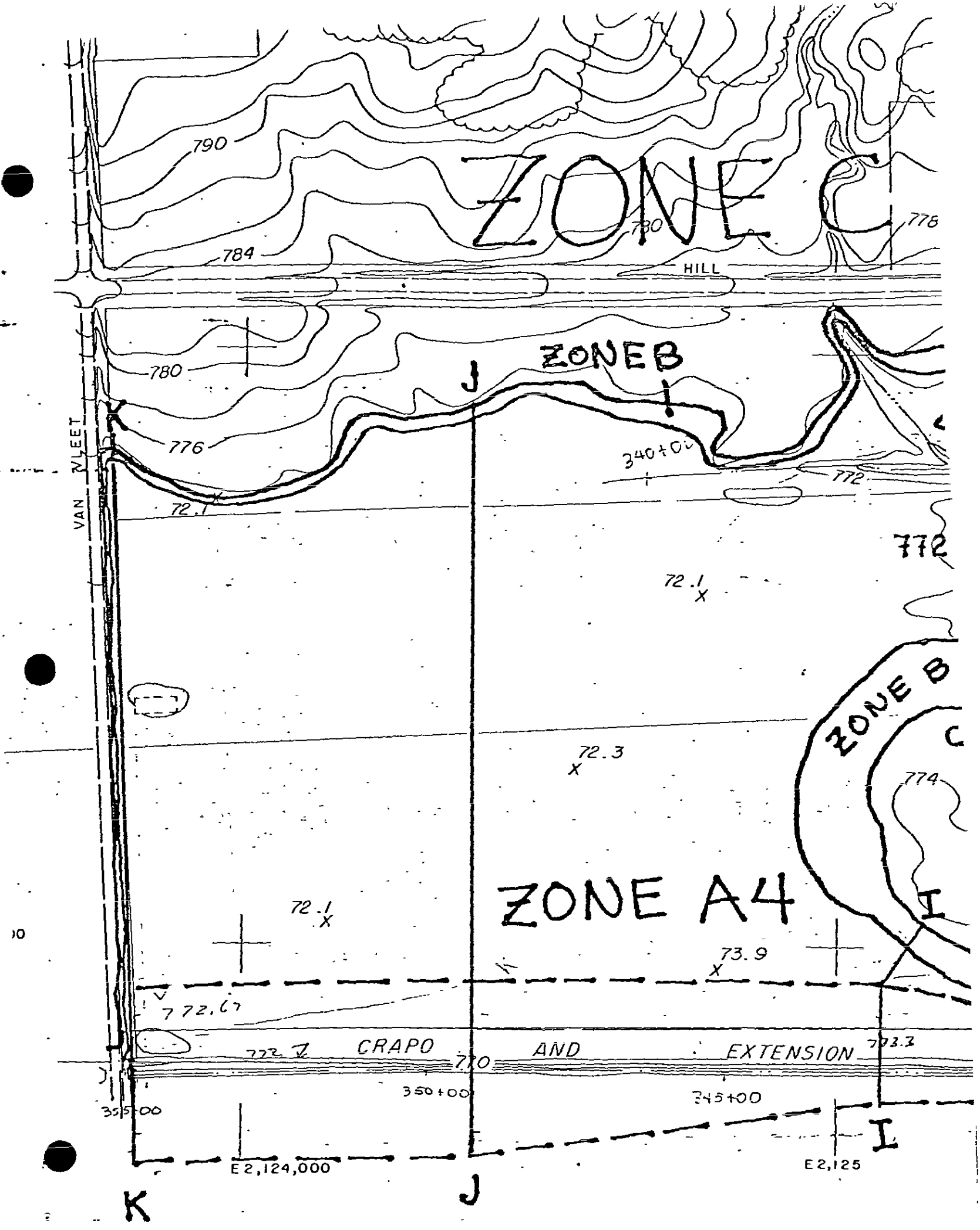
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774
ZONE A4
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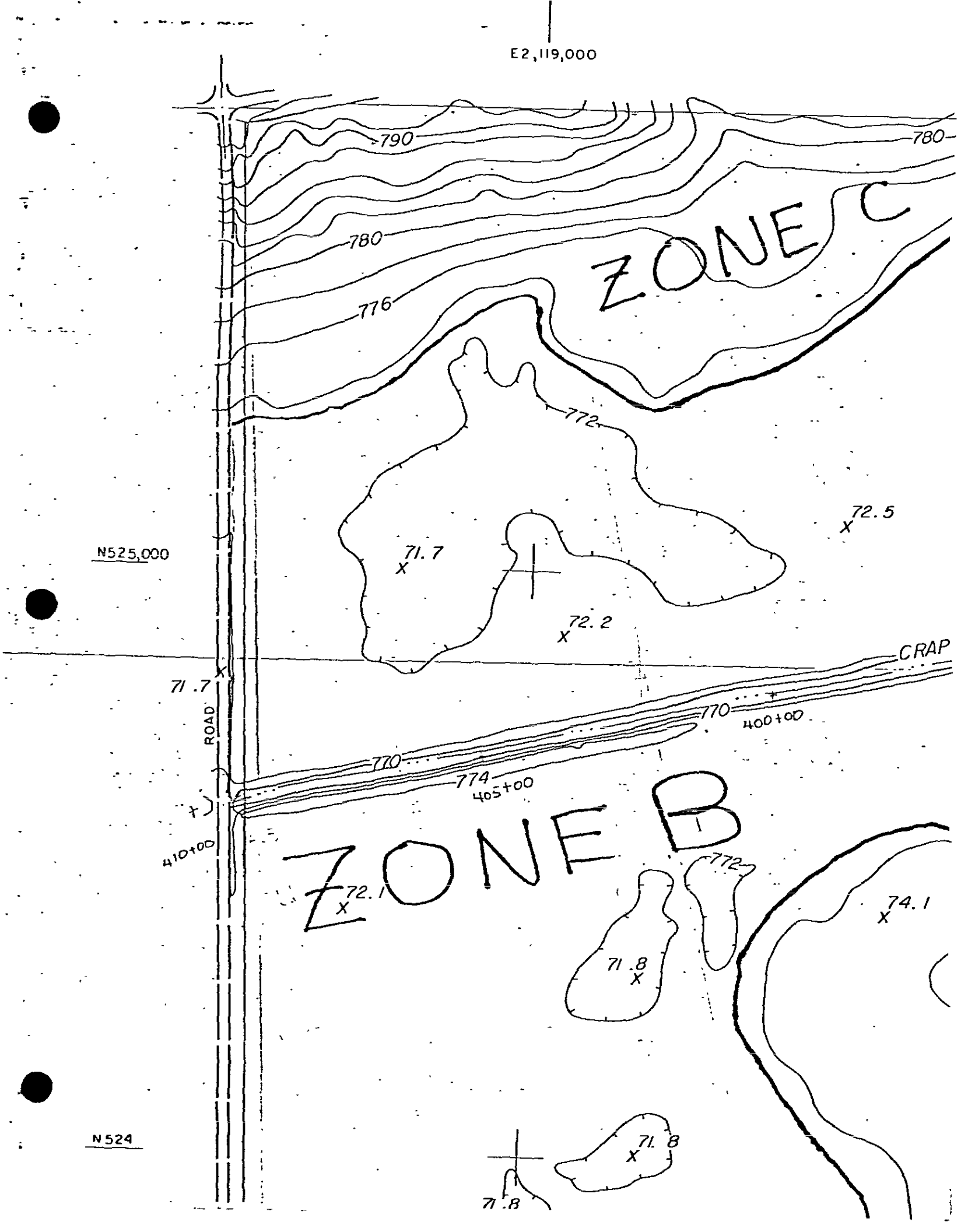
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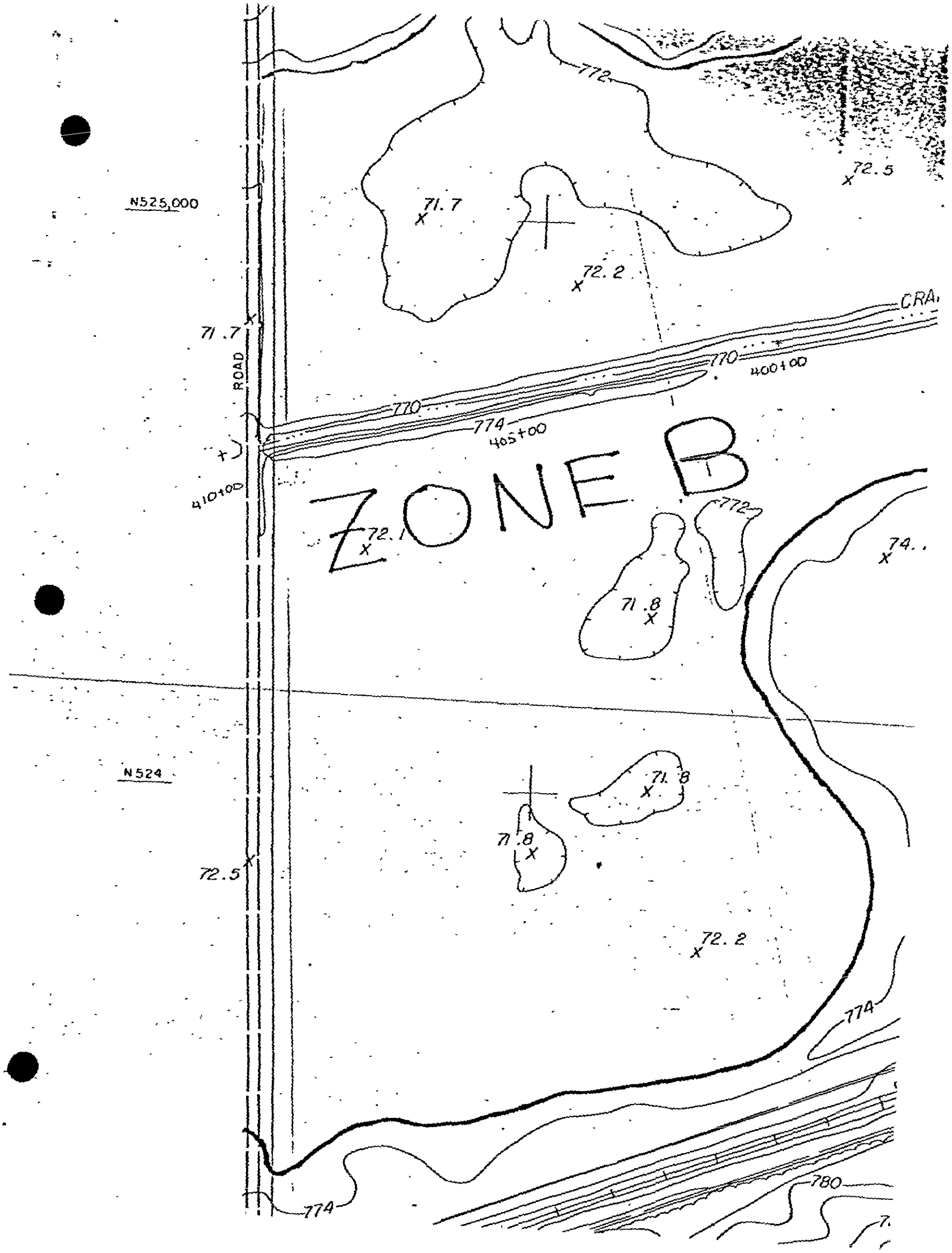
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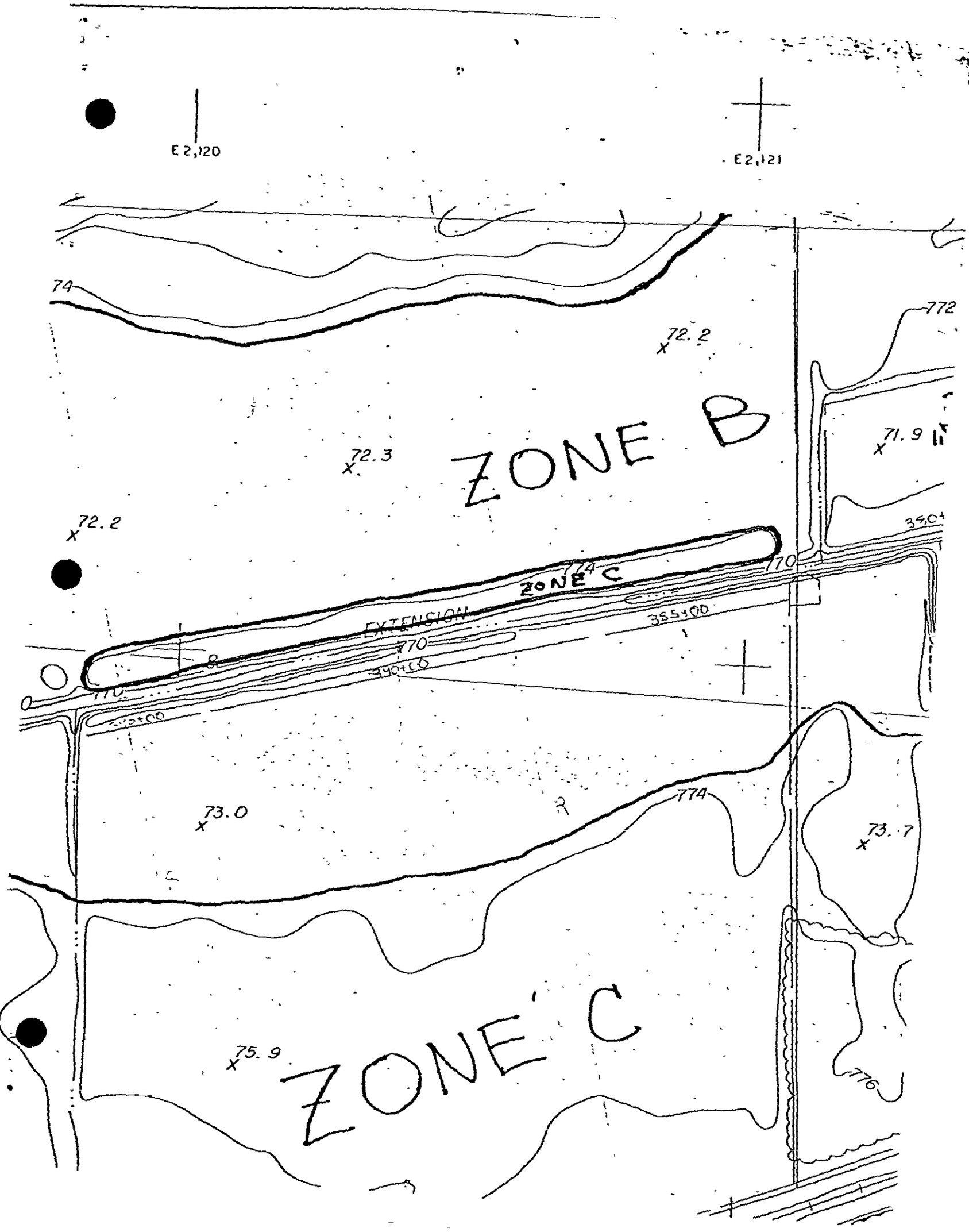
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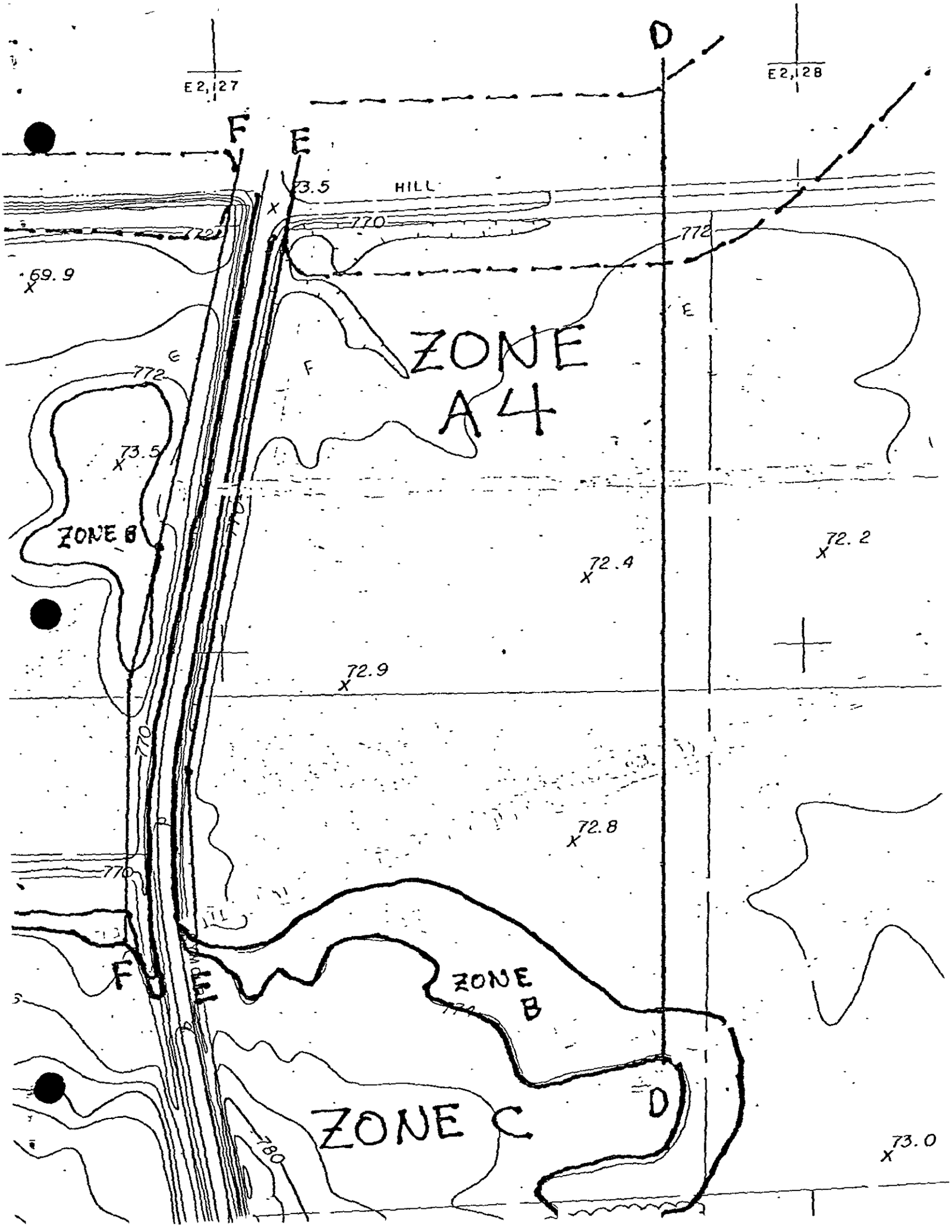
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ZONE C
D
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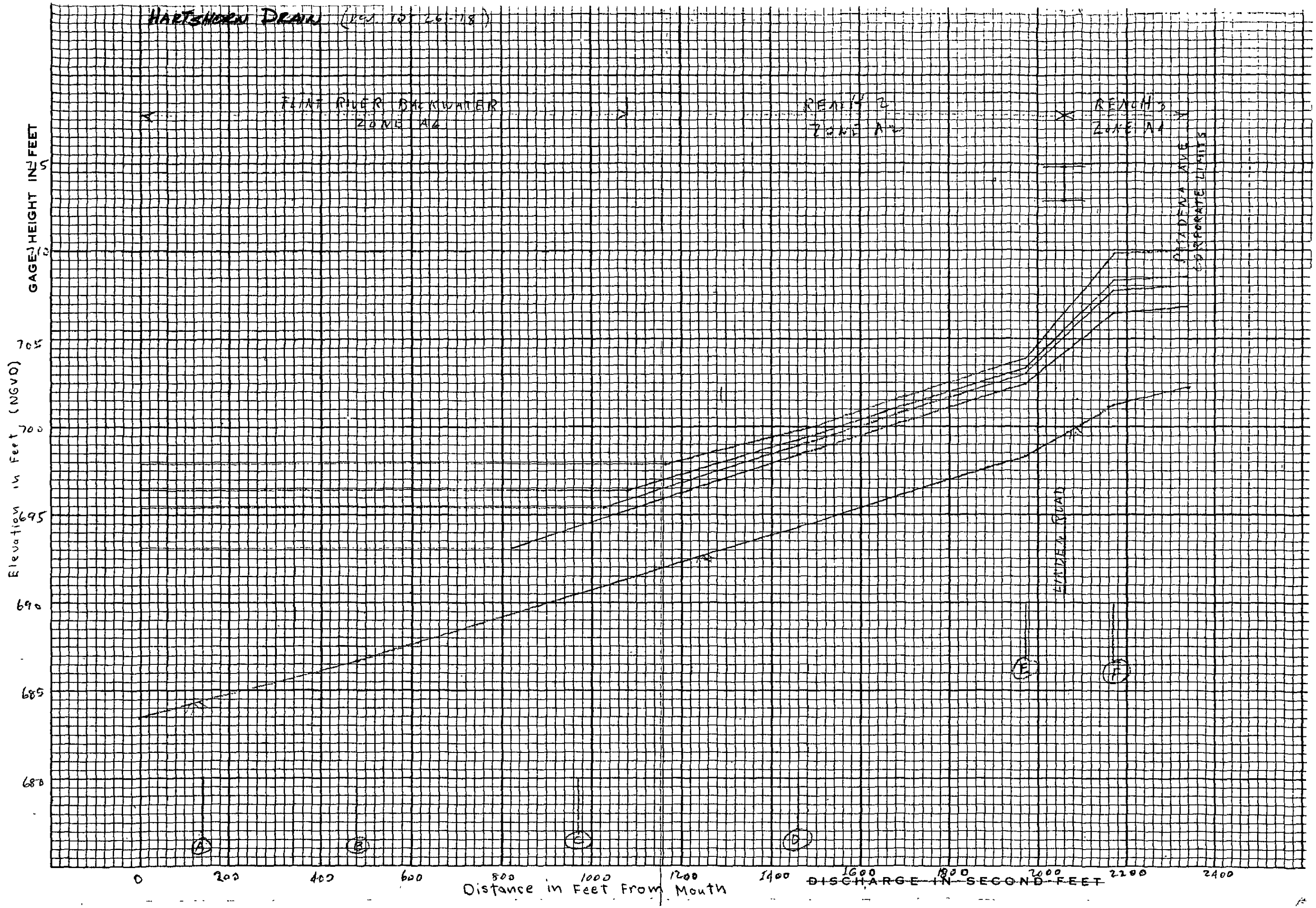
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FLINT RIVER BACKWATER
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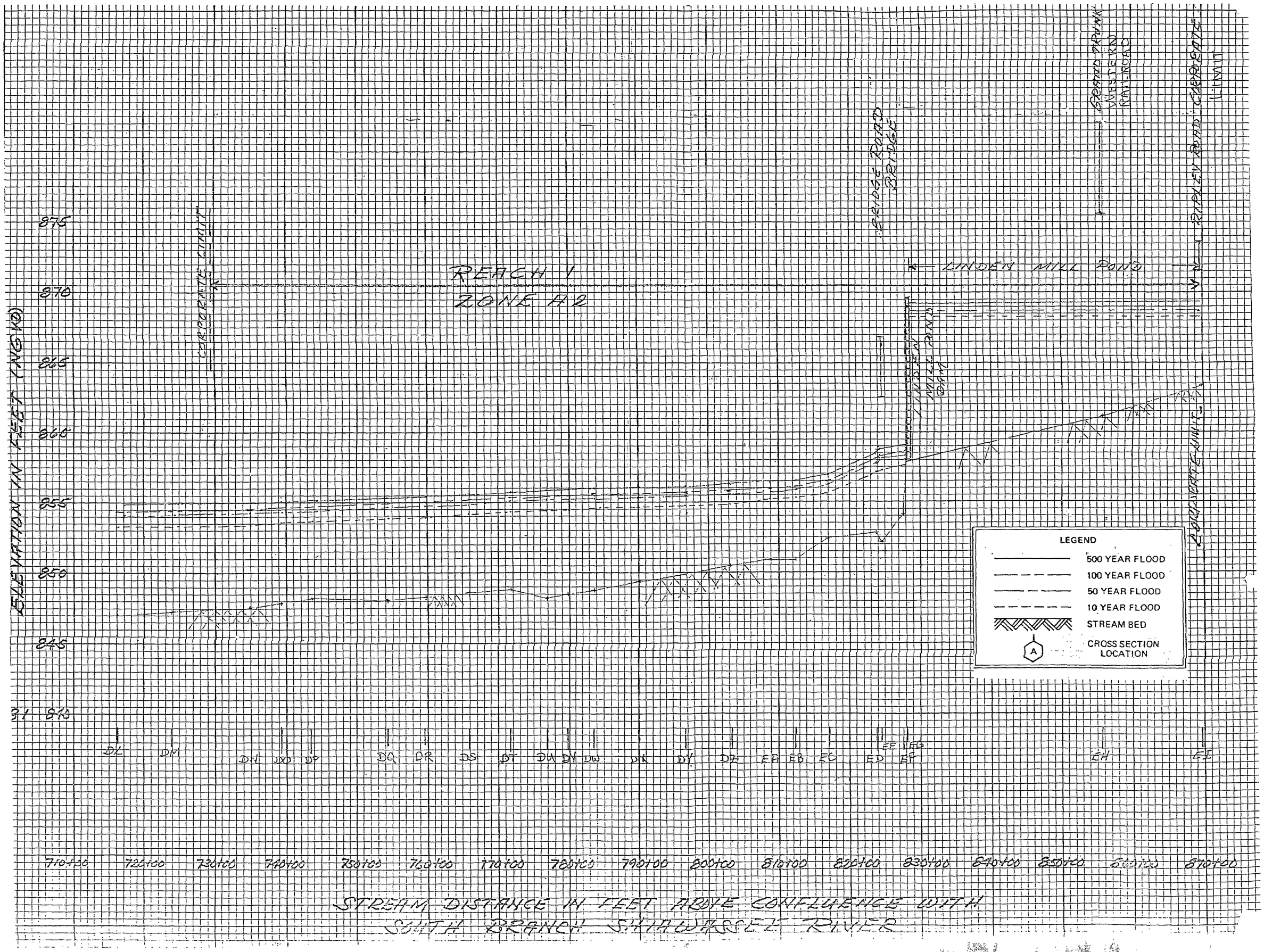
REACH 2
ZONE A2
REACH 3
ZONE A1
STADENA AVE
CORPORATE LIMITS
LYNDEN ROAD
GAGE HEIGHT IN FEET
Elevation in Feet (NGVD)
5
10
705
700
695
690
685
680
A
B
C
D
E
F
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
Distance in Feet From Mouth
DISCHARGE IN SECOND FEET


ELEVATION IN FEET (NGVD)
875
870
865
860
855
850
845
840
CORPORATE LIMIT
REACH 1
ZONE A2
FRIDAY ROAD BRIDGE
LINDEN MILL POND
MILL DAM
SPRING TRUNK WESTERN RAILROAD
RIPLEY ROAD CROSSING
CORPORATE LIMIT
LEGEND
500 YEAR FLOOD
100 YEAR FLOOD
50 YEAR FLOOD
10 YEAR FLOOD
STREAM BED
CROSS SECTION LOCATION
A
DL
DM
DN
DO
DP
DQ
DR
DS
DT
DU
DV
DW
DX
DY
DZ
EA
EB
EC
ED
EE
EF
EG
EH
EI
710+50
720+00
730+00
740+00
750+00
760+00
770+00
780+00
790+00
800+00
810+00
820+00
830+00
840+00
850+00
860+00
870+00
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH SOUTH BRANCH SHIAWASSEE RIVER

00BREAK00

1) COUNTY: Genesee

2) STUDY NAME: Village of Linden

3) WATERCOURSE: Shiawassee River

4) DOCUMENT TYPE: 100 yr natural & Encroached

00BREAK00

```
1 OHIAVASSEE RIVER E CORP FENION TWSP-DAM  RLL DJH  25 05 02 10 12
2 85024  85078  85136  85099  85106
3 11200    3A 1  12  3  846   65360 99 99
4 11204    420    580    790    650    650
5 11210      0  1  8560   53  1  8540   84  1  8520   97  1  8500  146  1  8490
5 11211    150  2  8488  156  2  8471  165  2  8453  178  2  8471  186  2  8486
5 11212    191  3  8500  202  3  8600
6 11229  1  2 100 100  1  2 047 047  1  2 080 080
3 11300    3H 0  10  3  846   65810 99 99
5 11310      0  1  8590    8  2  8540   17  2  8492   32  2  8462   47  2  8489
5 11311     49  3  8493   70  3  8500   86  3  8520   98  3  8540  114  3  8560
5 11329  1  2 100 100  1  2 055 055  1  2 080 080
3 11400    3C 0  16  3  847   66480 99 99
5 11410      0  1  8600   12  1  8560   22  1  8540   33  1  8520   45  1  8500
5 11411     84  1  8480   90  2  8480   94  2  8479   96  2  8472  120  2  8468
5 11412    150  2  8479  155  3  8480  177  3  8500  338  3  8520  422  3  8540
5 11413    506  3  8560
6 11429  1  2 110 110  1  2 055 055  1  2 080 080
3 11500    3D 1  16  3  848   67050 99 99
4 11504    380    530    720    590    590
5 11510      0  1  8580   35  1  8560   85  1  8540  132  1  8520  140  2  8500
5 11511    148  2  8480  153  2  8481  163  2  8479  173  2  8478  178  2  8472
5 11512    182  2  8480  193  3  8500  213  3  8520  236  3  8540  248  3  8560
5 11513    258  3  8580
6 11529  1  2 090 090  1  2 050 050  1  2 100 100
3 11600 8R 3D 2  10  1  848   67050        0  8544 3 1
5 11610      0  1  8544    0  1  8488    5  1  8481   10  1  8478   15  1  8479
5 11611     20  1  8479   25  1  8477   32  1  8472   32  1  8544    0 -9  8544
6 11629  1  2 042 042
3 11700 8D 3D 4  12  3   30          1  3          2 2 2          1
5 11710   -230  1  8601 -174  1  8581 -122  1  8566  -72  1  8565  -18  1  8567
5 11711    -17  2  8567   17  2  8568   18  3  8568   74  3  8568  126  3  8569
5 11712    180  3  8578  253  3  8591
3 11800    3E 5  21  3  847   67130  1  3
5 11810   -148  1  8580 -129  1  8560  -89  1  8540  -68  1  8520    0  1  8505
5 11811      5  1  8499   10  1  8494   15  1  8483   18  2  8475   25  2  8471
5 11812     30  2  8470   35  2  8468   40  2  8466   45  2  8467   50  3  8474
5 11813     55  3  8480   75  3  8501   88  3  8520  122  3  8540  142  3  8560
5 11814    168  3  8580
6 11829  1  2 100 100  1  2 050 050  1  2 120 120
3 11900    3F 0  15  3  846   67560 99 99
5 11910     15  1  8600   28  1  8580   56  1  8560   97  1  8540  116  1  8520
5 11911    296  2  8500  298  2  8486  320  2  8457  347  2  8486  349  3  8500
5 11912    360  3  8520  370  3  8540  376  3  8560  388  3  8580  402  3  8600
6 11929  1  2 120 120  1  2 050 050  1  2 065 065
```

CY

CZ

DA

DB

DC

DD

```
1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0
3 12000    3G 0  13  3  847   67950 99 99
5 12010      16  1  8600   18  1  8580   32  1  8560   42  1  8540   61  2  8520   OE
5 12011      77  2  8486   88  2  8471   98  2  8486  100  3  8503  159  3  8520
5 12012     170  3  8540  178  3  8560  194  3  8600
6 12029  1  2 100 100  1  2 050 050  1  2 060 060
3 12100    3H 0  13  3  845   68470 99 99
5 12110      18  1  8580   70  1  8560  120  1  8540  193  1  8520  214  2  8500
5 12111     216  2  8484  232  2  8445  244  2  8483  246  2  8503  257  3  8523   DF
5 12112     260  3  8540  275  3  8560  288  3  8580
6 12129  1  2 070 070  1  2 055 055  1  2 060 060
3 12200 HR 3H 2  12  1  845   68470       30  8531 3 1
5 12210       0  1  8531    0  1  8505    2  1  8484    4  1  8478    8  1  8456
5 12211      12  1  8445   16  1  8447   20  1  8449   24  1  8467   28  1  8485
5 12212      28  1  8531    0 -9  8531
6 12229  1  2 042 042
3 12300 HO 3H 4  10  3   15          1  3          2 2 2              1
5 12310    -248  1  8585 -174  1  8545 -120  1  8539  -76  1  8537  -19  2  8541
5 12311      19  2  8541   20  3  8540   48  3  8544   88  3  8558  114  3  8576
3 12400    3I 5  20  3  845   68510  1  3
5 12410    -178  1  8580 -162  1  8560 -143  1  8540 -126  1  8520  -20  1  8495   DG
5 12411      -5  1  8497    1  2  8483    4  2  8477   10  2  8457   14  2  8454
5 12412      18  2  8453   22  2  8451   26  2  8460   29  2  8473   30  3  8477
5 12413      31  3  8483   41  3  8541   88  3  8540  102  3  8560  124  3  8580
6 12429  1  2 120 120  1  2 050 050  1  2 053 053
3 12500    3J 0  15  3  846   69230 99 99
5 12510       0  1  8600   22  1  8580  138  1  8560  164  1  8540  208  1  8520   DH
5 12511     220  2  8520  230  2  8500  252  2  8458  285  2  8500  292  3  8520
5 12512     339  3  8520  492  3  8520  518  3  8540  533  3  8560  548  3  8580
6 12529  1  2 100 100  1  2 050 050  1  2 150 150
3 12600    3K 0  16  3  847   69810 99 99
5 12610       0  1  8600   21  1  8580   46  1  8560   68  1  8540  122  1  8520
5 12611     242  2  8500  248  2  8483  271  2  8463  290  2  8483  302  2  8500   DI
5 12612     304  3  8500  373  3  8520  438  3  8540  464  3  8560  498  3  8580
5 12613     512  3  8600
6 12629  1  2 120 120  1  2 050 050  1  2 120 120
3 12700    3L 0  15  3  847   70240 99 99
5 12710     100  1  8600  122  1  8580  141  1  8560  158  1  8540  210  1  8520
5 12711     614  2  8510  618  2  8473  660  2  8466  717  2  8500  720  3  8500   DJ
5 12712     748  3  8520  772  3  8540  790  3  8560  812  3  8580  830  3  8600
6 12729  1  2 150 150  1  2 045 045  1  2 100 100
3 12800    3M 0  17  3  847   70500 99 99
5 12810     500  1  8600  518  1  8580  543  1  8560  573  1  8540  618  1  8520
5 12811     800  1  8518 1230  1  8518 1234  2  8503 1240  2  8481 1280  2  8469   DK
5 12812    1320  2  8475 1322  3  8500 1333  3  8520 1347  3  8540 1369  3  8560
5 12813    1386  3  8580 1395  3  8600
```

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                1         2         3         4         5         6         7         8
       ....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
6 12329  1  2 150 150  1  2 038 038  1  2 080 080
3 12900    3N 0  17  3  848   71610 99 99
5 12910     200  1  8600  235  1  8580  274  1  8560  317  1  8540  362  1  8520
5 12911     446  1  8515  448  2  8500  458  2  8480  480  2  8473  508  2  8480   DL
5 12912     512  3  8515  800  3  8517 1092  3  8520 1169  3  8540 1206  3  8560
5 12913    1247  3  8580 1262  3  8600
6 12329  1  2 140 140  1  2 045 045  1  2 120 120
3 13000    30 0  15  3  848   72380 99 99
5 13012     553  1  8560  572  1  8540  608  1  8520  825  1  8517  988  1  8515
5 13013     990  2  8500  995  2  8480 1032  2  8476 1057  2  8480 1060  3  8515   DM
5 13014    1086  3  8520 1144  3  8540 1188  3  8560 1212  3  8580 1238  3  8600
6 13029  1  2 120 120  1  2 050 050  1  2 100 100
3 13100   300 0  16  3  848   73500 99 99
5 13111     500  1  8600  500  1  8600  500  1  8600  500  1  8600  550  1  8520
5 13112    1015  1  8520 1028  2  8500 1030  2  8480 1050  2  8479 1068  2  8480   DN
5 13113    1070  2  8500 1082  3  8520 1093  3  8540 1202  3  8560 1233  3  8580
5 13114    1273  3  8600
6 13129  1  2 140 140  1  2 050 050  1  2 160 160
3 13200    3P 0  15  3  848   73930 99 99
5 13212     510  1  8580  537  1  8560  568  1  8540  745  1  8520  750  2  8520
5 13213     760  2  8492  782  2  8482  814  2  8492  826  3  8520  858  3  8520   DO
5 13214     951  3  8520  977  3  8540 1002  3  8560 1023  3  8580 1052  3  8600
6 13229  1  2 090 090  1  2 050 050  1  2 140 140
3 13300    3Q 0  12  3  849   74340 99 99
5 13312     873  1  8600  933  1  8580  994  1  8560 1023  1  8540 1130  1  8520
5 13313    1133  2  8520 1135  2  8496 1152  2  8486 1170  2  8496 1173  3  8500   DP
5 13314    1192  3  8520 1210  3  8600
6 13329  1  2 100 100  1  2 050 050  1  2 060 060
3 13400    3R 0  19  3  849   75420 99 99
5 13412     902  1  8580  914  1  8560  942  1  8540  970  1  8520 1000  1  8540
5 13413    1100  1  8560 1125  1  8540 1234  1  8520 1236  2  8520 1248  2  8496   DQ
5 13414    1290  2  8484 1317  2  8496 1324  2  8500 1336  3  8520 1386  3  8520
5 13415    1600  3  8520 1600  3  8600 2232  3  8600 2262  3  8600
6 13429  1  2 100 100  1  2 050 050  1  2 150 150
3 13500    3S 0  19  3  849   75960 99 99
5 13511     333  1  8600  360  1  8600  685  1  8600  732  1  8580  783  1  8560
5 13512     621  1  8540  911  1  8520  912  2  8520  922  2  8498  953  2  8486   DR
5 13513     982  2  8498  988  3  8528 1142  3  8528 1153  3  8520 1181  3  8525
5 13514    1198  3  8540 1204  3  8560 1209  3  8580 1222  3  8600
6 13529  1  2 100 100  1  2 050 050  1  2 120 120
3 13600    3T 0  17  3  849   76590 99 99
5 13610      74  1  8600   93  1  8580  124  1  8560  142  1  8560  174  1  8540
5 13611     192  1  8520  193  2  8520  195  2  8501  212  2  8489  229  2  8501   DS
5 13612     232  2  8503  241  3  8540  400  3  8540  592  3  8540  636  3  8560
5 13613     652  3  8580  678  3  8600
```

```
                    2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
6 13629  1  2 090 090  1  2 050 050  1  2 120 120
3 13700    3U 0  15  3  849   77160 99 99
5 13710      35  1  8620   51  1  8600   63  1  8580   72  1  8560   88  1  8540
5 13711     278  1  8530  402  1  8520  403  2  8520  416  2  8511  443  2  8491   DT
5 13712     472  2  8511  474  3  8513  487  3  8520  503  3  8540  522  3  8600
6 13729  1  2 100 100  1  2 045 045  1  2 090 090
3 13800    3V 0  19  3  849   77690 99 99
5 13810       0  1  8620    9  1  8600   43  1  8580   80  1  8560  120  1  8560
5 13811     160  1  8580  354  1  8580  377  1  8560  389  1  8540  398  2  8520   DU
5 13812     407  2  8507  432  2  8485  453  2  8500  458  3  8510  462  3  8530
5 13813     614  3  8540  628  3  8560  671  3  8580  692  3  8600
6 13829  1  2 100 100  1  2 045 045  1  2 080 080
3 13900    3W 0  26  3  849   77960 99 99
5 13910       0  1  8620    7  1  8600   33  1  8580   60  1  8560  139  1  8560
5 13911     169  1  8580  193  1  8600  243  1  8620  373  1  8620  378  1  8600
5 13912     402  1  8580  404  1  8560  420  1  8540  437  1  8520  453  1  8500   DV
5 13913     465  1  8520  552  2  8520  562  2  8500  587  2  8488  610  2  8500
5 13914     617  3  8520  640  3  8540  663  3  8560  690  3  8580  718  3  8600
5 13915     743  3  8620
6 13929  1  2 120 120  1  2 050 050  1  2 090 090
3 14000   3WW 0  23  3  849   78350 99 99
5 14008      26  1  8620   42  1  8600   91  1  8580  157  1  8580  211  1  8600
5 14010     242  1  8620  295  1  8620  328  1  8600  363  1  8580  382  1  8560   DW
5 14011     398  1  8540  540  1  8530  546  2  8520  558  2  8500  597  2  8491
5 14012     633  2  8500  642  2  8520  648  3  8530  724  3  8540  743  3  8560
5 14013     780  3  8580  808  3  8600  866  3  8620
6 14029  1  2 120 120  1  2 050 050  1  2 100 100
3 14100    3X 0  16  3  850   79000 99 99
5 14111      22  1  8620   50  1  8600   93  1  8580  133  1  8560  173  1  8540
5 14112     746  1  8535  748  2  8520  750  2  8500  778  2  8497  808  2  8500   DX
5 14113     812  2  8520  824  3  8540  834  3  8560  853  3  8580  868  3  8600
5 14114     883  3  8620
6 14129  1  2 140 140  1  2 050 050  1  2 100 100
3 14200    3Y 0  18  3  850   79670 99 99
5 14211      50  1  8660  100  1  8640  160  1  8620  190  1  8600  235  1  8580
5 14212     450  1  8560  726  1  8540  740  2  8530  750  2  8520  752  2  8500   DY
5 14213     782  2  8502  816  2  8523  820  3  8541 1342  3  8540 1389  3  8560
5 14214    1398  3  8580 1420  3  8600 1426  3  8620
6 14229  1  2 140 140  1  2 048 048  1  2 120 120
3 14300    3Z 0  15  3  851   80320 99 99
5 14311      36  1  8620   70  1  8600   83  1  8580  101  1  8560  111  1  8540
5 14312     122  1  8520  124  2  8508  157  2  8508  160  2  8520  162  3  8538   DZ
5 14313     775  3  8540  803  3  8560  813  3  8580  826  3  8600  834  3  8620
6 14329  1  2 120 120  1  2 045 045  1  2 120 120
3 14400    4A 0  14  3  851   80900 99 99
```

835.4

*** INPUT CARD PRINTOUT ***

```
                1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5 14411      90  1  8640  102  1  8620  123  1  8600  152  1  8580  198  1  8560
5 14412     263  1  8540  372  1  8520  374  2  8520  376  2  8512  420  2  8512   EA
5 14413     424  2  8520  432  3  8540  448  3  8600  460  3  8620
6 14429  1  2 100 100  1  2 045 045  1  2 090 090
3 14500    4B 0  15  3  852   81230 99 99
5 14511      92  1  8640  132  1  8620  304  1  8600  322  1  8580  352  1  8560
5 14512     432  1  8540  455  2  8540  471  2  8520  473  2  8512  513  2  8512   EB
5 14513     524  2  8520  526  3  8540  538  3  8600  553  3  8620  574  3  8640
6 14529  1  2 100 100  1  2 040 040  1  2 070 070
3 14600    4C 0  16  3  853   81710 99 99
5 14611       0  1  8640   33  1  8620  102  1  8600  116  2  8540  125  2  8531
5 14612     127  2  8531  136  2  8527  147  2  8533  159  2  8570  170  3  8560   EC
5 14613     236  3  8560  253  3  8580  306  3  8600  406  3  8600  422  3  8620
5 14614     432  3  8640
6 14629  1  2 060 060  1  2 038 038  1  2 050 050
3 14700    4D 0   9  3  853   82380 99 99
5 14711       0  1  8700   12  1  8593   14  2  8533   29  2  8531   44  2  8533   ED
5 14712      46  2  8550   48  2  8563   50  3  8563  110  3  8615
6 14729  1  2 070 070  1  2 040 040  1  2 050 050
4 14800 HR 40 2  31  1  853   82380        0  8614 3 1
5 14811       0  1  8586    0  1  8533    4  1  8533    6  1  8536    8  1  8534
5 14812      10  1  8533   12  1  8532   14  1  8533   16  1  8534   18  1  8534
5 14813      20  1  8534   22  1  8535   24  1  8536   26  1  8537   28  1  8539
5 14814      30  1  8543   30  1  8588   28  1  8599   26  1  8607   24  1  8615
5 14815      22  1  8621   20  1  8626   18  1  8629   16  1  8629   14  1  8629
5 14816      12  1  8627   10  1  8622    8  1  8617    6  1  8608    4  1  8608
5 14817       0 -9  8586
6 14829  1  2 036 036
3 14900    4E 5  21  3  853   82450  1  3
5 14911       0  1  8700    0  1  8587   10  1  8584   20  1  8584   28  1  8579
5 14912      32  1  8562   36  2  8543   40  2  8540   45  2  8537   50  2  8537   EE
5 14913      55  2  8531   60  2  8525   66  2  8543   67  3  8548   70  3  8553
5 14914      76  3  8567   85  3  8569  110  3  8571  120  3  8573  130  3  8589
5 14915     140  3  8633
6 14929  1  2 050 050  1  2 038 038  1  2 052 052
3 15000    4F 0  11  3  855   82760 99 99
5 15011       0  1  8700    4  1  8580    9  1  8560   10  2  8560   11  2  8553   EF
5 15012      45  2  8544   90  2  8553   92  2  8560   97  3  8580  138  3  8600
5 15013     168  3  8700
6 15029  1  2 050 050  1  2 040 040  1  2 055 055
```

```
                                                                                    ACC    *ID*
CY  3A AT   65460 /     0 /    650. /    42. /   13636. / 1.65 /    91. /   192.
    850.99 /   0.18 /                  / 851.17 /    2.68 /   0.33/            *IS*
CZ  3B AT   65810 /   450 /    650. /   222. /   12061. / 1.30 /    11. /    87.
    852.16 /   0.17 /   1.16 /   0.0  / 852.33 /    2.93 /   0.32 / 0.003  *XS*
DA  3C AT   66480 /   670 /    650. /   951. /   47001. / 1.99 /    28. /   372.
    852.82 /   0.01 /   0.50 /   0.0  / 852.83 /    0.68 /   0.09 / 0.001  *XS*
DB  3D AT   67050 /   570 /    590. /   325. /   22296. / 1.40 /   108. /   225.
    853.00 /   0.07 /   0.21 /   0.03 / 853.07 /    1.82 /   0.18 / -0.000  *XS*
    ============================ BEGIN BRIDGE ANALYSIS ============================
BR  3D AT   67050 /       /    590. /   164. /   14426. / 1.00 /     0. /    32.
    853.00 /   0.20 /        ...1...  (-.001)     /    3.59 /   0.28 /          *BO*
    FMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /              *RG*
    3E AT   67130 /    80 /    590. /   536. /   27415. / 2.73 /   -79. /   106.
    853.07 /   0.05 /   0.05 /   0.0  / 853.12 /    1.10 /   0.15 / -0.000  *AS*
DC  M = 0.30 / E = 0.68 / K* = 0.65 /   561. /   28831. / 2.75 /   -81. /   108.
    853.20 /   0.05 /                  / 853.25 /    1.05 /   0.15 /          *AS*
    ============================ END BRIDGE ANALYSIS ==============================
DD  3F AT   67560 /   430 /    590. /   782. /   41321. / 2.61 /   103. /   367.
    853.35 /   0.02 /   0.13 /   0.0  / 853.37 /    0.75 /   0.10 / -0.000  *XS*
DE  3G AT   67950 /   390 /    590. /   333. /   20345. / 1.34 /    47. /   167.
    853.49 /   0.07 /   0.16 /   0.02 / 853.56 /    1.77 /   0.19 / 0.000  *XS*
DF  3H AT   68470 /   520 /    590. /   380. /   24999. / 1.48 /   125. /   260.
    853.86 /   0.06 /   0.36 /   0.0  / 853.91 /    1.55 /   0.15 / 0.000  *XS*
    ============================ BEGIN BRIDGE ANALYSIS ============================
BR  3H AT   68470 /       /    553. /   168. /   11992. / 1.00 /     0. /    28.
    853.10 /   0.17 /        ...3...  (-.001)     /    3.30 /   0.22 /          *BO*
    FMBANKMENT OVERFLOW (CFS) / LEFT       38. / RIGHT        0. /              *RG*
    3I AT   68510 /    40 /    590. /   700. /   39161. / 2.86 / -142. /    41.
    853.90 /   0.03 /   0.01 /   0.0  / 853.93 /    0.84 /   0.11 / -0.001  *AS*
DG  M = **** / F = **** / K* = **** /   738. /   40419. / 3.08 / -144. /    89.
    854.09 /   0.03 /                  / 854.12 /    0.80 /   0.11 /          *AS*
    ============================ END BRIDGE ANALYSIS ==============================
DH  3J AT   69230 /   720 /    590. /   966. /   46922. / 2.96 /   161. /   520.
    854.24 /   0.02 /   0.13 /   0.0  / 854.26 /    0.61 /   0.09 / 0.000  *XS*
DI  3K AT   69810 /   580 /    590. /  1182. /   58407. / 3.02 /    65. /   442.
    854.32 /   0.01 /   0.07 /   0.0  / 854.33 /    0.50 /   0.07 / -0.000  *XS*
```

100-YR

100-YR

	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*
	LENGTH/DISCHARGE/				AREA	/CONVEYANCE/	ALPHA/	LEW /	REW
DJ	3L AT 70240 /	430 /	590. /	2038. /	105367. /	3.69 /	155. /	775.	
	854.35 /	0.00 /	0.02 /	0.0 /	854.35 /	0.29 /	0.04 /	-0.000	*XS*
DK	3M AT 70500 /	260 /	590. /	2275. /	114679. /	5.66 /	568. /	1351.	
	854.35 /	0.01 /	0.01 /	0.00 /	854.36 /	0.26 /	0.05 /	-0.007	*XS*
DL	3N AT 71610 /	1110 /	590. /	2355. /	88778. /	4.77 /	309. /	1176.	
	854.39 /	0.00 /	0.04 /	0.0 /	854.39 /	0.25 /	0.05 /	0.000	*XS*
DM	30 AT 72380 /	770 /	590. /	1687. /	74172. /	3.40 /	568. /	1153.	
	854.43 /	0.01 /	0.04 /	0.00 /	854.44 /	0.35 /	0.06 /	-0.000	*XS*
DN	300 AT 73500 /	1120 /	590. /	1578. /	54162. /	4.28 /	534. /	1122.	
	854.52 /	0.01 /	0.10 /	0.00 /	854.53 /	0.37 /	0.08 /	0.000	*XS*
DO	3P AT 73930 /	430 /	590. /	1065. /	49895. /	2.78 /	559. /	984.	
	854.58 /	0.01 /	0.06 /	0.00 /	854.59 /	0.55 /	0.08 /	-0.000	*XS*
DP	3Q AT 74340 /	410 /	590. /	485. /	27477. /	1.95 /	1013. /	1198.	
	854.67 /	0.04 /	0.10 /	0.02 /	854.71 /	1.22 /	0.15 /	-0.000	*XS*
DQ	3R AT 75420 /	1080 /	590. /	1657. /	71358. /	3.16 /	929. /	1600.	
	854.90 /	0.01 /	0.19 /	0.0 /	854.90 /	0.36 /	0.06 /	-0.000	*XS*
DR	3S AT 75960 /	540 /	590. /	1058. /	50502. /	2.67 /	803. /	1201.	
	854.95 /	0.01 /	0.05 /	0.00 /	854.96 /	0.56 /	0.08 /	-0.000	*XS*
DS	3T AT 76590 /	630 /	590. /	688. /	26571. /	3.76 /	156. /	616.	
	855.10 /	0.04 /	0.16 /	0.02 /	855.14 /	0.86 /	0.15 /	0.000	*XS*
DT	3U AT 77160 /	570 /	590. /	1121. /	52500. /	2.69 /	78. /	507.	
	855.27 /	0.01 /	0.14 /	0.0 /	855.28 /	0.53 /	0.09 /	0.000	*XS*
DU	3V AT 77690 /	530 /	590. /	658. /	43047. /	2.02 /	381. /	623.	
	855.34 /	0.03 /	0.08 /	0.01 /	855.37 /	0.90 /	0.11 /	0.000	*XS*
DV	3W AT 77960 /	270 /	590. /	897. /	48163. /	2.20 /	409. /	656.	
	855.40 /	0.01 /	0.05 /	0.0 /	855.42 /	0.66 /	0.09 /	-0.000	*XS*
DW	3WW AT 78350 /	390 /	590. /	1016. /	60049. /	2.06 /	386. /	738.	
	855.45 /	0.01 /	0.05 /	0.0 /	855.46 /	0.58 /	0.07 /	0.000	*XS*
DX	3X AT 79000 /	650 /	590. /	1440. /	49805. /	4.35 /	142. /	832.	
	855.53 /	0.01 /	0.08 /	0.00 /	855.54 /	0.41 /	0.08 /	-0.000	*XS*

100-YR

100-YR

WATER-SURFACE PROFILE FOR: SHIAWASSEE RIVER E CORP FENTON TWSP-DAM RLL DJH
PAGE 3 OF 3, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
   3Y AT   79670 /   670 /   590. / 1433. /   46984. / 4.43 /  501. / 1380.
DY 855.63 /   0.01 /   0.10 /   0.00 / 855.64 /    0.41 /   0.09 /  0.000  *XS*
----------------------------------------------------------------------------------
   3Z AT   80320 /   650 /   590. / 1385. /   39158. / 4.87 /  102. /  800.
DZ 855.75 /   0.01 /   0.12 /   0.00 / 855.76 /    0.43 /   0.04 /  0.001  *XS*
----------------------------------------------------------------------------------
   4A AT   80900 /   580 /   590. /  644. /   32449. / 2.23 /  201. /  437.
EA 855.90 /   0.03 /   0.16 /   0.01 / 855.93 /    0.92 /   0.14 /  0.000  *XS*
----------------------------------------------------------------------------------
   4B AT   81230 /   330 /   590. /  434. /   31722. / 1.65 /  352. /  530.
EB 856.01 /   0.05 /   0.11 /   0.01 / 856.05 /    1.36 /   0.15 /  0.000  *XS*
----------------------------------------------------------------------------------
   4C AT   81710 /   480 /   590. /  156. /    9431. / 1.37 /  110. /  240.
EC 856.43 /   0.31 /   0.56 /   0.13 / 856.74 /    3.79 /   0.50 / -0.001  *XS*
----------------------------------------------------------------------------------
   4D AT   82380 /   670 /   590. /  183. /   16591. / 1.16 /   12. /   70.
ED 858.04 /   0.19 /   1.49 /   0.0  / 858.23 /    3.23 /   0.29 /  0.002  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR 4D AT   82380 /       /   590. /  137. /   13218. / 1.00 /    0. /   30.
   858.04 /   0.29 /       ...1...  (-.001)     /    4.30 /   0.35 /          *BO*
----------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
----------------------------------------------------------------------------------
   4E AT   82450 /    70 /   590. /  234. /   18435. / 1.58 /   24. /  125.
  858.16 /   0.16 /   0.08 /   0.0  / 858.31 /    2.52 /   0.28 / -0.001  *AS*
----------------------------------------------------------------------------------
   M = 0.18 / E = 0.21 / K* = 0.35 /  246. /   19474. / 1.59 /   22. /  126.
EE 858.27 /   0.14 /                / 858.41 /    2.40 /   0.27 /          *AS*
============================ END BRIDGE ANALYSIS ================================
   4F AT   82760 /   310 /   590. /  324. /   27221. / 1.04 /    4. /  109.
EF 858.56 /   0.05 /   0.20 /   0.0  / 858.62 /    1.82 /   0.17 / -0.000  *XS*
----------------------------------------------------------------------------------
```

100-YR

END OF THIS PROFILE

Continuation of Argentine Twp

```
CY  3A AT   65360 /     0 /    650. /   239. /   13674. / 1.63 /    97. /   187.
    851.06 /   0.19 /                  851.25 /    2.72 /   0.32/          *IS*
CZ  3B AT   65810 /   450 /    650. /   225. /   12366. / 1.30 /    12. /    87.
    852.21 /   0.17 /   1.12 /   0.0  /  852.37 /    2.89 /   0.31 / 0.001  *XS*
DA  3C AT   66480 /   670 /    650. /   787. /   45455. / 1.57 /    50. /   250.
    852.86 /   0.02 /   0.50 /   0.0  /  852.88 /    0.83 /   0.09 / 0.001  *XS*
DB  3D AT   67050 /   570 /    590. /   326. /   22816. / 1.36 /   120. /   220.
    853.05 /   0.07 /   0.21 /   0.03 /  853.12 /    1.81 /   0.18 / -0.000 *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR  3D AT   67050 /       /    590. /   166. /   14625. / 1.00 /     0. /    32.
    853.05 /   0.20 /       ...1...  (-.001)    /    3.56 /   0.28 /          *BO*  FW
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /               *RG*
    3E AT   67130 /    80 /    590. /   471. /   27400. / 2.17 /  -30. /    90.
    853.11 /   0.05 /   0.04 /   0.0  /  853.16 /    1.25 /   0.15 / -0.000 *AS*
DC  M = 0.29 / E = 0.94 / K* = 0.62 /   486. /   28592. / 2.17 /  -30. /    90.
    853.23 /   0.05 /                   /  853.28 /    1.21 /   0.15 /          *AS*
========================== END BRIDGE ANALYSIS ============================
DD  3F AT   67560 /   430 /    590. /   706. /   40846. / 2.24 /  160. /   360.
    853.39 /   0.02 /   0.13 /   0.0  /  853.41 /    0.84 /   0.10 / 0.000  *XS*
DE  3G AT   67950 /   390 /    590. /   320. /   20476. / 1.26 /   55. /   155.
    853.53 /   0.07 /   0.16 /   0.02 /  853.60 /    1.84 /   0.19 / 0.000  *XS*
DF  3H AT   68470 /   520 /    590. /   384. /   25424. / 1.46 /  130. /   260.
    853.89 /   0.05 /   0.35 /   0.0  /  853.94 /    1.54 /   0.14 / 0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR  3H AT   68470 /       /    547. /   168. /   11992. / 1.00 /     0. /    28.
    853.10 /   0.17 /       ...3...  (-.001)    /    3.26 /   0.22 /          *BO*
EMBANKMENT OVERFLOW (CFS) / LEFT       43. / RIGHT        0. /               *RG*
    3I AT   68510 /    40 /    590. /   455. /   33704. / 1.90 /  -45. /    41.
    853.91 /   0.05 /   0.02 /   0.0  /  853.96 /    1.30 /   0.13 / -0.001 *AS*
DG  M = **** / E = **** / K* = **** /   473. /   34189. / 2.08 /  -45. /    42.  FW
    854.10 /   0.05 /                   /  854.15 /    1.25 /   0.13 /          *AS*
========================== END BRIDGE ANALYSIS ============================
DH  3J AT   69230 /   720 /    590. /   925. /   47247. / 2.73 /  200. /   500.
    854.29 /   0.02 /   0.16 /   0.0  /  854.30 /    0.64 /   0.09 / -0.000 *XS*
DI  3K AT   69810 /   580 /    590. /  1131. /   59991. / 2.63 /  100. /   400.  300
    854.36 /   0.01 /   0.07 /   0.0  /  854.38 /    0.52 /   0.07 / 0.000  *XS*
```

```
SECTO AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /        /    EG  /     V  /    FN  /  ACC  /  D*
==========================================================================
   3Y AT   79670 /   670 /    590. /  1358. /   48083. / 3.93 /  600. / 1300.
DY 855.71 /  0.01 /  0.10 /    0.0  / 855.73 /    0.43 /  0.09 / 0.000  *XS*
--------------------------------------------------------------------------
   3Z AT   80320 /   650 /    590. /  1110. /   35569. / 4.39 /  110. /  610.
DZ 855.84 /  0.02 /  0.13 /   0.00  / 855.86 /    0.53 /  0.12 / 0.001  *XS*
--------------------------------------------------------------------------
   4A AT   80900 /   680 /    590. /   643. /   33811. / 2.01 /  230. /  430.
EA 856.01 /  0.03 /  0.17 /   0.00  / 856.03 /    0.92 /  0.13 / 0.000  *XS*
--------------------------------------------------------------------------
   4B AT   81230 /   330 /    590. /   451. /   33113. / 1.67 /  350. /  530.
EB 856.10 /  0.04 /  0.10 /   0.01  / 856.15 /    1.31 /  0.15 /-0.000  *XS*
--------------------------------------------------------------------------
   4C AT   81710 /   480 /    590. /   163. /    9811. / 1.39 /  110. /  240.
EC 856.50 /  0.28 /  0.51 /   0.12  / 856.78 /    3.62 /  0.48 /-0.001  *XS*
--------------------------------------------------------------------------
   4D AT   82380 /   670 /    590. /   182. /   16498. / 1.16 /   12. /   70.
ED 858.03 /  0.19 /  1.44 /    0.0  / 858.22 /    3.24 /  0.30 / 0.001  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 4D AT   82380 /        /    590. /   137. /   13158. / 1.00 /    0. /   30.
   858.03 /  0.29 /       ...1...  (-.001)    /    4.32 /  0.36 /         *BO*
--------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
--------------------------------------------------------------------------
   4E AT   82450 /    70 /    590. /   226. /   18198. / 1.51 /   24. /  115.
EE 858.14 /  0.16 /  0.08 /    0.0  / 858.30 /    2.61 /  0.29 /-0.001  *AS*
--------------------------------------------------------------------------
   M = 0.17 / E = 0.23 / K* = 0.34 /   236. /   19154. / 1.52 /   22. /  115.
   858.25 /  0.15 /                 / 858.40 /    2.50 /  0.27 /         *AS*
========================== END BRIDGE ANALYSIS ============================
   4F AT   82760 /   310 /    590. /   321. /   27059. / 1.04 /    5. /  105.
EF 858.55 /  0.05 /  0.21 /    0.0  / 858.61 /    1.84 /  0.18 / 0.000  *XS*
--------------------------------------------------------------------------
```

180 FW

9

END OF THIS PROFILE

00BREAK00

1) COUNTY: Genesee

2) STUDY NAME: Village of Linden

3) WATERCOURSE: Shiawassee River

4) DOCUMENT TYPE: report

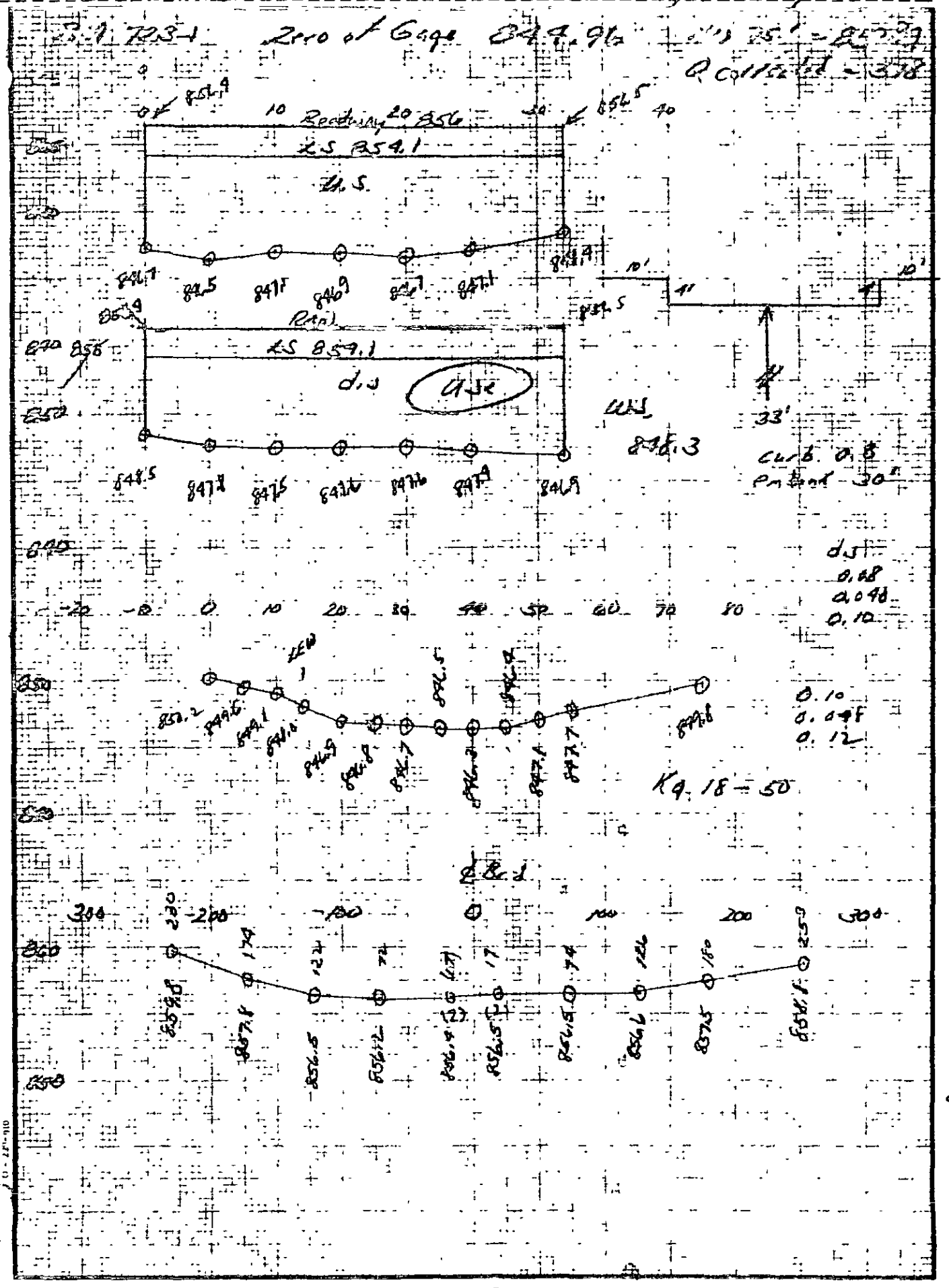
00BREAK00

WATER RESOURCES DIVISION

Shiawassee R. @ Gage Hogan Road.

Zero of Gage 849.96

Q Collected - 378



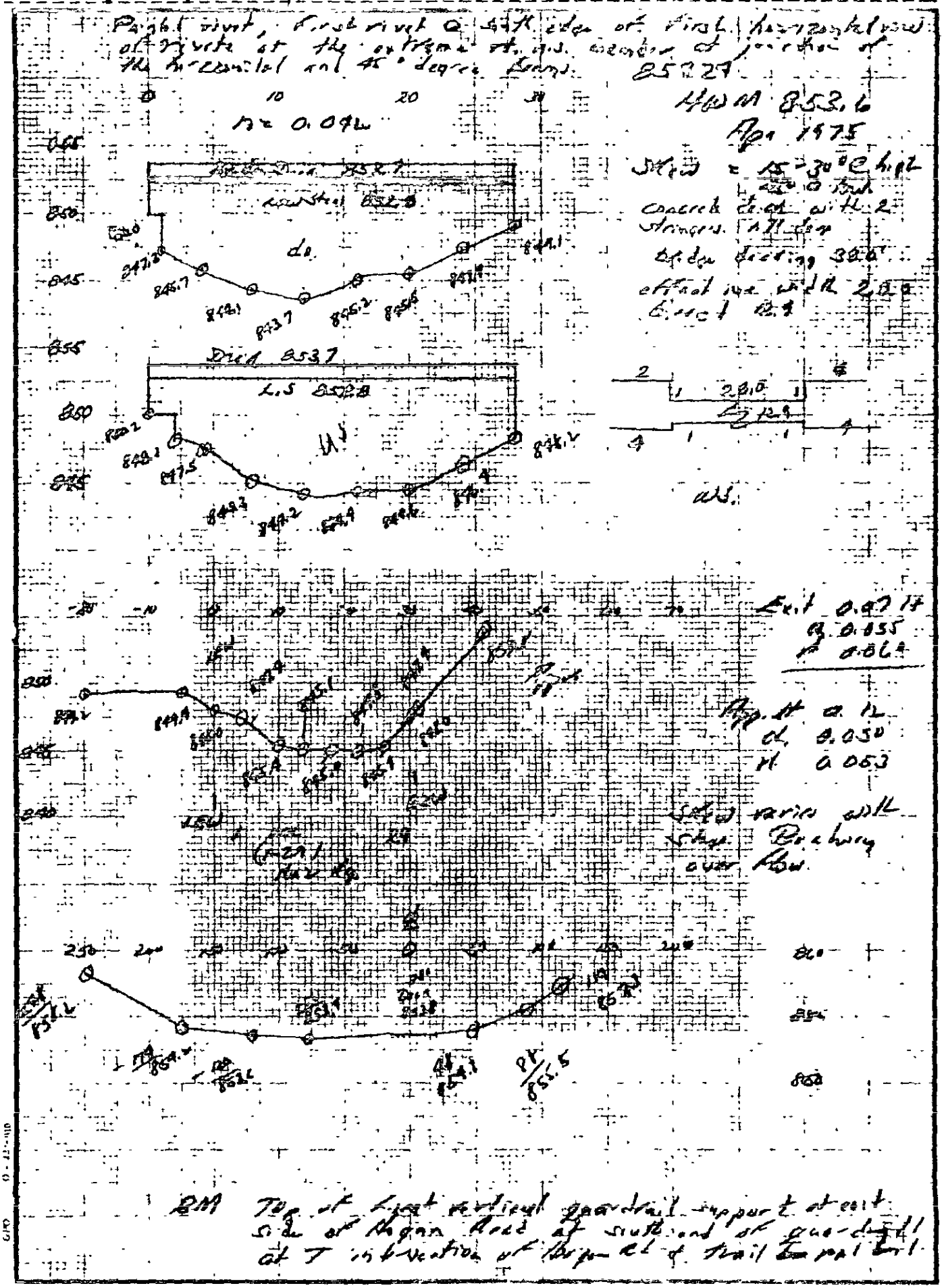
Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File

Shiawassee R. Private Trail Rd Bridge

Right pivot, first pivot @ left edge of first horizontal row of rivets at the extreme st. g.s. corner of junction of the horizontal and 45° degree brac. 852.27

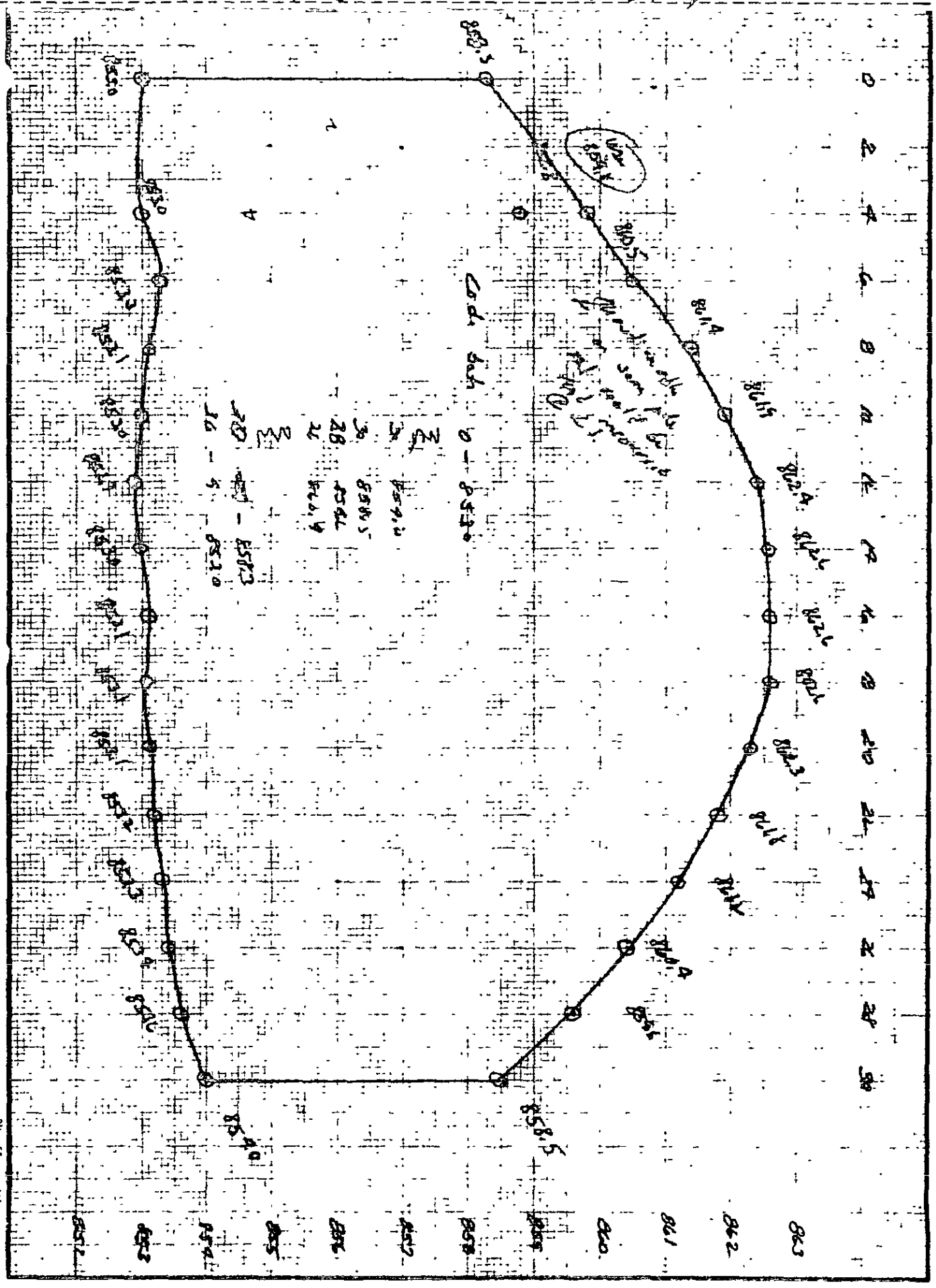


BM Top of first vertical guardrail support at east side of Hogan Road at southend of guardrail at T intersection of Hogan Rd & Trail Road Bridge

Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

WATER RESOURCES DIVISION

Linden Road Bridge



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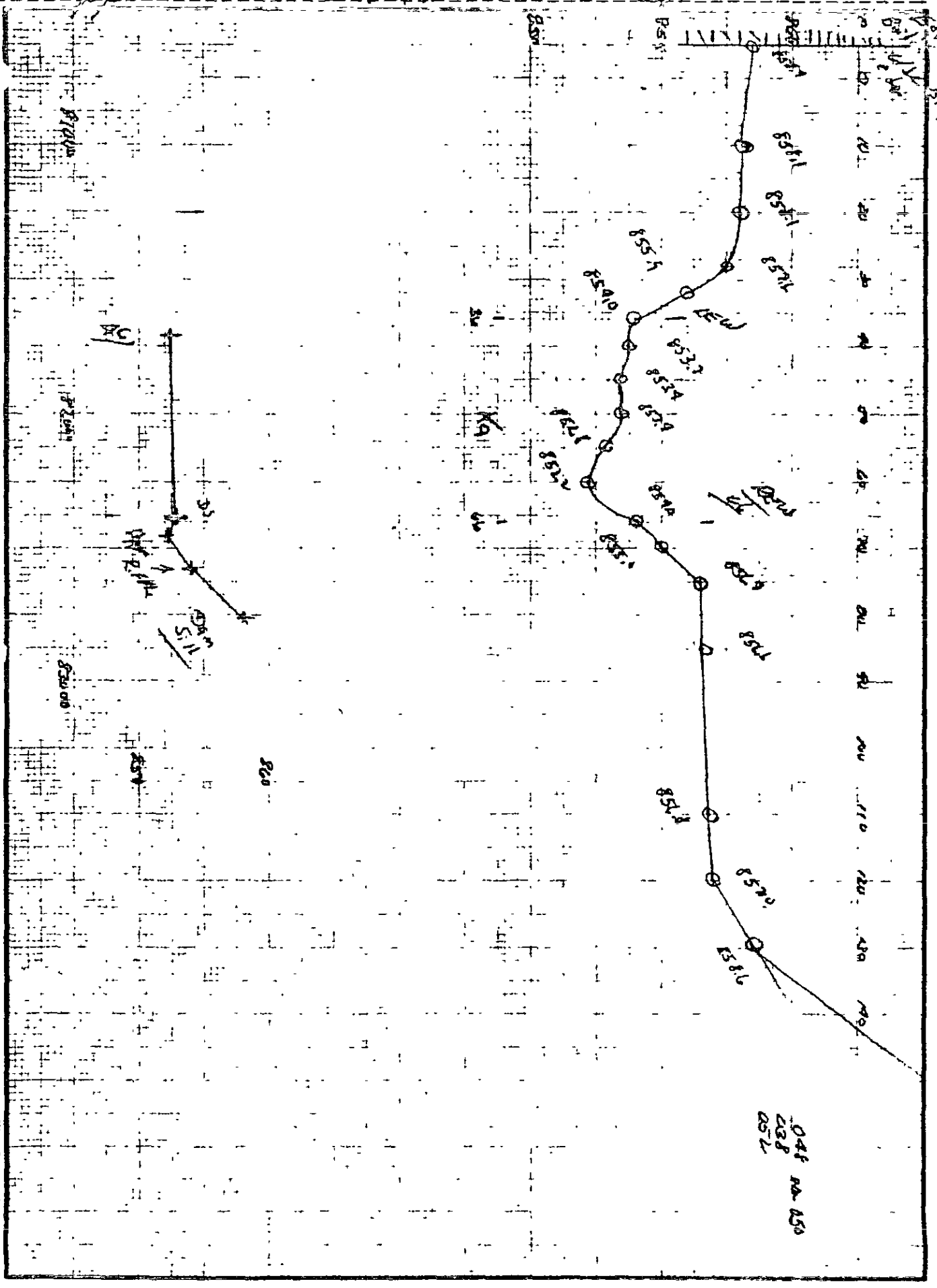
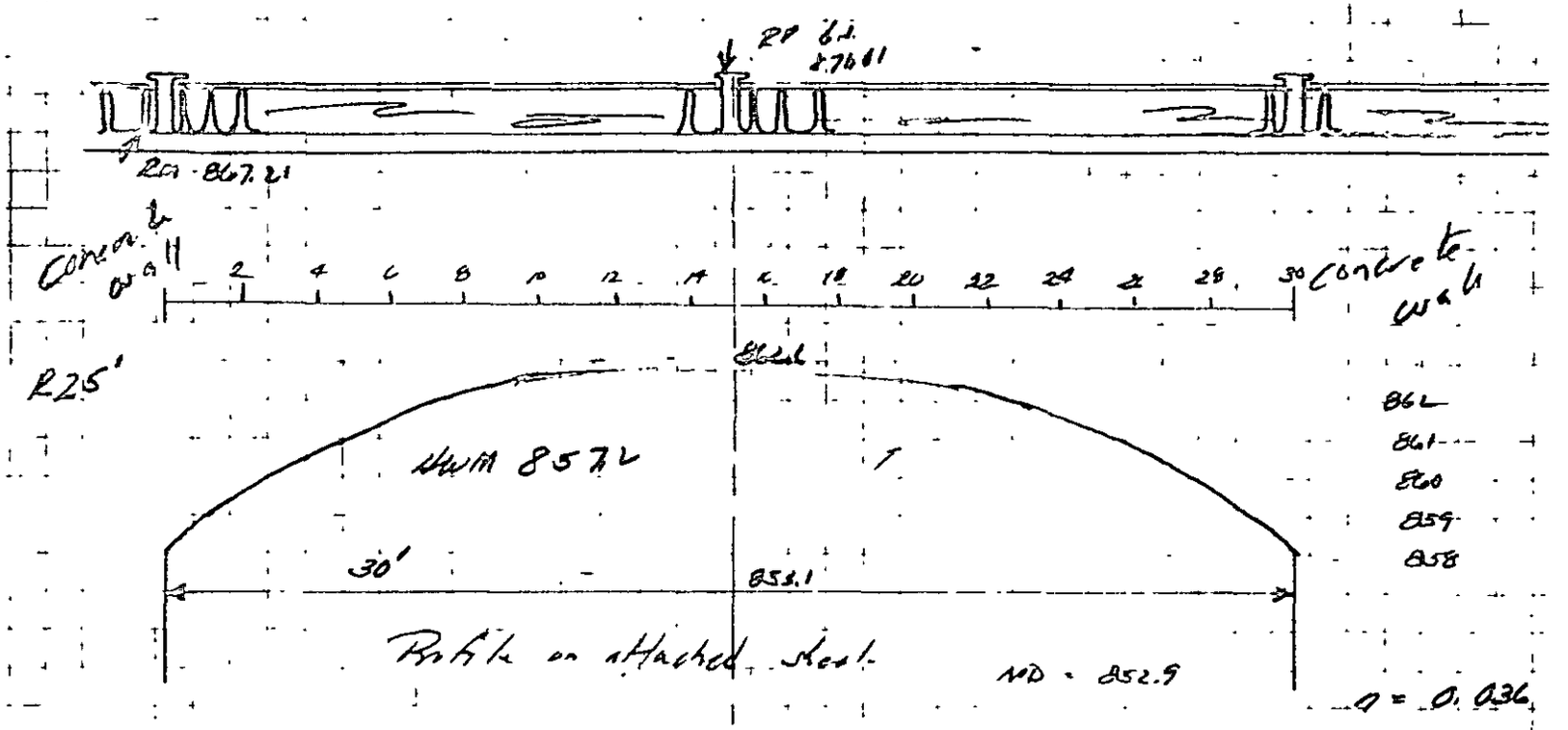
WATER RESOURCES DIVISION

Approach to Linden Rd Bridge 4F EL450



Sheet No ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

Skiawassee R. Linden Rd. Bridge



℄ Brid. 866.8
LS 862.8

Code bottom then around
L.S. to 0 then L.S. @ bott.

RM @ Lt. u/s. corner on sidewalk at 1st guardrail post.
USGS elevation from mid Sept 867.21

Note elevation of sidewalk from Ayres, Lewis, Norris & May 868.88

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE=11/16/77

*** INPUT CARD PRINTOUT ***

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1      1 GIBSON DRAIN BRISTOL-SCHUMACHER  AG-AL   KNUTILLA  6  5  2  5 12
2      2  75705  75930  75980  76055  75982
3 03000     AG 1 013 03 0752 0012230 01 03
4  3005     800   1160   1350   1750   1350
5 03010     -300 01 07660 -250 01 07640  -50 01 07620 0000 01 07607 0012 02 07592
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5 03111     0285 02 07515 0305 02 07515 0320 03 07580 0480 03 07600 0520 03 07620
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6 03320 01 02 070 070 01 02 045 045 01 02 100 100
3 03400     AK 0 011 03 0757 0014310 01 03
5 03410     0000 01 07700 0130 01 07680 0270 01 07660 0370 01 07640 0435 02 07640
5 03411     0450 02 07543 0480 02 07543 0485 03 07620 0640 03 07620 0650 03 07640
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3 03500     AL 0 011 03 0759 0014670 01 03
5 03510     0000 01 07700 0150 01 07680 0215 01 07660 0230 02 07620 0235 02 07545
5 03511     0255 02 07545 0260 03 07620 0270 03 07640 0330 03 07640 0350 03 07660
5 03512     0450 03 07700
6 03520 01 02 050 050 01 02 035 035 01 02 070 070
```

FCB XSEC

A

B

C

D

E

F

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 GIBSON DR SCHUMACHER TO JUDD AM-AN       KNUTILLA  2  5  2  5 12
2      2  76345  76575  76720  76770  76721                                          FIS&SEC
3 03600     AM 1 011 03 0758 0014730 01 03
4  3605     680     980    1160    1470    1160
5 03610     -240 01 07700  -80 01 07680 0000 01 07664 0010 02 07660 0024 02 07558  AJ      G
5 03611     0031 02 07547 0038 02 07558 0050 03 07556 0090 03 07663 0250 03 07680
5 03612     0300 03 07700
6 03620 01 02 045 045 01 02 045 045 01 02 050 050
3  3700     AN 0  11  3  758   15390  1  3
5  3710        0  1  7720  100  1  7700  220  1  7680  300  1  7660  380  1  7640  AK      H
5  3711      500  2  7640  515  2  7557  530  2  7557  540  3  7600  565  3  7700
5  3712      580  3  7720
6  3720  1  2 070 070  1  2 050 050  1  2 080 080
```

*** INPUT CARD PRINTOUT ***

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 GIBSON DRAIN JUDD TO MAPLE AO-AV          KNUTILLA  8  5  2  5 12
2      2  76527  76785  76850  76895  76853
3   3800    AO 1  13  3  758   15500  1  3
4   3805    680    980   1160   1470   1160
5   3810    -340  1  7720 -320  1  7700 -300  1  7690 -190  1  7680 -170  1  7660
5   3811       0  1  7659   26  2  7640   40  2  7568   49  2  7559   58  2  7566
5   3812      80  3  7692  100  3  7700  120  3  7720
6   3820  1  2 045 045  1  2 050 050  1  2 070 070
3   3900    AP 0   9  3  760   15980  1  3
5   3910       0  1  7700   30  1  7690  200  1  7660  285  1  7640  300  2  7620
5   3911     315  2  7600  325  2  7564  335  2  7600  350  3  7700
6   3920  1  2 040 040  1  2 045 045  1  2 080 080
3   4000    AQ 0  13  3  760   16600  1  3
5   4010       0  1  7720   20  1  7700  180  1  7700  200  1  7680  210  2  7660
5   4011     215  2  7577  235  2  7577  240  3  7640  260  3  7660  330  3  7660
5   4012     380  3  7680  410  3  7700  440  3  7720
6   4020  1  2 040 040  1  2 040 040  1  2 070 070
3   4100    AR 0  12  3  760   16920  1  3
5   4110       0  1  7740  180  1  7720  210  1  7700  235  1  7680  240  2  7660
5   4111     260  2  7588  275  2  7588  290  3  7660  300  3  7680  540  3  7640
5   4112     550  3  7700  580  3  7740
6   4120  1  2 040 040  1  2 040 040  1  2 060 060
3   4200    AS 0  12  3  762   17380  1  3
5   4210       0  1  7760   70  1  7740  110  1  7720  250  1  7720  270  1  7700
5   4211     320  1  7680  370  2  7660  390  2  7603  405  2  7603  415  3  7680
5   4212     480  3  7700  520  3  7760
6   4220  1  2 040 040  1  2 040 040  1  2 080 080
3   4300    AT 0  14  3  764   17720  1  3
5   4310       0  1  7760   80  1  7740  100  1  7720  240  1  7720  270  1  7700
5   4311     315  1  7680  330  2  7660  345  2  7614  355  2  7614  365  3  7660
5   4312     375  3  7700  380  3  7720  425  3  7740  435  3  7760
6   4320  1  2 035 035  1  2 045 045  1  2 045 045
3   4400    AU 1  10  3  766   18220  1  3
4   4405    390    560    660    840    660
5   4410       0  1  7760   55  1  7720  180  1  7720  195  2  7700  205  2  7634
5   4411     215  2  7634  230  3  7700  250  3  7740  300  3  7740  320  3  7760
6   4420  1  2 040 040  1  2 035 035  1  2 030 030
3   4500    AV 0  11  3  767   18400  1  3
5   4510       0  1  7760   45  1  7740  210  1  7740  220  1  7720  260  1  7700
5   4511     280  2  7680  300  2  7641  310  2  7641  330  3  7700  450  3  7720
```

FIS XSEC

AL I

AM J

AN K

AO L

AP M

AQ N

AR O

AS P

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE=11/16/77

WATER-SURFACE PROFILE FOR: GIBSON DRAIN BRISTOL-SCHUMACHER AG-AL KNUTILLA
PAGE 1 OF 1

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	FIS XSEC
AG AT 12230 /	0 /	1350. /	465. /	60455. /	1.14 /	7. /	210.		A
759.80 /	0.15 /		/ 759.95 /	2.90 /	0.24/			*IS*	AD
AH AT 12790 /	560 /	1350. /	585. /	49430. /	1.98 /	204. /	483.		B
760.14 /	0.16 /	0.34 /	0.01 / 760.30 /	2.31 /	0.24 /	0.001		*XS*	AE
AI AT 13260 /	470 /	1350. /	347. /	31700. /	1.52 /	295. /	484.		C
760.58 /	0.36 /	0.55 /	0.10 / 760.94 /	3.90 /	0.35 /	-0.000		*XS*	AF
AJ AT 13820 /	560 /	1350. /	337. /	33781. /	1.08 /	383. /	458.		D
761.63 /	0.27 /	0.95 /	0.0 / 761.90 /	4.00 /	0.31 /	0.000		*XS*	AG
AK AT 14310 /	490 /	1350. /	362. /	37655. /	1.31 /	438. /	642.		E
762.32 /	0.28 /	0.70 /	0.01 / 762.61 /	3.73 /	0.30 /	-0.000		*XS*	AH
AL AT 14670 /	360 /	1350. /	213. /	28076. /	1.02 /	227. /	264.		F
762.77 /	0.64 /	0.62 /	0.18 / 763.40 /	6.34 /	0.43 /	0.000		*XS*	AI

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 10,DATE=11/16/77

```
==================================================================================
WATER-SURFACE PROFILE FOR: GIBSON DR SCHUMACHER TO JUDD AM-AN        KNUTILLA
PAGE  1 OF  1
==================================================================================
SECTO AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
   AM AT   14730 /     0 /   1160. /   500. /   51329. / 1.38 /  -40. /  175.
   767.20 /   0.12 /                 / 767.32 /    2.32 /  0.17/          *IS*
----------------------------------------------------------------------------------
   AN AT   15390 /   660 /   1160. / 1122. /   79530. / 2.21 /  240. /  559.
   767.50 /   0.04 /   0.22 /   0.0  / 767.53 /    1.03 /  0.11 / -0.000  *XS*
----------------------------------------------------------------------------------
```

AJ

AK

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 15,DATE=11/17/77

WATER-SURFACE PROFILE FOR: GIBSON DRAIN JUDD TO MAPLE AO-AV KNUTILLA

PAGE 1 OF 1

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
AO AT 15500	0	1160.	1026.	84932.	1.45	-245.	79.		
768.50	0.03		768.53	1.13	0.10			*IS*	AL
AP AT 15980	480	1160.	956.	84885.	1.33	53.	348.		
768.59	0.03	0.09	0.00 768.62	1.21	0.11		0.000	*XS*	AM
AQ AT 16600	620	1160.	669.	57273.	2.25	193.	391.		
768.72	0.11	0.17	0.04 768.83	1.73	0.17		-0.000	*XS*	AN
AR AT 16920	320	1160.	616.	57566.	1.97	224.	544.		
768.85	0.11	0.13	0.00 768.96	1.88	0.18		0.001	*XS*	AO
AS AT 17380	460	1160.	437.	43717.	1.39	293.	450.		
769.08	0.15	0.25	0.02 769.23	2.65	0.23		-0.000	*XS*	AP
AT AT 17720	340	1160.	294.	27847.	1.21	284.	373.		
769.38	0.29	0.38	0.07 769.68	3.95	0.32		-0.000	*XS*	AQ
AU AT 18220	500	660.	158.	17264.	1.00	193.	231.		
770.27	0.27	0.06	0.0 770.54	4.17	0.35		0.001	*XS*	AR
AV AT 18400	180	660.	278.	22352.	1.17	247.	368.		
770.64	0.10	0.20	0.0 770.74	2.37	0.22		-0.000	*XS*	AS

END OF THIS PROFILE

10-4

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 21,DATE=11/16/77

```
==================================================================================
WATER-SURFACE PROFILE FOR: GIBSON DRAIN BRISTOL-SCHUMACHER  AG-AL   KNUTILLA
PAGE  1 OF  1
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECTID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /  ACC   *ID*
==================================================================================
   AG AT   12230 /     0 /   1350. /   458. /   60850. / 1.10 /   10. /  150.
.02 759.82 /   0.15 /                / 759.97 /   2.95 /  0.24/          *IS*
----------------------------------------------------------------------------------
   AH AT   12790 /   560 /   1350. /   555. /   50013. / 1.74 /  225. /  425.
.01 760.15 /   0.16 /   0.34 /   0.01 / 760.31 /   2.43 /  0.23 / 0.001  *XS*
----------------------------------------------------------------------------------
   AI AT   13260 /   470 /   1350. /   348. /   31776. / 1.52 /  295. /  484.
.01 760.59 /   0.36 /   0.54 /   0.10 / 760.95 /   3.88 /  0.35 / 0.000  *XS*
----------------------------------------------------------------------------------
   AJ AT   13820 /   560 /   1350. /   332. /   33243. / 1.05 /  383. /  450.
.02 761.65 /   0.27 /   0.97 /   0.0  / 761.92 /   4.07 /  0.30 / 0.000  *XS*
----------------------------------------------------------------------------------
   AK AT   14310 /   490 /   1350. /   347. /   37990. / 1.22 /  440. /  590.
.02 762.34 /   0.29 /   0.71 /   0.01 / 762.63 /   3.90 /  0.29 / 0.000  *XS*
----------------------------------------------------------------------------------
   AL AT   14670 /   360 /   1350. /   214. /   28192. / 1.02 /  227. /  264.
.01 762.78 /   0.63 /   0.61 /   0.17 / 763.42 /   6.32 /  0.42 / -0.000  *XS*
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

AD A
AE B
AF C
FW
AG D
AH E
AI F

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 16,DATE=11/16/77

```
==================================================================================
WATER-SURFACE PROFILE FOR: GIBSON DR SCHUMACHER TO JUDD AM-AN        KNUTILLA
PAGE  1 OF  1
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    EN  /   ACC    *ID*
==================================================================================
   AM AT   14730 /     0 /   1160. /   500. /   51534. / 1.37 /  -25. /  175.
.01 767.21 /   0.11 /                 / 767.32 /   2.32 /   0.17/          *IS*  AJ
----------------------------------------------------------------------------------
   AN AT   15390 /   660 /   1160. /   621. /   61224. / 1.46 /  450. /  550.
.03 767.53 /   0.08 /   0.28 /   0.0  / 767.61 /   1.87 /   0.14 / -0.000  *XS*  AK
----------------------------------------------------------------------------------
```

FW

G

H

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 25,DATE=11/17/77

WATER-SURFACE PROFILE FOR: GIBSON DRAIN JUDD TO MAPLE AO-AV KNUTILLA

PAGE 1 OF 1

*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HF	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*			
	AO AT 15500	0	1160.	811.	56698.	1.25	-225.	50.				I
.03	768.53	0.04		768.57	1.43	0.14			*IS*	AL		
	AP AT 15980	480	1160.	956.	87067.	1.30	65.	340.				J
.08	768.67	0.03	0.13 / 0.0	768.70	1.21	0.10	0.000		*XS*	AM		
	AQ AT 16600	620	1160.	684.	58603.	2.25	192.	391.				K
.08	768.80	0.10	0.16 / 0.04	768.90	1.70	0.16	-0.000		*XS*	AN		
	AR AT 16920	320	1160.	529.	56554.	1.57	225.	425.				L
.07	768.92	0.12	0.13 / 0.01	769.04	2.19	0.18	-0.000		*XS*	AO	FW	
	AS AT 17380	460	1160.	447.	45015.	1.38	295.	445.				M
.07	769.15	0.14	0.24 / 0.01	769.30	2.59	0.22	0.000		*XS*	AP		
	AT AT 17720	340	1160.	292.	28597.	1.15	295.	370.				N
.06	769.44	0.28	0.36 / 0.07	769.72	3.97	0.31	0.000		*XS*	AQ		
	AU AT 18220	500	660.	159.	17370.	1.01	193.	231.				O
.01	770.28	0.27	0.63 / 0.0	770.55	4.15	0.34	0.001		*XS*	AR		
	AV AT 18400	180	660.	277.	22556.	1.14	250.	350.				P
.01	770.65	0.10	0.20 / 0.0	770.75	2.39	0.22	-0.000		*XS*	AS		

END OF THIS PROFILE

```
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 ARSLEY CREEK      X  AG                    HOLTSLAG 10  5  2  5 12
2  3145  73951  74088  74154  74325  74154
3  3150 (X)    1  13  3  733   20100  1  3
4  3155   1470   2000   2300   2950
                                          M
5  3160       0  1  7454   20  1  7393   22  1  7390   34  2  7345   36  2  7330
5  3161      38  2  7320   80  2  7320   82  3  7345   88  3  7360   90  3  7380
5  3162      92  3  7390  118  3  7423  164  3  7483
6  3170  1  2 045 045  1  2 033 033  1  2 060 060
3  3200 (Y)    0  17  3  733   20600  1  3
5  3210       0  1  7460    5  1  7440   10  1  7420   15  1  7400   20  1  7380
5  3211      25  2  7360   35  2  7340   40  2  7319   55  2  7340   65  3  7360
5  3212      80  3  7380  145  3  7400  160  3  7420  165  3  7440  170  3  7460
5  3213     185  3  7480  210  3  7500
6  3220  1  2 080 080  1  2 030 030  1  2 080 080
3  3300 (Z)    0  20  3  733   21040  1  3
5  3309    -930  1  7500 -385  1  7450 -210  1  7450 -115  1  7450  -60  1  7420
5  3310       0  1  7413   12  1  7413   42  1  7385  148  1  7401  192  1  7389
5  3311     202  2  7379  204  2  7361  208  2  7348  226  2  7320  242  2  7347
5  3312     250  3  7370  280  3  7386  318  3  7427  325  3  7440  332  3  7460
6  3320  1  2 040 040  1  2 030 030  1  2 040 040
3  3400 (AA)   0  18  3  733   21510  1  3
5  3409    -370  1  7480 -350  1  7460 -320  1  7440 -100  1  7420  -80  1  7400
5  3410       0  1  7400   80  1  7400  170  2  7380  204  2  7360  225  2  7321
5  3411     235  2  7360  245  3  7380  255  3  7400  275  3  7420  288  3  7440
5  3412     298  3  7460  305  3  7480  320  3  7500
6  3420  1  2 045 045  1  2 030 030  1  2 040 040
3  3500 (AB)   0  16  3  733   21990  1  3
5  3509    -175  1  7520 -135  1  7500 -120  1  7480 -100  1  7460  -50  1  7440
5  3510       0  1  7420  260  1  7400  270  2  7380  280  2  7360  300  2  7324
5  3511     310  2  7360  320  3  7380  330  3  7400  335  3  7460  350  3  7480
5  3512     380  3  7500
6  3520  1  2 040 040  1  2 030 030  1  2 040 040
3  3600 (AC)   0  17  3  733   22540  1  3
5  3610     -30  1  7460    0  1  7433   34  1  7402   84  1  7379   96  1  7361
5  3611     100  2  7347  106  2  7320  114  2  7324  128  2  7327  140  2  7348
5  3612     142  3  7366  152  3  7372  172  3  7419  198  3  7447  280  3  7460
5  3613     300  3  7480  380  3  7500
6  3620  1  2 050 050  1  2 030 030  1  2 060 060
3  3700 (AD)   0  14  3  734   23250  1  3
5  3709    -260  1  7500 -235  1  7480 -210  1  7460 -180  1  7440 -155  1  7420
5  3710       0  1  7420  225  1  7400  230  2  7380  234  2  7360  260  2  7331
5  3711     285  2  7380  290  2  7400  308  3  7500  315  3  7520
6  3720  1  2 085 085  1  2 035 035  1  2 070 070
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
3  3800 AF    0  16  3  735   23750  1  3
5  3809     -310  1  7500 -300  1  7480 -290  1  7460 -275  1  7440 -225  1  7420
5  3810        0  1  7420  130  2  7400  140  2  7380  150  2  7360  170  2  7336
5  3811      182  2  7360  187  2  7380  195  3  7400  205  3  7420  240  3  7440
5  3812      250  3  7500  270  3  7520  300  3  7540
                           000  0  00000 000  0  00000
6  3820  1  2 085 085  1  2 030 030  1  2 070 070
3  3900 AF    0  17  3  735   24470  1  3
5  3910        0  1  7540  100  1  7520  110  1  7500  120  2  7400  125  2  7380
5  3911      130  2  7370  135  2  7348  145  2  7343  155  2  7348  160  2  7370
5  3912      170  2  7380  180  3  7400  200  3  7420  680  3  7440  690  3  7500
5  3913      705  3  7580  725  3  7620
6  3920  1  2 070 070  1  2 035 035  1  2 070 070
3  4000 AG    0  16  3  735   24760  1  3
5  4010        0  1  7540   75  1  7520  225  1  7500  260  1  7420  335  1  7400
5  4011      350  2  7380  360  2  7370  365  2  7348  375  2  7343  385  2  7348
5  4012      390  2  7380  395  3  7400  400  3  7420  710  3  7440  720  3  7500
5  4013      750  3  7600
6  4020  1  2 070 070  1  2 035 035  1  2 070 070
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 KEARSLEY CREEK     AE AJ                  HOLTSLAG  6  2  2 99 12
2  3795  74357  74360
3  3800 AE    1  18  3  735   23750  1  3
4  3155   2300   2300
**SEQUENCE**
5  3809    -310  1  7500 -300  1  7480 -290  1  7460 -275  1  7440 -225  1  7420
5  3810       0  1  7420  130  2  7400  140  2  7380  150  2  7360  170  2  7336
5  3811     182  2  7360  187  2  7380  195  3  7400  205  3  7420  240  3  7440
5  3812     250  3  7500  270  3  7520  300  3  7540
6  3820  1  2 085 085  1  2 030 030  1  2 070 070
3  3900 AF    0  17  3  735   24470  1  3
5  3910       0  1  7540  100  1  7520  110  1  7500  120  2  7400  125  2  7380
5  3911     130  2  7370  135  2  7348  145  2  7343  155  2  7348  160  2  7370
5  3912     170  2  7380  180  3  7400  200  3  7420  680  3  7440  690  3  7500
5  3913     705  3  7580  725  3  7620
6  3920  1  2 070 070  1  2 035 035  1  2 070 070
3  4000 AG    0  16  3  735   24910  1  3
5  4010       0  1  7540   75  1  7520  225  1  7500  260  1  7420  335  1  7400
5  4011     350  2  7380  360  2  7370  365  2  7348  375  2  7343  385  2  7348
5  4012     390  2  7380  395  3  7400  400  3  7420  710  3  7440  720  3  7500
5  4013     750  3  7600
6  4020  1  2 070 070  1  2 035 035  1  2 070 070
3  4100 AH    0  18  3  735   25280  1  3
5  4110       0  1  7540   90  1  7520  255  1  7500  290  1  7480  340  1  7460
5  4111 AG  360  1  7440  560  1  7420  575  2  7400  580  2  7380  590  2  7370
5  4112     595  2  7347  605  2  7342  615  2  7347  620  2  7370  620  2  7380
5  4113     630  3  7400  650  3  7500  675  3  7600
6  4120  1  2 070 070  1  2 037 037  1  2 070 070
3  4200 AI    0  16  3  735   25640  1  3
5  4210       0  1  7500   25  1  7480   65  1  7460  110  1  7440  230  1  7440
5  4211 AH  240  1  7420  255  2  7400  275  2  7380  285  2  7380  300  2  7346
5  4212     310  2  7341  320  2  7346  330  2  7380  340  3  7400  360  3  7500
5  4213     400  3  7600
6  4220  1  2 070 070  1  2 040 040  1  2 070 070
3  4300 AJ    0  18  3  735   26190  1  3
5  4310       0  1  7560  120  1  7540  160  1  7540  170  1  7500  230  1  7400
5  4311 AI  240  2  7380  245  2  7344  250  2  7339  255  2  7344  260  2  7380
5  4312     290  3  7400  430  3  7420  550  3  7420  755  3  7440  775  3  7460
5  4313     790  3  7500  815  3  7520  835  3  7580
6  4320  1  2 070 070  1  2 040 040  1  2 070 070
```

*** INPUT CARD PRINTOUT ***

Kearsley

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 KEARSLEY CREEK   AG   AO                    HOLTSLAG 13  5  2  5 12
2   3995  74284  74378  74424  74529  74429
3   4000 AG     1  16  3  735   24760  1  3
4   4005   1470   2000   2300   2950   2300
5   4010        0  1  7540   75  1  7520  225  1  7500  260  1  7420  335  1  7400
5   4011      350  2  7380  360  2  7370  365  2  7348  375  2  7343  385  2  7348
5   4012      390  2  7380  395  3  7400  400  3  7420  710  3  7440  720  3  7500
5   4013      750  3  7600
6   4020  1  2 070 070  1  2 035 035  1  2 070 070
3   4100 AH     0  18  3  735   25280  1  3
5   4110        0  1  7540   90  1  7520  255  1  7500  290  1  7480  340  1  7460
5   4111      360  1  7440  560  1  7420  575  2  7400  580  2  7380  590  2  7370
5   4112      595  2  7347  605  2  7342  615  2  7347  620  2  7370  620  2  7380
5   4113      630  3  7400  650  3  7500  675  3  7600
6   4120  1  2 070 070  1  2 037 037  1  2 070 070
3   4200 AI     0  16  3  735   25640  1  3
5   4210        0  1  7500   25  1  7480   65  1  7460  110  1  7440  230  1  7440
5   4211 AH   240  1  7420  255  2  7400  275  2  7380  285  2  7380  300  2  7346
5   4212      310  2  7341  320  2  7346  330  2  7380  340  3  7400  360  3  7500
5   4213      400  3  7600
6   4220  1  2 070 070  1  2 040 040  1  2 070 070
3   4300 AJ     0  18  3  735   26190  1  3
5   4310        0  1  7560  120  1  7540  160  1  7540  170  1  7500  230  1  7400
5   4311 AI   240  2  7380  245  2  7344  250  2  7339  255  2  7344  260  2  7380
5   4312      290  3  7400  430  3  7420  550  3  7420  755  3  7440  775  3  7460
5   4313      790  3  7500  815  3  7520  835  3  7580
6   4320  1  2 070 070  1  2 040 040  1  2 070 070
3   4400 AK     0  14  3  735   26690  1  3
5   4410        0  1  7580   50  1  7560   60  1  7500   72  2  7400   85  2  7380
5   4411 AJ   100  2  7351  105  2  7346  115  2  7351  125  2  7400  145  3  7420
5   4412      320  3  7420  720  3  7440  740  3  7500  760  3  7600
6   4420  1  2 070 070  1  2 035 035  1  2 070 070
3   4450 AKI    0  23  3  736   27090  1  3
5   4460        0  1  7580   25  1  7560   55  1  7540   60  1  7520   70  1  7500
5   4461       80  1  7480  100  1  7460  170  1  7460  200  1  7440  300  1  7440
5   4462      315  1  7420  325  2  7400  335  2  7390  340  2  7362  350  2  7357
5   4463      360  2  7362  365  2  7400  375  3  7420  605  3  7420  620  3  7500
5   4464      645  3  7560  690  3  7580  730  3  7600
6   4470  1  2 090 090  1  2 033 033  1  2 070 070
3   4500 AM     0  20  3  736   27190  1  3
5   4510        0  1  7580   10  1  7560   30  1  7540   40  1  7520   50  1  7500
5   4511       60  1  7480  310  1  7460  340  1  7440  355  1  7420  360  2  7400
5   4512 AK   370  2  7363  380  2  7358  390  2  7363  400  3  7400  440  3  7500
5   4513      490  3  7500  510  3  7520  550  3  7540  640  3  7560  710  3  7580
```

NP

AG

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....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
6  45[illegible]  1  2 100 100  1  2 032 032  1  2 070 0[illegible]
3  4600 AN    0  19  3  737   27730  1  3
5  4610       0  1  7600   65  1  7580  120  1  7560  190  1  7540  290  1  7520
5  4611     360  1  7500  385  1  7480  540  1  7460  805  1  7440  820  2  7420
5  4612     835  2  7400  845  2  7390  850  2  7370  855  2  7365  860  2  7370
5  4613     870  2  7400  880  3  7500  890  3  7560  900  3  7580
6  4620  1  2 150 150  1  2 035 035  1  2 070 070
3  4650 AM1   0  19  3  737   28170  1  3
5  4660       0  1  7500   20  1  7480   30  1  7460   40  1  7440   50  1  7420
5  4661     235  1  7420  245  2  7400  260  2  7395  270  2  7372  275  2  7367
5  4662     280  2  7372  285  2  7395  295  3  7400  300  3  7420  310  3  7440
5  4663     320  3  7460  340  3  7480  350  3  7500  380  3  7580
6  4670  1  2 075 075  1  2 042 042  1  2 070 070
3  4700 AN    0  20  3  739   28330  1  3
5  4710       0  1  7600   35  1  7580   75  1  7560  115  1  7540  140  1  7520
5  4711     160  1  7500  180  1  7480  220  1  7460  480  1  7440  500  2  7420
5  4712     510  2  7400  530  2  7396  533  2  7379  540  2  7374  545  2  7379
5  4713     550  2  7400  560  3  7460  580  3  7480  595  3  7500  625  3  7560
6  4720  1  2 050 050  1  2 045 045  1  2 070 070
3  4800 AN BR 2  12  1  738   28330        0  7459 1 0
5  4810       0  1  7446    1  1  7402    5  1  7385   10  1  7369   15  1  7373
5  4811      20  1  7380   25  1  7375   30  1  7380   32  1  7385   33  1  7402
5  4812      33  1  7459    0 -9  7446
6  4820  1  2 030 030
3  4900 AN BD 4   8  2   50          1  2          2 2                  1
5  4910    -470  1  7500 -460  1  7480 -420  1  7460 -360  1  7451 -294  1  7449
5  4911    -176  1  7439  -96  2  7470    0  2  7548
3  5000 AO    5  22  3  738   28370  1  3
5  5009    -500  1  7600 -475  1  7580 -430  1  7560 -400  1  7540 -370  1  7520
5  5010    -340  1  7500 -312  1  7480 -260  1  7460    0  1  7448   16  1  7444
5  5011 AN   26  1  7412   37  2  7407   40  2  7381   52  2  7370   68  2  7386
5  5012      70  3  7426   76  3  7438   84  3  7476   90  3  7500  100  3  7520
5  5013     110  3  7540  125  3  7560
6  5020  1  2 070 070  1  2 042  42  1  2 070 070
```

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 KEARSLEY CREEK    AO  AX                    HOLTSLAG 13  5  2 99 12
2  4995  74548  74651  74702  74802  74705
3  5000 AO     1  22  3  738   28370  1  3
4  5505   1470   2000   2300   2950   2300
5  5009    -500  1  7600 -475  1  7580 -430  1  7560 -400  1  7540 -370  1  7520
**SEQUENCE**
5  5010    -340  1  7500 -312  1  7480 -260  1  7460    0  1  7448   16  1  7444
5  5011      26  1  7412   37  2  7407   40  2  7381   52  2  7370   68  2  7386
5  5012      70  3  7426   76  3  7438   84  3  7476   90  3  7500  100  3  7520
5  5013     110  3  7540  125  3  7560
6  5020  1  2 070 070  1  2 042  42  1  2 070 070
3  5100 AP     0  20  3  739   28850  1  3
5  5109    -230  1  7540 -210  1  7520 -190  1  7500 -140  1  7420 -100  1  7420
5  5110AO   -65  1  7440  125  1  7440  130  1  7420  138  2  7400  150  2  7380
5  5111     162  2  7374  175  2  7380  182  3  7400  190  3  7420  210  3  7440
5  5112     230  3  7460  240  3  7480  250  3  7500  260  3  7520  310  3  7540
6  5120  1  2 070 070  1  2 040 040  1  2 070 070
3  5200 AQ     0  14  3  739   29390  1  3
5  5210       0  1  7520   15  1  7500   40  1  7480   55  1  7460  265  1  7440
5  5211 AP   280  2  7420  290  2  7400  295  2  7382  305  2  7377  315  2  7382
5  5212     318  3  7420  340  3  7480  375  3  7500  420  3  7520
6  5220  1  2 070 070  1  2 042 042  1  2 045 045
3  5300 AQ RR 2    9  1  739   29390         0  7465 3 0
5  5310       0  1  7465    0  1  7394    4  1  7375    8  1  7374   12  1  7372
5  5311      16  1  7371   19  1  7371   19  1  7465    0 -9  7465
6  5320  1  2 040 040
3  5400 AQ RD 4  10  3   25           1  3           2 1 2                  1
5  5410    -520  1  7500 -490  1  7480 -460  1  7469 -380  1  7456 -268  1  7462
5  5411    -245  2  7478 -215  3  7478 -206  3  7468  -86  3  7471    0  3  7498
3  5500 AR     5  18  5  738   29480  2  4
5  5510    =530  1  7520 =520  1  7500 =490  1  7480 =460  1  7469 =380  1  7456
5  5511 AQ -268  1  7462  -67  2  7400  -59  3  7390  -52  3  7379  -40  4  7403
5  5512     -39  4  7417  -36  4  7424  -33  5  7447    0  5  7449  100  5  7460
5  5513     150  5  7480  190  5  7500  250  5  7520
6  5520  1  2 070 070  1  2 040 040  1  2 040 040  1  2 040 040  1  2 065 065
3  5600 AS     0  19  3  740   30030  1  3
5  5609    -350  1  7600 -345  1  7580 -335  1  7540 -320  1  7500 -310  1  7480
5  5610 AR     0  1  7479  180  1  7480  235  1  7460  245  1  7440  255  2  7420
5  5611     265  2  7410  270  2  7403  285  2  7392  295  2  7403  300  2  7440
5  5612     310  3  7460  320  3  7480  340  3  7500  350  3  7520
6  5620  1  2 070 070  1  2 040 040  1  2 070 070
3  5700 AT     0  19  3  742   30560  1  3
5  5709    -120  1  7600 -110  1  7560  -95  1  7500  -90  1  7480  -30  1  7480
5  5710       0  1  7479   90  1  7460  225  2  7440  235  2  7420  240  2  7405
```

AS

AR

*** INPUT CARD PRINTOUT ***

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  5711      265  2  7400  270  2  7420  280  3  7480  300  3  7483  320  3  7480
5  5712      380  3  7480  390  3  7500  400  3  7520  430  3  7560
6  5720  1  2 070 070  1  2 030 030  1  2 070 070
3  5800 AT     0  15  3  742   31080  1  3
5  5810        0  1  7560   50  1  7500  170  1  7480  190  2  7460  195  2  7440
5  5811 AT   205  2  7430  210  2  7415  220  2  7410  230  2  7415  240  2  7440
5  5812      250  3  7460  400  3  7480  410  3  7500  420  3  7520  430  3  7540
6  5820  1  2 040 040  1  2 030 030  1  2 050 050
3  5900 AU     0  15  3  742   31610  1  3
5  5910        0  1  7559  100  1  7540  125  1  7520  145  1  7500  310  1  7485
5  5911 AU   350  1  7480  355  2  7460  365  2  7440  375  2  7430  380  2  7405
5  5912      390  2  7400  410  2  7405  415  2  7680  420  3  7500  450  3  7580
6  5920  1  2 070 070  1  2 040 040  1  2 070 070
3  6000 AV     0  20  3  742   32130  1  3
5  6010        0  1  7550   15  1  7540   20  1  7520   30  1  7500   40  1  7480
5  6011 AV    50  1  7460   60  2  7440   70  2  7435   80  2  7410   95  2  7406
5  6012      105  2  7410  110  2  7440  120  3  7460  130  3  7480  140  3  7500
5  6013      165  3  7520  185  3  7540  220  3  7560  270  3  7580  380  3  7600
6  6020  1  2 070 070  1  2 035 035  1  2 070 070
3  6100 AW BR 2  10  1  741   32130       30  7513 2 0
5  6100        0  1  7513    0  1  7424    7  1  7419   11  1  7412   20  1  7408
**SEQUENCE**
5  6111       28  1  7408   32  1  7410   40  1  7424   40  1  7513    0 -9  7513
6  6120  1  2 028 028
3  6300 AW     5  15  3  742   32240  1  3
5  6310      -50  1  7540  -15  1  7500   -5  1  7480    0  1  7471   11  2  7456
5  6311 AW    17  2  7426   29  2  7414   38  2  7407   54  2  7428   60  3  7483
5  6312       70  3  7504   80  3  7520   90  3  7540  100  3  7560  180  3  7580
6  6320  1  2 035 035  1  2 038 038  1  2 070 070
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1     KEARSLEY CREEK  AX  BI                    HOLTSLAG 12  5  2 99 12
2  62   74912  75007  75056  75143  75061
3  6300 AX    1  15  3  742   32240  1  3
4  6305   1470   2000   2300   2950   2300
5  6310    -50  1  7540  -15  1  7500   -5  1  7480    0  1  7471   11  2  7456
5  6311 AW  17  2  7426   29  2  7414   38  2  7407   54  2  7428   60  3  7483   740.7
5  6312     70  3  7504   80  3  7520   90  3  7540  100  3  7560  180  3  7580
6  6320  1  2 035 035  1  2 038 038  1  2 070 070
3  6400 AY    0  20  2  743   32850 99 99
5  6409  -475  1  7570 -415  1  7560 -310  1  7540 -305  1  7520 -295  1  7500
5  6410 AX    0  1  7500   20  1  7480   65  1  7480   95  1  7500  160  1  7500
5  6411     170  1  7480  175  2  7460  180  2  7440  190  2  7435  195  2  7417   741.2
5  6412     210  2  7412  220  2  7417  225  2  7435  235  2  7500  250  2  7620
6  6420  1  2 030 030  1  2 040 040
3  6500 AZ    0  20  3  743   33390  1  3
5  6510       0  1  7558  155  1  7540  200  1  7520  305  1  7500  405  1  7480
5  6511 AY  410  2  7460  418  2  7450  423  2  7421  430  2  7416  445  2  7421   741.6
5  6512     450  2  7450  460  3  7460  465  3  7480  600  3  7490  845  3  7500
5  6513     880  3  7520  910  3  7540  925  3  7560  950  3  7580  990  3  7600
6  6520  1  2 030 030  1  2 035 035  1  2 030 030
3  6600 BA    0  19  2  744   33975 99 99
5  6610 AZ    0  1  7580   22  1  7460   30  1  7450   35  1  7427   45  1  7422
5  6611      55  1  7427   65  1  7460   72  2  7480   90  2  7500  100  2  7520   742.2
5  6612     140  2  7539  250  2  7520  300  2  7500  530  2  7500  670  2  7520
5  6613     690  2  7540  710  2  7560  720  2  7580  750  2  7600
6  6620  1  2 035 035  1  2 032 032
3  6700 BB    0  20  3  744   34560  1  3
5  6710       0  1  7600   40  1  7580   80  1  7560  120  1  7540  150  1  7520
5  6711 BA  210  1  7500  285  2  7480  290  2  7460  300  2  7450  305  2  7431
5  6712     320  2  7426  335  2  7431  340  2  7460  350  3  7480  450  3  7500   742.6
5  6713     520  3  7520  590  3  7540  630  3  7560  650  3  7580  700  3  7600
6  6720  1  2 030 030  1  2 030 030  1  2 030 030
3  6750 BC    0  20  3  745   34810  1  3
5  6760       0  1  7600   15  1  7580   25  1  7560   50  1  7540   65  1  7520
5  6761 BB  220  1  7519  295  1  7500  430  2  7480  440  2  7460  450  2  7438
5  6762     480  2  7433  510  2  7438  520  2  7460  525  3  7480  570  3  7500   743.3
5  6763     650  3  7520  680  3  7540  700  3  7560  735  3  7580  810  3  7600
6  6770  1  2 030 030  1  2 031 031  1  2 030 030
3  6800 BD    0  25  3  745   34900  1  3
5  6810       0  1  7600   40  1  7580   80  1  7560  100  1  7540  125  1  7520
5  6811     240  1  7519  320  1  7500  420  1  7482  440  2  7480  450  2  7460   743.5
5  6812     460  2  7450  465  2  7440  510  2  7435  550  2  7440  555  2  7450
5  6813     565  2  7460  570  3  7480  590  3  7500  700  3  7520  815  3  7540
5  6814     870  3  7560  880  3  7580  890  3  7600  960  3  7620 1070  3  7640
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*** INPUT CARD PRINTOUT ***

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

6  6820  1  2 030 030  1  2 032 032  1  2 030 030
3  6850 BE    0  19  3  745   35090  1  3
5  6860        0  1  7600   15  1  7580   25  1  7560   40  1  7540   50  1  7520
5  6861 BC   200  1  7520  250  1  7500  280  2  7480  290  2  7460  310  2  7442   743.8
5  6862      330  2  7438  350  2  7442  370  2  7460  380  2  7480  390  3  7500
5  6863      705  3  7520  730  3  7540  740  3  7560  760  3  7580
6  6870  1  2 030 030  1  2 031 031  1  2 030 030
3  6900 BF    0  20  3  746   35360  1  3
5  6910        0  1  7620   25  1  7600   40  1  7588   70  1  7560   80  1  7540
5  6911 BD   250  1  7520  395  2  7500  405  2  7480  415  2  7470  420  2  7445
5  6912      430  2  7440  440  2  7445  450  3  7480  465  3  7500  670  3  7520   744.0
5  6913      690  3  7540  710  3  7560  720  3  7580  980  3  7600 1015  3  7620
6  6920  1  2 030 030  1  2 030 030  1  2 030 030
3  7000 BF BR 2  11  1  745   35360        0  7491 3 0
5  7010        0  1  7491    0  1  7459    2  1  7452    5  1  7449   10  1  7444
5  7011       13  1  7452   15  1  7439   20  1  7457   26  1  7484   26  1  7491
5  7012        0 -9  7491
6  7020  1  2 060 060
3  7100 BF RD 4   7  2   19          1  2          1 1                1
5  7110     -230  1  7559 -208  1  7540    0  1  7527   86  2  7520  280  2  7516
5  7111      322  2  7538  390  2  7560
3  7200 BG    5  20  3  746   35460  1  3
5  7210     -330  1  7620 -310  1  7600 -290  1  7580 -265  1  7560 -255  1  7540
5  7211 BE  -120  1  7535    0  1  7519   46  2  7518   56  2  7459   72  2  7442   741.2
5  7212       88  2  7459   90  2  7485  108  3  7507  200  3  7513  250  3  7546
5  7213      375  3  7560  575  3  7580  765  3  7600  800  3  7620  880  3  7640
6  7220  1  2 030 030  1  2 030 030  1  2 030 030
```

```
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1     1 KEARSLEY CREEK  BG THRU DAVISON ROAD      HOLTSLAG 16  4  2 99 12
2     2  75263  75301  75319  75351
3  7200 BG    1  20  3  746   35460  1  3
4  7204   1470   2000   2300   2950
5  7210     -330  1  7620 -310  1  7600 -290  1  7580 -265  1  7560 -255  1  7540
5  7211 BE  -120  1  7535    0  1  7519   46  2  7518   56  2  7459   72  2  7442
5  7212      88  2  7459   90  2  7485  108  3  7507  200  3  7513  250  3  7546
5  7213     375  3  7560  575  3  7580  765  3  7600  800  3  7620  880  3  7640
6  7220  1  2 030 030  1  2 030 030  1  2 030 030
3  7300 BH    0  18  3  747   35970  1  3
5  7310       0  1  7559   40  1  7540   80  1  7520  175  1  7500  180  1  7480
5  7311 BF  190  2  7470  195  2  7453  210  2  7448  220  2  7453  230  2  7480
5  7312     235  3  7500  250  3  7520  265  3  7540  280  3  7560  565  3  7580
5  7313     770  3  7600  795  3  7620  865  3  7640
6  7320  1  2 080 080  1  2 030 030  1  2 030 030
3  7400 BI    1  18  3  747   36580  1  3
4  7404   1470   1730   1780   1860
5  7410       0  1  7565   50  1  7560   60  1  7540  180  1  7520  190  1  7500
5  7411 BG  200  2  7480  210  2  7470  215  2  7458  220  2  7453  230  2  7458
5  7412     240  2  7480  245  3  7500  255  3  7520  430  3  7540  475  3  7560
5  7413     540  3  7580  690  3  7600  750  3  7620
6  7420  1  2 070 070  1  2 032 032  1  2 040 040
3  7500 BJ    0  23  3  747   36930  1  3
5  7510       0  1  7600  110  1  7595  210  1  7580  220  1  7560  225  1  7540
5  7511     230  1  7520  240  2  7500  245  2  7490  250  2  7462  255  2  7457
5  7512 BH  265  2  7462  270  2  7480  280  3  7500  285  3  7520  300  3  7540
5  7513     425  3  7540  510  3  7520  680  3  7520  885  3  7540  920  3  7560
5  7514     970  3  7580 1035  3  7600 1100  3  7620
6  7520  1  2 060 060  1  2 035 035  1  2 035 035
3  7600 BK    0  20  3  748   37300  1  3
5  7610       0  1  7600   75  1  7595  120  1  7600  170  1  7605  225  1  7600
5  7611 BI  240  1  7580  255  1  7560  270  1  7540  600  2  7520  610  2  7500
5  7612     615  2  7467  625  2  7462  640  2  7467  645  3  7500  655  3  7540
5  7613     750  3  7540  770  3  7560  780  3  7580  800  3  7600  820  3  7640
6  7620  1  2 050 050  1  2 035 035  1  2 030 030
3  7700 BL    0  18  3  748   37680  1  3
5  7710       0  1  7600  265  1  7580  280  1  7560  345  1  7540  355  1  7520
5  7711     360  2  7500  370  2  7480  375  2  7471  385  2  7466  395  2  7471
5  7712 BJ  405  3  7500  410  3  7520  425  3  7540  885  3  7540  895  3  7560
5  7713     905  3  7580  915  3  7600  935  3  7660
6  7720  1  2 040 040  1  2 040 040  1  2 070 070
3  7800 BM    0  20  3  749   38270  1  3
5  7810       0  1  7618  100  1  7600  630  1  7580  675  1  7560  690  1  7540
5  7811     710  2  7500  718  2  7480  720  2  7476  725  2  7471  735  2  7476
5  7812 BK  742  3  7500  760  3  7520 1070  3  7540 1080  3  7560 1090  3  7580
```

```
5  7[illegible]    1100  3  7600 1125  3  7600 1160  3  7540 1240  3  7600 1265  3  7620
6  7820  1  2 050 050  1  2 040 040  1  2 040 040
3  8000 BM1    0  22  3  748   39100  1  3
5  8009     -965  1  7600 -590  1  7580 -330  1  7579 -200  1  7560 -140  1  7560
5  8010        0  1  7564  150  1  7560  185  1  7540  200  1  7520  205  2  7500
5  8011 BL   210  2  7480  215  2  7475  220  2  7480  225  2  7500  230  3  7560
5  8012      300  3  7560  340  3  7540  490  3  7540  590  3  7560  630  3  7580
5  8013      645  3  7600  975  3  7620
6  8020  1  2 080 080  1  2 040 040  1  2 050 050
3  8100 BN     0  15  3  749   39540  1  3
5  8110        0  1  7600  400  1  7580  620  1  7579  685  1  7580  695  2  7540
5  8111 BM   705  2  7530  710  2  7483  725  2  7478  740  2  7483  745  2  7530
5  8112      750  2  7540  760  3  7560  915  3  7580 1010  3  7600 1065  3  7618
6  8120  1  2 060 060  1  2 042 042  1  2 080 080
3  8200 BO     0  13  3  750   40110  1  3
5  8210        0  1  7595  140  1  7580  180  1  7560  520  1  7540  530  1  7520
5  8211 BN   535  2  7510  540  2  7486  545  2  7481  550  2  7486  555  2  7510
5  8212      560  3  7520  585  3  7600  740  3  7618
6  8220  1  2 060 060  1  2 040 040  1  2 100 100
3  8300 BP     0  14  3  750   40580  1  3
5  8310        0  1  7595  120  1  7580  200  2  7560  335  2  7540  337  2  7510
5  8311 BØ   340  2  7489  365  2  7484  375  2  7489  390  2  7510  400  2  7520
5  8312      405  3  7560  480  3  7560  490  3  7580  810  3  7600
6  8320  1  2 040 040  1  2 035 035  1  2 080 080
3  8400 BQ     0  16  3  750   40970  1  3
5  8410     -200  1  7630 -200  1  7600  600  1  7580  625  1  7570  780  2  7560
5  8411 BP   783  2  7540  785  2  7520  790  2  7491  805  2  7486  810  2  7491
5  8411      815  2  7520  820  2  7540  835  3  7580 1150  3  7600 1610  3  7600
**SEQUENCE**
5  8412    1610  3  7630
6  8420  1  2 060 060  1  2 038 038  1  2 070 070
3  8500 BR     1  17  3  751   41550  1  3
4  8504   1470   2000   2300   2950
5  8509      207  1  7605  208  1  7605  209  1  7605  210  1  7605  315  1  7600
5  8510 BQ   710  1  7600 1210  1  7580 1220  2  7540 1230  2  7515 1235  2  7495
5  8511     1240  2  7490 1255  2  7495 1260  2  7520 1270  3  7540 1275  3  7560
5  8512    1360  3  7580 2180  3  7600
6  8520  1  2 030 030  1  2 035 035  1  2 060 060
3  8600 DVSNB 2  11  1  750   41550        0  7573 3 0
5  8610        0  1  7573    0  1  7493    5  1  7487   10  1  7485   15  1  7485
5  8611       20  1  7492   25  1  7498   30  1  7520   36  1  7538   36  1  7573
5  8612        0 -9  7573
6  8613  1  2 022 022
3  8650 DVSNR 4   9  2   40          1  2          1 1                  1
5  8651        0  1  7620  640  1  7610 1050  1  7600 1350  1  7588 1880  1  7600
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  8652     2300  2  7611 2650  2  7600 3200  2  7600 3780  2  7620
3  8800 BS     5  18  3  750   41670  1  3
5  8809    -999  1  7610 -900  1  7600 -800  1  7595 -700  1  7600 -600  1  7600
5  8810 BR -200  1  7600 -190  1  7580 -186  1  7568 -114  1  7543  -96  1  7534
5  8811    -92  2  7510  -78  2  7491  -60  2  7513  -56  3  7540  -20  3  7574
5  8812      0  3  7583   20  3  7600   70  3  7615
6  8820  1  2 070 070  1  2 035 035  1  2 035 035
```

```
1     1 KEARSLEY CREEK  DAVISION ROAD TO SECTCE  HOLTSLAG 30 05 02 99 12
2       75865  75933  75967  75949  75954
3  8800 BS    1  18  3  750   42660  1  3
4  8804   1470   2000   2950   2300   2300
5  8809    -999  1  7610 -900  1  7600 -800  1  7595 -700  1  7600 -600  1  7600
5  8810    -200  1  7600 -190  1  7580 -186  1  7568 -114  1  7543  -96  1  7534
5  8811 BR -92  2  7510  -78  2  7491  -60  2  7513  -56  3  7540  -20  3  7574
5  8812       0  3  7583   20  3  7600   70  3  7615
6  8820  1  2 070 070  1  2 035 035  1  2 035 035
3  8900 BT    1  17  3  752   43190  1  3
4  8904   1400   1950   2875   2250   2250
5  8910       0  1  7629  135  1  7620  160  1  7600  190  1  7580  360  1  7561
5  8911 BS  510  2  7560  520  2  7540  525  2  7509  535  2  7504  545  2  7509
5  8912     560  2  7540  565  3  7560  580  3  7580  640  3  7600 1100  3  7600
5  8913    1310  3  7620 1350  3  7640
6  8920  1  2 060 060  1  2 037 037  1  2 035 035
3  9000 BU    0  16  3  752   43760  1  3
5  9010       0  1  7640   15  1  7620   70  1  7600  565  1  7580  590  1  7560
5  9011 BT  630  2  7540  645  2  7505  660  2  7500  670  2  7505  670  2  7540
5  9012     680  3  7560  685  3  7580  710  3  7600 1025  3  7600 1220  3  7620
5  9013    1260  3  7640
6  9020  1  2 040 040  1  2 040 040  1  2 040 040
3  9030 BU BR 2  12  1  750   43760        0  7572 3 0
5  9040       0  1  7572    2  1  7567    5  1  7555    8  1  7524   15  1  7508
5  9041      20  1  7503   25  1  7499   30  1  7502   35  1  7509   40  1  7520
5  9042      40  1  7572    0 -9  7572
6  9050  1  2 035 035
3  9060 BU RD 4   9  2   50          1  2          2 2                1
5  9070       0  1  7620   60  1  7600  550  1  7580  640  2  7595  670  2  7580
5  9071     690  2  7600 1000  2  7600 1190  2  7620 1230  2  7640
3  9100 BV    5  20  3  752   43800  1  3
5  9110       0  1  7660  110  1  7640  140  1  7620  420  1  7600  550  1  7580
5  9111 BU  570  1  7560  590  2  7540  600  2  7520  605  2  7503  610  2  7498
5  9112     615  2  7503  620  2  7520  625  3  7540  640  3  7560  810  3  7580
5  9113     850  3  7600  970  3  7600 1180  3  7620 1220  3  7640 1250  3  7660
6  9120  1  2 040 040  1  2 037 037  1  2 070 070
3  9200 BW    0  19  3  752   44760  1  3
5  9210       0  1  7660  160  1  7640  215  1  7620  500  1  7600  750  1  7600
5  9211 BV  810  1  7580 1210  1  7580 1220  2  7560 1230  2  7540 1240  2  7527
5  9212     1245  2  7502 1250  2  7496 1254  2  7502 1262  2  7527 1264  3  7557
5  9213    1294  3  7594 1336  3  7590 1460  3  7620 1500  3  7640
6  9220  1  2 100 100  1  2 040 040  1  2 080 080
3  9300 BX    0  17  3  752   45290  1  3
5  9310       0  1  7660   50  1  7640  120  1  7620  560  1  7600  880  1  7600
5  9311 BW  940  2  7580  950  2  7540  953  2  7507  960  2  7502  965  2  7507
5  9312     970  2  7520  980  3  7540  985  3  7560 1030  3  7580 1170  3  7600
5  9313    1215  3  7620 1255  3  7640
6  9320  1  2 080 080  1  2 040 040  1  2 080 080
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*** INPUT CARD PRINTOUT ***

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1  1497 PHILLIPS DRAIN VASSAR RD TO PRIVATE RD    HERREID  8  5  2 99 12
2  1498  77800  77925  77950  77990  77950
3  1501 K   K 1  10  3  771    6680 99 99
4  1502    360    500    570    710    570
5  1510       0  1  7800   70  1  7779   83  2  7770   96  2  7710  102  2  7702
5  1511     108  2  7711  122  2  7763  140  3  7771  142  3  7780  152  3  7800
6  1559  1  2 080 080  1  2 050 050  1  2 090 090
3  1600 L   L 0  15  3  772    7550 99 99
5  1610       0  1  7810   45  1  7800  148  1  7780  178  1  7760  186  2  7740
5  1611     189  2  7710  199  2  7710  208  2  7740  216  2  7760  224  3  7780
5  1612     230  3  7798  250  3  7798  320  3  7800  400  3  7800  600  3  7820
6  1659  1  2 100 100  1  2 052 052  1  2 100 100
3  1700 M   M 0  15  3  772    8600 99 99
5  1710    -200  1  7820    0  1  7800  164  1  7780  225  1  7790  245  1  7772
5  1711     247  2  7760  255  2  7723  260  2  7712  265  2  7718  273  2  7793
5  1712     275  3  7790  320  3  7800  430  3  7780  600  3  7800  670  3  7820
6  1759  1  2 100 100  1  2 050 050  1  2 100 100
3  1800 N   N 0  21  3  773    9580 99 99
5  1810    -130  1  7860  -70  1  7840  -40  1  7820    0  1  7800   22  1  7780
5  1811      58  1  7760  221  1  7760  252  1  7780  282  2  7780  286  2  7760
5  1812     294  2  7740  304  2  7720  314  2  7720  320  2  7740  332  3  7760
5  1813     338  3  7780  352  3  7800  440  3  7800  580  3  7820  610  3  7840
5  1814     670  3  7860
6  1859  1  2 100 100  1  2 050 050  1  2 120 120
3  1870 N+1   0  12  3  774   10220  1  3
5  1880       0  1  7840  370  1  7820  480  1  7800  490  2  7780  500  2  7760
5  1881     505  2  7725  510  2  7725  520  2  7760  530  3  7800  540  3  7820
5  1882     660  3  7820  690  3  7840
6  1890  1  2 100 100  1  2 050 050  1  2 100 100
3  1900 O   O 0  14  3  773   10500 99 99
5  1910       0  1  7840   32  1  7820   62  1  7800   79  1  7793   80  2  7790
5  1911      90  2  7729   95  2  7726   99  2  7729  109  2  7793  111  3  7795
5  1912     117  3  7800  124  3  7820  158  3  7820  192  3  7840
6  1959  1  2 090 090  1  2 048 048  1  2 090 090
3  1970 O+1   0  11  3  774   10970  1  3
5  1980       0  1  7840   50  1  7820  120  2  7820  130  2  7800  140  2  7780
5  1981     145  2  7725  155  2  7725  160  2  7780  170  3  7800  225  3  7820
5  1982     285  3  7840
6  1990  1  2 090 090  1  2 050 050  1  2 100 100
3  2000 P   P 0  14  3  773   11300 99 99
5  2010       0  1  7840   48  1  7820   83  1  7800  116  1  7780  220  1  7770
5  2011     223  2  7760  225  2  7740  228  2  7725  238  2  7725  240  2  7740
5  2012     244  2  7780  253  3  7800  275  3  7820  318  3  7840
6  2059  1  2 070 070  1  2 040 040  1  2 070 070
```

K

L

M

N

O

P

Q

R

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1  2297 PHILLIPS DR PRIVATE RD TO ATHERTON RD     HERREID  5  5  2  5 99
2  2298  78052  78143  78176  78235  78176
3  2301 Q   P 1  14  3  773   11360 99 99
4  2302    360    500    570    710    570
5  2310       0  1  7840   54  1  7820   77  1  7800  113  1  7780  230  1  7796
5  2311     238  1  7736  240  1  7728  244  2  7728  245  2  7728  249  3  7728
5  2312     251  3  7737  257  3  7806  272  3  7820  312  3  7840
6  2359  1  2 080 080  1  2 043 043  1  2 075 075
3  2380 Q+1   0  10  3  775   11870  1  3
5  2385 .     0  1  7840  115  1  7820  130  2  7800  140  2  7780  145  2  7760
5  2386     150  2  7730  155  2  7760  170  3  7780  240  3  7800  310  3  7840
6  2390  1  2 090 090  1  2 045 045  1  2 080 080
3  2400 R   Q 0  13  3  774   12500 99 99
5  2410       0  1  7840   30  1  7820   48  1  7800   50  2  7780   54  2  7760
5  2411      58  2  7740   60  2  7736   67  2  7736   69  2  7740   72  2  7760
5  2412      81  2  7800   92  3  7820  103  3  7840
6  2459  1  2 100 100  1  2 045 045  1  2 090 090
3  2500 S   R 1  12  3  776   13000 99 99
4  2501    150    210    240    300    240
5  2510       0  1  7840   39  1  7820   73  1  7800   94  1  7780   98  2  7760
5  2511     104  2  7740  111  2  7740  114  2  7760  126  3  7780  210  3  7800
5  2512     282  3  7820  363  3  7825
6  2559  1  2 100 100  1  2 045 045  1  2 080 080
3  2600 T  RR 0  12  3  776   13510 99 99
5  2610       0  1  7840   25  1  7820  102  1  7800  120  2  7780  136  2  7760
5  2611     138  2  7751  143  2  7751  146  2  7780  148  3  7780  152  3  7800
5  2612     280  3  7820  340  3  7840
6  2659  1  2 050 050  1  2 045 045  1  2 080 080
```

R

S

T

U

V

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1 2897 PHILLIPS DR ATHERTON RD TO EUGENE RD          VH     4  5  2  5 12
      MB
2  2898  78180  78346  78375  78395  78375
**SEQUENCE**
3  2900 U   U 1  11  3  776   13580  1  3
4  2901     150    210    240    300    240
5  2910       0  1  7840   32  1  7820  100  1  7817  118  1  7810  126  2  7764
5  2911     128  2  7753  130  2  7753  132  2  7756  138  3  7817  160  3  7823
5  2912     210  3  7840
6  2959  1  2 060 060  1  2 050 050  1  2 060 060
3  3000 V   U 0  16  3  779   14300 99 99
5  3010     -30  1  7860    0  1  7840   28  1  7820   41  1  7800   62  1  7780
5  3011      70  1  7780  219  1  7780  254  1  7780  280  2  7770  284  2  7760
5  3012     298  2  7780  306  3  7780  400  3  7800  493  3  7820  562  3  7840
5  3013     700  3  7860
6  3059  1  2 080 080  1  2 050 050  1  2 080 080
3  3063 V   V 0  13  3  780   14730 99 99
5  3065       0  1  7900   90  1  7880  100  1  7860  106  2  7840  115  2  7820
5  3066     125  2  7800  131  2  7795  145  2  7800  150  2  7820  170  3  7840
5  3067     350  3  7860  420  3  7880  420  3  7900
6  3069  1  2 070 070  1  2 050 050  1  2 070 070
3  3100 W   V 0  15  3  782   15170 99 99
5  3110    -100  1  7940    0  1  7920   37  1  7900   53  1  7880   63  2  7860
5  3111      73  2  7840   82  2  7830   85  2  7820   88  2  7820   91  2  7830
5  3112      97  2  7840  102  2  7860  108  3  7880  240  3  7890  380  3  7900
6  3159  1  2 070 070  1  2 050 050  1  2 070 070
```

W

X

Y

Z

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1  3397 PHILLIPS DR EUGENE RD TO PRIVATE RD         VH     3  5  2  5 12
2  3398  78940  79075  79090  79100  79090
3  3400  X W  1  14  4  783   15210 99 99
4  3401    150    210    240    300    240
5  3410      0  1  7940   42  1  7920   75  1  7910  120  1  7904  127  1  7897   A A
5  3411    134  2  7831  135  2  7828  138  3  7828  139  4  7831  140  4  7838
5  3412    149  4  7889  172  4  7900  277  4  7920  312  4  7940
6  3459  1  2 065 065  1  2 040 040  1  2 040 040  1  2 055 055
3  3500  Y X  0  14  3  787   15900 99 99
5  3510      0  1  7980   28  1  7960   62  1  7940   65  1  7920   73  2  7900   A B
5  3511     82  2  7880   85  2  7866   90  2  7866   92  2  7880  100  2  7900
5  3512    103  3  7920  113  3  7940  217  3  7960  258  3  7980
6  3559  1  2 060 060  1  2 045 045  1  2 060 060
3  3600  Z Y  0  10  3  790   16270 99 99
5  3610      0  1  7980   54  1  7960   64  1  7940   68  2  7920   70  2  7890   A C
5  3611     81  2  7890   88  2  7920   92  2  7940  116  3  7960  158  3  7980
6  3659  1  2 080 080  1  2 060 060  1  2 070 070
```

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 1,DATE= 6/10/77

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1  3898 PHILLIPS DRAIN, LAST REACH TO VASSAR RD     VH     2  5  2  5 12
2  3899  79646  79703  79714  79732  79714
3  3900 AA  Z 1  12  3  790   16330 99 99
4  3901    150    210    240    300    240
5  3910       0  1  8000  200  1  7980  230  1  7970  239  1  7965  247  1  7909
5  3911     250  2  7897  255  2  7897  258  3  7910  271  3  7971  295  3  7972
5  3912     310  3  7980  362  3  8000
6  3959  1  2 080 080  1  2 045 045  1  2 050 050
3  4000 AB  W 0  14  3  794   16740 99 99
5  4010       0  1  8020   48  1  8000  142  1  7980  162  2  7960  172  2  7940
5  4011     176  2  7920  179  2  7890  182  2  7890  183  2  7920  185  2  7940
5  4012     187  2  7960  190  3  7880  234  3  8000  380  3  8014
6  4059  1  2 070 070  1  2 045 045  1  2 050 050
```

AD

AE

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 11,DATE= 6/ 8/77

100 - YR

WATER-SURFACE PROFILE FOR: PHILLIPS DRAIN VASSAR RD TO PRIVATE RD HERREID

	SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
	WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
K	K	AT	6680	0	570.	388.	29223.	1.35	17.	150.
	779.50	0.05			779.55	1.47	0.13			*IS*
L	L	AT	7550	870	570.	460.	26774.	2.19	52.	270.
	779.86	0.05	0.36	0.00	779.91	1.24	0.14	-0.000		*XS*
M	M	AT	8600	1050	570.	961.	30214.	4.90	-31.	611.
	780.31	0.03	0.42	0.0	780.33	0.59	0.12	0.001		*XS*
N	N	AT	9580	980	570.	1489.	72380.	2.34	-9.	473.
	780.47	0.01	0.15	0.0	780.48	0.38	0.03	0.000		*XS*
O	N+1	AT	10220	640	570.	224.	16590.	1.22	448.	533.
	780.59	0.12	0.17	0.06	780.71	2.55	0.23	0.000		*XS*
P	O	AT	10500	280	570.	212.	16459.	1.33	48.	120.
	780.91	0.15	0.33	0.01	781.06	2.69	0.23	-0.000		*XS*
Q	O+1	AT	10970	470	570.	242.	16012.	1.23	122.	212.
	781.53	0.11	0.58	0.0	781.64	2.36	0.22	0.000		*XS*
R	P	AT	11300	330	570.	789.	51618.	1.86	52.	272.
	781.75	0.02	0.13	0.0	781.77	0.72	0.05	-0.000		*XS*

100-Y

END OF THIS PROFILE

100 - YR

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 13,DATE= 6/ 9/77

100-YR

WATER-SURFACE PROFILE FOR: PHILLIPS DR PRIVATE RD TO ATHERTON RD HERREID

PAGE 1 OF 1

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
Q P	AT	11360	0	570.	654.	29759.	2.97	57.	269.
781.76	0.04				781.79	0.87	0.07		*IS*
Q+1	AT	11870	510	570.	459.	27225.	1.86	115.	274.
781.96	0.04	0.20	0.00		782.00	1.24	0.15	-0.000	*XS*
R Q	AT	12500	630	570.	250.	21520.	1.21	26.	94.
782.28	0.10	0.35	0.03		782.38	2.28	0.20	0.000	*XS*
S R	AT	13000	500	240.	757.	37510.	3.43	30.	359.
782.48	0.01	0.10	0.0		782.48	0.32	0.05	-0.000	*XS*
T RR	AT	13510	510	240.	556.	30199.	2.34	19.	295.
782.50	0.01	0.03	0.00		782.51	0.43	0.06	-0.000	*XS*

R S T 4 V

100-YR

END OF THIS PROFILE

100-YR

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 13,DATE= 6/ 9/77

100 - YR

WATER-SURFACE PROFILE FOR: HILLIPS DR ATHERTON RD TO EUGENE RD VH

PAGE 1 OF 1

	SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
	WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*
	U	U AT	13580	0	240.	387.	18234.	1.87	4.	203.
W	783.75		0.01			783.76	0.62	0.06		*IS*
	V	U AT	14300	720	240.	2364.	127263.	1.31	3.	554.
X	783.78		0.00	0.02	0.0	783.78	0.10	0.01	-0.000	*XS* 100-Y
	V	V AT	14730	430	240.	145.	7657.	1.00	107.	168.
Y	783.78		0.04	0.03	0.02	783.82	1.65	0.19	-0.005	*XS*
	W	V AT	15170	440	240.	54.	2250.	1.00	67.	100.
Z	785.13		0.30	1.47	0.13	785.43	4.41	0.60	0.009	*XS*

END OF THIS PROFILE

100 - YR

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 11,DATE= 6/10/77

100-YR

WATER-SURFACE PROFILE FOR: PHILLIPS DR EUGENE RD TO PRIVATE RD VH

PAGE 1 OF 1

	SECID AT DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*
AA	X W AT 15210	0	240.	190.	10169.	4.59	83.	219.
	790.90	0.11			791.01	1.26	0.22	*IS*
AB	Y X AT 15900	690	240.	95.	6249.	1.06	67.	102.
	791.54	0.10	0.63	0.0	791.64	2.51	0.26	0.001	*XS*
AC	Z Y AT 16270	370	240.	61.	2815.	1.01	67.	89.
	792.68	0.24	1.21	0.07	792.93	3.93	0.41	0.003	*XS*

100-Y

END OF THIS PROFILE

100-YR

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 9,DATE= 6/10/77

100-YR

WATER-SURFACE PROFILE FOR: PHILLIPS DRAIN, LAST REACH TO VASSAR RD VH

	SECID	AT	DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
AD	AA	Z	16330 / 797.14	0 / 0.09	240. /	150. /	10174. / 797.23	2.25 / 1.60	226. / 0.19	281.	*IS*
AE	AB	W	16740 / 797.33	410 / 0.01	240. / 0.11	290. / 0.0	21703. / 797.34	1.06 / 0.83	149. / 0.07	224. / 0.000	*XS*

100-YR

END OF THIS PROFILE

100-YR

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 17,DATE= 6/ 8/77

100-YR FW

WATER-SURFACE PROFILE FOR: PHILLIPS DRAIN VASSAR RD TO PRIVATE RD HERREID
PAGE 1 OF 1
*** FLOODWAY ANALYSIS *** HOR FW

	SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
K	K AT 6680 / 779.50	0 / 0.05	570. /	371. /	28441. / 779.55	1.23 / 1.54	40. / 0.13	140. /	*IS*
L	L AT 7550 / 779.86	870 / 0.05	570. / 0.37	456. / 0.00	27200. / 779.91	2.07 / 1.25	75. / 0.14	272. / 0.000	*XS*
M	M AT 8600 / 780.32	1050 / 0.03	570. / 0.43	778. / 0.0	28900. / 780.35	3.72 / 0.73	100. / 0.13	500. / 0.000	*XS*
N	N AT 9580 / 780.50	980 / 0.01	570. / 0.15	1402. / 0.0	71907. / 780.50	2.16 / 0.41	40. / 0.03	440. / -0.000	*XS*
O	N+1 AT 10220 / 780.61	640 / 0.12	570. / 0.17	226. / 0.06	16729. / 780.73	1.23 / 2.53	446. / 0.22	533. / 0.000	*XS*
P	O AT 10500 / 780.93	280 / 0.15	570. / 0.33	213. / 0.01	16562. / 781.07	1.33 / 2.67	48. / 0.23	120. / 0.000	*XS*
Q	O+1 AT 10970 / 781.54	470 / 0.11	570. / 0.57	243. / 0.0	16077. / 781.65	1.24 / 2.35	122. / 0.22	212. / 0.000	*XS*
R	P AT 11300 / 781.76	330 / 0.01	570. / 0.13	782. / 0.0	52377. / 781.78	1.78 / 0.73	60. / 0.05	260. / 0.000	*XS*

FW

END OF THIS PROFILE

100-YR FW

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 21,DATE= 6/ 9/77

100-YR FW

WATER-SURFACE PROFILE FOR: PHILLIPS DR PRIVATE RD TO ATHERTON RD HERREID

PAGE 1 OF 1

*** FLOODWAY ANALYSIS *** HOR FW

SECTD AT DISTANCE/ LENGTH/DISCHARGE/ AREA /CONVEYANCE/ ALPHA/ LEW / REW WS ELEV / HV / HF / HE / EG / V / FN / ACC *ID*										
Q P AT	11360 /	0 /	570. /	538. /	26662. /	2.79 /	100. /	250.		
781.76 /	0.05 /			/ 781.81 /	1.06 /	0.08/		*IS*		
Q+1 AT	11870 /	510 /	570. /	460. /	27904. /	1.79 /	115. /	265.		
781.99 /	0.04 /	0.22 /	0.0 /	782.03 /	1.24 /	0.15 /	-0.000	*XS*		FW
R Q AT	12500 /	630 /	570. /	251. /	21648. /	1.21 /	25. /	94.		
782.30 /	0.10 /	0.34 /	0.03 /	782.40 /	2.27 /	0.19 /	0.000	*XS*		
S R AT	13000 /	500 /	240. /	700. /	40675. /	2.41 /	50. /	250.		
782.49 /	0.00 /	0.09 /	0.0 /	782.49 /	0.34 /	0.05 /	0.000	*XS*		
T RR AT	13510 /	510 /	240. /	510. /	30520. /	1.97 /	50. /	250.		
782.51 /	0.01 /	0.02 /	0.00 /	782.52 /	0.47 /	0.06 /	-0.000	*XS*		

END OF THIS PROFILE

100-YR FW

R S T U V

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 19,DATE= 6/ 9/77

100-YR FW

WATER-SURFACE PROFILE FOR: HILLIPS DR ATHERTON RD TO EUGENE RD VH

PAGE 1 OF 1

*** FLOODWAY ANALYSIS ***

	SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
	WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
W	U	U AT	13580	0	240.	357.	18256.	1.65	30.	180.
	783.75	0.01			783.76	0.67	0.06			*IS*
X	V	U AT	14300	720	240.	1098.	68769.	1.29	200.	400.
	783.79	0.00	0.03	0.0	783.79	0.22	0.01	-0.000		*XS*
Y	V	V AT	14730	430	240.	148.	7827.	1.00	107.	168.
	783.82	0.04	0.05	0.02	783.86	1.62	0.18	-0.000		*XS*
Z	W	V AT	15170	440	240.	54.	2255.	1.00	67.	100.
	785.13	0.30	1.44	0.13	785.43	4.40	0.60	0.007		*XS*

FW

END OF THIS PROFILE

100-YR FW

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 17,DATE= 6/10/77

100-YR FW

WATER-SURFACE PROFILE FOR: PHILLIPS DR EUGENE RD TO PRIVATE RD VH

PAGE 1 OF 1

*** FLOODWAY ANALYSIS ***

	SECID AT DISTANCE/ LENGTH/DISCHARGE/ AREA /CONVEYANCE/ ALPHA/ LEW / REW									
	X W AT	15210 /	0 /	240. /	161. /	10785. /	2.89 /	90. /	165.	
AA	790.90 /	0.10 /			/ 791.00 /	1.49 /	0.21/		*IS*	
	Y X AT	15900 /	690 /	240. /	94. /	6131. /	1.06 /	67. /	102.	FW
AB	791.50 /	0.11 /	0.60 /	0.00 /	791.61 /	2.55 /	0.27 /	0.002	*XS*	
	Z Y AT	16270 /	370 /	240. /	61. /	2804. /	1.01 /	67. /	89.	
AG	792.67 /	0.24 /	1.24 /	0.07 /	792.92 /	3.94 /	0.42 /	0.003	*XS*	

END OF THIS PROFILE

100-YR FW

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 13,DATE= 6/10/77

100-YR FW

WATER-SURFACE PROFILE FOR: PHILLIPS DRAIN, LAST REACH TO VASSAR RD VH

PAGE 1 OF 1

	SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
	WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*
AD	AA	Z AT	16330	0	240.	150.	10174.	2.25	226.	281.
	797.14		0.09			797.23	1.60	0.19		*IS*
AE	AB	W AT	16740	410	240.	290.	21703.	1.06	149.	224.
	797.33		0.01	0.11	0.0	797.34	0.83	0.07	0.000	*XS*

FW

END OF THIS PROFILE

100-YR FW

```
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 THREAD CREEK  CHAMBERS RD TO ATHERTON RD HOLTSLAG 20  5 02 99 12
2      2  75754  75910  76029  75956  75959
3  6600    10 1  15  3  750   20110  1  3
4  6604   1200   1800   2600   2100   2100
5  6610       0  1  7610   24  1  7600  105  1  7580  117  1  7560  120  1  7545
5  6611     130  2  7503  150  2  7490  160  2  7503  171  3  7522  192  3  7530
5  6612     203  3  7540  262  3  7560  635  3  7560  642  3  7580  650  3  7600
6  6629  1  2 045 045  1  2 035 035  1  2 043 043
3  6700    1P 0  15  3  751   20610 99 99
5  6710       0  1  7680    0  1  7590   14  1  7580   42  1  7560   45  1  7540
5  6711      52  2  7520   63  2  7500   80  2  7498   94  2  7500  100  3  7540
5  6712     345  3  7560  353  3  7580  360  3  7600  368  3  7620  412  3  7640
6  6729  1  2 045 045  1  2 035 035  1  2 040 040
3  6800    1Q 0  14  3  751   21000 99 99
5  6810       0  1  7680    0  1  7540    8  1  7520   15  2  7510   22  2  7500
5  6811      40  2  7498   60  2  7500   62  2  7520   72  3  7540  166  3  7560
5  6812     181  3  7580  187  3  7600  194  3  7620  240  3  7640
6  6829  1  2 045 045  1  2 035 035  1  2 050 050
3  6900    1R 0  15  3  751   21240 99 99
5  6910       0  1  7700    0  1  7600   26  1  7580   33  1  7560   46  1  7540
5  6911      54  2  7520   63  2  7510   72  2  7503   82  2  7510   83  2  7520
5  6912      93  3  7580   96  3  7600  102  3  7620  110  3  7640  118  3  7660
6  6929  1  2 045 045  1  2 040 040  1  2 050 050
3  7000   1RR 0  15  3  751   21510 99 99
5  7010       0  1  7700    0  1  7560    8  1  7540   14  2  7520   22  2  7510
5  7011      41  2  7504   54  2  7510   58  2  7520   65  2  7540   70  3  7540
5  7012     175  3  7560  184  3  7580  212  3  7600  304  3  7620  358  3  7640
6  7029  1  2 045 045  1  2 040 040  1  2 050 050
3  7100    1S 0  15  3  751   21900 99 99
5  7110       0  1  7700    0  1  7580    3  1  7560    9  2  7540   18  2  7520
5  7111      20  2  7518   32  2  7506   44  2  7509   46  2  7520   54  3  7580
5  7112      56  3  7589   58  3  7600  171  3  7610  190  3  7620  510  3  7640
6  7129  1  2 050 050  1  2 040 040  1  2 055 055
3  7200   1SS 0  13  3  752   22350 99 99
5  7210       0  1  7700    0  1  7620   24  1  7600   30  1  7580   34  2  7560
5  7211      38  2  7540   45  2  7520   62  2  7515   72  2  7520   81  3  7580
5  7212      94  3  7600  240  3  7620  610  3  7640
6  7229  1  2 050 050  1  2 040 040  1  2 050 050
3  7300    1T 0  14  3  753   22780 99 99
5  7310       0  1  7700    0  1  7620   22  1  7600   26  2  7580   28  2  7540
5  7311      32  2  7525   52  2  7523   68  2  7525   74  2  7540   84  3  7560
5  7312     102  3  7580  310  3  7600  510  3  7620  710  3  7640
6  7329  1  2 050 050  1  2 040 040  1  2 050 050
3  7400   1TT 0  20  3  754   23170 99 99
5  7410       0  1  7700   70  1  7680  104  1  7660  184  1  7640  248  1  7620
```

BD

BE

BF

BG

BH

BI

BJ

BK

BL

```
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  7411      277  1  7600  294  1  7580  306  2  7560  314  2  7540  329  2  7535
5  7412      342  2  7532  354  2  7535  364  2  7540  380  3  7540  452  3  7560
5  7413      537  3  7560  550  3  7580  580  3  7600  950  3  7620 1150  3  7640
6  7429  1  2 055 055  1  2 045 045  1  2 060 060
3  7500     1U 0  15  3  754   23480 99 99
5  7510        0  1  7672   45  1  7640  330  1  7620  430  1  7600  455  1  7580
5  7511      505  2  7560  515  2  7550  523  2  7543  543  2  7543  553  2  7543   BM
5  7512      555  2  7560  563  3  7580 1110  3  7600 1150  3  7620 1495  3  7640
6  7529  1  2 055 055  1  2 045 045  1  2 060 060
3  7600 BR 1U 2  12  1  755   23480         0  7623 3 1
5  7610        0  1  7649    0  1  7555    5  1  7551   10  1  7546   15  1  7547
5  7611       20  1  7545   25  1  7543   30  1  7538   35  1  7534   42  1  7546
5  7612       42  1  7623    0 -9  7649
6  7659  1  2 035 035
3  7700 RD 1U 4  12  3   34           1  3           2 2 2                1
5  7710        0  1  7672   42  1  7640  164  1  7620  408  1  7633  520  2  7649
5  7711      520  2  7658  570  2  7658  571  3  7649  800  3  7629  972  3  7602
5  7712     1130  3  7620 1700  3  7640
3  7800     1V 5  16  3  754   23560  1  3
5  7810        0  1  7672  180  1  7640  378  1  7620  498  1  7600  514  2  7586
5  7811      516  2  7575  518  2  7548  532  2  7533  546  2  7546  550  2  7580   BN
5  7812      556  3  7593  590  3  7600  950  3  7620 1140  3  7620 1340  3  7620
5  7813     1540  3  7640
6  7829  1  2 050 050  1  2 038 038  1  2 060 060
3  7900     1W 0  18  3  756   24490  1  3
5  7910        0  1  7672   50  1  7640  230  1  7640  500  1  7620  580  1  7612
5  7911      734  2  7600  754  2  7580  768  2  7560  778  2  7551  786  2  7560   BØ
5  7912      792  2  7580  806  3  7600 1080  3  7610 1178  3  7620 1206  3  7640
5  7913     1222  3  7660 1236  3  7680 1268  3  7700
6  7929  1  2 060 060  1  2 040 040  1  2 065 065
3  8000     1X 1  17  3  756   25110 99 99
4  8004    1000   1150   1300   1200   1200
5  8010        0  1  7672   90  1  7660  620  1  7660  700  1  7640  750  1  7620
5  8011      900  1  7610 1030  2  7600 1042  2  7580 1044  2  7557 1068  2  7557   BP
5  8012     1070  2  7580 1075  3  7600 1245  3  7620 1272  3  7640 1302  3  7660
5  8013     1342  3  7680 1390  3  7700
6  8029  1  2 080 080  1  2 040 040  1  2 070 070
3  8050    1XX 0  13  3  757   25380  1  3
5  8060        0  1  7660   80  1  7640  120  1  7620  430  2  7600  442  2  7580
5  8061      444  2  7557  468  2  7557  470  2  7580  475  3  7600  480  3  7620   BQ
5  8062      490  3  7640  510  3  7660  535  3  7680
6  8069  1  2 080 080  1  2 040 040  1  2 070 070
3  8100     1Y 0  22  3  757   25710 99 99
5  8110        0  1  7670   50  1  7660   60  1  7640  440  1  7640  450  1  7660
5  8111      580  1  7640  723  1  7660  812  1  7662  960  1  7660 1008  1  7640   BR
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  8112    1026  1  7620 1220  2  7620 1232  2  7600 1236  2  7580 1246  2  7562
5  8113    1252  2  7562 1254  2  7580 1256  2  7600 1262  2  7620 1268  3  7640
5  8114    1276  3  7700 1282  3  7720
6  8129  1  2 080 080  1  2 040 040  1  2 070 070
3  8150 1YY   0  12  3  758   26070  1  3
5  8160       0  1  7800    0  1  7700   10  2  7640   15  2  7620   30  2  7602
5  8161      32  2  7562   38  2  7562   40  2  7600   50  3  7610  120  3  7620
5  8162     170  3  7640  420  3  7660
6  8169  1  2 090 090  1  2 040 040  1  2 065 065
3  8200    1Z 0  17  3  757   26430 99 99
5  8210       0  1  7680   30  1  7680   83  1  7680  170  1  7680  272  1  7662
5  8211     388  2  7660  398  2  7640  412  2  7620  418  2  7600  420  2  7569
5  8212     452  2  7569  454  2  7600  464  2  7620  470  2  7640  483  3  7660
5  8213     742  3  7680  780  3  7700
6  8229  1  2 080 080  1  2 040 040  1  2 060 060
3  8300    2A 1  15  3  755   26640 99 99
4  8304   1200   1800   2600   2100   2100
5  8310     250  1  7660  510  1  7640  760  1  7640  772  2  7620  776  2  7600
5  8311     778  2  7580  780  2  7576  792  2  7571  806  2  7579  808  2  7600
5  8312     822  2  7620  838  3  7640  884  3  7660 1233  3  7680 1270  3  7700
6  8329  1  2 075 075  1  2 040 040  1  2 055 055
3  8400 BR 2A 2  12  1  758   26640        0  7634 3 1
5  8410       0  1  7634    0  1  7580    5  1  7576   10  1  7576   15  1  7573
5  8411      20  1  7571   25  1  7572   30  1  7576   35  1  7576   41  1  7579
5  8412      41  1  7634    0 -9  7634
6  8429  1  2 035 035
3  8500 RD 2A 4  33  2   66          1  2          1 1                   1
5  8511    -993  1  7680 -992  1  7680 -991  1  7680 -990  1  7680 -640  1  7660
5  8512    -390  1  7643 -358  1  7645 -328  1  7647 -298  1  7649 -270  1  7651
5  8513    -244  1  7654 -224  1  7656 -174  1  7658 -120  2  7662 -100  2  7663
5  8514     -36  2  7664  -36  2  7670   30  2  7670   30  2  7665   68  2  7664
5  8515      98  2  7662  128  2  7661  156  2  7659  184  2  7659  216  2  7658
5  8516     252  2  7657  276  2  7656  316  2  7656  364  2  7657  384  2  7659
5  8517     424  2  7661  500  2  7680  630  2  7700
3  8600    2B 5  25  3  757   26790  1  3
5  8611       0  1  7690   40  1  7680  470  1  7660  580  1  7642  850  1  7642
5  8612     855  1  7700  970  1  7700  975  1  7661 1000  1  7660 1020  1  7655
5  8613    1034  1  7650 1039  2  7595 1040  2  7580 1050  2  7572 1058  2  7566
5  8614    1065  2  7572 1078  2  7583 1080  3  7598 1085  3  7634 1092  3  7644
5  8615    1130  3  7660 1360  3  7660 1438  3  7660 1605  3  7680 1642  3  7700
6  8629  1  2 040 040  1  2 040 040  1  2 050 050
```

BS

BT

BU

BV

```
1     1 THREAD CREEK  ATHERTON - BRISTOL ROAD   HOLTSLAG 25 05 02 99.12
2     2  76501  76545  76582  76561  76562
3  8600    2B 1  25  3  757   26790  1  3
4  8604   1200   1800  2600   2100   2100
5  8611      0  1  7690   40  1  7680  470  1  7660  580  1  7642  850  1  7642
5  8612    855  1  7700  970  1  7700  975  1  7661 1000  1  7660 1020  1  7655
5  8613   1034  1  7650 1039  2  7595 1040  2  7580 1050  2  7572 1058  2  7566   BV
5  8614   1065  2  7572 1078  2  7583 1080  3  7598 1085  3  7634 1092  3  7644
5  8615   1130  3  7660 1360  3  7660 1438  3  7660 1605  3  7680 1642  3  7700
6  8629  1  2 040 040  1  2 040 040  1  2 050 050
3  8700    2C 0  19  3  758   27310 99 99
5  8710      0  1  7740   40  1  7720  150  1  7700  538  1  7680  749  1  7660
5  8711   1014  1  7640 1020  1  7626 1025  2  7588 1054  2  7574 1079  2  7588   BW
5  8712   1084  2  7638 1106  3  7640 1218  3  7640 1260  3  7620 1370  3  7640
5  8713   1516  3  7660 1587  3  7680 1638  3  7700 1682  3  7720
6  8729  1  2 045 045  1  2 040 040  1  2 050 050
3  8800    2D 0  17  3  759   27920 99 99
5  8810      0  1  7740   98  1  7700  150  1  7680  240  1  7660  402  1  7640
5  8811    492  2  7620  500  2  7600  502  2  7590  518  2  7584  530  2  7590   BX
5  8812    532  2  7600  546  2  7620  558  3  7640  984  3  7660 1026  3  7680
5  8813   1088  3  7700 1126  3  7720
6  8829  1  2 050 050  1  2 040 040  1  2 060 060
3  8900    2E 1  18  3  760   28670 99 99
4  8904   1150   1700  2500   1950   1950
5  8910      0  1  7740   40  1  7700  128  1  7680  172  1  7660  218  1  7640
5  8911    276  1  7640  382  1  7640  390  2  7628  394  2  7598  410  2  7598   BY
5  8912    426  2  7598  428  2  7612  432  3  7649  570  3  7650  692  3  7660
5  8913    743  3  7680  784  3  7700  908  3  7720
6  8929  1  2 065 065  1  2 035 035  1  2 060 060
3  9000    2F 0  17  3  761   29150 99 99
5  9010      0  1  7740   30  1  7720   84  1  7700  107  1  7680  171  1  7660
5  9011    320  1  7655  596  2  7640  612  2  7620  614  2  7602  640  2  7602   BZ
5  9012    642  2  7620  647  3  7640  662  3  7660  806  3  7680  921  3  7700
5  9013    980  3  7720 1024  3  7740
6  9029  1  2 070 070  1  2 035 035  1  2 050 050
3  9100    2G 0  21  3  761   29860 99 99
5  9110      0  1  7800   36  1  7780   84  1  7760  240  1  7740  508  1  7720
5  9111    516  1  7700  518  1  7680  522  1  7660  528  2  7640  539  2  7620   CA
5  9112    541  2  7605  562  2  7605  564  2  7620  594  2  7640  596  3  7640
5  9113    853  3  7660  952  3  7660  978  3  7680 1107  3  7700 1171  3  7720
5  9114   1312  3  7740
6  9129  1  2 060 060  1  2 040 040  1  2 100 100
3  9200    2H 0  20  3  762   30520 99 99
5  9210      0  1  7800   48  1  7780  190  1  7760  534  1  7740  589  1  7720
5  9211    602  1  7700  611  1  7680  618  1  7660  652  1  7660  863  2  7660   CB
```

```
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  9212     875  2  7640  878  2  7612  894  2  7612  898  2  7640  902  3  7640
5  9213     932  3  7660  983  3  7680 1106  3  7700 1145  3  7720 1177  3  7740
6  9229  1  2 055 055  1  2 040 040  1  2 090 090
3  9300    2I 0  21  3  762   31230 99 99
5  9310       0  1  7800   90  1  7780  212  1  7760  486  1  7740  514  1  7720
5  9311     526  1  7700  546  1  7680  554  2  7660  567  2  7640  569  2  7617   CC
5  9312     581  2  7617  583  2  7640  603  3  7660  868  3  7680  877  3  7700
5  9313     900  3  7700 1088  3  7700 1146  3  7720 1174  3  7740 1203  3  7760
5  9314    1224  3  7780
6  9329  1  2 065 065  1  2 040 040  1  2 080 080
3  9400    2J 0  20  3  763   31820 99 99
5  9410       0  1  7800  137  1  7780  329  1  7760  434  1  7740  533  1  7720
5  9411     622  1  7700  632  1  7680 1050  1  7680 1076  2  7660 1078  2  7640   CD
5  9412    1080  2  7622 1108  2  7622 1110  2  7640 1114  2  7660 1122  3  7680
5  9413    1130  3  7700 1272  3  7720 1323  3  7740 1352  3  7760 1376  3  7780
6  9429  1  2 080 080  1  2 037 037  1  2 090 090
3  9500    2K 0  19  3  763   32630 99 99
5  9510       0  1  7800  137  1  7780  343  1  7760  563  1  7740  747  1  7720
5  9511     916  2  7700  929  2  7680  941  2  7660  943  2  7628  949  2  7628   CE
5  9512     950  2  7660  958  3  7660 1272  3  7680 1288  3  7700 1313  3  7720
5  9513    1424  3  7740 1518  3  7760 1547  3  7780 1554  3  7800
6  9529  1  2 080 080  1  2 037 037  1  2 060 060
3  9600    2L 0  20  3  765   33230 99 99
5  9610       0  1  7800   83  1  7780  322  1  7760  442  1  7740  563  1  7720
5  9611     733  1  7700  780  2  7700  789  2  7680  795  2  7654  807  2  7646
5  9612     818  2  7652  828  2  7660  838  3  7680  994  3  7680 1030  3  7680   CF
5  9613    1058  3  7700 1066  3  7720 1078  3  7740 1162  3  7760 1180  3  7780
6  9629  1  2 060 060  1  2 036 036  1  2 045 045
3  9700   2LL 0  17  3  764   33630 99 99
5  9710       0  1  7800  124  1  7780  263  1  7760  406  1  7740  487  1  7720
5  9711     613  1  7700  627  2  7680  643  2  7660  645  2  7636  650  2  7636   CG
5  9712     652  2  7660  666  3  7680  717  3  7700  724  3  7720  732  3  7740
5  9713     772  3  7760  790  3  7780
6  9729  1  2 060 060  1  2 036 036  1  2 050 050
3  9800    2M 0  21  3  764   34000 99 99
5  9810       0  1  7800   98  1  7780  190  1  7760  278  1  7740  292  1  7720
5  9811     300  1  7700  304  2  7683  309  2  7664  314  2  7640  319  2  7638
5  9812     324  2  7640  329  2  7643  334  2  7648  339  2  7664  343  2  7666   CH
5  9813     345  3  7700  348  3  7720  353  3  7740  450  3  7760  636  3  7780
5  9814     750  3  7800
6  9829  1  2 055 055  1  2 035 035  1  2 050 050
3  9900 BR 2M 2  12  1  765   34000        0  7721 3 1
5  9910       0  1  7721    0  1  7664    5  1  7659   10  1  7659   15  1  7647
5  9911      20  1  7642   25  1  7639   30  1  7641   35  1  7646   40  1  7659
5  9912      40  1  7721    0 -9  7721
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
6  9929  1  2 032 032
3 10000 RD 2M 4  11  3  75          1  3          1 1 1                1
5 10010       0  1  7800  104  1  7780  126  1  7766  302  2  7753  302  2  7761
5 10011     344  2  7761  344  3  7753  434  3  7760  538  3  7758  622  3  7780
5 10012     748  3  7800
3 10100    2N 5  24  3  764   34070  1  3
5 10110      16  1  7800   77  1  7780  107  1  7760  162  1  7740  210  1  7720
5 10111     300  1  7703  310  1  7699  313  2  7690  320  2  7672  323  2  7656
5 10112     330  2  7640  335  2  7637  341  2  7658  345  2  7671  350  2  7682
5 10113     354  3  7690  355  3  7693  360  3  7705  365  3  7705  380  3  7720
5 10114     396  3  7740  600  3  7760  670  3  7780  775  3  7800
6 10129  1  2 060 060  1  2 037 037  1  2 065 065
```

CI

```
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
 WS ELEV /    HV  /    HF  /    HE  /    EG  /     V  /    FN  /   ACC    *ID*
==========================================================================
BD  10 AT   20110 /     0 /   1200. /  1248. /   99799. / 2.26 /  108. /  640.
    757.54 /   0.03 /                 /  757.57 /    0.96 /   0.13/          *IS*
--------------------------------------------------------------------------
BE  1P AT   20610 /   500 /   1200. /  1049. /  101578. / 1.60 /   19. /  351.
    757.61 /   0.03 /   0.07 /   0.00 /  757.64 /    1.14 /   0.12 /  0.001  *XS*   10-YR
--------------------------------------------------------------------------
BF  1Q AT   21000 /   390 /   1200. /   746. /   84026. / 1.51 /    0. /  178.
    757.66 /   0.06 /   0.07 /   0.01 /  757.72 /    1.61 /   0.15 / -0.000  *XS*
--------------------------------------------------------------------------
BG  1R AT   21240 /   240 /   1200. /   300. /   30886. / 1.12 /   27. /   92.
    757.69 /   0.28 /   0.13 /   0.11 /  757.97 /    4.00 /   0.33 / -0.000  *XS*
--------------------------------------------------------------------------
BH  1RR AT  21510 /   270 /   1200. /   761. /   72825. / 1.39 /    0. /  185.   TUBE 1D
    758.09 /   0.05 /   0.17 /   0.0  /  758.14 /    1.58 /   0.15 / -0.000  *XS*
--------------------------------------------------------------------------
BI  1S AT   21900 /   390 /   1200. /   295. /   33605. / 1.06 /    0. /   54.
    758.21 /   0.27 /   0.23 /   0.11 /  758.48 /    4.07 /   0.30 /  0.000  *XS*
--------------------------------------------------------------------------
BJ  1SS AT  22350 /   450 /   1200. /   290. /   33299. / 1.05 /   28. /   86.
    758.78 /   0.28 /   0.58 /   0.00 /  759.06 /    4.14 /   0.31 /  0.002  *XS*
--------------------------------------------------------------------------
BK  1T AT   22780 /   430 /   1200. /   494. /   47250. / 1.49 /   23. /  239.
    759.32 /   0.14 /   0.39 /   0.0  /  759.46 /    2.43 /   0.22 / -0.000  *XS*
--------------------------------------------------------------------------
BL  1TT AT  23170 /   390 /   1200. /  1152. /   86281. / 1.33 /  281. /  574.
    759.57 /   0.02 /   0.14 /   0.0  /  759.59 /    1.04 /   0.11 / -0.003  *XS*
--------------------------------------------------------------------------
BM  1U AT   23480 /   310 /   1200. /   806. /   40340. / 2.29 /  434. / 1020.
    759.67 /   0.08 /   0.13 /   0.03 /  759.75 /    1.49 /   0.22 / -0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR  1U AT   23480 /       /   1200. /   221. /   24850. / 1.00 /    0. /   42.
    759.67 /   0.46 /       ...1...  (-.001)    /    5.43 /   0.42 /          *BO*
--------------------------------------------------------------------------
    EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /           *RG*   10-YR
--------------------------------------------------------------------------
    1V AT   23560 /    80 /   1200. /   199. /   19416. / 1.08 /  502. /  574.
    759.68 /   0.61 /   0.15 /   0.41 /  760.29 /    6.02 /   0.52 / -0.011  *AS*
--------------------------------------------------------------------------
BN  M = 0.01 / E = 0.22 / K* = 0.01 /   200. /   19475. / 1.09 /  502. /  575.
    759.69 /   0.61 /                 /  760.30 /    6.01 /   0.52 /          *AS*
========================== END BRIDGE ANALYSIS ============================
BØ  1W AT   24490 /   930 /   1200. /   895. /   43690. / 2.71 /  520. / 1159.
    761.80 /   0.08 /   1.57 /   0.0  /  761.88 /    1.34 /   0.23 /  0.006  *XS*
--------------------------------------------------------------------------
BP  1X AT   25110 /   620 /   1000. /   789. /   37604. / 3.50 /  744. / 1248.
    762.25 /   0.09 /   0.46 /   0.01 /  762.34 /    1.27 /   0.22 /  0.001  *XS*
--------------------------------------------------------------------------
```

```
WATER-SURFACE PROFILE FOR:  THREAD CREEK  CHAMBERS RD TO ATHERTON RD HOLTSLAG
PAGE  2 OF  2, PROFILE NUMBER  1,   UPSTREAM COMPUTATIONS
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
=================================================================================
  1XX AT   25380 /   270 /   1000. /   699. /   37390. / 3.09 /  111. /  482.
BQ 762.44 /   0.10 /   0.19 /   0.01 / 762.54 /    1.43 /   0.22 / -0.000  *XS*
---------------------------------------------------------------------------------
   1Y AT   25710 /   330 /   1000. /   332. /   16993. / 2.39 / 1018. / 1265.
BR 762.84 /   0.34 /   0.52 /   0.12 / 763.18 /    3.01 /   0.46 / -0.000  *XS*
---------------------------------------------------------------------------------
1YY   AT   26070 /   360 /   1000. /   382. /   20919. / 1.63 /   10. /  173.
BS 764.02 /   0.17 /   1.01 /   0.0  / 764.19 /    2.62 /   0.36 /  0.005  *XS*
---------------------------------------------------------------------------------
   1Z AT   26430 /   360 /   1000. /   359. /   35596. / 1.00 /  395. /  474.
BT 764.56 /   0.12 /   0.48 /   0.0  / 764.68 /    2.78 /   0.23 / -0.000  *XS*
=================================================================================
   2A AT   26640 /   210 /   1200. /   566. /   37255. / 2.27 /  415. /  855.
BU 764.73 /   0.16 /   0.19 /   0.02 / 764.89 /    2.12 /   0.27 / -0.000  *XS*
=========================== BEGIN BRIDGE ANALYSIS ===============================
BR 2A AT   26640 /        /   1005. /   242. /   19484. / 1.00 /    0. /   41.
   763.40 /   0.27 /       ...3...  (-.001)    /    4.15 /   0.30 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     202. / RIGHT       0. /                *RG*
---------------------------------------------------------------------------------
   2B AT   26790 /   150 /   1200. /   530. /   48004. / 2.02 /  540. / 1103.
   764.85 /   0.16 /   0.12 /   0.00 / 765.02 /    2.26 /   0.22 /  0.004  *AS*
---------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   592. /   51998. / 2.12 /  530. / 1107.
BV 765.01 /   0.14 /                 / 765.15 /    2.03 /   0.21 /          *AS*
============================ END BRIDGE ANALYSIS ================================

                              END OF THIS PROFILE
```

10-YR

```
==========================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /    EG  /     V  /    FN  /   ACC   *ID*
==========================================================================
BD  10 AT   20110 /     0 /   1800. /  2111. /  200371. / 1.70 /   60. /  646.
   759.10 /   0.02 /                 /  759.12 /    0.85 /   0.07/         *IS*
--------------------------------------------------------------------------
BE  1P AT   20610 /   500 /   1800. /  1577. /  178710. / 1.40 /    0. /  357.
   759.14 /   0.03 /   0.05 /   0.00 /  759.17 /    1.14 /   0.08 / -0.000  *XS*
--------------------------------------------------------------------------
BF  1Q AT   21000 /   390 /   1800. /  1021. /  127731. / 1.49 /    0. /  185.
   759.17 /   0.07 /   0.06 /   0.02 /  759.25 /    1.76 /   0.15 / -0.000  *XS*
--------------------------------------------------------------------------
BG  1R AT   21240 /   240 /   1800. /   409. /   46175. / 1.21 /   11. /   95.
   759.17 /   0.36 /   0.13 /   0.15 /  759.54 /    4.40 /   0.34 /  0.014  *XS*
--------------------------------------------------------------------------
BH  1RR AT  21510 /   270 /   1800. /  1066. /  114571. / 1.38 /    0. /  207.
   759.64 /   0.06 /   0.17 /   0.0  /  759.70 /    1.69 /   0.15 /  0.000  *XS*
--------------------------------------------------------------------------
BI  1S AT   21900 /   390 /   1800. /   379. /   49323. / 1.08 /    0. /   57.
   759.71 /   0.38 /   0.22 /   0.16 /  760.09 /    4.75 /   0.32 / -0.000  *XS*
--------------------------------------------------------------------------
BJ  1SS AT  22350 /   450 /   1800. /   393. /   49534. / 1.16 /   20. /  117.
   760.31 /   0.38 /   0.60 /   0.0  /  760.69 /    4.57 /   0.32 /  0.003  *XS*
--------------------------------------------------------------------------
BK  1T AT   22780 /   430 /   1800. /   974. /   85033. / 2.02 /   12. /  401.
   760.91 /   0.11 /   0.33 /   0.0  /  761.02 /    1.85 /   0.19 / -0.000  *XS*
--------------------------------------------------------------------------
BL  1TT AT  23170 /   390 /   1800. /  1738. /  124817. / 1.82 /  261. /  785.
   761.11 /   0.03 /   0.12 /   0.0  /  761.14 /    1.04 /   0.12 / -0.000  *XS*
--------------------------------------------------------------------------
BM  1U AT   23480 /   310 /   1800. /  1872. /  103559. / 1.91 /  371. / 1134.
   761.19 /   0.03 /   0.08 /   0.0  /  761.22 /    0.96 /   0.09 / -0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 1U AT    23480 /       /   1410. /   285. /   36493. / 1.00 /    0. /   42.
   761.19 /   0.38 /       ...1...  (-.001)    /    4.95 /   0.34 /         *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT     346. /              *RG*
--------------------------------------------------------------------------
   1V AT    23560 /    80 /   1800. /   508. /   36840. / 2.48 /  426. /  806.
   761.20 /   0.48 /   0.07 /   0.41 /  761.68 /    3.54 /   0.43 / -0.011  *AS*
--------------------------------------------------------------------------
BN  M = 0.0  / E = 0.0  / K* = 0.01 /   510. /   36930. / 2.48 /  426. /  806.
   761.20 /   0.48 /                 /  761.68 /    3.53 /   0.43 /         *AS*
========================== END BRIDGE ANALYSIS ============================
BØ  1W AT   24490 /   930 /   1800. /  1517. /   78176. / 2.52 /  409. / 1187.
   762.67 /   0.06 /   1.04 /   0.0  /  762.73 /    1.19 /   0.20 /  0.002  *XS*
--------------------------------------------------------------------------
BP  1X AT   25110 /   620 /   1150. /  1166. /   57930. / 3.19 /  726. / 1258.
   762.98 /   0.05 /   0.30 /   0.0  /  763.03 /    0.99 /   0.17 /  0.000  *XS*
```

50-YR

50-YR

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   17,DATE= 4/ 7/78

WATER-SURFACE PROFILE FOR:  THREAD CREEK  CHAMBERS RD TO ATHERTON RD HOLTSLAG
PAGE  2 OF  2, PROFILE NUMBER  2,   UPSTREAM COMPUTATIONS
=====================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    EN  /   ACC    *ID*
=====================================================================================
  1XX AT   25380 /   270 /   1150. /   944. /   52039. / 3.00 /   98. /  485.
  763.09 /   0.07 /   0.12 /   0.01 /  763.16 /   1.22 /   0.19 / -0.000  *XS*
-------------------------------------------------------------------------------------
  1Y AT   25710 /   330 /   1150. /   462. /   23514. / 2.46 / 1014. / 1266.
  763.36 /   0.24 /   0.36 /   0.08 /  763.60 /   2.49 /   0.39 / -0.000  *XS*
-------------------------------------------------------------------------------------
1YY   AT   26070 /   360 /   1150. /   427. /   23066. / 1.81 /   10. /  204.
  764.27 /   0.20 /   0.88 /   0.0  /  764.48 /   2.69 /   0.38 /  0.000  *XS*
-------------------------------------------------------------------------------------
  1Z AT   26430 /   360 /   1150. /   384. /   38702. / 1.00 /  394. /  476.
  764.87 /   0.14 /   0.53 /   0.0  /  765.01 /   2.99 /   0.24 /  0.000  *XS*
-------------------------------------------------------------------------------------
  2A AT   26640 /   210 /   1800. /   727. /   44816. / 2.66 /  370. /  863.
  765.08 /   0.25 /   0.26 /   0.06 /  765.33 /   2.47 /   0.34 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR 2A AT   26640 /      /   1166. /   242. /   19484. / 1.00 /    0. /   41.
  763.40 /   0.36 /        ...3...  (-.001)    /   4.82 /   0.35 /          *BO*
-------------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     629. / RIGHT       0. /                *RG*
-------------------------------------------------------------------------------------
  2B AT   26790 /   150 /   1800. /   704. /   59682. / 2.23 /  514. / 1113.
  765.29 /   0.23 /   0.18 /   0.0  /  765.51 /   2.56 /   0.27 /  0.001  *AS*
-------------------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /   775. /   64885. / 2.26 /  504. / 1117.
  765.45 /   0.19 /                 /  765.64 /   2.32 /   0.25 /          *AS*
============================ END BRIDGE ANALYSIS ==============================

                          END OF THIS PROFILE
```

BQ

BR

BS

BT

BU

BV

50-YR

```
==========================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/ AREA /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /    EG  /     V  /    FN  /  ACC   *ID*
==========================================================================
  10 AT   20110 /     0 /   2600. /  2839. /  303885. / 1.50 /   17. /  650.
 760.29 /   0.02 /                 / 760.31 /    0.92 /  0.07/          *IS*
--------------------------------------------------------------------------
  1P AT   20610 /   500 /   2600. /  2003. /  254113. / 1.30 /    0. /  361.
 760.33 /   0.03 /  0.04 /    0.01 / 760.36 /    1.30 /  0.09 / -0.000  *XS*
--------------------------------------------------------------------------
  1Q AT   21000 /   390 /   2600. /  1242. /  167864. / 1.46 /    0. /  188.
 760.36 /   0.10 /  0.06 /    0.03 / 760.46 /    2.09 /  0.17 / -0.000  *XS*
--------------------------------------------------------------------------
  1R AT   21240 /   240 /   2600. /   514. /   61784. / 1.25 /    0. /   97.
 760.31 /   0.50 /  0.16 /    0.20 / 760.81 /    5.06 /  0.38 / -0.000  *XS*
--------------------------------------------------------------------------
 1RR AT   21510 /   270 /   2600. /  1356. /  151360. / 1.48 /    0. /  254.
 760.92 /   0.08 /  0.20 /    0.0  / 761.01 /    1.92 /  0.16 / -0.000  *XS*
--------------------------------------------------------------------------
  1S AT   21900 /   390 /   2600. /   504. /   65056. / 1.32 /    0. /  166.
 760.96 /   0.55 /  0.27 /    0.23 / 761.51 /    5.16 /  0.36 /  0.000  *XS*
--------------------------------------------------------------------------
 1SS AT   22350 /   450 /   2600. /   611. /   70766. / 1.62 /    3. /  219.
 761.71 /   0.45 /  0.66 /    0.0  / 762.16 /    4.25 /  0.33 / -0.005  *XS*
--------------------------------------------------------------------------
  1T AT   22780 /   430 /   2600. /  1658. /  143212. / 2.15 /    0. /  547.
 762.37 /   0.08 /  0.29 /    0.0  / 762.45 /    1.57 /  0.17 / -0.000  *XS*
--------------------------------------------------------------------------
 1TT AT   23170 /   390 /   2600. /  2665. /  193158. / 2.00 /  231. / 1002.
 762.52 /   0.03 /  0.10 /    0.0  / 762.55 /    0.98 /  0.07 / -0.000  *XS*
--------------------------------------------------------------------------
  1U AT   23480 /   310 /   2600. /  3047. /  186608. / 1.76 /  247. / 1251.
 762.58 /   0.02 /  0.06 /    0.0  / 762.60 /    0.85 /  0.07 / -0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 1U AT   23480 /       /    759. /   343. /   45803. / 1.00 /    0. /   42.
 762.58 /   0.08 /       ...1...  (-.001)    /    2.22 /  0.14 /          *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     119. / RIGHT    1611. /              *RG*
--------------------------------------------------------------------------
  1V AT   23560 /    80 /   2600. /  1496. /   78043. / 4.34 /  319. / 1399.
 762.59 /   0.20 /  0.04 /    0.17 / 762.80 /    1.74 /  0.31 / -0.011  *AS*
--------------------------------------------------------------------------
 M = 0.0  / E = 0.0  / K* = 0.01 /  1497. /   78095. / 4.34 /  319. / 1399.
 762.59 /   0.20 /                 / 762.80 /    1.74 /  0.31 /          *AS*
========================== END BRIDGE ANALYSIS ============================
  1W AT   24490 /   930 /   2600. /  2143. /  118790. / 2.29 /  308. / 1198.
 763.42 /   0.05 /  0.68 /    0.0  / 763.48 /    1.21 /  0.19 /  0.001  *XS*
--------------------------------------------------------------------------
  1X AT   25110 /   620 /   1300. /  1546. /   81944. / 2.87 /  708. / 1268.
 763.67 /   0.03 /  0.24 /    0.0  / 763.71 /    0.84 /  0.14 / -0.013  *XS*
```

BO
BE
BF
BG
BH
BI
BJ
BK
BL
BM
BN
BØ
BP

500-YR

500-VR

```
WATER-SURFACE PROFILE FOR:  THREAD CREEK  CHAMBERS RD TO ATHERTON RD HOLTSLAG
PAGE  2 OF  2, PROFILE NUMBER  3,   UPSTREAM COMPUTATIONS
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
  1XX AT   25380 /   270 /   1300. /  1204. /   69657. / 2.83 /   85. /  489.
BQ 763.74 /   0.05 /   0.08 /   0.01 / 763.80 /   1.08 /   0.16 / -0.000  *XS*
----------------------------------------------------------------------------------
   1Y AT   25710 /   330 /   1300. /   609. /   32244. / 2.35 / 1009. / 1268.
BR 763.94 /   0.17 /   0.25 /   0.06 / 764.10 /   2.14 /   0.33 / -0.001  *XS*
----------------------------------------------------------------------------------
1YY   AT   26070 /   360 /   1300. /   502. /   26858. / 1.99 /    9. /  247.
BS 764.62 /   0.21 /   0.70 /   0.02 / 764.83 /   2.59 /   0.38 /  0.000  *XS*
----------------------------------------------------------------------------------
   1Z AT   26430 /   360 /   1300. /   413. /   42288. / 1.00 /  392. /  478.
BT 765.21 /   0.15 /   0.54 /   0.0  / 765.36 /   3.15 /   0.25 / -0.000  *XS*
----------------------------------------------------------------------------------
   2A AT   26640 /   210 /   2600. /   926. /   54633. / 2.95 /  321. /  872.
BU 765.46 /   0.36 /   0.35 /   0.10 / 765.82 /   2.81 /   0.41 /  0.008  *XS*
============================ BEGIN BRIDGE ANALYSIS ===========================
BR 2A AT   26640 /       /   1232. /   242. /   19484. / 1.00 /    0. /   41.
   763.40 /   0.40 /       ...3...  (-.001)    /   5.09 /   0.37 /         *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT    1255. / RIGHT      92. /                *RG*
----------------------------------------------------------------------------------
   2B AT   26790 /   150 /   2600. /   929. /   76578. / 2.27 /  483. / 1125.
   765.78 /   0.28 /   0.24 /   0.0  / 766.06 /   2.80 /   0.31 / -0.002  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   948. /   78042. / 2.26 /  481. / 1126.
BV 765.82 /   0.27 /                / 766.09 /   2.74 /   0.30 /         *AS*
============================ END BRIDGE ANALYSIS =============================

                          END OF THIS PROFILE
```

```
==========================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/ AREA /CONVEYANCE/ ALPHA/  LEW  /  REW
 WS ELEV /    HV  /    HF  /    HE  /    EG  /     V  /    FN  /  ACC   *ID*
==========================================================================
  10 AT   20110 /     0 /   2100. /  2386. / 237522. / 1.61 /   42. /  648.
BD 759.56 /   0.02 /                 / 759.58 /   0.88 /   0.07/         *IS*
--------------------------------------------------------------------------
  1P AT   20610 /   500 /   2100. /  1741. / 206494. / 1.35 /    0. /  359.
BE 759.60 /   0.03 /   0.04 /   0.01 / 759.63 /   1.21 /   0.09 / 0.000  *XS*
--------------------------------------------------------------------------
  1Q AT   21000 /   390 /   2100. /  1106. / 142699. / 1.47 /    0. /  186.
BF 759.63 /   0.08 /   0.06 /   0.03 / 759.71 /   1.90 /   0.16 / -0.000 *XS*
--------------------------------------------------------------------------
  1R AT   21240 /   240 /   2100. /   447. /  51514. / 1.24 /    5. /   95.
BG 759.60 /   0.43 /   0.14 /   0.17 / 760.03 /   4.70 /   0.36 / -0.000 *XS*
--------------------------------------------------------------------------
 1RR AT   21510 /   270 /   2100. /  1171. / 129029. / 1.39 /    0. /  218.
BH 760.14 /   0.07 /   0.18 /   0.0  / 760.21 /   1.79 /   0.15 / -0.000 *XS*
--------------------------------------------------------------------------
  1S AT   21900 /   390 /   2100. /   409. /  54849. / 1.11 /    0. /   80.
BI 760.19 /   0.45 /   0.24 /   0.19 / 760.64 /   5.13 /   0.34 / 0.000  *XS*
--------------------------------------------------------------------------
 1SS AT   22350 /   450 /   2100. /   459. /  56674. / 1.31 /   14. /  157.
BJ 760.86 /   0.43 /   0.64 /   0.0  / 761.28 /   4.57 /   0.33 / 0.000  *XS*
--------------------------------------------------------------------------
  1T AT   22780 /   430 /   2100. /  1224. / 105556. / 2.11 /    5. /  460.
BK 761.50 /   0.10 /   0.32 /   0.0  / 761.60 /   1.72 /   0.18 / -0.000 *XS*
--------------------------------------------------------------------------
 1TT AT   23170 /   390 /   2100. /  2071. / 147256. / 1.97 /  253. /  891.
BL 761.68 /   0.03 /   0.11 /   0.0  / 761.71 /   1.01 /   0.12 / -0.000 *XS*
--------------------------------------------------------------------------
  1U AT   23480 /   310 /   2100. /  2317. / 137805. / 1.74 /  342. / 1145.
BM 761.76 /   0.02 /   0.07 /   0.0  / 761.78 /   0.91 /   0.08 / -0.000 *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 1U AT   23480 /       /   1367. /   309. /  41164. / 1.00 /    0. /   42.
   761.76 /   0.31 /       ...1...  (-.001)    /   4.43 /   0.29 /         *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       0. / RIGHT     741. /              *RG*
--------------------------------------------------------------------------
  1V AT   23560 /    80 /   2100. /   762. /  49289. / 3.08 /  392. /  908.
   761.77 /   0.36 /   0.05 /   0.31 / 762.13 /   2.75 /   0.38 / -0.011 *AS*
--------------------------------------------------------------------------
   M = 0.0  / E = 0.0  / K* = 0.01 /   764. /  49371. / 3.09 /  392. /  908.
BN 761.77 /   0.36 /                 / 762.13 /   2.75 /   0.38 /         *AS*
========================== END BRIDGE ANALYSIS ============================
  1W AT   24490 /   930 /   2100. /  1755. /  93068. / 2.42 /  369. / 1192.
BØ 762.97 /   0.05 /   0.89 /   0.0  / 763.03 /   1.20 /   0.19 / 0.001  *XS*
--------------------------------------------------------------------------
  1X AT   25110 /   620 /   1200. /  1316. /  67011. / 3.06 /  719. / 1262.
BP 763.26 /   0.04 /   0.27 /   0.0  / 763.30 /   0.91 /   0.15 / 0.000  *XS*
```

100-YR

100-Y

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   23,DATE= 4/ 7/78

WATER-SURFACE PROFILE FOR:  THREAD CREEK  CHAMBERS RD TO ATHERTON RD HOLTSLAG
PAGE  2 OF  2, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
=================================================================================
  1XX AT   25380 /   270 /   1200. /  1045. /   58648. / 2.94 /   93. /  487.
BQ 763.35 /   0.06 /   0.10 /   0.01 / 763.41 /   1.15 /   0.18 / -0.000  *XS*
---------------------------------------------------------------------------------
  1Y AT   25710 /   330 /   1200. /   522. /   26905. / 2.43 / 1012. / 1267.
BR 763.60 /   0.20 /   0.30 /   0.07 / 763.80 /   2.30 /   0.36 / 0.018  *XS*
---------------------------------------------------------------------------------
1YY   AT   26070 /   360 /   1200. /   451. /   24247. / 1.87 /    9. /  219.
BS 764.39 /   0.21 /   0.79 /   0.00 / 764.60 /   2.66 /   0.38 / 0.002  *XS*
---------------------------------------------------------------------------------
  1Z AT   26430 /   360 /   1200. /   394. /   39924. / 1.00 /  393. /  476.
BT 764.99 /   0.14 /   0.54 /   0.0  / 765.13 /   3.04 /   0.25 / 0.000  *XS*  100-YR
---------------------------------------------------------------------------------
  2A AT   26640 /   210 /   2100. /   793. /   47994. / 2.77 /  353. /  866.
BU 765.21 /   0.30 /   0.30 /   0.08 / 765.51 /   2.65 /   0.37 / -0.001  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR 2A AT   26640 /       /   1224. /   242. /   19484. / 1.00 /    0. /   41.
   763.40 /   0.40 /       ...3...  (-.001)    /   5.06 /   0.37 /         *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     862. / RIGHT       9. /               *RG*
---------------------------------------------------------------------------------
  2B AT   26790 /   150 /   2100. /   778. /   65070. / 2.26 /  503. / 1117.
   765.46 /   0.26 /   0.21 /   0.0  / 765.71 /   2.70 /   0.29 / -0.008  *AS*
---------------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /   848. /   70347. / 2.27 /  494. / 1121.
BV 765.61 /   0.22 /                / 765.83 /   2.48 /   0.27 /         *AS*
============================ END BRIDGE ANALYSIS ================================

                          END OF THIS PROFILE
```

```
SECTD AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
 WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==========================================================================
BD  10 AT   20110 /     0 /   2100. /  1357. /  157275. / 1.58 /   50. /  350.
    759.59 /   0.06 /                 /  759.65 /    1.55 /   0.10/         *IS*
--------------------------------------------------------------------------
BE  1P AT   20610 /   500 /   2100. /  1571. /  194908. / 1.33 /    0. /  300.
    759.68 /   0.04 /   0.07 /   0.0  /  759.72 /    1.34 /   0.09 / -0.000  *XS*
--------------------------------------------------------------------------
BF  1Q AT   21000 /   390 /   2100. /  1015. /  138998. / 1.38 /    0. /  150.
    759.72 /   0.09 /   0.06 /   0.03 /  759.81 /    2.07 /   0.16 /  0.000  *XS*
--------------------------------------------------------------------------
BG  1R AT   21240 /   240 /   2100. /   457. /   53191. / 1.24 /    5. /   95.
    759.72 /   0.41 /   0.14 /   0.16 /  760.13 /    4.59 /   0.35 /  0.014  *XS*
--------------------------------------------------------------------------
BH  1RR AT  21510 /   270 /   2100. /  1013. /  123844. / 1.23 /    0. /  150.
    760.22 /   0.08 /   0.18 /   0.0  /  760.30 /    2.07 /   0.16 / -0.004  *XS*
--------------------------------------------------------------------------
BI  1S AT   21900 /   390 /   2100. /   414. /   56057. / 1.10 /    0. /   62.
    760.29 /   0.44 /   0.25 /   0.18 /  760.73 /    5.07 /   0.34 / -0.000  *XS*
--------------------------------------------------------------------------
BJ  1SS AT  22350 /   450 /   2100. /   465. /   58033. / 1.28 /   18. /  138.
    760.93 /   0.41 /   0.61 /   0.0  /  761.34 /    4.52 /   0.32 / -0.000  *XS*
--------------------------------------------------------------------------
BK  1T AT   22780 /   430 /   2100. /  1034. /  105515. / 1.58 /   10. /  260.
    761.55 /   0.10 /   0.31 /   0.0  /  761.65 /    2.03 /   0.18 / -0.000  *XS*
--------------------------------------------------------------------------
BL  1TT AT  23170 /   390 /   2100. /  1876. /  166403. / 1.34 /  280. /  630.
    761.72 /   0.03 /   0.10 /   0.0  /  761.75 /    1.12 /   0.07 / -0.000  *XS*
--------------------------------------------------------------------------
BM  1U AT   23480 /   310 /   2100. /  1844. /  127659. / 1.50 /  450. /  950.
    761.78 /   0.03 /   0.06 /   0.00 /  761.81 /    1.14 /   0.09 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR  1U AT   23480 /       /   1372. /   310. /   41393. / 1.00 /    0. /   42.
    761.78 /   0.31 /       ...1...  (-.001)    /    4.43 /   0.29 /         *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT     747. /               *RG*
--------------------------------------------------------------------------
    1V AT   23560 /    80 /   2100. /   736. /   50819. / 2.68 /  450. /  850.
    761.79 /   0.34 /   0.05 /   0.27 /  762.13 /    2.85 /   0.37 / -0.011  *AS*
--------------------------------------------------------------------------
BN  M = 0.0  / E = 0.0  / K* = 0.01 /   737. /   50899. / 2.68 /  450. /  850.
    761.80 /   0.34 /                 /  762.13 /    2.85 /   0.37 /         *AS*
============================ END BRIDGE ANALYSIS ==============================
BØ  1W AT   24490 /   930 /   2100. /  1144. /   78968. / 1.76 /  650. / 1000.
    763.05 /   0.09 /   1.02 /   0.0  /  763.14 /    1.84 /   0.23 / -0.016  *XS*
--------------------------------------------------------------------------
BP  1X AT   25110 /   620 /   1200. /  1290. /   71137. / 2.68 /  780. / 1230.
    763.40 /   0.04 /   0.30 /   0.0  /  763.44 /    0.93 /   0.15 /  0.000  *XS*
--------------------------------------------------------------------------
```

100 - FI

100 - FI

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   31,DATE= 4/ 7/78

WATER-SURFACE PROFILE FOR:  THREAD CREEK  CHAMBERS RD TO ATHERTON RD HOLTSLAG
PAGE  2 OF  2, PROFILE NUMBER, 5,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS
=================================================================================
SECTO AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
=================================================================================
  1XX AT   25380 /   270 /   1200. /  1096. /   62676. / 2.84 /  100. /  485.
  763.48 /   0.05 /   0.09 /   0.01 /  763.54 /    1.09 /   0.16 / -0.000  *XS*
---------------------------------------------------------------------------------
  1Y AT   25710 /   330 /   1200. /   542. /   28551. / 2.42 / 1015. / 1265.
  763.68 /   0.18 /   0.27 /   0.07 /  763.87 /    2.21 /   0.34 / -0.000  *XS*
---------------------------------------------------------------------------------
1YY   AT   26070 /   360 /   1200. /   460. /   24607. / 1.89 /   10. /  224.
  764.43 /   0.20 /   0.74 /   0.01 /  764.63 /    2.61 /   0.37 /  0.019  *XS*
---------------------------------------------------------------------------------
  1Z AT   26430 /   360 /   1200. /   396. /   40192. / 1.00 /  393. /  477.
  765.01 /   0.14 /   0.52 /   0.0  /  765.16 /    3.03 /   0.25 / -0.001  *XS*
---------------------------------------------------------------------------------
  2A AT   26640 /   210 /   2100. /   789. /   48256. / 2.73 /  350. /  840.
  765.23 /   0.30 /   0.29 /   0.08 /  765.53 /    2.66 /   0.37 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR 2A AT   26640 /       /   1207. /   242. /   19484. / 1.00 /    0. /   41.
  763.40 /   0.39 /       ...3...  (-.001)    /    4.99 /   0.36 /         *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     871. / RIGHT      10. /                *RG*
---------------------------------------------------------------------------------
  2B AT   26790 /   150 /   2100. /   781. /   65963. / 2.21 /  502. / 1100.
  765.48 /   0.25 /   0.21 /   0.0  /  765.73 /    2.69 /   0.29 / -0.011  *AS*
---------------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /   843. /   71026. / 2.19 /  500. / 1100.
  765.62 /   0.21 /                 /  765.83 /    2.49 /   0.27 /         *AS*
============================ END BRIDGE ANALYSIS ================================

                                END OF THIS PROFILE
```

BQ

BR

BS

BT

BU

BV

100-FW

```
BV  2B.AT   26790 /     0 /   1200. /   590. /   51897. / 2.12 /  531. /  1106.
    765.01 /   0.14 /                 / 765.15 /    2.03 /   0.21/          *IS*
BW  2C.AT   27310 /   520 /   1200. /  1144. /   76182. / 2.00 /  842. / 1465.
    765.30 /   0.03 /   0.19 /   0.0 / 765.34 /    1.05 /   0.13 / 0.000  *XS*
BX  2D.AT   27920 /   610 /   1200. /   897. /   55102. / 2.33 /  281. /  877.
    765.50 /   0.06 /   0.21 /   0.02 / 765.56 /    1.34 /   0.19 / 0.000  *XS*
BY  2E.AT   28670 /   750 /   1150. /   782. /   45860. / 3.24 /  175. /  678.
    765.88 /   0.11 /   0.41 /   0.02 / 765.99 /    1.47 /   0.24 / 0.000  *XS*
BZ  2F.AT   29150 /   480 /   1150. /   741. /   40176. / 3.47 /  164. /  678.
    766.22 /   0.13 /   0.34 /   0.01 / 766.35 /    1.55 /   0.27 / 0.001  *XS*
CA  2G.AT   29860 /   710 /   1150. /   874. /   43395. / 3.23 /  520. /  962.
    766.80 /   0.09 /   0.54 /   0.0 / 766.89 /    1.32 /   0.22 / 0.001  *XS*
CB  2H.AT   30520 /   660 /   1150. /   628. /   31490. / 2.30 /  613. /  968.
    767.43 /   0.12 /   0.64 /   0.02 / 767.55 /    1.83 /   0.30 / 0.002  *XS*
CC  2I.AT   31230 /   710 /   1150. /   601. /   29848. / 2.73 /  542. /  870.
    768.41 /   0.16 /   1.00 /   0.02 / 768.56 /    1.91 /   0.31 / 0.001  *XS*
CD  2J.AT   31820 /   590 /   1150. /   760. /   41318. / 3.82 /  627. / 1126.
    769.06 /   0.14 /   0.63 /   0.0 / 769.20 /    1.51 /   0.25 / 0.002  *XS*
CE  2K.AT   32630 /   810 /   1150. /   984. /   50745. / 1.18 /  918. / 1286.
    769.69 /   0.03 /   0.51 /   0.0 / 769.71 /    1.17 /   0.12 / 0.002  *XS*
CF  2L.AT   33230 /   600 /   1150. /   640. /   43214. / 1.39 /  731. / 1058.
    770.03 /   0.07 /   0.36 /   0.02 / 770.10 /    1.80 /   0.24 / 0.000  *XS*
CG  2LL.AT  33630 /   400 /   1150. /   261. /   19616. / 1.57 /  585. /  719.
    770.45 /   0.47 /   0.62 /   0.20 / 770.92 /    4.40 /   0.52 / 0.000  *XS*
CH  2M.AT   34000 /   370 /   1150. /   263. /   34012. / 1.07 /  295. /  347.
    771.34 /   0.32 /   0.73 /   0.0 / 771.66 /    4.38 /   0.33 / 0.000  *XS*
    ========================= BEGIN BRIDGE ANALYSIS =========================
BR  2M.AT   34000 /       / 1150. /   256. /   35114. / 1.00 /    0. /   40.
    771.34 /   0.31 /     ...1...  (-.001)  /    4.49 /   0.31 /          *BO*
    EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /          *RG*
    2N.AT   34070 /    70 /   1150. /   282. /   26312. / 1.50 /  241. /  374.
    771.41 /   0.39 /   0.10 /   0.03 / 771.80 /    4.08 /   0.40 / -0.000  *AS*
```

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   12,DATE= 4/ 7/78

WATER-SURFACE PROFILE FOR:  THREAD CREEK  ATHERTON - BRISTOL ROAD    HOLTSLAG
PAGE 2 OF  2, PROFILE NUMBER. 1,   UPSTREAM COMPUTATIONS
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /.   HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
CI  M = 0.06 / E * 0.38 / K* = 0.10 /   287. /   26720. / 1.52 /  239. /  374.   10-YR
    771.45 /   0.38 /                 /  771.82 /   4.01 /   0.39 /          *AS*
=========================.END BRIDGE ANALYSIS =========================

                          END OF THIS PROFILE
```

```
                                                                                                                  *ID*
BV  2B.AT   26790 /     0 /  1800. /   774. /  64829. / 2.25 /  504. / 111
    765.45 /   0.19 /                  / 765.64 /   2.32 /   0.25/                *IS*
BW  2C.AT   27310 /   520 /  1800. /  1517. / 102640. / 1.99 /  769. / 1505.
    765.85 /   0.04 /   0.25 /   0.0  / 765.89 /   1.19 /   0.15 / -0.000  *XS*
BX  2D.AT   27920 /   610 /  1800. /  1309. /  77966. / 2.50 /  236. /  986.
    766.10 /   0.07 /   0.25 /   0.02 / 766.17 /   1.38 /   0.20 /  0.018  *XS*
BY  2E.AT   28670 /   750 /  1700. /  1120. /  66279. / 3.14 /  160. /  705.
    766.53 /   0.11 /   0.44 /   0.02 / 766.64 /   1.52 /   0.25 /  0.001  *XS*
BZ  2F.AT   29150 /   480 /  1700. /  1096. /  60029. / 3.40 /  143. /  725.
    766.87 /   0.13 /   0.35 /   0.01 / 767.00 /   1.55 /   0.28 /  0.001  *XS*
CA  2G.AT   29860 /   710 /  1700. /  1167. /  60285. / 3.22 /  519. /  971.
    767.46 /   0.11 /   0.57 /   0.0  / 767.56 /   1.46 /   0.24 /  0.001  *XS*
CB  2H.AT   30520 /   660 /  1700. /   876. /  48468. / 2.03 /  611. /  990.
    768.11 /   0.12 /   0.65 /   0.01 / 768.22 /   1.94 /   0.19 /  0.002  *XS*
CC  2I.AT   31230 /   710 /  1700. /   818. /  43194. / 2.58 /  535. /  873.
    769.06 /   0.17 /   0.98 /   0.03 / 769.23 /   2.08 /   0.33 /  0.001  *XS*
CD  2J.AT   31820 /   590 /  1700. /  1106. /  60295. / 3.75 /  623. / 1129.
    769.75 /   0.14 /   0.65 /   0.0  / 769.89 /   1.54 /   0.26 /  0.000  *XS*
CE  2K.AT   32630 /   810 /  1700. /  1250. /  73407. / 1.16 /  883. / 1293.
    770.39 /   0.03 /   0.53 /   0.0  / 770.42 /   1.36 /   0.12 /  0.001  *XS*
CF  2L.AT   33230 /   600 /  1700. /   889. /  65497. / 1.40 /  671. / 1061.
    770.72 /   0.08 /   0.36 /   0.02 / 770.80 /   1.91 /   0.18 /  0.000  *XS*
CG  2LL.AT  33630 /   400 /  1700. /   364. /  27556. / 1.75 /  543. /  721.
    771.11 /   0.59 /   0.64 /   0.26 / 771.70 /   4.67 /   0.56 / -0.000  *XS*
CH  2M.AT   34000 /   370 /  1700. /   305. /  41823. / 1.11 /  291. /  348.
    772.11 /   0.54 /   0.93 /   0.0  / 772.64 /   5.58 /   0.40 /  0.015  *XS*
    ========================= BEGIN BRIDGE ANALYSIS =========================
BR  2M.AT   34000 /       / 1700. /   287. /  28429. / 1.00 /    0. /   40.
    772.10 /   0.55 /     ...3...  (-.001)   /   5.93 /   0.39 /            *BO*
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /             *RG*
    2N.AT   34070 /    70 /  1700. /   423. /  37396. / 1.91 /  203. /  382.
    772.30 /   0.48 /   0.13 /   0.0  / 772.77 /   4.02 /   0.42 / -0.001  *AS*
```

50 YR

50 YR

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   15,DATE= 4/ 7/78

WATER-SURFACE PROFILE FOR:  THREAD CREEK  ATHERTON - BRISTOL ROAD    HOLTSLAG
PAGE  2 OF  2, PROFILE NUMBER  2,   UPSTREAM COMPUTATIONS
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /   HE  /     EG  /     V  /    FN  /  ACC    *ID*
==================================================================================
CI  M = **** / E = **** / K* = **** /   471. /   41389. / 1.98 /  197. /  384.   50-YR
    772.56 /   0.40 /                 / 772.96 /    3.61 /   0.39 /          *AS*
============================ END BRIDGE ANALYSIS ==============================

                          END OF THIS PROFILE
```

```
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
 WS ELEV /    HV  /    HF  /   HE  /   EG  /    V  /    FN  /   ACC   *ID*
==========================================================================
BV  2B AT   26790 /     0 /  2600. /   947. /  77957. / 2.26 /  481. / 1126.
    765.82 /  0.27 /                / 766.09 /   2.75 /  0.30/          *IS*
--------------------------------------------------------------------------
BW  2C AT   27310 /   520 /  2600. /  1921. / 134596. / 1.90 /  710. / 1529.
    766.37 /  0.05 /  0.34 /   0.0 / 766.42 /   1.35 /  0.17 / 0.000  *XS*
--------------------------------------------------------------------------
BX  2D AT   27920 /   610 /  2600. /  1724. / 106638. / 2.32 /  211. /  997.
    766.64 /  0.08 /  0.29 /  0.01 / 766.72 /   1.51 /  0.22 / -0.000 *XS*
--------------------------------------------------------------------------
BY  2E AT   28670 /   750 /  2500. /  1465. /  90607. / 2.88 /  147. /  721.
    767.14 /  0.13 /  0.50 /  0.02 / 767.27 /   1.71 /  0.27 / 0.019  *XS*  500-YR
--------------------------------------------------------------------------
BZ  2F AT   29150 /   480 /  2500. /  1501. /  85825. / 3.16 /  122. /  772.
    767.53 /  0.14 /  0.39 /  0.00 / 767.66 /   1.67 /  0.29 / 0.002  *XS*
--------------------------------------------------------------------------
CA  2G AT   29860 /   710 /  2500. /  1491. /  81239. / 3.16 /  518. /  989.
    768.16 /  0.14 /  0.64 /  0.00 / 768.30 /   1.68 /  0.27 / 0.003  *XS*
--------------------------------------------------------------------------
CB  2H AT   30520 /   660 /  2500. /  1189. /  72045. / 1.90 /  607. / 1037.
    768.88 /  0.13 /  0.70 /   0.0 / 769.01 /   2.10 /  0.20 / 0.002  *XS*
--------------------------------------------------------------------------
CC  2I AT   31230 /   710 /  2500. /  1083. /  62355. / 2.38 /  528. /  876.
    769.83 /  0.20 /  0.99 /  0.03 / 770.03 /   2.31 /  0.34 / 0.001  *XS*
--------------------------------------------------------------------------
CD  2J AT   31820 /   590 /  2500. /  1537. /  87196. / 3.53 /  597. / 1170.
    770.56 /  0.15 /  0.68 /   0.0 / 770.71 /   1.63 /  0.27 / -0.000 *XS*
--------------------------------------------------------------------------
CE  2K AT   32630 /   810 /  2500. /  1622. / 105802. / 1.21 /  813. / 1303.
    771.21 /  0.04 /  0.55 /   0.0 / 771.26 /   1.54 /  0.13 / 0.001  *XS*
--------------------------------------------------------------------------
CF  2L AT   33230 /   600 /  2500. /  1242. /  98947. / 1.45 /  601. / 1064.
    771.55 /  0.09 /  0.36 /  0.02 / 771.64 /   2.01 /  0.18 / 0.000  *XS*
--------------------------------------------------------------------------
CG  2LL AT  33630 /   400 /  2500. /   522. /  39804. / 1.94 /  494. /  724.
    771.89 /  0.69 /  0.63 /  0.30 / 772.58 /   4.79 /  0.58 / -0.000 *XS*  500 YR
--------------------------------------------------------------------------
CH  2M AT   34000 /   370 /  2500. /   354. /  50949. / 1.16 /  286. /  350.
    772.92 /  0.90 /  1.14 /  0.11 / 773.82 /   7.06 /  0.49 / -0.000 *XS*
==========================BEGIN BRIDGE ANALYSIS===========================
BR  2M AT   34000 /       /  2500. /   287. /  28429. / 1.00 /    0. /   40.
    772.10 /  1.18 /      ....3...  (-.001)  /   8.72 /  0.57 /          *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /          *RG*
--------------------------------------------------------------------------
    2N AT   34070 /    70 /  2500. /   660. /  57978. / 2.16 /  174. /  392.
    773.49 /  0.48 /  0.15 /   0.0 / 773.97 /   3.79 /  0.42 / -0.001 *AS*
--------------------------------------------------------------------------
```

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   18,DATE= 4/ 7/78

WATER-SURFACE PROFILE FOR:  THREAD CREEK  ATHERTON - BRISTOL ROAD    HOLTSLAG
PAGE  2 OF  2, PROFILE NUMBER  3,  UPSTREAM COMPUTATIONS
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
  M = **** / E = **** / K* = **** /   901. /   78396. / 2.42 /  149. /  444.
  774.47 /   0.29 /                 /  774.76 /   2.77 /   0.31 /          *AS*
=========================== END BRIDGE ANALYSIS ==========================

                        END OF THIS PROFILE
```

CI

500-7R

```
                WS.ELEV /    MV  /    HF  /    HE  /    EG  /     V  /    FN  /   ACC   *ID*
==========================================================================================
BV   2B.AT   26790 /     0 /  .210[illegible] /   847. /  70244. / 2.27 /  494. / 11[illegible]
     765.61 /   0.22 /                  / 765.83 /    2.48 /   0.27/                  *IS*
------------------------------------------------------------------------------------------
BW   2C.AT   27310 /   520 /  .2100. /  1679. / 114882. / 1.96 /  742. / 1518.
     766.06 /   0.05 /  0.28 /   0.0  / 766.11 /    1.25 /   0.16 / 0.000  *XS*
------------------------------------------------------------------------------------------
BX   2D.AT   27920 /   610 /  .2100. /  1471. /  88657. / 2.44 /  226. /  991.
     766.31 /   0.08 /  0.26 /   0.01 / 766.39 /    1.43 /   0.21 / 0.000  *XS*
------------------------------------------------------------------------------------------
BY   2E.AT   28670 /   750 /  .1950. /  1249. /  74966. / 3.04 /  155. /  711.
     766.76 /   0.12 /  0.46 /   0.02 / 766.87 /    1.56 /   0.25 / 0.000  *XS*
------------------------------------------------------------------------------------------
BZ   2F.AT   29150 /   480 /  .1950. /  1238. /  68753. / 3.32 /  136. /  742.
     767.11 /   0.13 /  0.35 /   0.01 / 767.24 /    1.57 /   0.28 / 0.002  *XS*  100-Y
------------------------------------------------------------------------------------------
CA   2G.AT   29860 /   710 /  .1950. /  1279. /  67378. / 3.19 /  519. /  974.
     767.70 /   0.12 /  0.58 /   0.0  / 767.82 /    1.52 /   0.25 / 0.000  *XS*
------------------------------------------------------------------------------------------
CB   2H.AT   30520 /   660 /  .1950. /   978. /  55902. / 1.98 /  609. / 1006.
     768.37 /   0.12 /  0.67 /   0.00 / 768.49 /    1.99 /   0.19 / 0.002  *XS*
------------------------------------------------------------------------------------------
CC   2I.AT   31230 /   710 /  .1950. /   906. /  49276. / 2.51 /  533. /  874.
     769.32 /   0.18 /  0.98 /   0.03 / 769.50 /    2.15 /   0.33 / 0.001  *XS*
------------------------------------------------------------------------------------------
CD   2J.AT   31820 /   590 /  .1950. /  1244. /  68974. / 3.63 /  621. / 1132.
     770.02 /   0.14 /  0.66 /   0.0  / 770.16 /    1.57 /   0.26 / 0.001  *XS*
------------------------------------------------------------------------------------------
CE   2K.AT   32630 /   810 /  .1950. /  1366. /  83532. / 1.17 /  860. / 1296.
     770.66 /   0.04 /  0.53 /   0.0  / 770.70 /    1.43 /   0.13 / 0.001  *XS*
------------------------------------------------------------------------------------------
CF   2L.AT   33230 /   600 /  .1950. /  1000. /  75810. / 1.42 /  648. / 1062.
     771.00 /   0.08 /  0.36 /   0.02 / 771.08 /    1.95 /   0.18 / 0.001  *XS*
------------------------------------------------------------------------------------------
CG   2LL.AT  33630 /   400 /  .1950. /   412. /  31280. / 1.82 /  527. /  722.   100 Y
     771.37 /   0.63 /  0.64 /   0.27 / 772.00 /    4.73 /   0.57 / -0.001  *XS*
------------------------------------------------------------------------------------------
CH   2M.AT   34000 /   370 /  .1950. /   320. /  44626. / 1.13 /  289. /  349.
     772.37 /   0.65 /  1.01 /   0.01 / 773.02 /    6.10 /   0.43 / 0.001  *XS*
==========================BEGIN BRIDGE ANALYSIS==========================
BR   2M.AT   34000 /       /  .1950. /   287. /  28429. / 1.00 /    0. /   40.
     772.10 /   0.72 /      ...3...  (-.001)   /    6.80 /   0.45 /          *BO*
------------------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      0. / RIGHT      0. /                   *RG*
------------------------------------------------------------------------------------------
     2N.AT   34070 /    70 /  .1950. /   491. /  43090. / 2.01 /  194. /  385.
     772.66 /   0.49 /  0.14 /   0.0  / 773.16 /    3.97 /   0.43 / -0.001  *AS*
------------------------------------------------------------------------------------------
```

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   21,DATE= 4/ 7/78

WATER-SURFACE PROFILE FOR:  THREAD CREEK  ATHERTON - BRISTOL ROAD    HOLTSLAG
PAGE  2 OF  2, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /   HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
CA  M = **** / E = **** / K* = **** /   582. /   51004. / 2.11 /  183. /  389.   100YR
    773.12 /   0.37 /                 /  773.49 /   3.35 /   0.36 /          *AS*
=========================== END BRIDGE ANALYSIS ==========================

                          END OF THIS PROFILE
```

```
      WS.ELEV /    HV  /    HF  /    HE  /    EG  /    V  /    FN  /   ACC    *ID*
 ==========================================================================
BV  2B.AT   26790 /     0 /  2100. /   842. /  70954. / 2.19 /  500. / 1100.
    765.62 /  0.21 /                  / 765.83 /   2.50 /  0.27/            *IS*
 --------------------------------------------------------------------------
BW  2C.AT   27310 /   520 /  2100. / 1296. / 103611. / 1.61 /  850. / 1300.
    766.08 /  0.07 /  0.31 /   0.0  / 766.14 /   1.62 /  0.18 / 0.000  *XS*
 --------------------------------------------------------------------------
BX  2D.AT   27920 /   610 /  2100. / 1312. /  90987. / 1.91 /  300. /  800.
    766.36 /  0.08 /  0.29 /  0.01  / 766.44 /   1.60 /  0.20 / 0.000  *XS*
 --------------------------------------------------------------------------
BY  2E.AT   28670 /   750 /  1950. / 1215. /  76178. / 2.81 /  200. /  700.
    766.79 /  0.11 /  0.44 /  0.02  / 766.90 /   1.60 /  0.25 / 0.001  *XS*  100 FW
 --------------------------------------------------------------------------
BZ  2F.AT   29150 /   480 /  1950. / 1137. /  68103. / 2.93 /  245. /  743.
    767.13 /  0.13 /  0.35 /  0.01  / 767.26 /   1.71 /  0.28 / 0.000  *XS*
 --------------------------------------------------------------------------
CA  2G.AT   29860 /   710 /  1950. / 1174. /  66447. / 2.86 /  520. /  895.
    767.74 /  0.12 /  0.60 /   0.0  / 767.86 /   1.66 /  0.25 / 0.000  *XS*
 --------------------------------------------------------------------------
CB  2H.AT   30520 /   660 /  1950. /  967. /  56230. / 1.95 /  625. / 1000.
    768.41 /  0.12 /  0.67 /  0.00  / 768.53 /   2.02 /  0.19 / 0.004  *XS*
 --------------------------------------------------------------------------
CC  2I.AT   31230 /   710 /  1950. /  900. /  49812. / 2.44 /  535. /  860.
    769.35 /  0.18 /  0.96 /  0.03  / 769.53 /   2.17 /  0.33 / 0.001  *XS*
 --------------------------------------------------------------------------
CD  2J.AT   31820 /   590 /  1950. / 1245. /  69458. / 3.59 /  630. / 1130.
    770.04 /  0.14 /  0.65 /   0.0  / 770.18 /   1.57 /  0.26 / 0.000  *XS*
 --------------------------------------------------------------------------
CE  2K.AT   32630 /   810 /  1950. / 1294. /  82558. / 1.13 /  910. / 1260.
    770.67 /  0.04 /  0.54 /   0.0  / 770.71 /   1.51 /  0.13 / 0.001  *XS*
 --------------------------------------------------------------------------
CF  2L.AT   33230 /   600 /  1950. /  925. /  74823. / 1.29 /  740. / 1040.
    771.02 /  0.09 /  0.37 /  0.02  / 771.11 /   2.11 /  0.18 / 0.001  *XS*  100 FW
 --------------------------------------------------------------------------
CG  2LL.AT  33630 /   400 /  1950. /  417. /  31928. / 1.79 /  535. /  720.
    771.40 /  0.61 /  0.64 /  0.26  / 772.00 /   4.68 /  0.56 / -0.001 *XS*
 --------------------------------------------------------------------------
CH  2M.AT   34000 /   370 /  1950. /  320. /  44591. / 1.13 /  289. /  349.
    772.36 /  0.65 /  0.99 /  0.02  / 773.02 /   6.10 /  0.43 / 0.000  *XS*
 ========================= BEGIN BRIDGE ANALYSIS =========================
BR  2M.AT   34000 /       / 1950. /  287. /  28429. / 1.00 /    0. /   40.
    772.10 /  0.72 /  ....3...  (-.001)   /   6.80 /  0.45 /            *BO*
 --------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /            *RG*
 --------------------------------------------------------------------------
    2N.AT   34070 /    70 /  1950. /  491. /  43042. / 2.01 /  194. /  385.
    772.66 /  0.49 /  0.14 /   0.0  / 773.15 /   3.97 /  0.43 / -0.001 *AS*
 --------------------------------------------------------------------------
```

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   28,DATE= 4/ 7/78

WATER-SURFACE PROFILE FOR:  THREAD CREEK  ATHERTON - BRISTOL ROAD    HOLTSLAG
PAGE  2 OF  2, PROFILE NUMBER  5,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR.FW ANALYSIS
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /.   HE  /    EG  /    V  /    FN  /   ACC    *ID*
==================================================================================
CI  M = **** / E = **** / K* = **** /   582. /   51249. / 2.08 /  188. /  388.
    773.12 /   0.36 /                 /  773.49 /   3.35 /   0.36 /          *AS*  100 FW
==========================END BRIDGE ANALYSIS==========================

                          END OF THIS PROFILE
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 THREAD CREEK  BRISTOL ROAD - MAPLE ROAD  HOLTSLAG 27  5 02 99 12
2      2  77145  77256  77447  77312  77313
3 10100    2N 1  24  3  764   34070  1  3
4 10105   1150   1700   2500   1950   1950
5 10110     16  1  7800   77  1  7780  107  1  7760  162  1  7740  210  1  7720
5 10111    300  1  7703  310  1  7699  313  2  7690  320  2  7672  323  2  7656
5 10112    330  2  7640  335  2  7637  341  2  7658  345  2  7671  350  2  7682
5 10113    354  3  7690  355  3  7693  360  3  7705  365  3  7705  380  3  7720
5 10114    396  3  7740  600  3  7760  670  3  7780  775  3  7800
6 10129  1  2 060 060  1  2 037 037  1  2 065 065
3 10200    20 0  15  3  765   34440 99 99
5 10210      0  1  7800   82  1  7780  146  1  7760  156  1  7740  162  1  7720
5 10211    360  1  7710  472  2  7700  480  2  7680  483  2  7649  493  2  7649
5 10212    496  2  7680  508  3  7700  516  3  7760  526  3  7780  627  3  7800
6 10229  1  2 070 070  1  2 035 035  1  2 055 055
3 10300    2P 0  18  3  766   35280 99 99
5 10310      0  1  7820   52  1  7800   97  1  7780  152  1  7760  176  1  7740
5 10311    202  1  7720  252  1  7720  380  2  7720  392  2  7700  395  2  7658
5 10312    419  2  7658  422  3  7700  442  3  7720  443  3  7740  450  3  7760
5 10313    471  3  7780  495  3  7800  622  3  7820
6 10329  1  2 070 070  1  2 033 033  1  2 055 055
3 10400    2Q 0  18  3  767   35830 99 99
5 10410      0  1  7820   37  1  7800   72  1  7780   88  1  7760  100  1  7740
5 10411    110  1  7720  160  1  7720  212  2  7720  222  2  7700  225  2  7668
5 10412    240  2  7668  243  2  7700  252  3  7720  393  3  7740  406  3  7760
5 10413    422  3  7780  476  3  7800  634  3  7820
6 10429  1  2 065 065  1  2 038 038  1  2 070 070
3 10500    2R 0  19  3  768   36380 99 99
5 10510      0  1  7860   10  1  7840   70  1  7820   88  1  7800  100  1  7780
5 10511    122  1  7760  178  1  7740  470  2  7720  474  2  7700  477  2  7675
5 10512    491  2  7675  493  2  7700  501  3  7720  508  3  7740  514  3  7760
5 10513    528  3  7780  592  3  7800  650  3  7820  832  3  7840
6 10529  1  2 070 070  1  2 045 045  1  2 070 070
3 10600    2S 0  18  3  769   36930 99 99
5 10610      0  1  7860   60  1  7840  224  1  7820  284  1  7800  293  1  7780
5 10611    303  1  7760  321  1  7740  363  2  7720  370  2  7683  374  2  7683
5 10612    378  2  7720  387  3  7740  662  3  7760  682  3  7780  703  3  7800
5 10613    712  3  7820  722  3  7840  755  3  7860
6 10629  1  2 060 060  1  2 040 040  1  2 070 070
3 10700   2SS 0  17  3  770   37390 99 99
5 10710      0  1  7840  175  1  7820  214  1  7820  257  1  7800  280  1  7780
5 10711    313  1  7760  534  2  7738  540  2  7707  550  2  7691  560  2  7708
5 10712    566  2  7721  572  3  7740  612  3  7760  683  3  7780  733  3  7800
5 10713    757  3  7820  780  3  7840
6 10729  1  2 070 070  1  2 040 040  1  2 060 060
```

CI

CJ

CK

CL

CM

CN

CO

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
3 10800    2T 0  17  3  770   37880 99 99
5 10810       0  1  7840  130  1  7830  387  1  7820  532  1  7800  573  1  7780
5 10811     593  1  7760  673  2  7740  675  2  7697  692  2  7697  695  3  7740
5 10812     815  3  7754  907  3  7760  962  3  7780  982  3  7800 1003  3  7820
5 10813    1022  3  7840 1060  3  7860
6 10829  1  2 070 070  1  2 040 040  1  2 070 070
3 10900    2U 0  15  3  771   38630 99 99
5 10911       0  1  7840  130  1  7830  310  1  7820  572  1  7800  598  1  7780
5 10912     848  2  7760  850  2  7708  864  2  7708  868  2  7760  888  3  7780
5 10913     894  3  7800  904  3  7820  928  3  7840 1003  3  7860 1133  3  7880
6 10929  1  2 080 080  1  2 045 045  1  2 070 070
3 11000    2V 0  16  3  772   39220 99 99
5 11010       0  1  7840  135  1  7830  312  1  7820  496  1  7800  552  1  7780
5 11011     764  1  7770 1113  2  7771 1116  2  7743 1126  2  7717 1136  2  7743
5 11012    1141  3  7755 1151  3  7780 1157  3  7800 1178  3  7820 1210  3  7840
5 11013    1257  3  7860
6 11029  1  2 090 090  1  2 042 042  1  2 070 070
3 11100    2W 0  13  3  773   39800 99 99
5 11110       0  1  7840  270  1  7820  404  1  7800  453  1  7780  770  1  7770
5 11111     897  2  7760  900  2  7723  919  2  7723  922  2  7760  930  3  7770
5 11112     947  3  7780  958  3  7800  979  3  7900
6 11129  1  2 090 090  1  2 045 045  1  2 050 050
3 11200    2X 1  13  3  774   40660 99 99
4 11204   1150   1700   2500   1950   1950
5 11210       0  1  7840  174  1  7820  372  1  7800  398  1  7780  480  2  7760
5 11211     483  2  7732  503  2  7732  506  3  7760  534  3  7780  633  3  7800
5 11212     653  3  7820  672  3  7840  693  3  7860
6 11229  1  2 090 090  1  2 045 045  1  2 065 065
3 11300    2Y 1  17  3  774   41180 99 99
4 11304   1100   1625   2400   1850   1850
5 11310       0  1  7840   12  1  7820   21  1  7800   48  1  7780   95  1  7780
5 11311     118  1  7800  141  1  7800  158  1  7780  168  2  7760  170  2  7738
5 11312     197  2  7738  200  2  7760  213  3  7780  267  3  7800  313  3  7820
5 11313     370  3  7840  580  3  7860
6 11329  1  2 080 080  1  2 045 045  1  2 070 070
3 11400    2Z 0  14  3  775   41850 99 99
5 11410       0  1  7860   48  1  7860   64  1  7840   77  1  7820  128  1  7800
5 11411     139  2  7780  144  2  7746  165  2  7746  171  3  7800  341  3  7800
5 11412     377  3  7800  407  3  7820  543  3  7840  614  3  7860
6 11429  1  2 080 080  1  2 047 047  1  2 090 090
3 11500   2ZZ 0  15  3  776   42280 99 99
5 11510       0  1  7900    7  1  7800   18  2  7780   22  2  7751   45  2  7751
5 11511      48  2  7780   52  3  7780   78  3  7800  230  3  7815  320  3  7800
5 11512     372  3  7800  392  3  7820  453  3  7840  518  3  7860  750  3  7870
6 11529  1  2 060 060  1  2 045 045  1  2 090 090
```

CP

CQ

CR

CS

CT

CU

CV

CW

```
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
3 11[illegible]0    3A 0  20  3  776   42650 99 99
5 11610       0  1  7900    8  1  7880   12  1  7860   16  1  7840   18  1  7820
5 11611      28  1  7800   48  2  7780   52  2  7755   67  2  7755   71  2  7780
5 11612      76  3  7780   94  3  7800  168  3  7800  208  3  7800  318  3  7800
5 11613     348  3  7800  372  3  7820  386  3  7840  437  3  7860  535  3  7875
6 11629  1  2 055 055  1  2 042 042  1  2 090 090
3 11700   3AA 0  13  3  776   42860 99 99
5 11710       0  1  7900   16  1  7800   18  2  7780   20  2  7758   40  2  7758
5 11711      43  2  7780   45  3  7780   74  3  7800  310  3  7810  378  3  7820
5 11712     388  3  7840  407  3  7860  506  3  7875
6 11729  1  2 055 055  1  2 045 045  1  2 090 090
3 11800    3B 0  16  3  777   43320 99 99
5 11810       0  1  7900   23  1  7880   33  1  7860   42  1  7840   52  1  7820
5 11811     113  1  7800  178  2  7780  181  2  7762  195  2  7762  198  2  7780
5 11812     206  3  7780  285  3  7800  457  3  7820  484  3  7840  655  3  7847
5 11813     700  3  7860
6 11829  1  2 070 070  1  2 046 046  1  2 090 090
3 11900    3C 0  17  3  777   44030 99 99
5 11910       0  1  7900   36  1  7880   68  1  7860  140  1  7840  266  1  7820
5 11911     374  1  7820  452  1  7820  621  2  7800  623  2  7764  644  2  7764
5 11912     648  2  7780  651  3  7800  662  3  7820  750  3  7840  878  3  7847
5 11913    1063  3  7860 1120  3  7862
6 11929  1  2 100 100  1  2 050 050  1  2 080 080
3 12000    3D 0  19  3  778   44540 99 99
5 12010       0  1  7960   12  1  7940   37  1  7920   67  1  7900  112  1  7880
5 12011     136  1  7860  170  1  7840  470  1  7820  528  2  7800  539  2  7780
5 12012     543  2  7776  559  2  7776  562  2  7780  570  3  7780  634  3  7800
5 12013     718  3  7820  742  3  7840  876  3  7860  916  3  7875
6 12029  1  2 110 110  1  2 050 050  1  2 090 090
3 12100    3E 0  17  3  779   45150 99 99
5 12110       0  1  7934   20  1  7920   45  1  7900   82  1  7880  110  1  7860
5 12111     140  1  7840  322  2  7820  332  2  7800  334  2  7783  342  2  7783
5 12112     345  2  7800  352  3  7800  373  3  7820  412  3  7840  520  3  7860
5 12113     680  3  7880  720  3  7900
6 12129  1  2 100 100  1  2 050 050  1  2 065 065
3 12200   3EE 0  16  3  779   45370 99 99
5 12210       0  1  7936   18  1  7920   72  1  7900  131  1  7880  152  1  7860
5 12211     206  1  7840  442  1  7820  460  2  7800  462  2  7787  476  2  7787
5 12212     478  2  7800  493  3  7820  522  3  7840  560  3  7860  734  3  7880
5 12213     768  3  7900
6 12229  1  2 100 100  1  2 050 050  1  2 055 055
3 12300    3F 0  14  3  780   45740 99 99
5 12310       0  1  7940   12  1  7920   82  1  7900  152  1  7880  170  1  7860
5 12311     251  1  7840  337  2  7820  340  2  7791  353  2  7791  357  2  7800
5 12312     366  3  7820  554  3  7840  583  3  7860  590  3  7879
```

CX

CY

CZ

DA

DB

DC

DD

DE

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

6 12329  1  2 100 100  1  2 050 050  1  2 080 080
3 12400   3FF 0  17  3  780   46100 99 99
5 12410       0  1  7940   11  1  7920   21  1  7900   43  1  7880   75  1  7860
5 12411     242  1  7840  294  2  7820  298  2  7794  320  2  7794  324  2  7820   DF
5 12412     330  3  7820  412  3  7840  478  3  7855  590  3  7840  614  3  7860
5 12413     630  3  7880  650  3  7880
6 12429  1  2 110 110  1  2 050 050  1  2 070 070
3 12500    3G 0  21  3  781   46470 99 99
5 12510       0  1  7960    4  1  7940   12  1  7920   20  1  7900   98  1  7880
5 12511     117  1  7860  252  1  7840  300  1  7840  362  1  7840  490  1  7853   DG
5 12512     598  1  7840  617  2  7820  620  2  7801  640  2  7801  643  2  7820
5 12513     650  3  7820  686  3  7840  698  3  7860  707  3  7880  714  3  7900
5 12514     734  3  7920
6 12529  1  2 090 090  1  2 048 048  1  2 070 070
3 12600    3H 0  25  3  781   46660 99 99
5 12610       0  1  7960    2  1  7940   62  1  7920  111  1  7900  156  1  7880
5 12611     228  1  7860  318  1  7860  360  1  7876  361  1  7960  461  1  7960   DH
5 12612     462  1  7860  580  1  7840  620  1  7840  650  1  7840  668  2  7820
5 12613     670  2  7803  690  2  7803  692  2  7820  700  3  7820  768  3  7840
5 12614     773  3  7860  784  3  7880  790  3  7900  793  3  7920  803  3  7940
6 12629  1  2 075 075  1  2 045 045  1  2 070 070
3 12700   3HH 0  20  3  782   47150 99 99
5 12710      15  1  7940   40  1  7920  150  1  7900  253  1  7880  304  1  7860
5 12711     370  1  7860  486  1  7860  556  1  7840  568  1  7840  624  2  7840   DI
5 12712     636  2  7820  638  2  7810  658  2  7810  660  2  7820  663  3  7840
5 12713     678  3  7860  690  3  7880  696  3  7900  705  3  7920  716  3  7940
6 12729  1  2 080 080  1  2 045 045  1  2 055 055
3 12800    3I 1  18  3  782   47510 99 99
4 12804   1100   1625   2400   1850   1850
5 12810       0  1  7940   30  1  7920  250  1  7900  400  1  7880  705  1  7880
5 12811     720  1  7860  741  2  7840  752  2  7820  768  2  7817  772  2  7815   DJ
5 12812     773  2  7820  775  2  7840  780  3  7860  784  3  7880  786  3  7900
5 12813     793  3  7920  812  3  7940  830  3  7960
6 12829  1  2 060 060  1  2 043 043  1  2 050 050
3 12900 BR 3I 2  12  1  782   47510        0  7921 3 1
5 12910       0  1  7921    0  1  7851    5  1  7853   10  1  7850   15  1  7843
5 12911      20  1  7833   25  1  7827   30  1  7821   35  1  7817   40  1  7815
5 12912      40  1  7921    0 -9  7921
6 12929  1  2 040 040
3 13000 RD 3I 4   7  3   36          1  3          1 1 1              1
5 13010       0  1  7960  533  1  7941  740  1  7958  741  2  7988  787  2  7988
```

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
S	ELEV	HV	HF	HE		V	FN	ACC	*ID*	
2N	AT	34070	0	1150.	288.	26764.	1.52	239.	374.	CI
	771.45	0.38			771.83	4.00	0.39		*IS*	
2O	AT	34440	370	1150.	515.	27519.	3.36	161.	511.	CJ
	772.23	0.26	0.66	0.0	772.49	2.23	0.39	-0.001	*XS*	
2P	AT	35280	840	1150.	530.	40516.	2.53	185.	443.	CK
	773.30	0.18	1.00	0.0	773.49	2.17	0.28	0.001	*XS*	
2Q	AT	35830	550	1150.	526.	30414.	2.44	100.	386.	CL
	773.90	0.18	0.59	0.0	774.08	2.19	0.32	0.005	*XS*	
2R	AT	36380	550	1150.	695.	32603.	2.56	158.	510.	CM
	774.71	0.11	0.73	0.0	774.82	1.66	0.26	0.001	*XS*	
2S	AT	36930	550	1150.	443.	20610.	2.75	306.	622.	CN
	775.71	0.29	1.08	0.09	776.00	2.59	0.44	0.007	*XS*	
2SS	AT	37390	460	1150.	677.	38277.	2.74	302.	635.	CO
	776.65	0.12	0.77	0.0	776.77	1.70	0.26	0.001	*XS*	
2T	AT	37880	490	1150.	766.	37585.	3.00	582.	938.	CP
	777.12	0.11	0.45	0.0	777.22	1.50	0.24	0.001	*XS*	
2U	AT	38630	750	1150.	506.	20288.	2.38	593.	889.	CQ
	778.37	0.19	1.30	0.04	778.56	2.27	0.38	-0.008	*XS*	
2V	AT	39220	590	1150.	1379.	49352.	3.52	516.	1155.	CR
	779.30	0.04	0.78	0.0	779.34	0.83	0.08	0.003	*XS*	
2W	AT	39800	580	1150.	1331.	52818.	2.81	414.	956.	CS
	779.60	0.03	0.29	0.0	779.63	0.86	0.07	0.000	*XS*	
2X	AT	40660	860	1150.	673.	34230.	2.83	354.	635.	CT
	780.18	0.13	0.63	0.05	780.31	1.71	0.25	-0.000	*XS*	
2Y	AT	41180	520	1100.	658.	38877.	2.30	18.	283.	CU
	780.71	0.10	0.49	0.0	780.81	1.67	0.22	0.000	*XS*	
2Z	AT	41850	670	1100.	565.	26929.	3.17	91.	399.	CV
	781.46	0.19	0.77	0.04	781.64	1.95	0.29	0.019	*XS*	
2ZZ	AT	42280	430	1100.	776.	36612.	3.51	6.	394.	CW
	782.06	0.11	0.53	0.0	782.17	1.42	0.23	0.000	*XS*	

10-4"

```
SECID AT DISTANCE/ LENGTH/DISCHARGE/   AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
WS ELEV /     HV  /     HF  /     HE  /     G  /     V  /    FN  /   ACC    *ID*
==========================================================================
  3A AT   42650 /   370 /   1100. /   953. /   44207. / 2.98 /   18. /  375.
  782.39 /   0.06 /   0.28 /   0.0  /  782.45 /   1.15 /   0.08 /  0.000  *XS*  CK
--------------------------------------------------------------------------
 3AA AT   42860 /   210 /   1100. /   836. /   36030. / 3.52 /   12. /  381.
  782.53 /   0.09 /   0.16 /   0.02 /  782.63 /   1.32 /   0.23 / -0.000  *XS*  CY
--------------------------------------------------------------------------
  3B AT   43320 /   460 /   1100. /  1175. /   52304. / 2.28 /   48. /  469.
  782.89 /   0.03 /   0.30 /   0.0  /  782.92 /   0.94 /   0.07 /  0.000  *XS*  CZ
--------------------------------------------------------------------------
  3C AT   44030 /   710 /   1100. /   962. /   34246. / 4.21 /  181. /  721.
  783.34 /   0.09 /   0.48 /   0.03 /  783.43 /   1.14 /   0.22 /  0.000  *XS*  DA
--------------------------------------------------------------------------
  3D AT   44540 /   510 /   1100. /  1187. /   48941. / 2.77 /  206. /  739.
  783.76 /   0.04 /   0.37 /   0.0  /  783.80 /   0.93 /   0.16 /  0.000  *XS*  DB
--------------------------------------------------------------------------
  3E AT   45150 /   610 /   1100. /   535. /   20431. / 2.72 /  134. /  435.
  784.43 /   0.18 /   0.74 /   0.07 /  784.61 /   2.06 /   0.36 /  0.001  *XS*  DC
--------------------------------------------------------------------------
 3EE AT   45370 /   220 /   1100. /   782. /   29689. / 2.84 /  180. /  540.
  784.96 /   0.09 /   0.44 /   0.0  /  785.05 /   1.41 /   0.25 /  0.000  *XS*  DD
--------------------------------------------------------------------------
  3F AT   45740 /   370 /   1100. /   879. /   34808. / 2.47 /  193. /  575.
  785.42 /   0.06 /   0.43 /   0.0  /  785.48 /   1.25 /   0.12 /  0.001  *XS*  DE  10.7'
--------------------------------------------------------------------------
 3FF AT   46100 /   360 /   1100. /   906. /   35339. / 3.14 /   94. /  611.
  785.77 /   0.07 /   0.35 /   0.01 /  785.84 /   1.21 /   0.21 /  0.001  *XS*  DF
--------------------------------------------------------------------------
  3G AT   46470 /   370 /   1100. /  1093. /   39500. / 3.21 /  116. /  699.
  786.11 /   0.05 /   0.32 /   0.0  /  786.16 /   1.01 /   0.09 /  0.001  *XS*  DG
--------------------------------------------------------------------------
  3H AT   46660 /   190 /   1100. /   793. /   36565. / 2.54 /  219. /  774.
  786.26 /   0.08 /   0.16 /   0.01 /  786.34 /   1.39 /   0.23 / -0.000  *XS*  DH
--------------------------------------------------------------------------
 3HH AT   47150 /   490 /   1100. /   686. /   29880. / 2.99 /  284. /  683.
  786.78 /   0.12 /   0.54 /   0.02 /  786.90 /   1.60 /   0.27 /  0.000  *XS*  DI
--------------------------------------------------------------------------
  3I AT   47510 /   360 /   1100. /   245. /   19940. / 1.25 /  710. /  783.
  787.38 /   0.39 /   0.73 /   0.14 /  787.77 /   4.49 /   0.43 /  0.001  *XS*  DJ
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 3I AT   47510 /       /   1100. /   157. /   12759. / 1.00 /    0. /   40.
  787.38 /   0.77 /       ...1...  (-.001)    /   7.02 /   0.63 /          *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /            *RG*
--------------------------------------------------------------------------
  3J AT   47590 /    80 /   1100. /   143. /    9604. / 1.10 /  748. /  831.
  787.57 /   1.01 /   0.51 /   0.31 /  788.59 /   7.69 /   0.77 / -0.000  *AS*
--------------------------------------------------------------------------
```

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
2N	AT	34070	0	1700.	472.	41431.	1.98	197.	384.	CI
772.56		0.40			772.96	3.60	0.39		*IS*	
2O	AT	34440	370	1700.	894.	51963.	2.90	158.	512.	CJ
773.31		0.16	0.50	0.0	773.47	1.90	0.31	0.015	*XS*	
2P	AT	35280	840	1700.	740.	57111.	2.64	175.	443.	CK
774.10		0.22	0.82	0.03	774.32	2.30	0.30	0.001	*XS*	
2Q	AT	35830	550	1700.	771.	47234.	2.33	96.	398.	CL
774.73		0.18	0.59	0.0	774.91	2.20	0.32	-0.000	*XS*	
2R	AT	36380	550	1700.	975.	49876.	2.21	137.	512.	CM
775.48		0.10	0.67	0.0	775.59	1.74	0.15	0.004	*XS*	
2S	AT	36930	550	1700.	683.	32431.	2.63	301.	666.	CN
776.39		0.25	0.98	0.07	776.65	2.49	0.43	0.003	*XS*	
2SS	AT	37390	460	1700.	897.	52632.	2.62	292.	657.	CO
777.28		0.15	0.78	0.0	777.43	1.89	0.28	0.000	*XS*	
2T	AT	37880	490	1700.	1024.	53588.	2.60	575.	957.	CP 50-4"
777.82		0.11	0.50	0.0	777.93	1.66	0.14	0.000	*XS*	
2U	AT	38630	750	1700.	717.	31736.	2.12	584.	891.	CQ
779.07		0.19	1.27	0.04	779.25	2.37	0.37	0.012	*XS*	
2V	AT	39220	590	1700.	1809.	71738.	2.92	497.	1157.	CR
779.96		0.04	0.75	0.0	780.00	0.94	0.08	0.003	*XS*	
2W	AT	39800	580	1700.	1709.	73760.	2.49	385.	959.	CS
780.28		0.04	0.32	0.0	780.32	0.99	0.08	0.000	*XS*	
2X	AT	40660	860	1700.	920.	46470.	3.00	278.	642.	CT
780.95		0.16	0.73	0.06	781.11	1.85	0.28	0.001	*XS*	
2Y	AT	41180	520	1625.	892.	55369.	2.25	14.	303.	CY
781.55		0.12	0.56	0.0	781.67	1.82	0.23	0.000	*XS*	
2Z	AT	41850	670	1625.	841.	40259.	3.17	75.	427.	CV
782.30		0.18	0.79	0.03	782.49	1.93	0.29	-0.010	*XS*	
2ZZ	AT	42280	430	1625.	1110.	54391.	3.26	5.	419.	CW
782.90		0.11	0.52	0.0	783.00	1.46	0.23	0.000	*XS*	

```
SECID AT DISTANCE/ LENGTH/DISCHARGE/   AREA  /CONVEYANCE/ ALPHA/   LEW  /   REW
 WS ELEV /    HV  /    HF  /    HE  /     G  /     V  /    FN  /   ACC   *ID*
==================================================================================
   3A AT   42650 /   370 /   1625. /  1252. /   64228. / 2.60 /   17. /  381.   CX
  783.22 /   0.07 /   0.28 /   0.0  /  783.28 /   1.30 /   0.09 /  0.000  *XS*
----------------------------------------------------------------------------------
  3AA AT   42860 /   210 /   1625. /  1146. /   54097. / 2.96 /   11. /  385.   CY
  783.36 /   0.09 /   0.16 /   0.01 /  783.46 /   1.42 /   0.10 /  0.000  *XS*
----------------------------------------------------------------------------------
   3B AT   43320 /   460 /   1625. /  1530. /   75971. / 2.01 /   43. /  480.   CZ
  783.72 /   0.04 /   0.30 /   0.0  /  783.75 /   1.06 /   0.08 /  0.000  *XS*
----------------------------------------------------------------------------------
   3C AT   44030 /   710 /   1625. /  1441. /   53164. / 3.75 /  134. /  780.   DA
  784.16 /   0.07 /   0.46 /   0.02 /  784.24 /   1.13 /   0.09 /  0.000  *XS*
----------------------------------------------------------------------------------
   3D AT   44540 /   510 /   1625. /  1655. /   68081. / 2.97 /  160. /  780.   DB
  784.56 /   0.04 /   0.37 /   0.0  /  784.61 /   0.98 /   0.17 /  0.000  *XS*
----------------------------------------------------------------------------------
   3E AT   45150 /   610 /   1625. /   802. /   32252. / 2.59 /  121. /  479.   DC
  785.24 /   0.17 /   0.73 /   0.06 /  785.40 /   2.03 /   0.34 /  0.001  *XS*
----------------------------------------------------------------------------------
  3EE AT   45370 /   220 /   1625. /  1076. /   44491. / 2.56 /  159. /  555.   DD
  785.74 /   0.09 /   0.40 /   0.0  /  785.83 /   1.51 /   0.11 /  0.020  *XS*
----------------------------------------------------------------------------------
   3F AT   45740 /   370 /   1625. /  1189. /   51404. / 2.22 /  168. /  584.   DE
  786.19 /   0.06 /   0.43 /   0.0  /  786.26 /   1.37 /   0.12 /  0.000  *XS*
----------------------------------------------------------------------------------
  3FF AT   46100 /   360 /   1625. /  1315. /   55735. / 2.65 /   67. /  618.   DF
  786.53 /   0.06 /   0.33 /   0.0  /  786.59 /   1.24 /   0.12 /  0.002  *XS*
----------------------------------------------------------------------------------
   3G AT   46470 /   370 /   1625. /  1515. /   60870. / 2.62 /  109. /  702.   DG
  786.83 /   0.05 /   0.29 /   0.0  /  786.88 /   1.07 /   0.09 /  0.000  *XS*
----------------------------------------------------------------------------------
   3H AT   46660 /   190 /   1625. /  1107. /   53521. / 2.39 /  193. /  778.   DH
  786.97 /   0.08 /   0.15 /   0.02 /  787.05 /   1.47 /   0.23 / -0.000  *XS*
----------------------------------------------------------------------------------
  3HH AT   47150 /   490 /   1625. /   968. /   45014. / 2.67 /  267. /  687.   DI
  787.47 /   0.12 /   0.54 /   0.02 /  787.59 /   1.68 /   0.28 / -0.019  *XS*
----------------------------------------------------------------------------------
   3I AT   47510 /   360 /   1625. /   312. /   23308. / 1.86 /  396. /  784.   DJ
  788.05 /   0.79 /   0.91 /   0.33 /  788.84 /   5.21 /   0.55 /  0.009  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 3I AT   47510 /       /   1625. /   184. /   16324. / 1.00 /    0. /   40.
  788.05 /   1.22 /       ...1...  (-.001)    /   8.85 /   0.73 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /              *RG*
----------------------------------------------------------------------------------
   3J AT   47590 /    80 /   1625. /   263. /   15788. / 1.68 /  674. /  831.
  788.52 /   1.00 /   0.57 /   0.11 /  789.52 /   6.17 /   0.72 / -0.001  *AS*
----------------------------------------------------------------------------------
```

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
2N AT 34070	0	2500.	900.	78289.	2.42	149.	444.		CI
774.47	0.29			774.76	2.78	0.31		*IS*	
2O AT 34440	370	2500.	1480.	103460.	2.30	151.	515.		CJ
774.94	0.10	0.29	0.0	775.05	1.69	0.11	-0.000	*XS*	
2P AT 35280	840	2500.	1114.	92185.	2.56	159.	448.		CK
775.44	0.20	0.55	0.05	775.65	2.24	0.28	-0.001	*XS*	
2Q AT 35830	550	2500.	1147.	79075.	2.08	88.	406.		CL
775.94	0.15	0.47	0.0	776.10	2.18	0.29	-0.019	*XS*	
2R AT 36380	550	2500.	1390.	80549.	1.88	116.	518.		CM
776.54	0.09	0.54	0.0	776.64	1.80	0.14	0.001	*XS*	
2S AT 36930	550	2500.	1018.	54137.	2.18	297.	675.		CN
777.29	0.20	0.79	0.05	777.50	2.46	0.20	0.016	*XS*	
2SS AT 37390	460	2500.	1192.	73885.	2.45	279.	684.		CO
778.04	0.17	0.72	0.0	778.21	2.10	0.30	-0.005	*XS*	
2T AT 37880	490	2500.	1347.	76517.	2.25	560.	968.		CP
778.63	0.12	0.54	0.0	778.75	1.86	0.15	0.000	*XS*	
2U AT 38630	750	2500.	973.	48226.	1.90	574.	894.		CQ
779.88	0.20	1.27	0.04	780.08	2.57	0.20	0.017	*XS*	
2V AT 39220	590	2500.	2383.	101909.	2.66	424.	1165.		CR
780.78	0.05	0.75	0.0	780.83	1.05	0.09	0.001	*XS*	
2W AT 39800	580	2500.	2219.	103677.	2.29	328.	960.		CS
781.13	0.05	0.34	0.0	781.17	1.13	0.09	0.001	*XS*	
2X AT 40660	860	2500.	1291.	66442.	2.97	189.	651.		CT
781.85	0.17	0.78	0.06	782.02	1.94	0.30	0.000	*XS*	
2Y AT 41180	520	2400.	1174.	77395.	2.18	9.	327.		CU
782.49	0.14	0.61	0.0	782.63	2.04	0.25	0.000	*XS*	
2Z AT 41850	670	2400.	1227.	60090.	3.12	69.	495.		CV
783.29	0.19	0.83	0.02	783.48	1.96	0.30	0.001	*XS*	
2ZZ AT 42280	430	2400.	1533.	80486.	2.94	4.	449.		CW
783.88	0.11	0.51	0.0	783.99	1.57	0.10	0.000	*XS*	

SW-71

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SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
 WS ELEV /    HV  /    HF  /    HE        EG  /     V  /    FN  /   ACC    *ID*
==========================================================================
   3A AT   42650 /   370 /   2400. /  1614. /   91869. / 2.33 /   16. /  391.
  784.20 /   0.08 /   0.29 /   0.0  /  784.28 /    1.49 /   0.10 / -0.000  *XS*
--------------------------------------------------------------------------
  3AA AT   42860 /   210 /   2400. /  1521. /   80016. / 2.52 /    9. /  391.
  784.36 /   0.10 /   0.16 /   0.01 /  784.45 /    1.58 /   0.11 / -0.000  *XS*
--------------------------------------------------------------------------
   3B AT   43320 /   460 /   2400. /  2043. /  101313. / 2.33 /   39. /  656.
  784.73 /   0.05 /   0.33 /   0.0  /  784.78 /    1.17 /   0.08 / -0.001  *XS*
--------------------------------------------------------------------------
   3C AT   44030 /   710 /   2400. /  2216. /   86671. / 3.23 /   97. /  948.
  785.19 /   0.06 /   0.47 /   0.00 /  785.25 /    1.08 /   0.09 /  0.000  *XS*
--------------------------------------------------------------------------
   3D AT   44540 /   510 /   2400. /  2303. /   98622. / 2.91 /  144. /  845.
  785.54 /   0.05 /   0.34 /   0.0  /  785.59 /    1.04 /   0.18 / -0.000  *XS*
--------------------------------------------------------------------------
   3E AT   45150 /   610 /   2400. /  1173. /   51140. / 2.37 /  107. /  535.
  786.19 /   0.15 /   0.70 /   0.05 /  786.34 /    2.05 /   0.33 /  0.001  *XS*
--------------------------------------------------------------------------
  3EE AT   45370 /   220 /   2400. /  1455. /   64895. / 2.38 /  145. /  614.
  786.63 /   0.10 /   0.38 /   0.0  /  786.73 /    1.65 /   0.12 /  0.000  *XS*
--------------------------------------------------------------------------
   3F AT   45740 /   370 /   2400. /  1565. /   75976. / 1.95 /  160. /  587.
  787.09 /   0.07 /   0.43 /   0.0  /  787.16 /    1.53 /   0.13 / -0.000  *XS*
--------------------------------------------------------------------------
  3FF AT   46100 /   360 /   2400. /  1814. /   86024. / 2.24 /   52. /  625.
  787.42 /   0.06 /   0.32 /   0.0  /  787.48 /    1.32 /   0.13 /  0.000  *XS*
--------------------------------------------------------------------------
   3G AT   46470 /   370 /   2400. /  2033. /   92299. / 2.19 /  101. /  706.
  787.70 /   0.05 /   0.27 /   0.0  /  787.74 /    1.18 /   0.09 / -0.000  *XS*
--------------------------------------------------------------------------
   3H AT   46660 /   190 /   2400. /  1532. /   79594. / 2.19 /  162. /  783.
  787.83 /   0.08 /   0.15 /   0.02 /  787.91 /    1.57 /   0.12 / -0.000  *XS*
--------------------------------------------------------------------------
  3HH AT   47150 /   490 /   2400. /  1341. /   68113. / 2.39 /  236. /  691.
  788.33 /   0.12 /   0.52 /   0.02 /  788.45 /    1.79 /   0.14 / -0.003  *XS*
--------------------------------------------------------------------------
   3I AT   47510 /   360 /   2400. /   660. /   38527. / 2.88 /  334. /  785.
  788.88 /   0.59 /   0.79 /   0.24 /  789.47 /    3.64 /   0.50 / -0.001  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 3I AT   47510 /       /   2400. /   217. /   21072. / 1.00 /    0. /   40.
  788.88 /   1.91 /       ...1...  (-.001)    /  11.07 /   0.84 /          *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /            *RG*
--------------------------------------------------------------------------
   3J AT   47590 /    80 /   2400. /   363. /   21293. / 1.88 /  650. /  831.
  789.10 /   1.28 /   0.56 /   0.34 /  790.38 /    6.62 /   0.80 / -0.001  *AS*
--------------------------------------------------------------------------
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CX
CY
CZ
DA
DB
DC
DD
DE
DF
DG
DH
DI
DJ

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
S	ELEV	HV	HF	HE		V	FN	ACC	*ID*	
2N	AT	34070	0	1950.	582.	50982.	2.11	183.	389.	CI
773.12		0.37			773.49	3.35	0.37		*IS*	
2O	AT	34440	370	1950.	1058.	64871.	2.69	157.	513.	CJ
773.77		0.14	0.43	0.0	773.91	1.84	0.13	-0.000	*XS*	
2P	AT	35280	840	1950.	842.	66041.	2.63	170.	445.	CK
774.48		0.22	0.75	0.04	774.70	2.32	0.30	0.001	*XS*	
2Q	AT	35830	550	1950.	882.	55894.	2.25	93.	400.	CL
775.09		0.17	0.57	0.0	775.27	2.21	0.31	0.000	*XS*	
2R	AT	36380	550	1950.	1098.	58255.	2.10	127.	513.	CM
775.80		0.10	0.64	0.0	775.91	1.78	0.15	0.000	*XS*	
2S	AT	36930	550	1950.	786.	38532.	2.48	300.	669.	CN
776.67		0.24	0.93	0.07	776.91	2.48	0.42	0.002	*XS*	
2SS	AT	37390	460	1950.	988.	58949.	2.57	288.	666.	CO
777.52		0.16	0.77	0.0	777.68	1.97	0.29	0.000	*XS*	
2T	AT	37880	490	1950.	1128.	60616.	2.48	571.	963.	CP
778.09		0.12	0.52	0.0	778.20	1.73	0.14	-0.000	*XS*	
2U	AT	38630	750	1950.	800.	36812.	2.04	581.	892.	CQ
779.34		0.19	1.28	0.04	779.52	2.44	0.20	0.008	*XS*	
2V	AT	39220	590	1950.	1991.	81095.	2.82	474.	1159.	CR
780.23		0.04	0.75	0.0	780.28	0.98	0.08	0.001	*XS*	
2W	AT	39800	580	1950.	1873.	83082.	2.41	366.	959.	CS
780.56		0.04	0.33	0.0	780.60	1.04	0.08	0.001	*XS*	
2X	AT	40660	860	1950.	1035.	52536.	3.00	248.	646.	CT
781.25		0.17	0.75	0.06	781.42	1.88	0.29	0.000	*XS*	
2Y	AT	41180	520	1850.	984.	62438.	2.22	13.	310.	CU
781.87		0.12	0.57	0.0	781.99	1.88	0.23	0.000	*XS*	
2Z	AT	41850	670	1850.	956.	45985.	3.18	73.	449.	CV
782.62		0.18	0.80	0.03	782.80	1.93	0.29	-0.018	*XS*	
2ZZ	AT	42280	430	1850.	1242.	62135.	3.16	5.	429.	CW
783.21		0.11	0.52	0.0	783.32	1.49	0.23	0.000	*XS*	

10.4'

```
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
 S ELEV /    HV  /    HF  /    HE  /       /     V  /    FN  /   ACC    *ID*
==========================================================================
   3A AT   42650 /   370 /  1850. / 1366. /  72641. / 2.49 /   16. /  383.   CK
  783.53 /   0.07 /   0.28 /   0.0  / 783.60 /   1.35 /   0.09 / 0.000  *XS*
--------------------------------------------------------------------------
  3AA AT   42860 /   210 /  1850. / 1264. /  61818. / 2.79 /   10. /  386.   CY
  783.68 /   0.09 /   0.16 /   0.01 / 783.77 /   1.46 /   0.11 / -0.000 *XS*
--------------------------------------------------------------------------
   3B AT   43320 /   460 /  1850. / 1669. /  85440. / 1.98 /   42. /  492.   CZ
  784.03 /   0.04 /   0.30 /   0.0  / 784.07 /   1.11 /   0.08 / 0.002  *XS*
--------------------------------------------------------------------------
   3C AT   44030 /   710 /  1850. / 1655. /  61978. / 3.60 /  123. /  837.   DA
  784.48 /   0.07 /   0.46 /   0.02 / 784.55 /   1.12 /   0.09 / 0.000  *XS*
--------------------------------------------------------------------------
   3D AT   44540 /   510 /  1850. / 1847. /  76609. / 2.98 /  155. /  800.   DB
  784.87 /   0.05 /   0.37 /   0.0  / 784.91 /   1.00 /   0.17 / 0.000  *XS*
--------------------------------------------------------------------------
   3E AT   45150 /   610 /  1850. /  911. /  37605. / 2.52 /  117. /  495.   DC
  785.54 /   0.16 /   0.72 /   0.06 / 785.70 /   2.03 /   0.34 / 0.001  *XS*
--------------------------------------------------------------------------
  3EE AT   45370 /   220 /  1850. / 1182. /  50256. / 2.48 /  152. /  560.   DD   IN-4
  786.00 /   0.09 /   0.40 /   0.0  / 786.10 /   1.57 /   0.11 / 0.000  *XS*
--------------------------------------------------------------------------
   3F AT   45740 /   370 /  1850. / 1301. /  58354. / 2.12 /  166. /  585.   DE
  786.46 /   0.07 /   0.43 /   0.0  / 786.53 /   1.42 /   0.13 / 0.000  *XS*
--------------------------------------------------------------------------
  3FF AT   46100 /   360 /  1850. / 1464. /  64233. / 2.50 /   62. /  620.   DF
  786.80 /   0.06 /   0.33 /   0.0  / 786.86 /   1.26 /   0.13 / 0.001  *XS*
--------------------------------------------------------------------------
   3G AT   46470 /   370 /  1850. / 1671. /  69756. / 2.46 /  107. /  703.   DG
  787.09 /   0.05 /   0.28 /   0.0  / 787.14 /   1.11 /   0.09 / -0.000 *XS*
--------------------------------------------------------------------------
   3H AT   46660 /   190 /  1850. / 1231. /  60739. / 2.33 /  184. /  780.   DH
  787.23 /   0.08 /   0.15 /   0.02 / 787.31 /   1.50 /   0.24 / 0.000  *XS*
--------------------------------------------------------------------------
  3HH AT   47150 /   490 /  1850. / 1079. /  51622. / 2.56 /  260. /  688.   DI
  787.73 /   0.12 /   0.53 /   0.02 / 787.85 /   1.72 /   0.13 / -0.017 *XS*
--------------------------------------------------------------------------
   3I AT   47510 /   360 /  1850. /  409. /  26896. / 2.39 /  378. /  784.   DJ
  788.30 /   0.76 /   0.89 /   0.32 / 789.06 /   4.52 /   0.55 / -0.002 *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 3I AT   47510 /       /  1850. /  193. /  17688. / 1.00 /    0. /   40.
  788.30 /   1.42 /       ...1...  (-.001)    /   9.57 /   0.77 /         *BO*
==========================================================================
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /            *RG*
--------------------------------------------------------------------------
   3J AT   47590 /    80 /  1850. /  295. /  17489. / 1.77 /  664. /  831.
  788.72 /   1.08 /   0.58 /   0.16 / 789.80 /   6.27 /   0.74 / -0.002 *AS*
--------------------------------------------------------------------------
```

FLOODWAY ANALYSIS *** HOR FW ANALYSIS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	CA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
2N	AT	34070	0	1950.	583.	51392.	2.08	188.	388.	CI
773.13		0.36			773.49	3.34	0.36		*IS*	.01
2O	AT	34440	370	1950.	959.	61945.	2.53	210.	510.	CJ
773.77		0.16	0.44	0.0	773.93	2.03	0.30	-0.000	*XS*	0
2P	AT	35280	840	1950.	830.	66886.	2.52	190.	440.	CK
774.52		0.22	0.77	0.03	774.74	2.35	0.30	0.005	*XS*	.04
2Q	AT	35830	550	1950.	801.	53908.	2.09	120.	370.	CL
775.12		0.19	0.58	0.0	775.32	2.44	0.32	0.000	*XS*	.03
2R	AT	36380	550	1950.	1010.	58599.	1.86	210.	510.	CM
775.87		0.11	0.66	0.0	775.98	1.93	0.15	0.002	*XS*	.07
2S	AT	36930	550	1950.	745.	39349.	2.20	305.	605.	CN
776.72		0.23	0.91	0.06	776.95	2.62	0.41	0.002	*XS*	.05
2SS	AT	37390	460	1950.	895.	57963.	2.27	360.	660.	CO
777.55		0.17	0.77	0.0	777.72	2.18	0.29	0.000	*XS*	.03
2T	AT	37880	490	1950.	1030.	60713.	2.15	600.	900.	CP
778.13		0.12	0.53	0.0	778.25	1.89	0.14	0.000	*XS*	.04
2U	AT	38630	750	1950.	802.	37440.	1.98	590.	890.	CQ
779.36		0.18	1.25	0.03	779.54	2.43	0.20	0.002	*XS*	.02
2V	AT	39220	590	1950.	1688.	76004.	2.53	650.	1150.	CR
780.28		0.05	0.79	0.0	780.33	1.16	0.09	0.001	*XS*	.05
2W	AT	39800	580	1950.	1545.	78200.	2.09	550.	950.	CS
780.65		0.05	0.37	0.0	780.70	1.26	0.09	0.001	*XS*	.09
2X	AT	40660	860	1950.	1017.	57334.	2.39	340.	640.	CT
781.34		0.14	0.73	0.04	781.47	1.92	0.26	0.001	*XS*	.09
2Y	AT	41180	520	1850.	986.	62705.	2.21	13.	308.	CU
781.87		0.12	0.52	0.0	782.00	1.88	0.23	-0.000	*XS*	0
2Z	AT	41850	670	1850.	901.	46629.	2.75	80.	380.	CV
782.62		0.18	0.78	0.03	782.80	2.05	0.29	-0.005	*XS*	0
2ZZ	AT	42280	430	1850.	1121.	59672.	2.91	5.	355.	CW
783.21		0.12	0.53	0.0	783.33	1.65	0.24	-0.000	*XS*	0

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /    EG  /     V  /    FN  /  ACC   *ID*
==================================================================================
   3A AT   42650 /   370 /  1850. /  1359. /  73437. / 2.43 /   20. /  370.
.02 783.55 /  0.07 /  0.29 /   0.0  / 783.62 /   1.36 /  0.09 / 0.000  *XS*  CK
----------------------------------------------------------------------------------
  3AA AT   42860 /   210 /  1850. /  1232. /  61827. / 2.69 /   10. /  360.
.02 783.70 /  0.09 /  0.16 /  0.01  / 783.79 /   1.50 /  0.11 / -0.000 *XS*  CY
----------------------------------------------------------------------------------
   3B AT   43320 /   460 /  1850. /  1626. /  87037. / 1.85 /   60. /  460.
.02 784.05 /  0.04 /  0.29 /   0.0  / 784.09 /   1.14 /  0.08 / 0.000  *XS*  CZ
----------------------------------------------------------------------------------
   3C AT   44030 /   710 /  1850. /  1409. /  60729. / 2.85 /  275. /  725.
.01 784.49 /  0.08 /  0.46 /  0.02  / 784.57 /   1.31 /  0.10 / 0.000  *XS*  DA
----------------------------------------------------------------------------------
   3D AT   44540 /   510 /  1850. /  1554. /  77584. / 2.22 /  300. /  700.
.02 784.89 /  0.05 /  0.37 /   0.0  / 784.94 /   1.19 /  0.09 / 0.000  *XS*  DB
----------------------------------------------------------------------------------
   3E AT   45150 /   610 /  1850. /   865. /  38862. / 2.18 /  130. /  430.
 0 785.53 /  0.16 /  0.69 /  0.05  / 785.69 /   2.14 /  0.33 / 0.001  *XS*  DC
----------------------------------------------------------------------------------
  3EE AT   45370 /   220 /  1850. /  1049. /  48861. / 2.18 /  220. /  520.
 0 785.98 /  0.11 /  0.40 /   0.0  / 786.08 /   1.76 /  0.12 / -0.000 *XS*  DD  FW
----------------------------------------------------------------------------------
   3F AT   45740 /   370 /  1850. /  1286. /  58701. / 2.06 /  170. /  570.
 0 786.46 /  0.07 /  0.44 /   0.0  / 786.52 /   1.44 /  0.13 / -0.000 *XS*  DE
----------------------------------------------------------------------------------
  3FF AT   46100 /   360 /  1850. /  1410. /  64000. / 2.36 /  100. /  600.
 0 786.79 /  0.06 /  0.33 /   0.0  / 786.85 /   1.31 /  0.13 / 0.001  *XS*  DF
----------------------------------------------------------------------------------
   3G AT   46470 /   370 /  1850. /  1244. /  58170. / 2.32 /  300. /  700.
.03 787.12 /  0.08 /  0.34 /  0.01  / 787.20 /   1.49 /  0.11 / 0.000  *XS*  DG
----------------------------------------------------------------------------------
   3H AT   46660 /   190 /  1850. /  1074. /  62203. / 1.80 /  470. /  770.
.07 787.30 /  0.08 /  0.18 /  0.00  / 787.38 /   1.72 /  0.23 / 0.000  *XS*  DH
----------------------------------------------------------------------------------
  3HH AT   47150 /   490 /  1850. /  1014. /  52271. / 2.30 /  330. /  680.
.07 787.80 /  0.12 /  0.52 /  0.02  / 787.92 /   1.82 /  0.13 / 0.002  *XS*  DI
----------------------------------------------------------------------------------
   3I AT   47510 /   360 /  1850. /   391. /  25421. / 2.26 /  475. /  775.
.09 788.39 /  0.79 /  0.93 /  0.33  / 789.18 /   4.73 /  0.54 / -0.002 *XS*  DJ
================================ BEGIN BRIDGE ANALYSIS ============================
BR 3I AT   47510 /       /  1850. /   197. /  18229. / 1.00 /    0. /   40.
   788.39 /  1.37 /      ...1...  (-.001)   /   9.38 /  0.74 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /              *RG*
----------------------------------------------------------------------------------
   3J AT   47590 /    80 /  1850. /   194. /  15535. / 1.08 /  782. /  831.
   788.71 /  1.53 /  0.69 /  0.37  / 790.24 /   9.54 /  0.83 / -0.001 *AS*
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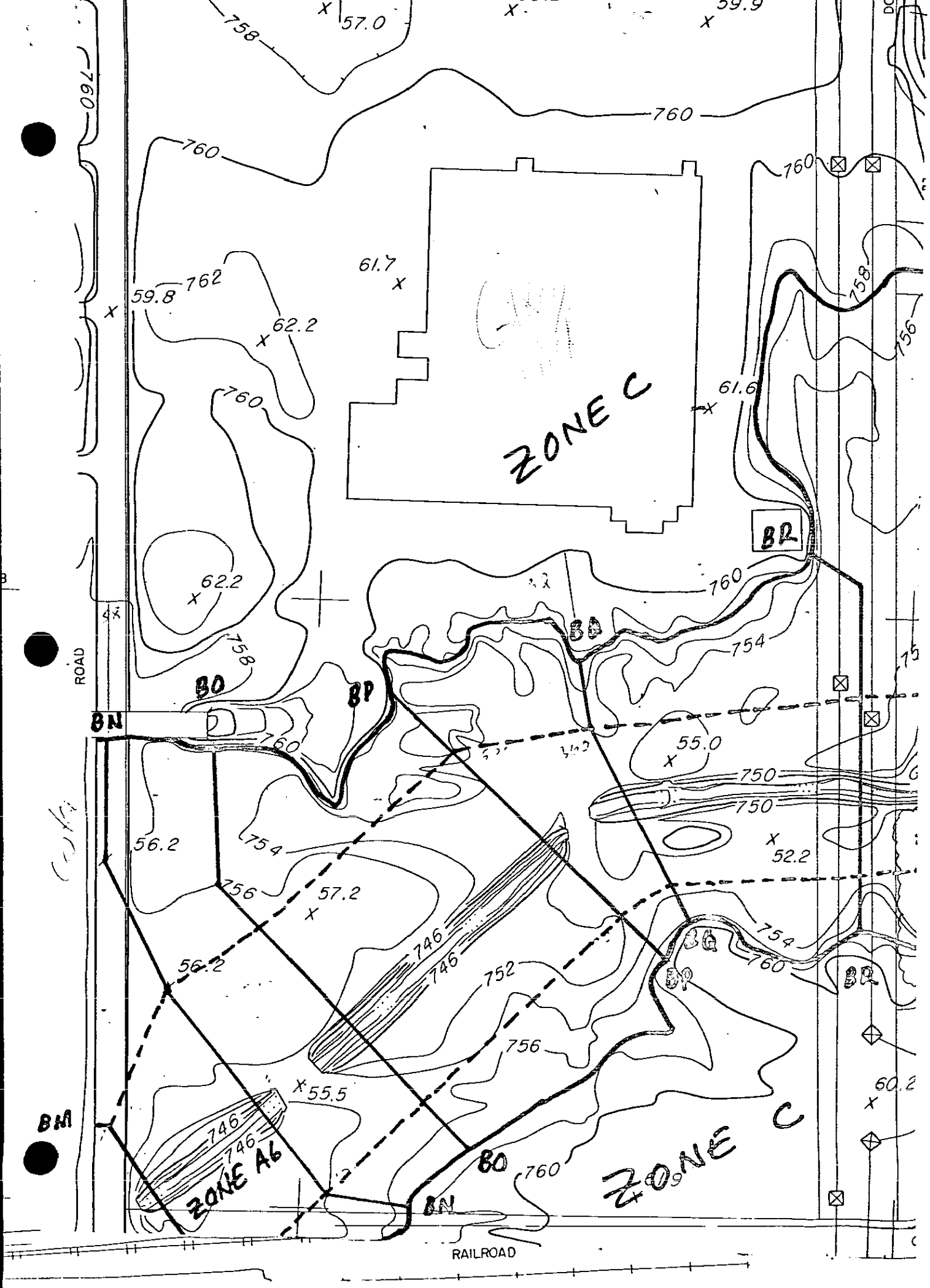
ZONE C
ZONE A6
ZONE C
ROAD
RAILROAD
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BO
BP
BQ
BR
BM
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760
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59.9
59.8
762
62.2
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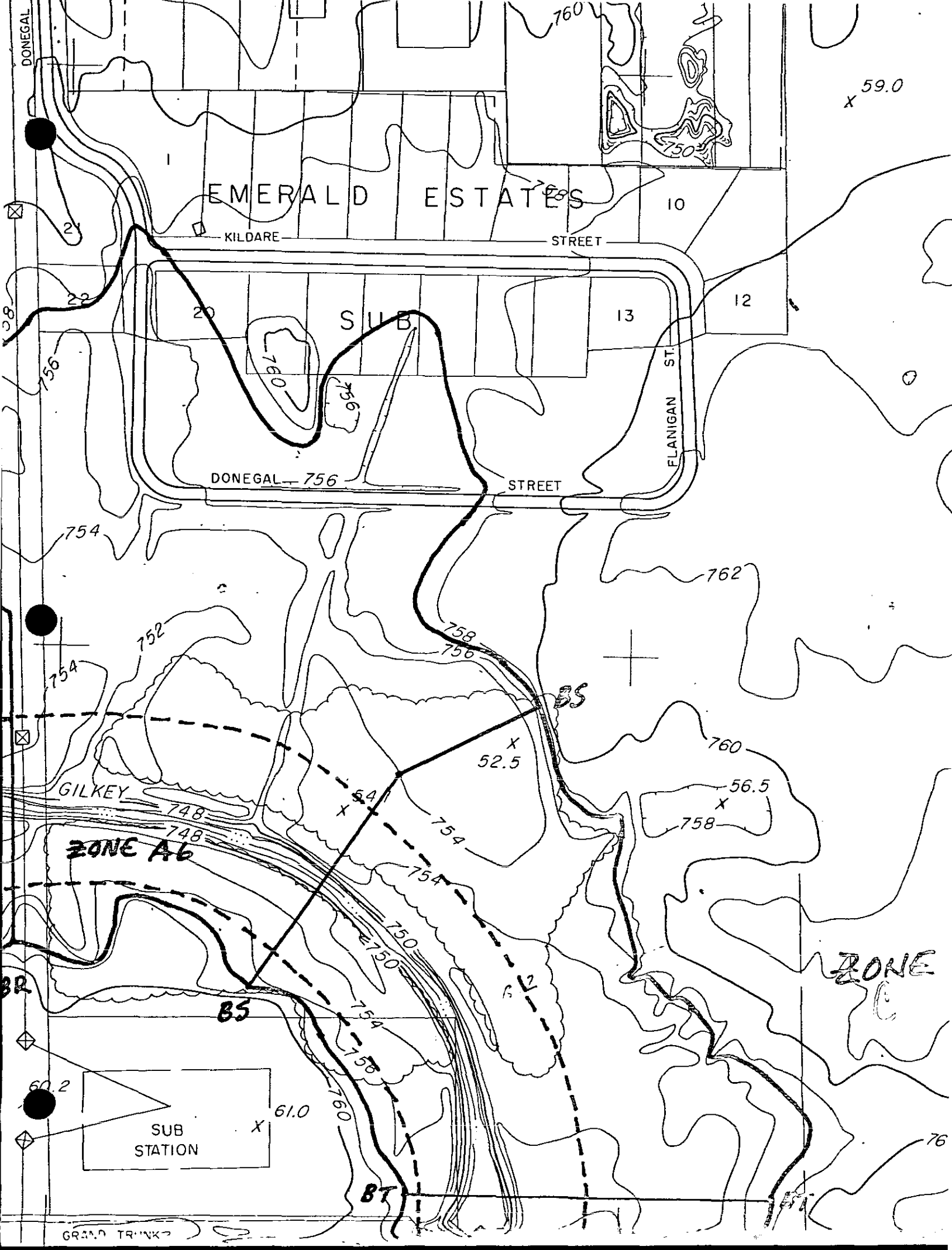
56.2
746
752
55.5
60.2


DONEGAL
EMERALD ESTATES
KILDARE STREET
SUB
DONEGAL STREET
FLANIGAN ST.
GILKEY
ZONE A6
ZONE C
BS
BT
SUB STATION
GRAND TRUNK
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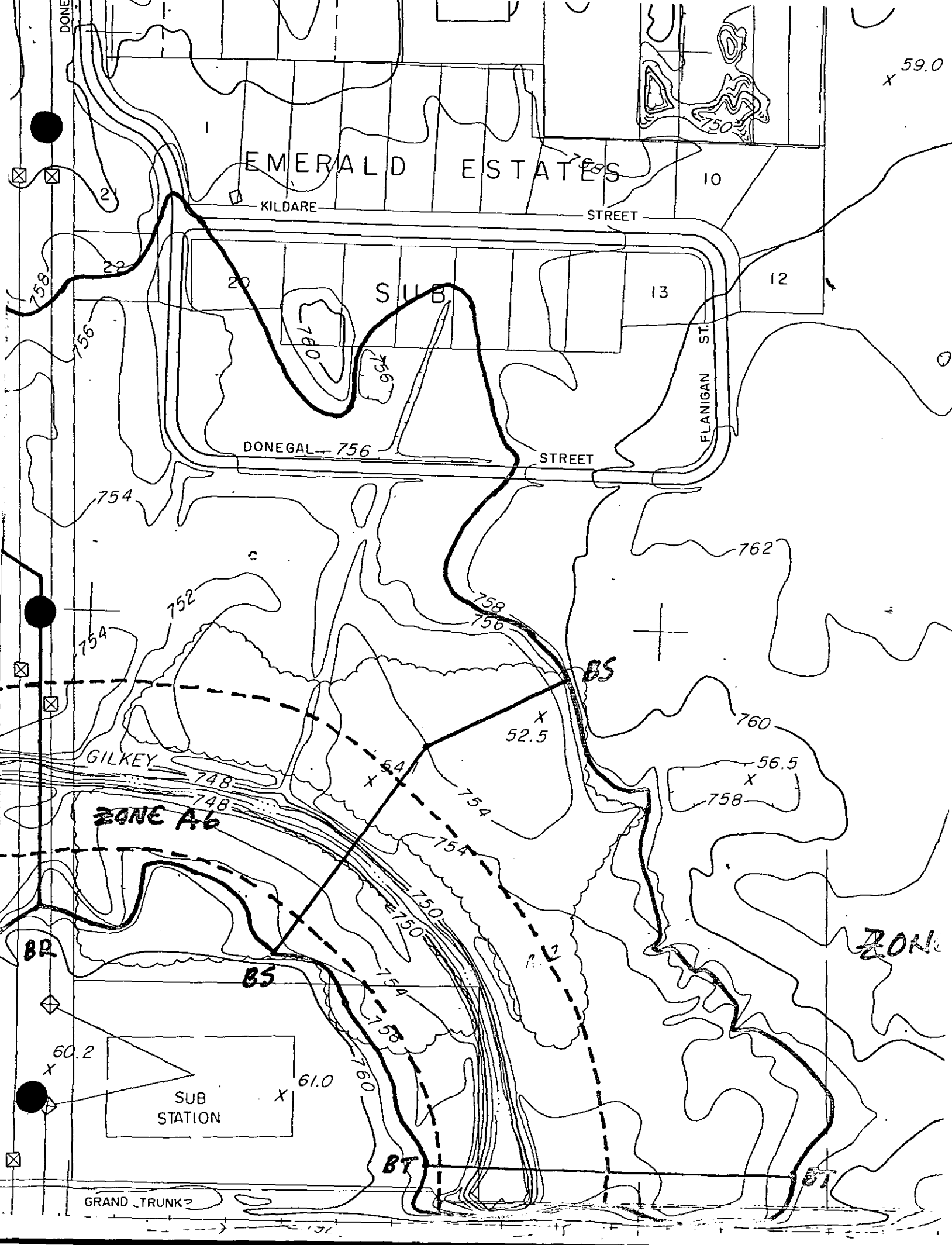
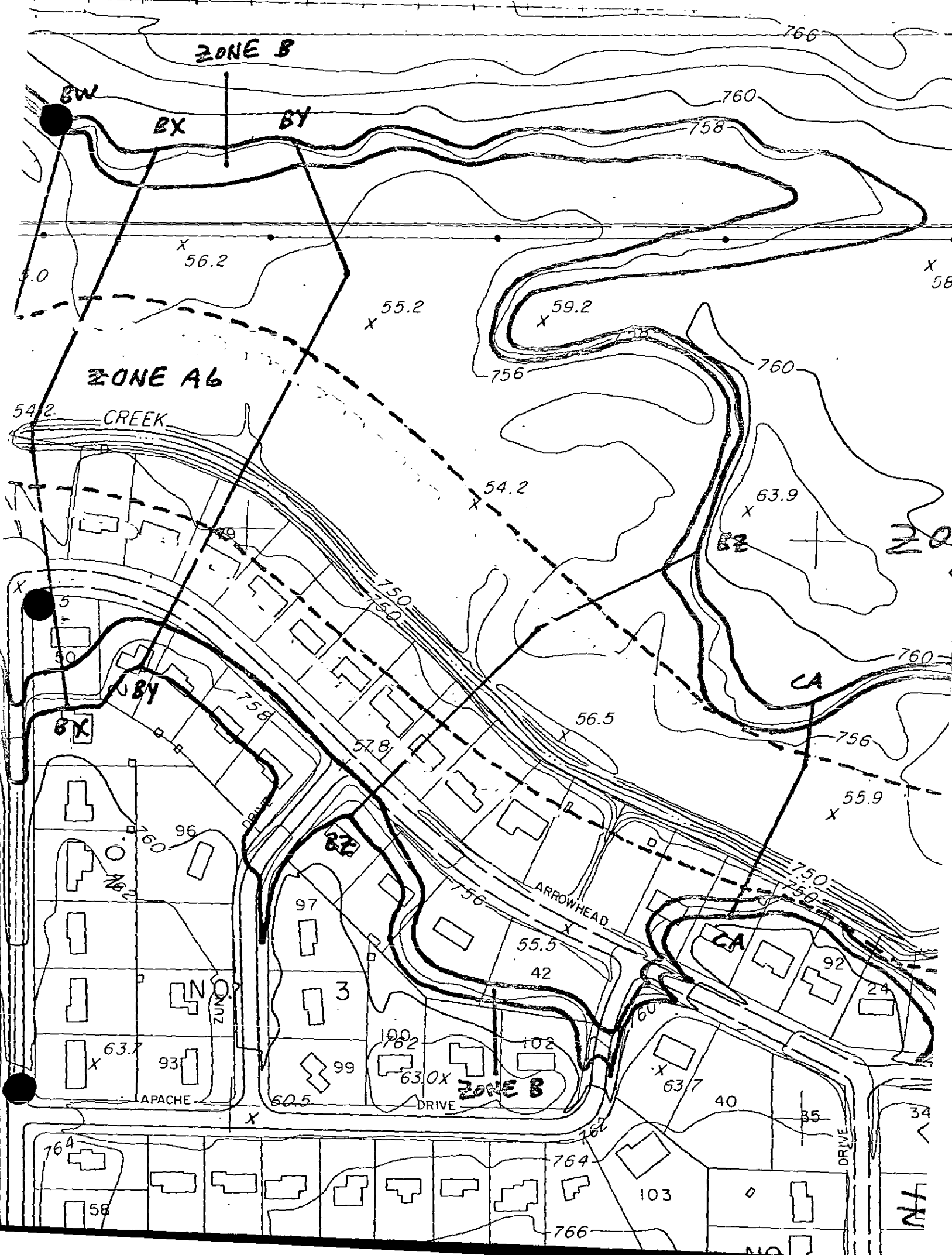
56.5
61.0
60.2
760
750
756
754
752
748
758
762


EMERALD ESTATES
SUB
KILDARE STREET
DONEGAL STREET
FLANIGAN ST.
DONE
GILKEY
ZONE A6
ZONE
BS
BR
BT
SUB STATION
GRAND TRUNK
59.0
52.5
54
56.5
60.2
61.0
1
2
10
12
13
20
22
750
752
754
756
758
760
762
748

GRAND—TRUNK
762
764
766
768
770
748
758
760
BU
BV
DFE 750
ZONE C
ZONE B
63.0
68.1
63.5
60.2
66.1
60.3
70.1
73.0
67.2
66.2
27
26
SUB STA.


ZONE B
BW
BX
BY
ZONE A6
CREEK
BZ
CA
ARROWHEAD
ZUNI
DRIVE
APACHE
DRIVE
ZONE B
DRIVE
NO. 3
766
760
758
756
750
56.2
55.2
59.2
54.2
63.9
56.5
57.8
55.9
55.5
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100
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42
92
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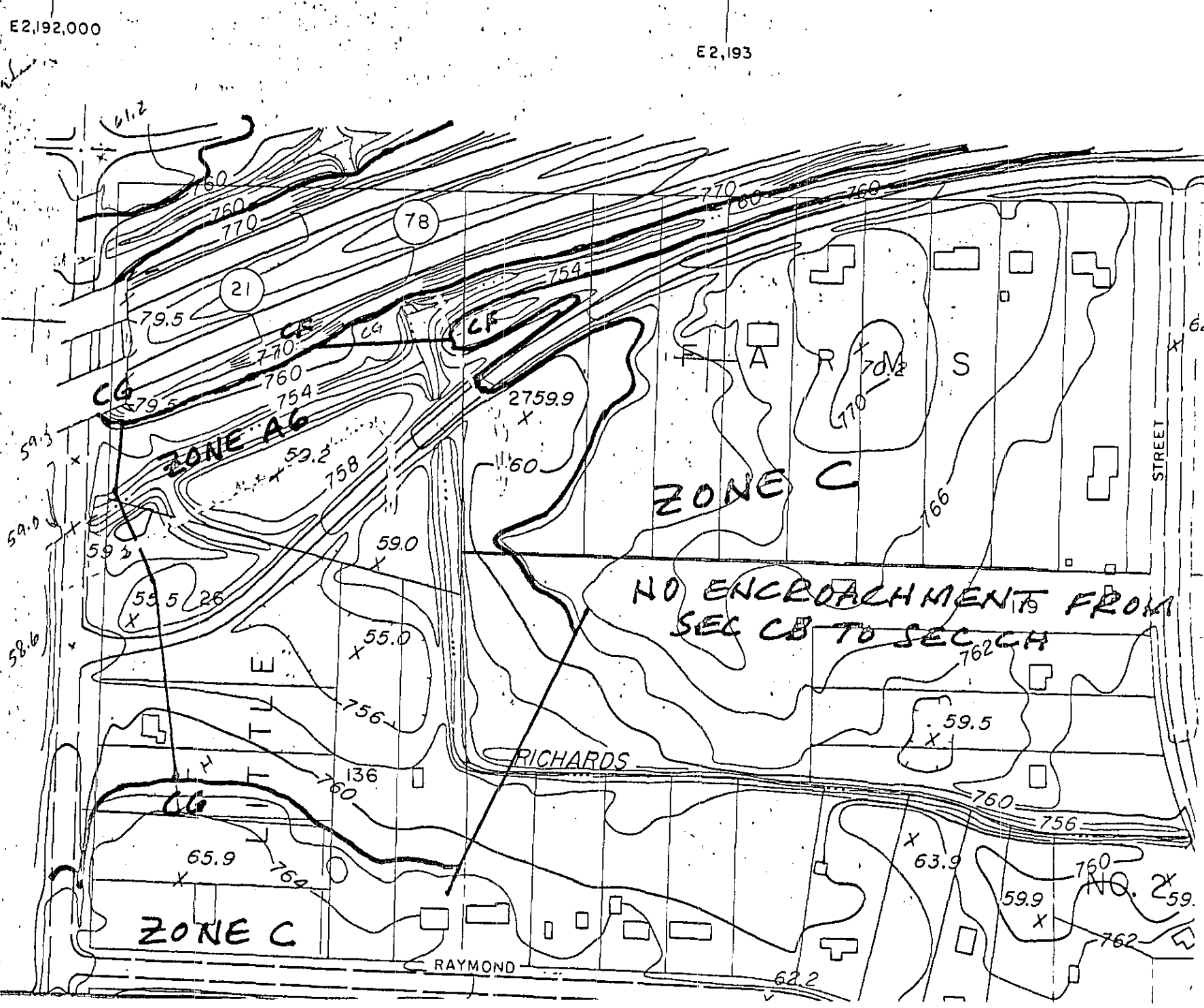
103
58
764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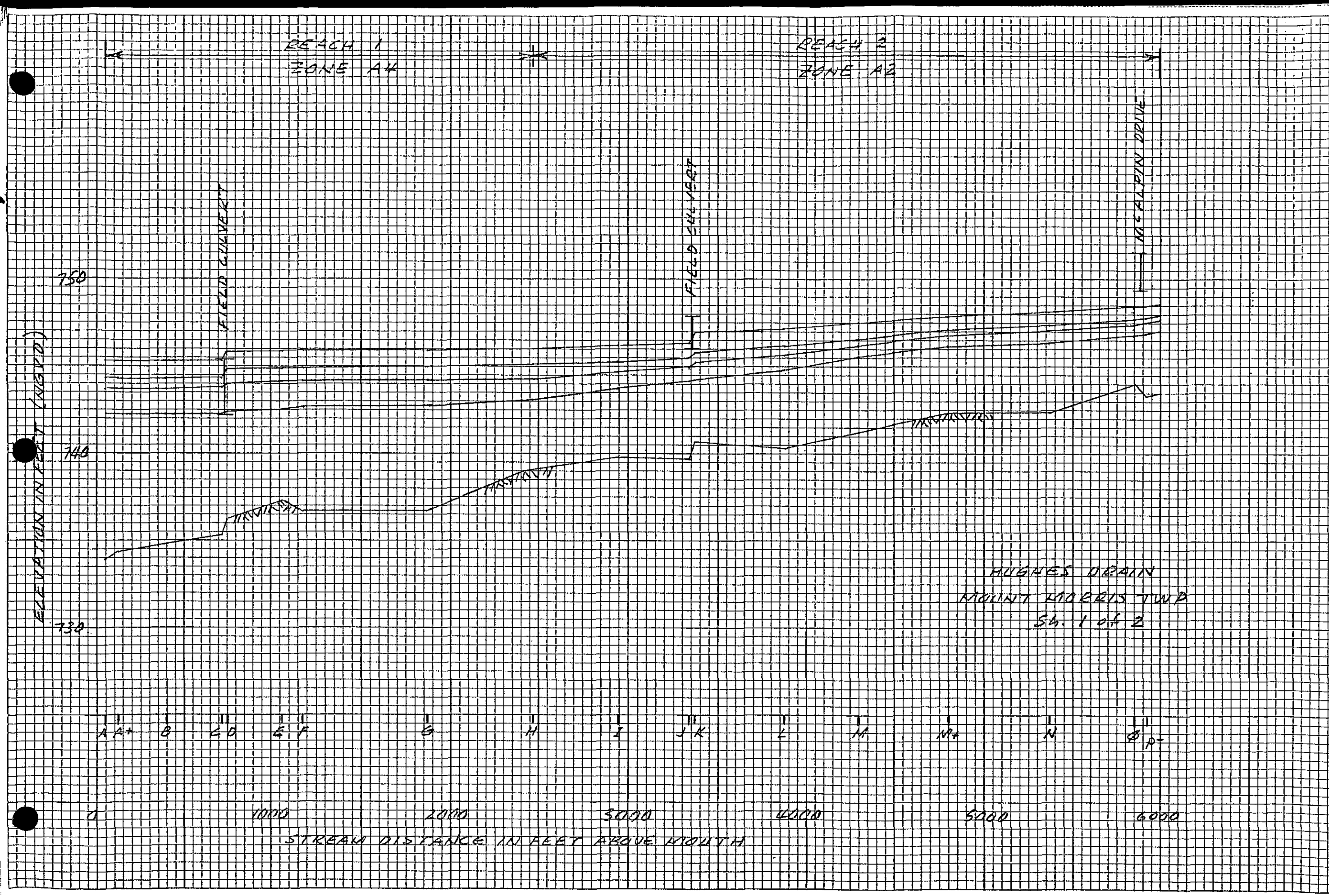
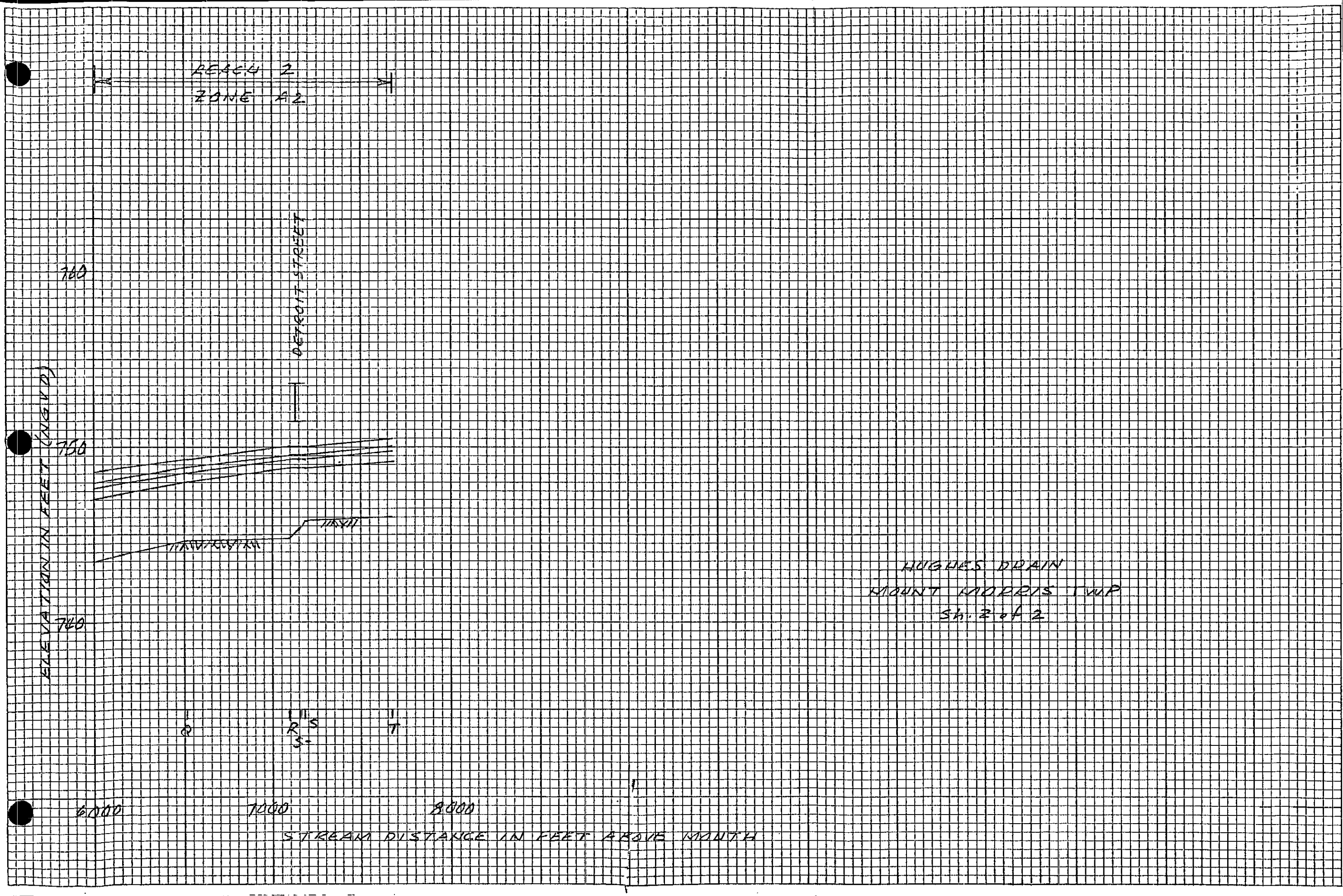
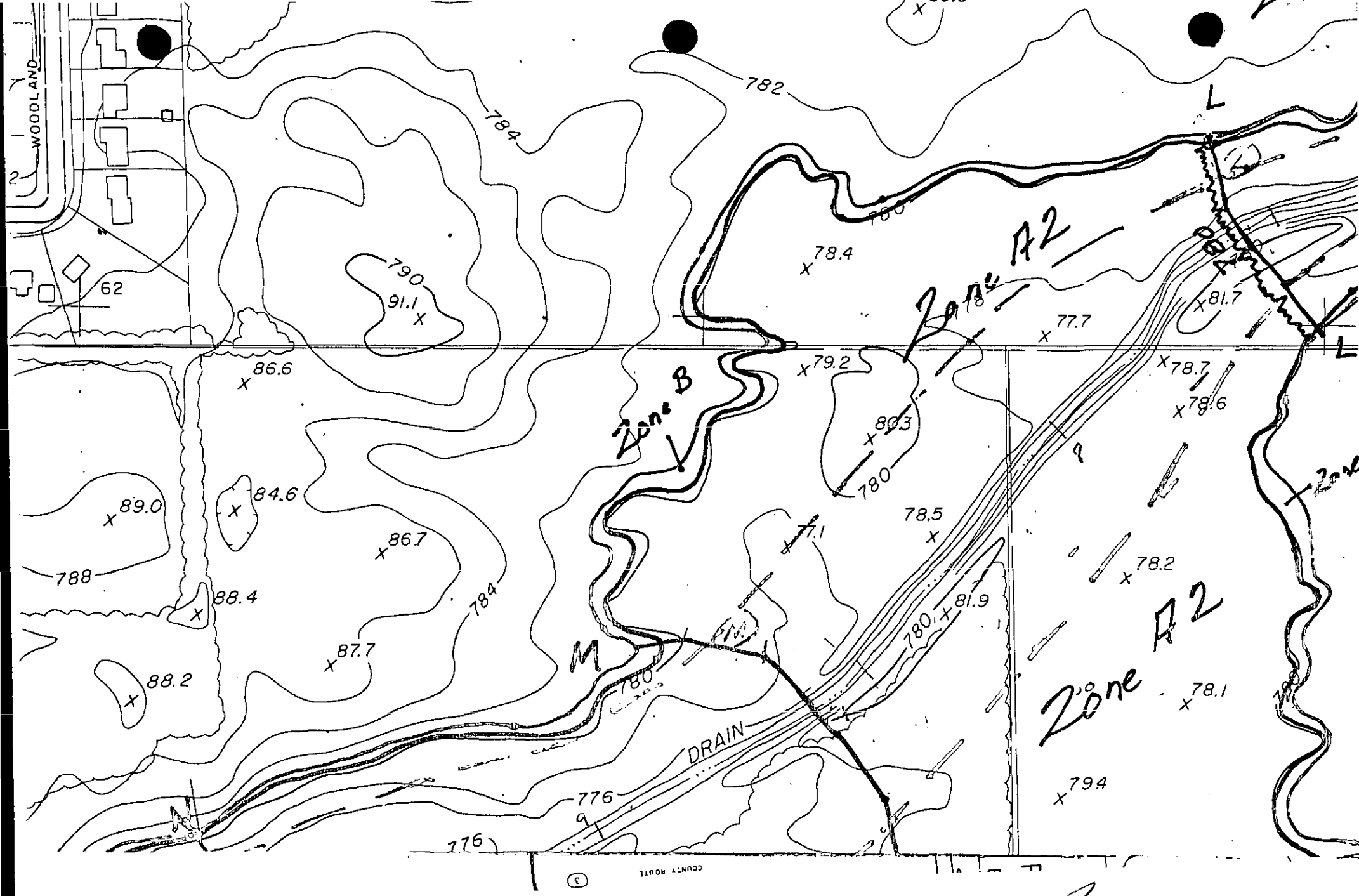
78
21
ZONE A6
ZONE C
ZONE C
NO ENCROACHMENT FROM SEC CB TO SEC CH
RICHARDS
RAYMOND
STREET
CG
CF
CH
NO. 2


REACH 1
ZONE A4
REACH 2
ZONE A2
FIELD CULVERT
FIELD CULVERT
McALPIN DRIVE
ELEVATION IN FEET (NGVD)
750
740
730
A A+ B C D E F G H I J K L M M+ N O P-
0
1000
2000
3000
4000
5000
6000
STREAM DISTANCE IN FEET ABOVE MOUTH
HUGHES DRAIN
MOUNT MORRIS TWP
Sh. 1 of 2


REACH 2
ZONE A2
DETROIT STREET
ELEVATION IN FEET (NGVD)
760
750
740
Q
R
S
T
6000
7000
8000
STREAM DISTANCE IN FEET ABOVE MOUTH
HUGHES DRAIN
MOUNT MORRIS TWP
Sh. 2 of 2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784
782
780
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Zone A2
77.7
81.7
86.6
79.2
Zone B
78.7
78.6
80.3
780
89.0
84.6
86.7
78.5
78.2
788
88.4
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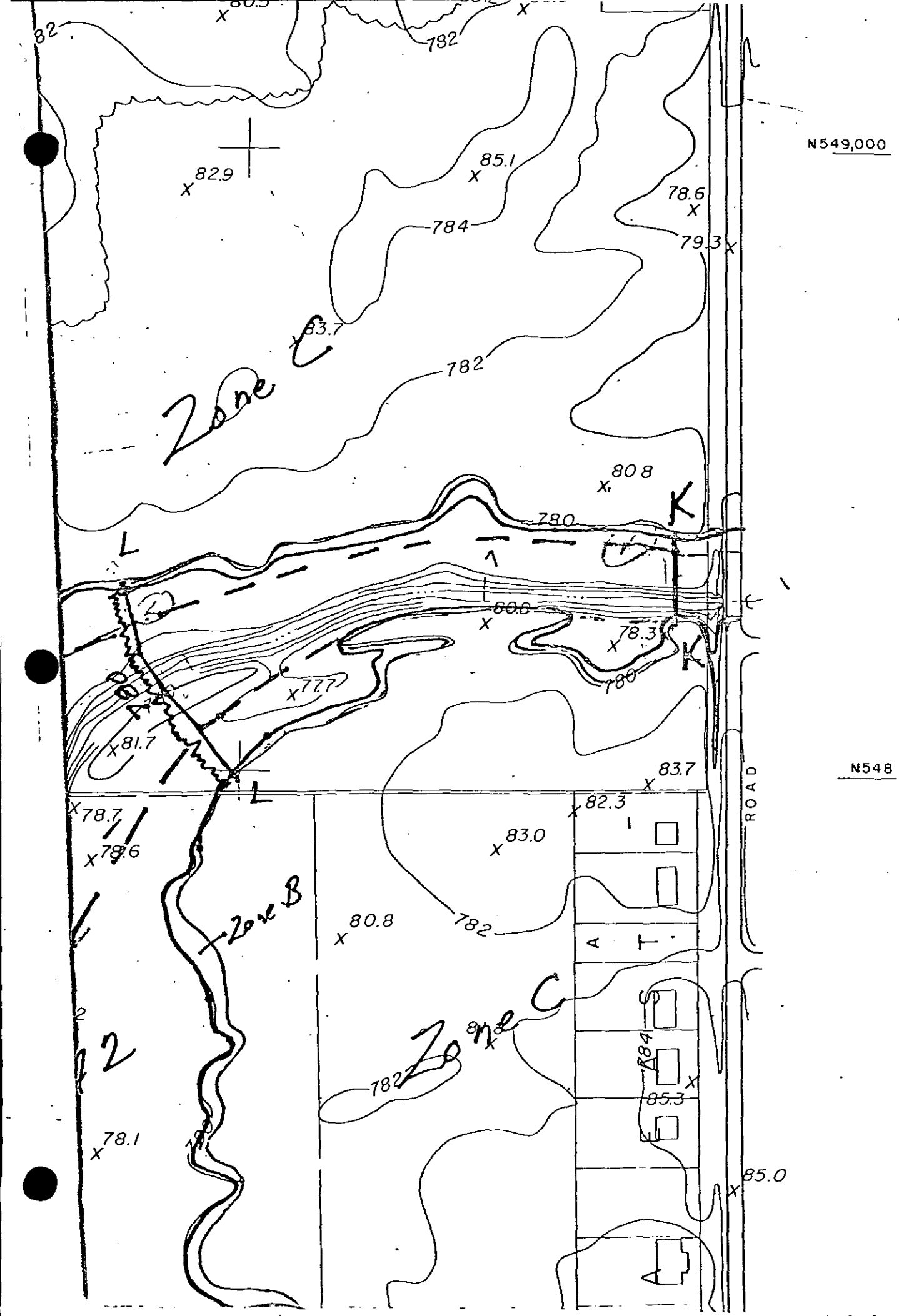
780
81.9
87.7
88.2
780
Zone A2
78.1
DRAIN
776
79.4
776
COUNTY ROUTE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N548
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Zone C
Zone B
Zone C
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85.1
78.6
79.3
83.7
782
784
780
80.8
K
L
80.8
78.3
77.7
81.7
83.7
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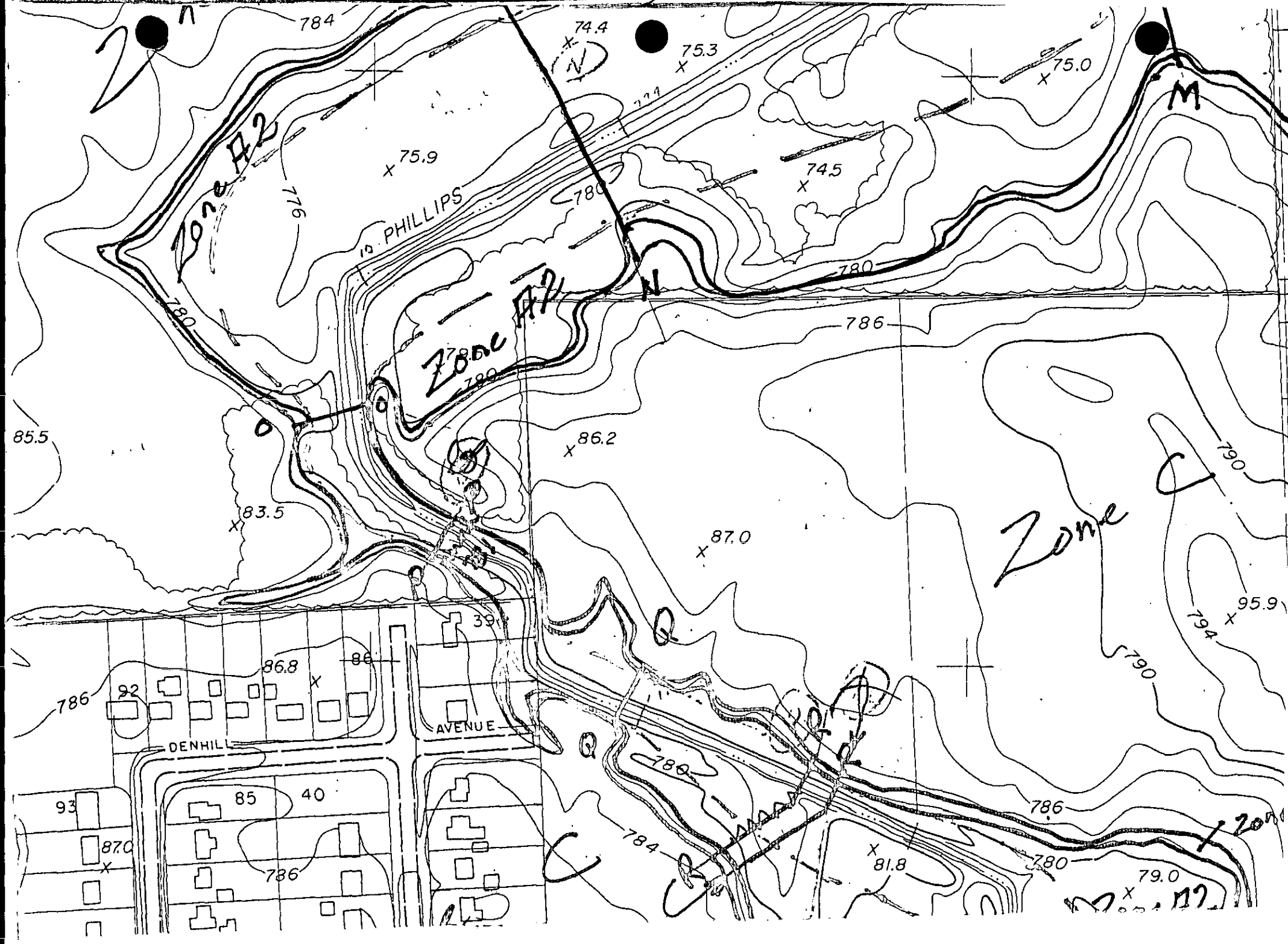
80.8
78.1
85.3
85.0
RAILROAD
BRIDGE
CULVERT


Zone A2
Zone A2
Zone A2
Zone C
PHILLIPS
DENHILL
AVENUE
784
74.4
75.3
75.0
75.9
776
780
74.5
780
786
78
790
85.5
86.2
83.5
87.0
790
95.9
794
790
39
86.8
86
786
92
93
85
40
87.0
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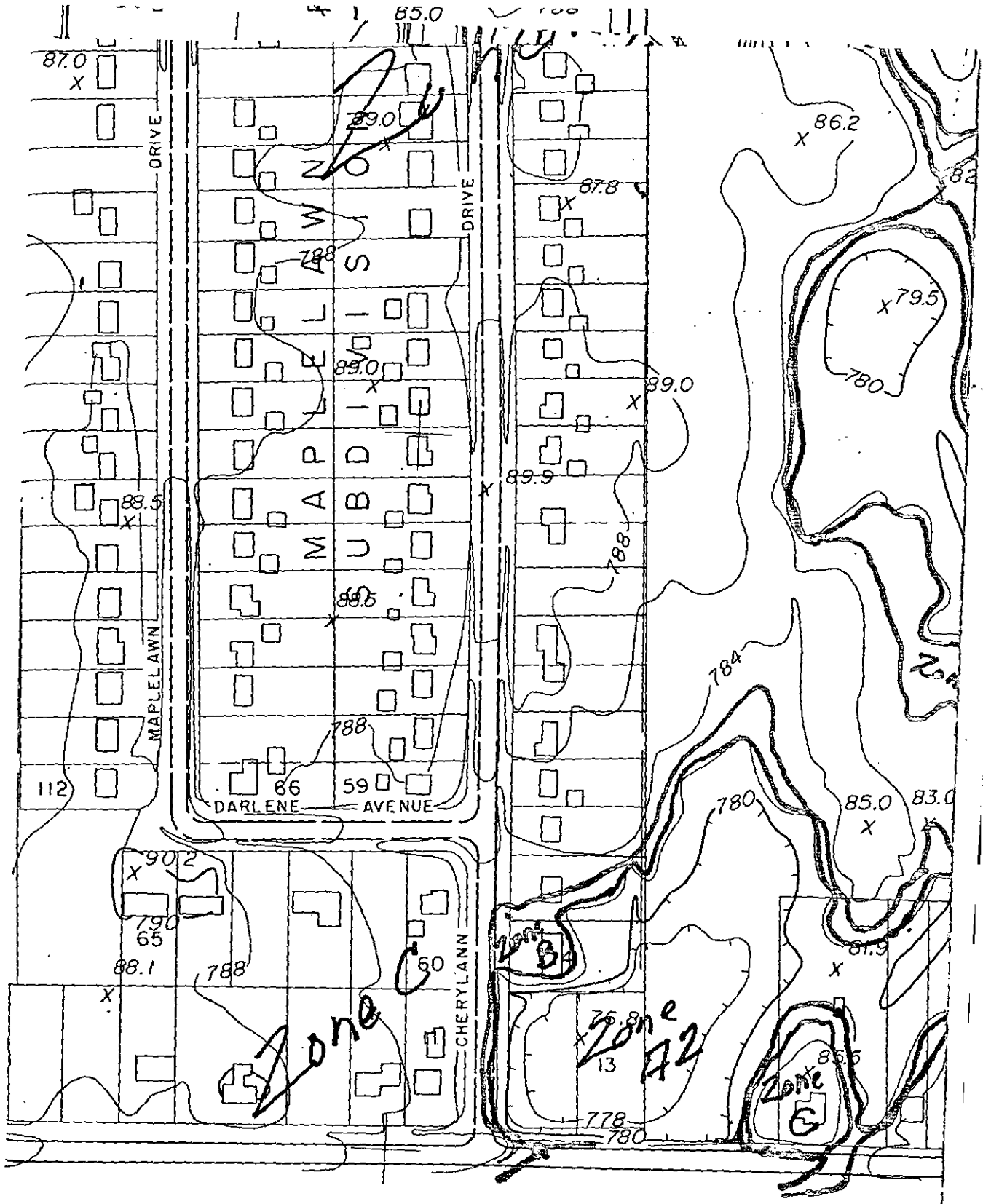
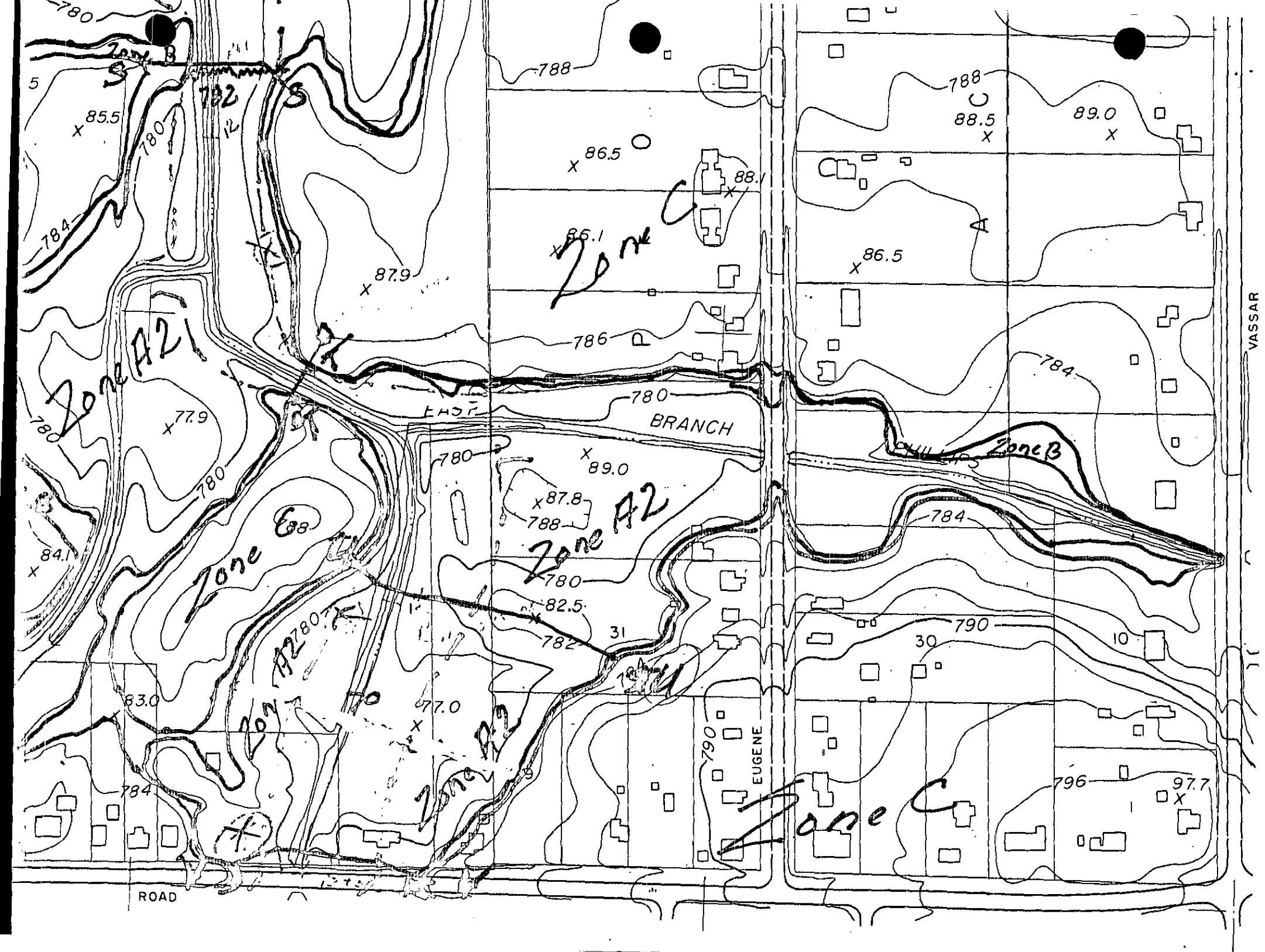
780
786
784
81.8
780
79.0


MAPLEWOOD
SUBDIVISION
MAPLELAWN DRIVE
DRIVE
DARLENE AVENUE
CHERYLANN
87.0
89.0
87.8
86.2
79.5
780
89.0
89.9
88.5
788
784
112
66
59
780
85.0
83.0
90.2
790
65
88.1
788
60
81.9
76.8
13
86.6
778
780
Zone C
Zone B
Zone A2
Zone C

E2,200


Zone B
Zone C
Zone A2
Zone A2
Zone A2
Zone A2
Zone A2
Zone B
Zone C
Zone C
EAST
BRANCH
EUGENE
VASSAR
ROAD
780
782
784
786
788
790
796
85.5
86.5
88.1
86.1
87.9
77.9
89.0
87.8
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88.5
89.0
86.5
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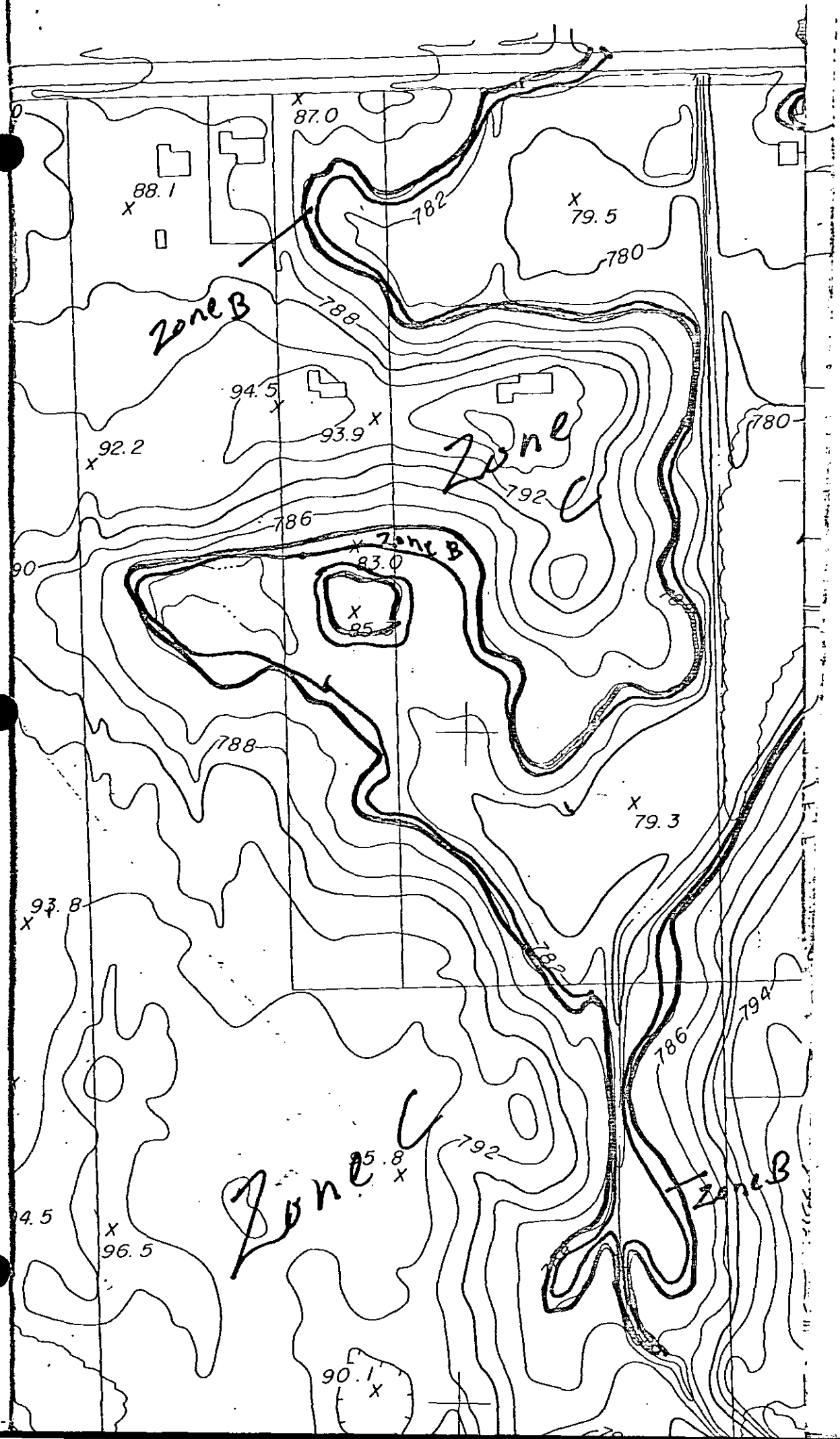
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88.1
782
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780
Zone B
788
94.5
93.9
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92.2
Zone C
792
786
Zone B
83.0
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788
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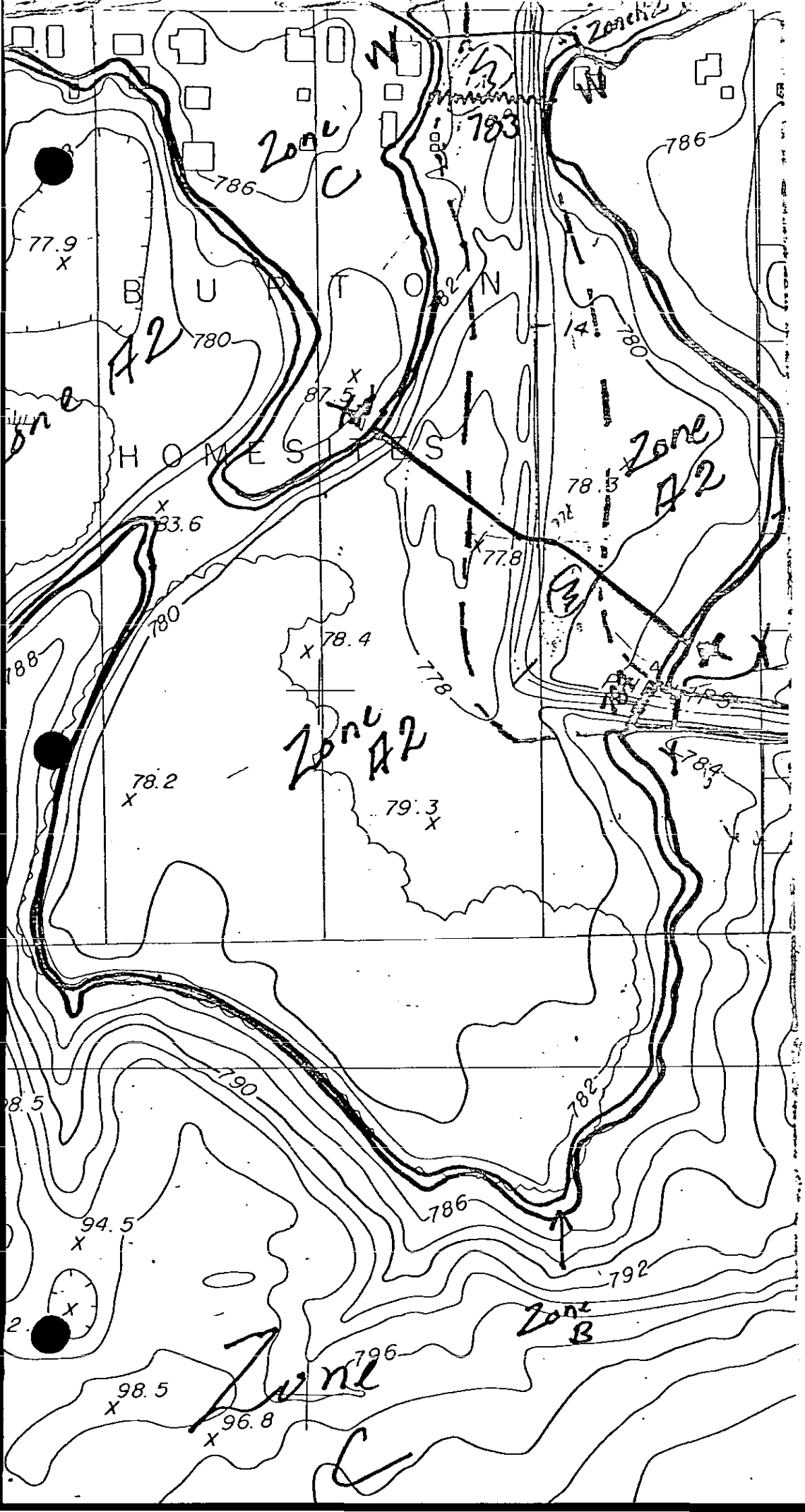
93.8
782
794
786
Zone C
792
85.8
Zone B
94.5
96.5
90.1


Zone C
Zone A2
Zone A2
Zone A2
Zone B
Zone C
B U R T O N
H O M E S T E A D S
786
783
786
77.9
780
87.5
14
780
78.3
83.6
77.8
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78.4
778
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782
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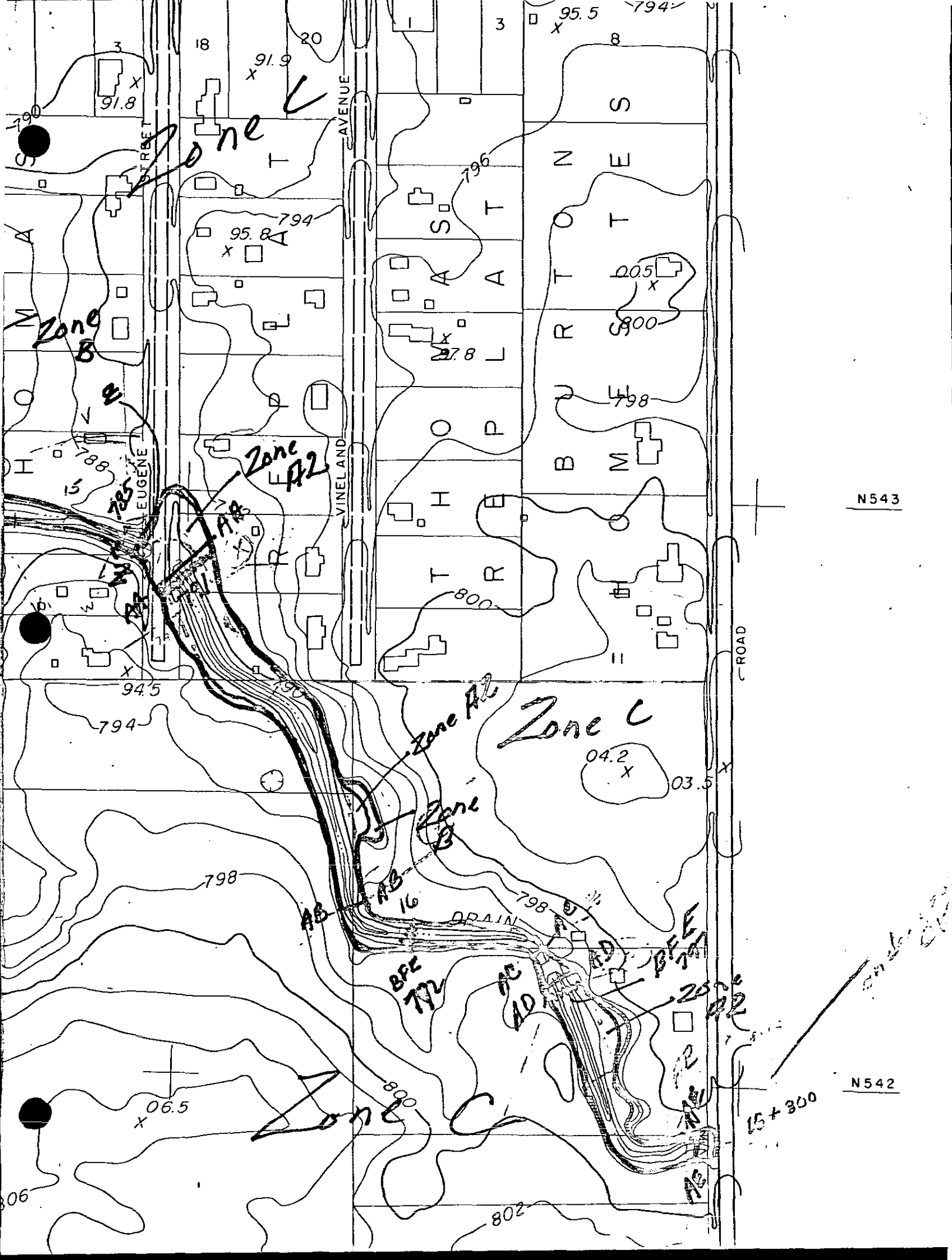
94.5
792
796
98.5
96.8


Zone C
Zone B
Zone A2
Zone A2
Zone B
Zone C
Zone C
Zone A2
EUGENE STREET
VINELAND AVENUE
ROAD
N543
N542
15+300
DRAIN
AB
AD
AE
BFE
790
794
796
798
800
802
788
785
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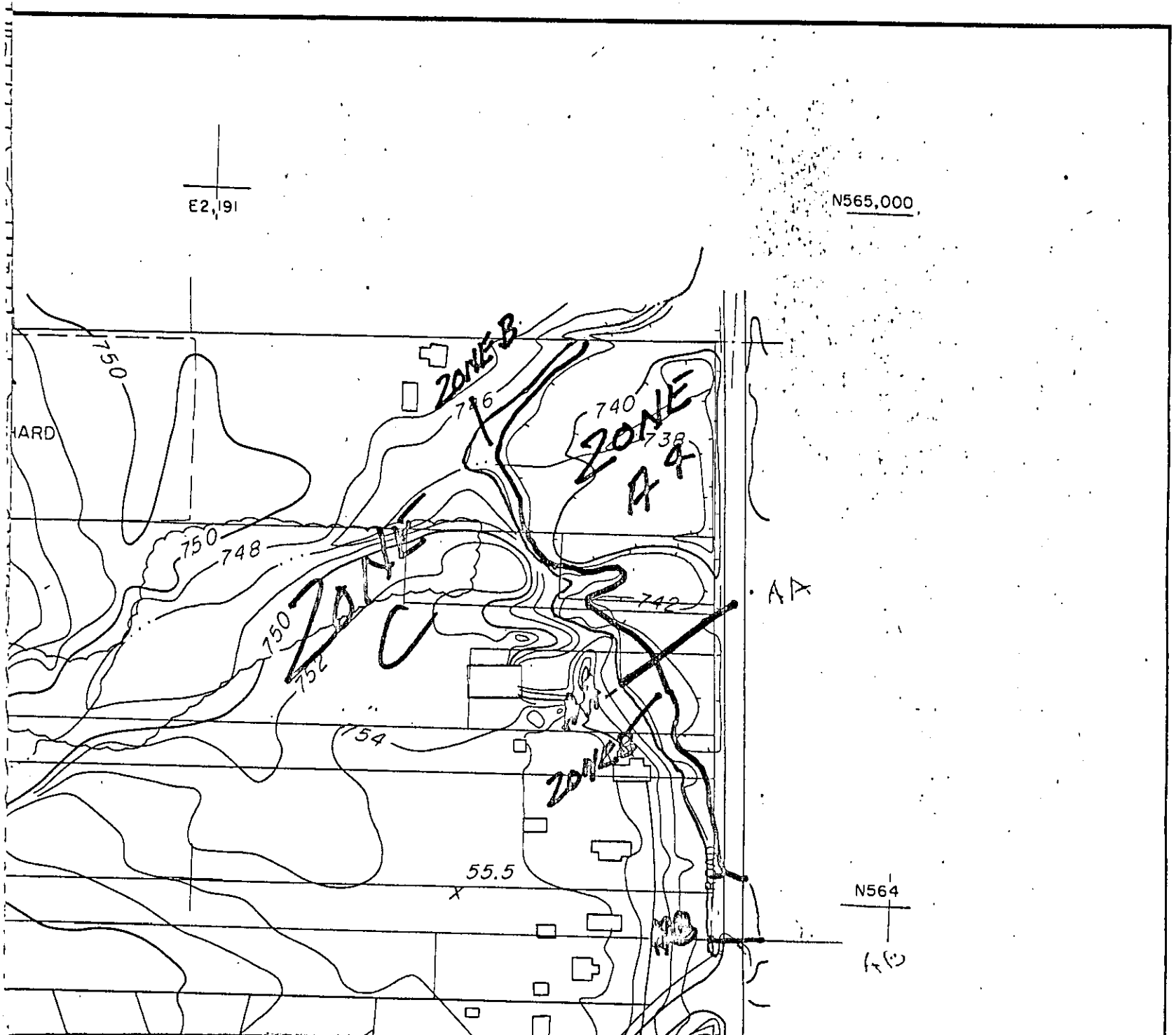
91.9
95.5
95.8
94.5
04.2
03.5
06.5
20.5
27.8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ZONE A
ZONE C
ZONE B
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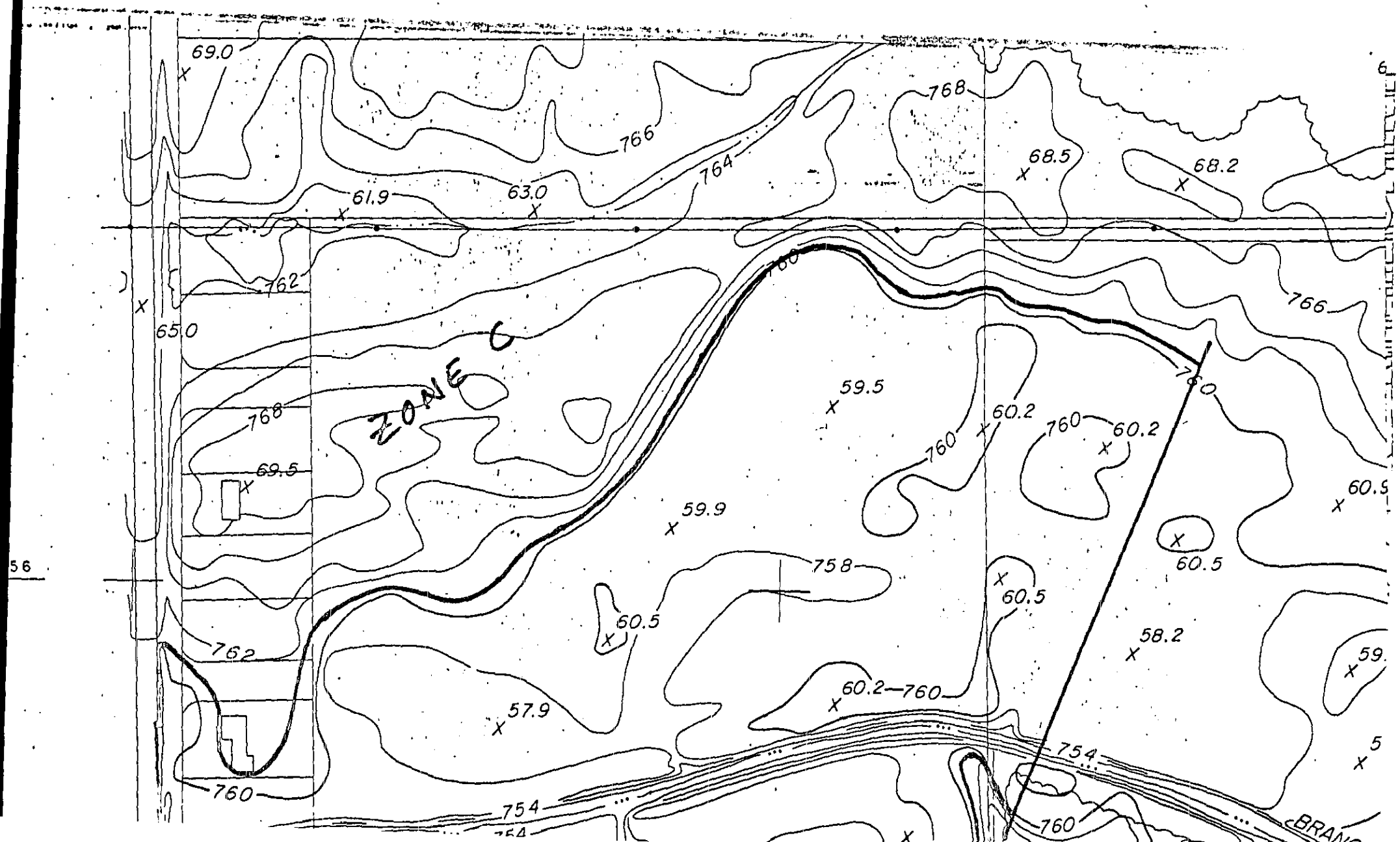
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760
766
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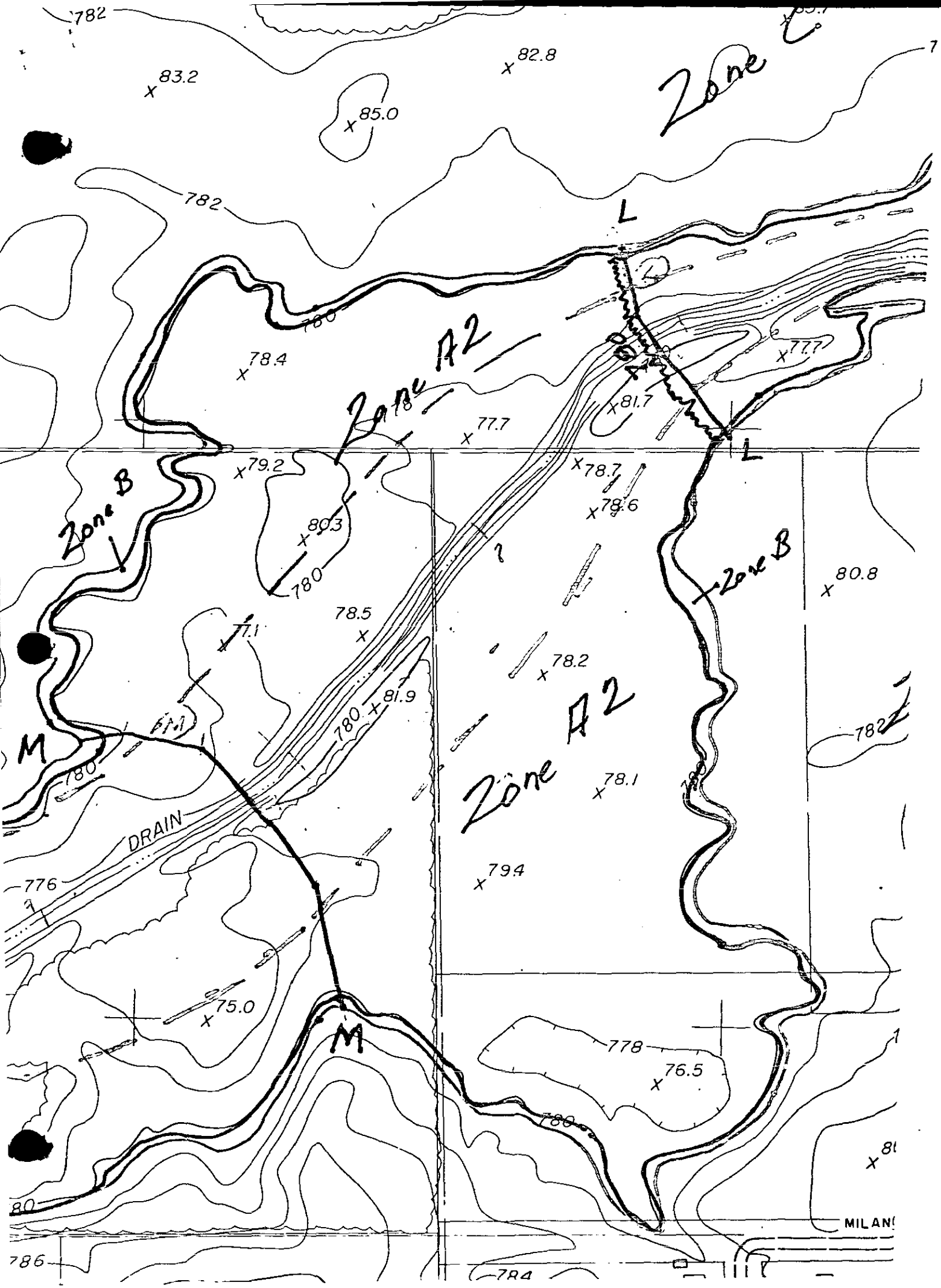
BRAN


Zone C
Zone A2
Zone B
Zone B
Zone A2
L
L
M
M
DRAIN
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82.8
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780
78.4
77.7
81.7
77.7
79.2
78.7
78.6
80.3
780
78.5
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78.1
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75.0
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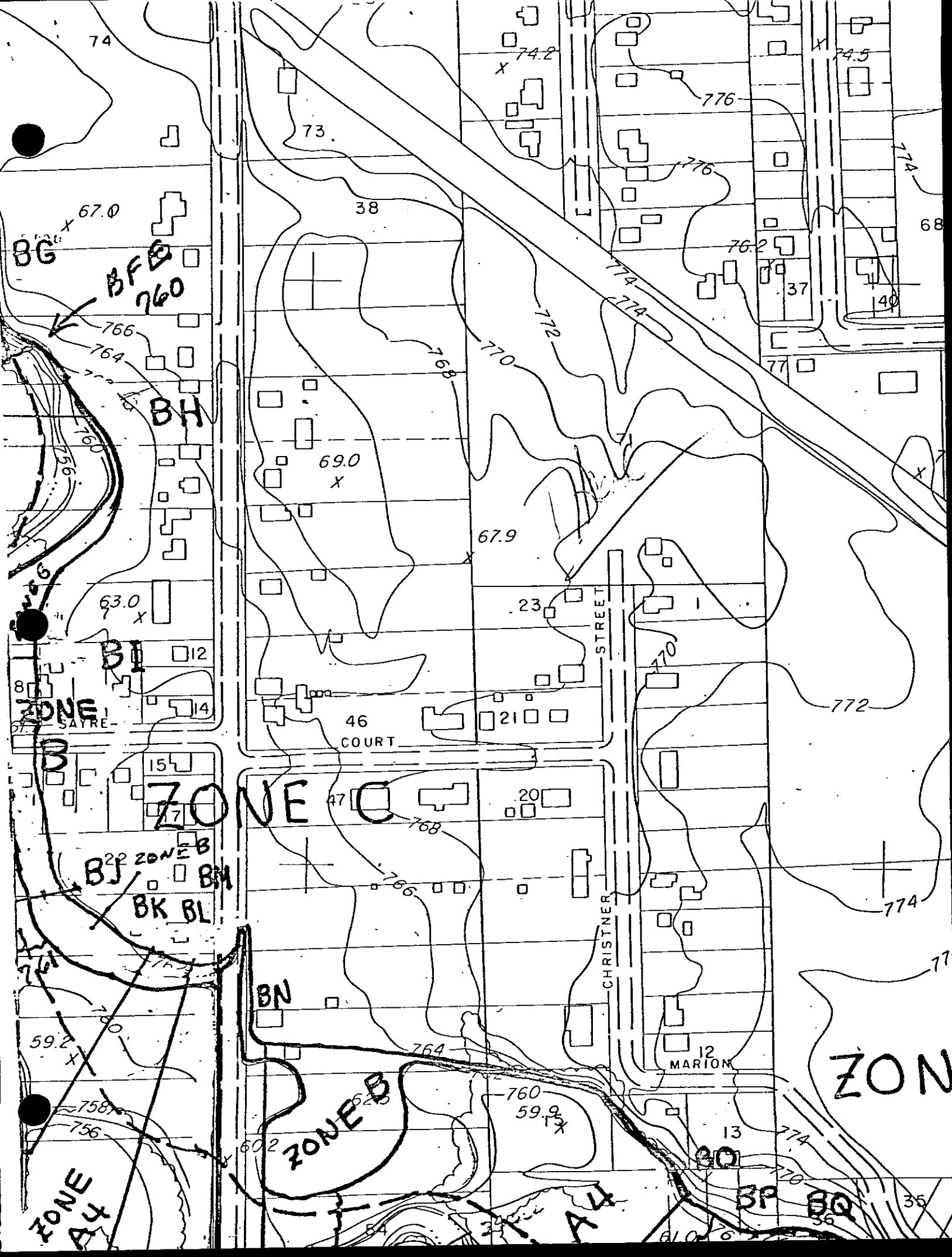
76.5
780
786
MILAN


BG
BF
760
BH
BI
ZONE B
SAYRE
COURT
ZONE C
BJ
ZONE B
BH
BK
BL
BN
ZONE B
ZONE A4
A4
BP
BQ
CHRISTNER STREET
MARION
ZON
74
73
38
67.0
74.2
74.5
776
776
774
774
772
770
768
76.2
37
40
68
77
766
764
760
756
69.0
67.9
63.0
23
1
12
8
14
46
21
15
47
20
22
770
772
768
766
774
59.2
760
764
758
756
62.8
60.2
59.9
13
12
770
774
54
61.0
35
36

ZONE C
ZONE B
ZONE A4
ZONE A2
ZONE B
ZONE C
ZONE B
ZONE B
46
COURT
21
20
47
CHRISTNER
12
MARION
13
35
32
SAXON
BOULEVARD
BN
BK
BL
BM
BO
BP
BQ
BR
BS
BT
BU
BV
ZR
THREAD
ROAD
HWM
770
772
774
776
768
766
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763
764
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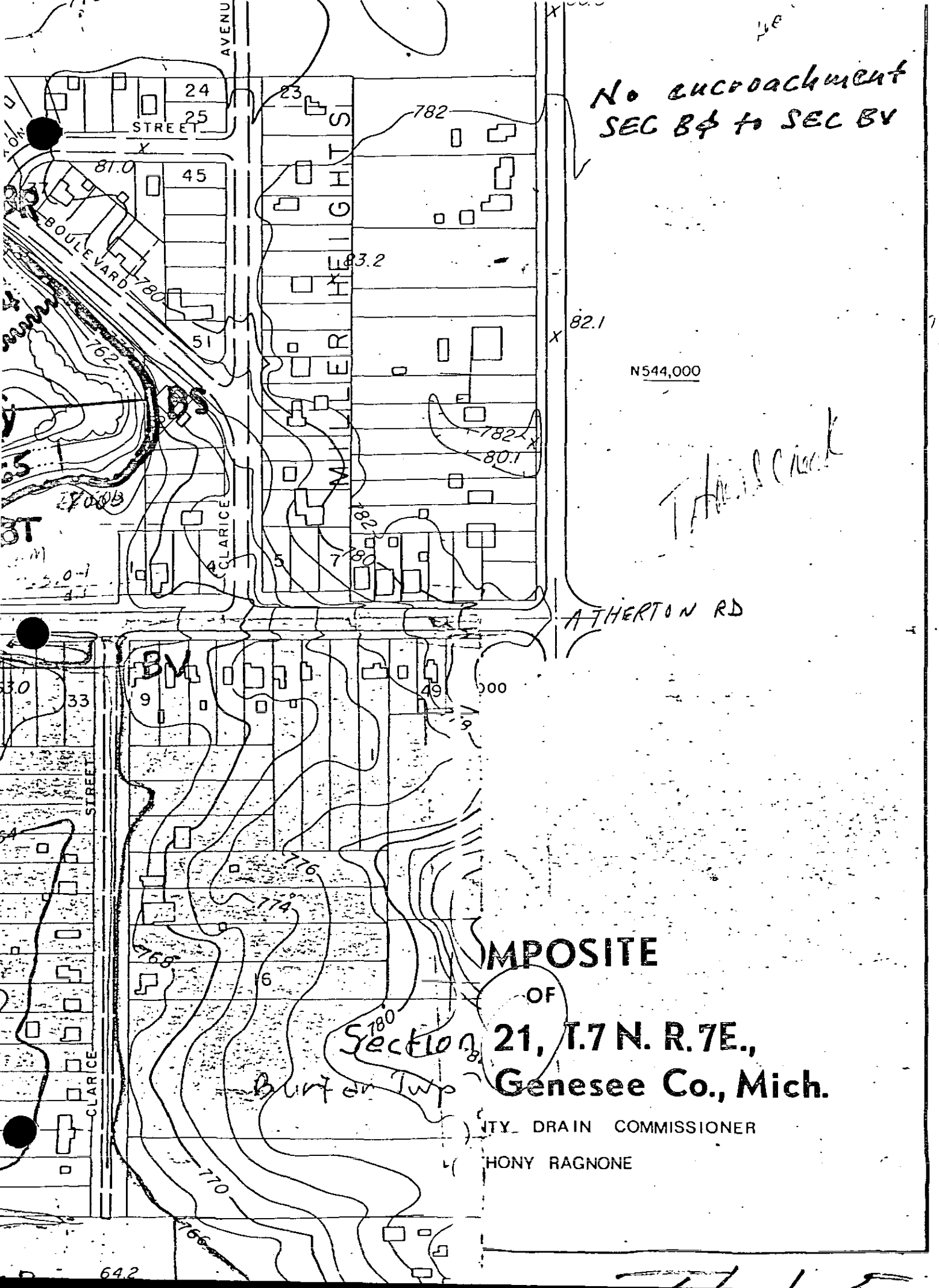
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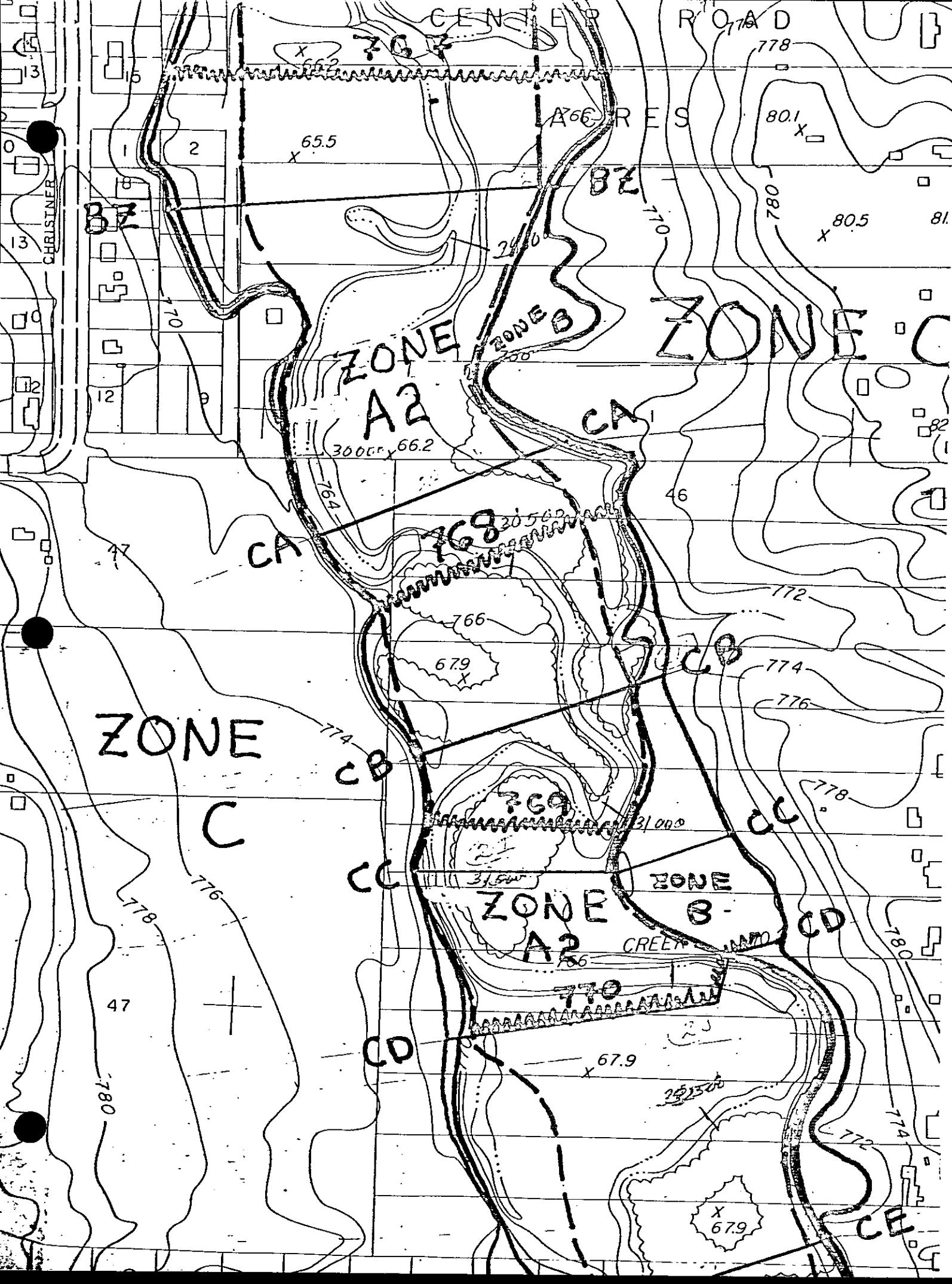
SEC B4 to SEC BV
AVENUE
STREET
BOULEVARD
CLARICE
STREET
CLARICE
ATHERTON RD
N544,000
24
25
45
51
23
33
9
49
782
780
776
774
768
766
770
642
81.0
83.2
82.1
80.1
BM
Section 21, T.7 N. R.7E.,
Burton Twp
Genesee Co., Mich.
OF
DRAIN COMMISSIONER
HONY RAGNONE

ROAD
THREAD
ZONE A2
ZONE B
STREET
AVENUE
BW
BOULEVARD
ZONE C
CLARICE
BX
2D
PIERSON
THREAD
BY
CENTER
ROAD


CENTER ROAD
CHRISTNER
ZONE A2
ZONE B
ZONE C
ZONE C
ZONE A2
ZONE B
CREEK
BZ
BZ
CA
CA
CB
CB
CC
CC
CD
CD
CE
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80.1
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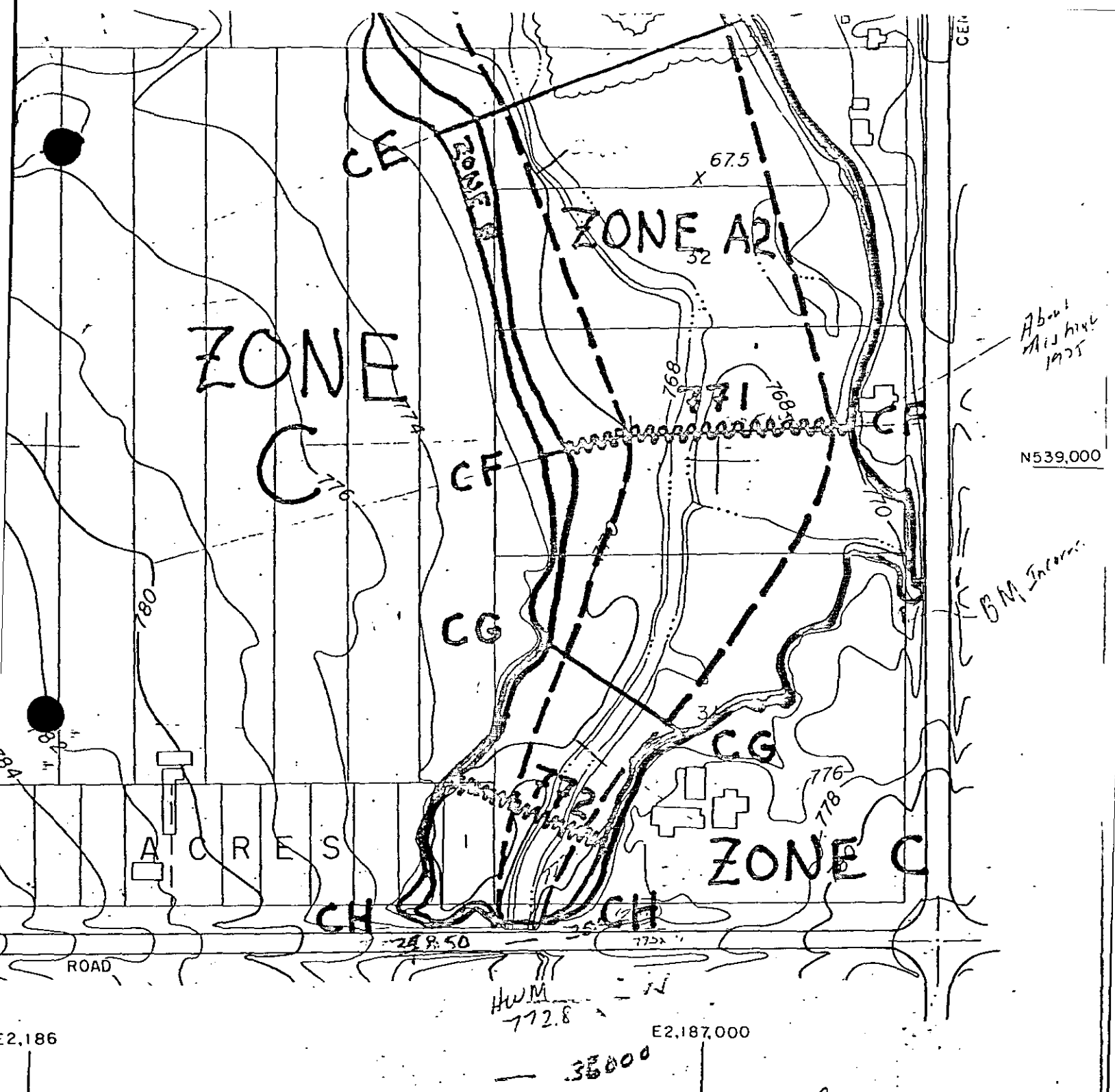
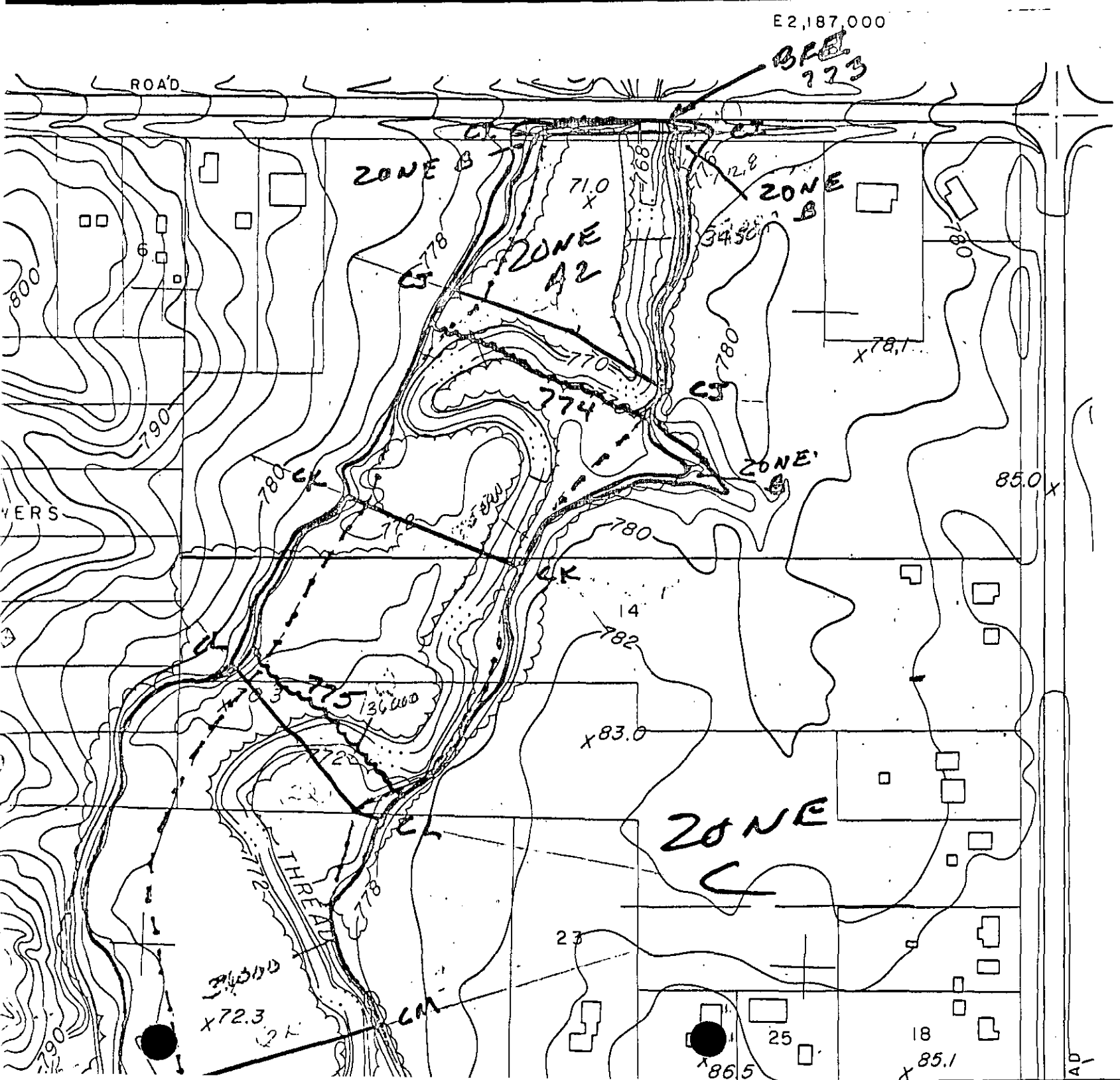


SECTION INDEX

5	4	3	2	1
8	9	10	11	12

COMPOSITE OF Section 28, T. 7N. R.


E 2,187,000
BFE 773
ROAD
ZONE B
ZONE A2
ZONE B
ZONE B
ZONE C
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CK
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CM
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N 538,000
N 537
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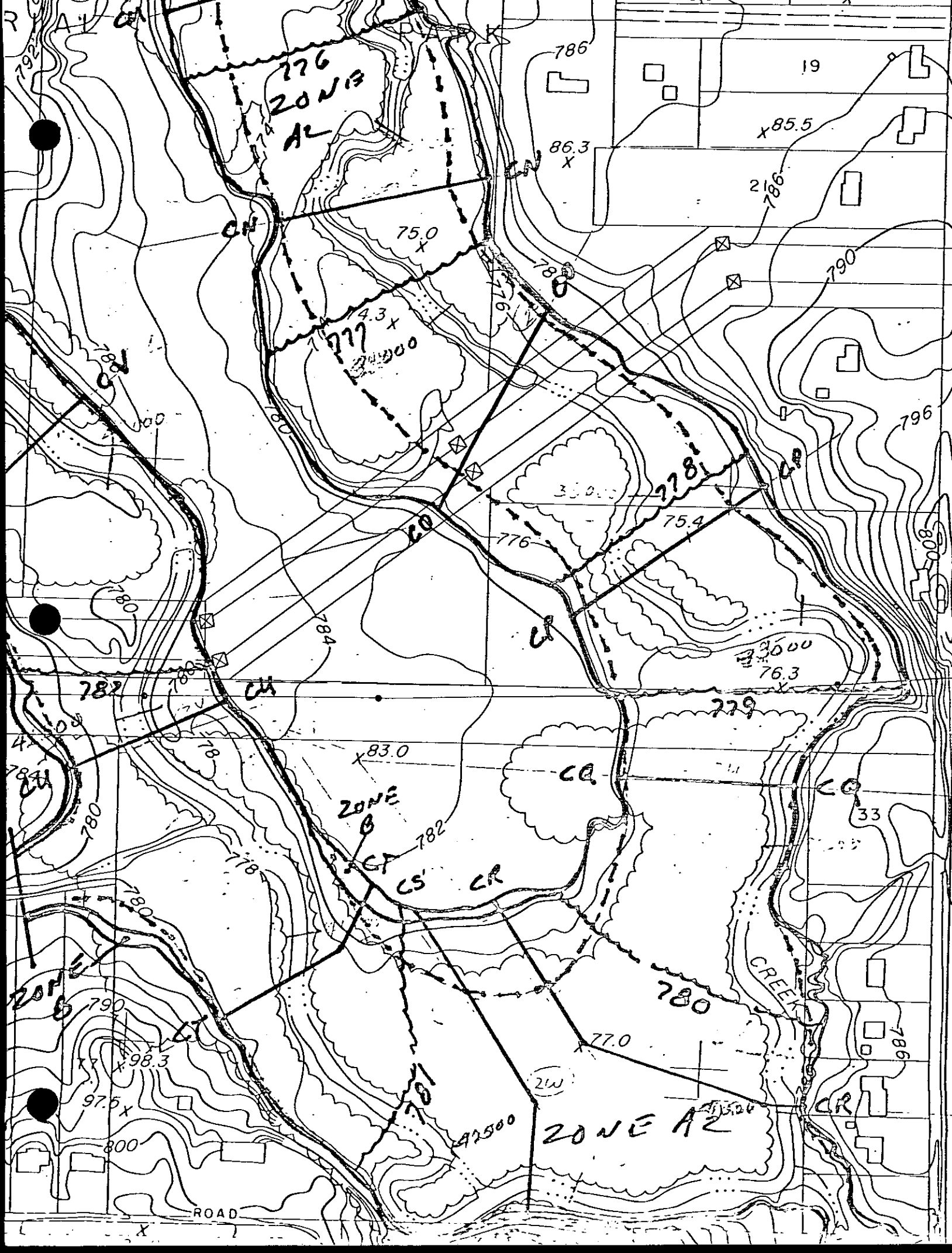
14
23
25
18
YERS


ZONE B
ZONE A2
CREEK
ROAD
19
21
33
21W
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777
778
779
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784
786
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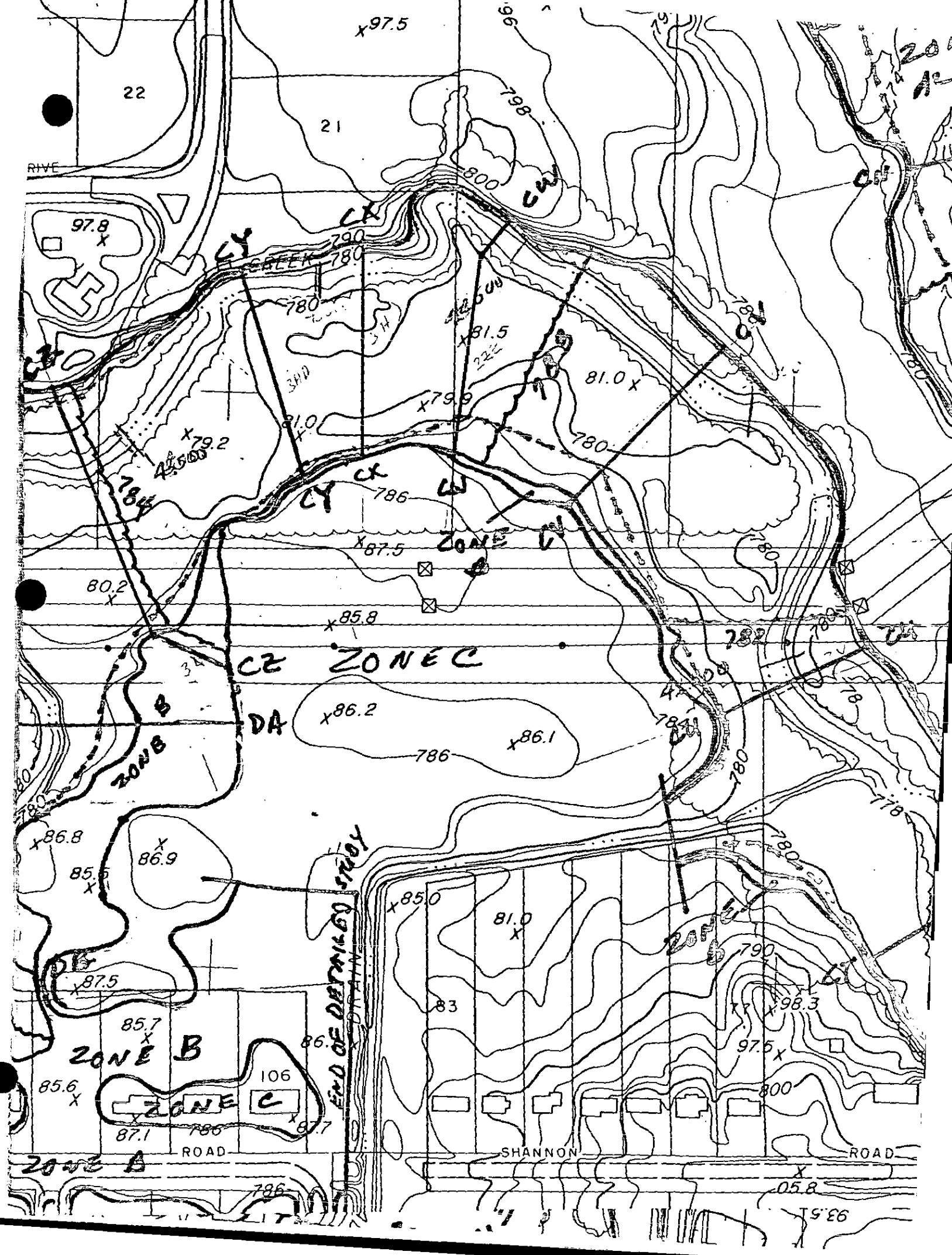
98.3
97.5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97.8
97.5
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CY
CZ
CW
CB
CA
CE
CD
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81.0
79.9
79.2
786
87.5
ZONE C
80.2
85.8
ZONE C
86.2
86.1
786
ZONE B
86.8
86.9
85.6
85.0
81.0
END OF DRAINAGE STUDY
87.5
83
85.7
ZONE B
106
ZONE C
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87.7
98.3
97.6
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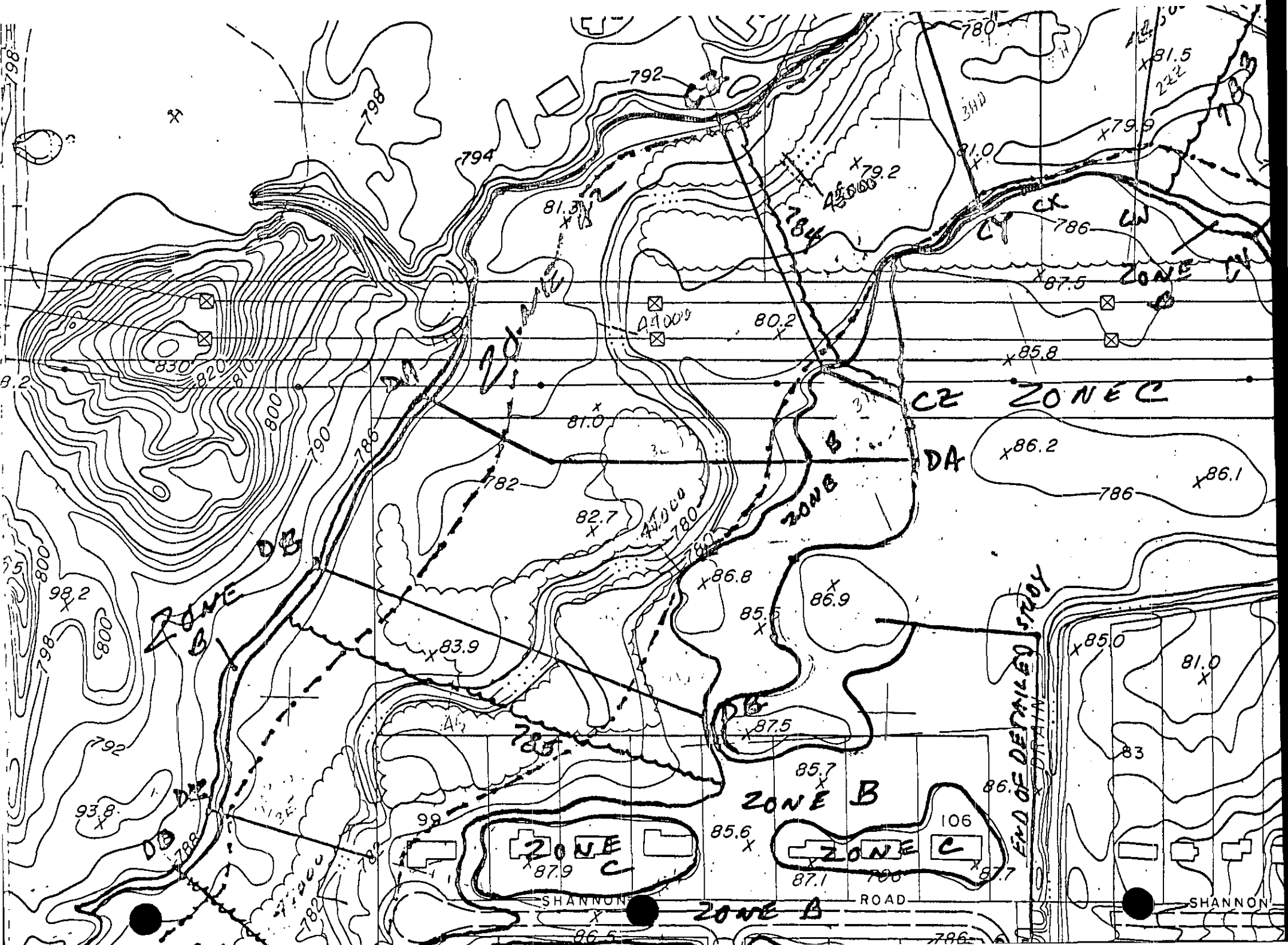
ROAD
SHANNON
ROAD
ZONE B
786
05.8


ZONE C
ZONE B
ZONE C
ZONE B
ZONE C
ZONE C
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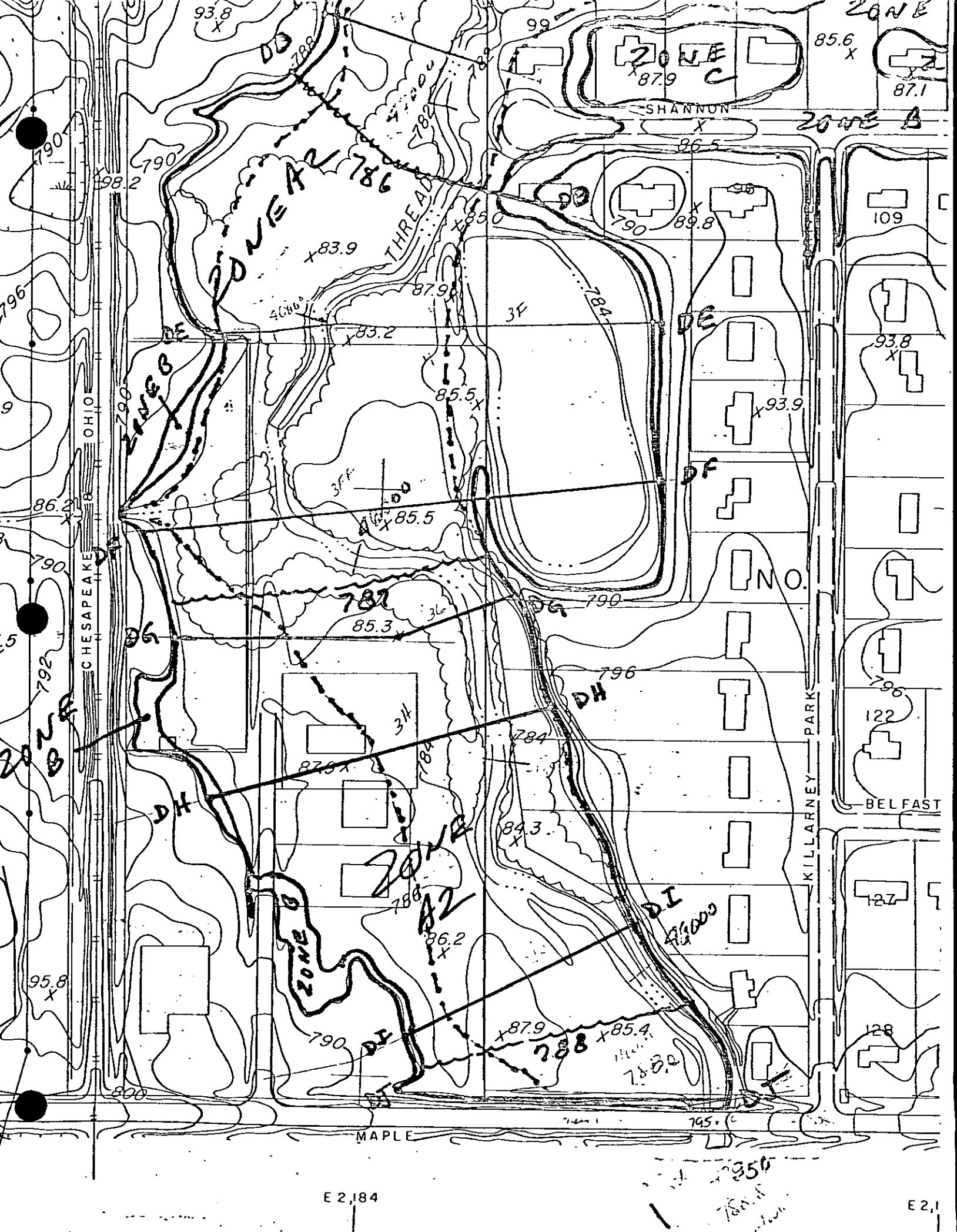
DB
CZ
CY
CX
CW
END OF DETAILED STUDY
DRAIN
SHANNON
ROAD
SHANNON


ZONE A2 786
ZONE B
ZONE C
ZONE A2
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KILLARNEY
PARK
BELFAST
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85.6
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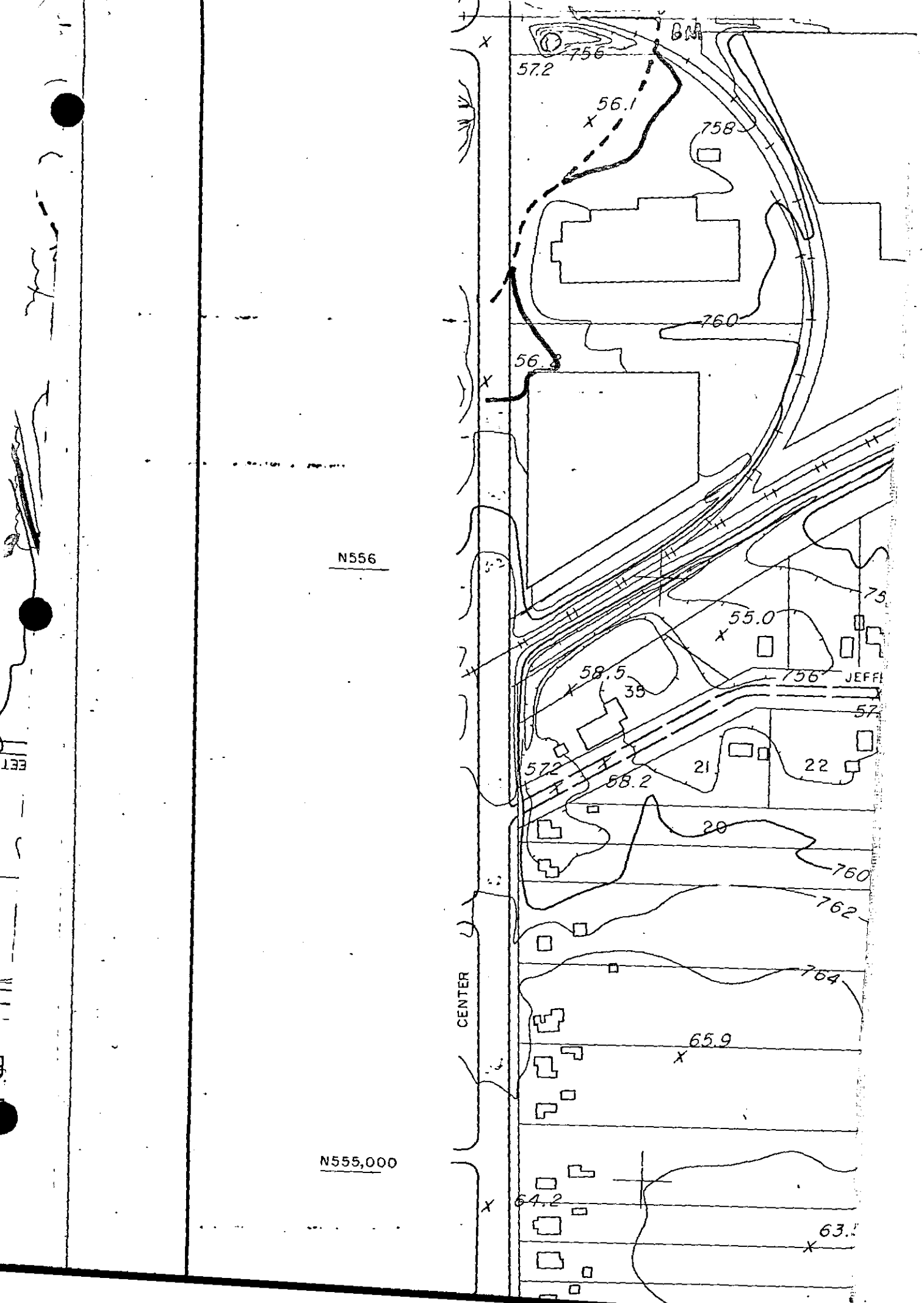
89.8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N556
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58.5
35
756
JEFF
57.2
58.2
21
22
20
760
762
764
CENTER
65.9
N555,000
64.2
63.

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 12,DATE= 5/27/77

100 YEAR Out Plot

WATER-SURFACE PROFILE FOR: GILKEY CR LES

PAGE 1 OF 1

X-Sects in FIS Profile

*** FLOODWAY ANALYSIS *** ~~VSA~~ HDR FW

	SECID	AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW *ID*
A	RM	AT 23770 / 757.16	0 / 0.02	750. /	888. /	757.18	63816. / 0.84	1.61 / 0.08	163. /	480. *IS*
B	RN	AT 24000 / 757.18	230 / 0.01	750. / 0.01	1831. / 0.0	757.19	146078. / 0.41	2.93 / 0.05	170. / 0.000	600. *XS*

END OF THIS PROFILE

BO-B7

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 9,DATE= 9/ 6/78

WATER-SURFACE PROFILE FOR: GILKEY CR BU TO BW FW LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

	SECTD AT DISTANCE/ LENGTH/DISCHARGE/ AREA /CONVEYANCE/ ALPHA/ LEW / REW WS ELEV / HV / HF / HE / EG / V / FN / ACC *ID*									
I	BU AT 26740 /	0 /	660. /	1124. /	144858. /	1.34 /	250. /	450.		
	757.80 /	0.01 /		/	757.81 /	0.59 /	0.04/			*IS*
J	BV AT 27240 /	500 /	660. /	1323. /	104885. /	2.05 /	430. /	730.		
	757.80 /	0.01 /	0.01 /	0.00 /	757.81 /	0.50 /	0.05 /	-0.014		*XS*
K	BW AT 27700 /	460 /	660. /	1132. /	90951. /	1.69 /	780. /	1080.		
	757.82 /	0.01 /	0.02 /	0.00 /	757.83 /	0.58 /	0.06 /	0.000		*XS*

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: GILKEY CR FW BX TO CC LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECTIO AT	DISTANCE/	LENGTH/	DISCHARGE/	AREA /	CONVEYANCE/	ALPHA/	LEW /	REW
WS ELEV /	HV /	HF /	HE /	FG /	V /	FN /	ACC	*ID*
BX AT	27800 /	0 /	600. /	1076. /	76013. /	1.80 /	480. /	830.
757.80 /	0.01 /		/	757.81 /	0.56 /	0.06/		*IS*
BY AT	28160 /	360 /	600. /	1350. /	103879. /	1.93 /	600. /	950.
757.80 /	0.01 /	0.02 /	0.0 /	757.81 /	0.44 /	0.05 /	-0.019	*XS*
BZ AT	28710 /	550 /	600. /	891. /	66222. /	2.47 /	780. /	1130.
757.82 /	0.02 /	0.03 /	0.01 /	757.84 /	0.67 /	0.08 /	0.000	*XS*
CA AT	29280 /	570 /	600. /	901. /	69243. /	2.05 /	260. /	510.
757.87 /	0.01 /	0.04 /	0.0 /	757.89 /	0.67 /	0.08 /	-0.000	*XS*
CB AT	29830 /	550 /	600. /	571. /	37062. /	1.72 /	570. /	870.
757.94 /	0.03 /	0.08 /	0.01 /	757.97 /	1.05 /	0.13 /	0.000	*XS*
CC AT	30470 /	640 /	575. /	312. /	24898. /	1.27 /	290. /	420.
758.16 /	0.07 /	0.24 /	0.02 /	758.23 /	1.84 /	0.19 /	0.000	*XS*

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 10,DATE= 6/29/77

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==================================================================================
WATER-SURFACE PROFILE FOR: GILKEY CR FW CD TO CE                          LES
PAGE  1 OF  1
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /   HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
CD     AT   30730 /     0 /    465. /   549. /   30937. / 2.24 /  200. /  550.
   760.67 /   0.02 /                  /  760.69 /   0.85 /   0.11/          *IS*
----------------------------------------------------------------------------------
CE     AT   31230 /   500 /    465. /   923. /   59036. / 2.43 /  150. /  450.
   760.74 /   0.01 /   0.06 /   0.0  /  760.75 /   0.50 /   0.07 / -0.000  *XS*
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

CF-

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 10,DATE= 7/18/77

```
==================================================================================
WATER-SURFACE PROFILE FOR: GILKEY CR FW CI TO CM                        LES
PAGE  1 OF  1
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
CI     AT   32440 /      0 /    465. /  1087. /  101296. / 1.32 /   21. /  221.
   761.76 /   0.00 /                  /  761.76 /    0.43 /   0.04/          *IS*
----------------------------------------------------------------------------------
CJ     AT   33000 /    560 /    465. /   959. /   74051. / 1.29 /   20. /  220.
   761.76 /   0.00 /   0.02 /   0.00 /  761.76 /    0.48 /   0.04 / -0.016  *XS*
----------------------------------------------------------------------------------
CK     AT   33730 /    730 /    465. /   330. /   16545. / 1.40 /  650. /  800.
   761.87 /   0.04 /   0.13 /   0.02 /  761.91 /    1.41 /   0.15 / 0.000  *XS*
----------------------------------------------------------------------------------
CL     AT   34250 /    520 /    465. /   210. /   14499. / 1.27 /  400. /  480.
   762.31 /   0.10 /   0.47 /   0.03 /  762.41 /    2.22 /   0.21 / 0.000  *XS*
----------------------------------------------------------------------------------
CM     AT   35050 /    800 /    465. /   211. /   14279. / 1.00 /  260. /  310.
   763.17 /   0.08 /   0.84 /   0.0  /  763.25 /    2.20 /   0.19 / 0.001  *XS*
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

R S T U

CH CI CJ CK CL

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 8,DATE= 7/21/77

```
==================================================================================
WATER-SURFACE PROFILE FOR: GILKET CR FW CN TO CP                        LES
PAGE  1 OF  1
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HF  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
CN    AT   35240 /     0 /    400. /   163. /   11630. / 1.00 /   80. /  120.
   763.55 /   0.09 /                 / 763.64 /    2.46 /   0.22/          *IS*
----------------------------------------------------------------------------------
CO    AT   35880 /   640 /    400. /   154. /   10328. / 1.02 /  340. /  380.
   764.40 /   0.11 /   0.85 /   0.01 / 764.50 /    2.60 /   0.22 /  0.001  *XS*
----------------------------------------------------------------------------------
CP    AT   36580 /   700 /    400. /   155. /   10361. / 1.11 /  280. /  330.
   765.44 /   0.11 /   1.05 /   0.00 / 765.56 /    2.58 /   0.24 /  0.002  *XS*
----------------------------------------------------------------------------------
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END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE= 8/31/77

```
==================================================================================
WATER-SURFACE PROFILE FOR: GILKEY CR FW CO TO ~~CV~~ CR 2          .    LES
PAGE  1 OF  1
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /    EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
CO    AT   36700 /     0 /    350. /   158. /   11293. / 1.00 /  406. /  441.
   765.92 /   0.08 /                 /  766.00 /    2.22 /  0.18/          *IS*
----------------------------------------------------------------------------------
CR    AT   37150 /   450 /    350. /   217. /   15439. / 1.36 /  210. /  310.
   766.26 /   0.05 /   0.32 /   0.0  /  766.31 /    1.61 /  0.16 /  0.000  *XS*
----------------------------------------------------------------------------------
CR1   AT   37580 /   430 /    350. /   156. /   10401. / 1.14 /  355. /  454.
   766.57 /   0.09 /   0.33 /   0.02 /  766.66 /    2.24 /  0.21 / -0.000  *XS*
----------------------------------------------------------------------------------
CR1RD AT   37600 /    20 /    350. /    37. /    3684. / 1.00 /  396. /  402.
   765.99 /   1.38 /   0.06 /   0.65 /  767.37 /    9.43 /  0.67 / -0.000  *XS*
----------------------------------------------------------------------------------
CR2   AT   37620 /    20 /    350. /   236. /   17018. / 1.12 /  350. /  450.
   767.37 /   0.04 /   0.04 /   0.0  /  767.41 /    1.48 /  0.13 / -0.000  *XS*
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE= 4/11/78

WATER-SURFACE PROFILE FOR: GILKEY CR FW CR2 TO CV LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
CR2 AT 37620 / 767.37	0 / 0.04	350. /	236. / 767.41	17013. / 1.48	1.12 / 0.13	350. /	450.	*IS*	CS
CS AT 37730 / 767.41	110 / 0.03	350. / 0.04	249. / 0.0	19532. / 767.45	1.12 / 1.40	220. / 0.13	320. / -0.000	*XS*	CT
CS RD AT 37760 / 767.34	30 / 0.22	350. / 0.02	136. / 0.09	8312. / 767.56	2.16 / 2.57	130. / 0.30	230. / -0.003	*XS*	
CT AT 37800 / 767.56	40 / 0.03	350. / 0.03	319. / 0.0	21981. / 767.59	1.68 / 1.10	90. / 0.12	240. / -0.000	*XS*	CU
CU AT 38280 / 767.67	480 / 0.02	350. / 0.10	424. / 0.0	26540. / 767.69	1.73 / 0.82	300. / 0.10	550. / 0.000	*XS*	CV
CV AT 38710 / 767.75	430 / 0.01	350. / 0.06	578. / 0.0	31087. / 767.75	1.39 / 0.61	570. / 0.07	870. / 0.000	*XS*	CW

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 10,DATE= 4/12/78

WATER-SURFACE PROFILE FOR: GILKEY CR SECS CW TO CY FW LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*	
CW AT	38860	0	315.	608.	47885.	1.21	180.	430.	
768.22	0.01			768.22	0.52	0.06		*IS*	CX
CX AT	39410	550	315.	138.	7054.	1.17	50.	130.	
768.34	0.10	0.16	0.05	768.43	2.28	0.23	0.000	*XS*	CY
CY AT	39890	480	315.	150.	6358.	1.61	48.	148.	
769.40	0.11	1.06	0.01	769.51	2.09	0.28	0.005	*XS*	CZ

END OF THIS PROFILE

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1  PINE RUN SECS P TO AC                        LES      14   4   2   5 12
2      2  68089  68134  68148  68183
3   1800 P      1  11  3  676     7330 99 99
4      4    740   1010   1110   1350
**SEQUENCE**
5   1850      150  1  6860  190  1  6800  370  1  6780  385  1  6769  391  2  6767
5   1851      398  2  6741  406  2  6745  418  3  6767  429  3  6772  880  3  6800
5   1852      930  3  6860
6   1870  1  2 075 075  1  2 030 030  1  2 100 100
3   1900 Q      0  11  2  676     7860 99 99
5   1950        0  1  6860   30  1  6800   80  1  6790  110  1  6800  280  1  6800
5   1951      340  2  6780  345  2  6760  350  2  6733  360  2  6733  365  2  6800
5   1952      385  2  6900
6   1970  1  2 065 065  1  2 055 055
3   2000 R      0  15  3  677     8360 99 99
5   2050        0  1  6900   60  1  6800  130  1  6800  320  1  6800  348  2  6802
5   2051      358  2  6765  365  2  6744  371  2  6758  375  3  6797  380  3  6800
5   2052      390  3  6820  400  3  6840  440  3  6860  480  3  6880  520  3  6900
6   2070  1  2 080 080  1  2 045 045  1  2 070 070
3   2100 S      0  16  3  678     8860 99 99
5   2150        0  1  6900  130  1  6880  200  1  6860  310  1  6840  400  1  6820
5   2151      630  2  6800  630  2  6780  635  2  6757  645  2  6757  650  2  6780
5   2152      655  3  6800  710  3  6820  730  3  6840  750  3  6860  780  3  6880
5   2153      800  3  6900
6   2170  1  2 075 075  1  2 045 045  1  2 075 075
3   2200 T      0  12  3  678     9420 99 99
5   2250        0  1  6900   70  1  6880  270  1  6860  310  1  6840  450  1  6820
5   2251      614  2  6810  617  2  6772  628  2  6761  634  2  6769  639  3  6816
5   2252      675  3  6820  710  3  6900
6   2270  1  2 080 080  1  2 050 050  1  2 080 080
3   2300 U      0  12  3  680     9870 99 99
5   2350        0  1  6900   40  1  6880   90  1  6860  170  2  6840  180  2  6840
5   2351      185  2  6800  190  2  6779  205  2  6779  215  3  6800  460  3  6820
5   2352      470  3  6840  490  3  6900
6   2370  1  2 080 080  1  2 050 050  1  2 080 080
3   2400 V      0   9  3  681    10380 99 99
5   2450        0  1  6900   30  1  6840  141  2  6835  150  2  6785  160  2  6773
5   2451      168  2  6786  174  3  6827  390  3  6840  420  3  6900
6   2470  1  2 080 080  1  2 045 045  1  2 080 080
3   2500 W      0  14  3  681    10830 99 99
5   2550        0  1  6900   20  1  6880   30  1  6860  170  1  6860  180  2  6860
5   2551      190  2  6800  190  2  6784  205  2  6784  215  2  6800  220  3  6820
5   2552      310  3  6840  350  3  6860  450  3  6880  510  3  6900
6   2570  1  2 070 070  1  2 045 045  1  2 080 080
3   2600 X      0  18  3  682    11110 99 99
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  2650        0  1  6900   20  1  6880   30  1  6860   50  1  6860  110  1  6860
5  2651      140  1  6860  160  1  6860  189  1  6839  197  2  6841  201  2  6803
5  2652      212  2  6790  222  2  6790  230  3  6837  236  3  6839  290  3  6840
5  2653      330  3  6860  350  3  6880  360  3  6900
6  2670  1  2 065 065  1  2 040 040  1  2 075 075
3  2700 Y      0  13  3  682   11660 99 99
5  2750      -90  1  7000    0  1  6900   40  1  6880   60  1  6860  190  2  6850
5  2751      200  2  6787  210  2  6787  220  3  6850  310  3  6860  320  3  6880
5  2752      340  3  6900  710  3  6920  800  3  6940
6  2770  1  2 070 070  1  2 045 045  1  2 075 075
3  2800 Z      0  14  3  688   12120 99 99
5  2850      -60  1  6940    0  1  6900   80  1  6880  123  1  6860  130  2  6862
5  2851      141  2  6826  148  2  6808  152  2  6812  165  3  6860  173  3  6860
5  2852      580  3  6860  650  3  6880  670  3  6900  750  3  7000
6  2870  1  2 065 065  1  2 050 050  1  2 080 080
3  2900 AA     0  11  3  686   12740 99 99
5  2950     -170  1  6960 -140  1  6920    0  1  6900   20  1  6880  125  2  6870
5  2951      135  2  6834  145  2  6834  160  3  6870  530  3  6880  560  3  6900
5  2952      640  3  7000
6  2970  1  2 070 070  1  2 040 040  1  2 065 065
3  3000 AB     0  12  3  686   13070 99 99
5  3050     -160  1  7000  -60  1  6920    0  1  6900   20  1  6880  178  2  6875
5  3051      182  2  6851  190  2  6835  195  2  6837  210  3  6876  490  3  6880
5  3052      500  3  6900  590  3  7000
6  3070  1  2 070 070  1  2 050 050  1  2 080 080
3  3100 AC     0  20  3  686   13530 99 99
5  3150        0  1  6960   20  1  6940   40  1  6920   50  1  6900  123  1  6886
5  3151      129  1  6890  133  2  6885  134  2  6863  137  2  6850  141  2  6846
5  3152      147  2  6841  153  2  6841  157  2  6840  160  2  6848  164  2  6863
5  3153      166  3  6876  173  3  6880  188  3  6888  480  3  6900  530  3  7000
6  3170  1  2 075 075  1  2 045 045  1  2 080 080
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1  PINE/RUN SECS AD TO AG                    LES      5  4  2  5 12
2      2  68999  69062  69082  69140
3   3400 AD    1  15  3  687   13610 99 99
4      4    740   1010   1110   1350
**SEQUENCE**
5   3450        0  1  7000   56  2  6907   60  2  6883   61  2  6878   61  2  6864
5   3451       64  2  6829   70  2  6822   78  2  6816   86  2  6817   94  2  6833
5   3452      100  2  6860  106  3  6887  113  3  6890  140  3  6900  160  3  7000
6   3470  1  2 070 070  1  2 045 045  1  2 070 070
3   3500 AF    0  15  3  687   13690 99 99
5   3550        0  1  7000   20  1  6900   40  1  6879   47  1  6885   51  2  6883
5   3551       53  2  6870   55  2  6862   59  2  6846   63  2  6839   67  2  6839
5   3552       72  2  6854   76  3  6891   89  3  6886  290  3  6900  320  3  7000
6   3570  1  2 080 080  1  2 040 040  1  2 065 065
3   3600 AF    0  15  3  688   14080 99 99
5   3650        0  1  7000   40  1  6900  136  1  6891  141  2  6891  146  2  6872
5   3651      156  2  6871  162  2  6863  168  2  6847  170  2  6858  173  3  6896
5   3652      178  3  6903  188  3  6903  198  3  6899  330  3  6900  380  3  7000
6   3670  1  2 080 080  1  2 040 040  1  2 065 065
3   3700 AF1   0  13  3  688   14220 99 99
5   3750        0  1  7000   40  1  6900  122  1  6900  133  2  6897  143  2  6863
5   3751      150  2  6859  156  2  6858  165  2  6851  172  3  6894  197  3  6903
5   3752      247  3  6896  320  3  6900  380  3  7000
6   3770  1  2 050 050  1  2 035 035  1  2 060 060
3   3800 AG    0  14  3  689   14290 99 99
5   3850        0  1  7000   30  1  6904   43  2  6886   44  2  6860   50  2  6812
5   3851       58  2  6795   66  2  6793   74  2  6796   80  2  6843   85  2  6858
5   3852       87  3  6894   94  3  6900  120  3  6896  240  3  7000
6   3870  1  2 035 035  1  2 035 035  1  2 060 060
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1  PINE RUN CENTER ST TO MILL ST  AH TO AJ   LFS     3  4  2  5 12
2      2  69264  69416  69479  69650
3  3900 AH     1  13  3  688   14400 99 99
4      4    740   1010   1110   1350
**SEQUENCE**
5  3950        0  1  7000   28  1  6910   66  1  6899   86  2  6885   90  2  6859
5  3951       97  2  6859  100  2  6855  104  2  6863  109  3  6891  138  3  6895
5  3952      275  3  6895  370  3  6980  390  3  7000
5  3970  1  2 060 060  1  2 040 040  1  2 045 045
3  4000 AI     0  15  3  688   14690 99 99
5  4050      -25  1  7000   -6  1  6899   24  2  6892   32  2  6869   42  2  6861
5  4051       46  2  6871   54  3  6902   80  3  6899  132  3  6896  200  3  6920
5  4052      220  3  6940  240  3  6960  250  3  6980  260  3  7000  270  3  7020
6  4070  1  2 070 070  1  2 050 050  1  2 035 035
3  4100 AJ     0  14  3  690   14920 99 99
5  4150        0  1  7100   40  1  7000   50  1  6980   75  1  6960  100  1  6906
5  4151      118  2  6913  124  2  6880  142  2  6862  148  2  6868  158  3  6928
5  4152      186  3  6928  210  3  6960  220  3  6980  230  3  7000
5  4170  1  2 070 070  1  2 048 048  1  2 030 030
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 PINE CLIO RD TO VIENNA RD   SEC AK TO AN   LES      3  4  2  5 12
2      2  69331  69487  69550  69727
3  4300 AK     1  13  3  688   14990 99 99
4      4    695    950   1040   1270
**SEQUENCE**
5  4350        0  1  7040   15  1  7000   35  1  6903   78  1  6903   89  1  6896
5  4351      105  2  6873  115  2  6867  123  3  6873  135  3  6895  173  3  6906
5  4352      220  3  6920  280  3  7020  310  3  7040
6  4370  1  2 040 040  1  2 042 042  1  2 040 040
3  4400 AI     0  15  3  689   15540 99 99
5  4450       45  1  7000   50  1  6980   65  1  6940  166  1  6922  195  1  6922
5  4451      214  2  6918  238  2  6882  245  2  6877  251  2  6876  264  3  6919
5  4452      306  3  6930  330  3  6940  350  3  6960  360  3  6980  410  3  7000
6  4470  1  2 038 038  1  2 038 038  1  2 040 040
3  4500 AN     0  13  3  688   16090 99 99
5  4550       60  1  7000   73  1  6942  101  2  6920  107  2  6883  120  2  6867
5  4551      130  2  6857  147  2  6872  153  3  6907  178  3  6930  205  3  6940
5  4552      225  3  6960  280  3  6980  320  3  7000
6  4570  1  2 040 040  1  2 035 035  1  2 040 040
```

```
....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      LINE RUN - MASON DR VIENNA RD TO C&O RR  LES      11  4  2  5 12
2     2  69433  69558  69616  69764
3  4800 AO     1    8  1  692   16230 99 99
4     4    695    950   1040   1270
**SEQUENCE**
5  4850       74  1  7067   82  1  7022   98  1  6993  120  1  6888  132  1  6875
5  4851      140  1  6884  200  1  7061  210  1  7079
6  4870  1  2 055 055
3  4900 AO     0    8  3  691   16780 99 99
5  4950       50  1  7000   70  1  6940  200  2  6920  210  2  6862  225  2  6862
5  4951      230  3  6920  300  3  6940  325  3  7000
6  4970  1  2 080 080  1  2 045 045  1  2 080 080
3  5000 AO     0   14  3  692   17330 99 99
5  5050        0  1  7100   20  1  7060   30  1  7040   50  1  7020   70  1  7000
5  5051      100  1  6960  470  1  6940  478  2  6933  490  2  6900  498  2  6889
5  5052      506  2  6898  510  3  6937  555  3  7049  690  3  7100
6  5070  1  2 075 075  1  2 042 042  1  2 075 075
3  5100 AO     0   11  3  693   18000 99 99
5  5150        0  1  7100   50  1  6960  200  2  6940  205  2  6920  210  2  6908
5  5151      225  2  6908  225  3  6940  330  3  6960  375  3  7060  390  3  7080
5  5152      410  3  7100
6  5170  1  2 080 080  1  2 045 045  1  2 080 080
3  5200 A      1   18  3  693   18600 99 99
4     4    480    655    720    875
**SEQUENCE**
5  5250        0  1  7100   40  1  7060   60  1  7000   80  1  6960  131  1  6950
5  5251      146  1  6946  153  1  6929  163  1  6958  177  1  6956  191  2  6960
5  5252      196  2  6917  200  2  6912  205  2  6919  210  3  6963  216  3  6966
5  5253      250  3  7000  310  3  7040  340  3  7100
6  5270  1  2 080 080  1  2 042 042  1  2 065 065
3  5300 A      0    9  3  693   18820 99 99
5  5350        0  1  7100   20  1  7000   65  1  6960  155  2  6940  160  2  6918
5  5351      170  2  6916  175  3  6940  190  3  7000  230  3  7100
6  5370  1  2 080 080  1  2 042 042  1  2 065 065
3  5400 C      0   17  3  694   19340 99 99
5  5450        0  1  7100   25  1  7080   60  1  7000  166  1  6987  190  1  6959
5  5451      210  1  6956  230  1  6958  250  1  6959  263  2  6963  270  2  6933
5  5452      275  2  6915  278  2  6947  285  3  6965  295  3  6965  310  3  7000
5  5453      340  3  7020  370  3  7100
6  5470  1  2 100 100  1  2 048 048  1  2 080 080
3  5500 D      0   10  3  695   19630 99 99
5  5550        0  1  7050   20  1  7000   40  2  6960   50  2  6931   55  2  6931
5  5551       65  2  6960   75  3  6980  170  3  7000  210  3  7020  240  3  7100
6  5570  1  2 090 090  1  2 040 040  1  2 090 090
3  5600 E      0   10  3  696   20160 99 99
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  5050       0  1  7050   20  1  7020   25  1  6987   41  2  6984   47  2  6941
5  5051      55  2  6923   64  2  6933   67  3  6978   95  3  7020  120  3  7100
6  5070  1  2 120 120  1  2 055 055  1  2 090 090
3  5700 E1    0  11  3  697   20410 99 99
5  5750       0  1  7100   10  1  7060   55  1  7002   62  1  6995   67  2  6984
5  5751      69  2  6971   75  2  6955   84  2  6974   90  3  7016  104  3  7073
5  5752     125  3  7100
6  5770  1  2 120 120  1  2 050 050  1  2 100 100
3  5800 F     0  14  3  701   20940 99 99
5  5850       0  1  7100   20  1  7080   52  1  7061   61  1  7050   73  1  7032
5  5851      79  2  7006   67  2  6985   95  2  6973   99  2  6978  106  3  7017
5  5852     140  3  7040  165  3  7060  180  3  7080  190  3  7100
6  5870  1  2 100 100  1  2 045 045  1  2 090 090
```

```
1      [illegible]INE RUN SEC R MASON DR TO VIENNA RD BD [illegible]ES     15  4  2  5 12
2      2  69638  69700  69730  69848
3  5100 AR     1  11  3  693   18000 99 99
4      4    695    950   1040   1270
**SEQUENCE**
5  5150        0  1  7100   50  1  6960  200  2  6940  205  2  6920  210  2  6908
5  5151      225  2  6908  225  3  6940  330  3  6960  375  3  7060  390  3  7080
5  5152      410  3  7100
6  5170  1  2 080 080  1  2 045 045  1  2 080 080
3  5200 AS     1  14  3  695   18630 99 99
4  5220      325    440    485    590
5  5250        0  1  7120   15  1  7100   70  1  6980   84  1  6960   90  2  6959
5  5251       96  2  6923   97  2  6921  102  2  6927  110  3  6950  118  3  6957
5  5252      127  3  6953  360  3  6980  390  3  7000  440  3  7120
6  5270  1  2 080 080  1  2 050 050  1  2 090 090
3  5300 AT     0  11  3  697   19100 99 99
5  5350        0  1  7100   25  1  7000  120  1  6980  235  2  6974  239  2  6957
5  5351      254  2  6954  260  2  6946  266  2  6964  274  3  6986  300  3  7000
5  5352      350  3  7100
6  5370  1  2 070 070  1  2 048 048  1  2 080 080
3  5400 AU     0  11  3  697   19490 99 99
5  5450        0  1  7120   40  1  7100   90  1  7000  100  2  6980  105  2  6960
5  5451      115  2  6960  115  3  6980  310  3  7000  340  3  7020  380  3  7100
5  5452      420  3  7200
6  5470  1  2 080 080  1  2 060 060  1  2 090 090
3  5500 AV     0  18  3  700   19890 99 99
5  5550        0  1  7200   25  1  7100   45  1  7040  100  1  7020  137  1  7010
5  5551      157  1  7013  187  1  7011  212  2  7016  216  2  6986  220  2  6980
5  5552      225  2  6985  231  3  7012  247  3  7042  250  3  7100  265  3  7140
5  5553      310  3  7160  350  3  7180  400  3  7200
6  5570  1  2 070 070  1  2 055 055  1  2 100 100
3  5600 AW     0  11  3  701   20240 99 99
5  5650        0  1  7200   10  1  7100   30  1  7040   70  1  7020  240  1  7020
5  5651      295  2  7020  300  2  6993  310  2  6993  315  2  7020  320  3  7100
5  5652      420  3  7200
6  5670  1  2 080 080  1  2 050 050  1  2 100 100
3  5675 AW1    0  10  3  705   20590 99 99
5  5680        0  1  7200   50  1  7100   60  1  7060  220  2  7040  225  2  7015
5  5681      235  2  7015  240  3  7040  290  3  7060  310  3  7100  330  3  7200
6  5690  1  2 080 080  1  2 060 060  1  2 100 100
3  5700 AX     0  12  3  707   20840 99 99
5  5750        0  1  7200   40  1  7100   63  2  7068   66  2  7033   70  2  7030
5  5751       75  2  7039   87  3  7070  105  3  7080  140  3  7080  240  3  7080
5  5752      250  3  7100  280  3  7200
6  5770  1  2 080 080  1  2 065 065  1  2 100 100
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....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
3  5775 AX1    0  10  3  707   21050 99 99
5  5780        0  1  7200   30  1  7100   50  1  7080   75  2  7060   85  2  7040
5  5781       95  2  7040  100  3  7060  260  3  7080  270  3  7100  315  3  7200
6  5790  1  2 080 080  1  2 060 060  1  2 085 085
3  5800 AY     0   9  3  716   21310 99 99
5  5850        0  1  7200   40  1  7100   50  2  7060   55  2  7051   65  2  7051
5  5851       70  3  7060  180  3  7080  210  3  7100  300  3  7200
6  5870  1  2 080 080  1  2 055 055  1  2 070 070
3  5900 AZ     0  13  3  708   21760 99 99
5  5950        0  1  7200   28  2  7104   31  2  7101   34  2  7067   37  2  7063
5  5951       45  2  7071   49  3  7088   57  3  7097   70  3  7100  190  3  7120
5  5952      220  3  7140  240  3  7160  260  3  7200
6  5970  1  2 080 080  1  2 050 050  1  2 075 075
3  6000 BB     0  11  3  708   22280 99 99
5  6050        0  1  7200   30  1  7120  150  2  7100  160  2  7080  165  2  7069
5  6051      175  2  7069  180  3  7080  210  3  7100  240  3  7120  270  3  7140
5  6052      330  3  7200
6  6070  1  2 100 100  1  2 055 055  1  2 100 100
3  6100 BB     1  13  3  711   22640 99 99
4  6120    290    400    435    530
5  6150        0  1  7240   30  1  7200   70  1  7120  133  2  7104  139  2  7102
5  6151      142  2  7096  147  2  7092  150  2  7096  156  2  7112  162  3  7110
5  6152      175  3  7200  180  3  7220  210  3  7240
6  6170  1  2 100 100  1  2 050 050  1  2 100 100
3  6200 BC     0  11  3  711   22800 99 99
5  6250        0  1  7240   25  1  7200   50  1  7120  130  1  7120  170  1  7120
5  6251      250  2  7100  255  2  7091  265  2  7091  270  3  7100  290  3  7200
5  6252      320  3  7240
6  6270  1  2 100 100  1  2 050 050  1  2 100 100
3  6300 BD     0  16  3  714   23420 99 99
5  6350        0  1  7240   15  1  7220   70  1  7200  180  1  7182  207  1  7153
5  6351      237  1  7146  246  2  7138  251  2  7114  255  2  7107  258  2  7109
5  6352      259  2  7123  271  2  7140  277  3  7170  281  3  7175  330  3  7200
5  6353      370  3  7220
6  6370  1  2 100 100  1  2 050 050  1  2 100 100
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WAT[illegible]-SURFACE PROFILE FOR: PINE RUN SECS P[illegible] AC LES
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*
P	AT	7330	0	1110.	2071.	89469.	5.14	180.	892.
	681.48	0.02			681.50	0.54	0.04		*IS*
Q	AT	7860	530	1110.	795.	36134.	1.58	22.	368.
	681.67	0.05	0.20	0.01	681.72	1.40	0.14	0.000	*XS*
R	AT	8360	500	1110.	805.	34019.	2.39	47.	391.
	682.17	0.07	0.50	0.01	682.24	1.38	0.12	0.010	*XS*
S	AT	8860	500	1110.	670.	28954.	2.93	365.	718.
	682.77	0.13	0.63	0.03	682.90	1.66	0.28	0.001	*XS*
T	AT	9420	560	1110.	675.	27546.	2.80	335.	682.
	683.65	0.12	0.87	0.0	683.76	1.64	0.26	0.004	*XS*
U	AT	9870	450	1110.	979.	45157.	1.30	163.	471.
	684.19	0.03	0.45	0.0	684.21	1.13	0.10	0.000	*XS*
V	AT	10380	510	1110.	562.	25165.	3.25	27.	393.
	684.65	0.20	0.55	0.09	684.85	1.98	0.32	0.000	*XS*
W	AT	10830	450	1110.	458.	28224.	1.91	181.	339.
	685.46	0.18	0.78	0.0	685.63	2.43	0.29	0.000	*XS*
X	AT	11110	280	1110.	380.	26177.	2.17	162.	327.
	685.87	0.29	0.47	0.06	686.15	2.92	0.35	0.000	*XS*
Y	AT	11660	550	1110.	502.	26916.	2.63	51.	315.
	686.92	0.20	0.96	0.0	687.12	2.21	0.30	0.000	*XS*
Z	AT	12120	460	1110.	962.	32910.	2.38	86.	640.
	687.71	0.05	0.64	0.0	687.76	1.15	0.12	0.001	*XS*
AA	AT	12740	620	1110.	666.	24982.	3.11	14.	539.
	688.60	0.13	0.93	0.04	688.74	1.67	0.36	0.007	*XS*
AB	AT	13070	330	1110.	801.	26988.	2.25	7.	496.
	689.28	0.07	0.60	0.0	689.34	1.39	0.27	0.003	*XS*
AC	AT	13530	460	1110.	502.	22129.	3.59	49.	481.
	690.12	0.27	0.95	0.10	690.40	2.21	0.37	0.002	*XS*

100 yr

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE= 6/27/78

WATER-SURFACE PROFILE FOR: PINE RUN SECS AD TO AG LES
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID AT DISTANCE/ LENGTH/DISCHARGE/	AREA	/CONVEYANCE/	ALPHA/	LEW /	REW
WS ELEV / HV / HF / HE /	EG /	V /	FN /	ACC	*ID*
AD AT 13610 / 0 / 1110. /	395. /	40161. /	1.19 /	55. /	142.
690.82 / 0.15 / /	690.97 /	2.81 /	0.21/		*IS*
AE AT 13690 / 80 / 1110. /	555. /	28029. /	2.66 /	18. /	293.
690.90 / 0.16 / 0.09 / 0.01 /	691.06 /	2.00 /	0.32 /	0.001	*XS*
AF AT 14080 / 390 / 1110. /	608. /	28410. /	2.53 /	34. /	338.
691.54 / 0.13 / 0.60 / 0.0 /	691.67 /	1.83 /	0.31 /	0.001	*XS*
AF1 AT 14220 / 140 / 1110. /	648. /	41666. /	2.27 /	33. /	330.
691.71 / 0.10 / 0.15 / 0.0 /	691.81 /	1.71 /	0.25 /	-0.001	*XS*
AG AT 14290 / 70 / 1110. /	567. /	84118. /	1.36 /	26. /	145.
691.76 / 0.08 / 0.02 / 0.0 /	691.84 /	1.96 /	0.13 /	-0.000	*XS*

100 yr.

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 11,DATE= 8/25/78

WATER-SURFACE PROFILE FOR: PINE RUN CENTER ST TO MILL ST AH TO AJ LES
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID AT DISTANCE/ LENGTH/DISCHARGE/ AREA /CONVEYANCE/ ALPHA/ LEW / REW WS ELEV / HV / HF / HE / EG / V / FN / ACC *ID*										
AH AT	14400 /	0 /	1110. /	1530. /	142823. /	1.19 /	16. /	334.		318
694.79 /	0.01 /			/ 694.80 /	0.73 /	0.06/		*IS*		
AI AT	14690 /	290 /	1110. /	1094. /	108842. /	1.09 /	-15. /	228.		100 yr.
694.79 /	0.02 /	0.02 /	0.00 /	694.81 /	1.01 /	0.10 /	-0.020	*XS*		
AJ AT	14920 /	230 /	1110. /	449. /	38119. /	1.28 /	81. /	201.		
694.79 /	0.12 /	0.07 /	0.05 /	694.91 /	2.47 /	0.21 /	-0.016	*XS*		

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 11,DATE= 9/13/78

WATER-SURFACE PROFILE FOR: PINE CLIO RD TO VIENNA RD SEC AK TO AN LES
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

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==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV   /    HF   /    HE   /    EG   /    V   /    FN   /   ACC   *ID*
==================================================================================
AK     AT   14990 /     0 /   1040. /  1105. /  123002. / 1.06 /   24. /  241.
  695.50 /   0.01 /                 / 695.51 /    0.94 /  0.07/          *IS*
----------------------------------------------------------------------------------
AL     AT   15540 /   550 /   1040. /   918. /   84546. / 1.29 /   59. /  346.
  695.55 /   0.03 /   0.06 /   0.01 / 695.58 /    1.13 /  0.11 / -0.000  *XS*
----------------------------------------------------------------------------------
AN     AT   16090 /   550 /   1040. /   666. /   88099. / 1.38 /   70. /  221.
  695.62 /   0.05 /   0.08 /   0.01 / 695.67 /    1.56 /  0.12 /  0.000  *XS*
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100 yr.

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 18,DATE=11/ 7/78

WATER-SURFACE PROFILE FOR: PINE RUN - MASON DR VIENNA RD TO C&O RR LES
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECTD	AT DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*
AO	AT 16230	0	1040.	321.	25263.	1.00	105.	166.
696.16	0.16			696.32	3.24	0.25		*IS*
AP	AT 16780	550	1040.	1023.	67199.	2.29	61.	311.
696.64	0.04	0.35	0.0	696.67	1.02	0.12	-0.000	*XS*
AQ	AT 17330	550	1040.	923.	44652.	3.16	94.	523.
696.82	0.06	0.20	0.01	696.89	1.13	0.19	0.000	*XS*
AR	AT 18000	670	1040.	742.	33605.	2.37	45.	336.
697.30	0.07	0.48	0.01	697.37	1.40	0.22	0.000	*XS*
A	AT 18500	600	720.	427.	20550.	2.06	70.	230.
697.97	0.09	0.67	0.01	698.06	1.68	0.13	0.001	*XS*
B	AT 18620	220	720.	453.	25258.	2.27	40.	185.
698.19	0.09	0.22	0.0	698.28	1.59	0.23	0.001	*XS*
C	AT 19340	520	720.	395.	15808.	2.22	154.	305.
698.85	0.11	0.68	0.01	698.97	1.82	0.30	-0.000	*XS*
D	AT 19630	290	720.	222.	15795.	1.72	23.	139.
699.35	0.28	0.60	0.08	699.63	3.24	0.37	-0.020	*XS*
E	AT 20160	530	720.	228.	15553.	1.46	22.	85.
700.52	0.23	1.12	0.0	700.75	3.16	0.27	0.000	*XS*
E1	AT 20410	250	720.	123.	7254.	1.42	46.	90.
701.41	0.76	1.15	0.27	702.17	5.86	0.62	0.000	*XS*
F	AT 20940	530	720.	214.	15866.	1.65	66.	143.
704.27	0.29	2.39	0.0	704.56	3.37	0.34	0.002	*XS*

100 yr

END OF THIS PROFILE

SECTIO	AT	DISTANCE/ WS ELEV /	LENGTH/ HV /	DISCHARGE/ HF /	AREA / HE /	EG /	NCE/ V /	ALPHA/ FN /	LEW / ACC	REW *ID*
AR	AT	18000 / 697.30 /	0 / 0.07 /	1040. /	742. / 697.3	/	0. / .40 /	2.37 / 0.22/	45. /	336. *IS*
AS	AT	18630 / 698.03 /	630 / 0.05 /	485. / 0.70 /	483. / 0.0 / 698.0	/	4. / .00 /	2.97 / 0.10 /	70. / -0.000	360. *XS*
AT	AT	19100 / 698.76 /	470 / 0.12 /	485. / 0.76 /	245. / 0.03 / 698.8		0. / .98 /	1.89 / 0.33 /	84. / 0.001	277. *XS*
AU	AT	19490 / 700.14 /	390 / 0.10 /	485. / 1.35 /	290. / 0.0 / 700.2	/	8. / .67 /	2.31 / 0.20 /	89. / 0.015	312. *XS*
AV	AT	19890 / 702.33 /	400 / 0.22 /	485. / 2.24 /	179. / 0.06 / 702.5	/	4. / .72 /	1.90 / 0.46 /	91. / 0.014	237. *XS*
AW	AT	20240 / 703.57 /	350 / 0.03 /	485. / 1.05 /	450. / 0.0 / 703.6	/	8. / .08 /	1.89 / 0.12 /	39. / 0.002	316. *XS*
AWI	AT	20590 / 705.03 /	350 / 0.60 /	485. / 1.74 /	113. / 0.28 / 705.6	/	0. / .28 /	2.11 / 0.71 /	138. / 0.002	266. *XS*
AX	AT	20840 / 708.40 /	250 / 0.28 /	485. / 3.05 /	171. / 0.0 / 708.6	/	4. / .83 /	2.27 / 0.41 /	51. / 0.010	242. *XS*
AXI	AT	21050 / 709.13 /	210 / 0.02 /	485. / 0.47 /	517. / 0.0 / 709.1		5. / .94 /	1.69 / 0.09 /	39. / 0.000	266. *XS*
AY	AT	21310 / 709.34 /	260 / 0.04 /	485. / 0.21 /	364. / 0.01 / 709.3		7. / .33 /	1.40 / 0.14 /	42. / 0.000	200. *XS*
AZ	AT	21760 / 710.69 /	450 / 0.62 /	485. / 1.64 /	100. / 0.29 / 711.3		4. / .83 /	1.71 / 0.68 /	27. / 0.004	111. *XS*
BA	AT	22280 / 712.70 /	520 / 0.03 /	485. / 1.43 /	519. / 0.0 / 712.7		3. / .93 /	2.44 / 0.15 /	27. / 0.001	251. *XS*
BB	AT	22640 / 713.14 /	360 / 0.12 /	435. / 0.47 /	214. / 0.04 / 713.2		3. / .03 /	1.82 / 0.34 /	64. / 0.002	165. *XS*
BC	AT	22800 / 713.47 /	160 / 0.04 /	435. / 0.25 /	472. / 0.0 / 713.5		6. / .92 /	2.72 / 0.08 /	45. / 0.000	277. *XS*
BD	AT	23420 / 715.17 /	620 / 0.52 /	435. / 1.93 /	87. / 0.24 / 715.6		[illegible]. / .98 /	1.34 / 0.64 /	213. / 0.004	273. *XS*

100 gr

WATER-SURFACE PROFILE FOR: PINE RUN SECS P TO AC FW LES
PAGE 1 OF 1. PROFILE NUMBER 2. UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
	WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
P	AT	7330	0	1110.	1703.	81427.	4.76	320.	820.	
	681.55	0.03			681.58	0.65	0.04			*IS*
Q	AT	7860	530	1110.	739.	35126.	1.55	68.	368.	
	681.77	0.05	0.23	0.01	681.82	1.50	0.14	0.000		*XS*
R	AT	8360	500	1110.	753.	33463.	2.31	91.	391.	
	682.27	0.08	0.52	0.01	682.35	1.47	0.12	-0.013		*XS*
S	AT	8860	500	1110.	665.	30707.	2.58	418.	718.	
	682.85	0.11	0.60	0.02	682.96	1.67	0.26	0.001		*XS*
T	AT	9420	560	1110.	610.	27817.	2.30	432.	682.	
	683.66	0.12	0.81	0.00	683.78	1.82	0.26	0.003		*XS*
U	AT	9870	450	1110.	863.	42232.	1.26	163.	413.	
	684.22	0.03	0.47	0.0	684.25	1.29	0.10	0.001		*XS*
V	AT	10380	510	1110.	465.	24141.	2.61	27.	277.	
	684.72	0.23	0.62	0.10	684.95	2.39	0.34	-0.017		*XS* FW
W	AT	10830	450	1110.	472.	29755.	1.85	181.	331.	
	685.56	0.16	0.77	0.0	685.72	2.35	0.27	0.000		*XS*
X	AT	11110	280	1110.	385.	27155.	2.08	162.	312.	
	685.94	0.27	0.43	0.05	686.20	2.89	0.34	0.000		*XS*
Y	AT	11660	550	1110.	439.	25795.	2.30	115.	315.	
	686.94	0.23	0.97	0.0	687.16	2.53	0.31	-0.007		*XS*
Z	AT	12120	460	1110.	869.	32144.	2.21	84.	533.	A
	687.79	0.06	0.68	0.0	687.85	1.28	0.12	0.003		*XS*
AA	AT	12740	620	1110.	611.	25491.	2.68	15.	415.	
	688.69	0.14	0.93	0.04	688.83	1.82	0.35	0.005		*XS*
AB	AT	13070	330	1110.	724.	26316.	2.10	10.	410.	
	689.36	0.08	0.61	0.0	689.44	1.53	0.27	0.002		*XS*
AC	AT	13530	460	1110.	417.	22433.	2.53	50.	280.	
	690.22	0.28	0.96	0.10	690.50	2.66	0.36	0.001		*XS*

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 10,DATE=11/17/78

WATER-SURFACE PROFILE FOR: PINE RUN SECS AD TO AG FW LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
AD AT 13610	0	1110.	398.	41154.	1.17	55.	135.	
690.92	0.14			691.06	2.79	0.20		*IS*
AE AT 13690	80	1110.	534.	28740.	2.42	20.	250.	
690.99	0.16	0.08	0.01	691.16	2.08	0.32	0.000	*XS*
AF AT 14080	390	1110.	517.	26814.	2.28	80.	310.	FW
691.62	0.16	0.62	0.00	691.79	2.15	0.33	0.006	*XS*
AF1 AT 14220	140	1110.	592.	41121.	2.11	60.	300.	
691.83	0.12	0.16	0.0	691.94	1.87	0.26	-0.001	*XS*
AG AT 14290	70	1110.	565.	86208.	1.31	26.	126.	
691.89	0.08	0.02	0.0	691.97	1.97	0.13	-0.000	*XS*

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 10,DATE=11/17/78

WATER-SURFACE PROFILE FOR: PINE RUN CENTER ST TO MILL ST AH-AJ FW LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
AH AT 14400 / 694.89	0 / 0.02	1110. /	1136. /	111857. / 694.91	1.22 / 0.98	16. / 0.07	226.	*IS*
AI AT 14690 / 694.92	290 / 0.02	1110. / 0.03	1035. / 0.00	110092. / 694.94	1.12 / 1.07	-15. / 0.10	185. / 0.000	*XS*
AJ AT 14920 / 694.92	230 / 0.11	1110. / 0.06	465. / 0.05	40031. / 695.03	1.27 / 2.39	81. / 0.20	201. / -0.018	*XS*

FW

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 10,DATE=11/17/78

WATER-SURFACE PROFILE FOR: PINE CLIO RD TO VIENNA RD SEC AK-AN FW LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
AK	AT	14990	0	1040.	1101.	127072.	1.05	24.	224.
695.60	0.01				695.61	0.94	0.07		*IS*
AL	AT	15540	550	1040.	752.	75649.	1.23	145.	345.
695.65	0.04	0.06	0.01		695.69	1.38	0.13	-0.000	*XS*
AN	AT	16090	550	1040.	662.	90860.	1.31	75.	205.
695.73	0.05	0.09	0.01		695.78	1.57	0.12	-0.000	*XS*

FW

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: PINE RUN-MASON DR SEC AO TO SEC F FW LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

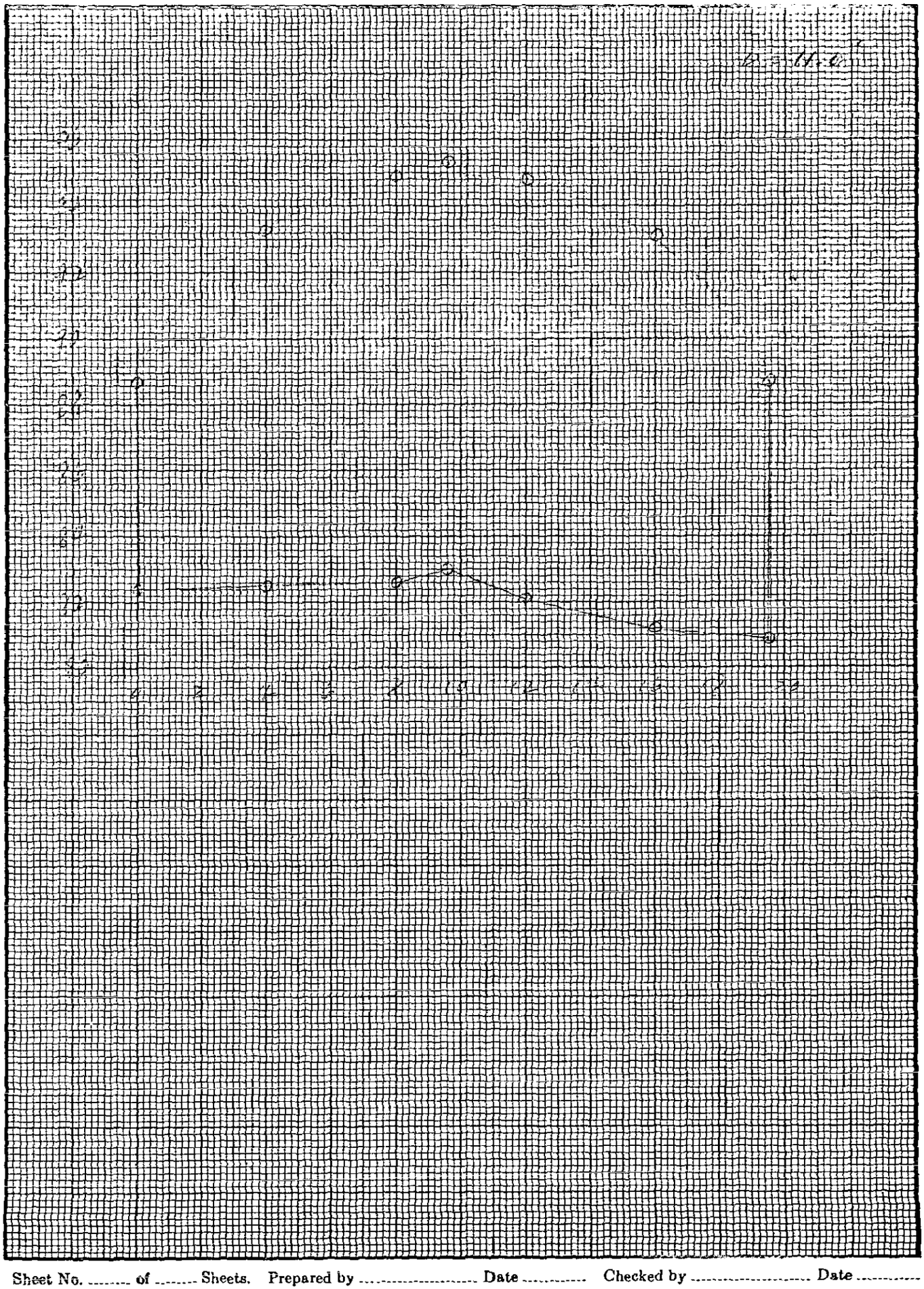
SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
AO	AT	16230	0	1040.	326.	26300.	1.00	105.	165.
696.26	0.16				696.42	3.19	0.24		*IS*
AP	AT	16780	550	1040.	911.	64342.	2.13	110.	310.
696.73	0.04	0.35	0.0		696.77	1.14	0.12	-0.000	*XS*
AQ	AT	17330	550	1040.	812.	44605.	2.60	220.	520.
696.92	0.07	0.21	0.01		696.99	1.28	0.19	0.000	*XS*
AR	AT	18000	670	1040.	716.	34339.	2.19	70.	320.
697.39	0.07	0.47	0.00		697.47	1.45	0.22	0.000	*XS*
A	AT	18600	600	720.	427.	21101.	1.98	80.	230.
698.03	0.09	0.64	0.01		698.12	1.69	0.13	0.001	*XS*
B	AT	18820	220	720.	432.	25734.	2.04	65.	185.
698.24	0.09	0.21	0.00		698.33	1.67	0.23	0.001	*XS*
C	AT	19340	520	720.	373.	16246.	1.91	185.	305.
698.87	0.11	0.64	0.01		698.98	1.93	0.29	0.001	*XS*
D	AT	19630	290	720.	222.	16004.	1.67	23.	123.
699.37	0.27	0.58	0.08		699.65	3.25	0.37	0.003	*XS*
E	AT	20160	530	720.	228.	15559.	1.46	22.	85.
700.52	0.23	1.10	0.0		700.75	3.16	0.27	0.000	*XS*
E1	AT	20410	250	720.	123.	7259.	1.42	46.	90.
701.41	0.76	1.15	0.27		702.17	5.86	0.62	0.001	*XS*
F	AT	20940	530	720.	214.	15856.	1.64	66.	143.
704.26	0.29	2.39	0.0		704.55	3.37	0.34	0.001	*XS*

FW

END OF THIS PROFILE

SECID	A	DISTANCE	LENGTH	DISCHARGE	AREA	CONV	ANCE	ALPHA	LEW	REW
WS	FLEV	HV	HF	HF	EG	V	FN	ACC	*ID*	
AR	AT	18000	0	1040.	715.	34282.	2.19	70.	320.	
697.39	0.07				697.46	1.45	0.22		*IS*	
AS	AT	18630	630	485.	483.	16537.	2.59	70.	320.	
698.07	0.04	0.65	0.0		698.11	1.00	0.09	0.002	*XS*	
AT	AT	19100	470	485.	227.	9238.	1.68	125.	275.	
698.76	0.12	0.72	0.04		698.88	2.13	0.34	0.004	*XS*	
AU	AT	19490	390	485.	255.	7364.	1.84	90.	240.	
700.13	0.10	1.35	0.0		700.24	1.90	0.20	0.011	*XS*	
AV	AT	19890	400	485.	176.	5729.	1.86	97.	237.	
702.32	0.22	2.23	0.06		702.54	2.75	0.46	0.017	*XS*	
AW	AT	20240	350	485.	371.	12465.	1.78	115.	315.	
703.65	0.05	1.15	0.0		703.70	1.31	0.14	0.006	*XS*	
AW1	AT	20590	350	485.	126.	3891.	2.07	140.	260.	
705.14	0.47	1.70	0.21		705.61	3.84	0.63	0.001	*XS*	FW
AX	AT	20840	250	485.	138.	5008.	1.86	55.	205.	
708.28	0.36	3.02	0.0		708.64	3.52	0.46	0.006	*XS*	
AX1	AT	21050	210	485.	412.	17123.	1.51	40.	190.	
709.18	0.03	0.58	0.0		709.22	1.18	0.10	0.001	*XS*	
AY	AT	21310	260	485.	372.	16008.	1.35	45.	195.	
709.41	0.04	0.22	0.00		709.44	1.30	0.13	0.000	*XS*	
AZ	AT	21760	450	485.	97.	4248.	1.71	30.	109.	
710.66	0.67	1.56	0.32		711.32	5.01	0.67	0.009	*XS*	
BA	AT	22280	520	485.	452.	19968.	1.97	80.	230.	
712.73	0.04	1.44	0.0		712.77	1.07	0.15	0.003	*XS*	
BB	AT	22640	360	435.	216.	8158.	1.81	65.	165.	
713.16	0.11	0.47	0.04		713.28	2.01	0.33	0.002	*XS*	
BC	AT	22800	160	435.	392.	13759.	2.48	105.	275.	
713.50	0.05	0.27	0.0		713.55	1.11	0.09	0.001	*XS*	
BD	AT	23420	620	435.	89.	4279.	1.35	220.	270.	
715.27	0.50	1.99	0.23		715.77	4.89	0.59	0.002	*XS*	

PINE RUN DS end culvert SEC 2C



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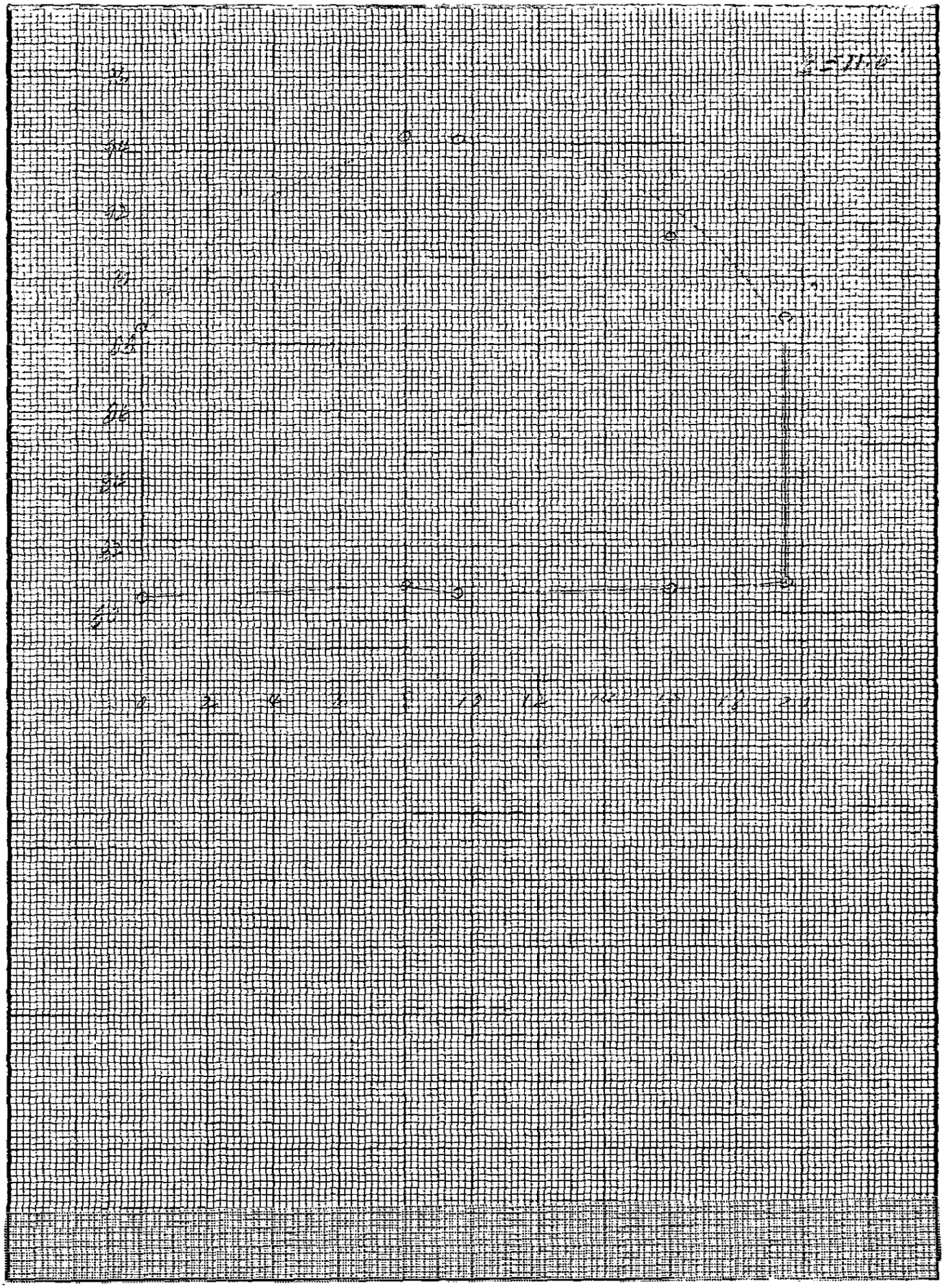
PINE RUN US END culvert SEC 4C



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UNITED STATES DEPARTMENT OF THE INTERIOR
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PINE RUN FES AC CUN. Properties.

DS END

El.	A	WP	R
88	115	32.7	3.52
88.7	129	34.1	3.78
89	135	34.8	3.88
90	154	37.1	4.15
91	172	39.5	4.35
92	188	42.2	4.45

US END

88	142	34.1	4.16
88.4	150	34.9	4.30
89	161	36.5	4.41
90	179	39.1	4.58
91	195	41.8	4.67
92	209	45.1	4.63
93	215	49.1	4.38

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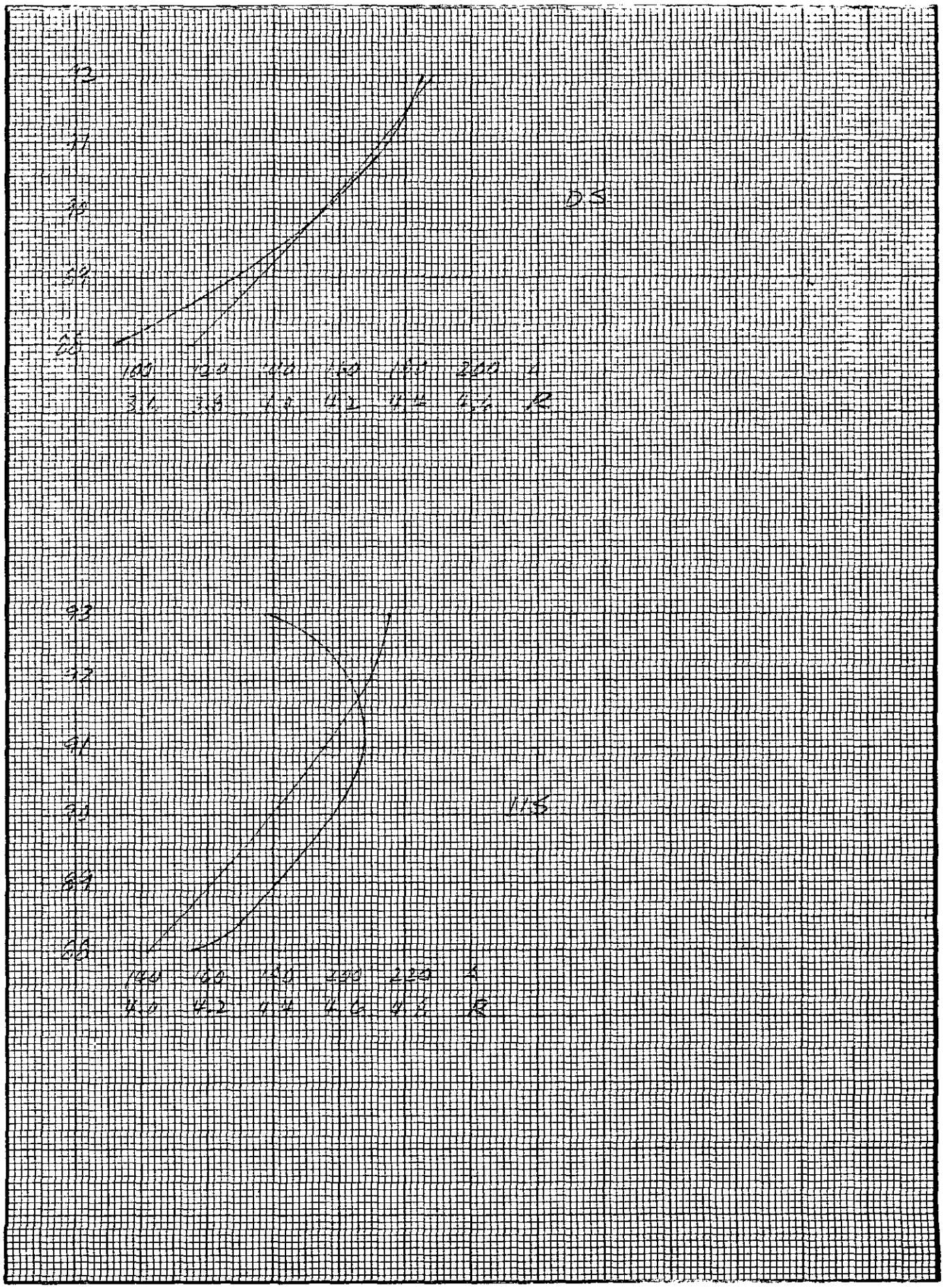
GPO : 1971 OF - 413-014

(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF ...
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....

PINE RUN SEC AC Culvert



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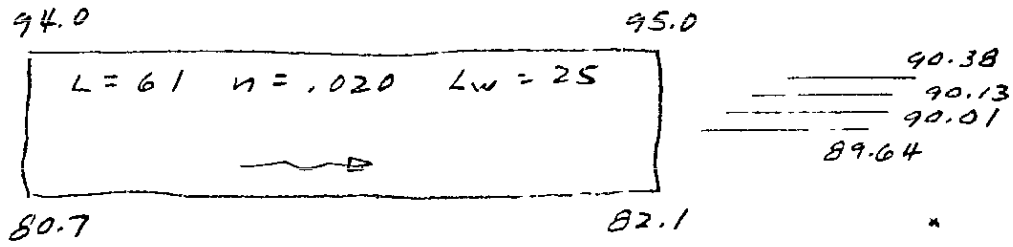
UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....

PINE RUN SEC AC CULVERT



$\frac{Q_{10}}{740}$

Assume III

1. 89.64 A = 149 V = 4.97
2. + .38

Assume d_2 = 9.1 or el 89.8 $K_3 = \frac{1.486}{.02}(1.49)(4.07)^{2/3} = 28,200$

3. + .04 A_2 = 176
3a. − .27 R_2 = 4.55 $K_2 = (\quad)(176)(4.55)^{2/3} = 30,400$

89.79 ok

$$hf_{2\cdot3} = \frac{(61)(740)^2}{(28,200)(30,400)} = .04 \quad V_2 = 4.20 \quad d = 9.0$$

$$V/\sqrt{gd} = 4.20/\sqrt{(9.0)(32.15)} = .25 \quad C = .82(1.21) = .99$$

4. + .01 $\left[\frac{1}{(.99)^2} - 1\right](.38) = .01$

5. + .01 Assume h_1 = 90.1 A_1 = 310 K_1 = 32,800
6. − .09 $hf_{1\cdot2} = \frac{(25)(740)^2}{(32,800)(30,400)} = .01$

89.99

Assume h_1 = 90.0 A_1 = 305 K_1 = 32,050

$$hf_{1\cdot2} = \frac{(25)(740)^2}{(32,800)(30,400)} = .01$$

5. + .01
6. − .09

89.99 ok

Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

GPO : 1971 OF - 413-014

PINE RUN AT SES AC CULVERT

$Q_{50} = 1010$

1. 90.01 $\quad A_3 = 154 \quad K_3 = \frac{1.486}{(.02)}(154)(4.15)^{2/3} = 29{,}500$ $\quad 74.3$
2. + .67

Assume $h_2 = 90.2 \quad A_2 = 183$

3. + .06 $\quad K_2 = (74.3)(183)(4.60)^{2/3} = 37{,}600$
3a − .47 $\quad h_{f_{2\cdot3}} = \frac{(61)(1010)^2}{(29{,}500)(37{,}600)} = .06$

90.27

Assume $h_2 = 90.27 \quad A_2 = 184 \quad R_2 = 4.62$

3. +.06 $\quad K_2 = (74.3)(184)(4.62)^{2/3} = 37{,}900$
3a − .47 $\quad h_{f_{2\cdot3}} = \frac{(61)(1010)^2}{(29{,}500)(37{,}900)} = .06$

90.27 ok

4. +.01 $\quad \left[\frac{1}{(.99)^2} - 1\right](.67) =$ 1.02

5. +.02 $\quad$ Assume $h_1 = 90.4 \quad K_1 = 35{,}250 \quad A_1 = 325$
6. −.15 $\quad h_{f_{1\cdot2}} = \frac{(25)(1010)^2}{(37{,}900)(35{,}250)} = .02$

90.62

Assume $h_1 = 90.6 \quad K_1 = 36{,}900 \quad A_1 = 334$

5. +.02 $\quad h_{f_{1\cdot2}} = \frac{(25)(1010)^2}{(37{,}900)(36{,}900)} = .02$
6. −.14

90.62 ok

PINE RUN AT SEC AC CULVERT

$Q_{100} = 1110$

1. 90.13 $\quad A_3 = 158 \quad K_3 = (74.3)(158)(4.19)^{2/3} = 30,500$
2. +.76 $\quad$ Assume $h_2 = 90.5 \quad A_2 = 188$
3. +.06 $\quad K_2 = (74.3)(188)(4.64)^{2/3} = 38,850$
3a −.54 $\quad h_{f_{2\cdot3}} = \dfrac{(61)(1110)^2}{(30,500)(38,850)} = .06$

90.41

Assume $h_2 = 90.41 \quad A_2 = 186 \quad R_2 = 4.63$

$K_2 = (74.3)(186)(4.63)^{2/3} = 38,400$

$h_{f_{2\cdot3}} = \dfrac{(61)(1110)^2}{(30,500)(38,400)} = .06$

3. +.06
3a −.55

90.40 OK

4. +.02 h_e
5. +.02 h_f $\quad$ Assume $h_1 = 90.7 \quad K_1 = 37,700 \quad A_1 = 334$
6. −.17 h_v $\quad h_{f_{1\cdot2}} = \dfrac{(25)(1110)^2}{(38,400)(37,700)} = .02$

90.80

Assume $h_1 = 90.8 \quad K_1 = 38,600 \quad A_1 = 344$

5. +.02 $\quad h_{f_{1\cdot2}} = \dfrac{(25)(1110)^2}{(38,400)(38,600)} = .02$
6. −.16

90.82 OK

PIKE RUN AT SEC 4C Culvert

$Q_{500} = 1350$

1.	90.38	$A_3 = 162$ $K_3 = (74.3)(162)(4.23)^{2/3} = 31,500$
2.	+ 1.08	Assume $h_2 = 90.7$ $A_2 = 181$
3.	+ .09	$K_2 = (74.3)(181)(4.66)^{2/3} = 37,500$
3a	− .87	$h_{f2\cdot3} = \frac{(61)(1350)^2}{(31,500)(37,500)} = .09$
	90.68 ok	

4.	+ .02	
5.	+ .03	Assume $h_1 = 91.4$ $K_1 = 44,400$ $A_1 = 376$
6.	− .20	$h_{f1\cdot2} = \frac{(25)(1350)^2}{(37,500)(44,400)} = .03$
	91.40 ok	

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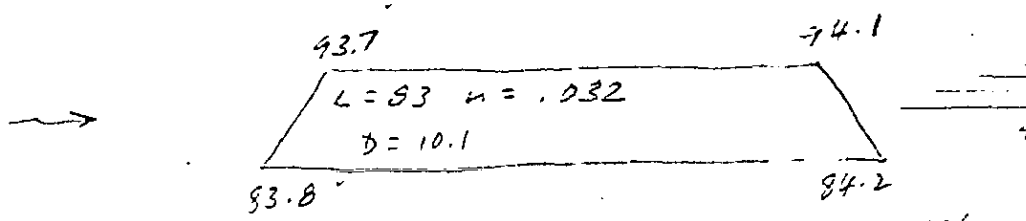
PINE RUN 'EC 4G CULVERT



$L_p = 5$

				L_w	L_D/D	K_L	$n'/D = .01$	
II	D + 2 d	=	573.80	.93 × 1.04		× .90	.87	
III	" + "	=	590.77	.93 × 1.04	.7	× .91	.87	
	1.1 D + "	=	5[illegible].91	.93 × 1.04	.5	× .91	.82	
	1.5 D + "	=	5[illegible].15	.93 × 1.04	.5	× .91	.77	
	1.5 D + "	=	5[illegible].15	.48 × .91	= .44			
IV	2 D + "	=	604.00	.54 "	.49			
	3 D + "	=	614.10	.58 "	.53			
	5 D + "	=	634.30	.62 "	.56			

II & VI, C = .67

$Q_{10} = 740$ $h_4 = h_3 = 91.18$

1. 91.18
2. + 1.14
3. + .41
   − .72
   92.0

$d/D = 5.88/10.1 = .58$ $A = .849(10.1)^2 = 86.6$

$\frac{LQ^2}{K_2 K_3} = \frac{(93)(740)^2}{(9130)(12,100)} = .41$ $\frac{(.613)(10.1)^{8/3}}{.032} = 9130 = K_3$

Assume $d_2 = 7.6$ $K_2 = \frac{(.814)(10.1)^{8/3}}{.032} = 12,100$ $d_2 = El.\ 91.4$

$A_2 = (1.073)(10.1)^2 = 109$ $V_2 = 679$ $d_2/D = \frac{7.6}{10.1} = .75$

Assume $d_2 = 8.2$ $d_2/10.1 = .81$ d_2 El = 92.0

3. + .39
   − .63
   92.08 OK

$\frac{(93)(740)^2}{9130(12,800)} = .39$ $K_3 = .858(14,900) = 12,800$

$A_3 = 1.136 D^2 = 116$ $\frac{V_2^2}{2g} = .63$

4. + .56
5. + .01
6. − 0
   93.28

Assume $h_1 = 94.9$ $C = .82 \cdot \left(\frac{1}{.82^2} - 1\right) V_3^2/2g =$

$\frac{(20)(740)^2}{(12,100)(147,000)} =$ $V_1 = \frac{740}{1560}$

$L_w = 20$

Sheet No. 1 of 4 Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

PINE RL'N SEC 4G CULVERT

$Q_{500} = 1350$ $h_4 = h_3 = 92.17$

1. 92.17 $d_3/D = 7.97/10.1 = .79$ $A_3 = 114$ $K_3 = 12,600$
2. +2.18
3. + .90 Assume $d_2 = 9.4$ $d_2/D = .93$ $K_2 = 13,400$ $d_2 = El\ 93.2$
   − 1.76 $\frac{(83)(1350)^2}{(12,600)(13,400)} = .90$ $A_2 = 127$
   93.49
3. + .91 Assume $d_2 = 9.7$ $d_2/D = .96$ $K_2 = 13,200$ $d_2 = El\ 93.5$
   − 1.73 $\frac{(83)(1350)^2}{(12,600)(13,200)} = .91$ $A_2 = 128$
   93.53 OK
4. + 1.14 Assume $h_1 = 95.3$ $c = .81$ $\frac{1}{c^2} - 1 (2.12) = 1.14$
5. + .02 $\frac{(20)(1350)^2}{(13,200)(170,000)} = .02$ $K_1 = 170,000$
6. ~~− .01~~ $A_1 = 1680$
   ~~96.41~~

Assume $h_1 = 96.4$ $c = .80$ $\frac{1}{c^2} - 1 (2.12) = 1.23$

4. + 1.23
5. .01 (est)
6. 0 (est)
   96.50 USE

$\frac{h_1 - Z}{D} = 1.25 < 1.5$ OK

$h_c/D = .66$ $h_c = 6.7$

PINE RUN EC 4A CULVERT

4. +.63 Assume h_1 = 94.2 c = .83 $\frac{1}{c^2} - 1 (1.37) = .63$
5. +.01 K_1 = 117,000 $\frac{(20)(1010)^2}{(13.200)(117,000)} = .01$
6. −.01 A_1 = 1340
94.16 USE

$\frac{h_1 - z}{D} = \frac{9.96 + 0.4}{10.1} = 1.0 < 1.5$ OK.
$d_c/D = .62$ $d_c = 6.3$

Q_{100} = 1110 $h_4 = h_3$ = 91.76

1. 91.76 $d_3/D = 7.56/10.1 = .75$ A_3 = 109
2. + 1.61
3. + .64 Assume d_2 = 8.8 d_2/D = .87 K_2 = 13,300 d_2 = El. 92.6
− 1.29 K_3 = 12,100 $\frac{(83)(1110)^2}{(12,100)(13,300)} = .64$ A_2 = 122
92.72

3. + .64 Assume d_2 = 8.9 d_2/D = .88 K_2 = 13,300 d_2 = El 92.7
− 1.27 $\frac{(83)(1110)^2}{(12,100)(13300)} = .64$ A_2 = 123
92.74 OK

~~4. +.73~~ Assume h_1 = 94.5 c = .83 $\frac{1}{c^2} - 1 (1.61) =$
~~5. +.01~~ K_1 = 128,000 $\frac{(20)(1110)^2}{(13,300)(128,000)} = .01$
~~6. −.01~~ A_1 = 1440
~~94.74~~

4. +.78 Assume h_1 = 94.75 c = .82
5. +.01 K_1 = 139,000
6. −.01
94.79 USE

$\frac{h_1 - z}{D} = \frac{10.59 + 0.4}{10.1} = 1.1 < 1.5$ OK
d_c/D = .63 d_c = 6.4

Sheet No. 3 of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

PINE RUN SEC CULVERT AG LES BASE ELEVATION = 684.20 Z = -0.40

APPROACH ELEVATION	AREA	CONVEYANCE	ALPHA	TOP WIDTH	QC
683.70	0.0	0.0	0.0	0.0	0.0
684.60	0.0	0.0	0.0	0.0	0.0
685.50	0.0	0.0	0.0	0.0	0.0
686.40	7.8	185.8	1.000	14.9	31.94
687.30	22.6	953.8	1.000	17.9	143.85
688.20	40.1	2212.6	1.000	20.9	314.71
689.10	62.5	4075.5	1.065	31.6	499.66
690.00	186.9	8884.7	2.283	218.0	981.74
690.90	401.6	21093.5	1.831	259.1	2836.49
691.80	643.2	40106.7	1.485	275.2	5580.67
692.70	896.7	64894.5	1.325	288.0	8977.39
693.60	1161.7	95030.6	1.246	300.9	12952.00
694.50	1438.2	130317.7	1.201	313.8	17473.12
695.40	1726.3	170649.9	1.173	326.6	22521.91
696.30	2026.0	215975.9	1.154	339.5	28086.87
697.20	2337.3	266279.4	1.141	352.3	34161.19
698.10	2660.1	321633.4	1.132	365.1	40747.60
699.00	2994.0	382513.2	1.124	376.9	47886.09
699.90	3338.4	448406.2	1.119	388.7	55520.75
700.80	3694.1	518580.9	1.117	402.0	63546.92
701.70	4061.9	593808.0	1.116	415.5	72069.94
702.60	4441.9	674252.6	1.116	429.0	81107.94
703.50	4834.0	759983.6	1.116	442.5	90665.62
704.40	5234.6	849583.6	1.119	457.9	100540.69

Check [illegible] computations [illegible] [illegible] [illegible]

PINE RUN SEC CULVERT AG LES BASE ELEVATION = 684.20 Z = -0.40

BARREL DEPTH	AREA	CONVEYANCE	TOP WIDTH	WETTED PERIMETER
0.0	0.0	0.0	0.0	
0.404	2.55	49.2	9.43	9.48
0.808	7.18	219.7	13.29	13.42
1.212	13.07	537.0	15.41	15.71
1.616	19.46	997.0	16.13	16.80
2.020	26.06	1567.2	16.47	17.68
2.424	32.74	2134.4	16.60	19.68
2.828	39.43	2832.8	16.52	20.49
3.232	46.08	3578.8	16.40	21.31
3.636	52.68	4360.8	16.24	22.13
4.040	59.20	5168.2	16.04	22.96
4.444	65.63	5991.2	15.79	23.81
4.848	71.95	6820.1	15.49	24.67
5.252	78.14	7645.9	15.15	25.55
5.656	84.18	8459.2	14.76	26.45
6.060	90.06	9250.7	14.30	27.37
6.464	95.73	10011.0	13.79	28.33
6.868	101.19	10729.9	13.21	29.33
7.272	106.40	11396.6	12.55	30.37
7.676	111.32	11999.2	11.79	31.48
8.080	115.91	12524.0	10.93	32.66
8.484	120.13	12954.0	9.93	33.95
8.888	123.91	13266.9	8.73	35.39
9.292	127.15	13428.7	7.26	37.07
9.696	129.71	13371.1	5.28	39.21
10.100	131.20	12759.2	1.29	43.29

PINE RUN SFC CULVERT AG LES BASE ELEVATION = 684.20 Z = -0.40

Q	ELEV H1	ELEV H4	D2	D3	TYPE	C	C ADJUSTED
700.0	691.82	********	6.50	4.23	2	0.86	0.86
700.0	692.36	691.00	7.66	6.80	3	0.85	0.85
700.0	692.48	691.18	7.81	6.98	3	0.85	0.85
700.0	692.79	691.60	8.17	7.40	3	0.85	0.85
700.0	692.91	691.76	8.32	7.56	3	0.84	0.84
700.0	693.10	692.00	8.53	7.80	3	0.84	0.84
700.0	693.24	692.17	8.69	7.97	3	0.84	0.84
700.0	693.96	693.00	9.47	8.80	3	0.83	0.83
700.0	694.91	694.00	10.10	9.80	3	0.82	0.82
700.0	696.23	695.00	10.10	10.10	4	0.67	0.67
740.0	692.12	********	6.69	4.37	2	0.85	0.85
740.0	692.53	691.00	7.72	6.80	3	0.85	0.85
740.0	692.64	691.18	7.87	6.98	3	0.85	0.85
740.0	692.93	691.60	8.22	7.40	3	0.84	0.84
740.0	693.05	691.76	8.36	7.56	3	0.84	0.84
740.0	693.23	692.00	8.58	7.80	3	0.84	0.84
740.0	693.37	692.17	8.73	7.97	3	0.84	0.84
740.0	694.07	693.00	9.50	8.80	3	0.83	0.83
740.0	695.02	694.00	10.10	9.80	3	0.82	0.82
740.0	696.38	695.00	10.10	10.10	4	0.67	0.67
800.0	692.56	********	6.98	4.57	2	0.85	0.85
800.0	692.79	691.00	7.82	6.80	3	0.85	0.85
800.0	692.90	691.18	7.96	6.98	3	0.84	0.84
800.0	693.16	691.60	8.30	7.40	3	0.84	0.84
800.0	693.27	691.76	8.44	7.56	3	0.84	0.84
800.0	693.45	692.00	8.64	7.80	3	0.84	0.84
800.0	693.58	692.17	8.79	7.97	3	0.84	0.84
800.0	694.26	693.00	9.56	8.80	3	0.83	0.83
800.0	695.20	694.00	10.10	9.80	3	0.82	0.82
800.0	696.61	695.00	10.10	10.10	4	0.67	0.67
900.0	693.30	********	7.44	4.91	2	0.84	0.84
900.0	693.28	691.00	8.01	6.80	3	0.84	0.84
900.0	693.37	691.18	8.14	6.98	3	0.84	0.84
900.0	693.59	691.60	8.45	7.40	3	0.84	0.84
900.0	693.69	691.76	8.58	7.56	3	0.84	0.84
900.0	693.85	692.00	8.78	7.80	3	0.83	0.83
900.0	693.96	692.17	8.92	7.97	3	0.83	0.83
900.0	694.61	693.00	9.66	8.80	3	0.82	0.82
900.0	695.53	694.00	10.10	9.80	3	0.81	0.81
900.0	697.04	695.00	10.10	10.10	4	0.67	0.67
1000.0	694.04	********	7.88	5.23	2	0.83	0.83

PINE RUN SEC CULVERT AG LES BASE ELEVATION = 684.20 Z = -0.40

Q	ELEV H1	ELEV H4	D2	D3	TYPE	C	C-ADJUSTED
1010.0	694.11	********	7.93	5.26	2	0.83	0.83
1010.0	693.90	691.00	8.26	6.80	3	0.83	0.83
1010.0	693.96	691.18	8.37	6.98	3	0.83	0.83
1010.0	694.14	691.60	8.65	7.40	3	0.83	0.83
1010.0	694.22	691.76	8.76	7.56	3	0.83	0.83
1010.0	694.35	692.00	8.95	7.80	3	0.83	0.83
1010.0	694.45	692.17	9.08	7.97	3	0.83	0.83
1010.0	695.05	693.00	9.79	8.80	3	0.82	0.82
1010.0	695.94	694.00	10.10	9.80	3	0.81	0.81
1010.0	697.57	695.00	10.10	10.10	4	0.67	0.67
1100.0	694.81	********	8.32	5.53	2	0.82	0.82
1100.0	694.48	691.00	8.50	6.80	3	0.83	0.83
1100.0	694.51	691.18	8.59	6.98	3	0.82	0.82
1100.0	694.64	691.60	8.83	7.40	3	0.82	0.82
1100.0	694.70	691.76	8.94	7.56	3	0.82	0.82
1100.0	694.81	692.00	9.11	7.80	3	0.82	0.82
1100.0	694.90	692.17	9.23	7.97	3	0.82	0.82
1100.0	695.46	693.00	9.92	8.80	3	0.81	0.81
1100.0	696.32	694.00	10.10	9.80	3	0.80	0.80
1100.0	698.05	695.00	10.10	10.10	4	0.67	0.67
1110.0	694.88	********	8.37	5.56	2	0.82	0.82
1110.0	694.54	691.00	8.53	6.80	3	0.82	0.82
1110.0	694.57	691.18	8.61	6.98	3	0.82	0.82
1110.0	694.70	691.60	8.86	7.40	3	0.82	0.82
1110.0	694.76	691.76	8.96	7.56	3	0.82	0.82
1110.0	694.87	692.00	9.13	7.80	3	0.82	0.82
1110.0	694.96	692.17	9.25	7.97	3	0.82	0.82
1110.0	695.51	693.00	9.94	8.80	3	0.81	0.81
1110.0	696.37	694.00	10.10	9.80	3	0.80	0.80
1110.0	698.10	695.00	10.10	10.10	4	0.67	0.67
1200.0	695.59	********	8.75	5.82	2	0.81	0.81
1200.0	695.19	691.00	8.80	6.80	3	0.82	0.82
1200.0	695.19	691.18	8.87	6.98	3	0.82	0.82
1200.0	695.26	691.60	9.07	7.40	3	0.82	0.82
1200.0	695.31	691.76	9.16	7.56	3	0.82	0.82
1200.0	695.39	692.00	9.31	7.80	3	0.81	0.81
1200.0	695.47	692.17	9.43	7.97	3	0.81	0.81
1200.0	695.98	693.00	10.08	8.80	3	0.81	0.81
1200.0	696.79	694.00	10.10	9.80	3	0.80	0.80
1200.0	698.63	695.00	10.10	10.10	4	0.67	0.67
1300.0	696.40	********	9.17	6.11	2	0.80	0.80

PINE RUN SEC CULVERT AG LES BASE ELEVATION = 684.20 Z = -0.40

Q	ELEV H1	ELEV H4	D2	D3	TYPE	C	C ADJUSTED
1350.0	696.83	********	9.38	6.24	2	0.80	0.80
1350.0	696.46	691.00	9.33	6.80	3	0.80	0.80
1350.0	696.40	691.18	9.36	6.98	3	0.80	0.80
1350.0	696.35	691.60	9.48	7.40	3	0.80	0.80
1350.0	696.36	691.76	9.55	7.56	3	0.80	0.80
1350.0	696.40	692.00	9.67	7.80	3	0.80	0.80
1350.0	696.45	692.17	9.77	7.97	3	0.80	0.80
1350.0	696.85	693.00	10.10	8.80	3	0.80	0.80
1350.0	697.60	694.00	10.10	9.80	3	0.79	0.79
1350.0	699.59	695.00	10.10	10.10	4	0.67	0.67
1400.0	697.26	********	9.59	6.38	2	0.79	0.79
1400.0	696.94	691.00	9.53	6.80	3	0.79	0.79
1400.0	696.86	691.18	9.55	6.98	3	0.80	0.80
1400.0	696.76	691.60	9.64	7.40	3	0.80	0.80
1400.0	696.76	691.76	9.70	7.56	3	0.80	0.80
1400.0	696.79	692.00	9.81	7.80	3	0.80	0.80
1400.0	696.83	692.17	9.90	7.97	3	0.80	0.80
1400.0	697.17	693.00	10.10	8.80	3	0.79	0.79
1400.0	697.90	694.00	10.10	9.80	3	0.78	0.78
1400.0	699.94	695.00	10.10	10.10	4	0.67	0.67

S-191
(July 1952)
Cross-section
projection

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File

FLOOD OF

SECTION AH [illegible] → SEC AF only

STA.	DIST.	W. S. ELEV.	ELEV.	DEPTH	MEAN DEPTH	AREA		W. P.		
L. B.										
0			700.0							n = .050
										[illegible] = .13
28	—	691.0	691.0	—	—	—		—		$Q^{2/3}$ = [illegible]
										K = 1600
66	38		689.9	1.1	.55	20.9		[illegible]		
86	20		688.5	2.5	1.8	[illegible]	[illegible]	[illegible]	[illegible]	
90	4		685.9	5.1	3.8	15.2		4.2		n = .050
										Q = 4.22
97	7		685.9	5.1	5.1	35.7		[illegible]		$Q^{2/3}$ = 2.61
										K = 10,000
100	3		685.5	5.5	5.3	15.9		3.0		
104	4		686.3	4.7	5.1	20.4		4.1		
							193.7		4.6	
109	5		689.1	1.9	3.3	16.5		5.7		
										n = .045
138	29		689.5	1.5	1.7	49.3		[illegible]		Q = [illegible]
										$Q^{2/3}$ = [illegible]
275	137		689.5	1.5	1.5	205.5	[illegible]	[illegible]		K = [illegible]
290	15	691.0	691.0	0	.75	11.2		15.1		
370			698.0							
390			700.0							
	262					426.6	426.6	[illegible]	[illegible]	L_T = 19,030

Sheet No. ____ of ____ sheets. Prepared by ____ Date ____ Checked by ____ Date ____

U. S. GOVERNMENT PRINTING OFFICE 16—66957-1

S-191
(July 1952)
Cross-section
projection

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File

FLOOD OF

SECTION AH [illegible] = SEE AB ELV

STA.	DIST.	W. S. ELEV.	ELEV.	DEPTH	MEAN DEPTH	AREA		W. P.		
L. B.										
0			700.0							
24	—	692.0	692.0	—	—			—		n = .060
28	4		691.0	1.0	0.5	2.0		4.1		r = 1.88
										r^2/3 = 1.52
56	28		689.9	2.1	[illegible]	[illegible]		28.0		Q = 4790
86	30		688.5	[illegible]	[illegible]	[illegible]		[illegible]		
										n = .060
90	4		685.9	6.1	4.7	18.2		4.2		r = 5.15
										r^2/3 = 2.98
97	7		685.9	6.1	6.1	42.7		7.0		Q = 12,000
100	3		685.5	6.5	6.3	17.0		3.0		
104	4		686.3	5.7	6.1	[illegible]		4.1		
109	5		689.1	2.9	4.3	21.5		[illegible]		n = .045
										r = 2.39
138	29		689.5	2.5	2.7	78.3		29.0		r^2/3 = 1.79
										Q = 26,400
275	137		689.5	2.5	2.5	342.5	[illegible]	137.0	[illegible]	
296	21	692.0	692.0	0	[illegible]	26.2		21.2		
370			698.0							
390			700.0							
						1033.5	[illegible]	[illegible]	373.9	Q = 44,800

Sheet No. ____ of ____ sheets. Prepared by ____ Date ____ Checked by ____ Date ____

U. S. GOVERNMENT PRINTING OFFICE 16—60957-1

6-191
(July 1952)
Cross-section
projection

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File

FLOOD OF

SECTION — [illegible] SEC 4G [illegible]

STA.	DIST.	W. S. ELEV.	ELEV.	DEPTH	MEAN DEPTH	AREA		W. P.		
L. B.										
0			700.0							n = .050
[illegible]	[illegible]	693.0	693.0	—	—	—				R = 3.73
28	8		691.0	2.0	1.0	8.0		1.2		D^2/3 = 1.75
										K = 2720
66	[illegible]		689.9	7.1	2.55	[illegible]		39.1		
96	[illegible]		688.5	[illegible]	[illegible]	[illegible]		[illegible]		
										n = .050
9.0	[illegible]		685.9	7.1	5.7	33.2		[illegible]		R = 3.99
										R^2/3 = 3.53
97	[illegible]		685.9	7.1	7.1	[illegible]		[illegible]		K = 8,511
100	3		685.5	7.5	[illegible]	31.4		3.0		
104	4		686.3	6.7	7.1	28.4		4.1		
							19.7			
109	5		689.1	[illegible]	[illegible]	[illegible]		5.7		n = .045
										K = [illegible]
138	29		689.5	[illegible]	3.7	[illegible]		[illegible]		R^2/3 = 2.35
										K = 50,700
275	137		689.5	[illegible]	3.5	479.5	63.3	137.0	[illegible]	
313	38	693.0	693.0	0	1.75	66.5		15.1		
370			698.0							
390			700.0							
						983.9	983.9	[illegible]	[illegible]	K = 77,920

Sheet No. ____ of ____ sheets. Prepared by ____ Date ____ Checked by ____ Date ____

U. S. GOVERNMENT PRINTING OFFICE 16—66957-1

4-191
(July 1952)
Cross-section
properties

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....

FLOOD OF .....

SECTION.— [illegible] & SEC 25 [illegible]

STA.	DIST.	W. S. ELEV.	ELEV.	DEPTH	MEAN DEPTH	AREA		W. P.		
L. B.										
0			700.0							n = .060
20	—	694.0	694.0	—	—	—				R = 3.65
28	8		691.0	3.0	1.5	12.0		8.5		$R^{2/3}$ = 2.37
										K = 14,300
66	38		689.9	4.1	3.55	134.9		33.0		
							[illegible]		[illegible]	
86	20		688.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
90	4		685.9	9.1	6.9	27.7		4.9		n = .040
										R = 7.02
97	7		685.9	8.1	8.1	56.7		7.0		$R^{2/3}$ = 3.67
										K = 23,500
100	3		685.5	8.5	8.3	24.9		3.0		
104	4		686.3	7.7	8.1	32.4		4.1		
							[illegible]		[illegible]	
109	5		689.1	[illegible]	6.3	31.5	[illegible]	5.7	[illegible]	n = .045
										R = 4.00
138	29		689.5	4.5	4.7	[illegible]		29.0		$R^{2/3}$ = 2.52
										K = 72,000
275	137		689.5	4.5	4.5	616.5	835.3	137.0	16.2	
325	50	694.0	694.0	0	2.25	112.5		50.2		
370			698.0							
390			700.0							
						1280.9	1280.9	307.3	307.3	K_T = 109,000

Sheet No. ..... of ..... sheets. Prepared by ..... Date ..... Checked by ..... Date .....

U. S. GOVERNMENT PRINTING OFFICE 16—66957-1

S-191
(July 1952)
Cross-section properties

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File

FLOOD OF

SECTION — [illegible] + SEC AG [illegible]

STA.	DIST.	W. S. ELEV.	ELEV.	DEPTH	MEAN DEPTH	AREA		W. P.		
L. B.										
0			700.0							
10	—	695.0	695.0	—	—					n = .060
28	12		691.0	4.0	2.0	23.0		12.6		R = 1.83
										r^2/3 = 2.70
66	38		689.9	5.1	[illegible]	172.1		37.9		L = 20,950
							[illegible]		[illegible]	
86	20		688.5	5.5	[illegible]	[illegible]		20.0		
90	4		685.9	9.1	7.7	31.2		4.8		n = .040
										C = 7.36
97	7		685.9	9.1	9.1	63.7		7.0		r^2/3 = 3.99
										L = 37,000
100	3		685.5	9.5	9.3	27.9		3.0		
104	4		686.3	8.7	9.1	36.4		4.1		
							[illegible]		[illegible]	
109	5		689.1	5.9	7.3	[illegible]		5.7		n = [illegible]
										C = 4.77
138	29		689.5	5.5	[illegible]	165.3		29.0		r^2/3 = 3.34
										L = 101,900
275	137		689.5	5.5	5.5	753.5	[illegible]	137.0	[illegible]	
336	61	695.0	695.0	0	2.75	168		61.2		
370			698.0							
390			700.0							
						[illegible]	[illegible]	322.4	322.4	K_T = 151,200

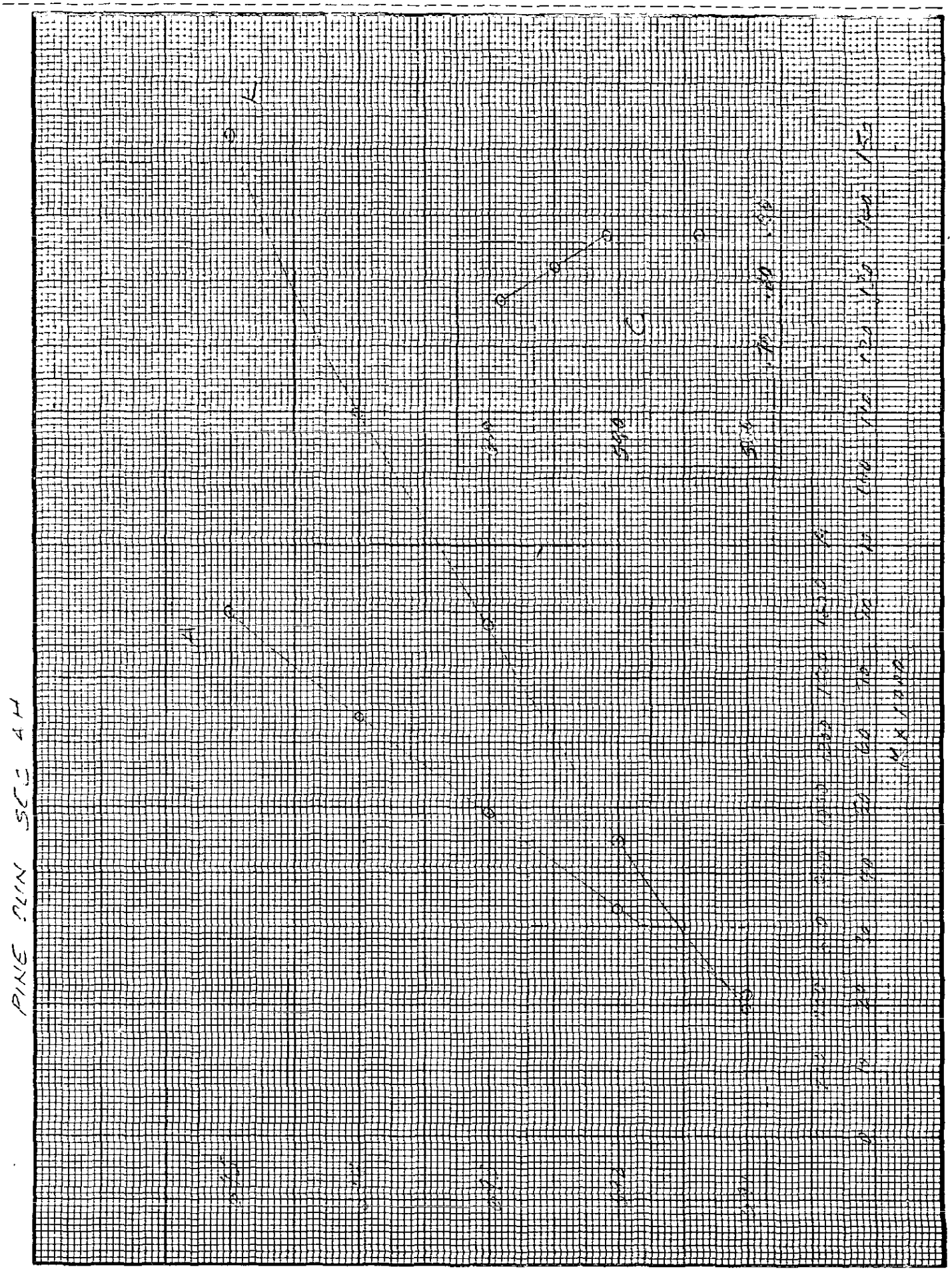
Sheet No. ____ of ____ sheets. Prepared by ____ Date ____ Checked by ____ Date ____

U. S. GOVERNMENT PRINTING OFFICE 16—66957-1

(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....



Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

PIPE CULVERT USE AS CULVERT $Z = -0.4$

$Q_{10} = 740$ $h_4 = h_3 = 91.18$

1. 91.18 $d/D = 6.93/10.1 = .69$ $A_3 = .998 D^2 = 102$
2. +.82
3. +.32 Assume $d_2 = 8.3$ $8.3/10.1 = .82$ $d_2 = El\ 92.1$
   −.62 $K_3 = .746(14,700) = 11,100$ $K_2 = .864(\ ) = 12,900$
   91.70 $\frac{(83)(740)^2}{(11,100)(12,900)} = .32$ $A_2 = 1.147(10.1)^2 = 117$
3. +.33
   −.67 Assume $d_2 = 7.9$ $7.9/10.1 = .78$ $K_2 = .837(\ ) = 12,500$ $d_2 = El\ 91.70$
   91.66 OK $\frac{(83)(740)^2}{(11,100)(12,500)} = .33$ $A_2 = (1.105) D^2 = 113$
4. +.31 Assume $h_1 = 92.6$ $c = .85$ $\frac{1}{c^2} - 1 (.82) = .31$
5. +.01 $K_1 = 64,000$ $\frac{(20)(740)^2}{(12,500)(64,000)} = .01$ $A_1 = 860$
6. −.01
   92.64 USE $\frac{8.44 + 0.4}{10.1} = .83 < 1.5$ OK
   $d_c = 6.0$

$Q_{50} = 1010$ $h_4 = h_3 = 91.60$

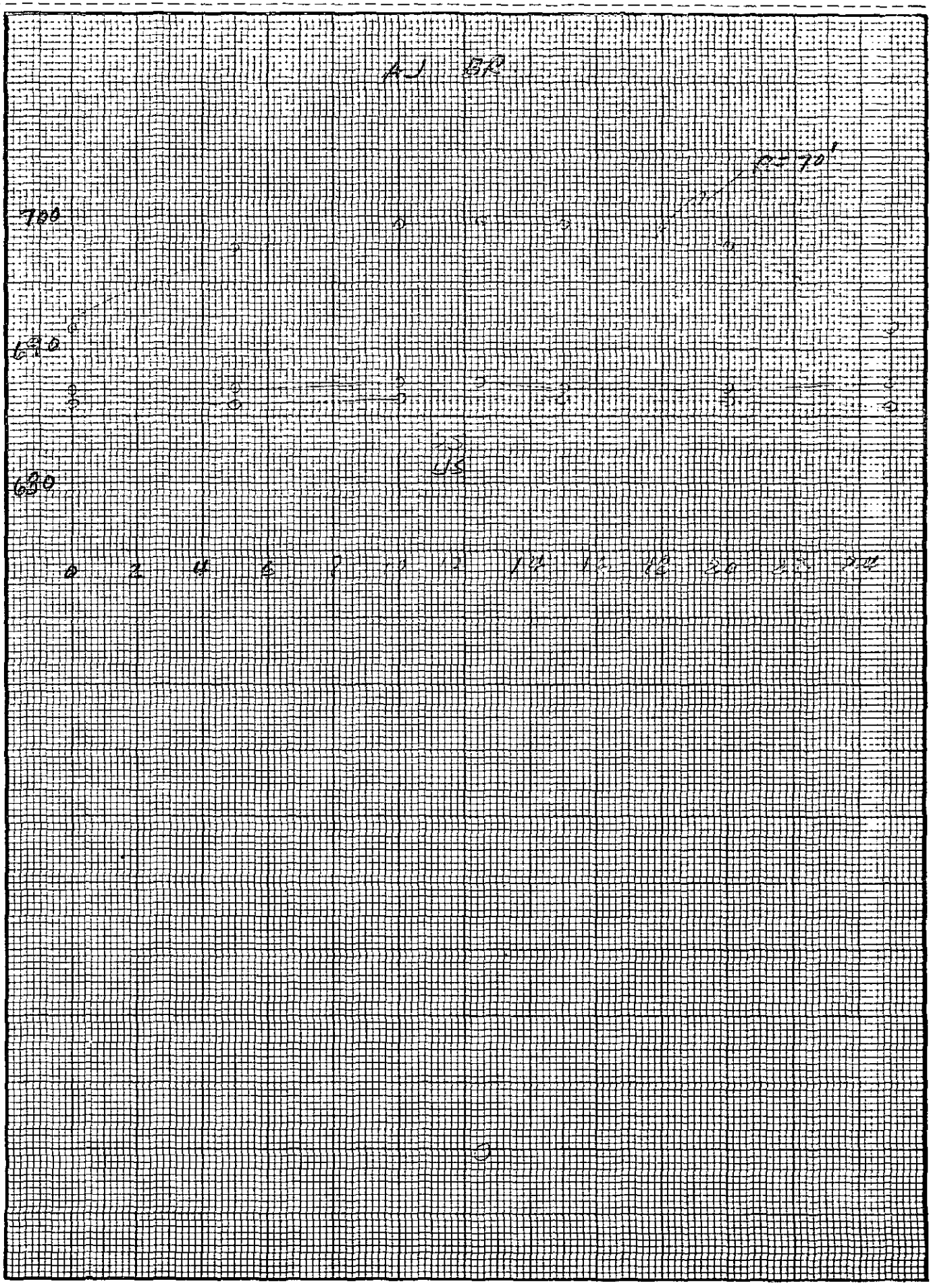
1. 91.60 $d_3/D = 7.4/10.1 = .73$ $A_3 = 1.049 D^2 = 107$
2. +1.39
3. +.57 Assume $d_2 = 8.0$ $d_2/D = .79$ $K_2 = .845(\ ) = 12,600$ $d_2 = El\ 91.8$
   −1.22 $K_3 = .793(\ ) = 11,800$ $\frac{(83)(1010)^2}{(11,800)(12,600)} = .57$ $A_2 = 114$
3. +.55 Assume $d_2 = 8.5$ $d_2/D = .84$ $K_2 = 13,100$ $d_2 = El\ 92.3$
   −1.12 $\frac{(83)(1010)^2}{(11,800)(13,100)} = .55$ $A_2 = 119$
3. +.54 Assume $d_2 = 8.6$ $d_2/D = .85$ $K_2 = 13,200$ $d_2 = El\ 92.4$
   −1.10 $\frac{(83)(1010)^2}{(11,800)(13,200)} = .54$ $A_2 = 120$
   92.43 OK
4. +.58 Assume $h_1 = 93.5$ $c = .84$ $\frac{1}{c^2} - 1 (1.39) = .58$
5. +.02 $K_1 = 93,500$ $\frac{(20)(1010)^2}{(13,200)(93,500)} = .02$
6. −.01 $A_1 = 1130$
   94.12

Cross-Section

GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....

PIKE RUN



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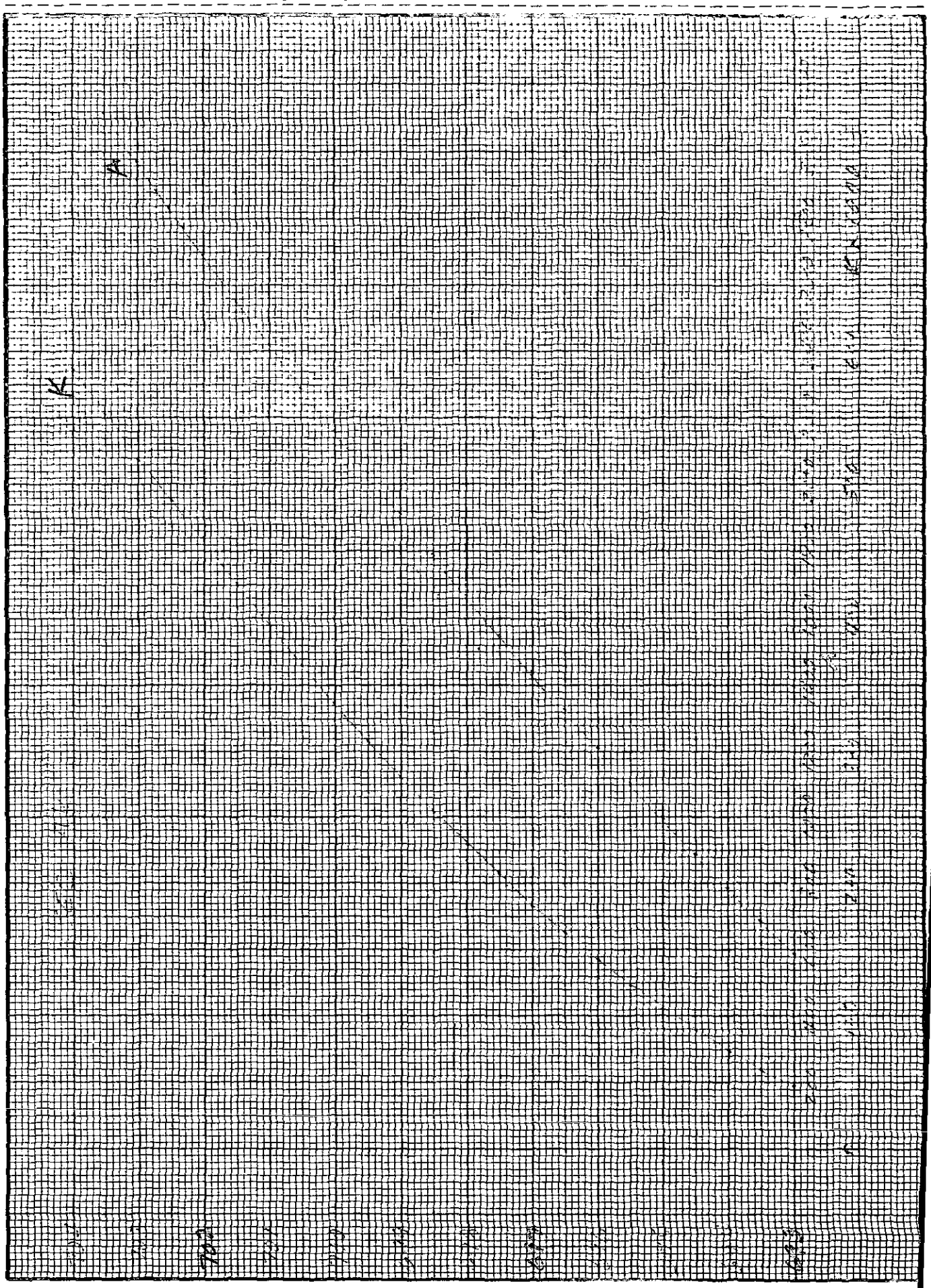
9-213-E
(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....



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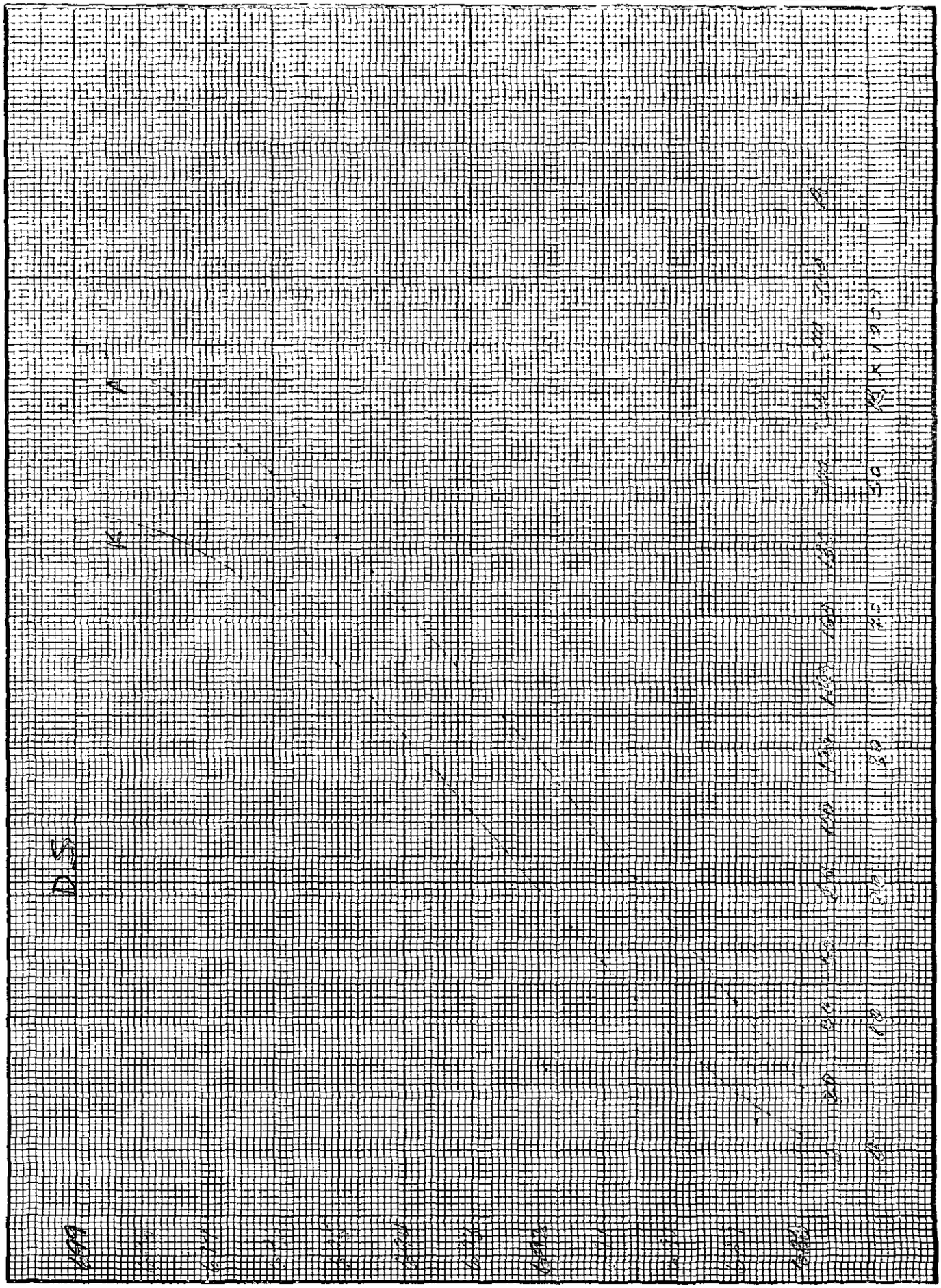
PINE RUN AT CULVERT DS RDY

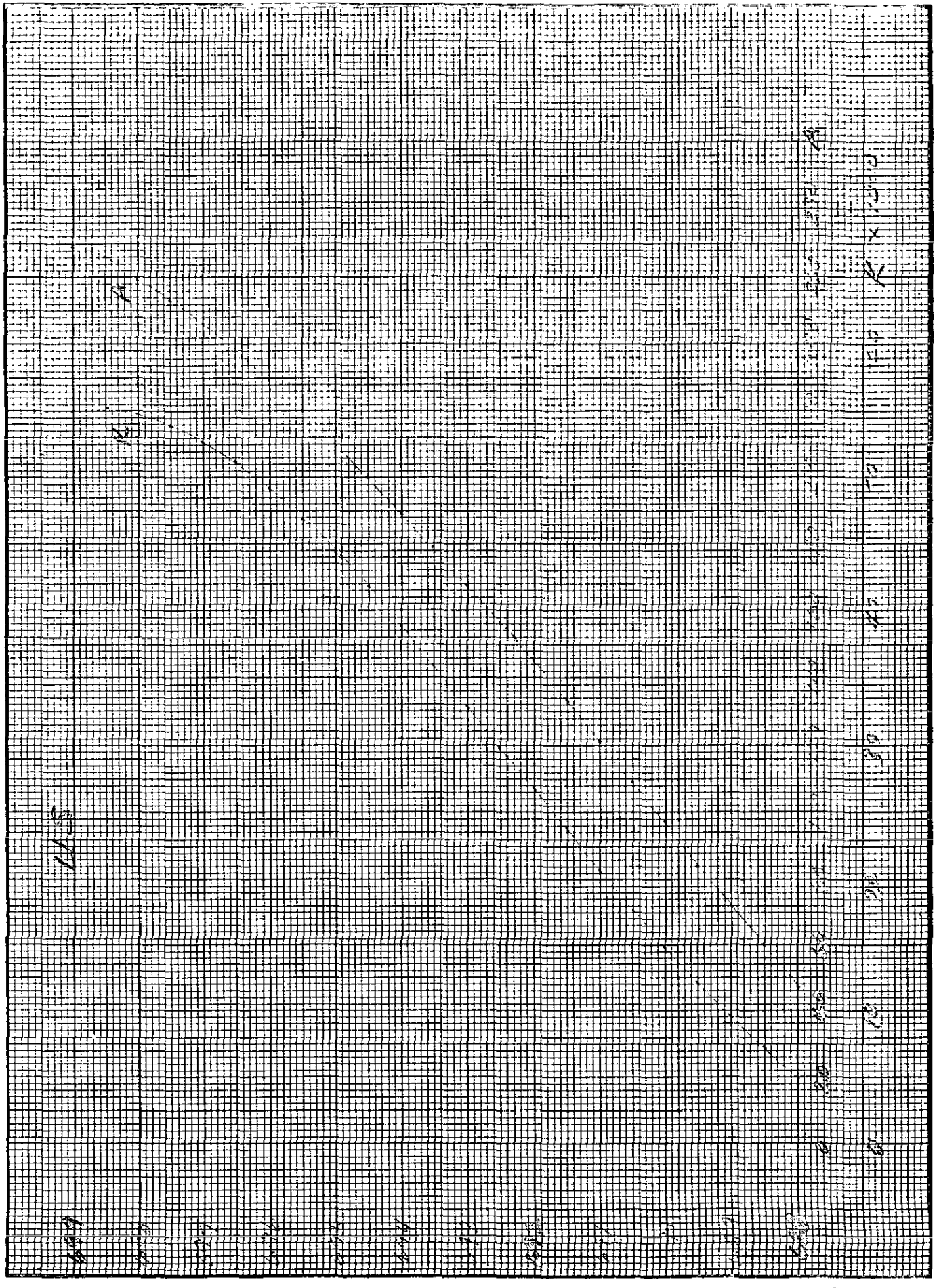


(March 1947)
Cross-Section

GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....

PIKE RUN [illegible]



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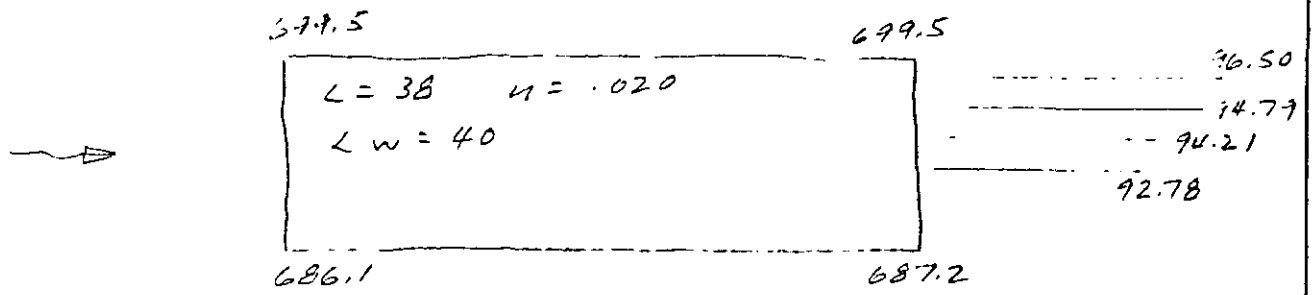
PIKE [illegible] SEC [illegible]



$Q_{10} = 695$ $h_4 = h_3 = 92.78$ $A_3 = 135$ $K_3 = 24{,}000$ $V_3 = 5.15$

1. 92.78
2. + .41
3. + .02 — Assume $h_2 = 93.00$ $K_2 = 32{,}600$ $A_2 = 167$
   − .27 — $\frac{LQ^2}{K_2 K_3} = \frac{(38)(695)^2}{(32{,}800)(24{,}000)} = .02$
   92.94 — Try $h_2 = 92.94$ $K_2 = 32{,}500$ $A_2 = 166$
3. + .02 — $\frac{(38)(695)^2}{(32{,}500)(24{,}000)} = .02$
   − .27
   92.94 OK
4. + .11 — $F = V/\sqrt{gd} = 5.15/\sqrt{32.2(5.59)} = .38$ $c = .84$
   $K_\theta = 1.06$ $c = (1.06)(.84) = .89$
   $\frac{1}{c^2} - 1 (.41) = .11$
5. + .01 — Assume $h_1 = 93.2$ $K_1 = 50{,}000$ $A_1 = 620$
6. − .02 — $\frac{(40)(695)^2}{(50{,}000)(32{,}500)} = .01$
   ~~93.31~~
   Assume $h_1 = 93.30$ $K_1 = 55{,}000$ $A_1 = 640$
5. + .01 — $\frac{(40)(695)^2}{(55{,}000)(32{,}500)} =$
6. − .02
   93.31 OK Use 93.31

$\frac{h_1 - z}{D} = \frac{6.11 + 1.1}{13} = .6 < 1.5$ $D_c > 1400$ OK

PINE RUN SEC 4J [illegible]

$P_{50} = 950$ $h_3 = h_4 = 94.21$ $A_3 = 166$ $K_3 = 32,400$ $V_3 = 5.72$

1. 94.21
2. + .51
3. + .03 Assume $h_2 = 94.50$ $K_2 = 41,800$ $A_2 = 200$
   − .35 $\frac{(950)^2(38)}{(32,400)(41,800)} = .03$
   94.40
3. + .03 Try $h_2 = 94.40$ $K_2 = 41,200$ $A_2 = 197$
   − .36 $\frac{(950)^2(38)}{(32,400)(41,200)} = .03$
   94.39 ok

$F = \frac{5.72}{\sqrt{32.2(.701)}} = .38$ $C = .85$

4. + .13 $C = (1.06)(.24) = .89$
   $\frac{1}{C^2} - 1 (.51) = .13$
5. + .01 Assume $h_1 = 94.9$ $K_1 = 103,000$ $A_1 = 960$
   $\frac{(950)^2(40)}{(103,000)(41,200)} =$
6. − .02
   94.87 ok USE

$\frac{h_1 - Z}{D} = \frac{7.87}{13} = .6 < 1.5$ ok $Q_c > 2500$ ok

PIKE CO. SEC ADJ CULVERT

$Q_{100} = 1040$ $h_4 = h_3 = 94.79$ $K_3 = 35,300$ $A_3 = 178$ $V_3 = 5.84$

1. 94.79
2. + .53 h_{v_3}
3. + .03 h_f Assume $h_2 = 95.00$ $K_2 = 44,300$ $A_2 = 210$

h_{v_2} $\frac{.38}{94.97} \frac{(38)(1040)^2}{(35,300)(44,300)} = .03$ OK $F = 5.84 / \sqrt{32.2(7.54)} = .37$

4. + .15 $C = .83 \times 1.06 = .88$ $\frac{1}{C^2} - 1 (.53) = .02$
5. + .01 Assume $h_1 = 95.6$ $K_1 = 128,000$ $A_1 = 1120$

h_{v_1} 6. $\frac{-.01}{95.50} \frac{(40)(1040)^2}{(128,000)(44,300)} = .01$

Try $h_1 = 95.50$ $K_1 = 124,000$ $A_1 = 1120$

5. + .01 $\frac{(40)(1040)^2}{(124,000)(44,300)} =$
6. − .01

95.50 OK USE

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....

PINE RUN SEC 4J Culvert

$Q_{500} = 1270$ $h_4 = h_3 = 96.50$ $K_3 = 42,900$ $A_3 = 210$ $V_3 = 6.05$

1. 96.50
2. + .57
3. + .03 Assume $h_2 = 96.70$ $K_2 = 51,800$ $A_2 = 241$
   − .43 $\frac{(39)(1270)^2}{51,800)(42,900)} = .03$
   96.67 OK
   $F = 6.05 / \sqrt{32.2(9.3)} = .35$
4. + .17 $C = (.83)(1.06) = .88$ $\frac{1}{C^2} - 1(.57) =$
5. + .01
6. − .01 Assume $h_1 = 97.20$ $K_1 = 193,000$ $A_1 = 1470$
   97.27 $\frac{(40)(1270)^2}{193,000)(51,800)} = .01$
5. + .01 Try $h_1 = 97.27$ $K_1 = 196,000$ $A_1 = 1490$
6. − .01 $\frac{(40)(1270)^2}{(196,000)(51,800)} = .01$
   97.27
   USE

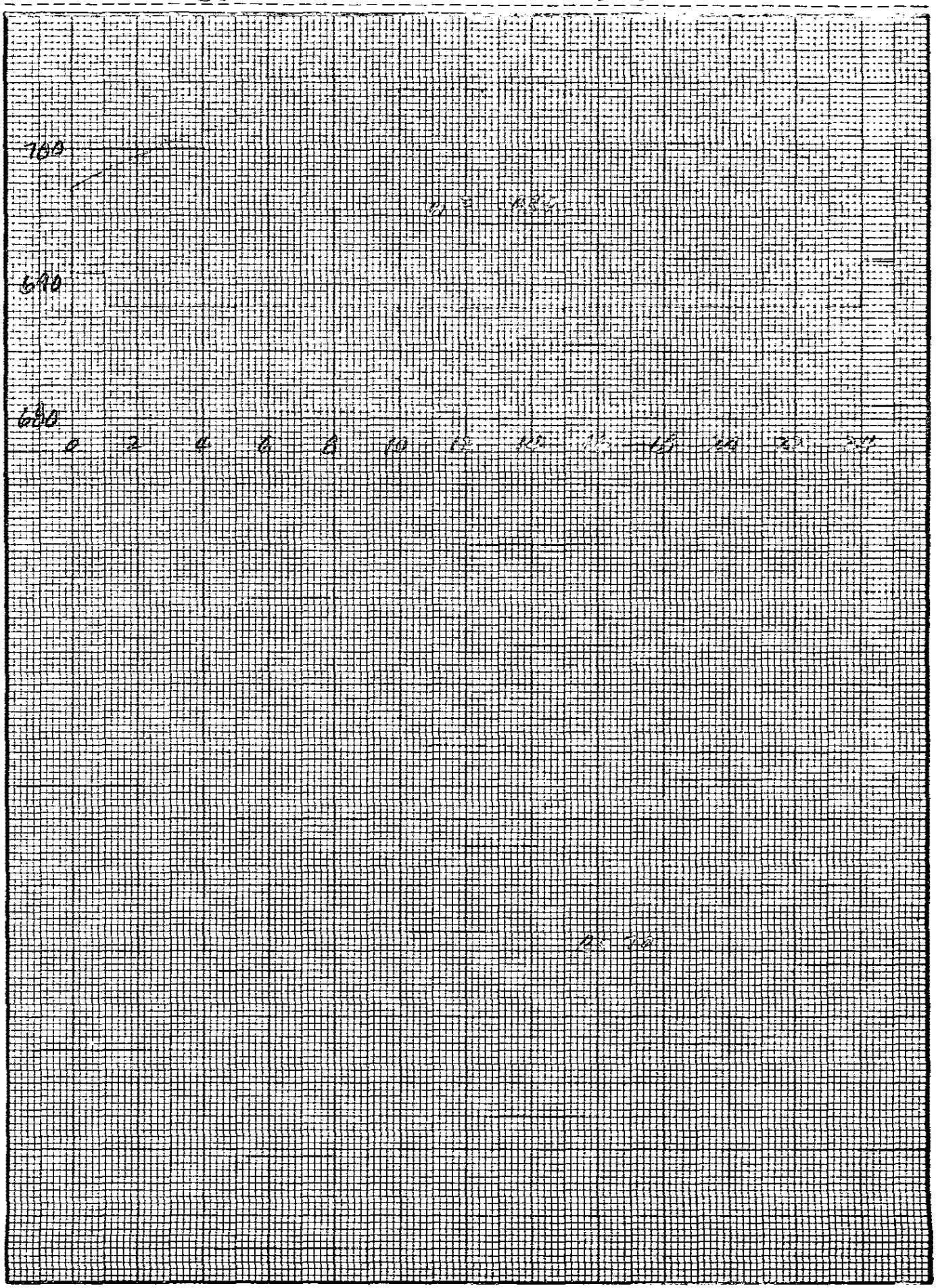
Sheet No. 4 of 4 Sheets. Prepared by ..... Date 8-15-78 Checked by ..... Date .....

(March 1959)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....

SEC 2N Cross-cut DSS



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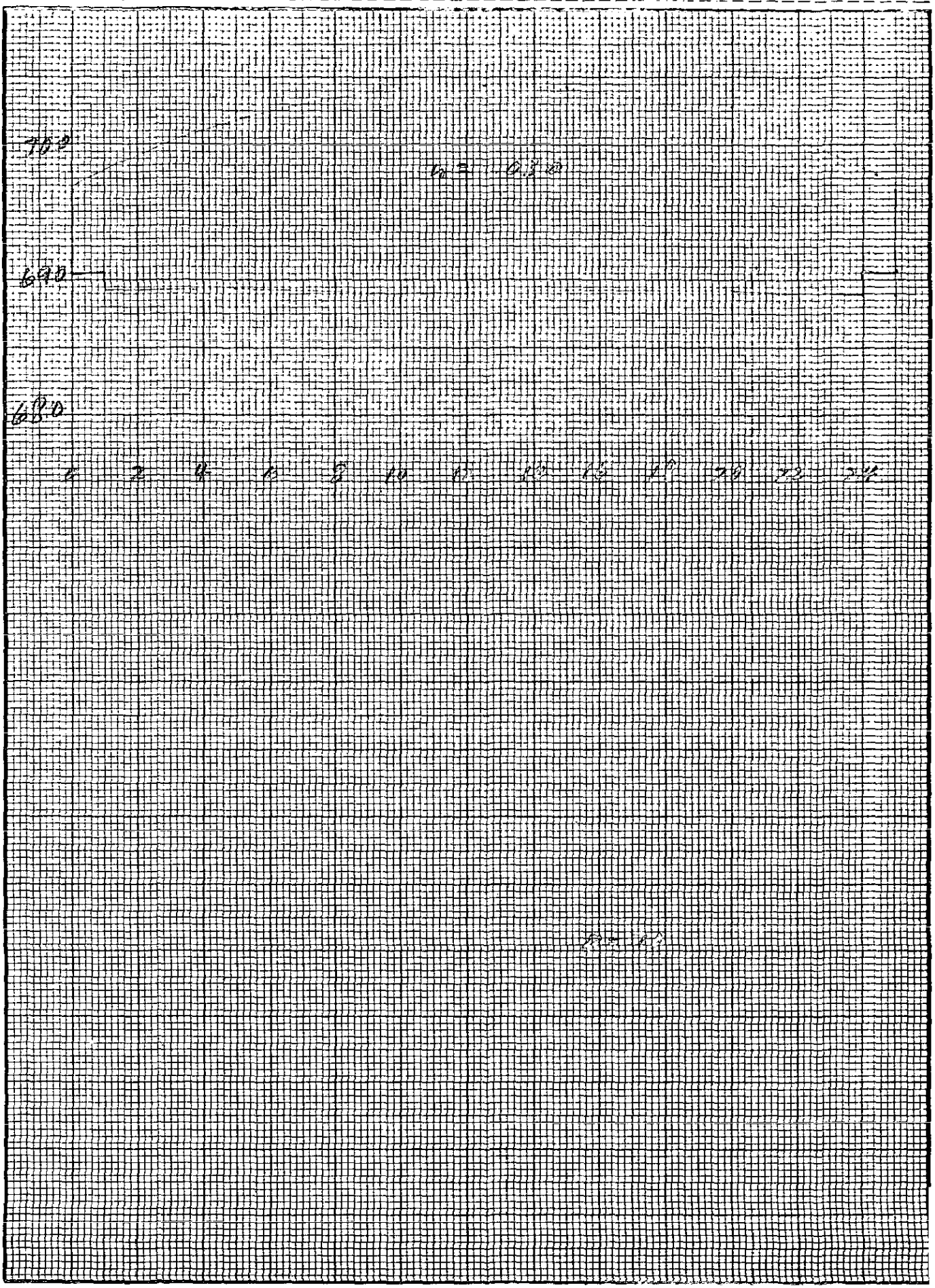
Cross-Section

GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File



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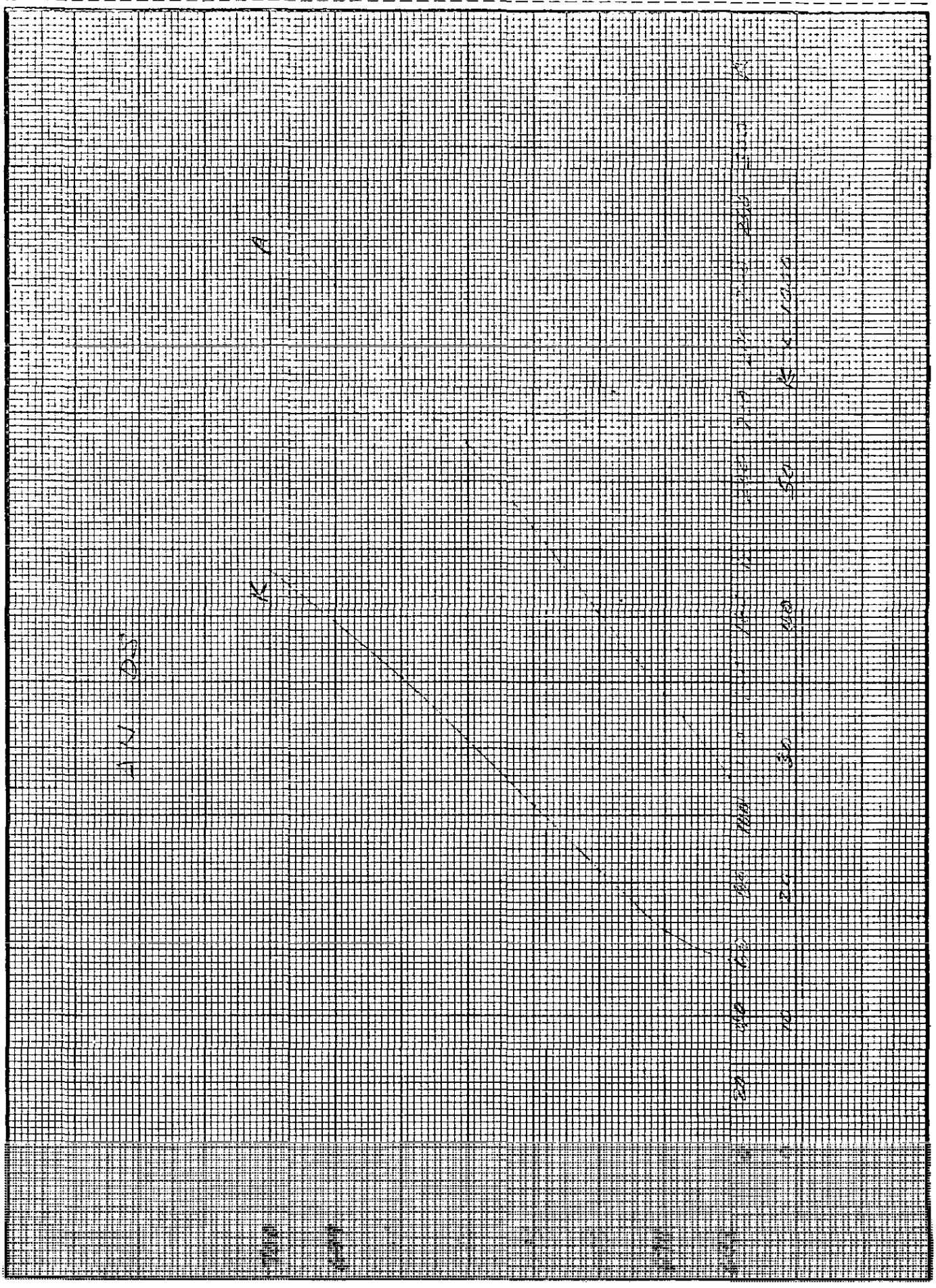
Cross-Section

GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....

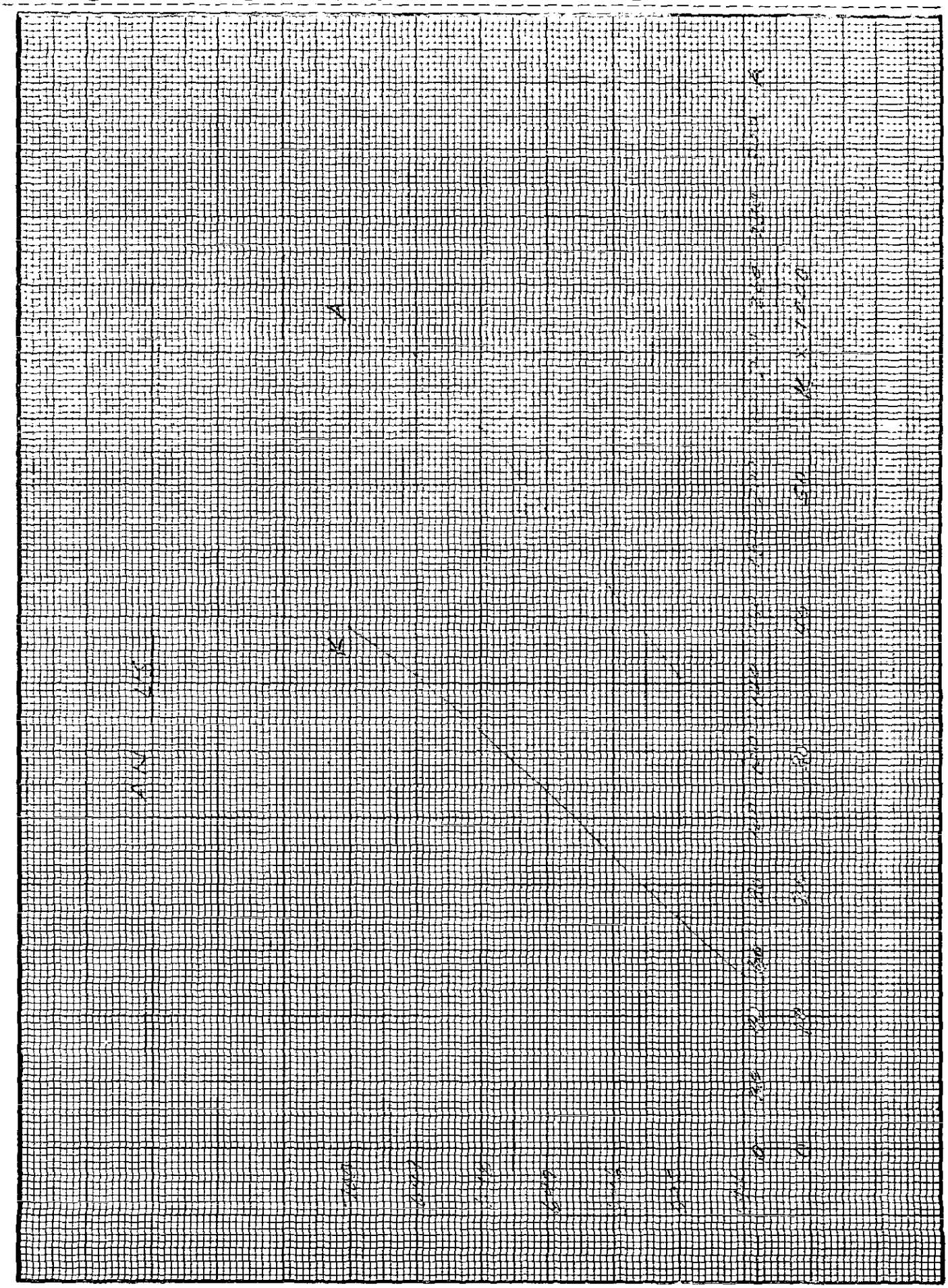
PINE BLUFF SEC [illegible]



Cross-Section

GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

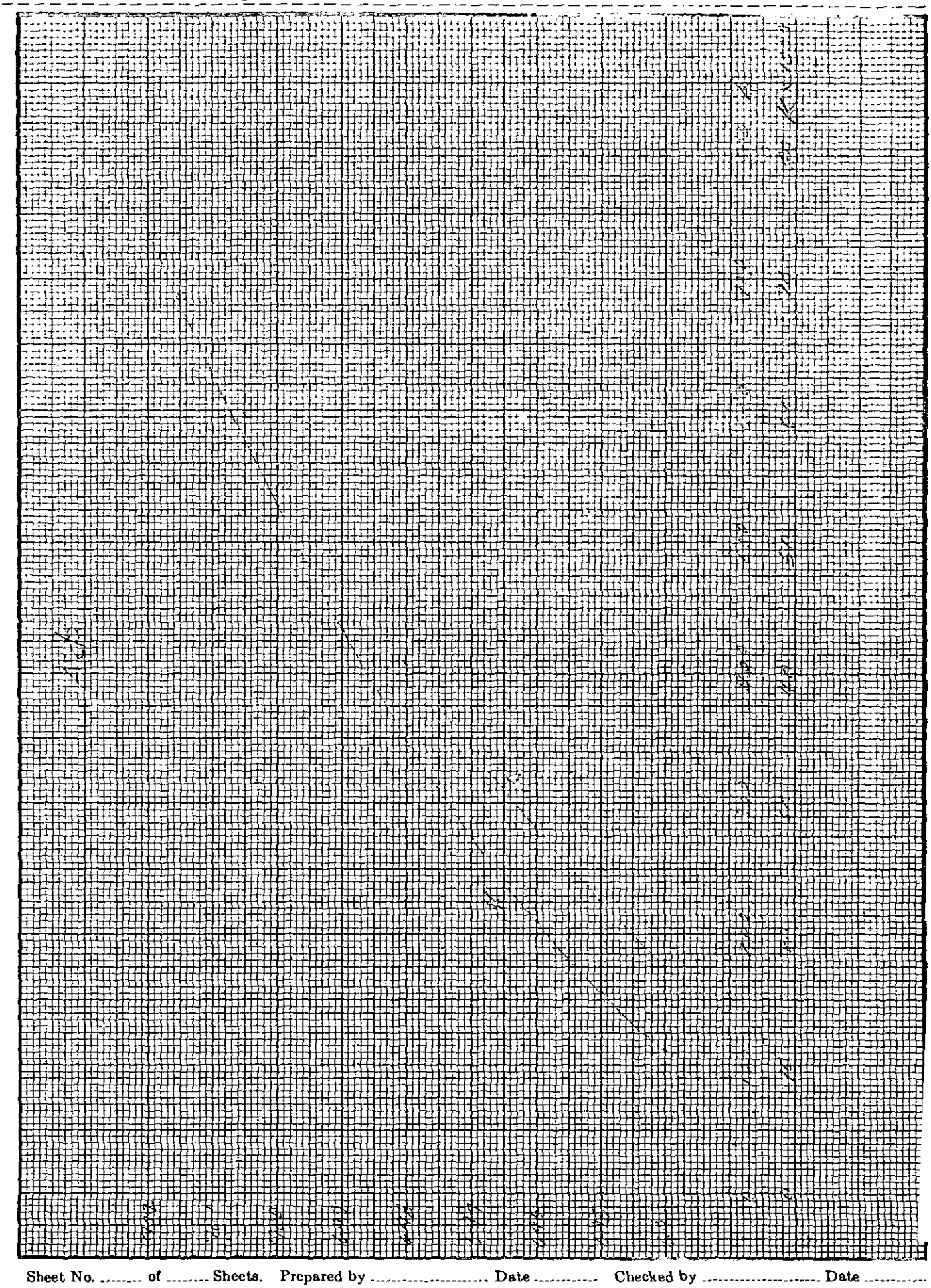
PIKE RUN SEC IN CAY. US and



Cross-Section

GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

PINE RUN SEC 10



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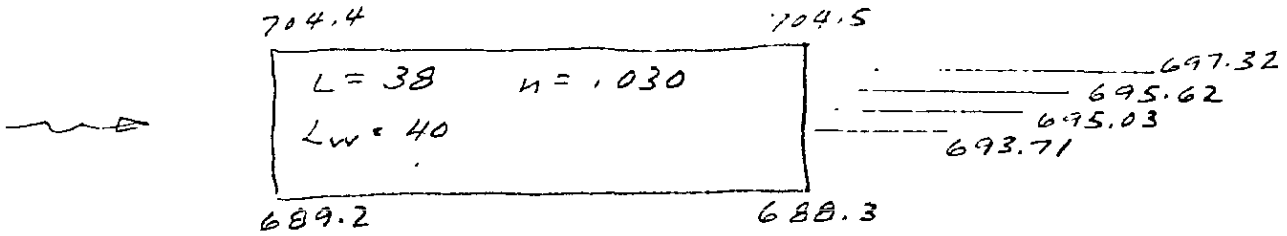
PINE RUN SEC AN Culvert



$Q_{10} = 695$ $h_4 = h_3 = 93.71$ $A_3 = 129$ $K_3 = 10{,}550$ $V_3 = 5.39$

1. 93.71
2. + .45
3. + .17 Assume $h_2 = 93.85$ $K_2 = 10{,}250$ $A_2 = 113$
   − .59 $\frac{LQ^2}{K_2K_3} = \frac{(38)(695)^2}{(10{,}550)(10{,}250)} = .17$
   93.70
   Assume $h_2 = 93.70$ $K_2 = 10{,}200$ $A_2 = 110$
   $\frac{(38)(695)^2}{(10{,}550)(10{,}200)} =$

3 + .17
− .62
93.71 ok

4. + .02 $F = V/\sqrt{Lg\bar{d}} = 5.39/\sqrt{32.2(5.41)} = .41$ $C = .84$
   $K_3 = 1.21$ $C = (1.21)(.84) = +.02$ use .48
   $\frac{1}{C^2} - 1 (.45) = .02$

5. ~~+.19~~ Assume $h_1 = 94.00$ $K_1 = 10{,}100$ $A_1 = 175$
6. −.25 $\frac{L_w Q^2}{K_1 K_2} = \frac{(40)(695)^2}{(10{,}200)(10{,}100)} = .19$
   ~~94.29~~
5. +.19 Assume $h_1 = 94.30$ $K_1 = 10{,}230$ $A_1 = 190$
6. −.21 $\frac{(40)(695)^2}{(10{,}200)(10{,}230)} =$
   94.33 ok

$\frac{h_1 - Z}{D} = \frac{6.03 - 0.9}{15.7} = .3 < 1.5$ ok

Pc ok

PINE RUN SEC 2 N CULVERT

$Q_{50} = 950$ $h_4 = h_3 = 95.03$ $A_3 = 161$ $K_3 = 21{,}000$ $V_3 = 5.90$

1. 95.03
2. +.54
3. +.09 Assume $h_2 = 95.10$ $K_2 = 18{,}000$ $A_2 = 145$
   −.69 $\frac{(38)(950)^2}{(21{,}000)(18{,}000)} = .09$
   94.99
   Assume $h_2 = 94.99$ $K_2 = 17{,}500$ $A_2 = 142$

3. +.09
   −.69
   94.97 OK

4. +.02 $F = V/\sqrt{gd} = 5.90/\sqrt{9.673} = .40$ $c = .84$
   $K_9 = 1.21$ $c = (1.21)(.84) = .102$ use .98
   $\frac{1}{c^2} - 1\ (.54) = .02$

5. +.11 Assume $h_1 = 95.6$ $K_1 = 18{,}500$ $A_1 = 258$
6. −.21 $\frac{(40)(950)^2}{(17{,}500)(18{,}500)} =$
   95.58 OK

$\frac{h_1 - z}{D} = \frac{7.28 - .9}{15.7} = .41 < 1.5$ OK

Q OK

PINE RUN SEC AN culvert

$Q_{100} = 1040$ $h_4 = h_3 = 95.62'$ $K_3 = 24,000'$ $A_3 = 177'$
$V_3 = 5.88'$

1. 95.62
2. + .54
3. + .08 Assume $h_2 = 95.60$ $K_2 = 20,200$ $A_2 = 158$
— .67 $\frac{(35)(1040)^2}{(24,000)(20,200)} = .08$
95.57 ok

~~Assume $h_2 = 95.38$ $K_2 =$ $A_2 =$~~

4. + .02 $F = 5.88/\sqrt{g(7.73)} = .38$ $C = .84$

$K_\theta = 1.21$ use $c = .98$ $\frac{1}{c^2} - 1 (.54) = .02$

5. + .11 Assume $h_1 = 96.28$ $K_1 = 22,500$ $A_1 = 296$
6. — .19 $\frac{(40)(1040)^2}{(20,200)(22,500)} = .11$
96.16

Assume $h_1 = 96.18$ $K_1 = 22,000$ $A_1 = 290$

5. + .10
6. — .20
96.16 ok

$\frac{h_1 - z}{D} = \frac{7.86 - .9}{15.7} = .44 < 1.5$ ok

D_c ok

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....

PINE RUN SEC AN Culvert

$Q_{500} = 1270$ $h_4 = h_3 = 97.32$ $K_3 = 32,200$ $A_3 = 220$ $V_3 = 5.77$

1. 97.32
2. + .52
3. + .07 Assume $h_2 = 97.30$ $K_2 = 28,400$ $A_2 = 200$

$$\frac{(38)(1270)^2}{(32,200)(28,400)} = .07$$

— .63 -
97.28 OK

4. + .02 Use $C = .98$ $\frac{1}{C^2} - 1(.52) = .02$

5. + .07 Assume $h_1 = 97.90$ $K_1 = 34,100$ $A_1 = 405$

$$\frac{(40)(1270)^2}{(28,400)(34,100)} = .05$$

6. — .16 -
97.84

Assume $h_1 = 97.82$ $K_1 = 33,500$ $A_1 = 395$

$$\frac{(40)(1270)^2}{(28,400)(33,500)} = .07$$

5. + .07
6. — .16
97.84 OK

$$\frac{h_1 - z}{D} = \frac{9.54 - .9}{15.7} = .55 < 1.5 \text{ OK}$$

Q_c OK

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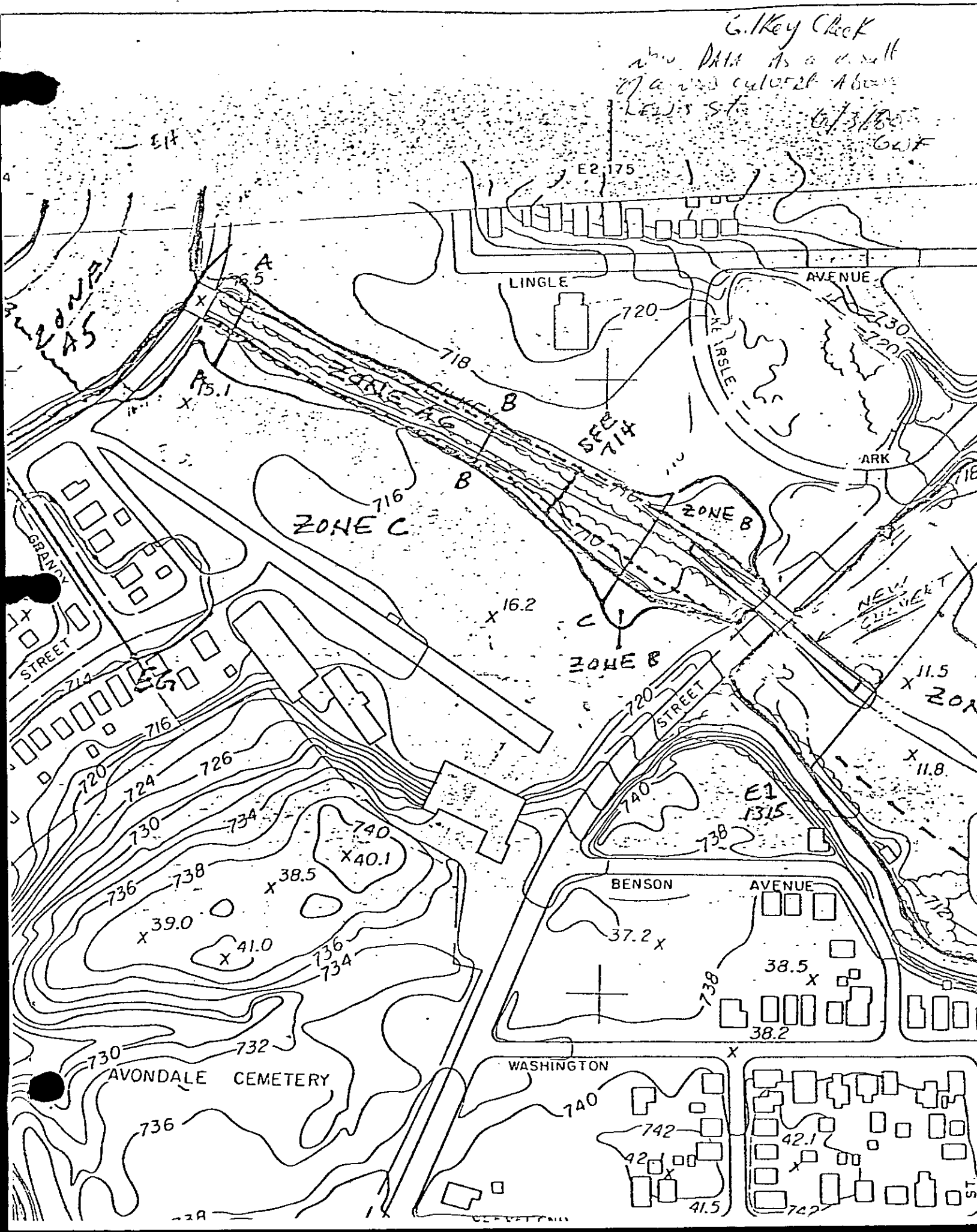
CITY OF FLIN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LINGLE
AVENUE
720
718
730
720
ZONE A6
B
SEE A14
ARK
716
ZONE C
ZONE B
16.2
C
ZONE B
NEW CULVERT
STREET
STREET
11.5
11.8
716
720
724
726
730
734
740
40.1
38.5
736
738
39.0
41.0
736
734
E1
1315
740
738
BENSON
AVENUE
37.2
38.5
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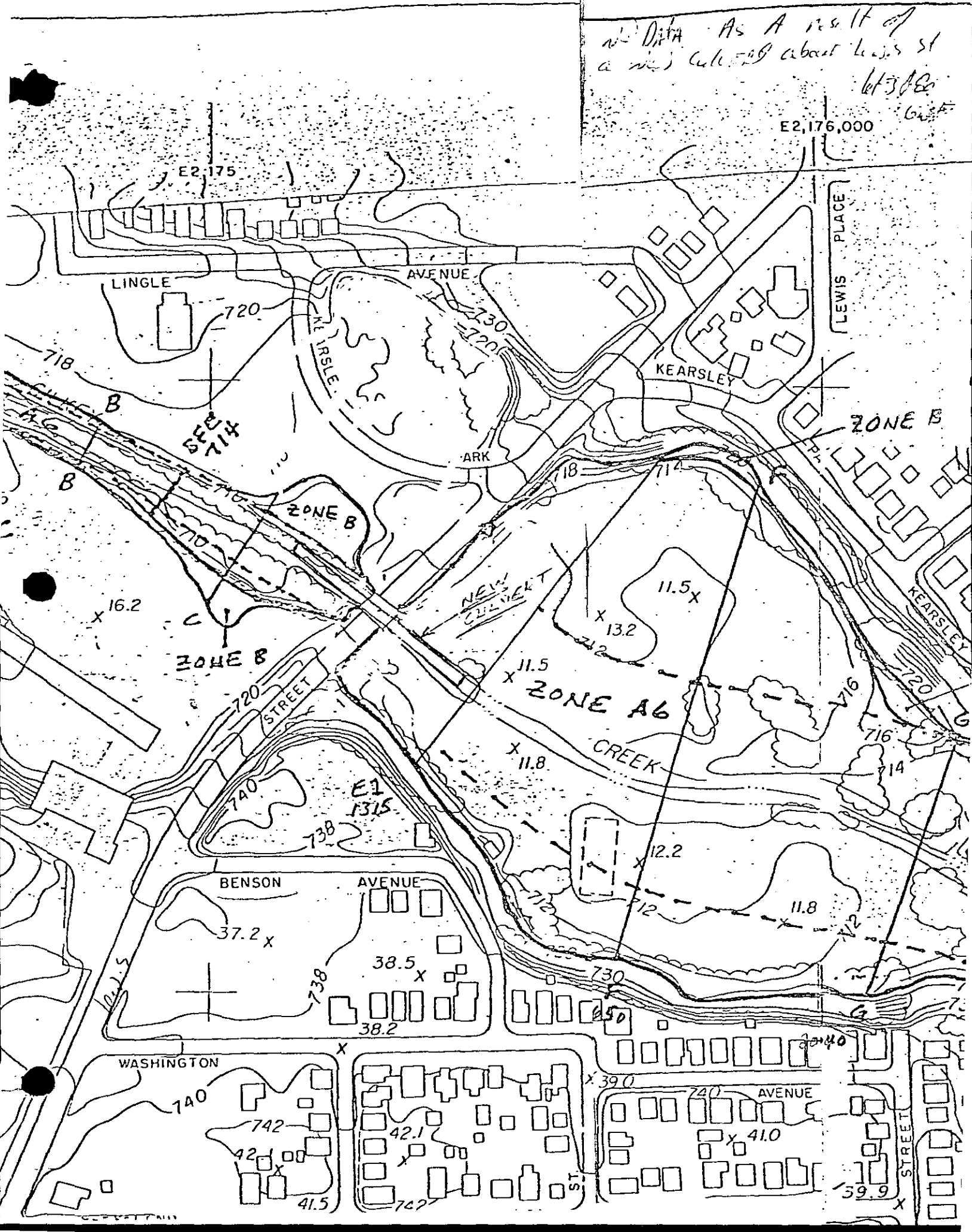
730
732
AVONDALE CEMETERY
736
WASHINGTON
740
742
42.1
41.5

CITY OF FLIN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E2,175
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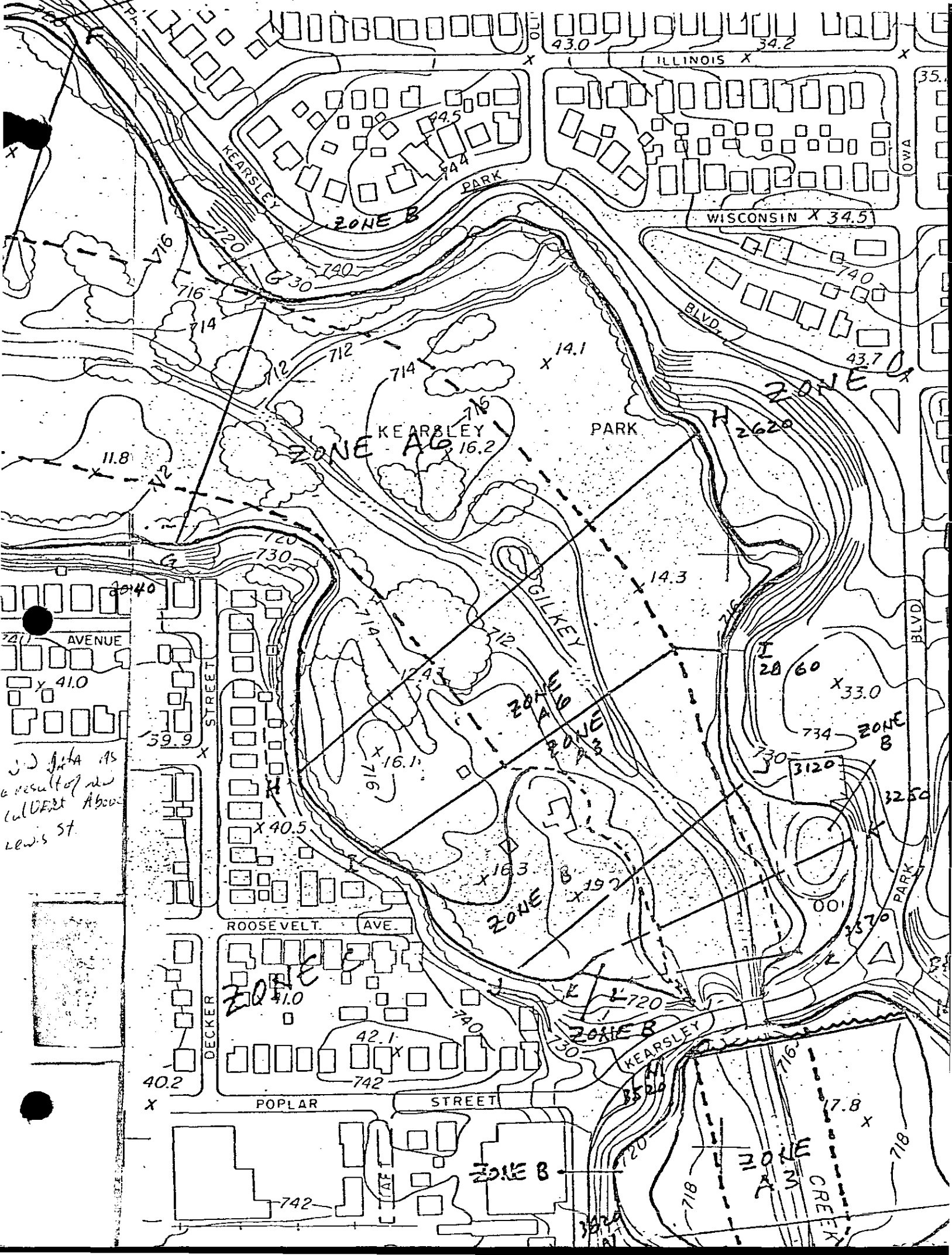
AVENUE
LEWIS PLACE
KEARSLEY
ZONE B
ARK
ZONE B
ZONE B
NEW CULVERT
ZONE A6
STREET
CREEK
KEARSLEY
BENSON
AVENUE
WASHINGTON
AVENUE
STREET


ILLINOIS
WISCONSIN
IOWA
KEARSLEY
PARK
BLVD.
ZONE B
ZONE A6
ZONE A3
KEARSLEY PARK
GILKEY
AVENUE
STREET
DECKER
ROOSEVELT AVE.
POPLAR STREET
KEARSLEY
PARK
CREEK
ZONE B
ZONE A3
ZONE B
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ZONE A3

EVELT AVE.
OPLAR STREET
KEARSLEY
KEARSLEY STREET
ZONE B
ZONE A
ZONE C
ZONE
SEE 715
GILLEYBROOK
PARK
NO ENCROA
SEC 0 TO S
40.5
16.3
19.0
41.0
42.1
742
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730
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716
17.8
39.0
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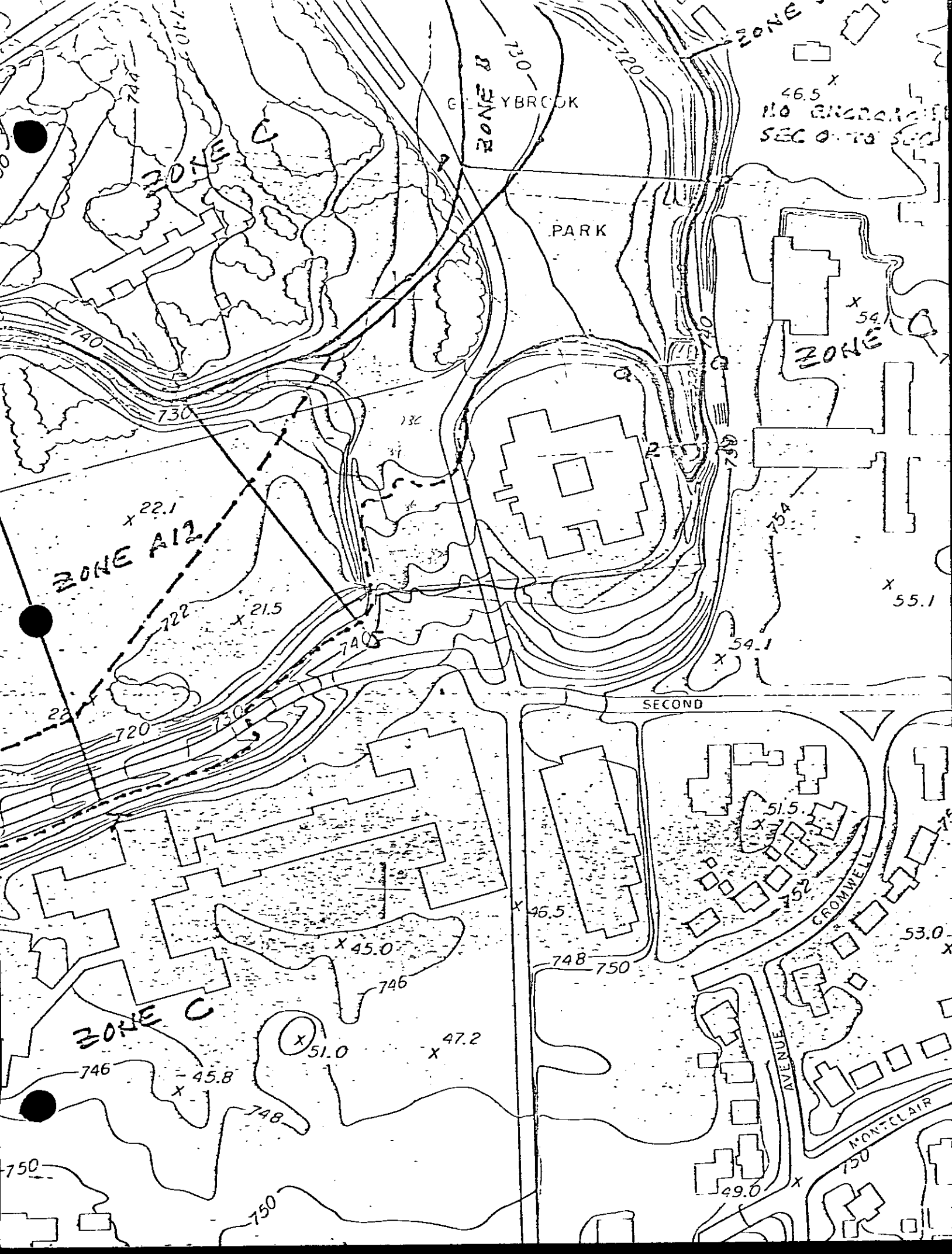
39.9
750
744
46.5
54
22.1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ZONE C
ZONE A12
ZONE C
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PARK
SECOND
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AVENUE
MONTCLAIR
730
720
740
730
722
720
730
740
748
750
746
748
750
750
754
752
750
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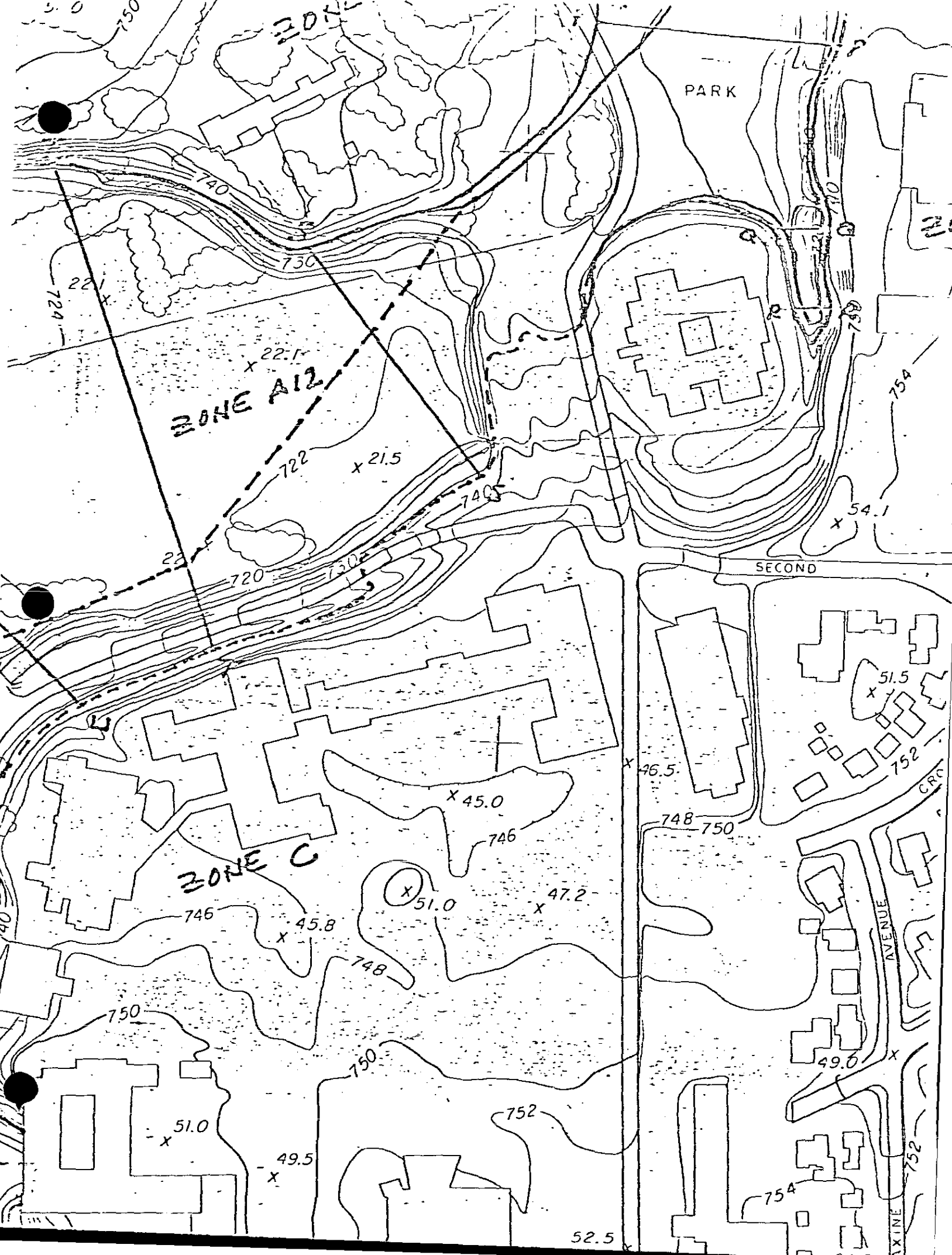
53.0
49.0


ZONE
PARK
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720
724
22.1
22.1
ZONE A12
722
21.5
740
720
730
54.1
754
SECOND
51.5
752
46.5
45.0
746
748
750
ZONE C
51.0
47.2
746
45.8
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750
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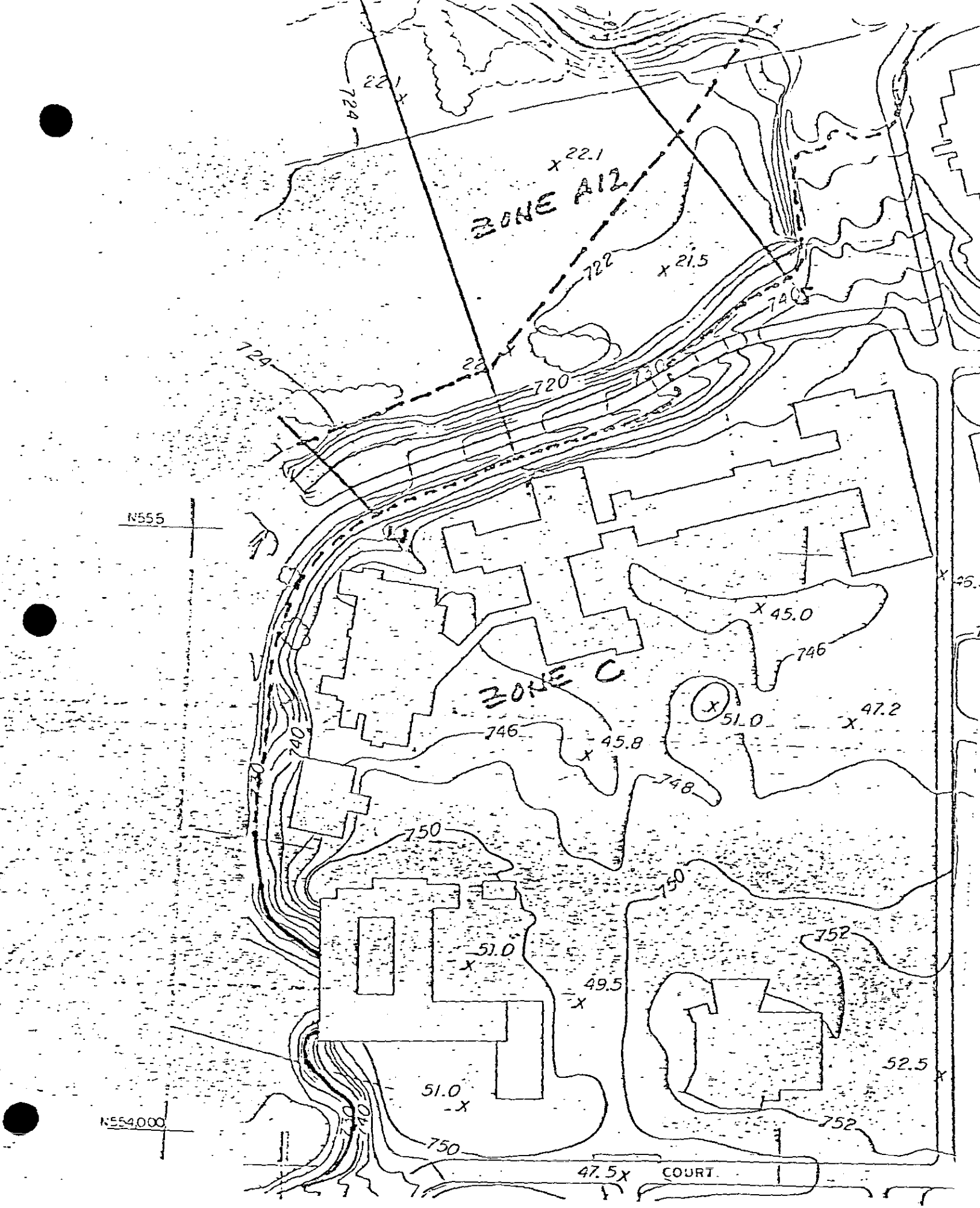
750
752
49.6
51.0
49.5
754
52.5
752
AVENUE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ZONE C
22.1
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46
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45.8
49.5
52.5
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COURT
720
722
724
730
740
746
748
750
752
N555
N554,000
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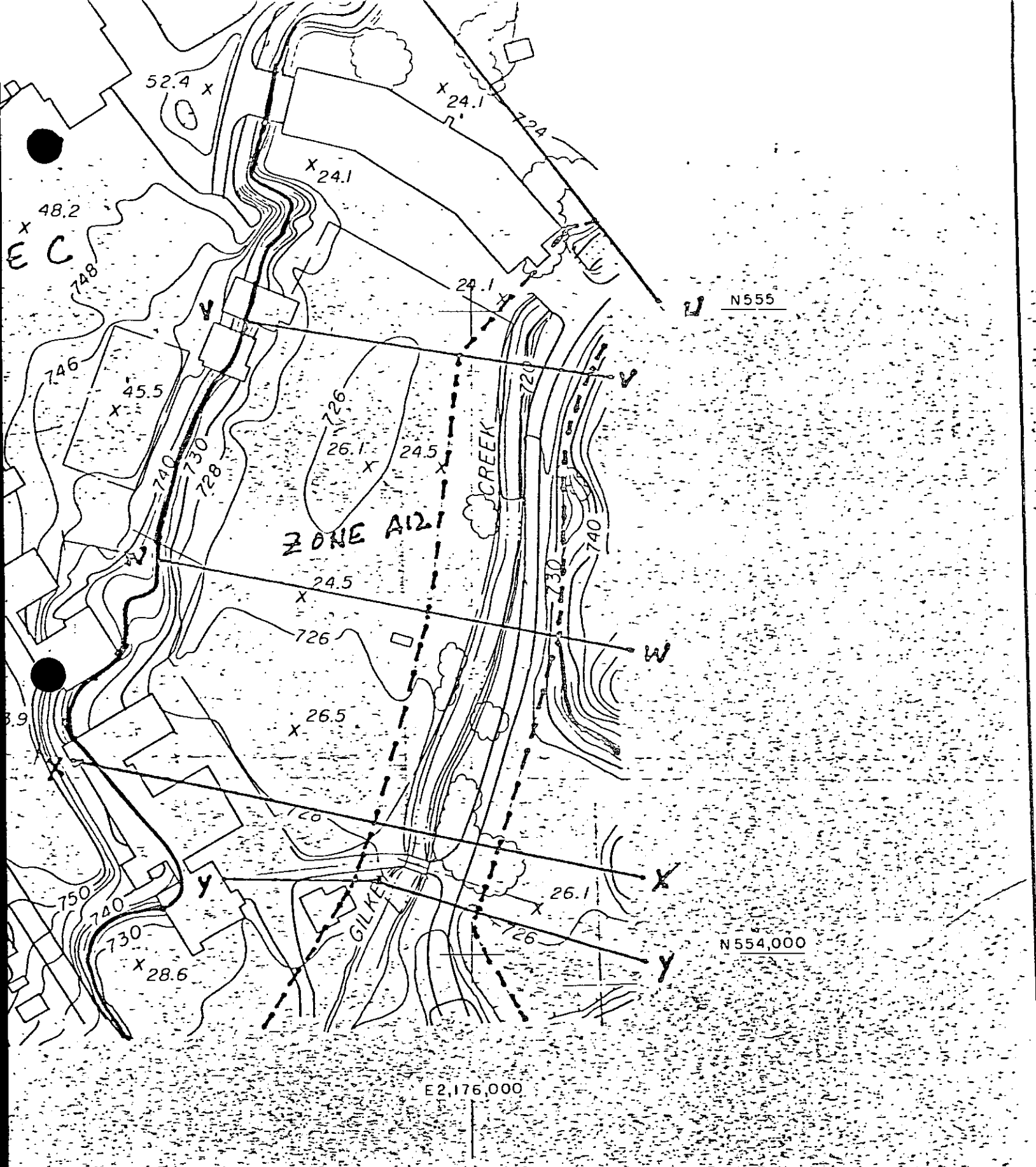
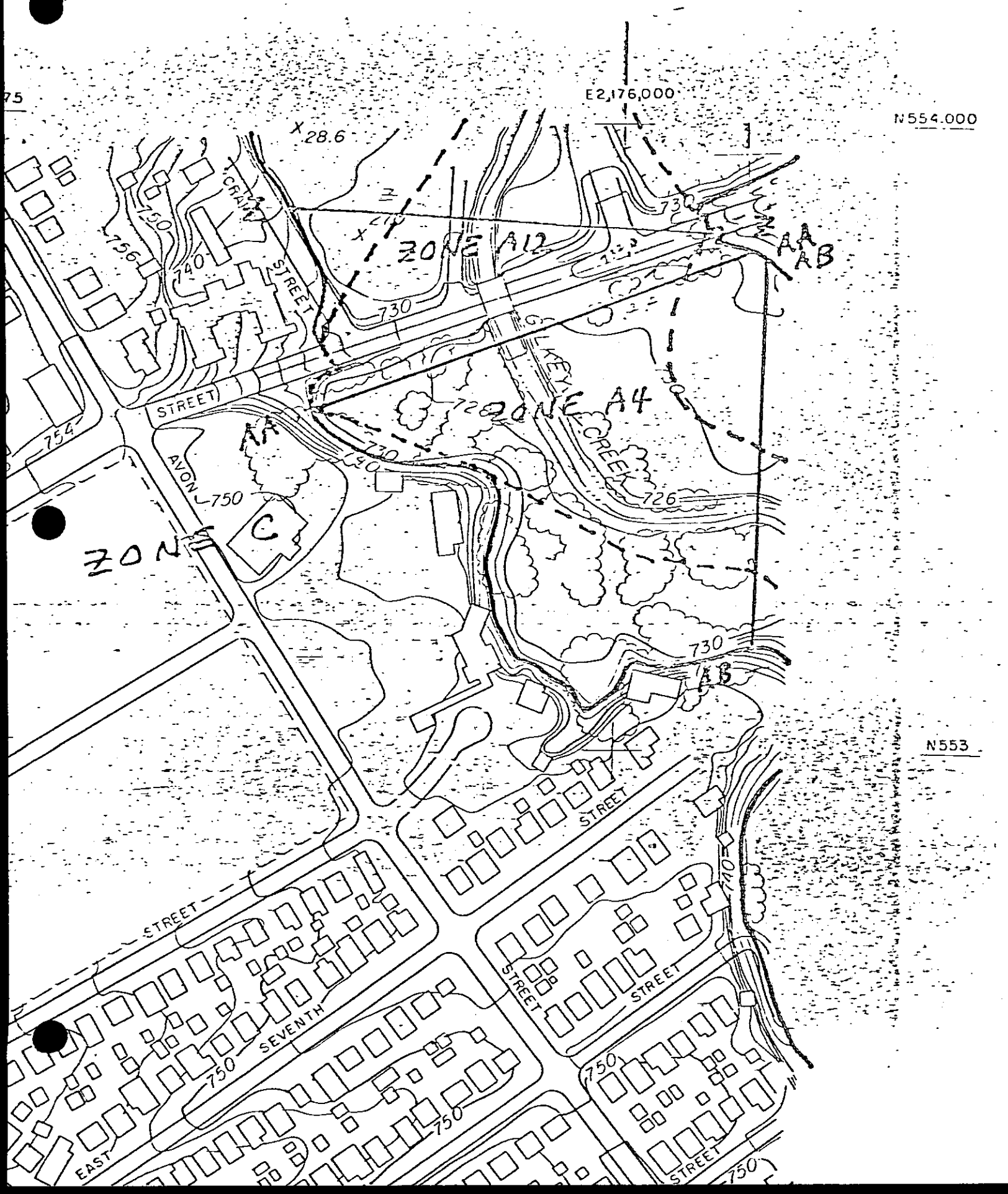
E 2,177


52.4
24.1
724
24.1
48.2
E C
748
24.1
N555
746
45.5
726
26.1
24.5
740
730
728
ZONE A12
CREEK
720
730
740
24.5
726
26.5
720
750
740
730
28.6
GILKE
26.1
726
N554,000
E2,176,000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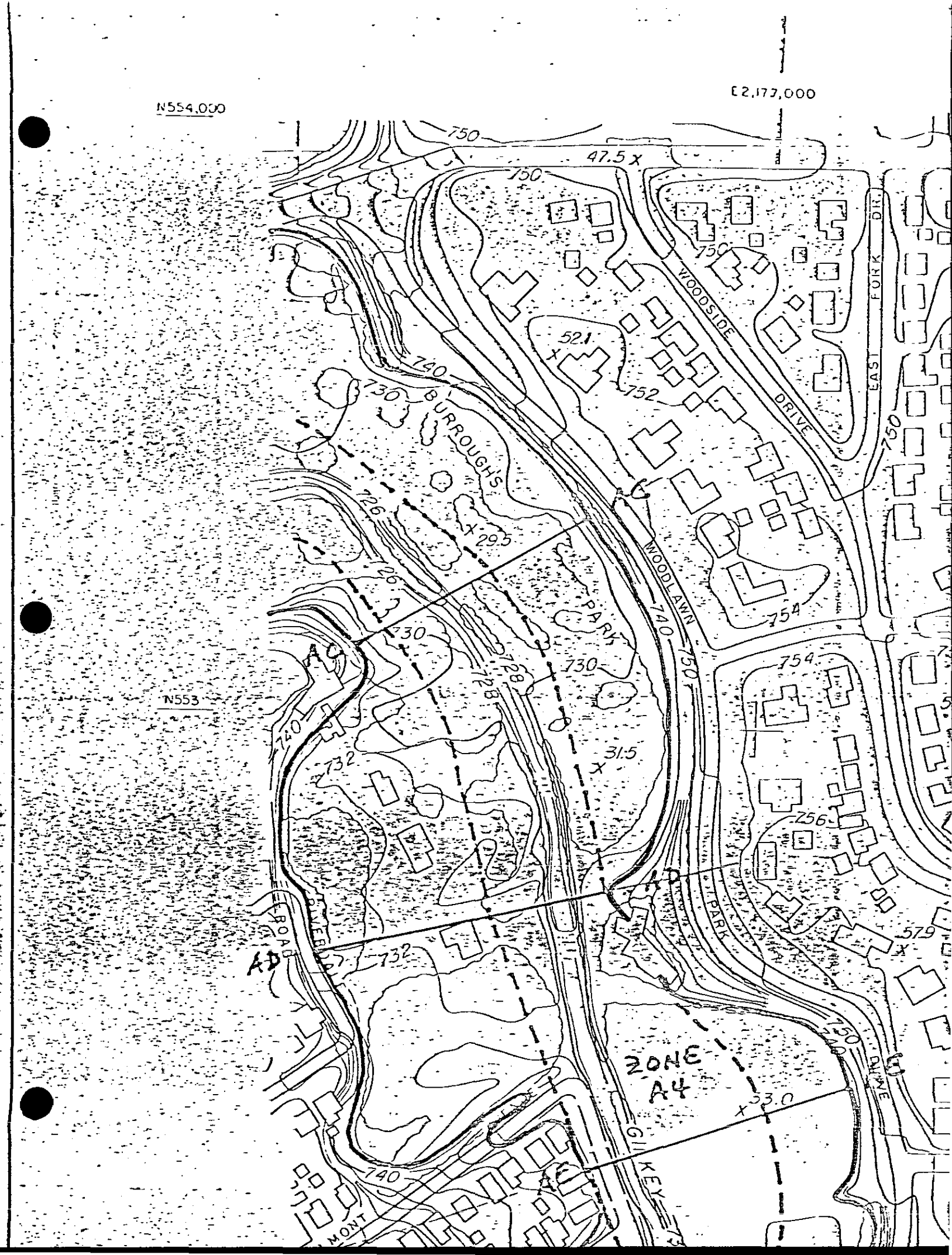
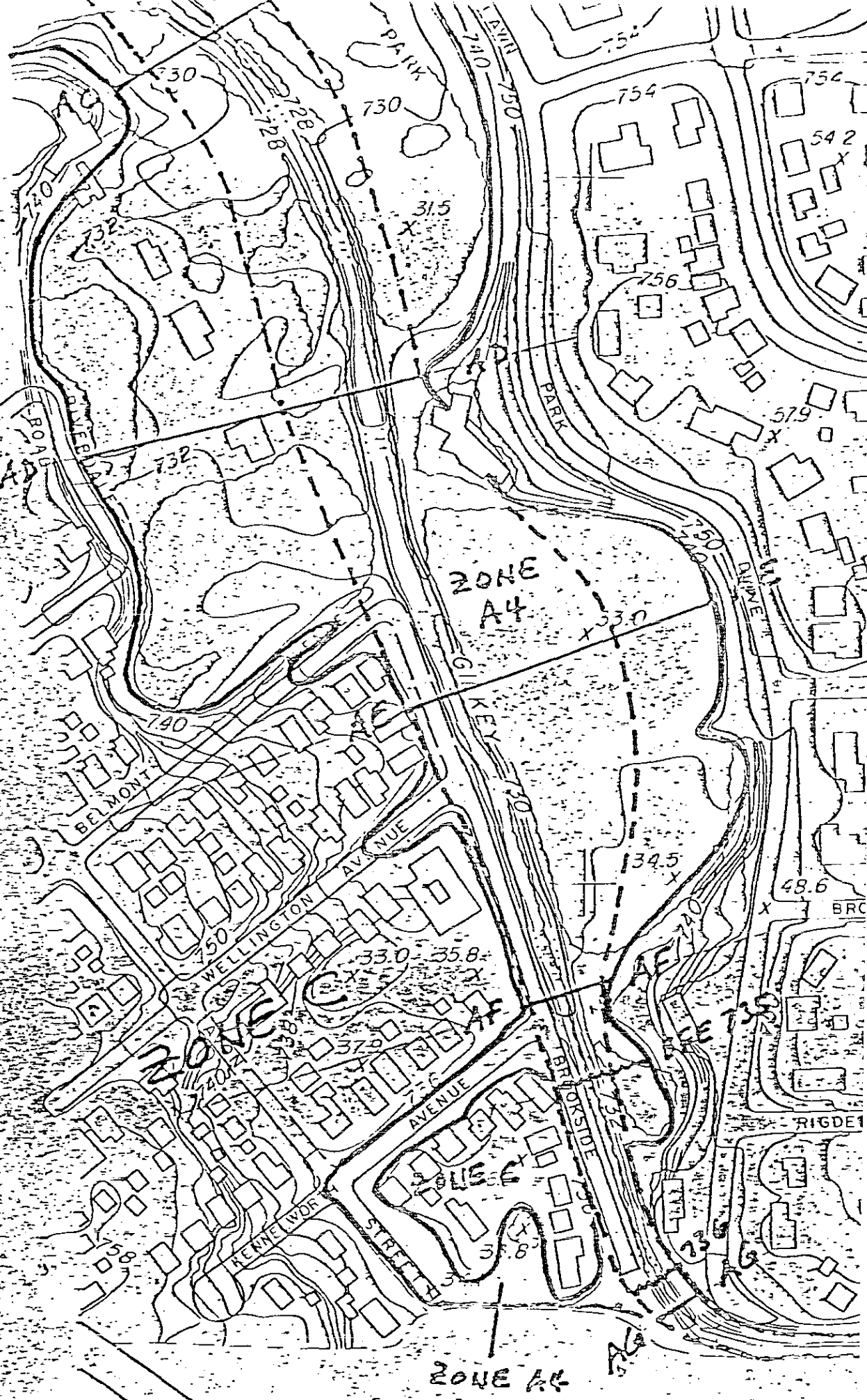
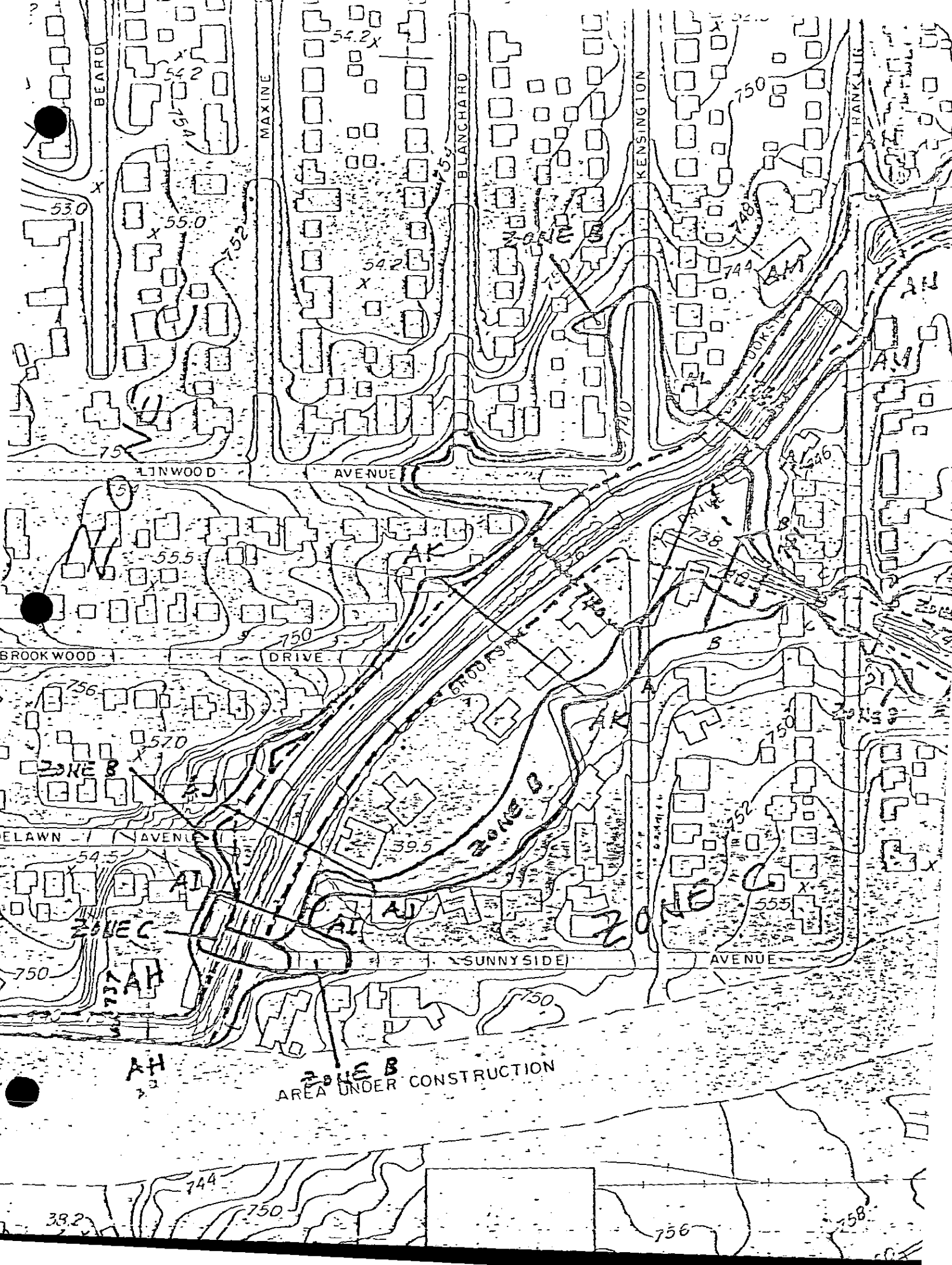
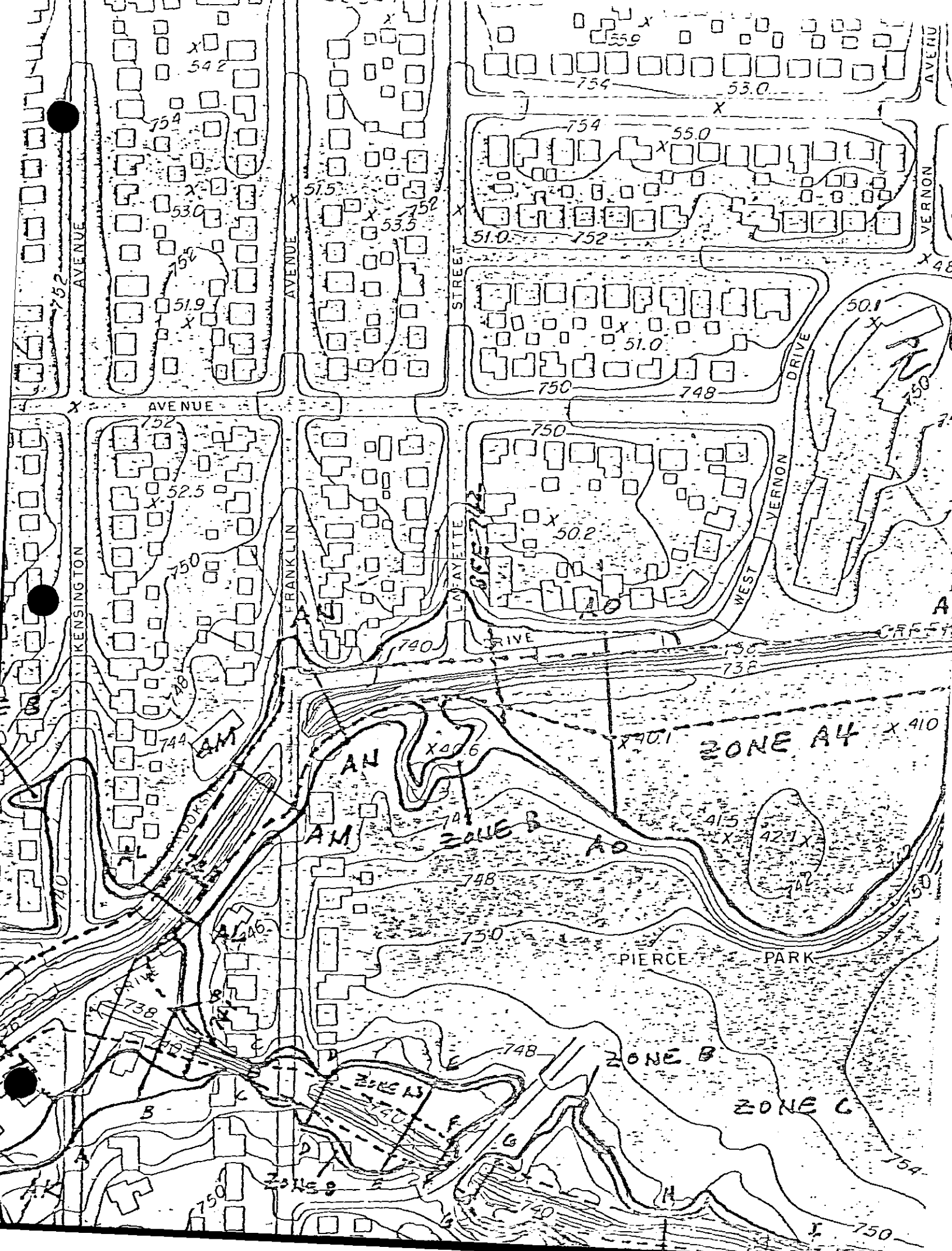
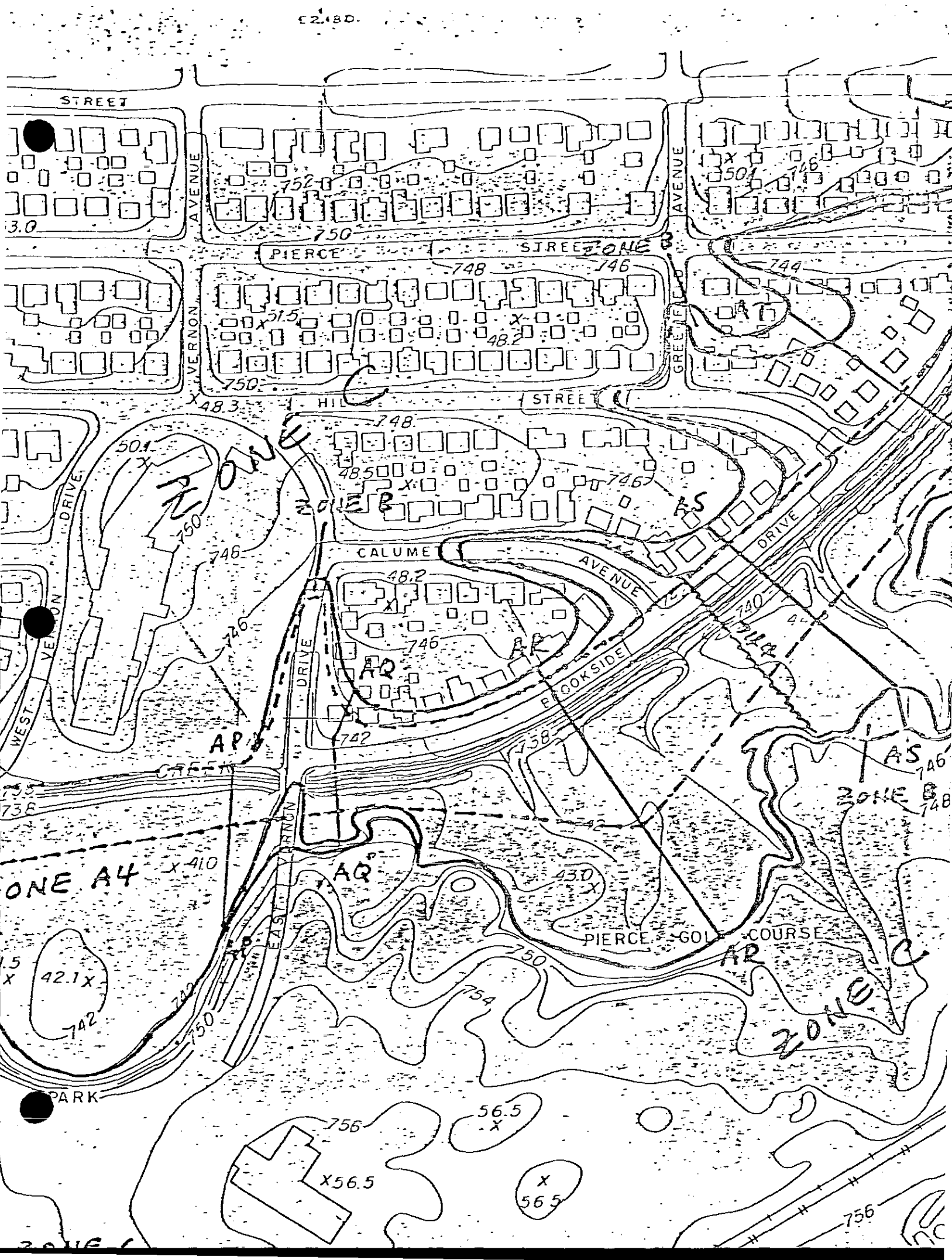
N554,000
N553
28.6
ZONE A12
ZONE A4
ZONE C
AA
AB
CRAIG
STREET
AVON
STREET
GILKEY CREEK
SEVENTH
EAST
STREET
750
740
730
726
754
756

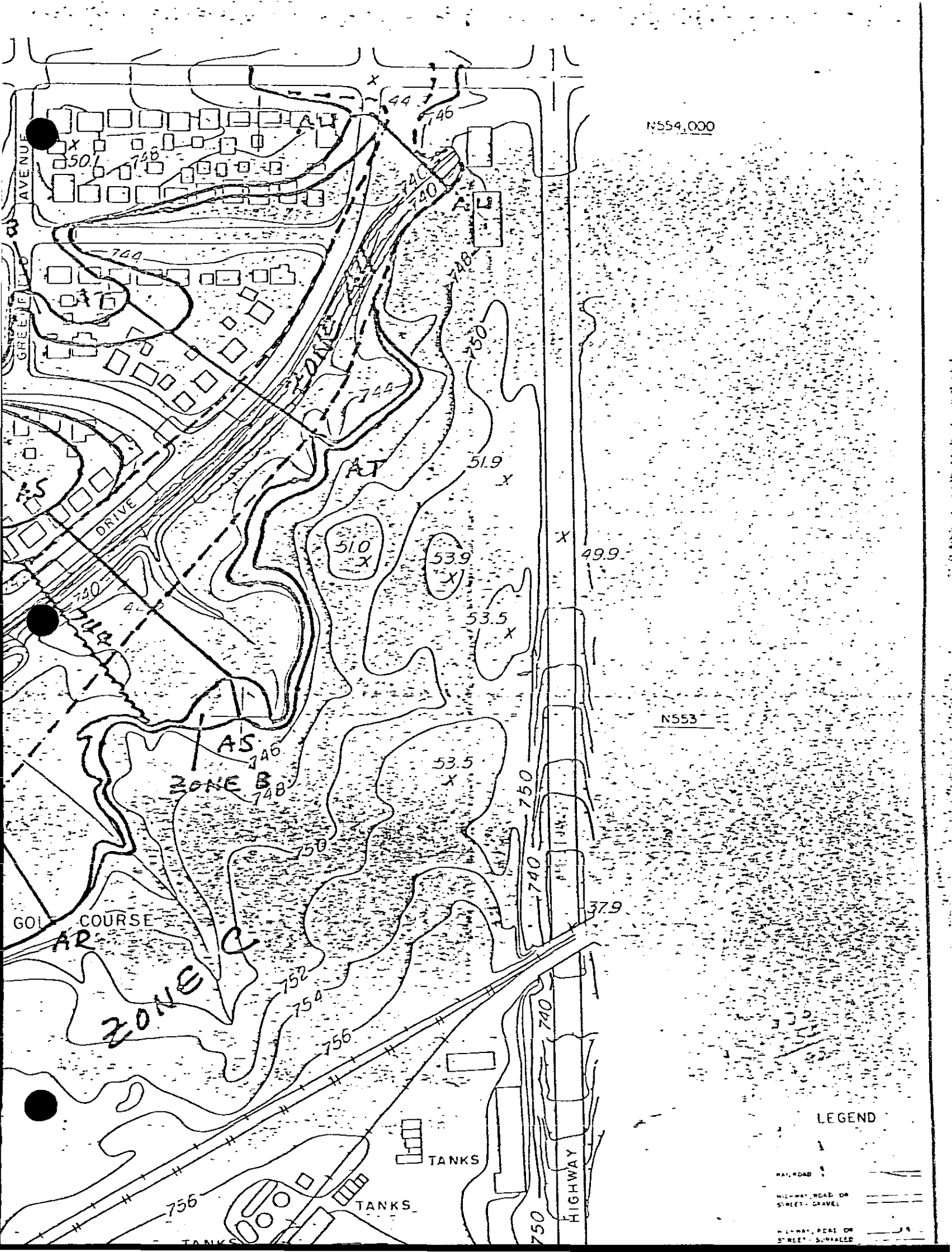

N554,000
E2,177,000
N553
750
47.5 x
750
750
WOODSIDE
DRIVE
EAST FORK DR.
52.1
x
740
752
730
BURROUGH'S
PARK
726
x 29.5
WOODLAWN
740
750
754
754
730
728
730
A-C
31.5
x
740
732
256
A-D
RIVER
ROAD
732
PARK
579
x
750
740
DRIVE
ZONE
A4
x 33.0
740
A-E
GILKEY
MONT

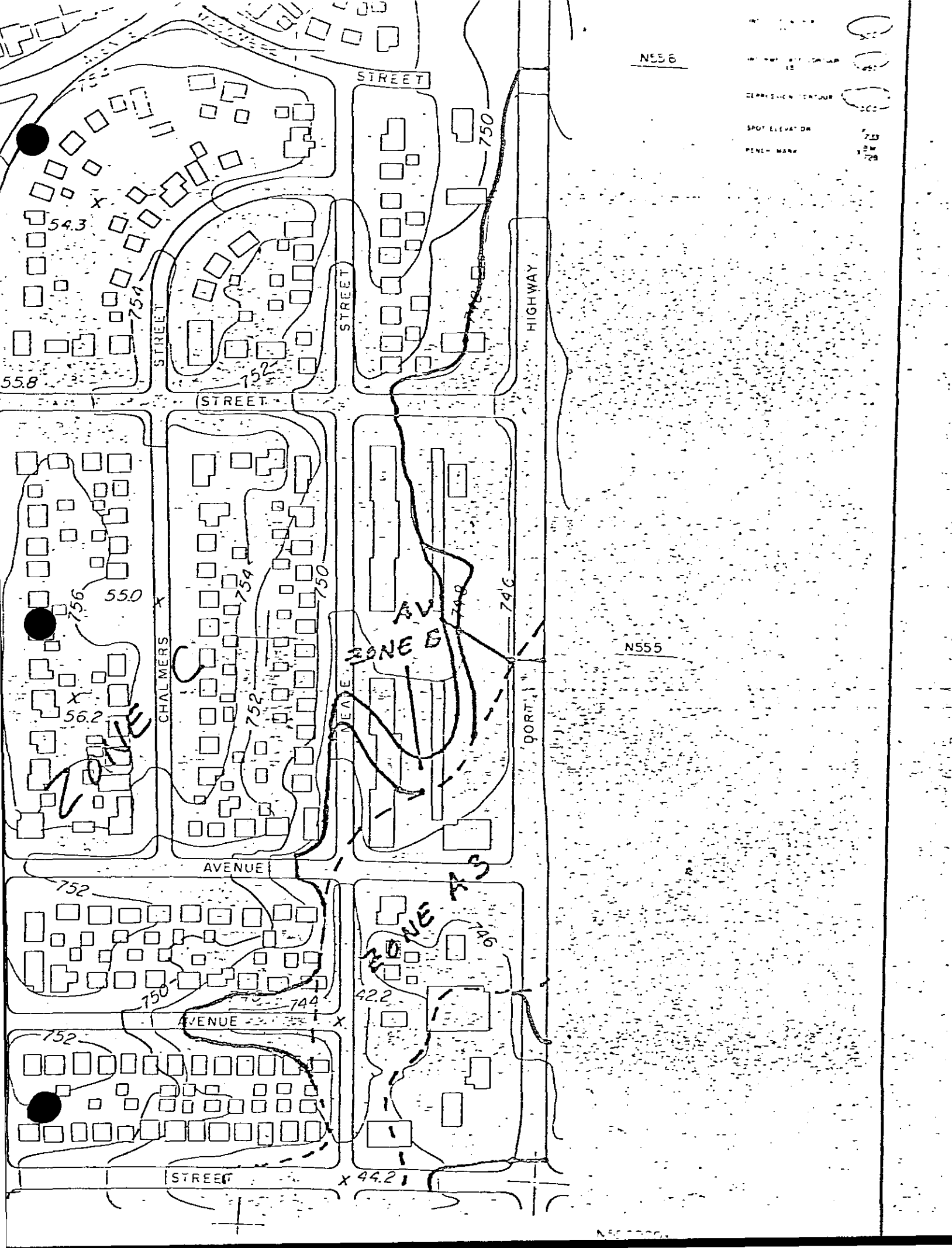

N553
N552
PARK
AVE
PARK
DRIVE
ROAD
RIVERDALE
ZONE A4
KEY
BELMONT
WELLINGTON
AVENUE
ZONE C
ZONE E
BROOKSIDE
AVENUE
RENNELWOR
STREET
ZONE A4
AD
AE
AG
730
728
732
740
750
754
756
31.5
33.0
34.5
48.6
35.8
37.9
57.9


BEARD
MAXINE
BLANCHARD
KENSINGTON
FRANKLIN
ELMWOOD AVENUE
BROOKWOOD DRIVE
DELAWN AVENUE
SUNNYSIDE AVENUE
BROOKS DRIVE
ZONE B
ZONE C
AREA UNDER CONSTRUCTION


AVENUE
AVENUE
STREET
VERNON
DRIVE
AVENUE
KENSINGTON
FRANKLIN
LAFAYETTE
WEST
VERNON
DRIVE
ZONE A4
ZONE B
ZONE B
ZONE C
PIERCE PARK
AM
AN
AO
AL


STREET
AVENUE
PIERCE
STREET
ZONE B
VERNON
GREENFIELD
HILL
STREET
ZONE B
CALUMET
AVENUE
DRIVE
BROOKSIDE
DRIVE
WEST
VERNON
DRIVE
EAST
VERNON
DRIVE
ZONE A4
PIERCE GOLF COURSE
PARK
ZONE C
AP
AQ
AR
AS
752
750
748
746
744
742
740
738
754
756
56.5
43.0
42.1
41.0
48.2
48.3
48.5
50.1
51.5


N554,000
N553
AVENUE
GREENE
DRIVE
ZONE A
ZONE B
ZONE C
AT
AS
AR
GOLF COURSE
TANKS
TANKS
TANKS
HIGHWAY
LEGEND
RAILROAD
HIGHWAY, ROAD OR STREET - GRAVEL
HIGHWAY, ROAD OR STREET - SURFACED


STREET
STREET
STREET
STREET
HIGHWAY
CHALMERS
AVENUE
AVENUE
STREET
N556
N555
ZONE C
ZONE B
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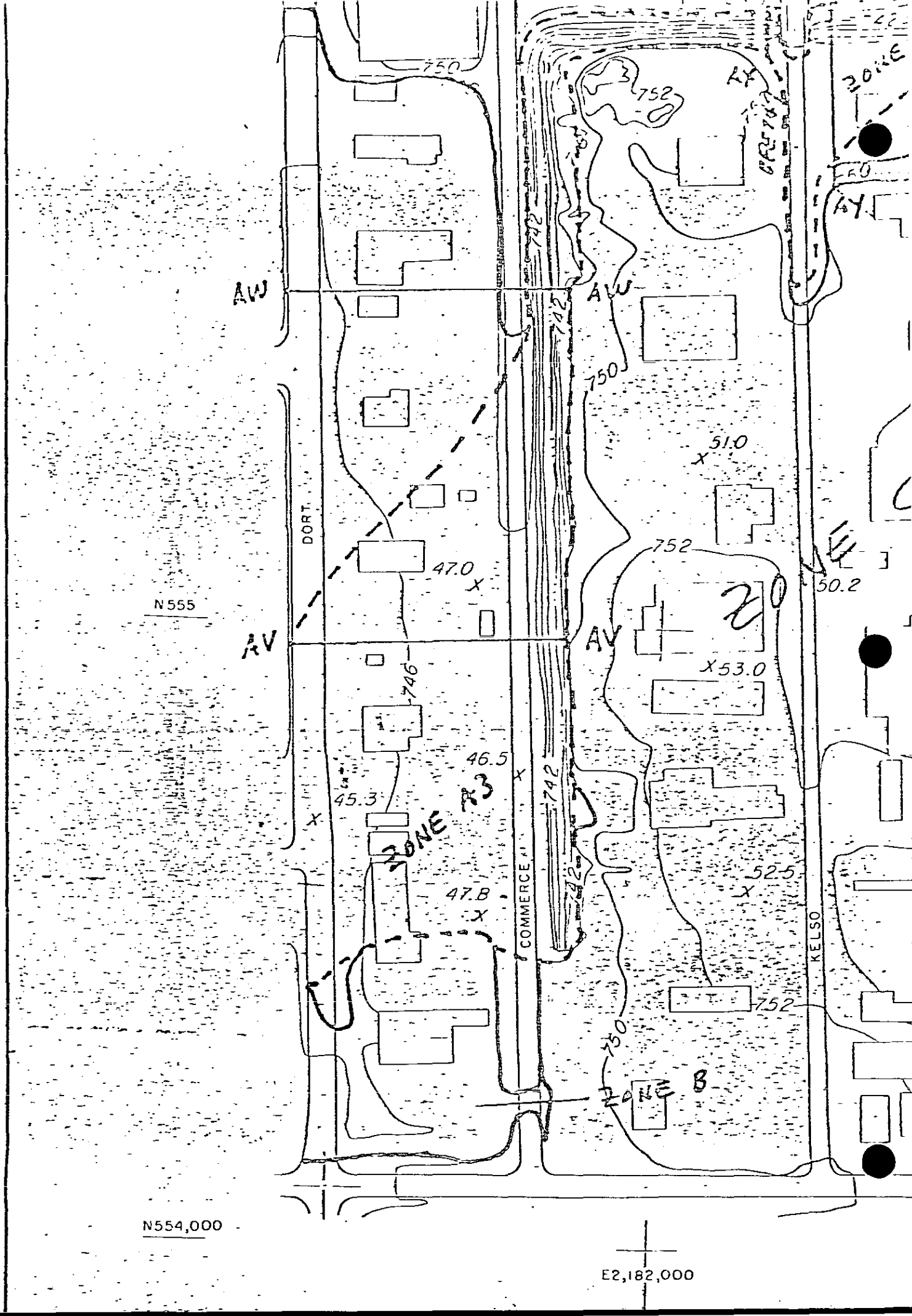
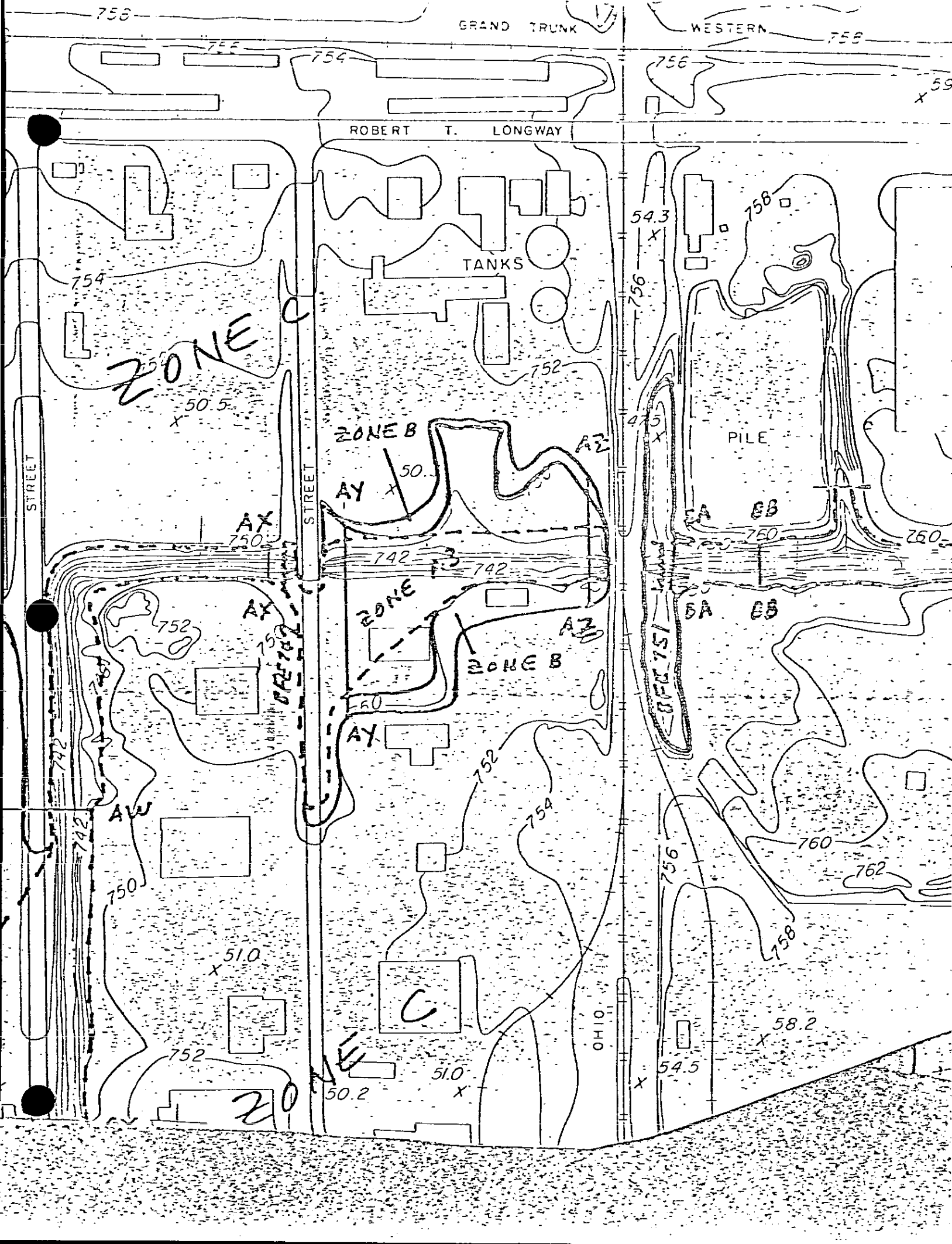
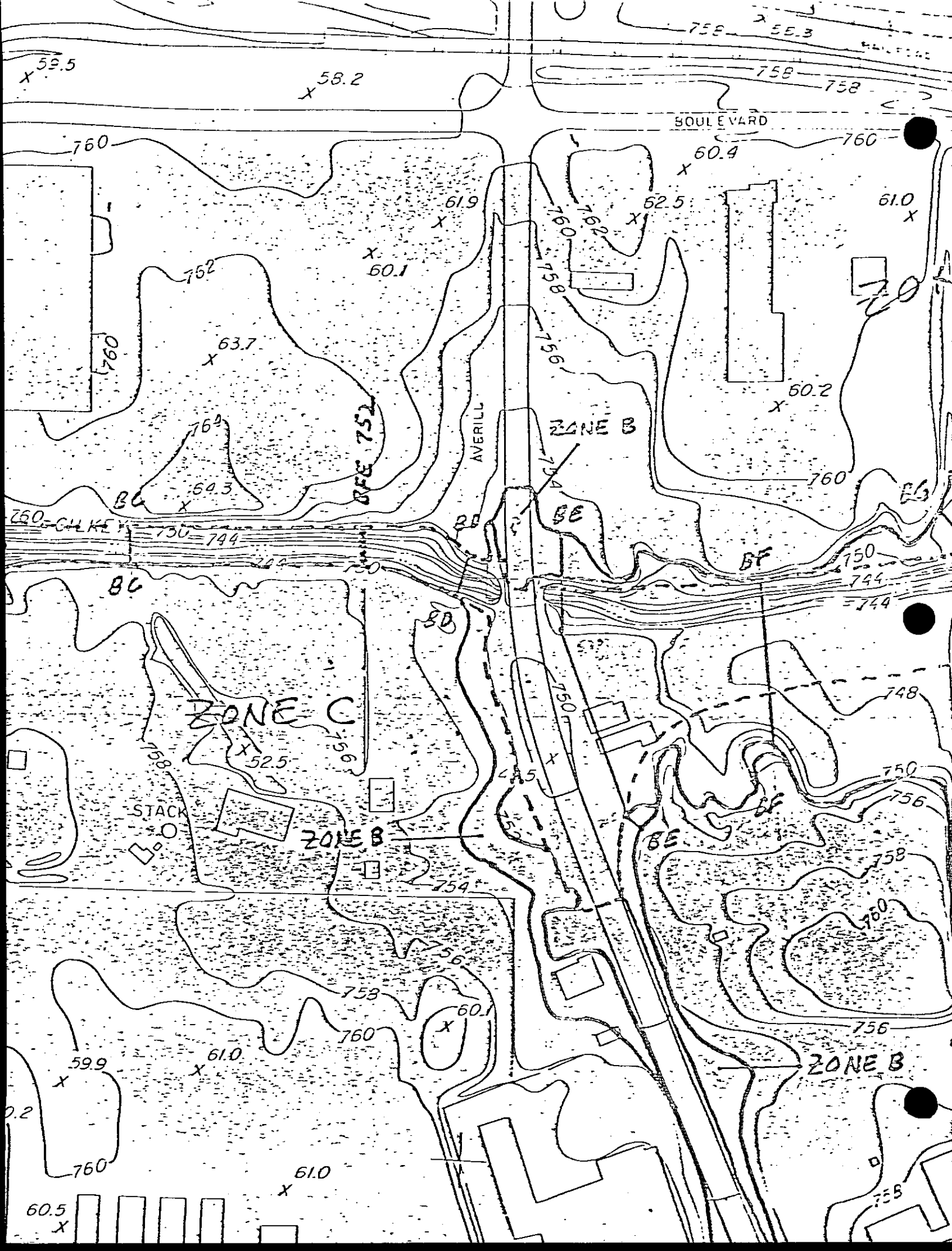
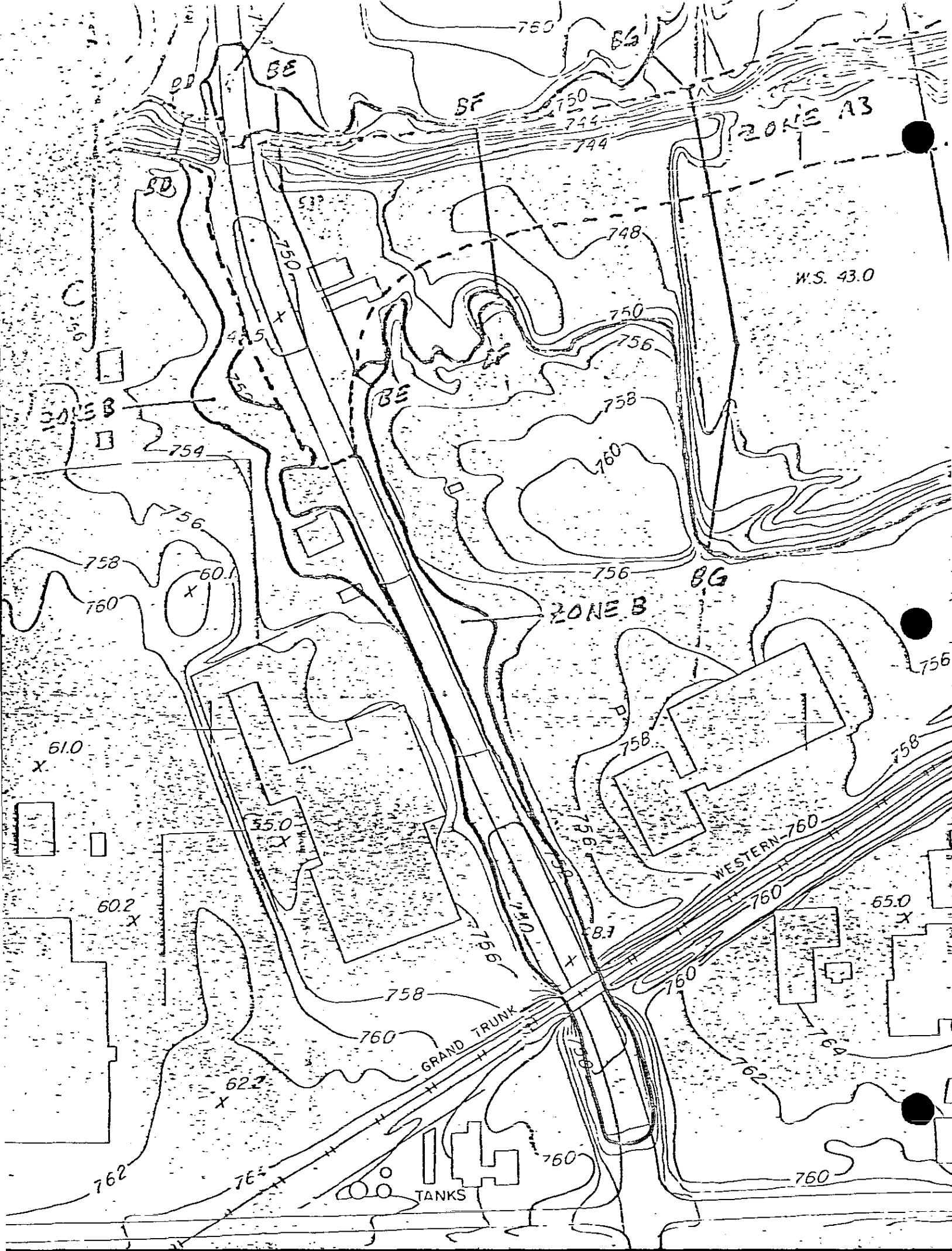
748
746
744


750
752
AX
ZONE
742
AW
AW
750
51.0
DORT
752
47.0
50.2
N555
AV
AV
53.0
746
46.5
45.3
ZONE A3
742
47.8
COMMERCE
52.5
KELSO
752
750
ZONE B
N554,000
E2,182,000


GRAND TRUNK
WESTERN
ROBERT T. LONGWAY
TANKS
PILE
STREET
STREET
ZONE C
ZONE B
ZONE B
ZONE
ZONE
AX
AY
AZ
AW
BA
BB
OHIO
758
756
754
752
750
742
760
762
50.5
47.5
54.3
51.0
50.2
58.2
54.5


BOULEVARD
AVERILL
ZONE B
ZONE C
ZONE B
ZONE B
STACK
BFE 752
BC
BD
BE
BF
BG
59.5
58.2
55.3
60.4
62.5
61.0
61.9
60.1
63.7
60.2
64.3
52.5
60.1
59.9
61.0
60.5
758
760
762
756
754
752
750
748
744


ZONE A3
ZONE B
ZONE B
W.S. 43.0
WESTERN
GRAND TRUNK
TANKS
BE
BF
BG
SD
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750
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748
756
758
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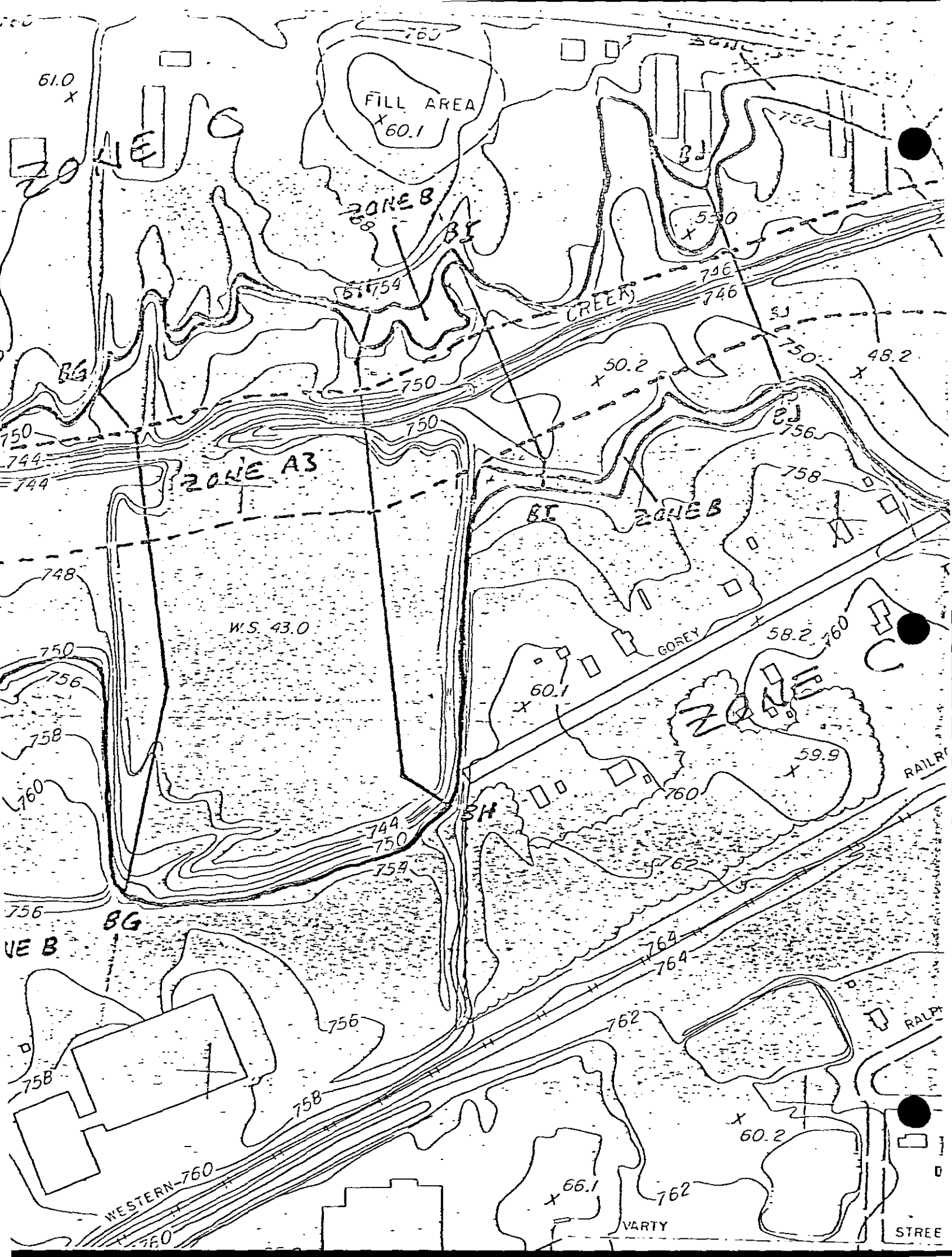
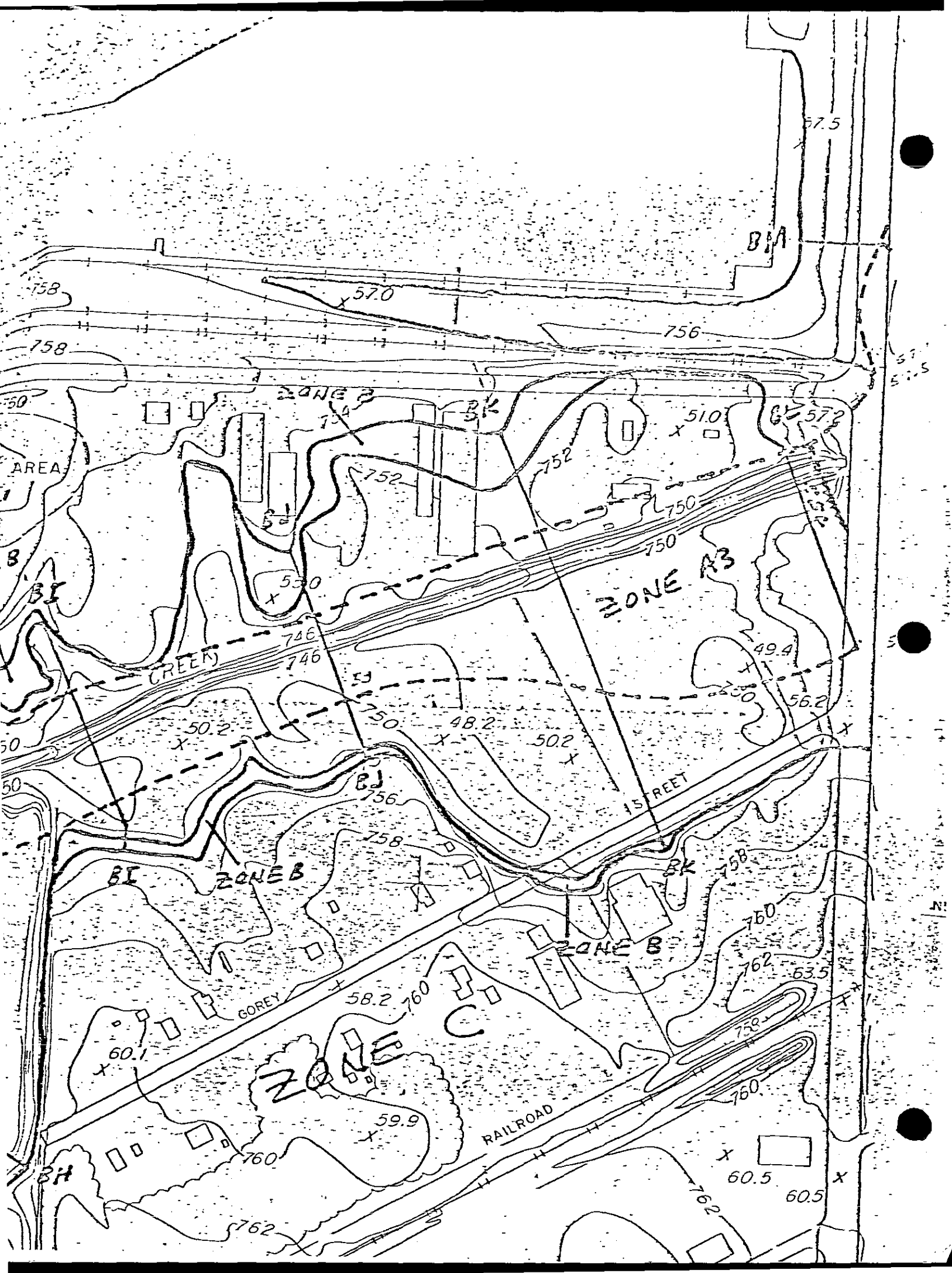
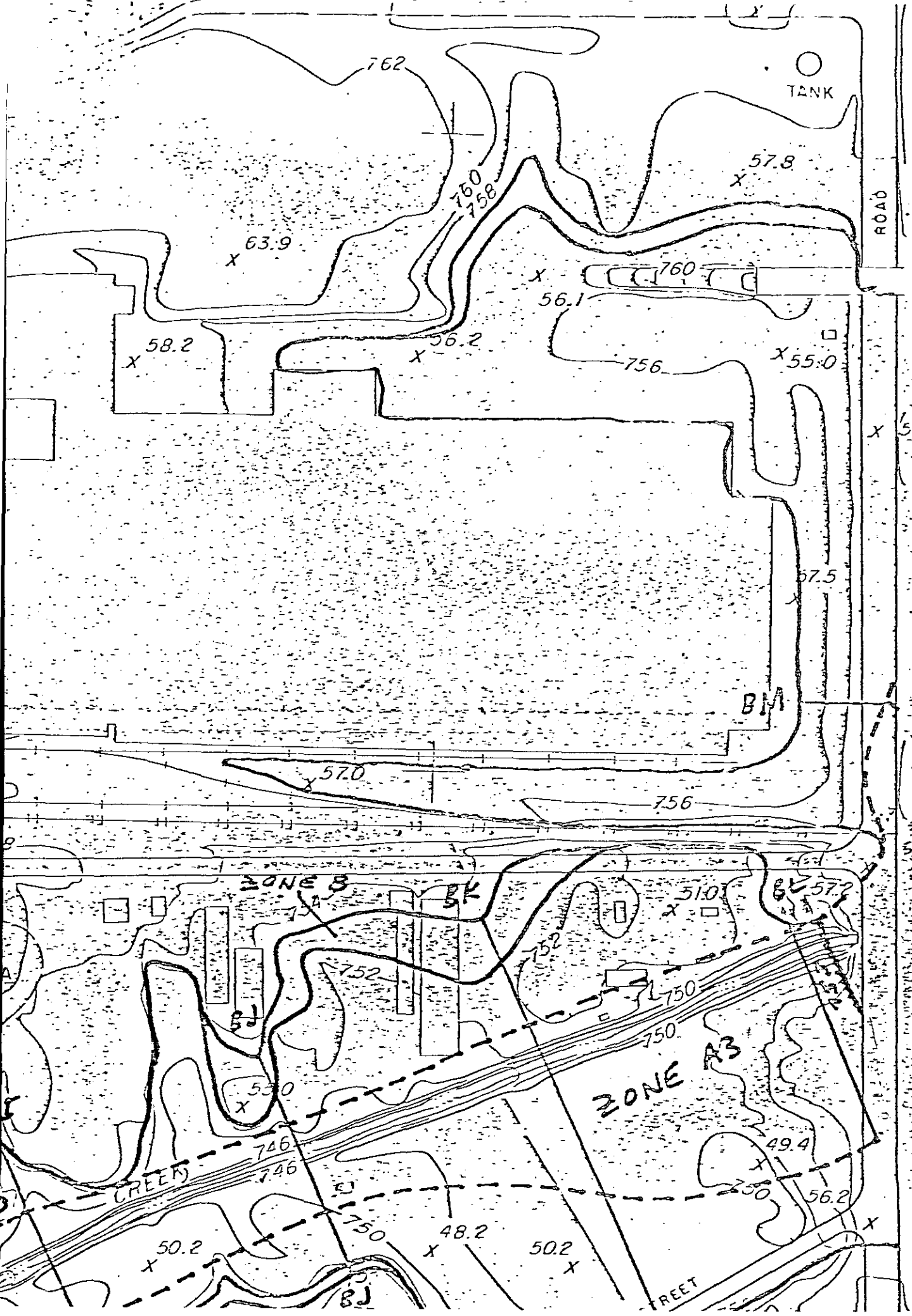
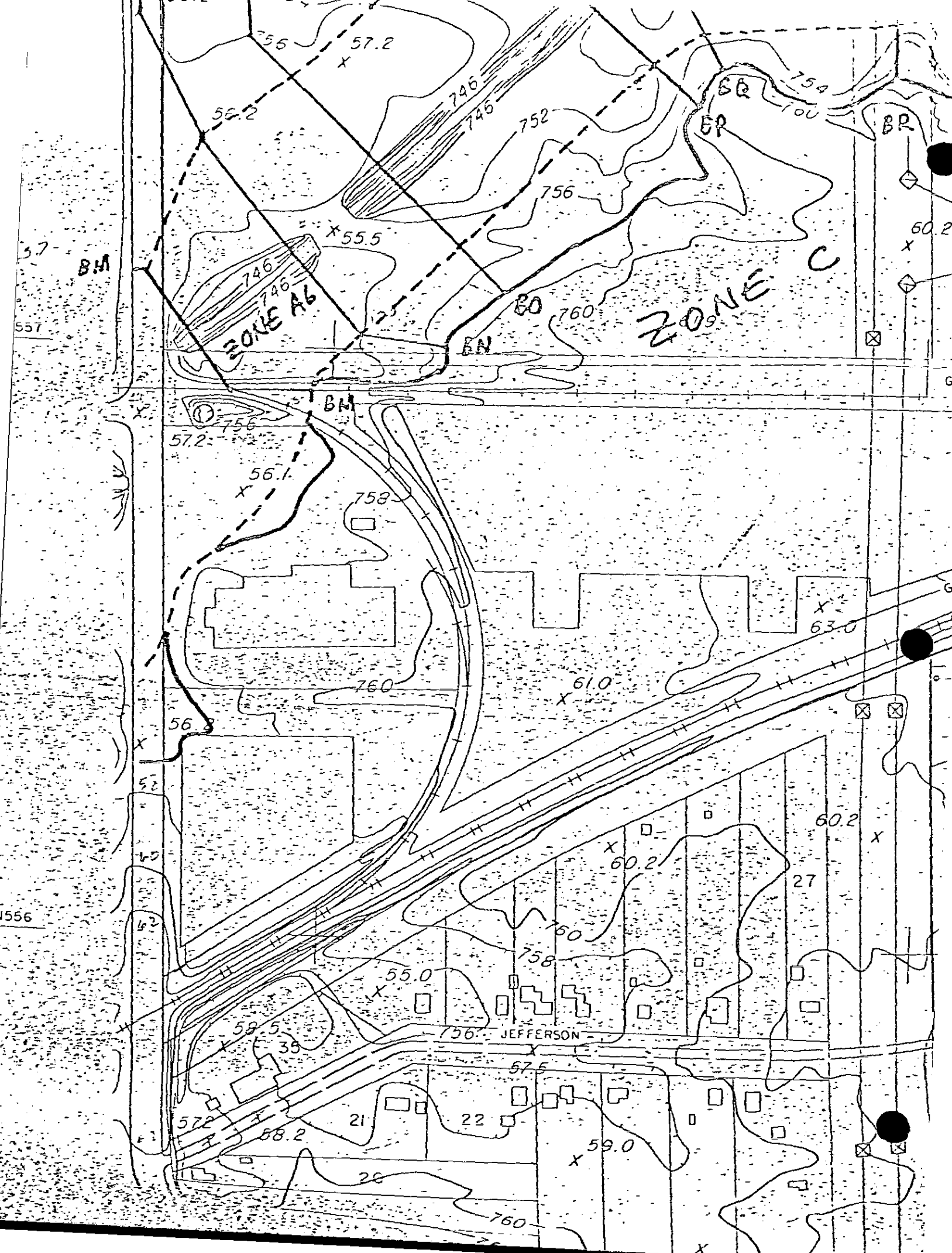
762
764
61.0
60.1
60.2
62.2
55.0
65.0


FILL AREA
60.1
ZONE B
ZONE A3
ZONE B
ZONE C
ZONE B
W.S. 43.0
CREEK
GOREY
WESTERN
VARTY
STREE
RAILR
RALPH
61.0
50.2
48.2
58.2
60.1
59.9
60.2
66.1
760
752
754
746
750
744
756
758
748
762
764


ZONE B
ZONE A3
ZONE B
ZONE B
ZONE C
CREEK
AREA
GOREY
RAILROAD
1ST STREET
BM
BK
BJ
BI
BH
57.0
51.0
57.2
49.4
56.2
50.2
48.2
50.2
58.2
60.1
59.9
63.5
60.5
60.5
756
758
760
762
752
750
746


762
TANK
57.8
760
758
ROAD
63.9
760
56.1
58.2
56.2
756
55.0
56.2
57.5
BM
57.0
756
ZONE B
BK
51.0
57.2
752
752
750
750
BJ
ZONE A3
53.0
746
746
49.4
CREEK
750
56.2
48.2
50.2
50.2
BJ
STREET


ZONE A6
ZONE C
JEFFERSON
BM
BN
BO
BP
BR
SQ
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756
760
758
57.2
56.2
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56.1
63.0
61.0
60.2
55.0
58.5
57.5
58.2
59.0
57.2
21
22
27
35
26

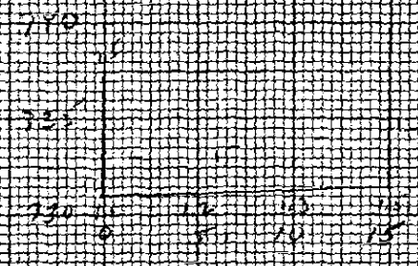
Cole Creek at Section AE - BA
Beecher Road

Recurrence Interval	Design Discharge	Section AE h_4	original bridge (BA) h_1	original culvert (BA) h_1	Flow type BPR Bridge	Flow type BPR Culvert
10-YR	335	737.06	737.60	738.01	1	3
50-YR	480	737.54	738.34	739.19	3	4
100-YR	550	737.72	738.80	739.91	3	4
500-YR	715	738.08	739.94	741.35	3	4

The original culvert computation is shown on the attached graph paper, p. 2. The error appears to have resulted from leaving out the E in the numerator of the square root equation. With this correction, the culvert equation verifies the head loss computed by the bridge analysis. Therefore, the bridge analysis was used to determine the h_1 value at section BA.

D.J. Holtsching
11-13-78

Gordon Creek



Type 4 [illegible] Q_0 [illegible]
[illegible]

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$A_0 = 86.8$
$n = 0.025$
$L = 53$
$R = 86.8/72.1$

$Q_0 = 7221$
[illegible]

```
1      1 COLE CREEK POTTER RD TO BEECHER RD        KNUTILLA 18  5  2  5 12
2      2  71434  71546  71622  71575  71578
3  430 AE     1  13  3  709   12825  1  3
4  4305     480    700   1050    790    790
5  4310    -205  1  7160 -190  1  7140 -180  1  7120    0  1  7126   16  2  7114   AK
5  4311      27  2  7085   32  2  7076   40  2  7085   46  3  7118   60  3  7127
5  4312     120  3  7140  140  3  7160  155  3  7200
6  4320  1  2 040 040  1  2 045 045  1  2 040 040
3  4400 AF     0   8  2  710   13310 99  2
5  4410     -62  1  7207  -44  1  7104  -38  1  7094  -36  1  7089  -34  1  7094   AL
5  4411     -26  1  7106  -20  2  7140    0  2  7170
6  4420  1  2 042 042  1  2 040 040
3  4500 AG     0  20  3  712   13870  1  3
5  4510       0  1  7300   20  1  7280   40  1  7260   70  1  7240  120  1  7220
5  4511     140  1  7200  165  1  7180  185  1  7160  380  2  7140  390  2  7120   AM
5  4512     395  2  7108  405  2  7120  420  3  7140  495  3  7140  505  3  7160
5  4513     510  3  7180  515  3  7200  545  3  7300  560  3  7320  575  3  7340
6  4520  1  2 120 120  1  2 050 050  1  2 120 120
3  4600 AH     0  17  3  714   14440  1  3
5  4610       0  1  7300   40  1  7280  100  1  7260  140  1  7240  285  1  7220   AN
5  4611     370  1  7200  390  1  7180  460  2  7160  470  2  7140  490  2  7129
5  4612     522  2  7140  530  3  7160  575  3  7180  605  3  7200  640  3  7280
5  4613     665  3  7300  690  3  7320
6  4620  1  2 120 120  1  2 060 060  1  2 120 120
3  4700 AI     1  23  3  716   15060  1  3
4  4705    335    480    715    550    550
5  4710       0  1  7340   90  1  7320  155  1  7300  205  1  7280  240  1  7260
5  4711     245  1  7240  255  1  7220  260  2  7200  268  2  7180  278  2  7160   AO
5  4712     282  2  7143  285  3  7160  410  3  7170  520  3  7180  535  3  7200
5  4713     555  3  7220  565  3  7240  585  3  7260  595  3  7280  615  3  7300
5  4714     640  3  7320  670  3  7340  680  3  7360
6  4720  1  2 100 100  1  2 060 060  1  2 100 100
3  4800 AJ     0  19  3  718   15880  1  3
5  4810       0  1  7340   40  1  7320   60  1  7300   95  1  7280  140  1  7260   AP
5  4811     170  1  7240  230  1  7220  300  1  7201  365  1  7200  410  2  7180
5  4812     415  2  7165  430  2  7160  440  2  7165  445  2  7180  465  3  7200
5  4813     490  3  7300  500  3  7320  530  3  7380  670  3  7400
6  4820  1  2 090 090  1  2 050 050  1  2 070 070
3  4900 AK     0  20  3  720   16950  1  3
5  4910       0  1  7360   40  1  7340   70  1  7320  105  1  7300  145  1  7280
5  4911     180  1  7260  205  1  7240  240  2  7220  255  2  7200  265  2  7183   AQ
5  4912     290  2  7188  300  3  7200  405  3  7220  420  3  7240  440  3  7260
5  4913     455  3  7280  465  3  7300  490  3  7360  515  3  7380  640  3  7400
6  4920  1  2 080 080  1  2 055 055  1  2 080 080
3  4950 AK+1  0  12  3  720   17300  1  3
```

```
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5  4962      205  3  7260  250  3  7300
6  497[illegible]  1  2 090 090  1  2 050 050  1  2 075 07[illegible]
3  5000 AL     0  15  3  722   17660  1  3
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5  5011      150  1  7280  175  1  7260  240  1  7240  380  2  7220  390  2  7200
5  5012      400  2  7220  435  3  7300  460  3  7400  475  3  7420  490  3  7440
6  5020  1  2 100 100  1  2 050 050  1  2 070 070
3  5100 AM     0  23  3  723   18290  1  3
5  5110         0  1  7460   50  1  7440   85  1  7420  100  1  7400  115  1  7380
5  5111      140  1  7360  170  1  7340  200  1  7320  215  1  7300  220  1  7280
5  5112      235  1  7260  350  1  7240  353  2  7220  362  2  7215  368  2  7220
5  5113      370  3  7240  510  3  7260  525  3  7280  550  3  7300  565  3  7400
5  5114      575  3  7420  580  3  7440  650  3  7460
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3  5200 AN     0  24  3  724   18820  1  3
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5  5212      390  2  7240  400  2  7228  410  2  7240  420  3  7260  485  3  7280
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5  5314      540  3  7400  550  3  7420  570  3  7440  590  3  7460  630  3  7480
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3  5400 AQ     0  18  3  730   20040  1  3
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5  5412      430  2  7288  445  2  7283  460  2  7288  470  3  7300  490  3  7320
5  5413      510  3  7400  520  3  7420  545  3  7480
6  5420  1  2 100 100  1  2 060 060  1  2 070 070
3  5500 AR     0  23  5  731   20790  1  5
5  5510         0  1  7480   35  1  7460   75  1  7440  130  1  7420  160  1  7400
5  5511      250  1  7380  300  1  7360  380  1  7340  430  2  7320  435  2  7305
5  5512      440  2  7300  450  2  7305  460  3  7320  510  3  7327  550  4  7320
5  5513      560  4  7305  570  4  7300  580  4  7305  590  5  7320  640  5  7340
5  5514      690  5  7400  730  5  7440  765  5  7460
6  5520  1  2 120 120  1  2 050 050  1  2 120 120  1  2 050 050  1  2 120 120
3  5600 AS     0  15  3  732   21410  1  3
5  5610         0  1  7440   70  1  7420  130  1  7400  210  1  7380  320  1  7360
```

A-
A-S
A-T
A-U
A-V
A-W
A-X
A-Y

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  5611      490  2  7340  495  2  7320  500  2  7315  505  2  7320  512  3  7340   AY
5  5612      525  3  7360  535  3  7380  550  3  7400  555  3  7420  570  3  7440
6  5620  1  2 100 100  1  2 040 040  1  2 060 060
3  5700 AT     0  18  3  734   21940  1  3
5  5710        0  1  7500   20  1  7480   50  1  7460   75  1  7440  100  1  7420   AZ
5  5711      120  1  7400  130  1  7380  260  2  7360  275  2  7340  280  2  7332
5  5712      285  2  7327  290  2  7332  295  2  7340  305  3  7360  510  3  7380
5  5713      535  3  7400  590  3  7420  770  3  7440
6  5720  1  2 100 100  1  2 050 050  1  2 100 100
3  5800 AT RR 2   7  1  733   21940        30  7375 3 1
5  5810        0  1  7375    0  1  7311    5  1  7312   10  1  7313   15  1  7315
5  5811       15  1  7375    0 -9  7375
6  5820  1  2 025 025
3  5900 AT RD 4  10  2   53          1  2          1 1                1
5  5910     -330  1  7500 -290  1  7480 -240  1  7460 -170  1  7440 -116  1  7423
5  5911        0  2  7409  234  2  7411  300  2  7420  425  2  7440  480  2  7460
3  6000 AU     5  20  3  734   22050  1  3
5  6010     -200  1  7460 -140  1  7440 -125  1  7420 -110  1  7400 -100  1  7380   BA
5  6011        0  1  7355   20  2  7338   30  2  7330   32  2  7329   33  2  7330
5  6012       36  3  7349   50  3  7350   60  3  7360   80  3  7380  130  3  7400
5  6013      180  3  7420  215  3  7440  230  3  7460  255  3  7480  270  3  7500
6  6020  1  2 100 100  1  2 060 060  1  2 100 100
```

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 COLE CR BEECHER RD TO MORRISH RD          KNUTILLA 17  5  2  5 12
2      2  73760  73834  73994  73880  73883
3   6000 AU     1  20  3  734   22050  1  3
4   6005     335    480    715    550    550
5   6010    -200  1  7460 -140  1  7440 -125  1  7420 -110  1  7400 -100  1  7380
5   6011       0  1  7355   20  2  7338   30  2  7330   32  2  7329   33  2  7330
5   6012      36  3  7349   50  3  7350   60  3  7360   80  3  7380  130  3  7400   BA
5   6013     180  3  7420  215  3  7440  230  3  7460  255  3  7480  270  3  7500
6   6020  1  2 100 100  1  2 060 060  1  2 100 100
3   6100 AV     0  17  3  735   22460  1  3
5   6110       0  1  7500   30  1  7480   60  1  7460   80  1  7440  120  1  7420
5   6111     200  1  7400  255  1  7380  370  1  7360  390  2  7340  400  2  7334   BB
5   6112     405  3  7360  415  3  7380  430  3  7400  440  3  7420  450  3  7440
5   6113     465  3  7500  490  3  7520
6   6120  1  2 100 100  1  2 050 050  1  2 100 100
3   6200 AW     0  22  3  736   23130  1  3
5   6210    -400  1  7540 -350  1  7520 -310  1  7500 -285  1  7480 -265  1  7460
5   6211    -240  1  7440 -200  1  7420 -160  1  7400  -10  1  7380    0  1  7375   BC
5   6212      16  2  7369   24  2  7345   25  2  7344   26  2  7345   34  3  7359
5   6213      40  3  7400   60  3  7420  110  3  7440  120  3  7460  130  3  7500
5   6214     200  3  7580  310  3  7600
6   6220  1  2 080 080  1  2 055 055  1  2 070 070
3   6300 AX     0  20  3  738   23980  1  3
5   6310       0  1  7600   60  1  7580   70  1  7560  110  1  7540  150  1  7520
5   6311     165  1  7500  220  1  7480  270  1  7460  350  1  7440  460  1  7420   BD
5   6312     725  1  7400  735  2  7380  740  2  7367  750  2  7362  755  3  7380
5   6313     825  3  7400  860  3  7420  870  3  7440  885  3  7500  950  3  7600
6   6320  1  2 070 070  1  2 055 055  1  2 070 070
3   6400 AY     0  24  3  739   24690  1  3
5   6410       0  1  7600   80  1  7580  110  1  7560  135  1  7540  145  1  7520
5   6411     185  1  7500  250  1  7480  265  1  7460  275  1  7460  290  1  7420   BE
5   6412     385  2  7400  395  2  7382  405  2  7377  410  3  7400  420  3  7420
5   6413     580  3  7440  610  3  7460  620  3  7480   40  3  7500  660  3  7520
5   6414     670  3  7540  700  3  7560  725  3  7580   40  3  7600
6   6420  1  2 070 070  1  2 055 055  1  2 070 070
3   6500 AZ     0  16  3  741   25560  1  3
5   6510     -80  1  7580  -10  1  7560    0  1  7548   20  1  7513   38  2  7430   BF
5   6511      42  2  7398   46  2  7396   52  2  7397   60  3  7428  104  3  7433
5   6512     152  3  7430  310  3  7440  330  3  7500  365  3  7520  430  3  7540
5   6513     540  3  7560
6   6520  1  2 060 060  1  2 055 055  1  2 070 070
3   6600 BA     0  20  3  742   26290  1  3
5   6610     -50  1  7595    0  1  7580  180  1  7560  265  1  7540  300  1  7520   BG
5   6611     320  1  7500  345  1  7480  365  1  7460  390  1  7440  550  1  7440
5   6612     555  2  7420  565  2  7406  570  2  7401  575  2  7406  580  2  7420
```

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5  6600  390  3  7440  610  3  7480  620  3  7500  680  3  7600  725  3  7620
6  6600  1  2 090 090  1  2 055 055  1  2 070 070
**SEQUENCE**
3  6700 BB    0  22  3  745   26640  1  3
5  6710       0  1  7600   55  1  7580  150  1  7560  190  1  7540  260  1  7520
5  6711     270  1  7500  280  1  7480  300  1  7460  375  1  7440  385  2  7430   BH
5  6712     390  2  7428  400  2  7423  405  2  7430  410  3  7440  465  3  7460
5  6713     475  3  7480  490  3  7500  505  3  7520  520  3  7540  540  3  7560
5  6714     570  3  7580  590  3  7600
6  6720  1  2 100 100  1  2 065 065  1  2 100 100
3  6800 BD    0  20  3  745   27375  1  3
5  6810       0  1  7600  110  1  7580  200  1  7560  225  1  7540  245  1  7520
5  6811     260  1  7500  285  1  7480  365  1  7460  375  2  7440  380  2  7439   BI
5  6812     390  2  7434  395  2  7440  410  3  7460  460  3  7480  475  3  7500
5  6813     490  3  7520  500  3  7540  515  3  7560  550  3  7580  580  3  7599
6  6820  1  2 070 070  1  2 060 060  1  2 080 080
3  6900 BDP   0  20  3  745   27650  1  3
5  6910       0  1  7600  130  1  7580  190  1  7560  245  1  7540  265  1  7520
5  6911     315  1  7500  335  1  7480  400  1  7460  410  2  7440  420  2  7437   BJ
5  6912     425  2  7440  435  2  7460  450  3  7480  460  3  7500  515  3  7520
5  6913     550  3  7540  560  3  7560  575  3  7580  620  3  7600  650  3  7620
6  6920  1  2 045 045  1  2 045 045  1  2 060 060
3  7000 BDPBR 2   7  1  745   27650        0  7496 1 0
5  7010       0  1  7496    0  1  7442    4  1  7440    8  1  7437   12  1  7440
5  7011      12  1  7496    0 -9  7496
6  7020  1  2 030 030
3  7100 BDPRD 4   6  2   20          1  2          2 2                1
5  7110    -100  1  7520  -70  1  7500    0  1  7493   66  2  7505  110  2  7512
5  7111     150  2  7520
3  7200 BDP+1 5  11  5  746   27720  2  4
5  7210    -100  1  7520  -80  1  7500  -40  1  7480    0  1  7480   42  2  7481   BK
5  7211      51  3  7451   54  3  7441   56  3  7439   60  3  7440   63  4  7450
5  7212      76  5  7490  104  5  7508  150  5  7520
                          UUU  U  UUUU  UUU  U  UUUU
6  7220  1  2 060 060  1  2 050 050  1  2 050 050  1  2 050 050  1  2 035 035
3  7300    BE 0   9  3  746   27880  1  3
5  7310       0  1  7520   25  1  7500   65  1  7480  110  2  7460  115  2  7441   BL
5  7311     135  2  7441  140  3  7480  180  3  7496  200  3  7520
6  7312  1  2 060 060  1  2 050 050  1  2 035 035
3  7400    BF 0   9  3  746   28500  1  3
5  7410       0  1  7540   45  1  7520   60  1  7500   95  2  7480  105  2  7460   BM
5  7411     120  2  7442  135  3  7500  215  3  7520  235  3  7540
6  7420  1  2 060 060  1  2 040 040  1  2 035 035
```

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 COLE CREEK  MORRISH ROAD  BG-BH          HOLTSLAG  2  5 02 05 12
2      2  75001  75116  75194  75152  75152
3   7700 CC BG 1  15  5  745   28580  2  4
4   7704     275    400    590    450    450
5   7710      -10  1  7600     0  1  7530     8  1  7531    14  2  7524    22  2  7490
5   7711       30  3  7450    34  3  7441    40  3  7449    41  4  7460    48  5  7497  BN
5   7712       58  5  7500   100  5  7520   140  5  7580   160  5  7600   175  5  7620
6   7719  1  2 035 035  1  2 040 040  1  2 040 040  1  2 040 040  1  2 070 070
3   7800 CC BH 0  15  5  746   29000  2  4
5   7810      -10  1  7600     0  1  7530     8  1  7531    14  2  7524    22  2  7490
5   7811       30  3  7464    34  3  7455    40  3  7463    41  4  7474    48  5  7497  BØ
5   7812       58  5  7500   100  5  7520   140  5  7580   160  5  7600   175  5  7620
6   7819  1  2 035 035  1  2 040 040  1  2 040 040  1  2 040 040  1  2 070 070
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 24,DATE= [illegible]10/78

*** INPUT CARD PRINTOUT ***

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1     1 COLE CREEK  USS MORRISH 2 - DSS CALKINS  HOLTSLAG  5  5 02 05 12
2     2  75073  75230  75275  75250  75250
3  8100 CC BI 1  17  4  746  29080  2  4
4  8104    275    400    590    450    450
5  8110    -100  1  7560  -50  1  7530    0  1  7524    2  2  7518    8  2  7487
5  8111      11  3  7458   12  3  7456   14  3  7458   22  4  7473   30  4  7508   BP
5  8112      40  4  7507   48  4  7515   75  4  7520  120  4  7540  200  4  7560
5  8113     260  4  7580  350  4  7600
6  8119  1  2 060 060  1  2 050 050  1  2 050 050  1  2 060 060
3  8200 CC BJ 0  15  3  747  29490  1  3
5  8210       0  1  7600   15  1  7580   40  1  7560  100  1  7540  150  2  7520
5  8211     160  2  7480  165  2  7460  180  2  7460  185  3  7500  210  3  7520   BQ
5  8212     275  3  7540  285  3  7560  310  3  7580  340  3  7600  385  3  7620
6  8219  1  2 060 060  1  2 050 050  1  2 060 060
3  8300 CC BK 0  14  3  747  30210  1  3
5  8310       0  1  7600   60  1  7580  125  1  7560  340  2  7540  347  2  7500   BR
5  8311     355  2  7480  360  2  7466  370  2  7480  375  2  7500  380  3  7520
5  8312     410  3  7540  630  3  7560  780  3  7580  850  3  7600
6  8319  1  2 060 060  1  2 050 050  1  2 040 040
```

Cole
Movi
Tc

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....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      COLE CREEK  CALKINS ROAD - MORRISH ROAD  HOLTSLAG 10  5 02 05 12
2     2  75234  75418  75461  75434  75434
3  8600 CC BL 1  20  5  748   30280  2  4
4  8604     275     400     590     450     450
5  8610    -760  1  7620 -690  1  7600 -650  1  7580 -300  1  7560  -50  1  7540
5  8611       0  2  7539    4  2  7539   12  3  7493   16  3  7470   18  3  7467
5  8612      22  3  7470   24  4  7495   32  5  7531   48  5  7529   55  5  7540   BS
5  8613     150  5  7540  260  5  7560  310  5  7580  390  5  7600  490  5  7620
6  8619  1  2 060 060  1  2 050 050  1  2 050 050  1  2 050 050  1  2 060 060
3  8700 CC BM 0  18  3  748   30820  1  3
5  8710       0  1  7660  130  1  7640  270  1  7620  410  1  7600  590  1  7600
5  8711     735  1  7580  860  1  7560  950  1  7560  975  2  7540  985  2  7500   BT
5  8712     990  2  7480 1000  2  7475 1010  2  7480 1020  3  7560 1090  3  7580
5  8713    1360  3  7600 1510  3  7620 1580  3  7640
6  8719  1  2 060 060  1  2 050 050  1  2 060 060
3  8800 CC BN 1  12  3  749   31550  1  3
4  8804     185     265     390     300     300
5  8810       0  1  7638  100  1  7620  160  1  7600  290  2  7580  295  2  7490
5  8811     300  2  7485  305  2  7490  315  3  7560  410  3  7560  500  3  7580   BU
5  8812     650  3  7600  820  3  7620
6  8819  1  2 060 060  1  2 055 055  1  2 060 060
3  8900 CC BO 0  12  3  750   32090  1  3
5  8910    -700  1  7620 -550  1  7600 -500  1  7590 -306  2  7581 -298  2  7536
5  8911    -290  2  7497 -286  2  7493 -280  2  7497 -272  3  7571 -224  3  7557   BV
5  8912    -112  3  7585    0  3  7605
6  8919  1  2 060 060  1  2 050 050  1  2 060 060
3  9000 CC BP 0  10  3  751   33000  1  3
5  9010       0  1  7625   50  1  7620  180  1  7600  300  2  7580  320  2  7520
5  9011     330  2  7503  335  2  7520  360  3  7580  800  3  7600 1000  3  7610   BW
6  9019  1  2 060 060  1  2 052 052  1  2 070 070
```

```
1      1 COLE CREEK  MORRISH ROAD - CORUNNA ROAD  HOLTSLAG 10 05 02 05 12
2      2 75588  75708  75841  75746  75746
3   9300 CC BQ 1  13  5  751   33100  2  4
4   9304    185    265    390    300    300
5   9310    -350  1  7600    0  1  7584    6  2  7579   17  3  7524   21  3  7508
5   9311      23  3  7504   26  3  7507   30  4  7545   36  5  7581   56  5  7580   BX
5   9312     290  5  7600  400  5  7620  400  5  7680
6   9319  1  2 060 060  1  2 045 045  1  2 045 045  1  2 045 045  1  2 060 060
3   9400 CC BR 0  16  3  753   34040  1  3
5   9410    -300  1  7680 -300  1  7600  -50  1  7600    0  1  7575   10  1  7584
5   9411      18  2  7572   22  2  7547   30  2  7518   31  2  7517   33  2  7518   BY
5   9412      48  3  7593   60  3  7586  150  3  7600  390  3  7620 1000  3  7620
5   9413    1000  3  7680
6   9419  1  2 060 060  1  2 050 050  1  2 060 060
3   9500 CLVTB 2   5  1   20   34040        0  7574 3 0
5   9510       0  1  7574    0  1  7513    6  1  7513    6  1  7574    0 -9  7574
6   9519  1  2 035 035
3   9600 CLVTR 4   9  2   30           1  2          2 2                  1
5   9610    -300  1  7680 -300  1  7600 -130  1  7587    0  2  7584  144  2  7585
5   9611     150  2  7600  390  2  7620 1000  2  7620 1000  2  7680
3   9700 CC BS 5  17  5  753   34080  2  4
5   9710    -300  1  7680 -300  1  7600  -50  1  7600    0  1  7575   10  1  7584
5   9711      18  2  7572   22  2  7547   27  3  7529   30  3  7518   31  4  7517   BZ
5   9712      33  4  7518   48  5  7593   60  5  7586  150  5  7600  390  5  7620
5   9713    1000  5  7620 1000  5  7680
6   9719  1  2 060 060  1  2 050 050  1  2 050 050  1  2 050 050  1  2 060 060
3   9800 CC BT 0  12  3  753   34500  1  3
5   9810       0  1  7680    0  1  7620  160  1  7620  340  1  7600  500  1  7600   CA -
5   9811     650  2  7580  660  2  7540  665  2  7520  670  2  7540  685  3  7600
5   9812    1500  3  7600 1500  3  7680
6   9819  1  2 060 060  1  2 060 060  1  2 060 060
3   9900 CC BU 0  10  3  754   35090  1  3
5   9910       0  1  7680    0  1  7620  150  1  7600 1125  2  7600 1145  2  7540
5   9911    1150  2  7525 1160  2  7540 1185  3  7590 1400  3  7600 1980  3  7620   CB
6   9919  1  2 060 060  1  2 060 060  1  2 060 060
3  10000 CC BV 0  13  3  754   35640  1  3
5  10010       0  1  7680    0  1  7620   80  1  7600 1015  2  7600 1025  2  7580
5  10011    1035  2  7560 1040  2  7540 1050  2  7531 1060  2  7540 1070  3  7600   CC
5  10012    1700  3  7600 1950  3  7620 2050  3  7621
6  10019  1  2 060 060  1  2 075 075  1  2 060 060
3  10100 CC BW 0  12  3  755   36170  1  3
5  10110       0  1  7680    0  1  7620  670  1  7600  900  2  7600  910  2  7560
5  10111     915  2  7540  920  2  7535  925  2  7540  930  2  7560  950  3  7600   CD
5  10112    1100  3  7600 2100  3  7620
6  10119  1  2 060 060  1  2 070 070  1  2 050 050
```

*** INPUT CARD PRINTOUT ***

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
3 10200 CC BX 0  18  3  755   36560  1  3
5 10210       0  1  7680    0  1  7640  200  1  7620  800  1  7600 1100  2  7590
5 10211    1170  2  7580 1178  2  7560 1185  2  7550 1190  2  7540 1195  2  7550  CE
5 10212    1205  3  7600 1600  3  7620 2250  3  7620 2250  3  7680
6 10219  1  2 060 060  1  2 050 050  1  2 045 045                    M  M     M
```

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....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      COLE CREEK  CORUNNA ROAD - LENNON ROAD  HOLTSLAG 15 05 02 05 12
2      2  76025  76170  76362  76226  76234
3 10500 CC BY 1  15  5  755   36680  2  5
4 10504    150    220    320    250    250
5 10510     440  1  7660  780  1  7640 1030  1  7620 1650  1  7600 1870  1  7598
5 10511    2000  1  7598 2024  1  7599 2032  2  7584 2038  3  7545 2041  3  7542 CF
5 10512    2046  4  7545 2060  5  7600 2080  5  7605 2500  5  7620 3000  5  7620
6 10519  1  2 060 060  1  2 045 045  1  2 045 045  1  2 045 045  1  2 035 035
3 10600 CC BZ 0  18  3  756   37370  1  3
5 10610    -770  1  7680 -610  1  7660 -450  1  7640 -100  1  7620  800  1  7600
5 10611     890  1  7590  940  1  7581  950  2  7600  958  2  7561  962  2  7547 CG
5 10612     968  2  7544  974  2  7547  982  3  7591 1000  3  7593 1056  3  7597
5 10613    1280  3  7620 1500  3  7620 2000  3  7640
6 10619  1  2 060 060  1  2 045 045  1  2 070 070
3 10700 CLVTB 2   5  1  754   37370        0  7575 3 0
5 10710       0  1  7575    0  1  7529    4  1  7529    4  1  7575    0 -9  7575
6 10719  1  2 032 032
3 10800 CLVTR 4  11  2   20          1  2          2 2                  1
5 10810    -770  1  7680 -610  1  7660 -450  1  7640 -100  1  7620  800  1  7600
5 10811     882  1  7593  958  2  7587 1070 02  7591 1280  2  7620 1500  2  7620
5 10812    2000  2  7640
3 10900 CC CA 5  18  5  755   37430  2  4
5 10910    -770  1  7680 -610  1  7660 -450  1  7640 -100  1  7620  800  1  7600
5 10911     890  1  7590  940  1  7581  950  2  7600  958  2  7561  962  3  7547 CH
5 10912     965  4  7544  974  4  7547  982  5  7591 1000  5  7593 1056  5  7597
5 10913    1280  5  7620 1500  5  7620 2000  5  7640
6 10919  1  2 060 060  1  2 040 040  1  2 040 040  1  2 040 040  1  2 075 075
3 11000 CC CB 0  13  3  756   37970  1  3
5 11010       0  1  7680  150  1  7660  220  1  7640  720  1  7620 1470  1  7620
5 11011    1485  2  7604 1490  2  7560 1500  2  7550 1505  2  7560 1520  3  7600 CI
5 11012    1800  3  7618 1950  3  7620 2400  3  7640
6 11019  1  2 060 060  1  2 055 055  1  2 070 070
3 11100 CC CC 0  11  3  757   38760  1  3
5 11110    -630  1  7660 -250  1  7640    0  1  7622   60  1  7627   94  2  7630
5 11111     105  2  7565  115  2  7565  120  3  7628  170  3  7619  400  3  7620 CJ
5 11112    1250  3  7640
6 11119  1  2 060 060  1  2 050 050  1  2 060 060
3 11200 CLVTB 2   5  1  756   38760        0  7607 3 0
5 11210       0  1  7607    0  1  7558    4  1  7558    4  1  7607    0  1  7607
6 11219  1  2 032 032
3 11300 CLVTR 4   8  2   20          1  2          2 2                  1
5 11310    -600  1  7660 -260  1  7640  -72  1  7630    0  1  7622  114  2  7631
5 11311     176  2  7617  400  2  7620 1080  2  7639
3 11400 CC CD 5  12  5  757   38830  2  4
5 11410    -540  1  7660 -300  1  7640    0  1  7624   60  1  7627   94  2  7630 CK
```

```
5 11411     105  3  7565  108  4  7565  115  4  7565  120  5  7628  170  5  7619
5 11412     370  5  7640  450  5  7660
6 11419  1  2 060 060  1  2 070 070  1  2 070 070  1  2 070 070  1  2 060 060
3 11500 CC CE 0  11  3  759   39460  1  3
5 11510       0  1  7680  320  1  7660  480  2  7640  500  2  7600  508  2  7590
5 11511     515  2  7585  520  2  7590  540  3  7620  750  3  7640  880  3  7660   CL
5 11512    1000  3  7680
6 11519  1  2 060 060  1  2 055 055  1  2 060 060
3 11600 CC CF 1  15  3  760   40160  1  3
4 11604    100    140    200    160    160
5 11610       0  1  7680   85  1  7660  200  1  7640  365  1  7620  410  2  7620
5 11611     420  2  7600  430  2  7595  435  2  7593  440  2  7595  450  3  7600   CM
5 11612     465  3  7620  480  3  7640  680  3  7660  840  3  7680  910  3  7700
6 11619  1  2 080 080  1  2 050 050  1  2 060 060
3 11700 CC CG 0  14  3  761   40900  1  3
5 11710       0  1  7680  350  1  7660  600  1  7640  750  1  7640  805  2  7620
5 11711     810  2  7605  820  2  7602  832  2  7605  845  3  7620  880  3  7640   CN.
5 11712    1050  3  7640 1180  3  7660 1280  3  7680 1360  3  7700
6 11719  1  2 080 080  1  2 070 070  1  2 080 080
3 11800 CC CH 0  12  3  762   41740  1  3
5 11810       0  1  7690  100  1  7680  200  1  7660  350  1  7660  650  1  7640
5 11811     720  2  7640  730  2  7620  735  2  7612  745  3  7620  790  3  7640   CΦ
5 11812    1000  3  7660 1210  3  7668
6 11819  1  2 060 060  1  2 070 070  1  2 070 070
3 11900 CC CI 0  10  3  764   42640  1  3
5 11910       0  1  7700  100  1  7680  260  1  7660  410  1  7640  470  2  7660
5 11911     480  2  7631  490  3  7635  540  3  7660  980  3  7660 1550  3  7680   CP
6 11919  1  2 040 040  1  2 035 035  1  2 040 040
```

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW		
S	ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*		
AF	AT	12825	0	790.	1126.	94938.	1.10	-203.	138.		
	715.75	0.01			715.76	0.70	0.07		*IS*	AK	
AF	AT	13310	485	790.	165.	14784.	1.06	-53.	-8.		
	715.78	0.38	0.22	0.19	716.16	4.79	0.41	-0.000	*XS*	AL	
AG	AT	13870	560	790.	812.	28074.	3.09	175.	507.		
	716.96	0.05	0.84	0.0	717.00	0.97	0.19	0.002	*XS*	AM	
AH	AT	14440	570	790.	347.	17033.	1.44	402.	568.		
	717.67	0.12	0.74	0.04	717.78	2.27	0.25	0.001	*XS*	AN	
AI	AT	15060	620	550.	529.	13350.	1.17	264.	527.		
	719.00	0.02	1.22	0.0	719.02	1.04	0.12	0.007	*XS*	AO	
AJ	AT	15880	820	550.	268.	11942.	1.75	285.	466.		
	720.50	0.11	1.56	0.05	720.61	2.05	0.29	-0.009	*XS*	AP	
AK	AT	16950	1070	550.	341.	14157.	1.48	232.	409.		
	722.47	0.06	1.91	0.0	722.53	1.61	0.22	0.004	*XS*	AQ	
AK+1	AT	17300	350	550.	139.	7337.	1.52	105.	177.		
	723.34	0.37	1.02	0.16	723.71	3.96	0.48	0.002	*XS*	AR	INT
AL	AT	17660	360	550.	377.	11702.	2.13	210.	413.		
	724.91	0.07	1.27	0.0	724.98	1.46	0.13	0.004	*XS*	AS	
AM	AT	18290	630	550.	475.	10406.	2.33	231.	514.		
	726.51	0.05	1.56	0.0	726.55	1.16	0.15	0.010	*XS*	AT	
AN	AT	18820	530	550.	266.	9727.	1.69	338.	486.		
	728.06	0.11	1.58	0.03	728.17	2.07	0.26	0.003	*XS*	AU	
AP	AT	19325	505	550.	203.	8085.	2.05	305.	437.		
	729.95	0.23	1.94	0.06	730.18	2.71	0.36	0.003	*XS*	AV	
AQ	AT	20040	715	550.	368.	12732.	1.92	270.	491.		
	732.22	0.07	2.10	0.0	732.29	1.49	0.23	0.003	*XS*	AW	
AR	AT	20790	750	550.	361.	13545.	2.08	392.	628.		
	733.54	0.08	1.32	0.00	733.61	1.52	0.25	0.006	*XS*	AX	
AS	AT	21410	620	550.	166.	6391.	3.21	365.	522.		
	735.47	0.55	2.17	0.24	736.02	3.30	0.67	0.007	*XS*	AY	

WATER-SURFACE PROFILE FOR: COLE CREEK POTTER RD TO BEECHER RD KNUTILLA
PAGE 2 OF 2, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
. WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
AT     AT   21940 /   530 /    550. /   406. /   14057. / 2.98 /  148. /  482.
   737.72 /   0.08 /   1.78 /   0.0  /  737.81 /    1.35 /   0.25 / 0.005  *XS*
============================ BEGIN BRIDGE ANALYSIS ===============================
AT BR AT   21940 /       /    550. /    81. /    7938. / 1.00 /    0. /   15.
   737.50 /   0.72 /       ...3...  (-.001)    /    6.79 /   0.48 /         *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /               *RG*
----------------------------------------------------------------------------------
AU     AT   22050 /   110 /    550. /   343. /   10525. / 2.39 /  -98. /   79.
   737.94 /   0.10 /   0.22 /   0.01 /  738.04 /    1.60 /   0.29 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   507. /   17172. / 2.17 / -104. /  100.
   738.80 /   0.04 /                 /  738.84 /    1.08 /   0.10 /         *AS*
============================ END BRIDGE ANALYSIS =================================
```

END OF THIS PROFILE

A B

101-4

BR

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   25,DATE=11/13/78

WATER-SURFACE PROFILE FOR:  COLE CR BEECHER RD TO MORRISH RD          KNUTILLA
PAGE  1 OF  1, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
==========================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==========================================================================================
AU    AT   22050 /     0 /    550.      507. /   17133. / 2.17 / -104. /  100.
   738.80 /   0.04 /                  / 738.84 /    1.09 /   0.10/          *IS*   BA
------------------------------------- ------------------------------------------------
AV    AT   22460 /   410 /    550.      469. /   16295. / 2.89 /  221. /  424.
   739.23 /   0.06 /   0.44 /   0.0  / 739.30 /    1.17 /   0.10 / 0.001  *XS*   BB
------------------------------------- ------------------------------------------------
AW    AT   23130 /   670 /    550.      352. /   12860. / 2.45 / -164. /   42.
   740.19 /   0.09 /   0.97 /   0.0  / 740.28 /    1.56 /   0.26 / 0.002  *XS*   BC
------------------------------------- ------------------------------------------------
AX    AT   23980 /   850 /    550.      448. /   16326. / 2.11 /  532. /  851.
   741.46 /   0.05 /   1.22 /   0.0  / 741.51 /    1.23 /   0.20 / 0.001  *XS*   BD
------------------------------------- ------------------------------------------------
AY    AT   24690 /   710 /    550.      281. /   11425. / 1.78 /  288. /  467.
   742.59 /   0.11 /   1.15 /   0.0  / 742.69 /    1.96 /   0.28 / 0.005  *XS*   BE
------------------------------------- ------------------------------------------------
AZ    AT   25560 /   870 /    550.      378. /   12362. / 2.03 /   35. /  312.
   744.51 /   0.07 /   1.86 /   0.0  / 744.57 /    1.46 /   0.17 / 0.017  *XS*   BF
------------------------------------- ------------------------------------------------
BA    AT   26290 /   730 /    550. /    438. /   16364. / 2.18 /  370. /  598.
   745.62 /   0.05 /   1.09 /   0.0  / 745.67 /    1.26 /   0.20 / 0.004  *XS*   BG
------------------------------------- ------------------------------------------------
BB    AT   26640 /   350 /    550.      293. /    8493. / 2.01 /  296. /  467.
   746.35 /   0.11 /   0.76 /   0.0  / 746.46 /    1.88 /   0.32 / 0.001  *XS*   BH
------------------------------------- ------------------------------------------------
BD    AT   27375 /   735 /    550.      341. /   13877. / 1.64 /  281. /  462.
   748.29 /   0.07 /   1.89 /   0.0  / 748.35 /    1.61 /   0.22 / 0.007  *XS*   BI
------------------------------------- ------------------------------------------------
BDP   AT   27650 /   275 /    550. /    280. /   16850. / 1.13 /  329. /  453.
   748.65 /   0.07 /   0.36 /   0.0  / 748.71 /    1.97 /   0.23 / 0.003  *XS*   BJ
========================== BEGIN BRIDGE ANALYSIS ==========================
BDPBR AT   27650 /       /    448. /     57. /    5415. / 1.00 /    0. /   12.
   748.65 /   0.98 /       ...1...  (-.001)    /    7.93 /   0.64 /          *BO*
------------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      100. / RIGHT        0. /                *RG*   100-year
------------------------------------------------------------------------------------
BDP+1 AT   27720 /    70 /    550. /    149. /    6916. / 1.97 /  -53. /   75.
   748.66 /   0.42 /   0.18 /   0.1  / 749.07 /    3.69 /   0.52 / -0.011  *AS*
------------------------------------- ------------------------------------------------
   M = 0.58 / E = 0.43 / K* = 1.13      369. /   19450. / 1.67 /  -81. /   93.
                                                                          *AS*   BK
```

WATER-SURFACE PROFILE FOR: COLE CREEK MORRISH ROAD BG-BH HOLTSLAG

PAGE [illegible] OF 1, PROFILE NUMBER 4, UPSTREAM C[illegible]PUTATIONS

	SECTO AT DISTANCE/ LENGTH/DISCHARGE/ AREA /CONVEYANCE/ ALPHA/ LEW / REW								
	WS ELEV /	HV /	HF /	HE /	EG /	V /	FN /	ACC	*ID*
	CC BG AT 28580 /	0 /	450. /	186. /	16116. /	1.66 /		16. /	90.
8N	751.52 /	0.15 /		/ 751.67 /	2.41 /	0.24/			*IS*
	CC BH AT 29000 /	420 /	450. /	190. /	14031. /	1.75 /		15. /	98.
8Ø	751.90 /	0.15 /	0.38 /	0.00 / 752.05 /	2.37 /	0.27 /		0.003	*XS*

END OF THIS PROFILE

100-YR

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 37,DATE= 5/10/78

WATER-SURFACE PROFILE FOR: COLE CREEK USS MORRISH 2 - DSS CALKINS HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

	SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
BP	CC BI AT 29080	0	450.	178.	10696.	1.91	-8.	86.	
	752.50	0.19			752.69	2.53	0.30		*IS*
BQ	CC BJ AT 29490	410	450.	273.	18981.	1.45	124.	244.	
	753.04	0.06	0.41	0.0	753.10	1.65	0.16	-0.000	*XS*
BR	CC BK AT 30210	720	450.	195.	14440.	1.08	341.	403.	
	753.56	0.09	0.53	0.01	753.65	2.31	0.20	-0.000	*XS*

END OF THIS PROFILE

100-YR

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 15,DATE= 5/15/78

WATER-SURFACE PROFILE FOR: COLE CREEK CALKINS ROAD - MORRISH ROAD HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

	SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
BS	CC BL AT 30280	0	450.	220.	11675.	2.52	-92.	169.	
	754.34	0.16			754.50	2.05	0.25		*IS*
BT	CC BM AT 30820	540	450.	237.	20031.	1.03	964.	1019.	
	754.91	0.06	0.47	0.0	754.97	1.90	0.15	0.000	*XS*
BU	CC BN AT 31550	730	300.	111.	7380.	1.00	291.	314.	
	755.58	0.11	0.69	0.03	755.69	2.70	0.22	0.000	*XS*
BV	CC BO AT 32090	540	300.	146.	10126.	1.14	-303.	-101.	
	756.27	0.07	0.65	0.0	756.34	2.05	0.10	[illegible]	[illegible]
BW	CC BP AT 33000	910	300.	181.	11620.	[illegible]	[illegible]	[illegible]	
	757.00	0.04	0.70	0.0	757.04	1.65	0.10	[illegible]	[illegible]

END OF THIS PROFILE

100-YR

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 20,DATE= 5/15/78

WATER-SURFACE PROFILE FOR: COLE CREEK MORRISH ROAD - CORUNNA ROAD HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
CC BQ AT   33100 /     0 /    300. /   110. /    9427. / 1.18 /     7. /    35.
   757.46 /   0.14 /                 / 757.60 /    2.72 /  0.23/            *IS*
----------------------------------------------------------------------------------
CC BR AT   34040 /   940 /    300. /   140. /    8879. / 1.24 /   -20. /    46.
   758.52 /   0.09 /  1.01 /   0.0  / 758.61 /    2.15 /  0.21 / 0.001    *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
CLVTB AT   34040 /       /    139. /    37. /    2053. / 1.00 /    0. /     6.
   757.40 /   0.23 /       ...3...  (-.001)    /    3.81 /  0.27 /           *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      60. / RIGHT     101. /                 *RG*
----------------------------------------------------------------------------------
CC BS AT   34080 /    40 /    300. /   142. /    9290. / 1.37 /   -21. /    47.
   758.56 /   0.09 /  0.04 /   0.00 / 758.65 /    2.11 /  0.20 / 0.000    *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   160. /   10293. / 1.45 /   -26. /    72.
   758.79 /   0.08 /                 / 758.87 /    1.87 /  0.18 /           *AS*
============================ END BRIDGE ANALYSIS ================================
CC BT AT   34500 /   420 /    300. /   187. /    8602. / 1.44 /   557. /   683.
   759.24 /   0.06 /  0.43 /   0.0  / 759.30 /    1.61 /  0.18 / 0.000    *XS*
----------------------------------------------------------------------------------
CC BU AT   35090 /   590 /    300. /   283. /   14606. / 1.32 /  1126. /  1335.
   759.70 /   0.02 /  0.42 /   0.0  / 759.72 /    1.06 /  0.11 / 0.000    *XS*
----------------------------------------------------------------------------------
CC BV AT   35640 /   550 /    300. /   224. /   10997. / 1.00 /  1015. /  1070.
   759.99 /   0.03 /  0.31 /   0.00 / 760.02 /    1.34 /  0.12 / -0.009   *XS*
----------------------------------------------------------------------------------
CC BW AT   36170 /   530 /    300. /   387. /   11959. / 2.19 /   547. /  1283.
   760.37 /   0.02 /  0.36 /   0.0  / 760.39 /    0.78 /  0.11 / 0.002    *XS*
----------------------------------------------------------------------------------
CC BX AT   36560 /   390 /    300. /   657. /   24430. / 1.82 /   649. /  1304.
   760.50 /   0.01 /  0.12 /   0.0  / 760.51 /    0.46 /  0.08 / 0.001    *XS*
----------------------------------------------------------------------------------
```

BX
BY
BZ
CA
CB
CC
CD
CE

100-YR

END OF THIS PROFILE

```
==========================================================================
CC BY AT   36680 /     0 /     250. /  2469. /   95913. / 2.20 /  998. / 3000.
   762.26 /   0.00 /                  / 762.26 /    0.10 /   0.01/          *IS*
--------------------------------------------------------------------------
CC BZ AT   37370 /   690 /     250. /  2393. /   84983. / 2.73 / -145. / 1565.
   762.26 /   0.00 /   0.01 /   0.00 / 762.26 /    0.10 /   0.01 / -0.006  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
CLVTB AT   37370 /       /       0. /    18. /     896. / 1.00 /    0. /    4.
   757.50 /   0.0  /        ...3...  (-.001)    /   0.0  /   0.0  /          *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT    1580. / RIGHT     837. /                *RG*
--------------------------------------------------------------------------
CC CA AT   37430 /    60 /     250. /  2410. /   87830. / 3.61 / -147. / 1567.
   762.27 /   0.00 /   0.00 /   0.02 / 762.27 /    0.10 /   0.01 / -0.011  *AS*
--------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  2410. /   87830. / 3.61 / -147. / 1567.
   762.27 /   0.00 /                  / 762.27 /    0.10 /   0.01 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
CC CB AT   37970 /   540 /     250. /   860. /   26011. / 4.02 /  653. / 2011.
   762.27 /   0.01 /   0.01 /   0.00 / 762.27 /    0.29 /   0.06 / -0.013  *XS*
--------------------------------------------------------------------------
CC CC AT   38760 /   790 /     250. /   280. /    9375. / 3.30 /  -35. /  593.
   762.45 /   0.04 /   0.20 /   0.02 / 762.49 /    0.89 /   0.16 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
CLVTB AT   38760 /       /       0. /    20. /     973. / 1.00 /    0. /    4.
   760.70 /   0.0  /        ...3...  (-.001)    /   0.0  /   0.0  /          *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      10. / RIGHT     338. /                *RG*
--------------------------------------------------------------------------
CC CD AT   38830 /    70 /     250. /   136. /    5780. / 1.57 /  -21. /  229.
   762.51 /   0.08 /   0.08 /   0.02 / 762.60 /    1.84 /   0.18 / -0.000  *AS*
--------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   136. /    5780. / 1.57 /  -21. /  229.
   762.51 /   0.08 /                  / 762.60 /    1.84 /   0.18 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
CC CE AT   39460 /   630 /     250. /   243. /   10438. / 1.44 /  484. /  669.
   763.23 /   0.02 /   0.65 /   0.0  / 763.25 /    1.03 /   0.14 /  0.001  *XS*
--------------------------------------------------------------------------
CC CF AT   40160 /   700 /     160. /   335. /   13728. / 2.03 /  245. /  476.
   763.45 /   0.01 /   0.21 /   0.0  / 763.46 /    0.48 /   0.08 /  0.000  *XS*
--------------------------------------------------------------------------
CC CG AT   40900 /   740 /     160. /   180. /    6083. / 1.39 /  759. /  874.
   763.67 /   0.02 /   0.23 /   0.00 / 763.69 /    0.89 /   0.12 /  0.000  *XS*
--------------------------------------------------------------------------
CC CH AT   41740 /   840 /     160. /   192. /    4347. / 1.62 /  576. /  842.
   764.49 /   0.02 /   0.81 /   0.00 / 764.51 /    0.84 /   0.16 /  0.010  *XS*
--------------------------------------------------------------------------
CC CI AT   42640 /   900 /     160. /   166. /    5965. / 1.33 /  306. /  528.
   [illegible]                                  / 765.40 /    0.96 /   0.17 / -0.001  *XS*
```

100-YR

100-YR

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
S	ELEV	HV	HF	HE	G	V	FN	ACC	*ID*	
AE	AT	12825	0	790.	1079.	94364.	1.07	-200.	100.	AK
.03	715.78	0.01			715.79	0.73	0.07		*IS*	
AF	AT	13310	485	790.	166.	15011.	1.06	-53.	-8.	AL
.03	715.81	0.37	0.21	0.18	716.19	4.76	0.40	-0.000	*XS*	
AG	AT	13870	560	790.	659.	25279.	2.89	200.	450.	AM
.08	717.04	0.06	0.92	0.0	717.11	1.20	0.21	0.001	*XS*	
AH	AT	14440	570	790.	364.	18186.	1.43	410.	560.	AN
.10	717.79	0.10	0.77	0.02	717.90	2.17	0.24	-0.004	*XS*	
AI	AT	15060	620	550.	466.	12957.	1.13	265.	465.	AO
.04	719.04	0.02	1.18	0.0	719.07	1.18	0.13	-0.012	*XS*	
AJ	AT	15880	820	550.	255.	12230.	1.85	300.	450.	AP
.05	720.55	0.13	1.57	0.05	720.69	2.16	0.28	0.001	*XS*	
AK	AT	16950	1070	550.	329.	14307.	1.37	235.	385.	AQ
.02	722.49	0.06	1.85	0.0	722.55	1.67	0.22	0.007	*XS*	
AK+1	AT	17300	350	550.	139.	7353.	1.52	105.	177.	AR
0	723.34	0.37	1.01	0.15	723.71	3.95	0.48	0.002	*XS*	
AL	AT	17660	360	550.	339.	11382.	2.10	250.	400.	AS
.02	724.93	0.09	1.30	0.0	725.02	1.62	0.14	0.004	*XS*	
AM	AT	18290	630	550.	392.	10298.	1.82	300.	475.	AT
.08	726.59	0.06	1.63	0.0	726.65	1.40	0.15	0.007	*XS*	
AN	AT	18820	530	550.	274.	10061.	1.70	338.	486.	AU
.06	728.12	0.11	1.55	0.03	728.22	2.01	0.26	0.001	*XS*	
AP	AT	19325	505	550.	202.	8052.	2.05	305.	437.	AV
0	729.94	0.24	1.89	0.06	730.18	2.72	0.36	0.002	*XS*	
AQ	AT	20040	715	550.	361.	12801.	1.82	290.	490.	AW
0	732.21	0.07	2.10	0.0	732.28	1.52	0.23	0.003	*XS*	
AR	AT	20790	750	550.	343.	13418.	1.93	400.	600.	AX
0	733.53	0.08	1.32	0.01	733.61	1.60	0.25	0.006	*XS*	
AS	AT	21410	620	550.	167.	6447.	3.15	370.	520.	AY
.01	735.48	0.53	2.17	0.23	736.01	3.30	0.66	0.004	*XS*	

FW

```
WATER-SURFACE PROFILE FOR:  COLE CREEK POTTER RD TO BEECHER RD        KNUTILLA
PAGE  2 OF  2, PROFILE NUMBER  5,   UPSTREAM COMPUTATIONS
***'FLOODWAY ANALYSIS *** HOR FW
==============================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==============================================================================
AT    AT   21940 /   530 /    550. /   327. /   13557. / 2.21 /  150. /  350.
   737.75 /   0.10 /   1.83 /   0.0  /  737.85 /   1.68 /   0.26 /  0.002  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
AT BR AT   21940 /       /    550. /    81. /    7938. / 1.00 /    0. /   15.
   737.50 /   0.72 /       ...3...  (-.001)    /   6.79 /   0.48 /          *BO*
------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       0. / RIGHT       0. /               *RG*
------------------------------------------------------------------------------
AU    AT   22050 /   110 /    550. /   353. /   10886. / 2.39 / -100. /   80.
   738.00 /   0.09 /   0.23 /   0.0  /  738.09 /   1.56 /   0.28 /  0.017  *AS*
------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   511. /   17518. / 2.13 / -100. /  100.
   738.83 /   0.04 /                  /  738.87 /   1.08 /   0.10 /          *AS*
============================ END BRIDGE ANALYSIS ==============================

                          END OF THIS PROFILE
```

AZ

BA

WATER-SURFACE PROFILE FOR: COLE CR BEECHER RD TO MORRISH RD KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*	
AU	AT	22050	0	550.	511.	17494.	2.13	-100.	100.	BA
	738.83	0.04			738.87	1.08	0.10		*IS*	
AV	AT	22460	410	550.	455.	16823.	2.55	250.	424.	BB
	739.24	0.06	0.42	0.0	739.30	1.21	0.10	0.001	*XS*	
AW	AT	23130	670	550.	335.	12948.	2.18	-130.	42.	BC
	740.16	0.09	0.93	0.0	740.25	1.64	0.26	0.003	*XS*	
AX	AT	23980	850	550.	373.	16051.	1.62	650.	825.	BD
	741.44	0.05	1.24	0.0	741.49	1.47	0.21	0.002	*XS*	
AY	AT	24690	710	550.	271.	11455.	1.66	300.	450.	BE
	742.58	0.11	1.17	0.0	742.69	2.03	0.28	0.005	*XS*	
AZ	AT	25560	870	550.	329.	11958.	1.78	35.	235.	BF
	744.54	0.08	1.92	0.0	744.62	1.67	0.18	0.008	*XS*	
BA	AT	26290	730	550.	430.	16546.	1.98	390.	590.	BG
	745.69	0.05	1.12	0.0	745.74	1.28	0.19	0.004	*XS*	
BB	AT	26640	350	550.	289.	8793.	1.86	300.	450.	BH
	746.39	0.10	0.73	0.0	746.50	1.90	0.31	0.002	*XS*	
BD	AT	27375	735	550.	303.	13693.	1.39	325.	450.	BI
	748.28	0.07	1.85	0.0	748.35	1.81	0.22	0.007	*XS*	
BDP	AT	27650	275	550.	263.	16786.	1.06	350.	450.	BJ
	748.65	0.07	0.36	0.0	748.72	2.09	0.23	0.003	*XS*	

BEGIN BRIDGE ANALYSIS

BDPBR	AT	27650		450.	57.	5415.	1.00	0.	12.	
	748.65	0.99	...1...	(-.001)		7.96	0.65		*BO*	

EMBANKMENT OVERFLOW (CFS) / LEFT 98. / RIGHT 0. / *RG*

BDP+1	AT	27720	70	550.	149.	6929.	1.96	-50.	75.	100-YR FLOODWAY
	748.66	0.42	0.18	0.1	749.07	3.70	0.52	-0.011	*AS*	
						19104.	1.53	-50.	93.	

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 22,DATE= 5/10/78

FW

WATER-SURFACE PROFILE FOR: COLE CREEK MORRISH ROAD BG-BH HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS

	SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
	CC BG AT 28580	0	450.	186.	16157.	1.64	16.		86.
BN	751.52	0.15		751.67	2.42	0.24			*IS*
	CC BH AT 29000	420	450.	186.	14171.	1.65	16.		86.
BØ	751.90	0.15	0.37	0.0	752.04	2.41	0.27	0.003	*XS*

END OF THIS PROFILE

FW

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 43,DATE= 5/10/78

WATER-SURFACE PROFILE FOR: COLE CREEK USS MORRISH 2 - DSS CALKINS HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS

	SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
BP	CC BI AT 29080	0	450.	178.	10723.	1.90	-5.	85.	
	752.50	0.19		752.69	2.53	0.30			*IS*
BQ	CC BJ AT 29490	410	450.	267.	19166.	1.36	125.	225.	
	753.03	0.06	0.40	0.0	753.09	1.68	0.16	0.000	*XS*
BR	CC BK AT 30210	720	450.	193.	14429.	1.08	342.	402.	
	753.53	0.09	0.53	0.02	753.63	2.33	0.20	-0.012	*XS*

END OF THIS PROFILE

FW

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 22,DATE= 5/15/78

WATER-SURFACE PROFILE FOR: COLE CREEK CALKINS ROAD - MORRISH ROAD HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS

	SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
BS	CC BL AT 30280	0	450.	175.	11453.	1.71	-45.	55.	
	754.34	0.17			754.51	2.57	0.26		*IS*
BT	CC BM AT 30820	540	450.	233.	19889.	1.03	965.	1015.	
	754.93	0.06	0.48	0.0	754.99	1.93	0.15	0.000	*XS*
BU	CC BN AT 31550	730	300.	112.	7454.	1.00	291.	314.	
	755.60	0.11	0.69	0.03	755.71	2.69	0.21	0.000	*XS*
BV	CC BO AT 32090	540	300.	133.	10086.	1.00	-300.	-244.	
	756.28	0.08	0.65	0.0	756.36	2.26	0.18	0.001	*XS*
BW	CC BP AT 33000	910	300.	181.	11876.	1.00	305.	355.	
	757.00	0.04	0.68	0.0	757.05	1.66	0.15	0.001	*XS*

END OF THIS PROFILE

FW

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USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   30,DATE= 5/15/78

WATER-SURFACE PROFILE FOR:  COLE CREEK  MORRISH ROAD - CORUNNA ROAD  HOLTSLAG
PAGE  1 OF  1, PROFILE NUMBER  5,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
CC BQ AT   33100 /     0 /    300. /   110. /    9433. / 1.17 /    7. /   35.
   757.46 /   0.14 /                 / 757.59 /    2.72 /   0.23/          *IS*
----------------------------------------------------------------------------------
CC BR AT   34040 /   940 /    300. /   138. /    8942. / 1.24 /  -20. /   45.
   758.51 /   0.09 /   1.00 /   0.0  / 758.60 /    2.17 /   0.21 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
CLVTB AT   34040 /       /    141. /    37. /    2053. / 1.00 /    0. /    6.
   757.40 /   0.23 /       ...3...  (-.001)    /    3.84 /   0.27 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      59. / RIGHT      99. /                *RG*
----------------------------------------------------------------------------------
CC BS AT   34080 /    40 /    300. /   141. /    9343. / 1.36 /  -20. /   45.
   758.55 /   0.10 /   0.04 /   0.00 / 758.65 /    2.13 /   0.19 /  0.000  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   157. /   10393. / 1.39 /  -20. /   45.
   758.79 /   0.08 /                 / 758.87 /    1.92 /   0.17 /          *AS*
============================ END BRIDGE ANALYSIS ================================
CC BT AT   34500 /   420 /    300. /   171. /    8659. / 1.28 /  600. /  680.
   759.23 /   0.06 /   0.42 /   0.0  / 759.29 /    1.75 /   0.18 /  0.000  *XS*
----------------------------------------------------------------------------------
CC BU AT   35090 /   590 /    300. /   244. /   14418. / 1.08 / 1130. / 1210.
   759.69 /   0.03 /   0.43 /   0.0  / 759.71 /    1.23 /   0.11 /  0.000  *XS*
----------------------------------------------------------------------------------
CC BV AT   35640 /   550 /    300. /   224. /   11007. / 1.00 / 1015. / 1070.
   760.00 /   0.03 /   0.31 /   0.00 / 760.03 /    1.34 /   0.12 / -0.000  *XS*
----------------------------------------------------------------------------------
CC BW AT   36170 /   530 /    300. /   253. /   10744. / 1.33 /  850. / 1050.
   760.40 /   0.03 /   0.40 /   0.00 / 760.43 /    1.19 /   0.13 /  0.002  *XS*
----------------------------------------------------------------------------------
CC BX AT   36560 /   390 /    300. /   397. /   20748. / 1.17 / 1050. / 1250.
   760.58 /   0.01 /   0.16 /   0.0  / 760.59 /    0.76 /   0.09 /  0.001  *XS*
----------------------------------------------------------------------------------

                                END OF THIS PROFILE
```

BX

BY

BZ

CA

CB

CC

CD

CE

FW

```
==========================================================================
CC BY AT   36680 /     0 /    250. /   672. /   44159. / 1.62 / 1900. / 2150.
   762.34 /   0.00 /                  / 762.34 /   0.37 /   0.03/          *IS*
--------------------------------------------------------------------------
CC BZ AT   37370 /   690 /    250. /   877. /   55203. / 1.51 /  800. / 1050.
   762.34 /   0.00 /   0.02 /   0.0  / 762.34 /   0.29 /   0.02 / -0.020  *XS*
============================ BEGIN BRIDGE ANALYSIS ========================
CLVTB AT   37370 /       /      0. /    18. /     896. / 1.00 /    0. /    4.
   757.50 /   0.0  /       ...3...  (-.001)    /   0.0  /   0.0  /          *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT    1745. / RIGHT     898. /               *RG*
--------------------------------------------------------------------------
CC CA AT   37430 /    60 /    250. /   879. /   57883. / 1.84 /  800. / 1050.
   762.35 /   0.00 /   0.00 /   0.02 / 762.35 /   0.28 /   0.02 / -0.011  *AS*
--------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   879. /   57883. / 1.84 /  800. / 1050.
   762.35 /   0.00 /                  / 762.35 /   0.28 /   0.02 /          *AS*
============================ END BRIDGE ANALYSIS ==========================
CC CB AT   37970 /   540 /    250. /   421. /   21939. / 1.75 / 1350. / 1600.
   762.37 /   0.01 /   0.03 /   0.00 / 762.38 /   0.59 /   0.07 /  0.000  *XS*
--------------------------------------------------------------------------
CC CC AT   38760 /   790 /    250. /   234. /    9786. / 2.26 /   96. /  346.
   762.59 /   0.04 /   0.23 /   0.02 / 762.63 /   1.07 /   0.15 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ========================
CLVTB AT   38760 /       /      0. /    20. /     973. / 1.00 /    0. /    4.
   760.70 /   0.0  /       ...3...  (-.001)    /   0.0  /   0.0  /          *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      25. / RIGHT     448. /               *RG*
--------------------------------------------------------------------------
CC CD AT   38830 /    70 /    250. /   140. /    6048. / 1.54 /  -21. /  179.
   762.64 /   0.08 /   0.07 /   0.02 / 762.72 /   1.79 /   0.17 /  0.000  *AS*
--------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   140. /    6048. / 1.54 /  -21. /  179.
   762.64 /   0.08 /                  / 762.72 /   1.79 /   0.17 /          *AS*
============================ END BRIDGE ANALYSIS ==========================
CC CE AT   39460 /   630 /    250. /   217. /   10767. / 1.18 /  485. /  585.
   763.30 /   0.02 /   0.60 /   0.0  / 763.33 /   1.15 /   0.13 /  0.003  *XS*
--------------------------------------------------------------------------
CC CF AT   40160 /   700 /    160. /   242. /   12862. / 1.39 /  375. /  475.
   763.53 /   0.01 /   0.21 /   0.0  / 763.54 /   0.66 /   0.08 / -0.000  *XS*
--------------------------------------------------------------------------
CC CG AT   40900 /   740 /    160. /   185. /    6552. / 1.31 /  770. /  870.
   763.75 /   0.02 /   0.22 /   0.00 / 763.77 /   0.86 /   0.11 /  0.001  *XS*
--------------------------------------------------------------------------
CC CH AT   41740 /   840 /    160. /   164. /    4480. / 1.26 /  650. /  800.
   764.49 /   0.02 /   0.73 /   0.00 / 764.51 /   0.98 /   0.15 /  0.003  *XS*
--------------------------------------------------------------------------
CC CI AT   42640 /   900 /    160. /   138. /    5663. / 1.19 /  375. /  525.
```

```
1      1 SHIAWASSEE RIVER E CORP FENTON TWSP-DAM  RLL DJH  25 05 02 10 12
2      2  85024  85078  85136  85099  85106
3 11200    3A 1  12  3  846   65360 99 99
4 11204    420    580    790    650    650
5 11210      0  1  8560   53  1  8540   84  1  8520   97  1  8500  146  1  8490   CY
5 11211    150  2  8488  156  2  8471  165  2  8453  178  2  8471  186  2  8486
5 11212    191  3  8500  202  3  8600
6 11229  1  2 100 100  1  2 047 047  1  2 080 080
3 11300    3B 0  10  3  846   65810 99 99
5 11310      0  1  8590    8  2  8540   17  2  8492   32  2  8462   47  2  8489
5 11311     49  3  8493   70  3  8500   86  3  8520   98  3  8540  114  3  8560   CZ
6 11329  1  2 100 100  1  2 055 055  1  2 080 080
3 11400    3C 0  16  3  847   66480 99 99
5 11410      0  1  8600   12  1  8560   22  1  8540   33  1  8520   45  1  8500
5 11411     84  1  8480   90  2  8480   94  2  8479   96  2  8472  120  2  8468   DA
5 11412    150  2  8479  155  3  8480  177  3  8500  338  3  8520  422  3  8540
5 11413    506  3  8560
6 11429  1  2 110 110  1  2 055 055  1  2 080 080
3 11500    3D 1  16  3  848   67050 99 99
4 11504    380    530    720    590    590
5 11510      0  1  8580   35  1  8560   85  1  8540  132  1  8520  140  2  8500
5 11511    148  2  8480  153  2  8481  163  2  8479  173  2  8478  178  2  8472   DB
5 11512    182  2  8480  193  3  8500  213  3  8520  236  3  8540  248  3  8560
5 11513    258  3  8580
6 11529  1  2 090 090  1  2 050 050  1  2 100 100
3 11600 BR 3D 2  10  1  848   67050        0 / 8544 3 1
5 11610      0  1  8544    0  1  8488    5  1  8481   10  1  8478   15  1  8479
5 11611     20  1  8479   25  1  8477   32  1  8472   32  1  8544    0 -9  8544   [illegible]
6 11629  1  2 042 042
3 11700 BD 3D 4  12  3   30          1  3          2 2 2          1
5 11710   -230  1  8601 -174  1  8581 -122  1  8566  -72  1  8565  -18  1  8567
5 11711    -17  2  8567   17  2  8568   18  3  8568   74  3  8568  126  3  8569
5 11712    180  3  8578  253  3  8591
3 11800    3E 5  21  3  847   67130  1  3
5 11810   -148  1  8580 -129  1  8560  -89  1  8540  -68  1  8520    0  1  8505
5 11811      5  1  8499   10  1  8494   15  1  8483   18  2  8475   25  2  8471
5 11812     30  2  8470   35  2  8468   40  2  8466   45  2  8467   50  3  8474   DC
5 11813     55  3  8480   75  3  8501   88  3  8520  122  3  8540  142  3  8560
5 11814    168  3  8580
6 11829  1  2 100 100  1  2 050 050  1  2 120 120
3 11900    3F 0  15  3  846   67560 99 99
5 11910     15  1  8600   28  1  8580   56  1  8560   97  1  8540  116  1  8520
5 11911    296  2  8500  298  2  8486  320  2  8457  347  2  8486  349  3  8500   DD
5 11912    360  3  8520  370  3  8540  376  3  8560  388  3  8580  402  3  8600
6 11929  1  2 120 120  1  2 050 050  1  2 065 065
```

```
3 12000     3G 0  13  3  847   67950 99 99
5 12010       16  1  8600   18  1  8580   32  1  8560   42  1  8540   61  2  8520   OE
5 12011       77  2  8486   88  2  8471   98  2  8486  100  3  8503  159  3  8520
5 12012      170  3  8540  178  3  8560  194  3  8600
6 12029  1  2 100 100  1  2 050 050  1  2 060 060
3 12100     3H 0  13  3  845   68470 99 99
5 12110       18  1  8580   70  1  8560  120  1  8540  193  1  8520  214  2  8500
5 12111      216  2  8484  232  2  8445  244  2  8483  246  2  8503  257  3  8523   OF
5 12112      260  3  8540  275  3  8560  288  3  8580
6 12129  1  2 070 070  1  2 055 055  1  2 060 060
3 12200 8R 3H 2  12  1  845   68470        30  8531 3 1
5 12210        0  1  8531    0  1  8505    2  1  8484    4  1  8478    8  1  8456
5 12211       12  1  8445   16  1  8447   20  1  8449   24  1  8467   28  1  8485
5 12212       28  1  8531    0 -9  8531
6 12229  1  2 042 042
3 12300 RO 3H 4  10  3   15          1  3          2 2 2              1
5 12310     -248  1  8585 -174  1  8545 -120  1  8539  -76  1  8537  -19  2  8541
5 12311       19  2  8541   20  3  8540   48  3  8544   88  3  8558  114  3  8576
3 12400     3I 5  20  3  845   68510  1  3
5 12410     -178  1  8580 -162  1  8560 -143  1  8540 -126  1  8520  -20  1  8495   DG
5 12411       -5  1  8497    1  2  8483    4  2  8477   10  2  8457   14  2  8454
5 12412       18  2  8453   22  2  8451   26  2  8460   29  2  8473   30  3  8477
5 12413       31  3  8483   41  3  8541   88  3  8540  102  3  8560  124  3  8580
6 12429  1  2 120 120  1  2 050 050  1  2 053 053
3 12500     3J 0  15  3  846   69230 99 99
5 12510        0  1  8600   22  1  8580  138  1  8560  164  1  8540  208  1  8520   DH
5 12511      220  2  8520  230  2  8500  252  2  8458  285  2  8500  292  3  8520
5 12512      339  3  8520  492  3  8520  518  3  8540  533  3  8560  548  3  8580
6 12529  1  2 100 100  1  2 050 050  1  2 150 150
3 12600     3K 0  16  3  847   69810 99 99
5 12610        0  1  8600   21  1  8580   46  1  8560   68  1  8540  122  1  8520
5 12611      242  2  8500  248  2  8483  271  2  8463  290  2  8483  302  2  8500   DI
5 12612      304  3  8500  373  3  8520  438  3  8540  464  3  8560  498  3  8580
5 12613      512  3  8600
6 12629  1  2 120 120  1  2 050 050  1  2 120 120
3 12700     3L 0  15  3  847   70240 99 99
5 12710      100  1  8600  122  1  8580  141  1  8560  158  1  8540  210  1  8520
5 12711      614  2  8510  618  2  8473  660  2  8466  717  2  8500  720  3  8500   DJ
5 12712      748  3  8520  772  3  8540  790  3  8560  812  3  8580  830  3  8600
6 12729  1  2 150 150  1  2 045 045  1  2 100 100
3 12800     3M 0  17  3  847   70500 99 99
5 12810      500  1  8600  518  1  8580  543  1  8560  573  1  8540  618  1  8520
5 12811      800  1  8518 1230  1  8518 1234  2  8503 1240  2  8481 1280  2  8469   DK
5 12812     1320  2  8475 1322  3  8500 1333  3  8520 1347  3  8540 1369  3  8560
5 12813     1386  3  8580 1395  3  8600
```

*** INPUT CARD PRINTOUT ***

```
                1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
6 12929  1  2 150 150  1  2 038 038  1  2 080 080
3 12900    3N 0  17  3  848   71610 99 99
5 12910     200  1  8600  235  1  8580  274  1  8560  317  1  8540  362  1  8520
5 12911     446  1  8515  448  2  8500  458  2  8480  480  2  8473  508  2  8480
5 12912     512  3  8515  800  3  8517 1092  3  8520 1169  3  8540 1206  3  8560   DL
5 12913    1247  3  8580 1262  3  8600
6 12929  1  2 140 140  1  2 045 045  1  2 120 120
3 13000    30 0  15  3  848   72380 99 99
5 13012     553  1  8560  572  1  8540  608  1  8520  825  1  8517  988  1  8515
5 13013     990  2  8500  995  2  8480 1032  2  8476 1057  2  8480 1060  3  8515   DM
5 13014    1086  3  8520 1144  3  8540 1188  3  8560 1212  3  8580 1238  3  8600
6 13029  1  2 120 120  1  2 050 050  1  2 100 100
3 13100   300 0  16  3  848   73500 99 99
5 13111     500  1  8600  500  1  8600  500  1  8600  500  1  8600  550  1  8520
5 13112    1015  1  8520 1028  2  8500 1030  2  8480 1050  2  8479 1068  2  8480   DN
5 13113    1070  2  8500 1082  3  8520 1093  3  8540 1202  3  8560 1233  3  8580
5 13114    1273  3  8600
6 13129  1  2 140 140  1  2 050 050  1  2 160 160
3 13200    3P 0  15  3  848   73930 99 99
5 13212     510  1  8580  537  1  8560  568  1  8540  745  1  8520  750  2  8520
5 13213     760  2  8492  782  2  8482  814  2  8492  826  3  8520  858  3  8520   DO
5 13214     951  3  8520  977  3  8540 1002  3  8560 1023  3  8580 1052  3  8600
6 13229  1  2 090 090  1  2 050 050  1  2 140 140
3 13300    3Q 0  12  3  849   74340 99 99
5 13312     873  1  8600  933  1  8580  994  1  8560 1023  1  8540 1130  1  8520
5 13313    1133  2  8520 1135  2  8496 1152  2  8486 1170  2  8496 1173  3  8500   DP
5 13314    1192  3  8520 1210  3  8600
6 13329  1  2 100 100  1  2 050 050  1  2 060 060
3 13400    3R 0  19  3  849   75420 99 99
5 13412     902  1  8580  914  1  8560  942  1  8540  970  1  8520 1000  1  8540
5 13413    1100  1  8560 1125  1  8540 1234  1  8520 1236  2  8520 1248  2  8496
5 13414    1290  2  8484 1317  2  8496 1324  2  8500 1336  3  8520 1386  3  8520   DQ
5 13415    1600  3  8520 1600  3  8600 2232  3  8600 2262  3  8600
6 13429  1  2 100 100  1  2 050 050  1  2 150 150
3 13500    3S 0  19  3  849   75960 99 99
5 13511     333  1  8600  360  1  8600  685  1  8600  732  1  8580  783  1  8560
5 13512     821  1  8540  911  1  8520  912  2  8520  922  2  8498  953  2  8486
5 13513     982  2  8498  988  3  8528 1142  3  8528 1153  3  8520 1181  3  8525   DR
5 13514    1198  3  8540 1204  3  8560 1209  3  8580 1222  3  8600
6 13529  1  2 100 100  1  2 050 050  1  2 120 120
3 13600    3T 0  17  3  849   76590 99 99
5 13610      74  1  8600   93  1  8580  124  1  8560  142  1  8560  174  1  8540
```

```
1      1 SHIAWASSEE TWPFENTON RIPLEY RD TO TUPLK          12  5  2  5 12
2      2  86850  86870  86930  86900  86910
3    100    4N 1  20  3  866   87030 99 99
4    105    290    400    560    450    450
5    111      0  1  8720   34  1  8706   54  1  8700   64  1  8697   74  1  8691
5    112     84  2  8674   95  2  8661  105  2  8654  115  2  8650  125  2  8654
5    113    135  2  8653  145  2  8651  155  2  8651  165  2  8660  173  3  8674
5    114    180  3  8693  190  3  8700  200  3  8703  220  3  8708  240  3  8720
6    129  1  2 100 100  1  2 045 045  1  2 060 060
3    200   4NN 0  10  3  865   87440 99 99
5    211      0  1  8760   52  1  8740  173  1  8720  200  1  8700  216  2  8674
5    212    244  2  8648  273  2  8674  280  3  8680  318  3  8700  328  3  8720
6    229  1  2 080 080  1  2 050 050  1  2 060 060
3    300    40 0  11  3  867   87880 99 99
5    311      0  1  8760    7  1  8740   18  1  8720   21  1  8700   38  2  8677
5    312     62  2  8660   80  2  8677   85  3  8680  121  3  8700  170  3  8700
5    313    232  3  8720
6    329  1  2 075 075  1  2 050 050  1  2 100 100
3    400   400 0  11  3  867   88060 99 99
5    411      0  1  8760   23  1  8740   68  1  8720  122  1  8700  142  2  8682
5    412    146  2  8665  158  2  8660  168  2  8665  173  2  8682  184  3  8700
5    413    240  3  8720
6    429  1  2 090 090  1  2 050 050  1  2 100 100
3    500    4P 0  11  3  867   88490 99 99
5    511      0  1  8760   32  1  8740   44  1  8720   52  1  8700   72  2  8680
5    512     76  2  8665   87  2  8660   96  2  8665  100  3  8680  111  3  8700
5    513    206  3  8720
6    529  1  2 100 100  1  2 048 048  1  2 100 100
3    600   4PP 0   9  3  867   88680 99 99
5    611      0  1  8740   32  1  8720  111  1  8700  123  2  8680  140  2  8660
5    612    160  2  8680  175  3  8700  182  3  8720  242  3  8740
6    629  1  2 100 100  1  2 050 050  1  2 100 100
3    700    4Q 0  10  3  866   88930 99 99
5    711      0  1  8760  102  1  8740  152  1  8720  275  1  8700  302  2  8683
5    712    316  2  8655  334  2  8682  340  3  8685  356  3  8700  463  3  8720
6    729  1  2 110 110  1  2 050 050  1  2 120 120
3    800   4QQ 0   9  3  866   89290 99 99
5    811      0  1  8760   28  1  8740   92  1  8720  450  1  8700  524  2  8683
5    812    538  2  8651  559  3  8682  706  3  8700  742  3  8720
6    829  1  2 120 120  1  2 050 050  1  2 150 150
3    900  4QQQ 0  17  3  865   89450 99 99
5    911   -550  1  8740 -488  1  8720 -145  1  8700 -100  1  8676    0  1  8676
5    912     15  1  8664   25  1  8657   35  2  8650   50  2  8647   65  2  8648
5    913     75  2  8657   88  3  8666  100  3  8676  170  3  8680  202  3  8700
5    914    302  3  8720  322  3  8740
```

EJ

EK

EL

EM

EN

EO

EP

EQ

ER

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

6   929  1  2 120 120  1  2 055 055  1  2 140 140
3  1000    4R 0  19  3  864   90600 99 99
5  1011    -276  1  8760 -267  1  8740 -238  1  8720 -175  1  8700  -28  1  8700
5  1012     -11  1  8700    1  2  8683   12  2  8672   25  2  8650   35  2  8625
5  1013      50  2  8631   65  2  8650   75  2  8666   85  2  8673  100  3  8682
5  1014     950  3  8683 1006  3  8700 1124  3  8720 1153  3  8740
6  1029  1  2 120 120  1  2 055 055  1  2 120 120
3  1100   4RR 0  19  3  863   90860 99 99
5  1111    -408  1  8760 -358  1  8740 -332  1  8720 -307  1  8700  -62  1  8700
5  1112     -18  1  8700    2  2  8684   23  2  8637   40  2  8627   60  2  8627
5  1113      61  2  8651   66  2  8664   73  2  8687   82  3  8687  350  3  8699
5  1114     772  3  8700 1032  3  8704 1128  3  8720 1152  3  8740
6  1133  1  2 150 150  1  2 050 050  1  2 120 120
3  1200  4RRR 0  18  3  866   91010 99 99
5  1211    -518  1  8760 -455  1  8740 -426  1  8720 -398  1  8700 -268  1  8700
5  1212    -200  1  8702    0  1  8703   15  2  8680   25  2  8671   37  2  8663
5  1213      50  2  8657   65  2  8699   72  3  8700  390  3  8699 1192  3  8699
5  1214    1208  3  8700 1228  3  8720 1246  3  8740
6  1233  1  2 120 120  1  2 050 050  1  2 140 140
```

ES

ET

EU

```
1     1 SH WASSEE R  LKPONEMAH TO FENTON                    10  5  2  5 12
2     2  87105  87164  87229  87186  87195
3   100    4S 1  19  3  866   97730 99 99
4   105    290    400    560    450    450
5   111        0  1  8740  196  1  8720  422  1  8700  430  1  8680  478  1  8680
5   112      496  1  8700  610  2  8700  620  2  8680  626  2  8660  635  2  8650   EV
5   113      647  2  8660  650  2  8680  668  3  8700  710  3  8705  710  3  8800
5   114      810  3  8800  810  3  8719 1048  3  8720 1078  3  8740
6   119  1  2 100 100  1  2 060 060  1  2 080 080
3   200   4SS 0  19  3  866   97950 99 99
5   211        2  1  8740  162  1  8720  348  1  8700  358  1  8680  397  1  8680
5   212      410  1  8700  520  2  8705  527  2  8652  560  2  8652  573  3  8700   EW
5   213      608  3  8705  608  3  8800  708  3  8800  708  3  8720  822  3  8720
5   214      850  3  8720  872  3  8720  887  3  8720  912  3  8740
6   219  1  2 100 100  1  2 060 060  1  2 080 080
3   300  4SSS 0  15  3  866   98430 99 99
5   311        0  1  8740  108  1  8720  200  1  8720  200  1  8800  290  1  8800
5   312      290  1  8705  293  2  8700  302  2  8680  304  2  8660  322  2  8650   EX
5   313      333  2  8660  340  2  8680  352  3  8720  824  3  8720  848  3  8740
6   319  1  2 100 100  1  2 060 060  1  2 090 090
3   400    4T 0  12  3  868   98740 99 99
5   411        0  1  8760    7  1  8740   34  1  8720   38  1  8700   50  2  8680
5   412       52  2  8677   60  2  8670   78  2  8670   82  3  8700   90  3  8720   EY
5   413      110  3  8740  128  3  8760
6   419  1  2 080 080  1  2 050 050  1  2 090 090
3   500 RR 4T 2  10  1  868   98740        0  8738 3 1
5   511        0  1  8738    0  1  8702    4  1  8682    9  1  8674   14  1  8676
5   512       19  1  8677   24  1  8676   30  1  8670   30  1  8738    0 -9  8738
6   529  1  2 036 036
3   600    4U 5  11  3  868   98800  1  3
5   611        0  1  8740   12  1  8720   23  1  8700   30  2  8680   32  2  8685   EZ
5   612       50  2  8677   60  2  8678   62  3  8680   69  3  8700   79  3  8720
5   613       89  3  8740
6   629  1  2 060 060  1  2 040 040  1  2 050 050
3   700    4V 0  11  3  868   99100 99 99
5   711        0  1  8760    6  1  8740   14  1  8720   19  2  8700   22  2  8680   FA
5   712       24  2  8672   38  2  8670   52  2  8680   58  3  8700   60  3  8720
5   713       65  3  8740
6   729  1  2 060 060  1  2 035 035  1  2 055 055
```

```
WATER-SURFACE PROFILE FOR:  SHIAWASSEE RIVER E CORP FENTON TWSP-DAM  RLL DJH
PAGE  1 OF  3, PROFILE NUMBER  5,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HORIZONTAL CONTROL
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /    EG  /    V  /    FN  /   ACC   *ID*
==================================================================================
   3A AT   65360 /     0 /    650. /   239. /  13674. / 1.63 /   97. /  187.
   851.06 /   0.19 /                 /  851.25 /   2.72 /   0.32/          *IS*
----------------------------------------------------------------------------------
   3B AT   65810 /   450 /    650. /   225. /  12366. / 1.30 /   12. /   87.
   852.21 /   0.17 /   1.12 /   0.0  /  852.37 /   2.89 /   0.31 / 0.001  *XS*
----------------------------------------------------------------------------------
   3C AT   66480 /   670 /    650. /   787. /  45455. / 1.57 /   50. /  250.
   852.86 /   0.02 /   0.50 /   0.0  /  852.88 /   0.83 /   0.09 / 0.001  *XS*
----------------------------------------------------------------------------------
   3D AT   67050 /   570 /    590. /   326. /  22816. / 1.36 /  120. /  220.
   853.05 /   0.07 /   0.21 /   0.03 /  853.12 /   1.81 /   0.18 / -0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 3D AT   67050 /       /    590. /   166. /  14625. / 1.00 /    0. /   32.
   853.05 /   0.20 /       ...1...  (-.001)    /   3.56 /   0.28 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       0. / RIGHT       0. /                *RG*
----------------------------------------------------------------------------------
   3E AT   67130 /    80 /    590. /   471. /  27400. / 2.17 /  -30. /   90.
   853.11 /   0.05 /   0.04 /   0.0  /  853.16 /   1.25 /   0.15 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = 0.29 / E = 0.94 / K* = 0.62 /   486. /  28592. / 2.17 /  -30. /   90.
   853.23 /   0.05 /                 /  853.28 /   1.21 /   0.15 /          *AS*
========================== END BRIDGE ANALYSIS ============================
   3F AT   67560 /   430 /    590. /   706. /  40846. / 2.24 /  160. /  360.
   853.39 /   0.02 /   0.13 /   0.0  /  853.41 /   0.84 /   0.10 / 0.000  *XS*
----------------------------------------------------------------------------------
   3G AT   67950 /   390 /    590. /   320. /  20476. / 1.26 /   55. /  155.
   853.53 /   0.07 /   0.16 /   0.02 /  853.60 /   1.84 /   0.19 / 0.000  *XS*
----------------------------------------------------------------------------------
   3H AT   68470 /   520 /    590. /   384. /  25424. / 1.46 /  130. /  260.
   853.89 /   0.05 /   0.35 /   0.0  /  853.94 /   1.54 /   0.14 / 0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 3H AT   68470 /       /    547. /   168. /  11992. / 1.00 /    0. /   28.
   853.10 /   0.17 /       ...3...  (-.001)    /   3.26 /   0.22 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      43. / RIGHT       0. /                *RG*
----------------------------------------------------------------------------------
   3I AT   68610 /   40 /    590. /   455. /  33704. / 1.80 /  -45. /   41.
```

CY

CZ

DA

DB

FW

DC

DD

DE

DF

```
   853.11 /    0.05 /    0.04 /    0.0  /  853.16 /    1.25 /    0.15 / -0.000   *AS*
-------------------------------------------------------------------------------------
   M = 0.29 / E = 0.94 / K* = 0.62 /    48[illegible] /    28592. / 2.17 /   -30. /    90.
   853.23 /    0.05 /                  /  853.28 /    1.21 /    0.15 /            *AS*
============================ END BRIDGE ANALYSIS ============================
   3F AT    67560 /    430 /    590. /    706. /    40846. / 2.24 /   160. /   360.
   853.39 /    0.02 /    0.13 /    0.0  /  853.41 /    0.84 /    0.10 / 0.000   *XS*
-------------------------------------------------------------------------------------
   3G AT    67950 /    390 /    590. /    320. /    20476. / 1.26 /    55. /   155.
   853.53 /    0.07 /    0.16 /    0.02 /  853.60 /    1.84 /    0.19 / 0.000   *XS*
-------------------------------------------------------------------------------------
   3H AT    68470 /    520 /    590. /    384. /    25424. / 1.46 /   130. /   260.
   853.89 /    0.05 /    0.35 /    0.0  /  853.94 /    1.54 /    0.14 / 0.000   *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 3H AT    68470 /        /    547. /    168. /    11992. / 1.00 /     0. /    28.
   853.10 /    0.17 /        ...3...  (-.001)    /    3.26 /    0.22 /            *BO*
-------------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        43. / RIGHT        0. /                 *RG*
-------------------------------------------------------------------------------------
   31 AT    68510 /     40 /    590. /    455. /    33704. / 1.90 /   -45. /    41.
   853.91 /    0.05 /    0.02 /    0.0  /  853.96 /    1.30 /    0.13 / -0.001   *AS*
-------------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /    473. /    34189. / 2.08 /   -45. /    42.
   854.10 /    0.05 /                  /  854.15 /    1.25 /    0.13 /            *AS*
============================ END BRIDGE ANALYSIS ============================
 *3J AT    69230 /    720 /    590. /    925. /    47247. / 2.73 /   200. /   500.
   854.29 /    0.02 /    0.16 /    0.0  /  854.30 /    0.64 /    0.09 / -0.000   *XS*
-------------------------------------------------------------------------------------
   3K AT    69810 /    580 /    590. /   1131. /    59991. / 2.63 /   100. /   400.
   854.36 /    0.01 /    0.07 /    0.0  /  854.38 /    0.52 /    0.07 / 0.000   *XS*
-------------------------------------------------------------------------------------
```

DC DD DE DF DG DH DI

FW

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=    59,DATE= 3/21/79

WATER-SURFACE PROFILE FOR:  SHIAWASSEE RIVER E CORP FENTON TWSP-DAM  RLL DJH
PAGE  2 OF  3, PROFILE NUMBER  5,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HORIZONTAL CONTROL
=====================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
=====================================================================================
   3L AT    70240 /    430 /    590. /   1604. /    99707. / 2.75 /   350. /   750.
   854.39 /    0.01 /    0.03 /    0.0  /  854.40 /    0.37 /    0.05 / -0.000   *XS*
```

DJ

	SECID AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*	
DJ	3L AT	70240	430	590.	1604.	99707.	2.75	350.	750.	
	854.39	0.01	0.03	0.0	854.40	0.37	0.05	-0.000	*XS*	
DK	3M AT	70500	260	590.	1682.	105926.	4.00	840.	1340.	
	854.39	0.01	0.01	0.00	854.40	0.35	0.05	-0.008	*XS*	
DL	3N AT	71610	1110	590.	2264.	90075.	4.33	350.	1100.	
	854.44	0.00	0.04	0.0	854.44	0.26	0.05	0.000	*XS*	
DM	30 AT	72380	770	590.	1372.	69183.	2.82	700.	1100.	FW
	854.48	0.01	0.04	0.00	854.49	0.43	0.06	-0.000	*XS*	
DN	300 AT	73500	1120	590.	1458.	52900.	4.04	600.	1100.	
	854.59	0.01	0.11	0.00	854.60	0.40	0.08	0.000	*XS*	
DO	3P AT	73930	430	590.	863.	48093.	2.21	600.	900.	
	854.64	0.02	0.06	0.00	854.66	0.67	0.08	-0.000	*XS*	
DP	3Q AT	74340	410	590.	481.	27764.	1.93	1020.	1190.	
	854.73	0.05	0.11	0.01	854.78	1.23	0.15	0.000	*XS*	
DQ	3R AT	75420	1080	590.	1432.	69273.	2.71	1200.	1600.	
	854.98	0.01	0.20	0.0	854.99	0.41	0.06	0.016	*XS*	
DR	3S AT	75960	540	590.	925.	49366.	2.30	850.	1150.	
	855.04	0.01	0.05	0.00	855.05	0.64	0.08	-0.000	*XS*	
DS	3T AT	76590	630	590.	680.	27617.	3.47	170.	570.	
	855.18	0.04	0.16	0.01	855.22	0.87	0.14	0.000	*XS*	
DT	3U AT	77160	570	590.	1123.	54248.	2.58	100.	500.	
	855.35	0.01	0.13	0.0	855.36	0.53	0.08	0.000	*XS*	
DU	3V AT	77690	530	590.	615.	41555.	1.81	400.	600.	FW
	855.42	0.03	0.08	0.01	855.45	0.96	0.11	0.000	*XS*	
DV	3W AT	77960	270	590.	808.	47011.	1.99	450.	650.	
	855.48	0.02	0.05	0.0	855.50	0.73	0.09	-0.000	*XS*	
DW	3WW AT	78350	390	590.	978.	61127.	1.89	430.	730.	
	855.53	0.01	0.05	0.0	855.54	0.60	0.07	-0.000	*XS*	
DX	3X AT	79000	650	590.	1210.	47527.	3.65	320.	820.	
	855.61	0.01	0.08	0.00	855.62	0.49	0.08	0.000	*XS*	

WATER-SURFACE PROFILE FOR: SHI[illegible]ASSEE TWPFENTON RIPLEY RD TO TUPLK
PAGE 1 OF 1, PROFILE NUMBER [illegible] UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HORIZONTAL CONTROL

	SECID AT	DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
EJ	4N AT	87030	0	450.	321.	23582.	1.05	77.	177.	
		869.10	0.03		869.13	1.40	0.14			*IS*
EK	4NN AT	87440	410	450.	226.	12922.	1.16	204.	304.	
		869.35	0.07	0.27	0.02	869.42	1.99	0.22	-0.003	*XS*
EL	40 AT	87880	440	450.	201.	10019.	1.43	21.	121.	
		870.02	0.11	0.69	0.02	870.13	2.24	0.28	0.001	*XS*
EM	400 AT	88060	180	450.	164.	8935.	1.30	111.	195.	
		870.41	0.15	0.41	0.02	870.56	2.74	0.32	0.001	*XS*
EN	4P AT	88490	430	450.	231.	13061.	1.95	50.	150.	
		871.19	0.12	0.75	0.0	871.31	1.95	0.24	0.000	*XS*
EO	4PP AT	88680	190	450.	266.	15873.	1.40	80.	180.	
		871.44	0.06	0.19	0.0	871.50	1.69	0.19	0.010	*XS*
EP	4Q AT	88930	250	450.	305.	16720.	1.83	275.	375.	
		871.63	0.06	0.19	0.00	871.69	1.48	0.18	0.001	*XS*
EQ	4QQ AT	89290	360	450.	400.	21028.	2.20	500.	600.	
		871.86	0.04	0.21	0.0	871.90	1.12	0.15	-0.000	*XS*
ER	4QQQ AT	89450	160	450.	1975.	67102.	4.27	-475.	298.	
		871.92	0.00	0.02	0.0	871.92	0.23	0.04	0.000	*XS*
ES	4R AT	90600	1150	450.	4457.	160944.	2.78	-236.	1121.	
		871.95	0.00	0.02	0.0	871.95	0.10	0.01	-0.000	*XS*
ET	4RR AT	90860	260	450.	3275.	109798.	5.55	-331.	1125.	
		871.95	0.00	0.00	0.00	871.95	0.14	0.03	-0.003	*XS*
EU	4RRR AT	91010	150	450.	3374.	75061.	4.22	-425.	1227.	
		871.95	0.00	0.00	0.0	871.95	0.13	0.01	-0.005	*XS*

END OF THIS PROFILE

Floodway

```
WATER-SURFACE PROFILE FOR:  SHIAWASSEE R  LKPONEMAH TO FENTON
PAGE  1 OF  1, PROFILE NUMBER  5,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HORIZONTAL CONTROL
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
=================================================================================
   4S AT   97730 /     0 /    450. /   758. /   31342. / 1.67 /  425. /  675.
   871.95 /   0.01 /                 / 871.96 /    0.59 /   0.08/          *IS*
---------------------------------------------------------------------------------
  4SS AT   97950 /   220 /    450. /   770. /   36411. / 1.92 /  350. /  600.
   871.99 /   0.01 /   0.04 /   0.00 / 872.00 /    0.58 /   0.07 / -0.000  *XS*
---------------------------------------------------------------------------------
 4SSS AT   98430 /   480 /    450. /   295. /   20722. / 1.03 /  290. /  350.
   872.10 /   0.04 /   0.13 /   0.01 / 872.14 /    1.52 /   0.12 /  0.000  *XS*
---------------------------------------------------------------------------------
   4T AT   98740 /   310 /    450. /   214. /   15033. / 1.31 /   30. /   90.
   872.28 /   0.09 /   0.20 /   0.03 / 872.37 /    2.11 /   0.20 / -0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==============================
BR 4T AT   98740 /       /    450. /   135. /   12990. / 1.00 /    0. /   30.
   872.28 /   0.17 /       ...1...  (-.001)    /    3.34 /   0.28 /          *BO*
---------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
---------------------------------------------------------------------------------
   4U AT   98800 /    60 /    450. /   214. /   16909. / 1.33 /   10. /   80.
   872.33 /   0.09 /   0.05 /   0.00 / 872.42 /    2.10 /   0.22 /  0.001  *AS*
---------------------------------------------------------------------------------
   M = 0.19 / E = 0.84 / K* = 0.38 /   219. /   17456. / 1.33 /   10. /   80.
   872.40 /   0.09 /                 / 872.48 /    2.06 /   0.22 /          *AS*
========================== END BRIDGE ANALYSIS ================================
   4V AT   99100 /   300 /    450. /   201. /   22905. / 1.09 /   12. /   61.
   872.55 /   0.08 /   0.15 /   0.0  / 872.64 /    2.24 /   0.19 /  0.001  *XS*
---------------------------------------------------------------------------------
```

EV

EW

EX

EY

EZ

FA

END OF THIS PROFILE

Floodway

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   38,DATE= 3/21/79

WATER-SURFACE PROFILE FOR:  SHIAWASSEE RIVER E CORP FENTON TWSP-DAM  RLL DJH
PAGE  1 OF  3, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
=================================================================================
CY  3A AT   65360 /     0 /    650. /   242. /   13636. / 1.65 /   91. /  192.
    850.99 /   0.18 /                 / 851.17 /    2.68 /   0.33/          *IS*
---------------------------------------------------------------------------------
CZ  3B AT   65810 /   450 /    650. /   222. /   12061. / 1.30 /   11. /   87.
    852.16 /   0.17 /   1.16 /   0.0  / 852.33 /    2.93 /   0.32 / 0.003  *XS*
---------------------------------------------------------------------------------
DA  3C AT   66480 /   670 /    650. /   951. /   47001. / 1.99 /   28. /  372.
    852.82 /   0.01 /   0.50 /   0.0  / 852.83 /    0.68 /   0.09 / 0.001  *XS*
---------------------------------------------------------------------------------
DB  3D AT   67050 /   570 /    590. /   325. /   22296. / 1.40 /  108. /  225.
    853.00 /   0.07 /   0.21 /   0.03 / 853.07 /    1.82 /   0.18 / -0.000 *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
    BR 3D AT   67050 /       /    590. /   164. /   14426. / 1.00 /    0. /   32.
    853.00 /   0.20 /       ...1...  (-.001)    /    3.59 /   0.28 /         *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       0. / RIGHT       0. /                *RG*
---------------------------------------------------------------------------------
    3E AT   67130 /    80 /    590. /   536. /   27415. / 2.73 /  -79. /  106.
    853.07 /   0.05 /   0.05 /   0.0  / 853.12 /    1.10 /   0.15 / -0.000 *AS*
---------------------------------------------------------------------------------
DC  M = 0.30 / E = 0.68 / K* = 0.65 /   561. /   28831. / 2.75 /  -81. /  108.
    853.20 /   0.05 /                 / 853.25 /    1.05 /   0.15 /         *AS*
============================ END BRIDGE ANALYSIS ================================
DD  3F AT   67560 /   430 /    590. /   782. /   41321. / 2.61 /  103. /  367.
    853.35 /   0.02 /   0.13 /   0.0  / 853.37 /    0.75 /   0.10 / -0.000 *XS*
---------------------------------------------------------------------------------
DE  3G AT   67950 /   390 /    590. /   333. /   20345. / 1.34 /   47. /  167.
    853.49 /   0.07 /   0.16 /   0.02 / 853.56 /    1.77 /   0.19 / 0.000  *XS*
---------------------------------------------------------------------------------
DF  3H AT   68470 /   520 /    590. /   380. /   24999. / 1.48 /  125. /  260.
    853.86 /   0.06 /   0.36 /   0.0  / 853.91 /    1.55 /   0.15 / 0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
    BR 3H AT   68470 /       /    553. /   168. /   11992. / 1.00 /    0. /   28.
    853.10 /   0.17 /       ...3...  (-.001)    /    3.30 /   0.22 /         *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      38. / RIGHT       0. /                *RG*
---------------------------------------------------------------------------------
    3I AT   68510 /    40 /    590. /   700. /   39161. / 2.86 / -142. /   41.
```

100-YR

100-YR

```
853.35 /   0.02 /   0.13 /   0.0  /  853.37 /   0.75 /   0.10 / -0.000   *XS*
-----------------------------------------------------------------------------
3G AT   67950 /   390 /   590. /   [illegible]. /   20345. / 1.34 /   47. /  167.
853.49 /   0.07 /   0.16 /   0.02 /  853.56 /   1.77 /   0.19 /  0.000   *XS*
-----------------------------------------------------------------------------
3H AT   68470 /   520 /   590. /   380. /   24999. / 1.48 /  125. /  260.
853.86 /   0.06 /   0.36 /   0.0  /  853.91 /   1.55 /   0.15 /  0.000   *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
RR 3H AT   68470 /       /   553. /   168. /   11992. / 1.00 /    0. /   28.
853.10 /   0.17 /       ...3...  (-.001)    /   3.30 /   0.22 /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       38. / RIGHT       0. /              *RG*
-----------------------------------------------------------------------------
3I AT   68510 /    40 /   590. /   700. /   39161. / 2.86 / -142. /   41.
853.90 /   0.03 /   0.01 /   0.0  /  853.93 /   0.84 /   0.11 / -0.001   *AS*
-----------------------------------------------------------------------------
M = **** / E = **** / K* = **** /   738. /   40419. / 3.08 / -144. /   89.
854.09 /   0.03 /                  /  854.12 /   0.80 /   0.11 /          *AS*
========================== END BRIDGE ANALYSIS ============================
3J AT   69230 /   720 /   590. /   966. /   46922. / 2.96 /  161. /  520.
854.24 /   0.02 /   0.13 /   0.0  /  854.26 /   0.61 /   0.09 /  0.000   *XS*
-----------------------------------------------------------------------------
3K AT   69810 /   580 /   590. /  1182. /   58407. / 3.02 /   65. /  442.
854.32 /   0.01 /   0.07 /   0.0  /  854.33 /   0.50 /   0.07 / -0.000   *XS*
-----------------------------------------------------------------------------
```

100-YR

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   39,DATE= 3/21/79

WATER-SURFACE PROFILE FOR:  SHIAWASSEE RIVER E CORP FENTON TWSP-DAM  RLL DJH
PAGE  2 OF  3, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
=============================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
=============================================================================
3L AT   70240 /   430 /   590. /  2038. /  105367. / 3.69 /  155. /  775.
854.35 /   0.00 /   0.02 /   0.0  /  854.35 /   0.29 /   0.04 / -0.000   *XS*
-----------------------------------------------------------------------------
3M AT   70500 /   260 /   590. /  2275. /  114679. / 5.66 /  568. / 1351.
854.35 /   0.01 /   0.01 /   0.00 /  854.36 /   0.26 /   0.05 / -0.007   *XS*
-----------------------------------------------------------------------------
3N AT   71610 /  1110 /   590. /  2355. /   88778. / 4.77 /  309. / 1176.
854.39 /   0.00 /   0.04 /   0.0  /  854.39 /   0.25 /   0.05 /  0.000   *XS*
```

	SECID AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*	
DJ	3L AT	70240	430	590.	2038.	105367.	3.69	155.	775.	
	854.35	0.00	0.02	0.0	854.35	0.29	0.04	-0.000	*XS*	
DK	3M AT	70500	260	590.	2275.	114679.	5.66	568.	1351.	
	854.35	0.01	0.01	0.00	854.36	0.26	0.05	-0.007	*XS*	
DL	3N AT	71610	1110	590.	2355.	88778.	4.77	309.	1176.	
	854.39	0.00	0.04	0.0	854.39	0.25	0.05	0.000	*XS*	
DM	30 AT	72380	770	590.	1687.	74172.	3.40	568.	1153.	
	854.43	0.01	0.04	0.00	854.44	0.35	0.06	-0.000	*XS*	100-YR
DN	300 AT	73500	1120	590.	1578.	54162.	4.28	534.	1122.	
	854.52	0.01	0.10	0.00	854.53	0.37	0.08	0.000	*XS*	
DO	3P AT	73930	430	590.	1065.	49895.	2.78	559.	984.	
	854.58	0.01	0.06	0.00	854.59	0.55	0.08	-0.000	*XS*	
DP	3Q AT	74340	410	590.	485.	27477.	1.95	1013.	1198.	
	854.67	0.04	0.10	0.02	854.71	1.22	0.15	-0.000	*XS*	
DQ	3R AT	75420	1080	590.	1657.	71358.	3.16	929.	1600.	
	854.90	0.01	0.19	0.0	854.90	0.36	0.06	-0.000	*XS*	
DR	3S AT	75960	540	590.	1058.	50502.	2.67	803.	1201.	
	854.95	0.01	0.05	0.00	854.96	0.56	0.08	-0.000	*XS*	
DS	3T AT	76590	630	590.	688.	26571.	3.76	156.	616.	
	855.10	0.04	0.16	0.02	855.14	0.86	0.15	0.000	*XS*	100-YR
DT	3U AT	77160	570	590.	1121.	52500.	2.69	78.	507.	
	855.27	0.01	0.14	0.0	855.28	0.53	0.09	0.000	*XS*	
DU	3V AT	77690	530	590.	658.	43047.	2.02	381.	623.	
	855.34	0.03	0.08	0.01	855.37	0.90	0.11	0.000	*XS*	
DV	3W AT	77960	270	590.	897.	48163.	2.20	409.	656.	
	855.40	0.01	0.05	0.0	855.42	0.66	0.09	-0.000	*XS*	
DW	3WW AT	78350	390	590.	1016.	60049.	2.06	386.	738.	
	855.45	0.01	0.05	0.0	855.46	0.58	0.07	0.000	*XS*	
DX	3X AT	79000	650	590.	1440.	49805.	4.35	142.	832.	
	855.53	0.01	0.08	0.00	855.54	0.41	0.08	-0.000	*XS*	

WATER-SURFACE PROFILE FOR: SHI ASSEE TWPFENTON RIPLEY RD TO TUPLK
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

	SECID AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*
EJ	4N AT	87030	0	450.	312.	22437.	1.06	75.	179.
	869.00	0.03			869.03	1.44	0.14		*IS*
EK	4NN AT	87440	410	450.	219.	12373.	1.15	204.	304.
	869.28	0.08	0.30	0.02	869.35	2.06	0.23	0.000	*XS*
EL	40 AT	87880	440	450.	199.	9893.	1.43	21.	121.
	870.00	0.11	0.73	0.02	870.11	2.27	0.29	0.012	*XS*
EM	400 AT	88060	180	450.	163.	8878.	1.29	111.	195.
	870.40	0.15	0.42	0.02	870.55	2.76	0.32	0.001	*XS*
EN	4P AT	88490	430	450.	235.	12948.	2.07	47.	167.
	871.19	0.12	0.76	0.0	871.31	1.92	0.24	0.000	*XS*
EO	4PP AT	88680	190	450.	275.	15767.	1.51	54.	180.
	871.44	0.06	0.19	0.0	871.50	1.64	0.19	0.006	*XS*
EP	4Q AT	88930	250	450.	430.	17558.	3.14	175.	443.
	871.63	0.05	0.18	0.0	871.69	1.05	0.17	0.000	*XS*
EQ	4QQ AT	89290	360	450.	1097.	30333.	5.40	126.	739.
	871.81	0.01	0.14	0.0	871.82	0.41	0.10	-0.000	*XS*
ER	4QQQ AT	89450	160	450.	1909.	64883.	4.24	-460.	294.
	871.84	0.00	0.02	0.0	871.84	0.24	0.05	-0.000	*XS*
ES	4R AT	90600	1150	450.	4343.	155487.	2.80	-234.	1116.
	871.86	0.00	0.02	0.0	871.86	0.10	0.01	0.000	*XS*
ET	4RR AT	90860	260	450.	3153.	105215.	5.62	-330.	1120.
	871.86	0.00	0.00	0.00	871.86	0.14	0.03	-0.003	*XS*
EU	4RRR AT	91010	150	450.	3235.	70632.	4.37	-424.	1227.
	871.86	0.00	0.00	0.0	871.86	0.14	0.01	-0.005	*XS*

END OF THIS PROFILE

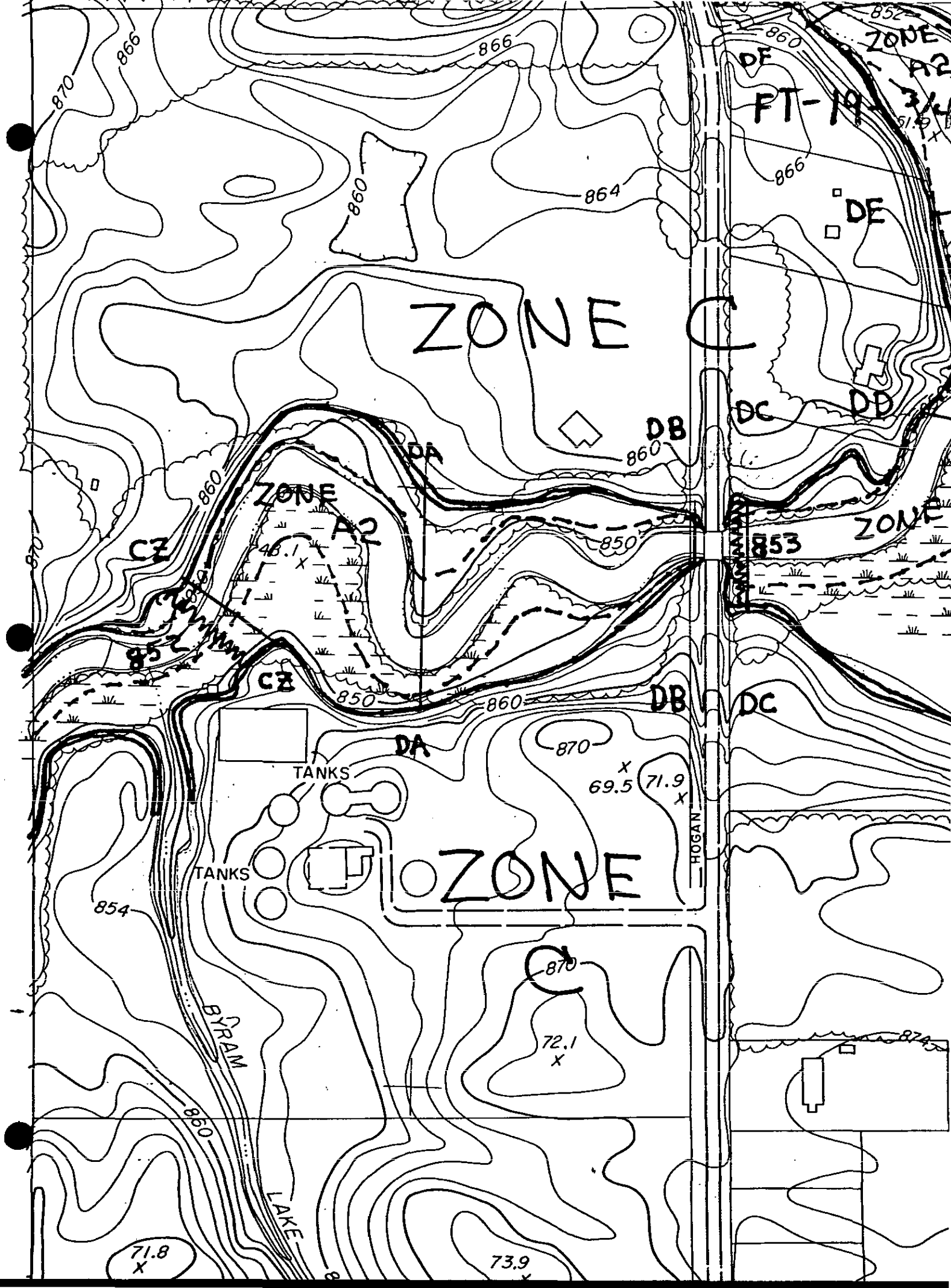
100-YR

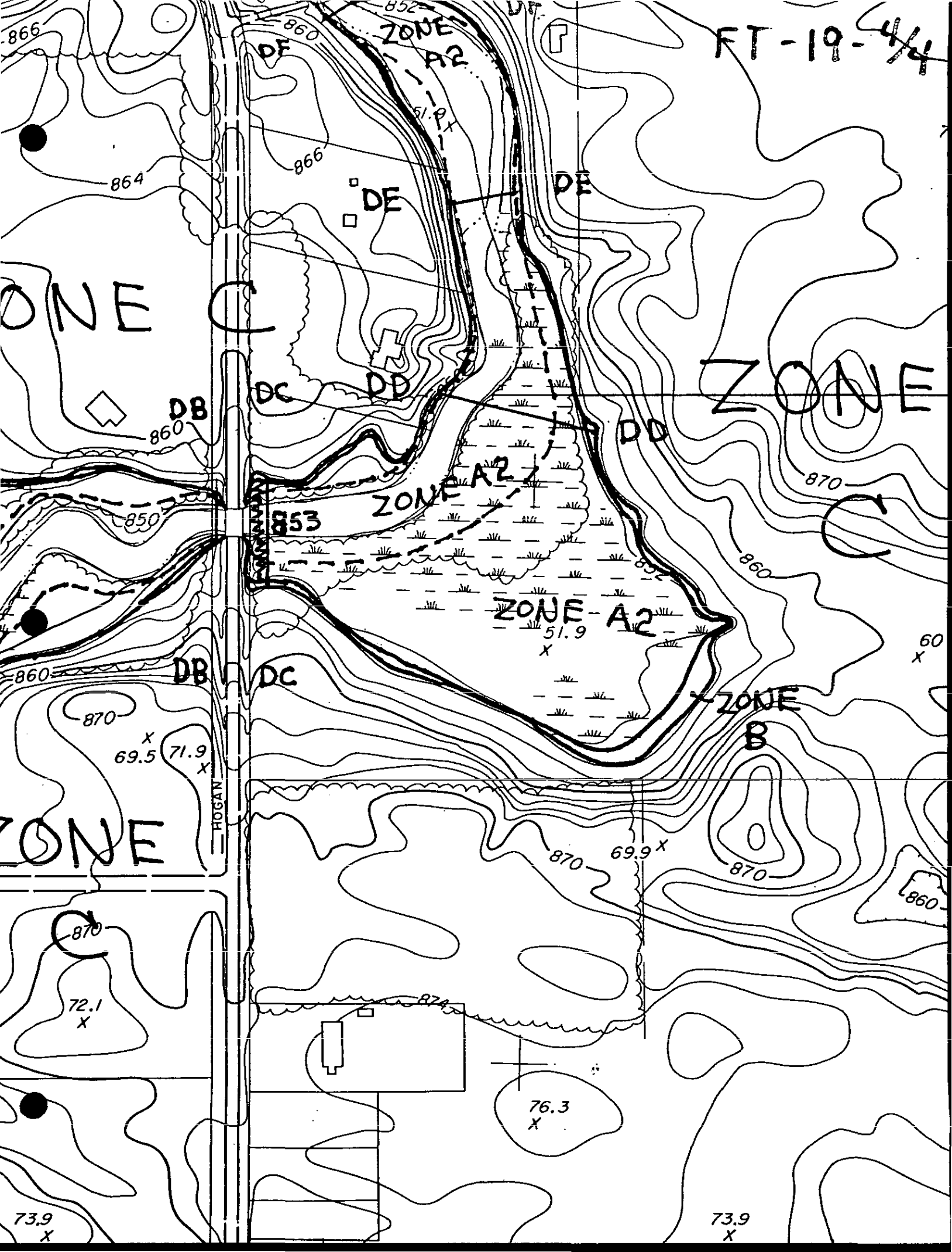
WATER-SURFACE PROFILE FOR: SHIAWASSEE R LKPONEMAH TO FENTON
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

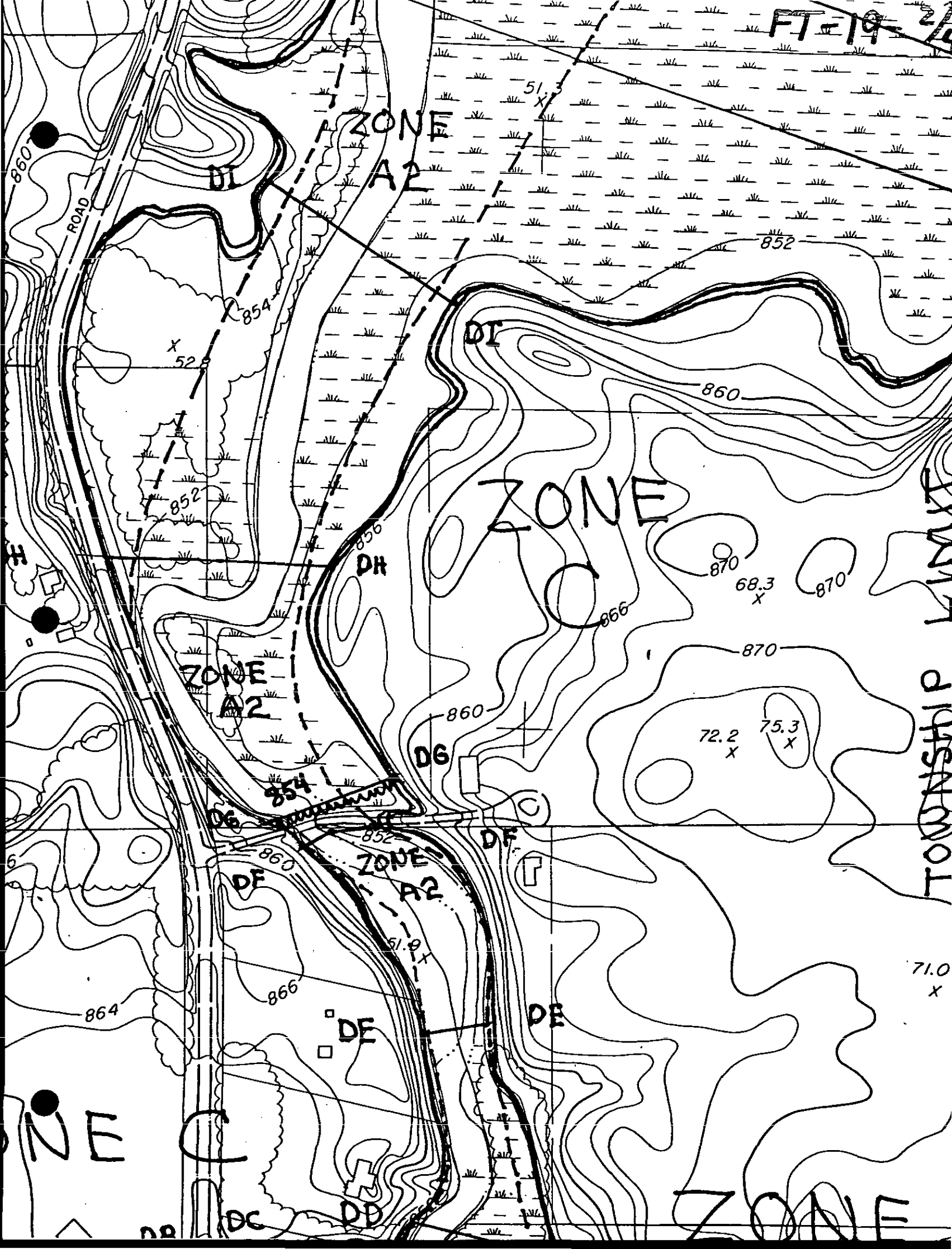
```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
EV   4S AT   97730 /     0 /    450. /   992. /   32705. / 2.29 /  212. /  710.
     871.86 /   0.01 /                 / 871.87 /   0.45 /   0.08/          *IS*
----------------------------------------------------------------------------------
EW  4SS AT   97950 /   220 /    450. /   930. /   36702. / 2.56 /  172. /  608.
     871.90 /   0.01 /   0.04 /   0.00 / 871.91 /   0.48 /   0.07 / -0.000  *XS*
----------------------------------------------------------------------------------
EX 4SSS AT   98430 /   480 /    450. /   299. /   19834. / 1.09 /  107. /  824.
     872.01 /   0.04 /   0.13 /   0.01 / 872.05 /   1.51 /   0.13 / -0.001  *XS*
----------------------------------------------------------------------------------
EY   4T AT   98740 /   310 /    450. /   209. /   14630. / 1.31 /   31. /   92.
     872.20 /   0.09 /   0.22 /   0.03 / 872.30 /   2.15 /   0.21 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR 4T AT   98740 /       /    450. /   133. /   12660. / 1.00 /    0. /   30.
     872.20 /   0.18 /       ...1...  (-.001)     /   3.40 /   0.28 /          *BO*
----------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
----------------------------------------------------------------------------------
     4U AT   98800 /    60 /    450. /   209. /   16341. / 1.33 /   10. /   80.
     872.25 /   0.10 /   0.05 /   0.00 / 872.35 /   2.16 /   0.23 /  0.001  *AS*
----------------------------------------------------------------------------------
     M = 0.19 / E = 0.85 / K* = 0.37 /   214. /   16848. / 1.33 /   10. /   81.
EZ   872.32 /   0.09 /                 / 872.42 /   2.11 /   0.22 /          *AS*
============================ END BRIDGE ANALYSIS ================================
     4V AT   99100 /   300 /    450. /   198. /   22396. / 1.08 /   12. /   61.
FA   872.49 /   0.09 /   0.16 /   0.0  / 872.58 /   2.28 /   0.19 /  0.000  *XS*
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

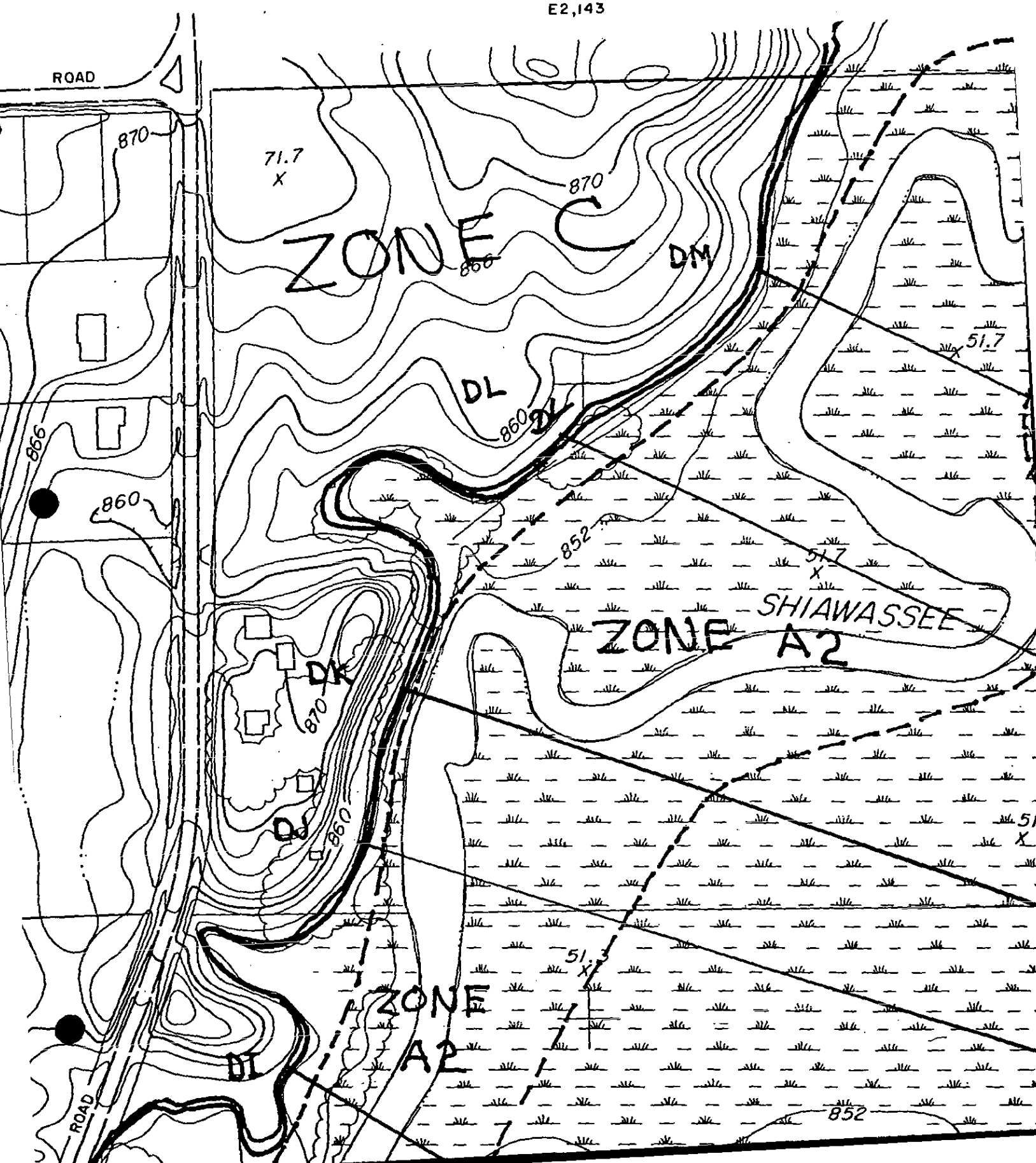
100 - Year


ZONE C
ZONE A2
ZONE
ZONE
DA
DB
DC
DD
DE
DF
CZ
TANKS
TANKS
HOGAN
BYRAM
LAKE
FT-19
3/4
866
870
860
864
850
853
854
852
874
69.5
71.9
72.1
71.8
73.9


FT-19-4/4
ZONE A2
DF
DE
DE
DC
DD
DD
DB
DB
DC
ZONE C
ZONE C
ZONE A2
ZONE A2
ZONE B
ZONE
HOGAN
853
852
860
866
864
850
870
51.9
69.5
71.9
69.9
72.1
76.3
73.9
73.9
874

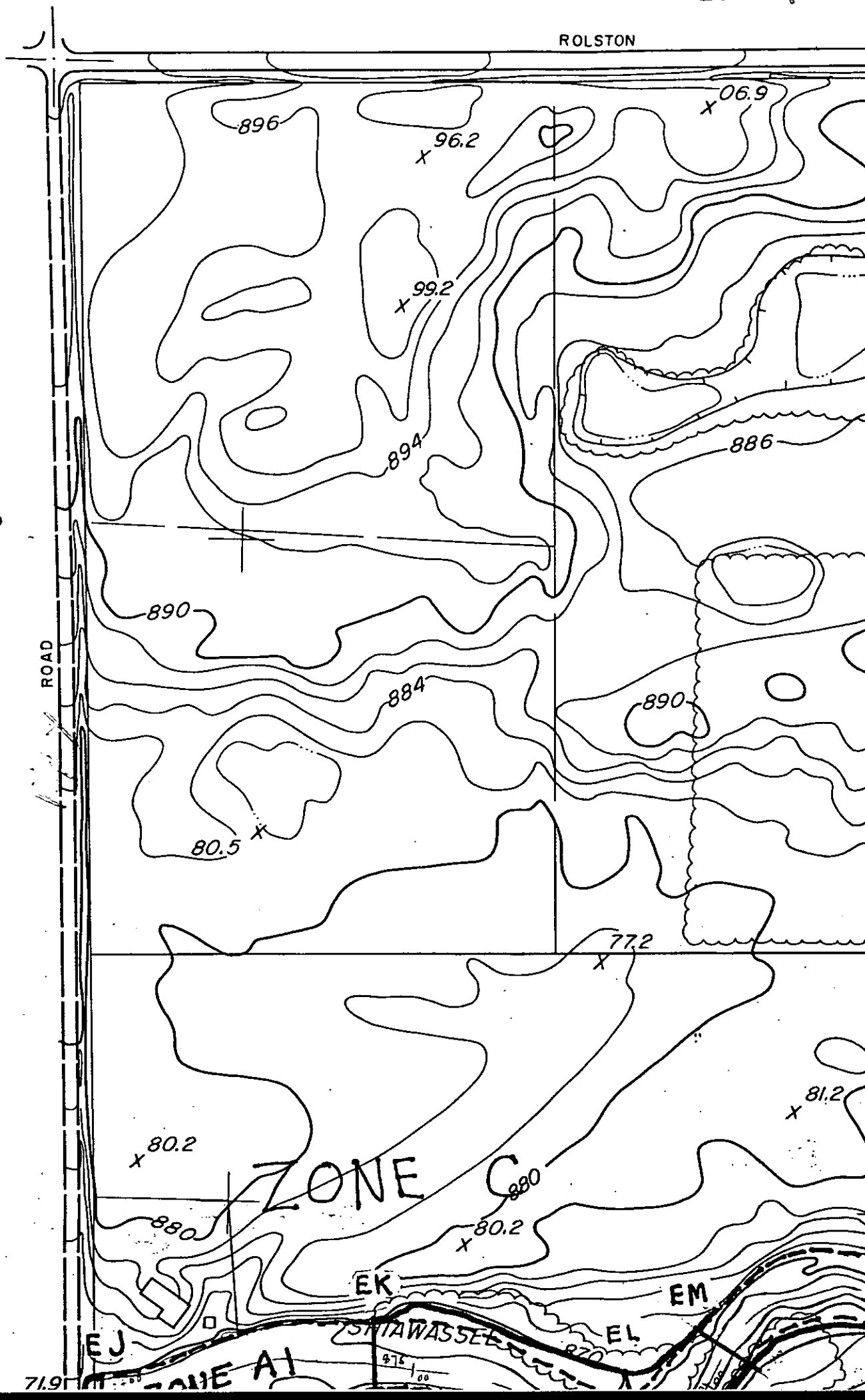

FT-19-2
ZONE A2
DI
ROAD
860
854
852
51.3
52.8
DI
860
ZONE C
870
68.3
870
866
870
ZONE A2
DH
856
860
72.2
75.3
DG
854
DG
852
DF
860
DF
ZONE A2
51.9
866
864
DE
DE
71.0
ZONE C
DC
DD
ZONE
TOWNSHIP LIMIT

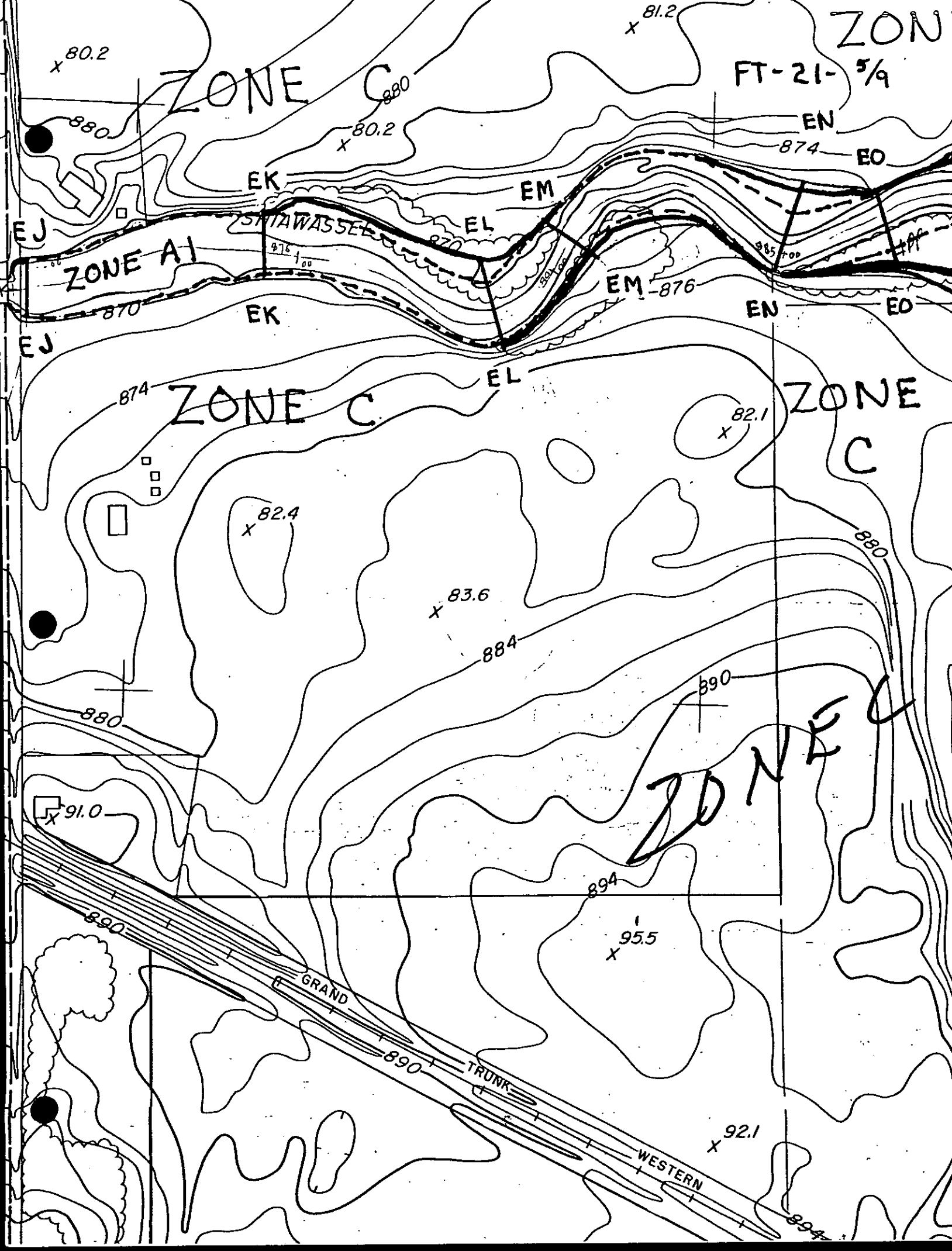
FI-19-74

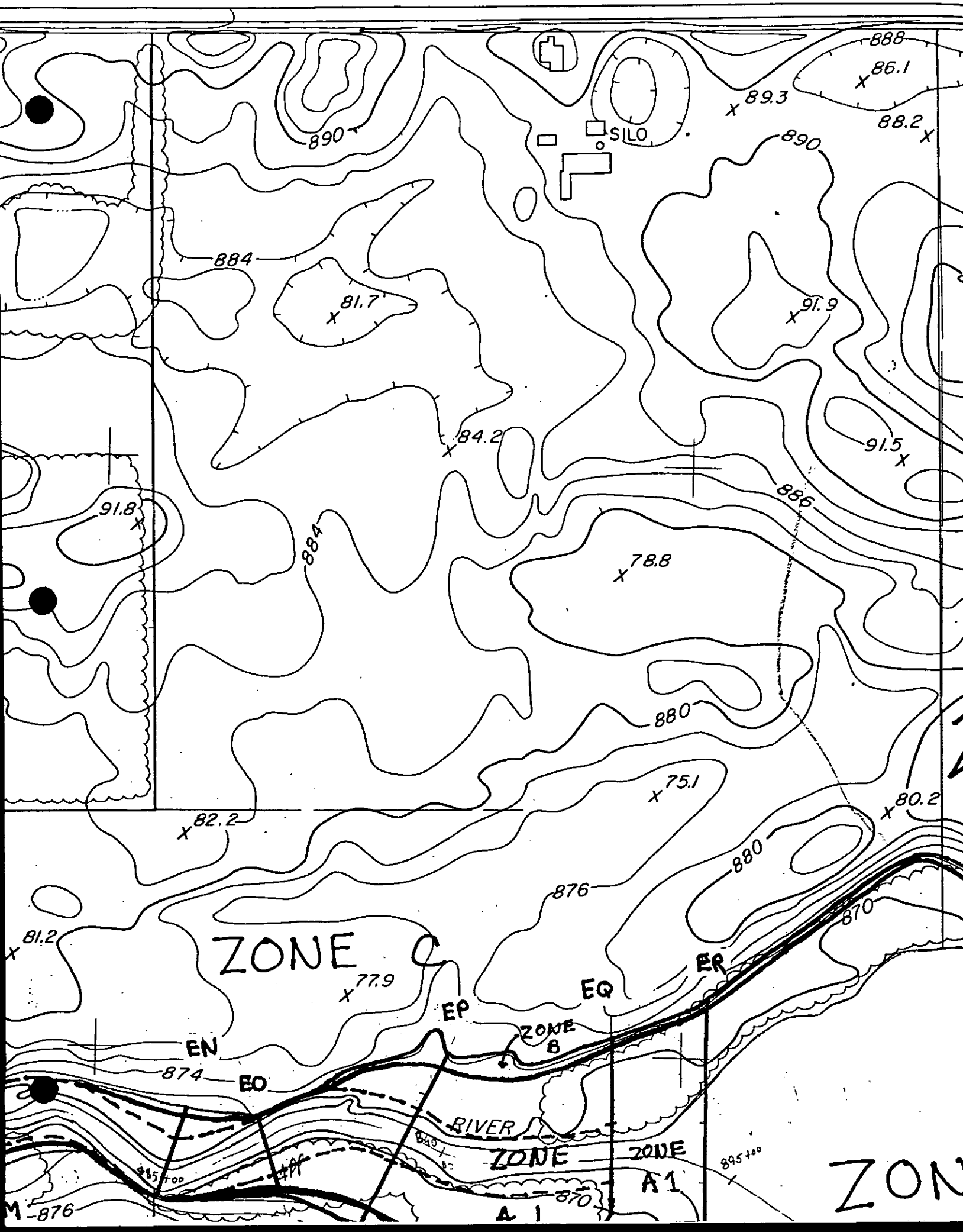

E2,143
ROAD
870
71.7
870
ZONE C
866
DM
51.7
DL
860
DL
866
860
852
51.7
SHIAWASSEE
ZONE A2
DK
870
DJ
860
51.7
ZONE
A2
DI
852
ROAD

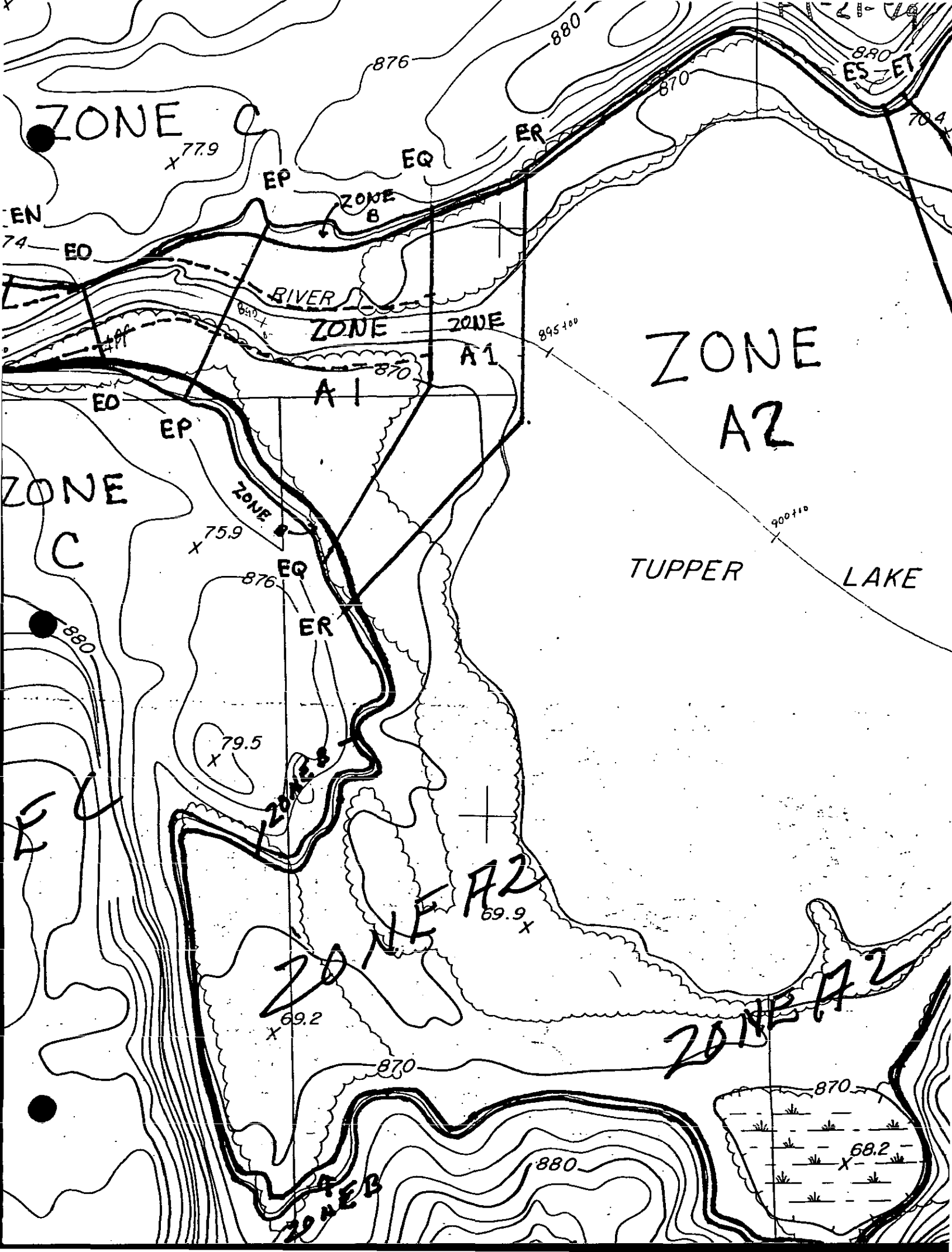
E2,152,000

FT-21-79



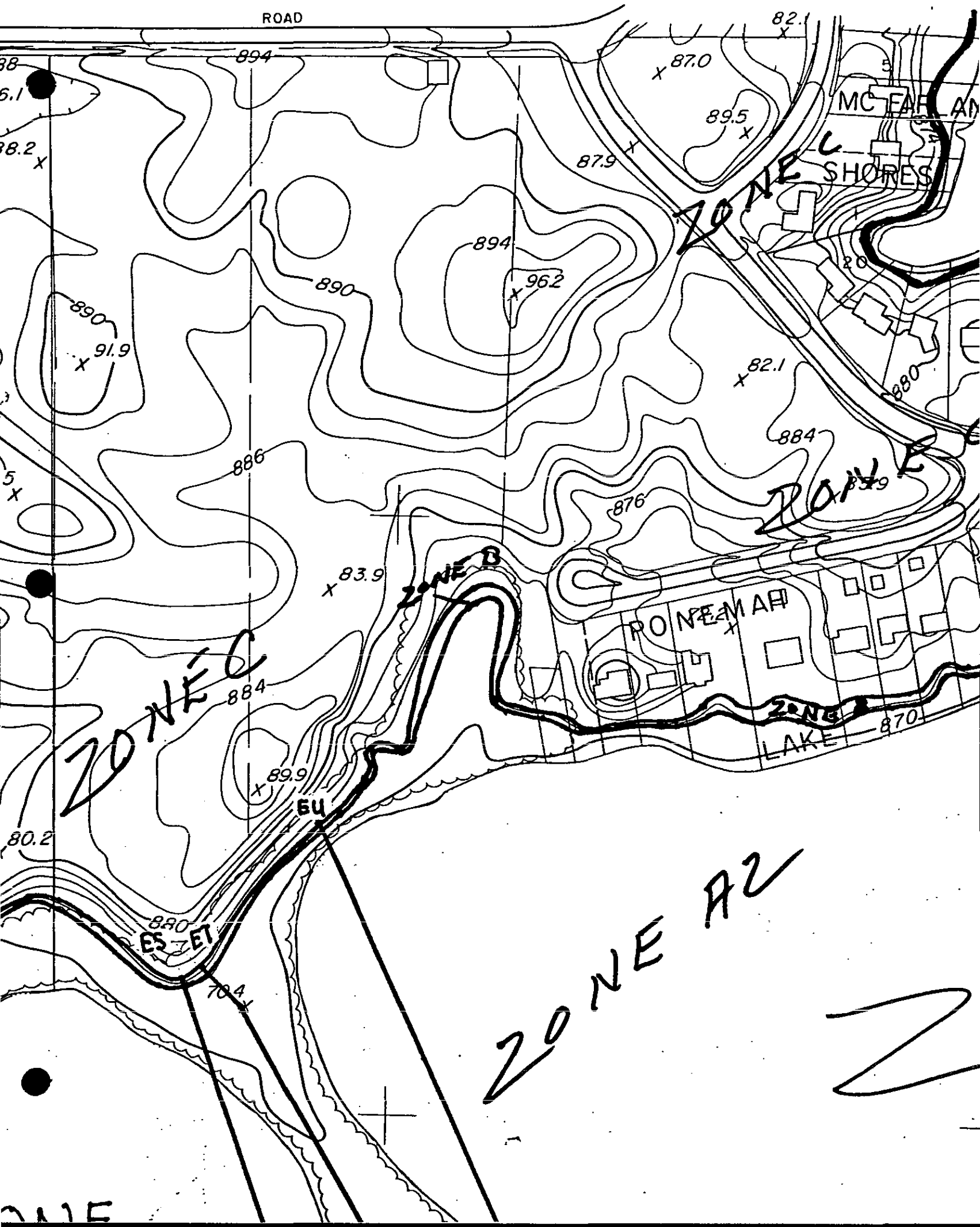

ZONE C
ZONE A1
ZONE C
ZONE C
ZONE C
FT-21-5/9
SHIAWASSEE
GRAND
TRUNK
WESTERN
EJ
EK
EL
EM
EN
EO
80.2
81.2
82.1
82.4
83.6
91.0
95.5
92.1
870
874
876
880
884
890
894


888
86.1
89.3
88.2
890
SILO
890
884
81.7
91.9
84.2
91.5
886
91.8
884
78.8
880
75.1
80.2
82.2
880
876
870
81.2
ZONE C
77.9
EP
EQ
ER
ZONE B
EN
874
EO
RIVER
ZONE
ZONE A1
870
876
A 1
ZON

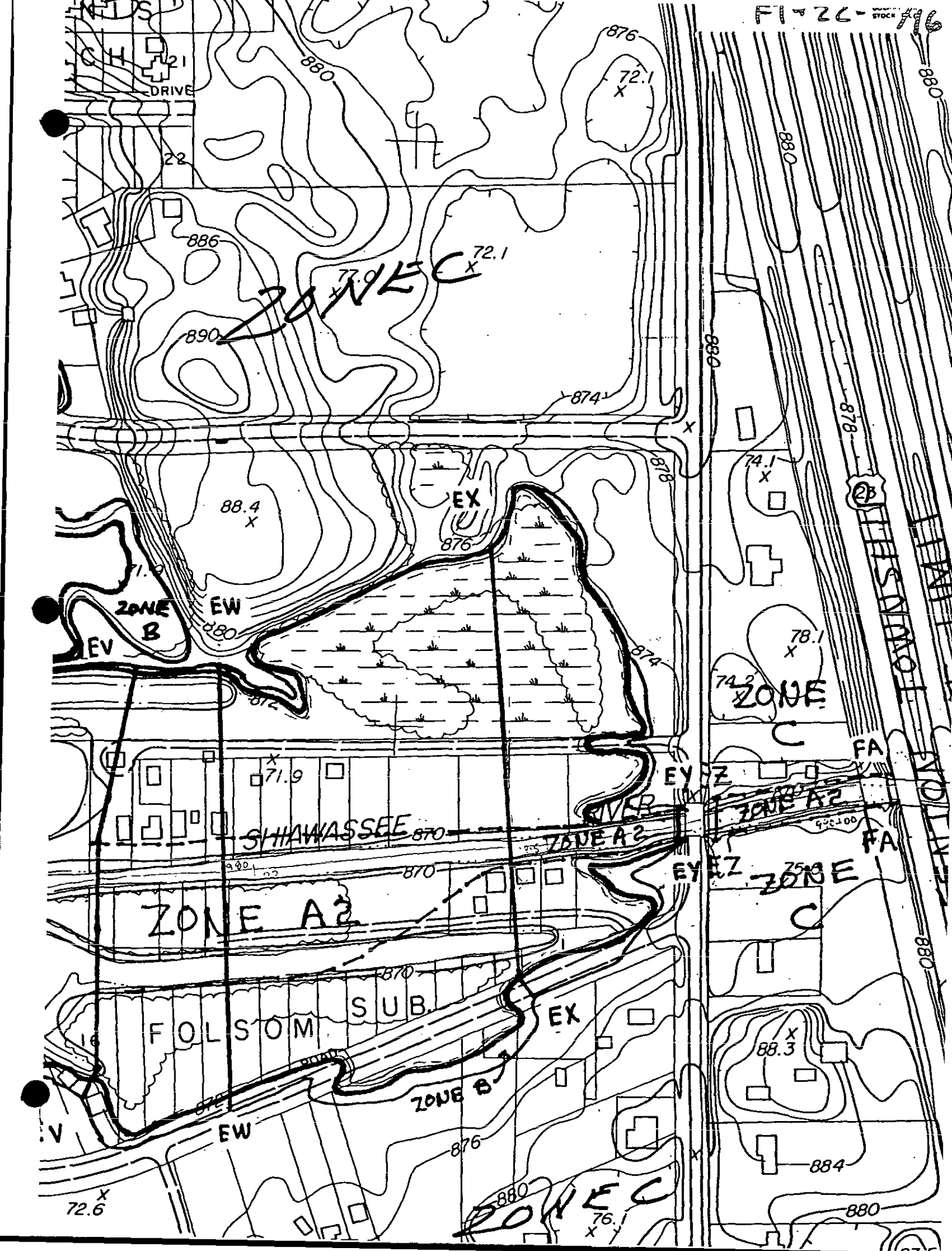

ZONE C
77.9
EP
EQ
ER
ES
ET
ZONE B
EN
74
EO
RIVER
ZONE
ZONE A1
A1
ZONE A2
TUPPER LAKE
ZONE C
75.9
ZONE B
EQ
876
ER
880
79.5
ZONE B
EC
ZONE A2
69.9
ZONE A2
69.2
870
880
68.2
ZONE B

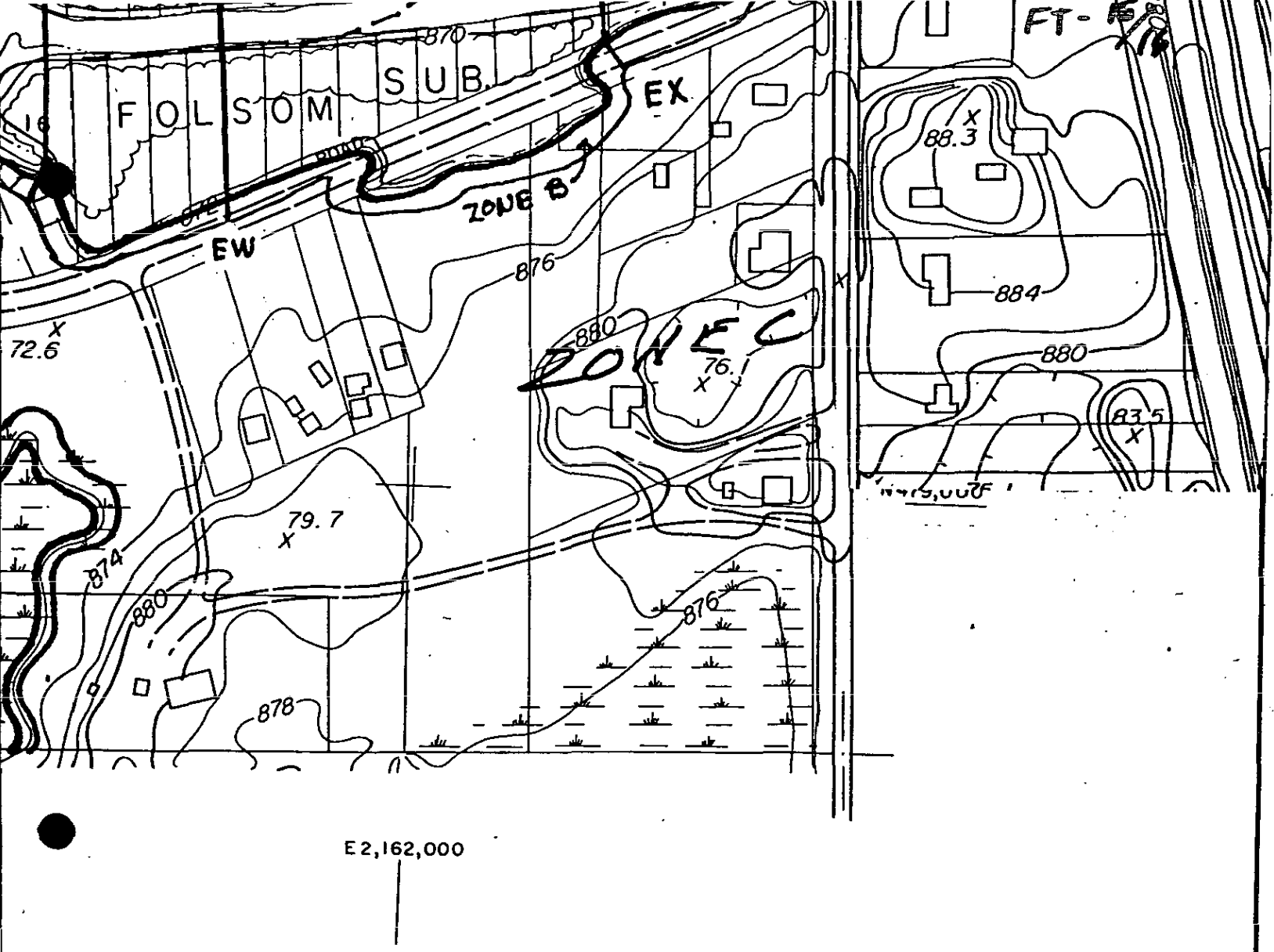
E2,155

FT-21-9/9



ZONE A
FT-21-7/9
69.9
915
LAKE
PC
920
ZONE A2
905
702
890
68.3
ZONE A2
FS
FT
FU
70.1
890
896
880
870
ZONE B
ZONE C


FI-22-
NELS
CH
21
DRIVE
22
876
880
72.1
886
77.9
ZONE C
890
874
878
74.1
88.4
EX
876
71.9
ZONE B
EW
EV
880
874
78.1
74.2
ZONE C
FA
EY
EZ
71.9
SHIAWASSEE
RIVER
870
ZONE A2
ZONE A2
ZONE C
ZONE A2
870
FOLSOM SUB.
EX
88.3
ZONE B
EW
876
884
72.6
880
ZONE C
76.1
880
HIGHLAND ROAD



COMPOSITE

OF

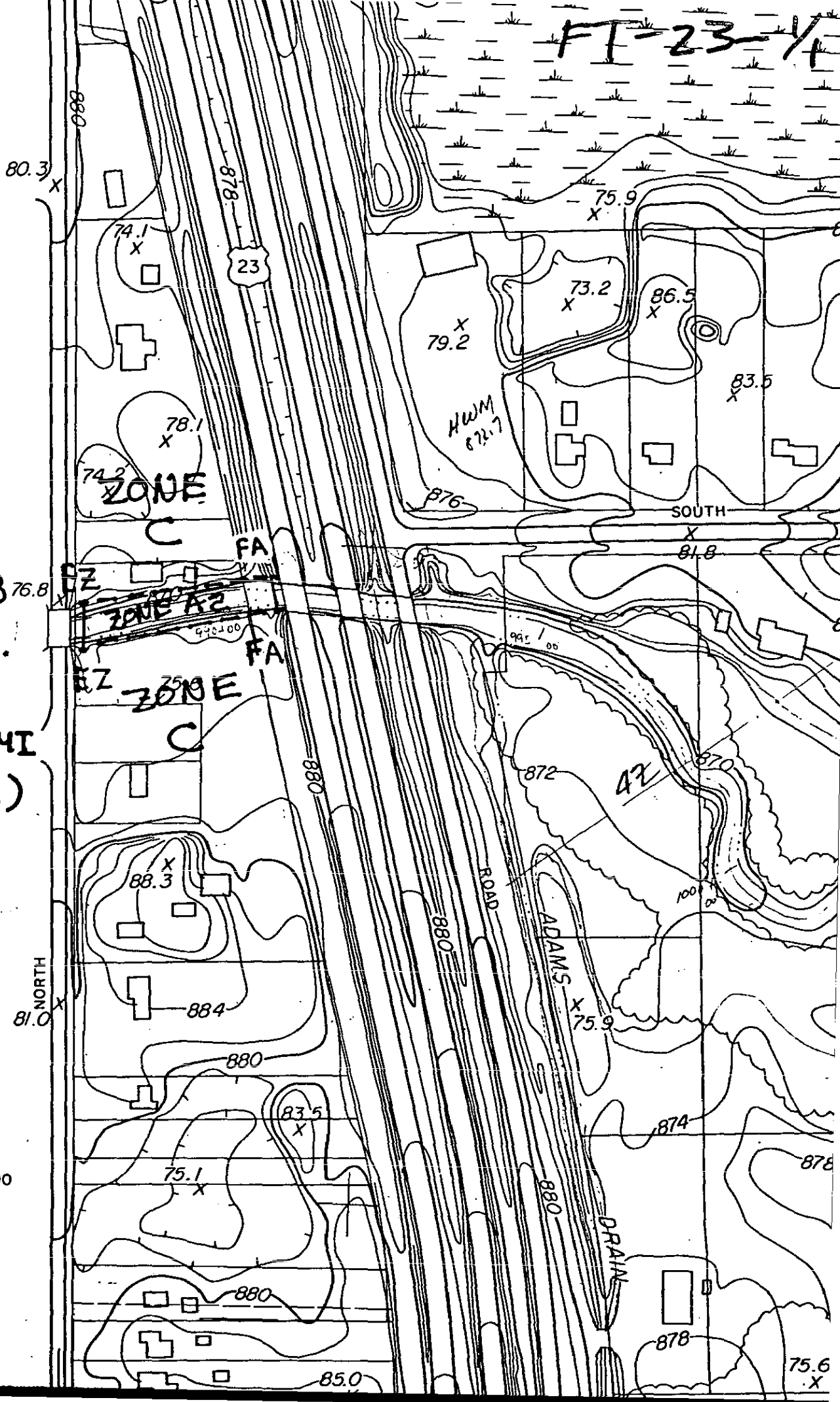
Section 22, T.5 N. R.6E., Fenton Twp., Genesee Co., Mich.

GENESEE COUNTY DRAIN COMMISSIONER

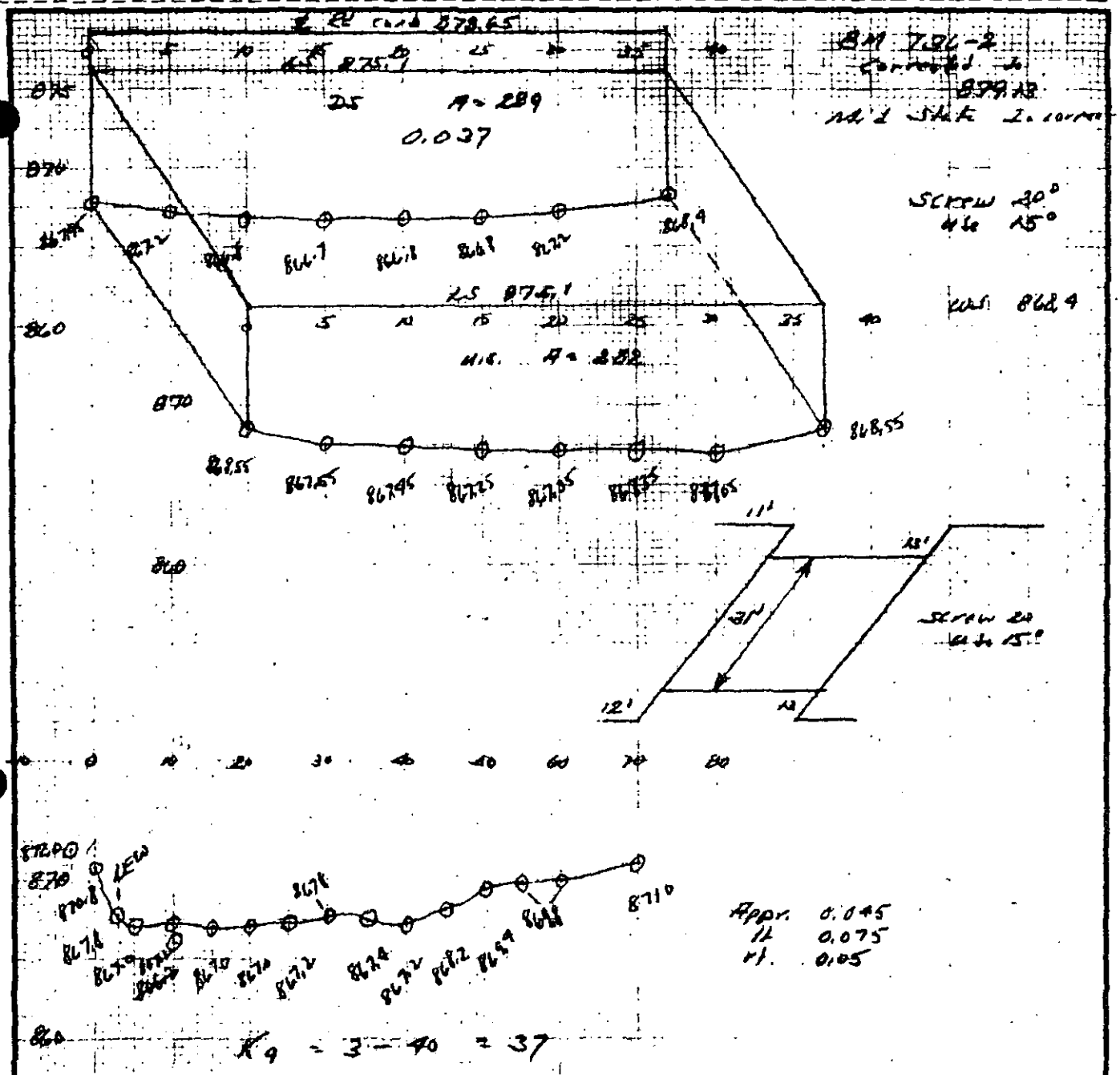
ANTHONY RAGNONE

Shiawasee 12

FT-23-1/1


SECTION 23
T.5N., R6E.
FENTON
TOWNSHIP, MI
(GENESEE Co.)
N480
N479,000
NORTH
SOUTH
ADAMS ROAD
DRAIN
23
ZONE C
ZONE A2
ZONE E
FA
FZ
HWM 872.7
42
80.3
76.8
81.0
74.1
78.1
74.2
75.9
73.2
86.5
79.2
83.5
81.8
88.3
83.5
75.1
85.0
75.6
880
878
876
872
870
874
884

Shiawassee River — Torrey Road



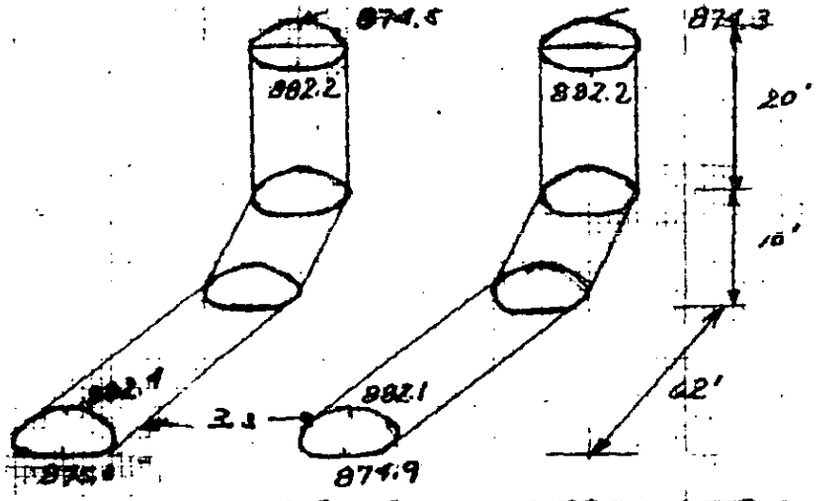
A cursory review of data provided by the DNR indicates that the HWM 1.3 below LS @ Torrey Rd 875.1 − 1.3 = 873.8 is probably incorrect. If the state had the nomenclature incorrect and this applies to North Rd 873.8 − 1.3 = 872.5 this would about 0.5 higher than known HWM. HWM by Hayes 1997 872 seems more correct than the 872.5 or 872.7 reported for 1975. CH Map of 872.7 could not occur.

Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

Shiawassee R — WATER RESOURCES DIVISION — North Road

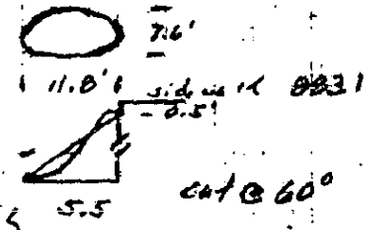
RM 23.9 Changed from 882.65 to 882.90

1975 flood was the highest known, exceeding the flood of 1947 by approximately [illegible] at rt and l. side of culvert.



Flow angular to roadway about 50° use 75°

Use 11'-5" x 7'-3"



Flag Pole Base elev 879.28 Probable

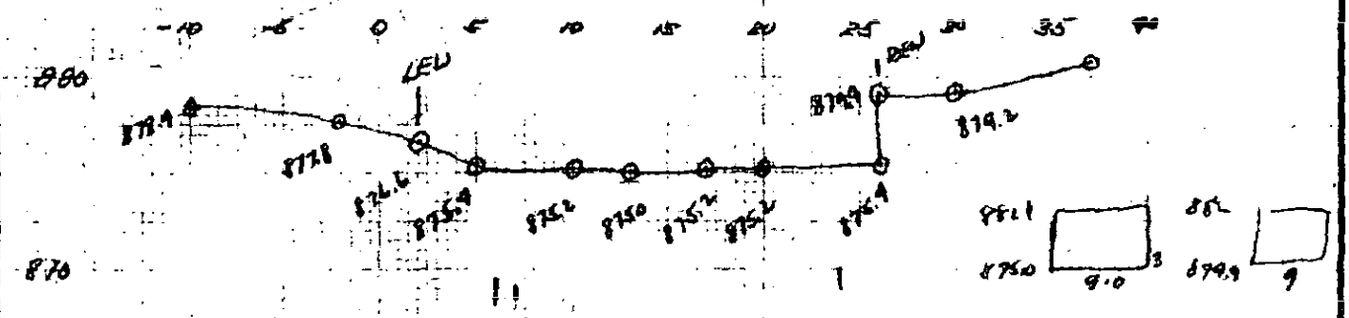
0.00 on Gage staff @ flag pole 881.23 -0.1 1975
881.13 1975

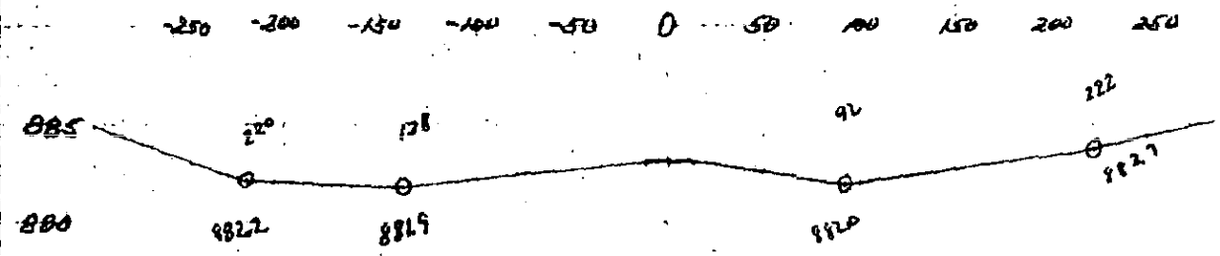
WS = 877.11

Hole @ Drive @ garage direct 881.16

DWR. RLR US wl - 18" below crown 878.5 882.1-1.5=880.6
ds wl 2' below crown 882.2 - 880.2

← See additional data on this.



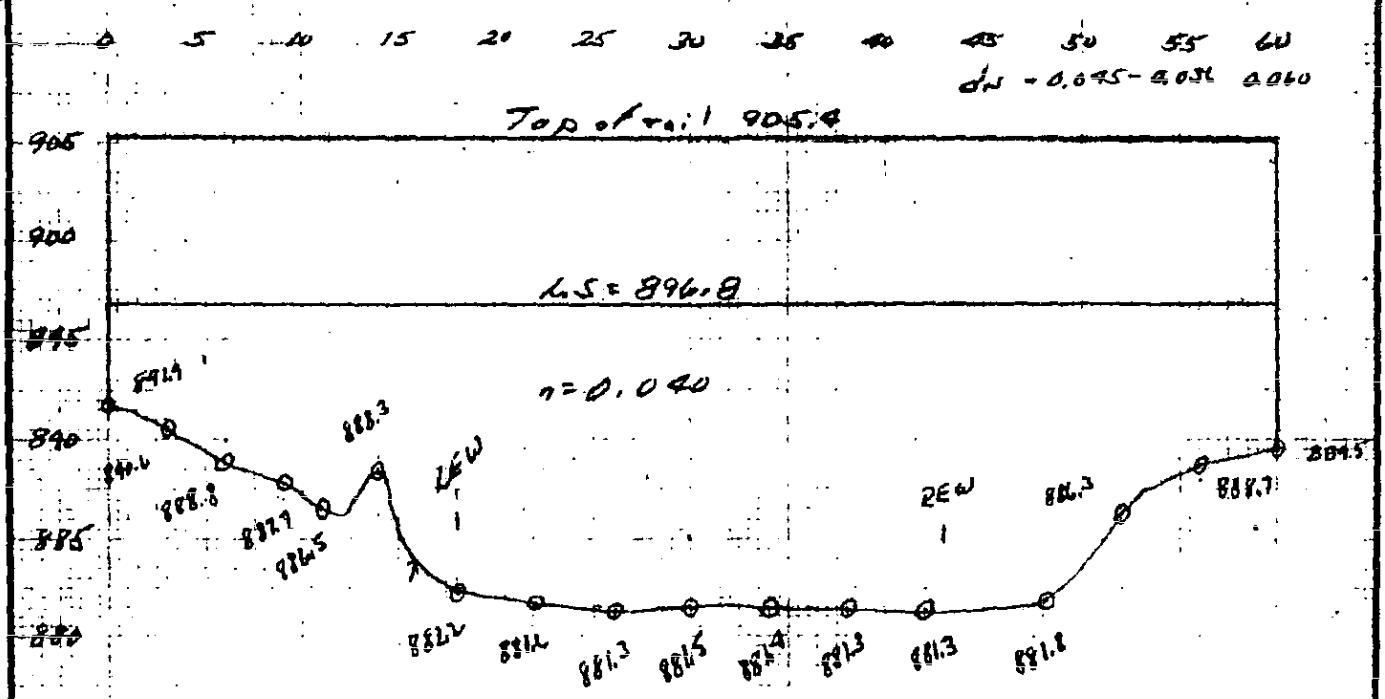


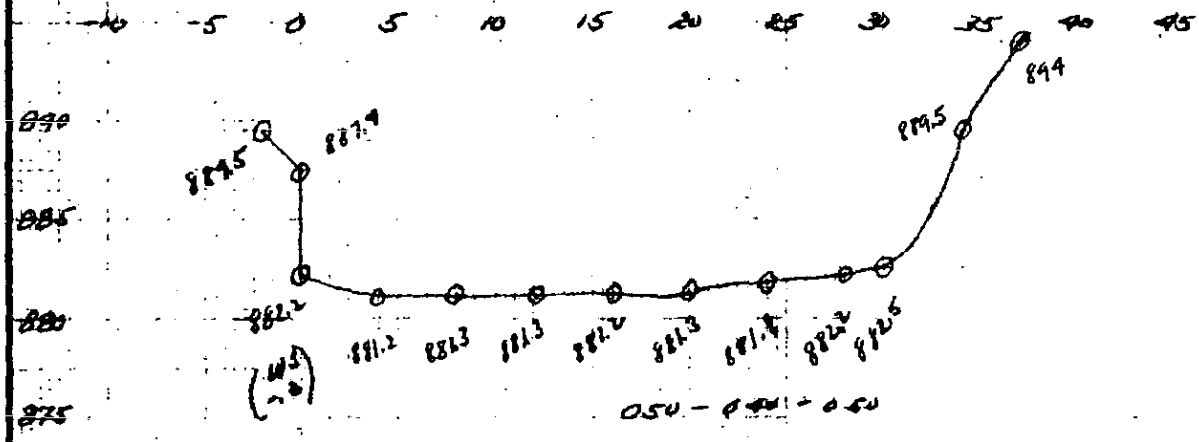
According to old time residents North Road has never overflowed. Roadway & culverts have been changed, but approach & rt of areas have not been inundated any higher than 75

Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

Shiawassee R. GTW RR Fenton

Rem: top of d.s. edge of concrete about 6in horizontal street at W. side of bridge at east abutment at first vertical concrete support 896.79 (Use for BM)





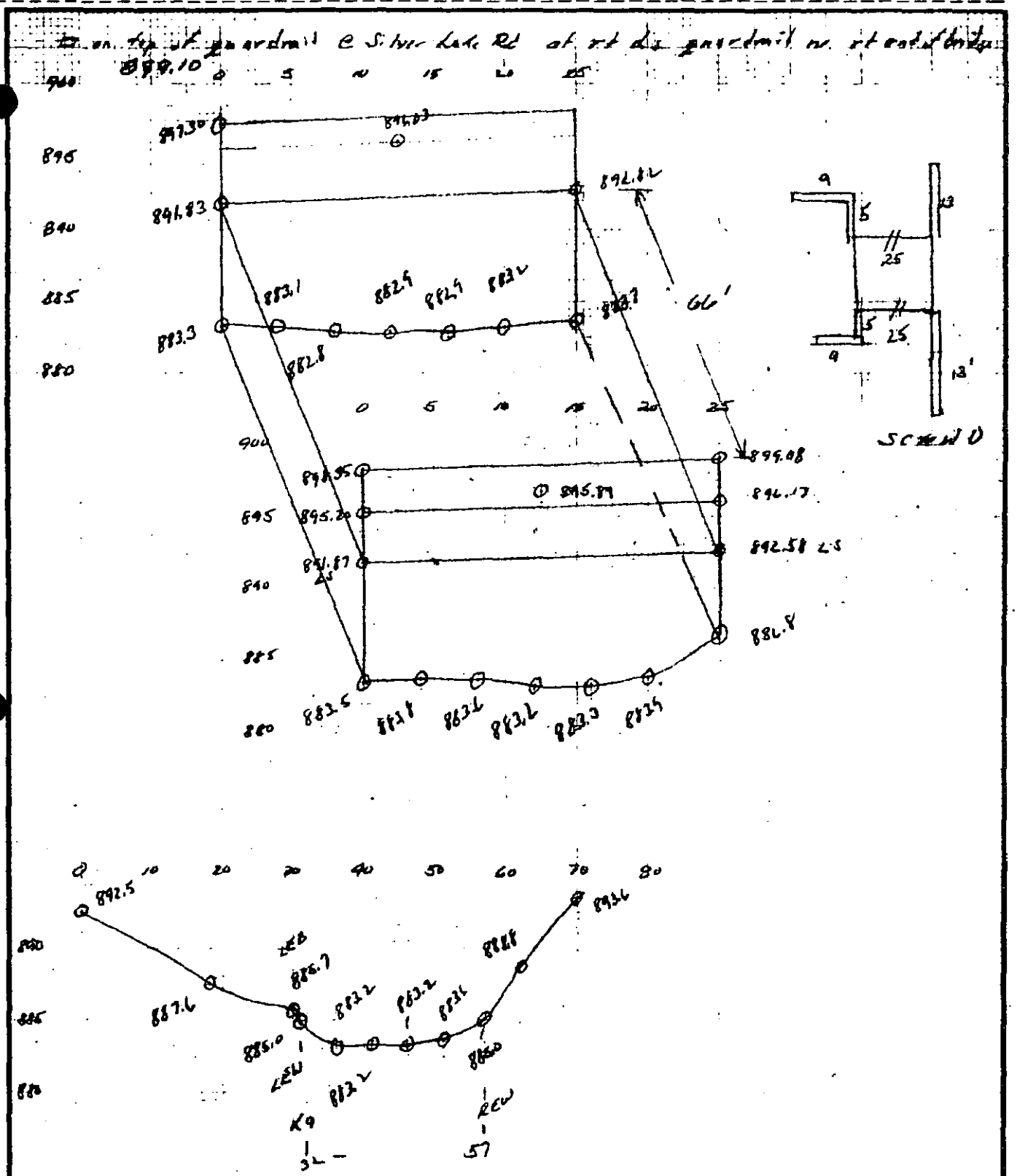
HWM - hard to come by in this reach
None available, most people didn't see river.

Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

Cross-section

GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

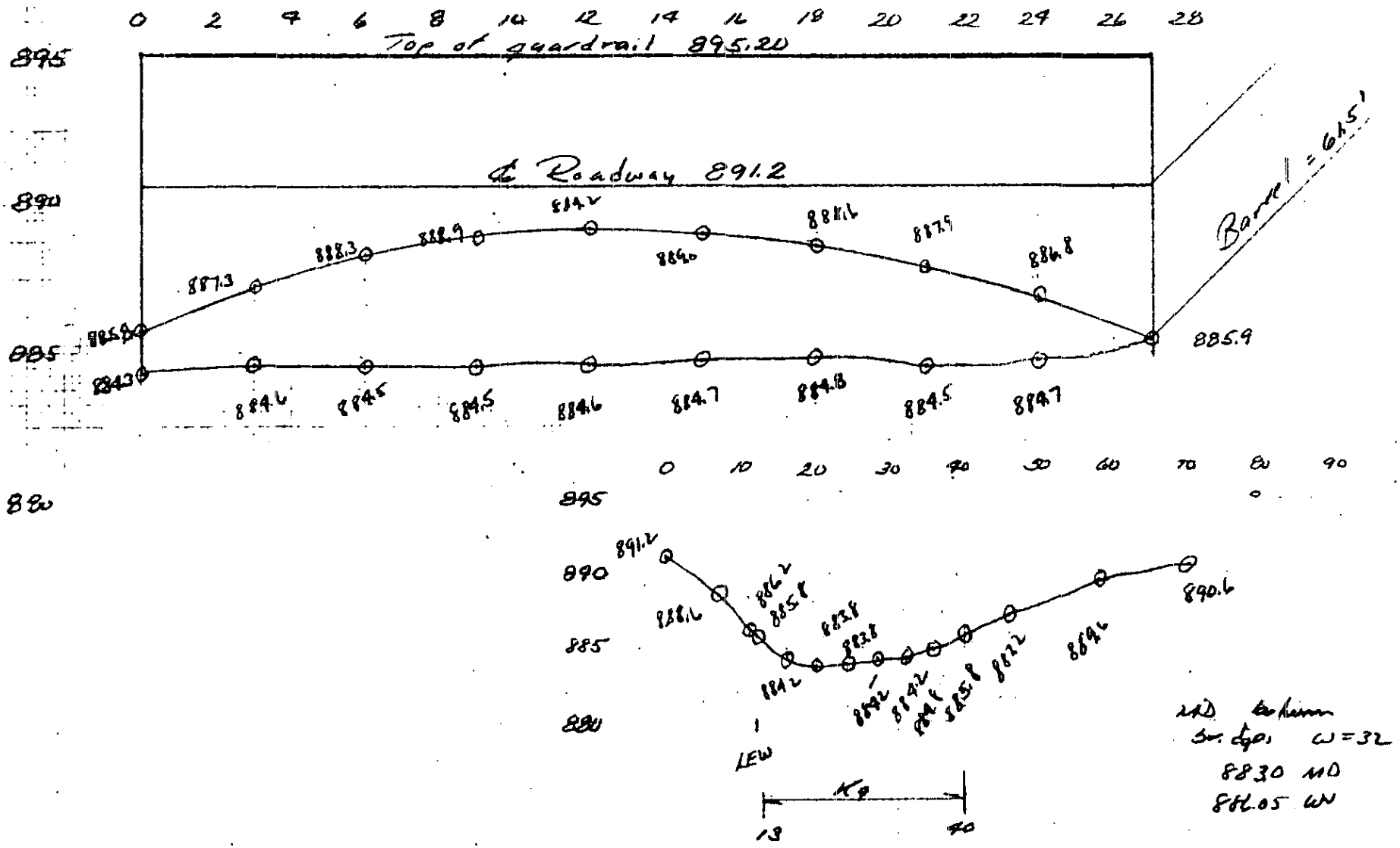
Silver Lake Rd — Skokomish River



Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

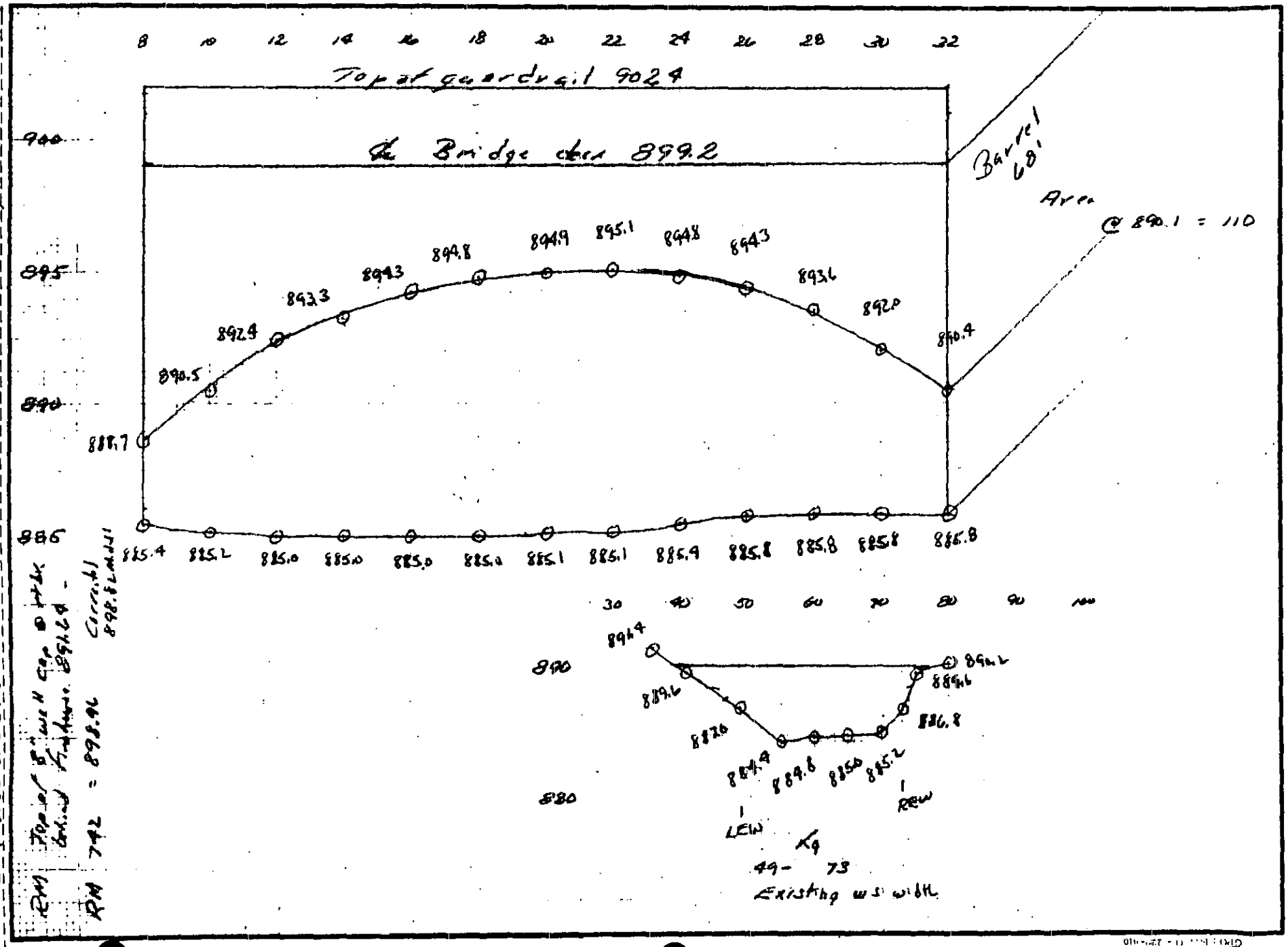
Shiawassee River — Centerline Bridge

WATER RESOURCES DIVISION

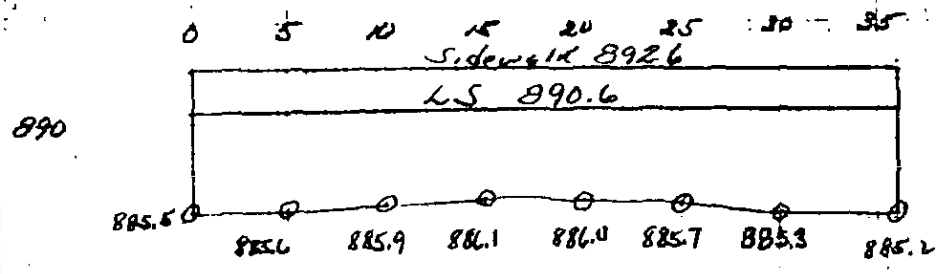


RM Top of first vertical guardrail post at left downstream side of Carolina St. Bridge 893.94

Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

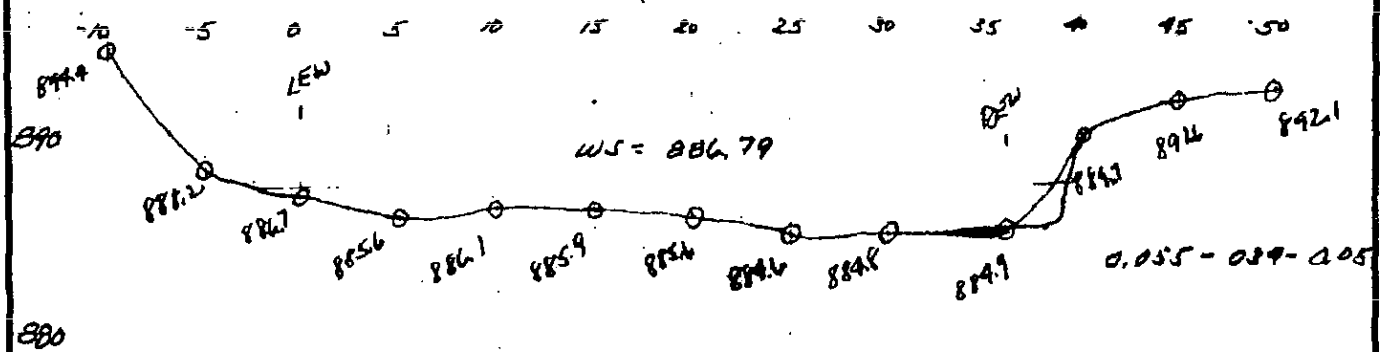

Le Roy Street
Top of guardrail 902.4
Bridge deck 899.2
Barrel 68'
Area
@ 890.1 = 110
8 10 12 14 16 18 20 22 24 26 28 30 32
900
895
890
885
888.7
890.5
892.4
893.3
894.3
894.8
894.9
895.1
894.8
894.3
893.6
892.0
890.4
885.4 885.2 885.0 885.0 885.0 885.0 885.1 885.1 885.4 885.8 885.8 885.8 885.8
30 40 50 60 70 80 90 100
890
880
894.4
889.6
887.0
884.9
889.8
885.0
885.2
886.8
894.2
889.6
LEW
REW
Kg
49- 73
Existing ws width
Skiawassee R
WATER RESOURCES DIVISION
RM 742 = 898.96
Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

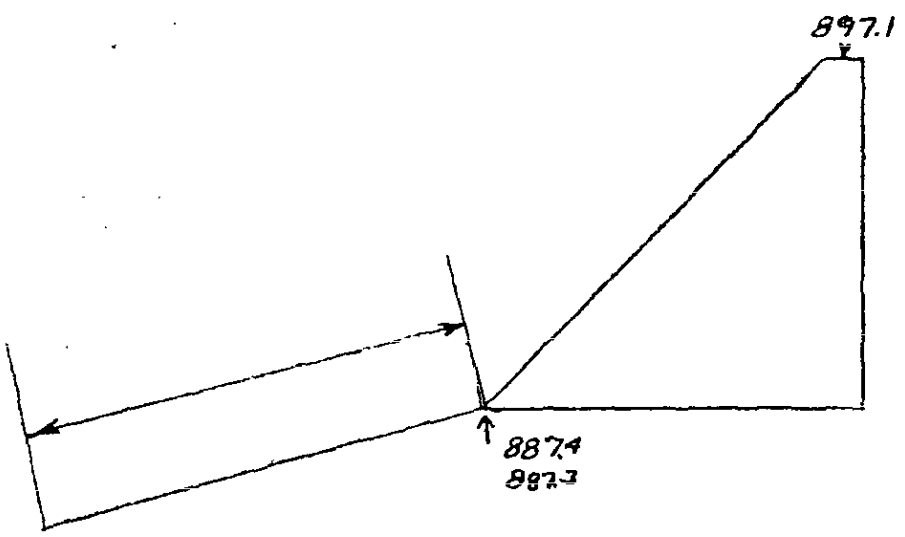
Note – Super critical flow @ Q50 + above



HWM also to low steel 890.6 whether or not this is the result of energy pickup is not known.

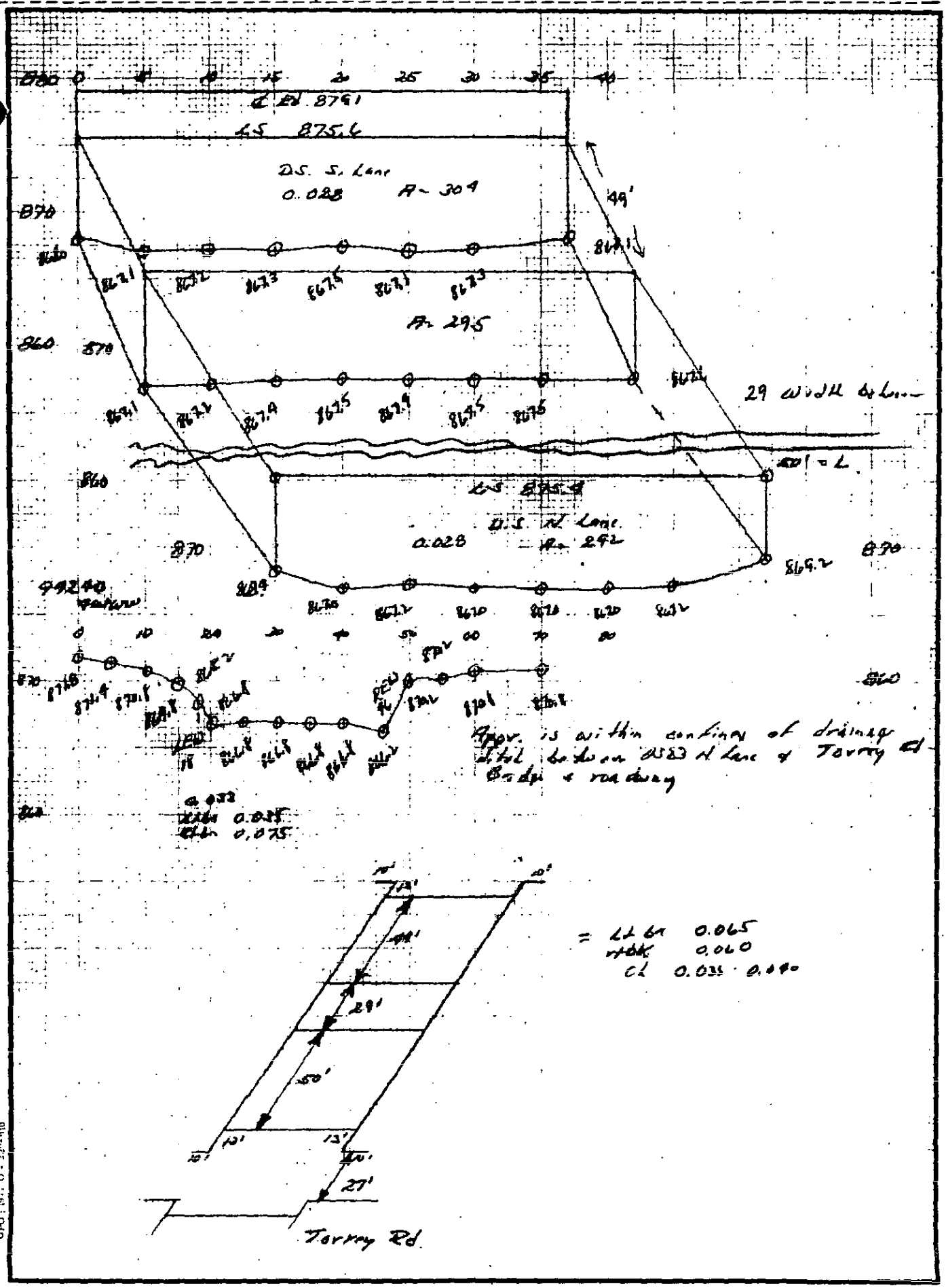
1975 Flood design @ approach 888.8





Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

Shiawassee River U.S. 23



Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

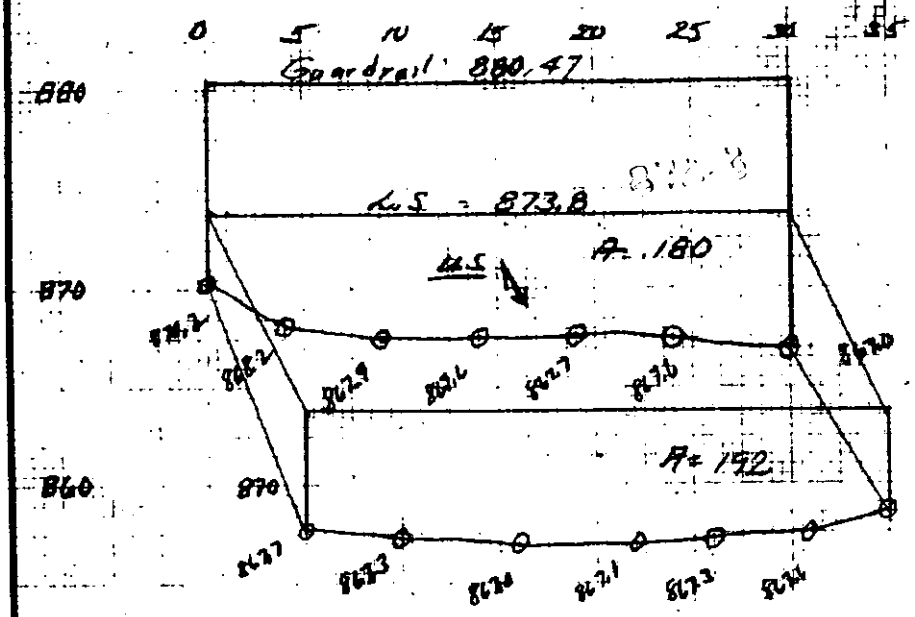
Top of 8" water rod set vertically on downstream side of bridge near end of U.S. 873.65

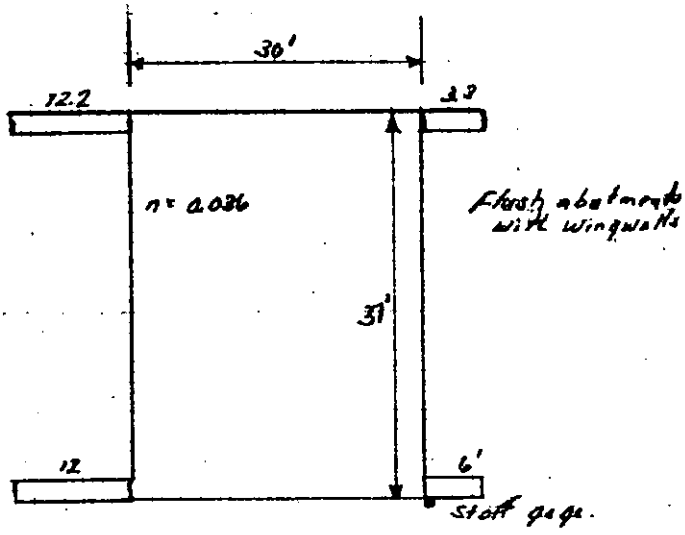
Same as above U.S. 873.07

BM on set r.b.w.s. guardrail N. side NE corner 880.00

Top of staff gage Lt d.s. abut. 872.82

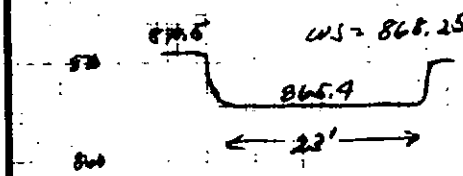
See other sheets for gage & HWMs



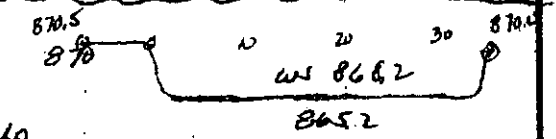


(98430) 4.35

Section d.s.



HWM about 872.6 - 872.1
Road overflow entire left & right bank, lake effect



Section 860 north

HWM 872.2 - 0.2 - 0.3
872.9 872.0

Use entire width for flood plain

(97730) 4.5

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FLOOD
INSURANCE
STUDY

RECEIVED
JUN 07 1979
WATER MANAGEMENT

TOWNSHIP OF FENTON, MICHIGAN GENESEE COUNTY

JUNE 1979

U.S. DEPARTMENT OF HOUSING & URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

TABLE OF CONTENTS

		Page
1.0	INTRODUCTION	1
	1.1 Purpose of Study	1
	1.2 Authority and Acknowledgments	1
	1.3 Coordination	2
2.0	AREA STUDIED	2
	2.1 Scope of Study	2
	2.2 Community Description	4
	2.3 Principal Flood Problems	6
	2.4 Flood Protection Measures on Shiawassee River	6
3.0	ENGINEERING METHODS	7
	3.1 Hydrologic Analyses	8
	3.2 Hydraulic Analyses	9
4.0	FLOOD PLAIN MANAGEMENT APPLICATIONS	11
	4.1 Flood Boundaries	12
	4.2 Floodways	13
5.0	INSURANCE APPLICATION	16
	5.1 Reach Determinations	17
	5.2 Flood Hazard Factors	18
	5.3 Flood Insurance Zones	18
	5.4 Flood Insurance Rate Map Description	20
6.0	OTHER STUDIES	20
7.0	LOCATION OF DATA	22
8.0	BIBLIOGRAPHY AND REFERENCES	23

TABLE OF CONTENTS--Continued

Page

FIGURES

Figure 1 - Vicinity Map 3

2 - Floodway Schematic 17

TABLES

Table 1 - Summary of Discharges 9

2 - Summary of Elevations 11

3 - Floodway Data 14

4 - Flood Insurance Zone Data 21

EXHIBITS

Exhibit 1 - Flood Profiles

Shiawassee River . . . . . .

2 - Flood Boundary and Flood Map Index . . . . . .

Flood Boundary and Floodway Map . . . . . .

3 - Elevation Reference Marks 25

PUBLISHED SEPARATELY:

Flood Insurance Rate Map Index

Flood Insurance Rate Map

FLOOD INSURANCE STUDY
TOWNSHIP OF FENTON, MICHIGAN

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Township of Fenton, Genesee County, Michigan, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert the Township of Fenton to the regular program of flood insurance by the Federal Insurance Administration (FIA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these Federally-supported studies are based. These criteria take precedence over the minimum Federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 24 CFR, 1910.1(d). In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgments

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by the U.S. Geological Survey, for the Federal Insurance Administration, under Inter-Agency Agreement No. IAA-H-8-76, Project Order No. 11. This study was completed in June 1979.

1.3 Coordination

Streams requiring detailed study were identified at a meeting attended by representatives of the U.S. Geological Survey (USGS), the FIA, and representatives of the Township of Fenton in January 1976. Results of the hydrologic and hydraulic analyses were coordinated with the Michigan Department of Natural Resources and the Genesee County Drain Commission.

On _____ the results of the study were reviewed and accepted at the final coordination meeting attended by personnel of the USGS, the FIA, and community officials.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Township of Fenton. The area of study is shown on the Vicinity Map (Figure 1).

The areas studied by detailed methods were selected with priority given to all known flood hazard areas, and areas of projected development or proposed construction for the next five years, through June 1984. Approximate methods of analysis were used to study those areas having a low development potential or a minimal flood hazard. The scope and methods of study were proposed to and agreed upon by the FIA and the Township of Fenton. Although development is occurring, if it continues at its present rate, it probably will not have any significant effect on peak flows or increased lake stages thru June 1984.

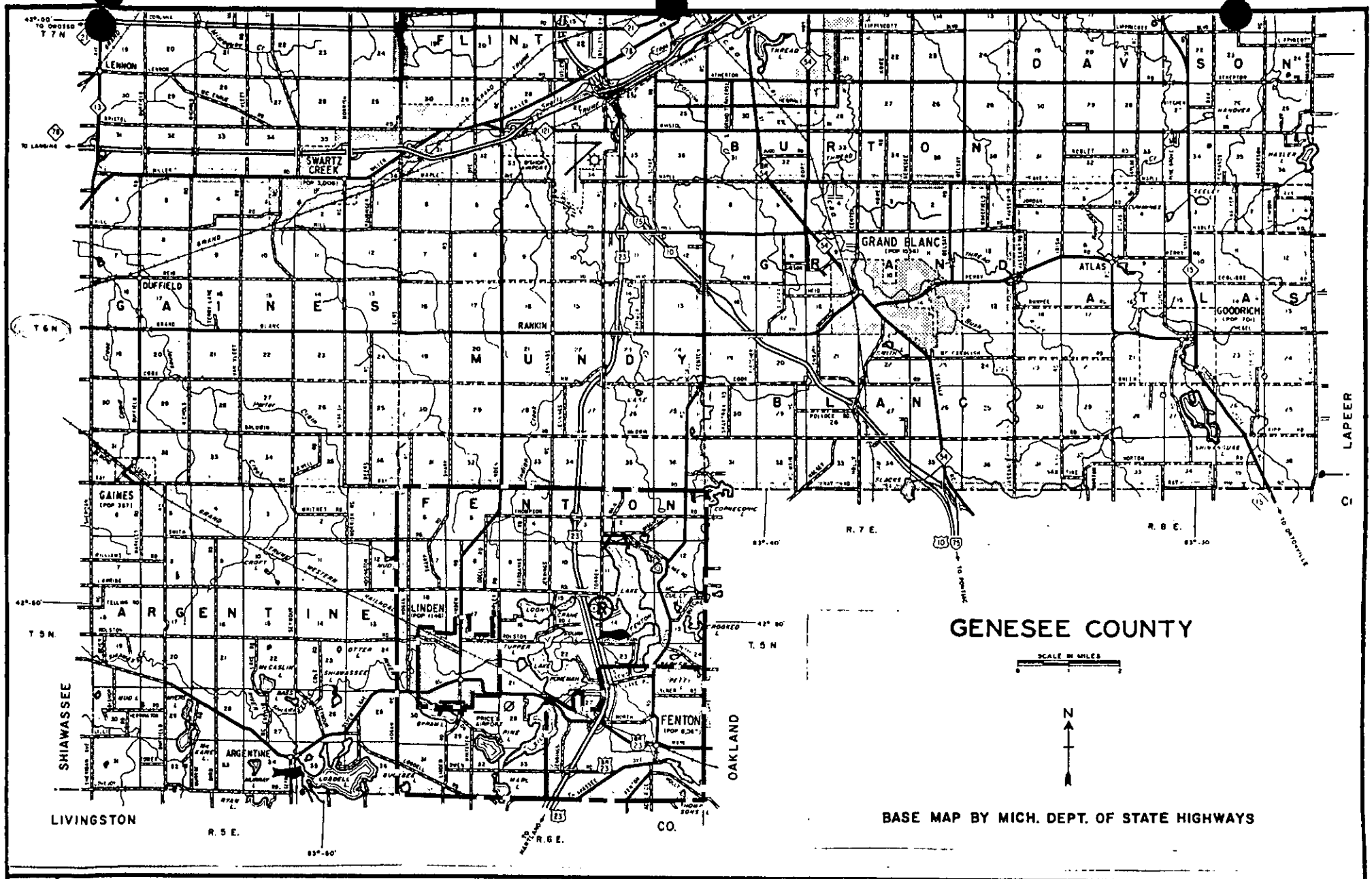


FIGURE 1

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration
TOWNSHIP OF FENTON, MI
(GENESEE CO.)

VICINITY MAP

Shiawassee River, Silver Lake, Lake Ponemah, Squaw Lake, and Tupper Lake were studied in detail and Crane Lake, Loon Lake, Lake Fenton, MuCully Lake, Crooked Lake, Copneconic Lake, and Swartz Creek were studied by approximate methods for their respective lengths within the corporate limits of the community.

2.2 Community Description

The Township of Fenton is located in the southeast part of Michigan's Lower Peninsula in southwest Genesee County. It is approximately 50 miles northwest of Detroit, and 15 miles southwest of Flint.

Total land area within the corporate limits is 26.9 square miles. According to U.S. Census Bureau figures, the population of the Township of Fenton has decreased from 12,761 in 1960 to 8,850 in 1970, a decrease of 31 percent (Reference 1). Some of this decrease occurred because parts of the township were annexed by the Village of Linden and the City of Fenton.

Transportation facilities serving the area include Interstate Highways 96, 75, and 69, and U.S. Highway 23. Bishop Airport, the major airport in the area, is located eight miles to the northeast. The Grand Trunk Western Railroad also serves the area.

The climate of this area is modified somewhat by its proximity to the Great Lakes, which have a cooling effect during the summer and a warming effect during the winter. The mean annual temperature of the area is about 47°F. The maximum recorded temperature, 108°F, occurred on July 13, 1936; the minimum, -28°F, occurred on February 16, 1916. Average annual precipitation is about 30 inches, about 65 percent of which occurs during the period of April through September. Annual snowfall for the area averages about 45 inches (Reference 2).

The area is under the influence of atmospheric disturbances that move eastward across the country causing violent windstorms associated with thunderstorms and squall lines. Twenty-four-hour rainfalls in excess of 6 inches have been recorded. Monthly rainfall of more than 11 inches occurred in August 1975, and more than 8 inches has occurred several times.

The land surface of the Township of Fenton ranges from level to gently undulating. Surface deposits are primarily moraines and ground moraines composed of tight clay and silt loam that generally have low permeability. Along the Shiawassee River, however, the deposits are principally glacial outwash (Reference 3).

Natural drainage along the Shiawassee River is poorly developed. Drains have been dug and portions of some streams channelized to improve drainage. Within the flood plains studied, development consists mainly of single family residences and a few private businesses.

2.3 Principal Flood Problems

Flooding is principally the result of overbank flow from the Shiawassee River, Swartz Creek and high lake levels.

Major flooding occurred in April 1947 and April 1975. Based on gaging station analysis and a field survey of areas inundated, these storms are believed to have had an equal magnitude and approached a 100-year event. Extensive property damage and transportation interruptions resulted from the flood in 1975 due to development in the flood plain.

2.4 Flood Protection Measures on Shiawassee River

As part of a flood control project, the Linden Mill Pond Dam was constructed in 1967 in the Village of Linden to replace the old dam that had deteriorated. The design included regulation of lake levels on Ponemah, Squaw and Tupper lakes. Spillway capacity of the new dam is sufficient to discharge over 2,000 cfs through the tainter gate prior to embankment overflow (Reference 12). The Linden Mill Pond Dam, operated by the Genesee County Drain Commission, completely regulates the level of Linden Mill Pond within the Village of Linden.

Proposed flood control projects of 1960 (Reference 16) and 1975 (Reference 18) included design channelization from the Linden Mill Pond Dam to Lake Ponemah. This channelization was to provide the increased channel conveyance necessary to lower the levels of Ponemah, Squaw, and Tupper lakes during periods of severe flooding. This portion of the flood control project has not been completed except for the dredging of the bridge opening of Grand Trunk Western Railroad, and the installation in December 1978 of a new highway bridge at Ripley Road. Should the channelization be completed at some future date, the Linden Mill Pond Dam would pass flood flows more effectively.

The Shiawassee River basin is studded with numerous small lakes and ponds. Because of this large natural storage in relation to the size of the basin, flood peaks are reduced.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10, 50, 100, or 500 year period (recurrence intervals), have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10, 50, 100, and 500 year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equalled or exceeded during any year. Although the recurrence interval represents the long term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (one percent chance of annual occurrence) in any 50 year period is about 40 percent (four in ten). and for any 90 year period, the risk increases to about 60 percent (six in ten). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationship for floods on the Shiawassee River, which was the only stream studied by detailed methods in the community.

Peak discharge estimates were developed using the following hydrologic analyses: (1) a log-Pearson Type III distribution analysis of annual peak flow data for the Shiawassee River at the Byron USGS gage No. 04144000, with 31 years of record, in Byron, Michigan, and the Linden USGS gage No. 04143900, with 11 years of record; on Hogan Road in Fenton Township (Reference 4 and 5); (2) application of regional relations between basin characteristics and streamflow characteristics (Reference 6); (3) flood magnitude-frequency relations developed by the U.S. Geological Survey (Reference 7); (4) regional relationships of streamflow to drainage area and population density developed by Brater (Reference 8); (5) ratios between the mean annual peak discharge and the 50-year and 100-year discharges (Reference 9); and (6) confirmation of flood profiles by high-water marks obtained from field survey.

Peak discharges for the 10-, 50-, 100-, and 500-year floods on the Shiawassee River are shown in Table 1.

TABLE 1: SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK-DISCHARGE (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
SHIAWASSEE RIVER					
At Hogan Road	80.3 ✓ OK	380	530	590	720
At North Road	66.3	290	400	450	560
Torrey Road	62.4 ?	290	400	450	560

3.2 Hydraulic Analysis

Analyses of the hydraulic characteristics of the Shiawassee River, studied in detail in the Township of Fenton, were carried out to compute elevations of floods of the selected recurrence interval.

Cross section data for the backwater analyses of Shiawassee River were obtained by field survey and from 2-foot interval contour maps having a scale of 1:2400 (Reference 10). All bridges, dams, and culverts were field surveyed to obtain elevation data and structural geometry.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles. For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the Flood Boundary and Floodway Map.

Channel roughness factors (Manning's "n") used in the hydraulic computations, were chosen by engineering judgment and based on field observations of the channel and flood plain areas. Roughness values for the main channel of the Shiawassee River ranged from 0.036 to 0.060 and flood plain roughness values ranged from 0.050 to 0.150 for all floods. The acceptability of all assumed hydraulic factors, cross sections, and hydraulic structural data was checked by computations that duplicated historic flood information.

Water-surface elevations of floods of the selected recurrence intervals were computed through the use of the U.S. Geological Survey's E-431 step-backwater computer program (Reference 11). Flood profiles were drawn showing computed water surface elevations for floods of the selected recurrence intervals. Starting water-surface elevations for the Shiawassee River at the west corporate limit were obtained from the portion of the Shiawassee River in the adjacent Township of Argentine, where a flood insurance study is also being prepared (Reference 14).

Starting elevations for the step-backwater analyses above Ripley Road were flood elevations obtained for Linden Mill Pond by flow over dam computations (Reference 12). Legal levels have been proposed for Linden Mill Pond but have not been finalized, therefore the operation of the tainter gates on the dam has been variable. Current practices in the operation of the gates can reduce the level of Linden Mill Pond within hours of the first evidence of increased runoff, thus, flooding problems have been reduced for the pond. In the design for frequency-elevation relationships, the normal operating levels were incorporated with levels for flow-over dam computations for the current operation.

A summary of the frequency-elevation relationships for Lake Ponemah, Squaw Lake, Tupper Lake and Silver Lake in the community are presented in Table 2, "Summary of Elevations."

TABLE 2: SUMMARY OF ELEVATIONS

FLOODING SOURCE AND LOCATION	ELEVATION ABOVE NGVD 10-YEAR	50-YEAR	100-YEAR	500-YEAR
Lake Ponemah	871.0	871.6	871.9	872.3
Squaw Lake	871.0	871.6	871.9	872.3
Tupper Lake	~~821.0~~ 871.0	871.6	871.9	872.3
Silver Lake	871.6	872.1	872.4	873.0

Approximate methods were used to determine the 100-year flood boundaries for Swartz Creek, and for Crane Lake, Loon Lake, Lake Fenton, McCully Lake, and Crooked Lake. Boundaries for the 100-year flood were based on analysis of peak discharge data for Swartz Creek at USGS gage number 04148200, with 22 years of record, near Holly, Michigan, and a regional stage-frequency felationship. Historic flood information was used to confirm flood boundaries.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced from the National Geodetic Vertical Datum of 1929 (NGVD), formerly referred to as Sea Level Datum of 1929. Elevation reference marks used in this study are shown on the maps.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study includes a Flood Boundary and Floodway map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the FIA as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100- and the 500-year floods have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:2,400 with a contour interval of two feet (Reference 10).

The boundaries of the 100- and 500-year floods are shown on the Flood Boundary and Floodway Map (Exhibit 2). Small areas within the flood boundaries may lie above the flood elevations, and therefore, may not be subject to flooding. Owing to limitations of the map scale and/or lack of detailed topographic data, such areas are not shown. In cases where the 100- and the 500-year flood boundaries are close together, only the 100-year boundary has been shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood may be carried without substantial increases in flood heights. Minimum standards of the FIA limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. In Michigan though, under Michigan Act 245, Public Acts of 1929, as amended by Act 167, Public Acts of 1968, encroachment in the flood plain is limited to that which will cause only an insignificant increase in flood heights. Thus, at the recommendation of the Bureau of Water Management, a floodway having no more than a 0.1 foot surcharge has been delineated for this study.

The floodways presented in this study were computed on the basis of equal conveyance reduction from each side of the flood plain. No encroachment was permitted within the low water channel. Additionally, attempts were made to obtain uniform floodway widths along the stream channels. The results of these computations were tabulated at selected cross sections for each stream segment for which a floodway was computed (Table 3).

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
Cross Section	Distance 1/	Width (ft.)	Section Area (Sq. ft)	Mean Velocity (F.P.S.)	With Floodway (NGVD)	Without Floodway (NGVD)	Difference (ft.)
Shiawassee River							
CZ	65,810	75	225	2.89	852.21	852.16	0.05
DA	66,480	200	787	.83	852.86	852.82	.04
DB	67,050	100	326	1.81	853.05	853.00	.05
DC	67,130	120	486	1.21	853.23	853.20	.03
DD	67,560	200	706	.84	853.39	853.35	.04
DE	67,950	100	320	1.84	853.53	853.49	.04
DF	68,470	130	384	1.54	853.89	853.86	.03
DG	68,510	87	473	1.25	854.10	854.09	.01
DH	69,230	300	925	.64	854.29	854.24	.05
DI	69,810	300	1,131	.52	854.36	854.32	.04
DJ	70,240	400	1,604	.37	854.39	854.35	.04
DK	70,500	500	1,682	.35	854.39	854.35	.04
DL	71,610	750/720 2/	2,264	.26	854.44	854.39	.05
DM	72,380	400	1,372	.43	854.48	854.43	.05
EJ	87,030	100	321	1.40	869.10	869.00	.10
EK	87,440	100	226	1.99	869.35	869.28	.07
EL	87,880	100	201	2.24	870.02	870.00	.02
EM	88,060	84	164	2.74	870.41	870.40	.01
EN	88,490	100	231	1.95	871.19	871.19	.00
EO	88,680	100	266	1.69	871.44	871.44	.00
EP	88,930	100	305	1.48	871.63	871.63	.01
EQ	89,290	100	400	1.12	871.86	871.81	.05
ER	89,450	--	--	--	871.92	871.84	.08
ES 3/	90,600	--	--	--	871.95	871.86	.09
ET	90,860	--	--	--	871.95	871.86	.09
EU	91,010	--	--	--	871.95	871.86	.09
EV	97,730	250	758	.59	871.95	871.86	.09
EW	97,950	250	770	.58	871.99	871.90	.09

1/ Feet above confluence with South Branch Shiawassee River.
2/ Width/width within corporate limits.
3/ No encroachment on flood plain within Lake Ponemah and Tupper Lake

TABLE 3

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration
TOWNSHIP OF FENTON, MI
(GENESEE CO.)

FLOODWAY DATA

SHIAWASSEE RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
Cross Section	Distance 1/	Width (ft.)	Section Area (Sq. ft)	Mean Velocity (F.P.S.)	With Floodway (NGVD)	Without Floodway (NGVD)	Difference (ft.)
Shiawassee River							
EX	98,430	60	295	1.52	872.10	872.01	0.09
EY	98,740	60	214	2.11	872.28	872.20	.08
EZ	98,800	70	219	2.06	872.40	872.32	.08
FA	99,100	49	201	2.24	872.55	872.49	.06

1/ Feet above confluence with South Branch Shiawassee River.

TABLE 3

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration
TOWNSHIP OF FENTON, MI
(GENESEE CO.)

FLOODWAY DATA

SHIAWASSEE RIVER

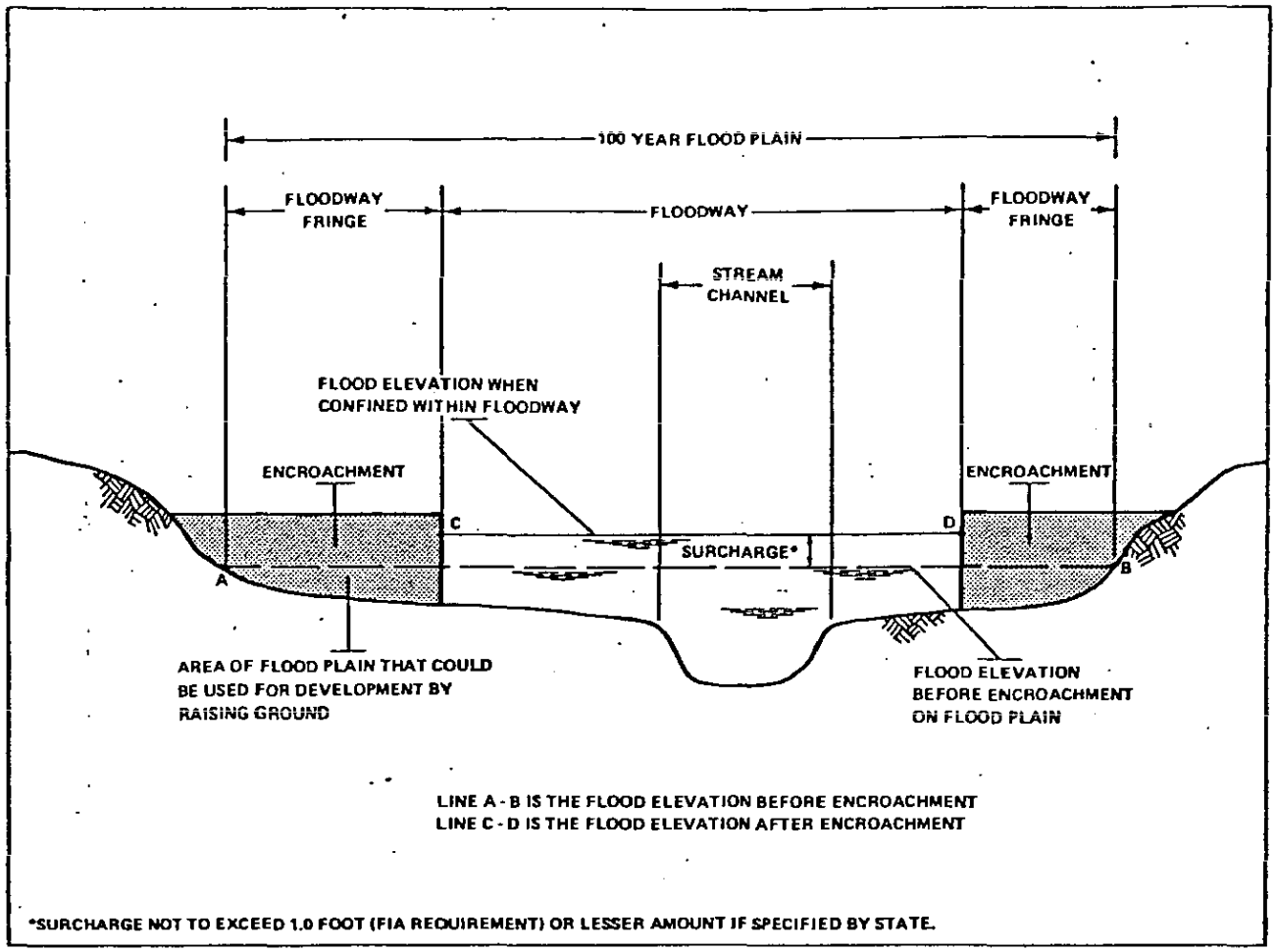
As shown on the Flood Boundary and Floodway Map (Exhibit 2), the floodway boundaries were determined at cross sections; between cross sections, the boundaries were interpolated. In cases where the boundaries of the floodway and the 100-year flood are either close together or collinear, only the floodway boundary has been shown. Along Lake Ponemah, Squaw Lake, Tupper Lake, and Silver Lake, the proposed floodway is at the normal water level.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water surface elevation of the 100-year flood more than 0.1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.

The floodways in this report are presented to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FIA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHFs), and corresponding flood insurance zone designations for each significant flooding source affecting the Township of Fenton.



FLOODWAY SCHEMATIC FIGURE 2

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than 0.5 foot for more than 20 percent of the reach.

Three reaches meeting the above criteria were required for the Shiawassee River in the Township of Fenton. The locations of the reaches are shown on the Flood Profiles (Exhibit 1).

5.2 Flood Hazard Factors (FHFs)

The Flood Hazard Factor is used to correlate flood information with insurance rate tables. Correlations between property damages from floods and their assigned FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three-digit code. For example, if the difference between the water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year flood water-surface elevations is greater than 10.0 feet, the accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire incorporated area of Township of Fenton was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zone A.:	Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods, no base flood elevations shown or FHFs determined.

Zone A1, A2:	Special Flood Hazard Areas inundated by 100-year floods, determined by detailed methods; base flood elevations shown, and zones assigned according to FHFs.
Zone B:	Areas between the Special Flood Hazard Areas and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; or, areas subject to 100-year flooding from sources with drainage areas of less than one square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flood hazard.

Table 4, "Flood Insurance Zone Data," summarizes the flood elevation difference, FHFs, flood insurance zones, and base flood elevations for each flooding source studies in detail in the community.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Township of Fenton is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FIA.

6.0 OTHER STUDIES

Flood insurance studies are currently being conducted for the following adjacent communities: Township of Argentine (Reference 14), Township of Mundy (Reference 13), Village of Linden (Reference 19), and City of Fenton (Reference 20).

In 1947, the State of Michigan prepared a report entitled "Ponemah Lake Level Control" (Reference 15). In 1960, a consulting firm produced a report called "Preliminary Report on Regulation of Water Levels on Certain Lakes in Fenton Township" (Reference 16). In 1966, the U.S. Army Corps of Engineers prepared a report entitled "Flood Control of Lake Ponemah" (Reference 17). And in 1975, a consulting firm prepared a paper entitled "Report on Shiawassee River Flood Control" (Reference 18).

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCES[2] BETWEEN 1.0% (100-year) Flood and			FHF	ZONE	BASE FLOOD ELEVATION[3]
		10% (10-YR)	2% (50-YR)	0.2% (500-YR)			
SHIAWASSEE RIVER							
REACH 1		-1.0	-0.3	0.5	010	A2	VARIES--SEE MAP
REACH 2		-0.7	-0.2	0.4	005	A1	VARIES--SEE MAP
REACH 3		-0.8	-0.3	0.4	010	A2	VARIES--SEE MAP

1/ Flood Insurance Rate map panel.
2/ Weighted average.
3/ Rounded to the nearest foot - see map.

TABLE 4

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration
TOWNSHIP OF FENTON, MI
(GENESEE CO., MI)

FLOOD INSURANCE ZONE DATA

SHIAWASSEE RIVER

This report either supersedes or is compatible with all previous studies published on streams studied in this report and should be considered authoritative for the purposes of the National Flood Insurance Program.

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study can be obtained by contacting the office of the Federal Insurance Administration, Regional Director, 1 North Dearborn, Chicago, Illinois, 60602.

8.0 BIBLIOGRAPHY AND REFERENCES

1. U.S. Department of Commerce, Bureau of Census, 1970 Census of Population, Number of Inhabitants, Michigan, Washington, D.C., 1971.
2. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Environmental Data Service, Monthly Averages of Temperature and Precipitation for State (MI) Climatic Divisions 1941-77, 1978.
3. Martin, H. M., 1955, Map of the surface formations of the Southern Peninsula of Michigan: Michigan Geological Survey Publication 49.
4. U.S. Water Resources Council, Guidelines for Determining Flood Flow Frequency, Bulletin No. 17, Hydrology Committee, March 1976.
5. U.S. Geological Survey, "Water Resources Data for Michigan," (undated).
6. Bent, P.C., A Proposed Streamflow Data Program for Michigan, U.S. Geological Survey Open-File Report, 1970.
7. Wiitala, S. W., 1965, Magnitude and Frequency of Floods in United States, Part 4, St. Lawrence River Basin, U.S. Geological Survey Water-Supply Paper 1677.
8. Brater, E. F., Rainfall-Runoff Relations on Urban and Rural Areas, University of Michigan, 1975.
9. Hardison, C. H., Estimation of 100-year Flood Magnitudes at Ungaged Sites, U.S. Geological Survey Open-File Report, 1973.
10. United Aerial Mapping, Topographic Maps of Genesee County, Michigan, Township of Fenton, 1970.
11. Shearman, J. O., 1976, Computer Applications for Step-backwater and Floodway Analyses, U.S. Geological Survey Open-File Report No. 76-499.
12. Hulsing, H., 1968, Techniques of Water-Resources Investigations of the United States Geological Survey, Measurement of Peak Discharge at Dams by Indirect Method, Book 3, Chapter 5.

13. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, Township of Mundy, Michigan. (In progress).

14. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, Township of Argentine, Michigan. (In progress).

15. Hayes, H. J., "Ponemah Lake Level Control," Michigan Department of Natural Resources, 1947.

16. Ayres, Lewis, Norris and May," Preliminary Report on Regulation of Water Levels on Certain Lakes in Fenton Township," Ann Arbor, Michigan, 1960.

17. U.S. Army, Corps of Engineers," Flood Control of Lake Ponemah," Detroit, Michigan, 1966.

18. Carlson, Hohloch, Mitchell, and Piotrowski, Inc., "Report on Shiawassee River Flood Control," Flint, Michigan, 1975.

19. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, Village of Linden, Michigan (In progress

20. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, City of Fenton, Michigan. (In progress).

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION IN FEET (NGVD)	DESCRIPTION OF LOCATION
RM 1	871.27	Argentine Township, Silver Lake Road, cut "x" on northeast hexnut of fire hydrant at north side of road, at residence 7140.
RM 2	861.20	Argentine Township, Shiawassee River, painted square at left downstream abutment, high point of concrete, at edge of low steel at abutment of abandoned road bridge at Shiawassee River.
RM 3	874.48	Fenton Township, Silver Lake Road, cut "x" on northwest hexnut of fire hydrant, at northeast corner of T-intersection of Silver Lake and south Hogan Road.
RM 4	883.20	Fenton Township, north Hogan Road, cut "x" on northwest hexnut of fire hydrant, at northeast corner of "T" intersection of Hogan and Silver Lake Roads.
RM 5	871.05	Fenton Township, Hogan Road, a 3/8-inch bolt set horizontally in east side of oak, at west side of road, second tree south of edge at drive to STP.
RM 6	856.89	Fenton Township, Hogan Road, river gaging station, standard USGS bronze tablet set in sill of gage house.
RM 7	858.24	Fenton Township, Shiawassee River, top of first rivet at south edge of horizontal row of rivets at extreme right upstream top cord of truss of private bridge.
RM 8	870.46	Fenton Township, Hogan Road, top of 4-inch well cap for well in front yard of residence at 6485 Rolston Road, southwest of intersection.
RM 9	876.02	Village of Linden, Rolston Road, a 3/8-inch bolt driven horizontally into south side of shag-bark hickory tree at north side of Rolston Road, opposite residence at 1573, at east side of driveway to residence at 1590.
RM 10	860.99	Village of Linden, Rolston Road, a 3/8-inch bolt driven at a 45 degree angle into south side of power pole at north side of T-intersection of Rolston and private road.

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION IN FEET (NGVD)	DESCRIPTION OF LOCATION
RM 11	883.46	Village of Linden, West Broad Street, railroad spike in power pole at southwest corner of West Broad and Byram Lake Drive.
RM 12	919.53	Fenton Township, Silver Lake Road, railroad spike in power pole at south side of Silver Lake Road, 150 ft west of intersection with Silver Lake Court.
RM 13	913.74	Fenton Township, Silver Lake Road, railroad spike in north side of power pole at T-intersection with Ripley Road.
RM 14	901.57	Village of Linden, Ripley Road, cut "x" on southeast hexnut of fire hydrant at northwest corner of intersection with Tickner Street.
RM 15	889.94	Village of Linden, Ripley Road, top of No. 5 on flange of fire hydrant at southwest corner of intersection with Grand Trunk Western Railroad.
RM 16	872.20	Village of Linden, Ripley Road, chiseled "x" on man hole rim of sanitary sewer near southwest corner of bridge approach to Shiawassee River.
RM 17	871.65	Village of Linden, Ripley Road, chiseled "x" on manhole rim of sanitary sewer near northwest corner of bridge approach to Shiawassee River, manhole encircled by rock-rip-rap mound.
RM 18	884.91	Fenton Township, Silver Lake Road, painted square on crown at northwest end of culvert at private drive to residence at abandoned cement plant.
RM 19	876.40	City of Fenton, Silver Lake Road, cut box on southwest corner of bridge abutment at Silver Lake outlet and dam.
RM 20	877.22	Fenton Township, Ponemah Road, extreme northeast edge of manhole rim, at center of roadway, between residence at 3309, 3317.
RM 21	871.51	Fenton Township, Ponemah Road, top of letter R in sewer of manhole cover at residence 3197.

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION IN FEET (NGVD)	DESCRIPTION OF LOCATION
RM 22	872.42	Fenton Township, Ponemah Road, extreme north edge of manhole rim, 1.2 ft south of south edge of blacktop, opposite entrance to Fisherman Landing.
RM 23	880.60	Fenton Township, North Road, cut box on north abutment, northeast corner, right upstream guardrail at bridge at Shiawassee River.
RM 24	879.13	Fenton Township, Torrey Road, cut box on southwest wingwall of bridge at Shiawassee River.
RM 25	886.35	Fenton Township, Torrey Road, extreme east edge of manhole rim at east side of road, just north of drive to Masonic Temple.
RM 26	874.57	Fenton Township, Torrey Road, extreme north edge of mahole rim at northeast corner of T-intersection with Golden Shores Ct.
RM 27	880.58	Fenton Township, Torrey Road, 3/8-inch bolt set in power pole, at west side of road, opposite to drive at residence 13095.
RM 28	876.05	Fenton Township, Torrey Road, north corner at top of concrete row post, at northwest corner of intersection with Lahring Road.
RM 29	897.73	Fenton Township, Torrey Road, extreme east edge of manhole rim, west of T-intersection with Margaret Drive.
RM 30	887.18	Fenton Township, Torrey Road, extreme east edge of manhole rim at east side of road, at 12217 residence.
RM 31	886.09	Fenton Township, Torrey Road, top of telephone spike set in north side of powerpole; 2 ft above ground, at northeast corner of intersection with north Long Lake Road.
RM 32	879.60	Fenton Township, Torrey Road, top of anchor bolt on west side of anchor for north set of flood lights at store at southwest corner of intersection with Thompson Road.

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION IN FEET (NGVD)	DESCRIPTION OF LOCATION
RM 33	893.09	Fenton Township, Thompson Road, standard tablet stamped "4-PJH 1967" set in top of bottom step of north wingwall of west abutment, 3.4 higher than intersection of overpass of U.S. Highway 23.
RM 34	894.88	Fenton Township, Thompson Road, standard tablet stamped "3 PJH 1967" set in concrete post flush with ground, 47 ft south 42.5 ft west of center of intersection of Thompson and Fenton Road.
RM 35.	857.79	Holly Township, Oakland County, Thompson Road, top of corrugated steel culvert crown at the west culvert at extreme north end, at Swartz Creek crossing.

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2      3  71300  71350
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4      5   2200   2200
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                                                M
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USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 2,DATE=12/14/76

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End of
of Cross Sec

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New Data As A Result of New Cut UFR Above Lewis St

6/3/80 GWF

Sect. D & E Are not in new data they are replaced by Sect. E1

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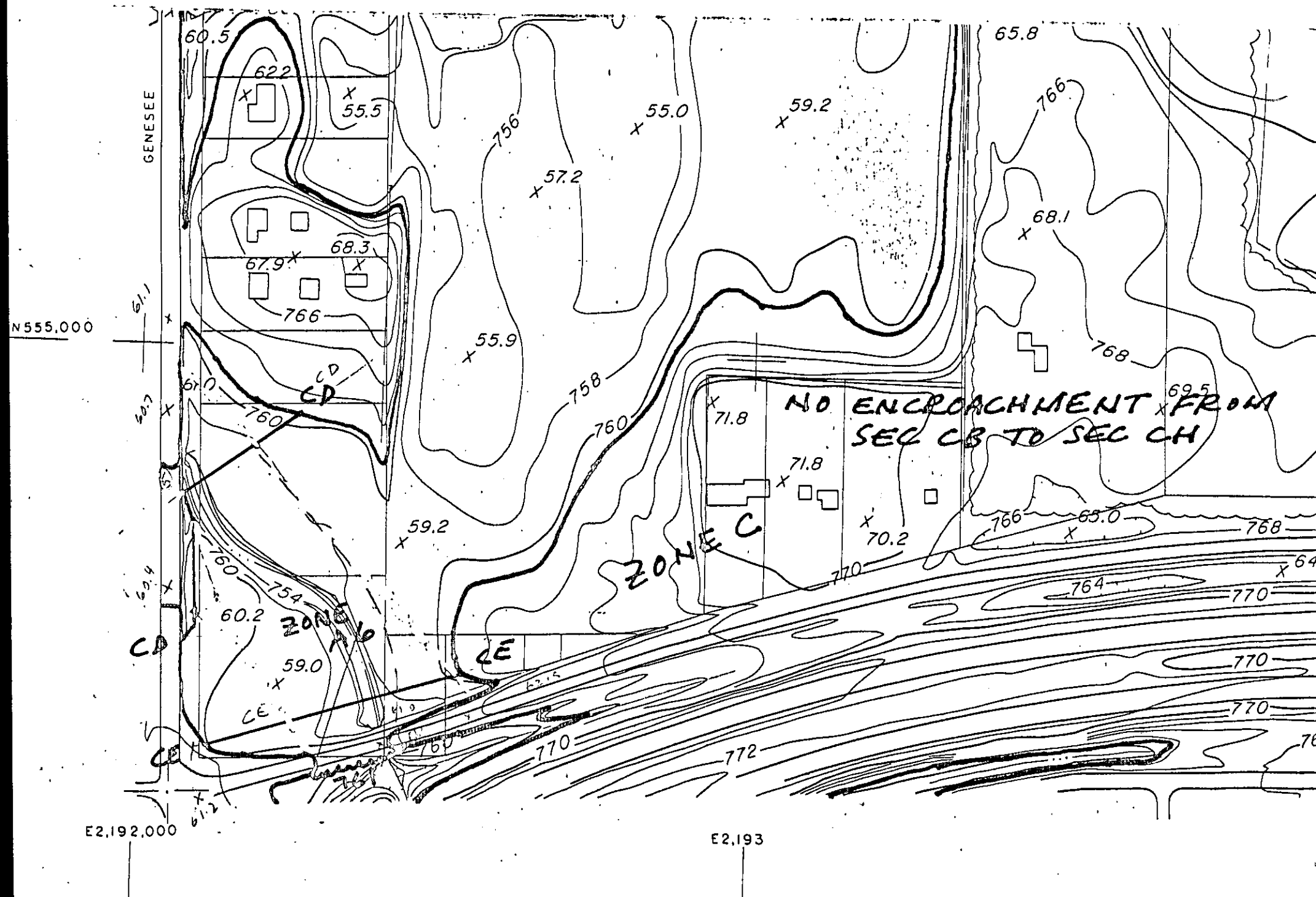
Part 1/2
New Subm. Hdl
6/7/80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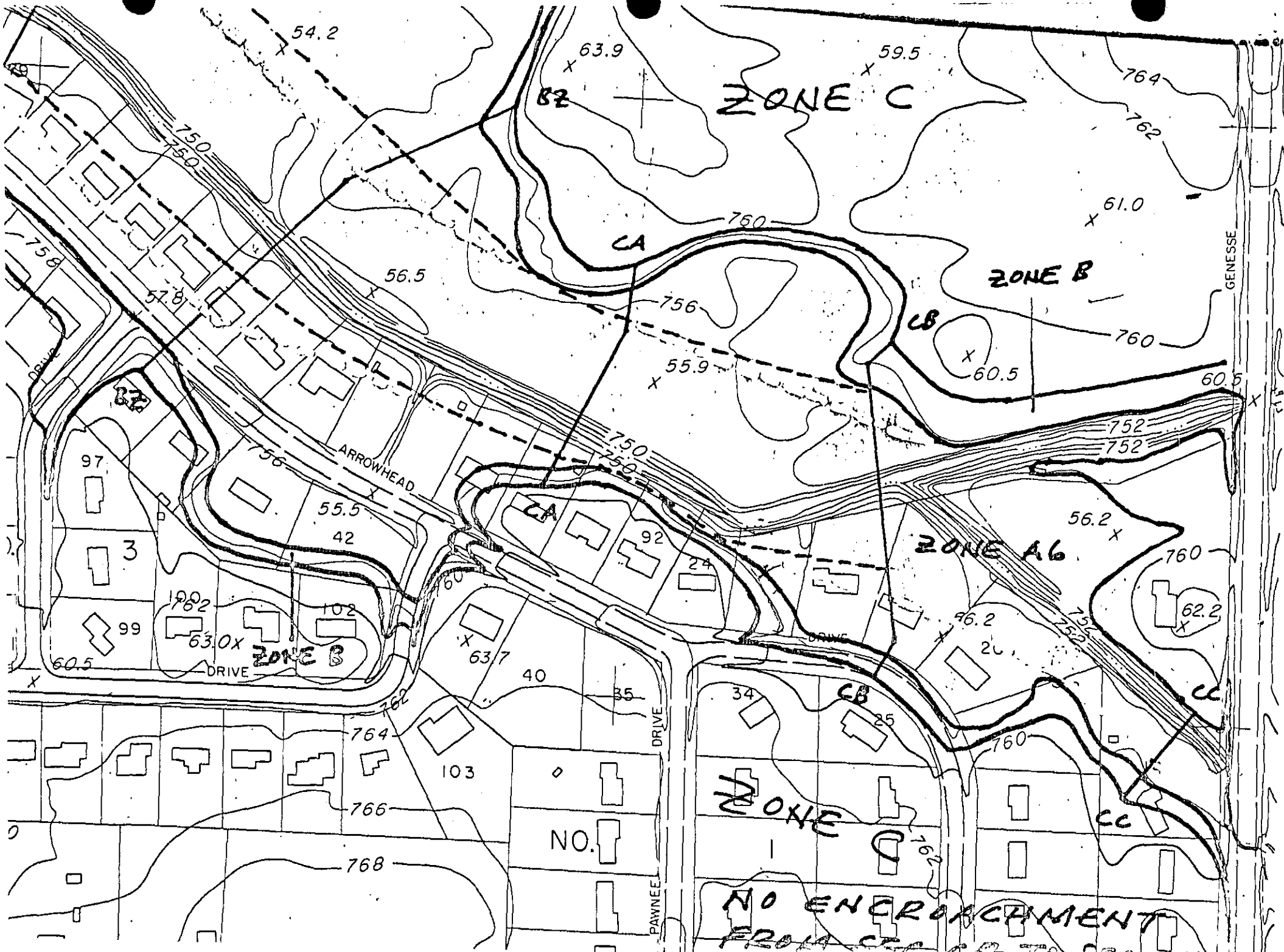
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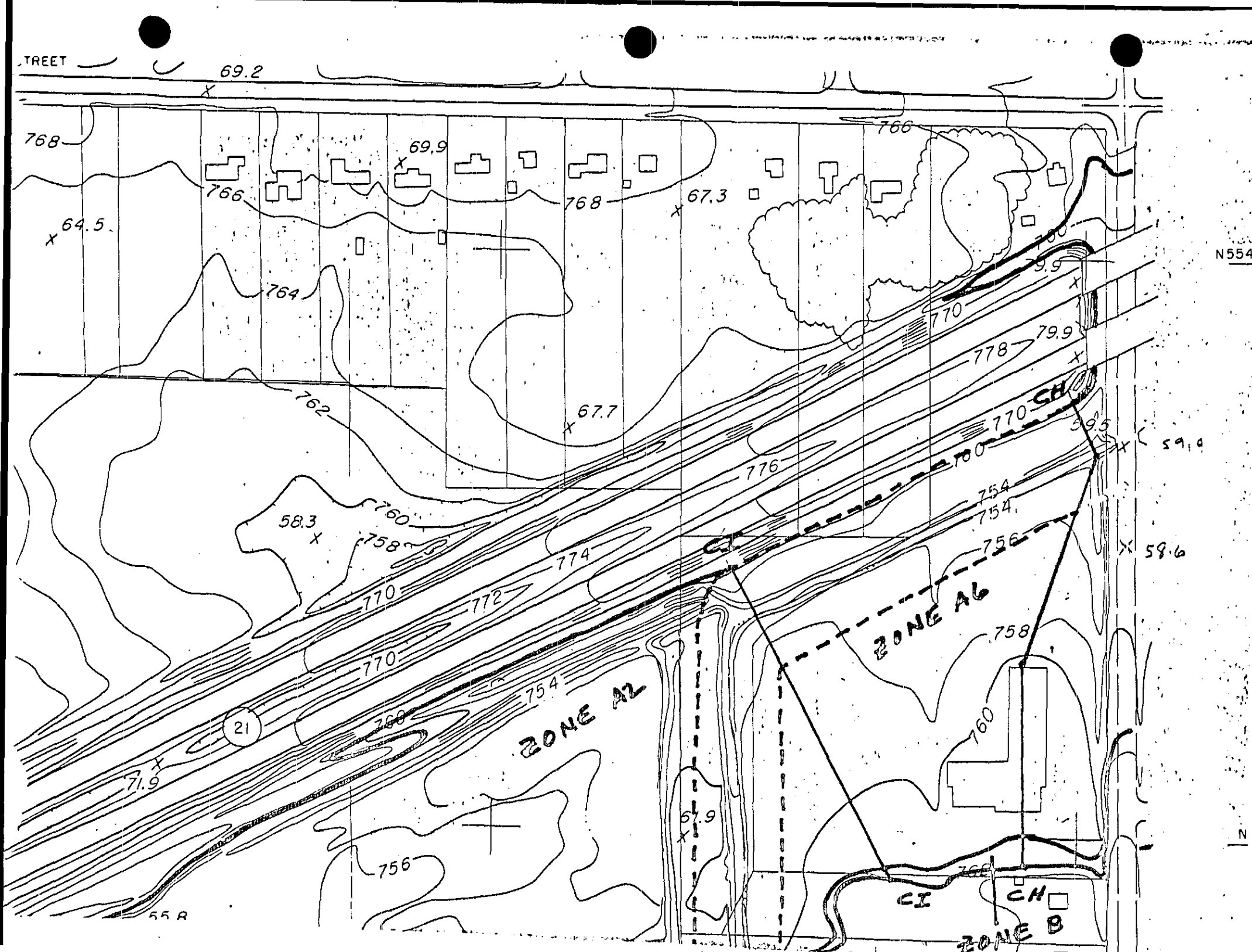
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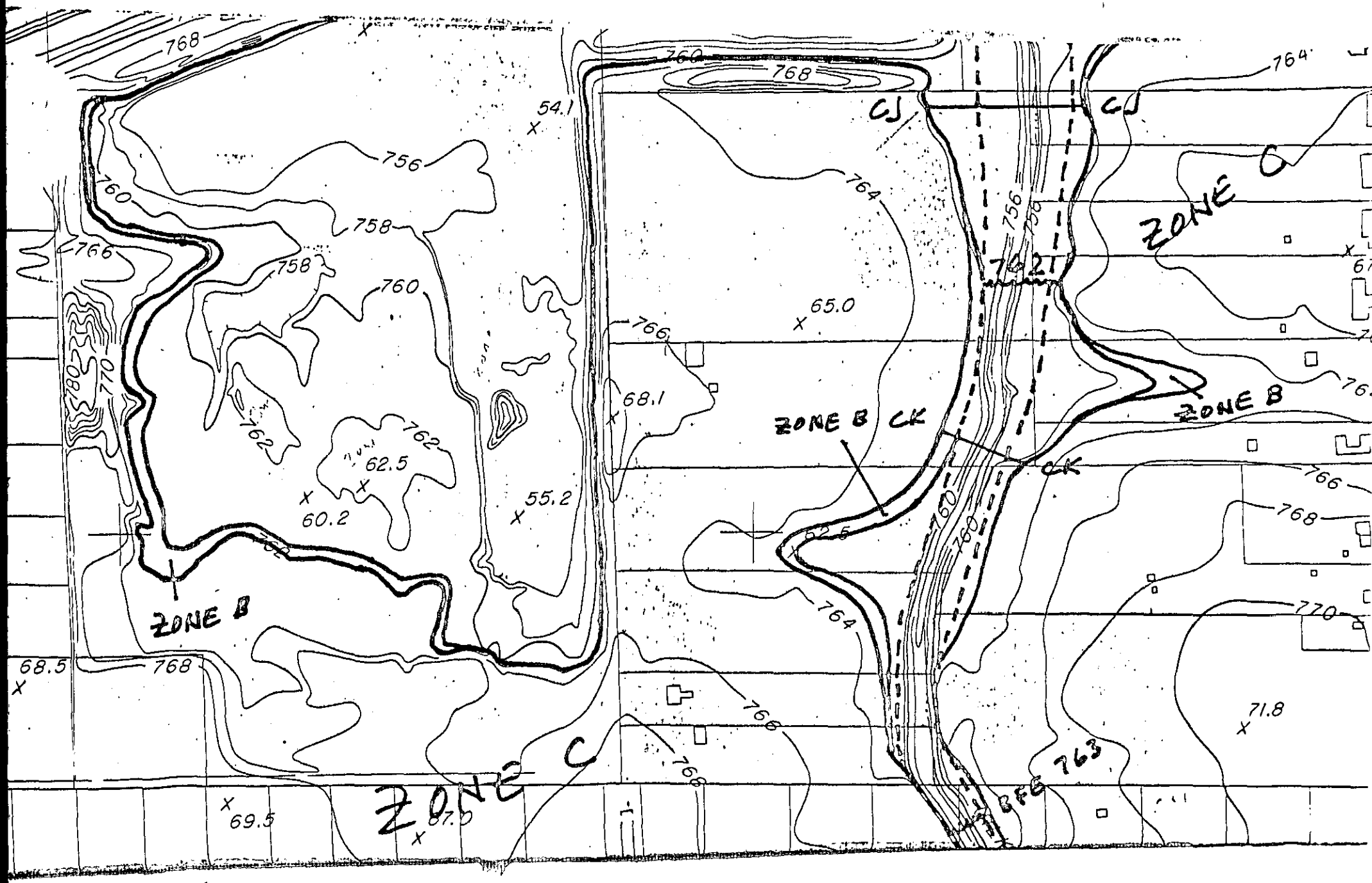
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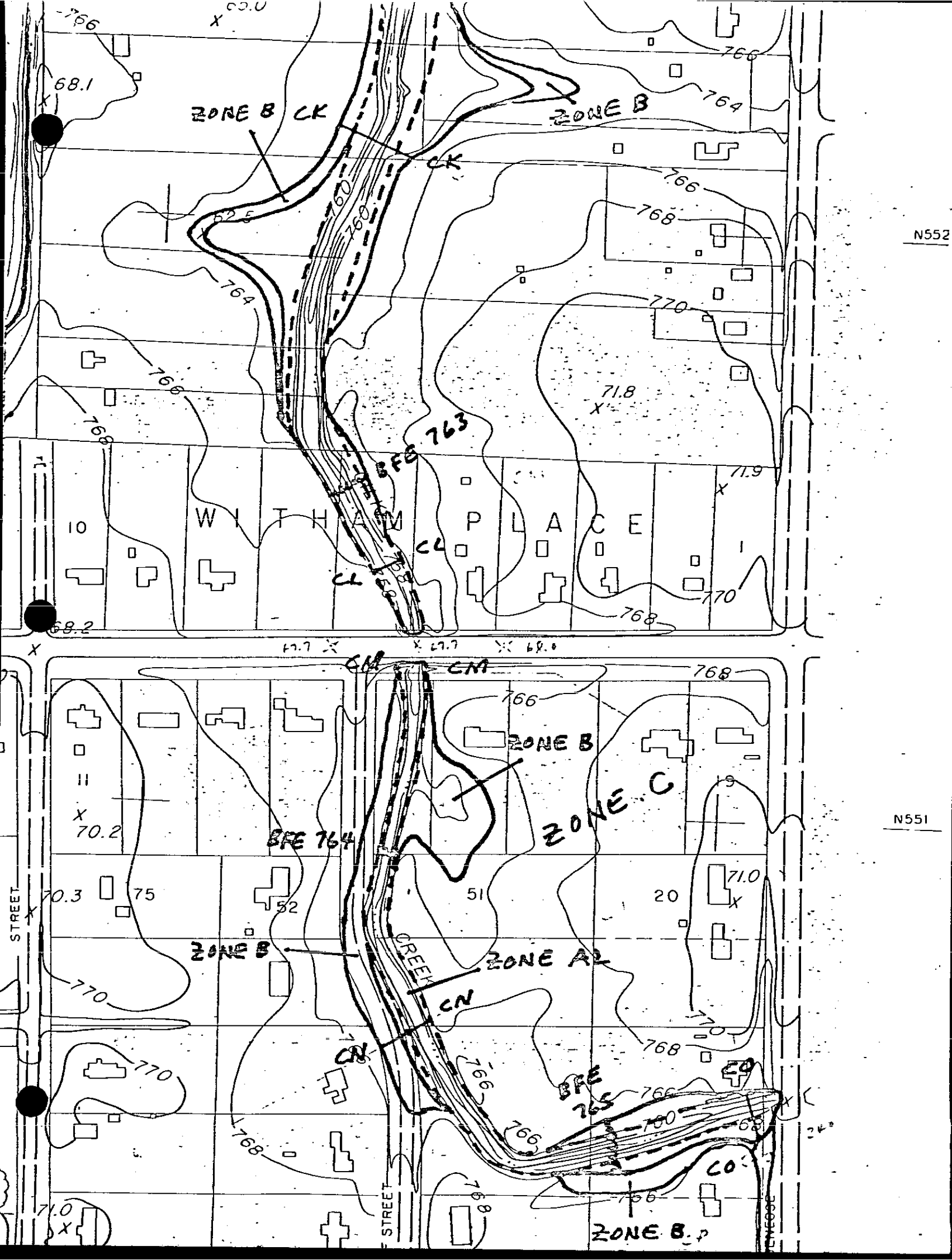
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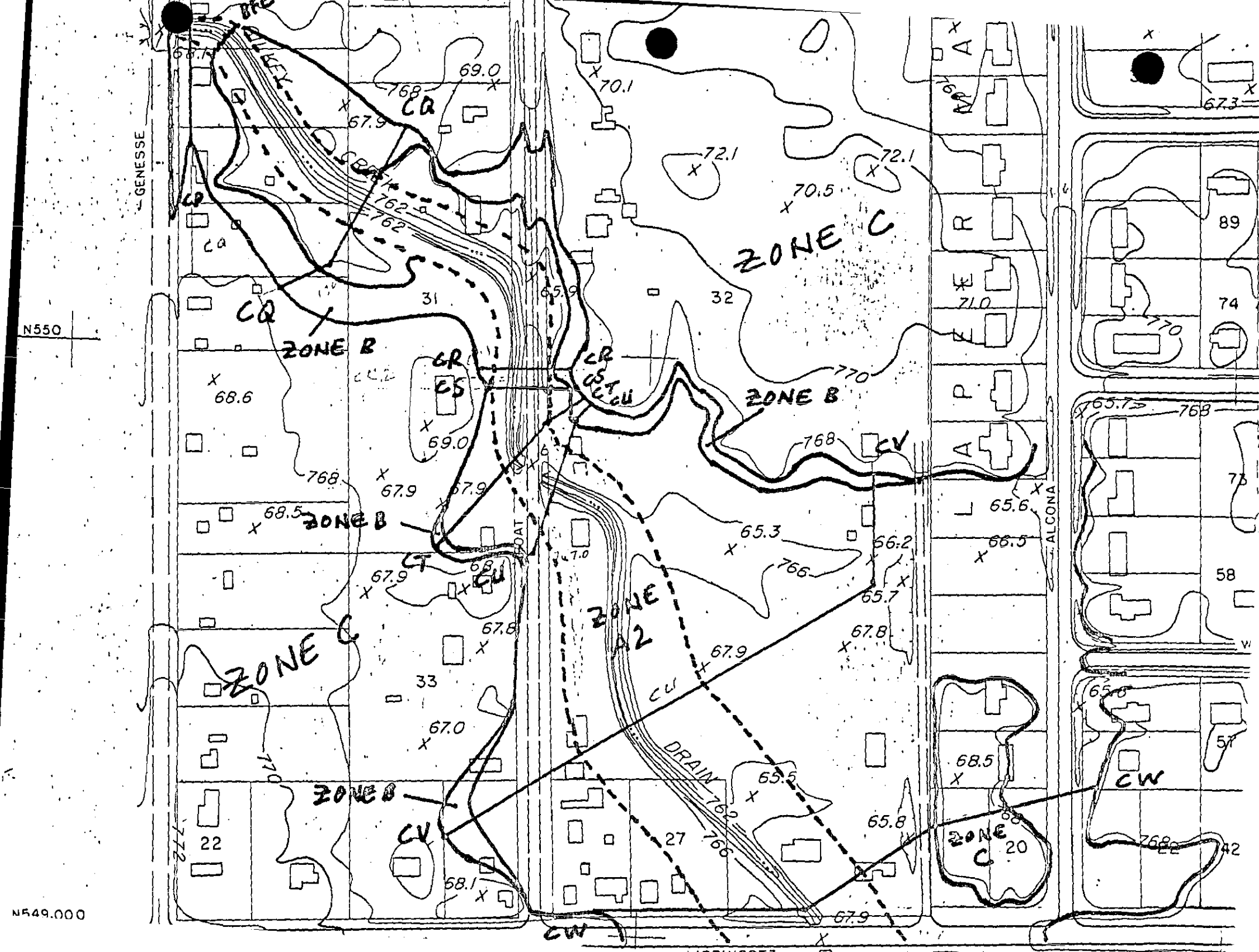
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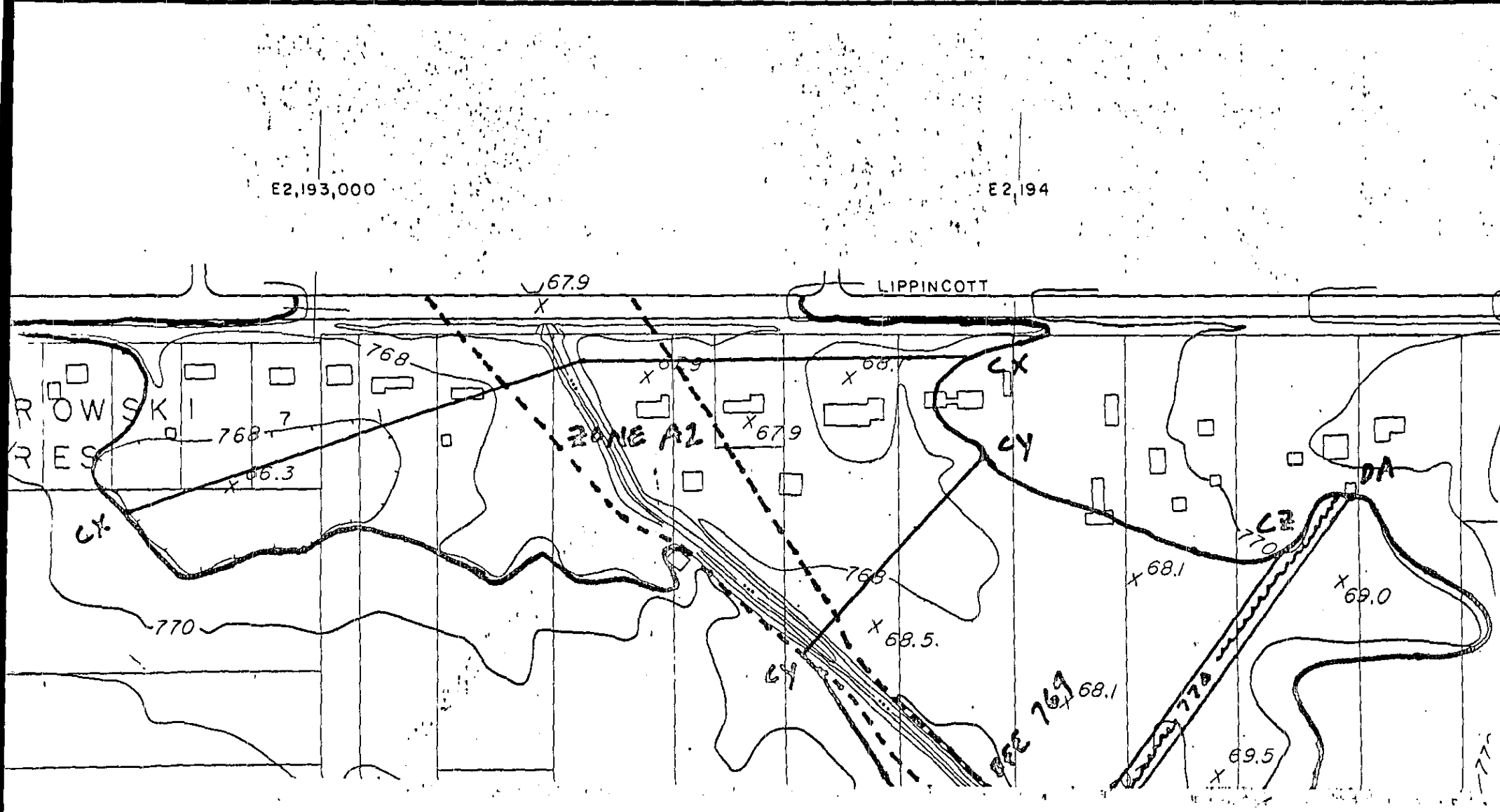
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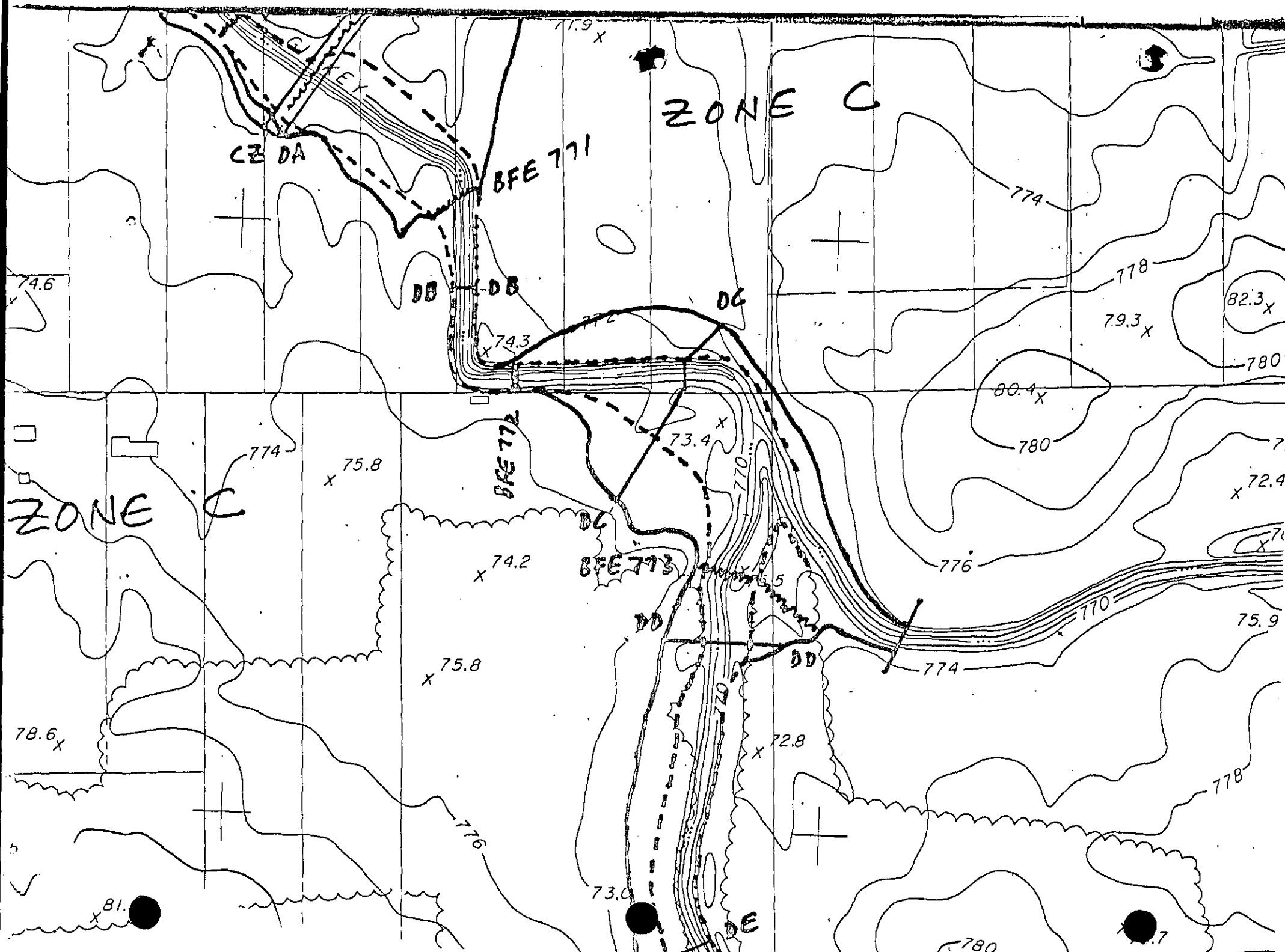
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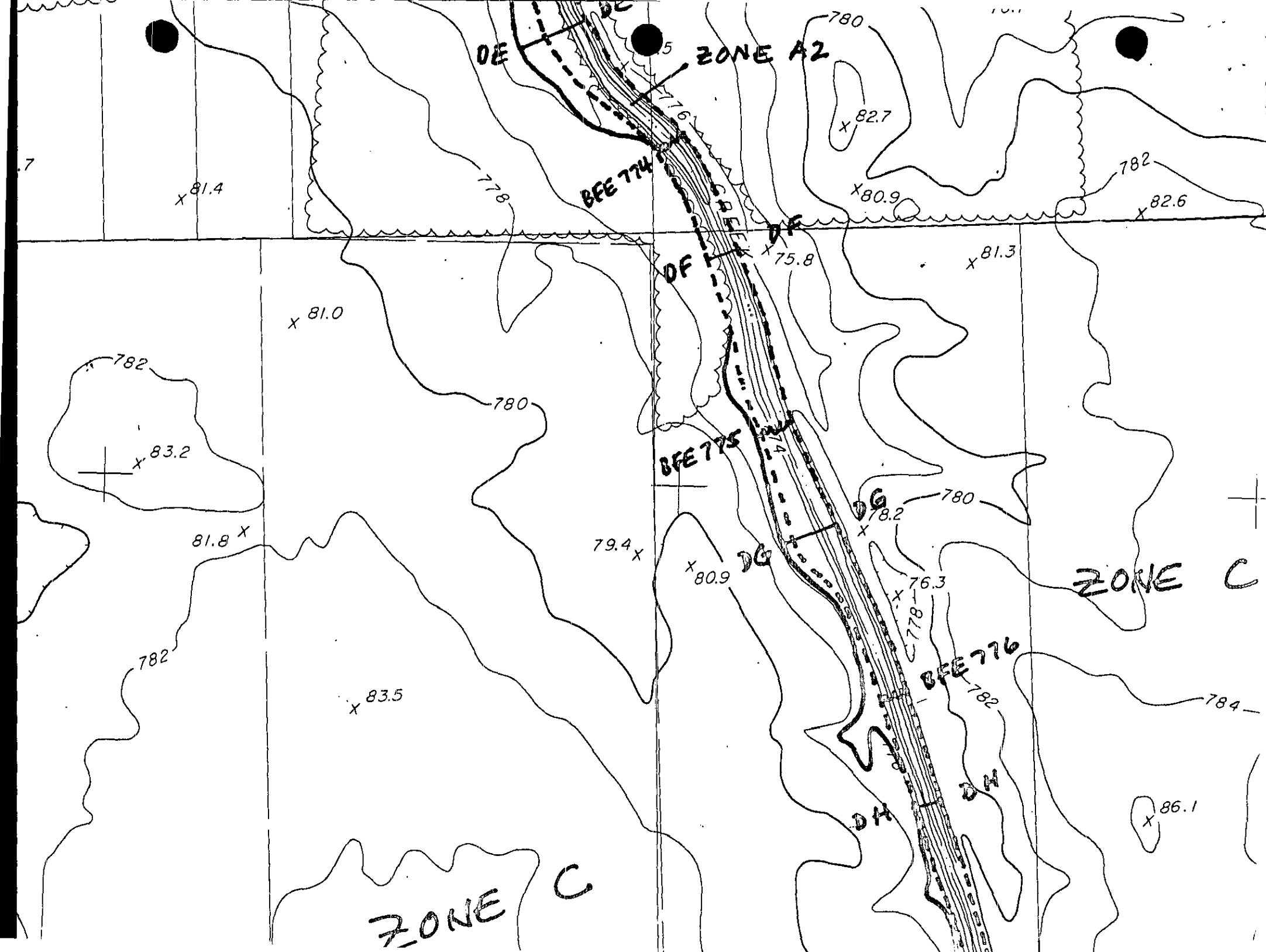
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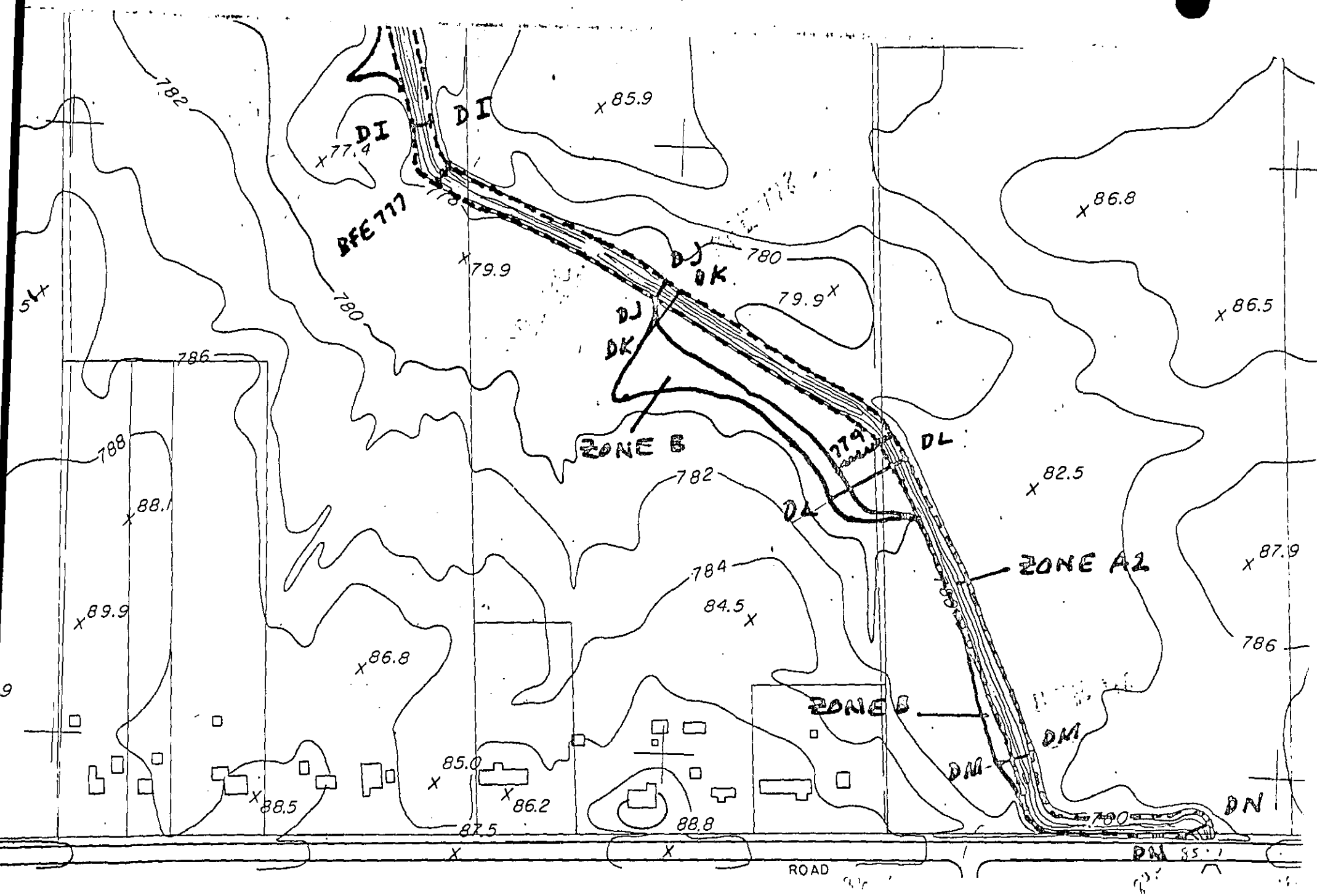
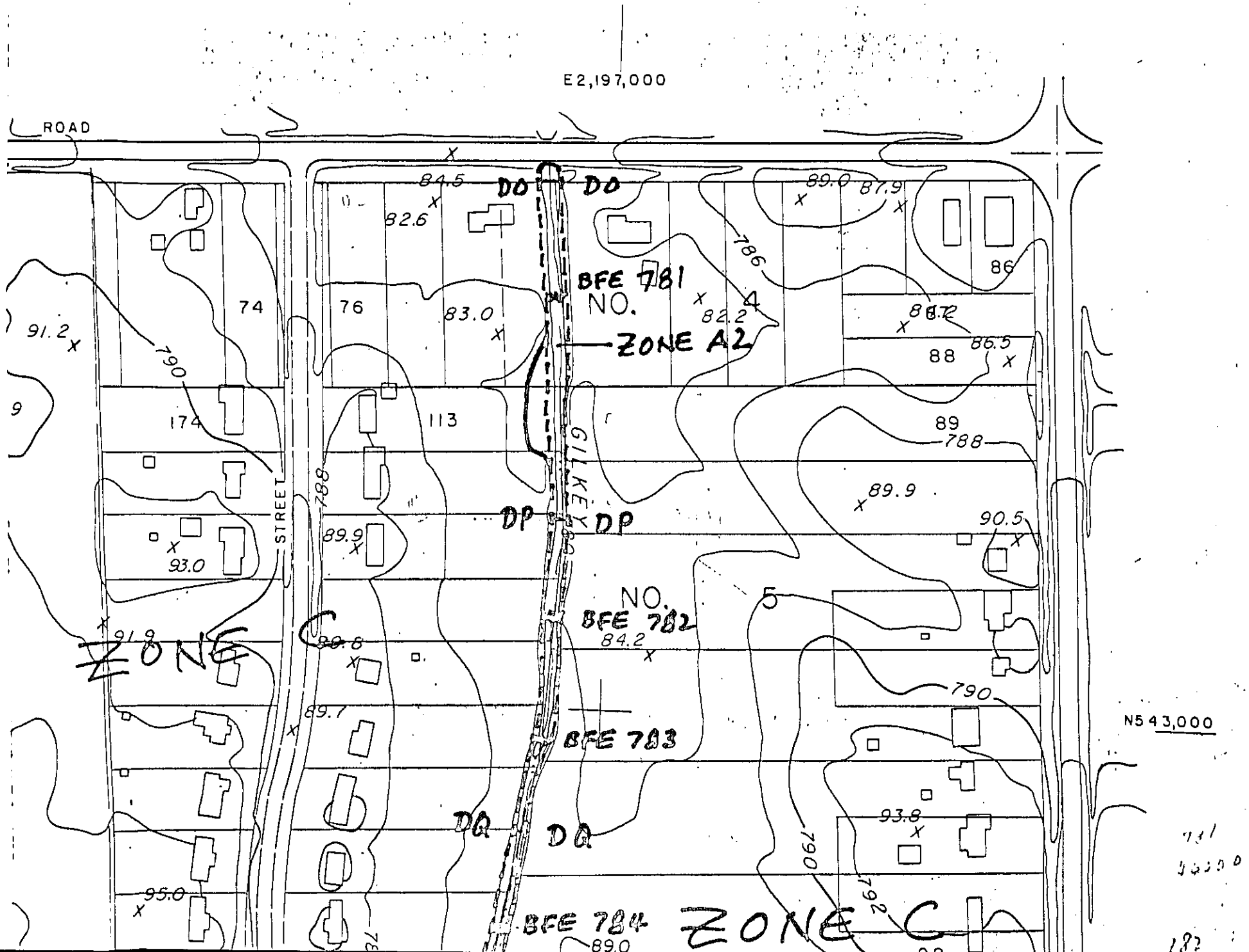

DI
DI
BFE 777
DJ
DK
DJ
DK
ZONE B
DL
DL
ZONE A2
ZONE B
DM
DM
DN
DN
ROAD
782
780
786
788
784
780
779
85.9
77.4
79.9
79.9
86.8
86.5
82.5
87.9
88.1
89.9
86.8
84.5
85.0
86.2
88.5
87.5
88.8


E2,197,000
ROAD
STREET
GILKEY
DO
DO
DP
DP
DQ
DQ
BFE 781
NO. 4
ZONE A2
NO. 5
BFE 782
BFE 783
BFE 784
ZONE C
ZONE C
N543,000
74
76
174
113
86
88
89
84.5
82.6
83.0
82.2
89.0
87.9
86.5
91.2
93.0
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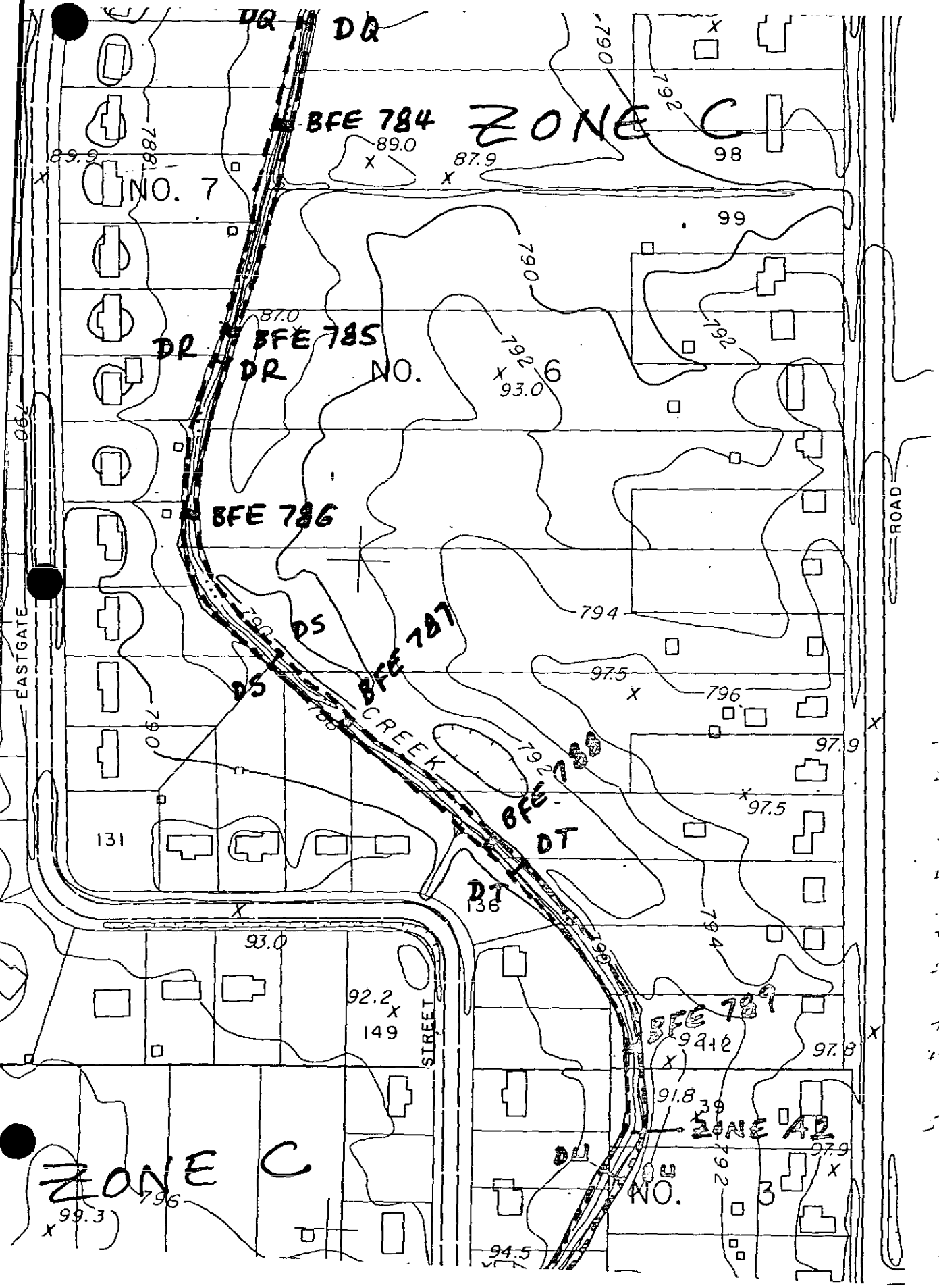
91.8
89.8
89.1
84.2
93.8
95.0
89.0
790
788
786
792


DQ
DQ
BFE 784
ZONE C
NO. 7
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89.0
87.9
98
99
87.0
DR
BFE 785
DR
NO. 6
93.0
BFE 786
EASTGATE
ROAD
N542
DS
BFE 787
DS
CREEK
BFE 788
DT
DT
136
131
97.5
796
97.9
97.5
794
93.0
92.2
149
STREET
BFE 789
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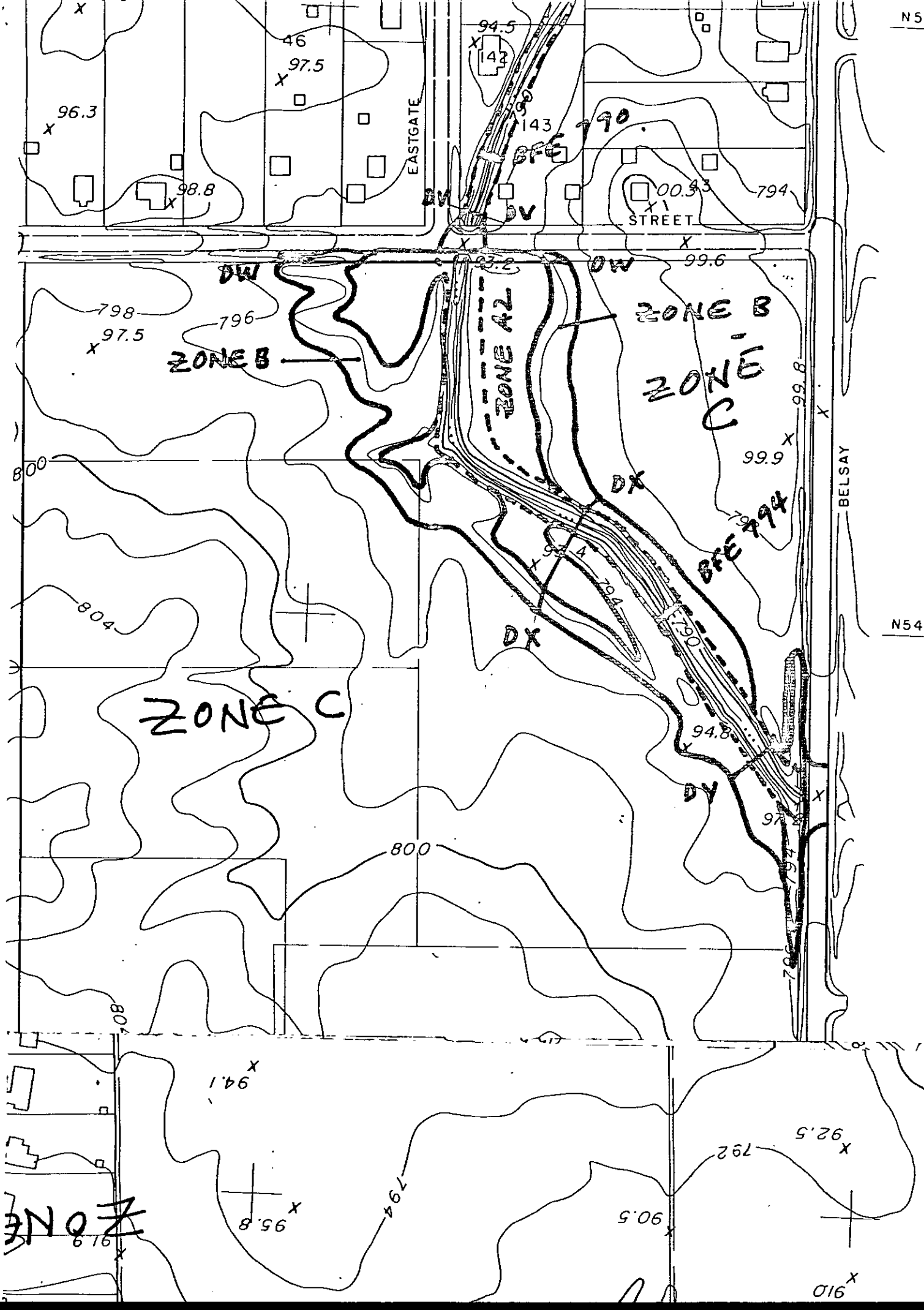
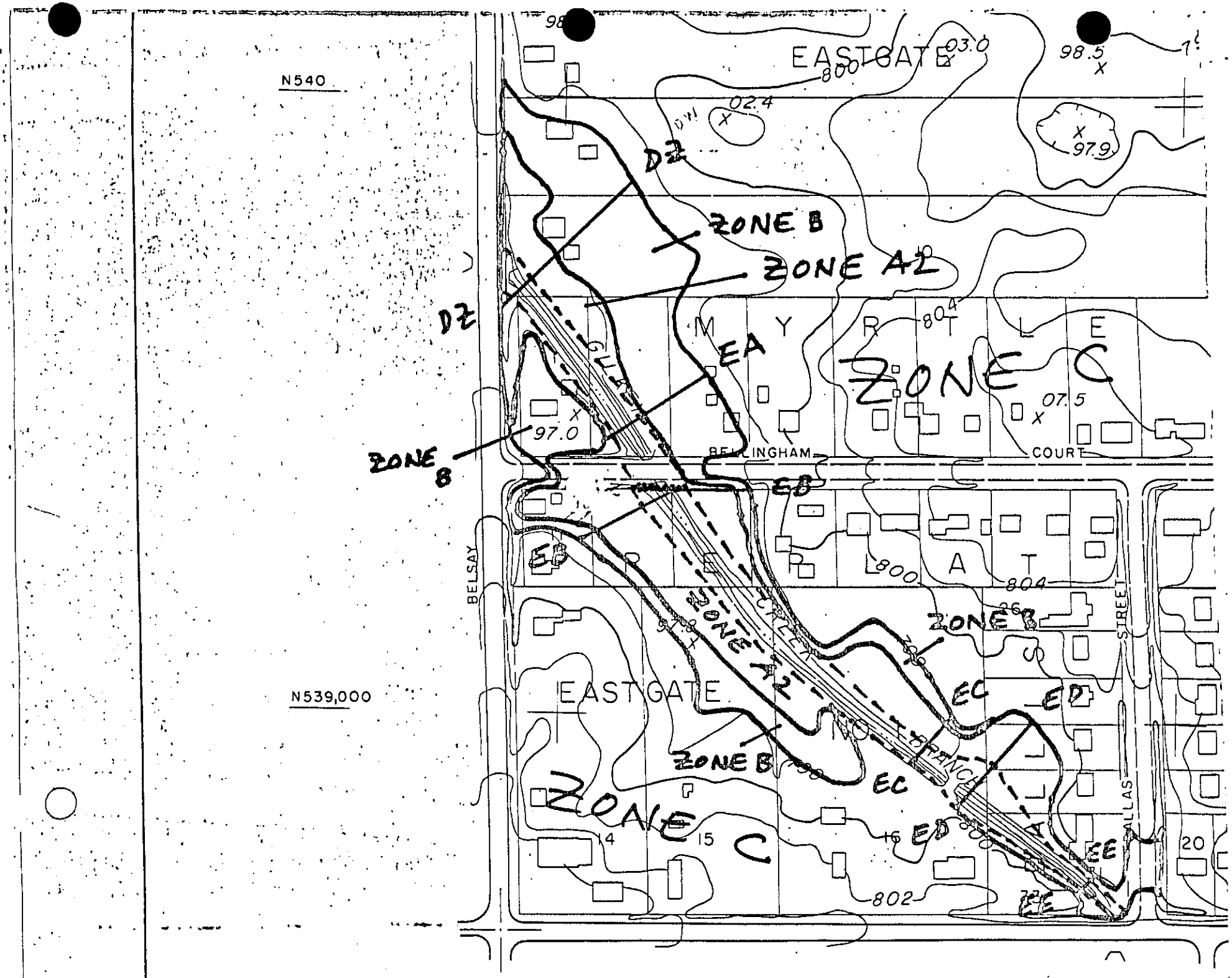
91.8
39
ZONE AE
97.9
DU
NO. 3
ZONE C
99.3
94.5
N541


N5
N54
EASTGATE
STREET
BELSAY
ZONE B
ZONE A2
ZONE C
ZONE B
ZONE C
DW
DW
DW
DX
DX
DV
BFE 790
BFE 794
94.5
97.5
96.3
98.8
93.2
99.6
99.9
99.8
94.8
800
798
796
804
794
790
792
92.5
90.5
95.8
91.9
94.1
91.0


N540
N539,000
EASTGATE
EASTGATE
MYRTLE
ZONE C
ZONE C
ZONE B
ZONE A2
ZONE A2
ZONE B
ZONE B
ZONE B
DZ
DZ
EA
EB
EB
EC
EC
ED
ED
EE
EE
BELLINGHAM
COURT
BELSAY
DALLAS
STREET
CREEK
BRANCH
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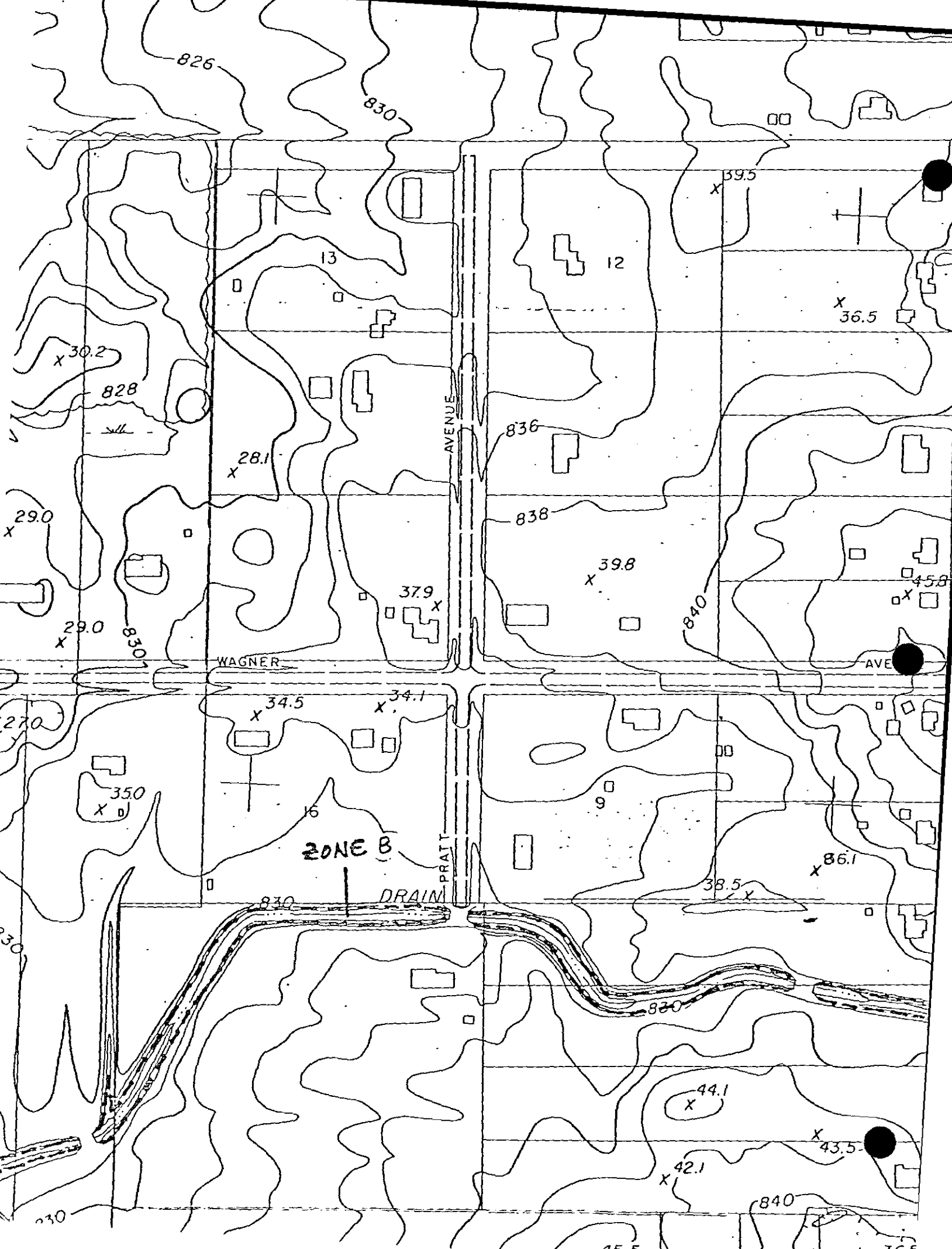
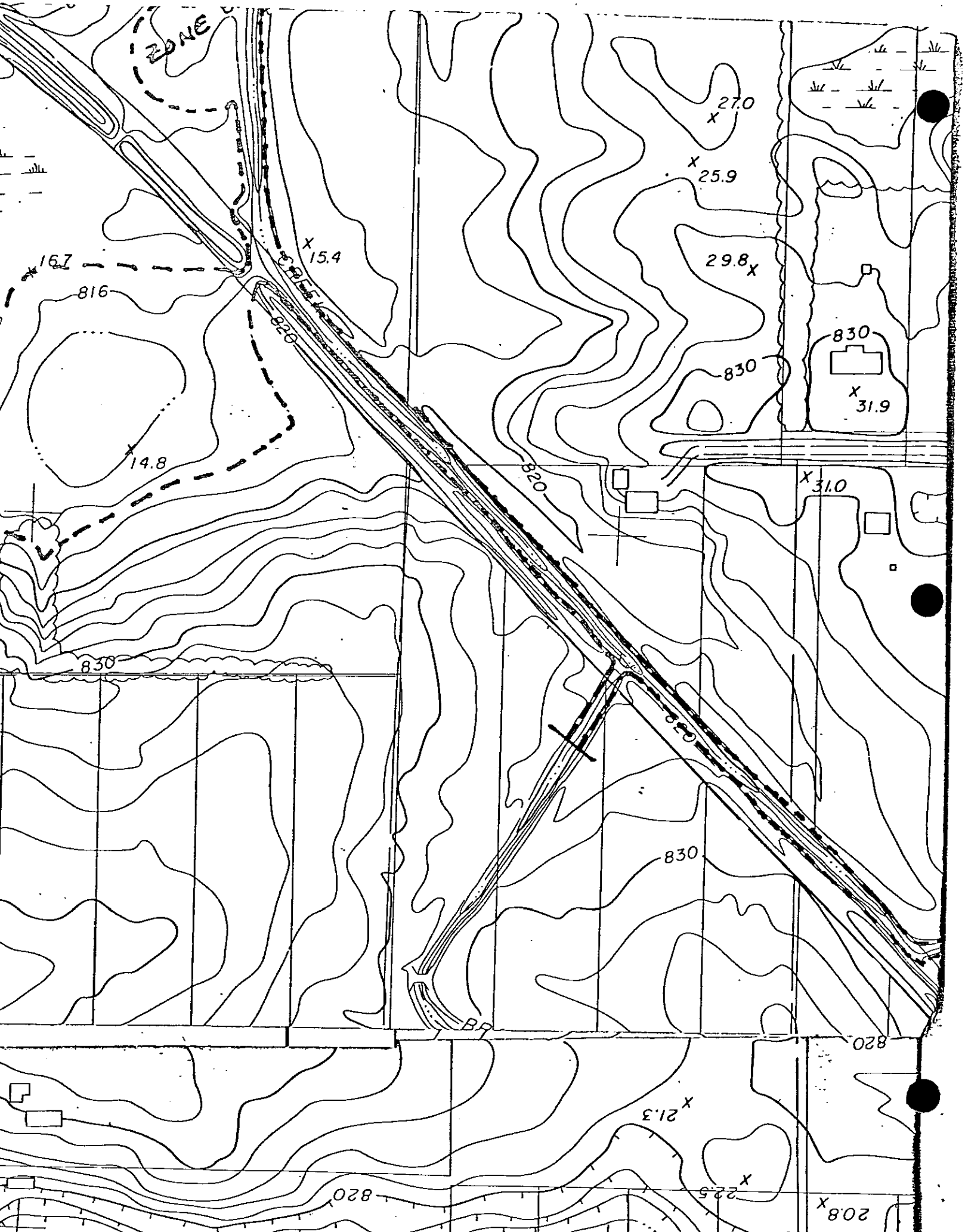
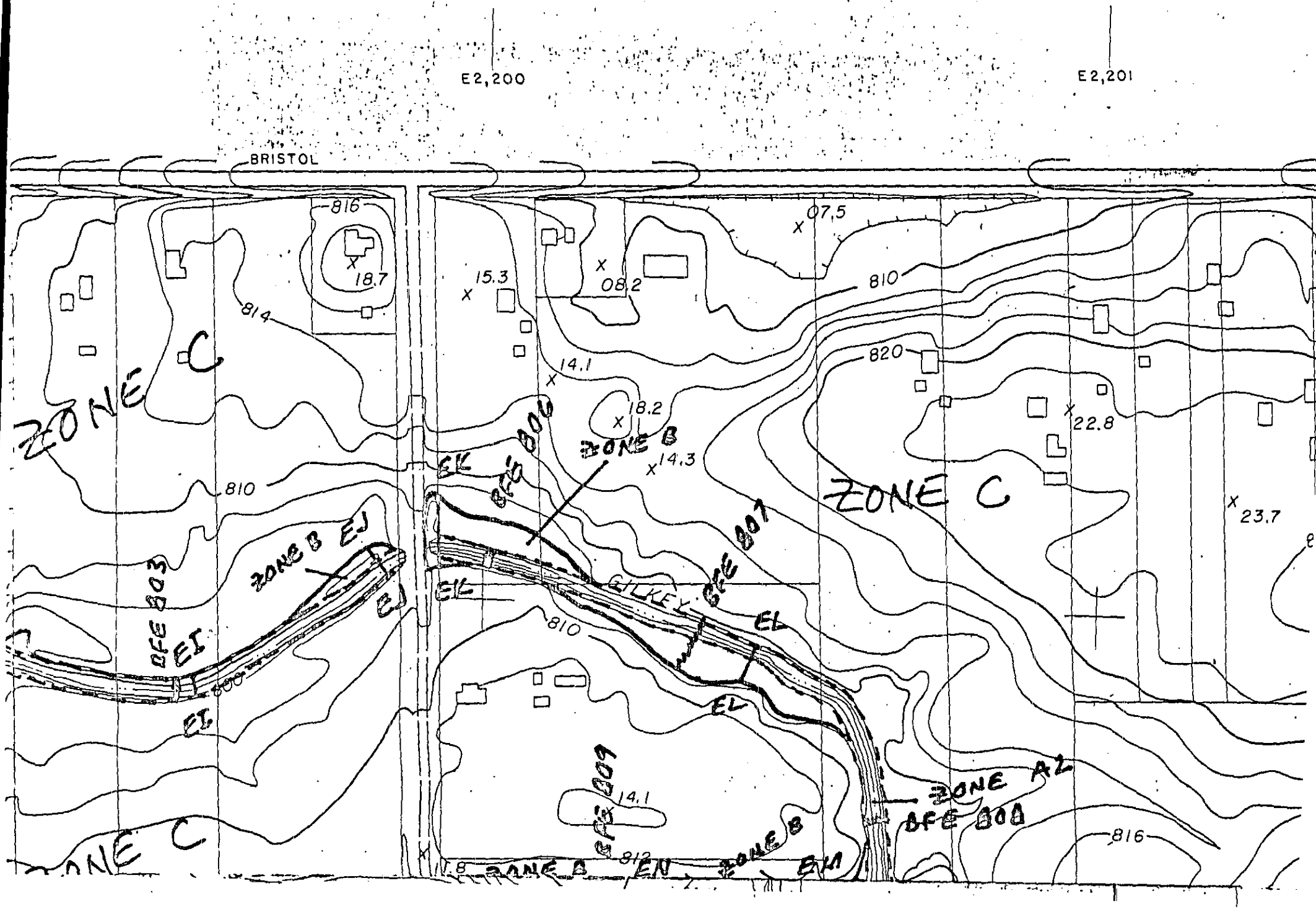
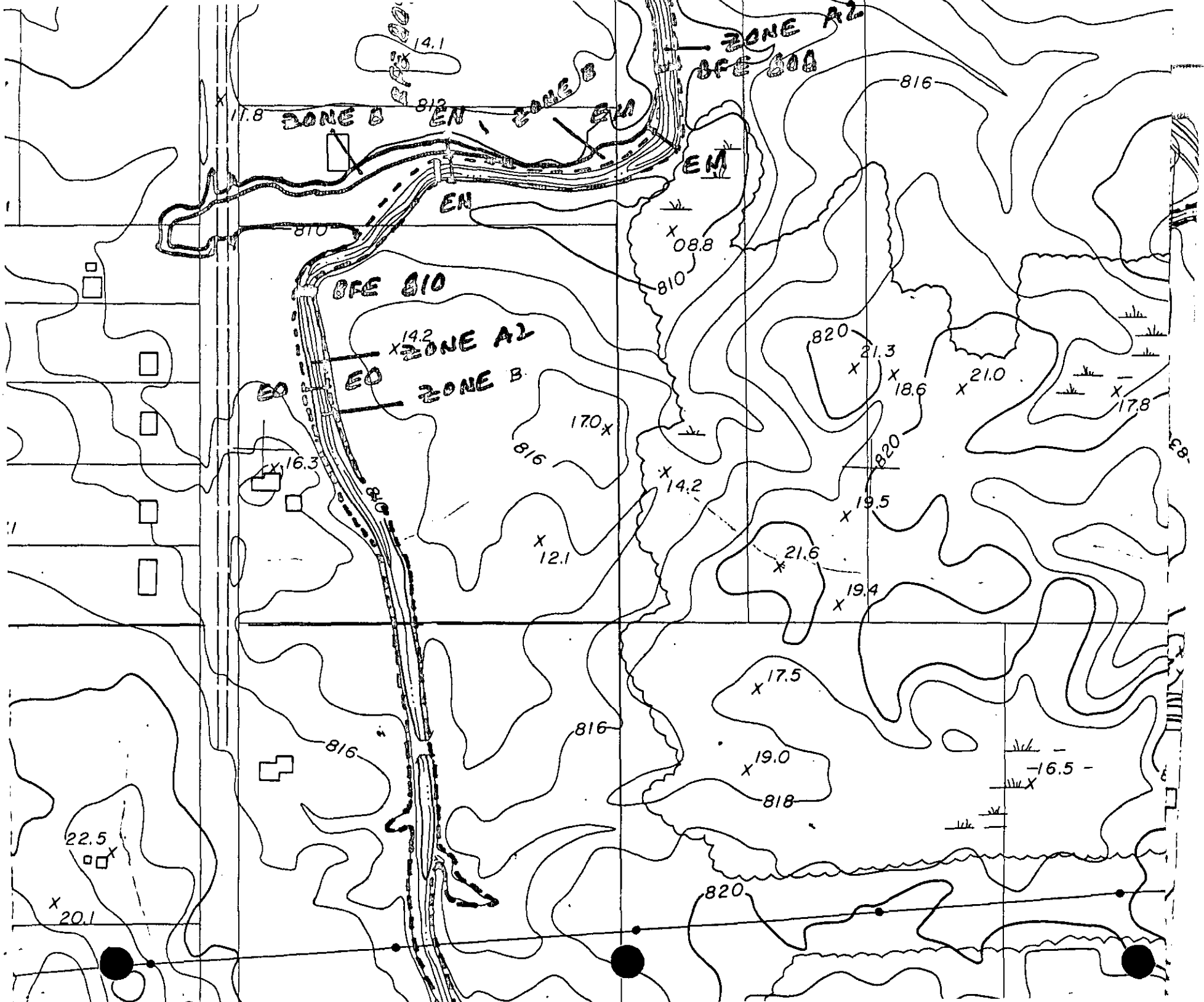
93.0
92.4
97.5
800
802
804
14
15
16
20

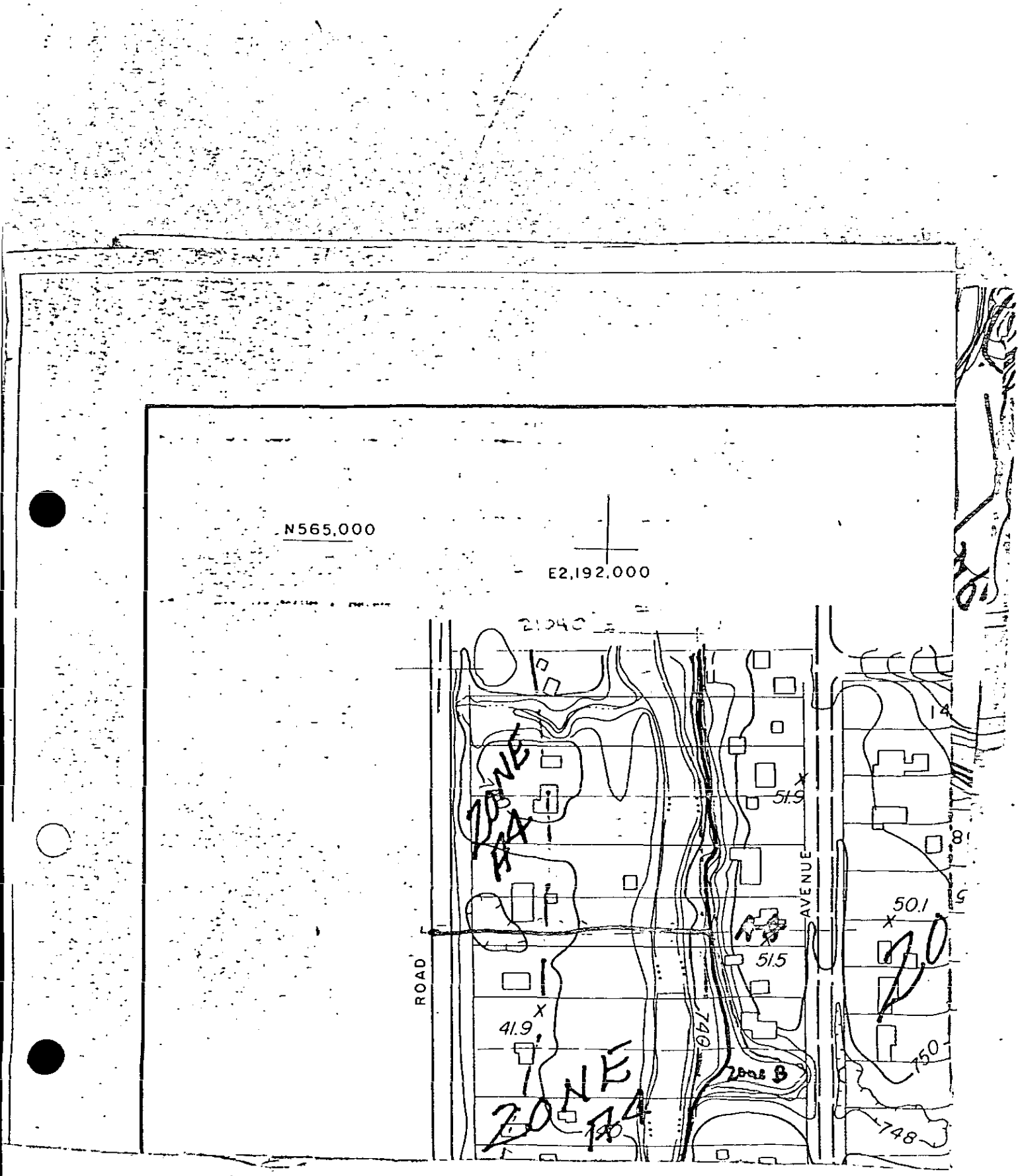

826
830
39.5
13
12
36.5
30.2
828
AVENUE
836
28.1
29.0
838
39.8
45.8
37.9
840
29.0
830
WAGNER
AVE
34.5
34.1
35.0
16
9
ZONE B
PRATT
DRAIN
86.1
38.5
830
830
830
44.1
43.5
42.1
840


ZONE
27.0
25.9
29.8
15.4
16.7
816
820
830
31.9
14.8
31.0
830
820
830
820
21.3
22.5
20.8
820

E2,198,000
N538,000
810
11.2
09.6
11.9
ZONE C
804
EF
EF
7
2
3
DALLAS STREET
01.8
ZONE B
03.0
BE 80
02.8
EG
18.2
800
ZONE AL
99.0
16.9
15.9
806
ZONE B
EH


E2,200
E2,201
BRISTOL
816
18.7
814
ZONE C
15.3
08.2
07.5
810
820
14.1
18.2
14.3
22.8
23.7
ZONE B
BFE 800
EL
ZONE B EJ
BFE 803
EI
EJ
EIL
GILKEY
BFE 807
EL
ZONE C
ZONE AZ
BFE 808
816
14.1
BFE 809
812
ZONE B
EN
EM
ZONE C


ZONE A2
BFE 808
ZONE B
EN
ZONE B
EN
EN
EN
816
812
14.1
11.8
810
08.8
810
BFE 810
14.2
ZONE A2
EO
EO
ZONE B
17.0
816
16.3
820
21.3
18.6
21.0
17.8
820
14.2
19.5
12.1
21.6
19.4
17.5
816
816
19.0
16.5
818
22.5
20.1
820


N565,000
E2,192,000
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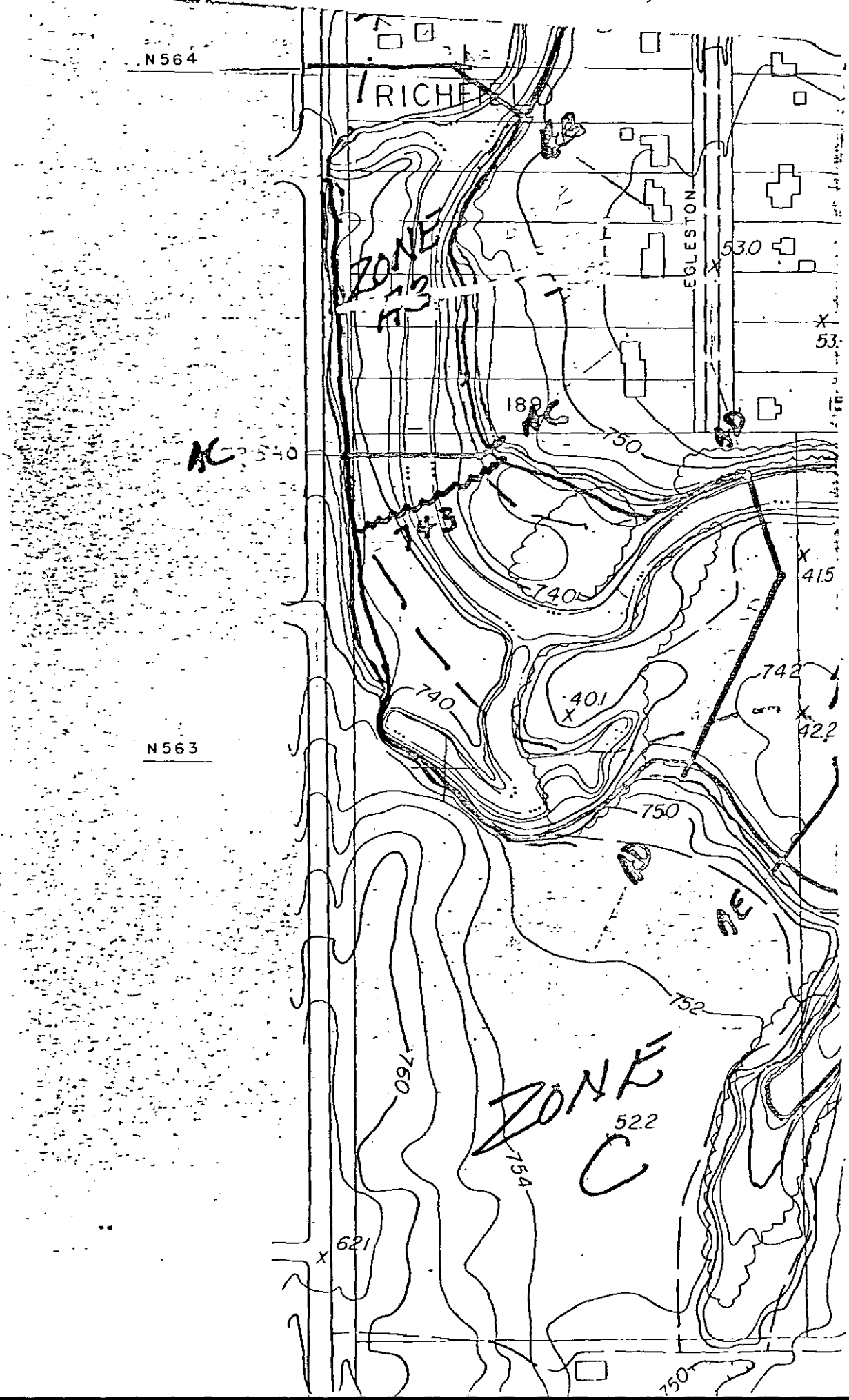
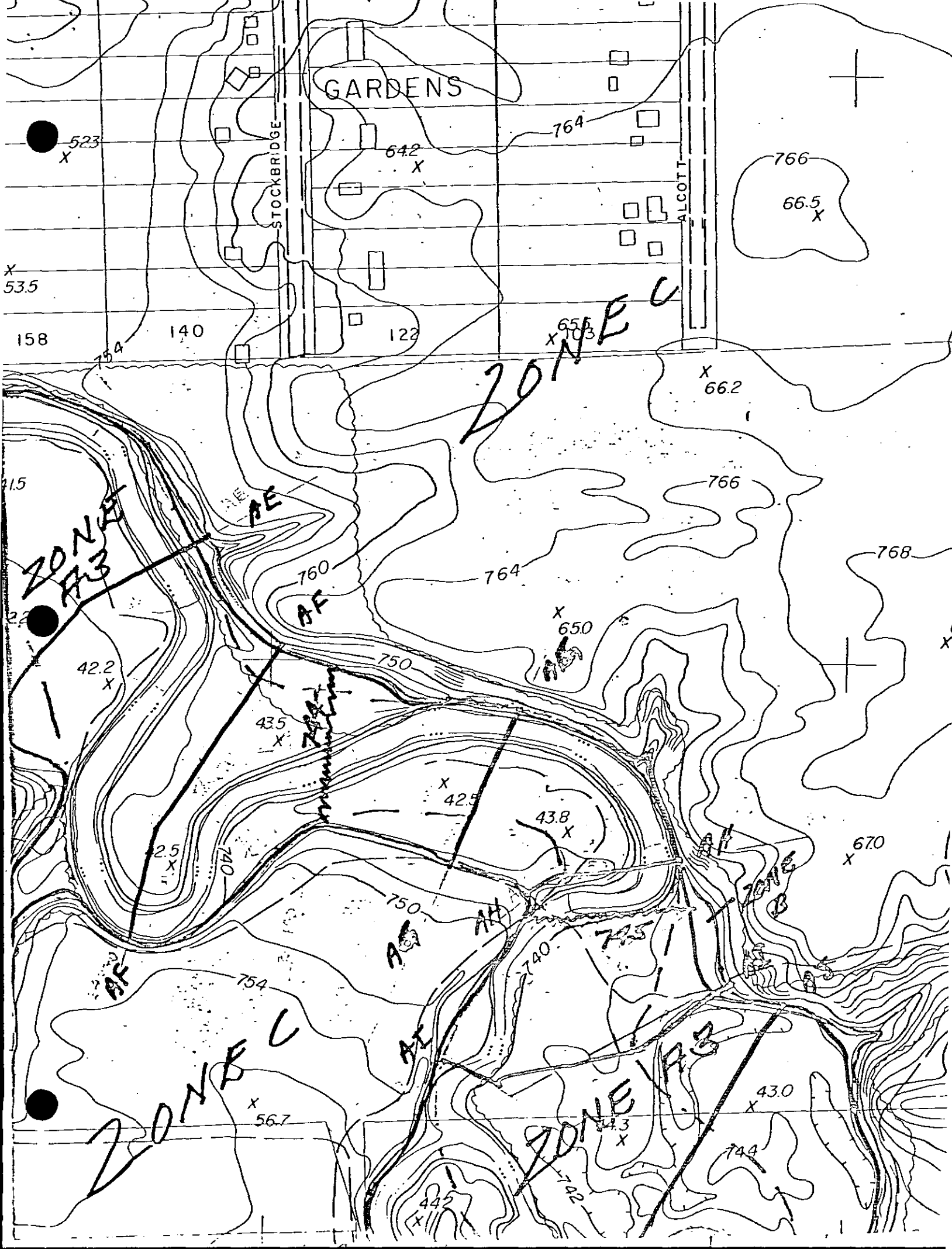
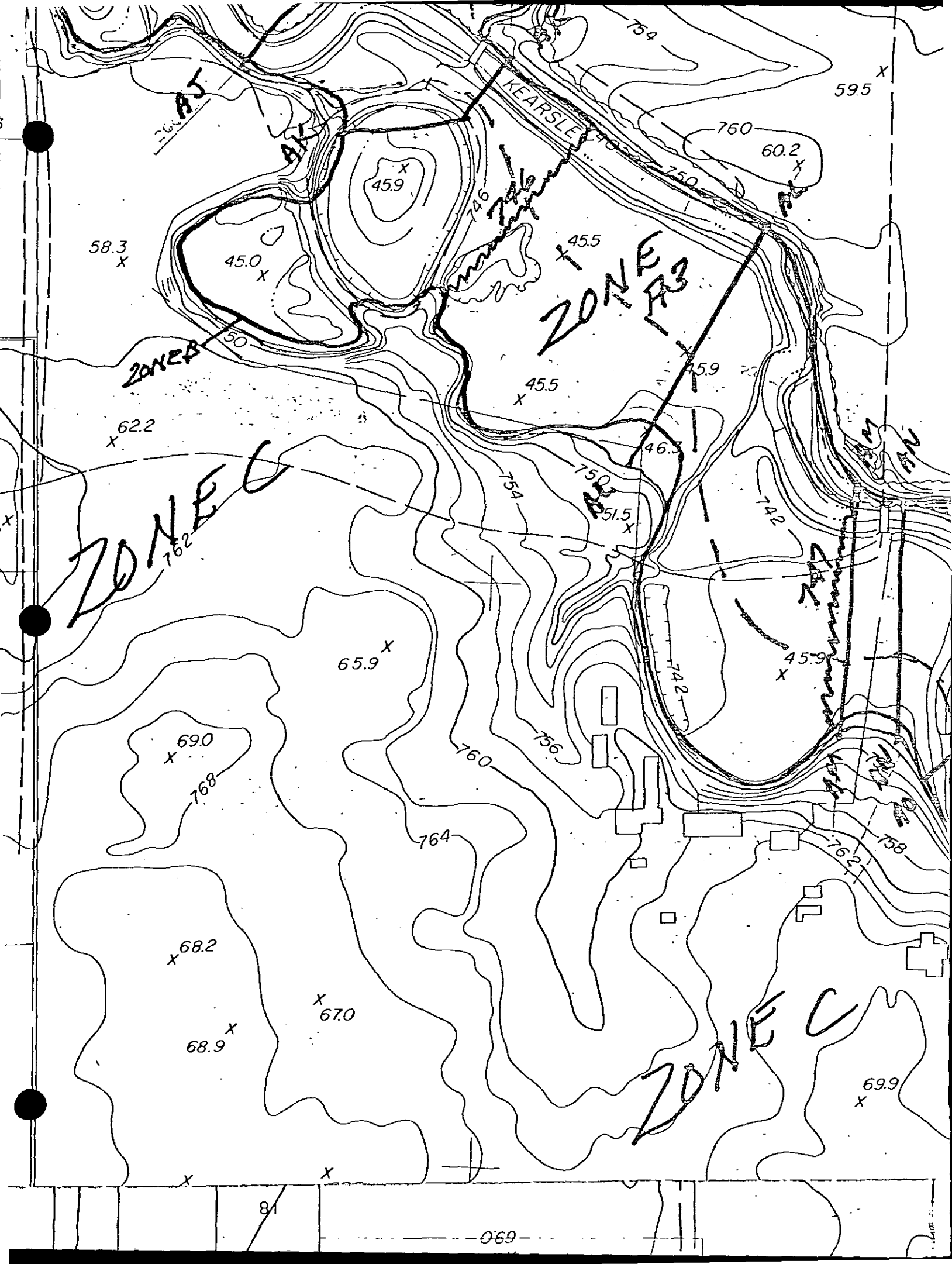
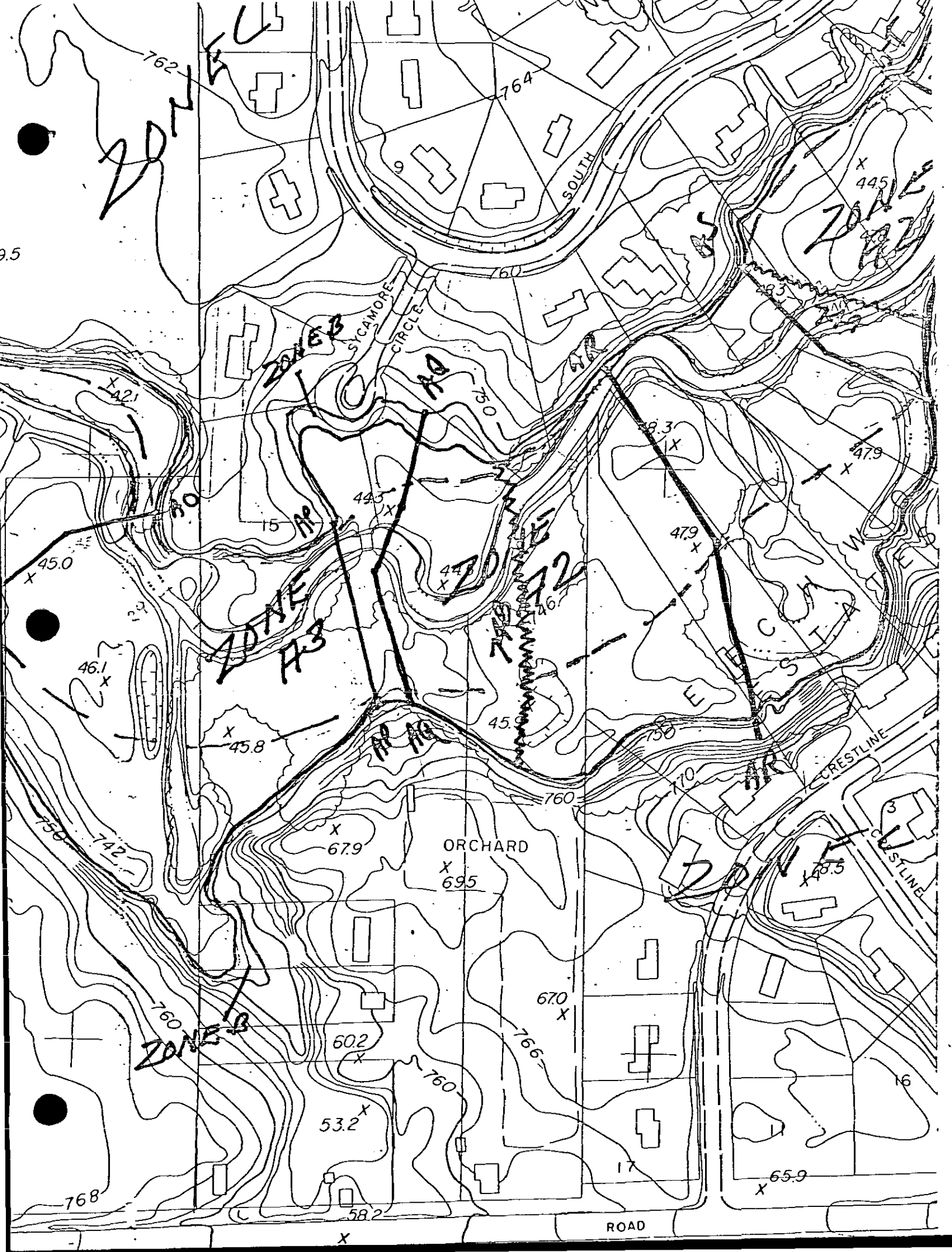
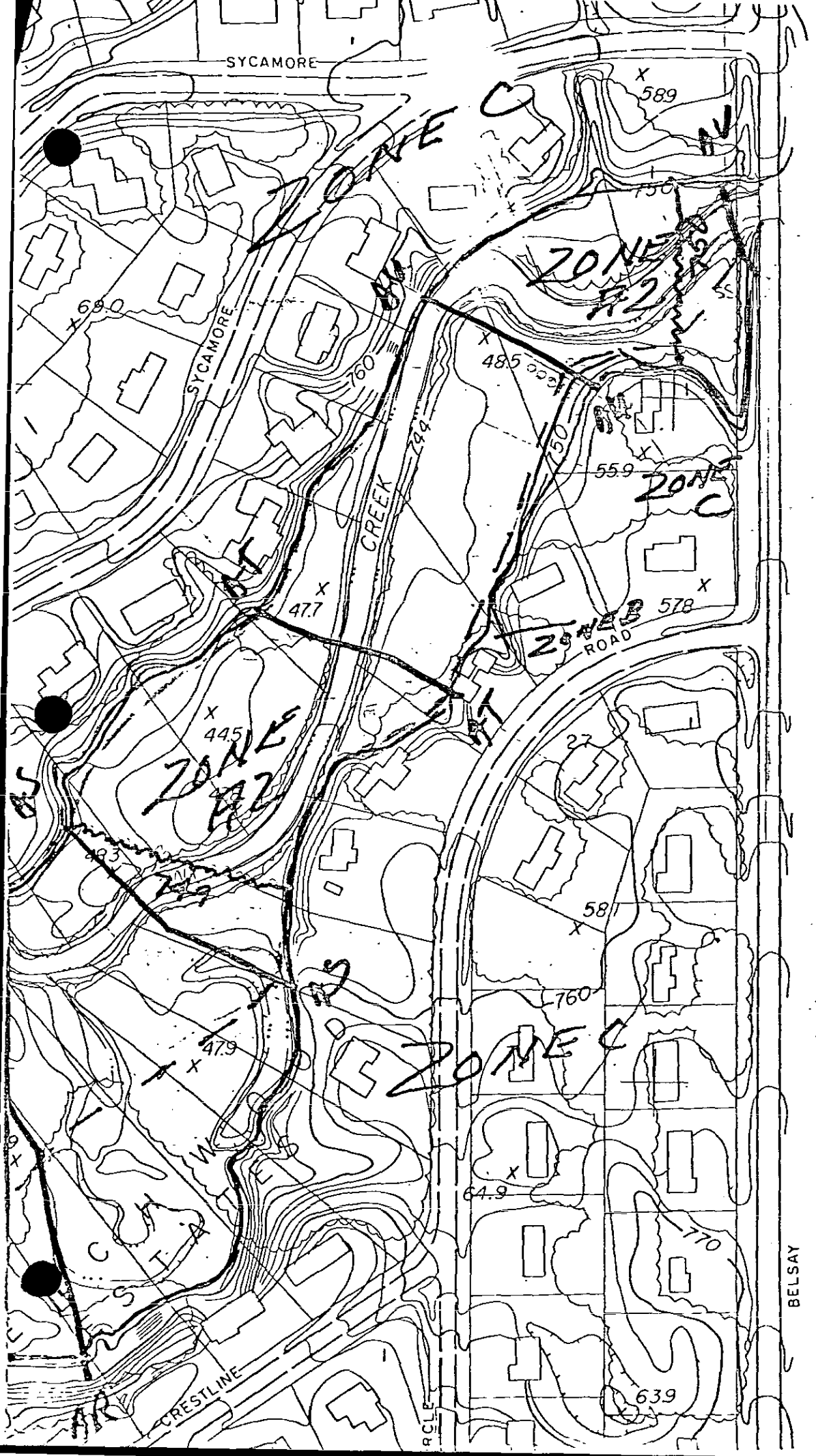
AVENUE
51.9
51.5
50.1
41.9
740
750
748
ZONE A
ZONE A
ZONE A


N564
RICHE
EGLESTON
ZONE B
ZONE C
NC
NC
NC
53.0
53.
188
750
740
740
740
415
742
42.2
401
750
752
760
754
522
621
750
N563


GARDENS
STOCKBRIDGE
ALCOTT
764
642
766
66.5
523
53.5
158
140
122
656
66.2
ZONE C
766
768
760
764
650
750
42.2
43.5
42.5
43.8
67.0
740
750
754
740
745
ZONE B
ZONE A3
ZONE C
56.7
43.0
744
742
442
AE
AF
AH


KEARSLE
ZONE R3
ZONE C
ZONE C
ZONE R3
ZONE R3
ZONE R3
754
59.5
760
60.2
750
746
45.9
58.3
45.0
45.5
45.5
45.9
50
62.2
46.5
750
751.5
754
742
762
65.9
45.9
742
69.0
768
760
756
764
762
758
68.2
67.0
68.9
69.9
81
069


ZONE C
ZONE A2
ZONE B
ZONE A3
ZONE A2
ZONE B
ZONE C
SOUTH
SYCAMORE
CIRCLE
ORCHARD
CRESTLINE
ROAD
762
764
760
750
742
746
768
445
443
448
45.0
46.1
45.8
45.9
42.1
48.3
47.9
67.9
69.5
67.0
60.2
53.2
58.2
65.9
68.5
15
16
17



BUILDING

UNDER CONSTRUCTION OR RUIN

TANK OR SILO

FENCE OR FIELD LINE

LOCATED OBJECT (LABEL)

TOWER

UTILITY LINE

QUARRY OR STOCK PILE

LAND USEAGE (LABEL)

RETAINING WALL

TREES

DRAIN LESS THAN 20' WIDE

DRAIN OVER 20' WIDE

LAKE

SWAMP

DAM

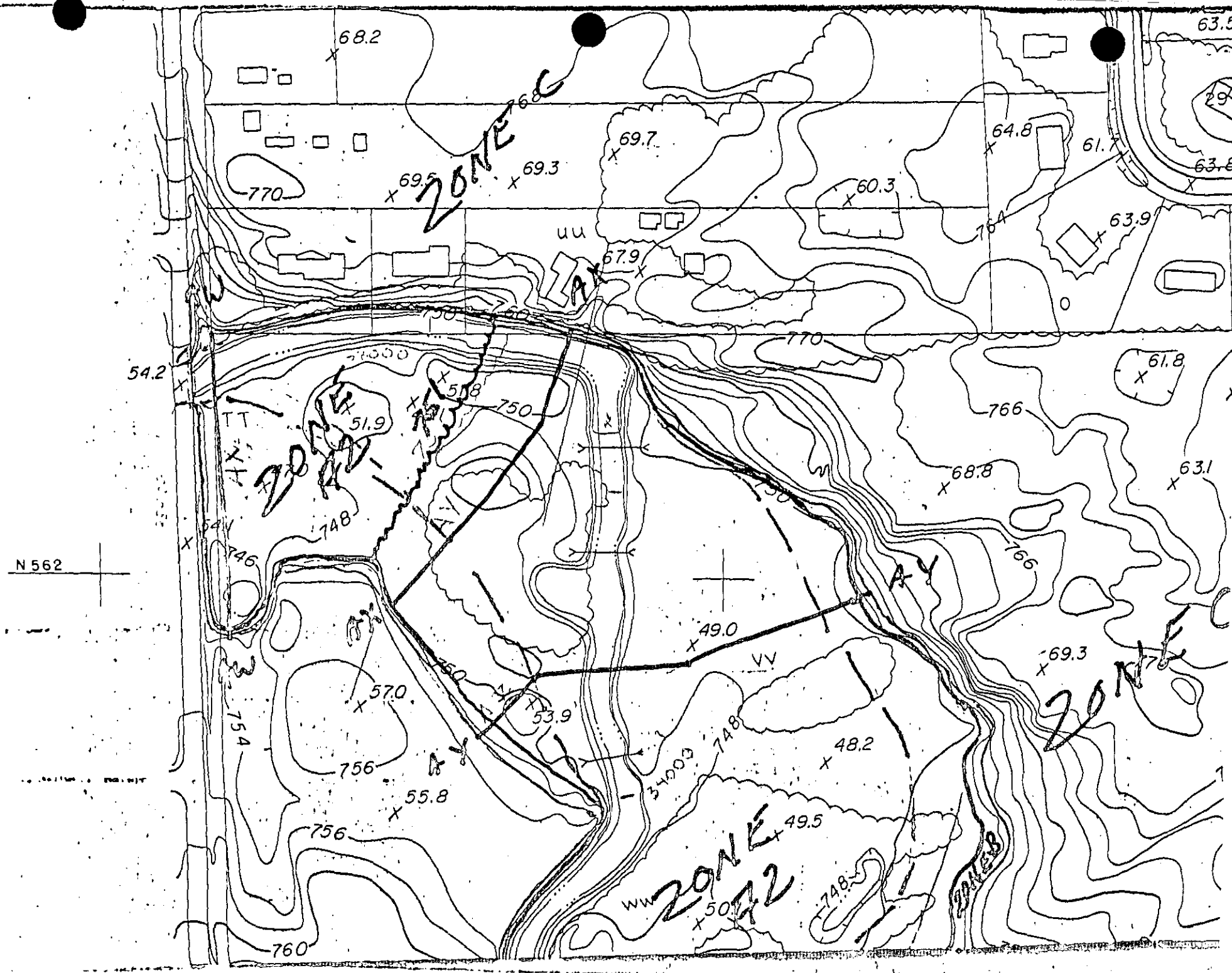
INDEX CONTOUR (25')

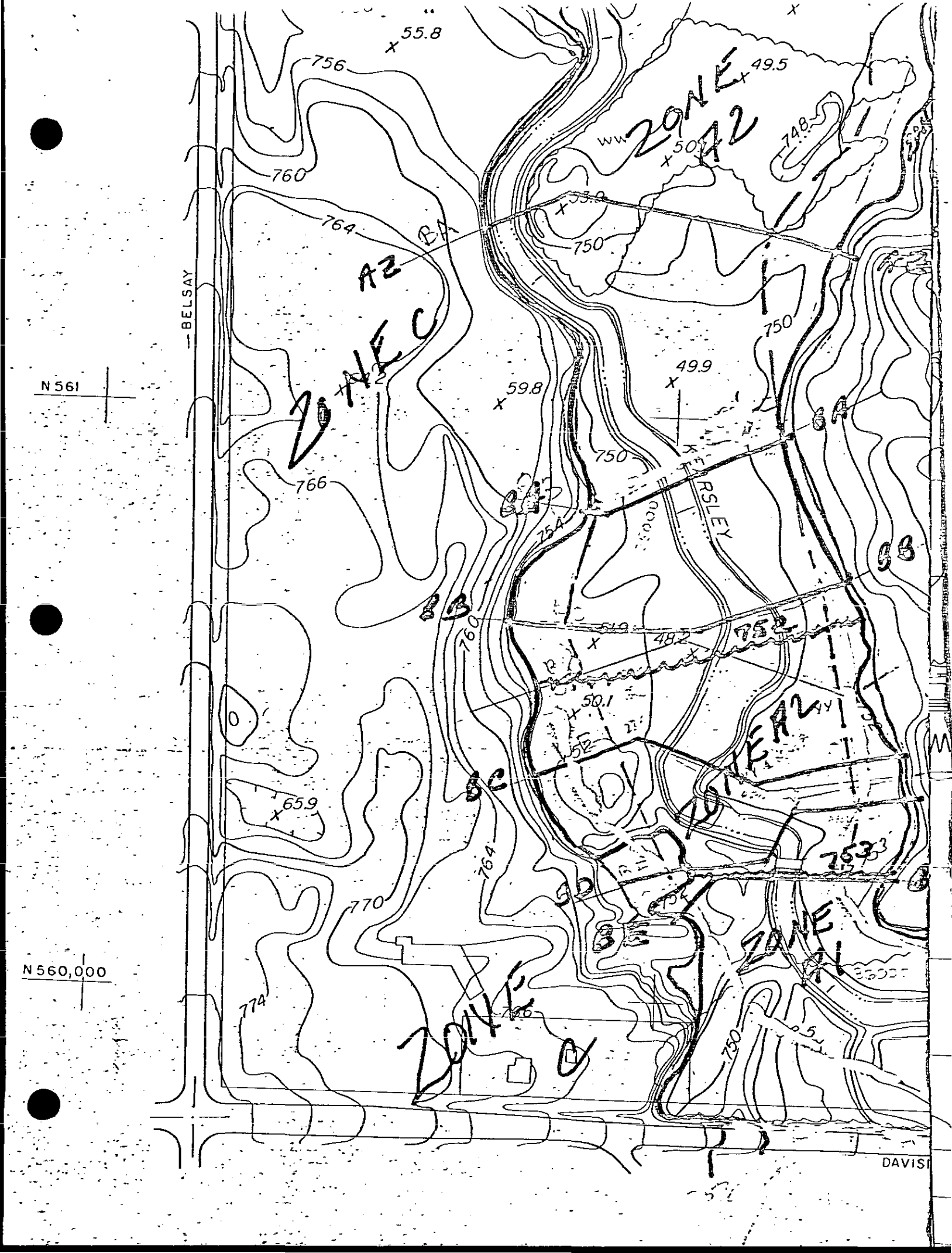
INTERMEDIATE CONTOUR (5')

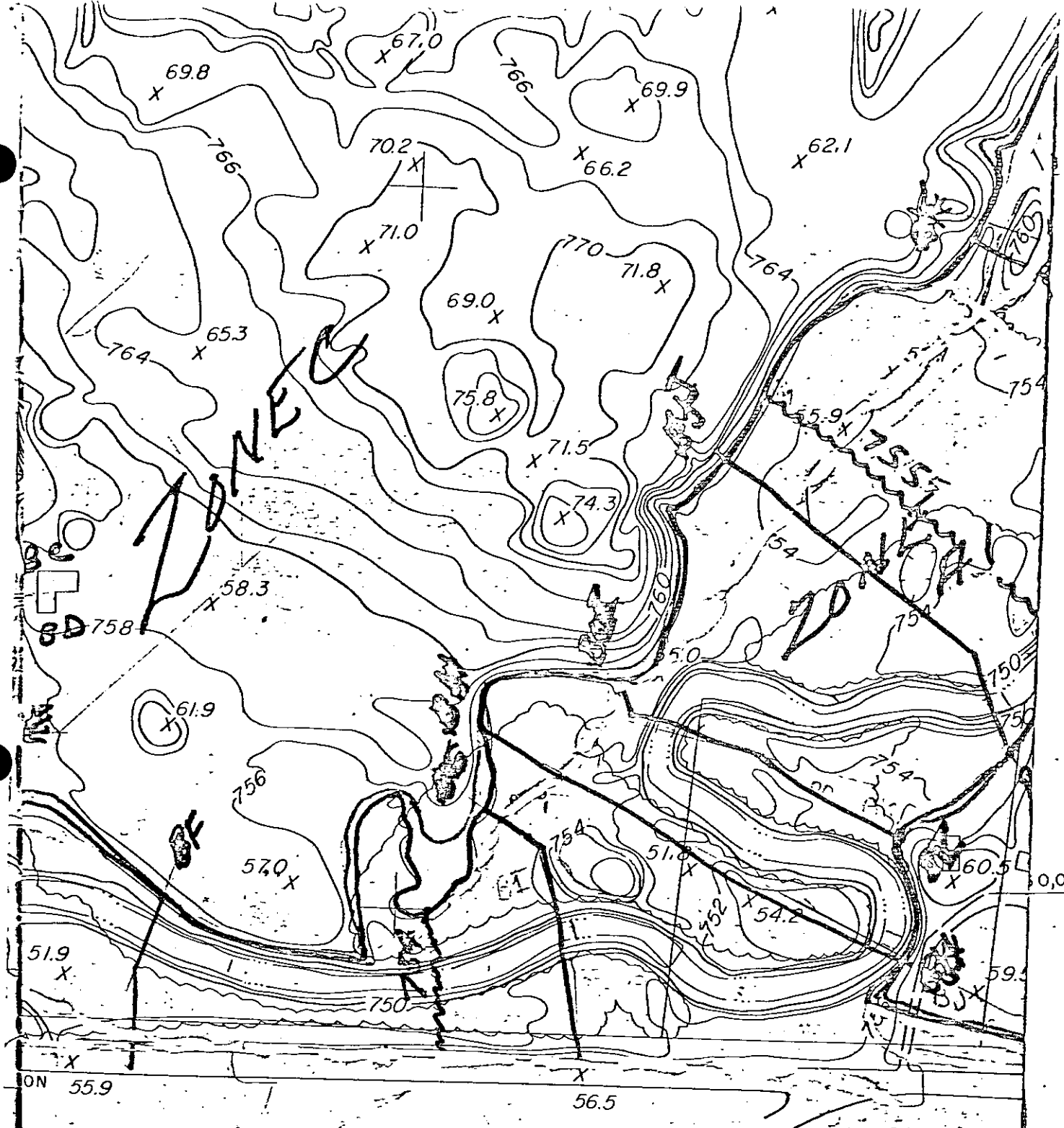
DEPRESSION CONTOUR

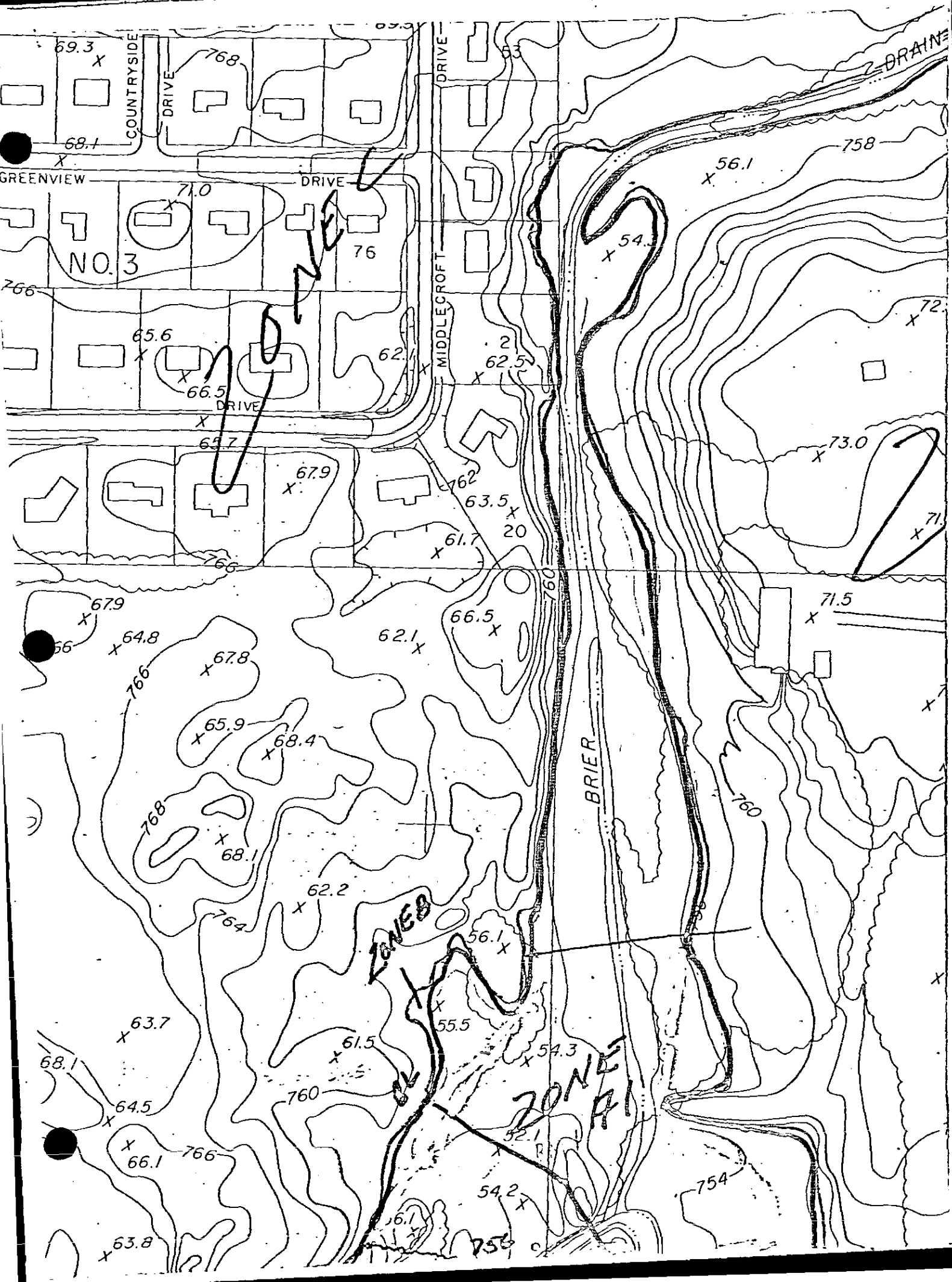
SPOT ELEVATION

BENCH MARK


ZONE C
ZONE A
ZONE B
ZONE C
ZONE A
ZONE A
ZONE A
ZONE A
ZONE A
N 562
68.2
69.7
69.3
69.5
64.8
61.7
60.3
63.9
67.9
54.2
51.9
61.8
68.8
63.1
69.3
49.0
57.0
53.9
48.2
55.8
49.5
50.2
770
766
764
760
756
754
748
746
750
TT
UU
VV
WW
XX
YY


55.8
756
49.5
ZONE A2
748
760
764
750
A2
BA
BELSAY
ZONE C
N561
59.8
49.9
750
6A
766
754
FERSLEY
6B
760
48.2
752
50.1
ZONE A2
6C
65.9
764
753
770
ZONE A
774
750
N560,000
ZONE D
DAVISI


69.8
67.0
766
69.9
70.2
66.2
62.1
71.0
770
71.8
764
69.0
65.3
764
75.8
71.5
74.3
55.9
754
58.3
758
760
55.0
754
750
61.9
756
754
57.0
51.8
752
54.2
60.5
51.9
750
59.5
55.9
56.5
E 2,199
No encroachment
SEC BE to SEC B


COUNTRYSIDE
DRIVE
GREENVIEW
DRIVE
NO. 3
MIDDLECROFT
DRIVE
DRIVE
DRAIN
BRIER
ZONE B
ZONE A1
768
766
764
762
760
758
756
754
69.3
68.1
71.0
65.6
66.5
69.7
67.9
63.5
61.7
66.5
62.1
62.5
56.1
54.3
73.0
71.5
64.8
67.8
65.9
68.4
68.1
62.2
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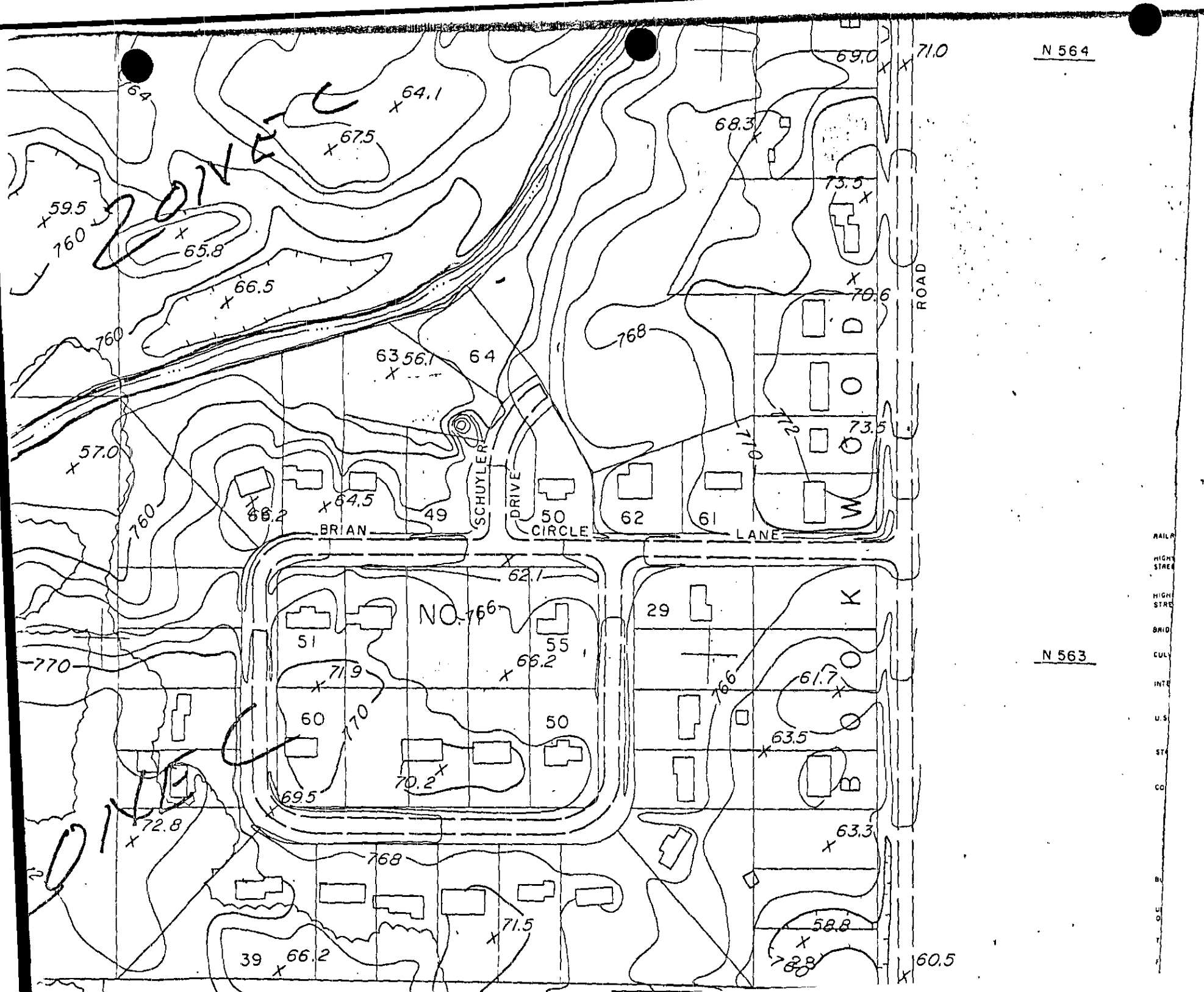
55.5
54.3
61.5
63.7
64.5
66.1
52.1
54.2
63.8


N 564
N 563
ROAD
BRIAN
CIRCLE
LANE
SCHUYLER
DRIVE
NO.
64
64.1
67.5
59.5
760
65.8
66.5
760
63
56.1
64
768
69.0
71.0
68.3
73.5
70.6
73.5
57.0
760
66.2
64.5
49
50
62
61
62.1
29
51
55
66.2
770
71.9
770
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50
69.5
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72.8
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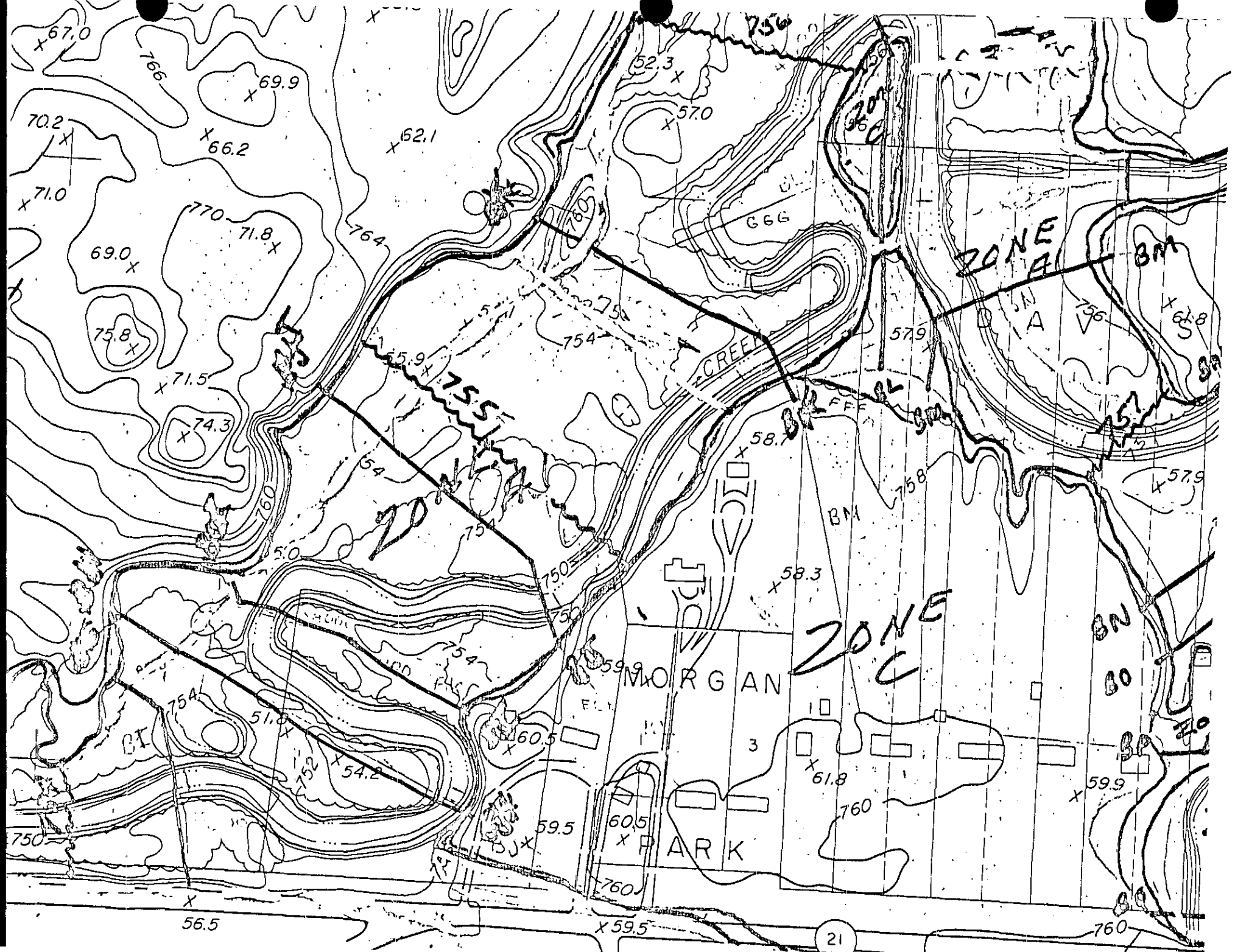
39
66.2
61.7
63.5
63.3
58.8
60.5


ZONE A
ZONE C
MORGAN
PARK
CREEK
BM
BP
BN
BO
BT
67.0
69.9
70.2
66.2
62.1
52.3
57.0
71.0
770
71.8
69.0
75.8
71.5
74.3
55.9
755
754
756
764
766
760
750
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59.5
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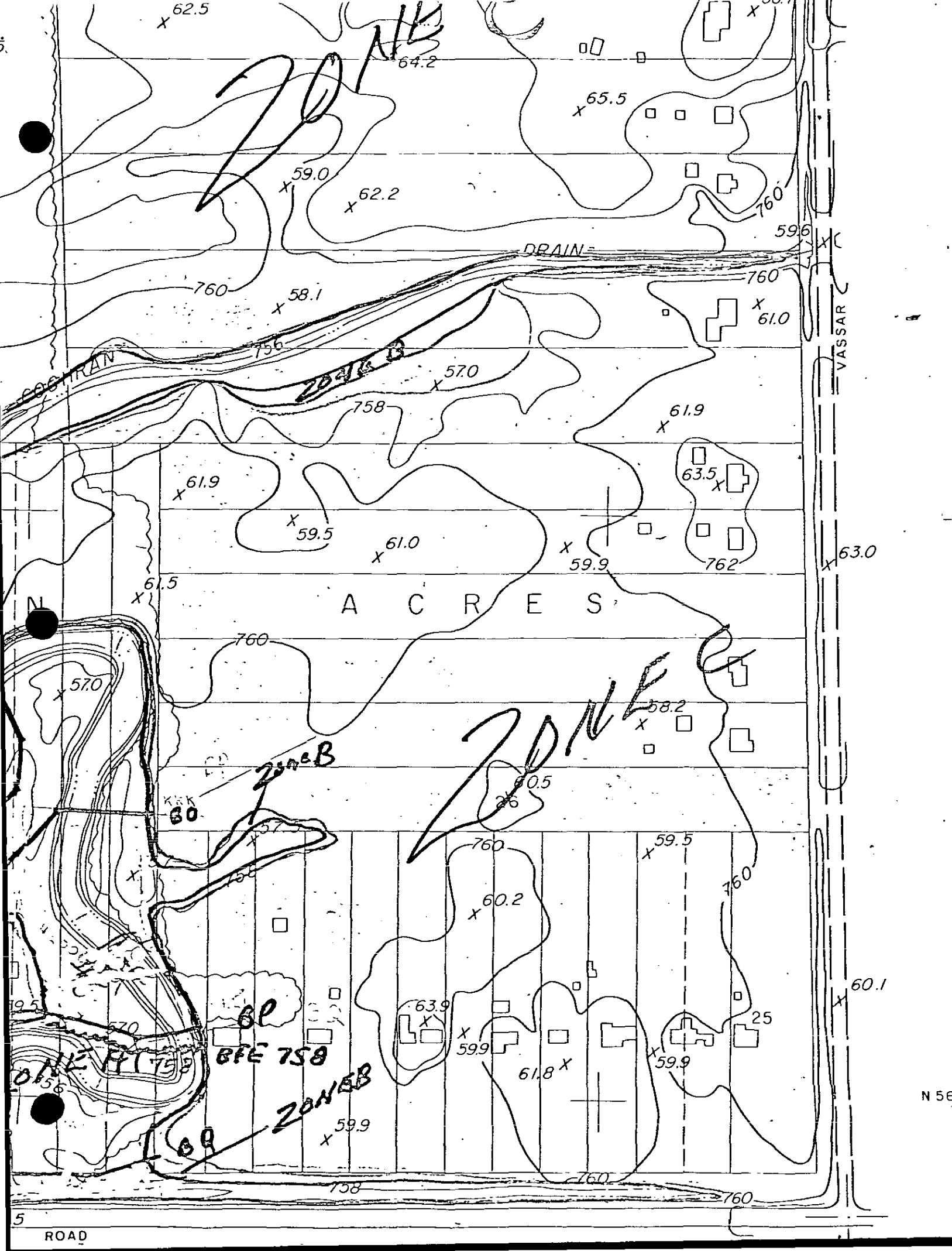
51.0
56.5
21


62.5
64.2
65.5
59.0
62.2
760
59.6
DRAIN
760
58.1
61.0
VASSAR
COCHRAN
756
57.0
758
61.9
63.5
61.9
59.5
61.0
59.9
762
63.0
61.5
A C R E S
760
57.0
58.2
60.5
60
760
59.5
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60.1
63.9
25
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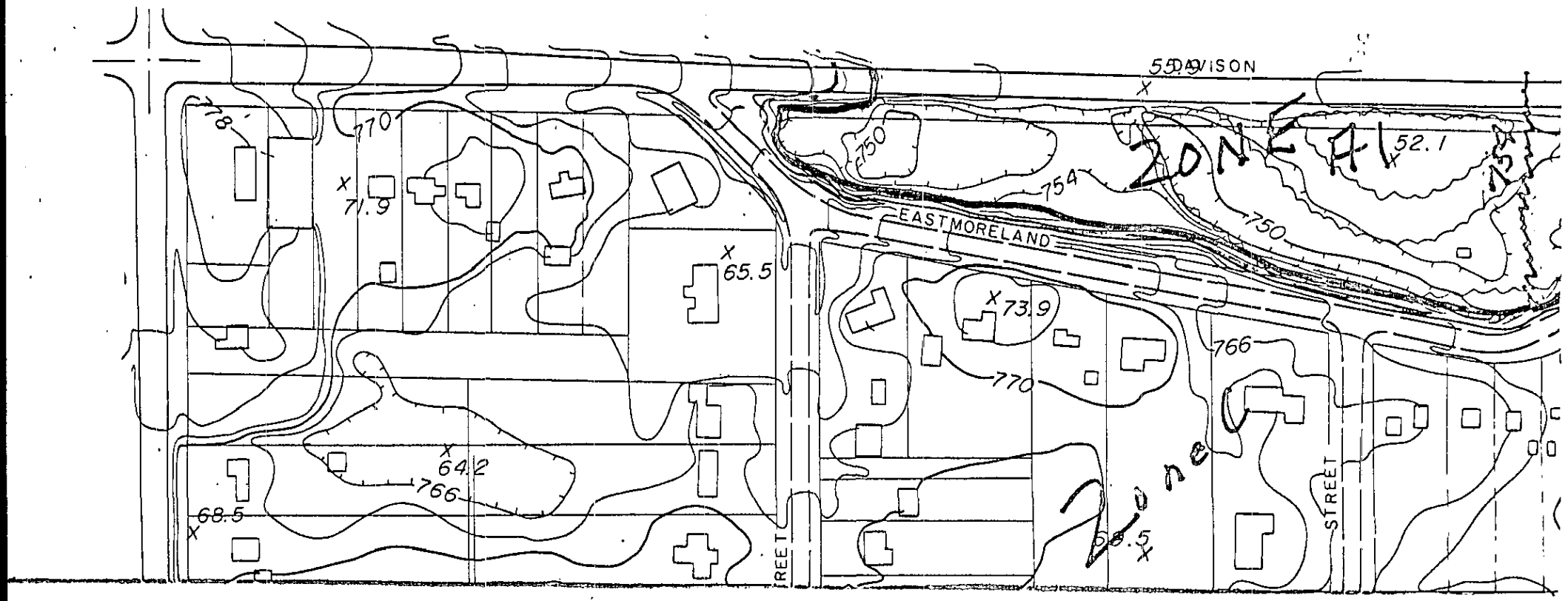
59.9
BFE 758
59.9
758
760
760
ROAD


E 2,198,000
E 2,199
DAVISON
EASTMORELAND
STREET
STREET
770
71.9
78
65.5
64.2
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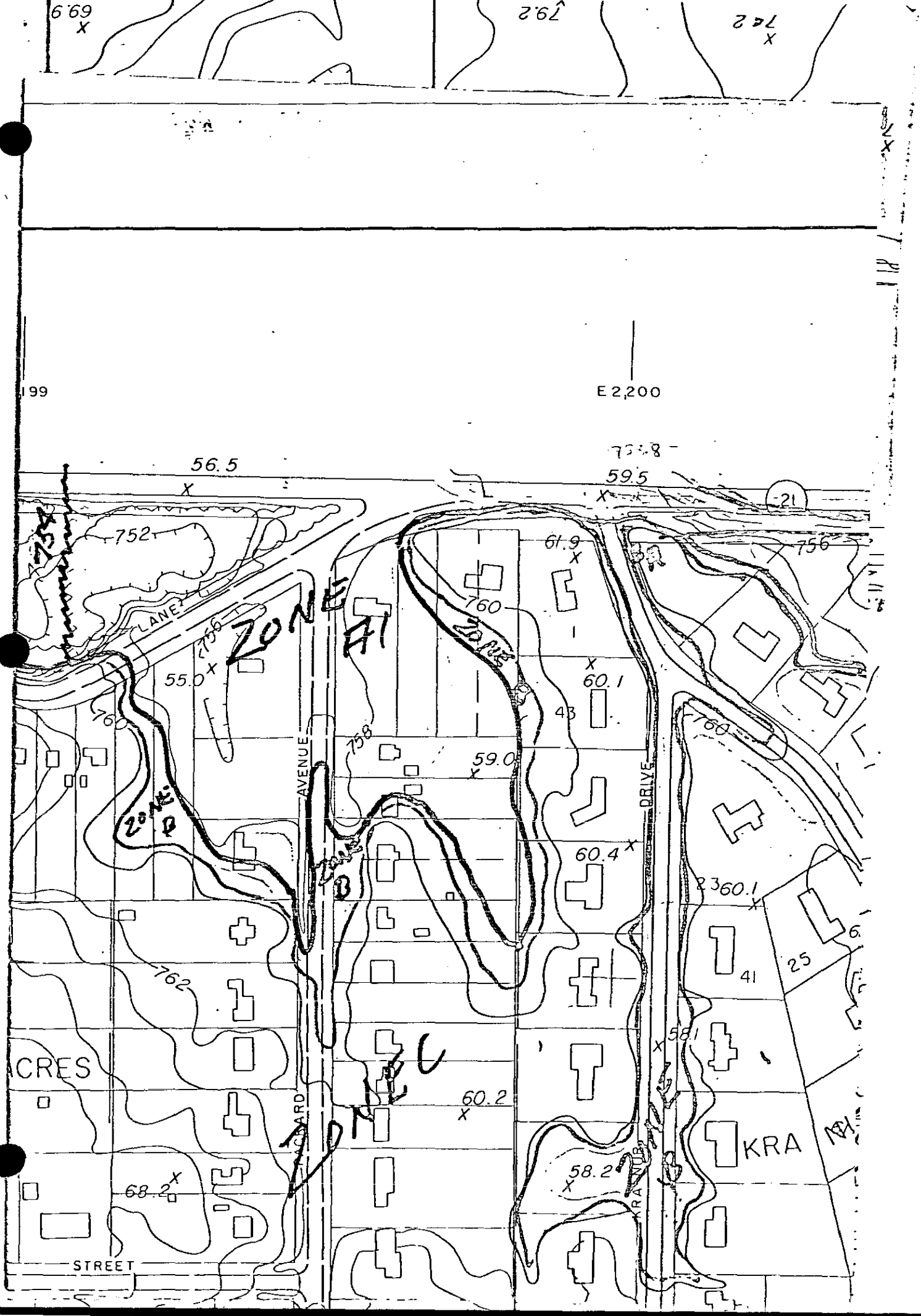
750
73.9
770
766
68.5
52.1
55.9
ZONE A1
None


E 2,200
56.5
59.5
752
754
756
758
760
762
LANE
AVENUE
DRIVE
STREET
ACRES
KRA
55.0
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60.1
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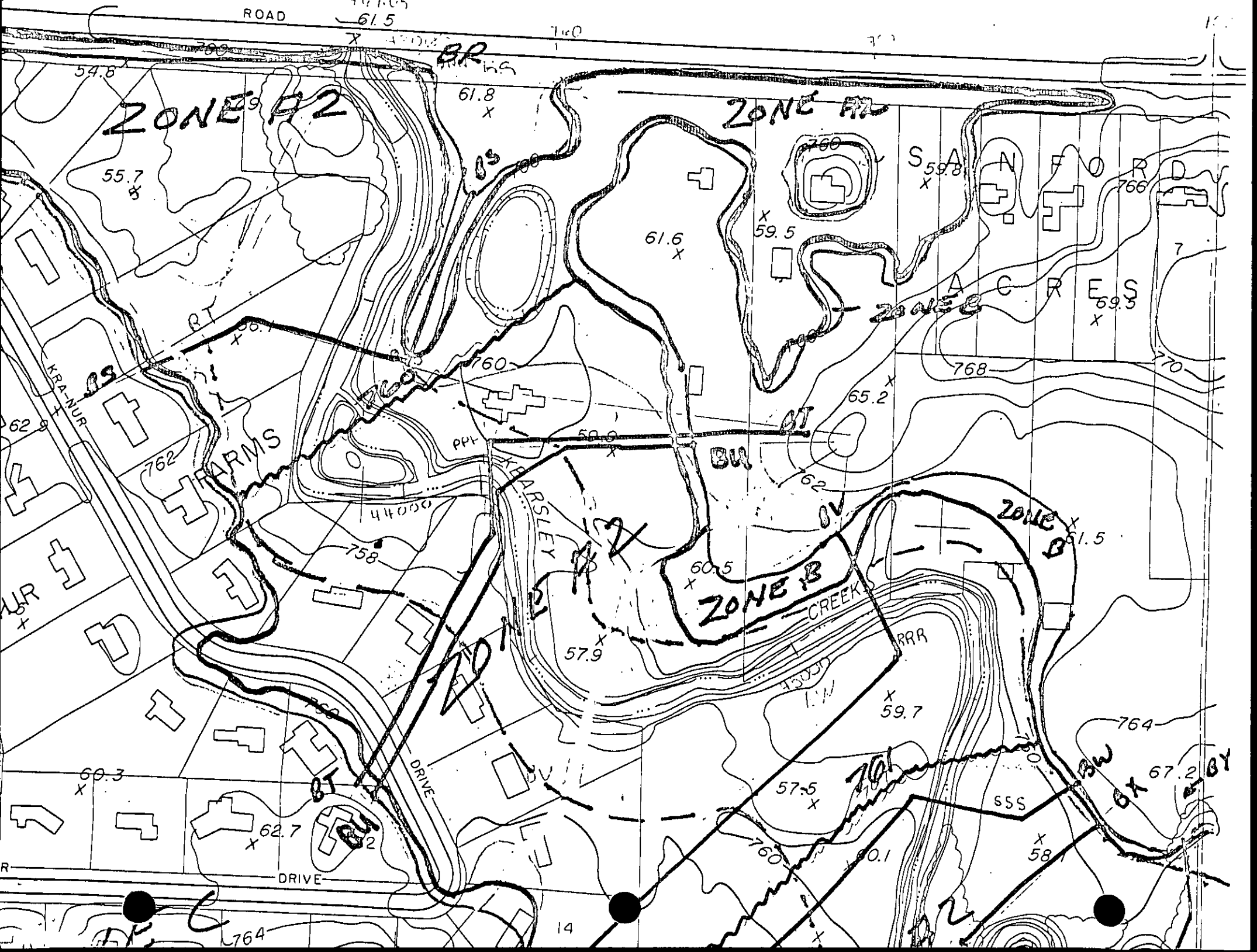
58.2
68.2
43
41
25
21
ZONE A1
ZONE B
ZONE C


ROAD
ZONE A2
ZONE A2
ZONE A2
ZONE A2
ZONE B
ZONE B
S A N F O R D
A C R E S
FARMS
KRANUR
BARSLEY
CREEK
DRIVE
DRIVE
61.5
61.8
54.8
55.7
61.6
59.5
59.8
69.5
65.2
62
61.5
60.5
57.9
59.7
57.5
58
67.2
62.7
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766
768
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762
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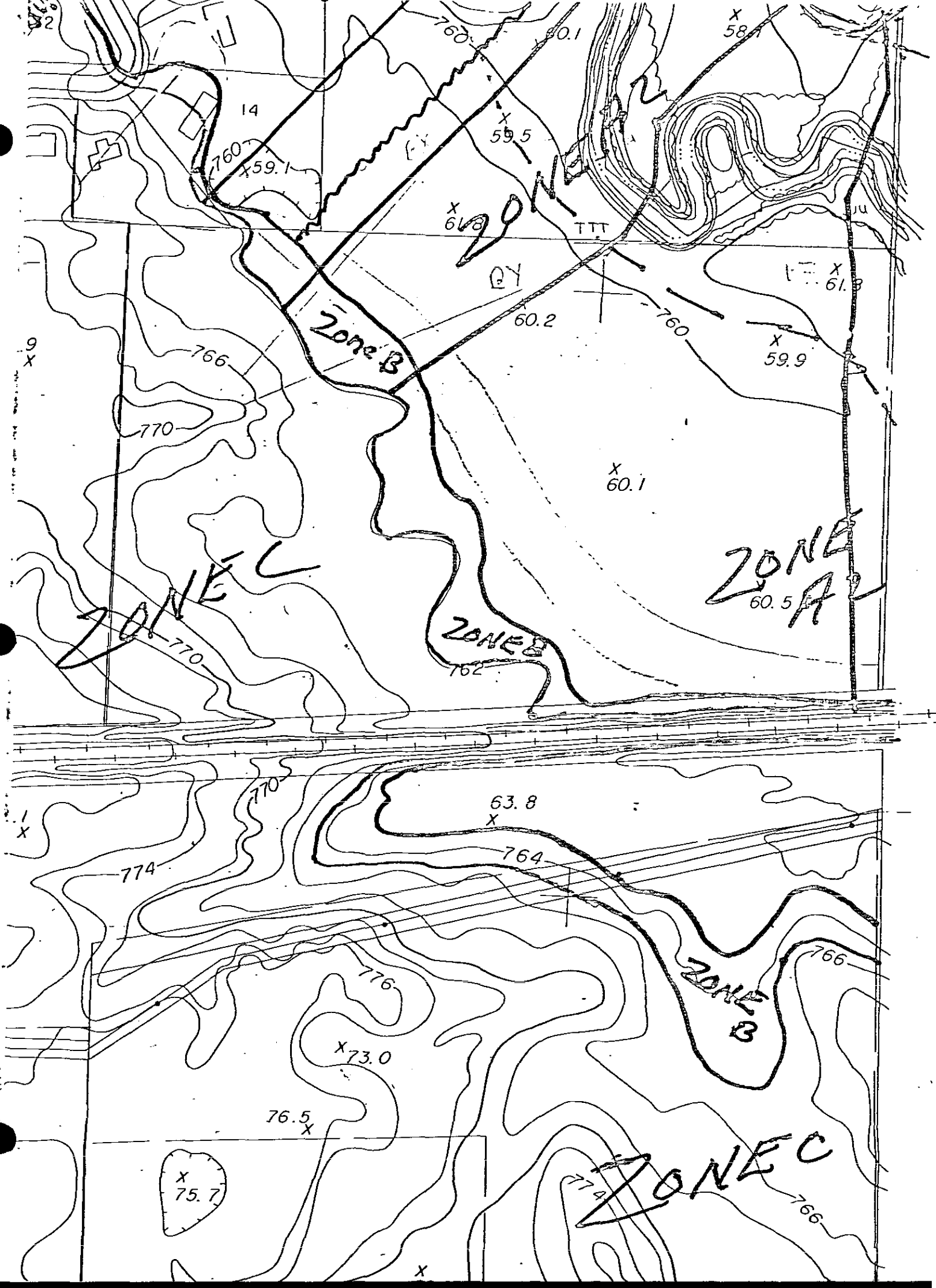
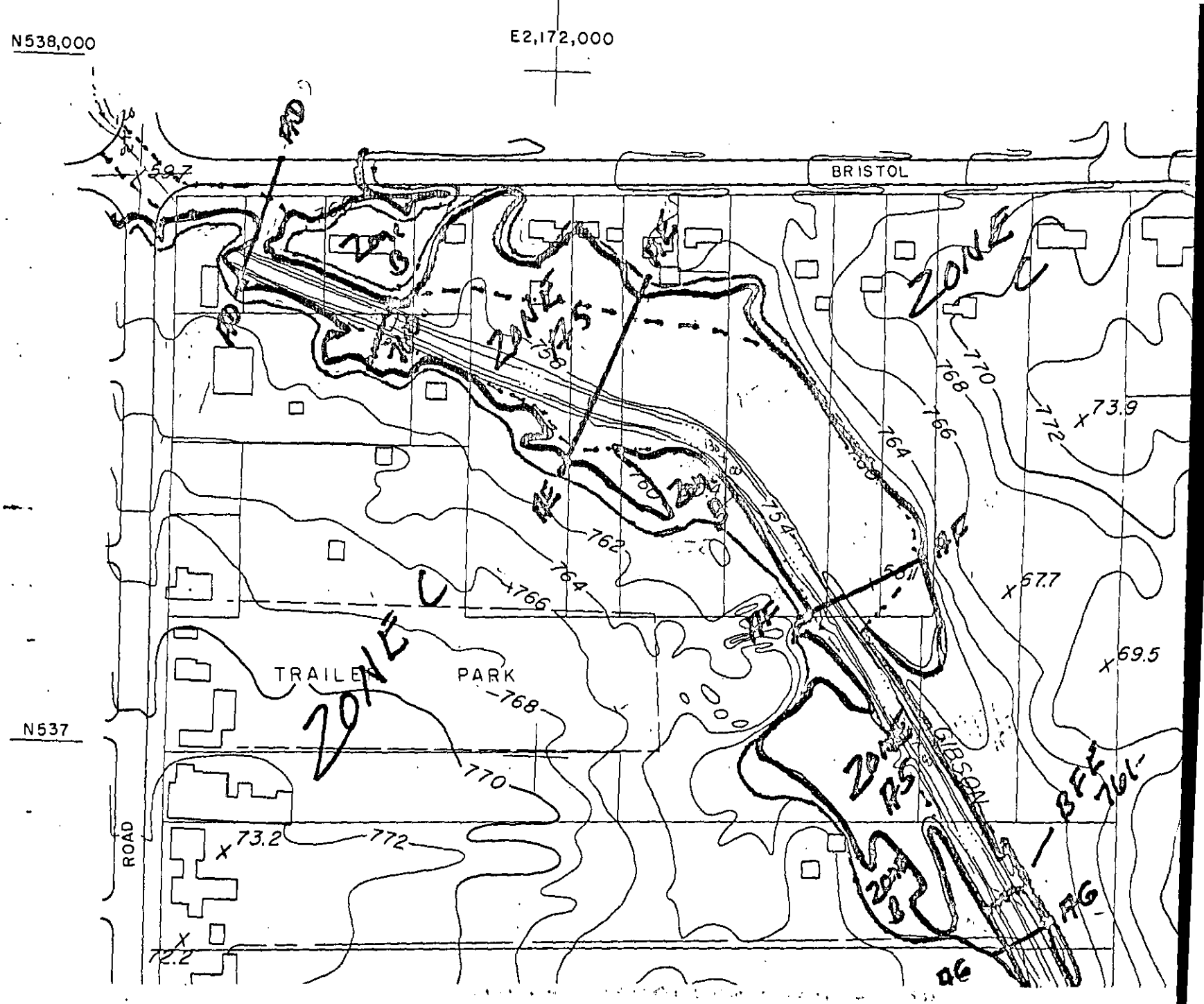
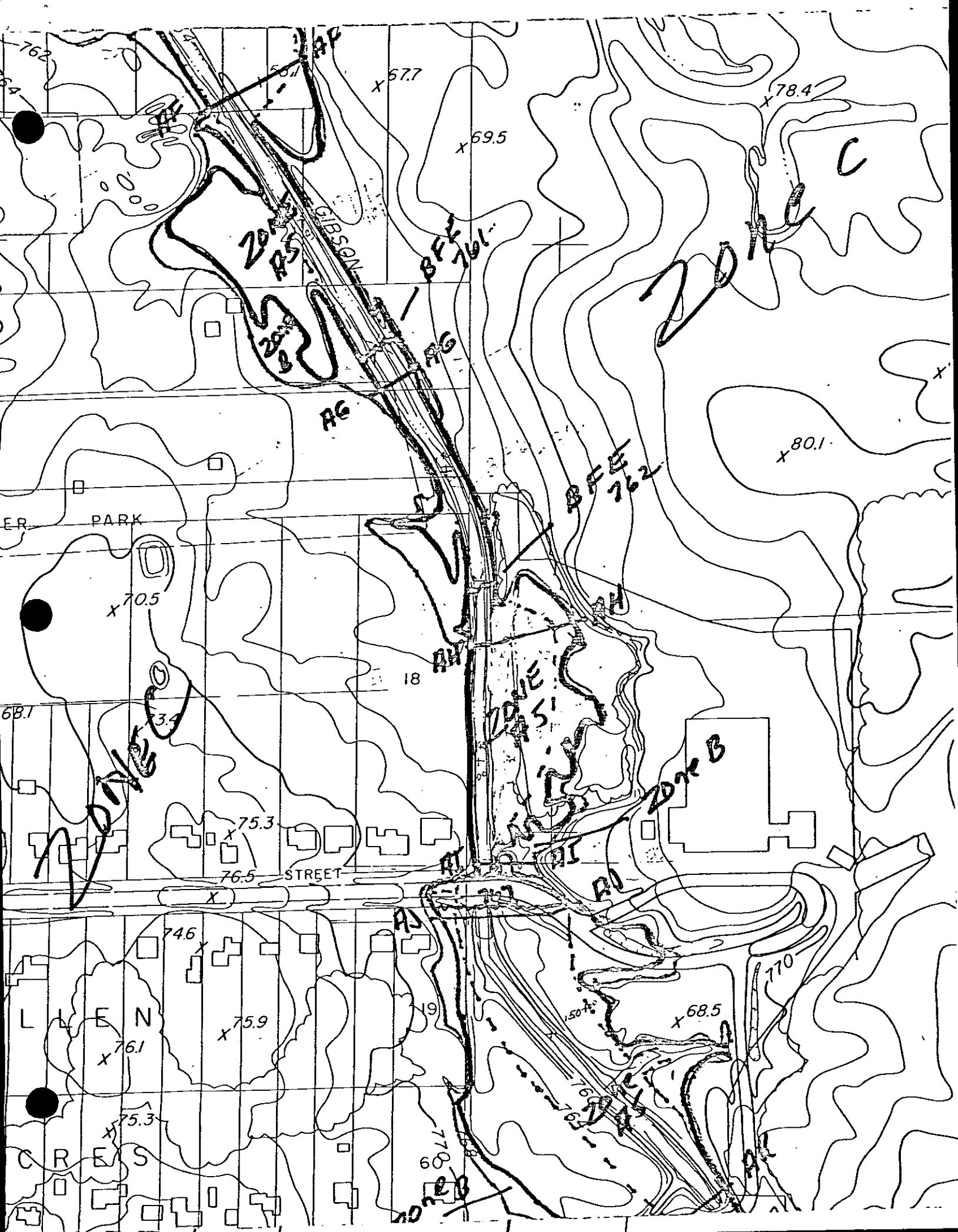
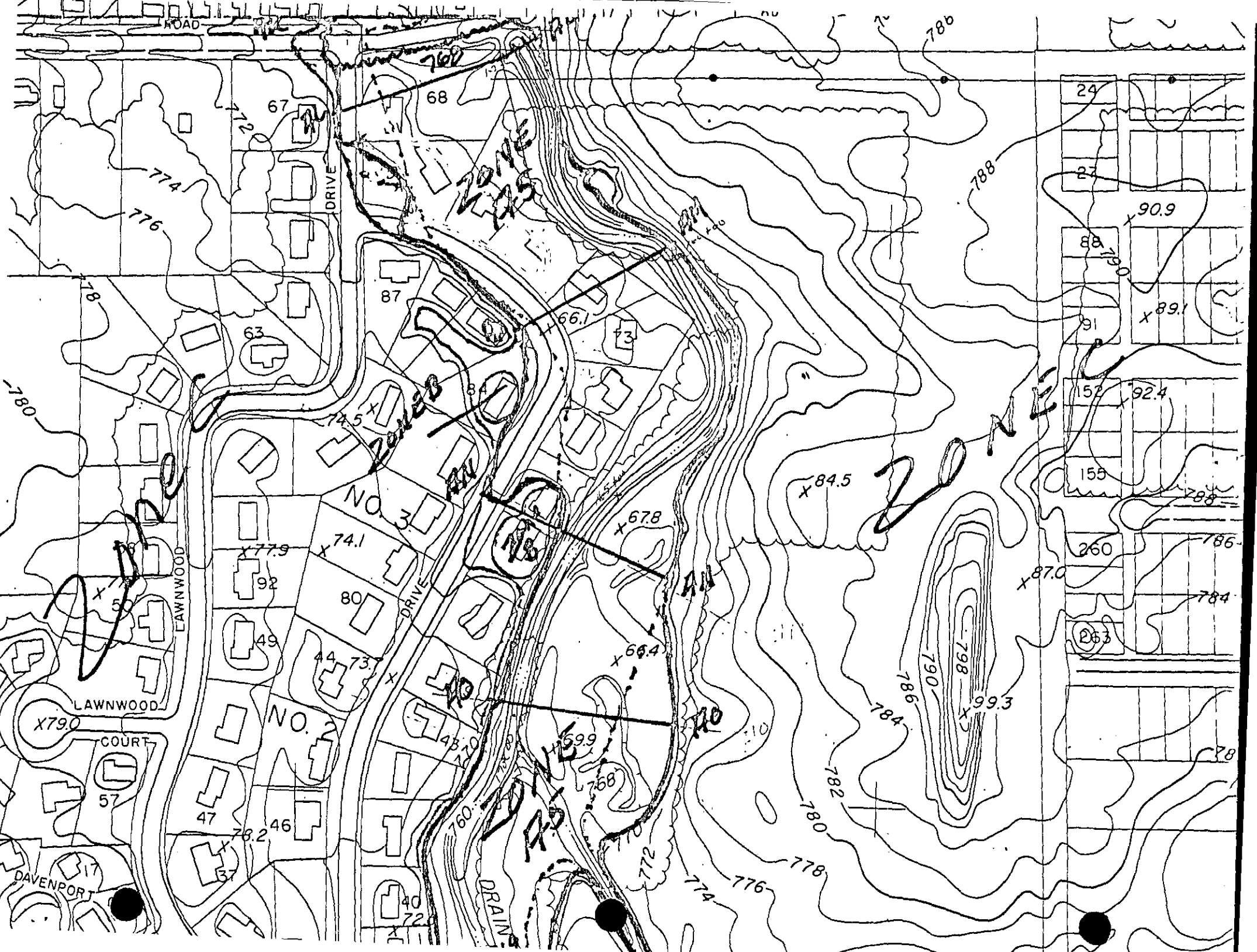
44000


ZONE A
ZONE B
ZONE C
ZONE A
ZONE B
ZONE B
ZONE C
14
760
59.1
59.5
58.1
60.1
60.2
59.9
60.1
60.5
61.8
766
770
774
764
63.8
776
73.0
76.5
75.7
774
766
770
762

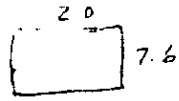

N538,000
E2,172,000
BRISTOL
TRAILER PARK
N537
ROAD
GIBSON
ZONE C
ZONE B
ZONE A5
ZONE A6
BFE
RP
73.9
67.7
69.5
73.2
72.2
59.7
770
768
766
764
762
754
772
761

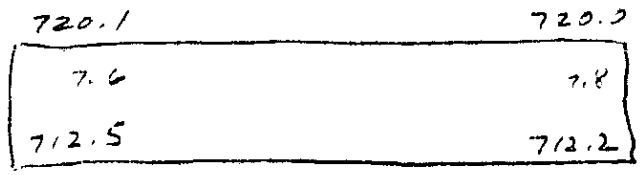

762
67.7
69.5
78.4
Zone C
GIBSON
Zone A5
BFE 761
Zone B
AG
AG
80.1
BFE 762
ER PARK
70.5
AH
AH
18
68.1
73.4
Zone C
Zone A5
Zone B
75.3
76.5
STREET
AI
AI
AJ
AJ
74.6
770
L L E N
75.9
19
68.5
76.1
75.3
C R E S
Zone A4
Zone B


ROAD
DRIVE
LAWNWOOD
LAWNWOOD
COURT
DAVENPORT
DRAIN
NO. 3
NO. 2
Zone A5
Zone B
Zone A4
Zone A6
Zone A7
Zone A8
Zone A9
Zone A10
Zone A11
Zone A12
768
67
68
72
774
776
778
780
87
63
66.1
73
84
74.5
74.1
77.9
92
80
50
49
44
73.7
43
57
47
46
76.2
37
17
40
72
66.4
69.9
67.8
84.5
87.0
99.3
90.9
89.1
92.4
24
27
88
91
152
155
260
263
788
790
786
784
782
780
778
776
774
772
770
768
760

ZONE
ZONE
ZONE
ZONE
FAIRWOOD
DRAIN
DRIVE
B U R T O N
W O O D S
E2,173
E2,174
N
200
0
SCALE 1" = 200'

City Flood
Gilkey Creek





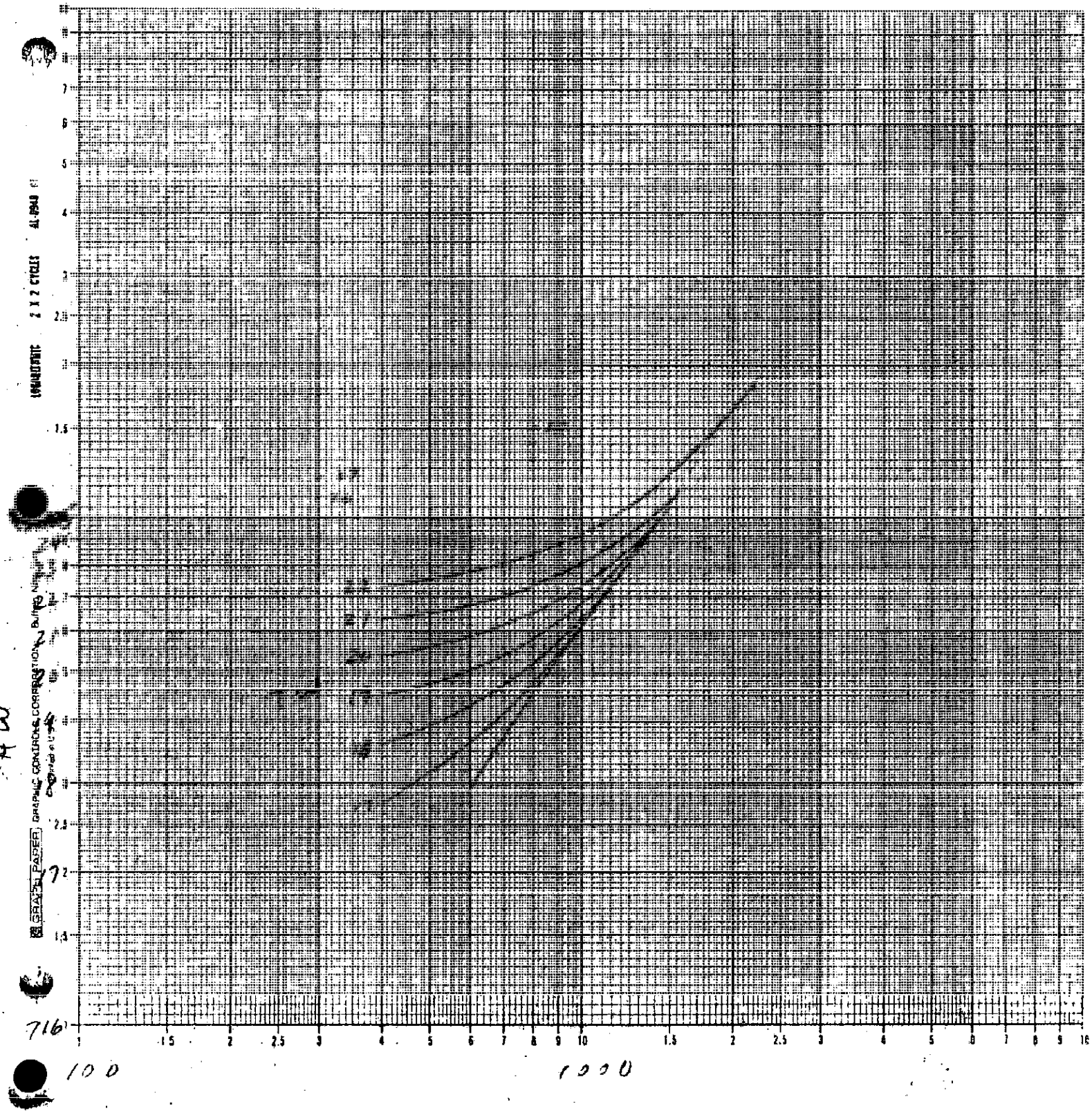
L = 72
D = 7.6

2 D + Z = 15.2
712.5
727.7
712.5
15.2

733.6
712.5
21.1

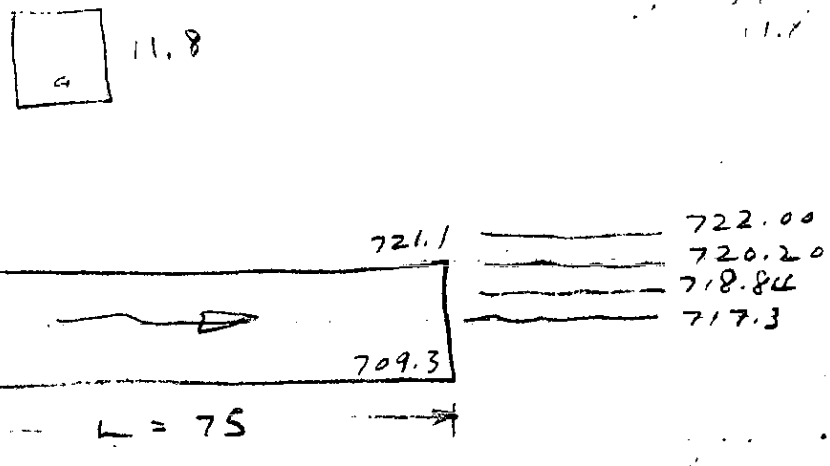
712.5
15.2
727.3

1.5 D + Z elev = 723.9
2 D " = 727.7
3 D " = 735.3
5 D " = 750.5



Culvert Sec M (2B)

SEE M1



D = 11.8

Z = 0.4

θ = 68°

2D + Z = 24.00

709.3

733.30

709.70

23.60 / 24 =

733.70

709.70

24.00 / 24 = 1.00

.04 D = .47

709.3

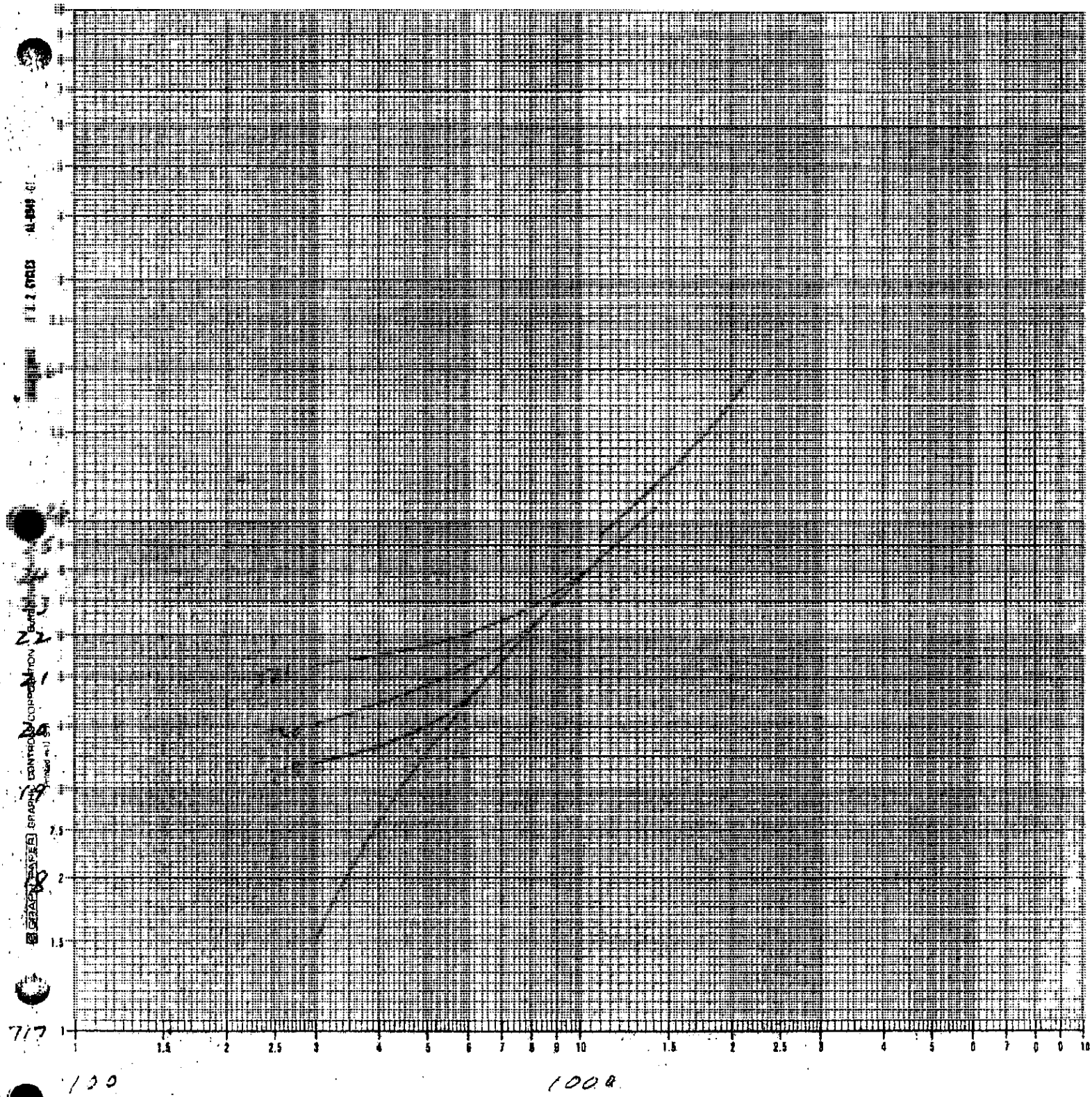
709.77

1.5 D + Z = 18.1 + 709.3 = 727.4

2 D + Z = 24.0 " = 733.3

3 D + Z = 35.8 " = 745.1

5 D + Z = 59.4 " = 768.7



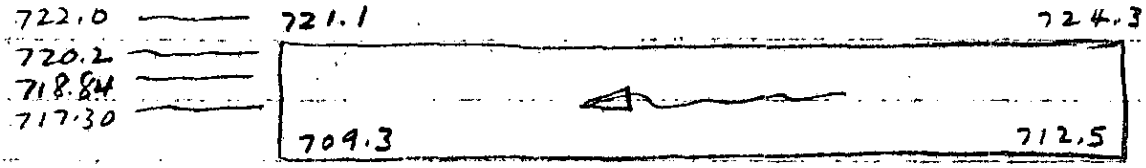
NOT USED

SEC. M, N combined

Gilkey

M, N

11.8 = D



L = 147 (72 + 75)

Z = 3.2

1.5 D + Z	=	20.9	+	709.3	=	730.2
2 D "	=	26.8	"		=	736.1
3 D "	=	38.6	"		=	747.9
5 D "	=	62.2	"		=	771.5

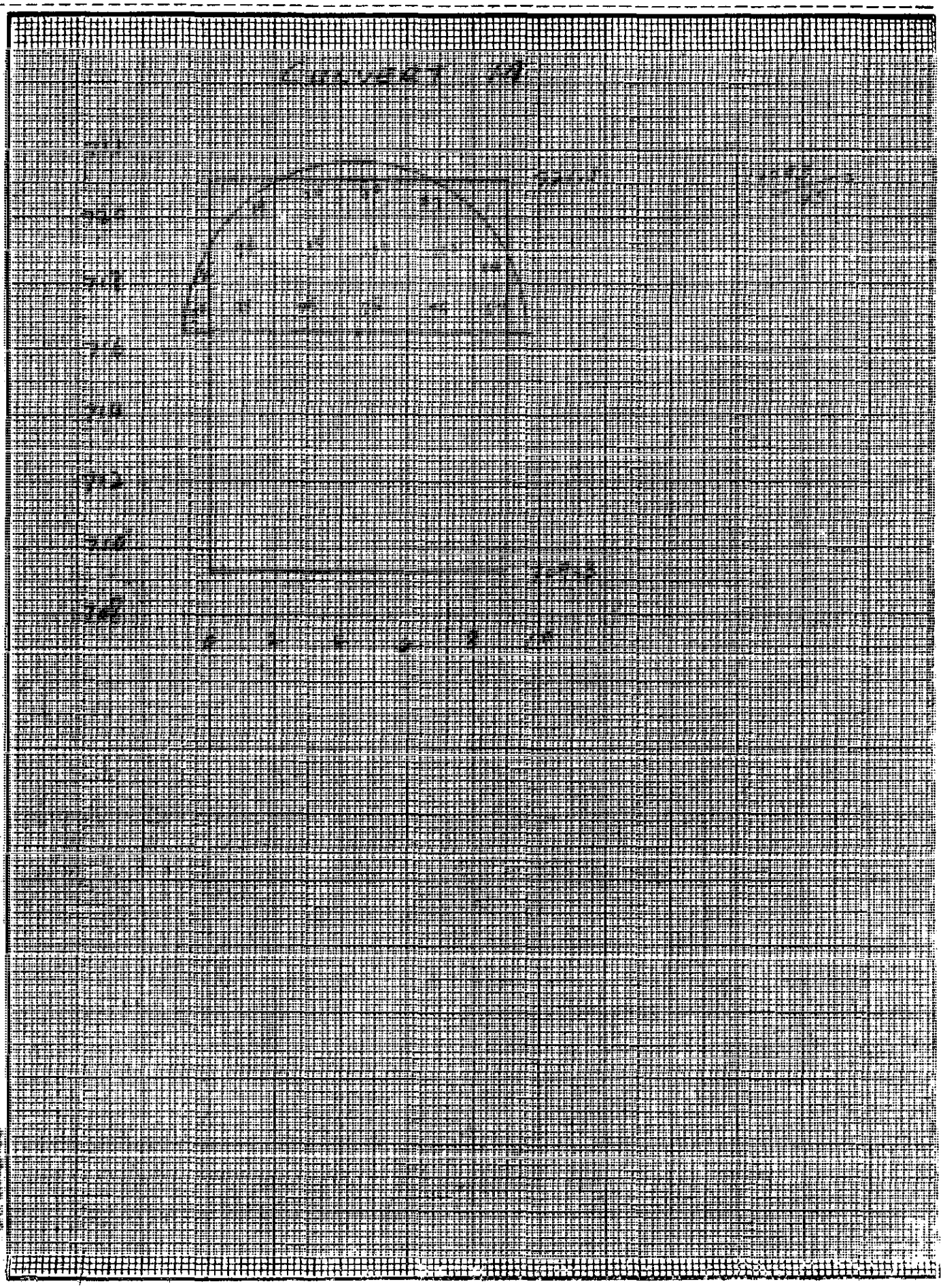
NOT USED

26.8
12.5
14.3

9-213-E
(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....



Gilkey.

Called Jim Bailey about culverts at sections M, N. He said I could compute it two ways.

1. As a culvert 147 ft long (75+72) with the dimensions of the smaller culvert.
2. Hand compute it using same length, but with a barrel tapering from dimensions of smaller culvert to those of larger.

He said results should agree within 0.5 ft.

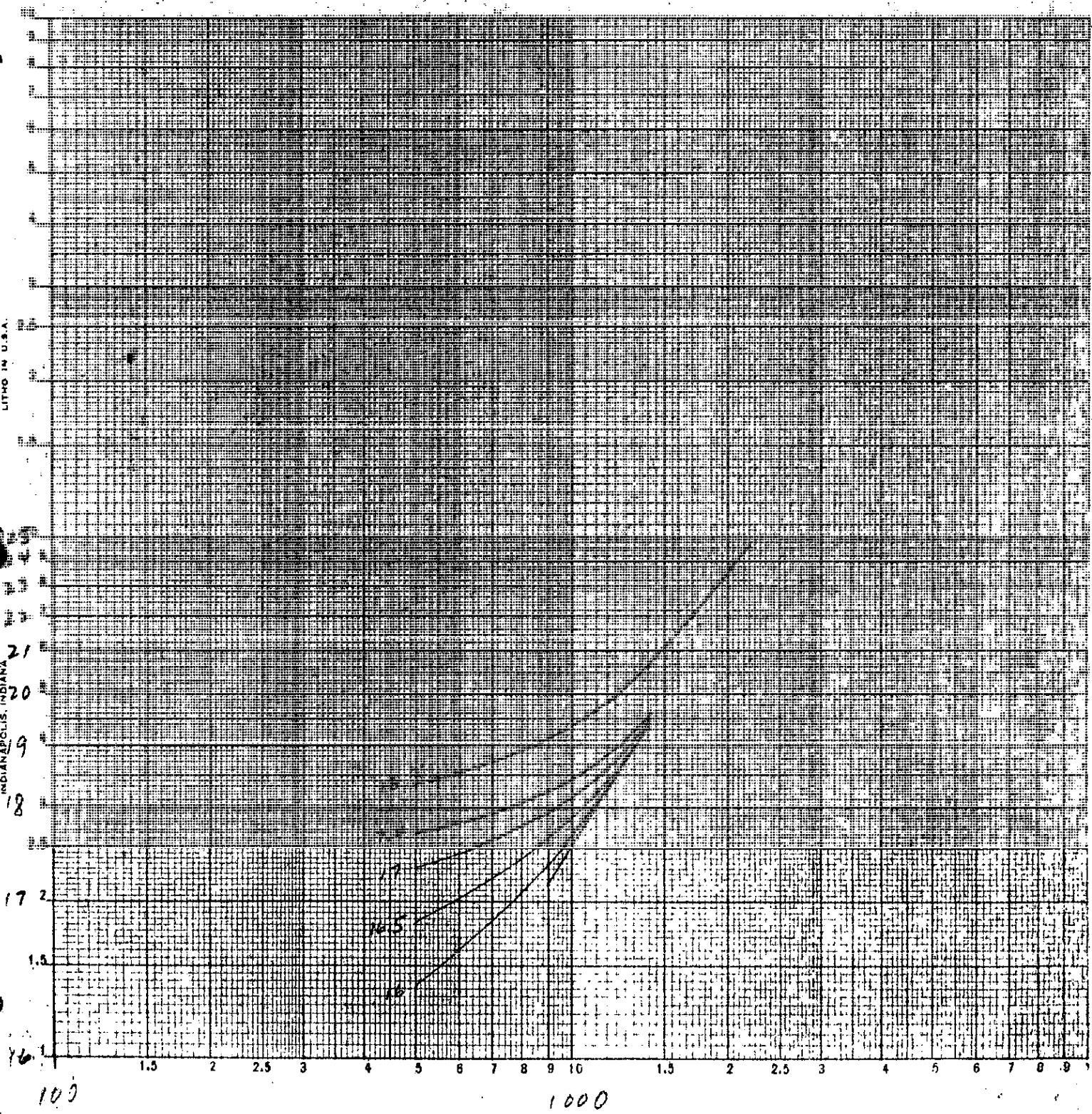
1-11-77

SEC K

721.6
Road overflow

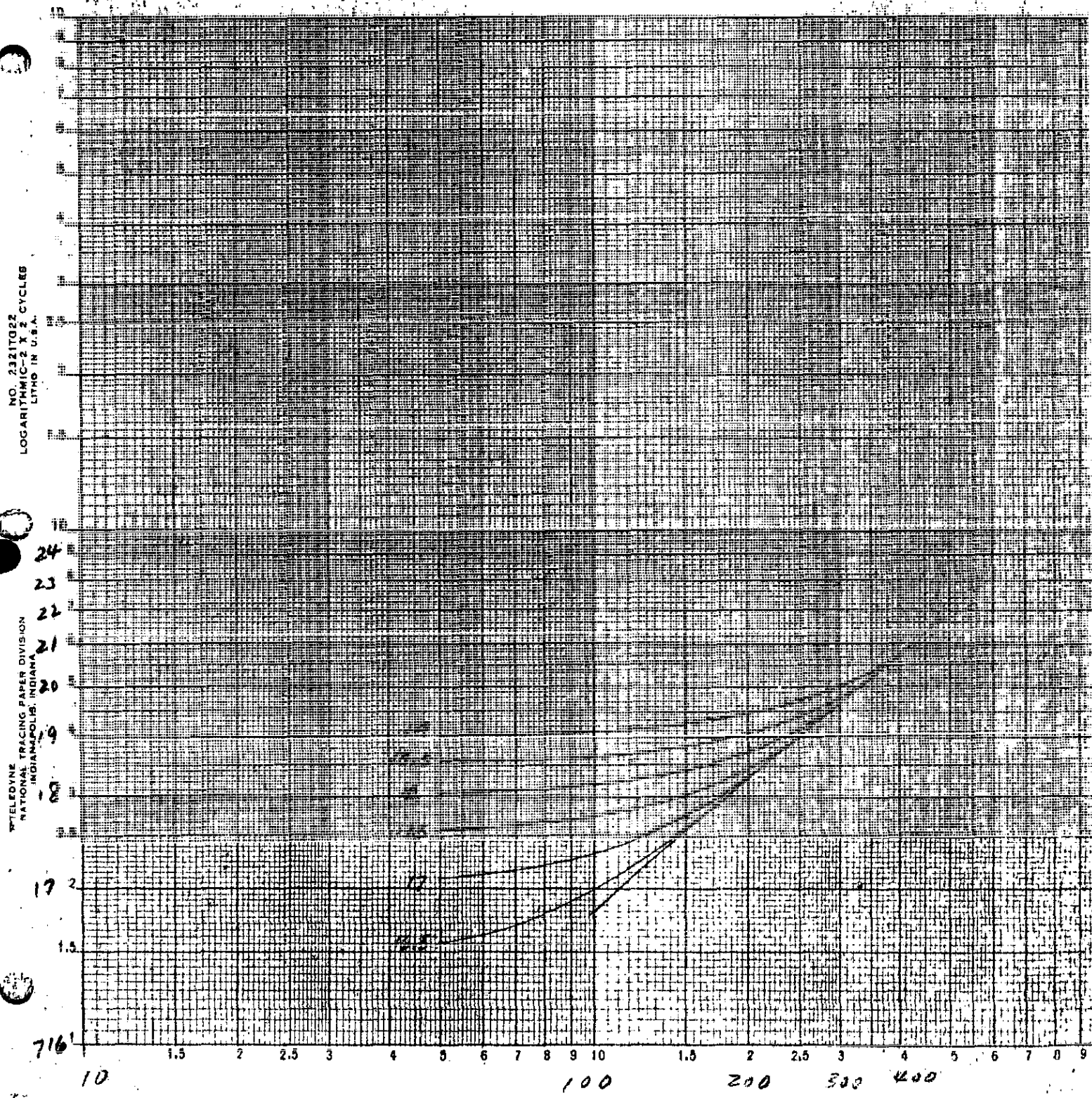
DS Elev.	Assumed US elev.	Q_L	Q_S	Q_{10}
716.33	717.1	700	130	[780]
	[717.0]	650	120	770 ok
717.44	[718.5]	1000	230 ok	[1200]
718.44	[719.5]	1100	270 ok	[1400]
719.34	721.0	1480	420	[1850]
	[720.9]	1450	410 ok	

No road overflow



SEC K. LARGE CULVERT

GILNEY.



SEE K [illegible] CULVERT

G. [illegible]

SEC K

721.6
Road overflow

Assumed

DS Elev.	US Elev.	Q_L	Q_S		Q_{10}
716.33	717.5	900	140		900
(.9)	717.0	640	120		
	717.2	760	125		885
717.44	718	700	155	855	1400
	718.2	840	180	1020	
(1.4)	718.4	960	200	1160	
	718.6	1050	215	1265	
	718.7	1080	225	1305	
	718.8	1150	235	1385	
719.44	720	1200	330	1530	1650
(1.8)	720.1	1240	340	1580	
	720.2	1300	350	1650	
719.34	721.6	1600	470	2070	2200
	721.8	1650	490	2140	
	722.0	1680	500	2180	
			over Rd.	7	
				2187	

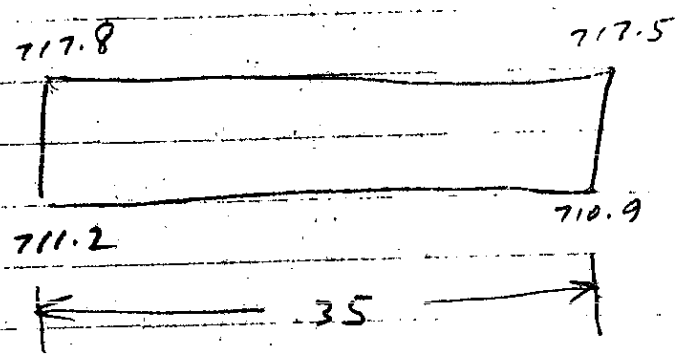
SUPERSEDED

$D = 6.6$

$2D + Z = 13.2 + 0.3 = 713.1$

724.4

SEC K
LARGE CULV



719.34
718.44
717.44
716.33

Road overflow begins at 721.6

$\Delta w = 724.4 - 711.2 = 13.2$

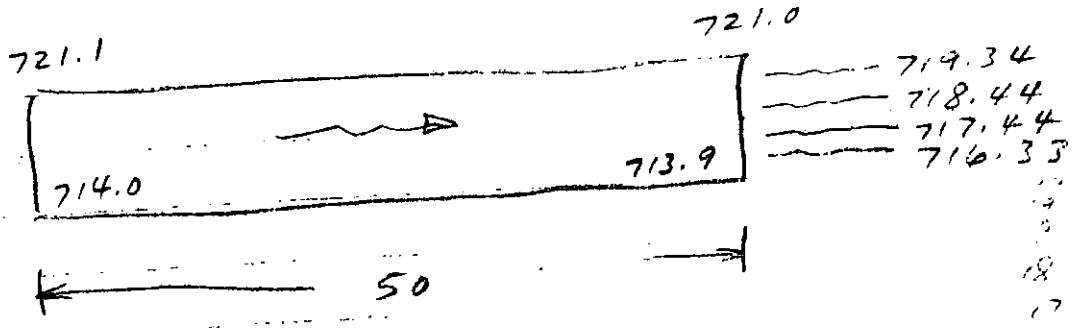
$13.2/24 = 0.55$

$1.5D + Z =$	$10.2 + 710.9 =$	721.1
$2D + Z =$	13.5	724.4
$3D + Z =$	20.1	731.0
$5D + Z =$	33.3	744.2

~~ROAD OVERFLOW~~ (500 yr. flood)

~~ROAD to~~ 234 to 274.

SEC K
Small culvert.



$\delta = .8$

$Z = 0.1$

$D = 7.1$

$L_w = 30$

$2D + Z = 14.2 + 0.1 = 14.3$

$\theta = 75°$

713.9
728.2
714
14.2/24 =

$1.5D + Z = 10.75 + 713.9 = 724.65$
$= 728.20$

$2D + Z = 14.30$
$= 735.30$

$3D + Z = 21.40$
$= 749.50$

$5D + Z = 35.60$

Use $Y/D = \frac{.2}{7.1} = .03$

$A_o = 56.9$

Q	Y
100	2.6
200	3.5
300	4.4
400	5.3
500	7.0
600	[illegible]

G-101
July 1954
Cross-section
properties

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File

Gilkey, Sec K Rd. FLOOD OF

SECTION—

STA.	DIST.	W. S. ELEV.	ELEV.	~~Depth~~ H	MEAN ~~Depth~~ H	~~Area~~ H/L	C	~~W. P.~~ $H^{3/2}$	Q	
L.B.										
172			723.2							
(234)	—	721.93	721.93	0	—					
250	16		721.6	.33	.16	.004	2.90	.06	3	
(274)	24	721.93	721.93	0	.16	.004	2.90	.06	4	
462			724.5						7 = Q_T over Rd.	

$Q = C L H^{3/2}$

$H_{max} = 5/6 (722.0 - 721.6) = .33$

$+ 721.60$

721.93

$L = 45$

SUPERSEDED

Sheet No. ____ of ____ sheets. Prepared by ____ Date ____ Checked by ____ Date ____

U. S. GOVERNMENT PRINTING OFFICE 16—63957-1

Gilkey Cr

7-18-79

LES TH VH Ø

Start at Riverside Dr (sect A)
Bridge, tie in &
diversion new
Lewis St culvert. (between sect. C & E2)

PART of new
Submittal. 6/3/80
May Affect computations
for sections K, M, &
and Previous Maps

			1.8	4	160
RP	0.04	719.98		719.94	
RP	(4.45)		0.13	719.85	
	6.45		(4.38)		
TP 1	5.27	720.38	4.87	715.11	6.-7
	(2.93)		(3.33)		
C/L			0.62	719.76	1.86
"			(7.57)		
"			3.56	716.82	
WS	719.76 - 12.48 =			707.28	
	Sec ds end		cnlr; tape		
	sta	tape	El		
	0	14.4	705.4		
	4	14.3	705.5		
	8	14.2	705.6		Avg. 705.6
	12	14.1	705.7		
	16	14.1	705.7		
	20	14.2	705.6		
C/L	719.76 - 2.84 =			716.92	

7-18-79 751 320 236 279 877

cntr rail, dss
" " uss 19.84

½ stad.

Center of dss ladder
~~ds corner, right side~~
ds corner, rt about
ds end of culvert is
870 ft us from us end
Riverside Dr bridge.
Tape down from ds ladder 12.48
down from ladder

Low stadi

NV

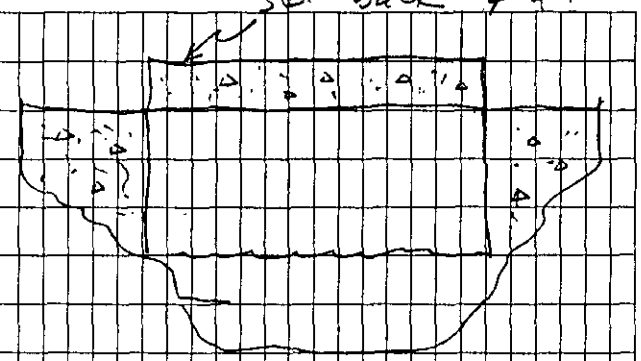
ZP	0.66	720.42	719.76'

NV sec below culv.

Sta	Rod	El.
140	4.2	716.2'
100	5.5	714.9'
94	5.9	714.5'
80	9.4	711.0'
73	12.4	708.0'
62	13.7	706.7'
53	13.4	707.0'
44	8.8	711.6'
32	5.7	714.7'
20	5.1	715.3'
0	4.8	715.6'
-100	4.2	716.2'

7-18-79

set back 4 ft



Rt side

el = 1.5

Ground same as before.

US	5.99	713.27		707.28	
TP	12.63	720.56	5.34	707.93	7.51
WS			13.29	707.27	
Culv.			0.70	719.86	

Sec US end culv

Sta	Rod	El.
0	13.8	706.8
4	13.8	706.8
8	14.1	706.5
12	14.6	706.0
16	14.3	706.3
20	14.7	705.9

Avg. 706.4

Inv steel		3.61	716.95

Approach Sec.

Sta	Rod	El.
0	8.7	711.9
24	10.5	710.1
32	12.7	707.9
34	13.8	706.8
45	14.7	705.9
51	14.7	705.9
59	12.4	708.2
75	~~10.6~~	~~710.0~~
100	11.1	709.5

717 7-18-79

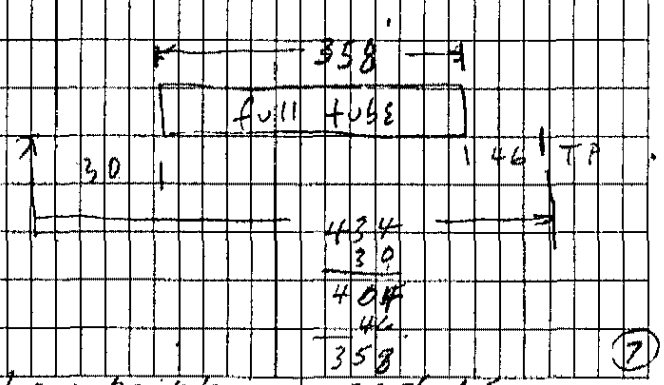
Instrument 30' ds hdwl

TP is 434' ft from X

center US hdwll

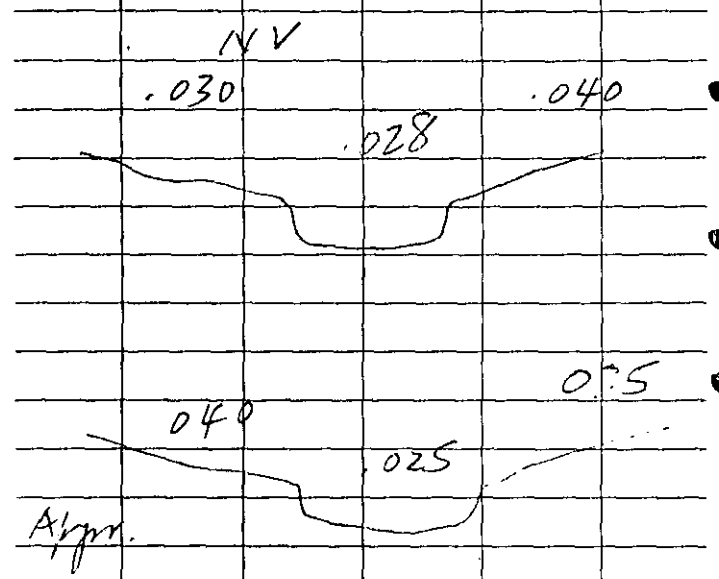
751
534
217

US end culv.
46 ft hdwl to TP



Low point in road is about 2 ft higher than hdwl. ~ 722

7



Alpm.

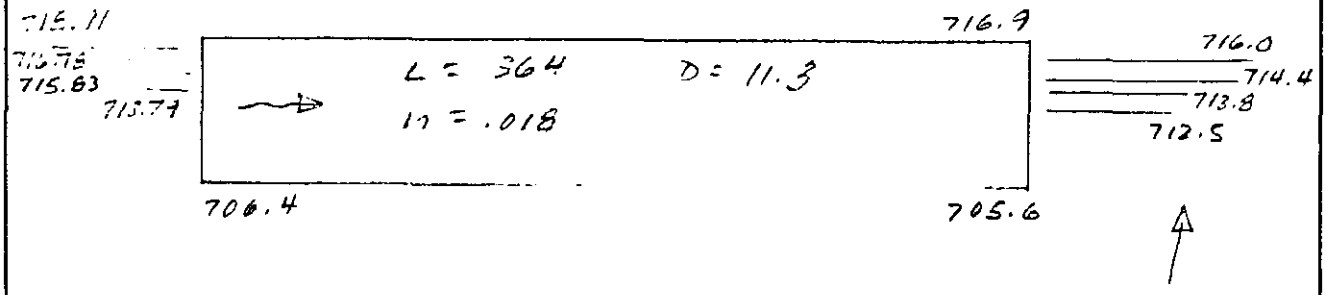
Culvert is new concrete in exc condition with natural bottom so n = .025 use n = .014 for concrete.

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....

Silkay

— 722

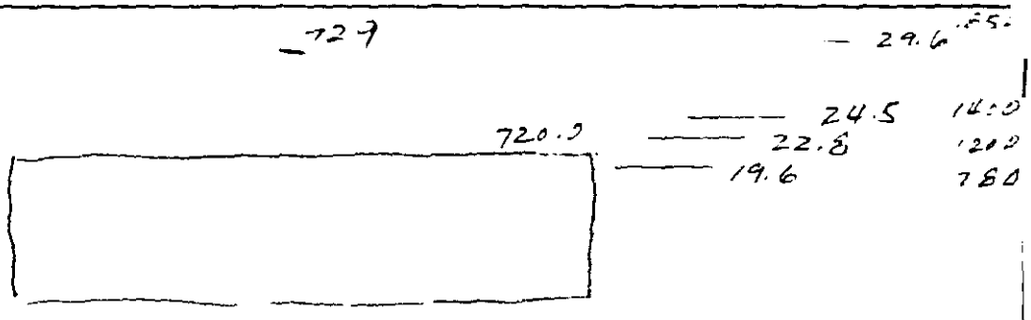


1.5 D " 3 d = 723.35
2 D " = 729.00
3 D " = 740.30
5 D " = 762.90

Elevs. extrap from old profiles

Sheet No. ..... of ..... Sheets. Prepared by ..... Date 7/31/79 Checked by ..... Date .....

Gilley [illegible]



IV $Q = 858\sqrt{h_1 - 44}$

50 yr $1200 = 858\sqrt{h_1 - 22.8}$
$h_1 = 24.7$

100 yr $1400 = 858\sqrt{h_1 - 24.5}$
$h_1 = 27.2$

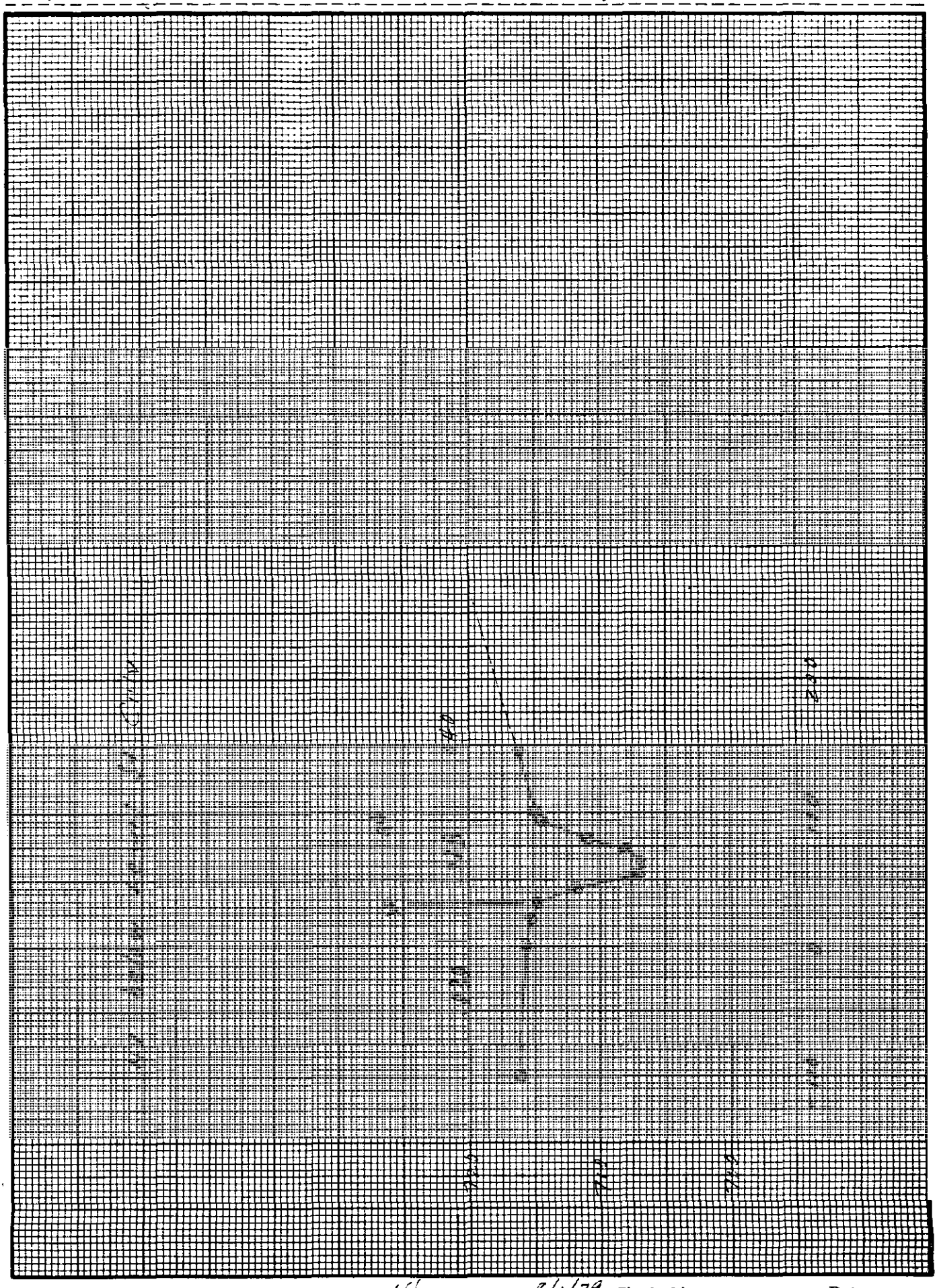
500 yr Will not change significantly. Road overflow

10 yr $h_1 = 20.1$ extrapolated from rating plotted from computer printout.

(March 1960)
(Cross-Section)

GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File



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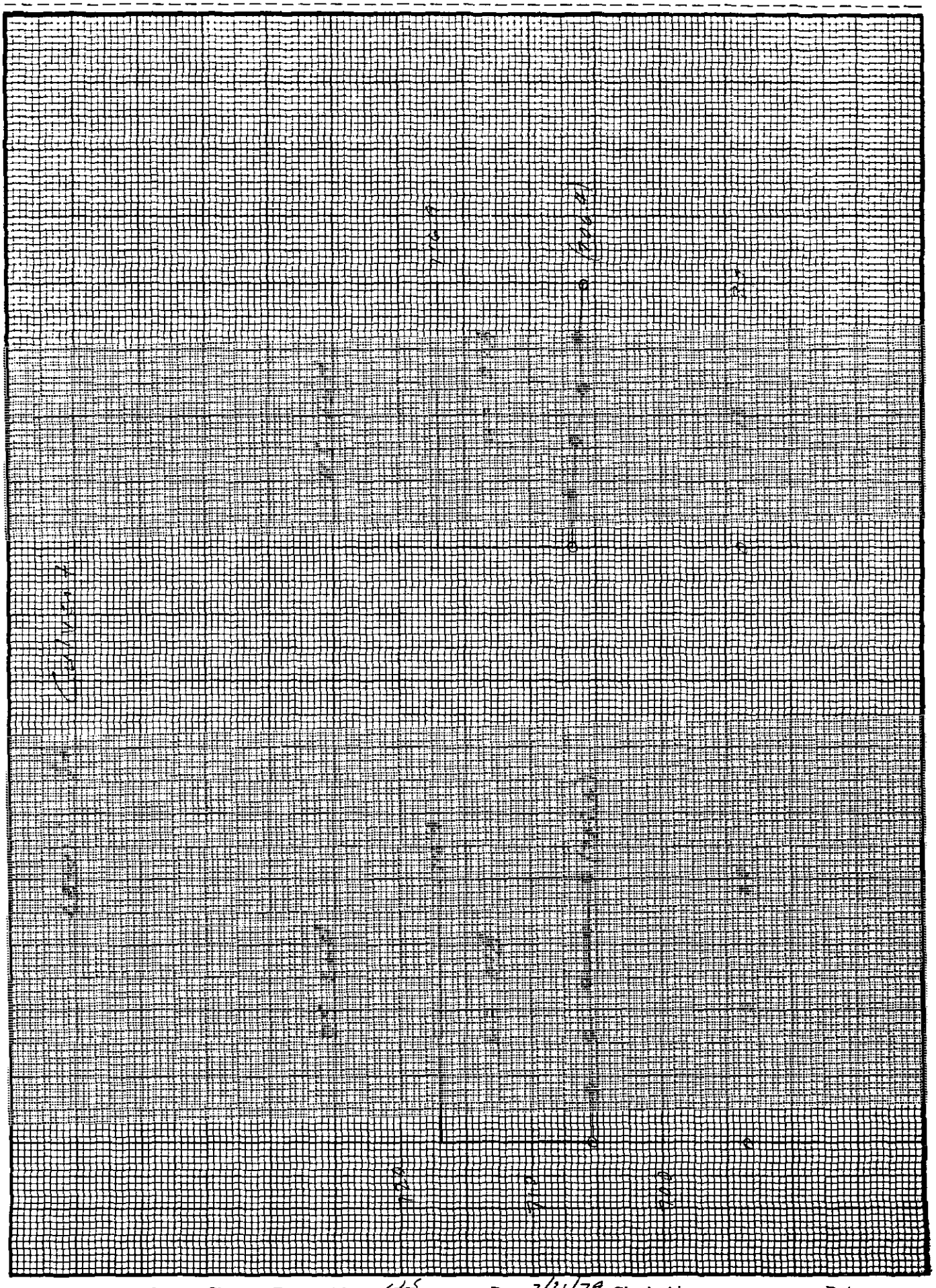
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....



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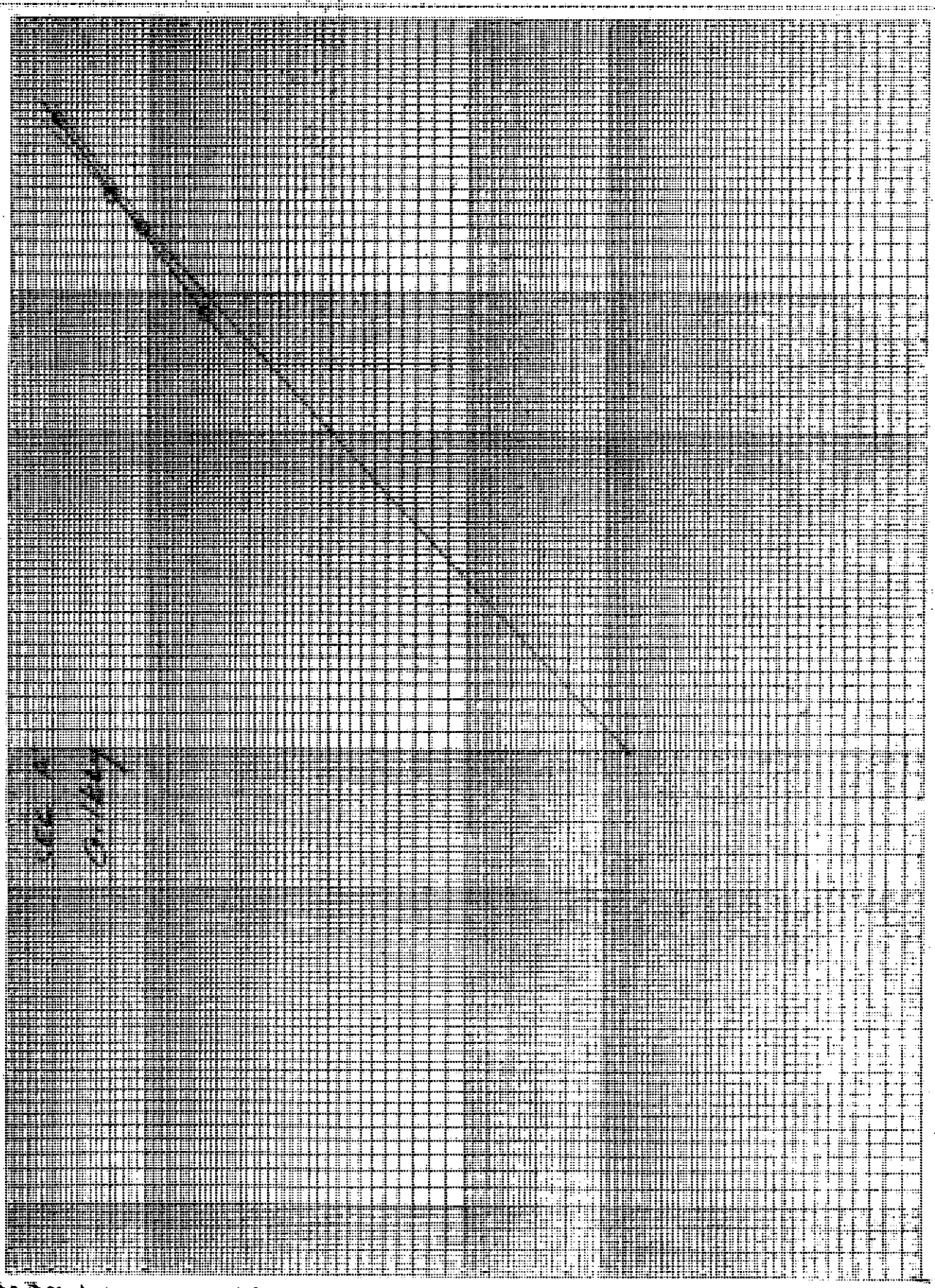
FORM 9-213G
(Nov. 69)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
2X3 LOG-LOG CYCLES

File

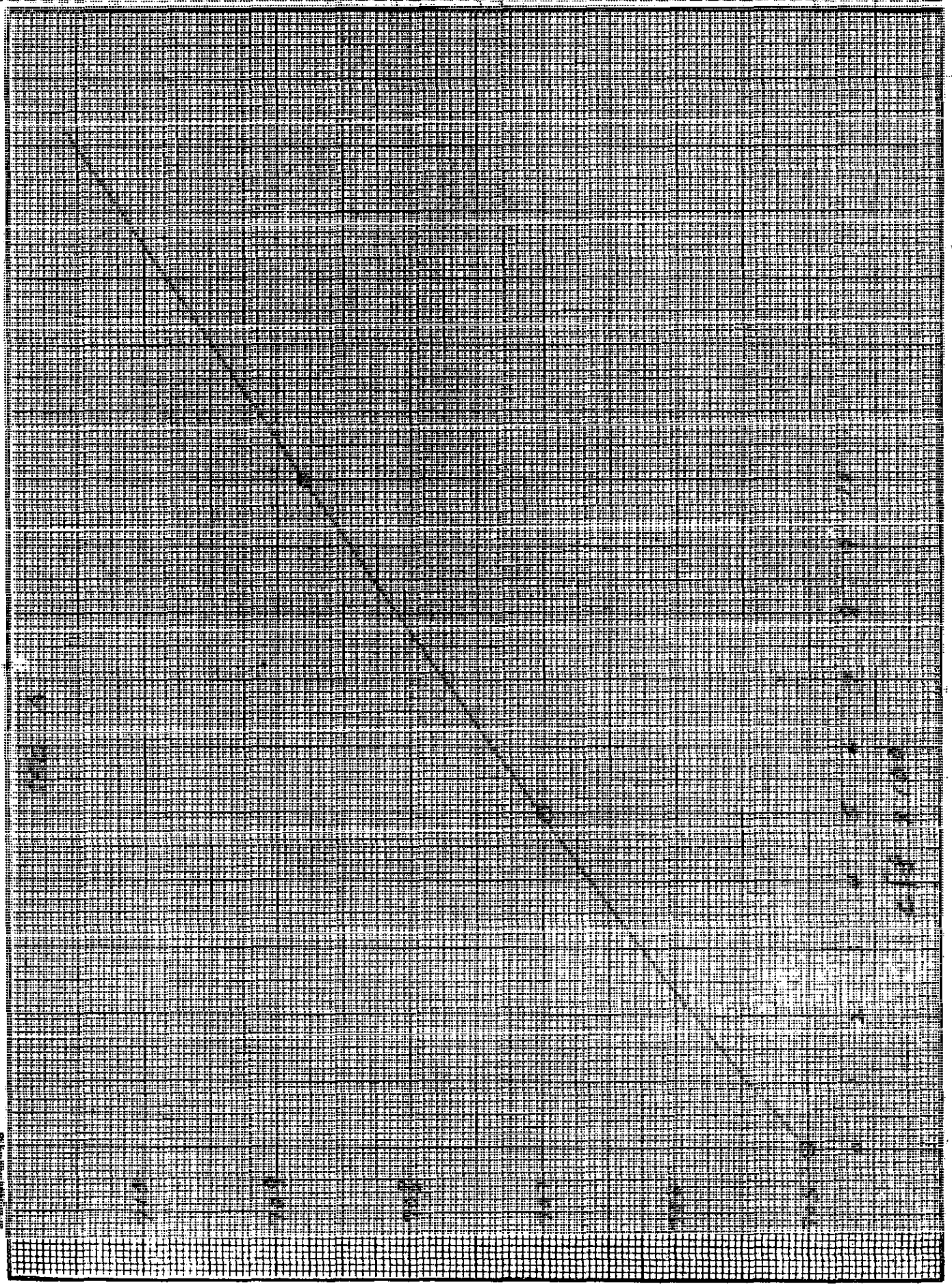


Sheet No. ____ of ____ sheets Prepared by ____ Date ____ Checked by ____ Date ____

GPO : 1973 O - 501-777

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....



Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

```
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 ILKEY FWY                                   S        8  2  2 99 12
2      2  71837  71837
3   1000 F      1  23  5  708     1150  2  4
4      4   1650    1650
**SEQUENCE**
5   1050        0  1  7300    15  1  7240    35  1  7220    50  1  7200    60  1  7180
5   1051       90  1  7160   105  1  7146   131  1  7107   149  1  7102   177  2  7096
5   1052      178  3  7085   185  3  7071   190  3  7071   195  3  7070   199  4  7083  E
5   1053      200  4  7086   201  5  7095   210  5  7107   270  5  7120   390  5  7140
5   1054      420  5  7160   430  5  7180   450  5  7200
6   1070  1  2 035 035  1  2 032 032  1  2 032 032  1  2 032 032  1  2 035 035
3   1100 G      0  17  3  710     1650  1  3
5   1150        0  1  7300    30  1  7200    60  1  7120   125  1  7120   260  1  7120
5   1151      295  2  7120   305  2  7082   325  2  7082   340  3  7120   350  3  7120  F
5   1152      410  3  7120   670  3  7120   815  3  7140   835  3  7160   840  3  7180
5   1153      850  3  7200   880  3  7300
6   1170  1  2 035 035  1  2 035 035  1  2 035 035
3   1200 H      0  15  3  710     2040  1  3
5   1250        0  1  7380    30  1  7300    60  1  7200    70  1  7140   310  1  7120
5   1251      315  2  7120   330  2  7090   340  2  7090   355  3  7120   360  3  7120  G
5   1252      500  3  7140   515  3  7160   525  3  7200   565  3  7300   610  3  7400
6   1270  1  2 035 035  1  2 035 035  1  2 035  35
3   1300 I      0  23  3  711     2620  1  3
5   1350        0  1  7400    40  1  7300    55  1  7200    75  1  7160   115  1  7140
5   1351      160  1  7140   250  1  7140   300  1  7140   445  1  7120   520  2  7120  H
5   1352      530  2  7102   550  2  7102   560  3  7120   590  3  7120   660  3  7120
5   1353      670  3  7140   930  3  7160   940  3  7180   960  3  7200   990  3  7220
5   1354     1010  3  7240  1060  3  7300  1110  3  7400
6   1370  1  2 035 035  1  2 035 035  1  2 035 035
3   1375 I2     0  15  3  711     2860  1  3
5   1380        0  1  7300    20  1  7200    40  1  7160   250  1  7160   370  1  7160
5   1381      405  1  7140   420  1  7120   465  2  7120   480  2  7108   490  2  7108  I
5   1382      495  3  7120   505  3  7140   715  3  7160   730  3  7200   760  3  7300
6   1385  1  2 035 035  1  2 035 035  1  2 035 035
3   1400 J      0  21  3  712     3120  1  3
5   1450        0  1  7400    80  1  7300   105  1  7200   120  1  7180   210  1  7180
5   1451      375  1  7180   400  1  7160   485  1  7140   490  2  7140   505  2  7113
5   1452      520  2  7113   525  3  7140   530  3  7140   570  3  7160   620  3  7180  J
5   1453      640  3  7200   690  3  7300   700  3  7340   750  3  7340   920  3  7340
5   1454      980  3  7360
6   1470  1  2 035 035  1  2 038 038  1  2 035 035
3   1475 J2     0  13  3  713     3250  1  3
5   1480        0  1  7300    30  1  7200   190  1  7180   230  1  7160   360  1  7140
5   1481      370  2  7140   390  2  7116   400  2  7116   405  3  7140   445  3  7160  K
```

PART of 010
Submittal

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  1482      465  3  7180  605  3  7200  650  3  7300
6  1485  1   2 035 035  1  2 038 038  1  2 035 035
3  1500 K      0  13  3  713    3370  1  3
5  1550        0  1  7240   35  1  7220   55  1  7200  140  1  7180  190  1  7160
5  1551      280  2  7140  300  2  7119  310  2  7119  315  2  7140  320  3  7160
5  1552      410  3  7180  420  3  7200  430  3  7240
6  1570  1   2 035 035  1  2 040 040  1  2 040  40
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1  GILKEY RECOMP SECS L TO M                LES      2  4  2  5 12
2      2  71700  71820  71900  72150
3   1800 L      1  17  3  713    3520 99 99
4      4    780   1200   1400   1850
**SEQUENCE**
5   1850        0  1  7280   20  1  7260   35  1  7240   50  1  7220   70  1  7200
5   1851       76  1  7185  120  1  7160  176  2  7152  188  2  7123  196  2  7122
5   1852      207  2  7124  221  3  7147  236  3  7160  276  3  7158  435  3  7180
5   1853      460  3  7200  490  3  7300
6   1870  1  2 035 035  1  2 022 022  1  2 035 035
3   1900 M      0  19  3  714     3820  1  3
5   1950        0  1  7380   50  1  7360   60  1  7300   70  1  7280   80  1  7260
5   1951       90  1  7240  120  1  7220  150  1  7200  230  1  7180  380  1  7160
5   1952      390  2  7140  400  2  7122  420  2  7122  430  3  7140  440  3  7160
5   1953      570  3  7180  810  3  7200  860  3  7300  890  3  7400
6   1970  1  2 035 035  1  2 022 022  1  2 035 035
```

Part of
new submittal
6/3/80

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 GILKEY CR                                  LES       2  4  2  5 12
2      2  71997  72416  72736  73116
3   2400 0      1  16  3  715     4100  1  3
4      4    780   1200   1400   1850
**SEQUENCE**
5   2450        0  1  7350     0  1  7320   50  1  7300   80  2  7280   98  2  7222
5   2451      114  2  7202   130  2  7125  138  2  7119  142  2  7128  144  2  7153
5   2452      154  2  7150   176  2  7227  191  2  7273  200  3  7300  300  3  7320
5   2453      300  3  7350
6   2470   1  2 050 050  1  2 045 045  1  2 060 060
3   2500 P      0  14  2  720     4640  1 99
5   2550        0  1  7360   50  1  7340  100  1  7320  240  1  7300  460  2  7280
5   2551      490  2  7260  500  2  7200  510  2  7180  510  2  7153  540  2  7153
5   2552      540  2  7180  545  2  7200  560  2  7300  570  2  7400
6   2570   1  2 020 020  1  2 048 048
```

STU

0

P

```
FQUENCE**
2650                 1  7360   20  1  7340   26  1  7294          1  7266   62  1  7153
2651            70   1  7155   82  1  7159   88  1  7198  106   1  7335  115  1  7400
2670   1   2 045 045
2700 R           0  13  1  717     5090 99 99
2750             0  1  7400    0  1  7370   10  1  7360   50  1  7340   60  1  7300
2751            70  1  7200   75  1  7180   75  1  7156   95  1  7156   95  1  7180
2752           100  1  7200  105  1  7300  130  1  7400
2770   1   2 045 045
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 GILKEY CR
2      2  72890  73410  73450  73530                    LES        3  4  2  5 12
3   2800 S      1  13  2  717     5820  1 99
4      4 —  780   1200   1400   1850
**SEQUENCE**
5   2850        0  1  7400   50  1  7320   60  1  7300   95  1  7240  210  1  7220
5   2851      402  1  7207  452  2  7195  460  2  7169  475  2  7161  490  2  7166
5   2852      506  2  7222  518  2  7272  550  2  7400
6   2870  1  2 035 035  1  2 028 028
3   2900 T      0  19  3  718     6310  1  3
5   2950 —      0  1  7480   45  1  7460   50  1  7440   65  1  7400   90  1  7300
5   2951      110  1  7280  140  1  7260  220  1  7240  310  1  7220  810  1  7220
5   2952      850  2  7220  860  2  7200  860  2  7168  890  2  7168  890  2  7200
5   2953      900  3  7230  955  3  7300  975  3  7400 1000  3  7460
6   2970  1  2 035 035  1  2 030 030  1  2 025 025
3   3000 U      0  11  3  718     6610  1  3
5   3050 —      0  1  7400   65  1  7260  280  1  7240  530  2  7240  545  2  7200
5   3051      550  2  7172  565  2  7172  570  3  7200  650  3  7240  660  3  7300
5   3052      690  3  7400
6   3070  1  2 035 035  1  2 032 032  1  2 025 025
```

S

T ✓

4

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 GILKEY CR                                LES       5  2  2 99 12
2      2  73450  73450
3   2800 S      1  13  2  717     5820  1 99
4      4  1400   1400
**SEQUENCE**
5   2850        0  1  7400   50  1  7320   60  1  7300   95  1  7240  210  1  7220
5   2851      402  1  7207  452  2  7195  460  2  7169  475  2  7161  490  2  7166
5   2852      506  2  7222  518  2  7272  550  2  7400
6   2870  1  2 035 035  1  2 028 028
3   2900 T      0  19  3  718     6310  1  3
5   2950        0  1  7480   45  1  7460   50  1  7440   65  1  7400   90  1  7300
5   2951      110  1  7280  140  1  7260  220  1  7240  310  1  7220  810  1  7220
5   2952      850  2  7220  860  2  7200  860  2  7168  890  2  7168  890  2  7200
5   2953      900  3  7230  955  3  7300  975  3  7400 1000  3  7460
6   2970  1  2 035 035  1  2 030 030  1  2 025 025
3   3000 U      0  11  3  718     6610  1  3
5   3050        0  1  7400   65  1  7260  280  1  7240  530  2  7240  545  2  7200
5   3051      550  2  7172  565  2  7172  570  3  7200  650  3  7240  660  3  7300
5   3052      690  3  7400
6   3070  1  2 035 035  1  2 032 032  1  2 025 025
3   4000 U1     0   8  1  725     6710 99 99
5   4050        0  1  7400    0  1  7240   50  1  7234   95  1  7238  110  1  7238
5   4051      125  1  7260  132  1  7300  155  1  7400
6   4070  1  2 032 032
3   5000 V      0  18  3  720     6850  1  3
5   5050        0  1  7400    0  1  7280   40  1  7260  160  1  7260  220  1  7260
5   5051      309  1  7243  335  1  7241  359  2  7235  369  2  7181  370  2  7176
5   5052      375  2  7175  387  2  7175  395  3  7239  413  3  7238  443  3  7241
5   5053      457  3  7244  470  3  7300  495  3  7400
6   5070  1  2 040 040  1  2 035 035  1  2 025 025
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 GILKEY CR                  3                 LES        6  4  2  5 12
2      2  72892  73410  73450  73542
3   5000 V      1  18  3  720     6850  1  3
4      4    780   1200   1400   1850
**SEQUENCE**
5   5050        0  1  7400     0  1  7280   40  1  7260  160  1  7260  220  1  7260
5   5051      309  1  7243   335  1  7241  359  2  7235  369  2  7181  370  2  7176
5   5052      375  2  7175   387  2  7175  395  3  7239  413  3  7238  443  3  7241
5   5053      457  3  7244   470  3  7300  495  3  7400
6   5070  1  2 040 040  1  2 035 035  1  2 025 025
3   6000 W      0  22  3  720     7240  1  3
5   6050        0  1  7440    40  1  7420   85  1  7420  100  1  7400  110  1  7380
5   6051      140  1  7360   150  1  7340  160  1  7320  170  1  7300  180  1  7280
5   6052      220  1  7260   430  1  7245  645  2  7240  650  2  7220  650  2  7188
5   6053      690  2  7188   690  2  7220  695  3  7260  760  3  7280  765  3  7300
5   6054      790  3  7400   850  3  7440
6   6070  1  2 035 035  1  2 032 032  1  2 025 025
3   7000 X      0  19  3  722     7580  1  3
5   7050        0  1  7520    20  1  7460   30  1  7440   50  1  7410   50  1  7520
5   7051      250  1  7520   250  1  7290  390  1  7280  550  1  7260  580  2  7240
5   7052      590  2  7220   600  2  7200  615  2  7200  620  2  7220  630  3  7260
5   7053      890  3  7280   900  3  7300  950  3  7400 1040  3  7500
6   7070  1  2 035 035  1  2 032 032  1  2 025 025
3   8000 X RD   0   9  2  727     7630 99 99
5   8050        0  1  7400     0  1  7290  190  1  7289  240  1  7280  310  2  7275
5   8051      510  2  7261   620  2  7280  640  2  7300  690  2  7400
6   8070  1  2 030 030  1  2 028 028
3   9000 Y      0  19  3  725     7680  1  3
5   9050      180  1  7500   180  1  7290  420  2  7260  430  2  7220  440  2  7204
5   9051      465  2  7204   475  2  7220  480  3  7260  550  3  7260  590  3  7260
5   9052      710  3  7260   830  3  7260  845  3  7280  860  3  7300  890  3  7400
5   9053      910  3  7440   920  3  7460  950  3  7480  980  3  7500
6   9070  1  2 025 025  1  2 028 028  1  2 028 028
3  10000 Z      0  16  3  725     7950  1  3
5  10050        0  1  7420    70  1  7400   90  1  7300  120  1  7280  365  2  7260
5  10051      375  2  7240   385  2  7214  400  2  7214  405  2  7240  415  3  7260
5  10052      540  3  7280   560  3  7300  570  3  7320  720  3  7340  830  3  7360
5  10053      880  3  7380
6  10070  1  2 035 035  1  2 035 035  1  2 035 035
```

*** INPUT CARD PRINTOUT ***

```
          1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 GILKEY CR                                  LES       8  4  2 05 12
2      2  73063  73411  73450  73532
3 10300 AA     1  16  5  725     8150  2  4
4      4 ___ 740   1130   1330   1750
**SEQUENCE**
5 10350        0  1  7400   40  1  7300  220  1  7280  335  2  7263  345  3  7223
5 10351      357  3  7221  363  4  7223  367  4  7224  381  5  7293  399  5  7297
5 10352      505  5  7303  620  5  7320  690  5  7340  760  5  7360  810  5  7380
5 10353      850  5  7400
6 10370  1  2 035 035  1  2 032 032  1  2 032 032  1  2 032 032  1  2 035 035
3 10400 AB     0  13  3  725     8690  1  3
5 10450 ___    0  1  7440   70  1  7300  240  2  7280  255  2  7260  260  2  7230
5 10451      275  2  7230  280  2  7260  285  3  7280  320  3  7300  570  3  7320
5 10452      660  3  7340  685  3  7360  700  3  7380
6 10470  1  2 035 035  1  2 030 030  1  2 035 035
3 10500 AC     0  13  3  726     9000  1  3
5 10550 ___    0  1  7440   20  1  7400   60  1  7320   90  1  7300  175  2  7280
5 10551      190  2  7260  190  2  7240  205  2  7240  210  2  7260  220  3  7280
5 10552      465  3  7300  510  3  7400  525  3  7500
6 10570  1  2 040 040  1  2 032 032  1  2 035 035
3 10600 AD     0  20  3  727     9540  1  3
5 10650 ___    0  1  7480   15  1  7460   30  1  7420   35  1  7400   90  1  7320
5 10651      160  1  7320  440  2  7320  455  2  7300  465  2  7260  470  2  7256
5 10652      495  2  7256  510  2  7300  520  3  7320  560  3  7340  570  3  7400
5 10653      605  3  7420  650  3  7440  670  3  7460  685  3  7480  700  3  7500
6 10670  1  2 040 040  1  2 037 037  1  2 035 035
3 10700 AE     0  17  3  729     9990  1  3
5 10750 ___    0  1  7500   70  1  7480  120  1  7480  150  1  7460  200  1  7420
5 10751      300  1  7400  360  1  7380  440  1  7360  455  1  7340  490  2  7320
5 10752      500  2  7300  505  2  7271  520  2  7271  540  3  7320  720  3  7330
5 10753      905  3  7340  930  3  7500
6 10770  1  2 045 045  1  2 033 033  1  2 035 035
3 10800 AF     0  14  3  731    10440  1  3
5 10850        0  1  7500   30  1  7400  120  1  7380  420  1  7360  540  2  7340
5 10851      550  2  7300  555  2  7285  570  2  7285  580  2  7300  590  3  7340
5 10852      670  3  7360  700  3  7380  740  3  7400  800  3  7480
6 10870  1  2 030 030  1  2 035 035  1  2 040 040
3 10900 AG     0  12  1  731    10900 99 99
5 10950        0  1  7540   20  1  7350   45  1  7340   50  1  7320   55  1  7296
5 10951       70  1  7296   75  1  7320  100  1  7400  105  1  7440  155  1  7460
5 10952      190  1  7480  215  1  7500
```

AA

AB

AA

AC

AD

AE

AF

AG

```
5 10[illegible]3      605  3  7420  650  3  7440  670  3  7460  685  3  7480  700  3  7[illegible]
6 10670  1  2 040 040  1  2 037 037  1  2 035[illegible]35
3 10700 AE    0  17  3  729    9990  1  3
5 10750       0  1  7500   70  1  7480  120  1  7480  150  1  7460  200  1  7420
5 10751     300  1  7400  360  1  7380  440  1  7360  455  1  7340  490  2  7320
5 10752     500  2  7300  505  2  7271  520  2  7271  540  3  7320  720  3  7330
5 10753     905  3  7340  930  3  7500
6 10770  1  2 045 045  1  2 033 033  1  2 035 035
3 10800 AF    0  14  3  731   10440  1  3
5 10850       0  1  7500   30  1  7400  120  1  7380  420  1  7360  540  2  7340
5 10851     550  2  7300  555  2  7285  570  2  7285  580  2  7300  590  3  7340
5 10852     670  3  7360  700  3  7380  740  3  7400  800  3  7480
6 10870  1  2 030 030  1  2 035 035  1  2 040 040
3 10900 AG    0  12  1  731   10900 99 99
5 10950       0  1  7540   20  1  7350   45  1  7340   50  1  7320   55  1  7296
5 10951      70  1  7296   75  1  7320  100  1  7400  105  1  7440  155  1  7460
5 10952     190  1  7480  215  1  7500
6 10970  1  2 035 035
3 11000 AH    0   9  2  734   11260 99  2
5 11050      20  1  7540   40  1  7340   50  1  7304   70  1  7304   75  1  7340
```

14

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 1.DATE= 5/ 2/7

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 GILKEY CR                                  LES      5  4  2 99 12
2      2  73633  73782  73866  74044
3      3 AH AP 1  21  3  735   11550  1  3
4      4    740   1130   1330   1750
5 11150        0  1  7500   10  1  7480   60  1  7460  210  1  7440  280  1  7420
5 11151      390  1  7400  405  1  7380  434  1  7382  460  2  7378  464  2  7314  AI
5 11152      472  2  7313  484  2  7317  490  3  7382  504  3  7387  520  3  7387
5 11153      540  3  7400  550  3  7420  640  3  7440  670  3  7460  700  3  7480
5 11154      730  3  7500
6 11170  1  2 030 030  1  2 032 032  1  2 030 030
3 11200 AI     0  16  3  734   11680  1  3
5 11250        0  1  7500   10  1  7480   60  1  7460  210  1  7440  260  1  7420
5 11251      280  1  7400  400  1  7380  450  2  7360  455  2  7340  460  2  7313  AJ
5 11252      480  2  7313  490  2  7340  495  3  7360  540  3  7380  595  3  7400
5 11253      670  3  7500                                                          AH  A
6 11270  1  2 030 030  1  2 032 032  1  2 030 030
3 11300 AJ     1  15  3  736   12170  1  3
4 11320    710   1060   1270   1650
5 11350        0  1  7480   40  1  7460   70  1  7440  110  1  7420  170  1  7400
5 11351      360  2  7380  365  2  7360  375  2  7323  390  2  7323  395  3  7380  AK
5 11352      460  3  7400  550  3  7420  570  3  7440  620  3  7460  670  3  7480
6 11353  1  2 030 030  1  2 033 033  1  2 030 030
3 11400 AK     1  17.13  737   12670  1  3
4 11420    540    800    930   1230
5 11450        0  1  7500  120  1  7480  240  1  7460  260  1  7440  290  1  7420  AL
5 11451      360  2  7400  370  2  7360  375  2  7330  380  2  7330  385  2  7360
5 11452      390  3  7400  445  3  7420  445  3  7500
                                                        M  M     M     M  M     M
6 11470  1  2 030 030  1  2 035 035  1  2 030 030
3 11500 AL     0  14  3  736   12980  1  3
5 11550        0  1  7480   70  1  7460   90  1  7440  190  1  7420  265  2  7400  AM
5 11551      275  2  7360  280  2  7334  290  2  7334  295  2  7360  300  3  7400
5 11552      340  3  7420  350  3  7440  460  3  7460  485  3  7480
6 11570  1  2.030 030  1  2 032 032  1  2 030 030
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 GILKEY CR                                      LES       3  4  2 99 12
2      2  74039  74165  74192  74244
3 11800 AM     1  21  5  737   13070  2  4
4      4     540    800    930   1230
**SEQUENCE**
5 11850        0  1  7500  110  1  7480  150  1  7460  210  1  7440  270  1  7440
5 11851      400  2  7420  410  2  7400  420  2  7379  428  2  7367  429  3  7343
5 11852      440  3  7345  450  3  7336  456  3  7338  457  4  7344  468  4  7412
5 11853      484  5  7415  550  5  7419  640  5  7440  660  5  7460  710  5  7480
5 11854      760  5  7500
6 11870  1  2 040 040  1  2 030 030  1  2 030 030  1  2 030 030  1  2 030 030
3 11900 AN     0  16  3  738   13540  1  3
5 11950        0  1  7500  120  1  7480  150  1  7460  170  1  7440  200  1  7420
5 11951      435  2  7400  445  2  7380  445  2  7342  460  2  7342  460  2  7380
5 11952      465  3  7400  510  3  7420  525  3  7440  535  3  7460  560  3  7480
5 11953      600  3  7500
6 11970  1  2 060 060  1  2 030 030  1  2 030 030
3 12000 AO     0  15  3  738   14120  1  3
5 12050        0  1  7500   25  1  7480   60  1  7460   80  1  7440  120  1  7420
5 12051      330  2  7400  340  2  7380  340  2  7348  355  2  7348  355  2  7380
5 12052      360  3  7400  380  3  7440  630  3  7460  740  3  7480  860  3  7500
6 12070  1  2 040 040  1  2 032 032  1  2 030 030
```

AN

AΦ

AP

```
         1         2         3         4         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 GILKEY CR                                  LES      .5  4 .2  5 12
2      2  74238  74350  74388  74453
3 13000 AP     1  20  3  738   14300  1  3
4      4    540    800    930   1230
**SEQUENCE**
5 13050      100  1  7500  130  1  7480  180  1  7460  195  1  7443  206  1  7427
5 13051      230  1  7421  260  1  7421  286  2  7422  292  2  7352  305  2  7351
5 13052      311  2  7354  315  2  7380  320  2  7382  330  3  7408  348  3  7406
5 13053      375  3  7420  440  3  7440  540  3  7460  600  3  7480  620  3  7482
6 13070  1  2 035 035  1  2 030 030  1  2 030 030
3 14000 AQ     0  15  3  740   14710  1  3
5 14050      220  1  7480  220  1  7420  285  1  7420  470  2  7420  480  2  7400
5 14051      485  2  7380  490  2  7352  495  2  7352  500  2  7380  505  3  7420
5 14052      560  3  7440  630  3  7460  760  3  7460  860  3  7460  880  3  7480
6 14070  1  2 032 032  1  2 030 030  1  2 030 030
3 14100 AR     0  14  3  740   15110  1  3
5 14150      220  1  7480  220  1  7440  390  1  7440  410  1  7440  420  1  7420
5 14151      430  1  7400  445  2  7380  445  2  7357  450  2  7357  455  2  7380
5 14152      465  3  7420  530  3  7440  700  3  7460  900  3  7480
6 14170  1  2 032 032  1  2 030 030  1  2 030 030
3 14200 AS     0  15  3  740   15500  1  3
5 14250        0  1  7500   60  1  7480  100  1  7460  150  1  7460  240  1  7440
5 14251      275  2  7420  285  2  7400  295  2  7361  300  2  7361  310  2  7400
5 14252      315  3  7420  375  3  7440  860  3  7460  875  3  7480  920  3  7500
6 14270  1  2 032 032  1  2 030 030  1  2 030 030
3 14300 AT     0  13  3  742   15970  1  3
5 14350        0  1  7500  140  1  7480  215  1  7460  225  2  7440  235  2  7420
5 14351      240  2  7400  245  2  7367  255  2  7367  260  2  7400  270  3  7440
5 14352      510  3  7460  650  3  7480  860  3  7500
6 14370  1  2 030 030  1  2 035 035  1  2 035 035
```

AQ

AR

AP

AS

AT

AU

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 GILKEY CR                                LES       3  4  2 99 12
2      2  74769  74797  74806  74823
3 14500 AV     1  12  3  742   17510  1  3
4      4    490    730    850   1100
**SEQUENCE**
5 14550        0  1  7520   70  2  7500   80  2  7420   95  2  7387  100  2  7387   AV
5 14551      105  2  7420  115  2  7440  125  3  7460  330  3  7460  520  3  7460
5 14552      610  3  7480  890  3  7500
6 14570  1  2 050 050  1  2 040 040  1  2 035 035
3 14600 AW     0   8  2  742   18070  1 99
5 14650        0  1  7520  500  1  7500  570  2  7480  590  2  7420  600  2  7396   AW
5 14651      610  2  7396  615  2  7420  640  2  7480
6 14670  1  2 040 040  1  2 042 042
3 14700 AX     0  12  3  745   18800  1  3
5 14750        0  1  7520  220  1  7500  560  1  7500  630  1  7500  660  2  7480   AX
5 14751      670  2  7420  680  2  7406  685  2  7406  690  2  7420  710  3  7480
5 14752      725  3  7500 1000  3  7520
6 14770  1  2 040 040  1  2 047 047  1  2 100 100
```

AV-

*** INPUT CARD PRINTOUT ***

```
          1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 GILKET CR                                  LES       2  4  2  5 12
2      2  74871  74960  74970  75000
3 15000 AY    1  14  5  747   18910  2  4
4      4  490    730    850   1100
**SEQUENCE**
5 15050        0  1  7540  100  1  7520  350  1  7500  583  2  7486  590  2  7477
5 15051      599  2  7417  605  2  7408  606  2  7410  609  2  7414  627  3  7473
5 15052      653  3  7492  683  3  7499 1130  3  7520 1200  3  7540
6 15070  1  2 035 035  1  2 037 037  1  2 037 037  1  2 037 037  1  2 045 045
3 15100 AZ     0  13  3  747   19330  1  3
5 15150        0  1  7540   20  1  7520  260  2  7500  265  2  7480  275  2  7420
5 15151      280  2  7408  285  2  7408  290  2  7420  295  3  7460  330  3  7480
5 15152      400  3  7500  620  3  7520  640  3  7540
6 15170  1  2 050 050  1  2 040 040  1  2 035 035
```

AY

AZ

AY-

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 GILKEY CR                                   LES       3  4  2  5 12
2      2  74965  75105  75159  75272
3 15200 BA     1  15  3  747   19540  1  3
4      4    490    730    850   1100
**SEQUENCE**
5 15250        0  1  7580   80  1  7560  330  2  7540  330  2  7490  342  2  7479
5 15251      347  2  7476  355  2  7412  357  2  7408  362  2  7411  368  2  7409
5 15252      370  2  7411  375  2  7449  386  3  7481  400  3  7488  420  3  7600
6 15270  1  2 070 070  1  2 040 040  1  2 070 070
3 15300 BB     0  12  2  748   19630  1 99
5 15350        0  1  7600   15  1  7580  200  1  7560  420  2  7540  430  2  7500
5 15351      440  2  7480  455  2  7420  460  2  7410  475  2  7410  480  2  7420
5 15352      500  2  7500  520  2  7600
6 15370  1  2 070 070  1  2 040 040
3 15400 BC     0  10  2  750   20090  1 99
5 15450        0  1  7600    0  1  7580  170  1  7560  265  2  7540  275  2  7500
5 15451      285  2  7440  290  2  7414  305  2  7414  310  2  7440  345  2  7600
6 15470  1  2 080 080  1  2 055 055
```

BA

BB ✓

BC

BA

From

Flow

So

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 GILKEY CR                                  LES       2  4  2  5 12
2      2  74981  75123  75178  75292
3 15400 BC    1  10  2  750   20090  1 99
4      4   490    730    850   1100
**SEQUENCE**
5 15450        0  1  7600     0  1  7580  170  1  7560  265  2  7540  275  2  7500
5 15451      285  2  7440  290  2  7414  305  2  7414  310  2  7440  345  2  7600
6 15470  1  2 080 080  1  2 055 055
3 15500 BD     0  12  3  750   20640  1  3
5 15550        0  1  7560  190  1  7540  570  2  7540  585  2  7500  590  2  7440
5 15551      595  2  7420  610  2  7420  615  2  7440  635  2  7500  645  3  7520
5 15552      710  3  7540  790  3  7560
6 15570  1  2 080 080  1  2 050 050  1  2 080 080
```

BC

BD

```
1   ILKET CR      BE THRU BL                    ES        8  4  2  5 12
2     2  75010  75160  75220  75330
3 15800 BE     1  18  3  747   20860  1  3
4     4    460    680    780   1020
**SEQUENCE**
5 15850        0  1  7580  110  1  7560  160  1  7540  210  1  7520  516  1  7505
5 15851      536  1  7500  553  2  7499  566  2  7488  579  2  7464  583  2  7430
5 15852      590  2  7422  597  2  7430  612  3  7517  625  3  7523  641  3  7526
5 15853      770  3  7540  980  3  7560 1050  3  7580
6 15870  1  2 070 070  1  2 040 040  1  2 050 050
3 15900 BF     0  17  3  747   21170  1  3
5 15950       90  1  7580  160  1  7560  310  1  7540  340  1  7520  355  1  7500
5 15951      370  1  7480  440  1  7480  510  1  7480  555  2  7460  565  2  7440
5 15952      570  2  7425  585  2  7425  595  2  7440  600  2  7460  605  2  7480
5 15953      615  2  7500  630  3  7560  760  3  7580
                                         000  0  00000
6 15970 → 1  2 040 040  1  2 038 038  1  2 050 050
3 16000 BG     0  20  3  744   21550  1  3
5 16050        0  1  7580   50  1  7560  210  1  7540  230  1  7520  250  1  7500
5 16051      260  1  7480  300  1  7460  470  1  7440  490  1  7430  880  1  7430
5 16052      890  1  7440  930  1  7460  960  2  7460  965  2  7440  970  2  7428
5 16053      985  2  7428  990  2  7440 1010  3  7480 1110  3  7500 1140  3  7580
6 16070  1  2 040 040  1  2 042 042  1  2 080 080
3 16100 BH     0  16  3  745   21870  1  3
5 16150        0  1  7580   30  1  7500   45  1  7440   60  1  7430  680  1  7430
5 16151      690  1  7440  710  2  7500  715  2  7440  720  2  7431  735  2  7431
5 16152      740  2  7440  770  3  7500  830  3  7520  950  3  7540  970  3  7560
5 16153      990  3  7580
6 16170  1  2 040 040  1  2 045 045  1  2 080 080
3 16200 BI     0  16  3  748   22120  1  3
5 16250        0  1  7580   90  1  7560  130  1  7540  180  1  7520  200  1  7500
5 16251      340  2  7500  355  2  7460  360  2  7433  370  2  7433  375  2  7460
5 16252      380  3  7480  460  3  7500  520  3  7520  620  3  7540  630  3  7560
5 16253      660  3  7580
6 16270  1  2 080 080  1  2 045 045  1  2 060 060
3 16300 BJ     0  15  3  748   22550  1  3
5 16350        0  1  7560   50  1  7540   90  1  7520  180  1  7500  255  2  7480
5 16351      260  2  7460  270  2  7437  280  2  7437  290  2  7460  295  3  7480
5 16352      320  3  7500  380  3  7520  470  3  7540  500  3  7550  500  3  7600
6 16370  1  2 120 120  1  2 050 050  1  2 100 100
3 16400 BK     0  11  3  749   22960  1  3
5 16450        0  1  7560   80  1  7540  130  1  7520  590  2  7500  600  2  7480
5 16451      610  2  7440  625  2  7440  630  2  7480  640  3  7520  920  3  7540
5 16452      990  3  7560
6            100 100        050 050        100 100
```

BE

BE

BF

BG

BH

BI

BJ

BK

SGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 10,DATE=12/21/76

ATER-SURFACE PROFILE FOR: GILKEY FWY LES

AGE 1 OF 1

** FLOODWAY ANALYSIS *** HOR FW

CID AT	DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
AT	110 / 711.96	0 / 0.70	1650. /	248. / 712.66	25566. / 6.65	1.03 / 0.49	445. /	490.	*IS*	A
AT	560 / 713.86	450 / 0.29	1650. / 1.48	383. / 0.0 / 714.15	32353. / 4.30	1.00 / 0.34	535. / 0.001	610.	*XS*	B
AT	850 / 714.43	290 / 0.11	1650. / 0.39	632. / 0.0 / 714.54	62350. / 2.61	1.02 / 0.18	580. / 0.000	680.	*XS*	C
AT	1040 / 714.57	190 / 0.24	1650. / 0.20	422. / 0.07 / 714.81	41324. / 3.91	1.01 / 0.27	450. / -0.000	530.	*XS*	

FW

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 13,DATE= 8/29/79

WATER-SURFACE PROFILE FOR: GILKEY RECOMP SECS E1-K FWY LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

Part of new Subm. that 6/3/80

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC		*ID*
F1	AT	1315	0	1650.	1997.	323272.	1.33	-20.	280.	
716.88		0.01			716.89	0.83	0.05			*IS*
G	AT	1650	335	1650.	1831.	234124.	1.05	150.	500.	
716.88		0.01	0.01	0.0	716.89	0.90	0.07	-0.013		*XS*
H	AT	2040	390	1650.	1544.	178148.	1.07	150.	500.	
716.90		0.02	0.03	0.00	716.92	1.07	0.09	-0.000		*XS*
I	AT	2620	580	1650.	1651.	196859.	1.03	350.	700.	
716.95		0.02	0.05	0.0	716.97	1.00	0.08	0.000		*XS*
I2	AT	2860	240	1650.	943.	81973.	1.25	280.	630.	
716.95		0.06	0.04	0.02	717.01	1.75	0.17	-0.019		*XS*
J	AT	3120	260	1650.	488.	40119.	1.25	390.	590.	
717.08		0.22	0.22	0.08	717.31	3.38	0.37	-0.000		*XS*
J2	AT	3250	130	1650.	580.	50492.	1.10	240.	440.	
717.33		0.14	0.17	0.0	717.47	2.85	0.28	-0.008		*XS*
K	AT	3370	120	1650.	470.	36795.	1.18	160.	360.	
717.47		0.23	0.18	0.04	717.69	3.51	0.37	-0.000		*XS*

D

FW

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 8,DATE= 8/29/79

WATER-SURFACE PROFILE FOR: GILKEY RECOMP SECS L TO M LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*
L	AT 3520	0	1400.	735.	100427.	1.74	80.	280.
719.06	0.10			719.16	1.90	0.22		*IS*
M	AT 3820	300	1400.	706.	97479.	1.91	300.	500.
719.11	0.12	0.06	0.01	719.23	1.98	0.23	-0.000	*XS*

FW

END OF THIS PROFILE

Part of No. 1
submitted
6/3/80

WATER-SURFACE PROFILE FOR: GILKEY CR LES

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
Q	AT	4950	0	1400.	498.	57044.	1.00	31.	100.
728.80	0.12				728.92	2.81	0.18		*IS*
R	AT	5090	140	1400.	423.	52659.	1.00	61.	104.
728.87	0.17	0.09	0.02		729.04	3.31	0.19	-0.000	*XS*

END OF THIS PROFILE

```
==================================================================================
WATER-SURFACE PROFILE FOR: GILKEY CR                                    LES
PAGE  1 OF  1
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
Q     AT    4950 /     0 /   1850. /   693. /   89442. / 1.00 /   23. /  103.
   731.37 /   0.11 /                 /  731.48 /   2.67 /   0.16/          *IS*
----------------------------------------------------------------------------------
R     AT    5090 /   140 /   1850. /   541. /   71142. / 1.00 /   56. /  109.
   731.41 /   0.18 /   0.08 /   0.04 /  731.59 /   3.42 /   0.19 / -0.000  *XS*
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

```
==================================================================================
WATER-SURFACE PROFILE FOR: GILKEY CR                                      LES
PAGE  1 OF  1
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
Q     AT    4950 /     0 /    780. /   233. /   23124. / 1.00 /   53. /   93.
   723.40 /   0.17 /                 /  723.57 /    3.35 /   0.24/          *IS*
----------------------------------------------------------------------------------
R     AT    5090 /   140 /    780. /   215. /   20240. / 1.00 /   66. /  102.
   723.57 /   0.21 /   0.18 /   0.02 /  723.77 /    3.64 /   0.26 / -0.000  *XS*
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: GILKEY CR LES

*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
S	AT	5820	0	1400.	4016.	992962.	1.03	236.	536.	
734.50		0.00			734.50	0.35	0.02		*IS*	S
T	AT	6310	490	1400.	1706.	414379.	1.10	814.	964.	
734.50		0.01	0.00	0.00	734.51	0.82	0.04	0.002	*XS*	T
U	AT	6610	300	1400.	1774.	488295.	1.03	524.	674.	
734.50		0.01	0.00	0.0	734.51	0.79	0.04	-0.004	*XS*	U
U1	AT	6710	100	1400.	1404.	284258.	1.00	0.	142.	
734.50		0.02	0.00	0.00	734.52	1.00	0.06	0.001	*XS*	FUl
V	AT	6850	140	1400.	2127.	462524.	1.11	281.	481.	
734.50		0.01	0.00	0.0	734.51	0.66	0.05	-0.010	*XS*	V

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: GILKEY CR LES
PAGE 1 OF 1
*** FLOODWAY ANALYSIS *** HOR FW

SECTD	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
V	AT	6850	0	1400.	2127.	462524.	1.11	281.	481.	V
734.50		0.01			734.51	0.66	0.05		*IS*	
W	AT	7240	390	1400.	1997.	432771.	1.06	576.	776.	W
734.50		0.01	0.00	0.00	734.51	0.70	0.04	-0.004	*XS*	
X	AT	7580	340	1400.	1910.	414914.	1.07	515.	715.	X
734.50		0.01	0.00	0.00	734.51	0.73	0.04	-0.004	*XS*	
X RD	AT	7630	50	1400.	1411.	257351.	1.01	220.	420.	FW
734.50		0.02	0.00	0.00	734.52	0.99	0.07	0.002	*XS*	
Y	AT	7680	50	1400.	1960.	470767.	1.07	390.	590.	Y
734.50		0.01	0.00	0.0	734.51	0.71	0.04	-0.008	*XS*	
Z	AT	7950	270	1400.	2725.	396770.	1.25	260.	748.	Z
734.50		0.01	0.00	0.0	734.51	0.51	0.03	-0.006	*XS*	

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: GILKEY CR LES

PAGE 1 OF 1

*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW		
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*		
AA	AT	8150	0	1330.	3431.	471816.	1.30	22.	708.		
734.50		0.00			734.50	0.39	0.03		*IS*		AA
AB	AT	8690	540	1330.	1271.	198770.	1.22	160.	360.		
734.50		0.02	0.01	0.01	734.52	1.05	0.08	-0.002	*XS*	0	AB
AC	AT	9000	310	1330.	1308.	189581.	1.14	100.	300.		
734.50		0.02	0.01	0.0	734.52	1.02	0.08	-0.017	*XS*		AC
AD	AT	9540	540	1330.	804.	91191.	1.26	350.	550.		
734.54		0.05	0.06	0.02	734.59	1.65	0.14	0.000	*XS*	.04	AD
AE	AT	9990	450	1330.	778.	72168.	1.49	451.	751.		
734.65		0.07	0.12	0.01	734.72	1.71	0.19	-0.000	*XS*	.09	AE
AF	AT	10440	450	1330.	264.	28480.	1.14	500.	600.		
734.85		0.45	0.39	0.19	735.30	5.04	0.44	-0.000	*XS*	.10	AF
AG	AT	10900	460	1330.	231.	21991.	1.00	20.	85.		
736.10		0.52	1.30	0.03	736.61	5.76	0.54	-0.017	*XS*	0	AG
AH	AT	11260	360	1330.	230.	28485.	1.00	37.	87.		
737.10		0.52	1.02	0.00	737.62	5.78	0.47	-0.015	*XS*	0	AH

END OF THIS PROFILE

FW

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 11,DATE= 5/ 4/77

WATER-SURFACE PROFILE FOR: GILKEY CR LES

PAGE 1 OF 1

*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*		
AH AP	AT	11550	.0	1330.	209.	25842.	1.18	423.	503.	
738.66	0.74				739.40	6.38	0.50		*IS*	AI
AT	AT	11680	130	1330.	513.	68218.	1.23	420.	550.	
739.41	0.13	0.13	0.0		739.54	2.59	0.21	0.003	*XS*	AJ
AJ	AT	12170	490	1270.	307.	33070.	1.36	318.	448.	
739.66	0.36	0.37	0.12		740.02	4.14	0.38	-0.001	*XS*	AK
AK	AT	12670	500	930.	152.	15767.	1.09	351.	405.	
740.68	0.64	1.16	0.14		741.32	6.14	0.53	0.000	*XS*	AL
AL	AT	12980	310	930.	273.	32663.	1.28	223.	322.	
741.61	0.23	0.52	0.0		741.84	3.41	0.29	-0.000	*XS*	AM

END OF THIS PROFILE

0

.03

.02

.08

.03

FW

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==================================================================================
WATER-SURFACE PROFILE FOR: GILKEY CR                                      LES
PAGE  1 OF  1
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /   HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
AM    AT   13070 /     0 /    930. /   374. /   55321. / 1.43 /  400. /  551.
   741.95 /   0.14 /                 /  742.09 /    2.48 /   0.21/          *IS*
----------------------------------------------------------------------------------
AN    AT   13540 /   470 /    930. /   361. /   30048. / 1.96 /  340. /  480.
   742.16 /   0.20 /   0.24 /   0.03 /  742.36 /    2.57 /   0.31 / -0.000  *XS*
----------------------------------------------------------------------------------
AO    AT   14120 /   580 /    930. /   331. /   33058. / 1.32 /  273. /  373.
   742.71 /   0.16 /   0.51 /   0.0  /  742.87 /    2.81 /   0.27 / 0.000   *XS*
----------------------------------------------------------------------------------
```

.03 AM AN

.12 AN AO ✓ FW

.10 AO AP

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 10.DATE= 5/ 7/77

WATER-SURFACE PROFILE FOR: GILKEY CR LES

PAGE 1 OF 1

*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
AP	AT	14300	0	930.	545.	68345.	1.43	260.	436.	AQ
743.98		0.06			744.04	1.71	0.15		*IS*	
AQ	AT	14710	410	930.	590.	57093.	1.45	309.	559.	AR
744.08		0.06	0.09	0.0	744.14	1.58	0.18	-0.001	*XS*	
AR	AT	15110	400	930.	337.	29538.	1.88	330.	530.	AS
744.20		0.22	0.21	0.08	744.42	2.76	0.33	-0.002	*XS*	
AS	AT	15500	390	930.	369.	43108.	1.41	215.	362.	AT
744.55		0.14	0.26	0.0	744.69	2.52	0.24	0.000	*XS*	
AT	AT	15970	470	930.	259.	25520.	1.29	221.	373.	AU
744.86		0.26	0.37	0.06	745.12	3.59	0.34	0.000	*XS*	

END OF THIS PROFILE

FW

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 10,DATE= 5/10/77

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==================================================================================
WATER-SURFACE PROFILE FOR: GILKEY CR                                        LES
PAGE  1 OF  1
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /   HE  /     EG  /    V  /    FN  /   ACC   *ID*
==================================================================================
AV    AT   17510 /     0 /    850. /  1119. /   90892. / 1.21 /   72. /  520.
   748.06 /   0.01 /                / 748.07 /    0.76 /   0.08/          *IS*
----------------------------------------------------------------------------------
AW    AT   18070 /   560 /    850. /   337. /   33313. / 1.00 /  570. /  640.
   748.15 /   0.10 /   0.13 /   0.04 / 748.25 /    2.52 /   0.20 / 0.000  *XS*
----------------------------------------------------------------------------------
AX    AT   18800 /   730 /    850. /   270. /   24590. / 1.02 /  650. /  710.
   748.77 /   0.16 /   0.64 /   0.03 / 748.92 /    3.15 /   0.24 / 0.000  *XS*
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

0 AV

0 AW

0 AX

FW

```
==================================================================================
WATER-SURFACE PROFILE FOR: GILKEY CR FW                                    LES
PAGE  1 OF  1
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /    V  /    FN  /   ACC    *ID*
==================================================================================
AY    AT   18910 /     0 /    850. /   381. /   32730. / 1.67 /  400. /  660.
   749.71 /   0.13 /                  /  749.84 /   2.23 /   0.23/          *IS*
----------------------------------------------------------------------------------
AZ    AT   19330 /   420 /    850. /   340. /   35497. / 1.08 /  260. /  340.
   750.00 /   0.10 /   0.26 /   0.0  /  750.10 /   2.50 /   0.20 / -0.000  *XS*
----------------------------------------------------------------------------------
```

AY ✓

AZ

END OF THIS PROFILE

FW

WATER-SURFACE PROFILE FOR: GILKEY CR FW LES

PAGE 1 OF 1

*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
	WS ELEV	HV	HF	HE	FG	V	FN	ACC	*ID*	
BE	AT 20860	0	780.	700.	45907.	2.48	210.	610.		BE
	752.20	0.05		752.25	1.11	0.14			*IS*	
BF	AT 21170	310	780.	1057.	124626.	1.08	425.	621.		BF
	752.27	0.01	0.03	0.0	752.28	0.74	0.06	0.000	*XS*	
BG	AT 21550	380	780.	1504.	203346.	1.06	830.	1030.		BG
	752.27	0.00	0.01	0.0	752.28	0.52	0.03	-0.014	*XS*	
BH	AT 21870	320	780.	1655.	234609.	1.03	565.	765.		BH
	752.27	0.00	0.00	0.0	752.28	0.47	0.03	-0.005	*XS*	
BI	AT 22120	250	780.	695.	47221.	1.77	240.	440.		BI
	752.27	0.03	0.01	0.02	752.31	1.12	0.13	0.002	*XS*	
BJ	AT 22550	430	780.	655.	42247.	2.24	175.	325.		BJ
	752.40	0.05	0.13	0.01	752.45	1.19	0.13	-0.000	*XS*	
BK	AT 22960	410	780.	743.	37227.	2.46	380.	680.		BK
	752.56	0.04	0.16	0.0	752.60	1.05	0.14	-0.000	*XS*	
BL	AT 23370	410	780.	317.	25073.	1.18	265.	396.		BL
	752.81	0.11	0.27	0.03	752.92	2.46	0.22	0.017	*XS*	

END OF THIS PROFILE

FW

```
==================================================================================
WATER-SURFACE PROFILE FOR: GILKEY CR                                      LES
PAGE  1 OF  1
==================================================================================
SECTD AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LFW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    EN  /   ACC   *ID*
==================================================================================
A      AT        0 /      0 /   1650. /   476. /   51532. / 1.00 /   38. /  132.
   711.10 /   0.19 /                  /  711.29 /    3.47 /   0.27/          *TS*
============================ BEGIN BRIDGE ANALYSIS ===============================
A BR   AT        0 /        /   1650. /   201. /   36903. / 1.00 /    0. /   33.
   711.10 /   1.04 /        ...1...  (=.001)    /    8.20 /   0.58 /          *BO*
----------------------------------------------------------------------------------
 NO ROAD OVERFLOW
                                                                            *RG*
----------------------------------------------------------------------------------
B      AT      110 /    110 /   1650. /   224. /   20664. / 1.03 /  448. /  500.
   711.11 /   0.97 /   0.28 /    0.42 /  711.98 /    7.37 /   0.59 / -0.011  *AS*
----------------------------------------------------------------------------------
   M = 0.21 / F = 0.00 / K* = 0.55 /   271. /   27420. / 1.03 /  445. /  503.
   711.96 /   0.60 /                  /  712.56 /    6.10 /   0.46 /          *AS*
============================ END BRIDGE ANALYSIS =================================
C      AT      560 /    450 /   1650. /   378. /   30415. / 1.00 /  531. /  613.
   713.73 /   0.30 /   1.47 /    0.0  /  714.03 /    4.36 /   0.36 / 0.000  *XS*
----------------------------------------------------------------------------------
D      AT      850 /    290 /   1650. /   733. /   68078. / 1.06 /  546. /  726.
   714.33 /   0.08 /   0.38 /    0.0  /  714.41 /    2.25 /   0.17 / 0.000  *XS*
----------------------------------------------------------------------------------
E      AT     1040 /    190 /   1650. /   429. /   40625. / 1.02 /  448. /  537.
   714.44 /   0.23 /   0.19 /    0.08 /  714.67 /    3.85 /   0.28 / -0.000 *XS*
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

A

B 100-YR

C

D

WATER-SURFACE PROFILE FOR: GILKEY RECOMP ABOVE LEWIS ST SECS E1-K LES
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
E1	AT	1315	0	1650.	2919.	399144.	1.47	-66.	514.
716.78	0.01			716.79	0.57	0.04			*IS*
G	AT	1650	335	1650.	3666.	436845.	1.04	42.	837.
716.78	0.00	0.01	0.0	716.78	0.45	0.04	-0.009		*XS*
H	AT	2040	390	1650.	1784.	193741.	1.08	65.	517.
716.78	0.01	0.01	0.01	716.79	0.92	0.08	-0.007		*XS*
I	AT	2620	580	1650.	2753.	260879.	1.10	71.	934.
716.82	0.01	0.03	0.0	716.83	0.60	0.06	0.000		*XS*
I2	AT	2860	240	1650.	1200.	82816.	1.56	36.	718.
716.82	0.05	0.03	0.02	716.87	1.37	0.16	-0.011		*XS*
J	AT	3120	260	1650.	460.	36537.	1.30	388.	594.
716.95	0.26	0.23	0.11	717.21	3.58	0.40	-0.000		*XS*
J2	AT	3250	130	1650.	611.	48835.	1.18	205.	458.
717.27	0.13	0.20	0.0	717.40	2.70	0.29	-0.000		*XS*
K	AT	3370	120	1650.	464.	34974.	1.24	155.	383.
717.41	0.24	0.19	0.05	717.65	3.55	0.39	-0.001		*XS*

END OF THIS PROFILE

100 yr

Part of Sch
Sub. this 6/3/80

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 8,DATE= 9/ 6/79

WATER-SURFACE PROFILE FOR: GILKEY RECOMP SECS L TO M LES
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
L	AT	3520	0	1400.	1054.	118876.	2.12	74.	448.
719.00	0.06				719.06	1.33	0.19		*IS*
M	AT	3820	300	1400.	989.	101878.	3.07	189.	694.
719.03	0.10	0.05	0.02		719.13	1.42	0.22	-0.000	*XS*

END OF THIS PROFILE

100 yr

Part of DW
Submittal 6/5/80

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 10,DATE= 1/27/77

WATER-SURFACE PROFILE FOR: GILKEY CR LES

PAGE 1 OF 1

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
0	AT	4100	0	1400.	869.	110582.	1.00	82.	191.
727.36	0.04				727.40	1.61	0.10		*IS*
P	AT	4640	540	1400.	597.	61554.	1.00	468.	556.
727.49	0.09	0.16	0.02		727.58	2.35	0.16	-0.000	*XS*

END OF THIS PROFILE

0

P

IN-7

556
4/2/78

WATER-SURFACE PROFILE FOR: GILKEY CR LES

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*	
Q	AT	4950	0	1400.	498.	57044.	1.00	31.	100.	Q
	728.80	0.12			728.92	2.81	0.18		*IS*	
R	AT	5090	140	1400.	423.	52659.	1.00	61.	104.	R
	728.87	0.17	0.09	0.02	729.04	3.31	0.19	-0.000	*XS*	

END OF THIS PROFILE

/n-4

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==================================================================================
WATFR-SURFACE PROFILE FOR: GILKEY CR                                    LES
PAGF  1 OF  1
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
S     AT    5820 /     0 /   1400. /  5983. / 1384192. / 1.04 /   34. /  536.   S
   734.50 /   0.00 /                 /  734.50 /    0.23 /   0.01/          *IS*
----------------------------------------------------------------------------------
T     AT    6310 /   490 /   1400. / 10162. / 2264715. / 1.02 /   79. /  964.   T
   734.50 /   0.00 /   0.00 /    0.0 /  734.50 /    0.14 /   0.01 / -0.001  *XS*
----------------------------------------------------------------------------------
U     AT    6610 /   300 /   1400. /  6547. / 1409427. / 1.11 /   26. /  674.   U
   734.50 /   0.00 /   0.00 /   0.00 /  734.50 /    0.21 /   0.01 / -0.000  *XS*
----------------------------------------------------------------------------------
```

IN-4

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: GILKEY CR LES

SECID	AT	DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
V	AT	6850	0	1400.	4512.	834215.	1.17	0.	481.		
		734.50	0.00			734.50	0.31	0.02		*IS*	V
W	AT	7240	390	1400.	5830.	1146482.	1.04	148.	776.		
		734.50	0.00	0.00	0.0	734.50	0.24	0.01	-0.002	*XS*	W
X	AT	7580	340	1400.	5021.	968327.	1.11	250.	923.		
		734.50	0.00	0.00	0.00	734.50	0.28	0.02	-0.001	*XS*	X ✓
X RD	AT	7630	50	1400.	4350.	790456.	1.03	0.	663.		
		734.50	0.00	0.00	0.00	734.50	0.32	0.02	-0.000	*XS*	10-70
Y	AT	7680	50	1400.	5656.	1270074.	1.04	180.	874.		
		734.50	0.00	0.00	0.0	734.50	0.25	0.01	-0.001	*XS*	Y
Z	AT	7950	270	1400.	3901.	576160.	1.17	81.	748.		
		734.50	0.00	0.00	0.00	734.50	0.36	0.03	-0.000	*XS*	Z

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: GILKEY CR LES

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
AA	AT	8150	0	1330.	3431.	471817.	1.30	22.	708.	
734.50		0.00			734.50	0.39	0.03		*IS*	AA
AB	AT	8690	540	1330.	2612.	325259.	1.40	48.	666.	
734.50		0.01	0.01	0.00	734.51	0.51	0.04	-0.005	*XS*	AB
AC	AT	9000	310	1330.	2374.	314030.	1.14	48.	485.	
734.50		0.01	0.01	0.0	734.51	0.56	0.04	-0.006	*XS*	AC
AD	AT	9540	540	1330.	1476.	135501.	1.45	73.	561.	
734.50		0.02	0.02	0.01	734.52	0.90	0.09	-0.016	*XS*	AD ✓
AE	AT	9990	450	1330.	901.	73187.	1.76	451.	906.	
734.56		0.06	0.08	0.02	734.62	1.48	0.19	0.000	*XS*	AE/AN-7✓
AF	AT	10440	450	1330.	259.	27305.	1.17	495.	620.	
734.75		0.48	0.40	0.21	735.23	5.13	0.46	0.000	*XS*	AF
AG	AT	10900	460	1330.	233.	21834.	1.00	19.	88.	
736.11		0.51	1.36	0.01	736.61	5.70	0.55	0.005	*XS*	AG
AH	AT	11260	360	1330.	231.	28534.	1.00	37.	87.	
737.11		0.52	1.02	0.01	737.62	5.77	0.47	-0.017	*XS*	AH

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: GILKEY CR LES

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
AH AP AT 11550 / 738.66	0 / 0.71	1330. /	221. /	26255. / 739.37	1.26 / 6.02	400. / 0.49	503.	*IS*	AI
AI AT 11680 / 739.38	130 / 0.11	1330. / 0.13	616. / 0.0	69597. / 739.50	1.58 / 2.16	317. / 0.21	578. / -0.000	*XS*	AJ
AJ AT 12170 / 739.63	490 / 0.31	1270. / 0.35	370. / 0.10	34470. / 739.94	1.71 / 3.43	205. / 0.37	448. / 0.003	*XS*	AK
AK AT 12670 / 740.60	500 / 0.67	930. / 1.15	149. / 0.18	15264. / 741.27	1.11 / 6.22	339. / 0.54	407. / 0.000	*XS*	AL
AL AT 12980 / 741.58	310 / 0.24	930. / 0.55	276. / 0.0	32038. / 741.82	1.37 / 3.37	206. / 0.30	332. / -0.000	*XS*	AM

END OF THIS PROFILE

100-7

WATER-SURFACE PROFILE FOR: GILKEY CR LES

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
AM AT 13070	0	930.	370.	54771.	1.42	400.	551.		
741.92	0.14	.	742.06	2.51	0.21			*IS*	AN
AN AT 13540	470	930.	486.	31970.	2.88	198.	511.		
742.14	0.16	0.23	0.01	742.30	1.92	0.29	-0.000	*XS*	AO
AO AT 14120	580	930.	530.	40099.	1.81	108.	373.		
742.61	0.09	0.39	0.0	742.70	1.76	0.22	0.000	*XS*	AP

END OF THIS PROFILE

10-4

WATER-SURFACE PROFILE FOR: GILKEY CR LES

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
AP	AT	14300	0	930.	621.	70910.	1.60	198.	436.	
743.88		0.06			743.94	1.50	0.15		*IS*	AQ
AQ	AT	14710	410	930.	740.	66536.	1.46	220.	559.	
743.98		0.04	0.09	0.0	744.01	1.26	0.13	-0.000	*XS*	AR
AR	AT	15110	400	930.	309.	24354.	2.48	220.	533.	
744.04		0.35	0.21	0.16	744.39	3.01	0.40	0.007	*XS*	AS
AS	AT	15500	390	930.	422.	42583.	1.89	214.	513.	
744.57		0.14	0.33	0.0	744.71	2.20	0.25	-0.000	*XS*	AT
AT	AT	15970	470	930.	263.	25838.	1.31	221.	376.	
744.88		0.25	0.37	0.06	745.14	3.53	0.33	-0.000	*XS*	AU

END OF THIS PROFILE

100-yr

WATER-SURFACE PROFILE FOR: GILKEY CR LES

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*
AV	AT	17510	0	850.	1214.	93195.	1.27	72.	618.
748.06		0.01			748.07	0.70	0.08		*IS*
AW	AT	18070	560	850.	338.	33318.	1.00	565.	640.
748.15		0.10	0.13	0.04	748.24	2.52	0.20	0.000	*XS*
AX	AT	18800	730	850.	272.	24767.	1.04	649.	716.
748.76		0.16	0.64	0.03	748.91	3.13	0.24	0.000	*XS*

AV

AW ✓

AX 18-9✓

END OF THIS PROFILE

```
==================================================================================
WATER-SURFACE PROFILE FOR: GILKET CR                                        LES
PAGE  1 OF  1
==================================================================================
SECTD AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
AY    AT   18910 /     0 /    850. /   381. /   32679. / 1.78 /  400. /  674.
   749.70 /   0.14 /                 /  749.84 /   2.23 /   0.24/          *IS*
----------------------------------------------------------------------------------
AZ    AT   19330 /   420 /    850. /   392. /   35987. / 1.29 /  260. /  400.
   750.00 /   0.09 /   0.26 /   0.0  /  750.10 /   2.17 /   0.20 / -0.000  *XS*
----------------------------------------------------------------------------------
```

AY ✓

AZ 10-7✓

END OF THIS PROFILE

```
==================================================================================
WATER-SURFACE PROFILE FOR: GILKEY CR                                    LES
PAGE  1 OF  1
==================================================================================
SECTD AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
BA     AT   19540 /     0 /    850. /   423. /   47546. / 1.14 /  330. /  405.
   751.59 /   0.07 /                  /  751.66 /    2.01 /   0.15/          *IS*
----------------------------------------------------------------------------------
BB     AT   19630 /    90 /    850. /   506. /   63794. / 1.00 /  426. /  503.
   751.64 /   0.04 /   0.02 /    0.0  /  751.68 /    1.68 /   0.12 / -0.000  *XS*
----------------------------------------------------------------------------------
BC     AT   20090 /   460 /    850. /   364. /   32355. / 1.00 /  271. /  327.
   751.78 /   0.08 /   0.16 /   0.02 /  751.86 /    2.33 /   0.16 / -0.000  *XS*
----------------------------------------------------------------------------------

                              END OF THIS PROFILE
```

BA

BB ✓

BC

10-7 ✓

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 6,DATE= 4/11/77

```
==================================================================================
WATER-SURFACE PROFILE FOR: GILKEY CR                                      LES
PAGE  1 OF  1
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
BC     AT   20090 /     0 /    850. /   364. /   32355. / 1.00 /  271. /  327.
   751.78 /   0.08 /                 /  751.86 /    2.33 /   0.16/          *IS*
----------------------------------------------------------------------------------
BD     AT   20640 /   550 /    850. /   392. /   35784. / 1.00 /  577. /  649.
   752.13 /   0.07 /   0.34 /   0.0  /  752.21 /    2.17 /   0.16 /  0.000  *XS*
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

BC

BD

10-7

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
Cross Section	Distance	Width (ft.)	Section Area (Sq. ft)	Mean Velocity (F.P.S.)	With Floodway (M.S.L.)	Without Floodway (M.S.L.)	Difference (ft.)
CP	371+50	100	217	1.61	766.26	766.22	.04
CR	375+00	100	156	2.24	766.57	766.54	.03
CS	376+20	100	236	1.48	767.37	767.34	.03
CT	377+50	100	249	1.40	767.41	767.39	.02
CU	378+00	150	319	1.10	767.56	767.47	.09
CV	382+60	250	424	.82	767.67	767.58	.09
CW	387+10	300	518	.61	767.73	767.63	.10
CX	388+60	250	608	.52	768.22	768.12	.10
CY	394+10	[illegible]	138	2.28	768.32	768.22	.10
CZ	399+40	100	150	2.09	769.40	769.37	.03
DA	399+20	150	[illegible]	1.43	770.42	770.40	.02
DB	403+50	[illegible]	101	3.11	770.50	770.40	.10
DC	408+00	140	253	1.12	772.85	772.83	.02
DD	[illegible]	80	223	1.05	773.21	773.11	.10

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

FLOODWAY DATA

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 13,DATE=10/ 5/77

WATER-SURFACE PROFILE FOR: GILKEY CR SECS CYAPP TO DH FW LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
CYAPP AT 39920 / 770.42	0 / 0.06	315. /	221. / 770.48	10199. / 1.43	1.79 / 0.19	20. /	170.	*IS*	DA
CZ AT 40380 / 771.52	460 / 0.16	315. / 1.15	101. / 0.05	3901. / 771.68	1.08 / 3.11	3. / 0.31	42. / 0.003	*XS*	DB
DA AT 40880 / 772.85	500 / 0.02	290. / 1.19	258. / 0.0	9825. / 772.88	1.26 / 1.12	-95. / 0.12	45. / 0.006	*XS*	DC
DB AT 41420 / 773.21	540 / 0.02	240. / 0.35	228. / 0.0	11077. / 773.23	1.06 / 1.05	120. / 0.10	200. / 0.001	*XS*	DD
DC AT 41930 / 773.50	510 / 0.04	240. / 0.30	168. / 0.01	8712. / 773.55	1.38 / 1.43	84. / 0.17	164. / 0.000	*XS*	DE
DD AT 42410 / 774.43	480 / 0.19	240. / 1.01	83. / 0.07	3154. / 774.62	1.45 / 2.90	159. / 0.35	211. / -0.005	*XS*	DF
DE AT 42920 / 775.68	510 / 0.04	240. / 1.08	179. / 0.0	8644. / 775.72	1.26 / 1.34	49. / 0.14	129. / 0.018	*XS*	DG
DF AT 43430 / 776.13	510 / 0.06	240. / 0.46	126. / 0.01	7337. / 776.19	1.00 / 1.90	117. / 0.20	164. / 0.000	*XS*	DH
DG AT 43880 / 776.76	450 / 0.11	240. / 0.66	91. / 0.03	5390. / 776.87	1.00 / 2.65	243. / 0.26	272. / -0.001	*XS*	DI
DH AT 44380 / 777.60	500 / 0.07	240. / 0.80	114. / 0.0	6702. / 777.67	1.00 / 2.10	201. / 0.20	234. / 0.000	*XS*	DJ

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE=10/13/77

WATER-SURFACE PROFILE FOR: GILKEY DH APP TO DK FW LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HF	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
DHAPP AT 44410	0	240.	115.	8423.	1.00	206.	236.		
778.40	0.07			778.47	2.08	0.19		*IS*	DK
DI AT 44890	480	240.	85.	4572.	1.09	183.	213.		
779.09	0.13	0.72	0.03	779.22	2.81	0.29	0.000	*XS*	DL
DJ AT 45390	500	240.	105.	6274.	1.00	103.	140.		
780.14	0.08	1.00	0.0	780.23	2.28	0.23	0.002	*XS*	DM
DK AT 45740	350	240.	86.	5029.	1.06	46.	87.		
780.76	0.13	0.64	0.02	780.89	2.80	0.32	0.001	*XS*	DN

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 17,DATE=10/20/77

WATER-SURFACE PROFILE FOR: GILKEY DL TO DS FW LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
DL AT 45820 / 780.86	0 / 0.04	205. /	130. /	780.90	10953. / 1.58	1.00 / 0.12	352. /	375. *IS*	DØ
DM AT 46350 / 781.48	530 / 0.27	205. / 0.73	50. / 0.12	781.75	2772. / 4.10	1.04 / 0.48	245. / 0.002	269. *XS*	DP
DN AT 46850 / 783.63	500 / 0.22	205. / 2.10	57. / 0.0	783.85	3617. / 3.59	1.10 / 0.39	192. / 0.004	217. *XS*	DQ
DO AT 47360 / 785.10	510 / 0.16	205. / 1.40	66. / 0.0	785.26	4220. / 3.12	1.07 / 0.33	135. / 0.002	161. *XS*	DR
DP AT 47860 / 786.70	500 / 0.20	205. / 1.61	58. / 0.02	786.89	3087. / 3.53	1.01 / 0.38	188. / 0.003	212. *XS*	DS
DQ AT 48360 / 788.23	500 / 0.10	205. / 1.44	81. / 0.0	788.33	4722. / 2.53	1.01 / 0.26	123. / 0.002	152. *XS*	DT
DR AT 48900 / 789.30	540 / 0.07	205. / 1.03	96. / 0.0	789.37	4650. / 2.13	1.00 / 0.24	43. / -0.000	82. *XS*	DU
DS AT 49350 / 790.15	450 / 0.10	205. / 0.86	83. / 0.01	790.25	4721. / 2.48	1.01 / 0.29	23. / 0.004	63. *XS*	DV

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE=10/26/77

WATER-SURFACE PROFILE FOR: GILKEY SEC DT TO DV FW LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECTD AT	DISTANCE/	LENGTH/	DISCHARGE/	AREA	/CONVEYANCE/	ALPHA/	LEW /	REW	
WS ELEV /	HV /	HF /	HE /	EG /	V /	FN /	ACC	*ID*	
DT AT	49430 /	0 /	205. /	205. /	13593. /	1.67 /	270. /	343.	
793.69 /	0.03 /		/	793.72 /	1.00 /	0.11/		*IS*	DW
DU AT	49960 /	530 /	205. /	195. /	10353. /	1.00 /	205. /	259.	
793.86 /	0.02 /	0.16 /	0.0 /	793.87 /	1.05 /	0.10 /	-0.000	*XS*	DX
DV AT	50460 /	500 /	205. /	123. /	5274. /	1.02 /	85. /	136.	
794.23 /	0.04 /	0.38 /	0.01 /	794.27 /	1.67 /	0.17 /	0.001	*XS*	DY

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 8,DATE=10/28/77

WATER-SURFACE PROFILE FOR: GILKEY SECS DW, DX FW LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE/ LENGTH/DISCHARGE/ AREA /CONVEYANCE/ ALPHA/ LEW / REW WS ELEV / HV / HE / HF / EG / V / FN / ACC *ID*										
DW AT 50640 /	0 /	205. /	98. /	6678. /	1.15 /	30. /	70.	DZ		
796.06 / 0.08 /		/	796.14 /	2.09 /	0.18/		*IS*			
DX AT 50920 /	280 /	205. /	140. /	8924. /	1.05 /	170. /	230.			
796.31 / 0.03 /	0.20 /	0.0 /	796.34 /	1.46 /	0.14 /	0.009	*XS*	EA		

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 10,DATE=10/31/77

WATER-SURFACE PROFILE FOR: DILKEY DY, DZ FW LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
DY    AT   51050 /     0 /    205. /   191. /   13037. / 1.35 /  150. /  230.
   797.49 /   0.02 /                 /  797.51 /    1.08 /   0.10/          *IS*  EB
----------------------------------------------------------------------------------
DZ    AT   51650 /   600 /    205. /   126. /    8246. / 1.14 /  121. /  161.
   797.71 /   0.05 /   0.23 /   0.01 /  797.76 /    1.62 /   0.16 / -0.000  *XS*  EC
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 9,DATE=11/ 4/77

WATER-SURFACE PROFILE FOR: GILKEY SECS EA, EB FW LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
EA	AT	51740	0	205.	153.	7959.	1.51	14.	114.	ED
799.22		0.04			799.26	1.34	0.14		*IS*	
EB	AT	51970	230	205.	71.	5139.	1.00	10.	30.	EE
799.41		0.13	0.24	0.04	799.54	2.88	0.27	0.000	*XS*	

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 14,DATE=11/16/77

WATER-SURFACE PROFILE FOR: GILKEY SECS EC TO EG FW LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE/ LENGTH/DISCHARGE/ AREA /CONVEYANCE/ ALPHA/ LEW / REW WS ELEV / HV / HF / HE / EG / V / FN / ACC *ID*										
EC AT	52120	0	140.	68.	3121.	1.05	208.	239.		EE
800.23	0.07			800.30	2.05	0.22		*IS*		
ED AT	52640	520	140.	92.	3797.	1.06	17.	57.		EG
801.12	0.04	0.86	0.0	801.16	1.53	0.17	0.001	*XS*		
EF AT	53010	370	140.	67.	2197.	1.00	160.	190.		EH
801.97	0.07	0.87	0.02	802.04	2.10	0.25	-0.001	*XS*		
EF AT	53410	400	140.	98.	3269.	1.00	118.	158.		EI
803.11	0.03	1.09	0.0	803.14	1.43	0.16	0.005	*XS*		
EG AT	53770	360	140.	72.	2557.	1.00	65.	90.		EJ
803.94	0.06	0.84	0.01	804.00	1.94	0.20	0.001	*XS*		

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 15,DATE=11/22/77

WATER-SURFACE PROFILE FOR: GILKEY SECS EH TO EL FW LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
EH	AT	53880	0	140.	79.	2953.	1.04	177.	211.
805.84	0.05			805.89	1.77	0.18			*IS*
EI	AT	54400	520	140.	80.	2665.	1.02	57.	87.
807.14	0.05	1.30	0.0	807.19	1.75	0.19	0.003		*XS*
EJ	AT	54900	500	140.	109.	3884.	1.00	170.	210.
808.11	0.03	0.95	0.0	808.14	1.28	0.14	0.000		*XS*
EK	AT	55280	380	140.	76.	2565.	1.06	84.	124.
808.84	0.06	0.75	0.02	808.90	1.84	0.20	0.001		*XS*
EL	AT	55760	480	140.	73.	2299.	1.04	98.	138.
810.45	0.06	1.60	0.00	810.51	1.91	0.23	0.010		*XS*

END OF THIS PROFILE

500 year output

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USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT=    9.DATE= 5/16/77

==================================================================================
WATER-SURFACE PROFILE FOR: GILKEY CR                                        LES
PAGE  1 OF  1
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
BM    AT   23770 /     0 /    750. /   960. /   65502. / 1.71 /  175. /  609.
   757.10 /   0.02 /                / 757.12 /    0.78 /   0.07/          *IS*
----------------------------------------------------------------------------------
RN    AT   24000 /   230 /    750. /  2346. /  155811. / 3.88 /   31. /  917.
   757.12 /   0.01 /   0.01 /   0.0  / 757.13 /    0.32 /   0.04 / 0.000  *XS*
----------------------------------------------------------------------------------

                                 END OF THIS PROFILE
```

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 12,DATE= 4/23/77

500 YFR

WATER-SURFACE PROFILE FOR: GILKEY CR LES

PAGE 1 OF 1

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
BO	AT	24190	0	750.	1376.	84182.	4.20	111.	926.
757.23	0.02			757.25	0.55	0.08			*IS*
BP	AT	24660	470	750.	2593.	224022.	1.74	27.	676.
757.26	0.00	0.01	0.0	757.26	0.29	0.03	0.000		*XS*
BQ	AT	24800	140	750.	2004.	160804.	1.91	10.	474.
757.26	0.00	0.00	0.00	757.27	0.37	0.04	-0.001		*XS*
BR	AT	25200	400	750.	2530.	183428.	1.69	46.	716.
757.26	0.00	0.01	0.0	757.26	0.30	0.03	-0.010		*XS*
BS	AT	25760	560	750.	2150.	157188.	2.22	91.	747.
757.26	0.00	0.01	0.00	757.27	0.35	0.03	-0.010		*XS*
BT	AT	26410	650	750.	2499.	285410.	2.96	101.	744.
757.26	0.00	0.01	0.0	757.27	0.30	0.03	-0.009		*XS*

W/s side private road

END OF THIS PROFILE

```
==================================================================================
WATER-SURFACE PROFILE FOR: GILKEY CR                                        LES
PAGE  1 OF  1
==================================================================================
SECTO AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HF  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
BU    AT   26740 /     0 /    660. /  1123. /  141770. / 1.38 /  217. /  450.
   757.70 /   0.01 /                 /  757.71 /    0.59 /   0.04/          *IS*
----------------------------------------------------------------------------------
BV    AT   27240 /   500 /    660. /  1960. /  127064. / 2.51 /  360. /  900.
   757.70 /   0.00 /   0.01 /   0.0  /  757.70 /    0.34 /   0.04 / -0.015  *XS*
----------------------------------------------------------------------------------
BW    AT   27700 /   460 /    660. /   957. /   77610. / 1.78 /  687. / 1020.
   757.70 /   0.01 /   0.02 /   0.00 /  757.71 /    0.69 /   0.07 / -0.016  *XS*
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 11,DATE= 6/ 2/77

WATER-SURFACE PROFILE FOR: GILKEY CR LES

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
BX	AT	27800	0	600.	1693.	86013.	2.67	155.	1126.
757.70	0.01			757.71	0.35	0.05			*IS*
BY	AT	28160	360	600.	2083.	116576.	2.93	413.	1314.
757.70	0.00	0.01	0.0	757.70	0.29	0.02	-0.014		*XS*
BZ	AT	28710	550	600.	999.	62443.	3.44	638.	1287.
757.70	0.02	0.03	0.01	757.72	0.60	0.09	-0.020		*XS*
CA	AT	29280	570	600.	976.	68177.	2.36	219.	566.
757.75	0.01	0.05	0.0	757.77	0.61	0.08	-0.000		*XS*
CB	AT	29830	550	600.	616.	35091.	2.12	424.	885.
757.83	0.03	0.08	0.01	757.86	0.97	0.14	0.000		*XS*
CC	AT	30470	640	575.	304.	23144.	1.27	285.	427.
758.08	0.07	0.27	0.02	758.15	1.89	0.20	-0.003		*XS*

END OF THIS PROFILE

```
==================================================================================
WATER-SURFACE PROFILE FOR: GILKEY CR                                      LES
PAGE  1 OF  1
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
CD     AT   30730 /     0 /    465. /   628. /   31397. / 2.65 /  201. /  634.
   760.60 /   0.02 /                 /  760.62 /    0.74 /   0.11/          *IS*
----------------------------------------------------------------------------------
CE     AT   31230 /   500 /    465. /  1073. /   59706. / 3.02 /   17. /  450.
   760.67 /   0.01 /   0.06 /   0.0  /  760.68 /    0.43 /   0.07 /  0.000  *XS*
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: GILKEY CR CI TO CM LES

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
CI	AT	32440	0	465.	2298.	218713.	1.12	21.	510.	
761.69		0.00			761.69	0.20	0.02		*IS*	CH
CJ	AT	33000	560	465.	1754.	120300.	1.25	17.	617.	
761.69		0.00	0.00	0.00	761.69	0.27	0.03	-0.005	*XS*	CI
CK	AT	33730	730	465.	359.	15781.	1.72	568.	801.	
761.75		0.05	0.08	0.02	761.80	1.30	0.16	-0.000	*XS*	CJ
CL	AT	34250	520	465.	204.	13936.	1.29	397.	487.	
762.23		0.10	0.51	0.03	762.34	2.28	0.22	0.000	*XS*	CK
CM	AT	35050	800	465.	216.	13715.	1.00	257.	316.	
763.17		0.07	0.91	0.0	763.24	2.15	0.20	0.001	*XS*	CL

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 7,DATE= 7/21/77

```
==================================================================================
WATER-SURFACE PROFILE FOR: GILKEY CR CN TO CP                          LES
PAGE  1 OF  1
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HF  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
CN    AT   35240 /     0 /    400. /   164. /   11351. / 1.00 /   79. /  123.
   763.55 /   0.09 /                 /  763.64 /   2.43 /   0.22/          *IS*
----------------------------------------------------------------------------------
CO    AT   35880 /   640 /    400. /   159. /   10367. / 1.04 /  325. /  382.
   764.42 /   0.10 /   0.87 /   0.01 /  764.52 /   2.52 /   0.22 /  0.001  *XS*
----------------------------------------------------------------------------------
CP    AT   36580 /   700 /    400. /   186. /   11228. / 1.31 /  231. /  332.
   765.39 /   0.09 /   0.96 /   0.0  /  765.48 /   2.15 /   0.23 /  0.002  *XS*
----------------------------------------------------------------------------------
```

CM

CN

CP

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 8,DATE= 8/18/77

```
==================================================================================
WATER-SURFACE PROFILE FOR: GILKEY CR  SEC CQ TO CR1                    LES
PAGE  1 OF  1
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
CQ    AT   36700 /     0 /    350. /   156. /   11118. / 1.00 /  407. /  441.
   765.87 /   0.08 /                 /  765.95 /    2.24 /   0.18/          *IS*
----------------------------------------------------------------------------------
CR    AT   37150 /   450 /    350. /   233. /   15289. / 1.56 /  116. /  319.
   766.22 /   0.05 /   0.32 /   0.0  /  766.27 /    1.50 /   0.16 / -0.000  *XS*
----------------------------------------------------------------------------------
CR1   AT   37580 /   430 /    350. /   153. /   10206. / 1.13 /  356. /  452.
   766.54 /   0.09 /   0.34 /   0.02 /  766.63 /    2.29 /   0.22 /  0.000  *XS*
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 6,DATE= 8/24/77

```
==================================================================================
WATER-SURFACE PROFILE FOR: GILKEY CR SECS CR2, CS                    LES
PAGE  1 OF  1
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    EN  /   ACC    *ID*
==================================================================================
CR2   AT   37620 /     0 /    350. /   253. /   16958. / 1.24 / .331. /  484.
   767.34 /   0.04 /                 /  767.38 /    1.38 /   0.13/          *IS*
----------------------------------------------------------------------------------
CS    AT   37730 /   110 /    350. /   375. /   22767. / 1.56 /   70. /  386.
   767.39 /   0.02 /   0.03 /   0.0  /  767.41 /    0.93 /   0.11 / -0.000  *XS*
----------------------------------------------------------------------------------
```

CS

CT

END OF THIS PROFILE

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=    9,DATE= 8/24/77

==================================================================================
WATER-SURFACE PROFILE FOR: GILKEY CR SECS CS, CSRD, CT                LES
PAGE  1 OF  1
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    EN  /   ACC   *ID*
==================================================================================
CS    AT   37730 /     0 /    350. /   375. /   22758. / 1.56 /   70. /  386.
   767.39 /   0.02 /                 /  767.41 /   0.93 /   0.11/          *IS*
----------------------------------------------------------------------------------
CS RD AT   37760 /    30 /    350. /   215. /    9786. / 3.29 /   33. /  303.
   767.35 /   0.14 /   0.02 /   0.06 /  767.48 /   1.63 /   0.26 / -0.004  *XS*
----------------------------------------------------------------------------------
CT    AT   37800 /    40 /    350. /   361. /   21237. / 2.24 /   26. /  305.
   767.47 /   0.03 /   0.02 /   0.0  /  767.50 /   0.97 /   0.12 / -0.001  *XS*
----------------------------U---------------------------------HUMKBK

4 REMOTE107 STARTED ON LINE6
```

CT

CU

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 8.DATE= 8/24/77

```
==================================================================================
WATER-SURFACE PROFILE FOR: GILKEY CR SECS CT, CU, CV                    LES
PAGE  1 OF  1
==================================================================================
SECTN AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     FG  /     V  /    FN  /   ACC   *ID*
==================================================================================
CT    AT   37800 /     0 /    350. /   361. /   21213. / 2.24 /   27. /  305.
   767.47 /   0.03 /                 /  767.50 /    0.97 /   0.12/          *IS*
----------------------------------------------------------------------------------
CU    AT   38280 /   480 /    350. /   818. /   33779. / 2.92 /   83. / 1070.
   767.58 /   0.01 /   0.08 /   0.0  /  767.59 /    0.43 /   0.08 / 0.000  *XS*
----------------------------------------------------------------------------------
CV    AT   38710 /   430 /    350. /   879. /   32951. / 2.11 /  364. / 1222.
   767.63 /   0.01 /   0.05 /   0.0  /  767.63 /    0.40 /   0.06 / 0.000  *XS*
----------------------------------------------------------------------------------

                                END OF THIS PROFILE
```

WATER-SURFACE PROFILE FOR: GILKEY CR SECS CW TO DH LES
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
CW	AT	38860	0	315.	875.	51562.	1.61	0.	630.
768.12	0.00			768.12	0.36	0.05			*IS*
CX	AT	39410	550	315.	148.	6759.	1.40	50.	223.
768.23	0.10	0.16	0.05	768.33	2.13	0.24	-0.000		*XS*
CY	AT	39890	480	315.	149.	6150.	1.66	38.	148.
769.37	0.12	1.15	0.01	769.49	2.12	0.29	0.003		*XS*
CY RD	AT	39900	10	315.	175.	4808.	5.01	-16.	410.
770.12	0.25	*******	*******	770.38	1.80	0.36	*******		*XS*
CYAPP	AT	39920	20	315.	346.	11269.	3.13	-47.	410.
770.37	0.04	0.04	0.0	770.41	0.91	0.18	0.002		*XS*
CZ	AT	40380	460	315.	97.	3673.	1.08	3.	42.
771.41	0.18	1.10	0.07	771.59	3.24	0.32	0.001		*XS*
DA	AT	40880	500	290.	326.	10304.	1.67	-147.	135.
772.78	0.02	1.21	0.0	772.80	0.89	0.11	0.009		*XS*
DB	AT	41420	540	240.	279.	11319.	1.43	53.	259.
773.11	0.02	0.33	0.0	773.13	0.86	0.10	0.001		*XS*
DC	AT	41930	510	240.	177.	8288.	1.64	38.	164.
773.41	0.05	0.31	0.02	773.46	1.36	0.18	0.000		*XS*
DD	AT	42410	480	240.	82.	3114.	1.45	159.	211.
774.41	0.19	1.07	0.07	774.61	2.93	0.35	0.002		*XS*
DE	AT	42920	510	240.	180.	8522.	1.32	36.	129.
775.68	0.04	1.11	0.0	775.71	1.33	0.15	0.000		*XS*
DF	AT	43430	510	240.	126.	7345.	1.00	117.	164.
776.14	0.06	0.47	0.01	776.19	1.90	0.20	0.000		*XS*
DG	AT	43880	450	240.	91.	5395.	1.00	243.	272.
776.76	0.11	0.65	0.03	776.87	2.65	0.26	0.001		*XS*
DH	AT	44380	500	240.	114.	6696.	1.00	201.	290.

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 14,DATE= 9/21/77

WATER-SURFACE PROFILE FOR: GILKEY SECS CYAPP TO DH LES
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
CYAPP AT 39920 / 770.40	0 / 0.04	315. /	358. / 770.44	11609. / 0.88	3.13 / 0.17	-50. /	410.	*IS*
CZ AT 40380 / 771.40	460 / 0.18	315. / 1.08	97. / 0.07	3653. / 771.58	1.08 / 3.25	3. / 0.33	42. / -0.007	*XS*
DA AT 40880 / 772.78	500 / 0.02	290. / 1.22	326. / 0.0	10297. / 772.80	1.67 / 0.89	-147. / 0.11	135. / 0.009	*XS*
DB AT 41420 / 773.11	540 / 0.02	240. / 0.33	279. / 0.0	11316. / 773.13	1.43 / 0.86	53. / 0.10	259. / 0.001	*XS*
DC AT 41930 / 773.41	510 / 0.05	240. / 0.31	177. / 0.02	8286. / 773.46	1.64 / 1.36	38. / 0.18	164. / 0.000	*XS*
DD AT 42410 / 774.41	480 / 0.19	240. / 1.07	82. / 0.07	3114. / 774.60	1.45 / 2.93	159. / 0.35	211. / 0.001	*XS*
DE AT 42920 / 775.68	510 / 0.04	240. / 1.11	180. / 0.0	8522. / 775.71	1.32 / 1.33	36. / 0.15	129. / 0.000	*XS*
DF AT 43430 / 776.14	510 / 0.06	240. / 0.47	126. / 0.01	7345. / 776.19	1.00 / 1.90	117. / 0.20	164. / 0.000	*XS*
DG AT 43880 / 776.76	450 / 0.11	240. / 0.65	91. / 0.03	5395. / 776.87	1.00 / 2.65	243. / 0.26	272. / 0.001	*XS*
DH AT 44380 / 777.60	500 / 0.07	240. / 0.80	114. / 0.0	6696. / 777.67	1.00 / 2.10	201. / 0.20	234. / 0.001	*XS*

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 10,DATE=10/13/77

WATER-SURFACE PROFILE FOR: GILKEY DHAPP TO DK LES
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
DHAPP AT 44410 / 778.40	0 / 0.07	240. /	117. / 778.47	8428. / 2.05	1.03 / 0.19	171. /	236.	*IS*	DH
DI AT 44890 / 779.05	480 / 0.10	240. / 0.66	121. / 0.02	4950. / 779.15	1.68 / 1.99	106. / 0.26	213. / 0.001	*XS*	DI
DJ AT 45390 / 780.05	500 / 0.09	240. / 0.98	101. / 0.0	5951. / 780.13	1.00 / 2.37	103. / 0.25	140. / 0.007	*XS*	DJ
DK AT 45740 / 780.72	350 / 0.13	240. / 0.69	84. / 0.02	4894. / 780.85	1.06 / 2.86	46. / 0.33	87. / 0.002	*XS*	DK

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 13,DATE=10/17/77

WATER-SURFACE PROFILE FOR: GILKEY DL TO DS LES
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID	AT DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*	
DL AT	45820	0	205.	129.	10842.	1.00	352.	375.	
780.82	0.04			780.86	1.59	0.12		*IS*	DL
DM AT	46350	530	205.	49.	2726.	1.05	245.	269.	
781.46	0.28	0.75	0.12	781.74	4.15	0.49	0.002	*XS*	DP
DN AT	46850	500	205.	57.	3635.	1.10	192.	217.	
783.64	0.22	2.12	0.0	783.86	3.58	0.39	0.004	*XS*	DQ
DO AT	47360	510	205.	66.	4222.	1.07	135.	161.	
785.10	0.16	1.40	0.0	785.26	3.12	0.33	0.002	*XS*	DR
DP AT	47860	500	205.	58.	3089.	1.01	188.	212.	
786.70	0.20	1.61	0.02	786.89	3.53	0.38	0.004	*XS*	DS
DQ AT	48360	500	205.	81.	4720.	1.01	123.	152.	
788.24	0.10	1.44	0.0	788.34	2.53	0.26	0.002	*XS*	DT
DR AT	48900	540	205.	96.	4655.	1.00	43.	83.	
789.30	0.07	1.03	0.0	789.37	2.12	0.24	0.002	*XS*	DU
DS AT	49350	450	205.	83.	4723.	1.01	23.	63.	
790.15	0.10	0.86	0.01	790.25	2.48	0.29	0.004	*XS*	DV

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 10,DATE=10/25/77

WATER-SURFACE PROFILE FOR: GILKEY SECS DT TO DV LES
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
DT AT 49430 / 793.69	0 / 0.02	205. /	300. / 793.71	14584. / 0.68	2.88 / 0.10	154. /	462.	*IS*	DW
DU AT 49960 / 793.84	530 / 0.02	205. / 0.15	194. / 0.0	10261. / 793.86	1.00 / 1.05	205. / 0.10	259. / -0.000	*XS*	DX
DV AT 50460 / 794.22	500 / 0.04	205. / 0.39	122. / 0.01	5247. / 794.27	1.02 / 1.68	85. / 0.17	136. / 0.001	*XS*	DY

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 6,DATE=10/27/77

WATER-SURFACE PROFILE FOR: GILKEY SECS DW, DX LES
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECTO AT DISTANCE/ WS ELEV	LENGTH/ HV	DISCHARGE/ HF	HE	AREA/ EG	CONVEYANCE/ V	ALPHA/ FN	LEW / ACC	REW *ID*	
DW AT 50640 / 796.05	0 / 0.07	205. /	109. / 796.12	6951. / 1.89	1.25 / 0.18	-4. /	120.	*IS*	DZ
DX AT 50920 / 796.27	280 / 0.03	205. / 0.19	153. / 0.0	8976. / 796.31	1.20 / 1.34	106. / 0.14	235. 0.000	*XS*	LA

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 9,DATE=10/29/77

WATER-SURFACE PROFILE FOR: GILKEY SELS DY, DZ LES
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HE	AREA / HF	CONVEYANCE / FG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
DY AT 51050 / 797.45	0 / 0.02	205. /	264. /	13892. / 797.47	2.05 / 0.78	61. / 0.10	313. /	*IS*	EB
DZ AT 51650 / 797.65	600 / 0.04	205. / 0.21	159. / 0.01	8751. / 797.69	1.44 / 1.29	121. / 0.15	209. / 0.000	*XS*	EC

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 7,DATE=11/ 4/77

WATER-SURFACE PROFILE FOR: GILKEY SECS EA, EB LES
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
EA	AT	51740	0	205.	174.	7930.	1.91	14.	200.	
799.16		0.04			799.20	1.18	0.14		*IS*	ED
EB	AT	51970	230	205.	79.	5591.	1.14	3.	37.	
799.34		0.12	0.22	0.04	799.46	2.60	0.27	0.000	*XS*	EE

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 11,DATE=11/16/77

WATER-SURFACE PROFILE FOR: GILKEY SECS EC TO EG LES
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HF	CONVEYANCE / EG	V	ALPHA / FN	LEW / ACC	REW *ID*	
EC AT 52120 / 800.16	0 / 0.07	140. /	66. / 800.23	2996. / 2.12	1.04 / 0.23	208. /	239. *IS*		EF
ED AT 52640 / 801.10	520 / 0.04	140. / 0.91	92. / 0.0	3754. / 801.14	1.09 / 1.52	11. / 0.17	57. 0.002	*XS*	EG
EE AT 53010 / 801.97	370 / 0.07	140. / 0.88	67. / 0.01	2188. / 802.04	1.00 / 2.10	160. / 0.25	190. -0.003	*XS*	EH
EF AT 53410 / 803.11	400 / 0.03	140. / 1.10	98. / 0.0	3256. / 803.14	1.00 / 1.42	118. / 0.16	158. 0.004	*XS*	EI
EG AT 53770 / 803.95	360 / 0.06	140. / 0.85	73. / 0.01	2555. / 804.00	1.00 / 1.92	65. / 0.20	92. 0.001	*XS*	EJ

END OF THIS PROFILE

*** TOPUT CARD PRINTOUT ***

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 HARTSHORN DRAIN. FLUSHING ROAD TO LINDEN ROAD  VH  5  5  2  5 12
2      2  68990  68990  69050  69180  69050
3      3   4   1   9  3  686      138 99 99
4      4    410     570     660     960     660
5      5      20  1  6974    20  1  6948    54  2  6950    72  2  6844    80  2  6857
5      6      91  2  6853   108  3  6947   128  3  6961   128  3  6974
5      7   0  1 028 028   0  1 045 045   0  1 028 028
3     33   4   0  11  3  698      480 99 99
5 00035     0025 01 07000 0035 01 06980 0044 01 06960 0050 01 06940 0055 02 06920
5 00036     0060 02 06900 0069 02 06867 0080 02 06867 0095 02 06900 0100 03 06920
5 00037     0120 03 07000
5 00038 00 01 038 038 00 01 045 045 00 01 038 038
3 00063   C   0 028 03 0692 0000970 99 99
5 00065     0000 01 07180 0017 01 07160 0022 01 07140 0030 01 07120 0036 01 07100
5 00066     0044 01 07080 0052 01 07060 0059 01 07040 0066 01 07020 0073 01 07000
5 00067     0088 02 06980 0096 02 06960 0103 02 06940 0116 02 06905 0123 02 06905
5 00068     0136 02 06940 0143 02 06960 0149 03 06930 0162 03 07000 0173 03 07020
5 00069     0186 03 07040 0199 03 07060 0209 03 07080 0222 03 07100 0240 03 07120
5 00070     0263 03 07140 0282 03 07160 0303 03 07180
5 00071 00 01 023 028 00 01 050 050 00 01 023 028
3 00093   D   0 026 03 0696 0001460 99 99
5 00095     0000 01 07200 0008 01 07180 0016 01 07160 0024 01 07140 0031 01 07120
5 00096     0038 01 07100 0052 01 07080 0067 01 07060 0117 01 07040 0157 01 07020
5 00097     0169 01 07000 0188 02 06980 0199 02 06944 0207 02 06944 0219 03 06980
5 00098     0226 03 07000 0230 03 07020 0234 03 07040 0238 03 07060 0242 03 07080
5 00099     0247 03 07100 0252 03 07120 0256 03 07140 0260 03 07160 0265 03 07180
5 00100     0270 03 07200
5 00101 00 01 040 040 00 01 045 045 00 01 030 030
3 00123   F   0 003 03 0700 0001970 99 99
5 00125     0000 01 07151 0022 01 07074 0046 01 07071 0076 02 07052 0088 02 06984
5 00126     0095 02 06987 0105 03 07008 0130 03 07148
5 00127 00 01 028 028 00 01 050 050 00 01 028 028
```

Corrected com

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 10,DATE= 9/25/78

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN, FLUSHING ROAD TO LINDEN ROAD VH
PAGE 1 OF 1, PROFILE NUMBER 1. UPSTREAM COMPUTATIONS

SECTO AT DISTANCE/ LENGTH/DISCHARGE/ AREA /CONVEYANCE/ ALPHA/ LEW / REW WS ELEV / HV / HF / HE / EG / V / FN / ACC *ID*									
A AT	138 /	0 /	410. /	97. /	6299. /	1.00 /	64. /	98.	
688.90 /	0.28 /		/	689.18 /	4.22 /	0.43/		*IS*	
B AT	480 /	342 /	410. /	94. /	5667. /	1.00 /	59. /	96.	10 YY
690.51 /	0.29 /	1.61 /	0.01 /	690.80 /	4.34 /	0.48 /	0.008	*XS*	
C AT	970 /	490 /	410. /	77. /	3868. /	1.00 /	102. /	137.	
694.22 /	0.44 /	3.76 /	0.07 /	694.65 /	5.31 /	0.62 /	0.019	*XS*	
D AT	1460 /	490 /	410. /	84. /	5167. /	1.02 /	184. /	220.	
698.41 /	0.38 /	4.12 /	0.0 /	698.78 /	4.89 /	0.53 /	0.009	*XS*	
E AT	1970 /	510 /	410. /	71. /	4051. /	1.01 /	81. /	108.	
702.44 /	0.52 /	4.10 /	0.07 /	702.96 /	5.79 /	0.61 /	0.008	*XS*	

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 13.DATE= 9/25/78

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN, FLUSHING ROAD TO LINDEN ROAD VH
PAGE 1 OF 1. PROFILE NUMBER 2. UPSTREAM COMPUTATIONS

SECTD AT DISTANCE / LENGTH / DISCHARGE / AREA / CONVEYANCE / ALPHA / LEW / REW									
WS ELEV /	HV /	HF /	HE /	EG /	V /	FN /	ACC	*TD*	
A AT	138 /	0 /	570. /	132. /	9779. /	1.00 /	63. /	99.	
689.90 /	0.29 /			/ 690.19 /	4.32 /	0.40/		*TS*	
B AT	480 /	342 /	570. /	124. /	8304. /	1.00 /	57. /	98.	50 YR
691.25 /	0.33 /	1.37 /	0.02 /	691.58 /	4.61 /	0.47 /	0.002	*XS*	
C AT	970 /	490 /	570. /	97. /	5298. /	1.00 /	100. /	139.	
694.77 /	0.53 /	3.62 /	0.10 /	695.30 /	5.85 /	0.65 /	0.002	*XS*	
D AT	1460 /	490 /	570. /	107. /	7265. /	1.06 /	179. /	222.	
698.97 /	0.47 /	4.14 /	0.0 /	699.45 /	5.35 /	0.54 /	0.008	*XS*	
E AT	1970 /	510 /	570. /	87. /	5508. /	1.00 /	80. /	109.	
703.03 /	0.66 /	4.14 /	0.10 /	703.69 /	6.52 /	0.64 /	0.006	*XS*	

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 15,DATE= 9/25/78

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN, FLUSHING ROAD TO LINDEN ROAD VH
PAGE 1 OF 1, PROFILE NUMBER 3. UPSTREAM COMPUTATIONS

SECTD AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / FG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*
A AT	139	0	660.	155.	12234.	1.00	62.	100.
690.50	0.28			690.78	4.27	0.38		*TS*
B AT	480	342	660.	142.	10094.	1.00	56.	99.
691.68	0.34	1.21	0.03	692.02	4.65	0.45	0.001	*XS*
C AT	970	490	660.	108.	6093.	1.00	99.	140.
695.04	0.58	3.47	0.12	695.62	6.11	0.66	0.007	*XS*
D AT	1460	490	660.	119.	8457.	1.08	176.	223.
699.25	0.51	4.14	0.0	699.77	5.54	0.55	0.006	*XS*
E AT	1970	510	660.	96.	6305.	1.00	79.	109.
703.31	0.74	4.17	0.11	704.05	6.88	0.65	0.005	*XS*

END OF THIS PROFILE

100 YR

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 17.DATE= 9/25/78

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN, FLUSHING ROAD TO LINDEN ROAD VH
PAGE 1 OF 1. PROFILE NUMBER 4. UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV	HV	HE	HE	FG	V	FN	ACC			*ID*
A	AT	138	0	860.	208.	18530.	1.00	59.	103.	
691.80	0.27				692.07	4.13	0.33			*IS*
B	AT	480	342	860.	185.	15397.	1.01	53.	102.	
692.65	0.33	0.89	0.03		692.99	4.61	0.40	0.001		*XS*
C	AT	970	490	860.	129.	7716.	1.00	98.	141.	
695.53	0.69	3.05	0.18		696.22	6.68	0.69	0.005		*XS*
D	AT	1460	490	860.	143.	11256.	1.11	171.	225.	
699.82	0.58	4.17	0.0		700.40	5.81	0.55	0.004		*XS*
E	AT	1970	510	860.	113.	7982.	1.00	78.	110.	
703.95	0.90	4.20	0.16		704.76	7.62	0.68	0.003		*XS*

500 YR

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 24,DATE= 9/25/78

WATER-SURFACE PROFILE FOR : [illegible] DRAIN, FLUSHING ROAD TO LINDEN ROAD VH
PAGE 1 OF 1, PROFILE NUMBER 5. UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECTO	AT	DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	HE	AREA / FG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW *TD*
A	AT	139 / 690.50	0 / 0.28	660. /		155. / 690.78	12275. / 4.27	1.00 / 0.37	62. /	100. *TS*
B	AT	480 / 691.67	342 / 0.34	660. / 1.20	0.03	142. / 692.01	10101. / 4.66	1.00 / 0.45	56. / 0.000	99. *XS*
C	AT	970 / 695.03	490 / 0.58	660. / 3.48	0.12	103. / 695.62	6078. / 6.12	1.00 / 0.66	99. / 0.004	140. *XS*
D	AT	1460 / 699.25	490 / 0.51	660. / 4.15	0.0	119. / 699.77	8467. / 5.53	1.08 / 0.55	176. / 0.005	223. *XS*
F	AT	1970 / 703.31	510 / 0.74	660. / 4.16	0.11	96. / 704.05	6301. / 6.88	1.00 / 0.65	79. / 0.005	109. *XS*

END OF THIS PROFILE

FW

No encroach
on This F

*** INPUT CARD PRINTOUT ***

```
          1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1   151 HARTSHORN DRAIN, LINDEN ROAD TO PASADENA AVE VH    2  5  2  5 12
2   152  70640  70770  70980  70830  70830
3   153   F   1   7  3  702    2170 99 99
4   154    410    570    860    660    660
5   155      -3  1  7147    8  1  7141   29  2  7098   37  2  7014   54  2  7012
5   156      61  2  7016   88  3  7154
6   157  0  1 025 025  0  1 040 040  0  1 025 025
3   183   6   0   7  3  704    2510 99 99
5   184      0  1  7135   33  2  7131   53  2  7039   58  2  7034   66 /2  7048
5   185     66  3  7106   85  3  7133  140  3  7161
                                       UUU  U  UUUU
6   186  0  1 035 035  0  1 040 040  0  1 035 035
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 8,DATE=10/18/78

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN, LINDEN ROAD TO PASADENA AVE VH
PAGE 1 OF 1, PROFILE NUMBER 1, UPSTREAM COMPUTATIONS

SECID	AT DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*
F AT	2170	0	410.	156.	14079.	1.00	32.	70.
706.40	0.11			706.51	2.63	0.23		*IS*
6 AT	2510	340	410.	53.	3458.	1.00	46.	66.
707.15	0.92	1.17	0.41	708.07	7.68	0.83	-0.019	*XS*

10 YR

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 10,DATE=10/18/78

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN, LINDEN ROAD TO PASADENA AVE VH
P GE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW *ID*
F AT 2170		0	570.	208.	21186.	1.00	31.	73.
707.70	0.12			707.82	2.74	0.22		*IS*
6 AT 2510		340	570.	77.	5714.	1.00	44.	66.
708.24	0.86	0.91	0.37	709.10	7.45	0.71	-0.000	*XS*

50 YR

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 14,DATE=10/18/78

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN, LINDEN ROAD TO PASADENA AVE VH
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
F	AT	2170	0	660.	234.	24949.	1.00	30.	74.
708.30	0.12				708.42	2.82	0.21		*IS*
6	AT	2510	340	660.	89.	7026.	1.00	42.	66.
708.78	0.86	0.84	0.37		709.63	7.42	0.67	-0.000	*XS*

100 YR

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE=10/18/78

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN, LINDEN ROAD TO PASADENA AVE VH
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
F AT 2170	0	860.	303.	35740.	1.00	29.	77.	
709.80	0.13		709.93	2.84	0.20			*IS*
6 AT 2510	340	860.	123.	10894.	1.00	39.	66.	
710.13	0.76	0.65	0.32	710.89	7.01	0.57	-0.000	*XS*

500 YR

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 19,DATE=10/18/78

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN, LINDEN ROAD TO PASADENA AVE VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*
F	AT	2170	0	660.	234.	24949.	1.00	30.	74.
708.30		0.12			708.42	2.82	0.21		*IS*
6	AT	2510	340	660.	89.	7026.	1.00	42.	66.
708.78		0.86	0.84	0.37	709.63	7.42	0.67	-0.000	*XS*

END OF THIS PROFILE

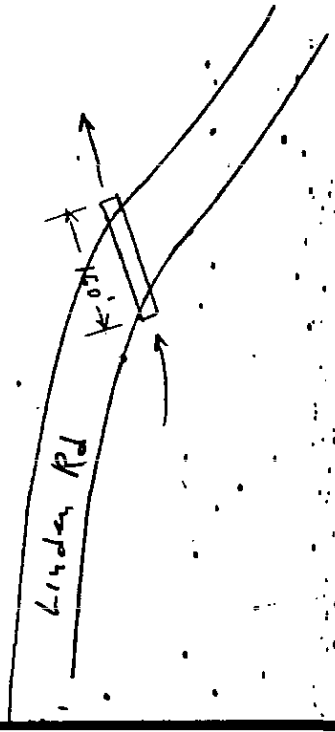
FW

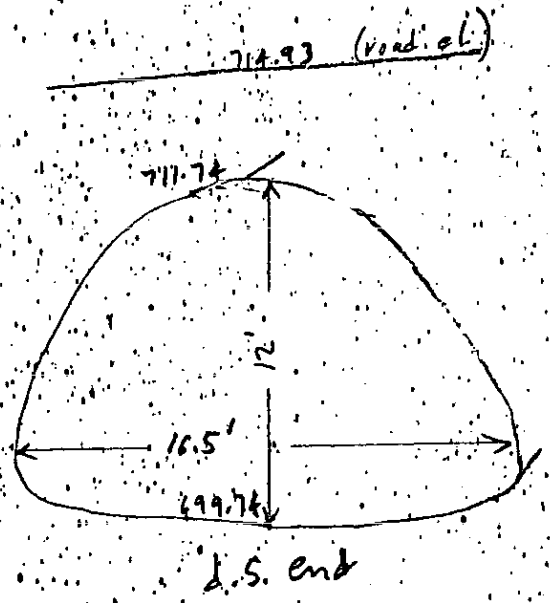
BRIDGE GEOMETRY SECTION Linden Rd d.s. of Pasadena Ave.

Upstream Side Bridge

Downstream Side Bridge

$L_p = 1.5$ (average)





BASIC DIMENSION CHECKLIST

Bridge
- Alinement ϕ
- Bridge opening width W
- Number of piers
- Widths of piers
- Elevation low steel
- " top curb
- " top guardrail
- Embankment top width
- Embankment sideslope
- Wingwall angles θ
- Wingwall lengths l

Culvert
- Size, shape, material
- 700.74 Upstr. Invert Elev.
- 699.74 Downstr. Invert Elev.
- 160' Length of culvert
- 714.93 Road elevation
- Entrance wingwall angle θ
- Entrance wingwall length
- 1.5' Length that pipe projects from headwall or fill

Culvert Computations

$Q_{10} = 410$, $h_4 = 702.44$ Assume type 3 flow

$\therefore h_4 = h_3 = 702.44$, $d_3 = 2.70$

$A_3 = 39$, $V_3^2/2g = 1.72$, $K_3 = 3114$

try $h_2 = 704.94$, $d_2 = 4.00$

$A_2 = 61$, $V_2^2/2g = 0.70$, $K_2 = 5927$

$h_{f_{2-3}} = \frac{160 * 410^2}{3114 * 5927} = 1.46$

	702.44
H_{v3}	1.72
HL	1.46
H_{v2}	− 0.70
	704.92

try $h_1 = 706.60$

$A_1 = 204$, $V_1^2/2g = 0.06$, $K_1 = 20588$

$h_f = \frac{20 * 410^2}{5927 * \cancel{20588}} = 0.03$

	704.94
	0.70
	0.03
c.loss	0.99
	− 0.06
	706.60

$(h_i - z)/D = 0.47$, $C' = 0.89$, $C_p = 0.92 = K_L$

$C = 0.82$

$$Q = 0.82 * 39 \sqrt{2g(6.86 + 0.06 - 2.70 - 0.03 - 1.46)}$$

$Q = 424/410 = 1.03$

try $h_1 = 706.40$

$A_1 = 156$, $V_1^2/2g = 0.11$, $K_1 = 14079$

$h_{f1-2} = \frac{20 * 410^2}{5927 * 14079} = 0.04$

$H_2 =$	704.94
	0.70
	0.04
	0.83
	− 0.11
	706.40
	38

$$Q = 0.83 * 39 \sqrt{2g(6.66 + 0.11 - 2.70 - 0.04 - 1.46)}$$

$416/410 = 1.016$

$h_1 = 706.4 - 699.74 = 6.66$ ← VH

$Q_{50} = 570$ cfs, $h_4 = 703.03$

Pipline type 3 flow, $\therefore h_4 = h_3 = 703.03$

pipe invert = 699.74, $d_3 = 3.30$

$A_3 = 49\ ft^2$, $K_3 = 4352$

$V_3^2/2g = (570/49)^2/2g = 2.10$

$h_3 = 703.03$
2.10
2.74
-2.10
705.77

try $d_2 = 3.3$, $h_2 = 704.24$; uss invert = 702.94

$h_{s2\text{-}3} = 160 * \frac{570^2}{4352^2} = 2.74$

try $h_2 = 705.84$, $d_2 = 4.90$

$A_2 = 75\ ft^2$, $V_2^2/2g = 0.90$

$K_2 = 7963$

$h_{s2\text{-}3} = 160 * \frac{570^2}{4352 * 7963} = 1.50$

703.03
2.10
1.50
-0.90
705.73

try $h_2 = 705.74$, $d_2 = 4.80$

$A_2 = 74$, $V_2^2/2g = 0.92$

$K_2 = 7734$

$h_{s2\text{-}3} = 160 * \frac{570^2}{4352 * 7734} = 1.54$

703.03
2.10
1.54
-0.92
705.75

try $h_2 = 705.70$, $d_2 = 4.76$

$A_2 = 73$ $V_2^2/2g = 0.95$

$K_2 = 7642$

$h_{s2\text{-}3} = 160 * \frac{570^2}{4352 * 7642} = 1.56$

703.03
2.10
1.56
-0.95
705.74

$Q = 570$

$d_2 = 4.80$, $h_2 = 705.74$

705.74
Hv2 0.92
0.06
~~0.92~~ 1.02
Hv1 −0.27
~~705.27~~
707.51

try $h_1 = 706.2$

$A_1 = 149$, $V_1^2/2g = 0.33$

$K_1 = 13111$

Entrance loss C

0.89 " [illegible] type [illegible]

* 0.92 adjustment for projection

0.82 adjusted C value

(?) Entrance loss = ~~0.17~~ 0.49 * 0.92 = ~~0.17~~ 1.02 = entrance loss

$h_{f1-2} = 20 * \frac{570^2}{7734 * 13{,}111} = 0.06$

try $706.9 = h_1$

$A_1 = 176$, $V_1^2/2g = (570/176)^2/2g = 0.16$

$K_1 = 16644$

$h_{f1-2} = 20 * \frac{570^2}{7734 * 16644} = 0.05$

705.74
0.92
0.05
0.43
~~0.92~~
−0.16
706.98

try 707.0

$A_1 = 180$, $V_1^2/2g = (570/180)^2/2g = 0.16$

$h_{f1-2} = 20 * \frac{570^2}{7734 * 17183} = 0.05$

$Q = 570$

Check for type 3 flow

$$Q = CA_3\sqrt{2g\left(h_1 + \alpha_1 \frac{V_1^2}{2g} - h_3 - h_{f\,1\text{-}2} - h_{s\,2\text{-}3}\right)}$$

$$Q = 0.82 * 49\sqrt{2g(7.26 + 100 * 0.1\ldots - 3.29 - 0.05 - 1.54)}$$

$= 514$

$514 / 570 = 0.90$

try $h_1 = 707.20$

$A_1 = 188$, $V_1^2/2g = 0.14$

$K_1 = 18284$

$h_{s\,1\text{-}2} = 20 * \frac{570^2}{7724 * 18284} = 0.05$

705.74
0.92
0.05
0.63
~~0.[illegible]~~
− 0.14
707.20

$$Q = 0.82 * 49\sqrt{2g(7.46 + 100 * 0.14 - 3.29 - 0.05 - 1.54)}$$

$= 532 / 570 = 0.93$

705.74
0.92
0.05
1.11
~~0.[illegible]~~
− 0.12
707.20

try $h_1 = 707.70$, $A_1 = 208$, $V_1^2/2g = 0.12$

$K_1 = 21186$

$$Q = 0.82 * 49\sqrt{2g(7.96 + 0.12 - 3.29 - 0.04 - 1.54)}$$

$Q = 578$

$\frac{h_1 - z}{D} = 0.66 < 1.5$

type 3 flow
Verified

$h_4/D = 0.27 < 1.0$

$h_4/h_c > 1$

VH

$Q_{100} = 660$, $h_4 = 703.31$

assume type 3 flow, $\therefore h_4 = h_3 = 703.31$, $d_3 = 3.57$

$A_3 = 54\ ft^2$, $V_3^2/2g = 2.32$, $K_3 = 4965.7$

try $h_2 = 706.04$, $d_2 = 5.10$

$A_2 = 78$, $V_2^2/2g = 1.11$, $K_2 = 8425$

$h_{f2.3} = 160 * \frac{660^2}{4965.7 * 8425} = 1.67$

703.31
2.32
1.67
− 1.11
706.19

try $h_2 = 706.20$, $d_2 = 5.26$

$A_2 = 81$, $V_2^2/2g = 1.03$, $K_2 = 8792.8$

$h_{f2.3} = 160 * \frac{660^2}{4965.7 * 8792.8} = 1.60$

703.31
2.32
1.60
−1.03
706.20

try $h_1 = 708.30$, $A_1 = 234$, $V_1^2/2g = 0.12$

$K_1 = 24949$

$h_{f1.2} = 20 * \frac{660^2}{8792.8 * 24949} = 0.04$

706.20
1.03
0.04
1.15
− 0.12
708.30

$(h_1 - z)/D = 0.61 = 0.90 = C' * C_f = 0.90 * 0.92 = 0.83$

$Q = 0.83 * 54 \sqrt{20(8.56 + 0.12 - 3.57 - 0.04 - 1.60)}$

$= 670$, w/i 1.015

$Q_{500} = 860$, $h_4 = 703.86$,

Assume type E flow, $h_4 = h_3 = 703.86$,

$d_3 = 4.12$, $A_3 = 62$, $V_3^2/2g = 2.99$

$K_3 = 6196.8$

703.86
2.99
1.79
-1.33
707.31

try $h_2 = 707.04$ $d_2 = 6.10$

$A_2 = 93$, $V_2^2/2g = 1.33$, $K_2 = 10683$

$$h_{f\,2\text{-}3} = 160 * \frac{860^2}{6196.8 * 10683} = 1.79$$

703.86
2.99
1.70
-1.22
707.33

try $h_2 = 707.30$, $d_2 = 6.36$

$A_2 = 97$, $V_2^2/2g = 1.22$, $K_2 = 11253.8$

$$h_{f\,2\text{-}3} = 160 * \frac{860^2}{6196.8 * 11253.8} = 1.70$$

703.86
2.99
1.68
-1.20
707.33

try $h_2 = 707.34$, $d_2 = 6.40$

$A_2 = 98$, $V_2^2/2g = 1.20$, $K_2 = 11341$

$$h_{f\,2\text{-}3} = \frac{160 * 860^2}{6196.8 * 11341} = 1.68$$

707.34
1.20
0.03
E.L. 1.55
-0.12
710.00

try $h_1 = 710.0$, $A_1 = 312$, $V_1^2/2g = 0.12$,

$(h_1 - Z)/D = 0.76$, $C' = 0.90$, $C_p = 0.92$, $C = 0.83$

$$h_{f\,1\text{-}2} = 20 * \frac{860^2}{11341 * 37457} = 0.03 \qquad K_1 = 37457$$

$$Q = 0.83 * 62 \sqrt{2g(10.26 + 0.12 - 4.12 - 0.03 - 1.68)}$$

$Q = 881/860$

$Q = 860$

$H_1 = 703.86$

$H_2 = 707.34$

try $h_1 = 709.8$, $A_1 = 303$, $V_1^2/2g = 0.13$

$K_1 = 35740$, $h_{f\,1\text{-}2} = \dfrac{20 * 860^2}{11341 * \cancel{37457}\ 35740} = 0.03$ 10

707.34
1.20
0.03 od
e.los. 1.36
− 0.13
709.80

$$Q = 0.83 * 62 \sqrt{2g\,(10.06 + 0.13 - 4.12 - 0.03 - 1.68)}$$

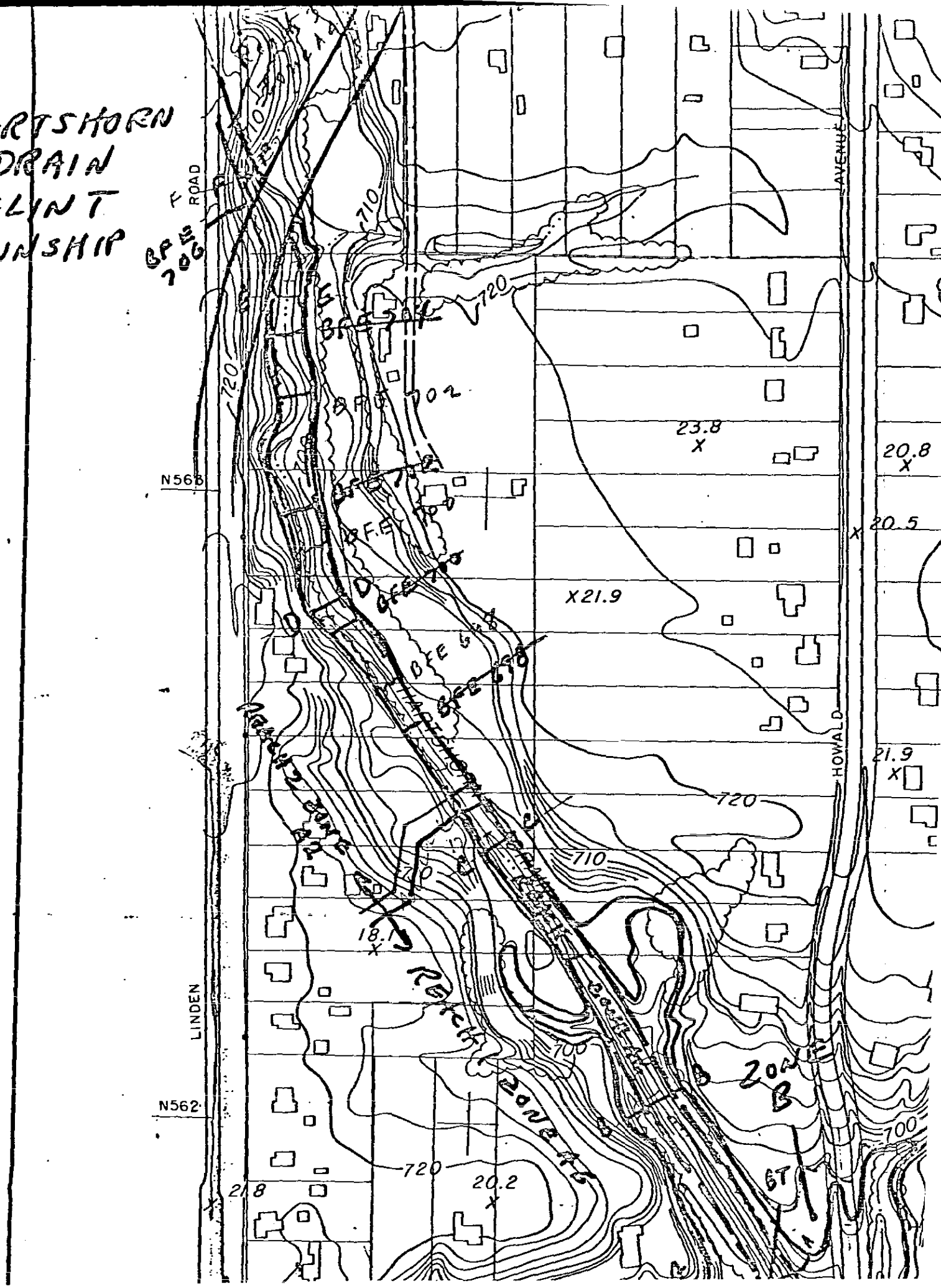
$= 862 / 860 =$

$$\frac{160 \times 860^2}{\underset{K_2}{11{,}341} \times \underset{K_3}{6197}} = 1.68$$

VH

Harrisburg Drain - Culvert I-F

Recurrence Interval	Design Discharge	h_4 Elevation	h_1 Elevation	Δh
10 YR	410 ✓	702.44 ✓	706.4	3.96
50 YR	570 ✓	703.03 ✓	707.7	4.67
100 YR	660 ✓	703.3[illegible] ✓	708.3	4.99
500 YR	860 ✓	703.86 ✓	709.8	5.94


ARTSHORN
DRAIN
FLINT
WNSHIP
ROAD
AVENUE
HOWALD
LINDEN
N563
N562
710
720
700
23.8
20.8
20.5
21.9
18.1
20.2
21.8
Zone B

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 23,DATE= 1/ 3/78

WATER-SURFACE PROFILE FOR: SWARTZ CK SECTION BC - B01 W/ NEW FILL HOLTSLAG
PAGE 1 OF 2, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
SZ BC AT   21970 /     0 /   4300. /  1150. /  148667. / 1.06 /   -9. /  147.
 - 742.37 /   0.23 /                 /  742.60 /    3.74 /   0.24/          *IS*
----------------------------------------------------------------------------------
SZ BD AT   22325 /   355 /   4300. /  2560. /  243700. / 2.36 /   70. /  677.
   742.68 /   0.10 /   0.18 /   0.0  /  742.78 /    1.68 /   0.16 / -0.000  *XS*
----------------------------------------------------------------------------------
SZ BE AT   22685 /   360 /   4300. /  1438. /  182521. / 1.75 /  726. /  945.
   742.76 /   0.24 /   0.15 /   0.07 /  743.00 /    2.99 /   0.22 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
CLAUB AT   22685 /       /   3181. /   497. /   48683. / 1.00 /    0. /   56.
   740.10 /   0.64 /       ...3...  (-.001)    /    6.39 /   0.37 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     1118. / RIGHT        0. /                *RG*
----------------------------------------------------------------------------------
SZ BF AT   22750 /    65 /   4300. /  1650. /  202682. / 1.43 / -228. /  -28.
   742.88 /   0.15 /   0.03 /   0.0  /  743.03 /    2.61 /   0.20 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  1800. /  230090. / 1.42 / -230. /  -26.
   743.63 /   0.13 /                 /  743.75 /    2.39 /   0.17 /          *AS*
============================ END BRIDGE ANALYSIS ================================
SZBF1 AT   23140 /   390 /   4300. /  2015. /  171474. / 2.71 / -269. /  318.
   743.78 /   0.19 /   0.18 /   0.03 /  743.97 /    2.13 /   0.23 / -0.000  *XS*
----------------------------------------------------------------------------------
SZ BG AT   23610 /   470 /   4300. /  2320. /  212327. / 2.13 / -226. /  389.
   744.09 /   0.11 /   0.24 /   0.0  /  744.21 /    1.85 /   0.18 / -0.000  *XS*
----------------------------------------------------------------------------------
SZBG1 AT   23770 /   160 /   4300. /  2488. /  185749. / 2.25 /   82. /  770.
   744.18 /   0.10 /   0.08 /   0.0  /  744.28 /    1.73 /   0.20 / -0.000  *XS*
----------------------------------------------------------------------------------
SZBG2 AT   23930 /   160 /   4300. /  4273. /  346203. / 1.93 /   61. / 1060.
   744.30 /   0.03 /   0.05 /   0.0  /  744.33 /    1.01 /   0.07 / -0.000  *XS*
```

BC

BD

BE

100-yr

BF

```
SZ BF AT   22750 /     0 /   4300. /  1801. /  2[illegible]238. / 1.42 / -230. /  -26.
743.[illegible] /   0.13 /.                    /  743.76 /   2.39 /   0.17/          *IS*
-----------------------------------------------------------------------------------------
SZBF1 AT   23140 /   390 /   4300. /  2028. /  151893. / 2.91 / -269. /  318.
743.80 /   0.20 /   0.21 /   0.04 /  744.00 /   2.12 /   0.23 / -0.000  *XS*
-----------------------------------------------------------------------------------------
SZ BG AT   23610 /   470 /   4300. /  2359. /  215846. / 2.14 / -226. /  391.
744.16 /   0.11 /   0.27 /   0.0  /  744.27 /   1.82 /   0.18 / -0.000  *XS*
-----------------------------------------------------------------------------------------
SZBG1 AT   23770 /   160 /   4300. /  2530. /  189438. / 2.24 /   81. /  770.
744.24 /   0.10 /   0.07 /   0.0  /  744.34 /   1.70 /   0.19 / -0.000  *XS*
-----------------------------------------------------------------------------------------
SZBG2 AT   23930 /   160 /   4300. /  4328. /  345617. / 2.01 /   61. / 1060.
744.35 /   0.03 /   0.05 /   0.0  /  744.38 /   0.99 /   0.07 / -0.000  *XS*
-----------------------------------------------------------------------------------------
SZ BH AT   24480 /   550 /   4300. /  2945. /  213965. / 1.[illegible]3 / -698. /  114.
744.48 /   0.05 /   0.14 /   0.01 /  744.53 /   1.46 /   0.09 / -0.000  *XS*
-----------------------------------------------------------------------------------------
SZ BI AT   25040 /   560 /   4300. /  3999. /  356115. / 1.43 /   48. /  780.
744.64 /   0.03 /   0.14 /   0.0  /  744.67 /   1.08 /   0.07 /  0.000  *XS*
-----------------------------------------------------------------------------------------
SZ BJ AT   25830 /   790 /   4300. /  5106. /  399565. / 2.78 /   66. / 1060.
744.74 /   0.03 /   0.10 /   0.00 /  744.77 /   0.84 /   0.05 / -0.000  *XS*
-----------------------------------------------------------------------------------------
SZBJ1 AT   26330 /   500 /   4300. /  1772. /  172781. / 2.91 /  107. /  684.
744.74 /   0.27 /   0.13 /   0.12 /  745.01 /   2.43 /   0.27 / -0.016  *XS*
-----------------------------------------------------------------------------------------
SZ BK AT   26580 /   250 /   4300. /   690. /  116505. / 1.35 /   96. /  232.
744.70 /   0.81 /   0.23 /   0.27 /  745.51 /   6.23 /   0.45 / -0.000  *XS*
-----------------------------------------------------------------------------------------
SZBK1 AT   26930 /   350 /   4300. /  1999. /  214616. / 1.81 /   40. /  423.
745.64 /   0.13 /   0.26 /   0.0  /  745.77 /   2.15 /   0.21 / -0.000  *XS*
-----------------------------------------------------------------------------------------
SZ BL AT   27225 /   295 /   4300. /  2386. /  265933. / 1.21 /   40. /  465.
745.81 /   0.06 /   0.10 /   0.0  /  745.87 /   1.80 /   0.12 / -0.000  *XS*
-----------------------------------------------------------------------------------------
SZ BM AT   28020 /   795 /   4300. /  1823. /  153036. / 1.83 /   40. /  482.
746.12 /   0.16 /   0.36 /   0.05 /  746.28 /   2.36 /   0.24 /  0.000  *XS*
-----------------------------------------------------------------------------------------
SZ BN AT   28500 /   480 /   4300. /  1190. /  103793. / 1.97 /   91. /  471.
746.56 /   0.40 /   0.56 /   0.12 /  746.96 /   3.61 /   0.32 / -0.000  *XS*
-----------------------------------------------------------------------------------------
SZBN1 AT   28810 /   310 /   4300. /   526. /   58836. / 1.00 /  -80. /  -14.
747.18 /   1.04 /   0.94 /   0.32 /  748.22 /   8.18 /   0.51 / -0.000  *XS*
-----------------------------------------------------------------------------------------
```

BF
BG
BH
BI
BJ
BK
BL 100-4
BM
BN
BO
BP
BQ
BR
BS
BT

WATER-SURFACE PROFILE FOR: SWARTZ CK SECTION BC - B01 W/ NEW FILL HOLTSLAG
PAGE 1 OF 2, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

```
==================================================================================
SECTO AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
SZ BC AT  21970 /     0 /   5400. /  1585. /  242544. / 1.09 /  -10. /  153.
  745.09 /   0.20 /                 /  745.29 /    3.41 /   0.19/          *IS*
----------------------------------------------------------------------------------
SZ BD AT  22325 /   355 /   5400. /  4188. /  428155. / 2.23 /   68. /  685.
  745.34 /   0.06 /   0.10 /   0.0  /  745.40 /    1.29 /   0.12 / 0.011  *XS*
----------------------------------------------------------------------------------
SZ BE AT  22685 /   360 /   5400. /  3693. /  338823. / 3.31 /   26. /  968.
  745.39 /   0.11 /   0.07 /   0.03 /  745.50 /    1.46 /   0.15 / -0.000 *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
CLAUB AT  22685 /       /   1252. /   497. /   48683. / 1.00 /    0. /   56.
  740.10 /   0.10 /       ...3...  (-.001)   /    2.52 /   0.15 /         *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT    4488. / RIGHT     145. /                *RG*
----------------------------------------------------------------------------------
SZ BF AT  22750 /    65 /   5400. /  2182. /  292491. / 1.51 / -246. /   -4.
  745.40 /   0.14 /   0.02 /   0.04 /  745.54 /    2.47 /   0.18 / -0.011 *AS*
----------------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /  2182. /  292491. / 1.51 / -246. /   -4.
  745.40 /   0.14 /                 /  745.54 /    2.47 /   0.18 /         *AS*
============================ END BRIDGE ANALYSIS ================================
SZBF1 AT  23140 /   390 /   5400. /  3089. /  270778. / 2.59 / -281. /  336.
  745.56 /   0.12 /   0.14 /   0.0  /  745.68 /    1.75 /   0.18 / -0.001 *XS*
----------------------------------------------------------------------------------
SZ BG AT  23610 /   470 /   5400. /  3392. /  320927. / 2.11 / -228. /  430.
  745.76 /   0.08 /   0.16 /   0.0  /  745.84 /    1.59 /   0.16 /  0.000 *XS*
----------------------------------------------------------------------------------
SZBG1 AT  23770 /   160 /   5400. /  3645. /  300331. / 1.95 /   53. /  770.
  745.82 /   0.07 /   0.09 /   0.0  /  745.89 /    1.48 /   0.10 / -0.000 *XS*
----------------------------------------------------------------------------------
SZBG2 AT  23930 /   160 /   5400. /  5887. /  539602. / 1.64 /   41. / 1060.
  745.90 /   0.02 /   0.03 /   0.0  /  745.92 /    0.92 /   0.06 /  0.000 *XS*
----------------------------------------------------------------------------------
SZ BH AT  24480 /   550 /   5400. /  3731. /  414466. / 1.08 / -704. /  115.
  745.96 /   0.04 /   0.07 /   0.01 /  746.00 /    1.45 /   0.09 / -0.000 *XS*
----------------------------------------------------------------------------------
SZ BI AT  25040 /   560 /   5400. /  5043. /  509414. / 1.46 /  [illegible] / 704.
```

BC

BD

BE

500 MV

BF

```
==========================================================================
SZ BF AT   22750 /     0 /   5400. /  2183. / 2[illegible]30. / 1.51 / -246. /   -4.
   745.40 /   0.14 /                 /  745.54 /   2.47 /   0.18/          *IS*
--------------------------------------------------------------------------
SZBF1 AT   23140 /   390 /   5400. /  3099. / 241230. / 2.72 / -282. /  336.
   745.58 /   0.13 /   0.16 /   0.0  /  745.71 /   1.74 /   0.19 / 0.000  *XS*
--------------------------------------------------------------------------
SZ BG AT   23610 /   470 /   5400. /  3418. / 324011. / 2.11 / -228. /  430.
   745.80 /   0.08 /   0.18 /   0.0  /  745.88 /   1.58 /   0.16 / -0.000 *XS*
==========================================================================
SZBG1 AT   23770 /   160 /   5400. /  3673. / 303428. / 1.94 /   52. /  770.
   745.86 /   0.07 /   0.05 /   0.0  /  745.93 /   1.47 /   0.10 / -0.000 *XS*
--------------------------------------------------------------------------
SZBG2 AT   23930 /   160 /   5400. /  5924. / 529485. / 1.75 /   41. / 1060.
   745.93 /   0.02 /   0.03 /   0.0  /  745.96 /   0.91 /   0.06 / -0.000 *XS*
--------------------------------------------------------------------------
SZ BH AT   24480 /   550 /   5400. /  3763. / 307206. / 1.49 / -704. /  115.
   746.02 /   0.05 /   0.10 /   0.01 /  746.07 /   1.44 /   0.08 / -0.000 *XS*
--------------------------------------------------------------------------
SZ BI AT   25040 /   560 /   5400. /  5115. / 520777. / 1.34 /   46. /  797.
   746.15 /   0.02 /   0.10 /   0.0  /  746.17 /   1.06 /   0.06 / -0.000 *XS*
--------------------------------------------------------------------------
SZ BJ AT   25830 /   790 /   5400. /  6593. / 570612. / 2.48 /   57. / 1073.
   746.22 /   0.03 /   0.08 /   0.00 /  746.25 /   0.82 /   0.04 / -0.000 *XS*
--------------------------------------------------------------------------
SZBJ1 AT   26330 /   500 /   5400. /  2679. / 258231. / 3.18 /   48. /  691.
   746.22 /   0.20 /   0.10 /   0.09 /  746.42 /   2.02 /   0.23 / -0.012 *XS*
--------------------------------------------------------------------------
SZ BK AT   26580 /   250 /   5400. /   896. / 155469. / 1.50 /   93. /  253.
   746.08 /   0.85 /   0.18 /   0.32 /  746.93 /   6.03 /   0.43 / -0.000 *XS*
--------------------------------------------------------------------------
SZBK1 AT   26930 /   350 /   5400. /  2541. / 300332. / 1.71 /   39. /  435.
   747.03 /   0.12 /   0.22 /   0.0  /  747.15 /   2.12 /   0.20 / -0.000 *XS*
--------------------------------------------------------------------------
SZ BL AT   27225 /   295 /   5400. /  2974. / 369762. / 1.18 /   38. /  480.
   747.17 /   0.06 /   0.08 /   0.0  /  747.23 /   1.82 /   0.11 / 0.000  *XS*
--------------------------------------------------------------------------
SZ BM AT   28020 /   795 /   5400. /  2427. / 221805. / 1.73 /   35. /  526.
   747.42 /   0.13 /   0.28 /   0.04 /  747.55 /   2.22 /   0.21 / 0.003  *XS*
--------------------------------------------------------------------------
SZ BN AT   28500 /   480 /   5400. /  1665. / 145582. / 2.00 /   55. /  471.
   747.75 /   0.33 /   0.43 /   0.10 /  748.08 /   3.24 /   0.29 / -0.000 *XS*
--------------------------------------------------------------------------
SZBN1 AT   28810 /   310 /   5400. /   595. /  68488. / 1.00 /  -82. /  -10.
   748.18 /   1.28 /   0.91 /   0.48 /  749.46 /   9.07 /   0.56 / -0.000 *XS*
--------------------------------------------------------------------------
```

BF
BG
BH
BI
BJ
BK
BL
BM
BN
BO
BP
BQ
BR
BS
BT

500-4-

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   23,DATE= 1/ 3/78

WATER-SURFACE PROFILE FOR:  SWARTZ CK  SECTION BC - BO1  W/ NEW FILL HOLTSLAG
PAGE  1 OF  2, PROFILE NUMBER  2,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
=================================================================================
SZ BC AT  / 21970 /     0 /   4300. /  1156. /  151351. / 1.06 /   -5. /  145.
   742.47 /   0.23 /                  /  742.70 /    3.72 /   0.23/          *IS*
---------------------------------------------------------------------------------
SZ BD AT   22325 /   355 /   4300. /  2547. /  261820. / 1.97 /  325. /  675.
   742.78 /   0.09 /   0.17 /   0.0  /  742.86 /    1.69 /   0.15 / -0.000  *XS*
---------------------------------------------------------------------------------
SZ BE AT   22685 /   360 /   4300. /  1444. /  186543. / 1.69 /  730. /  930.
   742.84 /   0.23 /   0.14 /   0.07 /  743.07 /    2.98 /   0.21 / 0.000   *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
CLAUB AT   22685 /       /   3133. /   497. /   48683. / 1.00 /    0. /   56.
   740.10 /   0.62 /       ...3...  (-.001)    /    6.30 /   0.37 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     1202. / RIGHT        0. /               *RG*
---------------------------------------------------------------------------------
SZ BF AT   22750 /    65 /   4300. /  1663. /  205386. / 1.43 / -229. /  -30.
   742.96 /   0.15 /   0.03 /   0.0  /  743.10 /    2.59 /   0.19 / -0.000  *AS*
---------------------------------------------------------------------------------
   N = **** / E = **** / K* = **** /  1807. /  232181. / 1.41 / -230. /  -30.
   743.68 /   0.12 /                  /  743.80 /    2.38 /   0.17 /          *AS*
============================ END BRIDGE ANALYSIS ================================
SZBF1 AT   23140 /   390 /   4300. /  1900. /  170538. / 2.50 / -265. /  235.
   743.82 /   0.20 /   0.18 /   0.04 /  744.02 /    2.26 /   0.23 / 0.000   *XS*
---------------------------------------------------------------------------------
SZ BG AT   23610 /   470 /   4300. /  2205. /  212462. / 1.96 / -225. /  275.
   744.15 /   0.12 /   0.24 /   0.0  /  744.26 /    1.95 /   0.18 / -0.000  *XS*
---------------------------------------------------------------------------------
SZBG1 AT   23770 /   160 /   4300. /  2196. /  182183. / 1.96 /  110. /  610.
   744.22 /   0.12 /   0.08 /   0.0  /  744.34 /    1.96 /   0.20 / 0.001   *XS*
---------------------------------------------------------------------------------
SZBG2 AT   23930 /   160 /   4300. /  3009. /  290720. / 1.01 /  200. /  700.
   744.34 /   0.05 /   0.06 /   0.0  /  744.40 /    1.43 /   0.09 / -0.000  *XS*
---------------------------------------------------------------------------------
SZ BH AT   24480 /   550 /   4300. /  2708. /  270611. / 1.12 / -640. /  110.
   744.48 /   0.06 /   0.13 /   0.0  /  744.53 /    1.59 /   0.11 / -0.000  *XS*
```

BC

BD

BE FW

BF

SECT AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*	
SZ BF AT 22750 / 743.68	0 / 0.12	4300. /	1807. / 743.80	232237. / 2.38	1.41 / 0.17	-230. /	-30. *IS*		BF
SZBF1 AT 23140 / 743.84	390 / 0.21	4300. / 0.21	1910. / 0.04	150636. / 744.05	2.69 / 2.25	-265. / 0.24	235. -0.000 *XS*		BG
SZ BG AT 23610 / 744.21	470 / 0.11	4300. / 0.27	2236. / 0.0	215792. / 744.32	1.96 / 1.92	-225. / 0.18	275. -0.000 *XS*		BH
SZBG1 AT 23770 / 744.29	160 / 0.11	4300. / 0.07	2226. / 0.0	185447. / 744.40	1.92 / 1.93	110. / 0.20	610. 0.001 *XS*		BI
SZBG2 AT 23930 / 744.40	160 / 0.05	4300. / 0.05	3037. / 0.0	293034. / 744.45	1.43 / 1.42	200. / 0.09	700. -0.000 *XS*		BJ
SZ BH AT 24480 / 744.56	550 / 0.06	4300. / 0.17	2746. / 0.01	205579. / 744.63	1.61 / 1.57	-640. / 0.10	110. -0.000 *XS*		BK
SZ BI AT 25040 / 744.74	560 / 0.03	4300. / 0.14	3963. / 0.0	357896. / 744.77	1.42 / 1.09	70. / 0.07	770. -0.000 *XS*		BL
SZ BJ AT 25830 / 744.84	790 / 0.03	4300. / 0.10	4856. / 0.00	393961. / 744.87	2.69 / 0.89	150. / 0.05	1050. 0.000 *XS*		BM FW
SZBJ1 AT 26330 / 744.86	500 / 0.25	4300. / 0.13	1826. / 0.11	179722. / 745.11	2.67 / 2.35	125. / 0.26	675. -0.000 *XS*		BN
SZ BK AT 26560 / 744.81	250 / 0.78	4300. / 0.22	698. / 0.27	119614. / 745.59	1.33 / 6.16	100. / 0.44	225. -0.000 *XS*		BO
SZBK1 AT 26930 / 745.71	350 / 0.14	4300. / 0.25	1860. / 0.0	216534. / 745.84	1.62 / 2.31	50. / 0.21	350. -0.000 *XS*		BP
SZ BL AT 27225 / 745.88	295 / 0.06	4300. / 0.10	2251. / 0.0	264236. / 745.94	1.10 / 1.91	50. / 0.12	400. -0.000 *XS*		BQ
SZ BM AT 28020 / 746.19	795 / 0.16	4300. / 0.36	1800. / 0.05	154614. / 746.35	1.78 / 2.39	50. / 0.23	450. -0.000 *XS*		BR
SZ BN AT 28500 / 746.62	480 / 0.38	4300. / 0.54	1199. / 0.11	106164. / 747.00	1.91 / 3.59	120. / 0.32	470. -0.000 *XS*		BS
SZBN1 AT 28810 / 747.20	310 / 1.03	4300. / 0.91	527. / 0.33	59501. / 748.23	1.00 / 8.16	-80. / 0.50	-15. -0.000 *XS*		BT

```
SZ BC 1 016 03 0730 0021970  1  3
  2500  3800   5400   4300   4300
    -10 01 07431   -8 01 07406 0000 02 07392 0024 02 07347 0030 02 07303
   0040 02 07293 0052 02 07295 0056 02 07303 0066 02 07329 0080 02 07326
   0085 02 07340 0100 02 07360 0120 02 07370 0128 03 07380 0142 03 07400
   0164 03 07500
01 02 047 047 01 02 045 045 01 02 060 060
SZ BD 0  16 03 0730 0022325 99 99
   0058 01 07580   70 01 07425 0330 01 07425 0394 02 07320 0403 02 07300
   0410 02 07294 0440 02 07294 0442 02 07300 0446 02 07320 0462 03 07340
   0478 03 07360 0583 03 07360 0640 03 07360 0652 03 07380 0668 03 07400
   0700 03 07500
01 02 065 065 01 02 043 043 01 02 080 080
SZ BE 0  17 03 0730 0022685 99 99.
      0 01 07480   50 01 07430 0725 01 07430 0770 02 07340 0775 02 07320
   0780 02 07300 0784 02 07294 0820 02 07294 0824 02 07300 0826 02 07320
   0833 02 07340 0839 03 07360 0874 03 07380 0926 03 07400 0934 03 07420
   0962 03 07440 0970 03 07460
01 02 065 065 01 02 042 042 01 02 080 080
CLAUB 2 011 01 0730 0022685       15 07393 3 1
   0000 01 07401 0000 01 07324 0007 01 07329 0016 01 07307 0026 01 07299
   0034 01 07297 0040 01 07298 0048 01 07296 0056 01 07294 0056 01 07393
   0000 -9 07401
01 02 038 038
CLAUR 4   7  3   30          1  3          1 1 2   1          1
      0  1  7441  254  1  7425  448  1  7425  448  2  7430  490  2  7444
    490  3  7439  624  3  7470
SZ BF 5  22  3  732   22750  1  3
   -260  1  7469 -230  1  7437 -214  1  7351 -154  1  7351 -110  2  7354
   -110  2  7337 -102  2  7324 -100  2  7305  -97  2  7299  -93  2  7304
    -85  2  7313  -79  2  7307  -73  2  7301  -67  2  7298  -61  2  7304
    -61  2  7337  -54  3  7341  -36  3  7382  -24  3  7449    0  3  7455
     34  3  7460   40  3  7488
 1  2 060 060  1  2 040 040  1  2 080 080
SZBF1 0  14  3  733   23140  1  3
   -286  1  7462 -266  1  7434 -262  1  7372 -192  2  7374 -186  2  7321
   -180  2  7310 -154  2  7310 -148  2  7325 -140  3  7396 -126  3  7409
      0  3  7421  120  3  7415  300  3  7420  380  3  7500
 1  2 060 060  1  2 041 041  1  2 075 075
SZ BG 0  13  3  733   23610  1  3
   -228  1  7452 -212  1  7367 -112  1  7363 -104  2  7330 -100  2  7314
    -68  2  7314  -64  2  7334  -50  3  7402    0  3  7419  164  3  7422
    326  3  7424  430  3  7452  430  3  7500
```

BC

BD

BE — 1ST DS

BF — 1ST US

BG

```
    -260  1  7469 -230  1  7437 -214  1  7351 -154  1  7351 -110  2  7354
    -110  2  7337 -102  2  7324 -100  2  7305  -9  2  7299  -93  2  7304
     -85  2  7313  -79  2  7307  -73  2  7301  -67  2  7298  -61  2  7304
     -61  2  7337  -54  3  7341  -36  3  7382  -24  3  7449    0  3  7455
      34  3  7460   40  3  7488
 1  2 060 060  1  2 040 040  1  2 080 080
SZBF1 0  14  3  733  23140  1  3
    -286  1  7462 -266  1  7434 -262  1  7372 -192  2  7374 -186  2  7321
    -180  2  7310 -154  2  7310 -148  2  7325 -140  3  7396 -126  3  7409
       0  3  7421  120  3  7415  300  3  7420  380  3  7500
 1  2 080 080  1  2 045 045  1  2 080 080
SZ BG 0  13  3  733  23610  1  3
    -228  1  7452  -212  1  7367 -112  1  7363 -104  2  7330 -100  2  7314
    -68  2  7314  -64  2  7334  50  3  7402  0  3  7419  164  3  7422
     326  3  7424  430  3  7452  430  3  7500
 1  2 060 060  1  2 042 042  1  2 070 070
SZBG1 0  15  3  732  23770  1  3
       0  1  7480   50  1  7460   85  1  7440  110  1  7420  120  1  7400
     200  1  7400  270  1  7380  310  2  7360  332  2  7340  334  2  7310
     350  2  7310  352  2  7340  360  3  7407  560  3  7422  770  3  7425
 1  2 060 060  1  2 042 042  1  2 070 070
SZBG2 0  18  3  733  23930  1  3
       0  1  7500   20  1  7480   40  1  7460   65  1  7440   90  1  7420
     110  1  7400  250  1  7400  440  1  7380  585  2  7380  590  2  7360
     600  2  7345  602  2  7313  635  2  7313  638  2  7345  642  3  7360
     652  3  7410  750  3  7422 1060  3  7420
 1  2  60 060  1  2 042 042  1  2 070 070
SZ BH 0 028 03 0732 0024480 99 99
    -765  1  7560 -720  1  7500 -680  1  7400 -450  1  7380 -380  1  7380
    -260  1  7400 -205  1  7500 -170  1  7520 -120  1  7540  -50  1  7560
    0000 01 07560 0030 01 07540 0038 01 07520 0047 01 07500 0062 01 07400
    0064 02 07380 0072 02 07360 0074 02 07340 0076 02 07319 0092 02 07319
    0095 02 07340 0098 02 07360 0102 02 07380 0111 02 07400 0118 03 07500
    0122 03 07520 0131 03 07540 0172 03 07560
01 02  75 075 01 02 042  42 01 02 050 050
SZ BI 0 024 03 0733 0025040 99 99
    0000 01 07560 0018 01 07540 0038 01 07520 0054 01 07400 0078 01 07380
    0102 01 07380 0138 01 07380 0198 01 07380 0270 01 07400 0664 02 07400
    0678 02 07380 0693 02 07360 0703 02 07340 0705 02 07321 0724 02 07321
    0735 02 07340 0738 02 07360 0742 02 07400 0756 03 07420 0773 03 07440
    0796 03 07460 0808 03 07480 0818 03 07500 0825 03 08540
```

BF

BG

BH

BI

BJ

BK

BL

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 14,DATE= 1/ 3/78

WATER-SURFACE PROFILE FOR: SWARTZ CK SECTION BC - B01 W/ NEW FILL HOLTSLAG
PAGE 1 OF 2, PROFILE NUMBER 1, UPSTREAM COMPUTATIONS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /   FN  /   ACC   *ID*
==================================================================================
SZ BC AT  /21970 /     0 /   2500. /   548. /   48446. / 1.00 /    5. /  130.
   738.23 /   0.32 /                 /  738.55 /   4.56 /   0.38/          *IS*
----------------------------------------------------------------------------------
SZ BD AT   22325 /   355 /   2500. /  1254. /  106514. / 2.08 /  352. /  659.
   738.86 /   0.13 /   0.43 /   0.0  /  738.98 /   1.99 /   0.20 / -0.000  *XS*
----------------------------------------------------------------------------------
SZ BE AT   22685 /   360 /   2500. /   724. /   86584. / 1.35 /  745. /  901.
   739.04 /   0.25 /   0.24 /   0.06 /  739.29 /   3.46 /   0.25 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
CLAUH AT   22685 /       /   2500. /   462. /   63233. / 1.00 /    0. /   56.
   739.04 /   0.46 /       ...1...  (-.001)    /   5.42 /   0.33 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       0. / RIGHT       0. /                *RG*
----------------------------------------------------------------------------------
SZ BF AT   22750 /    65 /   2500. /   929. /   89247. / 1.53 / -222. /  -34.
   739.17 /   0.17 /   0.05 /   0.0  /  739.34 /   2.69 /   0.24 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = 0.33 / E = 0.08 / K* = 0.77 /  1000. /   98768. / 1.52 / -222. /  -34.
   739.54 /   0.15 /                 /  739.69 /   2.50 /   0.22 /          *AS*
============================ END BRIDGE ANALYSIS ================================
SZBF1 AT   23140 /   390 /   2500. /   568. /   58779. / 1.40 / -264. /  -128.
   739.83 /   0.42 /   0.42 /   0.14 /  740.25 /   4.41 /   0.36 / -0.000  *XS*
----------------------------------------------------------------------------------
SZ BG AT   23610 /   470 /   2500. /   898. /   86530. / 1.42 / -219. /  -37.
   740.65 /   0.17 /   0.58 /   0.0  /  740.83 /   2.78 /   0.25 /  0.000  *XS*
----------------------------------------------------------------------------------
SZBG1 AT   23770 /   160 /   2500. /   680. /   52977. / 1.86 /  116. /  368.
   740.76 /   0.39 /   0.22 /   0.11 /  741.15 /   3.68 /   0.38 / -0.001  *XS*
----------------------------------------------------------------------------------
SZBG2 AT   23930 /   160 /   2500. /  1574. /  111647. / 2.42 /   98. /  671.
   741.23 /   0.10 /   0.17 /   0.0  /  741.32 /   1.59 /   0.19 / -0.000  *XS*
----------------------------------------------------------------------------------
SZ BH AT   24480 /   550 /   2500. /  1473. /  101877. / 1.41 / -686. /  112.
   741.56 /   0.06 /   0.30 /   0.0  /  741.62 /   1.70 /   0.15 /  0.000  *XS*
----------------------------------------------------------------------------------
```

BC

BD

BE

10.46

BF

SE[illegible] AT	DISTANCE/	LENGTH/	DISCHARGE/	AREA	CONVEYANCE/	ALPHA/	LEW /	REW	
WS ELEV /	HV /	HF /	HE /	EG /	V /	FN /	ACC	*ID*	
SZ BF AT	22750 /	0 /	2500. /	999. /	98691. /	1.52 /	-222. /	-34.	BF
739.54 /	0.15 /		/	739.69 /	2.50 /	0.22/		*IS*	
SZBF1 AT	23140 /	390 /	2500. /	572. /	52750. /	1.49 /	-264. /	-137.	
739.86 /	0.44 /	0.47 /	0.15 /	740.30 /	4.37 /	0.36 /	-0.000	*XS*	BG
SZ BG AT	23610 /	470 /	2500. /	919. /	89223. /	1.42 /	-220. /	-33.	
740.76 /	0.16 /	0.62 /	0.0 /	740.93 /	2.72 /	0.24 /	0.000	*XS*	BH
SZBG1 AT	23770 /	160 /	2500. /	707. /	55276. /	1.86 /	116. /	382.	
740.87 /	0.36 /	0.20 /	0.10 /	741.23 /	3.53 /	0.36 /	-0.001	*XS*	BI
SZBG2 AT	23930 /	160 /	2500. /	1614. /	114867. /	2.41 /	97. /	676.	
741.30 /	0.09 /	0.16 /	0.0 /	741.39 /	1.55 /	0.19 /	-0.000	*XS*	BJ
SZ BH AT	24480 /	550 /	2500. /	1520. /	83207. /	2.25 /	-687. /	112.	
741.66 /	0.09 /	0.36 /	0.00 /	741.75 /	1.65 /	0.12 /	0.001	*XS*	BK
SZ BI AT	25040 /	560 /	2500. /	2113. /	137384. /	1.83 /	51. /	756.	
742.02 /	0.04 /	0.31 /	0.0 /	742.06 /	1.18 /	0.09 /	-0.000	*XS*	BL 10-90
SZ BJ AT	25830 /	790 /	2500. /	2640. /	176579. /	3.48 /	82. /	1038.	
742.22 /	0.05 /	0.20 /	0.00 /	742.26 /	0.95 /	0.13 /	-0.000	*XS*	BM
SZBJ1 AT	26330 /	500 /	2500. /	640. /	82683. /	1.34 /	433. /	671.	
742.30 /	0.32 /	0.21 /	0.13 /	742.61 /	3.91 /	0.31 /	-0.000	*XS*	BN
SZ BK AT	26580 /	250 /	2500. /	432. /	67304. /	1.10 /	101. /	191.	
742.45 /	0.57 /	0.28 /	0.13 /	743.02 /	5.79 /	0.43 /	-0.000	*XS*	BO
SZBK1 AT	26930 /	350 /	2500. /	1128. /	103390. /	1.93 /	44. /	374.	
743.20 /	0.15 /	0.31 /	0.0 /	743.35 /	2.22 /	0.25 /	0.010	*XS*	BP
SZ BL AT	27225 /	295 /	2500. /	1422. /	125384. /	1.30 /	44. /	426.	
743.43 /	0.06 /	0.14 /	0.0 /	743.49 /	1.76 /	0.18 /	-0.000	*XS*	BQ
SZ BM AT	28020 /	795 /	2500. /	906. /	68507. /	1.90 /	68. /	458.	
743.93 /	0.22 /	0.58 /	0.08 /	744.15 /	2.76 /	0.29 /	0.002	*XS*	BR
SZ BN AT	28500 /	480 /	2500. /	599. /	60219. /	1.30 /	288. /	470.	
744.59 /	0.35 /	0.73 /	0.06 /	744.94 /	4.17 /	0.32 /	0.000	*XS*	BS
SZBN1 AT	28810 /	310 /	2500. /	405. /	40962. /	1.00 /	-77. /	-18.	
745.26 /	0.59 /	0.79 /	0.12 /	745.85 /	6.17 /	0.42 /	-0.000	*XS*	BT

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 17,DATE= 1/ 3/78

WATER-SURFACE PROFILE FOR: SWARTZ CK SECTION BC - B01 W/ NEW FILL HOLTSLAG
PAGE 1 OF 2, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS

```
==================================================================================
SECTD AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
SZ BC AT  21970 /     0 /  3800. /   913. / 104878. / 1.05 /   -8. /  144.
  740.84 /   0.28 /                / 741.12 /   4.16 /   0.29/          *IS*
----------------------------------------------------------------------------------
SZ BD AT  22325 /   355 /  3800. /  2030. / 193686. / 2.03 /  338. /  672.
  741.26 /   0.11 /  0.25 /   0.0  / 741.37 /   1.87 /   0.18 / -0.000  *XS*
----------------------------------------------------------------------------------
SZ BE AT  22685 /   360 /  3800. /  1151. / 141853. / 1.64 /  733. /  931.
  741.37 /   0.28 /  0.19 /  0.08  / 741.65 /   3.30 /   0.24 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
CLAUB AT  22685 /       /  3748. /   497. /  48683. / 1.00 /    0. /   56.
  740.10 /   0.88 /       ...3...  (-.001)    /   7.53 /   0.44 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      69. / RIGHT       0. /                *RG*
----------------------------------------------------------------------------------
SZ BF AT  22750 /    65 /  3800. /  1379. / 156226. / 1.46 / -226. /  -30.
  741.52 /   0.17 /  0.04 /   0.0  / 741.69 /   2.76 /   0.22 / -0.000  *AS*
----------------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /  1598. / 193301. / 1.44 / -228. /  -28.
  742.62 /   0.13 /                / 742.75 /   2.38 /   0.18 /          *AS*
============================ END BRIDGE ANALYSIS ================================
SZHF1 AT  23140 /   390 /  3800. /  1436. / 128144. / 2.46 / -266. /  308.
  742.78 /   0.27 /  0.23 /  0.07  / 743.04 /   2.65 /   0.26 / -0.000  *XS*
----------------------------------------------------------------------------------
SZ BG AT  23610 /   470 /  3800. /  1800. / 168047. / 1.98 / -224. /  357.
  743.22 /   0.14 /  0.32 /   0.0  / 743.36 /   2.11 /   0.20 / -0.000  *XS*
----------------------------------------------------------------------------------
SZBG1 AT  23770 /   160 /  3800. /  1903. / 137708. / 2.38 /   94. /  770.
  743.32 /   0.15 /  0.10 /  0.01  / 743.47 /   2.00 /   0.23 /  0.001  *XS*
----------------------------------------------------------------------------------
SZBG2 AT  23930 /   160 /  3800. /  3470. / 265282. / 2.12 /   71. / 1060.
  743.49 /   0.04 /  0.06 /   0.0  / 743.53 /   1.10 /   0.08 / -0.000  *XS*
----------------------------------------------------------------------------------
```

BC

BD

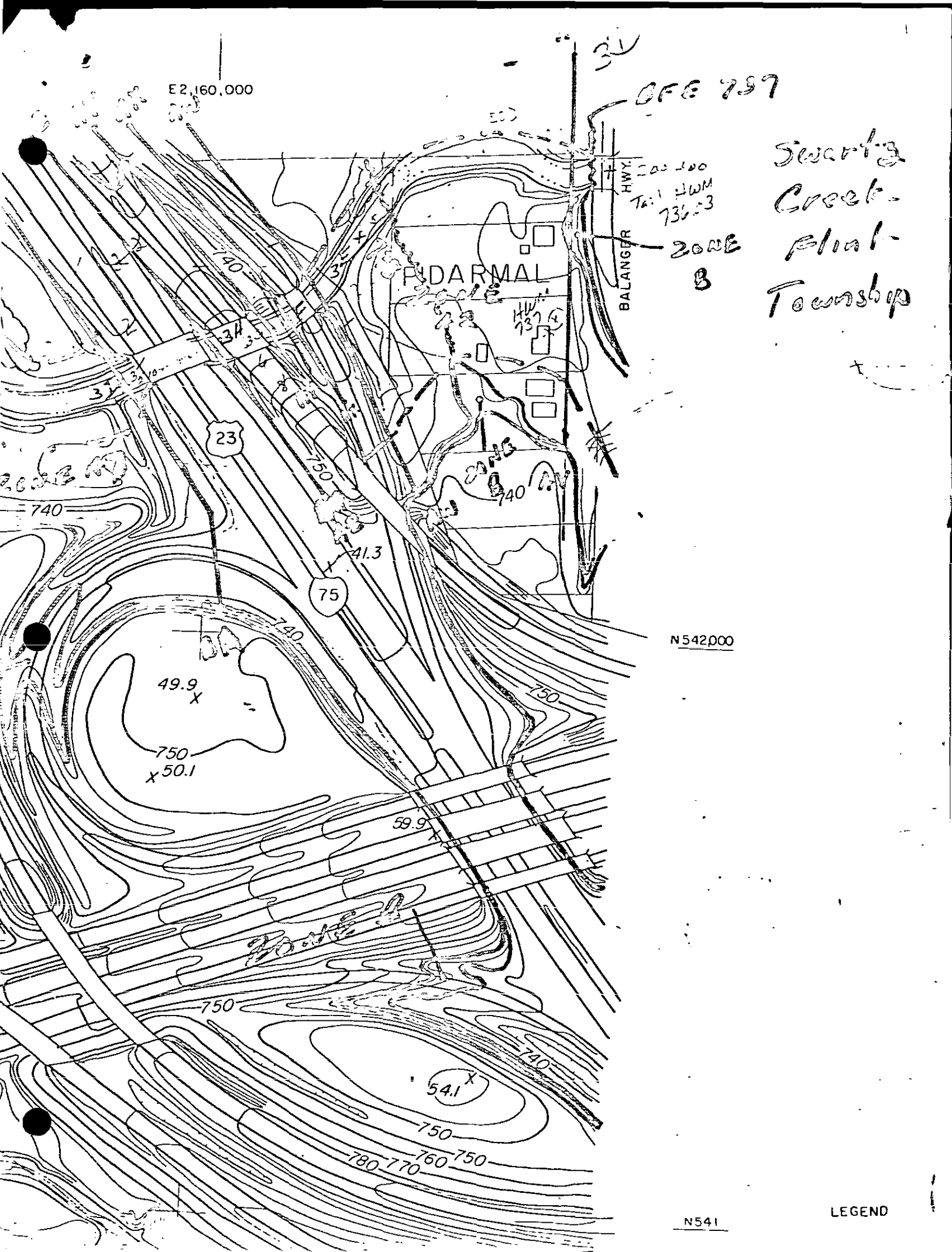
BE

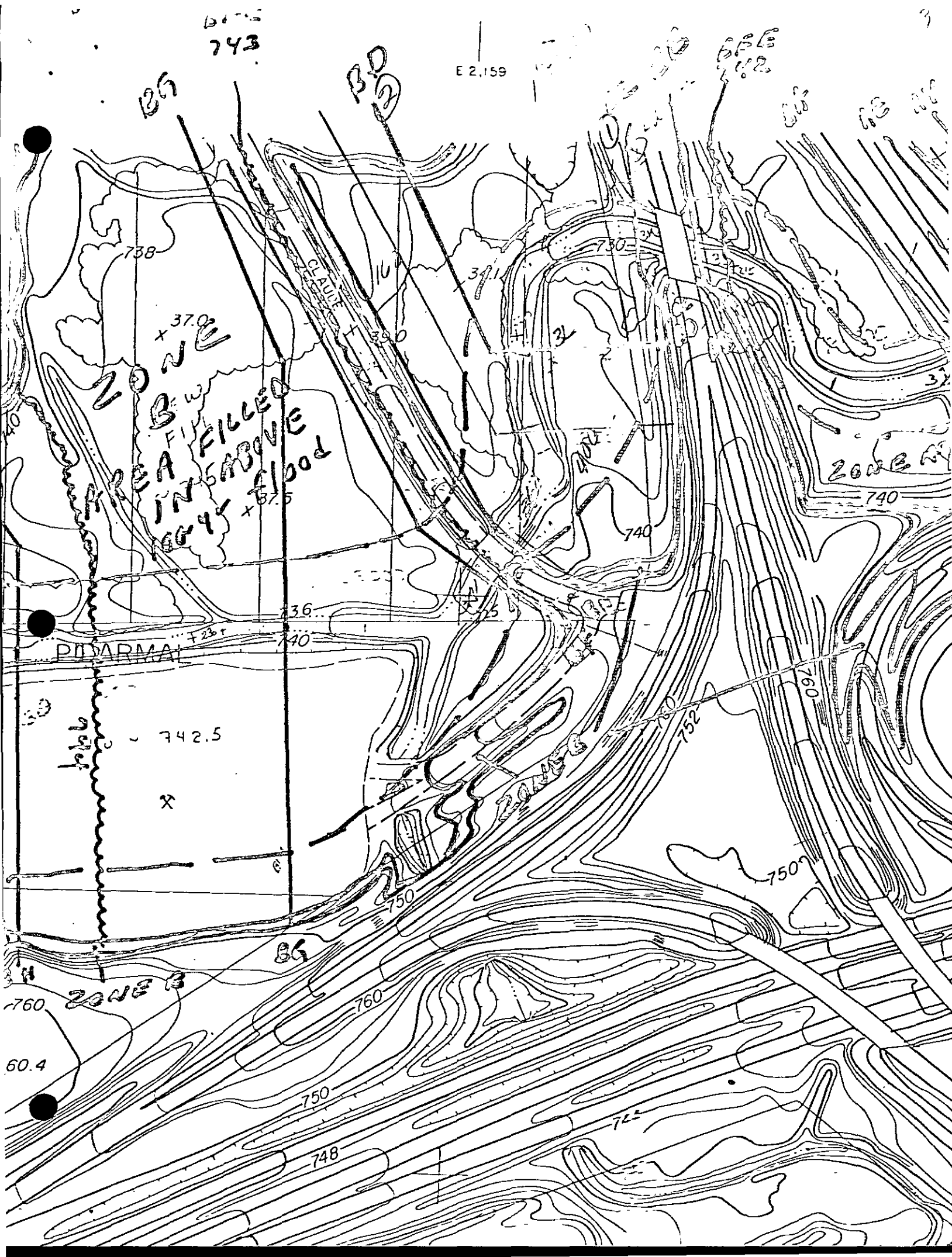
50-4

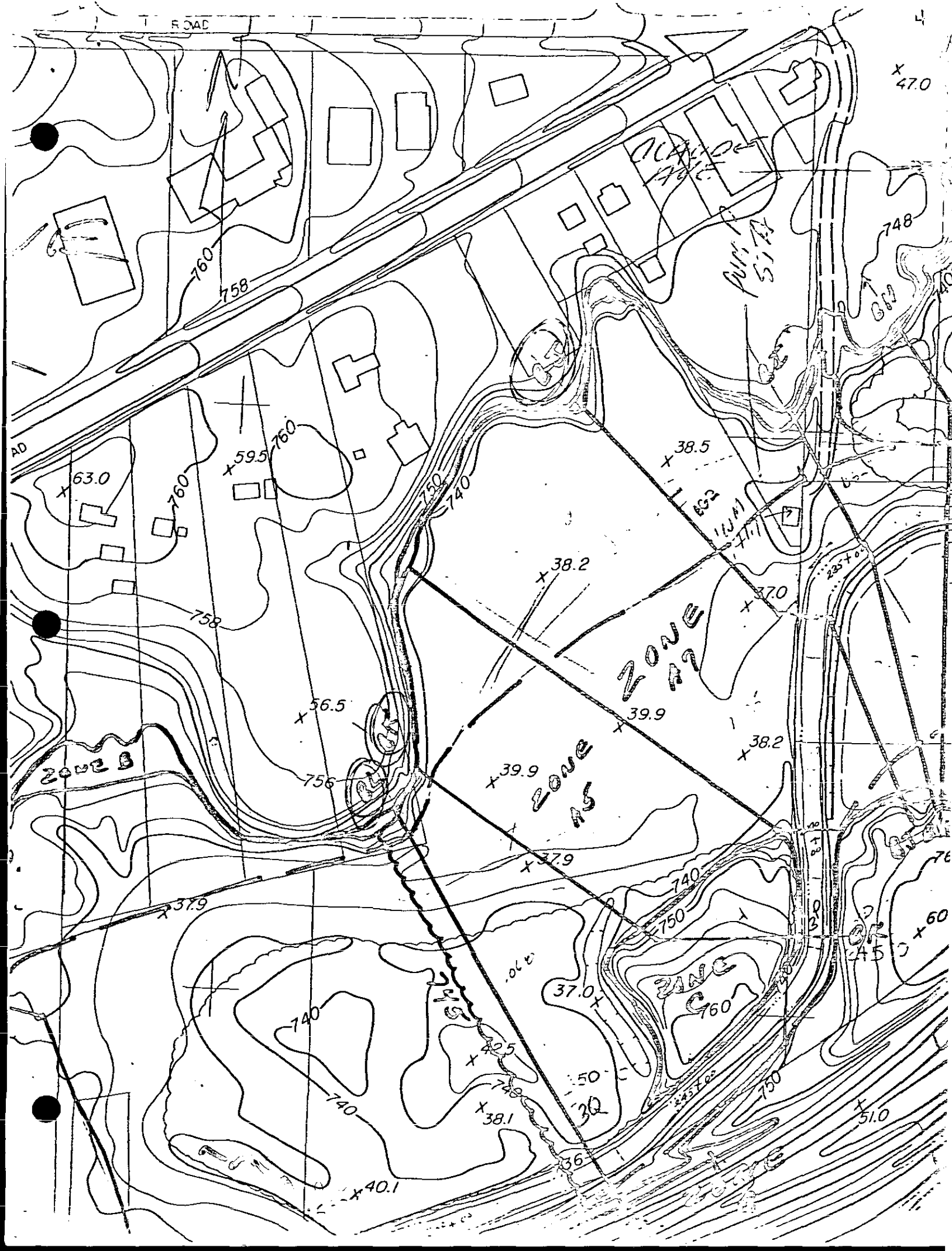
BF

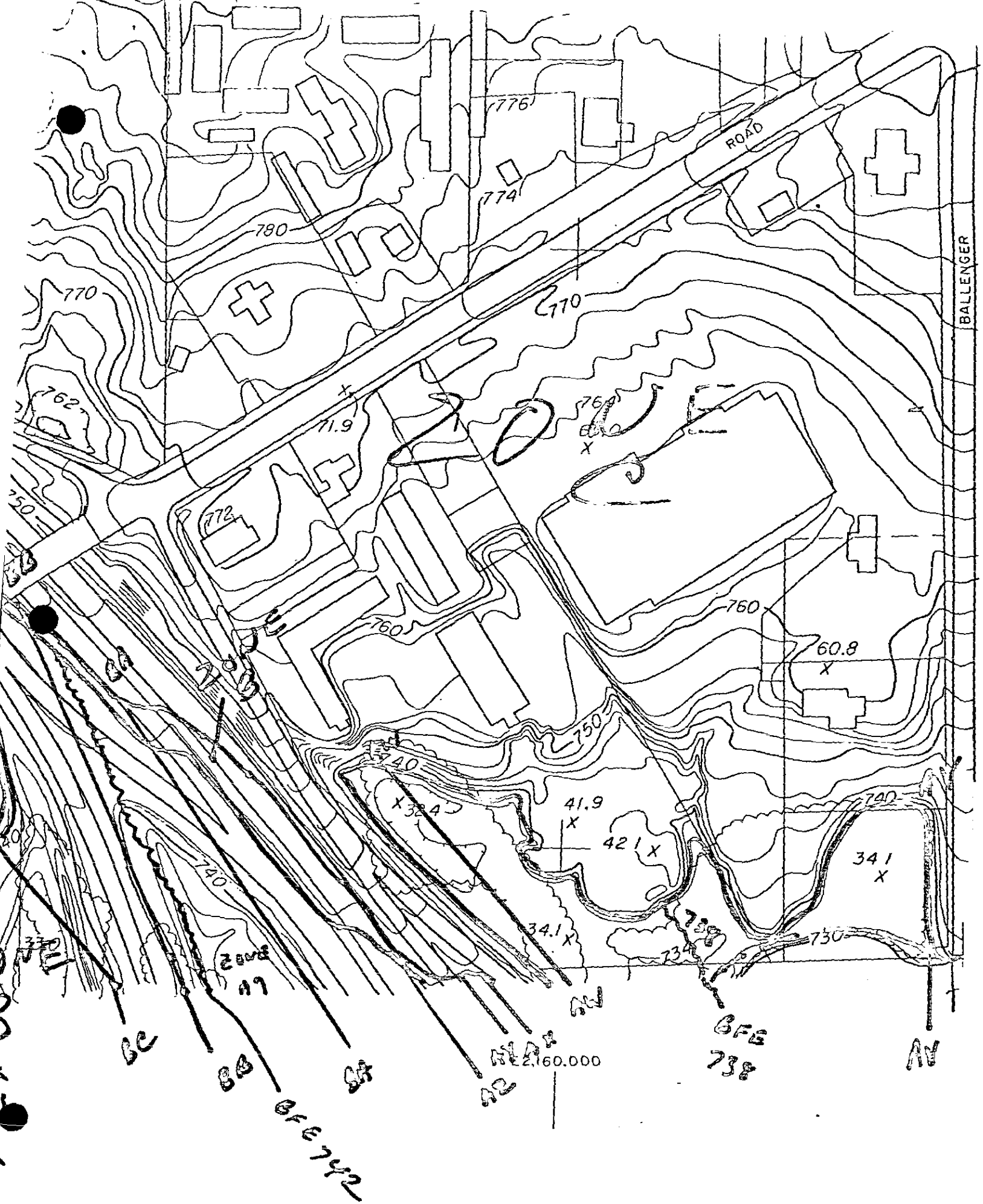
```
SZ BF AT   22750 /     0 /   3800. /  1597. /  193292. / 1.44 / -228. /  -28.
   742.62 /   0.13 /                  /  742.75 /   2.38 /   0.18/          *IS*
-------------------------------------------------------------------------------
SZBF1 AT   23140 /   390 /   3800. /  1448. /  113033. / 2.70 / -266. /  308.
   742.80 /   0.29 /   0.26 /   0.08 / 743.09 /   2.62 /   0.27 / -0.000  *XS*
-------------------------------------------------------------------------------
SZ BG AT   23610 /   470 /   3800. /  1843. /  171476. / 2.00 / -224. /  359.
   743.30 /   0.13 /   0.35 /   0.0  / 743.43 /   2.06 /   0.20 / -0.007  *XS*
-------------------------------------------------------------------------------
SZBG1 AT   23770 /   160 /   3800. /  1951. /  141337. / 2.38 /   93. /  770.
   743.39 /   0.14 /   0.10 /   0.00 / 743.53 /   1.95 /   0.23 /  0.001  *XS*
-------------------------------------------------------------------------------
SZBG2 AT   23930 /   160 /   3800. /  3531. /  267605. / 2.18 /   71. / 1060.
   743.55 /   0.04 /   0.06 /   0.0  / 743.59 /   1.08 /   0.08 / -0.000  *XS*
-------------------------------------------------------------------------------
SZ BH AT   24480 /   550 /   3800. /  2549. /  173160. / 1.73 / -695. /  114.
   743.71 /   0.06 /   0.17 /   0.01 / 743.77 /   1.49 /   0.10 / -0.000  *XS*
-------------------------------------------------------------------------------
SZ BI AT   25040 /   560 /   3800. /  3463. /  285779. / 1.49 /   49. /  772.
   743.91 /   0.03 /   0.16 /   0.0  / 743.94 /   1.10 /   0.07 / -0.000  *XS*
-------------------------------------------------------------------------------
SZ BJ AT   25830 /   790 /   3800. /  4396. /  327131. / 2.97 /   70. / 1053.
   744.03 /   0.03 /   0.12 /   0.00 / 744.06 /   0.86 /   0.11 /  0.000  *XS*
-------------------------------------------------------------------------------
SZBJ1 AT   26330 /   500 /   3800. /  1383. /  140354. / 2.60 /  138. /  680.
   744.05 /   0.30 /   0.16 /   0.14 / 744.35 /   2.75 /   0.29 / -0.000  *XS*
-------------------------------------------------------------------------------
SZ BK AT   26580 /   250 /   3800. /   605. /  100494. / 1.27 /   97. /  223.
   744.05 /   0.78 /   0.26 /   0.24 / 744.83 /   6.28 /   0.45 / -0.018  *XS*
-------------------------------------------------------------------------------
SZBK1 AT   26930 /   350 /   3800. /  1748. /  180006. / 1.05 /   41. /  409.
   744.97 /   0.14 /   0.28 /   0.0  / 745.11 /   2.17 /   0.22 / -0.000  *XS*
-------------------------------------------------------------------------------
SZ BL AT   27225 /   295 /   3800. /  2112. /  222428. / 1.23 /   41. /  455.
   745.16 /   0.06 /   0.11 /   0.0  / 745.22 /   1.80 /   0.13 /  0.000  *XS*
-------------------------------------------------------------------------------
SZ BM AT   28020 /   795 /   3800. /  1559. /  125554. / 1.89 /   46. /  473.
   745.51 /   0.17 /   0.41 /   0.06 / 745.68 /   2.44 /   0.25 / -0.000  *XS*
-------------------------------------------------------------------------------
SZ BN AT   28500 /   480 /   3800. /   987. /   87919. / 1.87 /  108. /  470.
   746.01 /   0.43 /   0.63 /   0.13 / 746.44 /   3.85 /   0.34 /  0.000  *XS*
-------------------------------------------------------------------------------
SZBN1 AT   28810 /   310 /   3800. /   495. /   54308. / 1.00 /  -80. /  -15.
   746.71 /   0.92 /   0.94 /   0.24 / 747.62 /   7.67 /   0.49 / -0.000  *XS*
-------------------------------------------------------------------------------
```

BF
BG
BH
BI
BJ
BK
BL
BM
BN
BO
BP
BQ
BR
BS
BT


E2,160,000
OFE 737
Swartz Creek-Flint-Township
HWY.
BALANGER
ZONE B
PIDARMAL
HW 737
23
75
740
750
41.3
49.9
50.1
59.9
54.1
780
770
760
N542,000
N541
LEGEND


743
E 2,159
BG
BD
BSE
CLAULT
ZONE B
AREA FILLED IN ABOVE
ZONE A
PIDARMAL
742.5
ZONE B
60.4
738
730
740
736
760
752
750
748


ROAD
ZONE A7
ZONE A5
ZONE B
ZONE C
760
758
756
750
748
740
745
63.0
59.5
56.5
47.0
38.5
38.2
37.0
39.9
37.9
38.1
40.1
51.0
60
50
36


ROAD
BALLENGER
776
774
780
770
770
762
71.9
760
760
60.8
750
750
740
740
41.9
42.1
34.1
34.1
730
734
738
BC
BB
BFE 742
BA
AC
AB
BFE
738
AV
AV
ZONE
A9

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1.DATE= 8/ 9/78

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 ARMSTRONG CREEK  FRANCES-MOUNT MORRIS RD HOLTSLAG 20  5 02 99 12
2      2  67819  67875  67937  67896  67904
3   4000 AS AO 1  15  3  675   27310  1  3
4   4004    330    470    650    530    530
5   4010      0  1  6860   15  1  6840   25  1  6820   40  1  6800   85  2  6780
5   4011     95  2  6760  100  2  6740  105  2  6733  110  2  6740  120  3  6760   AØ
5   4012    130  3  6780  245  3  6780  250  3  6800  300  3  6900  305  3  6920
6   4013  1  2 090 090  1  2 052 052  1  2 090 090
3   4050 FPARR 2   5  1  675   27310        0  6781 3 0
5   4051      0  1  6781    0  1  6733   23  1  6733   23  1  6781    0 -9  6781
6   4052  1  2 020 020
3   4060 FPARO 4  14  2   30          1  2          1 1                  1
5   4061   -190  1  6860 -140  1  6840 -100  1  6831  -50  1  6815    0  1  6806
5   4062      0  1  6841   25  2  6841   25  2  6806   50  2  6811  100  2  6827
5   4063    100  2  6840  150  2  6860  195  2  6880  235  2  6900
3   4200 AS AP 5  25  3  675   27380  1  3
5   4210   -190  1  6880 -130  1  6860  -90  1  6800  -15  1  6780  -10  1  6770
5   4211      0  1  6761   10  1  6743   20  2  6743   25  2  6744   27  2  6732
5   4212     30  2  6729   33  2  6731   36  2  6729   38  2  6733   40  2  6741   AP
5   4213     45  3  6753   50  3  6780  100  3  6800  140  3  6820  150  3  6840
5   4214    160  3  6860  180  3  6880  200  3  6900  220  3  6920  270  3  6940
6   4215  1  2 075 075  1  2 050 050  1  2 070 070
3   4300 AS AO 0  18  3  675   27750  1  3
```

```
5  4310        0  1  6900   35  1  6880   80  1  6860  110  1  6800  122  2  6780
5  4311      135  2  6741  138  2  6728  143  2  6741  145  3  6771  160  3  6780
5  4312      330  3  6800  360  3  6820  390  3  6840  400  3  6860  450  3  6880
5  4313      500  3  6900  585  3  6920  630  3  6940
6  4314  1  2 075 075  1  2 045 045  1  2 075 075
3  4400 AS AR 0  18  3  678   28075  1  3
5  4410     -190  1  6920 -150  1  6900 -110  1  6880  -70  1  6790    0  1  6782
5  4411       15  1  6780   22  2  6773   25  2  6767   30  2  6734   34  2  6744
5  4412       40  3  6766   50  3  6769   86  3  6767  114  3  6770  130  3  6800
5  4413      155  3  6820  180  3  6880  220  3  6900
6  4414  1  2 085 085  1  2 045 045  1  2 085 085
3  4500 AS AS 0  12  3  676   28525  1  3
5  4510     -210  1  6920 -190  1  6900 -150  1  6800    0  1  6791    6  2  6750
5  4511        8  2  6744   14  2  6751   20  2  6768   26  3  6789  150  3  6800
5  4512      160  3  6900  170  3  6920
6  4513  1  2 085 085  1  2 045 045  1  2 085 085
3  4600 AS AT 0  17  3  677   29000  1  3
5  4610     -510  1  6940 -415  1  6920 -370  1  6900 -350  1  6880 -315  1  6860
5  4611     -290  1  6840 -260  1  6820 -130  1  6800  -30  1  6800    0  2  6796
5  4612        5  2  6755    8  2  6756   18  2  6767   21  3  6799   60  3  6800
5  4613      130  3  6920  190  3  6940
6  4614  1  2 080 080  1  2 045 045  1  2 080 080
```

AQ

AR

AS

AT

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 2.DATE= 8/ 9/78

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
  4700 AS AU 0  19  3  678   29345  1  3
  4710     -400  1  6920 -340  1  6900 -270  1  6880 -240  1  6860 -150  1  6840
  4711     -110  1  6820  -70  1  6805  -30  1  6798    0  1  6809   40  2  6811
  4712       44  2  6769   48  2  6766   53  2  6768   60  3  6803   68  3  6805
  4713      200  3  6829  240  3  6900  280  3  6980  320  3  7000
  4714  1  2 065 065  1  2 038 038  1  2 065 065
  4800 AS AV 0  17  3  679   30040  1  3
  4810     -145  1  6940 -130  1  6920 -115  1  6900  -90  1  6840    0  1  6823
  4811       22  1  6816   42  2  6803   44  2  6774   50  2  6772   55  2  6775
  4812       60  3  6802  112  3  6814  158  3  6811  165  3  6840  185  3  6900
  4813      230  3  6960  280  3  6980
  4814  1  2 070 070  1  2 038 038  1  2 065 065
  4850 CULRR 2   5  1  677   30040        0  6812 3 0
  4851        0  1  6812    0  1  6762    5  1  6762    5  1  6812    0 -9  6812
  4852  1  2 018 018
  4860 CULRD 4  13  2  682          1  2          2 2                1
  4861     -145  1  6940 -130  1  6920 -115  1  6900  -90  1  6840    0  1  6823
  4862       22  1  6816   50  2  6819  112  2  6814  158  2  6811  165  2  6840
  4863      185  2  6900  230  2  6960  280  2  6980
  4900 AS AW 5  17  5  679   30065  2  4
  4910     -145  1  6940 -130  1  6920 -115  1  6900  -90  1  6840    0  1  6823
  4911       22  1  6816   42  2  6803   44  2  6774   50  3  6772   55  4  6775
  4912       60  5  6802  112  5  6814  158  5  6811  165  5  6840  185  5  6900
```

AU

AV

AW

```
6  4414  1  2 070 070  1  2 038 038  1  2 038 038  1  2 038 038  1  2 065 065
3  5000 AS AX 0  18  3  680   30760  1  3
5  5010    -300  1  6980 -160  1  6960  -90  1  6940  -75  1  6920  -60  1  6900
5  5011     -40  1  6840    0  1  6825   16  2  6822   19  2  6779   22  2  6776   AX
5  5012      25  2  6781   38  3  6831   92  3  6826  138  3  6828  140  3  6840
5  5013     165  3  6900  210  3  6980  240  3  7000
6  5014  1  2 070 070  1  2 038 038  1  2 065 065
3  5100 AS AY 0  20  3  680   31430  1  3
5  5110    -460  1  7000 -400  1  6980 -340  1  6960 -310  1  6940 -290  1  6920
5  5111    -265  1  6900 -220  1  6880 -200  1  6860 -150  1  6850    0  2  6830
5  5112       6  2  6792    9  2  6791   13  2  6792   17  2  6804   20  3  6843   AY
5  5113      65  3  6860   80  3  6880   90  3  6900  110  3  7000  140  3  7100
6  5114  1  2 070 070  1  2 038 038  1  2 065 065
3  5200 AS AZ 0  20  3  682   31840  1  3
5  5210    -480  1  7040 -400  1  7020 -340  1  7000 -280  1  6980 -250  1  6960
5  5211    -210  1  6940 -170  1  6880 -100  1  6860    0  1  6842   34  2  6849
5  5212      44  2  6807   48  2  6800   53  2  6807   56  3  6840  100  3  6860   AZ
5  5213     115  3  6900  150  3  7000  165  3  7020  180  3  7040  225  3  7100
6  5214  1  2 070 070  1  2 038 038  1  2 065 065
3  5300 AS BA 0  19  3  682   32280  1  3
5  5310    -300  1  7040 -215  1  7020 -170  1  7000 -135  1  6980 -100  1  6960
```

*** INPUT CARD PRINTOUT ***

```
                1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  5311      -70  1  6900  -30  1  6880  -24  1  6852    0  1  6848   70  2  6849
5  5312       75  2  6811   82  2  6808   90  3  6812   94  3  6847  205  3  6860
5  5313      215  3  6880  225  3  6900  240  3  7000  250  3  7100
6  5314  1  2 065 065  1  2 038 038  1  2 060 060
3  5400 AS BB 0  16  3  684   32710  1  3
5  5410     -300  1  7020 -270  1  7000 -250  1  6900 -220  1  6880  -60  1  6860
5  5411        0  1  6852   46  2  6852   50  2  6824   53  2  6821   57  2  6824
5  5412       60  3  6862  120  3  6880  140  3  6900  180  3  7000  205  3  7020
5  5413      235  3  7040
6  5414  1  2 065 065  1  2 038 038  1  2 060 060
3  5500 AS BC 0  18  3  685   33080  1  3
5  5510     -160  1  7040 -130  1  7020 -120  1  7000  -90  1  6900  -70  1  6880
5  5511      -33  2  6859  -31  2  6843  -29  2  6839  -27  2  6842  -25  3  6854
5  5512        0  3  6870   50  3  6892  140  3  6900  200  3  7000  230  3  7020
5  5513      240  3  7040  270  3  7060  310  3  7080
6  5514  1  2 065 065  1  2 038 038  1  2 060 060
3  5600 AS BD 0  15  3  687   33475  1  3
5  5610     -220  1  7040 -150  1  7020 -130  1  7000 -100  1  6900  -40  1  6880
5  5611      -30  2  6860  -28  2  6859  -25  2  6854  -23  2  6859  -20  3  6878
5  5612        0  3  6872   84  3  6875  130  3  6900  170  3  7000  240  3  7100
6  5613  1  2 070 070  1  2 038 038  1  2 065 065
3  5700 AS BE 0  15  3  686   33870  1  3
5  5710     -290  1  7060 -230  1  7040 -215  1  7020 -205  1  7000 -150  1  6900
5  5712      -68  1  6887  -25  2  6887  -22  2  6854  -18  2  6849  -14  2  6861
5  5713       -7  3  6879    0  3  6881   84  3  6899  125  3  7000  150  3  7060
6  5714  1  2 070 070  1  2 038 038  1  2 065 065
```

BA

BB

BC

BD

BE

USGS STFP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 8/14/78

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 ARMSTRONG CREEK MOUNT MORRIS - STANLEY   HOLTSLAG 20 05 02 99 12
2      2  69038  69125  69254  69162  69162
3  5.00 -5 95 1  20  3  686   34000  1  3
4  5.04    330    470    650    530    530
5  5.10   -430  1  7100 -385  1  7080 -350  1  7000 -305  1  6920 -196  1  6888
5  5.11   -114  1  6885  -65  2  6882  -60  2  6862  -50  2  6847  -42  2  6862
5  5.12    -30  3  6916    0  3  6931   66  3  6965   70  3  7000   80  3  7020
5  5.13    125  3  7040  150  3  7060  230  3  7080  320  3  7100  600  3  7120
6  5.14  1  2 080 080  1  2 060 060  1  2 070 070
3  5.00 -5 36 0  20  3  689   34450  1  3
5  5.10      0  1  7100   90  1  7040  140  1  7020  180  1  7000  210  1  6980
5  5.11    245  1  6920  370  1  6900  380  2  6883  386  2  6872  389  2  6870
5  5.12    392  2  6872  393  3  6896  420  3  6902  450  3  6920  485  3  7000
5  5.13    530  3  7020  585  3  7040  620  3  7060  680  3  7080  800  3  7100
6  5.14  1  2 075 075  1  2 065 065  1  2 075 075
3  6.00 -5 84 0  17  3  690   35270  1  3
5  6.10      0  1  7100   60  1  7080  100  1  7060  150  1  7040  225  1  7020
5  6.11    240  1  7000  275  1  6920  440  1  6914  448  2  6905  454  2  6898
5  6.12    458  2  6895  462  2  6898  468  3  6907  492  3  6913  555  3  6920
5  6.13    575  3  7000  610  3  7080
6  6.13  1  2 075 075  1  2 060 060  1  2 070 070
```

BF

BG

BH

```
**SEQUENCE**
3  6100 AS BI 0  17  3  689   36000  1  3
5  6110        0  1  7100   80  1  7080  110  1  7060  300  1  7040  345  1  7020
5  6111      365  1  7000  380  1  6940  390  1  6920  400  1  6915  440  2  6915
5  6112      445  2  6880  455  2  6880  460  3  6915  500  3  6940  700  3  6940
5  6113      730  3  7000  750  3  7100
5  6114  1  2 075 075  1  2 060 060  1  2 075 075
3  6200 AS BJ 0  17  3  690   36530  1  3
5  6210     -420  1  7120 -300  1  7100 -270  1  7080 -140  1  7060 -110  1  7000
5  6211      -60  2  6909  -54  2  6892  -50  2  6883  -46  2  6892  -36  3  6912
5  6212        0  3  6913   24  3  6907   50  3  6920  310  3  6940  340  3  7000
5  6213      370  3  7100  390  3  7140
5  6213  1  2 080 080  1  2 040 040  1  2 070 070
**SEQUENCE**
3  6250 FOCUS 2   5  1  689   36530        0  6935 3 0
5  6251        0  1  6935    0  1  6880    5  1  6880    5  1  6935    0 -9  6935
5  6252  1  2 018 018
3  6260 FOCUS 4  14  2   15          1  2          2 2                  1
5  6261     -420  1  7120 -300  1  7100 -270  1  7080 -140  1  7060 -110  1  7000
5  6262      -50  2  6940  -36  2  6912    0  2  6913   24  2  6907   50  2  6920
5  6263      310  2  6940  340  2  7000  370  2  7100  390  2  7140
3  6300 AS BK 5  17  5  690   36570  2  4
5  6310     -420  1  7120 -300  1  7100 -270  1  7080 -140  1  7060 -110  1  7000
5  6311      -60  2  6909  -55  3  6892  -50  4  6883  -46  4  6892  -36  5  6912
```

BI

BJ

BK

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

5  6312       0  5  6913   24  5  6907   50  5  6920  310  5  6940  340  5  7000
5  6313     370  5  7100  390  5  7140
6  6314  1  2 080 080  1  2 040 040  1  2 040 040  1  2 040 040  1  2 070 070
3  6400 AS BL 0  18  3  692   37420  1  3
5  6410    -550  1  7140 -360  1  7120 -300  1  7100 -200  1  7080 -160  1  7060
5  6411    -120  1  6960 -100  1  6940    0  1  6934   24  2  6927   27  2  6906   BL
5  6412      32  2  6904   38  2  6906   40  3  6934  100  3  6940  125  3  6960
5  6413     150  3  7000  170  3  7100  210  3  7120
6  6414  1  2 070 070  1  2 040 040  1  2 080 080
3  6500 AS BM 0  20  3  696   37970  1  3
5  6510    -400  1  7120 -315  1  7100 -230  1  7080 -165  1  7060 -140  1  7040
5  6511    -120  1  7020 -105  1  7000  -95  1  6980  -80  1  6947  -30  1  6950   BM
5  6512       0  1  6957   28  2  6958   38  2  6912   46  2  6899   55  2  6912
5  6513      67  3  6961  117  3  6948  140  3  6980  150  3  7000  220  3  7100
6  6514  1  2 070 070  1  2 040 040  1  2 075 075
3  6550 2-CUL 2  10  1  692   37970       0  6950 3 0
5  6551       0  1  6950    0  1  6905    5  1  6905    5  1  6950    0 -9  6950
5  6552       6  1  6945    6  1  6905    9  1  6905    9  1  6945    6 -9  6945
6  6555  1  2 018 018
```

```
3  6560 -CUL 4  20  2  16          1  2          2 2                  1
5  6561    -400  1  7120 -315  1  7100 -230  1  7080 -165  1  7060 -140  1  7040
5  6562    -120  1  7020 -105  1  7000  -95  1  6980  -80  1  6947  -30  1  6950
5  6563       0  1  6957   25  1  6962   40  1  6972   60  2  6972   75  2  6964
5  6564     100  2  6950  125  2  6957  140  2  6980  150  2  7000  220  2  7100
3  6600 AS BN 5  20  5  696   38000  2  4
5  6610    -400  1  7120 -315  1  7100 -230  1  7080 -165  1  7060 -140  1  7040
5  6611    -120  1  7020 -105  1  7000  -95  1  6980  -80  1  6947  -30  1  6950
5  6612       0  1  6957   28  2  6958   37  3  6912   47  4  6899   55  4  6912
5  6613      67  5  6961  117  5  6948  140  5  6980  150  5  7000  220  5  7100
6  6614  1  2 070 070  1  2 040 040  1  2 040 040  1  2 040 040  1  2 075 075
3  6700 AS BO 0  18  3  696   38840  1  3
5  6710    -400  1  7120 -320  1  7100 -280  1  7080 -240  1  7060 -215  1  7040
5  6711    -205  1  7020 -195  1  7000 -180  1  6980 -120  1  6960  -35  1  6960
5  6712      10  1  6954   16  2  6931   24  2  6923   28  2  6917   32  2  6923
5  6713      41  3  6974   50  3  7100   90  3  7120
6  6714  1  2 070 070  1  2 050 050  1  2 075 075
3  6800 AS BP 0  15  3  693   39440  1  3
5  6810    -350  1  7120 -230  1  7100 -140  1  7080  -80  1  7060  -60  1  7040
5  6811     -10  2  7020    0  2  6975   15  2  6925   20  2  6919   25  2  6925
5  6812      33  3  6960  100  3  6970  175  3  6980  205  3  7000  265  3  7100
6  6813  1  2 070 070  1  2 045 045  1  2 085 085
3  6900 AS BO 0  19  3  694   39780  1  3
5  6910       0  1  7120   80  1  7100  235  1  7080  250  1  7060  265  1  7040
5  6911     275  1  7020  295  1  7000  305  1  6999  430  1  6971  460  2  6978
5  6912     472  2  6936  478  2  6926  481  2  6936  486  3  6966  500  3  6968
```

BN

BØ

BP

BQ

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  6913      520  3  6988  545  3  7000  575  3  7100  625  3  7120
6  6913  1  2 065 065  1  2 040 040  1  2 075 075
**SEQUENCE**
3  6920 CULBO 2   5  1  693   39780          0  6976 3 0
5  6921        0  1  6976     0  1  6921     5  1  6921     5  1  6976     0 -9  6976
6  6922  1  2 024 024
3  6930 CULBO 4  14  2   20            1  2            2 2                  1
5  6931        0  1  7120   80  1  7100  235  1  7080  250  1  7060  265  1  7040
5  6932      275  1  7020  295  1  7005  305  1  7003  485  2  6992  510  2  7018
5  6933      530  2  7036  575  2  7100  625  2  7120  780  2  7140
3  7000 AS BR 5  19  5  694   39810  2  4
5  7010        0  1  7120   80  1  7100  235  1  7080  250  1  7060  265  1  7040
5  7011      275  1  7020  295  1  7000  305  1  6999  430  1  6971  460  2  6978
5  7012      472  3  6936  477  4  6926  481  4  6936  486  5  6966  500  5  6968
5  7013      520  5  6988  545  5  7000  575  5  7100  625  5  7120
6  7014  1  2 065 065  1  2 040 040  1  2 040 040  1  2 040 040  1  2 075 075
3  7100 AS BS 0  18  3  694   40310  1  3
5  7110     -600  1  7160 -440  1  7140 -250  1  7120 -145  1  7100 -100  1  7020
5  7111      -85  1  7018  -20  1  7000   18  2  6989   20  2  6942   24  2  6937
5  7112       28  2  6942   37  3  6987   50  3  7000  190  3  7020  210  3  7040
5  7113      260  3  7120  300  3  7140  400  3  7160
```

BR

BS

```
7114  1   060 060  1  2 040 040  1  2 075 075
7200 AS BT 1  12  3  694   40590  1  3
7204    225    320    445    360    360
7210     -90  1  7140  -70  1  7100  -38  1  7000   18  2  6989   20  2  6942
7211      24  2  6937   28  2  6942   37  3  6987   50  3  7000  190  3  7020
7212     290  3  7120  350  3  7140
7213  1  2 055 055  1  2 038 038  1  2 075 075
7300 AS BU 0  15  3  697   40830  1  3
7310    -150  1  7140  -90  1  7120  -50  1  7100    0  1  7020   10  2  6975
7311      12  2  6957   14  2  6955   15  2  6957   16  2  6967   23  3  6978
7312      40  3  7000  210  3  7020  235  3  7040  265  3  7100  305  3  7160
7313  1  2 045 045  1  2 038 038  1  2 060 060
7400 AS BV 0  23  3  698   41120  1  3
7410    -330  1  7160 -180  1  7140 -110  1  7120 -110  1  7040  -45  1  7030
7411     -10  1  7020    0  2  6990   16  2  6974   18  2  6968   20  2  6968
7412      22  2  6969   29  3  6989   35  3  7010  120  3  7020  145  3  7040
7413     160  3  7060  180  3  7080  210  3  7100  230  3  7120  260  3  7140
7414     290  3  7160  370  3  7180  420  3  7200
7415  1  2 045 045  1  2 038 038  1  2 060 060
7500 AS BW 0  22  3  698   41390  1  3
7510    -390  1  7160 -340  1  7140 -250  1  7120 -220  1  7100 -175  1  7080
7511    -150  1  7060 -130  1  7060    0  1  7060   10  1  7002   12  2  6997
7512      20  2  6968   22  2  6968   24  2  6968   27  2  6977   42  3  7060
7513     100  3  7060  170  3  7060  200  3  7060  245  3  7100  255  3  7120
```

BT

BU

BV

BW

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 ARMSTRONG CREEK  STANLEY RD TO ELMS RD   HOLTSLAG 10  5 02 99 12
2      2  70141  70213  70294  70240  70242
3   7600 AS BX 1  24  3  697   41470  1  3
4   7604     225    320    445    360    360
5   7610    -340  1  7160 -310  1  7140 -270  1  7060 -250  1  7040 -140  1  7010
5   7611     -90  1  7005  -40  1  7011  -22  1  6993   -2  2  6994    0  2  6970
5   7612       6  2  6961   12  2  6954   17  2  6973   19  3  6992   32  3  7002
5   7613      82  3  7009  132  3  7025  195  3  7040  230  3  7100  240  3  7120
5   7614     290  3  7140  400  3  7160  520  3  7180  635  3  7200
6   7615  1  2 075 075  1  2 040 040  1  2 080 080
3   7700 AS BY 0  20  3  698   42080  1  3
5   7710       0  1  7190   50  1  7160   70  1  7140  105  1  7120  132  1  7100
5   7711     340  1  7100  350  1  7080  370  1  7060  400  1  7040  520  1  7020
5   7712     530  2  7000  545  2  6967  555  2  6967  565  3  7000  570  3  7020
5   7713     590  3  7040  630  3  7060  650  3  7080  660  3  7100  675  3  7160
6   7714  1  2 100 100  1  2 045 045  1  2 100 100
3   7800 AS BZ 0  19  3  698   42550  1  3
5   7810    -450  1  7180 -400  1  7160 -260  1  7140 -140  1  7120 -100  1  7100
5   7811     -85  1  7080  -75  1  7063  -50  1  7043  -14  2  7026   -4  2  6971
5   7812       0  2  6966    4  2  6971    5  3  7026   90  3  7040  150  3  7060
5   7813     160  3  7080  175  3  7100  190  3  7120  200  3  7140
6   7814  1  2 085 085  1  2 040 040  1  2 085 085
```

BX

BY

BZ

```
7820 FDCUL 2   5  1  697   42550          0  7011 3
7821        0  1  7011    0  1  6965    5  1  6965    5  1  7011    0 -9  7011
7822  1  2 020 020
7830 FD RD 4  17  2   20                1  2          2 2                  1
7831     -450  1  7180 -400  1  7160 -260  1  7140 -140  1  7120 -100  1  7100
7811      -85  1  7080  -75  1  7063  -50  1  7043  -25  1  7032    0  2  7032
*SEQUENCE**
7812        4  2  7026   90  2  7040  150  2  7060  160  2  7080  175  2  7100
7813      190  2  7120  200  2  7140
7900 AS CA 5  20  5  698   42580  2  4
7910     -450  1  7180 -400  1  7160 -260  1  7140 -140  1  7120 -100  1  7100
7911      -85  1  7080  -75  1  7063  -50  1  7043  -14  2  7026   -4  2  6971   CA
7912       -2  3  6969    0  3  6966    1  4  6968    4  4  6971    5  5  7026
7913       90  5  7040  150  5  7060  160  5  7080  175  5  7100  190  5  7120
7914  1  2 090 090  1  2 040 040  1  2 040 040  1  2 040 040  1  2 090 090
8000 AS CB 0  18  3  702   43275  1  3
8010        0  1  7160   50  1  7140  130  1  7120  150  1  7100  170  1  7080
8011      190  1  7060  360  1  7060  365  2  7040  375  2  7000  385  2  7000   CB
8012      400  3  7020  410  3  7040  445  3  7060  455  3  7080  470  3  7100
8013      490  3  7120  510  3  7140  530  3  7160
8014  1  2 100 100  1  2 060 060  1  2 090 090
8100 AS CC 1  17  3  703   43870  1  3
8104      120     175     240     200     200
```

A

CATTAIL SWAMP DRAIN

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

5  8110        0  1  7160   30  1  7140   40  1  7120   50  1  7100   70  1  7080
5  8111       95  1  7060  110  2  7040  115  2  7025  125  2  7025  130  3  7040
5  8112      135  3  7060  165  3  7080  195  3  7080  220  3  7100  250  3  7120
5  8113      305  3  7140  375  3  7160
6  8114  1  2 100 100  1  2 060 060  1  2 090 090
3  8200 AS CD 0  19  3  706   44500  1  3
5  8210        0  1  7250    0  1  7180   25  1  7160   40  1  7140   50  1  7120
5  8211       85  1  7100   95  1  7080  105  2  7060  110  2  7045  120  2  7045
5  8212      130  2  7060  140  3  7080  145  3  7100  235  3  7120  240  3  7140
5  8213      270  3  7160  320  3  7180  380  3  7200  420  3  7220
6  8214  1  2 090 090  1  2 065 065  1  2 085 085
```

A

B

CATTAIL SWAMP DRAIN

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   22,DATE= 8/ 9/78

WATER-SURFACE PROFILE FOR:. ARMSTRONG CREEK  FRANCES-MOUNT MORRIS RD HOLTSLAG
PAGE  1 OF  2, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /  ACC    *ID*
=================================================================================
AS AO AT   27310 /     0 /    530. /   274. /   11340. / 2.20 /   63. /  247.
   678.96 /   0.13 /                 /  679.09 /   1.94 /   0.29/          *IS*
============================ BEGIN BRIDGE ANALYSIS ==============================
FRABR AT   27310 /       /    530. /   110. /   12994. / 1.00 /    0. /   23.
   678.10 /   0.36 /       ...3...  (-.001)    /   4.80 /   0.39 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                *RG*
---------------------------------------------------------------------------------
AS AP AT   27380 /    70 /    530. /   304. /   16818. / 1.95 /  -56. /   77.
   679.10 /   0.09 /   0.10 /   0.0  /  679.19 /   1.74 /   0.21 / -0.000  *AS*
---------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   355. /   19420. / 2.09 /  -69. /   86.
   679.45 /   0.07 /                 /  679.52 /   1.49 /   0.19 /          *AS*
============================ END BRIDGE ANALYSIS ================================
AS AQ AT   27750 /   370 /    530. /   294. /   13134. / 2.74 /  111. /  315.
   679.82 /   0.14 /   0.41 /   0.03 /  679.96 /   1.81 /   0.28 /  0.000  *XS*
---------------------------------------------------------------------------------
AS AR AT   28075 /   325 /    530. /   539. /   22693. / 2.10 /  -75. /  133.
   680.24 /   0.03 /   0.31 /   0.0  /  680.27 /   0.98 /   0.09 / 0.001  *XS*
---------------------------------------------------------------------------------
AS AS AT   28525 /   450 /    530. /   412. /   14208. / 3.93 / -152. /  151.
   680.60 /   0.10 /   0.39 /   0.03 /  680.70 /   1.29 /   0.27 / 0.001  *XS*
---------------------------------------------------------------------------------
```

AØ

AP

AQ

AR

AS

100-Y

```
AT  AS AT AT   29000 /   475 /    530. /   381. /   13687. / 3.32 / -214. /   68.
       681.29 /   0.10 /   0.69 /   0.0  /  681.39 /    1.39 /   0.27 /  0.005  *XS*
    ---------------------------------------------------------------------------
AU  AS AU AT   29345 /   345 /    530. /   309. /   12688. / 2.98 / -105. /  141.
       681.83 /   0.14 /   0.56 /   0.02 /  681.97 /    1.72 /   0.33 /  0.001  *XS*
    ---------------------------------------------------------------------------
AV  AS AV AT   30040 /   695 /    530. /   329. /   16369. / 2.65 /  -26. /  162.
       682.80 /   0.11 /   0.94 /   0.0  /  682.91 /    1.61 /   0.27 /  0.001  *XS*
    ========================== BEGIN BRIDGE ANALYSIS ==========================
    CULBR AT   30040 /       /       0. /    25. /    2401. / 1.00 /    0. /    5.
       681.20 /   0.0  /       ...3...  (-.001)    /   0.0  /   0.0  /          *BO*
    ---------------------------------------------------------------------------
    EMBANKMENT OVERFLOW (CFS) / LEFT     425. / RIGHT    1019. /                *RG*
    ---------------------------------------------------------------------------
    AS AW AT   30065 /    25 /    530. /   334. /   16775. / 2.78 /  -28. /  162.
       682.83 /   0.11 /   0.03 /   0.00 /  682.93 /    1.59 /   0.14 /  0.001  *AS*
    ---------------------------------------------------------------------------
AW     M = **** / E = **** / K* = **** /   334. /   16775. / 2.78 /  -28. /  162.
       682.83 /   0.11 /                   /  682.93 /    1.59 /   0.14 /          *AS*
    ========================== END BRIDGE ANALYSIS ============================
AX  AS AX AT   30760 /   695 /    530. /   238. /   11374. / 2.63 /  -35. /  140.
       683.80 /   0.20 /   1.02 /   0.05 /  684.01 /    2.23 /   0.37 /  0.001  *XS*
    ---------------------------------------------------------------------------
AY  AS AY AT   31430 /   670 /    530. /   265. /   13151. / 2.99 / -154. /   41.
       685.08 /   0.19 /   1.26 /   0.0  /  685.27 /    2.00 /   0.33 /  0.001  *XS*
    ---------------------------------------------------------------------------
```

100-YR

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 23,DATE= 8/ 9/78

WATER-SURFACE PROFILE FOR: ARMSTRONG CREEK FRANCES-MOUNT MORRIS RD HOLTSLAG
PAGE 2 OF 2, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

	SECID AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*
AZ	AS AZ AT	31840	410	530.	244.	11623.	2.86	-91.	96.
	685.83	0.21	0.75	0.01	686.04	2.17	0.37	0.008	*XS*
BA	AS BA AT	32280	440	530.	396.	19789.	2.87	-27.	207.
	686.50	0.08	0.54	0.0	686.58	1.34	0.23	0.001	*XS*
BB	AS BB AT	32710	430	530.	284.	10338.	2.84	-144.	88.
	687.05	0.15	0.59	0.04	687.21	1.87	0.21	0.001	*XS*
BC	AS BC AT	33080	370	530.	166.	6802.	2.32	-74.	32.
	688.43	0.37	1.48	0.11	688.80	3.20	0.63	0.005	*XS*
BD	AS BD AT	33475	395	530.	409.	16036.	1.73	-93.	126.
	689.77	0.05	1.02	0.0	689.82	1.30	0.15	0.005	*XS*
BE	AS BE AT	33870	395	530.	339.	13435.	2.93	-152.	86.
	690.27	0.11	0.52	0.03	690.39	1.56	0.32	0.018	*XS*

END OF THIS PROFILE

100-YR

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   23,DATE= 8/14/78

WATER-SURFACE PROFILE FOR:  ARMSTRONG CREEK MOUNT MORRIS - STANLEY   HOLTSLAG
PAGE  1 OF  2, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
AS BF AT   34000 /     0 /    530. /   705. /   29106. / 1.44 / -292. /  -30.
   691.62 /   0.01 /                 / 691.63 /    0.75 /   0.07/          *IS*
----------------------------------------------------------------------------------
AS BG AT   34450 /   450 /    530. /   307. /    9286. / 1.75 /  245. /  450.
   692.05 /   0.08 /   0.47 /   0.03 / 692.13 /    1.73 /   0.21 / 0.000  *XS*
----------------------------------------------------------------------------------
AS BH AT   35270 /   820 /    530. /   558. /   18738. / 1.25 /  269. /  559.
   693.45 /   0.02 /   1.32 /   0.0  / 693.47 /    0.95 /   0.11 / 0.010  *XS*
----------------------------------------------------------------------------------
AS BI AT   36000 /   730 /    530. /   350. /   13727. / 2.09 /  379. /  701.
   694.20 /   0.07 /   0.80 /   0.03 / 694.28 /    1.52 /   0.21 / -0.019 *XS*
----------------------------------------------------------------------------------
AS BJ AT   36530 /   530 /    530. /   848. /   36710. / 2.38 /  -80. /  313.
   694.56 /   0.01 /   0.30 /   0.0  / 694.57 /    0.63 /   0.06 / 0.001  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
```

BF

BG

BH

BI

BJ

100 YR

```
============================ BEGIN BRIDGE ANALYSIS ============================
FDCUL AT   36530 /        /      0. /     28. /    2725. / 1.00 /     0. /     5.
   693.50 /   0.0  /        ...3...  (-.001)     /   0.0  /   0.0  /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        2. / RIGHT      944. /                *RG*
-----------------------------------------------------------------------------
AS BK AT   36570 /    40 /    530. /    853. /   37241. / 2.45 /  -80. /  313.
   694.57 /   0.01 /   0.01 /   0.01 /  694.58 /    0.62 /   0.06 / -0.011  *AS*
-----------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /    853. /   37241. / 2.45 /  -80. /  313.
   694.57 /   0.01 /                  /  694.58 /    0.62 /   0.06 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
AS BL AT   37420 /   850 /    530. /    339. /   12569. / 2.88 / -110. /  113.
   695.03 /   0.11 /   0.51 /   0.05 /  695.14 /    1.56 /   0.32 /  0.001  *XS*
-----------------------------------------------------------------------------
AS BM AT   37970 /   550 /    530. /    247. /   13827. / 2.08 /  -85. /  125.
   695.90 /   0.15 /   0.89 /   0.02 /  696.05 /    2.15 /   0.30 /  0.001  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
2-CUL AT   37970 /        /    126. /     35. /    2942. / 1.00 /    0. /     9.
   695.00 /   0.21 /        ...3...  (-.001)     /   3.65 /   0.33 /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      317. / RIGHT       86. /                *RG*
-----------------------------------------------------------------------------
AS BN AT   38000 /    30 /    530. /    257. /   15272. / 2.38 /  -86. /  125.
   695.94 /   0.16 /   0.04 /   0.00 /  696.10 /    2.06 /   0.30 /  0.002  *AS*
-----------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /    290. /   16767. / 2.51 /  -86. /  126.
   696.10 /   0.13 /                  /  696.23 /    1.83 /   0.27 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
AS BO AT   38840 /   840 /    530. /    318. /   12669. / 2.08 / -158. /   41.
   697.25 /   0.09 /   1.11 /   0.0  /  697.34 /    1.67 /   0.27 /  0.004  *XS*
-----------------------------------------------------------------------------
AS BP AT   39440 /   600 /    530. /    301. /   14363. / 2.31 /   -1. /  178.
   698.17 /   0.11 /   0.93 /   0.01 /  698.28 /    1.76 /   0.26 /  0.002  *XS*
-----------------------------------------------------------------------------
```

BK

BL

BM

BN

BO

BP

100 YR

WATER-SURFACE PROFILE FOR: ARMSTRONG CREEK MOUNT MORRIS - STANLEY HOLTSLAG
PAGE 2 OF 2, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

```
==================================================================================
SECTO AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HE  /    HE  /     EG  /     V  /    EN  /  ACC    *ID*
==================================================================================
AS BQ AT   39780 /   340 /    530. /   240. /   12367. / 2.32 /  360. /  519.
   698.67 /   0.18 /   0.54 /   0.03 / 698.85 /    2.21 /   0.34 / -0.006  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
CULBQ AT   39780 /       /    234. /    28. /    2044. / 1.00 /    0. /     5.
   697.60 /   1.12 /       ...3...  (-.001)    /   8.50 /   0.64 /          *BO*
==================================================================================
EMBANKMENT OVERFLOW (CFS) / LEFT     275. / RIGHT      16. /                *RG*
----------------------------------------------------------------------------------
AS BR AT   39810 /    30 /    530. /   248. /   13129. / 2.61 /  358. /  519.
   698.72 /   0.19 /   0.05 /   0.00 / 698.90 /    2.14 /   0.32 /  0.002  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   607. /   33284. / 2.63 /  291. /  546.
   700.39 /   0.03 /                 / 700.42 /    0.87 /   0.07 /          *AS*
============================ END BRIDGE ANALYSIS ================================
AS BS AT   40310 /   500 /    530. /   184. /   11368. / 2.18 /  -43. /   95.
   700.64 /   0.28 /   0.37 /   0.13 / 700.93 /    2.89 /   0.35 /  0.004  *XS*
----------------------------------------------------------------------------------
AS BT AT   40590 /   280 /    360. /   275. /   16714. / 2.42 /  -42. /  130.
   701.14 /   0.06 /   0.29 /   0.0  / 701.21 /    1.31 /   0.17 / -0.010  *XS*
----------------------------------------------------------------------------------
AS BU AT   40830 /   240 /    360. /   187. /    9422. / 2.81 /    2. /  150.
   701.29 /   0.16 /   0.20 /   0.05 / 701.45 /    1.92 /   0.32 / -0.000  *XS*
----------------------------------------------------------------------------------
AS BV AT   41120 /   290 /    360. /   152. /   11382. / 1.49 /   -9. /   92.
   701.67 /   0.13 /   0.35 /   0.0  / 701.80 /    2.37 /   0.27 /  0.000  *XS*
----------------------------------------------------------------------------------
AS BW AT   41390 /   270 /    360. /    89. /    7469. / 1.06 /    7. /   35.
   702.02 /   0.27 /   0.41 /   0.07 / 702.29 /    4.04 /   0.39 /  0.000  *XS*
----------------------------------------------------------------------------------
```

BQ
BR
BS
BT
BU
BV
BW

100 YR

END OF THIS PROFILE

100-YR

WATER-SURFACE PROFILE FOR: ARMSTRONG CREEK STANLEY RD TO ELMS RD HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /  ACC   *ID*
==================================================================================
BX AS BX AT   41470 /     0 /    360. /   584. /  25670. / 3.63 / -191. /  129.
   702.40 /   0.02 /                   / 702.42 /   0.62 /  0.12/          *IS*
----------------------------------------------------------------------------------
BY AS BY AT   42080 /   610 /    360. /   200. /  15411. / 1.37 /  485. /  576.
   702.58 /   0.07 /   0.20 /   0.02 / 702.65 /   1.80 /  0.17 / 0.000   *XS*
----------------------------------------------------------------------------------
BZ AS BZ AT   42550 /   470 /    360. /    92. /   7110. / 1.16 /  -23. /   31.
   703.03 /   0.28 /   0.56 /   0.10 / 703.31 /   3.92 /  0.35 / 0.001   *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
   FDCUL AT   42550 /       /    145. /    23. /   1933. / 1.00 /    0. /    5.
   701.10 /   0.62 /       ...3...  (-.001)   /   6.31 /  0.52 /          *BO*
----------------------------------------------------------------------------------
   EMBANKMENT OVERFLOW (CFS) / LEFT      60. / RIGHT     155. /            *RG*
----------------------------------------------------------------------------------
   AS CA AT   42580 /    30 /    360. /    95. /   7635. / 1.42 /  -24. /   34.
   703.08 /   0.32 /   0.07 /   0.02 / 703.40 /   3.81 /  0.36 / -0.000   *AS*
----------------------------------------------------------------------------------
CA   M = **** / E = **** / K* = **** /   158. /  10374. / 2.39 /  -39. /   78.
   703.80 /   0.19 /                   / 704.00 /   2.28 /  0.27 /          *AS*
========================== END BRIDGE ANALYSIS ============================
CB AS CB AT   43275 /   695 /    360. /   164. /   8709. / 1.23 /  363. /  426.
   704.90 /   0.09 /   1.00 /   0.0  / 705.00 /   2.20 /  0.22 / 0.002   *XS*
----------------------------------------------------------------------------------
tail AS CC AT   43870 /   595 /    200. /    92. /   4044. / 1.43 /   92. /  138.
   706.22 /   0.10 /   1.32 /   0.01 / 706.33 /   2.17 /  0.26 / 0.003   *XS*
----------------------------------------------------------------------------------
swamp AS CD AT   44500 /   630 /    200. /    95. /   3648. / 1.10 /   95. /  140.
drain 707.96 /   0.08 /   1.71 /   0.0  / 708.04 /   2.12 /  0.25 / 0.001   *XS*
----------------------------------------------------------------------------------
```

100 YR

A

B

END OF THIS PROFILE

100-YR

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   30,DATE= 8/ 9/78

WATER-SURFACE PROFILE FOR:  ARMSTRONG CREEK  FRANCES-MOUNT MORRIS RD HOLTSLAG
PAGE  1 OF  2, PROFILE NUMBER  5,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS
==========================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /    EG  /     V  /    FN  /   ACC   *ID*
==========================================================================
AQ AS AQ AT   27310 /     0 /    530. /   245. /   11254. / 1.92 /   62. /  205.
   679.04 /   0.14 /                  /  679.18 /    2.16 /   0.29/          *IS*
============================ BEGIN BRIDGE ANALYSIS ============================
FRABR AT   27310 /       /    530. /   110. /   12994. / 1.00 /    0. /   23.
   678.10 /   0.36 /       ...3...  (-.001)    /    4.80 /   0.39 /          *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /              *RG*
--------------------------------------------------------------------------
AS AP AT   27380 /    70 /    530. /   314. /   17887. / 1.85 /  -50. /   70.
   679.19 /   0.08 /   0.10 /    0.0  / 679.28 /    1.69 /   0.20 / -0.001  *AS*
--------------------------------------------------------------------------
AP M = **** / E = **** / K* = **** /   355. /   20901. / 1.80 /  -50. /   70.
   679.54 /   0.06 /                  / 679.60 /    1.49 /   0.18 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
AQ AS AQ AT   27750 /   370 /    530. /   259. /   13504. / 2.06 /  112. /  232.
   679.87 /   0.13 /   0.37 /   0.04 / 680.00 /    2.05 /   0.28 /  0.000  *XS*
--------------------------------------------------------------------------
AR AS AR AT   28075 /   325 /    530. /   451. /   20811. / 1.94 /  -45. /  105.
   680.29 /   0.04 /   0.32 /    0.0  / 680.33 /    1.17 /   0.09 /  0.000  *XS*
--------------------------------------------------------------------------
AS AS AS AT   28525 /   450 /    530. /   396. /   14695. / 3.48 / -110. /  140.
   680.67 /   0.10 /   0.41 /   0.03 / 680.77 /    1.34 /   0.27 /  0.001  *XS*
```

FW

```
AT  AS AT AT   29000 /   475 /    530. /   343. /   13816. / 2.74 / -140. /   60.
       681.33 /   0.10 /   0.66 /   0.00 / 681.44 /   1.54 /   0.26 / 0.005  *XS*
    ---------------------------------------------------------------------------
AU  AS AU AT   29345 /   345 /    530. /   258. /   12376. / 2.35 /  -70. /   80.
       681.88 /   0.15 /   0.57 /   0.03 / 682.03 /   2.05 /   0.34 / 0.001  *XS*
    ---------------------------------------------------------------------------
AV  AS AV AT   30040 /   695 /    530. /   317. /   16790. / 2.40 /    0. /  150.
       682.88 /   0.10 /   0.94 /   0.0  / 682.98 /   1.67 /   0.26 / 0.011  *XS*
    ========================== BEGIN BRIDGE ANALYSIS ==========================
    CULBR AT   30040 /        /      0. /    25. /    2401. / 1.00 /    0. /    5.   FW
       681.20 /   0.0  /        ...3...  (-.001)    /   0.0  /   0.0  /          *BO*
    ---------------------------------------------------------------------------
    EMBANKMENT OVERFLOW (CFS) / LEFT     450. / RIGHT    1051. /                *RG*
    ---------------------------------------------------------------------------
    AS AW AT   30065 /    25 /    530. /   321. /   17175. / 2.50 /    0. /  150.
       682.90 /   0.11 /   0.02 /   0.00 / 683.01 /   1.65 /   0.14 / 0.001  *AS*
    ---------------------------------------------------------------------------
AW     M = **** / E = **** / K* = **** /   321. /   17175. / 2.50 /    0. /  150.
       682.90 /   0.11 /                  / 683.01 /   1.65 /   0.14 /          *AS*
    ========================== END BRIDGE ANALYSIS ============================
AX  AS AX AT   30760 /   695 /    530. /   232. /   11599. / 2.43 /  -15. /  135.
       683.84 /   0.20 /   0.98 /   0.05 / 684.04 /   2.28 /   0.36 / 0.003  *XS*
    ---------------------------------------------------------------------------
AY  AS AY AT   31430 /   670 /    530. /   250. /   13361. / 2.55 / -110. /   40.
       685.07 /   0.18 /   1.21 /   0.0  / 685.25 /   2.12 /   0.32 / 0.001  *XS*
    ---------------------------------------------------------------------------
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 31,DATE= 8/ 9/78

WATER-SURFACE PROFILE FOR: ARMSTRONG CREEK FRANCES-MOUNT MORRIS RD HOLTSLAG
PAGE 2 OF 2, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS

	SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
AZ	AS AZ AT 31840	410	530.	231.	11601.	2.53	-60.	90.	
	685.80	0.21	0.74	0.01	686.01	2.30	0.37	0.001	*XS*
BA	AS BA AT 32280	440	530.	317.	18094.	2.40	-20.	130.	
	686.50	0.10	0.59	0.0	686.60	1.67	0.25	0.001	*XS*
BB	AS BB AT 32710	430	530.	283.	11086.	2.44	-110.	90.	
	687.09	0.13	0.60	0.01	687.22	1.87	0.20	0.003	*XS*
BC	AS BC AT 33080	370	530.	160.	6632.	2.25	-70.	30.	
	688.38	0.39	1.41	0.13	688.76	3.32	0.64	0.004	*XS*
BD	AS BD AT 33475	395	530.	402.	16210.	1.64	-80.	120.	
	689.76	0.04	1.03	0.0	689.80	1.32	0.15	0.007	*XS*
BE	AS BE AT 33870	395	530.	267.	12207.	2.39	-75.	75.	
	690.26	0.15	0.56	0.05	690.40	1.99	0.35	-0.010	*XS*

END OF THIS PROFILE

FW

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   32,DATE= 8/14/78

WATER-SURFACE PROFILE FOR:  ARMSTRONG CREEK MOUNT MORRIS - STANLEY   HOLTSLAG
PAGE  1 OF  2, PROFILE NUMBER  5,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS
==================================================================================
SECTD AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
BF AS BF AT   34000 /     0 /    530. /   594. /   27815. / 1.25 / -205. /  -30.
   691.62 /   0.02 /                  /  691.64 /    0.89 /   0.07/          *IS*
----------------------------------------------------------------------------------
BG AS BG AT   34450 /   450 /    530. /   300. /    9693. / 1.57 /  265. /  440.
   692.06 /   0.08 /   0.47 /   0.03 /  692.14 /    1.77 /   0.20 /  0.002  *XS*
----------------------------------------------------------------------------------
BH AS BH AT   35270 /   820 /    530. /   510. /   17665. / 1.24 /  285. /  535.
   693.47 /   0.02 /   1.35 /   0.0  /  693.49 /    1.04 /   0.12 /  0.009  *XS*
----------------------------------------------------------------------------------
BI AS BI AT   36000 /   730 /    530. /   350. /   14279. / 1.94 /  380. /  630.
   694.26 /   0.07 /   0.81 /   0.02 /  694.33 /    1.51 /   0.20 /  0.001  *XS*
----------------------------------------------------------------------------------
BJ AS BJ AT   36530 /   530 /    530. /   710. /   36140. / 1.91 /  -75. /  175.   FW
   694.60 /   0.02 /   0.29 /   0.0  /  694.62 /    0.75 /   0.06 /  0.001  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
/  FDCUL AT   36530 /       /      0. /    28. /    2725. / 1.00 /    0. /     5.
   693.50 /   0.0  /       ...3...  (-.001)    /    0.0  /   0.0  /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        2. / RIGHT     999. /                *RG*
----------------------------------------------------------------------------------
AS BK AT   36570 /    40 /    530. /   714. /   36621. / 1.96 /  -75. /  175.
   694.61 /   0.02 /   0.01 /   0.01 /  694.63 /    0.74 /   0.06 / -0.011  *AS*
----------------------------------------------------------------------------------
BK M = **** / E = **** / K* = **** /   714. /   36621. / 1.96 /  -75. /  175.
   694.61 /   0.02 /                  /  694.63 /    0.74 /   0.06 /          *AS*
============================ END BRIDGE ANALYSIS ================================
```

```
                    ========== END BRIDGE ANALYSIS ==========================
BL  AS BL AT   37420 /   850 /    530. /   280. /   11844. / 2.48 /  -50. /  100.
       695.11 /   0.14 /   0.55 /   0.06 /  695.25 /   1.89 /   0.34 /  0.010  *XS*
    ---------------------------------------------------------------------------
BM  AS BM AT   37970 /   550 /    530. /   263. /   14716. / 2.10 /  -80. /  120.
       696.01 /   0.13 /   0.89 /   0.0  /  696.14 /   2.02 /   0.28 /  0.005  *XS*
    ========================== BEGIN BRIDGE ANALYSIS ==========================
    2-CUL AT   37970 /        /    111. /    35. /    2942. / 1.00 /    0. /    9.
       695.00 /   0.16 /        ...3...  (-.001)    /   3.20 /   0.29 /         *BO*
    ---------------------------------------------------------------------------
    EMBANKMENT OVERFLOW (CFS) / LEFT      325. / RIGHT      92. /                *RG*
    ---------------------------------------------------------------------------
    AS BN AT   38000 /    30 /    530. /   272. /   16135. / 2.40 /  -80. /  120.
       696.04 /   0.14 /   0.04 /   0.00 /  696.18 /   1.95 /   0.28 /  0.001  *AS*
    ---------------------------------------------------------------------------
BN     M = **** / E = **** / K* = **** /   290. /   17024. / 2.45 /  -80. /  120.
       696.13 /   0.13 /                 /  696.26 /   1.83 /   0.27 /         *AS*
    ========================== END BRIDGE ANALYSIS ==========================
BO  AS BO AT   38840 /   840 /    530. /   285. /   12455. / 1.86 / -110. /   40.
       697.28 /   0.10 /   1.11 /   0.0  /  697.38 /   1.86 /   0.27 /  0.004  *XS*
    ---------------------------------------------------------------------------
BP  AS BP AT   39440 /   600 /    530. /   295. /   14811. / 2.15 /    0. /  150.
       698.19 /   0.11 /   0.91 /   0.00 /  698.30 /   1.80 /   0.25 /  0.003  *XS*
    ---------------------------------------------------------------------------
```

FW

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   33,DATE= 8/14/78

WATER-SURFACE PROFILE FOR:  ARMSTRONG CREEK MOUNT MORRIS - STANLEY   HOLTSLAG
PAGE  2 OF  2, PROFILE NUMBER  5,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /  ACC    *ID*
==================================================================================
AS BQ AT   39780 /   340 /    530. /   242. /   12646. / 2.25 /  365. /  515.
   698.69 /   0.17 /   0.51 /   0.03 /  698.86 /   2.19 /   0.33 /  0.020  *XS*
============================ BEGIN BRIDGE ANALYSIS ===========================
CULBQ AT   39780 /        /    233. /    28. /    2044. / 1.00 /    0. /    5.
   697.60 /   1.12 /        ...3...  (-.001)    /   8.47 /   0.64 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     278. / RIGHT      16. /                *RG*
----------------------------------------------------------------------------------
AS BR AT   39810 /    30 /    530. /   249. /   13428. / 2.50 /  365. /  515.
   698.74 /   0.18 /   0.05 /   0.00 /  698.91 /   2.12 /   0.31 /  0.002  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   498. /   32330. / 2.00 /  365. /  515.
   700.40 /   0.04 /                 /  700.43 /   1.06 /   0.08 /          *AS*
============================ END BRIDGE ANALYSIS =============================
AS BS AT   40310 /   500 /    530. /   144. /   10589. / 1.65 /   10. /   95.
   700.65 /   0.35 /   0.41 /   0.16 /  700.99 /   3.68 /   0.38 / -0.004  *XS*
----------------------------------------------------------------------------------
AS BT AT   40590 /   280 /    360. /   264. /   16776. / 2.32 /  -20. /  130.
   701.24 /   0.07 /   0.31 /   0.0  /  701.31 /   1.37 /   0.17 /  0.000  *XS*
----------------------------------------------------------------------------------
AS BU AT   40830 /   240 /    360. /   183. /   10285. / 2.24 /    4. /  104.
   701.39 /   0.13 /   0.18 /   0.03 /  701.52 /   1.97 /   0.29 / -0.001  *XS*
----------------------------------------------------------------------------------
AS BV AT   41120 /   290 /    360. /   156. /   11636. / 1.50 /   -8. /   92.
   701.71 /   0.12 /   0.31 /   0.0  /  701.83 /   2.31 /   0.26 /  0.000  *XS*
----------------------------------------------------------------------------------
AS BW AT   41390 /   270 /    360. /    90. /    7539. / 1.06 /    7. /   35.
   702.04 /   0.27 /   0.40 /   0.07 /  702.30 /   4.01 /   0.39 /  0.000  *XS*
----------------------------------------------------------------------------------
```

BQ

BR

BS

BT

BU

BV

BW

FW

END OF THIS PROFILE

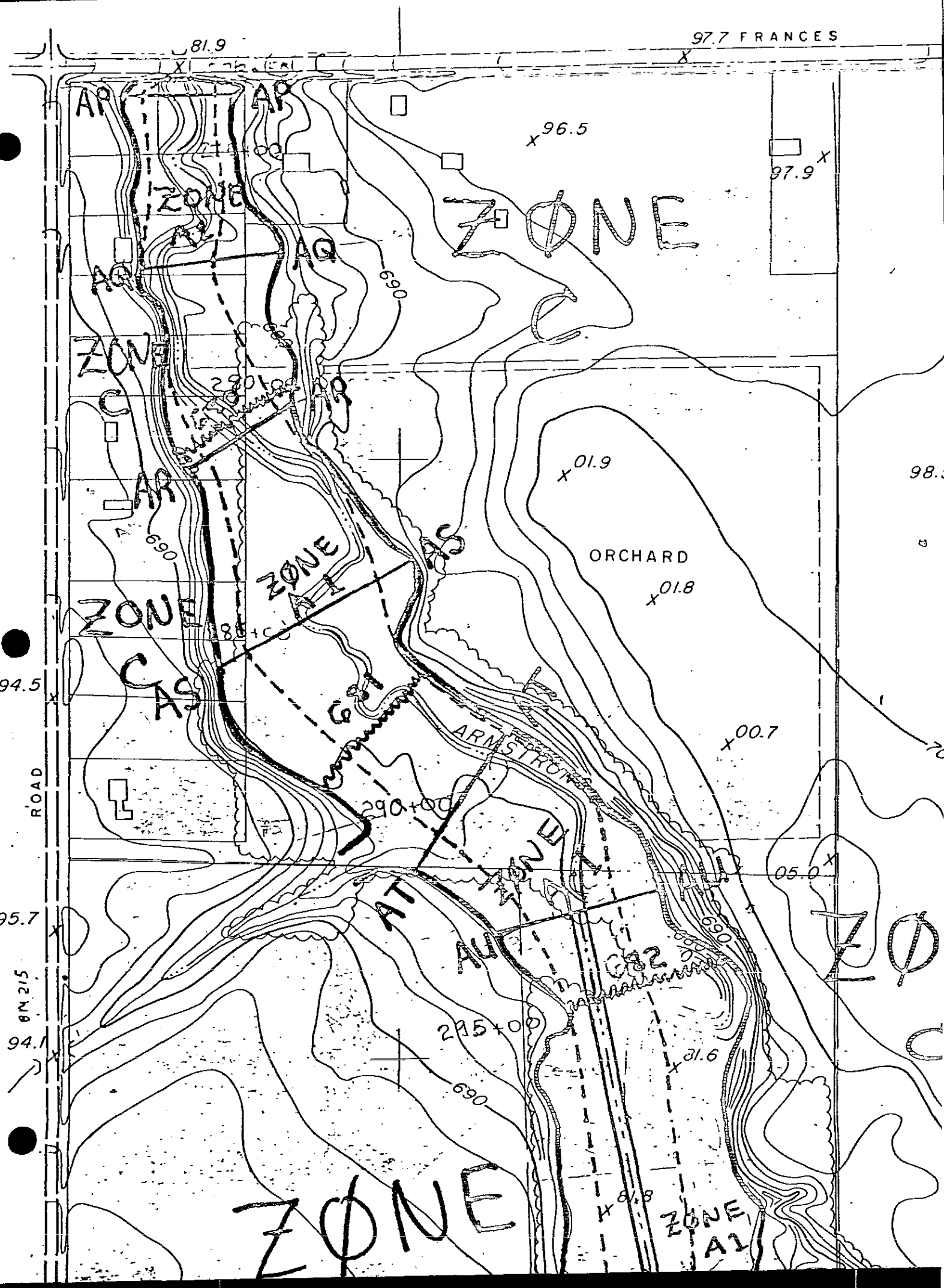
FW

WATER-SURFACE PROFILE FOR: ARMSTRONG CREEK STANLEY RD TO ELMS RD HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HORIZONTAL CONTROL

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
BX AS BX AT   41470 /      0 /    360. /   474. /   24352. / 2.86 / -100. /  100.
   702.42 /   0.03 /                   / 702.45 /    0.76 /  0.12/           *IS*
----------------------------------------------------------------------------------
BY AS BY AT   42080 /    610 /    360. /   202. /   15610. / 1.38 /  485. /  575.
   702.61 /   0.07 /   0.21 /   0.02 / 702.67 /    1.78 /  0.17 / 0.000   *XS*
----------------------------------------------------------------------------------
BZ AS BZ AT   42550 /    470 /    360. /    93. /    7170. / 1.18 /  -23. /   31.
   703.05 /   0.27 /   0.54 /   0.10 / 703.32 /    3.87 /  0.35 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
FDCUL AT      42550 /        /    144. /    23. /    1933. / 1.00 /    0. /    5.
   701.10 /   0.61 /        ...3...  (-.001)    /    6.26 /  0.51 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       61. / RIGHT      156. /                *RG*
----------------------------------------------------------------------------------
AS CA AT      42580 /     30 /    360. /    96. /    7693. / 1.44 /  -25. /   35.
   703.10 /   0.32 /   0.07 /   0.02 / 703.41 /    3.76 /  0.35 / -0.000  *AS*
----------------------------------------------------------------------------------
CA M = **** / E = **** / K* = **** /    156. /   10444. / 2.30 /  -30. /   70.
   703.81 /   0.19 /                   / 704.00 /    2.30 /  0.27 /          *AS*
============================ END BRIDGE ANALYSIS ================================
CB AS CB AT   43275 /    695 /    360. /   163. /    8712. / 1.22 /  364. /  424.
   704.90 /   0.09 /   0.99 /   0.0  / 704.99 /    2.21 /  0.22 / 0.002   *XS*
----------------------------------------------------------------------------------
Cattail ~~CC~~ AS CC AT   43870 /    595 /    200. /    92. /    4045. / 1.41 /   93. /  138.
   706.22 /   0.10 /   1.32 /   0.01 / 706.32 /    2.17 /  0.26 / 0.003   *XS*  A
----------------------------------------------------------------------------------
Swamp ~~CD~~ AS CD AT   44500 /    630 /    200. /    94. /    3643. / 1.10 /   95. /  140.
Drain 707.96 /   0.08 /   1.71 /   0.0  / 708.04 /    2.12 /  0.25 / 0.001   *XS*  B
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

FW


97.7 FRANCES
81.9
96.5
97.9
ZONE
AP
AQ
ZONE
C
AR
ZONE
AS
ZONE
CAS
ZONE
AT
ZONE
AU
ZONE
A1
ZONE
690
280+00
290+00
295+00
ORCHARD
01.9
01.8
00.7
05.0
81.6
81.8
94.5
95.7
94.1
ROAD
ARMSTRONG
BM 215

```
5  9312 BW  970  2  7520  980  3  7540  985  3  7560 1030  3  7580 1170  3  7600
5  9313     1215  3  7620 1255  3  7640
6  9320  1  2 080 080  1  2 040 040  1  2 080 080
3  9400 BY     0  17  3  752   45720  1  3
5  9410        0  1  7680   20  1  7660   70  1  7640  140  1  7620  620  1  7600
5  9411      720  2  7580  730  2  7560  735  2  7540  745  2  7513  755  2  7508
5  9412 BX   770  2  7513  780  2  7540  790  2  7560  800  3  7580 1170  3  7600
5  9413     1240  3  7620 1300  3  7640
6  9420  1  2 080 080  1  2 045 045  1  2 080 080
3  9500 BZ     0  16  3  753   46350  1  3
5  9510        0  1  7680   20  1  7620  500  1  7600  820  1  7600  895  1  7580
5  9511      910  2  7560  920  2  7540  930  2  7522  940  2  7517  945  2  7522
5  9512 BY   955  2  7540  960  3  7560  975  3  7580 1170  3  7600 1185  3  7620
5  9513     1220  3  7640
6  9520  1  2 080 080  1  2 045 045  1  2 060 060
3  9600 CA     0  15  3  754   46890  1  3
5  9610        0  1  7680   20  1  7620  530  1  7600  595  1  7580  600  2  7560
5  9611      610  2  7540  620  2  7530  627  2  7525  635  2  7530  640  3  7540
5  9612 BZ   660  3  7600  760  3  7620 1130  3  7640 1320  3  7660 1515  3  7680
6  9620  1  2 060 060  1  2 050 050  1  2 060 060
3  9700 CB     0  15  3  755   47440  1  3
5  9710        0  1  7680   15  1  7600  180  1  7580  190  1  7560  200  2  7540
5  9711      205  2  7537  215  2  7532  225  2  7537  230  2  7540  240  3  7580
5  9712 CA   250  3  7600  540  3  7620  940  3  7640 1130  3  7660 1475  3  7680
6  9720  1  2 070 070  1  2 050 050  1  2 060 060
3  9800 CC     0  19  3  755   48030  1  3
5  9810        0  1  7680   15  1  7600   90  1  7590  220  1  7580  230  1  7560
5  9811      240  2  7550  245  2  7537  255  2  7532  265  2  7537  270  2  7550
5  9812 CB   275  3  7560  285  3  7580  310  3  7600  440  3  7600  500  3  7620
5  9813      590  3  7640  685  3  7660 1130  3  7660 1300  3  7680
6  9820  1  2 070 070  1  2 040 040  1  2 070 070
3  9900 CD     0  13  3  755   48210  1  3
5  9910        0  1  7660   20  1  7600   90  1  7580   95  2  7560  105  2  7550
5  9911      110  2  7537  120  2  7532  130  2  7537  135  2  7550  140  3  7560
5  9912 CC   220  3  7580  230  3  7600  250  3  7660
6  9920  1  2 070 070  1  2 045 045  1  2 065 065
3 10000 CD BR 2  14  1  755   48210        0  7624 3 0
5 10010        0  1  7624    0  1  7543    5  1  7542   10  1  7541   15  1  7541
5 10011       20  1  7541   25  1  7545   30  1  7555   35  1  7554   40  1  7567
5 10012       45  1  7575   48  1  7579   48  1  7624    0 -9  7624
6 10020  1  2 030 030
3 10100 CD RD 4   4  2   25          1  2          2 2                1
5 10110        0  1  7680  850  2  7689 1370  2  7680 2320  2  7700
3 10200 CE     5  12  3  754   48360  1  3
5 10210      -75  1  7680  -50  1  7618    0  1  7618   28  2  7595   32  2  7553
5 10211 CD    46  2  7532   60  2  7554   66  3  7582   82  3  7596   96  3  7581
5 10212      150  3  7580  185  3  7680
6 10220  1  2 070 070  1  2 045 045  1  2 060 060
```

WATER-SURFACE PROFILE FOR: KEARSLEY CREEK X AG HOLTSLAG

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
X	AT	20100	0	1470.	421.	62134.	1.21	19.	96.
739.51	0.23			739.74	3.49	0.26			*IS*
Y	AT	20600	500	1470.	347.	39604.	1.81	15.	139.
739.81	0.50	0.44	0.14	740.32	4.23	0.43	-0.000		*XS*
Z	AT	21040	440	1470.	620.	66204.	1.95	20.	298.
740.51	0.17	0.36	0.0	740.68	2.37	0.26	-0.000		*XS*
AA	AT	21510	470	1470.	676.	64163.	1.91	-88.	263.
740.76	0.14	0.24	0.0	740.90	2.17	0.26	-0.019		*XS*
AB	AT	21990	480	1470.	391.	47636.	1.52	129.	331.
741.01	0.33	0.34	0.10	741.34	3.76	0.35	0.007		*XS*
AC	AT	22540	550	1470.	646.	86680.	1.85	20.	170.
741.48	0.15	0.29	0.0	741.63	2.28	0.21	-0.000		*XS*
AD	AT	23250	710	1470.	571.	55473.	1.90	25.	293.
741.78	0.20	0.32	0.02	741.97	2.58	0.26	0.000		*XS*
AE	AT	23750	500	1470.	540.	58506.	1.97	-227.	207.
742.09	0.23	0.33	0.02	742.32	2.72	0.29	0.000		*XS*
AF	AT	24470	720	1470.	436.	50250.	1.39	117.	342.
742.59	0.25	0.53	0.01	742.84	3.37	0.29	-0.020		*XS*
AG	AT	24760	290	1470.	567.	53107.	2.17	256.	531.
742.84	0.23	0.23	0.0	743.07	2.59	0.28	-0.005		*XS*

10-yr

END OF THIS PROFILE

```
==================================================================================
WATER-SURFACE PROFILE FOR: KEARSLEY CREEK  AG  AO                        HOLTSLAG
PAGE  1 OF  1
==================================================================================
SECTO AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
AG    AT   24760 /     0 /   1470. /   566. /   53039. / 2.17 /  256. /  530.
   742.84 /   0.23 /                 / 743.07 /    2.60 /   0.28/          *IS*
----------------------------------------------------------------------------------
AH    AT   25280 /   520 /   1470. /   493. /   54010. / 1.55 /  435. /  636.
   743.25 /   0.21 /  0.39 /   0.0  / 743.46 /    2.98 /   0.26 / 0.001   *XS*
----------------------------------------------------------------------------------
AI    AT   25640 /   360 /   1470. /   615. /   73912. / 1.13 /  232. /  347.
   743.55 /   0.10 /  0.19 /   0.0  / 743.66 /    2.39 /   0.18 / -0.000  *XS*
----------------------------------------------------------------------------------
AJ    AT   26190 /   550 /   1470. /  1195. /   67497. / 2.94 /  207. /  737.
   743.82 /   0.07 /  0.24 /   0.0  / 743.89 /    1.23 /   0.19 / -0.000  *XS*
----------------------------------------------------------------------------------
AK    AT   26690 /   500 /   1470. /  1211. /   80865. / 3.30 /   67. /  720.
   744.02 /   0.08 /  0.20 /   0.00 / 744.09 /    1.21 /   0.18 / -0.000  *XS*
----------------------------------------------------------------------------------
AK1   AT   27090 /   400 /   1470. /   872. /   63152. / 2.97 /  198. /  609.
   744.16 /   0.13 /  0.17 /   0.03 / 744.29 /    1.69 /   0.24 / -0.000  *XS*
----------------------------------------------------------------------------------
AL    AT   27190 /   100 /   1470. /   346. /   48475. / 1.37 /  338. /  416.
   744.11 /   0.38 /  0.07 /   0.13 / 744.49 /    4.25 /   0.34 / -0.000  *XS*
----------------------------------------------------------------------------------
AM    AT   27730 /   540 /   1470. /   361. /   38001. / 1.43 /  705. /  875.
   744.76 /   0.37 /  0.63 /   0.0  / 745.12 /    4.07 /   0.37 / 0.002   *XS*
----------------------------------------------------------------------------------
AM1   AT   28170 /   440 /   1470. /  1086. /   73987. / 2.02 /   33. /  317.
   745.41 /   0.06 /  0.34 /   0.0  / 745.46 /    1.35 /   0.17 / 0.000   *XS*
----------------------------------------------------------------------------------
AN    AT   28330 /   160 /   1470. /   515. /   38350. / 1.61 /  291. /  559.
   745.45 /   0.20 /  0.12 /   0.07 / 745.66 /    2.85 /   0.29 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
AN BR AT   28330 /       /    369. /   235. /   27495. / 1.00 /    0. /   33.
   745.45 /   0.04 /       ...1...  (-.001)    /    1.57 /   0.10 /          *BO*
----------------------------------------------------------------------------------
 ROAD OVERFLOW (CFS) / LEFT     1004. / RIGHT        0. /
                                                                            *RG*
----------------------------------------------------------------------------------
AO    AT   28370 /    40 /   1470. /   400. /   33936. / 2.03 / -144. /   80.
   745.46 /   0.43 /  0.07 /   0.18 / 745.89 /    3.67 /   0.35 / -0.011  *AS*
----------------------------------------------------------------------------------
   M = 0.0  / E = 0.0  / K* = 0.01 /   403. /   34091. / 2.04 / -147. /   80.
   745.48 /   0.42 /                 / 745.90 /    3.65 /   0.35 /          *AS*
============================ END BRIDGE ANALYSIS ================================
```

AG
AH
AI
AJ
AK
AL
AM
AN
AO

```
SECTION AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HE  /    HE  /     EG      V  /    FN  /   ACC   *ID*
==========================================================================
AO     AT   28370 /     0 /   1470. /   404. /   34104. / 2.05 / -147. /   80.
   745.48 /   0.42 /                  /  745.90 /   3.64 /   0.35/          *IS*
--------------------------------------------------------------------------
AP     AT   28850 /   480 /   1470. /  1285. /   89338. / 2.71 / -166. /  231.
   746.19 /   0.06 /   0.34 /   0.0  /  746.24 /   1.14 /   0.15 / 0.000  *XS*
--------------------------------------------------------------------------
AQ     AT   29390 /   540 /   1470. /   658. /   47338. / 2.46 /   52. /  334.
   746.40 /   0.19 /   0.28 /   0.07 /  746.59 /   2.23 /   0.26 / -0.001 *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
AQ BR AT   29390 /       /    853. /   169. /   17708. / 1.00 /    0. /   19.
   746.40 /   0.40 /       ...1...  (-.001)    /   5.05 /   0.30 /         *BO*
--------------------------------------------------------------------------
 ROAD OVERFLOW (CFS) / LEFT     601. / RIGHT      18. /
                                                                          *RG*
--------------------------------------------------------------------------
AR     AT   29480 /    90 /   1470. /  1207. /   63974. / 3.52 / -440. /  114.
   746.57 /   0.08 /   0.06 /   0.0  /  746.65 /   1.22 /   0.10 / -0.001 *AS*
--------------------------------------------------------------------------
   M = 0.50 / E = 0.67 / K* = 1.16 /  1491. /   81408. / 3.25 / -464. /  127.
   747.06 /   0.05 /                  /  747.11 /   0.99 /   0.08 /         *AS*
========================== END BRIDGE ANALYSIS ============================
AS     AT   30030 /   550 /   1470. /   424. /   42388. / 1.37 /  199. /  317.
   747.31 /   0.26 /   0.34 /   0.10 /  747.57 /   3.47 /   0.30 / 0.008  *XS*
--------------------------------------------------------------------------
AT     AT   30560 /   530 /   1470. /   790. /   69212. / 2.63 /    4. /  280.
   747.81 /   0.14 /   0.39 /   0.0  /  747.95 /   1.86 /   0.24 / -0.004 *XS*
--------------------------------------------------------------------------
AU     AT   31080 /   520 /   1470. /   491. /   51113. / 1.77 /  166. /  400.
   748.06 /   0.25 /   0.32 /   0.05 /  748.31 /   2.99 /   0.33 / -0.015 *XS*
--------------------------------------------------------------------------
AV     AT   31610 /   530 /   1470. /   396. /   45739. / 1.10 /  303. /  411.
   748.56 /   0.23 /   0.49 /   0.0  /  748.80 /   3.71 /   0.27 / -0.002 *XS*
--------------------------------------------------------------------------
AW     AT   32130 /   520 /   1470. /   484. /   62031. / 1.27 /   35. /  135.
   749.01 /   0.18 /   0.40 /   0.0  /  749.19 /   3.04 /   0.24 / -0.000 *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
AW BR AT   32130 /       /   1470. /   266. /   52292. / 1.00 /    0. /   40.
   749.01 /   0.48 /       ...1...  (-.001)    /   5.54 /   0.35 /         *BO*
--------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                          *RG*
--------------------------------------------------------------------------
AX     AT   32240 /   110 /   1470. /   365. /   45595. / 1.08 /  -10. /   64.
   749.05 /   0.27 /   0.08 /   0.04 /  749.32 /   4.02 /   0.29 / -0.000 *AS*
--------------------------------------------------------------------------
```

AN
AO
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AQ
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AX

10-4

```
USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT=   11.DATE= 4/ 1/77

==================================================================================
WATER-SURFACE PROFILE FOR: KEARSLEY CREEK   AO  AX                    HOLTSLAG
PAGE  2 OF  2
==================================================================================
SECTD AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    EN  /   ACC    *ID*
==================================================================================
   M = 0.06 / E = 0.01 / K* = 0.14 /   371. /   46504. / 1.08 /  -11. /   64.
   749.12 /   0.27 /                 /  749.39 /   3.97 /   0.29 /          *AS*
============================ END BRIDGE ANALYSIS ============================

                              END OF THIS PROFILE
```

AW

10-1

```
==========================================================================
SEC AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /    EG  /    V  /    FN  /   ACC   *ID*
==========================================================================
AX    AT   32240 /     0 /  1470. /   371. /  46482. / 1.08 /  -11. /   64.
  749.12 /  0.27 /                  / 749.39 /   3.97 / 0.29/           *IS*
--------------------------------------------------------------------------
AY    AT   32850 /   610 /  1470. /   528. /  57824. / 1.19 /    3. /  235.
  749.73 /  0.14 /  0.49 /   0.0  / 749.88 /   2.78 / 0.22 / -0.000  *XS*
--------------------------------------------------------------------------
AZ    AT   33390 /   540 /  1470. /   812. /  71535. / 1.93 /  302. /  846.
  750.06 /  0.10 /  0.28 /   0.0  / 750.16 /   1.81 / 0.21 / -0.001  *XS*
--------------------------------------------------------------------------
BA    AT   33975 /   585 /  1470. /   445. /  46563. / 1.50 /   14. /  555.
  750.36 /  0.25 /  0.38 /   0.08 / 750.61 /   3.31 / 0.31 / -0.000  *XS*
--------------------------------------------------------------------------
BB    AT   34560 /   585 /  1470. /   756. /  91724. / 1.52 /  185. /  479.
  750.82 /  0.09 /  0.30 /   0.0  / 750.91 /   1.95 / 0.19 / -0.000  *XS*
--------------------------------------------------------------------------
BC    AT   34810 /   250 /  1470. /   997. / 127968. / 1.41 /  269. /  606.
  750.91 / -0.05 /  0.05 /   0.0  / 750.96 /   1.47 / 0.13 / -0.000  *XS*
--------------------------------------------------------------------------
BD    AT   34900 /    90 /  1470. /  1164. / 156406. / 1.28 /  281. /  641.
  750.93 /  0.03 /  0.01 /   0.0  / 750.97 /   1.26 / 0.10 /  0.000  *XS*
--------------------------------------------------------------------------
BE    AT   35090 /   190 /  1470. /   747. /  97264. / 1.25 /  227. /  537.
  750.93 /  0.08 /  0.09 /   0.02 / 751.01 /   1.97 / 0.17 / -0.006  *XS*
--------------------------------------------------------------------------
BF    AT   35360 /   270 /  1470. /   366. /  39523. / 1.48 /  327. /  561.
  750.93 /  0.37 /  0.15 /   0.15 / 751.31 /   4.02 / 0.41 / -0.004  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BF BR AT   35360 /      /   849. /    97. /   3434. / 1.00 /    0. /   26.
  749.10 /  1.18 /      ...3....(-.001)   /   8.72 / 0.79 /           *BO*
--------------------------------------------------------------------------
 ROAD OVERFLOW (CFS) / LEFT      64. / RIGHT     566. /
                                                                      *RG*
--------------------------------------------------------------------------
BG    AT   35460 /   100 /  1470. /   255. /  30400. / 1.06 /   47. /  158.
  751.03 /  0.54 /  0.10 /   0.09 / 751.57 /   5.76 / 0.52 /  0.000  *AS*
--------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   564. /  64403. / 1.47 /  -54. /  220.
  752.63 /  0.16 /                  / 752.78 /   2.61 / 0.26 /          *AS*
========================== END BRIDGE ANALYSIS ============================
```

END OF THIS PROFILE

```
BE  B[illegible]  AT   35460 /     0 /   1470. /   565[illegible] /   64517. / 1.47 /  -55. /  220.
      752.63 /   0.15 /                   /  752.78 /    2.60 /    0.26/                  *IS*
BF  BH    AT   35970 /   510 /   1470. /   602. /   64920. / 2.32 /   62. /  257.
      752.88 /   0.22 /   0.26 /   0.03 /  753.10 /    2.44 /    0.27 / 0.017  *XS*
BG  BI    AT   36580 /   610 /   1470. /   491. /   51909. / 2.06 /  106. /  363.
      753.24 /   0.29 /   0.39 /   0.04 /  753.52 /    2.99 /    0.31 / -0.000  *XS*
BH  BJ    AT   36930 /   350 /   1470. /   777. /   59278. / 2.10 /  226. /  849.
      753.65 /   0.12 /   0.25 /   0.0  /  753.77 /    1.89 /    0.25 / -0.001  *XS*
BI  BK    AT   37300 /   370 /   1470. /   588. /   46929. / 2.35 /  286. /  655.
      753.90 /   0.23 /   0.29 /   0.06 /  754.13 /    2.50 /    0.31 / 0.018  *XS*
BJ  BL    AT   37680 /   380 /   1470. /   493. /   40712. / 2.24 /  336. /  886.
      754.29 /   0.31 /   0.43 /   0.04 /  754.60 /    2.98 /    0.32 / -0.000  *XS*
BK  BM    AT   38270 /   590 /   1470. /   977. /   73058. / 1.62 /  683. / 1173.
      754.97 /   0.06 /   0.43 /   0.0  /  755.03 /    1.50 /    0.15 / 0.001  *XS*
BL  BM1   AT   39100 /   830 /   1470. /   579. /   32640. / 2.64 /  157. /  571.
      755.62 /   0.26 /   0.75 /   0.10 /  755.89 /    2.54 /    0.37 / 0.000  *XS*
BM  BN    AT   39540 /   440 /   1470. /   376. /   39251. / 1.05 /  689. /  789.
      756.37 /   0.25 /   0.74 /   0.0  /  756.62 /    3.91 /    0.30 / -0.007  *XS*
BN  BO    AT   40110 /   570 /   1470. /  1010. /   58628. / 2.77 /  159. /  576.
      757.07 /   0.09 /   0.54 /   0.0  /  757.16 /    1.46 /    0.12 / 0.000  *XS*
BØ  BP    AT   40580 /   470 /   1470. /   970. /   92353. / 1.22 /  147. /  487.
      757.32 /   0.04 /   0.19 /   0.0  /  757.36 /    1.51 /    0.15 / 0.014  *XS*
BP  BQ    AT   40970 /   390 /   1470. /   447. /   39167. / 1.70 /  614. /  833.
      757.43 /   0.29 /   0.23 /   0.12 /  757.71 /    3.29 /    0.33 / -0.000  *XS*
BQ  BR    AT   41550 /   580 /   1470. /   478. /   57843. / 1.52 / 1199. / 1378.
      758.04 /   0.22 /   0.55 /   0.0  /  758.27 /    3.07 /    0.26 / -0.000  *XS*
    ========================== BEGIN BRIDGE ANALYSIS ==========================
    DVSNB AT   41550 /        /   1470. /   269. /   39386. / 1.00 /    0. /   36.
      757.30 /   0.47 /        ...3...  (-.001)    /    5.47 /    0.35 /          *BO*
    EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                *RG*
    BS    AT   41670 /   120 /   1470. /   669. /   64622. / 2.11 / -191. /   -3.
      758.18 /   0.16 /   0.07 /   0.0  /  758.34 /    2.20 /    0.24 / -0.001  *AS*
```

10-YR

10-YR

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 11,DATE= 8/25/78

WATER-SURFACE PROFILE FOR: KEARSLEY CREEK BG THRU DAVISON ROAD HOLTSLAG
PAGE 2 OF 2, PROFILE NUMBER 1, UPSTREAM COMPUTATIONS

```
==============================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==============================================================================
   M = **** / E = **** / K* = **** /   760. /   75052. / 2.10 / -193. /     4.
   758.65 /   0.12 /                 /  758.77 /   1.93 /   0.20 /          *AS*
============================ END BRIDGE ANALYSIS ============================
```

BR

END OF THIS PROFILE

10-YR

```
BR  BS    AT   42660 /     0 /   1470. /    761. /   75121. / 2.10 / -193. /     4.
    758.65 /   0.12 /                     /   75 77 /   1.93 /   0.20/                *IS*
    ---------------------------------------------------------------------------------
BS  BT    AT   43190 /   530 /   1400. /   1141. /   81455. / 2.28 /  177. /   607.
    758.90 /   0.05 /   0.18 /    0.0  /   758.95 /   1.23 /   0.16 / 0.003   *XS*
    ---------------------------------------------------------------------------------
BT  BU    AT   43760 /   570 /   1400. /    745. /   63335. / 1.92 /  295. /   699.
    759.09 /   0.11 /   0.22 /    0.03 /   759.20 /   1.88 /   0.19 / -0.000  *XS*
    ========================== BEGIN BRIDGE ANALYSIS ==========================
    BU BR AT   43760 /       /    695. /    219. /   17258. / 1.00 /    0. /    40.
    757.20 /   0.16 /       ...3...  (-.001)     /    3.17 /   0.24 /          *BO*
    ---------------------------------------------------------------------------------
    EMBANKMENT OVERFLOW (CFS) / LEFT      649. / RIGHT       64. /                *RG*
    ---------------------------------------------------------------------------------
    BV    AT   43800 /    40 /   1400. /    856. /   62129. / 2.83 /  478. /   832.
    759.10 /   0.12 /   0.02 /    0.01 /   759.22 /   1.64 /   0.22 / -0.011  *AS*
    ---------------------------------------------------------------------------------
BU  M = **** / E = **** / K* = **** /    901. /   65485. / 2.83 /  470. /   835.
    759.23 /   0.11 /                    /   759.33 /   1.55 /   0.21 /          *AS*
    ========================== END BRIDGE ANALYSIS ============================
BV  BW    AT   44760 /   960 /   1400. /   1169. /   59613. / 4.88 /  759. /  1365.
    759.71 /   0.11 /   0.48 /    0.00 /   759.82 /   1.20 /   0.21 /  0.000  *XS*
    ---------------------------------------------------------------------------------
BW  BX    AT   45290 /   530 /   1400. /    668. /   47417. / 2.99 /  554. /  1171.
    760.03 /   0.20 /   0.37 /    0.05 /   760.23 /   2.09 /   0.26 / -0.001  *XS*
    ---------------------------------------------------------------------------------
BX  BY    AT   45720 /   430 /   1400. /   1222. /   77190. / 2.77 /  523. /  1184.
    760.41 /   0.06 /   0.23 /    0.0  /   760.46 /   1.15 /   0.14 / -0.000  *XS*
    ---------------------------------------------------------------------------------
BY  BZ    AT   46350 /   630 /   1400. /   1187. /   65920. / 3.48 /  343. /  1175.
    760.66 /   0.08 /   0.24 /    0.01 /   760.73 /   1.18 /   0.17 /  0.016  *XS*
    ---------------------------------------------------------------------------------
BZ  CA    AT   46890 /   540 /   1400. /    673. /   42670. / 2.48 /  278. /   709.
    760.99 /   0.17 /   0.38 /    0.05 /   761.15 /   2.08 /   0.24 / -0.000  *XS*
    ---------------------------------------------------------------------------------
CA  CB    AT   47440 /   550 /   1400. /   1013. /   59043. / 2.20 /   12. /   470.
    761.52 /   0.07 /   0.43 /    0.0  /   761.58 /   1.38 /   0.17 /  0.000  *XS*
    ---------------------------------------------------------------------------------
CB  CC    AT   48030 /   590 /   1400. /   1373. /   83732. / 2.90 /   12. /   493.
    761.77 /   0.05 /   0.23 /    0.0  /   761.81 /   1.02 /   0.15 / -0.003  *XS*
    ---------------------------------------------------------------------------------
CC  CD    AT   48210 /   180 /   1400. /    983. /   77479. / 1.62 /   14. /   236.
    761.82 /   0.05 /   0.05 /    0.00 /   761.87 /   1.42 /   0.15 / -0.000  *XS*
    ========================== BEGIN BRIDGE ANALYSIS ==========================
    CD BR AT   48210 /       /   1400. /    322. /   49051. / 1.00 /    0. /    48.
    761.82 /   0.29 /       ...1...  (-.001)     /    4.35 /   0.30 /          *BO*
    ---------------------------------------------------------------------------------
```

10-YR

10-YR

```
WATER-SURFACE PROFILE FOR:  KEARSLEY CREEK  DAVISION ROAD TO SECTCE  HOLTSLAG
PAGE  2 OF  2, PROFILE NUMBER  1,   UPSTREAM COMPUTATIONS
==============================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==============================================================================
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /              *RG*
------------------------------------------------------------------------------
CE     AT   48360 /   150 /   1400. /   619. /   47839. / 1.54 /  -50. /  164.
   761.86 /   0.12 /   0.08 /   0.04 / 761.99 /    2.26 /   0.22 / 0.000  *AS*
------------------------------------------------------------------------------
   M = 0.40 / E = 0.05 / K* = 0.99 /   686. /   53471. / 1.57 /  -52. /  165.
   762.17 /   0.10 /                 / 762.28 /    2.04 /   0.20 /         *AS*
============================= END BRIDGE ANALYSIS ============================
```

CO

END OF THIS PROFILE

10-YR

WATER-SURFACE PROFILE FOR: KEARSLEY CREEK X AG HOLTSLAG

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
X	AT	20100	0	2000.	537.	84570.	1.30	15.	107.
740.88	0.28			741.16	3.73	0.26			*IS*
Y	AT	20600	500	2000.	529.	60338.	2.23	12.	154.
741.17	0.49	0.39	0.11	741.66	3.78	0.40	-0.000		*XS*
Z	AT	21040	440	2000.	1011.	109603.	2.06	-43.	310.
741.80	0.13	0.27	0.0	741.93	1.98	0.22	-0.000		*XS*
AA	AT	21510	470	2000.	1120.	113968.	1.89	-100.	275.
741.98	0.09	0.15	0.0	742.08	1.79	0.21	-0.000		*XS*
AB	AT	21990	480	2000.	695.	75184.	2.11	-3.	332.
742.12	0.27	0.22	0.09	742.39	2.88	0.31	-0.000		*XS*
AC	AT	22540	550	2000.	802.	110229.	1.95	9.	177.
742.47	0.19	0.27	0.0	742.66	2.49	0.23	-0.000		*XS*
AD	AT	23250	710	2000.	995.	78722.	3.06	-165.	295.
742.80	0.19	0.33	0.00	742.99	2.01	0.26	0.003		*XS*
AE	AT	23750	500	2000.	988.	86237.	3.36	-252.	224.
743.08	0.21	0.29	0.01	743.29	2.02	0.27	0.000		*XS*
AF	AT	24470	720	2000.	754.	69389.	2.46	116.	568.
743.53	0.27	0.48	0.03	743.80	2.65	0.29	-0.000		*XS*
~~AG~~	AT	24760	290	2000.	896.	74111.	2.96	252.	676.
743.78	0.23	0.23	0.0	744.01	2.23	0.28	-0.015		*XS*

END OF THIS PROFILE

50-4

```
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HF  /    FG  /      V  /    FN  /  ACC   *ID*
==================================================================================
AG    AT   24760 /     0 /   2000. /   894. /   74015. / 2.46 /  252. /  676.
   743.78 /   0.23 /                 / 744.01 /    2.24 /  0.28/          *IS*
----------------------------------------------------------------------------------
AH    AT   25280 /   520 /   2000. /   719. /   71552. / 2.08 /  358. /  638.
   744.16 /   0.25 /   0.39 /   0.01 / 744.41 /    2.78 /  0.27 / 0.000  *XS*
----------------------------------------------------------------------------------
AT    AT   25640 /   360 /   2000. /   786. /   93129. / 1.38 /   99. /  349.
   744.49 /   0.14 /   0.22 /   0.0  / 744.63 /    2.54 /  0.20 / -0.000 *XS*
----------------------------------------------------------------------------------
AJ    AT   26190 /   550 /   2000. /  1734. /  105986. / 2.58 /  201. /  763.
   744.80 /   0.05 /   0.22 /   0.0  / 744.85 /    1.15 /  0.08 / 0.000  *XS*
----------------------------------------------------------------------------------
AK    AT   26690 /   500 /   2000. /  1819. /  125282. / 3.15 /   66. /  723.
   744.95 /   0.06 /   0.15 /   0.00 / 745.01 /    1.10 /  0.16 / -0.000 *XS*
----------------------------------------------------------------------------------
AK1   AT   27090 /   400 /   2000. /  1247. /   91444. / 3.07 /  184. /  611.
   745.06 /   0.12 /   0.14 /   0.03 / 745.18 /    1.60 /  0.23 / -0.000 *XS*
----------------------------------------------------------------------------------
AL    AT   27190 /   100 /   2000. /   416. /   59046. / 1.52 /  326. /  420.
   744.92 /   0.55 /   0.07 /   0.21 / 745.46 /    4.81 /  0.38 / -0.001 *XS*
----------------------------------------------------------------------------------
AM    AT   27730 /   540 /   2000. /   592. /   51309. / 2.47 /  575. /  876.
   745.74 /   0.44 /   0.71 /   0.0  / 746.18 /    3.38 /  0.38 / -0.000 *XS*
----------------------------------------------------------------------------------
AM1   AT   28170 /   440 /   2000. /  1387. /  103770. / 1.92 /   28. /  324.
   746.45 /   0.06 /   0.33 /   0.0  / 746.51 /    1.44 /  0.17 / 0.000  *XS*
----------------------------------------------------------------------------------
AN    AT   28330 /   160 /   2000. /   856. /   62735. / 1.73 /  210. /  565.
   746.50 /   0.15 /   0.10 /   0.04 / 746.65 /    2.34 /  0.25 / -0.000 *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
AN BR AT   28330 /       /      0. /   238. /   25059. / 1.00 /    0. /   33.
   745.90 /   0.0  /       ...3...  (-.001)    /    0.0  /   0.0  /         *BO*
----------------------------------------------------------------------------------
 ROAD OVERFLOW (CFS) / LEFT     2535. / RIGHT        0. /
                                                                            *RG*
----------------------------------------------------------------------------------
AO    AT   28370 /    40 /   2000. /   729. /   50589. / 3.05 / -273. /   82.
   746.51 /   0.36 /   0.05 /   0.18 / 746.87 /    2.74 /  0.33 / -0.011 *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   729. /   50589. / 3.05 / -273. /   82.
   746.51 /   0.36 /                 / 746.87 /    2.74 /  0.33 /         *AS*
============================ END BRIDGE ANALYSIS ==============================

                              END OF THIS PROFILE
```

AG

AH

AI

AJ

AK

AL

AM

AN

50-7

```
SECTO AT DISTANCE/ LENGTH/DISCHARGE/   AREA   /CONVEYANCE/ ALPHA/   LFW   /   RFW
 WS ELEV /    HV   /    HF   /    HF   /    EG   /     V   /    FN   /   ACC    *ID*
==========================================================================================
AO    AT   28370 /     0 /   2000. /   729. /   50553. / 3.05 / -273. /   82.
  746.51 /   0.36 /                  / 746.87 /    2.75 /   0.33/          *IS*
------------------------------------------------------------------------------------------
AP    AT   28850 /   480 /   2000. /  1659. /  123736. / 2.46 / -172. /  236.
  747.12 /   0.06 /   0.31 /   0.0  / 747.17 /    1.21 /   0.15 / -0.000  *XS*
------------------------------------------------------------------------------------------
AO    AT   29390 /   540 /   2000. /   922. /   67849. / 2.41 /   45. /  337.
  747.32 /   0.18 /   0.26 /   0.06 / 747.49 /    2.17 /   0.25 / -0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
AO BR AT   29390 /       /    645. /   171. /   13553. / 1.00 /    0. /   19.
  746.50 /   0.22 /       ...3...  (-.001)    /    3.78 /   0.22 /         *BO*
------------------------------------------------------------------------------------------
 ROAD OVERFLOW (CFS) / LEFT     1163. / RIGHT      200. /
                                                                            *RG*
------------------------------------------------------------------------------------------
AP    AT   29480 /    90 /   2000. /  1744. /   98854. / 2.99 / -476. /  137.
  747.48 /   0.06 /   0.05 /   0.0  / 747.54 /    1.15 /   0.09 / -0.000  *AS*
------------------------------------------------------------------------------------------
  M = **** / F = **** / K* = **** /  1819. /  104295. / 2.92 / -479. /  140.
  747.61 /   0.05 /                  / 747.66 /    1.10 /   0.09 /         *AS*
========================== END BRIDGE ANALYSIS ============================
AS    AT   30030 /   550 /   2000. /   493. /   49902. / 1.47 /  184. /  319.
  747.86 /   0.38 /   0.42 /   0.16 / 748.23 /    4.06 /   0.35 / -0.012  *XS*
------------------------------------------------------------------------------------------
AT    AT   30560 /   530 /   2000. /  1092. /   88424. / 3.35 /  -91. /  383.
  748.54 /   0.17 /   0.48 /   0.0  / 748.71 /    1.83 /   0.26 / -0.000  *XS*
------------------------------------------------------------------------------------------
AU    AT   31080 /   520 /   2000. /   689. /   71147. / 1.98 /  120. /  404.
  748.83 /   0.26 /   0.33 /   0.04 / 749.09 /    2.90 /   0.33 / -0.000  *XS*
------------------------------------------------------------------------------------------
AV    AT   31610 /   530 /   2000. /   511. /   55641. / 1.37 /  219. /  412.
  749.33 /   0.33 /   0.54 /   0.03 / 749.65 /    3.91 /   0.30 / -0.002  *XS*
------------------------------------------------------------------------------------------
AW    AT   32130 /   520 /   2000. /   575. /   77438. / 1.34 /   31. /  139.
  749.88 /   0.25 /   0.48 /   0.0  / 750.14 /    3.48 /   0.27 / -0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
AW BR AT   32130 /       /   2000. /   296. /   61268. / 1.00 /    0. /   40.
  749.88 /   0.71 /       ...1...  (-.001)    /    6.76 /   0.41 /         *BO*
------------------------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                            *RG*
------------------------------------------------------------------------------------------
AX    AT   32240 /   110 /   2000. /   434. /   57547. / 1.11 /  -15. /   68.
  749.93 /   0.37 /   0.10 /   0.06 / 750.29 /    4.61 /   0.32 / -0.000  *AS*
------------------------------------------------------------------------------------------
```

AN

AO

AP

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AV

AW

50-1

```
USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT=   14,DATE= 4/ 1/77

==========================================================================
WATER-SURFACE PROFILE FOR: KEARSLEY CREEK   AO  AX                HOLTSLAG
PAGE  2 OF  2
==========================================================================
SECTO AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HE  /    HF  /     FG  /     V  /    FN  /   ACC   *ID*
==========================================================================
   M = 0.08 / E = 0.03 / K* = 0.18 /   446. /   59689. / 1.12 /  -16. /   68.
   750.07 /   0.35 /                 /  750.42 /   4.48 /   0.31 /         *AS*
============================ END BRIDGE ANALYSIS ============================

                              END OF THIS PROFILE
```

AW

50-4

```
==========================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  / ACC  *ID*
==========================================================================
AX    AT   32240 /     0 /  2000. /  446. /  59630. / 1.12 /  -16. /   68.
  750.07 /  0.35 /                 / 750.42 /   4.49 /  0.31/          *IS*
--------------------------------------------------------------------------
AY    AT   32850 /   610 /  2000. /  981. /  90376. / 1.63 /  -299. /  236.
  750.77 /  0.11 /  0.45 /   0.0  / 750.87 /   2.04 /  0.20 / -0.000  *XS*
--------------------------------------------------------------------------
AZ    AT   33390 /   540 /  2000. / 1365. / 131815. / 1.55 /  252. /  863.
  751.02 /  0.05 /  0.18 /   0.0  / 751.07 /   1.47 /  0.16 /  0.015  *XS*
--------------------------------------------------------------------------
BA    AT   33975 /   585 /  2000. /  765. /  72499. / 1.74 /   12. /  614.
  751.19 /  0.18 /  0.24 /  0.07  / 751.38 /   2.61 /  0.27 / -0.001  *XS*
--------------------------------------------------------------------------
BB    AT   34560 /   585 /  2000. /  985. / 123062. / 1.53 /  164. /  504.
  751.54 /  0.10 /  0.26 /   0.0  / 751.64 /   2.03 /  0.19 / -0.000  *XS*
--------------------------------------------------------------------------
BC    AT   34810 /   250 /  2000. / 1270. / 167431. / 1.44 /  230. /  635.
  751.63 /  0.06 /  0.05 /   0.0  / 751.69 /   1.58 /  0.14 / -0.000  *XS*
--------------------------------------------------------------------------
BD    AT   34900 /    90 /  2000. / 1452. / 199899. / 1.34 /  250. /  681.
  751.66 /  0.04 /  0.01 /   0.0  / 751.70 /   1.38 /  0.11 / -0.000  *XS*
--------------------------------------------------------------------------
BE    AT   35090 /   190 /  2000. / 1021. / 129256. / 1.45 /  208. /  652.
  751.66 /  0.09 /  0.03 /  0.02  / 751.75 /   1.96 /  0.18 / -0.006  *XS*
--------------------------------------------------------------------------
BF    AT   35360 /   270 /  2000. /  590. /  59452. / 1.80 /  273. /  638.
  751.69 /  0.32 /  0.14 /  0.12  / 752.01 /   3.39 /  0.38 / -0.000  *XS*
========================= BEGIN BRIDGE ANALYSIS =========================
BF BR AT   35360 /     /    774. /   97. /   3434. / 1.00 /    0. /   26.
  749.10 /  0.98 /        ...3...  (-.001)  /   7.95 /  0.72 /          *BO*
--------------------------------------------------------------------------
 ROAD OVERFLOW (CFS) / LEFT     217. / RIGHT    1007. /
                                                                      *RG*
--------------------------------------------------------------------------
BG    AT   35460 /   100 /  2000. /  353. /  41006. / 1.26 /   46. /  206.
  751.69 /  0.63 /  0.16 /  0.16  / 752.32 /   5.67 /  0.53 / -0.011  *AS*
--------------------------------------------------------------------------
  M = ****/ E = ****/ K* = ****/   678. /  77591. / 1.51 /  -84. /  226.
  753.01 /  0.21 /                 / 753.22 /   2.95 /  0.29 /          *AS*
========================= END BRIDGE ANALYSIS ===========================

                    END OF THIS PROFILE
```

```
BE  BG    AT   35460 /     0 /   2000. /    676. /   77403. / 1.51 /  -83. /  226.
      753.01 /   0.21 /                  /  753.[illegible]2 /   2.96 /   0.29/          *IS*
----------------------------------------------------------------------------------------
BF  BH    AT   35970 /   510 /   2000. /    687. /   74160. / 2.44 /   54. /  260.
    753.31 /   0.32 /   0.36 /   0.06 /  753.63 /   2.91 /   0.32 / -0.000  *XS*
----------------------------------------------------------------------------------------
BG  BI    AT   36580 /   610 /   1730. /    662. /   64569. / 2.52 /   72. /  413.
    753.81 /   0.27 /   0.44 /   0.0  /  754.07 /   2.61 /   0.30 /  0.002  *XS*
----------------------------------------------------------------------------------------
BH  BJ    AT   36930 /   350 /   1730. /   1080. /   79857. / 2.20 /  225. /  888.
    754.19 /   0.09 /   0.20 /   0.0  /  754.28 /   1.60 /   0.22 / -0.001  *XS*
----------------------------------------------------------------------------------------
BI  BK    AT   37300 /   370 /   1730. /    803. /   60345. / 2.60 /  267. /  754.
    754.37 /   0.19 /   0.23 /   0.05 /  754.56 /   2.15 /   0.28 / -0.001  *XS*
----------------------------------------------------------------------------------------
BJ  BL    AT   37680 /   380 /   1730. /    722. /   49891. / 3.15 /  322. /  888.
    754.70 /   0.28 /   0.38 /   0.05 /  754.98 /   2.40 /   0.31 / -0.001  *XS*
----------------------------------------------------------------------------------------
BK  BM    AT   38270 /   590 /   1730. /   1124. /   88419. / 1.51 /  680. / 1178.
    755.33 /   0.06 /   0.40 /   0.0  /  755.38 /   1.54 /   0.15 /  0.000  *XS*
----------------------------------------------------------------------------------------
BL  BM1   AT   39100 /   830 /   1730. /    698. /   39685. / 2.49 /  151. /  588.
    755.96 /   0.24 /   0.71 /   0.09 /  756.20 /   2.48 /   0.36 /  0.018  *XS*
----------------------------------------------------------------------------------------
BM  BN    AT   39540 /   440 /   1730. /    415. /   43516. / 1.12 /  688. /  815.
    756.71 /   0.30 /   0.76 /   0.03 /  757.01 /   4.17 /   0.32 /  0.020  *XS*
----------------------------------------------------------------------------------------
BN  BO    AT   40110 /   570 /   1730. /   1177. /   71376. / 2.53 /  151. /  577.
    757.46 /   0.08 /   0.55 /   0.0  /  757.55 /   1.47 /   0.12 / -0.018  *XS*
----------------------------------------------------------------------------------------
BØ  BP    AT   40580 /   470 /   1730. /   1097. /  108105. / 1.26 /  133. /  488.
    757.68 /   0.05 /   0.18 /   0.0  /  757.73 /   1.58 /   0.15 /  0.000  *XS*
----------------------------------------------------------------------------------------
BP  BQ    AT   40970 /   390 /   1730. /    529. /   44974. / 1.81 /  605. /  834.
    757.79 /   0.30 /   0.24 /   0.13 /  758.09 /   3.27 /   0.34 / -0.000  *XS*
----------------------------------------------------------------------------------------
BQ  BR    AT   41550 /   580 /   2000. /    611. /   64688. / 2.11 / 1094. / 1549.
    758.46 /   0.35 /   0.69 /   0.02 /  758.81 /   3.27 /   0.32 / -0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
DVSNB AT   41550 /       /   1747. /    269. /   39386. / 1.00 /    0. /   36.
    757.30 /   0.66 /       ...3...  (-.001)    /   6.50 /   0.42 /          *BO*
----------------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      263. / RIGHT        0. /                  *RG*
----------------------------------------------------------------------------------------
BS    AT   41670 /   120 /   2000. /    769. /   76064. / 2.10 / -193. /    5.
    758.69 /   0.22 /   0.10 /   0.0  /  758.91 /   2.60 /   0.28 / -0.000  *AS*
----------------------------------------------------------------------------------------
```

50-YR

50-YR

WATER-SURFACE PROFILE FOR: KEARSLEY CREEK BG THRU DAVISON ROAD HOLTSLAG
PAGE 2 OF 2, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
   M = **** / E = **** / K* = **** /   899. /   92105. / 2.06 / -197. /   12.
   759.33 /   0.16 /                 /  759.49 /   2.22 /   0.23 /         *AS*
============================= END BRIDGE ANALYSIS ==============================
```

BR

END OF THIS PROFILE

50-YR

```
BR  BS    AT   42660 /     0 /   2000. /   899. /   92111. / 2.06 / -197. /   12.
     759.33 /   0.16 /                  /   59.49 /    2.22 /   0.23 /          *IS*
BS  BT    AT   43190 /   530 /   1950. /  1468. /  111500. / 2.12 /  166. /  629.
     759.63 /   0.06 /   0.20 /    0.0  /  759.69 /    1.33 /   0.17 / -0.000  *XS*   50-YR
BT  BU    AT   43760 /   570 /   1950. /  1114. /   88602. / 2.15 /  112. /  708.
     759.83 /   0.10 /   0.22 /   0.02  /  759.93 /    1.75 /   0.19 / -0.000  *XS*
    ========================== BEGIN BRIDGE ANALYSIS ==========================
    BU BR AT.  43760 /       /    520. /   219. /   17258. / 1.00 /    0. /  40.
     757.20 /   0.09 /       ...3...  (-.001)    /    2.37 /   0.18 /         *BO*
    EMBANKMENT OVERFLOW (CFS) / LEFT     1611. / RIGHT      158. /              *RG*
    BV    AT   43800 /    40 /   1950. /  1140. /   83783. / 2.78 /  430. /  847.
     759.84 /   0.13 /   0.02 /   0.02  /  759.97 /    1.71 /   0.23 / -0.011  *AS*
Bu  M = **** / E = **** / K* = **** /  1140. /   83783. / 2.78 /  430. /  847.
     759.84 /   0.13 /                  /  759.97 /    1.71 /   0.23 /          *AS*
    ========================== END BRIDGE ANALYSIS ============================
BV  BW    AT   44760 /   960 /   1950. /  1720. /   77029. / 6.47 /  442. / 1394.
     760.41 /   0.13 /   0.57 /   0.00  /  760.54 /    1.13 /   0.22 /  0.003  *XS*
Bw  BX    AT   45290 /   530 /   1950. /  1191. /   66673. / 4.59 /  391. / 1187.
     760.77 /   0.19 /   0.39 /   0.03  /  760.96 /    1.64 /   0.26 / -0.001  *XS*
BX  BY    AT   45720 /   430 /   1950. /  1775. /  104936. / 3.21 /  348. / 1210.
     761.13 /   0.06 /   0.23 /    0.0  /  761.19 /    1.10 /   0.15 / -0.000  *XS*
BY  BZ    AT   46350 /   630 /   1950. /  1857. /   96787. / 3.70 /  168. / 1180.
     761.38 /   0.06 /   0.24 /   0.00  /  761.45 /    1.05 /   0.16 /  0.015  *XS*
BZ  CA    AT   46890 /   540 /   1950. /  1053. /   59346. / 3.02 /   99. /  745.
     761.69 /   0.16 /   0.36 /   0.05  /  761.85 /    1.85 /   0.24 /  0.000  *XS*   50-YR
CA  CB    AT   47440 /   550 /   1950. /  1373. /   80730. / 2.19 /   11. /  584.
     762.22 /   0.07 /   0.44 /    0.0  /  762.29 /    1.42 /   0.18 /  0.000  *XS*
CB  CC    AT   48030 /   590 /   1950. /  1722. /  110682. / 2.66 /   10. /  521.
     762.47 /   0.05 /   0.25 /    0.0  /  762.52 /    1.13 /   0.16 / -0.017  *XS*
CC  CD    AT   48210 /   180 /   1950. /  1142. /   95334. / 1.58 /   12. /  238.
     762.53 /   0.07 /   0.06 /   0.01  /  762.60 /    1.71 /   0.17 / -0.000  *XS*
    ========================== BEGIN BRIDGE ANALYSIS ==========================
    CD BR AT   48210 /       /   1950. /   350. /   37769. / 1.00 /    0. /  48.
     762.40 /   0.48 /       ...3...  (-.001)    /    5.58 /   0.36 /         *BO*
```

WATER-SURFACE PROFILE FOR: KEARSLEY CREEK DAVISION ROAD TO SECTCE HOLTSLAG
PAGE 2 OF 2, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS

```
==================================================================================
SECID AT.DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                *RG*
----------------------------------------------------------------------------------
CE    AT   48360 /   150 /   1950. /   775. /   61476. / 1.59 /  -53. /  166.
   762.58 /   0.16 /   0.10 /   0.04 / 762.74 /   2.52 /   0.25 / -0.000  *AS*
----------------------------------------------------------------------------------
CD   M = **** / E = **** / K* = **** /   905. /   74150. / 1.59 /  -56. /  168.
     763.17 /   0.11 /                 / 763.28 /   2.16 /   0.21 /          *AS*
========================== END BRIDGE ANALYSIS ==========================
```

END OF THIS PROFILE

50-4R

		WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*
X	AT	20100	0	2300.	600.	96850.	1.35	13.	112.	
		741.54	0.31			741.85	3.84	0.27		*IS*
Y	AT	20600	500	2300.	625.	72220.	2.36	10.	159.	
		741.82	0.50	0.38	0.09	742.32	3.68	0.39	0.000	*XS*
Z	AT	21040	440	2300.	1252.	139253.	2.02	-68.	316.	
		742.45	0.11	0.23	0.0	742.55	1.84	0.20	-0.000	*XS*
AA	AT	21510	470	2300.	1369.	140401.	2.01	-165.	279.	
		742.59	0.09	0.13	0.0	742.68	1.68	0.20	-0.000	*XS*
AB	AT	21990	480	2300.	899.	97421.	2.13	-18.	332.	
		742.71	0.22	0.19	0.06	742.93	2.56	0.28	-0.001	*XS*
AC	AT	22540	550	2300.	888.	123361.	2.00	4.	182.	
		742.96	0.21	0.24	0.0	743.17	2.59	0.23	-0.001	*XS*
AD	AT	23250	710	2300.	1236.	94907.	3.27	-171.	296.	
		743.32	0.18	0.32	0.0	743.49	1.86	0.25	-0.000	*XS*
AE	AT	23750	500	2300.	1225.	103251.	3.73	-264.	232.	
		743.57	0.20	0.27	0.01	743.77	1.88	0.27	-0.006	*XS*
AF	AT	24470	720	2300.	983.	81986.	3.08	116.	677.	
		743.99	0.26	0.45	0.03	744.25	2.34	0.29	-0.000	*XS*
AG	AT	24760	290	2300.	1100.	87628.	3.23	250.	710.	
		744.24	0.22	0.21	0.0	744.46	2.09	0.27	-0.006	*XS*

END OF THIS PROFILE

100-4

WATER-SURFACE PROFILE FOR: KEARSLEY CREEK AE AJ HOLTSLAG

SECID	AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
AE	AT 23750 / 743.57	0 / 0.20	2300. /	1227. /	103396. / 743.77	3.73 / 1.87	-264. / 0.27	232.	*IS*
AF	AT 24470 / 743.99	720 / 0.26	2300. / 0.45	985. / 0.03	82084. / 744.25	3.08 / 2.34	116. / 0.29	678. / -0.000	*XS*
~~AG~~	AT 24910 / 744.36	440 / 0.20	2300. / 0.31	1157. / 0.0	91760. / 744.56	3.26 / 1.99	250. / 0.26	711. / -0.001	*XS*
AG ~~AH~~	AT 25280 / 744.61	370 / 0.26	2300. / 0.26	845. / 0.03	82484. / 744.87	2.23 / 2.72	354. / 0.27	639. / 0.019	*XS*
AH ~~AI~~	AT 25640 / 744.93	360 / 0.15	2300. / 0.22	900. / 0.0	104792. / 745.09	1.50 / 2.56	89. / 0.20	350. / -0.000	*XS*
AI ~~AJ~~	AT 26190 / 745.26	550 / 0.05	2300. / 0.22	1991. / 0.0	127459. / 745.31	2.41 / 1.15	198. / 0.08	768. / -0.000	*XS*

END OF THIS PROFILE

```
==============================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /    FG  /     V  /    FN  /  ACC   *ID*
==============================================================================
AG    AT   24760 /     0 /   2300. / 1102. /   87725. / 3.23 /  250. /  710.
   744.24 /   0.22 /                / 744.46 /    2.09 /  0.27/          *IS*
------------------------------------------------------------------------------
AH    AT   25280 /   520 /   2300. /  843. /   82270. / 2.23 /  354. /  639.
   744.60 /   0.26 /   0.38 /   0.02 / 744.86 /    2.73 /  0.27 / -0.000  *XS*
------------------------------------------------------------------------------
AI    AT   25640 /   360 /   2300. /  898. /  104604. / 1.50 /   89. /  350.
   744.93 /   0.15 /   0.22 /   0.0  / 745.08 /    2.56 /  0.20 / -0.000  *XS*
------------------------------------------------------------------------------
AJ    AT   26190 /   550 /   2300. / 1988. /  127183. / 2.41 /  199. /  768.
   745.25 /   0.05 /   0.22 /   0.0  / 745.30 /    1.16 /  0.08 /  0.000  *XS*
------------------------------------------------------------------------------
AK    AT   26690 /   500 /   2300. / 2107. /  150034. / 3.00 /   66. /  725.
   745.39 /   0.06 /   0.14 /   0.00 / 745.44 /    1.09 /  0.16 / -0.000  *XS*
------------------------------------------------------------------------------
AK1   AT   27090 /   400 /   2300. / 1432. /  107141. / 3.04 /  178. /  612.
   745.48 /   0.12 /   0.13 /   0.03 / 745.61 /    1.61 /  0.23 / -0.000  *XS*
------------------------------------------------------------------------------
AL    AT   27190 /   100 /   2300. /  453. /   64485. / 1.60 /  320. /  421.
   745.30 /   0.64 /   0.08 /   0.26 / 745.94 /    5.08 /  0.41 / -0.000  *XS*
------------------------------------------------------------------------------
AM    AT   27730 /   540 /   2300. /  755. /   59457. / 3.17 /  522. /  876.
   746.23 /   0.46 /   0.75 /   0.0  / 746.69 /    3.05 /  0.38 / -0.000  *XS*
------------------------------------------------------------------------------
AM1   AT   28170 /   440 /   2300. / 1539. /  119820. / 1.88 /   25. /  329.
   746.95 /   0.07 /   0.33 /   0.0  / 747.01 /    1.49 /  0.17 / -0.000  *XS*
------------------------------------------------------------------------------
AN    AT   28330 /   160 /   2300. / 1039. /   79142. / 1.65 /  200. /  570.
   747.01 /   0.13 /   0.09 /   0.03 / 747.13 /    2.21 /  0.23 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
AN BR AT   28330 /       /      0. /  238. /   25059. / 1.00 /    0. /   33.
   745.90 /   0.0  /       ...3...  (-.001)    /    0.0  /  0.0  /         *BO*
------------------------------------------------------------------------------
 ROAD OVERFLOW (CFS) / LEFT     3343. / RIGHT        0. /
                                                                          *RG*
------------------------------------------------------------------------------
AO    AT   28370 /    40 /   2300. /  913. /   62144. / 3.10 / -286. /   83.
   747.02 /   0.31 /   0.04 /   0.16 / 747.32 /    2.52 /  0.31 / -0.011  *AS*
------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  913. /   62144. / 3.10 / -286. /   83.
   747.02 /   0.31 /                / 747.32 /    2.52 /  0.31 /         *AS*
============================ END BRIDGE ANALYSIS ==============================
```

AG
AH
AI
AJ
AK
AL
Y
AM
AN

```
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
 WS ELEV /    HV  /    HF  /    HF  /     G  /     V  /    FN  /   ACC   *ID*
==================================================================================
AO     AT   28370 /      0 /   2300. /   913. /   62180. / 3.10 / -287. /   83.
   747.02 /   0.31 /                  /  747.33 /    2.52 /   0.31/          *IS*
----------------------------------------------------------------------------------
AP     AT   28850 /    480 /   2300. /  1839. /  141828. / 2.36 / -175. /  238.
   747.56 /   0.06 /   0.29 /    0.0  /  747.61 /    1.25 /   0.15 / -0.000  *XS*
----------------------------------------------------------------------------------
AQ     AT   29390 /    540 /   2300. /  1051. /   79179. / 2.33 /   42. /  339.
   747.75 /   0.17 /   0.25 /   0.06  /  747.93 /    2.19 /   0.25 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
AQ BR AT   29390 /        /    519. /   171. /   13553. / 1.00 /    0. /   19.
   746.50 /   0.14 /        ...3...  (-.001)   /    3.04 /   0.18 /          *BO*
----------------------------------------------------------------------------------
 ROAD OVERFLOW (CFS) / LEFT     1421. / RIGHT     371. /
                                                                            *RG*
----------------------------------------------------------------------------------
AR     AT   29480 /     90 /   2300. /  2017. /  118930. / 2.76 / -488. /  148.
   747.92 /   0.06 /   0.05 /    0.0  /  747.98 /    1.14 /   0.09 / -0.001  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  2017. /  118930. / 2.76 / -488. /  148.
   747.92 /   0.06 /                  /  747.98 /    1.14 /   0.09 /          *AS*
============================ END BRIDGE ANALYSIS ================================
AS     AT   30030 /    550 /   2300. /   645. /   53093. / 2.39 / -311. /  322.
   748.17 /   0.47 /   0.46 /   0.21  /  748.64 /    3.57 /   0.38 / -0.002  *XS*
----------------------------------------------------------------------------------
AT     AT   30560 /    530 /   2300. /  1302. /  105449. / 3.41 /  -92. /  385.
   748.98 /   0.17 /   0.50 /    0.0  /  749.15 /    1.77 /   0.26 / -0.000  *XS*
----------------------------------------------------------------------------------
AU     AT   31080 /    520 /   2300. /   808. /   83908. / 2.04 /   96. /  406.
   749.23 /   0.26 /   0.31 /   0.05  /  749.49 /    2.85 /   0.32 / -0.016  *XS*
----------------------------------------------------------------------------------
AV     AT   31610 /    530 /   2300. /   598. /   61885. / 1.58 /  175. /  412.
   749.73 /   0.36 /   0.54 /   0.05  /  750.09 /    3.85 /   0.31 /  0.013  *XS*
----------------------------------------------------------------------------------
AW     AT   32130 /    520 /   2300. /   624. /   85687. / 1.38 /   28. /  144.
   750.32 /   0.29 /   0.52 /    0.0  /  750.61 /    3.69 /   0.28 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
AW BR AT   32130 /        /   2300. /   311. /   65879. / 1.00 /    0. /   40.
   750.32 /   0.85 /        ...1...  (-.001)   /    7.40 /   0.44 /          *BO*
----------------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                            *RG*
----------------------------------------------------------------------------------
AX     AT   32240 /    110 /   2300. /   471. /   63969. / 1.13 /  -18. /   70.
   750.36 /   0.42 /   0.11 /   0.06  /  750.78 /    4.88 /   0.34 / -0.000  *AS*
```

AN

AO

AP

AQ

AR

AS

AT

AU

AV

AW

AX

100-Y

```
==================================================================================
WATER-SURFACE PROFILE FOR: KEARSLEY CREEK    AO   AX                    HOLTSLAG
PAGE  2 OF  2
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HF  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
   M = 0.10 / E = 0.04 / K* = 0.20 /   489. /   66980. / 1.14 /  -20. /   71.
   750.56 /   0.39 /                 /  750.95 /   4.71 /   0.32 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
```

AW

10:4

END OF THIS PROFILE

```
 WS ELEV /   CHV /    HF /    HE /    EG /     V /    FN /   ACC    *ID*
==================================================================================
A[illegible]   AT   32240 /     0 /   2300. /   489[illegible] /   66995. / 1.14 /  -20. /   71.
  750.56 /   0.39 /                          / 750.95 /    4.71 /   0.32 /                *IS*
----------------------------------------------------------------------------------
AY :  AT   32850 /   610 /   2300. /   1254. /  121481. / 1.44 /  -301. /  237.
  751.28 /   0.08 /   0.40 /    0.0 /  751.35 /    1.83 /   0.17 /  0.000   *XS*
----------------------------------------------------------------------------------
AZ    AT   33390 /   540 /   2300. /   1635. /  166899. / 1.43 /  229. /  870.
  751.45 /   0.04 /   0.14 /    0.0 /  751.49 /    1.41 /   0.14 / -0.000   *XS*
----------------------------------------------------------------------------------
BA    AT   33975 /   585 /   2300. /    946. /   89774. / 1.70 /   12. /  642.
  751.60 /   0.16 /   0.21 /   0.06 /  751.75 /    2.43 /   0.26 / -0.000   *XS*
----------------------------------------------------------------------------------
BB    AT   34560 /   585 /   2300. /   1109. /  140968. / 1.52 /  153. /  516.
  751.90 /   0.10 /   0.24 /    0.0 /  752.00 /    2.07 /   0.20 / -0.000   *XS*
----------------------------------------------------------------------------------
BC    AT   34810 /   250 /   2300. /   1424. /  178979. / 1.67 /   84. /  650.
  751.99 /   0.07 /   0.05 /    0.0 /  752.06 /    1.62 /   0.15 /  0.004   *XS*
----------------------------------------------------------------------------------
BD    AT   34900 /    90 /   2300. /   1621. /  216003. / 1.51 /  125. /  701.
  752.02 /   0.05 /   0.01 /    0.0 /  752.07 /    1.42 /   0.12 /  0.000   *XS*
----------------------------------------------------------------------------------
BE    AT   35090 /   190 /   2300. /   1195. /  144353. / 1.68 /   50. /  705.
  752.02 /   0.10 /   0.03 /   0.02 /  752.12 /    1.92 /   0.18 / -0.007   *XS*
----------------------------------------------------------------------------------
BF    AT   35360 /   270 /   2300. /    741. /   73741. / 1.85 /  245. /  671.
  752.06 /   0.28 /   0.13 /   0.09 /  752.34 /    3.10 /   0.36 / -0.001   *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BF BR AT   35360 /       /    729. /     97. /    3434. / 1.00 /    0. /   26.
  749.10 /   0.87 /      ...3...  (-.001)    /    7.49 /   0.68 /                *BO*
----------------------------------------------------------------------------------
 ROAD OVERFLOW (CFS) / LEFT      330. / RIGHT     1244. /
                                                                                *RG*
----------------------------------------------------------------------------------
BG    AT   35460 /   100 /   2300. /    426. /   49160. / 1.35 /  -13. /  212.
  752.07 /   0.61 /   0.15 /   0.21 /  752.69 /    5.40 /   0.52 / -0.011   *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /    734. /   84322. / 1.53 /  -97. /  229.
  753.19 /   0.23 /                  /  753.43 /    3.13 /   0.31 /                *AS*
============================ END BRIDGE ANALYSIS ================================
```

END OF THIS PROFILE

```
==========================================================================
BE    AT   35460 /     0 /   2300. /   73[illegible] /   84236. / 1.53 /  -97. /  229.
   753.19 /   0.23 /                 /  753.42 /   3.14 /   0.31/          *IS*
--------------------------------------------------------------------------
BF  BH    AT   35970 /   510 /   2300. /   732. /   79051. / 2.49 /   50. /  261.
   753.52 /   0.38 /   0.41 /   0.07 /  753.90 /   3.14 /   0.35 / -0.000  *XS*
--------------------------------------------------------------------------
BG  BI    AT   36580 /   610 /   1780. /   776. /   73395. / 2.69 /   59. /  433.
   754.12 /   0.22 /   0.44 /   0.0  /  754.34 /   2.30 /   0.27 / -0.001  *XS*
--------------------------------------------------------------------------
BH  BJ    AT   36930 /   350 /   1780. /  1244. /   95615. / 1.99 /  224. /  893.
   754.44 /   0.06 /   0.16 /   0.0  /  754.50 /   1.43 /   0.15 / -0.001  *XS*
--------------------------------------------------------------------------
BI  BK    AT   37300 /   370 /   1780. /   902. /   68084. / 2.53 /  266. /  756.
   754.57 /   0.15 /   0.18 /   0.04 /  754.72 /   1.97 /   0.26 / -0.000  *XS*
--------------------------------------------------------------------------
BJ  BL    AT   37680 /   380 /   1780. /   807. /   53918. / 3.33 /  317. /  889.
   754.85 /   0.25 /   0.33 /   0.05 /  755.10 /   2.21 /   0.30 / -0.000  *XS*  100YR
--------------------------------------------------------------------------
BK  BM    AT   38270 /   590 /   1780. /  1164. /   92806. / 1.49 /  679. / 1179.
   755.42 /   0.05 /   0.37 /   0.0  /  755.47 /   1.53 /   0.15 /  0.000  *XS*
--------------------------------------------------------------------------
BL  BM1   AT   39100 /   830 /   1780. /   737. /   38126. / 3.16 / -203. /  591.
   756.05 /   0.29 /   0.74 /   0.12 /  756.33 /   2.41 /   0.38 / -0.000  *XS*
--------------------------------------------------------------------------
BM  BN    AT   39540 /   440 /   1780. /   432. /   45316. / 1.16 /  688. /  826.
   756.85 /   0.30 /   0.81 /   0.01 /  757.15 /   4.12 /   0.32 /  0.001  *XS*
--------------------------------------------------------------------------
BN  BO    AT   40110 /   570 /   1780. /  1235. /   76048. / 2.45 /  148. /  577.
   757.60 /   0.08 /   0.52 /   0.0  /  757.68 /   1.44 /   0.12 /  0.001  *XS*
--------------------------------------------------------------------------
BO  BP    AT   40580 /   470 /   1780. /  1140. /  113628. / 1.27 /  128. /  489.
   757.80 /   0.05 /   0.17 /   0.0  /  757.85 /   1.56 /   0.15 /  0.000  *XS*
--------------------------------------------------------------------------
BP  BQ    AT   40970 /   390 /   1780. /   555. /   46952. / 1.84 /  602. /  835.
   757.91 /   0.29 /   0.23 /   0.12 /  758.20 /   3.21 /   0.34 / -0.001  *XS*
--------------------------------------------------------------------------
BQ  BR    AT   41550 /   580 /   2300. /   680. /   68041. / 2.37 / 1060. / 1606.
   758.60 /   0.42 /   0.76 /   0.06 /  759.02 /   3.38 /   0.35 / -0.000  *XS*  100-YR
========================== BEGIN BRIDGE ANALYSIS ==========================
OVSNB AT   41550 /       /   1798. /   269. /   39386. / 1.00 /    0. /   36.
   757.30 /   0.70 /       ...3...  (-.001)    /   6.69 /   0.43 /          *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      503. / RIGHT        0. /             *RG*
--------------------------------------------------------------------------
BS    AT   41670 /   120 /   2300. /   805. /   80449. / 2.09 / -194. /    7.
   758.87 /   0.26 /   0.12 /   0.0  /  759.14 /   2.86 /   0.30 / -0.000  *AS*
--------------------------------------------------------------------------
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 17,DATE= 8/25/78

WATER-SURFACE PROFILE FOR: KEARSLEY CREEK BG THRU DAVISON ROAD HOLTSLAG
PAGE 2 OF 2, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
M = ****	E = ****	K* = ****	933.	96499.	2.05	-197.	14.	
759.49	0.19		759.69	2.46	0.25			*AS*

BR

END BRIDGE ANALYSIS

END OF THIS PROFILE

100-YR

```
BR  BS    AT    42660 /     0 /    2300. /    933. /   96419. / 2.05 / -197. /    14.
      759.49 /   0.19 /                     /   75[illegible]68 /   2.47 /   0.25/                *IS*
    ----------------------------------------------------------------------------------------
BS  BT    AT    43190 /   530 /    2250. /   1571. /  121630. / 2.07 /  162. /   636.
      759.85 /   0.07 /   0.23 /    0.0  /  759.92 /   1.43 /   0.18 / -0.000   *XS*   100-YR
    ----------------------------------------------------------------------------------------
BT  BU    AT    43760 /   570 /    2250. /   1287. /   98949. / 2.28 /   68. / 1032.
      760.07 /   0.11 /   0.24 /   0.02 / 760.18 /   1.75 /   0.20 / -0.001   *XS*
    ============================ BEGIN BRIDGE ANALYSIS ============================
    BU BR AT    43760 /       /       0. /    219. /   17258. / 1.00 /    0. /    40.
      757.20 /   0.0  /       ...3...  (-.001)    /   0.0  /   0.0  /            *BO*
    ----------------------------------------------------------------------------------------
    EMBANKMENT OVERFLOW (CFS) / LEFT     2346. / RIGHT      227. /                    *RG*
    ----------------------------------------------------------------------------------------
    BV    AT    43800 /    40 /    2250. /   1253. /   85216. / 3.44 /  409. /   978.
      760.08 /   0.17 /   0.02 /   0.06 / 760.25 /   1.80 /   0.26 / -0.011   *AS*
    ----------------------------------------------------------------------------------------
BU    M = **** / E = **** / K* = **** /   1253. /   85216. / 3.44 /  409. /   978.
      760.08 /   0.17 /                   / 760.25 /   1.80 /   0.26 /            *AS*
    ============================ END BRIDGE ANALYSIS ==============================
BV  BW    AT    44760 /   960 /    2250. /   2067. /   91038. / 6.49 /  392. / 1409.
      760.76 /   0.12 /   0.63 /    0.0  / 760.88 /   1.09 /   0.22 / -0.000   *XS*
    ----------------------------------------------------------------------------------------
BW  BX    AT    45290 /   530 /    2250. /   1474. /   78315. / 4.94 /  317. / 1195.
      761.11 /   0.18 /   0.38 /   0.03 / 761.28 /   1.53 /   0.26 / -0.000   *XS*
    ----------------------------------------------------------------------------------------
BX  BY    AT    45720 /   430 /    2250. /   2068. /  119938. / 3.33 /  271. / 1221.
      761.46 /   0.06 /   0.23 /    0.0  / 761.52 /   1.09 /   0.15 /  0.000   *XS*
    ----------------------------------------------------------------------------------------
BY  BZ    AT    46350 /   630 /    2250. /   2196. /  113652. / 3.66 /   91. / 1183.
      761.71 /   0.06 /   0.23 /    0.0  / 761.77 /   1.02 /   0.16 /  0.014   *XS*
    ----------------------------------------------------------------------------------------
BZ  CA    AT    46890 /   540 /    2250. /   1271. /   69455. / 3.11 /   20. /  761.
      762.01 /   0.15 /   0.35 /   0.05 / 762.16 /   1.77 /   0.24 / -0.000   *XS*   100-YR
    ----------------------------------------------------------------------------------------
CA  CB    AT    47440 /   550 /    2250. /   1545. /   91104. / 2.19 /   10. /  641.
      762.51 /   0.07 /   0.44 /    0.0  / 762.58 /   1.46 /   0.18 / -0.020   *XS*
    ----------------------------------------------------------------------------------------
CB  CC    AT    48030 /   590 /    2250. /   1885. /  123987. / 2.58 /   10. /  535.
      762.79 /   0.06 /   0.26 /    0.0  / 762.84 /   1.19 /   0.09 / -0.000   *XS*
    ----------------------------------------------------------------------------------------
CC  CD    AT    48210 /   180 /    2250. /   1214. /  103884. / 1.57 /   11. /  239.
      762.84 /   0.08 /   0.07 /   0.01 / 762.93 /   1.85 /   0.18 /  0.000   *XS*
    ============================ BEGIN BRIDGE ANALYSIS ============================
    CD BR AT    48210 /       /    2250. /    350. /   37769. / 1.00 /    0. /    48.
      762.40 /   0.64 /       ...3...  (-.001)    /   6.44 /   0.42 /            *BO*
    ----------------------------------------------------------------------------------------
```

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   21,DATE= 8/25/78

WATER-SURFACE PROFILE FOR:  KEARSLEY CREEK  DAVISION ROAD TO SECTCE  HOLTSLAG
PAGE  2 OF  2, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
=================================================================================
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                *RG*
---------------------------------------------------------------------------------
CE     AT    48360 /    150 /   2250. /   846. /   68312. / 1.59 /  -54. /  167.
   762.91 /   0.17 /   0.11 /   0.05 /  763.08 /    2.66 /   0.26 / -0.001  *AS*
---------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  1032. /   87661. / 1.57 /  -58. /  170.
CD 763.73 /   0.12 /                 /  763.85 /    2.18 /   0.21 /         *AS*
=============================== END BRIDGE ANALYSIS ==============================

                                 END OF THIS PROFILE
```

100-YR

WATER-SURFACE PROFILE FOR: KEARSLEY CREEK X AG HOLTSLAG

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*
X	AT	20100	0	2950.	786.	133419.	1.48	7.	125.
	743.25	0.32			743.57	3.75	0.26		*IS*
Y	AT	20600	500	2950.	882.	107994.	2.53	6.	164.
	743.50	0.44	0.30	0.06	743.94	3.35	0.34	0.006	*XS*
Z	AT	21040	440	2950.	1888.	234224.	1.77	-97.	325.
	744.02	0.07	0.15	0.0	744.09	1.56	0.16	0.000	*XS*
AA	AT	21510	470	2950.	2174.	231099.	2.15	-322.	289.
	744.11	0.06	0.08	0.0	744.17	1.36	0.16	-0.000	*XS*
AB	AT	21990	480	2950.	1440.	168783.	1.94	-55.	333.
	744.18	0.13	0.11	0.03	744.31	2.05	0.22	-0.000	*XS*
AC	AT	22540	550	2950.	1146.	163912.	2.11	-11.	194.
	744.31	0.22	0.17	0.05	744.53	2.57	0.23	0.000	*XS*
AD	AT	23250	710	2950.	1877.	145798.	3.27	-190.	298.
	744.66	0.13	0.26	0.0	744.78	1.57	0.21	-0.000	*XS*
AE	AT	23750	500	2950.	1876.	158077.	4.03	-281.	241.
	744.83	0.16	0.19	0.01	744.99	1.57	0.23	-0.000	*XS*
AF	AT	24470	720	2950.	1630.	129193.	3.39	115.	682.
	745.13	0.17	0.31	0.01	745.30	1.81	0.24	0.000	*XS*
~~AG~~	AT	24760	290	2950.	1587.	127243.	3.22	246.	712.
	745.29	0.17	0.15	0.00	745.46	1.86	0.25	0.003	*XS*

50-yr

END OF THIS PROFILE

```
SECTO AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==========================================================================
AG     AT   24760 /      0 /   2950. /  1588. /  127335. / 3.22 /  246. /  712.
   745.29 /   0.17 /                  /  745.46 /    1.86 /   0.25/          *IS*
--------------------------------------------------------------------------
AH     AT   25280 /    520 /   2950. /  1126. /  109765. / 2.38 /  344. /  641.
   745.57 /   0.25 /   0.32 /    0.04 /  745.83 /    2.62 /   0.27 / -0.000  *XS*
--------------------------------------------------------------------------
AI     AT   25640 /    360 /   2950. /  1154. /  132798. / 1.70 /   68. /  352.
   745.87 /   0.17 /   0.21 /    0.0  /  746.04 /    2.56 /   0.21 / -0.000  *XS*
--------------------------------------------------------------------------
AJ     AT   26190 /    550 /   2950. /  2536. /  178107. / 2.14 /  193. /  776.
   746.20 /   0.04 /   0.20 /    0.0  /  746.24 /    1.16 /   0.08 /  0.000  *XS*
--------------------------------------------------------------------------
AK     AT   26690 /    500 /   2950. /  2721. /  209668. / 2.70 /   64. /  728.
   746.31 /   0.05 /   0.12 /    0.00 /  746.36 /    1.08 /   0.15 /  0.000  *XS*
--------------------------------------------------------------------------
AK1    AT   27090 /    400 /   2950. /  1860. /  143299. / 3.10 /   96. /  613.
   746.39 /   0.12 /   0.12 /    0.04 /  746.52 /    1.59 /   0.23 / -0.000  *XS*
--------------------------------------------------------------------------
AL     AT   27190 /    100 /   2950. /   542. /   76668. / 1.81 /  295. /  424.
   746.12 /   0.83 /   0.08 /    0.36 /  746.95 /    5.44 /   0.45 /  0.000  *XS*
--------------------------------------------------------------------------
AM     AT   27730 /    540 /   2950. /  1163. /   80059. / 4.52 /  442. /  877.
   747.26 /   0.45 /   0.77 /    0.0  /  747.72 /    2.54 /   0.37 / -0.000  *XS*
--------------------------------------------------------------------------
AM1    AT   28170 /    440 /   2950. /  1852. /  155197. / 1.83 /   20. /  340.
   747.95 /   0.07 /   0.31 /    0.0  /  748.03 /    1.59 /   0.09 / -0.000  *XS*
--------------------------------------------------------------------------
AN     AT   28330 /    160 /   2950. /  1427. /  118443. / 1.52 /  180. /  580.
   748.01 /   0.10 /   0.08 /    0.01 /  748.12 /    2.07 /   0.20 / -0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
AN BR AT   28330 /        /       0. /   238. /   25059. / 1.00 /    0. /   33.
   745.90 /   0.0  /        ...3...  (-.001)    /    0.0  /   0.0  /         *BO*
--------------------------------------------------------------------------
 ROAD OVERFLOW (CFS) / LEFT     4863. / RIGHT        0. /
                                                                            *RG*
--------------------------------------------------------------------------
AO     AT   28370 /     40 /   2950. /  1298. /   90189. / 2.91 / -312. /   85.
   748.02 /   0.23 /   0.03 /    0.12 /  748.26 /    2.27 /   0.28 / -0.011  *AS*
--------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  1298. /   90189. / 2.91 / -312. /   85.
   748.02 /   0.23 /                  /  748.26 /    2.27 /   0.28 /         *AS*
========================== END BRIDGE ANALYSIS ============================
```

AG
AH
AI
AJ
AK
AK1
AL
AM
AN

END OF THIS PROFILE

```
SECTD AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     FG  /    V  /    FN  /   ACC    *ID*
==========================================================================
AN  AO    AT   28370 /     0 /   2950. /  1296. /   90034. / 2.91 / -312. /   85.
   748.02 /   0.23 /                   /  748.25 /    2.28 /   0.28/          *IS*
--------------------------------------------------------------------------
AO  AP    AT   28850 /   480 /   2950. /  2211. /  182328. / 2.19 / -180. /  242.
   748.45 /   0.06 /   0.25 /   0.0  /  748.51 /    1.33 /   0.08 / -0.000  *XS*
--------------------------------------------------------------------------
AP  AQ    AT   29390 /   540 /   2950. /  1323. /  104080. / 2.24 /   32. /  351.
   748.64 /   0.17 /   0.25 /   0.06 /  748.81 /    2.23 /   0.25 / -0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
   AQ BR AT   29390 /       /      0. /   171. /   13553. / 1.00 /    0. /   19.
   746.50 /   0.0  /       ...3...  (-.001)    /    0.0  /   0.0  /          *BO*
--------------------------------------------------------------------------
 ROAD OVERFLOW (CFS) / LEFT     2406. / RIGHT      996. /
                                                                            *RG*
--------------------------------------------------------------------------
   AR    AT   29480 /    90 /   2950. /  2597. /  167133. / 2.37 / -502. /  166.
   748.81 /   0.05 /   0.05 /   0.0  /  748.86 /    1.14 /   0.08 / -0.000  *AS*
--------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  2597. /  167133. / 2.37 / -502. /  166.
   748.81 /   0.05 /                   /  748.86 /    1.14 /   0.08 /          *AS*
========================== END BRIDGE ANALYSIS ============================
AS  AT    AT   30030 /   550 /   2950. /  1192. /   79878. / 3.46 / -315. /  330.
   749.03 /   0.33 /   0.36 /   0.14 /  749.36 /    2.47 /   0.33 / -0.000  *XS*
--------------------------------------------------------------------------
AT  AU    AT   30560 /   530 /   2950. /  1606. /  133133. / 3.36 /  -94. /  388.
   749.61 /   0.18 /   0.43 /   0.0  /  749.79 /    1.84 /   0.27 / -0.000  *XS*
--------------------------------------------------------------------------
AU  AV    AT   31080 /   520 /   2950. /  1018. /  107280. / 2.09 /   58. /  409.
   749.86 /   0.27 /   0.32 /   0.05 /  750.14 /    2.90 /   0.33 / -0.019  *XS*
--------------------------------------------------------------------------
AV  AW    AT   31610 /   530 /   2950. /   764. /   73772. / 1.87 /  141. /  421.
   750.36 /   0.43 /   0.58 /   0.08 /  750.80 /    3.86 /   0.34 / -0.003  *XS*
--------------------------------------------------------------------------
AW  AX    AT   32130 /   520 /   2950. /   709. /   99915. / 1.45 /   25. /  153.
   751.02 /   0.39 /   0.61 /   0.0  /  751.41 /    4.16 /   0.31 / -0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
   AW BR AT   32130 /       /   2950. /   335. /   73453. / 1.00 /    0. /   40.
   751.02 /   1.20 /       ...1...  (-.001)    /    8.80 /   0.50 /          *BO*
--------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                            *RG*
--------------------------------------------------------------------------
   AX    AT   32240 /   110 /   2950. /   537. /   75276. / 1.17 /  -24. /   74.
   751.07 /   0.55 /   0.13 /   0.08 /  751.62 /    5.50 /   0.37 / -0.000  *AS*
--------------------------------------------------------------------------
```

```
USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT=   20,DATE= 4/ 1/77

==========================================================================
WATER-SURFACE PROFILE FOR: KEARSLEY CREEK   AO  AX                HOLTSLAG
PAGE  2 OF  2
==========================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HF  /    EG  /     V  /    FN  /   ACC   *ID*
==========================================================================
AW   M = 0.12 / E = 0.07 / K* = 0.25 /   574. /   81619. / 1.19 /  -28. /   76.
     751.43 /   0.49 /                 /  751.92 /   5.14 /   0.35 /         *AS*
============================ END BRIDGE ANALYSIS ============================

                              END OF THIS PROFILE
```

```
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
      ELEV /    HV  /    HF  /    HE  /      /      V  /    FN  /  ACC   *ID*
==========================================================================
AW  AX    AT   32240 /     0 /   2950. /   573. /  81871. / 1.19 / -28. /  76.
    751.43 /  0.49 /                  /  751.92 /   5.15 / 0.35/          *IS*
--------------------------------------------------------------------------
AX  AY    AT   32850 /   610 /   2950. /  1756. / 198613. / 1.20 / -306. / 238.
    752.20 /  0.05 /  0.34 /    0.0 /  752.26 /   1.68 /  0.16 / 0.000  *XS*
--------------------------------------------------------------------------
AY  AZ    AT   33390 /   540 /   2950. /  2218. / 253667. / 1.27 /  193. / 885.
    752.32 /  0.03 /  0.10 /    0.0 /  752.35 /   1.33 /  0.12 / -0.000 *XS*
--------------------------------------------------------------------------
AZ  BA    AT   33975 /   585 /   2950. /  1368. / 135671. / 1.54 /   10. / 674.
    752.43 /  0.11 /  0.15 /   0.04 /  752.54 /   2.16 /  0.22 / -0.000 *XS*
--------------------------------------------------------------------------
BA  BB    AT   34560 /   585 /   2950. /  1393. / 185524. / 1.47 /  140. / 542.
    752.64 /  0.10 /  0.20 /    0.0 /  752.74 /   2.12 /  0.19 / 0.000  *XS*
--------------------------------------------------------------------------
BB  BC    AT   34810 /   250 /   2950. /  1862. / 243226. / 1.59 /   60. / 661.
    752.73 /  0.06 /  0.05 /    0.0 /  752.79 /   1.58 /  0.15 / -0.000 *XS*
--------------------------------------------------------------------------
    BD    AT   34900 /    90 /   2950. /  2063. / 282644. / 1.49 /  116. / 743.
    752.75 /  0.05 /  0.01 /    0.0 /  752.80 /   1.43 /  0.12 / -0.000 *XS*
--------------------------------------------------------------------------
BC  BE    AT   35090 /   190 /   2950. /  1680. / 204990. / 1.66 /   46. / 714.
    752.75 /  0.08 /  0.03 /   0.02 /  752.83 /   1.76 /  0.17 / -0.013 *XS*
--------------------------------------------------------------------------
BD  BF    AT   35360 /   270 /   2950. /  1078. / 112011. / 1.72 /  182. / 678.
    752.80 /  0.20 /  0.10 /   0.06 /  753.00 /   2.74 /  0.31 / -0.001 *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
    BF BR AT   35360 /     /   626. /    97. /   3434. / 1.00 /    0. /  26.
    749.10 /  0.64 /      ...3...  (-.001)   /   6.44 /  0.59 /          *BO*
--------------------------------------------------------------------------
 ROAD OVERFLOW (CFS) / LEFT     613. / RIGHT    1719. /
                                                                         *RG*
--------------------------------------------------------------------------
    BG    AT   35460 /   100 /   2950. /   615. / 70229. / 1.49 /  -68. / 223.
    752.81 /  0.53 /  0.11 /   0.24 /  753.34 /   4.80 /  0.48 / -0.011 *AS*
--------------------------------------------------------------------------
BE  M = **** / E = **** / K* = **** /   840. / 97330. / 1.54 / -121. / 233.
    753.51 /  0.30 /                  /  753.80 /   3.51 /  0.35 /          *AS*
============================ END BRIDGE ANALYSIS ==========================

                        END OF THIS PROFILE
```

```
BE  BG    AT   35460 /      0 /   2950. /   842.    97503. / 1.54 / -123. /  233.
      753.51 /   0.30 /                  /  753.80 /   3.50 /   0.35/          *IS*
BF  BH    AT   35970 /    510 /   2950. /   816. /   88528. / 2.58 /   42. /  264.
      753.91 /   0.52 /   0.51 /   0.11 /  754.43 /   3.61 /   0.41 / -0.001  *XS*
BG  BI    AT   36580 /    610 /   1860. /  1001. /   94148. / 2.71 /   56. /  446.
      754.71 /   0.15 /   0.42 /   0.0  /  754.86 /   1.86 /   0.23 /  0.000  *XS*
BH  BJ    AT   36930 /    350 /   1860. /  1569. /  131059. / 1.69 /  223. /  901.
      754.92 /   0.04 /   0.10 /   0.0  /  754.95 /   1.19 /   0.12 / -0.000  *XS*
BI  BK    AT   37300 /    370 /   1860. /  1113. /   86811. / 2.32 /  263. /  760.
      755.00 /   0.10 /   0.11 /   0.03 /  755.10 /   1.67 /   0.22 / -0.000  *XS*
BJ  BL    AT   37680 /    380 /   1860. /  1004. /   64368. / 3.52 /  306. /  891.
      755.19 /   0.19 /   0.24 /   0.04 /  755.38 /   1.85 /   0.26 / -0.000  *XS*
BK  BM    AT   38270 /    590 /   1860. /  1257. /  103192. / 1.44 /  678. / 1182.
      755.64 /   0.05 /   0.31 /   0.0  /  755.69 /   1.48 /   0.14 /  0.000  *XS*
BL  BM1   AT   39100 /    830 /   1860. /   826. /   42087. / 3.21 / -213. /  594.
      756.20 /   0.25 /   0.66 /   0.10 /  756.45 /   2.25 /   0.37 / -0.001  *XS*
BM  BN    AT   39540 /    440 /   1860. /   447. /   46673. / 1.18 /  688. /  833.
      756.95 /   0.32 /   0.77 /   0.03 /  757.27 /   4.17 /   0.32 /  0.008  *XS*
BN  BO    AT   40110 /    570 /   1860. /  1286. /   80227. / 2.39 /  146. /  578.
      757.71 /   0.08 /   0.53 /   0.0  /  757.79 /   1.45 /   0.12 /  0.000  *XS*
BØ  BP    AT   40580 /    470 /   1860. /  1181. /  118941. / 1.28 /  123. /  490.
      757.91 /   0.05 /   0.17 /   0.0  /  757.96 /   1.57 /   0.15 / -0.000  *XS*
BP  BQ    AT   40970 /    390 /   1860. /   581. /   48777. / 1.88 /  592. /  838.
      758.02 /   0.30 /   0.23 /   0.12 /  758.32 /   3.20 /   0.34 / -0.002  *XS*
BQ  BR    AT   41550 /    580 /   2950. /   807. /   74063. / 2.80 / 1008. / 1691.
      758.81 /   0.58 /   0.93 /   0.14 /  759.39 /   3.66 /   0.41 / -0.001  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
OVSNB AT   41550 /        /   1896. /   269. /   39386. / 1.00 /    0. /   36.
      757.30 /   0.77 /        ...3...  (-.001)     /   7.06 /   0.46 /          *BO*
EMBANKMENT OVERFLOW (CFS) / LEFT     1074. / RIGHT        0. /                 *RG*
BS    AT   41070 /    120 /   2950. /   867. /   88097. / 2.07 / -196. /   10.
      759.18 /   0.37 /   0.16 /   0.0  /  759.55 /   3.40 /   0.35 / -0.001  *AS*
```

500-YR

500-YR

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 20,DATE= 8/25/78

WATER-SURFACE PROFILE FOR: KEARSLEY CREEK BG THRU DAVISON ROAD HOLTSLAG
PAGE 2 OF 2, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
   M = **** / E = **** / K* = **** /   976. /  94903. / 2.45 / -833. /   16.
   759.67 /   0.35 /                 /  760.02 /   3.02 /   0.33 /          *AS*
============================ END BRIDGE ANALYSIS ============================
```

BR

END OF THIS PROFILE

500-YR

```
BR   759.67 /   0.35 /                  /  760.02 /   3.02 /   0.33/                    *IS*
-----------------------------------------------------------------------------------------------
BS   BT    AT   43190 /   530 /   2875. /   1902. /   141748. / 2.30 /   157. / 1129.
     760.27 /   0.08 /   0.33 /   0.0  /   760.35 /   1.51 /   0.11 /   0.000   *XS*
-----------------------------------------------------------------------------------------------
BT   BU    AT   43760 /   570 /   2875. /   1735. /   131342. / 2.20 /    56. / 1076.
     760.52 /   0.09 /   0.25 /   0.01 /   760.62 /   1.66 /   0.20 /   0.003   *XS*   500-YR
     ========================== BEGIN BRIDGE ANALYSIS ==========================
BU   BU BR AT   43760 /        /      0. /    219. /    17258. / 1.00 /     0. /    40.
     757.20 /   0.0  /        ...3...  (-.001)    /   0.0  /   0.0  /                *BO*
-----------------------------------------------------------------------------------------------
     EMBANKMENT OVERFLOW (CFS) / LEFT    3693. / RIGHT     914. /                    *RG*
-----------------------------------------------------------------------------------------------
BV   BV    AT   43800 /    40 /   2875. /   1535. /   101704. / 3.58 /   346. / 1026.
     760.53 /   0.20 /   0.02 /   0.10 /   760.73 /   1.87 /   0.28 / -0.011   *AS*
-----------------------------------------------------------------------------------------------
BU   M = **** / E = **** / K* = **** /   1535. /   101704. / 3.58 /   346. / 1026.
     760.53 /   0.20 /                   /  760.73 /   1.87 /   0.28 /           *AS*
     ========================== END BRIDGE ANALYSIS ============================
BV   BW    AT   44760 /   960 /   2875. /   2623. /   115016. / 6.29 /   317. / 1430.
     761.28 /   0.12 /   0.68 /   0.0  /   761.40 /   1.10 /   0.23 / -0.006   *XS*
-----------------------------------------------------------------------------------------------
BW   BX    AT   45290 /   530 /   2875. /   1973. /   100311. / 5.12 /   200. / 1207.
     761.64 /   0.17 /   0.38 /   0.03 /   761.80 /   1.46 /   0.26 / -0.000   *XS*
-----------------------------------------------------------------------------------------------
BX   BY    AT   45720 /   430 /   2875. /   2602. /   148109. / 3.45 /   145. / 1239.
     761.98 /   0.07 /   0.24 /   0.0  /   762.04 /   1.10 /   0.16 / -0.000   *XS*
-----------------------------------------------------------------------------------------------
BY   BZ    AT   46350 /   630 /   2875. /   2796. /   146602. / 3.42 /    19. / 1189.
     762.23 /   0.06 /   0.24 /   0.0  /   762.28 /   1.03 /   0.16 /   0.001   *XS*
-----------------------------------------------------------------------------------------------
BZ   CA    AT   46890 /   540 /   2875. /   1679. /    91763. / 2.91 /    18. /  857.
     762.52 /   0.13 /   0.33 /   0.04 /   762.66 /   1.71 /   0.24 /   0.000   *XS*   500-YR
-----------------------------------------------------------------------------------------------
CA   CB    AT   47440 /   550 /   2875. /   1897. /   112956. / 2.16 /     9. /  744.
     763.02 /   0.08 /   0.44 /   0.0  /   763.10 /   1.52 /   0.12 /   0.006   *XS*
-----------------------------------------------------------------------------------------------
CB   CC    AT   48030 /   590 /   2875. /   2174. /   148662. / 2.45 /     9. /  560.
     763.32 /   0.07 /   0.29 /   0.0  /   763.39 /   1.32 /   0.09 / -0.000   *XS*
-----------------------------------------------------------------------------------------------
CC   CD    AT   48210 /   180 /   2875. /   1339. /   119298. / 1.54 /     9. /  241.
     763.39 /   0.11 /   0.08 /   0.02 /   763.50 /   2.15 /   0.20 / -0.000   *XS*
     ========================== BEGIN BRIDGE ANALYSIS ==========================
     CD BR AT   48210 /        /   2875. /    350. /    37769. / 1.00 /     0. /    48.
     762.40 /   1.05 /        ...3...  (-.001)    /   8.22 /   0.54 /           *BO*
-----------------------------------------------------------------------------------------------
```

```
WATER-SURFACE PROFILE FOR:  KEARSLEY CREEK  DAVISION ROAD TO SECTCE  HOLTSLAG
PAGE  2 OF  2, PROFILE NUMBER  3,   UPSTREAM COMPUTATIONS
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC  . *ID*
=================================================================================
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /              *RG*
---------------------------------------------------------------------------------
CE    AT   48360 /   150 /  2875. /   971. /   81049. / 1.58 /  -57. /  169.
   763.46 /   0.22 /   0.13 /   0.05 /  763.68 /   2.96 /   0.28 / -0.000  *AS*
---------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  1306. /  119612. / 1.52 /  -63. /  174.
   764.91 /   0.11 /                  /  765.03 /   2.20 /   0.20 /          *AS*
=============================== END BRIDGE ANALYSIS ==============================
```

CO

END OF THIS PROFILE

500-YR

```
==================================================================================
WATER-SURFACE PROFILE FOR: KEARSLEY CREEK      X  AG                    HOLTSLAG
PAGE  1 OF  1
*** FLOODWAY ANALYSIS *** KEARSLEY CREEK X AG
==================================================================================
SECTO AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
X      AT   20100 /     0 /   2300. /   599. /   97142. / 1.34 /   15. /  110.
   741.54 /   0.31 /                 /  741.85 /   3.84 /   0.27/          *IS*
----------------------------------------------------------------------------------
Y      AT   20600 /   500 /   2300. /   584. /   71313. / 2.13 /   20. /  140.
   741.82 /   0.52 /   0.38 /   0.10 /  742.33 /   3.94 /   0.39 / 0.000  *XS*
----------------------------------------------------------------------------------
Z      AT   21040 /   440 /   2300. /  1026. /  128888. / 1.72 /   65. /  315.
   742.45 /   0.13 /   0.25 /   0.0  /  742.59 /   2.24 /   0.22 / -0.000 *XS*
----------------------------------------------------------------------------------
AA     AT   21510 /   470 /   2300. /  1051. /  128697. / 1.57 /   25. /  275.
   742.62 /   0.12 /   0.15 /   0.0  /  742.74 /   2.19 /   0.21 / -0.000 *XS*
----------------------------------------------------------------------------------
AB     AT   21990 /   480 /   2300. /   822. /   97689. / 1.82 /   80. /  330.
   742.77 /   0.22 /   0.20 /   0.05 /  742.99 /   2.80 /   0.28 / -0.000 *XS*
----------------------------------------------------------------------------------
AC     AT   22540 /   550 /   2300. /   898. /  125418. / 1.98 /    5. /  180.
   743.02 /   0.20 /   0.24 /   0.0  /  743.22 /   2.56 /   0.23 / -0.008 *XS*
----------------------------------------------------------------------------------
AD     AT   23250 /   710 /   2300. /  1101. /   93633. / 2.85 /  -60. /  290.
   743.35 /   0.19 /   0.32 /   0.0  /  743.54 /   2.09 /   0.25 / -0.000 *XS*
----------------------------------------------------------------------------------
AE     AT   23750 /   500 /   2300. /  1041. /  100477. / 2.96 / -120. /  230.
   743.60 /   0.23 /   0.28 /   0.02 /  743.82 /   2.21 /   0.27 / -0.016 *XS*
----------------------------------------------------------------------------------
AF     AT   24470 /   720 /   2300. /   910. /   81449. / 2.44 /  120. /  470.
   744.05 /   0.24 /   0.47 /   0.01 /  744.30 /   2.53 /   0.28 / -0.000 *XS*
----------------------------------------------------------------------------------
AG     AT   24760 /   290 /   2300. /  1058. /   89534. / 2.88 /  250. /  600.
   744.30 /   0.21 /   0.21 /   0.0  /  744.52 /   2.17 /   0.27 /  0.008 *XS*
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: KEARSLEY CREEK AE AJ HOLTSLAG

*** FLOODWAY ANALYSIS *** KEARSLEY CREEK AE AJ

	SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
			WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*
	AE	AT	23750	0	2300.	1042.	100565.	2.96	-120.	230.	
.03			743.60	0.22		743.82	2.21	0.27			*IS*
	AF	AT	24470	720	2300.	1003.	81871.	2.92	120.	620.	
.07			744.06	0.24	0.46	0.01	744.29	2.29	0.28	-0.000	*XS*
	~~AG~~	AT	24910	440	2300.	1093.	92607.	2.88	250.	600.	
.04			744.40	0.20	0.31	0.0	744.60	2.10	0.26	-0.000	*XS*
	~~AH~~	AT	25280	370	2300.	769.	81935.	1.90	435.	635.	
AG .02			744.63	0.26	0.26	0.03	744.89	2.99	0.27	-0.000	*XS*
	~~AI~~	AT	25640	360	2300.	857.	104772.	1.38	150.	350.	
AH .03			744.96	0.15	0.22	0.0	745.11	2.68	0.20	-0.000	*XS*
	~~AJ~~	AT	26190	550	2300.	1532.	114198.	2.01	200.	550.	
AI .03			745.29	0.07	0.24	0.0	745.36	1.50	0.18	0.000	*XS*

END OF THIS PROFILE

```
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LOW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *  *
==========================================================================
AG     AT   24760 /     0 /   2300. /  1054. /   89098. / 2.88 /  250. /  600.
   744.29 /   0.21 /                 /  744.50 /    2.18 /   0.27/          *IS*
--------------------------------------------------------------------------
AH     AT   25280 /   520 /   2300. /   771. /   82238. / 1.90 /  435. /  635.
   744.64 /   0.26 /   0.38 /   0.02 /  744.90 /    2.98 /   0.27 / 0.000  *XS*
--------------------------------------------------------------------------
AI     AT   25640 /   360 /   2300. /   860. /  105053. / 1.38 /  150. /  350.
   744.97 /   0.15 /   0.22 /   0.0  /  745.12 /    2.68 /   0.20 / -0.000 *XS*
--------------------------------------------------------------------------
AJ     AT   26190 /   550 /   2300. /  1535. /  114535. / 2.01 /  200. /  550.
   745.30 /   0.07 /   0.24 /   0.0  /  745.37 /    1.50 /   0.18 / -0.000 *XS*
--------------------------------------------------------------------------
AK     AT   26690 /   500 /   2300. /  1623. /  137624. / 2.38 /   70. /  470.
   745.46 /   0.07 /   0.17 /   0.00 /  745.54 /    1.42 /   0.17 / -0.000 *XS*
--------------------------------------------------------------------------
AK1    AT   27090 /   400 /   2300. /  1401. /  107708. / 2.97 /  190. /  590.
   745.58 /   0.12 /   0.14 /   0.03 /  745.70 /    1.64 /   0.23 / -0.000 *XS*
--------------------------------------------------------------------------
AL     AT   27190 /   100 /   2300. /   463. /   66117. / 1.61 /  320. /  420.
   745.41 /   0.62 /   0.07 /   0.25 /  746.02 /    4.96 /   0.40 / -0.001 *XS*
--------------------------------------------------------------------------
AM     AT   27730 /   540 /   2300. /   721. /   60883. / 2.79 /  625. /  875.
   746.29 /   0.44 /   0.71 /   0.0  /  746.73 /    3.19 /   0.37 / -0.000 *XS*
--------------------------------------------------------------------------
AM1    AT   28270 /   440 /   2300. /  1547. /  121512. / 1.86 /   30. /  330.
   746.99 /   0.06 /   0.31 /   0.0  /  747.05 /    1.49 /   0.09 / -0.000 *XS*
--------------------------------------------------------------------------
AN     AT   28330 /   160 /   2300. /   979. /   79322. / 1.50 /  270. /  570.
   747.04 /   0.13 /   0.09 /   0.03 /  747.17 /    2.35 /   0.23 / -0.000 *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
AN BR AT   28330 /       /      0. /   238. /   25059. / 1.00 /    0. /   33.
   745.90 /   0.0  /       ...3...  (-.001)   /    0.0  /   0.0  /         *BO*
--------------------------------------------------------------------------
 ROAD OVERFLOW (CFS) / LEFT     3375. / RIGHT        0. /
                                                                          *RG*
--------------------------------------------------------------------------
AO     AT   28370 /    40 /   2300. /   924. /   62932. / 3.10 / -287. /   83.
   747.05 /   0.30 /   0.04 /   0.15 /  747.35 /    2.49 /   0.31 / -0.011 *AS*
--------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   924. /   62932. / 3.10 / -287. /   83.
   747.05 /   0.30 /                 /  747.35 /    2.49 /   0.31 /         *AS*
========================== END BRIDGE ANALYSIS ============================
```

.07 AJ

.10 AK

.06 AL

AM

.03 AN

END OF THIS PROFILE

```
==================================================================================
WATER-SURFACE PROFILE FOR: KEARSLEY CREEK   AO  AR                    HOLTSLAG
PAGE  1 OF  1
*** FLOODWAY ANALYSIS *** KEARSLEY CREEK AO AR
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
AO    AT   28370 /     0 /   2300. /   789. /   60526. / 2.54 / -175. /   75.
   747.05 /   0.34 /                 /  747.39 /   2.91 /   0.32/          *IS*
----------------------------------------------------------------------------------
AP    AT   28850 /   480 /   2300. /  1669. /  135101. / 2.29 / -125. /  225.
   747.63 /   0.07 /   0.31 /   0.0  /  747.70 /   1.38 /   0.16 /  0.000  *XS*
----------------------------------------------------------------------------------
AQ    AT   29390 /   540 /   2300. /  1074. /   81911. / 2.28 /   45. /  335.
   747.84 /   0.16 /   0.26 /   0.05 /  748.00 /   2.14 /   0.24 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ===============================
AQ BR AT   29390 /       /    505. /   171. /   13553. / 1.00 /    0. /   19.
   746.50 /   0.14 /       ...3...  (-.001)    /   2.96 /   0.17 /          *BO*
----------------------------------------------------------------------------------
 ROAD OVERFLOW (CFS) / LEFT    1477. / RIGHT     411. /
                                                                             *RG*
----------------------------------------------------------------------------------
AR    AT   29480 /    90 /   2300. /  1584. /  117590. / 1.97 / -250. /  100.
   747.99 /   0.06 /   0.05 /   0.0  /  748.05 /   1.45 /   0.10 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  1584. /  117590. / 1.97 / -250. /  100.
   747.99 /   0.06 /                 /  748.05 /   1.45 /   0.10 /          *AS*
============================ END BRIDGE ANALYSIS =================================

                                END OF THIS PROFILE
```

```
==================================================================================
WATER-SURFACE PROFILE FOR: KRARSLEY CREEK  AS   AX                    HOLTSLAG
PAGE  1 OF  1
*** FLOODWAY ANALYSIS *** KEARSLEY CREEK AO AX
==================================================================================
SECTO AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
 WS ELEV /    HV  /    HF  /    HF  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
AS     AT   30030 /     0 /   2300. /   601. /   54139. / 2.01 /  -30. /  320.
   748.22 /   0.46 /                 /  748.68 /   3.83 /   0.38/          *IS*
----------------------------------------------------------------------------------
AT     AT   30560 /   530 /   2300. /  1238. /  106665. / 3.02 /  -25. /  375.
   749.00 /   0.16 /   0.49 /   0.0  /  749.16 /   1.86 /   0.25 /  0.000  *XS*
----------------------------------------------------------------------------------
AU     AT   31080 /   520 /   2300. /   810. /   84752. / 2.01 /  100. /  400.
   749.25 /   0.25 /   0.30 /   0.04 /  749.50 /   2.84 /   0.32 / -0.010  *XS*
----------------------------------------------------------------------------------
AV     AT   31610 /   530 /   2300. /   594. /   60669. / 1.59 /  180. /  410.
   749.75 /   0.37 /   0.55 /   0.06 /  750.12 /   3.87 /   0.31 /  0.014  *XS*
----------------------------------------------------------------------------------
AW     AT   32130 /   520 /   2300. /   627. /   86677. / 1.37 /   30. /  140.
   750.36 /   0.29 /   0.52 /   0.0  /  750.64 /   3.67 /   0.28 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
AW BR AT   32130 /       /   2300. /   312. /   66273. / 1.00 /    0. /   40.
   750.36 /   0.84 /       ...1...  (-.001)    /   7.37 /   0.43 /          *BO*
----------------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                             *RG*
----------------------------------------------------------------------------------
AX     AT   32240 /   110 /   2300. /   474. /   64492. / 1.13 /  -18. /   70.
   750.40 /   0.42 /   0.10 /   0.06 /  750.81 /   4.85 /   0.33 /  0.000  *AS*
----------------------------------------------------------------------------------
   M = 0.10 / E = 0.05 / K* = 0.20 /   492. /   67508. / 1.15 /  -20. /   71.
   750.59 /   0.39 /                 /  750.98 /   4.68 /   0.32 /          *AS*
============================ END BRIDGE ANALYSIS ================================
```

AR .05

AS .02

AT .02

AU .02

AV .04

AW .03

END OF THIS PROFILE

```
SECID AT DISTANCE/ LENGTH/DISCHARGE/   AREA  /CONVEYANCE/ ALPHA/   LEW  /   REW
WS ELEV /     HV  /     HF  /     HE  /     EG  /      V  /     FN  /    ACC    *ID*
==========================================================================================
AX     AT   32240 /      0 /   2300. /    491. /   67498. / 1.14 /  -20. /    70.
  750.59 /   0.39 /                  /   750.98 /    4.68 /  0.32/                *IS*
------------------------------------------------------------------------------------------
AY     AT   32850 /    610 /   2300. /   1095. /  114210. / 1.35 / -165. /   235.
  751.31 /   0.09 /   0.42 /    0.0  /   751.40 /    2.10 /  0.18 / 0.000      *XS*
------------------------------------------------------------------------------------------
AZ     AT   33390 /    540 /   2300. /   1484. /  163538. / 1.33 /  250. /   750.
  751.50 /   0.05 /   0.15 /    0.0  /   751.55 /    1.55 /  0.14 / -0.000     *XS*
------------------------------------------------------------------------------------------
BA     AT   33975 /    585 /   2300. /    848. /   88394. / 1.53 /   15. /   515.
  751.65 /   0.17 /   0.21 /   0.06  /   751.83 /    2.71 /  0.26 / -0.000     *XS*
------------------------------------------------------------------------------------------
BB     AT   34560 /    585 /   2300. /   1134. /  146825. / 1.47 /  160. /   510.
  751.97 /   0.09 /   0.24 /    0.0  /   752.07 /    2.03 /  0.19 / -0.000     *XS*
------------------------------------------------------------------------------------------
BC     AT   34810 /    250 /   2300. /   1448. /  192473. / 1.48 /  185. /   635.
  752.06 /   0.06 /   0.05 /    0.0  /   752.11 /    1.59 /  0.14 / -0.000     *XS*
------------------------------------------------------------------------------------------
BD     AT   34900 /     90 /   2300. /   1650. /  222151. / 1.48 /  130. /   680.
  752.08 /   0.04 /   0.01 /    0.0  /   752.12 /    1.39 /  0.12 / -0.000     *XS*
------------------------------------------------------------------------------------------
BE     AT   35090 /    190 /   2300. /   1178. /  154103. / 1.41 /  200. /   600.
  752.08 /   0.08 /   0.03 /   0.02  /   752.16 /    1.95 /  0.17 / -0.010     *XS*
------------------------------------------------------------------------------------------
BF     AT   35360 /    270 /   2300. /    758. /   76970. / 1.77 /  250. /   650.
  752.12 /   0.25 /   0.12 /   0.08  /   752.37 /    3.03 /  0.35 / -0.001     *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BF BR AT   35360 /        /    715. /     97. /    3434. / 1.00 /    0. /    26.
  749.10 /   0.84 /        ...3...  (-.001)    /    7.35 /  0.67 /                *BO*
------------------------------------------------------------------------------------------
 ROAD OVERFLOW (CFS) / LEFT      330. / RIGHT     1243. /
                                                                                  *RG*
------------------------------------------------------------------------------------------
BG     AT   35460 /    100 /   2300. /    438. /   50394. / 1.36 /  -17. /   213.
  752.13 /   0.59 /   0.14 /   0.22  /   752.71 /    5.25 /  0.51 / -0.011     *AS*
------------------------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /     734. /   84313. / 1.53 /  -97. /   229.
  753.19 /   0.23 /                  /   753.43 /    3.13 /  0.31 /                *AS*
========================== END BRIDGE ANALYSIS ============================

                          END OF THIS PROFILE
```

.03 AW

.03 AX

.05 AY

.05 AZ

.07 BA

.07 BB

.06 BC

.06 BD

FW

```
 ELEV / HV / X / HL / HE / EG / V / FN / ACC / *ID*
==================================================================================
BR  BS    AT   42660 /    0 /  2300. /   943.    98050. / 2.03 / -1.97 /   13.
     759.54 /   0.19 /                 / 759.73 /   2.44 /  0.25/          *IS*
----------------------------------------------------------------------------------
BS  BT    AT   43190 /  530 /  2250. /  1360. /  116454. / 1.82 /  275. /  625.
     759.89 /   0.08 /  0.24 /   0.0  / 759.97 /   1.65 /  0.19 / 0.000   *XS*
----------------------------------------------------------------------------------
BT  BU    AT   43760 /  570 /  2250. /  1099. /  104128. / 1.55 /  350. /  700.
     760.12 /   0.10 /  0.24 /  0.01  / 760.22 /   2.05 /  0.19 / -0.000  *XS*  FW
============================ BEGIN BRIDGE ANALYSIS ==============================
     BU BR AT   43760 /       /    0. /   219. /   17258. / 1.00 /    0. /   40.
     757.20 /   0.0  /       ...3...  (-.001)   /   0.0  /  0.0 /          *BO*
----------------------------------------------------------------------------------
     EMBANKMENT OVERFLOW (CFS) / LEFT    2363. / RIGHT     228. /            *RG*
----------------------------------------------------------------------------------
     BV    AT   43800 /   40 /  2250. /  1058. /   90314. / 2.19 /  450. /  750.
     760.13 /   0.15 /  0.02 /  0.05  / 760.28 /   2.13 /  0.25 / -0.011  *AS*
----------------------------------------------------------------------------------
BU   M = **** / E = **** / K* = **** /  1058. /   90314. / 2.19 /  450. /  750.
     760.13 /   0.15 /                 / 760.28 /   2.13 /  0.25 /          *AS*
============================ END BRIDGE ANALYSIS ================================
BV  BW    AT   44760 /  960 /  2250. /  1577. /   88809. / 4.11 /  850. / 1350.
     760.76 /   0.13 /  0.61 /  0.0   / 760.89 /   1.43 /  0.23 / 0.000   *XS*
----------------------------------------------------------------------------------
BW  BX    AT   45290 /  530 /  2250. /  1208. /   76300. / 3.63 /  650. / 1150.
     761.12 /   0.20 /  0.40 /  0.03  / 761.32 /   1.86 /  0.26 / -0.000  *XS*
----------------------------------------------------------------------------------
BX  BY    AT   45720 /  430 /  2250. /  1708. /  118156. / 2.43 /  600. / 1100.
     761.49 /   0.07 /  0.24 /  0.0   / 761.56 /   1.32 /  0.15 / 0.000   *XS*
----------------------------------------------------------------------------------
BY  BZ    AT   46350 /  630 /  2250. /  1540. /  102036. / 2.53 /  600. / 1100.
     761.74 /   0.08 /  0.26 /  0.01  / 761.83 /   1.46 /  0.18 / -0.006  *XS*
----------------------------------------------------------------------------------
BZ  CA    AT   46890 /  540 /  2250. /  1086. /   71856. / 2.17 /  350. /  750.
     762.08 /   0.15 /  0.37 /  0.03  / 762.23 /   2.07 /  0.23 / -0.000  *XS*  FW
----------------------------------------------------------------------------------
CA  CB    AT   47440 /  550 /  2250. /  1426. /   93466. / 1.82 /   10. /  410.
     762.58 /   0.07 /  0.41 /  0.0   / 762.65 /   1.58 /  0.18 / 0.010   *XS*
----------------------------------------------------------------------------------
CB  CC    AT   48030 /  590 /  2250. /  1426. /  110394. / 2.14 /   10. /  310.
     762.87 /   0.08 /  0.29 /  0.01  / 762.95 /   1.58 /  0.10 / 0.000   *XS*
----------------------------------------------------------------------------------
CC  CD    AT   48210 /  180 /  2250. /  1155. /  102777. / 1.52 /   15. /  215.
     762.95 /   0.09 /  0.08 /  0.00  / 763.03 /   1.95 /  0.18 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
     CD BR AT   48210 /       /  2250. /   350. /   37769. / 1.00 /    0. /   48.
     762.40 /   0.64 /       ...3...  (-.001)   /   6.44 /  0.42 /          *BO*
----------------------------------------------------------------------------------
```

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   28,DATE= 8/25/78

WATER-SURFACE PROFILE FOR:  KEARSLEY CREEK  DAVISION ROAD TO SECTCE  HOLTSLAG
PAGE  2 OF  2, PROFILE NUMBER  5,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** KEARSLEY CREEK
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /    EG  /     V  /    FN  /   ACC    *ID*
=================================================================================
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                *RG*
---------------------------------------------------------------------------------
CF    AT  48360 /   150 /  2250. /   822. /  68227. / 1.56 /  -50. /  150.
   763.01 /  0.18 /  0.11 /  0.05 /  763.19 /  2.74 /  0.26 / -0.000   *AS*
---------------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /   986. /  86395. / 1.54 /  -50. /  150.
  763.83 /  0.12 /                 /  763.95 /  2.28 /  0.21 /          *AS*
============================ END BRIDGE ANALYSIS ============================

                              END OF THIS PROFILE
```

CD

FW

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 8/31/78

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

  1  1 BOMAN DRAIN, MOUTH TO STANLEY ROAD                    VH    4 20  2  5 12
  2  3  70018  70062  70098  70076  70076
                                                   M     M     M     M     M                    **
  3  4 A  1  24  3  696      140 99 99
  4  5    150    220    330    250    250
                                                   M     M     M     M     M                    **
  5  7      0  1  7160  110  1  7140  285  1  7120  490  1  7100  512  1  7080
  5  8    527  1  7060  539  1  7040  557  1  7020  588  2  7000  594  2  6980
  5  9    599  2  6960  602  2  6955  606  2  6955  609  3  6960  615  3  6980
  5 10    708  3  7000  724  3  7020  730  3  7040  735  3  7060  744  3  7080
  5 11    749  3  7100  754  3  7120  763  3  7140  840  3  7150
  6 17  1  2 045 045  1  2 032 032  1  2 060 060
  3 104 B  0  26  3  697      310 99 99
  5 107      0  1  7190  145  1  7180  264  1  7160 1050  1  7160 1230  1  7140
  5 108   1340  1  7120 1367  1  7100 1392  1  7080 1411  1  7060 1430  1  7040
  5 109   1460  1  7020 1473  2  7000 1480  2  6980 1488  2  6969 1490  2  6968
  5 110   1492  2  6974 1500  3  6980 1550  3  7000 1564  3  7020 1580  3  7040
  5 111   1589  3  7060 1597  3  7080 1607  3  7100 1612  3  7120 1624  3  7140
  5 112   1753  3  7159
  6 117  1  2 045 045  1  2 032 032  1  2 065 065
  3 204 C  0  26  3  699      750 99 99
  5 207      0  1  7190  134  1  7180  510  1  7165  910  1  7160 1038  1  7140
  5 208   1102  1  7120 1135  1  7100 1163  1  7080 1177  1  7060 1198  1  7040
  5 209   1212  2  7020 1223  2  7000 1231  2  6984 1238  2  6984 1246  2  6983
  5 210   1253  2  7000 1260  3  7020 1341  3  7020 1390  3  7040 1400  3  7060
  5 211   1417  3  7080 1423  3  7100 1434  3  7120 1453  3  7140 1551  3  7160
  5 212   1650  3  7170
  6 217  1  2 045 045  1  2 032 032  1  2 065 065
  3 304 E  0  22  3  700      1490 99 99
  5 307 D  0  1  7178  210  1  7160  340  1  7140  400  1  7120  440  1  7100
  5 308    463  1  7080  510  1  7060  570  1  7040  583  2  7020  593  2  7000
  5 309    598  2  6998  603  2  7000  608  3  7020  624  3  7040  660  3  7060
  5 310    668  3  7080  760  3  7080  820  3  7100  840  3  7120  867  3  7140
  5 311    967  3  7160 1310  3  7170
  6 317  1  2 035 035  1  2 032 032  1  2 055 055
```

low pt

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 8/31/78

*** INPUT CARD PRINTOUT ***

```
    1         2         3         4         5         6         7         8
>....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
>01 ROMAN DRAIN, STANLEY ROAD TO X-SECTION E F   VH     2  4  2  5 12
>02  70363  70464  70631  70510  70510
                                 UUUUU                                      **ERROR
>04 E A  1  15  5  700    1640 99 99
>05    150    220    330    250    250
                                 UUU                                        **ERROR
>08     447  1  7080  473  1  7060  570  1  7040  578  2  7030  581  2  7020
>09     583  3  6998  587  4  6997  590  4  7005  592  4  7016  598  5  7023
>10     623  5  7040  642  5  7060  653  5  7080  660  5  7100  668  5  7120
>17  1  2 030 030  1  2 035 035  1  2 035 035  1  2 035 035  1  2 040 040
>04 F E  0  11  3  701    17~~2~~16 99 99                                    low pt
>07      0  1  7080   12  1  7060   37  1  7047   81  2  7037   86  2  7011
>08     90  2  7005   92  2  7006   95  3  7024  134  3  7036  170  3  7060
>09    179  3  7080
>17  1  2 030 030  1  2 085 085  1  2 030 030
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 9/ 1/78

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
                                 G         I
1   601 BOMAN DRAIN, SECT F TO SECT H                    VH   3  4  2  5 12
2   602  70460  70500  70635  70529  70529
                                     UUUUU
3   604 G F   1  13   3  701     1800 99 99
4   605     150     220     330     250     250
                                     UUU
5   607       0  1  7100    30  1 .7080    38  1  7074    68  1  7044   103  2  7032
5   608     106  2  7010   110  2  7002   112  2  7004   115  2  7027   143  3  7037
5   609     182  3  7060   198  3  7080   210  3  7100
6   617  0  1 030 030  0  1 080 080  0  1 030 030                                      low point
3   704 H F   0  12   3  703     2370 99 99
5   707       0  1  7120    19  1  7100    45  1  7079    94  2  7044    99  2  7028
5   708     103  2  7025   109  2  7029   114  3  7048   129  3  7063   188  3  7080
5   709     204  3  7100   213  3  7120
6   717  0  1 065 065  0  1 070 070  0  1 065 065
3   804 I H   0  13   3  704     2942 99 99
5   807       0  1  7120    17  1  7100    33  1  7080    80  2  7075    86  2  7044
5   808      92  2  7039    97  2  7042   102  2  7066   120  3  7070   130  3  7074
5   809     173  3  7080   229  3  7100   237  3  7120
6   817  0  1 040 040  0  1 045 045  0  1 070 070
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 9/ 1/78

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
                        J         L
  1  901 BOMAN DRAIN, SECT J TO SECT L                    VH    3  4  2  5 12
  2  902  70788  70812  70840  70820  70820
                                     00000
  3  904   J 1  15  4  704     2960 99 99
  4  905    110    160    240    180    180
                                     000
  5  907      0  1  7120   27  1  7100   80  1  7082   90  2  7067   94  2  7044
  5  908     96  2  7041  104  3  7039  108  4  7039  116  4  7042  120  4  7068
  5  909    135  4  7071  143  4  7072  192  4  7080  225  4  7100  237  4  7120
  6  917  0  1 030 030  0  1 035 035  0  1 035 035  0  1 070 07
                                                                   M
  3  954   K 0  9  3  705     3090 99 99
  5  957      0  1  7100   12  1  7080   20  2  7071   30  2  7047   34  2  7046
  5  958     38  2  7047   47  3  7071   55  3  7080   60  3  7100
  6  967  0  1 030 030  0  1 035 035  1  2 060 060
  3 1004   L 0  9  3  707     3350 99 99
  5 1007      0  1  7120   20  1  7100   41  2  7080   50  2  7061   54  2  7060
  5 1008     58  2  7064   67  3  7080  110  3  7100  120  3  7120
  6 1017  0  1 035 035  0  1 035 035  0  1 050 050
```

low poi

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 9/ 5/78

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
                          N         P
1  1101 HOMAN DRAIN SECT ~~1~~ TO SECT ~~11~~                VH     3  4  2  5 12
2  1102  70980  71184  71305  71237  71237
                                     00000
3  1104 N ~~1~~   1  14   3  707    3540 99 99
4  1105    110    160    240    180    180
                                     000
5  1107      0  1  7190  430  1  7180  473  1  7160  573  1  7160  628  1  7140
5  1108    662  2  7116  669  2  7080  675  2  7069  678  2  7067  681  2  7068
5  1109    690  3  7093  703  3  7100  756  3  7120  770  3  7140
6  1117  1  3 035 035  1  2 030 030  1  2 035 035
3  1154 0 ~~11~~   0  16   3  708    4110 99 99
5  1157      0  1  7200   90  1  7180  108  1  7160  130  1  7134  170  1  7115
5  1158    180  2  7107  188  2  7080  190  2  7072  194  2  7075  202  3  7111
5  1159    210  3  7116  250  3  7118  266  3  7140  278  3  7160  288  3  7180
5  1160    300  3  7200
6  1167  0  1 040 040  0  1 040 040  0  1 045 045
3  1204 P ~~11~~   0  12   3  709    4920 99 99
5  1207      0  1  7180   57  1  7160  113  1  7140  198  2  7133  208  2  7102
5  1208    210  2  7085  213  2  7094  229  3  7130  240  3  7140  303  3  7160
5  1209    332  3  7180  660  3  7200
6  1217  0  1 060 060  0  1 045 045  0  1 055 055
```

*** INPUT CARD PRINTOUT ***

```
                1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
                Set p to Q
1   1201 BOMAN DRAIN DUFF RD CULVERT  flow overroad   VH     4  5  2  5 12
2   1202  71258  71304  71320  71357  71357
3   1204 p-N-  1  12  3  709    4920 99 99
4   1205    110    160    180    240    300
5   1207      0  1  7180   57  1  7160  113  1  7140  198  2  7133  208  2  7102
5   1208    210  2  7085  213  2  7094  229  3  7130  240  3  7140  303  3  7160
5   1209    332  3  7180  660  3  7200
6   1217  0 p1 060 060  0  1 045 045  0  1 055 055
3   1224  BR N 2   5  1  708    4920        0  7131 3 0
5   1227      0  1  7131    0  1  7076    5  1  7076    5  1  7131    0 -9  7131
6   1237  0  1 021 021
3   1244  RD N 4   8  2   20          1  2          2 2                  2
5   1247   -180  1  7170  -80  1  7140  -30  1  7136   -9  1  7140    0  2  7142
5   1248      9  2  7137   33  2  7137   93  2  7160
3   1284  -Q 5   9  5  709    4950  2  4
5   1287      0  1  7180   67  1  7160  180  1  7136  198  2  7138  207  3  7090
5   1288    212  4  7089  218  4  7096  223  5  7144  287  5  7153
6   1297  0  1 060 060  0  1 045 045  0  1 045 045  0  1 045 045  0  1 055 055
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 9/ 5/78

*** INPUT CARD PRINTOUT ***

```
                    1         2         3         4         5         6         7         8
...5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
                                   Q         S
1  1241 ROMAN DRAIN SECT Q TO SECT S                    VH     3  4  2  5 12
2  1242  71293  71375  71420  71398  71402
                                     UUUUU
3  1244  Q   1   9  5  709    4950 99 99
4  1245  Q 110   160   240   180   180
                                   UUU
5  1287      0  1  7180   67  1  7160  180  1  7136  198  2  7138  207  3  7090
5  1288    212  4  7089  218  4  7096  223  5  7144  287  5  7153
6  1297  0  1 060 060  0  1 045 045  0  1 045 045  0  1 045 045  0  1 055 055
3  1304  R 0   8  3  711    5630 99 99
5  1307      0  1  7180   37  1  7178   64  2  7171   72  2  7126   77  2  7108
5  1308     87  2  7124  102  3  7164  157  3  7170
6  1317  0  1 040 040  0  1 070 070  0  1 042 042
3  1354  S 0   8  3  711    6380 99 99
5  1357     33  1  7184   60  2  7177   71  2  7117   76  2  7109   80  2  7113
5  1358     89  3  7169  100  3  7172  160  3  7180
6  1367  0  1 045 045  0  1 032 032  0  1 045 045
```

USGS STER-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1 DATE= 9/ 6/78

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1  1501 ROMAN DRAIN SECT T TO SECT V                    VH     3  4  2  5 12
2  1502  71577  71683  71758  71713  71713
                                     00000
3  1504 T V   1  10   5  712     6420 99 99
4  1505     110     160     240     180     180
                                     000
5  1507      62  1  7184   84  1  7179   95  2  7157  104  2  7120  105  3  7119
5  1508     110  4  7115  112  4  7121  120  5  7167  135  5  7167  160  5  7180
6  1517  0  1 045 045  0  1 070 070  0  1 070 070  0  1 070 070  0  1 045 045
3  1554 V T   0   8   3  713     6980 99 99
5  1557       0  1  7180  138  1  7175  161  2  7167  170  2  7130  175  2  7125
5  1558     182  2  7135  189  3  7184  460  3  7200
5  1567  0  1 045 045  0  1 055 055  0  1 050 050
3  1604 V T   0   7   3  712     7500 99 99
5  1607       0  1  7180   10  2  7172   20  2  7121   24  2  7115   30  2  7114
5  1608      38  3  7194  215  3  7200
5  1617  0  1 050 050  0  1 035 035  0  1 045 045
```

```
                                                  2         3         4         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
                                  W         BE
1  1701 ROMAN DRAIN SECT W TO SECT BE                          VH   9  5  2  5 12
2  1702  71707  71818  71950  71859  71863
3  1704 W W  1   7  3  713     7600 99 99
4  1705     90   130   200   150   150
5  1707       0  1  7190  180  2  7179  192  2  7131  194  2  7129  197  2  7131
5  1708     209  3  7182  305  3  7200
6  1717  0  1 035 035  1  2 030 030  1  2 030 030
3  1754 X W  0   9  3  713     8110 99 99
5  1757       0  1  7200  160  1  7165  178  2  7167  181  2  7142  184  2  7129
5  1758     189  2  7136  199  3  7177  208  3  7183  350  3  7200
6  1767  0  1 050 050  0  1 065 065  0  1 055 055
3  1804 Y W  0  10  3  714     8640 99 99
5  1807       0  1  7200   70  1  7176   90  1  7178   99  2  7171  106  2  7140
5  1808     110  2  7134  114  2  7137  125  3  7180  258  3  7180  381  3  7200
6  1817  0  1 045 045  0  1 065 065  0  1 045 045
3  1854 Z X  0  11  3  714     9190 99 99
5  1857       0  1  7200   65  1  7180  140  1  7185  154  1  7179  160  2  7171
5  1858     164  2  7138  168  2  7136  172  2  7143  176  3  7180  331  3  7180
5  1859     371  3  7200
6  1867  0  1 050 050  0  1 065 065  0  1 050 050
3  1904 BA Y  0  11  3  715     9780 99 99
5  1907       0  1  7200  137  1  7186  150  1  7186  167  1  7180  172  2  7174
5  1908     178  2  7142  181  2  7141  183  2  7144  188  3  7177  337  3  7180
5  1909     440  3  7200
6  1917 AA 0  1 050 050  0  1 075 075  0  1 050 050
3  1954 BB Z  0   8  3  715    10230 99 99
5  1957       0  1  7200  305  2  7191  314  2  7151  317  2  7146  322  2  7151
5  1958     332  3  7185  370  3  7186  453  3  7200
6  1967 AC 0  1 075 075  0  1 075 075  0  1 050 050
3  2004 BC BA  1   9  3  716    10780 99 99
4  2005      55    80   120    90    90
5  2007       0  1  7203   10  2  7194   16  2  7159   18  2  7152   22  2  7160
5  2008      32  3  7205   40  3  7202   55  3  7201   82  3  7206
6  2017 AD 0  1 040 040  0  1 055 055  0  1 040 040
3  2054 BD BB  0  11  3  716    11110 99 99
5  2057    -180  1  7201    0  1  7200    5  2  7198   15  2  7163   20  2  7153
5  2058      25  2  7162   35  3  7203   45  3  7202   69  3  7198   85  3  7201
5  2059     234  3  7219
6  2067 AE 0  1 040 040  0  1 060 060  0  1 040 040
3  2104 BE BC  0   9  3  716    11602 99 99
5  2107    -220  1  7210    0  1  7204    8  2  7200   17  2  7163   21  2  7157
5  2108      28  2  7171   37  3  7202   63  3  7201  140  3  7220
6  2117  0  1 040 040  0  1 070 070  0  1 040 040
```

```
    1         2         3         4         5         7         8
....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
                                        BM
51 ROMAN DRAIN, CARPENTER ROAD TO SECT ~~BK~~      VH      8  5  2  5 12
52  71990  72049  72107  72067  72071
54  ~~HO~~  1   9  3  717   11660 99 99
55  ~~BF~~ 55      80      120      90      90
57 AF-220  1  7215     0  1  7200   38  2  7198   48  2  7165   51  2  7163
58      56  2  7167   64  3  7196   71  3  7200  270  3  7220
67  0  1 055 055  0  1 075 075  0  1 055 055
04  ~~BF~~  0  10  3  716   12300 99 99
07  ~~BG~~  0  1  7220  272  1  7188  282  2  7182  287  2  7164  291  2  7156
08 AG 296  2  7163  302  3  7191  322  3  7192  342  3  7195  600  3  7220
17  0  1 040 040  0  1 070 070  0  1 045 045
54  ~~BF~~  0  11  3  717   13020 99 99
57  ~~BH~~  0  1  7220  154  1  7185  159  2  7188  164  2  7170  166  2  7164
58 AH 170  2  7168  175  3  7183  209  3  7184  229  3  7184  420  3  7200
59     770  3  7220
67  0  1 040 040  0  1 070 070  0  1 045 045
04  ~~BG~~  0  10  3  717   13740 99 99
07  ~~BI~~-350  1  7220     0  1  7200  268  1  7207  280  2  7200  287  2  7167
08 AI 290  2  7163  296  2  7166  303  3  7202  325  3  7206  650  3  7220
17  0  1 050 050  0  1 035 035  0  1 045 045
54  ~~BH~~  1  12  3  717   14030 99 99
55  ~~BJ~~ 30      45      70      50      50
57 AJ-400  1  7220     0  1  7200  200  1  7200  222  1  7198  231  2  7204
58     237  2  7173  241  2  7168  245  2  7172  252  3  7201  262  3  7207
59     300  3  7206  510  3  7220
67  0  1 035 035  0  1 025 025  0  1 035 035
14  ~~BI~~  0  11  3  718   14520 99 99
07  ~~BK~~  0  1  7250     0  1  7214  144  1  7210  164  1  7207  178  2  7202
08 AK 182  2  7179  184  2  7176  187  2  7184  194  3  7216  216  3  7216
09     240  3  7220
17  0  1 025 025  0  1 025 025  0  1 035 035
54  ~~BJ~~  0  10  3  718   15080 99 99
57  ~~BL~~  0  1  7240     0  1  7214  140  1  7208  152  1  7206  157  2  7203
58 AL 162  2  7182  164  2  7178  166  2  7180  172  3  7209  190  3  7212
67  0  1 025 025  0  1 025 025  0  1 035 035
04  ~~BK~~  0  12  3  718   15410 99 99
07  ~~BM~~-130  1  7220     0  1  7194   10  1  7193   26  2  7202   31  2  7182
08 AM 35  2  7176   39  2  7179   45  3  7199   55  3  7197   65  3  7194
19     290  3  7220  390  3  7240
 0  1 035 035  0  1 025 025  0  1 035 035
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 16,DATE= 8/31/78

WATER-SURFACE PROFILE FOR: BOMAN DRAIN, MOUTH TO STANLEY ROAD VH
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

	SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
	WS ELEV	HV	HF	HE	EG	V	EN	ACC		*ID*
A	~~A~~	AT	140	0	250.	273.	15922.	2.22	576.	714.
	700.76	0.03			700.79	0.91	0.16			*IS*
B	~~A~~	AT	310	170	250.	175.	10576.	1.83	1468.	1556.
	700.81	0.06	0.06	0.01	700.87	1.43	0.23	=0.000		*XS*
C	~~B~~	AT	750	440	250.	80.	5747.	1.00	1216.	1257.
	701.22	0.15	0.45	0.05	701.37	3.13	0.39	0.001		*XS*
D	~~EX C~~	AT	~~1490~~	740	250.	63.	4726.	1.12	577.	615.
	702.87	0.27	1.70	0.06	703.14	3.96	0.49	0.010		*XS*

100 YR.

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: ROMAN DRAIN, STANLEY ROAD TO X-SECTION ~~E~~ F VH
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HE	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	
E ~~D~~	AT 1640	0	250.	176.	12688.	1.65	517.	633.	
	705.10	0.05			705.15	1.42	0.18		*IS*
F ~~E~~	AT 1782	142	250.	201.	11333.	1.18	28.	158.	
	705.19	0.03	0.06	0.0	705.21	1.24	0.21	-0.000	*XS*

100 Y'

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 13,DATE= 9/ 1/78

WATER-SURFACE PROFILE FOR: ROMAN DRAIN, SECT ~~F~~ G TO SECT ~~H~~ I VH
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECTD	AT	DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
G ~~F~~	AT	1800 / 705.29	0 / 0.03	250. /	186. /	7993. / 705.32	1.18 / 1.35	59. / 0.12	170.	*IS*
H ~~G~~	AT	2370 / 706.42	570 / 0.11	250. / 1.17	106. / 0.04	3822. / 706.53	1.31 / 2.35	66. / 0.29	133. / 0.003	*XS*
I ~~H~~	AT	2942 / 708.07	572 / 0.08	250. / 1.61	132. / 0.0	5808. / 708.15	1.51 / 1.89	32. / 0.28	175. / 0.010	*XS*

END OF THIS PROFILE

100-YR

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 14,DATE= 9/ 1/78

WATER-SURFACE PROFILE FOR: BOMAN DRAIN, SECT J TO SECT L VH
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / LENGTH / DISCHARGE / AREA / CONVEYANCE / ALPHA / LEW / REW											
WS ELEV /	HV /	HF /	HE /	EG /	V /	FN /	ACC	*ID*			
J AT	2960 /	0 /	180. /	178. /	9763. /	2.62 /	80. /	195.			
708.20 /	0.04 /		/	708.24 /	1.01 /	0.17/		*IS*			
K AT	3090 /	130 /	180. /	85. /	6312. /	1.16 /	11. /	56.			
708.25 /	0.08 /	0.07 /	0.02 /	708.33 /	2.12 /	0.25 /	0.000	*XS*			
L AT	3350 /	260 /	180. /	53. /	3048. /	1.17 /	34. /	80.			
708.63 /	0.21 /	0.44 /	0.06 /	708.83 /	3.37 /	0.48 /	0.003	*XS*			

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 14,DATE= 9/ 5/78

WATER-SURFACE PROFILE FOR: ROMAN DRAIN SECT ~~L~~ N TO SECT ~~N~~ P VH
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
N ~~L~~	AT	3540	0	180.	230.	21368.	1.42	653.	759.
712.37	0.01			712.38	0.78	0.09			*IS*
0 ~~M~~	AT	4110	570	180.	144.	8665.	1.61	150.	255.
712.46	0.04	0.10	0.01	712.50	1.25	0.16	0.000		*XS*
P ~~N~~	AT	4920	810	180.	69.	3710.	1.01	198.	232.
713.24	0.11	0.82	0.03	713.35	2.63	0.31	0.000		*XS*

END OF THIS PROFILE

100-Y

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 14,DATE= 9/ 5/78

WATER-SURFACE PROFILE FOR: ROMAN DRAIN SECT ~~0~~ Q TO SECT ~~0~~ S VH
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
Q ~~0~~	AT	4950 / 713.98	0 / 0.07	180. /	95. /	6558. / 714.05	1.31 / 1.89	162. / 0.18	223.	*IS*
R ~~P~~	AT	5630 / 715.19	680 / 0.09	180. / 1.21	74. / 0.01	2769. / 715.28	1.00 / 2.44	67. / 0.27	97. / 0.002	*XS*
S ~~0~~	AT	6380 / 716.28	750 / 0.07	180. / 1.07	85. / 0.0	8234. / 716.35	1.00 / 2.13	63. / 0.21	88. / 0.001	*XS*

100-YR

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 14,DATE= 9/ 6/78

WATER-SURFACE PROFILE FOR: ROMAN DRAIN SECT. ~~R~~ T TO SECT ~~T~~ V VH
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID / WS ELEV	AT DISTANCE / HV	LENGTH / HF	DISCHARGE / HF	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*
T ~~R~~	AT 6420	0	180.	108.	5064.	1.24	88.	143.
717.13	0.05			717.18	1.67	0.18		*IS*
V ~~S~~	AT 6980	560	180.	118.	6088.	1.30	76.	188.
717.72	0.05	0.59	0.0	717.77	1.53	0.17	-0.001	*XS*
V ~~T~~	AT 7500	520	180.	122.	12543.	1.05	0.	37.
717.97	0.04	0.22	0.0	718.01	1.47	0.13	0.017	*XS*

100 YY.

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: BOMAN DRAIN SECT ~~U~~ W TO SECT ~~BC~~ BE VH
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
	WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
W ~~U~~	AT	7600	0	150.	143.	11787.	1.62	67.	230.	
	718.59	0.03			718.62	1.05	0.13			*IS*
X ~~V~~	AT	8110	510	150.	246.	9845.	1.23	59.	242.	
	718.71	0.01	0.10	0.0	718.72	0.61	0.08	0.001		*XS*
Y ~~W~~	AT	8640	530	150.	286.	10397.	1.36	34.	309.	
	718.83	0.01	0.12	0.0	718.84	0.52	0.07	0.001		*XS*
Z ~~X~~	AT	9190	550	150.	310.	9904.	1.43	34.	350.	
	718.95	0.01	0.12	0.0	718.96	0.48	0.08	0.002		*XS*
AA ~~BA~~ ~~Y~~	AT	9780	590	150.	314.	9968.	1.16	89.	393.	
	719.09	0.00	0.13	0.0	719.09	0.48	0.08	0.002		*XS*
AB ~~BB~~ ~~Z~~	AT	10230	450	150.	134.	4176.	1.37	229.	413.	
	719.32	0.03	0.24	0.01	719.35	1.12	0.15	0.000		*XS*
AC ~~BC~~ ~~BA~~	AT	10780	550	90.	59.	2931.	1.03	4.	31.	
	719.97	0.04	0.65	0.01	720.00	1.51	0.16	0.002		*XS*
AD ~~BD~~ ~~BB~~	AT	11110	330	90.	121.	4501.	1.55	-180.	93.	
	720.19	0.01	0.20	0.0	720.21	0.74	0.10	-0.001		*XS*
AE ~~BE~~ ~~BC~~	AT	~~11602~~	492	90.	95.	3603.	1.15	-16.	77.	
	720.44	0.02	0.25	0.00	720.46	0.95	0.11	0.005		*XS*

END OF THIS PROFILE

11602 end of clvt

100 YR

WATER-SURFACE PROFILE FOR: ROMAN DRAIN, CARPENTER ROAD TO SECT ~~AK~~ BM VH
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

	SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
	WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*
AF ~~BF~~	~~BD~~	AT	11660	0	90.	170.	4613.	1.65	-98.	138.
	720.67		0.01			720.68	0.53	0.08		*IS*
AG ~~BG~~	~~BE~~	AT	12300	640	90.	404.	15228.	1.13	106.	471.
	720.75		0.00	0.07	0.0	720.75	0.22	0.04	0.000	*XS*
AH ~~BH~~	~~BF~~	AT	13020	720	90.	651.	25957.	1.01	55.	551.
	720.75		0.00	0.01	0.0	720.75	0.14	0.02	-0.016	*XS*
AI ~~BI~~	~~BG~~	AT	13740	720	90.	254.	9231.	4.00	-135.	365.
	720.77		0.01	0.02	0.00	720.78	0.35	0.08	-0.000	*XS*
AJ ~~BJ~~	~~BH~~	AT	14030	290	50.	306.	13741.	2.99	-154.	326.
	720.77		0.00	0.01	0.0	720.77	0.16	0.03	-0.018	*XS*
AK ~~BK~~	~~BI~~	AT	14520	490	50.	32.	2503.	1.20	159.	192.
	720.77		0.05	0.04	0.02	720.82	1.56	0.22	-0.014	*XS*
AL ~~BL~~	~~BJ~~	AT	15080	560	50.	40.	2860.	1.46	99.	177.
	720.98		0.04	0.20	0.0	721.01	1.26	0.20	0.000	*XS*
AM ~~BM~~	~~BK~~	AT	15410	330	50.	294.	14987.	1.91	-82.	206.
	721.03		0.00	0.02	0.0	721.03	0.17	0.02	0.000	*XS*

100 YR

W/S of corporate limits

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 23,DATE= 8/31/78

WATER-SURFACE PROFILE FOR: BOMAN DRAIN, MOUTH TO STANLEY ROAD VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

	SECID AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*	FW Normal width
A	~~A~~ AT	140	0	250.	141.	11577.	1.49	592.	632.	
	700.76	0.07			700.83	1.77	0.21		*IS*	138
B	~~A~~ AT	310	170	250.	117.	8990.	1.33	1475.	1515.	
	700.85	0.09	0.10	0.01	700.95	2.14	0.26	-0.000	*XS*	88
C	~~B~~ AT	750	440	250.	84.	6292.	1.00	1217.	1257.	
	701.32	0.14	0.49	0.02	701.46	2.98	0.36	0.001	*XS*	41
D	~~EX C~~ AT	1490	740	250.	62.	4620.	1.12	578.	615.	
	702.84	0.28	1.59	0.07	703.12	4.03	0.50	0.002	*XS*	38

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 15,DATE= 8/31/78

WATER-SURFACE PROFILE FOR: ROMAN DRAIN, STANLEY ROAD TO X-SECTION ~~E~~ F VH
PAGE 1 OF 1, PROFILE NUMBER 5. UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

FW normal width

	SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	FW normal width
E	~~A~~ AT 1640	/ 0	/ 250.	/ 148.	/ 12232.	/ 1.35	/ 565.	/ 625.		116
	705.10	/ 0.06	/	/	705.16	/ 1.68	/ 0.19	/	*IS*	
	~~E~~ AT 1782 76	/ 142	/ 250.	/ 147.	/ 9544.	/ 1.26	/ 77.	/ 137.		
F	705.18	/ 0.06	/ ~ 0.08	/ 0.0	/ 705.24	/ 1.70	/ 0.25	/ 0.000	*XS*	130

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 17,DATE= 9/ 1/78

WATER-SURFACE PROFILE FOR: ROMAN DRAIN, SECT ~~F~~ 6 TO SECT ~~H~~ I VH
PAGE 1 OF 1, PROFILE NUMBER 5. UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** ROR FW

FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	normal width
WS ELEV		HV	HF	HF	EG	V	FN	ACC	*ID*	
6 ~~F~~	AT	1800	0	250.	168.	7623.	1.30	73.	153.	
705.29		0.04			705.33	1.49	0.12		*IS*	111
H ~~G~~	AT	2370	570	250.	109.	3916.	1.31	65.	134.	
706.45		0.11	1.19	0.03	706.56	2.30	0.29	0.003	*XS*	67
I ~~H~~	AT	2942	572	250.	118.	5730.	1.27	68.	148.	
708.08		0.09	1.59	0.0	708.17	2.12	0.29	0.012	*XS*	143

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 18,DATE= 9/ 1/78

WATER-SURFACE PROFILE FOR: BOMAN DRAIN, SECT J TO SECT L VH FW

PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS

*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
J AT 2960 / 708.20	0 / 0.04	180. /	147. / 708.24	9213. / 1.22	1.90 / 0.17	90. /	150.	*IS*
K AT 3090 / 708.25	130 / 0.08	180. / 0.07	85. / 0.02	6336. / 708.33	1.16 / 2.11	10. / 0.25	56. / 0.000	*XS*
L AT 3350 / 708.63	260 / 0.21	180. / 0.44	53. / 0.06	3056. / 708.84	1.17 / 3.37	34. / 0.48	81. / 0.003	*XS*

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 19,DATE= 9/ 5/78

WATER-SURFACE PROFILE FOR: BOMAN DRAIN SECT ~~L~~ N TO SECT ~~N~~ P VH

PAGE 1 OF 1, PROFILE NUMBER 5. UPSTREAM COMPUTATIONS

*** FLOODWAY ANALYSIS *** HOR

FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	normal width
	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*	
N ~~L~~	AT	3540	0	180.	193.	20143.	1.18	662.	722.	
	712.37	0.02			712.39	0.93	0.107		*IS*	100
O ~~M~~	AT	4110	570	180.	120.	8210.	1.32	168.	228.	
	712.47	0.05	0.11	0.02	712.51	1.50	0.17	-0.000	*XS*	105
P ~~N~~	AT	4920	810	180.	70.	3807.	1.01	198.	232.	
	713.28	0.10	0.84	0.03	713.38	2.58	0.31	0.000	*XS*	33

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 18,DATE= 9/ 5/78

WATER-SURFACE PROFILE FOR: ROMAN DRAIN SECT Q TO SECT S VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*
Q	AT	4950	0	180.	88.	6567.	1.13	198.	223.
714.02		0.07			714.09	2.05	0.18		*IS*
R	AT	5630	680	180.	75.	2806.	1.00	67.	98.
715.21		0.09	1.20	0.01	715.30	2.42	0.27	0.003	*XS*
S	AT	6380	750	180.	85.	8252.	1.00	63.	88.
716.28		0.07	1.05	0.0	716.35	2.12	0.20	0.001	*XS*

FW

END OF THIS PROFILE

USGS-STER-BACKWATER PROGRAM - - VERSION 77.180 *** PAGE COUNT= 19, DATE= 9/ 6/78

WATER-SURFACE PROFILE FOR: ROMAN DRAIN SECT R TO SECT T VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

FW

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / FG	ALPHA / V	LEW / FN	REW / ACC	*ID*	normal width	st low
T AT 717.13	6420 / 0.06	0 /	180. /	91. / 717.19	4897. / 1.82	1.14 / 0.18	90. /	120. *IS*	55	
U AT 717.76	6980 / 0.05	560 / 0.62	180. / 0.0	100. / 717.81	5981. / 1.79	1.02 / 0.17	158. / 0.001	188. *XS*	112	
V AT 718.01	7500 / 0.03	520 / 0.22	190. / 0.0	122. / 718.04	12672. / 1.48	1.02 / 0.12	7. / 0.011	37. *XS*	36	

END OF THIS PROFILE

USGS STE-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 22,DATE= 9/12/78

WATER-SURFACE PROFILE FOR: ROMAN DRAIN SECT U TO SECT BC VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

normal width

	SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW		
	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*			
W ~~U~~		AT	7600	0	150.	125.	11807.	1.26	149.	219.		
	718.63	0.03			718.66	1.20	0.13		*IS*			163
X ~~V~~		AT	8110	510	150.	190.	9323.	1.05	128.	208.		
	718.75	0.01	0.10	0.0	718.76	0.79	0.09	0.000	*XS*			183
Y ~~W~~		AT	8640	530	150.	264.	10582.	1.22	50.	250.		
	718.88	0.01	0.12	0.0	718.89	0.57	0.07	0.001	*XS*			275
Z ~~X~~		AT	9190	550	150.	236.	8381.	1.36	65.	265.		
	719.02	0.01	0.14	0.00	719.03	0.63	0.08	0.002	*XS*	FW		316
AA ~~BA~~ ~~Y~~		AT	9780	590	150.	294.	10836.	1.04	150.	350.		
	719.17	0.00	0.15	0.0	719.18	0.51	0.08	0.002	*XS*			304
AB ~~BB~~ ~~Z~~		AT	10230	450	150.	131.	4395.	1.18	305.	405.		
	719.38	0.02	0.21	0.01	719.40	1.15	0.14	0.001	*XS*			184
AC ~~BC~~ ~~BA~~		AT	10780	550	90.	60.	2954.	1.03	4.	31.		
	719.98	0.04	0.61	0.01	720.02	1.50	0.16	0.001	*XS*			27
AD ~~BD~~ ~~BB~~		AT	11110	330	90.	88.	4226.	1.02	0.	35.		
	720.23	0.02	0.21	0.0	720.25	1.02	0.11	0.016	*XS*			134
AE ~~BE~~ ~~BC~~		AT	11602	492	90.	87.	3565.	1.03	0.	40.		
	720.48	0.02	0.26	0.00	720.50	1.03	0.11	-0.015	*XS*			103

END OF THIS PROFILE

PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS

*** FLOODWAY ANALYSIS *** HOP FW

	SECID	AT	DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
AF ~~BE~~	~~RD~~	AT	11660 / 720.71	0 / 0.01	90. /	146. /	4684. / 720.72	1.27 / 0.62	-40. / 0.08	80.	*IS*
AG ~~BF~~	~~RE~~	AT	12300 / 720.79	640 / 0.00	90. / 0.08	287. / 0.0	14141. / 720.80	1.03 / 0.31	210. / 0.05	360. / 0.000	*XS*
AH ~~BH~~	~~RF~~	AT	13020 / 720.79	720 / 0.00	90. / 0.02	412. / 0.0	22610. / 720.80	1.01 / 0.22	130. / 0.03	310. / -0.019	*XS*
AI ~~BI~~	~~RG~~	AT	13740 / 720.82	720 / 0.02	90. / 0.04	123. / 0.01	7191. / 720.84	2.07 / 0.73	145. / 0.11	325. / -0.000	*XS*
AJ ~~BJ~~	~~RH~~	AT	14030 / 720.85	290 / 0.00	50. / 0.02	191. / 0.0	11602. / 720.86	2.12 / 0.26	82. / 0.05	262. / 0.000	*XS*
AK ~~BK~~	~~RI~~	AT	14520 / 720.87	490 / 0.04	50. / 0.04	36. / 0.02	2758. / 720.91	1.27 / 1.40	152. / 0.20	192. / -0.001	*XS*
AL ~~BL~~	~~RJ~~	AT	15080 / 721.05	560 / 0.03	50. / 0.16	39. / 0.0	3090. / 721.08	1.24 / 1.29	140. / 0.18	180. / 0.001	*XS*
AM ~~BM~~	~~RK~~	AT	15410 / 721.11	330 / 0.01	50. / 0.04	76. / 0.0	6578. / 721.12	1.34 / 0.66	15. / 0.09	55. / -0.000	*XS*

FW

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 1.DATE= 2/10/77

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 FLINT RIVER                                HOLTSLAG 46  6  2 99 12
2  5295  67620  67803  67873  67990  67657  67879
3  5300 AP     1  28  3  667   38450  1  3
4  5305   9500  13250  14900  17900  10200  14900
5  5310    -350  1  6940 -320  1  6920 -308  1  6900 -285  1  6800 -272  1  6780
5  5311    -255  1  6760 -245  1  6740 -230  2  6720 -220  2  6722 -208  2  6680
5  5312    -195  2  6654 -180  2  6655 -160  2  6656 -140  2  6654 -120  2  6652
5  5313    -100  2  6648  -80  2  6654  -60  2  6654  -48  2  6634  -38  2  6679
5  5314     -18  3  6750    0  3  6749  125  3  6750  230  3  6760  250  3  6780
5  5315     265  3  6800  303  3  6900  345  3  7000
6  5320  1  2 060 060  1  2 032 032  1  2 050 050
3  5400 AQ     0  25  3  668   39370  1  3
5  5410       0  1  6920   30  1  6900   40  1  6880   60  1  6860  125  1  6840
5  5411     150  1  6820  376  1  6800  635  1  6780 1030  1  6760 1100  1  6740
5  5412    1112  1  6720 1140  2  6700 1160  2  6685 1175  2  6670 1195  2  6674
5  5413    1215  2  6669 1230  2  6672 1245  2  6672 1265  2  6672 1285  2  6670
5  5414    1300  2  6686 1318  3  6700 1338  3  6800 1355  3  6900 1372  3  7000
6  5420  1  2 070 070  1  2 032 032  1  2 080 080
3  5500 AR     0  27  3  671   40535  1  3
5  5510       0  1  6900   20  1  6880  100  1  6860  165  1  6840  380  1  6820
5  5511     570  1  6800  680  1  6780  965  1  6780  985  2  6760  992  2  6740
5  5512    1000  2  6713 1015  2  6692 1030  2  6695 1045  2  6693 1060  2  6695
5  5513    1075  2  6694 1090  2  6693 1105  2  6686 1125  2  6694 1140  2  6689
5  5514    1160  2  6692 1185  2  6702 1195  2  6713 1205  3  6720 1235  3  6800
5  5515    1247  3  6900 1272  3  7000
6  5520  1  2 080 080  1  2 034 034  1  2 070 070
3  5600 AS     0  25  3  671   41710  1  3
5  5610    -310  1  6920 -300  1  6900 -290  1  6800 -260  1  6787 -250  2  6764
5  5611    -236  2  6719 -218  2  6698 -200  2  6695 -180  2  6695 -160  2  6701
5  5612    -140  2  6701 -120  2  6699 -100  2  6706  -80  2  6706  -64  2  6719
5  5613     -42  3  6768    0  3  6768   80  3  6760  200  3  6780  410  3  6800
5  5614     570  3  6820  615  3  6840  672  3  6860  730  3  6880  795  3  6900
6  5620  1  2 070 070  1  2 039 039  1  2 050 050
3  5700 AT     0  21  3  673   42695  1  3
5  5710    -300  1  6900 -285  1  6800 -260  2  6774 -252  2  6730 -230  2  6720
5  5711    -210  2  6715 -190  2  6718 -170  2  6716 -150  2  6714 -130  2  6700
5  5712    -110  2  6706  -90  2  6717  -72  2  6730  -56  3  6778    0  3  6794
5  5713     300  3  6800  380  3  6820  542  3  6840  580  3  6860  615  3  6880
5  5714     640  3  6900
6  5720  1  2 070 070  1  2 037 037  1  2 040 040
3  5800 AU     1  31  3  675   43850  1  3
4  5805   9100  12750  14400  17200   9730  14400
5  5810    -265  1  7040 -250  1  7020 -232  1  7000 -218  1  6900 -208  1  6880
5  5811    -200  1  6860 -183  1  6840  -55  1  6820    0  1  6792   86  2  6779
```

Flint River

34690 AP-BS

35610

36775

37950

38935

40090

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 2 DATE= 2/10/77

*** INPUT CARD PRINTOUT ***

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5  5812     104  2  6740  120  2  6721  140  2  6724  160  2  6712  180  2  6714
5  5813     200  2  6722  220  2  6718  240  2  6718  260  2  6723  280  2  6721
5  5814     292  2  6740  300  3  6771  315  3  6820  330  3  6860  345  3  6900
5  5815     380  3  6920  405  3  6940  418  3  6960  435  3  6980  440  3  7000
5  5816     457  3  7020
6  5820  1  2 050 050  1  2 039 039  1  2 040 040
3  5900 AV    0  30  3  673   44640  1  3
5  5910    -765  1  7000 -745  1  6980 -715  1  6960 -530  1  6940 -390  1  6920
5  5911    -340  1  6900 -300  1  6880 -170  1  6860 -155  1  6840 -140  1  6820
5  5912     -55  1  6800  -25  1  6820    0  1  6818   24  2  6807   46  2  6740
5  5913      60  2  6721   75  2  6724   45  2  6720  115  2  6722  135  2  6721
5  5914     155  2  6725  170  2  6724  185  2  6722  195  2  6722  220  2  6740
5  5915     232  3  6760  296  3  6804  320  3  6900  330  3  6960  450  3  6983
6  5920  1  2 050 050  1  2 039 039  1  2 050 050
3  6000 AW    0  35  3  674   45540  1  3
5  6010    -350  1  7000 -270  1  6980 -230  1  6960 -195  1  6940 -160  1  6920
5  6011    -150  1  6900 -135  1  6880 -125  1  6860 -105  1  6840  -62  1  6820
5  6012       0  1  6806   40  1  6793   56  2  6774   60  2  6749   75  2  6721
5  6013      90  2  6716  105  2  6705  120  2  6705  135  2  6707  150  2  6709
5  6014     165  2  6711  180  2  6715  190  2  6716  203  2  6714  210  2  6734
5  6015     218  2  6748  224  3  6783  336  3  6824  350  3  6860  410  3  6880
5  6016     422  3  6900  450  3  6920  530  3  6940  615  3  6960  870  3  6980
6  6020  1  2 050 050  1  2 032 032  1  2 040 040
3  6100 AX    0  30  3  674   46560  1  3
5  6110    -365  1  7100 -355  1  7000 -345  1  6900 -300  2  6810 -270  2  6754
5  6111    -250  2  6732 -230  2  6725 -210  2  6723 -190  2  6720 -170  2  6720
5  6112    -150  2  6728 -130  2  6729 -115  2  6730 -100  2  6733  -80  2  6753
5  6113     -74  3  6786  -46  3  6843    0  3  6831   74  3  6814  180  3  6820
5  6114     240  3  6840  280  3  6860  300  3  6880  330  3  6900  350  3  6920
5  6115     400  3  6940  550  3  6960  595  3  6980  680  3  7000  755  3  7020
6  6120  1  2 060 060  1  2 032 032  1  2 040 040
3  6200 AY    0  39  3  675   47625  1  3
5  6210    -450  1  7100 -440  1  7080 -422  1  7060 -413  1  7040 -400  1  7020
5  6211    -395  1  7000 -380  1  6980 -372  1  6960 -360  1  6940 -352  1  6920
5  6213    -338  1  6900 -320  1  6880 -280  1  6860 -265  1  6840 -255  1  6820
5  6214    -245  1  6800 -228  2  6777 -214  2  6754 -200  2  6722 -185  2  6721
5  6215    -165  2  6723 -145  2  6719 -135  2  6719 -110  2  6721  -90  2  6721
5  6216     -70  2  6726  -56  2  6753  -40  3  6804    0  3  6816  130  3  6800
5  6217     155  3  6820  195  3  6900  215  3  6980  255  3  7000  345  3  7020
5  6218     420  3  7040  450  3  7060  485  3  7080  575  3  7100
6  6220  1  2 060 060  1  2 034 034  1  2 045 045
3  6300 AZ    0  37  3  675   48610  1  3
5  6310    -630  1  7100 -615  1  7080 -592  1  7060 -583  1  7040 -570  1  7020
5  6311    -555  1  7000 -545  1  6980 -530  1  6960 -340  1  6960 -325  1  6920
5  6312    -312  1  6900 -300  1  6860 -245  1  6840 -218  1  6820 -214  2  6798
```

Flint River

40880

41780

42800

43865

44850

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 3,DATE= 2/10/77

*** INPUT CARD PRINTOUT ***

```
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5  6313    -178  2  6757 -165  2  6737 -150  2  6730 -135  2  6725 -120  2  6723
5  6314    -105  2  6724  -90  2  6720  -75  2  6720  -60  2  6739  -44  2  6757
5  6315     -30  3  6815    0  3  6825   86  3  6843   95  3  6860  110  3  6860
5  6316     125  3  6880  148  3  7000  155  3  7020  175  3  7040  245  3  7060
5  6317     290  3  7080  310  3  7100
6  6320  1  2 060 060  1  2 034 034  1  2 045 045
3  6400 BA    0  27  3  675   49640  1  3
5  6410    -490  1  7100 -465  1  7080 -425  1  7060 -405  1  7040 -380  1  7020
5  6411    -375  1  7000 -342  1  6900 -330  1  6880 -320  1  6860 -265  1  6840
5  6412    -212  1  6820 -206  2  6816 -194  2  6760 -180  2  6725 -165  2  6731
5  6413    -145  2  6729 -130  2  6732 -115  2  6736  -95  2  6737  -75  2  6735
5  6414     -60  2  6737  -46  2  6760  -40  3  6801    0  3  6796   25  3  6900
5  6415      40  3  7000   55  3  7020
6  6420  1  2 070 070  1  2 034 034  1  2 050 050
3  6500 BA BB 2  16  1  674   49640       30  7010 1.1
5  6510       6  1  7042    6  1  6980   12  1  6980   56  1  6758   75  1  6744
5  6511      95  1  6730  125  1  6734  150  1  6729  175  1  6729  192  1  6730
5  6512     220  1  6739  247  1  6754  282  1  6926  288  1  6926  288  1  6985
5  6513       6 -9  7042
6  6520  1  2 028 028
3  6600 BA BD 4  10  2   65          1  2          1 1                  1
5  6610       0  1  7100   55  1  7080   75  1  7072  250  2  7044  370  2  7015
5  6611     705  2  7020  790  2  7040  880  2  7060  950  2  7080 1050  2  7100
3  6700 BB    5  22  2  675   50090 99  2
5  6710    -230  1  7000 -210  1  6900 -190  1  6880 -174  1  6821 -166  1  6762
5  6711    -134  1  6742 -114  1  6742  -94  1  6748  -68  1  6742  -40  1  6762
5  6712     -28  2  6823    0  2  6829   25  2  6832   50  2  6840   90  2  6860
5  6713     110  2  6880  125  2  6900  133  2  6920  150  2  6940  200  2  6960
5  6714     345  2  6980  400  2  7000
6  6720  1  2 032 032  1  2 050 050
3  6800 BC    0  25  3  675   51030  1  3
5  6810    -265  1  7100 -247  1  7000 -232  1  6900 -226  2  6809 -212  2  6769
5  6811    -192  2  6755 -164  2  6745 -138  2  6738 -114  2  6739  -90  2  6736
5  6812     -68  2  6740  -48  2  6770  -20  3  6845    0  3  6846   50  3  6860
5  6813     202  3  6880  217  3  6900  225  3  6920  235  3  6940  242  3  6960
5  6814     255  3  6980  325  3  7000  398  3  7020  415  3  7040  430  3  7060
6  6820  1  2 060 060  1  2 034 034  1  2 050 050
3  6900 BD    0  41  3  675   51805  1  3
5  6910    -450  1  7200 -430  1  7180 -402  1  7160 -395  1  7140 -382  1  7120
5  6911    -372  1  7100 -360  1  7080 -338  1  7060 -317  1  7040 -285  1  7020
5  6912    -250  1  7000 -235  1  6980 -225  1  6940 -218  1  6920 -205  1  6900
5  6913    -178  2  6800 -164  2  6772 -160  2  6741 -145  2  6738 -130  2  6734
5  6914    -110  2  6737  -90  2  6741  -75  2  6755  -55  2  6748  -34  2  6772
5  6915     -25  3  6839    0  3  6839   35  3  6860  145  3  6880  190  3  6900
5  6916     228  3  6920  240  3  6940  255  3  6960  270  3  6980  290  3  7000
```

Flint River

45880

46330

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 35.DATE= 2/ 7/77

WATER-SURFACE PROFILE FOR: FLINT RIVER HOLTSLAG

SECID	AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	V	ALPHA / FN	LFW / ACC	REW / *ID*
A	AT 3990 / 645.88	0 / 0.42	14900. /	3102. /	562167. / 646.30	1.18 / 4.80	-358. / 0.28	-14. /	*IS*
B	AT 4812 / 646.50	822 / 0.51	14900. / 0.07	3148. / 0.05	485534. / 647.02	1.47 / 4.73	-450. / 0.32	20. / -0.000	*XS*
C	AT 5703 / 647.28	891 / 0.44	14900. / 0.71	2996. / 0.0	574390. / 647.73	1.15 / 4.97	-61. / 0.28	268. / -0.000	*XS*
D	AT 6190 / 647.69	487 / 0.31	14900. / 0.27	3371. / 0.0	694796. / 648.00	1.02 / 4.42	-298. / 0.23	-0. / 0.000	*XS*
E	AT 7065 / 648.15	875 / 0.59	14900. / 0.60	2479. / 0.14	468263. / 648.73	1.05 / 6.01	-255. / 0.33	10. / -0.000	*XS*
F	AT 7845 / 649.23	780 / 0.43	14900. / 0.92	3029. / 0.0	401533. / 649.65	1.13 / 4.92	-295. / 0.29	92. / 0.000	*XS*
G	AT 8885 / 650.50	1040 / 0.45	14900. / 1.28	2903. / 0.01	447562. / 650.95	1.11 / 5.13	-296. / 0.29	224. / -0.000	*XS*
H	AT 9640 / 651.36	755 / 0.78	14900. / 1.03	2465. / 0.16	363740. / 652.15	1.38 / 6.04	-210. / 0.37	206. / -0.000	*XS*
I	AT 10665 / 652.92	1025 / 0.34	14900. / 1.12	4338. / 0.0	558357. / 653.27	1.87 / 3.43	-511. / 0.24	206. / 0.000	*XS*
J	AT 11675 / 653.60	1010 / 0.28	14900. / 0.62	4598. / 0.0	646513. / 653.89	1.74 / 3.24	323. / 0.22	1204. / -0.000	*XS*
K	AT 12500 / 654.10	825 / 0.52	14900. / 0.61	3016. / 0.12	463122. / 654.62	1.36 / 4.94	-243. / 0.29	197. / 0.004	*XS*
L	AT 13345 / 655.13	845 / 0.58	14900. / 1.05	3576. / 0.03	385883. / 655.70	2.13 / 4.17	50. / 0.32	893. / 0.000	*XS*
M	AT 14185 / 656.34	840 / 0.21	14900. / 0.85	5227. / 0.0	567970. / 656.55	1.70 / 2.85	10. / 0.21	922. / -0.000	*XS*
N	AT 14985 / 656.82	800 / 0.20	14900. / 0.47	4876. / 0.0	665789. / 657.02	1.41 / 3.06	144. / 0.18	715. / -0.000	*XS*
O	AT 15895 / 657.34	910 / 0.37	14900. / 0.61	3430. / 0.08	499120. / 657.71	1.27 / 4.34	-96. / 0.25	339. / -0.000	*XS*

100-YR

```
N     AT   14985 /   800 /  14900. /  4876. /  665789. / 1.41 /  144. /  715.
   656.82 /   0.20 /   0.47 /   0.0  /  657.02 /   3.06 /   0.18 / -0.000  *XS*
-----------------------------------------------------------------------------
O     AT   15895 /   910 /  14900. /  3430. /  499120. / [illegible] /  -96. /  339.
   657.34 /   0.37 /   0.61 /   0.08 /  657.71 /   4.34 /   0.25 / -0.000  *XS*
-----------------------------------------------------------------------------
```

```
USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT=   36,DATE= 2/ 7/77

=============================================================================
WATER-SURFACE PROFILE FOR: FLINT RIVER                              HOLTSLAG
PAGE  2 OF  4
=============================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG /     V  /    FN  /   ACC   *ID*
=============================================================================
P     AT   16645 /   750 /  14900. /  3399. /  604982. / 1.39 / -121. /  260.
   657.87 /   0.42 /   0.55 /   0.02 /  658.29 /   4.38 /   0.27 / -0.000  *XS*
-----------------------------------------------------------------------------
Q     AT   17385 /   740 /  14900. /  3920. /  658499. / 1.42 /   28. /  431.
   658.37 /   0.32 /   0.41 /   0.0  /  658.69 /   3.80 /   0.25 / -0.011  *XS*
-----------------------------------------------------------------------------
R     AT   18285 /   900 /  14900. /  4034. /  892660. / 1.14 /  510. /  888.
   658.79 /   0.24 /   0.34 /   0.0  /  659.03 /   3.69 /   0.19 / -0.000  *XS*
-----------------------------------------------------------------------------
S     AT   19130 /   845 /  14900. /  2895. /  551892. / 1.51 /  -37. /  418.
   658.98 /   0.62 /   0.38 /   0.19 /  659.60 /   5.15 /   0.33 / -0.000  *XS*
-----------------------------------------------------------------------------
T     AT   19885 /   755 /  14900. /  3841. /  517426. / 1.76 /  281. /  820.
   659.78 /   0.41 /   0.59 /   0.0  /  660.19 /   3.88 /   0.26 / -0.000  *XS*
-----------------------------------------------------------------------------
U     AT   20700 /   815 /  14900. /  3921. /  463824. / 1.43 / -252. /  366.
   660.62 /   0.32 /   0.75 /   0.0  /  660.94 /   3.80 /   0.24 / -0.001  *XS*
-----------------------------------------------------------------------------
V     AT   21680 /   980 /  14900. /  4049. /  541942. / 1.34 /  -24. /  470.
   661.53 /   0.28 /   0.87 /   0.0  /  661.81 /   3.68 /   0.22 / -0.000  *XS*
-----------------------------------------------------------------------------
W     AT   22340 /   660 /  14900. /  3864. /  526054. / 1.25 /  367. /  787.
   662.03 /   0.29 /   0.51 /   0.00 /  662.32 /   3.86 /   0.24 / -0.010  *XS*
-----------------------------------------------------------------------------
X     AT   23270 /   930 /  14900. /  3772. /  411137. / 1.90 / -345. /  184.
   662.90 /   0.46 /   0.95 /   0.09 /  663.36 /   3.95 /   0.30 / -0.000  *XS*
-----------------------------------------------------------------------------
Y     AT   23810 /   540 /  14900. /  5340. /  794207. / 1.15 /   68. /  537.
   663.59 /   0.14 /   0.37 /   0.0  /  663.72 /   2.79 /   0.15 / -0.000  *XS*
-----------------------------------------------------------------------------
Z     AT   24720 /   910 /  14900. /  3513. /  484618. / 1.26 /   37. /  670.
   664.00 /   0.35 /   0.52 /   0.11 /  664.36 /   4.24 /   0.20 /  0.000  *XS*
-----------------------------------------------------------------------------
AA    AT   25395 /   675 /  14900. /  2000. /  331753. / 1.16 / -161. /   93.
   664.61 /   1.00 /   0.93 /   0.32 /  665.61 /   7.45 /   0.43 / -0.000  *XS*
-----------------------------------------------------------------------------
AB    AT   26300 /   905 /  14900. /  3820. /  561449. / 1.32 /  174. /  607.
   666.38 /   0.31 /   1.08 /   0.0  /  666.69 /   3.90 /   0.26 / -0.000  *XS*
-----------------------------------------------------------------------------
AC    AT   27095 /   795 /  14900. /  4233. /  677935. / 1.40 /  377. /  913.
   666.88 /   0.27 /   0.46 /   0.0  /  667.15 /   3.52 /   0.22 / -0.007  *XS*
-----------------------------------------------------------------------------
AD    AT   28160 /  1065 /  14900. /  4824. /  564903. / 2.19 /  355. / 1173.
   667.47 /   0.33 /   0.62 /   0.03 /  667.80 /   3.09 /   0.27 /  0.000  *XS*
-----------------------------------------------------------------------------
```

100-YR

```
==================================================================================
WATER-SURFACE PROFILE FOR: FLINT RIVER                                  HOLTSLAG
PAGE  3 OF  4
==================================================================================
SECTO AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
AE     AT   29210 /  1050 /  14900. /  4312. /  507589. / 2.53 /  356. / 1070.
   668.22 /   0.47 /   0.81 /   0.07 /  668.69 /    3.46 /   0.32 /  0.009  *XS*
----------------------------------------------------------------------------------
AF     AT   30185 /   975 /  14900. /  3000. /  406650. / 1.92 /  275. /  972.
   669.14 /   0.74 /   1.05 /   0.13 /  669.87 /    4.97 /   0.37 / -0.000  *XS*
----------------------------------------------------------------------------------
AG     AT   30940 /   755 /  14900. /  2956. /  395608. / 1.62 /  110. /  610.
   670.28 /   0.64 /   1.04 /   0.0  /  670.92 /    5.04 /   0.35 / -0.000  *XS*
----------------------------------------------------------------------------------
AH     AT   31970 /  1030 /  14900. /  1994. /  303590. / 1.33 /  345. /  545.
   671.92 /   1.15 /   1.90 /   0.26 /  673.08 /    7.47 /   0.45 /  0.000  *XS*
----------------------------------------------------------------------------------
AI     AT   32570 /   600 /  14900. /  2265. /  362809. / 1.11 /  921. / 1122.
   673.54 /   0.74 /   1.21 /   0.0  /  674.29 /    6.58 /   0.34 / -0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==============================
AI BR AT   32570 /        /  14926. /  2348. /  531544. / 1.00 /    0. /  184.
   673.54 /   0.63 /       ...1...  (-.001)    /    6.36 /   0.31 /          *BO*
----------------------------------------------------------------------------------
 NO ROAD OVERFLOW
                                                                            *RG*
----------------------------------------------------------------------------------
AJ     AT   32835 /   265 /  14900. /  2725. /  436905. / 1.22 / -165. /  185.
   674.09 /   0.57 /   0.37 /   0.0  /  674.66 /    5.47 /   0.29 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = 0.01 / F = 0.02 / K* = 0.02 /  2729. /  437665. / 1.22 / -165. /  185.
   674.10 /   0.57 /                 /  674.67 /    5.46 /   0.29 /          *AS*
========================== END BRIDGE ANALYSIS ================================
AK     AT   33820 /   985 /  14900. /  3244. /  436217. / 1.61 /   42. /  719.
   675.29 /   0.53 /   1.15 /   0.0  /  675.81 /    4.59 /   0.29 / -0.000  *XS*
----------------------------------------------------------------------------------
AL     AT   34885 /  1045 /  14900. /  3340. /  433707. / 1.47 /   59. /  512.
   676.59 /   0.45 /   1.23 /   0.0  /  677.04 /    4.46 /   0.29 / -0.000  *XS*
----------------------------------------------------------------------------------
AM     AT   35865 /  1000 /  14900. /  3690. /  661608. / 1.58 / -195. /  240.
   677.42 /   0.40 /   0.77 /   0.0  /  677.82 /    4.04 /   0.27 / -0.000  *XS*
----------------------------------------------------------------------------------
AN     AT   36500 /   635 /  14900. /  3244. /  690482. / 1.39 / -223. /  212.
   677.70 /   0.45 /   0.31 /   0.03 /  678.15 /    4.59 /   0.27 / -0.000  *XS*
----------------------------------------------------------------------------------
AO     AT   37555 /  1055 /  14900. /  4068. /  655401. / 1.71 / -283. /  369.
   678.31 /   0.36 /   0.52 /   0.0  /  678.67 /    3.66 /   0.27 /  0.000  *XS*
----------------------------------------------------------------------------------
AP     AT   38450 /   895 /  14900. /  3657. /  700708. / 1.47 / -277. /  255.
   678.73 /   0.38 /   0.43 /   0.01 /  679.11 /    4.07 /   0.26 / -0.000  *XS*
----------------------------------------------------------------------------------
```

100-YR

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AP    AT   38450 /   895 /  14900. /  3663. /  544119. / 2.25 /  485. / 1336.
   678.73 /   0.38 /   0.43 /   0.01 / 679.11 /   4.07 /   0.26 / -0.000   *XS*
-----------------------------------------------------------------------------
```

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USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT=:  38.DATE= 2/ 7/77

=============================================================================
WATER-SURFACE PROFILE FOR: FLINT RIVER                              HOLTSLAG
PAGE  4 OF  4
=============================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
=============================================================================
AQ    AT   39370 /   920 /  14900. /  3663. /  544119. / 2.25 /  485. / 1336.
   679.17 /   0.58 /   0.54 /   0.10 / 679.75 /   4.07 /   0.34 / -0.000   *XS*
-----------------------------------------------------------------------------
```

100-YR

END OF THIS PROFILE

```
==========================================================================
WATER-SURFACE PROFILE FOR: FLINT RIVER                          HOLTSLAG
PAGE  1 OF  4
==========================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==========================================================================
AP     AT   38450 /     0 /  14900. /  3655. /  700359. / 1.47 / -277. /  255.
   678.73 /   0.38 /                 /  679.11 /    4.08 /   0.26/          *IS*
--------------------------------------------------------------------------
AQ     AT   39370 /   920 /  14900. /  3661. /  543838. / 2.25 /  485. / 1336.
   679.17 /   0.58 /   0.54 /   0.10 /  679.75 /    4.07 /   0.34 / -0.000  *XS*
--------------------------------------------------------------------------
AR     AT   40535 /  1165 /  14900. /  3191. /  498428. / 1.66 /  557. / 1235.
   680.14 /   0.56 /   0.95 /   0.0  /  680.70 /    4.67 /   0.34 /  0.000  *XS*
--------------------------------------------------------------------------
AS     AT   41710 /  1175 /  14900. /  3980. /  506907. / 1.66 / -291. /  521.
   681.39 /   0.36 /   1.03 /   0.0  /  681.75 /    3.74 /   0.29 /  0.017  *XS*
--------------------------------------------------------------------------
AT     AT   42695 /   985 /  14900. /  3258. /  470587. / 1.47 / -288. /  400.
   682.25 /   0.48 /   0.92 /   0.06 /  682.73 /    4.57 /   0.33 /  0.000  *XS*
--------------------------------------------------------------------------
AU     AT   43850 /  1155 /  14400. /  3012. /  474369. / 1.29 / -143. /  320.
   683.38 /   0.46 /   1.11 /   0.0  /  683.84 /    4.78 /   0.30 / -0.000  *XS*
--------------------------------------------------------------------------
AV     AT   44640 /   790 /  14400. /  3193. /  498347. / 1.30 / -156. /  305.
   684.13 /   0.41 /   0.69 /   0.0  /  684.54 /    4.51 /   0.29 /  0.008  *XS*
--------------------------------------------------------------------------
AW     AT   45540 /   900 /  14400. /  3237. /  634274. / 1.47 / -112. /  345.
   684.70 /   0.45 /   0.59 /   0.02 /  685.15 /    4.45 /   0.28 / -0.000  *XS*
--------------------------------------------------------------------------
AX     AT   46560 /  1020 /  14400. /  3597. /  649163. / 1.39 / -321. /  266.
   685.29 /   0.35 /   0.48 /   0.0  /  685.63 /    4.00 /   0.26 / -0.000  *XS*
--------------------------------------------------------------------------
AY     AT   47625 /  1065 /  14400. /  3564. /  661349. / 1.39 / -278. /  174.
   685.79 /   0.35 /   0.48 /   0.00 /  686.14 /    4.04 /   0.25 /  0.019  *XS*
--------------------------------------------------------------------------
AZ     AT   48610 /   985 /  14400. /  2763. /  529846. / 1.32 / -301. /  112.
   686.29 /   0.56 /   0.58 /   0.10 /  686.85 /    5.21 /   0.32 /  0.019  *XS*
--------------------------------------------------------------------------
BA     AT   49640 /  1030 /  14400. /  2864. /  563647. / 1.35 / -325. /   18.
   687.04 /   0.53 /   0.72 /   0.0  /  687.57 /    5.03 /   0.30 /  0.009  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BA BR AT   49640 /        /  14400. /  2448. /  773429. / 1.00 /   34. /  271.
   687.04 /   0.54 /        ...1...  (-.001)  /    5.88 /   0.30 /          *BO*
--------------------------------------------------------------------------
 NO ROAD OVERFLOW
                                                                          *RG*
--------------------------------------------------------------------------
BB     AT   50090 /   450 /  14400. /  2197. /  429690. / 1.27 / -188. /  103.
   687.27 /   0.85 /   0.39 /   0.16 /  688.11 /    6.56 /   0.40 / -0.000  *AS*
--------------------------------------------------------------------------
```

100-YR

WATER-SURFACE PROFILE FOR: FLINT RIVER HOLTSLAG
PAGE 1 OF 4
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
A	AT	3990	0	14900.	3003.	558144.	1.12	-314.	-14.
645.88	0.43				646.31	4.96	0.28		*IS*
B	AT	4812	822	14900.	2739.	466193.	1.20	-320.	-20.
646.52	0.55	0.70	0.06		647.07	5.44	0.33	-0.000	*XS*
C	AT	5703	891	14900.	2981.	580872.	1.12	-35.	265.
647.37	0.44	0.73	0.0		647.80	5.00	0.27	-0.000	*XS*
D	AT	6190	487	14900.	3171.	667583.	1.00	-255.	-5.
647.74	0.34	0.28	0.0		648.08	4.70	0.23	0.000	*XS*
E	AT	7065	875	14900.	2493.	475095.	1.04	-234.	6.
648.24	0.58	0.61	0.12		648.82	5.98	0.32	0.004	*XS*
F	AT	7845	780	14900.	2995.	415587.	1.06	-290.	10.
649.29	0.41	0.88	0.0		649.70	4.98	0.28	0.000	*XS*
G	AT	8865	1040	14900.	2791.	446580.	1.03	-293.	-3.
650.51	0.46	1.24	0.02		650.96	5.34	0.29	0.000	*XS*
H	AT	9640	755	14900.	2382.	364468.	1.28	-205.	95.
651.38	0.78	1.03	0.16		652.16	6.26	0.37	-0.000	*XS*
I	AT	10665	1025	14900.	3708.	533695.	1.57	-294.	206.
652.93	0.39	1.17	0.0		653.33	4.02	0.25	0.000	*XS*
J	AT	11675	1010	14900.	3959.	634813.	1.39	700.	1200.
653.68	0.31	0.66	0.0		653.99	3.76	0.23	0.001	*XS*
K	AT	12500	825	14900.	3019.	470950.	1.32	-182.	193.
654.18	0.50	0.61	0.10		654.68	4.94	0.28	-0.016	*XS*
L	AT	13345	845	14900.	3112.	393704.	1.56	55.	455.
655.18	0.56	1.01	0.03		655.74	4.79	0.32	0.016	*XS*
M	AT	14185	840	14900.	4318.	546849.	1.31	15.	465.
656.36	0.24	0.87	0.0		656.60	3.46	0.22	-0.000	*XS*
N	AT	14985	800	14900.	4611.	663658.	1.29	150.	600.
656.88	0.21	0.49	0.0		657.09	3.23	0.18	-0.000	*XS*
O	AT	15895	910	14900.	3421.	504654.	1.24	-70.	330.
657.41	0.37	0.60	0.08		657.78	4.36	0.26	0.000	*XS*

FW

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 44 DATE= 2/ 8/77

WATER-SURFACE PROFILE FOR: FLINT RIVER HOLTSLAG
PAGE 2 OF 4
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
P	AT	16645	750	14900.	3371.	608769.	1.36	-100.	250.
657.91	0.41	0.54	0.02	658.32	4.42	0.26	-0.020		*XS*
Q	AT	17385	740	14900.	3792.	658736.	1.34	77.	427.
658.41	0.32	0.41	0.0	658.73	3.93	0.25	-0.001		*XS*
R	AT	18285	900	14900.	4038.	898358.	1.13	523.	883.
658.83	0.24	0.34	0.0	659.07	3.69	0.19	-0.000		*XS*
S	AT	19130	845	14900.	2612.	548235.	1.27	-30.	245.
659.01	0.64	0.38	0.20	659.65	5.71	0.33	-0.000		*XS*
T	AT	19885	755	14900.	3794.	521463.	1.70	300.	800.
659.83	0.41	0.59	0.0	660.24	3.93	0.26	-0.000		*XS*
U	AT	20700	815	14900.	3612.	464499.	1.23	-40.	360.
660.66	0.33	0.75	0.0	660.98	4.13	0.24	0.000		*XS*
V	AT	21680	980	14900.	3862.	535966.	1.27	-15.	410.
661.56	0.29	0.87	0.0	661.86	3.86	0.22	-0.000		*XS*
W	AT	22340	660	14900.	3785.	527662.	1.21	410.	785.
662.08	0.29	0.52	0.0	662.37	3.94	0.23	-0.000		*XS*
X	AT	23270	930	14900.	3374.	412694.	1.54	-170.	180.
662.94	0.47	0.95	0.09	663.41	4.42	0.30	-0.000		*XS*
Y	AT	23810	540	14900.	5312.	796935.	1.14	75.	525.
663.64	0.14	0.36	0.0	663.78	2.81	0.15	-0.000		*XS*
Z	AT	24720	910	14900.	3507.	490058.	1.24	40.	640.
664.05	0.35	0.52	0.11	664.40	4.25	0.20	0.000		*XS*
AA	AT	25395	675	14900.	2003.	334111.	1.15	-161.	79.
664.64	0.99	0.92	0.32	665.63	7.44	0.43	0.000		*XS*
AB	AT	26300	905	14900.	3820.	563047.	1.31	175.	600.
666.39	0.31	1.07	0.0	666.70	3.90	0.26	0.002		*XS*
AC	AT	27095	795	14900.	4163.	677077.	1.36	384.	884.
666.89	0.27	0.46	0.0	667.17	3.58	0.22	-0.002		*XS*
AD	AT	28160	1065	14900.	4154.	537745.	1.89	573.	1173.
667.49	0.38	0.65	0.05	667.87	3.59	0.28	0.000		*XS*

FW

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==================================================================================
WATER-SURFACE PROFILE FOR: FLINT RIVER                                  HOLTSLAG
PAGE  3 OF  4
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
AE    AT   29210 /  1050 /  14900. /  4103. /  510399. / 2.30 /  466. / 1066.
   668.29 /   0.47 /   0.85 /   0.05 / 668.77 /   3.63 /   0.31 / 0.000   *XS*
----------------------------------------------------------------------------------
AF    AT   30185 /   975 /  14900. /  2805. /  417523. / 1.59 /  360. /  810.
   669.20 /   0.70 /   1.02 /   0.11 / 669.90 /   5.31 /   0.36 / -0.000  *XS*
----------------------------------------------------------------------------------
AG    AT   30940 /   755 /  14900. /  2781. /  391643. / 1.48 /  120. /  520.
   670.26 /   0.66 /   1.03 /   0.0  / 670.92 /   5.36 /   0.35 / -0.000  *XS*
----------------------------------------------------------------------------------
AH    AT   31970 /  1030 /  14900. /  1994. /  304148. / 1.32 /  345. /  542.
   671.94 /   1.15 /   1.92 /   0.25 / 673.09 /   7.47 /   0.45 / -0.000  *XS*
----------------------------------------------------------------------------------
AI    AT   32570 /   600 /  14900. /  2262. /  363298. / 1.10 /  925. / 1120.
   673.55 /   0.74 /   1.21 /   0.0  / 674.29 /   6.59 /   0.34 / 0.000   *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
AI BR AT   32570 /        /  14826. /  2349. /  531898. / 1.00 /    0. /  184.
   673.55 /   0.62 /       ...1...  (-.001)   /   6.31 /   0.31 /          *BO*
----------------------------------------------------------------------------------
 ROAD OVERFLOW (CFS) / LEFT       67. / RIGHT        0. /
                                                                           *RG*
----------------------------------------------------------------------------------
AJ    AT   32835 /   265 /  14900. /  2702. /  436944. / 1.20 / -120. /  180.
   674.09 /   0.57 /   0.37 /   0.0  / 674.66 /   5.51 /   0.29 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = 0.01 / E = 0.0  / K* = 0.02 /  2706. /  437772. / 1.20 / -120. /  180.
   674.11 /   0.57 /                 / 674.67 /   5.51 /   0.29 /          *AS*
========================== END BRIDGE ANALYSIS ============================
AK    AT   33820 /   985 /  14900. /  3167. /  428042. / 1.54 /   50. /  650.
   675.31 /   0.53 /   1.17 /   0.0  / 675.84 /   4.70 /   0.29 / -0.000  *XS*
----------------------------------------------------------------------------------
AL    AT   34865 /  1045 /  14900. /  3332. /  437790. / 1.44 /   65. /  490.
   676.63 /   0.45 /   1.24 /   0.0  / 677.08 /   4.47 /   0.29 / 0.000   *XS*
----------------------------------------------------------------------------------
AM    AT   35865 /  1000 /  14900. /  3591. /  658050. / 1.53 / -170. /  230.
   677.44 /   0.41 /   0.77 /   0.0  / 677.85 /   4.15 /   0.27 / -0.000  *XS*
----------------------------------------------------------------------------------
AN    AT   36500 /   635 /  14900. /  3203. /  692467. / 1.35 / -190. /  210.
   677.73 /   0.45 /   0.31 /   0.02 / 678.18 /   4.65 /   0.27 / -0.000  *XS*
----------------------------------------------------------------------------------
AO    AT   37555 /  1055 /  14900. /  3646. /  632537. / 1.53 / -280. /  220.
   678.32 /   0.40 /   0.53 /   0.0  / 678.72 /   4.09 /   0.27 / -0.000  *XS*
----------------------------------------------------------------------------------
AP    AT   38450 /   895 /  14900. /  3644. /  706955. / 1.44 / -270. /  230.
   678.79 /   0.38 /   0.44 /   0.0  / 679.16 /   4.09 /   0.26 / -0.000  *XS*
----------------------------------------------------------------------------------
```

FW

WATER-SURFACE PROFILE FOR: FLINT RIVER HOLTSLAG

```
   678.32 /   0.40 /   0.53 /   0.0  /  678.72 /   4.09 /   0.27 / -0.000  *X5*
-------------------------------------------------------------------------------
AP     AT   38450 /   895 /  14900. /  3644. /  706955.   1.44 / -270. /  230.
   678.79 /   0.38 /   0.44 /   0.0  /  679.16 /   4.[illegible]   0.26 / -0.000  *X5*
-------------------------------------------------------------------------------
```

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 46+DATE= 2/ 8/77

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===============================================================================
WATER-SURFACE PROFILE FOR: FLINT RIVER                              HOLTSLAG
PAGE  4 OF  4
*** FLOODWAY ANALYSIS *** HOR FW
===============================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /    EG  /     V  /    FN  /  ACC   *ID*
===============================================================================
AQ     AT   39370 /   920 /  14900. /  3260. /  546646. / 1.78 /  836. / 1336.
   679.21 /   0.58 /   0.53 /   0.10 /  679.79 /   4.57 /   0.34 / 0.000  *X5*
-------------------------------------------------------------------------------
```

FW

END OF THIS PROFILE

```
USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT=  61,DATE= 2/10/77

==================================================================================
WATER-SURFACE PROFILE FOR: FLINT RIVER                                  HOLTSLAG
PAGE  1 OF  4
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
AP     AT   38450 /     0 /  14900. /  3645. /  707304. / 1.44 / -270. /  230.
   678.79 /   0.38 /                 /  679.17 /    4.09 /   0.26/          *IS*
----------------------------------------------------------------------------------
AQ     AT   39370 /   920 /  14900. /  3261. /  546884. / 1.78 /  836. / 1336.
   679.22 /   0.56 /   0.53 /   0.10 /  679.80 /    4.57 /   0.34 / -0.000  *XS*
----------------------------------------------------------------------------------
AR     AT   40535 /  1165 /  14900. /  2965. /  496686. / 1.46 /  735. / 1235.
   680.18 /   0.57 /   0.95 /   0.0  /  680.75 /    5.03 /   0.34 /  0.002  *XS*
----------------------------------------------------------------------------------
AS     AT   41710 /  1175 /  14900. /  3451. /  498653. / 1.34 / -290. /  210.
   681.41 /   0.39 /   1.05 /   0.0  /  681.82 /    4.32 /   0.30 /  0.012  *XS*
----------------------------------------------------------------------------------
AT     AT   42695 /   985 /  14900. /  2985. /  463845. / 1.32 / -280. /  220.
   682.31 /   0.51 /   0.95 /   0.06 /  682.82 /    4.99 /   0.33 /  0.000  *XS*
----------------------------------------------------------------------------------
AU     AT   43850 /  1155 /  14400. /  3054. /  484697. / 1.28 / -135. /  315.
   683.48 /   0.44 /   1.10 /   0.0  /  683.92 /    4.72 /   0.30 / -0.000  *XS*
----------------------------------------------------------------------------------
AV     AT   44640 /   790 /  14400. /  3214. /  504896. / 1.29 / -150. /  300.
   684.19 /   0.40 /   0.67 /   0.0  /  684.59 /    4.48 /   0.29 / -0.000  *XS*
----------------------------------------------------------------------------------
AW     AT   45540 /   900 /  14400. /  3256. /  640397. / 1.46 / -110. /  340.
   684.75 /   0.44 /   0.58 /   0.02 /  685.19 /    4.42 /   0.28 / -0.000  *XS*
----------------------------------------------------------------------------------
AX     AT   46560 /  1020 /  14400. /  3280. /  669689. / 1.26 / -320. /  130.
   685.31 /   0.38 /   0.49 /   0.0  /  685.69 /    4.39 /   0.26 / -0.000  *XS*
----------------------------------------------------------------------------------
AY     AT   47625 /  1065 /  14400. /  3387. /  647990. / 1.34 / -275. /  125.
   685.81 /   0.38 /   0.51 /   0.0  /  686.18 /    4.25 /   0.26 / -0.010  *XS*
----------------------------------------------------------------------------------
AZ     AT   48610 /   985 /  14400. /  2768. /  532794. / 1.31 / -300. /  100.
   686.31 /   0.55 /   0.59 /   0.09 /  686.86 /    5.20 /   0.31 / -0.004  *XS*
----------------------------------------------------------------------------------
BA     AT   49640 /  1030 /  14400. /  2849. /  565472. / 1.33 / -315. /   10.
   687.06 /   0.53 /   0.71 /   0.0  /  687.59 /    5.05 /   0.30 /  0.020  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BA BR AT   49640 /       /  14400. /  2452. /  775354. / 1.00 /   34. /  271.
   687.06 /   0.54 /       ...1...  (-.001)    /    5.87 /   0.30 /         *BO*
----------------------------------------------------------------------------------
 NO ROAD OVERFLOW
                                                                            *RG*
----------------------------------------------------------------------------------
BB     AT   50090 /   450 /  14400. /  2202. /  431111. / 1.27 / -188. /  102.
   687.29 /   0.84 /   0.38 /   0.16 /  688.13 /    6.54 /   0.40 /  0.000  *AS*
----------------------------------------------------------------------------------
```

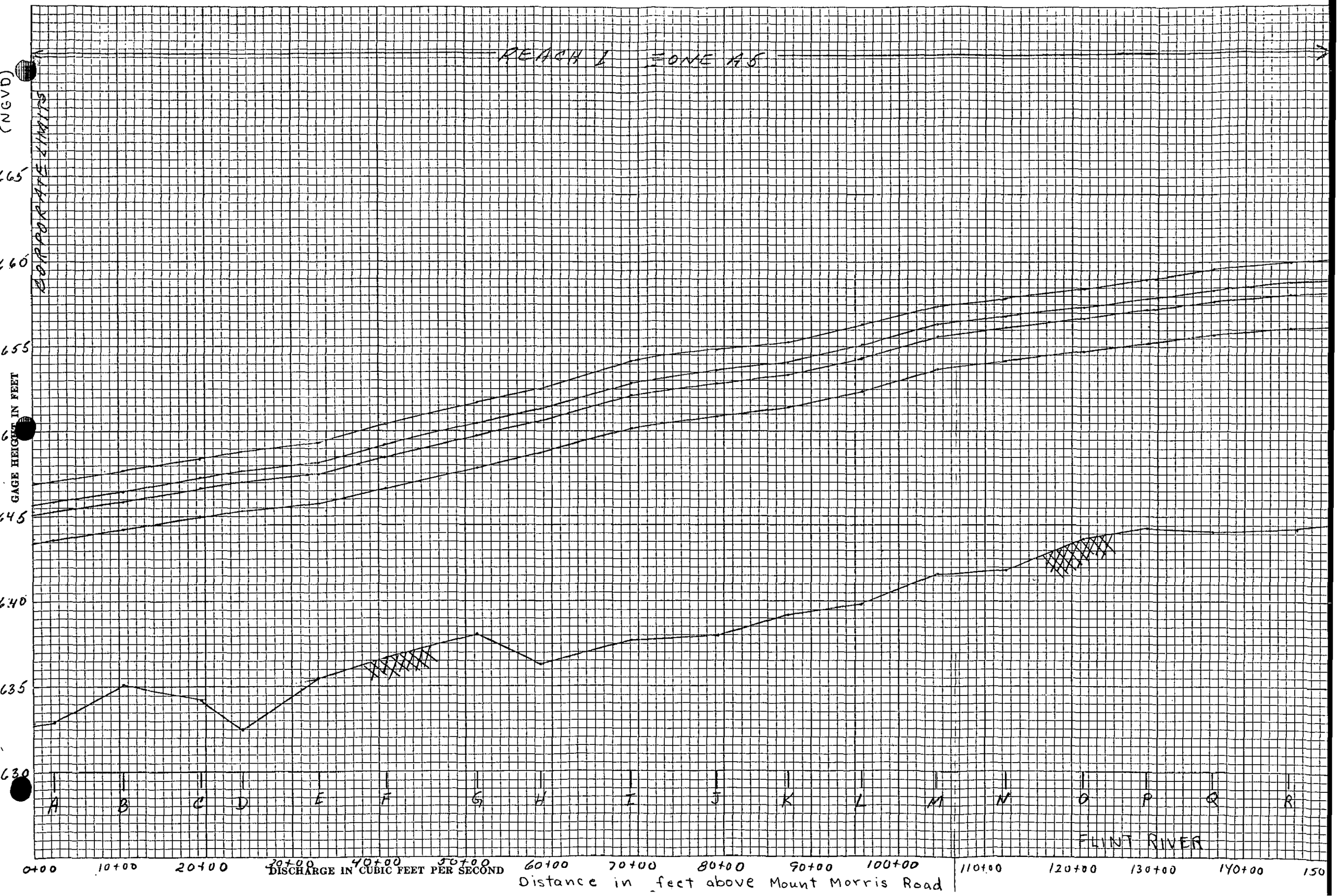
FW

9-279
(Rev. 6-63)

TOWNSHIP OF FLUSHING, MI. (GENESEE CO.)

UNITED STATES DEPARTMENT OF THE INTERIOR—GEOLOGICAL SURVEY (WATER RESOURCES DIVISION)

~~RATING CURVE FOR~~ TOWNSHIP OF FLUSHING, MICH. Sta.

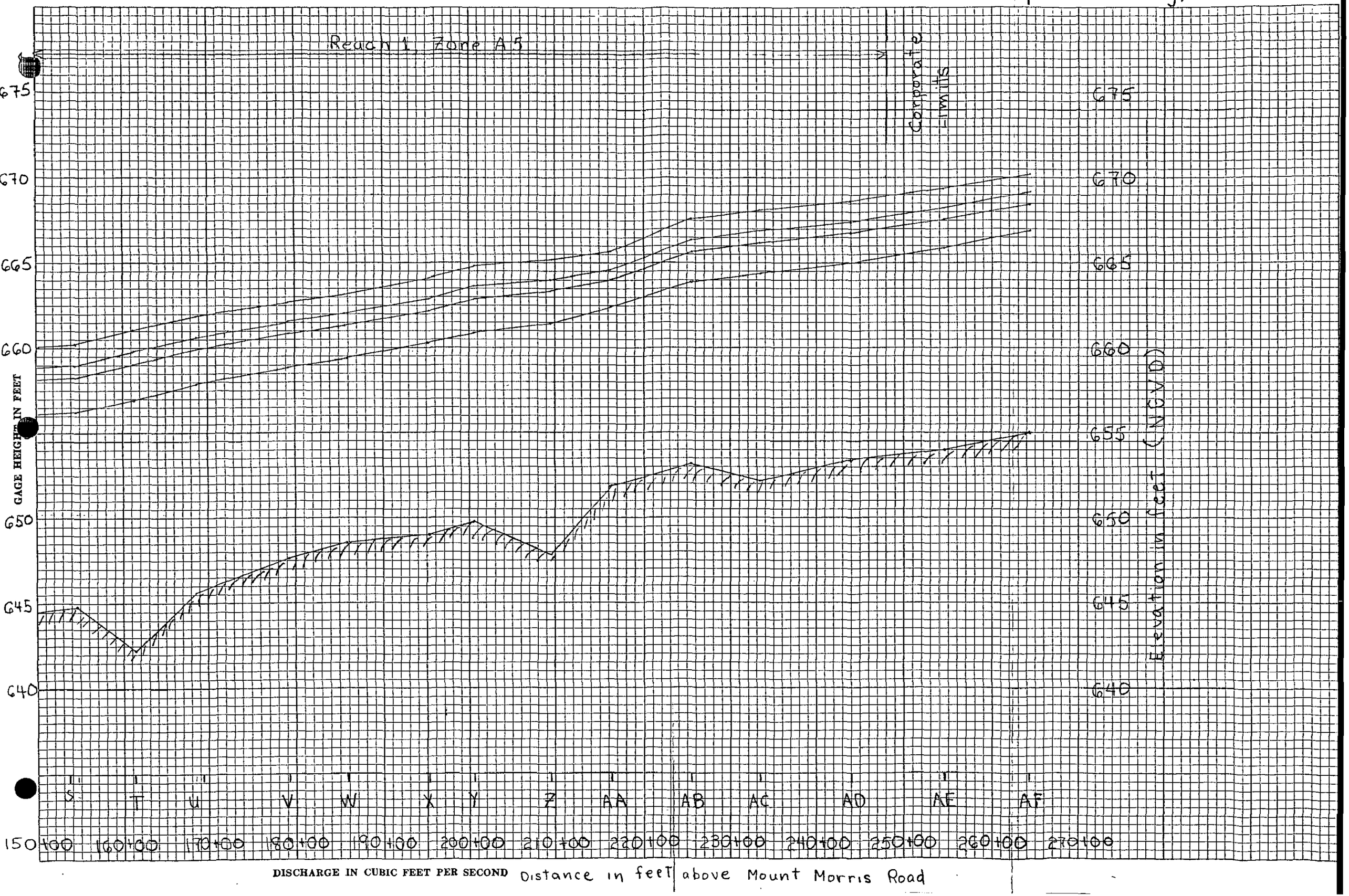


9-279
Rev. 6-63)

Township of Flushing, MI FLINT RIVER

UNITED STATES DEPARTMENT OF THE INTERIOR—GEOLOGICAL SURVEY (WATER RESOURCES DIVISION)

~~RATING CURVE FOR~~ Township of Flushing, MI Sta.

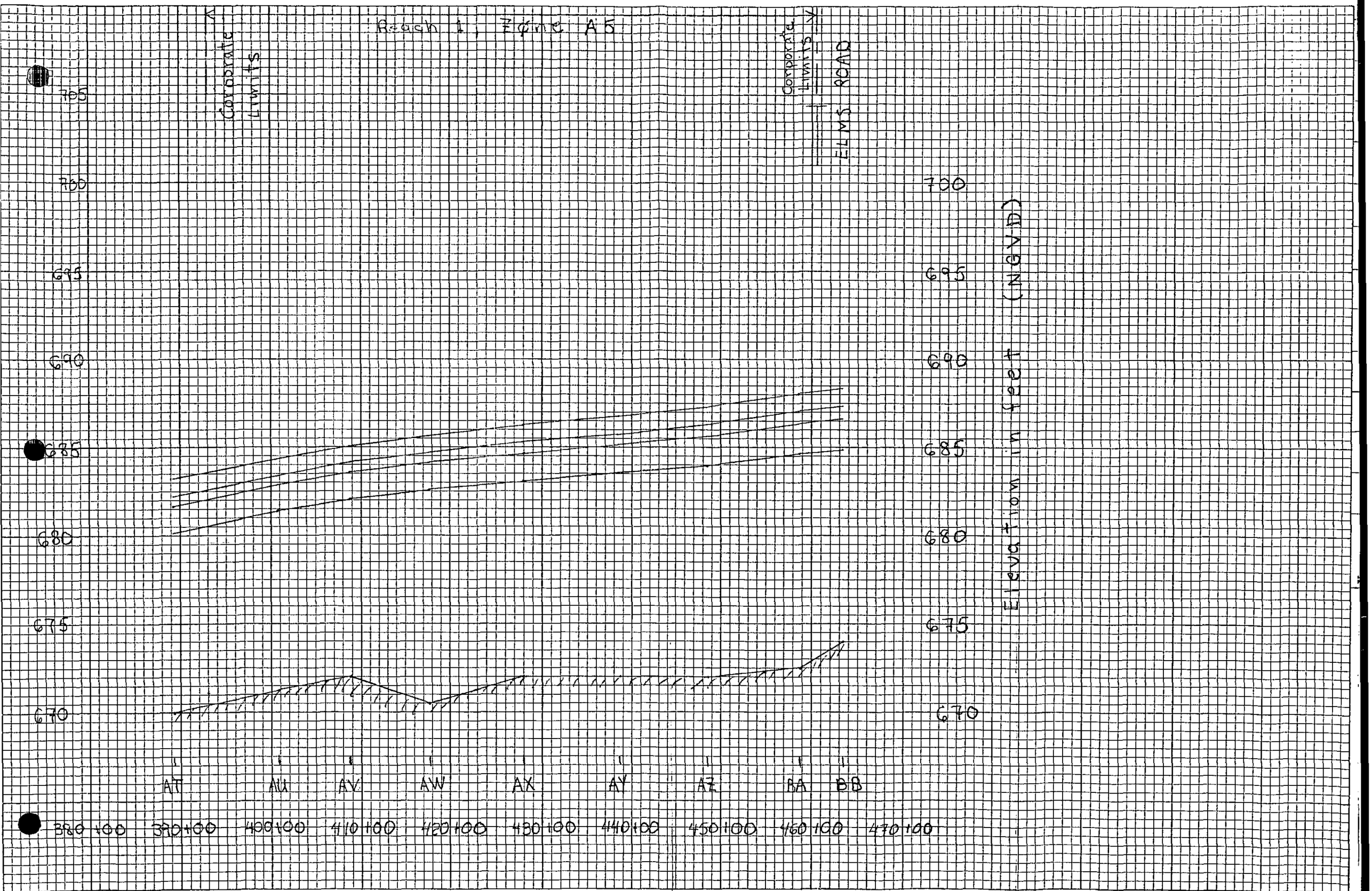


TOWNSHIP OF FLUSHING, MI. (GENESEE County)

UNITED STATES DEPARTMENT OF THE INTERIOR—GEOLOGICAL SURVEY (WATER RESOURCES DIVISION)

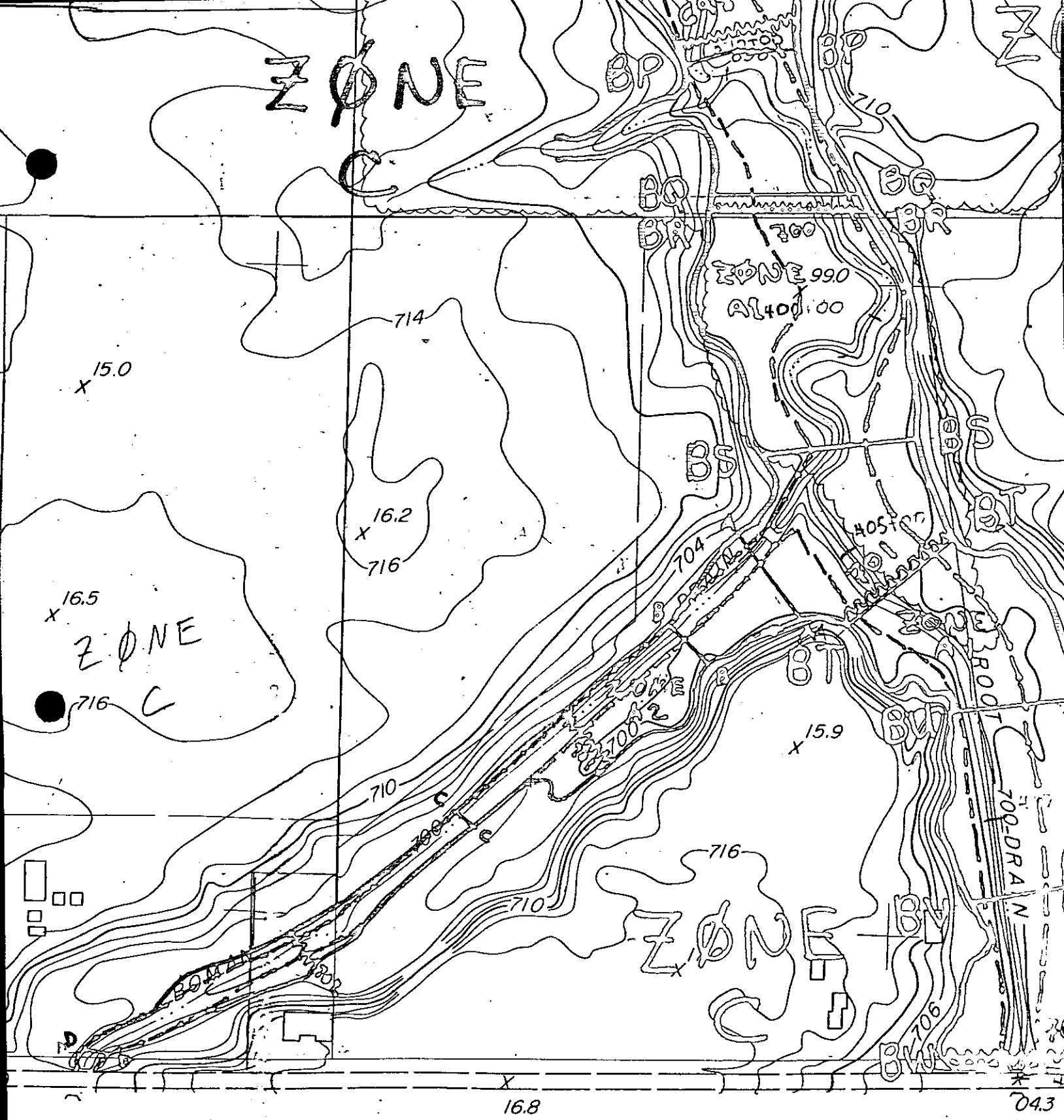
FLINT RIVER

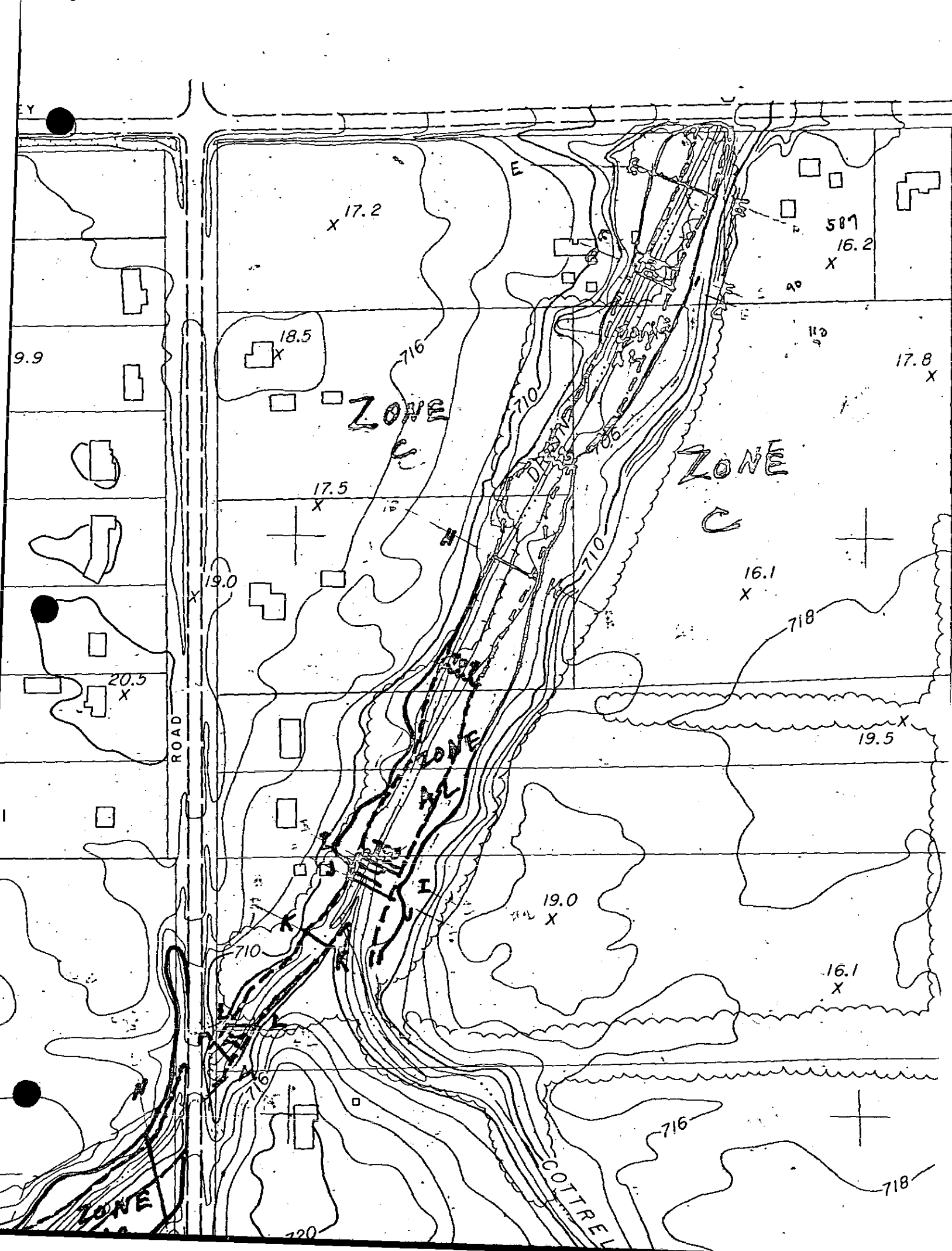
Sta.

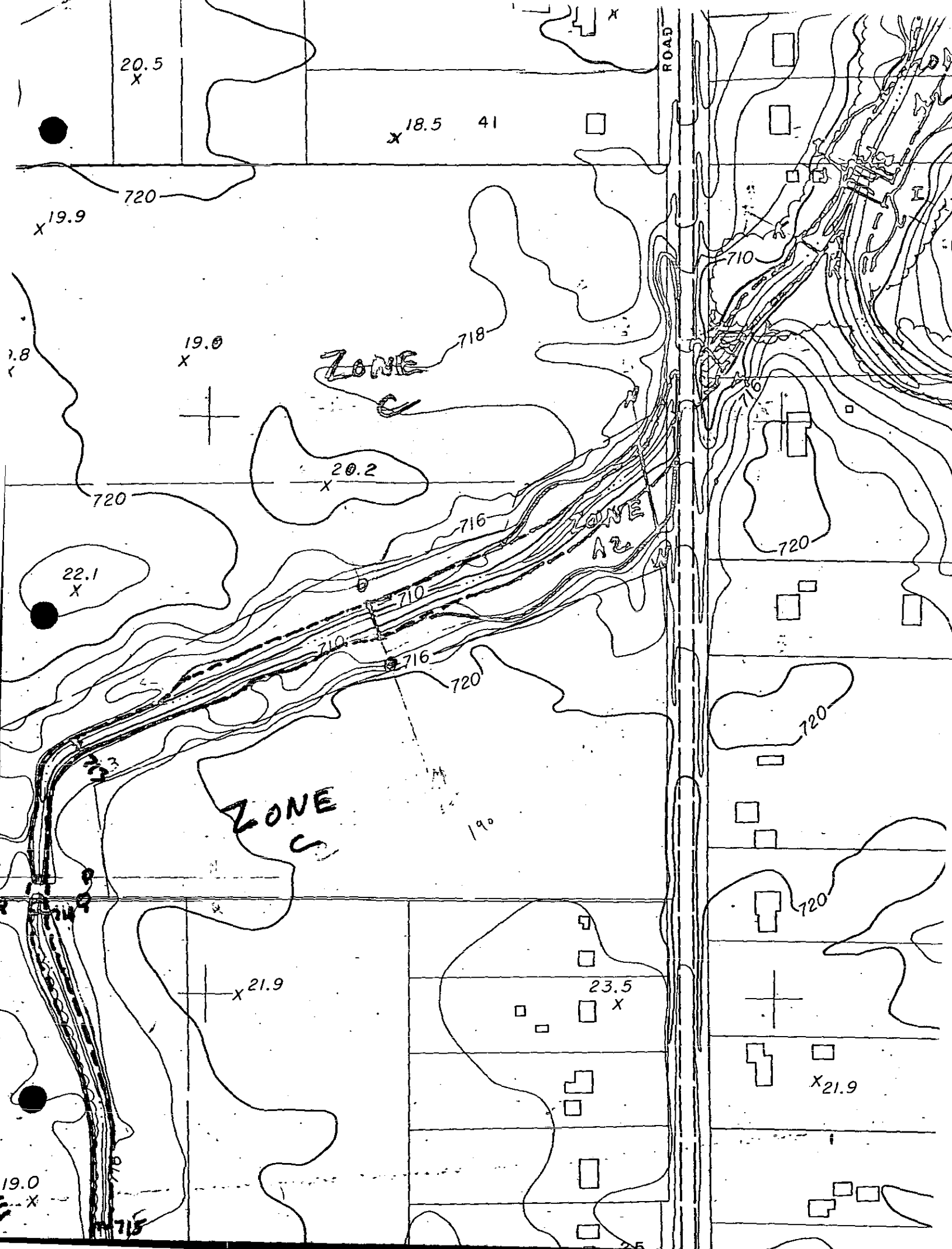


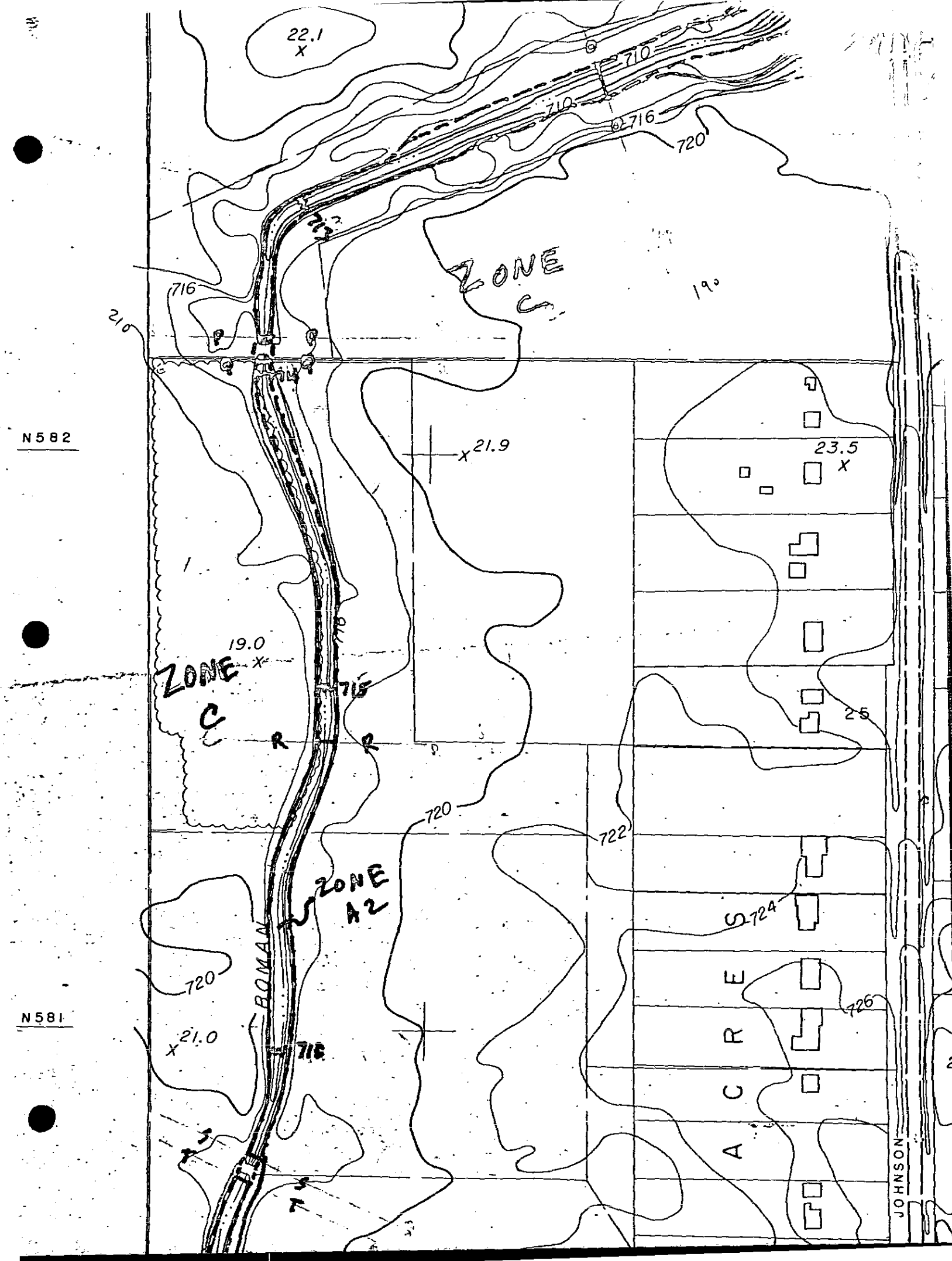
DISCHARGE IN CUBIC FEET PER SECOND

Distance in feet above Mount Morris Road


ZONE C
ZONE C
ZONE C
ZONE C
710
714
716
704
700
706
15.0
16.2
16.5
15.9
16.8
04.3
BP
BQ
BR
BS
BT
BU
BV
ROOT
700-DRAIN
E 2,136
E 2,137


ROAD
COTTREL
ZONE C
ZONE C
ZONE
ZONE
17.2
18.5
9.9
17.5
19.0
20.5
16.2
17.8
16.1
19.5
19.0
16.1
716
710
718
720
587
E
K
I


ROAD
20.5
18.5
41
720
19.9
710
718
19.0
ZONE C
716
20.2
720
ZONE A2
720
22.1
710
710
716
720
720
ZONE C
190
720
21.9
23.5
21.9
19.0
715


22.1
710
710
716
720
ZONE C
19.0
716
210
N582
21.9
23.5
19.0
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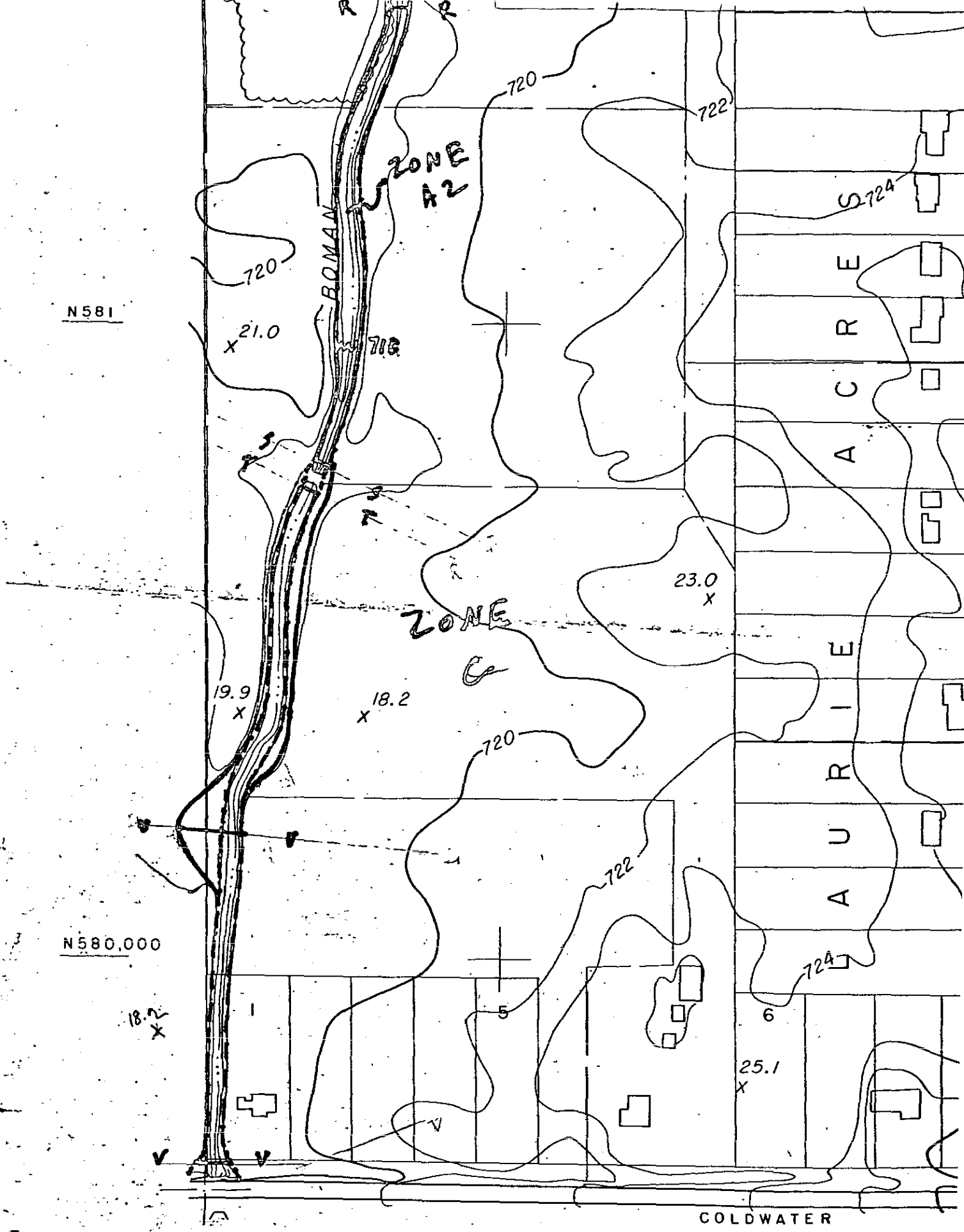
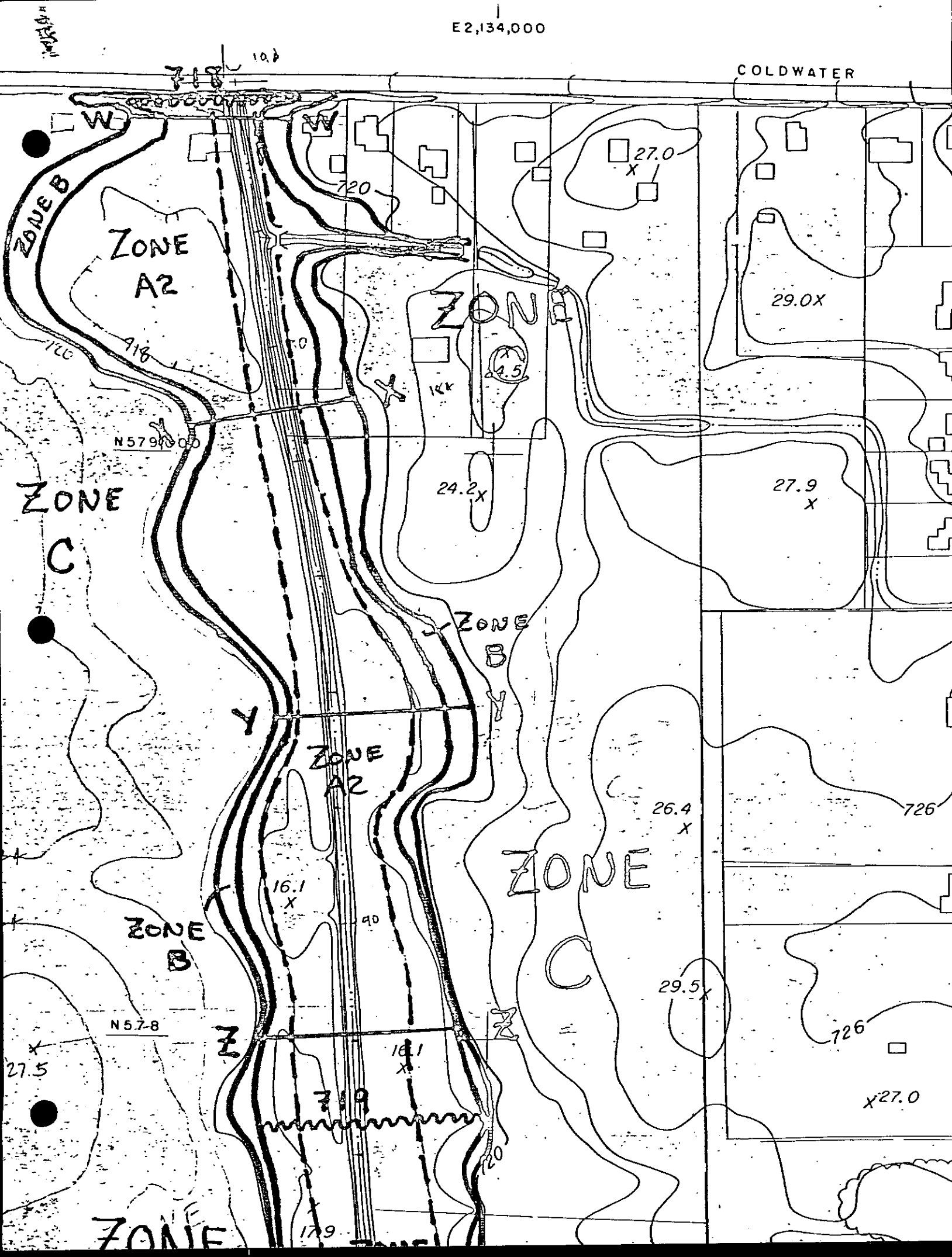
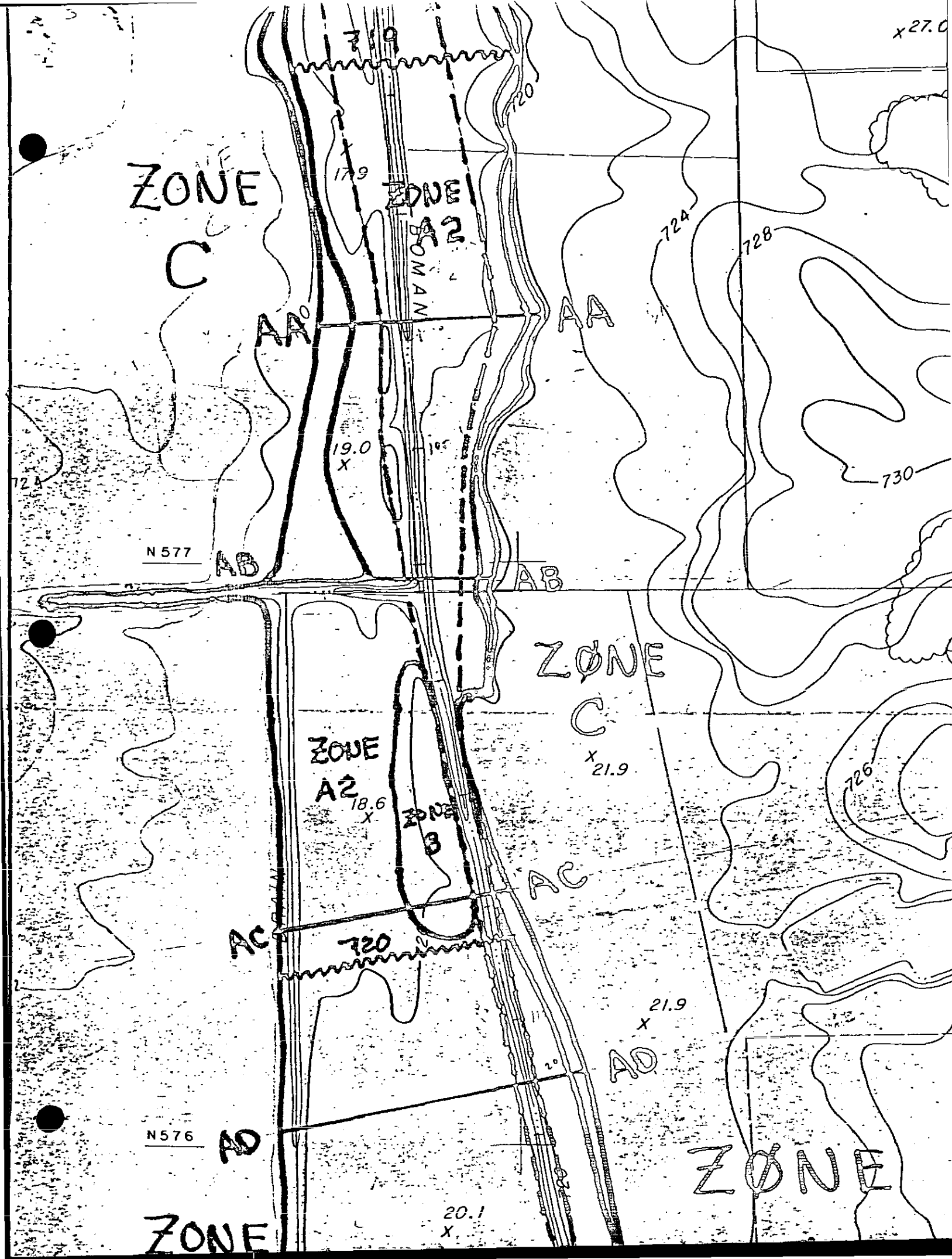
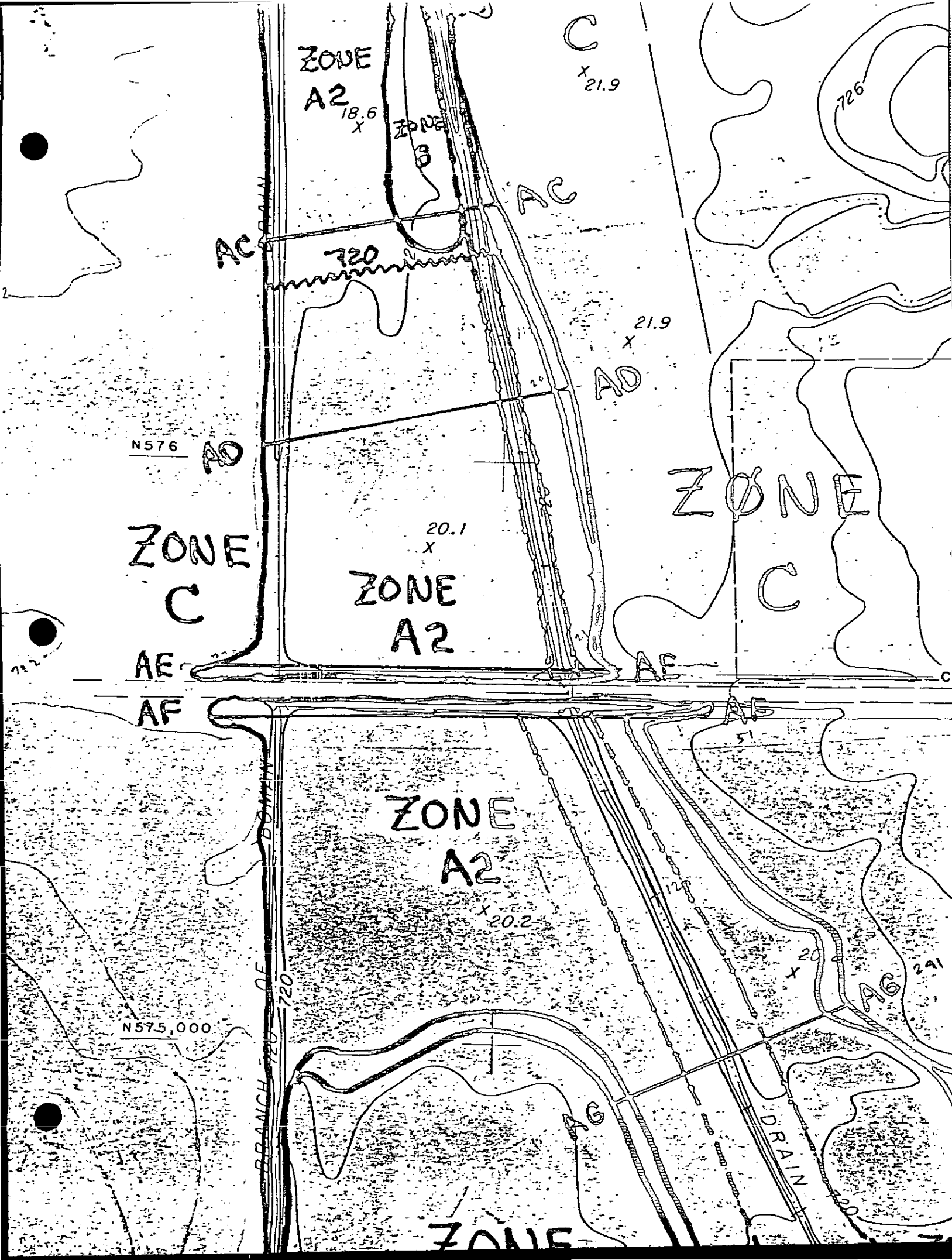
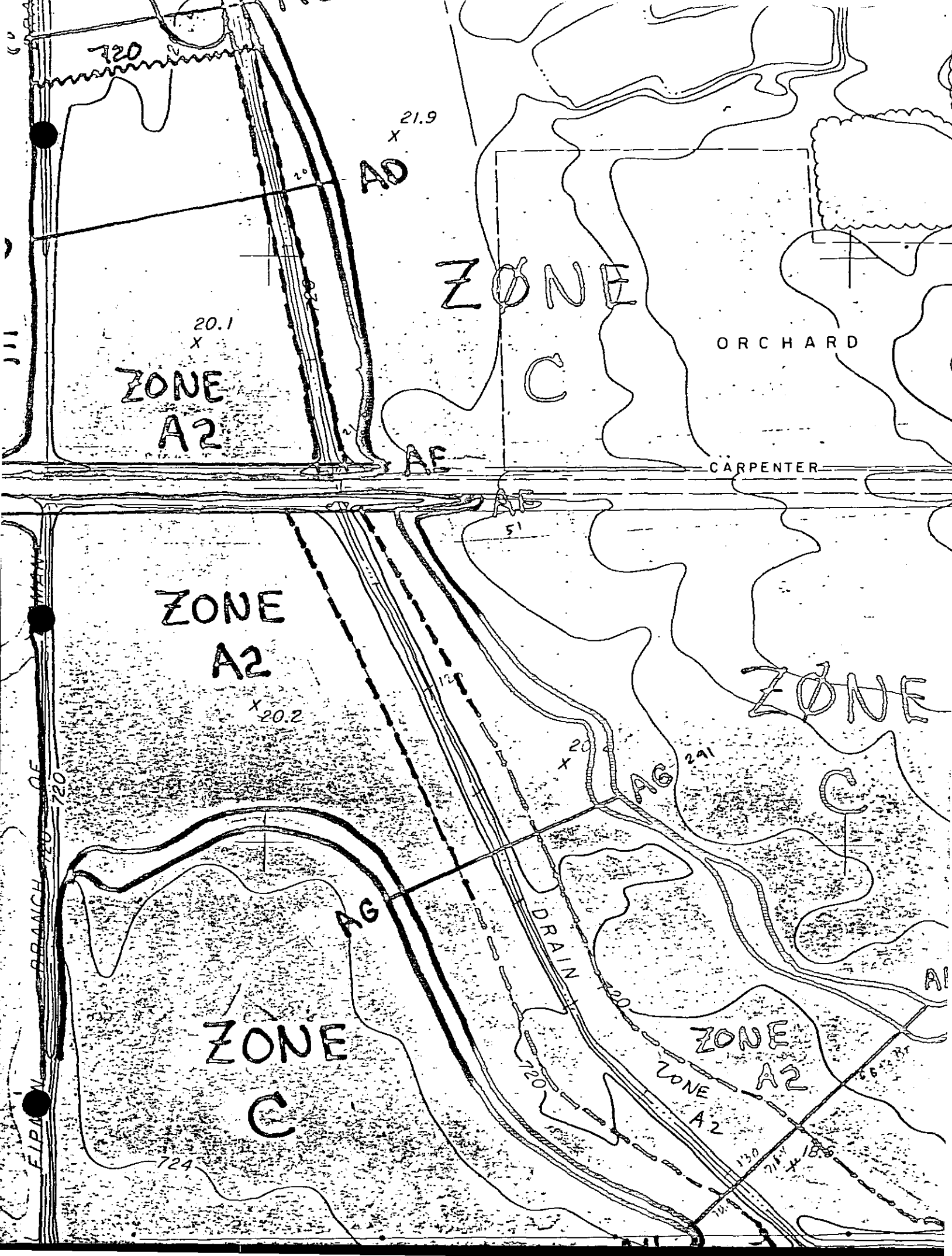
716
25
720
722
ZONE A2
724
ACRES
726
720
N581
21.0
716
ROMAN
JOHNSON

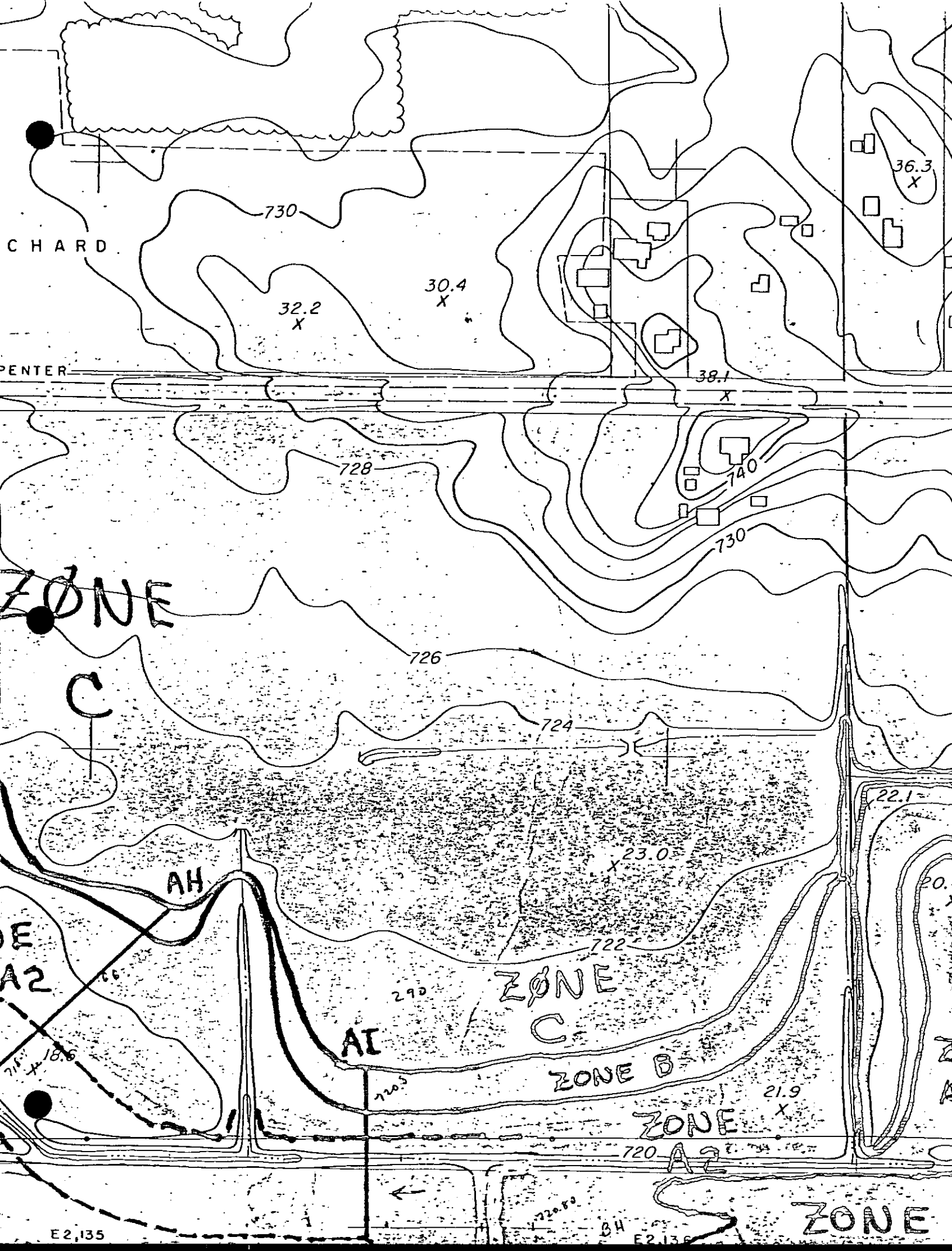

N581
N580,000
E2,134,000
ROMAN
ZONE A2
ZONE C
720
722
724
21.0
23.0
19.9
18.2
25.1
1
5
6
AURIE ACRES
COLDWATER

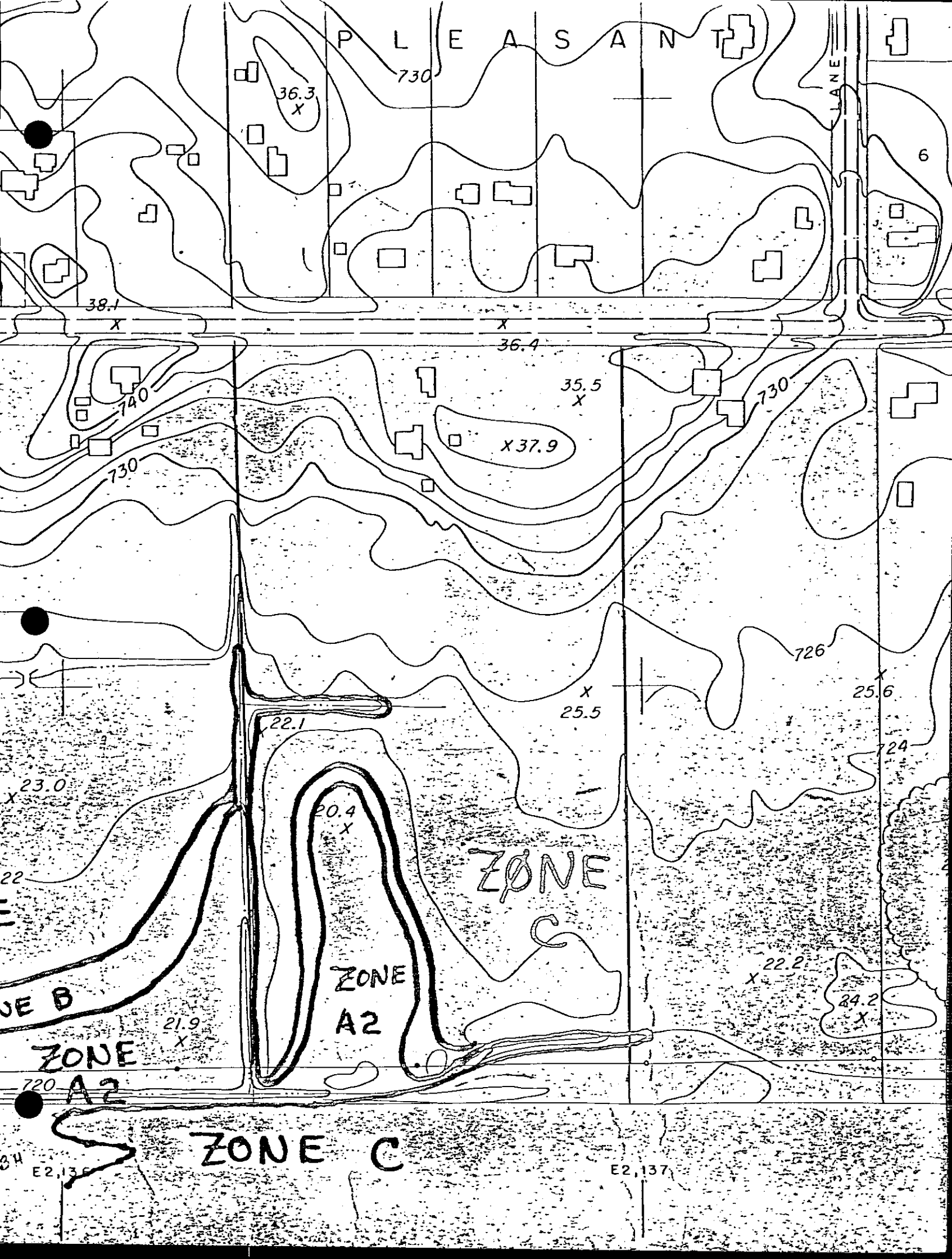

E2,134,000
COLDWATER
ZONE B
ZONE A2
ZONE C
ZONE B
ZONE A2
ZONE C
ZONE B
ZONE
N579000
N578
W
W
Y
Y
Z
Z
27.0
29.0
4.5
24.2
27.9
26.4
16.1
29.5
27.5
27.0
720
718
726
726
719
179

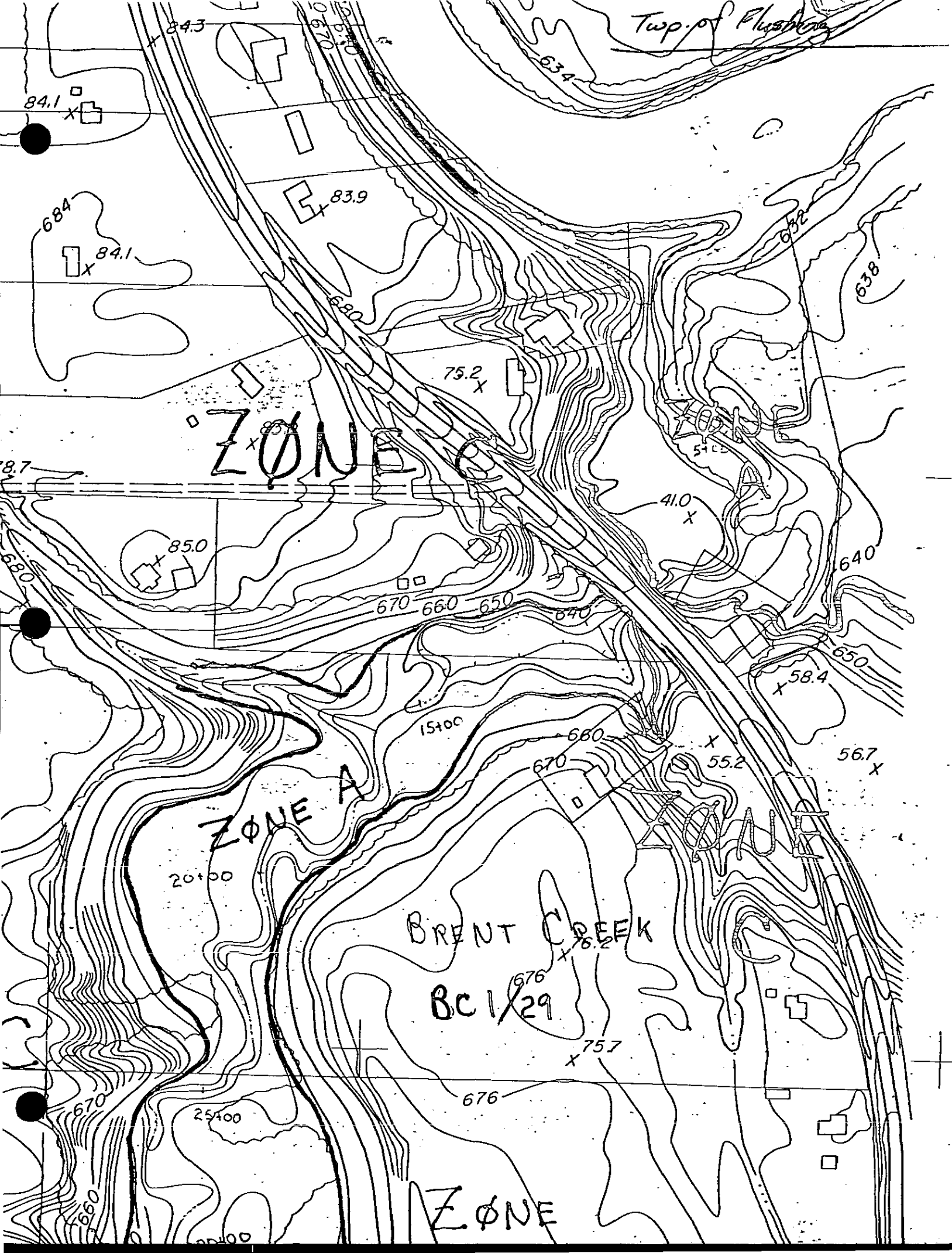

ZONE C
ZONE A2
BOMAN
AA
AA
724
728
730
19.0
N 577
AB
AB
ZONE C
21.9
ZONE A2
18.6
ZONE 3
AC
AC
720
21.9
AD
N 576
AD
ZONE
ZONE
20.1
726

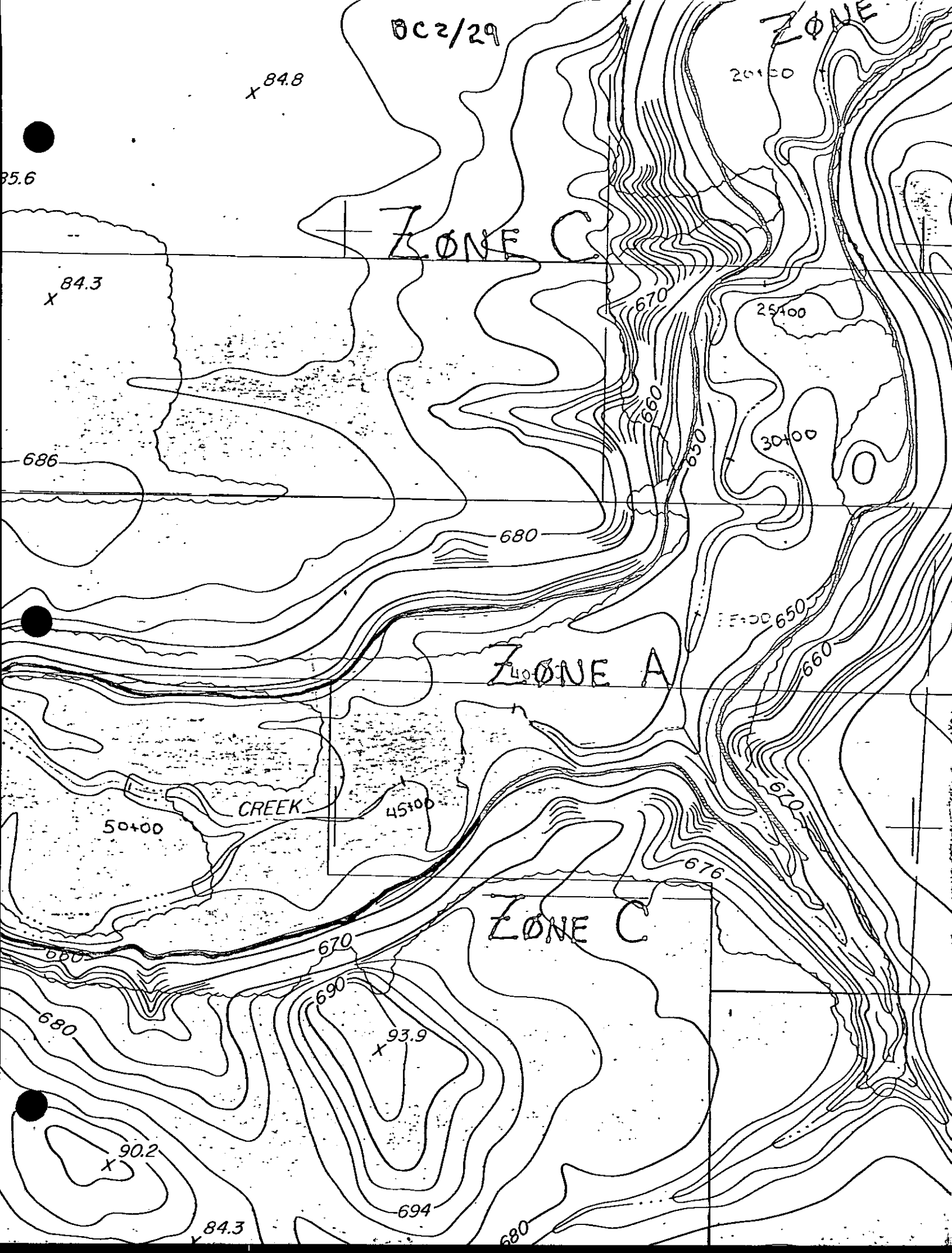

ZONE A2
18.6
ZONE B
C
21.9
726
AC
AC
720
21.9
AD
N576
AD
ZONE C
20.1
ZONE A2
ZONE C
AE
AE
AF
AF
AF
ZONE A2
20.2
BRANCH OF BOWMAN
720
N575,000
AG
AG
DRAIN
ZONE

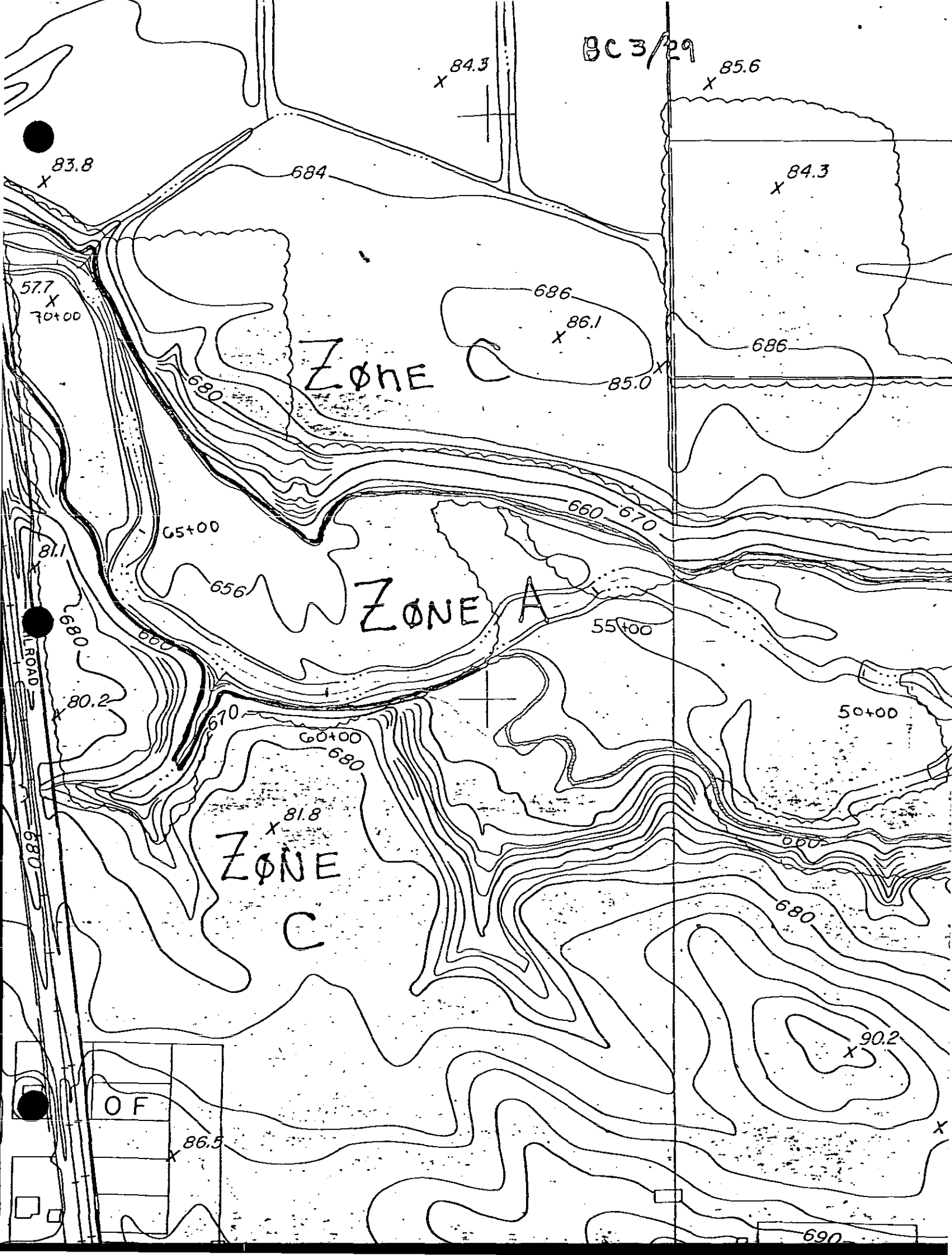

720
21.9
AD
ZONE
C
ORCHARD
20.1
ZONE
A2
AE
CARPENTER
AG
51
ZONE
A2
20.2
ZONE
C
20.4
AG
241
AG
DRAIN
720
ZONE
A2
ZONE
A2
ZONE
C
724
720

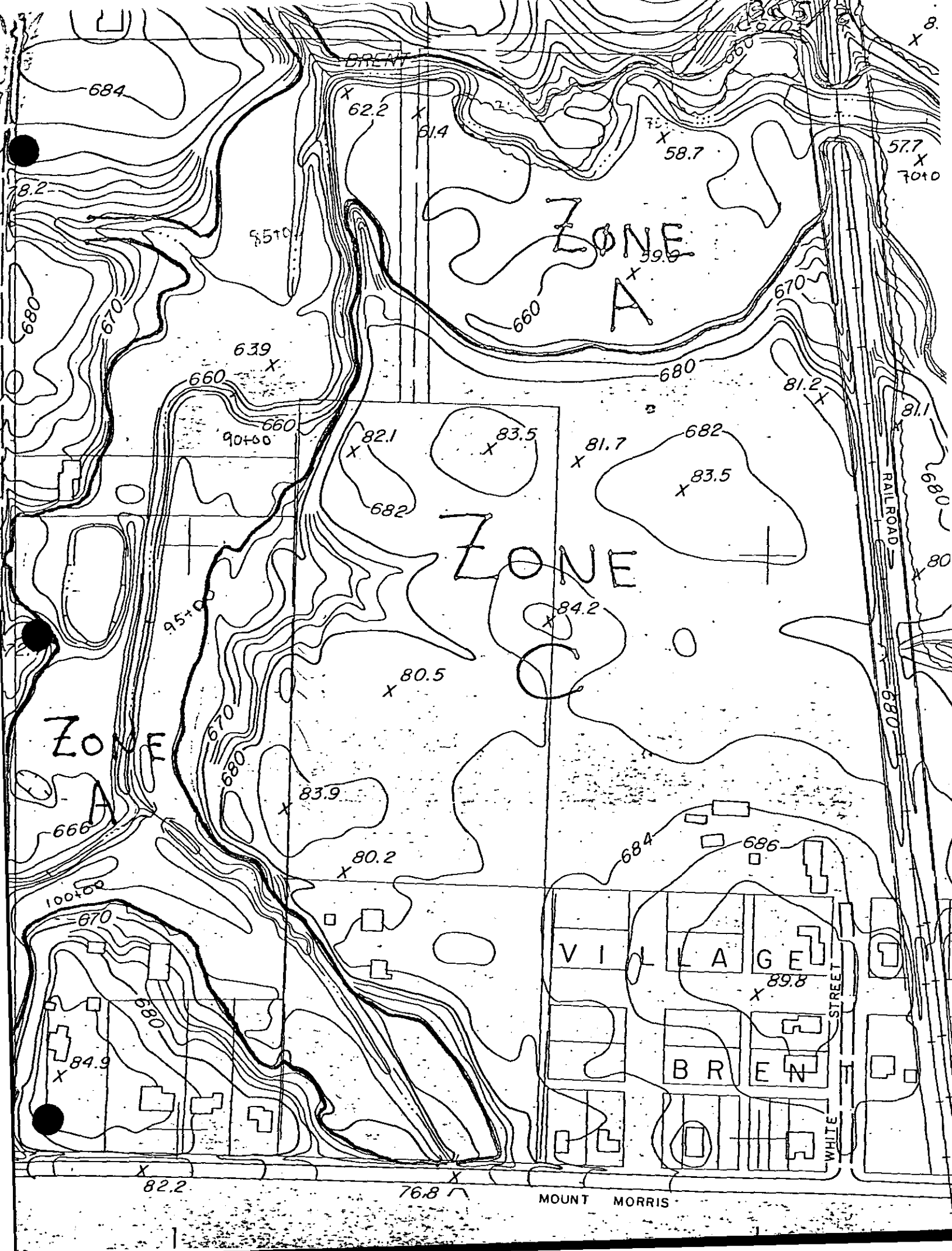

CHARD
PENTER
730
32.2
30.4
36.3
38.1
728
740
730
ZØNE
726
C
724
22.1
23.0
AH
722
ZØNE
C
AI
ZONE B
21.9
ZONE
720
A2
ZONE
E2,135
BH
E2,136


PLEASANT
LANE
730
36.3
6
38.1
36.4
35.5
740
730
37.9
730
726
25.6
25.5
22.1
724
23.0
20.4
ZONE C
ZONE A2
22.2
24.2
21.9
ZONE B
ZONE A2
720
ZONE C
E2,136
E2,137


Twp. of Flushing
84.3
84.1
83.9
684
84.1
680
75.2
ZONE C
78.7
41.0
85.0
680
670
660
650
640
640
650
58.4
15+00
680
670
55.2
56.7
ZONE A
20+00
BRENT CREEK
76.2
676
BC 1/29
75.7
676
670
25+00
660
ZONE


BC2/29
ZONE
20+00
84.8
35.6
ZONE C
84.3
670
25+00
660
650
30+00
686
680
650
ZONE A
660
CREEK
45+00
50+00
670
676
ZONE C
670
680
690
680
93.9
90.2
694
84.3
680


BC 3/29
84.3
85.6
83.8
684
84.3
57.7
70+00
686
86.1
686
ZØNE C
85.0
680
660
670
65+00
81.1
656
ZØNE A
55+00
680
660
80.2
670
60+00
680
50+00
81.8
ZØNE C
680
680
90.2
OF
86.5
690


ZONE A
ZONE C
ZONE A
VILLAGE
BREN
WHITE STREET
RAILROAD
MOUNT MORRIS
684
62.2
61.4
58.7
57.7
70+00
8.2
55+00
99.6
670
660
680
639
660
90+00
81.2
81.1
82.1
83.5
81.7
682
83.5
682
680
80
95+00
84.2
80.5
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100+00
670
89.8
680
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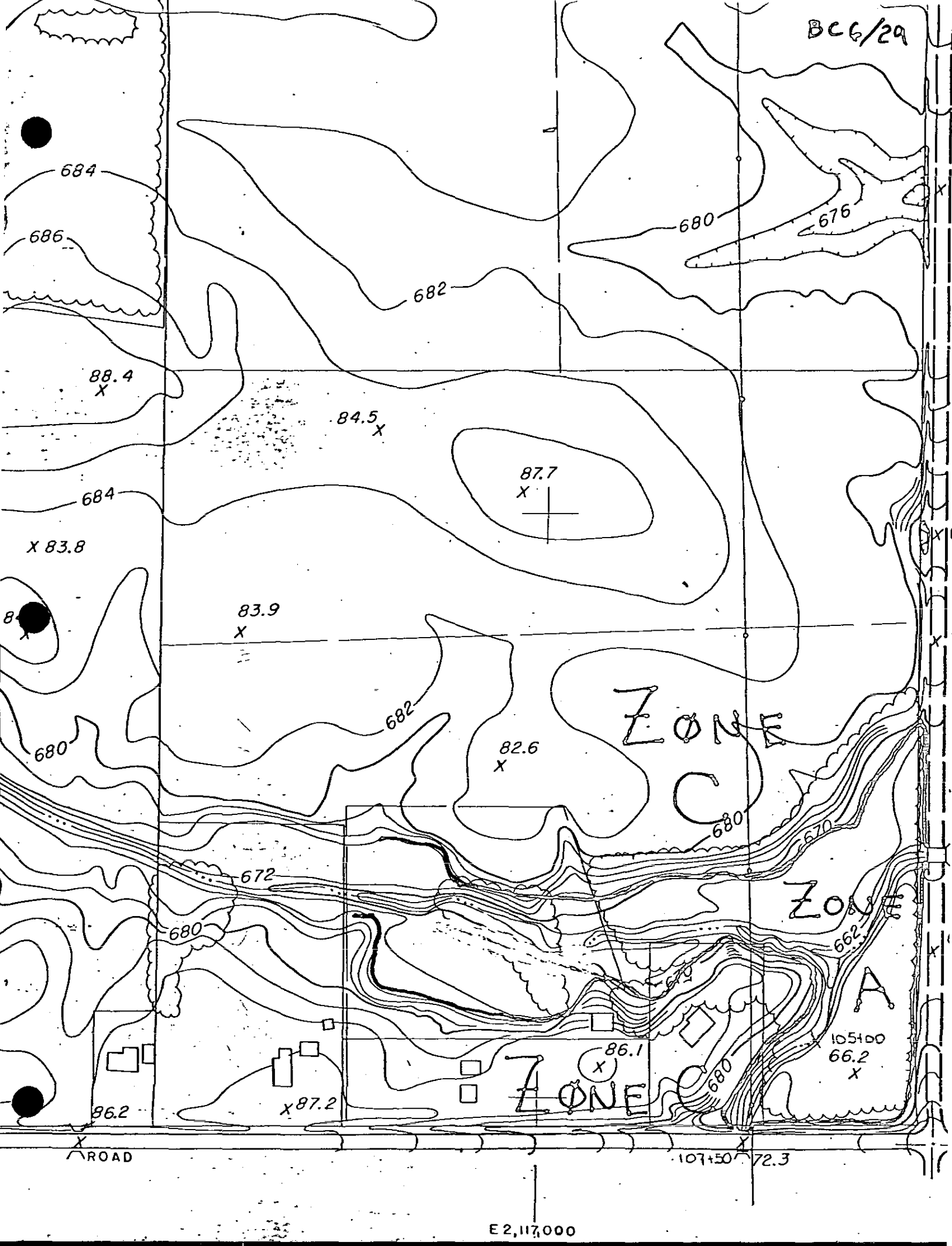
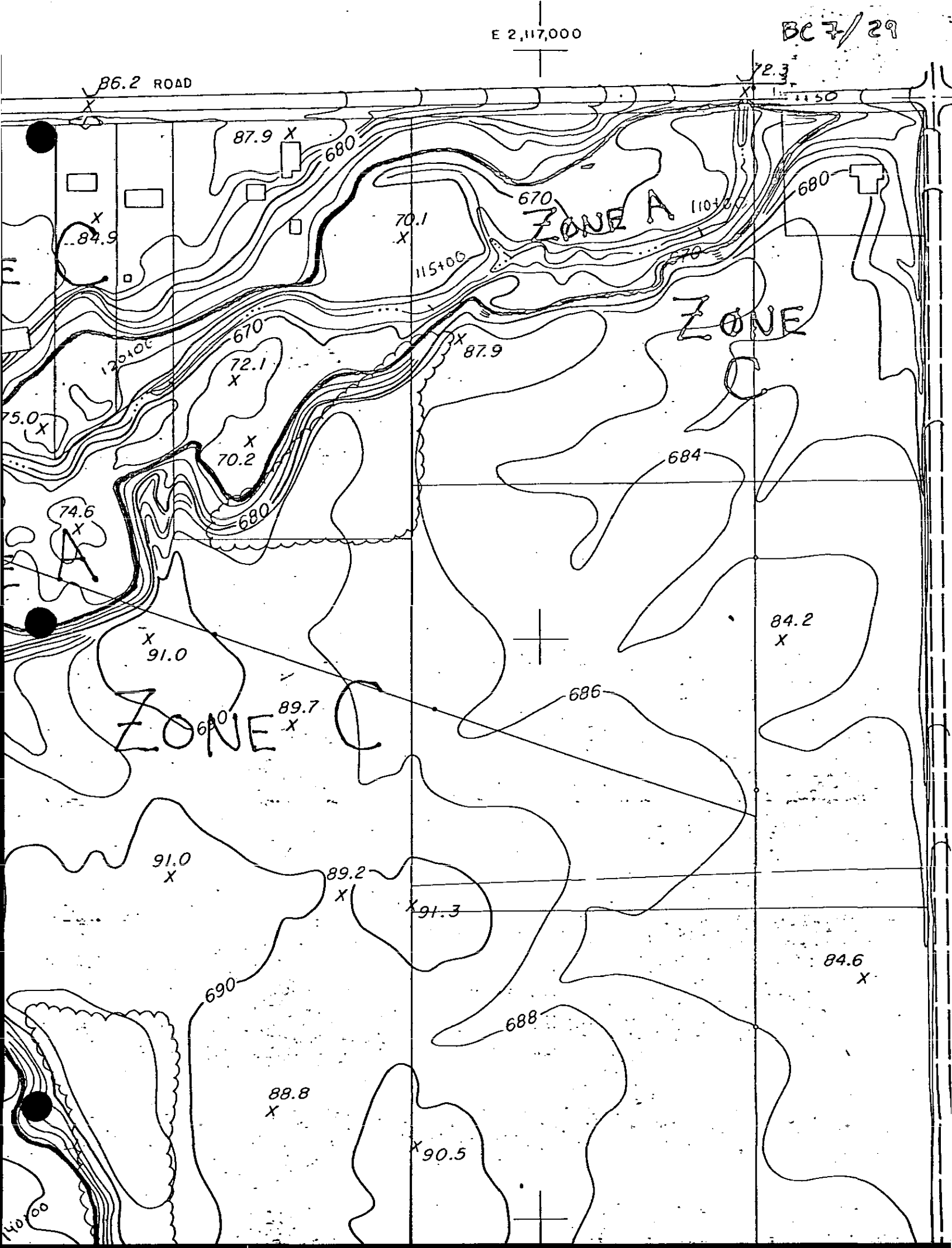
82.2
76.8


BC6/29
684
686
682
680
676
88.4
84.5
87.7
684
83.8
83.9
682
680
82.6
ZONE C
680
670
672
680
ZONE A
662
86.1
105+00
66.2
680
ZONE C
86.2
87.2
ROAD
107+50
72.3
E 2,117,000


E 2,117,000
BC 7/29
86.2 ROAD
72.3
87.9
680
670
ZONE A
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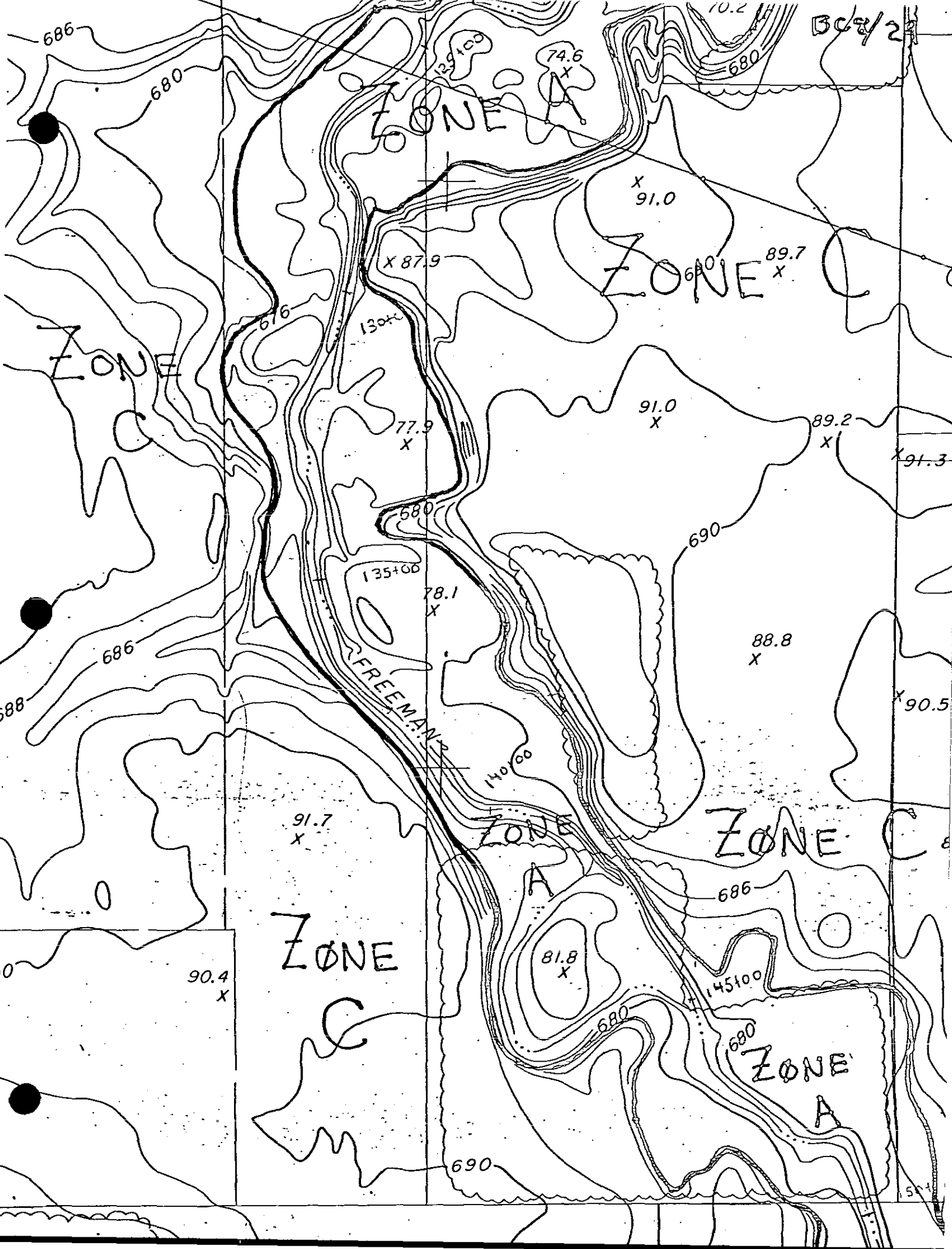
680
84.9
70.1
115+00
670
ZONE
C
120+00
670
87.9
72.1
75.0
70.2
684
74.6
680
A
91.0
84.2
686
ZONE C
89.7
690
91.0
89.2
91.3
84.6
690
688
88.8
90.5
140+00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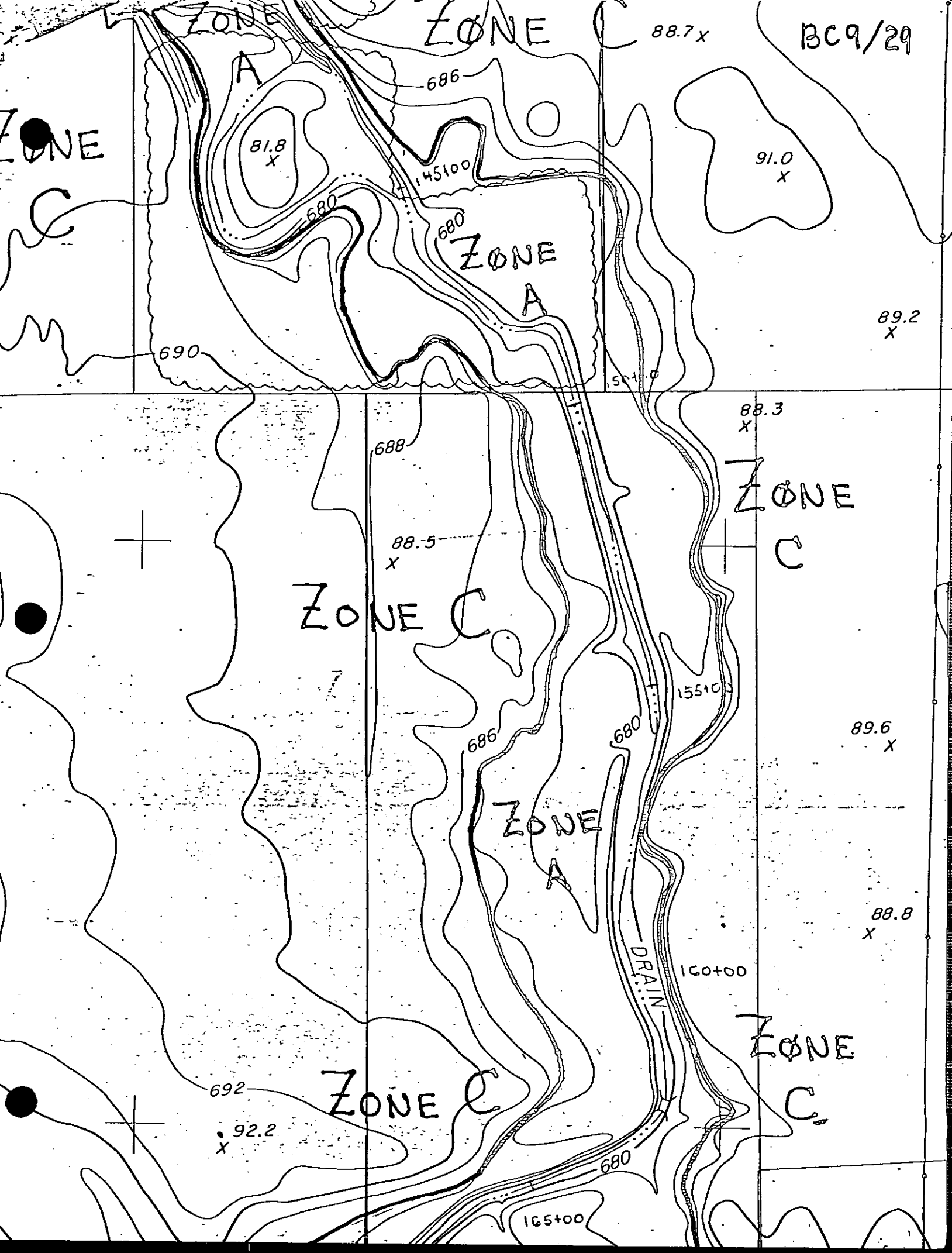
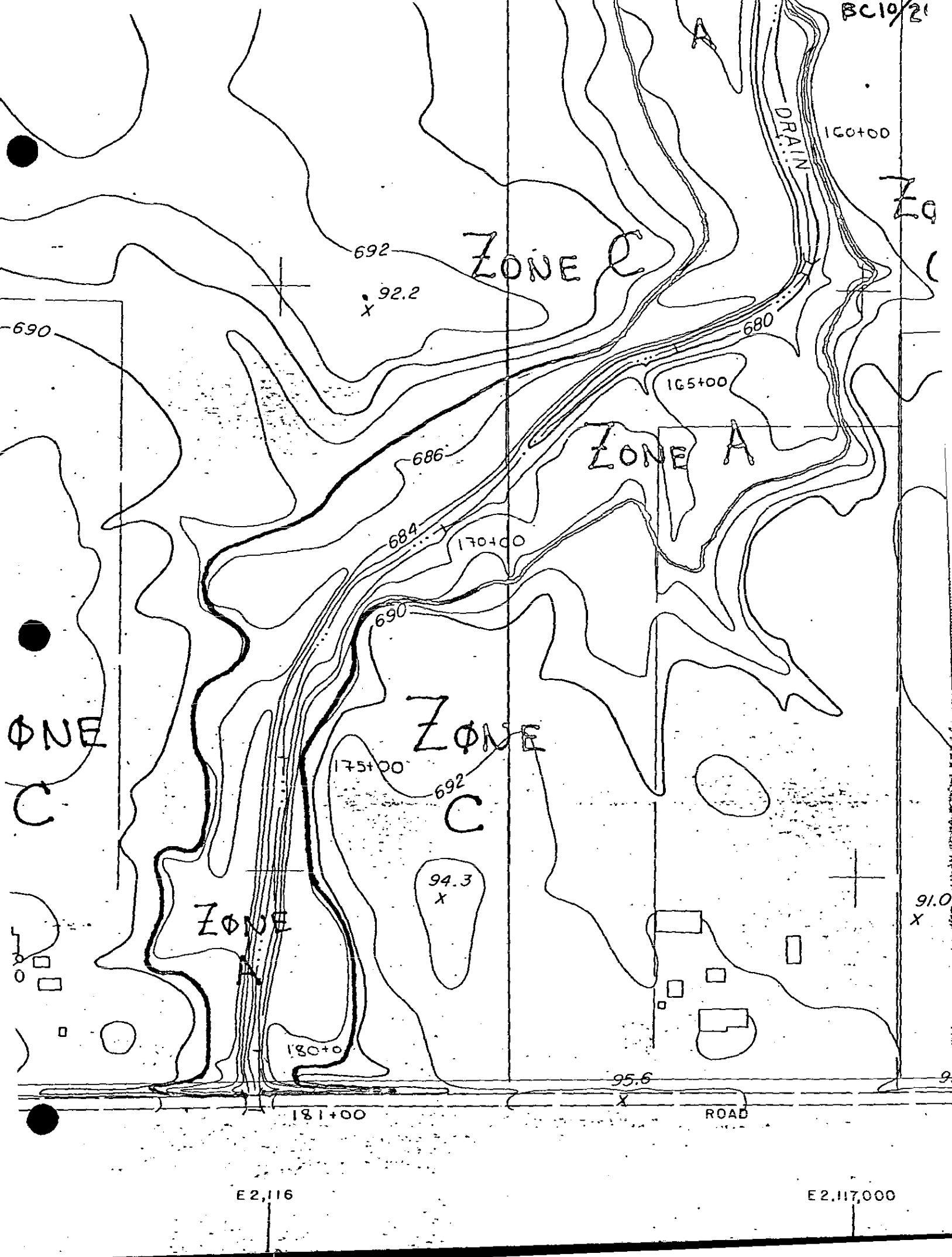
680
129+00
74.6
ZONE A
680
91.0
ZONE C
89.7
87.9
680
616
130+
ZONE C
91.0
89.2
77.9
91.3
680
690
135+00
78.1
686
88.8
688
FREEMAN
90.5
140+00
91.7
ZONE A
ZONE C
686
ZONE C
81.8
90.4
145+00
680
680
ZONE A
690


BC9/29
ZONE A
ZONE C
88.7
686
81.8
145+00
680
91.0
ZONE A
89.2
690
150+00
88.3
688
ZONE C
88.5
ZONE C
155+00
686
680
89.6
ZONE A
88.8
DRAIN
160+00
ZONE C
692
ZONE C
92.2
680
165+00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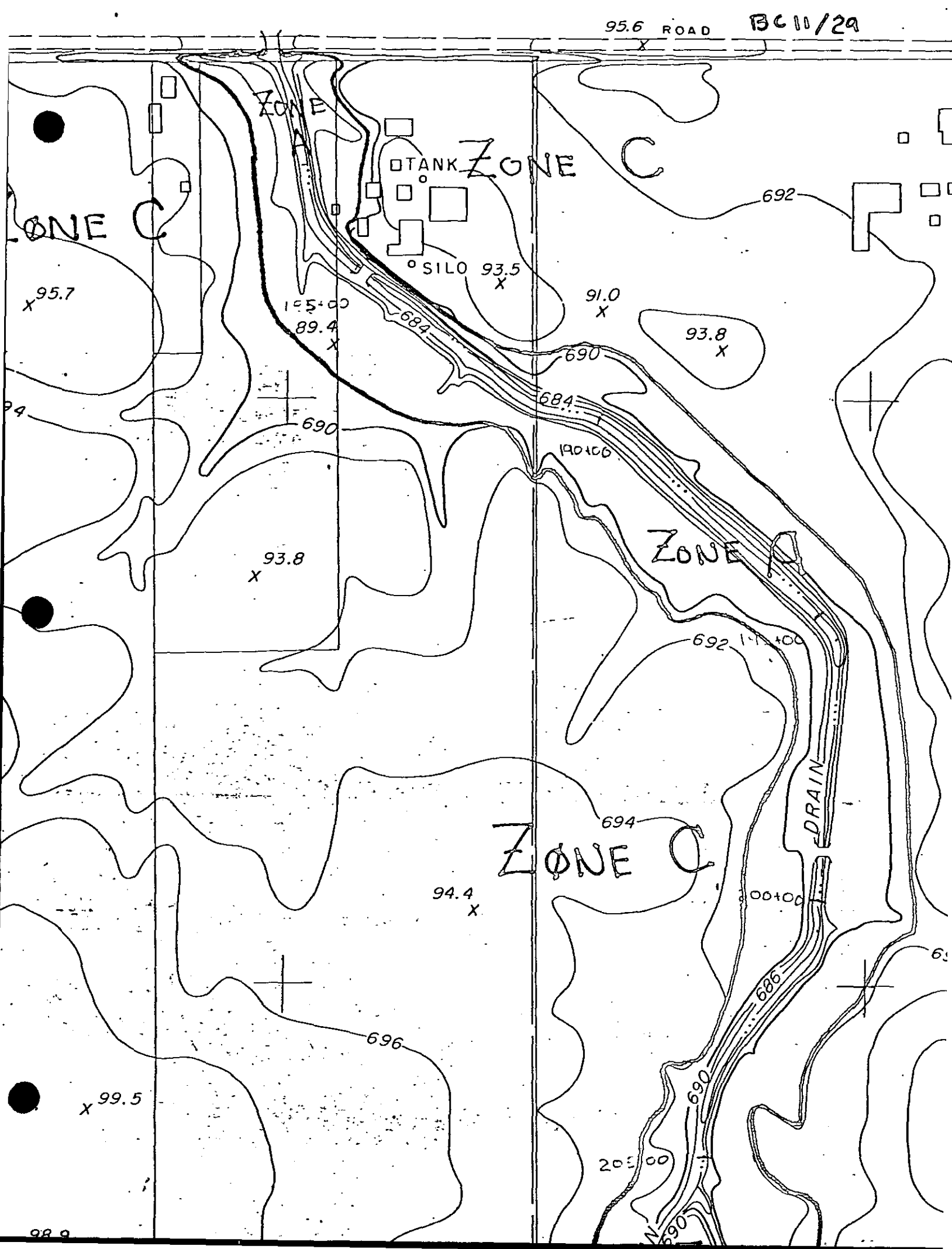
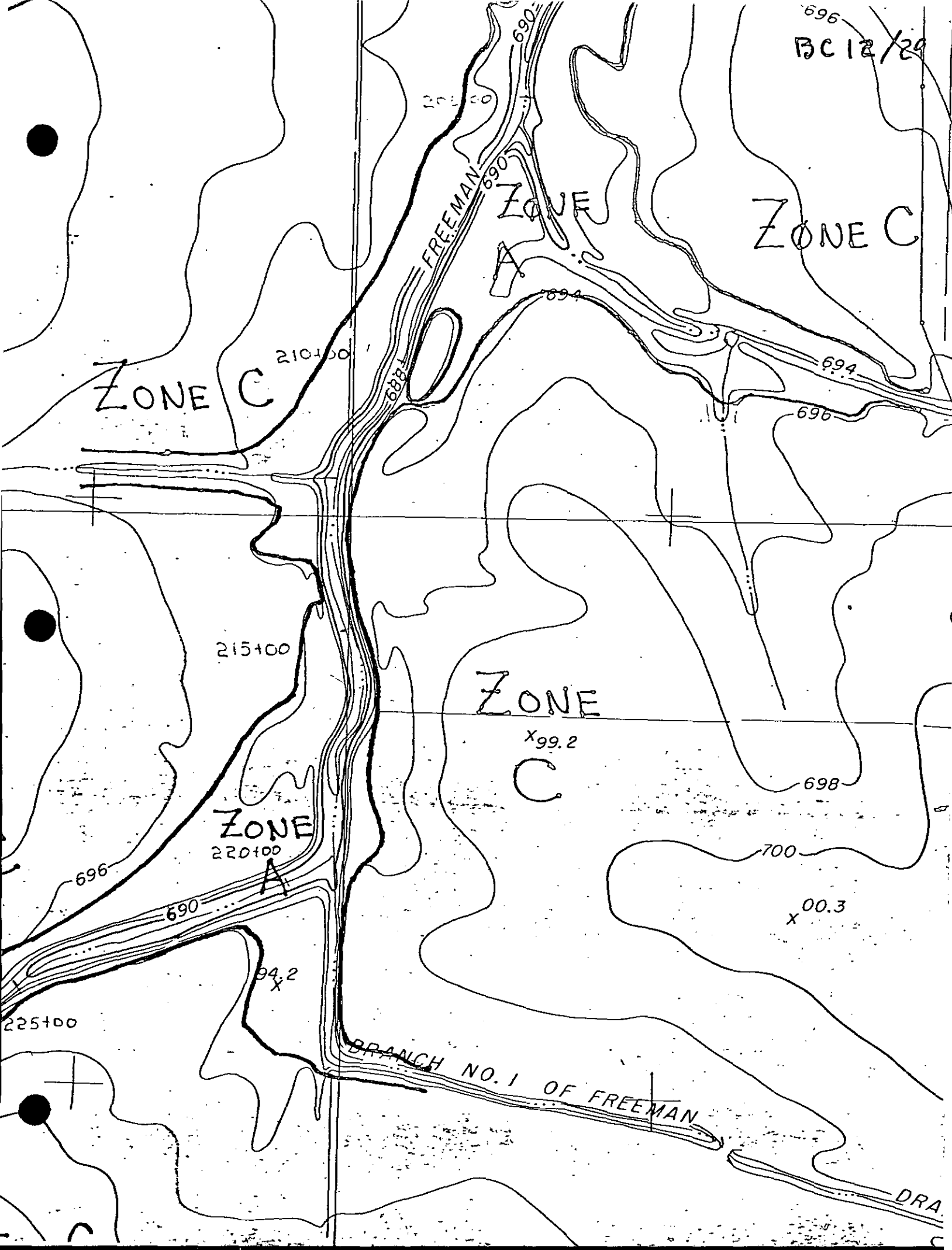
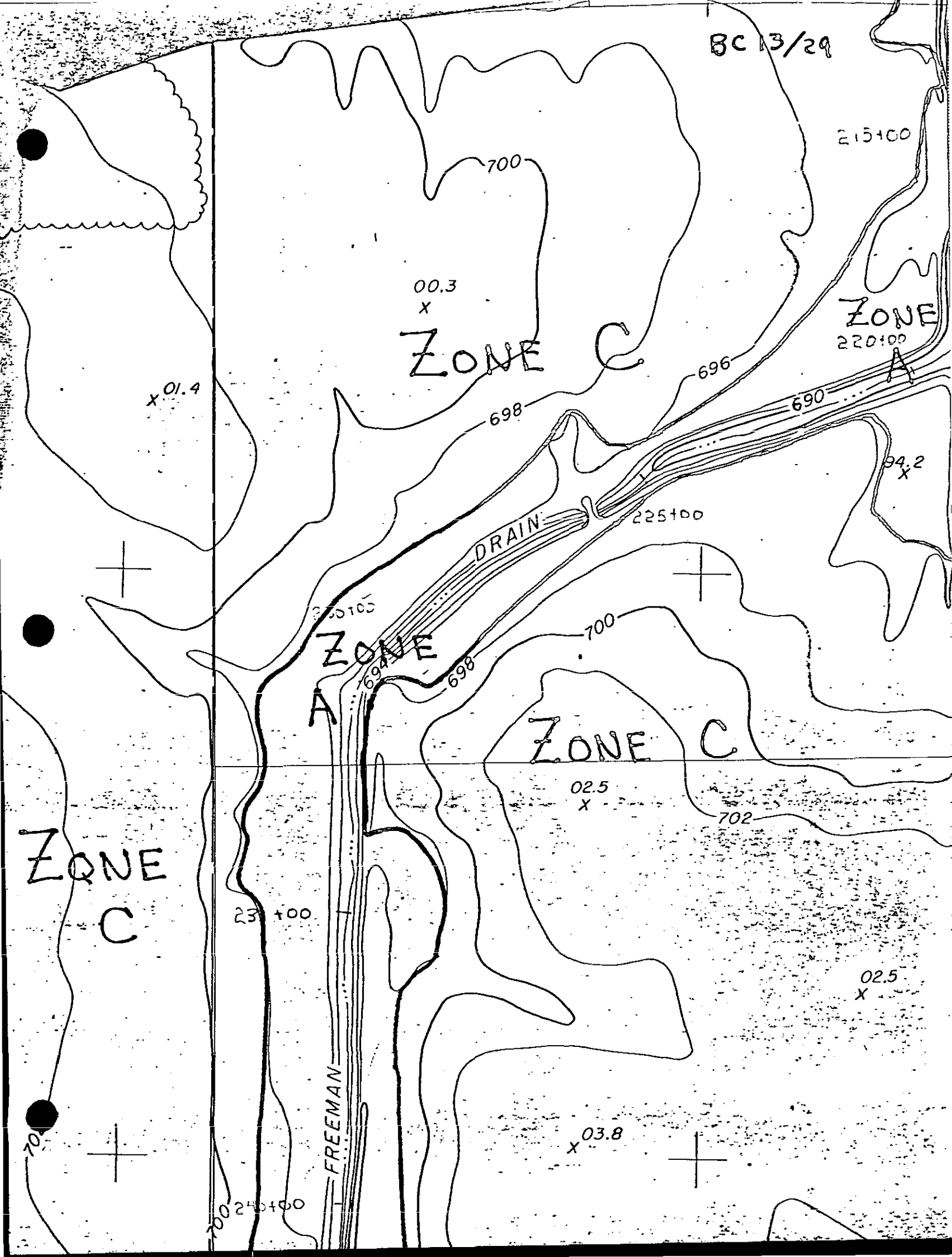
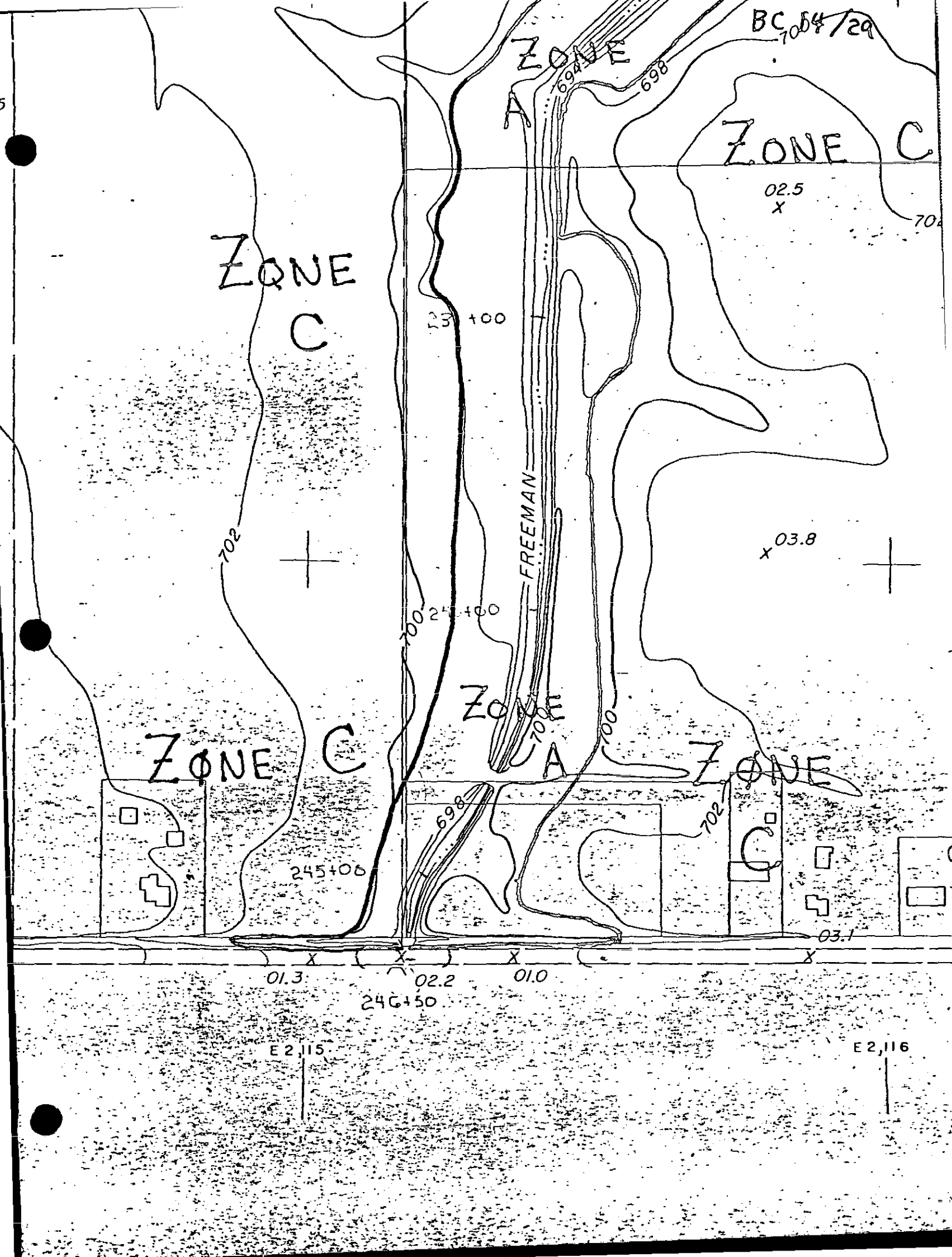
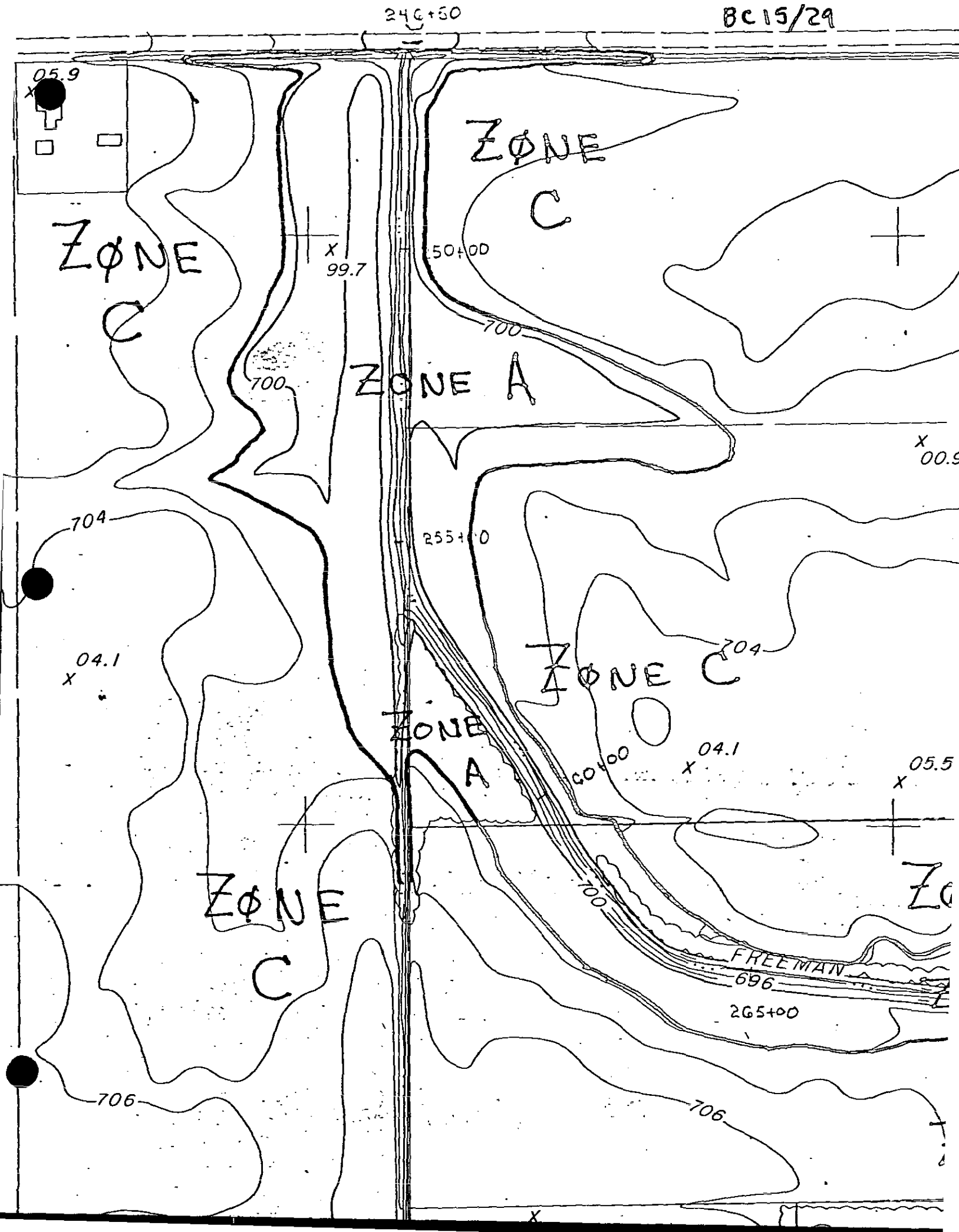
DRAIN
160+00
ZONE C
692
92.2
690
680
165+00
ZONE A
686
684
170+00
690
ZONE
C
ZONE
175+00
692
C
94.3
ZONE
91.0
180+0
95.6
181+00
ROAD
E2,116
E2,117,000

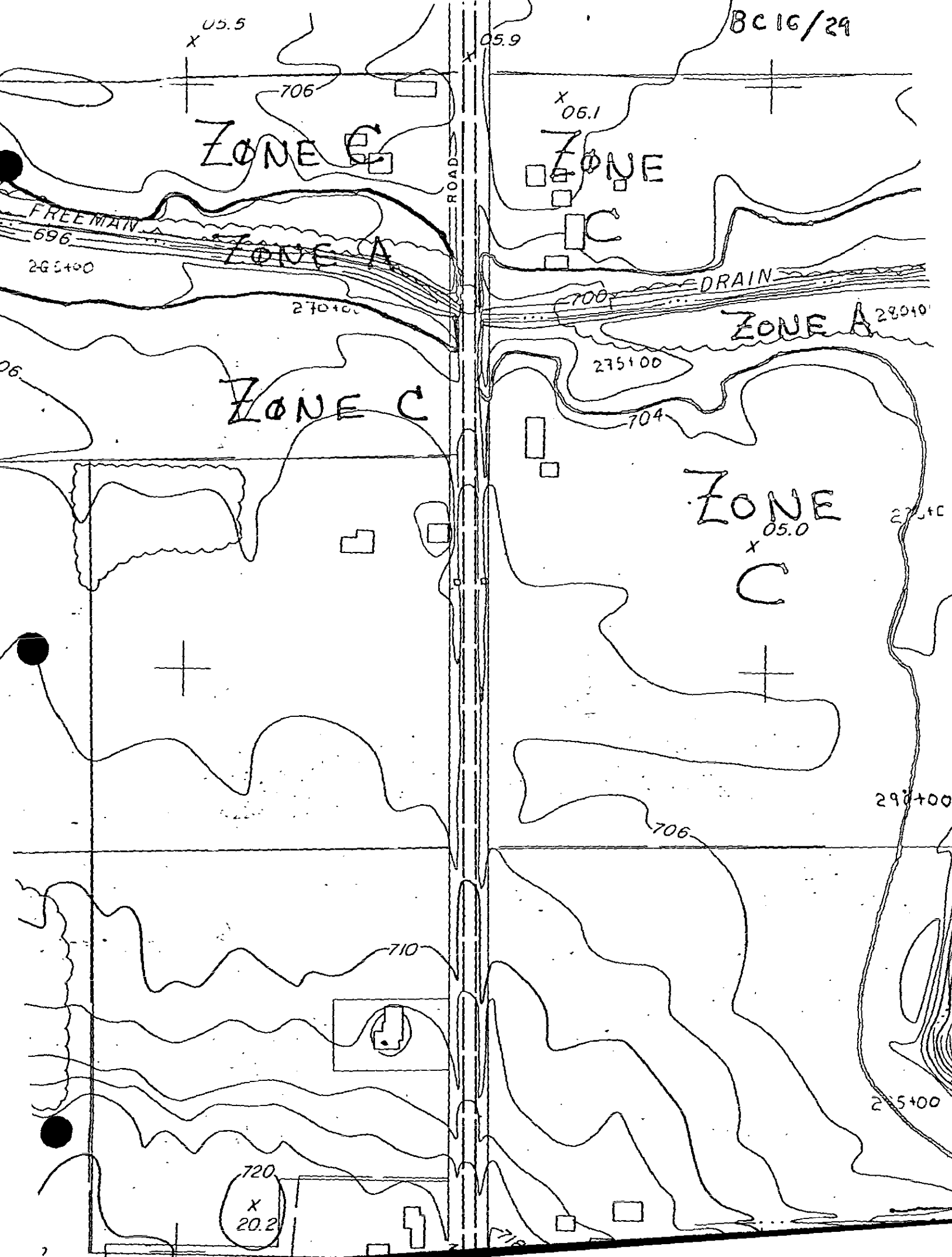

95.6 ROAD
BC 11/29
ZONE A
TANK
ZONE C
ZONE C
692
SILO
93.5
95.7
91.0
93.8
89.4
684
690
684
690
93.8
ZONE A
692
DRAIN
694
ZONE C
94.4
686
696
690
99.5
690

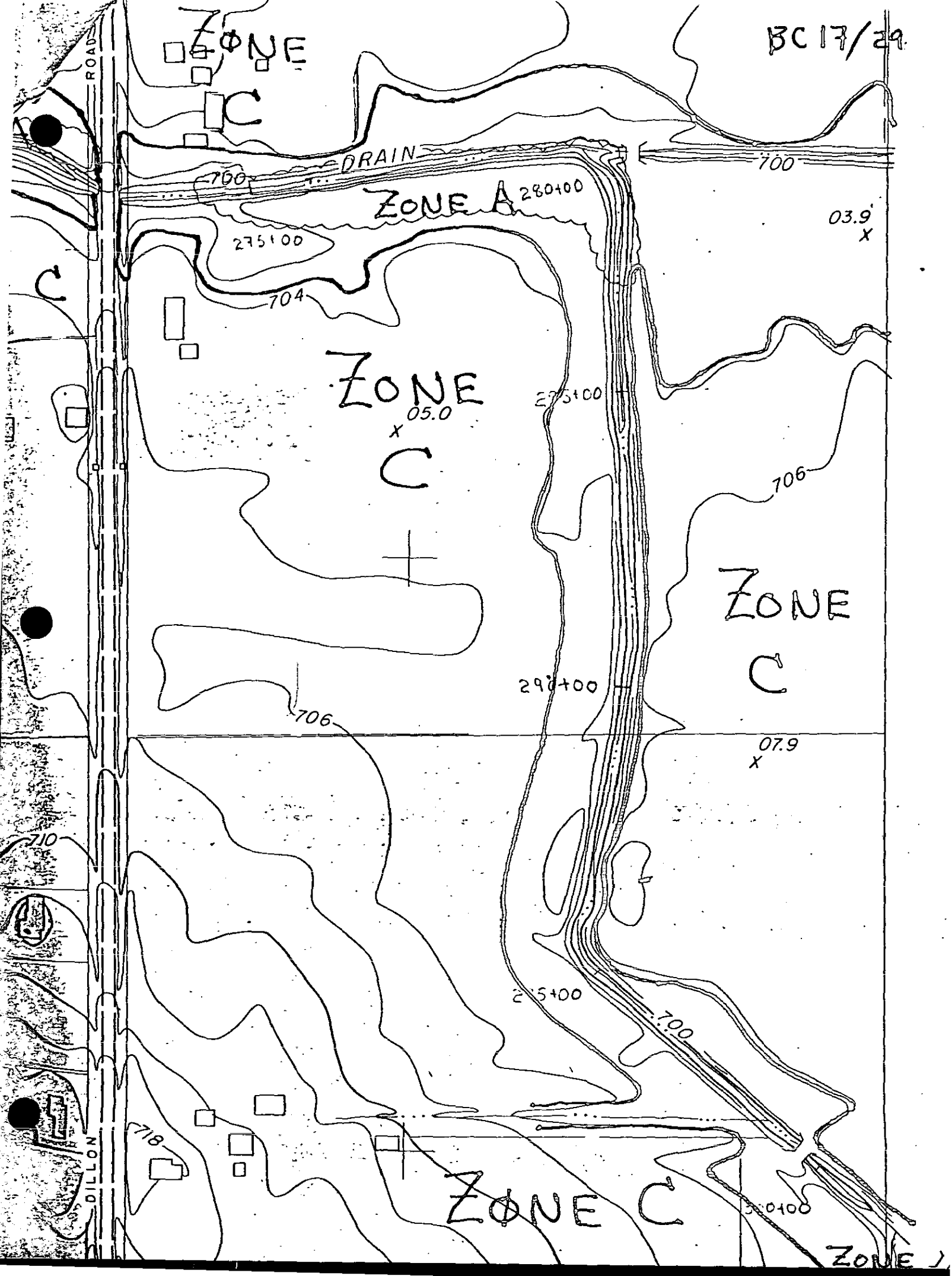

BC 12/29
696
690
FREEMAN
ZONE A
ZONE C
ZONE C
210+00
688
694
696
215+00
ZONE C
x99.2
698
ZONE A
220+00
696
690
700
x00.3
x94.2
225+00
BRANCH NO. 1 OF FREEMAN
DRA

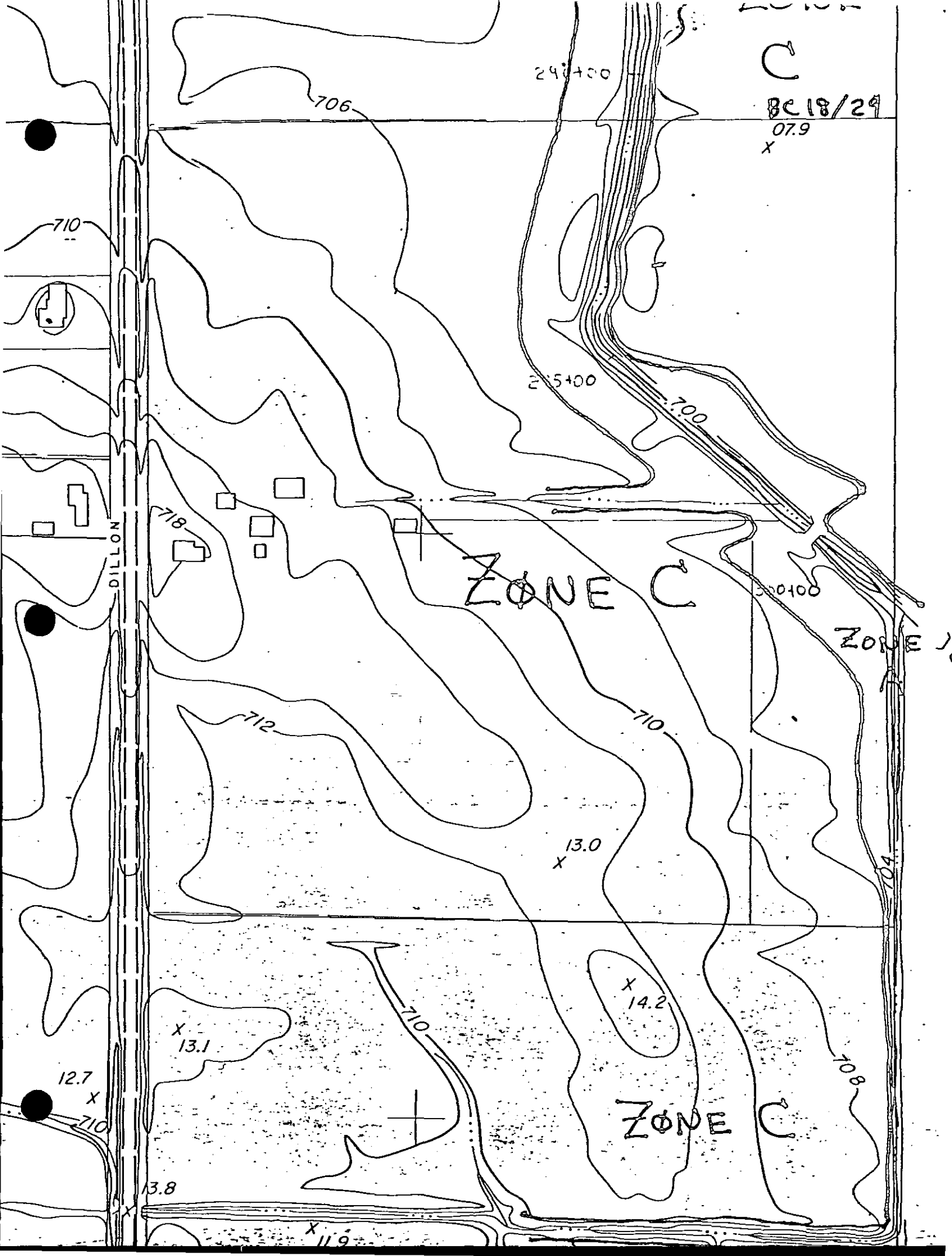

BC 13/29
215+00
700
00.3
ZONE C
ZONE A
220+00
696
690
698
01.4
94.2
DRAIN
225+00
ZONE A
694
698
700
ZONE C
02.5
702
ZONE C
23 +00
02.5
FREEMAN
03.8
700
240+00

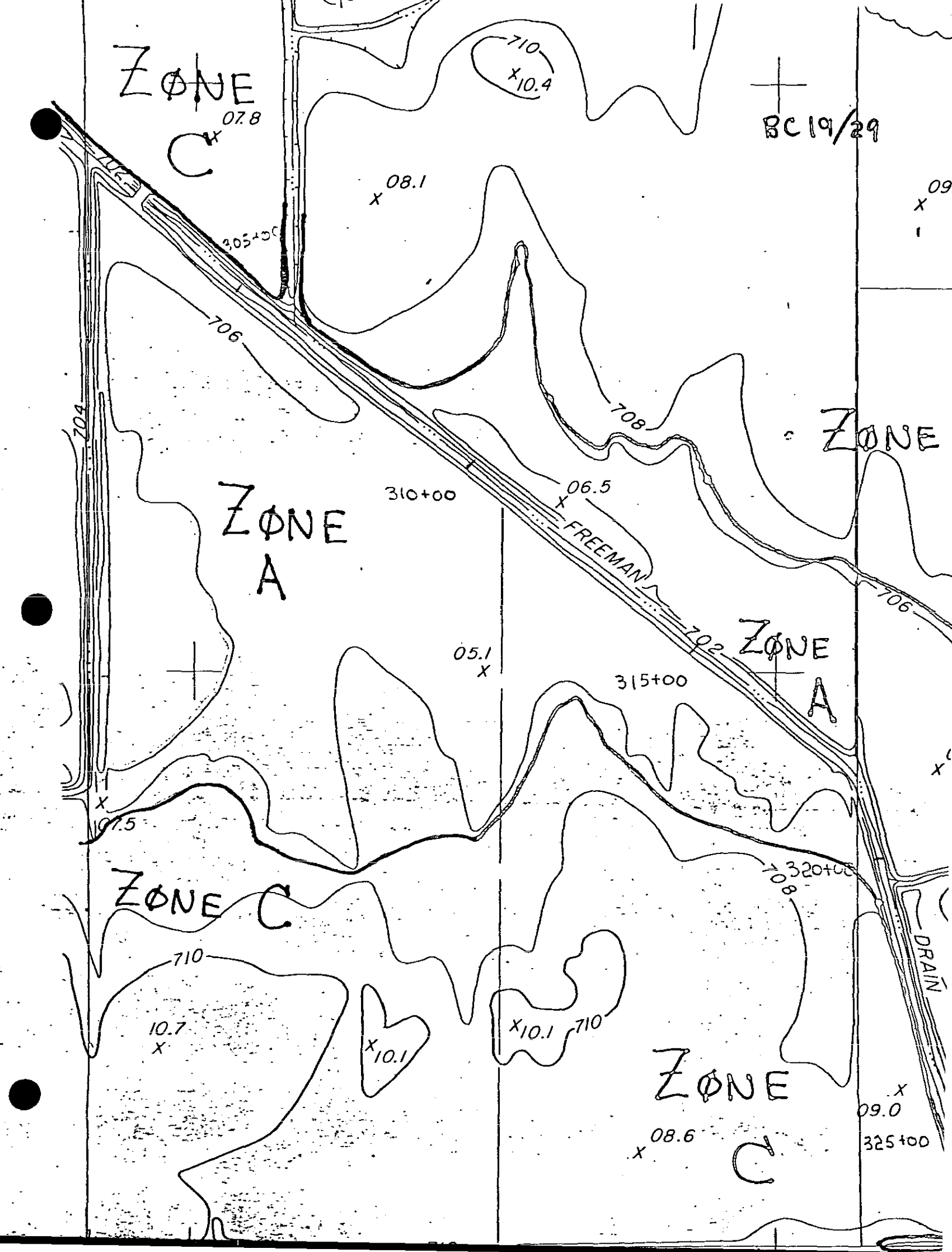

BC 54/29
ZONE A
ZONE C
ZONE C
ZONE C
ZONE A
ZONE C
FREEMAN
698
700
702
02.5
03.8
03.1
01.3
02.2
01.0
245+00
246+50
E 2,115
E 2,116

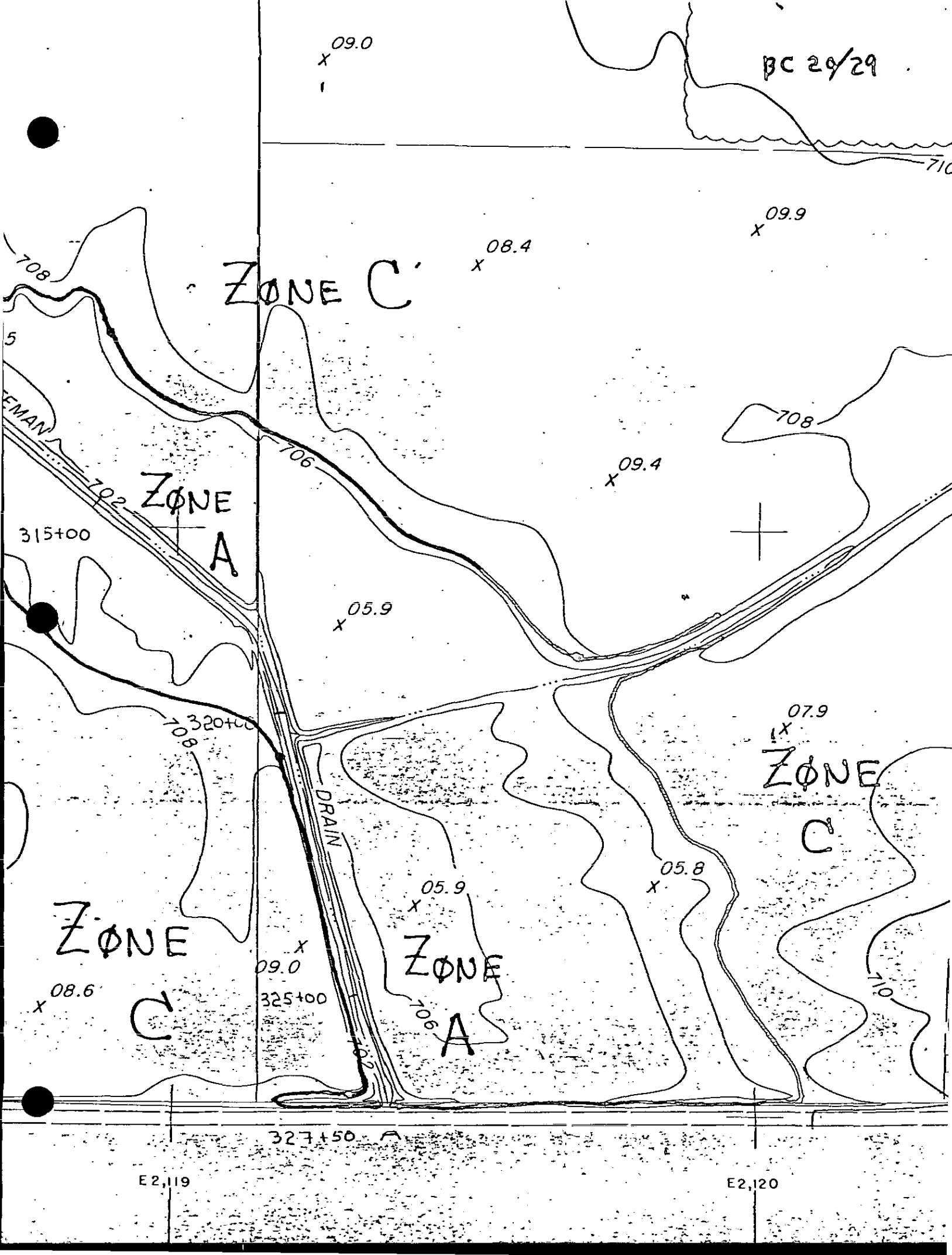

240+50
BC 15/29
05.9
ZONE C
ZONE C
99.7
250+00
700
700
ZONE A
704
255+00
04.1
ZONE C
704
ZONE A
260+00
04.1
05.5
ZONE C
700
FREEMAN
696
265+00
706
706


BC 16/29
05.5
05.9
06.1
05.0
20.2
706
696
700
704
710
720
ZONE C
ZONE C
ZONE A
ZONE A
ZONE C
ZONE C
FREEMAN
DRAIN
ROAD
275+00
290+00


BC 17/29
ZONE C
DRAIN
700
ZONE A
280+00
03.9
275+00
704
ZONE C
05.0
275+00
706
ZONE C
290+00
706
07.9
710
275+00
700
718
ZONE C
ZONE
DILLON ROAD


C
BC 18/29
07.9
706
710
700
718
DILLON
ZONE C
ZONE C
ZONE C
712
710
13.0
704
14.2
710
708
13.1
12.7
710
13.8
11.9

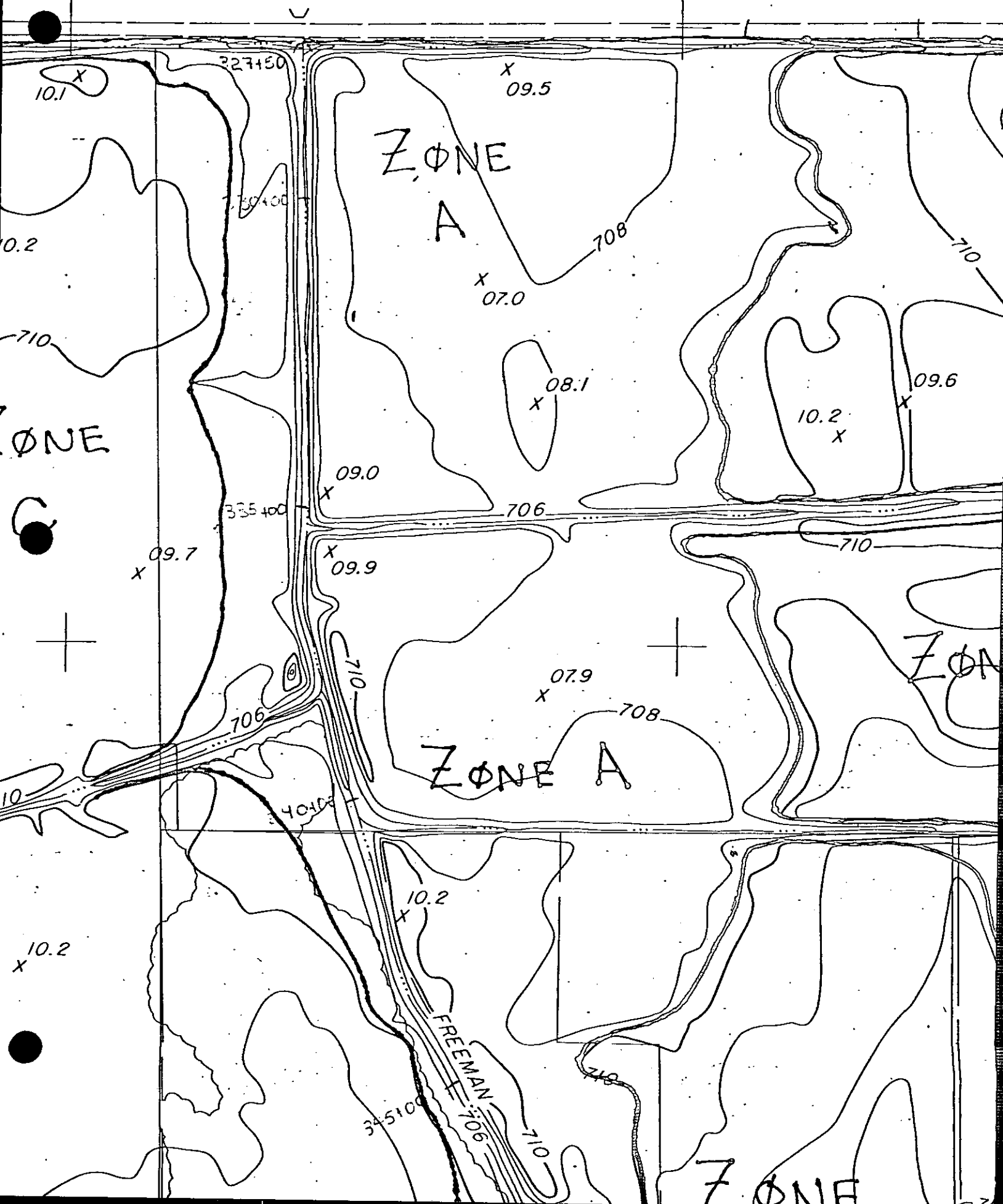

ZONE C
07.8
710
10.4
BC 19/29
08.1
09
305+00
706
704
708
ZONE
310+00
06.5
ZONE A
FREEMAN
706
702
ZONE A
05.1
315+00
07.5
320+00
708
ZONE C
DRAIN
710
10.7
10.1
10.1
710
ZONE C
09.0
08.6
325+00

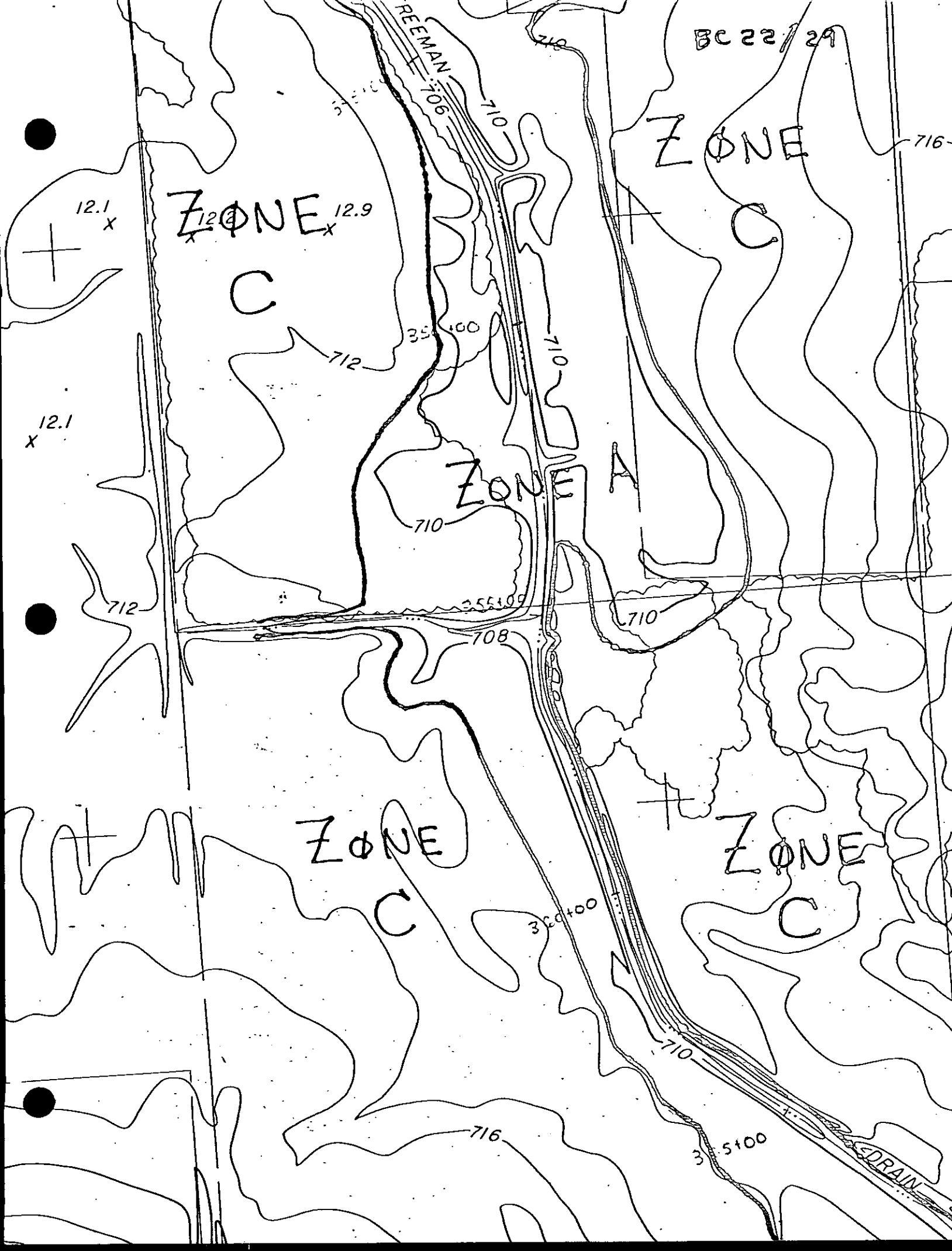

BC 29/29
ZONE C
ZONE A
ZONE C
ZONE A
ZONE C
DRAIN
315+00
320+00
325+00
327+50
E2,119
E2,120
09.0
08.4
09.9
09.4
05.9
07.9
05.8
05.9
09.0
08.6
708
706
702
710

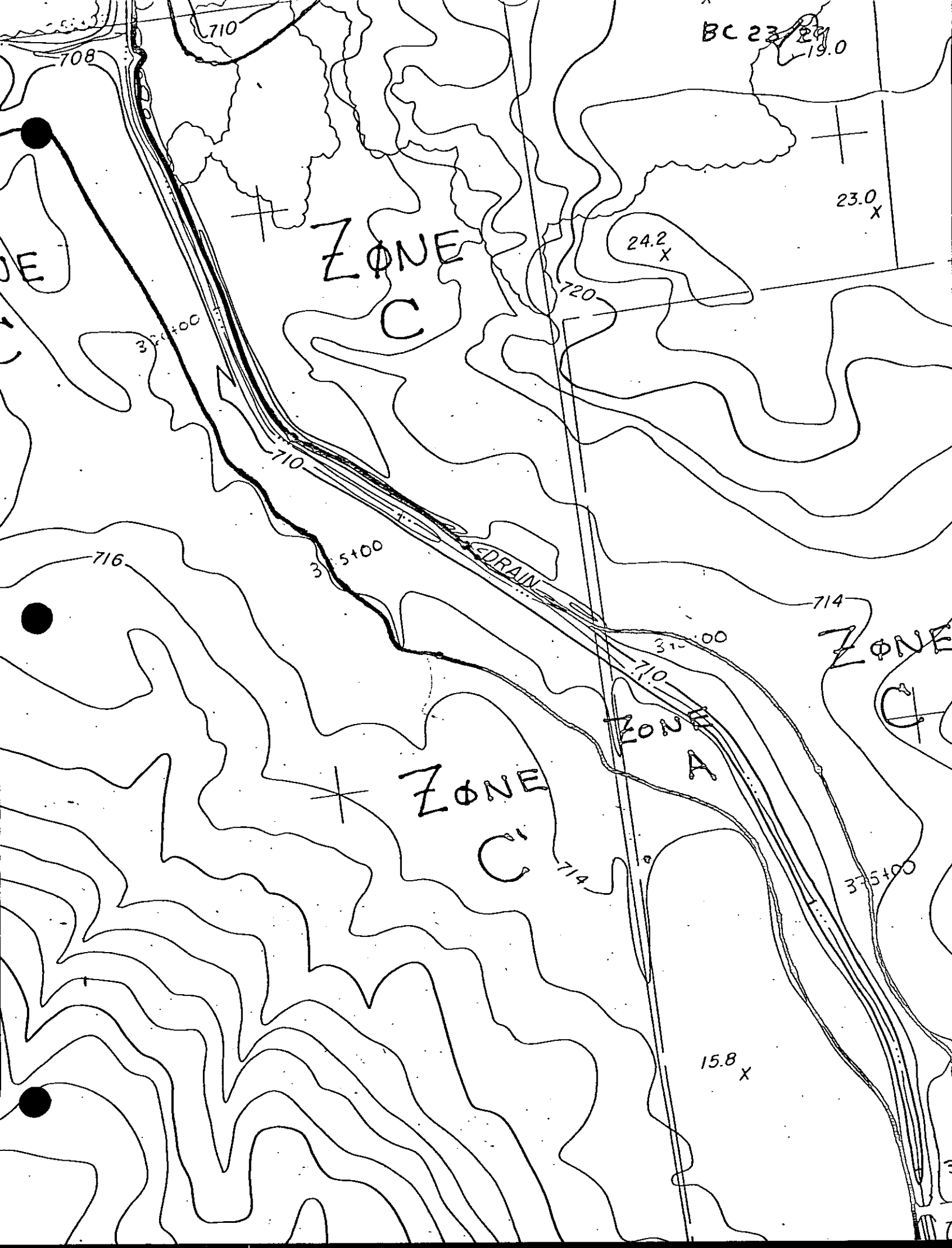
E2,119

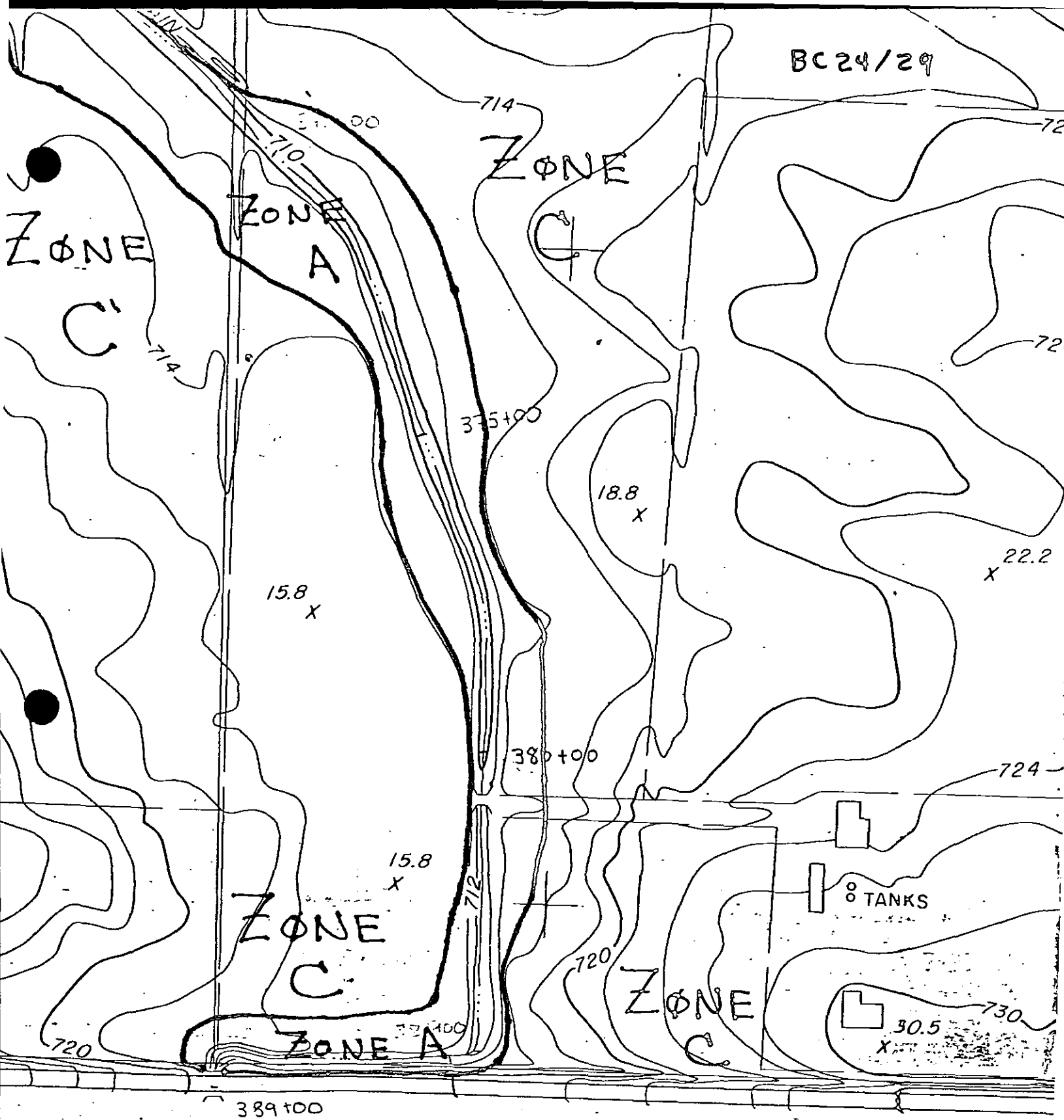
E2,120

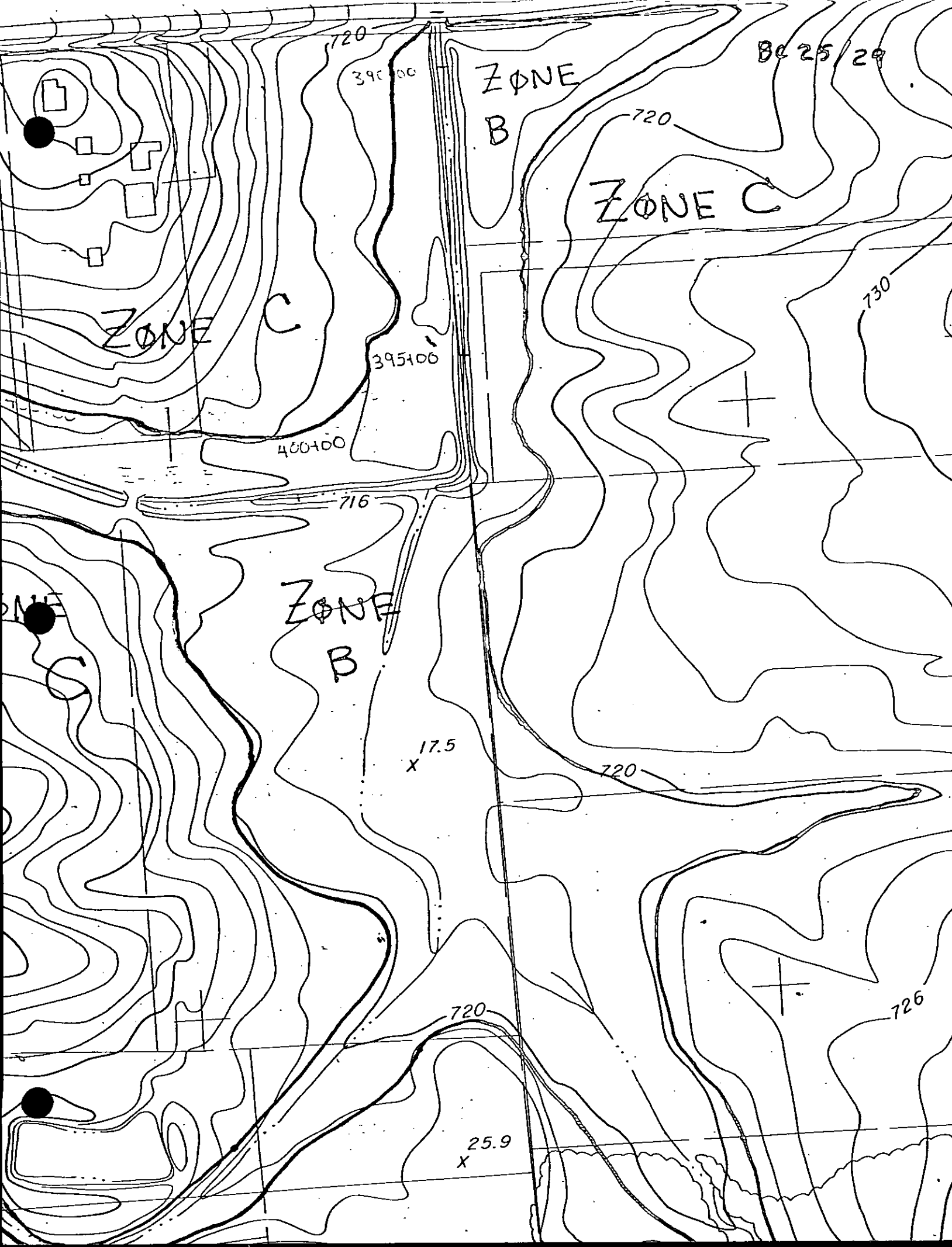
BC/21 29

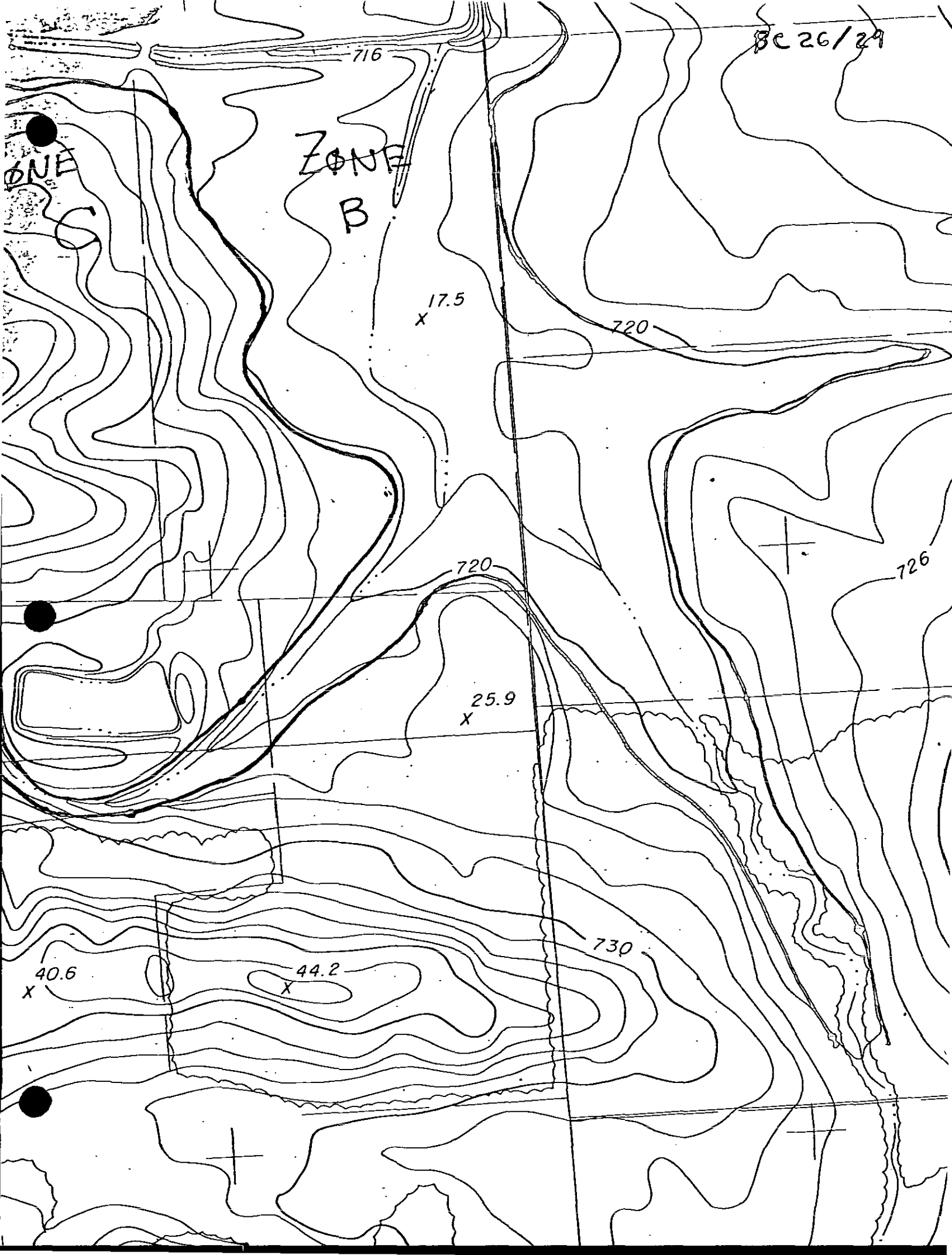


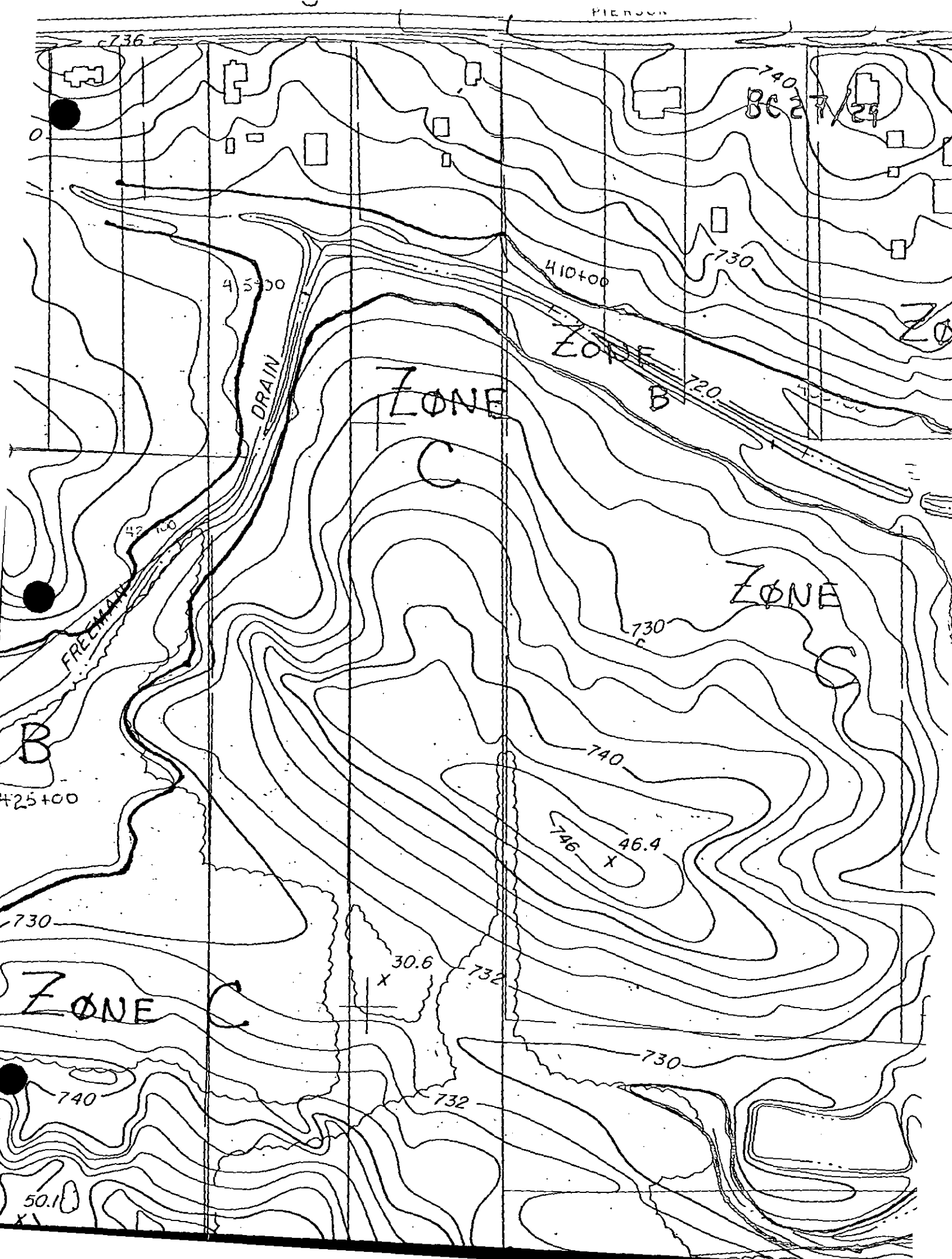

BC 22/29
REEMAN
706
710
716
ZONE C
12.1
12.9
712
ZONE A
710
712
708
ZONE C
ZONE C
716
DRAIN

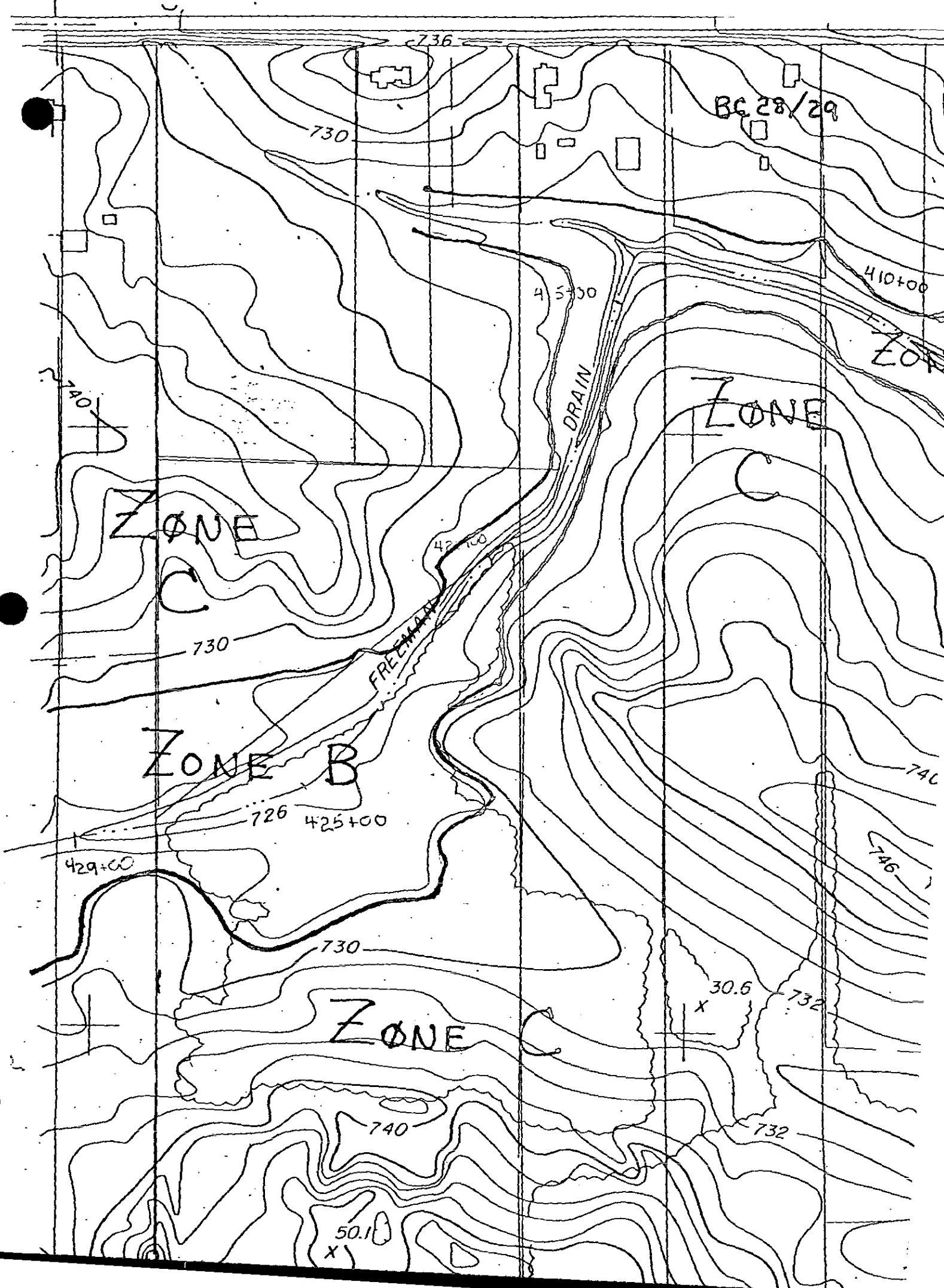

710
708
BC 23/24
19.0
23.0
24.2
ZONE
C
720
710
716
DRAIN
714
ZONE
A
ZONE
C'
714
15.8

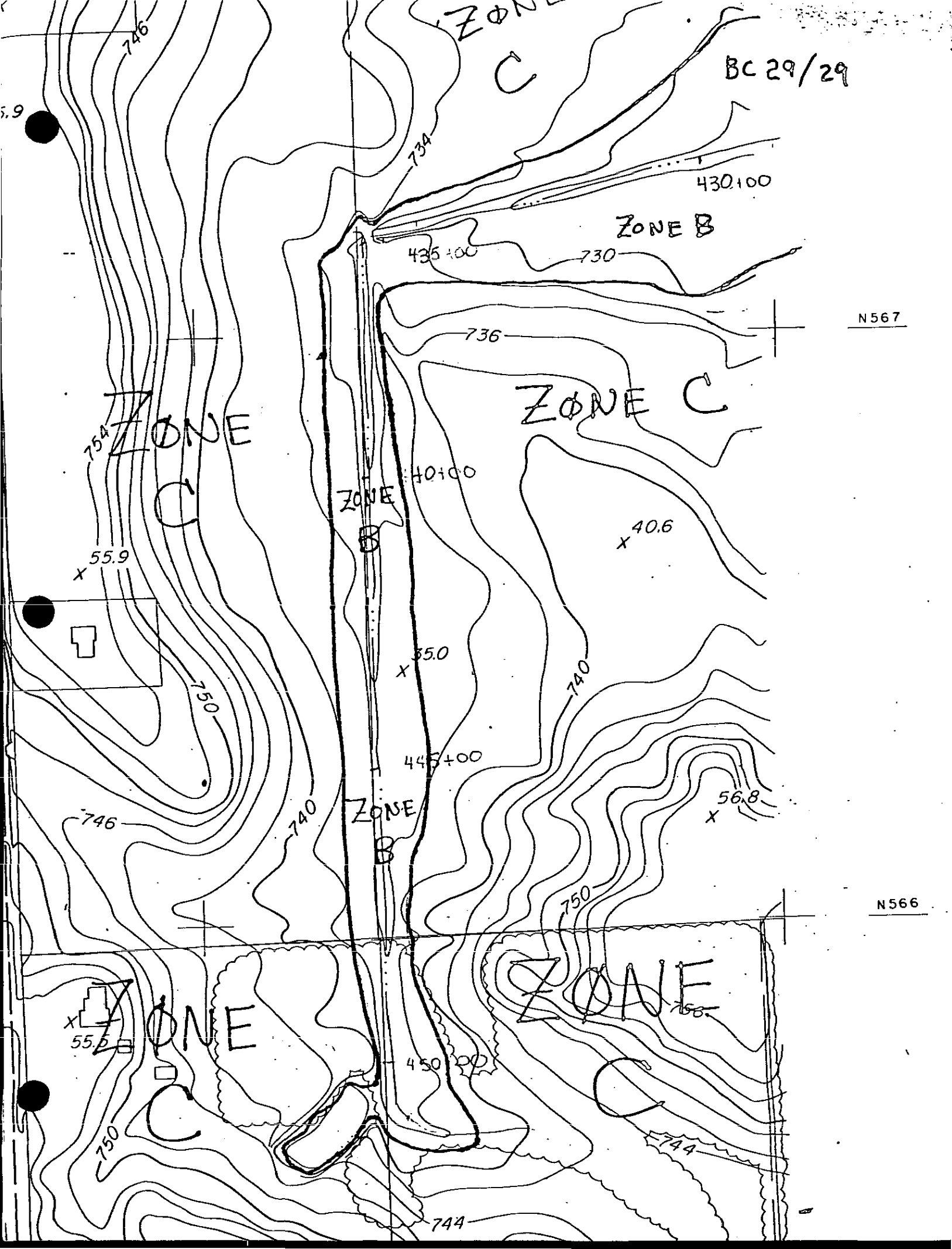

BC24/29
714
710
ZONE C
ZONE A
ZONE C
ZONE C
714
335+00
18.8
22.2
15.8
380+00
724
15.8
712
TANKS
ZONE C
720
ZONE C
730
30.5
720
ZONE A
389+00
E2,121

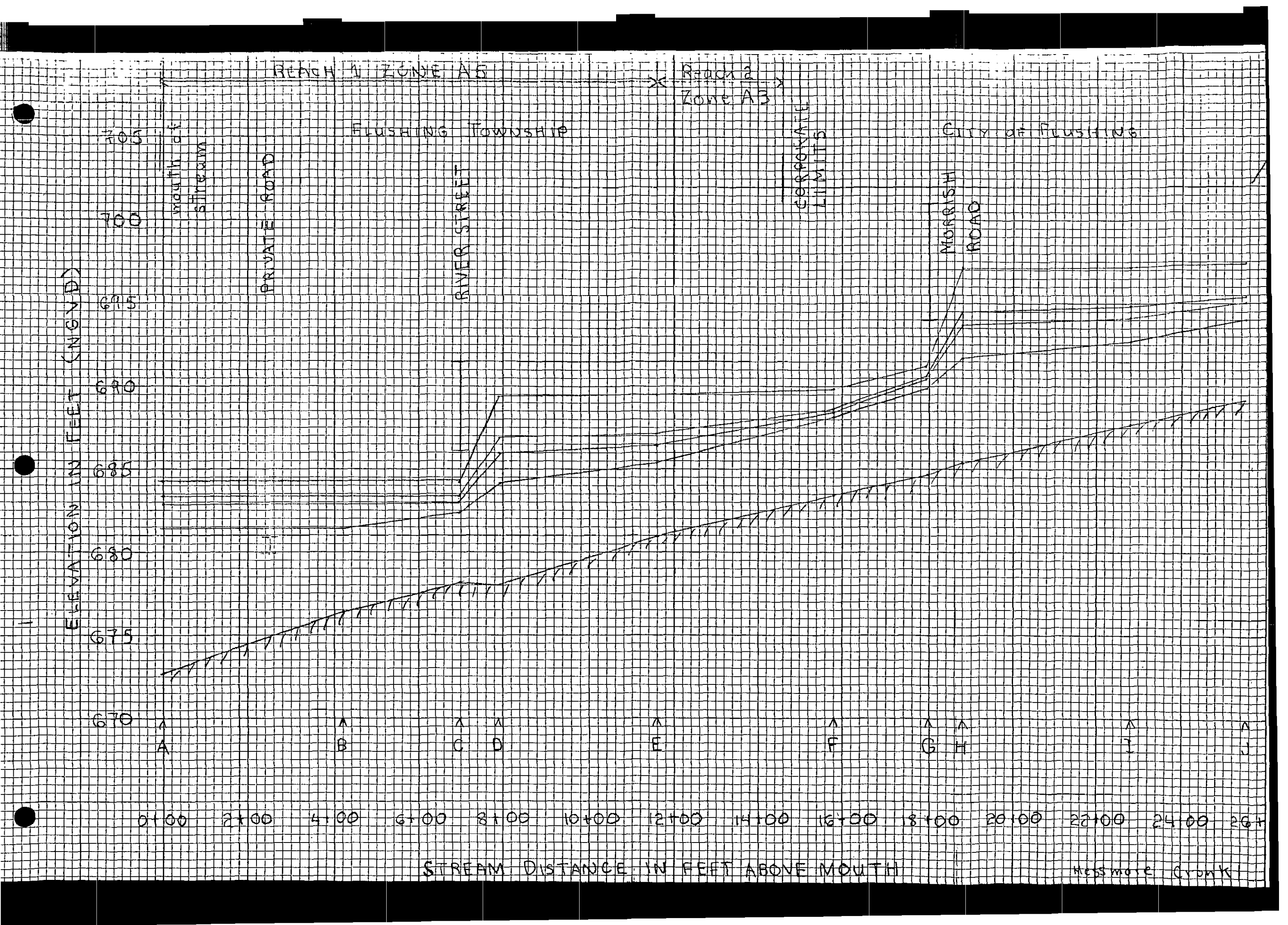

720
390100
ZONE
B
BC 25/29
720
ZONE C
730
ZONE C
395100
400100
716
ZONE
B
17.5
720
720
726
25.9

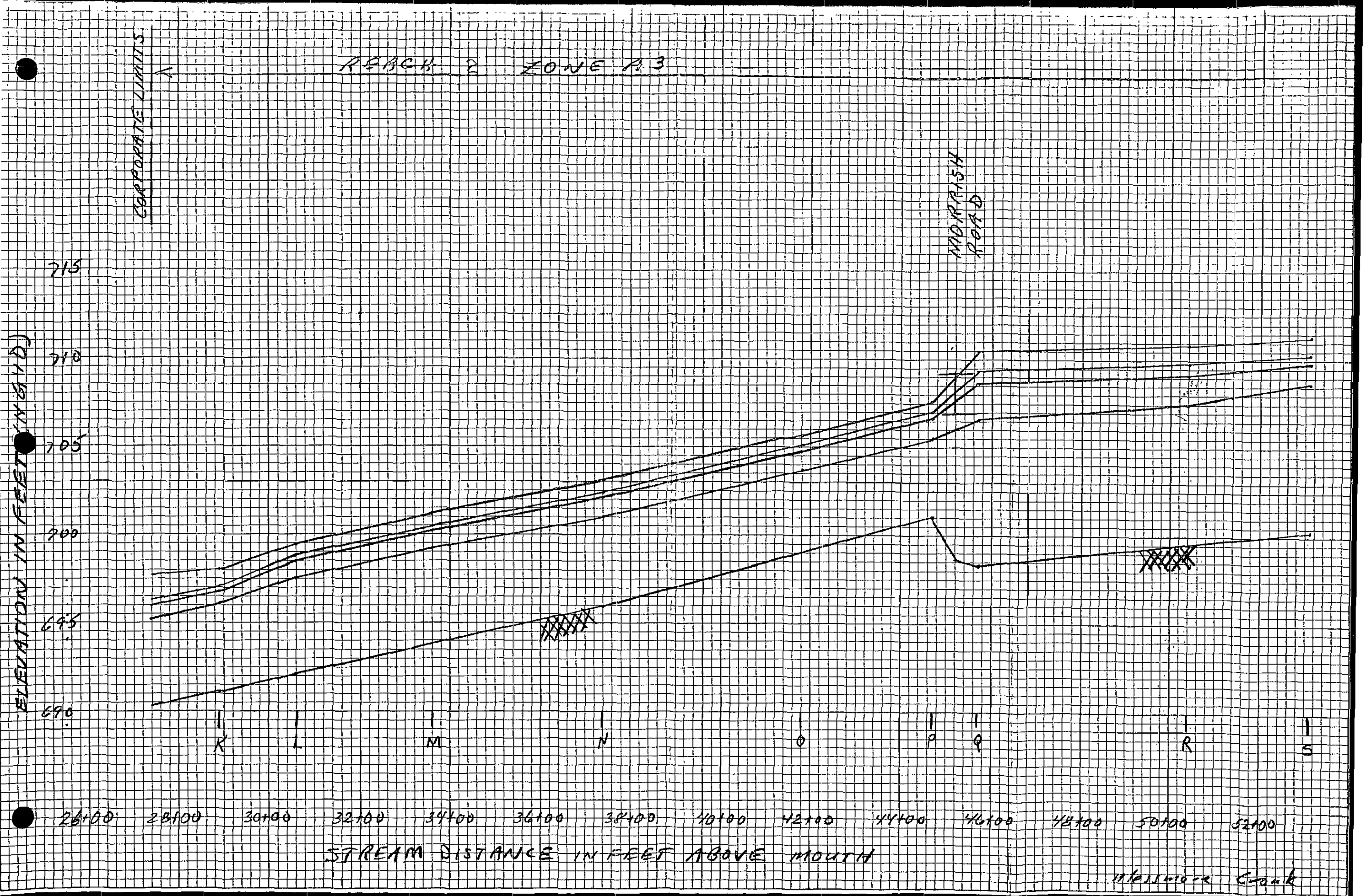

BC 26/29
716
ZONE
B
ONE
C
17.5
720
720
726
25.9
730
40.6
44.2

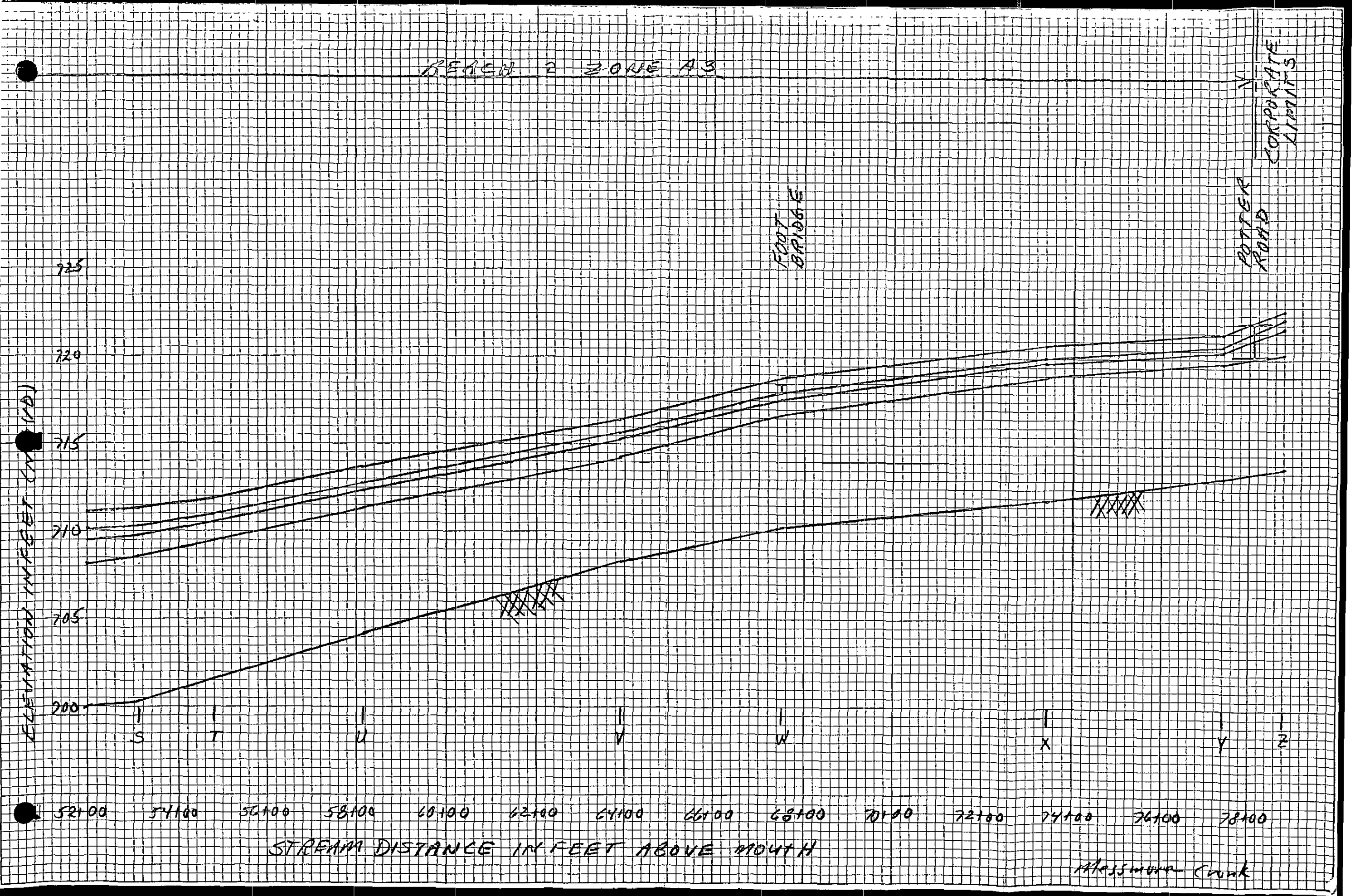

736
740
BC 27/29
730
410+00
415+00
ZONE B
720
DRAIN
ZONE C
420+00
FREEMAN
ZONE C
730
B
740
425+00
746
46.4
730
30.6
732
ZONE C
730
740
732
50.1


736
730
BC 28/29
410+00
415+00
DRAIN
ZONE
C
ZONE
C
740
420+00
FRE
730
ZONE B
726
425+00
429+00
740
746
730
30.6
732
ZONE C
740
732
50.1


BC 29/29
ZONE C
ZONE B
430+00
435+00
440+00
445+00
450+00
N567
N566
746
734
730
736
754
750
740
744
55.9
40.6
35.0
56.8
55.6


REACH 1 ZONE A5
Reach 2
Zone A3
FLUSHING TOWNSHIP
CITY OF FLUSHING
mouth of stream
PRIVATE ROAD
RIVER STREET
CORPORATE LIMITS
MORRISH ROAD
ELEVATION IN FEET (NGVD)
705
700
695
690
685
680
675
670
A
B
C
D
E
F
G
H
I
J
0+00
2+00
4+00
6+00
8+00
10+00
12+00
14+00
16+00
18+00
20+00
22+00
24+00
26+
STREAM DISTANCE IN FEET ABOVE MOUTH
Hopsmore Cronk


REACH 2 ZONE R3
CORPORATE LIMITS
MORRISH ROAD
715
710
705
700
695
690
ELEVATION IN FEET (MSLD)
K
L
M
N
O
P
Q
R
S
26+00
28+00
30+00
32+00
34+00
36+00
38+00
40+00
42+00
44+00
46+00
48+00
50+00
52+00
STREAM DISTANCE IN FEET ABOVE MOUTH
Mississippi Creek


REACH 2 ZONE A3
FOOT BRIDGE
POTTER ROAD
CORPORATE LIMITS
ELEVATION IN FEET (MSL)
725
720
715
710
705
700
S
T
U
V
W
X
Y
Z
52+00
54+00
56+00
58+00
60+00
62+00
64+00
66+00
68+00
70+00
72+00
74+00
76+00
78+00
STREAM DISTANCE IN FEET ABOVE MOUTH
Mississippi Creek

BOMAN DRAIN ST CULV. U.S.STANLEY RD VH BASE ELEVATION = 700.20 Z = 0.0

Sect F to G

Q	ELEV H1.	ELEV H4	D2	D3	TYPE	C	C ADJUSTE
80.0	704.04	********	2.80	2.50	2	0.88	0.
80.0	704.46	703.95	3.78	3.75	3	0.87	0.
80.0	705.17	704.81	4.63	4.61	3	0.85	0.
80.0	705.55	705.22	5.03	5.02	3	0.85	0.
80.0	706.72	706.37	5.20	5.20	4	0.81	0.
90.0	704.32	********	2.98	2.66	2	0.87	0.
90.0	704.60	703.95	3.79	3.75	3	0.87	0.
90.0	705.26	704.81	4.63	4.61	3	0.85	0.
90.0	705.64	705.22	5.04	5.02	3	0.85	0.
90.0	706.82	706.37	5.20	5.20	4	0.81	0.
100.0	704.59	********	3.14	2.81	2	0.87	0.
100.0	704.76	703.95	3.80	3.75	3	0.86	0.
100.0	705.37	704.81	4.64	4.61	3	0.85	0.
100.0	705.74	705.22	5.04	5.02	3	0.84	0.
100.0	706.92	706.37	5.20	5.20	4	0.81	0.
110.0	704.86	********	3.30	2.95	2	0.86	0
110.0	704.94	703.95	3.81	3.75	3	0.86	0
110.0	705.50	704.81	4.64	4.61	3	0.85	0
110.0	705.85	705.22	5.05	5.02	3	0.84	0
110.0	707.04	706.37	5.20	5.20	4	0.81	0
120.0	705.13	********	3.45	3.09	2	0.86	0
120.0	705.13	703.95	3.83	3.75	3	0.86	0
120.0	705.63	704.81	4.65	4.61	3	0.85	0
120.0	705.97	705.22	5.06	5.02	3	0.84	0
120.0	707.16	706.37	5.20	5.20	4	0.81	0
140.0	705.67	********	3.73	3.35	2	0.84	0
140.0	705.59	703.95	3.90	3.75	3	0.85	0
140.0	705.95	704.81	4.67	4.61	3	0.84	0
140.0	706.27	705.22	5.07	5.02	3	0.83	0
140.0	707.45	706.37	5.20	5.20	4	0.81	0
160.0	706.23	********	4.01	3.59	2	0.83	0
160.0	706.16	703.95	4.03	3.75	3	0.83	0
160.0	706.33	704.81	4.69	4.61	3	0.83	0
160.0	706.62	705.22	5.09	5.02	3	0.82	0
160.0	707.78	706.37	5.20	5.20	4	0.81	0
180.0	706.84	********	4.26	3.80	2	0.81	0
		[illegible]	4.73	4.61	3	0.81	0

100.0	705.74	705.22				
100.0	706.92	706.37	5.20	5.20	4	0.8
110.0	704.86	********	3.30	2.95	2	0.86
110.0	704.94	703.95	3.81	3.75	3	0.86
110.0	705.50	704.81	4.64	4.61	3	0.85
110.0	705.85	705.22	5.05	5.02	3	0.84
110.0	707.04	706.37	5.20	5.20	4	0.81
120.0	705.13	********	3.45	3.09	2	0.86
120.0	705.13	703.95	3.83	3.75	3	0.86
120.0	705.63	704.81	4.65	4.61	3	0.85
120.0	705.97	705.22	5.06	5.02	3	0.84
120.0	707.16	706.37	5.20	5.20	4	0.81
140.0	705.67	********	3.73	3.35	2	0.84
140.0	705.59	703.95	3.90	3.75	3	0.85
140.0	705.95	704.81	4.67	4.61	3	0.84
140.0	706.27	705.22	5.07	5.02	3	0.83
140.0	707.45	706.37	5.20	5.20	4	0.81
160.0	706.23	********	4.01	3.59	2	0.83
160.0	706.16	703.95	4.03	3.75	3	0.83
160.0	706.33	704.81	4.69	4.61	3	0.83
160.0	706.62	705.22	5.09	5.02	3	0.82
160.0	707.78	706.37	5.20	5.20	4	0.81
180.0	706.84	********	4.26	3.80	2	0.81
180.0	706.80	704.81	4.73	4.61	3	0.81
180.0	707.05	705.22	5.11	5.02	3	0.81
180.0	708.15	706.37	5.20	5.20	4	0.81
200.0	707.51	********	4.48	4.01	2	0.79
200.0	707.36	704.81	4.78	4.61	3	0.80
200.0	707.56	705.22	5.13	5.02	3	0.79
200.0	708.57	706.37	5.20	5.20	4	0.81

Culvert set F to G

BOMAN DRAIN 1ST CULV. U.S. STANLEY RD VH (Sect. F&G) BASE ELEVATION = 700.20 Z = 0.0

Q	ELEV H1	ELEV H4	D2	D3	TYPE	C1	C ADJUST
220.0	708.47	********	*******	*******	5	0.45	0
220.0	709.03	706.37	5.20	5.20	4	0.81	0
240.0	709.34	********	*******	*******	5	0.47	0
240.0	709.54	706.37	5.20	5.20	4	0.81	0
260.0	710.20	********	*******	*******	5	0.48	0
260.0	708.34	********	*******	*******	6	0.81	0
260.0	710.09	706.37	5.20	5.20	4	0.81	0

See plot.

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
                                   (1st culv. d.s. Johnson Rd)
1  1001 BOMAN DR FLOW OVER EMBANKMENT SECT LJ TO  SEC KMVH  4 12  2  5 12
2  1002  70820  70820  70820  70852  70852  70852  70863  70863  70863  70891
2  1003  70891  70891
3  1004 LJ   1   9  3  707    3350 99 99
4  1005     20     50     80     60     90    130     80    110    150    130
4  1006    160    200
5  1007       0  1  7120   20  1  7100   41  2  7080   50  2  7061   54  2  7060
5  1008      58  2  7064   67  3  7080  110  3  7100  120  3  7120
6  1017  0  1 035 035  0  1 035 035  0  1 050 050
3  1024 BR JL 2   5  1  707    3350        45  7094 3 1
5  1027       0  1  7094    0  1  7070    3  1  7070    3  1  7094    0 -9  7094
6  1037  0  1 011 011
3  1044 RD JL 4   7  2   19          1  2          2 2                  2
5  1047       0  1  7135   16  1  7126   38  2  7116   75  2  7120  105  2  7121
5  1048     115  2  7133  120  2  7150
3  1064 MK   5  11  4  706    3384  1  3
5  1067       0  1  7136   27  1  7121   36  1  7066   41  2  7061   44  3  7058
5  1068      49  3  7066   56  4  7094   76  4  7104   96  4  7106  111  4  7125
5  1069     126  4  7150
6  1077  0  1 035 035  0  1 035 035  0  1 035 035  0  1 030 030
```

R 1ST CULV .S. JOHNSON RD VH BASE ELEVATION = 705.90 Z = 0.45

Set L D M

Q	ELEV H1	ELEV H4	D2	D3	TYPE	C	C ADJUSTED
10.0	707.78	********	1.00	*******	1	0.92	0.92
10.0	708.26	708.20	1.82	2.30	3	0.92	0.92
10.0	708.56	708.52	2.16	2.62	3	0.92	0.92
10.0	708.67	708.63	2.27	2.73	3	0.91	0.91
20.0	708.44	********	1.43	*******	1	0.92	0.92
20.0	708.43	708.20	1.68	2.30	3	0.92	0.92
20.0	708.70	708.52	2.11	2.62	3	0.91	0.91
20.0	708.80	708.63	2.23	2.73	3	0.91	0.91
30.0	709.04	********	1.77	*******	1	0.90	0.90
30.0	NO SOLUTION TYPE THREE FLOW						
30.0	708.95	708.52	1.90	2.62	3	0.90	0.90
30.0	709.03	708.63	2.13	2.73	3	0.90	0.90
40.0	709.63	********	2.06	*******	1	0.87	0.87
40.0	NO SOLUTION TYPE THREE FLOW						
40.0	709.36	708.63	3.00	2.73	3	0.88	0.88
40.0	709.66	708.91	3.00	3.00	4	0.84	0.84
55.0	710.64	********	2.41	*******	1	0.82	0.82
55.0	710.33	708.91	3.00	3.00	4	0.84	0.84
80.0	NO SOLUTION TYPE ONE FLOW---SUPERCRITICAL FLOW AT APPROACH SECTION						
80.0	713.55	********	*******	*******	5	0.53	0.53
80.0	711.36	********	*******	*******	6	0.84	0.84
80.0	711.92	708.91	3.00	3.00	4	0.84	0.84
100	713.61	708.91					
20.0	NO SOLUTION TYPE ONE FLOW---SUPERCRITICAL FLOW AT APPROACH SECTION						
20.0	719.71	********	*******	*******	5	0.58	0.58
20.0	714.81	********	*******	*******	6	0.84	0.84
20.0	715.69	708.91	3.00	3.00	4	0.84	0.84

continued next page

type 4

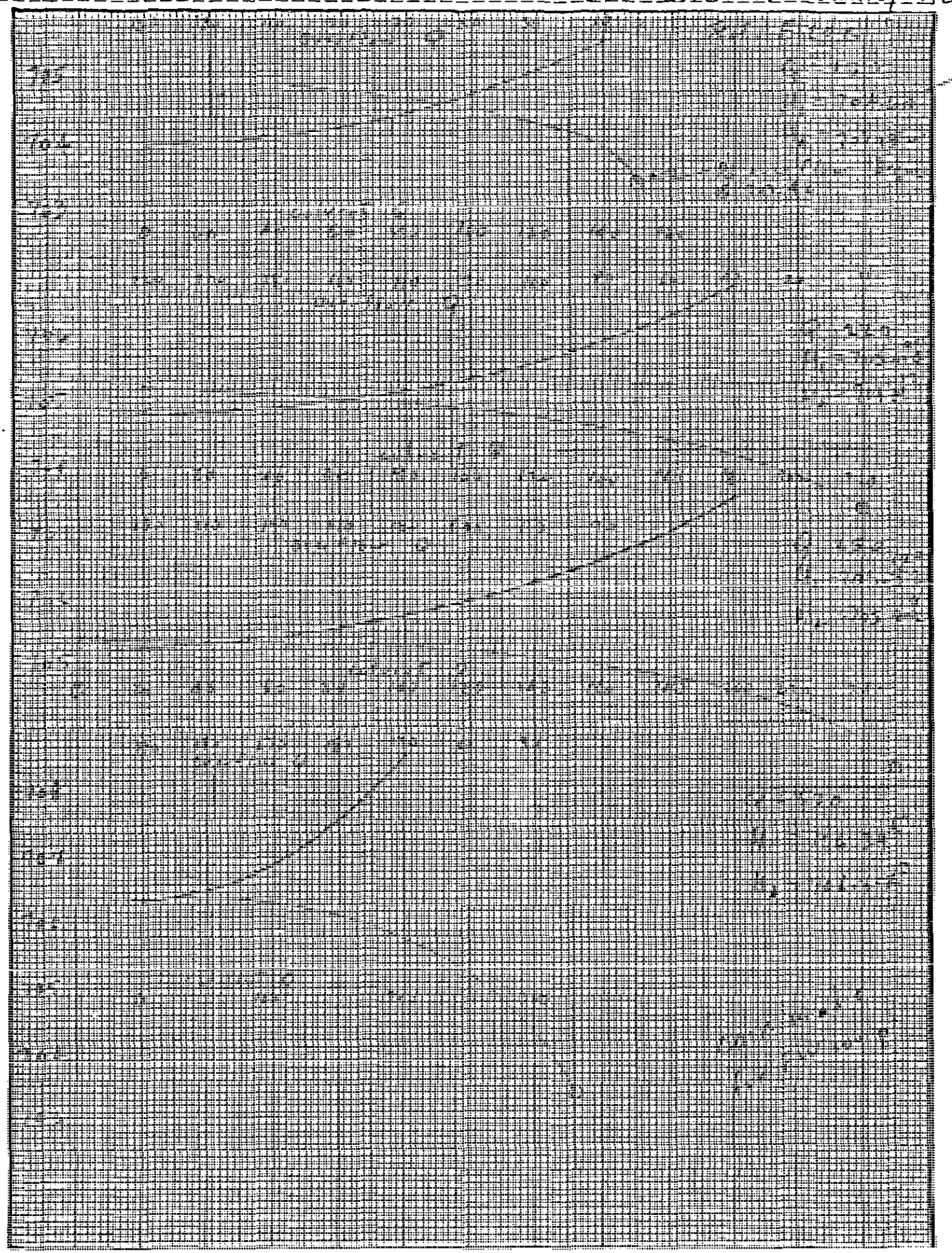
$Q = 46.11 H^{.5}$ ✓ = 1 barrel

9-213-E
(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

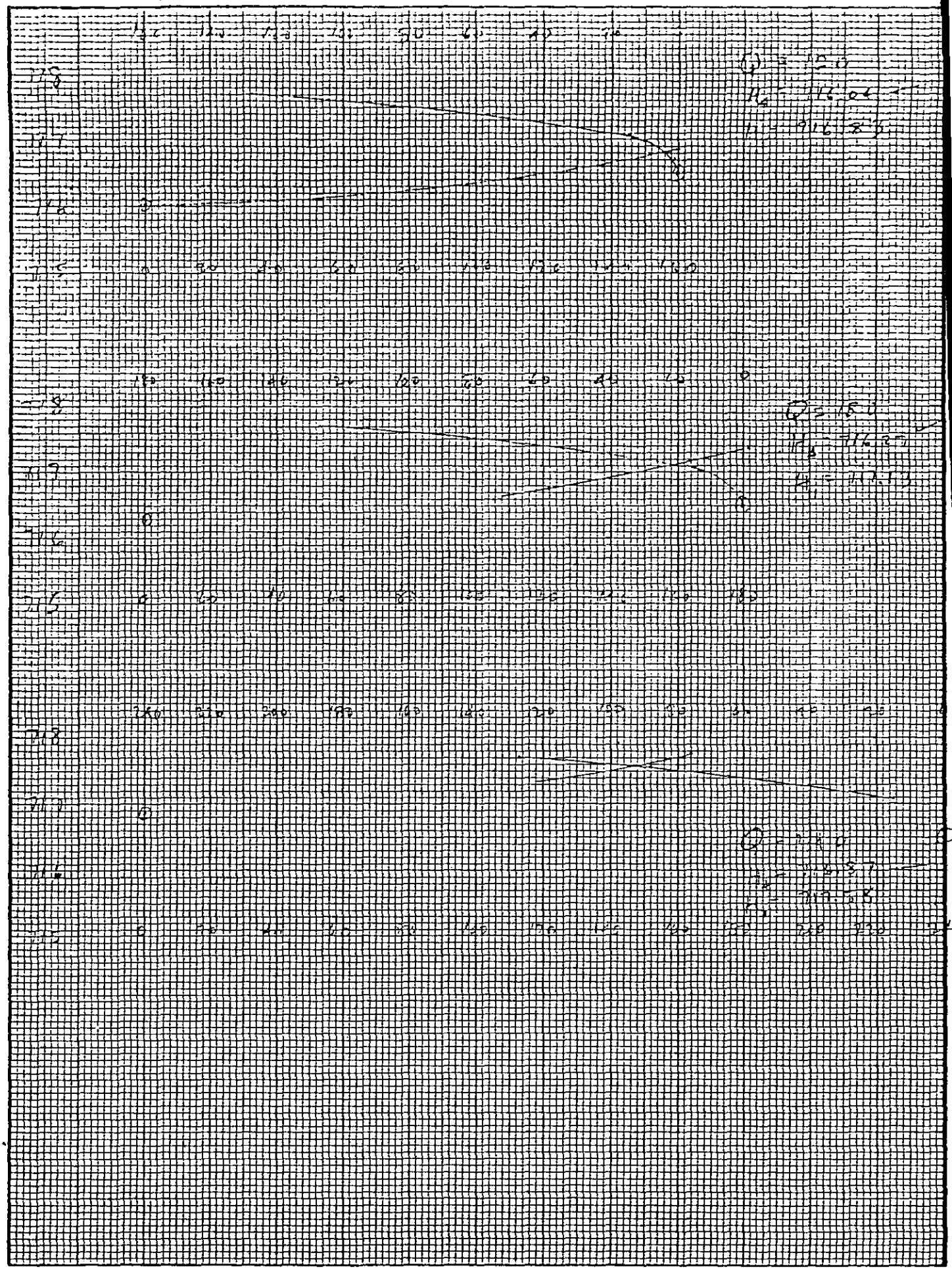
File

Boman drain 1st Culv. U.S. Stanley Rd



WATER RESOURCES DIVISION

Roman drain, 2nd Culvert U.S. Johnson Rd

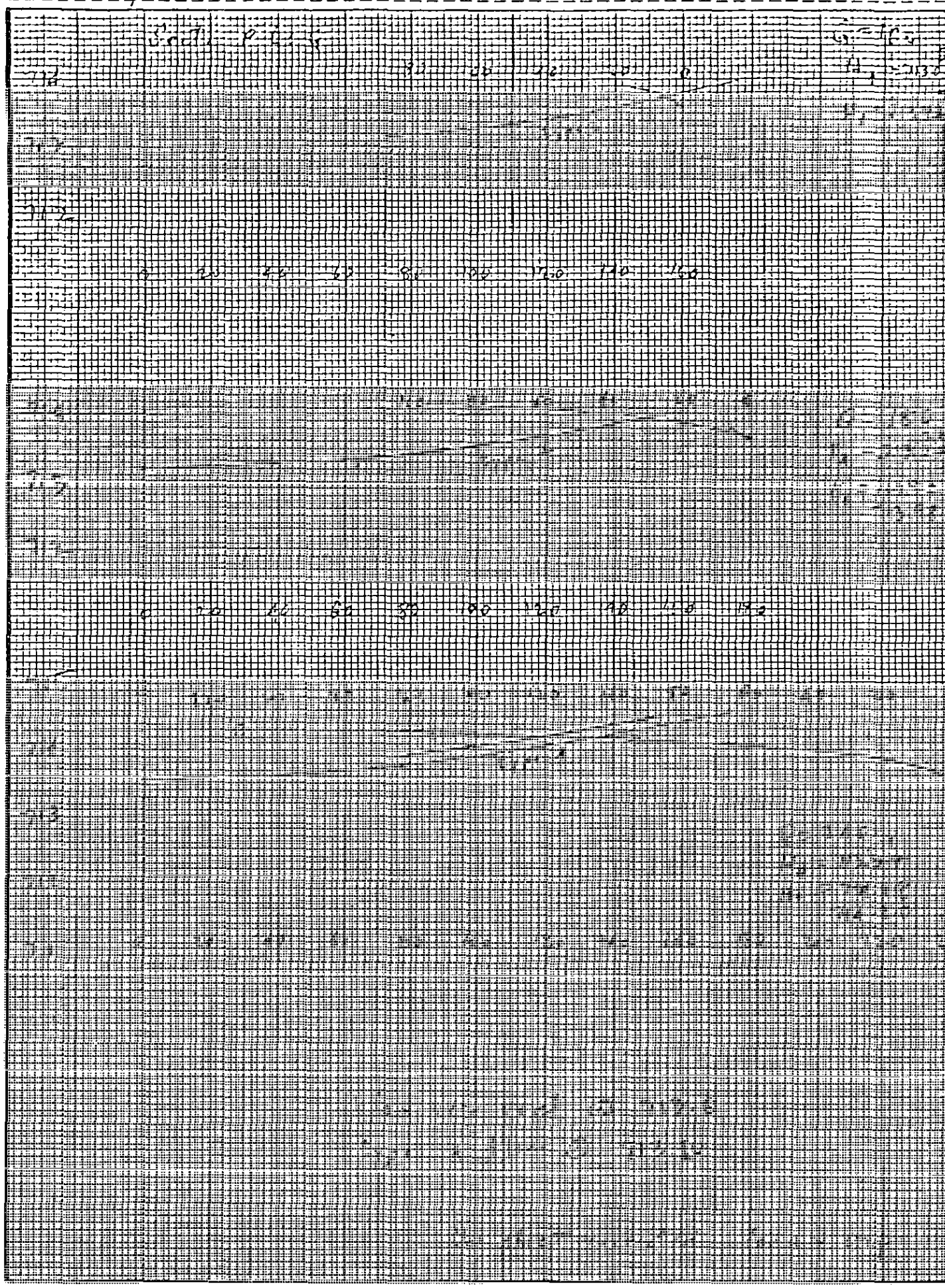


Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File

Boman dr, Duff Rd Culv.



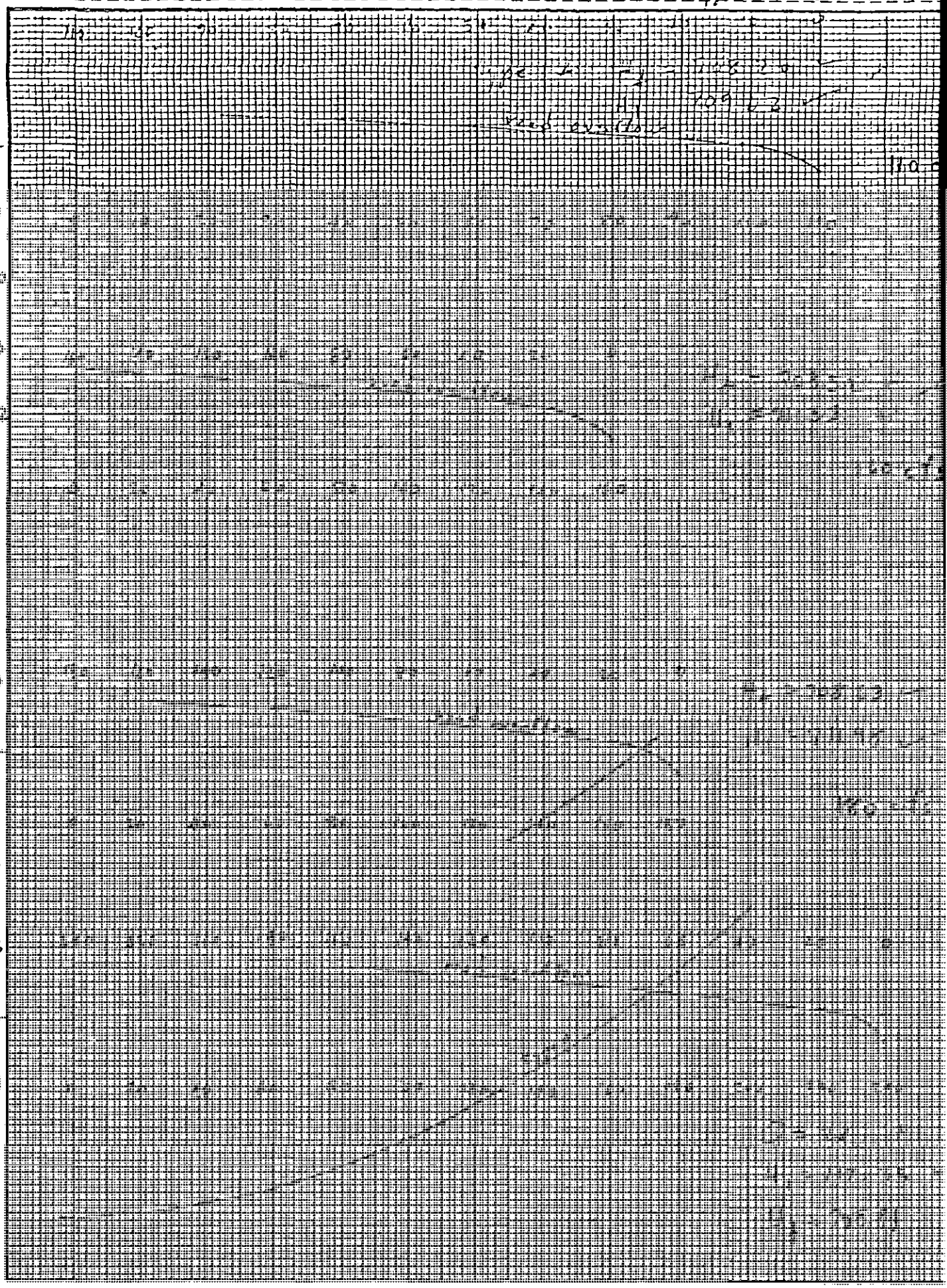
Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

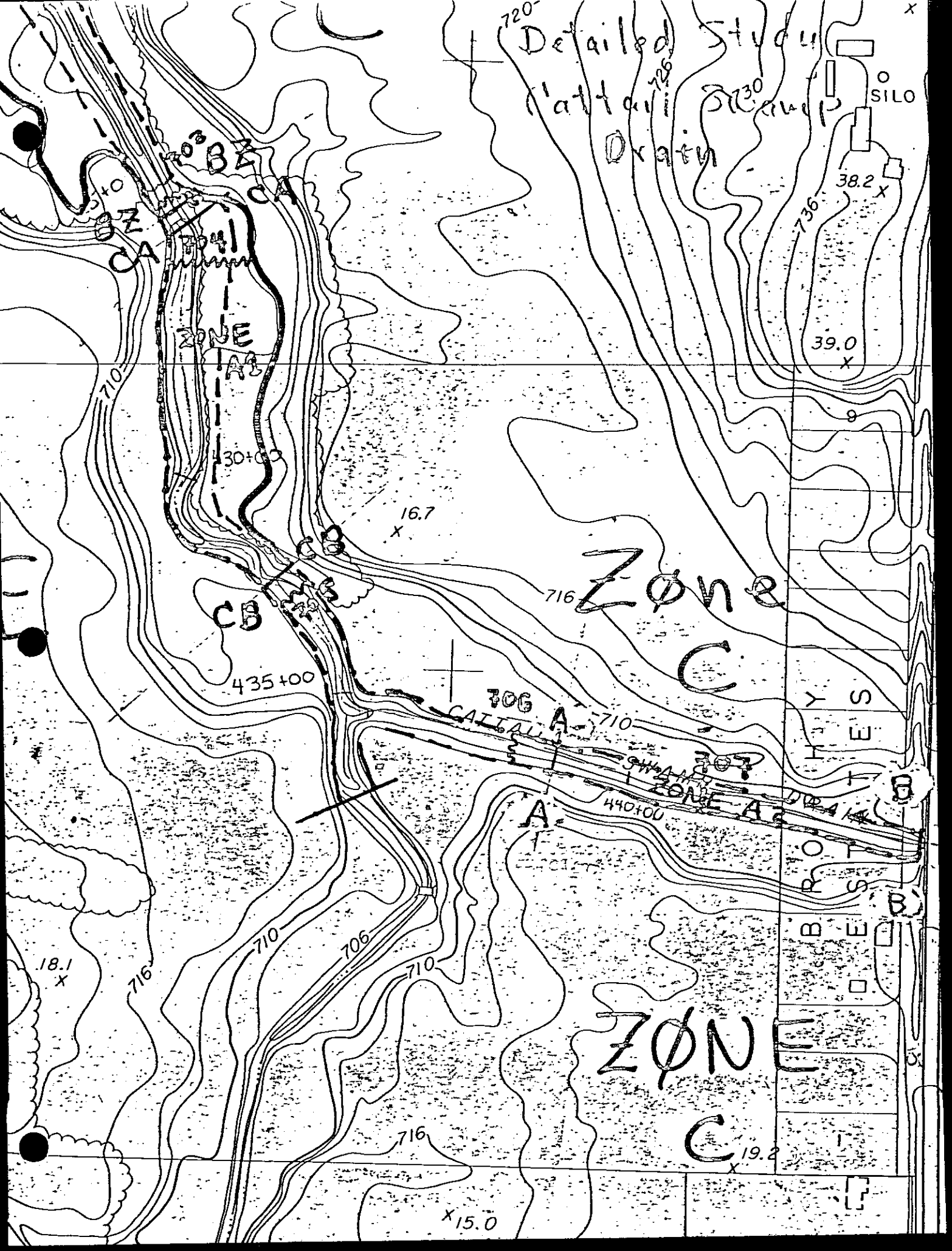
File .....

Sect. L to M

Bieman drain (1st culvert d.s. Johnson Rd) Use type 4 for all Qs



Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....


Detailed Study
Pattani Swamp
Drain
SILO
BZ
CA
ZONE A2
430+00
CB
435+00
ZONE C
CATTAIL
440+00
ZONE A2
ZONE C
HESS
BROOKES
710
716
706
720
726
730
736
38.2
39.0
16.7
18.1
19.2
15.0

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

5  8110        0  1  7160   30  1  7140   40  1  7120   50  1  7100   70  1  7080
5  8111       95  1  7060  110  2  7040  115  2  7025  125  2  7025  130  3  7040
5  8112      135  3  7060  165  3  7080  195  3  7080  220  3  7100  250  3  7120
5  8113      305  3  7140  375  3  7160
6  8114  1  2 100 100  1  2 060 060  1  2 090 090
3  8200 AS CD 0  19  3  706  ~~4450~~ 970  1  3
5  8210        0  1  7250    0  1  7180   25  1  7160   40  1  7140   50  1  7120
5  8211       85  1  7100   95  1  7080  105  2  7060  110  2  7045  120  2  7045
5  8212      130  2  7060  140  3  7080  145  3  7100  235  3  7120  240  3  7140
5  8213      270  3  7160  320  3  7180  380  3  7200  420  3  7220
6  8214  1  2 090 090  1  2 065 065  1  2 085 085
```

CATTAIL SWAMP DRAIN

```
7820 FDCUL 2   5  1  697   42550          0  7011 3 0
7821        0  1  7011     0  1  6965     5  1  6965     5  1  7011     0 -9  7011
7822  1  2 020 020
7830 FD RD 4  17  2   20                1  2            2 2                    1
7831     -450  1  7180 -400  1  7160 -260  1  7140 -140  1  7120 -100  1  7100
7811      -85  1  7080  -75  1  7063  -50  1  7043  -25  1  7032    0  2  7032
SEQUENCE**
7812        4  2  7026   90  2  7040  150  2  7060  160  2  7080  175  2  7100
7813      190  2  7120  200  2  7140
7900 AS CA 5  20  5  698   42580  2  4
7910     -450  1  7180 -400  1  7160 -260  1  7140 -140  1  7120 -100  1  7100
7911      -85  1  7080  -75  1  7063  -50  1  7043  -14  2  7026   -4  2  6971   CA
7912       -2  3  6969    0  3  6966    1  4  6968    4  4  6971    5  5  7026
7913       90  5  7040  150  5  7060  160  5  7080  175  5  7100  190  5  7120
7914  1  2 090 090  1  2 040 040  1  2 040 040  1  2 040 040  1  2 090 090
8000 AS CB 0  18  3  702   43275  1  3
8010        0  1  7160   50  1  7140  130  1  7120  150  1  7100  170  1  7080
8011      190  1  7060  360  1  7060  365  2  7040  375  2  7000  385  2  7000   CB
8012      400  3  7020  410  3  7040  445  3  7060  455  3  7080  470  3  7100
8013      490  3  7120  510  3  7140  530  3  7160
8014  1  2 100 100  1  2 060 060  1  2 090 090
8100 AS CC 1  17  3  703   ~~43870~~  1  3
8104      120     175     240     200     200
                                  340
```

A

CATTAIL SWAMP DRAIN

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 15,DATE= 8/24/78

WATER-SURFACE PROFILE FOR: ARMSTRONG CREEK STANLEY RD TO ELMS RD HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

```
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /  ACC   *ID*
BX AS BX AT   41470 /     0 /    360. /   584. /   25670. / 3.63 / -191. /  129.
   702.40 /   0.02 /                  /  702.42 /    0.62 /  0.12/          *IS*
BY AS BY AT   42080 /   610 /    360. /   200. /   15411. / 1.37 /  485. /  576.
   702.58 /   0.07 /   0.20 /   0.02 /  702.65 /    1.80 /  0.17 / 0.000  *XS*
BZ AS BZ AT   42550 /   470 /    360. /    92. /    7110. / 1.16 /  -23. /   31.
   703.03 /   0.28 /   0.56 /   0.10 /  703.31 /    3.92 /  0.35 / 0.001  *XS*
                          BEGIN BRIDGE ANALYSIS
   FDCUL AT   42550 /       /    145. /    23. /    1933. / 1.00 /    0. /    5.
   701.10 /   0.62 /       ...3...  (-.001)    /    6.31 /  0.52 /          *BO*
   EMBANKMENT OVERFLOW (CFS) / LEFT      60. / RIGHT     155. /             *RG*
   AS CA AT   42580 /    30 /    360. /    95. /    7635. / 1.42 /  -24. /   34.
   703.08 /   0.32 /   0.07 /   0.02 /  703.40 /    3.81 /  0.36 / -0.000  *AS*
CA M = **** / E = **** / K* = **** /   158. /   10374. / 2.39 /  -39. /   78.
   703.80 /   0.19 /                  /  704.00 /    2.28 /  0.27 /          *AS*
                          END BRIDGE ANALYSIS
CB AS CB AT   43275 /   695 /    360. /   164. /    8709. / 1.23 /  363. /  426.
   704.90 /   0.09 /   1.00 /   0.0  /  705.00 /    2.20 /  0.22 / 0.002  *XS*
tail AS CC AT  43870 /   595 /    200. /    92. /    4044. / 1.43 /   92. /  138.
   706.22 /   0.10 /   1.32 /   0.01 /  706.33 /    2.17 /  0.26 / 0.003  *XS*
ump AS CD AT   44500 /   630 /    200. /    95. /    3648. / 1.10 /   95. /  140.
ain 707.96 /   0.08 /   1.71 /   0.0  /  708.04 /    2.12 /  0.25 / 0.001  *XS*
```

100 YR

A

B

END OF THIS PROFILE

100-YR

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 20,DATE= 8/24/78

WATER-SURFACE PROFILE FOR: ARMSTRONG CREEK STANLEY RD TO ELMS RD HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HORIZONTAL CONTROL

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /      V  /    FN  /   ACC    *ID*
==================================================================================
AS BX AT   41470 /      0 /    360. /   474. /   24352. / 2.86 / -100. /  100.
  702.42 /   0.03 /                  /  702.45 /    0.76 /  0.12/           *IS*
----------------------------------------------------------------------------------
AS BY AT   42080 /    610 /    360. /   202. /   15610. / 1.38 /  485. /  575.
  702.61 /   0.07 /   0.21 /   0.02 /  702.67 /    1.78 /  0.17 / 0.000   *XS*
----------------------------------------------------------------------------------
AS BZ AT   42550 /    470 /    360. /    93. /    7170. / 1.18 /  -23. /   31.
  703.05 /   0.27 /   0.54 /   0.10 /  703.32 /    3.87 /  0.35 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
FDCUL AT   42550 /        /    144. /    23. /    1933. / 1.00 /    0. /    5.
  701.10 /   0.61 /       ...3...  (-.001)    /    6.26 /  0.51 /           *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      61. / RIGHT     156. /                *RG*
----------------------------------------------------------------------------------
AS CA AT   42580 /     30 /    360. /    96. /    7693. / 1.44 /  -25. /   35.
  703.10 /   0.32 /   0.07 /   0.02 /  703.41 /    3.76 /  0.35 / -0.000  *AS*
----------------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /   156. /   10444. / 2.30 /  -30. /   70.
  703.81 /   0.19 /                  /  704.00 /    2.30 /  0.27 /           *AS*
============================ END BRIDGE ANALYSIS ================================
AS CB AT   43275 /    695 /    360. /   163. /    8712. / 1.22 /  364. /  424.
  704.90 /   0.09 /   0.99 /   0.0  /  704.99 /    2.21 /  0.22 / 0.002   *XS*
----------------------------------------------------------------------------------
AS CC AT   ~~43870~~ /  595 /    200. /    92. /    4045. / 1.41 /   93. /  138.
  706.22 /   0.10 /   1.32 /   0.01 /  706.32 /    2.17 /  0.26 / 0.003   *XS*
----------------------------------------------------------------------------------
AS CD AT   ~~44500~~ /  630 /    200. /    94. /    3643. / 1.10 /   95. /  140.
  707.96 /   0.08 /   1.71 /   0.0  /  708.04 /    2.12 /  0.25 / 0.001   *XS*
----------------------------------------------------------------------------------
```

BX BY BZ CA CB Cattail Swamp Drain ~~CC~~ ~~CD~~ 340 170 FW A B

END OF THIS PROFILE

FW

WATER-SURFACE PROFILE FOR: ARMSTRONG CREEK STANLEY RD TO ELMS RD HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
BX  AS BX AT   41470 /     0 /    445. /   768. /   34557. / 3.44 / -211. /  150.
      702.94 /   0.02 /                  / 702.96 /    0.58 /   0.11/          *IS*
----------------------------------------------------------------------------------
BY  AS BY AT   42080 /   610 /    445. /   256. /   18830. / 1.69 /  454. /  581.
      703.10 /   0.08 /   0.19 /   0.03 / 703.17 /    1.74 /   0.18 / -0.000  *XS*
----------------------------------------------------------------------------------
BZ  AS BZ AT   42550 /   470 /    445. /   130. /    8856. / 1.68 /  -34. /   62.
      703.54 /   0.30 /   0.56 /   0.11 / 703.85 /    3.41 /   0.36 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
    FDCUL AT   42550 /        /    122. /    23. /    1933. / 1.00 /    0. /    5.
      701.10 /   0.44 /       ...3...  (-.001)   /    5.29 /   0.43 /          *BO*
----------------------------------------------------------------------------------
    EMBANKMENT OVERFLOW (CFS) / LEFT      94. / RIGHT     226. /                *RG*
----------------------------------------------------------------------------------
    AS CA AT   42580 /    30 /    445. /   135. /    9455. / 2.05 / -35. /   65.
      703.59 /   0.35 /   0.07 /   0.02 / 703.94 /    3.29 /   0.36 /  0.000  *AS*
----------------------------------------------------------------------------------
      M = **** / E = **** / K* = **** /   178. /   11133. / 2.66 / -43. /   88.
CA    703.96 /   0.26 /                  / 704.22 /    2.50 /   0.31 /          *AS*
============================ END BRIDGE ANALYSIS ================================
CB  AS CB AT   43275 /   695 /    445. /   190. /   10417. / 1.30 /  362. /  433.
      705.30 /   0.11 /   1.19 /   0.0  / 705.41 /    2.34 /   0.23 /  0.001  *XS*
----------------------------------------------------------------------------------
    AS CC AT   ~~43870~~ 340 /   595 /    240. /   113. /    5045. / 1.57 /   87. /  144.
Ca Hal CC 706.63 /   0.11 /   1.33 /   0.0  / 706.74 /    2.12 /   0.26 /  0.004  *XS*   A
----------------------------------------------------------------------------------
    AS CD AT   ~~44500~~ 990 /   630 /    240. /   109. /    4479. / 1.11 /   94. /  141.
Swamp CD 708.27 /   0.08 /   1.61 /   0.0  / 708.35 /    2.21 /   0.25 /  0.007  *XS*   B
drain
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

500 YR

500-YR

WATER-SURFACE PROFILE FOR: ARMSTRONG CREEK STANLEY RD TO ELMS RD HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 1, UPSTREAM COMPUTATIONS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
BX AS BX AT   41470 /     0 /    225. /   300. /   13503. / 3.63 / -155. /   98.
   701.41 /   0.03 /                  / 701.44 /    0.75 /  0.13/          *IS*
----------------------------------------------------------------------------------
BY AS BY AT   42080 /   610 /    225. /   141. /   10418. / 1.12 /  522. /  569.
   701.62 /   0.04 /   0.22 /   0.01 / 701.67 /    1.60 /  0.15 / -0.000  *XS*
----------------------------------------------------------------------------------
BZ AS BZ AT   42550 /   470 /    225. /    66. /    4877. / 1.00 /  -13. /    5.
   702.02 /   0.18 /   0.47 /   0.07 / 702.21 /    3.43 /  0.32 / 0.000   *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
FDCUL AT      42550 /       /    175. /    23. /    1933. / 1.00 /    0. /    5.
   701.10 /   0.91 /       ...3...  (-.001)    /    7.63 /  0.63 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       8. / RIGHT       42. /                *RG*
----------------------------------------------------------------------------------
AS CA AT      42580 /    30 /    225. /    66. /    5224. / 1.20 /  -13. /    5.
   702.07 /   0.22 /   0.06 /   0.02 / 702.28 /    3.40 /  0.31 / -0.000  *AS*
----------------------------------------------------------------------------------
CA M = **** / E = **** / K* = **** /    112. /    8456. / 1.69 /  -29. /   49.
   703.33 /   0.11 /                  / 703.44 /    2.02 /  0.20 /          *AS*
========================== END BRIDGE ANALYSIS ============================
CB AS CB AT   43275 /   695 /    225. /   119. /    5738. / 1.11 /  365. /  411.
   704.08 /   0.06 /   0.73 /   0.0  / 704.14 /    1.90 /  0.20 / -0.020  *XS*
----------------------------------------------------------------------------------
CATTAIL  CC AS CC AT  ~~43870~~ 340 /   595 /    120. /    60. /    2369. / 1.23 /  100. /  133.
SWAMP    705.38 /   0.08 /   1.30 /   0.01 / 705.46 /    2.02 /  0.25 / 0.004   *XS*  A
----------------------------------------------------------------------------------
DRAIN    CD AS CD AT  ~~44500~~ 970 /   630 /    120. /    63. /    2139. / 1.06 /   99. /  136.
         707.19 /   0.06 /   1.79 /   0.0  / 707.25 /    1.90 /  0.25 / 0.009   *XS*  B
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

10-YR

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 11,DATE= 8/24/78

WATER-SURFACE PROFILE FOR: ARMSTRONG CREEK STANLEY RD TO ELMS RD HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS

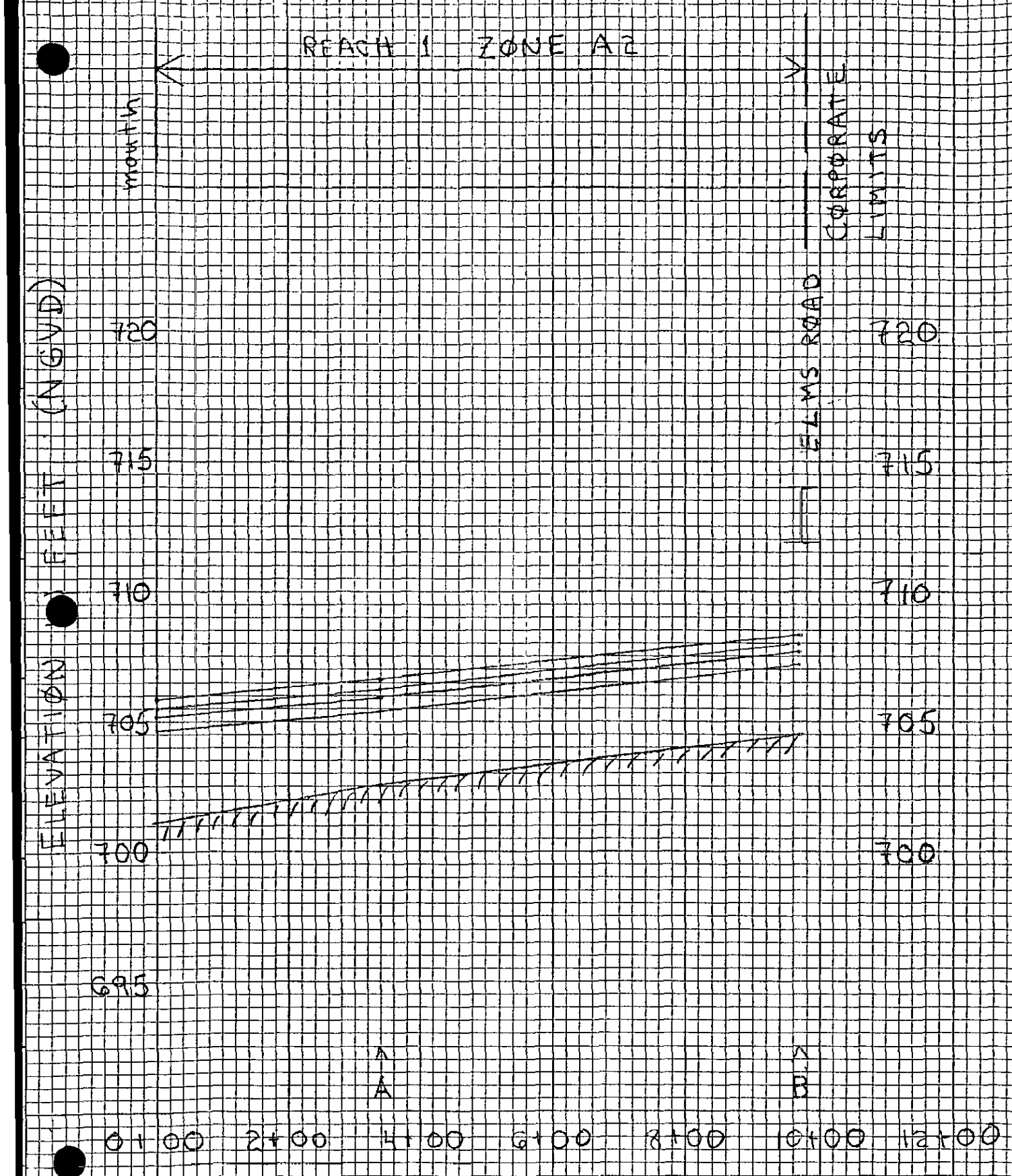
```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /    EG  /    V   /   FN  /  ACC   *ID*
==================================================================================
BX  AS BX AT   41470 /     0 /    320. /   500. /  21810. / 3.72 / -181. /  120.
    702.13 /   0.02 /                  / 702.15 /   0.64 /  0.12/          *IS*
----------------------------------------------------------------------------------
BY  AS BY AT   42080 /   610 /    320. /   179. /  13917. / 1.25 /  501. /  573.
    702.32 /   0.06 /   0.21 /   0.02 / 702.38 /   1.79 /  0.17 / 0.000   *XS*
----------------------------------------------------------------------------------
BZ  AS BZ AT   42550 /   470 /    320. /    80. /   6380. / 1.03 /  -17. /   15.
    702.76 /   0.25 /   0.54 /   0.09 / 703.02 /   3.98 /  0.35 / 0.000   *XS*
=========================== BEGIN BRIDGE ANALYSIS ==========================
    FDCUL AT   42550 /       /    155. /    23. /   1933. / 1.00 /    0. /    5.
    701.10 /   0.71 /       ...3...  (-.001)   /   6.74 /  0.55 /          *BO*
----------------------------------------------------------------------------------
    EMBANKMENT OVERFLOW (CFS) / LEFT      44. / RIGHT     121. /            *RG*
----------------------------------------------------------------------------------
    AS CA AT   42580 /    30 /    320. /    82. /   6866. / 1.25 /  -19. /   18.
    702.81 /   0.30 /   0.07 /   0.02 / 703.11 /   3.91 /  0.35 / -0.000   *AS*
----------------------------------------------------------------------------------
CA  M = **** / E = **** / K* = **** /    147. /   9916. / 2.23 /  -37. /   72.
    703.70 /   0.16 /                  / 703.87 /   2.18 /  0.25 /          *AS*
=========================== END BRIDGE ANALYSIS ============================
CB  AS CB AT   43275 /   695 /    320. /   151. /   7912. / 1.20 /  363. /  422.
    704.70 /   0.08 /   0.91 /   0.0  / 704.78 /   2.11 /  0.22 / 0.011   *XS*
----------------------------------------------------------------------------------
CATTAIL CC  AS CC AT   43870 /   595 /    175. /    82. /   3558. / 1.35 /   95. /  135.
SWAMP       705.99 /   0.09 /   1.29 /   0.01 / 706.09 /   2.13 /  0.26 / 0.004   *XS*  A
DRAIN
----------------------------------------------------------------------------------
CD  AS CD AT   44500 /   630 /    175. /    85. /   3174. / 1.09 /   96. /  139.
    707.74 /   0.07 /   1.71 /   0.0  / 707.82 /   2.06 /  0.25 / 0.018   *XS*  B
----------------------------------------------------------------------------------
```

END OF THIS PROFILE

50-YR

CATTAIL SWAMP DRAIN THRU FLUSHING TOWNSHIP

REACH 1 ZONE A2



```
      1         2         3         4         5         6         7         8
.5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

   1 COLE CREEK SEYMOUR RD TO MCKINLEY RD     KNUTILLA 15  5  2 99 12
   5  69590  69770  69840  70010  69840
2700 Q      1  14  3  691     5120  1  3
2705     650     950    1050    1400    1050
2710      -12  1  7020    -5  1  7000     0  1  6989    16  2  6952    22  2  6925
2711       26  2  6911    30  2  6902    36  2  6902    44  3  6939    57  3  6945
2712       85  3  6957   220  3  6980   340  3  7000   360  3  7020
2720  1  2 100 100  1  2  42  42  1  2  50  50
2750 Q+1    0  12  3  694     5410  1  3
2760        0  1  7060    40  1  6980    90  1  6960   100  2  6940   110  2  6920
2761      120  2  6908   130  3  6920   150  3  6940   155  3  6960   170  3  6980
2762      370  3  7000   420  3  7060
2780  1  2 100 100  1  2  50  50  1  2  80  80
2800 R      0  19  3  692     5780  1  3
2810        0  1  7100    30  1  7080    40  1  7060    80  1  7040   100  1  7020
2811      185  1  7000   195  2  6980   205  2  6960   212  2  6940   220  2  6913
2812      235  2  6940   250  2  6960   270  3  6980   500  3  7000   515  3  7020
2813      525  3  7040   575  3  7060   600  3  7080   610  3  7100
2820  1  2 080 080  1  2 050 050  1  2 080 080
2850 R+1    1  11  3  696     6180  1  3
2855     550     800     900    1200     900
2860        0  1  7060   .30  1  7040    65  1  7020   110  1  7000   175  1  7000
2861      220  2  6980   225  2  6926   240  3  6980   265  3  7000   400  3  7020
2862      440  3  7060
2880  1  2 080 080  1  2 055  55  1  2 080 080
2900 S      0  16  3  695     6450  1  3
2910        0  1  7100    50  1  7080   160  1  7060   180  1  7040   215  1  7020
2911      385  2  7000   390  2  6980   400  2  6940   420  2  6980   435  3  7000
2912      460  3  7020   510  3  7040   530  3  7060   545  3  7080   560  3  7100
2913      583  3  7120
2920  1  2 090 090  1  2 065 065  1  2 090 090
2950 S+1    0  10  3  698     6950  1  3
2960        0  1  7100    50  1  7040   210  1  7035   310  1  7020   370  2  7000
2961      380  2  6950   405  3  7000   415  3  7020   435  3  7040   500  3  7100
2980  1  2 100 100  1  2 065 065  1  2 120 120
3000 T      0  11  3  697     7670  1  3
3010        0  1  7100    30  1  7080    45  1  7060    80  1  7040   265  1  7020
3011      360  1  7000   380  2  6980   390  2  6967   405  3  7000   420  3  7100
3012      441  3  7120
3020  1  2 100 100  1  2 070 070  1  2 120 120
3100 U      0  18  3  699     8210  1  3
3110        0  1  7140    77  1  7120   130  1  7100   147  1  7080   153  1  7060
3111        [illegible]  1  7040   175  1  7020   195  2  7000   [illegible]0  2  6978   220  3  7000
3112      240  3  7020   280  3  7040   380  3  7040   450  3  7025   490  3  7040
3113      525  3  7100   580  3  7140   615  3  7160
```

WATER-SURFACE PROFILE FOR: COLE CREEK MCKINLEY RD TO POTTER RD KNUTILLA
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

```
==================================================================================
SECTD AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
AA     AT   10970 /     0 /    790. /  1096. /   39532. / 2.35 /   54. /  472.
   713.07 /   0.02 /                 /  713.09 /    0.72 /  0.06/          *IS*
----------------------------------------------------------------------------------
AB     AT   11650 /   680 /    790. /   930. /   28559. / 1.94 /   23. /  379.
   713.45 /   0.02 /   0.38 /   0.00 /  713.47 /    0.85 /  0.08 / 0.001  *XS*
----------------------------------------------------------------------------------
AB+1   AT   11910 /   260 /    790. /   715. /   21611. / 2.50 /   11. /  385.
   713.70 /   0.05 /   0.26 /   0.01 /  713.74 /    1.10 /  0.10 / -0.000 *XS*
----------------------------------------------------------------------------------
AC     AT   12380 /   470 /    790. /   661. /   24790. / 1.68 /   97. /  323.
   714.25 /   0.04 /   0.55 /   0.0  /  714.29 /    1.19 /  0.16 / 0.001  *XS*
----------------------------------------------------------------------------------
AD     AT   12720 /   340 /    790. /   994. /   35899. / 2.03 /   27. /  436.
   714.50 /   0.02 /   0.24 /   0.0  /  714.52 /    0.79 /  0.07 / -0.006 *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
AD BR AT   12720 /       /    585. /   103. /    9004. / 1.00 /    0. /   17.
   713.30 /   0.50 /       ...3...  (-.001)    /    5.65 /  0.40 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     212. / RIGHT        0. /                *RG*
----------------------------------------------------------------------------------
AE     AT   12825 /   105 /    790. /   727. /   49515. / 1.21 / -194. /  125.
   714.54 /   0.02 /   0.04 /   0.00 /  714.56 /    1.09 /  0.12 / 0.000  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   964. /   75181. / 1.13 / -200. /  133.
   715.27 /   0.01 /                 /  715.28 /    0.82 /  0.08 /          *AS*
============================ END BRIDGE ANALYSIS ================================
```

END OF THIS PROFILE

PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

	SECID	AT	DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
0	Q	AT	5120 / 698.40	0 / 0.15	1050. /	400. /	34918. / 698.55	1.38 / 2.63	3. / 0.25	103.	*IS*	S
.05	Q+1	AT	5410 / 698.70	290 / 0.16	1050. / 0.30	439. / 0.01	30216. / 698.86	1.80 / 2.39	40. / 0.25	150. / 0.000	*XS*	T
.02	R	AT	5780 / 699.26	370 / 0.17	1050. / 0.56	338. / 0.01	24052. / 699.43	1.14 / 3.10	200. / 0.28	300. / 0.001	*XS*	U
.05	R+1	AT	6180 / 700.59	400 / 0.47	900. / 1.48	223. / 0.15	10659. / 701.06	1.85 / 4.03	165. / 0.48	265. / 0.002	*XS*	V
.04	S	AT	6450 / 702.07	270 / 0.13	900. / 1.14	412. / 0.0	18018. / 702.20	1.80 / 2.18	220. / 0.25	430. / 0.000	*XS*	W
.06	S+1	AT	6950 / 703.27	500 / 0.15	900. / 1.22	380. / 0.01	18466. / 703.43	1.74 / 2.37	285. / 0.26	410. / 0.001	*XS*	X FW
.01	T	AT	7670 / 704.44	720 / 0.04	900. / 1.05	729. / 0.0	30115. / 704.48	1.61 / 1.23	210. / 0.09	410. / 0.002	*XS*	Y
.05	U	AT	8210 / 705.10	540 / 0.08	900. / 0.68	644. / 0.02	21324. / 705.18	2.64 / 1.40	170. / 0.21	445. / 0.001	*XS*	Z
.10	V	AT	8550 / 705.60	340 / 0.03	900. / 0.44	923. / 0.0	29681. / 705.63	2.03 / 0.98	180. / 0.08	480. / 0.014	*XS*	AA
.10	W	AT	8980 / 706.22	430 / 0.19	900. / 0.70	379. / 0.08	16871. / 706.41	2.17 / 2.38	380. / 0.33	480. / 0.001	*XS*	AB
.10	X	AT	9465 / 708.08	485 / 0.40	900. / 1.97	309. / 0.11	11833. / 708.48	3.05 / 2.91	-50. / 0.44	150. / 0.003	*XS*	AC
0	X+1	AT	9715 / 709.21	250 / 0.11	900. / 0.84	635. / 0.0	20440. / 709.32	3.54 / 1.42	20. / 0.26	370. / 0.002	*XS*	AD
.04	Y	AT	10270 / 710.68	555 / 0.19	900. / 1.50	341. / 0.04	14663. / 710.87	1.76 / 2.64	160. / 0.32	310. / 0.002	*XS*	AE
	Y+1	AT	10700 / 711.96	430 / 0.12	900. / 1.21	384. / 0.0	19590. / 712.08	1.42 / 2.35	50. / 0.24	150. / 0.001	*XS*	~~AF~~

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   23,DATE= 4/27/78

WATER-SURFACE PROFILE FOR:  COLE CREEK  MCKINLEY RD TO POTTER RD     KNUTILLA
PAGE  1 OF  1, PROFILE NUMBER  5,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
AA    AT   10970 /     0 /    790. /  1098. /   40281. / 2.26 /   60. /  460.
   713.09 /   0.02 /                 /  713.11 /    0.72 /  0.06/          *IS*
----------------------------------------------------------------------------------
AB    AT   11650 /   680 /    790. /   872. /   28532. / 1.79 /   50. /  350.
   713.46 /   0.02 /   0.37 /   0.00 /  713.48 /    0.91 /  0.08 / 0.001  *XS*
----------------------------------------------------------------------------------
AB+1  AT   11910 /   260 /    790. /   615. /   19858. / 2.40 /   75. /  375.
   713.73 /   0.06 /   0.29 /   0.02 /  713.79 /    1.28 /  0.22 / 0.000  *XS*
----------------------------------------------------------------------------------
AC    AT   12380 /   470 /    790. /   655. /   25742. / 1.58 /  110. /  310.
   714.33 /   0.04 /   0.57 /   0.0  /  714.36 /    1.21 /  0.15 / 0.001  *XS*
----------------------------------------------------------------------------------
AD    AT   12720 /   340 /    790. /   730. /   32545. / 1.01 /  150. /  350.
   714.58 /   0.03 /   0.25 /   0.0  /  714.61 /    1.08 /  0.08 / -0.010 *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
AD BR AT   12720 /       /    566. /   103. /    9004. / 1.00 /    0. /   17.
   713.30 /   0.47 /       ...3...  (-.001)    /    5.47 /  0.39 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT     220. / RIGHT       0. /                *RG*
----------------------------------------------------------------------------------
AE    AT   12825 /   105 /    790. /   517. /   37665. / 1.21 / -100. /  100.
   714.62 /   0.04 /   0.05 /   0.01 /  714.67 /    1.53 /  0.16 / -0.000 *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   648. /   53099. / 1.13 / -100. /  100.
   715.28 /   0.03 /                 /  715.30 /    1.22 /  0.11 /          *AS*
============================ END BRIDGE ANALYSIS ================================

                          END OF THIS PROFILE
```

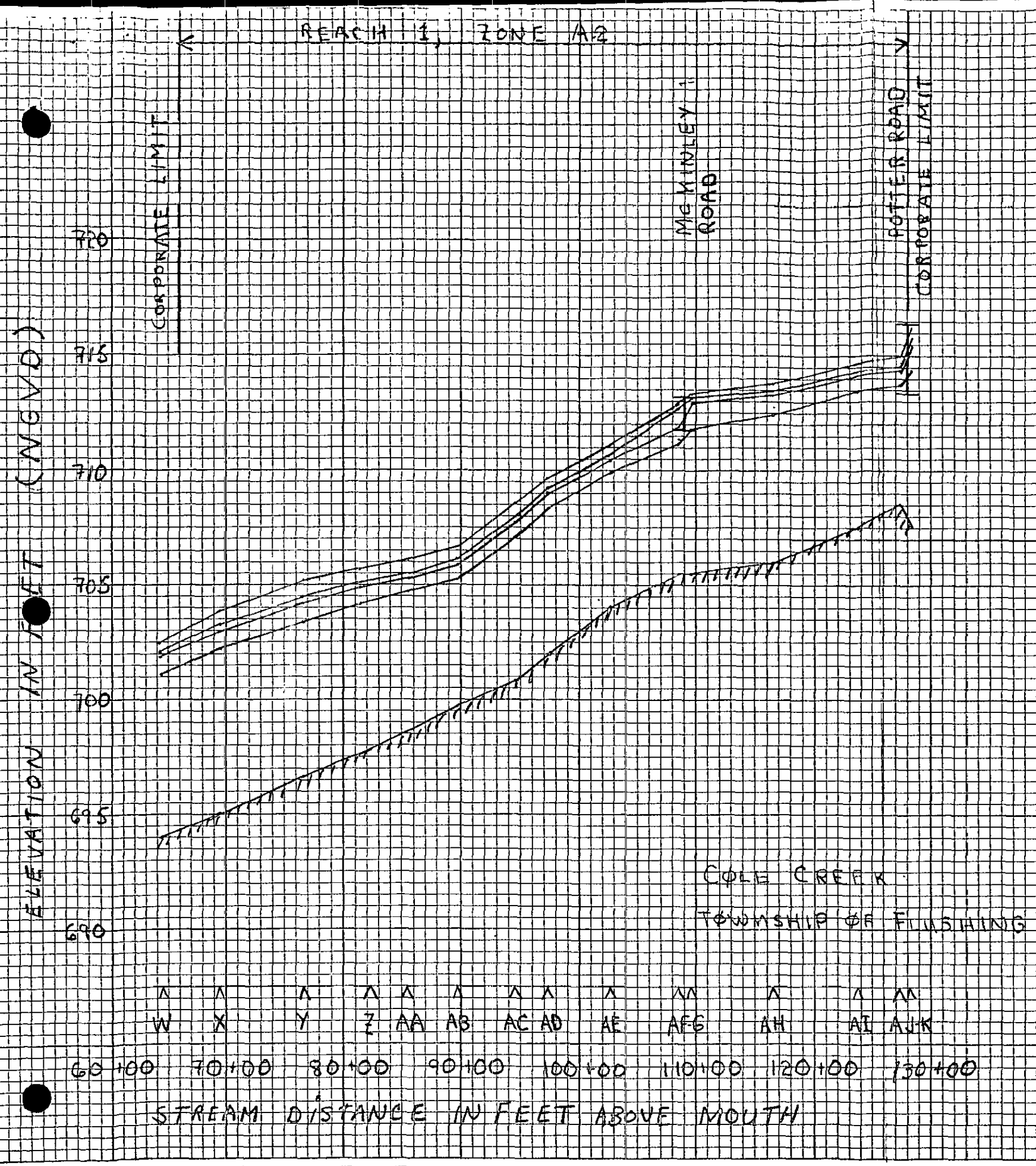
*** INPUT CARD PRINTOUT ***

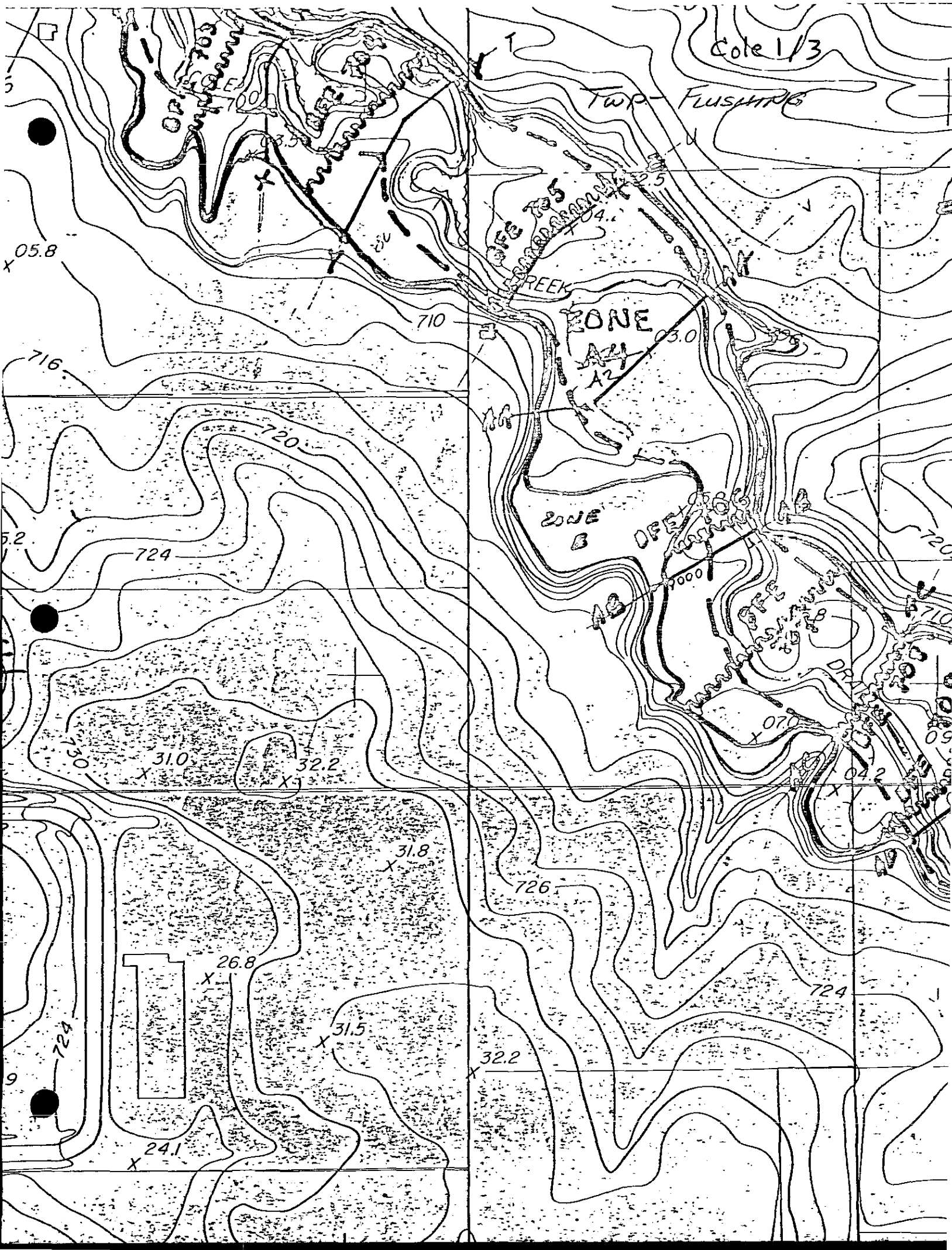
```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
 3120  1  2 100 100  1  2 070 070  1  2 120 120
 3200 V     0  15  3  699    8550  1  3
 3210       0  1  7140   70  1  7120   85  1  7100   90  1  7080   95  1  7060   AA
 3211     100  1  7040  440  2  7020  460  2  6986  470  3  7020  480  3  7040
 3212     488  3  7060  495  3  7080  510  3  7100  535  3  7120  600  3  7140
 3220  1  2 120 120  1  2 065 065  1  2 120 120
 3300 W     0  19  3  701    8980  1  3
 3310       0  1  7200   55  1  7180  160  1  7160  225  1  7140  235  1  7120   AB
 3311     248  1  7100  257  1  7080  267  1  7060  375  1  7040  450  2  7020
 3312     460  2  6997  473  3  7020  485  3  7040  495  3  7100  510  3  7120
 3313     535  3  7140  560  3  7160  610  3  7180  680  3  7200
 3320  1  2 120 120  1  2 055 055  1  2 120 120
 3400 X     0  27  3  702    9465  1  3
 3410    -375  1  7220 -325  1  7200 -255  1  7180 -182  1  7160 -125  1  7140
 3411    -100  1  7120  -90  1  7100  -55  1  7080  -10  1  7060    0  2  7051   AC
 3412       4  2  7049    6  2  7030    8  2  7017   13  2  7008   18  2  7018
 3413      20  2  7024   20  3  7042   24  3  7058   30  3  7068   42  3  7066
 3414     150  3  7080  200  3  7100  210  3  7120  220  3  7140  230  3  7160
 3415     242  3  7180  310  3  7200
 3420  1  2 120 120  1  2 055 055  1  2 090 090
 3450 X+1   0  10  3  704    9715  1  3
 3460       5  1  7100   50  2  7040   60  2  7020   70  3  7040   80  3  7060   AD
 3461     100  3  7080  255  3  7080  260  3  7080  370  3  7080  400  3  7100
 3480  1  2 120 120  1  2 060 060  1  2 100 100
 3500 Y     0  18  3  705   10270  1  3
 3510       0  1  7220   60  1  7200  110  1  7180  130  1  7160  140  1  7140   AE
 3511     148  1  7120  153  1  7100  160  1  7080  170  2  7060  185  2  7040
 3512     190  2  7060  205  3  7080  270  3  7100  400  3  7100  500  3  7120
 3513     710  3  7160  780  3  7180  815  3  7200
 3520  1  2 100 100  1  2 065 065  1  2 090 090
 3550 Y+1   0   9  3  708   10700  1  3
 3551       0  1  7140   45  1  7120   55  1  7100   75  2  7080  100  2  7050   AF
 0552     110  3  7080  160  3  7100  230  3  7120  240  3  7140
**SEQUENCE**
 3560  1  2 100 100  1  2 065 065  1  2 090 090
 3600 Z     0  11  3  706   10850  1  3
 3610       0  1  7180   20  1  7160   42  1  7140   52  1  7120   80  1  7100   AG
```

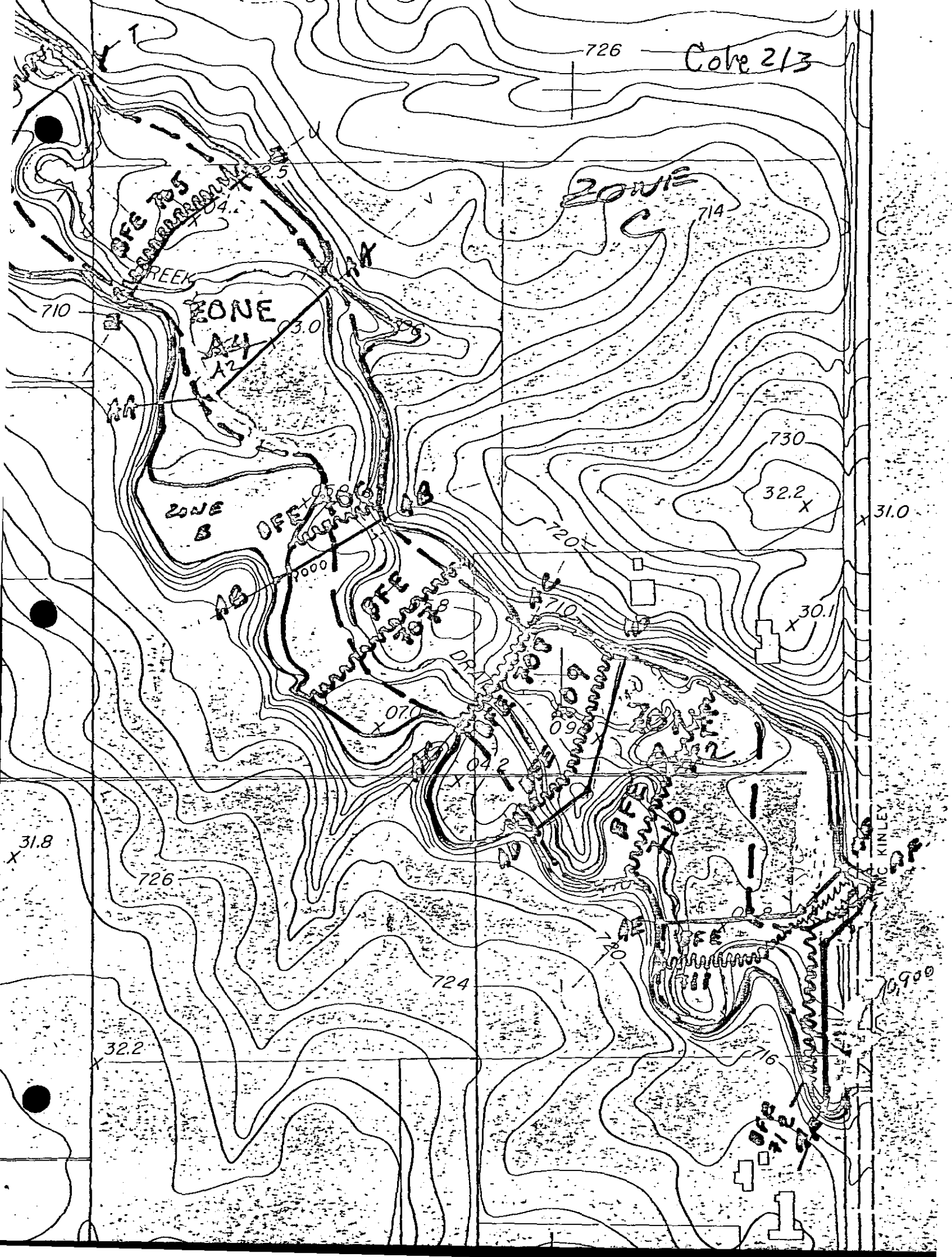
*** INPUT CARD PRINTOUT ***

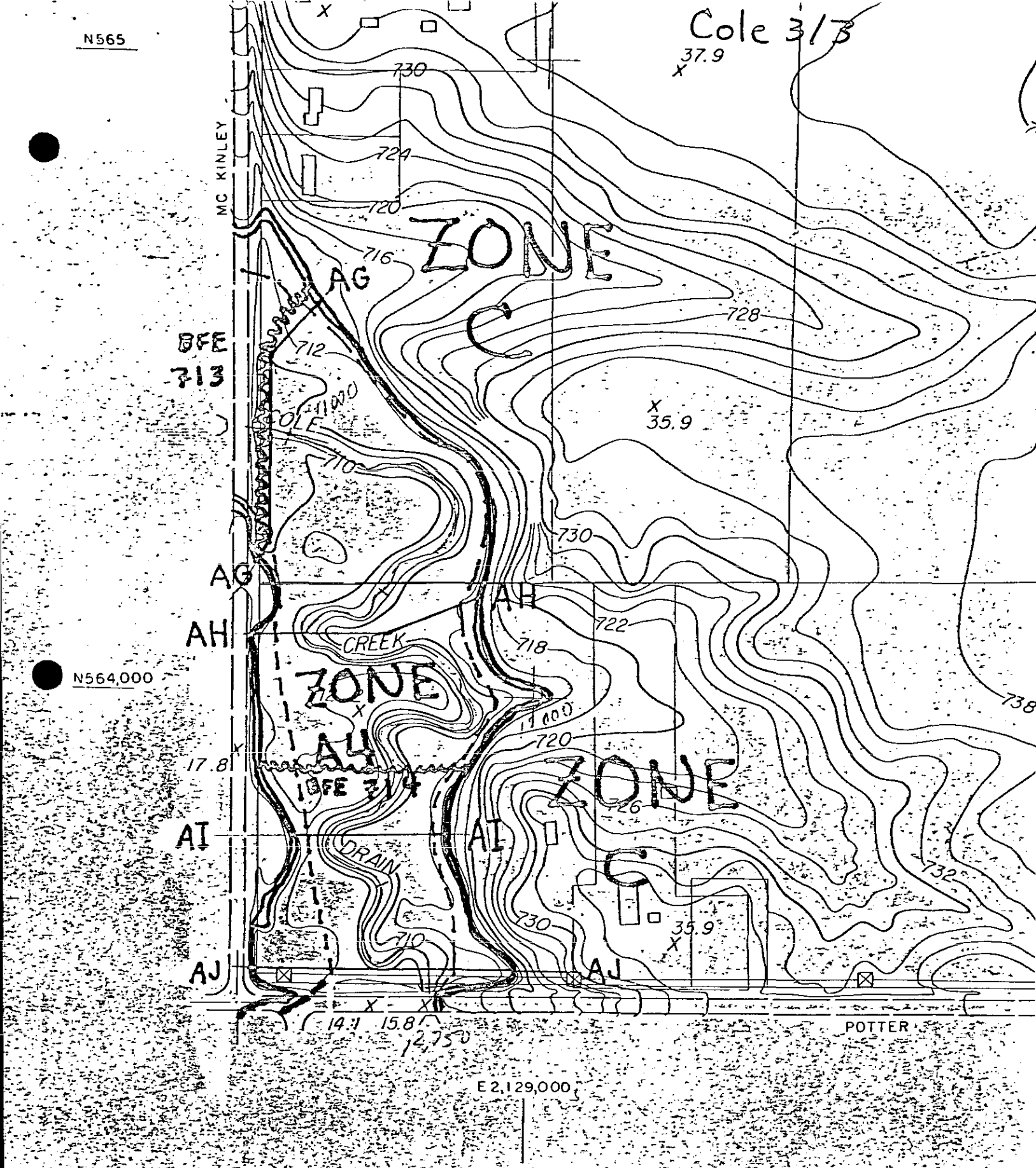
```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 COLE CREEK  MCKINLEY RD TO POTTER RD     KNUTILLA  8  5  2  5 12
2      5  71178  71292  71307  71328  71309
3   3700 AA     1  13  3  705   10970  1  3
4   3705     480    700    790   1050    790
5   3710       0  1  7160   50  1  7140   58  1  7120  200  1  7100  250  1  7080
5   3711     260  2  7045  265  2  7040  270  2  7045  285  3  7080  300  3  7100
5   3712     420  3  7120  518  3  7140  600  3  7160
6   3720  1  2 100 100  1  2 070 070  1  2 100 100
3   3800 AB     0  17  3  707   11650  1  3
5   3810       0  1  7180   15  1  7160   20  1  7140   30  1  7120   90  1  7100
5   3811     100  1  7085  105  2  7070  110  2  7060  115  2  7070  120  3  7085
5   3812     135  3  7100  350  3  7120  390  3  7140  405  3  7160  415  3  7180
5   3813     430  3  7200  440  3  7220
6   3820  1  2 100 120  1  2 070 070  1  2 100 100
3   3850 AB+1  0  12  3  708   11910  1  3
5   3860       0  1  7160   10  1  7140   15  1  7120  300  1  7120  315  2  7110
5   3861     325  2  7090  330  2  7070  340  2  7090  345  3  7110  360  3  7120
5   3862     390  3  7140  410  3  7160
6   3870  1  2 100 100  1  2 060 060  1  2 100 100
3   3900 AC     0  15  3  708   12380  1  3
5   3910       0  1  7178   80  1  7160  100  1  7140  110  1  7120  130  1  7110
5   3911     138  2  7085  145  2  7075  155  2  7085  170  3  7110  300  3  7120
5   3912     320  3  7140  340  3  7160  360  3  7180  375  3  7200  400  3  7220
6   3920  1  2 100 100  1  2 070 070  1  2 100 100
3   4000 AD     0  15  3  708   12720  1  3
5   4010       0  1  7178   20  1  7160   30  1  7140  190  1  7120  210  1  7110
5   4011     290  1  7110  292  2  7085  300  2  7083  320  3  7085  328  3  7110
5   4012     350  3  7120  435  3  7140  440  3  7160  445  3  7180  460  3  7200
6   4020  1  2 150 100  1  2 065 065  1  2 120 070
3   4100 AD BR 2   8  1  708   12720        0  7133 3 0
5   4110       0  1  7133    0  1  7075    5  1  7063   10  1  7069   15  1  7078
5   4111      16  1  7078   17  1  7133    0 -9  7133
6   4120  1  2 030 030
3   4200 AD RD 4   8  2   42          1  2          1 1                1
5   4210       0  1  7200  110  1  7180  240  1  7160  375  1  7141  470  2  7158
5   4211     490  2  7160  550  2  7180  600  2  7200
3   4300 AE     5  13  3  709   12825  1  3
5   4310    -205  1  7160 -190  1  7140 -180  1  7120    0  1  7126   16  2  7114
```

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
Q	AT	5120	0	1050.	568.	38536.	1.97	2.	244.	S
698.40		0.10			698.50	1.85	0.22		*IS*	
Q+1	AT	5410	290	1050.	499.	28605.	2.55	37.	235.	T
698.65		0.18	0.29	0.04	698.83	2.11	0.26	-0.005	*XS*	
R	AT	5780	370	1050.	405.	25064.	1.44	189.	413.	U
699.24		0.15	0.57	0.0	699.40	2.59	0.28	0.000	*XS*	
R+1	AT	6180	400	900.	261.	10360.	2.64	98.	302.	V
700.54		0.49	1.46	0.17	701.03	3.45	0.49	0.001	*XS*	
S	AT	6450	270	900.	442.	18831.	1.88	215.	461.	W
702.03		0.12	1.12	0.0	702.15	2.04	0.25	0.000	*XS*	
S+1	AT	6950	500	900.	412.	17860.	2.16	229.	427.	X
703.21		0.16	1.20	0.02	703.38	2.19	0.26	0.001	*XS*	
T	AT	7670	720	900.	876.	30127.	2.11	73.	412.	Y
704.43		0.03	1.08	0.0	704.46	1.03	0.09	0.001	*XS*	
U	AT	8210	540	900.	738.	22658.	2.82	156.	496.	Z
705.05		0.07	0.64	0.02	705.12	1.22	0.20	0.002	*XS*	
V	AT	8550	340	900.	1036.	30371.	2.22	96.	486.	AA
705.49		0.03	0.40	0.0	705.52	0.87	0.08	0.001	*XS*	
W	AT	8980	430	900.	511.	17325.	3.32	267.	488.	AB
706.09		0.16	0.66	0.07	706.25	1.76	0.32	0.001	*XS*	
X	AT	9465	485	900.	290.	11089.	3.08	-55.	149.	AC
707.98		0.46	2.04	0.15	708.45	3.10	0.47	-0.000	*XS*	
X+1	AT	9715	250	900.	659.	20641.	3.72	11.	389.	AD
709.23		0.11	0.88	0.0	709.34	1.36	0.26	0.012	*XS*	
Y	AT	10270	555	900.	417.	15181.	2.30	151.	432.	AE
710.64		0.17	1.43	0.03	710.81	2.16	0.31	0.004	*XS*	
Y+1	AT	10700	430	900.	458.	19679.	1.84	46.	2[illegible]	~~AF~~
711.87		0.11	1.17	0.[illegible]	711.98	1.96	0.24	0.001	*XS*	


REACH 1, ZONE A2
CORPORATE LIMIT
McKINLEY ROAD
POTTER ROAD
CORPORATE LIMIT
720
715
710
705
700
695
690
ELEVATION IN FEET (NGVD)
COLE CREEK
TOWNSHIP OF FLUSHING
W
X
Y
Z
AA
AB
AC
AD
AE
AFG
AH
AI
AJK
60+00
70+00
80+00
90+00
100+00
110+00
120+00
130+00
STREAM DISTANCE IN FEET ABOVE MOUTH


Cole 1/3
Twp - Flushing
OFF 703
OFF 705
CREEK
ZONE
A1
A2
ZONE
B
OFF 706
AB
7000
710
716
720
724
726
730
05.8
31.0
32.2
31.8
26.8
31.5
32.2
24.1
04.2
07.0
03.0
2.5


Core 2/3
726
ZONE C
714
ZONE A1 A2
710
ZONE B
730
32.2
31.0
720
30.1
710
DRAINAGE
31.8
726
724
32.2
716
MC KINLEY



GRID BASED ON MICHIGAN PLANE COORDINATE

*** INPUT CARD PRINTOUT ***

```
          1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
  1     1 MESSMORE CRONK MOUTH TO RIVER ST          KNUTILLA  4  5 02 05 12
  2     2  67620  67680  67710  67780  67710
  3   100 A1     1  10  3  674        0  1  3
  4   105     550     800     900    1200     900
  5   110       0  1  6800  135  1  6780  175  2  6760  185  2  6740  200  2  6727
  5   111     208  2  6740  220  3  6760  230  3  6780  290  3  6800  305  3  6820
  6   120  1  2 080 080  1  2 045 045  1  2 040 040
  3   200 A2     0  21  3  675      260  1  3
  5   210    -532  1  7000 -452  1  6980 -427  1  6960 -422  1  6940 -407  1  6920
  5   211    -392  1  6900 -352  1  6800 -347  1  6790 -319  1  6790 -292  1  6800
  5   212    -100  1  6800  -86  1  6783  -60  2  6790  -54  2  6777  -52  2  6752
  5   213     -42  2  6743  -30  2  6749  -24  2  6807  -12  3  6822   20  3  6900
  5   214      30  3  7000
  6   220  1  2 045 045  1  2 045 045  1  2 055 055
  3   500 B      0  13  3  678      420  1  3
  5   510    -180  1  6900 -170  1  6843 -125  1  6843   20  1  6843   34  2  6797
  5   511      42  2  6774   52  2  6764   60  2  6769   68  3  6805   84  3  6799
  5   512     135  3  6800  155  3  6900  175  3  7000
  6   520  1  2 080 080  1  2 035 035  1  2 080 080
  3   600 C      0  18  3  679      695  1  3
  5   610       0  1  6900   10  1  6880   30  1  6860   50  1  6840   90  2  6820
  5   611     108  2  6800  118  2  6782  135  2  6800  160  3  6820  175  3  6840
  5   612     200  3  6860  210  3  6880  235  3  6900  245  3  6920  260  3  6940
  5   613     280  3  6960  287  3  6980  300  3  7000
  6   620  1  2 045 045  1  2 047 047  1  2 080 080
```

A

6743

676.4 B

C

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 MESSMORE CRONK RIVER ST TO MORRISH   D-F KNUTILLA  5  5  2  5 12
2      2  68420  68600  68690  68940  68690
3    800 D      1  25  3  680      790  1  3
4    805     550     800     900    1200     900
5    810    -165  1  6960 -150  1  6940 -132  1  6920 -100  1  6900  -85  1  6880
5    811     -70  1  6860  -55  1  6840    0  1  6828   10  1  6835   16  1  6821
5    812      22  1  6804   26  2  6791   30  2  6780   34  2  6786   50  2  6803
5    813      55  3  6818   65  3  6839   95  3  6870  130  3  6880  160  3  6900
5    814     203  3  6920  208  3  6940  230  3  6960  240  3  6980  250  3  7000
6    820  1  2 060 060  1  2 050 050  1  2 075 075
3    900 E      0  15  3  682     1160  1  3
5    910       0  1  7000   20  1  6900   30  1  6880   40  1  6860  235  2  6840
5    911     243  2  6810  263  3  6840  275  3  6860  283  3  6880  292  3  6900
5    912     303  3  6920  312  3  6940  328  3  6960  335  3  6960  350  3  7000
6    920  1  2 120 120  1  2 050 050  1  2 080 080
3    950 E+1    0  13  3  686     1580  1  3
5    960       0  1  7000   10  1  6900   30  1  6880   35  2  6860   45  2  6840
5    961      50  2  6834   60  2  6840   70  3  6880  100  3  6880  260  3  6880
5    962     280  3  6900  305  3  6920  400  3  7000
6    970  1  2 100 100  1  2 050 050  1  2 080 080
3    980 E+2    0   9  3  686     1650  1  3
5    985       0  1  7000   15  1  6900   35  1  6880   60  2  6860   65  2  6840
5    986      85  3  6860  100  3  6900  260  3  6920  300  3  7000
6    690  1  2 085 085  1  2 050 050  1  2 080 080
**SEQUENCE**
3   1000 F      0  13  3  686     1795  1  3
5   1010       0  1  7000    5  1  6980   15  1  6960   20  1  6940   30  1  6920
5   1011      80  2  6900   95  2  6880  105  2  6847  115  2  6880  125  3  6900
5   1012     155  3  6920  185  3  7000  195  3  7020
6   1020  1  2 085 085  1  2 050 050  1  2 080 080
```

D

E

F

G

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 MESSMORE CRONK MORRISH RD TO MORRISH RD  KNUTILLA  9  5  2  5 12
2      2  69170  69370  69450  69710  69450
3   1200 G      1  19  3  687     1880  1  3
4   1305    500     800     900    1200     900
5   1210    -290  1  7100 -255  1  7000 -230  1  6980 -200  1  6960 -170  1  6940
**SEQUENCE**                                                                          H
5   1211    -140  1  6920  -80  1  6891  -62  2  6885  -48  2  6862  -44  2  6854
5   1212     -36  2  6861  -26  3  6935  -12  3  6984    0  3  6995   70  3  7020
5   1213     100  3  7040  130  3  7060  160  3  7080  200  3  7100
6   1220  1  2 075 075  1  2 055 055  1  2 075 075
3   1250 G+1   0  12  3  690     2280  1  3
5   1260       0  1  7100   20  1  7000   40  1  6960  130  1  6940  140  2  6920   I
5   1261     150  2  6900  165  2  6877  175  3  6900  190  3  6920  230  3  6940
5   1262     285  3  7000  345  3  7100
6   1270  1  2 090 090  1  2 055 055  1  2 080 080
3   1300 H      0  19  3  690     2550  1  3
5   1310       0  1  7120   15  1  7100   80  1  7000   95  1  6980  105  1  6960   J
5   1311     115  2  6940  130  2  6920  140  2  6892  163  2  6920  178  3  6940
5   1312     245  3  6960  254  3  6980  260  3  7000  275  3  7020  300  3  7040
5   1313     320  3  7060  350  3  7080  370  3  7100  385  3  7120
6   1320  1  2 090 090  1  2 050 050  1  2 085 085
3   1350 H+1   0  14  3  694     2890  1  3
5   1360       0  1  7100   40  1  7000  120  1  6980  165  1  6960  180  2  6940   K
5   1361     190  2  6911  205  2  6940  210  3. 6960  225  3  6980  250  3  7000
5   1362     270  3  7020  300  3  7040  370  3  7080  440  3  7100
6   1370  1  2 100 100  1  2 055 055  1  2 080 080
3   1400 I      0  21  3  693     3060  1  3
5   1410       0  1  7120   23  1  7100   33  1  7080   48  1  7060   58  1  7040
5   1411      65  1  7020  178  1  7000  195  2  6980  210  2  6960  217  2  6940   L
5   1412     225  2  6921  230  3  6940  245  3  6960  253  3  6980  283  3  7000
5   1413     298  3  7020  310  3  7040  313  3  7060  320  3  7080  330  3  7100
5   1414     430  3  7120
6   1420  1  2 150 150  1  2 055 055  1  2 070 070
3   1450 I+1   0   9  3  695     3360  1  3
5   1460       0  1  7100   75  1  7020  150  1  7000  180  2  6960  200  2  6938   M
5   1461     215  3  7000  270  3  7020  300  3  7040  340  3  7100
6   1470  1  2 150 150  1  2 055 055  1  2 070 070
3   1500 J      0  20  3  697     3740  1  3
5   1510    -420  1  7200 -345  1  7180 -330  1  7120 -320  1  7100 -318  1  7080
5   1511    -304  1  7060 -298  1  7040 -285  1  7020 -238  1  7041 -226  1  7006   N
5   1512    -214  2  6979 -202  2  6960 -196  2  6967 -188  3  7010 -124  3  7028
5   1513     -86  3  7107  -35  3  7120  -25  3  7140  -20  3  7160  -10  3  7180
6   1520  1  2 150 150  1  2 055 055  1  2 050 050
3   1550 J+1   0  10  3  702     4180  1  3
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  1560        0  1  7100   30  1  7060  115  1  7040  140  2  7000  160  2  6991
5  1561      180  3  7100  185  3  7120  200  3  7140  270  3  7180  330  3  7100
6  1570  1  2 100 100  1  2 055 055  1  2 070 070
3  1600 K      0  12  3  702    4470  1  3
5  1610        0  1  7112   32  1  7100   55  1  7080   83  1  7060   95  2  7040
5  1611      100  2  7020  105  2  7011  110  2  7020  115  3  7040  130  3  7060
5  1612      145  3  7080  160  3  7100
6  1620  1  2 080 080  1  2 050 050  1  2 090 090
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 MESSMORE CRONK MORRISH RD TO POTTER RD   KNUTILLA 12  5  2  5 12
2      2  70660  70860  70940  71050  70940
3  1800 L      1  13  3  700    4570  1  3
4  1805    550    800    900   1200    900
5  1810     -15  1  7100    0  1  7058   18  1  7042   22  2  7019   32  2  6983
5  1811      38  2  6977   44  2  7023   50  3  7046   60  3  7046   90  3  7080
5  1812     110  3  7100  118  3  7120  125  3  7140
6  1820  1  2 080 080  1  2 060 060  1  2 100 100
3  1850   L+1 1  10  3  702    5040  1  3
4  1855    510    740    835   1120    835
5  1860       0  1  7140   10  1  7120   40  1  7100   55  1  7080  130  2  7060
5  1861     150  2  6994  160  3  7080  170  3  7100  260  3  7120  280  3  7140
6  1870  1  2 080 080  1  2 065 065  1  2 100 100
3  1900 M      0  18  3  701    5310  1  3
5  1910       0  1  7200   52  1  7180   62  1  7160   80  1  7140   85  1  7120
5  1911     100  1  7100  145  2  7100  158  2  7080  162  2  7060  165  2  7003
5  1912     183  3  7060  245  3  7080  260  3  7100  330  3  7120  350  3  7140
5  1913     360  3  7160  370  3  7180  380  3  7200
6  1920  1  2 070 070  1  2 075 075  1  2 100 100
3  1950 MT1    0   9  3  710    5480  1  3
5  1960       0  1  7200   85  1  7100   90  2  7080  105  2  7020  120  3  7100
5  1961     130  3  7120  220  3  7126  400  3  7140  430  3  7200
6  1970  1  2 070 070  1  2 075 075  1  2 100 100
3  2000 N      0  23  3  705    5815  1  3
5  2010       0  1  7280  112  1  7260  180  1  7240  212  1  7220  235  1  7200
5  2011     260  1  7180  270  1  7160  280  1  7140  285  1  7120  295  2  7100
5  2012     310  2  7080  320  2  7042  330  2  7080  335  3  7100  343  3  7120
5  2013     390  3  7140  410  3  7160  420  3  7180  430  3  7200  445  3  7220
5  2014     455  3  7240  480  3  7260  495  3  7280
6  2020  1  2 100 100  1  2 065 065  1  2 120 120
3  2100 O      0  22  3  709    6390  1  3
5  2110    -420  1  7300 -375  1  7280 -308  1  7260 -218  1  7240 -170  1  7220
5  2111    -100  1  7200  -92  1  7180  -72  2  7162  -62  2  7110  -54  2  7095
5  2112     -46  2  7083  -42  2  7108  -28  3  7158  -14  3  7190    0  3  7178
5  2113      85  3  7180  100  3  7200  120  3  7220  132  3  7240  142  3  7260
5  2114     148  3  7280  165  3  7300
6  2120  1  2 090 090  1  2 065 065  1  2 090 090
3  2200 P      0  16  3  711    6750  1  3
5  2210       0  1  7280  132  1  7260  170  1  7240  192  1  7220  245  1  7200
5  2211     420  1  7190  490  1  7180  500  2  7160  510  2  7140  522  2  7103
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

5  2310       0  1  7300   90  1  7280  210  1  7260  330  1  7240  405  1  7220
5  2311     473  1  7200  525  2  7180  540  2  7160  557  2  7140  564  2  7118
5  2312     567  2  7140  570  2  7160  582  3  7180  650  3  7200  665  3  7220
5  2313     690  3  7240  700  3  7260  722  3  7280  760  3  7300
6  2320  1  2 075 075  1  2 060 060  1  2 075 075
3  2400 R      0  17  3  714    7740  1  3
5  2410       0  1  7300   60  1  7280  195  1  7260  275  1  7240  375  1  7220
5  2411     472  1  7200  478  2  7180  487  2  7160  496  2  7132  507  2  7160
5  2412     518  3  7180  523  3  7200  610  3  7220  715  3  7240  790  3  7260
5  2413     895  3  7280  950  3  7300
6  2420  1  2 075 075  1  2 050 050  1  2 075 075
3  2600 R BR  2  12  1  713    7740        15        3 0
                                                M
5  2610       0  1  7202    0  1  7183    1  1  7183    2  1  7135    5  1  7127
5  2611      10  1  7134   15  1  7143   16  1  7145   17  1  7184   18  1  7184
5  2612      18  1  7202    0 -9  7202
6  2620  1  2 028 028
3  2500 R RD  4   7  2   32    7740  1  2           1 1                    1
**SEQUENCE**
                                 8888
5  2510    -480  1  7300 -410  1  7280 -270  1  7260 -198  1  7241    0  2  7227
5  2511     196  2  7221  780  2  7260
3  2700 S      5  20  3  715    7880  1  3
5  2710    -430  1  7320 -380  1  7300 -330  1  7280 -240  1  7260 -160  1  7240
5  2711       0  1  7207   22  2  7200   32  2  7165   36  2  7147   46  2  7138
5  2712      52  2  7152   60  3  7181   72  3  7191  138  3  7200  180  3  7220
5  2713     265  3  7240  340  3  7260  490  3  7280  565  3  7300  625  3  7320
6  2720  1  2 060 060  1  2 050 050  1  2 060 060
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 13,DATE= 9/22/77

WATER-SURFACE PROFILE FOR: MESSMORE CRONK MOUTH TO RIVER ST KNUTILLA

PAGE 1 OF 1

	SECID	AT DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*
A	A1	AT 0	0	900.	148.	9163.	1.15	153.	225.
	677.10	0.67			677.77	6.10	0.68		*IS*
	A2	AT 260	260	900.	165.	10215.	1.34	-349.	-25.
	679.40	0.62	2.25	0.0	680.02	5.44	0.60	0.001	*XS*
B	B	AT 420	160	900.	140.	9013.	1.65	31.	136.
	680.59	1.07	1.41	0.23	681.65	6.44	0.88	-0.001	*XS*
C	C	AT 695	275	900.	224.	13635.	1.10	66.	169.
	683.19	0.28	1.81	0.0	683.47	4.01	0.44	0.006	*XS*

END OF THIS PROFILE

100-YR

WATER-SURFACE PROFILE FOR: MESSMORE CRONK RIVER ST TO MORRISH D-F KNUTILLA
PAGE 1 OF 1

	SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
	WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*
D	D	AT	790	0	900.	649.	46528.	1.55	-77.	94.
	686.90		0.05			686.95	1.39	0.14		*IS*
E	E	AT	1160	370	900.	589.	20345.	3.15	34.	280.
	687.18		0.11	0.32	0.03	687.30	1.53	0.30	-0.000	*XS*
F	E+1	AT	1580	420	900.	247.	10911.	2.28	25.	265.
	688.54		0.47	1.53	0.18	689.01	3.65	0.53	0.003	*XS*
	E+2	AT	1650	70	900.	172.	9112.	1.63	25.	96.
	689.00		0.69	0.57	0.11	689.69	5.24	0.65	-0.000	*XS*
G	F	AT	1795	145	900.	137.	7611.	1.11	63.	135.
	690.67		0.74	1.69	0.02	691.42	6.55	0.72	0.004	*XS*

END OF THIS PROFILE

100-YR

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 19,DATE=10/12/77

WATER-SURFACE PROFILE FOR: MESSMORE CRONK MORRISH RD TO MORRISH RD KNUTILLA

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
G	AT	1880	0	900.	640.	40954.	1.46	-178.	-23.	H
694.50		0.05			694.54	1.41	0.14		*IS*	
G+1	AT	2280	400	900.	356.	20010.	1.71	92.	238.	
694.83		0.17	0.40	0.06	695.00	2.53	0.28	0.000	*XS*	I
H	AT	2550	270	900.	274.	17128.	1.25	108.	227.	
695.45		0.21	0.64	0.02	695.66	3.28	0.34	0.001	*XS*	J
H+1	AT	2890	340	900.	168.	8950.	1.48	142.	218.	
697.03		0.66	1.80	0.23	697.69	5.35	0.59	0.002	*XS*	K
I	AT	3060	170	900.	205.	10717.	1.21	188.	265.	
698.78		0.36	1.44	0.0	699.14	4.38	0.49	0.013	*XS*	L
I+1	AT	3360	300	900.	247.	13387.	1.73	132.	228.	
700.48		0.36	1.69	0.0	700.83	3.64	0.41	0.004	*XS*	M
J	AT	3740	380	900.	212.	11466.	1.78	-288.	-138.	
702.41		0.50	2.01	0.07	702.91	4.25	0.47	0.001	*XS*	N
J+1	AT	4180	440	900.	244.	12300.	1.78	70.	171.	
705.06		0.38	2.53	0.0	705.44	3.69	0.44	0.002	*XS*	O
K	AT	4470	290	900.	156.	8887.	1.74	70.	137.	
706.96		0.90	2.15	0.26	707.85	5.76	0.67	0.002	*XS*	P

10-1

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 21,DATE=10/14/77

```
==================================================================================
WATER-SURFACE PROFILE FOR: MESSMORE CRONK MORRISH RD TO POTTER RD   KNUTILLA
PAGE  1 OF  1
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
L     AT    4570 /      0 /    900. /   532. /   35723. / 1.74 /  -13. /  104.
   709.40 /   0.08 /                  /  709.48 /   1.69 /  0.15/          *IS*
----------------------------------------------------------------------------------
  L+1 AT    5040 /    470 /    835. /   436. /   23195. / 1.47 /   41. /  169.
   709.82 /   0.08 /   0.43 /   0.00 /  709.91 /   1.91 /  0.18 / 0.001   *XS*
----------------------------------------------------------------------------------
M     AT    5310 /    270 /    835. /   424. /   15921. / 1.35 /   98. /  271.
   710.32 /   0.08 /   0.51 /   0.0  /  710.41 /   1.97 /  0.22 / -0.012  *XS*
----------------------------------------------------------------------------------
MT1   AT    5480 /    170 /    835. /   179. /    9712. / 1.10 /   77. /  125.
   710.95 /   0.37 /   0.77 /   0.14 /  711.32 /   4.66 /  0.37 / 0.000   *XS*
----------------------------------------------------------------------------------
N     AT    5815 /    335 /    835. /   247. /   14483. / 1.25 /  283. /  361.
   712.76 /   0.22 /   1.66 /   0.0  /  712.98 /   3.38 /  0.30 / 0.001   *XS*
----------------------------------------------------------------------------------
O     AT    6390 /    575 /    835. /   172. /    9614. / 1.00 /  -71. /  -29.
   715.57 /   0.37 /   2.88 /   0.07 /  715.93 /   4.86 /  0.42 / 0.002   *XS*
----------------------------------------------------------------------------------
P     AT    6750 /    360 /    835. /   231. /   11479. / 1.19 /  490. /  565.
   717.97 /   0.24 /   2.27 /   0.0  /  718.21 /   3.61 /  0.36 / 0.005   *XS*
----------------------------------------------------------------------------------
Q     AT    7345 /    595 /    835. /   374. /   18932. / 1.47 /  473. /  650.
   720.01 /   0.11 /   1.91 /   0.0  /  720.12 /   2.23 /  0.24 / 0.001   *XS*
----------------------------------------------------------------------------------
R     AT    7740 /    395 /    835. /   244. /   17484. / 1.36 /  435. /  556.
   720.76 /   0.25 /   0.83 /   0.07 /  721.01 /   3.42 /  0.32 / -0.016  *XS*
============================ BEGIN BRIDGE ANALYSIS ===============================
R BR  AT    7740 /        /    835. /   103. /    9771. / 1.00 /    0. /   18.
   720.20 /   1.03 /        ...1...  (-.001)    /   8.13 /  0.59 /          *BO*
----------------------------------------------------------------------------------
 NO ROAD OVERFLOW
                                                                            *RG*
----------------------------------------------------------------------------------
S     AT    7880 /    140 /    835. /   365. /   21873. / 1.65 /  -21. /  162.
   721.13 /   0.13 /   0.26 /   0.0  /  721.26 /   2.29 /  0.26 / -0.000  *AS*
----------------------------------------------------------------------------------
```

WATER-SURFACE PROFILE FOR: MESSMORE CRONK MOUTH TO RIVER ST KNUTILLA

*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
A1	AT	0	0	900.	143.	8957.	1.11	160.	220.	
		677.10	0.68		677.78	6.28	0.69			*IS*
A2	AT	260	260	900.	154.	10286.	1.18	-95.	-25.	
		679.45	0.62	2.29	0.0	680.07	5.83	0.60	0.002	*XS*
B	AT	420	160	900.	140.	9152.	1.63	32.	132.	
		680.61	1.05	1.38	0.21	681.66	6.42	0.86	0.000	*XS*
C	AT	695	275	900.	222.	13532.	1.09	66.	165.	
		683.18	0.28	1.80	0.0	683.46	4.05	0.44	0.004	*XS*

A 0

.05

B .02

C 0

END OF THIS PROFILE

FW

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 47,DATE= 9/22/77

```
==================================================================================
WATER-SURFACE PROFILE FOR: MESSMORE CRONK RIVER ST TO MORRISH   D-F KNUTILLA
PAGE  1 OF  1
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
D     AT     790 /     0 /    900. /   511. /   41744. / 1.33 /  -35. /   65.
   686.90 /   0.06 /                 /  686.96 /    1.76 /   0.16/          *IS*
----------------------------------------------------------------------------------
E     AT    1160 /   370 /    900. /   544. /   20235. / 2.83 /   75. /  275.
   687.23 /   0.12 /   0.35 /   0.03 /  687.35 /    1.65 /   0.30 /  0.001  *XS*
----------------------------------------------------------------------------------
E+1   AT    1580 /   420 /    900. /   235. /   10994. / 2.08 /   25. /  225.
   688.58 /   0.48 /   1.53 /   0.18 /  689.06 /    3.84 /   0.53 /  0.003  *XS*
----------------------------------------------------------------------------------
E+2   AT    1650 /    70 /    900. /   175. /    9292. / 1.63 /   25. /   96.
   689.04 /   0.67 /   0.56 /   0.10 /  689.71 /    5.15 /   0.63 / -0.000  *XS*
----------------------------------------------------------------------------------
F     AT    1795 /   145 /    900. /   137. /    7603. / 1.11 /   63. /  135.
   690.67 /   0.74 /   1.66 /   0.03 /  691.41 /    6.56 /   0.73 /  0.005  *XS*
----------------------------------------------------------------------------------
```

D 0

E .05

F .04

.04

G 0

END OF THIS PROFILE

FW

```
==================================================================================
WATER-SURFACE PROFILE FOR: MESSMORE CRONK MORRISH RD TO MORRISH RD  KNUTILLA
PAGE  1 OF  1
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
G     AT    1880 /     0 /    900. /   549. /   39793. / 1.24 / -125. /  -25.
   694.50 /   0.05 /                 /  694.55 /   1.64 /   0.14/          *IS*
----------------------------------------------------------------------------------
G+1   AT    2280 /   400 /    900. /   338. /   20238. / 1.51 /  130. /  230.
   694.85 /   0.17 /   0.40 /   0.06 /  695.01 /   2.66 /   0.28 /  0.000  *XS*
----------------------------------------------------------------------------------
H     AT    2550 /   270 /    900. /   268. /   16936. / 1.19 /  115. /  215.
   695.46 /   0.21 /   0.64 /   0.02 /  695.67 /   3.36 /   0.34 /  0.001  *XS*
----------------------------------------------------------------------------------
H+1   AT    2890 /   340 /    900. /   163. /    8963. / 1.34 /  155. /  210.
   697.07 /   0.64 /   1.81 /   0.21 /  697.70 /   5.53 /   0.58 /  0.003  *XS*
----------------------------------------------------------------------------------
I     AT    3060 /   170 /    900. /   184. /   10513. / 1.05 /  195. /  245.
   698.78 /   0.39 /   1.46 /   0.0  /  699.17 /   4.89 /   0.49 /  0.001  *XS*
----------------------------------------------------------------------------------
I+1   AT    3360 /   300 /    900. /   244. /   13793. / 1.57 /  150. /  220.
   700.51 /   0.33 /   1.68 /   0.0  /  700.84 /   3.69 /   0.39 / -0.000  *XS*
----------------------------------------------------------------------------------
J     AT    3740 /   380 /    900. /   188. /   11233. / 1.48 / -220. / -140.
   702.40 /   0.53 /   1.99 /   0.10 /  702.93 /   4.79 /   0.48 /  0.000  *XS*
----------------------------------------------------------------------------------
J+1   AT    4180 /   440 /    900. /   246. /   12521. / 1.79 /   70. /  170.
   705.09 /   0.37 /   2.53 /   0.0  /  705.46 /   3.66 /   0.43 / -0.001  *XS*
----------------------------------------------------------------------------------
K     AT    4470 /   290 /    900. /   145. /    8800. / 1.54 /   75. /  125.
   706.95 /   0.92 /   2.13 /   0.28 /  707.87 /   6.21 /   0.67 /  0.003  *XS*
----------------------------------------------------------------------------------
```

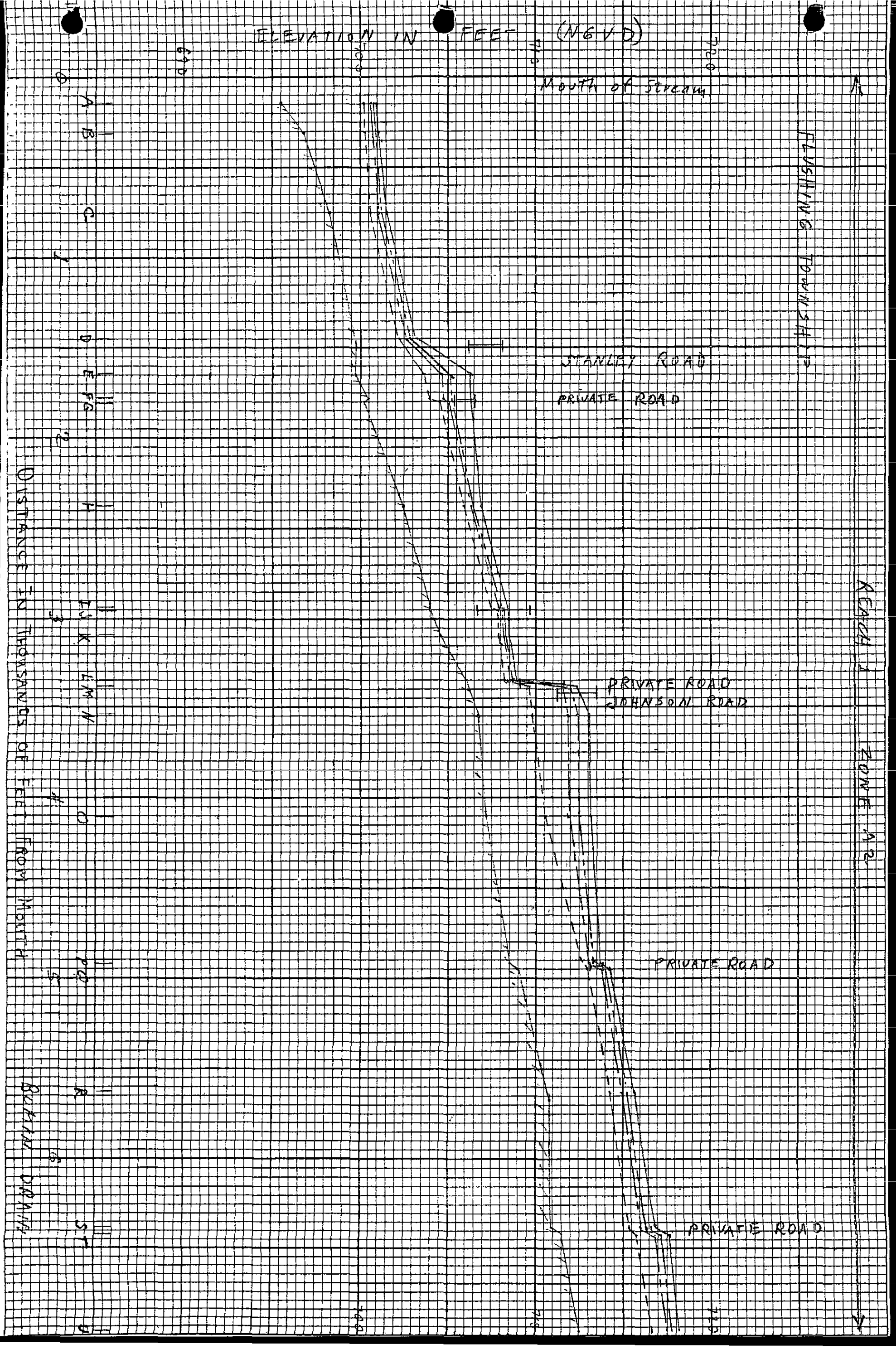
END OF THIS PROFILE FW

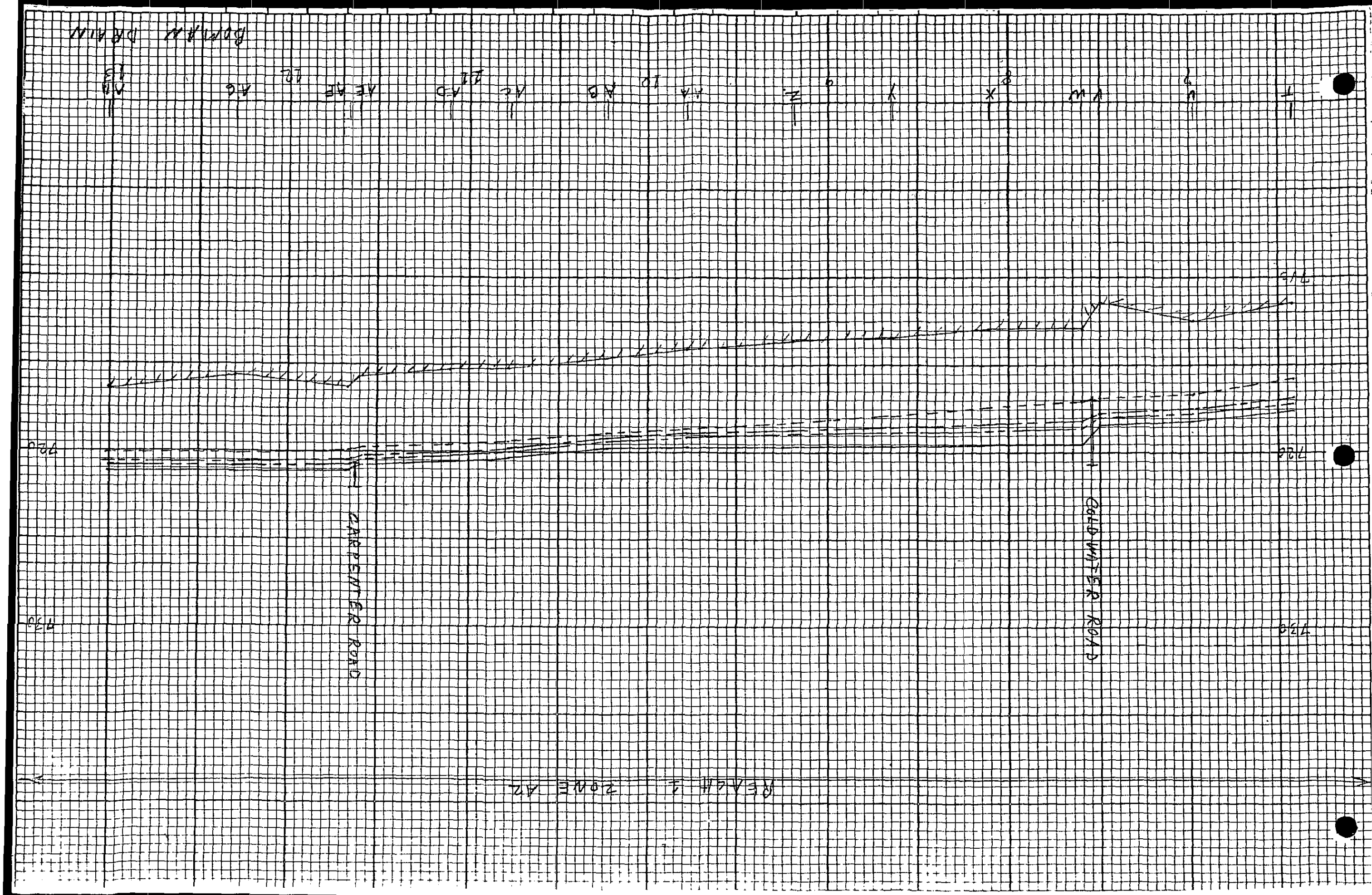
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 34,DATE=10/14/77

```
==================================================================================
WATER-SURFACE PROFILE FOR: MESSMORE CRONK MORRISH RD TO POTTER RD   KNUTILLA
PAGE  1 OF  1
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
L      AT    4570 /      0 /    900. /   519. /   36033. / 1.63 /   -5. /   95.
   709.40 /   0.08 /                  /  709.48 /   1.73 /   0.15/          *IS*
----------------------------------------------------------------------------------
  L+1 AT    5040 /    470 /    835. /   370. /   21674. / 1.30 /   80. /  165.
   709.84 /   0.10 /   0.45 /   0.01 /  709.94 /   2.26 /   0.20 /  0.000  *XS*
----------------------------------------------------------------------------------
M      AT    5310 /    270 /    835. /   373. /   15906. / 1.16 /  135. /  235.
   710.40 /   0.09 /   0.55 /   0.0  /  710.49 /   2.24 /   0.22 /  0.000  *XS*
----------------------------------------------------------------------------------
MT1    AT    5480 /    170 /    835. /   183. /    9938. / 1.10 /   76. /  125.
   711.02 /   0.36 /   0.75 /   0.13 /  711.37 /   4.58 /   0.37 /  0.000  *XS*
----------------------------------------------------------------------------------
N      AT    5815 /    335 /    835. /   223. /   13854. / 1.06 /  295. /  340.
   712.84 /   0.23 /   1.70 /   0.0  /  713.07 /   3.75 /   0.30 /  0.001  *XS*
----------------------------------------------------------------------------------
O      AT    6390 /    575 /    835. /   177. /    9987. / 1.00 /  -71. /  -28.
   715.68 /   0.35 /   2.90 /   0.06 /  716.03 /   4.73 /   0.41 /  0.001  *XS*
----------------------------------------------------------------------------------
P      AT    6750 /    360 /    835. /   231. /   11498. / 1.19 /  490. /  565.
   717.98 /   0.24 /   2.19 /   0.0  /  718.22 /   3.61 /   0.36 /  0.003  *XS*
----------------------------------------------------------------------------------
Q      AT    7345 /    595 /    835. /   350. /   18930. / 1.30 /  490. /  615.
   720.01 /   0.12 /   1.91 /   0.0  /  720.13 /   2.39 /   0.24 /  0.002  *XS*
----------------------------------------------------------------------------------
R      AT    7740 /    395 /    835. /   242. /   17550. / 1.32 /  450. /  550.
   720.76 /   0.24 /   0.83 /   0.06 /  721.00 /   3.46 /   0.32 / -0.015  *XS*
============================ BEGIN BRIDGE ANALYSIS ===============================
R BR   AT    7740 /        /    835. /   103. /    9771. / 1.00 /    0. /   18.
   720.20 /   1.03 /        ...1...  (-.001)    /   8.13 /   0.59 /          *BO*
----------------------------------------------------------------------------------
 NO ROAD OVERFLOW
                                                                              *RG*
----------------------------------------------------------------------------------
S      AT    7880 /    140 /    835. /   292. /   20219. / 1.33 /    0. /  100.
   721.11 /   0.17 /   0.28 /   0.0  /  721.28 /   2.86 /   0.28 / -0.000  *AS*
----------------------------------------------------------------------------------
```

Q R S T U V W X Y

FW


ELEVATION IN FEET (NGVD)
Mouth of Stream
STANLEY ROAD
PRIVATE ROAD
PRIVATE ROAD
JOHNSON ROAD
PRIVATE ROAD
PRIVATE ROAD
DISTANCE IN THOUSANDS OF FEET FROM MOUTH
BUTTON DRAIN
ZONE A2
SCALE 1


BOMBAY DRAIN
AB
AC
AD
AE
AE
AG
AH
AI
AJ
AK
AL
AM
AN
AO
AP
AQ
AR
AS
AT
AU
AV
AW
AX
AY
AZ
BA
BB
BC
BD
BE
BF
BG
BH
BI
BJ
BK
BL
BM
BN
BO
BP
BQ
BR
BS
BT
BU
BV
BW
BX
BY
BZ
CARPENTER ROAD
COLDWATER ROAD
REACH 1 ZONE A2
730
724
726
728

REACH 1 ZONE A2

CORPORATE LIMITS

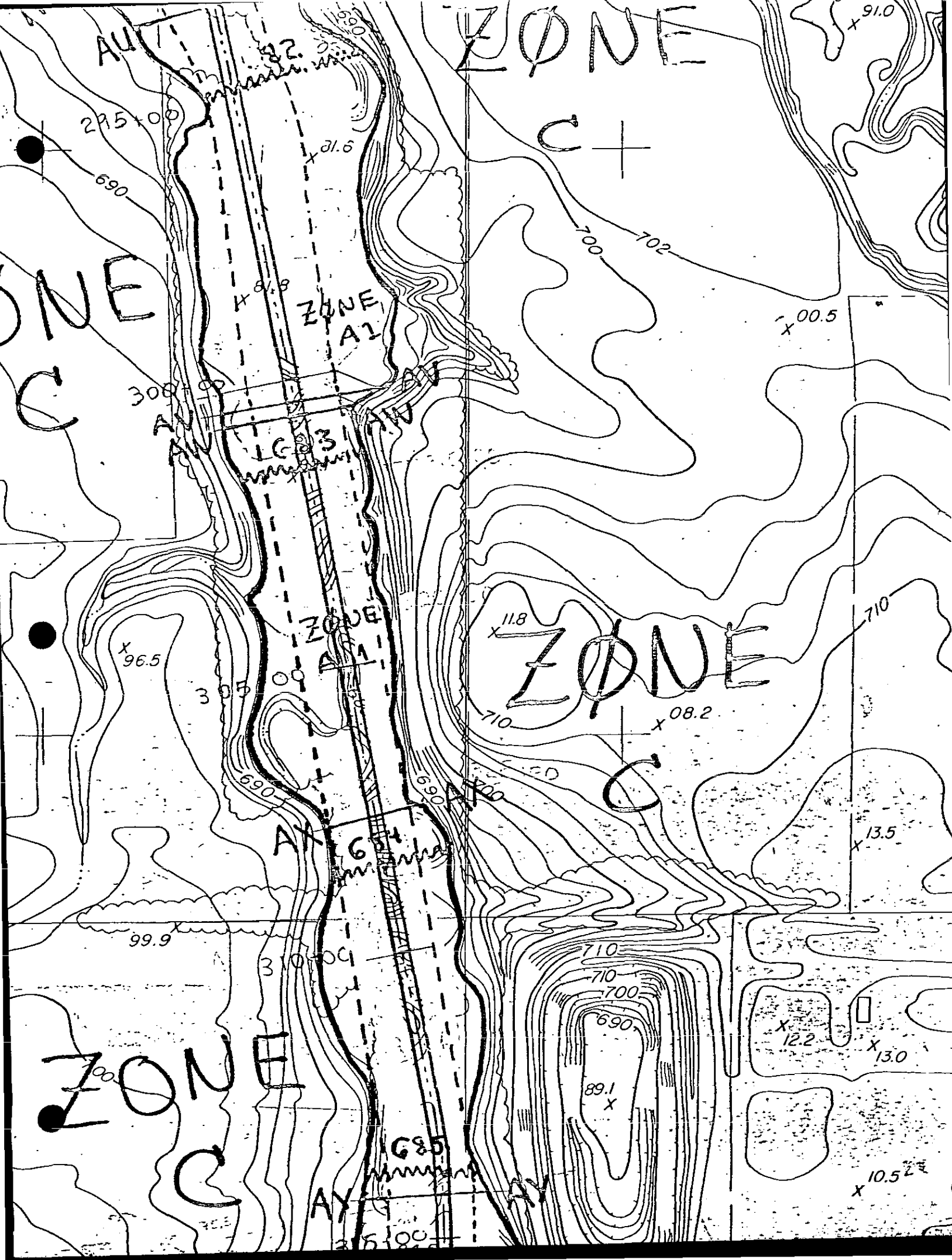
730

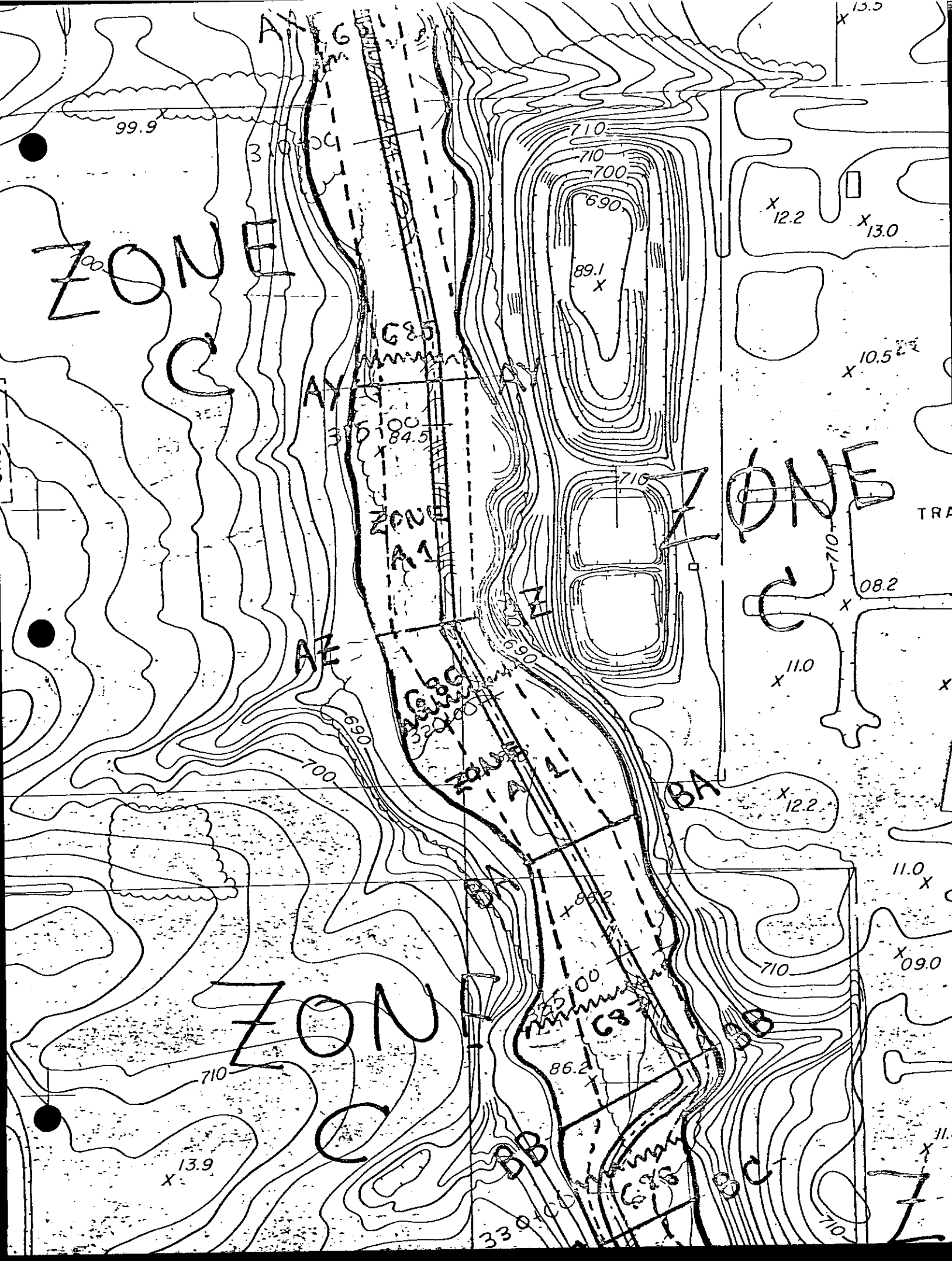
710

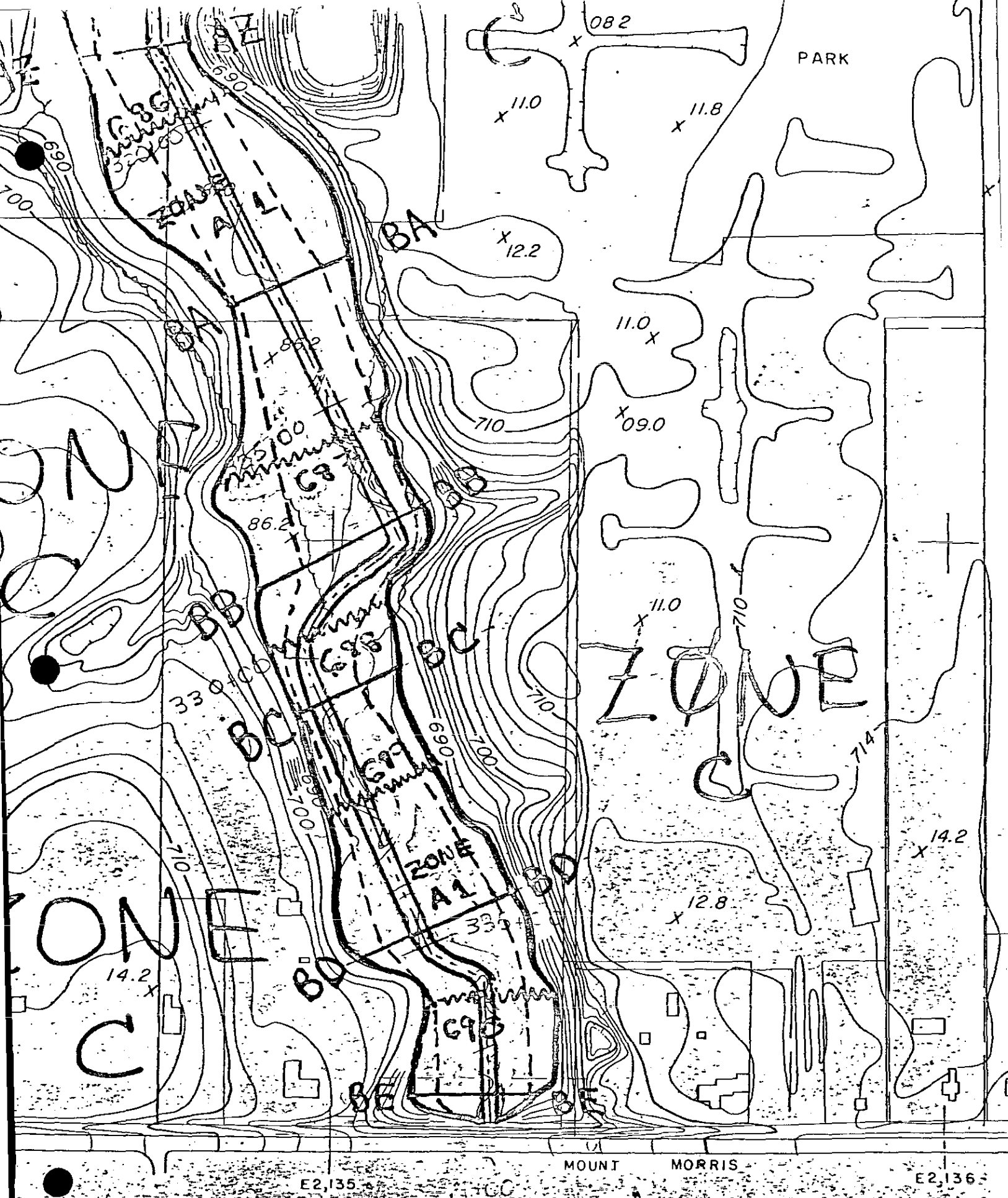
AH AI AJ

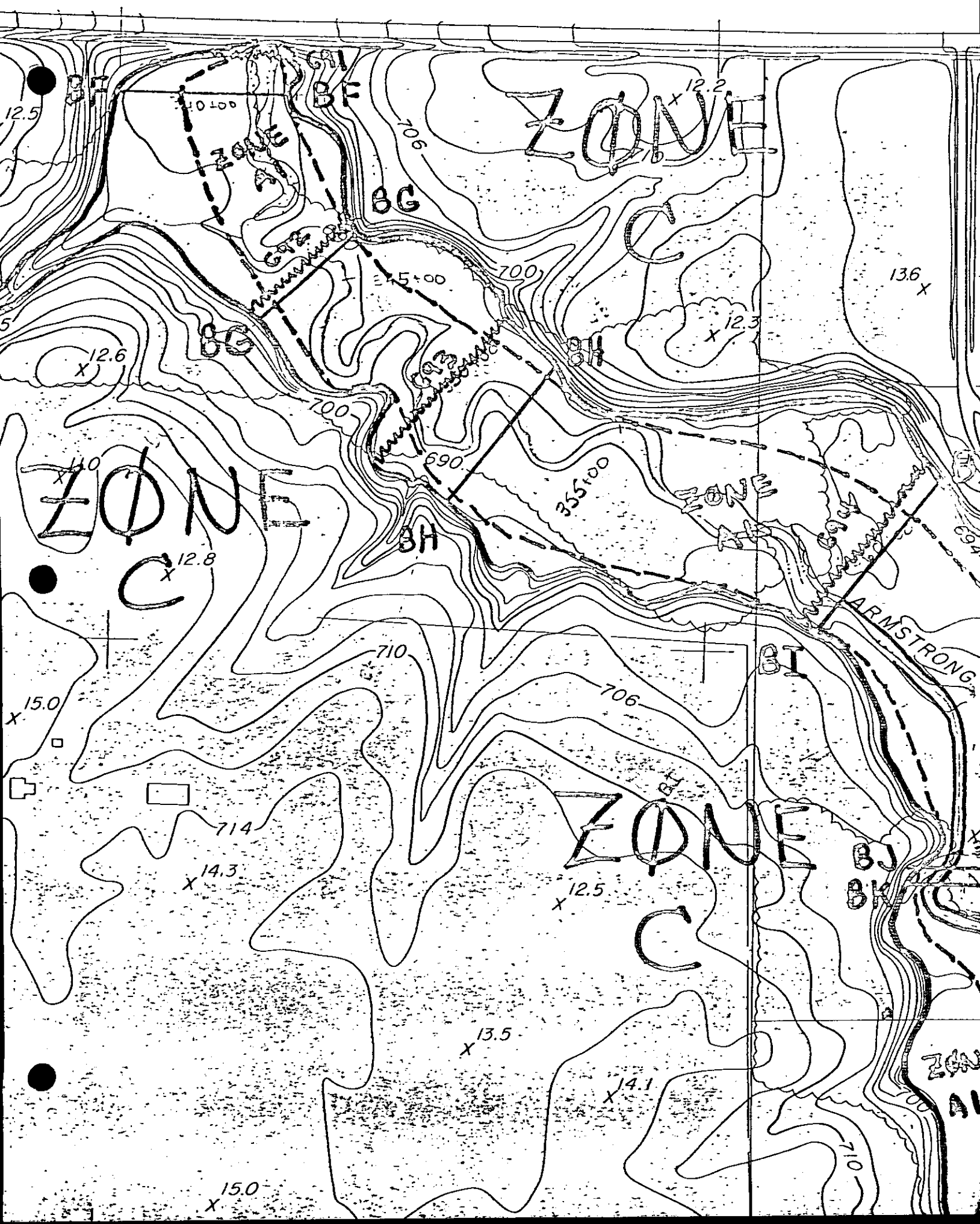
13 14 15 16

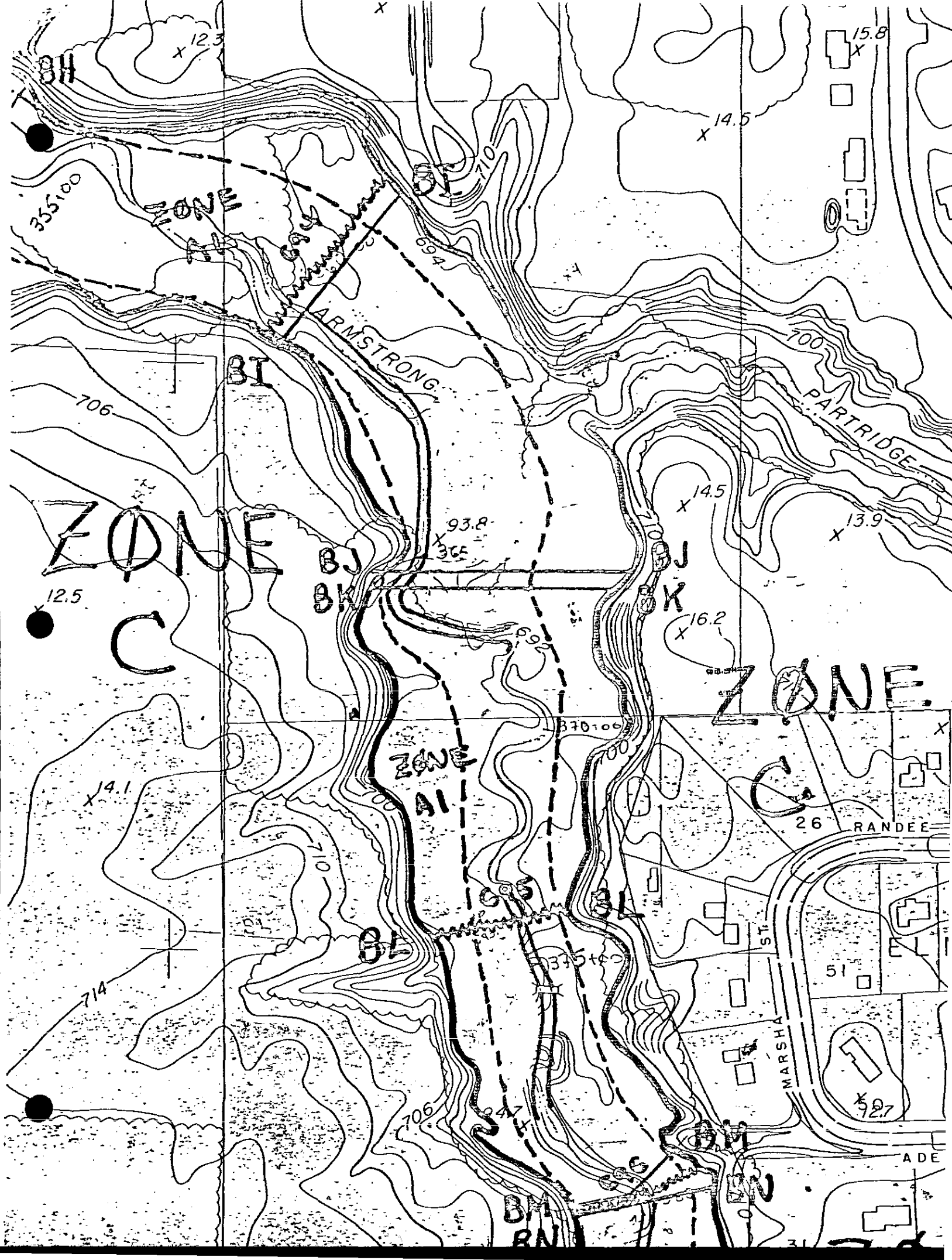
BROAD DRAIN

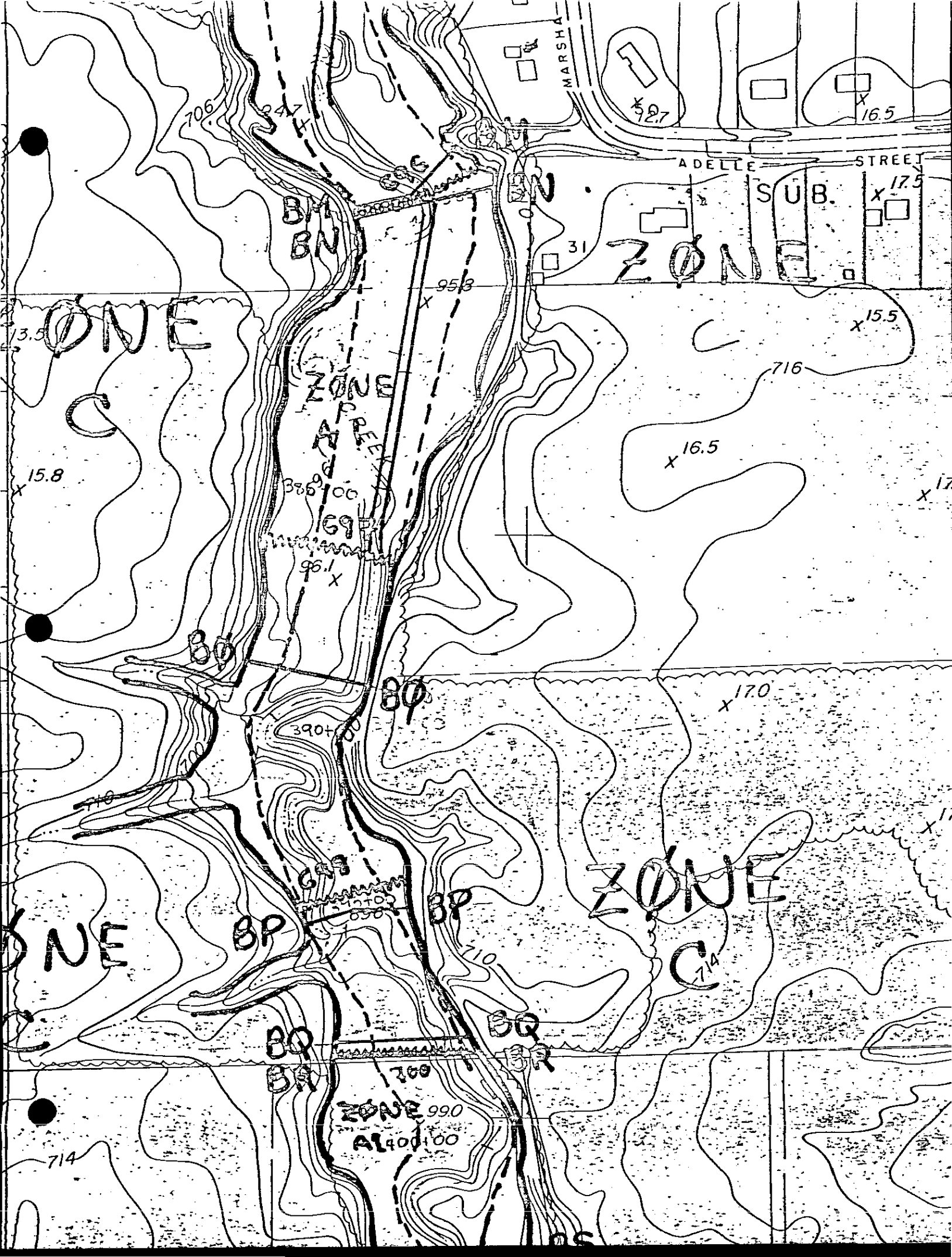

ZONE
C
ZONE
A1
ZONE
A1
ZONE
C
ZONE
C
AU
AW
AW
AW
AY
AY
AY
295+00
300+00
305+00
310+00
315+00
690
700
702
710
91.0
81.6
61.8
00.5
96.5
11.8
08.2
13.5
99.9
12.2
13.0
89.1
10.5
683
684
685

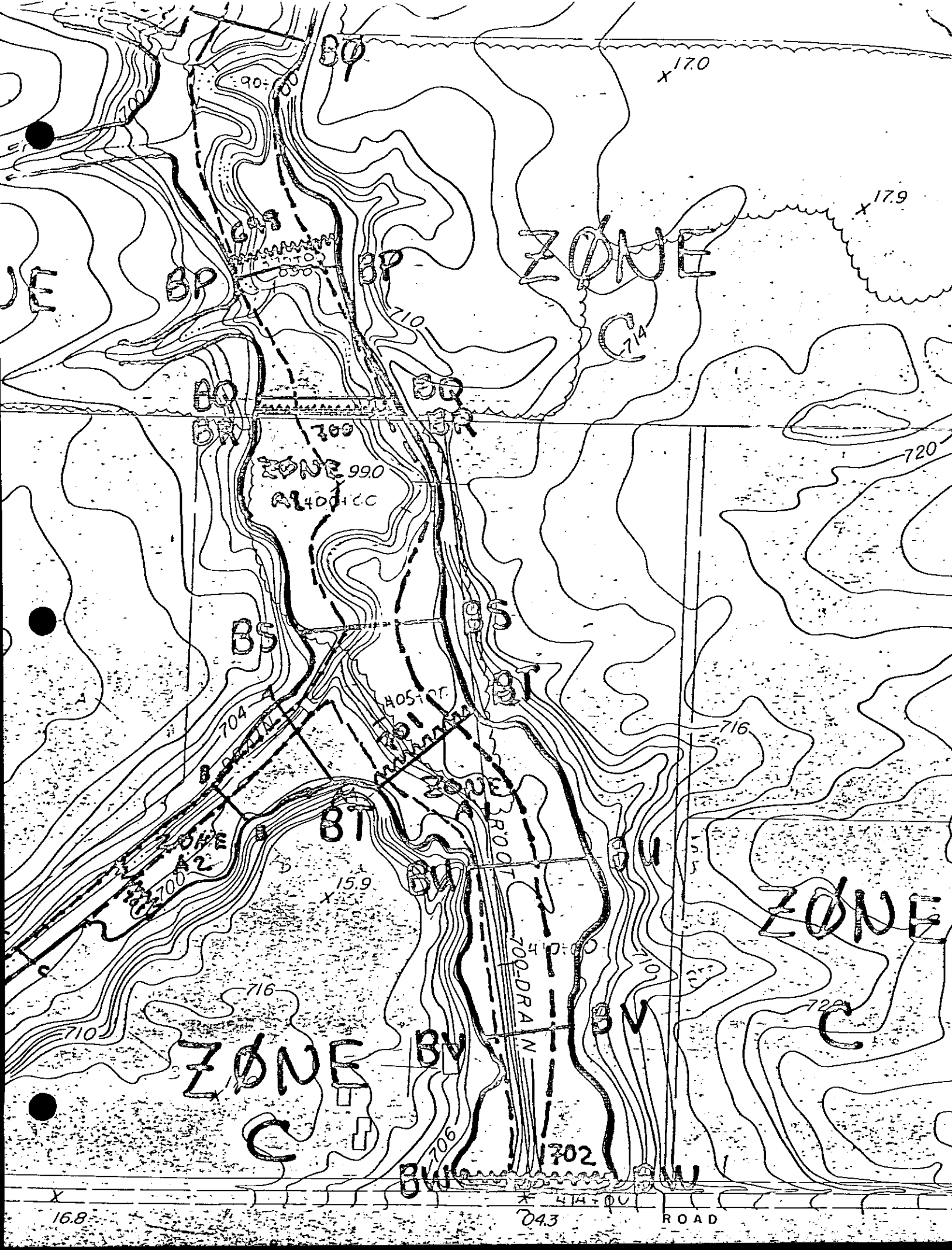

ZONE C
ZONE C
ZONE C
ZONE A1
ZONE A1
AY
AY
AE
BA
BB
BC
G85
G86
G87
G88
99.9
710
700
690
89.1
12.2
13.0
10.5
84.5
08.2
11.0
12.2
11.0
09.0
86.2
13.9
TRA

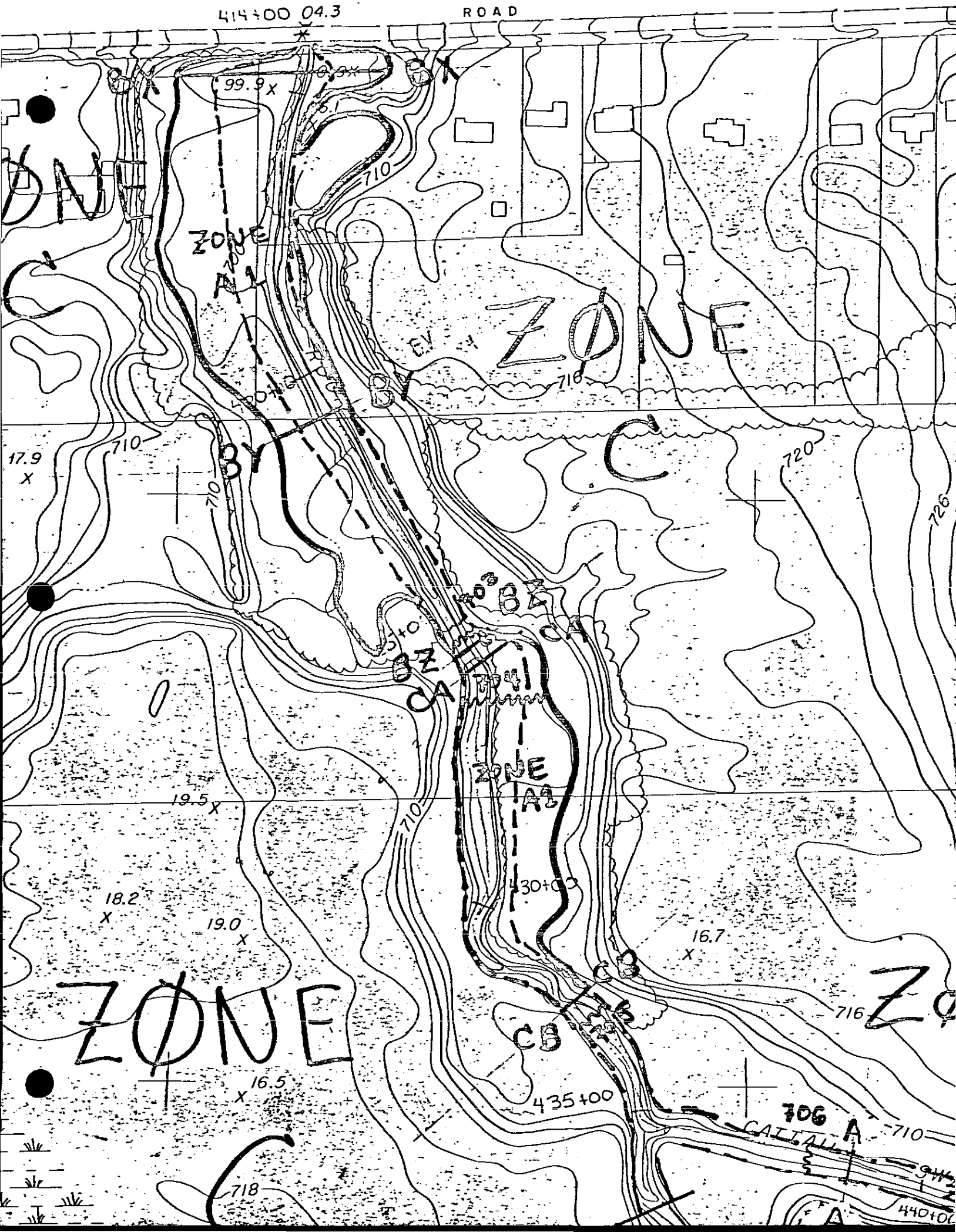

PARK
ZONE A1
ZONE A1
ZONE C
ZONE C
BA
BB
BC
BD
BE
MOUNT MORRIS
E2,135
E2,136
690
700
710
714
11.0
11.8
12.2
09.0
14.2
12.8
86.2

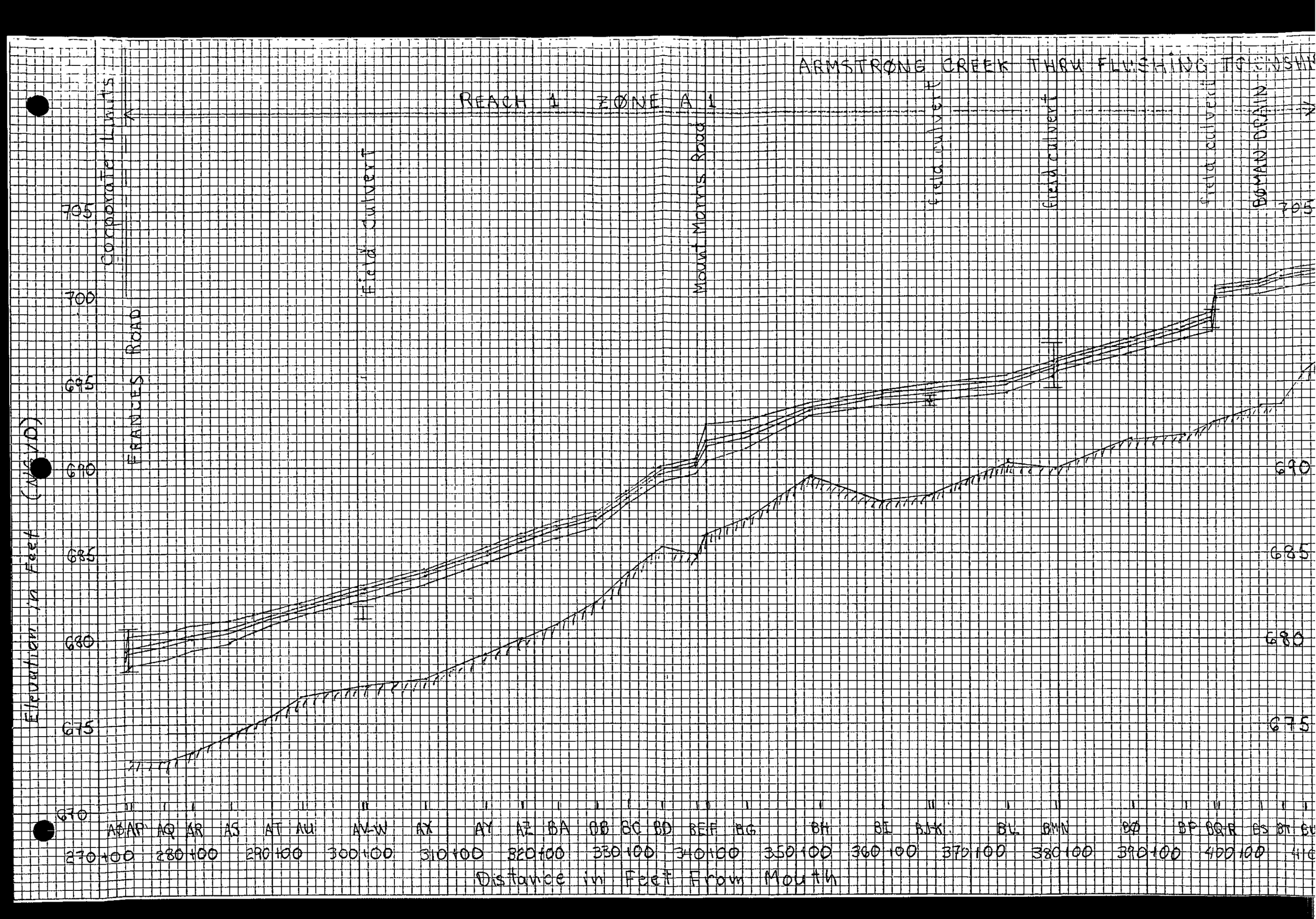

ZONE C
ZONE C
ZONE C
ZONE C
ZONE A
BE
BG
BH
BI
BJ
BK
ARMSTRONG
706
700
690
710
714
355+00
12.5
12.2
13.6
12.3
12.6
12.8
15.0
14.3
12.5
13.5
14.1
15.0


ZONE
ZONE
ZONE
ZONE
ZONE
ARMSTRONG
PARTRIDGE
RANDEE
MARSHA
ADE
BH
BI
BJ
BK
BL
BM
BN
12.3
15.8
14.5
710
694
700
706
714
93.8
13.9
16.2
14.1
12.5
26
51
92.7
355100
370100
375100

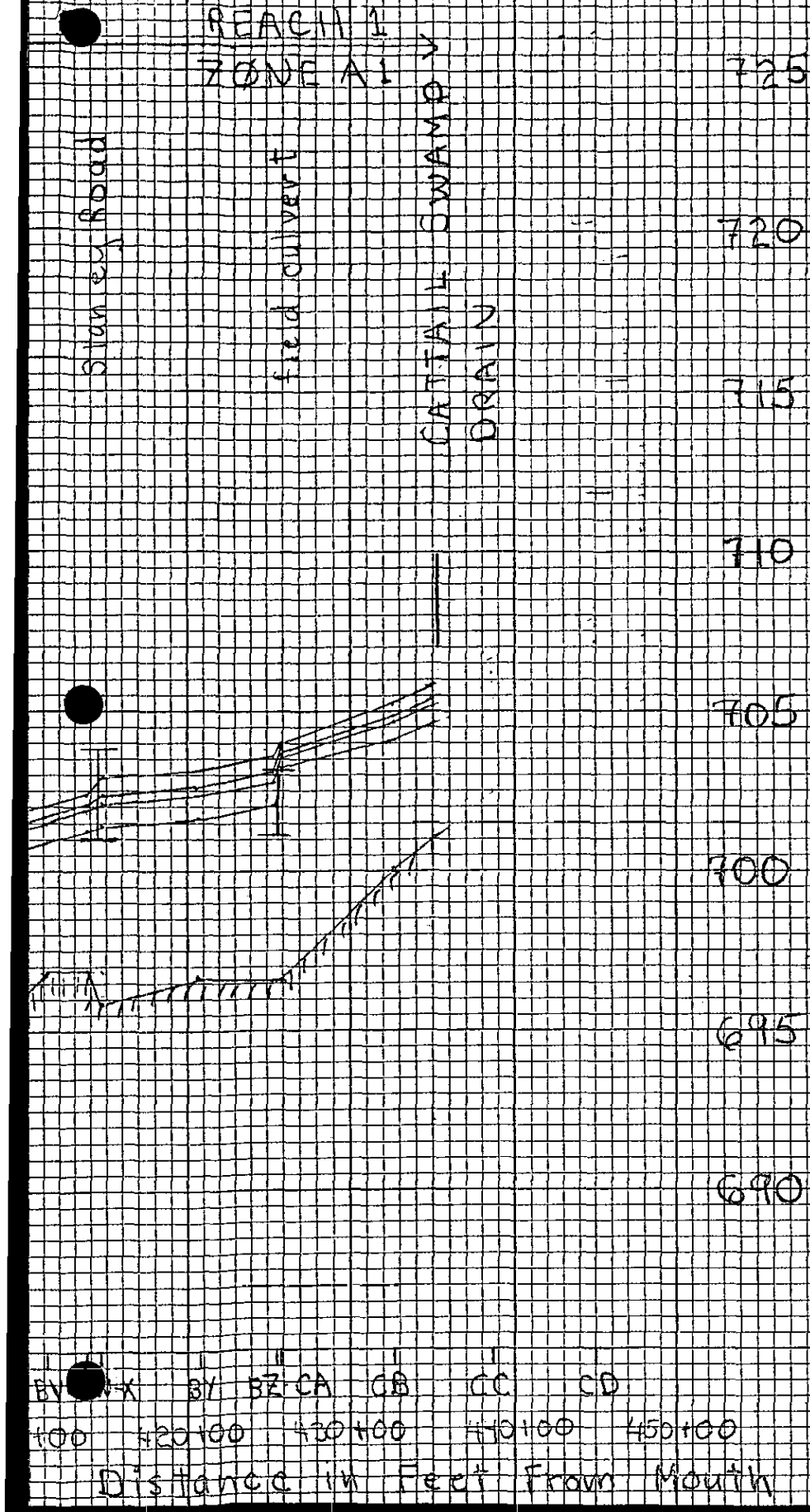

MARSHA
ADELLE STREET
SUB.
ZONE
ZONE
ZONE


BQ
17.0
17.9
ZONE
BP
BP
710
714
BQ
BQ
BR
BR
700
ZONE 99.0
A1 40 d.c.c
720
BS
BS
BT
BT
704
716
ZONE
A2
700
15.9
BU
BU
ZONE
700-DRAIN
710
716
710
ZONE
BV
BV
C
C
706
702
BU
BU
16.8
43
ROAD


414+00 04.3
ROAD
99.9
710
ZONE
A
ZONE
B
C
716
720
726
17.9
19.5
18.2
19.0
16.7
16.5
ZONE
ZONE
ZONE
CA
CB
ZONE
A
430+00
435+00
706
A
CANAL
718
440+00


ARMSTRONG CREEK THRU FLUSHING TOWNSHIP
REACH 1 ZONE A 1
Corporate Limits
FRANCES ROAD
Field culvert
Mount Morris Road
Field culvert
Field culvert
Field culvert
BOWAN DRAIN
Elevation in Feet (NGVD)
705
700
695
690
685
680
675
670
AO AP AQ AR AS AT AU AV-W AX AY AZ BA BB BC BD BE-F BG BH BI BJ-K BL BMN BO BP BQ-R BS BT BU
270+00 280+00 290+00 300+00 310+00 320+00 330+00 340+00 350+00 360+00 370+00 380+00 390+00 400+00 410
Distance in Feet From Mouth

ARMSTRONG CREEK THRU FLUSHING TOWNSHIP



Field Culvert Section AV-AW

Armstrong Creek thru Fluvirna Twp.

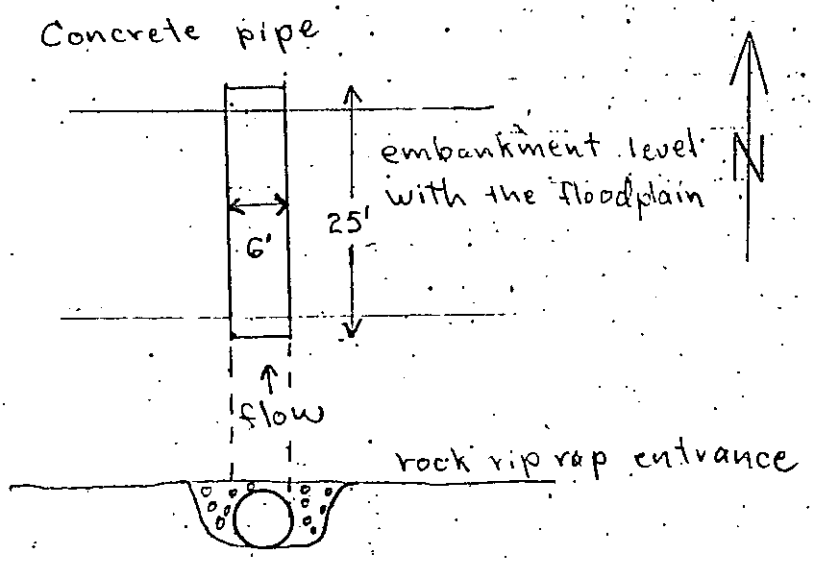
BRIDGE GEOMETRY SECTION _____

Attach Photo

Upstream Side Bridge

Attach Photo

Downstream Side Bridge



BASIC DIMENSION CHECKLIST

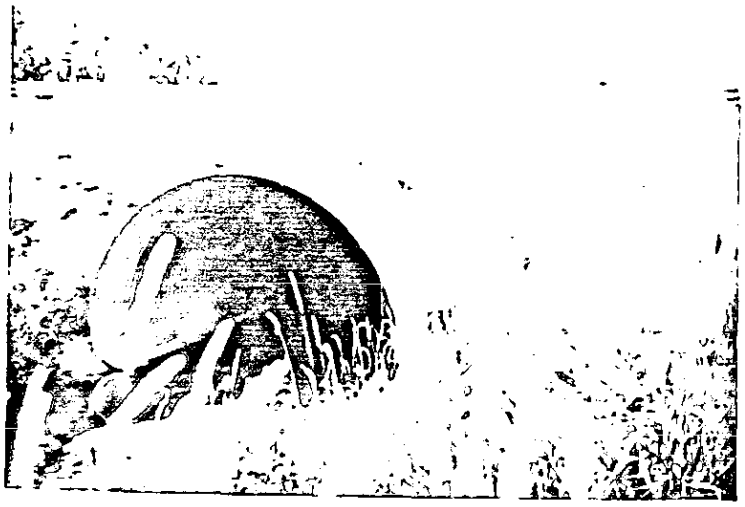
Bridge
- Alinement ϕ
- Bridge opening width W
- Number of piers
- Widths of piers
- Elevation low steel
- " top curb
- " top guardrail
- Embankment top width
- Embankment sideslope
- Wingwall angles θ
- Wingwall lengths l

Culvert
- Size, shape, material 6' round co
- Crown Upstr. ~~Invert~~ Elev. 681.19
- Crown Downstr. ~~Invert~~ Elev. 681.28
- Length of culvert 25'
- Road elevation 681.9
- Entrance wingwall angle 0
- Entrance wingwall length 0
- Length that pipe projects from headwall or fill 1'

ARMSTRONG CREEK

Mount Morris Road

BRIDGE GEOMETRY SECTION ____



Upstream Side Bridge

Attach Photo

Downstream Side Bridge

BASIC DIMENSION CHECKLIST

Bridge

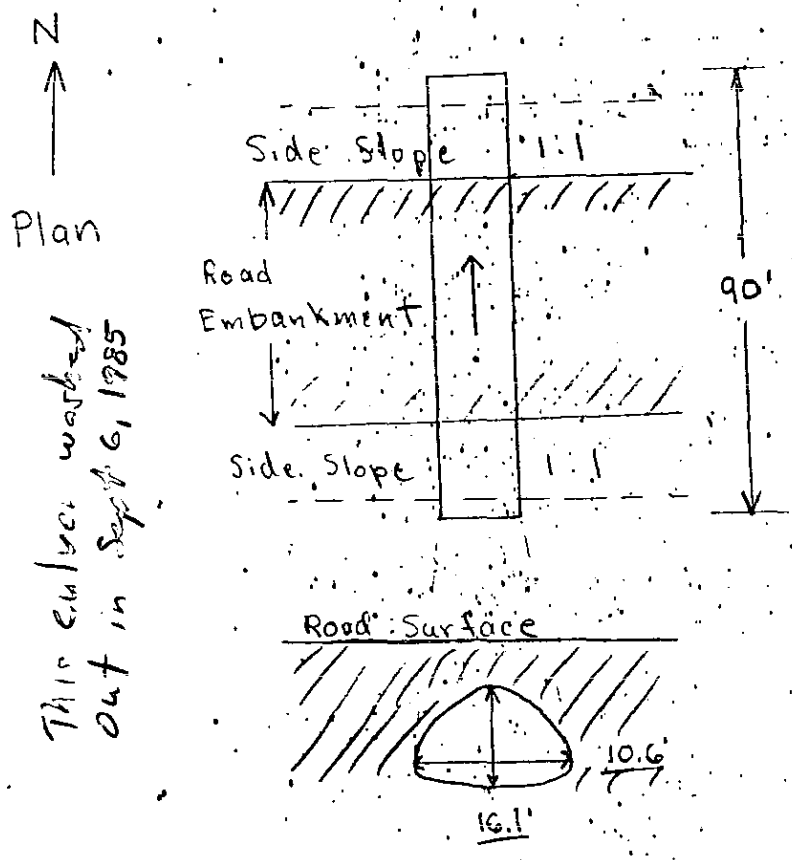
- Alinement ϕ
- Bridge opening width W
- Number of piers
- Widths of piers
- Elevation low steel
- " top curb
- " top guardrail
- Embankment top width
- Embankment sideslope
- Wingwall angles θ
- Wingwall lengths l

Culvert

- Size, shape, material 44" CMP
- Upstr. Invert Elev. 695.55
- Downstr. Invert Elev. 685.13
- Length of culvert 90'
- Road elevation 700.79
- Entrance wingwall angle θ No
- Entrance wingwall length No
- Length that pipe projects from headwall or fill ~ 0-15'

Paved Road

$k_L = 0.91$



This culvert washed out in Sept 6, 1985

ARMSTRONG CREEK MOUNT MORRIS RD HOLTSLAG BASE ELEVATION = 685.13 Z = 0.42

APPROACH ELEVATION	AREA	CONVEYANCE	ALPHA	TOP WIDTH	QC
685.50	3.8	61.6	1.000	9.6	13.78
686.50	19.1	556.5	1.000	19.4	107.61
687.50	40.9	1695.3	1.000	24.1	302.01
688.50	74.6	3532.9	1.191	77.1	416.67
689.50	230.9	8321.1	2.254	185.2	1463.22
690.50	434.2	17076.3	2.000	221.5	3450.40
691.50	673.8	29582.2	1.773	257.7	6182.61
692.50	953.4	47539.6	1.645	295.8	9712.23
693.50	1262.0	70931.3	1.544	321.2	14194.10
694.50	1595.7	98936.4	1.486	346.2	19438.40
695.50	1954.4	131653.7	1.449	371.3	25445.71
696.50	2338.2	169203.9	1.425	396.3	32228.86
697.50	2737.9	212763.8	1.383	403.1	40491.99
698.50	3144.4	260988.6	1.349	409.8	49422.52
699.50	3557.6	313697.7	1.321	416.6	58993.35
700.50	3978.0	370622.6	1.300	424.7	69085.19
701.50	4407.3	431700.0	1.285	434.1	79692.25
702.50	4848.3	494050.0	1.286	452.2	90084.37
703.50	5313.9	558934.1	1.299	479.1	100427.31
704.50	5805.2	631217.2	1.301	500.9	112138.87
705.50	6314.5	710252.6	1.298	517.8	125127.37
706.50	6844.2	789040.7	1.311	548.4	137198.44
707.50	7414.8	870318.3	1.336	592.8	148806.25

ARMSTRONG CREEK MOUNT MORRIS RD HOLTSLAG BASE ELEVATION = 685.13 Z = 0.42

BARREL DEPTH	AREA	CONVEYANCE	TOP WIDTH	WETTED PERIMETER
0.0	0.0	0.0	0.0	
0.424	2.74	72.8	9.66	9.71
0.848	7.72	325.2	13.61	13.75
1.272	14.00	796.6	15.56	15.90
1.696	20.76	1469.2	16.22	16.98
2.120	27.71	2296.9	16.51	17.88
2.544	34.73	3114.8	16.58	19.92
2.968	41.74	4115.4	16.49	20.77
3.392	48.70	5179.7	16.34	21.63
3.816	55.59	6290.7	16.15	22.50
4.240	62.39	7432.4	15.92	23.38
4.664	69.08	8589.9	15.63	24.28
5.088	75.64	9748.9	15.30	25.19
5.512	82.05	10895.0	14.90	26.12
5.936	88.27	12014.2	14.45	27.09
6.360	94.29	13091.7	13.93	28.08
6.784	100.08	14112.4	13.34	29.12
7.208	105.59	15059.9	12.66	30.20
7.632	110.80	15916.1	11.88	31.35
8.056	115.65	16660.3	10.99	32.59
8.480	120.09	17267.0	9.94	33.94
8.904	124.05	17702.0	8.68	35.45
9.328	127.41	17911.9	7.11	37.24
9.752	129.99	17783.4	4.93	39.58
10.176	131.22	16686.9	0.0	44.58
10.600	131.22	16686.9	0.0	44.58

RMSTRONG CREEK MOUNT MORRIS RD HOLTSLAG BASE ELEVATION = 685.13 Z = 0.42

Q	ELEV H1	ELEV H4	D2	D3	TYPE	C	C ADJUSTED
100.0	687.86	********	1.79	1.42	2	0.85	0.88
100.0	688.63	688.50	2.97	3.37	3	0.85	0.89
100.0	689.09	689.00	3.46	3.87	3	0.85	0.86
100.0	689.57	689.50	3.96	4.37	3	0.84	0.85
100.0	689.74	689.68	4.14	4.55	3	0.84	0.85
100.0	690.05	690.00	4.46	4.87	3	0.84	0.84
100.0	690.16	690.11	4.57	4.98	3	0.84	0.84
100.0	690.32	690.27	4.73	5.14	3	0.84	0.84
100.0	690.58	690.54	4.99	5.41	3	0.84	0.84
100.0	691.04	691.00	5.45	5.87	3	0.84	0.84
100.0	697.02	697.00	10.60	10.60	4	0.80	0.80
200.0	688.95	********	2.50	2.09	2	0.85	0.85
200.0	689.04	688.50	3.04	3.37	3	0.85	0.86
200.0	689.38	689.00	3.50	3.87	3	0.84	0.85
200.0	689.78	689.50	3.99	4.37	3	0.84	0.84
200.0	689.94	689.68	4.16	4.55	3	0.84	0.84
200.0	690.22	690.00	4.47	4.87	3	0.84	0.84
200.0	690.32	690.11	4.58	4.98	3	0.84	0.84
200.0	690.46	690.27	4.74	5.14	3	0.84	0.84
200.0	690.71	690.54	5.01	5.41	3	0.84	0.84
200.0	691.15	691.00	5.47	5.87	3	0.84	0.84
200.0	697.07	697.00	10.60	10.60	4	0.80	0.8
300.0	689.86	********	3.12	2.60	2	0.84	0.8
300.0	689.71	688.50	3.21	3.37	3	0.84	0.8
300.0	689.86	689.00	3.59	3.87	3	0.84	0.8
300.0	690.14	689.50	4.04	4.37	3	0.84	0.8
300.0	690.26	689.68	4.21	4.55	3	0.84	0.8
300.0	690.50	690.00	4.51	4.87	3	0.84	0.8
300.0	690.58	690.11	4.62	4.98	3	0.84	0.8
300.0	690.71	690.27	4.77	5.14	3	0.84	0.8
300.0	690.93	690.54	5.04	5.41	3	0.84	0.8
300.0	691.33	691.00	5.49	5.87	3	0.84	0.8
300.0	697.16	697.00	10.60	10.60	4	0.80	0.8

300.0	689.86	********	3.12	2.60	2	0.84	0.84
300.0	689.71	688.50	3.21	3.37	3	0.84	0.84
300.0	689.86	689.00	3.59	3.87	3	0.84	0.84
300.0	690.14	689.50	4.04	4.37	3	0.84	0.84
300.0	690.26	689.68	4.21	4.55	3	0.84	0.84
300.0	690.50	690.00	4.51	4.87	3	0.84	0.84
300.0	690.58	690.11	4.62	4.98	3	0.84	0.84
300.0	690.71	690.27	4.77	5.14	3	0.84	0.84
300.0	690.93	690.54	5.04	5.41	3	0.84	0.84
300.0	691.33	691.00	5.49	5.87	3	0.84	0.84
300.0	697.16	697.00	10.60	10.60	4	0.80	0.80
330.0	690.12	********	3.28	2.74	2	0.84	0.84
330.0	689.94	688.50	3.30	3.37	3	0.84	0.84
330.0	690.03	689.00	3.63	3.87	3	0.84	0.84
330.0	690.27	689.50	4.06	4.37	3	0.84	0.84
330.0	690.38	689.68	4.22	4.55	3	0.84	0.84
330.0	690.60	690.00	4.53	4.87	3	0.84	0.84
330.0	690.68	690.11	4.63	4.98	3	0.84	0.84
330.0	690.80	690.27	4.78	5.14	3	0.84	0.84
330.0	691.01	690.54	5.05	5.41	3	0.84	0.84
330.0	691.40	691.00	5.50	5.87	3	0.84	0.84
330.0	697.19	697.00	10.60	10.60	4	0.80	0.80

RMSTRONG CREEK MOUNT MORRIS RD HOLTSLAG BASE ELEVATION = 685.13 Z = 0.42

Q	ELEV H1	ELEV H4	D2	D3	TYPE	C	C ADJUSTED
400.0	690.67	********	3.64	3.06	2	0.84	0.84
400.0	690.53	688.50	3.57	3.37	3	0.84	0.84
400.0	690.49	689.00	3.76	3.87	3	0.84	0.84
400.0	690.63	689.50	4.13	4.37	3	0.84	0.84
400.0	690.70	689.68	4.28	4.55	3	0.84	0.84
400.0	690.88	690.00	4.57	4.87	3	0.84	0.84
400.0	690.94	690.11	4.67	4.98	3	0.84	0.84
400.0	691.05	690.27	4.82	5.14	3	0.84	0.84
400.0	691.23	690.54	5.08	5.41	3	0.84	0.84
400.0	691.58	691.00	5.52	5.87	3	0.84	0.84
400.0	697.28	697.00	10.60	10.60	4	0.80	0.80
470.0	691.18	********	3.98	3.36	2	0.84	0.84
470.0	691.18	688.50	3.98	3.37	3	0.84	0.84
470.0	691.01	689.00	3.96	3.87	3	0.84	0.84
470.0	691.04	689.50	4.23	4.37	3	0.84	0.84
470.0	691.08	689.68	4.37	4.55	3	0.84	0.84
470.0	691.20	690.00	4.63	4.87	3	0.84	0.8
470.0	691.25	690.11	4.72	4.98	3	0.84	0.8
470.0	691.34	690.27	4.87	5.14	3	0.84	0.8
470.0	691.49	690.54	5.12	5.41	3	0.84	0.8
470.0	691.80	691.00	5.55	5.87	3	0.84	0.8
470.0	697.38	697.00	10.60	10.60	4	0.80	0.8
500.0	691.41	********	4.13	3.47	2	0.84	0.8
500.0	691.25	689.00	4.08	3.87	3	0.84	0.8
500.0	691.23	689.50	4.29	4.37	3	0.84	0.8
500.0	691.26	689.68	4.41	4.55	3	0.84	0.8
500.0	691.36	690.00	4.66	4.87	3	0.84	0.8
500.0	691.40	690.11	4.75	4.98	3	0.84	0.8
500.0	691.48	690.27	4.89	5.14	3	0.84	0.8
500.0	691.62	690.54	5.14	5.41	3	0.84	0.8
500.0	691.91	691.00	5.56	5.87	3	0.84	0.8
500.0	697.43	697.00	10.60	10.60	4	0.80	0.8

530.0	691.63	********	4.27	3.59	2	0.84	0.8
530.0	691.50	689.00	4.21	3.87	3	0.84	0.8
530.0	691.43	689.50	4.36	4.37	3	0.84	0.8
530.0	691.45	689.68	4.47	4.55	3	0.84	0.8
530.0	691.52	690.00	4.70	4.87	3	0.84	0.8
530.0	691.56	690.11	4.79	4.98	3	0.84	0.8
530.0	691.62	690.27	4.92	5.14	3	0.84	0.8
530.0	691.75	690.54	5.16	5.41	3	0.84	0.8
530.0	692.02	691.00	5.58	5.87	3	0.84	0.8
530.0	697.49	697.00	10.60	10.60	4	0.80	0.8
600.0	692.11	********	4.58	3.87	2	0.84	0.8
600.0	692.11	689.00	4.58	3.87	3	0.84	0.8
600.0	691.93	689.50	4.57	4.37	3	0.84	0.8
600.0	691.91	689.68	4.63	4.55	3	0.84	0.8
600.0	691.93	690.00	4.82	4.87	3	0.84	0.8
600.0	691.95	690.11	4.89	4.98	3	0.84	0.8
600.0	691.99	690.27	5.01	5.14	3	0.84	0.8
600.0	692.08	690.54	5.22	5.41	3	0.84	0.8
600.0	692.30	691.00	5.63	5.87	3	0.84	0.8
600.0	697.62	697.00	10.60	10.60	4	0.80	0.8

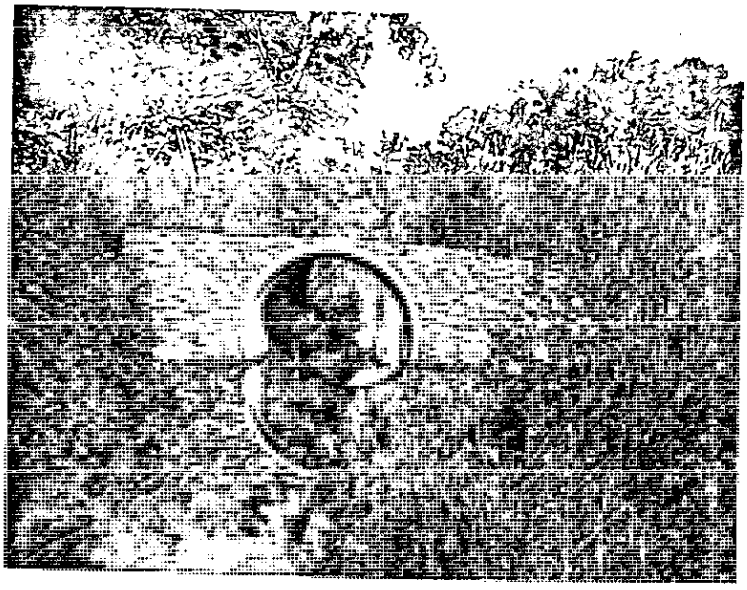
ARMSTRONG CREEK MOUNT MORRIS RD HOLTSLAG BASE ELEVATION = 685.13 Z = 0.42

Q	ELEV H1	ELEV H4	D2	D3	TYPE	C	C ADJUSTED
650.0	692.46	********	4.82	4.04	2	0.84	0.84
650.0	692.31	689.50	4.76	4.37	3	0.84	0.84
650.0	692.27	689.68	4.79	4.55	3	0.84	0.84
650.0	692.25	690.00	4.92	4.87	3	0.84	0.84
650.0	692.26	690.11	4.98	4.98	3	0.84	0.84
650.0	692.28	690.27	5.09	5.14	3	0.84	0.84
650.0	692.34	690.54	5.29	5.41	3	0.84	0.84
650.0	692.52	691.00	5.67	5.87	3	0.84	0.84
650.0	697.73	697.00	10.60	10.60	4	0.80	0.80
700.0	692.79	********	5.03	4.24	2	0.84	0.84
700.0	692.72	689.50	4.99	4.37	3	0.84	0.84
700.0	692.65	689.68	4.98	4.55	3	0.84	0.84
700.0	692.59	690.00	5.05	4.87	3	0.84	0.84
700.0	692.58	690.11	5.10	4.98	3	0.84	0.84
700.0	692.59	690.27	5.19	5.14	3	0.84	0.84
700.0	692.62	690.54	5.36	5.41	3	0.84	0.84
700.0	692.76	691.00	5.72	5.87	3	0.84	0.84
700.0	697.85	697.00	10.60	10.60	4	0.80	0.80
1000.0	694.92	********	6.26	5.22	2	0.82	0.82
1000.0	694.80	690.54	6.23	5.41	3	0.82	0.82
1000.0	694.64	691.00	6.29	5.87	3	0.82	0.82
1000.0	698.73	697.00	10.60	10.60	4	0.80	0.80

ARMSTRONG CREEK

Sec 81-BK

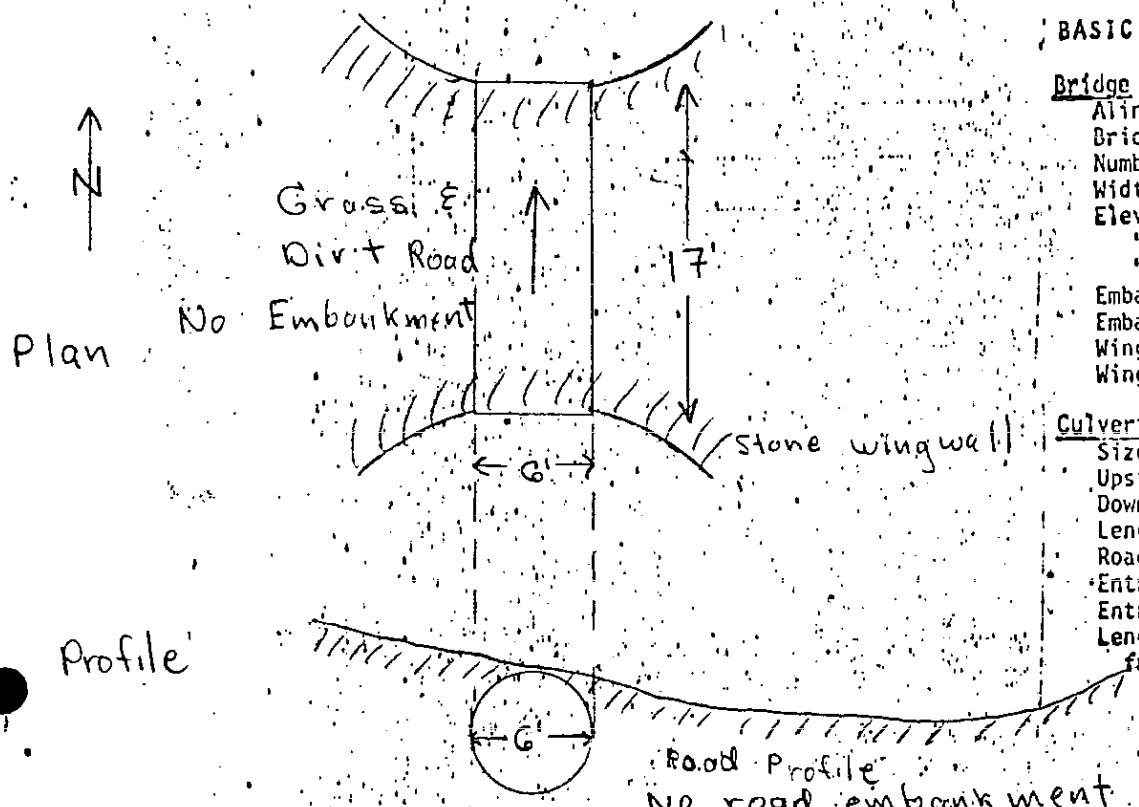
BRIDGE GEOMETRY SECTION ____



Attach Photo

Upstream Side Bridge

Downstream Side Bridge



BASIC DIMENSION CHECKLIST

Bridge
- Alinement ϕ
- Bridge opening width W
- Number of piers
- Widths of piers
- Elevation low steel
- " top curb
- " top guardrail
- Embankment top width
- Embankment sideslope
- Wingwall angles θ
- Wingwall lengths l

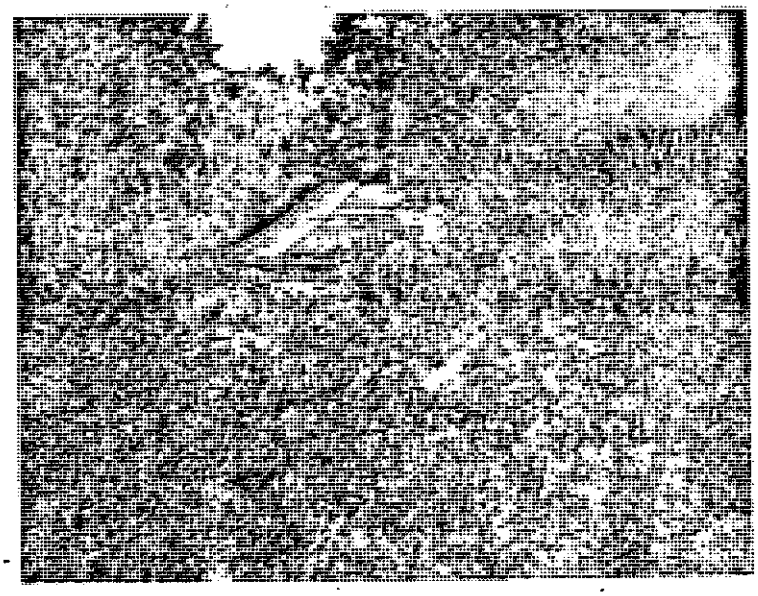
Culvert
- Size, shape, material 6' Circular Conc.
- Upstr. ~~Invert~~ Elev. Crown 693.52
- Downstr. ~~Invert~~ Elev. " 693.33
- Length of culvert 17'
- Road elevation 694.22
- Entrance wingwall angle θ
- Entrance wingwall length
- Length that pipe projects from headwall or fill

ARMSTRONG CREEK

Sec BL (near)

BRIDGE GEOMETRY SECTION _____

Attach



oto

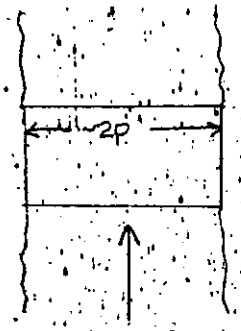
Upstream Side Bridge

Downstream Side Bridge

Platform Bridge Deck

N

Plan



No wingwalls

No abutments

No embankment

No constriction

Profile

℄ Road 695.16'

Low chord 694.16

Bridge not considered in analysis

BASIC DIMENSION CHECKLIST

Bridge

- Alinement ϕ
- Bridge opening width W
- Number of piers
- Widths of piers
- Elevation low steel
- " top curb
- " top guardrail
- Embankment top width
- Embankment sideslope
- Wingwall angles θ
- Wingwall lengths l

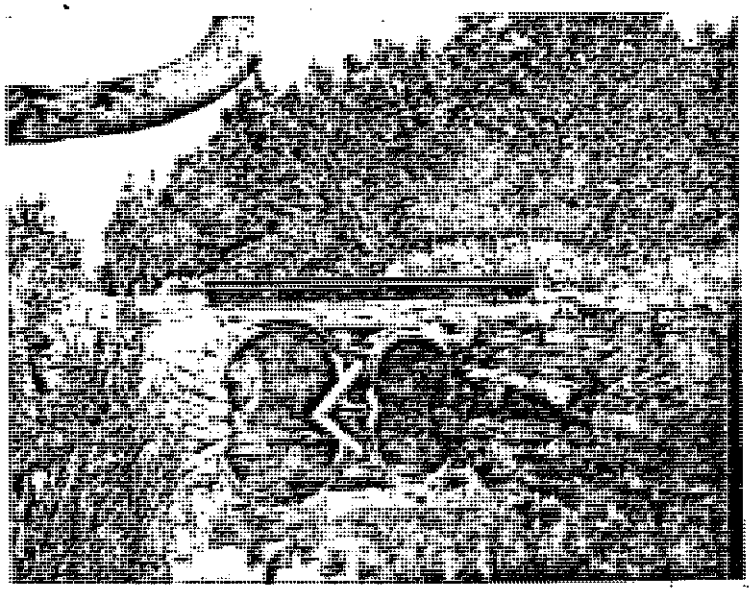
Culvert

- Size, shape, material
- Upstr. Invert Elev.
- Downstr. Invert Elev.
- Length of culvert
- Road elevation
- Entrance wingwall angle θ
- Entrance wingwall length
- Length that pipe projects from headwall or fill

ARMSTRONG CREEK

Sec 8M-8N

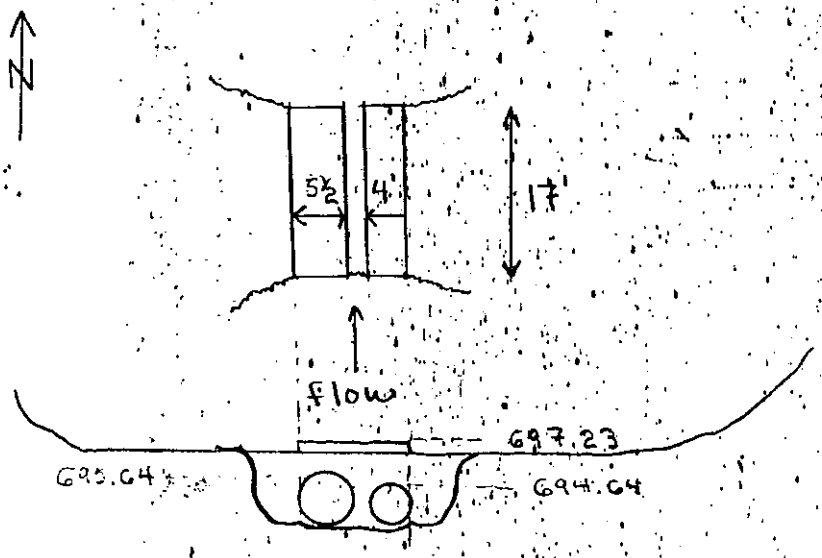
BRIDGE GEOMETRY SECTION ____



Upstream Side Bridge

Attach Photo

Downstream Side Bridge



BASIC DIMENSION CHECKLIST

Bridge
- Alinement ϕ
- Bridge opening width W
- Number of piers
- Widths of piers
- Elevation low steel
- " top curb
- " top guardrail
- Embankment top width
- Embankment sideslope
- Wingwall angles θ
- Wingwall lengths l

Culvert
- Size, shape, material concrete
- Upstr. Invert Elev.
- Downstr. Invert Elev.
- Length of culvert 17
- Road elevation
- Entrance wingwall angle θ
- Entrance wingwall length
- Length that pipe projects from headwall or fill

Armstrong Creek at Section BM-BN

Culvert Computation.

There are two concrete circular pipe culverts at section BM-BN on Armstrong Creek. Road overflow, without embankment, occurs for all flood discharges. Rating will be developed for the three control structures and combined.

Culvert Rating

Diameter = 5.5 feet

Length = 17 feet

Mannings "n" = 0.018

C = 0.84

type 4 flow

10	0.00
25	0.03
50	0.10
75	0.24
65	0.18
90	0.34
100	0.41

Culvert Rating

Diameter = 4.0 feet

Length = 17 feet

Mannings "n" = 0.018

C = 0.84

10	0.02
25	0.10
50	0.39
65	0.66
35	0.19

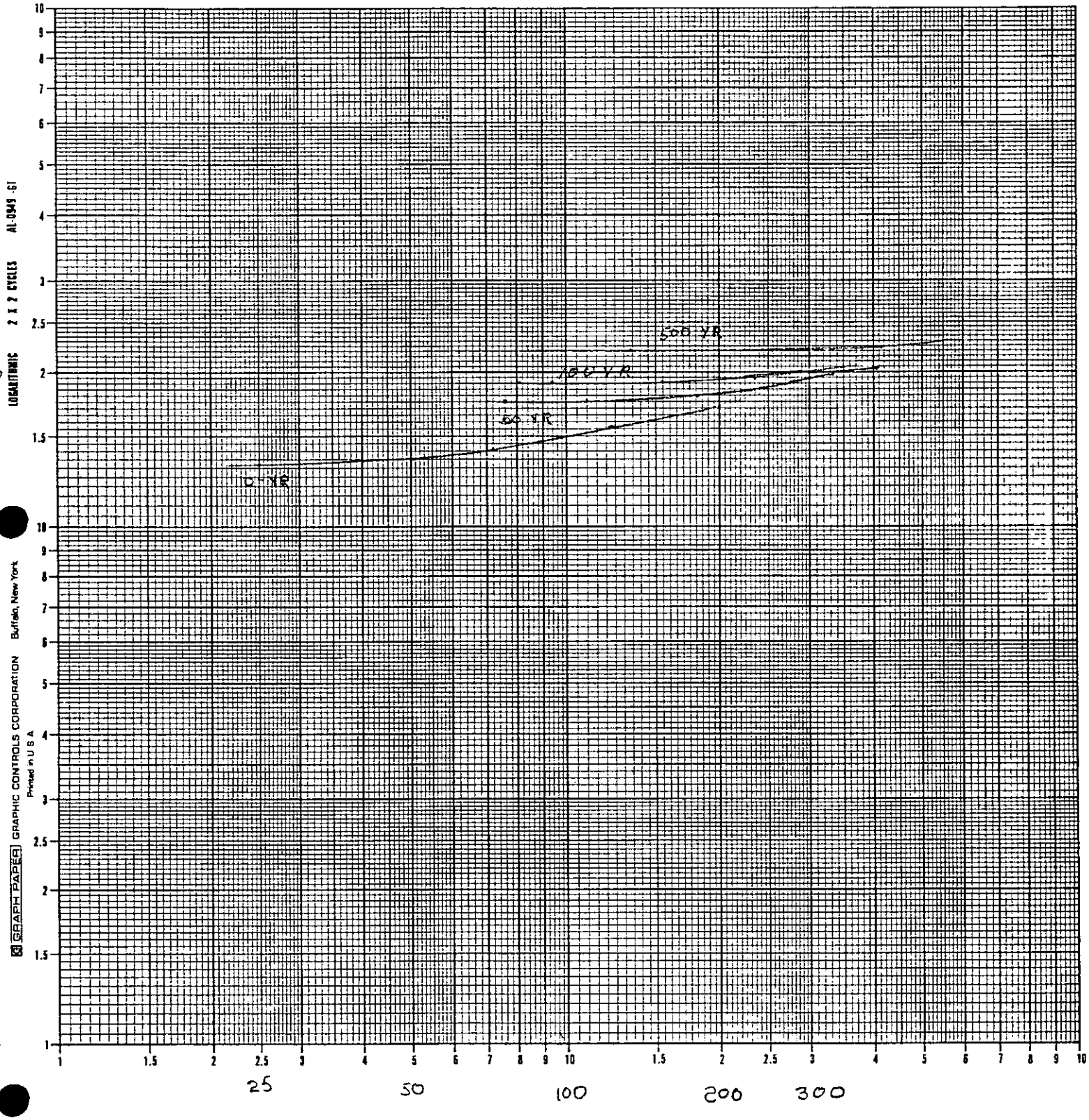
Armstrong Creek at Section BM-8N

Recurrence Interval	Design Discharge	Water Surface h_4	Discharge 5.5' Cul	Discharge 4.0' Cul	Discharge Road	h_1
10-YR	330	695.31	85	50	190	695.70
50-YR	470	695.74	85	50	350	696.00
100-YR	530	695.90	85	50	400	696.10
500-YR	650	696.19	50	25	550	696.30

Confirmed Bridge Computations
Used " "

Armstrong Creek @ Station EM-EN

Ford Overflow Rating

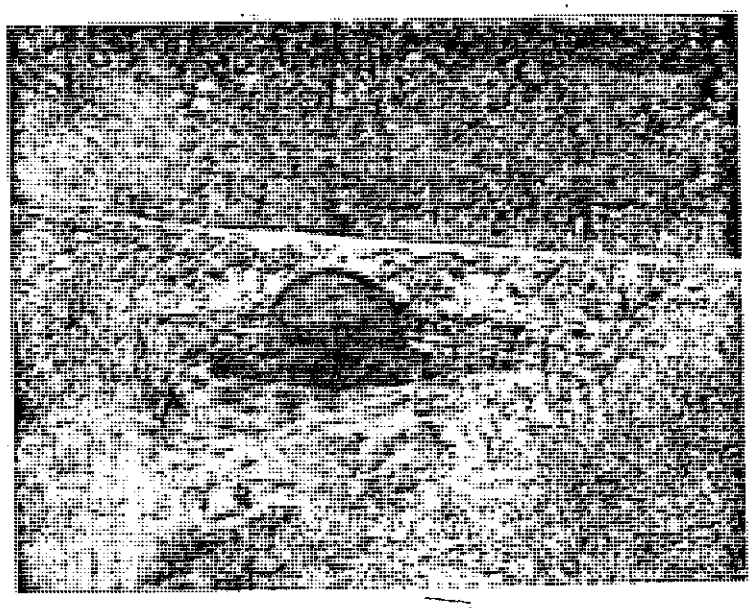


Armstrong Creek thru Flushing Twsp

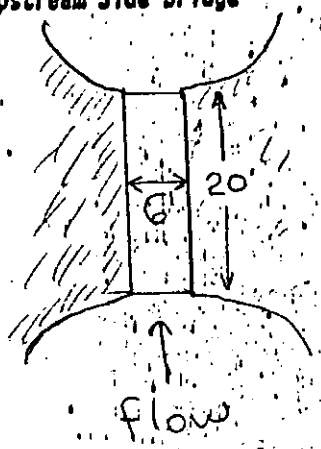
Culvert at Section BQ-BR

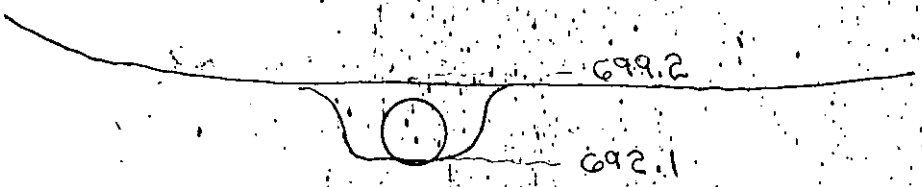
BRIDGE GEOMETRY SECTION ____

Attach Photo



Upstream Side Bridge





Downstream Side Bridge

N

BASIC DIMENSION CHECKLIST

Bridge
- Alinement ϕ
- Bridge opening width W
- Number of piers
- Widths of piers
- Elevation low steel
- " top curb
- " top guardrail
- Embankment top width
- Embankment sideslope
- Wingwall angles θ
- Wingwall lengths l

Culvert
- Size, shape, material 6' CMP circul
- Upstr. Invert Elev.
- Downstr. Invert Elev. 692.11
- Length of culvert 20'
- Road elevation 699.2
- Entrance wingwall angle θ
- Entrance wingwall length
- Length that pipe projects from headwall or fill

Armstrong Creek at Section BQ-BR

Culvert Properties

Circular

Diameter = 6'

Length = 20'

Material = CMP

Flow = Type 4

C = 0.84 * 0.96 = 0.81

"n" = 0.020

	Δh
10	0.00
20	0.01
35	0.04
50	0.08
75	0.18
100	0.32
125	0.50
150	0.73
175	0.99
200	1.29
225	1.63
250	2.01
275	2.44
300	2.90
325	3.40
350	3.95

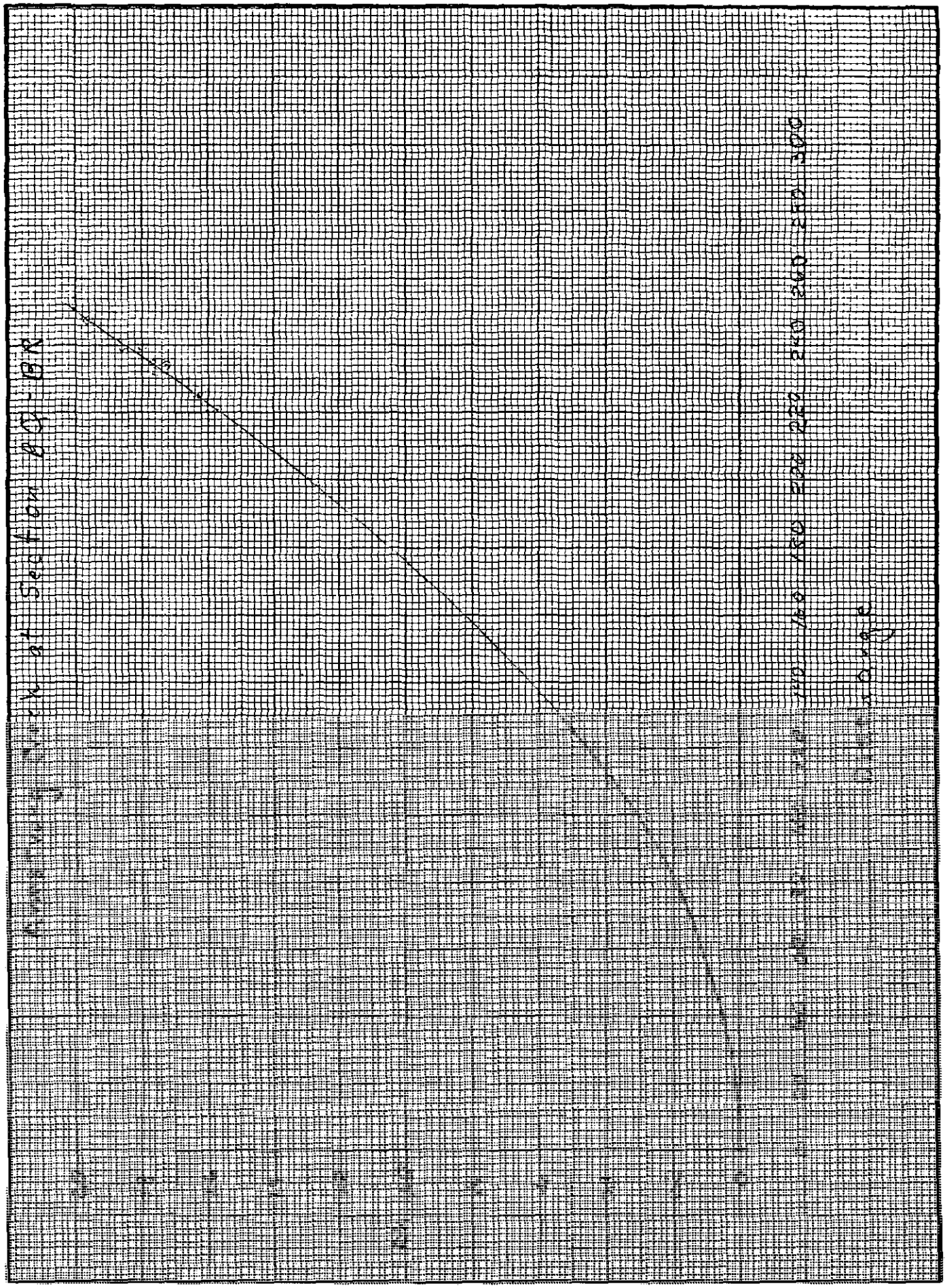
culvert computations verified bridge computations

bridge computations used

(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....



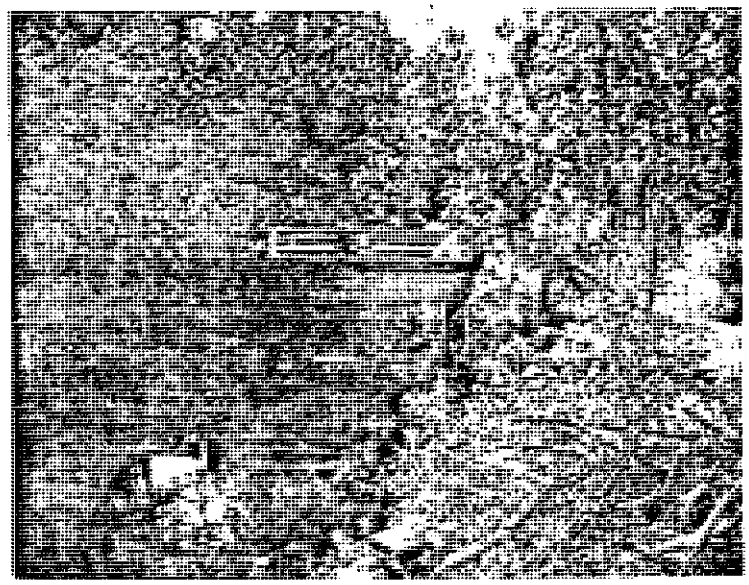
Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

ARMSTRONG SITE — Flushing Twsp.

Stanley Road

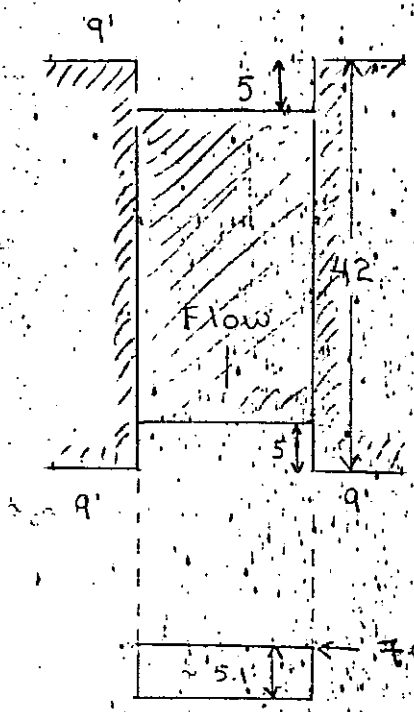
BRIDGE GEOMETRY SECTION ____

Attach Photo



Upstream Side Bridge

Downstream Side Bridge



Plan

Profile

BASIC DIMENSION CHECKLIST

Bridge

- Alinement ϕ
- Bridge opening width W
- Number of piers
- Widths of piers
- Elevation low steel
- " top curb
- " top guardrail
- Embankment top width
- Embankment sideslope
- Wingwall angles θ
- Wingwall lengths l

Culvert

- Size, shape, material Square Concrete Box
- Upstr. Invert Elev.
- Downstr. Invert Elev.
- Length of culvert 42'
- Road elevation
- Entrance wingwall angle θ 90°
- Entrance wingwall length 9'
- Length that pipe projects from headwall or fill

Armstrong Creek at Stanley Road

Recurrence Interval	Discharge	h_4	h_1
10-YR	225	701.26	701.41
50-YR	320	701.83	702.13
100-YR	360	702.02	702.40
500-YR	445	702.36	702.94

$A_o = 18.0 * 5.06 = 91.1$

$C = 0.84$

$n = 0.018$

$L = 42'$

$R_o = \frac{A}{P} = \frac{18 \times 5.06}{2*18+2*5.06} = 1.97$

For type 4 flow

$$Q = CA_o \sqrt{\frac{2g}{1+\frac{2gC^2n^2L}{R_o^{4/3}}}} \sqrt{\Delta h}$$

$$Q = 582.25 \sqrt{\Delta h}$$

ARMSTRØNG CREEK

Section BZ - CA

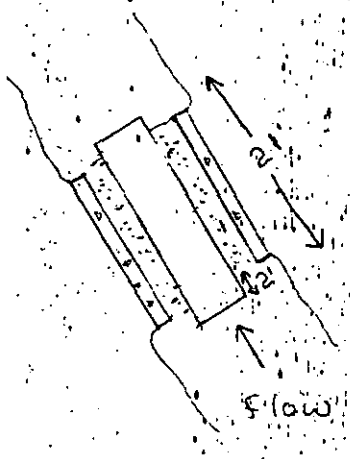
BRIDGE GEOMETRY SECTION _____

Attach Photo

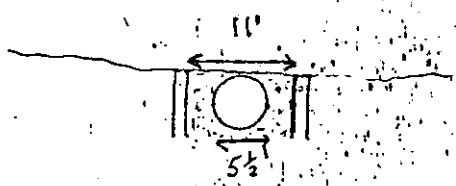
Upstream Side Bridge

Attach Photo

Downstream Side Bridge



Plan



Profile

BASIC DIMENSION CHECKLIST

Bridge

- Alinement ϕ
- Bridge opening width W
- Number of piers
- Widths of piers
- Elevation low steel
- " top curb
- " top guardrail
- Embankment top width
- Embankment sideslope
- Wingwall angles θ
- Wingwall lengths l

Culvert

- Size, shape, material 5½' CMP circular
- Upstr. ~~Invert~~ Crown Elev. 701.55
- Downstr. ~~Invert~~ Crown Elev. 701.10
- Length of culvert 21'
- Road elevation 703.19
- Entrance wingwall angle θ na
- Entrance wingwall length
- Length that pipe projects from headwall or fill 2'

Armstrong Creek Thru Flushing Township

Section BZ-CA Culvert Computations

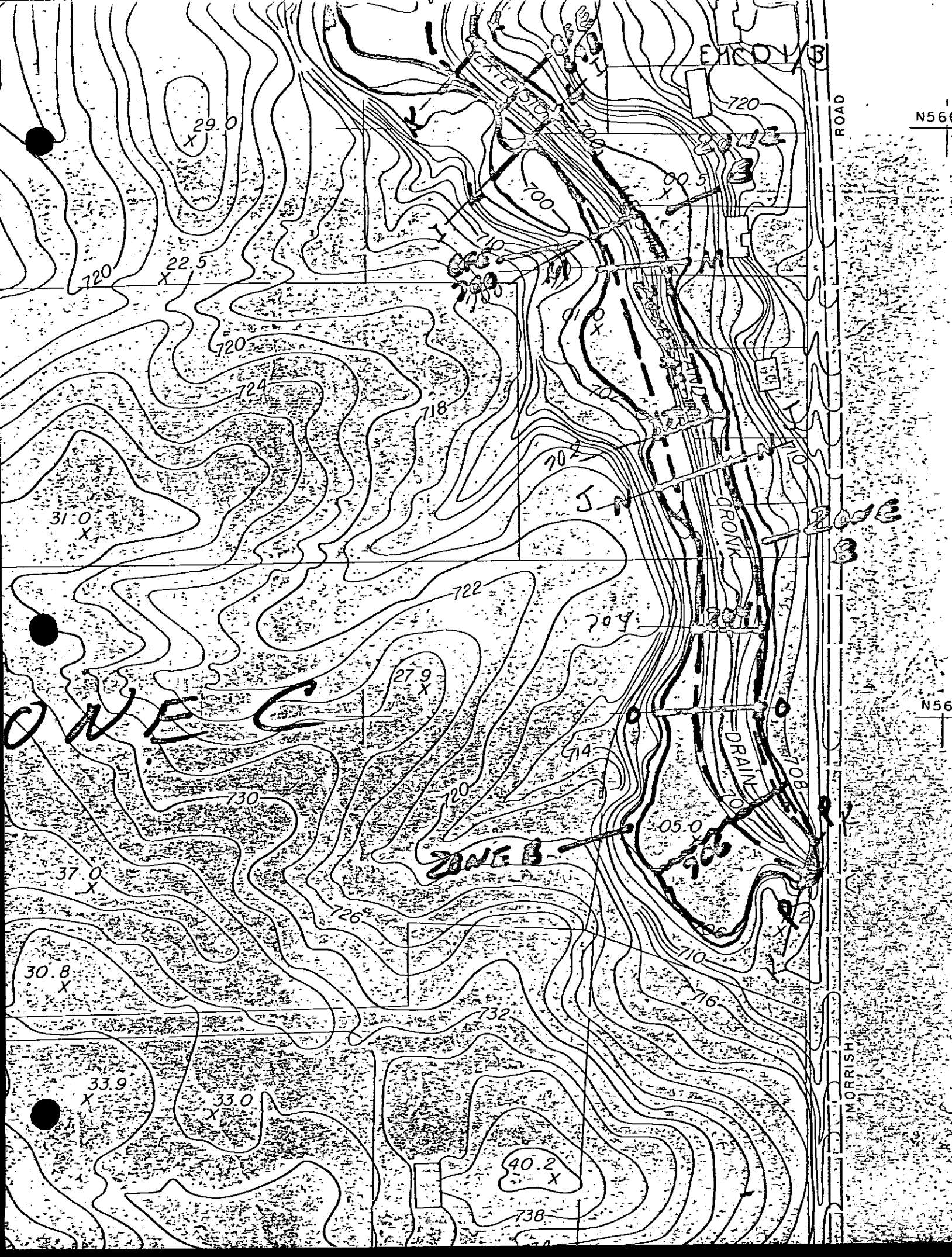
Recurrence Interval	Discharge	h_4	h_i	Q_{CUL}	Q_{RD}	Δh
10-YR	225	702.02	703.33	175	50	1.31
50-YR	320	702.76	703.70	155	165	1.06
100-YR	360	703.03	703.80	145	215	0.77
500-YR	445	703.54	703.96	122	323	0.42

Culvert Computations - type 4 flow

Culvert Diameter = 5.5 feet
Contraction Coefficient = 0.88
Mannings "n" = 0.016
Length = 21

Q	Δh
175	1.17
155	0.92
145	0.81
122	0.57

Culvert computation approx. check bridge computations, bridge computation used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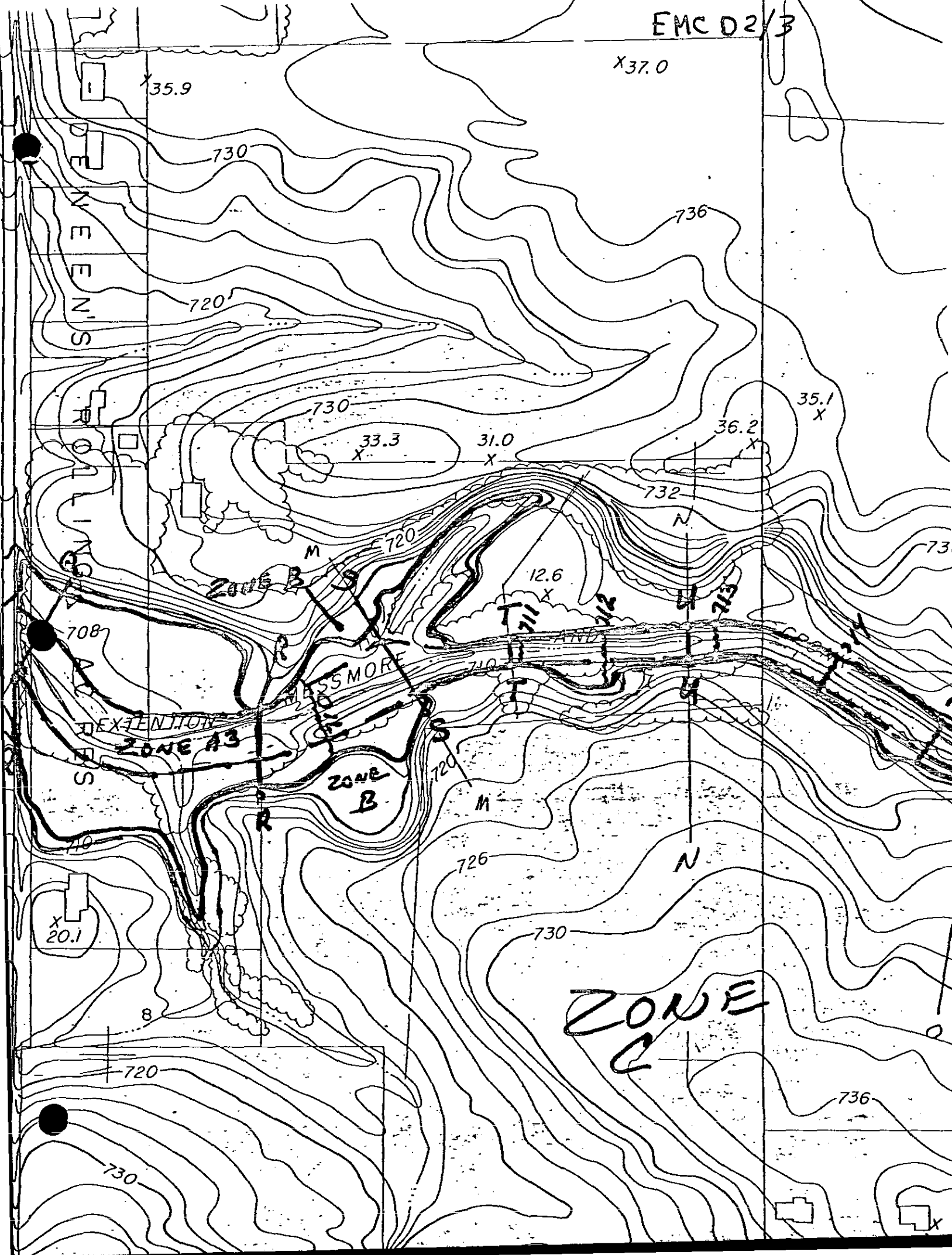
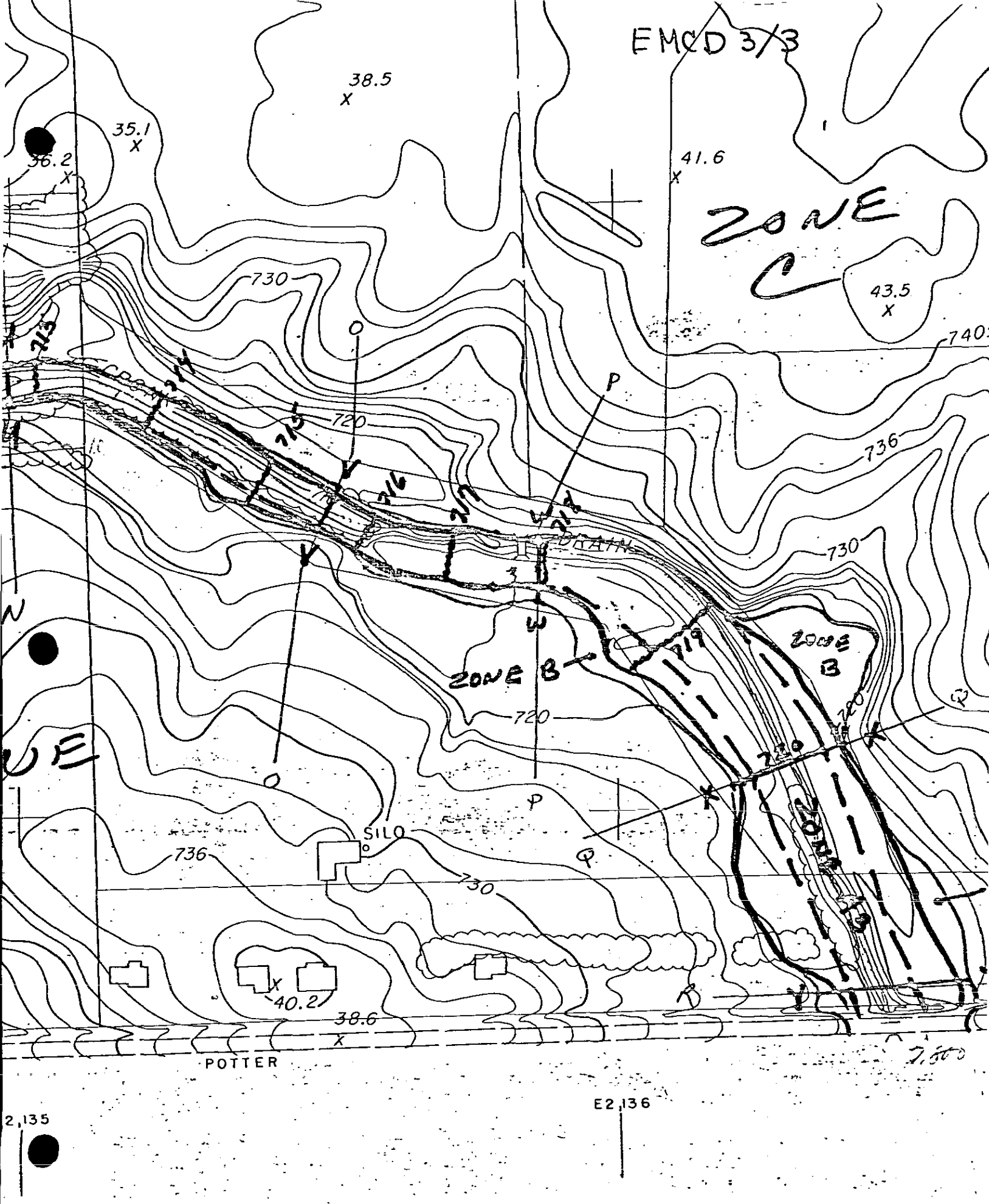
ROAD
N56
N56
29.0
22.5
720
720
724
718
31.0
722
704
27.9
714
720
730
37.0
726
30.8
732
33.9
33.0
40.2
738
710
716
708
05.0
90
DRAIN
CROOK
ZONE B
ZONE B
ZONE B
MORRISH

EMC D2/3


37.0
35.9
730
736
720
730
33.3
31.0
35.1
36.2
732
720
12.6
708
710
EXTENSION
ZONE A3
ZONE B
720
710
726
730
20.1
8
720
730
736
ZONE C


EMCD 3/3
38.5
35.1
36.2
41.6
ZONE C
43.5
730
740
720
736
DRAIN
ZONE B
ZONE B
ZONE B
SILO
40.2
38.6
POTTER
E2,136
2,135

Flint River

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 1 DATE= 2/ 7/77

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    6   820  1  2 070 070  1  2 037 037  1  2 070 070  1  2 037 037  1  2 065 065
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    5  1012     126  2  6342  174  2  6342  194  2  6348  224  2  6366  248  3  6396
    5  1013     275  3  6500  298  3  6600
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    3  1100 D     0  17  3  635    6190  1  3
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    6  1320  1  2 070 070  1  2 050 050  1  2 060 060
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    5  1411    -340  1  6700 -318  1  6600 -295  1  6500 -288  2  6454 -280  2  6400
```

A-A'

634.3

Distances - 3760

635.1

634.2

632.5

635.5

636.7

```
5 1411    -340  1  6700 -318  1  6600 -295  1  6500 -288  2  6454 -280  2  6400
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Flint River

USGS STEP-HACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 2.DATE= 2/ 7/77

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```

6381

Distances - 3760

6 30.3

6 37.7

6 39.0

6 34.2

6 40.8

6 41.6

Flint River

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 3,DATE= 2/ 7/77

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5  2313     160  2  6448  236  2  6461  240  3  6500  266  3  6600  295  3  6700
5  2314     310  3  6800  332  3  6900  342  3  6920  350  3  6940
6  2320  1  2 080 080  1  2 037 037  1  2 060 060
3  2400 Q     0  35  5  645   17385  1  5
5  2410    -580  1  6880 -563  1  6860 -548  1  6840 -537  1  6820 -527  1  6800
5  2411    -512  1  6780 -500  1  6760 -460  1  6740 -375  1  6720 -230  1  6700
5  2412     -70  1  6680  -15  1  6660    5  1  6640   13  1  6620   18  1  6600
5  2413      30  1  6580   50  1  6560   65  1  6540   95  1  6520  112  1  6500
5  2414     124  2  6480  128  2  6465  188  2  6441  210  2  6443  240  3  6465
5  2415     262  3  6518  290  3  6504  322  4  6460  360  4  6455  400  4  6466
5  2416     413  5  6500  435  5  6600  455  5  6700  472  5  6800  492  5  6900
6  2420  1  2 090 090  1  2 037 037  1  2 065 065  1  2 040 040  1  2 060 060
3  2500 R     0  30  3  645   18285  1  3
5  2510       0  1  6800  428  1  6700  445  1  6680  460  1  6660  472  1  6640
5  2511     482  1  6620  495  1  6600  520  1  6580  555  1  6560  568  1  6540
5  2512     572  1  6520  580  1  6500  585  2  6480  598  2  6477  615  2  6456
5  2513     640  2  6443  680  2  6446  720  2  6446  770  2  6451  820  2  6455
5  2514     845  2  6477  860  3  6500  892  3  6600  905  3  6620  912  3  6640
5  2515     940  3  6660  950  3  6680  980  3  6700 1030  3  6800 1080  3  6900
6  2520  1  2 075 075  1  2 035 035  1  2 065 065
```

Distances - 3760

641.9

643.7

649.3

644.1

644.3

```
6  2520  1  2 075 075  1  2 035 035  1  2 065 065
```

Flint River

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 4,DATE= 2/ 7/77

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

3  2600 S      0  27  3  646   19130  1  3
5  2610     -410  1  6800 -377  1  6780 -220  1  6760  -78  1  6740  -60  1  6720
5  2611      -55  1  6700  -40  1  6600  -15  2  6500    5  2  6509   10  2  6477
5  2612       40  2  6454   78  2  6448  104  2  6448  150  2  6477  160  3  6504
5  2613      170  3  6520  180  3  6540  200  3  6560  400  3  6580  437  3  6600
5  2614      452  3  6620  462  3  6640  475  3  6660  500  3  6680  525  3  6700
5  2615      542  3  6800  575  3  6900
6  2620  1  2 075 075  1  2 033 033  1  2 070 070
3  2700 T      0  30  3  645   19885  1  3
5  2710        0  1  6760  100  1  6740  155  1  6720  175  1  6700  245  1  6680
5  2711      258  1  6660  265  1  6640  270  1  6620  280  1  6600  287  1  6580
5  2712      298  1  6560  540  1  6560  555  1  6540  562  1  6520  570  2  6500
5  2713      580  2  6482  600  2  6443  605  2  6440  650  2  6422  680  2  6442
5  2714      694  2  6482  708  3  6490  735  3  6500  745  3  6520  752  3  6540
5  2715      788  3  6560  809  3  6580  821  3  6600  835  3  6700  855  3  6800
6  2720  1  2 065 065  1  2 045 045  1  2 070 070
3  2800 U      0  25  3  647   20700  1  3
5  2810     -620  1  6760 -545  1  6740 -480  1  6720 -442  1  6700 -380  1  6680
5  2811     -305  1  6660 -285  1  6640 -267  1  6620 -245  1  6600    0  1  6578
5  2812       90  2  6522  108  2  6487  132  2  6456  146  2  6464  212  2  6481
5  2813      260  2  6483  288  3  6500  305  3  6520  325  3  6540  342  3  6560
5  2814      355  3  6580  365  3  6600  377  3  6700  387  3  6800  398  3  6900
6  2820  1  2 065 065  1  2 053 053  1  2 062 062
3  2900 V      0  27  3  649   21680  1  3
5  2910     -630  1  6800 -340  1  6780 -275  1  6760 -190  1  6740 -130  1  6720
5  2911     -110  1  6700  -95  1  6680  -70  1  6660  -50  1  6640  -28  1  6620
5  2912      -12  1  6600    0  1  6587   56  2  6508   58  2  6494   84  2  6480
5  2913      128  2  6482  166  2  6480  212  2  6477  252  2  6488  262  3  6517
5  2914      275  3  6520  285  3  6540  300  3  6560  310  3  6580  455  3  6580
5  2915      470  3  6600  480  3  7000
6  2920  1  2 065 065  1  2 050 050  1  2 060 060
3  3000 W      0  42  5  650   22340  1  5
5  3010        0  1  6960   18  1  6940   32  1  6920   45  1  6900   57  1  6880
5  3011       70  1  6860   85  1  6840  110  1  6820  160  1  6800  250  1  6780
5  3012      287  1  6760  298  1  6740  307  1  6720  310  1  6700  322  1  6680
5  3013      338  1  6660  352  1  6640  367  1  6620  378  1  6600  421  1  6580
5  3014      430  1  6560  443  2  6540  455  2  6509  465  2  6504  475  2  6493
5  3015      485  2  6495  492  3  6509  540  3  6540  580  4  6509  620  4  6485
5  3016      650  4  6491  700  4  6489  730  4  6509  740  5  6540  765  5  6580
5  3017      770  5  6600  787  5  6620  800  5  6640  810  5  6660  840  5  6700
5  3018      890  5  6800  900  5  6820
6  3020  1  2 070 070  1  2 048 048  1  2 070 070  1  2 048 048  1  2 065 065
3  3100 X      0  25  3  650   23270  1  3
5  3110     -415  1  6900 -400  1  6800 -390  1  6700 -382  1  6680 -372  1  6660
5  3111     -362  1  6640 -332  1  6620 -195  1  6600 -187  1  6580 -185  1  6560
```

644.8

642.2

645.6

64
407.7

648.5

*** INPUT CARD PRINTOUT ***

Flint River

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  3112     -45  1  6560    0  1  6540   15  2  6520   34  2  6513   64  2  6503
5  3113      94  2  6497  115  2  6492  135  2  6491  150  2  6490  160  2  6513
5  3114     178  3  6600  198  3  6700  213  3  6720  240  3  6740  360  3  6800
6  3120  1  2 095 095  1  2 047 047  1  2 065 065
3  3200 Y     0  31  5  650   23810  1  5
5  3210       0  1  6900   20  1  6800   55  1  6700   75  1  6600  102  2  6540
5  3211     107  2  6520  120  2  6517  150  2  6499  200  2  6498  270  2  6491
5  3212     335  2  6517  340  2  6520  345  3  6540  375  3  6554  400  3  6540
5  3213     415  4  6520  430  4  6517  460  4  6498  485  4  6517  492  4  6520
5  3214     500  5  6540  510  5  6560  522  5  6580  532  5  6600  545  5  6700
5  3215     550  5  6720  560  5  6740  655  5  6740  718  5  6760  750  5  6780
5  3216     770  5  6800
6  3220  1  2 090 090  1  2 049 049  1  2 070 070  1  2 053 053  1  2 065 065
3  3300 Z     0  30  5  650   24720  1  5
5  3310       0  1  6900   15  1  6800   24  1  6700   45  1  6600   73  1  6580
5  3311      82  2  6560   90  2  6540  107  2  6529  130  2  6479  150  2  6487
5  3312     165  2  6500  190  2  6506  217  2  6529  225  2  6540  237  3  6560
5  3313     247  3  6580  256  3  6600  263  3  6620  270  3  6640  305  3  6680
5  3314     325  3  6640  345  3  6620  367  4  6600  622  5  6600  637  5  6620
5  3315     670  5  6640  720  5  6660  740  5  6680  765  5  6700  795  5  6720
6  3320  1  2 070 070  1  2 060 060  1  2 055 055  1  2 020 020  1  2 055 055
3  3400 AA    0  20  3  653   25395  1  3
5  3410    -235  1  6900 -222  1  6800 -193  1  6700 -172  1  6680 -162  2  6660
5  3411    -155  2  6551 -125  2  6522  -95  2  6526  -60  2  6519  -40  2  6523
5  3412     -20  2  6551    0  3  6580   10  3  6600   30  3  6620   80  3  6640
5  3413     110  3  6654  110  3  6700  410  3  6700  490  3  6700  530  3  6700
6  3420  1  2 065 065  1  2 040 040  1  2 065 065
3  3500 AB    0  30  6  654   26300  1  6
5  3510       0  1  6900   28  1  6880   50  1  6860   68  1  6840   85  1  6820
5  3511     110  1  6800  125  1  6780  145  1  6720  167  1  6700  185  2  6600
5  3512     197  2  6580  205  2  6559  230  2  6540  255  2  6543  280  2  6538
5  3513     305  2  6532  350  2  6559  365  3  6600  423  4  6600  438  5  6559
5  3514     468  5  6531  478  5  6539  500  5  6559  520  6  6600  554  6  6620
5  3515     595  6  6640  605  6  6660  615  6  6680  630  6  6700  710  6  6720
6  3520  1  2 065 065  1  2 040 040  1  2 080 080  1  2 050 050  1  2 055 055
6  3521  1  2 075 075
3  3600 AC    0  28  3  654   27095  1  3
5  3610       0  1  6800   27  1  6780  105  1  6760  160  1  6740  250  1  6720
5  3611     350  1  6700  367  1  6680  385  1  6660  402  1  6640  415  1  6620
5  3612     427  1  6600  442  2  6580  490  2  6561  530  2  6536  560  2  6532
5  3613     590  2  6534  620  2  6527  660  2  6521  673  2  6561  680  2  6580
5  3614     695  3  6600  705  3  6620  905  3  6640  910  3  6660  917  3  6680
5  3615     925  3  6700  955  3  6800  980  3  6900
6  3620  1  2 075 075  1  2 040 040  1  2 065 065
3  3700 AD    0  27  3  654   28160  1  3
```

649.0

209+60

649.8

216+35

651.9

225+40

653.2

233+35

652.1

24400.

```
3  3700 AD     0  27  3  654    28160  1  3
```

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 6,DATE= 2/ 7/77

Flint River

*** INPUT CARD PRINTOUT ***

```
          1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

5  3710       0  1  6760   60  1  6740  315  1  6720  330  1  6700  345  1  6680
5  3711     382  1  6660  515  1  6640  535  1  6620  575  1  6600  655  1  6620
5  3712     825  1  6640  910  1  6640  965  1  6620  985  1  6600 1000  2  6580
5  3713    1010  2  6565 1035  2  6543 1060  2  6534 1085  2  6540 1110  2  6544   653.9
5  3714    1140  2  6565 1148  2  6580 1168  3  6600 1175  3  6700 1200  3  6800
5  3715    1212  3  6900 1220  3  7000
6  3720  1  2 070 070  1  2 039 039  1  2 065 065
3  3800 AE     0  23  3  656   29210  1  3
5  3810       0  1  6760   40  1  6740  318  1  6720  340  1  6700  358  1  6680
5  3811     385  1  6660  560  1  6640  880  1  6620  888  2  6600  895  2  6580
5  3812     903  2  6575  905  2  6561  940  2  6554  960  2  6546  980  2  6545   654.0
5  3813    1000  2  6540 1017  2  6575 1025  3  6580 1043  3  6600 1060  3  6660
5  3814    1078  3  6700 1106  3  6800 1122  3  6900
6  3820  1  2 080 080  1  2 037 037  1  2 065 065
3  3900 AF     0  35  3  656   30165  1  3
5  3910       0  1  6860   45  1  6840   52  1  6820  100  1  6800  120  1  6780
5  3911     145  1  6760  153  1  6740  185  1  6720  203  1  6700  370  1  6680
5  3912     505  1  6680  520  1  6660  540  1  6640  550  1  6620  557  2  6600
5  3913     563  2  6580  570  2  6579  600  2  6556  620  2  6554  650  2  6550   655.0
5  3914     680  2  6579  700  3  6600  722  3  6620  740  3  6640  830  3  6660
5  3915     850  3  6680 1065  3  6700 1170  3  6720 1200  3  6740 1225  3  6760
5  3916    1273  3  6780 1300  3  6800 1335  3  6820 1358  3  6840 1370  3  6860
6  3920  1  2 075 075  1  2 040 040  1  2 061 061
3  4000 AG     0  29  3  656   30940  1  3
5  4010       0  1  6900   30  1  6820   50  1  6820   62  1  6840   80  1  6840
5  4011      85  1  6820   95  1  6800  110  1  6700  123  2  6600  140  2  6593
5  4012     155  2  6543  165  2  6551  175  2  6555  190  2  6560  205  2  6569   655.3
5  4013     225  2  6593  257  3  6600  270  3  6620  285  3  6640  305  3  6660
5  4014     545  3  6680  597  3  6700  782  3  6740 1010  3  6760 1067  3  6780
5  4015    1100  3  6800 1150  3  6820 1175  3  6840 1208  3  6900
6  4020  1  2 067 067  1  2 043 043  1  2 054 054
3  4100 AH     0  22  3  657   31970  1  3
5  4113     345  1  6820  345  1  6700  352  1  6680  375  1  6660  395  1  6640
5  4114     408  1  6620  423  2  6600  440  2  6598  455  2  6579  460  2  6567   656.0
5  4115     470  2  6560  480  2  6567  490  2  6569  500  2  6598  515  3  6600
5  4116     542  3  6700  555  3  6800  800  3  6820  835  3  6840  850  3  6860
5  4117     865  3  6880  910  3  6900
6  4120  1  2 060 060  1  2 044 044  1  2 068 068
3  4200 AI     0  26  3  659   32570  1  3
5  4210       0  1  6900   32  1  6880  100  1  6860  125  1  6840  180  1  6820
5  4211     220  1  6800  252  1  6780  328  1  6760  472  1  6740  920  1  6740   657.5
5  4212     932  2  6700  962  2  6602  975  2  6580 1005  2  6575 1030  2  6580
5  4213    1055  2  6602 1075  3  6620 1085  3  6640 1095  3  6660 1108  3  6680
5  4214    1117  3  6700 1132  3  6800 1142  3  6820 1160  3  6840 1180  3  6860
5  4215    1210  3  6900
```

25450

26425

27180

28210

28810

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
6  4220  1  2 062 062  1  2 048 048  1  2 060 060
3  4300 AI BR 2  41  1  661   32570          0  6755 1 0
5  4310       0  1  6579   55  1  6579   50 -9  6650   45 -9  6695   40 -9  6725
5  4311      35 -9  6740   30 -9  6750   25 -9  6750   20 -9  6743   15 -9  6730
5  4312      10 -9  6700    5 -9  6655    0 -9  6579   61  1  6590  123  1  6590
5  4313     120 -9  6625  115 -9  6675  110 -9  6710  105 -9  6735  100 -9  6750
5  4314      95 -9  6755   90 -9  6755   85 -9  6750   80 -9  6740   75 -9  6715
5  4315      70 -9  6685   65 -9  6640   61 -9  6590  129  1  6603  184  1  6603
5  4316     180 -9  6650  175 -9  6695  170 -9  6725  165 -9  6742  160 -9  6751
5  4317     155 -9  6755  150 -9  6750  145 -9  6735  140 -9  6710  135 -9  6671
5  4318     129 -9  6603
6  4320  1  2 035 035
3  4400 AI RD 4  17  2   39          1  2          1 1                  1
5  4410       0  1  6900   32  1  6880  100  1  6860  125  1  6840  180  1  6820
5  4411     220  1  6800  252  1  6780  328  1  6760  472  1  6740  830  1  6744
5  4412     910  1  6759 1010  2  6793 1145  2  6824 1200  2  6840 1285  2  6860
5  4413    1350  2  6880 1410  2  6900
3  4500 AJ    5  23  4  659   32835  1  4
5  4510    -270  1  6800 -240  1  6780 -205  1  6760 -163  1  6740   -5  2  6713
5  4511      15  2  6604   36  2  6585   50  2  6588   60  2  6587   70  2  6583
5  4512      80  2  6581   90  2  6585  100  2  6586  110  2  6586  120  2  6588
5  4513     130  2  6592  140  2  6592  150  2  6589  155  3  6605  180  4  6723
5  4514     195  4  6780  217  4  6800  290  4  6820
6  4520  1  2 062 062  1  2 048 048  1  2 080 080  1  2 060 060
3  4600 AK    0  23  3  661   33820  1  3                    3
5  4610       0  1  7000   18  1  6900   35  1  6800   50  2  6700   65  2  6626
5  4611      75  2  6611  100  2  6604  115  2  6599  140  2  6600  165  2  6603
5  4612     190  2  6626  210  3  6660  215  3  6680  230  3  6700  240  3  6720
5  4613     252  3  6740  425  3  6740  580  3  6720  680  3  6740  740  3  6760
5  4614     748  3  6780  760  3  6800  800  3  6820
6  4620  1  2 063 063  1  2 047 047  1  2 058 058
3  4700 AL    0  29  3  663   34865  1  3
5  4710       0  1  7100   20  1  7000   30  1  6900   40  1  6800   52  1  6780
5  4711      62  1  6760   75  1  6740   87  1  6720  102  1  6700  180  1  6700
5  4712     195  1  6720  330  1  6720  340  1  6700  348  2  6680  360  2  6642
5  4713     375  2  6616  390  2  6614  410  2  6617  430  2  6615  445  2  6620
5  4714     460  2  6642  470  2  6660  480  3  6700  500  3  6760  540  3  6780
5  4715     660  3  6800  870  3  6800  925  3  6820  970  3  6840
6  4720  1  2 058 058  1  2 047 047  1  2 063 063
3  5000 AM    0  23  3  664   35865  1  3
5  5010    -375  1  6840 -345  1  6820 -230  1  6800 -200  1  6780 -183  1  6760
5  5011    -175  1  6740 -100  1  6720    0  1  6708   58  2  6706   70  2  6650
5  5012      80  2  6638  100  2  6634  115  2  6632  130  2  6631  145  2  6628
5  5013     160  2  6631  175  2  6629  190  2  6636  212  2  6650  218  3  6674
5  5014     236  3  6700  242  3  6800  255  3  6900
```

28810

Flint River

29075

30060

31105

32105

*** INPUT CARD PRINTOUT ***

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= B.DATE= 2/ 7/77

*** INPUT CARD PRINTOUT ***

Flint River

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

6  5020  1  2 055 055  1  2 034 034  1  2 060 060
3  5100 AN    0  24  3  664   36500  1  3
5  5110    -515  1  6860 -475  1  6840 -425  1  6820 -400  1  6800 -235  1  6800
5  5111    -225  1  6780 -215  1  6760  -25  1  6740   -9  1  6734   14  2  6698
5  5112      25  2  6655   40  2  6628   55  2  6627   70  2  6629   85  2  6636
5  5113     100  2  6642  115  2  6641  130  2  6641  145  2  6643  165  2  6640
5  5114     183  2  6655  201  3  6699  215  3  6800  245  3  6900
6  5120  1  2 050 050  1  2 032 032  1  2 050 050
3  5200 AO    0  28  3  666   37555  1  3
5  5210    -355  1  6920 -295  1  6900 -285  1  6800 -276  1  6735 -268  2  6710
5  5211    -258  2  6674 -240  2  6659 -225  2  6659 -200  2  6654 -180  2  6649
5  5212    -160  2  6649 -140  2  6649 -125  2  6649 -110  2  6663  -92  2  6673
5  5213     -90  3  6701  -46  3  6751    0  3  6741  200  3  6740  345  3  6760
5  5214     365  3  6780  388  3  6800  402  3  6820  425  3  6840  440  3  6860
5  5215     452  3  6880  472  3  6900  500  3  7000
6  5220  1  2 050 050  1  2 034 034  1  2 050 050
3  5300 AP    0  28  3  667   38450  1  3
5  5310    -350  1  6940 -320  1  6920 -308  1  6900 -285  1  6800 -272  1  6780
5  5311    -255  1  6760 -245  1  6740 -230  2  6720 -220  2  6722 -208  2  6680
5  5312    -195  2  6654 -180  2  6655 -160  2  6656 -140  2  6654 -120  2  6652
5  5313    -100  2  6648  -80  2  6654  -60  2  6654  -48  2  6634  -38  2  6679
5  5314     -18  3  6750    0  3  6749  125  3  6750  230  3  6760  250  3  6780
5  5315     265  3  6800  303  3  6900  345  3  7000
6  5320  1  2 060 060  1  2 032 032  1  2 050 050
3  5400 AQ    0  25  3  668   39370  1  3
5  5410       0  1  6920   30  1  6900   40  1  6880   60  1  6860  125  1  6840
5  5411     150  1  6820  378  1  6800  635  1  6780 1030  1  6760 1100  1  6740
5  5412    1112  1  6720 1140  2  6700 1160  2  6685 1175  2  6670 1195  2  6674
5  5413    1215  2  6669 1230  2  6672 1245  2  6672 1265  2  6672 1285  2  6670
5  5414    1300  2  6686 1318  3  6700 1338  3  6800 1355  3  6900 1372  3  7000
6  5420  1  2 070 070  1  2 032 032  1  2 080 080
```

32740

33795

34690

35610

```
750.90 /    1.75 /        ...3...   (-.001)    /  10.61 /    1.05 /                *HO*
-----------------------------------------------------------------------------------------
ROAD [illegible]RFLOW (CFS) / LEFT     1085. / RIGHT [illegible]    0. /
                                                                                      *RG*
-----------------------------------------------------------------------------------------
  4I AT    33020 /     90 /    2200. /    484. /    58770. / 1.58 /     0. /    75.
  753.39 /    0.51 /    0.12 /    0.09 /  753.90 /    4.54 /    0.38 / -0.000   *AS*
-----------------------------------------------------------------------------------------
```

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=    37,DATE= 1/ 9/78

=========================================================================================
WATER-SURFACE PROFILE FOR: SWARTZ CR BRISTOL RD TO ARCH BR 4E TO 4I KNUTILLA
PAGE  2 OF  2
*** FLOODWAY ANALYSIS *** HOR FW
=========================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/   AREA   /CONVEYANCE/ ALPHA/   LEW   /   REW
  WS ELEV /     HV   /     HF   /     HE   /     EG   /     V   /     FN   /    ACC    *ID*
=========================================================================================
   M = **** / E = **** / K* = **** /    667. /    91982. / 1.56 /     0. /    75.
   755.83 /    0.26 /                 /  756.10 /    3.30 /    0.25 /                *AS*
============================ END BRIDGE ANALYSIS ============================
```

CI FW

END OF THIS PROFILE

```
 WS ELEV /    HV  /    HF  /    HE  /    EG  /     V  /    FN  /   ACC    *ID*
=========================================================================================
 4I AT   33020 /     0 /  2200. /  688. /  91474. / 1.67 /   -1. /   89.     CI
 755.83 /   0.27 /                 / 756.10 /   3.20 /  0.25/            *IS*
-----------------------------------------------------------------------------------------
 4J AT   33720 /   700 /  2200. /  663. / 114387. / 1.13 /  100. /  200.     CJ
 756.23 /   0.19 /   0.32 /   0.0 / 756.42 /   3.32 /  0.22 / -0.000  *XS*
-----------------------------------------------------------------------------------------
 4K AT   34570 /   850 /  2200. /  637. / 102011. / 1.15 /  221. /  320.     CK
 756.57 /   0.21 /   0.35 /  0.01 / 756.78 /   3.45 /  0.22 / -0.000  *XS*
-----------------------------------------------------------------------------------------
 4L AT   35200 /   630 /  2200. /  618. /  86042. / 1.42 /  170. /  321.     CL
 756.88 /   0.28 /   0.35 /  0.03 / 757.16 /   3.56 /  0.27 / -0.000  *XS*
-----------------------------------------------------------------------------------------
 4M AT   36160 /   960 /  2200. / 1332. / 139260. / 1.18 /  175. /  475.     CM
 757.50 /  0.05 /   0.39 /   0.0 / 757.55 /   1.65 /  0.13 /  0.000  *XS*
-----------------------------------------------------------------------------------------
 4N AT   36940 /   780 /  2200. / 1679. / 107030. / 1.35 /  370. /  870.     CN
 757.75 /   0.04 /   0.25 /   0.0 / 757.79 /   1.31 /  0.15 / -0.018  *XS*
-----------------------------------------------------------------------------------------
4N+1 AT   37370 /   430 /  2200. / 1059. /  61423. / 2.70 /   60. /  460.     CO   FW
 758.00 /   0.18 /   0.32 /  0.07 / 758.18 /   2.08 /  0.28 /  0.006  *XS*
-----------------------------------------------------------------------------------------
 4O AT   37760 /   390 /  2200. /  879. /  51935. / 2.71 /  600. /  900.     CP
 758.55 /   0.26 /   0.59 /  0.04 / 758.82 /   2.50 /  0.32 /  0.000  *XS*
-----------------------------------------------------------------------------------------
 4P AT   38650 /   890 /  2200. / 1446. /  68138. / 2.90 /  440. /  840.     CQ
 759.93 /   0.10 /   1.22 /   0.0 / 760.03 /   1.52 /  0.10 /  0.001  *XS*
-----------------------------------------------------------------------------------------
 4Q AT   39360 /   710 /  2200. / 1707. / 115709. / 1.35 /  200. /  600.     CR
 760.43 /   0.03 /   0.44 /   0.0 / 760.47 /   1.29 /  0.10 / -0.006  *XS*
-----------------------------------------------------------------------------------------
 4R AT   40000 /   640 /  2200. / 2072. / 154325. / 1.19 /  190. /  590.     CS
 760.62 /   0.02 /   0.17 /   0.0 / 760.64 /   1.06 /  0.07 / -0.000  *XS*
-----------------------------------------------------------------------------------------
 4S AT   40510 /   510 /  2200. /  586. /  33589. / 2.34 /  400. /  800.     CT
 760.87 /   0.51 /   0.48 /  0.25 / 761.38 /   3.76 /  0.47 /  0.020  *XS*
========================= BEGIN BRIDGE ANALYSIS =========================
BR 4S AT   40510 /       /  1873. /  249. /  20393. / 1.00 /    0. /   36.
 760.80 /   0.88 /      ...3...  (-.001)     /   7.53 /  0.50 /          *BO*
-----------------------------------------------------------------------------------------
 ROAD OVERFLOW (CFS) / LEFT      139. / RIGHT      182. /
                                                                          *RG*
-----------------------------------------------------------------------------------------
```

```
SEC[redacted] AT DISTANCE/ LENGTH/DISCHARGE/  AREA [redacted]CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /    E[redacted] /    V  /    FN  /   ACC    *ID*
==========================================================================================
   5A AT   44600 /     0 /   2200. /  1210. /   81845. / 2.05 / -125. /  225.      DB
.03 767.58 /   0.11 /                 / 767.69 /    1.82 /   0.20/              *IS*
------------------------------------------------------------------------------------------
   5B AT   45500 /   900 /   2200. /  1433. /   93024. / 1.24 /  500. /  850.      DC
.06 768.21 /   0.05 /   0.57 /   0.0  / 768.26 /    1.53 /   0.12 / 0.001   *XS*
------------------------------------------------------------------------------------------
   5C AT   46380 /   880 /   2200. /  1002. /   69514. / 1.98 / 1120. / 1470.      DD
.10 768.82 /   0.15 /   0.66 /   0.05 / 768.97 /    2.20 /   0.24 / 0.001   *XS*
------------------------------------------------------------------------------------------
   5D AT   47120 /   740 /   1950. /   754. /   44227. / 1.84 / 1240. / 1540.      DE
.0 769.82 /   0.19 /   1.04 /   0.02 / 770.01 /    2.59 /   0.32 / -0.015  *XS*
------------------------------------------------------------------------------------------
  5D+1  AT   47420 /   300 /   1950. /   823. /   54359. / 2.01 /  260. /  560.      DF
.0 770.32 /   0.18 /   0.47 /   0.0  / 770.50 /    2.37 /   0.28 / 0.009   *XS*
------------------------------------------------------------------------------------------
   5E AT   47960 /   540 /   1950. /   911. /   59721. / 2.30 /  100. /  400.      DG
.0 770.97 /   0.16 /   0.63 /   0.0  / 771.13 /    2.14 /   0.26 / 0.002   *XS*
------------------------------------------------------------------------------------------
  5E+1  AT   48180 /   220 /   1950. /  1037. /   72423. / 2.08 /  120. /  420.      DH
.0 771.22 /   0.11 /   0.19 /   0.0  / 771.33 /    1.88 /   0.22 / 0.006   *XS*
------------------------------------------------------------------------------------------
   5F AT   48640 /   460 /   1950. /   908. /   50188. / 1.97 /  480. /  780.      DI
.0 771.68 /   0.14 /   0.48 /   0.01 / 771.83 /    2.15 /   0.29 / 0.000   *XS*
------------------------------------------------------------------------------------------
   5G AT   49460 /   820 /   1950. /  1004. /   47907. / 2.69 /   10. /  410.      DJ
.03 772.98 /   0.16 /   1.30 /   0.01 / 773.13 /    1.94 /   0.15 / 0.003   *XS*
------------------------------------------------------------------------------------------
  5G+1  AT   50110 /   650 /   1950. /  1175. /   88586. / 2.13 /   50. /  450.      DK
.06 773.63 /   0.09 /   0.58 /   0.0  / 773.72 /    1.66 /   0.20 / 0.000   *XS*
------------------------------------------------------------------------------------------
   5H AT   50280 /   170 /   1950. /   274. /   23121. / 1.00 /  102. /  174.      DL
.05 773.59 /   0.79 /   0.32 /   0.35 / 774.38 /    7.13 /   0.64 / -0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 5H AT   50280 /       /   1950. /   226. /   50831. / 1.00 /    0. /   40.
   773.59 /   1.16 /       ...1...  (-.001)    /    8.62 /   0.54 /          *BO*
------------------------------------------------------------------------------------------
 NO ROAD OVERFLOW
                                                                                  *RG*
------------------------------------------------------------------------------------------
   5J AT   50370 /    90 /   1950. /   457. /   51461. / 1.54 /  162. /  270.
   774.24 /   0.43 /   0.29 /   0.0  / 774.67 /    4.26 /   0.36 / -0.001  *AS*
------------------------------------------------------------------------------------------
   M = 0.12 / E = 0.55 / K* = 0.16 /   482. /   54664. / 1.56 /  161. /  271.      DM
                                     / 774.86 /    4.04 /   0.34 /              *AS*
```

```
      8M AT    99210 /     0 /    360. /    236. /   16776. / 1.39 /    15. /    75.
.09   [redacted]823.40 /   0.05 /                  / 8[redacted].45 /   1.52 /   0.15/                *IS*
-----------------------------------------------------------------------------------------
      8N AT    99570 /   360 /    360. /    366. /   20748. / 1.23 /    10. /   120.
.10   823.57 /   0.02 /   0.13 /   0.0  /  823.58 /    0.98 /   0.08 /  0.000   *XS*
-----------------------------------------------------------------------------------------
      8NN  AT  99800 /   230 /    360. /    200. /   11328. / 1.67 /    20. /    95.
.10   823.66 /   0.08 /   0.13 /   0.03 /  823.74 /    1.80 /   0.21 /  0.000   *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR8NN AT    99800 /        /    360. /     71. /    4152. / 1.00 /    -2. /    18.
      823.66 /   0.40 /        ...1...  (-.001)    /    5.05 /   0.47 /          *BO*
-----------------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                  *RG*
-----------------------------------------------------------------------------------------
      8NNN AT  99860 /    60 /    360. /    213. /   11248. / 1.97 /    20. /   110.
      823.72 /   0.09 /   0.06 /   0.00 /  823.81 /    1.69 /   0.22 /  0.001   *AS*
-----------------------------------------------------------------------------------------
      M = 0.28 / E = 0.15 / K* = 0.44 /    230. /   12326. / 1.96 /    20. /   110.
.10   823.91 /   0.07 /                  /  823.98 /    1.57 /   0.20 /          *AS*
========================== END BRIDGE ANALYSIS ============================
      8O AT   100120 /   260 /    360. /    157. /    6705. / 1.79 /    -5. /    70.
.07   824.28 /   0.15 /   0.41 /   0.04 /  824.42 /    2.29 /   0.34 /  0.000   *XS*
-----------------------------------------------------------------------------------------
      8OO AT  100300 /   180 /    360. /    298. /   10360. / 1.84 /    10. /   160.
.03   824.72 /   0.04 /   0.34 /   0.0  /  824.76 /    1.21 /   0.21 /  0.001   *XS*
-----------------------------------------------------------------------------------------
      8P AT   100540 /   240 /    360. /    273. /   13698. / 1.85 /   170. /   270.
.03   824.94 /   0.05 /   0.22 /   0.00 /  824.99 /    1.32 /   0.16 /  0.000   *XS*
-----------------------------------------------------------------------------------------
      8P AT   100720 /   180 /    360. /    378. /   17258. / 1.97 /   -50. /   100.
.05   825.06 /   0.03 /   0.10 /   0.0  /  825.08 /    0.95 /   0.13 / -0.000   *XS*
-----------------------------------------------------------------------------------------
      8Q AT   100960 /   240 /    360. /    514. /   21540. / 1.65 /   -75. /    75.
.05   825.16 /   0.01 /   0.08 /   0.0  /  825.17 /    0.70 /   0.09 /  0.000   *XS*
-----------------------------------------------------------------------------------------
      8QQ AT  101130 /   170 /    360. /    366. /   16841. / 1.72 /   -75. /    37.
.05   825.21 /   0.03 /   0.06 /   0.01 /  825.24 /    0.98 /   0.13 /  0.000   *XS*
-----------------------------------------------------------------------------------------
      8Q+1  AT 101240 /   110 /    360. /    159. /    5771. / 2.24 /    40. /   140.
.04   825.28 /   0.18 /   0.15 /   0.08 /  825.46 /    2.26 /   0.34 / -0.000   *XS*
-----------------------------------------------------------------------------------------
      8R AT   101610 /   370 /    360. /    456. /   13561. / 4.64 /   300. /   700.
0     826.03 /   0.04 /   0.61 /   0.0  /  826.08 /    0.79 /   0.17 /  0.004   *XS*
-----------------------------------------------------------------------------------------
      8S AT   102510 /   900 /    360. /    746. /   12887. / 6.68 /   450. / 1100.
0     826.72 /   0.02 /   0.67 /   0.0  /  826.75 /    0.48 /   0.17 /  0.005   *XS*
-----------------------------------------------------------------------------------------
```

```
.03  8T+1  AT  104510 /   480 /    360. /    839. /   14985. / 3.12 /  130. /  630.   HN
       827.77 /   0.01 /   0.22 /   0.0  /  827.78 /    0.43 /   0.05 / 0.000  *XS*
-----------------------------------------------------------------------------------------
.02    8U AT  105000 /   490 /    360. /    320. /    7397. / 3.54 /  390. /  590.   HO
       828.32 /   0.07 /   0.57 /   0.03 /  828.39 /    1.12 /   0.27 / 0.002  *XS*
-----------------------------------------------------------------------------------------
0      8U+1  AT  105700 /   700 /    360. /    231. /    8832. / 2.10 /   14. /  164.   HP
       829.71 /   0.08 /   1.39 /   0.00 /  829.79 /    1.56 /   0.24 / 0.007  *XS*
-----------------------------------------------------------------------------------------
0      8V AT  106200 /   500 /    360. /    259. /   10612. / 1.86 /   50. /  150.   HQ
       830.42 /   0.06 /   0.69 /   0.0  /  830.48 /    1.39 /   0.20 / 0.001  *XS*
-----------------------------------------------------------------------------------------
.01    8W AT  106620 /   420 /    360. /    318. /   13407. / 2.11 /   88. /  238.   HR
       830.82 /   0.04 /   0.38 /   0.0  /  830.86 /    1.13 /   0.17 / 0.001  *XS*
-----------------------------------------------------------------------------------------
.03    8W+1  AT  107010 /   390 /    360. /    180. /    9272. / 1.35 /   60. /  160.   HS
       831.21 /   0.08 /   0.41 /   0.02 /  831.29 /    2.00 /   0.22 / 0.001  *XS*
-----------------------------------------------------------------------------------------
0      8X AT  107400 /   390 /    360. /    197. /    7953. / 1.14 /   40. /  140.   HT
       831.92 /   0.06 /   0.69 /   0.0  /  831.98 /    1.83 /   0.26 / 0.003  *XS*
-----------------------------------------------------------------------------------------
.01    8Y AT  108020 /   620 /    360. /    271. /   12890. / 1.70 /   25. /  125.   HU
       832.72 /   0.05 /   0.78 /   0.0  /  832.77 /    1.33 /   0.18 / 0.001  *XS*
-----------------------------------------------------------------------------------------
.02    8YY AT  108240 /   220 /    360. /    302. /   11338. / 1.70 /   25. /  163.   HV
       832.92 /   0.04 /   0.20 /   0.0  /  832.96 /    1.19 /   0.18 / 0.000  *XS*
-----------------------------------------------------------------------------------------
.06    8YYY AT  108540 /   300 /    360. /    702. /   17863. / 2.48 /  100. /  400.   HW
       833.14 /   0.01 /   0.19 /   0.0  /  833.15 /    0.51 /   0.05 / 0.000  *XS*
-----------------------------------------------------------------------------------------
.10    8Z AT  108870 /   330 /    360. /    170. /   10997. / 1.13 /  229. /  313.
       833.33 /   0.08 /   0.22 /   0.03 /  833.41 /    2.12 /   0.21 / 0.000  *XS*
-----------------------------------------------------------------------------------------
.10    8Z AT  108920 /    50 /    360. /    185. /   12451. / 1.17 /  224. /  314.   HX
       833.39 /   0.07 /   0.05 /   0.0  /  833.45 /    1.95 /   0.19 / 0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 8Z AT  108920 /        /    360. /     98. /    4812. / 1.00 /    0. /   28.
       832.20 /   0.21 /        ...3...  (-.001)     /    3.68 /   0.35 /          *BO*
-----------------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                   *RG*
-----------------------------------------------------------------------------------------
       9A AT  108970 /    50 /    360. /    235. /   13552. / 1.88 /   -2. /   98.
       833.43 /   0.07 /   0.04 /   0.0  /  833.49 /    1.53 /   0.18 / 0.000  *AS*
-----------------------------------------------------------------------------------------
```

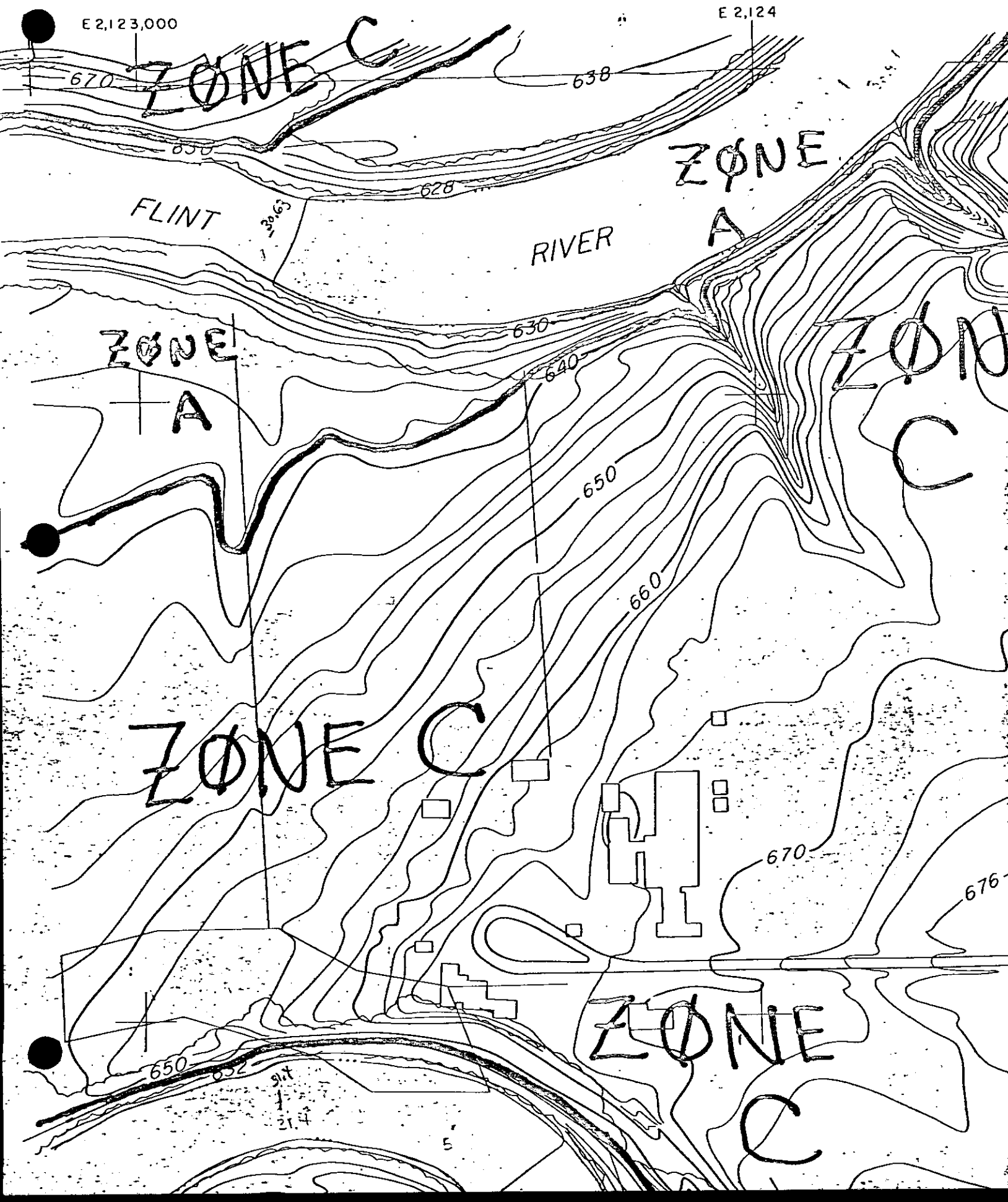
FW

```
==========================================================================
   9A AT  108970 /     0 /    360. /   277. /   16193. / 1.99 /    0. /  107.
.10 833.86 /   0.05 /                  / 833.91 /   1.30 /   0.15/          *IS*  HY
--------------------------------------------------------------------------
   9B AT  109740 /   770 /    360. /   339. /   22405. / 1.30 /   52. /  147.
.08 834.16 /   0.02 /   0.28 /   0.0  / 834.19 /   1.06 /   0.10 / 0.000  *XS*  HE
--------------------------------------------------------------------------
   9C AT  110200 /   460 /    360. /   631. /   21853. / 2.51 /  100. /  300.
.08 834.30 /   0.01 /   0.12 /   0.0  / 834.31 /   0.57 /   0.10 / 0.000  *XS*  IA
--------------------------------------------------------------------------
   9D AT  110910 /   710 /    360. /   663. /   14376. / 3.72 /  145. /  545.
.07 834.59 /   0.02 /   0.29 /   0.00 / 834.61 /   0.54 /   0.14 / 0.001  *XS*  IB
--------------------------------------------------------------------------
   9E AT  111500 /   590 /    360. /   414. /   10499. / 3.19 /  275. /  575.
.03 835.09 /   0.04 /   0.51 /   0.01 / 835.13 /   0.87 /   0.19 / 0.003  *XS*  IC
--------------------------------------------------------------------------
9E+1  AT  111940 /   440 /    360. /   264. /    9169. / 1.80 /  100. /  250.
.03 835.68 /   0.05 /   0.59 /   0.01 / 835.73 /   1.36 /   0.22 / 0.003  *XS*  ID
--------------------------------------------------------------------------
   9F AT  112160 /   220 /    360. /   274. /    6751. / 2.86 /  100. /  400.
.05 836.13 /   0.08 /   0.46 /   0.01 / 836.21 /   1.31 /   0.29 / 0.002  *XS*  IE
--------------------------------------------------------------------------
   9G AT  113480 /  1320 /    360. /   258. /   10220. / 1.09 /   75. /  225.
.10 838.66 /   0.03 /   2.48 /   0.0  / 838.69 /   1.40 /   0.19 / 0.009  *XS*  IF
--------------------------------------------------------------------------
   9H AT  113970 /   490 /    360. /   207. /    7175. / 1.93 /   60. /  210.
.01 839.50 /   0.09 /   0.87 /   0.03 / 839.60 /   1.74 /   0.30 / 0.006  *XS*  IG
--------------------------------------------------------------------------
9H+1  AT  114620 /   650 /    360. /   214. /    6711. / 1.78 /   90. /  215.
0   841.27 /   0.08 /   1.75 /   0.0  / 841.35 /   1.68 /   0.31 / 0.003  *XS*  IH
--------------------------------------------------------------------------
9I+1  AT  115090 /   470 /    360. /   303. /   10597. / 1.60 /   20. /  145.
0   842.17 /   0.04 /   0.86 /   0.0  / 842.21 /   1.19 /   0.10 / 0.004  *XS*  II
--------------------------------------------------------------------------
   9J AT  115380 /   290 /    360. /   169. /    6684. / 1.93 /  175. /  275.
.09 842.67 /   0.14 /   0.53 /   0.05 / 842.81 /   2.13 /   0.32 / 0.019  *XS*  IJ
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 9J AT  115380 /       /    360. /    70. /    3198. / 1.00 /    0. /   21.
   842.20 /   0.42 /       ...3...  (-.001)    /   5.18 /   0.50 /          *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /            *RG*
--------------------------------------------------------------------------
   9K AT  115420 /    40 /    360. /   205. /    9832. / 1.82 /  -52. /   29.
   842.80 /   0.09 /   0.08 /   0.0  / 842.89 /   1.75 /   0.24 / -0.001  *AS*
--------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   243. /   12373. / 1.80 /  -53. /   31.
   843.26 /   0.06 /                  / 843.32 /   1.48 /   0.19 /          *AS*
========================== END BRIDGE ANALYSIS ============================
```

FW

Twp. of Flushing

FR 1/6



ZONE C
ZONE A
ZONE A
ZONE C
FR 2/6
RIVER
FLINT
ROAD
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640
644
634
632
680
690
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82.8
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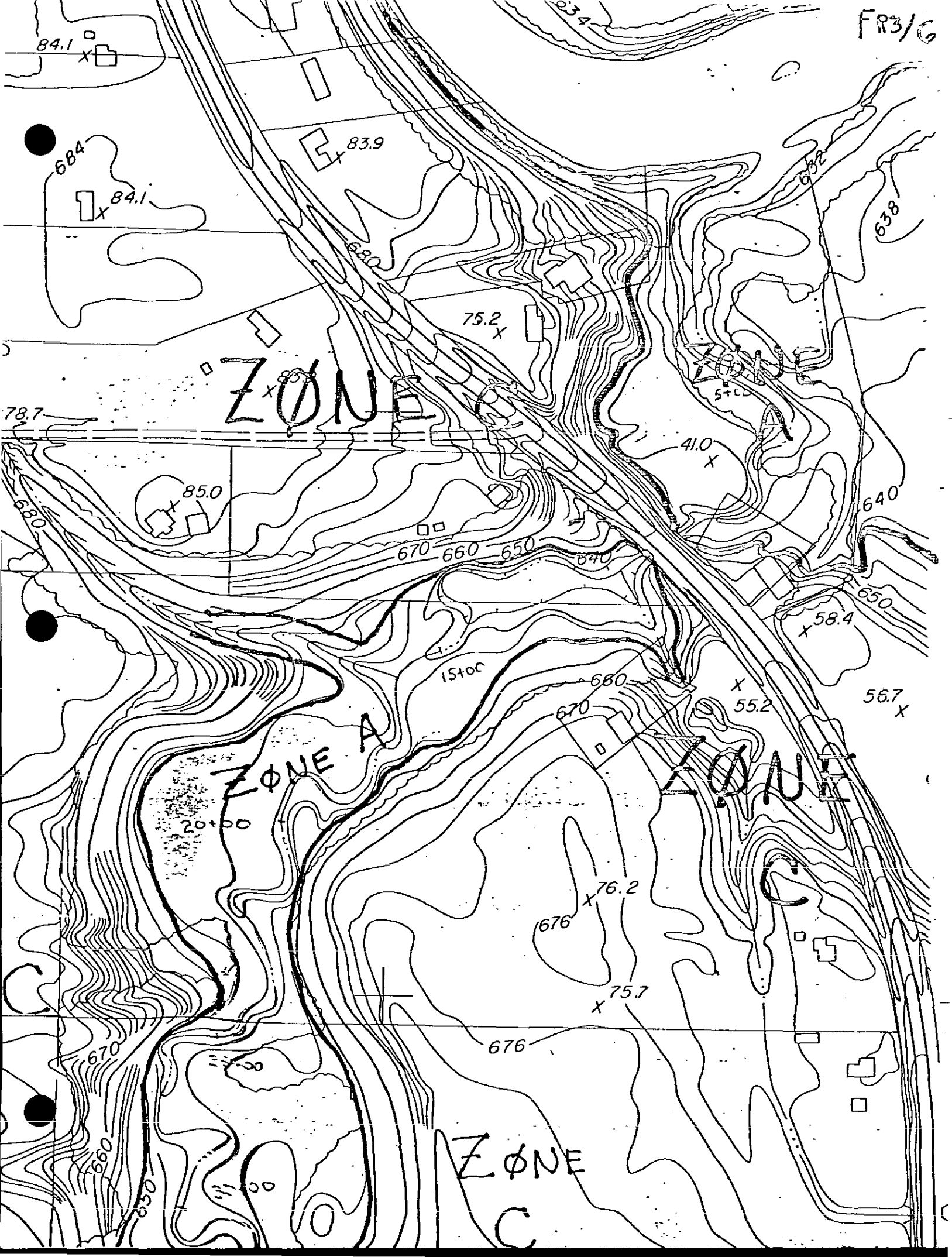
31.2
84.1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75.2
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41.0
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650
640
640
652
638
650
58.4
15+00
660
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56.7
ZONE A
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76.2
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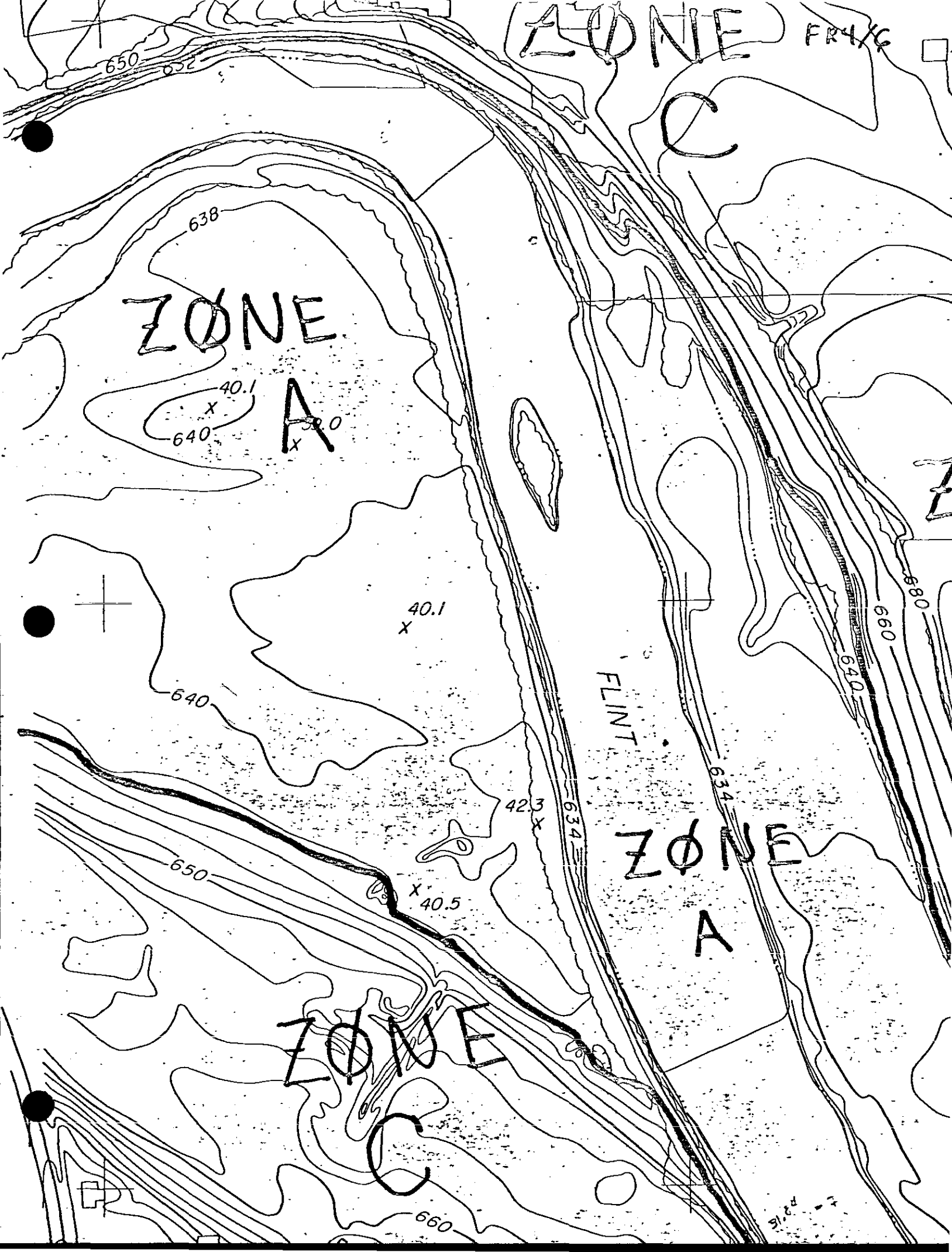
75.7
676
670
660
650
ZONE
C


ZONE C
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652
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42.3
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ZONE C
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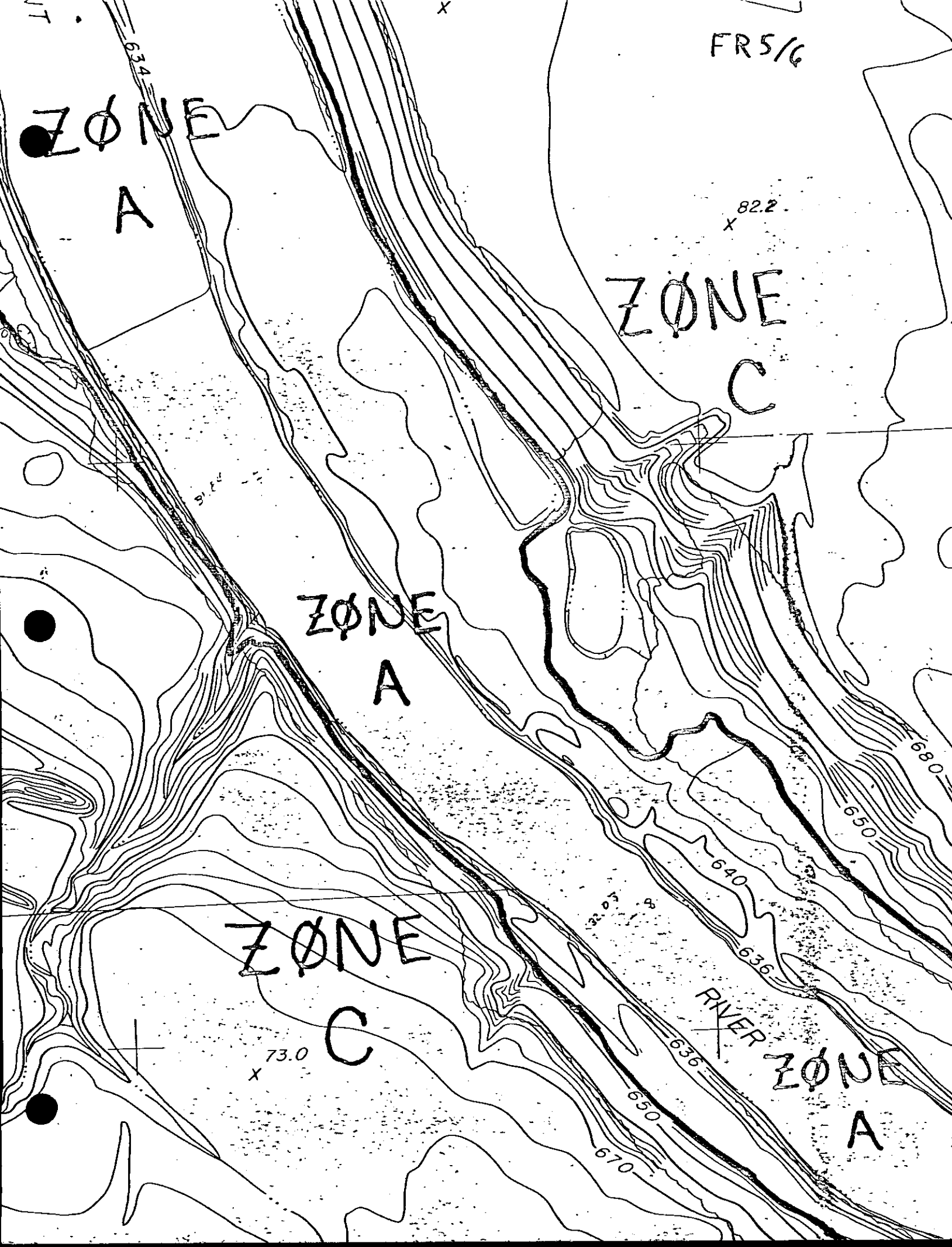
680
660
640


FR5/6
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A
ZØNE
C
ZØNE
A
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ZØNE
A
RIVER
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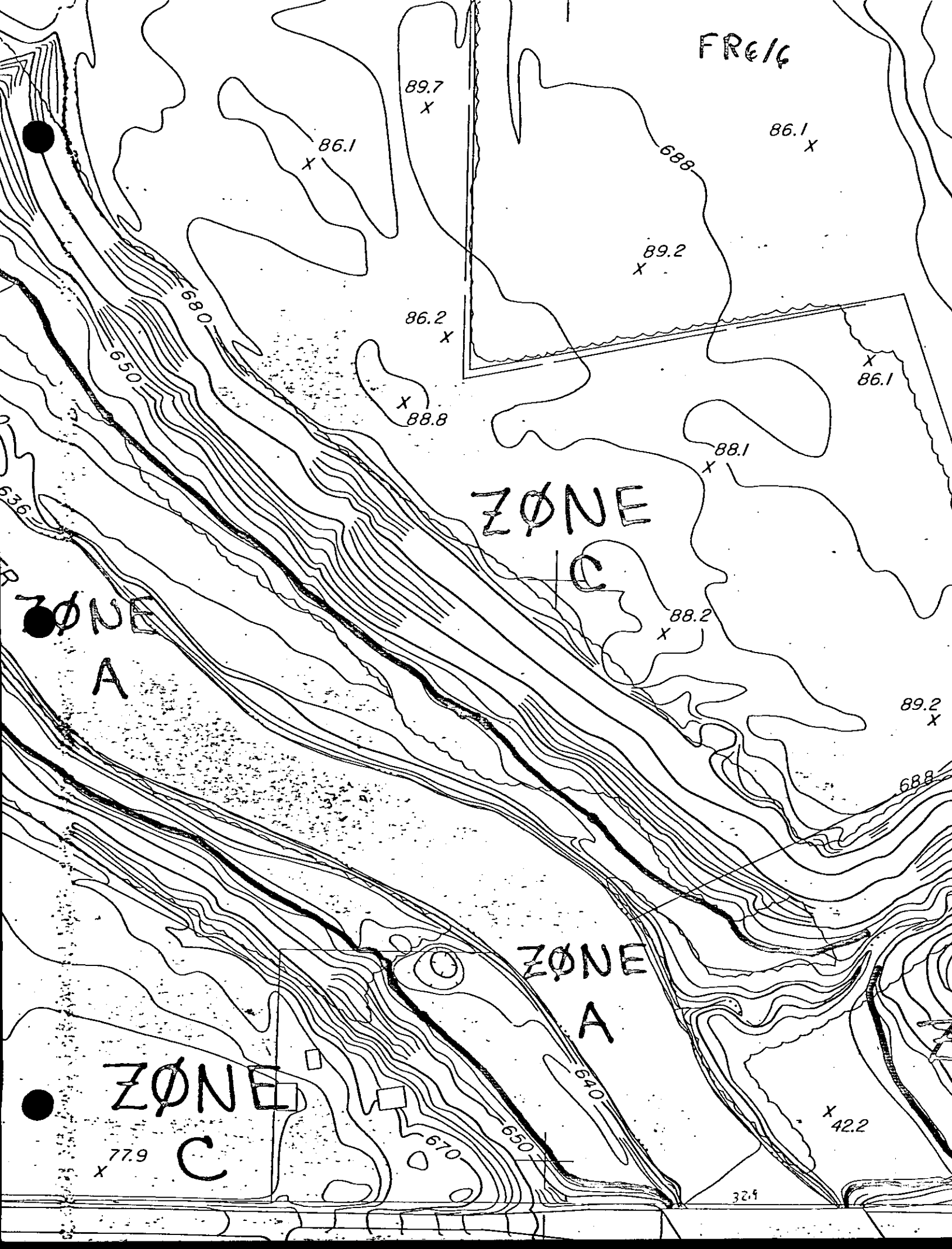
640
636
636
650
670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86.1
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89.2
680
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650
86.1
88.8
88.1
636
ZØNE
C
ZØNE
A
88.2
89.2
688
ZØNE
A
640
ZØNE
C
77.9
670
650
42.2
32.9

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 1/30/78

*** INPUT CARD PRINTOUT ***

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1      1 ALGER/CRAPO DRAINS THRU RAILROAD BRIDGE  HOLTSLAG 10  5 02 05 12
2      2  76975  77086  77198  77111  77118
3   9200 SC BT 1  13  3  762   29150  1  3
4   9204   1110   1590   2140   1750   1750
5   9210    -550  1  7740 -450  1  7720 -335  1  7700 -200  1  7690    0  1  7697
5   9212      24  2  7691   34  2  7618   58  2  7604   64  2  7601   72  2  7606
5   9214      90  3  7692  102  3  7696  120  3  7700
6   9229  1  2 040 040  1  2 037 037  1  2 070 070
3   9300 C/ABU 0   9  3  762   29340  1  3
5   9310       0  1  7760   10  2  7760   20  2  7720   35  2  7660   40  2  7610  A
5   9312      60  2  7610   80  3  7700  190  3  7720  210  3  7760
6   9329  1  2 060 060  1  2 045 045  1  2 060 060
3   9400 C/ABV 0  15  3  762   29580  1  3
5   9410       0  1  7720   50  1  7700   85  1  7700   90  2  7680  100  2  7619
5   9412     105  2  7607  130  2  7607  135  2  7619  145  3  7680  160  3  7700
5   9414     170  3  7780  190  3  7780  200  3  7700  225  3  7700  230  3  7760  B
6   9490  1  2 060 060  1  2 045 045  1  2 060 060
3   9500 BR BV 2  10  1  762   29580       30  7706 1 0
5   9510       1  1  7706    1  1  7650   10  1  7629   20  1  7614   28  1  7609
5   9512      40  1  7610   46  1  7624   50  1  7630   50  1  7706    0 -9  7706
6   9590  1  2 055 055
3   9595 PR BV 3   2                                  2
5   9596       4      7620    4      7706
3   9600 RD BV 4   5  2   35           1  2           2 2                 1
5   9610    -499  1  7760 -499  1  7749    0  2  7749  499  2  7749  499  2  7760
3   9600 C/AAP 5  17  6  762   29730  4  6
**SEQUENCE**
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5   9612     -28  3  7690    0  3  7699    5  4  7705   20  5  7706   36  5  7608  C
5   9614      46  5  7607   56  5  7619   66  6  7701  270  6  7700  470  6  7720
5   9616     500  6  7740 1100  6  7740
6   9629  1  2 060 060  1  2 090 090  1  2 060 060  1  2 105 105  1  2 055 055
6   9630  1  2 075 075
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 16,DATE= 1/30/78

WATER-SURFACE PROFILE FOR: ALGER/CRAPO DRAINS THRU RAILROAD BRIDGE HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
SC BT AT   29150 /     0 /   1750. /  1250. /  122918. / 2.01 / -399. /  120.
   771.11 /   0.06 /                 /  771.17 /    1.40 /   0.14/          *IS*
----------------------------------------------------------------------------------
C/ABU AT   29340 /   190 /   1750. /   419. /   43301. / 1.14 /   22. /  141.
   771.11 /   0.31 /   0.11 /   0.12 /  771.42 /    4.18 /   0.31 / 0.014  *XS*
----------------------------------------------------------------------------------
C/ABV AT   29580 /   240 /   1750. /   674. /   74982. / 1.45 /   13. /  226.
   771.49 /   0.15 /   0.23 /   0.0  /  771.65 /    2.60 /   0.19 / -0.000 *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR BV AT   29580 /       /   1750. /   330. /   23437. / 1.00 /    1. /   50.
   770.60 /   0.44 /       ...3...  (0.094)  /    5.30 /   0.34 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /              *RG*
----------------------------------------------------------------------------------
C/AAP AT   29730 /   150 /   1750. /  1183. /   64011. / 2.18 /  -72. /  437.
   771.67 /   0.07 /   0.10 /   0.0  /  771.74 /    1.48 /   0.17 / -0.000 *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  1426. /   77116. / 2.18 /  -73. /  472.
   772.12 /   0.05 /                 /  772.18 /    1.23 /   0.14 /          *AS*
============================ END BRIDGE ANALYSIS ================================
```

A

B

C

END OF THIS PROFILE 100 yr NP

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   22,DATE= 1/30/78

WATFR-SURFACE PROFILE FOR:  ALGER/CRAPO DRAINS THRU RAILROAD BRIDGE  HOLTSLAG
PAGE  1 OF  1, PROFILE NUMBER  5,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS
==========================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC  *ID*
==========================================================================
SC BT AT   29150 /      0 /   1750. /  1081. /  118676. / 1.72 / -230. /  120.
   771.18 /   0.07 /                 /  771.25 /    1.62 /   0.14/          *IS*
--------------------------------------------------------------------------
C/ARU AT   29340 /    190 /   1750. /   425. /   44709. / 1.15 /   25. /  140.
   771.18 /   0.30 /   0.11 /   0.12 /  771.48 /    4.11 /   0.30 /  0.006  *XS*
--------------------------------------------------------------------------
C/ARV AT   29580 /    240 /   1750. /   610. /   74219. / 1.25 /   50. /  160.
   771.55 /   0.16 /   0.22 /   0.0  /  771.70 /    2.87 /   0.19 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR BV AT   29580 /        /   1750. /   330. /   23437. / 1.00 /    1. /   50.
   770.60 /   0.44 /       ...3...  (0.094)    /    5.30 /   0.34 /          *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /              *RG*
--------------------------------------------------------------------------
C/AAP AT   29730 /    150 /   1750. /   941. /   60049. / 1.70 /  -70. /  200.
   771.72 /   0.09 /   0.10 /   0.0  /  771.81 /    1.86 /   0.18 / -0.000  *AS*
--------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  1060. /   69238. / 1.68 /  -70. /  200.
   772.16 /   0.07 /                 /  772.23 /    1.65 /   0.16 /          *AS*
============================ END BRIDGE ANALYSIS ==============================

                          END OF THIS PROFILE
```

100 yr FW

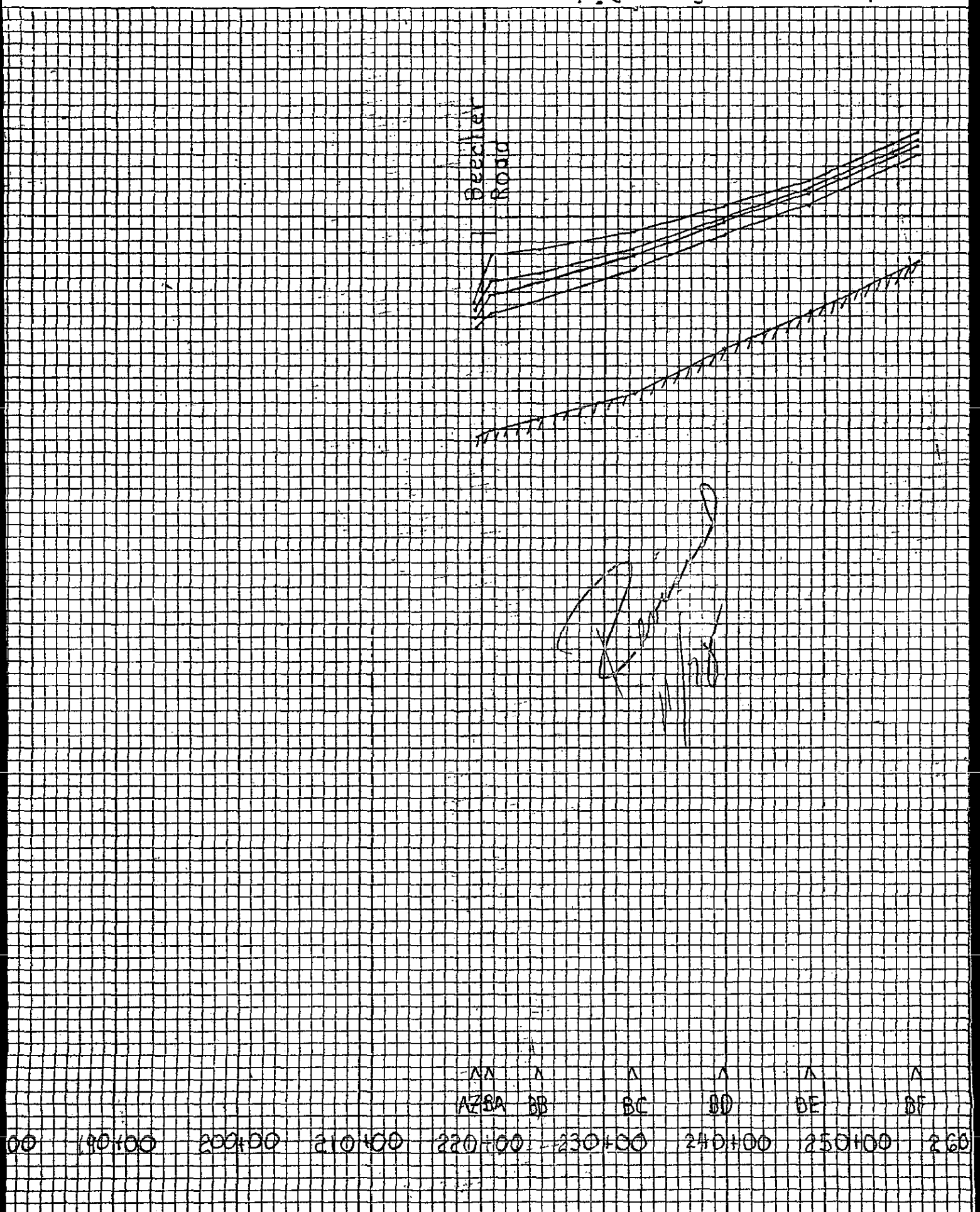
A

A

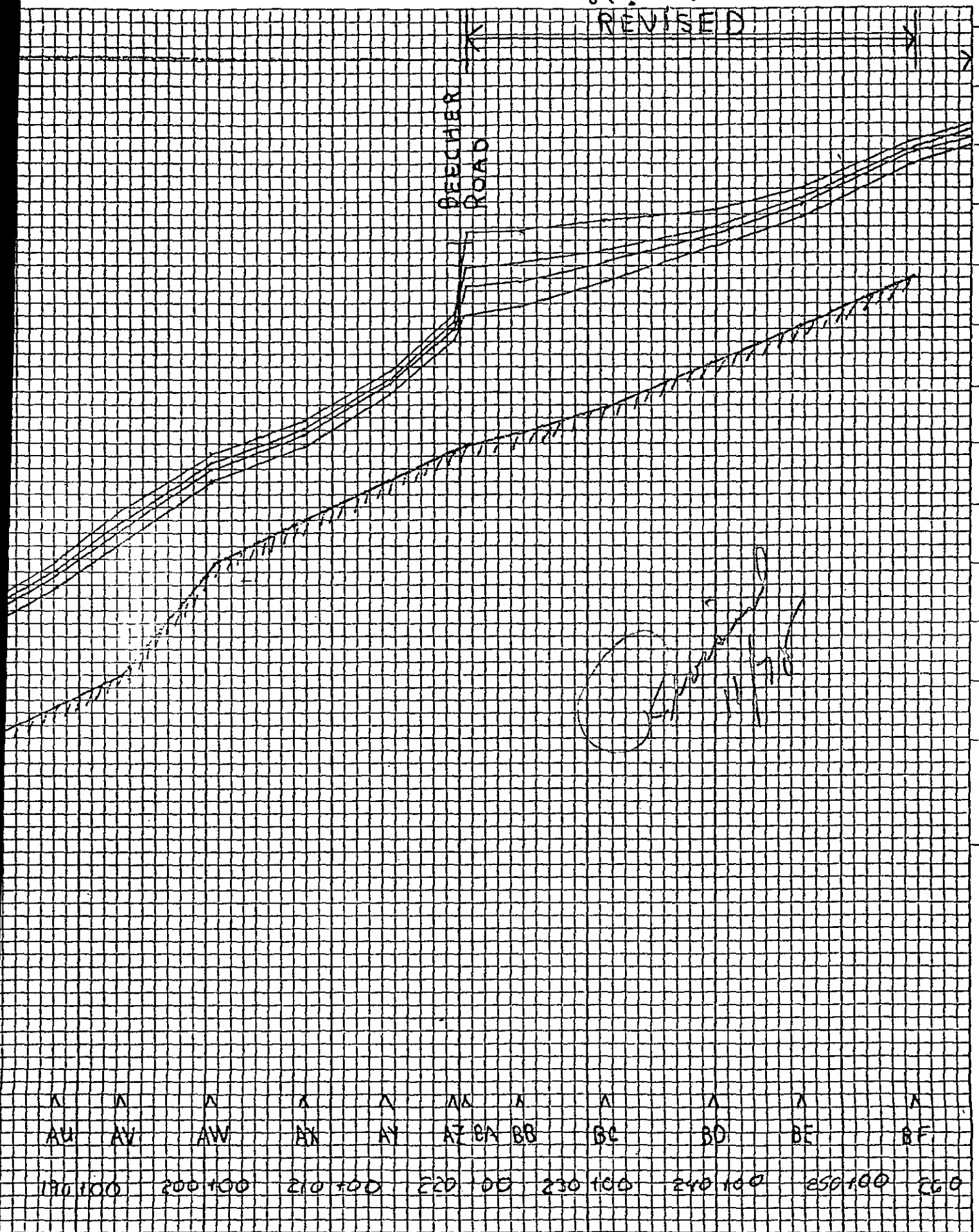
B

C

(ON) **RATING CURVE FOR** Cole Creek through Clayton Township Sta.

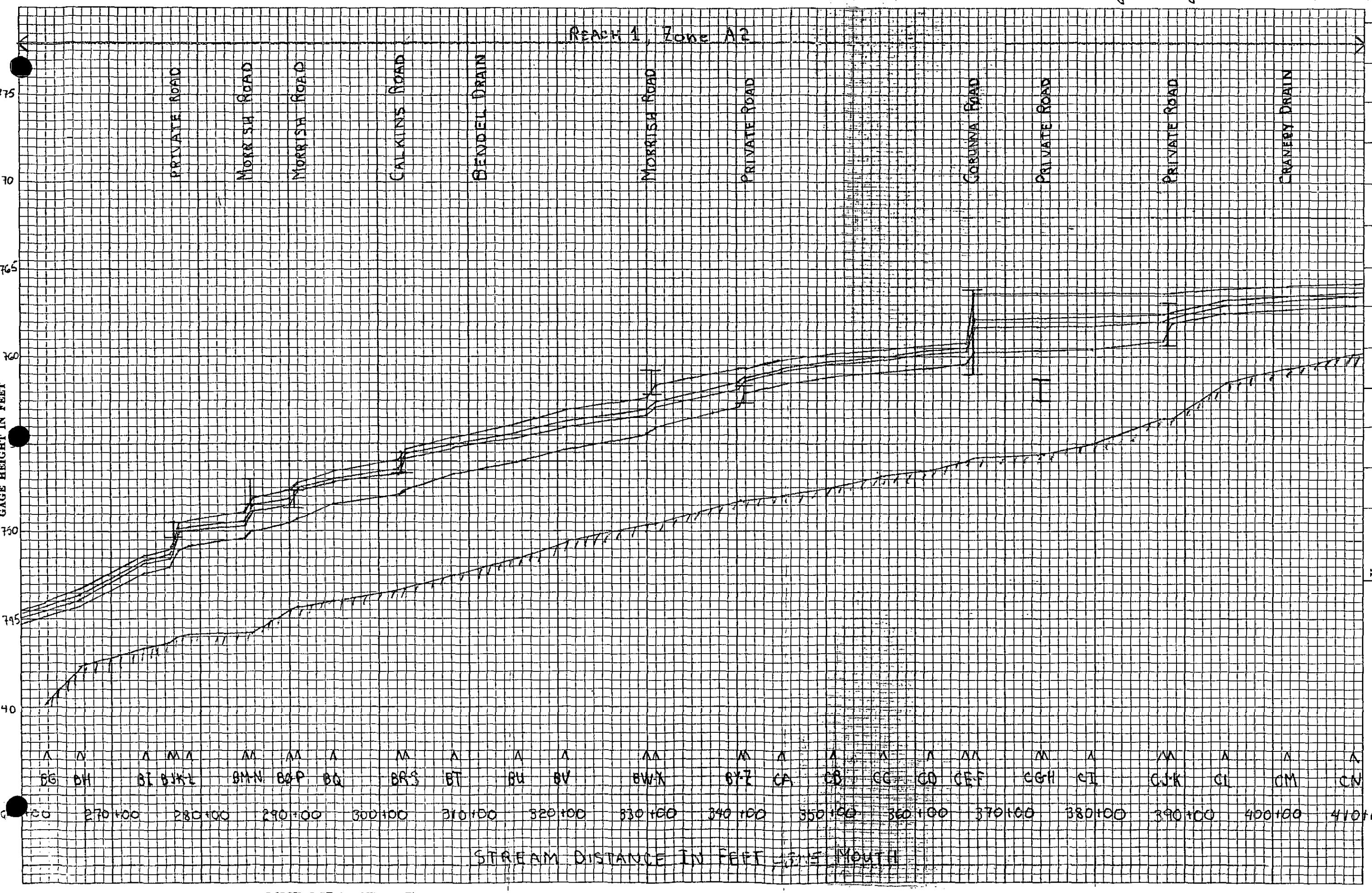


RATING CURVE FOR Cole Creek through Clayton Township Sta. No.



9-279
Rev. 6-63) UNITED STATES DEPARTMENT OF THE INTERIOR—GEOLOGICAL SURVEY (WATER RESOURCES DIVISION)

RATING CURVE FOR Cole Creek through Clayton Township Sta. No. 2/3



Year,
Meas. Nos.,
Max. G. H.,
Min. G. H.,
Plotted by
Checked by

Curve approved by:

..... Office Engineer.

..... District Engineer.

Date .....

U.S. GOVERNMENT PRINTING OFFICE 16—58146-8

9-879
(Rev. 8-63)

UNITED STATES DEPARTMENT OF THE INTERIOR—GEOLOGICAL SURVEY (WATER RESOURCES DIVISION)

RATING CURVE FOR Cole Creek through Clayton Township Sta. No. 1/3

Curve approved by:

..... *Office Engineer.*

..... *District Engineer.*

Date .....

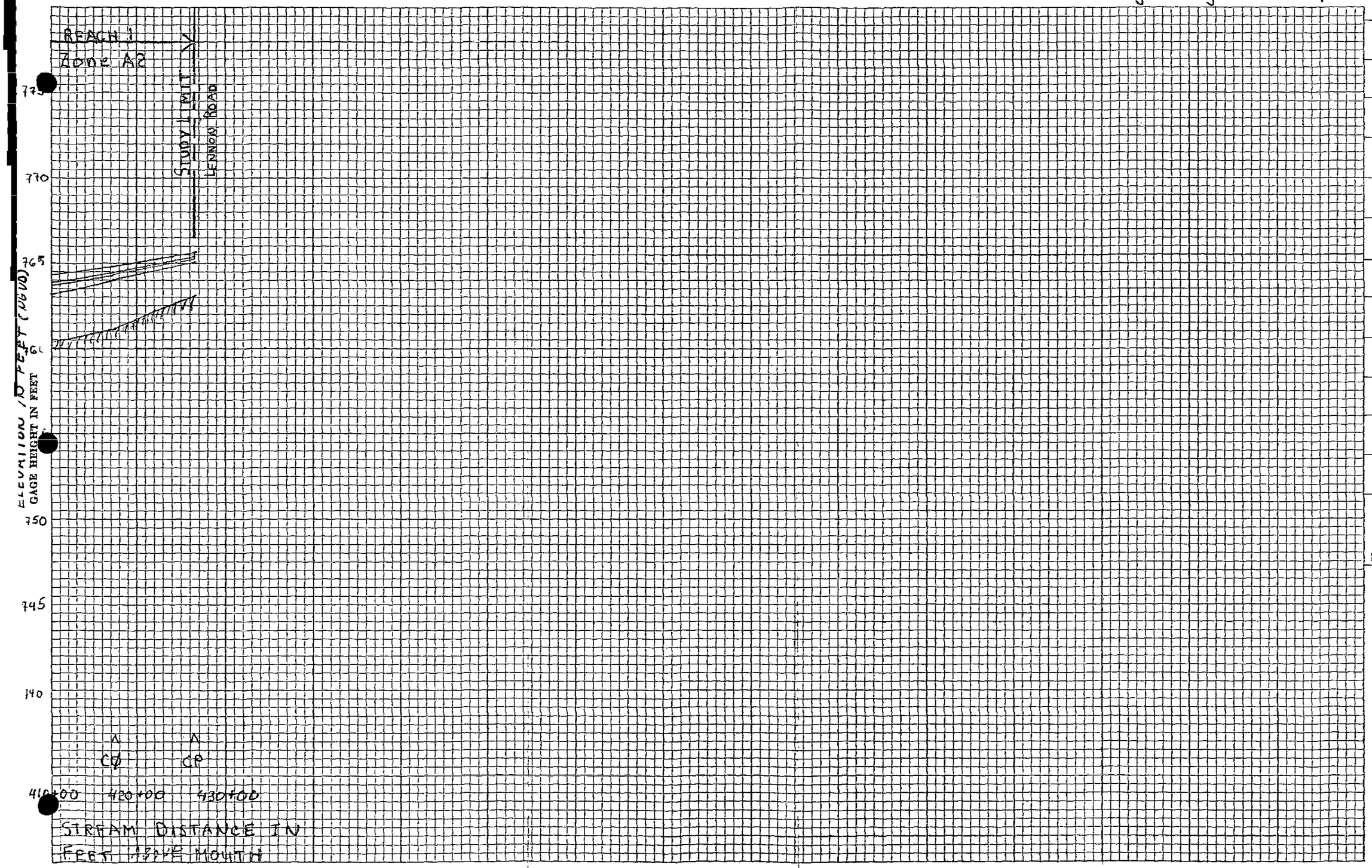
Year,												
Meas. Nos.,												
Max. G. H.,												
Min. G. H.,												
Plotted by												
Checked by												

U.S. GOVERNMENT PRINTING OFFICE 16—58140-8

9-279
Rev. 6-33)

UNITED STATES DEPARTMENT OF THE INTERIOR—GEOLOGICAL SURVEY (WATER RESOURCES DIVISION)

RATING CURVE FOR Cole Creek through Clayton Township Sta. No. 3/3



Year,	
Meas. Nos.,	
Max. G. H.,	
Min. G. H.,	
Plotted by	
Checked by	

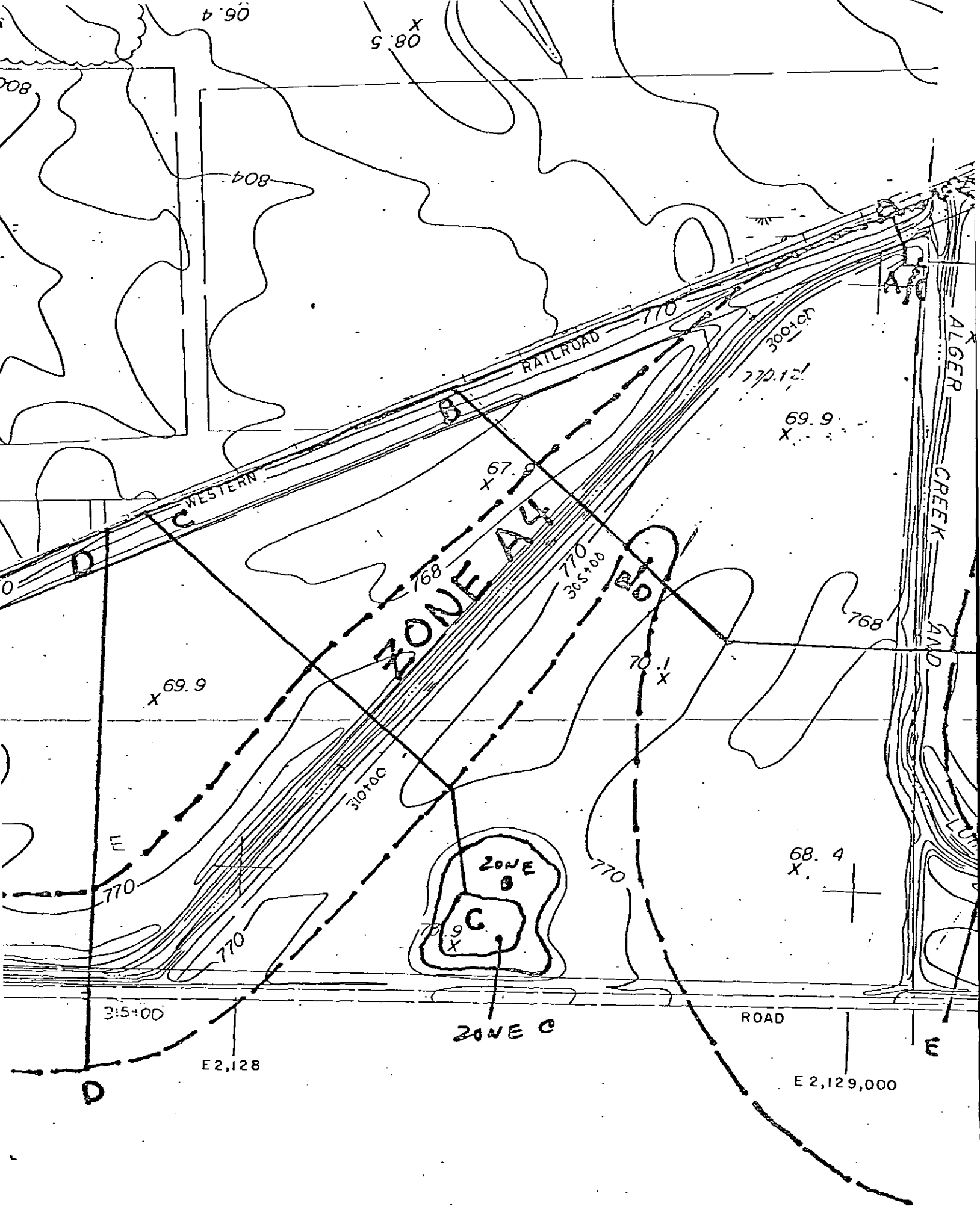
Curve approved by:

Office Engineer.

District Engineer.

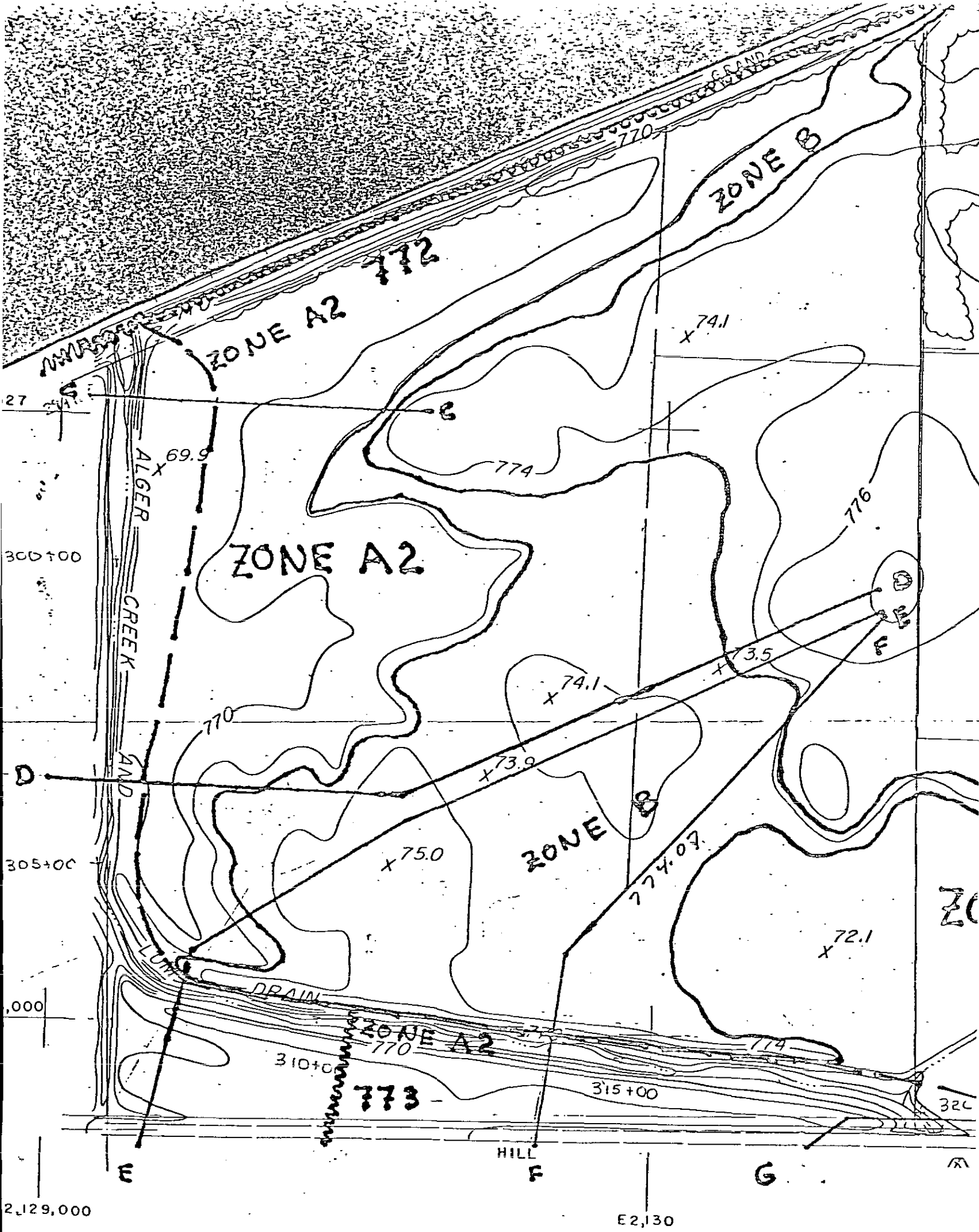
Date

U.S. GOVERNMENT PRINTING OFFICE 16—56145-2



SECTION INDEX

6 | 5 | 4 | 3 | 2 | 1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ZONE A2
ZONE A2
ZONE B
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69.9
73.5
73.9
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305+00
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E
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G
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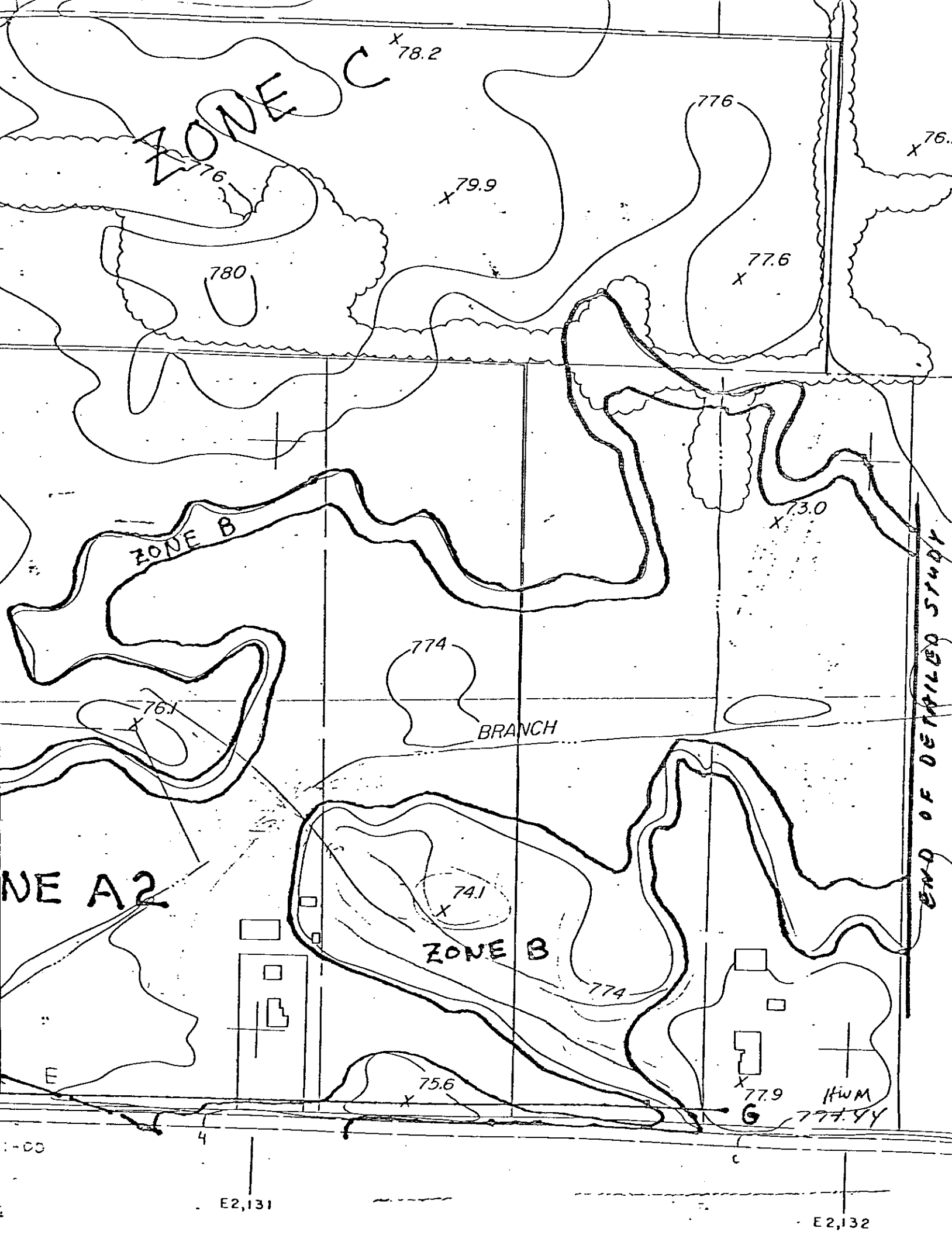
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79.9
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76..
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END OF DETAILED STUDY
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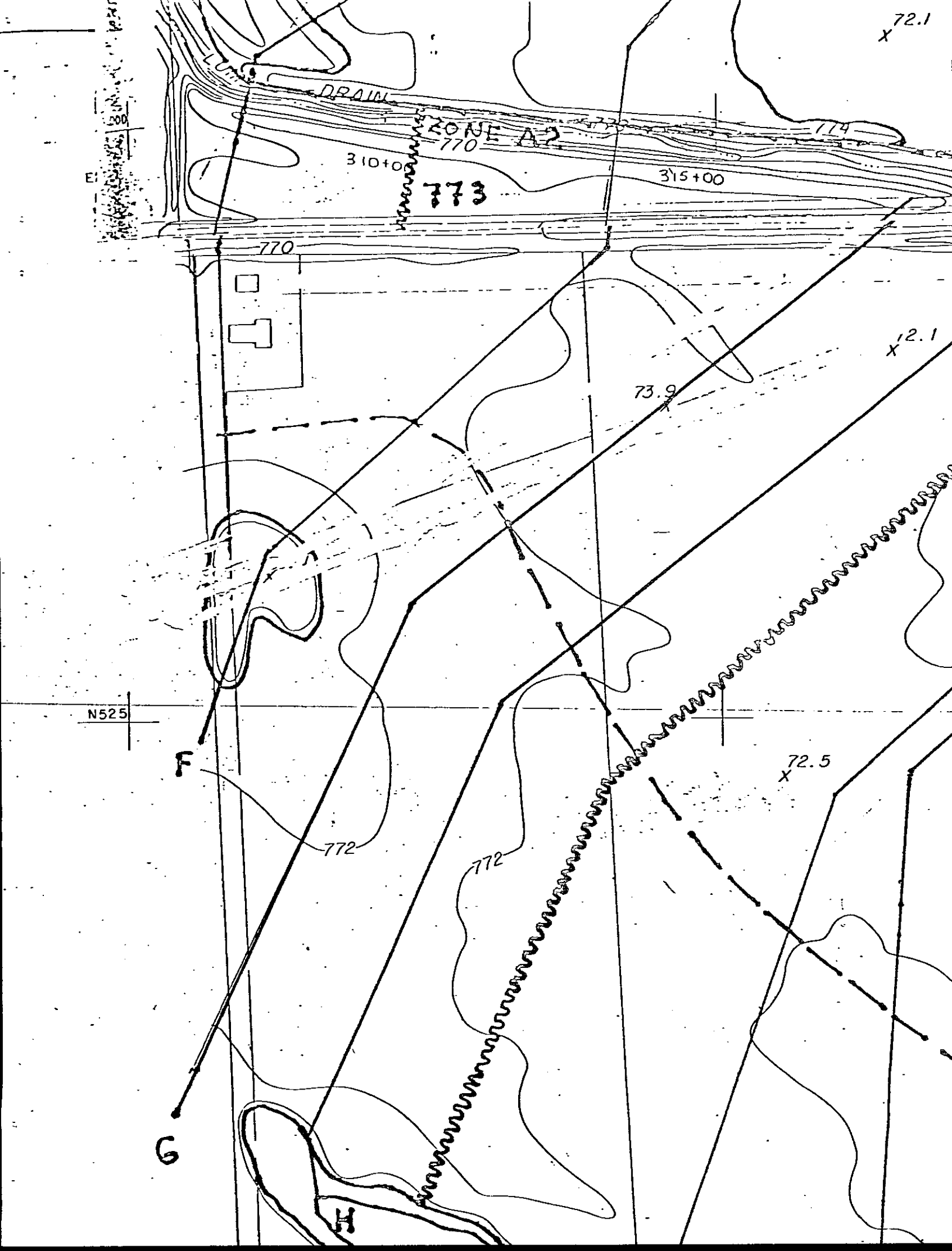
E2,132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G
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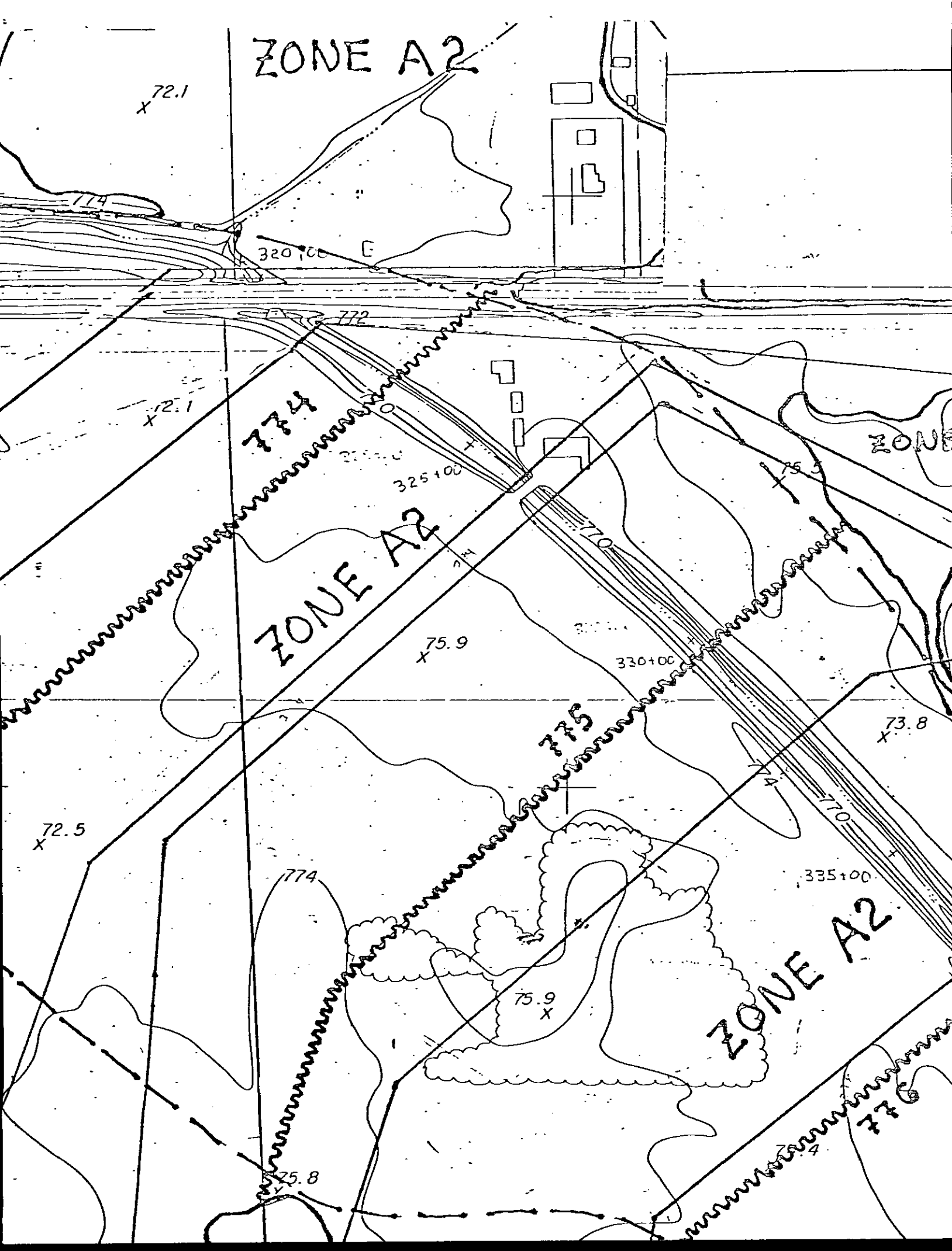
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ZONE A2
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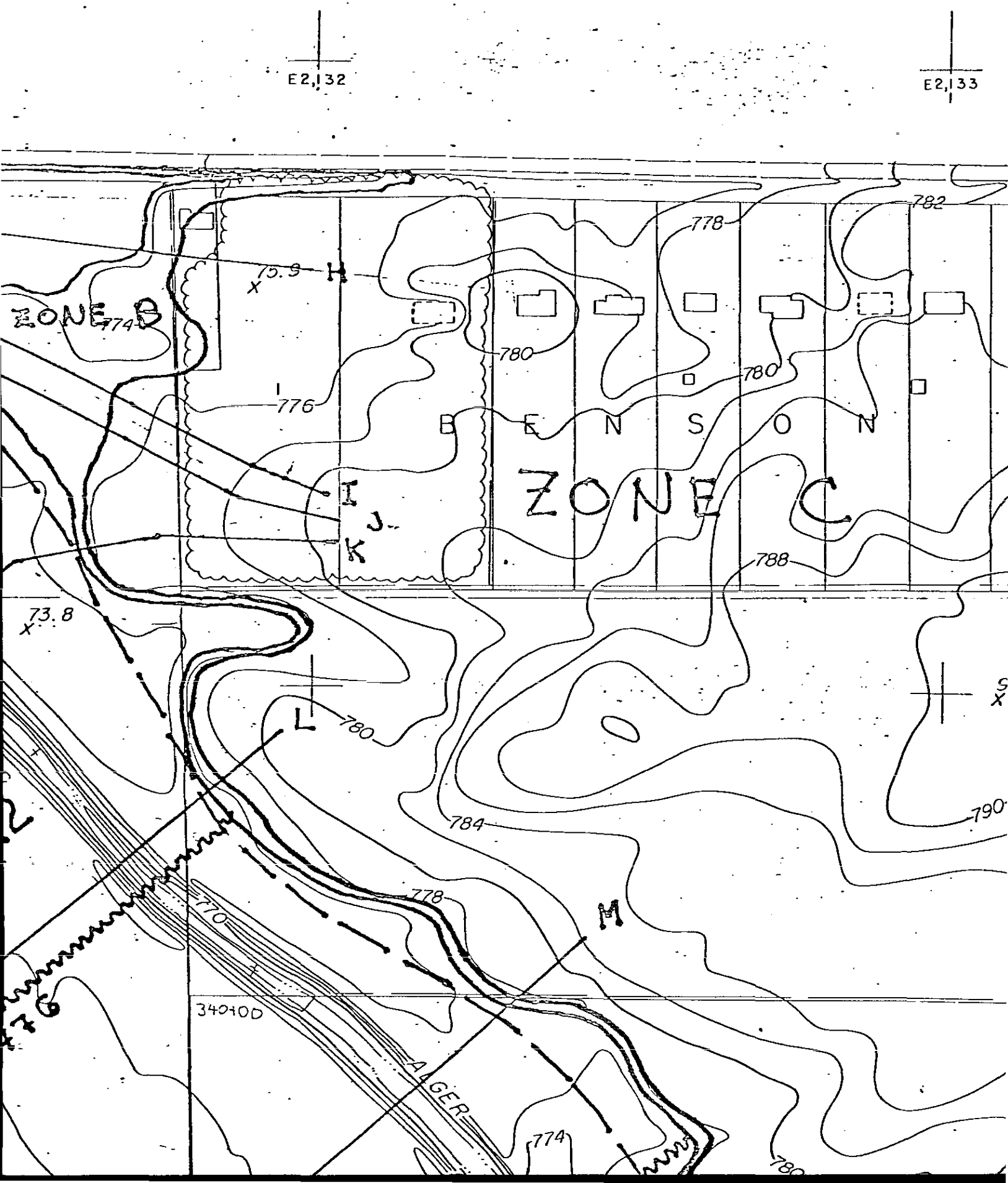
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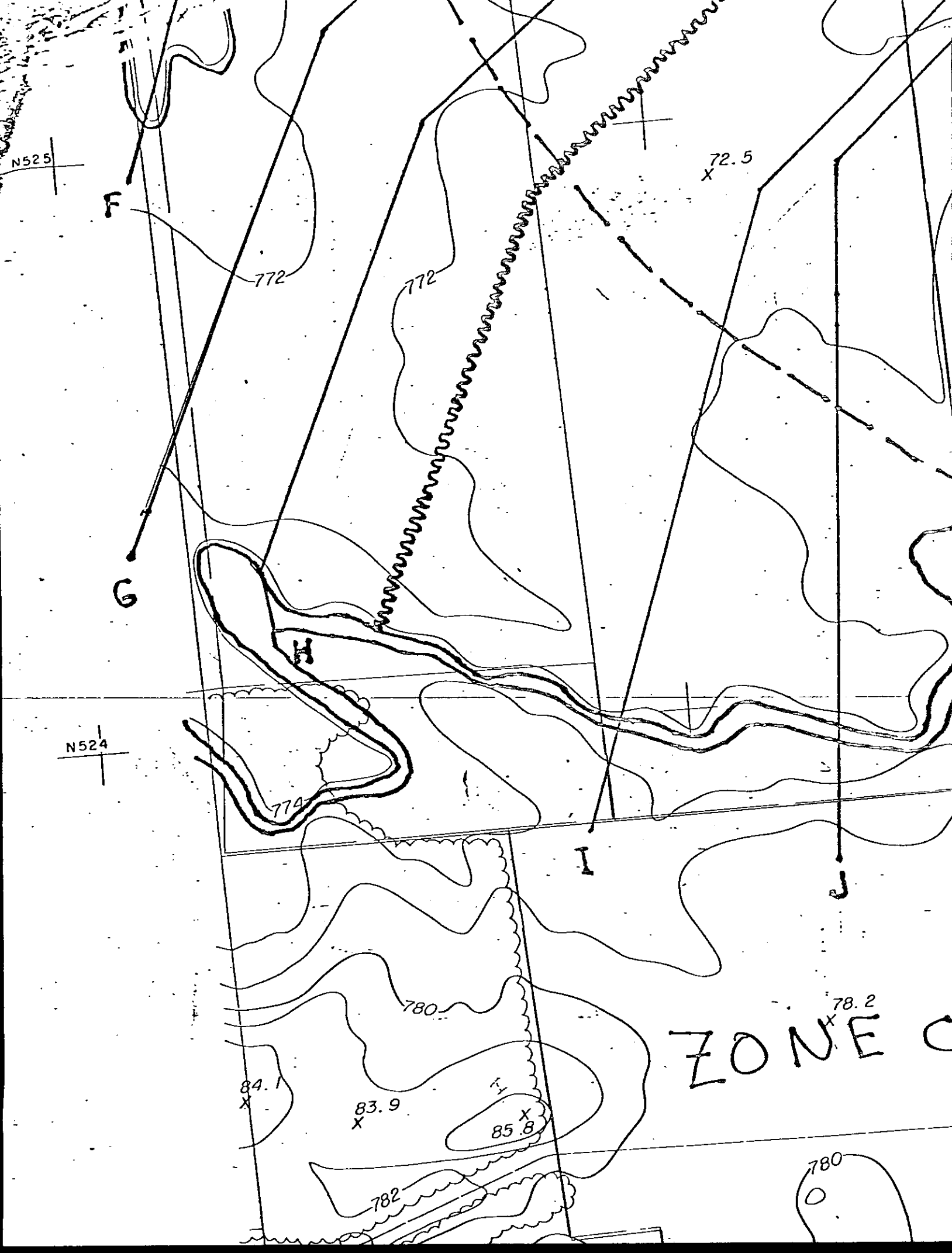
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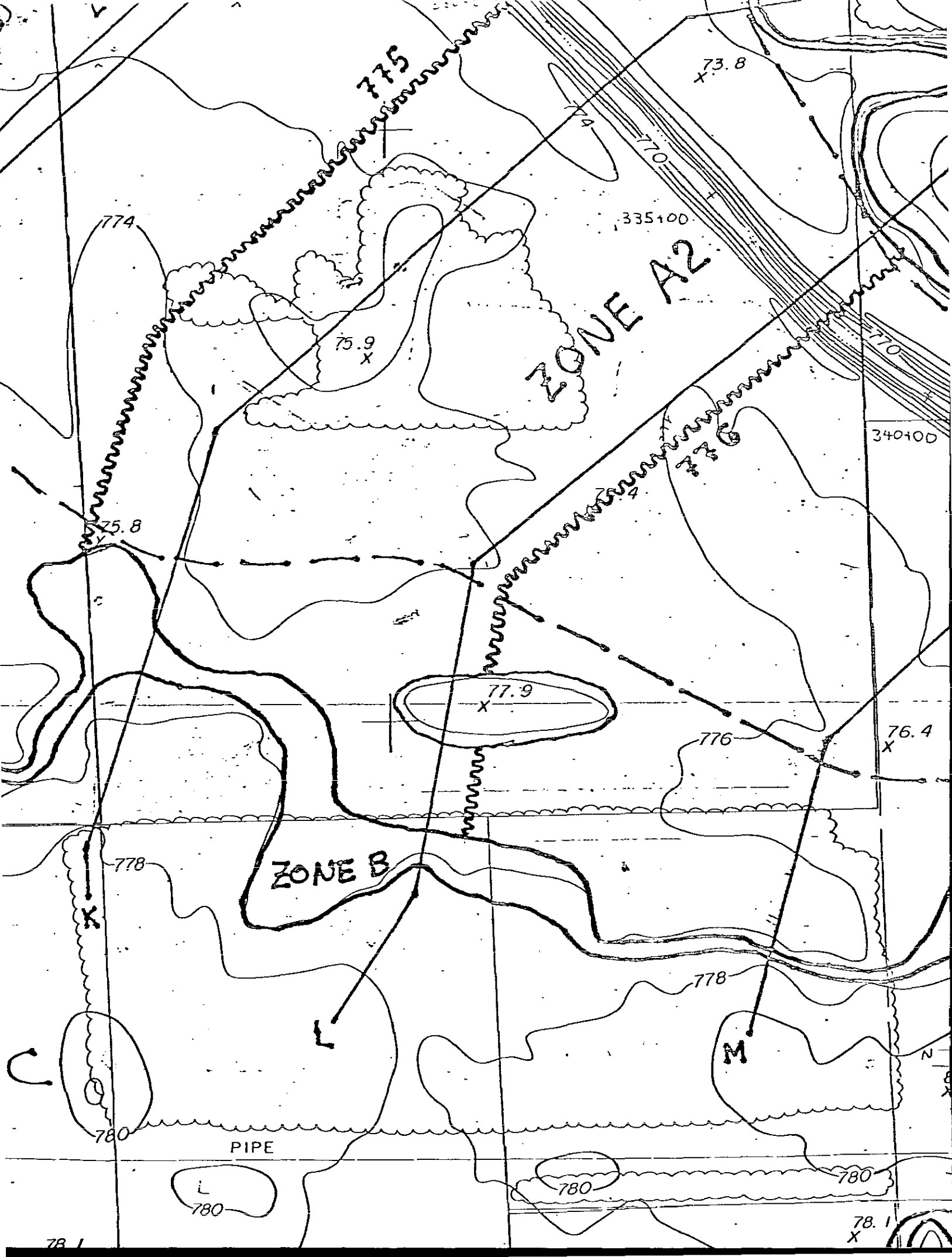
ZONE C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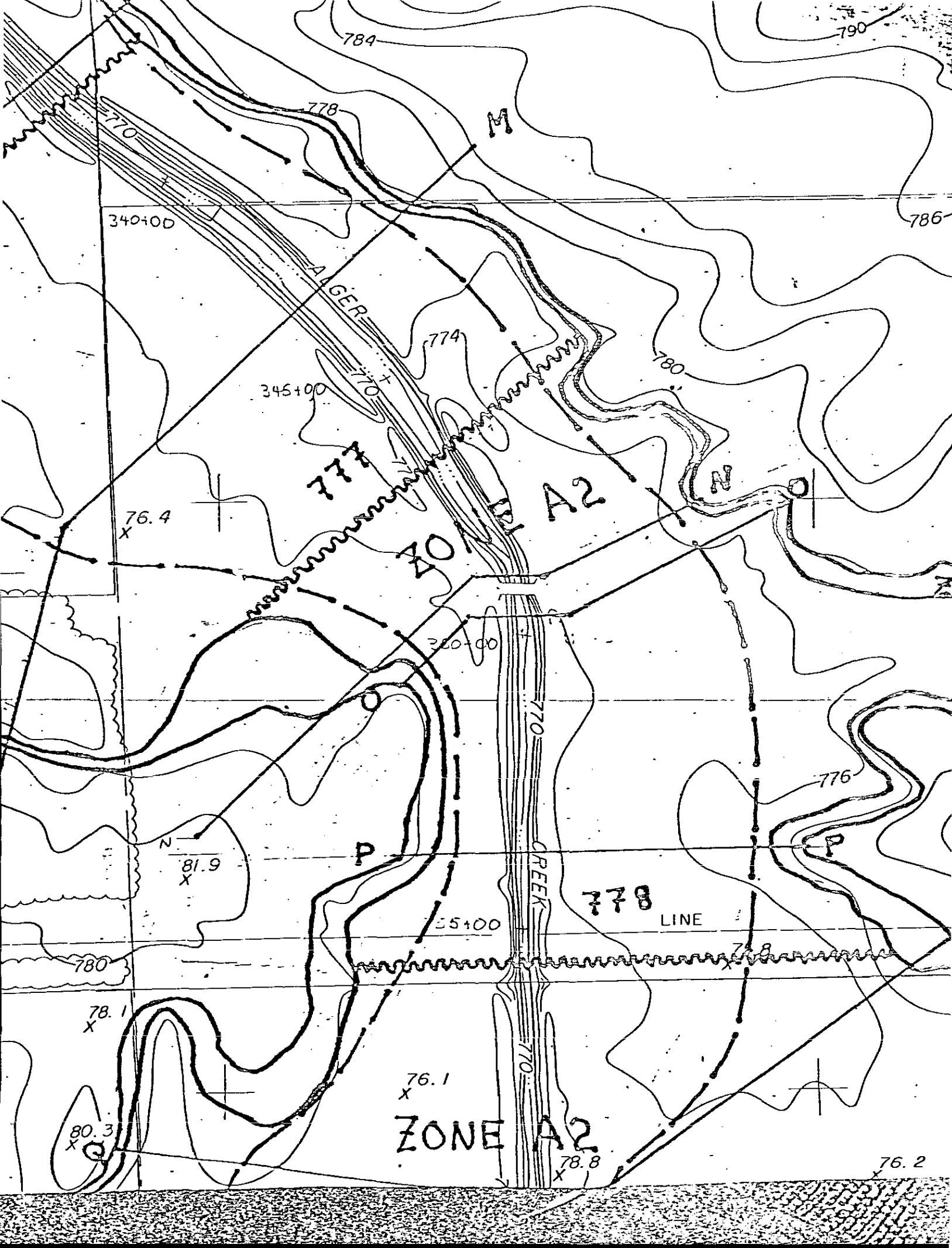
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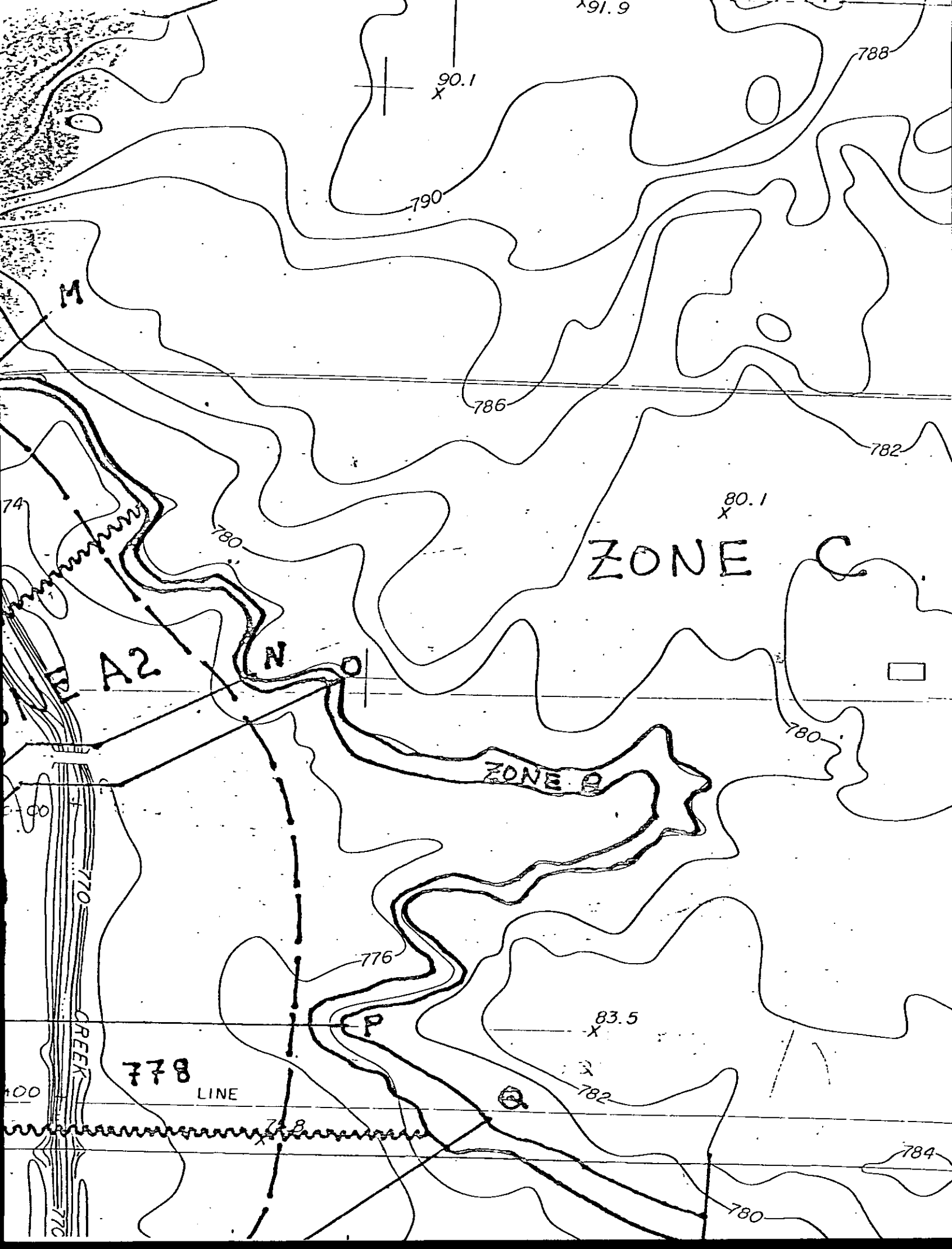
80.3
Q
ZONE A2
78.8
76.2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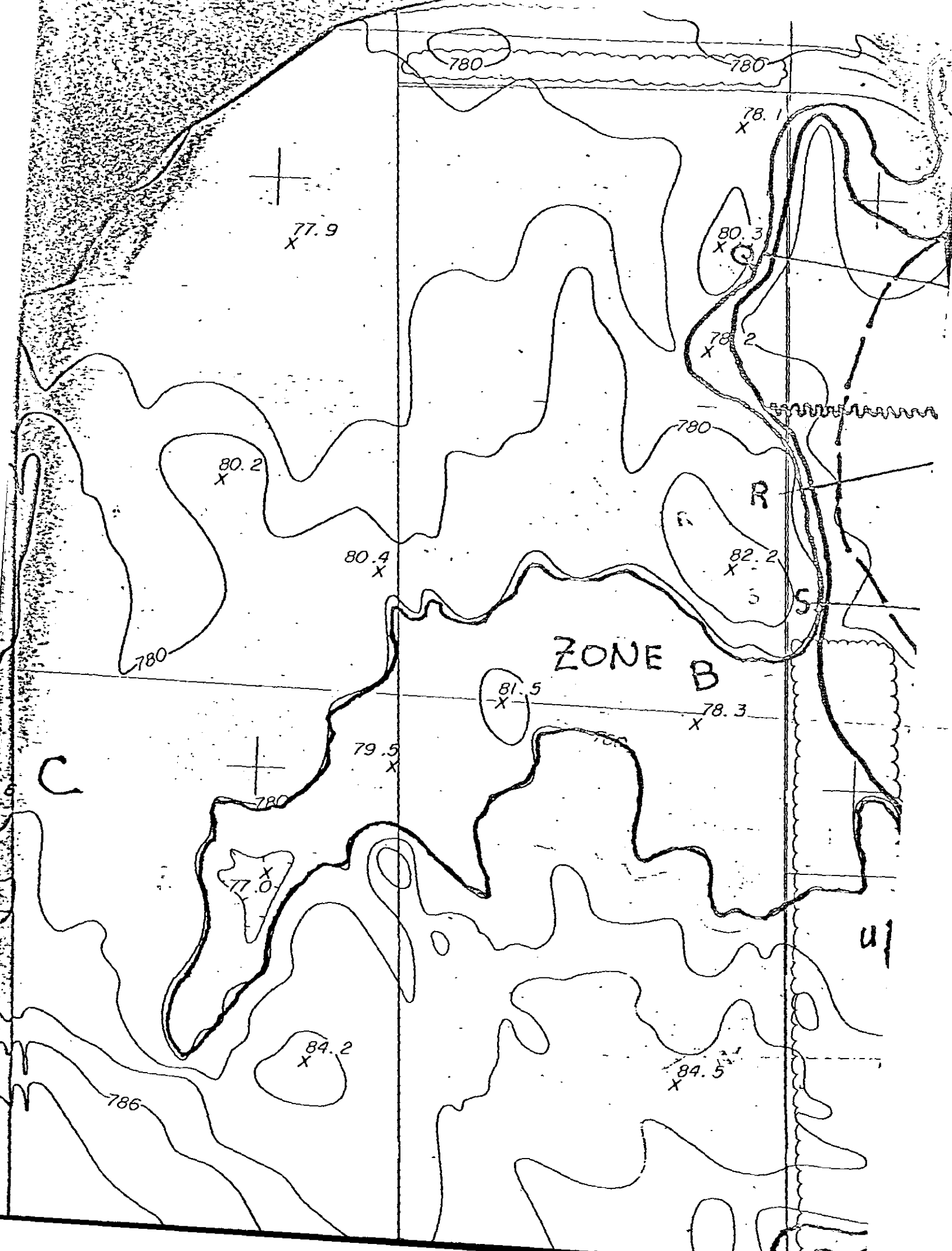
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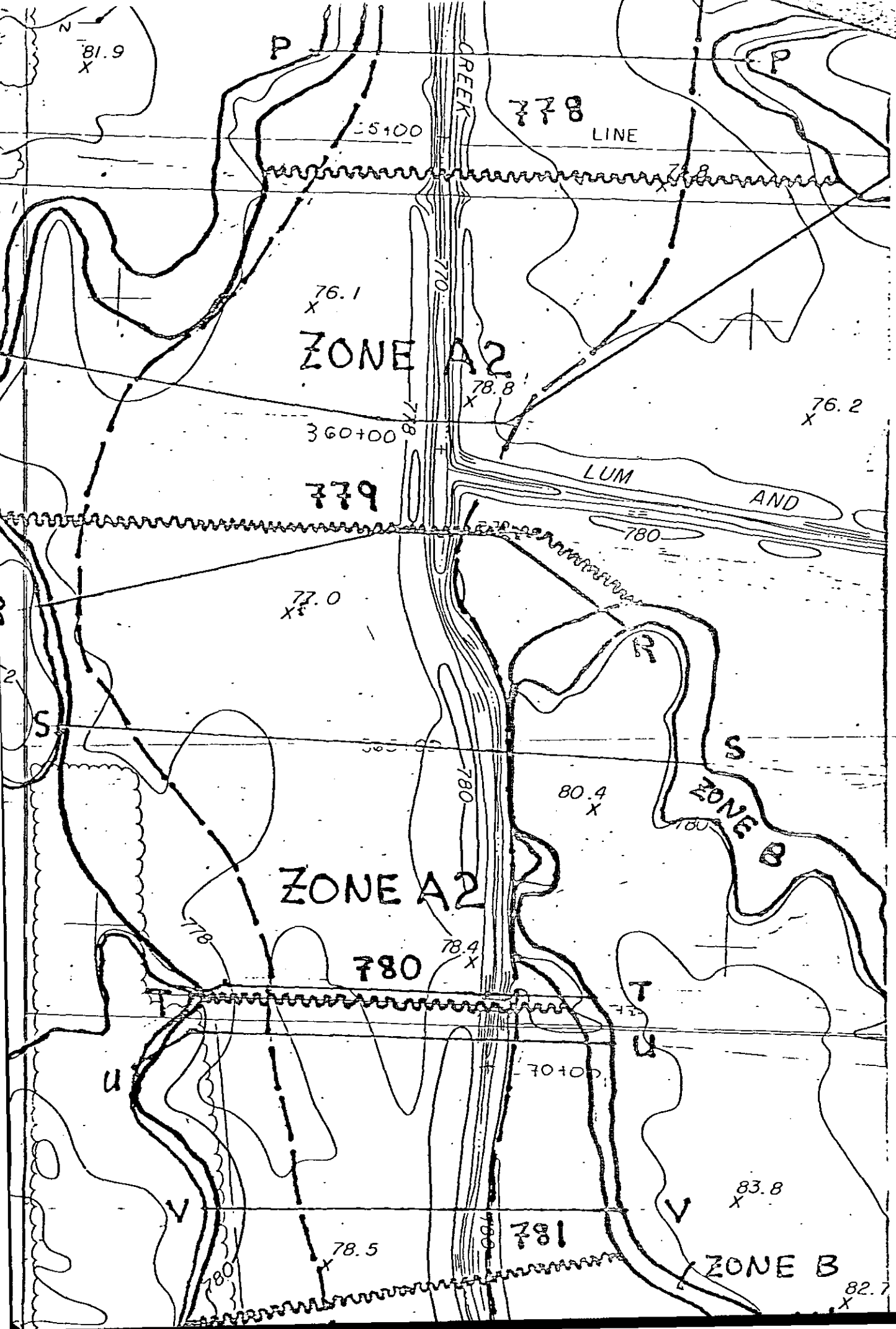
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360+00
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AND
779
780
77.0
R
S
S
ZONE B
80.4
ZONE A2
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780
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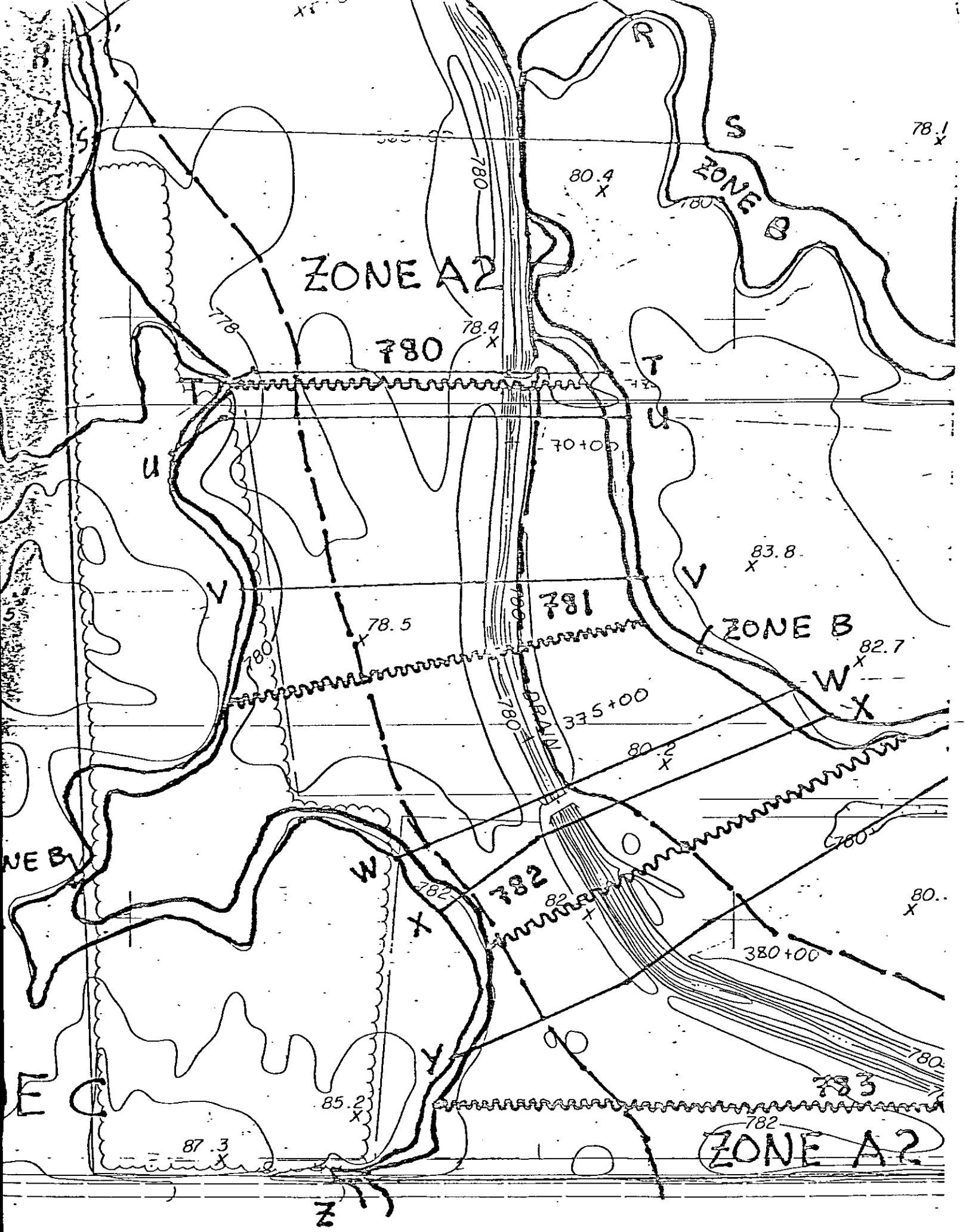
V
V
83.8
781
78.5
ZONE B
82.7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ZONE B
ZONE B
ZONE A2
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375+00
380+00
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80.4
78.1
83.8
78.5
82.7
80.2
85.2
87.3
80..
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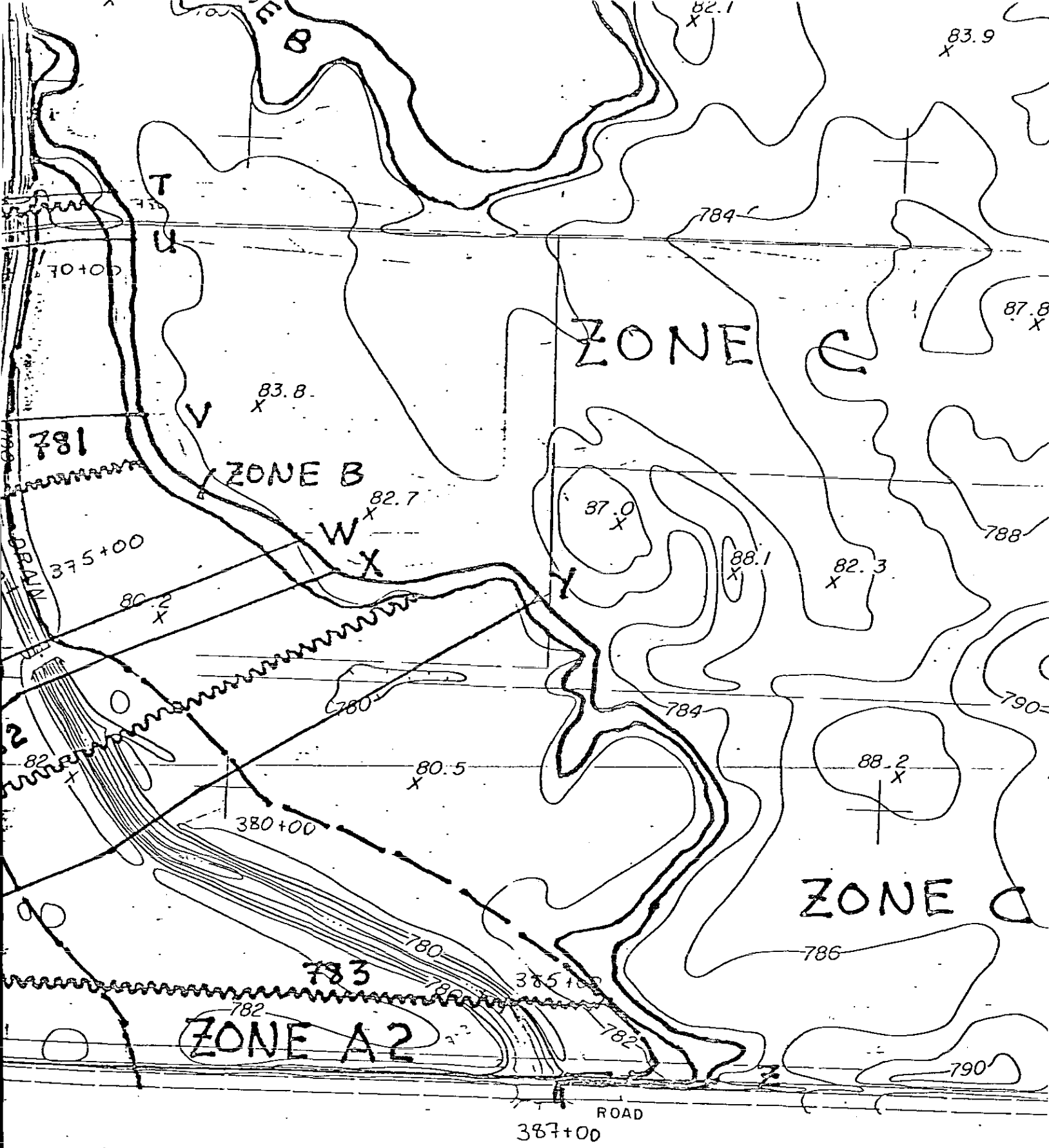
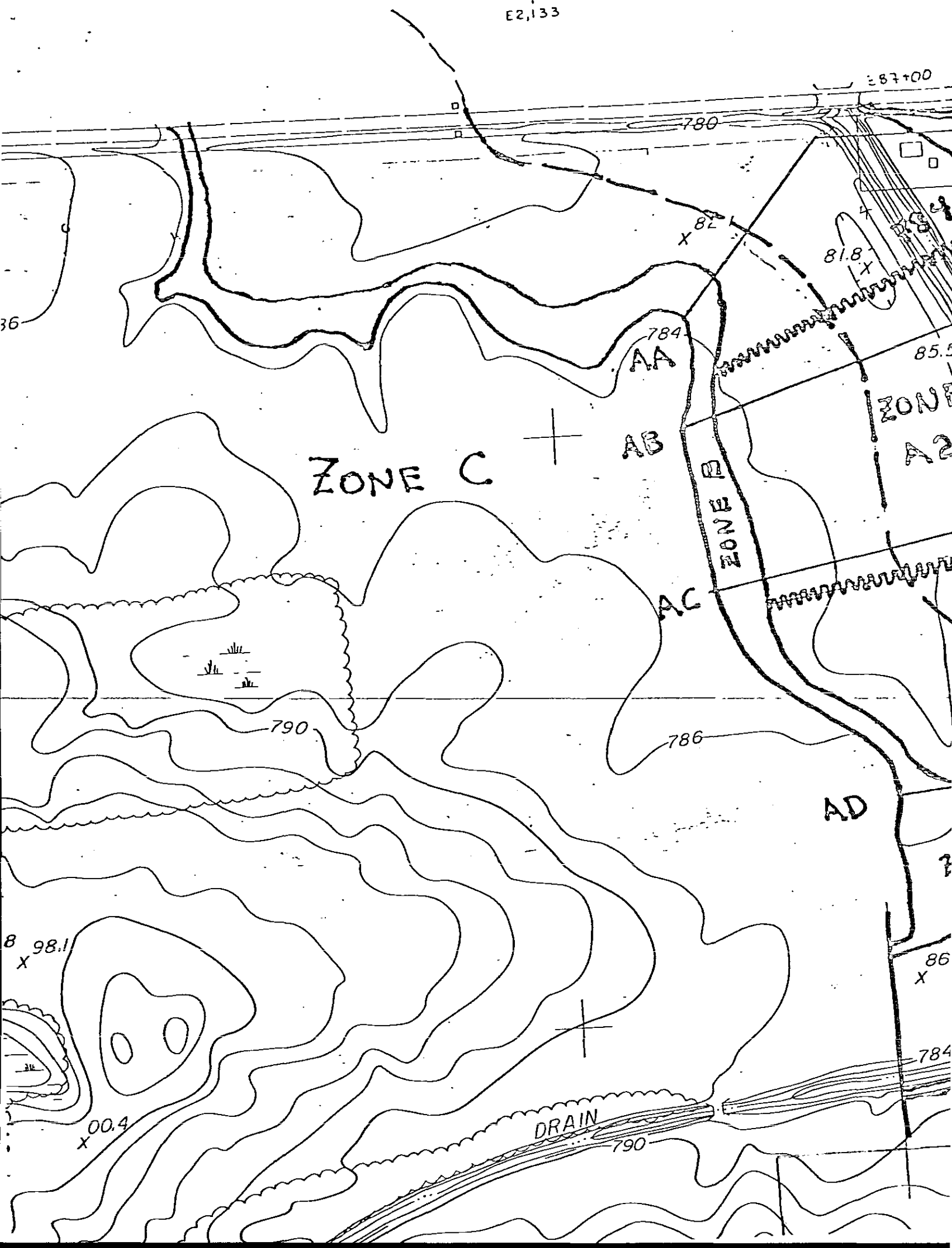
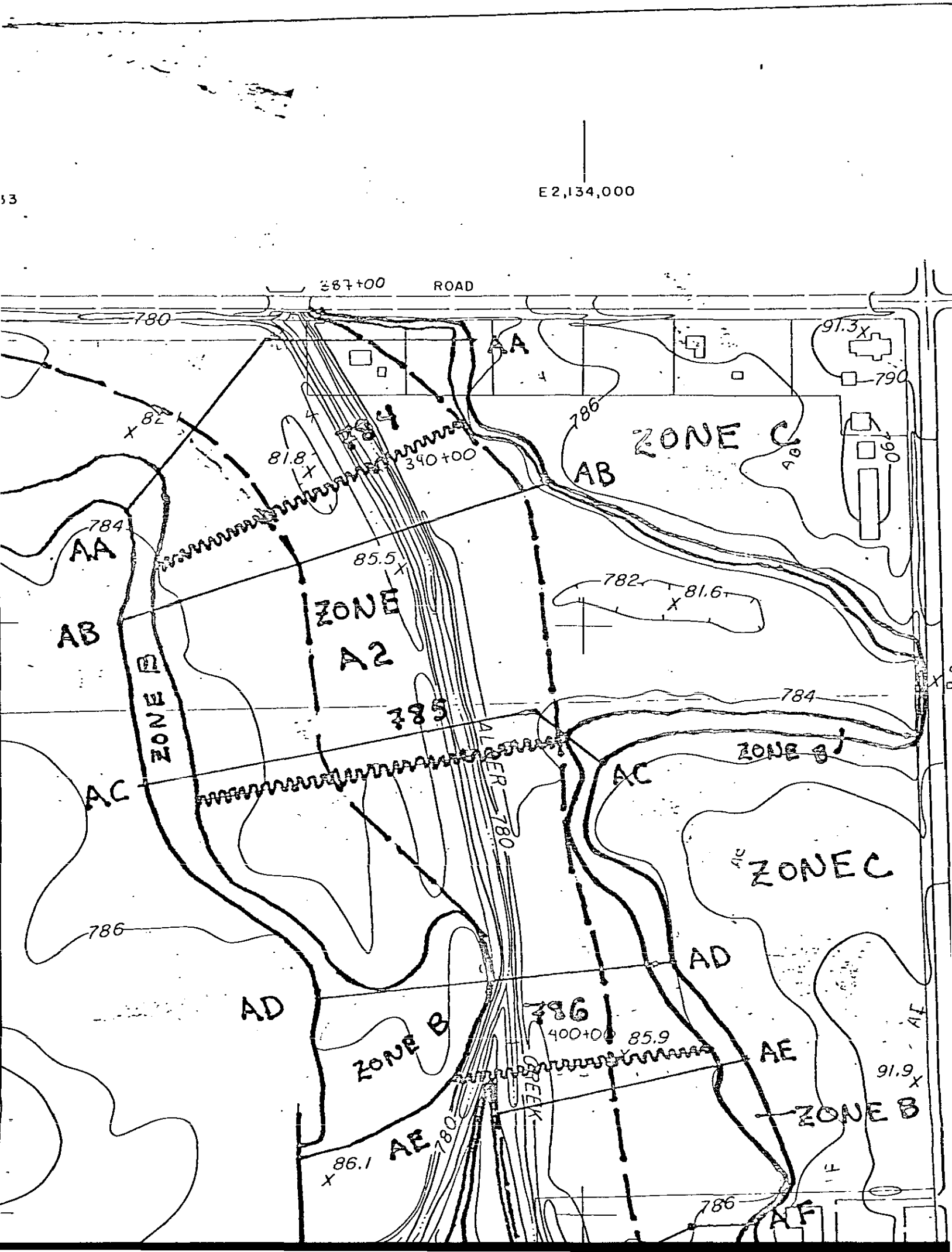
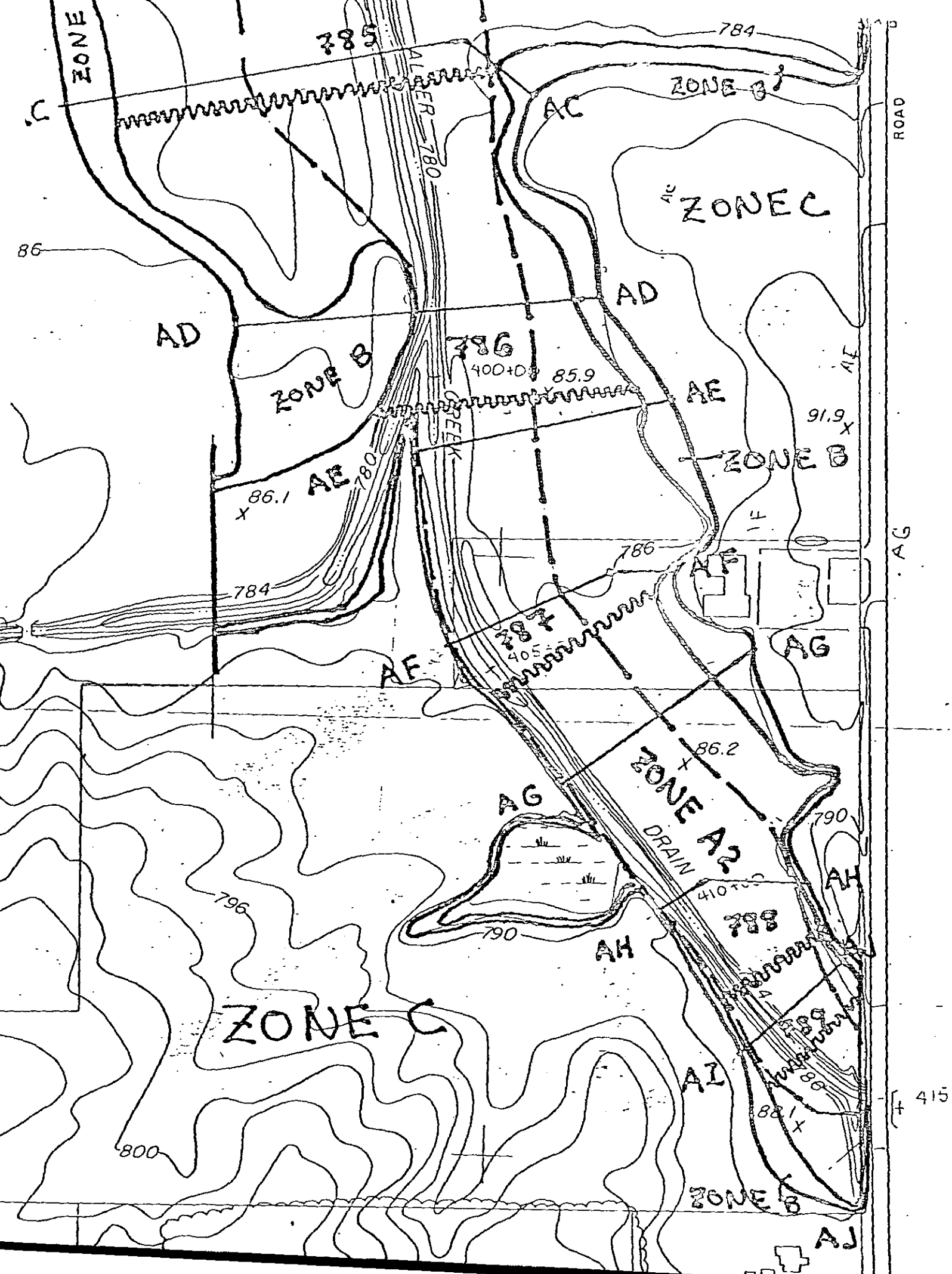
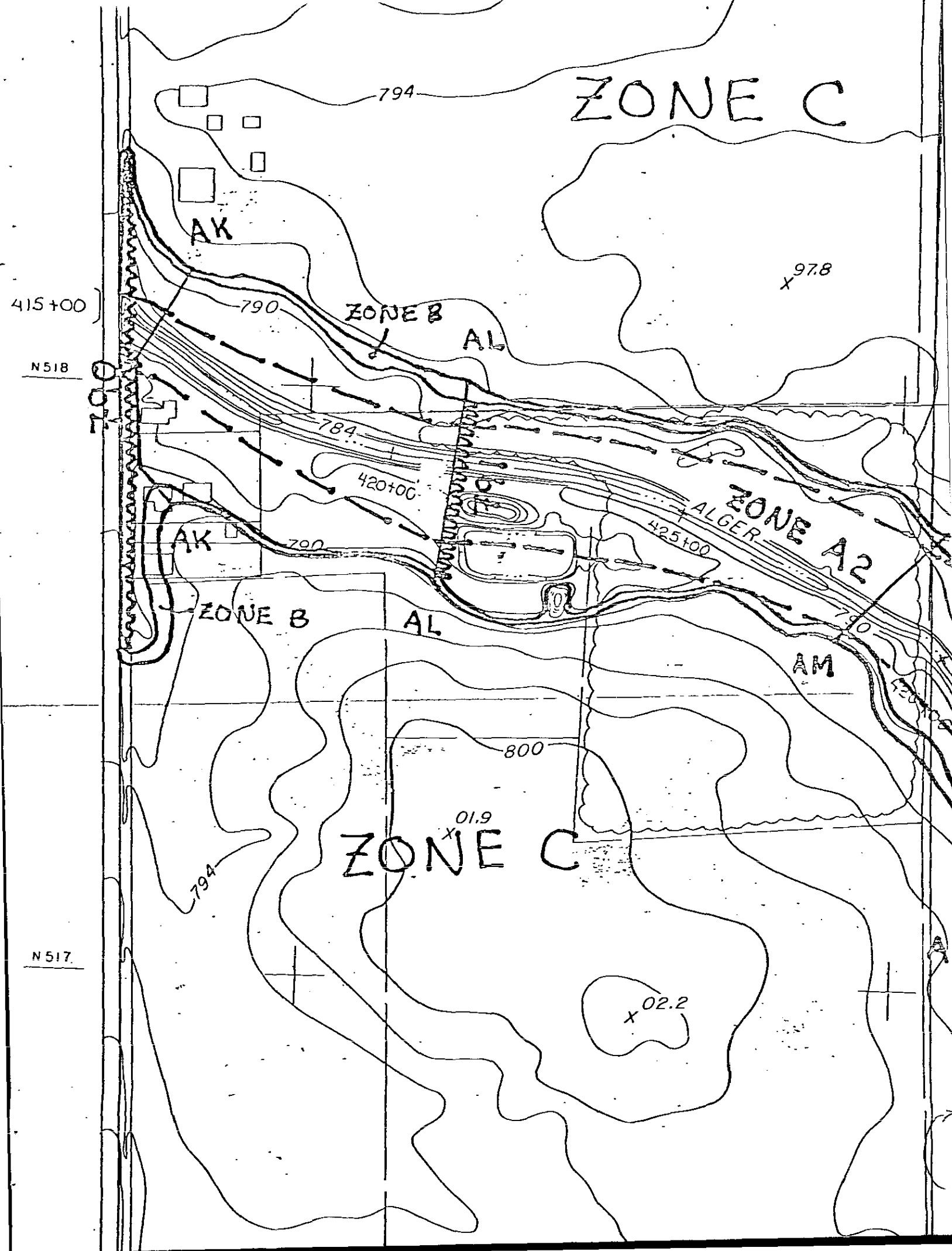
S
T
U
V
W
X
Y
Z

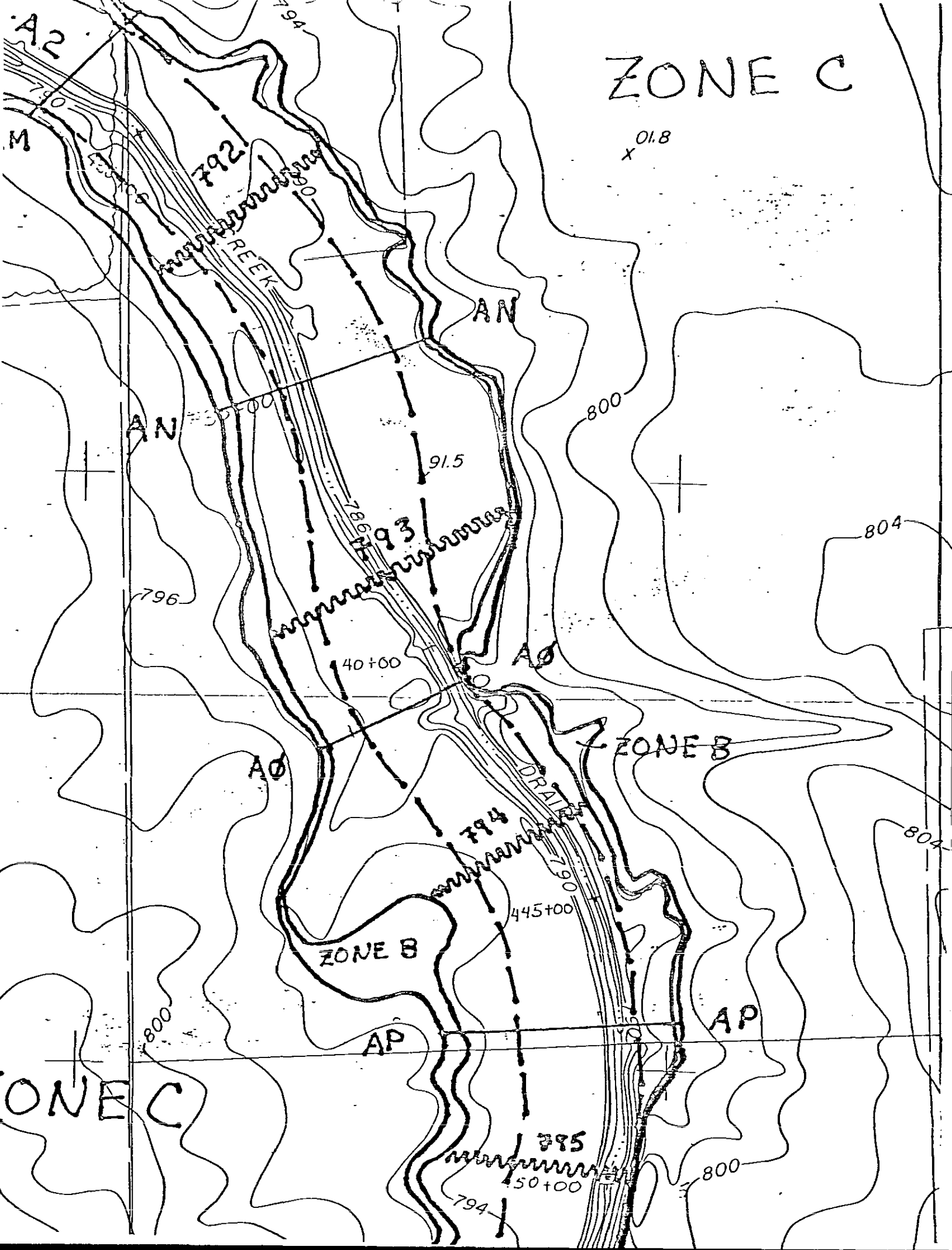

ZONE C
ZONE B
ZONE A2
ZONE C
T
U
V
W
X
Y
Z
781
783
784
780
782
786
788
790
82.1
83.9
87.8
83.8
82.7
87.0
88.1
82.3
80.2
80.5
88.2
70+00
375+00
380+00
385+00
387+00
ROAD
E2,133
E2,134,000

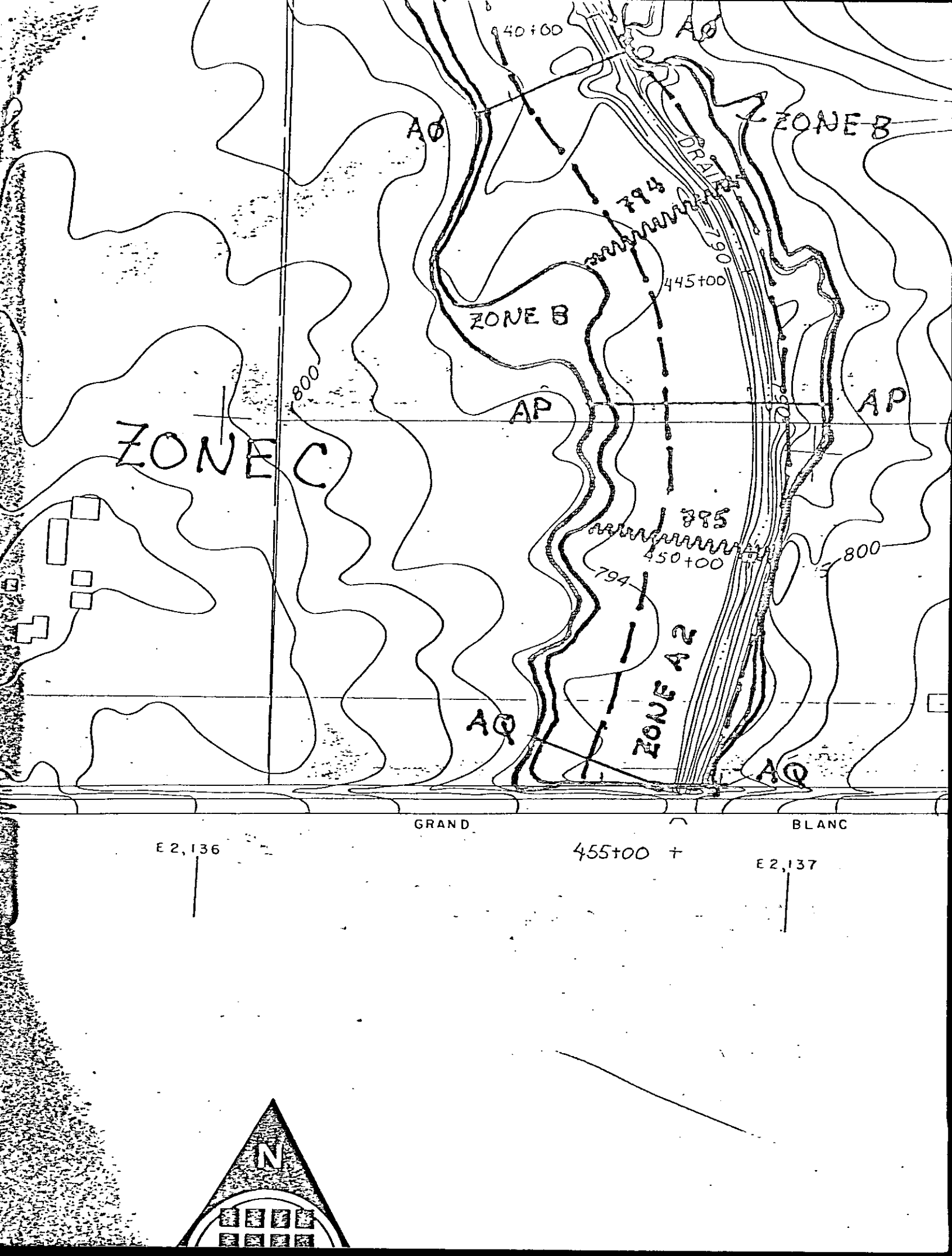

E2,133
E87+00
780
82
81.8
784
AA
AB
ZONE C
ZONE B
AC
790
786
AD
98.1
00.4
DRAIN
790
784

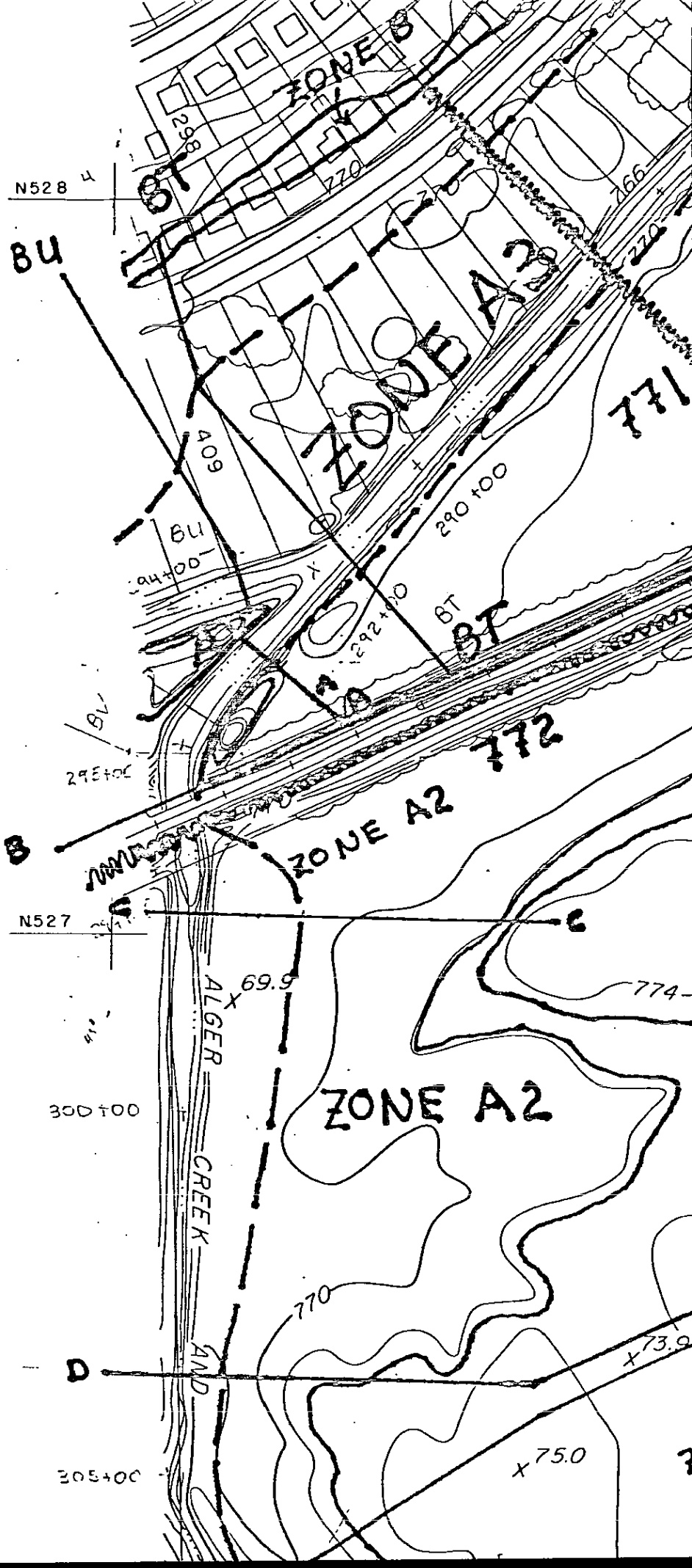

E 2,134,000
387+00
ROAD
780
AA
91.3
790
786
ZONE C
AB
82
81.8
784
340+00
AA
85.5
782
81.6
ZONE A2
AB
ZONE B
785
784
ALLER
780
ZONE B
AC
AC
ZONE C
786
AD
AD
786
400+00
85.9
ZONE B
AE
91.9
ZONE B
AE
780
86.1
786
AF

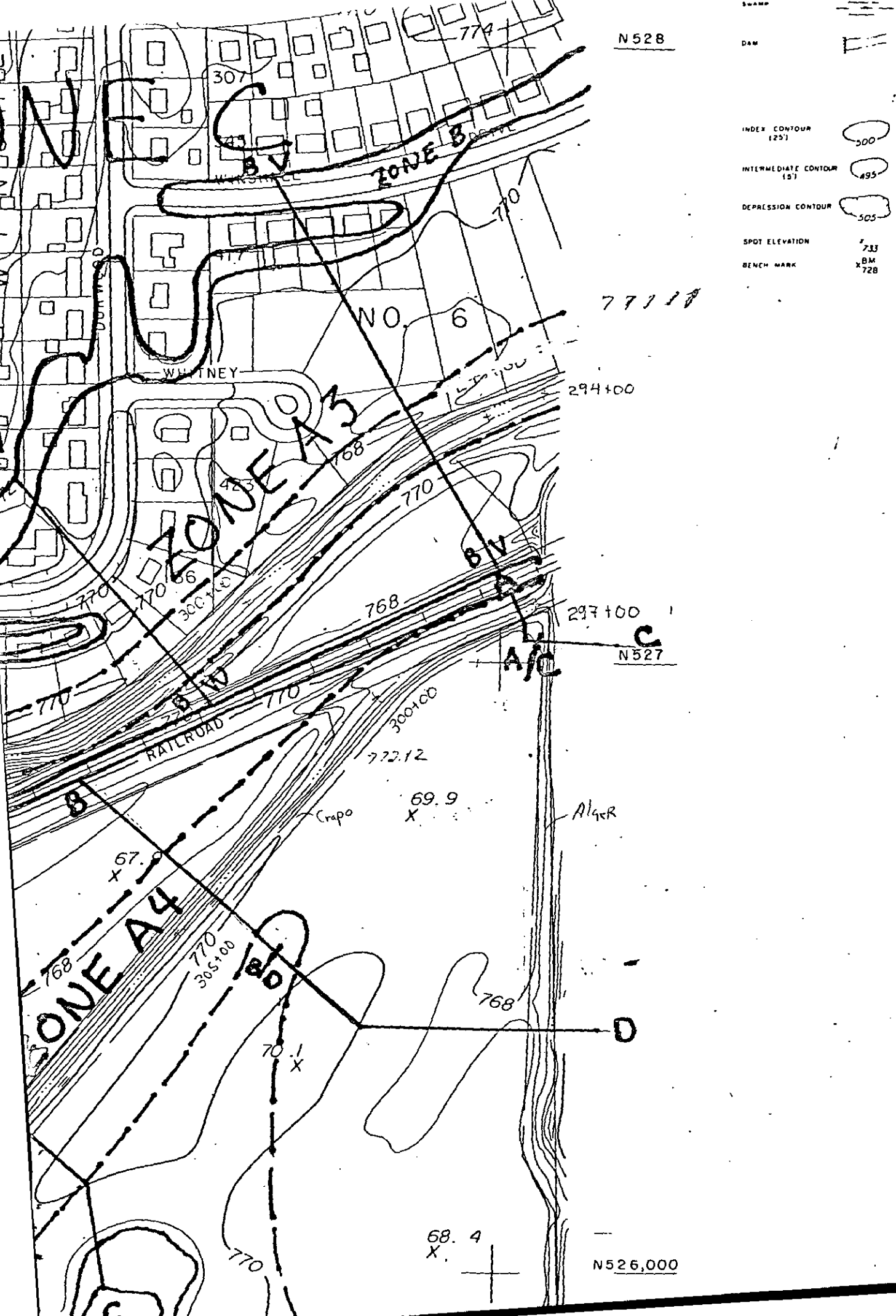

ZONE
785
784
ZONE B
C
AC
ALDER
780
ZONE C
86
AD
AD
786
400+0
85.9
ZONE B
AE
91.9
ZONE B
AE
86.1
780
CREEK
786
AF
784
787
405
AF
AG
86.2
ZONE A?
AG
DRAIN
790
AH
410
788
796
790
AH
ZONE C
AI
415
800
ZONE B
AJ
ROAD
AG

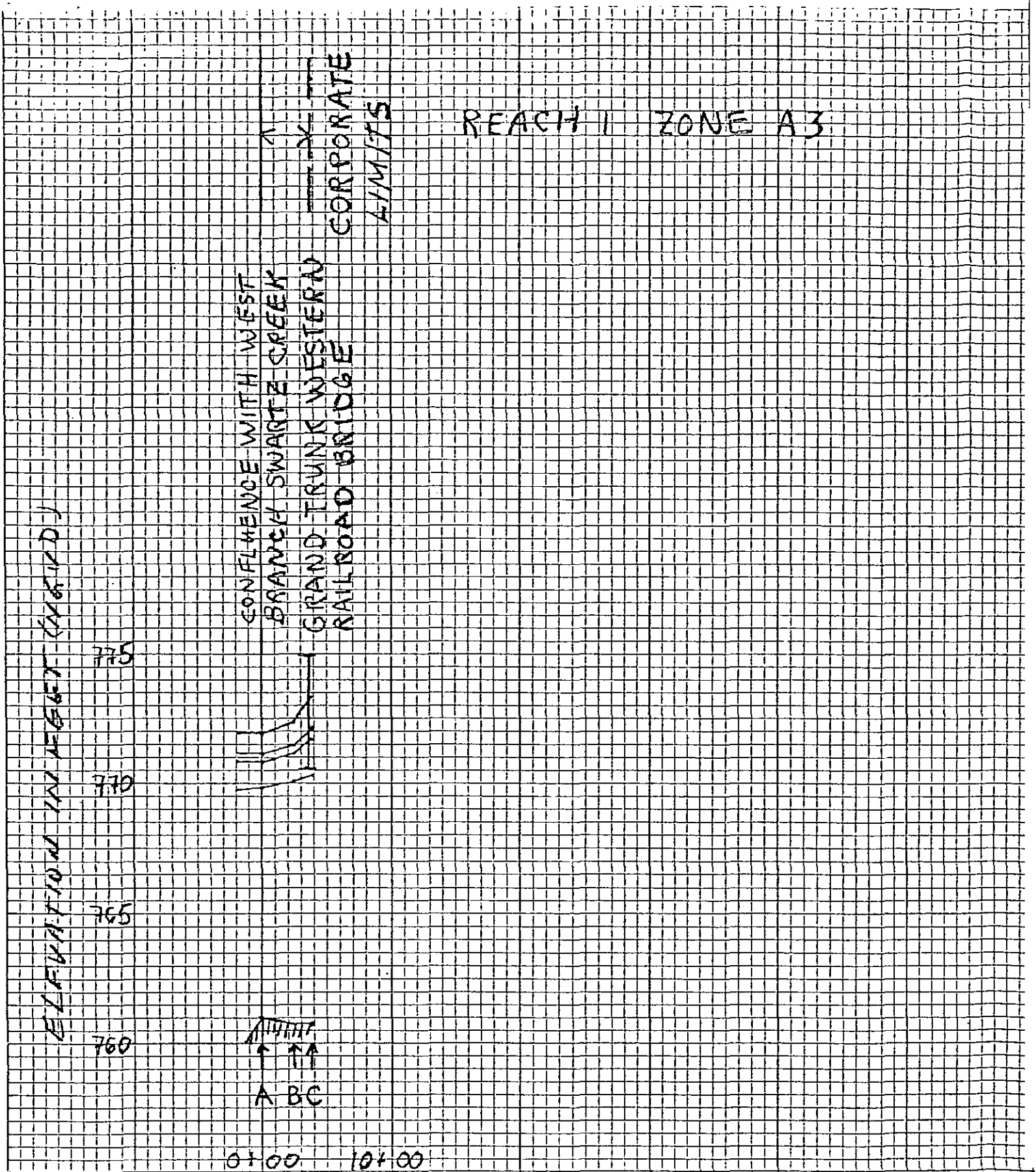

ZONE C
794
AK
97.8
415+00
790
ZONE B
AL
N518
784
420+00
ALGER
ZONE A2
425+00
AK
790
ZONE B
AL
790
AM
800
01.9
ZONE C
794
N517
02.2


A2
ZONE C
M
792
REEK
AN
AN
800
91.5
793
804
796
40+00
AØ
AØ
ZONE B
DRAIN
794
804
445+00
ZONE B
AP
AP
800
ONE C
795
50+00
800
794


AØ
AØ
ZONE B
DRAIN
794
790
445+00
ZONE B
800
AP
AP
ZONE C
785
450+00
800
794
ZONE A2
AQ
AQ
GRAND
BLANC
E 2,136
455+00
E 2,137
N


ZONE B
N528
BT
BU
ZONE A2
771
409
BU
290+00
294+00
292+00
BT
BT
BV
295+00
772
ZONE A2
B
N527
C
C
69.9
ALGER
CREEK
300+00
ZONE A2
774
770
D
AND
73.9
75.0
305+00


N528
SWAMP
DAM
INDEX CONTOUR (25')
500
INTERMEDIATE CONTOUR (5')
495
DEPRESSION CONTOUR
505
SPOT ELEVATION
733
BENCH MARK
BM 728
774
307
ZONE B
BV
WARSTREET
770
417
NO. 6
WHITNEY
294+00
ZONE A3
768
770
423
BV
770
300+00
768
297+00
C
N527
A/C
770
BV
770
RAILROAD
300+00
772.12
B
69.9
Crapo
Algar
67.9
ZONE A4
768
770
305+00
BV
768
D
70.1
68.4
770
N526,000


REACH 1 ZONE A3
CORPORATE LIMITS
GRAND TRUNK WESTERN RAILROAD BRIDGE
BRANCH SWARTZ CREEK
CONFLUENCE WITH WEST
ELEVATION IN FEET (MSL D)
775
770
765
760
A
B
C
0+00
10+00
STREAM DISTANCE IN FEET ABOVE MOUTH
ALGER CREEK
SHEET 1 of 1

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 2.DATE= 5/ 3/78

*** INPUT CARD PRINTOUT ***

```
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....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  1212      92  4  7350  144  4  7357  224  4  7358  275  4  7380  310  4  7400   G
5  1213     330  4  7400  400  4  7420  560  4  7440  680  4  7460
6  1219  1  2 042 042  1  2 040 040  1  2 065 065  1  2 090 090
3  1300 CR  H 0  15  3  732    1810  1  3
5  1310     -50  1  7500  -20  1  7400    0  1  7357   36  2  7356   38  2  7336
5  1311      43  2  7296   48  2  7311   66  3  7350  160  3  7352  170  3  7362   H
5  1312     220  3  7380  240  3  7400  280  3  7420  440  3  7440  470  3  7460
6  1319  1  2 045 045  1  2 042 042  1  2 080 080
3  1400 CR  I 0  15  3  735    2370  1  3
5  1410     -90  1  7500  -50  1  7480    0  1  7368   18  1  7375   56  2  7361
5  1411      60  2  7341   63  2  7333   70  2  7338   75  2  7349   76  3  7359   I
5  1412      91  3  7370  200  3  7380  215  3  7400  290  3  7420  350  3  7460
6  1419  1  2 042 042  1  2 050 050  1  2 080 080
3  1500 CR  J 0  15  3  735    3080  1  3
5  1510     -70  1  7500  -40  1  7480  -10  1  7440    0  1  7424   64  1  7405
5  1511      79  2  7385   82  2  7359   89  2  7345   94  2  7347   96  2  7360   J
5  1512     103  3  7383  123  3  7404  220  3  7420  270  3  7440  330  3  7460
6  1519  1  2 060 060  1  2 045 045  1  2 060 060
3  1600 CR  K 0  11  3  737    3790  1  3
5  1610       0  1  7517   30  1  7512  114  1  7415  152  1  7415  168  2  7386
5  1611     169  2  7361  174  2  7356  184  2  7361  190  3  7403  248  3  7419   K
5  1612     250  3  7500
6  1619  1  2 055 055  1  2 042 042  1  2 050 050
3  1700 CR  L 0   7  3  738    4360  1  3
5  1710       0  1  7489   96  1  7436  172  2  7419  182  2  7376  194  2  7376
5  1711     208  3  7453  215  3  7500                                            L
6  1719  1  2 060 060  1  2 037 037  1  2 055 055
3  1800 CR  M 0  10  3  740    4950  1  3
5  1810    -220  1  7500 -180  1  7480    0  1  7462   90  2  7450   93  2  7383
5  1811     106  2  7390  110  3  7472  160  3  7482  200  3  7480  230  3  7500   M
6  1819  1  2 050 050  1  2 042 042  1  2 055 055
```

West Corporate limits to Genesee Road

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1     1 CRAMPTON DRAIN  GENESEE RD - UNDERHILL   HOLTSLAG 10  5 02 05 12
2     2  74322  74461  74641  74516  74519
3  2000 CR 89 1  13  3  740    5050  1  3
4  2004    270    450    760    540    540
5  2010   -115  1  7600 -115  1  7500 -104  1  7490  -86  1  7480  -60  1  7470
5  2011      0  2  7450   10  2  7380   22  2  7380   33  3  7450   38  3  7470
5  2012     45  3  7480   50  3  7490   50  3  7600
6  2013  1  2 040 040  1  2 028 028  1  2 040 040
3  2100 CR 90 0  10  3  740    5158  1  3
5  2110   -128  1  7480  -85  1  7470  -35  1  7460  -10  1  7450    0  2  7445
5  2111      9  2  7381   21  2  7381   31  3  7445   35  3  7450   40  3  7470
6  2112  1  2 040 040  1  2 028 028  1  2 040 040
3  2200 CR100 0  10  3  740    5514  1  3
5  2210   -138  1  7490 -110  1  7480  -32  1  7470   -5  1  7460    0  2  7455
5  2211     10  2  7388   22  2  7388   32  3  7455   80  3  7460  150  3  7470
6  2212  1  2 040 040  1  2 028 028  1  2 040 040
3  2300 CR110 0  10  3  741    6120  1  3
5  2310   -160  1  7490 -160  1  7470  -16  1  7470   -3  1  7470    0  2  7465
5  2311     11  2  7392   23  2  7392   34  3  7465  115  3  7470  173  3  7480
6  2312  1  2 040 040  1  2 028 028  1  2 040 040
3  2400 CR115 0   9  3  741    6325  1  3
5  2410    -92  1  7500  -92  1  7470  -25  1  7470    0  2  7460   10  2  7394
5  2411     22  2  7394   32  3  7460   40  3  7470   55  3  7479
6  2412  1  2 040 040  1  2 028 028  1  2 040 040
```

N

O

P

Q

R

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 CRAMPTON DRAIN  UNDRHILL RD - FOOT BR   HOLTSLAG  2 05 02 03 12
2      2  74424  74590  74800  74685  74687
3   2500 CR116 1  10  3  741    6390  1  3
4   2504    270    450    760    540    540
5   2510   -123  1  7490 -123  1  7470  -10  1  7470    0  2  7460   10  2  7394
5   2511     22  2  7394   32  3  7460   33  3  7470  100  3  7470  120  3  7490
6   2512  1  2 040 040  1  2 028 028  1  2 040 040
3   2600 CR121 0  10  3  742    6577  1  3
5   2610   -113  1  7490 -113  1  7470  -10  1  7470    0  2  7460   10  2  7397
5   2611     22  2  7397   31  3  7460   45  3  7470  120  3  7470  210  3  7480
6   2612  1  2 040 040  1  2 028 028  1  2 040 040
```

S

T

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1      1 CRAMPTON DRAIN  FOOT BR - ROSARY BASIN   HOLTSLAG  3 05 02 02 12
2      2  74452  74654  74840  74754  74756
3   2700 CR122 1  10  3  742    6610  1  3
4   2704    270    450    760    540    540
5   2710    -113  1  7490 -113  1  7470  -10  1  7470    0  2  7460   10  2  7397
5   2711      22  2  7397   31  3  7460   45  3  7470  120  3  7470  210  3  7480
6   2712  1  2 040 040  1  2 028 028  1  2 040 040
3   2800 CR130 0  10  3  742    6972  1  3
5   2810    -100  1  7500  -80  1  7480   -5  1  7470    0  2  7465   10  2  7400
5   2811      22  2  7400   32  3  7465   35  3  7470  150  3  7472  150  3  7480
6   2812  1  2 040 040  1  2 028 028  1  2 040 040
3   2900 CR131 0  10  3  742    7040  1  3
5   2910    -105  1  7490 -105  1  7480  -20  1  7480    0  2  7470   10  2  7401
5   2911      22  2  7401   33  3  7470   80  3  7470  200  3  7480  200  3  7490
6   2912  1  2 040 040  1  2 028 028  1  2 040 040
```

U

V

W

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 CRAMPTON DRAIN  ROSARY BASIN - BELSAY RD HOLTSLAG RD 05 OR 06 -18
2      2  74616  74900  74979  74940  74946
3   3000 CR155 1  10  3  743    7940  1  3
4   3004    120    200    330    240    240
5   3010   -135  1  7530 -135  1  7510  -70  1  7500  -10  1  7500    0  1  7480
5   3011      0  2  7480   14  2  7409   26  2  7409   40  3  7480   70  3  7490  X
6   3012  1  2 040 040  1  2 028 028  1  2 040 040
3   3100 CR160 0  10  3  743    8065  1  3
5   3110   -120  1  7530 -120  1  7510  -75  1  7500  -18  1  7500    0  2  7480
5   3111     14  2  7409   26  2  7409   41  3  7480   42  3  7500   44  3  7510  Y
6   3112  1  2 040 040  1  2 028 028  1  2 040 040
3   3200 CR170 0   9  3  743    8219  1  3
5   3210   -110  1  7530 -110  1  7510  -10  1  7510    0  2  7472   12  2  7411  Z
5   3211     24  2  7411   36  3  7472   37  3  7500   38  3  7510
6   3212  1  2 040 040  1  2 028 028  1  2 040 040
3   3300 CR180 0  10  3  743    8644  1  3
5   3310    -20  1  7527  -10  1  7520    0  2  7485   14  2  7412   26  2  7412
5   3311     41  3  7485   42  3  7500   50  3  7503  200  3  7500  200  3  7520  AA
6   3312  1  2 040 040  1  2 028 028  1  2 040 040
3   3400 CR190 0   9  3  744    9183  1  3
5   3410    -20  1  7542   -6  1  7540    0  2  7515   20  2  7416   32  2  7416  AB
5   3411     52  3  7515  145  3  7520  200  3  7520  200  3  7530
6   3412  1  2 040 040  1  2 028 028  1  2 040 040
3   3500 CR200 0  10  3  744    9607  1  3
5   3510    -50  1  7540  -47  1  7530  -44  1  7520  -10  1  7520    0  2  7510
5   3511     18  2  7420   30  2  7420   48  3  7510   50  3  7520  180  3  7530  AC
6   3512  1  2 040 040  1  2 028 028  1  2 040 040
3   3600 CR210 0   9  3  744    9988  1  3
5   3610   -135  1  7550 -135  1  7530  -10  1  7530    0  2  7505   17  2  7421  AD
5   3611     29  2  7421   46  3  7505   47  3  7530   50  3  7540
6   3612  1  2 040 040  1  2 028 028  1  2 040 040
3   3700 CR220 0   9  3  744   10357  1  3
5   3710     -9  1  7539   -5  1  7530    0  2  7506   17  2  7422   29  2  7422  AE
5   3711     42  3  7506   44  3  7510  100  3  7520  150  3  7530
6   3712  1  2 040 040  1  2 028 028  1  2 040 040
3   3800 CR230 0   9  3  745   10902  1  3
5   3810   -160  1  7529  -50  1  7522   -5  1  7520    0  2  7515   18  2  7426  AF
5   3811     30  2  7426   48  3  7515   50  3  7530   60  3  7538
6   3812  1  2 040 040  1  2 028 028  1  2 040 040
3   3900 CR240 0  10  3  745   11196  1  3
5   3910    -64  1  7600  -64  1  7528  -48  1  7520    0  2  7515   18  2  7426
5   3911     30  2  7426   48  3  7515   50  3  7520   80  3  7520   80  3  7600  AG
6   3912  1  2 040 040  1  2 028 028  1  2 040 040
3   4000 CR245 0  10  3  745   11295  1  3
5   4010   -100  1  7540 -100  1  7528  -35  1  7520    0  2  7510   16  2  7431  AH
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*** INPUT CARD PRINTOUT ***

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5  4011      24  2  7431   40  3  7510   42  3  7520  100  3  7526  100  3  7530
6  4012  1  2 040 040  1  2 028 028  1  2 040 040
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AH

*** INPUT CARD PRINTOUT ***

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1     1 CRAMPTON DRAIN  BELSAY ROAD  - STUDY END  HOLTSLAG 20 05 02 05 12
2     2  74693  74950  75124  75019  75025
3  4100 CR246 1  10  3  746   11365  1  3
4  4104     120    200    330    240    240
5  4110    -100  1  7540 -100  1  7530  -20  1  7530  -10  1  7520    0  2  7513
5  4111      16  2  7431   24  2  7431   41  3  7513  110  3  7520  175  3  7530   AI
6  4112  1  2 040 040  1  2 028 028  1  2 040 040
3  4200 CR255 0   9  3  746   11740  1  3
5  4210    -175  1  7540   -5  1  7530    0  2  7518   16  2  7435   24  2  7435   AJ
5  4211      40  3  7518   42  3  7530  150  3  7530  150  3  7540
6  4212  1  2 040 040  1  2 028 028  1  2 040 040
3  4300 CR260 0  10  3  746   12273  1  3
5  4310    -125  1  7550 -125  1  7540  -15  1  7540   -2  1  7530    0  2  7522
5  4311      16  2  7440   24  2  7440   41  3  7522  160  3  7530  160  3  7540   AK
6  4312  1  2 040 040  1  2 028 028  1  2 040 040
3  4400 CR270 0  11  3  747   12731  1  3
5  4410    -175  1  7550 -175  1  7540  -30  1  7540  -20  1  7530    0  2  7525
5  4411      16  2  7448   24  2  7448   39  3  7525   43  3  7530  170  3  7530   AL
5  4412     170  3  7540
6  4413  1  2 040 040  1  2 028 028  1  2 040 040
3  4500 CR280 0  11  3  747   13215  1  3
5  4510    -120  1  7560 -120  1  7550  -18  1  7540   -5  1  7530    0  2  7522
5  4511      14  2  7452   22  2  7452   36  3  7522   38  3  7530   40  3  7540   AM
5  4512     120  3  7550
6  4513  1  2 040 040  1  2 028 028  1  2 040 040
3  4600 CR290 0  10  3  748   13765  1  3
5  4610    -175  1  7569 -100  1  7560  -10  1  7550   -3  1  7540    0  2  7532
5  4611      14  2  7460   22  2  7460   37  3  7532   40  3  7540   48  3  7550   AN
6  4612  1  2 040 040  1  2 028 028  1  2 040 040
3  4700 CR300 0   9  3  748   14151  1  3
5  4710     -94  1  7580  -18  1  7570   -2  1  7560    0  2  7535   14  2  7463   AO
5  4711      22  2  7463   37  3  7535   38  3  7550   92  3  7560
6  4712  1  2 040 040  1  2 028 028  1  2 040 040
3  4800 CR309 0   7  3  749   14407  1  3
5  4810      -9  1  7590   -2  1  7560    0  2  7531   13  2  7467   21  2  7467   AP
5  4811      34  3  7531   40  3  7570
6  4812  1  2 040 040  1  2 028 028  1  2 040 040
3  4900 CR310 1   9  3  749   14557  1  3
4  4904     80    130    220    160    160
5  4910     -25  1  7590  -15  1  7580   -4  1  7570    0  2  7534   13  2  7468   AQ
5  4911      21  2  7468   34  3  7534   35  3  7560   40  3  7570
6  4912  1  2 040 040  1  2 028 028  1  2 040 040
3  5000 CR321 0  10  3  750   15098  1  3
```

```
5  4511      14  2  7452    22  2  7452    36  3  75[illegible]    38  3  7530    40  3  7540
5  4512     120  3  7550
6  4513  1  2 040 040  1  2 028 028  1  2 040 040
3  4600 CR290 0  10  3  748   13765  1  3
5  4610    -175  1  7569 -100  1  7560  -10  1  7550   -3  1  7540    0  2  7532
5  4611      14  2  7460   22  2  7460   37  3  7532   40  3  7540   48  3  7550
6  4612  1  2 040 040  1  2 028 028  1  2 040 040
3  4700 CR300 0   9  3  748   14151  1  3
5  4710     -94  1  7580  -18  1  7570   -2  1  7560    0  2  7535   14  2  7463
5  4711      22  2  7463   37  3  7535   38  3  7550   92  3  7560
6  4712  1  2 040 040  1  2 028 028  1  2 040 040
3  4800 CR309 0   7  3  749   14407  1  3
5  4810      -9  1  7590   -2  1  7560    0  2  7531   13  2  7467   21  2  7467
5  4811      34  3  7531   40  3  7570
6  4812  1  2 040 040  1  2 028 028  1  2 040 040
3  4900 CR310 1   9  3  749   14557  1  3
4  4904      80    130    220    160    160
5  4910     -25  1  7590  -15  1  7580   -4  1  7570    0  2  7534   13  2  7468
5  4911      21  2  7468   34  3  7534   35  3  7560   40  3  7570
6  4912  1  2 040 040  1  2 028 028  1  2 040 040
3  5000 CR321 0  10  3  750   15098  1  3
5  5010     -30  1  7580  -30  1  7570  -17  1  7560   -3  1  7550    0  2  7548
5  5011      14  2  7475   22  2  7475   37  3  7548   39  3  7560   70  3  7570
```

AN

AO

AP

AQ

AR

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 2,DATE= 3/ 9/79

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
6  5012  1  2 040 040  1  2 028 028  1  2 040 040
```

```
   738.66 /    0.01 /          ...1...  (0.110)     /    0.65 /    0.05 /                  *
-----------------------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      191. / RIGHT      170. /                              *RG*
-----------------------------------------------------------------------------------------------
CR  G AT     1430 /     60 /     540. /    989. /    65473. / 2.51 /     3. /   287.
   738.67 /    0.01 /   0.00 /    0.02 /  738.68 /     0.55 /    0.07 / -0.011   *AS*
-----------------------------------------------------------------------------------------------
100 YR  M = 0.0   / E = 0.0   / K* = 0.82 /    991. /    65596. / 2.51 /     3. /   287.
   738.67 /    0.01 /                    /  738.69 /     0.55 /    0.07 /           *AS*   G
============================ END BRIDGE ANALYSIS ============================
CR  H AT     1810 /    380 /     540. /    771. /    46223. / 1.97 /   -14. /   227.
   738.71 /    0.02 /   0.04 /    0.00 /  738.72 /     0.70 /    0.09 / -0.000   *XS*   H
-----------------------------------------------------------------------------------------------
CR  I AT     2370 /    560 /     540. /    405. /    18530. / 1.80 /    -9. /   207.
   738.88 /    0.05 /   0.19 /    0.02 /  738.93 /     1.33 /    0.19 /  0.001   *XS*   I
-----------------------------------------------------------------------------------------------
CR  J AT     3080 /    710 /     540. /    122. /     8516. / 1.27 /    68. /   119.
   740.03 /    0.39 /   1.31 /    0.17 /  740.42 /     4.43 /    0.45 /  0.002   *XS*   J
-----------------------------------------------------------------------------------------------
CR  K AT     3790 /    710 /     540. /    215. /    14238. / 1.91 /   110. /   248.
   741.94 /    0.19 /   1.71 /    0.0  /  742.13 /     2.52 /    0.29 /  0.001   *XS*   K
-----------------------------------------------------------------------------------------------
CR  L AT     4360 /    570 /     540. /    142. /    11638. / 1.28 /   128. /   204.
   742.89 /    0.29 /   1.00 /    0.05 /  743.18 /     3.79 /    0.39 /  0.001   *XS*   L
-----------------------------------------------------------------------------------------------
```

West Corporate Limit
to Genesee Road

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=,  20,DATE= 5/ 3/78

WATER-SURFACE PROFILE FOR:  CRAMPTON DRAIN  1ST CWY - GENESEE RD     HOLTSLAG
PAGE  2 OF  2, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
===============================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /      V  /    FN  /   ACC   *ID*
===============================================================================
CR  M AT     4950 /    590 /     540. /     95. /     7900. / 1.00 /    90. /   109.
   744.64 /    0.51 /   1.87 /    0.11 /  745.15 /     5.70 /    0.45 / -0.012   *XS*   M
-----------------------------------------------------------------------------------------------
```

d/s side Genesee Rd

100 YR END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: CRAMPTON DRAIN GENESEE RD - UNDERHILL HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
CR 89 AT 5050	0	540.	163.	23158.	1.00	-5.	33.		N
745.16	0.17			745.33	3.31	0.26		*IS*	
CR 90 AT 5158	108	540.	167.	23587.	1.07	-15.	36.		O
745.22	0.17	0.06	0.00	745.39	3.23	0.26	0.001	*XS*	
CR100 AT 5514	356	540.	145.	19586.	1.00	0.	32.		P
745.42	0.22	0.22	0.02	745.64	3.73	0.31	-0.000	*XS*	
CR110 AT 6120	606	540.	147.	20019.	1.00	1.	33.		Q
745.88	0.21	0.45	0.0	746.09	3.66	0.30	0.001	*XS*	
CR115 AT 6325	205	540.	146.	19814.	1.00	-1.	32.		R
746.03	0.21	0.15	0.00	746.24	3.69	0.30	0.001	*XS*	

ds side Underhill Rd

END OF THIS PROFILE

100-YR

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 10,DATE= 3/ 8/79

WATER-SURFACE PROFILE FOR: CRAMPTON DRAIN UNDRHILL RD - FOOT BR HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
CR116 AT 6390 / 746.85	0 / 0.15	540. /	176. /	26164. / 747.00	1.04 / 3.06	-8. / 0.24	33.	*IS*	S
CR121 AT 6577 / 746.93	187 / 0.16	540. / 0.08	175. / 0.01	24814. / 747.09	1.10 / 3.09	-9. / 0.25	44. / -0.000	*XS*	T

d/s side footbridge

END OF THIS PROFILE

100 - YR

WATER-SURFACE PROFILE FOR: CRAMPTON DRAIN FOOT BR - ROSARY BASIN HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*	
CR122	6610	0	540.	317.	32796.	2.19	-113.	169.	
747.54	0.10			747.64	1.70	0.19		*IS*	U
CR130	6972	362	540.	264.	29937.	1.76	-53.	150.	
747.64	0.11	0.11	0.01	747.75	2.05	0.21	-0.000	*XS*	V
CR131	7040	68	540.	235.	27761.	1.55	-13.	157.	
747.64	0.13	0.02	0.01	747.77	2.30	0.22	-0.018	*XS*	W

END OF THIS PROFILE

100-YR

WATER-SURFACE PROFILE FOR: CRAMPTON DRAIN ROSARY BASIN - BELSAY RD HOLTSLAG
PAGE 1 OF 1. PROFILE NUMBER 4. UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*		
CR155	7940	0	240.	272.	41178.	1.19	-7.	70.		
749.40	0.01			749.41	0.88	0.07		*IS*	X	
CR160	8065	125	240.	255.	41196.	1.06	-13.	42.		
749.40	0.01	0.00	0.00	749.41	0.94	0.07	-0.005	*XS*	Y	
CR170	8219	154	240.	233.	38995.	1.04	-6.	37.		
749.40	0.02	0.01	0.00	749.42	1.03	0.07	-0.005	*XS*	Z	
CR180	8644	425	240.	232.	36725.	1.01	-3.	42.		
749.40	0.02	0.02	0.0	749.42	1.04	0.08	-0.018	*XS*	AA	
CR190	9183	539	240.	218.	32043.	1.00	4.	48.		
749.43	0.02	0.03	0.00	749.44	1.10	0.09	-0.000	*XS*	AB	
CR200	9607	424	240.	200.	28736.	1.00	3.	45.		
749.45	0.02	0.03	0.00	749.47	1.20	0.10	0.000	*XS*	AC	
CR210	9988	381	240.	199.	28326.	1.00	2.	44.		
749.48	0.02	0.03	0.00	749.50	1.21	0.10	-0.000	*XS*	AD	
CR220	10357	369	240.	183.	25985.	1.00	2.	40.		
749.50	0.03	0.03	0.00	749.53	1.31	0.11	-0.000	*XS*	AE	
CR230	10902	545	240.	181.	25014.	1.00	4.	44.		
749.55	0.03	0.05	0.00	749.58	1.32	0.11	0.000	*XS*	AF	
CR240	11196	294	240.	182.	25220.	1.00	4.	44.		
749.58	0.03	0.03	0.0	749.61	1.32	0.11	0.000	*XS*	AG	
CR245	11295	99	240.	137.	17341.	1.00	3.	37.		
749.58	0.05	0.01	0.01	749.63	1.75	0.15	-0.003	*XS*	AH	

END OF THIS PROFILE

100-YR

dis side Belsay

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 14,DATE= 3/ 9/79

WATER-SURFACE PROFILE FOR: CRAMPTON DRAIN BELSAY ROAD = STUDY END HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID AT DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*
CR246 AT 11365	0	240.	158.	21029.	1.00	2.	39.	AI
750.19	0.04			750.23	1.52	0.13		*IS*
CR255 AT 11740	375	240.	142.	18334.	1.00	3.	37.	AJ
750.24	0.04	0.06	0.00	750.29	1.70	0.15	0.000	*XS*
CR260 AT 12273	533	240.	132.	16470.	1.00	4.	37.	AK
750.34	0.05	0.10	0.00	750.39	1.82	0.16	-0.000	*XS*
CR270 AT 12731	458	240.	110.	12870.	1.00	4.	35.	AL
750.45	0.07	0.12	0.01	750.53	2.19	0.20	0.000	*XS*
CR280 AT 13215	484	240.	102.	11776.	1.00	3.	33.	AM
750.63	0.09	0.18	0.01	750.72	2.34	0.22	-0.000	*XS*
CR290 AT 13765	550	240.	87.	9435.	1.00	5.	32.	AN
750.88	0.12	0.29	0.02	751.00	2.76	0.27	-0.019	*XS*
CR300 AT 14151	386	240.	86.	9234.	1.00	5.	32.	AØ
751.13	0.12	0.26	0.00	751.25	2.80	0.28	-0.004	*XS*
CR309 AT 14407	256	240.	80.	8421.	1.00	4.	30.	AP
751.31	0.14	0.19	0.01	751.45	2.99	0.30	0.000	*XS*
CR310 AT 14557	150	160.	80.	8522.	1.00	4.	30.	AQ
751.48	0.06	0.08	0.0	751.54	1.99	0.20	-0.000	*XS*
CR321 AT 15098	541	160.	69.	6861.	1.00	6.	31.	AR
751.70	0.08	0.24	0.01	751.79	2.33	0.25	-0.000	*XS*

END OF THIS PROFILE

100-YR

```
EMBANKMENT OVERFLOW (CFS) / LEFT     206. / RIGHT     183. /                    *RG*
-----------------------------------------------------------------------------------
CR  G AT    1430 /    60 /    540. /    688. /   56979. / 1.83 /    3. /  153.
   738.67 /   0.02 /   0.00 /   0.03 /  738.69 /    0.78 /   0.08 / -0.011  *AS*
-----------------------------------------------------------------------------------
   M = 0.0  / E = 0.0  / K* = 0.82 /   689. /   57046. / 1.83 /    3. /  153.
   738.67 /   0.02 /                 /  738.69 /    0.78 /   0.08 /          *AS*
=================================== END BRIDGE ANALYSIS ===================================
FW CR  H AT    1810 /   380 /    540. /    587. /   41248. / 1.62 /  -10. /  140.
   738.72 /   0.02 /   0.05 /   0.00 /  738.74 /    0.92 /   0.10 /  0.000  *XS*
-----------------------------------------------------------------------------------
CR  I AT    2370 /   560 /    540. /    342. /   17623. / 1.55 /    0. /  150.
   738.93 /   0.06 /   0.22 /   0.02 /  738.99 /    1.58 /   0.20 /  0.000  *XS*
-----------------------------------------------------------------------------------
CR  J AT    3080 /   710 /    540. /    126. /    8845. / 1.27 /   68. /  118.
   740.10 /   0.37 /   1.33 /   0.15 /  740.47 /    4.30 /   0.43 /  0.002  *XS*
-----------------------------------------------------------------------------------
CR  K AT    3790 /   710 /    540. /    201. /   14210. / 1.68 /  130. /  230.
   741.93 /   0.19 /   1.65 /   0.0  /  742.12 /    2.69 /   0.29 /  0.002  *XS*
-----------------------------------------------------------------------------------
CR  L AT    4360 /   570 /    540. /    138. /   11533. / 1.28 /  130. /  200.
   742.89 /   0.30 /   1.01 /   0.06 /  743.19 /    3.90 /   0.39 / -0.000  *XS*
-----------------------------------------------------------------------------------
```

West Corporate Limit
to Genesee Road

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   27,DATE= 5/ 3/78

WATER-SURFACE PROFILE FOR:  CRAMPTON DRAIN  1ST CWY - GENESEE RD     HOLTSLAG
PAGE  2 OF  2, PROFILE NUMBER  5,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS
===================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
===================================================================================
CR  M AT    4950 /   590 /    540. /     95. /    7948. / 1.00 /   90. /  109.
   744.67 /   0.50 /   1.88 /   0.10 /  745.17 /    5.68 /   0.44 /  0.000  *XS*
-----------------------------------------------------------------------------------
```

END OF THIS PROFILE FW

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 15,DATE= 3/ 8/79

WATER-SURFACE PROFILE FOR: CRAMPTON DRAIN GENESEE RD - UNDERHILL HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HORIZONTAL CONTROL

SECID AT	DISTANCE /	LENGTH /	DISCHARGE /	AREA /	CONVEYANCE /	ALPHA /	LEW /	REW	
WS ELEV /	HV /	HF /	HE /	EG /	V /	FN /	ACC	*ID*	
CR 89 AT	5050 /	0 /	540. /	164. /	23232. /	1.00 /	0. /	33.	
745.19 /	0.17 /		/	745.36 /	3.30 /	0.26/		*IS*	N
CR 90 AT	5158 /	108 /	540. /	161. /	23022. /	1.00 /	0. /	31.	
745.25 /	0.18 /	0.06 /	0.00 /	745.42 /	3.36 /	0.26 /	0.000	*XS*	O
CR100 AT	5514 /	356 /	540. /	146. /	19789. /	1.00 /	0. /	32.	
745.46 /	0.21 /	0.23 /	0.02 /	745.67 /	3.70 /	0.30 /	-0.000	*XS*	P
CR110 AT	6120 /	606 /	540. /	148. /	20173. /	1.00 /	1. /	33.	
745.91 /	0.21 /	0.44 /	0.0 /	746.11 /	3.64 /	0.30 /	0.001	*XS*	Q
CR115 AT	6325 /	205 /	540. /	147. /	19947. /	1.00 /	0. /	32.	
746.05 /	0.21 /	0.15 /	0.00 /	746.26 /	3.67 /	0.30 /	0.001	*XS*	R

END OF THIS PROFILE

F W

WATER-SURFACE PROFILE FOR: CRAMPTON DRAIN UNDRHILL RD - FOOT BR HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HORIZONTAL CONTROL

SECID	AT DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*	
CR116 AT	6390	0	540.	173.	25430.	1.00	0.	32.	
746.87	0.15			747.02	3.12	0.24		*IS*	S
CR121 AT	6577	187	540.	175.	25021.	1.10	-8.	42.	
746.95	0.16	0.09	0.01	747.11	3.08	0.25	-0.000	*XS*	T

END OF THIS PROFILE

FW

WATER-SURFACE PROFILE FOR: CRAMPTON DRAIN FOOT BR - ROSARY BASIN HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HORIZONTAL CONTROL

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
CR122	AT	6610	0	540.	201.	29420.	1.13	0.	50.	
747.56		0.13			747.69	2.68	0.21		*IS*	U
CR130	AT	6972	362	540.	195.	28726.	1.11	-5.	45.	
747.68		0.13	0.12	0.00	747.81	2.77	0.22	-0.000	*XS*	V
CR131	AT	7040	68	540.	190.	27367.	1.09	-5.	45.	
747.70		0.14	0.03	0.00	747.84	2.84	0.23	-0.000	*XS*	W

END OF THIS PROFILE

FW

TER-SURFACE PROFILE FOR: CRAMPTON DRAIN ROSARY BASIN - BELSAY RD HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HORIZANTOL CONTROL

SECID	AT DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW		
WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*		
CR155 AT	7940	0	240.	243.	39887.	1.00	0.	40.		
749.46	0.02			749.48	0.99	0.07		*IS*	X	
CR160 AT	8065	125	240.	248.	39882.	1.00	0.	41.		
749.46	0.01	0.00	0.0	749.47	0.97	0.07	-0.005	*XS*	Y	
CR170 AT	8219	154	240.	228.	36578.	1.00	0.	36.		
749.46	0.02	0.01	0.00	749.48	1.05	0.07	-0.005	*XS*	Z	
CR180 AT	8644	425	240.	233.	36315.	1.00	0.	41.		
749.46	0.02	0.02	0.0	749.48	1.03	0.08	-0.019	*XS*	AA	
CR190 AT	9183	539	240.	220.	32568.	1.00	4.	48.		
749.49	0.02	0.03	0.00	749.50	1.09	0.09	0.000	*XS*	AB	
CR200 AT	9607	424	240.	203.	29218.	1.00	3.	45.		
749.51	0.02	0.03	0.00	749.53	1.18	0.09	-0.000	*XS*	AC	
CR210 AT	9988	381	240.	201.	28801.	1.00	2.	44.		
749.54	0.02	0.03	0.00	749.56	1.19	0.10	0.000	*XS*	AD	
CR220 AT	10357	369	240.	185.	26409.	1.00	2.	40.		
749.56	0.03	0.03	0.00	749.59	1.30	0.10	-0.000	*XS*	AE	
CR230 AT	10902	545	240.	183.	25439.	1.00	4.	44.		
749.61	0.03	0.05	0.00	749.64	1.31	0.11	0.000	*XS*	AF	
CR240 AT	11196	294	240.	185.	25641.	1.00	4.	44.		
749.64	0.03	0.03	0.0	749.66	1.30	0.11	0.000	*XS*	AG	
CR245 AT	11295	99	240.	139.	17668.	1.00	3.	37.		
749.64	0.05	0.01	0.01	749.68	1.73	0.15	-0.003	*XS*	AH	

END OF THIS PROFILE

FW

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 22,DATE= 3/ 9/79

WATER-SURFACE PROFILE FOR: CRAMPTON DRAIN BELSAY ROAD - STUDY END HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HORIZANTOL CONTROL

SECID AT DISTANCE / LENGTH / DISCHARGE / AREA / CONVEYANCE / ALPHA / LEW / REW WS ELEV / HV / HF / HE / EG / V / FN / ACC *ID*										
CR246 AT	11365	/ 0	/ 240.	/ 160.	/ 21423.	/ 1.00	/ 2.	/ 39.		
750.25	/ 0.03	/	/	/ 750.28	/ 1.50	/ 0.13	/	*IS*	AI	
CR255 AT	11740	/ 375	/ 240.	/ 144.	/ 18678.	/ 1.00	/ 3.	/ 37.		
750.30	/ 0.04	/ 0.05	/ 0.00	/ 750.34	/ 1.67	/ 0.14	/ -0.000	*XS*	AJ	
CR260 AT	12273	/ 533	/ 240.	/ 133.	/ 16779.	/ 1.00	/ 4.	/ 37.		
750.39	/ 0.05	/ 0.10	/ 0.00	/ 750.45	/ 1.80	/ 0.16	/ 0.000	*XS*	AK	
CR270 AT	12731	/ 458	/ 240.	/ 111.	/ 13116.	/ 1.00	/ 4.	/ 35.		
750.50	/ 0.07	/ 0.12	/ 0.01	/ 750.58	/ 2.16	/ 0.20	/ 0.000	*XS*	AL	
CR280 AT	13215	/ 484	/ 240.	/ 104.	/ 11981.	/ 1.00	/ 3.	/ 33.		
750.68	/ 0.08	/ 0.18	/ 0.01	/ 750.76	/ 2.31	/ 0.22	/ 0.000	*XS*	AM	
CR290 AT	13765	/ 550	/ 240.	/ 88.	/ 9615.	/ 1.00	/ 4.	/ 32.		
750.93	/ 0.11	/ 0.27	/ 0.02	/ 751.04	/ 2.72	/ 0.27	/ -0.010	*XS*	AN	
CR300 AT	14151	/ 386	/ 240.	/ 87.	/ 9412.	/ 1.00	/ 5.	/ 32.		
751.18	/ 0.12	/ 0.25	/ 0.00	/ 751.29	/ 2.76	/ 0.27	/ 0.006	*XS*	AØ	
CR309 AT	14407	/ 256	/ 240.	/ 81.	/ 8563.	/ 1.00	/ 4.	/ 30.		
751.35	/ 0.14	/ 0.18	/ 0.01	/ 751.49	/ 2.96	/ 0.30	/ 0.000	*XS*	AP	
CR310 AT	14557	/ 150	/ 160.	/ 81.	/ 8646.	/ 1.00	/ 4.	/ 30.		
751.51	/ 0.06	/ 0.08	/ 0.0	/ 751.57	/ 1.97	/ 0.20	/ -0.000	*XS*	AQ	
CR321 AT	15098	/ 541	/ 160.	/ 69.	/ 6950.	/ 1.00	/ 6.	/ 31.		
751.73	/ 0.08	/ 0.23	/ 0.01	/ 751.81	/ 2.31	/ 0.24	/ 0.000	*XS*	AR	

END OF THIS PROFILE

FW

CRAMPTON DRAIN AT GENESEE ROAD HOLTSLAG BASE ELEVATION = 738.21 Z = 0.18

APPROACH ELEVATION	AREA	CONVEYANCE	ALPHA	TOP WIDTH	QC
738.30	3.7	86.1	1.000	12.9	11.39
739.20	16.6	889.2	1.000	15.6	96.78
740.10	31.8	2339.7	1.000	18.3	237.97
741.00	49.5	4412.7	1.000	21.0	431.13
741.90	69.6	7129.2	1.000	23.7	676.85
742.80	92.1	10522.7	1.000	26.4	976.85
743.70	117.1	14631.8	1.000	29.1	1333.22
744.60	144.5	19496.3	1.000	31.8	1748.19
745.50	178.0	25927.6	1.040	49.2	1921.09
746.40	235.5	34568.5	1.233	78.5	2314.63
747.30	319.3	45707.2	1.480	107.9	3116.80
748.20	429.5	60113.2	1.699	135.6	4337.81
749.10	560.7	78464.6	1.818	155.1	6050.46
750.00	704.8	101103.1	1.829	165.0	8265.46
750.90	853.2	128543.4	1.749	165.0	11010.18
751.80	1001.7	159172.9	1.670	165.0	14005.85
752.70	1150.2	192729.5	1.602	165.0	17232.63
753.60	1298.7	229007.3	1.547	165.0	20675.03
754.50	1447.2	267837.7	1.502	165.0	24320.27
755.40	1595.7	309077.7	1.465	165.0	28157.70
756.30	1744.1	352604.7	1.436	165.0	32178.07
757.20	1892.6	398310.4	1.412	165.0	36373.42
758.10	2041.1	446099.0	1.393	165.0	40736.74

CRAMPTON DRAIN AT GENESEE ROAD HOLTSLAG BASE ELEVATION = 738.21 Z = 0.18

BARREL DEPTH	AREA	CONVEYANCE	TOP WIDTH	WETTED PERIMETER
0.0	0.0	0.0	0.0	
0.400	2.51	64.2	9.39	9.43
0.800	7.07	286.8	13.22	13.35
1.200	12.89	700.4	15.38	15.67
1.600	19.21	1302.1	16.1[illegible]	16.76
2.000	25.73	2048.9	16.4[illegible]	17.64
2.400	32.34	2793.0	16.51	19.63
2.800	38.97	3710.3	16.53	20.43
3.200	45.56	4691.0	16.41	21.24
3.600	52.09	5719.9	16.26	22.05
4.000	58.56	6783.2	16.06	22.88
4.400	64.93	7868.1	15.82	23.72
4.800	71.20	8962.2	15.53	24.57
5.200	77.35	10053.4	15.20	25.43
5.600	83.36	11130.0	14.81	26.32
6.000	89.20	12179.9	14.38	27.23
6.400	94.85	13190.7	13.88	28.15
6.800	100.29	14149.6	13.31	29.16
7.200	105.49	15042.8	12.67	30.18
7.600	110.41	15855.1	11.94	31.26
8.000	115.03	16569.3	11.11	32.42
8.400	119.29	17164.5	10.15	33.67
8.800	123.13	17613.6	9.01	35.06
9.200	126.46	17876.9	7.63	36.66
9.600	129.17	17881.9	5.92	38.54
10.000	130.98	17395.9	2.87	41.69

CRAMPTON DRAIN AT GENESEE ROAD HOLTSLAG BASE ELEVATION = 738.21 Z = 0.18

Q	ELEV H1	ELEV H4	D2	D3	TYPE	C	C ADJUSTED
100.0	740.58	********	1.98	1.43	2	0.96	0.97
100.0	742.54	742.50	4.12	4.29	3	0.95	0.97
100.0	743.02	742.99	4.61	4.78	3	0.95	0.97
100.0	744.22	744.20	5.81	5.99	3	0.95	0.97
100.0	744.66	744.64	6.25	6.43	3	0.95	0.97
100.0	745.52	745.51	7.12	7.30	3	0.95	0.96
100.0	746.01	746.00	7.61	7.79	3	0.94	0.95
100.0	747.01	747.00	8.61	8.79	3	0.93	0.94
100.0	748.01	748.00	9.61	9.79	3	0.92	0.93
100.0	749.01	749.00	10.00	10.00	4	0.86	0.86
200.0	741.48	********	2.74	2.08	2	0.96	0.97
200.0	742.66	742.50	4.16	4.29	3	0.95	0.97
200.0	743.11	742.99	4.64	4.78	3	0.95	0.97
200.0	744.28	744.20	5.83	5.99	3	0.95	0.97
200.0	744.71	744.64	6.27	6.43	3	0.95	0.97
200.0	745.57	745.51	7.13	7.30	3	0.95	0.96
200.0	746.05	746.00	7.62	7.79	3	0.94	0.96
200.0	747.05	747.00	8.62	8.79	3	0.93	0.94
200.0	748.05	748.00	9.62	9.79	3	0.92	0.93
200.0	749.06	749.00	10.00	10.00	4	0.86	0.86
270.0	742.02	********	3.20	2.46	2	0.95	0.97
270.0	742.79	742.50	4.21	4.29	3	0.95	0.97
270.0	743.22	742.99	4.67	4.78	3	0.95	0.97
270.0	744.34	744.20	5.85	5.99	3	0.95	0.97
270.0	744.76	744.64	6.28	6.43	3	0.95	0.97
270.0	745.61	745.51	7.14	7.30	3	0.95	0.96
270.0	746.10	746.00	7.63	7.79	3	0.94	0.96
270.0	747.09	747.00	8.63	8.79	3	0.93	0.94
270.0	748.09	748.00	9.63	9.79	3	0.92	0.93
270.0	749.11	749.00	10.00	10.00	4	0.86	0.86
350.0	742.59	********	3.65	2.84	2	0.95	0.97
350.0	743.01	742.50	4.29	4.29	3	0.95	0.97
350.0	743.38	742.99	4.72	4.78	3	0.95	0.97
350.0	744.44	744.20	5.87	5.99	3	0.95	0.97
350.0	744.85	744.64	6.30	6.43	3	0.95	0.97
350.0	745.68	745.51	7.16	7.30	3	0.95	0.96
350.0	746.16	746.00	7.65	7.79	3	0.94	0.96
350.0	747.15	747.00	8.64	8.79	3	0.93	0.94
350.0	748.15	748.00	9.64	9.79	3	0.92	0.92
350.0	749.18	749.00	10.00	10.00	4	0.86	0.86
450.0	743.25	********	4.17	3.27	2	0.95	0.97
450.0	743.39	742.50	4.45	4.29	3	0.95	0.97
450.0	743.66	742.99	4.82	4.78	3	0.95	0.97
450.0	744.61	744.20 - 50 YR	5.92	5.99	3	0.95	0.97
450.0	745.00	744.64	6.34	6.43	3	0.95	0.96
450.0	745.80	745.51	7.19	7.30	3	0.94	0.96
450.0	746.27	746.00	7.67	7.79	3	0.94	0.95
450.0	747.25	747.00	8.66	8.79	3	0.93	0.94
450.0	748.25	748.00	9.66	9.79	3	0.91	0.92
450.0	749.30	749.00	10.00	10.00	4	0.86	0.86

CRAMPTON DRAIN AT GENESEE ROAD HOLTSLAG BASE ELEVATION = 738.21 Z = 0.18

Q	ELEV H1	ELEV H4		D2	D3	TYPE	C	C ADJUSTED
500.0	743.57	********		4.42	3.47	2	0.95	0.97
500.0	743.62	742.50		4.56	4.29	3	0.95	0.97
500.0	743.84	742.99		4.89	4.78	3	0.95	0.97
500.0	744.71	744.20		5.95	5.99	3	0.95	0.97
500.0	745.08	744.64		6.36	6.43	3	0.95	0.96
500.0	745.87	745.51		7.20	7.30	3	0.94	0.96
500.0	746.34	746.00		7.68	7.79	3	0.94	0.95
500.0	747.31	747.00		8.67	8.79	3	0.93	0.94
500.0	748.31	748.00		9.68	9.79	3	0.91	0.92
500.0	749.38	749.00		10.00	10.00	4	0.86	0.86
540.0	743.82	********		4.61	3.64	2	0.95	0.96
540.0	743.82	742.50		4.67	4.29	3	0.95	0.97
540.0	744.00	742.99		4.95	4.78	3	0.95	0.97
540.0	744.80	744.20		5.97	5.99	3	0.95	0.96
540.0	745.16	744.64	100 YR	6.38	6.43	3	0.95	0.96
540.0	745.94	745.51		7.22	7.30	3	0.94	0.96
540.0	746.40	746.00		7.70	7.79	3	0.94	0.95
540.0	747.36	747.00		8.68	8.79	3	0.93	0.94
540.0	748.36	748.00		9.69	9.79	3	0.91	0.92
540.0	749.44	749.00		10.00	10.00	4	0.86	0.86
600.0	744.20	********		4.89	3.86	2	0.95	0.96
600.0	744.15	742.50		4.87	4.29	3	0.95	0.96
600.0	744.26	742.99		5.08	4.78	3	0.95	0.96
600.0	744.95	744.20		6.02	5.99	3	0.95	0.96
600.0	745.29	744.64		6.42	6.43	3	0.95	0.96
600.0	746.05	745.51		7.24	7.30	3	0.94	0.96
600.0	746.50	746.00		7.72	7.79	3	0.94	0.95
600.0	747.45	747.00		8.70	8.79	3	0.92	0.94
600.0	748.45	748.00		9.70	9.79	3	0.91	0.92
600.0	749.54	749.00		10.00	10.00	4	0.86	0.86
700.0	744.80	********		5.34	4.23	2	0.95	0.96
700.0	744.78	742.50		5.32	4.29	3	0.95	0.96
700.0	744.76	742.99		5.35	4.78	3	0.95	0.96
700.0	745.26	744.20		6.12	5.99	3	0.95	0.96
700.0	745.56	744.64		6.50	6.43	3	0.95	0.96
700.0	746.26	745.51		7.29	7.30	3	0.94	0.95
700.0	746.69	746.00		7.76	7.79	3	0.93	0.95
700.0	747.63	747.00		8.74	8.79	3	0.92	0.93
700.0	748.62	748.00		9.74	9.79	3	0.91	0.92
700.0	749.74	749.00		10.00	10.00	4	0.86	0.86
760.0	745.15	********		5.60	4.44	2	0.95	0.96
760.0	745.10	742.99		5.57	4.78	3	0.95	0.96
760.0	745.47	744.20		6.19	5.99	3	0.95	0.96
760.0	745.75	744.64		6.55	6.43	3	0.95	0.96
760.0	746.41	745.51	500 YR	7.33	7.30	3	0.94	0.95
760.0	746.83	746.00		7.79	7.79	3	0.93	0.94
760.0	747.75	747.00		8.76	8.79	3	0.92	0.93
760.0	748.74	748.00		9.76	9.79	3	0.91	0.91
760.0	749.87	749.00		10.00	10.00	4	0.86	0.86

CRAMPTON DRAIN AT GENESEE ROAD HOLTSLAG BASE ELEVATION = 738.21 Z = 0.18

Q	ELEV H1	ELEV H4	D2	D3	TYPE	C	C ADJUSTED
1000.0	746.66	********	6.58	5.23	2	0.93	0.[illegible]
1000.0	746.61	744.20	6.66	5.99	3	0.93	0.[illegible]
1000.0	746.74	744.64	6.89	6.43	3	0.93	0.[illegible]
1000.0	747.20	745.51	7.54	7.30	3	0.93	0.[illegible]
1000.0	747.55	746.00	7.97	7.79	3	0.92	0.[illegible]
1000.0	748.37	747.00	8.89	8.79	3	0.91	0.[illegible]
1000.0	749.33	748.00	9.89	9.79	3	0.90	0.[illegible]
1000.0	750.50	749.00	10.00	10.00	4	0.86	0.[illegible]

CRAMPTON DRAIN ROSARY OUTLET HOLTSLAG BASE ELEVATION = 739.89 Z = 0.11

APPROACH ELEVATION	AREA	CONVEYANCE	ALPHA	TOP WIDTH	QC
739.80	0.0	0.0	0.0	0.0	0.0
740.40	0.0	0.0	0.0	0.0	0.0
741.00	0.0	0.0	0.0	0.0	0.0
741.60	119.9	4215.5	1.000	200.0	526.62
742.20	239.8	13339.5	1.000	200.0	1490.41
742.80	359.8	26122.4	1.000	200.0	2738.61
743.40	479.8	42033.2	1.000	200.0	4216.80
744.00	599.8	60736.2	1.000	200.0	5893.52
744.60	719.7	81988.7	1.000	200.0	7747.54
745.20	839.7	105602.7	1.000	200.0	9763.30
745.80	959.7	131424.5	1.000	200.0	11928.73
746.40	1079.6	159325.9	1.000	200.0	14234.12
747.00	1199.6	189196.1	1.000	200.0	16671.42
747.60	1319.6	220938.5	1.000	200.0	19233.86
748.20	1439.6	254467.4	1.000	200.0	21915.60
748.80	1559.5	289706.0	1.000	200.0	24711.55
749.40	1679.5	326584.1	1.000	200.0	27617.21
750.00	1799.5	365038.8	1.000	200.0	30628.59
750.60	1919.4	405010.9	1.000	200.0	33742.12
751.20	2039.4	446447.2	1.000	200.0	36954.52
751.80	2159.4	489297.1	1.000	200.0	40262.87
752.40	2279.3	533515.2	1.000	200.0	43664.45
753.00	2399.3	579056.2	1.000	200.0	47156.77
753.60	2519.3	625880.1	1.000	200.0	50737.52

CRAMPTON DRAIN ROSARY OUTLET HOLTSLAG BASE ELEVATION = 739.89 Z = 0.11

BARREL DEPTH	AREA	CONVEYANCE	TOP WIDTH	WETTED PERIMETER
0.0	0.0	0.0	0.0	
0.280	0.52	17.7	2.74	2.82
0.560	1.44	77.4	3.80	4.01
0.840	2.62	181.4	4.55	4.95
1.120	3.97	329.4	5.13	5.76
1.400	5.48	519.5	5.60	6.49
1.680	7.10	749.3	5.98	7.17
1.960	8.82	1015.7	6.29	7.81
2.240	10.62	1315.4	6.53	8.42
2.520	12.47	1644.6	6.72	9.01
2.800	14.38	1999.0	6.86	9.59
3.080	16.31	2374.3	6.95	10.15
3.360	18.26	2765.8	6.99	10.72
3.640	20.22	3168.4	6.99	11.28
3.920	22.18	3576.8	6.95	11.84
4.200	24.11	3985.4	6.86	12.41
4.480	26.01	4388.0	6.72	12.98
4.760	27.87	4778.3	6.53	13.57
5.040	29.66	5148.9	6.29	14.18
5.320	31.38	5492.0	5.98	14.82
5.600	33.01	5798.3	5.60	15.50
5.880	34.51	6057.0	5.13	16.23
6.160	35.87	6253.5	4.55	17.04
6.440	37.04	6366.7	3.80	17.98
6.720	37.97	6355.4	2.74	19.17
7.000	38.48	5932.0	0.0	21.99

CRAMPTON DRAIN ROSARY OUTLET HOLTSLAG BASE ELEVATION = 739.89 Z = 0.11

Q	ELEV H1	ELEV H4	D2	D3	TYPE	C	C ADJUSTED
100.0	743.81	********	3.03	2.56	2	0.92	0.92
100.0	744.80	744.50	4.54	4.61	3	0.92	0.92
100.0	745.06	744.80	4.83	4.91	3	0.92	0.92
100.0	745.24	745.00	5.03	5.11	3	0.91	0.91
100.0	746.66	746.50	6.52	6.61	3	0.89	0.89
100.0	746.89	746.73	6.75	6.84	3	0.88	0.88
100.0	748.17	748.00	7.00	7.00	4	0.84	0.84
140.0	744.57	********	3.59	3.06	2	0.92	0.92
140.0	745.09	744.50	4.58	4.61	3	0.92	0.92
140.0	745.31	744.80	4.87	4.91	3	0.91	0.91
140.0	745.47	745.00	5.06	5.11	3	0.91	0.91
140.0	746.82	746.50	6.54	6.61	3	0.89	0.89
140.0	747.04	746.73	6.78	6.84	3	0.88	0.88
140.0	748.34	748.00	7.00	7.00	4	0.84	0.84
200.0	745.64	********	4.32	3.68	2	0.91	0.91
200.0	745.72	744.50	4.71	4.61	3	0.91	0.91
200.0	745.86	744.80	4.96	4.91	3	0.90	0.90
200.0	745.98	745.00	5.14	5.11	3	0.90	0.90
200.0	747.16	746.50	6.59	6.61	3	0.88	0.88
200.0	747.38	746.73	6.83	6.84	3	0.88	0.88
200.0	748.70	748.00	7.00	7.00	4	0.84	0.84
240.0	746.33	********	4.76	4.05	2	0.89	0.89
240.0	746.28	744.50	4.88	4.61	3	0.90	0.90
240.0	746.35	744.80	5.08	4.91	3	0.89	0.89
240.0	746.43	745.00	5.23	5.11	3	0.89	0.89
240.0	747.46	746.50	6.63	6.61	3	0.87	0.87
240.0	747.68	746.73	6.87	6.84	3	0.87	0.87
240.0	749.01	748.00	7.00	7.00	4	0.84	0.84
300.0	747.37	********	5.37	4.55	2	0.88	0.88
300.0	747.35	744.50	5.36	4.61	3	0.88	0.88
300.0	747.28	744.80	5.40	4.91	3	0.88	0.88
300.0	747.28	745.00	5.48	5.11	3	0.88	0.88
300.0	748.03	746.50	6.72	6.61	3	0.86	0.86
300.0	748.26	746.73	6.97	6.84	3	0.86	0.86
300.0	749.57	748.00	7.00	7.00	4	0.84	0.84
340.0	748.09	********	5.75	4.85	2	0.86	0.86
340.0	748.06	744.80	5.74	4.91	3	0.86	0.86
340.0	748.00	745.00	5.75	5.11	3	0.86	0.86
340.0	748.51	746.50	6.80	6.61	3	0.85	0.85
340.0	748.73	746.73	7.00	6.84	3	0.85	0.85
340.0	750.02	748.00	7.00	7.00	4	0.84	0.84
400.0	749.27	********	6.29	5.26	2	0.84	0.84
400.0	749.42	746.50	6.96	6.61	3	0.83	0.83
400.0	749.61	746.73	7.00	6.84	3	0.83	0.83
400.0	750.80	748.00	7.00	7.00	4	0.84	0.84

CRAMPTON DRAIN ROSARY OUTLET HOLTSLAG BASE ELEVATION = 739.89 Z = 0.11

Q	ELEV H1	ELEV H4	D2	D3	TYPE	C	C ADJUSTED
440.0	750.16	********	6.62	5.51	2	0.82	0.82
440.0	750.15	746.50	7.00	6.61	3	0.82	0.82
440.0	750.33	746.73	7.00	6.84	3	0.81	0.81
440.0	751.38	748.00	7.00	7.00	4	0.84	0.84
500.0	TYPE.. 2	ENERGY EQUATIONS NOT BALANCED					
500.0	750.57	********	*******	*******	5	0.50	0.50
500.0	752.37	748.00	7.00	7.00	4	0.84	0.84

CRAMPTON DRAIN ROSARY INLET HOLTSLAG BASE ELEVATION = 740.95 Z = 0.06

APPROACH ELEVATION	AREA	CONVEYANCE	ALPHA	TOP WIDTH	QC
740.50	0.0	0.0	0.0	0.0	0.0
741.20	3.8	86.6	1.000	13.2	11.46
741.90	14.0	667.3	1.000	15.9	74.19
742.60	26.1	1685.2	1.000	18.7	174.89
743.30	40.2	3133.0	1.000	21.5	311.61
744.00	56.1	5028.7	1.000	24.2	484.97
744.70	74.1	7397.3	1.000	27.0	696.24
745.40	93.9	10266.6	1.000	29.7	946.95
746.10	115.7	13665.2	1.000	32.5	1238.67
746.80	139.4	17621.8	1.000	35.3	1573.02
747.50	165.1	22165.0	1.000	38.0	1951.57
748.20	192.6	27672.9	1.000	40.0	2397.65
748.90	220.6	34698.4	1.000	40.0	2939.11
749.60	248.6	42345.6	1.000	40.0	3516.12
750.30	276.6	50590.0	1.000	40.0	4126.62
751.00	304.6	59410.7	1.000	40.0	4768.86
751.70	332.6	68789.4	1.000	40.0	5441.34
752.40	360.6	78710.0	1.000	40.0	6142.75
753.10	388.6	89158.0	1.000	40.0	6871.96
753.80	416.6	100120.4	1.000	40.0	7627.94
754.50	444.6	111585.6	1.000	40.0	8409.77
755.20	472.6	123542.7	1.000	40.0	9216.62
755.90	500.5	135981.6	1.000	40.0	10047.75

CRAMPTON DRAIN ROSARY INLET HOLTSLAG BASE ELEVATION = 740.95 Z = 0.06

BARREL DEPTH	AREA	CONVEYANCE	TOP WIDTH	WETTED PERIMETER
0.0	0.0	0.0	0.0	
0.300	0.59	21.2	2.94	3.02
0.600	1.66	93.0	4.07	4.30
0.900	3.00	218.1	4.87	5.31
1.200	4.56	395.9	5.50	6.17
1.500	6.29	624.4	6.00	6.95
1.800	8.15	900.6	6.41	7.68
2.100	10.13	1220.9	6.73	8.36
2.400	12.19	1581.2	7.00	9.02
2.700	14.32	1976.8	7.20	9.65
3.000	16.50	2402.8	7.35	10.27
3.300	18.72	2853.9	7.45	10.88
3.600	20.96	3324.4	7.49	11.48
3.900	23.21	3808.4	7.49	12.08
4.200	25.46	4299.3	7.45	12.68
4.500	27.68	4790.4	7.35	13.29
4.800	29.86	5274.4	7.20	13.91
5.100	31.99	5743.4	7.00	14.54
5.400	34.05	6188.9	6.73	15.20
5.700	36.03	6601.3	6.41	15.88
6.000	37.89	6969.6	6.00	16.61
6.300	39.62	7280.4	5.50	17.39
6.600	41.18	7516.7	4.87	18.26
6.900	42.52	7652.7	4.07	19.26
7.200	43.59	7639.1	2.94	20.54
7.500	44.18	7131.7	0.01	23.55

CRAMPTON DRAIN ROSARY INLET HOLTSLAG BASE ELEVATION = 740.95 Z = 0.06

Q	ELEV H1	ELEV H4	D2	D3	TYPE	C	C ADJUSTED
50.0	743.64	********	2.21	1.75	2	0.92	0.93
50.0	744.62	744.50	3.51	3.55	3	0.92	0.93
50.0	745.09	745.00	4.00	4.05	3	0.92	0.93
50.0	745.56	745.50	4.50	4.55	3	0.92	0.93
50.0	746.05	746.00	5.00	5.05	3	0.92	0.93
50.0	746.54	746.50	5.50	5.55	3	0.92	0.92
50.0	747.04	747.00	5.99	6.05	3	0.91	0.91
50.0	747.53	747.50	6.49	6.55	3	0.90	0.90
50.0	748.03	748.00	6.99	7.05	3	0.89	0.89
50.0	748.43	748.40	7.39	7.45	3	0.88	0.89
50.0	749.03	749.00	7.50	7.50	4	0.84	0.84
75.0	744.24	********	2.67	2.16	2	0.92	0.93
75.0	744.78	744.50	3.54	3.55	3	0.92	0.93
75.0	745.20	745.00	4.02	4.05	3	0.92	0.93
75.0	745.65	745.50	4.51	4.55	3	0.92	0.93
75.0	746.11	746.00	5.01	5.05	3	0.92	0.93
75.0	746.59	746.50	5.50	5.55	3	0.91	0.92
75.0	747.08	747.00	6.00	6.05	3	0.91	0.91
75.0	747.57	747.50	6.50	6.55	3	0.90	0.90
75.0	748.07	748.00	7.00	7.05	3	0.89	0.89
75.0	748.47	748.40	7.40	7.45	3	0.88	0.89
75.0	749.07	749.00	7.50	7.50	4	0.84	0.84
100.0	744.76	********	3.07	2.50	2	0.92	0.92
100.0	745.00	744.50	3.59	3.55	3	0.92	0.93
100.0	745.35	745.00	4.05	4.05	3	0.92	0.93
100.0	745.76	745.50	4.53	4.55	3	0.92	0.93
100.0	746.20	746.00	5.02	5.05	3	0.92	0.92
100.0	746.67	746.50	5.51	5.55	3	0.91	0.92
100.0	747.14	747.00	6.01	6.05	3	0.91	0.91
100.0	747.63	747.50	6.51	6.55	3	0.90	0.90
100.0	748.12	748.00	7.01	7.05	3	0.89	0.89
100.0	748.52	748.40	7.41	7.45	3	0.88	0.88
100.0	749.13	749.00	7.50	7.50	4	0.84	0.84
125.0	745.22	********	3.42	2.81	2	0.92	0.92
125.0	745.29	744.50	3.68	3.55	3	0.92	0.92
125.0	745.55	745.00	4.09	4.05	3	0.92	0.92
125.0	745.91	745.50	4.56	4.55	3	0.92	0.92
125.0	746.32	746.00	5.04	5.05	3	0.92	0.92
125.0	746.76	746.50	5.53	5.55	3	0.91	0.92
125.0	747.23	747.00	6.02	6.05	3	0.90	0.91
125.0	747.70	747.50	6.52	6.55	3	0.90	0.90
125.0	748.19	748.00	7.02	7.05	3	0.89	0.89
125.0	748.59	748.40	7.42	7.45	3	0.88	0.88
125.0	749.21	749.00	7.50	7.50	4	0.84	0.84

CRAMPTON DRAIN ROSARY INLET HOLTSLAG BASE ELEVATION = 740.95 Z = 0.06

Q	ELEV H1	ELEV H4	D2	D3	TYPE	C	C ADJUSTED
150.0	745.66	********	3.74	3.10	2	0.92	0.92
150.0	745.63	744.50	3.82	3.55	3	0.92	0.92
150.0	745.80	745.00	4.15	4.05	3	0.92	0.92
150.0	746.09	745.50	4.59	4.55	3	0.92	0.92
150.0	746.47	746.00	5.06	5.05	3	0.92	0.92
150.0	746.88	746.50	5.54	5.55	3	0.91	0.91
150.0	747.33	747.00	6.03	6.05	3	0.90	0.91
150.0	747.79	747.50	6.53	6.55	3	0.89	0.90
150.0	748.27	748.00	7.03	7.05	3	0.89	0.89
150.0	748.67	748.40	7.43	7.45	3	0.88	0.88
150.0	749.30	749.00	7.50	7.50	4	0.84	0.84
175.0	746.07	********	4.04	3.36	2	0.92	0.92
175.0	746.03	744.50	4.03	3.55	3	0.92	0.92
175.0	746.09	745.00	4.25	4.05	3	0.92	0.92
175.0	746.31	745.50	4.64	4.55	3	0.92	0.92
175.0	746.64	746.00	5.09	5.05	3	0.91	0.92
175.0	747.02	746.50	5.57	5.55	3	0.91	0.91
175.0	747.45	747.00	6.05	6.05	3	0.90	0.90
175.0	747.90	747.50	6.54	6.55	3	0.89	0.90
175.0	748.37	748.00	7.04	7.05	3	0.88	0.89
175.0	748.77	748.40	7.45	7.45	3	0.88	0.88
175.0	749.41	749.00	7.50	7.50	4	0.84	0.84
200.0	746.47	********	4.32	3.61	2	0.92	0.92
200.0	746.43	745.00	4.39	4.05	3	0.92	0.92
200.0	746.57	745.50	4.71	4.55	3	0.91	0.92
200.0	746.84	746.00	5.13	5.05	3	0.91	0.91
200.0	747.19	746.50	5.60	5.55	3	0.90	0.91
200.0	747.59	747.00	6.07	6.05	3	0.90	0.90
200.0	748.02	747.50	6.56	6.55	3	0.89	0.89
200.0	748.49	748.00	7.06	7.05	3	0.88	0.88
200.0	748.88	748.40	7.47	7.45	3	0.88	0.88
200.0	749.53	749.00	7.50	7.50	4	0.84	0.84
225.0	746.87	********	4.59	3.83	2	0.91	0.91
225.0	746.83	745.00	4.59	4.05	3	0.91	0.91
225.0	746.87	745.50	4.80	4.55	3	0.91	0.91
225.0	747.08	746.00	5.19	5.05	3	0.91	0.91
225.0	747.38	746.50	5.63	5.55	3	0.90	0.90
225.0	747.75	747.00	6.10	6.05	3	0.90	0.90
225.0	748.17	747.50	6.58	6.55	3	0.89	0.89
225.0	748.62	748.00	7.08	7.05	3	0.88	0.88
225.0	749.02	748.40	7.49	7.45	3	0.87	0.87
225.0	749.67	749.00	7.50	7.50	4	0.84	0.84
250.0	747.27	********	4.85	4.05	2	0.90	0.90
250.0	747.27	745.00	4.85	4.05	3	0.90	0.90
250.0	747.21	745.50	4.93	4.55	3	0.90	0.90
250.0	747.35	746.00	5.25	5.05	3	0.90	0.90
250.0	747.60	746.50	5.67	5.55	3	0.90	0.90
250.0	747.94	747.00	6.13	6.05	3	0.89	0.89
250.0	748.33	747.50	6.61	6.55	3	0.89	0.89
250.0	748.77	748.00	7.10	7.05	3	0.88	0.88
250.0	749.17	748.40	7.50	7.45	3	0.87	0.87
250.0	749.83	749.00	7.50	7.50	4	[illegible]	[illegible]

CRAMPTON DRAIN ROSARY INLET HOLTSLAG BASE ELEVATION = 740.95 Z = 0.06

Q	ELEV H1	ELEV H4	D2	D3	TYPE	C	C ADJUSTED
275.0	747.66	********	5.09	4.26	2	0.90	0.90
275.0	747.59	745.50	5.11	4.55	3	0.90	0.90
275.0	747.65	746.00	5.34	5.05	3	0.90	0.90
275.0	747.85	746.50	5.73	5.55	3	0.89	0.89
275.0	748.15	747.00	6.17	6.05	3	0.89	0.89
275.0	748.51	747.50	6.64	6.55	3	0.88	0.88
275.0	748.94	748.00	7.13	7.05	3	0.88	0.88
275.0	749.33	748.40	7.50	7.45	3	0.87	0.87
275.0	750.00	749.00	7.50	7.50	4	0.84	0.84
300.0	748.05	********	5.33	4.46	2	0.89	0.89
300.0	748.01	745.50	5.32	4.55	3	0.89	0.89
300.0	747.98	746.00	5.46	5.05	3	0.89	0.89
300.0	748.12	746.50	5.79	5.55	3	0.89	0.89
300.0	748.38	747.00	6.21	6.05	3	0.88	0.88
300.0	748.72	747.50	6.67	6.55	3	0.88	0.88
300.0	749.12	748.00	7.16	7.05	3	0.87	0.87
300.0	749.52	748.40	7.50	7.45	3	0.86	0.86
300.0	750.19	749.00	7.50	7.50	4	0.84	0.84
340.0	748.67	********	5.70	4.76	2	0.88	0.88
340.0	748.59	746.00	5.71	5.05	3	0.88	0.88
340.0	748.62	746.50	5.93	5.55	3	0.88	0.88
340.0	748.80	747.00	6.30	6.05	3	0.88	0.88
340.0	749.08	747.50	6.74	6.55	3	0.87	0.87
340.0	749.47	748.00	7.21	7.05	3	0.87	0.87
340.0	749.86	748.40	7.50	7.45	3	0.86	0.86
340.0	750.53	749.00	7.50	7.50	4	0.84	0.84

CRAMPTON DRAIN BELSAY ROAD HOLTSLAG BASE ELEVATION = 743.36 Z = -0.22

APPROACH ELEVATION	AREA	CONVEYANCE	ALPHA	TOP WIDTH	QC
743.10	0.0	0.0	0.0	0.0	0.0
743.70	2.8	94.3	1.000	5.2	11.38
744.30	6.2	315.7	1.000	6.3	34.81
744.90	10.4	657.7	1.000	7.5	69.02
745.50	15.2	1127.3	1.000	8.7	114.29
746.10	20.8	1733.8	1.000	9.9	171.17
746.70	27.0	2487.3	1.000	11.0	240.25
747.30	34.0	3398.2	1.000	12.2	322.13
747.90	41.7	4476.4	1.000	13.4	417.43
748.50	50.0	5731.9	1.000	14.5	526.72
749.10	59.1	7174.4	1.000	15.7	650.56
749.70	68.9	8813.5	1.000	16.9	789.51
750.30	79.3	10658.6	1.000	18.0	944.10
750.90	90.5	12718.7	1.000	19.2	1114.84
751.50	102.6	15193.1	1.005	22.8	1235.04
752.10	118.9	18366.0	1.064	31.0	1321.58
752.70	139.3	21977.8	1.150	37.0	1533.67
753.30	186.6	26202.2	1.600	120.0	1320.29
753.90	258.6	33053.2	1.975	120.0	2153.82
754.50	330.6	41537.0	2.071	120.0	3113.17
755.10	402.5	51424.5	2.040	120.0	4183.56

CRAMPTON DRAIN BELSAY ROAD HOLTSLAG BASE ELEVATION = 743.36 Z = -0.22

BARREL DEPTH	AREA	CONVEYANCE	TOP WIDTH	WETTED PERIMETER
0.0	0.0	0.0	0.0	
0.240	0.38	6.8	2.35	2.42
0.480	1.06	29.9	3.26	3.44
0.720	1.92	70.2	3.90	4.24
0.960	2.92	127.4	4.40	4.94
1.200	4.03	200.9	4.80	5.56
1.440	5.22	289.8	5.12	6.14
1.680	6.48	392.8	5.39	6.69
1.920	7.80	508.7	5.60	7.22
2.160	9.16	636.0	5.76	7.72
2.400	10.56	773.0	5.88	8.22
2.640	11.98	918.2	5.96	8.70
2.880	13.42	1069.6	6.00	9.18
3.120	14.86	1225.3	6.00	9.66
3.360	16.29	1383.2	5.96	10.15
3.600	17.71	1541.2	5.88	10.63
3.840	19.11	1696.9	5.76	11.13
4.080	20.47	1847.8	5.60	11.63
4.320	21.79	1991.2	5.39	12.16
4.560	23.06	2123.8	5.13	12.71
4.800	24.25	2242.3	4.80	13.29
5.040	25.35	2342.3	4.40	13.91
5.280	26.35	2418.3	3.90	14.60
5.520	27.21	2462.1	3.26	15.41
5.760	27.89	2457.7	2.35	16.43
6.000	28.27	2294.5	0.01	18.84

CRAMPTON DRAIN BELSAY ROAD HOLTSLAG BASE ELEVATION = 743.36 Z = -0.22

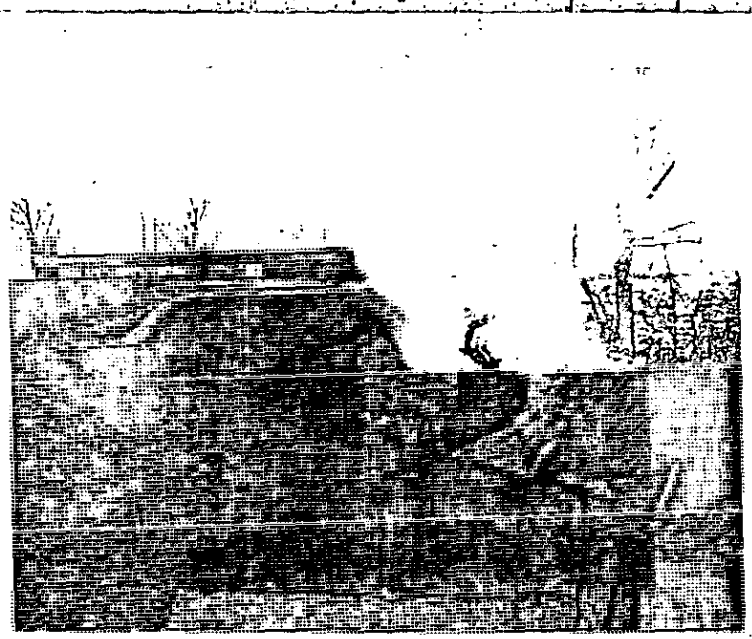
Q	ELEV H1	ELEV H4		D2	D3	TYPE	C	C ADJUSTED
20.0	745.22	********		1.94	1.16	2	0.88	0.93
20.0	746.06	746.00		2.89	2.64	3	0.87	0.93
20.0	746.54	746.50		3.38	3.14	3	0.87	0.93
20.0	746.64	746.61		3.49	3.25	3	0.87	0.93
20.0	747.03	747.00		3.87	3.64	3	0.87	0.93
20.0	747.52	747.50		4.37	4.14	3	0.87	0.92
20.0	748.02	748.00		4.87	4.64	3	0.86	0.91
20.0	748.51	748.50		5.36	5.14	3	0.85	0.90
20.0	749.01	749.00		5.86	5.64	3	0.84	0.89
20.0	749.17	749.16		6.00	5.80	3	0.83	0.88
20.0	749.60	749.58		6.00	6.00	4	0.79	0.79
40.0	745.95	********		2.59	1.67	2	0.87	0.93
40.0	746.25	746.00		3.00	2.64	3	0.87	0.93
40.0	746.65	746.50		3.44	3.14	3	0.87	0.93
40.0	746.75	746.61		3.54	3.25	3	0.87	0.93
40.0	747.10	747.00		3.91	3.64	3	0.87	0.93
40.0	747.58	747.50		4.39	4.14	3	0.87	0.92
40.0	748.06	748.00		4.88	4.64	3	0.85	0.91
40.0	748.55	748.50		5.38	5.14	3	0.84	0.90
40.0	749.05	749.00		5.88	5.64	3	0.83	0.89
40.0	749.21	749.16		6.00	5.80	3	0.83	0.88
40.0	749.65	749.58		6.00	6.00	4	0.79	0.79
60.0	746.55	********		3.09	2.05	2	0.87	0.92
60.0	746.57	746.00		3.19	2.64	3	0.87	0.93
60.0	746.85	746.50		3.54	3.14	3	0.87	0.93
60.0	746.93	746.61	10-YR	3.63	3.25	3	0.87	0.93
60.0	747.24	747.00		3.97	3.64	3	0.87	0.92
60.0	747.68	747.50		4.43	4.14	3	0.86	0.92
60.0	748.14	748.00		4.91	4.64	3	0.85	0.91
60.0	748.62	748.50		5.40	5.14	3	0.84	0.90
60.0	749.12	749.00		5.90	5.64	3	0.83	0.88
60.0	749.28	749.16		6.00	5.80	3	0.83	0.88
60.0	749.73	749.58		6.00	6.00	4	0.79	0.79
80.0	747.07	********		3.51	2.39	2	0.87	0.92
80.0	747.01	746.00		3.50	2.64	3	0.87	0.92
80.0	747.13	746.50		3.70	3.14	3	0.87	0.92
80.0	747.18	746.61		3.77	3.25	3	0.87	0.92
80.0	747.43	747.00		4.06	3.64	3	0.87	0.92
80.0	747.82	747.50		4.49	4.14	3	0.86	0.91
80.0	748.26	748.00		4.96	4.64	3	0.85	0.91
80.0	748.72	748.50		5.44	5.14	3	0.84	0.89
80.0	749.21	749.00		5.93	5.64	3	0.83	0.88
80.0	749.37	749.16		6.00	5.80	3	0.83	0.87
80.0	749.85	749.58		6.00	6.00	4	0.79	0.79

CRAMPTON DRAIN BELSAY ROAD HOLTSLAG BASE ELEVATION = 743.36 Z = -0.22

Q	ELEV H1	ELEV H4		D2	D3	TYPE	C	C ADJUSTED	
100.0	747.56	********		3.89	2.69	2	0.87	0.91	
100.0	747.50	746.50		3.92	3.14	3	0.87	0.91	
100.0	747.53	746.61		3.97	3.25	3	0.87	0.91	
100.0	747.69	747.00		4.19	3.64	3	0.86	0.91	
100.0	748.01	747.50		4.58	4.14	3	0.86	0.91	
100.0	748.41	748.00		5.02	4.64	3	0.85	0.90	
100.0	748.85	748.50		5.49	5.14	3	0.84	0.89	
100.0	749.34	749.00		5.98	5.64	3	0.83	0.88	
100.0	749.50	749.16	50-YR	6.00	5.80	3	0.83	0.87	
100.0	750.01	749.58		6.00	6.00	4	0.79	0.79	
120.0	748.04	********		4.25	2.95	2	0.86	0.90	
120.0	747.98	746.50		4.22	3.14	3	0.86	0.90	
120.0	747.96	746.61		4.23	3.25	3	0.86	0.90	
120.0	748.02	747.00		4.37	3.64	3	0.86	0.90	
120.0	748.26	747.50		4.69	4.14	3	0.85	0.90	
120.0	748.60	748.00		5.09	4.64	3	0.84	0.89	
120.0	749.02	748.50		5.54	5.14	3	0.83	0.88	
120.0	749.50	749.00		6.00	5.64	3	0.83	0.87	
120.0	749.66	749.16		6.00	5.80	3	0.82	0.86	
120.0	750.19	749.58	100-YR	6.00	6.00	4	0.79	0.79	
140.0	748.52	********		4.58	3.20	2	0.85	0.89	
140.0	748.50	746.61		4.57	3.25	3	0.85	0.89	
140.0	748.43	747.00		4.59	3.64	3	0.85	0.89	
140.0	748.56	747.50		4.83	4.14	3	0.84	0.89	
140.0	748.84	748.00		5.19	4.64	3	0.84	0.89	
140.0	749.23	748.50		5.62	5.14	3	0.83	0.88	
140.0	749.69	749.00		6.00	5.64	3	0.82	0.86	
140.0	749.85	749.16		6.00	5.80	3	0.82	0.86	
140.0	750.41	749.58		6.00	6.00	4	0.79	0.79	
165.0	749.13	********		4.97	3.49	2	0.83	0.87	
165.0	749.06	747.00		4.94		3.64	3	0.83	0.88
165.0	749.03	747.50		5.05	4.14	3	0.83	0.88	
165.0	749.22	748.00		5.34	4.64	3	0.83	0.87	
165.0	749.54	748.50		5.73	5.14	3	0.82	0.87	
165.0	749.99	749.00		6.00	5.64	3	0.81	0.85	
165.0	750.15	749.16		6.00	5.80	3	0.81	0.85	
165.0	750.74	749.58	500-YR	6.00	6.00	4	0.79	0.79	
			BH = 1.16						
200.0	750.03	********		5.49	3.86	2	0.81	0.85	
200.0	749.89	747.50		5.46	4.14	3	0.82	0.85	
200.0	749.90	748.00		5.62	4.64	3	0.82	0.85	
200.0	750.15	748.50		5.95	5.14	3	0.81	0.85	
200.0	750.53	749.00		6.00	5.64	3	0.80	0.83	
200.0	750.68	749.16		6.00	5.80	3	0.80	0.83	
200.0	751.28	749.58		6.00	6.00	4	0.79	0.79	

Crampton Drain at Genesee Road

BRIDGE GEOMETRY SECTION ____

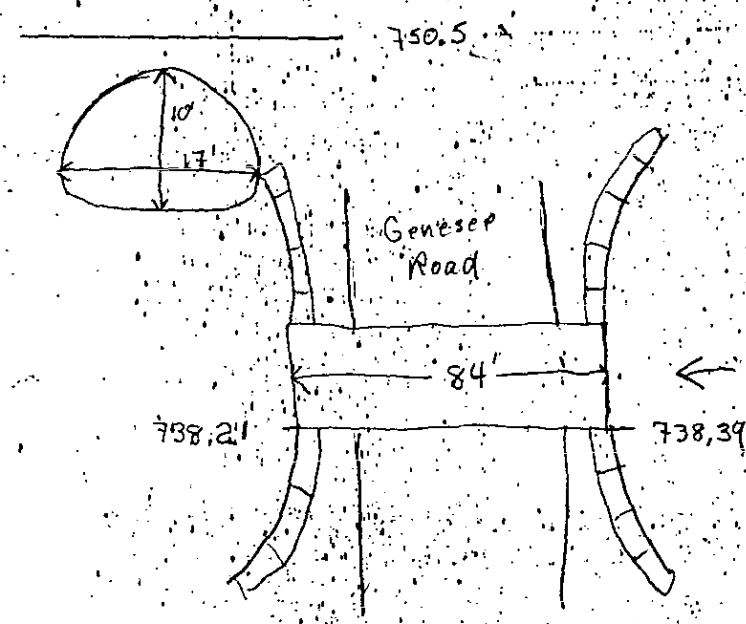


Attach Photo

Upstream Side Bridge

Downstream Side Bridge

Pipe arch Culvert



BASIC DIMENSION CHECKLIST

Bridge
- Alinement ϕ
- Bridge opening width W
- Number of piers
- Widths of piers
- Elevation low steel
- " top curb
- " top guardrail
- Embankment top width
- Embankment sideslope
- Wingwall angles θ
- Wingwall lengths l

Culvert
- Size, shape, material
- Upstr. Invert Elev.
- Downstr. Invert Elev.
- Length of culvert
- Road elevation
- Entrance wingwall angle θ
- Entrance wingwall length
- Length that pipe projects from headwall or fill

Crampton Drain at Genesee Road

Culvert Computation

Type: Pipe Arch 10' × 17'
Material: CMP
Length: 84 feet
Projected length: 0 feet

Discharge Coefficient

$\frac{h_1 - z}{D}$	Base* Coefficient	Entrance Rounding	Adjusted Coefficient	
0	0.93	1.03	0.96 ✓	types 1, 2, 3 flow
0.7	0.92	1.03	0.95 ✓	
1.1	0.87	1.03	0.90 ✓	
1.5	0.81	1.03	0.83 ✓	

* Base coefficient for a flush setting in a vertical headwall, the addition of wingwalls for this type does not affect the discharge coefficient.

Crampton Drain at Genesee Road

Culvert Computation (continued)

Discharge Coefficient type 5 flow

$\frac{h_1 - z}{D}$	Discharge Coefficient r/d ≥ 0.01	
1.5	0.47	✓
2.0	0.53	✓
3.0	0.58	✓
5.0	0.62	✓

Discharge Coefficient type 4 & 6 flow

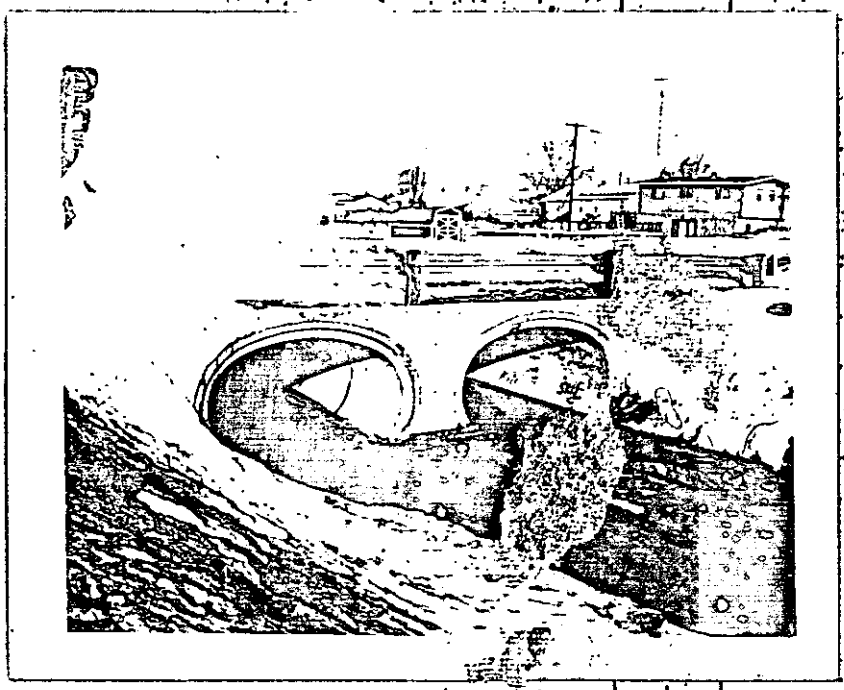
0.86 ✓

Crampton Drain at Genesee Road

Recurrence Interval	Design Discharge	Water Surface at Culvert Downstream	upstream	Fall	Type
10-YR	270 ✓	742.99	743.22	0.23	3
50-YR	450 ✓	744.20	744.61	0.41	3
100-YR	540 ✓	744.64	745.16	0.52	3
500-YR	760 ✓	745.51	746.41	0.90	3 ✓

Crompton Drain at Underhill Road

BRIDGE GEOMETRY SECTION _____

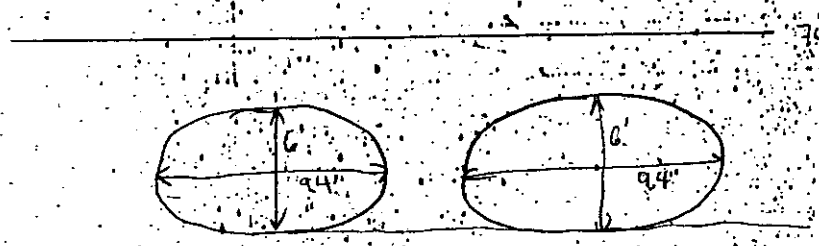


Attach Photo

Upstream Side Bridge

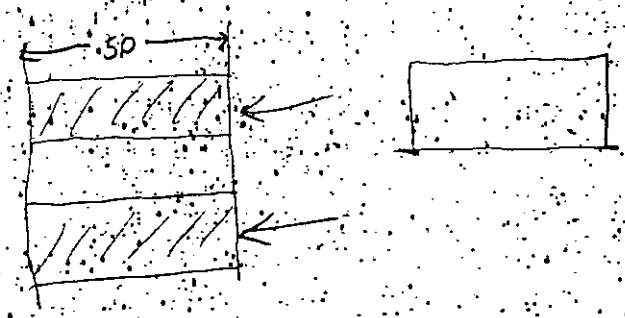
Downstream Side Bridge

BASIC DIMENSION CHECKLIST



Bridge
- Alinement ϕ
- Bridge opening width W
- Number of piers
- Widths of piers
- Elevation low steel
- " top curb
- " top guardrail
- Embankment top width
- Embankment sideslope
- Wingwall angles θ
- Wingwall lengths l

Culvert
- Size, shape, material
- Upstr. Invert Elev. 739.60
- Downstr. Invert Elev. 739.56
- Length of culvert 50.0
- Road elevation 747.20
- Entrance wingwall angle θ
- Entrance wingwall length
- Length that pipe projects from headwall or fill



Crompton Drain at Underhill Road

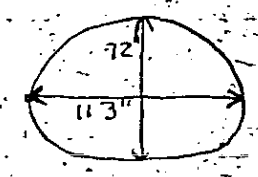
	Recurrence Interval	Design Discharge	Water Surface at Culvert Downstream	Upstream	Fall	Type
270	10-YR	270	744.06	744.24		3
450	50-YR	450	745.47	745.90		3
540	100-YR	540	746.03	746.85		4
760	500-YR	760	747.17	748.00 [1,2]		4

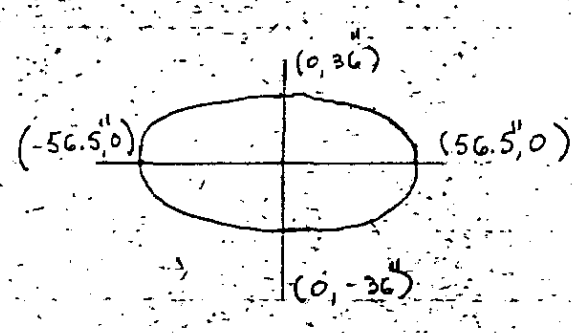
1. Road Overflow can occur at 747.20
2. Elevation given discharge w/ road overflow, w/o road overflow h_1 = 748.79 (culvert flow only)

Crampton Drain - Culvert Properties

near 4600 + 4850

ellipse





$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \qquad b^2 = a^2 - c^2$$

$$\frac{x^2}{3192.25} + \frac{y^2}{1296} = 1$$

$$\frac{x^2}{3192.25} + \frac{y^2}{1296} = 1$$

Circumference of an ellipse $= 2\pi\sqrt{\frac{a^2+b^2}{2}} = 297.6$ ✓

Area of an ellipse $= \pi ab = 6{,}390''$ $44.4\ ft^2$ ✓

crown elev = 745.56

invert elev = 739.56

Underhill Road Culvert Computations

$Q_{10} = 270$, $h_4 = 744.06$, Length = 50 feet

assume type III flow Invert USS = 739.60

$\therefore h_3 = h_4$ " DSS 739.56

$d_3 = 4.50$ feet

$A_3 = 36\ ft^2$ (each) 72 total

$P_w = 14.4$ ft 28.8 total

$$\frac{V_3^2}{2g} = \frac{(270/72)^2}{2g} = 0.22 \text{ feet}$$

$R_3 = 2.50$, $R_3^{2/3} = 1.84$

$$K_3 = \frac{1.486}{0.014} * 72 * 1.84 = 14061.8$$

try $h_2 = 744.08$, $d_2 = 4.52$

$A_2 = 72$

$\frac{V_2^2}{2g} = 0.22$ ft

$K_2 = 14061.8$

$$h_{f_{2-3}} = 50 * \frac{270^2}{14061.8^2} = 0.02$$

try $h_1 = 744.15$

744.08	ws_2
0.22	$V_2^2/2g$
0.04	K_o
0.01	$h_{f\,1-2}$
− 0.14	$V_1^2/2g$
744.20	

$c = 0.88$, $0.12 * V_3^2/2g = 0.03$

$A_1 = 89.1$

$$\frac{V_1^2}{2g} = \frac{(270/89.1)^2}{2g} = 0.14$$

$K_1 = 10062.3$

$$h_f = \frac{15 * 270^2}{14062 * 10062} = 0.01$$

try $h_1 = 744.20$

744.08	h_2
0.22	$V_2^2/2g$
0.06	K_o
0.01	$h_{f\,1-2}$
− 0.13	
744.24	✓

$c = 0.88$, $K_o = 0.03$

$A_1 = 92.6$, K_1 10591

$$\frac{V_1^2}{2g} = \frac{(270/92.6)^2}{2g} = 0.13$$

$$h_f = \frac{15 * (270)^2}{14062 * 10591} = 0.01$$

try $h_1 = 744.24$

744.08	h_2
0.22	
0.06	
0.01	
−0.13	
744.24	✓

$c = 0.88$ $K_o = 0.06$

$A_1 = 93.7$; $K_1 = 10760$

$$\frac{V_1^2}{2g} = \frac{(270/93.7)^2}{2g} = 0.13$$

$$h_f = \frac{15 * 270^2}{10760 * 14062} = 0.01$$

$Q_{50} = 450$, $h_4 = 745.47$

Assume type III flow

$h_4 = h_3 = 745.47$

$d_3 = 5.91$

$A_3 = 44 \times 2 = 88$

$$\frac{V_3^2}{2g} = \frac{(450/88)^2}{2g} = 0.41$$

$$R_0 = \frac{A}{Pw} = \frac{88}{48} = 1.83, \quad R_0^{2/3} = 1.50$$

$$K = \frac{1.486}{0.014} * A * R_0^{2/3} = 14010.8$$

try $h_2 = 745.52$, $d_2 = 5.92$

$A_3 = 44 * 2 = 88$

$$\frac{V_3^2}{2g} = 0.41$$

$$R_0 = \frac{88}{24.4 * 2} = 1.80, \quad R_0^{2/3} = 1.48$$

$$K = \frac{1.486}{0.014} * 88 * 1.48 = 13838$$

$$h_{f_{2-3}} = \frac{50 * 450^2}{14010.8 * 13838} = 0.05 \checkmark$$

try $h_1 = 745.70$

$A_1 = 136$

$V_1^2/2g = (450/136)^2/2g = 0.17$

$K_1 = 17902$

$C = 0.88, \quad \frac{1}{C} - 1 = K_0 = 0.29$

$h_e = 0.29 * 0.41 = 0.12$

$h_f = \frac{15 * 450^2}{17902 * 13838} = 0.01$

745.52	h_2
0.41	$V_2^2/2g$
0.12	h_e
0.01	$h_{f\,1-2}$
− 0.17	
745.89	

try $h_1 = 745.90$

$A_1 = 142$

$\frac{V_1^2}{2g} = \frac{(450/142)^2}{2g} = 0.16$

$K_1 = 19029$

$h_e = 0.12$

$h_f = 0.01$

745.52
0.41
0.12
0.01
− 0.16
745.90

$C = 0.88$

$Q_{100} = 540$ cfs , $h_4 = 746.03$

Assume type 4 flow

$Area_3 = 44.4 * 2 = 88.8$

$\frac{V_3^2}{2g} = \frac{(540/88.8)^2}{2g} = 0.57$

$C = 0.88$

$n = 0.014$

$L = 50$

$R_o^{4/3} = \left(\frac{88.8}{49.6}\right)^{4/3} = 2.17$

$$Q = C A_o \sqrt{\frac{2g\,(\Delta h)}{1 + \frac{2gC^2n^2L}{R_o^{4/3}}}}$$

$$\frac{540}{0.88 * 88.8 \sqrt{1 + \frac{2g}{\frac{2g * 0.88^2 * 0.014^2 * 50}{2.17}}}} = \left(\frac{540}{597.53}\right)^2 = 0.82 = \Delta h$$

$h_1 = 746.85$ for $Q_{100} = 540$

$Q_{500} = 760$, $h_4 = 747.17$, $h_1 = 748.79$

$\left(\frac{760}{597.53}\right)^2 = \Delta h = 1.62$, $h_1 = 748.79$ w/o road overflow.

Road overflow may occur on both the 100 yr & 500 yr floods

Crompton Drain at Underhill Road

500 year combined rating

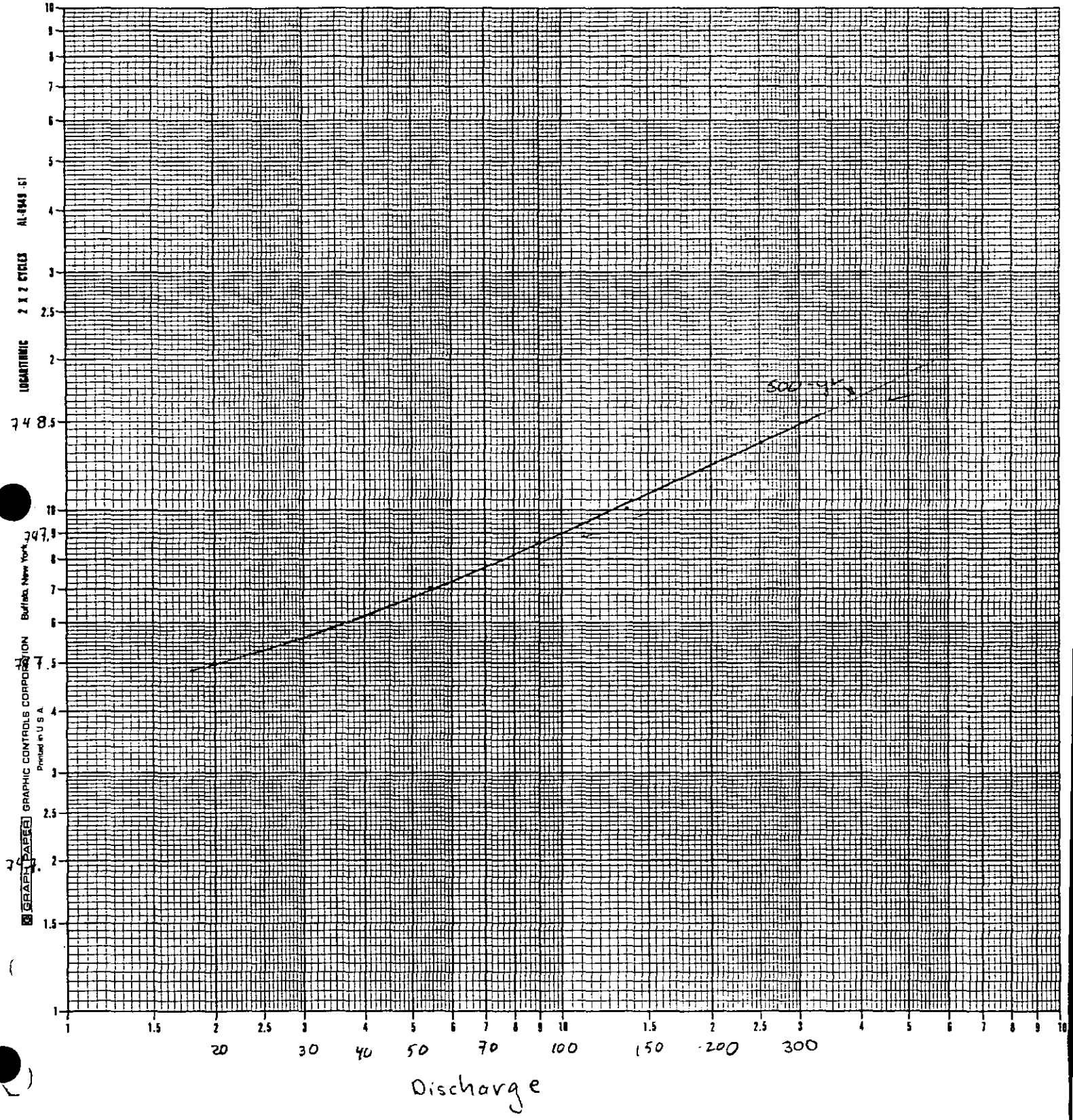
Culvert Type 4 flow $Q = 597.53 * \Delta h^{1/2}$

Design Discharge	h_4	h_1	Discharge Culvert	Discharge Road *	Total Discharge	Qc/Qo
760	747.17	748.79	760	460	1220	1.61
760	747.17	748.00	646	126	772	1.02
760	747.17	747.90	510	100	610	0.80

* See attached Rating Curve

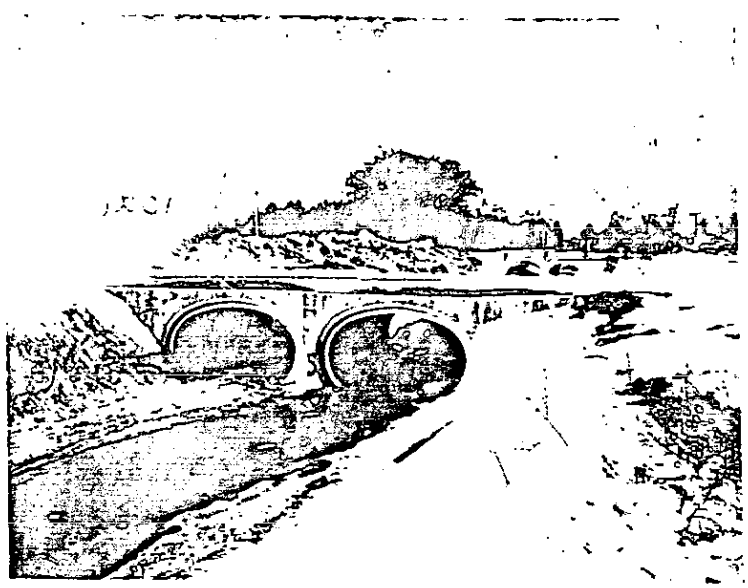
Crockton Drain at [illegible]

Overflow Rating



Crompton Drain at Concrete Footbridge

BRIDGE GEOMETRY SECTION _____



Upstream Side Bridge

Attach Photo

Downstream Side Bridge

BASIC DIMENSION CHECKLIST

Bridge
- Alinement ϕ
- Bridge opening width W
- Number of piers
- Widths of piers
- Elevation low steel
- " top curb
- " top guardrail
- Embankment top width
- Embankment sideslope
- Wingwall angles θ
- Wingwall lengths l

Culvert
- Size, shape, material
- Upstr. Invert Elev. 739.81
- Downstr. Invert Elev. 739.79
- Length of culvert 20'
- Road elevation 747.2
- Entrance wingwall angle θ
- Entrance wingwall length
- Length that pipe projects from headwall or fill

Crampton Drain at Foot Bridge

Recurrence Interval	Design Discharge	Water Surface Elevation Downstream	Water Surface Elevation Upstream
10-YR	270	744.36	744.52
50-YR	450	746.00	746.54
100-YR	540	746.93	747.55
500-YR	760	748.07	748.40

Begins road overflow 747.2

Elevation given is w/ road overflow, w/o overflow = 747.70

" " " " " " , w/o " = 749.60

Crompton Drain at Foot Bridge

$Q_{10} = 270$, $h_4 = 744.36$

Assume type III flow

$h_4 = h_3 = 744.36$

$d_3 = 4.57$

$A_3 = 36.7 * 2$

$V_3^2/2g = (270/73.4)^2/2g = 0.21$

$P_w = 15.9 * 2 = 31.8$

$R_o^{2/3} = \left(\frac{73.4}{31.8}\right)^{2/3} = 1.75$

$K = \frac{1.486}{0.014} * 73.4 * 1.75 = 13607$

try $h_2 = 744.37$, $d_2 = 4.56$

$V_2^2/2g = 0.21$

$K = 13607$

$h_{f_{2-3}} = \frac{20 * 270^2}{13607^2} = 0.01$

744.36
0.21
0.01
− 0.21
744.37 ✓

try $h_1 = 744.5$

$A_1 = 93$

$V_1^2/2g = (270/93)^2/2g = 0.13$

$K_1 = 10553.6$

$C = 0.88$, $K_o = \frac{1}{C^2} - 1 = 0.29$

$he = K_o * V_3^2/2g = 0.29 * 0.21 = 0.06$

$h_{f_{1-2}} = \frac{13 * 270^2}{10553.6 * 13607} = 0.01$

744.37 h_3
0.21 $V_2^2/2g$
0.01 h_f
0.06 he
− 0.13 $V_1^2/2g$
744.52 ✓

$Q_{50} = 450$, $h_4 = 746.00$

assume type 4 flow

$$Q = C A_o \sqrt{\frac{2g}{1 + \frac{2g * C^2 * n^2 L}{R_o^{4/3}}}} \sqrt{(h_1 - h_4)}$$

$$\left(\frac{450}{0.88 * 88.8 \sqrt{\frac{2g}{1 + \frac{2g * 0.88^2 * 0.014^2 * 20}{2.17}}}} \right)^2 = \left(\frac{450}{614.76} \right)^2 = 0.54$$

$h_1 = 746.54$ for $Q_{50} = 450$ cfs

$Q_{100} = 540$ cfs, $h_4 = 746.93$, $h_1 = 747.70$

$$\left(\frac{540}{614.76} \right)^2 = 0.77$$

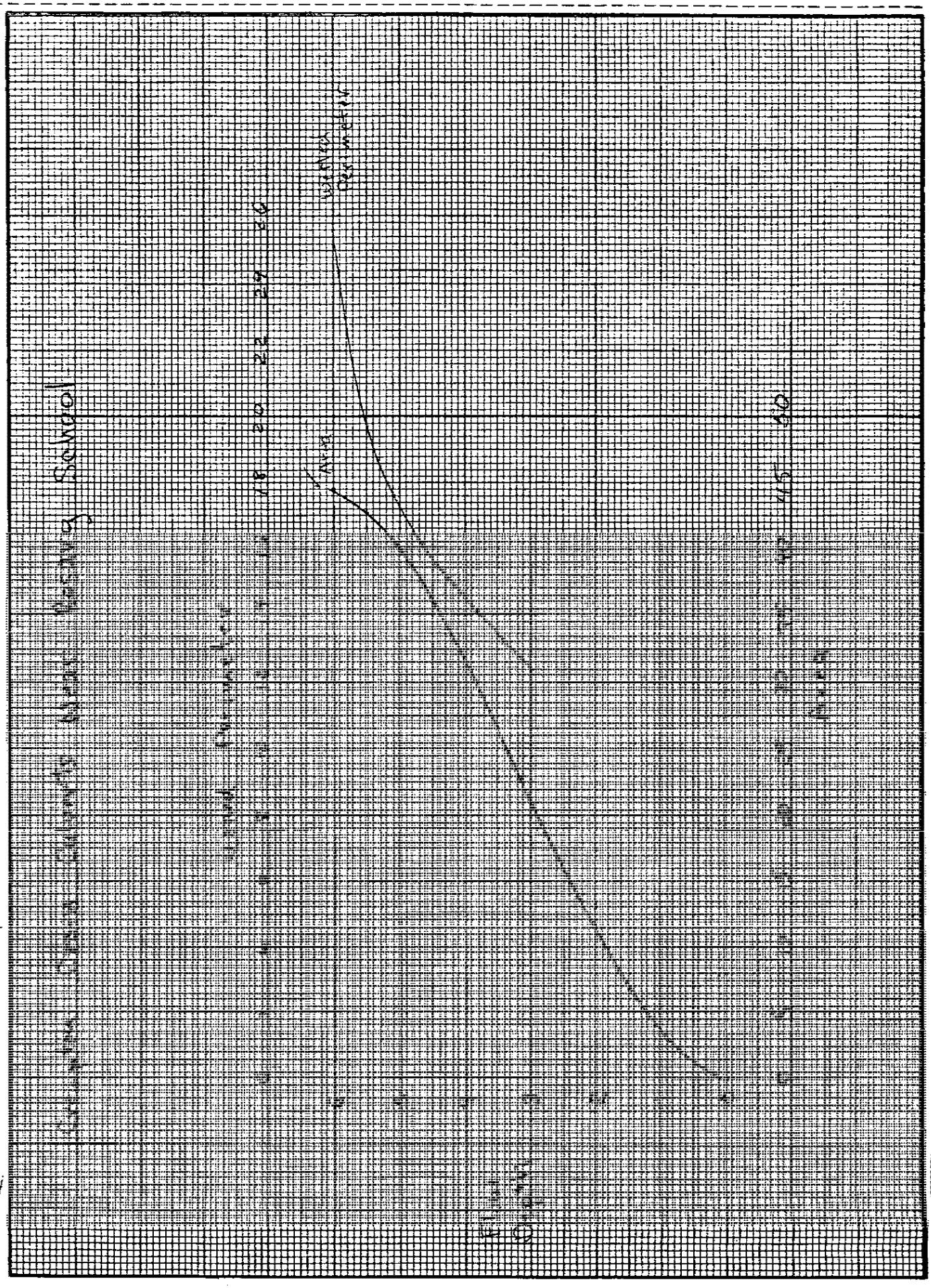
$Q_{500} = 760$, $h_4 = 748.83$, $h_1 = 750.36$

$$\left(\frac{760}{614.76} \right)^2 = 1.53$$

9-213-E
(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....



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Crompton Drain at Foot Bridge

$Q_{100} = 540$ cfs, $h_4 = 746.93$

$Q_T = Q_c + Q_{RD}$

Design Discharge	h_4	trial h_1	Discharge Culvert	Discharge Road	Total Computed Q	Q_c/Q_D
540	746.93	747.70	540	108	648	1.20
540	746.93	747.50	464	47	511	0.95
540	746.93	747.55	484	61	545	1.01

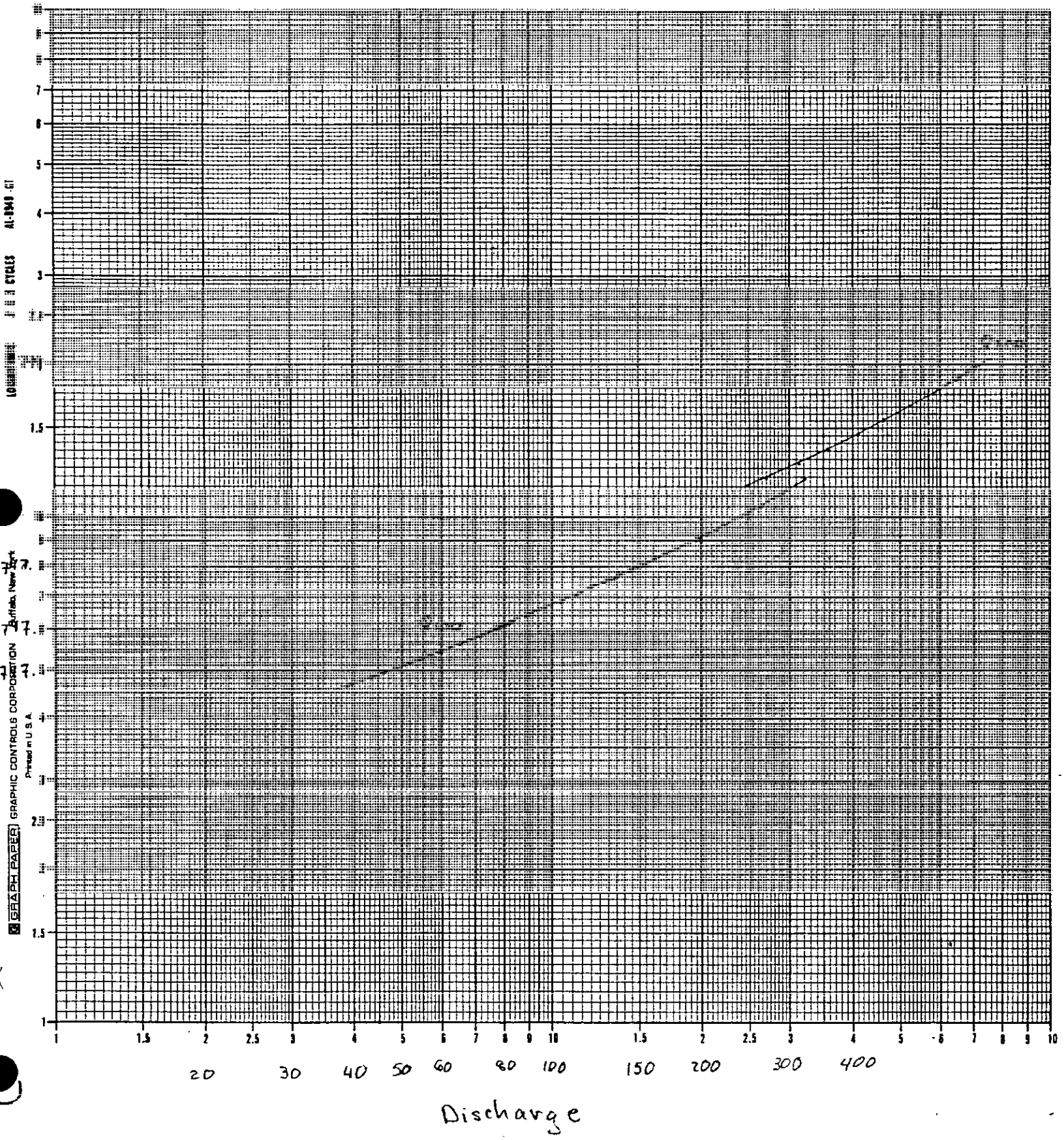
$Q_{500} = 760$, $h_4 = 748.07$

$Q_T = Q_c + Q_{RD}$

Design Discharge	h_4	trial h_1	Discharge Culvert	Discharge Road	Total Q_c	Q_c/Q_D
760	748.07	749.60	760	1000	1760	3.83
760	748.07	749.00	593	720	1313	1.73
760	748.07	748.70	488	550	1038	1.37
760	748.07	748.40	353	375	728	0.96
760	748.07	748.45	379	400	779	1.03

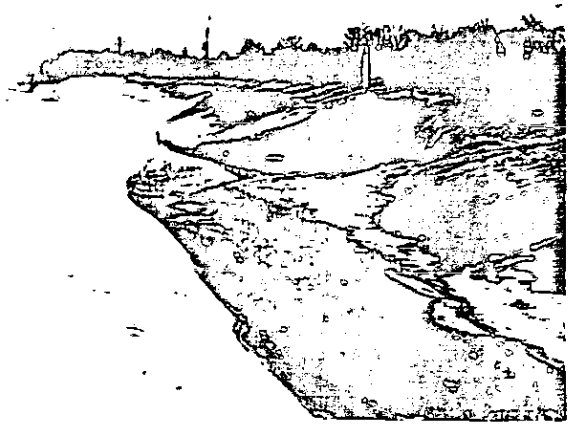
Crompton Drain at Foot Ev[illegible]e

Overflow Rating



Crampton Drain at Rosary Basin

BRIDGE GEOMETRY SECTION _____



Attach Photo

~~Upstream Side Bridge~~

Downstream Side Bridge

Looking upstream at Rosary Basin outlet. Old Channel on left.

BASIC DIMENSION CHECKLIST

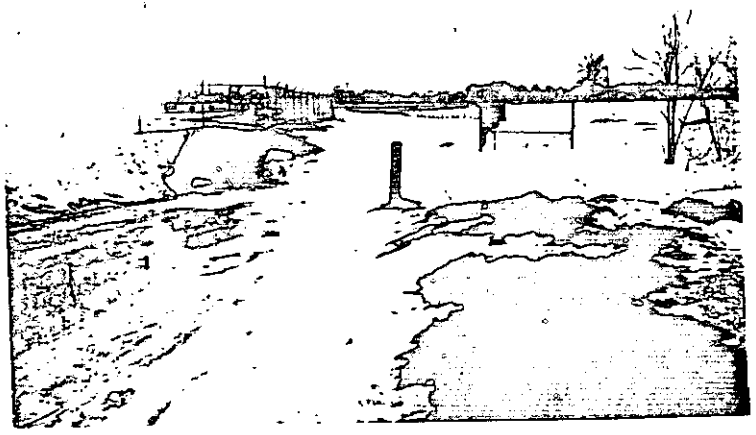
Bridge
- Alinement ϕ
- Bridge opening width W
- Number of piers
- Widths of piers
- Elevation low steel
- " top curb
- " top guardrail
- Embankment top width
- Embankment sideslope
- Wingwall angles θ
- Wingwall lengths l

Culvert
- Size, shape, material
- Upstr. Invert Elev. 740.00
- Downstr. Invert Elev. 739.89
- Length of culvert 92'
- Road elevation 752.0
- Entrance wingwall angle θ
- Entrance wingwall length
- Length that pipe projects from headwall or fill

Crompton Drain at Rosary Basin

BRIDGE GEOMETRY SECTION ____

Attach Photo



Upstream Side Bridge

Downstream Side Bridge

Looking downstream at Rosary Basin inlet. Old channel on right.

BASIC DIMENSION CHECKLIST

Bridge
- Alinement ϕ
- Bridge opening width W
- Number of piers
- Widths of piers
- Elevation low steel
- " top curb
- " top guardrail
- Embankment top width
- Embankment sideslope
- Wingwall angles θ
- Wingwall lengths l

Culvert
- Size, shape, material
- Upstr. Invert Elev. 738.39
- Downstr. Invert Elev. 738.21
- Length of culvert 100
- Road elevation 752
- Entrance wingwall angle θ
- Entrance wingwall length
- Length that pipe projects from headwall or fill

Crompton Drain above Rosary Basin Inlet

BRIDGE GEOMETRY SECTION ____

Attach Photo

Upstream Side Bridge

Downstream Side Bridge

Shows channel improvement above Rosary basin inlet

BASIC DIMENSION CHECKLIST

Bridge
- Alinement ϕ
- Bridge opening width W
- Number of piers
- Widths of piers
- Elevation low steel
- " top curb
- " top guardrail
- Embankment top width
- Embankment sideslope
- Wingwall angles θ
- Wingwall lengths l

Culvert
- Size, shape, material
- Upstr. Invert Elev.
- Downstr. Invert Elev.
- Length of culvert
- Road elevation
- Entrance wingwall angle θ
- Entrance wingwall length
- Length that pipe projects from headwall or fill

Crampton Drain at Rosary Basin Outlet

7.0' RCP CL III

45° Headwall

Length = 92 feet

$n = 0.014$

$C = 0.84$

$A = 38.48$

$P_w = 21.99$

$R_o^{4/3} = 2.11$

$$Q_{7.0} = CA\sqrt{\frac{2g}{1+\frac{29\,C^2 n^2 L}{R_o}}}\sqrt{\Delta h}$$

type 4

$$Q_{7.0} = 237.78\sqrt{\Delta h}$$

$$\Delta h = (Q/237.78)^2$$

Hill Drain Storm Sewers

Type 4 flow solution

A 54 inch, 2200' RCP, n = 0.014, let c = 1.0

area = 15.90 ft², pw = 14.14

$R_o^{4/3}$ = 1.17

$$Q = C A_o \sqrt{\frac{2g}{1 + \frac{29 c^2 n^2 L}{R_o^{4/3}}}} \sqrt{\Delta h}$$

$Q = 37.32 * \sqrt{\Delta h}$

$\Delta h = (Q/37.32)^2$

B 84 inch, 1600' RCP, n = 0.014, let c = 1.0

area = 38.48, pw = 21.99

$R_o^{4/3}$ = 2.11

$Q = 134.01 \sqrt{\Delta h}$

$\Delta h = (Q/134.01)^2$

50
120 70
70
P100 170 100
P500

Crompton Drain at Rosary Basin Inlet

7.5' RCP CL III

45° Headwall

Length = 100 feet

$n = 0.014$

$C = 0.84$

$A = 44.18$

$P_w = 23.56$

$R_o^{4/3} = 2.31$

$$Q_{7.5} = C A \sqrt{\frac{2g}{1 + \frac{29 C^2 n^2 L}{R_o}}} \sqrt{\Delta h}$$

$Q = 274.91 * \sqrt{\Delta h}$

$\Delta h = (Q / 274.91)^2$

Equation Describing Flow Type 4 Solutions

$Q_{RO} = 237.78 \, (\Delta h_{RO})^{1/2}$ outlet

$\Delta h_{RO} = (Q_{RO} / 237.78)^2$

$Q_{54} = 37.32 \, (\Delta h_{54})^{1/2}$ 54"

$\Delta h_{54} = (Q_{54} / 37.32)^2$

$Q_{84} = 134.01 \, (\Delta h_{84})^{1/2}$ 84"

$\Delta h_{84} = (Q_{84} / 134.01)^2$

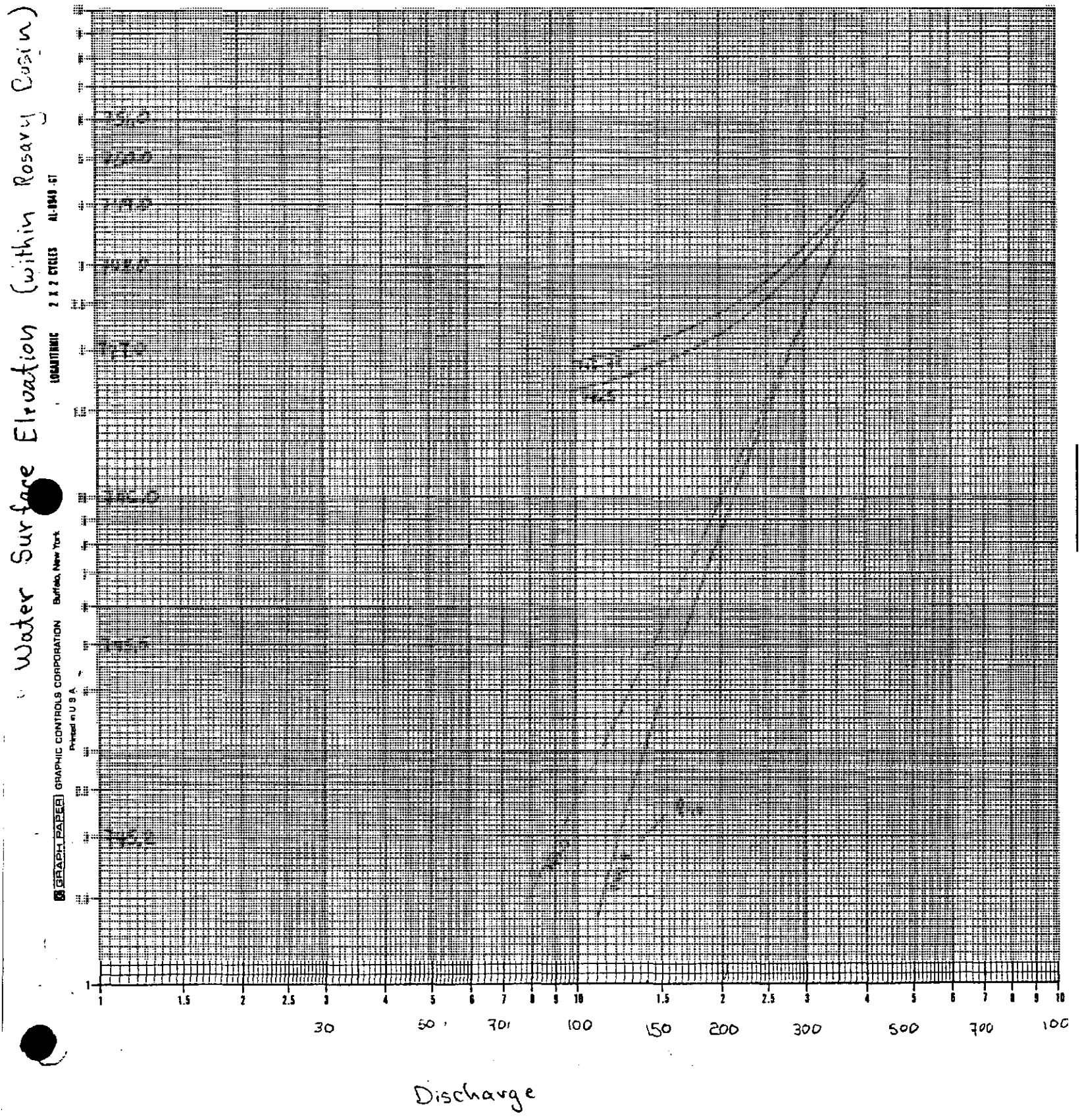
$Q_{RI} = 274.97 \, (\Delta h_{RI})^{1/2}$ Inlet

$\Delta h_{RI} = (Q_{RI} / 274.97)^2$

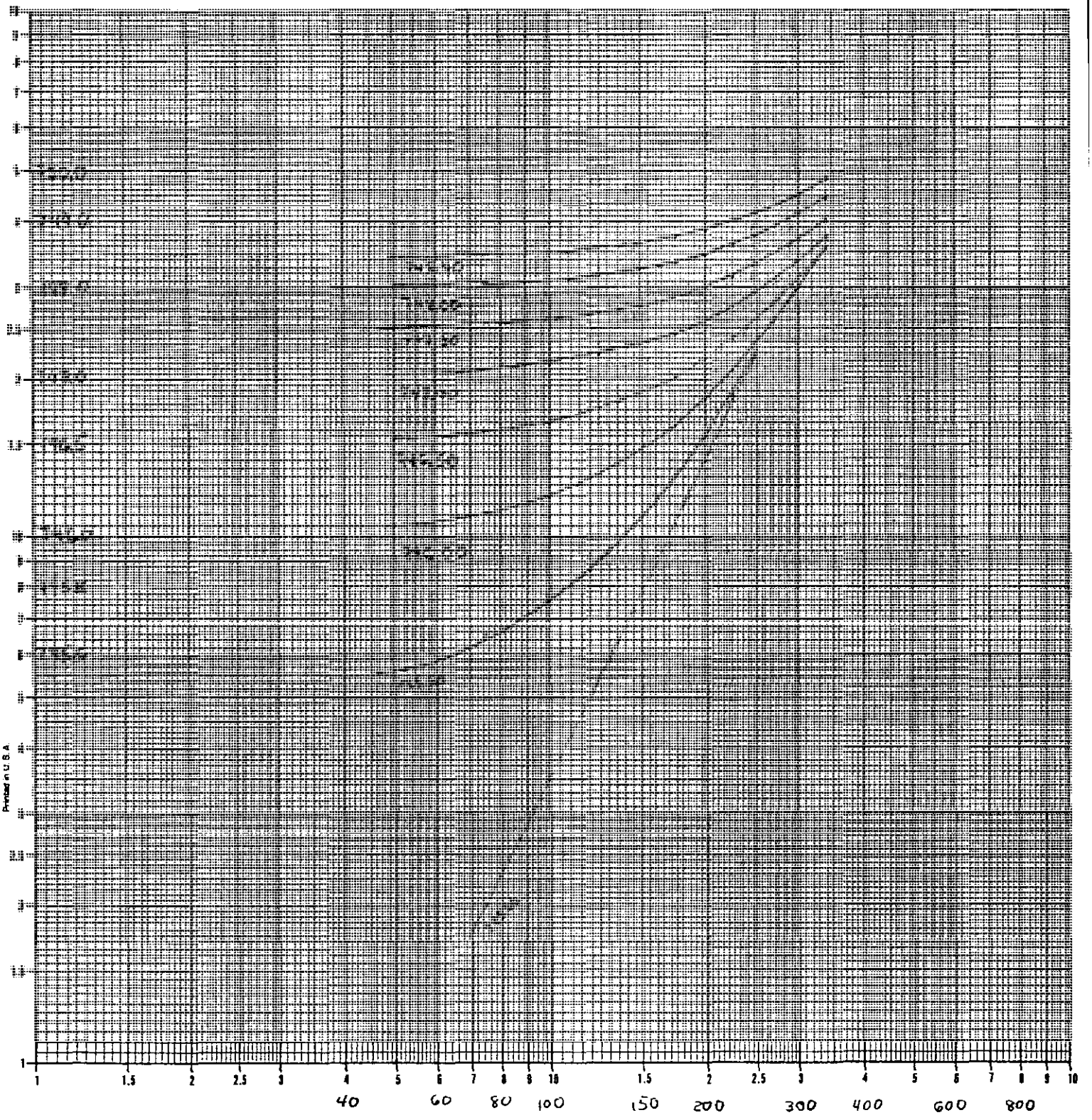
$h_{2HC} = f(Q)$

h_4

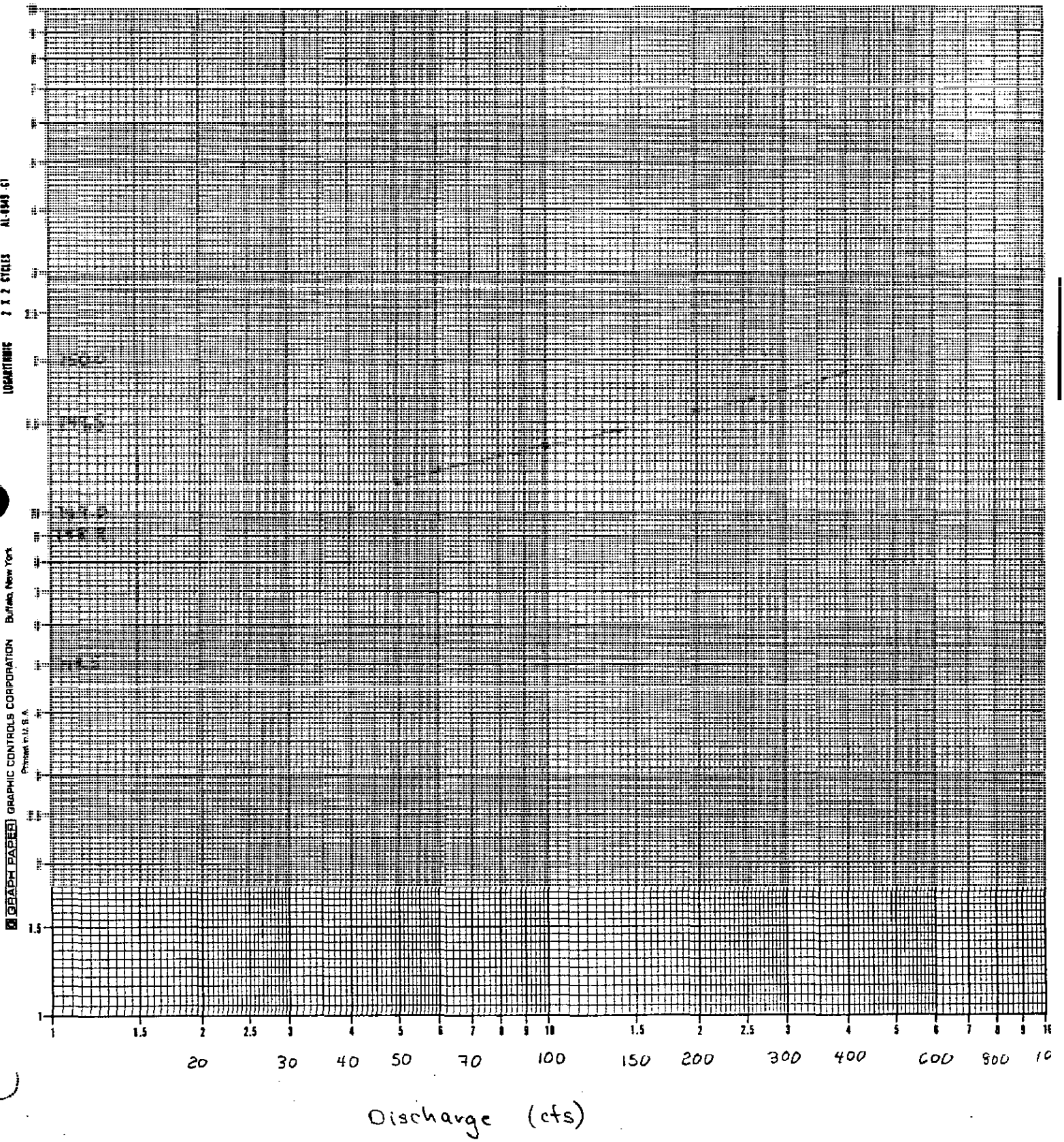
Crampton Drain at Rosary Drain Outlet



Crompton Dunn at [illegible] Inlet



Crompton Drain Above Kelly Basin



$y = 748.8866307 + 5.889299566\text{-}03X - 1.687396378\text{-}05X^2 + 2.171885592\text{-}08X^3$

```
1      1 CRAMPTON DRAIN  ALONG ROSARY BASIN        ULTSLAG 12  3 02 02 12
2      2  74673  74764  74847
3    100    10 1    5  2  744        0 99 99
4    104     23     128     330
5    110     -50  1  7498  -22  1  7419    0  2  7469   60  2  7470  220  2  7480
6    111  1  2 045 045  1  2 045 045
3    150    15 0    5  2  745      110 99 99
5    160     -44  1  7501  -22  1  7430   -2  2  7471   60  2  7473  220  2  7480
6    161  1  2 045 045  1  2 045 045
3    200    20 0    5  2  745      220 99 99
5    210     -36  1  7506  -18  1  7435    0  2  7474   14  2  7474  200  2  7480
6    211  1  2 045 045  1  2 045 045
3    250    25 0    8  2  745      305 99 99
5    260     -36  1  7505  -18  1  7443  -10  1  7451    0  1  7464   12  2  7470
5    261     100  2  7474  170  2  7478  250  2  7494
6    262  1  2 045 045  1  2 045 045
3    300    30 0    6  2  745      390 99 99
5    310      -5  1  7503   12  1  7447   26  1  7455   40  2  7468  200  2  7480
5    311     270  2  7500
6    312  1  2 045 045  1  2 045 045
3    350    35 0    6  2  747      450 99 99
5    360      -6  1  7502   12  1  7458   40  2  7470  140  2  7478  200  2  7480
5    361     270  2  7500
6    362  1  2 045 045  1  2 045 045
3    400    40 0    7  2  747      600 99 99
5    410       0  1  7501   20  1  7467   28  1  7469   40  2  7469  150  2  7480
5    411     250  2  7480  300  2  7500
6    412  1  2 045 045  1  2 045 045
3    450    45 0    8  2  748      715 99 99
5    460       5  1  7500   20  1  7470   28  1  7470   39  1  7474   54  2  7480
5    461     174  2  7484  220  2  7490  230  2  7500
6    462  1  2 045 045  1  2 045 045
3    500    50 0    7  2  748      830 99 99
5    510     -50  1  7510  -34  1  7470  -24  1  7471    0  2  7490   52  2  7488
5    511     120  2  7490  120  2  7520
6    512  1  2 045 045  1  2 045 045
3    550    55 0    6  2  749      850 99 99
5    560       0  1  7507   10  1  7480   20  1  7480   25  2  7490  150  2  7490
5    561     150  2  7510
6    562  1  2 045 045  1  2 045 045
3   3000 CR155 0   10  3  743      880  1  3
5   3010    -135  1  7530 -135  1  7510  -70  1  7500  -10  1  7500    0  1  7480
5   3011       0  2  7480   14  2  7409   26  2  7409   40  3  7480   70  3  7490
6   3012  1  2 040 040  1  2 028 028  1  2 040 040
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE= 3/13/79

WATER-SURFACE PROFILE FOR: CRAMPTON DRAIN ALONG ROSARY BASIN HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 1, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*
10 AT	0	0	23.	93.	5410.	1.00	-39.	-1.
746.73	0.00			746.73	0.25	0.03		*IS*
15 AT	110	110	23.	55.	2725.	1.00	-34.	-4.
746.73	0.00	0.00	0.00	746.73	0.41	0.05	-0.004	*XS*
20 AT	220	110	23.	37.	1654.	1.00	-26.	-3.
746.73	0.01	0.01	0.00	746.74	0.62	0.09	-0.012	*XS*
25 AT	305	85	23.	36.	1293.	1.00	-25.	7.
746.75	0.01	0.02	0.00	746.76	0.63	0.10	-0.000	*XS*
30 AT	390	85	23.	39.	1390.	1.00	6.	40.
746.78	0.01	0.03	0.0	746.78	0.59	0.10	-0.000	*XS*
35 AT	450	60	23.	15.	312.	1.00	8.	36.
746.83	0.04	0.07	0.02	746.87	1.57	0.38	-0.000	*XS*
40 AT	600	150	23.	26.	458.	1.16	16.	92.
747.42	0.01	0.56	0.0	747.43	0.87	0.26	0.007	*XS*
45 AT	715	115	23.	17.	347.	1.00	16.	49.
747.80	0.03	0.38	0.01	747.83	1.39	0.34	0.003	*XS*
50 AT	830	115	23.	20.	541.	1.00	-39.	-11.
748.14	0.02	0.32	0.0	748.16	1.14	0.23	0.002	*XS*
55 AT	850	20	23.	6.	111.	1.00	8.	22.
748.49	0.23	*******	*******	748.72	3.84	1.04	*******	*XS*
CR155 AT	880	30	23.	223.	33082.	1.07	-4.	62.
748.73	0.00	0.00	0.0	748.73	0.10	0.01	-0.000	*XS*

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 15,DATE= 3/13/79

WATER-SURFACE PROFILE FOR: CRAMPTON DRAIN ALONG ROSARY BASIN HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW *ID*
10 AT 747.64	0 / 0.01	0 /	128. /	204. / 747.65	10322. / 0.63	1.59 / 0.09	-42. /	162. *IS*
15 AT 747.66	110 / 0.02	110 / 0.03	128. / 0.01	130. / 747.69	5775. / 0.99	1.60 / 0.15	-36. / 0.000	143. *XS*
20 AT 747.73	220 / 0.05	110 / 0.08	128. / 0.01	86. / 747.78	3735. / 1.49	1.49 / 0.22	-29. / -0.000	117. *XS*
25 AT 747.83	305 / 0.02	85 / 0.07	128. / 0.0	150. / 747.85	5335. / 0.86	1.57 / 0.15	-28. / -0.004	172. *XS*
30 AT 747.88	390 / 0.02	85 / 0.04	128. / 0.0	156. / 747.90	5899. / 0.82	1.52 / 0.14	2. / -0.000	184. *XS*
35 AT 747.92	450 / 0.03	60 / 0.05	128. / 0.01	107. / 747.96	3136. / 1.20	1.48 / 0.25	3. / -0.000	177. *XS*
40 AT 748.19	600 / 0.02	150 / 0.25	128. / 0.0	133. / 748.21	3192. / 0.96	1.29 / 0.21	11. / 0.002	255. *XS*
45 AT 748.49	715 / 0.06	115 / 0.30	128. / 0.02	78. / 748.55	1958. / 1.64	1.46 / 0.38	13. / 0.019	181. *XS*
50 AT 748.99	830 / 0.09	115 / 0.50	128. / 0.02	60. / 749.08	1908. / 2.13	1.30 / 0.40	-42. / 0.010	115. *XS*
55 AT 749.28	850 / 0.14	20 /*******	128. /*******	55. / 749.42	1143. / 2.34	1.60 / 0.65	5. /*******	150. *XS*
CR155 AT 749.42	880 / 0.00	30 / 0.01	128. / 0.0	274. / 749.43	41473. / 0.47	1.19 / 0.04	-7. / -0.000	70. *XS*

Rosary Basin outlet

LS side

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 18,DATE= 3/13/79

WATER-SURFACE PROFILE FOR: CRAMPTON DRAIN ALONG ROSARY BASIN HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
10 AT	0	0	330.	412.	21583.	1.48	-45.	220.
748.47	0.01			748.48	0.80	0.11		*IS*
15 AT	110	110	330.	333.	15115.	1.48	-39.	220.
748.50	0.02	0.04	0.00	748.53	0.99	0.15	-0.000	*XS*
20 AT	220	110	330.	266.	11194.	1.49	-31.	200.
748.57	0.04	0.07	0.01	748.60	1.24	0.20	0.000	*XS*
25 AT	305	85	330.	328.	14474.	1.27	-31.	212.
748.64	0.02	0.06	0.0	748.66	1.01	0.13	-0.000	*XS*
30 AT	390	85	330.	323.	14840.	1.26	-0.	224.
748.68	0.02	0.04	0.00	748.70	1.02	0.13	0.000	*XS*
35 AT	450	60	330.	273.	10831.	1.16	0.	225.
748.72	0.03	0.04	0.00	748.75	1.21	0.18	-0.000	*XS*
40 AT	600	150	330.	305.	11253.	1.04	7.	272.
748.86	0.02	0.13	0.0	748.88	1.08	0.17	0.000	*XS*
45 AT	715	115	330.	182.	5879.	1.21	10.	220.
749.03	0.06	0.19	0.02	749.09	1.82	0.31	0.000	*XS*
50 AT	830	115	330.	137.	4667.	1.33	-44.	120.
749.46	0.12	0.46	0.03	749.58	2.40	0.44	0.001	*XS*
55 AT	850	20	330.	100.	2712.	1.19	4.	150.
749.59	0.20	0.17	0.04	749.79	3.30	0.65	-0.001	*XS*
CR155 AT	880	30	330.	303.	46505.	1.23	-9.	70.
749.79	0.02	0.03	0.0	749.81	1.09	0.09	-0.005	*XS*

END OF THIS PROFILE

Crampton Drain thru Rosary Basin

$Q_{10} = 270$ $h_4 = 744.80$

$Q_L = 30$

$Q_{10} = 240$ DSS of Rosary Outlet

try $Q_{RO} = 200$, $h_1 = 745.84$

$\Delta h = 745.84 - 744.80 = 1.04$

$Q_{54} = 38$ /40

$Q_{84} = 0$

38/59

try $h_{H@} = 745.84 + 0.01 =$

$Q_{54} = 38$

$Q_{84} = 13$

51/59

try $h_{H@} = 745.86$

$Q_{54} = 38$

$Q_{84} = 19$

57/59

$h_{4RI} = 745.84$, $Q_{RI} = Q_{UC} = 200 - 19 - 61 = 120$ cfs

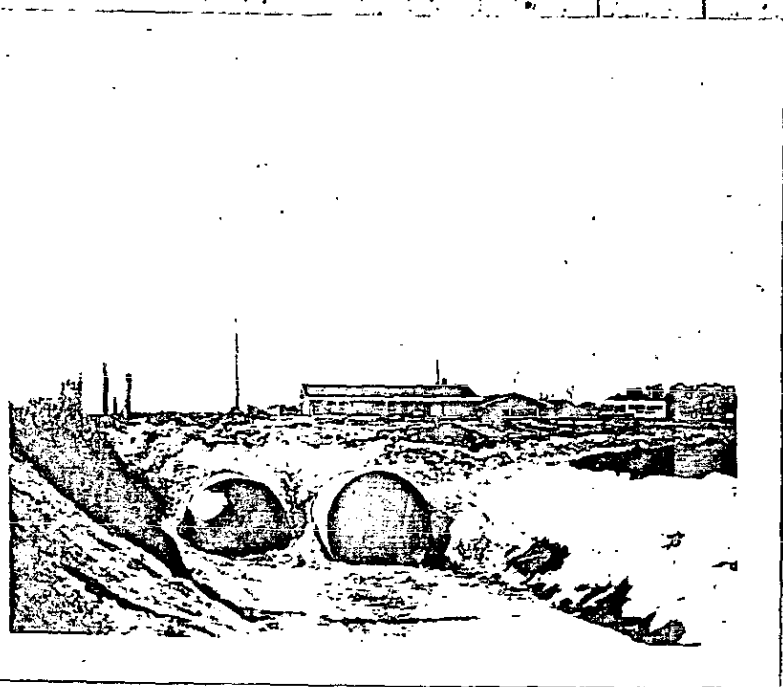
$h_{1RI} = 746.16$

Crampton Drain near Rosary Basin

	Recurrence Interval Flood			
	10	50	100	500
Water Surface Below Rosary Outlet	744.80	746.73	747.64	748.47
Discharge Below Rosary Outlet	270	450	540	760
Local inflow Below Rosary Outlet	30	50	60	87
Discharge thru Rosary Outlet	200	324	300	273
Water Surface in Rosary Basin	745.84	748.59	749.24	749.79
Discharge thru 54 inch culvert	38	53	51	53
Discharge thru 84 inch culvert	19	45	67	114
Water surface at Inlet to Hill Drain	745.86	748.71	749.49	750.52
Discharge thru Rosary Inlet	120	177	111	0
Discharge thru old Crampton Channel	0	23	128	330
Water Surface above Rosary Inlet	746.16	749.00	749.40	749.79

Crompton Drain at Belsay Road

BRIDGE GEOMETRY SECTION _____



Upstream Side Bridge

Attach Photo

Downstream Side Bridge

BASIC DIMENSION CHECKLIST

Bridge
- Alinement ϕ
- Bridge opening width W
- Number of piers
- Widths of piers
- Elevation low steel
- " top curb
- " top guardrail
- Embankment top width
- Embankment sideslope
- Wingwall angles θ
- Wingwall lengths l

Culvert
- Size, shape, material
- Upstr. Invert Elev.
- Downstr. Invert Elev.
- Length of culvert
- Road elevation
- Entrance wingwall angle θ
- Entrance wingwall length
- Length that pipe projects from headwall or fill

Crampton Drain at Belsay Road

Culvert Description

Type: Circular CMP

Diameter: 6 feet

Length: 60 feet

Average Projection: 3 feet

Invert

Upstream 743.14

Downstream 743.36

Discharge Coefficient

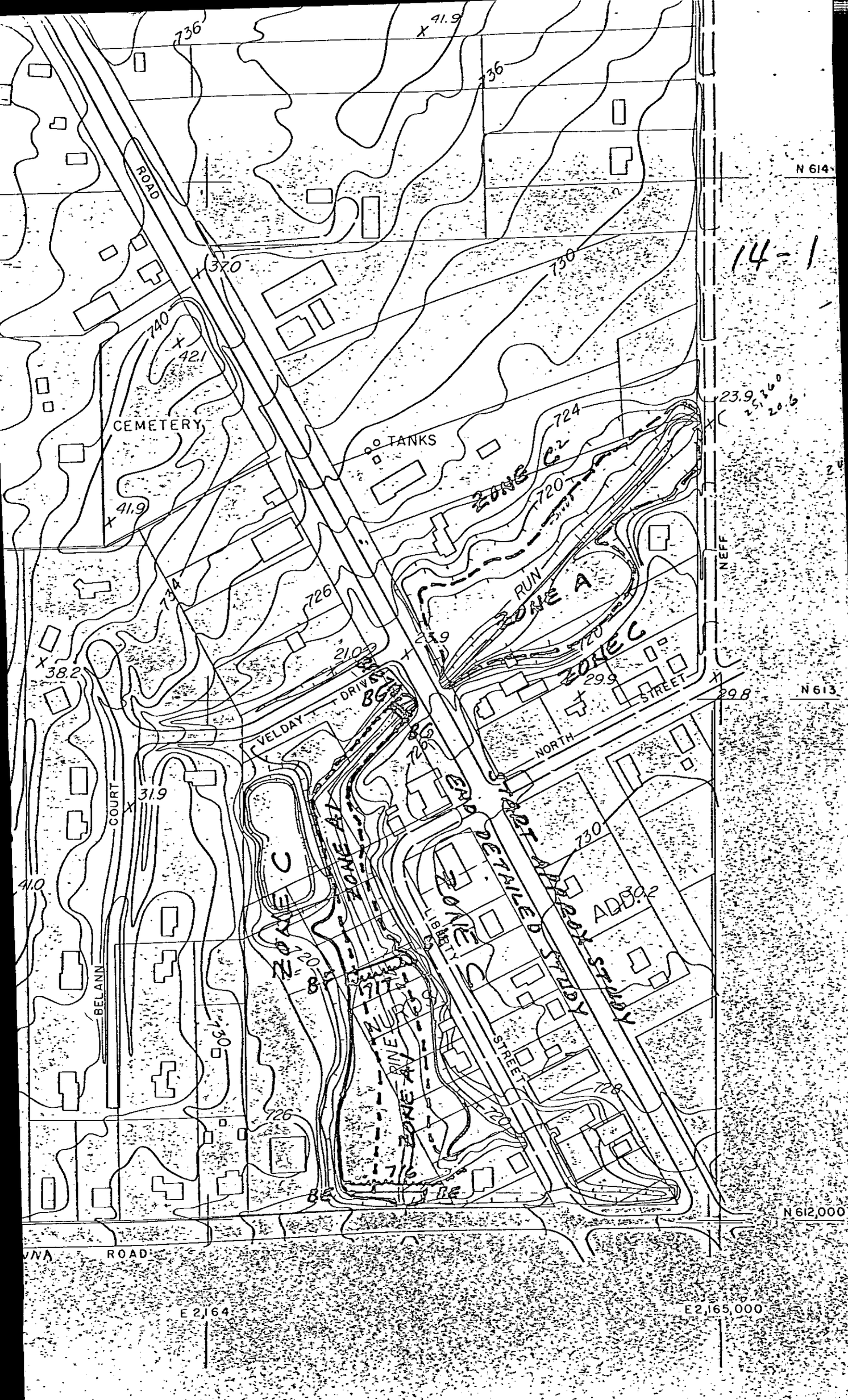
$\frac{h_1 - z}{D}$	Base Coefficient	Rounding Adjust	Projecting Entrance	Discharge Coefficient	Applicable Flow Types
0.0	0.93	1.04	0.91	0.88	I, II, III
0.7	0.92	1.04	0.91	0.87	"
1.1	0.87	1.04	0.91	0.82	"
1.5	0.81	1.04	0.91	0.77	"
1.5	0.46	1.04	0.91	0.44	5
2.0	0.51	1.04	0.91	0.48	"
3.0	0.55	1.04	0.91	0.52	"
5.0	0.59	1.04	0.91	0.56	"
>1.0	0.84	1.04	0.91	0.79	4, 6

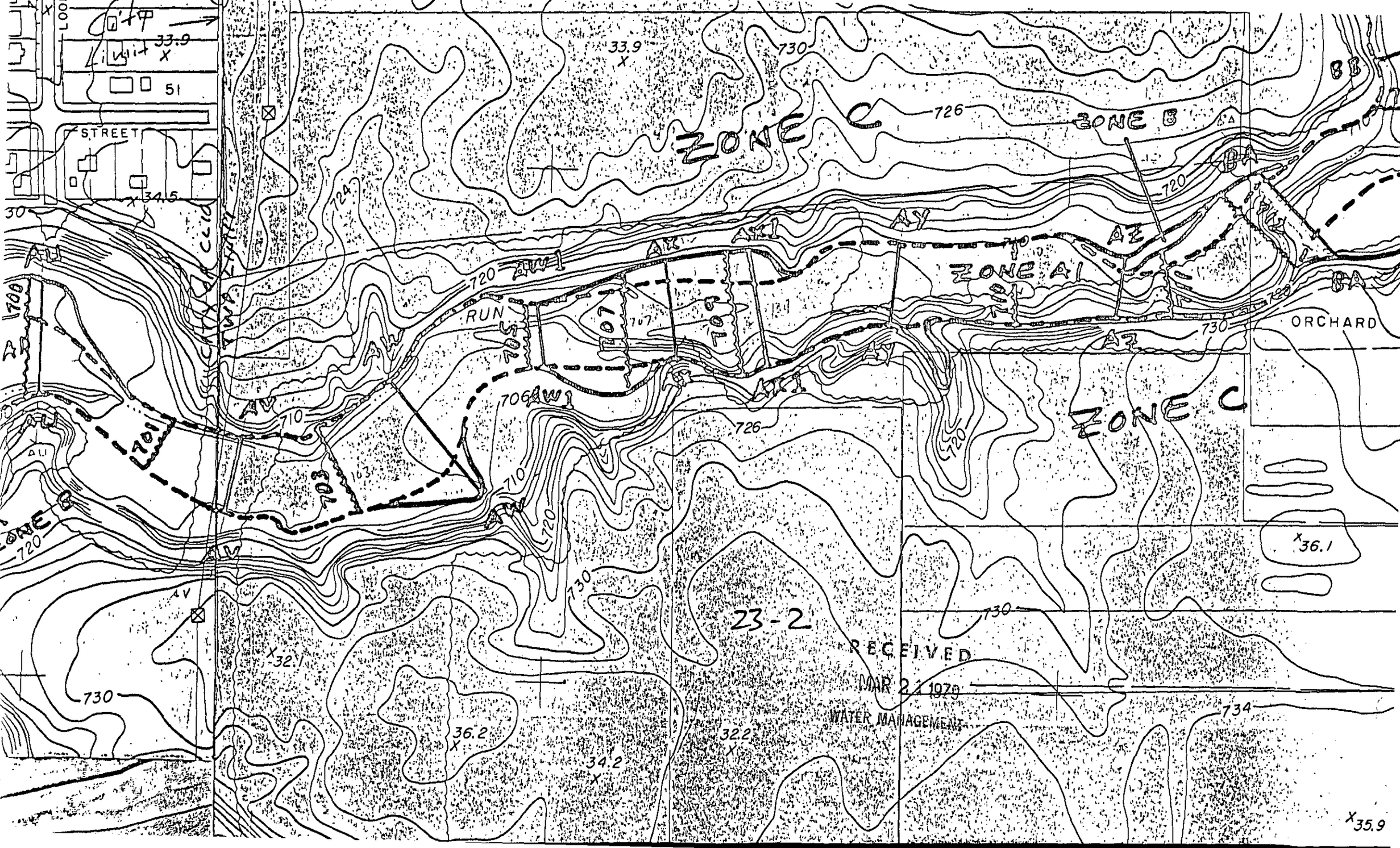
Crompton Drain at Belsay Road

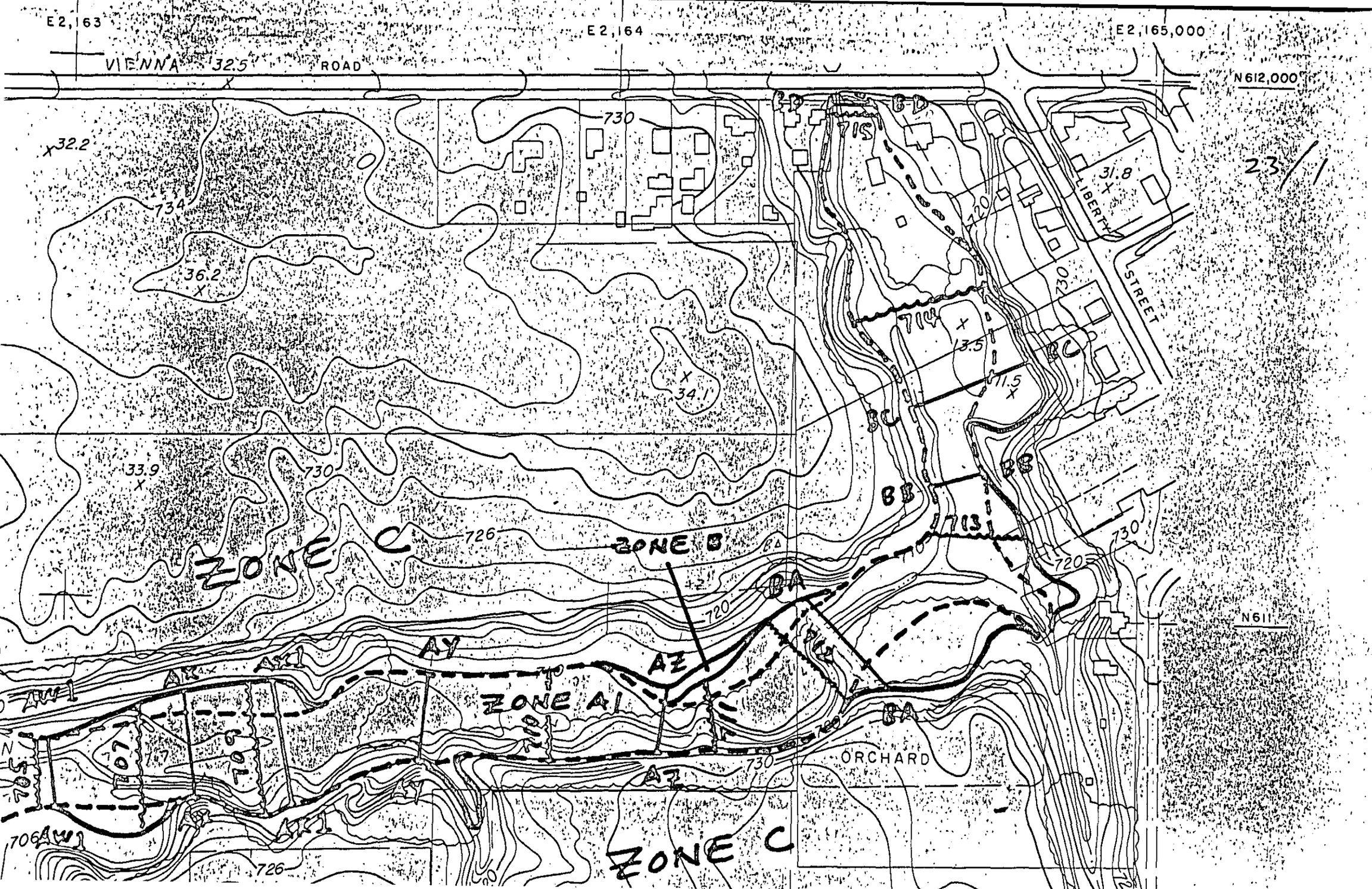
Recurrence Interval	Design Discharge	Water Surface Downstream	Water Surface Upstream	Flow Type	Fall
10	120	746.61	746.93	3	0.32
50	200	749.16	749.50	3	0.34
100	240	749.58	750.19	4	0.61
500	330	750.08	751.24	4	1.16

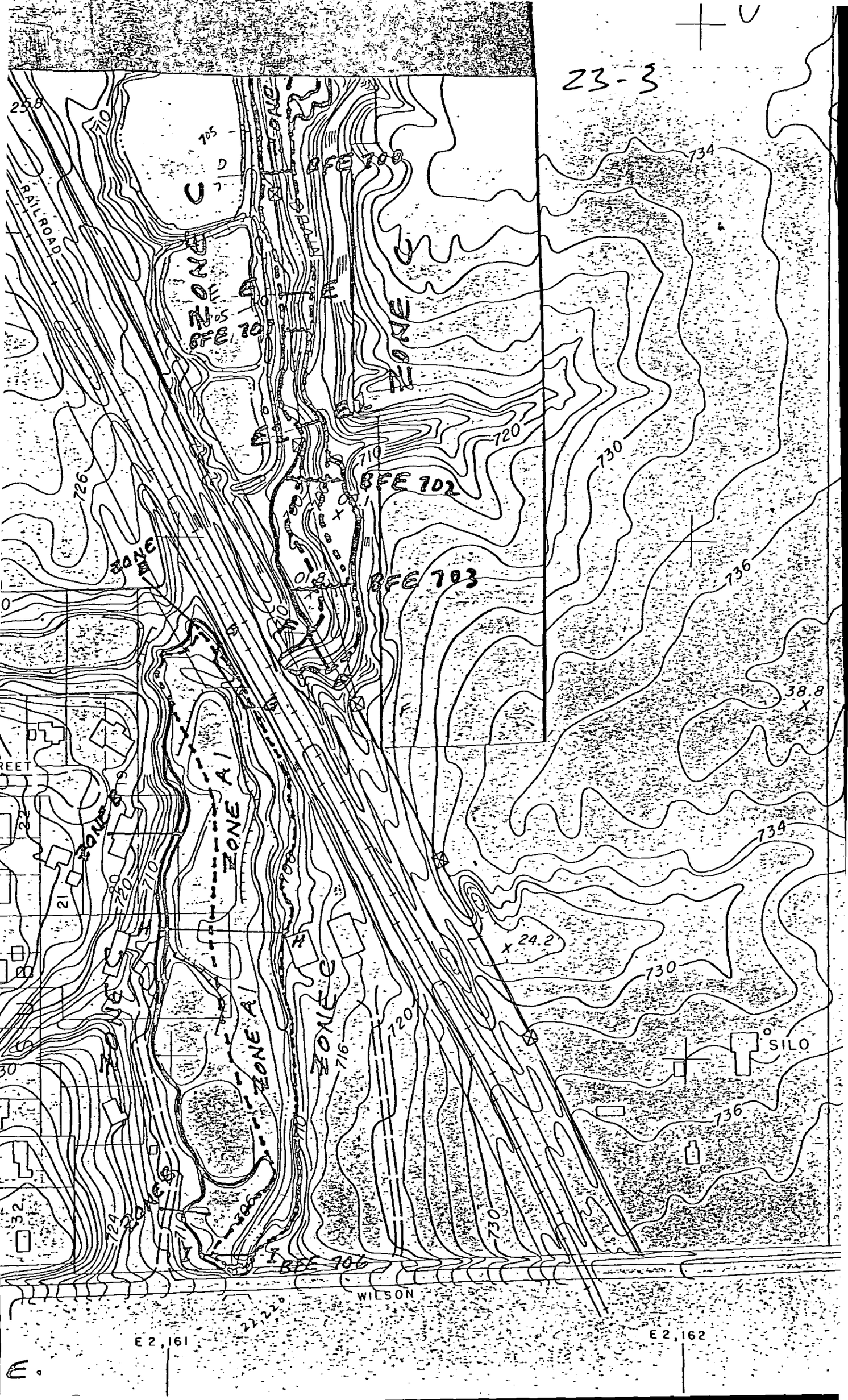
2 circular pipe culverts

½ Q assumed thru each pipe

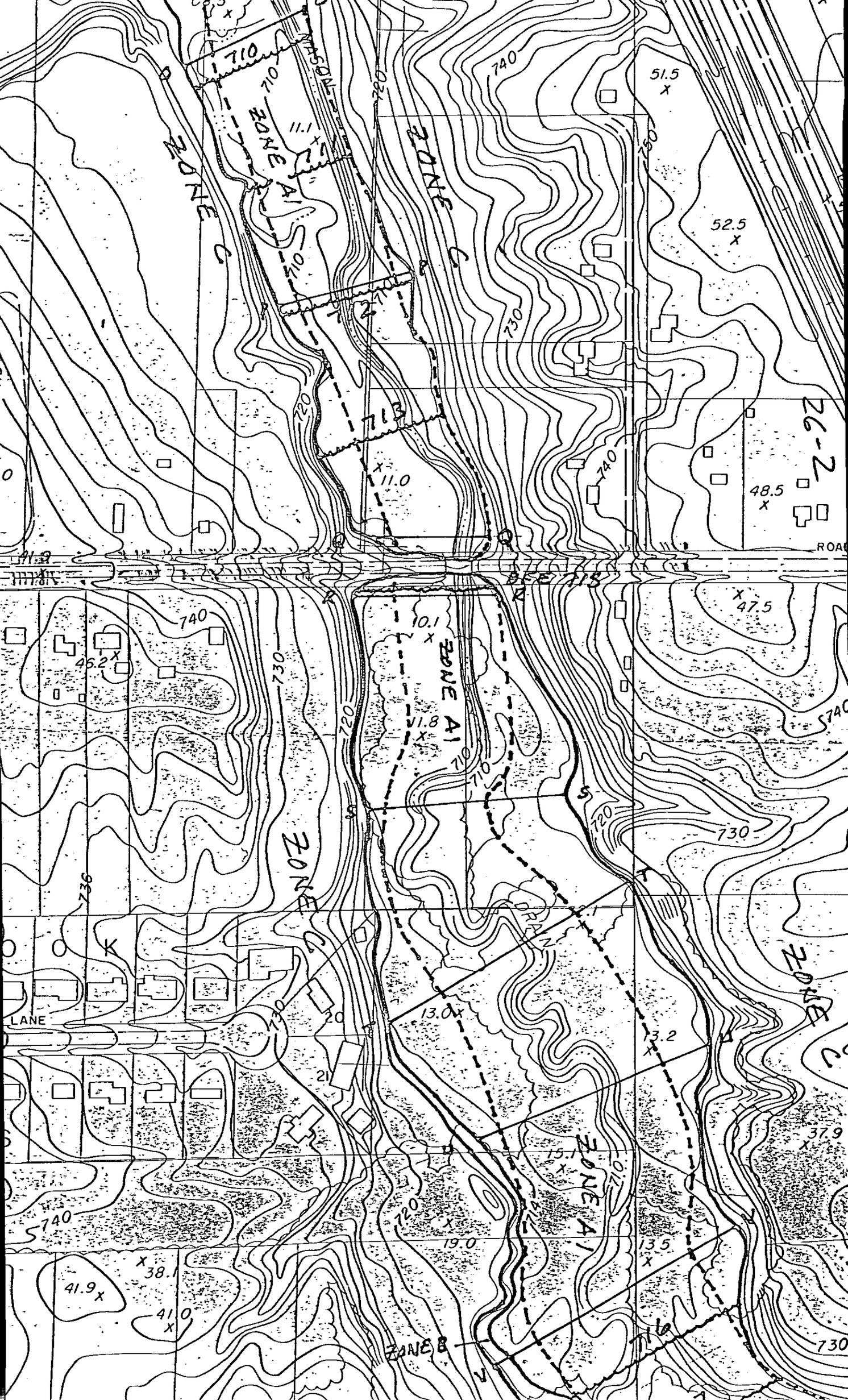

14-1
ROAD
CEMETERY
TANKS
ZONE C2
ZONE A
ZONE C
RUN
NEFF
N 614
N 613
N 612,000
E 2,164
E 2,165,000
VELDAY
DRIVE
NORTH
STREET
COURT
BELANN
LIBERTY
STREET
DETAILED STUDY
APPROX STUDY
ADD
ZONE A1
ZONE C
ZONE A
PINE
NURSE
ROAD

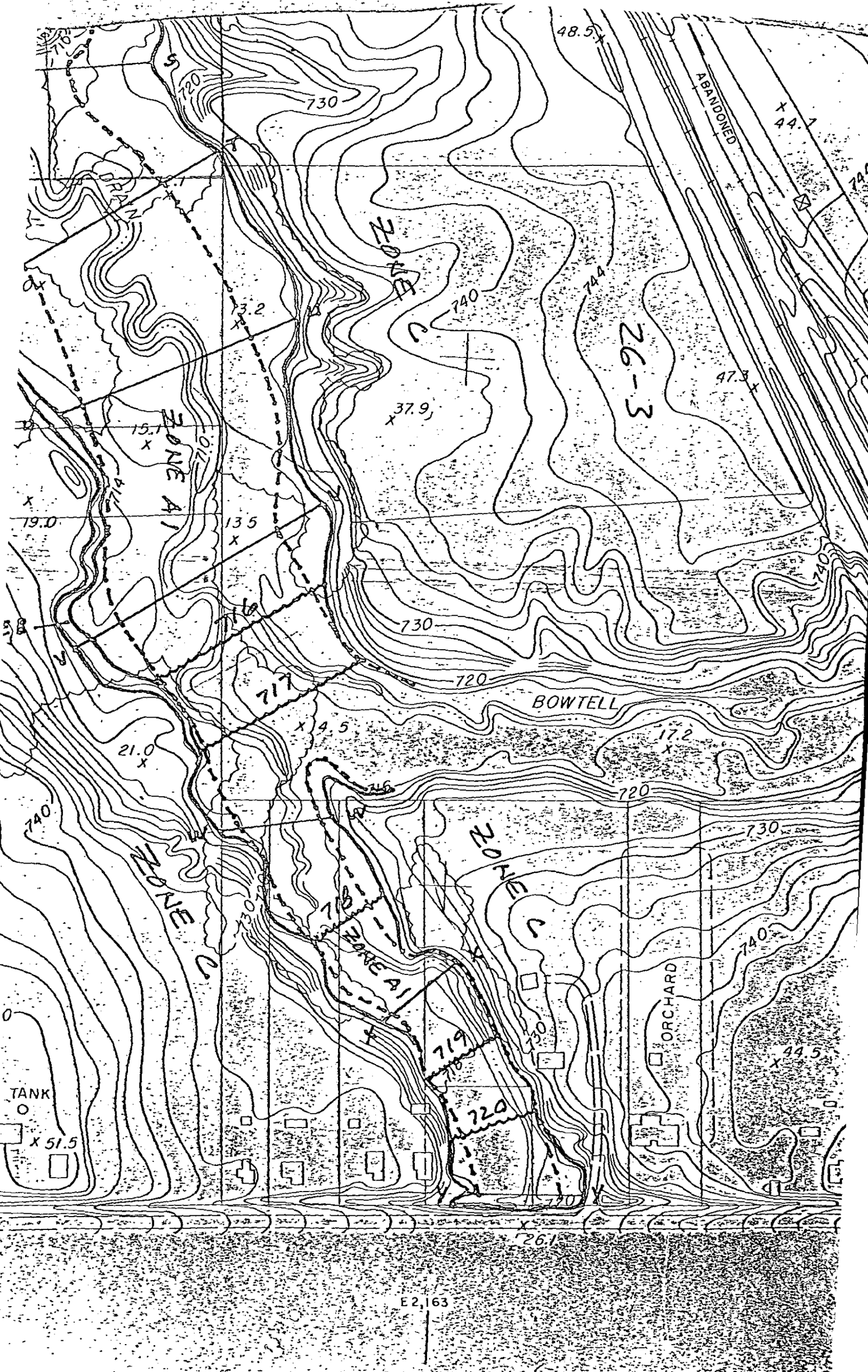

ZONE C
ZONE B
ZONE A1
ZONE C
ZONE C
STREET
RUN
ORCHARD
23-2
RECEIVED
MAR 21 1979
WATER MANAGEMENT


E2,163
E2,164
E2,165,000
VIENNA ROAD
N612,000
N611
LIBERTY STREET
ORCHARD
ZONE C
ZONE B
ZONE A1
BD
BC
BB
BA
AY
AZ
AW1
AX
AX1
730
734
36.2
32.2
32.5
33.9
34.1
31.8
33.5
31.5
715
714
713
720
726
706
705
707
23/1

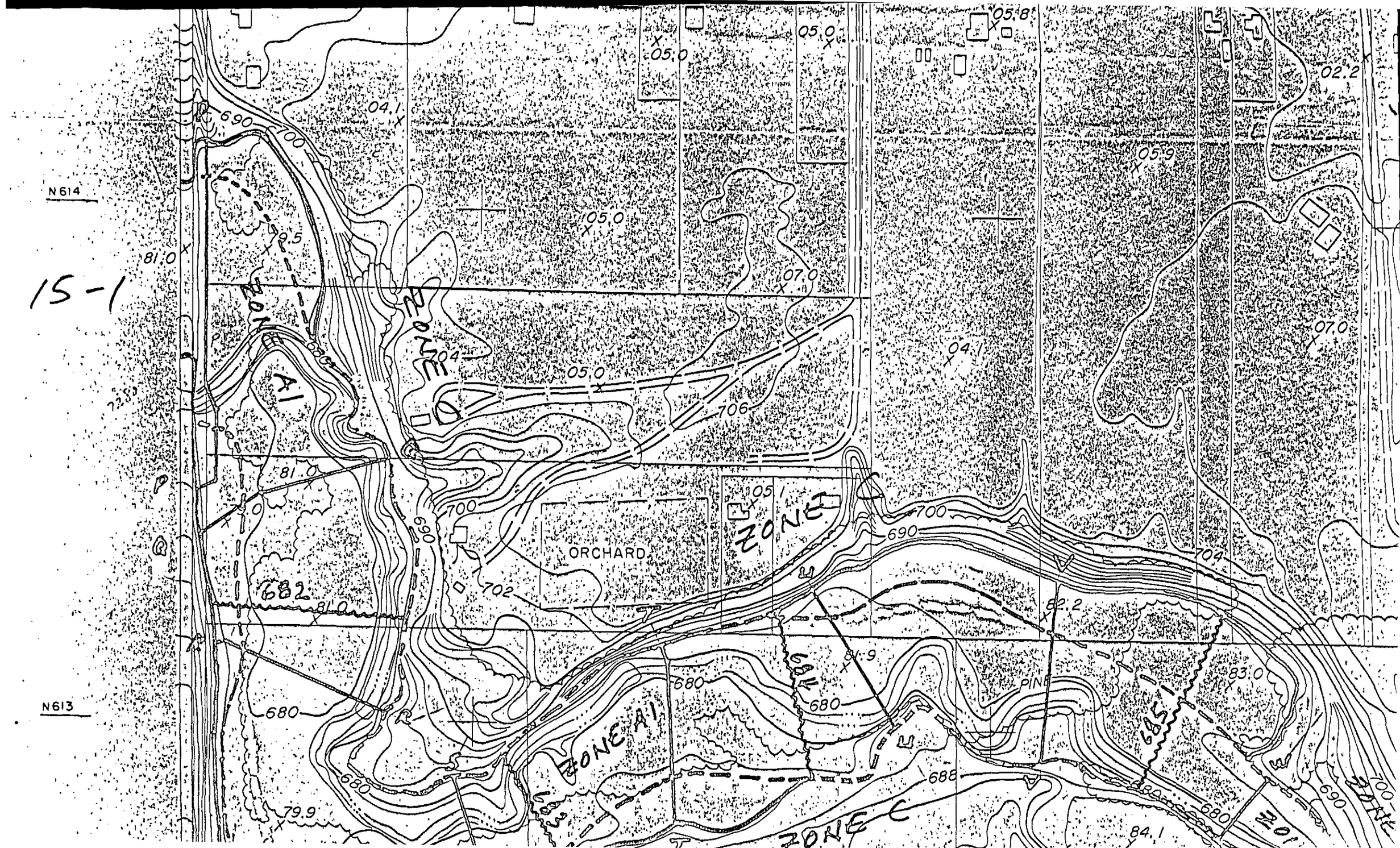

23-3
RAILROAD
ZONE A
ZONE C
BFE 708
BFE 702
BFE 703
BFE 706
SILO
WILSON
E 2,161
E 2,162
734
720
730
726
736
38.8
24.2
710
716
724

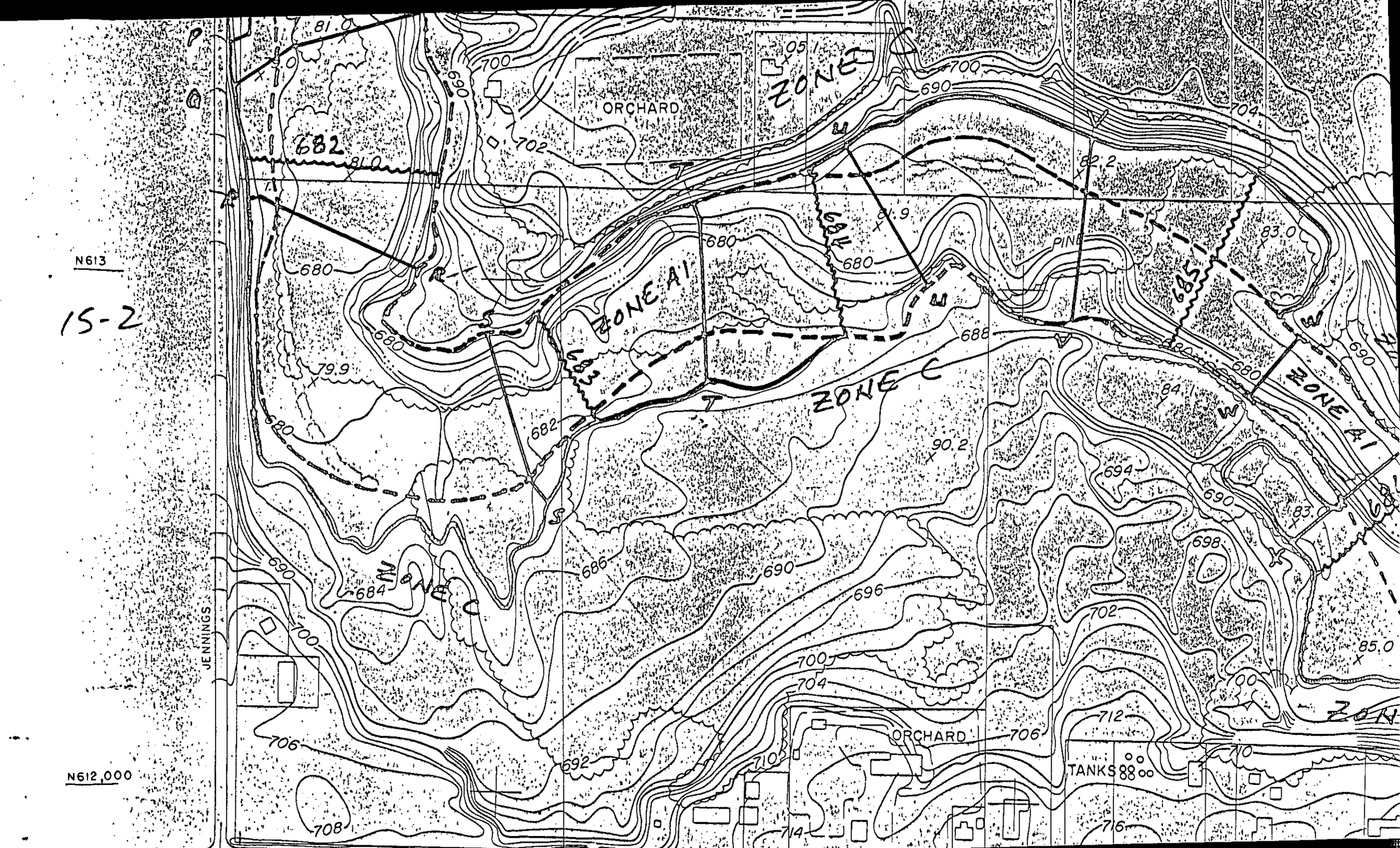
ZONE C
ZONE A
ZONE B
ZONE C
ZONE A
ZONE C
ZONE B
ZONE B
ZONE A
ZONE C
ORCHARD
CHESAPEAKE
OHIO
I-92
N
M
L
K
P
Q
R
S
T
U
V
W
X
Y
Z
708
710
713
720
730
740
714
43.0
39.8
41.9
46.7
44.2
39.0
08.5
41.1
41.0
41.1
35.9
36.2
33
35
28
29


ZONE C
ZONE A1
ZONE C
ZONE A1
ZONE C
ZONE A1
ZONE C
ZONE A1
ZONE B
710
711
712
713
716
720
730
740
750
11.1
11.0
10.1
11.8
13.0
13.2
15.1
13.5
19.0
38.1
41.9
41.0
46.2
51.5
52.5
48.5
47.5
37.9
ROAD
LANE
DRAIN
22-2

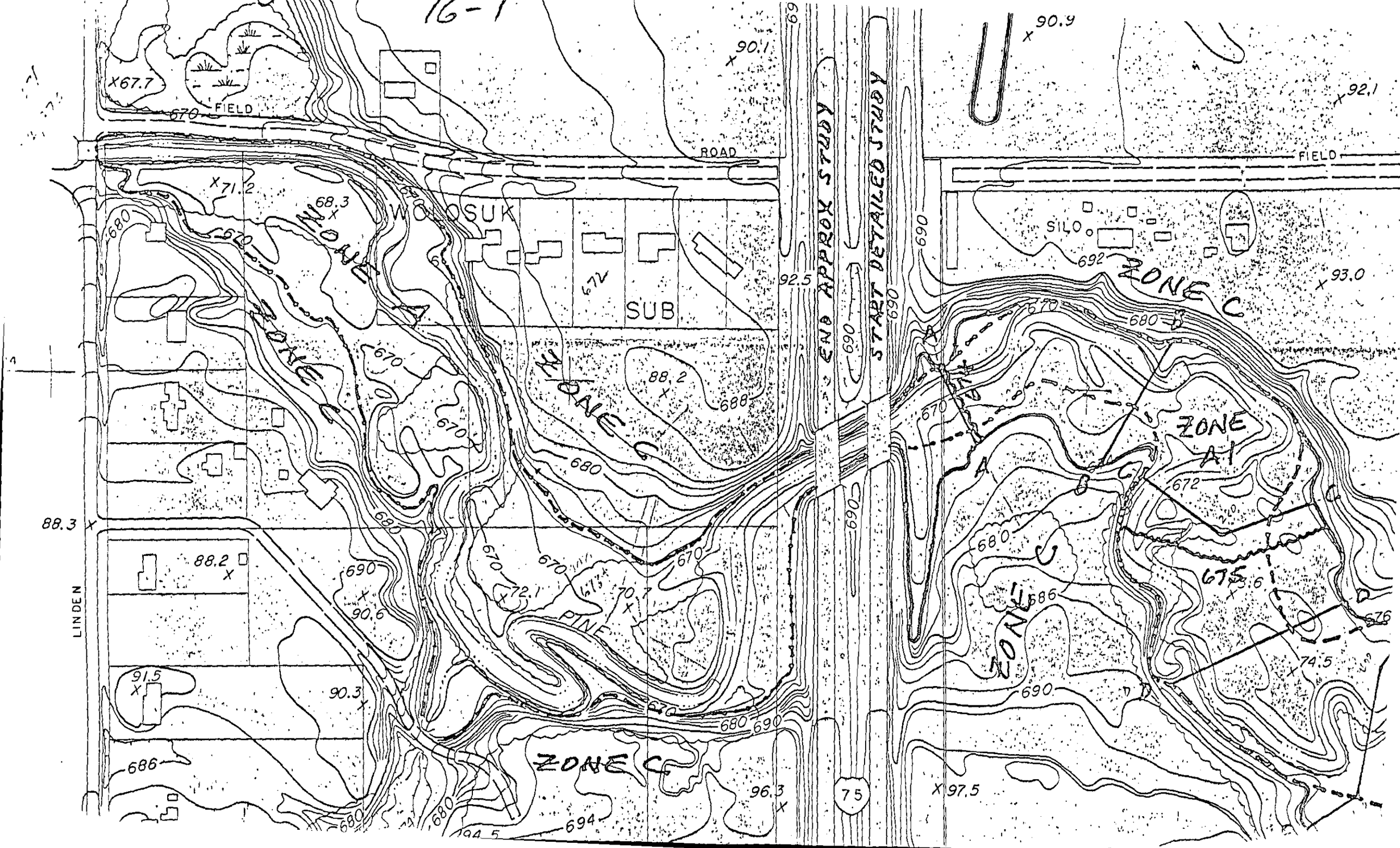

ABANDONED
ZONE C
ZONE A1
ZONE C
ZONE A1
ZONE C
BOWTELL
ORCHARD
TANK
E 2,163
48.5
44.1
37.9
47.3
15.1
13.2
19.0
13.5
4.5
17.2
21.0
44.5
51.5
26.1
730
720
740
744
710
714
716
717
718
719
720

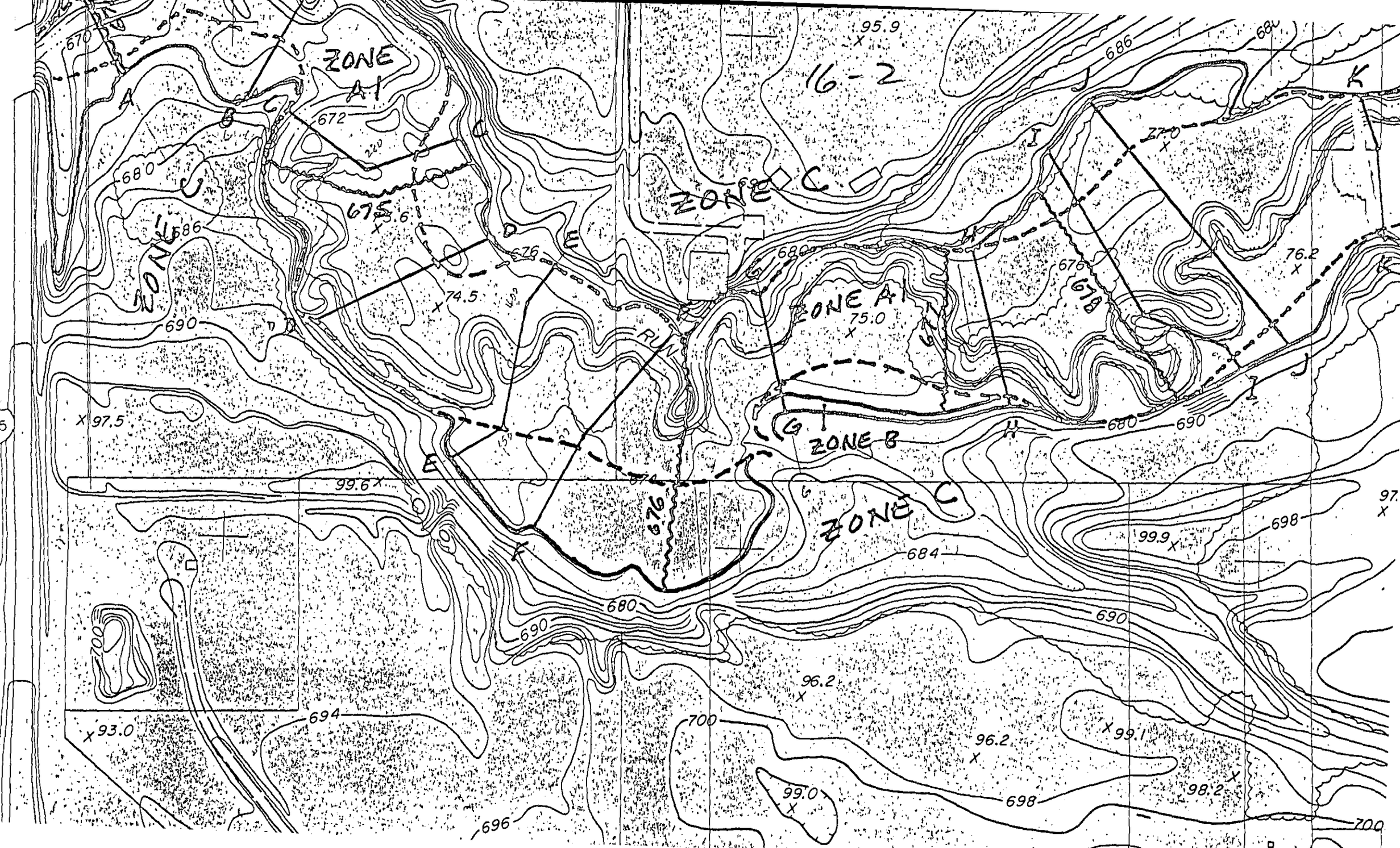
15-1

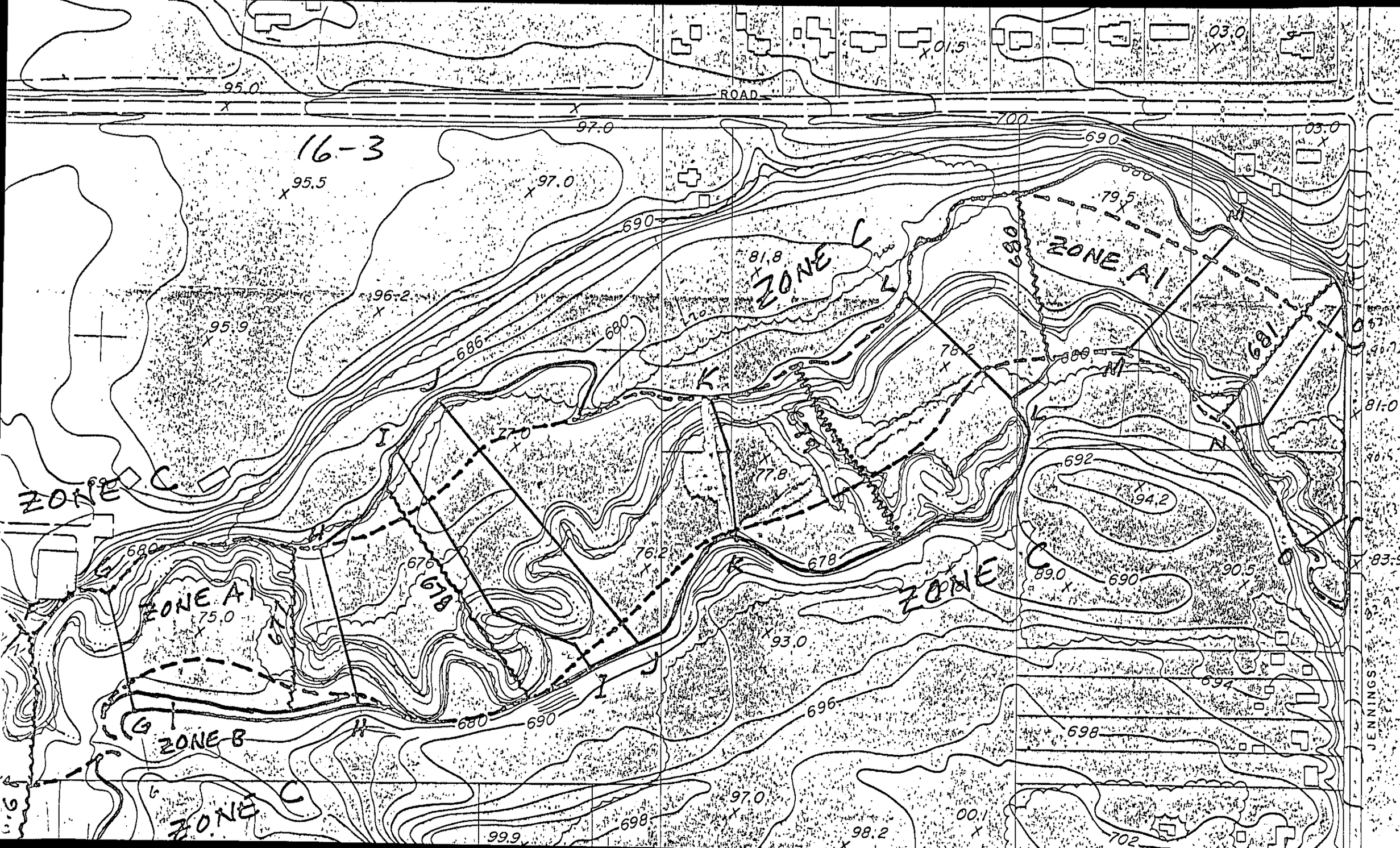

N614
N613
ZONE A1
ZONE A1
ZONE C
ZONE C
ORCHARD
PINE
682
684
685
690
700
702
706
680
688
81.0
79.9
84.1
83.0
82.2
81.9
05.0
05.8
05.9
02.2
07.0
04.1
05.1


ZONE C
ORCHARD
682
81.0
700
690
702
680
ZONE A1
684
686
688
79.9
90.2
694
696
698
704
706
708
710
712
714
716
83.0
85.0
84
82.2
81.9
PINE
DRAINAGE
ZONE A1
ZONE C
JENNINGS
ORCHARD
TANKS
N613
N612,000
15-2

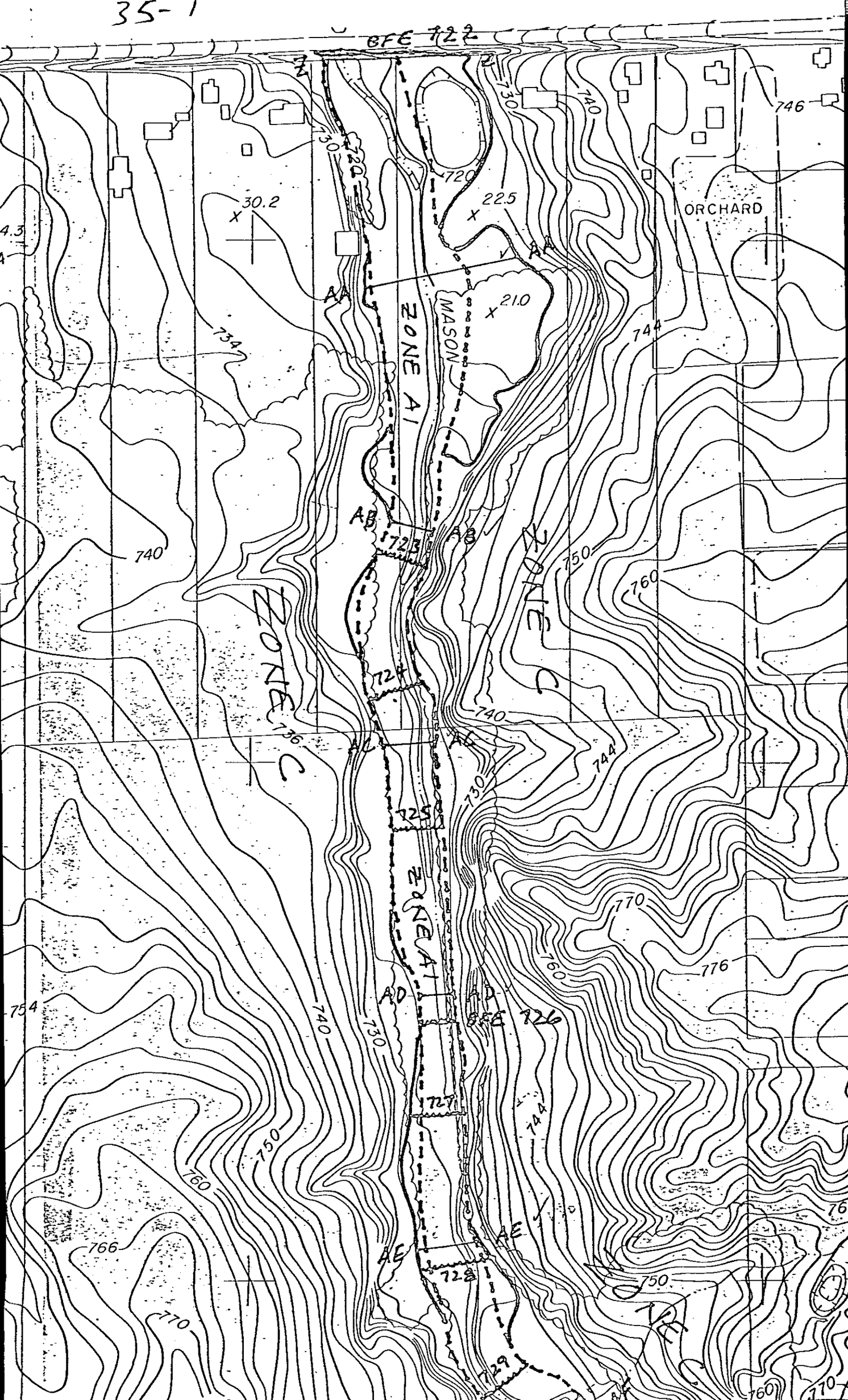
ZONE C
ZONE A1
ZONE C
ZONE A1
ZONE C
ZONE A1
ZONE C
ZONE C
TWP LIMIT
CITY OF CLIO
CITY OF CLIO
CITY LIMIT
PINE
RUN
ORCHARD
TANKS
INCOLN
15-3
AA
AA
700
690
704
680
688
694
696
702
698
712
706
710
714
716
686
82.2
81.9
83.0
84.1
90.2
85.0
86.5
09.8

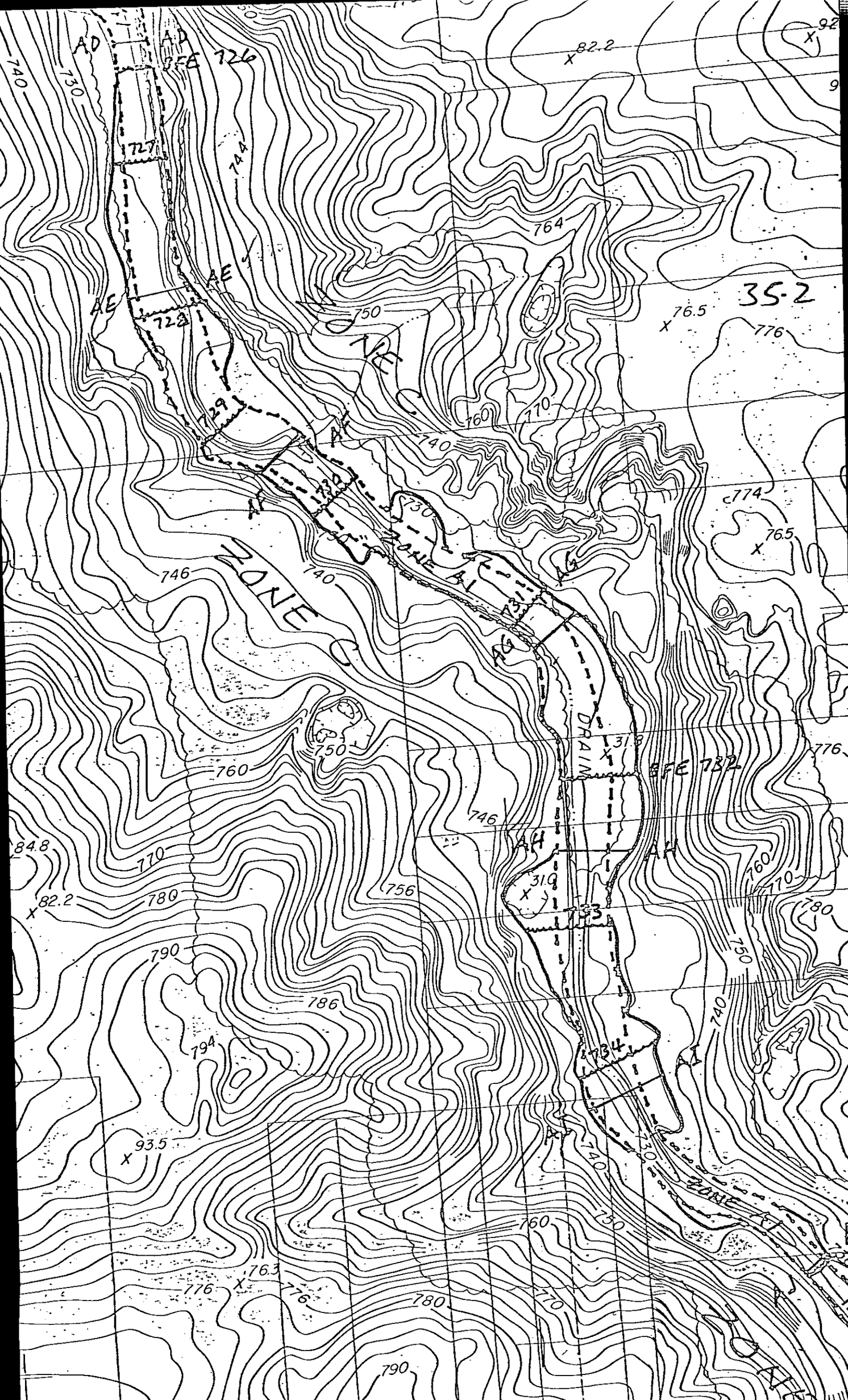

16-1
FIELD
ROAD
FIELD
WOLOSUK
SUB
SILO
ZONE A
ZONE C
ZONE A
ZONE C
ZONE A1
ZONE C
ZONE C
END APPROX STUDY
START DETAILED STUDY
PINE
LINDEN
75
67.7
71.2
68.3
90.1
90.9
92.1
92.5
93.0
88.2
88.3
91.5
90.3
90.6
72.1
70.7
96.3
97.5
74.5
670
680
690
692
688
686
672
675
676
694


16-2
ZONE A1
ZONE C
ZONE A1
ZONE B
ZONE C
ZONE A1
RUN
A
B
C
D
E
F
G
H
I
J
K
670
672
675
676
678
680
684
686
690
694
696
698
700
95.9
74.5
75.0
76.2
97.5
99.6
99.9
93.0
96.2
96.2
99.1
98.2
99.0

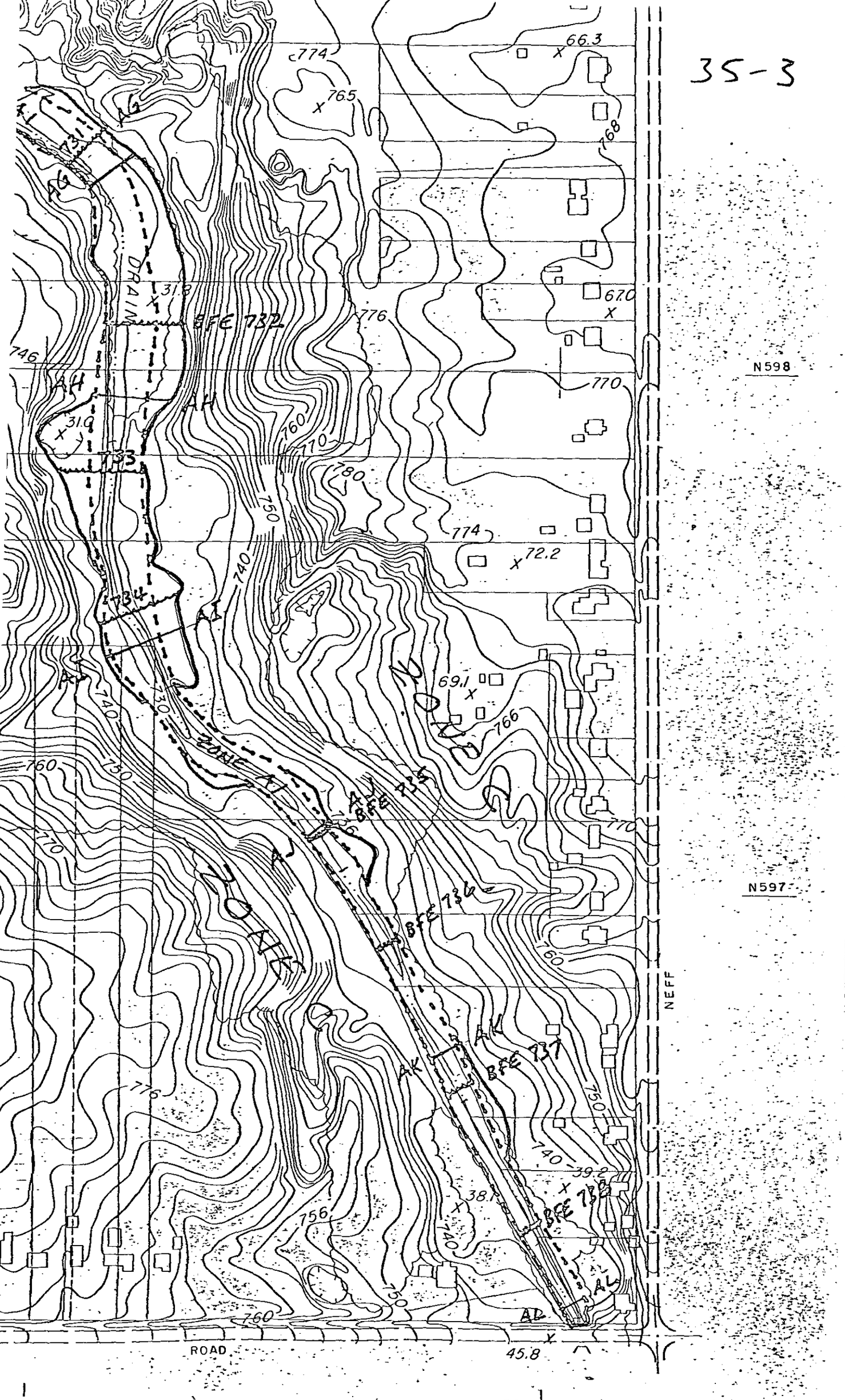

16-3
ROAD
ZONE C
ZONE A1
ZONE B
ZONE E
JENNINGS

35-1


BFE 722
ORCHARD
MASON
ZONE A1
ZONE C
ZONE A1
ZONE C
ZONE A1
ZONE C
AA
AA
AB
AB
AC
AC
AD
AD
AE
AE
BFE 726
720
722
723
724
725
727
728
729
730
734
736
740
744
746
750
754
760
766
770
776
30.2
22.5
21.0


35-2
ZONE C
ZONE C
ZONE A1
DRAIN
BFE 726
BFE 732
AD
AE
AF
AG
AH
AI
727
728
729
730
731
732
733
734
740
730
744
764
750
760
770
774
776
746
756
780
790
786
794
82.2
76.5
84.8
93.5
76.3
31.8
31.9

35-3


774
66.3
76.5
768
731
AG
AG
DRAIN
31.8
BFE 732
776
67.0
746
AH
AH
770
31.9
733
760
770
780
750
774
72.2
740
734
AI
AI
69.1
766
740
730
ZONE A
760
730
770
AJ
BFE 735
736
770
ZONE A
BFE 736
760
AK
AK
BFE 737
750
776
740
39.2
38.1
BFE 738
756
740
AL
AL
760
750
760
45.8
ROAD
NEFF
N598
N597

```
WATER-SURFACE PROFILE FOR:  SWARTZ CK  MOUTH AT FLINT TO THREAD CK   HOLTSLAG
PAGE  1 OF  3, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
=================================================================================
SZ  A AT     390 /      0 /   6500. /  1297. /  500623. / 1.00 /  -47. /   47.
   705.45V/   0.39 /                 /  705.84 /    5.01 /   0.24/          *IS*  A
============================ BEGIN BRIDGE ANALYSIS ==============================
GTWRR AT     390 /        /   6500. /  1346. /  429760. / 1.00 /    0. /   90.
   705.45 /   0.36 /       ...1...  (-.001)   /    4.83 /   0.22 /          *BO*
---------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
---------------------------------------------------------------------------------
SZ  B AT     460 /     70 /   6500. /  1360. /  405444. / 1.03 /  -64. /   55.
   705.49 /   0.37 /   0.01 /    0.0  /  705.85 /    4.78 /   0.24 / -0.000  *AS*
---------------------------------------------------------------------------------
   M = 0.00 / E = 0.23 / K* = 0.01 /  1361. /  405548. / 1.03 /  -64. /   55.
   705.49V/   0.37 /                 /  705.86 /    4.78 /   0.24 /          *AS*  B
============================ END BRIDGE ANALYSIS ================================
SZ C  AT     560 /    100 /   6500. /  1239. /  313966. / 1.00 /  -56. /   56.  C
   705.49V/   0.43 /   0.03 /   0.03 /  705.92 /    5.25 /   0.28 / -0.002  *XS*
---------------------------------------------------------------------------------
SZ C5 AT V   660 /    100 /   6500. /  1059. /  250518. / 1.00 /  -54. /   48.
   705.47 /   0.59 /   0.05 /   0.08 /  706.05 /    6.14 /   0.34 / -0.000  *XS*
---------------------------------------------------------------------------------
SZ  D AT V   970 /    310 /   6500. /  1160. /  287514. / 1.00 /  -55. /   53.
   705.75V/   0.49 /   0.18 /    0.0 /  706.23 /    5.61 /   0.30 / -0.000  *XS*  D
============================ BEGIN BRIDGE ANALYSIS ==============================
KERRR AT V   970 /        /   6500. /   958. /  196771. / 1.00 /    0. /   70.
   705.75 /   0.72 /       ...1...  (-.001)   /    6.78 /   0.32 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /              *RG*
---------------------------------------------------------------------------------
SZ  E AT    1075 /    105 /   6500. /  1244. /  281324. / 1.19 /  -56. /   62.
   705.79 /   0.50 /   0.05 /   0.01 /  706.30 /    5.23 /   0.29 /  0.000  *AS*
---------------------------------------------------------------------------------
   M = 0.13 / E = 0.40 / K* = 0.16 /  1259. /  286161. / 1.19 /  -56. /   62.
   705.92 /   0.49 /                 /  706.41 /    5.16 /   0.28 /          *AS*  E
============================ END BRIDGE ANALYSIS ================================
SZ E5 AT V  1270 /    195 /   6500. /  1276. /  278573. / 1.00 /  -57. /   62.
   706.11 /   0.40 /   0.10 /    0.0 /  706.52 /    5.09 /   0.27 / -0.000  *XS*  F
============================ BEGIN BRIDGE ANALYSIS ==============================
C&ORR AT    1270 /        /   6500. /   961. /  138464. / 1.00 /    2. /  116.
   706.11 /   0.[illegible]
```

100-4

```
SZ  AT    970 /   310 /   6500. /  1160. /  287514. / 1.00 /  -55. /   53.
   705.75 /   0.49 /   0.18 /    0.0  /  706.2 /    5.61 /   0.30 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
KERBR AT    970 /       /   6500. /   958. /  196771. / 1.00 /    0. /   70.
   705.75 /   0.72 /       ...1...  (-.001)    /   6.78 /   0.32 /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /              *RG*
-----------------------------------------------------------------------------
SZ  E AT   1075 /   105 /   6500. /  1244. /  281324. / 1.19 /  -56. /   62.
   705.79 /   0.50 /   0.05 /   0.01 /  706.30 /    5.23 /   0.29 /  0.000  *AS*
-----------------------------------------------------------------------------
   M = 0.13 / E = 0.40 / K* = 0.16 /  1259. /  286161. / 1.19 /  -56. /   62.
   705.92 /   0.49 /                  /  706.41 /    5.16 /   0.28 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
SZ E5 AT   1270 /   195 /   6500. /  1276. /  278573. / 1.00 /  -57. /   62.
   706.11 /   0.40 /   0.10 /    0.0  /  706.52 /    5.09 /   0.27 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
C&OBR AT   1270 /       /   6500. /   961. /  138464. / 1.00 /    2. /  116.
   706.11 /   0.71 /       ...1...  (-.001)    /   6.77 /   0.41 /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /              *RG*
-----------------------------------------------------------------------------
SZ  F AT   1340 /    70 /   6500. /  1221. /  309664. / 1.09 /  -56. /   57.
   706.12 /   0.48 /   0.03 /   0.07 /  706.61 /    5.33 /   0.29 / -0.011  *AS*
-----------------------------------------------------------------------------
   M = 0.04 / E = 0.0  / K* = 0.10 /  1230. /  312949. / 1.10 /  -56. /   57.
   706.20 /   0.48 /                  /  706.68 /    5.29 /   0.28 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
SZ  G AT   1490 /   150 /   6500. /  2291. /  581214. / 1.00 / -115. /   98.
   706.59 /   0.13 /   0.03 /    0.0  /  706.71 /    2.84 /   0.15 / -0.000  *XS*
```

D

E

F

G

H

100-7

WATER-SURFACE PROFILE FOR: SWARTZ CK MOUTH AT FLINT TO THREAD CK HOLTSLAG
PAGE 2 OF 3, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /   HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
SZ  H AT    1780 /   290 /   6500. /  2445. /  654237. / 1.00 / -107. /  103.
   706.64 v/  0.11 /  0.03 /   0.0  /  706.75 /   2.66 /  0.14 / -0.000  *XS*  I
----------------------------------------------------------------------------------
SZ H3 AT    1880 /   100 /   6500. /  1634. /  390694. / 1.00 /  -74. /   73.
   706.58 /  0.25 /  0.02 /   0.07 /  706.83 /   3.98 /  0.21 / -0.000  *XS*
----------------------------------------------------------------------------------
SZ H5 AT    1930 /    50 /   6500. /  1231. /  239964. / 1.00 /  -58. /   61.
   706.51 /  0.43 /  0.02 /   0.09 /  706.95 /   5.28 /  0.29 / -0.000  *XS*
----------------------------------------------------------------------------------
SZ  I AT    2170 /   240 /   6500. /  1095. /  224775. / 1.00 /  -58. /   54.
   706.64 /  0.55 /  0.19 /   0.06 /  707.19 /   5.94 /  0.34 / -0.000  *XS*  J
========================== BEGIN BRIDGE ANALYSIS ==========================
2STBR AT    2170 /       /   6500. /   643. /  118181. / 1.00 /    0. /   56.
   706.64 /  1.59 /      ...1...  (-.001)    /  10.11 /  0.53 /          *BO*
----------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
----------------------------------------------------------------------------------
SZ  J AT    2273 /   103 /   6500. /  1029. /  197674. / 1.13 /  -54. /   59.
   706.67 /  0.70 /  0.10 /   0.08 /  707.37 /   6.32 /  0.37 / -0.001  *AS*
----------------------------------------------------------------------------------
   M = 0.27 / E = 0.62 / K* = 0.57 /  1148. /  231971. / 1.13 /  -55. /   61.
   707.71 /  0.56 /                /  708.27 /   5.66 /  0.32 /          *AS*  K.
========================== END BRIDGE ANALYSIS ============================
SZ  K AT    2712 /   439 /   6500. /  1262. /  311092. / 1.00 /  -61. /   60.
   708.11 /  0.41 /  0.26 /   0.0  /  708.53 /   5.15 /  0.28 / -0.000  *XS*  L
----------------------------------------------------------------------------------
SZ K5 AT    3208 /   496 /   6500. /  1132. /  225019. / 1.00 /  -67. /   56.
   708.36 /  0.51 /  0.30 /   0.05 /  708.88 /   5.74 /  0.33 /  0.000  *XS*
----------------------------------------------------------------------------------
SZ  L AT    3360 /   152 /   6500. /   793. /  166460. / 1.00 /  -35. /   48.
   708.27 /  1.05 /  0.17 /   0.27 /  709.31 /   8.20 /  0.47 / -0.000  *XS*  M
========================== BEGIN BRIDGE ANALYSIS ==========================
CORTB AT    3360 /       /   6500. /   572. /  109819. / 1.00 /    0. /   59.
   708.27 /  2.01 /      ...1...  (-.001)    /  11.36 /  0.64 /          *BO*
----------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
----------------------------------------------------------------------------------
SZ  M AT    3461
```

100-4

```
-----------------------------------------------------------------------------------------
 [illegible] = 0.27 / E = 0.62 / K* = 0.57 /  1148. [illegible]  231971. / 1.13 /  -55. /   61.
  707.71 /   0.56 /                        /  708.27 /   5.66 /   0.32 /                 *AS*  K.
============================ END BRIDGE ANALYSIS ============================
SZ  K AT    2712 /   439 /   6500. /  1262. /  311092. / 1.00 /  -61. /   60.
   708.11 /   0.41 /   0.26 /   0.0  /  708.53 /   5.15 /   0.28 / -0.000  *XS*  L
-----------------------------------------------------------------------------------------
SZ KS AT    3208 /   496 /   6500. /  1132. /  225019. / 1.00 /  -67. /   56.
   708.36 /   0.51 /   0.30 /   0.05 /  708.88 /   5.74 /   0.33 /  0.000  *XS*
-----------------------------------------------------------------------------------------
SZ  L AT    3360 /   152 /   6500. /   793. /  166460. / 1.00 /  -35. /   48.
   708.27 /   1.05 /   0.17 /   0.27 /  709.31 /   8.20 /   0.47 / -0.000  *XS*  M
************************** BEGIN BRIDGE ANALYSIS ***************************
CORTS AT    3360 /        /   6500. /   572. /  109819. / 1.00 /    0. /   59.
   708.27 /   2.01 /        ...1...  (-.001)    /  11.36 /   0.64 /          *BO*
-----------------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
-----------------------------------------------------------------------------------------
SZ  M AT    3461 /   101 /   6500. /  1714. /  391331. / 1.70 /  -56. /  114.
   709.02 /   0.38 /   0.07 /   0.0  /  709.40 /   3.79 /   0.23 /  0.019  *AS*
-----------------------------------------------------------------------------------------
   M = 0.18 / E = 0.42 / K* = 0.36 /  1849. /  429118. / 1.72 /  -58. /  116.
   709.80 /   0.33 /                        /  710.13 /   3.52 /   0.21 /                 *AS*  N
============================ END BRIDGE ANALYSIS ============================
SZ  N AT    3911 /   450 /   6500. /  1399. /  221703. / 1.37 /  -58. /  216.
   709.94 /   0.46 /   0.20 /   0.06 /  710.40 /   4.65 /   0.31 / -0.000  *XS*  O
-----------------------------------------------------------------------------------------
SZ  O AT    4310 /   399 /   6500. /  1127. /  166259. / 1.13 /  -61. /  112.
   710.33 /   0.58 /   0.46 /   0.06 /  710.92 /   5.77 /   0.36 / -0.000  *XS*  P
-----------------------------------------------------------------------------------------
```

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   33,DATE=12/28/77

WATER-SURFACE PROFILE FOR:  SWARTZ CK  MOUTH AT FLINT TO THREAD CK   HOLTSLAG
PAGE  3 OF  3, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
=============================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
=============================================================================
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 33,DATE=12/28/77

WATER-SURFACE PROFILE FOR: SWARTZ CK MOUTH AT FLINT TO THREAD CK HOLTSLAG
PAGE 3 OF 3, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS.

```
==========================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==========================================================================================
SZ  P AT    4630 /   320 /   4300. /   659. /   79417. / 1.19 /  361. /  507.
   710.94 /   0.79 /   0.71 /   0.10 /  711.73 /    6.53 /   0.45 /  0.000   *XS*
------------------------------------------------------------------------------------------
SZ  Q AT    5080 /   450 /   4300. /  1201. /   91002. / 2.03 /  141. /  485.
   712.47 /   0.40 /   1.15 /   0.0  /  712.88 /    3.58 /   0.37 / -0.000   *XS*
------------------------------------------------------------------------------------------
SZ  R AT    5680 /   600 /   4300. /  1630. /  103807. / 2.03 /   44. /  492.
   713.83 /   0.22 /   1.17 /   0.0  /  714.05 /    2.64 /   0.30 /  0.001   *XS*
------------------------------------------------------------------------------------------
SZ  S AT    6430 /   750 /   4300. /  1161. /  106889. / 1.71 /   55. /  473.
   715.01 /   0.36 /   1.25 /   0.07 /  715.38 /    3.70 /   0.30 /  0.000   *XS*
------------------------------------------------------------------------------------------
SZ  T AT    7120 /   690 /   4300. /  1237. /  101325. / 1.06 /   26. /  328.
   716.36 /   0.20 /   1.18 /   0.0  /  716.55 /    3.48 /   0.30 /  0.001   *XS*
------------------------------------------------------------------------------------------
SZ  U AT    7720 /   600 /   4300. /  1176. /  103864. / 1.73 /   23. /  292.
   717.33 /   0.36 /   1.05 /   0.08 /  717.69 /    3.66 /   0.34 /  0.000   *XS*
------------------------------------------------------------------------------------------
SW  V AT    8050 /   330 /   4300. /   763. /   98926. / 1.07 /  393. /  519.
   717.83 /   0.53 /   0.59 /   0.08 /  718.36 /    5.63 /   0.39 / -0.010   *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
CIRBR AT    8050 /        /   4300. /   501. /   67786. / 1.00 /    0. /   65.
   717.83 /   1.15 /        ...1...  (0.074)  /    8.59 /   0.55 /          *BO*
------------------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
------------------------------------------------------------------------------------------
SZ  W AT    8110 /    60 /   4300. /   456. /   60353. / 1.03 /   -7. /   69.
   717.84 /   1.42 /   0.19 /   0.73 /  719.26 /    9.43 /   0.65 / -0.011   *AS*
------------------------------------------------------------------------------------------
   M = 0.01 / E = 0.08 / K* = 0.25 /   494. /   68092. / 1.04 /   -8. /   71.
   718.33 /   1.22 /                 /  719.55 /    8.70 /   0.59 /          *AS*
========================== END BRIDGE ANALYSIS ============================
```

END OF THIS PROFILE

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   31,DATE=11/30/77


WATER-SURFACE PROFILE FOR:  SWARTZ CK USS W COURT ST  SEC SZ AG      HOLTSLAG
PAGE  1 OF  2, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
==========================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /    V  /    FN  /   ACC   *ID*
==========================================================================
SZ  W AT    8110 /     0 /   4300. /   494. /   68112. / 1.04 /   -8. /   71.
   718.33 /   1.22 /                 /  719.55 /    8.70 /   0.59/         *IS*
--------------------------------------------------------------------------
SZ  X AT    8920 /   810 /   4300. /   694. /   83753. / 1.03 /  202. /  343.
   721.56 /   0.62 /   2.63 /   0.0  /  722.18 /    6.20 /   0.47 /  0.000  *XS*
--------------------------------------------------------------------------
SZ  Y AT    9435 /   515 /   4300. /   747. /  113309. / 1.05 /  132. /  235.
   722.64 /   0.54 /   1.00 /   0.0  /  723.18 /    5.76 /   0.35 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ========================
HAMBR AT    9435 /        /   4300. /   784. /  175801. / 1.29 /    0. /   90.
   722.64 /   0.47 /       ...1...  (-.001)    /    5.48 /   0.33 /         *BO*
--------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
--------------------------------------------------------------------------
SZ  Z AT    9560 /   125 /   4300. /   832. /  134176. / 1.08 /   -9. /  121.
   722.89 /   0.45 /   0.15 /   0.0  /  723.34 /    5.17 /   0.32 /  0.007  *AS*
--------------------------------------------------------------------------
   M = 0.02 / E = 0.12 / K* = 0.02 /   833. /  134468. / 1.08 /   -9. /  121.
   722.90 /   0.45 /                 /  723.35 /    5.16 /   0.32 /         *AS*
============================ END BRIDGE ANALYSIS ==========================
SZ AA AT    9975 /   415 /   4300. /   746. /  100136. / 1.05 /  330. /  463.
   723.43 /   0.54 /   0.57 /   0.05 /  723.97 /    5.76 /   0.40 /  0.000  *XS*
--------------------------------------------------------------------------
SZ AB AT   10360 /   385 /   4300. /  1479. /  230310. / 1.30 /   15. /  287.
   724.11 /   0.17 /   0.31 /   0.0  /  724.28 /    2.91 /   0.21 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ========================
CIRBR AT   10360 /        /   2731. /   465. /   45110. / 1.00 /    0. /   72.
   721.70 /   0.54 /       ...3...  (-.001)    /    5.88 /   0.40 /         *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT    1579. /              *RG*
--------------------------------------------------------------------------
SZ AC AT   10425 /    65 /   4300. /  1277. /  161126. / 1.43 / -134. /  169.
   724.12 /   0.25 /   0.03 /   0.07 /  724.37 /    3.37 /   0.26 / -0.011  *AS*
--------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  1476.  /  193145.
```

X

Y

Z

AA

AB

AC

000.4

```
-----------------------------------------------------------------------------------------
  NO EMBANKMENT CROSS SECTION
-----------------------------------------------------------------------------------------
SZ  Z AT     9560 /    125 /    4300. /    832. /  134176. / 1.08 /    -9. /   121.
   722.89 /    0.45 /    0.15 /    0.0  /  723.34 /    5.17 /    0.32 /  0.007   *AS*
-----------------------------------------------------------------------------------------
   M = 0.02 / E = 0.12 / K* = 0.02 /    833. /  134468. / 1.08 /    -9. /   121.
   722.90 /    0.45 /                 /  723.35 /    5.16 /    0.32 /           *AS*  AA
============================ END BRIDGE ANALYSIS ============================
SZ AA AT     9975 /    415 /    4300. /    746. /  100136. / 1.05 /   330. /   463.
   723.43 /    0.54 /    0.57 /    0.05 /  723.97 /    5.76 /    0.40 /  0.000   *XS*  AB
-----------------------------------------------------------------------------------------
SZ AB AT    10360 /    385 /    4300. /   1479. /  230310. / 1.30 /    15. /   287.   AC   000.4
   724.11 /    0.17 /    0.31 /    0.0  /  724.28 /    2.91 /    0.21 / -0.000   *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
CIRBR AT    10360 /        /    2731. /    465. /   45110. / 1.00 /     0. /    72.
   721.70 /    0.54 /        ...3...  (-.001)    /    5.88 /    0.40 /           *BO*
-----------------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT    1579. /                    *RG*
-----------------------------------------------------------------------------------------
SZ AC AT    10425 /     65 /    4300. /   1277. /  161126. / 1.43 / -134. /   169.
   724.12 /    0.25 /    0.03 /    0.07 /  724.37 /    3.37 /    0.26 / -0.011   *AS*
-----------------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   1476. /  193145. / 1.40 / -140. /   175.
   724.76 /    0.18 /                 /  724.94 /    2.91 /    0.22 /           *AS*  AD
============================ END BRIDGE ANALYSIS ============================
SZ AD AT    10650 /    225 /    4300. /   1807. /  202988. / 1.78 /   192. /   683.
   724.89 /    0.16 /    0.11 /    0.0  /  725.05 /    2.38 /    0.21 / -0.001   *XS*  AE
============================ BEGIN BRIDGE ANALYSIS ============================
CAMBR AT    10650 /        /      56. /    562. /   75164. / 1.00 /     0. /    60.
   724.89 /    0.00 /        ...1...  (-.001)    /    0.10 /    0.01 /           *BO*
-----------------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      131. / RIGHT    3686. /                    *RG*
-----------------------------------------------------------------------------------------
SZ AE AT    10720 /     70 /    4300. /   2642. /  310084. / 1.66 / -119. /   498.
   725.00 /    0.07 /    0.02 /    0.0  /  725.07 /    1.63 /    0.12 / -0.000   *AS*
-----------------------------------------------------------------------------------------
   M = 0.0  / E = 0.0  / K* = 0.01 /   2642. /  310084. / 1.66 / -119. /   498.
   725.00 /    0.07 /                 /  725.07 /    1.63 /    0.12 /           *AS*  AF
```

END BRIDGE ANALYSIS

WATER-SURFACE PROFILE FOR: SWARTZ CK USS W COURT ST SEC SZ AG HOLTSLAG
PAGE 2 OF 2, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID / WS ELEV	AT DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*	
SZ AF AT	11275	555	4300.	2702.	228191.	1.94	21.	550.	A6
725.14	0.08	0.15	0.00	725.22	1.59	0.17	0.000	*XS*	
SZ AG AT	11620	345	4300.	2655.	250045.	1.62	298.	991.	A4
725.27	0.07	0.11	0.0	725.33	1.62	0.12	-0.000	*XS*	

100-yr

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 16,DATE=11/30/77

WATER-SURFACE PROFILE FOR: SWARTZ CK CIRCLE RD THROUGH GOLF COURSE HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	HV	HF	HE	EG	V	FN	LENGTH / DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	ACC	REW	*ID*
SZ AG AT 11620		0	4300.	2658.	250373.	1.62					297.		991.	
725.27	0.07			725.34	1.62	0.12								*IS*
SZ AH AT 12165		545	4300.	1979.	167212.	1.49					64.		735.	
725.49	0.11	0.24	0.02	725.60	2.17	0.18						-0.000		*XS*
SZ AI AT 12970		805	4300.	1647.	118006.	2.00					43.		1117.	
726.18	0.21	0.75	0.05	726.39	2.61	0.32						-0.017		*XS*
SZ AJ AT 13535		565	4300.	1868.	169631.	1.41					471.		1195.	
726.79	0.12	0.52	0.0	726.91	2.30	0.20						0.000		*XS*
SZ AK AT 13780		245	4300.	1430.	127032.	1.53					20.		557.	
726.95	0.21	0.21	0.05	727.17	3.01	0.29						-0.001		*XS*
SZ AL AT 14140		360	4300.	1712.	124323.	1.59					475.		1353.	
727.43	0.16	0.42	0.0	727.59	2.51	0.29						-0.001		*XS*

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 15,DATE=12/13/77

WATER-SURFACE PROFILE FOR: SWARTZ CK SEC AK TO BALLANGER ROAD HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECTO AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*	
SZ AK AT / 726.95	13780 / 0.22	0 /	4300. /	1428. / 727.17	126782. / 3.01	1.53 / 0.29	20. /	557. *IS*	AL
SZ AL AT / 727.45	14140 / 0.15	360 / 0.42	4300. / 0.0	1726. / 727.60	125510. / 2.49	1.58 / 0.29	473. / 0.018	1353. *XS*	AM
SZ AM AT / 728.91	15135 / 0.28	995 / 1.52	4300. / 0.07	1325. / 729.19	96387. / 3.24	1.74 / 0.36	80. / 0.002	803. *XS*	AN
SZ AN AT / 730.33	16045 / 0.17	910 / 1.30	4300. / 0.0	1478. / 730.50	133803. / 2.91	1.27 / 0.25	215. / 0.000	662. *XS*	AO
SZ AO AT / 731.61	17055 / 0.31	1010 / 1.35	4300. / 0.07	1182. / 731.92	103235. / 3.64	1.52 / 0.36	89. / 0.001	538. *XS*	AP 10-4-
SZ AP AT / 732.86	17900 / 0.10	845 / 1.03	4300. / 0.0	1861. / 732.96	147204. / 2.31	1.24 / 0.24	23. / 0.010	747. *XS*	AQ
SZ AQ AT / 733.77	18560 / 0.26	660 / 0.99	4300. / 0.08	1434. / 734.03	83879. / 3.00	1.87 / 0.39	20. / 0.001	594. *XS*	AR
SZ AR AT / 735.04	19170 / 0.24	610 / 1.25	4300. / 0.0	1825. / 735.28	107564. / 2.36	2.78 / 0.33	25. / 0.000	649. *XS*	AS
SZ AS AT / 735.73	19590 / 0.12	420 / 0.57	4300. / 0.0	2311. / 735.85	127193. / 1.86	2.32 / 0.24	29. / 0.000	641. *XS*	AT
SZ AT AT / 736.81	20240 / 0.49	650 / 1.26	4300. / 0.18	1685. / 737.30	74745. / 2.55	4.82 / 0.42	23. / 0.000	984. *XS*	AU

END OF THIS PROFILE

```
==========================================================================
SECTION DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==========================================================================
S7 4C AT   31840 /     0 /   2200. /   641. /   68404. / 1.21 /    0. /  132.
   752.12 /  0.22 /                 /  752.34 /    3.43 /  0.25/          *IS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR 4C AT   31840 /       /   1163. /   242. /   22883. / 1.00 /    0. /   40.
   748.00 /  0.36 /       ...3...  (-.001)    /    4.81 /  0.32 /          *BO*
--------------------------------------------------------------------------
 ROAD OVERFLOW (CFS) / LEFT     628. / RIGHT     406. /
                                                                          *RG*
--------------------------------------------------------------------------
00040 AT   31920 /    80 /   2200. /  1500. /  120169. / 2.47 / -145. /  217.
   752.31 /  0.08 /  0.05 /   0.0  /  752.39 /    1.47 /  0.17 / -0.000  *AS*
--------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  1611. /  131164. / 2.43 / -145. /  224.
   752.61 /  0.07 /                 /  752.68 /    1.37 /  0.16 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
   4E AT   32350 /   430 /   2200. /   997. /  118391. / 1.30 /   36. /  206.
   752.73 /  0.10 /  0.13 /  0.01 /  752.83 /    2.21 /  0.16 / 0.000   *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR 4E AT   32350 /       /   2200. /   513. /   59189. / 1.00 /    0. /   68.
   752.73 /  0.29 /       ...1...  (-.001)    /    4.29 /  0.27 /          *BO*
--------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                          *RG*
--------------------------------------------------------------------------
   4F AT   32410 /    60 /   2200. /   574. /   55373. / 1.21 /   35. /  157.
   752.74 /  0.28 /  0.04 /  0.15 /  753.02 /    3.83 /  0.29 / -0.011  *AS*
--------------------------------------------------------------------------
   M = 0.07 / E = 0.11 / K* = 0.13 /   580. /   56133. / 1.22 /   35. /  157.
   752.79 /  0.27 /                 /  753.06 /    3.79 /  0.28 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
   4G AT   32620 /   210 /   2200. /   682. /   81353. / 1.22 /   15. /  126.
   753.09 /  0.20 /  0.22 /   0.0  /  753.29 /    3.23 /  0.22 / -0.000  *XS*
--------------------------------------------------------------------------
   4H AT   32930 /   310 /   2200. /   544. /   61732. / 1.33 /   93. /  232.
   753.32 /  0.34 /  0.30 /  0.07 /  753.66 /    4.04 /  0.29 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BRC4H AT   32930 /       /   1124. /   105. /    6859. / 1.00 /   31. /   64.
   750.90 /  1.78 /       ...3...  (-.001)    /   10.70 /  1.06 /          *BO*
--------------------------------------------------------------------------
 ROAD OVERFLOW (CFS) / LEFT    1086. / RIGHT       0. /
                                                                          *RG*
--------------------------------------------------------------------------
```

CC

CD

CE 104

CF

CG

CH

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 23,DATE= 1/ 9/78

```
==================================================================================
WATER-SURFACE PROFILE FOR: SWARTZ CR BRISTOL RD TO ARCH BR 4E TO 4I KNUTILLA
PAGE  2 OF  2
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HF  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
   M = **** / E = **** / K# = **** /  702. /   91327. / 1.73 /   -9. /   89.
   755.83 /   0.26 /                 /  756.10 /   3.13 /   0.25 /          *AS*
============================ END BRIDGE ANALYSIS ==============================

                          END OF THIS PROFILE
```

CI 100-4

```
SECTD AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
 WS EL  /    HV  /    HF  /    HE  /     FG  /      V  /    FN  /   ACC    *ID*
==========================================================================
  4I AT   33020 /     0 /   2200. /   701. /   91270. / 1.73 /   -9. /   89.
  755.83 /  0.26 /                  / 756.09 /    3.14 /  0.25/          *IS*
--------------------------------------------------------------------------
  4J AT   33720 /   700 /   2200. /   666. /  114163. / 1.15 /  100. /  207.
  756.23 /  0.19 /  0.33 /   0.0  / 756.42 /    3.30 /  0.22 / 0.000   *XS*
--------------------------------------------------------------------------
  4K AT   34570 /   850 /   2200. /   637. /  102022. / 1.15 /  221. /  320.
  756.57 /  0.21 /  0.35 /  0.01  / 756.78 /    3.45 /  0.22 / -0.000  *XS*
--------------------------------------------------------------------------
  4L AT   35200 /   630 /   2200. /   635. /   85029. / 1.54 /  164. /  370.
  756.88 /  0.29 /  0.35 /  0.04  / 757.17 /    3.47 /  0.27 / 0.000   *XS*
--------------------------------------------------------------------------
  4M AT   36160 /   960 /   2200. /  1497. /  140270. / 1.34 /  173. /  601.
  757.52 /  0.05 /  0.39 /   0.0  / 757.56 /    1.47 /  0.12 / 0.000   *XS*
--------------------------------------------------------------------------
  4N AT   36940 /   780 /   2200. /  1961. /  120182. / 1.39 /  264. /  874.
  757.77 /  0.03 /  0.22 /   0.0  / 757.79 /    1.12 /  0.14 / 0.008   *XS*
--------------------------------------------------------------------------
4N+1 AT   37370 /   430 /   2200. /  1126. /   62625. / 2.85 /   15. /  470.
  757.97 /  0.17 /  0.28 /  0.07  / 758.14 /    1.95 /  0.27 / -0.000  *XS*
--------------------------------------------------------------------------
  4O AT   37760 /   390 /   2200. /   876. /   50610. / 2.90 /  563. /  903.
  758.51 /  0.28 /  0.60 /  0.06  / 758.80 /    2.51 /  0.34 / 0.000   *XS*
--------------------------------------------------------------------------
  4P AT   38650 /   890 /   2200. /  1482. /   68209. / 3.02 /  425. /  857.
  759.94 /  0.10 /  1.25 /   0.0  / 760.04 /    1.48 /  0.10 / 0.001   *XS*
--------------------------------------------------------------------------
  4Q AT   39360 /   710 /   2200. /  1822. /  116070. / 1.42 /  151. /  618.
  760.44 /  0.03 /  0.43 /   0.0  / 760.47 /    1.21 /  0.09 / 0.002   *XS*
--------------------------------------------------------------------------
  4R AT   40000 /   640 /   2200. /  2242. /  160720. / 1.22 /  131. /  598.
  760.62 /  0.02 /  0.16 /   0.0  / 760.64 /    0.98 /  0.07 / -0.000  *XS*
--------------------------------------------------------------------------
  4S AT   40510 /   510 /   2200. /   599. /   33136. / 2.49 /  349. /  825.
  760.83 /  0.52 /  0.46 /  0.25  / 761.35 /    3.67 /  0.48 / -0.001  *XS*
========================= BEGIN BRIDGE ANALYSIS =========================
BR 4S AT   40510 /       /   1892. /   249. /   20393. / 1.00 /    0. /   36.
  760.80 /  0.90 /       ...3...  (-.001)   /    7.60 /  0.51 /          *BO*
--------------------------------------------------------------------------
 ROAD OVERFLOW (CFS) / LEFT      135. / RIGHT      177. /
                                                                         *RG*
--------------------------------------------------------------------------
  4T AT   40570 /    60 /   2200. /  1424. /   [illegible]
```

```
==========================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==========================================================================================
   5A AT   44600 /     0 /   2200. /  1214. /   78283. / 2.27 / -155. /  247.
   767.55 /   0.12 /                 /  767.67 /    1.81 /   0.21/          *IS*
------------------------------------------------------------------------------------------
   5B AT   45500 /   900 /   2200. /  1695. /  107224. / 1.22 /  426. /  852.
   768.15 /   0.03 /   0.52 /   0.0  /  768.19 /    1.30 /   0.10 / 0.001  *XS*
------------------------------------------------------------------------------------------
   5C AT   46380 /   880 /   2200. /  1007. /   65440. / 2.11 / 1060. / 1476.
   768.70 /   0.16 /   0.61 /   0.06 /  768.86 /    2.19 /   0.26 / 0.000  *XS*
------------------------------------------------------------------------------------------
   5D AT   47120 /   740 /   1950. /   829. /   42526. / 2.27 / 1084. / 1544.
   769.83 /   0.20 /   1.14 /   0.02 /  770.02 /    2.35 /   0.34 / 0.001  *XS*
------------------------------------------------------------------------------------------
5D+1  AT   47420 /   300 /   1950. /   893. /   54182. / 2.38 /  152. /  561.
   770.33 /   0.18 /   0.50 /   0.0  /  770.50 /    2.18 /   0.28 / -0.014 *XS*
------------------------------------------------------------------------------------------
   5E AT   47960 /   540 /   1950. /   956. /   59765. / 2.53 /   65. /  424.
   770.98 /   0.16 /   0.63 /   0.0  /  771.14 /    2.04 /   0.26 / 0.002  *XS*
------------------------------------------------------------------------------------------
5E+1  AT   48180 /   220 /   1950. /  1056. /   71459. / 2.23 /   94. /  438.
   771.23 /   0.12 /   0.20 /   0.0  /  771.34 /    1.85 /   0.22 / 0.009  *XS*
------------------------------------------------------------------------------------------
   5F AT   48640 /   460 /   1950. /   925. /   50269. / 2.11 /  458. /  790.
   771.70 /   0.15 /   0.49 /   0.01 /  771.84 /    2.11 /   0.29 / -0.000 *XS*
------------------------------------------------------------------------------------------
   5G AT   49460 /   820 /   1950. /  1140. /   49306. / 3.10 /    8. /  538.
   772.95 /   0.14 /   1.26 /   0.0  /  773.09 /    1.71 /   0.14 / -0.013 *XS*
------------------------------------------------------------------------------------------
5G+1  AT   50110 /   650 /   1950. /  1225. /   86670. / 2.40 /   34. /  540.
   773.57 /   0.09 /   0.58 /   0.0  /  773.67 /    1.59 /   0.20 / 0.000  *XS*
------------------------------------------------------------------------------------------
   5H AT   50280 /   170 /   1950. /   270. /   22798. / 1.00 /  103. /  173.
   773.54 /   0.81 /   0.33 /   0.36 /  774.35 /    7.22 /   0.65 / -0.000 *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 5H AT   50280 /       /   1950. /   225. /   50378. / 1.00 /    0. /   40.
   773.54 /   1.17 /        ...I...  (-.001)  /    8.67 /   0.54 /          *BO*
------------------------------------------------------------------------------------------
 NO ROAD OVERFLOW
                                                                            *RG*
------------------------------------------------------------------------------------------
   5J AT   50370 /    90 /   1950. /   455. /   51096. / 1.54 /  163. /  270.
   774.21 /   0.44 /   0.29 /   0.0  /  774.65 /    4.29 /   0.36 / -0.000 *AS*
------------------------------------------------------------------------------------------
```

DB
DC
DD
DE
DF
DG
DH
DI
DJ
DK
DL

```
8M AT   99210 /     0 /    360. /    234. /   16241. / 1.42 /    12. /    77.
823.31 /   0.05 /                  / 82[illegible]36 /   1.54 /   0.15/          *IS*
-------------------------------------------------------------------------------
8N AT   99570 /   360 /    360. /    402. /   22436. / 1.33 /    -2. /   131.
823.47 /   0.02 /   0.13 /   0.0  /  823.49 /   0.90 /   0.08 /  0.000  *XS*
-------------------------------------------------------------------------------
8NN  AT   99800 /   230 /    360. /    203. /   10791. / 1.85 /    15. /   108.
823.56 /   0.09 /   0.12 /   0.04 /  823.65 /   1.77 /   0.22 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR8NN AT   99800 /       /    360. /     69. /    4008. / 1.00 /    -2. /    18.
823.56 /   0.42 /       ...1...  (-.001)    /   5.18 /   0.49 /          *BO*
-------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                *RG*
-------------------------------------------------------------------------------
8NNN AT   99860 /    60 /    360. /    209. /   10846. / 2.00 /    15. /   109.
823.63 /   0.09 /   0.07 /   0.00 /  823.72 /   1.72 /   0.22 /  0.001  *AS*
-------------------------------------------------------------------------------
M = 0.28 / E = 0.21 / K* = 0.41 /    227. /   11889. / 2.01 /    14. /   111.
823.81 /   0.08 /                  /  823.89 /   1.59 /   0.21 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
80 AT  100120 /   260 /    360. /    154. /    6444. / 1.83 /    -5. /    73.
824.21 /   0.16 /   0.44 /   0.04 /  824.37 /   2.34 /   0.35 /  0.001  *XS*
-------------------------------------------------------------------------------
800 AT  100300 /   180 /    360. /    296. /   10035. / 1.91 /    10. /   167.
824.69 /   0.04 /   0.36 /   0.0  /  824.73 /   1.22 /   0.22 /  0.000  *XS*
-------------------------------------------------------------------------------
8P AT  100540 /   240 /    360. /    340. /   14484. / 2.39 /   118. /   289.
824.91 /   0.04 /   0.21 /   0.0  /  824.95 /   1.06 /   0.15 /  0.001  *XS*
-------------------------------------------------------------------------------
8P AT  100720 /   180 /    360. /    457. /   17973. / 2.47 /   -88. /   143.
825.01 /   0.02 /   0.09 /   0.0  /  825.04 /   0.79 /   0.12 / -0.000  *XS*
-------------------------------------------------------------------------------
8Q AT  100960 /   240 /    360. /    516. /   20710. / 1.77 /   -81. /    87.
825.11 /   0.01 /   0.08 /   0.0  /  825.12 /   0.70 /   0.10 / -0.000  *XS*
-------------------------------------------------------------------------------
800 AT  101130 /   170 /    360. /    376. /   16627. / 1.81 /   -88. /    36.
825.16 /   0.03 /   0.06 /   0.01 /  825.19 /   0.96 /   0.13 / -0.000  *XS*
-------------------------------------------------------------------------------
80+1  AT  101240 /   110 /    360. /    156. /    5520. / 2.36 /    38. /   151.
825.24 /   0.20 /   0.16 /   0.08 /  825.43 /   2.31 /   0.35 / -0.000  *XS*
-------------------------------------------------------------------------------
8R AT  101610 /   370 /    360. /    482. /   12817. / 4.76 /   259. /   703.
826.07 /   0.04 /   0.68 /   0.0  /  826.11 /   0.75 /   0.16 /  0.002  *XS*
-------------------------------------------------------------------------------
8S AT  102510 /   900 /    360. /    975. /   13482. / 6.20 /    58. / 1101.
826.78 /   0.01 /   0.68 /   0.0  /  826.79 /   0.37 /   0.14 /  0.005  *XS*
-------------------------------------------------------------------------------
```

HB
HC
HD
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HF
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HL

Fenton Road

SWARTZ Creek

Grand Blanc Twp

```
8T AT  104030 /  1520 /    360. /  1292. /   19363. / 7.72 /   40. / 1095.
827.53 /   0.01 /   0.75 /   0.0  /  827.54 /    0.28 /   0.10 / -0.009  *XS*
-----------------------------------------------------------------------------
8T+1  AT  104510 /   480 /    360. /   867. /   15061. / 3.89 /   47. /  638.
827.74 /   0.01 /   0.21 /   0.00 / 827.75 /    0.42 /   0.04 /  0.001  *XS*
-----------------------------------------------------------------------------
8U AT  105000 /   490 /    360. /   330. /    7143. / 4.10 /  338. /  594.
828.30 /   0.08 /   0.59 /   0.03 / 828.38 /    1.09 /   0.28 /  0.002  *XS*
-----------------------------------------------------------------------------
8U+1  AT  105700 /   700 /    360. /   237. /    8887. / 2.22 /   12. /  181.
829.73 /   0.08 /   1.43 /   0.00 / 829.81 /    1.52 /   0.23 /  0.005  *XS*
-----------------------------------------------------------------------------
8V AT  106200 /   500 /    360. /   324. /   10864. / 2.66 /    0. /  200.
830.44 /   0.05 /   0.67 /   0.0  / 830.49 /    1.11 /   0.20 /  0.002  *XS*
-----------------------------------------------------------------------------
8W AT  106620 /   420 /    360. /   358. /   13970. / 2.44 /   44. /  239.
830.81 /   0.04 /   0.36 /   0.0  / 830.85 /    1.01 /   0.16 /  0.001  *XS*
-----------------------------------------------------------------------------
8W+1  AT  107010 /   390 /    360. /   203. /    9220. / 1.69 /   61. /  301.
831.18 /   0.08 /   0.39 /   0.02 / 831.26 /    1.78 /   0.22 /  0.000  *XS*
-----------------------------------------------------------------------------
8X AT  107400 /   390 /    360. /   209. /    7611. / 1.11 /   32. /  156.
831.93 /   0.05 /   0.72 /   0.0  / 831.98 /    1.72 /   0.27 / -0.002  *XS*
-----------------------------------------------------------------------------
8Y AT  108020 /   620 /    360. /   313. /   13709. / 1.88 /   14. /  148.
832.71 /   0.04 /   0.77 /   0.0  / 832.75 /    1.15 /   0.17 /  0.001  *XS*
-----------------------------------------------------------------------------
8YY AT  108240 /   220 /    360. /   305. /   11253. / 1.73 /   18. /  163.
832.90 /   0.04 /   0.18 /   0.0  / 832.94 /    1.18 /   0.18 /  0.002  *XS*
-----------------------------------------------------------------------------
8YYY AT  108540 /   300 /    360. /  1088. /   23767. / 2.55 /   43. /  554.
833.08 /   0.00 /   0.15 /   0.0  / 833.08 /    0.33 /   0.03 /  0.000  *XS*
-----------------------------------------------------------------------------
8Z AT  108870 /   330 /    360. /   161. /   10417. / 1.09 /  239. /  312.
833.21 /   0.08 /   0.17 /   0.04 / 833.30 /    2.24 /   0.22 /  0.000  *XS*
-----------------------------------------------------------------------------
8Z AT  108920 /    50 /    360. /   176. /   11862. / 1.13 /  234. /  313.
833.28 /   0.07 /   0.05 /   0.0  / 833.35 /    2.05 /   0.19 / -0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 8Z AT  108920 /       /    360. /    98. /    4812. / 1.00 /    0. /   28.
832.20 /   0.21 /       ...3...  (-.001)    /    3.68 /   0.35 /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /            *RG*
-----------------------------------------------------------------------------
9A AT  108970 /    50 /    360. /   224. /   12942. / 1.84 /   -2. /   96.
833.32 /   0.07 /   0.04 /   0.00 / 833.39 /    1.61 /   0.19 /  0.001  *AS*
-----------------------------------------------------------------------------
```

```
833.76 /   0.05 /                    /  833.81 /   1.34 /   0.16/                 *IS*
-----------------------------------------------------------------------------------------
98 AT  109740 /   770 /    360. /    331. /   21754. / 1.29 /    53. /   146.
834.08 /   0.02 /   0.29 /   0.0  /  834.11 /   1.09 /   0.10 /  0.000   *XS*
-----------------------------------------------------------------------------------------
9C AT  110200 /   460 /    360. /    707. /   22377. / 2.78 /    53. /   307.
834.22 /   0.01 /   0.12 /   0.0  /  834.23 /   0.51 /   0.10 /  0.000   *XS*
-----------------------------------------------------------------------------------------
9D AT  110910 /   710 /    360. /    636. /   13531. / 3.83 /   143. /   549.
834.52 /   0.02 /   0.30 /   0.00 /  834.54 /   0.57 /   0.15 /  0.001   *XS*
-----------------------------------------------------------------------------------------
9E AT  111500 /   590 /    360. /    435. /   10459. / 3.44 /   244. /   588.
835.06 /   0.04 /   0.54 /   0.01 /  835.09 /   0.83 /   0.19 /  0.002   *XS*
-----------------------------------------------------------------------------------------
9E+1  AT  111940 /   440 /    360. /    281. /    9041. / 2.06 /    56. /   252.
835.65 /   0.05 /   0.60 /   0.01 /  835.71 /   1.28 /   0.22 /  0.003   *XS*
-----------------------------------------------------------------------------------------
9F AT  112160 /   220 /    360. /    366. /    7504. / 3.50 /    61. /   489.
836.08 /   0.05 /   0.42 /   0.00 /  836.13 /   0.98 /   0.26 /  0.004   *XS*
-----------------------------------------------------------------------------------------
9G AT  113480 /  1320 /    360. /    262. /    9375. / 1.23 /    72. /   269.
838.54 /   0.04 /   2.43 /   0.0  /  838.58 /   1.37 /   0.20 /  0.015   *XS*
-----------------------------------------------------------------------------------------
9H AT  113970 /   490 /    360. /    206. /    6991. / 2.02 /    50. /   216.
839.49 /   0.10 /   0.97 /   0.03 /  839.58 /   1.75 /   0.31 /  0.005   *XS*
-----------------------------------------------------------------------------------------
9H+1  AT  114620 /   650 /    360. /    219. /    6798. / 1.91 /    82. /   218.
841.28 /   0.08 /   1.77 /   0.0  /  841.36 /   1.65 /   0.31 /  0.007   *XS*
-----------------------------------------------------------------------------------------
9I+1  AT  115090 /   470 /    360. /    313. /   10667. / 1.83 /    13. /   157.
842.17 /   0.04 /   0.84 /   0.0  /  842.21 /   1.15 /   0.21 /  0.003   *XS*
-----------------------------------------------------------------------------------------
9J AT  115380 /   290 /    360. /    195. /    8007. / 1.86 /   153. /   289.
842.58 /   0.10 /   0.44 /   0.03 /  842.68 /   1.85 /   0.29 /  0.001   *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 9J AT  115380 /        /    360. /     70. /    3198. / 1.00 /     0. /    21.
842.20 /   0.42 /        ...3...  (-.001)    /   5.18 /   0.50 /                *BO*
-----------------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                  *RG*
-----------------------------------------------------------------------------------------
9K AT  115420 /    40 /    360. /    193. /    9070. / 1.83 /   -52. /    29.
842.65 /   0.10 /   0.07 /   0.00 /  842.75 /   1.86 /   0.26 /  0.002   *AS*
-----------------------------------------------------------------------------------------
M = **** / E = **** / K* = **** /    235. /   11802. / 1.80 /   -52. /    31.
843.16 /   0.07 /                   /  843.23 /   1.53 /   0.20 /                *AS*
========================== END BRIDGE ANALYSIS ============================
```

```
8M AT   99210 /     0 /    260. /    175. /   11134. / 1.34 /    13. /    69.
  822.33 /   0.05 /                  /  822.[illegible]8 /   1.48 /   0.16/          *IS*   HB
-----------------------------------------------------------------------------------------
8N AT   99570 /   360 /    260. /    277. /   12762. / 1.45 /    -1. /   128.
  822.53 /   0.02 /   0.17 /   0.0  /  822.55 /   0.94 /   0.09 / 0.001  *XS*   HC
-----------------------------------------------------------------------------------------
8NN  AT   99800 /   230 /    260. /    127. /    6573. / 1.66 /    18. /    88.
  822.67 /   0.11 /   0.19 /   0.04 /  822.78 /   2.05 /   0.26 / 0.000  *XS*   HD
========================== BEGIN BRIDGE ANALYSIS ==========================
BR8NN AT   99800 /       /    260. /     53. /    2774. / 1.00 /    -2. /    18.
  822.67 /   0.37 /       ...1...  (-.001)    /   4.86 /   0.52 /          *BO*
-----------------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                  *RG*
-----------------------------------------------------------------------------------------
8NNN AT   99860 /    60 /    260. /    134. /    6787. / 1.80 /    17. /    93.
  822.76 /   0.11 /   0.09 /   0.0  /  822.87 /   1.94 /   0.25 / 0.002  *AS*
-----------------------------------------------------------------------------------------
  M = 0.15 / E = 0.20 / K* = 0.18 /    139. /    7045. / 1.85 /    16. /    97.
  822.84 /   0.10 /                  /  822.94 /   1.87 /   0.24 /          *AS*   HE
========================== END BRIDGE ANALYSIS ============================
  8O AT  100120 /   260 /    260. /     96. /    3712. / 1.90 /    -4. /    70.
  823.45 /   0.22 /   0.67 /   0.06 /  823.67 /   2.72 /   0.42 / 0.002  *XS*   HF
-----------------------------------------------------------------------------------------
 8OO AT  100300 /   180 /    260. /    212. /    6371. / 2.06 /    12. /   161.
  824.14 /   0.05 /   0.51 /   0.0  /  824.19 /   1.23 /   0.24 / 0.003  *XS*
-----------------------------------------------------------------------------------------
  8P AT  100540 /   240 /    260. /    255. /   10844. / 2.27 /   124. /   286.
  824.39 /   0.04 /   0.23 /   0.0  /  824.43 /   1.02 /   0.14 / 0.003  *XS*   HG
-----------------------------------------------------------------------------------------
  8P AT  100720 /   180 /    260. /    337. /   13148. / 2.33 /   -84. /   142.
  824.49 /   0.02 /   0.09 /   0.0  /  824.51 /   0.77 /   0.12 / 0.000  *XS*   HH
-----------------------------------------------------------------------------------------
  8Q AT  100960 /   240 /    260. /    430. /   16125. / 1.82 /   -79. /    81.
  824.58 /   0.01 /   0.08 /   0.0  /  824.59 /   0.61 /   0.09 / -0.000  *XS*   HI
-----------------------------------------------------------------------------------------
 8QQ AT  101130 /   170 /    260. /    311. /   12853. / 1.83 /   -86. /    32.
  824.63 /   0.02 /   0.06 /   0.00 /  824.65 /   0.84 /   0.12 / -0.000  *XS*
-----------------------------------------------------------------------------------------
8Q+1  AT  101240 /   110 /    260. /    105. /    3999. / 1.85 /    43. /   120.
  824.70 /   0.18 /   0.14 /   0.08 /  824.87 /   2.48 /   0.34 / -0.000  *XS*   HJ
-----------------------------------------------------------------------------------------
  8R AT  101610 /   370 /    260. /    264. /    8777. / 2.80 /   308. /   691.
  825.54 /   0.04 /   0.71 /   0.0  /  825.59 /   0.99 /   0.17 / 0.001  *XS*   HK
-----------------------------------------------------------------------------------------
  8S AT  102510 /   900 /    260. /    649. /    8544. / 6.71 /    66. /  1094.
  826.39 /   0.02 /   0.81 /   0.0  /  826.41 /   0.40 /   0.15 / 0.013  *XS*   HL
-----------------------------------------------------------------------------------------
```

10.4✓

SWARTZ

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.18 *** PAGE COUNT=   31,DATE=12/28/77

WATER-SURFACE PROFILE FOR:  SWARTZ CK  MOUTH AT FLINT TO THREAD CK   HOLTSLAG
PAGE  1 OF  3, PROFILE NUMBER  2,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
=================================================================================
SZ  A AT     390 /     0 /   6500. /  1282. /  498053. / 1.00 /  -45. /   45.
   705.55 /   0.40 /                 /  705.95 /    5.07 /   0.24/          *IS*   A
============================ BEGIN BRIDGE ANALYSIS ==========================
GTWRR AT     390 /       /   6500. /  1355. /  434052. / 1.00 /    0. /   90.
   705.55 /   0.36 /       ...1...  (-.001)    /    4.80 /   0.22 /          *BO*
---------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
---------------------------------------------------------------------------------
SZ  B AT     460 /    70 /   6500. /  1370. /  411498. / 1.03 /  -62. /   53.
   705.60 /   0.36 /   0.01 /    0.0  /  705.96 /    4.74 /   0.24 / -0.000  *AS*
---------------------------------------------------------------------------------
   M = 0.00 / E = 0.08 / K* = 0.01 /  1370. /  411603. / 1.03 /  -62. /   53.
   705.61 /   0.36 /                 /  705.97 /    4.74 /   0.24 /          *AS*   B
============================ END BRIDGE ANALYSIS ============================
SZ C  AT     560 /   100 /   6500. /  1251. /  320955. / 1.00 /  -55. /   55.
   705.61 /   0.42 /   0.03 /   0.03 /  706.03 /    5.20 /   0.27 / -0.002  *XS*   C
---------------------------------------------------------------------------------
SZ C5 AT     660 /   100 /   6500. /  1070. /  257270. / 1.00 /  -53. /   47.
   705.58 /   0.57 /   0.05 /   0.08 /  706.15 /    6.08 /   0.33 / -0.000  *XS*
---------------------------------------------------------------------------------
SZ  D AT     970 /   310 /   6500. /  1167. /  293817. / 1.00 /  -53. /   52.
   705.83 /   0.48 /   0.17 /    0.0  /  706.31 /    5.57 /   0.29 / -0.015  *XS*   D   FW
============================ BEGIN BRIDGE ANALYSIS ==========================
KERBR AT     970 /       /   6500. /   964. /  198503. / 1.00 /    0. /   70.
   705.83 /   0.71 /       ...1...  (-.001)    /    6.74 /   0.31 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                *RG*
---------------------------------------------------------------------------------
SZ  E AT    1075 /   105 /   6500. /  1252. /  284983. / 1.18 /  -54. /   61.
   705.88 /   0.49 /   0.05 /   0.01 /  706.37 /    5.19 /   0.28 /  0.001  *AS*
---------------------------------------------------------------------------------
   M = 0.13 / E = 0.41 / K* = 0.17 /  1267. /  289963. / 1.18 /  -54. /   61.
   706.01 /   0.48 /                 /  706.49 /    5.13 /   0.28 /          *AS*   E
============================ END BRIDGE ANALYSIS ============================
SZ E5 AT    1270 /   195 /   6500. /  1283. /  284244. / 1.00 /  -54. /   61.
   706.19 /   0.40 /   0.10 /    0.0  /  706.59 /    5.06 /   0.27 / -0.000  *XS*   F
============================ BEGIN BRIDGE ANALYSIS ==========================
```

```
============================ END BRIDGE ANALYSIS ============================
SZ C  AT     560 /   100 /   6500. /  1251. /  320955. / 1.00 /  -55. /   55.
   705.61 /   0.42 /   0.03 /   0.03 /  706.03 /   5.20 /   0.27 / -0.002  *XS*
-----------------------------------------------------------------------------
SZ C5 AT     660 /   100 /   6500. /  1070. /  257270. / 1.00 /  -53. /   47.
   705.58 /   0.57 /   0.05 /   0.08 /  706.15 /   6.08 /   0.33 / -0.000  *XS*
-----------------------------------------------------------------------------
SZ  D AT     970 /   310 /   6500. /  1167. /  293817. / 1.00 /  -53. /   52.
   705.83 /   0.48 /   0.17 /   0.0  /  706.31 /   5.57 /   0.29 / -0.015  *XS*
============================ BEGIN BRIDGE ANALYSIS ==========================
KERBR AT     970 /       /   6500. /   964. /  198503. / 1.00 /    0. /   70.
   705.83 /   0.71 /       ...1...  (-.001)    /   6.74 /   0.31 /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /             *RG*
-----------------------------------------------------------------------------
SZ  E AT    1075 /   105 /   6500. /  1252. /  284983. / 1.18 /  -54. /   61.
   705.88 /   0.49 /   0.05 /   0.01 /  706.37 /   5.19 /   0.28 /  0.001  *AS*
-----------------------------------------------------------------------------
   M = 0.13 / E = 0.41 / K* = 0.17 /  1267. /  289963. / 1.18 /  -54. /   61.
   706.01 /   0.48 /                  /  706.49 /   5.13 /   0.28 /          *AS*
============================ END BRIDGE ANALYSIS ============================
SZ E5 AT    1270 /   195 /   6500. /  1283. /  284244. / 1.00 /  -54. /   61.
   706.19 /   0.40 /   0.10 /   0.0  /  706.59 /   5.06 /   0.27 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==========================
C&OBR AT    1270 /       /   6500. /   968. /  139651. / 1.00 /    2. /  116.
   706.19 /   0.70 /       ...1...  (-.001)    /   6.72 /   0.41 /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /             *RG*
-----------------------------------------------------------------------------
SZ  F AT    1340 /    70 /   6500. /  1227. /  314054. / 1.09 /  -54. /   56.
   706.20 /   0.48 /   0.03 /   0.07 /  706.68 /   5.30 /   0.28 / -0.011  *AS*
-----------------------------------------------------------------------------
   M = 0.05 / E = 0.0 / K* = 0.11 /  1236. /  317430. / 1.09 /  -54. /   56.
   706.28 /   0.47 /                  /  706.75 /   5.26 /   0.28 /          *AS*
============================ END BRIDGE ANALYSIS ============================
SZ  G AT    1490 /   150 /   6500. /  2305. /  590339. / 1.00 / -114. /   96.

   706.66 /   0.12 /   0.03 /   0.0  /  706.79 /   2.82 /   0.15 / -0.000  *XS*
-----------------------------------------------------------------------------
```

WATER-SURFACE PROFILE FOR: SWARTZ CK MOUTH AT FLINT TO THREAD CK HOLTSLAG
PAGE 2 OF 3, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
SZ  H AT    1780 /   290 /   6500. /  2460. /  661035. / 1.00 / -107. /  103.
   706.71 /   0.11 /   0.03 /   0.0  /  706.82 /   2.64 /   0.14 / -0.000  *XS*
----------------------------------------------------------------------------------
SZ H3 AT    1880 /   100 /   6500. /  1635. /  399052. / 1.00 /  -70. /   70.
   706.66 /   0.25 /   0.02 /   0.07 /  706.90 /   3.98 /   0.20 /  0.000  *XS*
----------------------------------------------------------------------------------
SZ H5 AT    1930 /    50 /   6500. /  1236. /  244744. / 1.00 /  -55. /   60.
   706.59 /   0.43 /   0.02 /   0.09 /  707.02 /   5.26 /   0.28 / -0.000  *XS*
----------------------------------------------------------------------------------
SZ  I AT    2170 /   240 /   6500. /  1101. /  228875. / 1.00 /  -56. /   54.
   706.71 /   0.54 /   0.18 /   0.06 /  707.25 /   5.90 /   0.33 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
2STBR AT    2170 /       /   6500. /   646. /  118951. / 1.00 /    0. /   56.
   706.71 /   1.58 /       ...1...  (-.001)    /  10.07 /   0.52 /         *BO*
----------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
----------------------------------------------------------------------------------
SZ  J AT    2273 /   103 /   6500. /  1036. /  199453. / 1.13 /  -54. /   59.
   706.72 /   0.69 /   0.10 /   0.08 /  707.41 /   6.28 /   0.37 / -0.011  *AS*
----------------------------------------------------------------------------------
   M = 0.27 / E = 0.63 / K* = 0.57 /  1154. /  234036. / 1.13 /  -55. /   60.
   707.76 /   0.56 /                /  708.31 /   5.63 /   0.32 /         *AS*
============================ END BRIDGE ANALYSIS ================================
SZ  K AT    2712 /   439 /   6500. /  1267. /  313973. / 1.00 /  -60. /   60.
   708.16 /   0.41 /   0.25 /   0.0  /  708.57 /   5.13 /   0.28 / -0.000  *XS*
----------------------------------------------------------------------------------
SZ K5 AT    3208 /   496 /   6500. /  1136. /  229349. / 1.00 /  -65. /   55.
   708.41 /   0.51 /   0.29 /   0.05 /  708.92 /   5.72 /   0.33 /  0.009  *XS*
----------------------------------------------------------------------------------
SZ  L AT    3360 /   152 /   6500. /   792. /  168694. / 1.00 /  -35. /   45.
   708.30 /   1.05 /   0.17 /   0.27 /  709.35 /   8.21 /   0.46 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
CORTB AT    3360 /       /   6500. /   574. /  110420. / 1.00 /    0. /   59.
   708.30 /   1.99 /       ...1...  (-.001)    /  11.32 /   0.64 /         *BO*
----------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
----------------------------------------------------------------------------------
SZ  M AT    3461 /   101 /   6500.
```

I

J

FW

K

L

M

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   53,DATE=12/29/77


WATER-SURFACE PROFILE FOR:  SWARTZ CK SEC L TO W                        HOLTSLAG
PAGE  1 OF  2, PROFILE NUMBER  2,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
=================================================================================
SZ  L AT    3360 /     0 /   6500. /   792. / 168580. / 1.00 /  -35. /   45.
   708.30 /   1.05 /                 / 709.35 /   8.21 /   0.46/          *IS*
============================ BEGIN BRIDGE ANALYSIS ==============================
CORTB AT    3360 /       /   6500. /   574. / 110346. / 1.00 /    0. /   59.
   708.30 /   2.00 /       ...1...  (-.001)    /  11.33 /   0.64 /          *BO*
---------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
---------------------------------------------------------------------------------
SZ  M AT    3461 /   101 /   6500. /  1719. / 392816. / 1.70 /  -56. /  114.
   709.05 /   0.38 /   0.06 /   0.0  /  709.43 /   3.78 /   0.23 /  0.016  *AS*
---------------------------------------------------------------------------------
   M = 0.19 / E = 0.42 / K* = 0.37 /  1854. / 430649. / 1.72 /  -58. /  116.
   709.83 /   0.33 /                 / 710.16 /   3.51 /   0.21 /          *AS*
============================ END BRIDGE ANALYSIS ================================
SZ  N AT    3911 /   450 /   6500. /  1364. / 223243. / 1.35 /  -50. /  200.
   709.95 /   0.48 /   0.20 /   0.07 / 710.43 /   4.76 /   0.31 / -0.000  *XS*
---------------------------------------------------------------------------------
SZ  O AT    4310 /   399 /   6500. /  1130. / 167347. / 1.13 /  -60. /  110.
   710.35 /   0.58 /   0.45 /   0.05 / 710.93 /   5.75 /   0.36 /  0.000  *XS*
---------------------------------------------------------------------------------
SZ  P AT    4630 /   320 /   4300. /   660. /  79873. / 1.18 /  365. /  505.
   710.95 /   0.78 /   0.70 /   0.10 / 711.73 /   6.52 /   0.45 / -0.000  *XS*
---------------------------------------------------------------------------------
SZ  Q AT    5080 /   450 /   4300. /  1200. /  91141. / 2.02 /  142. /  482.
   712.47 /   0.40 /   1.14 /   0.0  / 712.88 /   3.58 /   0.37 / -0.000  *XS*
---------------------------------------------------------------------------------
SZ  R AT    5680 /   600 /   4300. /  1427. /  98204. / 1.85 /  140. /  490.
   713.86 /   0.26 /   1.24 /   0.0  / 714.12 /   3.01 /   0.32 /  0.001  *XS*
---------------------------------------------------------------------------------
SZ  S AT    6430 /   750 /   4300. /  1072. / 108990. / 1.43 /
   715.11 /   0.36 /   1.30 /
```

M

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P

Q

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S

FW

```
SZ  M AT    3461 /   101 /   6500. /   1719. /  392816. / 1.70 /  -56. /  114.
   709.05 /   0.38 /   0.06 /   0.0  /  709.43 /    3.78 /   0.23 /  0.016  *AS*
-----------------------------------------------------------------------------
   M = 0.19 / E = 0.42 / K* = 0.37 /   1854. /  430649. / 1.72 /  -58. /  116.
   709.83 /   0.33 /                 /  710.16 /    3.51 /   0.21 /         *AS*
============================ END BRIDGE ANALYSIS ============================
SZ  N AT    3911 /   450 /   6500. /   1364. /  223243. / 1.35 /  -50. /  200.
   709.95 /   0.48 /   0.20 /   0.07 /  710.43 /    4.76 /   0.31 / -0.000  *XS*
-----------------------------------------------------------------------------
SZ  O AT    4310 /   399 /   6500. /   1130. /  167347. / 1.13 /  -60. /  110.
   710.35 /   0.58 /   0.45 /   0.05 /  710.93 /    5.75 /   0.36 /  0.000  *XS*
-----------------------------------------------------------------------------
SZ  P AT    4630 /   320 /   4300. /    660. /   79873. / 1.18 /  365. /  505.
   710.95 /   0.78 /   0.70 /   0.10 /  711.73 /    6.52 /   0.45 / -0.000  *XS*
-----------------------------------------------------------------------------
SZ  Q AT    5080 /   450 /   4300. /   1200. /   91141. / 2.02 /  142. /  482.
   712.47 /   0.40 /   1.14 /   0.0  /  712.88 /    3.58 /   0.37 / -0.000  *XS*
-----------------------------------------------------------------------------
SZ  R AT    5680 /   600 /   4300. /   1427. /   98204. / 1.85 /  140. /  490.
   713.86 /   0.26 /   1.24 /   0.0  /  714.12 /    3.01 /   0.32 /  0.001  *XS*
-----------------------------------------------------------------------------
SZ  S AT    6430 /   750 /   4300. /   1072. /  108990. / 1.43 /   65. /  265.
   715.11 /   0.36 /   1.30 /   0.05 /  715.46 /    4.01 /   0.30 /  0.002  *XS*
-----------------------------------------------------------------------------
SZ  T AT    7120 /   690 /   4300. /   1209. /  103164. / 1.05 /   30. /  280.
   716.39 /   0.21 /   1.13 /   0.0  /  716.60 /    3.56 /   0.29 /  0.000  *XS*
-----------------------------------------------------------------------------
SZ  U AT    7720 /   600 /   4300. /   1102. /  102292. / 1.60 /   25. /  250.
   717.36 /   0.38 /   1.05 /   0.09 /  717.74 /    3.90 /   0.34 / -0.000  *XS*
-----------------------------------------------------------------------------
SW  V AT    8050 /   330 /   4300. /    770. /  100224. / 1.07 /  393. /  518.
   717.88 /   0.52 /   0.60 /   0.07 /  718.40 /    5.58 /   0.38 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==========================
CIRBR AT    8050 /       /   4300. /    504. /   68497. / 1.00 /    0. /   65.
   717.88 /   1.13 /       ...1...  (0.074)    /    8.53 /   0.54 /         *BO*
-----------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
-----------------------------------------------------------------------------
SZ  W AT    8110 /    60 /   4300. /    460. /   61167. / 1.03 /   -7. /   69.
   717.89 /   1.40 /   0.18 /   0.72 /  719.29 /    9.34 /   0.65 / -0.011  *AS*
-----------------------------------------------------------------------------
```

N
O
P
Q
R
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T
U
V
W

FW

WATER-SURFACE PROFILE FOR: SWARTZ CK SEC TO W HOLTSLAG
PAGE 2 OF 2, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
   M = 0.01 / E = 0.09 / K* = 0.25 /   497. /   68742. / 1.04 /   -8. /   71.
   718.37 /   1.21 /                 /  719.58 /   8.65 /   0.58 /         *AS*
============================ END BRIDGE ANALYSIS ============================
```

END OF THIS PROFILE

```
SECTO AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS [redacted]EV /    HV  /    HF  /    HE  /     EG [redacted]     V  /    FN  /   ACC    *ID*
==================================================================================
SZ  W AT    8110 /     0 /   4300. /   496. /   68439. / 1.04 /   -8. /   71.
   718.35 /   1.22 /                 /  719.57 /    8.67 /   0.58/          *IS*
----------------------------------------------------------------------------------
SZ  X AT    8920 /   810 /   4300. /   681. /   83063. / 1.01 /  210. /  330.
   721.58 /   0.62 /   2.63 /   0.0  /  722.20 /    6.31 /   0.47 /  0.000  *XS*
----------------------------------------------------------------------------------
SZ  Y AT    9435 /   515 /   4300. /   747. /  113370. / 1.04 /  132. /  225.
   722.68 /   0.54 /   1.01 /   0.0  /  723.21 /    5.76 /   0.34 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
HAMBR AT    9435 /        /   4300. /   787. /  176768. / 1.29 /    0. /   90.
   722.68 /   0.46 /       ...1...  (-.001)    /    5.46 /   0.33 /          *BO*
----------------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
----------------------------------------------------------------------------------
SZ  Z AT    9560 /   125 /   4300. /   779. /  127916. / 1.00 /    0. /   90.
   722.90 /   0.47 /   0.16 /   0.0  /  723.37 /    5.52 /   0.33 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /   780. /  127977. / 1.00 /    0. /   90.
   722.90 /   0.47 /                 /  723.38 /    5.52 /   0.33 /          *AS*
============================ END BRIDGE ANALYSIS ================================
SZ AA AT    9975 /   415 /   4300. /   728. /   98190. / 1.01 /  342. /  452.
   723.48 /   0.55 /   0.61 /   0.04 /  724.02 /    5.91 /   0.40 / -0.000  *XS*
----------------------------------------------------------------------------------
SZ AB AT   10360 /   385 /   4300. /   980. /  175871. / 1.00 /   90. /  200.
   724.14 /   0.30 /   0.41 /   0.0  /  724.44 /    4.39 /   0.26 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
CIRBR AT   10360 /        /   2698. /   465. /   45110. / 1.00 /    0. /   72.
   721.70 /   0.52 /       ...3...  (-.001)    /    5.81 /   0.40 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT     1590. /                *RG*
----------------------------------------------------------------------------------
SZ AC AT   10425 /    65 /   4300. /  1103. /  153956. / 1.25 /  -60. /  140.
   724.19 /   0.30 /   0.04 /   0.0  /  724.48 /    3.90 /   0.28 /  0.000  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  1209. /  174916. / 1.23 /  -60. /  140.
   724.71 /   0.24 /                 /  724.95 /    3.56 /   0.25 /          *AS*
============================ END BRIDGE ANALYSIS ================================
SZ AD AT   10650 /   225 /   4300. /  1481. /  173747. / 1.80 /  200. /  600.
   724.86 /   0.24 /   0.14 /   0.0  /  725.09 /    2.90 /   0.25 /  0.003  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
CAMBR AT   10650 /        /      0. /   560. /   74990. / 1.00 /    0. /   60.
   724.86 /   0.0  /       ...1...  (-.001)    /    0.0  /   0.0  /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      147. / RIGHT     4384. /                *RG*
```

X

Y

Z

AA

AB FW

AC

AD

AE 300

```
SZ  Z AT    9560 /   125 /   4300. /   779. /  127916. / 1.00 /    0. /   90.
   722.90 /   0.47 /   0.16 /   0.0  /  723.37 /   5.52 /   0.33 / -0.000  *AS*
-----------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /   780. /  127977. / 1.00 /    0. /   90.
   722.90 /   0.47 /                 /  723.38 /   5.52 /   0.33 /          *AS*
============================ END BRIDGE ANALYSIS ============================
SZ AA AT    9975 /   415 /   4300. /   728. /   98190. / 1.01 /  342. /  452.
   723.48 /   0.55 /   0.61 /   0.04 /  724.02 /   5.91 /   0.40 / -0.000  *XS*
-----------------------------------------------------------------------------
SZ AB AT   10360 /   385 /   4300. /   980. /  175871. / 1.00 /   90. /  200.
   724.14 /   0.30 /   0.41 /   0.0  /  724.44 /   4.39 /   0.26 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==========================
CIRBR AT   10360 /       /   2698. /   465. /   45110. / 1.00 /    0. /   72.
   721.70 /   0.52 /       ...3...  (-.001)    /   5.81 /   0.40 /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT [illegible]0. / RIGHT    1590. /            *RG*
-----------------------------------------------------------------------------
SZ AC AT   10425 /    65 /   4300. /  1103. /  153956. / 1.25 /  -60. /  140.
   724.19 /   0.30 /   0.04 /   0.0  /  724.48 /   3.90 /   0.28 /  0.000  *AS*
-----------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  1209. /  174916. / 1.23 /  -60. /  140.
   724.71 /   0.24 /                 /  724.95 /   3.56 /   0.25 /          *AS*
============================ END BRIDGE ANALYSIS ============================
SZ AD AT   10650 /   225 /   4300. /  1481. /  173747. / 1.80 /  200. /  600.
   724.86 /   0.24 /   0.14 /   0.0  /  725.09 /   2.90 /   0.25 /  0.003  *XS*
============================ BEGIN BRIDGE ANALYSIS ==========================
CAMBR AT   10650 /       /      0. /   560. /   74990. / 1.00 /    0. /   60.
   724.86 /   0.0  /       ...1...  (-.001)    /   0.0  /   0.0  /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      147. / RIGHT    4384. /               *RG*
-----------------------------------------------------------------------------
SZ AE AT   10720 /    70 /   4300. /  2294. /  279378. / 1.64 /  -75. /  425.
   725.03 /   0.09 /   0.03 /   0.0  /  725.12 /   1.87 /   0.16 / -0.000  *AS*
-----------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  2294. /  279378. / 1.64 /  -75. /  425.

   725.03 /   0.09 /                 /  725.12 /   1.87 /   0.16 /          *AS*
============================ END BRIDGE ANALYSIS ============================
```

AA

AB FW

AC

AD

AE 300

400

AF

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 16,DATE=12/12/77

WATER-SURFACE PROFILE FOR: SWARTZ CK USS W COURT ST SEC SZ AG HOLTSLAG
PAGE 2 OF 2, PROFILE NUMBER 1, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
SZ AF AT 11275	555	4300.	2504.	221984.	1.85	80.	530.		450 AG
725.20	0.08	0.17	0.0	725.29	1.72	0.17	0.000	*XS*	FW
SZ AG AT 11620	345	4300.	2285.	230641.	1.42	485.	985.		500 AH
725.33	0.08	0.12	0.0	725.41	1.88	0.13	-0.000	*XS*	

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: SWARTZ CK CIRCLE RD THROUGH GOLF COURSE HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*		
SZ AG AT	11620	0	4300.	2284.	230417.	1.43	485.	985.		
725.33	0.08			725.41	1.88	0.13		*IS*	AH	
SZ AH AT	12165	545	4300.	1766.	164017.	1.36	150.	650.		
725.58	0.13	0.27	0.02	725.71	2.43	0.19	0.006	*XS*	AI	
SZ AI AT	12970	805	4300.	1314.	116711.	1.46	400.	900.		1025
726.30	0.24	0.78	0.06	726.54	3.27	0.33	0.000	*XS*	AJ	
SZ AJ AT	13535	565	4300.	1799.	190065.	1.17	475.	915.		
726.91	0.10	0.47	0.0	727.01	2.39	0.19	0.000	*XS*	AK	FW
SZ AK AT	13780	245	4300.	1447.	132285.	1.46	20.	520.		
727.04	0.20	0.18	0.05	727.24	2.97	0.28	-0.000	*XS*	AL	
SZ AL AT	14140	360	4300.	1307.	110202.	1.37	750.	1250.		1340
727.48	0.23	0.46	0.02	727.71	3.29	0.33	-0.000	*XS*	AM	4/60
SZ AM AT	15135	995	4300.	1189.	100710.	1.41	350.	800.		
729.12	0.29	1.66	0.03	729.40	3.62	0.35	0.003	*XS*		3

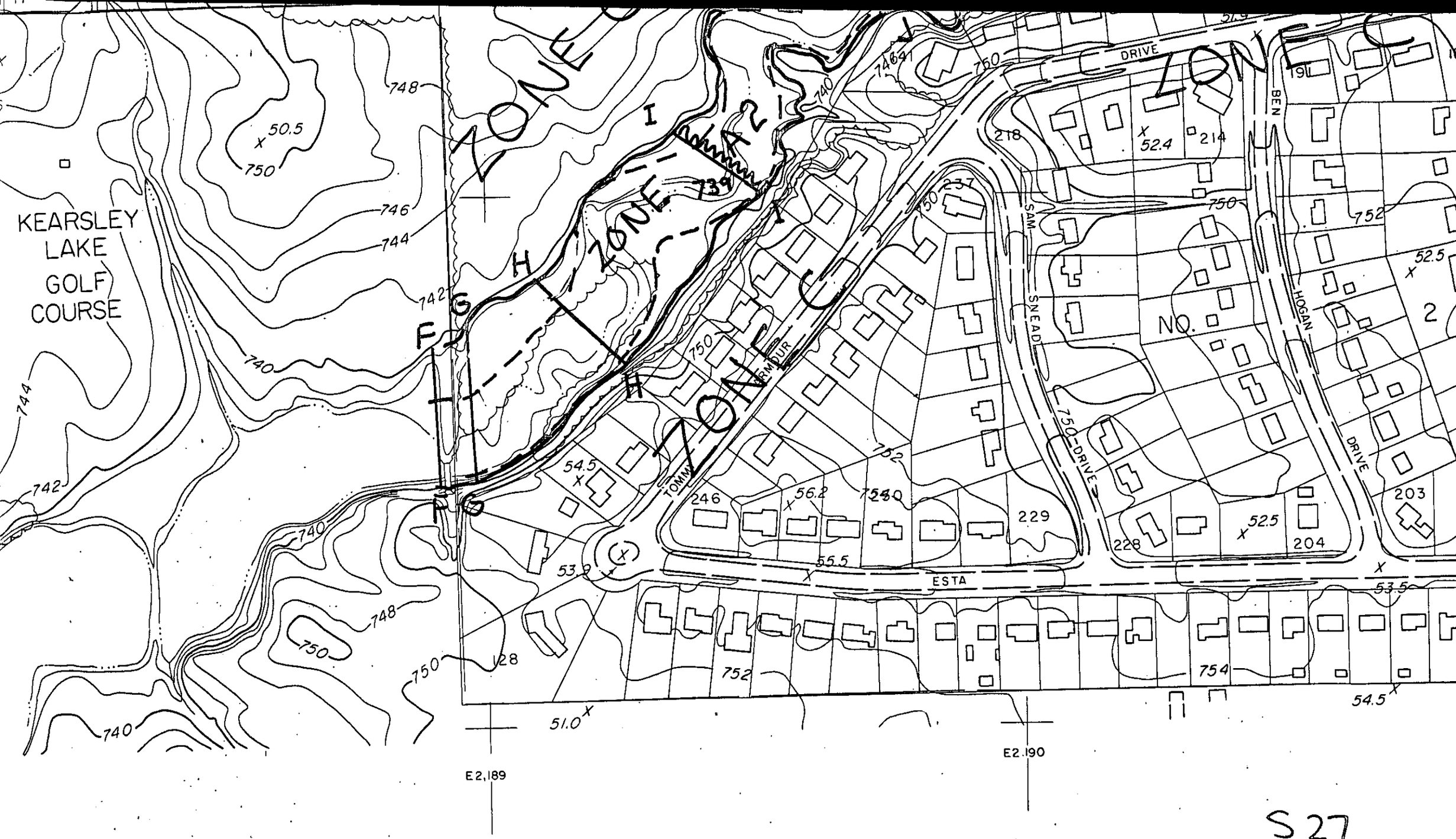
END OF THIS PROFILE

*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS

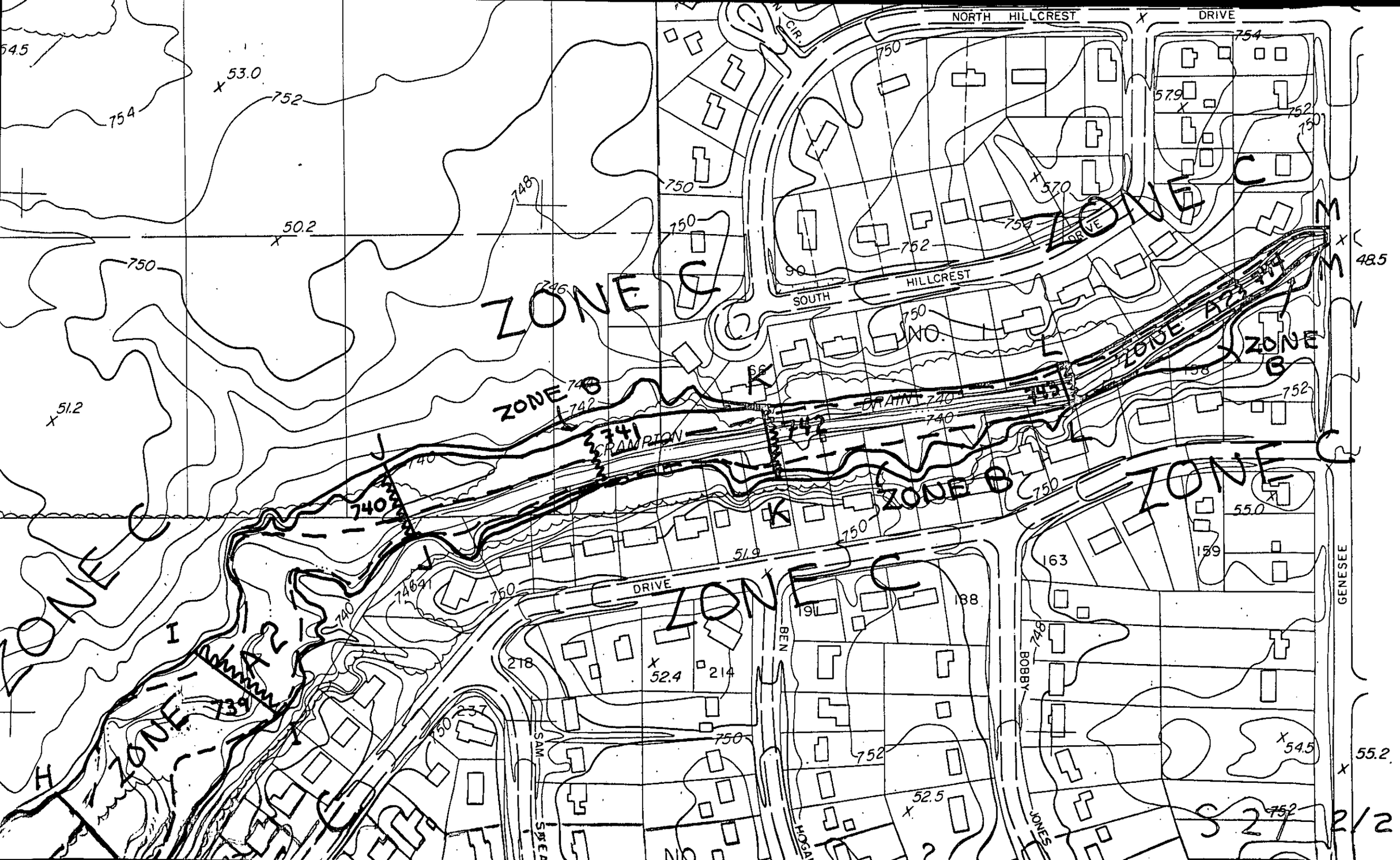
SECTO	AT	DISTANCE/ WS ELEV	LENGTH/ HV	DISCHARGE/ HF	AREA / HE	CONVEYANCE/ EG	ALPHA/ V	LEW / FN	REW / ACC	*ID*	
SZ AK	AT	13780	0	4300.	1446.	132167.	1.46	20.	520.		
		727.04	0.20		727.24	2.97	0.28			*IS*	AL
SZ AL	AT	14140	360	4300.	1481.	119339.	1.40	725.	1325.		
		727.48	0.18	0.42	0.0	727.66	2.90	0.30	0.002	*XS*	AM
SZ AM	AT	15135	995	4300.	1193.	97019.	1.49	300.	800.		
		729.01	0.30	1.59	0.06	729.31	3.60	0.36	0.002	*XS*	AN
SZ AN	AT	16045	910	4300.	1428.	142704.	1.15	310.	660.		
		730.37	0.16	1.22	0.0	730.53	3.01	0.25	0.001	*XS*	AO
SZ AO	AT	17055	1010	4300.	1147.	103411.	1.44	100.	500.		
		731.56	0.31	1.27	0.08	731.87	3.75	0.35	0.001	*XS*	AP
SZ AP	AT	17900	845	4300.	1596.	139634.	1.13	25.	525.		
		732.81	0.13	1.08	0.0	732.94	2.69	0.25	-0.019	*XS*	AQ FW
SZ AQ	AT	18560	660	4300.	1334.	82133.	1.77	20.	520.		
		733.81	0.29	1.06	0.08	734.09	3.22	0.40	0.015	*XS*	AR
SZ AR	AT	19170	610	4300.	1688.	107532.	2.48	75.	575.		
		735.12	0.25	1.28	0.0	735.37	2.55	0.33	0.001	*XS*	AS
SZ AS	AT	19590	420	4300.	2133.	126172.	2.11	30.	530.		
		735.81	0.13	0.57	0.0	735.95	2.02	0.25	-0.000	*XS*	AT
SZ AT	AT	20240	650	4300.	1363.	74848.	3.27	30.	530.		
		736.90	0.51	1.27	0.19	737.41	3.15	0.42	0.000	*XS*	AU

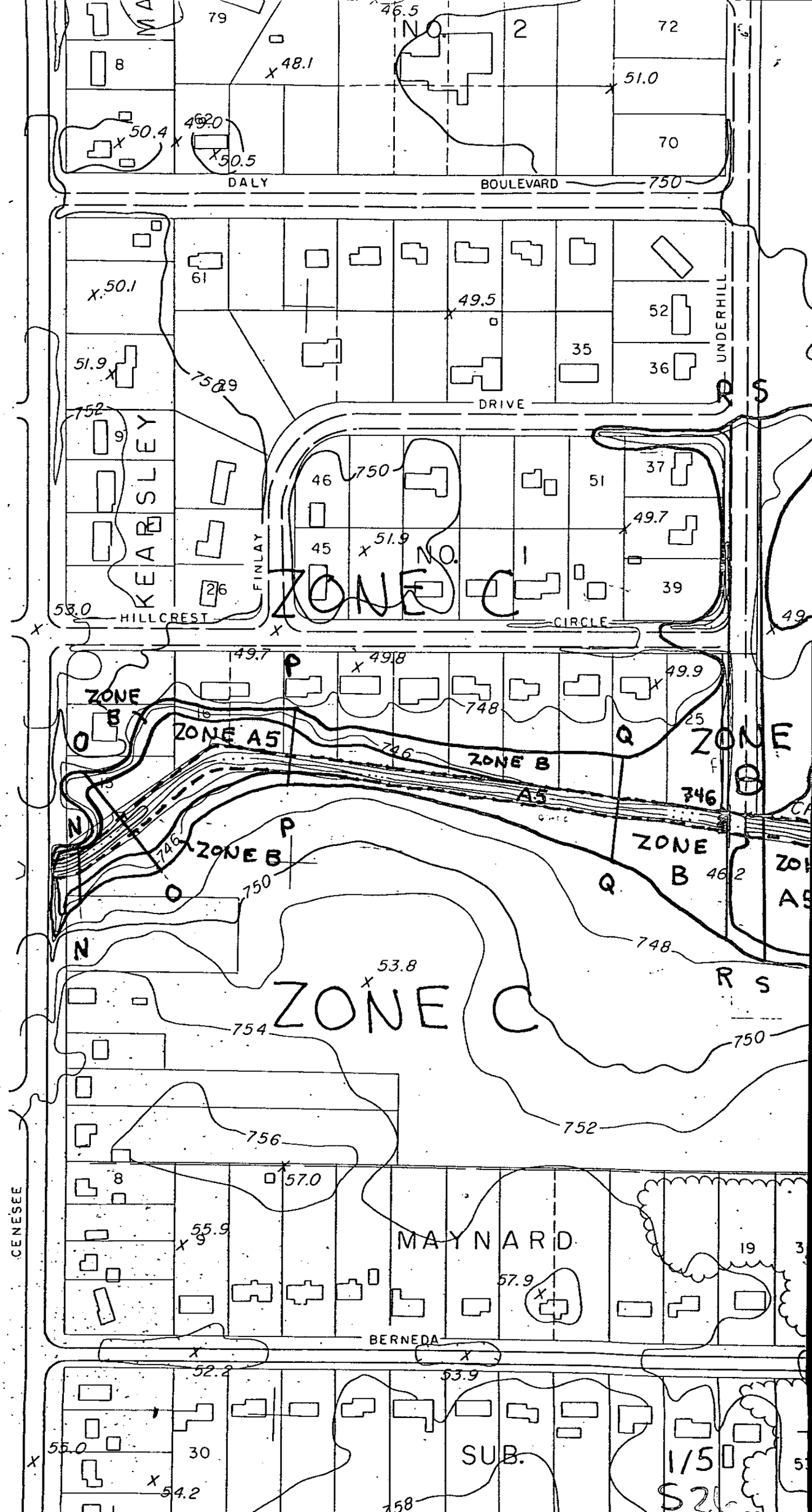
END OF THIS PROFILE

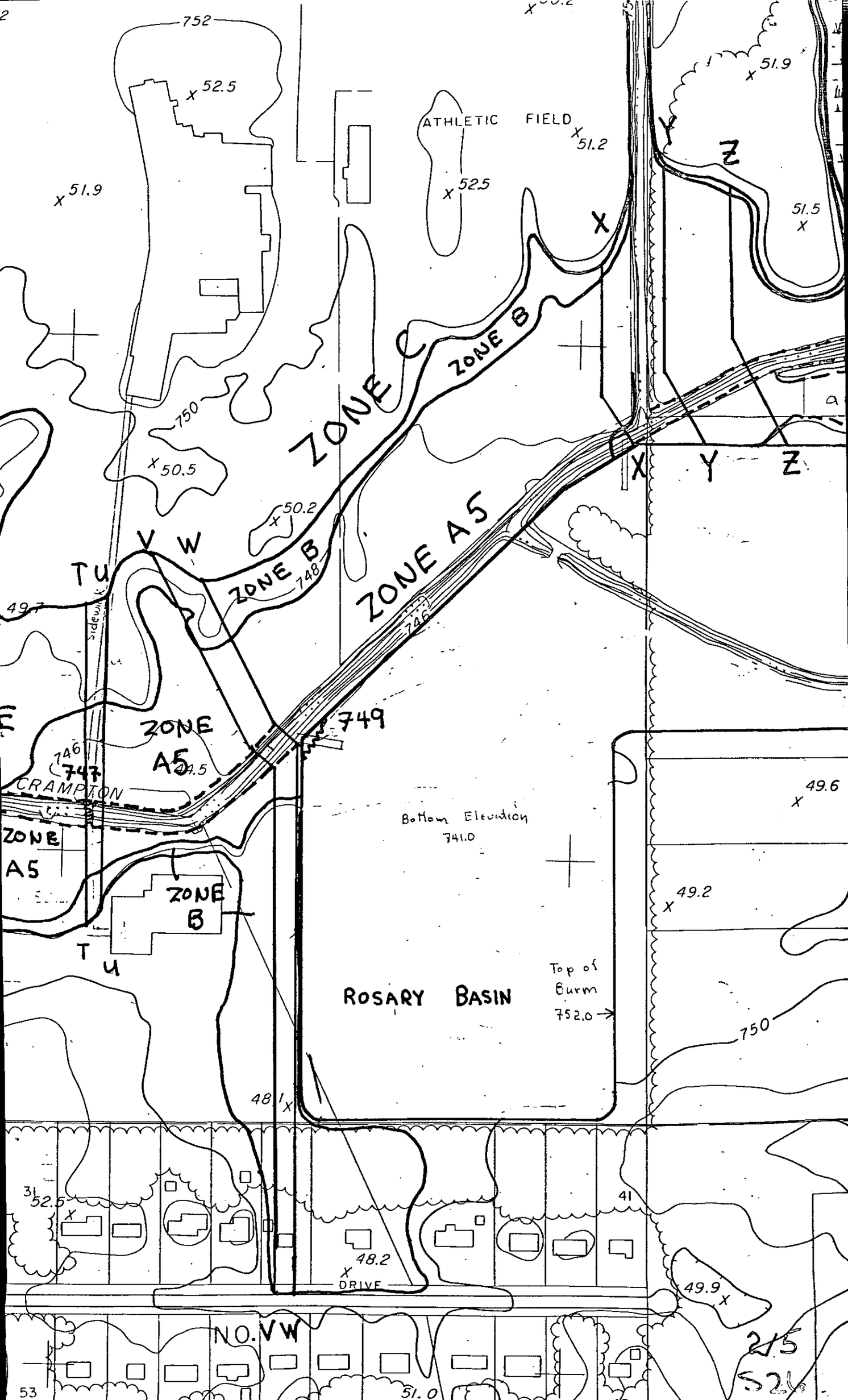
```
*** FLOWAY ANALYSIS *** HOR FW
==================================================================================
SECTID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /   HV  /    HF  /    HE  /     FG  /      V  /    FN  /  ACC    *ID*
==================================================================================
S7 4C AT   31840 /      0 /   2200. /   654. /   70277. / 1.22 /     0. /  132.
   752.22 /   0.21 /                  / 752.43 /    3.36 /  0.25/          *IS*
============================ BEGIN BRIDGE ANALYSIS ===============================
HR 4C AT   31840 /        /   1096. /   242. /   22883. / 1.00 /     0. /   40.
   748.00 /   0.32 /       ...3...  (-.001)    /    4.53 /  0.30 /          *BO*
----------------------------------------------------------------------------------
 ROAD OVERFLOW (CFS) / LEFT      669. / RIGHT      434. /
                                                                            *RG*
----------------------------------------------------------------------------------
00040 AT   31920 /     80 /   2200. /  1470. /  126079. / 2.17 / -100. /  200.
   752.40 /   0.08 /   0.04 /    0.0 /  752.48 /    1.50 /  0.16 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  1545. /  134954. / 2.13 / -100. /  200.
   752.65 /   0.07 /                  / 752.72 /    1.42 /  0.15 /          *AS*
============================ END BRIDGE ANALYSIS =================================
   4E AT   32350 /    430 /   2200. /   981. /  119218. / 1.25 /    50. /  200.
   752.77 /   0.10 /   0.13 /   0.02 / 752.86 /    2.24 /  0.15 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ===============================
HR 4E AT   32350 /        /   2200. /   516. /   59607. / 1.00 /     0. /   68.
   752.77 /   0.28 /       ...1...  (-.001)    /    4.27 /  0.27 /          *BO*
----------------------------------------------------------------------------------
 NO ROAD-GRADE DATA
                                                                            *RG*
----------------------------------------------------------------------------------
   4F AT   32410 /     60 /   2200. /   565. /   53384. / 1.16 /    40. /  150.
   752.78 /   0.27 /   0.05 /   0.15 / 753.05 /    3.89 /  0.28 / -0.011  *AS*
----------------------------------------------------------------------------------
   M = 0.07 / E = 0.0  / K* = 0.17 /   572. /   54273. / 1.16 /    40. /  150.
   752.84 /   0.27 /                  / 753.11 /    3.85 /  0.28 /          *AS*
============================ END BRIDGE ANALYSIS =================================
   4G AT   32620 /    210 /   2200. /   687. /   82301. / 1.21 /    15. /  125.
   753.14 /   0.19 /   0.23 /    0.0 / 753.33 /    3.20 /  0.21 / -0.000  *XS*
----------------------------------------------------------------------------------
   4H AT   32930 /    310 /   2200. /   549. /   62570. / 1.33 /   100. /  232.
   753.36 /   0.33 /   0.29 /   0.07 / 753.69 /    4.00 /  0.28 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ===============================
HRC4H AT   32930 /        /   1114. /   105. /    6859. / 1.00 /    31. /   64.
   750.90 /   1.75 /       ...3...  (-.001)    /   10.61 /  1.05 /          *BO*
----------------------------------------------------------------------------------
 ROAD OVERFLOW (CFS) / LEFT     1085. / RIGHT        0. /
                                                                            *RG*
```

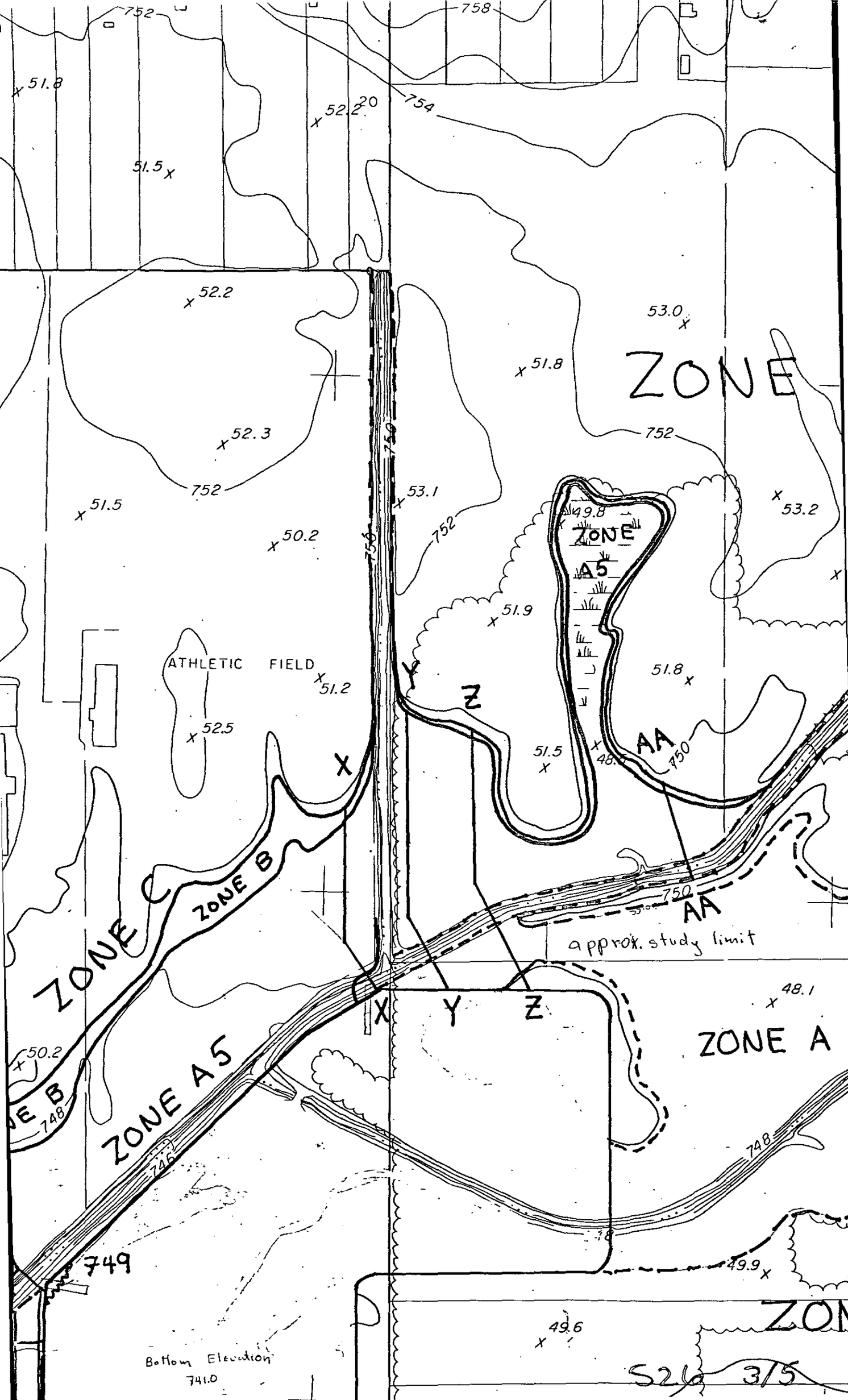

KEARSLEY
LAKE
GOLF
COURSE
ZONE C
ZONE A
ZONE C
ZONE C
DRIVE
BEN
HOGAN
DRIVE
SAM
SNEAD
DRIVE
TOMMY
ARMOUR
ESTA
NO.
2
191
218
214
237
246
229
228
204
203
128
52.4
52.5
52.5
54.5
56.2
55.5
53.9
53.5
54.5
51.0
50.5
E2,189
E2,190

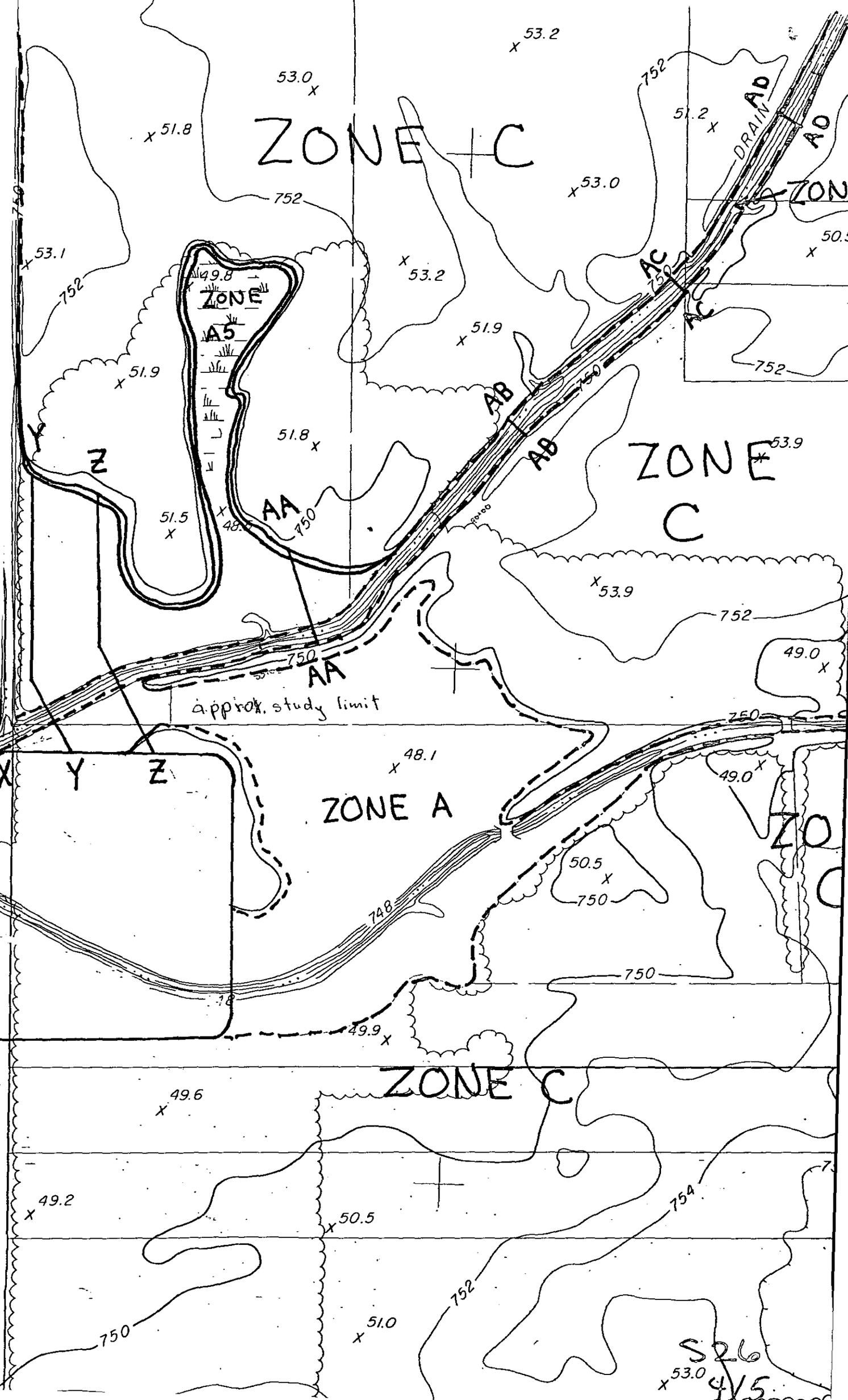
S 27
1/2

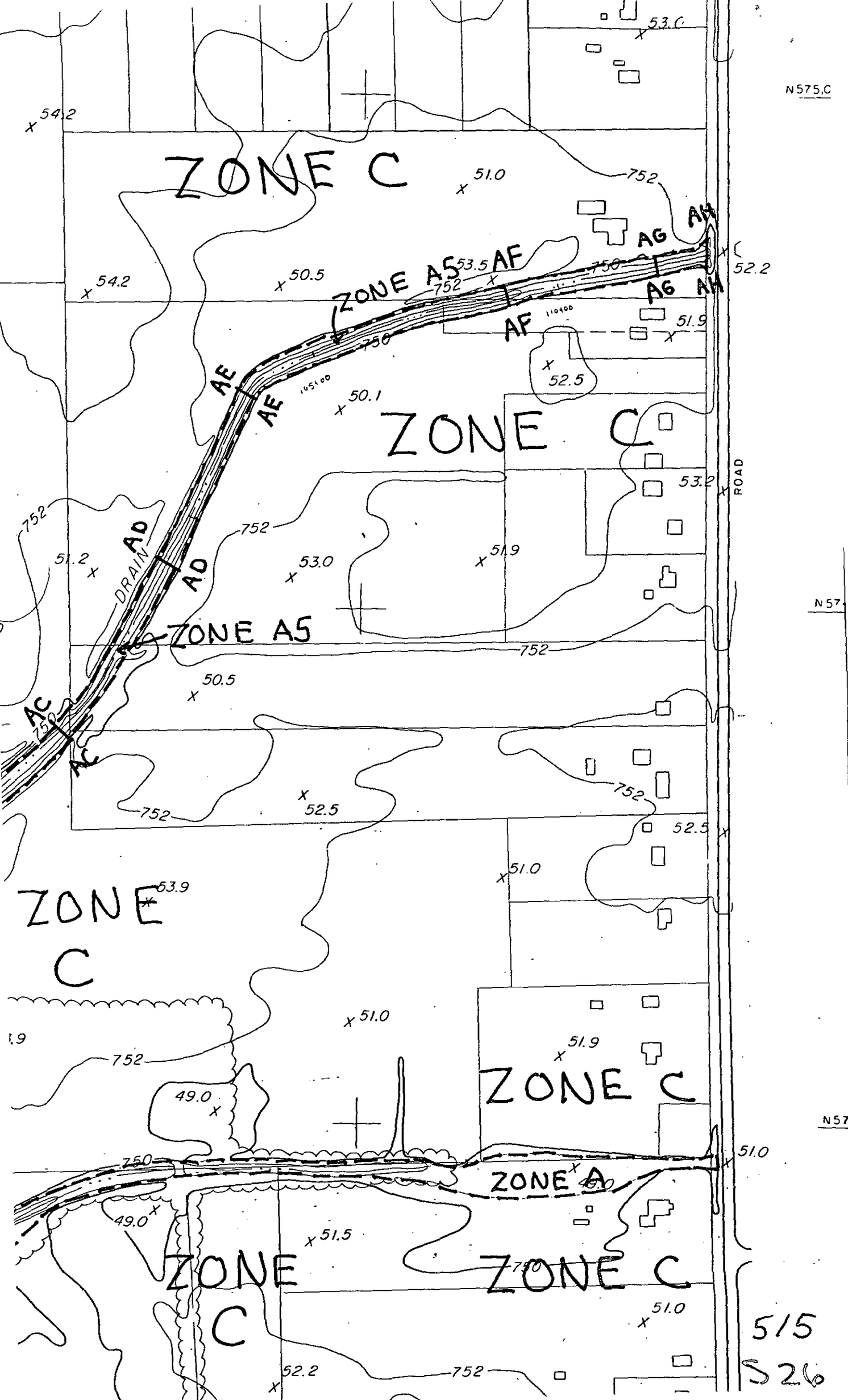

NORTH HILLCREST DRIVE
SOUTH HILLCREST
DRIVE
CIR.
ZONE C
ZONE B
ZONE A2
ZONE A1
ZONE C
ZONE C
ZONE C
ZONE C
ZONE C
ZONE B
ZONE B
ZONE A2
ZONE A1
DRAIN
CRAMPTON
DRIVE
SAM
BEN
BOBBY
JONES
GENESEE
NO. 1
NO. 2
S 27
2/2
53.0
50.2
51.2
48.5
55.2
54.5
52.4
52.5
51.9
57.9
57.0
55.0
54.5
163
159
188
191
218
214
237
90
66
158
754
752
750
748
746
742
741
740
739

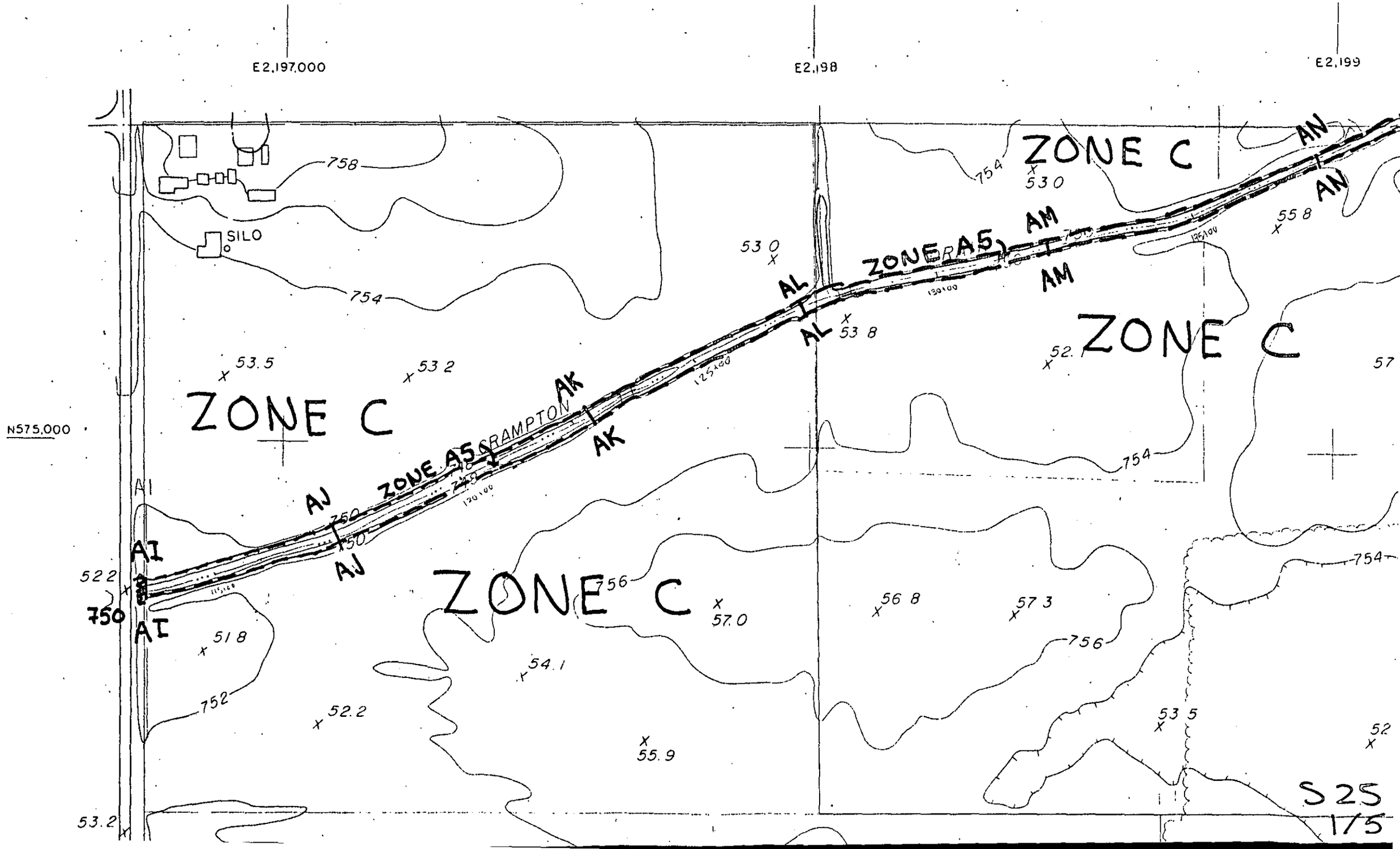

DALY
BOULEVARD
750
NO. 2
72
70
79
8
48.1
46.5
51.0
50.4
50.5
DRIVE
UNDERHILL
61
52
35
36
50.1
49.5
51.9
75
29
752
9
KEARSLEY
FINLAY
46
750
51
37
49.7
45
51.9
NO. 1
26
39
ZONE C
53.0
HILLCREST
CIRCLE
49.7
49.8
49.9
ZONE B
ZONE A5
748
746
ZONE B
A5
746
ZONE B
ZONE B
ZONE B
ZONE A5
750
748
53.8
ZONE C
754
750
752
756
57.0
8
55.9
9
MAYNARD
19
57.9
BERNEDA
52.2
53.9
55.0
30
54.2
SUB.
1/5
S2
758
CENESEE
573
572
571

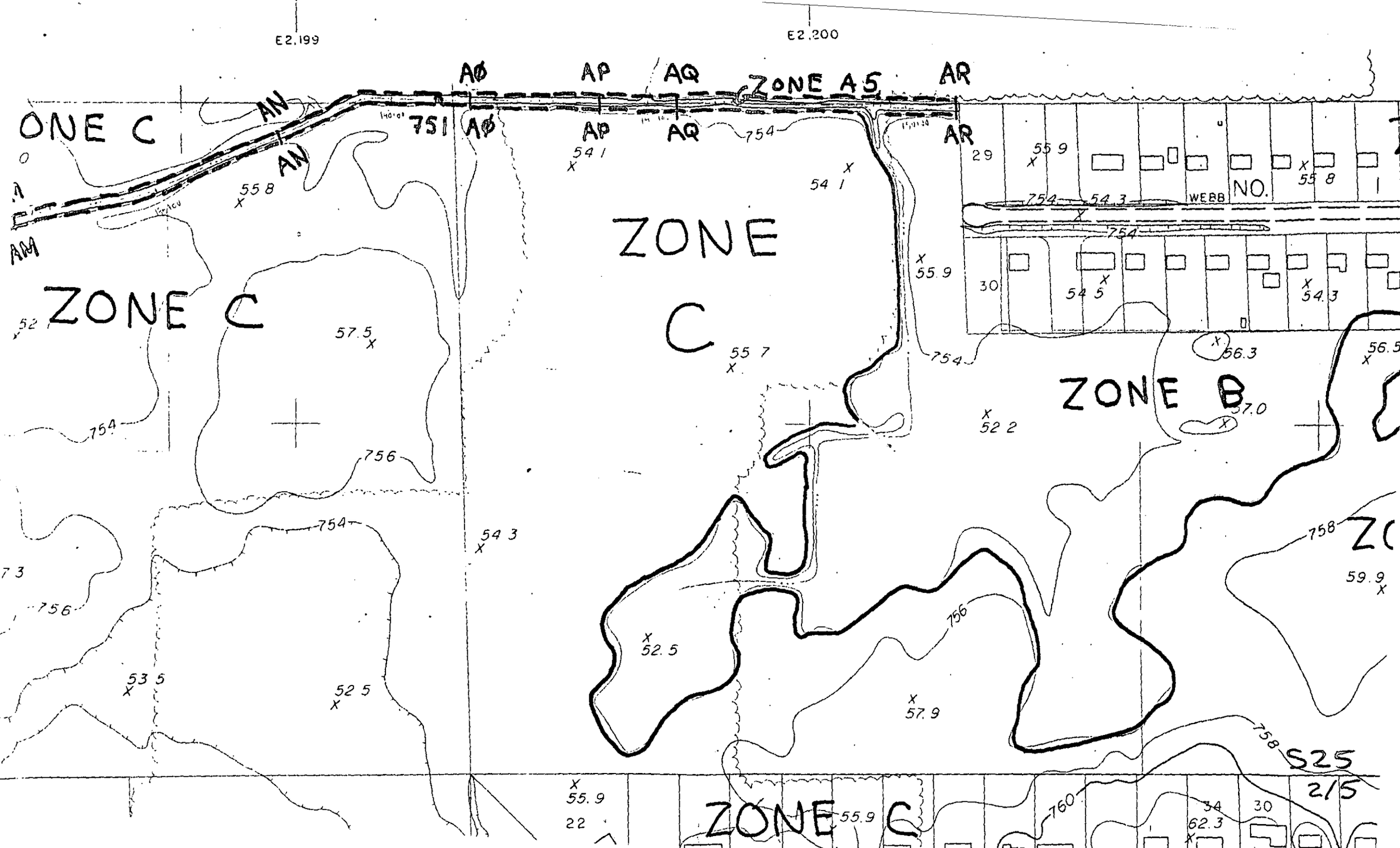

752
52.5
51.9
ATHLETIC FIELD
51.2
52.5
51.9
51.5
X
Y
Z
ZONE C
ZONE B
750
50.5
50.2
ZONE A5
ZONE B
748
746
T U
V
W
49.7
Sidewalk
ZONE A5
749
746
747
CRAMPTON
ZONE A5
ZONE B
T
U
Bottom Elevation
741.0
49.6
49.2
ROSARY BASIN
Top of Burm
752.0
750
48.1
52.5
48.2
DRIVE
49.9
NO. VW
51.0
53

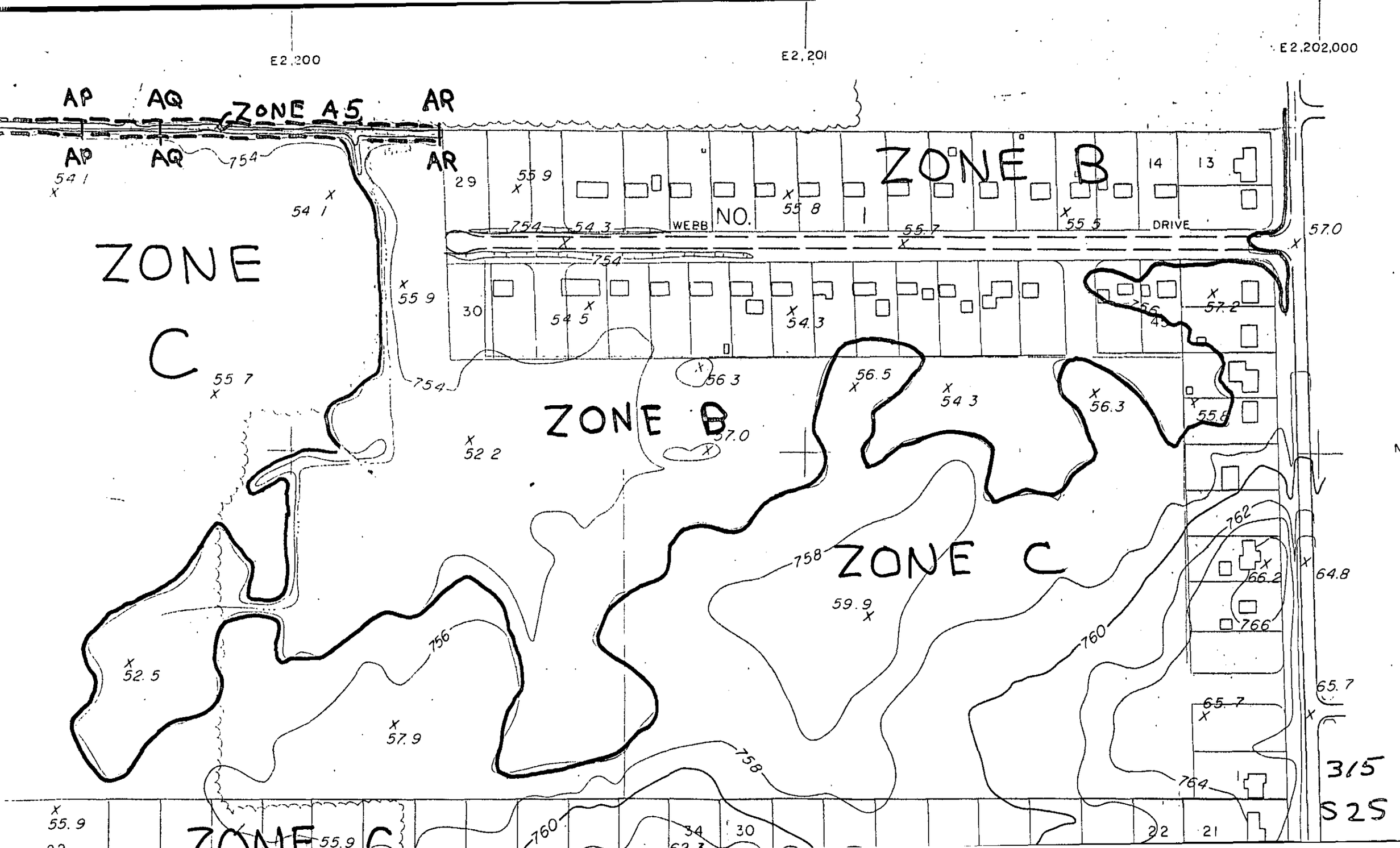

752
758
754
51.8
52.20
51.5
52.2
52.3
752
51.5
50.2
53.1
752
750
53.0
51.8
ZONE
752
53.2
49.8
ZONE
A5
51.9
51.8
ATHLETIC FIELD
51.2
52.5
Y
Z
X
51.5
48.1
AA
750
ZONE B
ZONE C
750
AA
approx. study limit
X
Y
Z
48.1
ZONE A
50.2
ZONE A5
748
748
749
49.9
49.6
Bottom Elevation
741.0
526 3/5

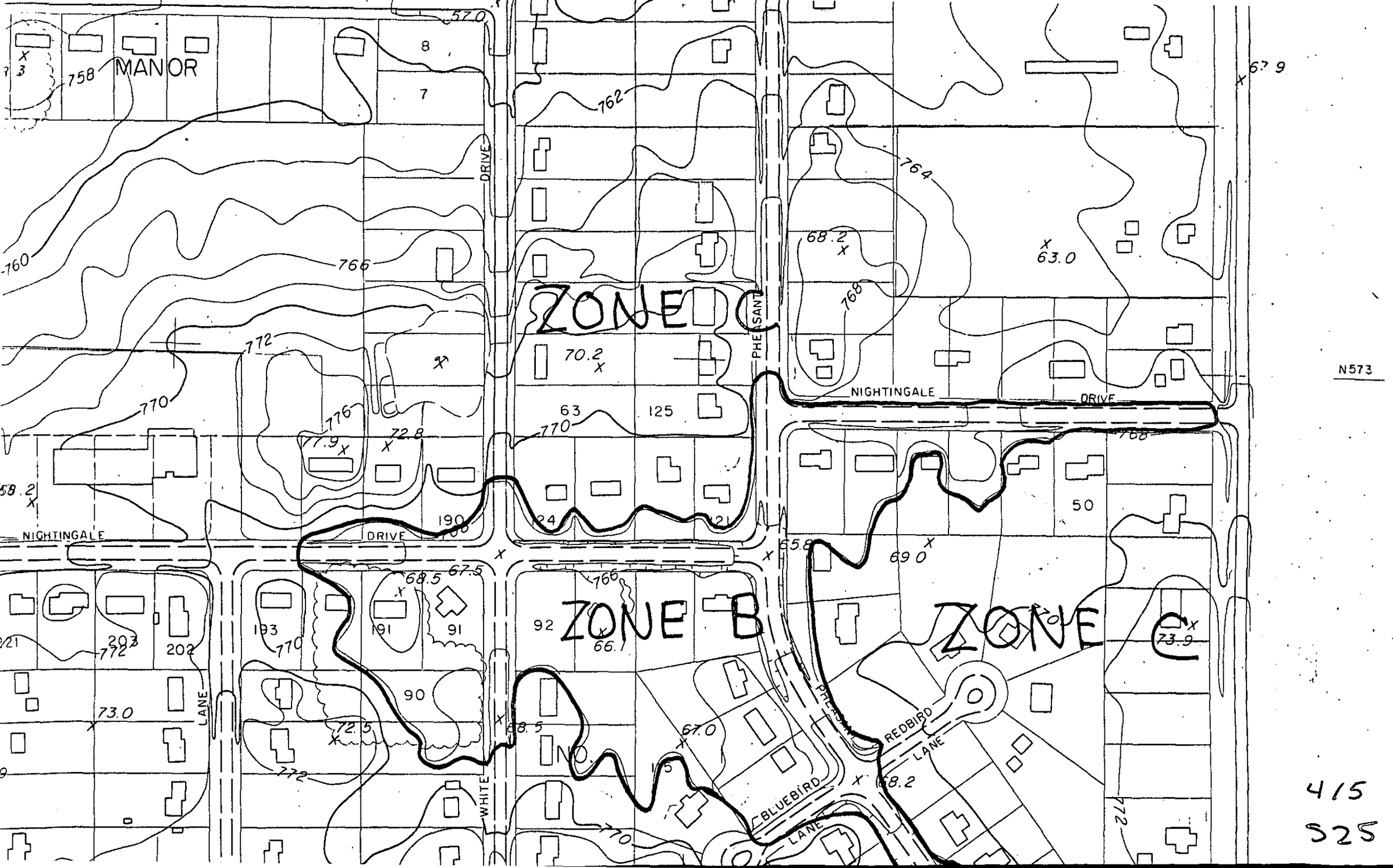

ZONE C
ZONE A5
ZONE C
ZONE A
ZONE C
DRAIN
AA
AB
AC
AD
X
Y
Z
approx. study limit
53.2
53.0
51.8
53.0
51.2
53.1
49.8
53.2
51.9
51.9
51.8
51.5
48.1
53.9
53.9
49.0
48.1
49.0
50.5
49.9
49.6
49.2
50.5
51.0
53.0
752
750
748
754
S26
4/5


ZONE C
ZONE A5
ZONE A5
ZONE C
ZONE C
ZONE C
ZONE C
ZONE C
ZONE A
AF
AG
AH
AE
AD
AC
DRAIN
ROAD
N575.0
515
S26


E2,197,000
E2,198
E2,199
N575,000
ZONE C
ZONE C
ZONE C
ZONE C
ZONE A5
ZONE A5
BRAMPTON
SILO
758
754
754
754
754
756
756
752
750
750
750
AI
AI
AI
AJ
AJ
AK
AK
AL
AL
AM
AM
AN
AN
115,100
120,100
125,100
130,100
135,100
53.5
53.2
53.0
53.8
53.0
55.8
52.2
51.8
54.1
52.2
55.9
57.0
56.8
57.3
53.5
52.2
53.2
S25
1/5


E2,199
E2,200
AØ
AP
AQ
ZONE A5
AR
ONE C
AN
AM
751
754
ZONE C
ZONE C
ZONE C
ZONE B
WEBB
NO.
29
30
34
30
22
S25
215
55.9
55.8
54.1
54.3
54.5
56.3
57.0
52.2
57.5
756
758
760
54.3
52.5
53.5
52.5
57.9
59.9
62.3

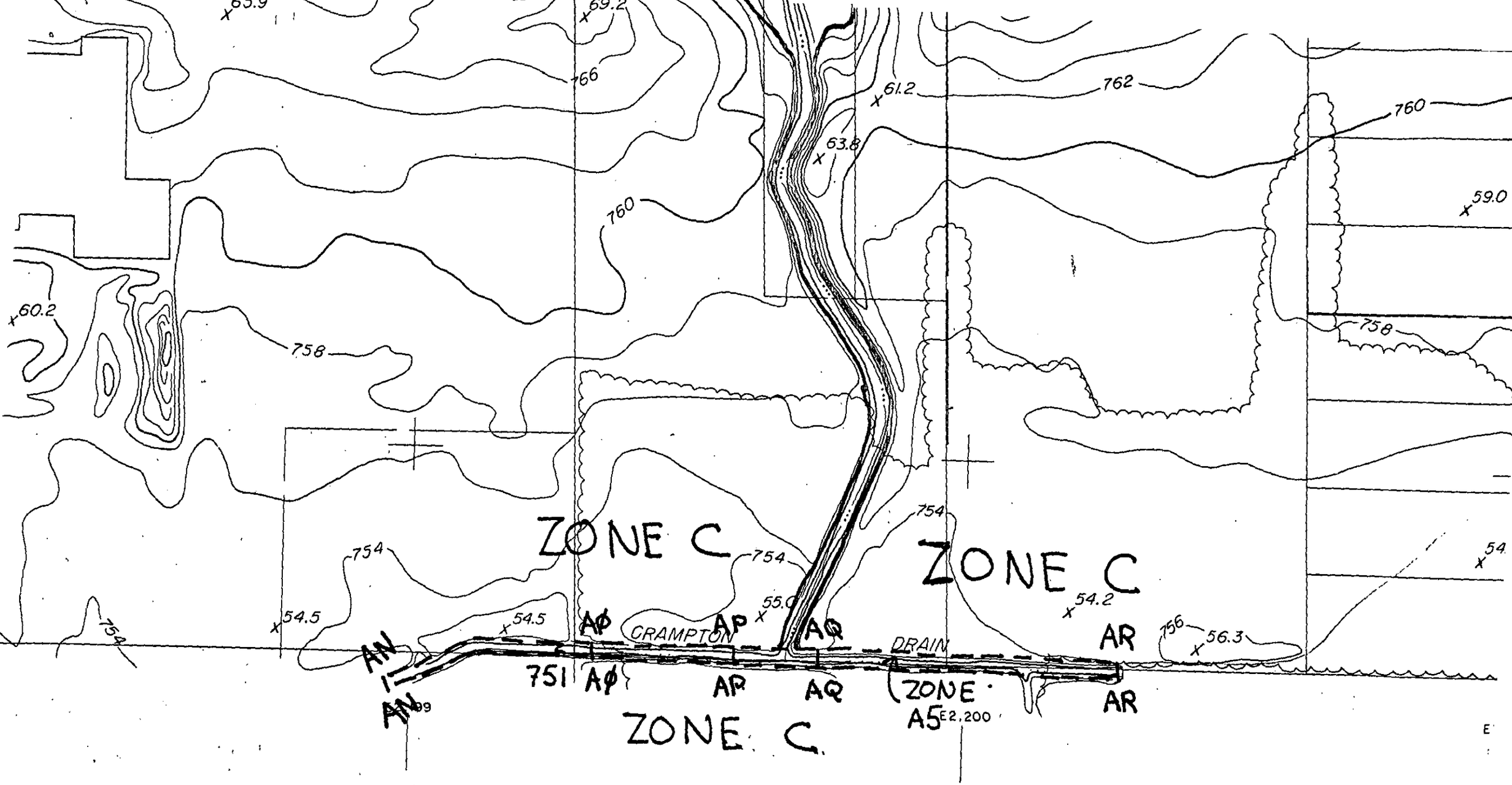

E2,200
E2,201
E2,202,000
AP
AQ
ZONE A5
AR
ZONE B
ZONE C
WEBB NO. 1 DRIVE
ZONE B
ZONE C
ZONE C
315
S25


MANOR
ZONE C
ZONE B
ZONE C
NIGHTINGALE DRIVE
NIGHTINGALE DRIVE
PHEASANT
WHITE LANE
REDBIRD LANE
BLUEBIRD LANE
N573

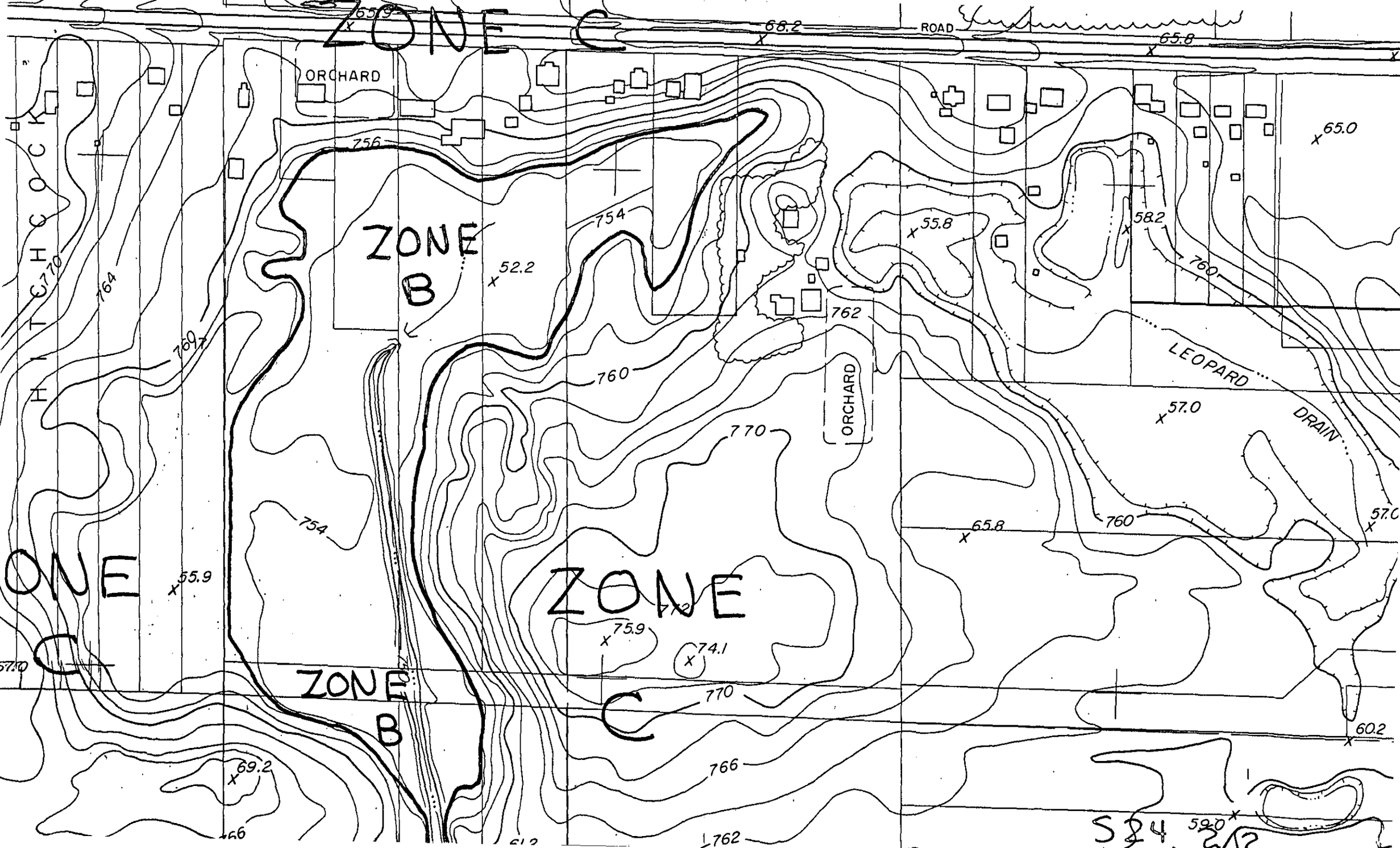
415
325

NIGHTINGALE
DRIVE
ZONE B
ZONE C
ZONE C
ZONE B
LANE
LARK
WHITE
BOB
PHEASANT
REDBIRD
LANE
BLUEBIRD
LANE
DRIVE
DRIVE
VASSAR
N572
203
202
193
191
91
92
90
210
214
201
200
83
100
112
68
137
82
67.5
68.5
66.
69.0
73.9
73.0
72.5
68.5
67.0
68.2
70.5
70.7
71.0
78.5
77.9
68.2
67.5
71.2

515
S25


65.9
69.2
66
61.2
762
760
63.8
59.0
60.2
758
754
ZONE C
ZONE C
54.2
54.5
55.0
AN
AN
AØ
AP
AQ
AR
CRAMPTON
DRAIN
756
56.3
751
ZONE
A5
E2,200
ZONE C

S24
1/2


ZONE C
ROAD
ORCHARD
ZONE B
ZONE C
ZONE B
ZONE C
ORCHARD
LEOPARD DRAIN
HITCHCOCK
S24
65.9
68.2
65.8
65.0
56
54
55.8
58.2
52.2
62
60
57.0
70
65.8
57.0
55.9
75.9
74.1
70
60.2
69.2
66
62
59.0

```
1      1 SWARTZ CK  MOUTH AT FLINT TO THREAD CK  HOLTSLAG 24  5 02 99 12
2        70134  70429  70778  70545  70555
3      3 SZ  A 1   7  1  701     390 99 99
4      4   3800   5700   8200   6500   6500
5      5     -47  1  7100  -47  1  7000  -25  1  6891    0  1  6891   25  1  6891  A
5      6      47  1  7000   47  1  7100
6      9  1  2  20  20
3     10 GTWRR 2   7  1  692     390        0  7076 3 0
5     12       0  1  7077    0  1  6950    8  1  6902   82  1  6902   90  1  6920
5     14      90  1  7075    0 -9  7077
6     16  1  2  24  24
3    100 SZ  B 5  10  3  690     460  1  3
5    110    -200  1  7120 -180  1  7100  -80  1  7100  -52  2  7020  -25  2  6894  B
5    111      25  2  6894   52  3  7020   60  3  7100  100  3  7100  100  3  7120
6    119  1  2  40  40  1  2  26  26  1  2  40  40
3    125 SZ C  0   7  3  692     560  1  3
5 00130     -70 01 07100  -62 02 07085  -25 02 06902 0000 02 06902 0025 02 06902  C
5 00132    0062 03 07084 0065 03 07100
6    139  1  2  40  40  1  2  28  28  1  2  40  40
3    200 SZ C5 0  11  3  691     660  1  3
5    210    -210  1  7160 -210  1  7110  -80  1  7110  -65  2  7110  -25  2  6905
5    211      25  2  6905   35  2  7040   53  2  7060   75  3  7110  100  3  7110
5    212     100  3  7160
6    219  1  2  40  40  1  2  28  28  1  2  40  40
3    300 SZ  D 0   9  3  692     970  1  3
5    310    -175  1  7160 -175  1  7100  -70  1  7080  -60  2  7080  -25  2  6911  D
5    311      25  2  6911   65  3  7120  125  3  7120  125  3  7160
6    319  1  2  40  40  1  2  28  28  1  2  40  40
3    320 KERBR 2   6  1  692     970       15  7075 1 0
5    321       0  1  7075    0  1  6935    5  1  6915   70  1  6915   70  1  7075
5    322       0 -9  7075
6    329  1  2 034 034
3    350 KERRD 4   6  2   60          1  2          1 1                  1
5    351       0  1  7150    0  1  7100   70  1  7100  240  2  7119  500  2  7095
5    352     500  2  7150
3    500 SZ  E 5  13  3  692    1075  1  3
5    510    -285  1  7160 -285  1  7120 -135  1  7100  -65  1  7100  -35  2  6960  E
5    511     -25  2  6917   25  2  6917   32  2  6950   35  3  6950   45  3  6950
5    512      68  3  7100  300  3  7100  300  3  7160
6    519  1  2 040 040  1  2 032 032  1  2 040 040
3    500 SZ E5 0  11  3  692    1270  1  3
**SEQUENCE**
5    510    -285  1  7160 -285  1  7120 -135  1  7100  -65  2  7100  -25  2  6917  F
5    511      25  2  6917   32  2  6950   45  2  6950   68  3  7100  300  3  7100
5    512     300  3  7160
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```
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
6   519  1  2  40  40  1  2  32  32  1  2  40  40
3   530 C&OBR 2  16  1  692    1270        0  7092 3 1
5   531       0  1  7081    0  1  7071   16  1  6991   16  1  7081    0 -9  7081
5   532      28  1  7072   28  1  6945   32  1  6920   83  1  6920   93  1  6970
5   533      93  1  7072   28 -9  7072  106  1  7092  106  1  7012  119  1  7077
5   534     106 -9  7092
6   539  1  2 040 040
3   550 C&ORD 4   7  2   60          1  2          2 2                  1
5   551       0  1  7200    0  1  7116  220  1  7116  270  2  7116  320  2  7115
5   552     700  2  7115  700  2  7200
3   600 SZ  F 5  13  3  693    1340  1  3
5   610    -240  1  7180 -240  1  7120  -75  1  7120  -60  2  7100  -45  2  6960
5   611     -35  2  6960  -28  2  6922   28  2  6922   34  3  6952   60  3  7075
5   612      65  3  7100  500  3  7100  500  3  7180
6   619  1  2  40  50  1  2  28  28  1  2  40  40
3   630 SZ  G 0  10  3  695    1490  1  3
5 00632    -140 01 07120 -120 02 07100 -100 02 06950  -75 02 06950  -70 02 06925
5 00634    0000 02 06952 0070 02 06952 0100 03 07075 0120 03 07100  220  3  7100
6 00639 01 02 050 050 01 02 028 028 01 02 050 050
3   700 SZ  H 0  10  3  695    1780  1  3
5   710    -135  1  7180 -135  1  7140 -120  2  7140  -90  2  6970  -82  2  6970
5   711     -75  2  6932   75  2  6932  105  3  7075  150  3  7080  150  3  7180
6   719  1  2  40  40  1  2  28  28  1  2  40  40
3   770 SZ H3 0   8  3  695    1880 99 99
5 00772     -90 01 07150  -50 01 06934 0000 01 06934 0050 01 06934 0075 02 07075
5 00774    0085  3 07100  150  3  7100  150  3  7150
6   779  1  2  30  30  1  2  40  40  1  2 040 040
3   780 SZ H5 0  10  3  695    1930  1  3
5 00772    -110 01 07165  -76 02 07165  -35 02 06935 0000 02 06935 0035 02 06935
**SEQUENCE**
5 00774    0063 03 07075 0130 03 07078 0150 03 07080 0150 03 07100  250  3  7100
6 00779 01 02 040 040 01 02 035 035 01 02 040 040
3 00790 SZ  I 0 006 02 0695 0002170 99 99
5 00792     -86 01 07190  -29 01 06938 0000 01 06938 0029 01 06938 0067 02 07130
5 00794    0090 02 07150
6 00799 01 02 032 032 01 02 040 040
3   830 2STBR 2  24  1  700    2170        0  7164 3 0
5   832       0  1  6988    0  1  6955    5  1  6944   51  1  6944   56  1  6955
5   834      56  1  6988   55  1  7010   52  1  7050   50  1  7075   47  1  7100
5   836      45  1  7115   40  1  7140   35  1  7156   30  1  7163   28  1  7164
5   838      26  1  7163   21  1  7156   16  1  7140   11  1  7115    9  1  7100
5   840       6  1  7075    4  1  7050    1  1  7010    0  1  6988
6   849  1  2 032 032
3   920 SZ  J 5   8  3  696    2272  1  3
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```
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5   924        0  2  6944   35  3  6944   67  3  7110
6   929  1  2  35  35  1  2 035 035  1  2 035 035
3  1000 SZ  K 0   8  3  694    2712  1  3
5  1010    -120  1  7350  -65  2  7100  -35  2  6958    0  2  6933   35  2  6958  L
5  1011      66  2  7112   76  3  7112   76  3  7180
6  1019  1  2 050 050  1  2 028 028  1  2 050 050
3 01020 SZ K5 0 007 02 0697 0003208 99 99
5 01022    -165 01 07200  -80 02 07115  -50 02 07040  -35 02 06973 0000 02 06948
5 01024    0035 02 06973 0062 02 07115
6 01029 01 02 030 030 01 02 032 032
3  1100 SZ  L 0   8  3  696    3360  1  3
5  1110    -100  1  7300  -35  2  7200  -35  2  7070  -25  2  6979    0  2  6954  M
5  1111      30  2  6979   55  3  7120   90  3  7300
6  1119  1  2 050 050  1  2 030  30  1  2 050 050
3  1130 CORTB 2  24  1  700    3360       00  7302 3 0
5  1132       0  1  7079    0  1  7004   10  1  6982   49  1  6982   59  1  7004
5  1133      59  1  7079   58  1  7108   56  1  7150   55  1  7165   52  1  7204
5  1134      50  1  7225   45  1  7260   40  1  7285   35  1  7298   29  1  7302
5  1135      24  1  7298   19  1  7285   14  1  7260    9  1  7225    7  1  7204
5  1136       4  1  7165    3  1  7150    1  1  7108    0 -9  7079
6  1139  1  2 030 030
3  1200 SZ  M 5  14  3  700    3461  1  3
5  1210    -120  1  7300 -100  1  7170  -85  1  7160  -80  1  7110  -60  1  7110  N
5  1211     -35  1  6981  -29  2  6879    0  2  6956   29  3  6879   35  3  6981
5  1212      45  3  7030  105  3  7050  140  3  7200  165  3  7300
6  1219  1  2 050 050  1  2 030 030  1  2 050 050
3  1300 SZ  N 0  12  3  698    3911  1  3
5  1310    -120  1  7200 -120  1  7160 -108  2  7150 -100  2  7125  -80  2  7110  Ø
5  1311     -60  2  7110  -35  2  6996    0  2  6971   35  2  6971   50  3  7080
5  1312     210  3  7080  250  3  7200
6  1319  1  2 050 050  1  2 035 035  1  2 050 050
3  1400 SZ  O 0  14  3  699    4310  1  3
5  1410    -580  1  7220 -420  1  7200 -380  1  7180 -250  1  7160 -230  1  7140  P
5  1411    -130  1  7120 -100  1  7115  -62  2  7110  -43  2  7007    0  2  6982
5  1412      35  2  7007   50  3  7090  108  3  7080  128  3  7200
6  1419  1  2 050 050  1  2 040 040  1  2 050 050
3   500 SZ  P 1 022 03 0699 0004630 99 99
**SEQUENCE**
4   505   2500   3800   5400   4300   4300
5 00510    0000 01 07200 0100 01 07180 0258 01 07160 0302 01 07140 0350 01 07120
5 00511    0370 01 07100 0390 01 07100 0436 02 07080 0444 02 07060 0448 02 07030  Q
5 00512    0458 02 06985 0468 02 06974 0480 02 06985 0483 02 07040 0486 02 07060
5 00513    0497 02 07080 0502 03 07100 0512 03 07120 0524 03 07140 0536 03 07160
5 00514    0546 03 07180 0549 03 07200
6 00559 01 02 040 040 01 02 043 043 01 02 [illegible]
```

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3 00600 SZ  Q 0 030 03 0705 0005080 99 99
5 00610     0100  1  7300  111  1  7200  119  1  7180  128  1  7160  138  1  7140
5 00611     0142 01 07120 0144 02 07100 0146 02 07080 0148 02 07060 0150 02 07030
5 00612     0152 02 07038 0172 02 07032 0192 02 07038 0196 02 07060 0208 03 07080 R
5 00613     0213 03 07100 0264 03 07104 0350 03 07100 0380 03 07081 0415 03 07100
5 00614     0455 03 07100 0482 03 07120 0493 03 07140 0505 03 07160 0522 03 07180
5 00615     0533 03 07200 0552 03 07220 0564 03 07240 0582 03 07260 0608 03 07300
6 00659 01 02 080 080 01 02 045 045 01 02 070 070
3 00700 SZ  R 0 018 03 0706 0005680 99 99
5 00710     0000 01 07300 0016 01 07200 0028 01 07180 0032 01 07160 0043 01 07140
5 00711     0054 01 07120 0210 01 07102 0360 01 07114 0407 02 07100 0416 02 07080 S
5 00712     0420 02 07060 0424 02 07058 0474 02 07058 0476 02 07060 0482 02 07080
5 00713     0486 03 07100 0502 03 07200 0515 03 07300
6 00759 01 02 080 080 01 02 050 050 01 02 070 070
3 00800 SZ  S 0 022 03 0707 0006430 99 99
5 00810     0000 01 07300 0027 01 07200 0038 01 07180 0048 01 07160 0062 01 07140
5 00811     0064 01 07120 0070 02 07100 0075 02 07080 0087 02 07060 0090 02 07056
5 00812     0120 02 07052 0142 02 07056 0144 02 07060 0152 03 07080 0156 03 07100 T
5 00813     0168 03 07120 0250 03 07132 0312 03 07140 0350 03 07160 0372 03 07160
5 00814     0472 03 07140 0478 03 07200
6 00859 01 02 080 080 01 02 050 050 01 02 070 070
3 00900 SZ  T 0 019 03 0708 0007120 99 99
5 00910     0000 01 07300 0018 01 07200 0024 01 07180 0026 01 07160 0040 01 07120
5 00911     0048 02 07100 0050 02 07080 0070 02 07074 0086 02 07080 0088 02 07100
5 00912     0092 02 07120 0224 02 07120 0282 02 07140 0300 03 07160 0460 03 07180 U
5 00913     0465 03 07200 0472 03 07220 0479 03 07240 0495 03 07260
6 00959 01 02 090 090 01 02 048 048 01 02 080 080
3   960 SZ  U 0  15  3  708    7720  1  3
5   962       0  1  7300   15  1  7200   40  2  7120   50  2  7110   60  2  7075
5   964      75  2  7065   90  2  7075  100  2  7110  105  2  7120  115  3  7140 V
5   966     260  3  7140  275  3  7160  300  3  7180  350  3  7200  370  3  7240
6   969  1  2 075 075  1  2 045 045  1  2 070 070
3 01000 SW  V 0 025 03 0708 0008050 99 99
5 01110     0000 01 07300 0008 01 07280 0012 01 07260 0016 01 07240 0026 01 07220
5 01111     0100 01 07220 0165 01 07220 0238 01 07220 0383 01 07200 0392 02 07180
5 01112     0403 02 07160 0416 02 07140 0422 02 07120 0427 02 07100 0430 02 07080 W
5 01113     0455 02 07074 0480 02 07080 0482 02 07100 0484 02 07120 0494 03 07140
5 01114     0504 03 07160 0520 03 07180 0530 03 07200 0750 03 07220 0780 03 07240
6 01159 01 02 047 047 01 02 040 040 01 02 060 060
3 01100 CIRBR 2 018 01 0708 0008050      00 07194 1 0
**SEQUENCE**
5 01110     0000 01 07194 0000 01 07154 0012 01 07142 0018 01 07108 0020 01 07100
5 01111     0022 01 07100 0026 01 07084 0030 01 07074 0034 01 07072 0044 01 07072
5 01112     0046 01 07072 0052 01 07072 0058 01 07108 0065 01 07131 0065 01 07194
5 01113     0045 01 07194 0021 01 07194 0000 -9 07194
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*** INPUT CARD PRINTOUT ***

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6 01159 00 01 039 039
3  1200 CIR P 3   4                                   5
5 01210     0002    07072 0002    07100    4     7100    4     7194
3 01300 SZ  W 5 018 03 0709 0008110 01 03
5 01310     -10 01 07200   -5 01 07162   -1 01 07155 0000 02 07155 0010 02 07140
5 01311    0020 02 07107 0024 02 07097 0028 02 07094 0034 02 07088 0040 02 07080
5 01312    0046 02 07082 0049 02 07078 0056 02 07108 0063 02 07155 0065 02 07170
5 01313    0066 03 07172 0070 03 07180 0075 03 07200
6 01359 01 02 042 042 01 02 038 038 01 02 046 046
```

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 SWARTZ CK USS W COURT ST  SEC SZ AG      HOLTSLAG 20 05 02 05 12
2      2  71648  71787  71938  71833  71838
3 01300 SZ  W 1 018 03 0709 0008110 01 03
4  1305   2500   3800   5400   4300   4300
5 01310     -10 01 07200   -5 01 07162   -1 01 07155 0000 02 07155 0010 02 07140
5 01311    0020 02 07107 0024 02 07097 0028 02 07094 0034 02 07088 0040 02 07080
5 01312    0046 02 07082 0049 02 07078 0056 02 07108 0063 02 07155 0065 02 07170
5 01313    0066 03 07172 0070 03 07180 0075 03 07200
6 01359 01 02 042 042 01 02 038 038 01 02 046 046
3  1400 SZ  X 0  24  3  710    8920 99 99
5 01410    0000 01 07400 0016 01 07300 0040 01 07280 0052 01 07260 0108 01 07240
5 01411    0118 01 07240 0120 01 07220 0153 01 07220 0200 01 07220 0210 02 07200
5 01412    0232 02 07180 0240 02 07160 0241 02 07130 0242 02 07108 0262 02 07098
5 01413    0280 02 07108 0281 02 07130 0282 02 07160 0284 02 07180 0328 03 07200
5 01414    0347 03 07220 0362 03 07240 0367 03 07260 0400 03 07300
6 01459 01 02 044 044 01 02 037 037 01 02 046 046
3 01500 SZ  Y 0 024 03 0710 0009435 99 99
5 01510    0000 01 07300 0010 01 07280 0045 01 07280 0090 01 07260 0116 01 07260
5 01511    0125 01 07240 0136 01 07220 0142 01 07200 0146 02 07180 0148 02 07160
5 01512    0155 02 07140 0157 02 07120 0161 02 07113 0175 02 07096 0188 02 07113
5 01513    0200 02 07120 0202 02 07140 0210 02 07160 0212 02 07180 0220 02 07200
5 01514    0225 03 07220 0255 03 07240 0275 03 07260 0285 03 07280
6 01559 01 02 048 048 01 02 040 040 01 02 045 045
3 01600 HAMBR 2 017 03 0710 0009435        0 07243 1 1
5 01610    0000 01 07243 0000 01 07216 0008 01 07199 0016 01 07158 0025 01 07115
5 01611    0029 01 07092 0032 02 07092 0040 02 07093 0046 02 07095 0054 02 07100
5 01612    0061 02 07111 0064 03 07113 0070 03 07152 0080 03 07181 0090 03 07201
5 01613    0090 03 07243 0000 -9 07243
6 01559 00 01 030 030 00 01 028 028 01 02 034 034
**SEQUENCE**
3  1800 SZ  Z 5  22  3  710    9560  1  3
5 01810     -65 01 07300  -53 01 07280  -35 01 07260  -13 01 07240   -5 01 07220
5 01811    0000 02 07214 0010 02 07157 0018 02 07113 0023 02 07096 0027 02 07096
5 01812    0033 02 07096 0038 02 07101 0045 02 07107 0049 02 07113 0059 02 07145
5 01813    0067 02 07154 0075 02 07177 0080 02 07198 0090 03 07200 0112 03 07220
5 01814    0132 03 07240 0158 03 07260
6 01859 01 02 038 038 01 02 036 036 01 02 040 040
3 01900 SZ AA 0  18  3  712    9975 99 99
5 01911    0271 01 07300 0283 01 07300 0310 01 07260 0328 01 07240 0336 01 07220
5 01912    0342 02 07200 0353 02 07180 0363 02 07160 0366 02 07128 0381 02 07114
5 01913    0396 02 07128 0404 02 07160 0406 02 07180 0432 02 07200 0447 03 07220
5 01914    0469 03 07240 0482 03 07260 0520 03 07280
6 01959 01 02 040 040 01 02 [illegible]
```

X

Y

Z

AA

AB

```
5 02014     0310 03 07300
6 02059 01 02 039 039 01 02 033 033 01 02 036 036
3 02100 CAMBR 2  15  1  713   10360        15 07217 1 1
5 02110     0000 01 07217 0000 01 07192 0014 01 07153 0022 01 07156 0024 01 07156
5 02111     0030 01 07148 0038 01 07140 0047 01 07127 0049 01 07127 0055 01 07136
5 02112     0062 01 07144 0069 01 07160 0072 01 07172 0072 01 07217 0000 -9 07217
6 01359 00 01 033 033
**SEQUENCE**
3 02270 CIRRD 4  15  3  100            1  3            2 1 2                  1
5 02276     0000 01 07270 0090 01 07261 0091 02 07261 0166 02 07261 0167 03 07260
5 02277     0240 03 07246 0268 03 07240 0276 03 07220 0306 03 07220 0336 03 07200
5 02278     0347 03 07220 0354 03 07240 0366 03 07260 0372 03 07280 0380 03 07300
3 02300 SZ AC 5  19  3  712   10425 99 99
5 02310     -180 01 07300 -165 01 07280 -152 01 07260 -133 01 07240 -118 01 07220
5 02311      -10 01 07213 0000 02 07210 0018 02 07180 0030 02 07129 0034 02 07121   AD
5 02312     0042 02 07117 0050 02 07119 0062 02 07129 0072 02 07150 0073 03 07155
5 02313     0080 03 07158 0091 03 07212 0145 03 07220 0175 03 07246
6 02359 01 02 038 038 01 02 038 038 01 02 037 037
3 02400 SZ AD 0  24  3  713   10650 99 99
5 02410     0000 01 07340 0092 01 07320 0110 01 07300 0145 01 07280 0159 01 07260
5 02411     0218 01 07240 0266 01 07220 0270 01 07200 0275 02 07180 0278 02 07160
5 02412     0280 02 07125 0315 02 07125 0317 02 07140 0318 02 07160 0326 03 07180   AE
5 02413     0332 03 07200 0346 03 07220 0438 03 07236 0482 03 07220 0505 03 07220
5 02414     0510 03 07220 0650 03 07200 0665 03 07220 0714 03 07300
6 02459 01 02 038 038 01 02 037 037 01 02 040 040
3 02500 CAMBR 2  25  1  714   10650         0  7282 3 1
5 02510     0000 01 07168 0005 01 07165 0010 01 07155 0015 01 07138 0020 01 07130
5 02511     0025 01 07131 0030 01 07126 0035 01 07123 0040 01 07123 0045 01 07127
5 02512     0050 01 07133 0055 01 07138 0060 01 07139 0060 01 07139 0055 01 07205
5 02513     0050 01 07244 0045 01 07258 0040 01 07271 0035 01 07279 0030 01 07282
5 02514     0025 01 07280 0020 01 07274 0015 01 07264 0010 01 07220 0000 -9 07168
6 02559 01 02 037 037
3 02570 CAMRD 4  14  3   50            1  3            2 1 2                  1
5 02571     0000 01 07300 0026 01 07280 0128 01 07260 0150 01 07240 0180 01 07236
5 02572     0186 02 07284 0210 02 07282 0300 02 07240 0365 03 07237 0440 03 07220
5 02573     0590 03 07200 0618 03 07200 0652 03 07300 0658 03 07320
3 02600 SZ AE 5  23  3  712   10720  1  3
5 02610     -172 01 07300 -157 01 07280 -138 01 07260 -100 01 07240  -40 01 07220
5 02611       -8 01 07200 0000 02 07173 0012 02 07139 0020 02 07129 0032 02 07123   AF
5 02612     0039 02 07117 0050 02 07124 0058 02 07139 0059 02 07142 0060 03 07146
5 02613     0072 03 07188 0086 03 07200 0110 03 07220 0180 03 07237 0215 03 07220
5 02614     0458 03 07200 0481 03 07200 0514 03 07300
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*** INPUT CARD PRINTOUT ***

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

6 02659 01 02 055 055 01 02 038 038 01 02 038 038
3 02700 SZ AF 0 023 03 0714 0011275 99 99
5 02710    0000 01 07300 0010 01 07280 0018 01 07260 0025 01 07240 0036 01 07220
5 02711    0076 01 07200 0108 01 07200 0335 01 07200 0374 01 07200 0384 02 07180   AG
5 02712    0390 02 07180 0396 02 07160 0400 02 07130 0440 02 07130 0442 02 07160
5 02713    0444 02 07180 0449 02 07200 0458 03 07220 0480 03 07220 0532 03 07240
5 02714    0563 03 07260 0617 03 07280 0632 03 07300
6 02759 01 02 075 075 01 02 042 042 01 02 038 038
3  2800 SZ AG 0  19  3  711   11620  1  3
5  2810       0  1  7400   15  1  7300   25  1  7280   40  1  7260  250  1  7260
5  2812     380  1  7240  430  1  7220  870  1  7220  890  1  7200  900  1  7180   AH
5  2814     910  1  7200  930  2  7202  940  2  7140  970  2  7100  990  2  7150
5  2816     991  3  7270 1015  3  7300 1125  3  7300 1160  3  7400
6  2829  1  2 045 045  1  2 044 044  1  2 042 042
```

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2      2  72303  72470  72632  72527
3  2800 SZ AG 1  19  3  711   11620  1  3
4  280    2500   3800   5400   4300
5  2810       0  1  7400   15  1  7300   25  1  7280   40  1  7260  250  1  7260
5  2812     380  1  7240  430  1  7220  870  1  7220  890  1  7200  900  1  7180   AH
5  2814     910  1  7200  930  2  7202  940  2  7140  970  2  7100  990  2  7150
5  2816     991  3  7270 1015  3  7300 1125  3  7300 1160  3  7400
6  2829  1  2 045 045  1  2 044 044  1  2 042 042
3 02900 SZ AH 0 029 03 0717   12165 99 99
5 02910    0000 01 07400 0012 01 07380 0020 01 07360 0028 01 07340 0038 01 07320
5 02911    0042 01 07300 0055 01 07280 0062 01 07260 0068 01 07240 0085 01 07240
5 02912    0100 01 07240 0196 01 07220 0300 01 07220 0400 02 07200 0405 02 07180   AI
5 02913    0416 02 07170 0426 02 07163 0437 02 07170 0448 02 07180 0452 02 07200
5 02914    0463 03 07220 0486 03 07240 0548 03 07240 0709 03 07240 0744 03 07260
5 02915    0778 03 07280 0781 03 07300 0791 03 07320 0800 03 07340
6 02959 01 02 045 045 01 02 040 040 01 02 038 038
3 03000 SZ AI 0 028 03 0718 0012970 99 99
5 03010    0000 01 07400 0029 01 07300 0038 01 07280 0044 01 07260 0192 01 07260
5 03011    0366 01 07260 0418 01 07260 0478 01 07240 0575 01 07240 0622 02 07220
5 03012    0628 02 07200 0634 02 07180 0646 02 07176 0659 02 07187 0678 02 07200   AJ
5 03013    0686 02 07220 0700 03 07220 0710 03 07240 0740 03 07260 0785 03 07260
5 03014    0800 03 07240 0980 03 07240 1114 03 07260 1152 03 07280 1162 03 07300
5 03015    1172 03 07320 1192 03 07340 1250 03 07359
6 03059 01 02 037 037 01 02 040 040 01 02 037 037
3 03100 SZ AJ 0 028 03 0719 0013535 99 99
5 03110    0000 01 07400 0020 01 07380 0081 01 07360 0106 01 07340 0146 01 07320
5 03111    0260 01 07300 0420 01 07280 0504 01 07260 0507 01 07240 0513 01 07220
5 03112    0519 02 07200 0526 02 07184 0556 02 07184 0568 02 07200 0600 03 07210   AK
5 03113    0730 03 07225 0784 03 07240 0910 03 07260 0920 03 07280 1064 03 07260
5 03114    1178 03 07260 1220 03 07280 1245 03 07300 1292 03 07320 1342 03 07340
5 03115    1418 03 07360 1430 03 07380 1437 03 07400
6 03159 01 02 037 037 01 02 041 041 01 02 038 038
3  3160 SZ AK 0  18  3  720   13780  1  3
5  3168    -650  1  7360 -530  1  7340 -450  1  7320 -430  1  7300  -65  1  7300
5  3170       0  1  7310   18  2  7300   25  2  7200   40  2  7192   70  2  7182   AL
5  3172      85  2  7192   95  3  7200  100  3  7220  150  3  7240  400  3  7260
5  3174     540  3  7260  575  3  7280  630  3  7360
6  3179  1  2 037 037  1  2 042 042  1  2 038 038
3 03200 SZ AL 0 020 03 0720 0014140 99 99
5 03210    0000 01 07400 0012 01 07340 0100 01 07320 0190 01 07300 0408 01 07280
5 03211    0646 01 07260 1018 01 07260 1023 02 07220 1036 02 07200 1050 02 07199   AM
5 03212    1064 02 07199 1080 02 07220 1088 03 07240 1330 03 07260 1362 03 07280
5 03213    1392 03 07300 1442 03 07320 1476 03 07340 1500 03 07360 1542 03 07400
6 03259 01 02 038 038 01 02 043 043 01 02 038 038
```

```
2     2  72568  72658  72751  72695  72704
3  3160 SZ AK 1  18  3  720   13780  1  3
4  3163  2500   3800   5400   4300   4300
5  3168   -650  1  7360 -530  1  7340 -450  1  7320 -430  1  7300  -65  1  7300
5  3170      0  1  7310   18  2  7300   25  2  7200   40  2  7192   70  2  7182
5  3172     85  2  7192   95  3  7200  100  3  7220  150  3  7240  400  3  7260
5  3174    540  3  7260  575  3  7280  630  3  7360
6  3179  1  2 037 037  1  2 042 042  1  2 038 038
3 03200 SZ AL 0 020 03 0720 0014140 99 99
5 03210    0000 01 07400 0012 01 07340 0100 01 07320 0190 01 07300 0408 01 07280
5 03211    0646 01 07260 1018 01 07260 1023 02 07220 1036 02 07200 1050 02 07199
5 03212    1064 02 07199 1080 02 07220 1088 03 07240 1330 03 07260 1362 03 07280
5 03213    1392 03 07300 1442 03 07320 1476 03 07340 1500 03 07360 1542 03 07400
6 03259 01 02 038 038 01 02 043 043 01 02 038 038
3 03300 SZ AM 0 022 03 0721 0015135 99 99
5 03310    0000 01 07400 0008 01 07380 0012 01 07360 0028 01 07340 0038 01 07320
5 03311    0042 01 07300 0112 01 07280 0138 01 07280 0442 01 07280 0722 02 07260
5 03312    0728 02 07208 0758 02 07208 0778 02 07220 0784 02 07260 0793 03 07280
5 03313    0814 03 07300 0918 03 07300 0938 03 07320 0948 03 07340 0962 03 07360
5 03314    0972 03 07380 1020 03 07400
6 03359 01 02 038 038 01 02 043 043 01 02 038 038
3 03400 SZ AN 0 018 03 0722 0016045 99 99
5 03410    0000 01 07400 0017 01 07340 0029 01 07320 0252 01 07300 0340 01 07280
5 03411    0588 01 07260 0603 02 07240 0612 02 07220 0614 02 07213 0642 02 07213
5 03412    0646 02 07220 0654 02 07240 0660 02 07300 0670 03 07320 0724 03 07340
5 03413    0782 03 07360 0810 03 07380 0870 03 07400
6 03459 01 02 039 039 01 02 043 043 01 02 037 037
3 03500 SZ AO 0 020 03 0723 0017055 99 99
5 03510    0000 01 07400 0010 01 07380 0018 01 07360 0036 01 07340 0077 01 07320
5 03511    0140 01 07300 0300 02 07280 0300 02 07260 0308 02 07240 0324 02 07225
5 03512    0341 02 07225 0343 03 07240 0348 03 07280 0450 03 07300 0560 03 07320
5 03513    0660 03 07320 0672 03 07340 0692 03 07360 0732 03 07380 0782 03 07400
6 03559 01 02 037 037 01 02 042 042 01 02 037 037
3 03600 SZ AP 0 020 03 0726 0017900 99 99
5 03610    0000 01 07400 0006 01 07380 0008 01 07360 0017 01 07340 0028 01 07320
5 03611    0158 01 07300 0204 02 07280 0218 02 07260 0227 02 07247 0236 02 07247
5 03612    0256 02 07260 0264 02 07280 0300 03 07300 0510 03 07300 0590 03 07320
5 03613    0740 03 07320 0757 03 07340 0768 03 07360 0776 03 07380 0784 03 07400
6 03659 01 02 038 038 01 02 043 043 01 02 037 037
3 03700 SZ AQ 0 017 03 0726 0018560 99 99
5 03710    0000 01 07500 0017 01 07400 0022 01 07300 0026 02 07280 0031 02 07260
5 03711    0049 02 07253 0067 02 07260 0074 02 07280 0080 02 07300 0175 03 07319
5 03712    0392 03 07320 0532 03 07320 0582 03 07320 0595 03 07340 0606 03 07360
5 03713    0672 03 07400 0692 03 07500
```

AL

AM

AN

AO

AP

AQ

AR

*** INPUT CARD PRINTOUT ***

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
6 03759 01 02 080 080 01 02 044 044 01 02 075 075
3 03800 SZ AR 0 016 03 0726 0019170 99 99
5 03810    0000 01 07400 0012 01 07380 0022 01 07360 0028 01 07340 0322 01 07320
5 03811    0372 02 07300 0392 02 07280 0396 02 07256 0420 02 07256 0424 02 07240   AS
5 03812    0434 02 07300 0438 03 07320 0555 03 07320 0638 03 07340 0702 03 07400
5 03813    0738 03 07500
6 03859 01 02 080 080 01 02 044 044 01 02 075 075
3 03900 SZ AS 0 020 03 0727 0019590 99 99
5 03910    0000 01 07440 0010 01 07420 0020 01 07400 0022 01 07380 0028 01 07360
5 03911    0032 01 07340 0056 01 07320 0095 02 07300 0116 02 07280 0118 02 07261
5 03912    0148 02 07261 0149 02 07280 0158 02 07300 0165 02 07320 0170 03 07320   AT
5 03913    0368 03 07320 0404 03 07320 0626 03 07340 0678 03 07400 0702 03 07500
6 03959 01 02 090 090 01 02 050 050 01 02 090 090
3 04000 SZ AT 0 018 03 0727 0020240 99 99
5 04010    0000 01 07420 0018 01 07400 0019 01 07380 0025 01 07360 0058 01 07340
5 04011    0060 01 07320 0065 02 07300 0076 02 07280 0078 02 07268 0094 02 07268
5 04012    0097 02 07280 0104 02 07300 0112 03 07320 0260 03 07340 0310 03 07360   AU
5 04013    0970 03 07360 1040 03 07400 1050 03  7440
6 04059 01 02 090 090 01 02 050 050 01 02 090 090
```

```
5 08010    0000 01 07520 0011 01 07500 0014 02 07480 0016 02 07460 0018 02 07440
5 08011    0020 02 07420 0021 02 07398 0032 02 073[illegible] 0033 02 07400 0035 02 07420
5 08012    0042 02 07440 0048 02 07460 0072 03 074[illegible] 0122 03 07500 0131 03 07520
5 08013    0142 03 07540
6 08059 01 02 070 070 01 02 044 044 01 02 045 045
3 08100 BR 4C 2 012 01 0740 0031840        30 07480 3 1
5 08110    0000 01 07480 0000 01 07413 0005 01 07415 0010 01 07408 0015 01 07405
5 08111    0020 01 07398 0025 01 07402 0030 01 07413 0035 01 07421 0040 01 07426
5 08112    0040 01 07480 0000 -9 07480
6 08159 01 02 038 038
3  8175 BD 4C 4   8  2   40          1  2          1 1                  1
5  8180      0  1  7560  190  1  7540  495  1  7520  530  1  7517  675  2  7515
5  8181    820  2  7520  910  2  7540  940  2  7500
3 08200 00040 5 018 03 0741 0031920  1  3
5 08210   -145 01 07520  -90 01 07500  -44 01 07480  -10 01 07460 0000 02 07456
5 08211   0010 02 07413 0014 02 07402 0018 02 07401 0022 02 07404 0026 02 07414
5 08212   0032 02 07447 0037 02 07450 0040 03 07446 0042 03 07442 0063 03 07400
5 08213   0094 03 07480 0170 03 07500 0252 03 07540
6 08259 01 02 065 065 01 02 040 040 01 02 070 070
3  8100   4E 0  15  3  743   32350 99 99
5  8110      0  1  7600   50  1  7500   60  1  7480   68  2  7460   80  2  7440
5  8111     88  2  7420  118  2  7420  128  2  7440  140  2  7460  150  3  7480
5  8112    182  3  7500  202  3  7520  213  3  7540  230  3  7560  242  3  7580
6  8359  1  2 060 060  1  2 045 045  1  2 060 060
3  8400 BR 4E 2  18  1  743   32350        0  7566 1 1
5  8410      0  1  7566    0  1  7503    5  1  7484   10  1  7462   15  1  7482
5  8411     20  1  7459   25  1  7427   30  1  7420   35  1  7429   40  1  7427
5  8412     45  1  7432   50  1  7439   55  1  7451   60  1  7458   65  1  7403
5  8413     68  1  7497   68  1  7566    0 -9  7566
6  8459  1  2 046 046
3  8500   4F 5  11  3  744   32410  1  3
5  8510      0  1  7640   34  1  7539   40  2  7480   44  2  7458   62  2  7435
5  8511     98  2  7472  104  2  7485  108  3  7490  128  3  7508  162  3  7531
5  8512    202  3  7651
6  8559  1  2 065 065  1  2 050 050  1  2 060 060
3  8600   4G 0  17  3  743   32820 99 99
5  8610      0  1  7600   17  1  7520   26  1  7500   28  2  7480   31  2  7440
5  8611     42  2  7430   52  2  7427   62  2  7430   72  2  7440   81  2  7480
5  8612     90  3  7480  108  3  7500  118  3  7520  132  3  7540  138  3  7500
5  8613    148  3  7580  161  3  7600
```

CC

CD

CE

CF

CG

```
         1         2         3         4         5         6         7         8
....7....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

6  8859  1  2 060 060  1  2 046 046  1  2 060 060
3  8700    4H 0  18  3  744   32930 99 99
5  8710       0  1  7580   43  1  7560   64  1  7540  150  1  7520  166  1  7500   CH
5  8711     170  2  7480  184  2  7460  196  2  7430  210  2  7427  216  2  7430
5  8712     218  2  7460  220  3  7480  222  3  7500  224  3  7520  236  3  7540
5  8713     252  3  7560  292  3  7580  340  3  7600
6  8759  1  2 055 055  1  2 045 045  1  2 060 060
3  8800 8RC4H 2  47  3  744   32930        0  7506 3 0
5  8810      31  1  7472   32  1  7449   33  1  7444   34  1  7442   35  1  7444
5  8811      36  1  7449   37  1  7472   36  1  7497   35  1  7502   34  1  7502
5  8812      33  1  7502   32  1  7497   31 -9  7472   38  2  7479   39  2  7453
5  8813      40  2  7455   41  2  7440   42  2  7439   43  2  7440   44  2  7455
5  8814      45  2  7453   46  2  7479   45  2  7496   44  2  7504   43  2  7508
5  8815      42  2  7509   41  2  7508   40  2  7503   39  2  7497   38 -9  7479
5  8816      56  3  7479   57  3  7453   58  3  7455   59  3  7440   60  3  7439
5  8817      61  3  7440   62  3  7455   63  3  7453   64  3  7479   63  3  7476
5  8818      62  3  7504   61  3  7508   60  3  7509   59  3  7508   58  3  7503
5  8819      57  3  7495   56 -9  7479
6  8859  1  2 028 028  1  2 032 032  1  2 032 032
3  8900 8DC4H 4  16  1   16          1  2          2 2          1
                                                    0
5  8910       0  1  7580   15  1  7568   35  1  7563   45  1  7555   55  1  7540
5  8911      70  1  7539   85  1  7533  100  1  7531  105  1  7532  130  1  7537
5  8912     145  1  7549  160  1  7552  175  1  7553  190  1  7561  205  1  7568
5  8913     220  2  7575
3  9000    4I 5  20  3  743   33020  1  3
5  9010     -20  1  7600    0  1  7522    5  1  7502   10  1  7489   15  1  7482
5  9011      18  1  7447   24  1  7444   28  2  7445   32  2  7438   36  2  7432   CI
5  9012      40  2  7430   44  2  7428   49  2  7441   50  3  7445   54  3  7468
5  9013      60  3  7485   65  3  7501   75  3  7535   85  3  7550  115  3  7613
6  9059  1  2 055 055  1  2 038 038  1  2 060 060
```

```
1     1 SWARTZ CR ARCH HR TO MAPLE QU AT TO AS  KNUTILLA 15  5  2  5 12
2     2 75462  75545  75583  75653  75583
3  9000    41 1  20  3  743   33020  1  3
4  9005   1300   1900   2200   2900   2200
5  9010    -20  1  7600    0  1  7522    5  1  7502   10  1  7489   15  1  7482
5  9011     18  1  7447   24  1  7444   28  2  7445   32  2  7438   36  2  7432   CI
5  9012     40  2  7430   44  2  7428   49  2  7441   50  3  7445   54  3  7468
5  9013     60  3  7485   65  3  7501   75  3  7535   85  3  7550  115  3  7613
6  9059  1  2 055 055  1  2 038 038  1  2 060 060
3  9100    4J 0  17  3  745   33720 99 99
5  9110      0  1  7659   48  1  7640   68  1  7620   92  1  7600  112  2  7500   CJ
5  9111    122  2  7480  137  2  7460  147  2  7448  157  2  7460  162  2  7400
5  9112    170  2  7500  178  3  7520  188  3  7540  206  3  7560  217  3  7580
5  9113    232  3  7600  560  3  7619
6  9159  1  2 037 037  1  2 033 033  1  2 037 037
3  9200    4K 0  21  3  746   34570 99 99
5  9210      0  1  7660  123  1  7640  178  1  7620  204  1  7600  216  1  7580
5  9211    223  1  7560  238  1  7540  242  1  7520  250  2  7500  257  2  7480   CK
5  9212    267  2  7460  279  2  7450  289  2  7460  293  2  7480  301  2  7500
5  9213    308  3  7520  312  3  7540  318  3  7560  325  3  7580  338  3  7600
5  9214    640  3  7610
6  9259  1  2 038 038  1  2 036 036  1  2 039 039
3  9300    4L 0  22  3  746   35200 99 99
5  9310      0  1  7680   26  1  7660   74  1  7640  114  1  7620  152  1  7600
5  9311    162  1  7580  166  1  7560  176  1  7540  178  1  7520  188  2  7500   CL
5  9312    194  2  7480  196  2  7470  206  2  7459  216  2  7470  218  2  7480
5  9313    227  2  7500  234  3  7520  248  3  7540  272  3  7560  493  3  7580
5  9314    637  3  7600 1060  3  7620
6  9359  1  2 040 040  1  2 035 035  1  2 040 040
3  9400    4M 0  20  3  747   36160 99 99
5  9410      0  1  7660  135  1  7640  152  1  7620  162  1  7600  172  1  7580
5  9411    176  1  7560  186  2  7540  190  2  7520  192  2  7500  198  2  7480   CM
5  9412    208  2  7467  218  2  7480  231  2  7500  238  3  7520  354  3  7540
5  9413    534  3  7560  622  3  7580  829  3  7600  925  3  7620 1344  3  7640
6  9459  1  2 040 040  1  2 043 043  1  2 040 040
3  9500    4N 0  21  3  749   36940 99 99
5  9510      0  1  7680  157  1  7660  236  1  7640  242  1  7620  252  1  7600
5  9511    262  1  7580  283  1  7560  357  1  7540  527  1  7540  590  1  7560   CN
5  9512    716  2  7560  803  2  7540  811  2  7520  822  2  7500  837  2  7480
5  9513    852  2  7500  857  2  7520  870  3  7560  874  3  7580  880  3  7600
5  9514    892  3  7700
6  9559  1  2 065 065  1  2 045 045  1  2 060 060
3  9570 4N+1  0   9  3  750   37370  1  3
5  9575      0  1  7600   30  1  7560  380  1  7560  400  2  7540  410  2  7490   CO
```

```
         1         2         3         4         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 SWARTZ CR JENNINGS RD TO HILL RD 5A - 5J KNUTILLA 13  5  2  5 12
2      2  76568  76708  76755  76807  76758
3 11100    5A 1  26  3  758   44600 99 99
4 11105   1300   1900   2200   2900   2200
5 11110    -280  1  7700 -182  1  7680  -60  1  7660    0  1  7634    5  1  7620
5 11111      10  1  7620   16  1  7599   18  2  7592   20  2  7588   25  2  7587
5 11112      30  2  7582   35  2  7577   40  2  7581   45  2  7585   50  2  7591
5 11113      51  2  7594   52  3  7595   53  3  7598   55  3  7606   60  3  7622
5 11114      65  3  7627   70  3  7630  130  3  7640  196  3  7660  262  3  7680
5 11115     338  3  7700
6 11159  1  2 065 065  1  2 050 050  1  2 065 065
3 11200    5B 0  16  3  761   45500 99 99
5 11210       0  1  7740  408  1  7720  421  1  7700  438  1  7640  482  1  7640
5 11211     719  1  7640  748  2  7620  760  2  7603  772  2  7620  784  2  7640
5 11212     786  3  7645  810  3  7660  850  3  7680  875  3  7700  890  3  7720
5 11213     916  3  7740
6 11259  1  2 065 065  1  2 050 050  1  2 065 065
3 11300    5C 0  21  3  761   46380 99 99
5 11310       0  1  7800   34  1  7780   93  1  7760  708  1  7740  982  1  7720
5 11311    1024  1  7700 1080  1  7680 1398  1  7660 1408  2  7640 1418  2  7620
5 11312    1420  2  7608 1452  2  7608 1455  2  7620 1463  2  7640 1468  2  7660
5 11313    1475  2  7680 1477  2  7700 1493  3  7720 1516  3  7740 1528  3  7760
5 11314    1558  3  7800
6 11359  1  2 065 065  1  2 045 045  1  2 065 065
3 11400    5D 1  20  3  762   47120 99 99
4 11405   1150   1650   1950   2500   1950
5 11410       0  1  7800   27  1  7780  142  1  7760  525  1  7742  888  1  7740
5 11411     978  1  7720 1054  1  7700 1400  1  7680 1483  1  7660 1485  2  7658
5 11412    1506  2  7640 1508  2  7614 1520  2  7614 1522  2  7640 1528  2  7660
5 11413    1539  2  7680 1545  2  7700 1550  3  7720 1560  3  7760 1571  3  7800
6 11459  1  2 065 065  1  2 045 045  1  2 065 065
3 11470 5D+1  0   9  3  765   47420  1  3
5 11480       0  1  7740  110  1  7720  160  1  7700  460  1  7680  510  2  7660
5 11481     520  2  7617  540  2  7617  560  3  7700  580  3  7800
6 11485  1  2 065 065  1  2 045 045  1  2 065 065
3 11500    5E 0  12  3  765   47960  1  3
5 11510       0  1  7760   35  1  7740   50  1  7720   80  1  7700  180  2  7680
5 11511     200  2  7620  215  2  7620  225  3  7660  260  3  7680  400  3  7700
5 11512     450  3  7720  520  3  7760
6 11520  1  2 060 060  1  2 045 045  1  2 080 080
3 11570 5E+1  0  12  3  765   48180  1  3
5 11580       0  1  7760   20  1  7740   40  1  7720  180  1  7700  220  2  7680
5 11581     235  2  7625  255  2  7625  270  3  7660  370  3  7680  420  3  7700
5 11582     450  3  7720  490  3  7760
```

DB

DC

DD

DE

DF

DG

DH

Add 270 ft to distance

```
5 22612      125  3  8232  130  3  8216  135  3  8220  150  3  8220  160  3  8240
5 22613      180  3  8260  187  3  8280  193  3  8300
6 22629  1  2 075 075  1  2 050 050  1  2 090 090
3 22600    8P 0  18  3  820  100540 99 99
**SEQUENCE**
5 22610        0  1  8360   18  1  8340   47  1  8320   58  1  8300   92  1  8280
5 22611      106  1  8260  128  1  8240  224  1  8230  236  2  8220  238  2  8194
5 22612      252  2  8194  260  2  8200  265  3  8230  283  3  8240  296  3  8260
5 22613      303  3  8280  317  3  8300  344  3  8400
6 22659  1  2 100 100  1  2 055 055  1  2 100 100
3 22650    8P 0  21  3  820  100720 99 99
**SEQUENCE**
5 22651     -162  1  8360 -144  1  8340 -115  1  8320 -104  1  8300  -94  1  8280
5 22652      -88  1  8248  -78  1  8241  -54  1  8231  -10  2  8219   -8  2  8209
5 22653        0  2  8195   22  2  8210   30  3  8225   58  3  8240   86  3  8240
5 22654      123  3  8240  142  3  8245  145  3  8260  148  3  8280  152  3  8300
5 22655      158  3  8360
6 22659  1  2 100 100  1  2 055 055  1  2 120 120
3 22700    8Q 0  20  3  820  100960 99 99
5 22710     -202  1  8340 -112  1  8320 -102  1  8300  -88  1  8280  -80  1  8247
5 22711      -68  1  8234  -38  1  8209   -7  2  8212   -6  2  8202    5  2  8195
5 22712       17  2  8203   18  2  8212   19  3  8218   44  3  8218   78  3  8243
5 22713       98  3  8260  108  3  8280  114  3  8300  118  3  8320  122  3  8340
6 22719  1  2 100 100  1  2 060 060  1  2 100 100
3 22760   8QQ 0  15  3  820  101130 99 99
5 22761     -128  1  8340 -107  1  8300 -100  1  8280  -86  1  8247  -74  1  8228
5 22762      -30  1  8215  -12  2  8217  -11  2  8206   -2  2  8198   10  2  8208
5 22763       16  3  8219   28  3  8240   38  3  8254   54  3  8300   64  3  8340
6 22769  1  2 100 100  1  2 055 055  1  2 100 100
3 22770 8Q+1  0   9  3  822  101240  1  3
5 22775        0  1  8300   30  1  8260   50  1  8240   65  2  8210   80  2  8210
5 22776       80  3  8240  195  3  8260  200  3  8280  215  3  8300
6 22780  1  2 100 100  1  2 055 055  1  2 100 100
3 22800    8R 0  19  3  822  101610 99 99
5 22810        0  1  8340   50  1  8320   86  1  8300  164  1  8280  262  1  8260
5 22811      363  1  8250  383  1  8255  396  1  8255  600  1  8250  602  1  8240
5 22812      608  2  8240  610  2  8220  643  2  8220  648  2  8240  652  3  8240
5 22813      702  3  8260  744  3  8280  778  3  8300  818  3  8400
6 22859  1  3 200 200  1  2 055 055  1  2 120 100
3 22900    8S 0  26  3  823  102510 99 99
5 22910        0  1  8400   10  1  8350   24  1  8300   32  1  8280   74  1  8260
5 22911      200  1  8255  246  1  8260  314  1  8280  360  1  8296  410  1  8280
5 22912      472  1  8260  484  1  8255  572  1  8255  828  1  8255  856  1  8260
5 22913      910  1  8260  924  2  8260  926  2  8240  976  2  8240  980  3  8260
5 22914     1086  3  8260 1124  3  8280 1154  3  8300 1172  3  8320 1190  3  8340
```

HG

HH

HI

SWADTZ

HJ

HK

HL

```
6 22959   1  3 200 200  1  2 060 060  1  3 150 150
3 23000     8T 0  23  3  825  104030 99 99
5 23010        0  1  8400   20  1  8300   34  1  8280   58  1  8260  140  1  8255
5 23011      230  1  8270  296  1  8270  572  1  8265  620  1  8265  660  1  8265   H M
5 23012      828  1  8265  858  1  8260 1030  1  8260 1034  2  8240 1082  2  8240
5 23013     1090  3  8260 1096  3  8280 1108  3  8300 1118  3  8320 1130  3  8340
5 23014     1142  3  8360 1154  3  8380 1175  3  8400
6 23059   1  3 200 200  1  2 060 060  1  3 150 150
3 23070 8T+1  0  11  3  826  104510  1  3
5 23080        0  1  8320    5  1  8300   15  1  8280  200  1  8265  350  1  8264   H N
5 23081      450  1  8265  600  2  8245  605  2  8245  630  2  8245  635  3  8260
5 23082      645  3  8320
6 23090   1  3 150 150  1  2 060 060  1  2 100 100
3 23100     8U 0  20  3  825  105000 99 99
5 23110        0  1  8450   14  1  8440   30  1  8420   40  1  8400   50  1  8300
5 23111       63  1  8290   83  1  8290  150  1  8290  150  1  8290  200  1  8290   H O
5 23112      242  1  8290  380  1  8280  532  1  8265  534  1  8265  564  2  8250
5 23113      583  2  8250  590  2  8265  593  3  8280  602  3  8300  614  3  8400
6 23159   1  3 150 150  1  2 055 055  1  2 100 100
3 23170 8U+1  0   8  3  826  105700  1  3
5 23175        0  1  8400   10  1  8300   25  2  8280   30  2  8260   55  2  8260   H P
5 23176       60  3  8280  200  3  8300  280  3  8300
6 23180   1  3 150 150  1  2 055 055  1  2 100 100
3 23200     8V 0  19  3  826  106200 99 99
5 23210        0  1  8300   26  1  8300   36  1  8300   44  1  8300   52  1  8280
5 23211       58  2  8260   70  2  8260   78  2  8270   84  3  8280  100  3  8280   H Q
5 23212      190  3  8300  235  3  8320  343  3  8340  348  3  8360  361  3  8380
5 23213      394  3  8400  403  3  8420  416  3  8440  428  3  8460
6 23259   1  2 100 100  1  2 055 055  1  2 100 100
3 23300     8W 0  14  3  828  106620 99 99
5 23310        0  1  8400    6  1  8380   12  1  8360   18  1  8340   42  1  8320
5 23311       45  1  8300  190  1  8290  202  2  8280  206  2  8270  221  2  8265   H R
5 23312      236  2  8270  238  3  8300  242  3  8350  246  3  8400
6 23359   1  2 100 100  1  2 050 050  1  2 080 080
3 23370 8W+1  0  12  3  829  107010  1  3
5 23375        0  1  8400   40  1  8320   65  1  8310   95  2  8300  100  2  8274   H S
5 23376      135  2  8274  135  3  8300  150  3  8310  300  3  8310  315  3  8360
5 23377      360  3  8380  380  3  8400
6 23380   1  2 090 090  1  2 055 055  1  3 100 100
3 23400     8X 0  15  3  830  107400 99 99
5 23410        0  1  8400    6  1  8380   14  1  8360   22  1  8340   32  1  8320
5 23411       41  1  8300   72  1  8300   74  2  8290   89  2  8290  104  2  8290   H T
5 23412      106  2  8302  158  3  8320  214  3  8340  226  3  8360  235  3  8400
6 23459   1  2 080 080  1  2 050 050  1  2 090 090
```

```
1      1 SWARTZ CR BALDWIN RD TO COPNECONIC RD    KNUTILLA 16  5  2  5 12
2      2 83306  83355  83376  83420  83386
3 24000    9A 1  25  3  828  108970  1  3
4 24005    260    330    360    425    360
5 24010    -148  1  8400  -68  1  8380   -5  1  8360   -3  1  8340    0  1  8317
5 24011       5  1  8318   10  1  8320   14  2  8305   16  2  8297   20  2  8283
5 24012      24  2  8278   28  2  8277   32  2  8279   36  2  8284   40  2  8294   HY
5 24013      42  3  8300   43  3  8305   45  3  8313   50  3  8317   60  3  8316
5 24014     110  3  8340  174  3  8340  203  3  8360  238  3  8380  262  3  8400
6 24059  1  2 090 090  1  2 050 050  1  2 095 095
3 24100    9B 0  19  3  829  109740 99 99
5 24110       0  1  8500   32  1  8400   40  1  8380   42  1  8360   53  1  8340   HZ
5 24111      72  1  8320   86  2  8300   92  2  8289  110  2  8286  120  2  8289
5 24112     135  2  8300  140  3  8320  145  3  8340  172  3  8360  183  3  8380
5 24113     194  3  8400  203  3  8420  213  3  8440  238  3  8500
6 24159  1  2 100 100  1  2 055 055  1  2 100 100
3 24200    9C 0  23  3  830  110200 99 99
5 24210       0  1  8500   28  1  8400   34  1  8380   46  1  8360   54  1  8340
5 24211      72  1  8320  250  1  8310  252  2  8310  262  2  8300  264  2  8292   IA
5 24212     281  2  8292  282  2  8300  296  2  8320  298  3  8320  305  3  8340
5 24213     322  3  8360  360  3  8380  382  3  8400  398  3  8420  410  3  8440
5 24214     422  3  8460  430  3  8480  434  3  8500
6 24259  1  2 150 150  1  2 055 055  1  2 090 090
3 24300    9D 0  20  3  832  110910 99 99
5 24310       0  1  8500   14  1  8480   32  1  8460   43  1  8440   54  1  8420
5 24311      84  1  8400   94  1  8380  123  1  8360  150  1  8340  242  1  8320   IB
5 24312     244  2  8320  253  2  8314  274  2  8314  286  2  8320  288  3  8320
5 24313     519  3  8340  520  3  8340  630  3  8360  631  3  8360  633  3  8360
6 24359  1  2 150 150  1  2 055 055  1  2 150 150
3 24400    9E 0  24  3  833  111500 99 99
5 24410       0  1  8500   26  1  8480   33  1  8460   36  1  8440   47  1  8420
5 24411      54  1  8400  210  1  8380  235  1  8360  255  1  8340  510  2  8340   IC
5 24412     518  2  8320  552  2  8320  564  3  8340  570  3  8340  604  3  8360
5 24413     662  3  8360  744  3  8360  900  3  8380  933  3  8400  952  3  8420
5 24414     982  3  8440  995  3  8460 1014  3  8480 1035  3  8500
6 24459  1  2 150 150  1  2 055 055  1  2 150 150
3 24460 9E+1  0   9  3  834  111940  1  3
5 24465       0  1  8380   40  1  8360  135  2  8340  150  2  8330  190  2  8330   ID
5 24466     200  3  8340  215  3  8340  260  3  8360  280  3  8380
6 24470  1  2 150 150  1  2 055 055  1  2 150 150
3 24500    9F 0  25  3  834  112160 99 99
5 24510       0  1  8500   18  1  8400   46  1  8380   62  1  8360  180  1  8350
5 24511     182  2  8350  184  2  8340  193  2  8336  212  2  8336  213  2  8340   IE
5 24512     224  2  8340  230  3  8340  264  3  8360  284  3  8360  444  3  8350
5 24513     445  3  8340  458  3  8340  483  3  8360  634  3  8380  682  3  8400
```

```
5 24514      714  3  8420  737  3  8440  767  3  8460  822  3  8480  868  3  8500
6 24559    1  2 120 120  1  2 055 055  1  2 120 12
3 24600     9G 0  14  3  836  113480 99 99
5 24610       .0  1  8500   18  1  8460   30  1  8440   60  1  8420   65  1  8400   I F
5 24611       75  2  8380   82  2  8358  102  2  8358  110  2  8360  200  3  8380
5 24612      260  3  8380  294  3  8400  312  3  8420  333  3  8500
6 24659  1  2 120 120  1  2 055 055  1  2 120 120
3 24700     9H 0  14  3  837  113970 99 99
5 24710       0.  1  8500    4  1  8480    8  1  8460   10  1  8440   23  1  8420   I G
5 24711      .32  1  8400  102  1  8380  110  2  8380  122  2  8368  144  2  8368
5 24712      156  2  8380  158  3  8380  236  3  8400  261  3  8500
6 24759  1  2 100 100  1  2 050 050  1  2 120 120
3 24760 9H+1  0   9  3  840  114620  1  3
5 24765       0  1  8440   60  1  8420  120  1  8400  180  2  8390  180  2  8380   I H
5 24766      195  2  8380  195  2  8390  215  3  8400  225  3  8440
6 24770  1  2 100 100  1  2 050 050  1  2 100 100
3 24860 9I+1  0   9  3  840  115090  1  3
5 24865       0  1  8460   20  2  8400   30  2  8390   40  2  8390   50  3  8395   I I
5 24866      130  3  8400  150  3  8420  235  3  8440  270  3  8460
6 24870  1  2 075 075  1  2 050 050  1  2 100 100
3 24900     9J 0  19  3  839  115380 99 99
5 24910       0  1  8500   30  1  8480   70  1  8460   88  1  8440  180  1  8420
5 24911      248  1  8410  250  2  8410  260  2  8400  262  2  8388  270  2  8382   I J
5 24912      276  2  8388  283  2  8400  285  2  8420  292  3  8430  296  3  8440
5 24913      318  3  8460  360  3  8460  490  3  8500  522  3  8600
6 24959  1  2 090 090  1  2 048 048  1  2 080 080
3 25000 BR 9J 2  14  1  839  115380        0  8421 1 1
5 25010       0  1  8420    0  1  8404    2  1  8403    4  1  8385    6  1  8382
5 25011       8  1  8382   10  1  8383   12  1  8384   14  1  8383   16  1  8385
5 25012      18  1  8390   21  1  8395   21  1  8422    0 -9  8420
6 25059  1  2 042 042
3 25100 RD 9J 4   9  3   26          1  3          2 2 2              1
5 25110     -60  1  8500    0  1  8468   62  1  8447  191  1  8443  192  2  8442
5 25111     216  2  8437  217  3  8438  252  3  8460  300  3  8500
3 25200     9K 5  15  3  839  115420  1  3
5 25210     -60  1  8500  -50  1  8410   -5  1  8406    0  2  8392    2  2  8387   I K
5 25211       6  2  8382   10  2  8386   14  2  8384   16  2  8386   21  2  8395
5 25212      22  3  8400   25  3  8416   30  3  8430   40  3  8448   64  3  8500
6 25259  1  2 090 090  1  2 050 050  1  2 070 070
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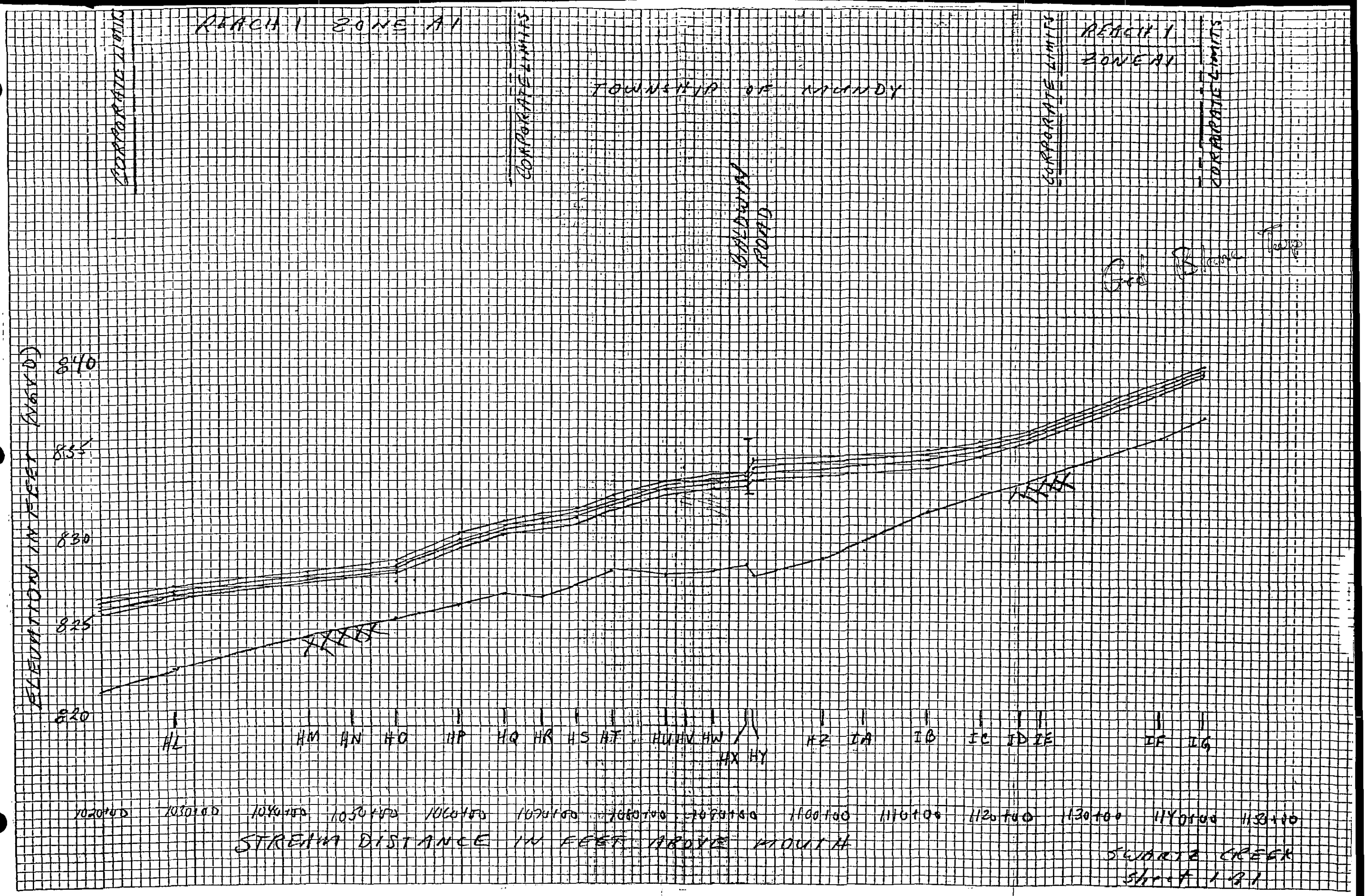
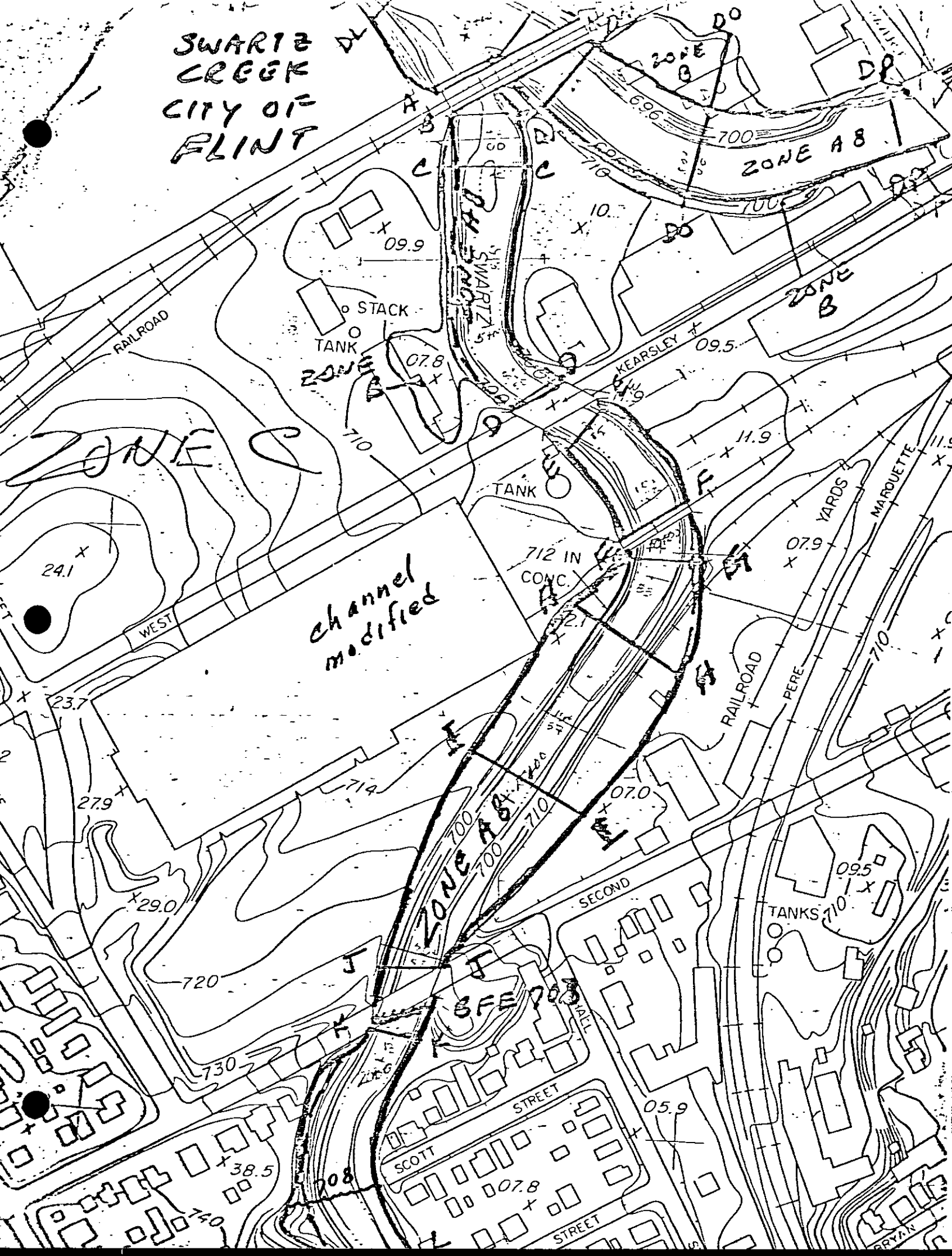
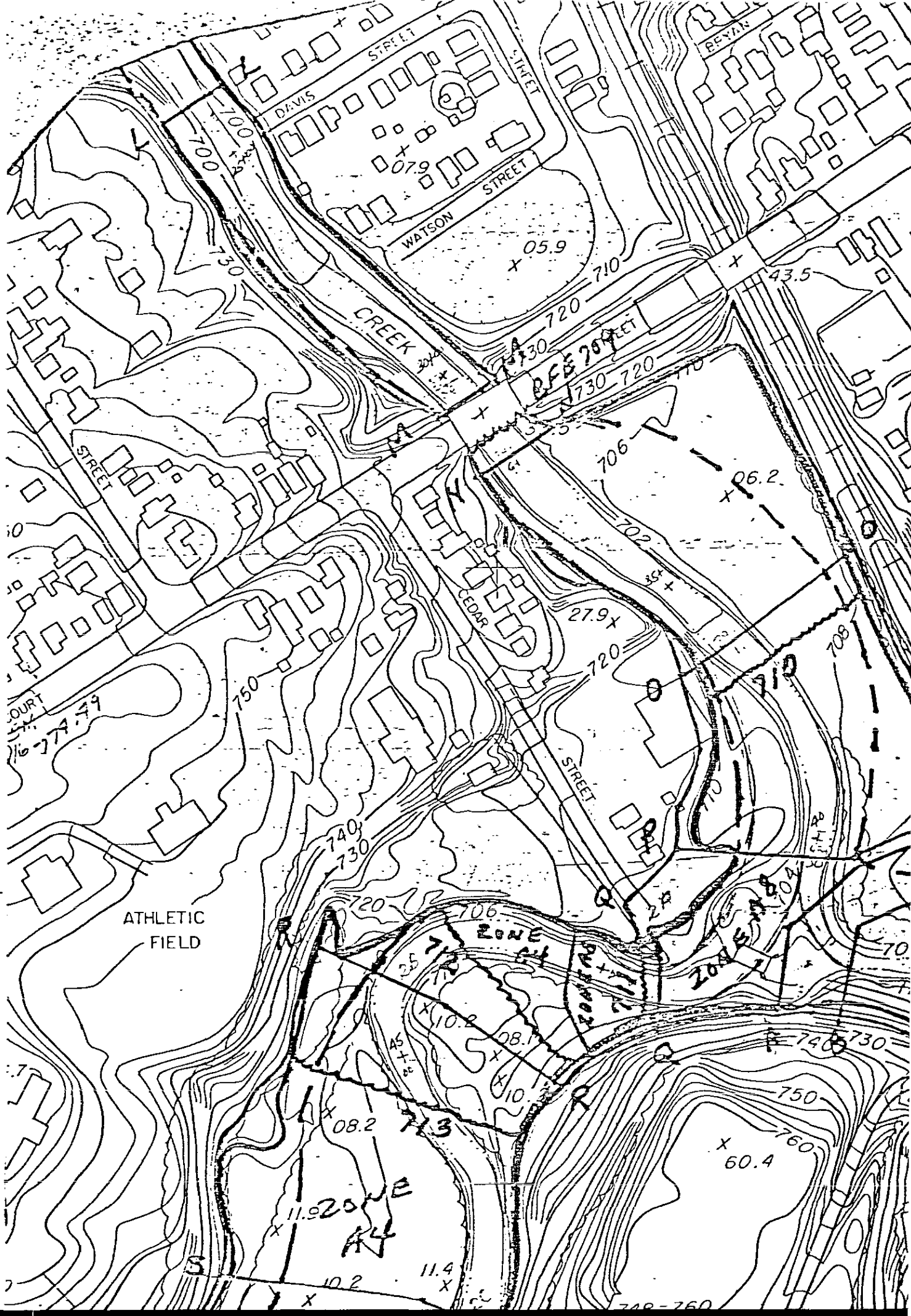

REACH 1 ZONE A1
CORPORATE LIMITS
TOWNSHIP OF MONDY
CALDWELL ROAD
REACH 1
ZONE A1
CORPORATE LIMITS
ELEVATION IN FEET (MSL)
840
835
830
825
820
HL
HM
HN
HO
HP
HQ
HR
HS
HT
HU
HV
HW
HX
HY
HZ
IA
IB
IC
ID
IE
IF
IG
1020+00
1030+00
1040+00
1050+00
1060+00
1070+00
1080+00
1090+00
1100+00
1110+00
1120+00
1130+00
1140+00
1150+00
STREAM DISTANCE IN FEET ABOVE MOUTH
SWARTZ CREEK
Sheet 1 of 1


SWARTZ CREEK CITY OF FLINT
ZONE A8
ZONE B
ZONE C
ZONE A8
ZONE B
ZONE A8
SWARTZ CREEK
STACK
TANK
TANK
TANKS
RAILROAD
KEARSLEY
WEST
712 IN CONC.
channel modified
RAILROAD
PERE
MARQUETTE
YARDS
SECOND
JAIL
STREET
SCOTT
STREET
BRYAN
SFE 708
708
710
714
720
730
740
700
696
09.9
07.8
09.5
11.9
07.9
07.0
09.5
05.9
38.5
24.1
23.7
27.9
29.0

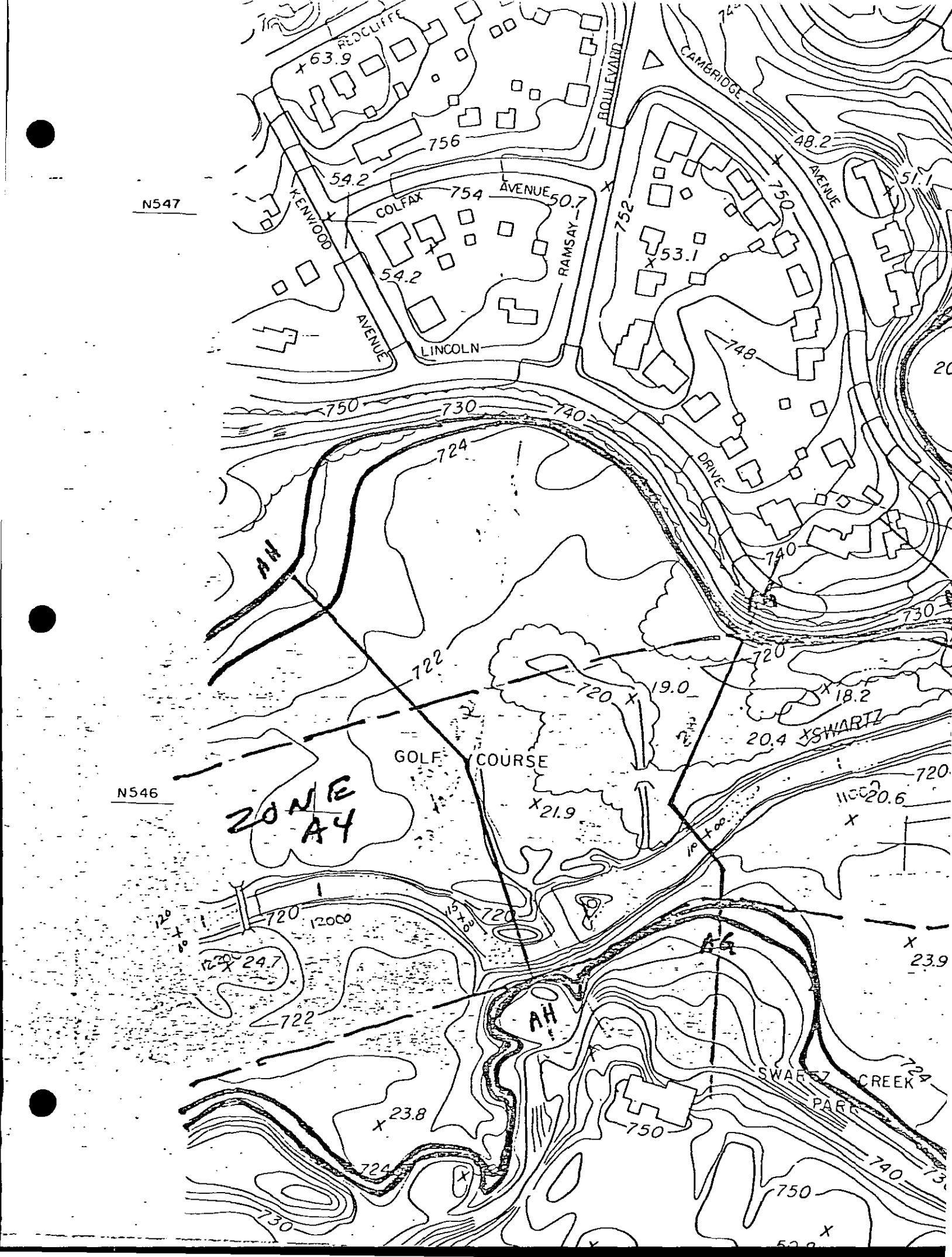

DAVIS
STREET
STREET
BEYAN
WATSON
STREET
CREEK
STREET
CEDAR
STREET
ATHLETIC
FIELD
ZONE
A4
ZONE
A4
ZONE
A4
ZONE
A4
700
730
720
710
706
702
750
740
760
07.9
05.9
43.5
06.2
27.9
60.4
10.2
08.1
08.2
11.9
11.4
10.2

COURT
STREET
ATHLETIC
FIELD
SCHOOL
THE DEAF
ZONE
ZONE
IN WA

E 2,169
E 2,170
ZONE A
ZONE B
ZONE B
710
712
720
730
740
750
746
744
742
748
12.2
10.1
17.4
18.2
13.8
14.2
12.6
16.1
18.3
28.3
50.1
44.8
42.9
43.1
35.7
47.0
46.3
52.1
52.2

E 2,168
E 2,169
750
748
746
714
720
17.4
18.2
15.2
52.9
52.1
50.1
752
740
724
730
28.3
720
14.1
730
12.6
18.6
720
740
19.0
35.7
20.4

ZONE
A4
2M
2N
2O
2P
2Q
2R
2S
2T
2U
2V
2W
2X
2Y
2Z
SWARTZ
CREEK
PART
ROAD
78
21
740
730
720
722
728
750
48.2
51.1
22.8
20.9
22.6
21.5
18.2
20.6
20.1
23.9
27.9
18.6
12.6
48.2
47.9
47.6
47.7
21.0
21.9
27.0
50.8


REDCLIFFE
63.9
756
54.2
COLFAX
754
AVENUE
50.7
KENWOOD
RAMSAY
54.2
AVENUE
LINCOLN
BOULEVARD
CAMBRIDGE
48.2
AVENUE
51.1
752
750
53.1
748
N547
750
730
740
724
DRIVE
740
730
722
720
19.0
18.2
20.4
SWARTZ
GOLF COURSE
N546
ZONE A4
21.9
20.6
720
12000
24.7
722
AH
AG
23.9
SWARTZ CREEK PARK
23.8
750
724
740
750
730

AVENUE
AVENUE
RADCLIFFE AVENUE
WOODBURNE DRIVE
DRIVE
N547
GOLF COURSE
ZONE B
ZONE A2
ZONE A4
A1
A3
A5
A7
A8
75.9
60.2
770
762
760
63.9
760
750
53.0
52.1
754
78.3
72.5
770
766
60.3
760
60.3
750
730
750
740
754
750
754
746
740
50.1
46.2
126
57.9
750
740
730
724
23.0
722
23.3
23.8
720
12000
24.3
24.2
24.7
1220
722
22.3
720
23.8
27.3
726
26.2
726
48.1
29.8

GOLF
COURSE
CARMAN
CREEK
PARK
CREEK
ZONE A2
ZONE C
ZONE B
ZONE D
ZONE A1
724
722
720
726
728
730
740
746
23.0
23.8
24.3
24.7
22.3
27.3
26.2
48.1
28.1
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46.1
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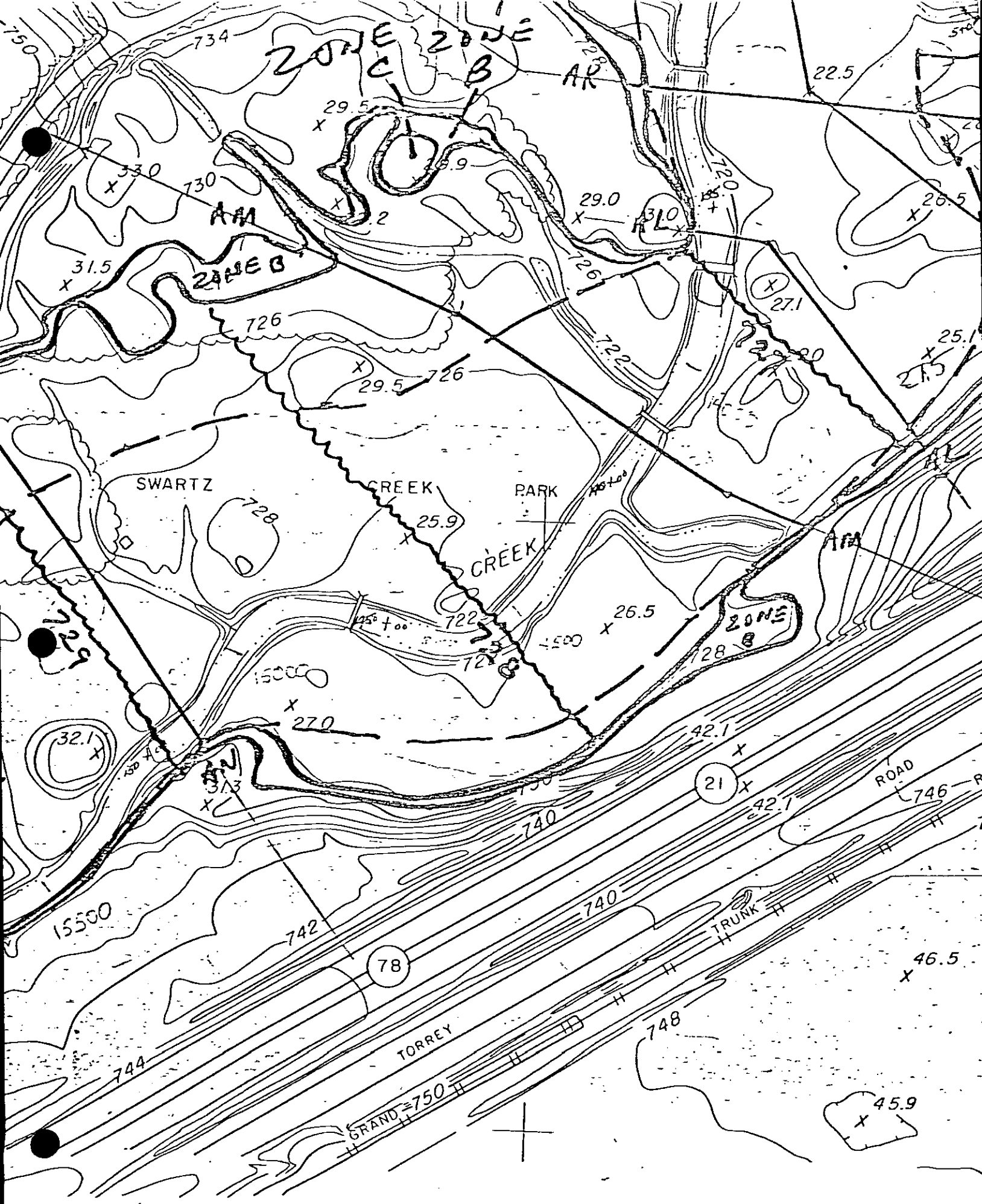
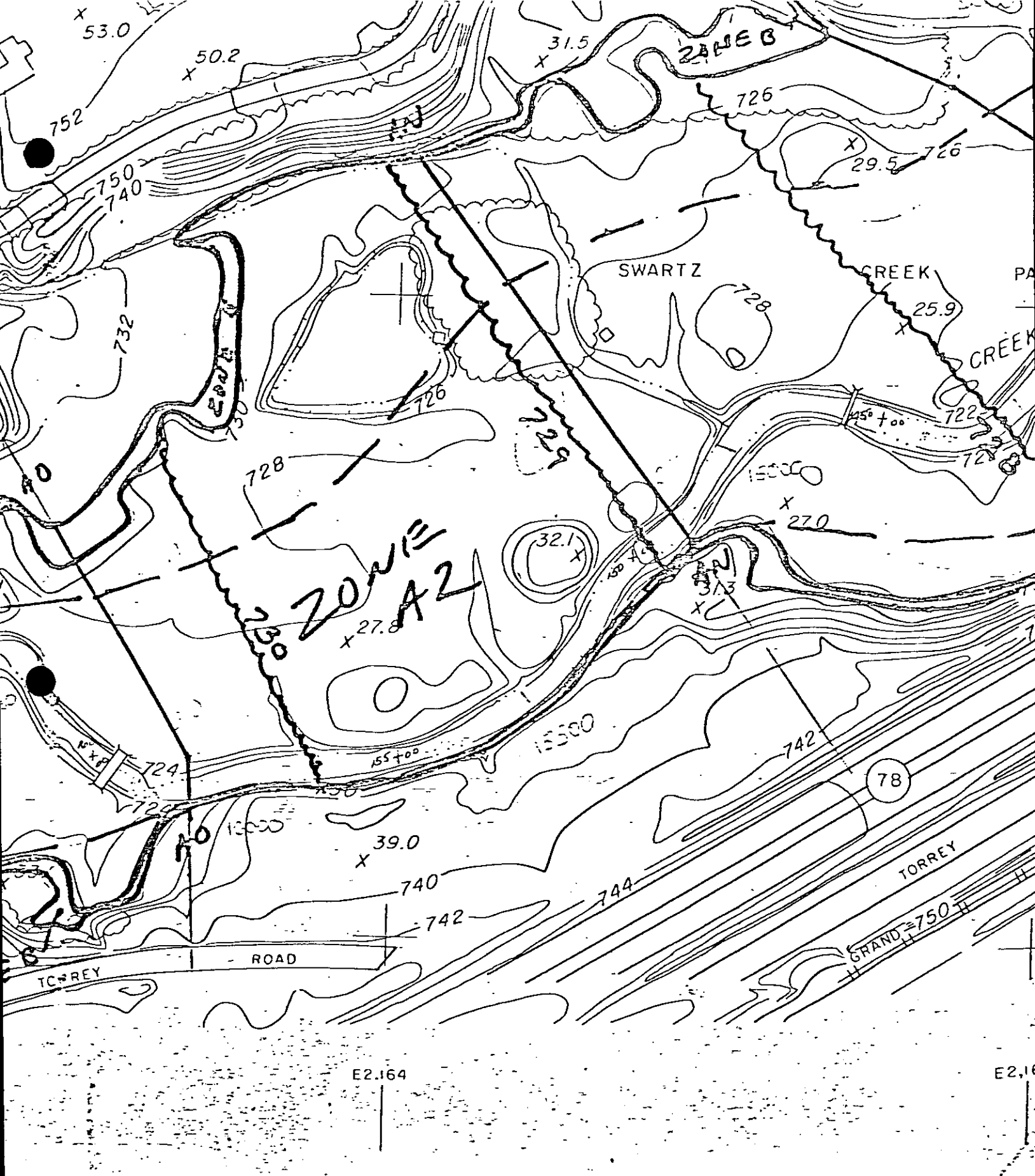
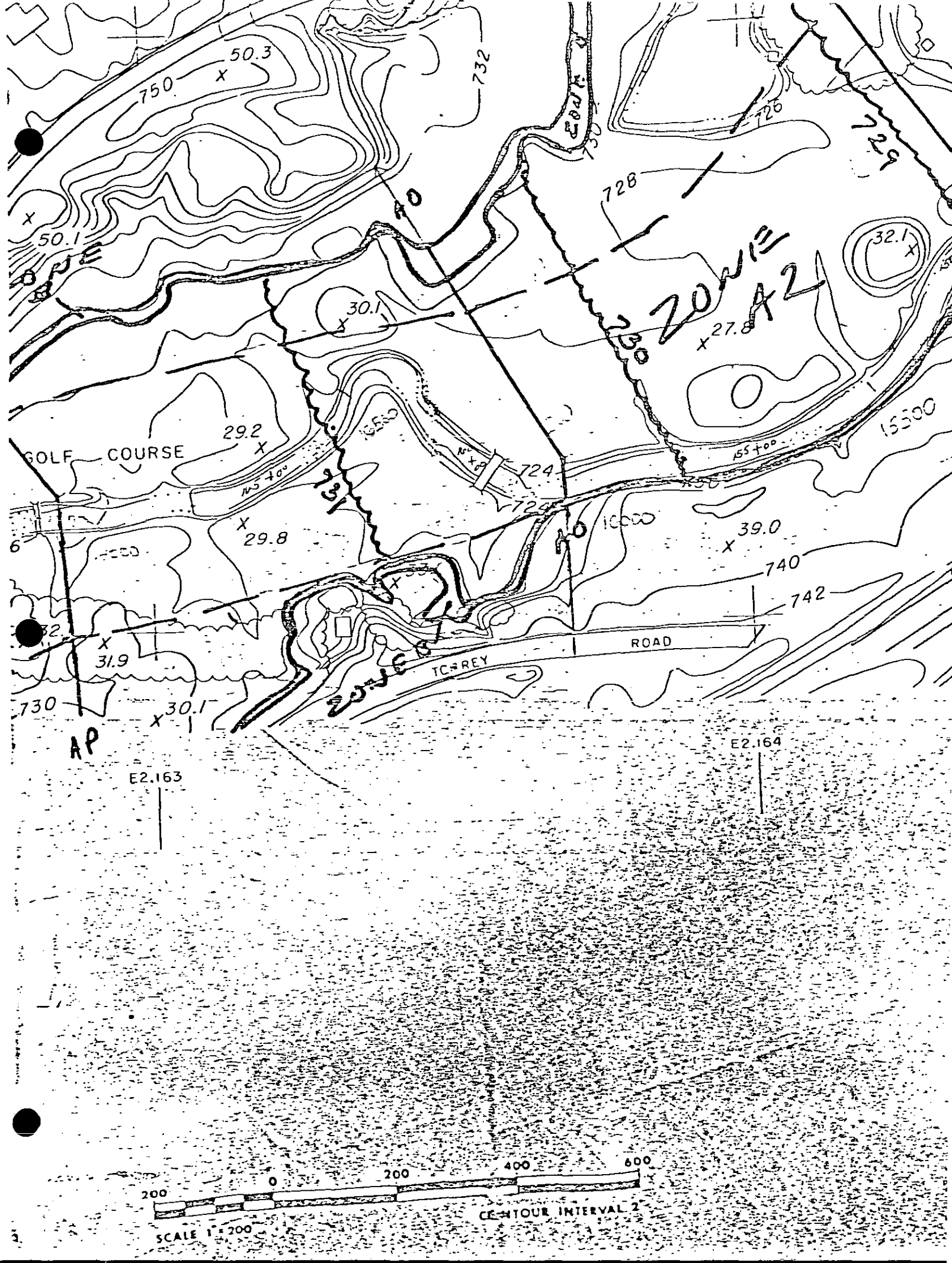
22.5
29.5
29.0
26.5
27.1
25.1
25.9

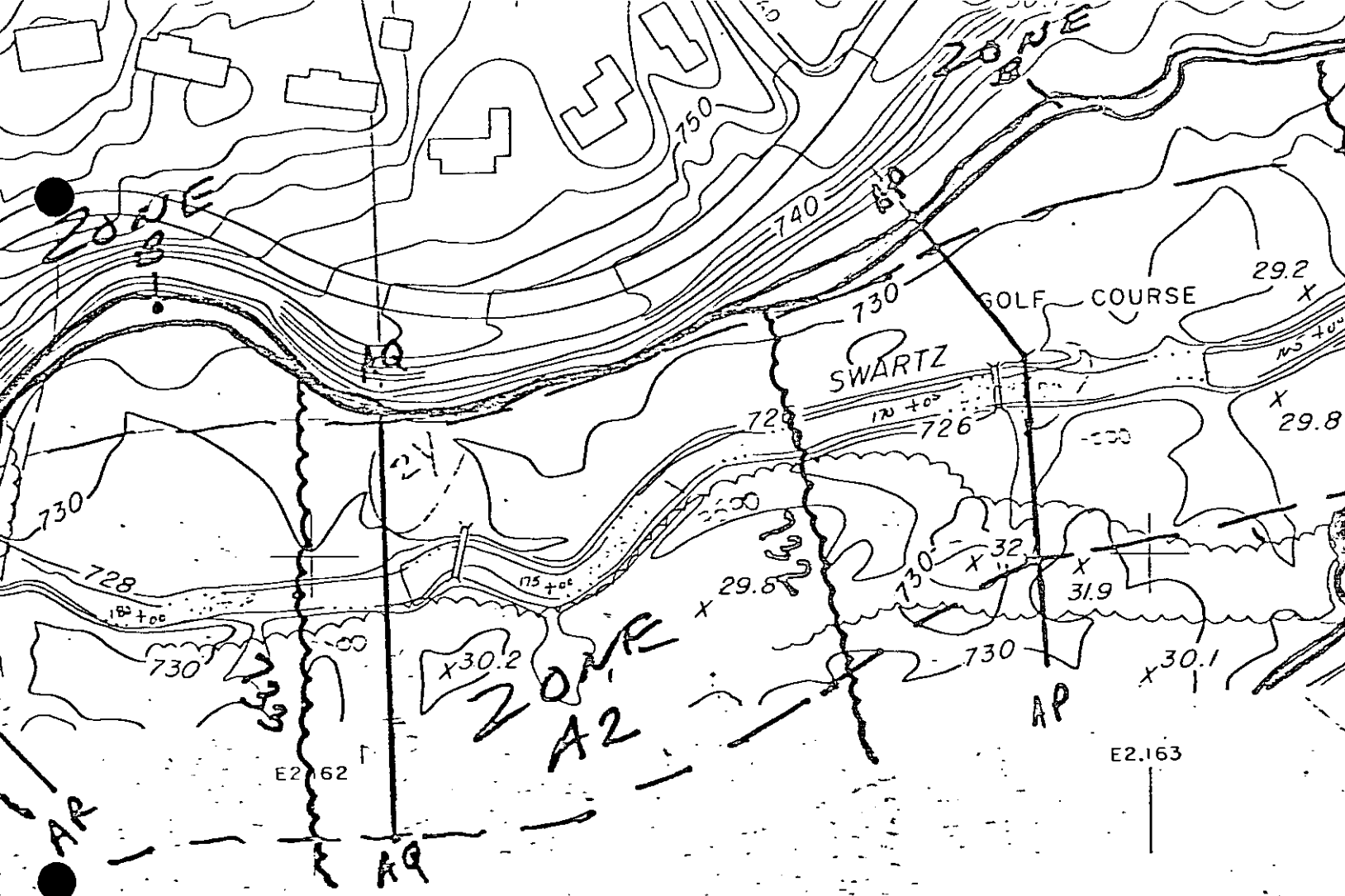

ZONE C
ZONE B
AR
AM
ZONE B
AL
SWARTZ
CREEK
PARK
CREEK
ZONE B
ROAD
TRUNK
TORREY
GRAND
78
21
15500
15000
734
730
726
722
720
728
740
742
744
746
748
750
22.5
29.5
33.0
29.0
31.5
27.1
25.1
26.5
25.9
27.0
32.1
42.1
46.5
45.9

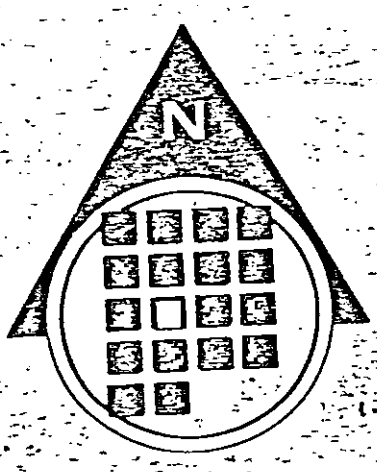
E2,165



SECTION INDEX

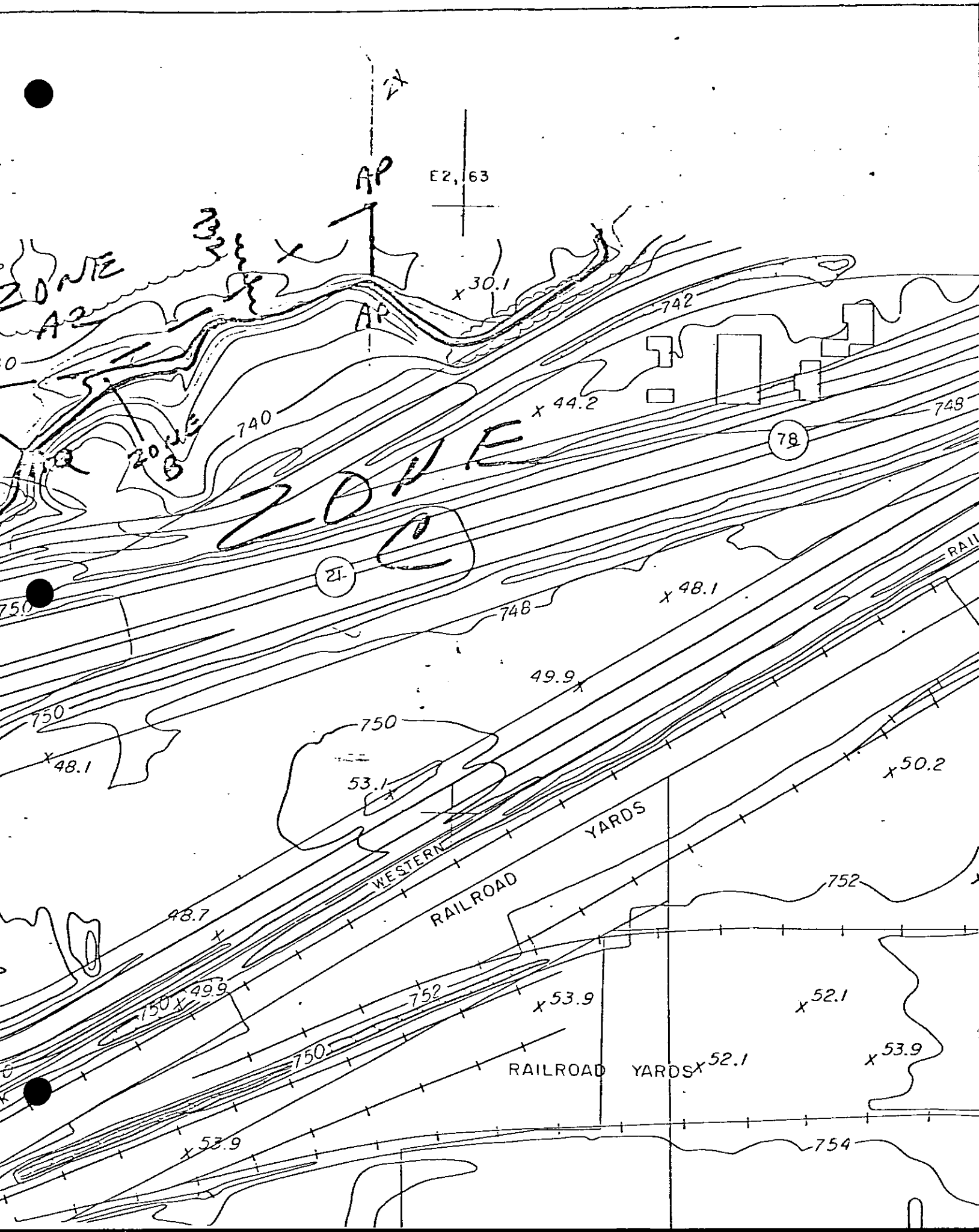

750
50.3
732
50.1
726
729
728
40
30.1
27.8
32.1
ZONE A2
29.2
GOLF COURSE
724
729
731
29.8
39.0
740
742
ROAD
TORREY
31.9
730
30.1
AP
E2.163
E2.164
200
0
200
400
600
SCALE 1" = 200'
CONTOUR INTERVAL 2'

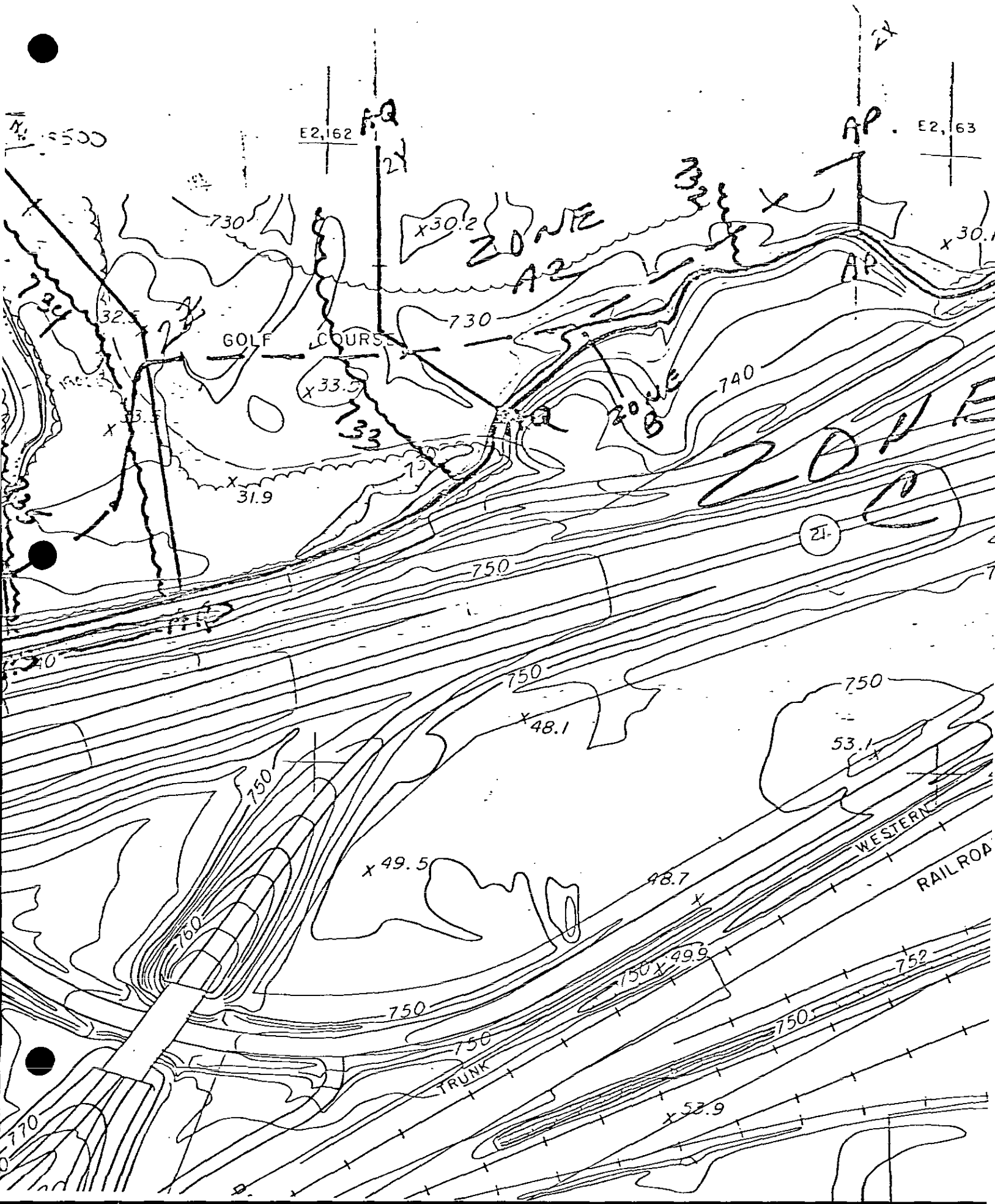


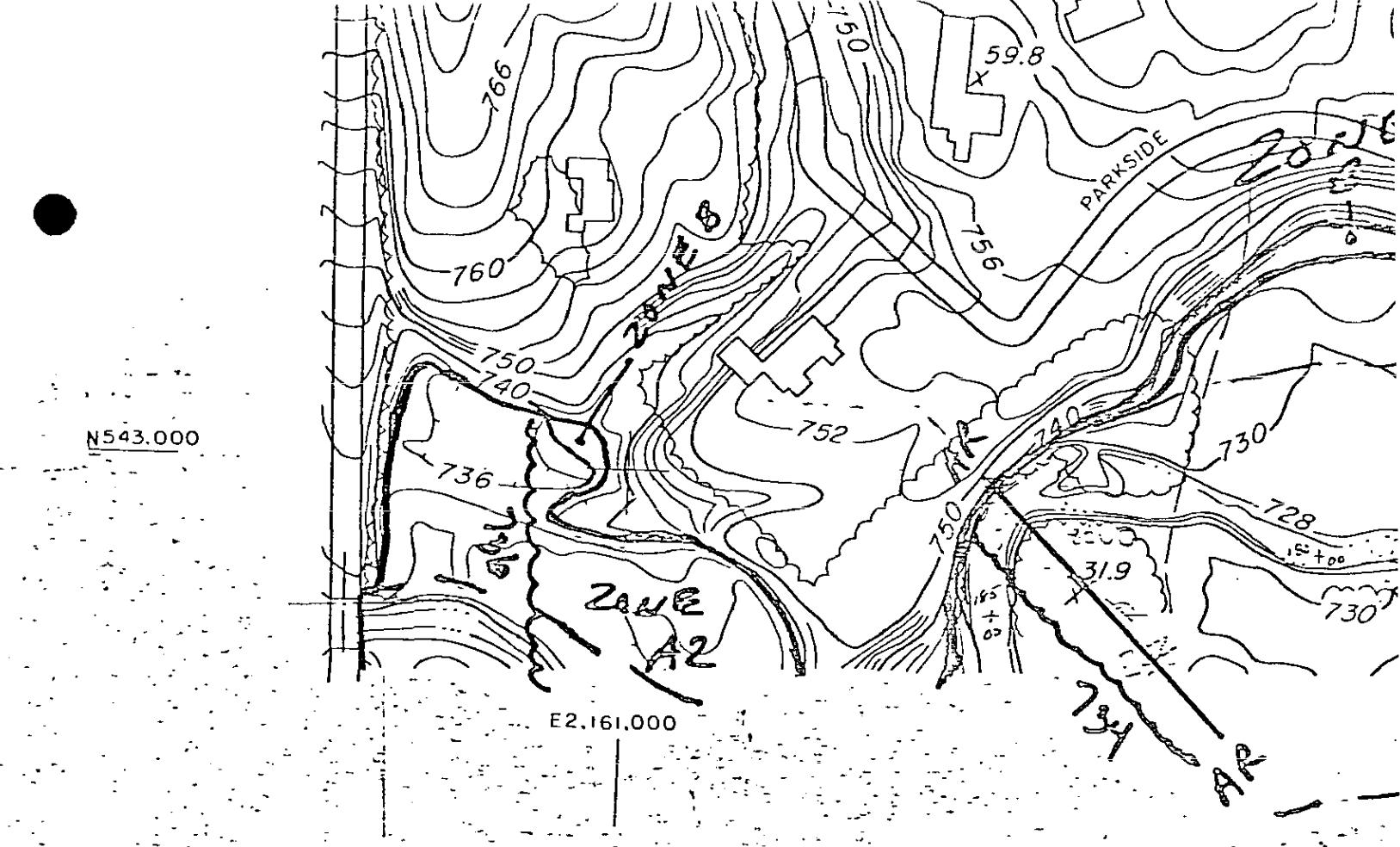


200 0

SCALE 1" = 200'


AP
E2,163
ZONE
A2
AP
30.1
742
740
44.2
748
78
ZONE
B
ZONE
C
21
48.1
746
49.9
750
750
48.1
53.1
50.2
YARDS
WESTERN
RAILROAD
752
48.7
49.9
750
752
53.9
52.1
750
RAILROAD YARDS
52.1
53.9
53.9
754

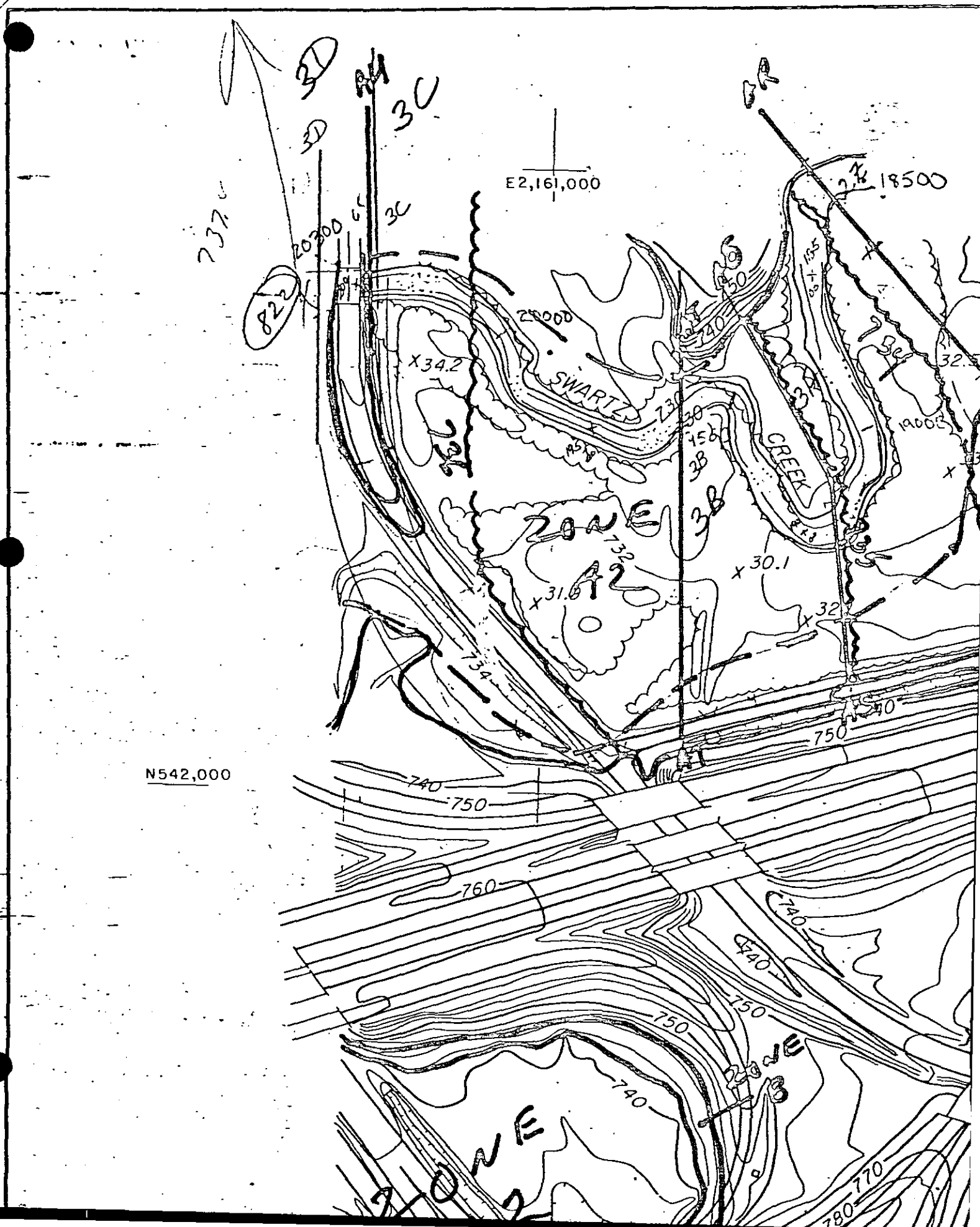

E2,162
E2,163
730
730
730
740
750
750
750
750
750
750
750
752
770
GOLF COURSE
ZONE A2
ZONE B
ZONE
WESTERN
RAILROA
TRUNK
x30.2
x33.5
x31.9
x48.1
x49.5
48.7
53.1
x49.9
x53.9
21



GRID BASED ON MICHIGAN PLANE COORDINATE
M. PROVIDED IN ACT 9, P.A. 1964

P BY PHOTOGRAMMETRIC METHODS
BY

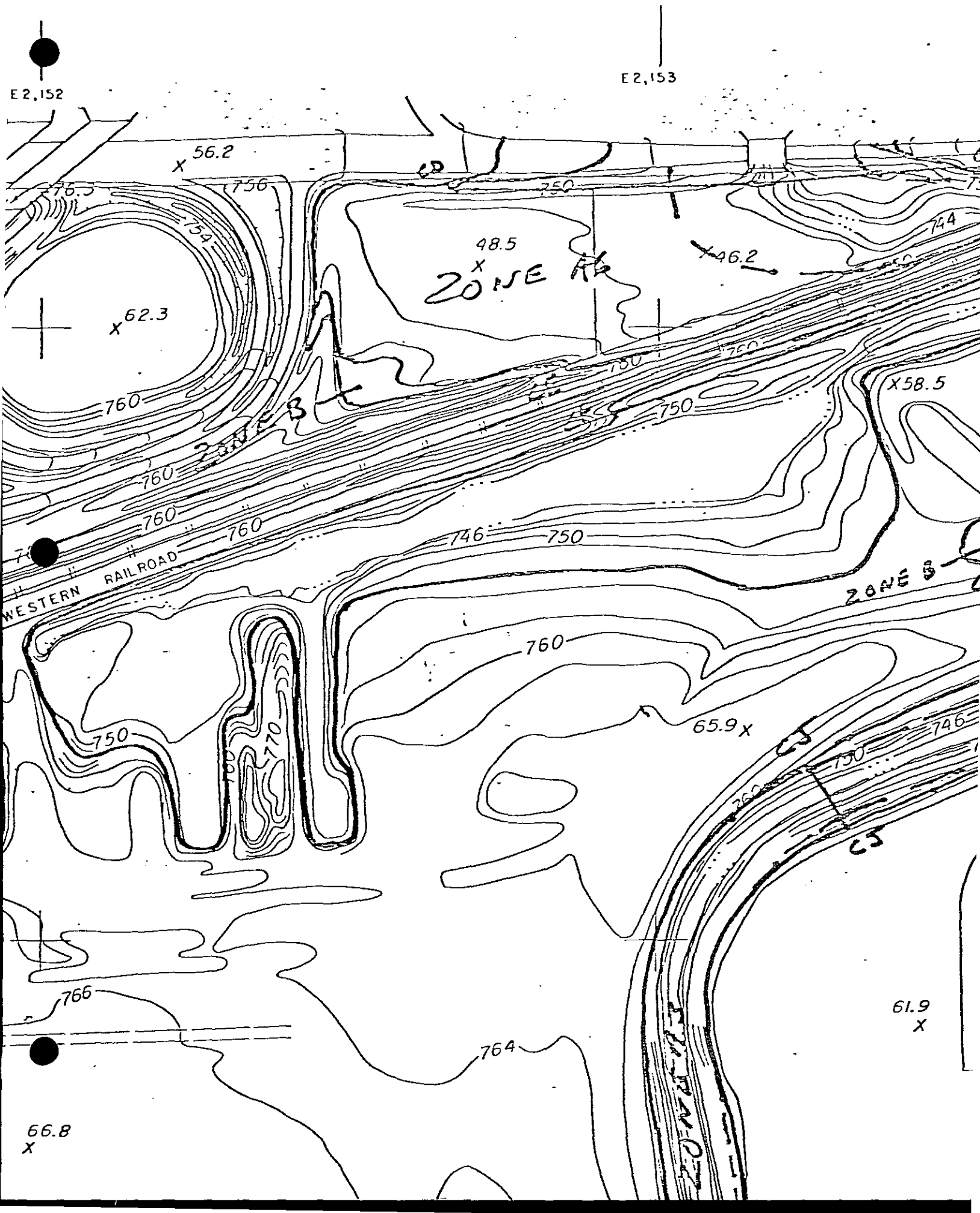
TED AERIAL MAPPING


E2,161,000
N542,000
SWARTZ
CREEK
ZONE 3B
ZONE 2
ZONE 3
18500
20000
20300
19000
X34.2
X31.6
X30.1
X32
730
732
734
740
750
760
770
780

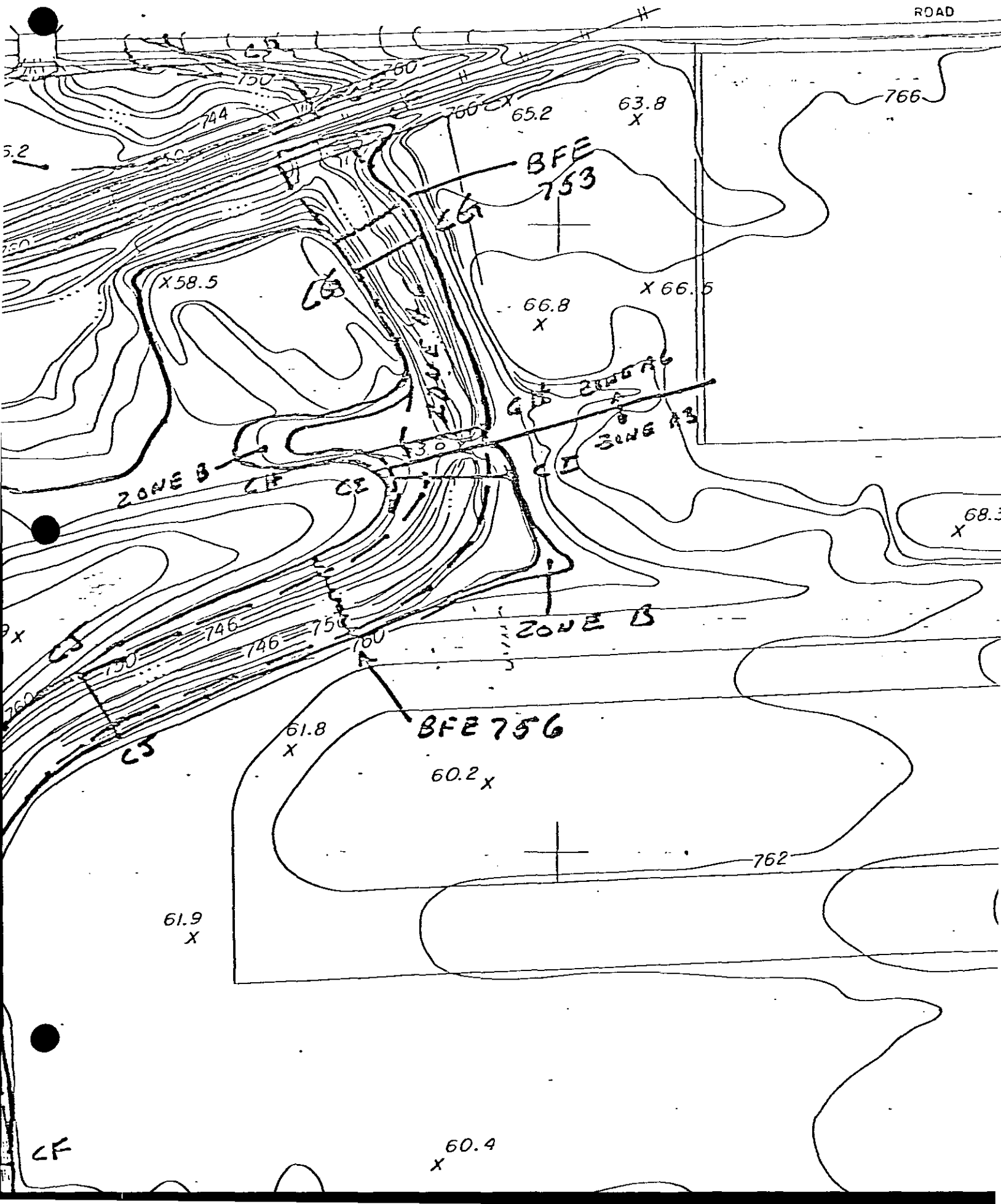
N542,000
N541
ZONE A2
ZONE B
GRAND
TRAILER PARK
23
55.5
55.0
53.6
37.9
36.7
36.2
740
750
760
770
780
754

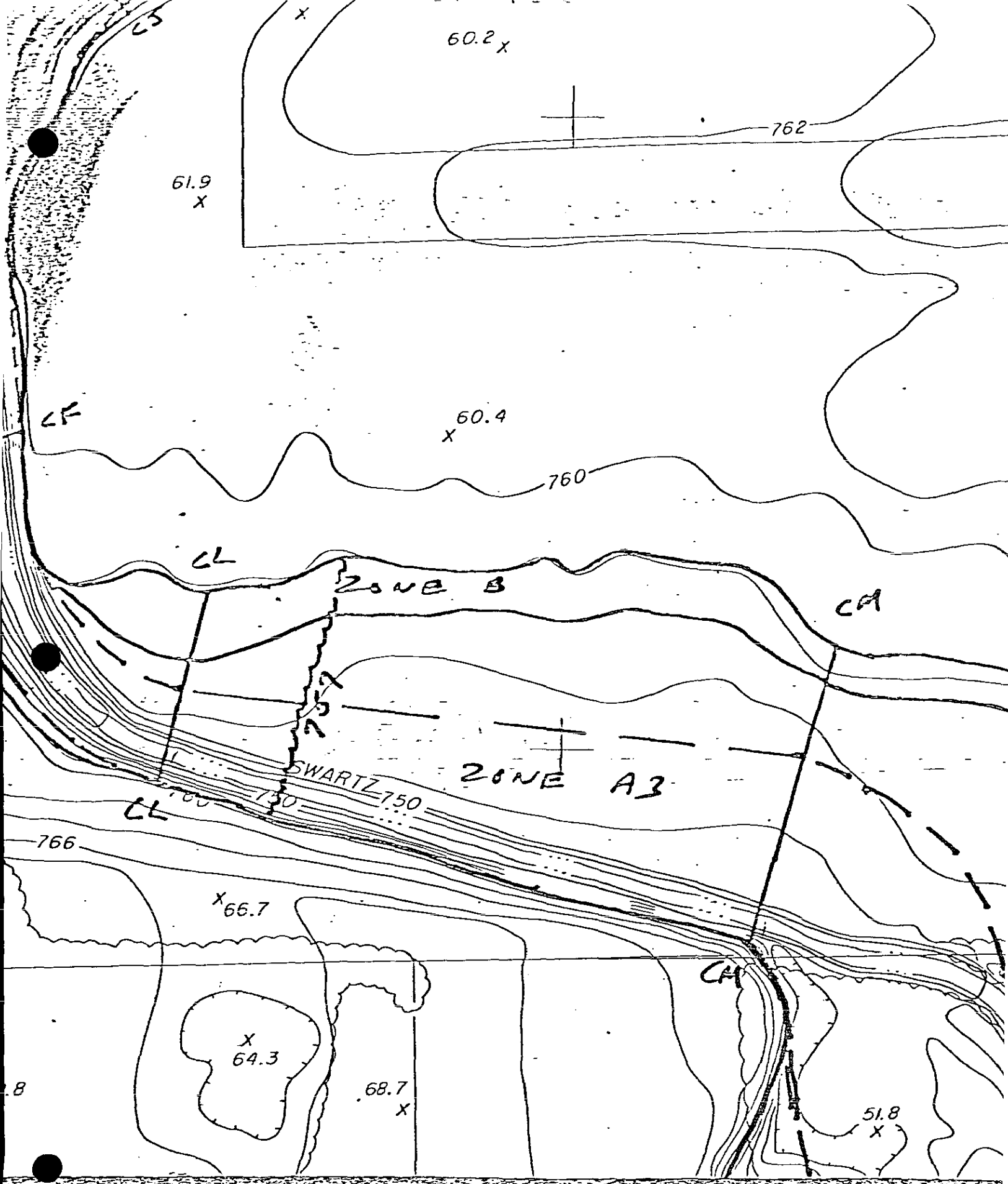
E2,161,000
N542,000
SWARTZ
CREEK
ZONE A2
ZONE B
ZONE A2
X34.2
X31.6
X30.1
X32
740
750
760
770
780

Section 33
T7N R6E



E 2,154


ROAD
BFE 753
BFE 756
ZONE B
ZONE B
ZONE A
ZONE A
ZONE B
CB
CF
CE
CS
CF
744
750
760
766
762
746
65.2
63.8
58.5
66.8
66.5
61.8
60.2
61.9
60.4


CS
60.2
762
61.9
CF
60.4
760
CL
ZONE B
CA
SWARTZ
750
ZONE A3
CL
766
66.7
CA
64.3
68.7
51.8

766
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CA
A3
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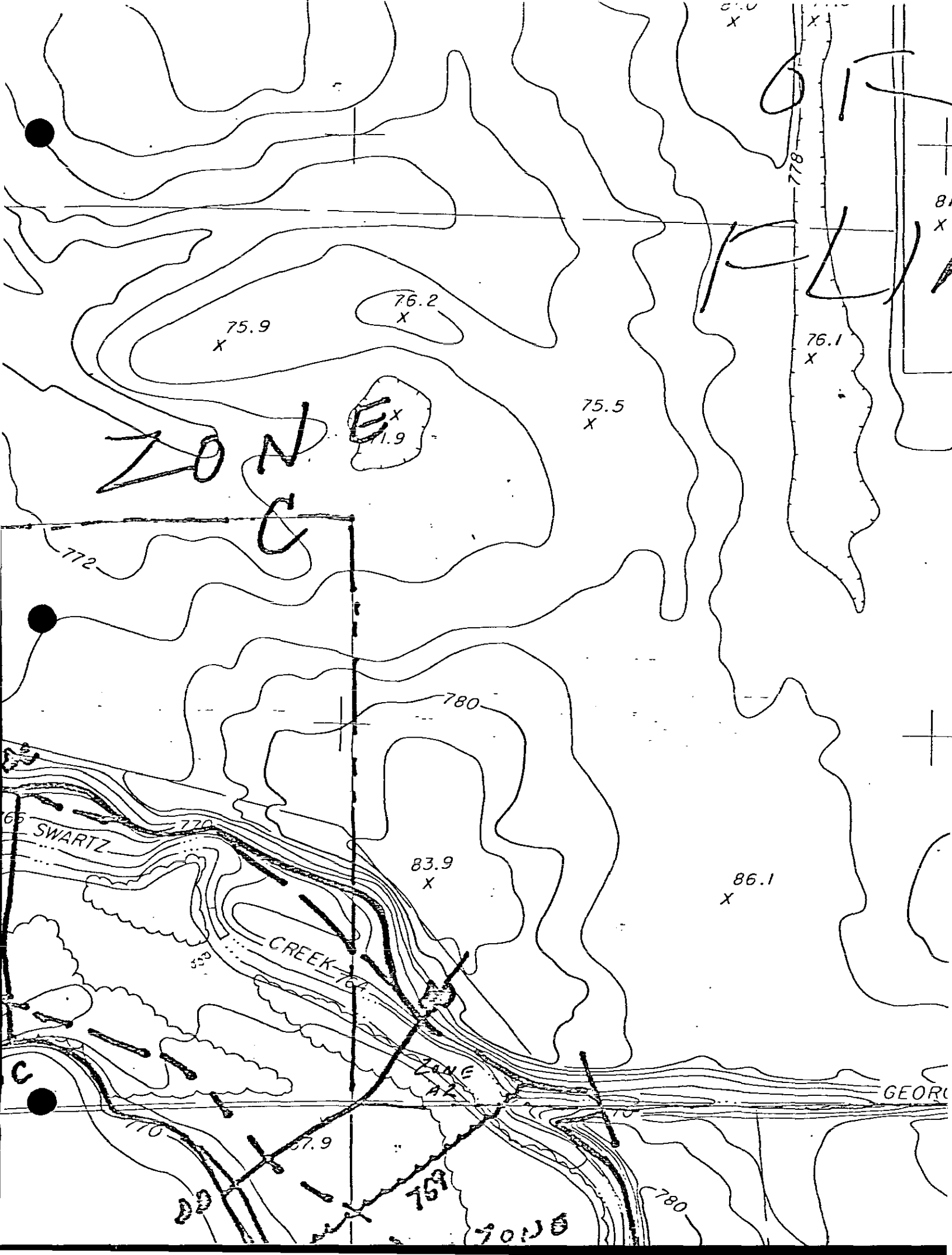
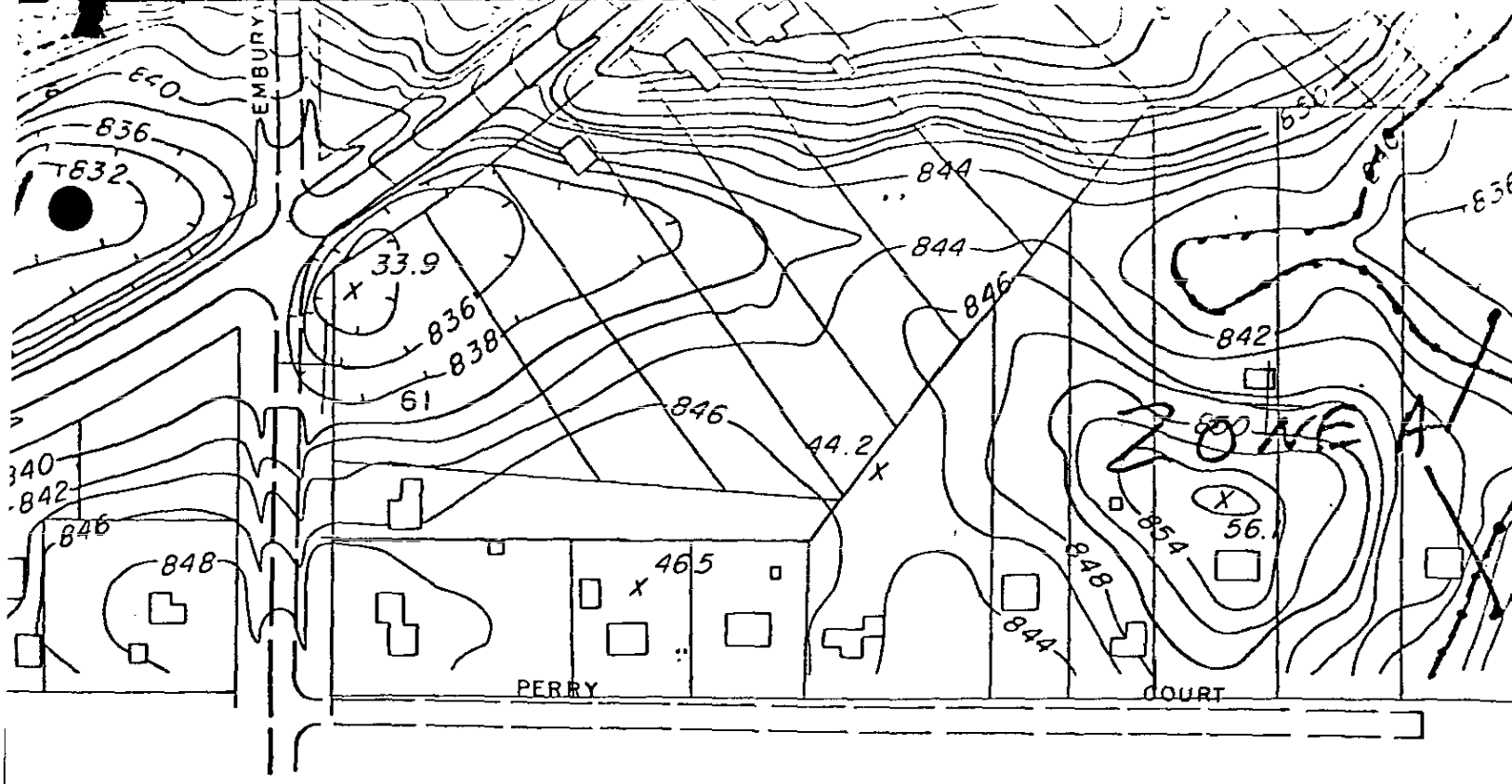
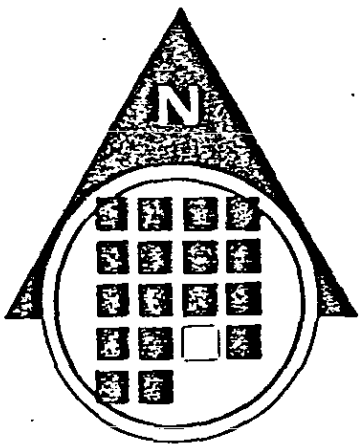
CA
51.8
X
776


76.2
75.9
75.5
76.1
778
772
780
770
SWARTZ
83.9
86.1
CREEK
764
LANE
AL
GEORG
770
87.9
759
780
POND
ZONE
G



SECTION 16

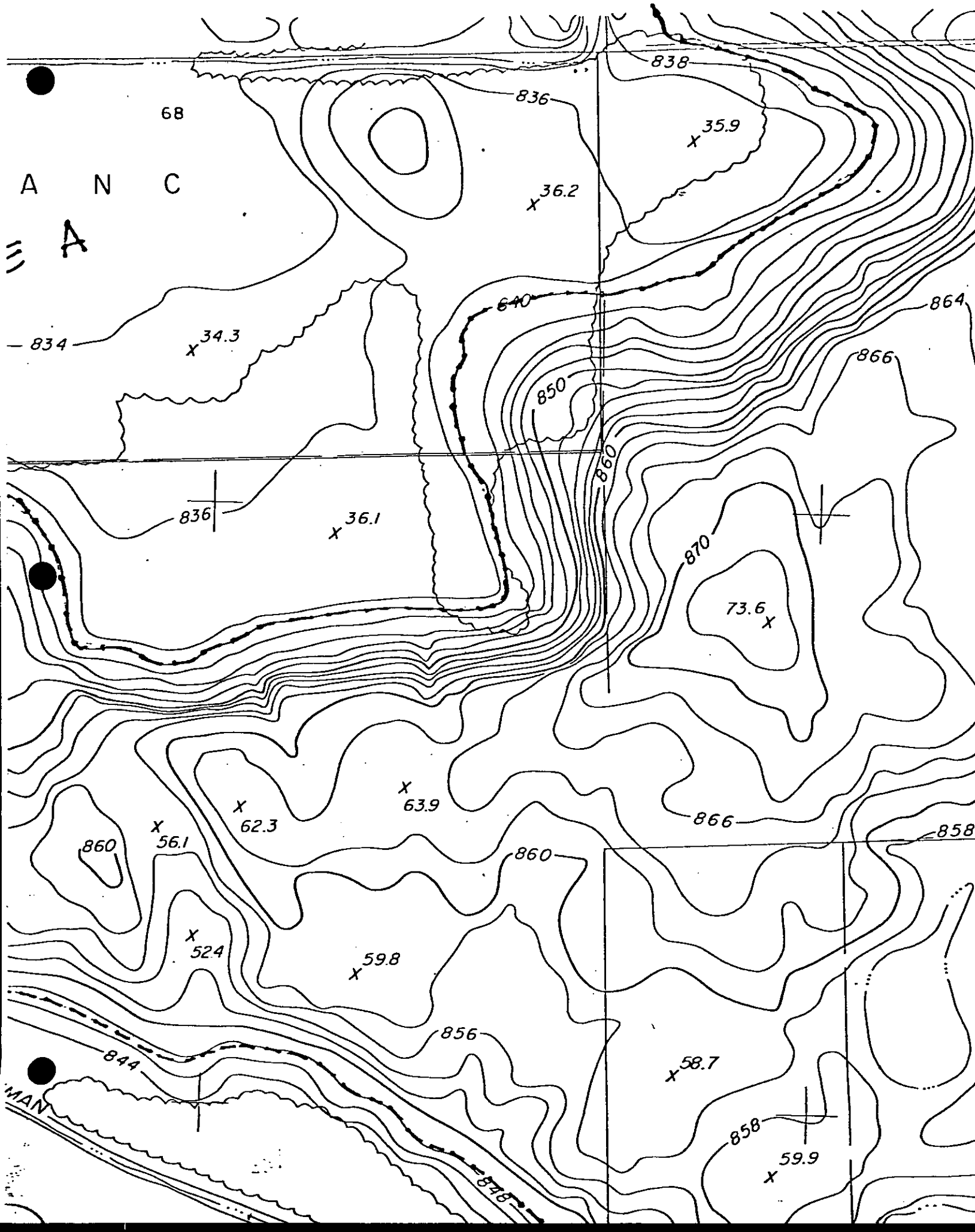


GRAND BLANC TWSP

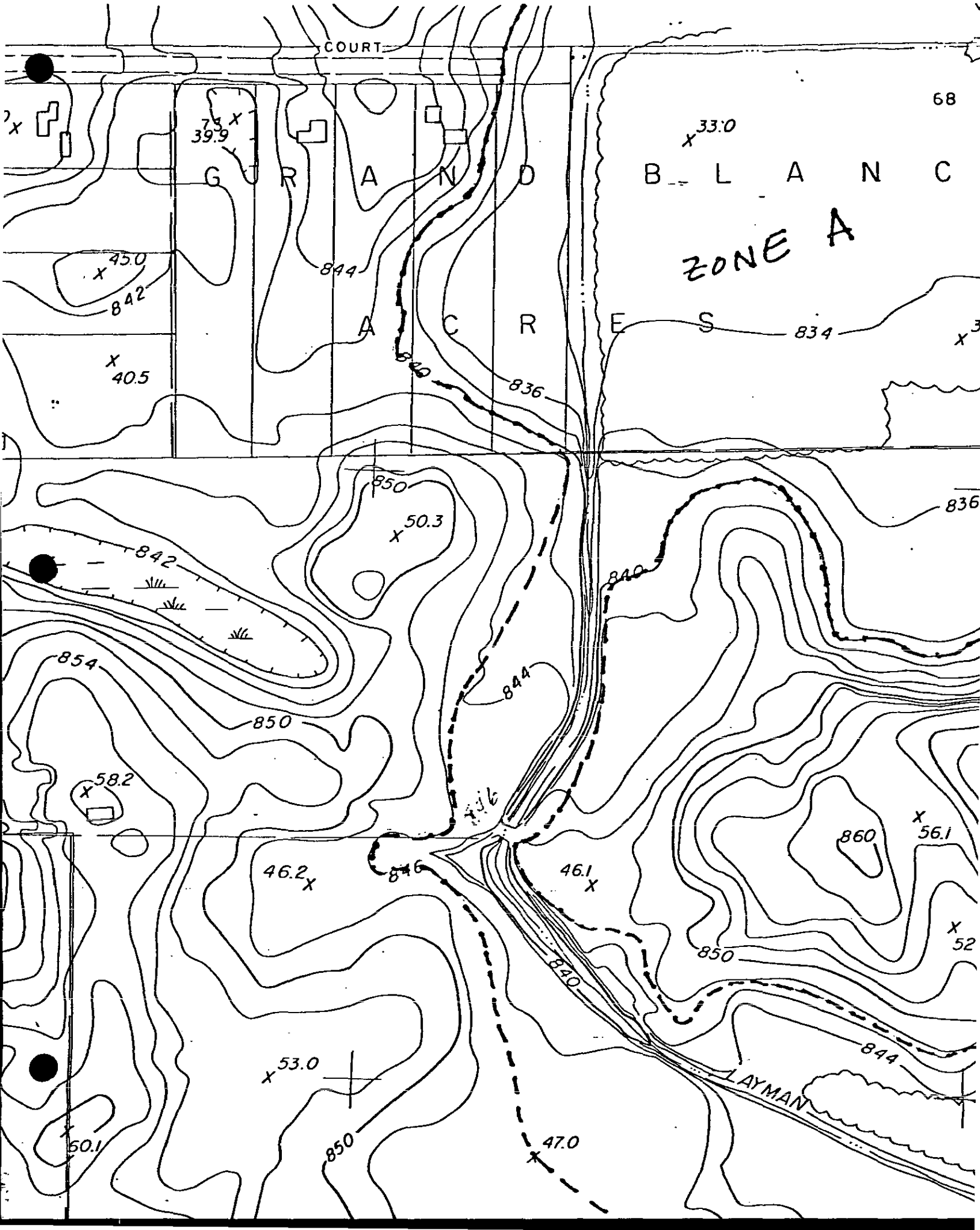
LAYMAN DR

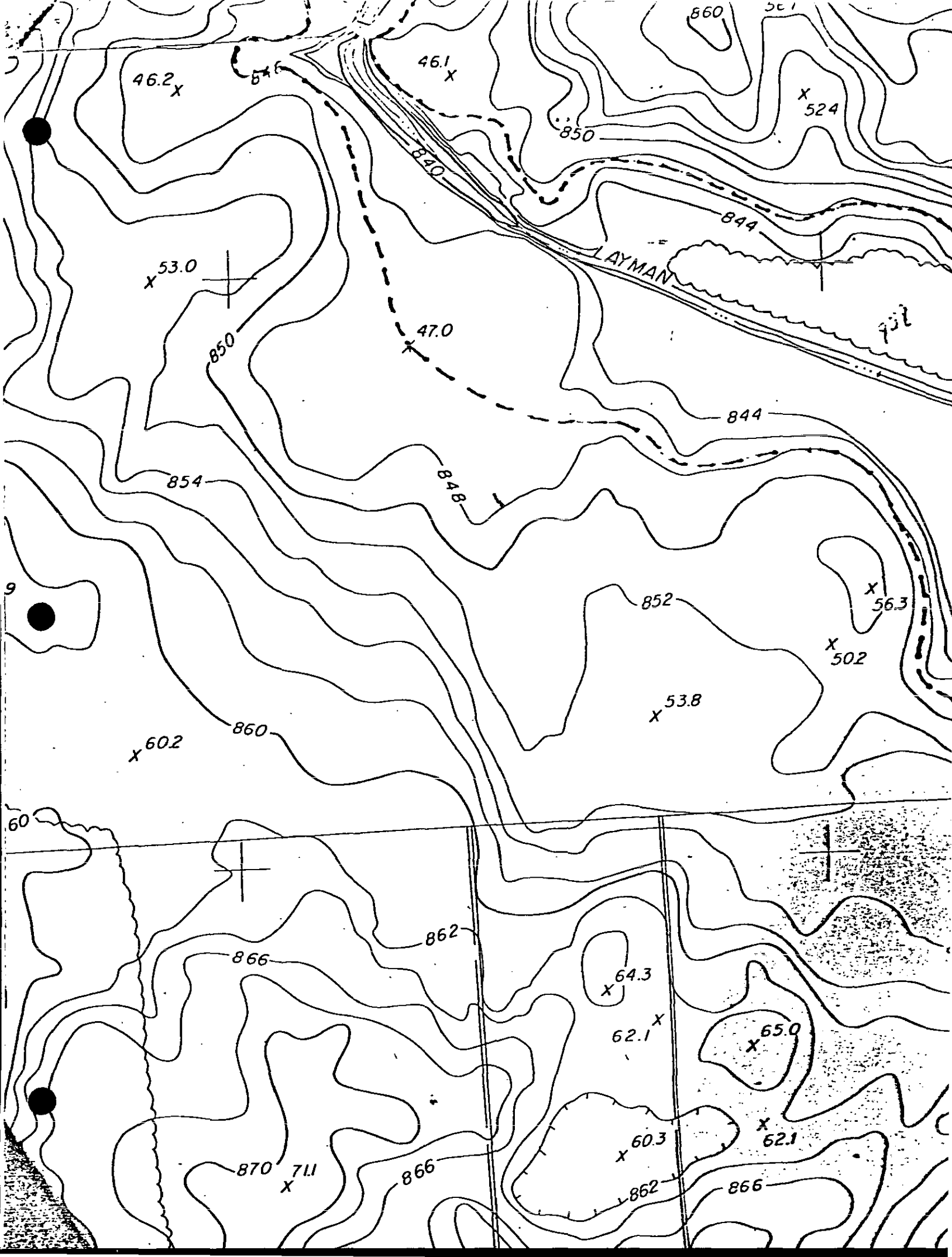
E 2,186

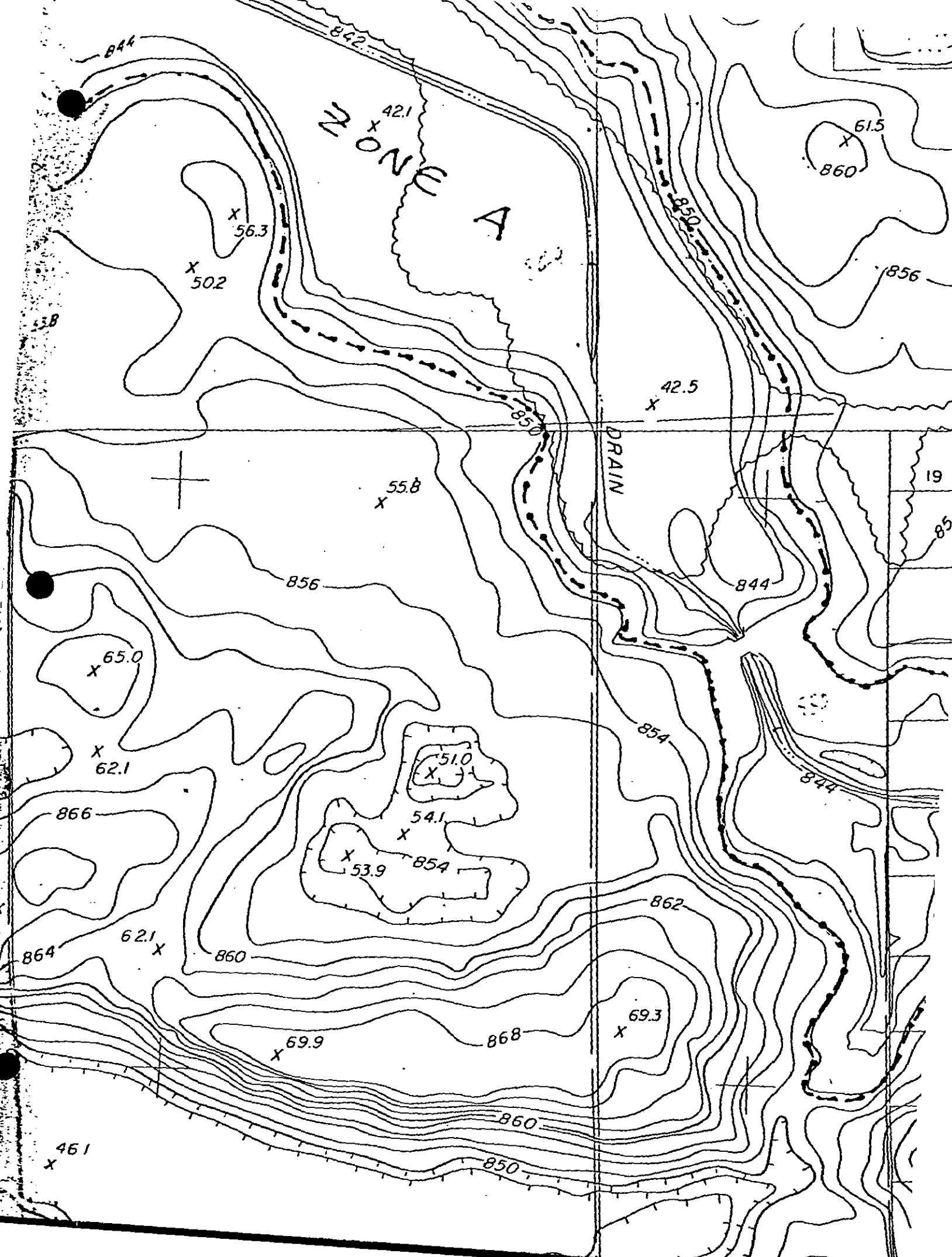
E 2,167

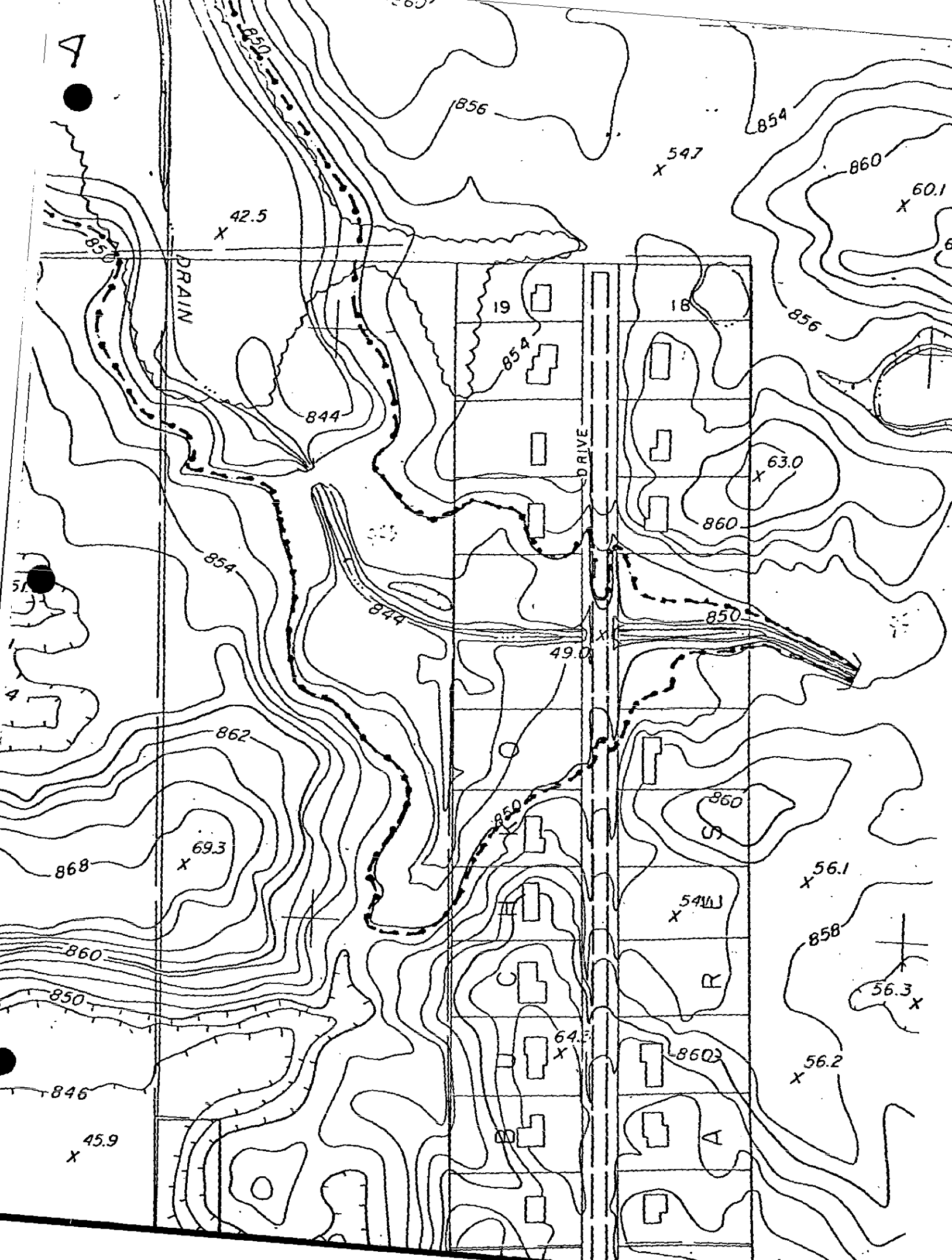

68
A N C
A
838
836
35.9
36.2
640
864
834
34.3
866
850
860
836
36.1
870
73.6
63.9
62.3
866
858
56.1
860
860
524
59.8
856
844
58.7
858
59.9
848
MAN

E 2,185


COURT
68
G U R A N D
A C R E S
B L A N C
ZONE A
LAYMAN
39.9
33.0
45.0
40.5
50.3
58.2
46.2
46.1
56.1
52
53.0
60.1
47.0
842
844
840
836
834
850
854
860
846


860
46.1
46.2
524
850
840
844
LAYMAN
53.0
47.0
850
844
854
848
852
56.3
502
53.8
860
60.2
60
862
866
64.3
62.1
65.0
60.3
62.1
870
71.1
866
862
866


ZONE A
DRAIN
844
842
42.1
61.5
860
56.3
50.2
850
856
42.5
55.8
19
844
65.0
854
62.1
51.0
844
866
54.1
53.9
854
862
62.1
864
860
69.3
69.9
868
860
46.1
850


850
856
854
54.7
860
60.1
42.5
DRAIN
19
18
854
844
DRIVE
63.0
860
854
844
850
49.0
862
860
850
69.3
868
56.1
54.1
858
860
850
56.3
64.5
860
56.2
846
45.9

ZONE C
ZONE A1
CREEK
860
854
565
856
60.1
623
52.8
860
852
58.9
860
53.1
850
840
830
828
832
826
24.5
835
830
840
850
50.2
52.5
56.4
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832
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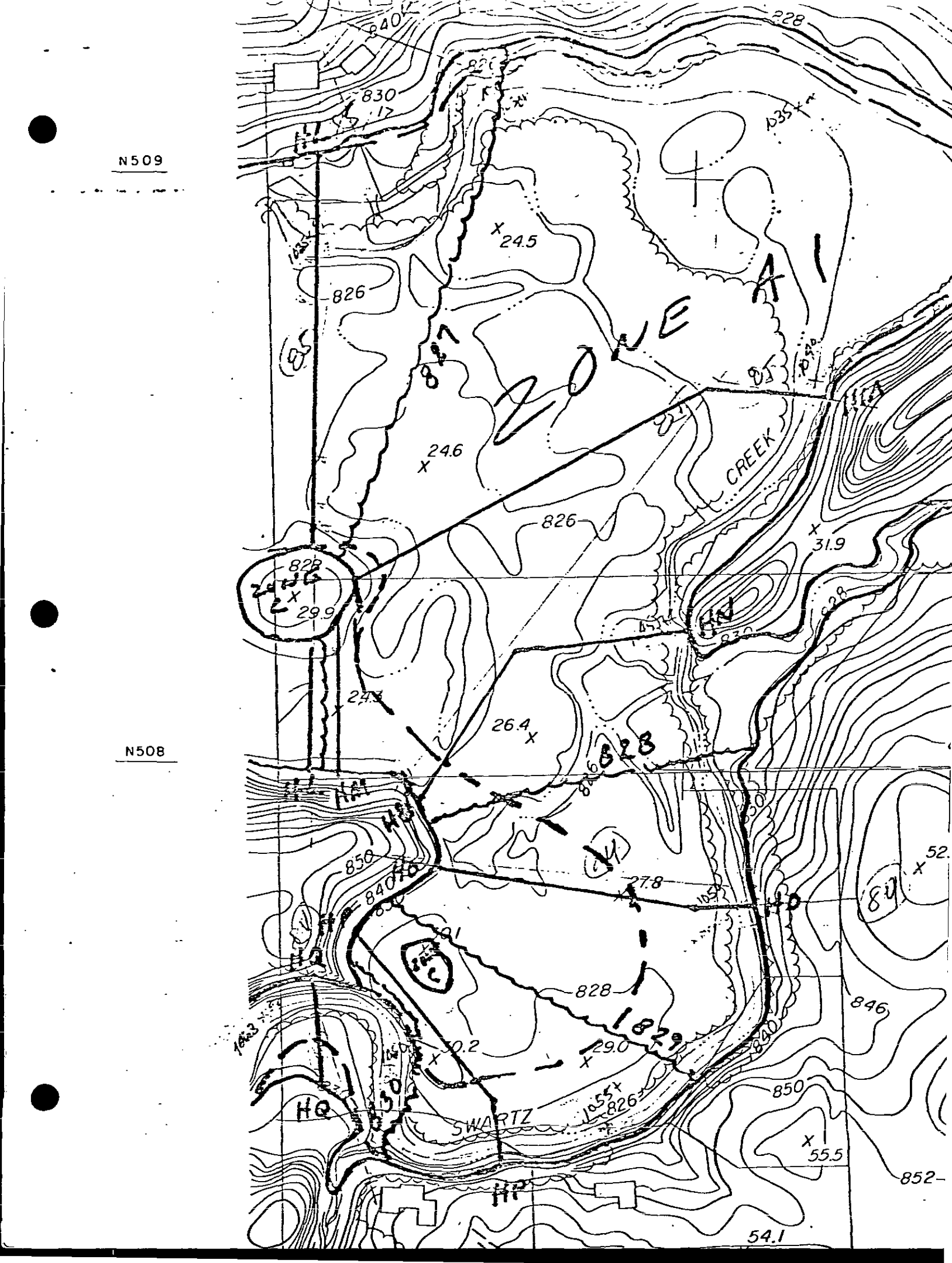
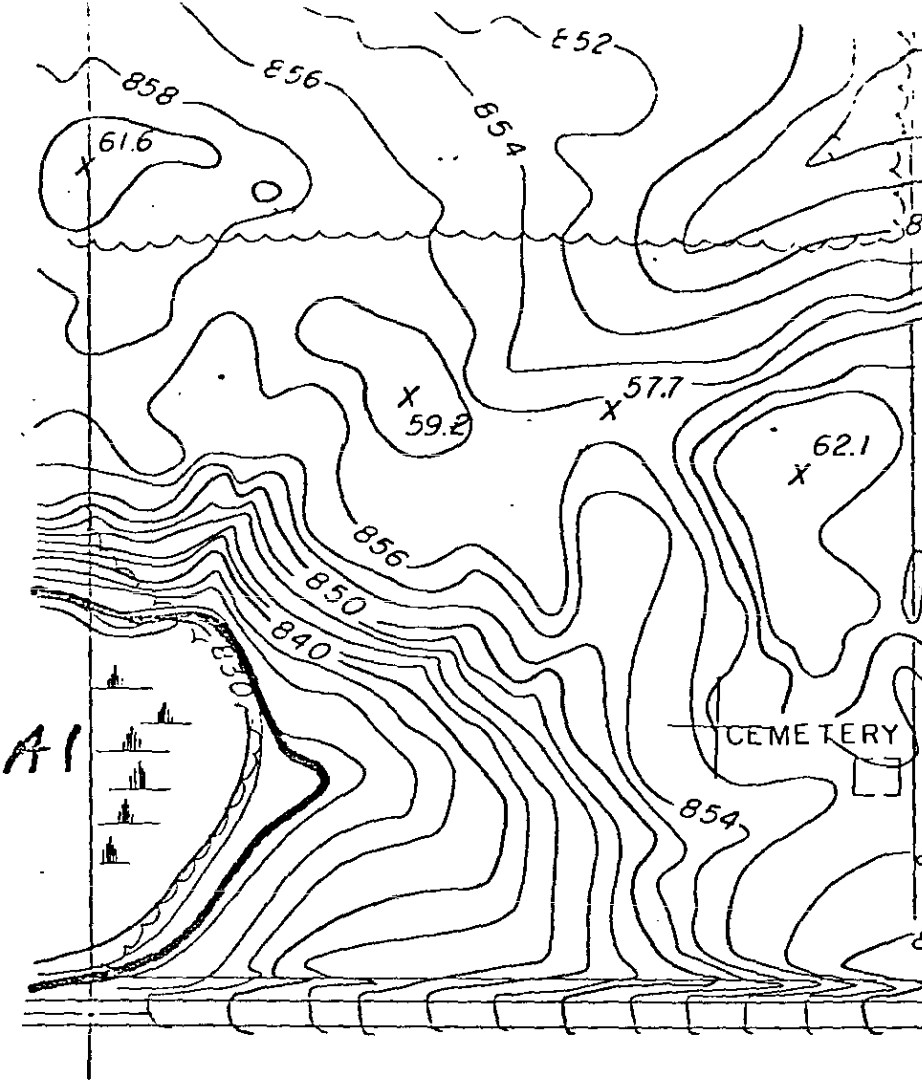
39.4
40.2
53.2
465
840
850
828
826
817


N509
N508
CREEK
SWARTZ
HP
HQ
HN
HM
HL
HK
HJ
HI
HG
HE
HD
HC
HA
24.5
24.6
26.4
27.8
29.9
31.9
29.0
55.5
54.1
826
828
830
840
850
846
852
1035
1055



N506,000

ZONE A1

BFE 833

E 2,173,000

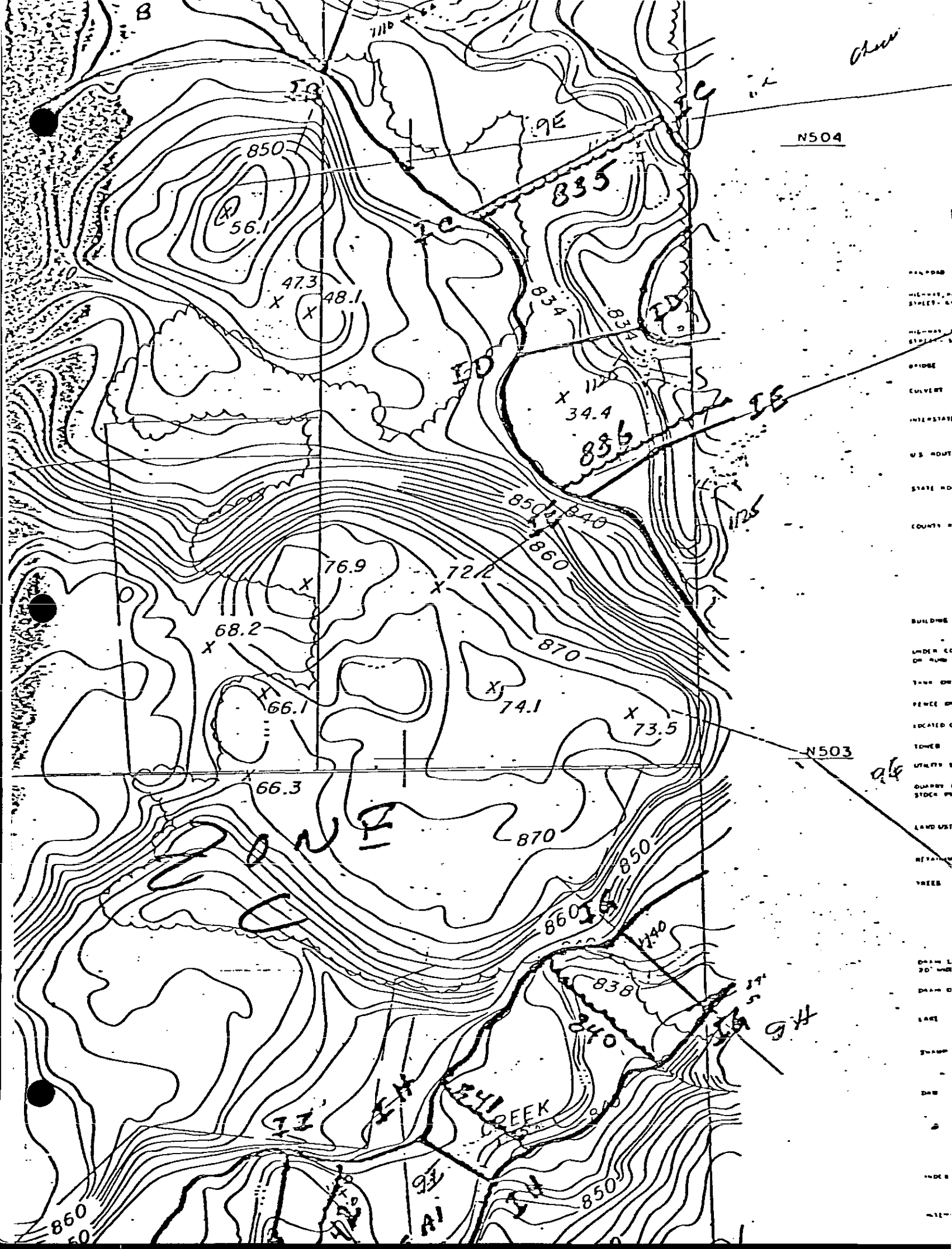
1000' GRID BASED ON MICHIGAN PLANE COORDINATE SYSTEM PROVIDED IN ACT 9, P.A. 1964.

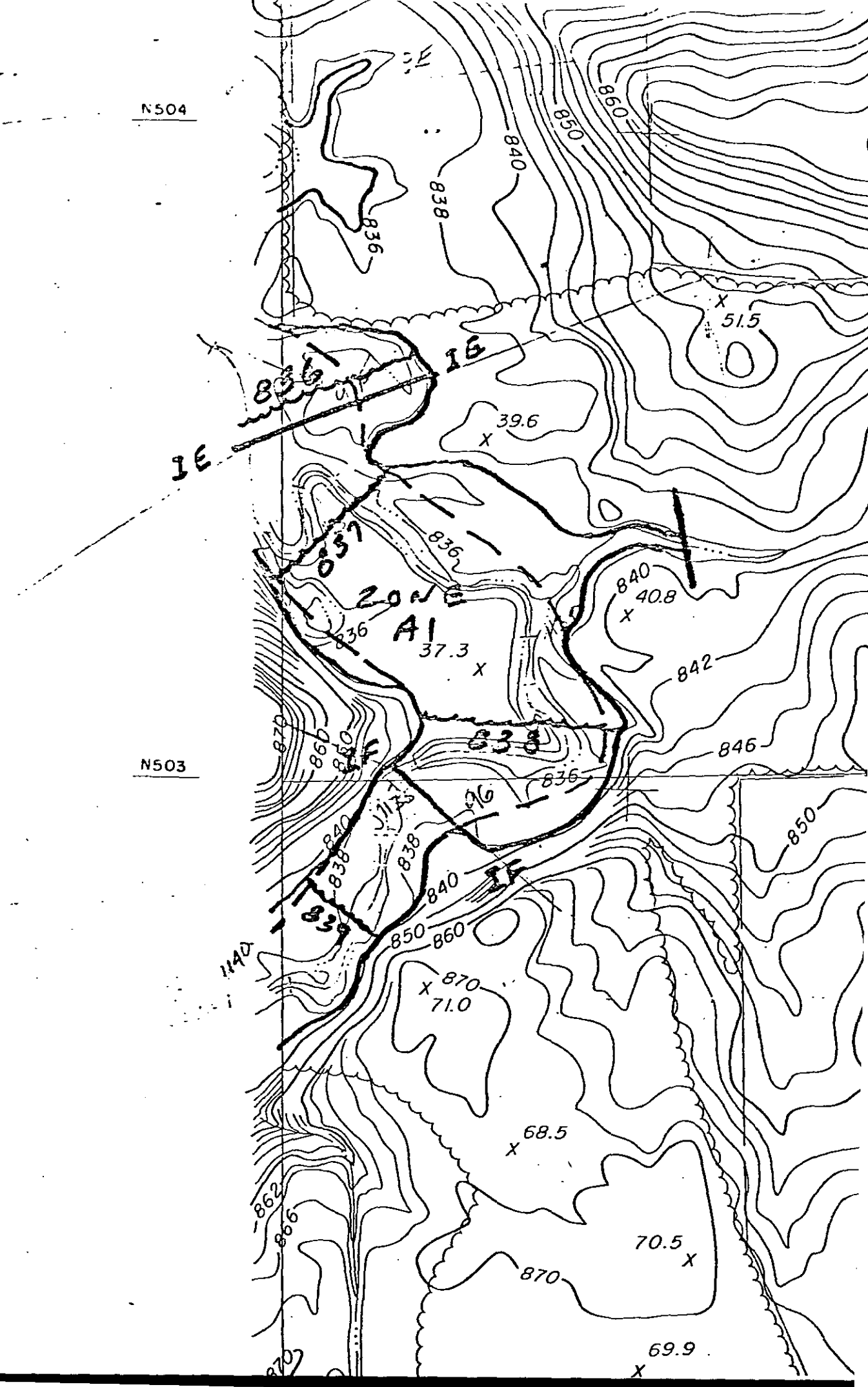
COMPILED BY PHOTOGRAMMETRIC METHODS

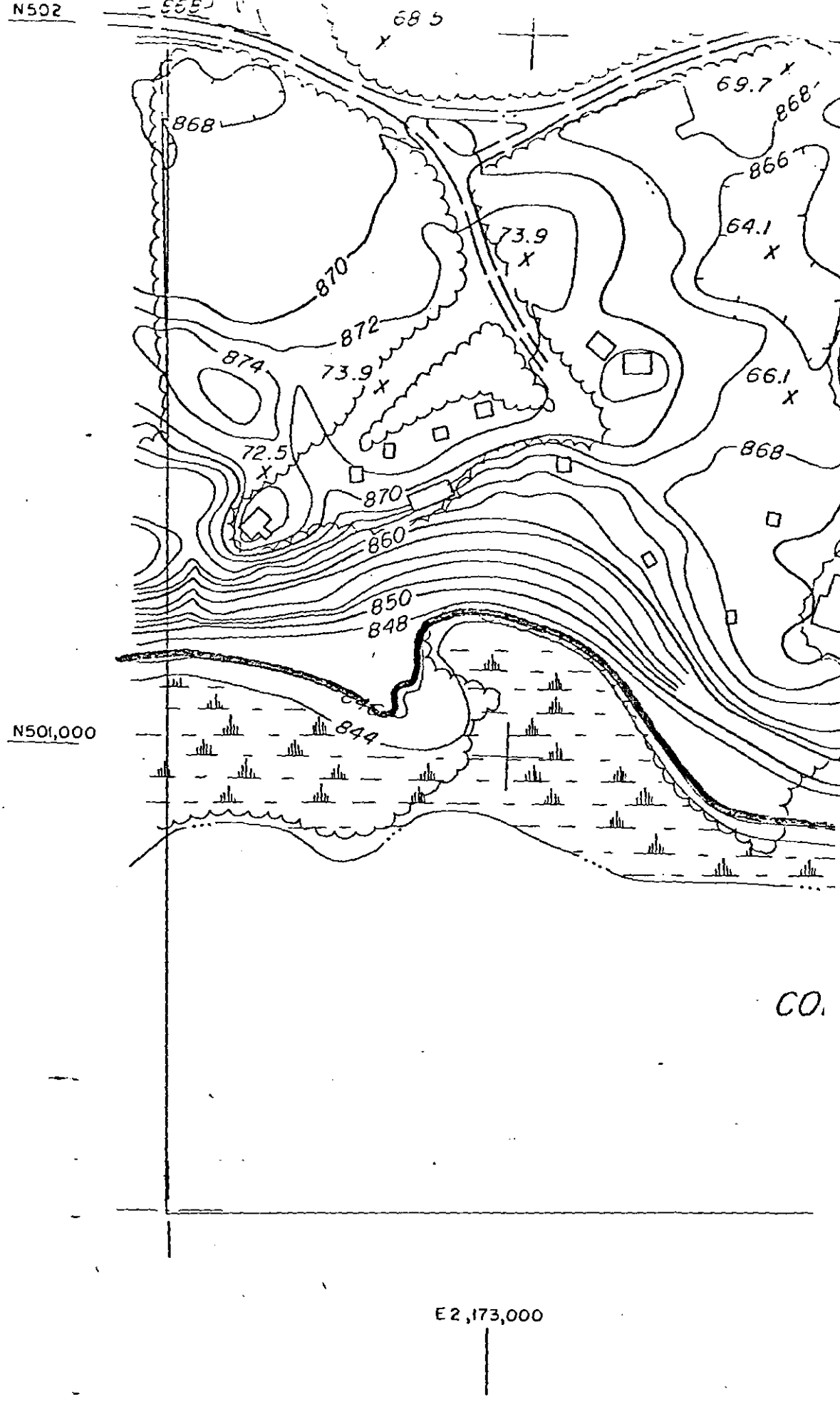
BY

UNITED AERIAL MAPPING

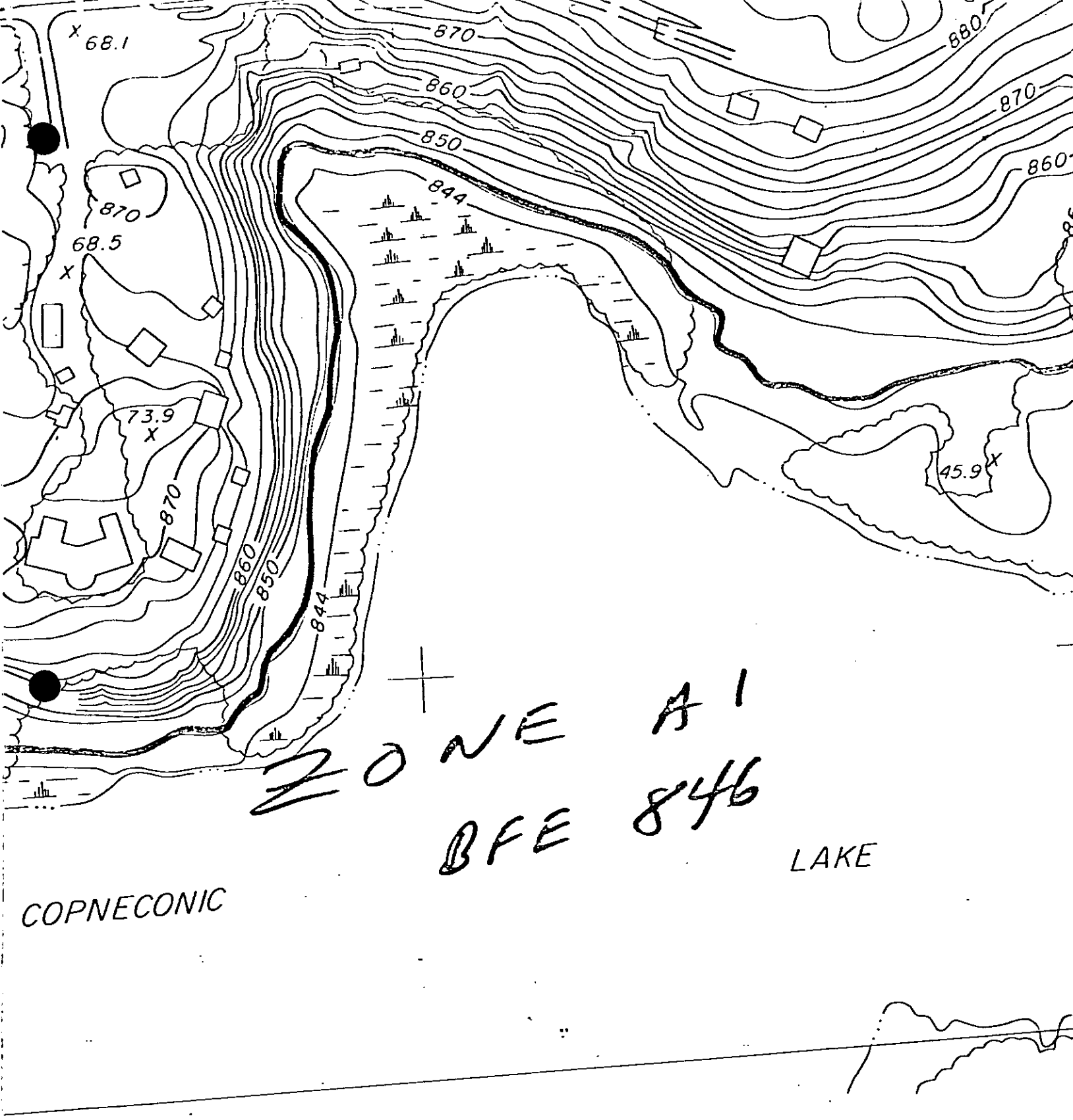
SAN ANTONIO, TEXAS


N504
N503
850
835
56.1
47.3
48.1
834
34.4
836
840
860
76.9
72.2
68.2
870
66.1
74.1
73.5
66.3
870
850
860
840
838
840
CREEK
850
860

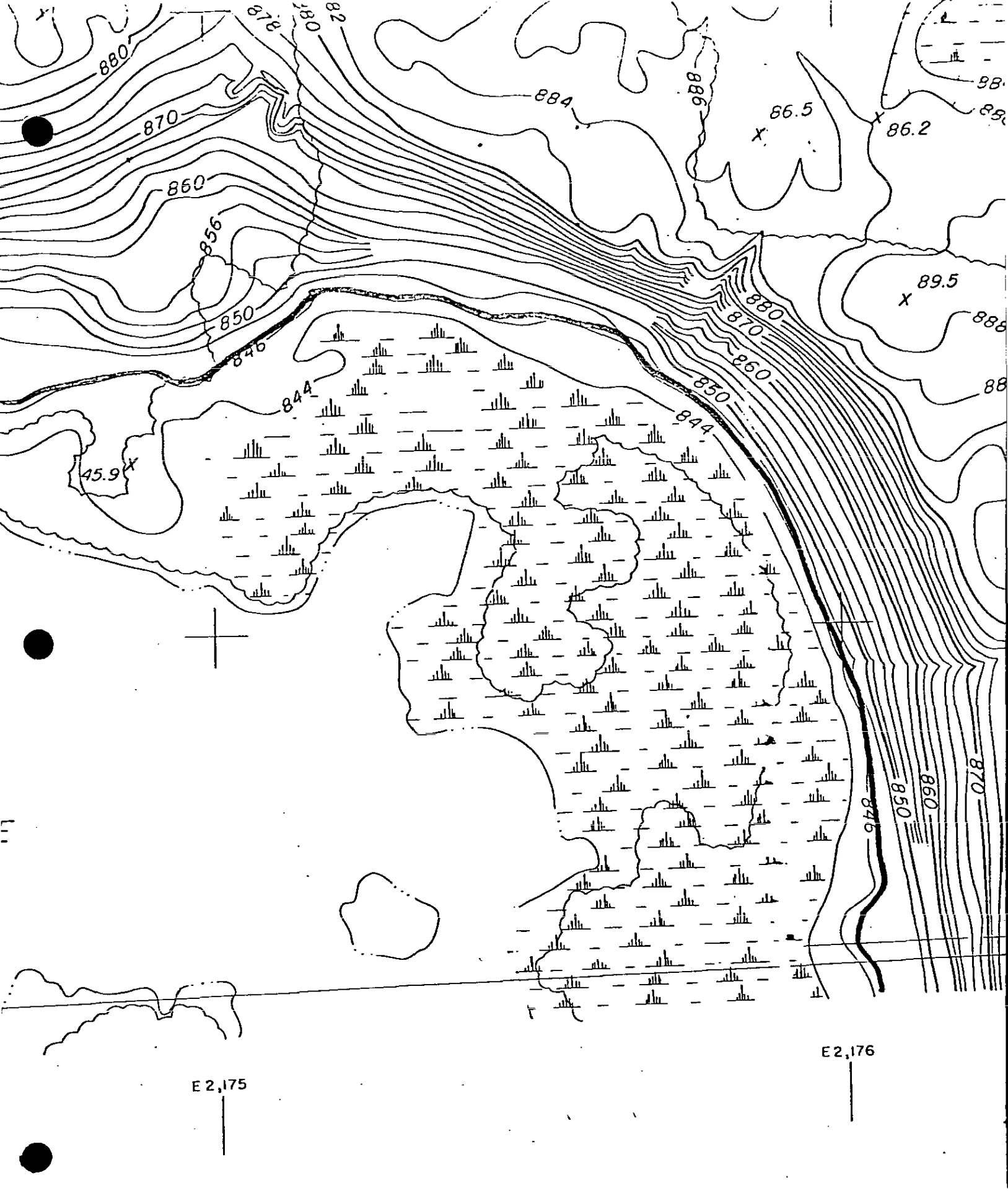

N504
N503
836
838
840
850
860
51.5
39.6
836
837
ZONE
A1
37.3
840
40.8
842
846
838
836
850
840
838
839
850
860
870
71.0
68.5
70.5
870
69.9
1140
862
866
IE
IF


N502
N501,000
E2,173,000
868
870
872
874
73.9
72.5
870
860
850
848
844
68.5
69.7
868
866
64.1
66.1
868

CO.


68.1
870
860
850
844
880
870
860
870
68.5
73.9
870
860
850
844
45.9
ZONE A1
BFE 846
LAKE
COPNECONIC

E2,174


880
870
860
856
850
846
844
884
886
86.5
86.2
89.5
45.9
E 2,175
E 2,176

```
1      ARMSTRONG CREEK                                  OLTSLAG 10  5 02 99 12
2    3  61875  61965  62050  62000  62000
3  100 AS  A 1  17  3  615        0  1  3
4  105     380     540     750     610     610
5  110        0  1  6300  115  1  6280  150  1  6260  210  1  6240  340  1  6220
5  111 A  385  2  6200  390  2  6160  405  2  6140  420  2  6160  425  3  6200   614.0
5  112    440  3  6220  460  3  6240  520  3  6240  580  3  6240  600  3  6260
5  113    650  3  6280  700  3  6300
6  114  1  2 085 085  1  2 050 050  1  2 085 085
3  200 AS  B 0  16  3  618      510  1  3
5  210        0  1  6300  110  1  6280  130  1  6260  160  1  6240  240  1  6220
5  211    250  2  6200  280  2  6180  290  2  6172  295  2  6180  300  3  6200   617.2
5  212 B  320  3  6220  350  3  6240  485  3  6260  530  3  6280  590  3  6300
5  213    620  3  6400
6  214  1  2 085 085  1  2 050 050  1  2 085 085
3  300 AS  C 0  13  3  620      950  1  3
5  310        0  1  6320  200  1  6315  225  1  6300  245  2  6200  250  2  6190
5  311 C  265  2  6190  270  3  6200  275  3  6220  400  3  6240  600  3  6260   619.0
5  312    625  3  6280  635  3  6300  650  3  6400
6  314  1  2 085 085  1  2 050 050  1  2 085 085
3  400 AS  D 0  17  3  622     1340  1  3
5  410        0  1  6500   20  1  6400   32  1  6300   42  1  6280   50  1  6260
5  411    160  1  6245  290  2  6240  305  2  6220  310  2  6210  315  2  6210
5  412 D  320  2  6220  330  3  6240  410  3  6260  425  3  6280  435  3  6300   621.0
5  413    450  3  6400  470  3  6500
6  414  1  2 085 085  1  2 050 050  1  2 085 085
3  500 AS  E 0  15  3  625     2460  1  3
5  510        0  1  6500   40  1  6400   55  1  6340  250  1  6340  280  1  6320
5  511 E  325  1  6300  430  1  6280  450  2  6260  460  2  6245  480  2  6245   624.5
5  512    485  3  6260  500  3  6280  530  3  6300  570  3  6400  610  3  6500
6  513  1  2 085 085  1  2 050 050  1  2 085 085
3  600 AS  F 0  13  3  627     3240  1  3
5  610        0  1  6500   40  1  6400   70  1  6340  170  1  6320  250  2  6300   626.4
5  611 F  265  2  6280  270  2  6264  280  2  6264  285  2  6280  305  3  6300
5  612    340  3  6320  375  3  6400  400  3  6500
6  613  1  2 085 085  1  2 050 050  1  2 085 085
3  700 AS  G 0  15  3  728     3680  1  3
5  710        0  1  6500   70  1  6400  100  1  6340  115  1  6320  160  2  6320
5  711 G  180  2  6300  190  2  6280  195  2  6270  200  2  6270  205  2  6280   627.0
5  712    210  2  6300  215  3  6320  405  3  6340  415  3  6400  435  3  6500
6  713  1  2 085 085  1  2 050 050  1  2 085 085
3  800 AS  H 0  19  3  630     4730  1  3
5  810        0  1  6600   10  1  6500   30  1  6400   48  2  6360   60  2  6340
5  811 H   70  2  6300   75  2  6295   85  2  6295   90  2  6300  100  3  6320   629.5
5  812    130  3  6340  300  3  6340  350  3  6340  370  3  6360  395  3  6380
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5   813      450  3  6380  470  3  6400  490  3  6500  520  3  6600
6   814  1   2 085 085  1  2 050 050  1  2 085 085
3   900 AS   I 0  13  3  632    5900  1  3
5   910      -45  1  6600  -15  1  6500    0  1  6429   30  2  6346   33  2  6322
5   911 I     38  2  6312   54  2  6324   60  3  6336   70  3  6360  170  3  6380     631.2
5   912      195  3  6400  230  3  6500  270  3  6600
6   913  1   2 085 085  1  2 050 050  1  2 085 085
3  1000 AS   J 0  13  3  635    6780  1  3
5  1010        0  1  6500   20  1  6400   40  1  6380   85  2  6380   90  2  6360
5  1011 J    100  2  6345  110  2  6345  115  3  6360  125  3  6380  220  3  6380     634.5
5  1012      250  3  6400  290  3  6500  305  3  6600
6  1013  1   2 085 085  1  2 047 047  1  2 085 085
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 ARMSTRONG CREEK  MCKINLEY RD - DODGE RD  HOLTSLAG 20  5 02 99 12
2      2  63845  63915  63993  63940  63945
3   1100 AS  K 1  23  3  634    6850  1  3
4      4    380    540    750    610    610
**SEQUENCE**
5   1110    -300  1  6600 -250  1  6560 -235  1  6540 -200  1  6520 -175  1  6500
5   1111    =160  1  6400 =140  1  6385  =68  1  6382  =44  2  6368  =36  2  6334
5   1112 K   -29  2  6325  -22  2  6334  -17  3  6374    0  3  6379  120  3  6388    632.5
5   1113     180  3  6400  200  3  6420  230  3  6440  250  3  6460  275  3  6480
5   1114     290  3  6500  310  3  6600  370  3  6700
6   1115  1  2 070 070  1  2 045 045  1  2 070 070
3   1200 AS  L 0  16  3  638    7800  1  3
5   1210       0  1  6560   10  1  6540  130  1  6520  180  1  6500  200  1  6420    635.2
5   1211     303  2  6402  306  2  6360  310  2  6352  314  2  6361  322  2  6372
5   1212 L   340  3  6403  415  3  6420  535  3  6440  620  3  6460  650  3  6500
5   1213     670  3  6600
6   1214  1  2 085 085  1  2 050 050  1  2 085 085
3   1300 AS  M 0  17  4  640    8320  1  4
5   1310       0  1  6640   20  1  6620   35  1  6600   75  1  6580  155  1  6560
5   1311 M   165  1  6540  184  1  6520  200  2  6400  205  2  6380  210  2  6378    637.8
```

```
5  1312      220  2  6380  230  3  6400  305  4  6420  575  4  6440  600  4  6500
5  1313      650  4  6600  700  4  6680
6  1314  1   2 085 085  1  2 050 050  1  2 085 085  1  2 100 100
3  1400 AS   N 0  20  3  641    8920  1  3
5  1410     -260  1  6740 -220  1  6700 -180  1  6600 -140  1  6500 -105  1  6443
5  1412 N   -100  1  6443  -36  1  6443   28  2  6430   28  2  6395   33  2  6382
5  1413      38  2  6393   44  3  6418   50  3  6425  210  3  6440  225  3  6500     638.2
5  1414     270  3  6600  285  3  6620  300  3  6640  340  3  6660  390  3  6680
6  1415  1   2 085 085  1  2 050 050  1  2 085 085
3  1500 AS   O 0  20  3  642    9780  1  3
5  1510     -300  1  6760 -250  1  6700 -230  1  6600 -200  1  6500 -180  1  6480
5  1511 Φ    -46  1  6451  -36  2  6445  -32  2  6412  -24  2  6395  -13  2  6413
5  1512      -11  3  6453    0  3  6452   34  3  6458   80  3  6460  100  3  6500     639.5
5  1513      125  3  6600  140  3  6620  190  3  6640  250  3  6660  280  3  6680
6  1514  1   2 085 085  1  2 050 050  1  2 085 085
3  1600 AS   P 0  20  3  643   10175  1  3
5  1610     -140  1  6700 -125  1  6600  -80  1  6500  -46  1  6456  -32  2  6450
5  1611 P    -26  2  6420  -20  2  6415  -14  2  6420   -8  3  6447    0  3  6463
5  1612      50  3  6470  200  3  6480  320  3  6480  350  3  6500  370  3  6600     641.5
5  1613     390  3  6620  410  3  6640  420  3  6660  470  3  6680  520  3  6700
6  1619  1   2 090 090  1  2 045 045  1  2 090 090
3  1700 AS   Q 0  20  3  643   10510  1  3
5  1710      -55  1  6740  -45  1  6720  -30  1  6700  -15  1  6600    0  1  6523
5  1711 Q    12  1  6468   22  2  6466   26  2  6430   33  2  6420   40  2  6430     642.0
5  1712      46  3  6468  105  3  6480  150  3  6485  470  3  6485  480  3  6500
```

*** INPUT CARD PRINTOUT ***

```
                1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  1713      505  3  6600  530  3  6700  550  3  6720  600  3  6740  630  3  6760
6  1714   1  2 065 065  1  2 042 042  1  2 075 075
3  1800  AS  R 0  15  3  645   11470  1  3
5  1810      -280  1  6720 -240  1  6700 -200  1  6640 -165  1  6600 -140  1  6520
5  1811   R  -50  2  6500  -42  2  6484  -32  2  6444  -27  2  6431  -22  2  6445   643.1
5  1812       0  3  6473   10  3  6500  100  3  6510  540  3  6510  610  3  6800
6  1813   1  2 075 075  1  2 042 042  1  2 075 075
3  1900  AS  S 0  15  3  647   12020  1  3
5  1910       0  1  6700   90  1  6600  115  2  6500  125  2  6480  132  2  6460
5  1911   S  140  2  6450  148  2  6460  155  2  6480  160  3  6500  165  3  6510   645.0
5  1912      275  3  6519  480  3  6520  570  3  6540  615  3  6600  640  3  6700
6  1913   1  2 085 085  1  2 050 050  1  2 085 085
3  2000  AS  T 0  19  3  651   13375  1  3
5  2010       0  1  6740   35  1  6720   50  1  6700  110  1  6600  200  2  6580
5  2011   T  245  2  6500  250  2  6490  260  2  6490  270  2  6500  290  2  6520   649.0
5  2012      300  3  6535  430  3  6539  510  3  6540  570  3  6560  595  3  6580
5  2013      610  3  6600  620  3  6700  635  3  6800  650  3  6820
6  2014   1  2 075 075  1  2 050 050  1  2 085 085
3  2100  AS  U 0  18  3  654   14840  1  3
5  2110       0  1  6740   50  1  6720   90  1  6700  130  1  6600  140  1  6580
5  2111   U  180  1  6560  230  1  6560  270  2  6540  280  2  6525  295  2  6525   652.5
5  2112      305  3  6540  370  3  6560  550  3  6560  565  3  6580  575  3  6600
5  2113      600  3  6700  645  3  6800  680  3  6820
6  2114   1  2 085 085  1  2 050 050  1  2 085 085
3  2200  AS  V 0  19  3  654   15750  1  3
5  2210     -320  1  6760 -260  1  6740 -240  1  6720 -225  1  6700 -200  1  6600
5  2211      -60  1  6580    0  1  6567   32  2  6560   38  2  6532   44  2  6524
5  2212   V   50  2  6532   56  3  6568   75  3  6580  180  3  6600  340  3  6620   652.4
5  2213      390  3  6700  440  3  6800  470  3  6820  550  3  6840
6  2214   1  2 080 080  1  2 045 045  1  2 080 080
```

```
3  2300 AS  W 0   20   4   654  16010  1   3
5  2310       -220  1  6760 -185  1  6740 -150  1  6720 -130  1  6700 -110  1  6680
5  2311 W     -70  1  6660  -50  1  6640  -30  1  6620  -23  1  6590    6  2  6581
5  2312        12  2  6540   22  2  6528   32  2  6540   38  3  6569   74  3  6578      652.8
5  2313       250  4  6600  520  4  6600  550  4  6700  590  4  6800  650  4  6820
5  2314  1  2 075 075  1  2 042 042  1  2 085 085  1  2 100 100
3  2400 AS  X 0   17   3   660   17030  1   3
5  2410         0  1  6760  125  1  6740  160  1  6720  215  1  6620  300  1  6600
5  2411       320  1  6580  340  1  6580  375  1  6600  415  1  6600  420  2  6580
5  2412 X     425  2  6570  435  2  6570  445  2  6580  455  3  6600  480  3  6700      657.0
5  2413       525  3  6800  575  3  6820
5  2414  1  2 075 075  1  2 045 045  1  2 080 080
3  2500 AS  Y 0   10   3   660   17250  1   3
5  2510         0  1  6700   50  2  6600   80  2  6600   82  2  6570  100  2  6570
5  2511 Y     102  2  6600  120  3  6600  140  3  6620  200  3  6700  235  3  6800      657.0
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 8/ 4/78

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 ARMSTRONG CREEK  DODGE ROAD - FRANCES RD HOLTSLAG 20  5 02 99 12
2      2  66106  66164  66235  66188  66188
3   2600 AS  Z I  25  3  658   17360  1  3
4   2604     380    540    750    610    610
5   2610    -500  1  6820 -440  1  6800 -400  1  6780 -300  1  6760 -190  1  6740
5   2611Z   -170  1  6720 -155  1  6700 -130  1  6620    0  1  6604   36  2  6600
5   2612      42  2  6578   57  2  6558   60  2  6560   80  2  6576   86  3  6597
5   2613      90  3  6600  125  3  6620  190  3  6640  205  3  6660  215  3  6680
5   2614     225  3  6700  250  3  6760  290  3  6780  320  3  6800  430  3  6840
6   2615  1  2 085 085  1  2 050 050  1  2 090 090
3   2700 AS AA 0  18  3  660   18080  1  3
5   2710       0  1  6800  110  1  6780  185  1  6760  200  1  6740  210  1  6720
5   2711     215  1  6700  230  1  6680  240  1  6660  260  1  6635  410  2  6630
5   2712AA   412  2  6580  426  2  6580  432  3  6627  465  3  6640  480  3  6660
5   2713     490  3  6680  500  3  6700  535  3  6800
6   2714  1  2 085 085  1  2 050 050  1  2 090 090
3   2800 AS AB 0  15  3  661   19000  1  3
5   2810       0  1  6800   15  1  6780   35  1  6700   50  1  6640  120  2  6630
5   2811AB   122  2  6600  128  2  6597  134  2  6600  135  3  6630  150  3  6645
5   2812     300  3  6650  315  3  6660  335  3  6680  340  3  6700  360  3  6800
6   2813  1  2 085 085  1  2 055 055  1  2 090 090
3   2900 AS AC 0  20  3  662   19460  1  3
5   2910       0  1  6840   20  1  6820   50  1  6800   70  1  6780   85  1  6760
5   2911     105  1  6700  120  1  6660  150  1  6640  195  2  6640  200  2  6610
5   2912AC   206  2  6605  212  2  6610  215  3  6630  240  3  6640  270  3  6665
5   2913     400  3  6665  420  3  6700  470  3  6800  495  3  6820  510  3  6840
6   2914  1  2 080 080  1  2 055 055  1  2 090 090
3   3000 AS AD 0  18  3  664   20330  1  3
```

655.8

658.0

659.7

660.5

```
5  3010        0  1  6820   45  1  6800   90  1  6780  120  1  6760  145  1  6700
5  3011      160  1  6660  205  2  6640  210  2  6625  216  2  6622  222  2  6625
5  3012 AD   230  3  6640  242  3  6660  385  3  6680  410  3  6700  440  3  6800
5  3013      450  3  6820  480  3  6840  540  3  6860
6  3014  1  2 085 085  1  2 055 055  1  2 080 080
3  3100 AS AE 0  15  3  665   21050  1  3
5  3110        0  1  6808   18  1  6767   38  2  6637   43  2  6634   48  2  6637
5  3111 AE    55  3  6669  200  3  6680  310  3  6700  340  3  6720  375  3  6740
5  3112      415  3  6760  460  3  6780  490  3  6800  515  3  6820  545  3  6840
6  3113  1  2 085  85  1  2 050  50  1  2 085 085
3  3200 AS AF 0  18  3  666   22550  1  3
5  3210     -340  1  6840 -290  1  6820 -225  1  6800 -165  1  6780 -125  1  6700
5  3211 AF  -114  1  6696    0  1  6699   66  2  6684   76  2  6647   77  2  6641
5  3212       89  2  6641   90  2  6646   92  3  6697  110  3  6700  118  3  6720
5  3213      180  3  6800  190  3  6820  200  3  6840
6  3214  1  2 085 085  1  2 055 055  1  2 090 090
3  3300 AS AG 0  19  3  668   23100  1  3
```

662.2

663.4

664.1

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

5  3310        0  1  6860   30  1  6840  100  1  6820  255  1  6800  270  1  6700
5  3312 AG   285  2  6680  290  2  6660  297  2  6650  304  2  6660  305  3  6680   665.0
5  3313      310  3  6700  380  3  6720  510  3  6740  525  3  6760  545  3  6780
5  3314      570  3  6800  610  3  6820  660  3  6840  700  3  6860
6  3315  1  2 085 085  1  2 055 055  1  2 085 085
3  3400 AS AH 0  15  3  670   24000  1  3
5  3410        0  1  6860   30  1  6840   40  1  6820   50  1  6800   80  1  6740
5  3411 AH   335  1  6720  345  2  6680  351  2  6675  357  2  6680  370  3  6700   667.5
5  3412      390  3  6720  420  3  6740  450  3  6780  460  3  6800  490  3  6860
6  3413  1  2 085 085  1  2 055 055  1  2 085 085
3  3500 AS AI 0  22  3  670   24900  1  3
5  3510     -230  1  6860 -200  1  6840 -125  1  6820  -80  1  6800  -70  1  6780
5  3511      -60  1  6760  -55  1  6740    0  1  6728   90  2  6726  100  2  6692
5  3512 AI   106  2  6688  110  2  6693  112  3  6705  120  3  6720  130  3  6740   668.8
5  3513      140  3  6760  155  3  6780  170  3  6800  180  3  6820  195  3  6840
5  3514      220  3  6860  250  3  6880
6  3515  1  2 080 080  1  2 050 050  1  2 080 080
3  3600 AS AJ 0  15  3  672   25500  1  3
5  3610     -130  1  6900  -70  1  6880  -35  1  6860    0  1  6840   34  1  6750
5  3611 AJ   234  2  6740  246  2  6705  248  2  6702  252  2  6705  260  3  6738   670.2
5  3612      276  3  6796  300  3  6820  330  3  6840  350  3  6860  390  3  6880
6  3613  1  2 080 080  1  2 060 060  1  2 080 080
3  3650 AS AK 0  13  3  674   26380  1  3
```

```
5  3660      -40  1  6860     0  1  6850    14  2  6818    45  2  6729    52  2  6723
5. 3661 K     59  2  6729    66  3  6754   150  3  6860   240  3  6780   270  3  6800
5  3662      285  3  6820   350  3  6840   410  3  6860
6  3663  1  2 080 080  1  2 060 060  1  2 075 075
3  3700 AS AL 1  14  3  672   26540  1  3
4  3704     330    470    650    530    530
5  3710     -250  1  6823 -200  1  6811 -150  1  6802 -100  1  6799  -30  2  6806
5  3711 AL  -20  2  6760  -15  2  6707    5  2  6707   10  3  6760   25  3  6810
5  3712      50  3  6809  100  3  6809  150  3  6817  200  3  6828
6  3713  1  2 075 075  1  2 055 055  1  2 080 080
3  3750 MORBR 2   5  1  672   26540        0  6800 3 0
5  3751       0  1  6800    0  1  6707   20  1  6707   20  1  6800    0 -9  6800
6  3752  1  2 016 016
3  3770 MORRD 4  10  2   25          1  2          2 2                 1
5  3771     -250  1  6823 -200  1  6811 -150  1  6802 -100  1  6799  -50  1  6806
5  3772       0  2  6811   50  2  6809  100  2  6809  150  2  6817  200  2  6828
3  3800 AS AM 5  20  5  672   26600  2  4
5  3810     -350  1  6860 -310  1  6820 -250  1  6800 -240  1  6780  -60  1  6762
5  3811 AM  -50  1  6757  -46  2  6747  -40  3  6732  -36  3  6723  -32  3  6715
5  3812     -29  3  6711  -26  3  6706  -23  3  6708  -20  4  6713  -19  5  6739
5  3813     -10  5  6749    5  5  6760   60  5  6780   95  5  6800  210  5  6900
6  3814  1  2 080 080  1  2 080 080  1  2 050 050  1  2 080 080  1  2 080 080
```

670.7

670.6

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 3,DATE= 8/ 4/78

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

3  3900 AS AN 0  10  3  674   26880  1  3
5  3910 AN    0  1  6860   40  1  6800   60  1  6780  200  1  6770  265  2  6760
5  3911     270  2  6730  280  2  6720  290  2  6730  300  3  6760  315  3  6900
6  3912  1  2 090 090  1  2 055 055  1  2 085 085
3  4000 AS AO 0  15  3  675   27310  1  3
5  4010       0  1  6860   15  1  6840   25  1  6820   40  1  6800   85  2  6780
5  4011 AØ   95  2  6760  100  2  6740  105  2  6733  110  2  6740  120  3  6760
5  4012      130  3  6780  245  3  6780  250  3  6800  300  3  6900  305  3  6920
6  4013  1  2 090 090  1  2 052 052  1  2 090 090
3  4050 FRABR 2   5  1  675   27310        0  6781 3 0
5  4051       0  1  6781    0  1  6733   23  1  6733   23  1  6781    0 -9  6781
6  4052  1  2 020 020
3  4060 FRARD 4  14  2   30          1  2          1 1                 1
5  4061    -190  1  6860 -140  1  6840 -100  1  6831  -50  1  6815    0  1  6806
5  4062       0  1  6841   25  2  6841   25  2  6806   50  2  6811  100  2  6827
5  4063     100  2  6840  150  2  6860  195  2  6880  235  2  6900
3  4200 AS AP 5  25  3  675   27380  1  3
5  4210    -190  1  6880 -130  1  6860  -90  1  6800  -15  1  6780  -10  1  6770
5  4211       0  1  6761   10  1  6743   20  2  6743   25  2  6744   27  2  6732
5  4212 AP   30  2  6729   33  2  6731   36  2  6729   38  2  6733   40  2  6741
5  4213      45  3  6753   50  3  6780  100  3  6800  140  3  6820  150  3  6840
5  4214     160  3  6860  180  3  6880  200  3  6900  220  3  6920  270  3  6940
6  4215  1  2 075 075  1  2 050 050  1  2 070 070
```

672.0

WATER-SURFACE PROFILE FOR: ARMSTRONG CREEK HOLTSLAG

PAGE [illegible]F 1, PROFILE NUMBER 4, UPSTREAM COM[illegible]TATIONS

	SECID	AT	DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
A	AS A	AT	0 / 620.00	0 / 0.20	610. /	170. / 620.20	12652. / 3.59	1.00 / 0.31	385. /	425.	*IS*
B	AS B	AT	510 / 621.57	510 / 0.24	610. / 1.59	168. / 0.02	9461. / 621.81	1.16 / 3.63	242. / 0.40	316. / 0.004	*XS*
C	AS C	AT	950 / 623.38	440 / 0.34	610. / 1.85	187. / 0.05	9340. / 623.72	2.05 / 3.27	238. / 0.43	361. / 0.002	*XS*
D	AS D	AT	1340 / 625.22	390 / 0.17	610. / 1.67	289. / 0.0	9305. / 625.39	2.51 / 2.11	107. / 0.41	379. / 0.009	*XS*
E	AS E	AT	2460 / 628.87	1120 / 0.19	610. / 3.65	233. / 0.01	12260. / 629.06	1.80 / 2.62	384. / 0.33	513. / 0.008	*XS*
F	AS F	AT	3240 / 631.16	780 / 0.19	610. / 2.28	201. / 0.0	10385. / 631.35	1.33 / 3.03	204. / 0.37	325. / 0.006	*XS*
G	AS G	AT	3680 / 632.58	440 / 0.17	610. / 1.40	216. / 0.0	11257. / 632.76	1.39 / 2.83	111. / 0.34	270. / 0.005	*XS*
H	AS H	AT	4730 / 634.81	1050 / 0.09	610. / 2.14	408. / 0.0	16230. / 634.90	2.51 / 1.50	55. / 0.24	358. / 0.002	*XS*
I	AS I	AT	5900 / 636.90	1170 / 0.24	610. / 2.17	193. / 0.08	12377. / 637.14	1.53 / 3.16	22. / 0.33	115. / 0.003	*XS*
J	AS J	AT	6780 / 639.12	880 / 0.16	610. / 2.14	309. / 0.0	12387. / 639.28	2.64 / 1.97	29. / 0.34	237. / 0.004	*XS*

END OF THIS PROFILE

100-YR

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 17,DATE= 8/ 1/78

WATER-SURFACE PROFILE FOR: ARMSTRONG CREEK MCKINLEY RD - DODGE RD HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

	SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
K	AS K AT 6850 / 639.40	0 / 0.09	610. /	436. / 639.49	20393. / 1.40	2.96 / 0.22	-152. /	150.	*IS*
L	AS L AT 7800 / 641.16	950 / 0.28	610. / 1.86	176. / 0.10	9330. / 641.45	1.51 / 3.47	248. / 0.41	378. / 0.001	*XS*
M	AS M AT 8320 / 642.79	520 / 0.13	610. / 1.47	311. / 0.0	14077. / 642.92	2.25 / 1.96	196. / 0.29	411. / 0.003	*XS*
N	AS N AT 8920 / 644.35	600 / 0.20	610. / 1.61	317. / 0.03	9822. / 644.55	3.43 / 1.92	-105. / 0.36	211. / -0.017	*XS*
Ø	AS O AT 9780 / 646.62	860 / 0.16	610. / 2.23	300. / 0.0	14595. / 646.79	2.53 / 2.04	-116. / 0.27	83. / 0.001	*XS*
P	AS P AT 10175 / 647.39	395 / 0.29	610. / 0.83	221. / 0.06	12102. / 647.68	2.41 / 2.76	-60. / 0.37	109. / 0.000	*XS*
Q	AS Q AT 10510 / 648.24	335 / 0.32	610. / 0.86	184. / 0.02	11948. / 648.56	1.87 / 3.32	9. / 0.39	127. / 0.001	*XS*
R	AS R AT 11470 / 650.10	960 / 0.14	610. / 1.68	215. / 0.0	17779. / 650.24	1.11 / 2.84	-55. / 0.27	19. / -0.001	*XS*
S	AS S AT 12020 / 651.00	550 / 0.19	610. / 0.92	178. / 0.03	12554. / 651.19	1.03 / 3.44	113. / 0.31	165. / 0.002	*XS*

100-YR

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T   AS  T AT   13375 /  1355 /    610. /   257. /   14167. / 1.22 /  223. /  445.
      653.92 /   0.11 /   2.83 /   0.0  /  654.03 /    2.37 /   0.27 /  0.006  *XS*
    ------------------------------------------------------------------------------
U   AS  U AT   14840 /  1465 /    610. /   448. /   14402. / 3.19 /  168. /  555.
      656.62 /   0.09 /   2.67 /   0.0  /  656.71 /    1.36 /   0.28 /  0.016  *XS*
    ------------------------------------------------------------------------------
V   AS  V AT   15750 /   910 /    610. /   270. /   12727. / 2.67 /  -89. /   97.
      658.41 /   0.21 /   1.85 /   0.06 /  658.62 /    2.26 /   0.34 /  0.001  *XS*
    ------------------------------------------------------------------------------
W   AS  W AT   16010 /   260 /    610. /   264. /   15773. / 2.24 /  -20. /  163.
      658.91 /   0.19 /   0.48 /   0.0  /  659.10 /    2.31 /   0.30 / -0.009  *XS*
    ------------------------------------------------------------------------------
X   AS  X AT   17030 /  1020 /    610. /   327. /   12917. / 1.97 /  263. /  457.
      660.86 /   0.11 /   1.86 /   0.0  /  660.97 /    1.86 /   0.33 /  0.007  *XS*
    ------------------------------------------------------------------------------
Y   AS  Y AT   17250 /   220 /    610. /   177. /    9930. / 1.13 /   43. /  135.
      661.45 /   0.21 /   0.64 /   0.05 /  661.66 /    3.44 /   0.43 /  0.003  *XS*
    ------------------------------------------------------------------------------
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100-YR

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 21,DATE= 8/ 4/78

100 - YR

WATER-SURFACE PROFILE FOR: ARMSTRONG CREEK DODGE ROAD - FRANCES RD HOLTSLAG
PAGE 1 OF 2, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

	SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
Z	AS Z AT 17360 / 661.88	0 / 0.07	610. /	421. / 661.95	22344. / 1.45	2.07 / 0.18	-120. /	123.	*IS*
AA	AS AA AT 18080 / 663.33	720 / 0.57	610. / 1.70	120. / 0.25 / 663.90	7044. / 5.10	1.41 / 0.51	311. / -0.000	448.	*XS*
AB	AS AB AT 19000 / 666.29	920 / 0.04	610. / 2.42	574. / 0.0 / 666.33	20088. / 1.06	2.19 / 0.17	44. / 0.006	318.	*XS*
AC	AS AC AT 19460 / 666.79	460 / 0.07	610. / 0.50	454. / 0.02 / 666.86	17015. / 1.34	2.57 / 0.22	117. / 0.016	402.	*XS*
AD	AS AD AT 20330 / 667.87	870 / 0.07	610. / 1.08	422. / 0.00 / 667.94	17624. / 1.45	2.22 / 0.21	153. / 0.004	376.	*XS*
AE	AS AE AT 21050 / 669.04	720 / 0.13	610. / 1.20	363. / 0.03 / 669.17	12715. / 1.68	3.07 / 0.32	30. / 0.004	257.	*XS*
AF	AS AF AT 22550 / 671.23	1500 / 0.05	610. / 2.11	508. / 0.0 / 671.29	20845. / 1.20	2.39 / 0.17	-131. / 0.005	115.	*XS*

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AG  AS AG AT   23100 /   550 /    610. /   245. /  13020. / 1.99 /  267. /  377.
       671.92 /   0.19 /   0.75 /   0.07 /  672.11 /   2.49 /   0.28 /  0.000  *XS*
    ------------------------------------------------------------------------------
AH  AS AH AT   24000 /   900 /    610. /   409. /  15841. / 3.03 /  127. /  414.
       673.63 /   0.10 /   1.62 /   0.0  /  673.74 /   1.49 /   0.24 /  0.002  *XS*
    ------------------------------------------------------------------------------
AI  AS AI AT   24900 /   900 /    610. /   428. /  18114. / 2.16 /  -57. /  134.
       674.84 /   0.07 /   1.17 /   0.0  /  674.90 /   1.42 /   0.22 /  0.002  *XS*
    ------------------------------------------------------------------------------
AJ  AS AJ AT   25500 /   600 /    610. /   376. /  12447. / 1.99 /   31. /  266.
       675.82 /   0.08 /   0.99 /   0.01 /  675.90 /   1.62 /   0.26 /  0.002  *XS*
    ------------------------------------------------------------------------------
880 AK  AS AK AT   26380 /   880 /    610. /   375. /  13992. / 1.55 /   28. /  228.
       677.73 /   0.06 /   1.88 /   0.0  /  677.79 /   1.63 /   0.23 /  0.007  *XS*
    ------------------------------------------------------------------------------
160 AL  AS AL AT   26540 /   160 /    530. /   201. /  15472. / 1.04 /  -24. /   16.
       677.94 /   0.11 /   0.24 /   0.02 /  678.06 /   2.64 /   0.20 / -0.000  *XS*
    ========================== BEGIN BRIDGE ANALYSIS ==========================
    MORBR AT   26540 /        /    530. /   145. /  35116. / 1.00 /    0. /   20.
       677.94 /   0.21 /      ...1...  (-.001)    /   3.66 /   0.24 /          *BO*
    ------------------------------------------------------------------------------
    EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /              *RG*
    ------------------------------------------------------------------------------
    AS AM AT   26600 /    60 /    530. /   492. /  21936. / 3.42 / -240. /   61.
       678.04 /   0.06 /   0.05 /   0.0  /  678.10 /   1.08 /   0.17 / -0.001  *AS*
    ------------------------------------------------------------------------------
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100-YR

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USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   22,DATE= 8/ 4/78
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100-YR

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WATER-SURFACE PROFILE FOR:  ARMSTRONG CREEK  DODGE ROAD - FRANCES RD HOLTSLAG
PAGE  2 OF  2, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
   M = 0.43 / E = 0.64 / K* = 0.97 /   557. /   24874. / 3.35 / -241. /   65.
AM 678.26 /   0.05 /                 / 678.31 /    0.95 /   0.15 /         *AS*
============================ END BRIDGE ANALYSIS ==========================
AS AN AT   26880 /   280 /    530. /   436. /   18687. / 2.49 /   56. /  303.
AN 678.42 /   0.06 /   0.17 /   0.01 / 678.48 /    1.22 /   0.17 / -0.000  *XS*
----------------------------------------------------------------------------
AS AO AT   27310 /   430 /    530. /   274. /   11336. / 2.20 /   63. /  247.
Aφ 678.96 /   0.13 /   0.57 /   0.04 / 679.09 /    1.94 /   0.29 /  0.001  *XS*
============================ BEGIN BRIDGE ANALYSIS ========================
FRABR AT   27310 /        /    530. /   110. /   12994. / 1.00 /    0. /   23.
   678.10 /   0.36 /       ...3...  (-.001)    /    4.80 /   0.39 /         *BO*
----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       0. / RIGHT       0. /               *RG*
----------------------------------------------------------------------------
AS AP AT   27380 /    70 /    530. /   304. /   16815. / 1.95 /  -56. /   77.
   679.10 /   0.09 /   0.10 /   0.0  / 679.19 /    1.74 /   0.21 / -0.000  *AS*
----------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   355. /   19414. / 2.09 /  -69. /   86.
AP 679.45 /   0.07 /                 / 679.52 /    1.50 /   0.19 /         *AS*
============================ END BRIDGE ANALYSIS ==========================

                          END OF THIS PROFILE
```

100-YR

WATER-SURFACE PROFILE FOR: ARMSTRONG CREEK HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
AS A AT 0	0	610.	170.	12652.	1.00	385.	425.	
620.00	0.20		620.20	3.59	0.31			*IS*
AS B AT 510	510	610.	162.	9316.	1.08	250.	310.	
621.60	0.24	1.61	0.02	621.83	3.77	0.40	0.005	*XS*
AS C AT 950	440	610.	189.	9500.	2.04	240.	360.	
623.40	0.33	1.85	0.05	623.73	3.22	0.43	0.002	*XS*
AS D AT 1340	390	610.	231.	8951.	1.87	200.	350.	
625.25	0.20	1.71	0.0	625.45	2.64	0.42	0.008	*XS*
AS E AT 2460	1120	610.	230.	12765.	1.63	400.	500.	
628.93	0.18	3.65	0.0	629.10	2.65	0.32	0.009	*XS*
AS F AT 3240	780	610.	199.	10253.	1.33	205.	325.	
631.14	0.19	2.22	0.01	631.33	3.07	0.37	0.003	*XS*
AS G AT 3680	440	610.	214.	11256.	1.37	115.	265.	
632.58	0.17	1.42	0.0	632.76	2.85	0.34	0.005	*XS*
AS H AT 4730	1050	610.	340.	15675.	2.03	55.	255.	
634.87	0.10	2.21	0.0	634.98	1.79	0.25	0.004	*XS*
AS I AT 5900	1170	610.	198.	12812.	1.53	25.	115.	
636.98	0.23	2.17	0.06	637.21	3.08	0.32	0.003	*XS*
AS J AT 6780	880	610.	263.	11897.	2.24	30.	180.	
639.18	0.19	2.15	0.0	639.36	2.32	0.35	0.006	*XS*

END OF THIS PROFILE

FW

A B C D E F G H I J

WATER-SURFACE PROFILE FOR: GILKET CR BE THRU BL LES

SECID	AT	DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
BE	AT	20860	0	780.	705.	46028.	2.50	205.	623.		
		752.20	0.05		752.25	1.11	0.14			*IS*	BE
BF	AT	21170	310	780.	1360.	150365.	1.11	336.	621.		
		752.27	0.01	0.03	0.0	752.27	0.57	0.04	-0.000	*XS*	BF
BG	AT	21550	380	780.	6591.	940556.	1.07	227.	1119.		
		752.27	0.00	0.00	0.0	752.27	0.12	0.01	-0.007	*XS*	BG
BH	AT	21870	320	780.	6648.	1034984.	1.03	21.	846.		
		752.27	0.00	0.00	0.0	752.27	0.12	0.01	-0.000	*XS*	BH
BI	AT	22120	250	780.	940.	52896.	2.25	173.	533.		
		752.27	0.02	0.00	0.01	752.29	0.83	0.11	0.009	*XS*	BI
BJ	AT	22550	430	780.	839.	43335.	3.35	83.	397.		
		752.37	0.05	0.11	0.01	752.42	0.93	0.13	0.000	*XS*	BJ
BK	AT	22960	410	780.	1013.	40114.	3.58	117.	714.		
		752.53	0.03	0.14	0.0	752.56	0.77	0.13	-0.000	*XS*	BK
BL	AT	23370	410	780.	308.	24391.	1.16	265.	396.		
		752.74	0.12	0.25	0.04	752.86	2.53	0.22	-0.000	*XS*	BL

END OF THIS PROFILE

INV

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 7,DATE= 8/ 1/79

WATER-SURFACE PROFILE FOR: GILKEY RECOMP ABOVE LEWIS ST SECS E1-K LES
PAGE 1 OF 1, PROFILE NUMBER 1, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*
E1	AT	1315	0	900.	1270.	122781.	2.17	-26.	479.
	713.79	0.02			713.81	0.71	0.06		*IS*
G	AT	1650	335	900.	1361.	92310.	1.31	53.	802.
	713.82	0.01	0.02	0.0	713.83	0.66	0.08	-0.000	*XS*
H	AT	2040	390	900.	512.	30499.	1.73	82.	493.
	713.90	0.08	0.11	0.04	713.98	1.76	0.27	-0.000	*XS*
I	AT	2620	580	900.	802.	46772.	1.45	109.	707.
	714.28	0.03	0.33	0.0	714.31	1.12	0.14	0.001	*XS*
I2	AT	2860	240	900.	250.	18085.	1.20	398.	548.
	714.41	0.24	0.23	0.11	714.65	3.61	0.45	-0.000	*XS*
J	AT	3120	260	900.	174.	11430.	1.37	431.	555.
	715.26	0.57	1.02	0.16	715.83	5.17	0.65	0.001	*XS*
J2	AT	3250	130	900.	337.	21493.	1.38	228.	446.
	716.11	0.15	0.43	0.0	716.26	2.67	0.35	-0.000	*XS*
K	AT	3370	120	900.	260.	17214.	1.21	182.	335.
	716.33	0.23	0.26	0.04	716.56	3.47	0.41	-0.000	*XS*

END OF THIS PROFILE

10 yr

Part of new submittal 6/3/80

WATER-SURFACE PROFILE FOR: GILKEY RECOMP SECS L TO M LES
PAGE 1 OF 1, PROFILE NUMBER 1, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
L	AT	3520	0	780.	385.	38416.	2.22	102.	363.
717.00	0.14				717.14	2.03	0.30		*IS*
M	AT	3820	300	780.	304.	36737.	2.01	298.	511.
717.10	0.21	0.13	0.03		717.30	2.57	0.32	-0.001	*XS*

END OF THIS PROFILE

10 yr

Part of new submittal 6/3/80

WATER-SURFACE PROFILE FOR: GILKEY RECOMP ABOVE LEWIS ST SECS E1-K LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*
E1	AT	1315	0	1400.	2376.	294407.	1.59	-53.	509.
	715.83	0.01			715.84	0.59	0.05		*IS*
G	AT	1650	335	1400.	2914.	301738.	1.07	46.	833.
	715.83	0.00	0.01	0.0	715.83	0.48	0.04	-0.012	*XS*
H	AT	2040	390	1400.	1357.	125558.	1.14	67.	514.
	715.83	0.02	0.02	0.01	715.85	1.03	0.10	-0.013	*XS*
I	AT	2620	580	1400.	1963.	154267.	1.19	77.	917.
	715.90	0.01	0.06	0.0	715.91	0.71	0.08	-0.000	*XS*
I2	AT	2860	240	1400.	610.	46876.	1.42	372.	704.
	715.90	0.12	0.07	0.05	716.01	2.30	0.26	-0.012	*XS*
J	AT	3120	260	1400.	322.	23074.	1.38	397.	576.
	716.22	0.41	0.47	0.15	716.63	4.35	0.52	-0.000	*XS*
J2	AT	3250	130	1400.	491.	35937.	1.24	214.	453.
	716.78	0.16	0.31	0.0	716.94	2.85	0.32	-0.000	*XS*
K	AT	3370	120	1400.	371.	26695.	1.22	166.	364.
	716.97	0.27	0.25	0.06	717.24	3.77	0.43	-0.001	*XS*

50 yr

END OF THIS PROFILE

Part of rev submittal 6/30/80

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 7,DATE= 9/ 6/79

WATER-SURFACE PROFILE FOR: GILKEY RECOMP SECS L TO M LES
PAGE 1 OF 1, PROFILE NUMBER 2, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
L	AT	3520	0	1200.	761.	78564.	2.35	81.	437.
718.20	0.09				718.29	1.58	0.24		*IS*
M	AT	3820	300	1200.	643.	68136.	2.87	220.	600.
718.25	0.16	0.08	0.03		718.40	1.86	0.28	-0.000	*XS*

END OF THIS PROFILE

50 yr.

Part of Jew Submittal 6/3/80

USG STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 13,DATE= 8/ 1/79

WATER-SURFACE PROFILE FOR: GILKEY RECOMP ABOVE LEWIS ST SECS E1-K LES
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
E1	AT	1315	0	2200.	4197.	685372.	1.34	-95.	525.
718.91	0.01				718.92	0.52	0.03		*IS*
G	AT	1650	335	2200.	5375.	810609.	1.02	34.	845.
718.91	0.00	0.00	0.0		718.91	0.41	0.03	-0.006	*XS*
H	AT	2040	390	2200.	2756.	389352.	1.03	62.	522.
718.91	0.01	0.01	0.00		718.92	0.80	0.06	-0.002	*XS*
I	AT	2620	580	2200.	4581.	588311.	1.04	60.	949.
718.91	0.00	0.01	0.0		718.91	0.48	0.04	-0.019	*XS*
I2	AT	2860	240	2200.	2645.	279831.	1.11	25.	726.
718.91	0.01	0.01	0.00		718.92	0.83	0.07	-0.003	*XS*
J	AT	3120	260	2200.	1160.	95095.	1.47	113.	629.
718.91	0.08	0.05	0.04		718.99	1.90	0.19	-0.012	*XS*
J2	AT	3250	130	2200.	1148.	101570.	1.25	111.	534.
718.99	0.07	0.07	0.0		719.06	1.92	0.19	-0.000	*XS*
K	AT	3370	120	2200.	918.	80500.	1.21	96.	415.
719.04	0.11	0.07	0.02		719.15	2.40	0.24	-0.000	*XS*

END OF THIS PROFILE

500 yr

Part of new submittal 6/3/80

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 9,DATE= 9/ 6/79

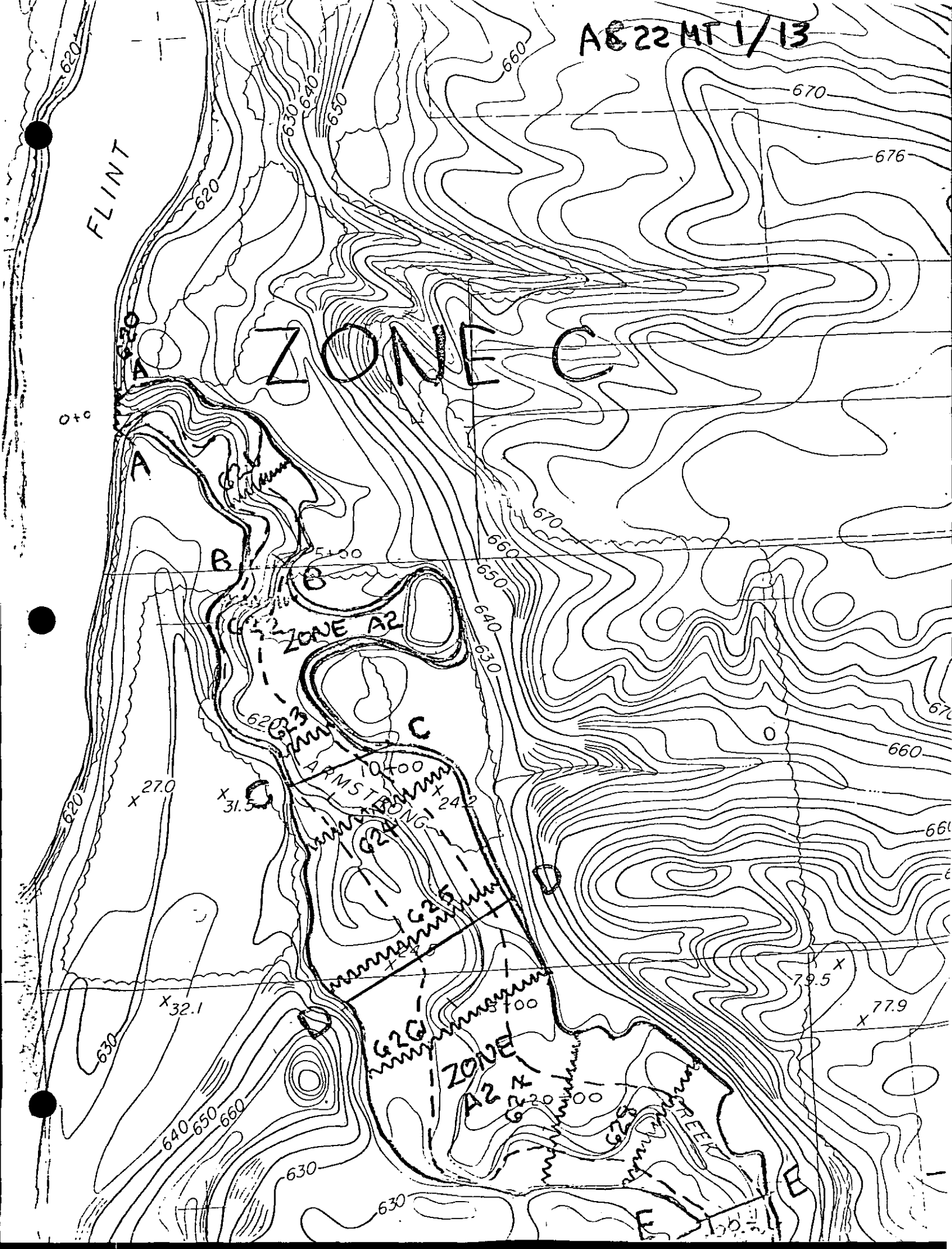
WATER-SURFACE PROFILE FOR: GILKEY RECOMP SECS L TO M LES
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

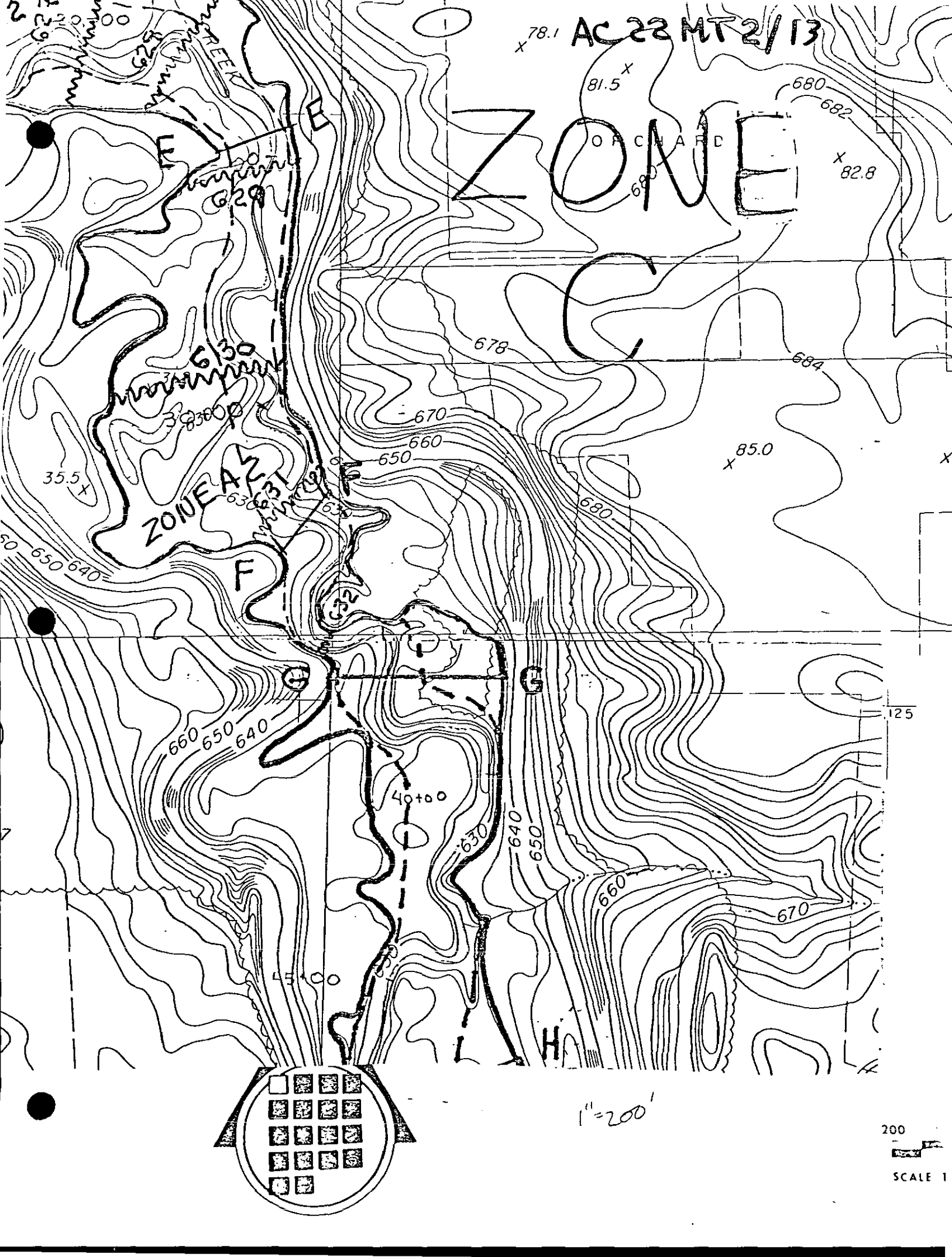
SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*
L	AT	3520	0	1850.	2035.	298737.	1.68	55.	465.
	721.50	0.02			721.52	0.91	0.06		*IS*
M	AT	3820	300	1850.	2567.	315425.	2.20	128.	818.
	721.50	0.02	0.01	0.0	721.52	0.72	0.05	-0.015	*XS*

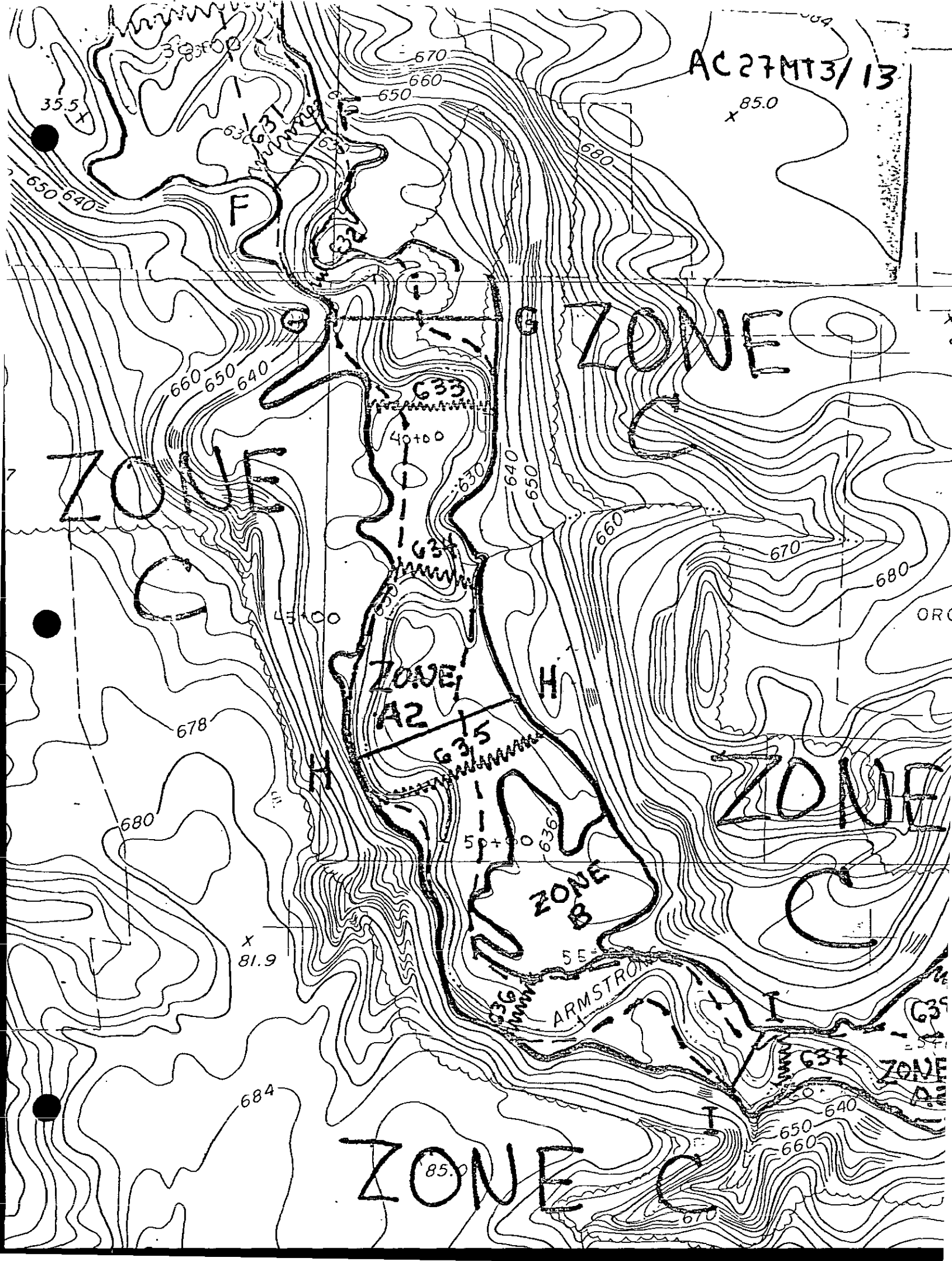
END OF THIS PROFILE

500 yr

Part of new submittal 6/3/80


AE22 MT 1/13
ZONE C
FLINT
ZONE A2
ARMSTRONG
ZONE A2
CREEK
A
B
C
D
E
620
630
640
650
660
670
676
27.0
31.5
32.1
79.5
77.9


AC 22 MT 2/13
ZONE C
ZONE A
ORCHARD
CREEK
E
F
G
H
78.1
81.5
82.8
85.0
35.5
680
682
678
684
670
660
650
640
630
629
631
632
125
40+00
45+00
1"=200'
200
SCALE 1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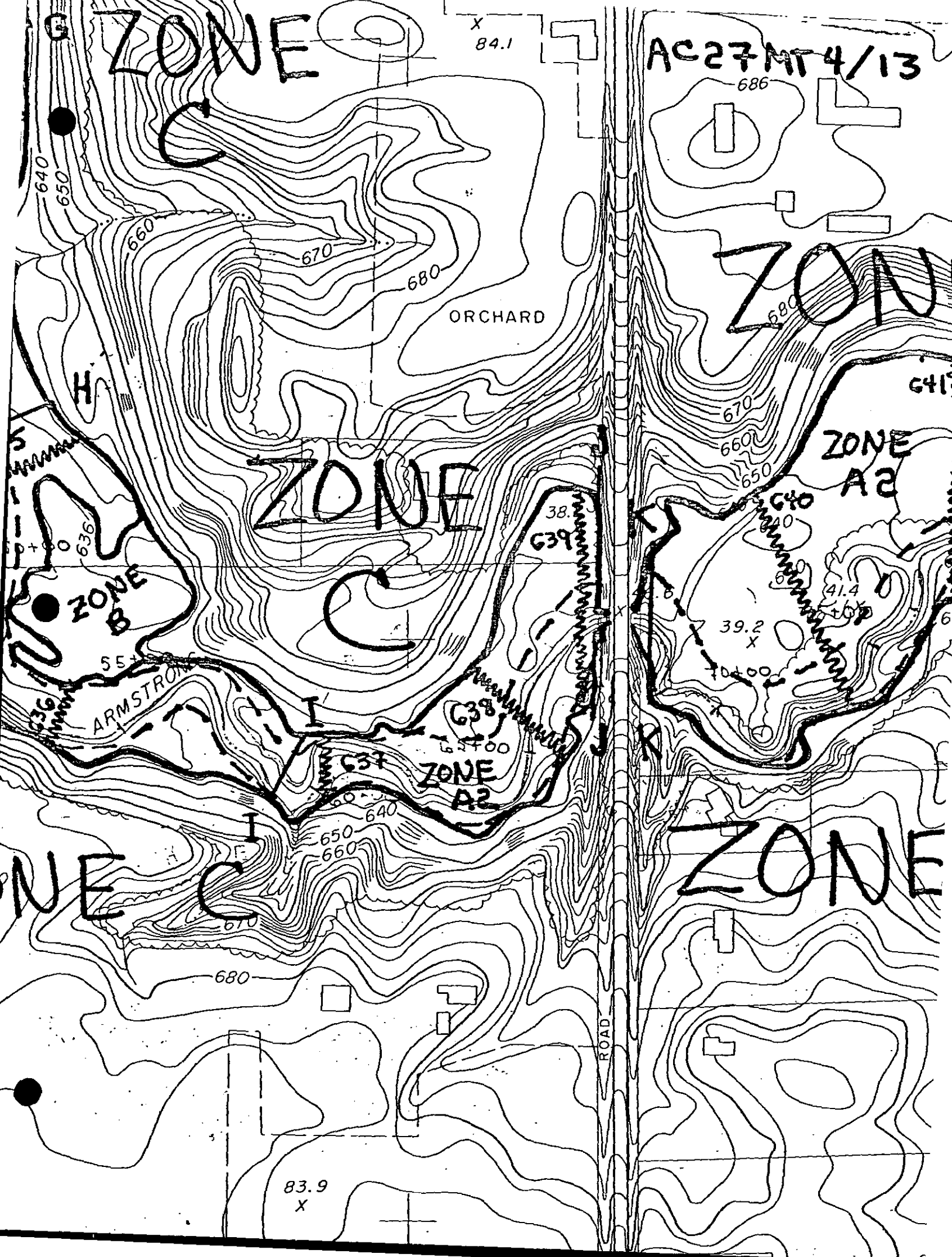
ZONE C
ZONE C
ZONE C
ZONE C
ZONE A2
ZONE B
ZONE
F
G
H
I
ARMSTRONG
670
660
650
640
680
678
684
85.0
81.9
35.5
631
632
633
634
635
636
637
40+00
45+00
50+00
55+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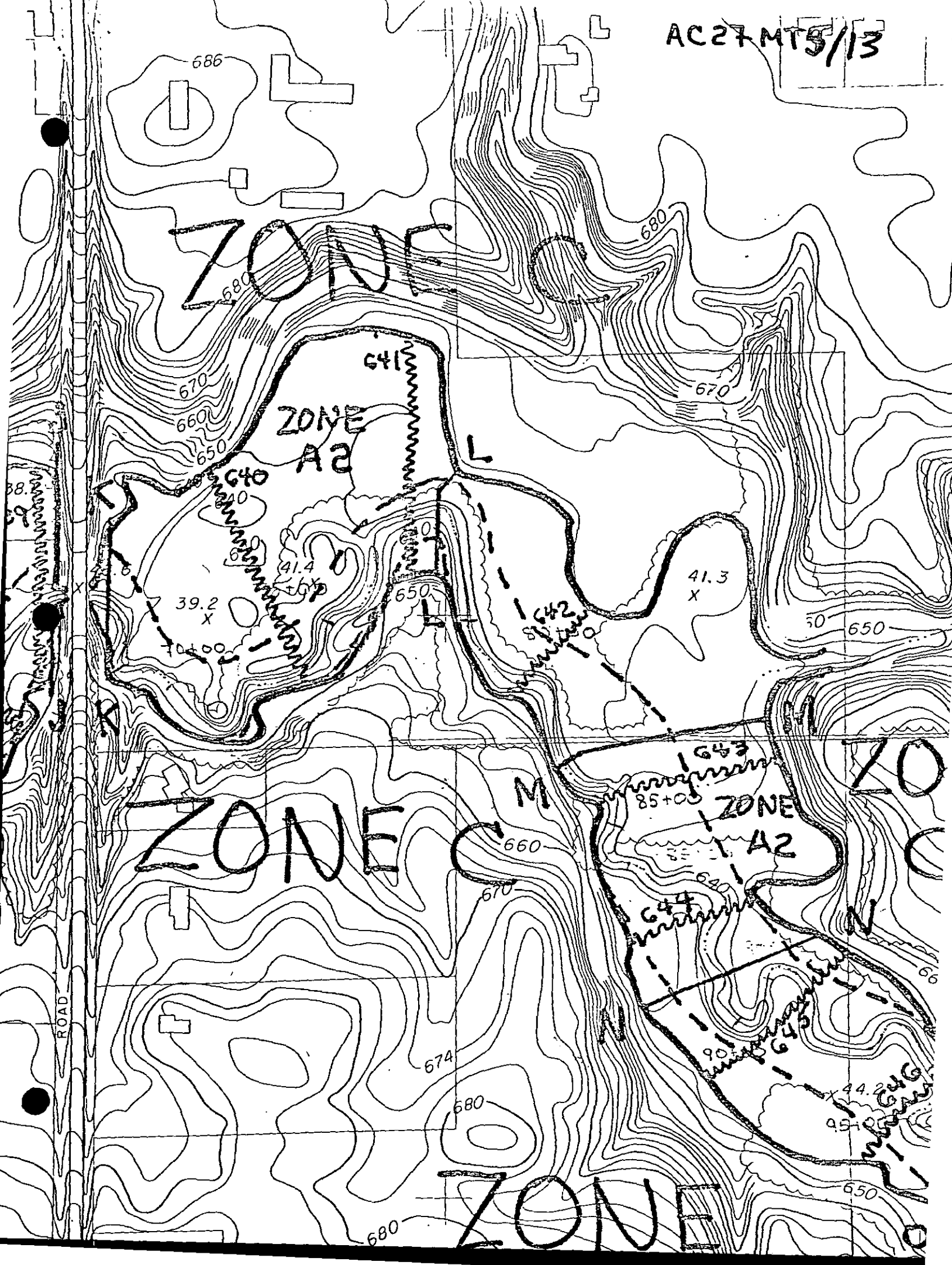
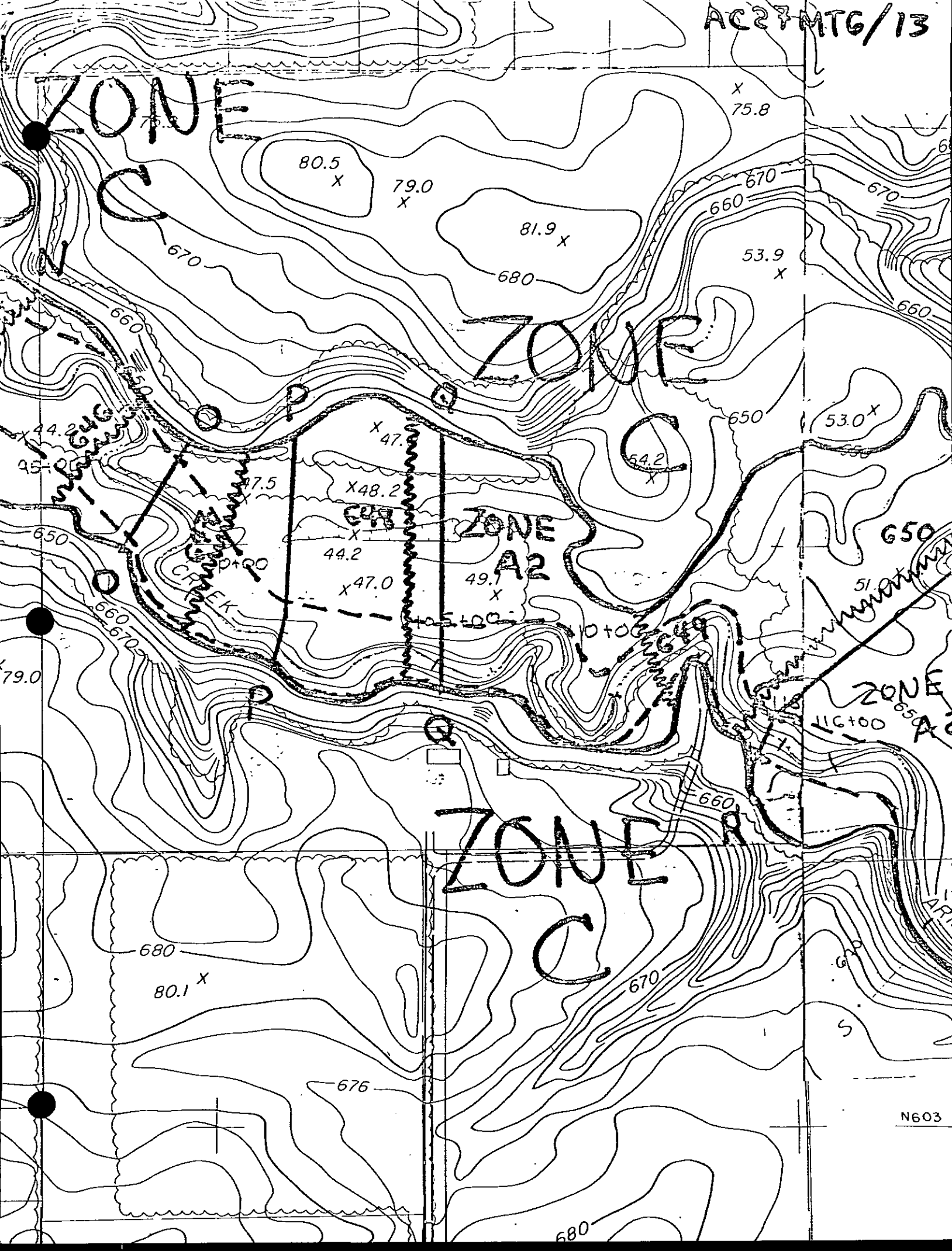
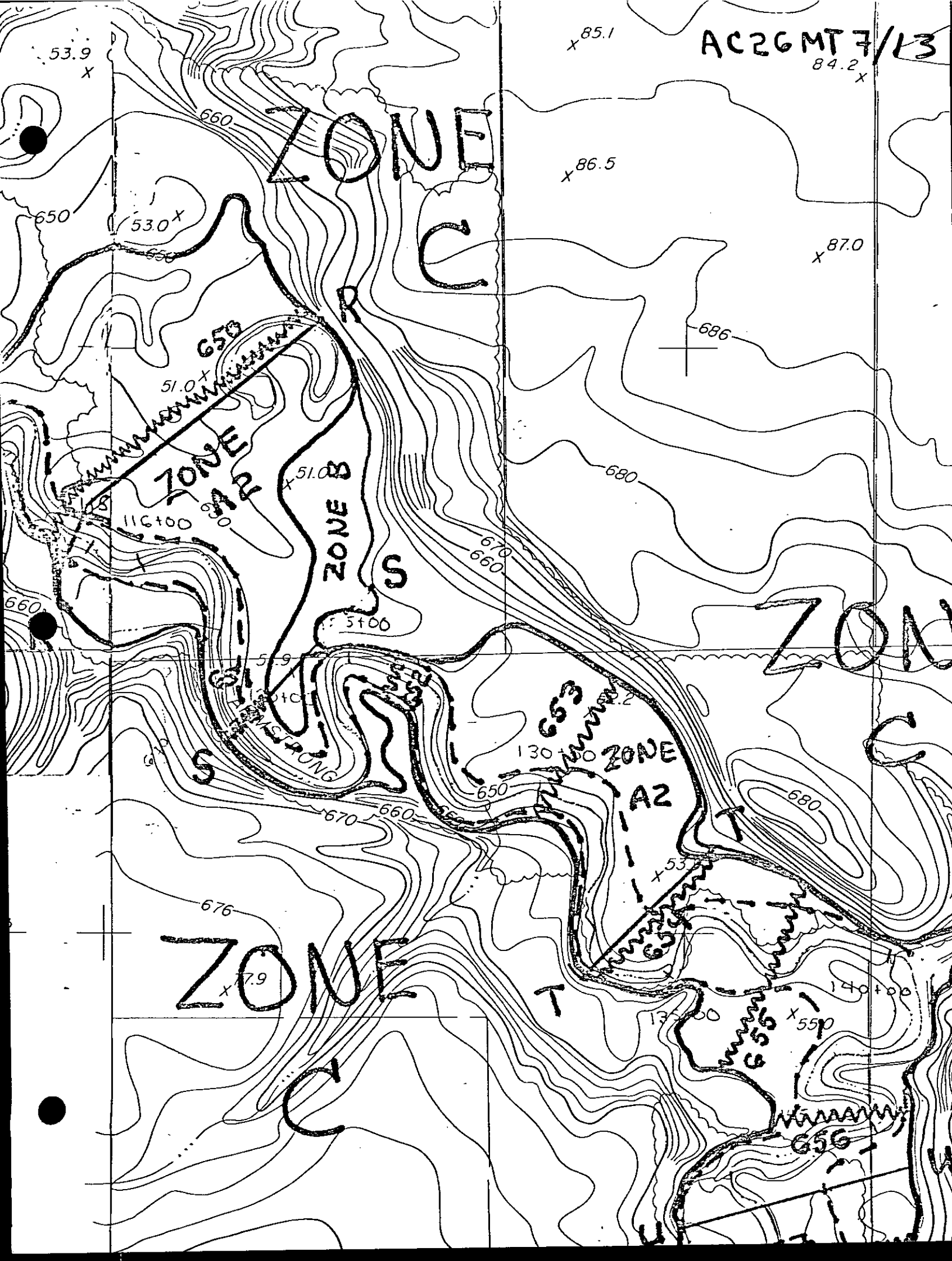
ZONE C
ZONE C
ZONE A2
ZONE B
ZONE A2
ZONE C
ZONE
ORCHARD
ARMSTRONG
ROAD
G36
G37
G38
G39
G40
84.1
686
680
670
660
650
640
636
38.
41.4
39.2
83.9

AC27MT5/13


ZONE
ZONE A2
ZONE A2
ZONE
ZONE
ZONE
L
M
N
641
640
642
643
644
645
646
686
680
670
660
650
674
41.4
39.2
41.3
44.2
70+00
85+00
90+
95+
ROAD

AC27MTG/13


ZONE C
ZONE C
ZONE A2
ZONE C
ZONE A
CREEK
80.5
79.0
81.9
75.8
53.9
53.0
54.2
47.5
48.2
44.2
47.0
49.1
670
660
680
650
676
80.1
116+00
N603


AC26MT 7/13
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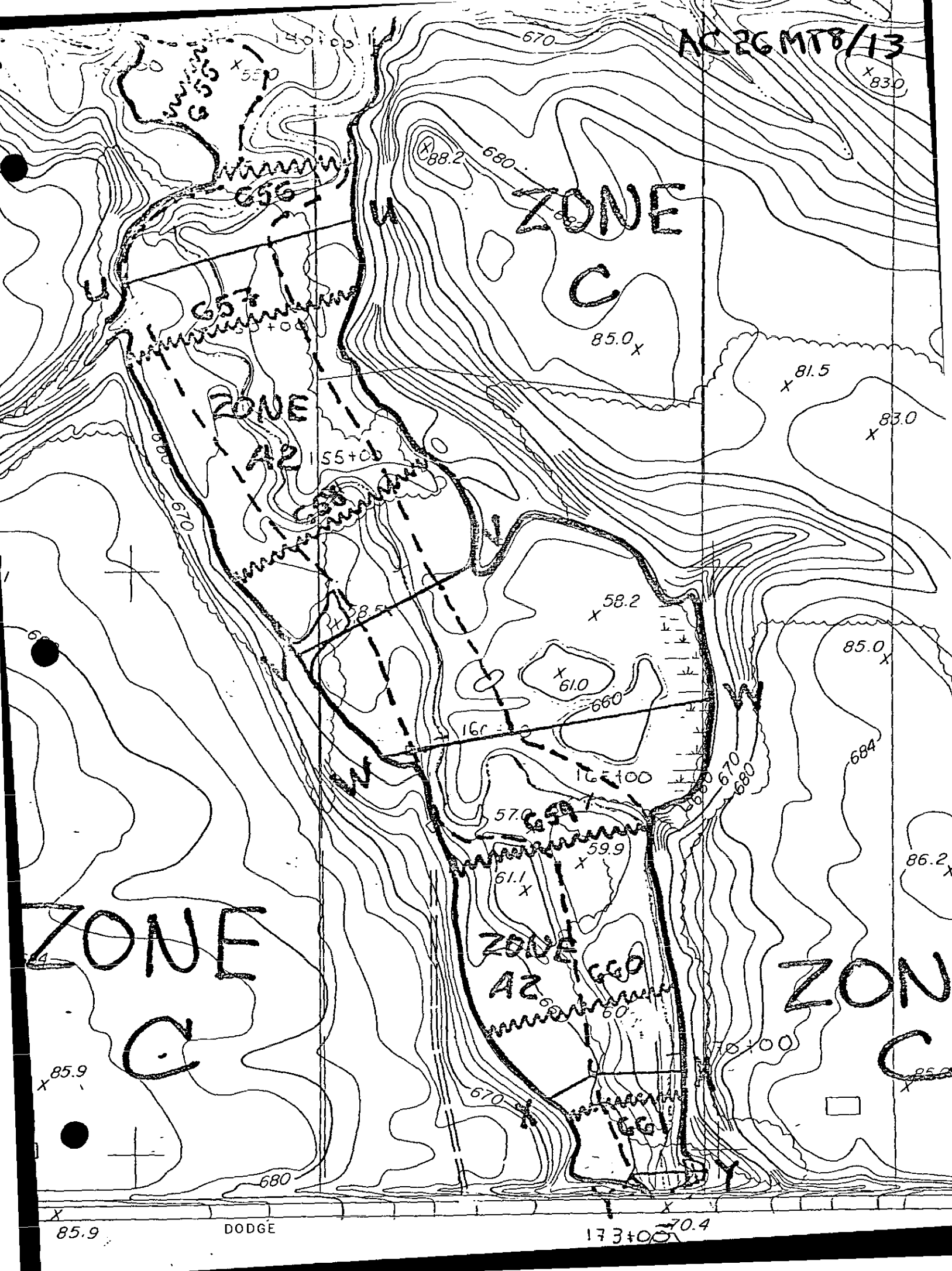
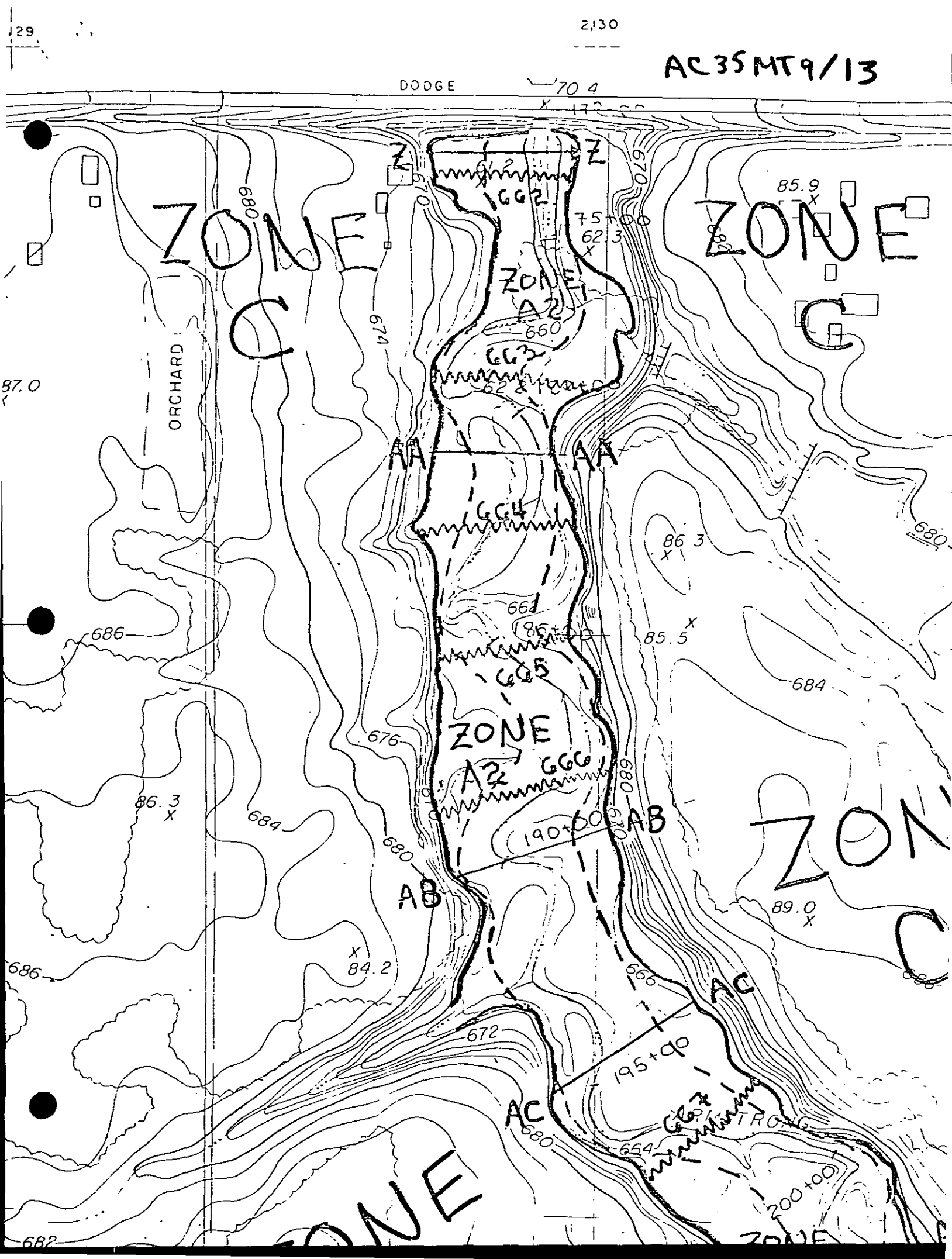
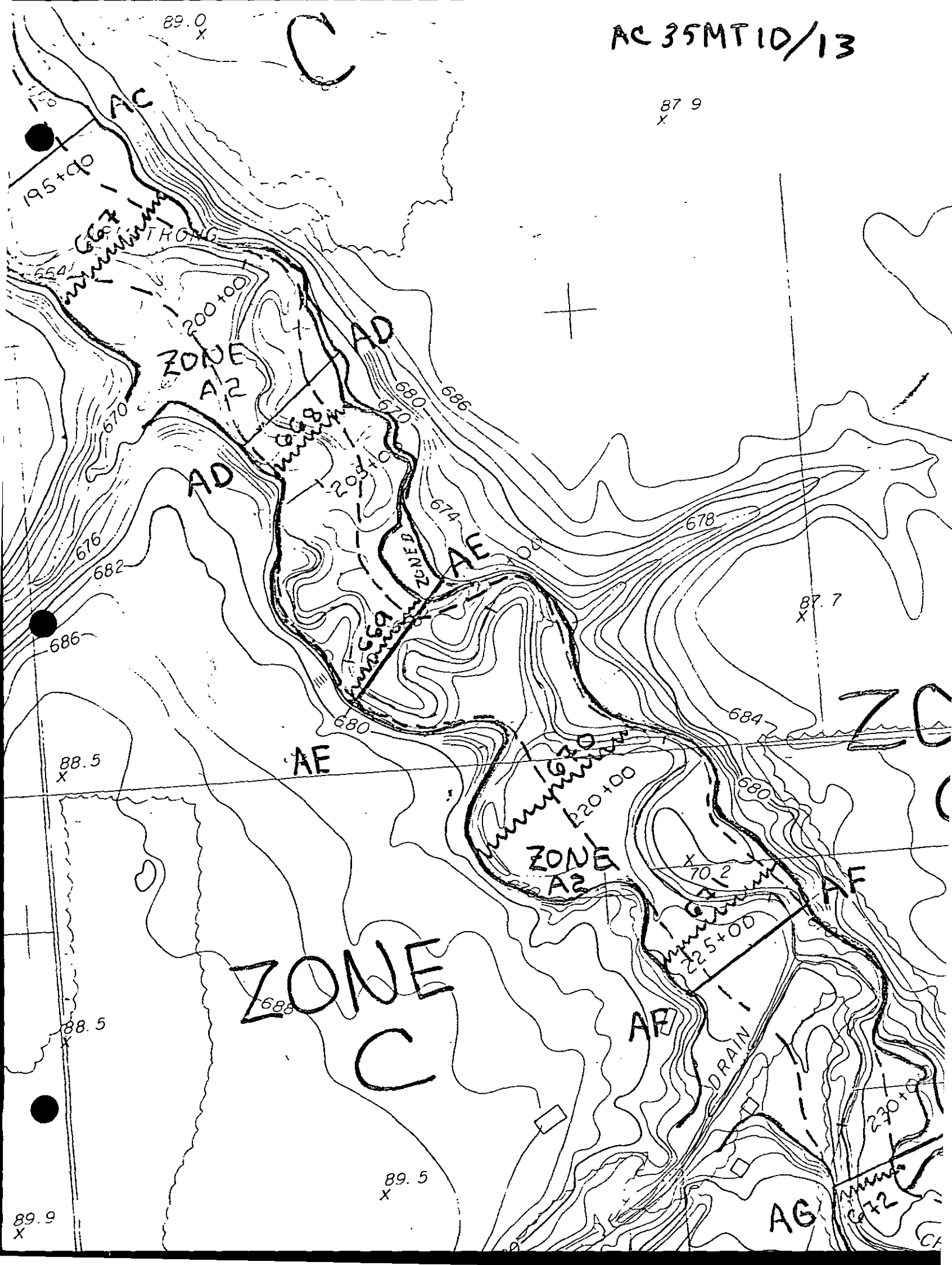
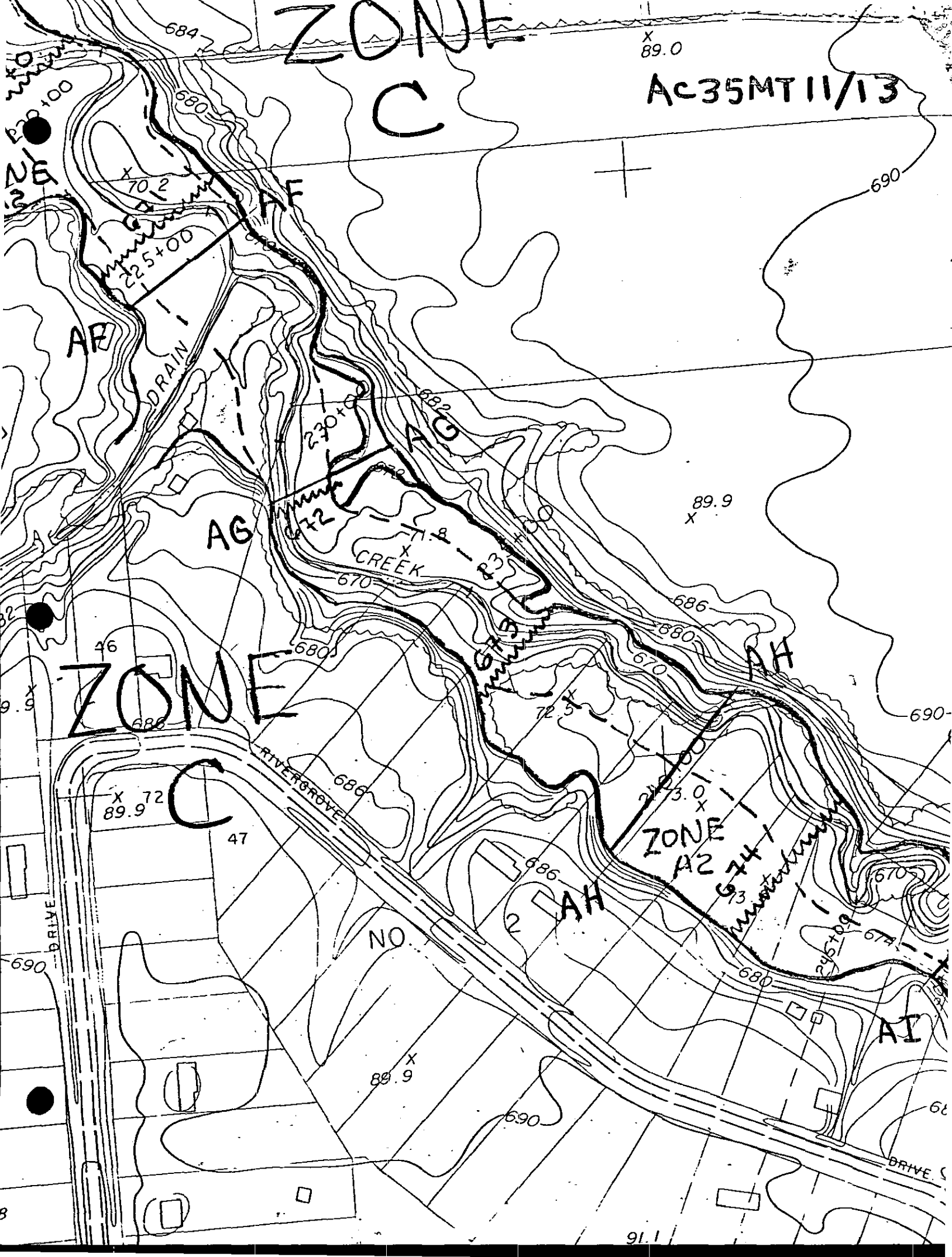
ZONE A2
ZONE B
ZONE S
ZONE A2
ZONE T
ZONE C
ZONE
ZONE
658
653
655
656
53.9
85.1
84.2
86.5
87.0
53.0
51.0
51.0
53.9
53.2
17.9
55p
660
650
670
680
686
676
116+00
130+00
140+00
135+00
5+00
LAWSTRONG


AC 26 MT 8/13
ZONE C
ZONE A2
ZONE A2
ZONE C
ZONE C
656
657
658
659
660
661
670
680
684
88.2
85.0
81.5
83.0
58.2
61.0
57.0
59.9
61.1
86.2
85.9
70.4
DODGE
173+00

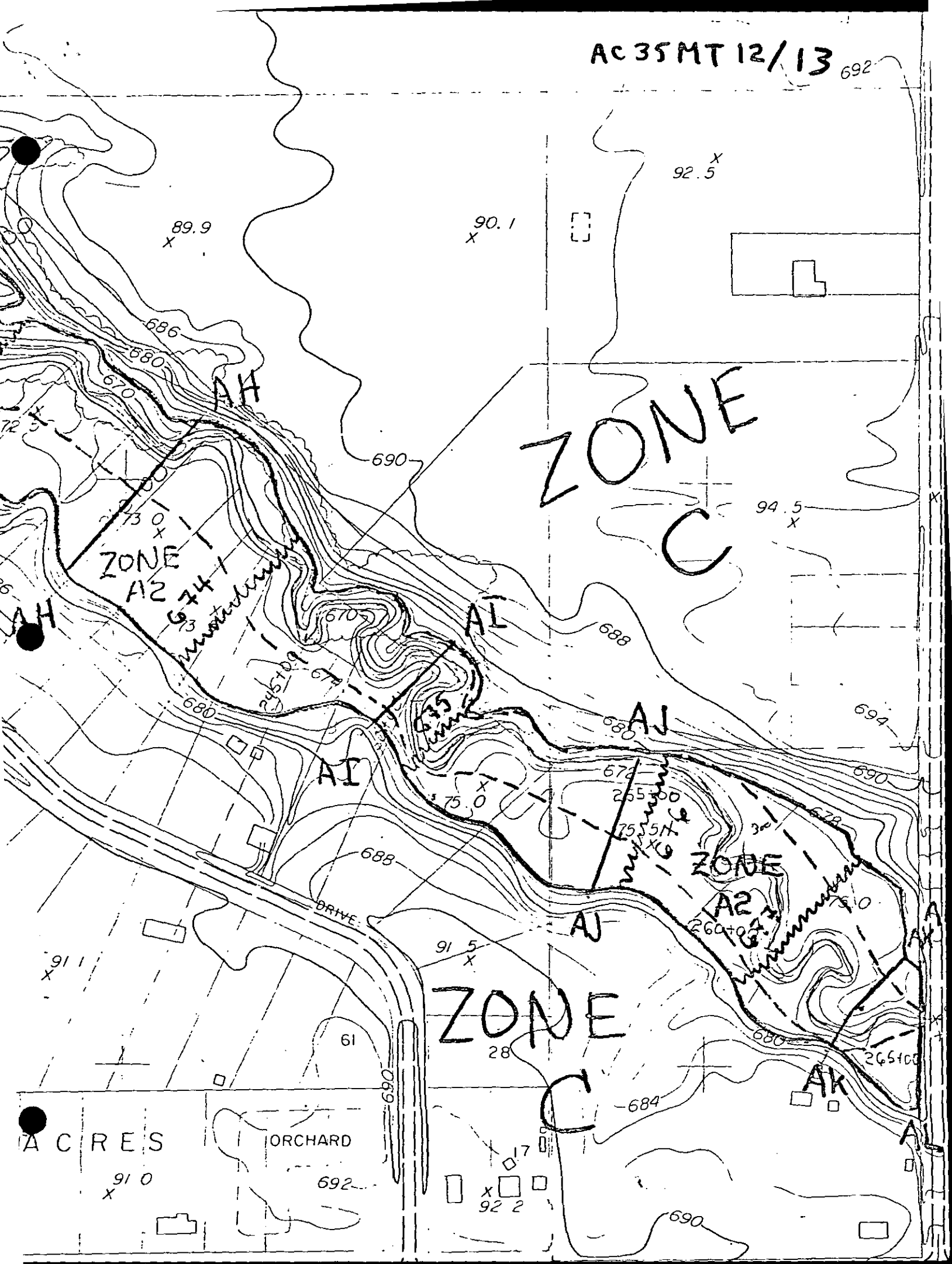

AC35MT9/13
DODGE
ZONE C
ZONE C
ZONE C
ZONE A2
ZONE A2
ZONE
ORCHARD
Z
Z
AA
AA
AB
AB
AC
AC
662
663
664
665
666
667
75+00
185+00
190+00
195+00
200+00
680
670
674
686
684
676
672
682
664
660
85.9
62.3
86.3
85.5
87.0
84.2
89.0

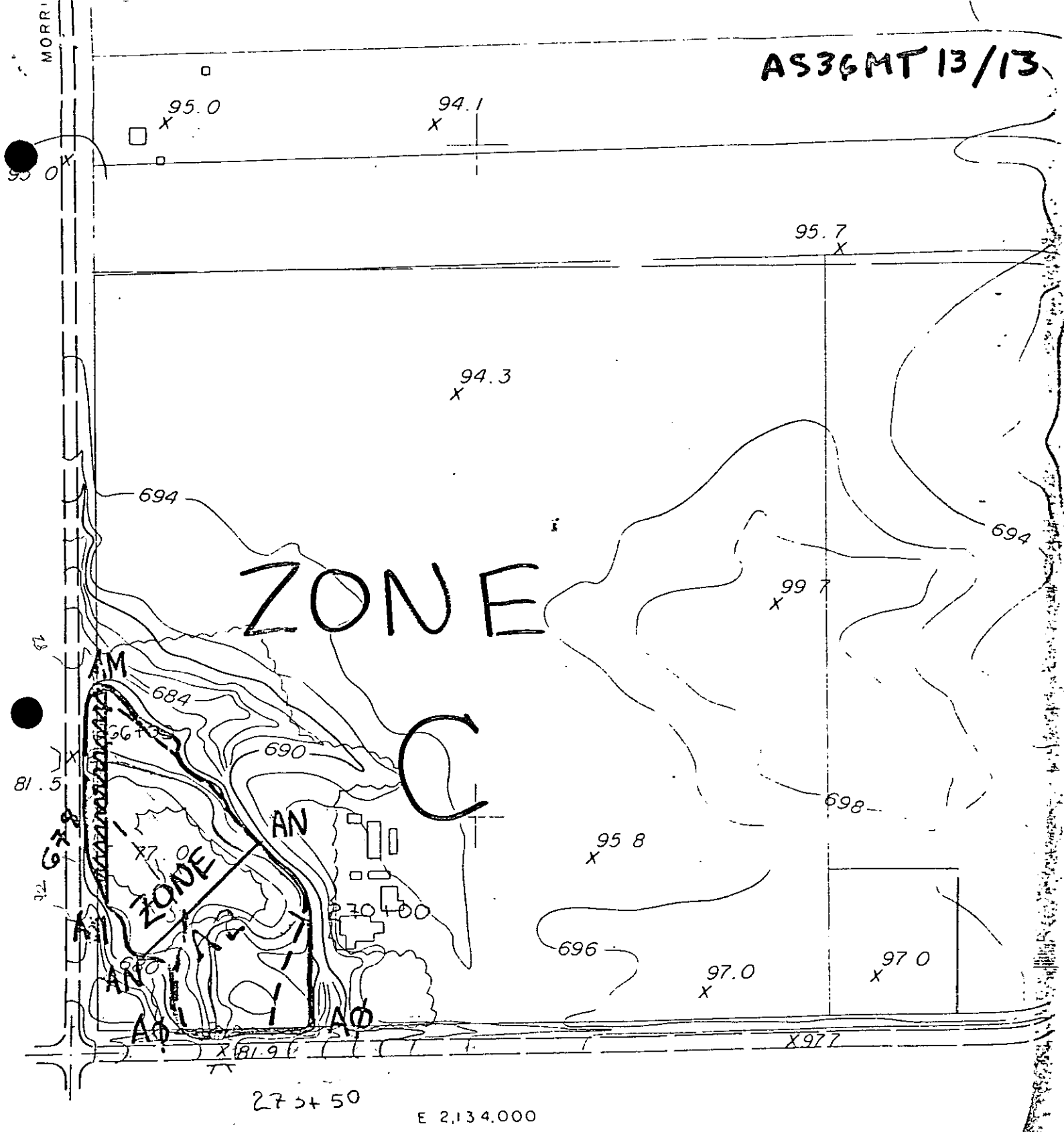
AC 35MT10/13


89.0
C
87.9
AC
195+90
667
STRONG
664
200+00
ZONE
A2
AD
680
686
670
668
670
AD
203+0
674
678
676
682
ZONE B
AE
669
87.7
686
680
684
ZC
88.5
AE
670
220+00
680
ZONE
A2
70.2
AF
225+00
ZONE
C
688
AF
DRAIN
88.5
230+0
89.5
AG
89.9


ZONE C
AC35MT11/13
ZONE C
ZONE A2
AF
AE
AG
AG
AH
AH
AI
DRAIN
CREEK
RIVERGROVE
DRIVE
NO
225+00
270+00
295+00
690
686
680
670
682
89.0
89.9
70.2
72.5
73.0
91.1

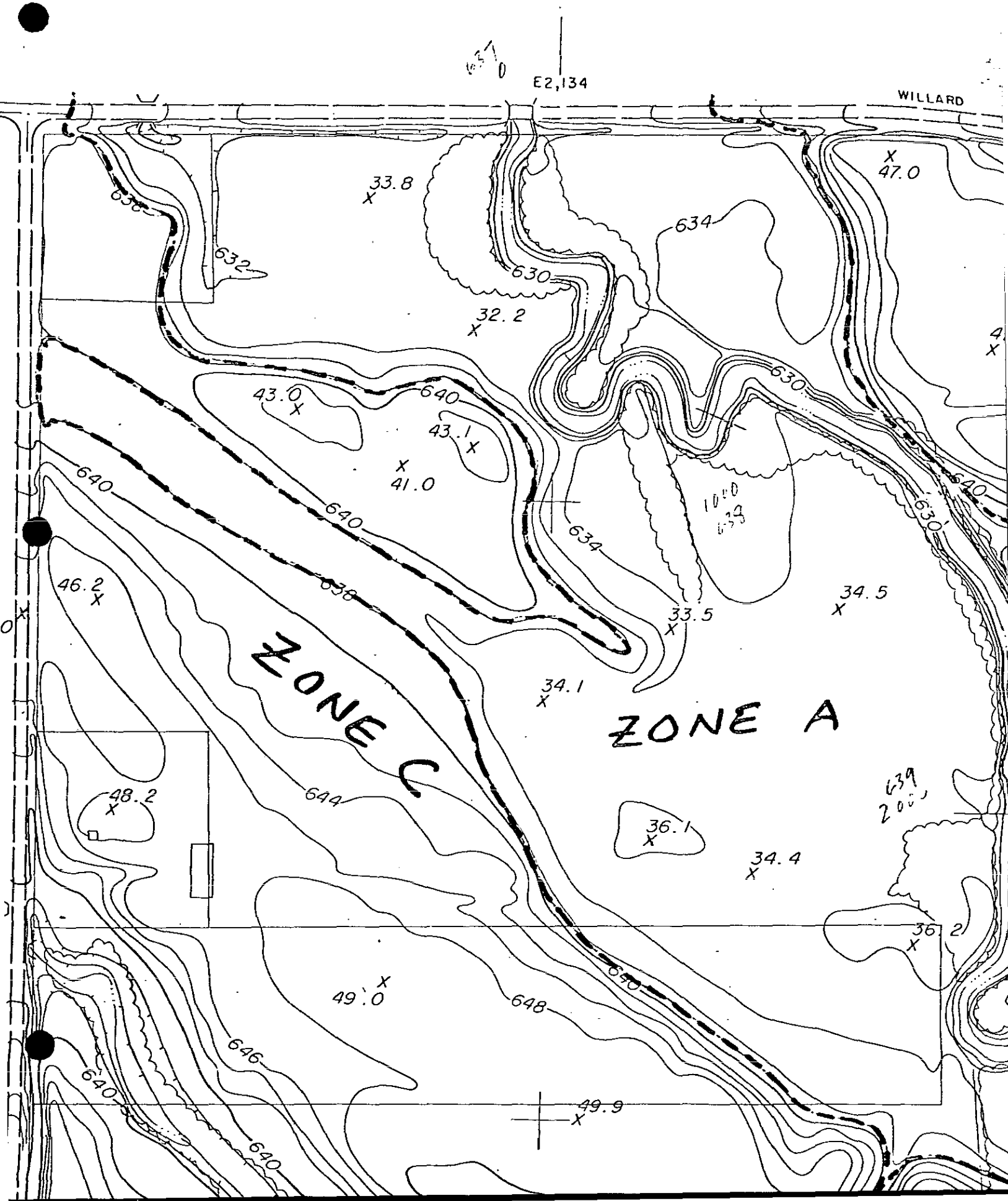
AC 35 MT 12/13


ZONE C
ZONE A2
ZONE A2
ZONE C
AH
AH
AL
AJ
AI
AJ
AK
AL
DRIVE
ORCHARD
ACRES
692
686
680
670
690
688
694
672
678
684
89.9
90.1
92.5
94.5
91.5
91.1
91.0
92.2
75.0
61
28
17



N MICHIGAN PLANE COORDINATE
N ACT 9, P A 1964

PRIMT 1/5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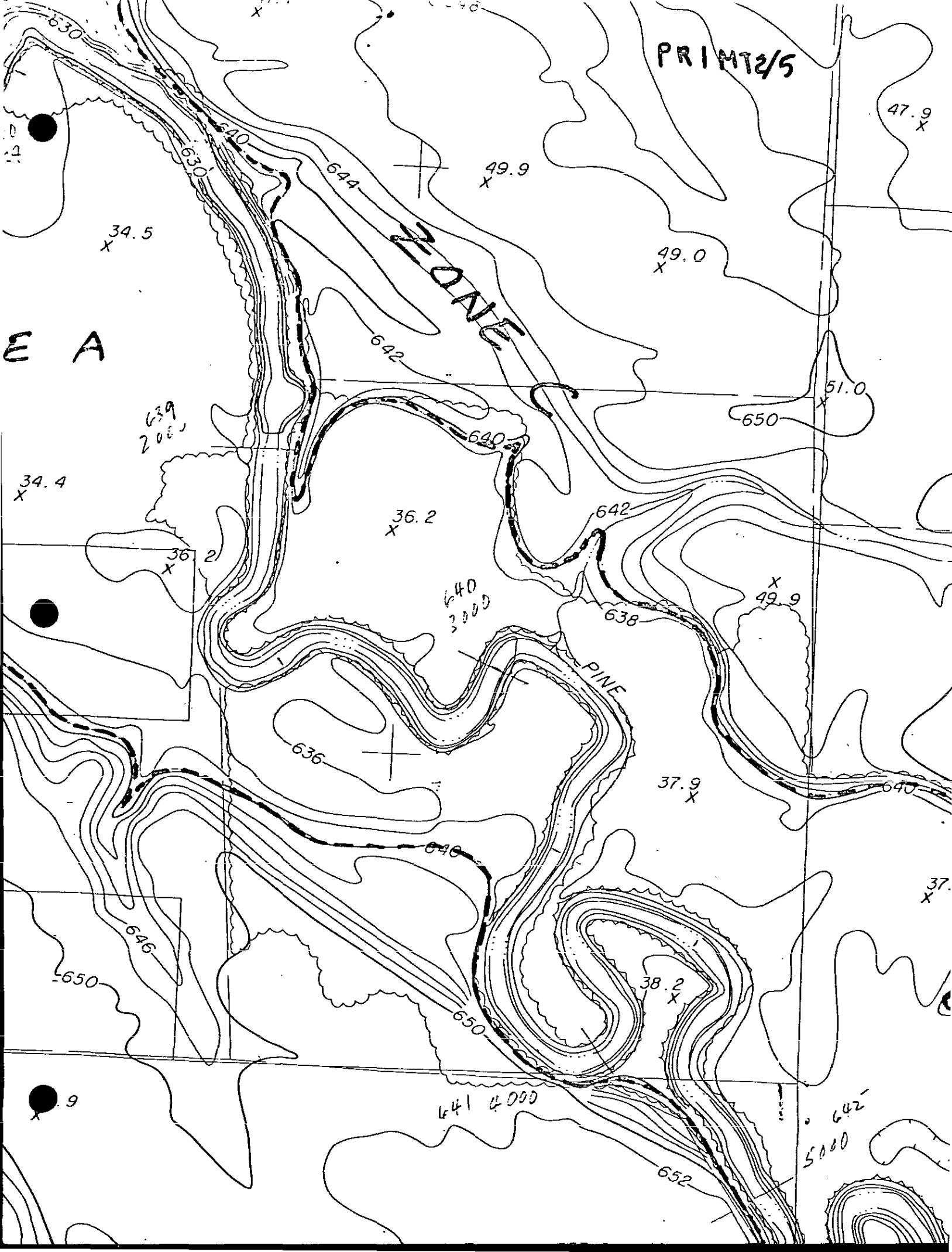
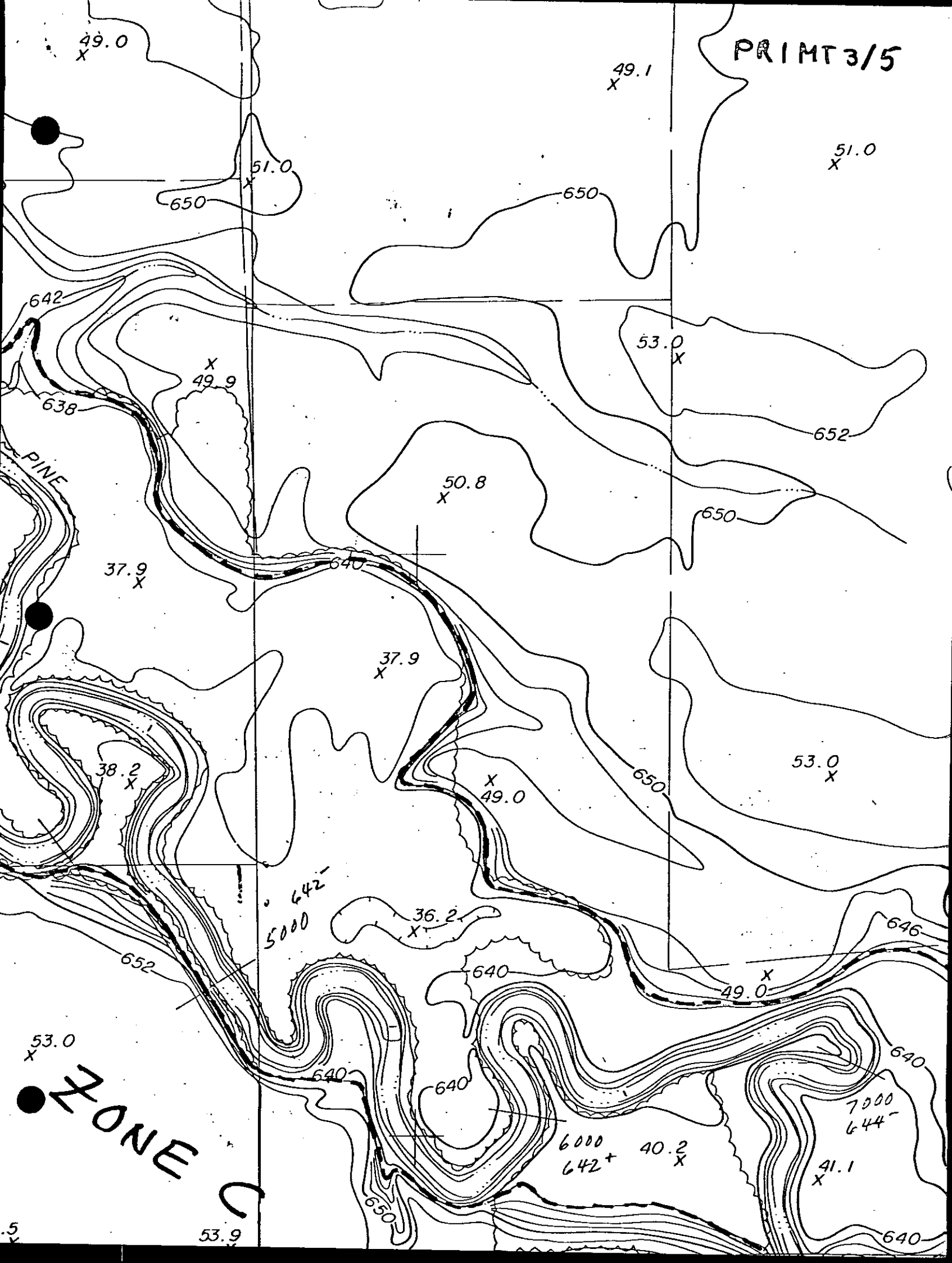
WILLARD
33.8
47.0
634
638
632
630
32.2
43.0
640
43.1
41.0
630
640
640
640
634
638
46.2
33.5
34.5
ZONE C
34.1
ZONE A
48.2
644
36.1
34.4
36.2
49.0
648
646
640
640
640
49.9


PRIMT2/5
ZONE
E A
PINE
630
640
630
644
49.9
47.9
34.5
49.0
642
51.0
650
639
2000
640
34.4
36.2
642
36.2
640
3000
638
49.9
636
37.9
640
640
646
650
38.2
650
641 4000
642
5000
652


PRIMT 3/5
49.0
49.1
51.0
51.0
650
650
642
53.0
49.9
638
652
PINE
50.8
650
37.9
640
37.9
38.2
53.0
49.0
650
642
5000
36.2
646
652
640
49.0
53.0
ZONE C
640
640
640
7000
644
6000
642+
40.2
41.1
650
640
53.9

```
****************************************
* HEC-2 WATER SURFACE PROFILES         *
*                                      *
* Version   4.6.0;  February 1991      *
*                                      *
* RUN DATE    18JUN92    TIME   12:06:00 *
****************************************
```

```
*************************************
* U.S. ARMY CORPS OF ENGINEERS      *
* HYDROLOGIC ENGINEERING CENTER     *
* 609 SECOND STREET, SUITE D        *
* DAVIS, CALIFORNIA 95616-4687      *
*         (916) 756-1104            *
*************************************
```

```
X     X  XXXXXXX   XXXXX             XXXXX
X     X  X        X     X           X     X
X     X  X        X                       X
XXXXXXX  XXXX     X         XXXXX    XXXXX
X     X  X        X                 X
X     X  X        X     X           X
X     X  XXXXXXX   XXXXX            XXXXXXX
```

ARMSTRONG CREEK
MULTIPLE PROFILE RUN

REVISED JUNE 18, 1992

```
:::::::::::::::::::::::::::::::::::::::::::
:::::::::::::::::::::::::::::::::::::::::::
:::                                     :::
:::   FULL MICRO-COMPUTER IMPLEMENTATION  :::
:::                                     :::
:::::::::::::::::::::::::::::::::::::::::::
:::::::::::::::::::::::::::::::::::::::::::
```

==========
H A E S T A D M E T H O D S
==========

37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

THIS RUN EXECUTED 19JUN92 13:12:33

```
**********************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.0;  February 1991
**********************************


T1 MONTROSE TWP. - ARMSTRONG CREEK F.I.S.
T2  J&A JOB NO. 13039-01
T3    . 10 YEAR FLOOD          FILENAME: MONARM.HC2

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ

      0        2                          0                            623.35

J2  NPROF     IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITRACE

     1        0.       -1.


NC    .095      .095     0.046      .3        .5
GT      4      1200      1800     2000      2500
        CROSS SECTION A
X1      0        17       385      425         0         0         0
GR    630         0       628      115       626       150       624       210       622       340
GR    620       385       616      390       614       405       616       420       620       425
GR    622       440       624      460       624       520       624       580       626       600
GR    628       650       630      700

        CROSS SECTION B
X1   0.10        16       250      300       300       490       510
GR    630         0       628      110       626       130       624       160       622       240
GR    620       250       618      280     617.2       290       618       295       620       300
GR    622       320       624      350       626       485       628       530       630       590
GR    640       620

        CROSS SECTION C
X1   0.18        13       245      270       400       300       440
GR    632         0     631.5      200       630       225       620       245       619       250
GR    619       265       620      270       622       275       624       400       626       600
GR    628       625       630      635       640       650

        CROSS SECTION C-D
X1  0.215        18       511      535       200       160       195
GR    630         0       628       18       628       128       630       237       628       299
GR    624       347       622      378       622       398       624       458       624       505
GR    622       511       620      525       622       535       624       555       626       680
GR    628       692       630      752       640       862
```

CROSS SECTION D

X1	0.25	18	422	459	200	160	195			
GR	650	0	660	95	650	128	640	148	630	161
GR	628	170	626	181	624	422	622	436	621	440
GR	621	445	622	449	624	459	626	540	628	555
GR	630	565	640	585	650	600				

CROSS SECTION D-E

X1	0.36				290	325	560		1.75	
X3				415						

CROSS SECTION E

X1	0.47	14.0	525	560	290	325	560			
GR	650	0	640	60	632	118	632	353	630	390
GR	628	500	626	525	624.5	545	624.5	550	626	560
GR	628	575	630	605	640	648	650	680		

CROSS SECTION E-F

X1	0.54	20	485	509	350	300	390			
X3				285						
GR	650	0	640	30	638	42	636	51	634	71
GR	632	200	630	210	628	248	628	270	630	300
GR	630	380	628	475	626	485	625.5	492	625.5	497
GR	626	509	628	522	630	599	640	612	650	630

CROSS SECTION F

X1	0.61	13	250	305	350	300	390			
GR	650	0	640	40	634	70	632	170	630	250
GR	628	265	626.4	270	626.4	280	628	285	630	305
GR	632	340	640	375	650	400				

CROSS SECTION G

X1	0.70	15	160	215	20	400	440			
GR	650	0	640	70	634	100	632	115	632	160
GR	630	180	628	190	627	195	627	200	628	205
GR	630	210	632	215	634	405	640	415	650	435

CROSS SECTION H

X1	0.90	19	48	100	765	640	1050			
GR	660	0	650	10	640	30	636	48	634	60
GR	630	70	629.5	75	629.5	85	630	90	632	100
GR	634	130	634	300	634	350	636	370	638	395
GR	638	450	640	470	650	490	660	520		

CROSS SECTION I

X1	1.12	13	75	105	900	720	1170			
GR	660	0	660	30	642.9	45	634.6	75	632.2	78
GR	631.2	83	632.4	99	633.6	105	636	115	638	215
GR	640	240	650	275	660	315				

```
        CROSS SECTION I-J
X1    1.21        13       100       150     366.0     240.0     470.0
GR     660         0       650        10       640        45       638        62       636       100
GR     634       110     632.1       115       634       145       636       150       638       340
GR     640       390       650       470       660       515

X1   1.267        14       538       582     100.0      90.0     300.0
X3                                  417                 617
GR     670         0       660       110       650       240       640       365       638       428
GR     638       478       638       538       636       547     632.6       554       636       565
GR     638       582       640       795       650       895       660       908

X1   1.276                                    50.0      50.0      50.0
X3                                502.8                617.3

        CROSS SECTION J-I (41.0' DOWNSTREAM FROM McKINLEY ROAD BRIDGE)
X1   1.286                                    50.0      50.0      50.0
X3                                515.3                604.8

NC                          0.030
QT       4      1300       1800      2000      2500
        DOWNSTREAM FACE OF McKINLEY ROAD BRIDGE - J
X1    1.29      24.0      237.2     262.8      41.0      41.0      41.0
X3      10
GR  658.52       0.0     655.36      50.0    652.32     100.0    649.76     150.0    648.21     200.0
GR  647.71     237.2     636.89     237.2    634.78    243.15    633.58     249.1    641.64     249.1
GR  641.62     250.9     633.19     250.9     632.7    256.85    633.73     262.8    647.52     262.8
GR   647.5     270.0     647.45     300.0    647.97     350.0     649.0     400.0    650.62     450.0
GR   652.7     500.0     655.48     550.0    656.77     570.0     658.7     600.0

SB    1.25       1.6        3.0         0      25.6       1.8    209.92         0     633.6     632.7
        UPSTREAM FACE OF McKINLEY ROAD BRIDGE
X1   1.296                                    45.5      45.5      45.5
X2                            1    641.73    647.52                 0
X3      10
BT      19       0.0     658.52    658.52      50.0    655.36    655.36     100.0    652.32    652.32
BT   150.0    649.76     649.76     200.0    648.21    648.21     237.2    647.71    641.73    243.15
BT  647.63    641.68      249.1    647.55    641.64    256.85    647.53    641.57     262.8    647.52
BT  641.52     270.0     647.50    647.50     300.0    647.45    647.45     350.0    647.97    647.97
BT   400.0     649.0      649.0     450.0    650.62    650.62     500.0     652.7     652.7     550.0
BT  655.48    655.48      570.0    656.77    656.77     600.0     658.7     658.7

        CROSS SECTION K
X1    1.30       18.       230.      255.      23.5      23.5      23.5
X3                                 219.0                266.0
GR    660.        0.       652.       29.      652.       50.      654.      80.0      656.      115.
GR    654.      130.       652.      178.      650.      195.      640.      220.      638.      225.
GR    636.      230.       634.      232.      634.      254.      636.      255.      638.      312.
GR    640.      587.       650.      660.      660.      695.
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        CROSS SECTION K-L
X1    1.31                                  50.0      50.0      50.0
X3                                169.0               316.0

X1    1.35                                  50.0      50.0     190.0                0.103
X3                                119.0               366.0

        CROSS SECTION L-K
X1    1.36                                  50.0      50.0      85.0                0.103
X3                                 69.0               416.0

        CROSS SECTION L
X1    1.53        16       425       472     410.0      650.      850.
GR     660         0       658        55       656       140       654       150       652       280
GR     650       330       640       425       638       440     635.2       460       638       465
GR     640       472       642       555       644       678       646       768       648       790
GR     650       880

NH       4      .085       200       .05       230      .085       340        .1       780
        CROSS SECTION M
X1    1.62        23       200       230       250       650       520
GR     664         0       662        19       660        35       658        75       656       158
GR     654       168       652       185       650       188       640       200       638       205
GR   637.8       212       638       220       640       230       642       340       642       535
GR     644       580       646       590       648       595       650       605       654       620
GR     660       655       664       680       668       780

NC    .085      .085       .05
        CROSS SECTION N
X1    1.74        20       288       304       400       400       600
GR     674         0       670        40       660        80       650       120     644.3       155
GR   644.3       160     644.3       224       643       288     639.5       288     638.2       293
GR   639.3       298     641.8       304     642.5       310       644       470       650       485
GR     660       530       662       545       664       560       666       600       668       650

        CROSS SECTION O
X1    1.90        20       264       289       600       350       860
GR     676         0       670        50       660        70       650       100       648       120
GR   645.1       254     644.5       264     641.2       268     639.5       276     641.3       287
GR   645.3       289     645.2       300     645.8       334       646       380       650       400
GR     660       425       662       440       664       490       666       550       668       580

NC     .09       .09      .045
        CROSS SECTION P
X1    1.98        20       108       132       350       200       395
GR     670         0       660        15       650        60     645.6        94       645       108
GR     642       114     641.5       120       642       126     644.7       132     646.3       140
GR     647       190       648       340       648       460       650       490       660       510
GR     662       530       664       550       666       560       668       610       670       660
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NC     .065      .057      .042
        CROSS SECTION Q
X1    2.04        20        77       101       300       250       335
GR     674         0       672        10       670        25       660        40     652.3        55
GR   646.8        67     646.6        77       643        81       642        88       643        95
GR   646.8       101       648       160     648.5       205     648.5       525       650       535
GR     660       560       670       585       672       605       674       655       676       685

NC     .075
        CROSS SECTION R
X1    2.22        15       230       280       530      1030       960
X3                                 190
GR     672         0       670        40       664        80       660       115       652       140
GR     650       230     648.4       238     644.4       248     643.1       253     644.5       258
GR   647.3       280       650       290       651       380       651       820       680       890

NC     .085      .085       .05
        CROSS SECTION S
X1    2.32        15       115       160       370       400       550
GR     670         0       660        90       650       115       648       125       646       132
GR     645       140       646       148       648       155       650       160       651       165
GR   651.9       275       652       480       654       570       660       615       670       640

NC     .075      .085
        CROSS SECTION T
X1    2.58        19       200       300       720       730      1355
X3                                 200
GR     674         0       672        35       670        50       660       110       658       200
GR     650       245       649       250       649       260       650       270       652       290
GR   653.5       300     653.9       430       654       510       656       570       658       595
GR     660       610       670       620       680       635       682       650

NC     .085
        CROSS SECTION U
X1    2.86        18       270       305       430       660      1465
GR     674         0       672        50       670        90       660       130       658       140
GR     656       180       656       230       654       270     652.5       280     652.5       295
GR     654       305       656       370       656       550       658       565       660       575
GR     670       600       680       645       682       680

NC      .08       .08      .045
        CROSS SECTION V
X1    3.03        19       352       376       710       600       910
X3                                 150
GR     676         0       674        60       672        80       670        95       660       120
GR     658       260     656.7       320       656       352     653.2       358     652.4       364
GR   653.2       370     656.8       376       658       395       660       500       662       660
GR     670       710       680       760       682       790       684       870
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NH      4      .075      226      .042      258      .085      470      .1      870
        CROSS SECTION W
X1    3.08       20      226       258      200       370      260
X3                              210                 660
GR     676        0      674        35      672        70      670       90      668      110
GR     666      150      664       170      662       190      659      197    658.1      226
GR     654      232    652.8       242      654       252    656.9      258    657.8      294
GR     660      470      660       740      670       770      680      810      682      870

NC    .075      .08     .045
        CROSS SECTION W-X
X1    3.25       17      420       455    461.0     421.0    891.0
GR     676        0      674       125      672       160      662      215      660      300
GR     658      320      658       340      660       375      660      415      658      420
GR     657      425      657       435      658       445      660      455      670      480
GR     680      525      682       575

        CROSS SECTION X
X1    3.27                                100.0     100.0    100.0
X3                              355.0                 520.0

        CROSS SECTION X-Y
X1    3.28                                 65.0      65.0     65.0                0.39
X3                              380.0                 495.0

        CROSS SECTION Y-X
X1    3.29                                 50.0      50.0     50.0                0.30
X3                              396.5                 478.5

        46' DOWNSTREAM FROM DODGE ROAD BRIDGE - Y
X1    3.30       15     370.      405.     44.0      44.0     50.0
X3                              359.0                 416.0
GR    676.        0.    674.      122.     672.      180.     670.     190.     662.     240.
GR    660.      335.   659.5      370.     658.      375.     658.     397.    659.5     405.
GR    660.      415.    662.      435.     664.      470.     670.     510.     680.     550.

QT      4     1400     1900      2100     2700
        DOWNSTREAM FACE OF DODGE ROAD BRIDGE
X1    3.31     29.0    292.7     327.5     46.0      46.0     46.0
X3      10                                                   670.20   670.50
GR  673.79      0.0   672.65      50.0   671.55     100.0   670.67    150.0   670.18    200.0
GR  669.93    250.0   670.20     292.7   658.8      292.7    658.0    294.5    656.9    297.5
GR   656.6    300.0    656.7     302.5   656.9      305.5    657.0    307.5   657.15    312.5
GR   657.2    314.5   657.25     317.5   657.3      320.0   657.35    322.5   657.38    325.5
GR   657.4    327.5    670.5     327.5   670.7      350.0   671.68    400.0   672.61    450.0
GR  673.18    475.0   673.91     500.0   675.54     550.0   676.51    580.0

SB     0.9      1.6      3.0                35.0       5.0    176.0
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        UPSTREAM FACE OF DODGE ROAD BRIDGE
X1    3.32                                    80.0      80.0      80.0
X2                          1     657.4     669.93
X3      10                                                        670.20    670.50
BT      27       0.0    673.79               50.0     672.65      100.0     671.55
BT   150.0    670.67             200.0     670.18               250.0     669.93              292.7
BT  670.20     658.8     294.5  670.22      662.7     297.5     670.25     664.5     300.0   670.27
BT  664.84     302.5    670.29  664.35      305.5    670.32      662.1     307.5    670.34    657.0
BT   312.5    670.38    657.15   314.5     670.39     662.9     317.5    670.42     664.7    320.0
BT  670.44    664.95     322.5  670.46      664.5     325.5    670.49     662.4     327.5    670.5
BT   657.4     350.0     670.7               400.0    671.68               450.0    672.61
BT   475.0    673.18             500.0     673.91               550.0    675.54               580.0
BT  676.51

        CROSS SECTION Z
X1    3.33        15      480.     535.      46.0      34.0      40.0
X3                                442.0                573.0
GR    680.                678.      50.      676.      175.      674.      200.      670.      290.
GR    662.       315.     660.     480.     658.5      495.     658.5      515.      660.      535.
GR    662.       565.     664.     650.      670.      670.      676.      690.      680.      760.

NC    .085       .09      .05
        CROSS SECTION Z-AA
X1    3.34                                    50.0      50.0      50.0               -0.045
X3                                392.0                623.0

        CROSS SECTION AA-Z
X1    3.35                                    50.0      50.0      50.0               -0.045
X3                                342.0                673.0

        CROSS SECTION AA
X1    3.48        18      410      432     395.0     425.0     670.0
GR     680         0      678      110       676       185       674       200       672       210
GR     670       215      668      230       666       240     663.5       260       663       410
GR     658       412      658      426     662.7       432       664       465       666       480
GR     668       490      670      500       680       535

NC                        .055
        CROSS SECTION AB
X1    3.65        15      120      135       740       625       920
GR     680         0      678       15       670        35       664        50       663       120
GR     660       122    659.7      128       660       134       663       135     664.5       150
GR     665       300      666      315       668       335       670       340       680       360

NC     .08
        CROSS SECTION AC
X1    3.74        20      195      215       400       325       460
X3                                150
GR     684         0      682       20       680        50       678        70       676        85
GR     670       105      666      120       664       150       664       195       661       200
GR   660.5       206      661      212       663       215       664       240     666.5       270
GR   666.5       400      670      420       680       470       682       495       684       510
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NC     .085       .08
       CROSS SECTION AD
X1    3.90        18       205       230       630       560       870
GR     682         0       680        45       678        90       676       120       670       145
GR     666       160       664       205     662.5       210     662.2       216     662.5       222
GR     664       230       666       242       668       385       670       410       680       440
GR     682       450       684       480       686       540

NC               .085       .05
       CROSS SECTION AE
X1    4.04        15        38        55       440       380       720
GR   680.8         0     676.7        18     663.7        38     663.4        43     663.7        48
GR   666.9        55       668       200       670       310       672       340       674       375
GR     676       415       678       460       680       490       682       515       684       545

NC               .09      .055
       CROSS SECTION AF
X1    4.32        18       406       432       740       850      1500
GR     684         0       682        50       680       115       678       175       670       215
GR   669.6       226     669.9       340     668.4       406     664.7       416     664.1       417
GR   664.1       429     664.6       430     669.7       432       670       450       672       458
GR     680       520       682       530       684       540

       CROSS SECTION AF-AG
X1    4.38        25       562       588       185       240       275
X3                                 330
GR     680         0       678        39       676       100       676       162       678       170
GR     678       201       676       209       674       213       672       279       671       285
GR     671       298       672       315       672       410       670       490       670       553
GR     668       562     664.6       580       668       588       670       598       672       630
GR     674       642       676       650       678       681       680       700       684       785

NC               .085
       CROSS SECTION AG
X1    4.43        19       285       305       185       240       275
GR     686         0       684        30       682       100       680       255       670       270
GR     668       285       666       290       665       297       666       304       668       305
GR     670       310       672       380       674       510       676       525       678       545
GR     680       570       682       610       684       660       686       700

       CROSS SECTION AG-AH
X1    4.51                                     445       335       450                 1.25

       CROSS SECTION AH-AG
X1    4.56                                   222.5     167.5     225.0                0.625
X3                                 300                 520

       CROSS SECTION AH
X1    4.60        15       345       370     222.5     167.5     225.0
X3                                 120                 440
GR     686         0       684        30       682        40       680        50       674        80
GR     672       335       668       345     667.5       351       668       357       670       370
GR     672       390       674       420       678       450       680       460       686       490
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NC      .08       .08       .05
        CROSS SECTION AI
X1     4.77        23       260       430       560       580       900
GR      686         0       684        29       682        49       682       122       680       150
GR      680       190       680       228       678       236       676       248       674       260
GR      672       380       670       390     668.8       400       670       410       672       422
GR      674       430       676       445       678       456       680       475       682       480
GR      684       495       686       519       688       558

NC                          0.06
        CROSS SECTION AJ
X1     4.88        19       391       420       520       345       600
GR      690         0       688        60       686        95       684       114       682       138
GR      680       145       678       158       676       172       674       373       672       391
GR    670.2       402     670.2       410       672       420       674       430       680       438
GR      682       456       684       489       686       510       688       555

NC                 0.075
        CROSS SECTION AK
X1     5.03        17       298       330       410       430       800
GR      688         0       686       240       684       255       682       270       680       285
GR      678       291       676       298       674       305     673.6       315     673.6       325
GR      674       330       676       351       678       500       680       525       682       540
GR      684       595       686       610

        CROSS SECTION AK-AL
X1     5.06        18      177.      220.     190.0      40.0     130.0
GR     686.         0.     684.       18.      682.       30.      680.       40.      678.       58.
GR     676.       72.     675.9      177.      674.      180.      674.      205.      676.      220.
GR     677.      268.      676.      305.     677.5      360.      676.      420.      678.      440.
GR     680.      455.      682.      540.      684.      560.

        DOWNSTREAM FACE OF MORRISH ROAD BRIDGE - AL
X1     5.07      15.0     353.1     375.6       38.       38.       38.
GR     684.        0.      682.       60.      680.      125.      678.      192.      676.      275.
GR    675.4      350.      674.      353.      674.     353.1      674.     375.6      674.     375.7
GR     676.      377.      678.      392.      680.      402.      682.      430.      684.      522.

NC                          0.03
SB                 1.75       3.0                 22.5         0    101.25                 674.0     674.0
        UPSTREAM FACE OF MORRISH ROAD BRIDGE
X1    5.073                                      35.       35.       35.
X2                             1     678.5     679.9
BT       12       0.0     684.0     684.0      60.0     682.0     682.0     125.0     681.7     681.7
BT    275.0     681.5     681.5     350.0     681.5     681.5     353.1     679.9     678.5     375.6
BT    679.9     678.5     377.0     681.5     681.5     392.0     681.5     681.5     402.0    681.63
BT   681.63     430.0     682.0     682.0     522.0     684.0     684.0
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NC                          .055
        CROSS SECTION AM
X1    5.08        13.       315.      350.       30.       30.       30.
GR    685.        0.        684.      15.       682.       30.       680.       52.       678.       72.
GR    676.       315.     674.15      320.     674.15      340.      676.      350.       678.      405.
GR    680.       435.       682.      455.       684.      465.

        CROSS SECTION AM-AN
X1    5.11                                        43.       165.      148.

NC     .09       .085
        CROSS SECTION AN
X1    5.13        12        321       364        57.       150.      137.
GR    688         0         686        10       686         58       684        69        682        80
GR    680        100        678       121       676        321      674.2      338       674.2      355
GR    680        364        690       375

        CROSS SECTION AO
X1    5.21        14       105.      130.      110.       350.      430.
GR    685.        0.        684.      20.       682.       30.       680.       50.       678.       95.
GR    676.       105.     674.25      106.     674.25      128.      676.      130.       677.      150.
GR    677.       205.       678.      255.       680.      270.      690.      320.

NC                          0.012      0.3       0.5
QT       4       1400       1900      2200      2800
        DOWNSTREAM FACE OF FRANCES ROAD BRIDGE
X1    5.22       16.0       171.1     195.6      20.0      20.0      20.0
GR   686.0        0.0       684.6      46.0     683.6      66.0     682.5     140.0      681.9     160.0
GR   681.9      170.0       681.9     171.1    674.29     171.1    674.29     195.6      681.9     195.6
GR   681.9      200.0       681.9     230.0     682.5     262.0     684.4     295.0      685.5     315.0
GR   686.0      340.0

SB       0        1.6        3.0                 24.5         0      93.35
        UPSTREAM FACE OF FRANCES ROAD BRIDGE
X1   5.224                                        35.       35.       35.
X2                            1      678.1     681.9
BT      14        0.0       686.0     686.0      46.0     684.6     684.6      66.0      683.6     683.6
BT   140.0      682.5       682.5     160.0     681.9     681.9     170.0     681.9      681.9     171.1
BT   681.9      678.1       195.6     681.9     678.1     200.0     681.9     681.9      230.0     681.9
BT   681.9      262.0       682.5     682.5     295.0     684.4     684.4     315.0      685.5     685.5
BT   340.0      686.0       686.0

NC                           .05

X1   5.226                                        10.       10.       10.                0.022

X1    5.24        14.       203.      235.       70.       70.       70.
GR    688.        0.        686.      75.       680.      105.      678.      193.       676.      203.
GR  674.35       208.     674.35      228.      676.      235.      678.      242.       680.      280.
GR    682.       325.       686.      345.      690.      415.      696.      515.
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*PROF 1



CCHV=     .300 CEHV=     .500
*SECNO  .000
      CROSS SECTION A
     .000      9.35    623.35      .00    623.35    623.52      .17      .00      .00    620.00
   1200.0     106.8    1061.6     31.7     165.0     304.0     44.4       .0       .0    620.00
     .00       .65      3.49      .71      .095      .046     .095     .000   614.00    252.25
  .000863       0.        0.       0.         0         0        0      .00   201.25    453.50


*SECNO  .100
      CROSS SECTION B
     .100      6.69    623.89      .00      .00    624.10      .20      .56      .02    620.00
   1200.0      79.2    1031.8     89.0    100.8     265.7     84.8      5.0      1.7    620.00
     .04       .79      3.88     1.05      .095      .046     .095     .000   617.20    164.20
  .001580     300.      510.     490.         2         0        0      .00   184.22    348.42


*SECNO  .180

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .67

      CROSS SECTION C
     .180      5.74    624.74      .00      .00    625.12      .38      .93      .09    620.00
   1200.0      34.2     822.6    343.2     22.5     138.5    263.7      8.8      3.4    620.00
     .07      1.52      5.94     1.30      .095      .046     .095     .000   619.00    235.52
  .003483     400.      440.     300.         2         0        0      .00   238.52    474.04


*SECNO  .215
      CROSS SECTION C-D
     .215      5.60    625.60      .00      .00    625.74      .14      .55      .07    622.00
   1200.0     588.4     482.0    129.5     416.3     110.6    133.0     11.1      4.5    622.00
     .09      1.41      4.36      .97      .095      .046     .095     .000   620.00    327.70
  .002418     200.      195.     160.         2         0        0      .00   327.82    655.52


*SECNO  .250
      CROSS SECTION D
     .250      5.17    626.17      .00      .00    626.46      .29      .64      .08    624.00
   1200.0     337.6     748.9    113.5     280.1     139.0    94.2     13.7      6.0    624.00
     .10      1.21      5.39     1.20      .095      .046     .095     .000   621.00    180.11
  .004865     200.      195.     160.         1         0        0      .00   361.10    541.21
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


#SECNO  .360

3470 ENCROACHMENT STATIONS=     415.0     600.0  TYPE=     1  TARGET=     -415.000
       CROSS SECTION D-E
     .360      5.72    628.47       .00       .00    628.91       .44      2.37       .08    625.75
   1200.0      32.2     947.6     220.2      18.8     159.6     141.2      17.4       8.0    625.75
     .13      1.71      5.94      1.56      .095      .046      .095      .000    622.75    415.00
  .004910      290.      560.      325.         3         0         0       .00    130.40    545.40


#SECNO  .470

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.49

       CROSS SECTION E
     .470      5.82    630.32       .00       .00    630.54       .23      1.57       .06    626.00
   1200.0     263.5     820.7     115.8     228.5     181.0      89.4      21.3       9.4    626.00
     .17      1.15      4.53      1.30      .095      .046      .095      .000    624.50    384.17
  .002216      290.      560.      325.         2         0         0       .00    222.19    606.36


#SECNO  .540

3470 ENCROACHMENT STATIONS=     285.0     630.0  TYPE=     1  TARGET=     -285.000
       CROSS SECTION E-F
     .540      5.65    631.15       .00       .00    631.29       .14       .72       .03    626.00
   1200.0     379.3     548.9     271.8     362.2     130.8     220.2      26.2      11.5    626.00
     .21      1.05      4.20      1.23      .095      .046      .095      .000    625.50    285.00
  .001761      350.      390.      300.         2         0         0       .00    315.49    600.49


#SECNO  .610

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .64

       CROSS SECTION F
     .610      5.61    632.01       .00       .00    632.38       .37       .98       .12    630.00
   1200.0      83.7    1079.8      36.6      80.6     209.4      35.3      30.3      13.4    630.00
     .23      1.04      5.16      1.04      .095      .046      .095      .000    626.40    169.62
  .004360      350.      390.      300.         2         0         0       .00    170.42    340.03
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        DLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO  .700
       CROSS SECTION G
     .700      6.60    633.60       .00       .00    633.87       .27      1.45       .03    632.00
   1200.0      90.9    1020.0      89.2      81.5     227.9     121.4      33.3      14.9    632.00
      .26      1.11      4.47       .73      .095      .046      .095      .000    627.00    103.01
  .002971       20.      440.      400.         3         0         0       .00    263.88    366.89


*SECNO  .900
       CROSS SECTION H
     .900      6.29    635.79       .00       .00    635.90       .11      1.99       .05    636.00
   1200.0        .0    730.0     470.0        .0     218.4     492.0      43.9      19.7    632.00
      .37       .00      3.34       .96      .000      .046      .095      .000    629.50     49.29
  .001574      765.     1050.      640.         2         0         0       .00    318.55    367.84


*SECNO 1.120

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .68

       CROSS SECTION I
    1.120      6.76    637.96       .00       .00    638.43       .47      2.35       .18    634.60
   1200.0      25.7    1027.0     147.3      20.4     173.2     127.4      54.5      24.1    633.60
      .42      1.26      5.93      1.16      .095      .046      .095      .000    631.20     62.86
  .003411      900.     1170.      720.         2         0         0       .00    150.05    212.91


*SECNO 1.210

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.93

       CROSS SECTION I-J
    1.210      7.01    639.11       .00       .00    639.21       .10       .67       .11    636.00
   1200.0      63.9     819.5     316.6      85.4     273.7     416.1      58.8      25.6    636.00
      .47       .75      2.99       .76      .095      .046      .095      .000    632.10     52.57
  .000914      366.      470.      240.         2         0         0       .00    315.16    367.73


*SECNO 1.267

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .39
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


3470 ENCROACHMENT STATIONS=      417.0     617.0  TYPE=      1  TARGET=      200.000
    1.267      6.83    639.43       .00       .00    639.80       .37       .45       .14    638.00
   1200.0     259.2     879.6      61.2     170.8     155.4      44.2      61.1      26.4    638.00
      .49      1.52      5.66      1.39      .095      .046      .095      .000    632.60    417.00
  .005992      100.      300.       90.         2         0         0       .00    200.00    617.00


#SECNO 1.276

3470 ENCROACHMENT STATIONS=      502.8     617.3  TYPE=      1  TARGET=      114.500
    1.276      7.08    639.68       .00       .00    640.17       .49       .31       .06    638.00
   1200.0     100.5    1014.2      85.3      59.0     166.3      53.3      61.5      26.6    638.00
      .49      1.70      6.10      1.60      .095      .046      .095      .000    632.60    502.80
  .006352       50.       50.       50.         2         0         0       .00    114.50    617.30


#SECNO 1.286

3470 ENCROACHMENT STATIONS=      515.3     604.8  TYPE=      1  TARGET=       89.500
       CROSS SECTION J-I (41.0' DOWNSTREAM FROM McKINLEY ROAD BRIDGE)
    1.286      7.39    639.99       .00       .00    640.47       .47       .29       .01    638.00
   1200.0      76.4    1053.3      70.4      45.0     179.9      42.8      61.8      26.7    638.00
      .49      1.70      5.86      1.64      .095      .046      .095      .000    632.60    515.30
  .005275       50.       50.       50.         0         0         0       .00     89.50    604.80


#SECNO 1.290

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      647.71 ELREA=      647.52

       DOWNSTREAM FACE OF McKINLEY ROAD BRIDGE - J
    1.290      7.11    639.81       .00       .00    641.20      1.39       .27       .46    647.71
   1300.0        .0    1300.0        .0        .0     137.3        .0      62.0      26.8    647.52
      .49       .00      9.47       .00      .000      .030      .000      .000    632.70    237.20
  .008568       41.       41.       41.         2         0         0       .00     23.80    262.80
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.25	1.60	3.00	.00	25.60	1.80	209.92	.00	633.60	632.70

*SECNO 1.296

3265 DIVIDED FLOW

CLASS A LOW FLOW

3420 BRIDGE W.S.= 640.08 BRIDGE VELOCITY= 7.88 CALCULATED CHANNEL AREA= 154.

ESPRS	EGLWC	H3	QWEIR	QLOW	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
.00	641.58	.64	0.	1300.	210.	193.	641.73	647.52	0.

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 647.71 ELREA= 647.52

UPSTREAM FACE OF McKINLEY ROAD BRIDGE

1.296	7.75	640.45	.00	.00	641.58	1.13	.38	.00	647.71
1300.0	.0	1300.0	.0	.0	152.4	.0	62.1	26.8	647.52
.49	.00	8.53	.00	.000	.030	.000	.000	632.70	237.20
.006490	46.	46.	46.	0	0	0	.00	23.80	262.80

*SECNO 1.300

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.06

3470 ENCROACHMENT STATIONS= 219.0 266.0 TYPE= 1 TARGET= 47.000

CROSS SECTION K

1.300	7.15	641.15	.00	.00	641.79	.64	.06	.15	636.00
1300.0	41.9	1182.1	76.1	32.4	175.7	54.5	62.2	26.8	636.00
.50	1.29	6.73	1.40	.095	.030	.095	.000	634.00	219.00
.001524	24.	24.	24.	3	0	0	.00	47.00	266.00

*SECNO 1.310

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

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.43

3470 ENCROACHMENT STATIONS= 169.0 316.0 TYPE= 1 TARGET= 147.000

CROSS SECTION K-L

1.310	7.67	641.67	.00	.00	641.95	.28	.05	.11	636.00
1300.0	38.3	933.7	328.0	40.2	188.9	281.1	62.7	26.9	636.00
.50	.95	4.94	1.17	.095	.030	.095	.000	634.00	215.81
.000747	50.	50.	50.	2	0	0	.00	100.18	316.00

*SECNO 1.350

3470 ENCROACHMENT STATIONS= 119.0 366.0 TYPE= 1 TARGET= 247.000

1.350	7.78	641.88	.00	.00	642.07	.19	.09	.03	636.10
1300.0	34.6	821.3	444.0	41.8	191.5	466.2	64.0	27.1	636.10
.51	.83	4.29	.95	.095	.030	.095	.000	634.10	215.55
.000551	50.	190.	50.	2	0	0	.00	150.45	366.00

*SECNO 1.360

3470 ENCROACHMENT STATIONS= 69.0 416.0 TYPE= 1 TARGET= 347.000

CROSS SECTION L-K

1.360	7.77	641.98	.00	.00	642.12	.14	.04	.01	636.21
1300.0	31.5	748.0	520.5	41.6	191.3	625.0	65.0	27.3	636.21
.52	.76	3.91	.83	.095	.030	.095	.000	634.21	215.57
.000459	50.	85.	50.	2	0	0	.00	200.43	416.00

*SECNO 1.530

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .55

CROSS SECTION L

1.530	7.25	642.45	.00	.00	642.86	.40	.61	.13	640.00
1300.0	19.9	1184.5	95.6	28.6	222.3	127.0	75.0	30.2	640.00
.57	.69	5.33	.75	.095	.030	.095	.000	635.20	401.69
.001512	410.	850.	650.	2	0	0	.00	181.23	582.92

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


1490 NH CARD USED
*SECNO 1.620
       CROSS SECTION M
    1.620      5.93    643.73       .00       .00    643.82       .10       .88       .09    640.00
   1300.0       7.5     569.3     723.3       8.3     158.3     670.1      83.3      34.2    640.00
      .64       .90      3.60      1.08      .085      .050      .091      .000    637.80    195.53
  .001635      250.      520.      650.         3         0         0       .00    378.32    573.85


*SECNO 1.740

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .53

       CROSS SECTION N
    1.740      6.79    644.99       .00       .00    645.25       .26      1.35       .08    643.00
   1300.0     188.5     531.9     579.6     135.1      88.6     297.0      90.1      37.5    641.80
      .67      1.40      6.01      1.95      .085      .050      .085      .000    638.20    150.75
  .005722      400.      600.      400.         3         0         0       .00    321.73    472.48


*SECNO 1.900

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.41

       CROSS SECTION O
    1.900      8.08    647.58       .00       .00    647.85       .27      2.59       .00    644.50
   1300.0     206.0     835.5     258.5     169.9     164.3     179.9      96.6      40.8    645.30
      .72      1.21      5.09      1.44      .085      .050      .085      .000    639.50    139.39
  .002896      600.      860.      350.         3         0         0       .00    248.51    387.90


*SECNO 1.980
       CROSS SECTION P
    1.980      7.05    648.55       .00       .00    648.87       .32      1.00       .03    645.00
   1300.0     127.8     810.0     362.1      79.3     143.2     346.3     100.2      42.7    644.70
      .75      1.61      5.66      1.05      .090      .045      .090      .000    641.50     71.18
  .002914      350.      395.      200.         3         0         0       .00    397.12    468.30


*SECNO 2.040
       CROSS SECTION Q
    2.040      7.42    649.42       .00       .00    649.60       .18       .69       .04    646.60
   1300.0      59.7     658.3     582.0      34.5     142.2     464.8     104.1      45.2    646.80
      .78      1.73      4.63      1.25      .065      .042      .057      .000    642.00     61.31
  .001832      300.      335.      250.         0         0         0       .00    469.76    531.07
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        DLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO 2.220

3470 ENCROACHMENT STATIONS=     190.0     890.0  TYPE=     1  TARGET=    -190.000
       CROSS SECTION R
    2.220      8.09    651.19       .00       .00    651.46       .28      1.81       .05    650.00
   1300.0      20.8    1143.0     136.2      29.5     253.9     166.5     116.3      57.8    647.30
      .84       .71      4.50       .82      .075      .042      .057      .000    643.10    190.00
  .001927      530.      960.     1030.         1         0         0       .00    630.44    820.44


*SECNO 2.320
       CROSS SECTION S
    2.320      7.41    652.41       .00       .00    652.71       .30      1.24       .01    650.00
   1300.0       7.4    1127.6     165.0       7.3     237.6     214.2     121.3      62.7    650.00
      .88      1.01      4.75       .77      .085      .050      .085      .000    645.00    108.97
  .002879      370.      550.      400.         2         0         0       .00    389.61    498.58


*SECNO 2.580

3470 ENCROACHMENT STATIONS=     200.0     650.0  TYPE=     1  TARGET=    -200.000
       CROSS SECTION T
    2.580      6.28    655.28       .00       .00    655.38       .11      2.61       .06    658.00
   1300.0        .0    1005.4     294.6        .0     338.0     334.1     134.9      69.7    653.50
     1.01       .00      2.97       .88      .000      .050      .085      .000    649.00    215.35
  .001601      720.     1355.      730.         3         0         0       .00    332.77    548.13


*SECNO 2.860
       CROSS SECTION U
    2.860      4.89    657.39       .00       .00    657.50       .11      2.11       .00    654.00
   1300.0     223.8     587.4     488.7     184.8     156.3     413.6     149.8      76.1    654.00
     1.15      1.21      3.76      1.18      .085      .050      .085      .000    652.50    152.14
  .002195      430.     1465.      660.         2         0         0       .00    408.31    560.45


*SECNO 3.030

3470 ENCROACHMENT STATIONS=     150.0     870.0  TYPE=     1  TARGET=    -150.000
       CROSS SECTION V
    3.030      6.95    659.35       .00       .00    659.64       .29      2.06       .09    656.00
   1300.0     459.9     741.0      99.2     280.4     133.3      85.2     160.0      81.5    656.80
     1.21      1.64      5.56      1.16      .080      .045      .080      .000    652.40    165.29
  .003162      710.      910.      600.         2         0         0       .00    300.75    466.03
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   SECNO     DEPTH     CWSEL     CRIWS     WSELX     EG        HV        HL        OLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


1490 NH CARD USED
*SECNO 3.080

3470 ENCROACHMENT STATIONS=     210.0     660.0  TYPE=     1  TARGET=     450.000
       CROSS SECTION W
    3.080      7.24    660.04       .00       .00    660.34       .29       .69       .00    658.10
   1300.0      33.5     934.9     331.6      27.1     184.3     305.8     163.4      84.3    656.90
     1.22      1.24      5.07      1.08      .075      .042      .085      .000    652.80    210.00
  .002164      200.      260.      370.         2         0         0       .00    450.00    660.00


*SECNO 3.250
       CROSS SECTION W-X
    3.250      4.86    661.86       .00       .00    662.01       .15      1.63       .04    658.00
   1300.0     704.4     592.0       3.6     397.1     142.7       4.3     170.4      88.1    660.00
     1.29      1.77      4.15       .84      .075      .045      .080      .000    657.00    220.87
  .002457      461.      891.      421.         2         0         0       .00    238.78    459.65


*SECNO 3.270

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .69


3470 ENCROACHMENT STATIONS=     355.0     520.0  TYPE=     1  TARGET=     165.000
       CROSS SECTION X
    3.270      5.05    662.05       .00       .00    662.51       .46       .35       .15    658.00
   1300.0     362.8     930.4       6.8     149.9     149.4       5.3     171.4      88.4    660.00
     1.30      2.42      6.23      1.30      .075      .045      .080      .000    657.00    355.00
  .005205      100.      100.      100.         2         0         0       .00    105.13    460.13


*SECNO 3.280

3470 ENCROACHMENT STATIONS=     380.0     495.0  TYPE=     1  TARGET=     115.000
       CROSS SECTION X-Y
    3.280      4.94    662.33       .00       .00    663.04       .71       .40       .13    658.39
   1300.0     224.4    1068.6       7.1      82.6     145.4       4.7     171.8      88.6    660.39
     1.30      2.72      7.35      1.50      .075      .045      .080      .000    657.39    380.00
  .007509       65.       65.       65.         2         0         0       .00     79.85    459.85
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   SECNO     DEPTH     CWSEL     CRIWS     WSELX     EG        HV        HL        DLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       ARDB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


#SECNO 3.290

3470 ENCROACHMENT STATIONS=      396.5     478.5  TYPE=      1  TARGET=       82.000
       CROSS SECTION Y-X
    3.290      4.97    662.66       .00       .00    663.51       .85       .40       .07    658.69
   1300.0     149.6    1142.7       7.7      51.0     146.0       4.8     172.1      88.7    660.69
     1.30      2.93      7.82      1.60      .075      .045      .080      .000    657.69    396.50
  .008467       50.       50.       50.         0         0         0       .00     63.40    459.90


#SECNO 3.300

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.47


3470 ENCROACHMENT STATIONS=      359.0     416.0  TYPE=      1  TARGET=       57.000
       46' DOWNSTREAM FROM DODGE ROAD BRIDGE - Y
    3.300      5.39    663.39       .00       .00    663.89       .50       .27       .10    659.50
   1300.0     104.6    1091.8     103.6      42.0     179.0      39.8     172.3      88.7    659.50
     1.31      2.49      6.10      2.60      .075      .045      .080      .000    658.00    359.00
  .003926       44.       50.       44.         2         0         0       .00     57.00    416.00


#SECNO 3.310

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      670.20 ELREA=      670.50

       DOWNSTREAM FACE OF DODGE ROAD BRIDGE
    3.310      6.92    663.52       .00       .00    664.15       .63       .20       .06    670.20
   1400.0        .0    1400.0        .0        .0     220.4        .0     172.6      88.8    670.50
     1.31       .00      6.35       .00      .000      .045      .000      .000    656.60    292.70
  .004584       46.       46.       46.         2         0         0       .00     34.80    327.50


SPECIAL BRIDGE

5070, VARIABLE ELCHU OR ELCHD ON SB CARD NOT SPECIFIED
SB  XK        XKOR      COFQ      RDLEN     BWC       BWP       BAREA     SS        ELCHU     ELCHD
     .90      1.60      3.00       .00     35.00      5.00    176.00       .00    656.60    656.60

#SECNO 3.320
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

PRESSURE FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
665.09	664.31	.20	0.	1400.	176.	24.	657.40	669.93	0.

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 670.20 ELREA= 670.50

UPSTREAM FACE OF DODGE ROAD BRIDGE

3.320	8.04	664.64	.00	.00	665.09	.45	.95	.00	670.20
1400.0	.0	1400.0	.0	.0	259.5	.0	173.0	88.8	670.50
1.31	.00	5.40	.00	.000	.045	.000	.000	656.60	292.70
.002836	80.	80.	80.	2	0	0	.00	34.80	327.50

*SECNO 3.330

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.07

3470 ENCROACHMENT STATIONS= 442.0 573.0 TYPE= 1 TARGET= 131.000

CROSS SECTION Z

3.330	6.65	665.15	.00	.00	665.25	.10	.05	.11	660.00
1400.0	255.5	970.8	173.7	187.0	339.5	149.0	173.4	88.9	660.00
1.32	1.37	2.86	1.17	.075	.045	.080	.000	658.50	442.00
.000664	46.	40.	34.	2	0	0	.00	131.00	573.00

*SECNO 3.340

3470 ENCROACHMENT STATIONS= 392.0 623.0 TYPE= 1 TARGET= 231.000

CROSS SECTION Z-AA

3.340	6.79	665.24	.00	.00	665.29	.05	.03	.02	659.96
1400.0	428.8	752.7	218.4	417.9	346.8	279.3	174.4	89.1	659.96
1.32	1.03	2.17	.78	.085	.050	.090	.000	658.46	392.00
.000459	50.	50.	50.	0	0	0	.00	231.00	623.00

*SECNO 3.350

SECNO	DEPTH	CWSEL	CRIWS	WSELK	ES	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3470 ENCROACHMENT STATIONS= 342.0 673.0 TYPE= 1 TARGET= 331.000

CROSS SECTION AA-Z

3.350	6.87	665.28	.00	.00	665.31	.03	.02	.00	659.91
1400.0	534.5	652.7	212.8	625.1	351.4	335.2	175.8	89.4	659.91
1.34	.85	1.86	.63	.085	.050	.090	.000	658.41	342.00
.000331	50.	50.	50.	1	0	0	.00	312.55	654.55

*SECNO 3.480

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .35

CROSS SECTION AA

3.480	7.58	665.58	.00	.00	665.78	.20	.39	.08	663.00
1400.0	576.2	708.9	115.0	367.5	147.8	83.1	186.2	92.2	662.70
1.38	1.57	4.80	1.38	.085	.050	.090	.000	658.00	243.33
.002703	395.	670.	425.	2	0	0	.00	233.56	476.88

*SECNO 3.650

CROSS SECTION AB

3.650	7.62	667.32	.00	.00	667.38	.07	1.56	.04	663.00
1400.0	459.9	362.2	577.9	280.6	107.0	473.7	198.4	96.4	663.00
1.49	1.64	3.39	1.22	.085	.055	.090	.000	659.70	41.72
.001543	740.	920.	625.	2	0	0	.00	286.41	328.13

*SECNO 3.740

3470 ENCROACHMENT STATIONS= 150.0 510.0 TYPE= 1 TARGET= -150.000

CROSS SECTION AC

3.740	7.47	667.97	.00	.00	668.09	.12	.68	.03	664.00
1400.0	348.5	529.9	521.7	178.5	131.8	389.9	204.9	98.6	663.00
1.54	1.95	4.02	1.34	.080	.055	.090	.000	660.50	150.00
.001969	400.	460.	325.	2	0	0	.00	258.38	408.38

*SECNO 3.900

CROSS SECTION AD

3.900	6.99	669.20	.00	.00	669.30	.10	1.20	.01	664.00
1400.0	350.4	570.1	479.4	207.5	159.2	371.9	215.5	102.1	664.00
1.62	1.69	3.58	1.29	.085	.055	.080	.000	662.20	148.05
.001517	630.	870.	560.	1	0	0	.00	251.80	399.84

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


*SECNO 4.040
       CROSS SECTION AE
    4.040      6.80    670.20       .00       .00    670.36       .16      1.03       .03    663.70
   1400.0      57.6     496.8     845.6      32.5     100.7     529.8     222.8     104.7    666.90
     1.67      1.78      4.93      1.60      .085      .050      .085      .000    663.40     28.01
  .002714      440.      720.      380.         2         0         0       .00    284.92    312.93


*SECNO 4.320
       CROSS SECTION AF
    4.320      8.25    672.35       .00       .00    672.45       .09      2.07       .02    668.40
   1400.0     719.3     620.6      60.0     550.0     183.4      56.4     238.4     110.0    669.70
     1.81      1.31      3.38      1.07      .085      .055      .090      .000    664.10    203.24
  .001429      740.     1500.      850.         1         0         0       .00    257.50    460.73


*SECNO 4.380

3470 ENCROACHMENT STATIONS=     330.0     785.0  TYPE=      1  TARGET=     -330.000
       CROSS SECTION AF-AG
    4.380      8.13    672.73       .00       .00    672.89       .16       .41       .03    668.00
   1400.0     547.2     720.8     132.0     402.0     167.1      94.2     241.9     111.3    668.00
     1.83      1.36      4.31      1.40      .085      .055      .090      .000    664.60    330.00
  .002242      185.      275.      240.         2         0         0       .00    304.37    634.37


*SECNO 4.430
       CROSS SECTION AG
    4.430      8.32    673.32       .00       .00    673.63       .31       .67       .08    668.00
   1400.0     183.9     828.2     387.9      73.1     147.4     240.6     244.9     112.6    668.00
     1.85      2.52      5.62      1.61      .085      .055      .085      .000    665.00    265.02
  .003374      185.      275.      240.         2         0         0       .00    200.78    465.80


*SECNO 4.510
       CROSS SECTION AG-AH
    4.510      8.45    674.70       .00       .00    674.98       .29      1.34       .01    669.25
   1400.0     183.8     810.1     406.1      75.4     149.7     259.9     249.1     114.2    669.25
     1.88      2.44      5.41      1.56      .085      .055      .085      .000    666.25    264.84
  .003063      445.      450.      335.         2         0         0       .00    208.57    473.41
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 4.560

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .50

3470 ENCROACHMENT STATIONS= 300.0 520.0 TYPE= 1 TARGET= 220.000

CROSS SECTION AH-AG

4.560	8.94	675.81	.00	.00	676.04	.23	1.04	.02	100000.00
1400.0	.0	228.8	1171.2	.0	39.8	352.9	250.9	115.1	669.88
1.89	.00	5.74	3.32	.000	.055	.085	.000	666.88	300.00
.012042	223.	225.	168.	3	0	0	.00	206.14	506.14

*SECNO 4.600

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 5.05

3470 ENCROACHMENT STATIONS= 120.0 440.0 TYPE= 1 TARGET= 320.000

CROSS SECTION AH

4.600	8.82	676.32	.00	.00	676.36	.04	.26	.06	668.00
1400.0	724.9	459.7	215.4	810.8	198.0	226.2	254.7	116.2	670.00
1.93	.89	2.32	.95	.085	.055	.085	.000	667.50	120.00
.000473	223.	225.	168.	3	0	0	.00	317.40	437.40

*SECNO 4.770

CROSS SECTION AI

4.770	7.91	676.71	.00	.00	676.76	.05	.39	.01	674.00
1400.0	12.8	1371.3	15.9	22.0	746.7	27.0	271.5	120.4	674.00
2.05	.58	1.84	.59	.080	.050	.080	.000	668.80	243.74
.000534	560.	900.	580.	3	0	0	.00	205.16	448.90

*SECNO 4.880

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .58

CROSS SECTION AJ

4.880	6.97	677.17	.00	.00	677.27	.10	.49	.02	672.00
1400.0	694.9	619.5	85.6	517.2	183.4	48.5	281.5	123.3	672.00
2.12	1.34	3.38	1.77	.080	.060	.080	.000	670.20	163.78
.001614	520.	600.	345.	2	0	0	.00	270.46	434.23

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

*SECNO 5.030

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .60

CROSS SECTION AK

5.030	5.04	678.64	.00	.00	678.84	.20	1.51	.05	676.00
1400.0	19.8	684.9	695.3	12.1	148.4	323.0	288.8	125.9	674.00
2.17	1.64	4.61	2.15	.080	.060	.075	.000	673.60	289.09
.004545	410.	800.	430.	2	0	0	.00	218.89	507.98

*SECNO 5.060

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.18

CROSS SECTION AK-AL

5.060	5.03	679.03	.00	.00	679.06	.03	.18	.05	675.90
1400.0	420.4	416.4	563.2	356.4	198.4	521.4	290.5	126.5	676.00
2.19	1.18	2.10	1.08	.080	.060	.075	.000	674.00	48.75
.000955	190.	130.	40.	2	0	0	.00	398.97	447.71

*SECNO 5.070

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .57

DOWNSTREAM FACE OF MORRISH ROAD BRIDGE - AL

5.070	5.05	679.05	.00	.00	679.16	.12	.06	.04	674.00
1400.0	886.2	448.1	65.8	452.6	113.5	39.2	291.3	126.8	674.00
2.19	1.96	3.95	1.68	.080	.060	.075	.000	674.00	156.97
.002934	38.	38.	38.	2	0	0	.00	240.26	397.23

SPECIAL BRIDGE

SB XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
.00	1.75	3.00	.00	22.50	.00	101.25	.00	674.00	674.00

*SECNO 5.073

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 3.89

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

PRESSURE AND WEIR FLOW, Weir Submergence Based on TRAPEZOIDAL Shape

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
684.24	679.33	.00	363.	1038.	101.	101.	678.50	679.90	341.

UPSTREAM FACE OF MORRISH ROAD BRIDGE

5.073	7.85	681.85	.00	.00	681.90	.04	2.74	.00	674.00
1400.0	832.6	481.4	85.9	1133.9	176.7	135.1	292.1	127.1	674.00
2.20	.73	2.72	.64	.080	.030	.075	.000	674.00	64.73
.000194	35.	35.	35.	2	0	4	.00	363.24	427.96

*SECNO 5.080

CROSS SECTION AM

5.080	7.75	681.90	.00	.00	681.91	.01	.01	.01	676.00
1400.0	832.0	326.6	241.3	1269.0	257.4	374.7	293.2	127.3	676.00
2.21	.66	1.27	.64	.080	.055	.075	.000	674.15	31.08
.000157	30.	30.	30.	0	0	0	.00	422.93	454.01

*SECNO 5.110

CROSS SECTION AM-AN

5.110	7.77	681.92	.00	.00	681.93	.01	.01	.00	676.00
1400.0	832.5	325.8	241.7	1275.6	258.2	377.1	296.8	128.1	676.00
2.24	.65	1.26	.64	.080	.055	.075	.000	674.15	30.83
.000155	43.	148.	165.	0	0	0	.00	423.42	454.25

*SECNO 5.130

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .68

CROSS SECTION AN

5.130	7.73	681.93	.00	.00	681.95	.02	.02	.01	676.00
1400.0	901.6	497.9	.5	1067.6	291.2	2.1	299.9	128.8	680.00
2.26	.84	1.71	.25	.090	.055	.085	.000	674.20	80.64
.000330	57.	137.	150.	0	0	0	.00	285.49	366.13

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

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*SECNO 5.210
        CROSS SECTION AO
    5.210      7.79    682.04       .00       .00    682.08       .04       .12       .01    676.00
   1400.0     175.4     452.5     772.1     208.1     192.2     671.2     306.6     130.1    676.00
     2.32       .84      2.35      1.15      .090      .055      .085      .000    674.25     29.79
  .000546      110.      430.      350.         2         0         0       .00    250.41    280.21

CCHV=     .300 CEHV=     .500
*SECNO 5.220

3301 HV CHANGED MORE THAN HVINS

        DOWNSTREAM FACE OF FRANCES ROAD BRIDGE
    5.220      7.31    681.60       .00       .00    682.55       .95       .01       .45    681.90
   1400.0        .0    1400.0        .0        .0     179.1        .0     306.8     130.2    681.90
     2.32       .00      7.82       .00      .000      .012      .000      .000    674.29    171.10
  .000524       20.       20.       20.         2         0         0       .00     24.50    195.60


SPECIAL BRIDGE

5070, VARIABLE ELCHU OR ELCHD ON SB CARD NOT SPECIFIED
SB  XK        XKOR      COFQ      RDLEN     BWC       BWP       BAREA     SS        ELCHU     ELCHD
     .00      1.60      3.00       .00     24.50       .00     93.35       .00    674.29    674.29

*SECNO 5.224
PRESSURE AND WEIR FLOW,  Weir Submergence Based on TRAPEZOIDAL Shape


 EGPRS      EGLWC      H3       QWEIR      QPR       BAREA   TRAPEZOID      ELLC      ELTRD     WEIRLN
                                                              AREA
   687.19    682.55      .00      625.      786.       93.       93.      678.10    681.90      195.


        UPSTREAM FACE OF FRANCES ROAD BRIDGE
    5.224      8.37    682.66       .00       .00    683.36       .70       .81       .00    681.90
   1400.0       3.8    1386.4       9.8      18.5     205.1      41.2     307.0     130.2    681.90
     2.32       .21      6.76       .24      .090      .012      .085      .000    674.29    129.16
  .000334       35.       35.       35.         2         0         4       .00    135.63    264.80


*SECNO 5.226
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .26

5.226	8.48	682.79	.00	.00	683.40	.61	.01	.03	681.92
1400.0	20.3	1329.9	49.8	23.4	207.7	48.7	307.1	130.3	681.92
2.32	.87	6.40	1.02	.090	.050	.085	.000	674.31	121.95
.005112	10.	10.	10.	2	0	0	.00	144.71	266.66

*SECNO 5.240

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 3.78

5.240	9.23	683.58	.00	.00	683.63	.05	.06	.17	676.00
1400.0	432.4	683.4	284.2	500.5	265.4	342.1	308.2	130.6	676.00
2.33	.86	2.39	.83	.090	.050	.085	.000	674.35	87.12
.000358	70.	70.	70.	2	0	0	.00	245.77	332.88

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T1 MONTROSE TWP. - ARMSTRONG CREEK F.I.S.
T2  J&A JOB NO. 13039-01
T3      50 YEAR FLOOD          FILENAME: MONARM.HC2

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ

      0        3                          0                           625.31

J2  NPROF     IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITRACE

      2        0.       -1.
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*PROF 2



CCHV=     .300 CEHV=     .500
*SECNO  .000
      CROSS SECTION A
     .000     11.31    625.31       .00    625.31    625.43       .12       .00       .00    620.00
   1800.0     389.3    1246.7     164.0     520.0     382.4     276.6        .0        .0    620.00
     .00       .75      3.26       .59      .095      .046      .095      .000    614.00    170.70
  .000554        0.        0.        0.         0         0         0       .00    422.40    593.10


*SECNO  .100
      CROSS SECTION B
     .100      8.43    625.63       .00       .00    625.78       .16       .34       .02    620.00
   1800.0     266.0    1297.4     236.5     276.5     352.4     261.0      10.1       3.5    620.00
     .04       .96      3.68       .91      .095      .046      .095      .000    617.20    135.57
  .000975      300.      510.      490.         2         0         0       .00    324.37    459.94


*SECNO  .180

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .68

      CROSS SECTION C
     .180      7.13    626.13       .00       .00    626.37       .24       .54       .04    620.00
   1800.0      52.5     923.0     824.4      37.6     173.3     643.4      17.3       6.2    620.00
     .08      1.40      5.33      1.28      .095      .046      .095      .000    619.00    232.74
  .002079      400.      440.      300.         2         0         0       .00    368.90    601.64


*SECNO  .215
      CROSS SECTION C-D
     .215      6.65    626.65       .00       .00    626.76       .11       .36       .04    622.00
   1800.0     914.6     580.9     304.5     613.9     135.6     280.6      21.2       7.6    622.00
     .10      1.49      4.28      1.08      .095      .046      .095      .000    620.00    315.19
  .001780      200.      195.      160.         2         0         0       .00    368.72    683.91


*SECNO  .250
      CROSS SECTION D
     .250      6.05    627.05       .00       .00    627.25       .20       .45       .04    624.00
   1800.0     702.8     859.3     237.9     497.4     171.9     170.3      25.2       9.2    624.00
     .12      1.41      5.00      1.40      .095      .046      .095      .000    621.00    175.22
  .003154      200.      195.      160.         2         0         0       .00    372.67    547.88
```

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

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#SECNO  .360

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .66


3470 ENCROACHMENT STATIONS=      415.0     600.0  TYPE=      1  TARGET=     -415.000
       CROSS SECTION D-E
      .360      6.16    628.91       .00       .00    629.62       .71      2.11       .25    625.75
    1800.0      49.0    1355.1     395.9      22.0     176.3     180.9      30.5      11.2    625.75
      .14      2.23      7.69      2.19      .095      .046      .095      .000    622.75    415.00
   .007213      290.      560.      325.         2         0         0       .00    133.77    548.77


#SECNO  .470

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.82

       CROSS SECTION E
      .470      6.75    631.25       .00       .00    631.49       .25      1.74       .14    626.00
    1800.0     519.9    1072.8     207.3     367.5     213.6     134.4      35.5      12.7    626.00
      .17      1.41      5.02      1.54      .095      .046      .095      .000    624.50    366.96
   .002181      290.      560.      325.         2         0         0       .00    243.40    610.36


#SECNO  .540

3470 ENCROACHMENT STATIONS=      285.0     630.0  TYPE=      1  TARGET=     -285.000
       CROSS SECTION E-F
      .540      6.57    632.07       .00       .00    632.20       .13       .67       .03    626.00
    1800.0     685.4     680.0     434.6     544.7     152.7     304.3      42.3      14.9    626.00
      .21      1.26      4.45      1.43      .095      .046      .095      .000    625.50    285.00
   .001614      350.      390.      300.         2         0         0       .00    316.68    601.68


#SECNO  .610

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .62

       CROSS SECTION F
      .610      6.42    632.82       .00       .00    633.25       .43       .90       .15    630.00
    1800.0     231.2    1471.1      97.7     162.8     254.3      65.3      48.2      17.0    630.00
      .23      1.42      5.79      1.50      .095      .046      .095      .000    626.40    128.83
   .004237      350.      390.      300.         2         0         0       .00    214.77    343.60
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


#SECNO  .700
       CROSS SECTION G
     .700      7.36    634.36       .00       .00    634.66       .30      1.36       .04    632.00
   1800.0     181.5    1348.5     270.0     126.9     269.8     258.5      52.4      18.7    632.00
     .26      1.43      5.00      1.04      .095      .046      .095      .000    627.00     98.20
  .002960      20.      440.      400.         3         0         0       .00    307.40    405.60


#SECNO  .900
       CROSS SECTION H
     .900      7.04    636.54       .00       .00    636.66       .13      1.96       .05    636.00
   1800.0        .2    961.7     838.2        .6     257.4     696.9      66.9      24.0    632.00
     .36       .26      3.74      1.20      .095      .046      .095      .000    629.50     45.58
  .001633     765.     1050.      640.         3         0         0       .00    331.13    376.72


#SECNO 1.120

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .64

       CROSS SECTION I
    1.120      7.58    638.78       .00       .00    639.38       .60      2.48       .24    634.60
   1800.0      49.9    1392.1     358.0      31.5     197.8     221.2      81.0      28.5    633.60
     .41      1.58      7.04      1.62      .095      .046      .095      .000    631.20     59.90
  .004027     900.     1170.      720.         2         0         0       .00    164.81    224.71


#SECNO 1.210

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.12

       CROSS SECTION I-J
    1.210      7.99    640.09       .00       .00    640.20       .11       .67       .15    636.00
   1800.0     125.4    1066.0     608.7     135.9     322.7     641.2      86.9      30.2    636.00
     .46       .92      3.30       .95      .095      .046      .095      .000    632.10     44.69
  .000894     366.      470.      240.         2         0         0       .00    346.01    390.71


#SECNO 1.267

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .44
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        DLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


3470 ENCROACHMENT STATIONS=      417.0     617.0  TYPE=      1  TARGET=      200.000
    1.267      7.75    640.35       .00       .00    640.70       .35       .38       .12    638.00
   1800.0     525.8    1141.8     132.4     282.2     195.9      76.4      89.9      31.1    638.00
      .47      1.86      5.83      1.73      .095      .046      .095      .000    632.60    417.00
  .004663      100.      300.       90.         2         0         0       .00    200.00    617.00


#SECNO 1.276

3470 ENCROACHMENT STATIONS=      502.8     617.3  TYPE=      1  TARGET=      114.500
    1.276      7.88    640.48       .00       .00    641.12       .63       .28       .14    638.00
   1800.0     195.1    1429.5     175.4      87.5     202.0      81.9      90.4      31.2    638.00
      .47      2.23      7.08      2.14      .095      .046      .095      .000    632.60    502.80
  .006600       50.       50.       50.         0         0         0       .00    114.50    617.30


#SECNO 1.286

3470 ENCROACHMENT STATIONS=      515.3     604.8  TYPE=      1  TARGET=       89.500
        CROSS SECTION J-I (41.0' DOWNSTREAM FROM McKINLEY ROAD BRIDGE)
    1.286      8.18    640.78       .00       .00    641.46       .68       .32       .02    638.00
   1800.0     141.0    1525.5     133.4      62.9     214.6      60.8      90.8      31.4    638.00
      .47      2.24      7.11      2.20      .095      .046      .095      .000    632.60    515.30
  .006147       50.       50.       50.         1         0         0       .00     89.50    604.80


#SECNO 1.290

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .69


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       647.71 ELREA=       647.52

        DOWNSTREAM FACE OF McKINLEY ROAD BRIDGE - J
    1.290      7.66    640.36       .00       .00    642.59      2.23       .35       .78    647.71
   1800.0        .0    1800.0        .0        .0     150.3        .0      91.0      31.4    647.52
      .48       .00     11.98       .00      .000      .030      .000      .000    632.70    237.20
  .012918       41.       41.       41.         3         0         0       .00     23.80    262.80
```

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	DLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

SPECIAL BRIDGE

SB	XK	XKOR	CDFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.25	1.60	3.00	.00	25.60	1.80	209.92	.00	633.60	632.70

#SECNO 1.296

3301 HV CHANGED MORE THAN HVINS

CLASS A LOW FLOW

3420 BRIDGE W.S.= 640.42 BRIDGE VELOCITY= 10.40 CALCULATED CHANNEL AREA= 162.

EGPRS	EGLWC	H3	QWEIR	QLOW	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
642.18	643.25	1.40	0.	1800.	210.	193.	641.73	647.52	0.

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 647.71 ELREA= 647.52

UPSTREAM FACE OF McKINLEY ROAD BRIDGE

1.296	9.06	641.76	.00	.00	643.25	1.49	.66	.00	647.71
1800.0	.0	1800.0	.0	.0	183.8	.0	91.2	31.4	647.52
.48	.00	9.79	.00	.000	.030	.000	.000	632.70	237.20
.007927	46.	46.	46.	0	0	0	.00	25.60	262.80

#SECNO 1.300

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.35

3470 ENCROACHMENT STATIONS= 219.0 266.0 TYPE= 1 TARGET= 47.000

CROSS SECTION K

1.300	8.75	642.75	.00	.00	643.53	.78	.07	.21	636.00
1800.0	78.5	1611.4	110.1	50.0	215.6	72.1	91.3	31.5	636.00
.48	1.57	7.47	1.53	.095	.030	.095	.000	634.00	219.00
.001430	24.	24.	24.	3	0	0	.00	47.00	266.00

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

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*SECNO 1.310

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.50


3470 ENCROACHMENT STATIONS=      169.0     316.0  TYPE=      1  TARGET=      147.000
       CROSS SECTION K-L
     1.310      9.42    643.42       .00       .00    643.72       .29       .05       .15    636.00
    1800.0      71.7    1215.8     512.5      68.9     232.6     387.9      91.9      31.5    636.00
       .48      1.04      5.23      1.32      .095      .030      .095      .000    634.00    211.44
   .000632       50.       50.       50.         2         0         0       .00    104.56    316.00


*SECNO 1.350

3470 ENCROACHMENT STATIONS=      119.0     366.0  TYPE=      1  TARGET=      247.000
     1.350      9.54    643.64       .00       .00    643.82       .18       .07       .03    636.10
    1800.0      62.4    1036.7     700.9      71.1     235.5     661.3      93.6      31.8    636.10
       .49       .88      4.40      1.06      .095      .030      .095      .000    634.10    211.15
   .000441       50.      190.       50.         2         0         0       .00    154.85    366.00


*SECNO 1.360

3470 ENCROACHMENT STATIONS=       69.0     416.0  TYPE=      1  TARGET=      347.000
       CROSS SECTION L-K
     1.360      9.53    643.74       .00       .00    643.87       .13       .03       .02    636.21
    1800.0      55.1     915.6     829.3      71.0     235.4     908.8      95.1      32.0    636.21
       .50       .78      3.89       .91      .095      .030      .095      .000    634.21    211.16
   .000345       50.       85.       50.         2         0         0       .00    204.84    416.00


*SECNO 1.530

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .64

       CROSS SECTION L
     1.530      8.85    644.05       .00       .00    644.35       .29       .40       .08    640.00
    1800.0      56.7    1439.5     303.8      78.1     297.6     383.3     110.6      35.7    640.00
       .56       .73      4.84       .79      .095      .030      .095      .000    635.20    386.48
   .000845      410.      850.      650.         2         0         0       .00    293.98    680.46
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

1490 NH CARD USED

*SECNO 1.620

CROSS SECTION M

1.620	7.07	644.87	.00	.00	644.94	.07	.52	.07	640.00
1800.0	11.9	617.0	1171.1	14.2	192.6	1071.3	124.7	40.5	640.00
.64	.84	3.20	1.09	.085	.050	.093	.000	637.80	194.16
.000999	250.	520.	650.	2	0	0	.00	390.19	584.35

*SECNO 1.740

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .48

CROSS SECTION N

1.740	7.46	645.66	.00	.00	645.85	.20	.85	.07	643.00
1800.0	375.5	562.9	861.6	228.1	99.3	410.1	134.6	43.9	641.80
.68	1.65	5.67	2.10	.085	.050	.085	.000	638.20	146.65
.004383	400.	600.	400.	2	0	0	.00	327.50	474.15

*SECNO 1.900

CROSS SECTION O

1.900	8.55	648.05	.00	.00	648.38	.33	2.46	.07	644.50
1800.0	348.6	1036.6	414.8	233.8	176.1	227.1	143.0	47.4	645.30
.73	1.49	5.89	1.83	.085	.050	.085	.000	639.50	119.48
.003537	600.	860.	350.	3	0	0	.00	270.78	390.26

*SECNO 1.980

CROSS SECTION P

1.980	7.63	649.13	.00	.00	649.43	.30	1.04	.01	645.00
1800.0	176.7	931.2	692.0	101.8	157.0	543.0	147.7	49.4	644.70
.75	1.74	5.93	1.27	.090	.045	.090	.000	641.50	66.72
.002831	350.	395.	200.	2	0	0	.00	410.25	476.96

*SECNO 2.040

CROSS SECTION Q

2.040	7.93	649.93	.00	.00	650.08	.15	.61	.04	646.60
1800.0	77.0	708.6	1014.3	43.0	154.8	690.1	152.9	52.0	646.80
.78	1.79	4.58	1.47	.065	.042	.057	.000	642.00	60.17
.001602	300.	335.	250.	2	0	0	.00	474.38	534.55

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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        QLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


#SECNO 2.220

3470 ENCROACHMENT STATIONS=      190.0     890.0  TYPE=      1  TARGET=     -190.000
       CROSS SECTION R
    2.220      8.50    651.60       .00       .00    651.88       .27      1.74       .06    650.00
   1800.0      45.4    1332.7     422.0      46.8     275.5     400.1     171.1      64.7    647.30
      .85       .97      4.84      1.05      .075      .042      .057      .000    643.10    190.00
  .001996      530.      960.     1030.         1         0         0       .00    631.48    821.48


#SECNO 2.320
       CROSS SECTION S
    2.320      7.86    652.86       .00       .00    653.21       .35      1.29       .04    650.00
   1800.0      12.4    1382.9     404.6      10.3     257.9     371.9     178.2      69.6    650.00
      .88      1.21      5.36      1.09      .085      .050      .085      .000    645.00    107.84
  .003292      370.      550.      400.         2         0         0       .00    411.09    518.93


#SECNO 2.580

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.41


3470 ENCROACHMENT STATIONS=      200.0     650.0  TYPE=      1  TARGET=     -200.000
       CROSS SECTION T
    2.580      6.86    655.86       .00       .00    655.98       .12      2.71       .07    658.00
   1800.0        .0    1262.1     537.9        .0     388.9     485.5     195.6      77.0    653.50
     1.01       .00      3.25      1.11      .000      .050      .085      .000    649.00    212.04
  .001665      720.     1355.      730.         3         0         0       .00    353.77    565.80


#SECNO 2.860
       CROSS SECTION U
    2.860      5.41    657.91       .00       .00    658.03       .12      2.04       .00    654.00
   1800.0     341.8     702.1     756.1     248.1     174.3     546.1     214.1      83.6    654.00
     1.13      1.38      4.03      1.38      .085      .050      .085      .000    652.50    141.84
  .002180      430.     1465.      660.         1         0         0       .00    422.47    564.31


#SECNO 3.030

3470 ENCROACHMENT STATIONS=      150.0     870.0  TYPE=      1  TARGET=     -150.000
       CROSS SECTION V
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
3.030	7.48	659.88	.00	.00	660.19	.31	2.06	.10	656.00
1800.0	722.1	889.6	188.3	384.2	145.8	139.4	227.3	89.6	656.80
1.19	1.88	6.10	1.35	.080	.045	.080	.000	652.40	150.00
.003377	710.	910.	600.	2	0	0	.00	343.46	493.46

1490 NR CARD USED
*SECNO 3.080

3470 ENCROACHMENT STATIONS= 210.0 660.0 TYPE= 1 TARGET= 450.000
CROSS SECTION W

3.080	7.83	660.63	.00	.00	660.92	.29	.73	.01	658.10
1800.0	54.4	1107.8	637.8	36.6	203.4	545.5	232.2	92.4	656.90
1.21	1.49	5.45	1.17	.075	.042	.086	.000	652.80	210.00
.002187	200.	260.	370.	1	0	0	.00	450.00	660.00

*SECNO 3.250
CROSS SECTION W-X

3.250	5.40	662.40	.00	.00	662.58	.18	1.62	.03	658.00
1800.0	1036.6	756.0	7.4	507.6	161.5	7.2	241.5	96.3	660.00
1.27	2.04	4.68	1.03	.075	.045	.080	.000	657.00	212.79
.002648	461.	891.	421.	2	0	0	.00	248.21	461.00

*SECNO 3.270

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .65

3470 ENCROACHMENT STATIONS= 355.0 520.0 TYPE= 1 TARGET= 165.000
CROSS SECTION X

3.270	5.57	662.57	.00	.00	663.19	.62	.39	.22	658.00
1800.0	552.7	1233.6	13.6	183.5	167.4	8.3	242.7	96.7	660.00
1.27	3.01	7.37	1.65	.075	.045	.080	.000	657.00	355.00
.006257	100.	100.	100.	2	0	0	.00	106.42	461.42

*SECNO 3.280

3470 ENCROACHMENT STATIONS= 380.0 495.0 TYPE= 1 TARGET= 115.000
CROSS SECTION X-Y

3.280	5.49	662.88	.00	.00	663.85	.97	.48	.17	658.39
1800.0	355.8	1429.4	14.8	104.1	164.2	7.7	243.2	96.8	660.39
1.28	3.42	8.70	1.93	.075	.045	.080	.000	657.39	380.00
.008960	65.	65.	65.	1	0	0	.00	81.19	461.19

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

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$SECNO 3.290

3470 ENCROACHMENT STATIONS=      396.5     478.5  TYPE=      1  TARGET=       82.000
        CROSS SECTION Y-X
     3.290      5.56    663.25       .00       .00    664.41      1.16       .47       .10    658.69
    1800.0     238.3    1544.7      17.1      65.3     167.4       8.2     243.5      96.9    660.69
      1.28      3.65      9.23      2.07      .075      .045      .080      .000    657.69    396.50
   .009820       50.       50.       50.         0         0         0       .00     64.92    461.42


$SECNO 3.300

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.46


3470 ENCROACHMENT STATIONS=      359.0     416.0  TYPE=      1  TARGET=       57.000
        46' DOWNSTREAM FROM DODGE ROAD BRIDGE - Y
     3.300      6.16    664.16       .00       .00    664.87       .71       .32       .14    659.50
    1800.0     149.1    1496.6     154.3      50.4     205.9      48.2     243.8      97.0    659.50
      1.28      2.96      7.27      3.20      .075      .045      .080      .000    658.00    359.00
   .004624       44.       50.       44.         3         0         0       .00     57.00    416.00


$SECNO 3.310

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       670.20 ELREA=       670.50

        DOWNSTREAM FACE OF DODGE ROAD BRIDGE
     3.310      7.70    664.30       .00       .00    665.21       .91       .24       .10    670.20
    1900.0        .0    1900.0        .0        .0     247.6        .0     244.1      97.0    670.50
      1.28       .00      7.67       .00      .000      .045      .000      .000    656.60    292.70
   .005989       46.       46.       46.         2         0         0       .00     34.80    327.50


SPECIAL BRIDGE

5070, VARIABLE ELCHU OR ELCHD ON SB CARD NOT SPECIFIED
SB  XK        XKOR      COFQ      RDLEN     BWC       BWP       BAREA     SS        ELCHU     ELCHD
     .90      1.60      3.00       .00     35.00      5.00    176.00       .00    656.60    656.60

$SECNO 3.320

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.52
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	DLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

PRESSURE FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
667.20	665.49	.36	0.	1900.	176.	24.	657.40	669.93	0.

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 670.20 ELREA= 670.50

UPSTREAM FACE OF DODGE ROAD BRIDGE

3.320	10.08	666.68	.00	.00	667.20	.51	1.98	.00	670.20
1900.0	.0	1900.0	.0	.0	330.6	.0	244.6	97.1	670.50
1.28	.00	5.75	.00	.000	.045	.000	.000	656.60	292.70
.002596	80.	80.	80.	2	0	0	.00	34.80	327.50

*SECNO 3.330

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.48

3470 ENCROACHMENT STATIONS= 442.0 573.0 TYPE= 1 TARGET= 131.000

CROSS SECTION Z

3.330	8.77	667.27	.00	.00	667.36	.09	.03	.13	660.00
1900.0	358.0	1264.5	277.5	267.5	456.1	229.5	245.2	97.1	660.00
1.29	1.34	2.77	1.21	.075	.045	.080	.000	658.50	442.00
.000421	46.	40.	34.	2	0	0	.00	131.00	573.00

*SECNO 3.340

3470 ENCROACHMENT STATIONS= 392.0 623.0 TYPE= 1 TARGET= 231.000

CROSS SECTION Z-AA

3.340	8.90	667.35	.00	.00	667.39	.04	.02	.02	659.96
1900.0	594.7	929.2	376.1	603.4	462.7	464.7	246.6	97.4	659.96
1.30	.99	2.01	.81	.085	.050	.090	.000	658.46	392.00
.000268	50.	50.	50.	0	0	0	.00	231.00	623.00

*SECNO 3.350

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

3470 ENCROACHMENT STATIONS= 342.0 673.0 TYPE= 1 TARGET= 331.000

CROSS SECTION AA-I

3.350	8.97	667.38	.00	.00	667.40	.02	.01	.00	659.91
1900.0	739.4	776.2	384.5	914.8	466.8	593.5	248.6	97.7	659.91
1.31	.81	1.66	.65	.085	.050	.090	.000	658.41	342.00
.000181	50.	50.	50.	1	0	0	.00	319.55	661.55

#SECNO 3.480

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .42

CROSS SECTION AA

3.480	9.53	667.53	.00	.00	667.62	.09	.18	.03	663.00
1900.0	1007.6	664.5	227.9	703.6	190.6	181.8	264.8	100.6	662.70
1.38	1.43	3.49	1.25	.085	.050	.090	.000	658.00	232.34
.001017	395.	670.	425.	2	0	0	.00	255.31	487.66

#SECNO 3.650

CROSS SECTION AB

3.650	8.68	668.38	.00	.00	668.44	.06	.82	.01	663.00
1900.0	606.8	395.3	897.9	365.7	123.0	685.2	283.4	105.0	663.00
1.49	1.66	3.21	1.31	.085	.055	.090	.000	659.70	39.05
.001154	740.	920.	625.	2	0	0	.00	296.91	335.95

#SECNO 3.740

3470 ENCROACHMENT STATIONS= 150.0 510.0 TYPE= 1 TARGET= -150.000

CROSS SECTION AC

3.740	8.38	668.88	.00	.00	669.00	.11	.53	.03	664.00
1900.0	450.2	608.8	841.1	219.8	150.2	569.8	292.2	107.3	663.00
1.54	2.05	4.05	1.48	.080	.055	.090	.000	660.50	150.00
.001683	400.	460.	325.	2	0	0	.00	263.62	413.62

#SECNO 3.900

CROSS SECTION AD

3.900	7.76	669.96	.00	.00	670.07	.11	1.07	.00	664.00
1900.0	464.0	677.5	758.4	252.6	178.5	506.7	305.8	110.9	664.00
1.62	1.84	3.79	1.50	.085	.055	.080	.000	662.20	145.15
.001463	630.	870.	560.	2	0	0	.00	264.34	409.49

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


*SECNO 4.040
       CROSS SECTION AE
    4.040      7.47    670.87       .00       .00    671.03       .15       .94       .02    663.70
   1900.0      71.9     569.6    1258.5      39.6     112.2     708.1     315.0     113.6    666.90
     1.67      1.82      5.07      1.78      .085      .050      .085      .000    663.40     26.96
  .002486      440.      720.      380.         2         0         0       .00    296.13    323.10


*SECNO 4.320
       CROSS SECTION AF
    4.320      8.87    672.97       .00       .00    673.08       .11      2.04       .01    668.40
   1900.0    1054.2     749.9      95.8     675.2     199.3      75.4     334.1     119.1    669.70
     1.79      1.56      3.76      1.27      .085      .055      .090      .000    664.10    200.17
  .001581      740.     1500.      850.         1         0         0       .00    265.31    465.48


*SECNO 4.380

3470 ENCROACHMENT STATIONS=     330.0     785.0  TYPE=      1  TARGET=     -330.000
       CROSS SECTION AF-AG
    4.380      8.77    673.37       .00       .00    673.53       .16       .42       .03    668.00
   1900.0     863.7     838.9     197.3     550.3     183.8     125.1     338.5     120.4    668.00
     1.81      1.57      4.57      1.58      .085      .055      .090      .000    664.60    330.00
  .002214      185.      275.      240.         2         0         0       .00    308.21    638.21


*SECNO 4.430
       CROSS SECTION AG
    4.430      8.95    673.95       .00       .00    674.30       .35       .68       .09    668.00
   1900.0     246.2     997.1     656.8      86.0     160.1     355.7     342.2     121.8    668.00
     1.82      2.86      6.23      1.85      .085      .055      .085      .000    665.00    264.07
  .003714      185.      275.      240.         2         0         0       .00    242.96    507.03


*SECNO 4.510
       CROSS SECTION AG-AH
    4.510      9.16    675.41       .00       .00    675.71       .30      1.39       .02    669.25
   1900.0     243.2     955.3     701.4      90.4     164.2     398.3     347.7     123.8    669.25
     1.85      2.69      5.82      1.76      .085      .055      .085      .000    666.25    263.76
  .003131      445.      450.      335.         2         0         0       .00    247.46    511.21
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        QLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


$SECNO 4.560

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .57


3470 ENCROACHMENT STATIONS=      300.0     520.0  TYPE=      1  TARGET=      220.000
       CROSS SECTION AH-AG
    4.560      9.61    676.49       .00       .00    676.70       .21       .96       .03 100000.00
   1900.0        .0     227.8    1672.2        .0      43.3     493.9     350.2     124.7    669.88
     1.87       .00      5.27      3.39      .000      .055      .085      .000    666.88    300.00
  .009644      223.      225.      168.         2         0         0       .00    214.66    514.66


$SECNO 4.600

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  4.17


3470 ENCROACHMENT STATIONS=      120.0     440.0  TYPE=      1  TARGET=      320.000
       CROSS SECTION AH
    4.600      9.48    676.98       .00       .00    677.03       .05       .28       .05    668.00
   1900.0    1029.9     567.7     302.4     957.5     214.3     271.4     354.8     125.9    670.00
     1.90      1.08      2.65      1.11      .085      .055      .085      .000    667.50    120.00
  .000553      223.      225.      168.         2         0         0       .00    320.00    440.00


$SECNO 4.770
       CROSS SECTION AI
    4.770      8.61    677.41       .00       .00    677.48       .07       .44       .01    674.00
   1900.0      25.4    1843.5      31.1      35.0     866.5      41.7     374.4     130.1    674.00
     2.00       .73      2.13       .75      .080      .050      .080      .000    668.80    239.51
  .000588      560.      900.      580.         3         0         0       .00    213.27    452.78


$SECNO 4.880

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .62

       CROSS SECTION AJ
    4.880      7.71    677.91       .00       .00    678.01       .10       .51       .02    672.00
   1900.0    1061.7     726.4     111.9     685.4     204.6      59.2     386.5     133.1    672.00
     2.07      1.55      3.55      1.89      .080      .060      .080      .000    670.20    158.65
  .001540      520.      600.      345.         2         0         0       .00    276.56    435.21
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 5.030

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .60

CROSS SECTION AK

5.030	5.64	679.24	.00	.00	679.45	.21	1.39	.06	676.00
1900.0	33.7	815.8	1050.5	17.9	167.5	431.2	395.6	135.8	674.00
2.12	1.88	4.87	2.44	.080	.060	.075	.000	673.60	287.30
.004311	410.	800.	430.	2	0	0	.00	228.12	515.42

*SECNO 5.060

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.13

CROSS SECTION AK-AL

5.060	5.63	679.63	.00	.00	679.67	.04	.17	.05	675.90
1900.0	571.4	508.1	820.4	434.7	224.1	659.0	397.7	136.4	676.00
2.14	1.31	2.27	1.25	.080	.060	.075	.000	674.00	43.36
.000948	190.	130.	40.	2	0	0	.00	408.83	452.20

*SECNO 5.070

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .56

DOWNSTREAM FACE OF MORRISH ROAD BRIDGE - AL

5.070	5.64	679.64	.00	.00	679.77	.13	.06	.05	674.00
1900.0	1254.5	543.9	101.7	574.7	126.9	52.9	398.6	136.7	674.00
2.14	2.18	4.29	1.92	.080	.060	.075	.000	674.00	137.11
.002985	38.	38.	38.	2	0	0	.00	263.08	400.19

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	.00	1.75	3.00	.00	22.50	.00	101.25	.00	674.00	674.00

*SECNO 5.073

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 3.29

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

PRESSURE AND WEIR FLOW, Weir Submergence Based on TRAPEZOIDAL Shape

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
689.21	679.97	.00	899.	1009.	101.	101.	678.50	679.90	396.

UPSTREAM FACE OF MORRISH ROAD BRIDGE

5.073	8.27	682.27	.00	.00	682.34	.07	2.56	.00	674.00
1900.0	1148.5	626.9	124.6	1256.4	186.1	159.3	399.5	137.0	674.00
2.14	.91	3.37	.78	.080	.030	.075	.000	674.00	51.90
.000277	35.	35.	35.	2	0	5	.00	390.51	442.41

*SECNO 5.080

CROSS SECTION AM

5.080	8.19	682.34	.00	.00	682.36	.02	.01	.02	676.00
1900.0	1138.6	423.9	337.6	1395.0	272.9	421.2	400.8	137.3	676.00
2.15	.82	1.55	.80	.080	.055	.075	.000	674.15	27.43
.000218	30.	30.	30.	2	0	0	.00	429.28	456.71

*SECNO 5.110

CROSS SECTION AM-AN

5.110	8.21	682.36	.00	.00	682.38	.02	.02	.00	676.00
1900.0	1139.0	422.9	338.1	1402.0	273.7	423.8	404.7	138.1	676.00
2.18	.81	1.54	.80	.080	.055	.075	.000	674.15	27.25
.000215	43.	148.	165.	1	0	0	.00	429.58	456.83

*SECNO 5.130

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .68

CROSS SECTION AN

5.130	8.18	682.38	.00	.00	682.41	.04	.03	.01	676.00
1900.0	1243.3	655.6	1.1	1176.6	310.6	3.1	408.1	138.7	680.00
2.20	1.06	2.11	.35	.090	.055	.085	.000	674.20	77.87
.000462	57.	137.	150.	0	0	0	.00	288.75	366.63

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   SECND     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECND 5.210
       CROSS SECTION AO
    5.210      8.28    682.53       .00       .00    682.59       .06       .16       .01    676.00
   1900.0     259.7     582.6    1057.7     245.4     204.3     745.0     415.4     140.1    676.00
     2.24      1.06      2.85      1.42      .090      .055      .085      .000    674.25     27.36
  .000737      110.      430.      350.         2         0         0       .00    255.29    282.64


CCHV=     .300 CEHV=     .500
*SECND 5.220

3301 HV CHANGED MORE THAN HVINS

       DOWNSTREAM FACE OF FRANCES ROAD BRIDGE
    5.220      7.44    681.73       .00       .00    683.42      1.68       .02       .81    681.90
   1900.0        .0    1900.0        .0        .0     182.4        .0     415.7     140.2    681.90
     2.24       .00     10.41       .00      .000      .012      .000      .000    674.29    171.10
  .000916       20.       20.       20.         2         0         0       .00     24.50    195.60



SPECIAL BRIDGE

5070, VARIABLE ELCHU OR ELCHD ON SB CARD NOT SPECIFIED
SB  XK        XKOR      COFQ      RDLEN     BWC       BWP       BAREA     SS        ELCHU     ELCHD
     .00      1.60      3.00       .00     24.50       .00     93.35       .00    674.29    674.29

*SECND 5.224
PRESSURE AND WEIR FLOW,  Weir Submergence Based on TRAPEZOIDAL Shape


 EGPRS     EGLWC     H3        QWEIR     QPR       BAREA   TRAPEZOID     ELLC      ELTRD     WEIRLN
                                                             AREA
   692.02    683.42       .00     1053.      853.       93.       93.     678.10    681.90      223.


       UPSTREAM FACE OF FRANCES ROAD BRIDGE
    5.224      8.12    682.41       .00       .00    683.81      1.40       .39       .00    681.90
   1900.0       2.3    1891.2       6.5      10.1     199.0      24.6     415.9     140.2    681.90
     2.24       .23      9.50       .26      .090      .012      .085      .000    674.29    142.92
  .000687       35.       35.       35.         3         0         0       .00    114.41    257.33


*SECND 5.226
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	DLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .27

5.226	8.49	682.80	680.01	.00	683.91	1.11	.02	.09	681.92
1900.0	28.5	1802.1	69.4	24.1	208.1	49.7	415.9	140.3	681.92
2.24	1.18	8.66	1.40	.090	.050	.085	.000	674.31	121.02
.009336	10.	10.	10.	6	19	0	.00	145.88	266.90

*SECNO 5.240

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 4.52

5.240	9.89	684.24	.00	.00	684.31	.07	.09	.31	676.00
1900.0	611.6	870.4	418.0	579.0	306.7	408.6	417.2	140.6	676.00
2.25	1.06	2.84	1.02	.090	.050	.085	.000	674.35	83.78
.000456	70.	70.	70.	2	0	0	.00	252.45	336.22

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T1 MONTROSE TWP. - ARMSTRONG CREEK F.I.S.
T2  J&A JOB NO. 13039-01
T3      100 YEAR FLOOD          FILENAME: MONARM.HC2

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0        4                           0                                 626.00

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       3       0.       -1.
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   SECND     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        DLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*PROF 3



CCHV=     .300 CEHV=     .500
*SECND  .000
        CROSS SECTION A
      .000     12.00    626.00       .00    626.00    626.09       .09       .00       .00    620.00
    2000.0     503.2    1252.1     244.7     675.0     410.0     395.0        .0        .0    620.00
       .00       .75      3.05       .62      .095      .046      .095      .000    614.00    150.00
   .000443        0.        0.        0.         0         0         0       .00    450.00    600.00


*SECND  .100
        CROSS SECTION B
      .100      9.05    626.25       .00       .00    626.38       .13       .27       .02    620.00
    2000.0     338.2    1343.2     318.6     350.2     383.4     371.7      12.5       3.8    620.00
       .05       .97      3.50       .86      .095      .046      .095      .000    617.20    127.51
   .000789      300.      510.      490.         2         0         0       .00    363.09    490.60


*SECND  .180

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .70

        CROSS SECTION C
      .180      7.65    626.65       .00       .00    626.83       .19       .43       .03    620.00
    2000.0      57.5     918.5    1024.0      44.2     186.2     816.3      21.3       6.6    620.00
       .09      1.30      4.93      1.25      .095      .046      .095      .000    619.00    231.70
   .001620      400.      440.      300.         2         0         0       .00    376.39    608.09


*SECND  .215
        CROSS SECTION C-D
      .215      7.05    627.05       .00       .00    627.15       .10       .29       .03    622.00
    2000.0    1018.6     602.5     378.9     692.7     145.2     340.3      25.8       8.1    622.00
       .11      1.47      4.15      1.11      .095      .046      .095      .000    620.00    310.42
   .001526      200.      195.      160.         2         0         0       .00    375.87    686.29


*SECND  .250
        CROSS SECTION D
      .250      6.39    627.39       .00       .00    627.56       .18       .38       .04    624.00
    2000.0     831.7     885.4     282.9     580.9     184.4     200.7      30.5       9.7    624.00
       .13      1.43      4.80      1.41      .095      .046      .095      .000    621.00    173.36
   .002651      200.      195.      160.         2         0         0       .00    377.05    550.41
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

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*SECNO  .360

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .57


3470 ENCROACHMENT STATIONS=      415.0     600.0  TYPE=      1  TARGET=     -415.000
       CROSS SECTION D-E
      .360      6.28    629.03       .00       .00    629.84       .81      1.96       .32    625.75
    2000.0      54.5    1489.7     455.8      22.7     180.3     190.7      36.3      11.8    625.75
       .15      2.40      8.26      2.39      .095      .046      .095      .000    622.75    415.00
   .008084      290.      560.      325.         3         0         0       .00    134.59    549.59


*SECNO  .470

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.94

       CROSS SECTION E
      .470      7.03    631.53       .00       .00    631.78       .25      1.77       .17    626.00
    2000.0     612.1    1148.8     239.1     413.2     223.6     148.9      41.6      13.3    626.00
       .18      1.48      5.14      1.61      .095      .046      .095      .000    624.50    361.69
   .002149      290.      560.      325.         2         0         0       .00    249.88    611.58


*SECNO  .540

3470 ENCROACHMENT STATIONS=      285.0     630.0  TYPE=      1  TARGET=     -285.000
       CROSS SECTION E-F
      .540      6.84    632.34       .00       .00    632.48       .13       .66       .04    626.00
    2000.0     789.8     721.4     488.8     599.5     159.3     329.7      49.0      15.5    626.00
       .22      1.32      4.53      1.48      .095      .046      .095      .000    625.50    285.00
   .001578      350.      390.      300.         2         0         0       .00    317.04    602.04


*SECNO  .610
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .62

CROSS SECTION F

.610	6.67	633.07	.00	.00	633.51	.44	.88	.15	630.00
2000.0	290.6	1589.0	120.3	194.5	268.0	75.0	55.5	17.7	630.00
.24	1.49	5.93	1.60	.095	.046	.095	.000	626.40	116.39
.004151	350.	390.	300.	2	0	0	.00	228.30	344.69

*SECNO .700

CROSS SECTION G

.700	7.58	634.58	.00	.00	634.88	.30	1.32	.04	632.00
2000.0	212.2	1443.2	344.6	140.6	281.8	300.3	60.1	19.3	632.00
.27	1.51	5.12	1.15	.095	.046	.095	.000	627.00	97.11
.002931	20.	440.	400.	3	0	0	.00	308.86	405.96

*SECNO .900

CROSS SECTION H

.900	7.25	636.75	.00	.00	636.88	.13	1.95	.05	636.00
2000.0	.4	1038.8	960.8	1.3	268.3	754.9	75.7	24.7	632.00
.36	.32	3.87	1.27	.095	.046	.095	.000	629.50	44.64
.001660	765.	1050.	640.	3	0	0	.00	334.68	379.32

*SECNO 1.120

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .63

CROSS SECTION I

1.120	7.81	639.01	.00	.00	639.65	.64	2.52	.25	634.60
2000.0	58.8	1503.6	437.5	35.2	204.9	249.8	90.8	29.3	633.60
.41	1.67	7.34	1.75	.095	.046	.095	.000	631.20	59.05
.004180	900.	1170.	720.	2	0	0	.00	168.60	227.66

*SECNO 1.210

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

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.17

CROSS SECTION I-J

1.210	8.27	640.37	.00	.00	640.48	.11	.67	.16	636.00
2000.0	147.4	1142.3	710.3	151.4	336.6	708.5	97.1	31.0	636.00
.46	.97	3.39	1.00	.095	.046	.095	.000	632.10	43.72
.000891	366.	470.	240.	2	0	0	.00	349.22	392.93

#SECNO 1.267

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .45

3470 ENCROACHMENT STATIONS= 417.0 617.0 TYPE= 1 TARGET= 200.000

1.267	8.01	640.61	.00	.00	640.97	.36	.37	.12	638.00
2000.0	614.6	1229.5	156.0	314.3	207.6	85.7	100.3	31.9	638.00
.47	1.96	5.92	1.82	.095	.046	.095	.000	632.60	417.00
.004458	100.	300.	90.	2	0	0	.00	200.00	617.00

#SECNO 1.276

3470 ENCROACHMENT STATIONS= 502.8 617.3 TYPE= 1 TARGET= 114.500

1.276	8.12	640.72	.00	.00	641.40	.68	.27	.16	638.00
2000.0	227.6	1565.5	206.8	95.8	212.4	90.3	100.9	32.0	638.00
.47	2.38	7.37	2.29	.095	.046	.095	.000	632.60	502.80
.006698	50.	50.	50.	2	0	0	.00	114.50	617.30

#SECNO 1.286

3470 ENCROACHMENT STATIONS= 515.3 604.8 TYPE= 1 TARGET= 89.500

CROSS SECTION J-I (41.0' DOWNSTREAM FROM McKINLEY ROAD BRIDGE)

1.286	8.42	641.02	.00	.00	641.76	.74	.33	.03	638.00
2000.0	163.6	1680.8	155.6	68.3	225.0	66.2	101.4	32.2	638.00
.48	2.40	7.47	2.35	.095	.046	.095	.000	632.60	515.30
.006370	50.	50.	50.	1	0	0	.00	89.50	604.80

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPW1D	ENDST

*SECNO 1.290

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .64

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 647.71 ELREA= 647.52

DOWNSTREAM FACE OF McKINLEY ROAD BRIDGE - J

1.290	7.73	640.43	.00	.00	643.12	2.68	.39	.97	647.71
2000.0	.0	2000.0	.0	.0	152.1	.0	101.6	32.2	647.52
.48	.00	13.15	.00	.000	.030	.000	.000	632.70	237.20
.015442	41.	41.	41.	3	0	0	.00	23.80	262.80

SPECIAL BRIDGE

SB	XK	XKOR	CDFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.25	1.60	3.00	.00	25.60	1.80	209.92	.00	633.60	632.70

*SECNO 1.296

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, XRATIO = 1.42

CLASS A LOW FLOW

3420 BRIDGE W.S.= 640.31 BRIDGE VELOCITY= 11.74 CALCULATED CHANNEL AREA= 160.

EGPRS	EGLWC	H3	QWEIR	QLOW	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
642.69	643.94	1.95	0.	2000.	210.	193.	641.73	647.52	0.

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 647.71 ELREA= 647.52

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      UPSTREAM FACE OF McKINLEY ROAD BRIDGE
    1.296      9.69    642.39      .00      .00    643.94     1.55      .82      .00    647.71
   2000.0       .0    2000.0       .0       .0     199.9       .0    101.8     32.2    647.52
      .48      .00     10.00      .00     .000      .030     .000     .000    632.70    237.20
  .007621      46.       46.      46.        0         0        0      .00     25.60    262.80


*SECND 1.300

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.36


3470 ENCROACHMENT STATIONS=      219.0     266.0  TYPE=      1  TARGET=       47.000
      CROSS SECTION K
    1.300      9.41    643.41      .00      .00    644.22      .82      .06      .22    636.00
   2000.0      95.0    1781.8    123.2     57.3     232.1     79.3    101.9     32.2    636.00
      .48      1.66      7.68     1.55     .095      .030     .095     .000    634.00    219.00
  .001368       24.       24.      24.        3         0        0      .00     47.00    266.00


*SECND 1.310

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.52


3470 ENCROACHMENT STATIONS=      169.0     316.0  TYPE=      1  TARGET=      147.000
      CROSS SECTION K-L
    1.310     10.13    644.13      .00      .00    644.42      .30      .04      .16    636.00
   2000.0      87.7    1324.6    587.7     82.6     250.3    430.9    102.6     32.3    636.00
      .48      1.06      5.29     1.36     .095      .030     .095     .000    634.00    209.67
  .000588       50.       50.      50.        2         0        0      .00    106.32    316.00


*SECND 1.350

3470 ENCROACHMENT STATIONS=      119.0     366.0  TYPE=      1  TARGET=      247.000
    1.350     10.24    644.35      .00      .00    644.53      .18      .07      .04    636.10
   2000.0      75.5    1119.6    804.9     85.0     253.1    739.6    104.5     32.6    636.10
      .49       .89      4.42     1.09     .095      .030     .095     .000    634.10    209.39
  .000405       50.      190.      50.        2         0        0      .00    156.61    366.00
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        DLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO 1.360

3470 ENCROACHMENT STATIONS=      69.0     416.0  TYPE=      1  TARGET=      347.000
       CROSS SECTION L-K
    1.360     10.24    644.45       .00       .00    644.57       .12       .02       .02    636.21
   2000.0      66.0     980.3     953.7      84.9     253.0    1022.3     106.1      32.8    636.21
      .50       .78      3.87       .93      .095      .030      .095      .000    634.21    209.40
  .000311       50.       85.       50.         2         0         0       .00    206.60    416.00


*SECNO 1.530

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .69

       CROSS SECTION L
    1.530      9.52    644.72       .00       .00    644.96       .25       .33       .06    640.00
   2000.0      75.1    1502.8     422.1     105.7     328.8     531.6     124.2      36.8    640.00
      .56       .71      4.57       .79      .095      .030      .095      .000    635.20    380.18
  .000661      410.      850.      650.         2         0         0       .00    330.15    710.32


1490 NH CARD USED
*SECNO 1.620
       CROSS SECTION M
    1.620      7.58    645.38       .00       .00    645.44       .06       .42       .06    640.00
   2000.0      14.0     631.9    1354.0      17.4     207.9    1253.2     141.1      41.8    640.00
      .65       .81      3.04      1.08      .085      .050      .093      .000    637.80    193.54
  .000812      250.      520.      650.         2         0         0       .00    393.36    586.91


*SECNO 1.740

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .48

       CROSS SECTION N
    1.740      7.81    646.01       .00       .00    646.18       .17       .68       .05    643.00
   2000.0     466.3     558.1     975.5     278.5     104.9     470.4     152.5      45.3    641.80
      .70      1.67      5.32      2.07      .085      .050      .085      .000    638.20    144.48
  .003582      400.      600.      400.         2         0         0       .00    330.55    475.03


*SECNO 1.900
       CROSS SECTION O
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


    1.900     8.70    648.20       .00       .00    648.55       .35      2.28       .09    644.50
   2000.0    414.3    1110.7     475.0     255.0     179.7     241.9     161.9      48.8    645.30
      .74     1.62      6.18      1.96      .085      .050      .085      .000    639.50    118.02
  .003794     600.      860.      350.         2         0         0       .00    272.97    390.99


*SECNO 1.980
       CROSS SECTION P
    1.980     7.83    649.33       .00       .00    649.62       .29      1.06       .02    645.00
   2000.0    195.9     976.0     828.1     110.1     161.8     611.5     166.8      50.8    644.70
      .76     1.78      6.03      1.35      .090      .045      .090      .000    641.50     65.19
  .002816     350.      395.      200.         2         0         0       .00    414.74    479.93


*SECNO 2.040
       CROSS SECTION Q
    2.040     8.11    650.11       .00       .00    650.26       .14       .59       .04    646.60
   2000.0     83.8     729.5    1186.7      46.1     159.1     769.2     172.6      53.4    646.80
      .79     1.82      4.58      1.54      .065      .042      .057      .000    642.00     59.77
  .001547     300.      335.      250.         2         0         0       .00    475.52    535.29


*SECNO 2.220

3470 ENCROACHMENT STATIONS=      190.0     890.0  TYPE=      1  TARGET=     -190.000
       CROSS SECTION R
    2.220     8.66    651.76       .00       .00    652.03       .27      1.71       .06    650.00
   2000.0     55.0    1391.9     553.1      52.6     282.8     479.0     192.8      66.1    647.30
      .87     1.05      4.92      1.15      .075      .042      .057      .000    643.10    190.00
  .001996     530.      960.     1030.         2         0         0       .00    631.83    821.83


*SECNO 2.320
       CROSS SECTION S
    2.320     8.01    653.01       .00       .00    653.37       .36      1.30       .05    650.00
   2000.0     14.6    1474.1     511.3      11.4     264.8     427.5     200.7      71.1    650.00
      .90     1.28      5.57      1.20      .085      .050      .085      .000    645.00    107.45
  .003425     370.      550.      400.         2         0         0       .00    418.38    525.83


*SECNO 2.580
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        QLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.42


3470 ENCROACHMENT STATIONS=      200.0     650.0  TYPE=      1  TARGET=     -200.000
       CROSS SECTION T
    2.580      7.06    656.06       .00       .00    656.19       .13      2.74       .07    658.00
   2000.0        .0    1360.5     639.5        .0     406.7     539.4     219.3      78.6    653.50
     1.02       .00      3.35      1.19      .000      .050      .085      .000    649.00    210.91
  .001696      720.     1355.      730.         3         0         0       .00    359.85    570.76


*SECNO 2.860
       CROSS SECTION U
    2.860      5.59    658.09       .00       .00    658.21       .12      2.02       .00    654.00
   2000.0     391.5     743.9     864.7     272.9     181.0     595.7     239.2      85.3    654.00
     1.14      1.43      4.11      1.45      .085      .050      .085      .000    652.50    139.51
  .002158      430.     1465.      660.         1         0         0       .00    425.99    565.49


*SECNO 3.030

3470 ENCROACHMENT STATIONS=      150.0     870.0  TYPE=      1  TARGET=     -150.000
       CROSS SECTION V
    3.030      7.65    660.05       .00       .00    660.37       .32      2.06       .10    656.00
   2000.0     828.4     942.3     229.3     419.5     150.0     160.7     253.5      91.3    656.80
     1.20      1.97      6.28      1.43      .080      .045      .080      .000    652.40    150.00
  .003448      710.      910.      600.         2         0         0       .00    354.01    504.01


1490 NH CARD USED
*SECNO 3.080

3470 ENCROACHMENT STATIONS=      210.0     660.0  TYPE=      1  TARGET=      450.000
       CROSS SECTION W
    3.080      8.03    660.83       .00       .00    661.12       .30       .75       .01    658.10
   2000.0      62.1    1172.4     765.4      39.6     209.4     620.8     258.9      94.2    656.90
     1.22      1.57      5.60      1.23      .075      .042      .087      .000    652.80    210.00
  .002224      200.      260.      370.         0         0         0       .00    450.00    660.00


*SECNO 3.250
       CROSS SECTION W-X
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IBC	ICONT	CORAR	TOPWID	ENDST
3.250	5.59	662.59	.00	.00	662.79	.19	1.63	.03	658.00
2000.0	1172.9	817.9	9.2	547.9	168.3	8.4	268.9	98.1	660.00
1.27	2.14	4.86	1.09	.075	.045	.080	.000	657.00	211.73
.002703	461.	891.	421.	2	0	0	.00	249.76	461.49

#SECNO 3.270

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .64

3470 ENCROACHMENT STATIONS= 355.0 520.0 TYPE= 1 TARGET= 165.000
CROSS SECTION X

3.270	5.75	662.75	.00	.00	663.44	.69	.40	.25	658.00
2000.0	630.5	1352.7	16.9	195.2	173.8	9.5	270.2	98.5	660.00
1.28	3.23	7.78	1.78	.075	.045	.080	.000	657.00	355.00
.006648	100.	100.	100.	2	0	0	.00	106.88	461.88

#SECNO 3.280

3470 ENCROACHMENT STATIONS= 380.0 495.0 TYPE= 1 TARGET= 115.000
CROSS SECTION X-Y

3.280	5.68	663.07	.00	.00	664.14	1.07	.51	.19	658.39
2000.0	410.4	1571.0	18.6	111.8	171.0	8.9	270.7	98.6	660.39
1.28	3.67	9.19	2.09	.075	.045	.080	.000	657.39	380.00
.009462	65.	65.	65.	1	0	0	.00	81.68	461.68

#SECNO 3.290

3470 ENCROACHMENT STATIONS= 396.5 478.5 TYPE= 1 TARGET= 82.000
CROSS SECTION Y-X

3.290	5.76	663.45	.00	.00	664.75	1.29	.50	.11	658.69
2000.0	274.3	1704.2	21.5	70.2	174.6	9.6	271.0	98.7	660.69
1.28	3.91	9.76	2.24	.075	.045	.080	.000	657.69	396.50
.010391	50.	50.	50.	1	0	0	.00	65.43	461.93

#SECNO 3.300

3301 HV CHANGED MORE THAN HVINS

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

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.46

3470 ENCROACHMENT STATIONS= 359.0 416.0 TYPE= 1 TARGET= 57.000
46' DOWNSTREAM FROM DODGE ROAD BRIDGE - Y

3.300	6.45	664.45	.00	.00	665.24	.79	.34	.15	659.50
2000.0	166.7	1658.1	175.2	53.6	215.9	51.4	271.3	98.8	659.50
1.28	3.11	7.68	3.41	.075	.045	.080	.000	658.00	359.00
.004844	44.	50.	44.	3	0	0	.00	57.00	416.00

*SECNO 3.310

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 670.20 ELREA= 670.50

DOWNSTREAM FACE OF DODGE ROAD BRIDGE

3.310	7.98	664.58	.00	.00	665.62	1.03	.26	.12	670.20
2100.0	.0	2100.0	.0	.0	257.5	.0	271.6	98.8	670.50
1.28	.00	8.16	.00	.000	.045	.000	.000	656.60	292.70
.006525	46.	46.	46.	2	0	0	.00	34.80	327.50

SPECIAL BRIDGE

5070, VARIABLE ELCHU OR ELCHD ON SB CARD NOT SPECIFIED

SB XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
.90	1.60	3.00	.00	35.00	5.00	176.00	.00	656.60	656.60

*SECNO 3.320

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.63

PRESSURE FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
668.12	665.95	.44	0.	2100.	176.	24.	657.40	669.93	0.

SECND	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 670.20 ELREA= 670.50

UPSTREAM FACE OF DODGE ROAD BRIDGE

3.320	11.00	667.60	.00	.00	668.12	.52	2.50	.00	670.20
2100.0	.0	2100.0	.0	.0	362.5	.0	272.2	98.9	670.50
1.29	.00	5.79	.00	.000	.045	.000	.000	656.60	292.70
.002442	80.	80.	80.	2	0	0	.00	34.80	327.50

*SECND 3.330

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.63

3470 ENCROACHMENT STATIONS= 442.0 573.0 TYPE= 1 TARGET= 131.000

CROSS SECTION Z

3.330	9.70	668.20	.00	.00	668.28	.08	.03	.13	660.00
2100.0	397.6	1382.4	319.9	302.8	507.1	264.7	272.9	99.0	660.00
1.29	1.31	2.73	1.21	.075	.045	.080	.000	658.50	442.00
.000354	46.	40.	34.	2	0	0	.00	131.00	573.00

*SECND 3.340

3470 ENCROACHMENT STATIONS= 392.0 623.0 TYPE= 1 TARGET= 231.000

CROSS SECTION Z-AA

3.340	9.82	668.28	.00	.00	668.31	.03	.01	.01	659.96
2100.0	659.6	999.7	440.7	684.5	513.4	545.9	274.5	99.2	659.96
1.30	.96	1.95	.81	.085	.050	.090	.000	658.46	392.00
.000219	50.	50.	50.	0	0	0	.00	231.00	623.00

*SECND 3.350

3470 ENCROACHMENT STATIONS= 342.0 673.0 TYPE= 1 TARGET= 331.000

CROSS SECTION AA-Z

3.350	9.89	668.30	.00	.00	668.32	.02	.01	.00	659.91
2100.0	818.2	824.6	457.2	1041.9	517.5	711.5	276.8	99.5	659.91
1.32	.79	1.59	.64	.085	.050	.090	.000	658.41	342.00
.000145	50.	50.	50.	1	0	0	.00	322.62	664.62

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

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*SECNO 3.480

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  XRATIO =   .45

       CROSS SECTION AA
    3.480     10.42    668.42       .00       .00    668.48       .07       .14       .02    663.00
   2100.0    1170.0     654.0     276.0     863.3     210.1     233.1     295.6     102.5    662.70
     1.39      1.36      3.11      1.18      .085      .050      .090      .000    658.00    226.87
  .000712      395.      670.      425.         2         0         0       .00    265.22    492.09


*SECNO 3.650
       CROSS SECTION AB
    3.650      9.33    669.03       .00       .00    669.08       .05       .59       .00    663.00
   2100.0     660.8     394.3    1045.0     418.8     132.8     816.2     317.7     107.0    663.00
     1.51      1.58      2.97      1.28      .085      .055      .090      .000    659.70     37.42
  .000891      740.      920.      625.         2         0         0       .00    300.15    337.58


*SECNO 3.740

3470 ENCROACHMENT STATIONS=     150.0     310.0  TYPE=     1  TARGET=    -150.000
       CROSS SECTION AC
    3.740      8.92    669.42       .00       .00    669.52       .10       .42       .02    664.00
   2100.0     483.7     621.1     995.2     244.0     161.0     677.7     327.8     109.3    663.00
     1.56      1.98      3.86      1.47      .080      .055      .090      .000    660.50    150.00
  .001391      400.      460.      325.         2         0         0       .00    266.70    416.70


*SECNO 3.900
       CROSS SECTION AD
    3.900      8.14    670.34       .00       .00    670.44       .10       .92       .00    664.00
   2100.0     508.1     706.7     885.1     275.7     188.1     575.5     343.1     113.0    664.00
     1.64      1.84      3.76      1.54      .085      .055      .080      .000    662.20    143.58
  .001338      630.      870.      560.         2         0         0       .00    267.44    411.02


*SECNO 4.040
       CROSS SECTION AE
    4.040      7.77    671.17       .00       .00    671.32       .15       .85       .02    663.70
   2100.0      77.3     591.2    1431.5      42.9     117.3     788.5     353.2     115.7    666.90
     1.69      1.80      5.04      1.82      .085      .050      .085      .000    663.40     26.51
  .002313      440.      720.       380         2         0         0       .00    301.05    327.56
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        DLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       NTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO 4.320
       CROSS SECTION AF
    4.320      9.10    673.20       .00       .00    673.31       .11      1.98       .01    668.40
   2100.0    1191.0     797.5     111.4     722.6     205.3      83.3     373.8     121.3    669.70
     1.80      1.65      3.88      1.34      .085      .055      .090      .000    664.10    199.02
  .001620      740.     1500.      850.         2         0         0       .00    268.24    467.26


*SECNO 4.380

3470 ENCROACHMENT STATIONS=      330.0     785.0  TYPE=      1  TARGET=     -330.000
       CROSS SECTION AF-AG
    4.380      8.99    673.59       .00       .00    673.76       .17       .42       .03    668.00
   2100.0     992.5     883.6     223.9     602.8     189.6     136.6     378.4     122.6    668.00
     1.83      1.65      4.66      1.64      .085      .055      .090      .000    664.60    330.00
  .002212      185.      275.      240.         2         0         0       .00    309.56    639.56


*SECNO 4.430
       CROSS SECTION AG
    4.430      9.18    674.18       .00       .00    674.54       .36       .68       .10    668.00
   2100.0     268.6    1052.2     779.2      90.8     164.6     401.8     382.5     124.0    668.00
     1.84      2.96      6.39      1.94      .085      .055      .085      .000    665.00    263.73
  .003772      185.      275.      240.         2         0         0       .00    247.61    511.34


*SECNO 4.510
       CROSS SECTION AG-AH
    4.510      9.40    675.65       .00       .00    675.95       .30      1.40       .02    669.25
   2100.0     264.7    1006.1     829.1      95.5     169.0     447.1     388.5     126.0    669.25
     1.87      2.77      5.96      1.85      .085      .055      .085      .000    666.25    263.40
  .003160      445.      450.      335.         2         0         0       .00    249.58    512.98


*SECNO 4.560

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .58


3470 ENCROACHMENT STATIONS=      300.0     520.0  TYPE=      1  TARGET=      220.000
       CROSS SECTION AH-AG
    4.560      9.84    676.71       .00       .00    676.92       .21       .95       .03 100000.00
   2100.0        .0     230.6    1869.4        .0      44.4     540.3     391.1     126.9    669.88
     1.88       .00      5.20      3.46      .000      .055      .085      .000    666.88    300.00
  .009260      223.      225.      168.         2         0         0       .00    216.32    516.32
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	DLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

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#SECNO 4.600

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.99


3470 ENCROACHMENT STATIONS=      120.0     440.0  TYPE=      1  TARGET=      320.000
       CROSS SECTION AH
    4.600      9.71    677.21       .00       .00    677.26       .05       .29       .05    668.00
   2100.0    1152.9     609.0     338.1    1009.6     220.1     287.6     396.0     128.1    670.00
     1.92      1.14      2.77      1.18      .085      .055      .085      .000    667.50    120.00
  .000583      223.      225.      168.         2         0         0       .00    320.00    440.00


#SECNO 4.770
       CROSS SECTION AI
    4.770      8.86    677.66       .00       .00    677.74       .08       .46       .01    674.00
   2100.0      31.2    2030.8      38.0      40.2     908.5      47.5     416.6     132.4    674.00
     2.02       .78      2.24       .80      .080      .050      .080      .000    668.80    238.03
  .000609      560.      900.      580.         3         0         0       .00    216.11    454.14


#SECNO 4.880

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .63

       CROSS SECTION AJ
    4.880      7.97    678.17       .00       .00    678.27       .10       .52       .01    672.00
   2100.0    1209.6     768.0     122.4     745.7     212.1      63.2     429.5     135.4    672.00
     2.08      1.62      3.62      1.94      .080      .060      .080      .000    670.20    156.92
  .001527      520.      600.      345.         2         0         0       .00    278.63    435.55


#SECNO 5.030

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .60

       CROSS SECTION AK
    5.030      5.86    679.46       .00       .00    679.67       .21      1.35       .06    676.00
   2100.0      39.8     864.5    1195.7      20.4     174.6     472.9     439.3     138.1    674.00
     2.13      1.95      4.95      2.53      .080      .060      .075      .000    673.60    286.63
  .004212      410.      800.      430.         2         0         0       .00    231.58    518.21
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 5.060

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.11

CROSS SECTION AK-AL

5.060	5.85	679.85	.00	.00	679.89	.04	.16	.05	675.90
2100.0	631.9	543.3	924.7	464.6	233.6	710.7	441.5	138.8	676.00
2.14	1.36	2.33	1.30	.080	.060	.075	.000	674.00	41.37
.000943	190.	130.	40.	2	0	0	.00	412.50	453.86

*SECNO 5.070

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .56

DOWNSTREAM FACE OF MORRISH ROAD BRIDGE - AL

5.070	5.86	679.86	.00	.00	680.00	.14	.06	.05	674.00
2100.0	1404.0	579.2	116.8	623.1	131.8	58.4	442.5	139.1	674.00
2.15	2.25	4.39	2.00	.080	.060	.075	.000	674.00	129.74
.002980	38.	38.	38.	2	0	0	.00	271.56	401.29

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	.00	1.75	3.00	.00	22.50	.00	101.25	.00	674.00	674.00

*SECNO 5.073

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 3.09

PRESSURE AND WEIR FLOW, Weir Submergence Based on TRAPEZOIDAL Shape

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
691.55	680.20	.00	1124.	994.	101.	101.	678.50	679.90	406.

UPSTREAM FACE OF MORRISH ROAD BRIDGE

5.073	8.40	682.40	.00	.00	682.48	.08	2.48	.00	674.00
2100.0	1275.3	683.9	140.8	1296.4	189.0	168.5	443.5	139.3	674.00
2.15	.98	3.62	.84	.080	.030	.075	.000	674.00	47.95
.000312	35.	35.	35.	2	0	5	.00	400.53	448.48

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


#SECNO 5.080
       CROSS SECTION AM
    5.080      8.33    682.48       .00       .00    682.50       .02       .01       .02    676.00
   2100.0    1261.3     462.2     376.5    1435.9     277.8     436.5     444.8     139.6    676.00
     2.16       .88      1.66       .86      .080      .055      .075      .000    674.15     26.37
  .000244       30.       30.       30.         2         0         0       .00    431.06    457.42


#SECNO 5.110
       CROSS SECTION AM-AN
    5.110      8.36    682.51       .00       .00    682.52       .02       .02       .00    676.00
   2100.0    1261.9     461.0     377.1    1443.8     278.8     439.4     448.8     140.4    676.00
     2.18       .87      1.65       .86      .080      .055      .075      .000    674.15     26.16
  .000240       43.      148.      165.         1         0         0       .00    431.40    457.56


#SECNO 5.130

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  XRATIO =   .68

       CROSS SECTION AN
    5.130      8.32    682.52       .00       .00    682.57       .04       .03       .01    676.00
   2100.0    1380.6     718.0       1.3    1212.4     317.0       3.5     452.2     141.1    680.00
     2.20      1.14      2.27       .38      .090      .055      .085      .000    674.20     77.06
  .000518       57.      137.      150.         0         0         0       .00    289.72    366.79


#SECNO 5.210
       CROSS SECTION AO
    5.210      8.44    682.69       .00       .00    682.76       .07       .18       .01    676.00
   2100.0     294.4     633.5    1172.1     258.1     208.4     770.0     459.8     142.5    676.00
     2.24      1.14      3.04      1.52      .090      .055      .085      .000    674.25     26.54
  .000816      110.      430.      350.         2         0         0       .00    256.92    283.46


CCHV=     .300 CEHV=     .500
#SECNO 5.220

3301 HV CHANGED MORE THAN HVINS

       DOWNSTREAM FACE OF FRANCES ROAD BRIDGE
    5.220      7.27    681.56       .00       .00    683.93      2.37       .02      1.15    681.90
   2200.0        .0    2200.0        .0        .0     178.2        .0     460.1     142.5    681.90
     2.24       .00     12.35       .00      .000      .012      .000      .000    674.29    171.10
  .001314       20.       20.       20.         3         0         0       .00     24.50    195.60
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

SPECIAL BRIDGE

5070, VARIABLE ELCHU OR ELCHD ON SB CARD NOT SPECIFIED

SB	XK	XKOR	CDFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	.00	1.60	3.00	.00	24.50	.00	93.35	.00	674.29	674.29

*SECNO 5.224
PRESSURE AND WEIR FLOW, Weir Submergence Based on TRAPEZOIDAL Shape

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
695.36	683.93	.00	1290.	927.	93.	93.	678.10	681.90	231.

UPSTREAM FACE OF FRANCES ROAD BRIDGE

5.224	7.49	681.78	.00	.00	684.01	2.23	.08	.00	681.90
2200.0	.0	2200.0	.0	.0	183.6	.0	460.3	142.5	681.90
2.24	.00	11.98	.00	.000	.012	.000	.000	674.29	171.10
.001206	35.	35.	35.	4	0	5	.00	24.50	195.60

*SECNO 5.226

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .24

5.226	7.51	681.83	.00	.00	684.05	2.22	.03	.00	681.92
2200.0	.0	2200.0	.0	.0	183.9	.0	460.3	142.5	681.92
2.24	.00	11.96	.00	.000	.050	.000	.000	674.31	171.10
.020837	10.	10.	10.	2	0	0	.00	24.50	195.60

*SECNO 5.240

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 6.60

5.240	10.37	684.72	.00	.00	684.79	.07	.10	.64	676.00
2200.0	725.4	967.2	507.5	637.1	322.2	458.0	461.6	142.8	676.00
2.25	1.14	3.00	1.11	.090	.050	.085	.000	674.35	81.37
.000478	70.	70.	70.	2	0	0	.00	257.27	338.63

```
T1 MONTROSE TWP. - ARMSTRONG CREEK F.I.S.
T2  J&A JOB NO. 13039-01
T3      500 YEAR FLOOD          FILENAME: MONARM.HC2

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0        5                            0                                    627.39

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     14        0.       -1.
```

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


*PROF 4



CCHV=     .300 CEHV=     .500
*SECNO  .000
       CROSS SECTION A
     .000     13.39    627.39       .00    627.39    627.46       .07       .00       .00    620.00
   2500.0     768.3    1295.1    436.6    1018.6     465.6     662.4        .0        .0    620.00
     .00       .75      2.78       .66      .095      .046      .095      .000    614.00    125.67
  .000310        0.        0.        0.         0         0         0       .00    509.08    634.75


*SECNO  .100
       CROSS SECTION B
     .100     10.36    627.56       .00       .00    627.65       .10       .18       .02    620.00
   2500.0     503.7    1449.1    547.2     518.8     448.8     640.0      18.0       4.3    620.00
     .06       .97      3.23       .85      .095      .046      .095      .000    617.20    114.44
  .000543      300.      510.      490.         2         0         0       .00    405.56    520.00


*SECNO  .180
       CROSS SECTION C
     .180      8.82    627.82       .00       .00    627.94       .12       .28       .01    620.00
   2500.0      70.7     933.9    1495.4      61.1     215.5    1221.0      30.4       7.3    620.00
     .10      1.16      4.33      1.22      .095      .046      .095      .000    619.00    229.36
  .001029      400.      440.      300.         2         0         0       .00    393.38    622.74


*SECNO  .215

3265 DIVIDED FLOW

       CROSS SECTION C-D
     .215      8.07    628.07       .00       .00    628.15       .08       .19       .01    622.00
   2500.0    1275.5     652.5     571.9     910.4     169.6     497.4      36.6       9.2    622.00
     .13      1.40      3.85      1.15      .095      .046      .095      .000    620.00     17.41
  .001066      200.      195.      160.         2         0         0       .00    511.19    693.97


*SECNO  .250
       CROSS SECTION D
     .250      7.30    628.30       .00       .00    628.43       .13       .26       .02    624.00
   2500.0    1155.4     945.1     399.6     808.9     218.0     286.7      42.9      11.1    624.00
     .15      1.43      4.34      1.39      .095      .046      .095      .000    621.00    168.67
  .001729      200.      195.      160.         2         0         0       .00    387.81    556.48
```

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

```
#SECNO  .360

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .43


3470 ENCROACHMENT STATIONS=      415.0     600.0  TYPE=      1  TARGET=     -415.000
       CROSS SECTION D-E
      .360      6.62    629.37       .00       .00    630.38      1.02      1.51       .44    625.75
    2500.0      68.2    1805.6     626.2      25.1     192.8     221.7      50.2      13.2    625.75
      .16      2.72      9.37      2.82      .095      .046      .095      .000    622.75    415.00
   .009499      290.      560.      325.         3         0         0       .00    137.12    552.12


#SECNO  .470

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.13

       CROSS SECTION E
      .470      7.66    632.16       .00       .00    632.42       .26      1.81       .23    626.00
    2500.0     853.5    1328.3     318.2     556.8     245.6     182.2      56.5      15.6    626.00
      .20      1.53      5.41      1.75      .095      .046      .095      .000    624.50    116.85
   .002100      290.      560.      325.         2         0         0       .00    497.44    614.28


#SECNO  .540

3470 ENCROACHMENT STATIONS=      285.0     630.0  TYPE=      1  TARGET=     -285.000
       CROSS SECTION E-F
      .540      7.46    632.96       .00       .00    633.10       .14       .64       .04    626.00
    2500.0    1052.5     823.6     623.9     724.0     174.2     387.9      65.5      18.8    626.00
      .24      1.45      4.73      1.61      .095      .046      .095      .000    625.50    285.00
   .001526      350.      390.      300.         3         0         0       .00    317.84    602.84


#SECNO  .610
```

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

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .62

CROSS SECTION F

.610	7.24	633.64	.00	.00	634.10	.46	.84	.16	630.00
2500.0	455.3	1866.0	178.7	278.5	299.2	98.3	73.3	21.1	630.00
.26	1.64	6.24	1.82	.095	.046	.095	.000	626.40	87.98
.003964	350.	390.	300.	2	0	0	.00	259.19	347.18

*SECNO .700

CROSS SECTION G

.700	8.08	635.08	.00	.00	635.39	.31	1.25	.04	632.00
2500.0	290.0	1669.5	540.5	172.7	309.4	396.2	78.7	22.8	632.00
.28	1.68	5.40	1.36	.095	.046	.095	.000	627.00	94.60
.002874	20.	440.	400.	3	0	0	.00	312.20	406.80

*SECNO .900

CROSS SECTION H

.900	7.73	637.23	.00	.00	637.38	.15	1.93	.05	636.00
2500.0	1.6	1225.6	1272.8	3.4	293.3	890.6	97.0	28.2	632.00
.37	.46	4.18	1.43	.095	.046	.095	.000	629.50	42.48
.001717	765.	1050.	640.	3	0	0	.00	342.85	385.33

*SECNO 1.120

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .62

CROSS SECTION I

1.120	8.34	639.54	.00	.00	640.27	.72	2.61	.29	634.60
2500.0	82.7	1768.3	648.9	44.2	220.8	316.9	114.4	32.9	633.60
.41	1.87	8.01	2.05	.095	.046	.095	.000	631.20	57.13
.004501	900.	1170.	720.	2	0	0	.00	177.18	234.31

*SECNO 1.210

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


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.25

       CROSS SECTION I-J
    1.210      8.90    641.00       .00       .00    641.12       .12       .67       .18    636.00
   2500.0     204.1    1327.0     968.9     187.6     368.1     863.2     121.8      34.7    636.00
      .46      1.09      3.60      1.12      .095      .046      .095      .000    632.10     41.51
  .000893      366.      470.      240.         2         0         0       .00    356.46    397.98


*SECNO 1.267

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .46


3470 ENCROACHMENT STATIONS=      417.0     617.0  TYPE=      1  TARGET=      200.000
    1.267      8.62    641.22       .00       .00    641.59       .37       .35       .13    638.00
   2500.0     837.2    1448.1     214.7     387.6     234.2     106.9     125.5      35.6    638.00
      .47      2.16      6.18      2.01      .095      .046      .095      .000    632.60    417.00
  .004136      100.      300.       90.         2         0         0       .00    200.00    617.00


*SECNO 1.276

3470 ENCROACHMENT STATIONS=      502.8     617.3  TYPE=      1  TARGET=      114.500
    1.276      8.67    641.27       .00       .00    642.06       .79       .26       .21    638.00
   2500.0     310.9    1901.5     287.6     115.2     236.6     109.7     126.2      35.7    638.00
      .47      2.70      8.04      2.62      .095      .046      .095      .000    632.60    502.80
  .006894       50.       50.       50.         2         0         0       .00    114.50    617.30


*SECNO 1.286

3470 ENCROACHMENT STATIONS=      515.3     604.8  TYPE=      1  TARGET=       89.500
       CROSS SECTION J-I (41.0' DOWNSTREAM FROM McKINLEY ROAD BRIDGE)
    1.286      8.96    641.56       .00       .00    642.46       .90       .34       .06    638.00
   2500.0     221.1    2066.6     212.3      80.7     249.0      78.6     126.7      35.9    638.00
      .48      2.74      8.30      2.70      .095      .046      .095      .000    632.60    515.30
  .006873       50.       50.       50.         1         0         0       .00     89.50    604.80
```

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

*SECNO 1.290

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 647.71 ELREA= 647.52

DOWNSTREAM FACE OF McKINLEY ROAD BRIDGE - J

1.290	8.26	640.96	640.96	.00	644.54	3.59	.45	1.34	647.71
2500.0	.0	2500.0	.0	.0	164.5	.0	127.0	35.9	647.52
.48	.00	15.20	.00	.000	.030	.000	.000	632.70	237.20
.019655	41.	41.	41.	4	8	0	.00	23.80	262.80

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 638.12 , NOT 640.96 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.25	1.60	3.00	.00	25.60	1.80	209.92	.00	633.60	632.70

*SECNO 1.296

3301 HV CHANGED MORE THAN HVINS

CLASS B LOW FLOW

3420 BRIDGE W.S.= 640.15 BRIDGE VELOCITY= 15.01 CALCULATED CHANNEL AREA= 156.

EGPRS	EGLWC	H3	QWEIR	QLOW	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
644.48	644.90	.00	0.	2500.	210.	193.	641.73	647.52	0.

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 647.71 ELREA= 647.52

UPSTREAM FACE OF McKINLEY ROAD BRIDGE

1.296	9.91	642.61	.00	.00	644.90	2.30	.36	.00	647.71
2500.0	.0	2500.0	.0	.0	205.6	.0	127.2	35.9	647.52
.48	.00	12.16	.00	.000	.030	.000	.000	632.70	237.20
.010970	46.	46.	46.	0	0	0	.00	25.60	262.80

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SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        DLOSS     L-BANK ELEV
Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

*SECNO 1.300

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.66

3470 ENCROACHMENT STATIONS=      219.0     266.0  TYPE=      1  TARGET=       47.000
       CROSS SECTION K
    1.300     10.31    644.31       .00       .00    645.36      1.05       .08       .37    636.00
   2500.0     130.2    2215.2     154.6      67.1     254.5      89.2     127.3      36.0    636.00
      .48      1.94      8.70      1.73      .095      .030      .095      .000    634.00    219.00
  .001555       24.       24.       24.         3         0         0       .00     47.00    266.00

*SECNO 1.310

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.60

3470 ENCROACHMENT STATIONS=      169.0     316.0  TYPE=      1  TARGET=      147.000
       CROSS SECTION K-L
    1.310     11.27    645.27       .00       .00    645.61       .35       .05       .21    636.00
   2500.0     125.4    1610.7     763.8     107.4     278.8     500.4     128.1      36.0    636.00
      .48      1.17      5.78      1.53      .095      .030      .095      .000    634.00    206.82
  .000607       50.       50.       50.         2         0         0       .00    109.18    316.00

*SECNO 1.350

3470 ENCROACHMENT STATIONS=      119.0     366.0  TYPE=      1  TARGET=      247.000
    1.350     11.42    645.52       .00       .00    645.72       .20       .07       .04    636.10
   2500.0     106.8    1345.2    1048.0     110.9     282.5     869.8     130.2      36.3    636.10
      .49       .96      4.76      1.20      .095      .030      .095      .000    634.10    206.45
  .000405       50.      190.       50.         2         0         0       .00    159.55    366.00

*SECNO 1.360
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


3470 ENCROACHMENT STATIONS=      69.0     416.0  TYPE=      1  TARGET=      347.000
       CROSS SECTION L-K
    1.360     11.43    645.63      .00       .00    645.77      .13       .02       .02    636.21
   2500.0      92.5    1163.4    1244.2     111.1     282.7    1213.6     132.1      36.5    636.21
      .50       .83      4.12      1.03      .095      .030      .095      .000    634.21    206.43
  .000302      50.       85.       50.         2         0         0       .00    209.57    416.00


*SECNO 1.530
       CROSS SECTION L
    1.530     10.68    645.88      .00       .00    646.09      .21       .29       .04    640.00
   2500.0     118.0    1694.0    688.0     164.5     383.6     840.1     155.2      41.0    640.00
      .57       .72      4.42      .82      .095      .030      .095      .000    635.20    369.10
  .000502     410.      850.      650.         2         0         0       .00    393.71    762.81


1490 NH CARD USED
*SECNO 1.620
       CROSS SECTION M
    1.620      8.61    646.41      .00       .00    646.46      .05       .32       .05    640.00
   2500.0      19.5     694.3    1786.2      24.7     238.8    1623.2     177.8      46.5    640.00
      .67       .79      2.91      1.10      .085      .050      .093      .000    637.80    192.31
  .000618     250.      520.      650.         2         0         0       .00    398.72    591.03


*SECNO 1.740

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .51

       CROSS SECTION N
    1.740      8.67    646.87      .00       .00    646.99      .12       .49       .04    643.00
   2500.0     690.0     561.4    1248.6     403.0     118.5     617.0     192.5      49.9    641.80
      .72      1.71      4.74      2.02      .085      .050      .085      .000    638.20    139.25
  .002412     400.      600.      400.         2         0         0       .00    337.92    477.16


*SECNO 1.900
       CROSS SECTION O
    1.900      9.10    648.60      .00       .00    648.98      .38      1.86       .13    644.50
   2500.0     599.6    1265.9    634.6     313.7     189.7     282.8     204.1      53.5    645.30
      .75      1.91      6.67      2.24      .085      .050      .085      .000    639.50    114.05
  .004119     600.      860.      350.         2         0         0       .00    278.92    392.97
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        DLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO 1.980
       CROSS SECTION P
    1.980      8.28    649.78       .00       .00    650.07       .28      1.06       .03    645.00
   2500.0     243.7    1078.6    1177.6     130.4     172.7     771.7     210.0      55.6    644.70
      .78      1.87      6.24      1.53      .090      .045      .090      .000    641.50     61.67
  .002765      350.      395.      200.         2         0         0       .00    425.10    486.77


*SECNO 2.040
       CROSS SECTION Q
    2.040      8.53    650.53       .00       .00    650.67       .13       .56       .04    646.60
   2500.0     100.4     781.1    1618.5      53.5     169.2     951.0     216.9      58.3    646.80
      .81      1.88      4.62      1.70      .065      .042      .057      .000    642.00     58.86
  .001447      300.      335.      250.         2         0         0       .00    477.47    536.33


*SECNO 2.220

3470 ENCROACHMENT STATIONS=     190.0     890.0  TYPE=      1  TARGET=     -190.000
       CROSS SECTION R
    2.220      9.00    652.10       .00       .00    652.35       .25      1.63       .06    650.00
   2500.0      79.4    1510.6     910.0      66.4     300.0     666.1     241.9      71.0    647.30
      .88      1.20      5.03      1.37      .075      .042      .057      .000    643.10    190.00
  .001929      530.      960.     1030.         2         0         0       .00    632.66    822.66


*SECNO 2.320
       CROSS SECTION S
    2.320      8.33    653.33       .00       .00    653.73       .40      1.30       .07    650.00
   2500.0      20.1    1693.5     786.4      13.9     279.2     547.0     251.5      76.0    650.00
      .91      1.44      6.06      1.44      .085      .050      .085      .000    645.00    106.65
  .003789      370.      550.      400.         2         0         0       .00    433.60    540.25


*SECNO 2.580

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.47


3470 ENCROACHMENT STATIONS=     200.0     650.0  TYPE=      1  TARGET=     -200.000
       CROSS SECTION T
    2.580      7.51    656.51       .00       .00    656.65       .14      2.84       .08    658.00
   2500.0        .0    1595.6     904.4        .0     447.5     663.1     273.0      83.7    653.50
     1.03       .00      3.57      1.36      .000      .050      .085      .000    649.00    208.37
  .001761      720.     1355.      730.         3         0         0       .00    368.04    576.41
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Run Date: 19JUN92 Run Time: 13:12:33 HMVersion: 6.20 Data File: monarm.hc2

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

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*SECNO 2.860
      CROSS SECTION U
   2.860      6.03    658.53       .00       .00    658.65       .12      2.00       .00    654.00
  2500.0     518.8     845.9    1135.3     328.6     195.8     706.6     295.8      90.6    654.00
    1.14      1.58      4.32      1.61      .085      .050      .085      .000    652.50    137.39
 .002146      430.     1465.      660.         2         0         0       .00    430.23    567.61

*SECNO 3.030

3470 ENCROACHMENT STATIONS=      150.0     870.0  TYPE=      1  TARGET=     -150.000
      CROSS SECTION V
   3.030      8.06    660.46       .00       .00    660.78       .32      2.03       .10    656.00
  2500.0    1090.6    1055.2     354.3     502.0     159.8     219.7     312.7      96.9    656.80
    1.19      2.17      6.60      1.61      .080      .045      .080      .000    652.40    150.00
 .003501      710.      910.      600.         2         0         0       .00    386.67    536.67

1490 NH CARD USED
*SECNO 3.080

3470 ENCROACHMENT STATIONS=      210.0     660.0  TYPE=      1  TARGET=      450.000
      CROSS SECTION W
   3.080      8.46    661.26       .00       .00    661.56       .30       .77       .01    658.10
  2500.0      80.9    1316.9    1102.2      46.7     223.5     797.3     319.4      99.9    656.90
    1.22      1.73      5.89      1.38      .075      .042      .088      .000    652.80    210.00
 .002260      200.      260.      370.         2         0         0       .00    450.00    660.00

*SECNO 3.250
      CROSS SECTION W-X
   3.250      6.01    663.01       .00       .00    663.24       .22      1.65       .02    658.00
  2500.0    1515.1     970.8      14.2     635.4     182.9      11.3     331.1     103.8    660.00
    1.27      2.38      5.31      1.25      .075      .045      .080      .000    657.00    209.43
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .61

3470 ENCROACHMENT STATIONS= 355.0 520.0 TYPE= 1 TARGET= 165.000
CROSS SECTION X

3.270	6.13	663.13	.00	.00	664.00	.87	.44	.32	658.00
2500.0	826.1	1648.2	25.7	220.2	187.2	12.3	332.5	104.2	660.00
1.27	3.75	8.80	2.09	.075	.045	.080	.000	657.00	355.00
.007694	100.	100.	100.	2	0	0	.00	107.84	462.84

*SECNO 3.280

3470 ENCROACHMENT STATIONS= 380.0 495.0 TYPE= 1 TARGET= 115.000
CROSS SECTION X-Y

3.280	6.09	663.48	.00	.00	664.83	1.34	.59	.24	658.39
2500.0	548.2	1922.6	29.2	128.5	185.6	11.9	333.1	104.3	660.39
1.27	4.26	10.36	2.45	.075	.045	.080	.000	657.39	380.00
.010780	65.	65.	65.	0	0	0	.00	82.72	462.72

*SECNO 3.290

3470 ENCROACHMENT STATIONS= 396.5 478.5 TYPE= 1 TARGET= 82.000
CROSS SECTION Y-X

3.290	6.21	663.90	.00	.00	665.55	1.65	.57	.15	658.69
2500.0	364.6	2101.3	34.1	80.4	189.8	12.9	333.4	104.4	660.69
1.27	4.53	11.07	2.65	.075	.045	.080	.000	657.69	396.50
.011946	50.	50.	50.	2	0	0	.00	66.52	463.02

*SECNO 3.300

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.51

3470 ENCROACHMENT STATIONS= 359.0 416.0 TYPE= 1 TARGET= 57.000
46' DOWNSTREAM FROM DODGE ROAD BRIDGE - Y

3.300	7.14	665.14	.00	.00	666.12	.98	.37	.20	659.50
2500.0	210.5	2060.6	228.9	61.1	240.0	58.9	333.8	104.5	659.50
1.28	3.44	8.59	3.88	.075	.045	.080	.000	658.00	359.00
.005258	44.	50.	44.	3	0	0	.00	57.00	416.00

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

#SECNO 3.310

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 670.20 ELREA= 670.50

DOWNSTREAM FACE OF DODGE ROAD BRIDGE

3.310	8.61	665.21	.00	.00	666.66	1.45	.31	.24	670.20
2700.0	.0	2700.0	.0	.0	279.3	.0	334.1	104.5	670.50
1.28	.00	9.67	.00	.000	.045	.000	.000	656.60	292.70
.008513	46.	46.	46.	2	0	0	.00	34.80	327.50

SPECIAL BRIDGE

5070, VARIABLE ELCHU OR ELCHD ON SB CARD NOT SPECIFIED

SB XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
.90	1.60	3.00	.00	35.00	5.00	176.00	.00	656.60	656.60

#SECNO 3.320

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.93

PRESSURE AND WEIR FLOW, Weir Submergence Based on TRAPEZOIDAL Shape

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
671.06	667.19	.77	107.	2576.	176.	24.	657.40	669.93	167.

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 670.20 ELREA= 670.50

UPSTREAM FACE OF DODGE ROAD BRIDGE

3.320	13.36	669.96	.00	.00	670.53	.57	3.87	.00	670.20
2700.0	.0	2700.0	.0	.0	444.3	.0	334.8	104.6	670.50
1.28	.00	6.08	.00	.000	.045	.000	.000	656.60	292.70
.002289	80.	80.	80.	2	0	2	.00	34.80	327.50

#SECNO 3.330

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

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.97

3470 ENCROACHMENT STATIONS= 442.0 573.0 TYPE= 1 TARGET= 131.000

CROSS SECTION Z

3.330	12.12	670.62	.00	.00	670.70	.08	.02	.15	660.00
2700.0	511.9	1745.7	442.4	394.8	640.4	356.8	335.6	104.7	660.00
1.29	1.30	2.73	1.24	.075	.045	.080	.000	658.50	442.00
.000259	46.	40.	34.	2	0	0	.00	131.00	573.00

#SECNO 3.340

3470 ENCROACHMENT STATIONS= 392.0 623.0 TYPE= 1 TARGET= 231.000

CROSS SECTION Z-AA

3.340	12.24	670.70	.00	.00	670.73	.03	.01	.02	659.96
2700.0	850.4	1225.3	624.3	897.8	646.7	759.1	337.8	104.9	659.96
1.30	.95	1.89	.82	.085	.050	.090	.000	658.46	392.00
.000152	50.	50.	50.	1	0	0	.00	231.00	623.00

#SECNO 3.350

3470 ENCROACHMENT STATIONS= 342.0 673.0 TYPE= 1 TARGET= 331.000

CROSS SECTION AA-Z

3.350	12.31	670.72	.00	.00	670.74	.02	.01	.00	659.91
2700.0	1047.0	983.0	669.9	1375.6	650.5	1034.6	340.8	105.2	659.91
1.31	.76	1.51	.65	.085	.050	.090	.000	658.41	342.00
.000096	50.	50.	50.	1	0	0	.00	330.68	672.68

#SECNO 3.480

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .52

CROSS SECTION AA

3.480	12.79	670.79	.00	.00	670.83	.04	.08	.01	663.00
2700.0	1612.9	671.5	415.6	1316.0	262.1	388.8	367.0	108.3	662.70
1.40	1.23	2.56	1.07	.085	.050	.090	.000	658.00	213.04
.000359	395.	670.	425.	0	0	0	.00	289.70	502.74

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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        QLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO 3.650
       CROSS SECTION AB
    3.650     11.40    671.10       .00       .00    671.13       .03       .30       .00    663.00
   2700.0     825.4     401.2    1473.4     594.7     163.7    1239.7     399.4     113.1    663.00
     1.54      1.39      2.45      1.19      .085      .055      .090      .000    659.70     32.26
  .000458      740.      920.      625.         2         0         0       .00    309.93    342.19


*SECNO 3.740

3470 ENCROACHMENT STATIONS=      150.0     510.0  TYPE=      1  TARGET=     -150.000
       CROSS SECTION AC
    3.740     10.80    671.30       .00       .00    671.36       .07       .21       .02    664.00
   2700.0     569.8     648.1    1482.1     328.3     198.4    1064.8     414.2     115.5    663.00
     1.59      1.74      3.27      1.39      .080      .055      .090      .000    660.50    150.00
  .000754      400.      460.      325.         2         0         0       .00    276.48    426.48


*SECNO 3.900
       CROSS SECTION AD
    3.900      9.62    671.82       .00       .00    671.89       .08       .53       .01    664.00
   2700.0     636.1     761.0    1302.9     370.8     224.9     845.8     435.7     119.3    664.00
     1.68      1.72      3.38      1.54      .085      .055      .080      .000    662.20    137.43
  .000854      630.      870.      560.         2         0         0       .00    278.01    415.45


*SECNO 4.040
       CROSS SECTION AE
    4.040      8.93    672.33       .00       .00    672.44       .11       .53       .02    663.70
   2700.0      92.4     623.0    1984.6      57.3     137.0    1115.1     449.4     122.1    666.90
     1.74      1.61      4.55      1.78      .085      .050      .085      .000    663.40     24.72
  .001530      440.      720.      380.         2         0         0       .00    321.07    345.79


*SECNO 4.320
       CROSS SECTION AF
    4.320      9.81    673.91       .00       .00    674.03       .12      1.58       .01    668.40
   2700.0    1613.1     923.3     163.6     870.5     223.7     110.2     475.5     128.0    669.70
     1.84      1.85      4.13      1.48      .085      .055      .090      .000    664.10    195.48
  .001631      740.     1500.      850.         2         0         0       .00    277.27    472.75
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO 4.380

3470 ENCROACHMENT STATIONS=      330.0     785.0  TYPE=      1  TARGET=     -330.000
       CROSS SECTION AF-AG
    4.380      9.69    674.29       .00       .00    674.46       .16       .41       .02    668.00
   2700.0    1394.1     997.9     308.0     763.0     207.6     173.5     481.1     129.4    668.00
     1.86      1.83      4.81      1.77      .085      .055      .090      .000    664.60    330.00
  .002087      185.      275.      240.         1         0         0       .00    313.14    643.14


*SECNO 4.430
       CROSS SECTION AG
    4.430      9.84    674.84       .00       .00    675.20       .36       .64       .10    668.00
   2700.0     330.6    1186.6    1182.8     105.2     177.9     540.5     486.1     130.8    668.00
     1.88      3.14      6.67      2.19      .085      .055      .085      .000    665.00    262.74
  .003704      185.      275.      240.         2         0         0       .00    253.59    516.32


*SECNO 4.510
       CROSS SECTION AG-AH
    4.510     10.03    676.28       .00       .00    676.59       .31      1.38       .01    669.25
   2700.0     326.9    1148.7    1224.4     109.2     181.4     578.1     493.4     132.9    669.25
     1.91      2.99      6.33      2.12      .085      .055      .085      .000    666.25    262.47
  .003249      445.      450.      335.         2         0         0       .00    255.19    517.65


*SECNO 4.560

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .62


3470 ENCROACHMENT STATIONS=      300.0     520.0  TYPE=      1  TARGET=      220.000
       CROSS SECTION AH-AG
    4.560     10.43    677.31       .00       .00    677.54       .23       .92       .03 100000.00
   2700.0        .0     240.3    2459.7        .0      47.3     667.4     496.6     133.8    669.88
     1.92       .00      5.08      3.69      .000      .055      .085      .000    666.88    300.00
  .008511      223.      225.      168.         2         0         0       .00    220.00    520.00


*SECNO 4.600

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.59
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3470 ENCROACHMENT STATIONS= 120.0 440.0 TYPE= 1 TARGET= 320.000

CROSS SECTION AH

4.600	10.34	677.84	.00	.00	677.90	.06	.31	.05	668.00
2700.0	1524.8	728.4	446.8	1151.8	235.9	331.9	502.2	135.0	670.00
1.95	1.32	3.09	1.35	.085	.055	.085	.000	667.50	120.00
.000662	223.	225.	168.	2	0	0	.00	320.00	440.00

#SECNO 4.770

CROSS SECTION AI

4.770	9.53	678.33	.00	.00	678.43	.10	.51	.02	674.00
2700.0	51.7	2586.6	61.7	56.3	1023.0	65.3	525.6	139.3	674.00
2.04	.92	2.53	.95	.080	.050	.080	.000	668.80	234.66
.000665	560.	900.	580.	3	0	0	.00	224.53	459.19

#SECNO 4.880

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .66

CROSS SECTION AJ

4.880	8.67	678.87	.00	.00	678.98	.11	.54	.01	672.00
2700.0	1657.6	888.8	153.6	911.9	232.5	74.5	540.6	142.4	672.00
2.10	1.82	3.82	2.06	.080	.060	.080	.000	670.20	152.35
.001506	520.	600.	345.	2	0	0	.00	284.14	436.49

#SECNO 5.030

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .62

CROSS SECTION AK

5.030	6.48	680.08	.00	.00	680.31	.23	1.27	.06	676.00
2700.0	59.7	1002.8	1637.5	28.1	194.6	593.0	552.3	145.2	674.00
2.14	2.12	5.15	2.76	.080	.060	.075	.000	673.60	284.39
.003948	410.	800.	430.	2	0	0	.00	241.23	525.61

#SECNO 5.060

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.07

CROSS SECTION AK-AL

5.060	6.47	680.47	.00	.00	680.52	.05	.15	.05	675.90
2700.0	814.3	644.3	1241.4	550.3	260.4	861.5	554.9	145.9	676.00
2.16	1.48	2.47	1.44	.080	.060	.075	.000	674.00	37.65
.000923	190.	130.	40.	2	0	0	.00	437.35	474.99

*SECNO 5.070

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .57

DOWNSTREAM FACE OF MORRISH ROAD BRIDGE - AL

5.070	6.48	680.48	.00	.00	680.63	.15	.06	.05	674.00
2700.0	1860.0	674.3	165.7	767.4	145.7	76.3	556.0	146.2	674.00
2.16	2.42	4.63	2.17	.060	.060	.075	.000	674.00	109.51
.002891	38.	38.	38.	2	0	0	.00	299.16	408.67

SPECIAL BRIDGE

SB	XK	XKOR	CQFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	.00	1.75	3.00	.00	22.50	.00	101.25	.00	674.00	674.00

*SECNO 5.073

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.59

PRESSURE AND WEIR FLOW, Weir Submergence Based on TRAPEZOIDAL Shape

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
699.80	680.63	.00	1764.	941.	101.	101.	678.50	679.90	433.

UPSTREAM FACE OF MORRISH ROAD BRIDGE

5.073	8.72	682.72	.00	.00	682.82	.11	2.20	.00	674.00
2700.0	1656.0	853.0	191.1	1393.9	196.1	193.7	557.1	146.5	674.00
2.16	1.19	4.35	.99	.080	.030	.075	.000	674.00	38.50
.000430	35.	35.	35.	2	0	6	.00	424.46	462.96

*SECNO 5.080

CROSS SECTION AM

5.080	8.68	682.83	.00	.00	682.86	.03	.01	.02	676.00
2700.0	1629.8	576.1	494.1	1536.8	290.0	474.1	558.5	146.8	676.00
2.17	1.06	1.99	1.04	.080	.055	.075	.000	674.15	23.76
.000329	30.	30.	30.	2	0	0	.00	435.41	459.16

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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       ARDB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO 5.110
       CROSS SECTION AM-AN
    5.110      8.71    682.86       .00       .00    682.89       .03       .03       .00    676.00
   2700.0    1630.6     574.3     495.1    1547.6     291.3     478.2     562.9     147.6    676.00
     2.19      1.05      1.97      1.04      .080      .055      .075      .000    674.15     23.48
  .000322       43.      148.      165.         1         0         0       .00    435.87    459.35


*SECNO 5.130

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .68

       CROSS SECTION AN
    5.130      8.69    682.89       .00       .00    682.94       .06       .04       .02    676.00
   2700.0    1793.8     904.0       2.2    1300.2     332.4       4.6     566.5     148.3    680.00
     2.20      1.38      2.72       .48      .090      .055      .085      .000    674.20     75.09
  .000700       57.      137.      150.         1         0         0       .00    292.09    367.18


*SECNO 5.210
       CROSS SECTION AO
    5.210      8.86    683.11       .00       .00    683.20       .09       .24       .02    676.00
   2700.0     401.3     783.4    1515.4     291.0     218.8     833.9     574.6     149.7    676.00
     2.24      1.38      3.58      1.82      .090      .055      .085      .000    674.25     24.47
  .001062      110.      430.      350.         2         0         0       .00    261.06    285.53


CCHV=     .300 CEHV=     .500
*SECNO 5.220

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
       DOWNSTREAM FACE OF FRANCES ROAD BRIDGE
    5.220      7.22    681.51    681.51       .00    685.40      3.89       .03      1.90    681.90
   2800.0        .0    2800.0        .0        .0     176.8        .0     575.0     149.7    681.90
     2.24       .00     15.83       .00      .000      .012      .000      .000    674.29    171.10
  .002174       20.       20.       20.         4        12         0       .00     24.50    195.60
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SECNO	DEPTH	CWSEL	CRIWS	WSELX	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

SPECIAL BRIDGE

5070, VARIABLE ELCHU OR ELCHD ON SB CARD NOT SPECIFIED

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	.00	1.60	3.00	.00	24.50	.00	93.35	.00	674.29	674.29

*SECNO 5.224
6870 D.S. ENERGY OF 685.40 IS HIGHER THAN COMPUTED ENERGY OF 684.40
PRESSURE AND WEIR FLOW, Weir Submergence Based on TRAPEZOIDAL Shape

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
703.86	685.40	.00	1796.	1008.	93.	93.	678.10	681.90	245.

UPSTREAM FACE OF FRANCES ROAD BRIDGE

5.224	7.66	681.95	.00	.00	685.40	3.45	.00	.00	681.90
2800.0	.1	2799.7	.2	.7	187.9	2.1	575.1	149.8	681.90
2.24	.09	14.90	.11	.090	.012	.085	.000	674.29	158.06
.001824	35.	35.	35.	5	0	0	.00	75.05	233.11

*SECNO 5.226

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3720 CRITICAL DEPTH ASSUMED

5.226	9.36	683.67	683.67	.00	685.04	1.36	.04	.63	681.92
2800.0	171.3	2339.4	289.3	93.1	229.4	118.3	575.2	149.8	681.92
2.24	1.84	10.20	2.45	.090	.050	.085	.000	674.31	64.95
.011363	10.	10.	10.	20	12	0	.00	217.07	282.02

*SECNO 5.240

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 4.53

SECND	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	DLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
5.240	11.08	685.43	.00	.00	685.52	.09	.10	.38	676.00
2800.0	950.2	1165.4	684.4	724.5	344.8	532.7	576.8	150.2	676.00
2.25	1.31	3.38	1.28	.090	.050	.085	.000	674.35	77.82
.000554	70.	70.	70.	2	0	0	.00	264.35	342.18

THIS RUN EXECUTED 19JUN92 13:13:42

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**********************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.0;  February 1991
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

10 YEAR FLOOD

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	.000	.00	.00	.00	614.00	1200.00	623.35	.00	623.52	8.63	3.49	513.34	408.50
	.000	.00	.00	.00	614.00	1800.00	625.31	.00	625.43	5.54	3.26	1179.02	764.77
	.000	.00	.00	.00	614.00	2000.00	626.00	.00	626.09	4.43	3.05	1480.00	950.33
	.000	.00	.00	.00	614.00	2500.00	627.39	.00	627.46	3.10	2.78	2146.56	1419.60
	.100	510.00	.00	.00	617.20	1200.00	623.89	.00	624.10	15.80	3.88	451.33	301.88
	.100	510.00	.00	.00	617.20	1800.00	625.63	.00	625.78	9.75	3.68	889.90	576.53
	.100	510.00	.00	.00	617.20	2000.00	626.25	.00	626.38	7.89	3.50	1105.32	712.11
	.100	510.00	.00	.00	617.20	2500.00	627.56	.00	627.65	5.43	3.23	1607.54	1072.44
*	.180	440.00	.00	.00	619.00	1200.00	624.74	.00	625.12	34.83	5.94	424.65	203.33
*	.180	440.00	.00	.00	619.00	1800.00	626.13	.00	626.37	20.79	5.33	854.28	394.78
*	.180	440.00	.00	.00	619.00	2000.00	626.65	.00	626.83	16.20	4.93	1046.70	496.90
	.180	440.00	.00	.00	619.00	2500.00	627.82	.00	627.94	10.29	4.33	1497.65	779.28
	.215	195.00	.00	.00	620.00	1200.00	625.60	.00	625.74	24.18	4.36	659.89	244.03
	.215	195.00	.00	.00	620.00	1800.00	626.65	.00	626.76	17.80	4.28	1030.18	426.66
	.215	195.00	.00	.00	620.00	2000.00	627.05	.00	627.15	15.26	4.15	1178.10	511.90
	.215	195.00	.00	.00	620.00	2500.00	628.07	.00	628.15	10.66	3.85	1577.36	765.65
	.250	195.00	.00	.00	621.00	1200.00	626.17	.00	626.46	48.65	5.39	513.26	172.04
	.250	195.00	.00	.00	621.00	1800.00	627.05	.00	627.25	31.54	5.00	839.59	320.52
	.250	195.00	.00	.00	621.00	2000.00	627.39	.00	627.56	26.51	4.80	966.00	388.44
	.250	195.00	.00	.00	621.00	2500.00	628.30	.00	628.43	17.29	4.34	1313.48	601.23
	.360	560.00	.00	.00	622.75	1200.00	628.47	.00	628.91	49.10	5.94	319.68	171.25
*	.360	560.00	.00	.00	622.75	1800.00	628.91	.00	629.62	72.13	7.69	379.12	211.94
*	.360	560.00	.00	.00	622.75	2000.00	629.03	.00	629.84	80.84	8.26	393.76	222.45
*	.360	560.00	.00	.00	622.75	2500.00	629.37	.00	630.38	94.99	9.37	439.63	256.51
*	.470	560.00	.00	.00	624.50	1200.00	630.32	.00	630.54	22.16	4.53	498.90	254.93
*	.470	560.00	.00	.00	624.50	1800.00	631.25	.00	631.49	21.81	5.02	715.51	385.43
*	.470	560.00	.00	.00	624.50	2000.00	631.53	.00	631.78	21.49	5.14	785.64	431.47
*	.470	560.00	.00	.00	624.50	2500.00	632.16	.00	632.42	21.00	5.41	984.58	545.49

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	.540	390.00	.00	.00	625.50	1200.00	631.15	.00	631.29	17.61	4.20	713.26	285.95
	.540	390.00	.00	.00	625.50	1800.00	632.07	.00	632.20	16.14	4.45	1001.71	448.11
	.540	390.00	.00	.00	625.50	2000.00	632.34	.00	632.48	15.78	4.53	1088.45	503.45
	.540	390.00	.00	.00	625.50	2500.00	632.96	.00	633.10	15.26	4.73	1286.06	640.03
*	.610	390.00	.00	.00	626.40	1200.00	632.01	.00	632.38	43.60	5.16	325.31	181.74
*	.610	390.00	.00	.00	626.40	1800.00	632.82	.00	633.25	42.37	5.79	482.42	276.52
*	.610	390.00	.00	.00	626.40	2000.00	633.07	.00	633.51	41.51	5.93	537.54	310.41
*	.610	390.00	.00	.00	626.40	2500.00	633.64	.00	634.10	39.64	6.24	676.01	397.09
	.700	440.00	.00	.00	627.00	1200.00	633.60	.00	633.87	29.71	4.47	430.90	220.16
	.700	440.00	.00	.00	627.00	1800.00	634.36	.00	634.66	29.60	5.00	655.28	330.85
	.700	440.00	.00	.00	627.00	2000.00	634.58	.00	634.88	29.31	5.12	722.71	369.40
	.700	440.00	.00	.00	627.00	2500.00	635.08	.00	635.39	28.74	5.40	878.29	466.32
	.900	1050.00	.00	.00	629.50	1200.00	635.79	.00	635.90	15.74	3.34	710.48	302.49
	.900	1050.00	.00	.00	629.50	1800.00	636.54	.00	636.66	16.33	3.74	954.96	445.45
	.900	1050.00	.00	.00	629.50	2000.00	636.75	.00	636.88	16.60	3.87	1024.39	490.84
	.900	1050.00	.00	.00	629.50	2500.00	637.23	.00	637.38	17.17	4.18	1187.30	603.29
*	1.120	1170.00	.00	.00	631.20	1200.00	637.96	.00	638.43	34.11	5.93	321.07	205.48
*	1.120	1170.00	.00	.00	631.20	1800.00	638.78	.00	639.38	40.27	7.04	450.59	283.64
*	1.120	1170.00	.00	.00	631.20	2000.00	639.01	.00	639.65	41.80	7.34	489.84	309.34
*	1.120	1170.00	.00	.00	631.20	2500.00	639.54	.00	640.27	45.01	8.01	581.90	372.63
*	1.210	470.00	.00	.00	632.10	1200.00	639.11	.00	639.21	9.14	2.99	775.23	396.96
*	1.210	470.00	.00	.00	632.10	1800.00	640.09	.00	640.20	8.94	3.30	1099.70	602.17
*	1.210	470.00	.00	.00	632.10	2000.00	640.37	.00	640.48	8.91	3.39	1196.49	669.93
*	1.210	470.00	.00	.00	632.10	2500.00	641.00	.00	641.12	8.93	3.60	1418.89	836.82
*	1.267	300.00	.00	.00	632.60	1200.00	639.43	.00	639.80	59.92	5.66	370.35	155.02
*	1.267	300.00	.00	.00	632.60	1800.00	640.35	.00	640.70	46.63	5.83	554.58	263.59
*	1.267	300.00	.00	.00	632.60	2000.00	640.61	.00	640.97	44.58	5.92	607.67	299.55
*	1.267	300.00	.00	.00	632.60	2500.00	641.22	.00	641.59	41.36	6.18	728.71	388.74
	1.276	50.00	.00	.00	632.60	1200.00	639.68	.00	640.17	63.52	6.10	278.58	150.56
	1.276	50.00	.00	.00	632.60	1800.00	640.48	.00	641.12	66.00	7.08	371.47	221.56
	1.276	50.00	.00	.00	632.60	2000.00	640.72	.00	641.40	66.98	7.37	398.50	244.38
	1.276	50.00	.00	.00	632.60	2500.00	641.27	.00	642.06	68.94	8.04	461.52	301.09
	1.286	50.00	.00	.00	632.60	1200.00	639.99	.00	640.47	52.75	5.86	267.70	165.22
	1.286	50.00	.00	.00	632.60	1800.00	640.78	.00	641.46	61.47	7.11	338.28	229.59
	1.286	50.00	.00	.00	632.60	2000.00	641.02	.00	641.76	63.70	7.47	359.50	250.59
	1.286	50.00	.00	.00	632.60	2500.00	641.56	.00	642.46	68.73	8.30	408.22	301.55
	1.290	41.00	.00	.00	632.70	1300.00	639.81	.00	641.20	85.68	9.47	137.27	140.44
*	1.290	41.00	.00	.00	632.70	1800.00	640.36	.00	642.59	129.18	11.98	150.28	158.37
*	1.290	41.00	.00	.00	632.70	2000.00	640.43	.00	643.12	154.42	13.15	152.14	160.95
*	1.290	41.00	.00	.00	632.70	2500.00	640.96	640.96	644.54	196.55	15.20	164.52	178.32

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	1.296	45.50	647.52	641.73	632.70	1300.00	640.45	.00	641.58	64.90	8.53	152.44	161.37
	1.296	45.50	647.52	641.73	632.70	1800.00	641.76	.00	643.25	79.27	9.79	183.84	202.16
*	1.296	45.50	647.52	641.73	632.70	2000.00	642.39	.00	643.94	76.21	10.00	199.95	229.10
*	1.296	45.50	647.52	641.73	632.70	2500.00	642.61	.00	644.90	109.70	12.16	205.56	238.69
*	1.300	23.50	.00	.00	634.00	1300.00	641.15	.00	641.79	15.24	6.73	262.59	333.03
*	1.300	23.50	.00	.00	634.00	1800.00	642.75	.00	643.53	14.30	7.47	337.68	475.94
*	1.300	23.50	.00	.00	634.00	2000.00	643.41	.00	644.22	13.68	7.68	368.70	540.79
*	1.300	23.50	.00	.00	634.00	2500.00	644.31	.00	645.36	15.55	8.70	410.85	634.06
*	1.310	50.00	.00	.00	634.00	1300.00	641.67	.00	641.95	7.47	4.94	510.16	475.63
*	1.310	50.00	.00	.00	634.00	1800.00	643.42	.00	643.72	6.32	5.23	689.40	715.87
*	1.310	50.00	.00	.00	634.00	2000.00	644.13	.00	644.42	5.88	5.29	763.76	824.64
*	1.310	50.00	.00	.00	634.00	2500.00	645.27	.00	645.61	6.07	5.78	886.65	1014.67
	1.350	190.00	.00	.00	634.10	1300.00	641.88	.00	642.07	5.51	4.29	699.51	553.61
	1.350	190.00	.00	.00	634.10	1800.00	643.64	.00	643.82	4.41	4.40	967.89	856.92
	1.350	190.00	.00	.00	634.10	2000.00	644.35	.00	644.53	4.05	4.42	1077.71	994.32
	1.350	190.00	.00	.00	634.10	2500.00	645.52	.00	645.72	4.05	4.76	1263.19	1241.90
	1.360	85.00	.00	.00	634.21	1300.00	641.98	.00	642.12	4.59	3.91	857.91	606.59
	1.360	85.00	.00	.00	634.21	1800.00	643.74	.00	643.87	3.45	3.89	1215.13	969.34
	1.360	85.00	.00	.00	634.21	2000.00	644.45	.00	644.57	3.11	3.87	1360.17	1134.70
	1.360	85.00	.00	.00	634.21	2500.00	645.63	.00	645.77	3.02	4.12	1607.41	1438.06
*	1.530	850.00	.00	.00	635.20	1300.00	642.45	.00	642.86	15.12	5.33	377.96	334.31
*	1.530	850.00	.00	.00	635.20	1800.00	644.05	.00	644.35	8.45	4.84	759.00	619.12
*	1.530	850.00	.00	.00	635.20	2000.00	644.72	.00	644.96	6.61	4.57	966.09	778.00
	1.530	850.00	.00	.00	635.20	2500.00	645.88	.00	646.09	5.02	4.42	1388.20	1115.58
	1.620	520.00	.00	.00	637.80	1300.00	643.73	.00	643.82	16.35	3.60	836.77	321.46
	1.620	520.00	.00	.00	637.80	1800.00	644.87	.00	644.94	9.99	3.20	1278.10	569.42
	1.620	520.00	.00	.00	637.80	2000.00	645.38	.00	645.44	8.12	3.04	1478.49	701.92
	1.620	520.00	.00	.00	637.80	2500.00	646.41	.00	646.46	6.18	2.91	1886.67	1006.01
*	1.740	600.00	.00	.00	638.20	1300.00	644.99	.00	645.25	57.22	6.01	520.64	171.86
*	1.740	600.00	.00	.00	638.20	1800.00	645.66	.00	645.85	43.83	5.67	737.50	271.88
*	1.740	600.00	.00	.00	638.20	2000.00	646.01	.00	646.18	35.82	5.32	853.77	334.15
*	1.740	600.00	.00	.00	638.20	2500.00	646.87	.00	646.99	24.12	4.74	1138.56	509.04
*	1.900	860.00	.00	.00	639.50	1300.00	647.58	.00	647.85	28.96	5.09	514.13	241.58
	1.900	860.00	.00	.00	639.50	1800.00	648.05	.00	648.38	35.37	5.89	637.06	302.65
	1.900	860.00	.00	.00	639.50	2000.00	648.20	.00	648.55	37.94	6.18	676.62	324.71
	1.900	860.00	.00	.00	639.50	2500.00	648.60	.00	648.98	41.19	6.67	786.18	389.52
	1.980	395.00	.00	.00	641.50	1300.00	648.55	.00	648.87	29.14	5.66	568.77	240.81
	1.980	395.00	.00	.00	641.50	1800.00	649.13	.00	649.43	28.31	5.93	801.83	338.32
	1.980	395.00	.00	.00	641.50	2000.00	649.33	.00	649.62	28.16	6.03	883.40	376.91
	1.980	395.00	.00	.00	641.50	2500.00	649.78	.00	650.07	27.65	6.24	1074.81	475.41

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	2.040	335.00	.00	.00	642.00	1300.00	649.42	.00	649.60	18.32	4.63	641.54	303.73
	2.040	335.00	.00	.00	642.00	1800.00	649.93	.00	650.08	16.02	4.58	887.86	449.67
	2.040	335.00	.00	.00	642.00	2000.00	650.11	.00	650.26	15.47	4.58	974.46	508.42
	2.040	335.00	.00	.00	642.00	2500.00	650.53	.00	650.67	14.47	4.62	1173.68	657.24
	2.220	960.00	.00	.00	643.10	1300.00	651.19	.00	651.46	19.27	4.50	449.89	296.15
	2.220	960.00	.00	.00	643.10	1800.00	651.60	.00	651.88	19.96	4.84	722.39	402.94
	2.220	960.00	.00	.00	643.10	2000.00	651.76	.00	652.03	19.96	4.92	814.34	447.71
	2.220	960.00	.00	.00	643.10	2500.00	652.10	.00	652.35	19.29	5.03	1032.53	569.14
	2.320	550.00	.00	.00	645.00	1300.00	652.41	.00	652.71	28.79	4.75	459.05	242.29
	2.320	550.00	.00	.00	645.00	1800.00	652.86	.00	653.21	32.92	5.36	640.11	313.71
	2.320	550.00	.00	.00	645.00	2000.00	653.01	.00	653.37	34.25	5.57	703.73	341.72
	2.320	550.00	.00	.00	645.00	2500.00	653.33	.00	653.73	37.89	6.06	840.20	406.17
	2.580	1355.00	.00	.00	649.00	1300.00	655.28	.00	655.38	16.01	2.97	672.14	324.87
*	2.580	1355.00	.00	.00	649.00	1800.00	655.86	.00	655.98	16.65	3.25	874.41	441.10
*	2.580	1355.00	.00	.00	649.00	2000.00	656.06	.00	656.19	16.96	3.35	946.07	485.63
*	2.580	1355.00	.00	.00	649.00	2500.00	656.51	.00	656.65	17.61	3.57	1110.56	595.77
	2.860	1465.00	.00	.00	652.50	1300.00	657.39	.00	657.50	21.95	3.76	754.67	277.49
	2.860	1465.00	.00	.00	652.50	1800.00	657.91	.00	658.03	21.80	4.03	968.45	385.56
	2.860	1465.00	.00	.00	652.50	2000.00	658.09	.00	658.21	21.58	4.11	1049.52	430.54
	2.860	1465.00	.00	.00	652.50	2500.00	658.53	.00	658.65	21.46	4.32	1231.02	539.66
	3.030	910.00	.00	.00	652.40	1300.00	659.35	.00	659.64	31.62	5.56	498.79	231.20
	3.030	910.00	.00	.00	652.40	1800.00	659.88	.00	660.19	33.77	6.10	669.40	309.74
	3.030	910.00	.00	.00	652.40	2000.00	660.05	.00	660.37	34.48	6.28	730.23	340.61
	3.030	910.00	.00	.00	652.40	2500.00	660.46	.00	660.78	35.01	6.60	881.43	422.53
	3.080	260.00	.00	.00	652.80	1300.00	660.04	.00	660.34	21.64	5.07	517.22	279.49
	3.080	260.00	.00	.00	652.80	1800.00	660.63	.00	660.92	21.87	5.45	765.56	384.87
	3.080	260.00	.00	.00	652.80	2000.00	660.83	.00	661.12	22.24	5.60	869.82	424.08
	3.080	260.00	.00	.00	652.80	2500.00	661.26	.00	661.56	22.60	5.89	1067.41	525.90
	3.250	891.00	.00	.00	657.00	1300.00	661.86	.00	662.01	24.57	4.15	544.07	262.26
	3.250	891.00	.00	.00	657.00	1800.00	662.40	.00	662.58	26.48	4.68	676.37	349.77
	3.250	891.00	.00	.00	657.00	2000.00	662.59	.00	662.79	27.03	4.86	724.65	384.72
	3.250	891.00	.00	.00	657.00	2500.00	663.01	.00	663.24	28.84	5.31	829.67	465.51
*	3.270	100.00	.00	.00	657.00	1300.00	662.05	.00	662.51	52.05	6.23	304.60	180.19
*	3.270	100.00	.00	.00	657.00	1800.00	662.57	.00	663.19	62.57	7.37	359.15	227.57
*	3.270	100.00	.00	.00	657.00	2000.00	662.75	.00	663.44	66.48	7.78	378.41	245.29
*	3.270	100.00	.00	.00	657.00	2500.00	663.13	.00	664.00	76.94	8.80	419.77	285.01
	3.280	65.00	.00	.00	657.39	1300.00	662.33	.00	663.04	75.09	7.35	232.77	150.02
	3.280	65.00	.00	.00	657.39	1800.00	662.88	.00	663.85	89.60	8.70	276.01	190.16
	3.280	65.00	.00	.00	657.39	2000.00	663.07	.00	664.14	94.62	9.19	291.74	205.60
	3.280	65.00	.00	.00	657.39	2500.00	663.48	.00	664.83	107.80	10.36	326.08	240.78

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	3.290	50.00	.00	.00	657.69	1300.00	662.66	.00	663.51	84.67	7.82	201.86	141.28
	3.290	50.00	.00	.00	657.69	1800.00	663.25	.00	664.41	98.20	9.23	240.97	181.64
	3.290	50.00	.00	.00	657.69	2000.00	663.45	.00	664.75	103.91	9.76	254.35	196.20
	3.290	50.00	.00	.00	657.69	2500.00	663.90	.00	665.55	119.46	11.07	283.13	228.73
*	3.300	50.00	.00	.00	658.00	1300.00	663.39	.00	663.89	39.26	6.10	260.71	207.49
*	3.300	50.00	.00	.00	658.00	1800.00	664.16	.00	664.87	46.24	7.27	304.54	264.70
*	3.300	50.00	.00	.00	658.00	2000.00	664.45	.00	665.24	48.44	7.68	320.85	287.35
*	3.300	50.00	.00	.00	658.00	2500.00	665.14	.00	666.12	52.58	8.59	360.10	344.76
	3.310	46.00	.00	.00	656.60	1400.00	663.52	.00	664.15	45.84	6.35	220.41	206.77
	3.310	46.00	.00	.00	656.60	1900.00	664.30	.00	665.21	59.89	7.67	247.62	245.51
	3.310	46.00	.00	.00	656.60	2100.00	664.58	.00	665.62	65.25	8.16	257.49	259.98
	3.310	46.00	.00	.00	656.60	2700.00	665.21	.00	666.66	85.13	9.67	279.30	292.64
	3.320	80.00	669.93	657.40	656.60	1400.00	664.64	.00	665.09	28.36	5.40	259.46	262.88
*	3.320	80.00	669.93	657.40	656.60	1900.00	666.68	.00	667.20	25.96	5.75	330.60	372.92
*	3.320	80.00	669.93	657.40	656.60	2100.00	667.60	.00	668.12	24.42	5.79	362.50	424.94
*	3.320	80.00	669.93	657.40	656.60	2700.00	669.96	.00	670.53	22.89	6.08	444.31	564.35
*	3.330	40.00	.00	.00	658.50	1400.00	665.15	.00	665.25	6.64	2.86	675.51	543.35
*	3.330	40.00	.00	.00	658.50	1900.00	667.27	.00	667.36	4.21	2.77	953.13	925.80
*	3.330	40.00	.00	.00	658.50	2100.00	668.20	.00	668.28	3.54	2.73	1074.62	1116.86
*	3.330	40.00	.00	.00	658.50	2700.00	670.62	.00	670.70	2.59	2.73	1392.04	1677.68
	3.340	50.00	.00	.00	658.46	1400.00	665.24	.00	665.29	4.59	2.17	1044.00	653.25
	3.340	50.00	.00	.00	658.46	1900.00	667.35	.00	667.39	2.68	2.01	1530.83	1161.39
	3.340	50.00	.00	.00	658.46	2100.00	668.28	.00	668.31	2.19	1.95	1743.84	1418.95
	3.340	50.00	.00	.00	658.46	2700.00	670.70	.00	670.73	1.52	1.89	2303.64	2186.74
	3.350	50.00	.00	.00	658.41	1400.00	665.28	.00	665.31	3.31	1.86	1311.79	770.09
	3.350	50.00	.00	.00	658.41	1900.00	667.38	.00	667.40	1.81	1.66	1975.21	1411.14
	3.350	50.00	.00	.00	658.41	2100.00	668.30	.00	668.32	1.45	1.59	2270.93	1743.16
	3.350	50.00	.00	.00	658.41	2700.00	670.72	.00	670.74	.96	1.51	3060.69	2752.17
*	3.480	670.00	.00	.00	658.00	1400.00	665.58	.00	665.78	27.03	4.80	598.42	269.30
*	3.480	670.00	.00	.00	658.00	1900.00	667.53	.00	667.62	10.17	3.49	1076.01	595.84
*	3.480	670.00	.00	.00	658.00	2100.00	668.42	.00	668.48	7.12	3.11	1306.47	787.10
*	3.480	670.00	.00	.00	658.00	2700.00	670.79	.00	670.83	3.59	2.56	1966.85	1425.36
	3.650	920.00	.00	.00	659.70	1400.00	667.32	.00	667.38	15.43	3.39	861.28	356.40
	3.650	920.00	.00	.00	659.70	1900.00	668.38	.00	668.44	11.54	3.21	1173.89	559.30
	3.650	920.00	.00	.00	659.70	2100.00	669.03	.00	669.08	8.91	2.97	1367.74	703.66
	3.650	920.00	.00	.00	659.70	2700.00	671.10	.00	671.13	4.58	2.45	1998.19	1261.34
	3.740	460.00	.00	.00	660.50	1400.00	667.97	.00	668.09	19.69	4.02	700.25	315.50
	3.740	460.00	.00	.00	660.50	1900.00	668.88	.00	669.00	16.83	4.05	939.76	463.11
	3.740	460.00	.00	.00	660.50	2100.00	669.42	.00	669.52	13.91	3.86	1082.67	563.12
	3.740	460.00	.00	.00	660.50	2700.00	671.30	.00	671.36	7.54	3.27	1591.47	983.32

	SECND	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	3.900	870.00	.00	.00	662.20	1400.00	669.20	.00	669.30	15.17	3.58	738.60	359.45
	3.900	870.00	.00	.00	662.20	1900.00	669.96	.00	670.07	14.63	3.79	937.81	496.72
	3.900	870.00	.00	.00	662.20	2100.00	670.34	.00	670.44	13.38	3.76	1039.32	574.01
	3.900	870.00	.00	.00	662.20	2700.00	671.82	.00	671.89	8.54	3.38	1441.52	923.70
	4.040	720.00	.00	.00	663.40	1400.00	670.20	.00	670.36	27.14	4.93	662.94	268.73
	4.040	720.00	.00	.00	663.40	1900.00	670.87	.00	671.03	24.86	5.07	859.95	381.06
	4.040	720.00	.00	.00	663.40	2100.00	671.17	.00	671.32	23.13	5.04	948.68	436.65
	4.040	720.00	.00	.00	663.40	2700.00	672.33	.00	672.44	15.30	4.55	1309.41	690.32
	4.320	1500.00	.00	.00	664.10	1400.00	672.35	.00	672.45	14.29	3.38	789.80	370.31
	4.320	1500.00	.00	.00	664.10	1900.00	672.97	.00	673.08	15.81	3.76	949.92	477.84
	4.320	1500.00	.00	.00	664.10	2100.00	673.20	.00	673.31	16.20	3.88	1011.27	521.70
	4.320	1500.00	.00	.00	664.10	2700.00	673.91	.00	674.03	16.31	4.13	1204.48	668.59
	4.380	275.00	.00	.00	664.60	1400.00	672.73	.00	672.89	22.42	4.31	663.33	295.66
	4.380	275.00	.00	.00	664.60	1900.00	673.37	.00	673.53	22.14	4.57	859.17	403.76
	4.380	275.00	.00	.00	664.60	2100.00	673.59	.00	673.76	22.12	4.66	929.00	446.52
	4.380	275.00	.00	.00	664.60	2700.00	674.29	.00	674.46	20.87	4.81	1144.16	591.08
	4.430	275.00	.00	.00	665.00	1400.00	673.32	.00	673.63	33.74	5.62	461.08	241.01
	4.430	275.00	.00	.00	665.00	1900.00	673.95	.00	674.30	37.14	6.23	601.82	311.76
	4.430	275.00	.00	.00	665.00	2100.00	674.18	.00	674.54	37.72	6.39	657.11	341.91
	4.430	275.00	.00	.00	665.00	2700.00	674.84	.00	675.20	37.04	6.67	823.56	443.65
	4.510	450.00	.00	.00	666.25	1400.00	674.70	.00	674.98	30.63	5.41	485.06	252.94
	4.510	450.00	.00	.00	666.25	1900.00	675.41	.00	675.71	31.31	5.82	652.97	339.57
	4.510	450.00	.00	.00	666.25	2100.00	675.65	.00	675.95	31.60	5.96	711.50	373.57
	4.510	450.00	.00	.00	666.25	2700.00	676.28	.00	676.59	32.49	6.33	868.76	473.65
*	4.560	225.00	.00	.00	666.88	1400.00	675.81	.00	676.04	120.42	5.74	392.77	127.58
*	4.560	225.00	.00	.00	666.88	1900.00	676.49	.00	676.70	96.44	5.27	537.16	193.47
*	4.560	225.00	.00	.00	666.88	2100.00	676.71	.00	676.92	92.60	5.20	584.68	218.23
*	4.560	225.00	.00	.00	666.88	2700.00	677.31	.00	677.54	85.11	5.08	714.77	292.66
*	4.600	225.00	.00	.00	667.50	1400.00	676.32	.00	676.36	4.73	2.32	1234.97	644.05
*	4.600	225.00	.00	.00	667.50	1900.00	676.98	.00	677.03	5.53	2.65	1443.19	807.62
*	4.600	225.00	.00	.00	667.50	2100.00	677.21	.00	677.26	5.83	2.77	1517.31	869.82
*	4.600	225.00	.00	.00	667.50	2700.00	677.84	.00	677.90	6.62	3.09	1719.58	1049.58
	4.770	900.00	.00	.00	668.80	1400.00	676.71	.00	676.76	5.34	1.84	795.74	605.84
	4.770	900.00	.00	.00	668.80	1900.00	677.41	.00	677.48	5.88	2.13	943.22	783.81
	4.770	900.00	.00	.00	668.80	2100.00	677.66	.00	677.74	6.09	2.24	996.25	850.93
	4.770	900.00	.00	.00	668.80	2700.00	678.33	.00	678.43	6.65	2.53	1144.52	1046.86
*	4.880	600.00	.00	.00	670.20	1400.00	677.17	.00	677.27	16.14	3.38	749.00	348.52
*	4.880	600.00	.00	.00	670.20	1900.00	677.91	.00	678.01	15.40	3.55	949.26	484.20
*	4.880	600.00	.00	.00	670.20	2100.00	678.17	.00	678.27	15.27	3.62	1021.00	537.43
*	4.880	600.00	.00	.00	670.20	2700.00	678.87	.00	678.98	15.06	3.82	1218.91	695.83

	SECND	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10%KS	VCH	AREA	.01K
*	5.030	800.00	.00	.00	673.60	1400.00	678.64	.00	678.84	45.45	4.61	483.51	207.66
*	5.030	800.00	.00	.00	673.60	1900.00	679.24	.00	679.45	43.11	4.87	616.63	289.38
*	5.030	800.00	.00	.00	673.60	2100.00	679.46	.00	679.67	42.12	4.95	667.89	323.56
*	5.030	800.00	.00	.00	673.60	2700.00	680.08	.00	680.31	39.48	5.15	815.68	429.71
*	5.060	130.00	.00	.00	674.00	1400.00	679.03	.00	679.06	9.55	2.10	1076.17	452.94
*	5.060	130.00	.00	.00	674.00	1900.00	679.63	.00	679.67	9.48	2.27	1317.73	617.25
*	5.060	130.00	.00	.00	674.00	2100.00	679.85	.00	679.89	9.43	2.33	1408.84	683.94
*	5.060	130.00	.00	.00	674.00	2700.00	680.47	.00	680.52	9.23	2.47	1672.15	888.52
*	5.070	38.00	.00	.00	674.00	1400.00	679.05	.00	679.16	29.34	3.95	605.28	258.46
*	5.070	38.00	.00	.00	674.00	1900.00	679.64	.00	679.77	29.85	4.29	754.46	347.76
*	5.070	38.00	.00	.00	674.00	2100.00	679.86	.00	680.00	29.80	4.39	813.31	384.70
*	5.070	38.00	.00	.00	674.00	2700.00	680.48	.00	680.63	28.91	4.63	989.39	502.15
*	5.073	35.00	679.90	678.50	674.00	1400.00	681.85	.00	681.90	1.94	2.72	1445.80	1005.98
*	5.073	35.00	679.90	678.50	674.00	1900.00	682.27	.00	682.34	2.77	3.37	1601.71	1142.46
*	5.073	35.00	679.90	678.50	674.00	2100.00	682.40	.00	682.48	3.12	3.62	1653.87	1188.33
*	5.073	35.00	679.90	678.50	674.00	2700.00	682.72	.00	682.82	4.30	4.35	1783.76	1302.49
	5.080	30.00	.00	.00	674.15	1400.00	681.90	.00	681.91	1.57	1.27	1901.11	1116.95
	5.080	30.00	.00	.00	674.15	1900.00	682.34	.00	682.36	2.18	1.55	2089.13	1287.11
	5.080	30.00	.00	.00	674.15	2100.00	682.48	.00	682.50	2.44	1.66	2150.23	1344.41
	5.080	30.00	.00	.00	674.15	2700.00	682.83	.00	682.86	3.29	1.99	2301.00	1489.69
	5.110	148.00	.00	.00	674.15	1400.00	681.92	.00	681.93	1.55	1.26	1911.00	1125.64
	5.110	148.00	.00	.00	674.15	1900.00	682.36	.00	682.38	2.15	1.54	2099.59	1296.86
	5.110	148.00	.00	.00	674.15	2100.00	682.51	.00	682.52	2.40	1.65	2161.99	1355.55
	5.110	148.00	.00	.00	674.15	2700.00	682.86	.00	682.89	3.22	1.97	2317.14	1505.56
*	5.130	137.00	.00	.00	674.20	1400.00	681.93	.00	681.95	3.30	1.71	1360.88	770.75
*	5.130	137.00	.00	.00	674.20	1900.00	682.38	.00	682.41	4.62	2.11	1490.30	884.35
*	5.130	137.00	.00	.00	674.20	2100.00	682.52	.00	682.57	5.18	2.27	1532.92	923.04
*	5.130	137.00	.00	.00	674.20	2700.00	682.89	.00	682.94	7.00	2.72	1637.18	1020.23
	5.210	430.00	.00	.00	674.25	1400.00	682.04	.00	682.08	5.46	2.35	1071.48	599.24
	5.210	430.00	.00	.00	674.25	1900.00	682.53	.00	682.59	7.37	2.85	1194.77	699.81
	5.210	430.00	.00	.00	674.25	2100.00	682.69	.00	682.76	8.16	3.04	1236.45	735.07
	5.210	430.00	.00	.00	674.25	2700.00	683.11	.00	683.20	10.62	3.58	1343.71	828.61
	5.220	20.00	.00	.00	674.29	1400.00	681.60	.00	682.55	5.24	7.82	179.09	611.49
	5.220	20.00	.00	.00	674.29	1900.00	681.73	.00	683.42	9.16	10.41	182.44	627.76
	5.220	20.00	.00	.00	674.29	2200.00	681.56	.00	683.93	13.14	12.35	178.16	607.01
*	5.220	20.00	.00	.00	674.29	2800.00	681.51	681.51	685.40	21.74	15.83	176.83	600.57
	5.224	35.00	681.90	678.10	674.29	1400.00	682.66	.00	683.36	3.34	6.76	264.79	766.21
	5.224	35.00	681.90	678.10	674.29	1900.00	682.41	.00	683.81	6.87	9.50	233.70	724.93
	5.224	35.00	681.90	678.10	674.29	2200.00	681.78	.00	684.01	12.06	11.98	183.63	633.53
	5.224	35.00	681.90	678.10	674.29	2800.00	681.95	.00	685.40	18.24	14.90	190.67	655.66

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10%KS	VCH	AREA	.01K
*	5.226	10.00	.00	.00	674.31	1400.00	682.79	.00	683.40	51.12	6.40	279.82	195.80
*	5.226	10.00	.00	.00	674.31	1900.00	682.80	680.01	683.91	93.36	8.66	281.84	196.64
*	5.226	10.00	.00	.00	674.31	2200.00	681.83	.00	684.05	208.37	11.96	183.94	152.41
*	5.226	10.00	.00	.00	674.31	2800.00	683.67	683.67	685.04	113.63	10.20	440.83	262.67
*	5.240	70.00	.00	.00	674.35	1400.00	683.58	.00	683.63	3.58	2.39	1127.96	740.12
*	5.240	70.00	.00	.00	674.35	1900.00	684.24	.00	684.31	4.56	2.84	1294.36	889.52
*	5.240	70.00	.00	.00	674.35	2200.00	684.72	.00	684.79	4.78	3.00	1417.21	1005.95
*	5.240	70.00	.00	.00	674.35	2800.00	685.43	.00	685.52	5.54	3.38	1602.04	1190.10

10 YEAR FLOOD

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	.000	1200.00	623.35	.00	.00	.00	201.25	.00
	.000	1800.00	625.31	1.96	.00	.00	422.40	.00
	.000	2000.00	626.00	.69	.00	.00	450.00	.00
	.000	2500.00	627.39	1.39	.00	.00	509.08	.00
	.100	1200.00	623.89	.00	.54	.00	184.22	510.00
	.100	1800.00	625.63	1.73	.32	.00	324.37	510.00
	.100	2000.00	626.25	.62	.25	.00	363.09	510.00
	.100	2500.00	627.56	1.31	.17	.00	405.56	510.00
*	.180	1200.00	624.74	.00	.84	.00	238.52	440.00
*	.180	1800.00	626.13	1.39	.50	.00	368.90	440.00
*	.180	2000.00	626.65	.52	.40	.00	376.39	440.00
	.180	2500.00	627.82	1.17	.26	.00	393.38	440.00
	.215	1200.00	625.60	.00	.87	.00	327.82	195.00
	.215	1800.00	626.65	1.05	.52	.00	368.72	195.00
	.215	2000.00	627.05	.40	.40	.00	375.87	195.00
	.215	2500.00	628.07	1.02	.25	.00	511.19	195.00
	.250	1200.00	626.17	.00	.57	.00	361.10	195.00
	.250	1800.00	627.05	.88	.40	.00	372.67	195.00
	.250	2000.00	627.39	.34	.34	.00	377.05	195.00
	.250	2500.00	628.30	.91	.23	.00	387.81	195.00
	.360	1200.00	628.47	.00	2.30	.00	130.40	560.00
*	.360	1800.00	628.91	.44	1.86	.00	133.77	560.00
*	.360	2000.00	629.03	.12	1.64	.00	134.59	560.00
*	.360	2500.00	629.37	.34	1.07	.00	137.12	560.00
*	.470	1200.00	630.32	.00	1.85	.00	222.19	560.00
*	.470	1800.00	631.25	.93	2.34	.00	243.40	560.00
*	.470	2000.00	631.53	.29	2.50	.00	249.88	560.00
*	.470	2500.00	632.16	.63	2.80	.00	497.44	560.00
	.540	1200.00	631.15	.00	.83	.00	315.49	390.00
	.540	1800.00	632.07	.92	.82	.00	316.68	390.00
	.540	2000.00	632.34	.28	.81	.00	317.04	390.00
	.540	2500.00	632.96	.61	.79	.00	317.84	390.00
*	.610	1200.00	632.01	.00	.86	.00	170.42	390.00
*	.610	1800.00	632.82	.82	.76	.00	214.77	390.00
*	.610	2000.00	633.07	.25	.73	.00	228.30	390.00
*	.610	2500.00	633.64	.57	.68	.00	259.19	390.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	.700	1200.00	633.60	.00	1.59	.00	263.88	440.00
	.700	1800.00	634.36	.76	1.54	.00	307.40	440.00
	.700	2000.00	634.58	.22	1.51	.00	308.86	440.00
	.700	2500.00	635.08	.50	1.44	.00	312.20	440.00
	.900	1200.00	635.79	.00	2.19	.00	318.55	1050.00
	.900	1800.00	636.54	.75	2.18	.00	331.13	1050.00
	.900	2000.00	636.75	.21	2.17	.00	334.68	1050.00
	.900	2500.00	637.23	.48	2.15	.00	342.85	1050.00
*	1.120	1200.00	637.96	.00	2.17	.00	150.05	1170.00
*	1.120	1800.00	638.78	.82	2.24	.00	164.81	1170.00
*	1.120	2000.00	639.01	.24	2.27	.00	168.60	1170.00
*	1.120	2500.00	639.54	.53	2.32	.00	177.18	1170.00
*	1.210	1200.00	639.11	.00	1.15	.00	315.16	470.00
*	1.210	1800.00	640.09	.98	1.31	.00	346.01	470.00
*	1.210	2000.00	640.37	.28	1.36	.00	349.22	470.00
*	1.210	2500.00	641.00	.63	1.45	.00	356.46	470.00
*	1.267	1200.00	639.43	.00	.32	.00	200.00	300.00
*	1.267	1800.00	640.35	.92	.26	.00	200.00	300.00
*	1.267	2000.00	640.61	.27	.24	.00	200.00	300.00
*	1.267	2500.00	641.22	.60	.22	.00	200.00	300.00
	1.276	1200.00	639.68	.00	.25	.00	114.50	50.00
	1.276	1800.00	640.48	.81	.14	.00	114.50	50.00
	1.276	2000.00	640.72	.24	.11	.00	114.50	50.00
	1.276	2500.00	641.27	.55	.05	.00	114.50	50.00
	1.286	1200.00	639.99	.00	.32	.00	89.50	50.00
	1.286	1800.00	640.78	.79	.30	.00	89.50	50.00
	1.286	2000.00	641.02	.24	.29	.00	89.50	50.00
	1.286	2500.00	641.56	.54	.29	.00	89.50	50.00
	1.290	1300.00	639.81	.00	-.19	.00	23.80	41.00
*	1.290	1800.00	640.36	.55	-.42	.00	23.80	41.00
*	1.290	2000.00	640.43	.08	-.58	.00	23.80	41.00
*	1.290	2500.00	640.96	.52	-.60	.00	23.80	41.00
	1.296	1300.00	640.45	.00	.64	.00	23.80	45.50
	1.296	1800.00	641.76	1.31	1.40	.00	25.60	45.50
*	1.296	2000.00	642.39	.63	1.95	.00	25.60	45.50
*	1.296	2500.00	642.61	.22	1.65	.00	25.60	45.50
*	1.300	1300.00	641.15	.00	.70	.00	47.00	23.50
*	1.300	1800.00	642.75	1.60	.99	.00	47.00	23.50
*	1.300	2000.00	643.41	.66	1.02	.00	47.00	23.50
*	1.300	2500.00	644.31	.90	1.70	.00	47.00	23.50

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	1.310	1300.00	641.67	.00	.52	.00	100.18	50.00
*	1.310	1800.00	643.42	1.75	.68	.00	104.56	50.00
*	1.310	2000.00	644.13	.71	.72	.00	106.32	50.00
*	1.310	2500.00	645.27	1.14	.96	.00	109.18	50.00
	1.350	1300.00	641.88	.00	.21	.00	150.45	190.00
	1.350	1800.00	643.64	1.76	.22	.00	154.85	190.00
	1.350	2000.00	644.35	.71	.22	.00	156.61	190.00
	1.350	2500.00	645.52	1.17	.26	.00	159.55	190.00
	1.360	1300.00	641.98	.00	.09	.00	200.43	85.00
	1.360	1800.00	643.74	1.76	.10	.00	204.84	85.00
	1.360	2000.00	644.45	.71	.10	.00	206.60	85.00
	1.360	2500.00	645.63	1.19	.11	.00	209.57	85.00
*	1.530	1300.00	642.45	.00	.48	.00	181.23	850.00
*	1.530	1800.00	644.05	1.60	.31	.00	293.98	850.00
*	1.530	2000.00	644.72	.66	.27	.00	330.15	850.00
	1.530	2500.00	645.88	1.17	.25	.00	393.71	850.00
	1.620	1300.00	643.73	.00	1.27	.00	378.32	520.00
	1.620	1800.00	644.87	1.14	.81	.00	390.19	520.00
	1.620	2000.00	645.38	.51	.66	.00	393.36	520.00
	1.620	2500.00	646.41	1.03	.53	.00	398.72	520.00
*	1.740	1300.00	644.99	.00	1.27	.00	321.73	600.00
*	1.740	1800.00	645.66	.66	.79	.00	327.50	600.00
*	1.740	2000.00	646.01	.36	.63	.00	330.55	600.00
*	1.740	2500.00	646.87	.85	.45	.00	337.92	600.00
*	1.900	1300.00	647.58	.00	2.59	.00	248.51	860.00
	1.900	1800.00	648.05	.47	2.40	.00	270.78	860.00
	1.900	2000.00	648.20	.14	2.18	.00	272.97	860.00
	1.900	2500.00	648.60	.40	1.73	.00	278.92	860.00
	1.980	1300.00	648.55	.00	.97	.00	397.12	395.00
	1.980	1800.00	649.13	.58	1.08	.00	410.25	395.00
	1.980	2000.00	649.33	.20	1.13	.00	414.74	395.00
	1.980	2500.00	649.78	.46	1.19	.00	425.10	395.00
	2.040	1300.00	649.42	.00	.87	.00	469.76	335.00
	2.040	1800.00	649.93	.51	.80	.00	474.38	335.00
	2.040	2000.00	650.11	.18	.79	.00	475.52	335.00
	2.040	2500.00	650.53	.42	.75	.00	477.47	335.00
	2.220	1300.00	651.19	.00	1.77	.00	630.44	960.00
	2.220	1800.00	651.60	.42	1.67	.00	631.48	960.00
	2.220	2000.00	651.76	.15	1.64	.00	631.83	960.00
	2.220	2500.00	652.10	.35	1.57	.00	632.66	960.00

	SECND	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	2.320	1300.00	652.41	.00	1.22	.00	389.61	550.00
	2.320	1800.00	652.86	.45	1.26	.00	411.09	550.00
	2.320	2000.00	653.01	.15	1.26	.00	418.38	550.00
	2.320	2500.00	653.33	.32	1.23	.00	433.60	550.00
	2.580	1300.00	655.28	.00	2.87	.00	332.77	1355.00
*	2.580	1800.00	655.86	.59	3.00	.00	353.77	1355.00
*	2.580	2000.00	656.06	.20	3.05	.00	359.85	1355.00
*	2.580	2500.00	656.51	.45	3.18	.00	368.04	1355.00
	2.860	1300.00	657.39	.00	2.11	.00	408.31	1465.00
	2.860	1800.00	657.91	.52	2.05	.00	422.47	1465.00
	2.860	2000.00	658.09	.18	2.03	.00	425.99	1465.00
	2.860	2500.00	658.53	.43	2.01	.00	430.23	1465.00
	3.030	1300.00	659.35	.00	1.97	.00	300.75	910.00
	3.030	1800.00	659.88	.52	1.97	.00	343.46	910.00
	3.030	2000.00	660.05	.17	1.96	.00	354.01	910.00
	3.030	2500.00	660.46	.41	1.93	.00	386.67	910.00
	3.080	1300.00	660.04	.00	.69	.00	450.00	260.00
	3.080	1800.00	660.63	.59	.76	.00	450.00	260.00
	3.080	2000.00	660.83	.20	.78	.00	450.00	260.00
	3.080	2500.00	661.26	.44	.80	.00	450.00	260.00
	3.250	1300.00	661.86	.00	1.82	.00	238.78	891.00
	3.250	1800.00	662.40	.54	1.77	.00	248.21	891.00
	3.250	2000.00	662.59	.19	1.77	.00	249.76	891.00
	3.250	2500.00	663.01	.42	1.75	.00	253.10	891.00
*	3.270	1300.00	662.05	.00	.19	.00	105.13	100.00
*	3.270	1800.00	662.57	.52	.17	.00	106.42	100.00
*	3.270	2000.00	662.75	.18	.16	.00	106.88	100.00
*	3.270	2500.00	663.13	.38	.12	.00	107.84	100.00
	3.280	1300.00	662.33	.00	.28	.00	79.85	65.00
	3.280	1800.00	662.88	.55	.31	.00	81.19	65.00
	3.280	2000.00	663.07	.19	.32	.00	81.68	65.00
	3.280	2500.00	663.48	.41	.35	.00	82.72	65.00
	3.290	1300.00	662.66	.00	.33	.00	63.40	50.00
	3.290	1800.00	663.25	.59	.37	.00	64.92	50.00
	3.290	2000.00	663.45	.20	.38	.00	65.43	50.00
	3.290	2500.00	663.90	.45	.42	.00	66.52	50.00
*	3.300	1300.00	663.39	.00	.73	.00	57.00	50.00
*	3.300	1800.00	664.16	.78	.91	.00	57.00	50.00
*	3.300	2000.00	664.45	.29	.99	.00	57.00	50.00
*	3.300	2500.00	665.14	.69	1.24	.00	57.00	50.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	3.310	1400.00	663.52	.00	.13	.00	34.80	46.00
	3.310	1900.00	664.30	.78	.14	.00	34.80	46.00
	3.310	2100.00	664.58	.28	.14	.00	34.80	46.00
	3.310	2700.00	665.21	.63	.07	.00	34.80	46.00
	3.320	1400.00	664.64	.00	1.12	.00	34.80	80.00
*	3.320	1900.00	666.68	2.04	2.38	.00	34.80	80.00
*	3.320	2100.00	667.60	.92	3.02	.00	34.80	80.00
*	3.320	2700.00	669.96	2.36	4.75	.00	34.80	80.00
*	3.330	1400.00	665.15	.00	.51	.00	131.00	40.00
*	3.330	1900.00	667.27	2.12	.59	.00	131.00	40.00
*	3.330	2100.00	668.20	.93	.60	.00	131.00	40.00
*	3.330	2700.00	670.62	2.42	.66	.00	131.00	40.00
	3.340	1400.00	665.24	.00	.09	.00	231.00	50.00
	3.340	1900.00	667.35	2.11	.08	.00	231.00	50.00
	3.340	2100.00	668.28	.92	.08	.00	231.00	50.00
	3.340	2700.00	670.70	2.42	.08	.00	231.00	50.00
	3.350	1400.00	665.28	.00	.04	.00	312.55	50.00
	3.350	1900.00	667.38	2.10	.03	.00	319.55	50.00
	3.350	2100.00	668.30	.92	.03	.00	322.62	50.00
	3.350	2700.00	670.72	2.42	.02	.00	330.68	50.00
*	3.480	1400.00	665.58	.00	.30	.00	233.56	670.00
*	3.480	1900.00	667.53	1.95	.15	.00	255.31	670.00
*	3.480	2100.00	668.42	.89	.11	.00	265.22	670.00
*	3.480	2700.00	670.79	2.37	.07	.00	289.70	670.00
	3.650	1400.00	667.32	.00	1.73	.00	286.41	920.00
	3.650	1900.00	668.38	1.07	.85	.00	296.91	920.00
	3.650	2100.00	669.03	.65	.61	.00	300.15	920.00
	3.650	2700.00	671.10	2.07	.31	.00	309.93	920.00
	3.740	1400.00	667.97	.00	.65	.00	258.38	460.00
	3.740	1900.00	668.88	.92	.50	.00	263.62	460.00
	3.740	2100.00	669.42	.54	.39	.00	266.70	460.00
	3.740	2700.00	671.30	1.87	.20	.00	276.48	460.00
	3.900	1400.00	669.20	.00	1.23	.00	251.80	870.00
	3.900	1900.00	669.96	.77	1.08	.00	264.34	870.00
	3.900	2100.00	670.34	.38	.92	.00	267.44	870.00
	3.900	2700.00	671.82	1.47	.52	.00	278.01	870.00
	4.040	1400.00	670.20	.00	1.00	.00	284.92	720.00
	4.040	1900.00	670.87	.68	.91	.00	296.13	720.00
	4.040	2100.00	671.17	.30	.83	.00	301.05	720.00
	4.040	2700.00	672.33	1.16	.52	.00	321.07	720.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	4.320	1400.00	672.35	.00	2.16	.00	257.50	1500.00
	4.320	1900.00	672.97	.62	2.10	.00	265.31	1500.00
	4.320	2100.00	673.20	.22	2.03	.00	268.24	1500.00
	4.320	2700.00	673.91	.71	1.57	.00	277.27	1500.00
	4.380	1400.00	672.73	.00	.38	.00	304.37	275.00
	4.380	1900.00	673.37	.64	.39	.00	308.21	275.00
	4.380	2100.00	673.59	.23	.40	.00	309.56	275.00
	4.380	2700.00	674.29	.70	.39	.00	313.14	275.00
	4.430	1400.00	673.32	.00	.59	.00	200.78	275.00
	4.430	1900.00	673.95	.63	.59	.00	242.96	275.00
	4.430	2100.00	674.18	.22	.58	.00	247.61	275.00
	4.430	2700.00	674.84	.66	.55	.00	253.59	275.00
	4.510	1400.00	674.70	.00	1.38	.00	208.57	450.00
	4.510	1900.00	675.41	.72	1.46	.00	247.46	450.00
	4.510	2100.00	675.65	.23	1.47	.00	249.58	450.00
	4.510	2700.00	676.28	.63	1.43	.00	255.19	450.00
*	4.560	1400.00	675.81	.00	1.12	.00	206.14	225.00
*	4.560	1900.00	676.49	.67	1.07	.00	214.66	225.00
*	4.560	2100.00	676.71	.22	1.06	.00	216.32	225.00
*	4.560	2700.00	677.31	.60	1.03	.00	220.00	225.00
*	4.600	1400.00	676.32	.00	.51	.00	317.40	225.00
*	4.600	1900.00	676.98	.66	.49	.00	320.00	225.00
*	4.600	2100.00	677.21	.23	.50	.00	320.00	225.00
*	4.600	2700.00	677.84	.63	.53	.00	320.00	225.00
	4.770	1400.00	676.71	.00	.39	.00	205.16	900.00
	4.770	1900.00	677.41	.71	.43	.00	213.27	900.00
	4.770	2100.00	677.66	.25	.45	.00	216.11	900.00
	4.770	2700.00	678.33	.67	.49	.00	224.53	900.00
*	4.880	1400.00	677.17	.00	.47	.00	270.46	600.00
*	4.880	1900.00	677.91	.73	.49	.00	276.56	600.00
*	4.880	2100.00	678.17	.26	.51	.00	278.63	600.00
*	4.880	2700.00	678.87	.70	.53	.00	284.14	600.00
*	5.030	1400.00	678.64	.00	1.46	.00	218.89	800.00
*	5.030	1900.00	679.24	.60	1.33	.00	228.12	800.00
*	5.030	2100.00	679.46	.22	1.29	.00	231.58	800.00
*	5.030	2700.00	680.08	.62	1.22	.00	241.23	800.00
*	5.060	1400.00	679.03	.00	.39	.00	398.97	130.00
*	5.060	1900.00	679.63	.60	.39	.00	408.83	130.00
*	5.060	2100.00	679.85	.22	.39	.00	412.50	130.00
*	5.060	2700.00	680.47	.62	.39	.00	437.35	130.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	5.070	1400.00	679.05	.00	.02	.00	240.26	38.00
*	5.070	1900.00	679.64	.59	.01	.00	263.08	38.00
*	5.070	2100.00	679.86	.22	.01	.00	271.56	38.00
*	5.070	2700.00	680.48	.62	.01	.00	299.16	38.00
*	5.073	1400.00	681.85	.00	2.81	.00	363.24	35.00
*	5.073	1900.00	682.27	.42	2.63	.00	390.51	35.00
*	5.073	2100.00	682.40	.13	2.54	.00	400.53	35.00
*	5.073	2700.00	682.72	.31	2.24	.00	424.46	35.00
	5.080	1400.00	681.90	.00	.05	.00	422.93	30.00
	5.080	1900.00	682.34	.44	.07	.00	429.28	30.00
	5.080	2100.00	682.48	.14	.08	.00	431.06	30.00
	5.080	2700.00	682.83	.35	.12	.00	435.41	30.00
	5.110	1400.00	681.92	.00	.01	.00	423.42	148.00
	5.110	1900.00	682.36	.44	.02	.00	429.58	148.00
	5.110	2100.00	682.51	.14	.02	.00	431.40	148.00
	5.110	2700.00	682.86	.36	.03	.00	435.87	148.00
*	5.130	1400.00	681.93	.00	.01	.00	285.49	137.00
*	5.130	1900.00	682.38	.45	.02	.00	288.75	137.00
*	5.130	2100.00	682.52	.15	.02	.00	289.72	137.00
*	5.130	2700.00	682.89	.36	.02	.00	292.09	137.00
	5.210	1400.00	682.04	.00	.11	.00	250.41	430.00
	5.210	1900.00	682.53	.49	.15	.00	255.29	430.00
	5.210	2100.00	682.69	.16	.17	.00	256.92	430.00
	5.210	2700.00	683.11	.41	.22	.00	261.06	430.00
	5.220	1400.00	681.60	.00	-.44	.00	24.50	20.00
	5.220	1900.00	681.73	.13	-.80	.00	24.50	20.00
	5.220	2200.00	681.56	-.17	-1.13	.00	24.50	20.00
*	5.220	2800.00	681.51	-.05	-1.60	.00	24.50	20.00
	5.224	1400.00	682.66	.00	1.06	.00	135.63	35.00
	5.224	1900.00	682.41	-.24	.68	.00	114.41	35.00
	5.224	2200.00	681.78	-.63	.22	.00	24.50	35.00
	5.224	2800.00	681.95	.17	.45	.00	75.05	35.00
*	5.226	1400.00	682.79	.00	.13	.00	144.71	10.00
*	5.226	1900.00	682.80	.01	.39	.00	145.88	10.00
*	5.226	2200.00	681.83	-.98	.04	.00	24.50	10.00
*	5.226	2800.00	683.67	1.85	1.72	.00	217.07	10.00
*	5.240	1400.00	683.58	.00	.79	.00	245.77	70.00
*	5.240	1900.00	684.24	.67	1.44	.00	252.45	70.00
*	5.240	2200.00	684.72	.48	2.89	.00	257.27	70.00
*	5.240	2800.00	685.43	.71	1.76	.00	264.35	70.00

SUMMARY OF ERRORS AND SPECIAL NOTES

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WARNING SECNO=      .180  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=      .180  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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WARNING SECNO=     1.290  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO=     1.290  PROFILE=  4  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     1.290  PROFILE=  4  MINIMUM SPECIFIC ENERGY

WARNING SECNO=     1.296  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO=     1.296  PROFILE=  4  HYDRAULIC JUMP D.S.

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WARNING SECNO=      5.130  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=      5.130  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=      5.130  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=      5.220  PROFILE=  4  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      5.220  PROFILE=  4  MINIMUM SPECIFIC ENERGY

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WARNING SECNO=      5.226  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=      5.226  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO=      5.226  PROFILE=  4  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      5.226  PROFILE=  4  20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO=      5.240  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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Normal program termination
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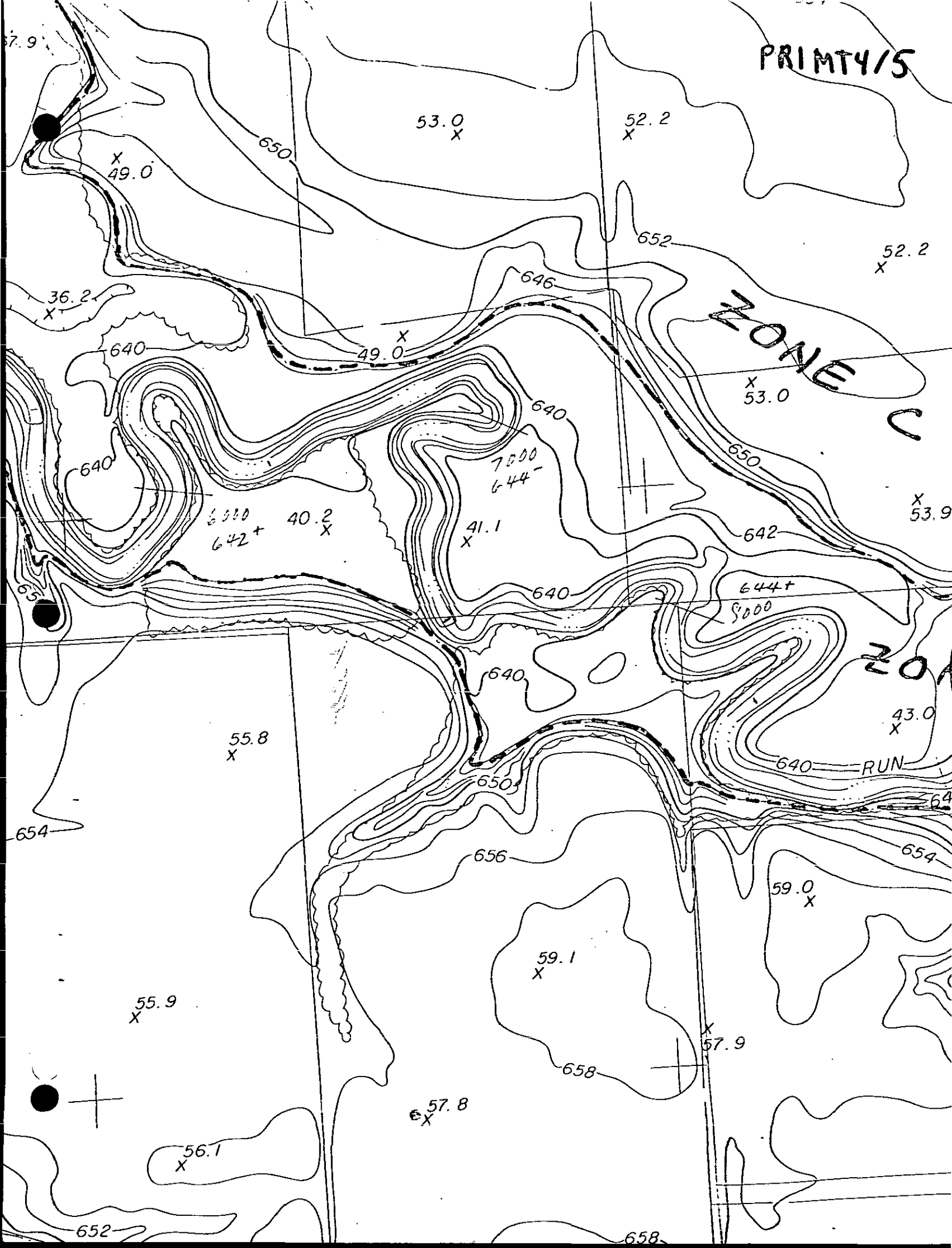
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650
49.0
652
52.2
646
36.2
640
49.0
ZONE C
53.0
640
640
7000
644-
650
53.9
6000
642+
40.2
41.1
642
640
644+
8000
640
ZON
43.0
55.8
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57.9
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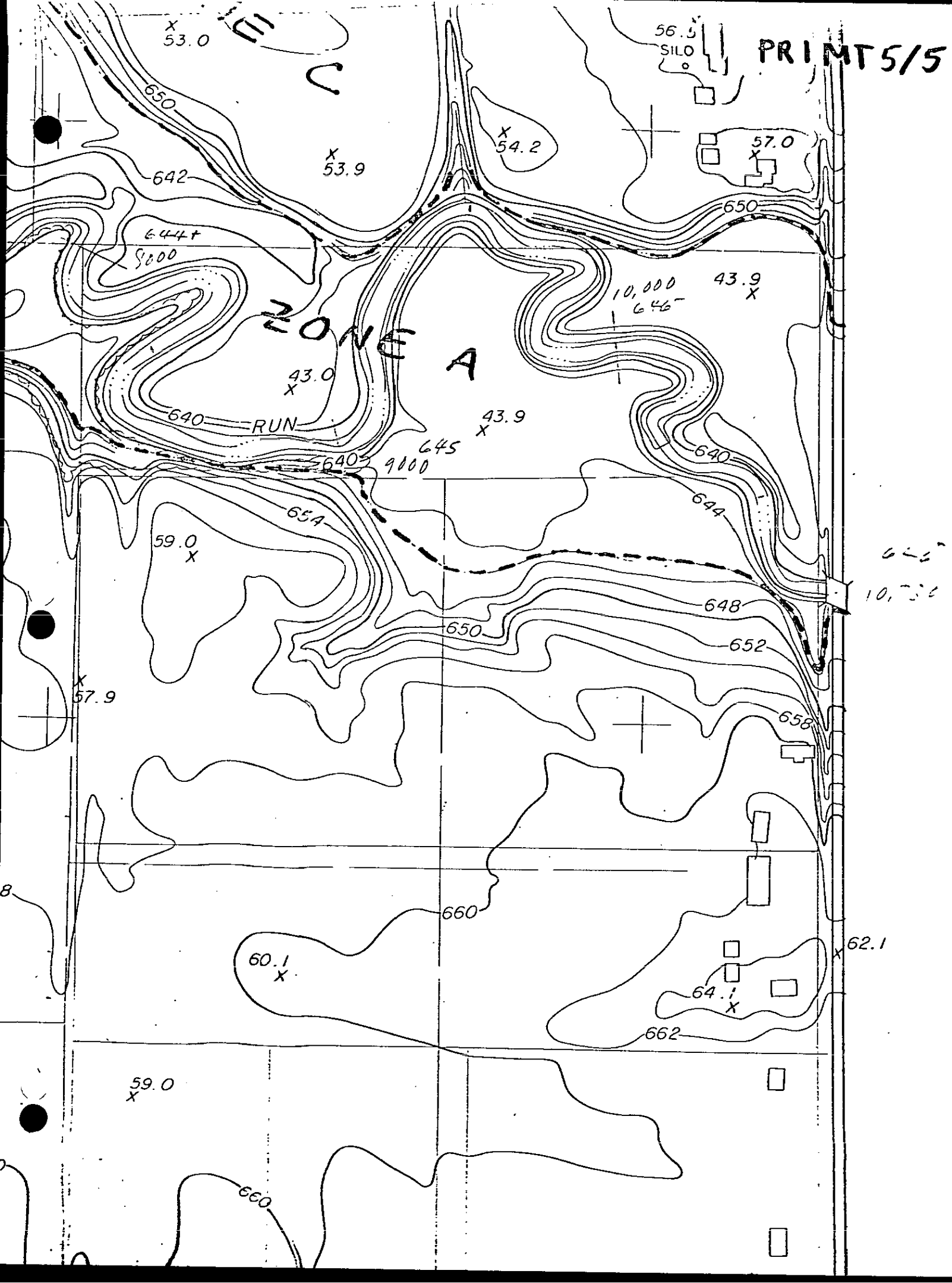
57.8
56.1
652
658


PRINT 5/5
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54.2
56.5
SILO
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642
644+
9000
10,000
646
43.9
43.0
640
RUN
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60.1
62.1
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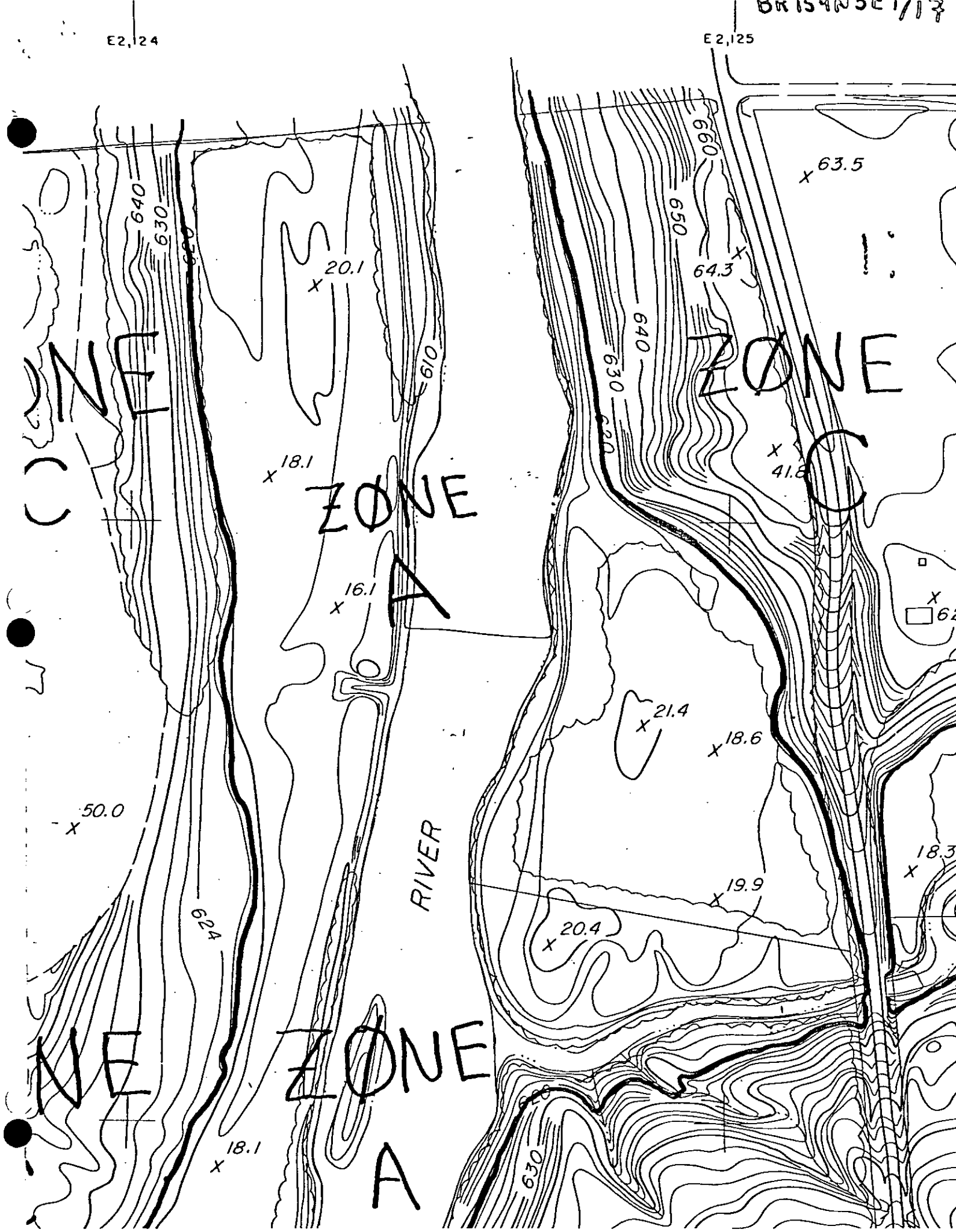
662
59.0
660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E2,125
NE ZONE A
ZONE A
ZONE C
NE ZONE A
RIVER
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630
610
660
650
624
20.1
18.1
16.1
50.0
63.5
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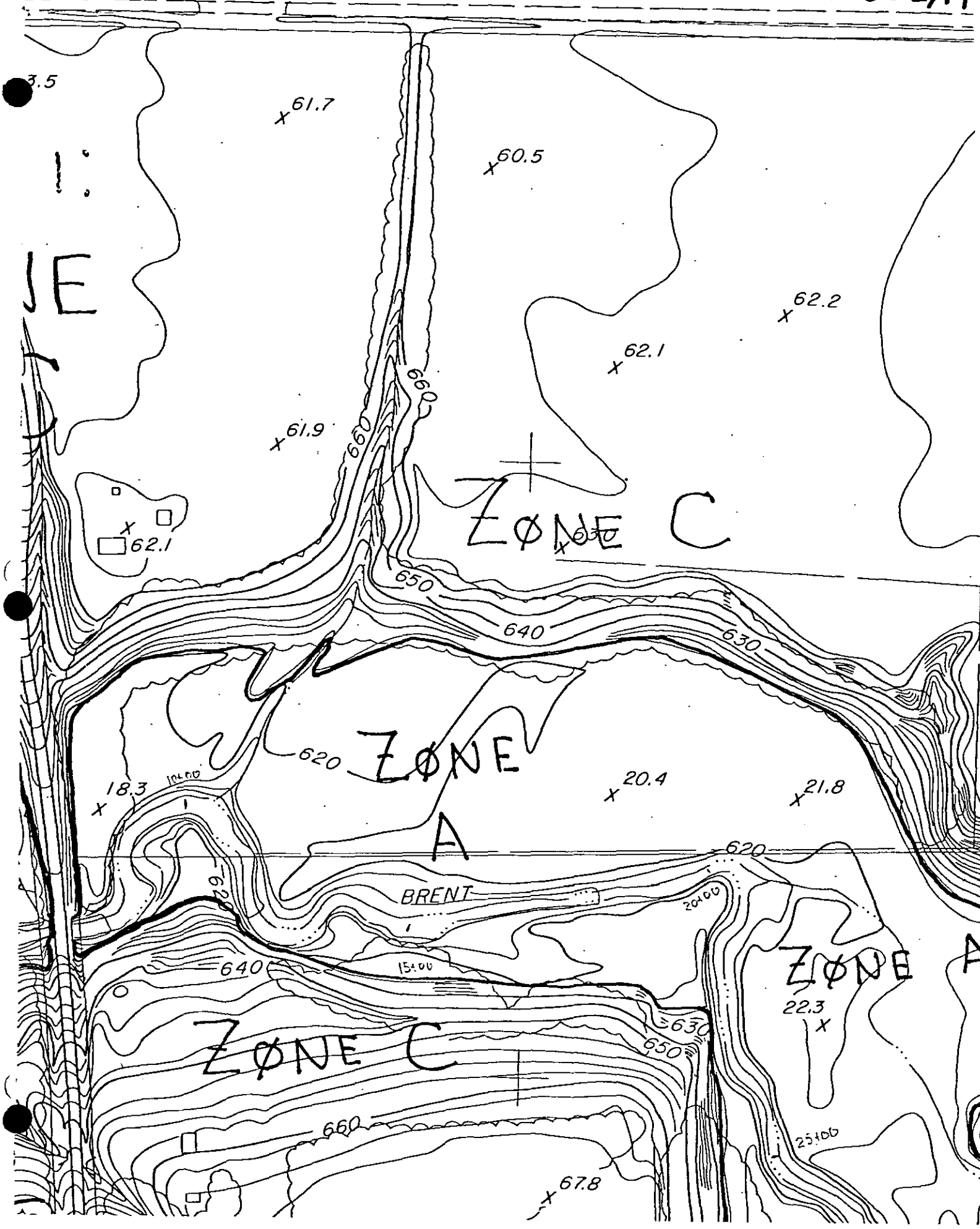
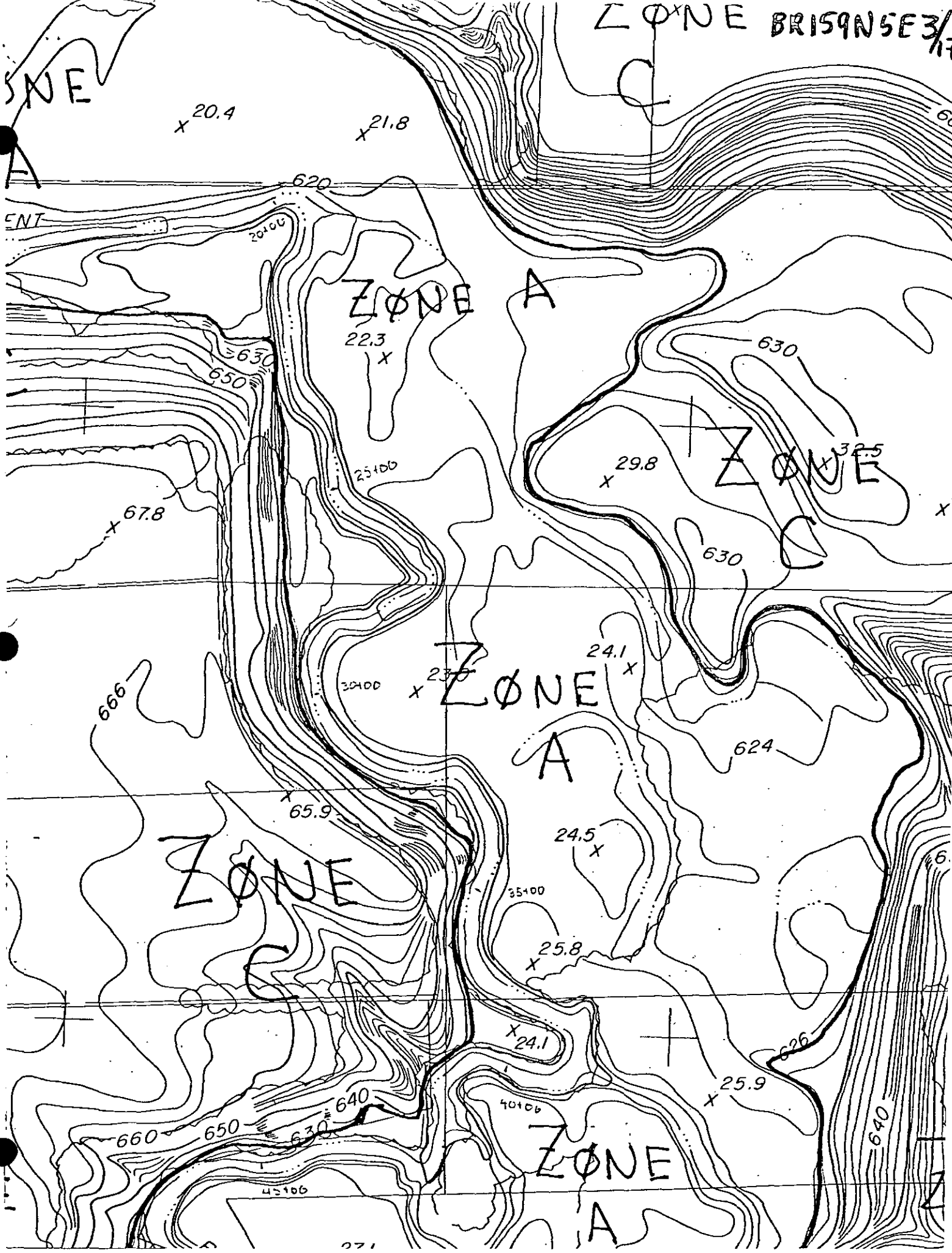
21.4
18.6
19.9
20.4
18.3
18.1

E2,126

BR159N5E2/17

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ZONE C
ZONE A
ZONE C
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ZONE C
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25100
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67.8
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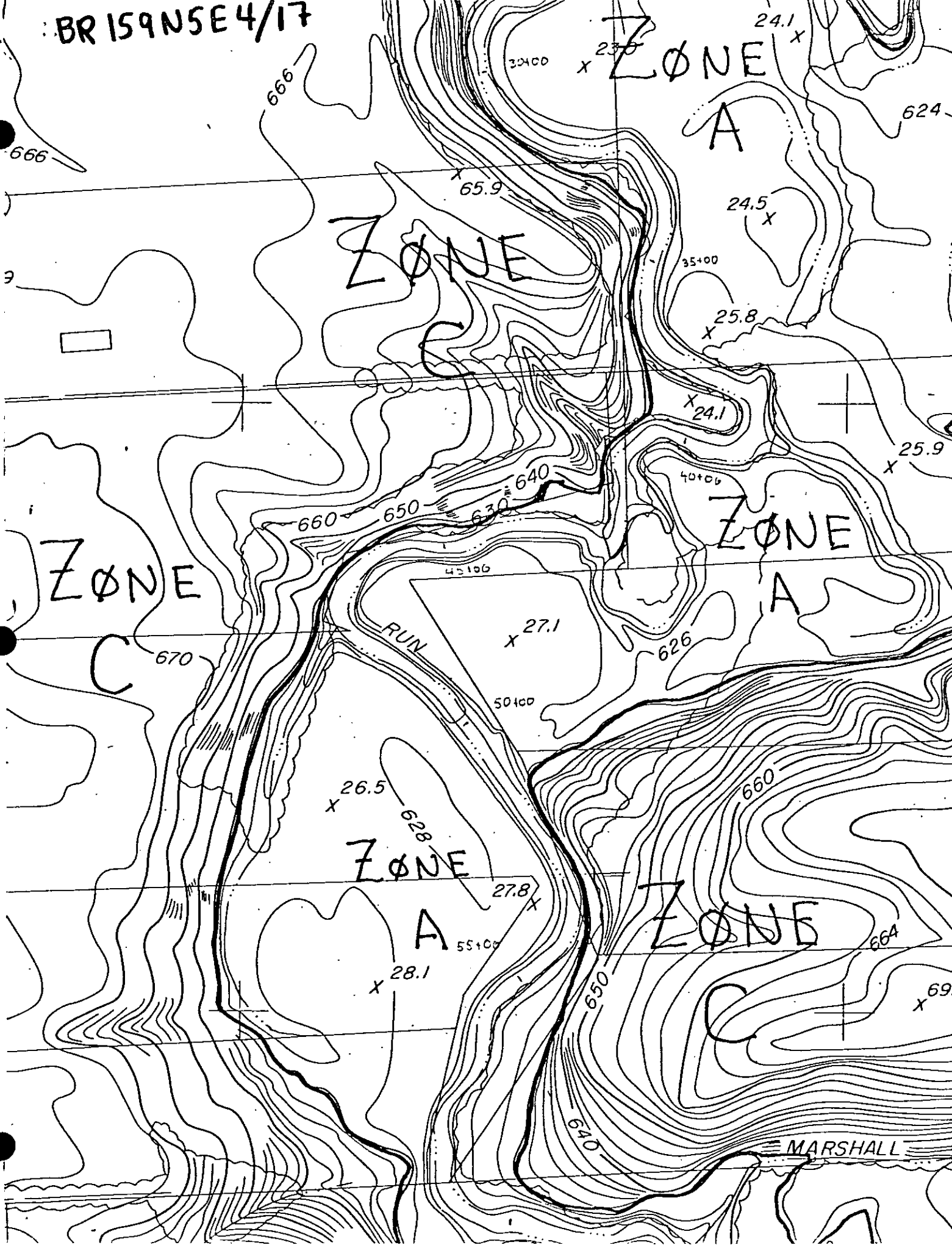
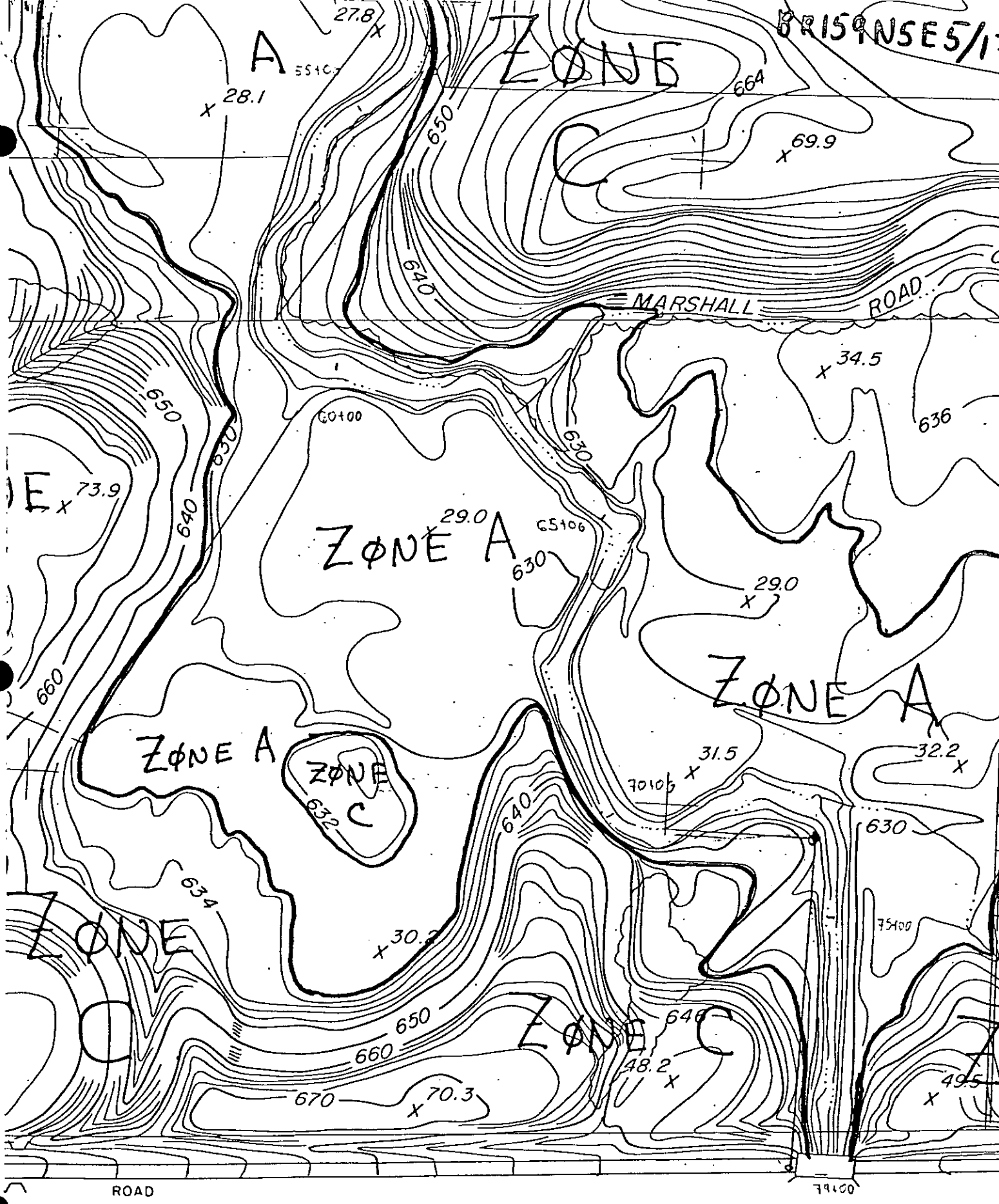
BR 159N5E 4/17




BRISENSES 5/1
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ZONE C
MARSHALL ROAD
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ZONE A
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ZONE C
ZONE C
ROAD
27.8
28.1
69.9
34.5
73.9
29.0
29.0
31.5
32.2
30.2
48.2
49.5
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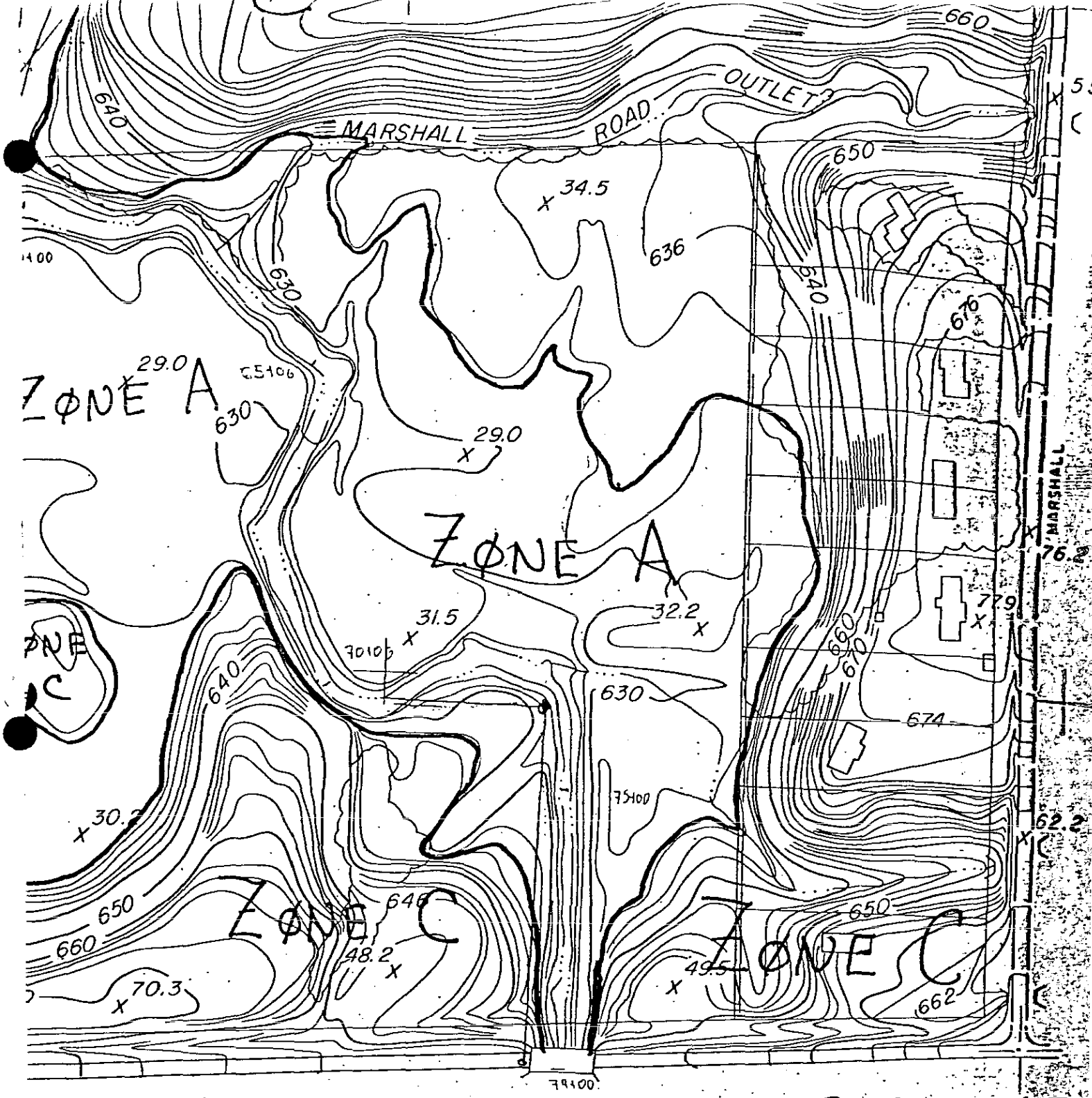
75+00
79+00



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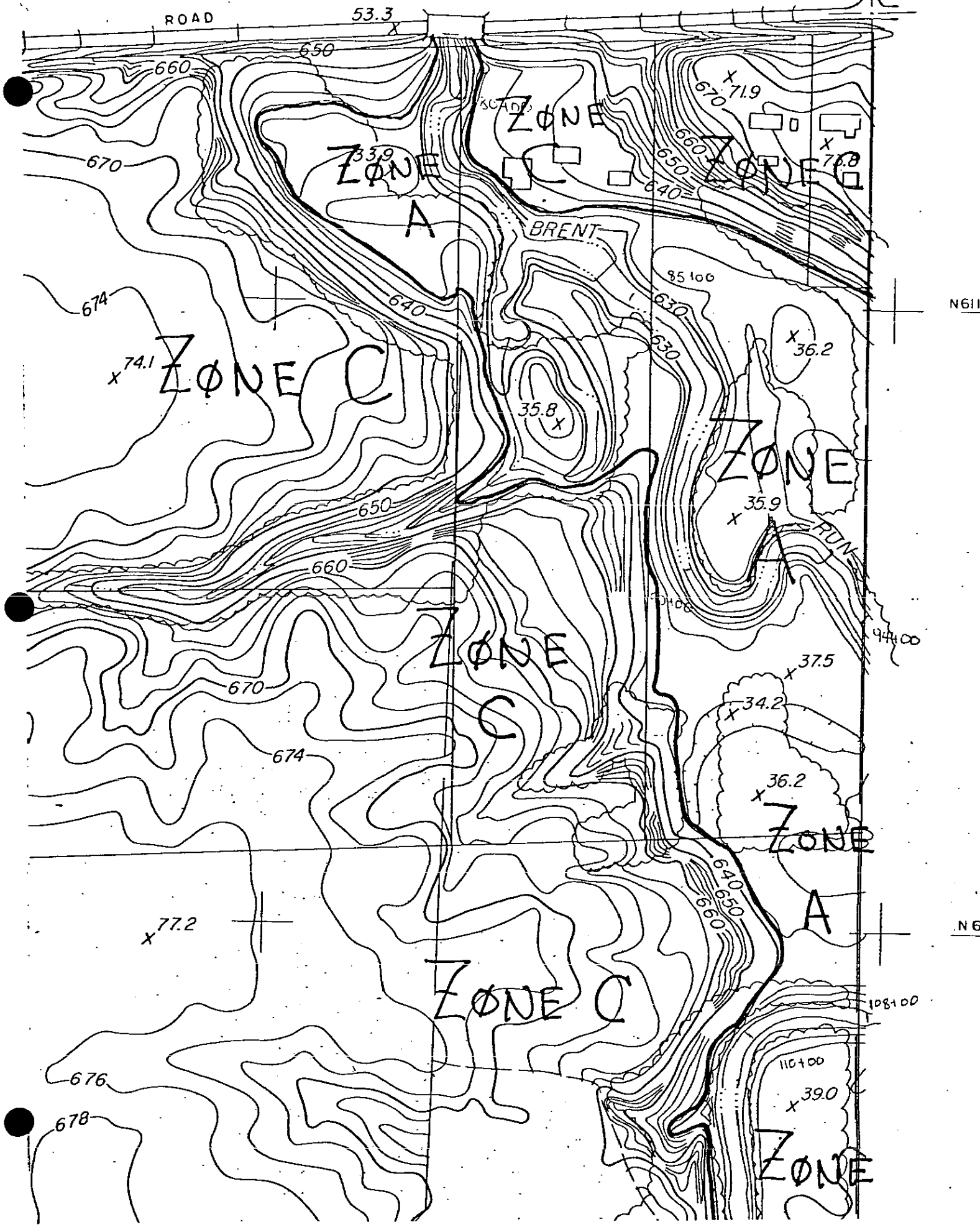
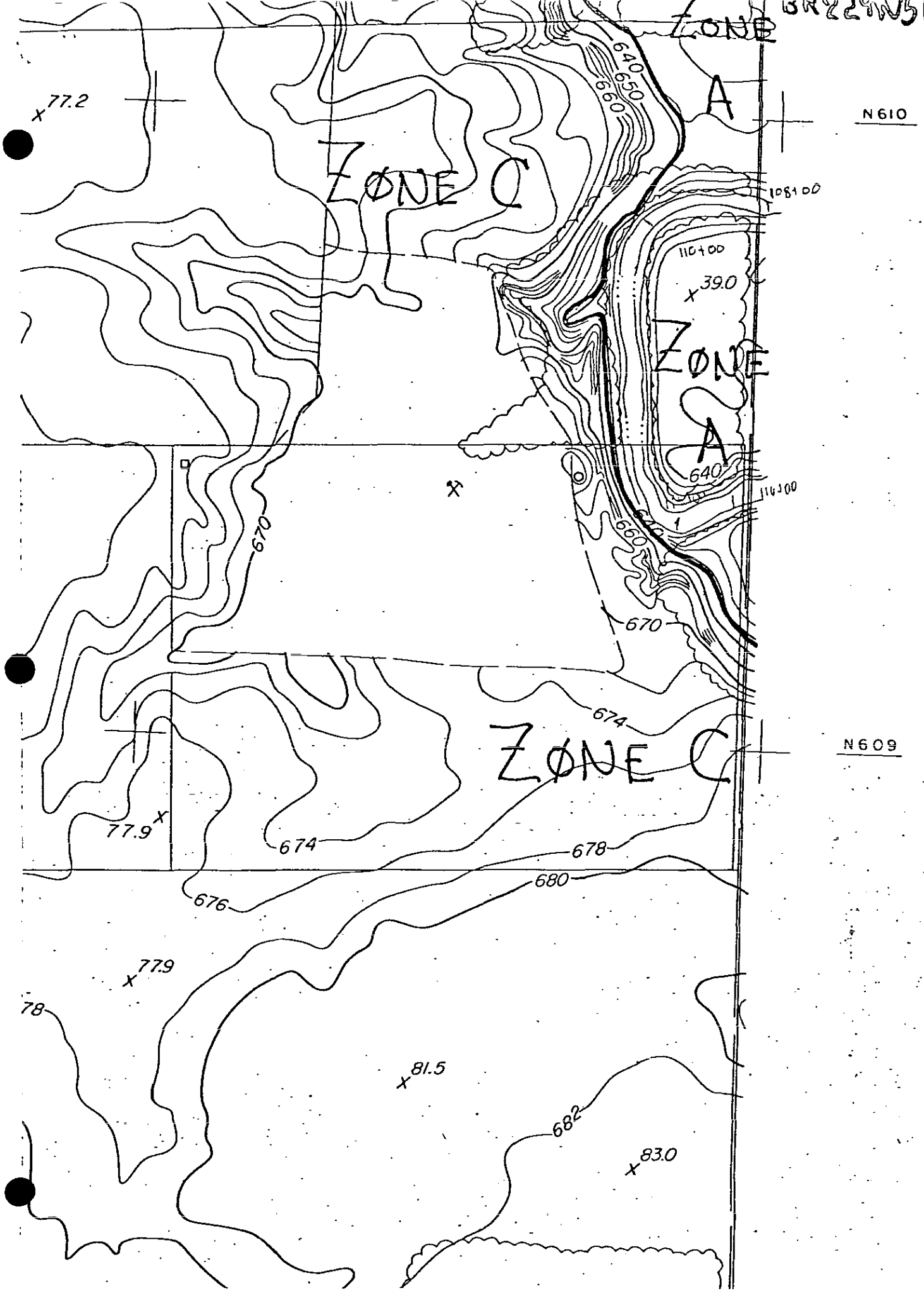
E2,128,000

BR229N5E7/17

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N610
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110+00
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640
110+00
660
670
674
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78
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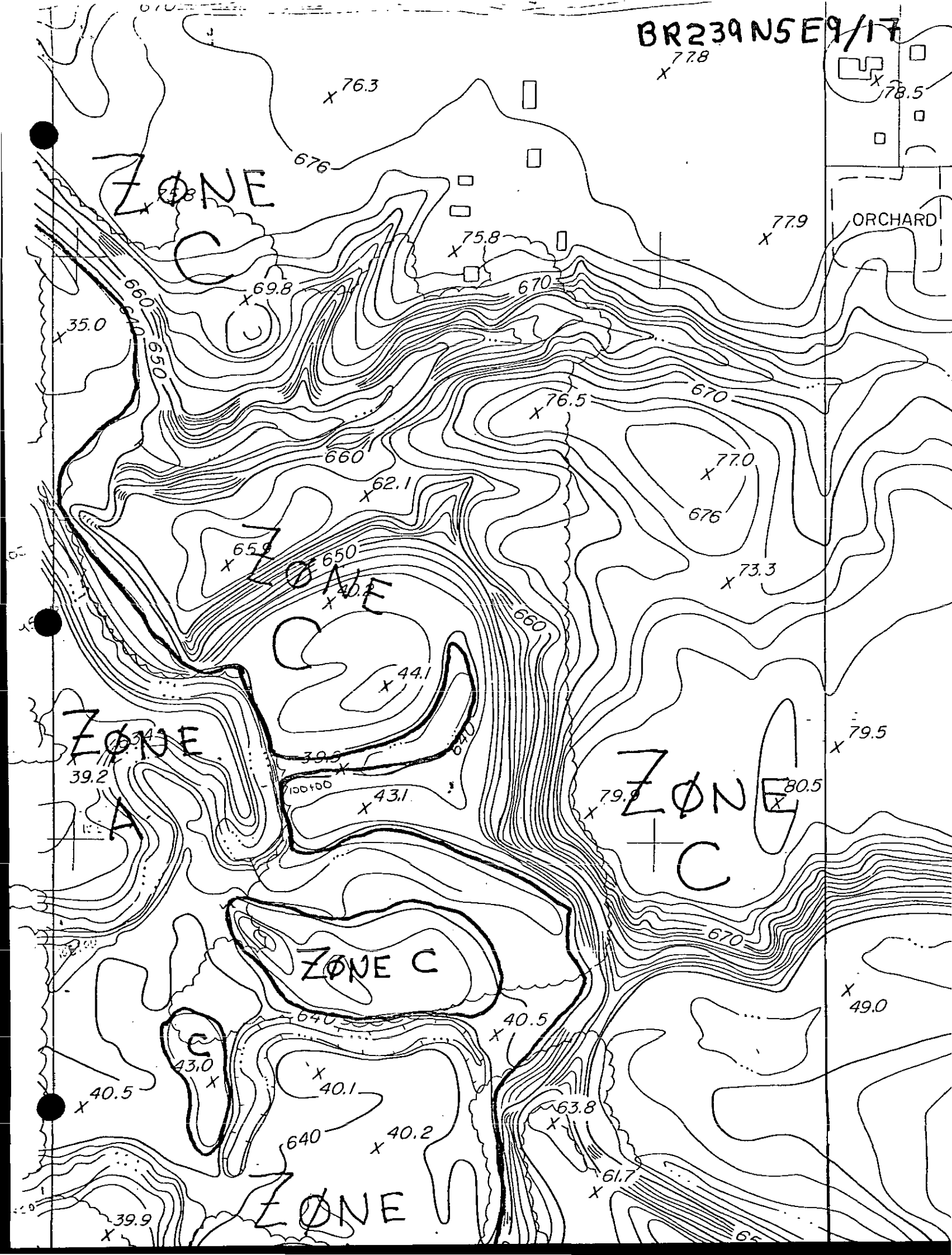
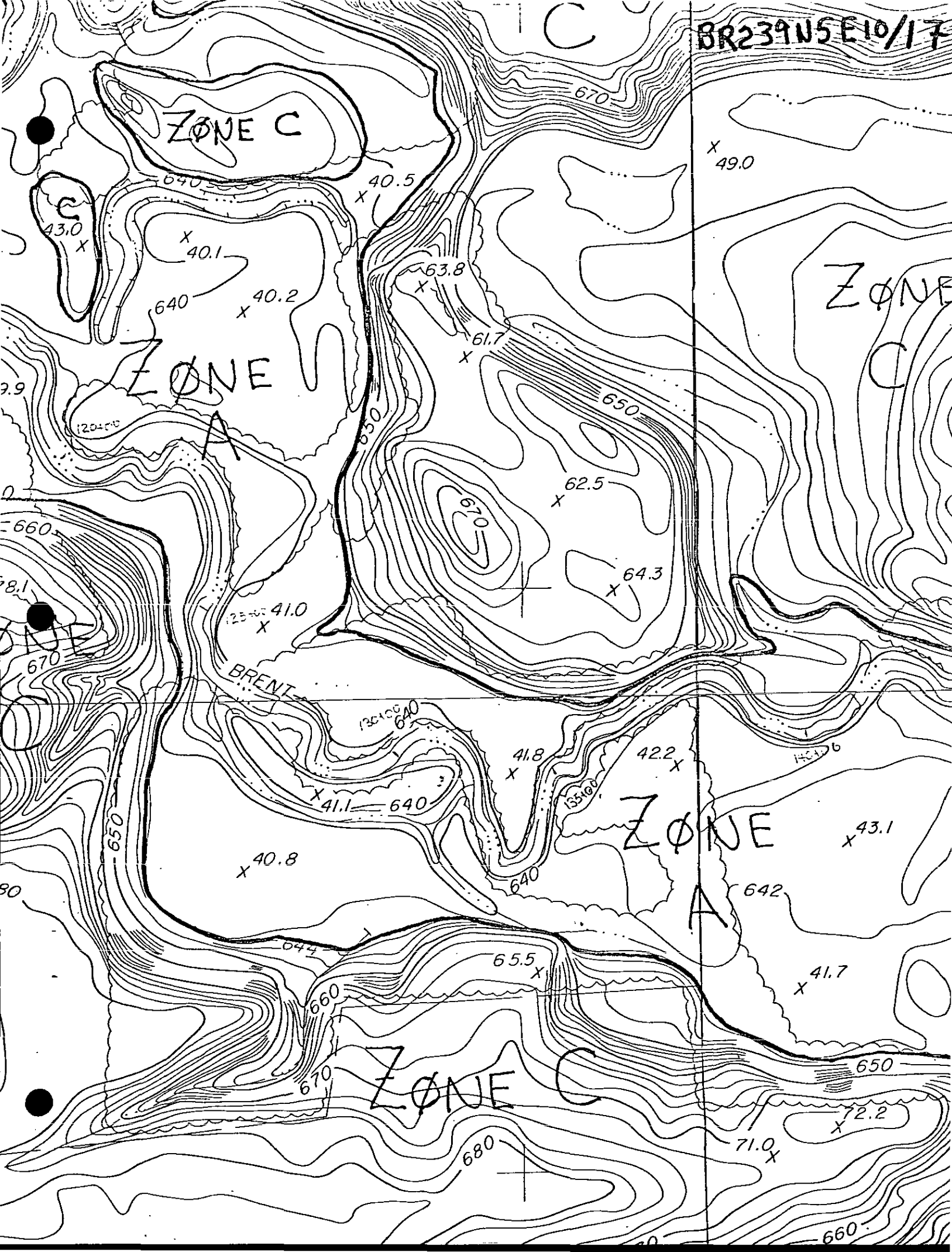
682
83.0
77.2

BR239N5E9/17

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ZONE A
ZONE C
ZONE A
ZONE C
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61.7
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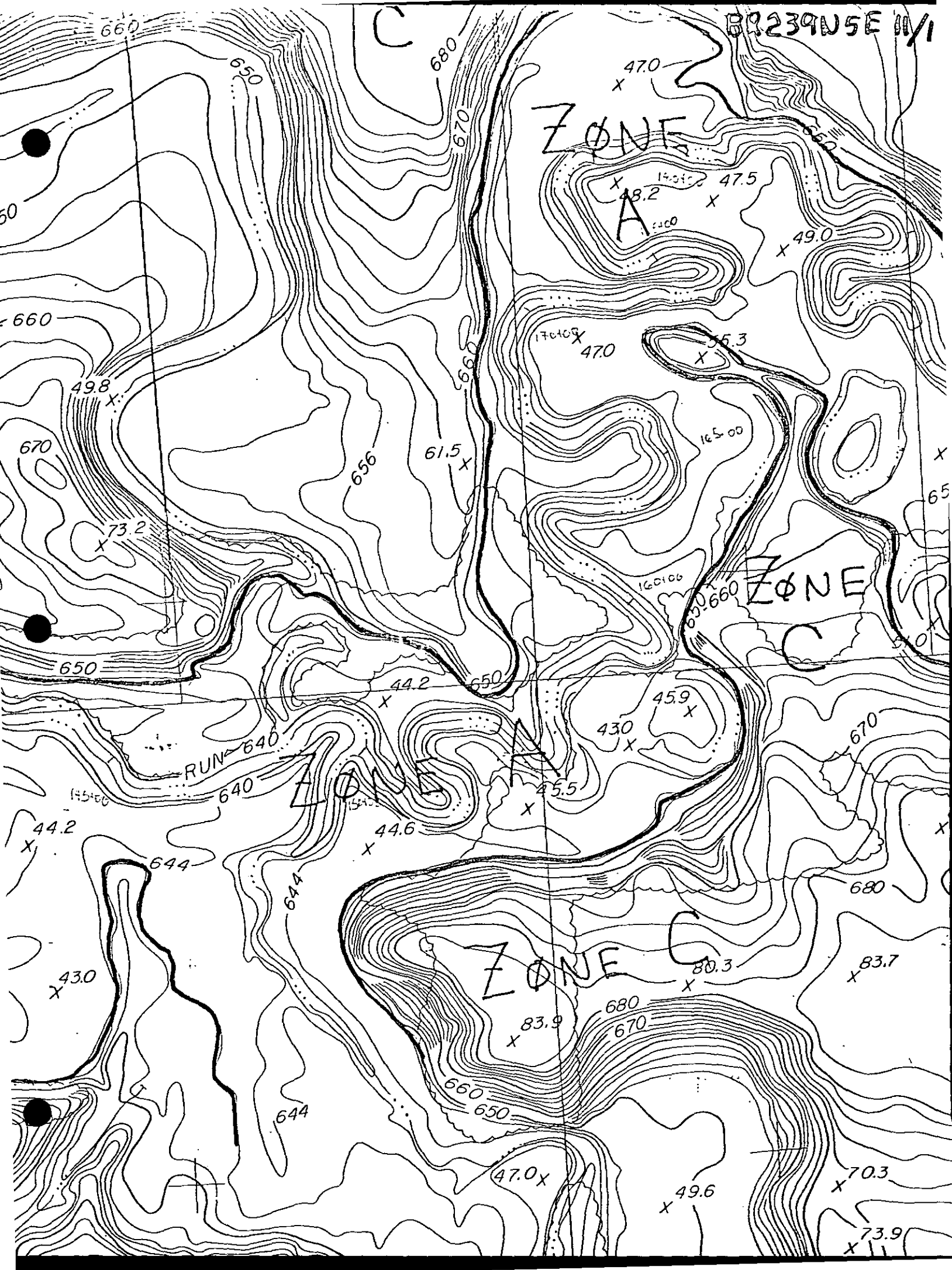
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ZONE C
ZONE C
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61.5
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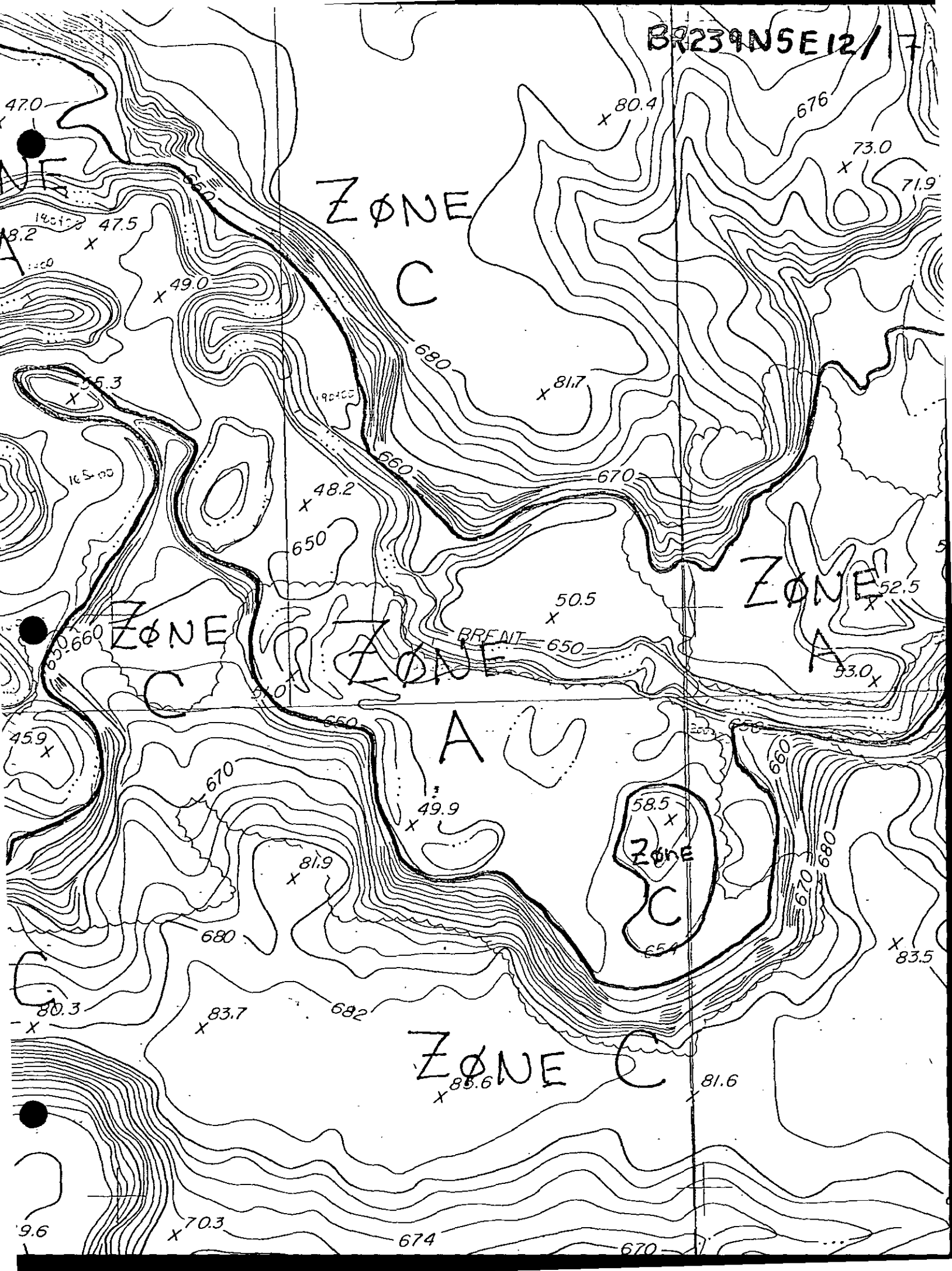
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81.7
50.5
52.5
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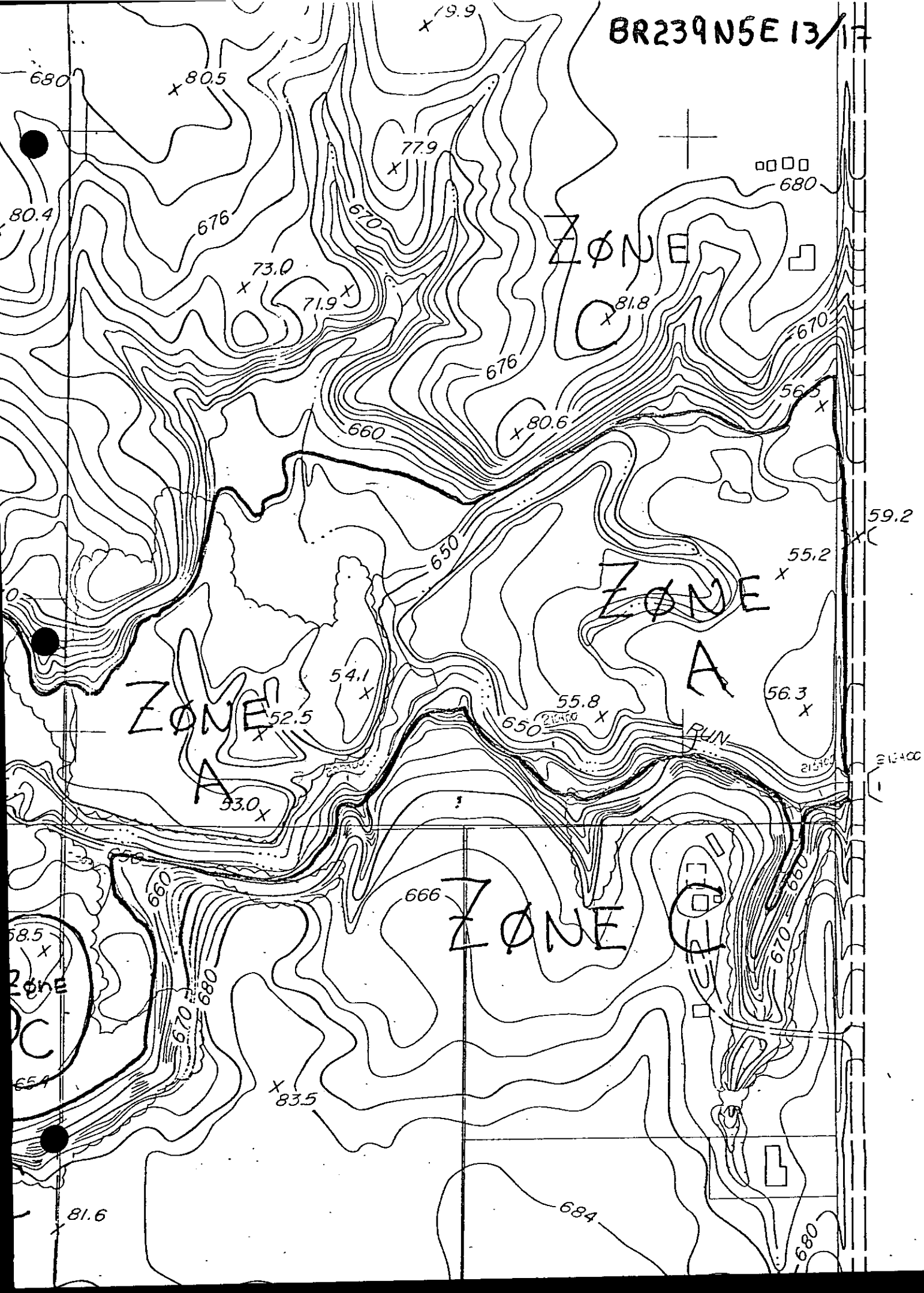
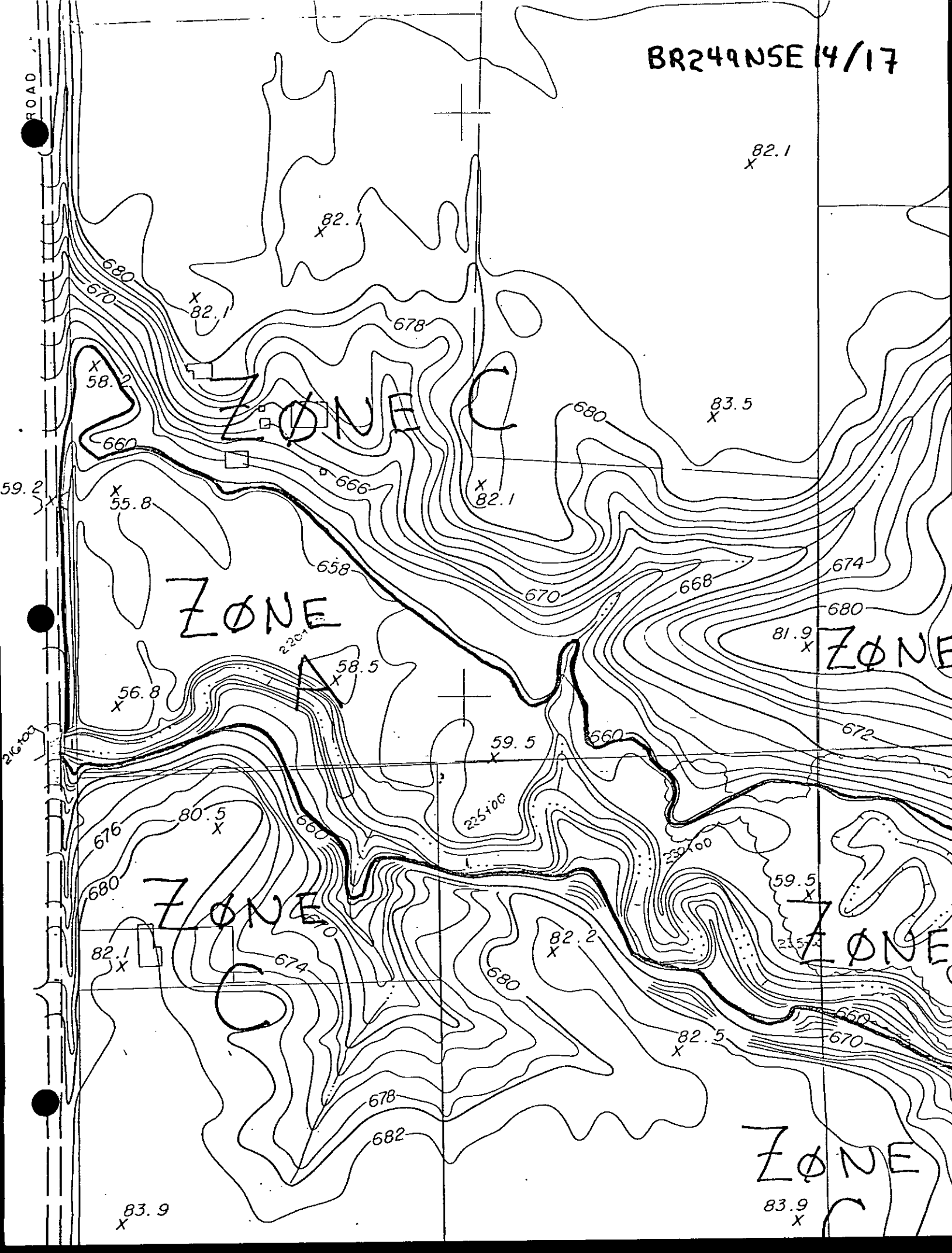
682
674

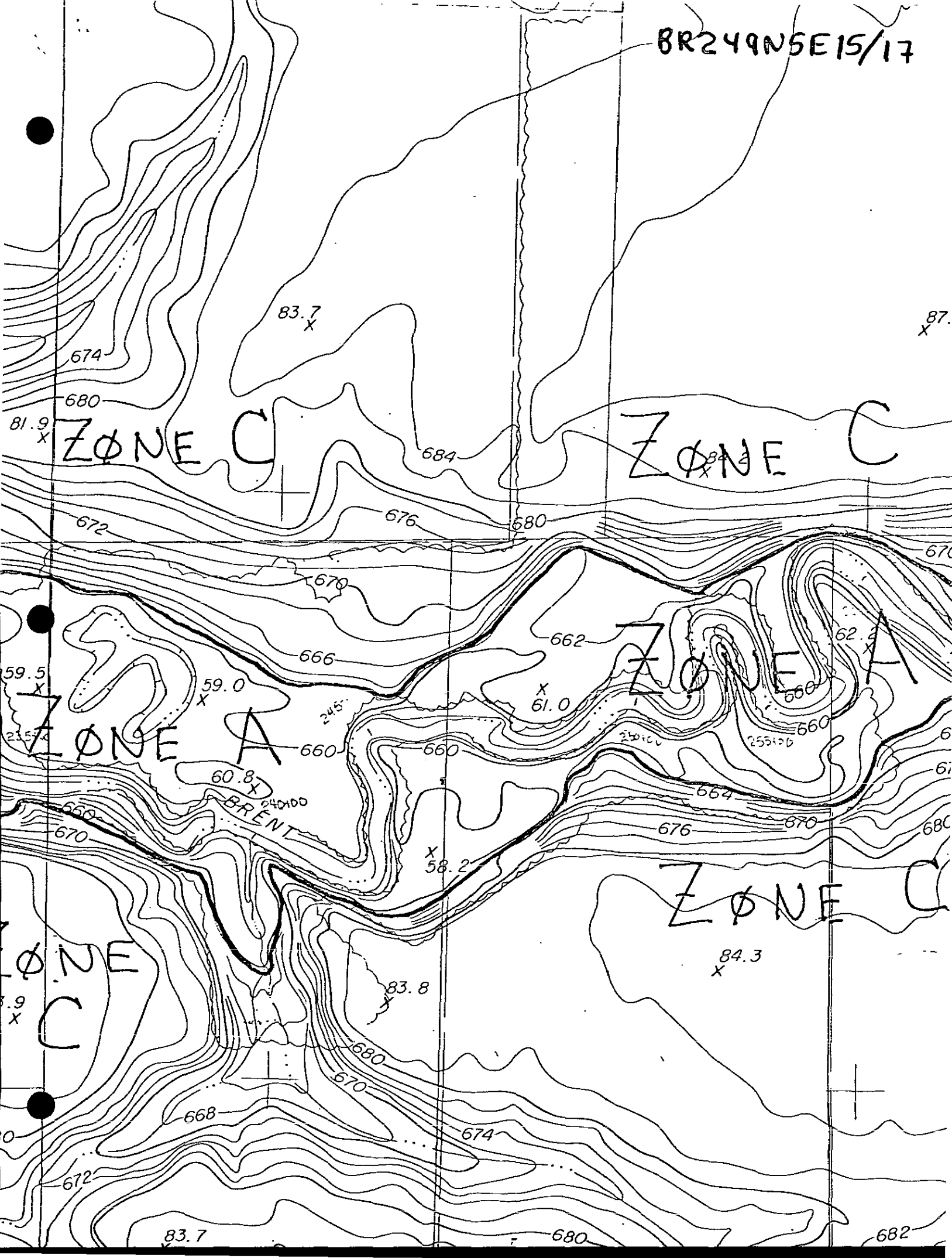
BR239N5E 13/17

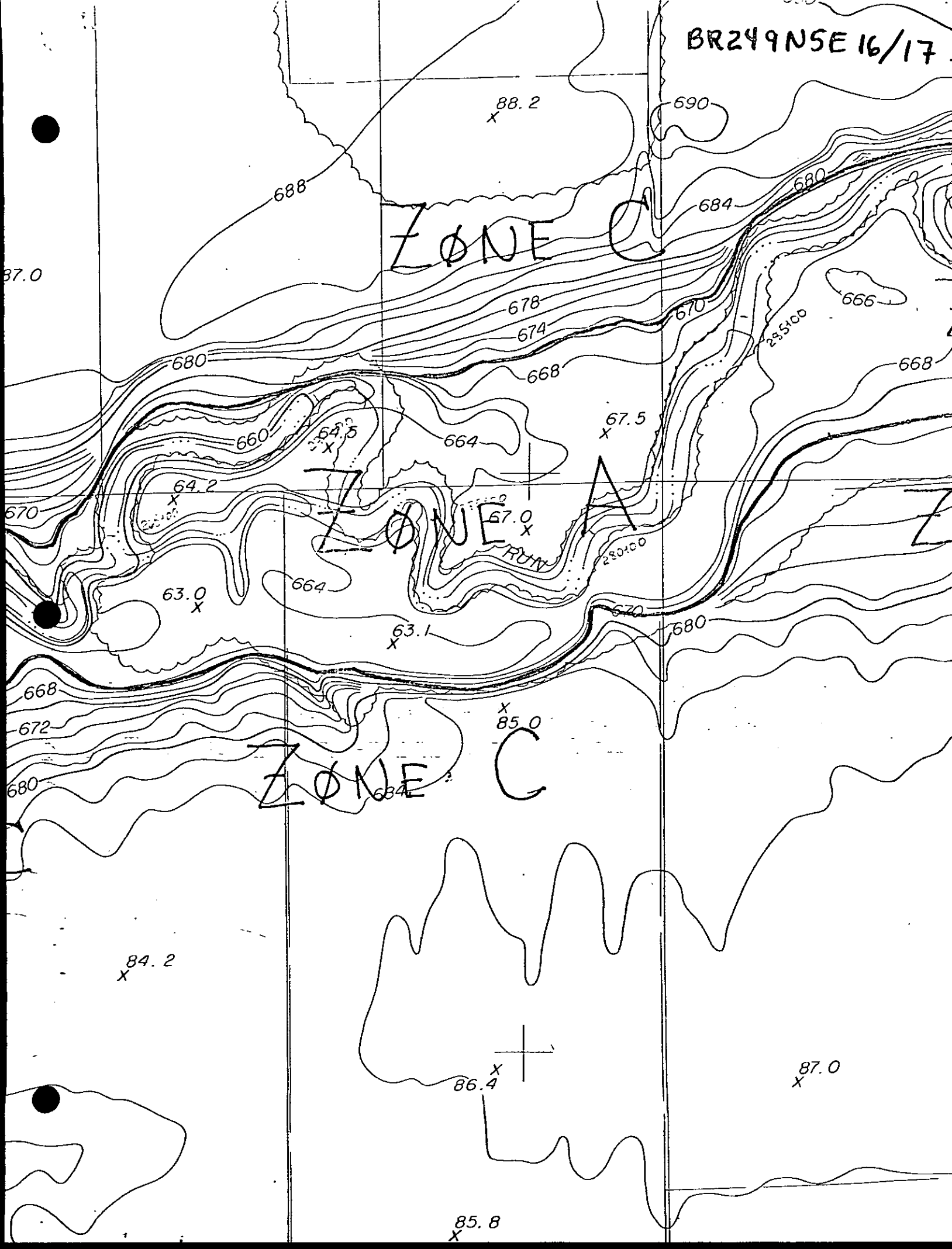


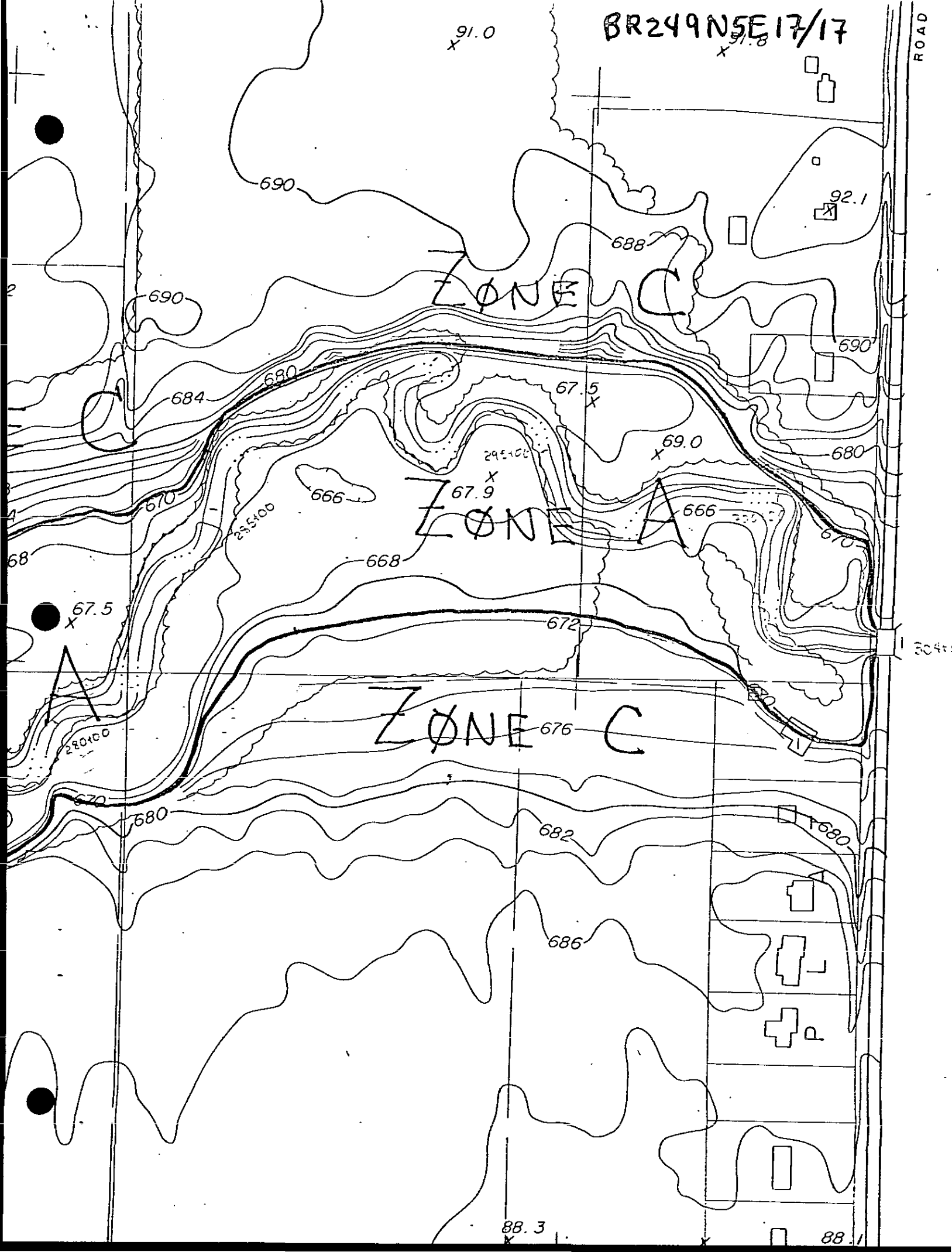
BR249NSE 14/17



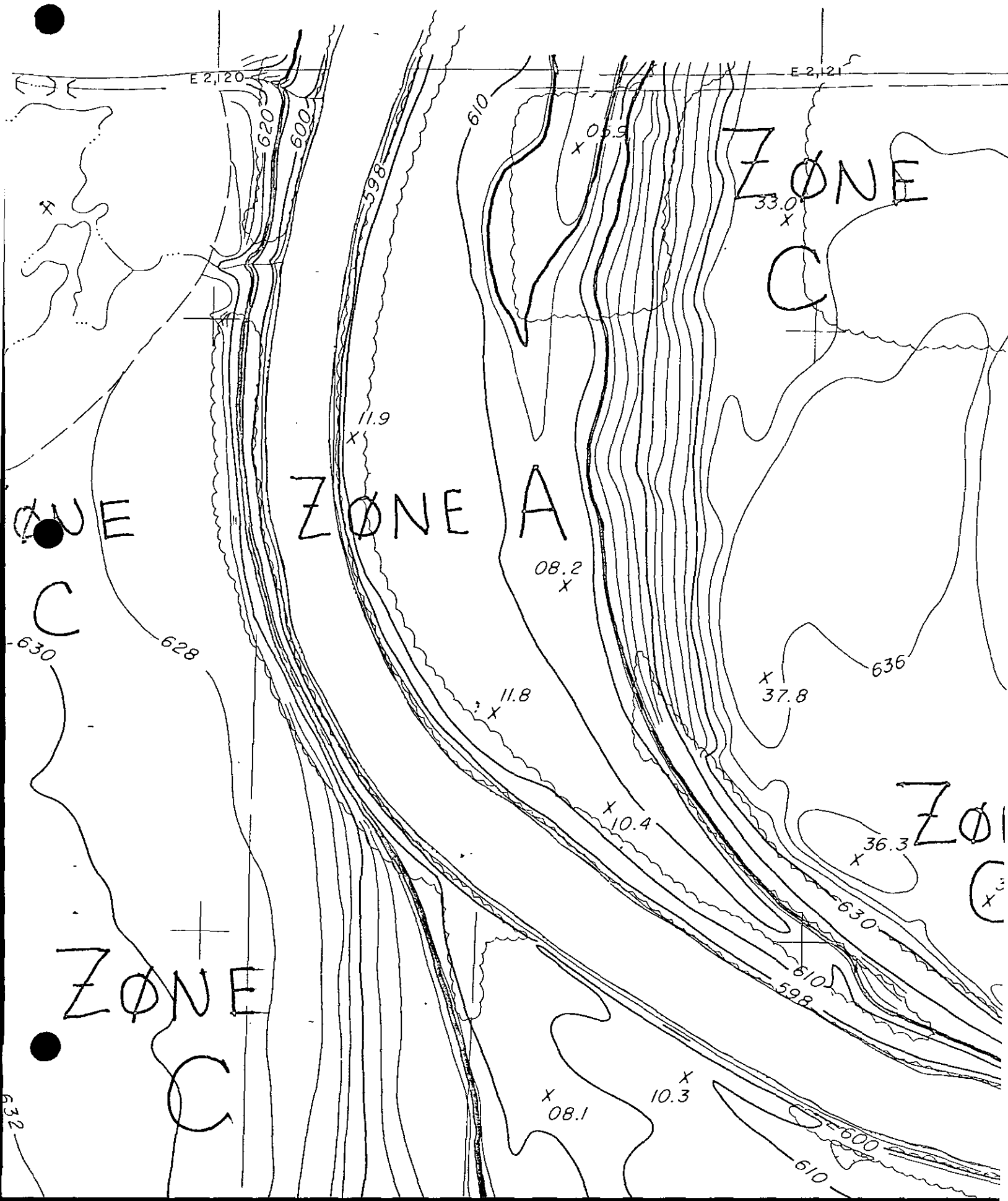
BR249NSE15/17




BR249NSE 16/17
ZONE C
ZONE A
ZONE C
RUN
88.2
690
688
684
680
678
674
670
668
666
664
660
87.0
67.5
64.5
64.2
67.0
63.0
63.1
85.0
84.2
86.4
87.0
85.8
285+00
280+00


BR249N5E17/17
ROAD
91.0
91.8
92.1
690
688
ZONE C
690
684
680
67.5
69.0
680
295+00
67.9
666
ZONE A
666
670
670
668
67.5
672
304+
ZONE C
676
280+00
670
680
682
680
686
88.3
88.1

FR4MT 1/36


E 2,120
E 2,121
620
600
598
610
05.9
33.0
ZØNE
C
11.9
ZØNE A
ØNE
C
08.2
630
628
636
11.8
37.8
10.4
36.3
630
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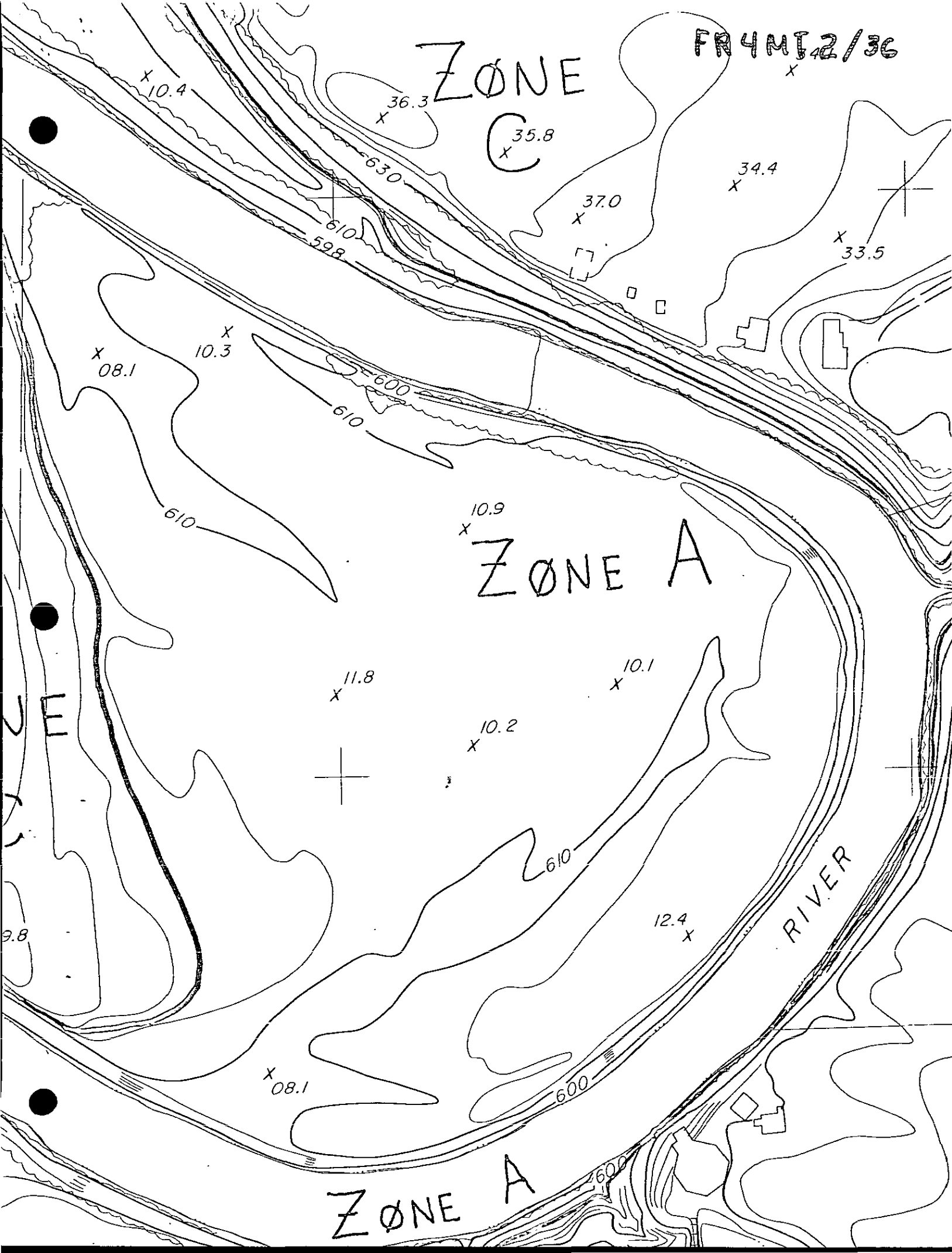
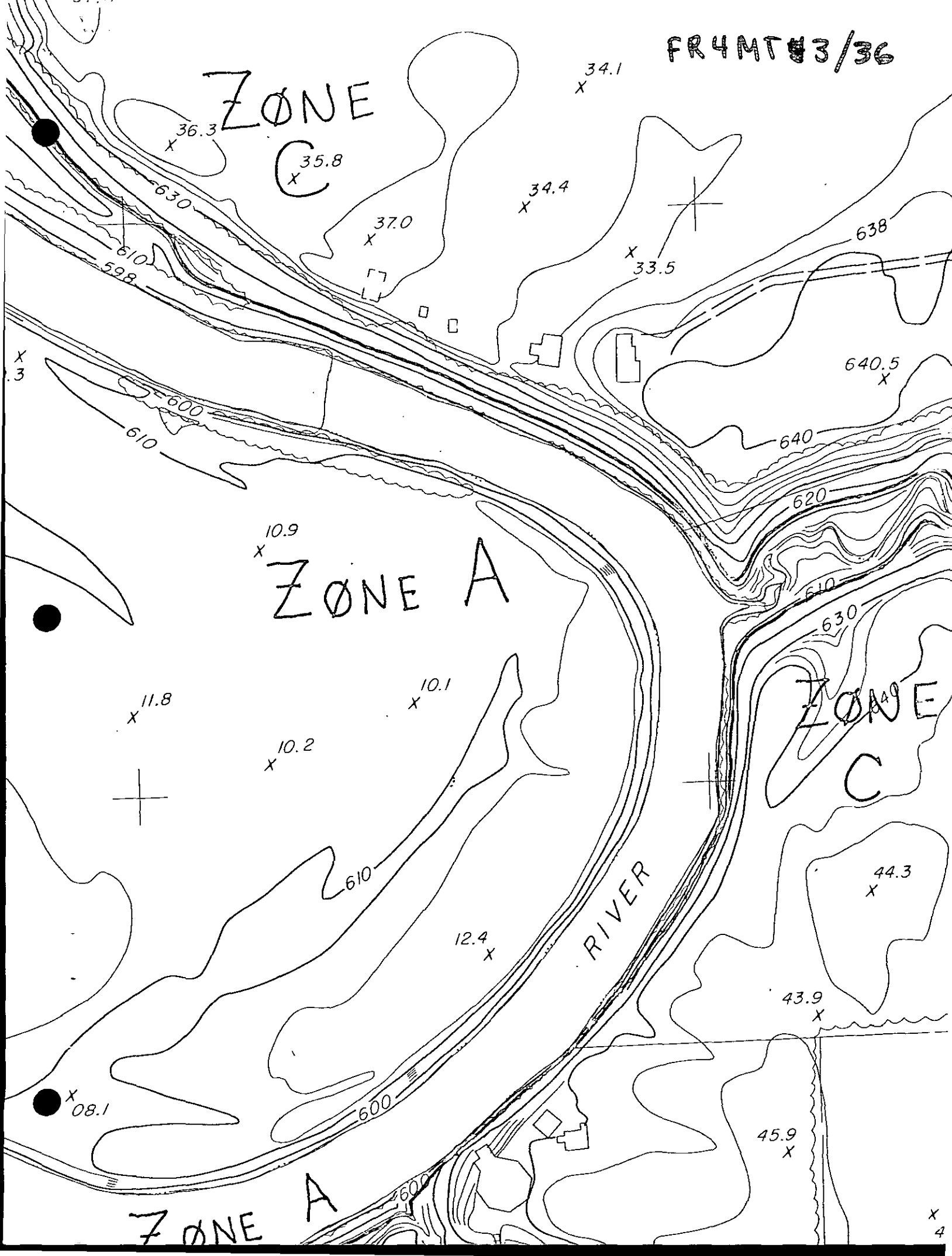
598
ZØNE
C
08.1
10.3
600
610
632


FR4MI42/36
ZØNE C
10.4
36.3
35.8
630
610
598
37.0
34.4
33.5
10.3
08.1
600
610
610
10.9
ZØNE A
11.8
10.1
10.2
610
12.4
RIVER
9.8
08.1
600
ZØNE A
600

FR4MT#3/36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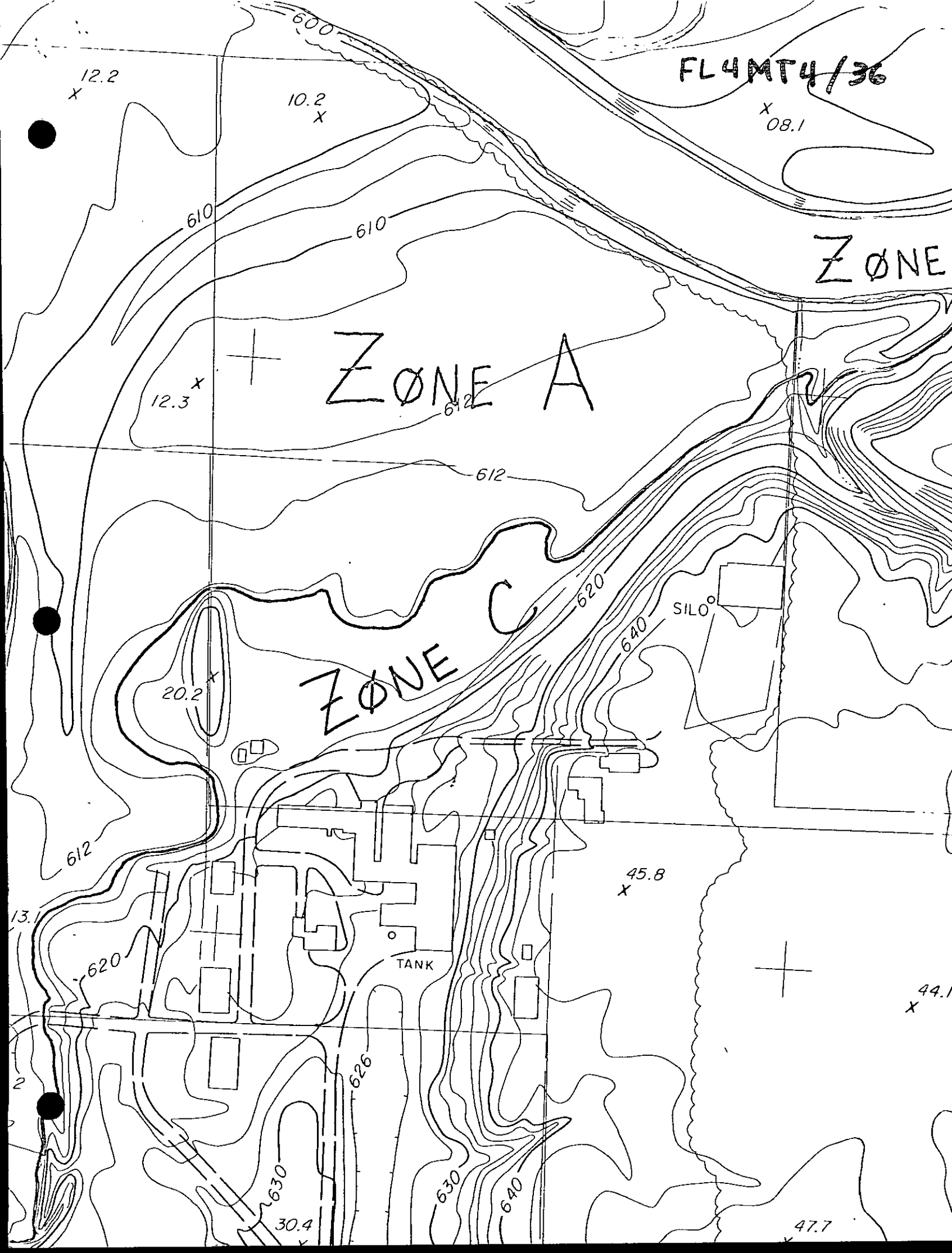
36.3
35.8
34.1
34.4
37.0
33.5
630
610
598
638
640.5
600
610
640
620
10.9
ZØNE A
610
630
11.8
10.1
10.2
ZØNE C
610
44.3
12.4
RIVER
43.9
08.1
600
45.9
600
ZØNE A


FL4MT4/36
ZØNE A
ZØNE C
ZØNE
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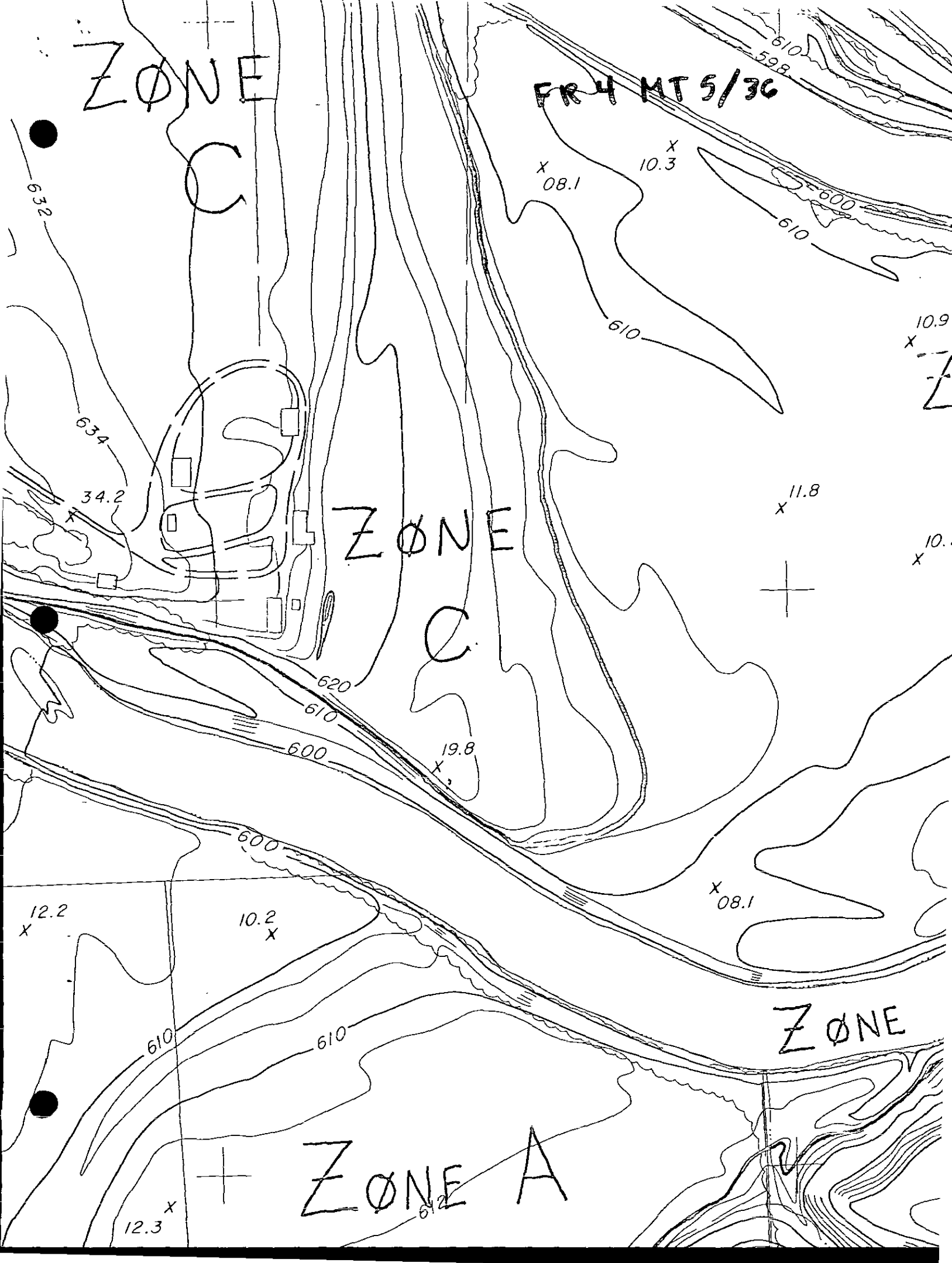
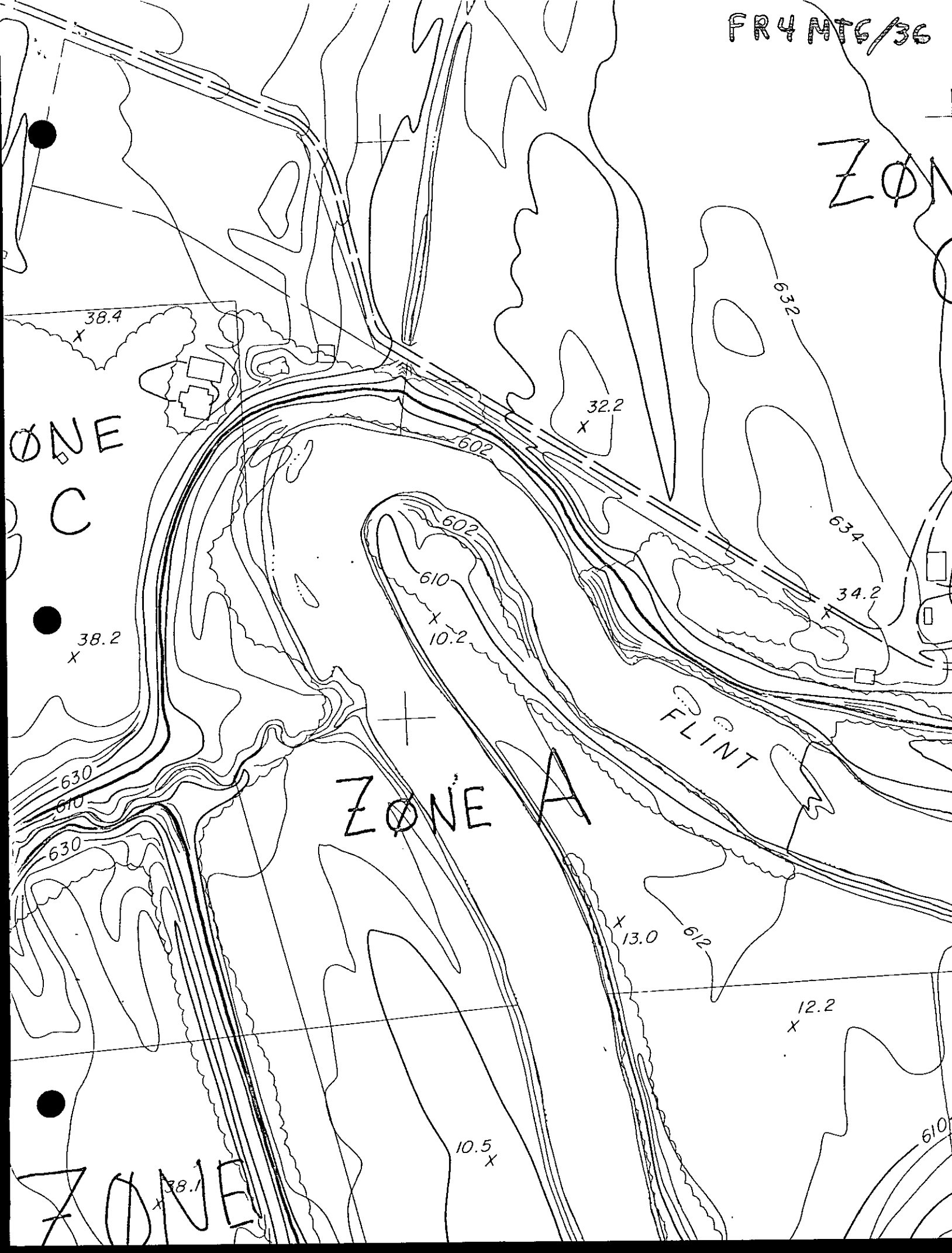
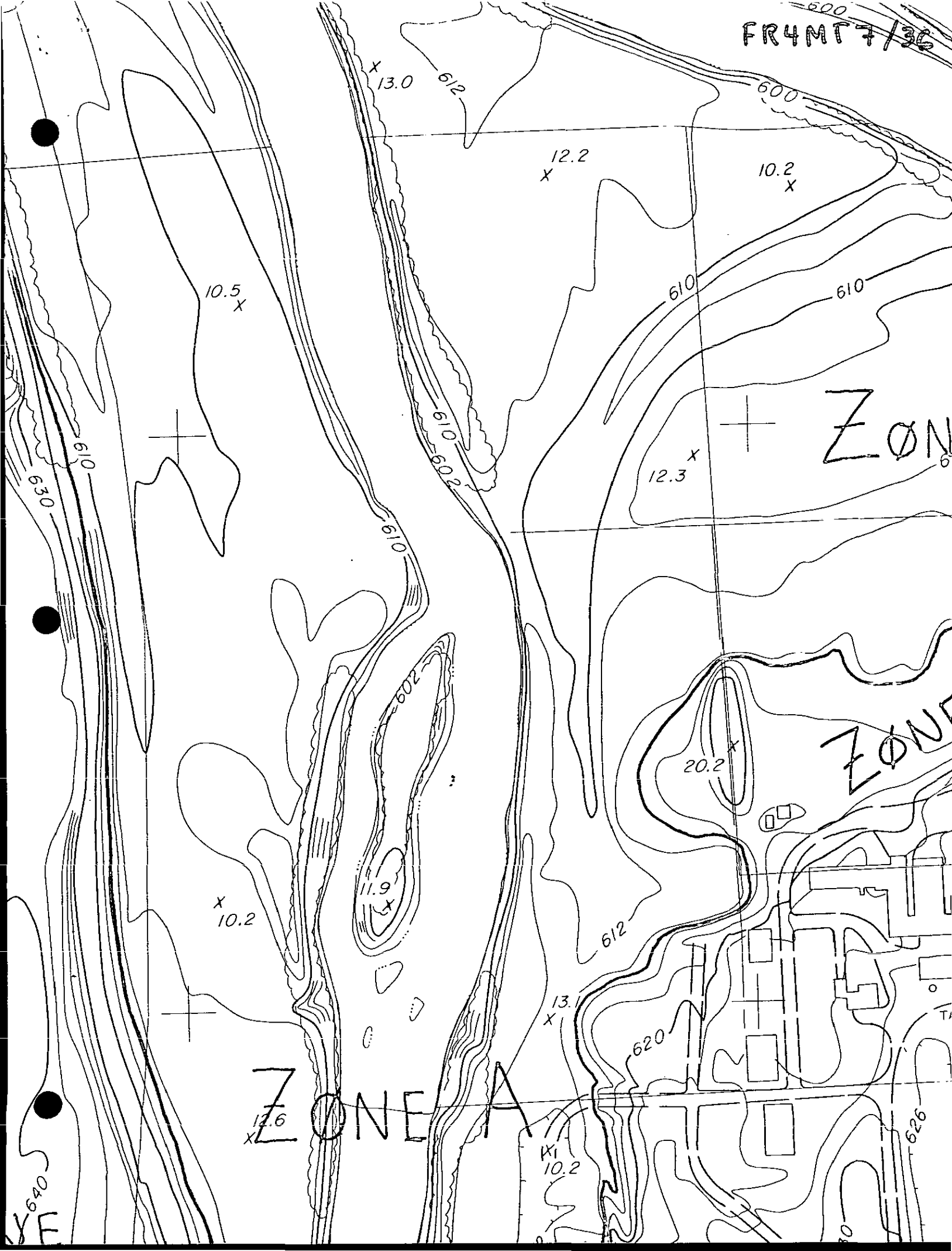
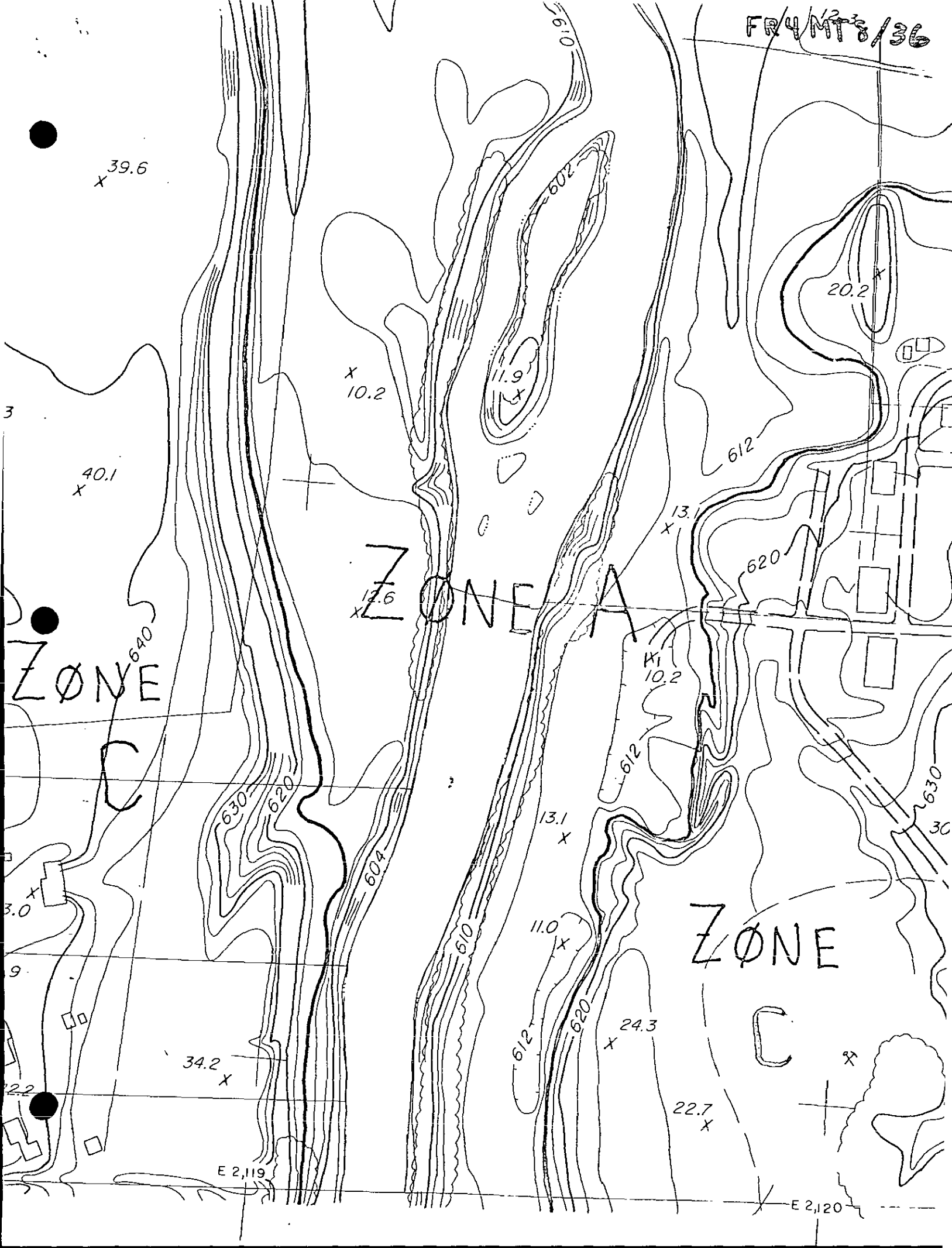
610
610
612
612
612
620
620
626
630
630
640
640
12.2
10.2
08.1
12.3
20.2
13.1
45.8
44.1
30.4
47.7
SILO
TANK


ZØNE C
FR 4 MT 5/36
632
634
34.2
08.1
10.3
610
598
600
610
610
10.9
11.8
ZØNE C
620
610
600
19.8
600
08.1
12.2
10.2
610
610
ZØNE
ZØNE A
612
12.3

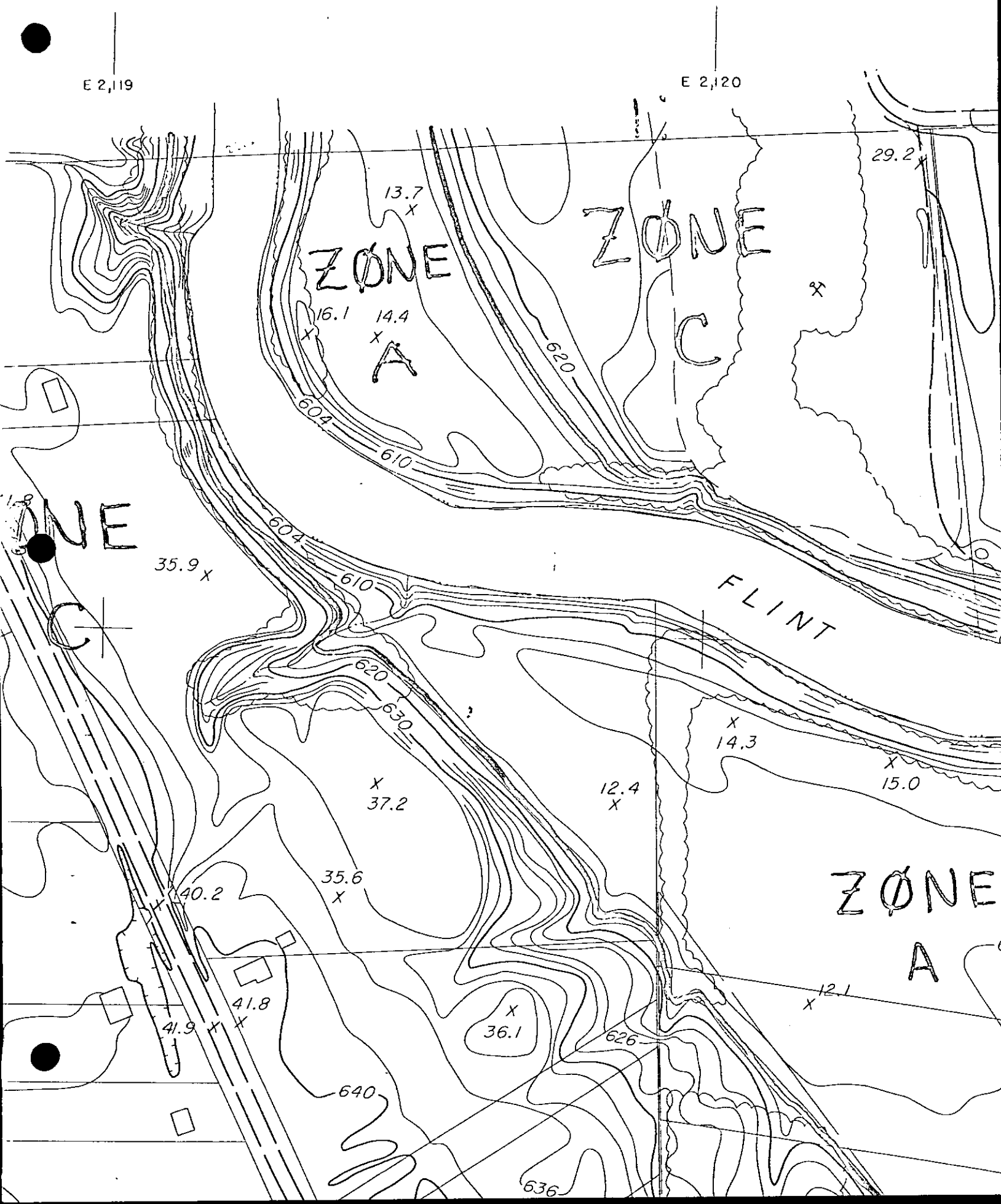
FR4 MT6/36

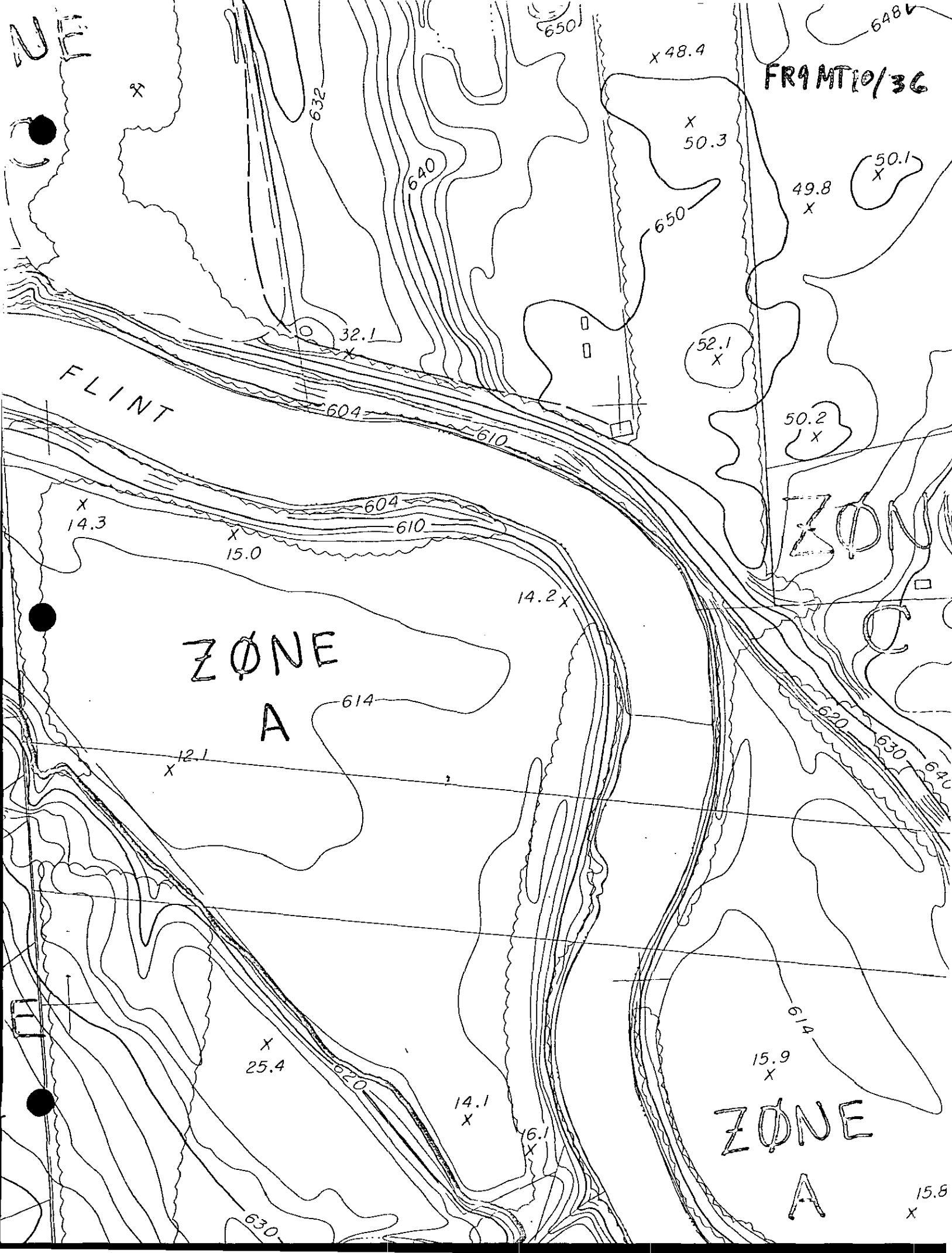

ZØNE
C
ZØNE A
ZØNE
FLINT
38.4
38.2
38.1
32.2
34.2
13.0
12.2
10.2
10.5
602
610
612
630
632
634


FR4MT 7/36
600
600
13.0
612
12.2
10.2
10.5
610
610
610
610
602
630
610
12.3
ZØN
602
20.2
ZØNE
11.9
10.2
612
13.1
620
ZONE A
12.6
10.2
626
640


FR4MT 8/36
39.6
40.1
10.2
11.9
20.2
612
13.1
620
ZONE A
12.6
640
ZONE C
10.2
612
630
620
604
13.1
630
610
11.0
ZONE C
612
620
24.3
34.2
22.7
E 2,119
E 2,120

FR9 MT 9/36


E 2,119
E 2,120
29.2
13.7
ZONE
A
ZONE
C
16.1
14.4
620
604
610
604
610
35.9
FLINT
620
630
14.3
15.0
37.2
12.4
35.6
40.2
ZONE
A
41.8
41.9
36.1
12.1
626
640
636


FR9MT10/36
FLINT
ZØNE
A
ZØNE
A
ZØNE
C
650
648
48.4
632
640
50.3
50.1
49.8
650
32.1
52.1
604
610
50.2
604
610
14.3
15.0
14.2
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12.1
620
630
640
614
25.4
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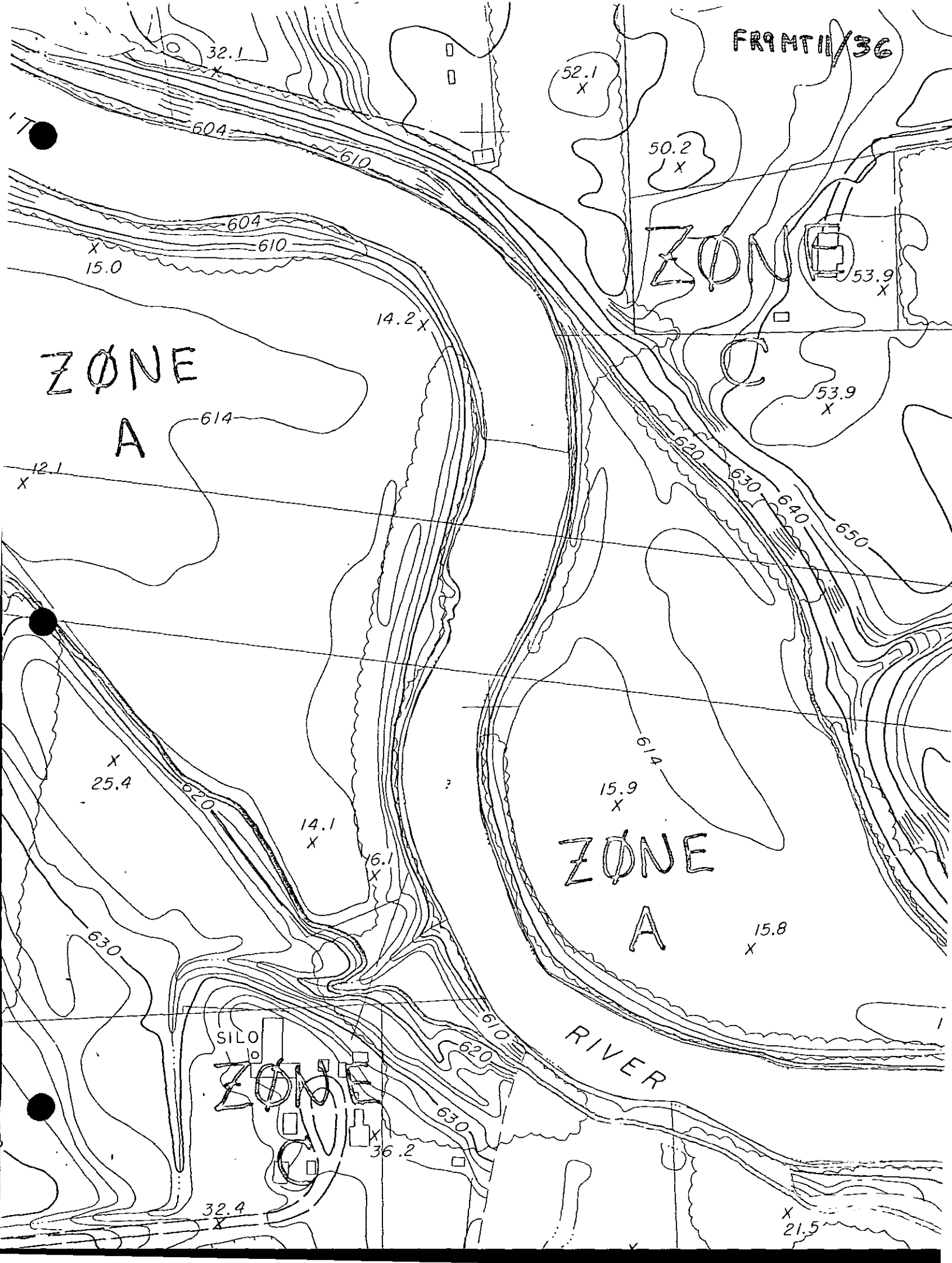
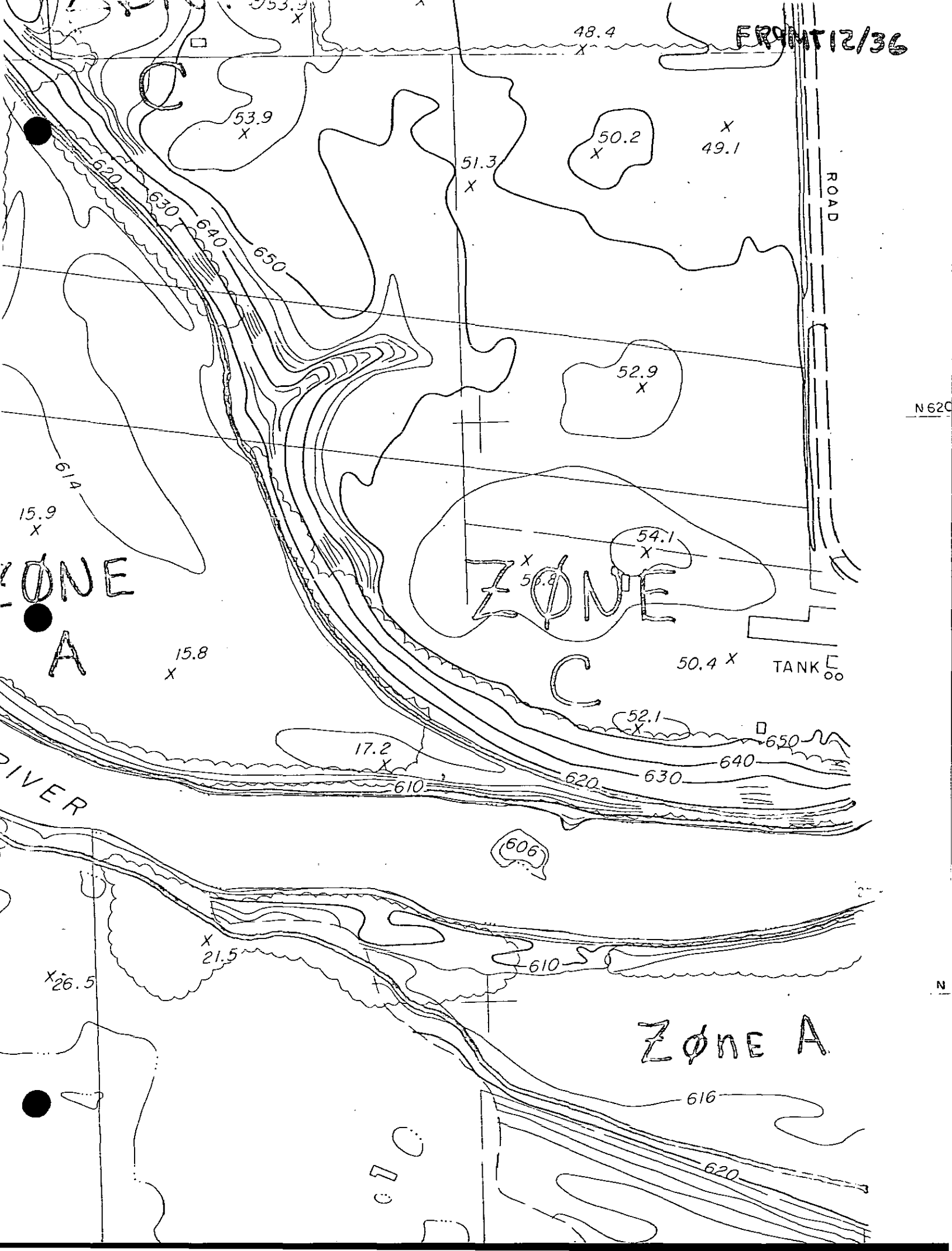
14.1
16.1
15.9
630
15.8


FR9MT11/36
32.1
52.1
50.2
604
610
604
610
15.0
14.2
ZØNE
A
614
12.1
ZØNE
C
53.9
53.9
620
630
640
650
614
25.4
620
14.1
16.1
15.9
ZØNE
A
15.8
630
610
620
RIVER
SILO
ZØNE
C
630
36.2
32.4
21.5


FRONT 12/36
48.4
53.9
50.2
49.1
51.3
620
630
640
650
ROAD
52.9
N 620
614
15.9
54.1
ZØNE
A
15.8
ZØNE
C
50.4
TANK
52.1
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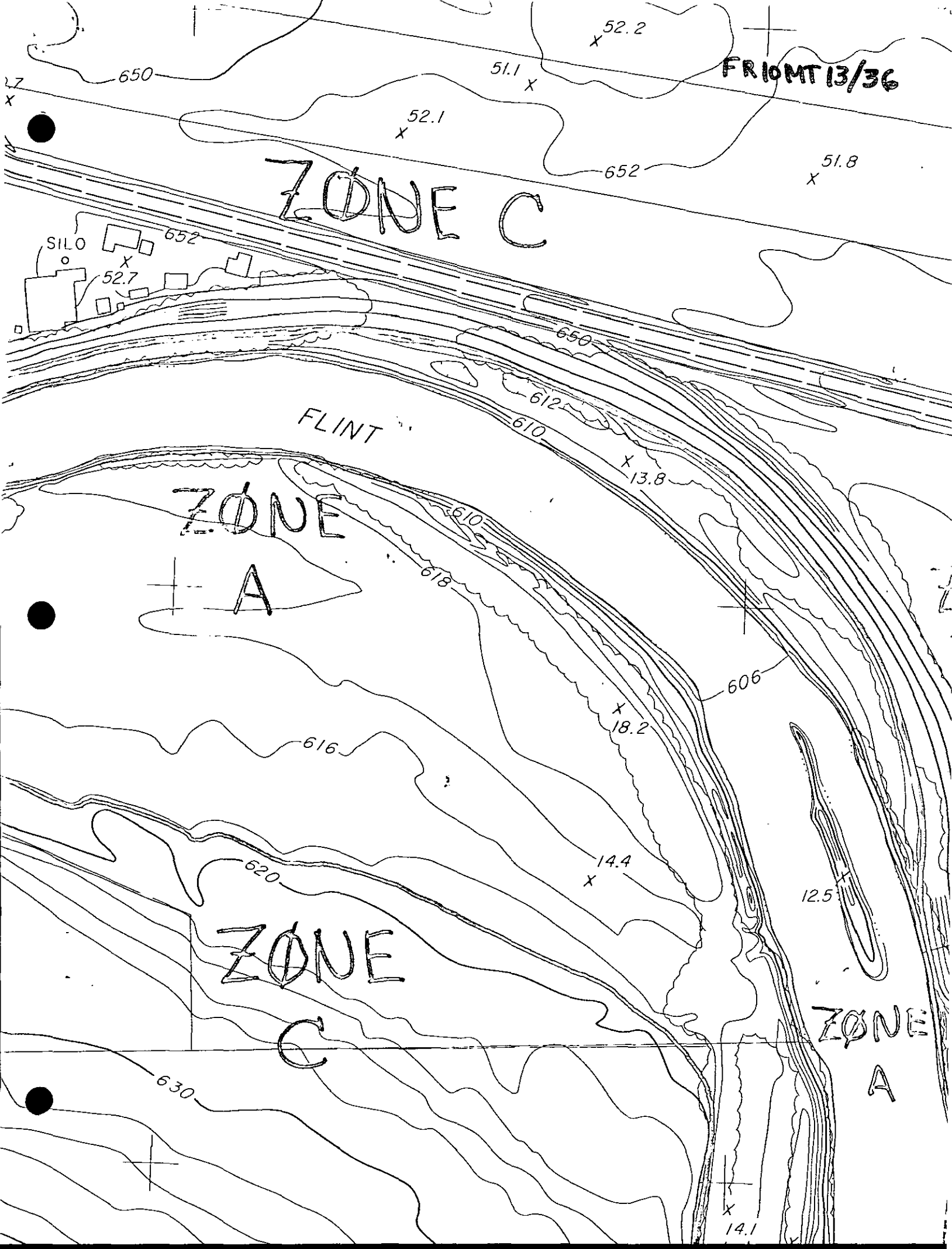
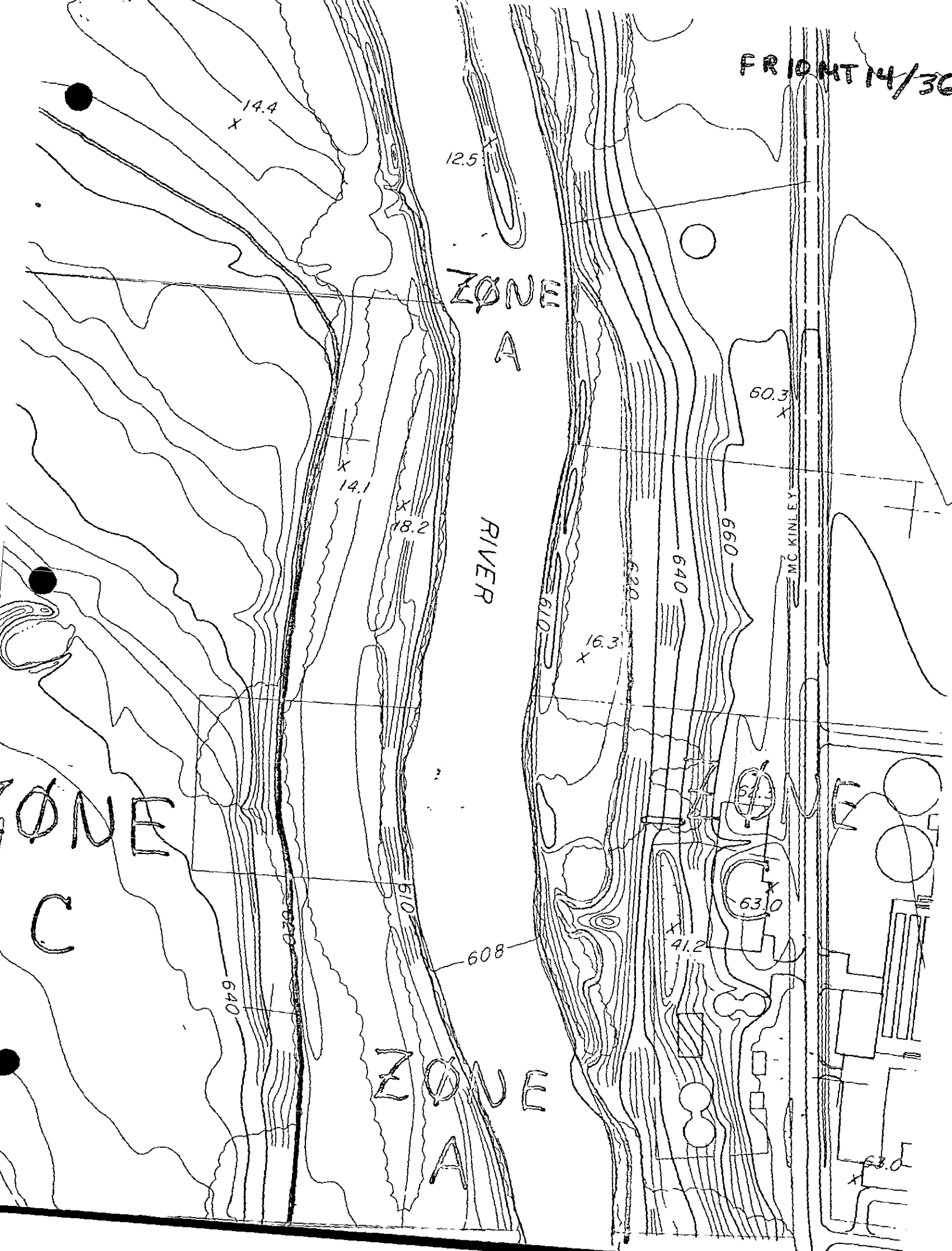
630
620
610
17.2
RIVER
606
21.5
610
26.5
N
ZØNE A
616
620

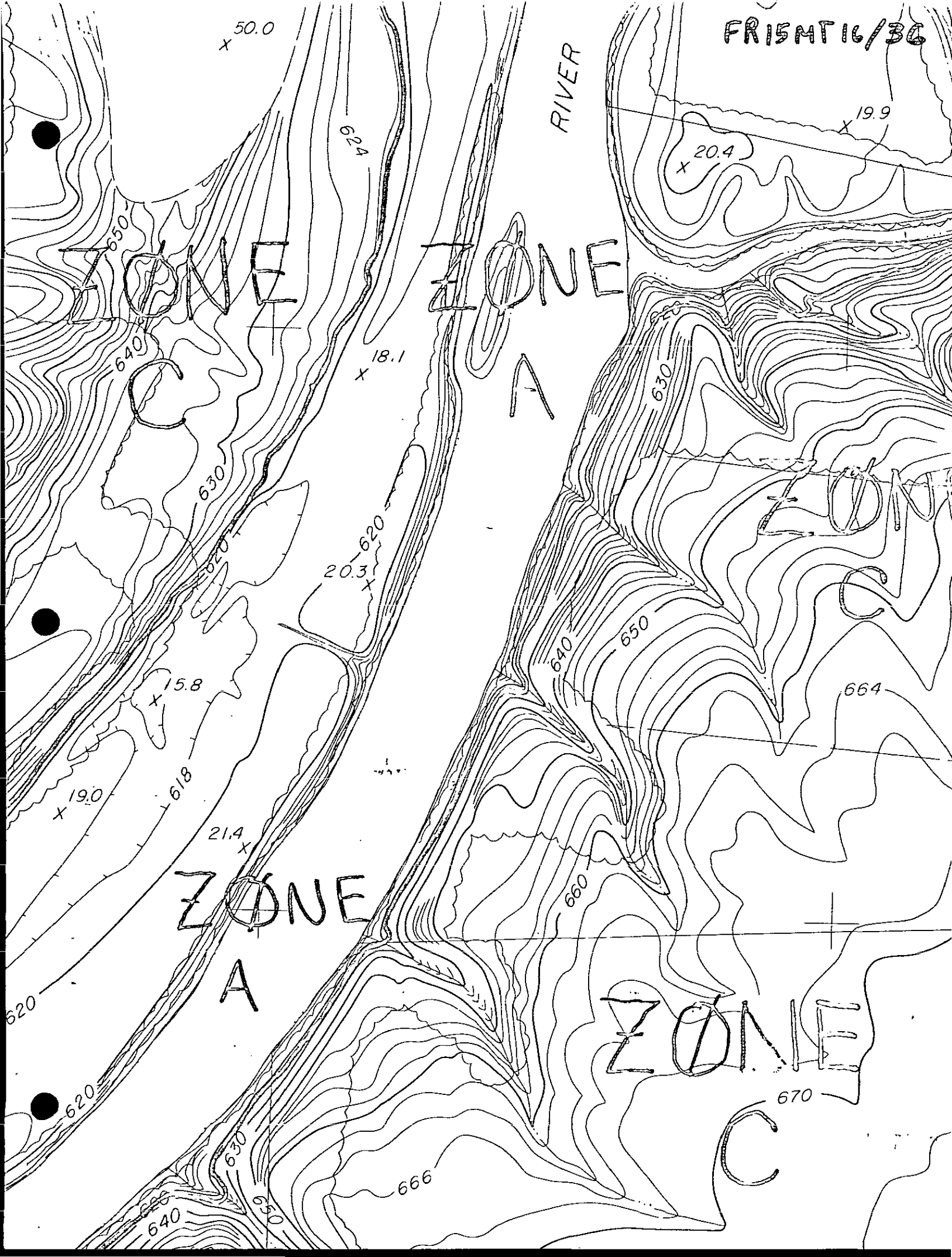

FR10MT 13/36
52.2
51.1
650
52.1
652
51.8
ZONE C
SILO
652
52.7
650
612
610
FLINT
13.8
ZONE
A
610
618
606
18.2
616
14.4
620
12.5
ZONE
C
ZONE
A
630
14.1

FRIONT 14/36

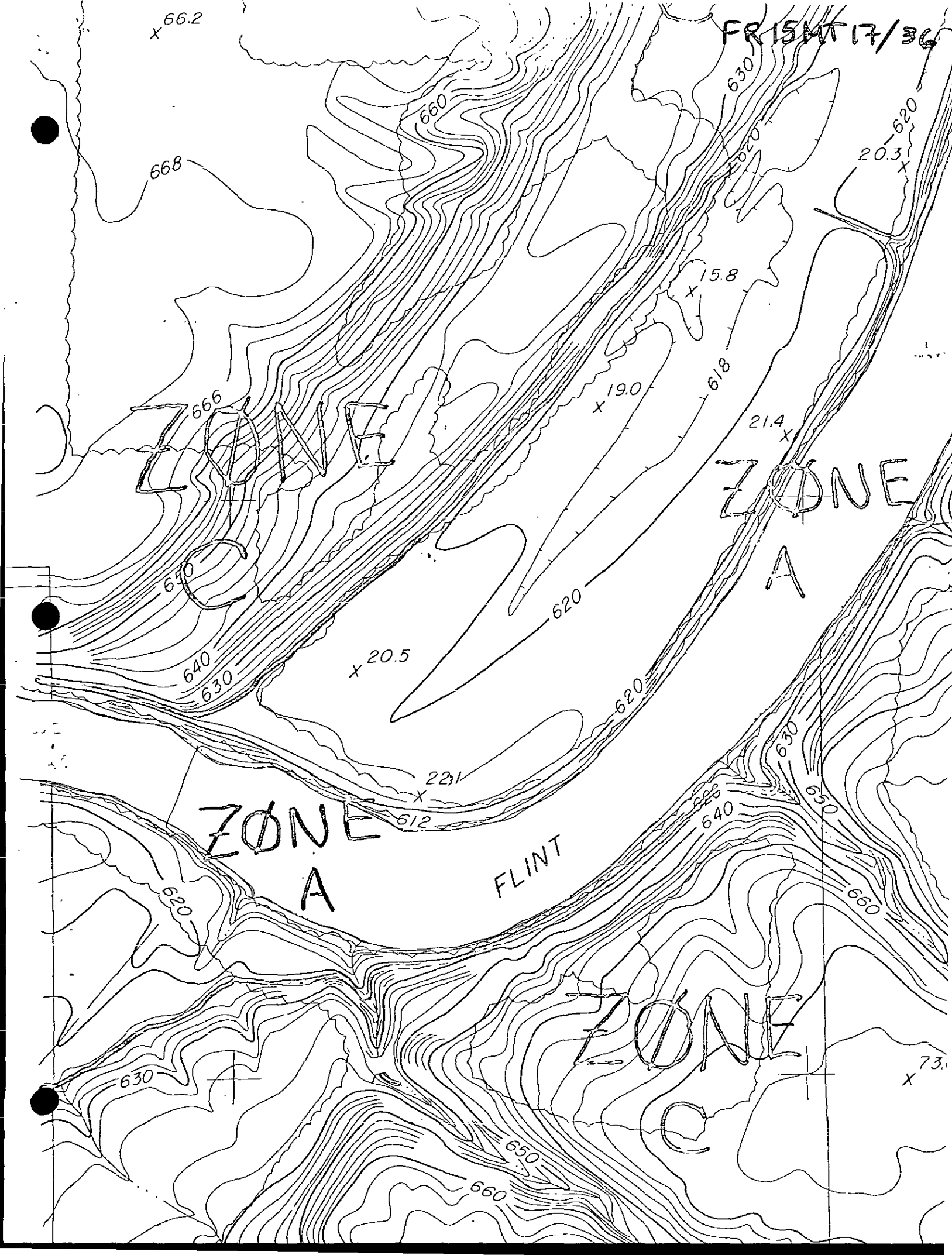

14.4
12.5
ZONE
A
60.3
14.1
18.2
RIVER
660
640
620
610
MC KINLEY
16.3
ZONE
C
610
620
608
640
63.0
41.2
ZONE
A
63.0

FR15MT 15/36

E2,124
E2,125
ONE
ZONE
C
ZONE
A
RIVER
ZONE
ZONE
A
640
630
620
610
660
650
640
630
624
630
20.1
18.1
16.1
50.0
18.1
63.5
64.3
41.8
21.4
18.6
18.3
19.9
20.4


FR15MT16/36
RIVER
ZONE C
ZONE A
ZONE A
ZONE C
ZONE C
50.0
624
650
640
630
620
618
19.9
20.4
18.1
20.3
15.8
19.0
21.4
664
660
670
666

FR15MT 17/36


66.2
668
660
630
620
20.3
15.8
618
19.0
666
21.4
ZONE
ZONE
A
670
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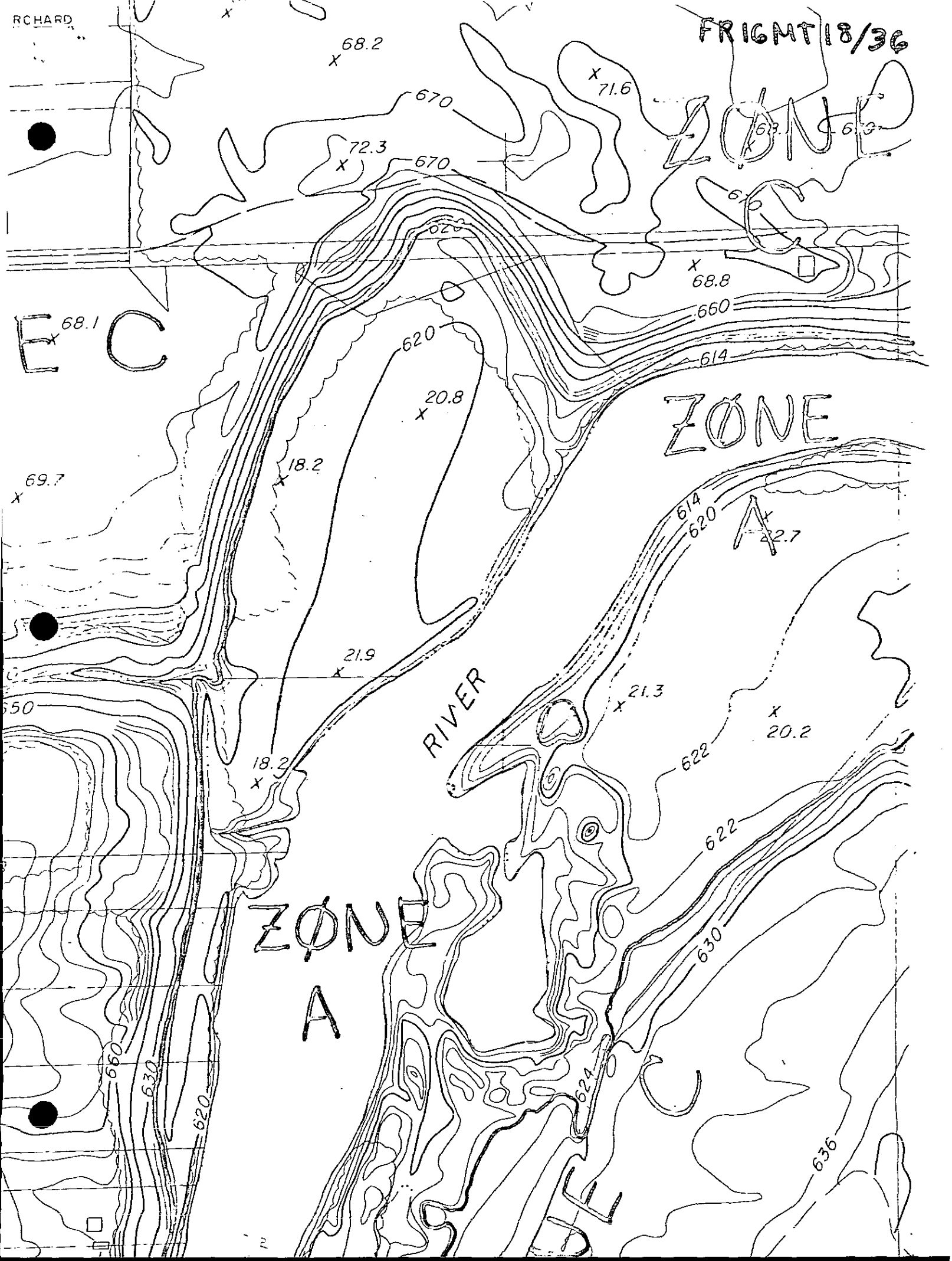
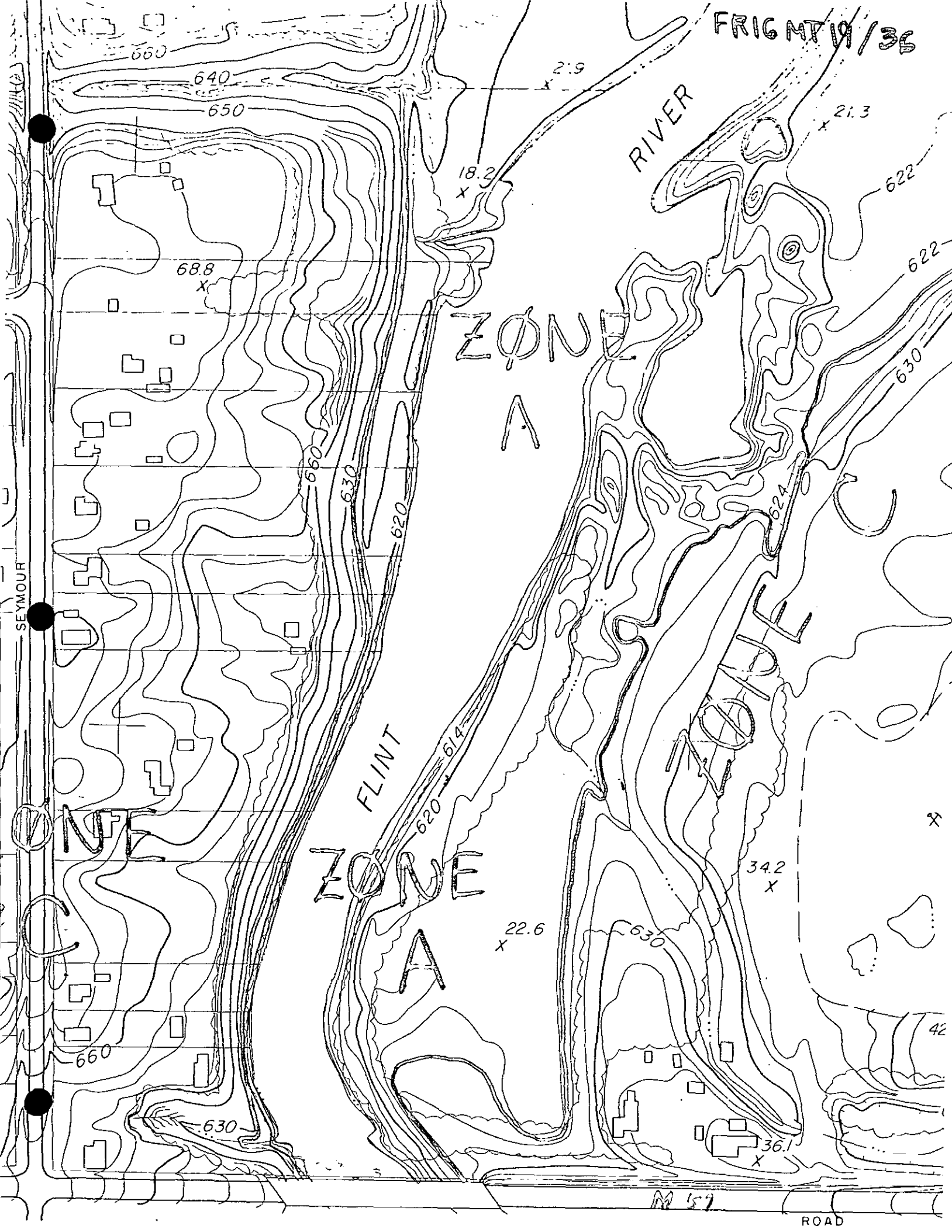
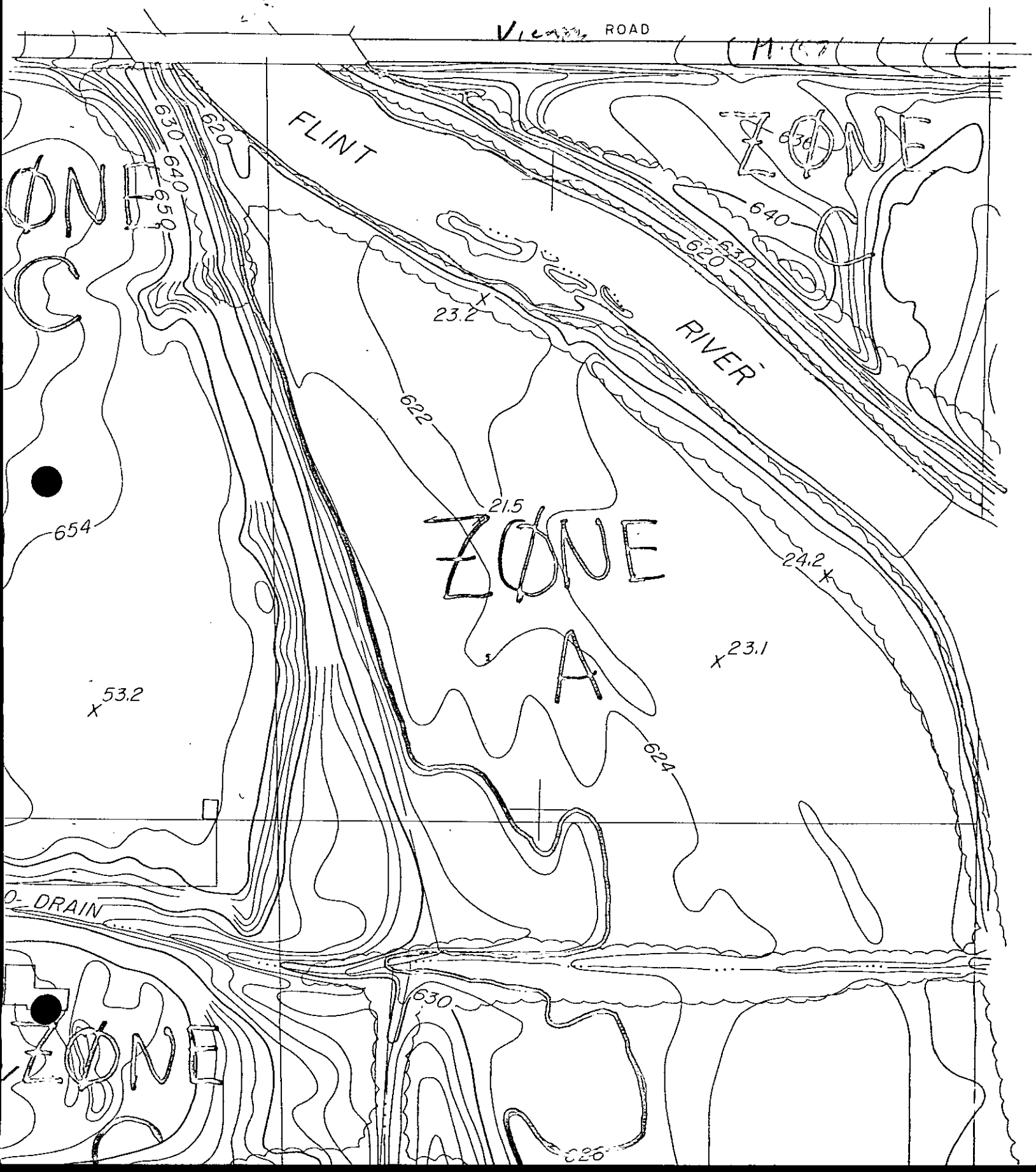
20.5
640
630
620
630
22.1
612
ZONE
A
FLINT
640
650
660
620
ZONE
C
630
650
660
73.


RCHARD
FRIGHT 18/36
68.2
71.6
670
72.3
670
ZONE
68.8
660
68.1
620
614
20.8
ZONE
18.2
69.7
614
620
22.7
21.9
RIVER
21.3
20.2
622
18.2
622
ZONE
A
630
660
630
620
624
636

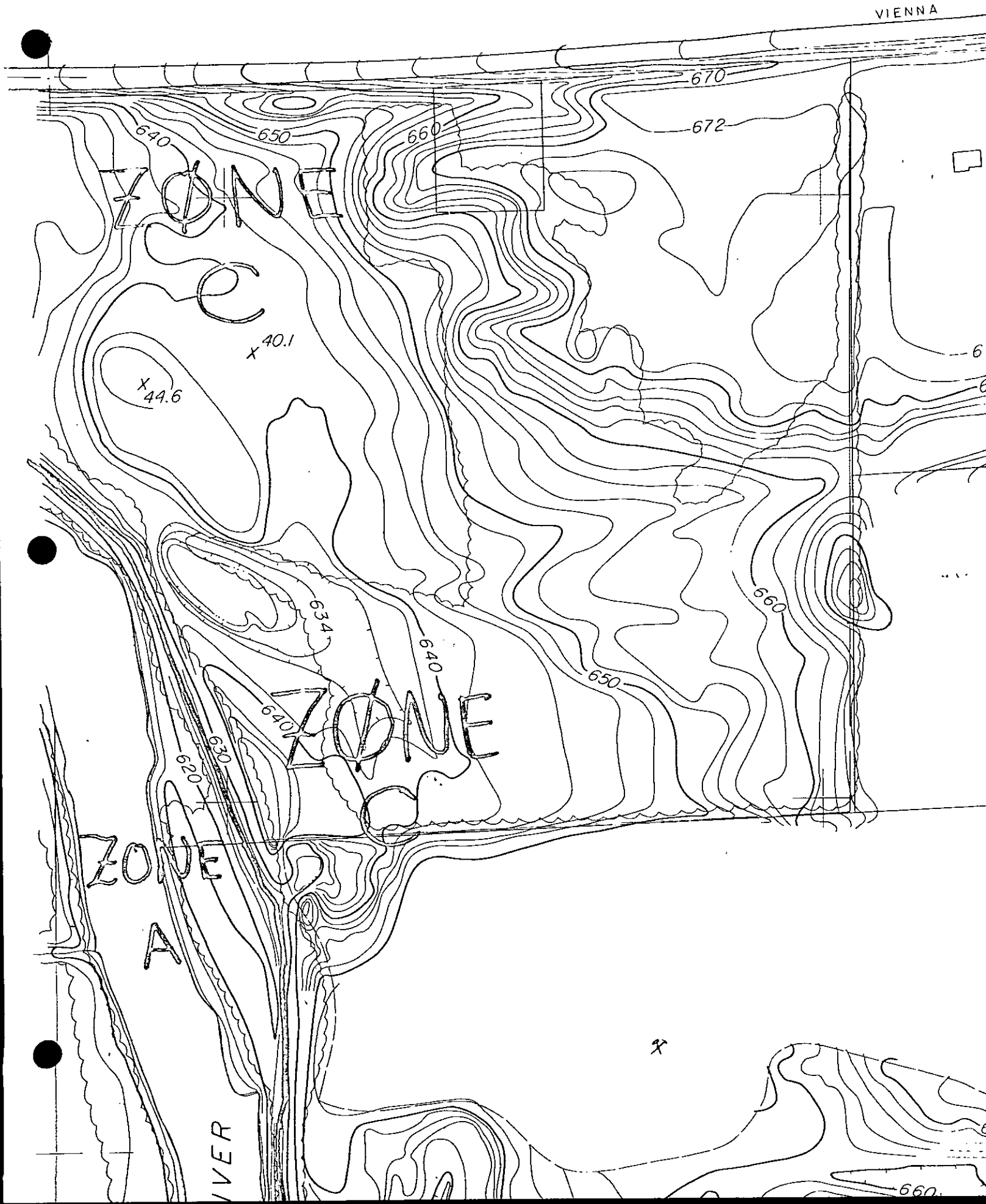

FRIGMT 19/36
RIVER
FLINT
ZONE A
ZONE A
ZONE C
ZONE C
SEYMOUR
ROAD
M 57
660
640
650
630
620
614
622
624
21.9
21.3
18.2
68.8
22.6
34.2
36.1

FR21 MT20/36

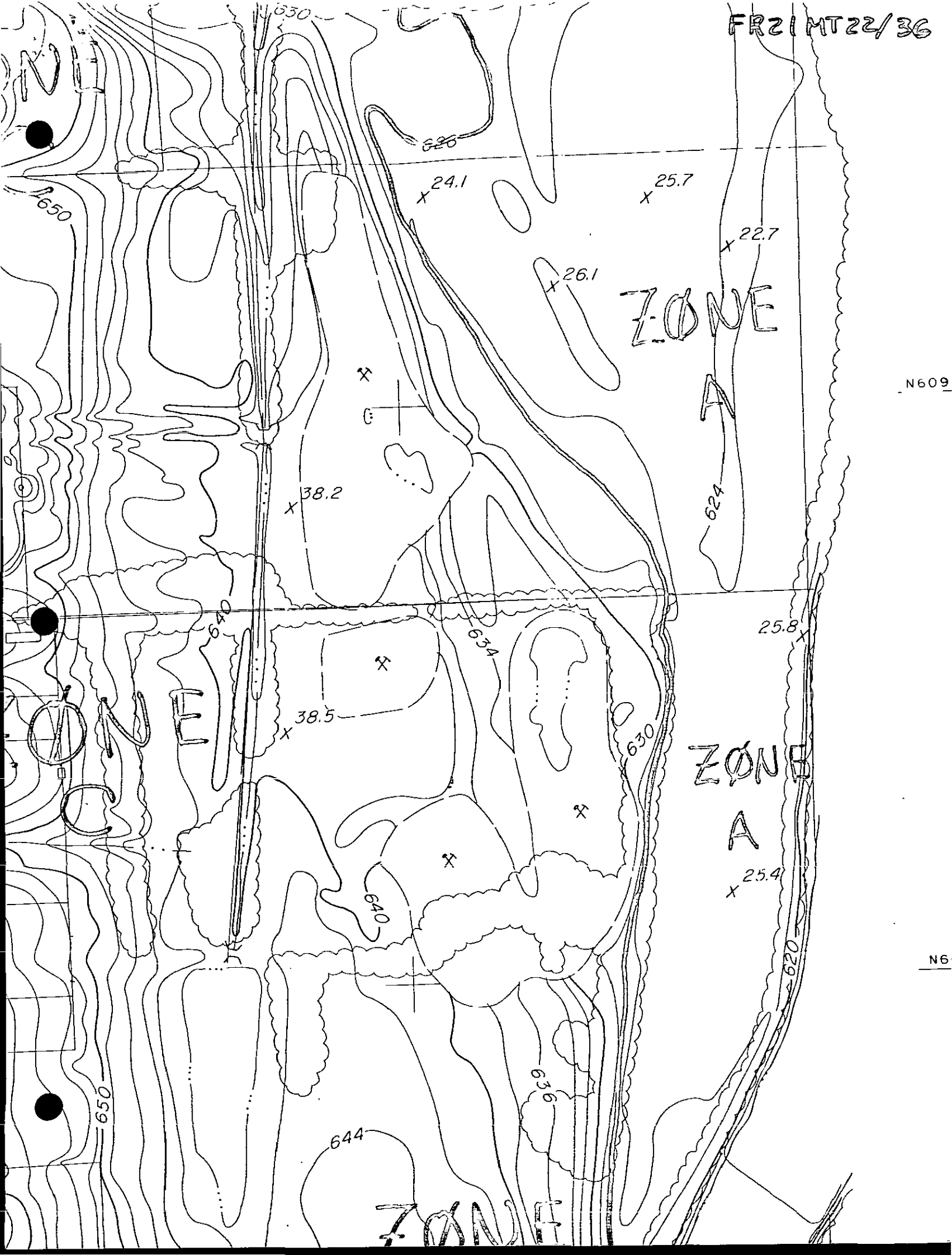
E2,122,000



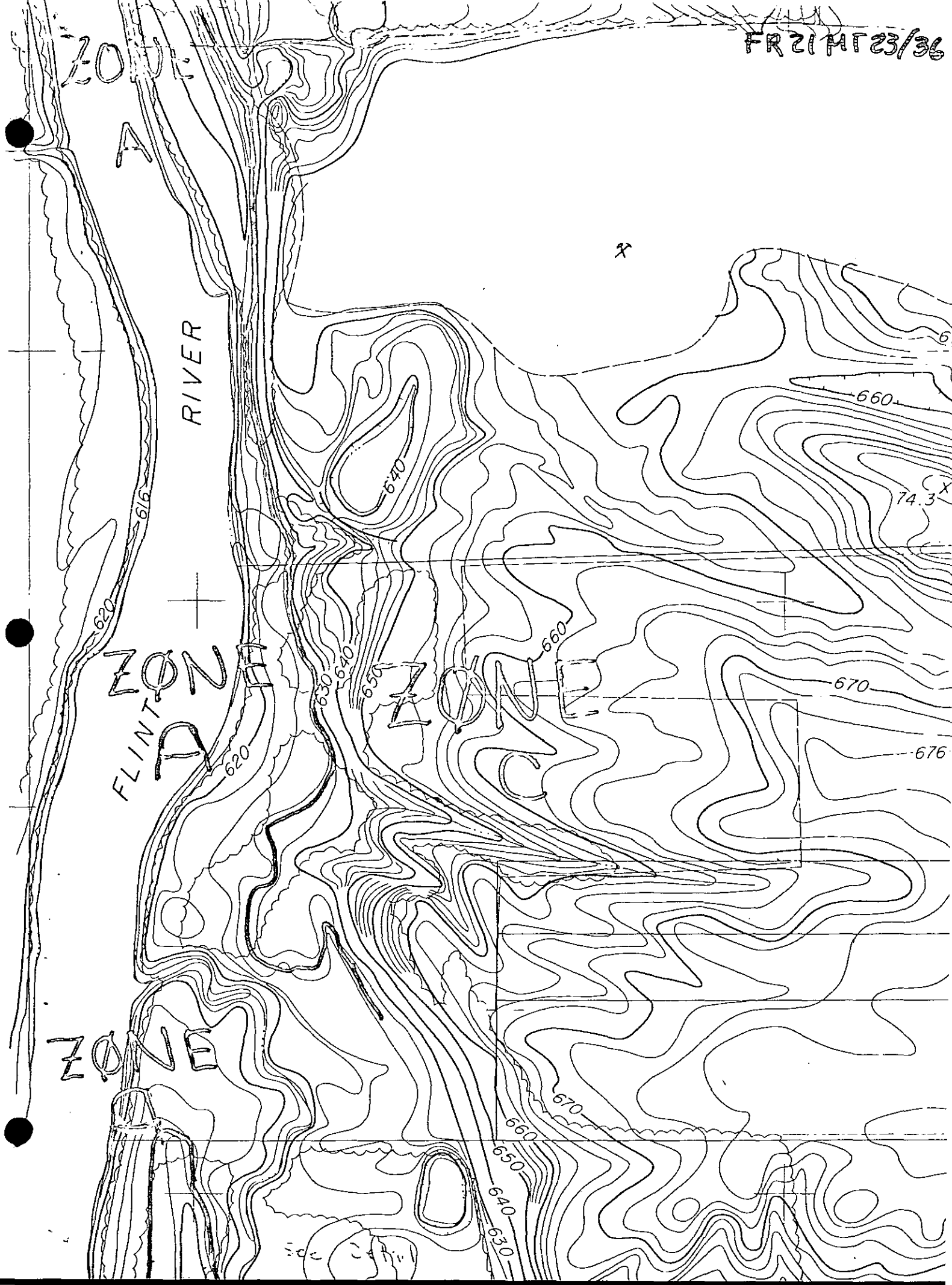
FR21MT21/36


VIENNA
670
672
640
650
660
ZONE
C
40.1
44.6
634
640
650
660
640
630
620
ZONE
ZONE
A
VER
660

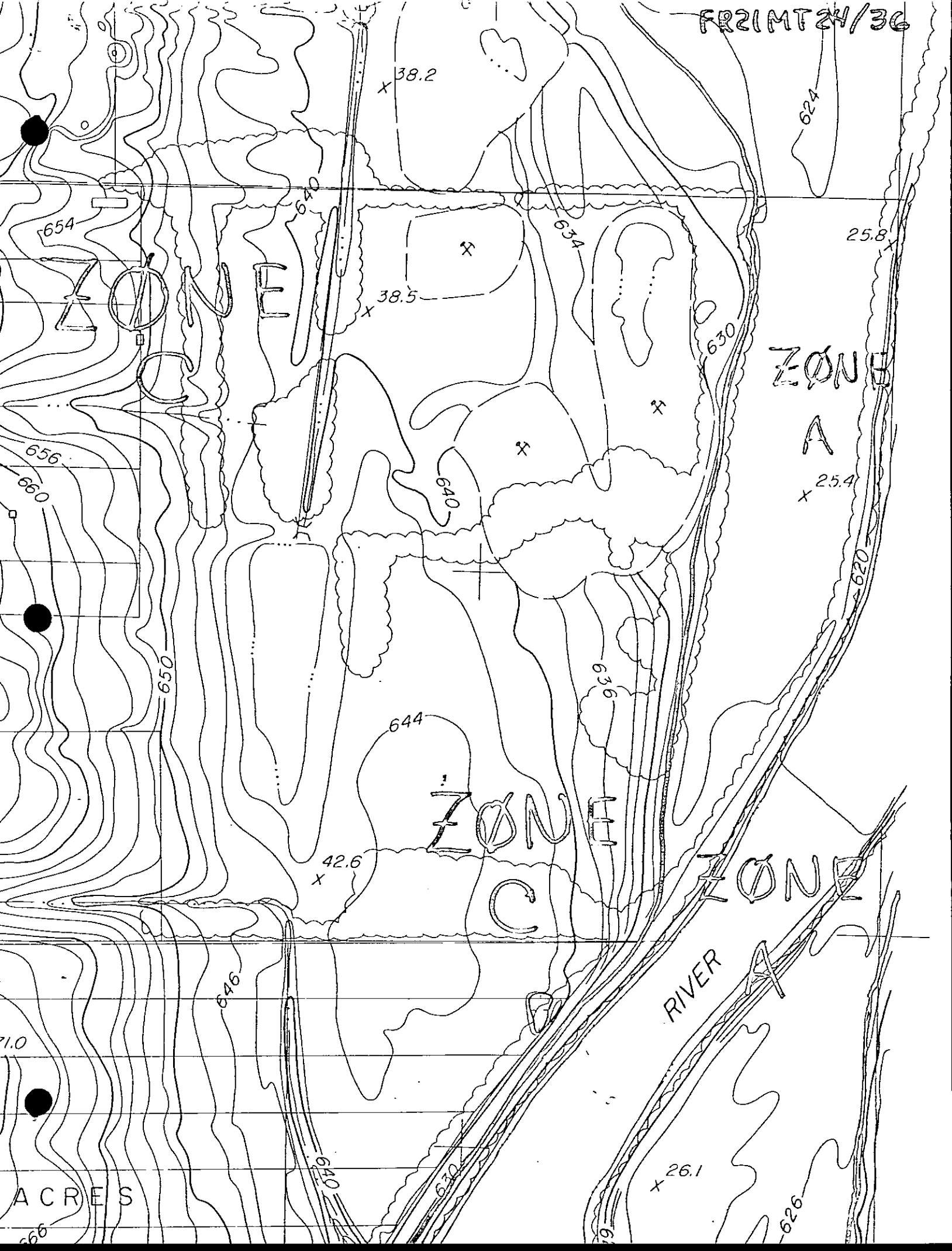
FR21MT22/36


630
626
650
24.1
25.7
22.7
26.1
ZONE
A
N609
38.2
624
640
634
25.8
38.5
630
ZONE
A
25.4
640
620
N6
636
650
644
ZONE

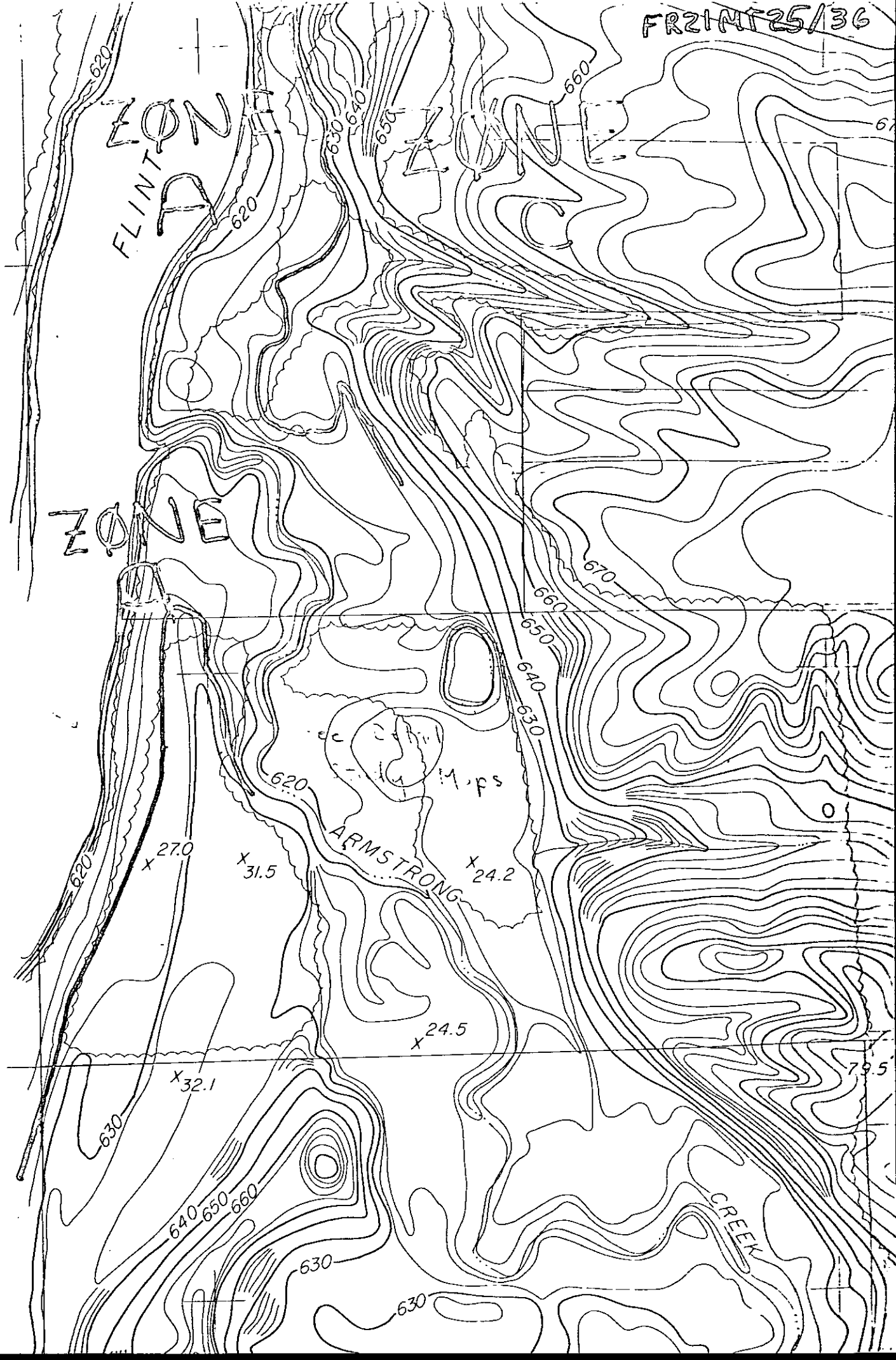
FR 21 MT 23/36


ZONE
A
RIVER
FLINT
ZONE
D
ZONE
C
ZONE
620
616
640
630
650
660
670
676
74.3

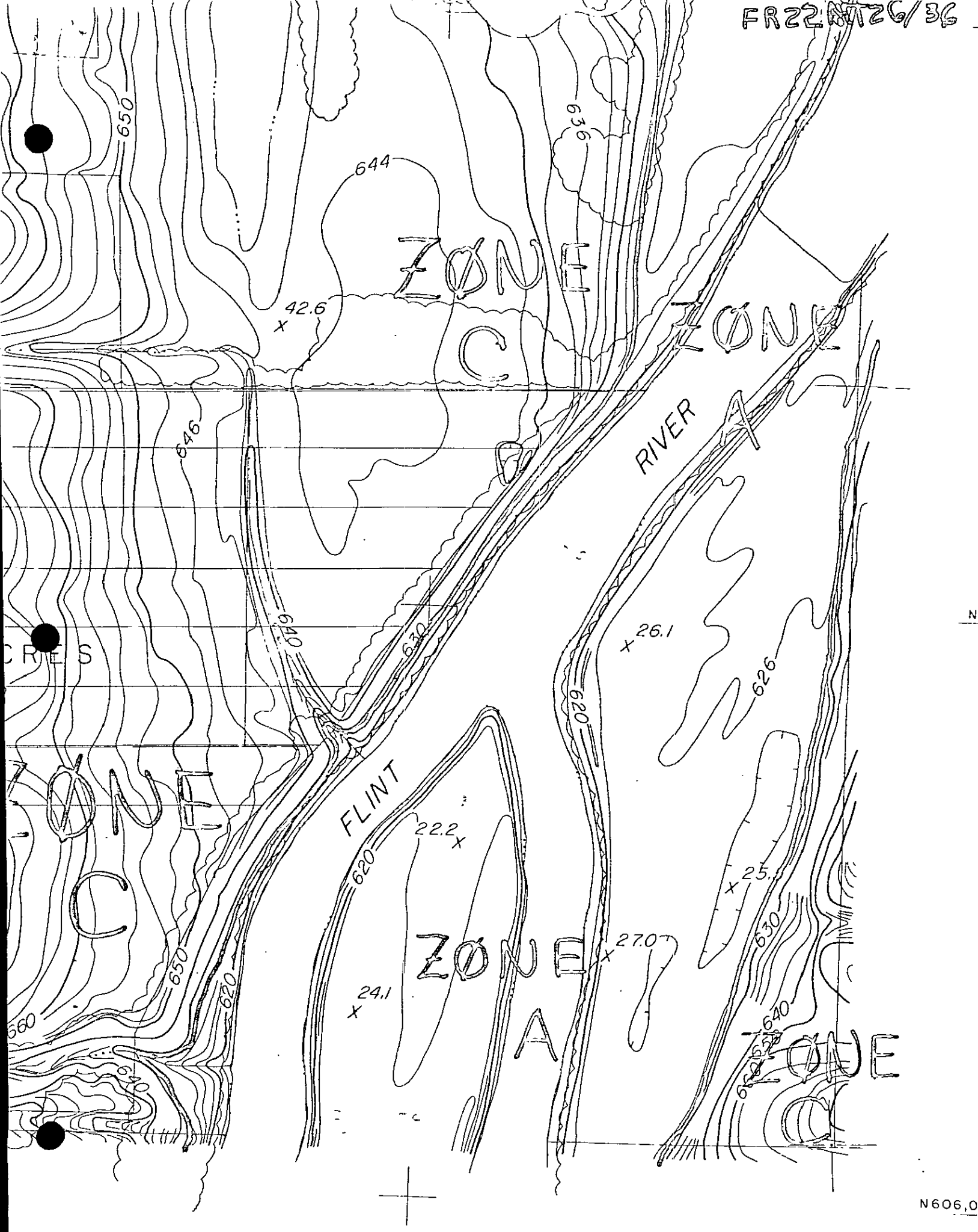
FR21MT24/36


38.2
624
640
654
634
25.8
38.5
630
ZONE
ZONE
A
656
660
640
25.4
620
650
636
644
ZONE
C
ZONE
42.6
RIVER
A
646
71.0
640
630
26.1
626
ACRES
66

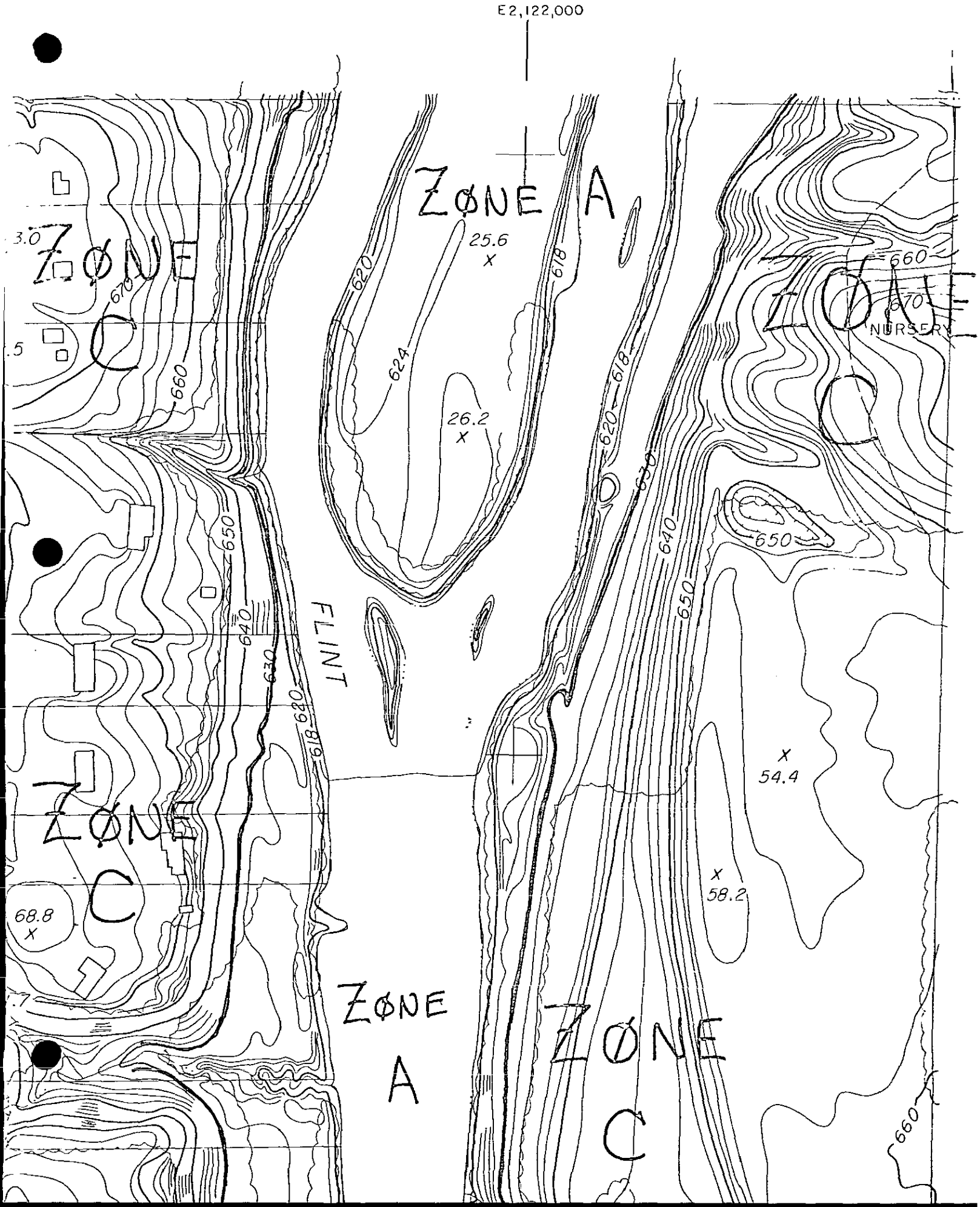
FR21MT25/36

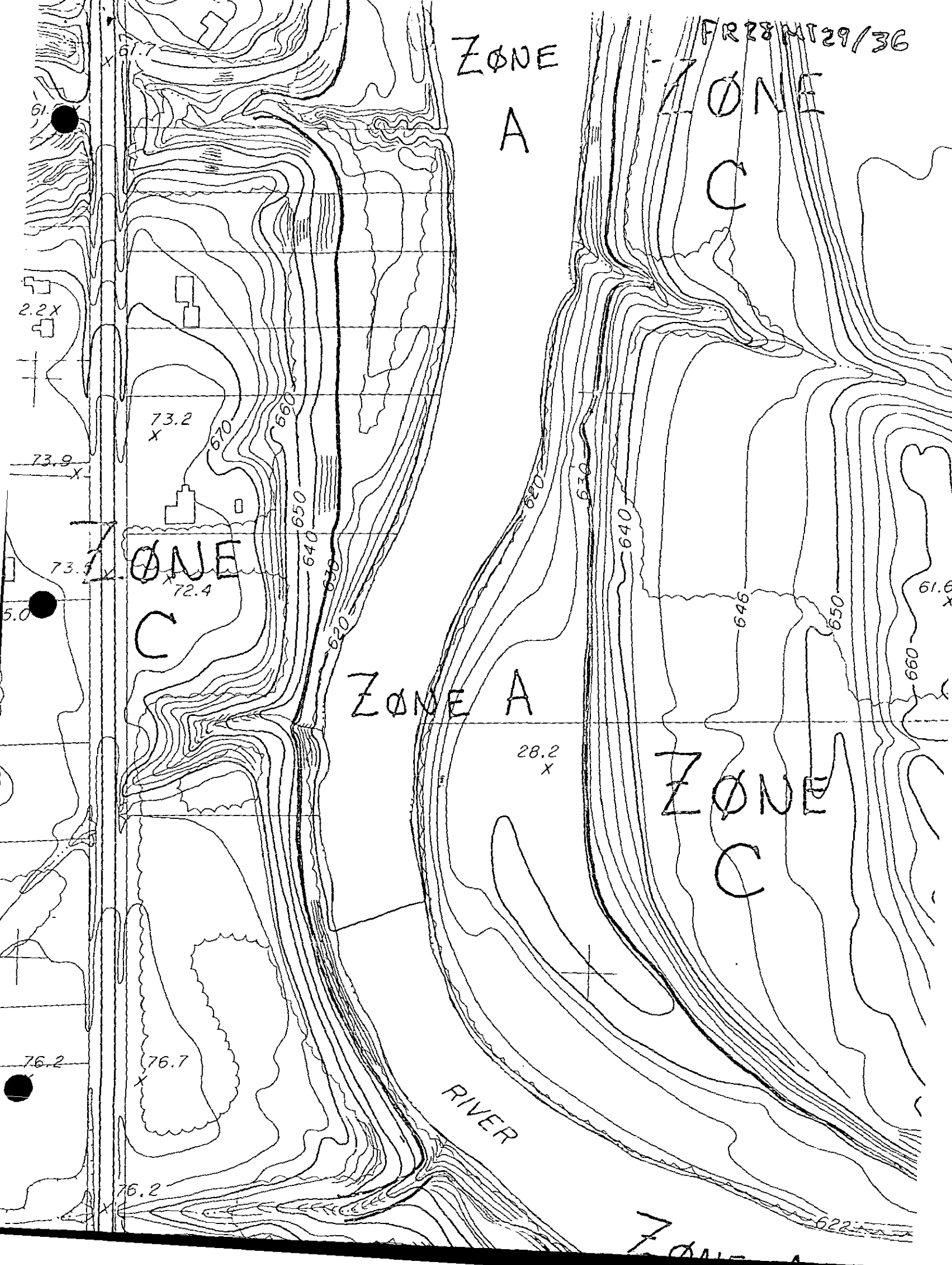

FLINT ZONE
ZONE
620
630
640
650
660
670
ARMSTRONG
CREEK
27.0
31.5
24.2
24.5
32.1
73.5

FR22 N26/36

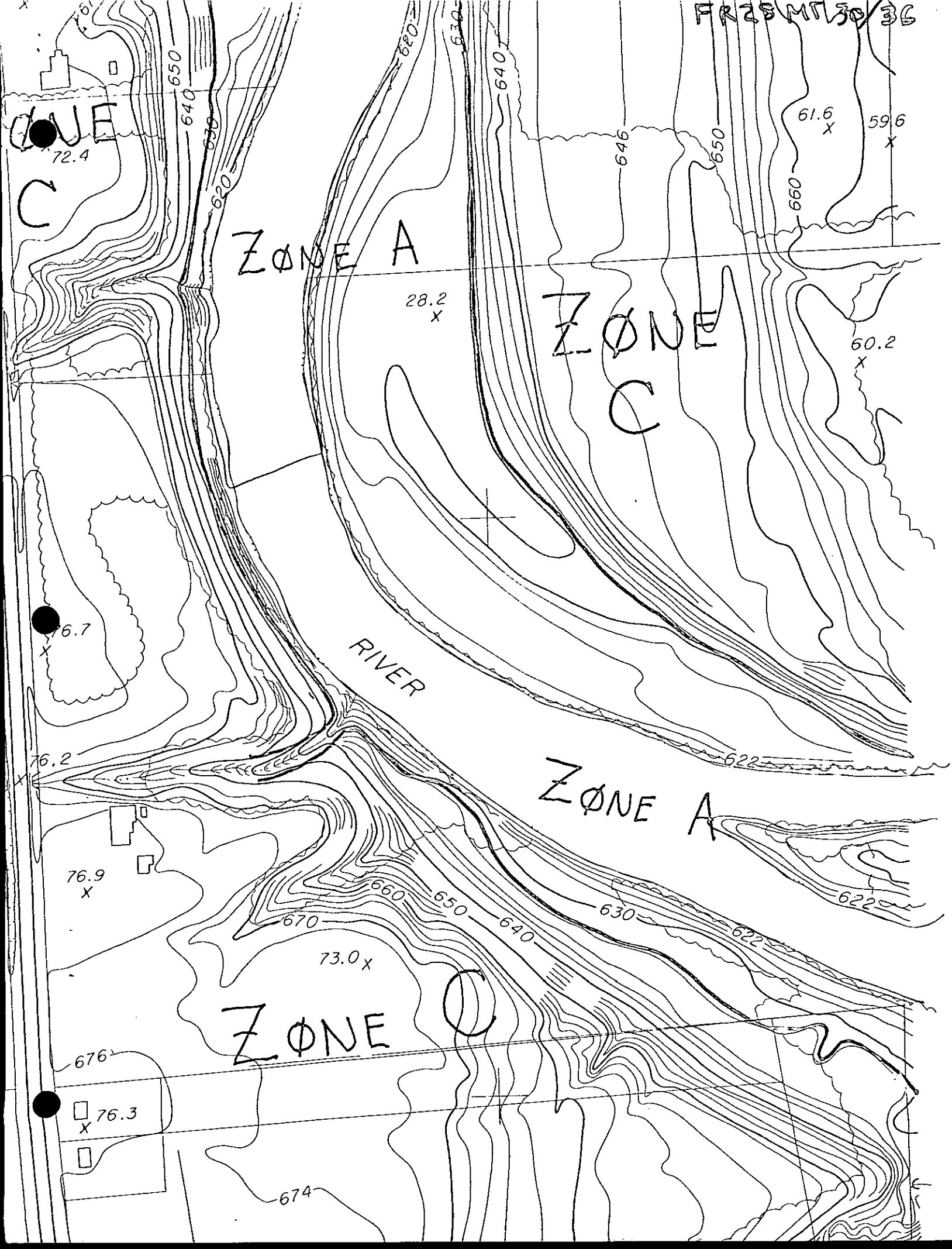

ZONE
C
ZONE
RIVER
A
FLINT
ZONE
A
ZONE
C
CRES
ZONE
C
650
636
644
42.6
646
640
630
26.1
626
620
22.2
25.
27.0
24.1
630
640
650
620
660
N606,0

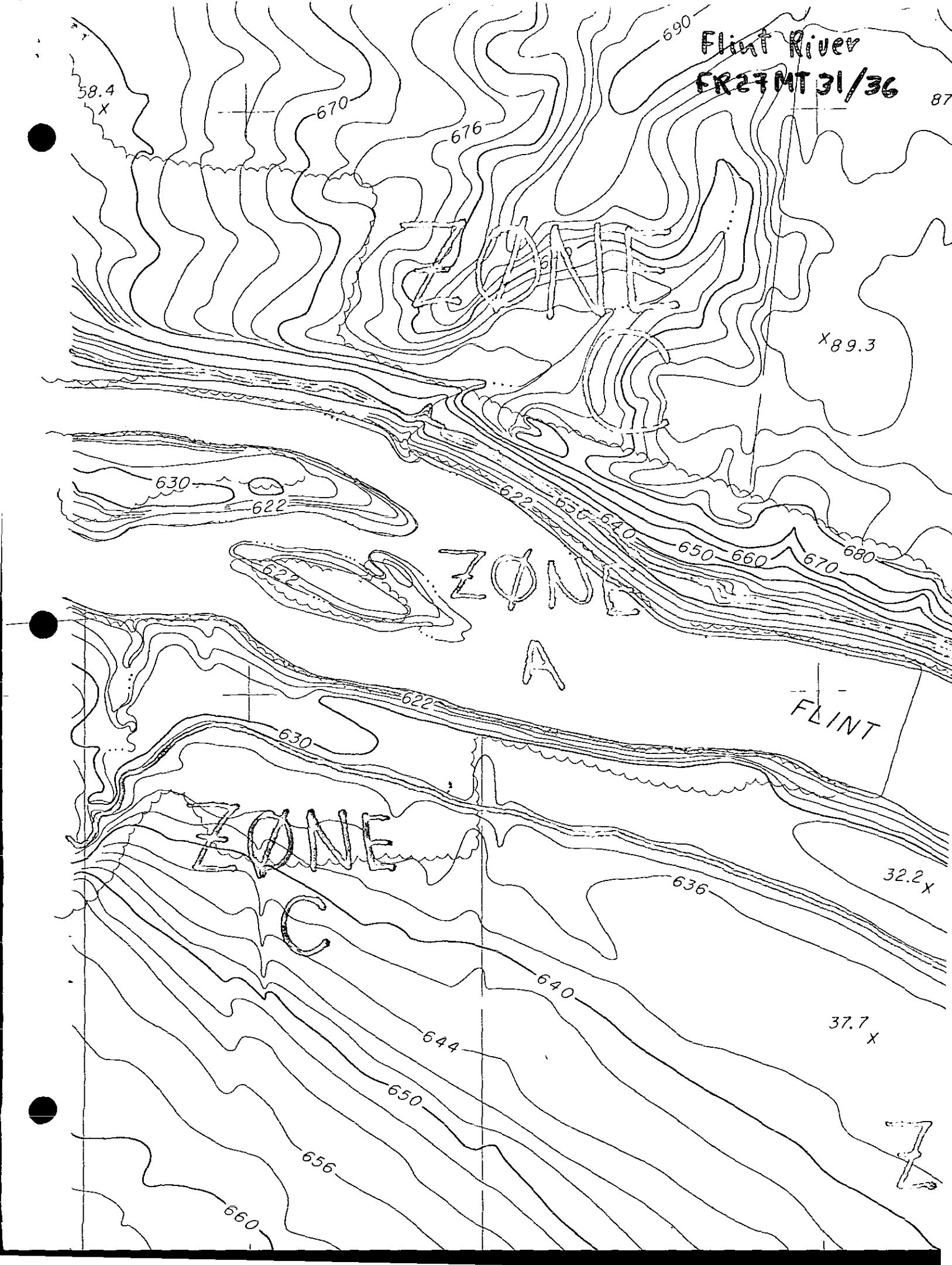
FR28MT27/36


E2,122,000
ZØNE A
ZØNE C
ZØNE C
ZØNE A
ZØNE C
ZØNE C
NURSERY
FLINT
25.6
26.2
54.4
58.2
68.8
620
624
618
660
670
650
640
630

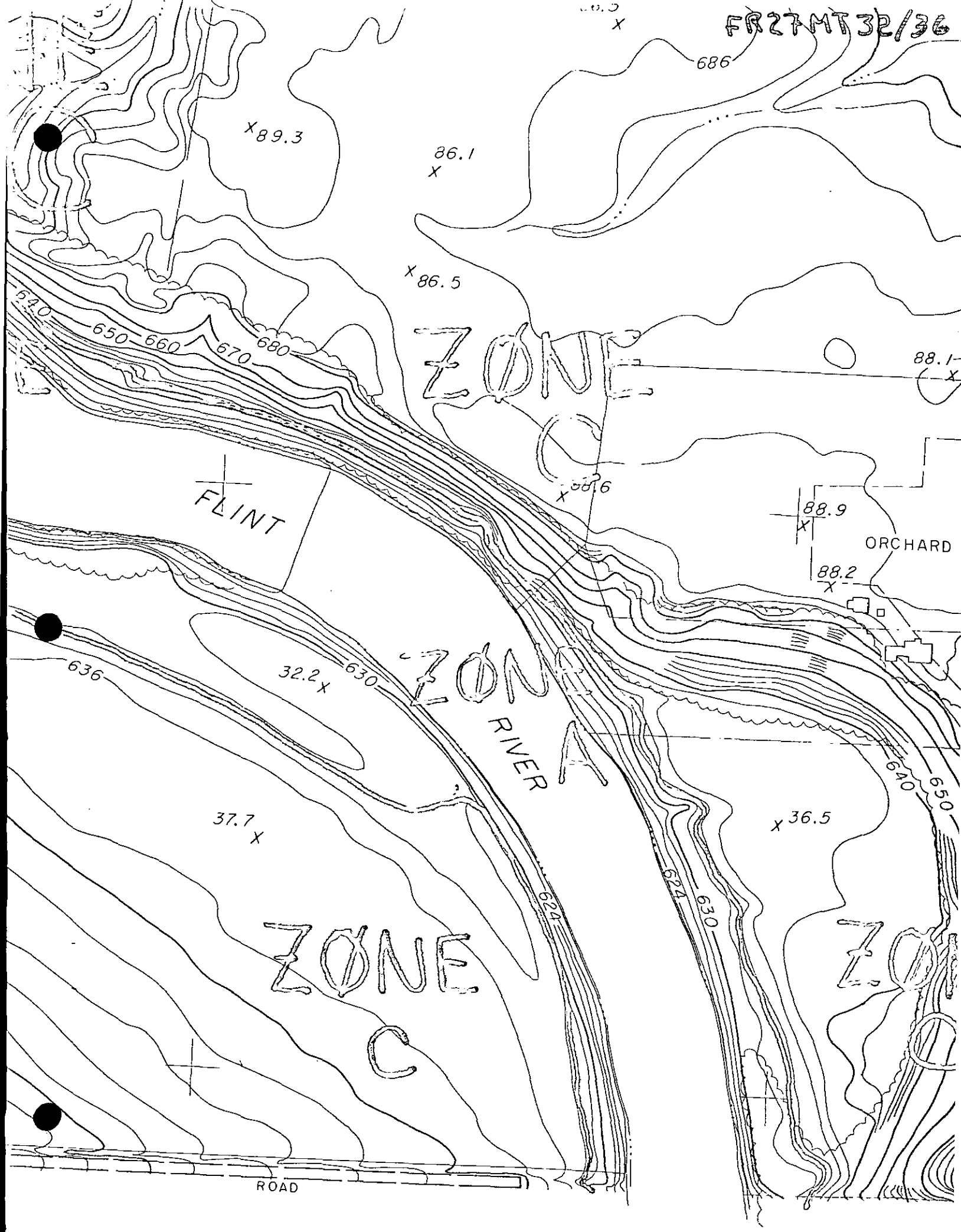

FR28 MT29/36
ZØNE A
ZØNE C
ZØNE C
ZØNE A
ZØNE C
RIVER
61.7
2.2
73.2
73.9
73.9
72.4
5.0
76.2
76.7
76.2
28.2
61.6
670
660
650
640
630
620
646
650
660
622

FR28MT30/36


ZONE C
72.4
650
640
630
620
ZONE A
28.2
640
646
650
660
61.6
59.6
ZONE C
60.2
76.7
RIVER
76.2
622
ZONE A
76.9
660
650
640
630
622
670
73.0
ZONE C
676
76.3
674


Flint River
FR27MT31/36
690
670
676
58.4
87
DAM
89.3
630
622
622
650
640
650
660
670
680
ZONE
A
622
FLINT
630
ZONE
C
636
32.2
640
37.7
644
650
656
660

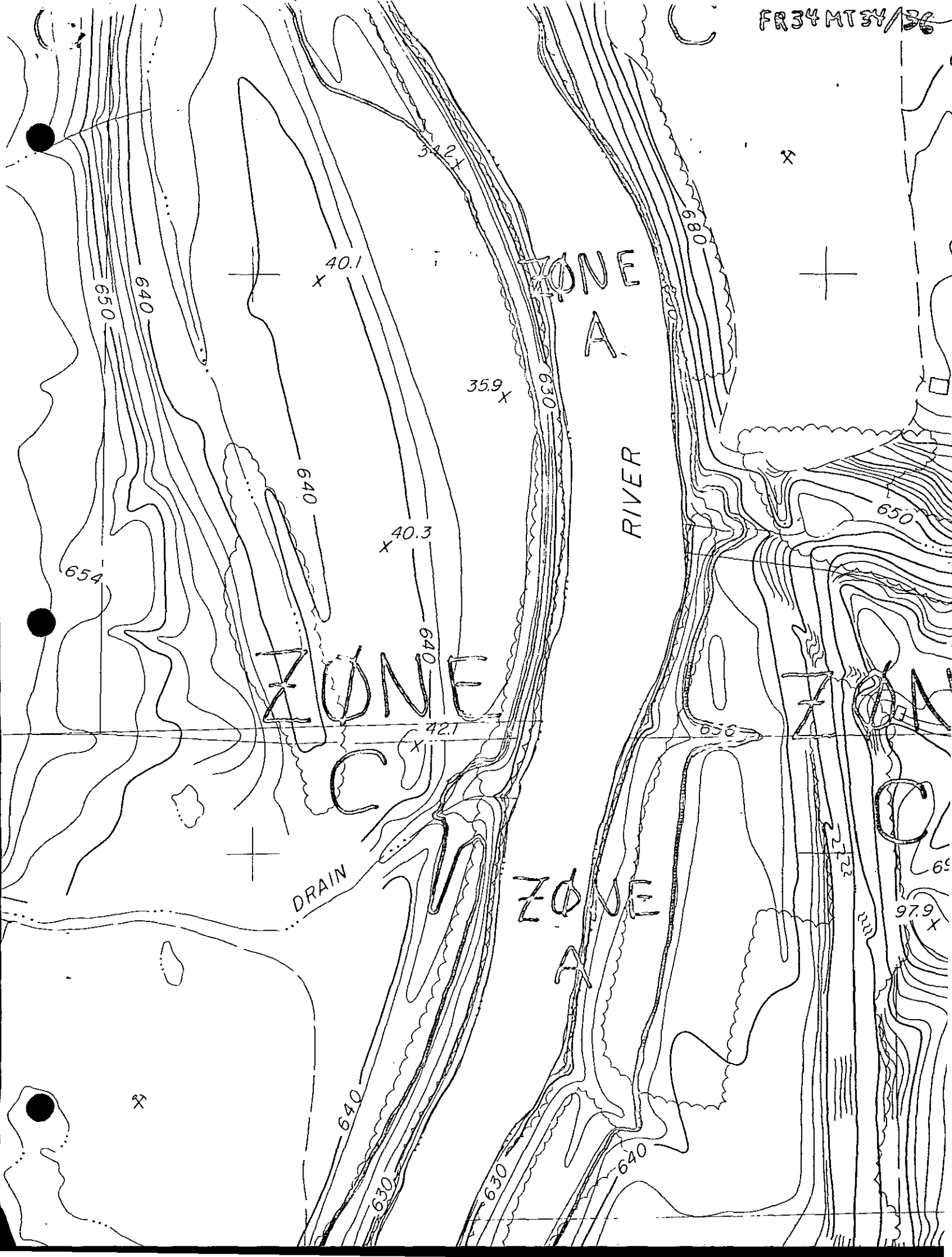
FR27MT32/36

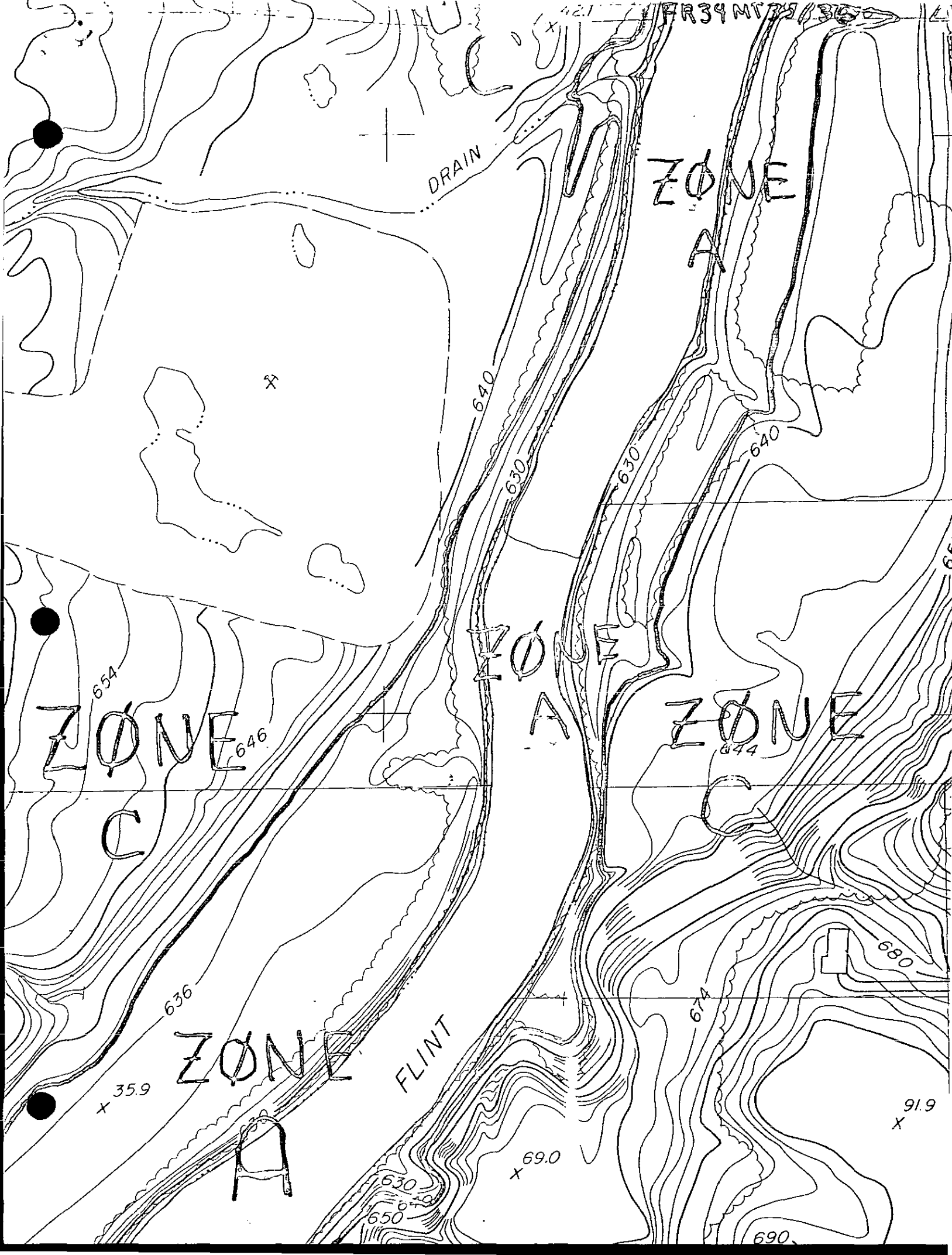


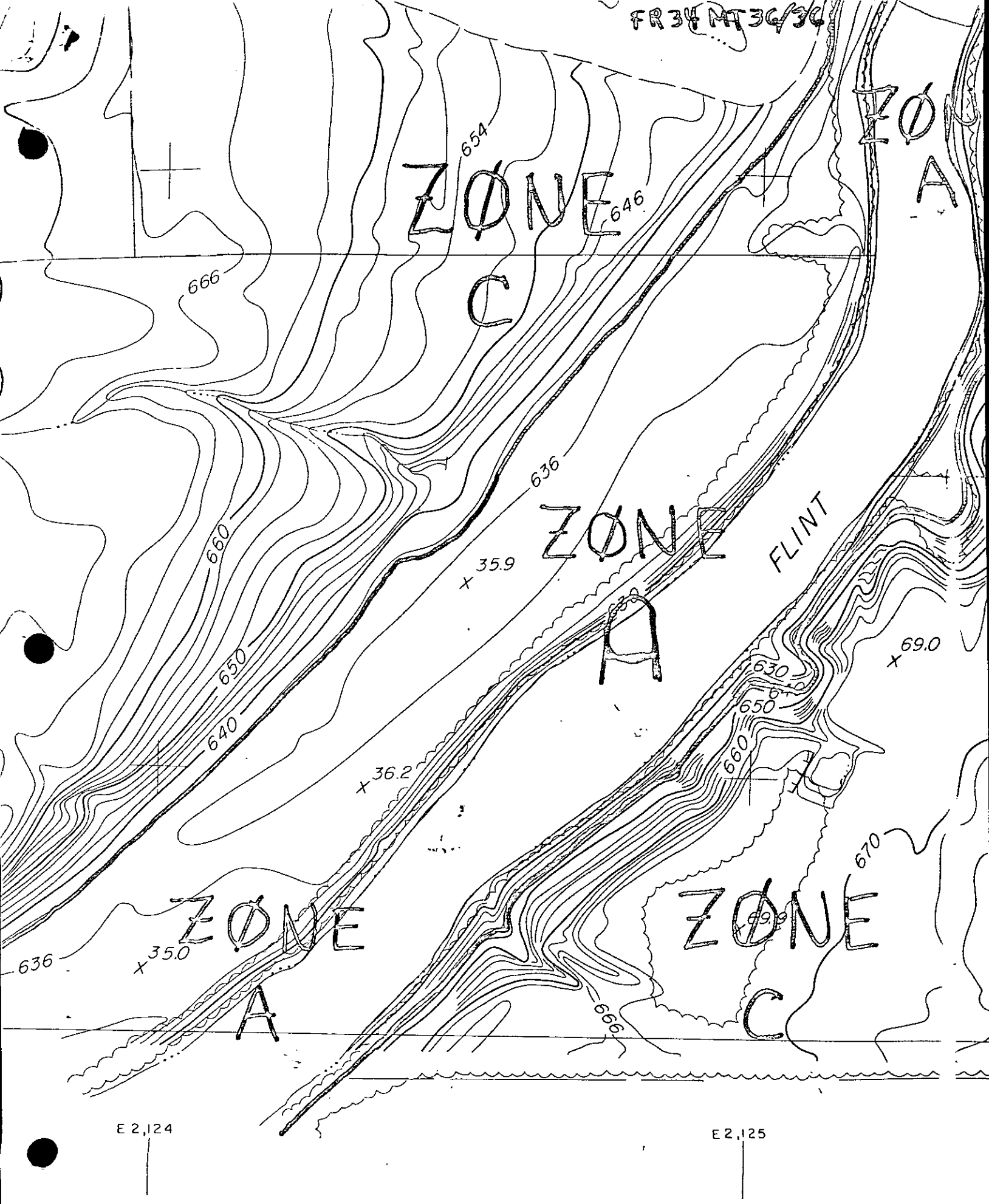
E2,124

FR34MT 33/36
ZONE C
ZONE A
ZONE C
ZONE A
ZONE C
ZONE A
ZONE C
ZONE A
ORCHARD
640
646
624
630
630
640
650
700
690
690
88.7
91.9
680
670
660
646
93.
680
670
634
650
640
40.1
680

FR34 MT 34/36


ZONE A
ZONE C
ZONE A
RIVER
DRAIN
ZONE C
40.1
35.9
40.3
42.1
34.2
97.9
650
640
654
630
680
656


FR34 MT
42.1
DRAIN
ZONE
A
640
630
630
640
654
ZONE
C
646
ZONE
A
ZONE
C
644
680
674
636
ZONE
A
FLINT
35.9
91.9
69.0
630
650
690


FR34 MT36/36
ZØNE
C
654
646
ZØNE
A
666
636
ZØNE
A
FLINT
660
650
640
35.9
630
69.0
630
650
660
36.2
670
ZØNE
A
636
35.0
ZØNE
C
69.9
666
E 2,124
E 2,125

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 24,DATE= 8/ 1/78

WATER-SURFACE PROFILE FOR: ARMSTRONG CREEK MCKINLEY RD - DODGE RD HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS

	SECID AT DISTANCE/ WS ELEV	LENGTH/ HV	DISCHARGE/ HF	AREA/ HE	CONVEYANCE/ EG	ALPHA/ V	LEW/ FN	REW/ ACC	*ID*
K	AS K AT 6850 / 639.45	0 / 0.11	610. /	329. /	19172. / 639.56	2.10 / 1.85	-100. / 0.23	50.	*IS*
L	AS L AT 7800 / 641.25	950 / 0.26	610. / 1.87	180. / 0.07	9848. / 641.51	1.45 / 3.39	270. / 0.39	370. / 0.003	*XS*
M	AS M AT 8320 / 642.82	520 / 0.13	610. / 1.43	312. / 0.0	13701. / 642.95	2.12 / 1.95	200. / 0.28	400. / 0.003	*XS*
N	AS N AT 8920 / 644.41	600 / 0.19	610. / 1.61	287. / 0.03	10095. / 644.60	2.72 / 2.12	-50. / 0.35	150. / 0.006	*XS* FW
Ø	AS O AT 9780 / 646.62	860 / 0.17	610. / 2.18	278. / 0.0	14531. / 646.79	2.21 / 2.20	-80. / 0.27	70. / 0.003	*XS*
P	AS P AT 10175 / 647.39	395 / 0.28	610. / 0.83	205. / 0.06	12177. / 647.67	2.03 / 2.98	-60. / 0.37	40. / 0.000	*XS*
Q	AS Q AT 10510 /	335 /	610. /	181. /	11993. /	1.79 /	10. /	110	

```
R  AS  R AT   11470 /   960 /    610. /   214. /   17689. / 1.11 /  -54. /   18.
     650.09 /   0.14 /   1.68 /   0.0  /  650.23 /    2.85 /   0.27 / -0.004  *XS*
-------------------------------------------------------------------------------
S  AS  S AT   12020 /   550 /    610. /   177. /   12522. / 1.03 /  113. /  165.
     650.99 /   0.19 /   0.92 /   0.03 /  651.18 /    3.44 /   0.31 /  0.002  *XS*
-------------------------------------------------------------------------------
T  AS  T AT   13375 /  1355 /    610. /   249. /   14244. / 1.16 /  225. /  375.
     653.91 /   0.11 /   2.83 /   0.0  /  654.01 /    2.45 /   0.27 /  0.008  *XS*
-------------------------------------------------------------------------------
U  AS  U AT   14840 /  1465 /    610. /   375. /   14000. / 2.50 /  225. /  475.
     656.65 /   0.10 /   2.73 /   0.0  /  656.75 /    1.63 /   0.28 /  0.003  *XS*
-------------------------------------------------------------------------------
V  AS  V AT   15750 /   910 /    610. /   262. /   13220. / 2.31 /  -50. /   98.
     658.43 /   0.19 /   1.83 /   0.05 /  658.63 /    2.33 /   0.33 /  0.002  *XS*
-------------------------------------------------------------------------------
W  AS  W AT   16010 /   260 /    610. /   262. /   15788. / 2.19 /  -10. /  160.
     658.91 /   0.18 /   0.46 /   0.0  /  659.09 /    2.32 /   0.30 /  0.002  *XS*
-------------------------------------------------------------------------------
X  AS  X AT   17030 /  1020 /    610. /   304. /   12850. / 1.77 /  300. /  450.
     660.86 /   0.11 /   1.87 /   0.0  /  660.97 /    2.01 /   0.32 /  0.006  *XS*
-------------------------------------------------------------------------------
Y  AS  Y AT   17250 /   220 /    610. /   177. /    9964. / 1.12 /   45. /  135.
     661.45 /   0.21 /   0.64 /   0.05 /  661.66 /    3.44 /   0.43 /  0.003  *XS*
-------------------------------------------------------------------------------
```

FW

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 29,DATE= 8/ 4/78

FW

WATER-SURFACE PROFILE FOR: ARMSTRONG CREEK DODGE ROAD - FRANCES RD HOLTSLAG
PAGE 1 OF 2, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS

	SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
Z	AS Z AT 17360 / 661.88	0 / 0.07	610. /	371. / 661.95	22090. / 1.64	1.67 / 0.19	-30. /	120.	*IS*
AA	AS AA AT 18080 / 663.34	720 / 0.56	610. / 1.71	121. / 0.25 / 663.91	7091. / 5.03	1.43 / 0.51	312. / -0.001	447.	*XS*
AB	AS AB AT 19000 / 666.36	920 / 0.05	610. / 2.50	502. / 0.0 / 666.41	19308. / 1.22	1.97 / 0.18	50. / 0.002	250.	*XS*
AC	AS AC AT 19460 / 666.86	460 / 0.07	610. / 0.49	437. / 0.01 / 666.93	17991. / 1.40	2.15 / 0.21	130. / 0.017	330.	*XS*
AD	AS AD AT 20330 / 667.89	870 / 0.08	610. / 1.03	376. / 0.01 / 667.97	17409. / 1.62	1.87 / 0.22	170. / 0.001	320.	*XS*
AE	AS AE AT 21050 / 669.06	720 / 0.13	610. / 1.19	337. / 0.03 / 669.19	12950. / 1.81	2.57 / 0.31	30. / 0.004	200.	*XS*

```
AF  AS AF AT   22550 /  1500 /    610. /   457. /   20035. / 2.22 /  -90. /  110.
       671.28 /   0.06 /   2.15 /   0.0  /  671.34 /    1.34 /   0.18 /  0.002  *XS*
    ------------------------------------------------------------------------------
AG  AS AG AT   23100 /   550 /    610. /   252. /   13410. / 2.00 /  267. /  377.
       671.98 /   0.18 /   0.76 /   0.06 /  672.16 /    2.42 /   0.28 / -0.000  *XS*
    ------------------------------------------------------------------------------
AH  AS AH AT   24000 /   900 /    610. /   337. /   15678. / 2.18 /  265. /  415.
       673.65 /   0.11 /   1.59 /   0.0  /  673.76 /    1.81 /   0.24 /  0.002  *XS*
    ------------------------------------------------------------------------------
AI  AS AI AT   24900 /   900 /    610. /   390. /   17866. / 1.94 /  -20. /  130.
       674.88 /   0.07 /   1.20 /   0.0  /  674.96 /    1.56 /   0.23 /  0.001  *XS*
    ------------------------------------------------------------------------------
AJ  AS AJ AT   25500 /   600 /    610. /   308. /   11809. / 1.69 /  115. /  265.
       675.93 /   0.10 /   1.06 /   0.01 /  676.03 /    1.98 /   0.28 /  0.002  *XS*
    ------------------------------------------------------------------------------
AK  AS AK AT   26380 /   880 /    610. /   361. /   15038. / 1.32 /   28. /  177.
       677.82 /   0.06 /   1.84 /   0.0  /  677.88 /    1.69 /   0.22 /  0.007  *XS*
    ------------------------------------------------------------------------------
AL  AS AL AT   26540 /   160 /    530. /   204. /   15778. / 1.04 /  -24. /   16.
       678.02 /   0.11 /   0.22 /   0.03 /  678.13 /    2.60 /   0.20 /  0.000  *XS*
    ============================ BEGIN BRIDGE ANALYSIS ============================
    MORBR AT   26540 /        /    530. /   146. /   35627. / 1.00 /    0. /   20.
       678.02 /   0.20 /        ...1...  (-.001)   /    3.62 /   0.24 /          *BO*
    ------------------------------------------------------------------------------
    EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                *RG*
    ------------------------------------------------------------------------------
    AS AM AT   26600 /    60 /    530. /   395. /   21597. / 2.41 / -100. /   50.
       678.11 /   0.07 /   0.05 /   0.0  /  678.18 /    1.34 /   0.17 / -0.000  *AS*
    ------------------------------------------------------------------------------
```

FW

FW

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 30,DATE= 8/ 4/78

FW

WATER-SURFACE PROFILE FOR: ARMSTRONG CREEK DODGE ROAD - FRANCES RD HOLTSLAG
PAGE 2 OF 2, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW ANALYSIS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /    EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
  M = 0.39 / E = 0.99 / K* = 0.87 /   423. /   23439. / 2.37 / -100. /   50.
  678.30 /   0.06 /                 /  678.35 /    1.25 /   0.16 /          *AS*
============================ END BRIDGE ANALYSIS ==========================
AS AN AT   26880 /   280 /    530. /   374. /   18003. / 1.88 /  150. /  300.
  678.48 /   0.06 /   0.19 /   0.00 /  678.54 /    1.42 /   0.17 /  0.001  *XS*
----------------------------------------------------------------------------
AS AO AT   27310 /   430 /    530. /   245. /   11256. / 1.92 /   62. /  205.
  679.04 /   0.14 /   0.60 /   0.04 /  679.18 /    2.16 /   0.29 /  0.001  *XS*
============================ BEGIN BRIDGE ANALYSIS ========================
FRABR AT   27310 /       /    752. /   110. /   12994. / 1.00 /    0. /   23.
  678.10 /   0.72 /       ...3...  (-.001)    /    6.81 /   0.55 /          *BO*
----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      0. / RIGHT        0. /                *RG*
----------------------------------------------------------------------------
AS AP AT   27380 /    70 /    530. /    97. /    2131. / 1.00 /  -79. /    0.
  679.70 /   0.47 /   0.82 /   0.16 /  680.17 /    5.49 /   0.87 /  0.003  *AS*
----------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /    97. /    2131. / 1.00 /  -79. /    0.
  679.70 /   0.47 /                 /  680.17 /    5.49 /   0.87 /          *AS*
============================ END BRIDGE ANALYSIS ==========================
```

AM

AN

AØ

~~BP~~

AP

END OF THIS PROFILE

FW

ARMSTRONG CREEK AT MCKINLEY RD HOLTSLAG BASE ELEVATION = 633.18 Z = -0.32

APPROACH ELEVATION	AREA	CONVEYANCE	ALPHA	TOP WIDTH	QC
632.75	0.5	4.0	1.000	3.9	0.98
633.50	7.7	167.6	1.000	14.4	32.11
634.25	19.5	690.2	1.000	17.1	118.31
635.00	33.3	1511.5	1.000	19.8	245.41
635.75	49.2	2632.8	1.000	22.5	412.52
636.50	67.0	4067.3	1.000	25.2	620.50
637.25	88.4	5971.4	1.033	34.5	802.67
638.00	125.9	8643.8	1.276	77.9	907.76
638.75	253.3	13029.4	2.547	256.7	1427.57
639.50	466.6	21778.7	2.957	308.3	3257.20
640.25	714.1	34608.0	2.664	342.9	5847.30
641.00	974.4	51774.1	2.239	351.5	9206.62
641.75	1241.3	72317.2	1.956	360.1	13077.30
642.50	1515.3	95789.3	1.780	371.2	17370.96
643.25	1798.3	122188.7	1.663	383.6	22094.29
644.00	2090.7	151578.7	1.580	396.0	27259.37
644.75	2390.9	184609.9	1.509	404.6	32980.05
645.50	2697.6	220541.1	1.455	413.2	39110.67
646.25	3010.9	259140.1	1.416	422.5	45609.45
647.00	3331.7	300196.0	1.387	433.0	52442.27
647.75	3660.4	344074.8	1.364	443.5	59671.99
648.50	3996.3	391810.8	1.340	451.5	67466.62
649.25	4337.5	442858.6	1.319	458.2	75723.62

ARMSTRONG CREEK AT MCKINLEY RD HOLTSLAG BASE ELEVATION = 633.18 Z = -0.32

BARREL DEPTH	AREA	CONVEYANCE	TOP WIDTH	WETTED PERIMETER
633.18 0.0	0.0	0.0	24.00	
0.337	8.08	350.4	24.00	25.35
0.674	16.17	1074.7	24.00	26.69
1.010	24.25	2044.3	24.00	28.04
1.347	32.33	3200.2	24.00	29.39
1.684	40.42	4505.3	24.00	30.74
2.021	48.50	5933.0	24.00	32.08
2.358	56.58	7463.4	24.00	33.43
2.694	64.67	9081.4	24.00	34.78
3.031	72.75	10774.7	24.00	36.12
3.368	80.83	12533.3	24.00	37.47
3.705	88.92	14349.2	24.00	38.82
4.042	97.00	16215.5	24.00	40.17
4.378	105.08	18126.6	24.00	41.51
4.715	113.16	20077.5	24.00	42.86
5.052	121.25	22064.2	24.00	44.21
5.389	129.33	24083.1	24.00	45.56
5.726	137.41	26131.0	24.00	46.90
6.062	145.50	28205.2	24.00	48.25
6.399	153.58	30303.4	24.00	49.60
6.736	161.66	32423.4	24.00	50.94
7.073	169.75	34563.4	24.00	52.29
7.410	177.83	36721.8	24.00	53.64
7.746	185.91	38897.2	24.00	54.99
8.083	194.00	41088.0	24.00	56.33
8.420	202.08	34331.6	24.00	81.68

850.0	637.82	********	4.95	3.39	2	0.95
850.0	638.38	637.50	5.18	4.32	3	0.91
850.0	638.89	638.00	5.52	4.82	3	0.89
850.0	639.23	638.32	5.76	5.14	3	0.88
850.0	639.39	638.50	5.91	5.32	3	0.87
850.0	639.73	638.90	6.26	5.72	3	0.86
850.0	639.92	639.12	6.45	5.94	3	0.85
850.0	640.25	639.52	6.82	6.34	3	0.84
1000.0	639.13	********	5.42	3.77	2	0.95
1000.0	639.21	637.50	5.47	4.32	3	0.93
1000.0	639.46	638.00	5.71	4.82	3	0.91
1000.0	639.66	638.32	5.91	5.14	3	0.90
1000.0	639.78	638.50	6.05	5.32	3	0.89
1000.0	640.06	638.90	6.36	5.72	3	0.88
1000.0	640.22	639.12	6.54	5.94	3	0.87
1000.0	640.52	639.52	6.89	6.34	3	0.86

Armstrong Creek - McKinley Road Culvert Computation

Recurrence Interval	Discharge	DSS WS Section	USS WS Section	Δh
10-YR	380	638.32	638.45	.13
50-YR	540	638.90	639.15	.25
100-YR	610	639.12	639.40	.28
500-YR	750	639.52	639.93	.41

AS - McKinley Road Culvert Computation

$Q_{50} = 540, \quad h_4 = 638.90$

Assume type III flow

$\therefore \; h_4 = h_3 = 638.90, \quad 5.72$

$A_3 = 137.41$

$K_3 = 26131.0$

$P_3 = 46.90$

$V_3^2/2g = 0.24$

try $h_2 = 5.74$

$A_2 = 137.75$

$K_2 = 26217.4$

$P_2 = 47.0$

$V_2^2/2g = 0.24$

638.90
.24
.02
− .24
638.92 −

$$h_{f\,2\text{-}3} = \frac{48 * 540^2}{26131 * 26217.4} = 0.02$$

Use 638.92 at inlet, $K_o \cong 0.01$

try $h_1 = 639.10$ | try $h_1 = 639.13$ | use $h_1 = 639.15$

$A_1 = 352.84$ | $A_1 = 361.37$ | 367.06

$V_1^2/2g = 0.04$ | $V_1^2/2g = 0.03$ | .03

$K_1 = 17462.38$ | 17695.7

638.92
.24
.01
.01
−.03
639.15

6850
6780
22
48

try ws = 638.35 at

638.32
0.15
0.01
-0.15
638.33

$h_{f\,2\cdot3} = \frac{48 * 380^2}{22591.4 * 22771.11} = 0.01$

use 638.33 at inlet

K_o entrance coefficient

since $v_3^2/2g$ is small, K_o is small ~ 0.01 feet

compute friction loss $h_{f\,1\cdot2}$

638.33
.15
.01
.01
-.05
638.45

try $h_1 = 638.50$ $h_1 = 638.45$

$A_1 = 210.83$ $A_1 = 202.34$

$v_1^2/2g = 0.05$ $v_1^2/2g = 0.05$

$K_1 = 11567.53$ $K_1 = 11275.15$

$h_f = \frac{22 * 380^2}{22651.3 * 11567.5} = 0.01$

try 638.45 at approach

$h_f = \frac{22 * 380^2}{22651.3 * 11275.16} = 0.01$

638.33
.15
.01
.01
-.05
638.45 ✓

type III flow ✓

AS – McKinley Road
10-YR Flood

$Q = 380$

$h_4 = h_3 = 638.32$ if type three flow

$A_3 = 123.36$ from computer output of culvert barrel properties

$\frac{V_2^2}{2g} = \frac{(380/123.36)^2}{2g} = 0.15$ ft

$P_3 = 44.56$

$K_3 = 22591.4$

$R_3 = \frac{123.36}{44.56} = 277$

$R_3^{2/3} = 1.97$

Assume ws at inlet = 638.50 ; = 5.32

A_2	127.68	124.08	123.60
$\frac{V_2^2}{2g}$ =	0.14'	0.15	
P_2 =	45.28		
K_2 =	23669.73	22771.11	22651.30
R_2 =	2.82		
$R_2^{2/3}$ =	2.00		
	@ 5.32	@ 5.17	@ 5.15

Compute frictional loss through culvert

$$h_{f2-3} = \frac{48 * 380^2}{22591.4 * 23669.73} = 0.01$$

638.32
0.15
0.01
– 0.14
638.34

Assumed ws too high

AS - McKinley Road - Culvert Computations

$Q_{100} = 610$, $h_4 = 639.12$

Assume type III flow ; $h_4 = h_3 = 639.12$ ✓ $= 5.94$

$h_3 = 5.94$

$A_3 = 142.56$

$V_3^2/2g = 0.28$

$K_3 = 27452.1$

try $h_2 = 5.96$

$A_2 = 143.04$

$V_2^2/2g = 0.28$

$K_2 = 27575.53$

639.12
0.28
0.02
- 0.28
639.14 ✓

$$h_{f\,2\text{-}3} = \frac{48 * 610^2}{27452.1 * 27575.5} = 0.02$$

try $h_1 = 639.40$, $K_0 \sim 0.01$

$A_1 = 438.16$

$V_1^2/2g = 0.03$

$K_1 = 20612$

639.14
.28
.01
.01
- .03
639.41 ✓

$$h_{f\,1\text{-}2} = \frac{22 * 610^2}{27575.5 * 20612} = 0.01$$

use 639.40

AS - McKinley Road Culvert Computations

$Q_{500} = 750$, $h_4 = 639.52$

Assume type III flow , $h_4 = h_3 = 639.52$, 6.34

$h_3 = 6.34$. try $h_2 = 6.37$ ✓

$A_3 = 152.17$ $A_2 = 152.88$

$V_3^2/2g = 0.38$ $V_2^2/2g = 0.37$

$K_3 = 29936.1$ $K_2 = 30122.84$

639.52
0.38
.03
- 0.37
639.56 ✓

$$h_{f\,23} = \frac{48 * 720^2}{29936.1 * 30122.84} = 0.03$$

$k_o \sim 0.01$

Use 639.56

try $h_1 = 639.90$ $h_1 = 639.93$

$A_1 = 598.60$

$A_1^2/2g = 0.02$

$K_1 = 28621.0$

639.56
0.37
0.01
0.01
-0.02
639.93 ✓

$$h_{f\,1-2} = \frac{22 * 750^2}{30122.84 * 28621.0} = 0.01$$

Use 639.93

ARMSTRONG CREEK

DODGE ROAD

BRIDGE GEOMETRY SECTION ____

Attach Photo

Upstream Side Bridge

Attach Photo

Downstream Side Bridge

Dual CMP-arch Culvert under Dodge Road

Length = 80 feet

	Left	Right
Max. Inside Vertical Diameter	8.5'	8.7'
" " Horizontal "	15.4	15.4

Set in sloping embankment

Max Project varies with water surface at approach 0 - 12 feet.

	Left	Right
Base elevation	655.89	656.40
Z elevation	656.08	656.31

BASIC DIMENSION CHECKLIST

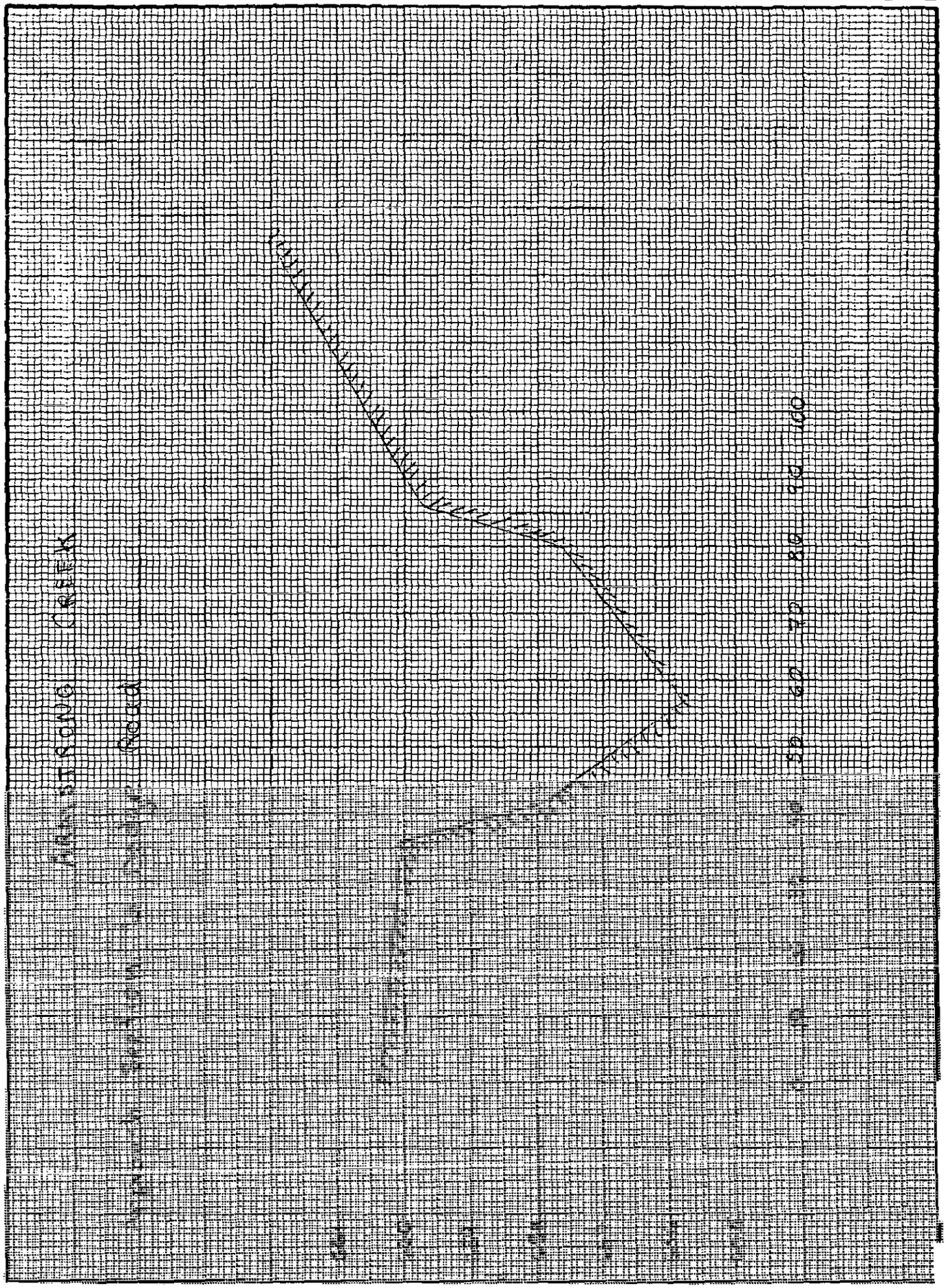
Bridge
- Alinement ϕ
- Bridge opening width W
- Number of piers
- Widths of piers
- Elevation low steel
- " top curb
- " top guardrail
- Embankment top width
- Embankment sideslope
- Wingwall angles θ
- Wingwall lengths l

Culvert
- Size, shape, material
- Upstr. Invert Elev.
- Downstr. Invert Elev.
- Length of culvert
- Road elevation
- Entrance wingwall angle θ
- Entrance wingwall length
- Length that pipe projects from headwall or fill

9-213-E
(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....



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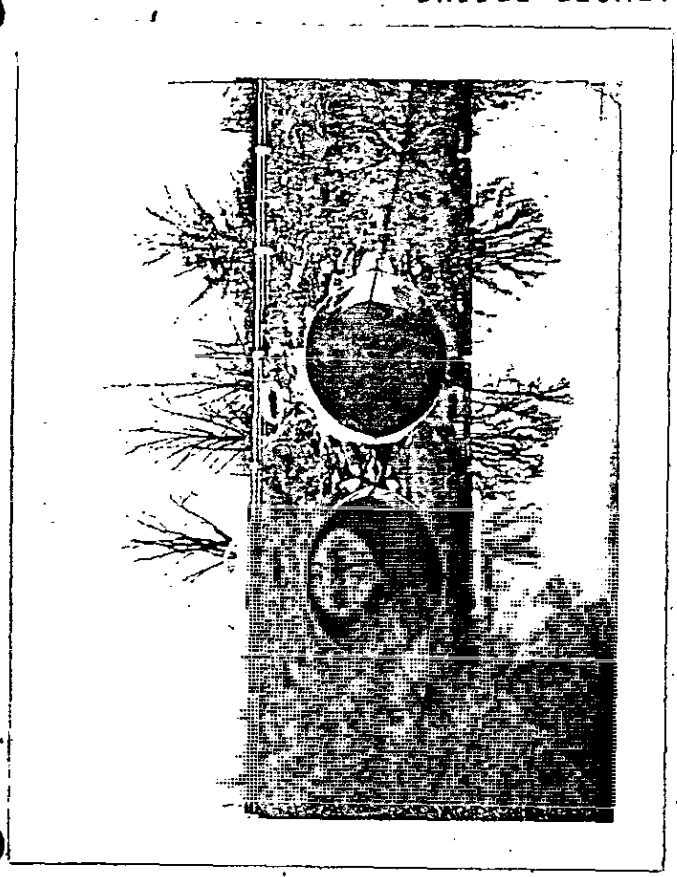
Armstrong Creek - Culverts at Dodge Road

The two pipe arch culverts under Dodge Road are seperated by a minimum distance of 4 feet which is more than 0.1 times the width. Therefore, the computation proceeded in the following manner. The approach section was surveyed and the data was plotted on figure 1. Since the culverts lie centered within the approach section, an imaginary line between the two culverts was constructed to divide the approach section into two approximately equal areas. Care was taken not to increase the wetted perimeter due to this construction. Discharge was routed seperately through the two culverts and the seperate culvert rating were combined to route the design discharges.

Armstrong Creek
Dodge Road

BRIDGE GEOMETRY SECTION _____

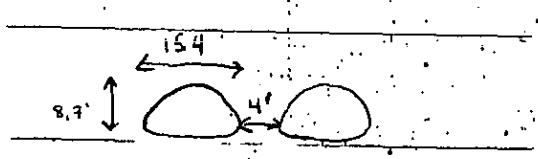


Upstream Side Bridge

Attach Photo

Downstream Side Bridge

Multiple Culverts

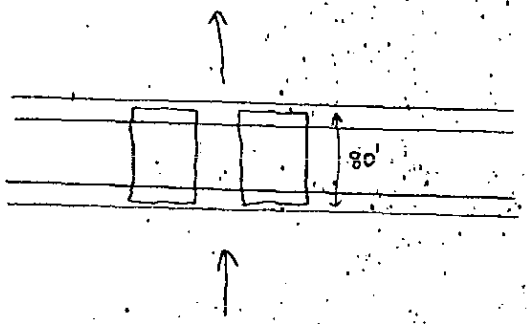


1.1 Sloping Embankment

Size 38 ~ 14'10", 9'1"

Each Culvert Area = 105.23

K_L = 0.92 if h_1 hr top of culvert



BASIC DIMENSION CHECKLIST

Bridge
- Alinement ϕ
- Bridge opening width W
- Number of piers
- Widths of piers
- Elevation low steel
- " top curb
- " top guardrail
- Embankment top width
- Embankment sideslope
- Wingwall angles θ
- Wingwall lengths l

Culvert
- Size, shape, material
- Upstr. Invert Elev.
- Downstr. Invert Elev.
- Length of culvert
- Road elevation
- Entrance wingwall angle θ
- Entrance wingwall length
- Length that pipe projects from headwall or fill

Armstrong Creek at Dodge Road

Recurrence Interval	Discharge cfs	DSWSE	Left Culvert Q	Left Culvert USWSE	Right Culvert Q	Right Culvert USWSE	Combined USWSE
10-YR	380	660.87	190	661.04	190	661.08	661.06
50-YR	540	661.29	270	661.61	270	661.66	661.64
100-YR	610	661.45	305	661.85	305	661.90	661.88
500-YR	750	661.75	375	662.32	375	662.37	662.35

ARMSTRONG CREEK DODGE ROAD LEFT HOLTSLAG BASE ELEVATION = 655.89 Z = 0.19

APPROACH ELEVATION	AREA	CONVEYANCE	ALPHA	TOP WIDTH	QC
656.00	0.5	3.2	1.000	4.5	0.81
657.00	8.7	231.4	1.000	12.0	42.05
658.00	24.4	961.2	1.000	18.5	158.40
659.00	44.3	2363.0	1.000	21.3	362.36
660.00	66.9	4324.4	1.000	24.0	633.87
661.00	134.3	7725.9	1.776	108.8	847.20
662.00	283.7	13830.4	2.819	190.0	1967.29
663.00	475.3	24513.1	2.611	193.1	4230.82
664.00	670.0	38430.7	2.286	196.2	7024.22
665.00	867.8	55230.8	2.055	199.4	10273.13
666.00	1068.7	74697.2	1.899	202.5	13931.77
667.00	1272.8	96680.4	1.791	205.6	17968.71
668.00	1480.0	121069.1	1.713	208.7	22360.96
669.00	1690.3	147777.4	1.656	211.9	27090.92
670.00	1903.7	176736.8	1.612	215.0	32144.77
671.00	2122.5	206093.2	1.604	222.5	37198.27
672.00	2348.7	237668.6	1.597	230.0	42590.08
673.00	2583.7	270189.0	1.606	240.0	48104.80
674.00	2828.7	305082.6	1.614	250.0	53993.41
675.00	3106.2	318516.9	1.866	305.0	56250.27
676.00	3438.7	342123.0	2.080	360.0	60307.32
677.00	3823.7	376027.8	2.221	410.0	66261.81
678.00	4258.7	416871.1	2.325	460.0	73530.25

ARMSTRONG CREEK DODGE ROAD LEFT HOLTSLAG BASE ELEVATION = 655.89 Z = 0.19

BARREL DEPTH	AREA	CONVEYANCE	TOP WIDTH	WETTED PERIMETER
0.0	0.0	0.0	0.0	
0.348	1.78	41.5	7.65	7.69
0.696	5.02	185.2	10.77	10.89
1.044	9.19	444.8	13.07	13.29
1.392	13.93	840.0	14.03	14.49
1.740	18.90	1345.4	14.51	15.34
2.088	24.00	1941.1	14.75	16.08
2.436	29.15	2459.3	14.85	18.33
2.784	34.30	3145.7	14.75	19.03
3.132	39.42	3870.2	14.63	19.74
3.480	44.48	4623.1	14.47	20.45
3.828	49.48	5395.2	14.27	21.18
4.176	54.41	6178.2	14.04	21.91
4.524	59.25	6963.6	13.77	22.66
4.872	63.99	7743.2	13.46	23.42
5.220	68.61	8509.0	13.10	24.20
5.568	73.10	9252.7	12.69	25.01
5.916	77.44	9965.6	12.23	25.84
6.264	81.61	10638.8	11.71	26.71
6.612	85.58	11262.6	11.13	27.62
6.960	89.34	11826.1	10.46	28.58
7.308	92.86	12317.0	9.71	29.61
7.656	96.09	12719.9	8.83	30.73
8.004	98.98	13014.8	7.79	31.98
8.352	101.48	13171.0	6.51	33.44
8.700	103.47	13129.1	4.82	35.27

ONG CREEK DODGE ROAD LEFT HOLTSLAG BASE ELEVATION = 655.89 Z = 0.19

Q	ELEV H1	ELEV H4	D2	D3	TYPE	C	C ADJUSTED
50.0	657.78	********	1.53	1.09	2	0.88	0.95
50.0	659.03	659.00	2.93	3.11	3	0.88	0.96
50.0	660.01	660.00	3.92	4.11	3	0.87	0.95
50.0	660.51	660.50	4.42	4.61	3	0.87	0.92
[illegible]	660.88	660.87	4.79	4.98	3	0.87	0.91
50.0	661.01	661.00	4.92	5.11	3	0.87	0.91
50.0	661.30	661.29	5.21	5.40	3	0.87	0.90
50.0	661.46	661.45	5.37	5.56	3	0.87	0.89
50.0	661.76	661.75	5.67	5.86	3	0.87	0.88
50.0	665.51	665.50	8.70	8.70	4	0.81	0.81
100.0	658.42	********	2.07	1.54	2	0.88	0.94
100.0	659.12	659.00	2.97	3.11	3	0.88	0.95
100.0	660.06	660.00	3.94	4.11	3	0.87	0.94
100.0	660.55	660.50	4.43	4.61	3	0.87	0.92
100.0	660.91	660.87	4.80	4.98	3	0.87	0.91
100.0	661.04	661.00	4.93	5.11	3	0.87	0.91
100.0	661.33	661.29	5.22	5.40	3	0.87	0.89
100.0	661.49	661.45	5.38	5.56	3	0.87	0.89
100.0	661.79	661.75	5.68	5.86	3	0.87	0.88
100.0	665.53	665.50	8.70	8.70	4	0.81	0.81
150.0	658.97	********	2.52	1.91	2	0.88	0.94
150.0	659.29	659.00	3.03	3.11	3	0.87	0.95
150.0	660.14	660.00	3.96	4.11	3	0.87	0.94
150.0	660.62	660.50	4.45	4.61	3	0.87	0.92
150.0	660.97	660.87	4.81	4.98	3	0.87	0.91
150.0	661.10	661.00	4.94	5.11	3	0.87	0.90
150.0	661.39	661.29	5.23	5.40	3	0.87	0.89
150.0	661.54	661.45	5.39	5.56	3	0.87	0.89
150.0	661.84	661.75	5.69	5.86	3	0.87	0.88
150.0	665.56	665.50	8.70	8.70	4	0.81	0.81
190.0	659.36	********	2.83	2.18	2	0.87	0.94
190.0	659.48	659.00	3.12	3.11	3	0.87	0.94
190.0	660.24	660.00	3.99	4.11	3	0.87	0.93
190.0	660.69	660.50	4.47	4.61	3	0.87	0.91
190.0	661.04	660.87	4.83	4.98	3	0.87	0.91
190.0	661.16	661.00	4.96	5.11	3	0.87	0.90
190.0	661.45	661.29	5.24	5.40	3	0.87	0.89
190.0	661.60	661.45	5.40	5.56	3	0.87	0.89
190.0	661.89	661.75	5.70	5.86	3	0.87	0.88
190.0	665.60	665.50	8.70	8.70	4	0.81	0.81

[illegible]	[illegible]	660.87	4.80	4.98	[illegible]	[illegible]	[illegible]
100.0	661.04	661.00	4.93	5.11	3	0.87	0.9
100.0	661.33	661.29	5.22	5.40	3	0.87	0.8
100.0	661.49	661.45	5.38	5.56	3	0.87	0.8
100.0	661.79	661.75	5.68	5.86	3	0.87	0.8
100.0	665.53	665.50	8.70	8.70	4	0.81	0.8
150.0	658.97	********	2.52	1.91	2	0.88	0.9
150.0	659.29	659.00	3.03	3.11	3	0.87	0.9
150.0	660.14	660.00	3.96	4.11	3	0.87	0.9
150.0	660.62	660.50	4.45	4.61	3	0.87	0.9
150.0	660.97	660.87	4.81	4.98	3	0.87	0.9
150.0	661.10	661.00	4.94	5.11	3	0.87	0.9
150.0	661.39	661.29	5.23	5.40	3	0.87	0.8
150.0	661.54	661.45	5.39	5.56	3	0.87	0.8
150.0	661.84	661.75	5.69	5.86	3	0.87	0.8
150.0	665.56	665.50	8.70	8.70	4	0.81	0.8
190.0	659.36	********	2.83	2.18	2	0.87	0.9
190.0	659.48	659.00	3.12	3.11	3	0.87	0.9
190.0	660.24	660.00	3.99	4.11	3	0.87	0.9
190.0	660.69	660.50	4.47	4.61	3	0.87	0.9
190.0	661.04	660.87	4.83	4.98	3	0.87	0.9
190.0	661.16	661.00	4.96	5.11	3	0.87	0.9
190.0	661.45	661.29	5.24	5.40	3	0.87	0.8
190.0	661.60	661.45	5.40	5.56	3	0.87	0.8
190.0	661.89	661.75	5.70	5.86	3	0.87	0.8
190.0	665.60	665.50	8.70	8.70	4	0.81	0.8
230.0	659.73	********	3.13	2.42	2	0.87	0.93
230.0	659.73	659.00	3.24	3.11	3	0.87	0.94
230.0	660.36	660.00	4.03	4.11	3	0.87	0.92
230.0	660.79	660.50	4.49	4.61	3	0.87	0.91
230.0	661.12	660.87	4.85	4.98	3	0.87	0.90
230.0	661.25	661.00	4.97	5.11	3	0.87	0.90
230.0	661.52	661.29	5.26	5.40	3	0.87	0.89
230.0	661.67	661.45	5.41	5.56	3	0.87	0.88
230.0	661.95	661.75	5.71	5.86	3	0.87	0.88
230.0	665.64	665.50	8.70	8.70	4	0.81	0.81

ARMSTRONG CREEK DODGE ROAD LEFT HOLTSLAG BASE ELEVATION = 655.89 Z = 0.19

Q	ELEV H1	ELEV H4	D2	D3	TYPE	C	C ADJUSTED
270.0	660.12	********	3.40	2.63	2	0.87	0.92
270.0	660.02	659.00	3.40	3.11	3	0.87	0.93
270.0	660.52	660.00	4.07	4.11	3	0.87	0.92
270.0	660.90	660.50	4.52	4.61	3	0.87	0.91
270.0	661.23	660.87	4.87	4.98	3	0.87	0.90
270.0	661.35	661.00	4.99	5.11	3	0.87	0.89
270.0	661.61	661.29	5.27	5.40	3	0.87	0.89
270.0	661.76	661.45	5.43	5.56	3	0.87	0.88
270.0	662.03	661.75	5.72	5.86	3	0.87	0.88
270.0	665.69	665.50	8.70	8.70	4	0.81	0.81
305.0	660.48	********	3.62	2.82	2	0.87	0.91
305.0	660.39	659.00	3.58	3.11	3	0.87	0.91
305.0	660.69	660.00	4.13	4.11	3	0.87	0.91
305.0	661.03	660.50	4.56	4.61	3	0.87	0.90
305.0	661.35	660.87	4.90	4.98	3	0.87	0.89
305.0	661.46	661.00	5.02	5.11	3	0.87	0.89
305.0	661.71	661.29	5.29	5.40	3	0.87	0.88
305.0	661.85	661.45	5.45	5.56	3	0.87	0.88
305.0	662.12	661.75	5.74	5.86	3	0.87	0.88
305.0	665.75	665.50	8.70	8.70	4	0.81	0.81
375.0	661.15	********	4.04	3.17	2	0.87	0.89
375.0	661.12	660.00	4.27	4.11	3	0.87	0.89
375.0	661.38	660.50	4.65	4.61	3	0.87	0.89
375.0	661.63	660.87	4.96	4.98	3	0.87	0.88
375.0	661.72	661.00	5.08	5.11	3	0.87	0.88
375.0	661.94	661.29	5.35	5.40	3	0.87	0.88
375.0	662.07	661.45	5.49	5.56	3	0.87	0.88
375.0	662.32	661.75	5.78	5.86	3	0.87	0.87
375.0	665.88	665.50	8.70	8.70	4	0.81	0.81
450.0	661.87	********	4.46	3.51	2	0.87	0.87
450.0	661.73	660.00	4.50	4.11	3	0.87	0.88
450.0	661.84	660.50	4.78	4.61	3	0.87	0.88
450.0	662.00	660.87	5.06	4.98	3	0.87	0.87
450.0	662.08	661.00	5.17	5.11	3	0.87	0.87
450.0	662.27	661.29	5.42	5.40	3	0.87	0.87
450.0	662.38	661.45	5.56	5.56	3	0.87	0.87
450.0	662.60	661.75	5.83	5.86	3	0.86	0.86
450.0	666.04	665.50	8.70	8.70	4	0.81	0.81

305.0	661.03	660.50	4.58	[illegible]	[illegible]	[illegible]	[illegible]
305.0	661.35	660.87	4.90	4.98	3	0.87	0.89
305.0	661.46	661.00	5.02	5.11	3	0.87	0.89
305.0	661.71	661.29	5.29	5.40	3	0.87	0.88
305.0	661.85	661.45	5.45	5.56	3	0.87	0.88
305.0	662.12	661.75	5.74	5.86	3	0.87	0.88
305.0	665.75	665.50	8.70	8.70	4	0.81	0.81
375.0	661.15	********	4.04	3.17	2	0.87	0.89
375.0	661.12	660.00	4.27	4.11	3	0.87	0.89
375.0	661.38	660.50	4.65	4.61	3	0.87	0.89
375.0	661.63	660.87	4.96	4.98	3	0.87	0.88
375.0	661.72	661.00	5.08	5.11	3	0.87	0.88
375.0	661.94	661.29	5.35	5.40	3	0.87	0.88
375.0	662.07	661.45	5.49	5.56	3	0.87	0.88
375.0	662.32	661.75	5.78	5.86	3	0.87	0.87
375.0	665.88	665.50	8.70	8.70	4	0.81	0.81
450.0	661.87	********	4.46	3.51	2	0.87	0.87
450.0	661.73	660.00	4.50	4.11	3	0.87	0.88
450.0	661.84	660.50	4.78	4.61	3	0.87	0.88
450.0	662.00	660.87	5.06	4.98	3	0.87	0.87
450.0	662.08	661.00	5.17	5.11	3	0.87	0.87
450.0	662.27	661.29	5.42	5.40	3	0.87	0.87
450.0	662.38	661.45	5.56	5.56	3	0.87	0.87
450.0	662.60	661.75	5.83	5.86	3	0.86	0.86
450.0	666.04	665.50	8.70	8.70	4	0.81	0.81
600.0	663.23	********	5.25	4.14	2	0.85	0.85
600.0	663.05	660.50	5.24	4.61	3	0.85	0.85
600.0	663.04	660.87	5.38	4.98	3	0.85	0.85
600.0	663.06	661.00	5.45	5.11	3	0.85	0.85
600.0	663.14	661.29	5.64	5.40	3	0.85	0.85
600.0	663.20	661.45	5.76	5.56	3	0.85	0.85
600.0	663.34	661.75	6.00	5.86	3	0.85	0.85
600.0	666.46	665.50	8.70	8.70	4	0.81	0.81

ARMSTRONG CREEK DODGE ROAD RT HOLTSLAG BASE ELEVATION = 656.40 Z = -0.09

BARREL DEPTH	AREA	CONVEYANCE	TOP WIDTH	WETTED PERIMETER
0.0	0.0	0.0	0.0	
0.348	1.78	41.5	7.65	7.69
0.696	5.02	185.2	10.77	10.89
1.044	9.19	444.8	13.07	13.29
1.392	13.93	840.0	14.03	14.49
1.740	18.90	1345.4	14.51	15.34
2.088	24.00	1941.1	14.75	16.08
2.436	29.15	2459.3	14.85	18.33
2.784	34.30	3145.7	14.75	19.03
3.132	39.42	3870.2	14.63	19.74
3.480	44.48	4623.1	14.47	20.45
3.828	49.48	5395.2	14.27	21.18
4.176	54.41	6178.2	14.04	21.91
4.524	59.25	6963.6	13.77	22.66
4.872	63.99	7743.2	13.46	23.42
5.220	68.61	8509.0	13.10	24.20
5.568	73.10	9252.7	12.69	25.01
5.916	77.44	9965.6	12.23	25.84
6.264	81.61	10638.8	11.71	26.71
6.612	85.58	11262.6	11.13	27.62
6.960	89.34	11826.1	10.46	28.58
7.308	92.86	12317.0	9.71	29.61
7.656	96.09	12719.9	8.83	30.73
8.004	98.98	13014.8	7.79	31.98
8.352	101.48	13171.0	6.51	33.44
8.700	103.47	13129.1	4.82	35.27

)NG CREEK DODGE ROAD RT HOLTSLAG BASE ELEVATION = 656.40 Z = -0.09

Q	ELEV H1	ELEV H4	D2	D3	TYPE	C	C ADJUSTED
50.0	658.22	********	1.77	1.09	2	0.88	0.94
50.0	659.06	659.00	2.72	2.60	3	0.88	0.94
50.0	660.02	660.00	3.70	3.60	3	0.87	0.93
50.0	660.52	660.50	4.20	4.10	3	0.87	0.93
50.0	660.88	660.87	4.56	4.47	3	0.87	0.92
50.0	661.01	661.00	4.69	4.60	3	0.87	0.92
50.0	661.30	661.29	4.98	4.89	3	0.87	0.91
50.0	661.46	661.45	5.14	5.05	3	0.87	0.91
50.0	661.76	661.75	5.44	5.35	3	0.87	0.91
50.0	665.51	665.50	8.70	8.70	4	0.81	0.81
100.0	658.92	********	2.36	1.54	2	0.88	0.93
100.0	659.23	659.00	2.81	2.60	3	0.88	0.93
100.0	660.10	660.00	3.73	3.60	3	0.87	0.93
100.0	660.57	660.50	4.21	4.10	3	0.87	0.92
100.0	660.93	660.87	4.58	4.47	3	0.87	0.92
100.0	661.05	661.00	4.71	4.60	3	0.87	0.92
100.0	661.34	661.29	4.99	4.89	3	0.87	0.91
100.0	661.50	661.45	5.15	5.05	3	0.87	0.91
100.0	661.79	661.75	5.45	5.35	3	0.87	0.91
100.0	665.53	665.50	8.70	8.70	4	0.81	0.81
150.0	659.48	********	2.82	1.91	2	0.87	0.93
150.0	659.53	659.00	2.97	2.60	3	0.87	0.93
150.0	660.22	660.00	3.78	3.60	3	0.87	0.93
150.0	660.66	660.50	4.25	4.10	3	0.87	0.92
150.0	661.00	660.87	4.60	4.47	3	0.87	0.92
150.0	661.12	661.00	4.73	4.60	3	0.87	0.92
150.0	661.40	661.29	5.01	4.89	3	0.87	0.91
150.0	661.55	661.45	5.17	5.05	3	0.87	0.91
150.0	661.84	661.75	5.47	5.35	3	0.87	0.91
150.0	665.56	665.50	8.70	8.70	4	0.81	0.81
190.0	659.89	********	3.14	2.18	2	0.87	0.92
190.0	659.84	659.00	3.16	2.60	3	0.87	0.92
190.0	660.36	660.00	3.83	3.60	3	0.87	0.92
190.0	660.76	660.50	4.28	4.10	3	0.87	0.92
190.0	661.08	660.87	4.63	4.47	3	0.87	0.92

100.0	661.05	661.00	4.71	4.60	3	0.87	
100.0	661.34	661.29	4.99	4.89	3	0.87	0.91
100.0	661.50	661.45	5.15	5.05	3	0.87	0.91
100.0	661.79	661.75	5.45	5.35	3	0.87	0.91
100.0	665.53	665.50	8.70	8.70	4	0.81	0.81
150.0	659.48	********	2.82	1.91	2	0.87	0.93
150.0	659.53	659.00	2.97	2.60	3	0.87	0.93
150.0	660.22	660.00	3.78	3.60	3	0.87	0.93
150.0	660.66	660.50	4.25	4.10	3	0.87	0.92
150.0	661.00	660.87	4.60	4.47	3	0.87	0.92
150.0	661.12	661.00	4.73	4.60	3	0.87	0.92
150.0	661.40	661.29	5.01	4.89	3	0.87	0.91
150.0	661.55	661.45	5.17	5.05	3	0.87	0.91
150.0	661.84	661.75	5.47	5.35	3	0.87	0.91
150.0	665.56	665.50	8.70	8.70	4	0.81	0.81
190.0	659.89	********	3.14	2.18	2	0.87	0.92
190.0	659.84	659.00	3.16	2.60	3	0.87	0.92
190.0	660.36	660.00	3.83	3.60	3	0.87	0.92
190.0	660.76	660.50	4.28	4.10	3	0.87	0.92
190.0	661.08	660.87	4.63	4.47	3	0.87	0.92
190.0	661.20	661.00	4.75	4.60	3	0.87	0.91
190.0	661.47	661.29	5.03	4.89	3	0.87	0.91
190.0	661.62	661.45	5.19	5.05	3	0.87	0.91
190.0	661.90	661.75	5.48	5.35	3	0.87	0.90
190.0	665.60	665.50	8.70	8.70	4	0.81	0.81
230.0	660.28	********	3.45	2.42	2	0.87	0.92
230.0	660.23	659.00	3.42	2.60	3	0.87	0.92
230.0	660.53	660.00	3.91	3.60	3	0.87	0.92
230.0	660.89	660.50	4.33	4.10	3	0.87	0.92
230.0	661.19	660.87	4.66	4.47	3	0.87	0.91
230.0	661.30	661.00	4.79	4.60	3	0.87	0.91
230.0	661.56	661.29	5.06	4.89	3	0.87	0.91
230.0	661.70	661.45	5.21	5.05	3	0.87	0.91
230.0	661.97	661.75	5.50	5.35	3	0.87	0.90
230.0	665.64	665.50	8.70	8.70	4	0.81	0.81

ARMSTRONG CREEK DODGE ROAD RT HOLTSLAG BASE ELEVATION = 656.40 Z = -0.09

Q	ELEV H1	ELEV H4	D2	D3	TYPE	C	C ADJUSTED
270.0	660.66	********	3.73	2.63	2	0.87	0.91
270.0	660.75	660.00	4.01	3.60	3	0.87	0.91
270.0	661.04	660.50	4.39	4.10	3	0.87	0.91
270.0	661.32	660.87	4.71	4.47	3	0.87	0.91
270.0	661.42	661.00	4.83	4.60	3	0.87	0.91
270.0	661.66	661.29	5.09	4.89	3	0.87	0.91
270.0	661.80	661.45	5.24	5.05	3	0.87	0.90
270.0	662.06	661.75	5.53	5.35	3	0.87	0.90
270.0	665.69	665.50	8.70	8.70	4	0.81	0.81
305.0	660.97	********	3.96	2.82	2	0.87	0.91
305.0	660.96	660.00	4.11	3.60	3	0.87	0.91
305.0	661.21	660.50	4.45	4.10	3	0.87	0.91
305.0	661.45	660.87	4.76	4.47	3	0.87	0.91
305.0	661.54	661.00	4.87	4.60	3	0.87	0.91
305.0	661.77	661.29	5.13	4.89	3	0.87	0.90
305.0	661.90	661.45	5.27	5.05	3	0.87	0.90
305.0	662.15	661.75	5.55	5.35	3	0.87	0.90
305.0	665.75	665.50	8.70	8.70	4	0.81	0.81
375.0	661.59	********	4.39	3.17	2	0.87	0.90
375.0	661.50	660.00	4.39	3.60	3	0.87	0.90
375.0	661.60	660.50	4.62	4.10	3	0.87	0.90
375.0	661.77	660.87	4.88	4.47	3	0.87	0.90
375.0	661.84	661.00	4.98	4.60	3	0.87	0.90
375.0	662.03	661.29	5.21	4.89	3	0.87	0.90
375.0	662.14	661.45	5.35	5.05	3	0.87	0.90
375.0	662.37	661.75	5.62	5.35	3	0.87	0.89
375.0	665.88	665.50	8.70	8.70	4	0.81	0.81
450.0	662.23	********	4.83	3.51	2	0.87	0.89
450.0	662.18	660.00	4.81	3.60	3	0.87	0.89
450.0	662.12	660.50	4.87	4.10	3	0.87	0.89
450.0	662.20	660.87	5.06	4.47	3	0.87	0.89
450.0	662.25	661.00	5.14	4.60	3	0.87	0.89
450.0	662.39	661.29	5.34	4.89	3	0.87	0.89
450.0	662.48	661.45	5.46	5.05	3	0.87	0.89
450.0	662.67	661.75	5.71	5.35	3	0.86	0.88
450.0	666.04	665.50	8.70	8.70	4	0.81	0.81
600.0	663.61	********	5.6[illegible]	4.14	2	0.85	0.85
600.0	663.45	660.87	5.61	4.47	3	0.85	0.86

305.0	661.90	661.45	5.27	5.05	3	0.87	0.90
305.0	662.15	661.75	5.55	5.35	3	0.87	0.90
305.0	665.75	665.50	8.70	8.70	4	0.81	0.81
375.0	661.59	********	4.39	3.17	2	0.87	0.90
375.0	661.50	660.00	4.39	3.60	3	0.87	0.90
375.0	661.60	660.50	4.62	4.10	3	0.87	0.90
375.0	661.77	660.87	4.88	4.47	3	0.87	0.90
375.0	661.84	661.00	4.98	4.60	3	0.87	0.90
375.0	662.03	661.29	5.21	4.89	3	0.87	0.90
375.0	662.14	661.45	5.35	5.05	3	0.87	0.90
375.0	662.37	661.75	5.62	5.35	3	0.87	0.89
375.0	665.88	665.50	8.70	8.70	4	0.81	0.81
450.0	662.23	********	4.83	3.51	2	0.87	0.89
450.0	662.18	660.00	4.81	3.60	3	0.87	0.89
450.0	662.12	660.50	4.87	4.10	3	0.87	0.89
450.0	662.20	660.87	5.06	4.47	3	0.87	0.89
450.0	662.25	661.00	5.14	4.60	3	0.87	0.89
450.0	662.39	661.29	5.34	4.89	3	0.87	0.89
450.0	662.48	661.45	5.46	5.05	3	0.87	0.89
450.0	662.67	661.75	5.71	5.35	3	0.86	0.88
450.0	666.04	665.50	8.70	8.70	4	0.81	0.81
600.0	663.61	********	5.63	4.14	2	0.85	0.85
600.0	663.45	660.87	5.61	4.47	3	0.85	0.86
600.0	663.42	661.00	5.63	4.60	3	0.85	0.86
600.0	663.42	661.29	5.73	4.89	3	0.85	0.86
600.0	663.44	661.45	5.81	5.05	3	0.85	0.86
600.0	663.52	661.75	5.98	5.35	3	0.85	0.86
600.0	666.46	665.50	8.70	8.70	4	0.81	0.81

ARMSTRONG CREEK DODGE ROAD RT HOLTSLAG BASE ELEVATION = 656.40 Z = -0.09

Q	ELEV H1	ELEV H4	D2	D3	TYPE	C	C ADJUSTED
750.0	665.04	********	6.38	4.71	2	0.82	0.82
750.0	664.92	661.29	6.35	4.89	3	0.82	0.82
750.0	664.84	661.45	6.36	5.05	3	0.82	0.82
750.0	664.77	661.75	6.42	5.35	3	0.82	0.82
750.0	667.00	665.50	8.70	8.70	4	0.81	0.81
1000.0	667.42	********	7.52	5.58	2	0.78	0.78
1000.0	668.17	665.50	8.70	8.70	4	0.81	0.81

Armstrong Creek

Morrish Road @ CSG

BRIDGE GEOMETRY SECTION _____

Upstream Side Bridge

Attach Photo

Downstream Side Bridge

BASIC DIMENSION CHECKLIST

Bridge
- Alinement ϕ
- Bridge opening width W
- Number of piers
- Widths of piers
- Elevation low steel
- " top curb
- " top guardrail
- Embankment top width
- Embankment sideslope
- Wingwall angles θ
- Wingwall lengths l

Culvert
- Size, shape, material Conc. Box
- Upstr. Invert Elev.
- Downstr. Invert Elev.
- Length of culvert
- Road elevation
- Entrance wingwall angle θ
- Entrance wingwall length
- Length that pipe projects from headwall or fill

Morrish Road Bridge computation

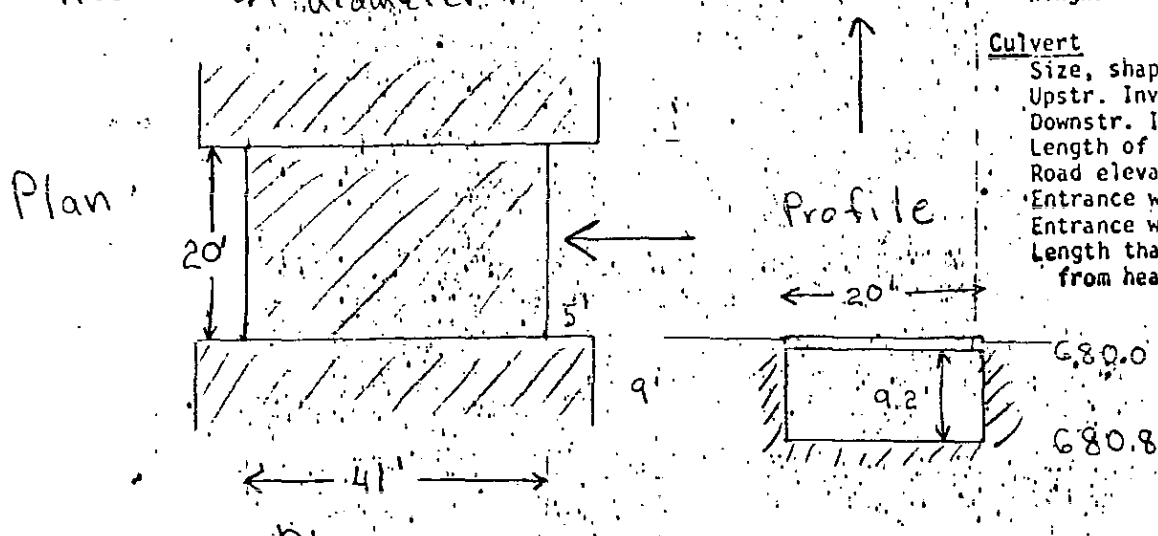
Concrete Bridge

20 feet wide

"n" = 0.016 Vertical Diameter 9.2'

Lowsteel Elevation 680.0' feet

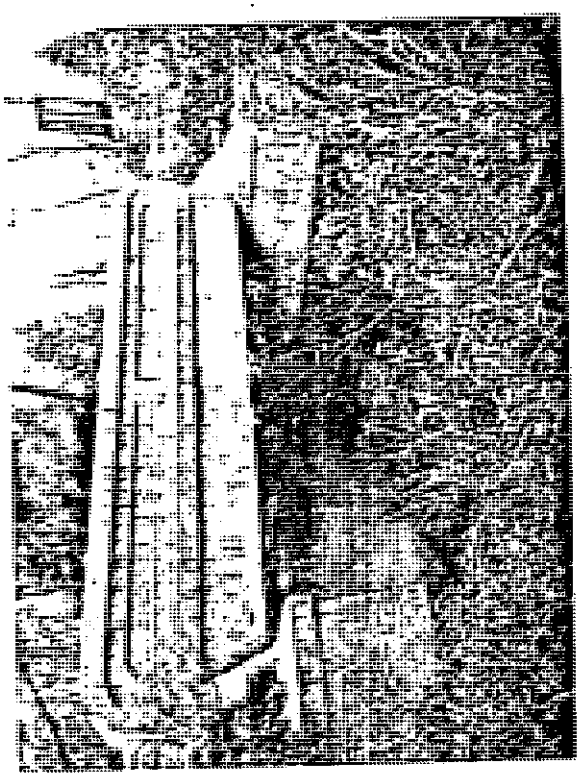
Ave vertical diameter =



Armstrong Creek

Frances " Road

BRIDGE GEOMETRY SECTION ____



Upstream Side Bridge

Attach Photo

Downstream Side Bridge

BASIC DIMENSION CHECKLIST

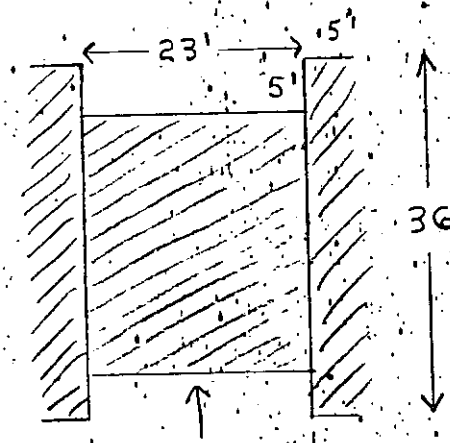
Bridge

- Alinement ϕ 90°
- Bridge opening width W 23'
- Number of piers 0
- Widths of piers 0
- Elevation low steel
- " top curb
- " top guardrail
- Embankment top width
- Embankment sideslope
- Wingwall angles θ
- Wingwall lengths l

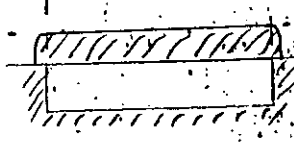
Culvert

- Size, shape, material
- Upstr. Invert Elev.
- Downstr. Invert Elev.
- Length of culvert
- Road elevation
- Entrance wingwall angle θ
- Entrance wingwall length
- Length that pipe projects from headwall or fill

Plan



Profile



Top of Guardrail 681.6

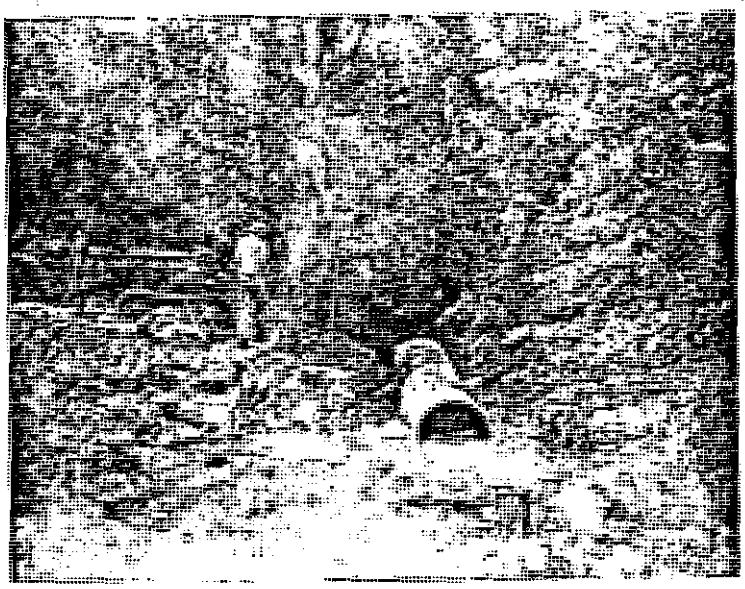
Low Chord 678.1

Channel Bottom ~ 673.3

Contracted Section

* Bridge & Culvert Geometry
Armstrong Creek

BRIDGE GEOMETRY SECTION _____



Upstream Side Bridge

Attach Photo

Downstream Side Bridge

Culvert accross Armstrong Creek
Ds of McKinley Road near section I.

DSS crown Elevation 643.10
USS crown Elevation 635.19.

The 16 feet long, 2.8 feet maximum inside diameter CMP has an average projected entrance of 1.5 feet.
work was, still in progress replacing pipe and embankment after last washout.
The purpose of the structure is to back water up for irrigation. the pipe nor embankment were included in hydraulic computations

BASIC DIMENSION CHECKLIST

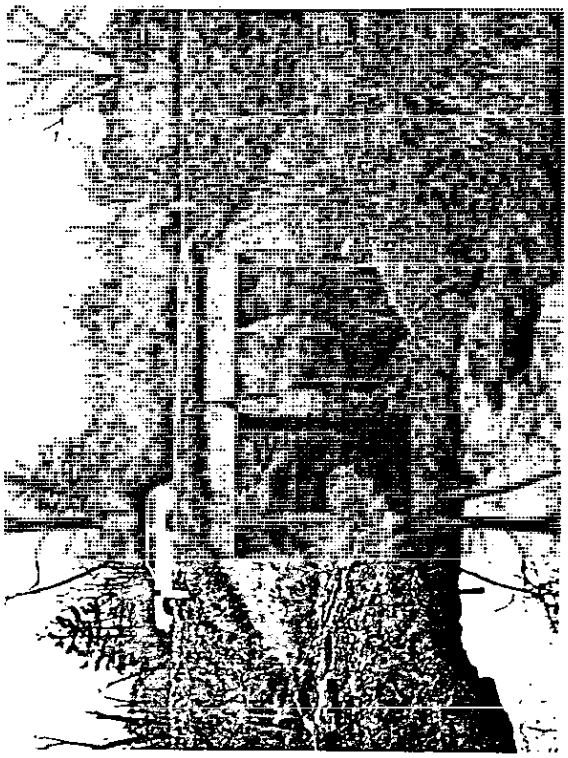
Bridge
- Alinement ϕ
- Bridge opening width W
- Number of piers
- Widths of piers
- Elevation low steel
- " top curb
- " top guardrail
- Embankment top width
- Embankment sideslope
- Wingwall angles θ
- Wingwall lengths l

Culvert
- Size, shape, material
- Upstr. Invert Elev.
- Downstr. Invert Elev.
- Length of culvert
- Road elevation
- Entrance wingwall angle θ
- Entrance wingwall length
- Length that pipe projects from headwall or fill

Armstrong Creek

McKinley Road

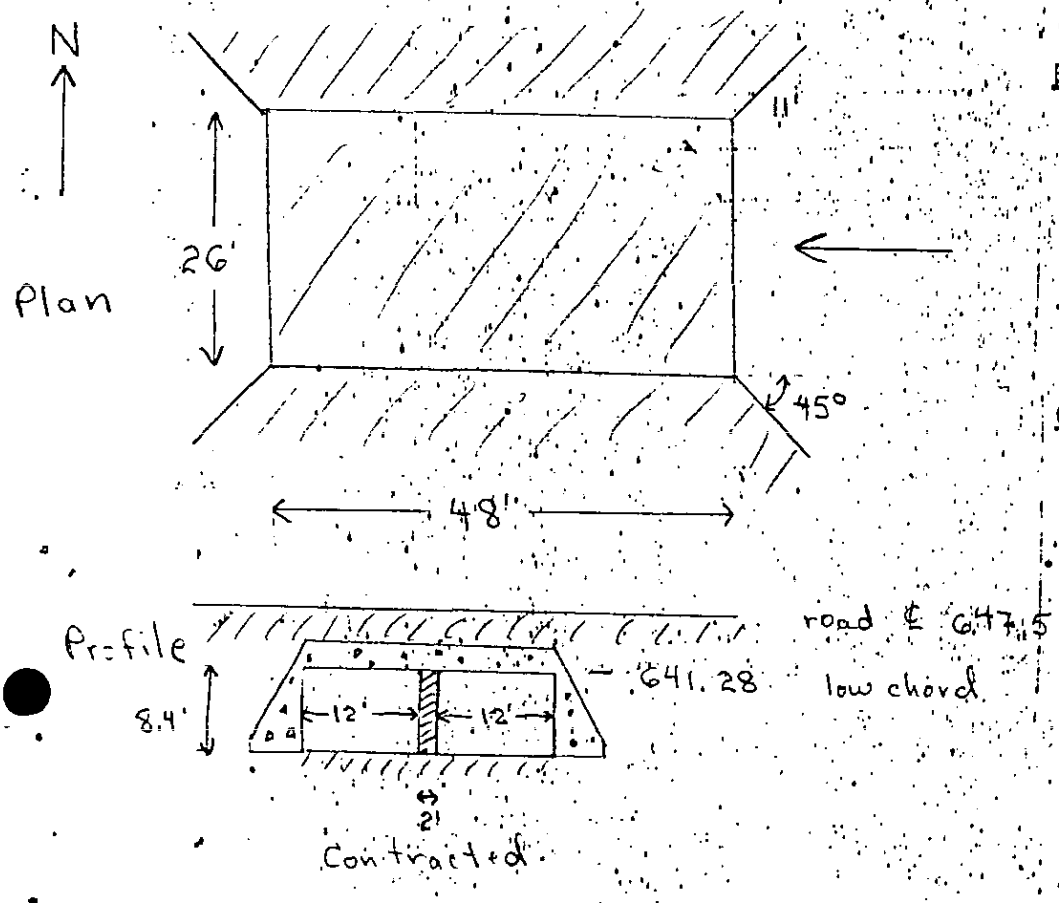
BRIDGE GEOMETRY SECTION ____



Upstream Side Bridge

Attach Photo

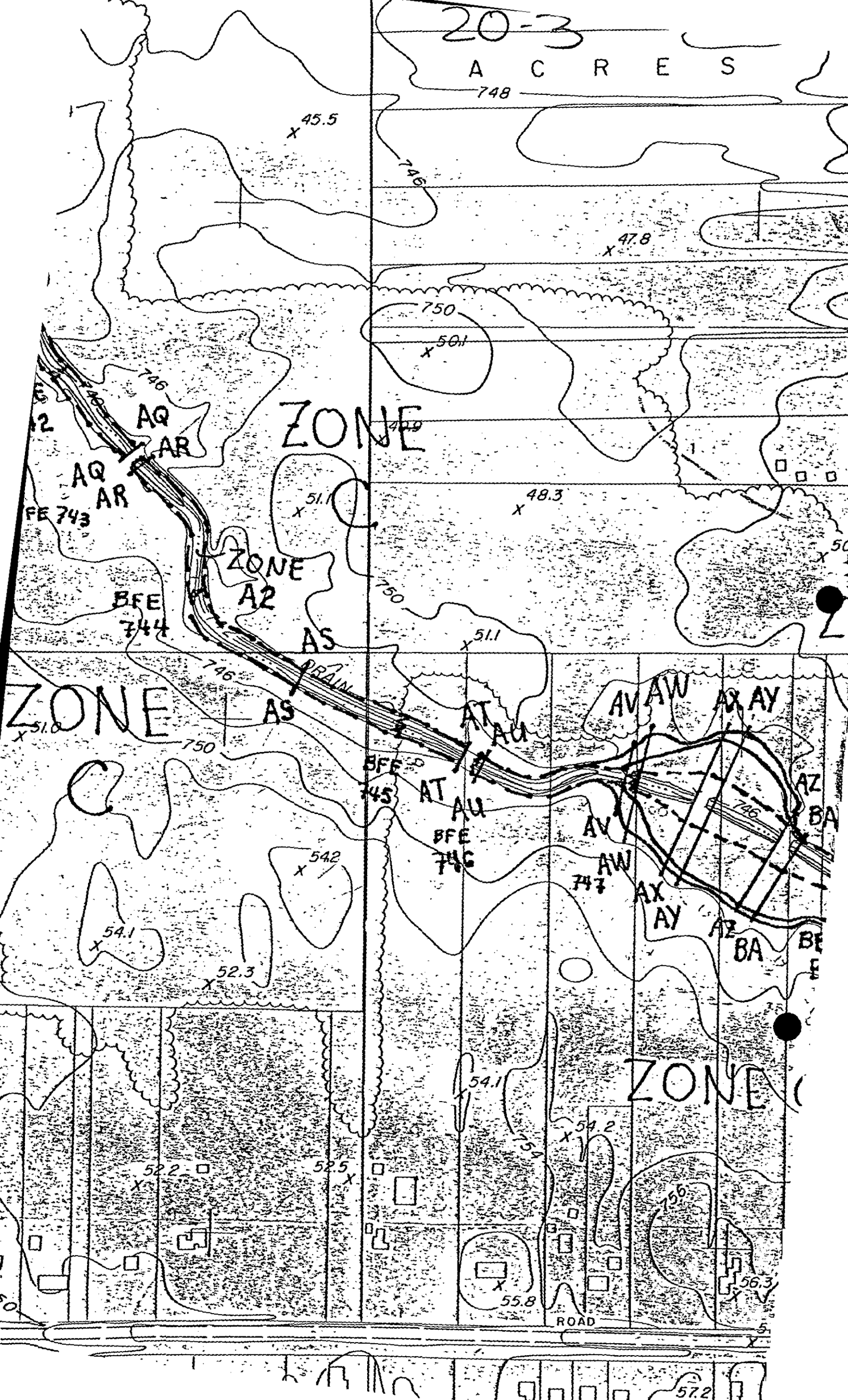
Downstream Side Bridge



BASIC DIMENSION CHECKLIST

Bridge
- Alinement ϕ
- Bridge opening width W
- Number of piers 1
- Widths of piers 2'
- Elevation low steel
- " top curb
- " top guardrail
- Embankment top width
- Embankment sideslope
- Wingwall angles θ
- Wingwall lengths l

Culvert
- Size, shape, material Concrete Box
- Upstr. ~~Invert~~ Elev. Crown 641.28
- Downstr. ~~Invert~~ Elev. Crown 641.60
- Length of culvert 48'
- Road elevation
- Entrance wingwall angle θ
- Entrance wingwall length
- Length that pipe projects from headwall or fill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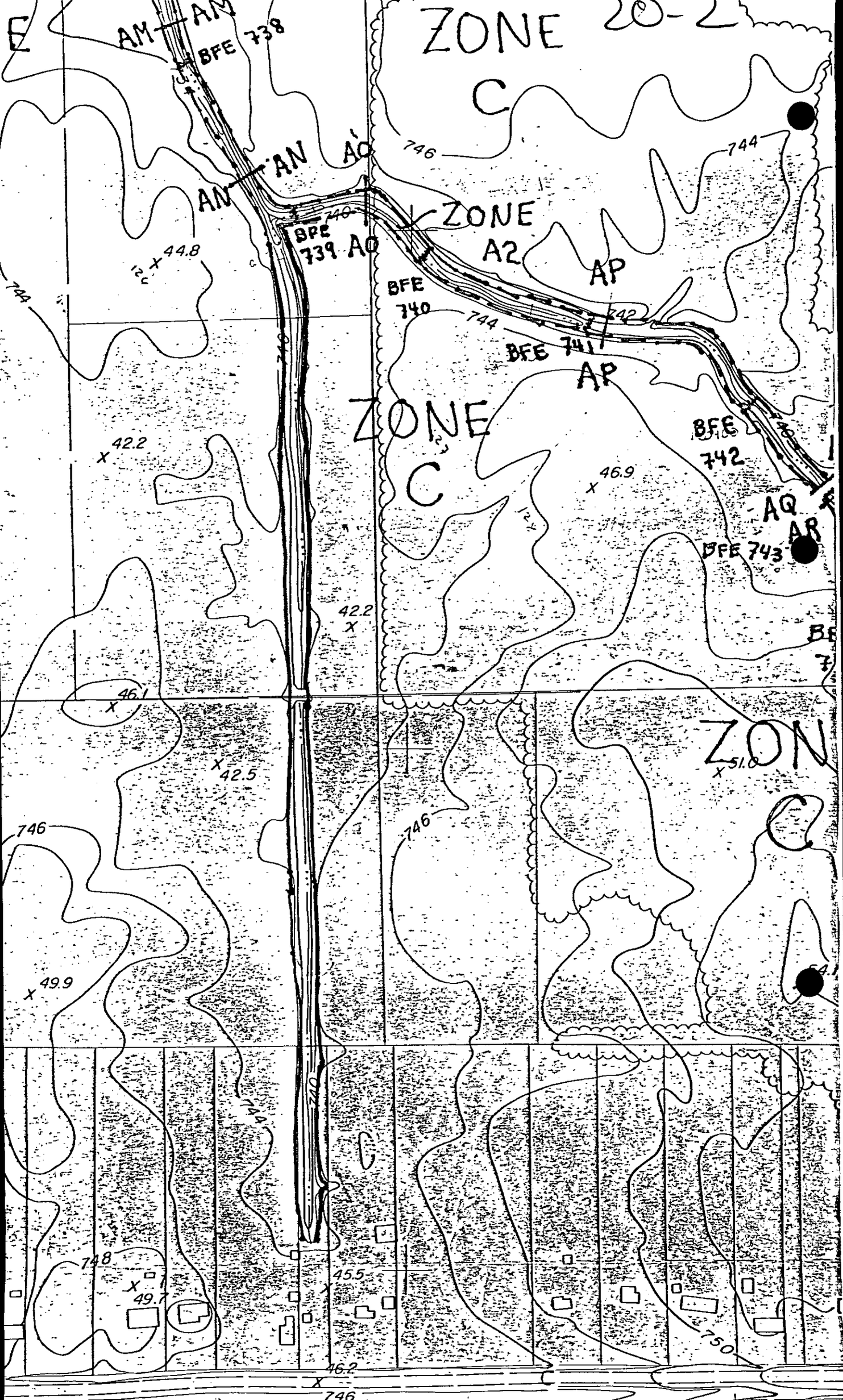
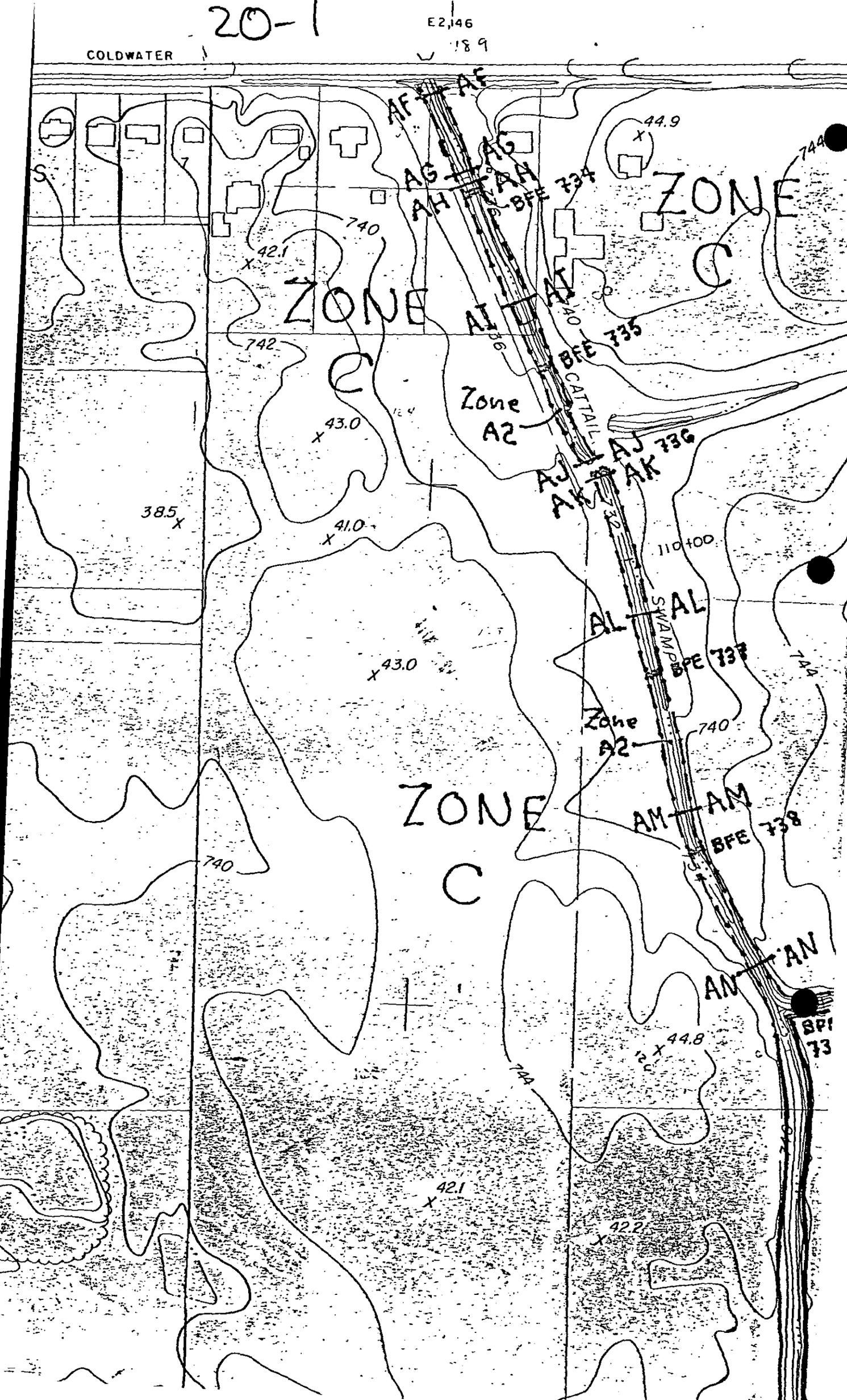
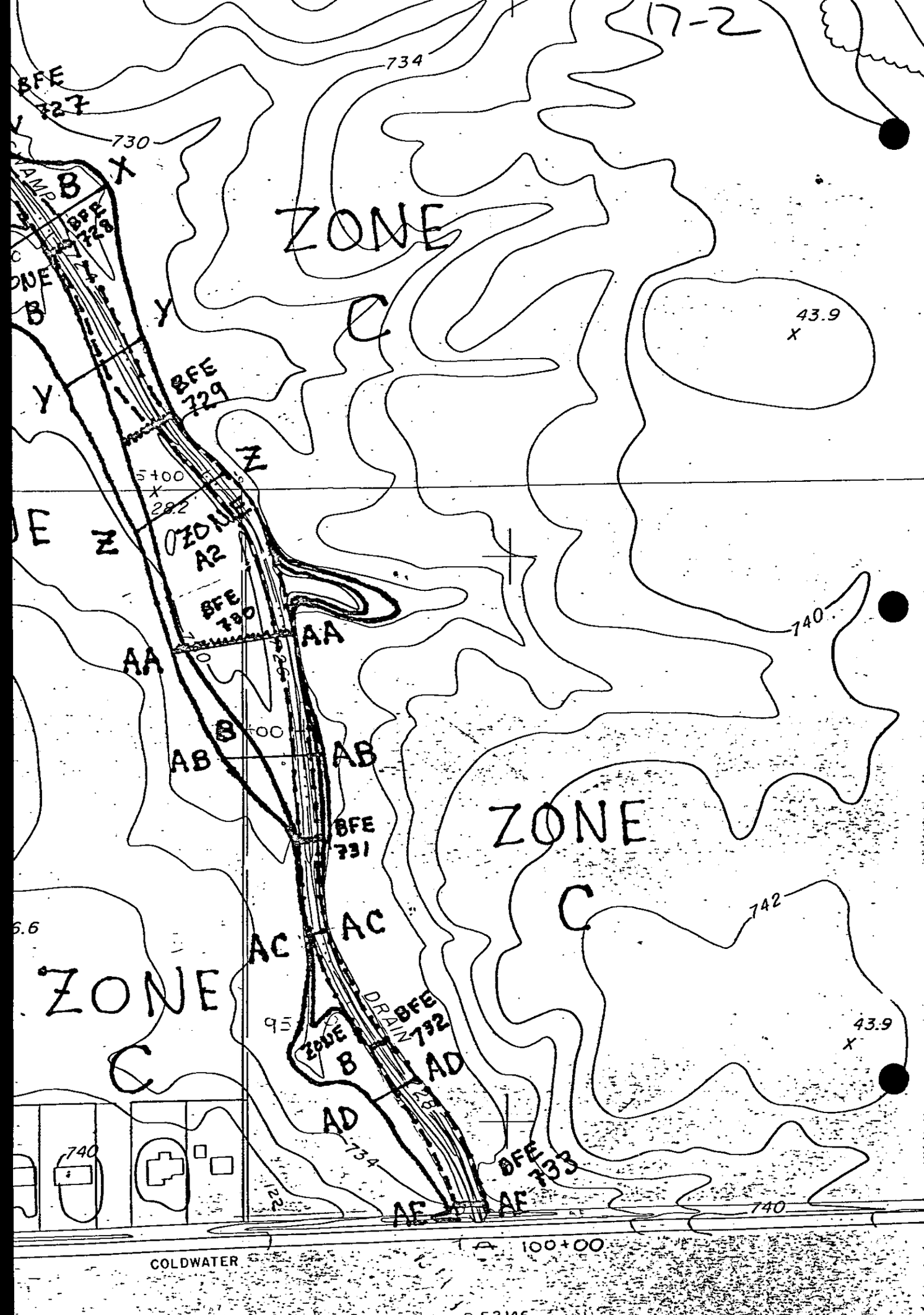
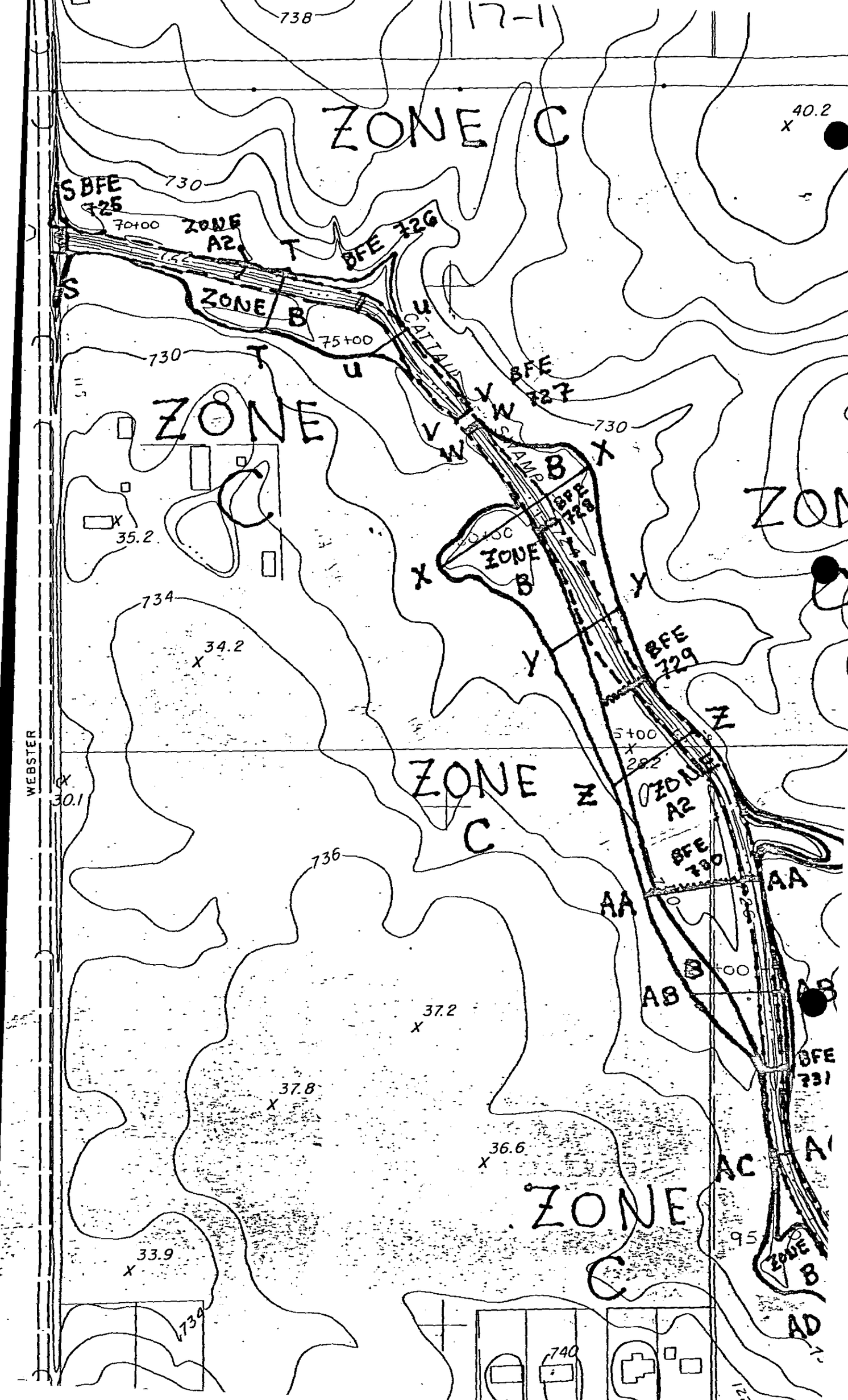
ACRES
748
45.5
746
47.8
750
50.1
ZONE
AQ
AR
AQ
AR
FE 743
51.1
48.3
ZONE
A2
BFE
744
AS
DRAIN
51.1
746
ZONE
AS
750
AT
AU
AV
AW
AX
AY
AZ
BA
BFE
745
AT
AU
BFE
746
AV
AW
747
AX
AY
AZ
BA
746
54.2
54.1
52.3
ZONE
54.1
54.2
52.2
52.5
756
55.8
56.3
ROAD
57.2

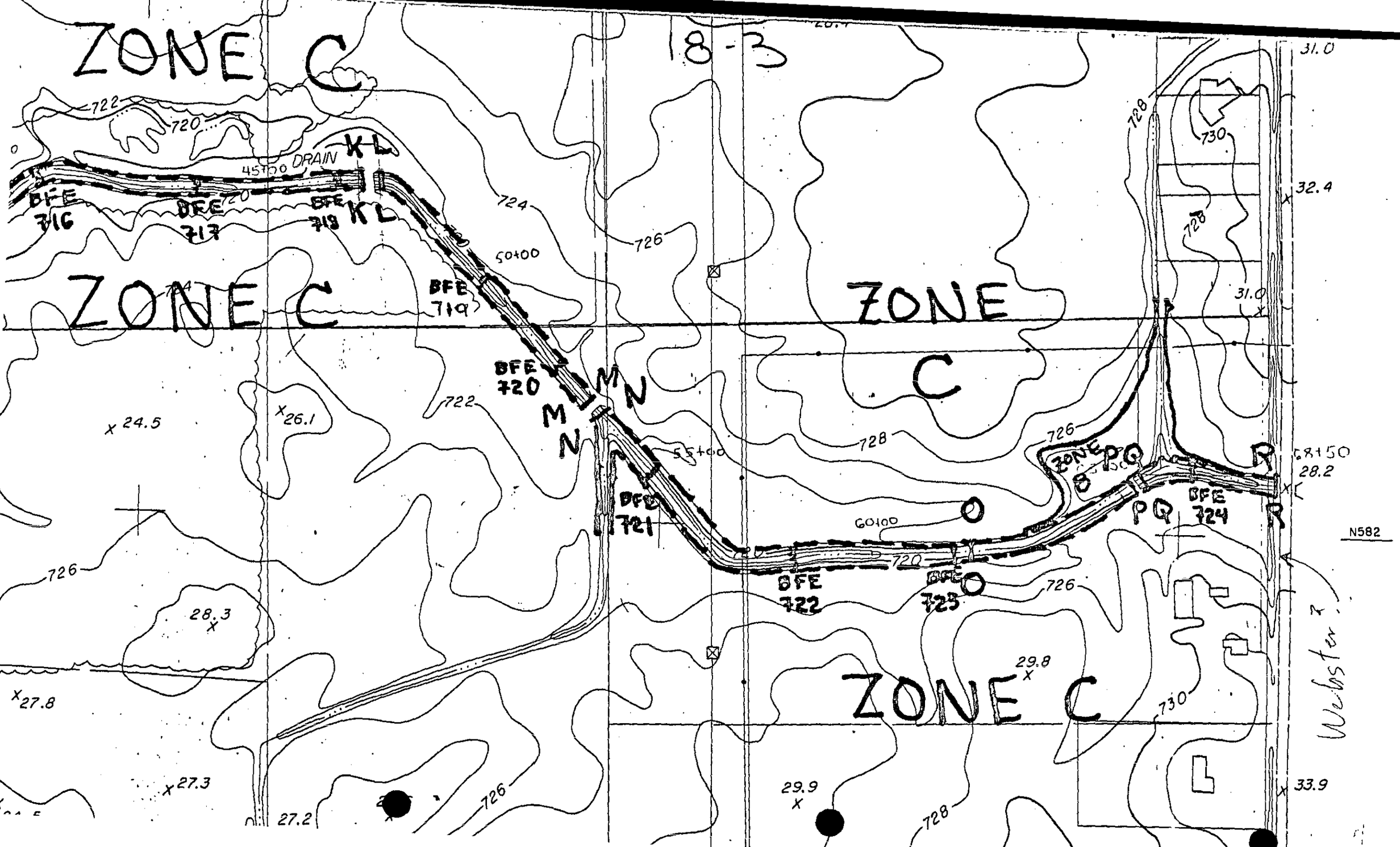

20-2
ZONE
C
AM
AM
BFE 738
AN
AN
AO
746
744
ZONE
A2
AP
BFE
739 AO
740
44.8
744
BFE
740
744
742
BFE 741
AP
ZONE
C
BFE
742
46.9
AQ
AR
BFE 743
42.2
42.2
46.1
42.5
746
746
ZON
51.0
49.9
744
740
748
49.7
45.5
750
46.2
746

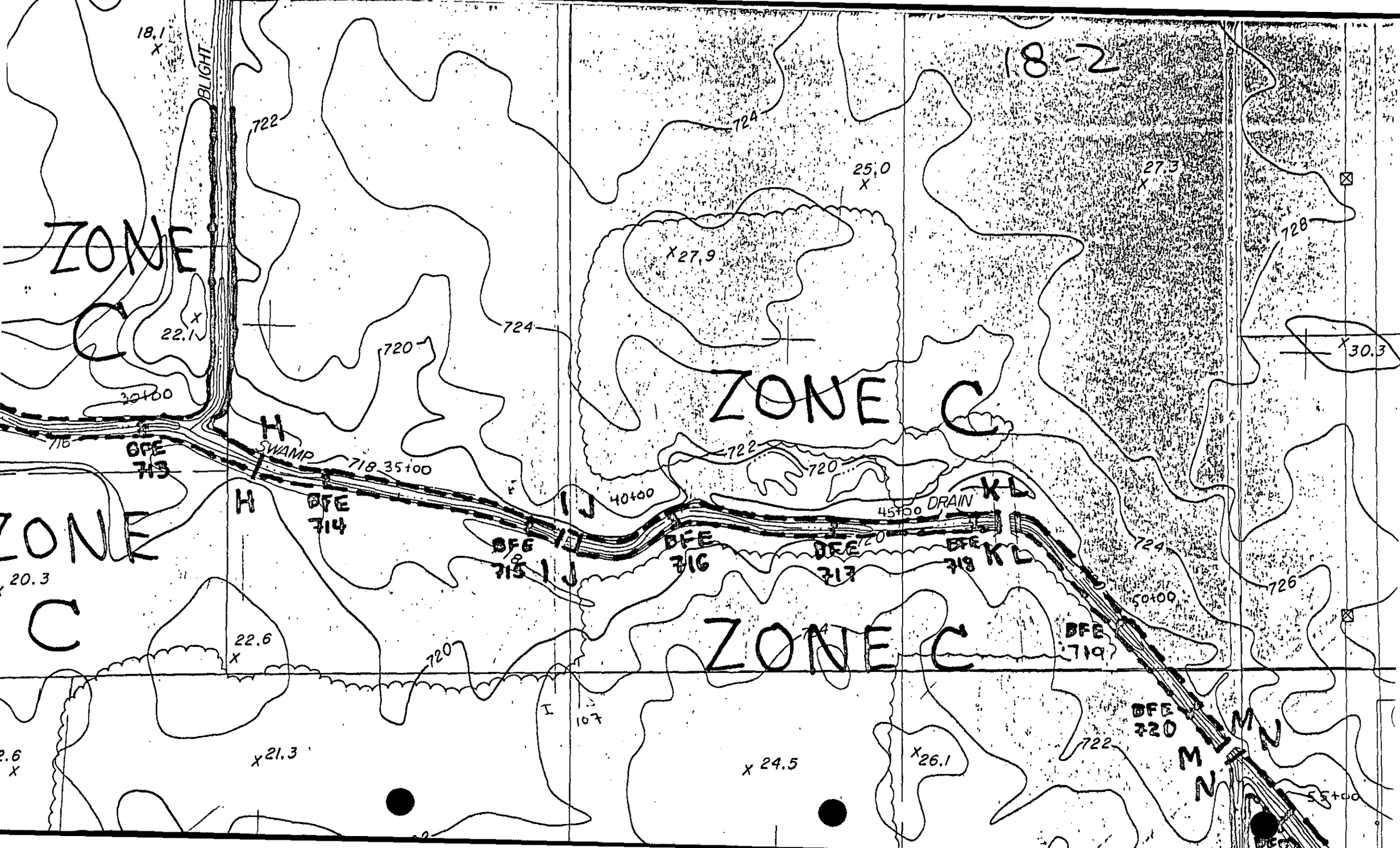
20-1


E2,146
189
COLDWATER
AF
AG
AH
BFE 734
ZONE C
44.9
744
740
42.1
ZONE C
AI
AJ
BFE 735
742
CATTAIL
Zone A2
43.0
AJ
AK
736
38.5
41.0
110+00
AL
SWAMP
BFE 737
43.0
744
Zone A2
740
ZONE C
AM
BFE 738
740
AN
44.8
744
42.1
42.2


17-2
734
BFE 727
730
X
B
BFE 728
ZONE
C
Y
43.9
BFE 729
Z
5+00
28.2
ZONE A2
BFE 730
AA
740
B
+00
AB
BFE 731
ZONE
C
742
AC
ZONE
C
95
DRAIN
BFE 732
ZONE B
AD
43.9
734
BFE 733
AE
AF
740
100+00
COLDWATER
E 2,146


17-1
ZONE C
ZONE A2
ZONE B
BFE 725
BFE 726
BFE 727
BFE 728
BFE 729
BFE 730
BFE 731
CATTAIL SWAMP
WEBSTER
70+00
75+00
80+00
5+00
B+00
95
738
730
734
736
739
740
40.2
35.2
34.2
30.1
28.2
37.2
37.8
36.6
33.9


ZONE C
18-3
ZONE C
ZONE C
ZONE C
ZONE C
45+00 DRAIN
50+00
55+00
60+00
58+50
BFE 716
BFE 717
BFE 718
BFE 719
BFE 720
BFE 721
BFE 722
BFE 723
BFE 724
K L
M N
O
P Q
R
722
720
724
726
728
730
31.0
32.4
31.0
28.2
24.5
26.1
28.3
27.8
27.3
27.2
29.8
29.9
33.9
N582
Webster


18-2
BLIGHT
ZONE C
ZONE C
ZONE C
ZONE C
ZONE C
SWAMP
DRAIN
BFE 713
BFE 714
BFE 715
BFE 716
BFE 717
BFE 718
BFE 719
BFE 720
H
I J
K L
M N
722
724
720
716
718
726
728
18.1
22.1
20.3
22.6
21.3
24.5
26.1
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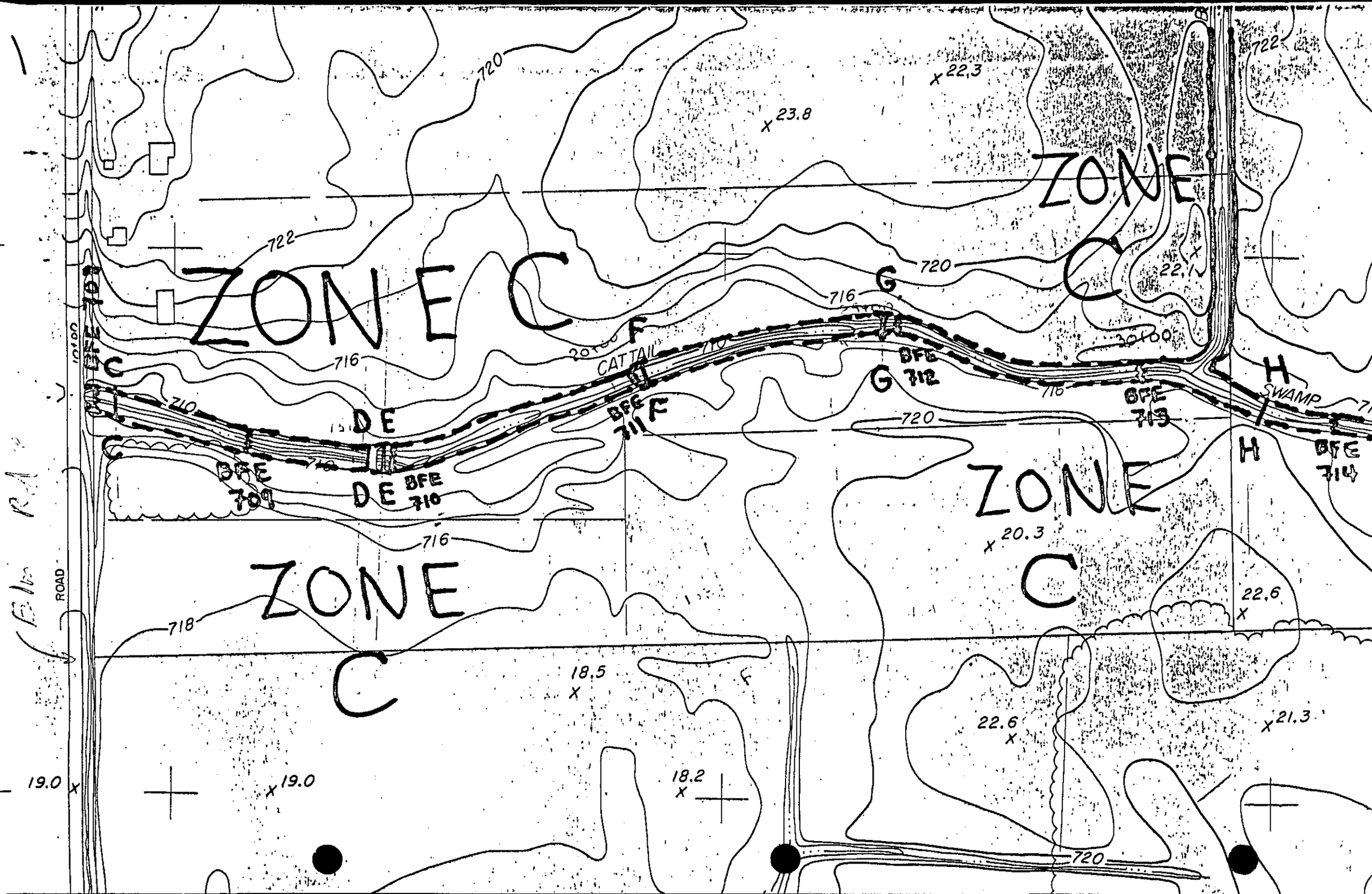
27.3
27.9
30.3
30+00
35+00
40+00
45+00
50+00
55+00

18-1


ZONE C
ZONE C
ZONE C
ZONE C
N583
N582
ROAD
CATTAIL
SWAMP
BFE 709
BFE 710
BFE 711
BFE 712
BFE 713
BFE 714
DE
F
G
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718
710
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22.6
18.5
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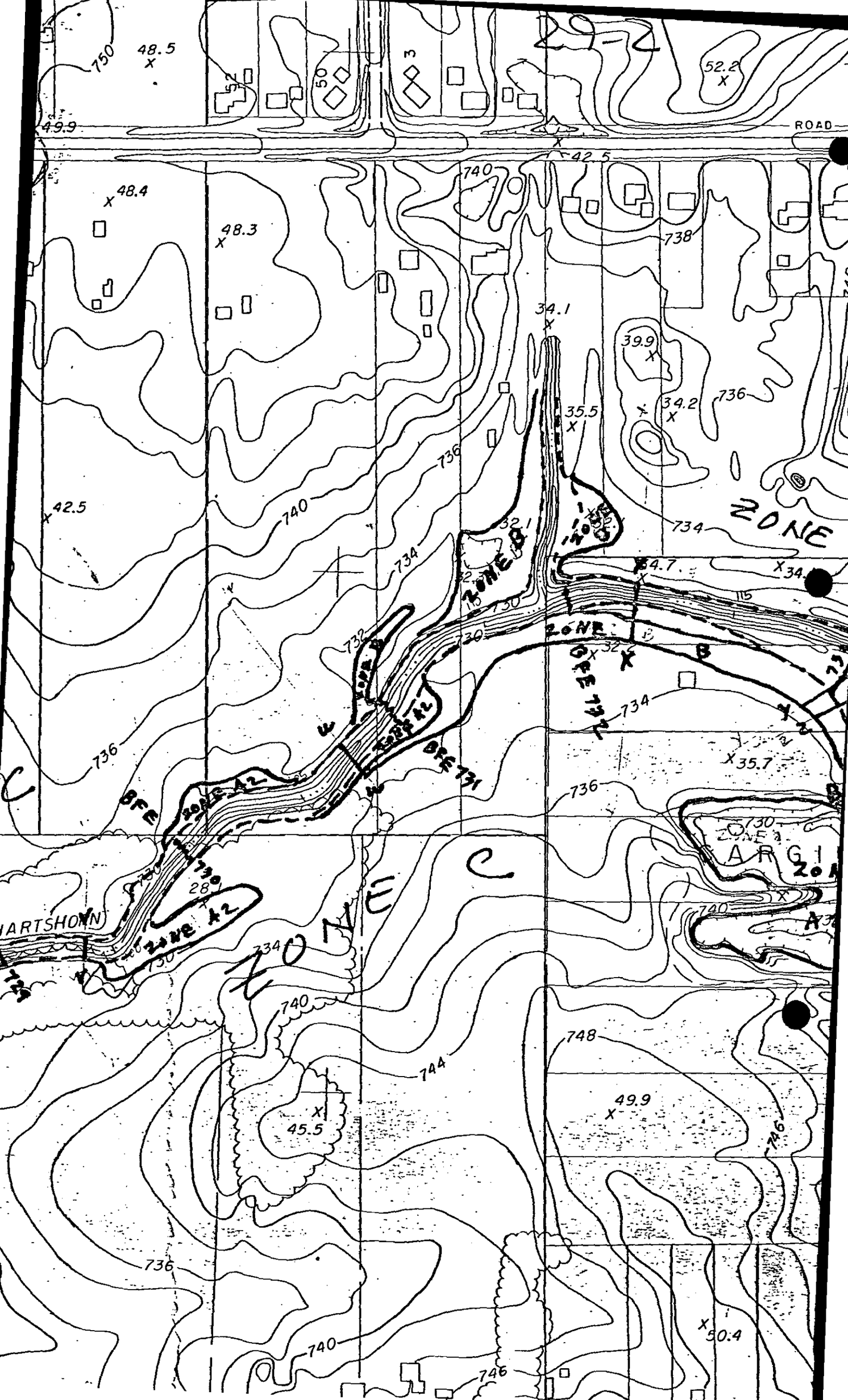
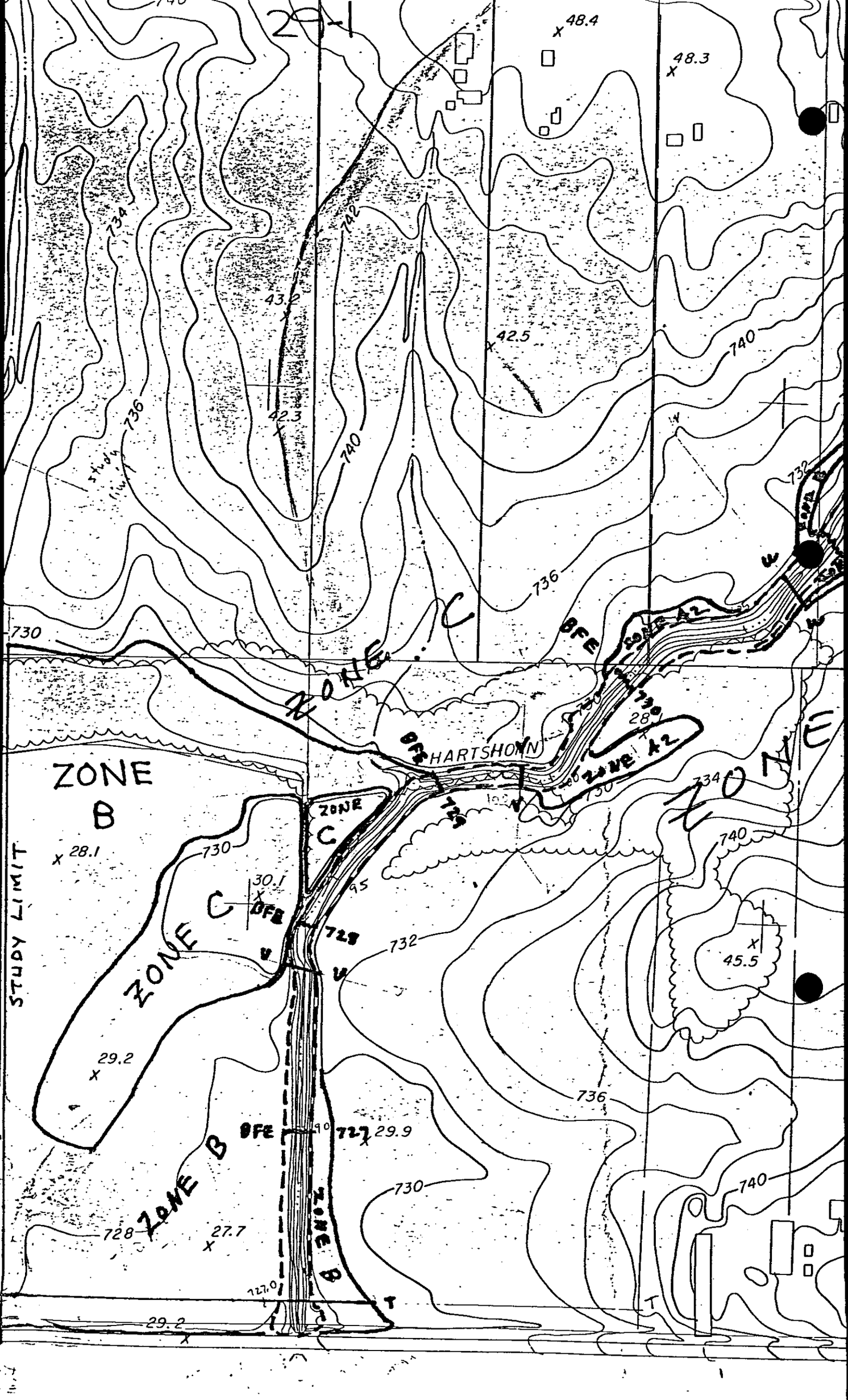
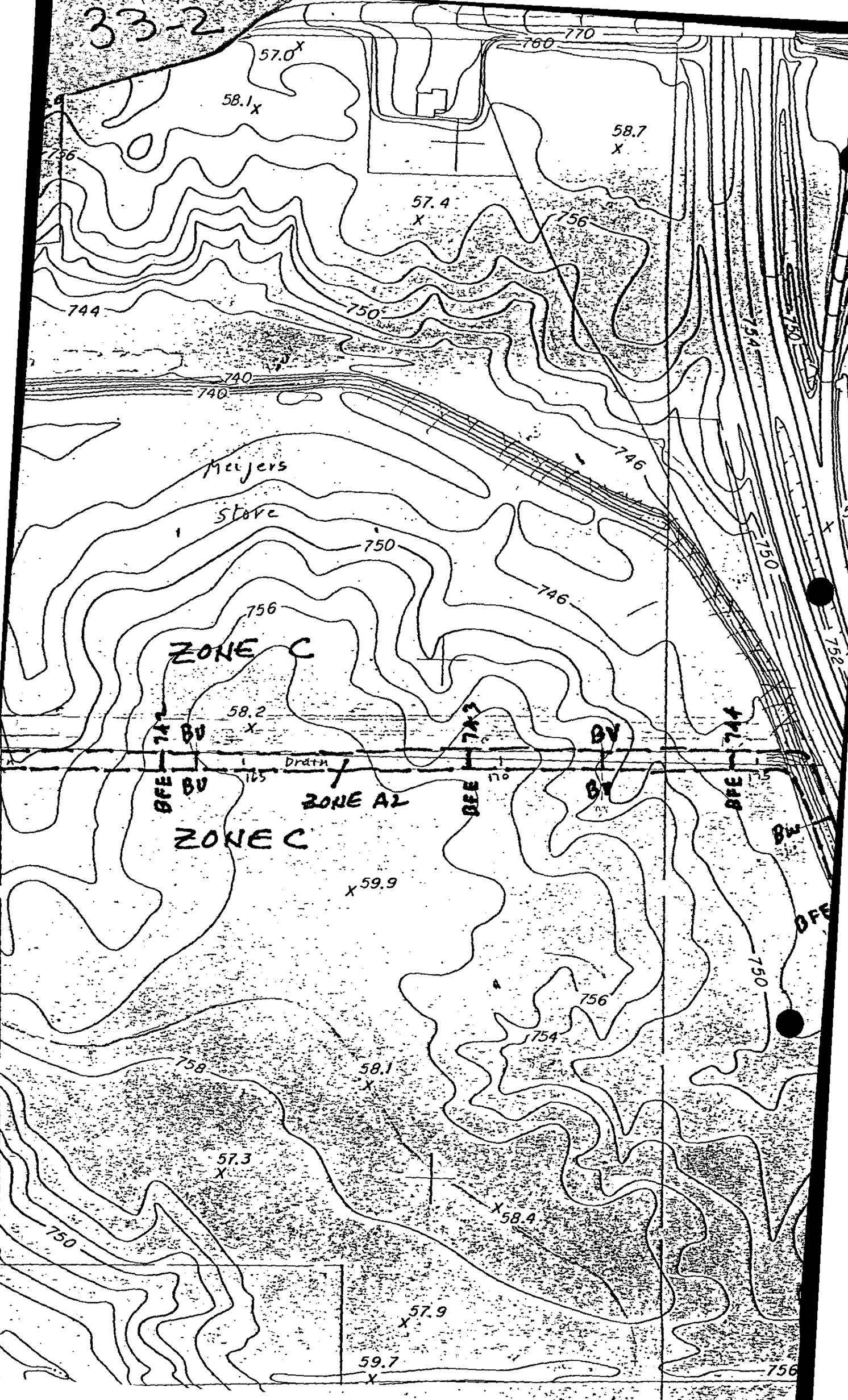
18.2
21.3

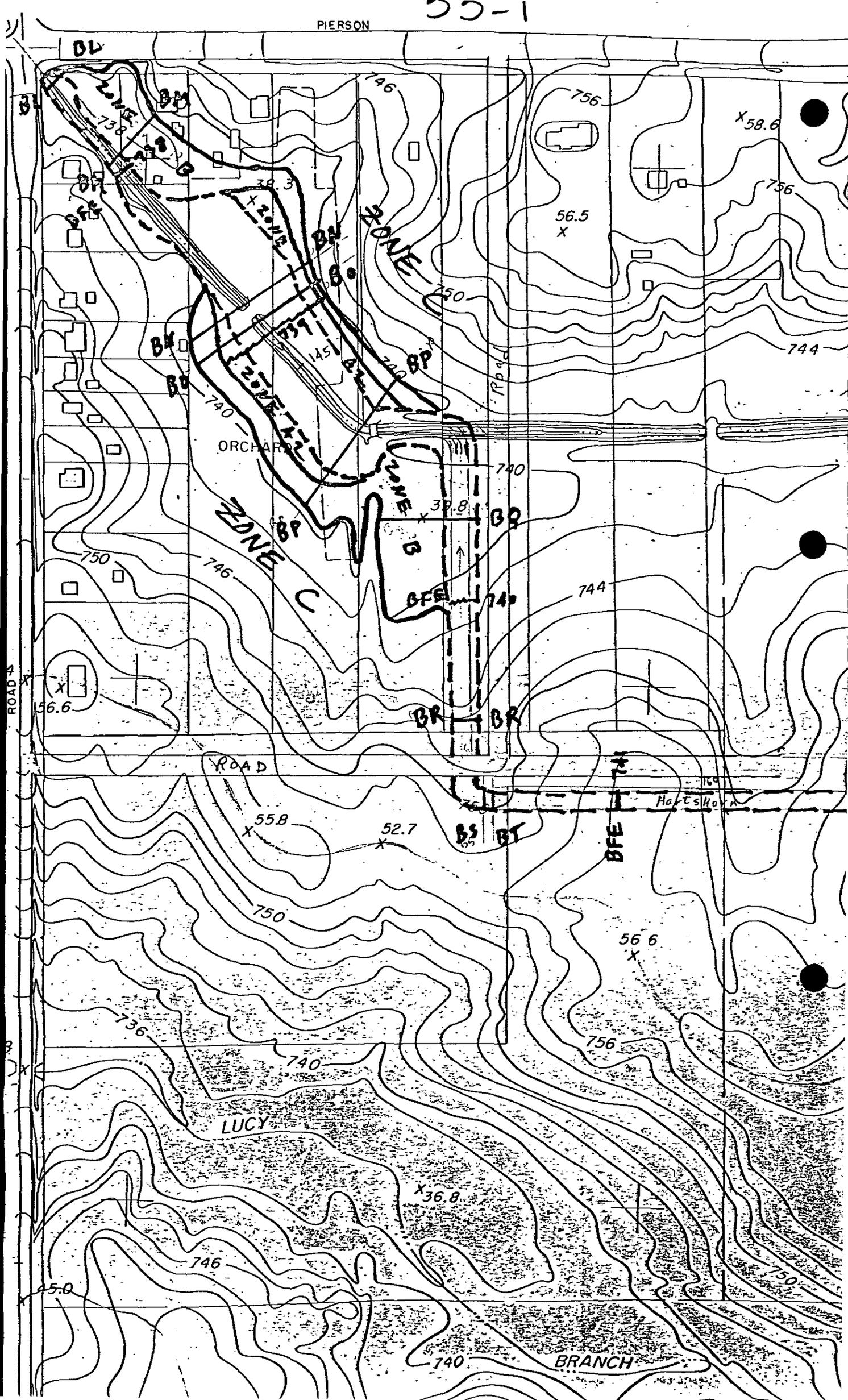

29-2
ROAD
750
48.5
49.9
42.5
52.2
48.4
48.3
740
738
34.1
39.9
35.5
34.2
736
42.5
734
ZONE
32.1
34.7
730
ZONE B
BFE 732
BFE 731
ZONE A2
35.7
HARTSHORN
ZONE C
ARG
748
744
49.9
45.5
746
50.4

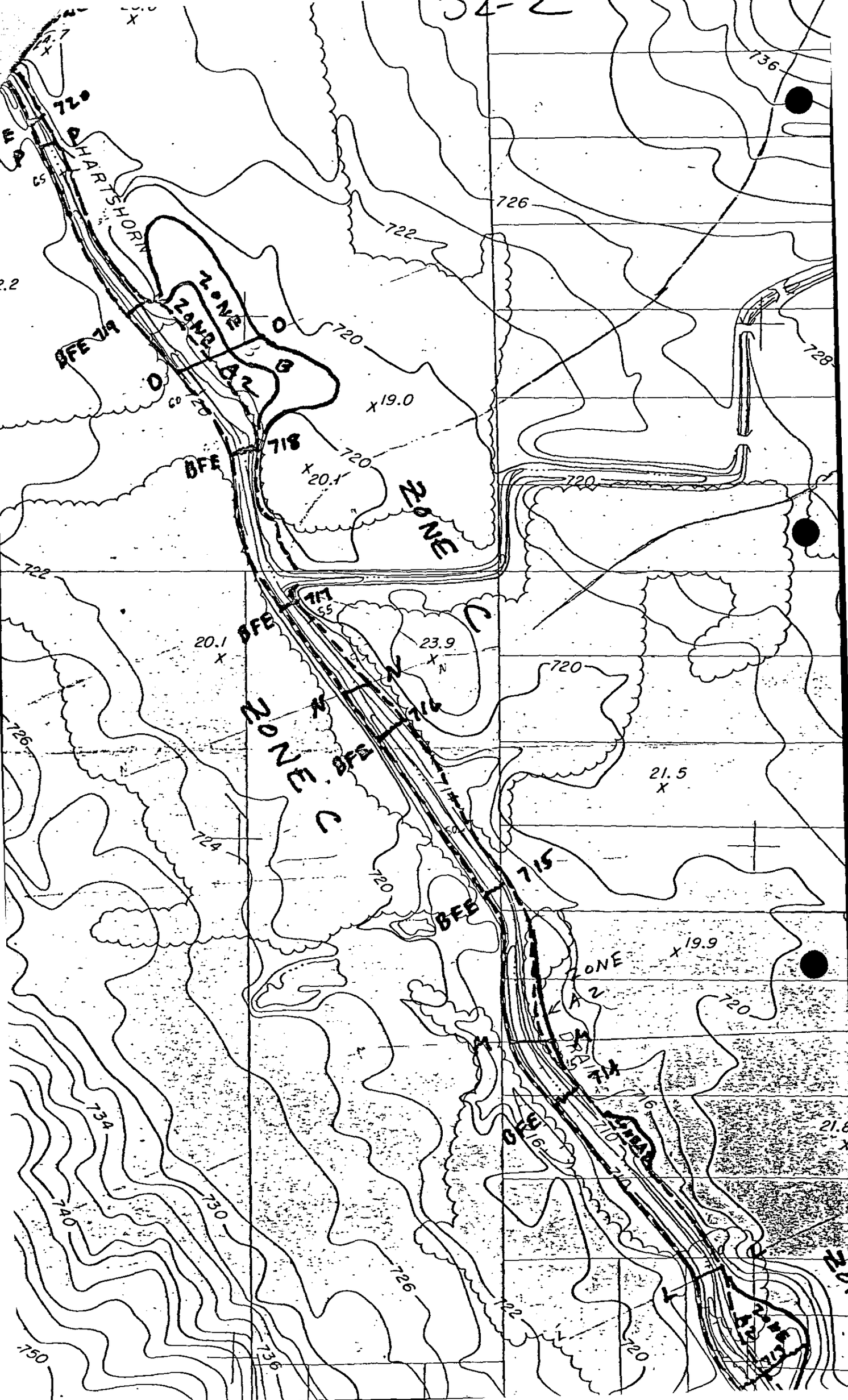

29-1
48.4
48.3
734
742
43.2
42.5
740
736
42.3
740
study limit
736
730
ZONE C
BFE
ZONE A2
730
28
BFE
HARTSHORN
ZONE A2
ZONE
ZONE
B
ZONE
C
730
28.1
30.1
95
ZONE C
BFE
728
732
STUDY LIMIT
29.2
BFE
90
727
29.9
ZONE B
ZONE B
730
728
27.7
727.0
29.2
734
740
45.5
736
740

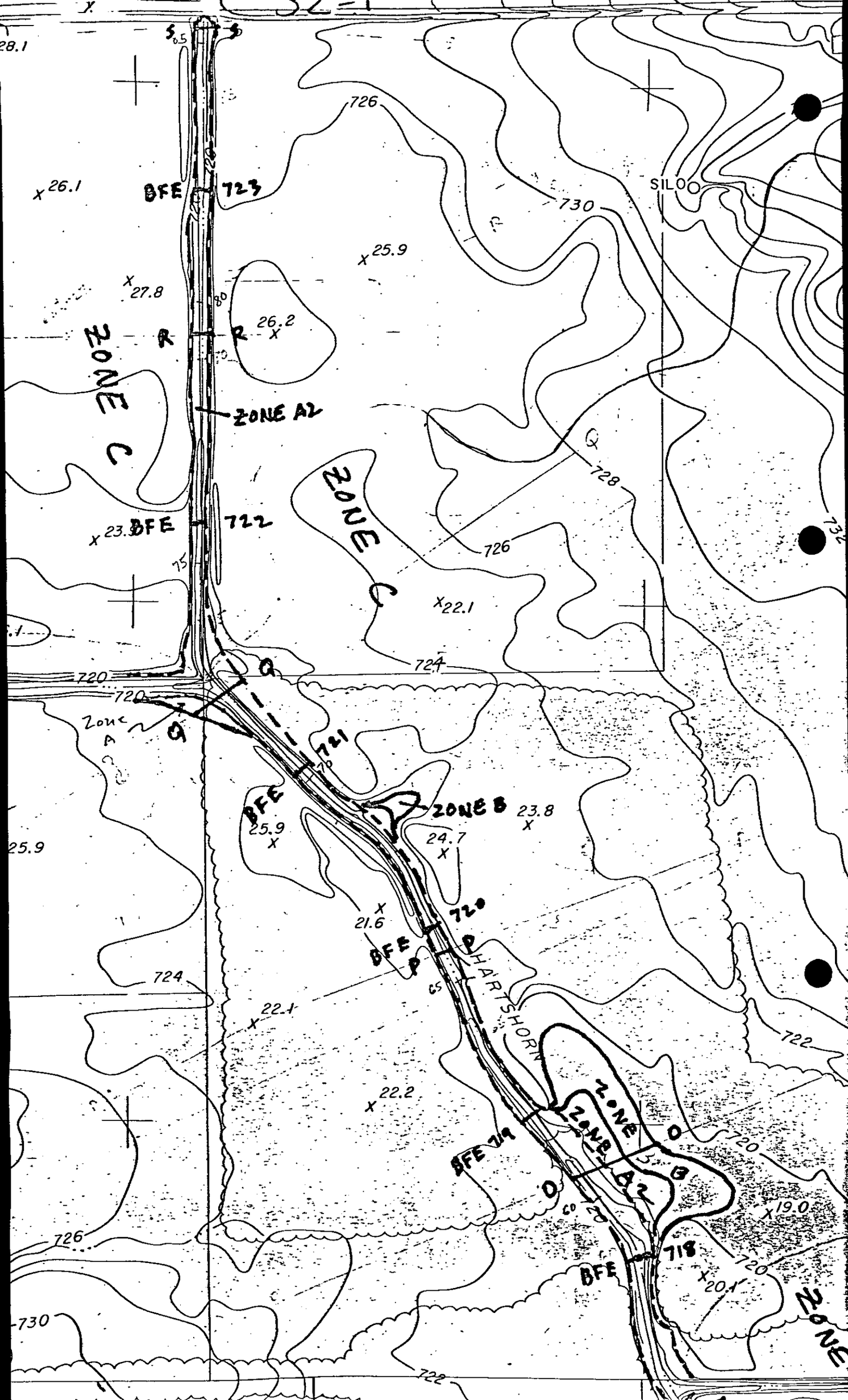
33-2

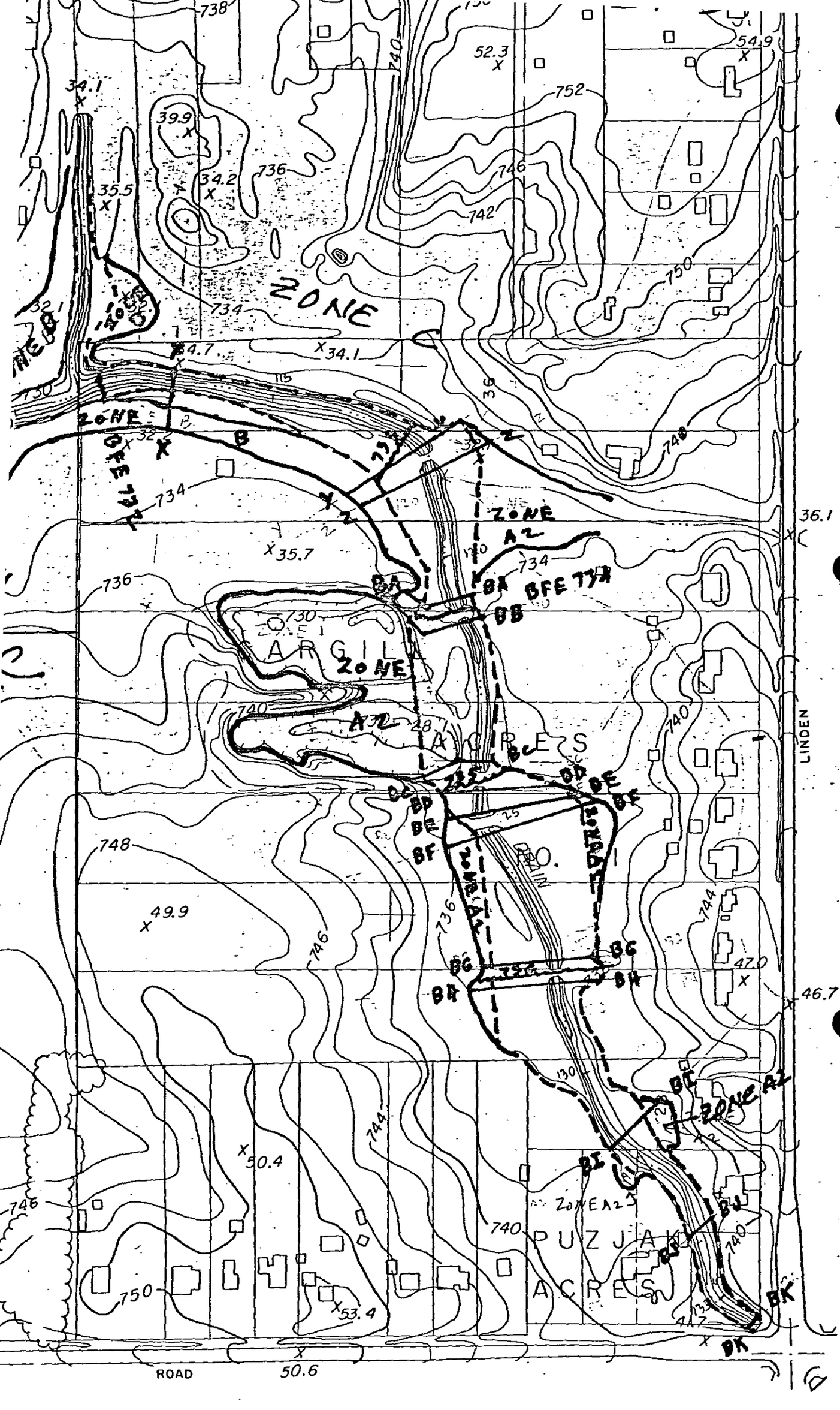

770
760
57.0
58.1
58.7
57.4
756
744
750
754
740
740
746
Meijers
Store
750
746
756
ZONE C
58.2
744
BU
BFE
BU
Drain
165
ZONE A2
743
BFE
170
BU
BU
BFE
175
BW
ZONE C
59.9
750
756
754
758
58.1
57.3
58.4
750
57.9
59.7
756
752

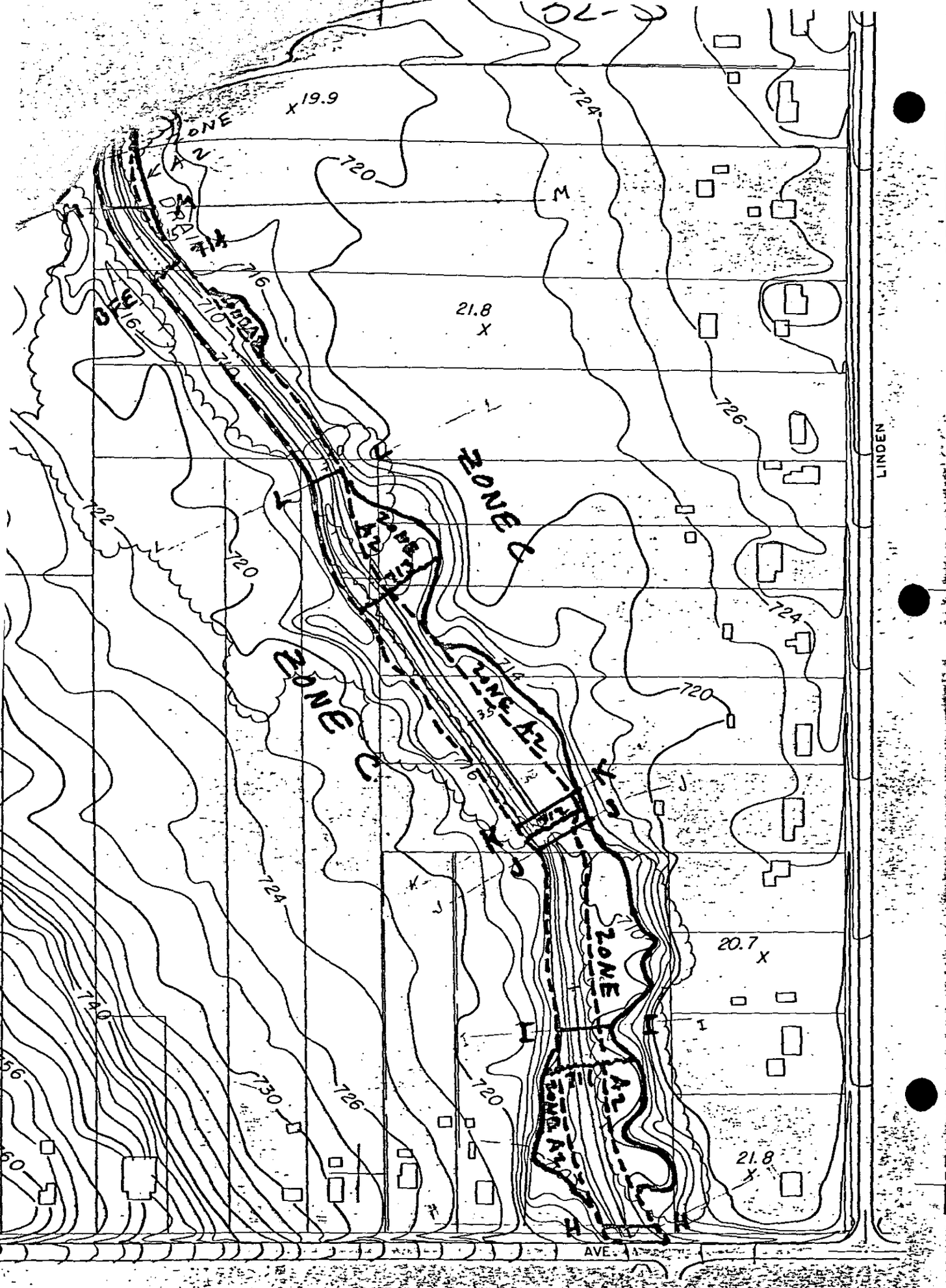
31-1
14.2
714
13.7
FLUSHING
ZONE C
680
694
BB
BC
463+30
ZONE A5
N565
688
FLINT
710
700
690
87.8
BC
680
51500
742
RIVER
710
480+50
SD
ZONE B
709.8
714

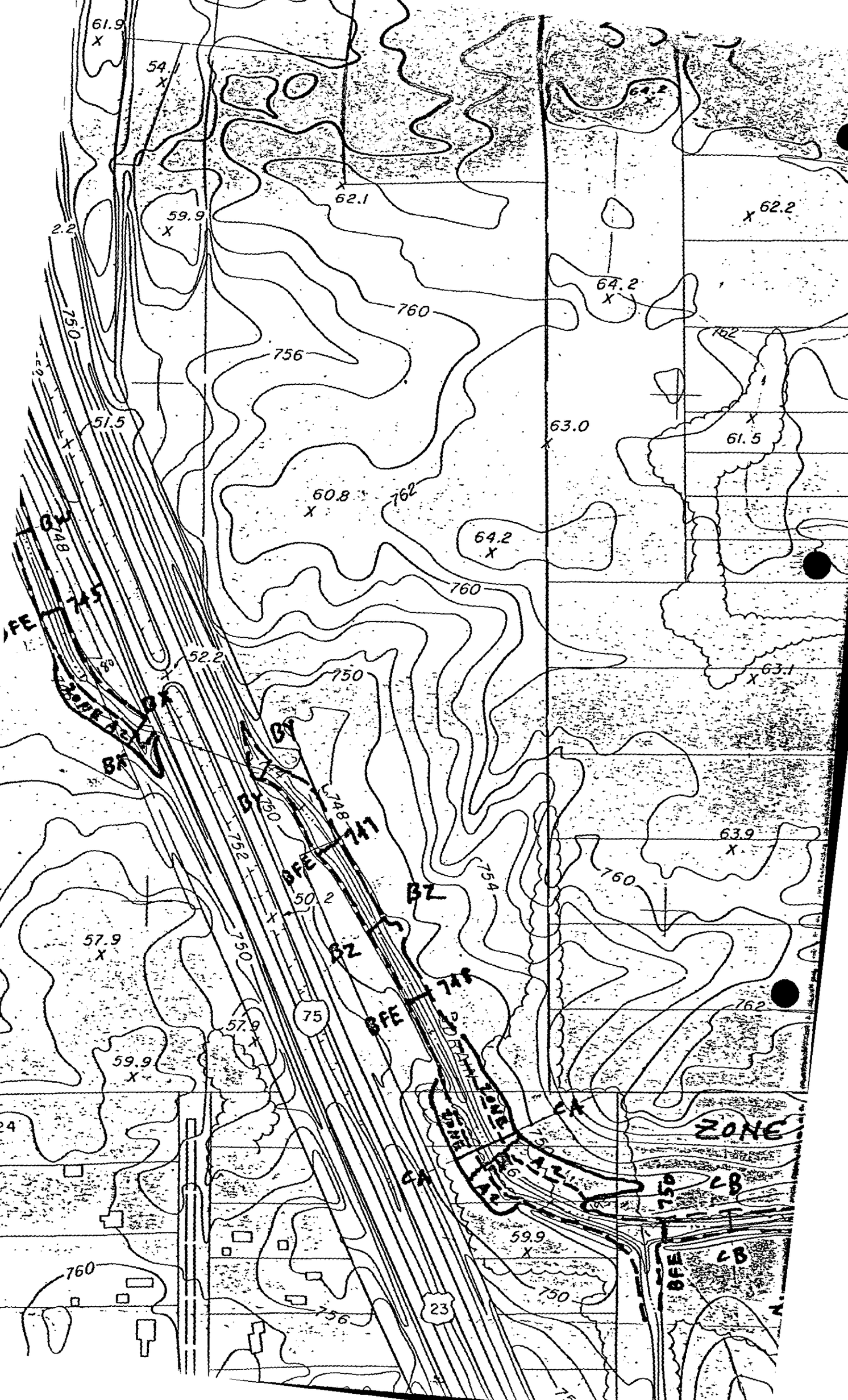

PIERSON
ZONE C
ZONE A
ZONE B
ORCHARD
ROAD
Hartshorn
LUCY
BRANCH
ROAD 4
BL
BM
BN
BO
BP
BQ
BR
BS
BT
BFE
BFF
BH
B
A
746
756
58.6
56.5
744
750
740
738
39.3
39.8
56.6
55.8
52.7
736
36.8
45.0

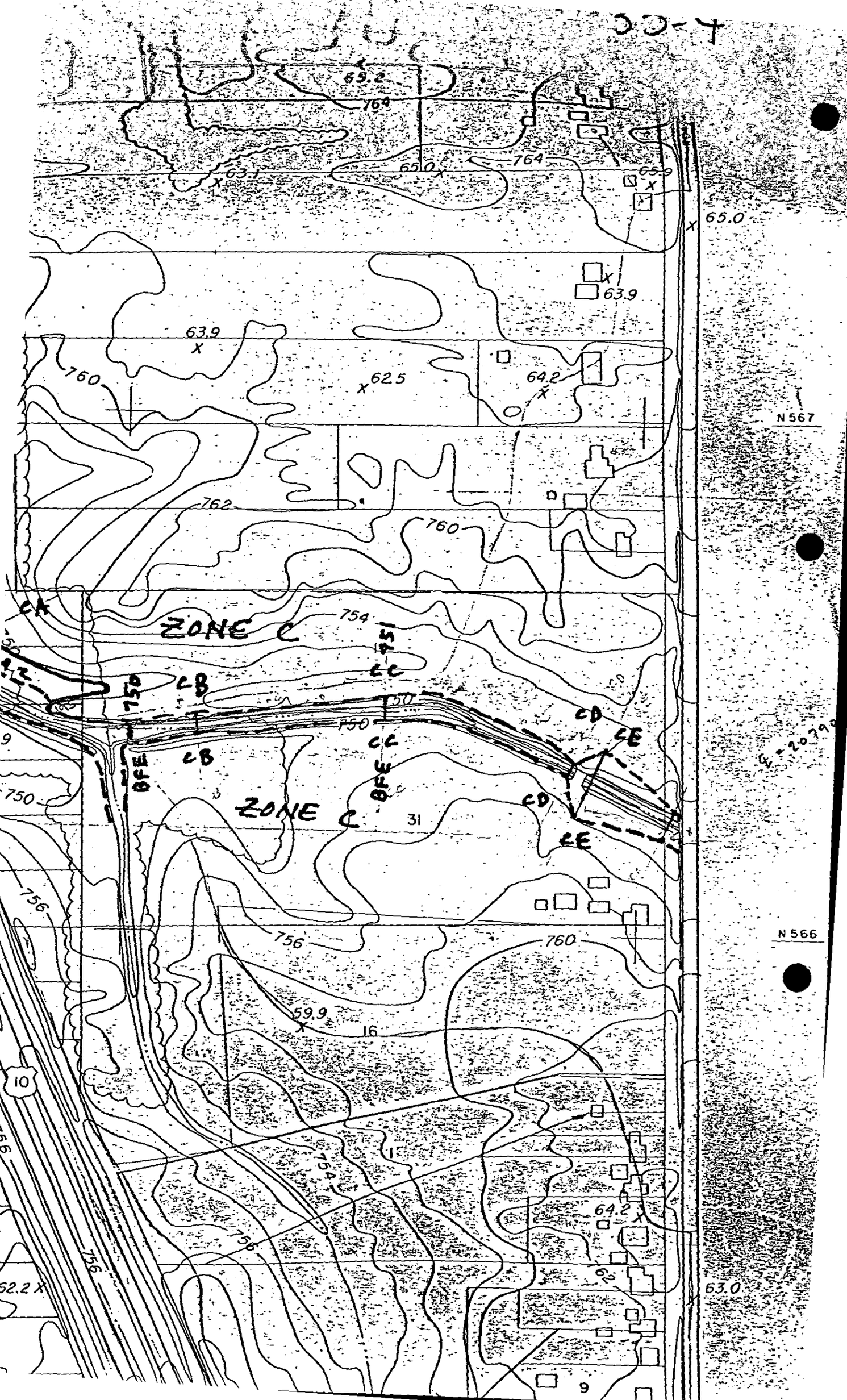

34-2
HARTSHORN
BFE 719
BFE
718
717
716
715
714
ZONE A2
ZONE C
ZONE NE
ZONE D
ZONE B
720
722
724
726
728
730
734
736
740
750
19.0
20.1
23.9
21.5
19.9

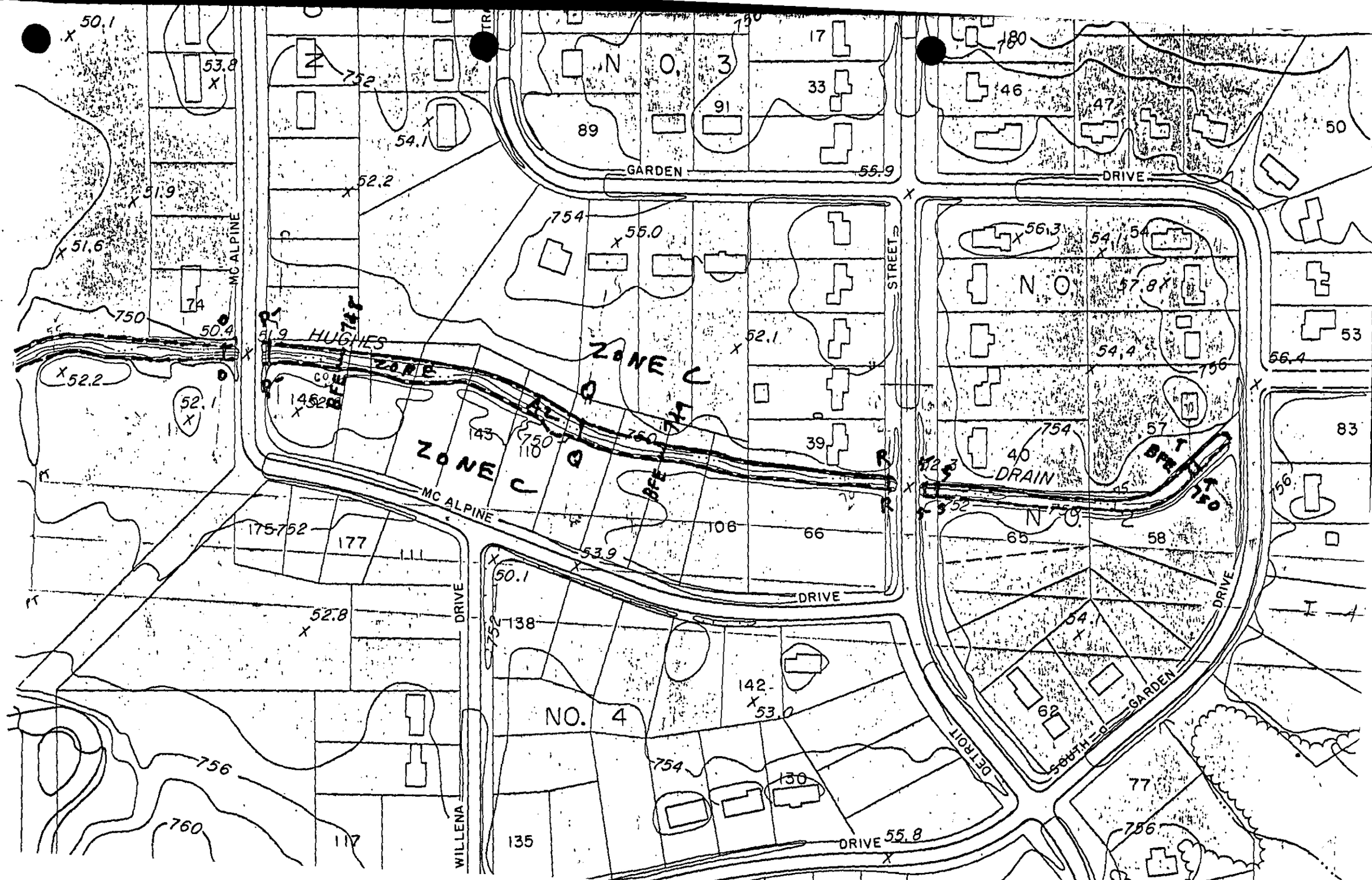

726
730
SILO
BFE
723
26.1
25.9
27.8
26.2
R
ZONE C
ZONE A2
728
722
23.3
726
ZONE C
22.1
724
720
720
Q
Zone A
721
BFE
25.9
ZONE B
23.8
24.7
25.9
720
21.6
BFE
P
HARTSHORN
724
22.1
722
22.2
ZONE
ZONE A2
O
720
BFE 719
B
19.0
726
718
BFE
20.1
720
730
722
ZONE


ZONE
ZONE
ZONE
ZONE A2
ZONE A2
ZONE A2
ZONE A2
ARGIL
ACRES
PUZJAK
ACRES
LINDEN
ROAD
E 2,149,000


ZONE A2
ZONE C
ZONE A2
ZONE A2
ZONE A2


61.9
54
64.2
62.1
62.2
59.9
2.2
64.2
760
750
756
762
51.5
63.0
61.5
60.8
762
64.2
748
745
760
52.2
750
63.1
BX
BY
BY
750
748
741
752
BFE
50.2
754
63.9
760
BZ
57.9
750
BZ
748
75
BFE
57.9
762
59.9
ZONE
ZONE
CA
ZONE
CA
750
CB
59.9
CB
BFE
760
750
756
23


ZONE C
ZONE C
CA
CB
CC
CD
CE
BFE
750
754
756
760
762
764
N 567
N 566
10
31
16
1
9


NO. 3
GARDEN
DRIVE
STREET
MC ALPINE
HUGHES
ZONE C
ZONE C
ZONE C
BFE
DRAIN
NO. 2
NO. 4
WILLENA
DRIVE
DETROIT
SOUTH HUGHES
GARDEN
DRIVE
584

B-1

14-2

49.3
52.2
744
53.
50.2
51.5
45.2
748
48.8
746
46.7
ZONE E
46.5
748
49.0
G
G
745
H
H
740
740
ZONE A4
ZONE A
I
I
BFE
47.1
46.2
46.
746
47.1
43.0
ZONE C
48.2
47.0
47.0
746
45.0
ZONE B
46.2
46.1
46.2
47.0
47.0
746
748
ZONE A2
45.9
DT
HIGH EMBANKMENT
I 475
46.5
BU
750
46.2

14-3

50.9
750
746
750
46.3
754
55.0
752
50.8
53.3
54.6
54.5
750
750
746
48.6
ZONE C
742
740
DRAIN
748
48.2
748
BFE
46.2
ZONE B
46.2
47.0
47.0
47.0
46.2
ZONE C
BFE
748
PC
PC
T. NO OVERFLOW
756
62.2
760
762
766
770
73.0

14-4

E2,165,000

750

750

53.9 X

SILO

X 51.2

X 53.8

N585,000

X 53.5

752

752

X 50.7

X 51.8

750

48.6 X

C

52.3 X

752

747

M

M

BFE

N

N584

750

744

N

X 48.2

ONE C

49.0 X

750

752

PT

PT

LEGEND

760

762

X 62.2

ROAD

N583

61.0 X

X 63.2

764

RAILROAD

HIGHWAY, ROAD, OR STREET - GRAVEL

HIGHWAY, ROAD, OR STREET - SURFACED

BRIDGE

CULVERT

INTERSTATE

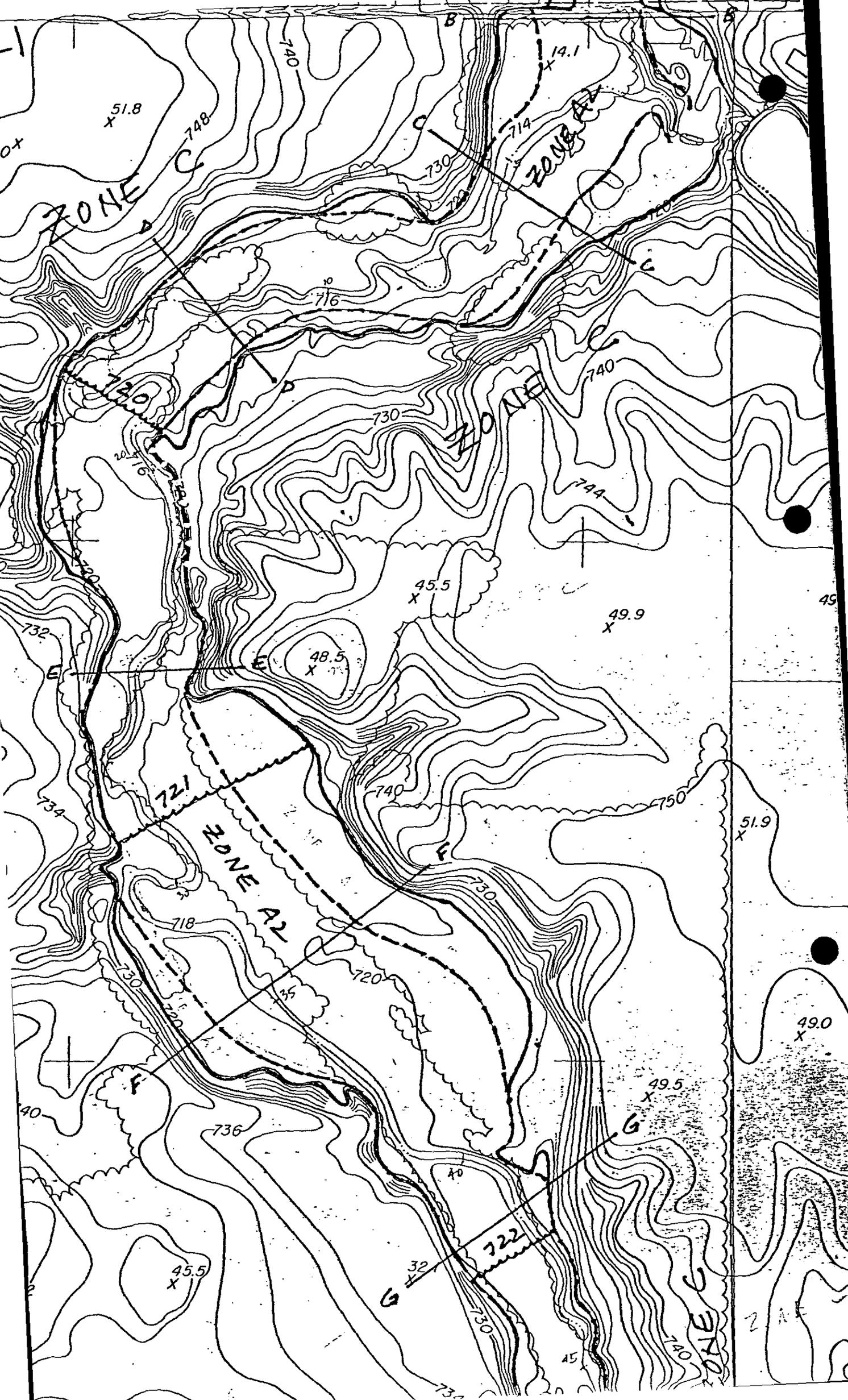
U.S. ROUTE

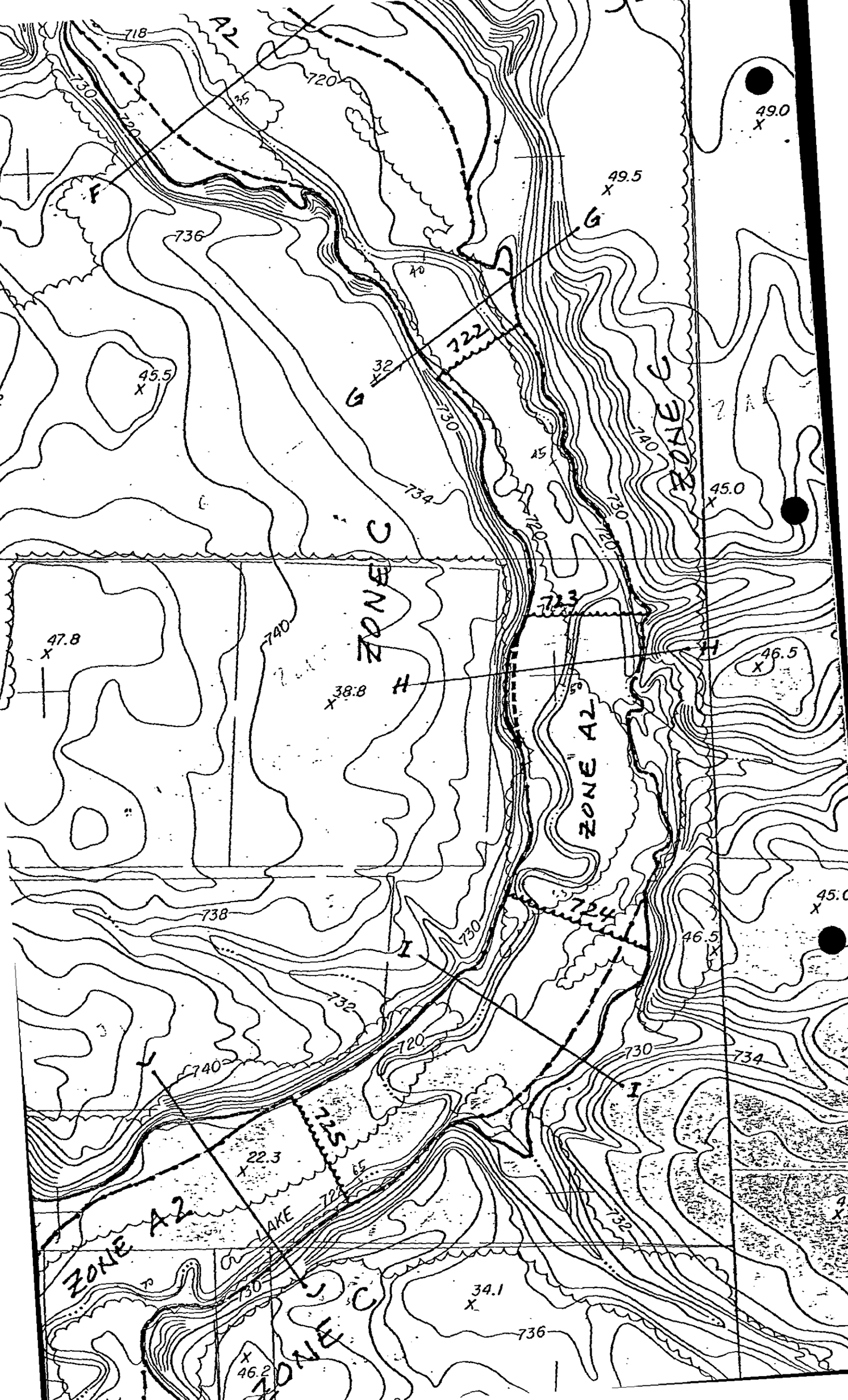
STATE ROUTE

COUNTY ROUTE

BUILDING

UNDER CONSTRUCTION


ZONE C
ZONE A2
ZONE C
ZONE A2
ZONE C
ZONE A2
ZONE C
B
B
C
C
D
D
E
E
F
F
G
G
721
722
51.8
14.1
45.5
49.9
48.5
51.9
49.0
49.5
45.5
748
740
730
714
716
744
750
734
732
718
720
736


A2
F
G
H
I
J
ZONE C
ZONE A2
LAKE
718
720
730
735
736
722
723
724
725
738
732
734
740
45.5
49.0
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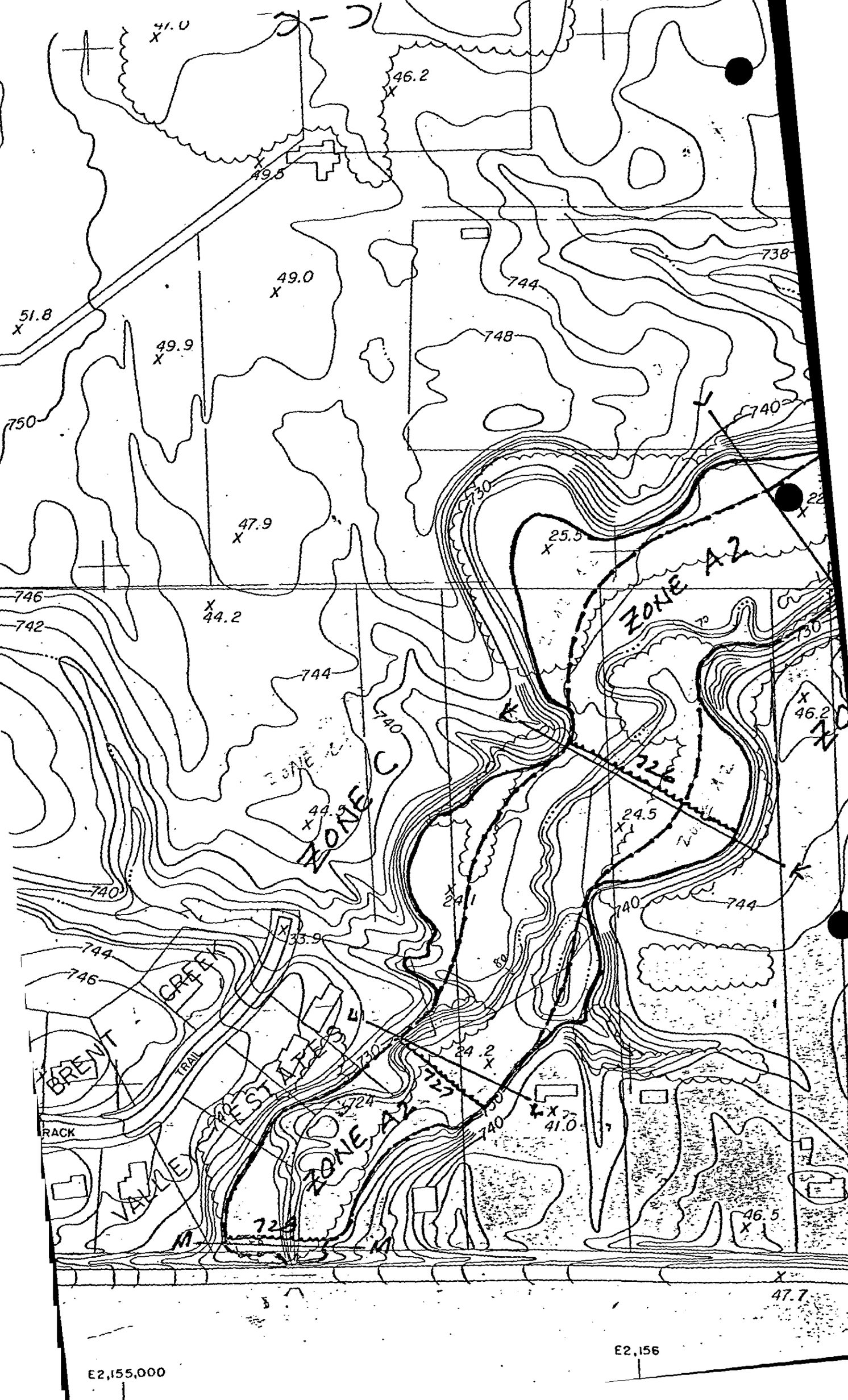
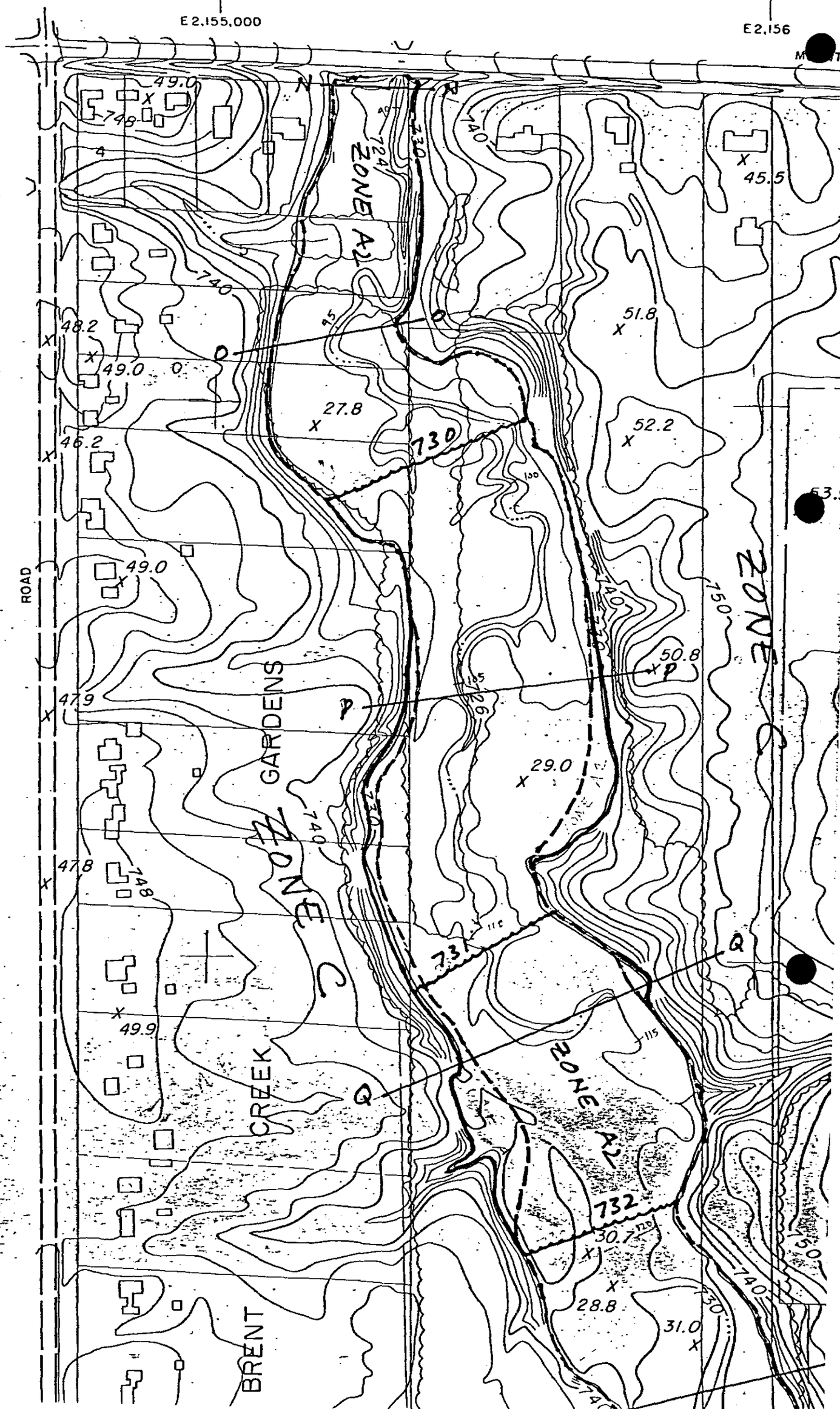
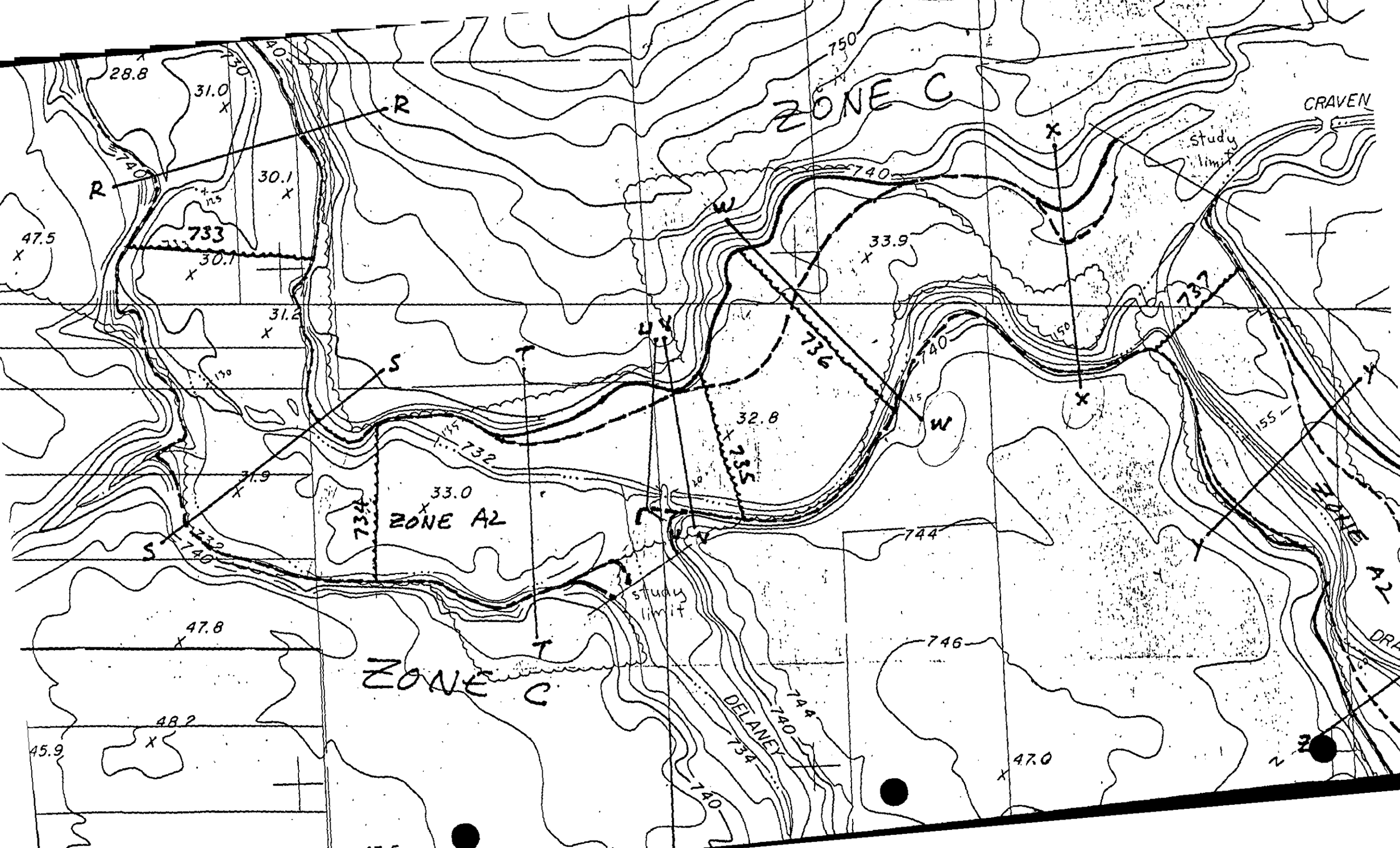
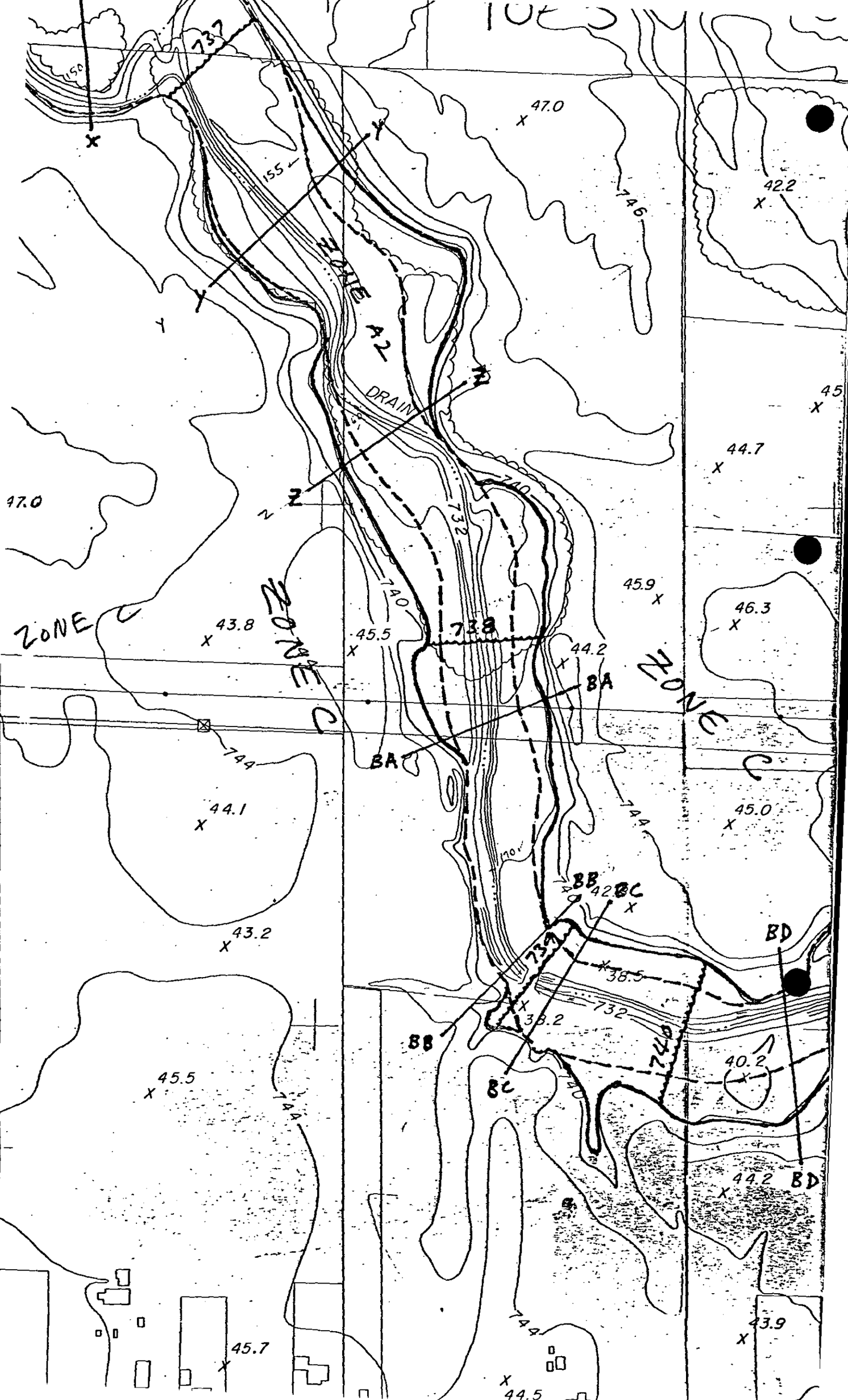
45.0
47.8
38.8
46.5
22.3
34.1
46.2


ZONE A2
ZONE C
ZONE A2
ZONE A2
BRENT CREEK
VALLEY ESTATES
TRAIL
TRACK
E2,155,000
E2,156

10-1


E 2,155,000
E 2,156
590,000
589
ROAD
BRENT
CREEK
GARDENS
ZONE C
ZONE A2
ZONE A2
ZONE D
O
P
Q
730
731
732
740
750
49.0
48.2
46.2
47.9
47.8
49.9
45.5
51.8
52.2
27.8
29.0
50.8
30.7
28.8
31.0


ZONE C
CRAVEN
study limit
ZONE A2
ZONE C
DELANEY
DRA
R
S
T
U
V
W
X
Y
Z
733
734
735
736
737
28.8
31.0
30.1
47.5
31.2
31.9
33.0
47.8
48.2
45.9
33.9
32.8
47.0
740
730
750
732
744
746
734


ZONE A2
DRAIN
ZONE C
ZONE C
ZONE C
X
Y
Z
BA
BB
BC
BD
737
155
150
747
47.0
42.2
45
44.7
47.0
732
740
45.9
46.3
43.8
45.5
738
44.2
744
44.1
45.0
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42.8
38.5
38.2
40.2
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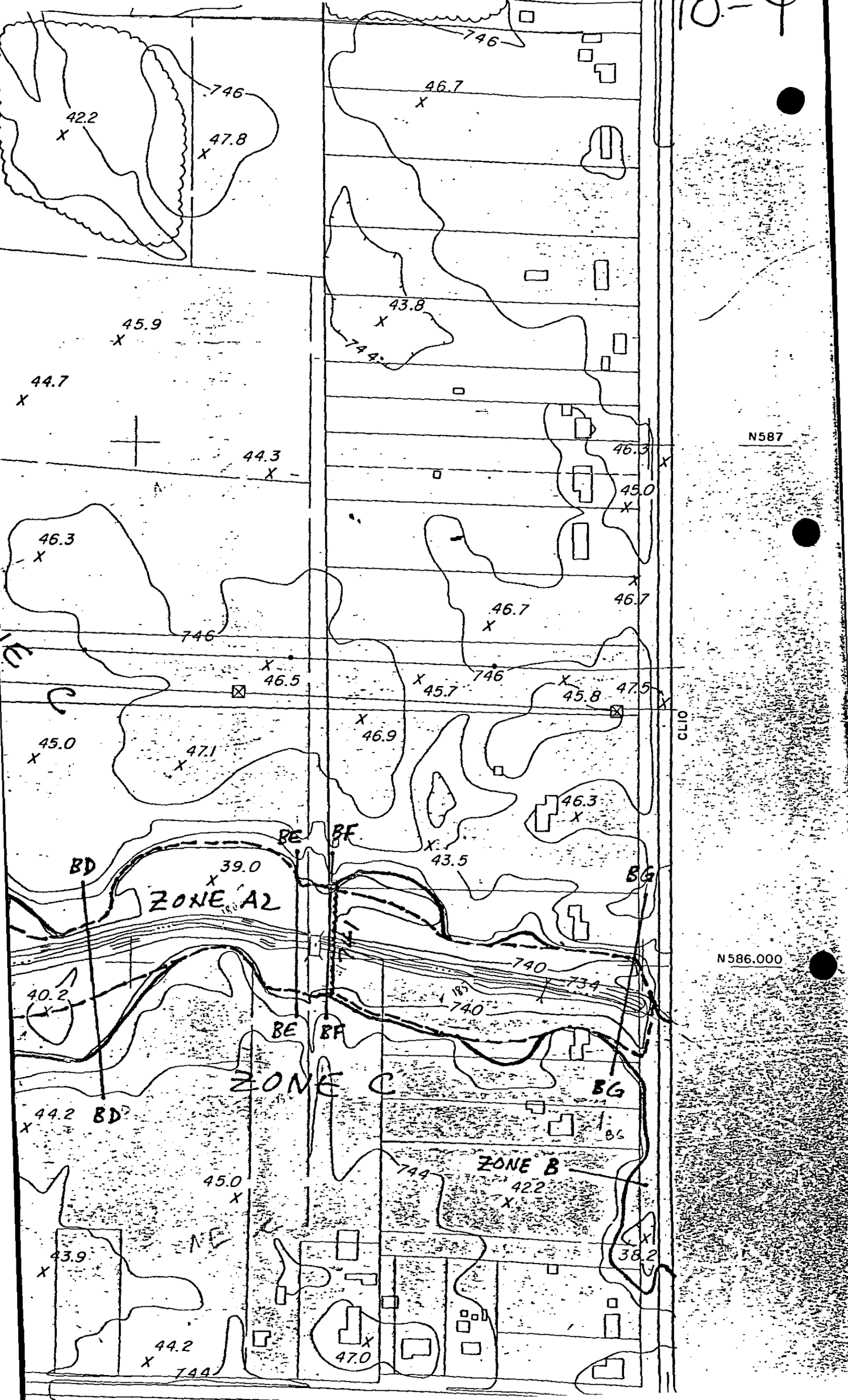
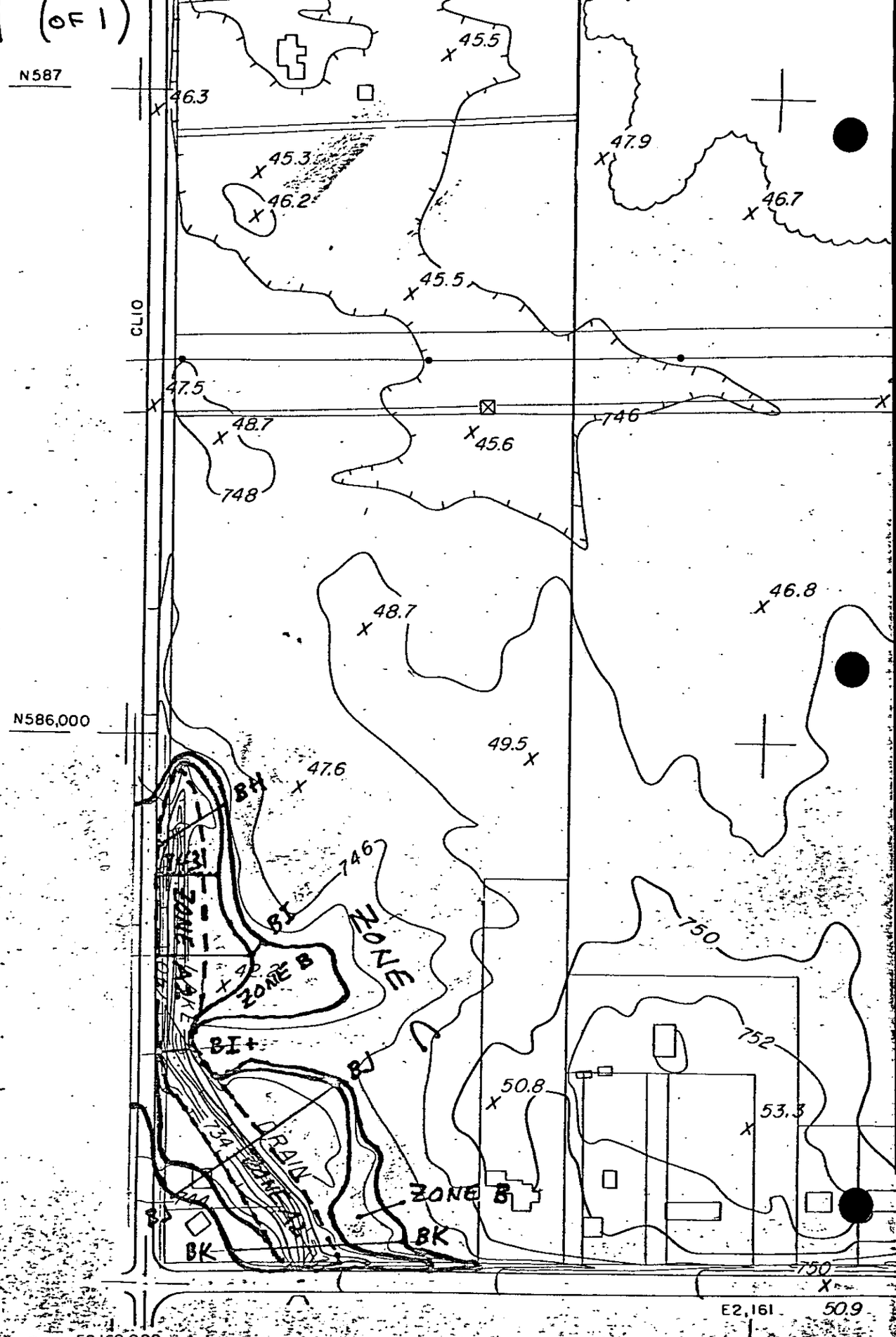
43.9
45.7
44.5


746
42.2
47.8
46.7
43.8
45.9
744
44.7
44.3
46.3
45.0
46.7
746
46.5
45.7
746
45.8
47.5
46.9
45.0
47.1
46.3
43.5
BE
BF
BD
39.0
ZONE A2
BG
740
734
40.2
740
BE
BF
ZONE C
BG
44.2
BD
ZONE B
744
45.0
42.2
43.9
38.2
44.2
47.0
744
N587
CLIO
N586.000

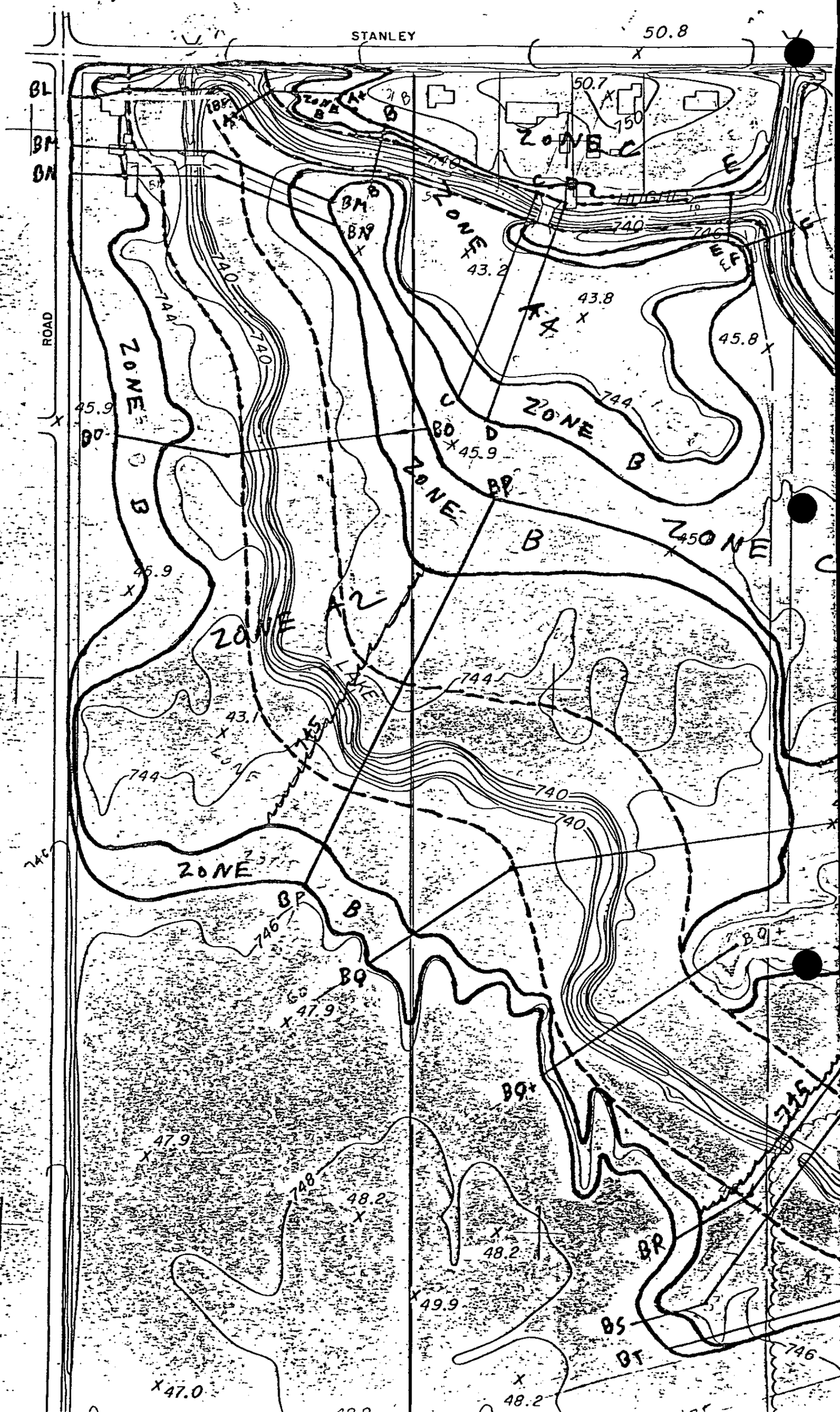
11-1 (OF 1)

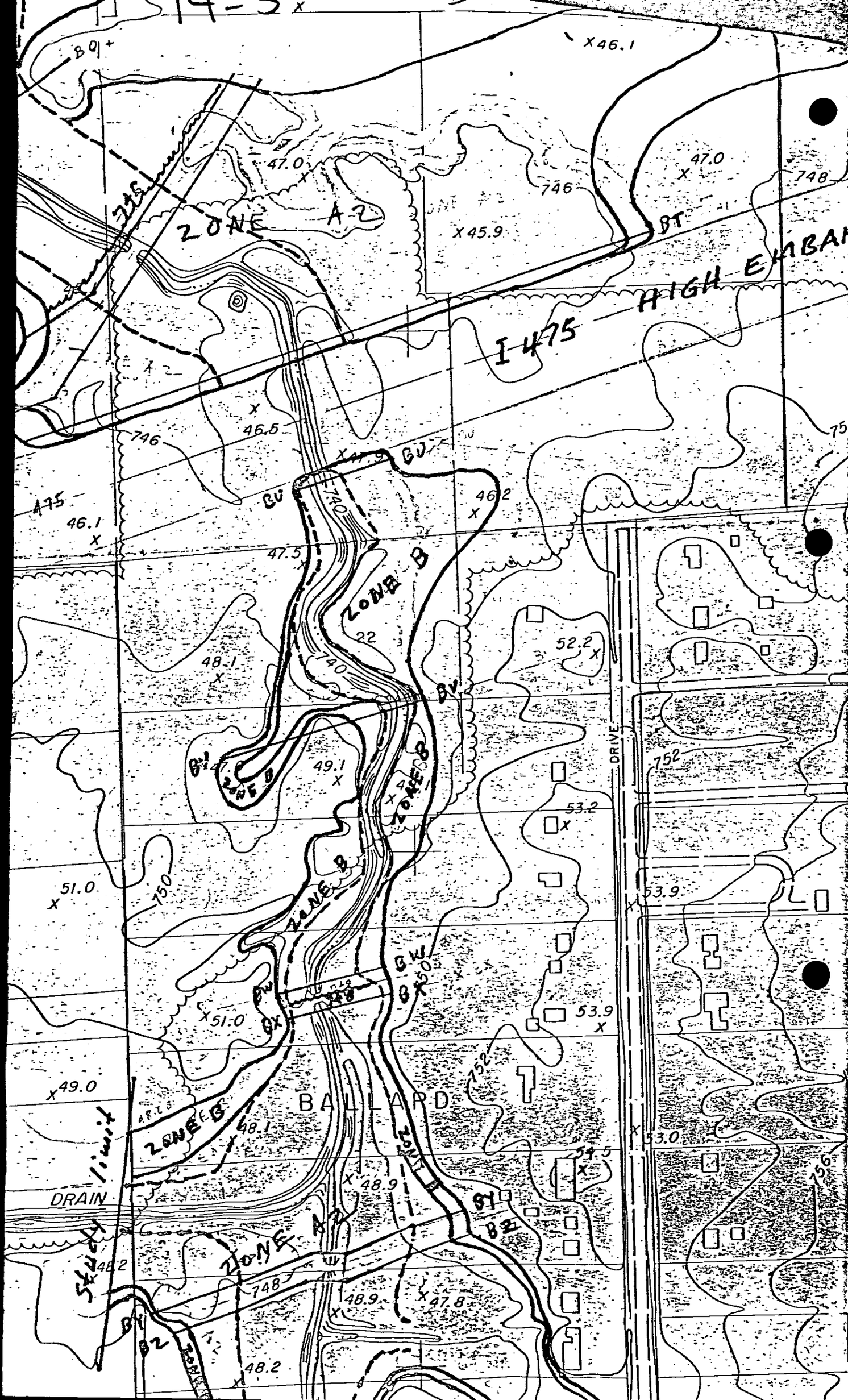


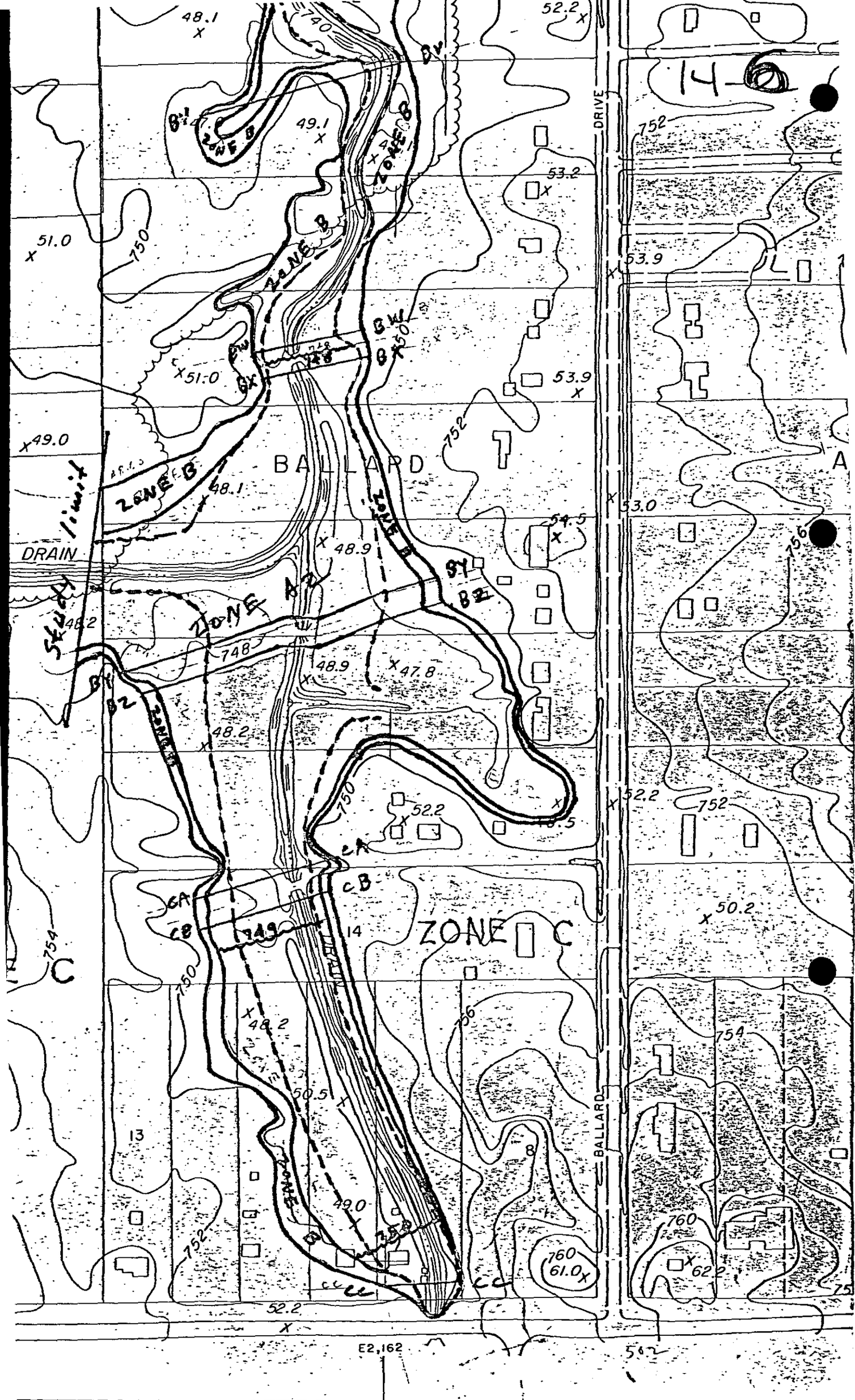
1000' GRID BASED ON MICHIGAN PLANE COORDINATE SYSTEM PROVIDED IN ACT 9, P.A. 1964.

E2,160,000

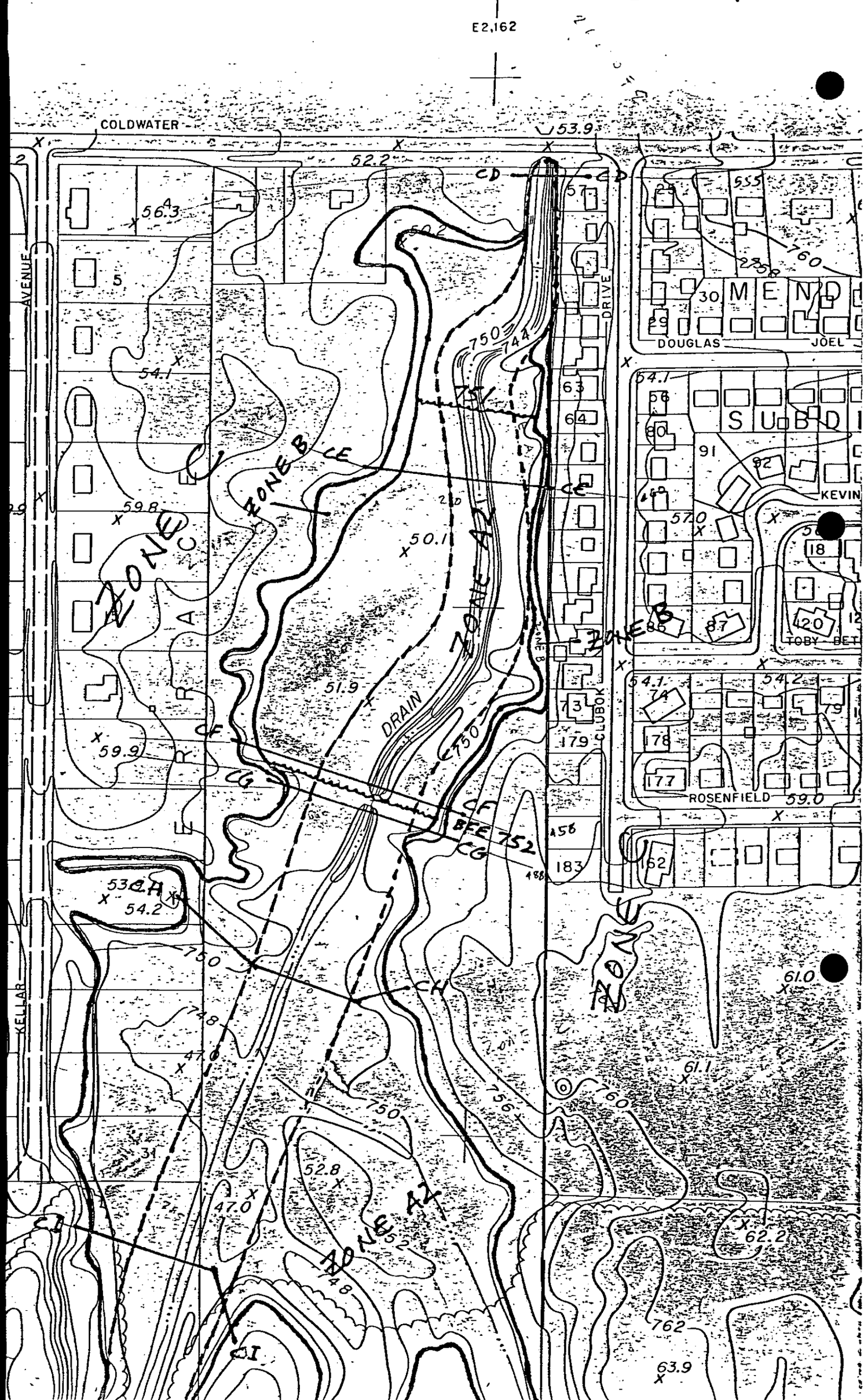
14-1

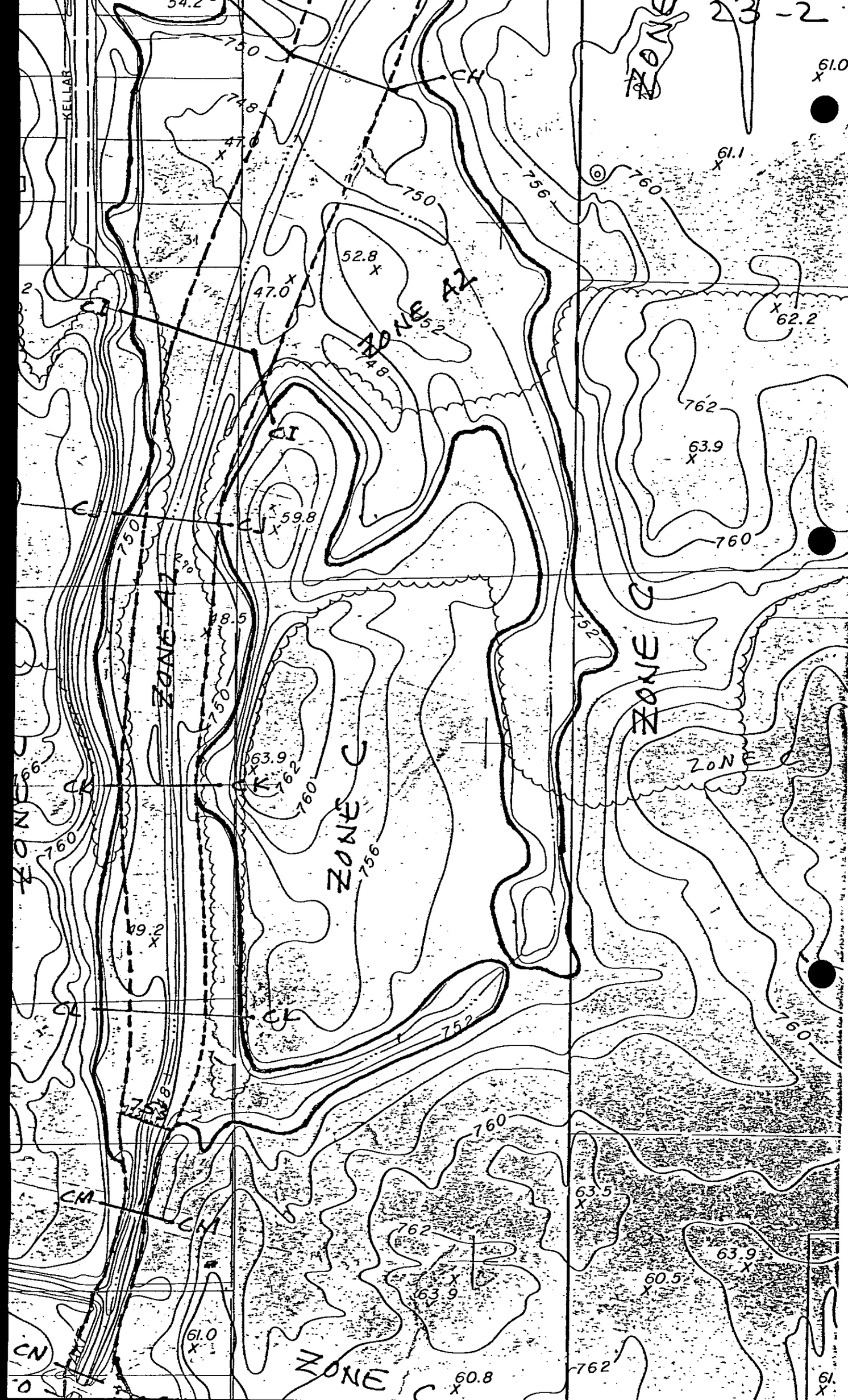


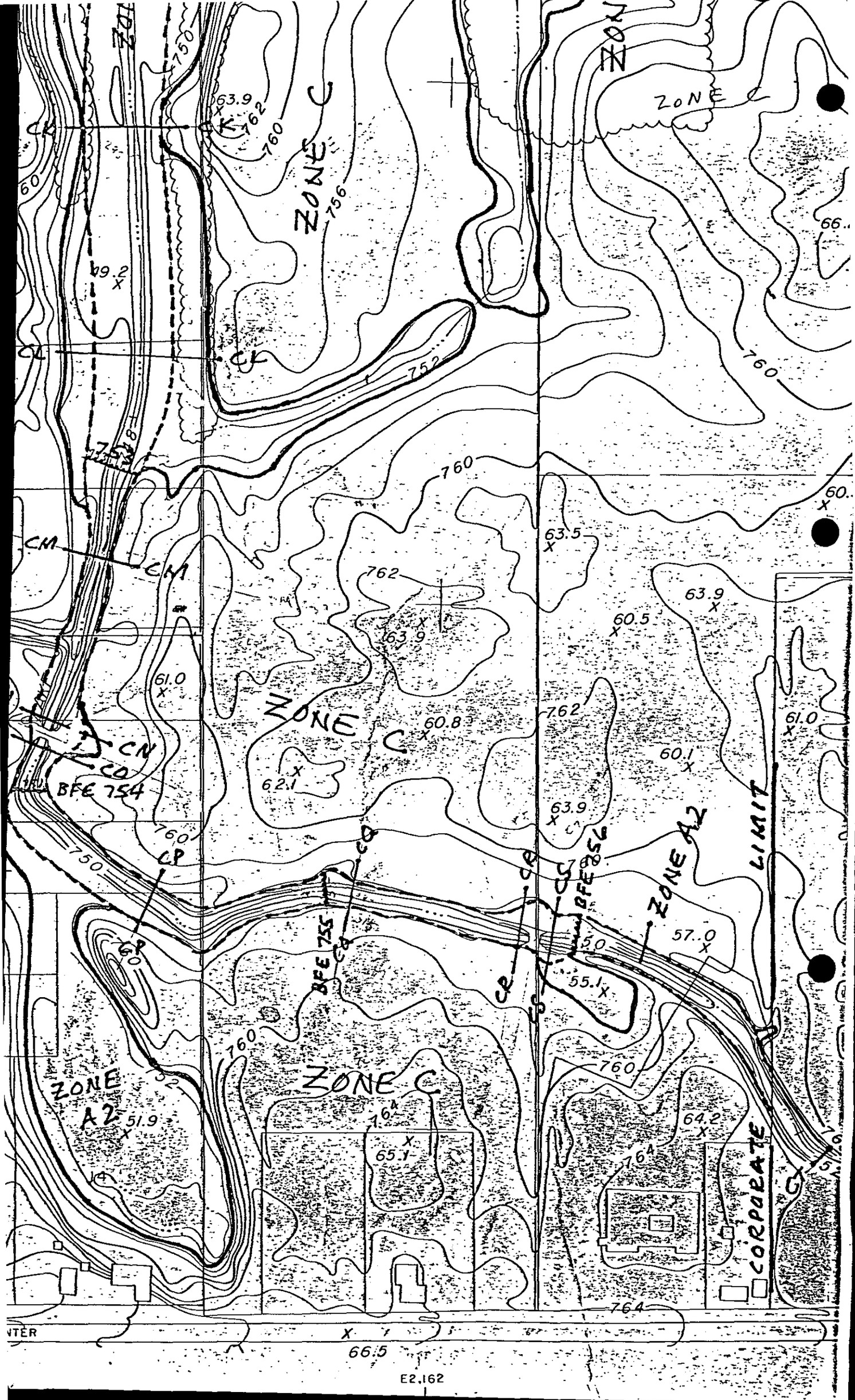

ZONE A2
I 475
HIGH EMBAN
ZONE B
BALLARD
DRIVE
DRAIN
study limit
46.1
47.0
45.9
46.5
47.5
48.1
49.1
51.0
49.0
52.2
53.2
53.9
53.0
54.5
48.9
47.8
48.2
746
748
740
750
752
756

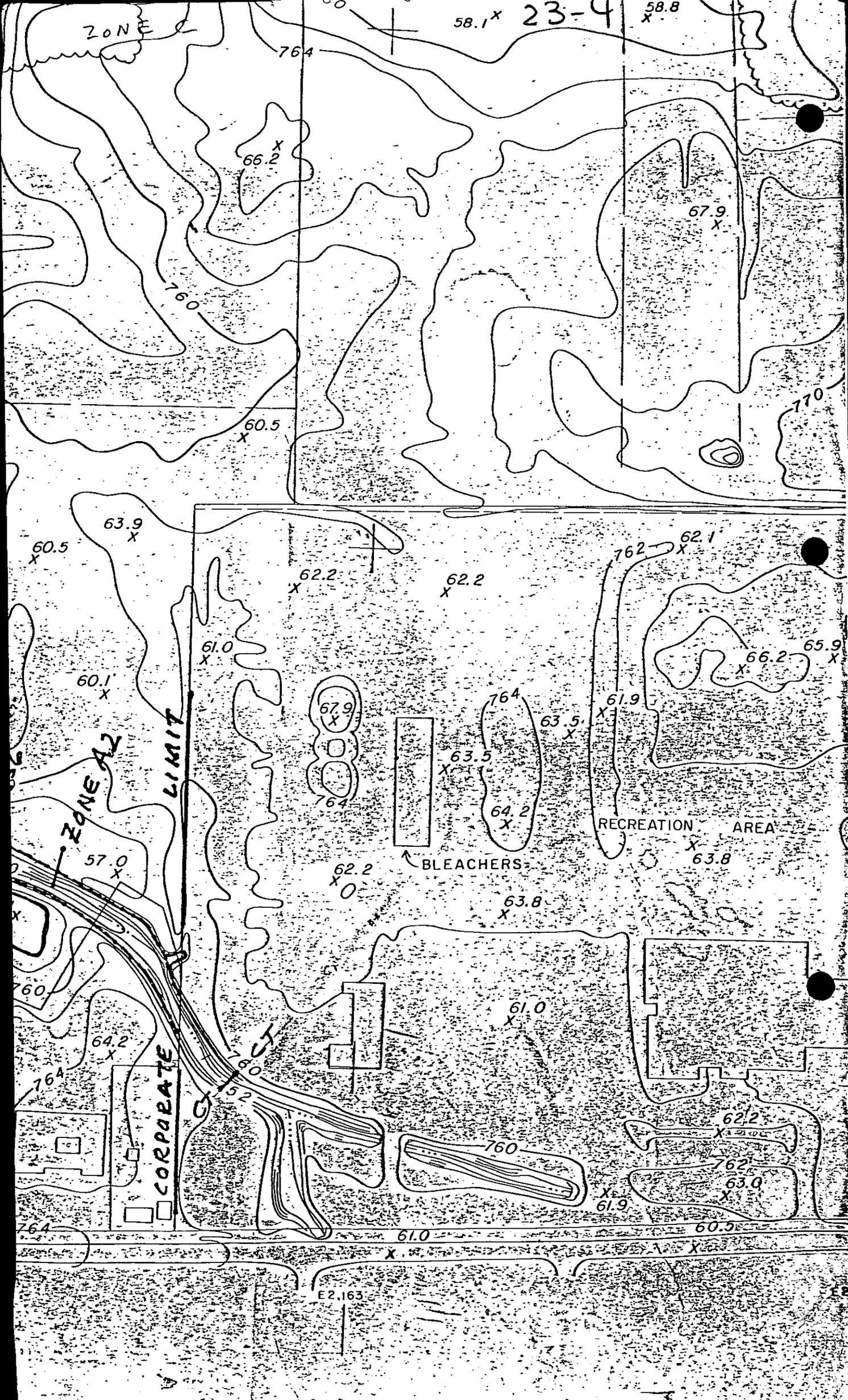

BALLARD
ZONE B
ZONE A2
ZONE C
DRAIN
BALLARD DRIVE
14
13
8
E2,162

23-1


E2,162
COLDWATER
AVENUE
KELLAR
DRIVE
CLUBOK
DOUGLAS
JOEL
KEVIN
TOBY
ROSENFIELD
DRAIN
ZONE C
ZONE B
ZONE A2
ZONE A1
CD
CE
CF
CG
CH
CI
BEE 752
53.9
52.2
56.3
54.1
59.8
50.1
51.9
59.9
54.2
47.0
52.8
61.0
61.1
62.2
63.9
59.0
750
744
751
748
756
760
762


23-2
KELLAR
ZONE A2
ZONE C
ZONE N
CH
CI
CJ
CK
CL
CM
CN
750
748
752
756
760
762
47.0
52.8
59.8
63.9
61.0
61.1
62.2
60.5
60.8
63.5
34.2
31
2
66
18.5
19.2


ZONE C
ZONE C
ZONE C
ZONE C
ZONE A2
ZONE A2
CORPORATE LIMIT
BFE 754
BFE 755
BFE 756
CK
CL
CM
CN
CO
CP
CQ
CR
CS
CT
750
752
756
760
762
764
63.9
62.1
60.8
63.9
61.0
63.5
60.5
63.9
60.5
61.0
60.1
57.0
55.1
64.2
65.1
51.9
66.5


23-4
ZONE
764
58.1
58.8
66.2
67.9
760
770
60.5
63.9
60.5
62.2
62.2
762
62.1
61.0
66.2
65.9
60.1
67.9
764
63.5
61.9
63.5
764
64.2
RECREATION AREA
63.8
ZONE A2
LIMIT
57.0
BLEACHERS
62.2
63.8
760
61.0
64.2
764
CORPORATE
760
752
760
62.2
762
63.0
61.9
764
61.0
60.5
E2,163

```
    1         2         3         4         5         6         7         8
...5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
```

Sec GD 100 yr [illegible] DS [illegible] P.L.

```
  1 CATTAIL SWAMP DRAIN  MT MORRIS TWSP      HOLTSLAG 20  5 02/99 12
  2  70731  70796  70861  70822  70822
300 CSD C 1  14  3  705     1055  1  3
304    120    175    240    200    200
310   -195  1  7160 -165  1  7140 -150  1  7120 -144  1  7109  -92  2  7092
311    -69  2  7043  -62  2  7059  -46  2  7110    0  3  7130   25  3  7140
312     45  3  7160   85  3  7180  110  3  7200  140  3  7220
313  1  2 060 060  1  2 045 045  1  2 070 070
400 CSD D 0  17  3  707     1525  1  3
410   -330  1  7180 -120  1  7160  -85  1  7140  -62  1  7122  -10  1  7104
411      0  1  7107   12  1  7108   21  2  7104   32  2  7065   36  2  7067
412     46  2  7075   52  3  7106  102  3  7138  132  3  7140  220  3  7160
413    340  3  7180  450  3  7200
414  1  2 060 060  1  2 045 045  1  2 065 065
420 FTBR1 2   8  1  707     1525        0  7122 1 0
421     21  1  7122   21  1  7104   32  1  7065   36  1  7067   46  1  7075
422     52  1  7106   52  1  7122   21 -9  7122
423  1  2 045 045
430 FTBD1 4  12  2   20            1  2            2 2                  1
431   -330  1  7180 -120  1  7160  -85  1  7140  -62  1  7122  -10  1  7104
432     40  2  7128   52  2  7106  102  2  7138  132  2  7140  220  2  7160
433    340  2  7180  450  2  7200
500 CSD E 5  17  3  707     1560  1  3
510   -330  1  7180 -120  1  7160  -85  1  7140  -62  1  7122  -10  1  7104
511      0  1  7107   12  1  7108   21  2  7104   32  2  7065   36  2  7067
512     46  2  7075   52  3  7106  102  3  7138  132  3  7140  220  3  7160
513    340  3  7180  450  3  7200
514  1  2 060 060  1  2 045 045  1  2 065 065
600 CSD F 0  18  3  708     2060  1  3
610   -600  1  7200 -600  1  7185 -500  1  7180 -170  1  7180  -28  1  7155
611      0  1  7142   18  2  7133   36  2  7069   40  2  7063   45  2  7067
612     50  3  7125   66  3  7137   76  3  7118  116  3  7145  140  3  7160
613    160  3  7180  200  3  7200  320  3  7220
614  1  2 060 060  1  2 042 042  1  2 065 065
700 CSD G 0  19  3  709     2500  1  3
710   -750  1  7226 -600  1  7220 -400  1  7203 -250  1  7200 -140  1  7200
711    -34  1  7179    0  1  7130   22  1  7145   30  2  7129   40  2  7081
712     47  2  7079   52  2  7098   58  3  7139   88  3  7138   92  3  7157
713    135  3  7180  190  3  7200  275  3  7220  500  3  7238
714  1  2 060 060  1  2 043 043  1  2 065 065
800 CSD H 0  14  3  709     3225  1  3
810   -350  1  7226 -200  1  7220  -20  1  7200  -15  1  7186    0  1  7178
811     20  2  7158   28  2  7096   33  2  7086   37  2  7095   52  3  7162
812    148  3  7178  160  3  7200  210  3  7220  600  3  7240
813  1  2 070 070  1  2 045 045  1  2 070 070
```

100 yr

[illegible] 100 yr [illegible] "W" [illegible] which

following this run is used for FIS [illegible]

```
...5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
900 CSD I 0  18  3  712    3820  1  3
910    -750  1  7260 -600  1  7240 -510  1  7240 -300  1  7240 -220  1  7220
911    -120  1  7200  -75  1  7173    0  1  7171   30  2  7170   40  2  7111
912      42  2  7107   44  2  7111   51  2  7133   56  3  7179   76  3  7192
913      80  3  7200  160  3  7220  300  3  7240
914  1  2 070 070  1  2 045 045  1  2 070 070
920 FTBR2 2   8  1  712    3820        0  7176 1 0
921      30  1  7176   30  1  7170   40  1  7111   42  1  7107   44  1  7111
922      51  1  7133   52  1  7176   30 -9  7176
923  1  2 045 045
931 FTBR2 4   7  2   20          1  2          2 2                1
932    -120  1  7200  -75  1  7173    0  1  7171   50  2  7182   56  2  7179
933      76  2  7192   80  2  7200
1000 CSD J 5  18  3  712    3860  1  3
1010   -750  1  7260 -600  1  7240 -510  1  7240 -300  1  7240 -220  1  7220
1011   -120  1  7200  -75  1  7173    0  1  7171   30  2  7170   40  2  7111
1012     42  2  7107   44  2  7111   51  2  7133   56  3  7179   76  3  7192
1013     80  3  7200  160  3  7220  300  3  7240
1014  1  2 070 070  1  2 050 050  1  2 070 070
1100 CSD K 0  12  3  715    4690  1  3
1110   -400  1  7260 -290  1  7240    0  1  7224   90  2  7196   98  2  7134
1111    102  2  7134  108  2  7149  118  3  7202  200  3  7200  225  3  7220
1112    280  3  7240  400  3  7260
1113  1  2 070 070  1  2 050 050  1  2 070 070
1120 FTBR3 2   8  1  715    4690        0  7207 1 0
1121     90  1  7207   90  1  7196   98  1  7134  102  1  7134  108  1  7149
1122    118  1  7202  118  1  7207   90 -9  7207
1123  1  2 050 050
1130 FTBR3 4  11  2   20          1  2          2 2                1
1131   -400  1  7260 -290  1  7240    0  1  7224   85  1  7196   90  1  7212
1132    118  2  7212  118  2  7202  200  2  7200  225  2  7220  280  2  7240
1133    400  2  7260
1200 CSD L 5  12  3  715    4725  1  3
1210   -400  1  7260 -290  1  7240    0  1  7224   90  2  7196   98  2  7134
1211    102  2  7134  108  2  7149  118  3  7202  200  3  7200  225  3  7220
1212    280  3  7240  400  3  7260
1213  1  2 070 070  1  2 050 050  1  2 070 070
1300 CSD M 0  12  3  717    5310  1  3
1310   -800  1  7280 -450  1  7260 -250  1  7240 -210  1  7220  -60  1  7210
1311    -34  2  7211  -26  2  7170  -22  2  7157  -18  2  7161   -8  3  7225
1312      0  3  7227   35  3  7227
1313  1  2 060 060  1  2 060 060  1  2 075 075
1320 FTBR4 2   7  1  717    5310        0  7224 1 0
1321    -34  1  7224  -34  1  7211  -26  1  7170  -22  1  7157  -18  1  7161
1322    -10  1  7224  -34 -9  7224
```

```
1323  1   060 060
1330 FTR04 4  11  2   20          1  2          2 2                  1
1331    -800  1  7280 -450  1  7260 -250  1  7240 -210  1  7220  -60  1  7210
1332     -34  1  7211  -30  1  7230  -10  2  7230   -8  2  7225    0  2  7227
1333      35  2  7227
1400 CSD N 5  12  3  717    5345  1  3
1410    -800  1  7280 -450  1  7260 -250  1  7240 -210  1  7220  -60  1  7210
1411     -34  2  7211  -26  2  7170  -22  2  7157  -18  2  7161   -8  3  7225
1412       0  3  7227   35  3  7227
1413  1  2 060 060  1  2 060 060  1  2 075 075
1500 CSD 0 0  11  3  718    6190  1  3
1510    -500  1  7300 -150  1  7280 -110  1  7260  -80  1  7240  -28  2  7233
1511     -15  2  7175  -11  2  7173    0  3  7231   60  3  7232  148  3  7280
1512     200  3  7300
1513  1  2 060 060  1  2 060 060  1  2 060 060
1600 CSD P 0  14  3  720    6530  1  3
1610    -350  1  7300 -200  1  7280 -160  1  7271 -110  1  7242  -30  2  7236
1611     -24  2  7203  -19  2  7189  -17  2  7189  -12  2  7198   -3  3  7248
1612       0  3  7250   98  3  7263  150  3  7280  210  3  7300
1613  1  2 060 060  1  2 055 055  1  2 065 065
1620 FTRR5 2   9  1  720    6530        0  7255 1 0
1621     -30  1  7255  -30  1  7236  -24  1  7203  -19  1  7189  -17  1  7189
1622     -12  1  7198   -3  1  7248   -3  1  7255  -30 -9  7255
1623  1  2 055 055
1630 FTR05 4  12  2   20          1  2          2 2                  1
1631    -350  1  7300 -200  1  7280 -160  1  7271 -110  1  7242  -30  1  7236
1632     -25  1  7261   -5  2  7261   -3  2  7248    0  2  7250   98  2  7263
1633     150  2  7280  210  2  7300
1700 CSD 0 5  14  3  720    6550  1  3
1710    -350  1  7300 -200  1  7280 -160  1  7271 -110  1  7242  -30  2  7236
1711     -24  2  7203  -19  2  7189  -17  2  7189  -12  2  7198   -3  3  7248
1712       0  3  7250   98  3  7263  150  3  7280  210  3  7300
1713  1  2 060 060  1  2 055 055  1  2 065 065
1800 CSD R 0  11  3  722    6810  1  3
1810    -200  1  7300 -130  1  7280  -80  1  7260    0  1  7258   23  2  7253
1811      32  2  7203   40  2  7207   52  3  7254   70  3  7260  170  3  7280
1812     250  3  7300
1813  1  2 060 060  1  2 055 055  1  2 065 065
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

   1 CATTAIL SWAMP DRAIN WEBSTER-COLDWATER RD HOLTSLAG 20  4 02 99 12
   2  72375  72466  72560  72504
1900 CSD S 1  18  3  722     6875  1  3
1904    120    175    240    200
1910   -510  1  7450 -510  1  7350 -440  1  7340 -340  1  7320 -242  1  7294
1911    -50  1  7260    0  1  7258   23  2  7253   32  2  7203   40  2  7207
1912     52  3  7254  102  3  7264  148  3  7280  200  3  7300  250  3  7320
1913    450  3  7340  480  3  7350  480  3  7450
1914  1  2 060 060  1  2 040 040  1  2 060 060
2000 CSD T 0  17  3  721     7305  1  3
2010   -410  1  7430 -410  1  7330 -290  1  7320 -215  1  7300 -180  1  7280
2011   -155  1  7270 -114  1  7268  -80  2  7262  -74  2  7211  -68  2  7201
2012    -66  2  7206  -50  3  7264    0  3  7259   36  3  7267   40  3  7300
2013     60  3  7320  120  3  7340
2014  1  2 060 060  1  2 055 055  1  2 060 060
2100 CSD U 0  15  3  723     7560  1  3
2110   -500  1  7430 -500  1  7330 -400  1  7320 -300  1  7300 -240  1  7280
2111   -116  1  7274  -82  2  7272  -72  2  7227  -64  2  7216  -62  2  7223
2112    -48  3  7277    0  3  7288   50  3  7311   60  3  7320  180  3  7340
2113  1  2 060 060  1  2 055 055  1  2 060 060
2200 CSD V 0  17  4  724     7760  1  4
2210   -625  1  7340 -440  1  7320 -290  1  7300 -155  1  7273 -152  2  7300
2211    -55  2  7315  -52  3  7285  -37  3  7233  -32  3  7227  -30  3  7236
2212    -24  4  7274    0  4  7274   36  4  7283   80  4  7300  100  4  7320
2213    135  4  7340  350  4  7360
2214  1  2 060 060  1  2 085 085  1  2 050 050  1  2 060 060
2220 RRV-W 2   5  1  714     7760        0  7195 3 0
2221      0  1  7195    0  1  7135    9  1  7135    9  1  7195    0 -9  7195
2222  1  2 024 024
2230 RRV-W 4  15  2   20          1  2          2 2                1
2231   -625  1  7340 -440  1  7320 -290  1  7300 -155  1  7273 -152  1  7300
2232    -55  1  7315  -52  1  7285  -32  2  7286  -24  2  7274    0  2  7274
2233     36  2  7283   80  2  7300  100  2  7320  135  2  7340  350  2  7360
2300 CSD W 5  17  6  724     7790  3  5
2310   -625  1  7340 -440  1  7320 -290  1  7300 -155  1  7273 -152  2  7300
2311    -55  2  7315  -50  3  7285  -37  4  7233  -32  4  7227  -30  5  7236
2312    -24  6  7274    0  6  7274   36  6  7283   80  6  7300  100  6  7320
2313    135  6  7340  350  6  7360
2314  1  2 060 060  1  2 085 085  1  2 050 050  1  2 050 050  1  2 050 050
2315  1  2 060 060
```

```
        1         2         3         4         5         6         7         8
...5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

   1 CATTAIL SWAMP DRAIN  V-COLDWATER ROAD    HOLTSLAG 10  5 02 99 12
   2  72510  72678  72780  72722  72722
2300 CSD W 1  17  6  724    7790  3  5
2304     120     175     240     200     200
2310    -625  1  7340 -440  1  7320 -290  1  7300 -155  1  7273 -152  2  7300
2311     -55  2  7315  -50  3  7285  -37  4  7233  -32  4  7227  -30  5  7236
2312     -24  6  7274    0  6  7274   36  6  7283   80  6  7300  100  6  7320
2313     135  6  7340  350  6  7360
2314  1  2 060 060  1  2 085 085  1  2 050 050  1  2 050 050  1  2 050 050
2315  1  2 060 060
2400 CSD Y 0  15  3  724    7980  1  3
2410    -600  1  7340 -480  1  7320 -350  1  7300 -100  1  7291  -54  2  7289
2411     -42  2  7234  -40  2  7227  -36  2  7232  -28  3  7274    0  3  7277
2412      40  3  7278   80  3  7280  100  3  7300  150  3  7320  265  3  7340
2413  1  2 060 060  1  2 050 050  1  2 060 060
2500 CSD Y 0  15  3  725    8240  1  3
2510    -585  1  7340 -520  1  7320 -270  1  7300  -82  1  7292  -44  2  7290
2511     -32  2  7245  -31  2  7234  -30  2  7238  -20  3  7286    0  3  7279
2512      32  3  7282   80  3  7300  125  3  7320  320  3  7340  420  3  7360
2513  1  2 060 060  1  2 050 050  1  2 060 060
2600 CSD Z 0  14  3  725    8520  1  3
2610    -550  1  7360 -440  1  7340 -375  1  7320 -220  1  7300  -94  1  7302
2611     -56  2  7287  -46  2  7250  -40  2  7243  -38  2  7250  -32  3  7306
2612       0  3  7313   42  3  7331  225  3  7340  300  3  7360
2613  1  2 060 060  1  2 050 050  1  2 060 060
2700 CSDAA 0  15  3  727    8830  1  3
2710    -460  1  7360 -300  1  7340 -215  1  7320 -135  1  7300  -30  1  7301
2711       0  1  7304    9  2  7313   20  2  7258   26  2  7252   28  2  7262
2712      36  3  7313   84  3  7315  190  3  7340  300  3  7360  460  3  7380
2713  1  2 060 060  1  2 045 045  1  2 060 060
2800 CSDAB 0  15  3  728    9040  1  3
2810    -430  1  7360 -250  1  7340 -208  1  7320  -38  1  7325    0  1  7309
2811      24  2  7311   32  2  7272   36  2  7259   42  2  7270   52  3  7310
2812      86  3  7317  100  3  7320  155  3  7340  210  3  7360  330  3  7380
2813  1  2 060 060  1  2 045 045  1  2 060 060
2900 CSDAC 0  13  3  729    9360  1  3
2910    -250  1  7360  -66  1  7343    0  1  7337   24  2  7332   34  2  7275
2911      40  2  7270   42  2  7280   54  3  7321  100  3  7323  190  3  7340
2912     230  3  7360  260  3  7380  400  3  7400
2913  1  2 060 060  1  2 045 045  1  2 060 060
**SEQUENCE**
3000 CSDAD 0  15  3  730    9680  1  3
3010    -260  1  7380 -200  1  7360 -125  1  7340  -50  1  7322    0  1  7329
3011      16  2  7333   22  2  7284   26  2  7281   32  2  7286   36  3  7319
3012     114  3  7328  135  3  7340  170  3  7360  210  3  7380  240  3  7400
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 2.DATE=10/30/78

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
 3013  1  2 060 060  1  2 045 045  1  2 060 060
 3100 CSDAE 0  14  3  730    9955  1  3
 3110     -200  1  7380 -125  1  7360 -118  1  7348    0  1  7328   38  2  7327
 3111       40  2  7285   42  2  7283   54  2  7300   62  3  7339  124  3  7343
 3112      190  3  7360  230  3  7380  270  3  7400  350  3  7420
 3113  1  2 060 060  1  2 045 045  1  2 060 060
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
    1  CATTAIL SWAMP DRAIN COLDWATER - LINDEN   HOLTSLAG 10  5 02 99 12
    2   73226  73306  73382  73338  73338
 3200 CSDAF 1  15  3  731  10055  1  3
 3204     105    150    210    175    175
 3210    -180  1  7420 -160  1  7400  -50  1  7380    0  1  7361   76  2  7348
 3211      88  2  7300   94  2  7294  100  2  7302  112  3  7337  170  3  7358
 3212     180  3  7360  230  3  7380  245  3  7400  430  3  7420  450  3  7440
 3213  1  2 045 045  1  2 070 070  1  2 045 045
 3300 CSDAG 0  15  3  730  10185  1  3
 3310    -400  1  7430 -310  1  7420 -220  1  7400 -170  1  7380  -74  1  7341
 3311     -40  2  7343  -30  2  7300  -24  2  7291  -16  2  7301  -10  3  7345
 3312       0  3  7346   24  3  7379   70  3  7400  210  3  7420  250  3  7440
 3313  1  2 045 045  1  2 065 065  1  2 045 045
 3320 BR AH 2   8  1  730  10185        0  7329 1 0
 3321     -33  1  7329  -33  1  7314  -30  1  7300  -24  1  7291  -16  1  7301
 3322     -15  1  7310  -15  1  7329  -33 -9  7329
 3323  1  2 050 050
 3330 RD AH 4  15  2   5          1  2          2 2                1
 3331    -400  1  7430 -310  1  7420 -220  1  7400 -170  1  7380  -74  1  7341
 3332     -40  1  7343  -38  1  7336  -25  2  7336  -11  2  7336  -10  2  7345
 3333       0  2  7346   24  2  7379   70  2  7400  210  2  7420  250  2  7440
 3400 CSDAH 5  17  5  730  10210  2  4
 3410    -400  1  7430 -310  1  7420 -220  1  7400 -170  1  7380  -74  1  7341
 3411     -40  2  7343  -33  3  7314  -30  3  7300  -24  3  7291  -16  3  7301
 3412     -15  4  7310  -10  5  7345    0  5  7346   24  5  7379   70  5  7400
 3413     210  5  7420  250  5  7440
 3414  1  2 045 045  1  2 065 065  1  2 065 065  1  2 065 065  1  2 045 045
 3500 CSDAI 0  14  3  730  10455  1  3
 3510    -450  1  7430 -340  1  7420 -300  1  7400 -170  1  7380  -90  1  7360
 3511     -78  1  7346  -32  2  7349  -24  2  7311  -16  2  7299  -14  2  7314
 3512       0  3  7356   36  3  7388   50  3  7400   50  3  7500
 3513  1  2 060 060  1  2 065 065  1  2 060 060
 3600 CSDAJ 0  14  3  732  10800  1  3
 3610    -500  1  7430 -340  1  7420 -275  1  7400 -100  1  7380  -70  1  7356
 3611     -44  2  7356  -36  2  7311  -30  2  7308  -24  2  7321  -14  3  7369
 3612       0  3  7369   24  3  7379  100  3  7400  270  3  7420
 3613  1  2 060 060  1  2 065 065  1  2 060 060
 3620 CL AK 2   9  1  733  10800        0  7362 3 0
 3621       0  1  7312    5  1  7315    4  1  7335    3  1  7353    0  1  7362
 3622      -3  1  7353   -4  1  7335   -5  1  7315    0  1  7312
 3623  1  2 024 024
 3630 RD AK 4  10  2   30          1  2          2 2                1
 3631    -500  1  7430 -360  1  7420 -290  1  7400  -90  1  7380  -72  1  7362
 3632     -32  2  7362  -12  2  7366    0  2  7367   10  2  7380  100  2  7400
 3700 CSDAK 5  14  5  732  10845  2  4
```

```
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  3710     -300  1  7430 -360  1  7420 -290  1  7400  -90  1  7380  -72  1  7362
5  3711      -46  2  7358  -40  2  7319  -32  3  7309  -26  4  7317  -12  5  7366
5  3712        0  5  7367   10  5  7380  100  5  7400  150  5  7420
6  3713  1  2 060 060  1  2 065 065  1  2 065 065  1  2 065 065  1  2 060 060
3  3800 CSDAL 0  15  3  733   11110  1  3
5  3810     -560  1  7430 -285  1  7420 -110  1  7400  -70  1  7375  -36  2  7382
5  3811      -25  2  7330  -20  2  7320  -16  2  7330   -6  3  7380    0  3  7380
5  3812       30  3  7378  125  3  7400  190  3  7420  250  3  7440  380  3  7460
6  3813  1  2 060 060  1  2 065 065  1  2 060 060
3  3900 CSDAM 0  15  3  735   11500  1  3
5  3910     -400  1  7448 -240  1  7440 -185  1  7420 -100  1  7400  -72  1  7379
5  3911      -44  2  7387  -36  2  7341  -32  2  7331  -22  2  7339  -18  3  7394
5  3912        0  3  7399   26  3  7408   60  3  7420  185  3  7440  390  3  7460
6  3913  1  2 060 060  1  2 065 065  1  2 060 060
3  4000 CSDAN 0  12  3  735   11835  1  3
5  4010     -275  1  7448 -160  1  7440  -80  1  7420  -68  1  7386  -42  2  7394
5  4011      -34  2  7348  -30  2  7337  -24  2  7344  -16  3  7396  -10  3  7420
5  4012      120  3  7440  275  3  7460
6  4013  1  2 060 060  1  2 065 065  1  2 060 060
3  4100 CSDAO 0  11  3  736   12110  1  3
5  4110     -260  1  7440  -78  1  7414  -32  2  7409  -20  2  7361  -14  2  7349
5  4111       -8  2  7357    0  3  7403   32  3  7411   35  3  7420   70  3  7440
5  4112      140  3  7460
6  4113  1  2 060 060  1  2 065 065  1  2 060 060
3  4200 CSDAP 0  12  3  738   12650  1  3
5  4210     -660  1  7500 -430  1  7480 -110  1  7460  -70  1  7440  -41  2  7417
5  4211      -31  2  7372  -26  2  7364  -21  2  7375  -12  3  7418    0  3  7440
5  4212      350  3  7460  750  3  7477
6  4213  1  2 070 070  1  2 065 065  1  2 070 070
3  4300 CSDAQ 0  14  3  739   13200  1  3
5  4310     -470  1  7500 -310  1  7480 -230  1  7460  -60  1  7440  -50  1  7435
5  4311      -38  2  7426  -30  2  7384  -26  2  7377  -22  2  7395  -12  3  7433
5  4312        0  3  7437   30  3  7460  250  3  7480  510  3  7500
6  4313  1  2 070 070  1  2 065 065  1  2 070 070
3  4320 BR AR 2   5  1  738   13200          0  7431 3 0
5  4321        0  1  7431    0  1  7366    5  1  7366    5  1  7431    0 -9  7431
6  4322  1  2 024 024
3  4330 RD AR 4   9  2   20            1  2            2 2                  1
5  4331     -470  1  7500 -310  1  7480 -230  1  7460  -60  1  7440  -50  1  7435
5  4332      -30  2  7436  -12  2  7433    0  2  7480  240  2  7500
3  4400 CSDAR 5  12  5  739   13235  2  4
5  4410     -470  1  7500 -310  1  7480 -230  1  7460  -60  1  7440  -50  1  7435
5  4411      -38  2  7426  -30  3  7384  -25  4  7377  -22  4  7395  -12  5  7433
5  4412        0  5  7480  240  5  7500
6  4413  1  2 070 070  1  2 065 065  1  2 065 065  1  2 065 065  1  2 070 070
```

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....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
3  4500 CSDAS 0  13  3  741   13800  1  3
5  4510     -540  1  7540 -210  1  7520 -140  1  7500  -80  1  7480  -30  1  7460
5  4511        0  2  7461   11  2  7398   15  2  7396   18  2  7398   30  3  7447
5  4512       42  3  7471   45  3  7480  115  3  7500
6  4513  1  2 070 070  1  2 065  65  1  2 070 070
3  4600 CSDAT 0  12  3  741   14150  1  3
5  4610        0  1  7520   50  1  7500  135  1  7480  215  1  7460  220  2  7459
5  4611      232  2  7400  235  2  7391  238  2  7400  250  3  7461  312  3  7481
5  4612      330  3  7500  400  3  7510
6  4613  1  2 070 070  1  2 080  80  1  2 070 070
3  4620 BR AU 2   5  1  740   14150        0  7444 3 0
5  4621        0  1  7444    0  1  7389    4  1  7389    4  1  7444    0 -9  7444
6  4622  1  2 024 024
3  4630 RD AU 4   9  2   20          1  2          2 2                  1
5  4631        0  1  7520   50  1  7500  135  1  7480  215  1  7460  230  2  7461
5  4632      250  2  7461  312  2  7481  330  2  7500  400  2  7510
3  4700 CSDAU 5  12  5  742   14190  2  4
5  4710        0  1  7520   50  1  7500  135  1  7480  215  1  7460  220  2  7459
5  4711      233  3  7405  235  3  7404  237  4  7405  250  5  7461  312  5  7481
5  4712      330  5  7500  400  5  7510
6  4713  1  2 070 070  1  2 080 080  1  2 080 080  1  2 080 080  1  2 070 070
3  4800 CSDAV 0  12  3  741   14470  1  3
5  4810        0  1  7540   70  1  7520  200  1  7500  240  1  7480  350  2  7467
5  4811      356  2  7398  360  2  7395  364  2  7398  370  3  7467  400  3  7480
5  4812      560  3  7480  650  3  7500
6  4813  1  2 065 065  1  2 080 080  1  2 070 070
3  4820 BR AW 2   5  1  742   14470        0  7450 3 0
5  4821        0  1  7450    0  1  7395    4  1  7395    4  1  7450    0 -9  7450
6  4822  1  2 024 024
3  4830 RD AW 4  10  2   20          1  2          2 2                  1
5  4831        0  1  7540   70  1  7520  200  1  7500  240  1  7480  350  1  7467
5  4832      360  2  7465  370  2  7467  400  2  7480  560  2  7480  650  2  7500
3  4900 CSDAW 5  12  5  742   14505  2  4
5  4910        0  1  7540   70  1  7520  200  1  7500  240  1  7480  350  2  7467
5  4912      356  3  7398  360  4  7395  364  4  7398  370  5  7467  400  5  7480
5  4913      560  5  7480  650  5  7500
6  4914  1  2 065 065  1  2 080 080  1  2 080 080  1  2 080 080  1  2 070 070
3  5000 CSDAX 0  13  3  743   14615  1  3
5  5010     -520  1  7540 -380  1  7520 -250  1  7500 -170  1  7480  -62  1  7460
5  5011      -24  2  7466  -14  2  7415  -11  2  7413   -7  2  7415    0  3  7462
5  5012       46  3  7460  150  3  7480  300  3  7500
6  5013  1  2 070 070  1  2 080 080  1  2 075 075
3  5020 BR AY 2   5  1  743   14615        0  7455 3 0
5  5021        0  1  7455    0  1  7400    4  1  7400    4  1  7455    0 -9  7455
6  5022  1  2 024 024
```

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
3  5030 RD AY 4  10  2   20           1  2           2 2                   1
5  5031     -520  1  7540 -380  1  7520 -250  1  7500  -45  1  7480  -45  1  7460
5  5032      -11  2  7467    0  2  7462   35  2  7460   35  2  7480  300  2  7500
3  5100 CSDAY 5  13  5  743   14650  2  4
5  5110     -520  1  7540 -380  1  7520 -250  1  7500 -170  1  7480  -62  1  7460
5  5111      -24  2  7466  -14  2  7415  -11  3  7413   -7  4  7415    0  5  7462
5  5112       46  5  7460  150  5  7480  300  5  7500
6  5113  1  2 070 070  1  2 080 080  1  2 080 080  1  2 080 080  1  2 075 075
3  5200 CSDAZ 0  12  3  742   14800  1  3
5  5210        0  1  7540  340  1  7520  410  1  7500  470  1  7480  660  2  7465
5  5211      666  2  7407  670  2  7405  674  2  7407  680  3  7465  750  3  7480
5  5213      950  3  7500 1200  3  7520
6  5214  1  2 070 070  1  2 065 065  1  2 070 070
3  5220 BR BA 2   5  1  743   14800        0  7460 3 0
5  5221        0  1  7460    0  1  7405    4  1  7405    4  1  7460    0 -9  7460
6  5222  1  2 024 024
3  5230 RD BA 4  10  2   20           1  2           2 2                   1
5  5231        0  1  7540  340  1  7520  645  1  7500  645  1  7470  660  1  7465
5  5232      670  2  7465  680  2  7465  690  2  7470  690  2  7500 1200  2  7520
3  5300 CSDBA 5  12  5  742   14835  2  4
5  5310        0  1  7540  340  1  7520  410  1  7500  470  1  7480  660  2  7465
5  5311      666  3  7407  670  4  7405  674  4  7407  680  5  7465  750  5  7480
5  5312      950  5  7500 1200  5  7520
6  5313  1  2 070 070  1  2 080 080  1  2 080 080  1  2 080 080  1  2 070 070
3  5400 CSDBR 0  13  3  743   14965  1  3
5  5410     -670  1  7560 -610  1  7540 -420  1  7520 -210  1  7500 -120  1  7480
5  5411      -44  1  7464  -22  2  7469  -15  2  7420  -11  2  7415   -7  2  7420
5  5412        0  3  7481  125  3  7500  500  3  7500
6  5413  1  2 070 070  1  2 080 080  1  2 070 070
3  5420 BR BC 2   5  1  742   14965        0  7463 3 0
5  5421        0  1  7463    0  1  7408    4  1  7408    4  1  7463    0 -9  7463
6  5422  1  2 024 024
3  5430 RD BC 4  11  2   20           1  2           2 2                   1
5  5431     -670  1  7560 -610  1  7540 -420  1  7520  -30  1  7500  -30  1  7470
5  5432      -26  1  7464  -22  1  7469  -10  2  7469    0  2  7481  125  2  7500
5  5433      500  2  7500
3  5500 CSDBC 5  13  5  743   15000  2  4
5  5510     -670  1  7560 -610  1  7540 -420  1  7520 -210  1  7500 -120  1  7480
5  5511      -44  1  7464  -22  2  7469  -15  3  7420  -11  4  7415   -7  4  7420
5  5512        0  5  7481  125  5  7500  500  5  7500
6  5513  1  2 070 070  1  2 080 080  1  2 080 080  1  2 080 080  1  2 070 070
3  5600 CSDBD 0  12  3  743   15395  1  3
5  5610     -550  1  7540 -490  1  7520 -260  1  7500  -50  1  7480    0  1  7473
5  5611       16  2  7468   22  2  7427   29  2  7417   31  2  7429   40  3  7480
5  5612      110  3  7500  300  3  7520
```

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
6  5613  1  2 070 070  1  2 080 080  1  2 070 070
3  5620 BR BE 2   5  1  743   15395        0  7468 3 0
5  5621       0  1  7468   0  1  7413   3  1  7413   3  1  7468   0 -9  7468
6  5622  1  2 024 024
3  5630 RD BE 4   8  2   20          1  2          1 1                  1
5  5631    -700  1  7540 -470  1  7520 -350  1  7500 -152  1  7489   0  2  7492
5  5632     150  2  7502  330  2  7520  700  2  7522
3  5700 CSDBE 5  14  3  744   15480  1  3
5  5710    -700  1  7540 -470  1  7520 -350  1  7500 -152  1  7489   0  1  7492
5  5711      36  2  7488   48  2  7427   56  2  7430   68  3  7487  102  3  7487
5  5712     120  3  7500  250  3  7520  350  3  7540  460  3  7560
6  5713  1  2 050 050  1  2 070 070  1  2 060 060
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 22,DATE=10/25/78

WATER-SURFACE PROFILE FOR: CATTAIL SWAMP DRAIN MT MORRIS TWSP HOLTSLAG
PAGE 1 OF 2, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

```
==================================================================================
SECTD AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /   HV  /   HF  /   HE  /   EG  /    V  /   FN  /   ACC   *TD*
==================================================================================
CSD C AT     1055 /     0 /    200. /    66. /   3456. / 1.00 /  -87. /  -55.
   708.22 /  0.14 /                  / 708.36 /   3.01 /  0.37/          *IS*
----------------------------------------------------------------------------------
CSD D AT     1525 /   470 /    200. /    61. /   3345. / 1.00 /   23. /   51.
   709.84 /  0.16 /  1.63 /   0.01 / 710.01 /   3.26 /  0.39 / 0.007  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
FTBR1 AT     1525 /       /    200. /    61. /   3345. / 1.00 /   23. /   51.
   709.84 /  0.16 /      ...1...  (-.001)    /   3.26 /  0.39 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                *RG*
----------------------------------------------------------------------------------
CSD E AT     1560 /    35 /    200. /    65. /   3636. / 1.00 /   22. /   51.
   709.97 /  0.15 /  0.12 /   0.0  / 710.12 /   3.07 /  0.36 / -0.001  *AS*
----------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /    65. /   3638. / 1.00 /   22. /   51.
   709.98 /  0.15 /                  / 710.12 /   3.07 /  0.36 /          *AS*
============================ END BRIDGE ANALYSIS ================================
CSD F AT     2060 /   500 /    200. /    74. /   5086. / 1.00 /   24. /   49.
   711.09 /  0.11 /  1.08 /   0.0  / 711.20 /   2.71 /  0.27 / 0.002  *XS*
----------------------------------------------------------------------------------
CSD G AT     2500 /   440 /    200. /    62. /   3927. / 1.00 /   32. /   55.
   711.95 /  0.16 /  0.88 /   0.02 / 712.11 /   3.23 /  0.35 / 0.002  *XS*
----------------------------------------------------------------------------------
CSD H AT     3225 /   725 /    200. /    70. /   4531. / 1.00 /   23. /   46.
   713.62 /  0.13 /  1.63 /   0.0  / 713.74 /   2.85 /  0.29 / 0.003  *XS*
----------------------------------------------------------------------------------
CSD I AT     3820 /   595 /    200. /    54. /   3255. / 1.00 /   33. /   53.
   715.19 /  0.21 /  1.61 /   0.04 / 715.40 /   3.69 /  0.39 / 0.003  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
FTBR2 AT     3820 /       /    200. /    53. /   3185. / 1.00 /   33. /   51.
   715.19 /  0.22 /      ...1...  (-.001)    /   3.79 /  0.39 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                *RG*
----------------------------------------------------------------------------------
CSD J AT     3860 /    40 /    200. /    58. /   3203. / 1.00 /   33. /   53.
   715.37 /  0.19 /  0.15 /   0.0  / 715.56 /   3.45 /  0.36 / -0.000  *AS*
----------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /    58. /   3204. / 1.00 /   33. /   53.
```

Sec C is U/S of Elms Rd.

100 YR

Natural channel (encroached on floodplain)

```
709.84 /   0.16 /   1.63 /   0.01 / 710.01 /   3.26 /   0.39 /  0.007   *XS*
=========================== BEGIN BRIDGE ANALYSIS ============================
FTBR1 AT    1525 /       /    200. /    61. /   3345. / 1.00 /   23. /   51.
709.84 /   0.16 /        ...1...  (-.001)    /   3.26 /   0.39 /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /            *RG*
-----------------------------------------------------------------------------
CSD F AT    1560 /    35 /    200. /    65. /   3636. / 1.00 /   22. /   51.
709.97 /   0.15 /   0.12 /   0.0  / 710.12 /   3.07 /   0.36 / -0.001   *AS*
-----------------------------------------------------------------------------
M = 0.0  / E = 1.00 / K* = 0.01 /    65. /   3638. / 1.00 /   22. /   51.
709.98 /   0.15 /                  / 710.12 /   3.07 /   0.36 /          *AS*
=========================== END BRIDGE ANALYSIS ==============================
CSD F AT    2060 /   500 /    200. /    74. /   5086. / 1.00 /   24. /   49.
711.09 /   0.11 /   1.08 /   0.0  / 711.20 /   2.71 /   0.27 /  0.002   *XS*
-----------------------------------------------------------------------------
CSD G AT    2500 /   440 /    200. /    62. /   3927. / 1.00 /   32. /   55.
711.95 /   0.16 /   0.88 /   0.02 / 712.11 /   3.23 /   0.35 /  0.002   *XS*
-----------------------------------------------------------------------------
CSD H AT    3225 /   725 /    200. /    70. /   4531. / 1.00 /   23. /   46.
713.62 /   0.13 /   1.63 /   0.0  / 713.74 /   2.85 /   0.29 /  0.003   *XS*
-----------------------------------------------------------------------------
CSD I AT    3820 /   595 /    200. /    54. /   3255. / 1.00 /   33. /   53.
715.19 /   0.21 /   1.61 /   0.04 / 715.40 /   3.69 /   0.39 /  0.003   *XS*
=========================== BEGIN BRIDGE ANALYSIS ============================
FTBR2 AT    3820 /       /    200. /    53. /   3185. / 1.00 /   33. /   51.
715.19 /   0.22 /        ...1...  (-.001)    /   3.79 /   0.39 /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /            *RG*
-----------------------------------------------------------------------------
CSD J AT    3860 /    40 /    200. /    58. /   3203. / 1.00 /   33. /   53.
715.37 /   0.19 /   0.15 /   0.0  / 715.56 /   3.45 /   0.36 / -0.000   *AS*
-----------------------------------------------------------------------------
M = 0.0  / E = 1.00 / K* = 0.01 /    58. /   3204. / 1.00 /   33. /   53.
715.37 /   0.19 /                  / 715.56 /   3.45 /   0.36 /          *AS*
=========================== END BRIDGE ANALYSIS ==============================
CSD K AT    4690 /   830 /    200. /    67. /   3848. / 1.00 /   92. /  114.
718.11 /   0.14 /   2.69 /   0.0  / 718.25 /   3.00 /   0.30 /  0.001   *XS*
=========================== BEGIN BRIDGE ANALYSIS ============================
FTBR3 AT    4690 /       /    200. /    67. /   3848. / 1.00 /   92. /  114.
718.11 /   0.14 /        ...1...  (-.001)    /   3.00 /   0.30 /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /            *RG*
-----------------------------------------------------------------------------
CSD L AT    4725 /    35 /    200. /    69. /   4023. / 1.00 /   92. /  114.
718.21 /   0.13 /   0.09 /   0.0  / 718.34 /   2.90 /   0.29 / -0.001   *AS*
```

100 YR

```
USGS ST[illegible]-BACKWATER PROGRAM - VERSION 77.180 *** [illegible]GE COUNT=   23.DATE=10/25/78

WATER-SURFACE PROFILE FOR:  CATTAIL SWAMP DRAIN  MT MORRIS TWSP      HOLTSLAG
PAGE  2 OF  2. PROFILE NUMBER  4.   UPSTREAM COMPUTATIONS
=================================================================================
SECTD AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV. /    HV   /    HE   /    HE   /    EG   /    V   /    EN   /   ACC    *ID*
=================================================================================
   M = 0.0  / E = 1.00 / K* = 0.01 /     69. /    4023. / 1.00 /   92. /  114.
  718.21 /   0.13 /                  /  718.34 /   2.90 /   0.29 /              *AS*
============================ END BRIDGE ANALYSIS ============================
CSD M AT     5310 /   585 /    200. /     59. /    2697. / 1.00 /  -33. /  -11.
   720.35 /   0.18 /   2.16 /   0.02 /  720.53 /   3.40 /   0.36 /  0.005   *XS*
============================ BEGIN BRIDGE ANALYSIS ==========================
FTBR4 AT     5310 /        /    200. /     56. /    2573. / 1.00 /  -33. /  -13.
   720.35 /   0.20 /        ...1...  (-.001)    /   3.56 /   0.37 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                *RG*
---------------------------------------------------------------------------------
CSD N AT     5345 /    35 /    200. /     63. /    2964. / 1.00 /  -33. /  -11.
   720.55 /   0.16 /   0.18 /   0.0  /  720.70 /   3.17 /   0.33 / -0.001   *AS*
---------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /     63. /    2965. / 1.00 /  -33. /  -11.
   720.55 /   0.16 /                  /  720.70 /   3.17 /   0.33 /          *AS*
============================ END BRIDGE ANALYSIS ============================
CSD O AT     6190 /   845 /    200. /     90. /    4607. / 1.00 /  -28. /   -0.
   723.09 /   0.08 /   2.47 /   0.0  /  723.17 /   2.23 /   0.22 / -0.006   *XS*
---------------------------------------------------------------------------------
CSD P AT     6530 /   340 /    200. /     80. /    4260. / 1.05 /  -54. /   -5.
   723.78 /   0.10 /   0.69 /   0.01 /  723.88 /   2.50 /   0.26 /  0.001   *XS*
============================ BEGIN BRIDGE ANALYSIS ==========================
FTBR5 AT     6530 /        /    173. /     78. /    4232. / 1.00 /  -30. /   -5.
   723.78 /   0.08 /        ...1...  (-.001)    /   2.22 /   0.22 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        8. / RIGHT        0. /                *RG*
---------------------------------------------------------------------------------
CSD Q AT     6550 /    20 /    200. /     82. /    4367. / 1.07 /  -60. /   -5.
   723.82 /   0.10 /   0.04 /   0.0  /  723.92 /   2.43 /   0.25 / -0.000   *AS*
---------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /     82. /    4368. / 1.07 /  -60. /   -5.
   723.82 /   0.10 /                  /  723.92 /   2.42 /   0.25 /          *AS*
============================ END BRIDGE ANALYSIS ============================
CSD R AT     6810 /   260 /    200. /     67. /    3306. / 1.00 /   24. /   50.
   724.52 /   0.14 /   0.72 /   0.02 /  724.66 /   2.99 /   0.32 /  0.001   *XS*
---------------------------------------------------------------------------------

                          END OF THIS PROFILE
```

100 YR

WATER-SURFACE PROFILE FOR: CATTAIL SWAMP DRAIN WEBSTER-COLDWATER RD HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /    EG  /    V  /    EN  /  ACC   *ID*
==================================================================================
CSD S AT    6875 /     0 /   200. /    81. /  5843. / 1.00 /   23. /   51.
  725.04 /   0.10 /                 / 725.14 /   2.48 /  0.26/          *IS*
----------------------------------------------------------------------------------
CSD T AT    7305 /   430 /   200. /    88. /  4921. / 1.00 /  -79. /  -52.
  725.66 /   0.08 /  0.60 /   0.0 / 725.73 /   2.26 /  0.22 / 0.001   *XS*
----------------------------------------------------------------------------------
CSD U AT    7560 /   255 /   200. /    74. /  3711. / 1.00 /  -80. /  -52.
  726.20 /   0.11 /  0.56 /  0.02 / 726.31 /   2.70 /  0.29 / 0.001   *XS*
----------------------------------------------------------------------------------
CSD V AT    7760 /   200 /   200. /    55. /  2795. / 1.00 /  -47. /  -25.
  726.92 /   0.21 /  0.77 /  0.05 / 727.13 /   3.65 /  0.41 / 0.001   *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BRV-W AT    7760 /       /   210. /    54. /  4961. / 1.00 /    0. /    9.
  719.50 /   0.24 /      ...3...  (-.001)  /   3.89 /  0.28 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /          *RG*
----------------------------------------------------------------------------------
CSD W AT    7790 /    30 /   200. /    55. /  3157. / 1.23 /  -46. /  -25.
  727.03 /   0.26 /  0.14 /  0.02 / 727.29 /   3.66 /  0.41 / -0.000   *AS*
----------------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /    55. /  3157. / 1.23 /  -46. /  -25.
  727.03 /   0.26 /                 / 727.29 /   3.66 /  0.41 /          *AS*
========================== END BRIDGE ANALYSIS ============================
```

100 YR

END OF THIS PROFILE.

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 14,DATE=10/30/78

WATER-SURFACE PROFILE FOR: CATTAIL SWAMP DRAIN V-COLDWATER ROAD HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *TD*
CSD W AT	7790	0	200.	59.	3475.	1.23	-47.	-24.
727.22	0.22			727.44	3.40	0.38		*TS*
CSD X AT	7980	190	200.	83.	4239.	1.29	-52.	48.
727.94	0.12	0.52	0.0	727.96	2.41	0.28	-0.001	*XS*
CSD Y AT	8240	260	200.	82.	3191.	1.51	-43.	42.
728.59	0.14	0.77	0.01	728.73	2.44	0.36	-0.007	*XS*
CSD Z AT	8520	280	200.	80.	4561.	1.12	-74.	-33.
729.39	0.11	0.77	0.0	729.50	2.51	0.26	0.001	*XS*
CSDAA AT	8830	310	200.	66.	4119.	1.02	-136.	34.
730.03	0.15	0.66	0.02	730.18	3.03	0.32	-0.002	*XS*
CSDAB AT	9040	210	200.	67.	4068.	1.00	25.	51.
730.53	0.14	0.50	0.0	730.67	2.97	0.32	-0.010	*XS*
CSDAC AT	9360	320	200.	63.	3665.	1.00	27.	52.
731.35	0.16	0.86	0.01	731.54	3.20	0.35	0.002	*XS*
CSDAD AT	9680	320	200.	65.	3747.	1.22	-54.	71.
732.31	0.18	0.93	0.01	732.48	3.06	0.34	0.000	*XS*
CSDAE AT	9955	275	200.	81.	4579.	1.26	-12.	60.
733.01	0.12	0.64	0.0	733.13	2.48	0.28	0.000	*XS*

END OF THIS PROFILE

V
W
X
100 YR Y
Z

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   29,DATE= 2/13/79


WATER-SURFACE PROFILE FOR:  CATTAIL SWAMP DRAIN COLDWATER - LINDEN   HOLTSLAG
PAGE  1 OF  3, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
=================================================================================
CSDAF AT   10055 /     0 /   175. /    75. /   2796. / 1.00 /   80. /   111.
   733.38 /   0.08 /                 / 733.46 /   2.33 /   0.26/           *IS*
---------------------------------------------------------------------------------
CSDAG AT   10185 /   130 /   175. /    84. /   3860. / 1.00 /  -39. /   -11.
   733.77 /   0.07 /   0.37 /   0.0  / 733.83 /   2.08 /   0.21 /  0.001  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR AH AT   10185 /       / 160. /    55. /   2048. / 1.00 /  -33. /   -15.
   732.90 /   0.13 /        ...3...  (-.001)     /   2.89 /   0.29 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       7. / RIGHT       7. /                 *RG*
---------------------------------------------------------------------------------
CSDAH AT   10210 /    25 /   175. /    84. /   4339. / 1.12 /  -39. /   -11.
   733.81 /   0.07 /   0.05 /   0.00 / 733.88 /   2.07 /   0.20 /  0.000  *AS*
---------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /    87. /   4520. / 1.12 /  -39. /   -11.
   733.90 /   0.07 /                 / 733.97 /   2.01 /   0.19 /          *AS*
============================ END BRIDGE ANALYSIS ================================
CSDAI AT   10455 /   245 /   175. /    68. /   2717. / 1.00 /  -31. /    -4.
   734.49 /   0.10 /   0.61 /   0.02 / 734.60 /   2.58 /   0.29 /  0.001  *XS*
---------------------------------------------------------------------------------
CSDAJ AT   10800 /   345 /   175. /    82. /   3771. / 1.00 /  -44. /   -17.
   735.56 /   0.07 /   1.03 /   0.0  / 735.63 /   2.12 /   0.21 / -0.002  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
CL AK AT   10800 /       / 169. /    33. /   2884. / 1.00 /   -5. /     4.
   735.56 /   0.40 /        ...1...  (-.001)     /   5.07 /   0.46 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       4. / RIGHT       0. /                 *RG*
---------------------------------------------------------------------------------
CSDAK AT   10845 /    45 /   175. /    93. /   4493. / 1.11 /  -46. /   -15.
   735.65 /   0.06 /   0.08 /   0.0  / 735.71 /   1.88 /   0.18 / -0.000  *AS*
---------------------------------------------------------------------------------
   M = 0.66 / E = 0.41 / K* = 1.56 /   122. /   6096. / 1.22 /  -73. /   -13.
   736.29 /   0.04 /                 / 736.33 /   1.44 /   0.14 /          *AS*
============================ END BRIDGE ANALYSIS ================================
CSDAL AT   11110 /   265 /   175. /    67. /   2842. / 1.00 /  -33. /    -9.
   736.73 /   0.11 /   0.47 /   0.03 / 736.84 /   2.63 /   0.28 /  0.001  *XS*
```

100 YR

```
733.38 /    0.08 /                    /  733.46 /    2.33 /    0.26/          *IS*
-----------------------------------------------------------------------------------
CSEAG AT    10185 /    130 /    175. /    84. /    3860. / 1.00 /  -39. /  -11.
733.77 /    0.07 /    0.37 /    0.0  /  733.83 /    2.08 /    0.21 /  0.001  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR AH AT    10185 /        /    160. /    55. /    2048. / 1.00 /  -33. /  -15.
732.90 /    0.13 /        ...3...  (-.001)    /    2.89 /    0.29 /          *BO*
-----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        7. / RIGHT        7. /                *RG*
-----------------------------------------------------------------------------------
CSDAH AT    10210 /     25 /    175. /    84. /    4339. / 1.12 /  -39. /  -11.
733.81 /    0.07 /    0.05 /    0.00 /  733.88 /    2.07 /    0.20 /  0.000  *AS*
-----------------------------------------------------------------------------------
M = **** / E = **** / K* = **** /    87. /    4520. / 1.12 /  -39. /  -11.
733.90 /    0.07 /                    /  733.97 /    2.01 /    0.19 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
CSDAI AT    10455 /    245 /    175. /    68. /    2717. / 1.00 /  -31. /   -4.
734.49 /    0.10 /    0.61 /    0.02 /  734.60 /    2.58 /    0.29 /  0.001  *XS*
-----------------------------------------------------------------------------------
CSDAJ AT    10800 /    345 /    175. /    82. /    3771. / 1.00 /  -44. /  -17.
735.56 /    0.07 /    1.03 /    0.0  /  735.63 /    2.12 /    0.21 / -0.002  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
CL AK AT    10800 /        /    169. /    33. /    2884. / 1.00 /   -5. /    4.
735.56 /    0.40 /        ...1...  (-.001)    /    5.07 /    0.46 /          *BO*
-----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        4. / RIGHT        0. /                *RG*
-----------------------------------------------------------------------------------
CSDAK AT    10845 /     45 /    175. /    93. /    4493. / 1.11 /  -46. /  -15.
735.65 /    0.06 /    0.08 /    0.0  /  735.71 /    1.88 /    0.18 / -0.000  *AS*
-----------------------------------------------------------------------------------
M = 0.66 / E = 0.41 / K* = 1.56 /   122. /    6096. / 1.22 /  -73. /  -13.
736.29 /    0.04 /                    /  736.33 /    1.44 /    0.14 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
CSDAL AT    11110 /    265 /    175. /    67. /    2842. / 1.00 /  -33. /   -9.
736.73 /    0.11 /    0.47 /    0.03 /  736.84 /    2.63 /    0.28 /  0.001  *XS*
-----------------------------------------------------------------------------------
CSDAM AT    11500 /    390 /    175. /    79. /    3749. / 1.00 /  -43. /  -19.
737.88 /    0.08 /    1.12 /    0.0  /  737.96 /    2.21 /    0.21 /  0.001  *XS*
-----------------------------------------------------------------------------------
CSDAN AT    11835 /    335 /    175. /    73. /    3344. / 1.00 /  -68. /  -17.
738.70 /    0.09 /    0.82 /    0.01 /  738.78 /    2.39 /    0.24 /  0.000  *XS*
-----------------------------------------------------------------------------------
CSDAO AT    12110 /    275 /    175. /    75. /    3280. / 1.00 /  -28. /   -1.
739.47 /    0.08 /    0.77 /    0.0  /  739.55 /    2.32 /    0.24 /  0.000  *XS*
-----------------------------------------------------------------------------------
CSDAP AT    12650 /    540 /    175. /    72. /    3122. / 1.00 /  -40. /  -13.
741.08 /    0.09 /    1.61 /    0.00 /  741.18 /    2.42 /    0.26 /  0.004  *XS*
-----------------------------------------------------------------------------------
```

100 YR

100YR

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=  30,DATE= 2/13/79


WATER-SURFACE PROFILE FOR:  CATTAIL SWAMP DRAIN COLDWATER - LINDEN   HOLTSLAG
PAGE  2 OF  3, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /  ACC    *ID*
=================================================================================
CSDAQ AT   13200 /   550 /   175. /    70. /   3037. / 1.01 /  -41. /  -13.
   742.86 /   0.10 /   1.78 /   0.00 /  742.96 /   2.48 /   0.26 /  0.002  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR AR AT   13200 /       /   169. /    31. /   2861. / 1.00 /    0. /    5.
   742.86 /   0.45 /       ...1...  (-.001)     /   5.40 /   0.38 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        2. / RIGHT        4. /               *RG*
---------------------------------------------------------------------------------
CSDAR AT   13235 /    35 /   175. /    74. /   3482. / 1.26 /  -43. /  -13.
   742.96 /   0.11 /   0.10 /   0.01 /  743.06 /   2.37 /   0.26 / -0.000  *AS*
---------------------------------------------------------------------------------
   M = 0.57 / E = 0.78 / K* = 1.33 /    96. /   4794. / 1.30 /  -52. /  -11.
   743.60 /   0.07 /                /  743.67 /   1.81 /   0.19 /          *AS*
============================ END BRIDGE ANALYSIS ================================
100 YR CSDAS AT   13800 /   565 /   175. /    82. /   3725. / 1.00 /    3. /   30.
   744.57 /   0.07 /   0.97 /   0.00 /  744.64 /   2.14 /   0.22 /  0.001  *XS*
---------------------------------------------------------------------------------
CSDAT AT   14150 /   350 /   175. /    93. /   3643. / 1.00 /  221. /  249.
   745.38 /   0.06 /   0.79 /   0.0  /  745.43 /   1.89 /   0.18 /  0.001  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR AU AT   14150 /       /   148. /    22. /   1506. / 1.00 /    0. /    4.
   744.40 /   0.70 /       ...3...  (-.001)     /   6.72 /   0.51 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       15. / RIGHT       13. /               *RG*
---------------------------------------------------------------------------------
CSDAU AT   14190 /    40 /   175. /    78. /   2985. / 1.21 /  221. /  249.
   745.47 /   0.09 /   0.11 /   0.02 /  745.56 /   2.23 /   0.25 /  0.000  *AS*
---------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   114. /   4676. / 1.28 /  198. /  260.
   746.43 /   0.05 /                /  746.47 /   1.53 /   0.14 /          *AS*
============================ END BRIDGE ANALYSIS ================================
CSDAV AT   14470 /   280 /   175. /   101. /   4567. / 1.02 /  339. /  373.
   746.83 /   0.05 /   0.40 /   0.00 /  746.88 /   1.73 /   0.14 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR AW AT   14470 /       /   103. /    22. /   1506. / 1.00 /    0. /    4.
   745.00 /   0.34 /       ...3...  (-.001)     /   4.70 /   0.35 /          *BO*
```

```
-----------------------------------------------------------------------------
CSDAT AT   14150 /   350 /    175. /    93. /    3643. / 1.00 /  221. /  249.
   745.38 /   0.06 /   0.79 /   0.0 /  745.[illegible] /   1.89 /   0.18 /  0.001  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR AU AT   14150 /        /    148. /    22. /    1506. / 1.00 /    0. /    4.
   744.40 /   0.70 /        ...3...  (-.001)    /   6.72 /   0.51 /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       15. / RIGHT       13. /               *RG*
-----------------------------------------------------------------------------
CSDAU AT   14190 /    40 /    175. /    78. /    2985. / 1.21 /  221. /  249.
   745.47 /   0.09 /   0.11 /   0.02 /  745.56 /   2.23 /   0.25 /  0.000  *AS*
-----------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   114. /    4676. / 1.28 /  198. /  260.
   746.43 /   0.05 /                  /  746.47 /   1.53 /   0.14 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
CSDAV AT   14470 /   280 /    175. /   101. /    4567. / 1.02 /  339. /  373.
   746.83 /   0.05 /   0.40 /   0.00 /  746.88 /   1.73 /   0.14 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR AW AT   14470 /        /    103. /    22. /    1506. / 1.00 /    0. /    4.
   745.00 /   0.34 /        ...3...  (-.001)    /   4.70 /   0.35 /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       46. / RIGHT       26. /               *RG*
-----------------------------------------------------------------------------
100 YR CSDAW AT   14505 /    35 /    175. /   103. /    5047. / 1.26 /  336. /  374.
   746.87 /   0.06 /   0.05 /   0.00 /  746.93 /   1.70 /   0.12 / -0.000  *AS*
-----------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   131. /    5979. / 1.53 /  297. /  384.
   747.32 /   0.04 /                  /  747.36 /   1.34 /   0.11 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
CSDAX AT   14615 /   110 /    175. /   312. /    8585. / 1.66 / -139. /  120.
   747.42 /   0.01 /   0.07 /   0.0  /  747.43 /   0.56 /   0.08 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR AY AT   14615 /        /     28. /    22. /    1506. / 1.00 /    0. /    4.
   745.50 /   0.02 /        ...3...  (-.001)    /   1.26 /   0.10 /          *BO*
-----------------------------------------------------------------------------
```

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=  31,DATE= 2/13/79

WATER-SURFACE PROFILE FOR:  CATTAIL SWAMP DRAIN COLDWATER - LINDEN  HOLTSLAG
PAGE  3 OF  3, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
=================================================================================
EMBANKMENT OVERFLOW (CFS) / LEFT       58. / RIGHT       90. /                *RG*
---------------------------------------------------------------------------------
CSDAY AT    14650 /     35 /    175. /    314. /    8830. / 1.87 / -139. /  120.
   747.43 /   0.01 /   0.01 /   0.01 /  747.44 /    0.56 /   0.08 / -0.011   *AS*
---------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /    319. /    8998. / 1.86 / -140. /  122.
   747.45 /   0.01 /                  /  747.46 /    0.55 /   0.08 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
CSDAZ AT    14800 /    150 /    175. /    191. /    7252. / 2.05 /  532. /  727.
   747.51 /   0.03 /   0.07 /   0.01 /  747.54 /    0.91 /   0.11 / -0.000   *XS*
============================ BEGIN BRIDGE ANALYSIS =============================
BR BA AT    14800 /        /     54. /     22. /    1506. / 1.00 /    0. /    4.
   746.00 /   0.09 /       ...3...  (-.001)    /    2.45 /   0.18 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       66. / RIGHT       55. /                *RG*
---------------------------------------------------------------------------------
CSDBA AT    14835 /     35 /    175. /    196. /    6513. / 2.20 /  529. /  728.
   747.54 /   0.03 /   0.02 /   0.00 /  747.56 /    0.89 /   0.10 /  0.000   *AS*
---------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /    217. /    7033. / 2.26 /  516. /  733.
   747.64 /   0.02 /                  /  747.66 /    0.81 /   0.09 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
CSDBB AT    14965 /    130 /    175. /    157. /    5112. / 1.43 / -108. /   -0.
   747.75 /   0.03 /   0.11 /   0.00 /  747.77 /    1.11 /   0.13 /  0.000   *XS*
============================ BEGIN BRIDGE ANALYSIS =============================
BR BC AT    14965 /        /     82. /     22. /    1506. / 1.00 /    0. /    4.
   746.30 /   0.22 /       ...3...  (-.001)    /    3.73 /   0.28 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       82. / RIGHT       13. /                *RG*
---------------------------------------------------------------------------------
CSDBC AT    15000 /     35 /    175. /    161. /    5442. / 1.67 / -110. /   -0.
   747.78 /   0.03 /   0.04 /   0.00 /  747.81 /    1.09 /   0.12 /  0.000   *AS*
---------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /    194. /    6563. / 1.64 / -123. /   -0.
```

100 YR

```
CSDBB AT   14965 /   130 /    175. /    137. /    5112. / 1.43 / -106. /    -0.
   747.75 /   0.03 /   0.11 /   0.00 /  747.77 /   1.11 /   0.13 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR BC AT   14965 /       /     82. /     22. /    1506. / 1.00 /    0. /     4.
   746.30 /   0.22 /        ...3...  (-.001)     /   3.73 /   0.28 /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       82. / RIGHT       13. /               *RG*
-----------------------------------------------------------------------------
CSDBC AT   15000 /    35 /    175. /    161. /    5442. / 1.67 / -110. /    -0.
   747.78 /   0.03 /   0.04 /   0.00 /  747.81 /   1.09 /   0.12 /  0.000  *AS*
-----------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /    194. /    6563. / 1.64 / -123. /    -0.
   748.06 /   0.02 /                 /  748.08 /   0.90 /   0.10 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
CSDBD AT   15395 /   395 /    175. /    172. /    5761. / 1.56 /  -90. /    53.
   748.38 /   0.03 /   0.32 /   0.00 /  748.41 /   1.02 /   0.12 /  0.001  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR BE AT   15395 /       /    102. /     17. /    1004. / 1.00 /    0. /     3.
   746.80 /   0.60 /        ...3...  (-.001)     /   6.21 /   0.47 /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       72. / RIGHT        0. /               *RG*
-----------------------------------------------------------------------------
CSDBE AT   15480 /    85 /    175. /    109. /    5100. / 1.00 /   37. /    68.
   748.46 /   0.04 /   0.09 /   0.01 /  748.50 /   1.61 /   0.15 /  0.000  *AS*
-----------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /    222. /    8277. / 1.75 / -224. /   110.
   749.30 /   0.02 /                 /  749.32 /   0.79 /   0.10 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
```

100 YR

END OF THIS PROFILE

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   27,DATE=10/25/78

WATER-SURFACE PROFILE FOR:  CATTAIL SWAMP DRAIN  MT MORRIS TWSP      HOLTSLAG
PAGE  1 OF  2. PROFILE NUMBER  5.   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HORIZANTAL STATION
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/   AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HE  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
CSD C AT    1055 /      0 /    200. /     66. /   3456. / 1.00 /   -87. /   -55.
   708.22 /   0.14 /                  /  708.36 /    3.01 /   0.37/            *IS*
----------------------------------------------------------------------------------
CSD D AT    1525 /    470 /    200. /     61. /   3345. / 1.00 /    23. /    51.
   709.84 /   0.16 /   1.63 /   0.01 /  710.01 /    3.26 /   0.39 /  0.007   *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
FTBR1 AT    1525 /        /    200. /     61. /   3345. / 1.00 /    23. /    51.
   709.84 /   0.16 /        ...1...  (-.001)    /    3.26 /   0.39 /           *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                *RG*
----------------------------------------------------------------------------------
CSD E AT    1560 /     35 /    200. /     65. /   3636. / 1.00 /    22. /    51.
   709.97 /   0.15 /   0.12 /    0.0 /  710.12 /    3.07 /   0.36 / -0.001   *AS*
----------------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /     65. /   3638. / 1.00 /    22. /    51.
   709.98 /   0.15 /                  /  710.12 /    3.07 /   0.36 /           *AS*
============================ END BRIDGE ANALYSIS ================================
CSD F AT    2060 /    500 /    200. /     74. /   5086. / 1.00 /    24. /    49.
   711.09 /   0.11 /   1.08 /    0.0 /  711.20 /    2.71 /   0.27 /  0.002   *XS*
----------------------------------------------------------------------------------
CSD G AT    2500 /    440 /    200. /     62. /   3927. / 1.00 /    32. /    55.
   711.95 /   0.16 /   0.88 /   0.02 /  712.11 /    3.23 /   0.35 /  0.002   *XS*
----------------------------------------------------------------------------------
CSD H AT    3225 /    725 /    200. /     70. /   4531. / 1.00 /    23. /    46.
   713.62 /   0.13 /   1.63 /    0.0 /  713.74 /    2.85 /   0.29 /  0.003   *XS*
----------------------------------------------------------------------------------
CSD I AT    3820 /    595 /    200. /     54. /   3255. / 1.00 /    33. /    53.
   715.19 /   0.21 /   1.61 /   0.04 /  715.40 /    3.69 /   0.39 /  0.003   *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
FTBR2 AT    3820 /        /    200. /     53. /   3185. / 1.00 /    33. /    51.
   715.19 /   0.22 /        ...1...  (-.001)    /    3.79 /   0.39 /           *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                *RG*
----------------------------------------------------------------------------------
CSD J AT    3860 /     40 /    200. /     58. /   3203. / 1.00 /    33. /    53.
   715.37 /   0.19 /   0.15 /    0.0 /  715.56 /    3.45 /   0.36 / -0.000   *AS*
```

ENCROACHMENT RUN - USED FOR FW

FW

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709.08 /   0.15 /                    / 710.12 /   3.07 /   0.36 /                *AS*
========================= END BRIDGE ANALYSIS ==========================
CSD F AT     2060 /    500 /    200. /    74. /    5086. / 1.00 /   24. /   49.
  711.09 /   0.11 /   1.08 /   0.0  /  711.20 /   2.71 /   0.27 /  0.002  *XS*
-----------------------------------------------------------------------
CSD G AT     2500 /    440 /    200. /    62. /    3927. / 1.00 /   32. /   55.
  711.95 /   0.16 /   0.88 /   0.02 /  712.11 /   3.23 /   0.35 /  0.002  *XS*
-----------------------------------------------------------------------
CSD H AT     3225 /    725 /    200. /    70. /    4531. / 1.00 /   23. /   46.
  713.62 /   0.13 /   1.63 /   0.0  /  713.74 /   2.85 /   0.29 /  0.003  *XS*
-----------------------------------------------------------------------
CSD I AT     3820 /    595 /    200. /    54. /    3255. / 1.00 /   33. /   53.
  715.19 /   0.21 /   1.61 /   0.04 /  715.40 /   3.69 /   0.39 /  0.003  *XS*
========================= BEGIN BRIDGE ANALYSIS ========================
FTBR2 AT     3820 /        /    200. /    53. /    3185. / 1.00 /   33. /   51.
  715.19 /   0.22 /        ...1...  (-.001)    /   3.79 /   0.39 /         *BO*
-----------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /             *RG*
-----------------------------------------------------------------------
CSD J AT     3860 /     40 /    200. /    58. /    3203. / 1.00 /   33. /   53.
  715.37 /   0.19 /   0.15 /   0.0  /  715.56 /   3.45 /   0.36 / -0.000  *AS*
-----------------------------------------------------------------------
  M = 0.0  / E = 1.00 / K* = 0.01 /     58. /    3204. / 1.00 /   33. /   53.
  715.37 /   0.19 /                   /  715.56 /   3.45 /   0.36 /         *AS*
========================= END BRIDGE ANALYSIS ==========================
CSD K AT     4690 /    830 /    200. /    67. /    3848. / 1.00 /   92. /  114.
  718.11 /   0.14 /   2.69 /   0.0  /  718.25 /   3.00 /   0.30 /  0.001  *XS*
========================= BEGIN BRIDGE ANALYSIS ========================
FTBR3 AT     4690 /        /    200. /    67. /    3848. / 1.00 /   92. /  114.
  718.11 /   0.14 /        ...1...  (-.001)    /   3.00 /   0.30 /         *BO*
-----------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /             *RG*
-----------------------------------------------------------------------
CSD L AT     4725 /     35 /    200. /    69. /    4023. / 1.00 /   92. /  114.


  718.21 /   0.13 /   0.09 /   0.0  /  718.34 /   2.90 /   0.29 / -0.001  *AS*
-----------------------------------------------------------------------
```

FW

```
WATER-SURFACE PROFILE FOR:  CATTAIL SWAMP DRAIN  MT MORRIS TWSP      HOLTSLAG
PAGE  2 OF  2. PROFILE NUMBER  5.   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HORIZANTAL STATION
==========================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==========================================================================
   M = 0.0  / E = 1.00 / K* = 0.01 /    69. /    4023. / 1.00 /   92. /  114.
   718.21 /   0.13 /                  / 718.34 /   2.90 /   0.29 /          *AS*
============================ END BRIDGE ANALYSIS ============================
CSD M AT     5310 /   585 /    200. /    59. /    2697. / 1.00 /  -33. /  -11.
   720.35 /   0.18 /   2.16 /   0.02 / 720.53 /   3.40 /   0.36 /  0.005  *XS*
=========================== BEGIN BRIDGE ANALYSIS ==========================
FTBR4 AT     5310 /        /    200. /    56. /    2573. / 1.00 /  -33. /  -13.
   720.35 /   0.20 /       ...1...  (-.001)    /   3.56 /   0.37 /          *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /             *RG*
--------------------------------------------------------------------------
CSD N AT     5345 /    35 /    200. /    63. /    2964. / 1.00 /  -33. /  -11.
   720.55 /   0.16 /   0.18 /   0.0  / 720.70 /   3.17 /   0.33 / -0.001  *AS*
--------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /    63. /    2965. / 1.00 /  -33. /  -11.
   720.55 /   0.16 /                  / 720.70 /   3.17 /   0.33 /          *AS*
============================ END BRIDGE ANALYSIS ============================
CSD O AT     6190 /   845 /    200. /    90. /    4607. / 1.00 /  -28. /   -0.
   723.09 /   0.08 /   2.47 /   0.0  / 723.17 /   2.23 /   0.22 / -0.006  *XS*
--------------------------------------------------------------------------
CSD P AT     6530 /   340 /    200. /    79. /    4264. / 1.02 /  -35. /   -5.
   723.78 /   0.10 /   0.69 /   0.01 / 723.88 /   2.54 /   0.26 /  0.001  *XS*
=========================== BEGIN BRIDGE ANALYSIS ==========================
FTBR5 AT     6530 /        /    173. /    78. /    4231. / 1.00 /  -30. /   -5.
   723.78 /   0.08 /       ...1...  (-.001)    /   2.22 /   0.22 /          *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        7. / RIGHT        0. /             *RG*
--------------------------------------------------------------------------
CSD Q AT     6550 /    20 /    200. /    80. /    4367. / 1.02 /  -35. /   -5.
   723.82 /   0.10 /   0.04 /   0.0  / 723.92 /   2.50 /   0.25 / -0.000  *AS*
--------------------------------------------------------------------------
   M = 0.0  / E = 1.00 / K* = 0.01 /    80. /    4368. / 1.02 /  -35. /   -5.
   723.82 /   0.10 /                  / 723.92 /   2.50 /   0.25 /          *AS*
============================ END BRIDGE ANALYSIS ============================
CSD R AT     6810 /   260 /    200. /    67. /    3305. / 1.00 /   24. /   50.
   724.52 /   0.14 /   0.72 /   0.02 / 724.66 /   2.99 /   0.32 /  0.001  *XS*
--------------------------------------------------------------------------
```

FW

END OF THIS PROFILE

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=  12,DATE=10/25/78

WATER-SURFACE PROFILE FOR:  CATTAIL SWAMP DRAIN WEBSTER-COLDWATER RD HOLTSLAG
PAGE  1 OF  1, PROFILE NUMBER  4,   UPSTREAM COMPUTATIONS
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /     HV  /     HF  /     HE  /     EG  /     V   /    EN  /   ACC   *ID*
==================================================================================
CSD S AT     6875 /      0 /    200. /    81. /    5843. / 1.00 /   23. /   51.
   725.04 /   0.10 /                   / 725.14 /    2.48 /  0.26 /          *IS*
----------------------------------------------------------------------------------
CSD T AT     7305 /    430 /    200. /    88. /    4921. / 1.00 /  -79. /  -52.
   725.66 /   0.08 /   0.60 /    0.0  / 725.73 /    2.26 /  0.22 /  0.001   *XS*
----------------------------------------------------------------------------------
CSD U AT     7560 /    255 /    200. /    74. /    3711. / 1.00 /  -80. /  -52.
   726.20 /   0.11 /   0.56 /   0.02  / 726.31 /    2.70 /  0.29 /  0.001   *XS*
----------------------------------------------------------------------------------
CSD V AT     7760 /    200 /    200. /    55. /    2795. / 1.00 /  -47. /  -25.
   726.92 /   0.21 /   0.77 /   0.05  / 727.13 /    3.65 /  0.41 /  0.001   *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BRV-W AT     7760 /        /    210. /    54. /    4961. / 1.00 /    0. /    9.
   719.50 /   0.24 /        ...3...  (=.001)   /    3.89 /  0.28 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT        0. /                *RG*
----------------------------------------------------------------------------------
CSD W AT     7790 /     30 /    200. /    55. /    3157. / 1.23 /  -46. /  -25.
   727.03 /   0.26 /   0.14 /   0.02  / 727.29 /    3.66 /  0.41 / -0.000   *AS*
----------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /    55. /    3157. / 1.23 /  -46. /  -25.
   727.03 /   0.26 /                  / 727.29 /    3.66 /  0.41 /          *AS*
========================== END BRIDGE ANALYSIS ============================

                          END OF THIS PROFILE.
```

FW

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YR

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 19.DATE=10/30/78

WATER-SURFACE PROFILE FOR: CATTAIL SWAMP DRAIN V-COLDWATER ROAD HOLTSLAG
PAGE 1 OF 1, PROFILE NUMBER 5. UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HORIZATAL SPECIFICAT

SECTO AT DISTANCE/ LENGTH/DISCHARGE/ AREA /CONVEYANCE/ ALPHA/ LEW / REW WS ELEV / HV / HE / HF / EG / V / FN / ACC *TO*										
CSD W AT	7790 /	0 /	200. /	59. /	3475. /	1.23 /	-47. /	-24.		
727.22 /	0.22 /		/	727.44 /	3.40 /	0.38/		*TS*		
CSD X AT	7980 /	190 /	200. /	79. /	4241. /	1.16 /	-52. /	-2.		
727.94 /	0.12 /	0.52 /	0.0 /	727.96 /	2.53 /	0.28 /	0.000	*XS*		
CSD Y AT	8240 /	260 /	200. /	69. /	3053. /	1.24 /	-43. /	7.		
728.62 /	0.16 /	0.80 /	0.02 /	728.79 /	2.90 /	0.37 /	-0.000	*XS*		
CSD Z AT	8520 /	280 /	200. /	82. /	4729. /	1.13 /	-73. /	-33.		
729.46 /	0.10 /	0.78 /	0.0 /	729.56 /	2.43 /	0.25 /	0.001	*XS*		
CSDAA AT	8830 /	310 /	200. /	66. /	4183. /	1.00 /	11. /	34.	FW	
730.07 /	0.14 /	0.63 /	0.02 /	730.21 /	3.03 /	0.31 /	0.001	*XS*		
CSDAB AT	9040 /	210 /	200. /	68. /	4140. /	1.00 /	25. /	51.		
730.57 /	0.13 /	0.49 /	0.0 /	730.70 /	2.93 /	0.32 /	0.006	*XS*		
CSDAC AT	9360 /	320 /	200. /	63. /	3689. /	1.00 /	27. /	52.		
731.40 /	0.16 /	0.84 /	0.01 /	731.55 /	3.18 /	0.35 /	0.002	*XS*		
CSDAD AT	9680 /	320 /	200. /	65. /	3758. /	1.19 /	17. /	65.		
732.31 /	0.18 /	0.92 /	0.01 /	732.49 /	3.09 /	0.34 /	0.001	*XS*		
CSDAE AT	9955 /	275 /	200. /	77. /	4569. /	1.17 /	10. /	60.		
733.01 /	0.12 /	0.64 /	0.0 /	733.13 /	2.59 /	0.28 /	-0.000	*XS*		

END OF THIS PROFILE

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   37,DATE= 2/13/79


WATER-SURFACE PROFILE FOR:  CATTAIL SWAMP DRAIN COLDWATER - LINDEN   HOLTSLAG
PAGE  1 OF  3, PROFILE NUMBER  5,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HORIZANTAL SPECIFICA
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
=================================================================================
CSDAF AT   10055 /     0 /    175. /    75. /    2796. / 1.00 /   80. /  111.
   733.38 /   0.08 /                 / 733.46 /   2.33 /  0.26/          *IS*
---------------------------------------------------------------------------------
CSDAG AT   10185 /   130 /    175. /    84. /    3860. / 1.00 /  -39. /  -11.
   733.77 /   0.07 /   0.37 /   0.0  / 733.83 /   2.08 /  0.21 /  0.001  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR AH AT   10185 /        /    160. /    55. /    2048. / 1.00 /  -33  /  -15.
   732.90 /   0.13 /       ...3...  (-.001)    /   2.89 /  0.29 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       7. / RIGHT       7. /                *RG*
---------------------------------------------------------------------------------
CSDAH AT   10210 /    25 /    175. /    84. /    4339. / 1.12 /  -39. /  -11.
   733.81 /   0.07 /   0.05 /   0.00 / 733.88 /   2.07 /  0.20 /  0.000  *AS*
---------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /    87. /    4520. / 1.12 /  -39. /  -11.
   733.90 /   0.07 /                 / 733.97 /   2.01 /  0.19 /          *AS*
============================ END BRIDGE ANALYSIS ================================
CSDAI AT   10455 /   245 /    175. /    68. /    2717. / 1.00 /  -31. /   -4.
   734.49 /   0.10 /   0.61 /   0.02 / 734.60 /   2.58 /  0.29 /  0.001  *XS*
---------------------------------------------------------------------------------
CSDAJ AT   10800 /   345 /    175. /    82. /    3771. / 1.00 /  -44. /  -17.
   735.56 /   0.07 /   1.03 /   0.0  / 735.63 /   2.12 /  0.21 / -0.002  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
CL AK AT   10800 /        /    169. /    33. /    2884. / 1.00 /   -5. /    4.
   735.56 /   0.40 /       ...1...  (-.001)    /   5.07 /  0.46 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       4. / RIGHT       0. /                *RG*
---------------------------------------------------------------------------------
CSDAK AT   10845 /    45 /    175. /    93. /    4493. / 1.11 /  -46. /  -15.
   735.65 /   0.06 /   0.08 /   0.0  / 735.71 /   1.88 /  0.18 / -0.000  *AS*
---------------------------------------------------------------------------------
   M = 0.66 / E = 0.42 / K* = 1.56 /   117. /    6054. / 1.15 /  -53. /  -13.
   736.29 /   0.04 /                 / 736.33 /   1.50 /  0.14 /          *AS*
============================ END BRIDGE ANALYSIS ================================
CSDAL AT   11110 /   265 /    175. /    67. /    2843. / 1.00 /  -33. /   -9.
   736.73 /   0.11 /   0.47 /   0.03 / 736.84 /   2.62 /  0.28 /  0.001  *XS*
```

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```
   733.38 /   0.08 /                    /  733.46 /   2.33 /   0.26/          *IS*
-------------------------------------------------------------------------------
CSDAG AT   10185 /   130 /    175. /    84. /    3860. / 1.00 /  -39. /  -11.
   733.77 /   0.07 /   0.37 /   0.0  /  733.83 /   2.08 /   0.21 /  0.001  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR AH AT   10185 /       /    160. /    55. /    2048. / 1.00 /  -33  /  -15.
   732.90 /   0.13 /        ...3...  (-.001)    /   2.89 /   0.29 /          *BO*
-------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        7. / RIGHT        7. /               *RG*
-------------------------------------------------------------------------------
CSDAH AT   10210 /    25 /    175. /    84. /    4339. / 1.12 /  -39. /  -11.
   733.81 /   0.07 /   0.05 /   0.00 /  733.88 /   2.07 /   0.20 /  0.000  *AS*
-------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /    87. /    4520. / 1.12 /  -39. /  -11.
   733.90 /   0.07 /                    /  733.97 /   2.01 /   0.19 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
CSDAI AT   10455 /   245 /    175. /    68. /    2717. / 1.00 /  -31. /   -4.
   734.49 /   0.10 /   0.61 /   0.02 /  734.60 /   2.58 /   0.29 /  0.001  *XS*
-------------------------------------------------------------------------------
CSDAJ AT   10800 /   345 /    175. /    82. /    3771. / 1.00 /  -44. /  -17.
   735.56 /   0.07 /   1.03 /   0.0  /  735.63 /   2.12 /   0.21 / -0.002  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
CL AK AT   10800 /       /    169. /    33. /    2884. / 1.00 /   -5. /    4.
   735.56 /   0.40 /        ...1...  (-.001)    /   5.07 /   0.46 /          *BO*
-------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        4. / RIGHT        0. /               *RG*
-------------------------------------------------------------------------------
CSDAK AT   10845 /    45 /    175. /    93. /    4493. / 1.11 /  -46. /  -15.
   735.65 /   0.06 /   0.08 /   0.0  /  735.71 /   1.88 /   0.18 / -0.000  *AS*
-------------------------------------------------------------------------------
   M = 0.66 / E = 0.42 / K* = 1.56 /   117. /    6054. / 1.15 /  -53. /  -13.
   736.29 /   0.04 /                    /  736.33 /   1.50 /   0.14 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
CSDAL AT   11110 /   265 /    175. /    67. /    2843. / 1.00 /  -33. /   -9.
   736.73 /   0.11 /   0.47 /   0.03 /  736.84 /   2.62 /   0.28 /  0.001  *XS*
-------------------------------------------------------------------------------
CSDAM AT   11500 /   390 /    175. /    79. /    3749. / 1.00 /  -43. /  -19.
   737.88 /   0.08 /   1.12 /   0.0  /  737.96 /   2.21 /   0.21 /  0.002  *XS*
-------------------------------------------------------------------------------
CSDAN AT   11835 /   335 /    175. /    73. /    3344. / 1.00 /  -41. /  -17.
   738.70 /   0.09 /   0.82 /   0.01 /  738.78 /   2.40 /   0.24 /  0.001  *XS*
-------------------------------------------------------------------------------
CSDAO AT   12110 /   275 /    175. /    75. /    3281. / 1.00 /  -28. /   -1.
   739.47 /   0.08 /   0.77 /   0.0  /  739.55 /   2.32 /   0.24 /  0.000  *XS*
-------------------------------------------------------------------------------
CSDAP AT   12650 /   540 /    175. /    72. /    3122. / 1.00 /  -40. /  -13.
   741.08 /   0.09 /   1.61 /   0.00 /  741.18 /   2.42 /   0.26 /  0.004  *XS*
-------------------------------------------------------------------------------
```

FW

FW

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USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   38,DATE= 2/13/79


WATER-SURFACE PROFILE FOR:  CATTAIL SWAMP DRAIN COLDWATER - LINDEN   HOLTSLAG
PAGE  2 OF  3, PROFILE NUMBER  5,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HORIZANTAL SPECIFICA
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /   FN  /   ACC    *ID*
=================================================================================
CSDAQ AT   13200 /   550 /    175. /    70. /    3037. / 1.01 /  -41. /  -13.
   742.86 /   0.10 /   1.78 /   0.00 / 742.96 /   2.48 /   0.26 /  0.002  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR AR AT   13200 /        /    169. /    31. /    2861. / 1.00 /    0. /    5.
   742.86 /   0.45 /        ...1...  (-.001)    /   5.40 /   0.38 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       2. / RIGHT       4. /                *RG*
---------------------------------------------------------------------------------
CSDAR AT   13235 /    35 /    175. /    74. /    3485. / 1.25 /  -43. /  -13.
   742.96 /   0.11 /   0.10 /   0.01 / 743.06 /   2.37 /   0.26 /  0.000  *AS*
---------------------------------------------------------------------------------
   M = 0.57 / E = 0.77 / K* = 1.32 /    93. /    4758. / 1.24 /  -43. /  -13.
   743.60 /   0.07 /                  / 743.66 /   1.88 /   0.20 /          *AS*
============================ END BRIDGE ANALYSIS ================================
CSDAS AT   13800 /   565 /    175. /    82. /    3727. / 1.00 /    3 /   30.
   744.57 /   0.07 /   0.98 /   0.00 / 744.64 /   2.14 /   0.22 /  0.000  *XS*
---------------------------------------------------------------------------------
CSDAT AT   14150 /   350 /    175. /    93. /    3644. / 1.00 /  221. /  249.
   745.38 /   0.06 /   0.79 /   0.0  / 745.43 /   1.89 /   0.18 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR AU AT   14150 /        /    148. /    22. /    1506. / 1.00 /    0. /    4.
   744.40 /   0.70 /        ...3...  (-.001)    /   6.72 /   0.50 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      15. / RIGHT      13. /                *RG*
---------------------------------------------------------------------------------
CSDAU AT   14190 /    40 /    175. /    79. /    2986. / 1.21 /  221. /  249.
   745.47 /   0.09 /   0.11 /   0.02 / 745.56 /   2.23 /   0.25 /  0.000  *AS*
---------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   106. /    4544. / 1.18 /  220. /  250.
   746.42 /   0.05 /                  / 746.47 /   1.64 /   0.14 /          *AS*
============================ END BRIDGE ANALYSIS ================================
CSDAV AT   14470 /   280 /    175. /   102. /    4582. / 1.02 /  338. /  373.
   746.84 /   0.05 /   0.41 /   0.0  / 746.88 /   1.72 /   0.14 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
```

```
   744.57 /   0.07 /   0.98 /   0.00 /  744.64 /   2.14 /   0.22 /  0.000   *XS*
-------------------------------------------------------------------------------
CSDAT AT   14150 /   350 /   175. /   9[illegible] /   3644. / 1.00 /  221. /  249.
   745.38 /   0.06 /   0.79 /   0.0  /  745.43 /   1.89 /   0.18 /  0.000   *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR AU AT   14150 /       /   148. /    22. /   1506. / 1.00 /    0. /    4.
   744.40 /   0.70 /        ...3...  (-.001)     /   6.72 /   0.50 /         *BO*
-------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      15. / RIGHT      13. /                *RG*
-------------------------------------------------------------------------------
CSDAU AT   14190 /    40 /   175. /    79. /   2986. / 1.21 /  221. /  249.
   745.47 /   0.09 /   0.11 /   0.02 /  745.56 /   2.23 /   0.25 /  0.000   *AS*
-------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   106. /   4544. / 1.18 /  220. /  250.
   746.42 /   0.05 /                  /  746.47 /   1.64 /   0.14 /         *AS*
============================ END BRIDGE ANALYSIS ==============================
CSDAV AT   14470 /   280 /   175. /   102. /   4582. / 1.02 /  338. /  373.
   746.84 /   0.05 /   0.41 /   0.0  /  746.88 /   1.72 /   0.14 /  0.000   *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR AW AT   14470 /       /   103. /    22. /   1506. / 1.00 /    0. /    4.
   745.00 /   0.34 /        ...3...  (-.001)     /   4.69 /   0.35 /         *BO*
-------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      47. / RIGHT      26. /                *RG*
-------------------------------------------------------------------------------
CSDAW AT   14505 /    35 /   175. /   103. /   5063. / 1.26 /  335. /  374.
   746.88 /   0.06 /   0.05 /   0.00 /  746.94 /   1.70 /   0.12 / -0.000   *AS*
-------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   121. /   5926. / 1.34 /  335. /  375.
   747.33 /   0.04 /                  /  747.37 /   1.45 /   0.11 /         *AS*
============================ END BRIDGE ANALYSIS ==============================
CSDAX AT   14615 /   110 /   175. /   196. /   6766. / 1.31 /  -50. /   50.
   747.44 /   0.02 /   0.08 /   0.0  /  747.46 /   0.89 /   0.10 /  0.000   *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR AY AT   14615 /       /    29. /    22. /   1506. / 1.00 /    0. /    4.
```

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```
   745.50 /   0.03 /        ...3...  (-.001)     /   1.30 /   0.10 /         *BO*
-------------------------------------------------------------------------------
```

```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=  39,DATE= 2/13/79


WATER-SURFACE PROFILE FOR:  CATTAIL SWAMP DRAIN COLDWATER - LINDEN  HOLTSLAG
PAGE  3 OF  3, PROFILE NUMBER  5,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HORIZANTAL SPECIFICA
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
=================================================================================
EMBANKMENT OVERFLOW (CFS) / LEFT      57. / RIGHT      89. /                 *RG*
---------------------------------------------------------------------------------
CSDAY AT  14650 /    35 /    175. /   198. /    7035. / 1.46 /  -50. /    50.
   747.46 /   0.02 /   0.02 /   0.00 /  747.48 /   0.88 /   0.10 / -0.000  *AS*
---------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   198. /    7042. / 1.46 /  -50. /    50.
   747.46 /   0.02 /                 /  747.48 /   0.88 /   0.10 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
CSDAZ AT  14800 /   150 /    175. /   148. /    7001. / 1.40 /  625. /   695.
   747.55 /   0.03 /   0.09 /   0.01 /  747.58 /   1.18 /   0.12 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS =============================
BR BA AT  14800 /       /     52. /    22. /    1506. / 1.00 /    0. /     4.
   746.00 /   0.09 /       ...3...  (-.001)    /   2.36 /   0.18 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      67. / RIGHT      56. /                 *RG*
---------------------------------------------------------------------------------
CSDBA AT  14835 /    35 /    175. /   154. /    6288. / 1.55 /  620. /   695.
   747.57 /   0.03 /   0.02 /   0.00 /  747.61 /   1.14 /   0.10 /  0.000  *AS*
---------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   160. /    6573. / 1.54 /  620. /   695.
   747.66 /   0.03 /                 /  747.69 /   1.09 /   0.10 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
CSDBB AT  14965 /   130 /    175. /   124. /    4704. / 1.16 /  -50. /    -0.
   747.78 /   0.04 /   0.13 /   0.00 /  747.82 /   1.42 /   0.14 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS =============================
BR BC AT  14965 /       /     80. /    22. /    1506. / 1.00 /    0. /     4.
   746.30 /   0.20 /       ...3...  (-.001)    /   3.62 /   0.27 /          *BO*
---------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      83. / RIGHT      13. /                 *RG*
---------------------------------------------------------------------------------
CSDBC AT  15000 /    35 /    175. /   126. /    5009. / 1.33 /  -50. /    -0.
   747.83 /   0.04 /   0.05 /   0.00 /  747.87 /   1.39 /   0.13 /  0.000  *AS*
---------------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   138. /    5643. / 1.30 /  -50. /    -0.
```

FW

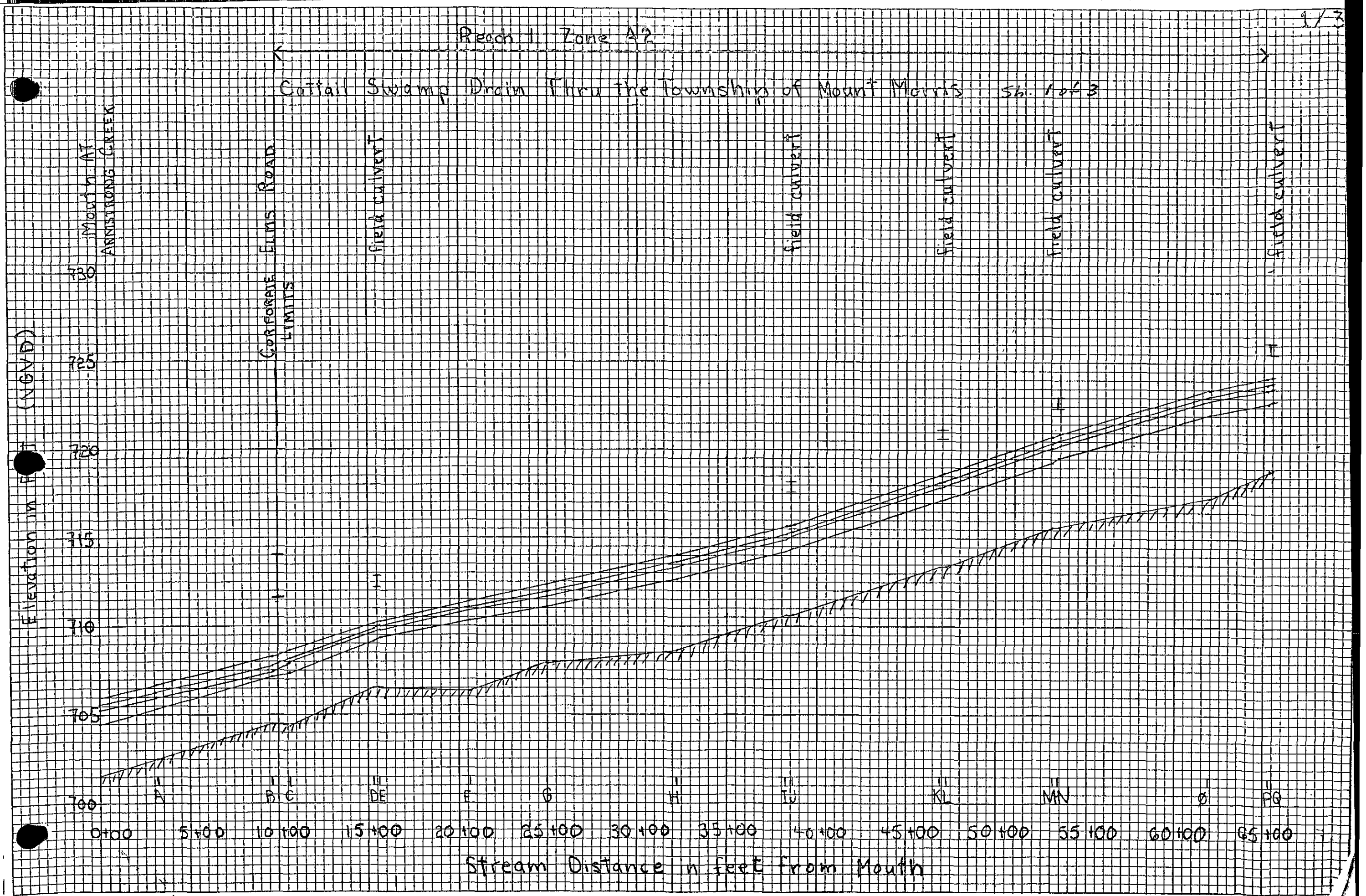
```
CSDBA AT    14835 /     35 /     175. /    156. /     6288. / 1.55 /  620. /  695.
  747.57 /   0.03 /   0.02 /   0.00 /  747.61 /   1.14 /   0.10 /  0.000  *AS*
-----------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /    160. /     6573. / 1.54 /  620. /  695.
   747.66 /   0.03 /                 /  747.69 /   1.09 /   0.10 /        *AS*
============================ END BRIDGE ANALYSIS ============================
CSDBB AT    14965 /    130 /     175. /    124. /     4704. / 1.16 /  -50. /   -0.
  747.78 /   0.04 /   0.13 /   0.00 /  747.82 /   1.42 /   0.14 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ==========================
BR BC AT    14965 /        /      80. /     22. /     1506. / 1.00 /    0. /    4.
   746.30 /   0.20 /          ...3...  (-.001)  /    3.62 /   0.27 /        *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      83. / RIGHT      13. /                *RG*
-----------------------------------------------------------------------------
CSDBC AT    15000 /     35 /     175. /    126. /     5009. / 1.33 /  -50. /   -0.
  747.83 /   0.04 /   0.05 /   0.00 /  747.87 /   1.39 /   0.13 /  0.000  *AS*
-----------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /    138. /     5643. / 1.30 /  -50. /   -0.
   748.07 /   0.03 /                 /  748.10 /   1.27 /   0.11 /        *AS*
============================ END BRIDGE ANALYSIS ============================
CSDBD AT    15395 /    395 /     175. /    135. /     5587. / 1.14 /   -5. /   45.
  748.46 /   0.03 /   0.38 /   0.0  /  748.49 /   1.29 /   0.12 /  0.001  *XS*
FW
============================ BEGIN BRIDGE ANALYSIS ==========================
BR BE AT    15395 /        /      99. /     17. /     1004. / 1.00 /    0. /    3.
   746.80 /   0.56 /          ...3...  (-.001)  /    6.01 /   0.45 /        *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT      75. / RIGHT       0. /                *RG*
-----------------------------------------------------------------------------
CSDBE AT    15480 /     85 /     175. /    111. /     5250. / 1.00 /   37. /   68.
  748.54 /   0.04 /   0.09 /   0.00 /  748.58 /   1.57 /   0.15 /  0.000  *AS*
-----------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /    145. /     7335. / 1.07 /   25. /   75.
   749.31 /   0.02 /                 /  749.33 /   1.21 /   0.11 /        *AS*


============================ END BRIDGE ANALYSIS ============================

                          END OF THIS PROFILE
```

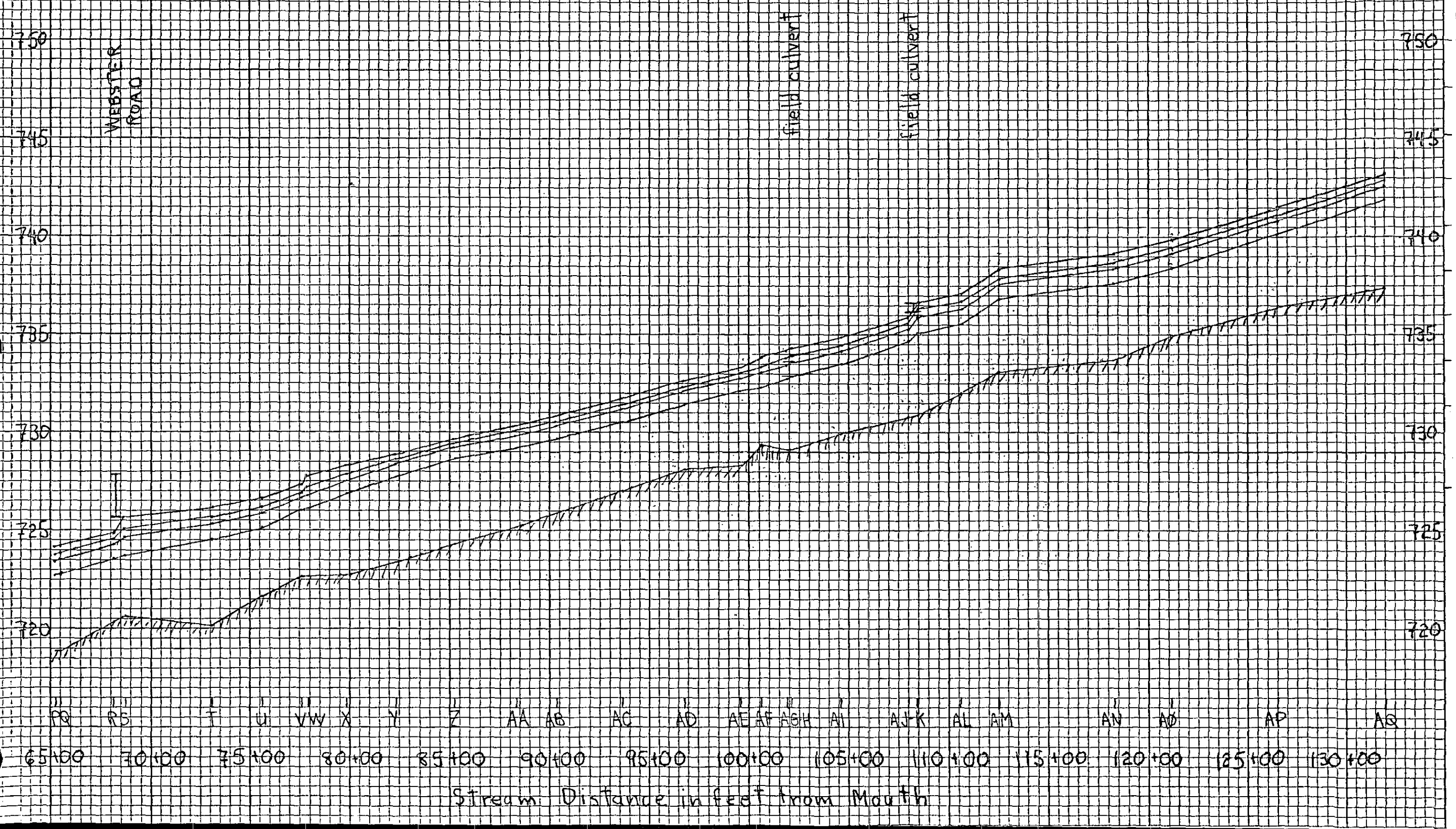
Reach 1 Zone A?

Cattail Swamp Drain Thru the Township of Mount Morris Sh. 1 of 3



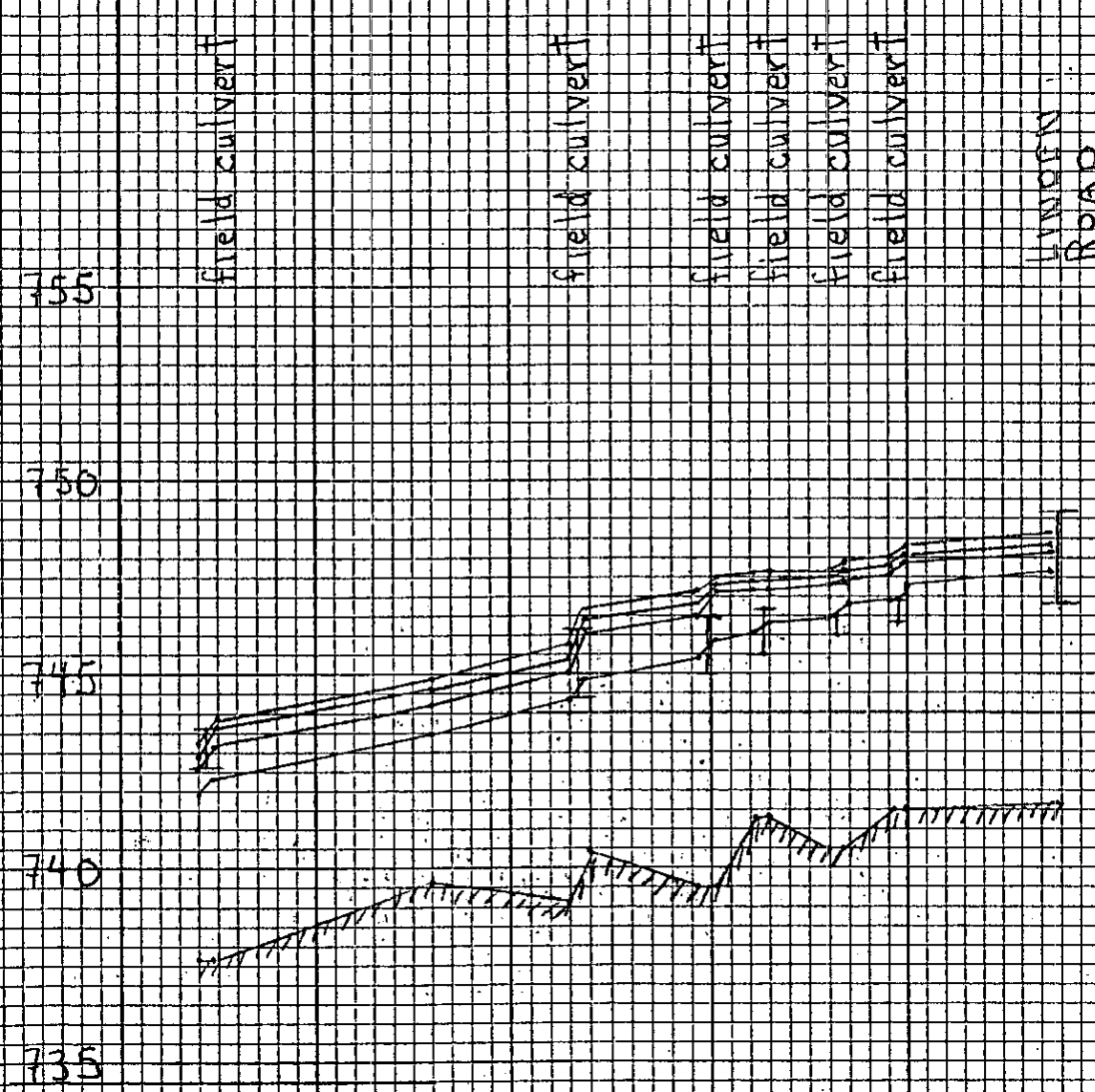
Reach 1 Zone A2

Cattail Swamp Drain Thru The Township of Mount Morris Sh. 2 of 5



Reach 1 Zone A2

Cattail Swamp Drain Thru The Township of Mount Morris SH. 3 of 3



*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1   211 HARTSHORN DRAIN, PASADENA AVE TO SECT. J     VH      3  5  2  5 12
2   212  70864  70986  71182  71052  71052
3   213   H   1  16  3  704     2590 99 99
4   214    410     570     860     660     660
5   215       0 -1  7218   50  1  7200   90  1  7180  128  1  7160  160  1  7133
5   216     210  1  7105  235  2  7081  240  2  7037  245  2  7034  250  2  7040
5   217     261  3  7090  276  3  7114  335  3  7158  402  3  7180  414  3  7200
5   218     442  3  7220
6   219  0  1 040 040  0  1 032 032  0  1 045 045
3   243   I   0  21  3  705     2930 99 99
5   245       0 -1  7219  180  1  7200  183  1  7180  193  1  7160  210  1  7140
5   246     232  1  7120  280  2  7100  290  2  7080  303  2  7060  304  2  7042
5   247     309  2  7040  316  2  7042  317  2  7060  323  2  7080  332  3  7100
5   248     349  3  7120  363  3  7140  372  3  7160  396  3  7180  510  3  7200
5   249     585  3  7220
6   250  0  1 045 045  0  1 045 045  0  1 040 040
3   273   J   0  18  3  706     3260 99 99
5   275       0  1  7200   70  1  7180   97  1  7160  109  1  7140  116  1  7134
5   276     141  1  7112  186  1  7110  197  2  7100  208  2  7046  221  2  7046
5   277     233  2  7100  239  3  7120  246  3  7122  256  3  7128  280  3  7140
5   278     296  3  7160  327  3  7180  380  3  7200
6   279  0  1 075 075  0  1 060 060  0  1 050 050
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 10,DATE=10/26/78

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN, PASADENA AVE TO SECT. J VH
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS P 100

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
H AT 2590	0	660.	174.	19366.	1.29	210.	270.	
710.52	0.29			710.81	3.79	0.34		*IS*
I AT 2930	340	660.	233.	17937.	1.11	254.	341.	
711.10	0.14	0.43	0.0	711.24	2.83	0.26	0.000	*XS*
J AT 3260	330	660.	236.	13889.	1.27	136.	238.	
711.67	0.15	0.58	0.01	711.82	2.79	0.26	0.001	*XS*

100 YR

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN, PASADENA AVE TO SECT. J VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*	
H	AT	2590	0	660.	174.	19366.	1.29	210.	270.	
710.52		0.29			710.81	3.79	0.34		*IS*	
I	AT	2930	340	660.	228.	17884.	1.06	270.	340.	FW
711.10		0.14	0.43	0.0	711.24	2.90	0.26	0.000	*XS*	
J	AT	3260	330	660.	214.	13677.	1.20	160.	230.	
711.67		0.18	0.59	0.02	711.84	3.08	0.26	-0.000	*XS*	

END OF THIS PROFILE

```
         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1   361 HARTSHORN DRAIN SECT K TO PIERSON ROAD      VH     9  5  2  5 12
2   362  71182  71222  71241  71287  71241
3 00363   K   1 018 03 0706 0003300 99 99
4   364    410    570    660    860    660
5   335      0  1  7200   70  1  7180   97  1  7160  109  1  7140  116  1  7134
**SEQUENCE**
5   336     141  1  7112  186  1  7110  197  2  7100  208  2  7052  221  2  7052
5   337     233  2  7100  239  3  7120  246  3  7122  256  3  7128  280  3  7140
5   338     296  3  7160  327  3  7180  380  3  7200
6   339  0  1 050 050  0  1 060 060  0  1 055 055
3 00393   L   0 018 03 0708 0003980 99 99
5 00395    0000 01 07217 0280 01 07200 0297 01 07180 0320 01 07160 0329 01 07140
5 00396    0346 02 07120 0353 02 07100 0358 02 07080 0361 02 07068 0371 02 07068
5 00397    0374 02 07080 0380 02 07100 0387 03 07120 0397 03 07140 0410 03 07160
5 00398    0480 03 07180 0532 03 07200 0722 03 07300
6 00399 00 01 045 045 00 01 040 040 00 01 045 045
3 00423   M   0 016 03 0710 0004550 99 99
5 00425    0000 01 07220 0350 01 07200 0574 01 07180 0588 01 07160 0677 02 07140
5 00426    0690 02 07120 0697 02 07100 0705 02 07081 0710 02 07081 0722 02 07100
5 00427    0728 02 07120 0733 02 07140 0738 03 07160 0787 03 07180 0810 03 07200
5 00428    0960 03 07220
6 00429 00 01 045 045 00 01 040 040 00 01 050 050
3 00453   N   0 016 03 0712 0005340 99 99
5 00454    0000 01 07239 0070 01 07220 0090 01 07200 0123 02 07180 0140 02 07160
5 00455    0155 02 07140 0158 02 07120 0160 02 07100 0170 02 07100 0172 02 07120
5 00456    0175 02 07140 0183 02 07160 0194 02 07180 0203 03 07200 0507 03 07220
5 00457    0533 03 07240
6 00458 00 01 055 055 00 01 040 040 00 01 055 055
3 00483   O   1 016 03 0714 0006070 99 99
4   484    360    500    580    760    580
5 00485    0000 01 07260 0060 01 07240 0150 01 07220 0460 01 07200 0662 02 07180
5 00486    0684 02 07160 0688 02 07140 0691 02 07120 0701 02 07120 0704 02 07140
5 00487    0707 02 07160 0710 02 07180 0717 03 07200 0870 03 07220 1165 03 07240
5 00488    1365 03 07260
6 00489 00 01 050 050 00 01 040 040 00 01 050 050
3 00513   P   0 018 03 0716 0006560 99 99
5 00515    0000 01 07260 0250 01 07240 0631 02 07220 0642 02 07200 0652 02 07180
5 00516    0654 02 07160 0656 02 07140 0658 02 07132 0667 02 07132 0669 02 07140
5 00517    0671 02 07160 0673 02 07180 0676 02 07200 0684 03 07220 0759 03 07220
5 00518    1060 03 07221 1240 03 07240 1420 03 07260
6 00519 00 01 060 060 00 01 045 045 00 01 060 060
3 00543   Q   0 018 03 0716 0007240 99 99
5 00545    0000 01 07280 0287 01 07260 0361 01 07240 0680 01 07240 0798 02 07214
5 00546    0818 02 07196 0828 02 07184 0832 02 07151 0836 02 07150 0840 02 07149
5 00547    0850 03 07211 0868 03 07217 0888 03 07212 0927 03 07223 1110 03 07240
```

*** INPUT CARD PRINTOUT ***

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5 00548     1370 03 07259 1610 03 07260 1750 03 07280
6 00549 00 01 040 040 00 01 030 030 00 01 045 045
3   573   R   1  16  3  718     7940 99 99
4   574     340     470     540     710     540
5 00575     0000 01 07280 0038 01 07260 0220 01 07259 0353 01 07260 0500 01 07231
5 00576     0530 01 07232 0550 01 07235 0561 02 07237 0575 02 07161 0580 02 07162
5 00577     0585 02 07164 0600 03 07256 0620 03 07258 0650 03 07241 0670 03 07243
5 00578     0840 03 07270
6 00579 00 01 045 045 00 01 030 030 00 01 030 030
3 00603   S   0 013 03 0719 0008530 99 99
5 00605     0000 01 07300 0210 01 07280 0337 01 07274 0387 01 07262 0407 02 07259
5 00606     0422 02 07220 0427 02 07178 0432 02 07180 0437 02 07190 0447 02 07217
5 00607     0457 03 07261 0472 03 07266 0830 03 07281
6 00608 00 01 040 040 00 01 040 040 00 01 030 030
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 17,DATE= 2/ 8/79

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECT K TO PIERSON ROAD VH
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS 100

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV		HV	HF	HE	EG	V	FN	ACC		*ID*
K	AT	3300	0	660.	304.	18160.	1.22	127.	250.	
712.41		0.09			712.50	2.17	0.20			*IS*
L	AT	3980	680	660.	190.	17619.	1.08	335.	393.	
713.28		0.20	0.93	0.06	713.48	3.47	0.31	0.002		*XS*
M	AT	4550	570	660.	196.	16321.	1.01	669.	733.	
714.17		0.18	0.86	0.0	714.35	3.37	0.32	0.001		*XS*
N	AT	5340	790	660.	134.	9550.	1.00	138.	185.	
716.28		0.38	2.21	0.10	716.66	4.94	0.52	0.002		*XS*
O	AT	6070	730	580.	188.	13654.	1.18	597.	712.	
718.64		0.18	2.15	0.0	718.81	3.09	0.33	0.003		*XS*
P	AT	6560	490	580.	126.	9448.	1.00	643.	676.	
719.84		0.33	1.28	0.08	720.17	4.59	0.41	0.000		*XS*
Q	AT	7240	680	580.	161.	15166.	1.09	791.	900.	
721.55		0.22	1.60	0.0	721.76	3.59	0.39	0.000		*XS*
R	AT	7940	700	540.	130.	15420.	1.00	563.	595.	
722.46		0.27	0.94	0.03	722.73	4.17	0.36	0.001		*XS*
S	AT	8530	590	540.	116.	9049.	1.00	416.	451.	
723.66		0.34	1.23	0.03	724.00	4.65	0.45	0.001		*XS*

100 yr

115

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECT K TO PIERSON ROAD VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
K	AT	3300	0	660.	294.	18081.	1.17	140.	240.
712.41	0.09			712.50	2.24	0.20			*IS*
L	AT	3980	680	660.	190.	17645.	1.08	335.	393.
713.28	0.20	0.93	0.06	713.49	3.47	0.31	0.001		*XS*
M	AT	4550	570	660.	195.	16330.	1.00	675.	733.
714.17	0.18	0.86	0.0	714.35	3.38	0.32	0.001		*XS*
N	AT	5340	790	660.	134.	9549.	1.00	138.	185.
716.28	0.38	2.21	0.10	716.66	4.94	0.52	0.001		*XS*
O	AT	6070	730	580.	173.	13552.	1.04	653.	712.
718.65	0.18	2.17	0.0	718.83	3.34	0.33	0.005		*XS*
P	AT	6560	490	580.	127.	9502.	1.00	643.	676.
719.86	0.32	1.28	0.07	720.18	4.56	0.41	-0.000		*XS*
Q	AT	7240	680	580.	155.	15159.	1.02	793.	853.
721.55	0.22	1.59	0.0	721.77	3.73	0.39	0.001		*XS*
R	AT	7940	700	540.	130.	15449.	1.00	563.	595.
722.47	0.27	0.94	0.02	722.74	4.16	0.36	0.000		*XS*
S	AT	8530	590	540.	116.	9057.	1.00	416.	451.
723.66	0.34	1.23	0.03	724.00	4.64	0.45	0.001		*XS*

FW

END OF THIS PROFILE

*** INPUT CARD PRINTOUT ***

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1   631 HARTSHORN DRAIN PIERSON ROAD TO SECT. Y     VH     6  5  2  5 12
2   632  72373  72526  72617  72880  72617
3   633   T    1  13  3  720    8660 99 99
4   634    340    470    540    710    540
5   635       0  1  7320  270  1  7300  477  1  7273  497  2  7268  507  2  7255
5   636     521  2  7192  525  2  7183  532  2  7188  542  2  7233  557  2  7258
5   637     587  3  7270 1075  3  7280 1120  3  7285
6   638  0  1 070 070  0  1 055 055  0  1 070 070
3   663   U    0  10  3  722    9300 99 99
5   665    -280  1  7360 -195  1  7340    0  1  7320   56  2  7300   74  2  7235
5   666      83  2  7194   88  2  7227  106  2  7311  120  3  7286  127  3  7300
6   668  0  1 070 070  0  1 055 055  0  1 070 070
3   693   V    0  15  3  724    9940 99 99
5   695       0  1  7360   50  1  7340  170  1  7320  287  2  7300  296  2  7280
5   696     307  2  7260  308  2  7221  315  2  7216  321  2  7221  322  2  7260
5   697     330  2  7280  342  3  7300  520  3  7320  637  3  7340  800  3  7360
6   698  0  1 070 070  0  1 040 040  0  1 070 070
3   723   W    0  15  3  726   10620 99 99
5   725       0  1  7360   68  1  7340  144  1  7320  211  2  7300  219  2  7280
5   726     225  2  7260  226  2  7241  231  2  7236  236  2  7241  237  2  7260
5   727     243  2  7280  257  3  7300  268  3  7320  440  3  7340  600  3  7360
6   728  0  1 060 060  0  1 045 045  0  1 060 060
3   753   X    0  17  3  728   11310 99 99
5   755       0  1  7360  150  1  7340  300  1  7328  320  1  7323  340  1  7330
5   756     346  2  7334  365  2  7273  368  2  7268  370  2  7266  373  2  7264
5   757     380  2  7298  388  2  7328  395  3  7354  400  3  7335  420  3  7336
5   758     535  3  7340  590  3  7360
6   759  0  1 040 040  0  1 040 040  0  1 070 070
3   783   Y    0  15  3  726   11798 99 99
5   785       0  1  7357  140  1  7340  265  1  7326  295  1  7334  309  2  7332
5   786     325  2  7271  335  2  7246  343  2  7271  365  3  7331  375  3  7331
5   787     395  3  7323  405  3  7326  458  3  7340  475  3  7360  520  3  7380
6   788  0  1 025 025  0  1 030 030  0  1 025 025
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 13,DATE= 2/14/79

100

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN PIERSON ROAD TO SECT. Y VH
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
T	AT	8660	0	540.	215.	12703.	1.00	502.	566.
726.17	0.10			726.27	2.51	0.24			*IS*
U	AT	9300	640	540.	143.	8956.	1.00	62.	99.
727.75	0.22	1.64	0.06	727.97	3.79	0.34	0.001		*XS*
V	AT	9940	640	540.	166.	12833.	1.00	290.	339.
729.43	0.16	1.62	0.0	729.60	3.25	0.31	0.001		*XS*
W	AT	10620	680	540.	173.	12030.	1.09	187.	261.
730.72	0.17	1.28	0.00	730.89	3.13	0.31	0.002		*XS*
X	AT	11310	690	540.	124.	9792.	1.00	317.	387.
732.36	0.30	1.71	0.07	732.66	4.37	0.43	0.002		*XS*
Y	AT	11798	488	540.	270.	31694.	1.17	225.	422.
733.05	0.07	0.46	0.0	733.12	2.00	0.18	-0.000		*XS*

100yr

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 19,DATE= 2/14/79

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN PIERSON ROAD TO SECT. Y VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE / WS ELEV	HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW *ID*	
T AT 8660 / 726.17	0.10	0	540.	215. / 726.27	12703. / 2.51	1.00 / 0.24	502.	566. *IS*	
U AT 9300 / 727.75	0.22	640 / 1.64	540. / 0.06	143. / 727.97	8956. / 3.79	1.00 / 0.34	62. / 0.001	99. *XS*	
V AT 9940 / 729.43	0.16	640 / 1.62	540. / 0.0	166. / 729.60	12833. / 3.25	1.00 / 0.31	290. / 0.001	339. *XS*	FW
W AT 10620 / 730.72	0.17	680 / 1.29	540. / 0.00	170. / 730.89	12022. / 3.18	1.06 / 0.31	201. / 0.003	261. *XS*	
X AT 11310 / 732.36	0.30	690 / 1.71	540. / 0.07	123. / 732.66	9795. / 4.37	1.00 / 0.43	349. / 0.001	387. *XS*	
Y AT 11798 / 733.05	0.07	488 / 0.46	540. / 0.0	270. / 733.12	31700. / 2.00	1.17 / 0.18	225. / -0.000	422. *XS*	

END OF THIS PROFILE

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1   871 HARTSHORN DRAIN SECT Z TO BA                VH     2  5  2  5 12
2   872  73292  73311  73321  73369  73321
3   873   Z   1  14  3  728   11826 99 99
4   874    255    355    410    535    410
5   875       0 01  7357  153 01  7340  284  1  7320  309  2  7334  318  2  7284
5   876     324 02  7272  328  2  7271  334  2  7299  344  2  7321  359 03  7327
5   877     389  3  7323  485  3  7340  515  3  7360  540  3  7380
6   878  0  1  25  25 00  1  22  22  0  1  30  30
3   903   BA  0  13  3  728   12095 99 99
5   905       0  1  7357  240  1  7340  305  1  7331  325  1  7340  340  2  7341
5   906     353  2  7270  360  2  7273  365  2  7270  375  3  7330  400  3  7334
5   907     430  3  7342  756  3  7360  800  3  7380
6   908  0  1 025 025  0  1 025 025  0  1 025 025
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 8,DATE= 1/29/79

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECT Z TO BA 100 Yr. VH
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE/ WS ELEV	LENGTH/ HV	DISCHARGE/ HF	AREA / HE	CONVEYANCE/ EG	V	ALPHA/ FN	LEW / ACC	REW *ID*
Z	AT	11826 / 733.21	0 / 0.07	410. /	246. /	22472. / 733.28	1.72 / 1.67	205. / 0.25	-	440. *IS*
BA	AT	12095 / 733.28	269 / 0.13	410. / 0.10	146. / 0.03	20995. / 733.41	1.05 / 2.80	292. / 0.25	-0.000	392. *XS*

100 Yr

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECT Z TO BA VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
Z AT 11826 / 733.21	0 / 0.07	410. /	241. /	22718. / 733.28	1.60 / 1.70	225. / 0.25	425. /	*IS* FW
BA AT 12095 / 733.28	269 / 0.13	410. / 0.09	146. / 0.03	20979. / 733.41	1.05 / 2.80	292. / 0.25	392. / 0.000	*XS*

END OF THIS PROFILE

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1    991 HAETSHORN DRAIN SECTION BB TO BC          VH     2  5  2  5 12
2    992  73381  73403  73435  73417  73417
3 00993  BB    1 014 03 0728 0012130 99 99
4    994     255    355    535    410    410
5    995      135  1  7400  135  1  7340  230  1  7330  250  1  7328  280  2  7345
5    996      295  2  7282  300  2  7271  305  2  7290  320  3  7328  340  3  7334
5    997      370  3  7342  680  3  7360  720  3  7380  750  3  7400
6    998  0  1 030 030  0  1 025 025  0  1 022 022
3 01024   BC  0 013 03 0728 0012407 99 99
5  1027       75  1  7350  120  1  7340  170  1  7328  190  1  7346  210  2  7354
5 01028     0220 02 07298 0228 02 07270 0233 02 07276 0245 03 07360 0255 03 07348
5 01029     0270 03 07344 0490 03 07360 0543 03 07380
6 01030 00 01 045 045 00 01 028 028 00 01 045 045
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE= 1/31/79

WATER-SURFACE PROFILE FOR: HAETSHORN DRAIN SECTION BB TO BC VH
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
BB	AT	12130	0	410.	293.	28249.	1.79	135.	369.
734.17	0.05			734.22	1.40	0.18			*IS*
BC	AT	12407	277	410.	184.	18308.	1.58	110.	242.
734.23	0.12	0.09	0.03	734.35	2.23	0.25	-0.000		*XS*

100YR

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77[illegible]30 *** PAGE COUNT= 17,DATE= 1/31/79

WATER-SURFACE PROFILE FOR: HAETSHORN DRAIN SECTION BB TO BC VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*	
BB	AT	12130	0	410.	255.	27482.	1.48	200.	350.	FW
734.17	0.06				734.23	1.61	0.19		*IS*	
BC	AT	12407	277	410.	~~165.~~ 184	~~18041.~~ 18708	~~1.33~~ 1.58	~~150.~~ 110	242.	Use NOE
734.23	0.12	0.09	0.03		734.36	~~2.48~~ 2.21	0.25	-0.001	*XS*	

END OF THIS PROFILE

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1  1110 HARTSHORN DRAIN SECTION BD TO BE          VH     2  5  2  5 12
2  1111  73517  73546  73577  73557  73557
3  1114  BD   1  18  3  730   12435 99 99
4  1115     255    355    535    410    410
5 01117     0000 01 07420 0055 01 07400 0080 01 07380 0103 01 07360 0125 01 07349
5 01118     0145 01 07343 0165 02 07349 0180 02 07344 0193 02 07281 0196 02 07279
5 01119     0199 02 07277 0210 02 07345 0225 03 07352 0260 03 07348 0430 03 07360
5 01120     0530 03 07380 0557 03 07400 0595 03 07420
6 01121 00 01 040 040 00 01 025 025 00 01 045 045
3  1144  BE   0  15  3  730   12498 99 99
5  1147       0  1  7400   32  1  7380  110  1  7360  145  1  7351  165  1  7346
5  1148     183  2  7344  192  2  7272  195  2  7264  200  2  7274  209  3  7339
5  1149     230  3  7343  270  3  7344  437  3  7360  517  3  7380  547  3  7400
6  1151  0  1 040 040  0  1 028 028  0  1 045 045
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 10,DATE= 2/ 1/79

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECTION BD TO BE VH
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS 100

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
BD	AT	12435	0	410.	281.	23275.	1.81	112.	369.
735.57	0.06			735.63	1.46	0.21			*IS*
BE	AT	12498	63	410.	346.	30183.	2.68	127.	392.
735.57	0.06	0.02	0.0	735.63	1.19	0.15	-0.016		*XS*

100 yr

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 14,DATE= 2/ 1/79

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECTION BD TO BE VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*	
BD	AT	12435	0	410.	271.	23366.	1.66	120.	320.	
735.57	0.06			735.63	1.51	0.21			*IS*	FW
BE	AT	12498	63	410.	331.	30583.	2.37	145.	345.	
735.57	0.06	0.01	0.0	735.63	1.24	0.15	-0.018		*XS*	

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 2/ 2/79

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1  1211 HARTSHORN DRAIN SECTION BF TO BG          VH     2  5  2  5 12
2  1212  73522  73550  73579  73560  73560
3  1214  BF   1  19  3  728   12525 99 99
4  1215    255    355    535    410    410
5  1217       0  1  7420   25  1  7400   54  1  7380  135  1  7351  155  1  7346
5  1218     175  1  7350  190  2  7355  200  2  7313  210  2  7282  213  2  7275
5  1219     215  2  7278  230  3  7353  255  3  7350  290  3  7343  335  3  7342
5  1220     457  3  7360  527  3  7380  555  3  7400  595  3  7420
6  1221  0  1 040 040  0  1 028 028  0  1 045 045
3  1244  BG   0  15  3  729   12798 99 99
5  1246       0  1  7400   51  1  7380  110  1  7360  233  1  7353  253  1  7360
5  1247     279  2  7362  293  2  7281  298  2  7282  303  2  7283  313  3  7355
5  1248     343  3  7351  383  3  7358  400  3  7360  440  3  7380  480  3  7400
6  1250  0  1 040 040  0  1 045 045  0  1 040 040
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 13,DATE= 2/ 2/79

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECTION BF TO BG VH
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS 100

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
BF	AT	12525	0	410.	392.	31059.	2.46	121.	430.
735.60	0.04				735.64	1.05	0.15		*IS*
BG	AT	12798	273	410.	197.	14807.	1.33	167.	376.
735.68	0.09	0.10	0.02		735.77	2.08	0.19	-0.000	*XS*

100 YR

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 18,DATE= 2/ 2/79

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECTION BF TO BG VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
BF AT 12525 / 735.60	0 / 0.05	410. /	340. /	30142. / 735.65	2.02 / 1.20	190. / 0.16	390.	*IS* FW
BG AT 12798 / 735.68	273 / 0.09	410. / 0.10	198. / 0.02	14855. / 735.77	1.32 / 2.07	180. / 0.19	376. / -0.000	*XS*

END OF THIS PROFILE

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1  1291 HARTSHORN DRAIN SECTION BH TO BK            VH     4  5  2  5 12
2  1292  73582  73602  73624  73610  73610
3  1294  BH   1  19  3  730   12830 99 99
4  1295    255    355    535    410    410
5  1297       0  1  7440   37  1  7420   92  1  7400  139  1  7380  232  1  7360
5  1298     300  1  7355  320  1  7353  350  1  7359  375  2  7364  385  2  7336
5  1299     393  2  7287  395  2  7281  399  2  7281  412  3  7356  435  3  7353
5  1300     455  3  7355  530  3  7380  574  3  7400  593  3  7420
6  1301  0  1 060 060  0  1 035 035  0  1 045 045
3  1324  BI   0  13  3  732   13140 99 99
5  1326       0  1  7400  165  1  7380  219  2  7360  225  2  7340  233  2  7320
5  1327     237  2  7294  241  2  7290  245  2  7294  249  2  7320  260  3  7340
5  1328     345  3  7360  370  3  7380  400  3  7400
6  1329  0  1 060 060  0  1 045 045  0  1 045 045
3  1354  BJ   0  13  3  732   13370 99 99
5  1356       0  1  7400   50  1  7380   55  2  7360   59  2  7340   63  2  7320
5  1357      69  2  7301   74  2  7297   79  2  7301   85  2  7320   98  2  7340
5  1358     111  3  7360  141  3  7380  158  3  7400
6  1359  0  1 045 045  0  1 055 055  0  1 045 045
3  1384   BK  0   7  3  732   13580 99 99
5  1386       0  1  7405   12  2  7309   18  2  7304   26  2  7310   32  3  7377
5  1387      42  3  7399   70  3  7416
6  1388  0  1 025 025  0  1 040 040  0  1 025 025
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 10,DATE= 2/ 5/79

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECTION BH TO BK VH
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS 100

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
BH	AT	12830	0	410.	242.	17581.	1.90	227.	473.
736.10	0.09				736.18	1.70	0.21		*IS*
BI	AT	13140	310	410.	285.	18588.	1.32	211.	349.
736.30	0.04	0.16	0.0		736.34	1.44	0.16	-0.000	*XS*
BJ	AT	13370	230	410.	215.	13815.	1.01	54.	118.
736.45	0.06	0.15	0.01		736.50	1.91	0.17	0.000	*XS*
BK	AT	13580	210	410.	117.	11879.	1.00	5.	31.
736.59	0.19	0.22	0.07		736.78	3.50	0.27	-0.000	*XS*

100 yr

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 14,DATE= 2/ 5/79

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECTION BH TO BK VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
BH	AT	12830	0	410.	232.	17558.	1.76	270.	470.
736.10	0.09				736.19	1.76	0.21		*IS*
BI	AT	13140	310	410.	260.	18348.	1.18	211.	311.
736.30	0.05	0.16	0.0		736.35	1.58	0.16	0.000	*XS*
BJ	AT	13370	230	410.	215.	13835.	1.01	54.	118.
736.45	0.06	0.15	0.01		736.51	1.90	0.17	0.000	*XS*
BK	AT	13580	210	410.	117.	11889.	1.00	5.	31.
736.60	0.19	0.21	0.07		736.79	3.50	0.27	-0.000	*XS*

FW

END OF THIS PROFILE

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1  1411 HARTSHORN DRAIN SECT BL TO BN                VH     3  5  2  5 12
2  1412  73647  73713  73749  73837  73749
3 01414  BL   1 011 03 0732 0013755 99 99
4  1415    255    355    410    535    410
5 01416      -9 01 07416 0000 01 07413 0015 01 07384 0025 02 07367 0036 02 07310
5 01417    0039 02 07308 0042 02 07312 0050 02 07348 0060 03 07383 0080 03 07392
5 01418    0105 03 07421
6 01419 00 01 032 032 00 01 042 042 00 01 058 058
3 01434  BM   0 014 03 0732 0013960 99 99
5 01436    0000 01 07420 0030 01 07400 0037 02 07380 0041 02 07360 0044 02 07340
5 01437    0045 02 07316 0050 02 07312 0056 02 07316 0057 02 07340 0063 02 07360
5 01438    0068 02 07380 0157 03 07380 0200 03 07400 0220 03 07420
6 01439 00 01 050 050 00 01 055 055 00 01 060 060
3 01464  BN   0 013 03 0732 0014345 99 99
5 01466    0000 01 07420 0050 01 07400 0175 01 07387 0205 02 07387 0215 02 07327
5 01467    0220 02 07320 0223 02 07319 0232 03 07379 0250 03 07379 0275 03 07374
5 01468    0300 03 07373 0390 03 07400 0427 03 07420
6 01469 00 01 045 045 00 01 065 065 00 01 045 045
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USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 11,DATE= 2/ 6/79

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECT BL TO BN 100 VH
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
BL	AT	13755	0	410.	127.	10415.	1.02	20.	58.
737.49	0.16			737.65	3.22	0.29			*IS*
BM	AT	13960	205	410.	117.	7025.	1.00	37.	68.
737.95	0.19	0.47	0.01	738.14	3.49	0.32	0.000		*XS*
BN	AT	14345	385	410.	258.	11537.	1.24	157.	353.
738.89	0.05	0.80	0.0	738.94	1.59	0.17	0.002		*XS*

100 YR

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 17,DATE= 2/ 6/79

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECT BL TO BN VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
BL	AT	13755	0	410.	127.	10415.	1.02	20.	58.
737.49	0.16			737.65	3.22	0.29			*IS*
BM	AT	13960	205	410.	117.	7025.	1.00	37.	68.
737.95	0.19	0.47	0.01	738.14	3.49	0.32	0.000		*XS*
BN	AT	14345	385	410.	247.	11609.	1.15	180.	330.
738.89	0.05	0.79	0.0	738.93	1.66	0.17	0.003		*XS*

FW

END OF THIS PROFILE

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1  1530 HARTSHORN DRAIN SECTION BO TO BR            VH     4  5  2  5 12
2  1531  73840  73868  73895  73957  73895
3  1533   BO  1  15  3  734   14376 99 99
4  1534    255    355    410    535    410
5 01535    0000 01 07442 0066 01 07420 0094 01 07400 0210 01 07384 0235 01 07386
5 01536    0254 02 07388 0265 02 07336 0270 02 07327 0274 02 07338 0280 03 07376
5 01537    0290 03 07380 0310 03 07378 0335 03 07373 0360 03 07379 0415 03 07400
6 01538 00 01 045 045 00 01 075 075 00 01 045 045
3  1563   BP  0  11  3  734   14670 99 99
5  1565       0  1  7420   78  1  7400  265  2  7380  270  2  7360  273  2  7335
5  1566     278  2  7331  283  2  7335  286  2  7360  292  3  7380  403  3  7400
5  1567     442  3  7420
6  1568  0  1 040 040  0  1 040 040  0  1 070 070
3  1593   BQ  0   6  3  734   15010 99 99
5  1595      13  1  7398   58  2  7398   95  2  7346  114  2  7368  124  3  7400
5  1596     146  3  7470
6  1597  0  1 035 035  0  1 055 055  0  1 035 035
3  1623   BR  0   8  3  736   15400 99 99
5  1625       0  1  7446   50  1  7438   58  1  7438   83  2  7367   95  2  7342
5  1626     114  3  7374  146  3  7485  156  3  7491
6  1627  0  1 070 070  0  1 060 060  0  1 040 040
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 13,DATE= 2/ 6/79

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECTION BO TO BR VH
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS 100

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
BO AT 14376 / 738.95	0 / 0.05	410. /	244. /	9148. / 739.00	1.17 / 1.68	170. / 0.19	388.	*IS*	
BP AT 14670 / 739.33	294 / 0.09	410. / 0.40	245. / 0.02	13499. / 739.42	2.16 / 1.67	141. / 0.24	366. / 0.001	*XS*	100 YR
BQ AT 15010 / 739.77	340 / 0.08	410. / 0.42	186. / 0.0	10068. / 739.84	1.00 / 2.20	58. / 0.23	123. / -0.000	*XS*	65
BR AT 15400 / 740.34	390 / 0.09	410. / 0.58	181. / 0.01	11259. / 740.43	1.12 / 2.27	70. / 0.20	122. / 0.001	*XS*	52

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 20,DATE= 2/ 6/79

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECTION BO TO BR VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
BO AT 14376	0	410.	219.	8863.	1.09	210.	360.	
738.95	0.06			739.01	1.87	0.19		*IS*
BP AT 14670	294	410.	226.	13749.	1.77	175.	325.	
739.34	0.09	0.41	0.02	739.43	1.82	0.23	0.001	*XS*
BQ AT 15010	340	410.	186.	10069.	1.00	58.	123.	
739.77	0.08	0.41	0.0	739.84	2.20	0.23	-0.001	*XS*
BR AT 15400	390	410.	181.	11259.	1.12	70.	122.	
740.34	0.09	0.58	0.01	740.43	2.27	0.20	0.001	*XS*

FW

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 1/ 4/78

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1  1680 HARTSHORN DRAIN SECT BS TO SECT BX          VH     6  4  2  5 12
2  1681  73968  74021  74047  74095
3  1683   BS  1   9  3  736   15567 99 99
4  1684    255    355    410    535
5  1685       0  1  7471   20  2  7439   20  2  7378   40  2  7352   46  2  7350
5  1686      46  3  7439   63  3  7436   80  3  7481   85  3  7486
6  1687  0  1 035 035  0  1 040 040  0  1 035 035
3  1713   BT  0   7  1  738   15585 99 99
5  1715       0  1  7492   30  1  7480   55  1  7382   71  1  7354   80  1  7373
5  1716     105  1  7474  120  1  7486
6  1717  0  1 040 040
3  1743   BU  0   4  1  738   16400 99 99
5  1744      11  1  7564   61  1  7366   69  1  7366  123  1  7580
6  1746  0  1 040 040
3  1773   BV  0   4  1  740   17200 99 99
5  1774      24  1  7520   60  1  7377   68  1  7377  103  1  7520
6  1776  0  1 040 040
3  1803   BW  0  12  1  740   17700 99 99
5  1805       0  1  7480  114  1  7460  127  1  7440  139  1  7420  142  1  7389
5  1806     146  1  7384  150  1  7389  153  1  7420  164  1  7440  171  1  7460
5  1807     212  1  7480  233  1  7500
6  1808  0  1 040 040
3  1833   BX  0  10  1  740   18150 99 99
5  1835    -110  1  7500  -74  1  7480    0  1  7464   18  1  7461   31  1  7410
5  1836      36  1  7389   40  1  7413   55  1  7480   80  1  7508   88  1  7515
6  1838  0  1 040 040
```

FW No encroachment These sections

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 13,DATE= 1/ 4/78

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECT BS TO SECT BX 100 VH

PAGE 1 OF 1

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
BS AT 15567 / 740.47	0 / 0.21	410. /	112. /	9129. / 740.68	1.00 / 3.67	20. / 0.31	46.	*IS*	26
BT AT 15585 / 740.53	18 / 0.19	410. / 0.04	117. / 0.0	8849. / 740.72	1.00 / 3.50	49. / 0.36	88. / -0.001	*XS*	39
BU AT 16400 / 742.12	815 / 0.18	410. / 1.58	121. / 0.0	9784. / 742.30	1.00 / 3.38	47. / 0.32	83. / 0.002	*XS*	36
BV AT 17200 / 743.44	800 / 0.16	410. / 1.30	128. / 0.0	10559. / 743.60	1.00 / 3.21	46. / 0.30	82. / 0.001	*XS*	46
BW AT 17700 / 744.53	500 / 0.22	410. / 1.11	108. / 0.03	7162. / 744.75	1.00 / 3.80	124. / 0.42	166. / 0.002	*XS*	42
BX AT 18150 / 745.81	450 / 0.24	410. / 1.29	104. / 0.01	8173. / 746.05	1.00 / 3.92	19. / 0.38	50. / 0.002	*XS*	31

100 YR

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 2/ 6/79

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1  1860 HARTSHORN DRAIN SECTION BY TO CD            VH    6  5  2  5 12
2  1861  74517  74600  74641  74812  74641
3  1863   BY  1  10  3  742   18390 99 99
4  1864    255    355    410    535    410
5  1866      -8  1  7516    0  1  7504   17  1  7494   34  2  7482   40  2  7417
5  1867      49  2  7408   52  2  7418   60  3  7454   70  3  7470   95  3  7478
6  1869  0  1 032 032  0  1 035 035  0  1 030 030
3  1893   BZ  0  13  3  742   18770 99 99
5  1895       0  1  7520   26  1  7500  101  2  7480  111  2  7460  117  2  7440
5  1896     119  2  7420  124  2  7415  129  2  7420  132  2  7440  143  2  7460
5  1897     155  3  7480  230  3  7500  258  3  7520
6  1898  0  1 070 070  0  1 055 055  0  1 070 070
3  1923   CA  0  11  3  744   19240 99 99
5  1925       0  1  7520   11  1  7500  116  2  7480  128  2  7460  132  2  7428
5  1926     137  2  7423  142  2  7428  146  2  7460  153  3  7480  233  3  7500
5  1927     287  3  7520
6  1928  0  1 072 072  0  1 060 060  0  1 070 070
3  1953   CB  1  14  3  744   19770 99 99
4  1954    200    275    320    415    320
5  1955       0  1  7540   73  1  7520  193  1  7520  203  2  7500  208  2  7480
5  1956     211  2  7460  213  2  7436  217  2  7431  221  2  7436  223  2  7460
5  1957     226  2  7480  230  3  7500  342  3  7520  372  3  7540
6  1958  0  1 072 072  0  1 062 062  0  1 070 070
3  1983   CC  0  16  3  744   20140 99 99
5  1985       0  1  7560  133  1  7540  227  2  7520  234  2  7500  238  2  7480
5  1986     241  2  7460  245  2  7442  249  2  7437  253  2  7442  258  2  7460
5  1987     265  2  7480  274  2  7500  280  3  7520  364  3  7520  412  3  7540
5  1988     460  3  7560
6  1989  0  1 070 070  0  1 060 060  0  1 070 070
3  2013   CD  0  11  3  746   20534 99 99
5  2016       0  1  7560   74  1  7540  108  1  7523  120  2  7522  130  2  7473
5  2017     136  2  7444  140  2  7454  153  3  7538  213  3  7524  254  3  7540
5  2018     291  3  7560
6  2019  0  1 050 050  0  1 070 070  0  1 045 045
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 13,DATE= 2/ 6/79

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECTION BY TO CD 100 VH
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
BY	AT	18390	0	410.	98.	9284.	1.04	36.	66.
746.41	0.28			746.69	4.20	0.38			*IS*
BZ	AT	18770	380	410.	136.	7088.	1.00	103.	152.
747.52	0.14	0.97	0.0	747.67	3.01	0.32	0.001		*XS*
CA	AT	19240	470	410.	175.	8169.	1.38	68.	190.
748.92	0.12	1.36	0.0	749.03	2.34	0.26	0.003		*XS* 100 YR
CB	AT	19770	530	320.	113.	6105.	1.05	201.	248.
750.33	0.13	1.42	0.01	750.46	2.83	0.25	0.002		*XS*
CC	AT	20140	370	320.	179.	10497.	1.00	231.	277.
751.00	0.05	0.59	0.0	751.05	1.79	0.16	0.000		*XS*
CD	AT	20534	394	320.	112.	5451.	1.00	121.	150.
751.67	0.13	0.71	0.04	751.79	2.86	0.26	0.000		*XS*

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 19,DATE= 2/ 6/79

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECTION BY TO CD VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
BY	AT	18390	0	410.	98.	9284.	1.04	36.	66.
746.41	0.28			746.69	4.20	0.38			*IS*
BZ	AT	18770	380	410.	136.	7088.	1.00	103.	152.
747.52	0.14	0.97	0.0	747.67	3.01	0.32	0.001		*XS*
CA	AT	19240	470	410.	155.	8050.	1.14	100.	160.
748.93	0.12	1.38	0.0	749.05	2.65	0.26	0.003		*XS*
CB	AT	19770	530	320.	114.	6169.	1.06	201.	250.
750.35	0.13	1.42	0.00	750.48	2.80	0.25	0.002		*XS*
CC	AT	20140	370	320.	179.	10546.	1.00	230.	277.
751.01	0.05	0.58	0.0	751.06	1.78	0.16	0.000		*XS*
CD	AT	20534	394	320.	112.	5467.	1.00	121.	150.
751.68	0.13	0.70	0.04	751.80	2.86	0.25	0.000		*XS*

FW

END OF THIS PROFILE

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1  2081 HARTSHORN DRAIN SECTION CE TO JENNINGS   ROAD  VH  2  5  2  5 12
2  2082  75174  75285  75308  75331  75309
3  2083   CE  1  13  3  746   20566 99 99
4  2084    200    275    320    415    320
5  2085       0  1  7580  144  1  7518  174  1  7522  194  2  7532  204  2  7458
5  2086     207  2  7447  211  3  7453  222  3  7529  254  3  7530  294  3  7528
5  2087     330  3  7540  370  3  7560  476  3  7580
6  2088  0  1 045 045  0  1 060 060  0  1 045 045
3  2113   CF  0  11  3  746   20742 99 99
5  2116       0  1  7560   65  1  7540   92  1  7527  120  2  7525  126  2  7450
5  2117     130  2  7449  134  2  7464  147  3  7526  167  3  7534  172  3  7540
5  2118     184  3  7560
6  2120  0  1 045 045  0  1 070 070  0  1 045 045
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 8,DATE= 2/ 8/79

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECTION CE TO JENNINGS ROAD VH
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS 10.1

SECID AT DISTANCE / LENGTH / DISCHARGE / AREA / CONVEYANCE / ALPHA / LEW / REW													
WS ELEV	/	HV	/	HF	/	HE	/	EG	/	V	/	FN	/	ACC	*ID*
CE AT 20566	/	0	/	320.	/	207.	/	9353.	/	1.73	/	114.	/	302.	
753.08	/	0.06	/		/	753.14	/	1.55	/	0.18	/				*IS* 100 yr
CF AT 20742	/	176	/	320.	/	170.	/	8643.	/	1.18	/	79.	/	165.	
753.30	/	0.06	/	0.22	/	0.00	/	753.37	/	1.88	/	0.16	/	0.000	*XS*

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 13,DATE= 2/ 8/79

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECTION CE TO JENNINGS ROAD VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
CE AT 20566	0	320.	201.	9541.	1.56	125.	275.	
753.09	0.06			753.15	1.60	0.18		*IS*
CF AT 20742	176	320.	164.	8595.	1.11	90.	150.	
753.31	0.07	0.22	0.00	753.37	1.95	0.16	-0.000	*XS*

FW

END OF THIS PROFILE

*** INPUT CARD PRINTOUT ***

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1  2180 HARTSHORN DRAIN JENNINGS ROAD TO SECT CI     VH      3  4  2  5 12
2  2181  75397  75422  75430  75447  75431
                                     UUUUU
3  2183   CG  1  10  3  748   20845 99 99
4  2184    180     250     290     380     290
                                     UUU
5  2185       0  1  7600  220  1  7542  252  2  7528  264  2  7470  268  2  7460
5  2186     272  2  7477  282  3  7522  310  3  7541  350  3  7556  423  3  7600
6  2188  0  1 045 045  0  1 050 050  0  1 045 045
3  2213   CH  0  12  3  748   21180 99 99
5  2215       0  1  7600   22  1  7580   52  1  7560  101  1  7540  156  2  7553
5  2216     167  2  7483  171  2  7462  176  3  7491  186  3  7548  217  3  7560
5  2217     360  3  7580  450  3  7600
6  2218  0  1 070 070  0  1 055 055  0  1 080 080
3  2243   CI  0  15  3  748   21414 99 99
5  2245       0  1  7600   20  1  7580   75  1  7560  122  1  7538  152  1  7542
5  2246     173  2  7550  184  2  7484  188  2  7464  192  2  7492  202  3  7550
5  2247     217  3  7549  242  3  7548  313  3  7560  347  3  7580  375  3  7600
6  2248  0  1 045 045  0  1 070 070  0  1 045 045
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE= 2/ 9/79

100

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN JENNINGS ROAD TO SECT CI VH
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV	HV	HF	HE	EG	V	FN	ACC			*ID*
CG	AT	20845	0	290.	216.	15095.	1.32	216.	315.	
754.30	0.04			754.34	1.34	0.13				*IS*
CH	AT	21180	335	290.	128.	7614.	1.30	88.	185.	
754.51	0.10	0.25	0.03	754.62	2.26	0.21	-0.000			*XS*
CI	AT	21414	234	290.	171.	7344.	1.22	98.	249.	
754.91	0.05	0.35	0.0	754.97	1.69	0.17	-0.001			*XS*

1004

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 19,DATE= 2/ 9/79

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN JENNINGS ROAD TO SECT CI VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
CG AT 20845	0	290.	200.	15059.	1.16	240.	300.	
754.31	0.04			754.35	1.45	0.13		*IS*
CH AT 21180	335	290.	128.	7636.	1.29	96.	186.	
754.52	0.10	0.24	0.03	754.63	2.27	0.21	-0.000	*XS*
CI AT 21414	234	290.	159.	7156.	1.14	120.	220.	
754.93	0.06	0.36	0.0	754.99	1.82	0.17	-0.001	*XS*

FW

END OF THIS PROFILE

*** INPUT CARD PRINTOUT ***

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1  2310 HARTSHORN DRAIN SECTION CJ TO CK              VH     2  5  2  5 12
2  2311  75473  75505  75517  75542  755179
3  2312  CJ   1  14  3  748   21446 99 99
4  2313    180    250    290    380    290
5  2316       0  1  7600   36  1  7580  146  1  7539  184  1  7545  192  2  7542
5  2317     202  2  7478  205  2  7474  208  2  7486  222  3  7550  244  3  7550
5  2318     284  3  7548  323  3  7560  357  3  7580  392  3  7600
6  2319  0  1 045 045  0  1 070 070  0  1 045 045
3  2342  CK   0  14  3  750   21584 99 99
5  2344       0  1  7600   84  1  7580  197  1  7543  217  1  7552  225  2  7543
5  2345     233  2  7484  237  2  7469  243  2  7478  254  3  7545  287  3  7544
5  2346     297  3  7544  453  3  7560  545  3  7580  620  3  7600
6  2347  0  1 045 045  0  1 065 065  0  1 045 045
```

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECTION CJ TO CK 100 VH

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
CJ	AT	21446	0	290.	215.	9185.	1.30	112.	296.
755.17	0.04				755.21	1.35	0.14		*IS*
CK	AT	21584	138	290.	258.	12245.	1.53	167.	383.
755.28	0.03	0.10	0.0		755.31	1.12	0.12	-0.000	*XS*

100 YV

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 13,DATE= 1/ 9/78

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==============================================================================
WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECTION CJ TO CK            VH
PAGE  1 OF  1
*** FLOODWAY ANALYSIS *** HOR FW
==============================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==============================================================================
 CJ   AT  21446 /     0 /    290. /   206. /    9172. / 1.22 /  125. /  275.
   755.17 /   0.04 /                 /  755.21 /   1.41 /   0.14/         *IS*
------------------------------------------------------------------------------
 CK   AT  21584 /   138 /    290. /   240. /   12193. / 1.35 /  175. /  325.
   755.26 /   0.03 /   0.10 /   0.0  /  755.31 /   1.21 /   0.12 / -0.000  *XS*
------------------------------------------------------------------------------
```

FW

END OF THIS PROFILE

*** INPUT CARD PRINTOUT ***

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1  2410 HARTSHORN DRAIN SECTION CL TO CM          VH     2  5  2  5 12
2  2411  75498  75520  75533  75560  75533
3  2412   CL  1  14  3  750   21616 99 99
4  2413    180    250    290    380    290
5  2415       0  1  7600   60  1  7580  184  1  7545  204  1  7544  228  2  7545
5  2416     239  2  7480  244  2  7475  247  2  7484  256  3  7530  294  3  7548
5  2417     324  3  7546  380  3  7560  460  3  7580  510  3  7600
6  2418  0  1 045 045  0  1 065 065  0  1 045 045
3  2442   CM  0  13  3  750   21874 99 99
5  2445       0  1  7620   60  1  7600  240  1  7580  274  2  7566  286  2  7492
5  2446     292  2  7479  296  2  7483  308  3  7576  328  3  7574  368  3  7576
5  2447     393  3  7575  454  3  7600  500  3  7620
6  2448  0  1 065 065  0  1 060 060  0  1 045 045
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 10,DATE= 1/10/78

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECTION CL TO CM VH

PAGE 1 OF 1 100

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
CL AT 21616 / 755.33	0 / 0.02	290. /	281. / 755.35	13296. / 1.03	1.43 / 0.11	155. /	353.	*IS*
CM AT 21874 / 755.50	258 / 0.07	290. / 0.19	137. / 0.02	8613. / 755.57	1.00 / 2.12	276. / 0.17	305. / -0.000	*XS*

100 YR

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 17.DATE= 1/10/78

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECTION CL TO CM VH
PAGE 1 OF 1
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE / WS ELEV	HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW *ID*
CL AT 21616 / 755.39	0.02	0	290.	266. / 755.35	13321. / 1.09	1.30 / 0.11	180.	330. *IS*
CM AT 21874 / 755.50	0.07	258 / 0.19	290. / 0.02	137. / 755.57	8613. / 2.12	1.00 / 0.17	276. / 0.000	305. *XS*

END OF THIS PROFILE

FW

305
276
29

*** INPUT CARD PRINTOUT ***

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1  2510 HARTSHORN DRAIN SECTION CN TO CQ            VH     4  5  2  5 12
2  2511  75595  75633  75649  75671  75649
3  2512   CN  1  12  3  750   21926 99 99
4  2513    180    250    290    380    290
5  2515       0  1  7600   70  1  7580  210  1  7556  250  1  7552  280  2  7566
5  2516     290  2  7494  293  2  7489  303  2  7503  316  3  7571  340  3  7576
5  2517     380  3  7588  437  3  7600
6  2518  0  1 065 065  0  1 075 075  0  1 045 045
3  2542   CO  1  17  3  750   22240 99 99
4  2543    175    245    285    370    285
5  2545       0  1  7620   43  1  7600   86  1  7580  193  2  7580  203  2  7560
5  2546     206  2  7540  208  2  7520  210  2  7500  214  2  7493  222  2  7493
5  2547     230  2  7520  238  2  7540  246  2  7560  253  3  7580  327  3  7580
5  2548     382  3  7600  430  3  7620
6  2549  0  1 100 100  0  1 050 050  0  1 080 080
3  2572   CP  0  15  3  752   22580 99 99
5  2575       0  1  7620   46  1  7600   83  2  7580   87  2  7560   91  2  7540
5  2576      96  2  7520  105  2  7496  112  2  7496  121  2  7520  123  2  7540
5  2577     125  2  7560  128  3  7580  221  3  7580  254  3  7600  333  3  7620
6  2578  0  1 080 080  0  1 055 055  0  1 080 080
3  2602   CQ  0  13  3  752   23026 99 99
5  2605       0  1  7640   50  1  7620  145  1  7603  155  2  7580  165  2  7517
5  2606     170  2  7501  175  2  7515  185  3  7586  205  3  7585  235  3  7599
5  2607     250  3  7602  318  3  7620  408  3  7640
6  2608  0  1 075 075  0  1 045 045  0  1 075 075
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE= 2/11/79

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECTION CN TO CQ 100 VH
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
CN AT 21926 / 756.49	0 / 0.03	290. /	247. /	9947. / 756.52	1.43 / 1.17	158. / 0.12	315.	*IS*
CO AT 22240 / 756.66	314 / 0.03	285. / 0.17	0.0 / 0.0	15017. / 756.70	1.00 / 1.40	200. / 0.12	248. / 0.001	*XS*
CP AT 22580 / 756.79	340 / 0.03	285. / 0.13	0.00 / 0.00	14372. / 756.82	1.00 / 1.45	85. / 0.12	126. / -0.001	*XS*
CQ AT 23026 / 757.04	446 / 0.11	285. / 0.31	0.04 / 0.04	8160. / 757.15	1.00 / 2.68	157. / 0.24	183. / -0.020	*XS*

100YR

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 20,DATE= 2/11/79

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECTION CN TO CQ VH
PAGE 1 OF 1, PROFILE NUMBER 5. UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV		HV	HF	HE	EG	V	FN	ACC	*ID*
CN	AT	21926	0	290.	218.	9598.	1.24	216.	315.
756.49		0.03			756.52	1.33	0.13		*IS*
CO	AT	22240	314	285.	204.	15055.	1.00	200.	248.
756.67		0.03	0.18	0.0	756.70	1.40	0.12	-0.000	*XS* FW
CP	AT	22580	340	285.	197.	14406.	1.00	85.	126.
756.80		0.03	0.13	0.00	756.83	1.45	0.12	-0.000	*XS*
CQ	AT	23026	446	285.	106.	8182.	1.00	157.	183.
757.05		0.11	0.31	0.04	757.16	2.68	0.23	-0.018	*XS*

END OF THIS PROFILE

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1  2650 HARTSHORN DRAIN SECTION CR TO CT            VH     3  5  2  5 12
2  2651  75813  75916  75933  75958  75933
3  2653  CR   1  11  3  752   23054 99 99
4  2654    175    245    285    370    285
5  2655        0  1  7640   50  1  7620  149  2  7599  163  2  7511  169  2  7508
5  2656      173  2  7521  183  3  7591  201  3  7594  274  3  7600  345  3  7620
5  2657      402  3  7640
6  2658  0  1 045 045  0  1 052 052  0  1 045 045
3  2683   CS  0  12  3  752   23450 99 99
5  2385        0  1  7640   94  1  7620  245  1  7600  268  2  7580  274  2  7560
**SEQUENCE**
5  2386      278  2  7513  284  2  7513  287  2  7560  293  3  7580  301  3  7600
5  2387      391  3  7600  493  3  7620
6  2388  0  1 100 100  0  1 050 050  0  1 040 040
3  2713   CT  0  13  1  752   23950 99 99
5  2715        0  1  7640  137  1  7620  147  1  7600  156  1  7580  162  1  7560
5  2716      168  1  7519  174  1  7519  179  1  7560  183  1  7580  193  1  7600
5  2717      204  1  7620  212  1  7640  450  1  7660
6  2718  0  1 040 040
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE= 2/15/79

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECTION CR TO CT 100 VH
PAGE 1 OF 1, PROFILE NUMBER 3, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
CR AT 23054 / 759.33	0 / 0.04	285. /	175. / 759.37	13654. / 1.63	1.02 / 0.13	150. /	197.	*IS*
CS AT 23450 / 759.58	396 / 0.08	285. / 0.25	141. / 0.02	9538. / 759.66	1.21 / 2.01	250. / 0.18	299. / 0.020	*XS*
CT AT 23950 / 759.93	500 / 0.05	285. / 0.32	161. / 0.0	13201. / 759.98	1.00 / 1.77	147. / 0.17	193. / -0.000	*XS*

100 YR

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 20,DATE= 2/15/79

WATER-SURFACE PROFILE FOR: HARTSHORN DRAIN SECTION CR TO CT VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
CR	AT	23054	0	285.	175.	13666.	1.02	150.	197.
759.33	0.04				759.37	1.63	0.13		*IS*
CS	AT	23450	396	285.	141.	9543.	1.21	250.	299.
759.58	0.08	0.25	0.02		759.66	2.01	0.18	0.020	*XS*
CT	AT	23950	500	285.	161.	13196.	1.00	147.	193.
759.93	0.05	0.32	0.0		759.98	1.77	0.17	-0.001	*XS*

FW

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 24,DATE=12/13/78

WATER-SURFACE PROFILE FOR: BRENT RUN (LAKE DRAIN) SECT CG TO CN VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
CG AT 27657	0	415.	298.	18088.	1.90	370.	570.	
752.24	0.06			752.30	1.39	0.15		*IS*
CH AT 28010	353	415.	700.	42517.	1.46	97.	297.	
752.37	0.01	0.08	0.0	752.38	0.59	0.05	-0.000	*XS*
CI AT 28580	570	380.	711.	39347.	1.81	147.	347.	
752.42	0.01	0.05	0.00	752.43	0.53	0.07	-0.000	*XS*
CJ AT 28930	350	380.	490.	31478.	1.65	124.	274.	
752.46	0.02	0.04	0.00	752.48	0.78	0.09	-0.000	*XS*
CK AT 29440	510	380.	355.	19182.	2.32	49.	198.	
752.57	0.04	0.12	0.01	752.61	1.07	0.14	0.000	*XS*
CL AT 29880	440	380.	277.	13488.	1.74	120.	270.	
752.82	0.05	0.25	0.00	752.87	1.37	0.16	0.009	*XS*
CM AT 30280	400	380.	131.	7968.	1.08	295.	358.	
753.32	0.14	0.54	0.05	753.46	2.91	0.24	0.008	*XS*
CN AT 30610	330	380.	198.	11195.	1.17	266.	378.	
753.93	0.07	0.53	0.0	754.00	1.92	0.16	-0.001	*XS*

FW

END OF THIS PROFILE

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1  2511 BRENT RUN (LAKE DRAIN) SECTION CO TO CR      VH     4  5  2  5 12
2  2512  75297  75356  75435  75388  75398
3  2513   CO  1  14  3  753   30650  1  3
4  2514     210    300    435    350    350
5  2515       0  1  7600  175  1  7570  260  1  7550  270  1  7548  284  2  7561
5  2516     290  2  7547  298  2  7468  305  2  7461  310  2  7467  322  3  7547
5  2517     345  3  7534  405  3  7560  495  3  7580  560  3  7600
6  2520  0  1 065 065  0  1 065 065  0  1 070 070
3  2543  CR   0  13  3  753   31060 99 99
5  2545       0  1  7600   17  1  7580   40  1  7560   65  1  7540   90  1  7535
5  2546     102  2  7534  108  2  7472  114  2  7467  118  2  7471  130  3  7557
5  2547     150  3  7557  186  3  7580  242  3  7600
6  2548  0  1 070 070  0  1 060 060  0  1 070 070
3  2573  CO   0  13  3  754   31480 99 99
5  2575       0  1  7600   67  1  7580  132  1  7563  144  1  7559  150  2  7559
5  2576     157  2  7485  158  2  7476  164  2  7476  168  2  7484  178  3  7554
5  2577     193  3  7558  280  3  7580  340  3  7600
6  2578  0  1 075 075  0  1 060 060  0  1 065 065
3  2603  CR   0  12  3  753   31810 99 99
5  2606       0  1  7600   75  1  7580  192  1  7554  200  2  7547  208  2  7490
5  2607     214  2  7478  223  2  7483  231  3  7553  241  3  7548  292  3  7560
5  2608     342  3  7580  380  3  7600
6  2609  0  1 065 065  0  1 055 055  0  1 070 070
```

WATER-SURFACE PROFILE FOR: BRENT RUN (LAKE DRAIN) SECTION CO TO CR VH
PAGE 1 OF 1 100 YR

SECID AT	DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HF	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
CO AT	30650 / 753.88	0 / 0.08	350. /	158. /	9445. / 753.96	1.05 / 2.21	291. / 0.18	356.	*IS*
CP AT	31060 / 754.43	410 / 0.09	350. / 0.55	167. / 0.00	9644. / 754.52	1.27 / 2.09	60. / 0.19	128. / 0.001	*XS* 100 YR
CO AT	31480 / 755.05	420 / 0.11	350. / 0.63	132. / 0.01	8408. / 755.16	1.00 / 2.65	151. / 0.21	178. / 0.000	*XS*
CR AT	31810 / 755.47	330 / 0.07	350. / 0.37	185. / 0.0	12929. / 755.53	1.17 / 1.89	189. / 0.16	269. / 0.000	*XS*

END OF THIS PROFILE

WATER SURFACE PROFILE FOR: BRENT RUN (LAKE DRAIN) SECTION CO TO CR VH

 FW

SECID AT	DISTANCE /	LENGTH /	DISCHARGE /	AREA /	CONVEYANCE /	ALPHA /	LEW /	REW
WS ELEV /	HV /	HE /	HF /	EG /	V /	FN /	ACC	*ID*
CO AT	30650 /	0 /	350. /	163. /	9721. /	1.07 /	291. /	358.
753.98 /	0.08 /			/ 754.06 /	2.14 /	0.17/		*IS*
CR AT	31060 /	410 /	350. /	172. /	9904. /	1.28 /	59. /	128.
754.50 /	0.08 /	0.52 /	0.00 /	754.58 /	2.04 /	0.18 /	0.000	*XS*
CO AT	31480 /	420 /	350. /	133. /	8511. /	1.00 /	151. /	178.
755.10 /	0.11 /	0.61 /	0.01 /	755.21 /	2.63 /	0.21 /	0.000	*XS*
CR AT	31810 /	330 /	350. /	188. /	13092. /	1.18 /	187. /	271.
755.50 /	0.06 /	0.36 /	0.0 /	755.57 /	1.87 /	0.15 /	0.000	*XS*

FW

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 1/15/79

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1  2661 BRENT RUN (LAKE DR) SECT CS TO CT            VH     2  4  2  5 12
2  2662  75447  75557  75640  75594  75597
                                     UUUUU                                      **ERI
3  2663  CS   5  12  3  754   31850  1  3
4  2664     210    300    435    350    350
                                      UUU                                       **ERI
5  2665       0  1  7600   50  1  7580  193  1  7560  233  1  7556  257  2  7556
5  2666     269  2  7492  272  2  7488  279  2  7492  286  3  7553  318  3  7548
5  2667     393  3  7580  423  3  7600
6  2668  0  1 065 065  0  1 055 055  0  1 070 070
3  2693   CT  0   8  2  756   32570 99 99
5  2696       0  1  7608   27  2  7606   39  2  7497   44  2  7493   49  2  7495
5  2697      55  2  7541   65  2  7588   79  2  7602
6  2700  0  1 065 065  0  1 060 060
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 9,DATE= 1/15/79

WATER-SURFACE PROFILE FOR: BRENT RUN (LAKE DR) SECT CS TO CT VH
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
CS	AT	31850	0	350.	195.	10573.	1.55	199.	345.
755.94	0.08			756.02	1.79	0.19			*IS*
CT	AT	32570	720	350.	141.	8910.	1.00	31.	61.
756.87	0.10	0.94	0.01	756.96	2.48	0.20	0.001		*XS*

100 Yr

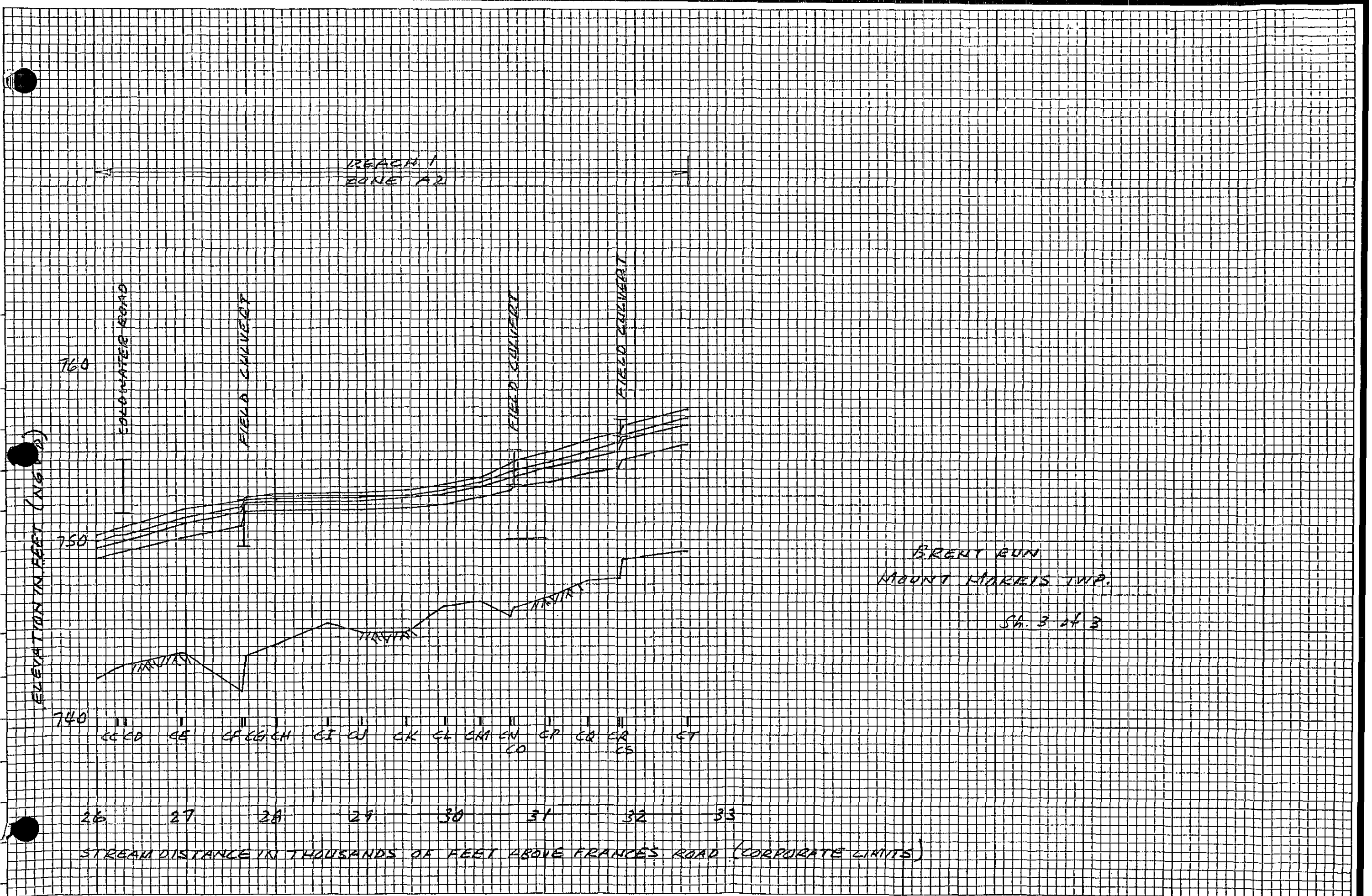
END OF THIS PROFILE

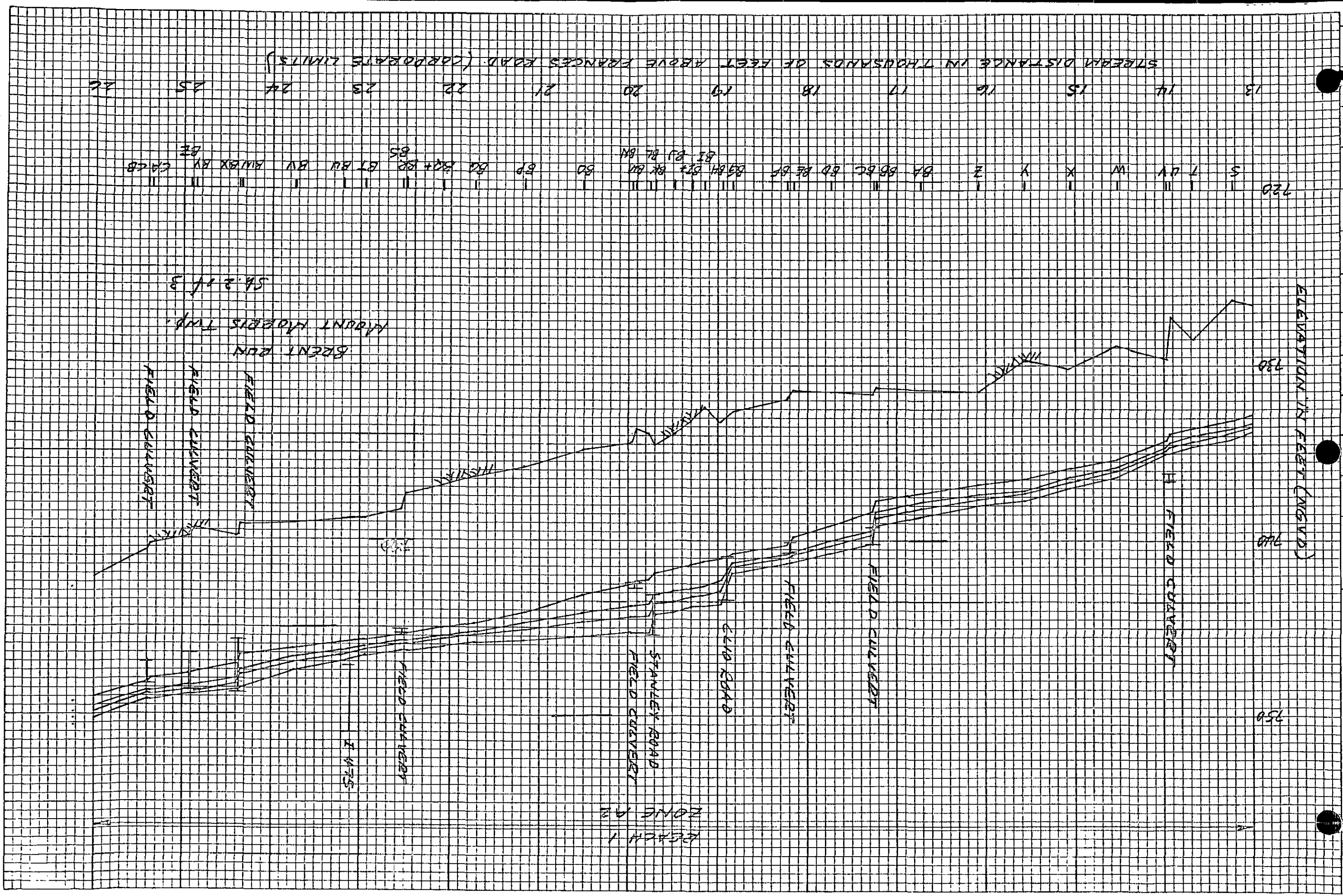
```
USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT=   12,DATE= 1/15/79

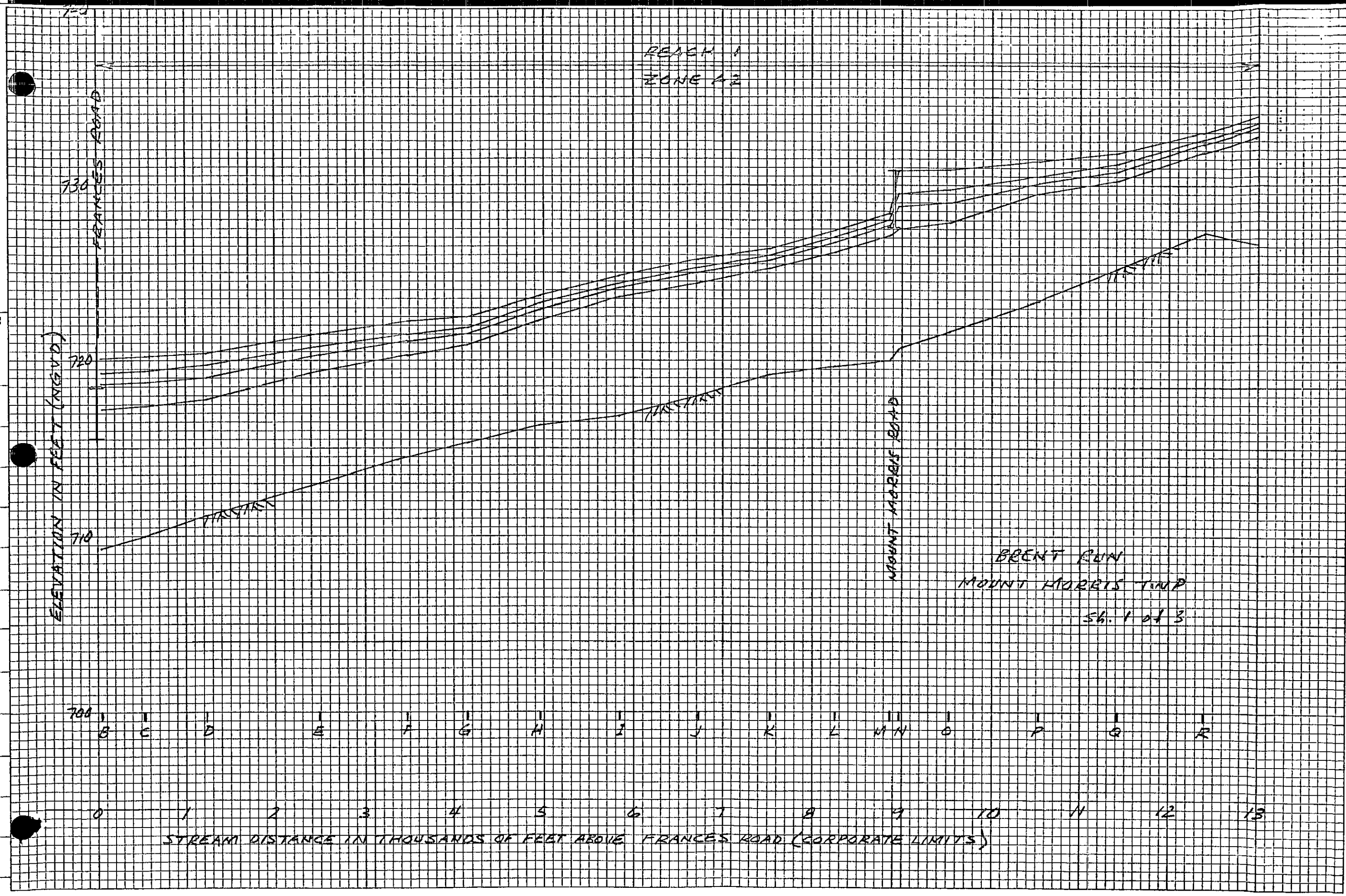
WATER-SURFACE PROFILE FOR:  BRENT RUN (LAKE DR) SECT CS TO CT          VH
PAGE  1 OF  1, PROFILE NUMBER  5,   UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW
=================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
=================================================================================
 CS   AT   31850 /     0 /    350. /   190. /   10702. / 1.44 /  240. /  340.
   755.97 /   0.08 /                 /  756.05 /   1.84 /   0.19/          *IS*
---------------------------------------------------------------------------------
  CT  AT   32570 /   720 /    350. /   141. /    8947. / 1.00 /   31. /   61.
   756.88 /   0.10 /   0.92 /   0.01 /  756.98 /   2.47 /   0.20 /  0.001  *XS*
=================================================================================

                                END OF THIS PROFILE
```

FW


REACH 1
ZONE A2
COLDWATER ROAD
FIELD CULVERT
FIELD CULVERT
FIELD CULVERT
760
750
740
ELEVATION IN FEET (NGVD)
CC CD CE CF CG CH CI CJ CK CL CM CN CO CP CQ CR CS CT
26 27 28 29 30 31 32 33
STREAM DISTANCE IN THOUSANDS OF FEET ABOVE FRANCES ROAD (CORPORATE LIMITS)
BRENT RUN
MOUNT MORRIS TWP.
Sh. 3 of 3


STREAM DISTANCE IN THOUSANDS OF FEET ABOVE FRANCES COAL (CORPORATE LIMITS)
13 14 15 16 17 18 19 20 21 22 23 24 25 26
ELEVATION IN FEET (MSL)
750
700
650
RECENT CUT
MOUNT MORRIS TWP.
SEC. 2 T 3
FIELD CLAYCRAFT
FIELD CLAYCRAFT
FIELD CLAYCRAFT


REACH 1
ZONE A2
FRANCES ROAD
MOUNT MORRIS ROAD
BRENT RUN
MOUNT MORRIS TWP
Sh. 1 of 3
ELEVATION IN FEET (NGVD)
730
720
710
700
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
0
1
2
3
4
5
6
7
8
9
10
11
12
13
STREAM DISTANCE IN THOUSANDS OF FEET ABOVE FRANCES ROAD (CORPORATE LIMITS)

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1   100 HUGHES DRAIN (SECT A+TO SECT C)              VH     3  5  2  5 12
2   101  74217  74362  74530  74432  74440
3   102   A+  1    9  2  742      120 99 99
4   103    145     205     295     240     240
5   104     -12  1  7460    -4  1  7441    25  1  7363   32  1  7343   40  1  7361
5   105      56  2  7433    76  2  7440    96  2  7436  120  2  7460
6   106  0  1 040 040  0  1 065 065
3   133   B   0   #9 2  742      400 99 99
5   135     127  1  7474  137  1  7456  147  1  7445  171  1  7365  176  1  7347
5   136     183  1  7365  199, 2  7440  221  2  7437  275  2  7460
                                                      UUU  U  UUUU                **E
6   138  0  1 045 045  0  1 065 065
3   163   C   0   8  2  743      720 99 99
5   165     400  1  7456  428  1  7453  436  1  7450  455  1  7372  461  1  7353
5   166     466  1  7373  490  2  7448  511  2  7454
6   168  0  1 040 040  0  1 065 065
```

WATER-SURFACE PROFILE FOR: HUGHES DRAIN (SECT A+TO SECT C) 100 VH
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
A+ AT 120 / 744.32	0 / 0.01	240. /	356. /	37023. / 744.33	1.13 / 0.67	-5. / 0.05	103.	*IS*	108
B AT 400 / 744.32	280 / 0.01	240. / 0.02	276. / 0.00	24684. / 744.33	1.09 / 0.87	148. / 0.07	236. / -0.016	*XS*	108 8Y
C AT 720 / 744.35	320 / 0.02	240. / 0.03	231. / 0.00	22585. / 744.37	1.00 / 1.04	438. / 0.09	489. / -0.000	*XS*	51

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: HUGHES DRAIN (SECT A+TO SECT C) VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT	DISTANCE/	LENGTH/	DISCHARGE/	AREA	/CONVEYANCE/	ALPHA/	LEW	/ REW
WS ELEV /	HV /	HF /	HE /	EG /	V /	FN /	ACC	*ID*
A+ AT	120 /	0 /	240. /	349. /	37743. /	1.07 /	-5. /	75.
744.40 /	0.01 /		/	744.41 /	0.69 /	0.05/		*IS*
B AT	400 /	280 /	240. /	270. /	25264. /	1.02 /	148. /	208.
744.40 /	0.01 /	0.02 /	0.00 /	744.41 /	0.89 /	0.07 /	-0.015	*XS*
C AT	720 /	320 /	240. /	235. /	23113. /	1.00 /	437. /	489.
744.43 /	0.02 /	0.03 /	0.00 /	744.45 /	1.02 /	0.08 /	-0.000	*XS*

FW

END OF THIS PROFILE

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1   231 HUGHES DRAIN SECT D TO SECT J                VH     7  5  2  5 12
2   232  74241  74400  74581  74482  74490
3   233   D   1   9  3  743     750 99 99
4   234     145    205    295    240    240
5   235     424  1  7494  433  1  7469  439  2  7460  461  2  7380  467  2  7362
5   236     471  2  7381  485  3  7446  537  3  7460  600  3  7480
6   237  0  1 040 040  0  1 040 040  0  1 060 060
3   263   E   0   8  2  743    1060 99 99
5   265     -11  1  7493    6  1  7471   32  1  7388   39  1  7373   46  1  7393
5   266      58  2  7449   81  2  7447  127  2  7460
6   268  0  1 040 040  0  1 060 060
3   293   F   1   6  1  744    1180 99 99
4   294    125    175    255    200    200
5   295      10  1  7481   26  1  7459   43  1  7390   49  1  7366   60  1  7391
5   296      80  1  7458
6   298  0  1 040 040
3   323   G   0   6  1  744    1870 99 99
5   325      59  1  7477   90  1  7396   98  1  7366  105  1  7400  127  1  7468
5   326     140  1  7473
6   328  0  1 040 040
3   353   H   0   6  1  744    2470 99 99
5   355      51  1  7494   75  1  7418   84  1  7390   93  1  7411  107  1  7469
5   356     115  1  7482
6   358  0  1 040 040
3   383   I   0   7  2  745    2950 99 99
5   385      48  1  7515   60  1  7479   80  1  7425   93  1  7398  102  1  7424
5   386     115  2  7466  122  2  7474
6   388  0  1 040 040  0  1 060 060
3   413   J   0   8  2  746    3340 99 99
5   415      54  1  7505   60  1  7485   73  1  7451   84  1  7408   89  1  7396
5   416      94  1  7407  110  2  7472  181  2  8484
6   418  0  1 040 040  0  1 060 060
```

WATER-SURFACE PROFILE FOR: HUGHES DRAIN SECT D TO SECT J 100 VH
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
D	AT	750	0	240.	190.	18128.	1.01	442.	493.
744.82	0.02			744.84	1.26	0.11			*IS*
E	AT	1060	310	240.	187.	17046.	1.02	13.	87.
744.88	0.03	0.06	0.00	744.90	1.28	0.11	-0.000		*XS*
F	AT	1180	120	200.	214.	20473.	1.00	28.	77.
744.91	0.01	0.02	0.0	744.92	0.94	0.08	-0.000		*XS*
G	AT	1870	690	200.	197.	17354.	1.00	69.	121.
744.98	0.02	0.08	0.00	745.00	1.01	0.09	-0.000		*XS*
H	AT	2470	600	200.	125.	9892.	1.00	65.	103.
745.11	0.04	0.14	0.01	745.15	1.60	0.16	-0.000		*XS*
I	AT	2950	480	200.	120.	8912.	1.00	70.	111.
745.33	0.04	0.22	0.00	745.37	1.66	0.17	0.000		*XS*
J	AT	3340	390	200.	111.	8651.	1.00	71.	106.
745.53	0.05	0.20	0.00	745.58	1.80	0.18	0.000		*XS*

100 yr

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: HUGHES DRAIN SECT D TO SECT J VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
D AT 750	0	240.	195.	18622.	1.02	442.	496.	
744.90	0.02			744.92	1.23	0.10		*IS*
E AT 1060	310	240.	193.	17529.	1.04	13.	90.	
744.95	0.03	0.05	0.00	744.98	1.24	0.11	-0.000	*XS*
F AT 1180	120	200.	217.	20952.	1.00	28.	78.	
744.98	0.01	0.02	0.0	745.00	0.92	0.08	-0.000	*XS*
G AT 1870	690	200.	201.	17791.	1.00	69.	121.	
745.06	0.02	0.07	0.00	745.07	0.99	0.09	-0.000	*XS*
H AT 2470	600	200.	127.	10161.	1.00	64.	103.	
745.18	0.04	0.13	0.01	745.22	1.57	0.15	0.000	*XS*
I AT 2950	480	200.	123.	9140.	1.00	69.	111.	
745.38	0.04	0.21	0.00	745.42	1.63	0.17	0.000	*XS*
J AT 3340	390	200.	112.	8809.	1.00	71.	106.	
745.57	0.05	0.19	0.00	745.62	1.78	0.17	-0.000	*XS*

FW

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 2/15/79

*** INPUT CARD PRINTOUT ***

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1   471 HUGHES DRAIN SECT K TO SECT O                VH     7  5  2  5 12
2   472  74422  74519  74699  74583  74587
3   473   K   1  10  2  744     3370 99 99
4   474     125     175     255     200     200
5   475     1018  1  7526 1030  1  7483 1042  1  7466 1055  1  7413 1060  1  7406
5   476     1066  1  7406 1083  1  7460 1088  2  7473 1118  2  7476 1214  2  7500
6   478  0  1 040 040  0  1 060 060
3   503   L   0   8  2  744     3880 99 99
5   505      54  1  7506   70  1  7437   78  1  7403   87  1  7434   96  1  7463
5   506     106  2  7470  137  2  7476  225  2  7500
6   508  0  1 040 040  0  1 060 060
3   533   M   0   9  2  745     4300 99 99
5   535      15  1  7512   26  1  7509   54  1  7437   60  1  7417   67  1  7438
5   536      78  2  7474   94  2  7471  127  2  7477  270  2  7500
6   538  0  1 040 040  0  1 060 060
3   563   M+  0   9  2  745     4800 99 99
5   565      23  1  7520   37  1  7511   55  1  7497   74  1  7423   79  1  7425
5   566      89  1  7427  100  2  7478  110  2  7490  134  2  7499
6   568  0  1 040 040  0  1 060 060
3   593   N   1   8  2  746     5370 99 99
4   594     115     160     230     185     185
5   595      32  1  7543   51  1  7524   86  1  7431   91  1  7424   95  1  7429
5   596     116  2  7510  141  2  7511  176  2  7511
6   598  0  1 040 040  0  1 060 060
3   623   O   0   9  2  747     5850 99 99
5   626      -2  1  7528   20  1  7525   30  1  7515   44  1  7495   60  1  7447
5   627      65  1  7440   77  1  7441   87  2  7504  117  2  7509
6   629  0  1 040 040  0  1 028 028
```

WATER-SURFACE PROFILE FOR: HUGHES DRAIN SECT K TO SECT O 100 VH
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
K	AT	3370	0	200.	124.	9768.	1.00	1044.	1082.
745.83	0.04			745.87	1.61	0.16			*IS*
L	AT	3880	510	200.	90.	6518.	1.00	64.	95.
746.13	0.08	0.32	0.02	746.21	2.22	0.23	0.001		*XS*
M	AT	4300	420	200.	80.	5195.	1.00	43.	76.
746.63	0.10	0.50	0.01	746.73	2.51	0.28	0.014		*XS*
M+	AT	4800	500	200.	119.	9364.	1.00	62.	98.
747.10	0.04	0.41	0.0	747.14	1.68	0.16	0.000		*XS*
N	AT	5370	570	185.	103.	7449.	1.00	70.	107.
747.40	0.05	0.30	0.00	747.45	1.79	0.19	0.000		*XS*
O	AT	5850	480	185.	88.	6071.	1.00	50.	83.
747.75	0.07	0.36	0.01	747.82	2.11	0.23	0.001		*XS*

100yr

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 17,DATE= 2/15/79

WATER-SURFACE PROFILE FOR: HUGHES DRAIN SECT K TO SECT O VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
K AT 3370	0	200.	126.	9933.	1.00	1044.	1083.	
745.87	0.04			745.91	1.59	0.16		*IS*
L AT 3880	510	200.	91.	6611.	1.00	64.	96.	
746.16	0.08	0.31	0.02	746.24	2.20	0.23	0.001	*XS*
M AT 4300	420	200.	80.	5217.	1.00	43.	76.	FW
746.64	0.10	0.49	0.01	746.74	2.50	0.28	0.000	*XS*
M+ AT 4800	500	200.	119.	9383.	1.00	62.	98.	
747.10	0.04	0.41	0.0	747.15	1.68	0.16	0.000	*XS*
N AT 5370	570	185.	103.	7461.	1.00	70.	107.	
747.40	0.05	0.30	0.00	747.45	1.79	0.19	0.000	*XS*
O AT 5850	480	185.	88.	6078.	1.00	50.	83.	
747.76	0.07	0.36	0.01	747.83	2.11	0.23	0.001	*XS*

END OF THIS PROFILE

*** INPUT CARD PRINTOUT ***

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1   658 HUGHES DRAIN, MCALPIN DR TO DETROIT ST      VH     4  5  2  5 12
2   659  74686  74748  74848  74780  74781
3   660    P- 1    8  3  747    5905 99 99
4   661    115     160    230    185    185
5   662      41  1  7540   52  1  7525   66  2  7502   77  2  7433  103  2  7433
5   663     107  3  7502  127  3  7507  148  3  7508
6   665  0  1 060 060  0  1 040 040  0  1 030 030
3   673   P   0    9  3  748    5920 99 99
5   676      41  1  7540   52  1  7525   66  2  7502   85  2  7453   90  2  7441
5   677      95  2  7442  107  3  7502  127  3  7507  148  3  7508
6   679  0  1 060 060  0  1 040 040  0  1 030 030
3   703   Q   0    9  3  749    6510 99 99
5   705       0  1  7530   35  1  7517   56  2  7446   60  2  7448   70  2  7454
5   706      86  3  7522  105  3  7511  120  3  7510  147  3  7514
6   708  0  1 060 060  0  1 040 040  0  1 030 030
3   733   R   0    7  3  749    7100 99 99
5   735      10  1  7534   35  2  7528   45  2  7460   48  2  7448   54  2  7460
5   736      65  3  7519   95  3  7529
6   738  0  1 060 060  0  1 040 040  0  1 060 060
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USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 13,DATE= 2/16/79

WATER-SURFACE PROFILE FOR: HUGHES DRAIN, MCALPIN DR TO DETROIT ST VH
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS 100

SECID	AT	DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
P-	AT	5905 / 747.80	0 / 0.03	185. /	139. / 747.83	11946. / 1.33	1.00 / 0.12	70. /	106.	*IS*
P	AT	5920 / 747.74	15 / 0.16	185. / 0.01	57. / 0.07	3458. / 747.91	1.00 / 3.23	76. / 0.39	102. / -0.000	*XS*
Q	AT	6510 / 748.79	590 / 0.07	185. / 0.95	93. / 0.0	6124. / 748.86	1.18 / 2.00	44. / 0.23	78. / 0.001	*XS*
R	AT	7100 / 749.56	590 / 0.15	185. / 0.81	59. / 0.04	4050. / 749.72	1.00 / 3.16	40. / 0.33	61. / 0.001	*XS*

100yr

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 16,DATE= 2/16/79

WATER-SURFACE PROFILE FOR: HUGHES DRAIN, MCALPIN DR TO DETROIT ST VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
-FLOODWAY ANALYSIS--HOR-FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
P-	AT	5905	0	185.	139.	11991.	1.00	70.	106.
747.81	0.03			747.84	1.33	0.12			*IS*
P	AT	5920	15	185.	58.	3480.	1.00	75.	102.
747.~~76~~ 81	0.16	0.01	0.07	747.92	3.21	0.38	-0.001		*XS* FW
Q	AT	6510	590	185.	93.	6129.	1.18	44.	78.
748.79	0.07	0.95	0.0	748.86	1.99	0.23	0.001		*XS*
R	AT	7100	590	185.	59.	4051.	1.00	40.	61.
749.56	0.15	0.81	0.04	749.72	3.15	0.33	0.001		*XS*

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE= 2/21/79

*** INPUT CARD PRINTOUT ***

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1   768 HUGHES DRAIN  SEC S- TO SEC T                VDH    3  5  2  5 12
2   769  74875  74930  75005  74958  74958
3   770   S-  1   4  1  749    7155 99 99
4   771     80    115    170    135    135
5   772       9  1  7530   14  1  7453   38  1  7453   44  1  7524
6   774  0  1 040 040
3   783   S   0   7  3  749    7180 99 99
5   785      -2  1  7533   14  2  7524   22  2  7464   27  2  7458   33  2  7459
5   786      44  3  7524   64  3  8534
6   787  0  0 060 060  0  1 040 040  0  1 030 030
3   813   T   0   7  3  750    7670 99 99
5   815       0  1  7562   37  2  7553   54  2  7473   65  2  7460   73  2  7467
5   816      82  3  7540  104  3  7550
6   818  0  1 060 060  0  1 040 040  0  1 030 060
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USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 14,DATE= 2/21/79

WATER-SURFACE PROFILE FOR: HUGHES DRAIN SEC S- TO SEC T VDH
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS 100

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
S- AT 7155		0	135.	116.	9716.	1.00	11.	42.
749.58	0.02			749.60	1.16	0.10		*IS*
S AT 7180		25	135.	58.	3936.	1.00	18.	39.
749.58	0.08	0.01	0.03	749.66	2.33	0.25	0.020	*XS*
T AT 7670		490	135.	81.	5752.	1.00	48.	77.
750.02	0.04	0.39	0.0	750.06	1.67	0.18	0.001	*XS*

100 yr

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 17,DATE= 2/21/79

WATER-SURFACE PROFILE FOR: HUGHES DRAIN SEC S- TO SEC T VDH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
S- AT 7155 / 749.58	0 / 0.02	135. /	116. / 749.60	9716. / 1.16	1.00 / 0.10	11. /	42.	*IS*
S AT 7180 / 749.58	25 / 0.08	135. / 0.01	58. / 0.03	3936. / 749.66	1.00 / 2.33	18. / 0.25	39. / 0.020	*XS*
T AT 7670 / 750.02	490 / 0.04	135. / 0.39	81. / 0.0	5752. / 750.06	1.00 / 1.67	48. / 0.18	77. / 0.001	*XS*

FW

END OF THIS PROFILE

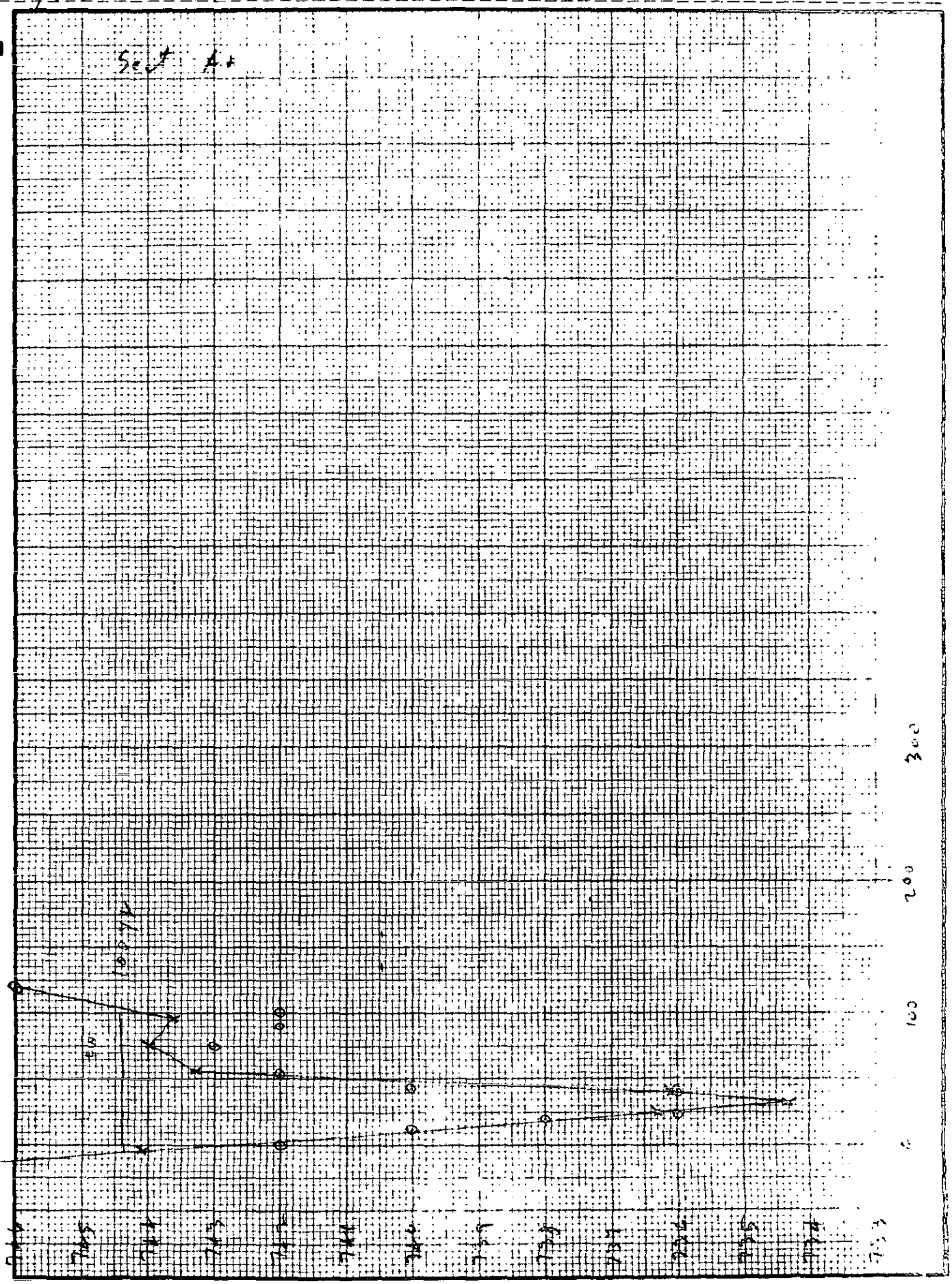
9-213-E
(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File

Hughes drain

Sect A-A



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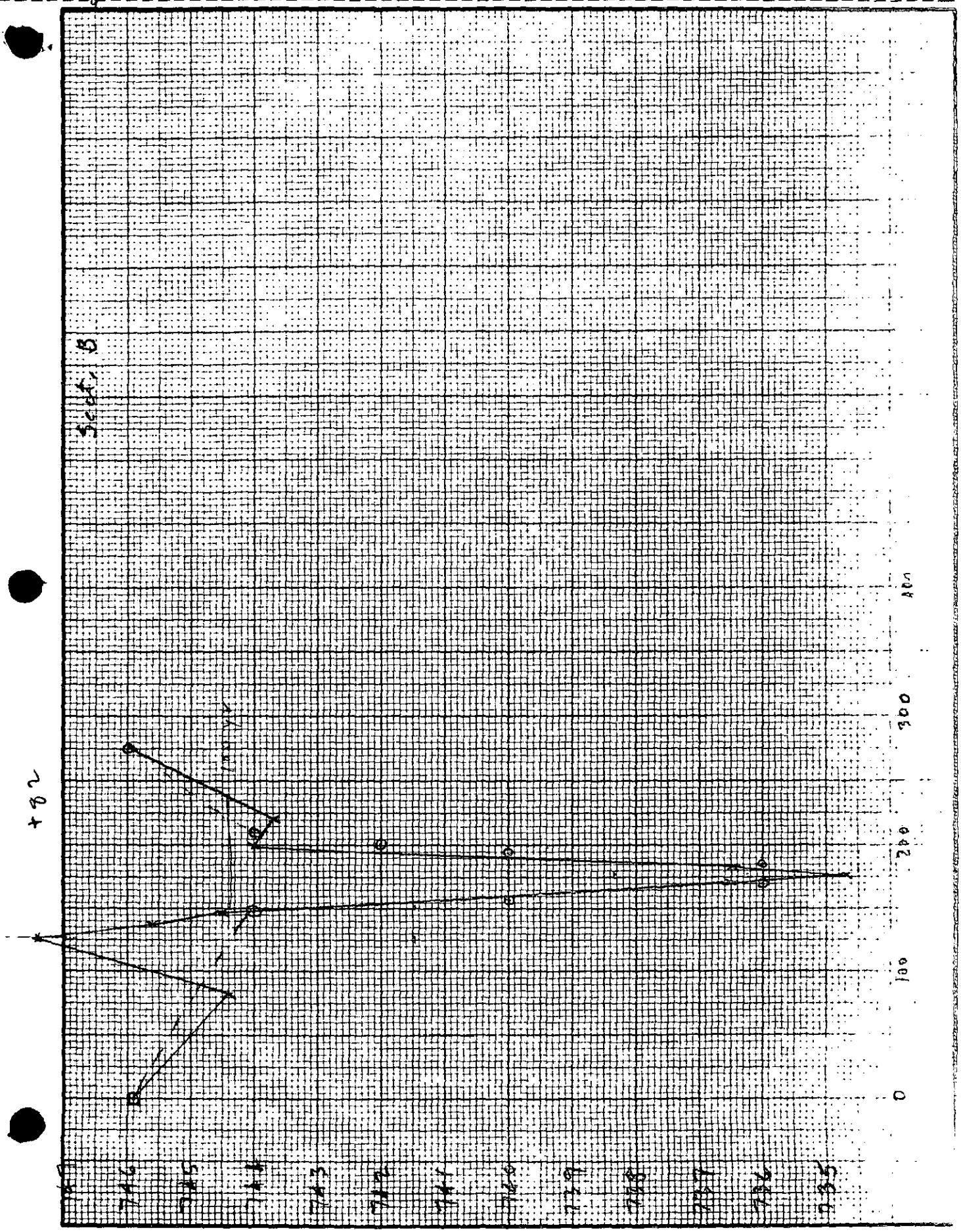
9-213-E
(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....

Hughes drain



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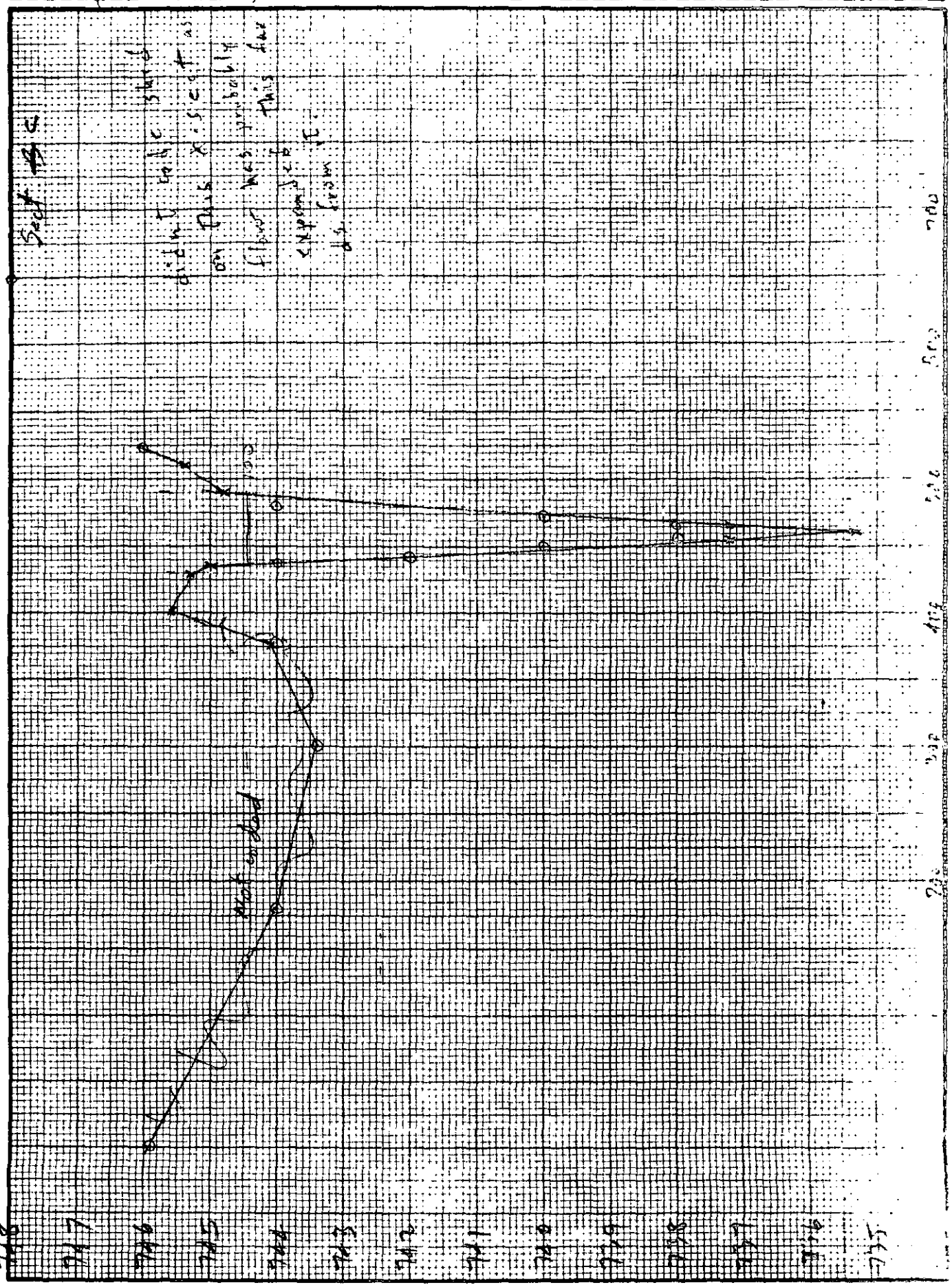
9-213-E
(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....

Hughes dr (Brent Run)



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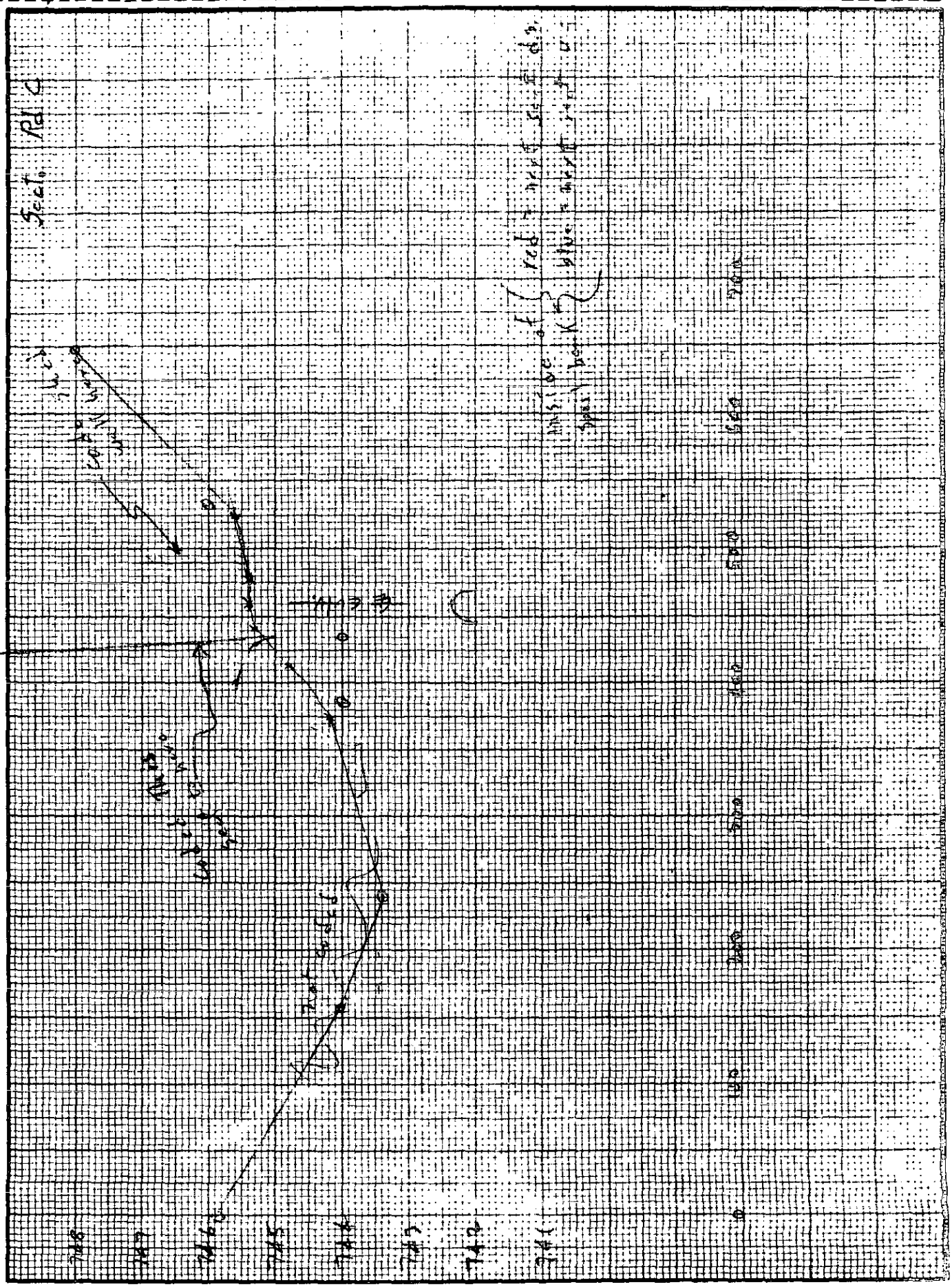
UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....

Hughes drain

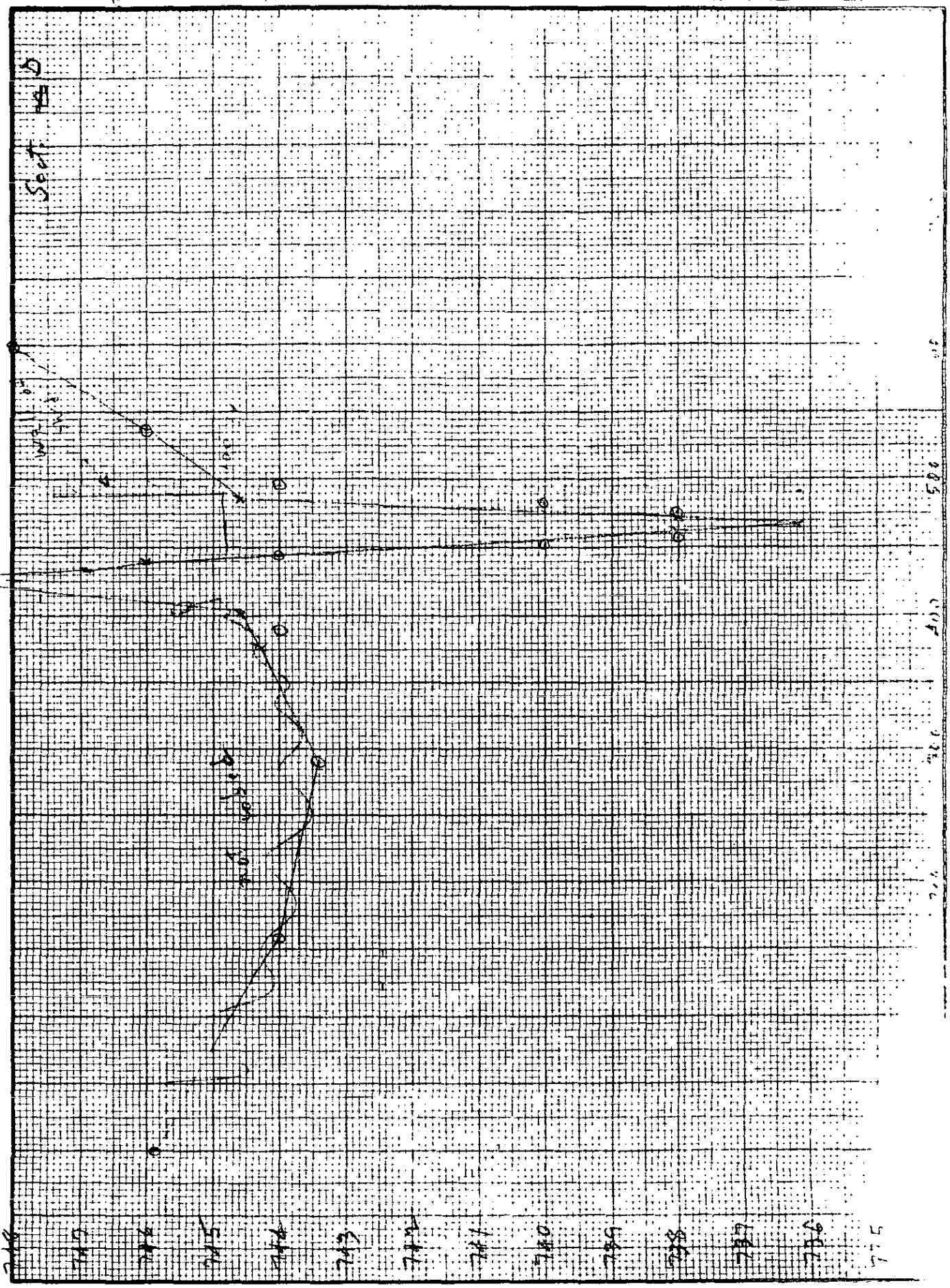

Scale 1" = 20'
Hughes drain
Water surface
Top of bank
Bottom of bank
Left bank looking downstream
Right bank looking downstream
Left bank looking downstream
Right bank looking downstream
Left bank looking downstream
Right bank looking downstream

9-213-E
(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....

Hughes dr (Brent Run)



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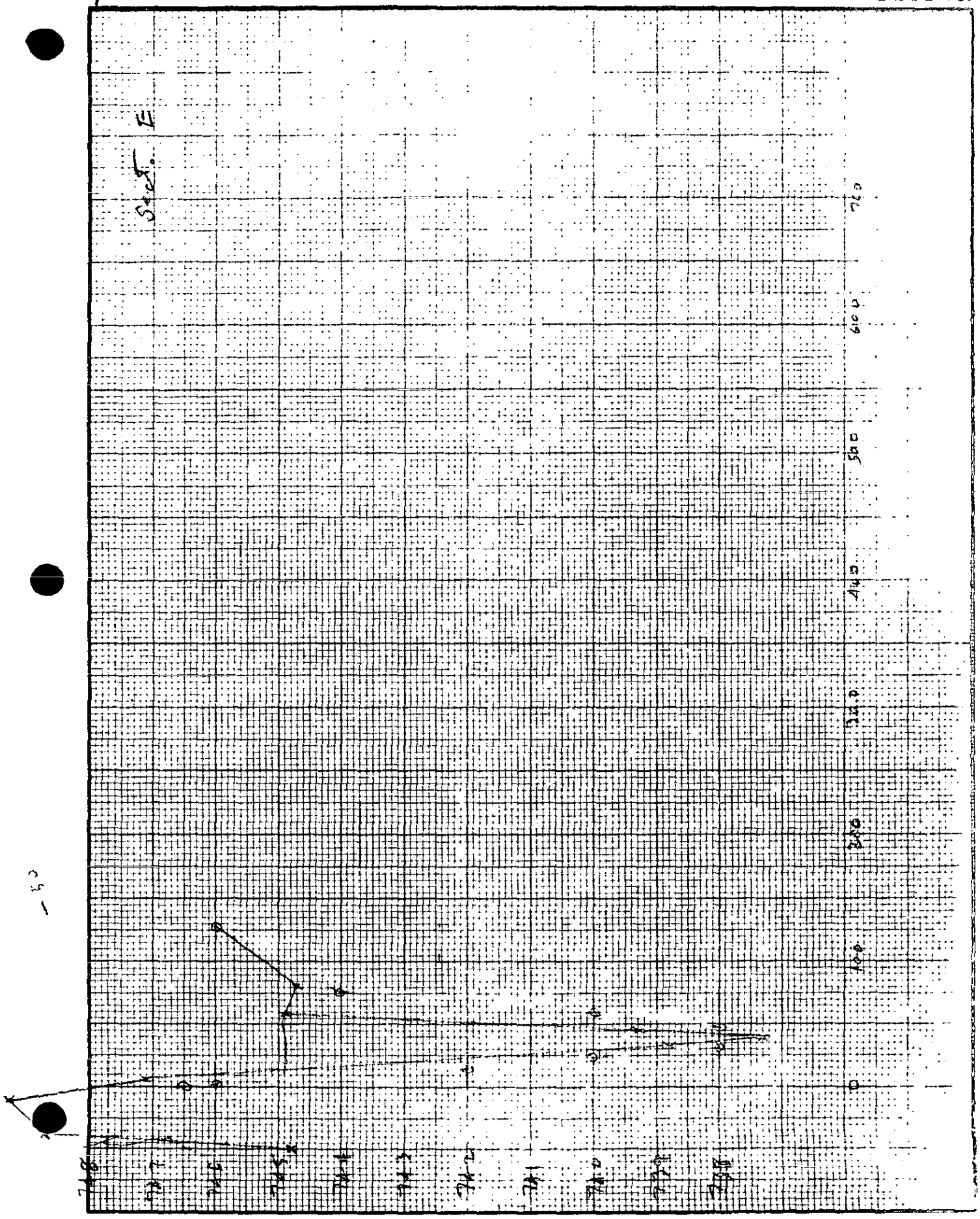
9-213-E
(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File

Hughes drain

Sect. E

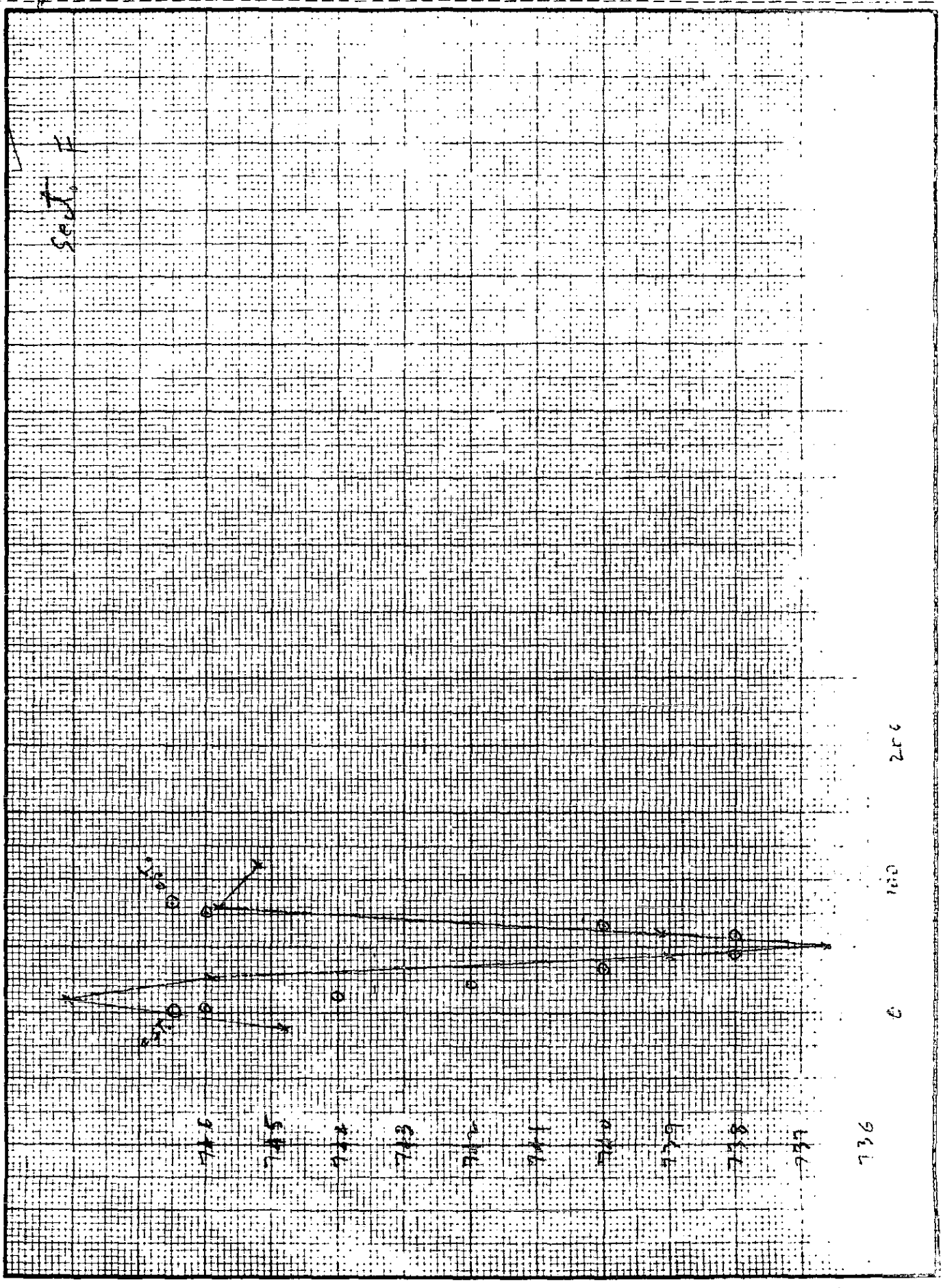


9-213-E
(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File

Hughes drain



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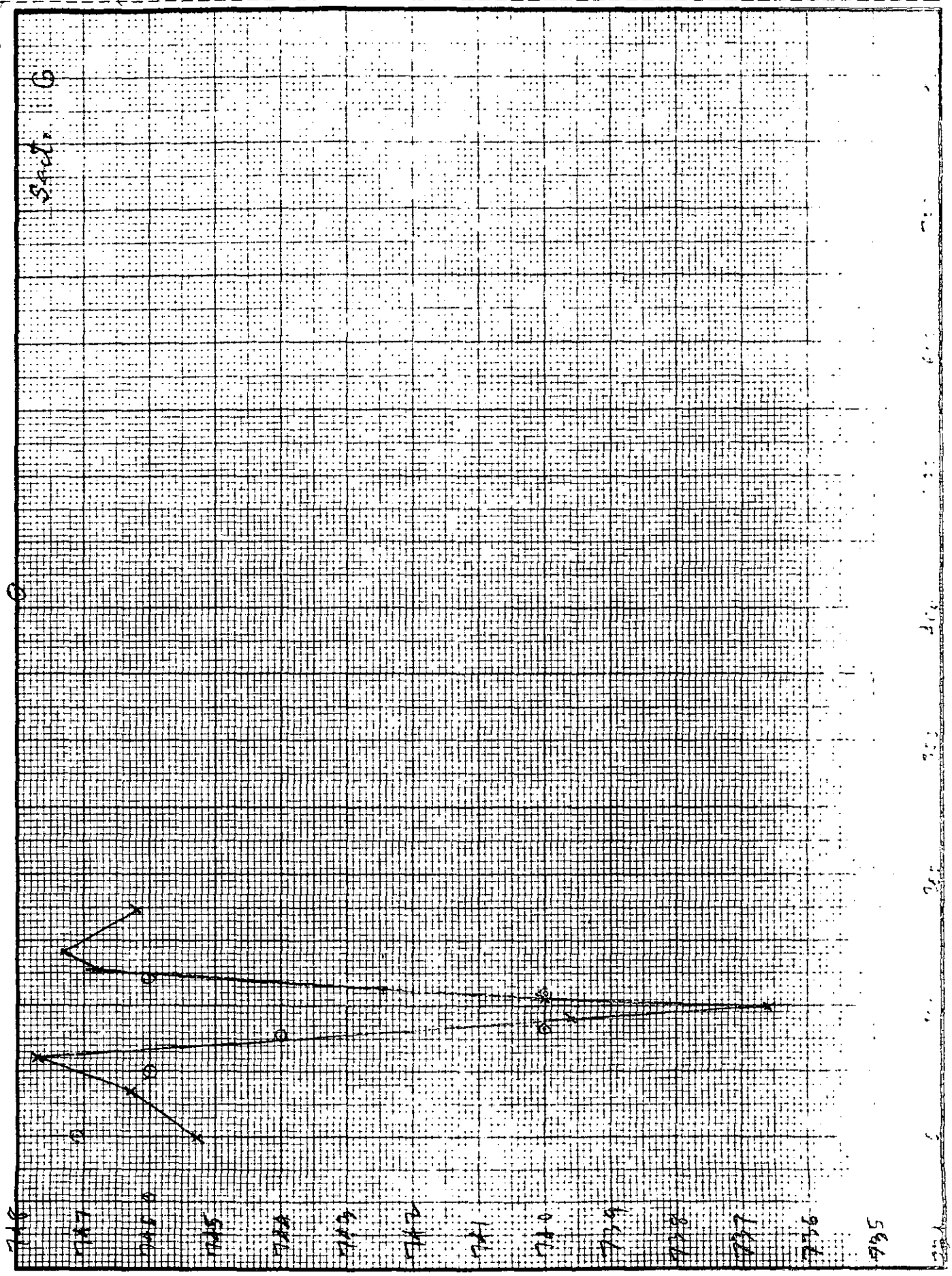
9-213-E
(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File

Hughes dr (Brent Pon

Sect. G



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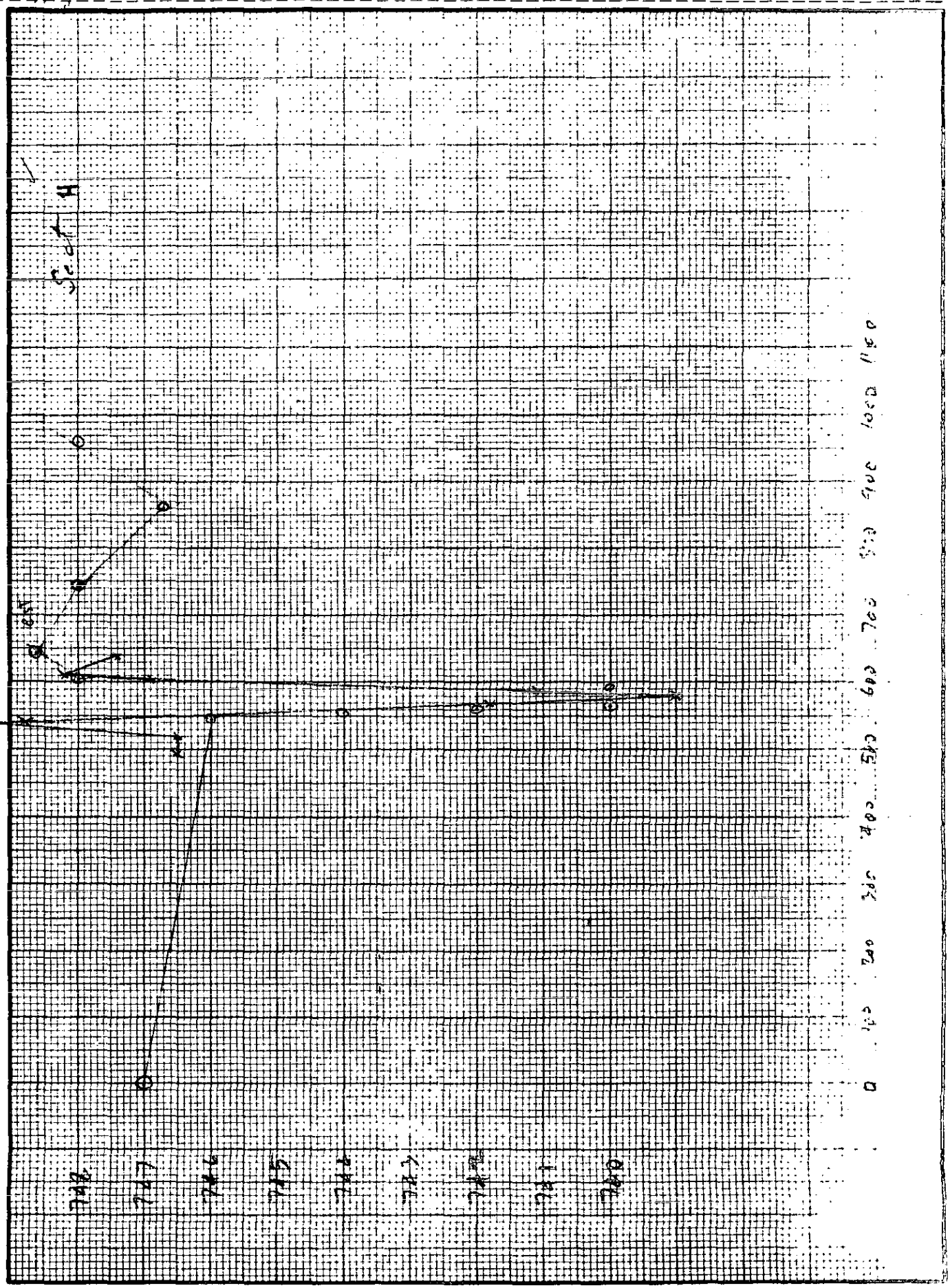
9-913-E
(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File

Hughes drain



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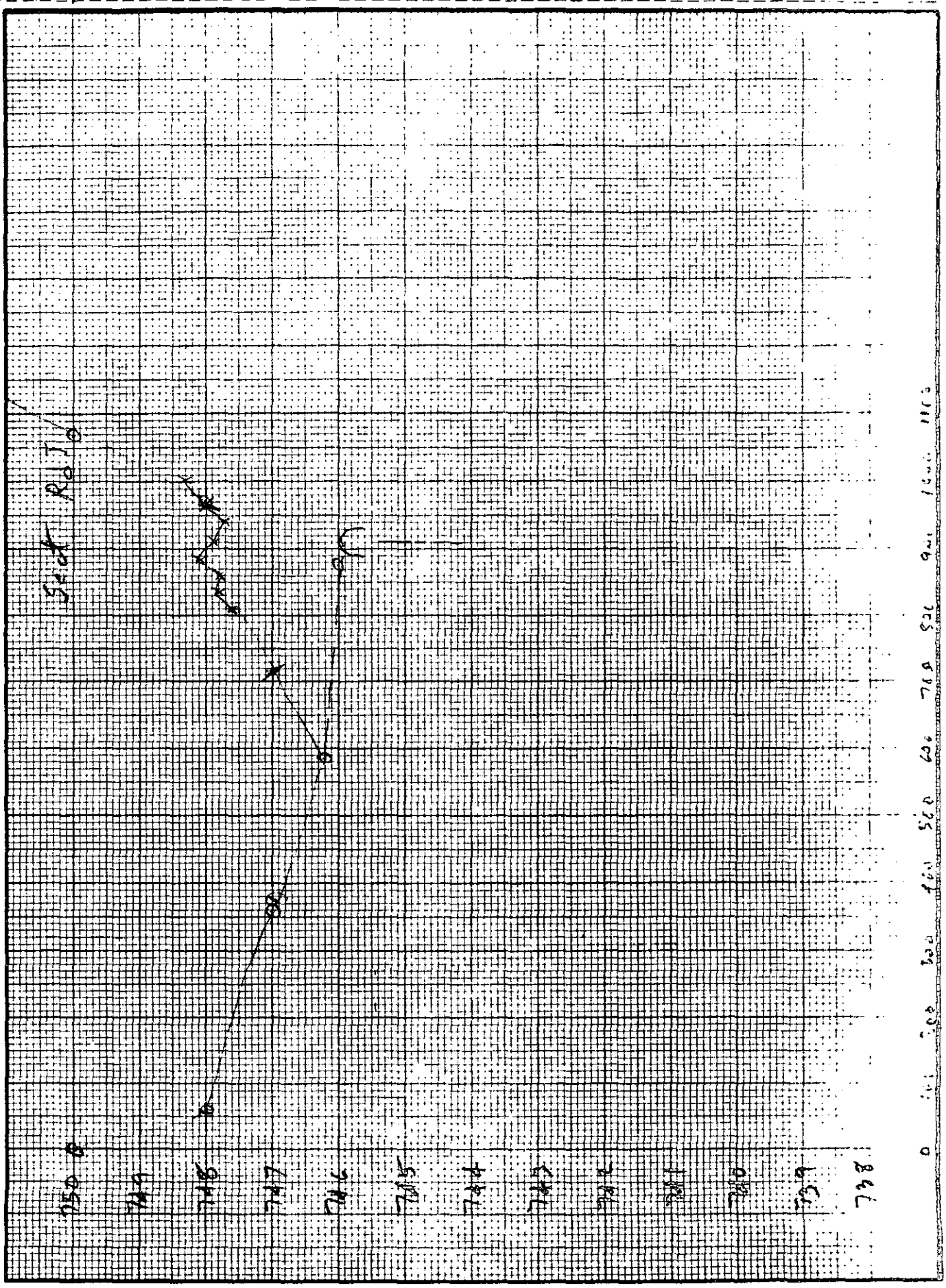
9-213-E
(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File

Hughes drain



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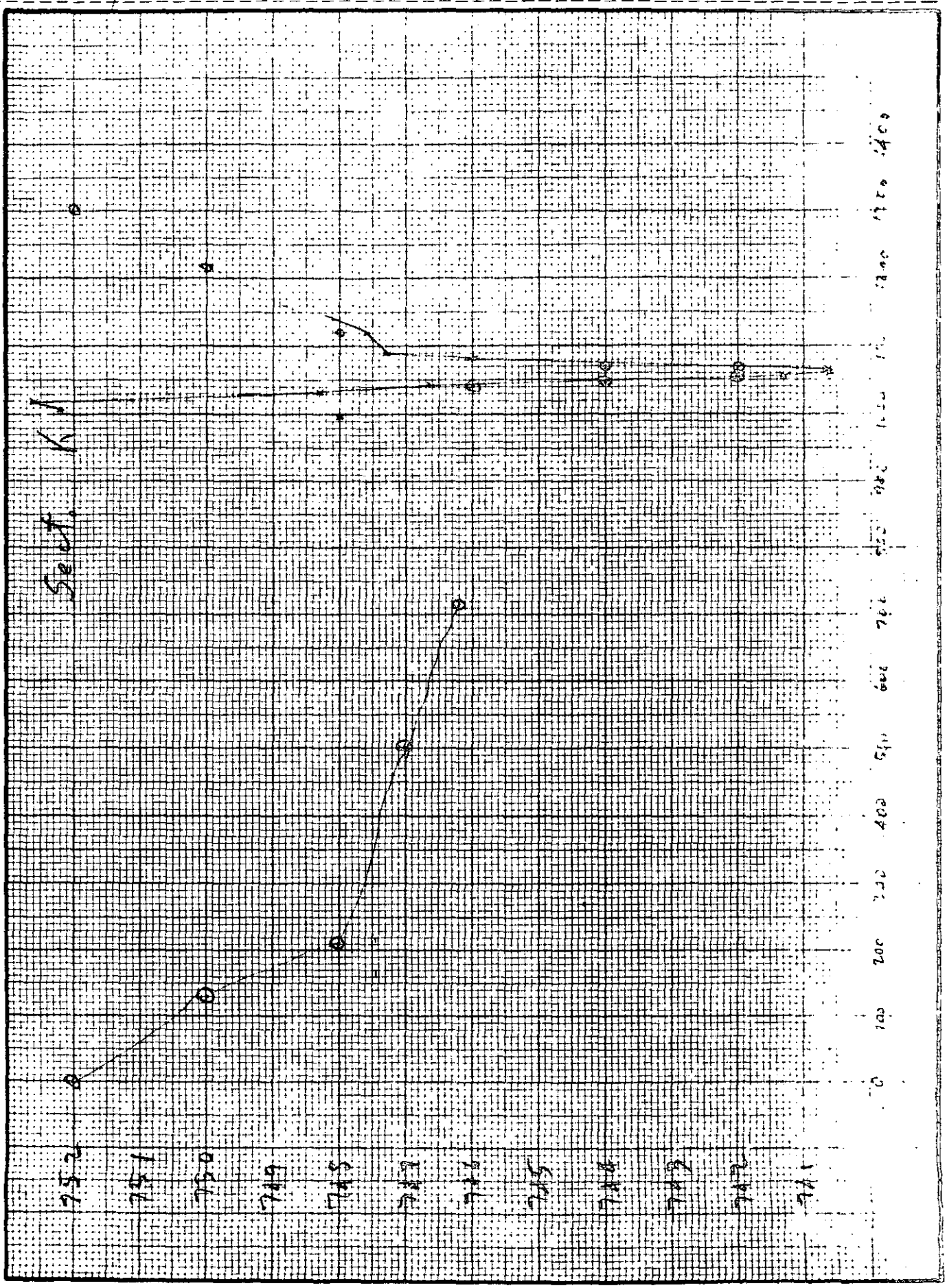
9-213-E
(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File

Hughes Creek



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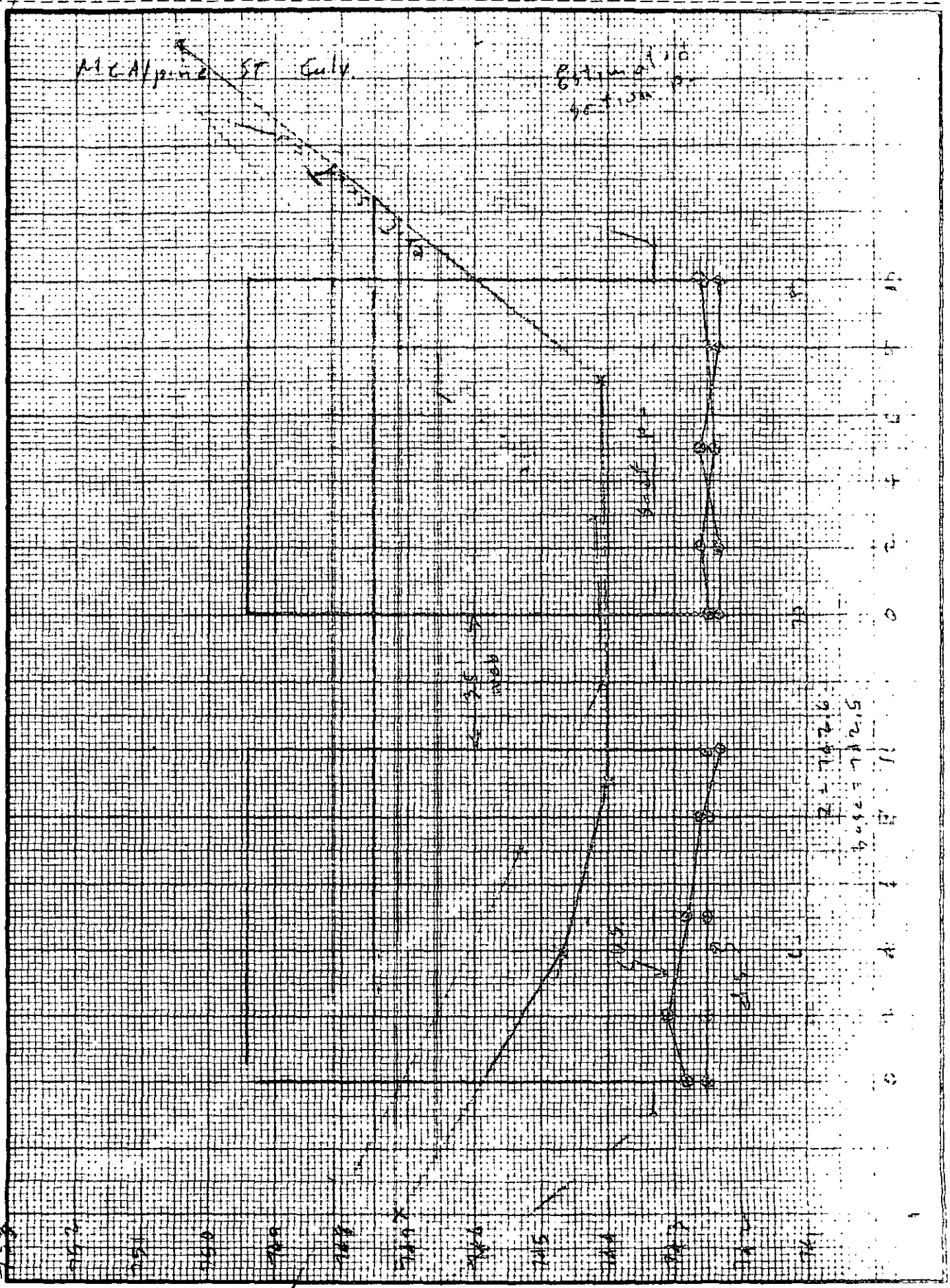
9-213-E
(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File

Hughes drain

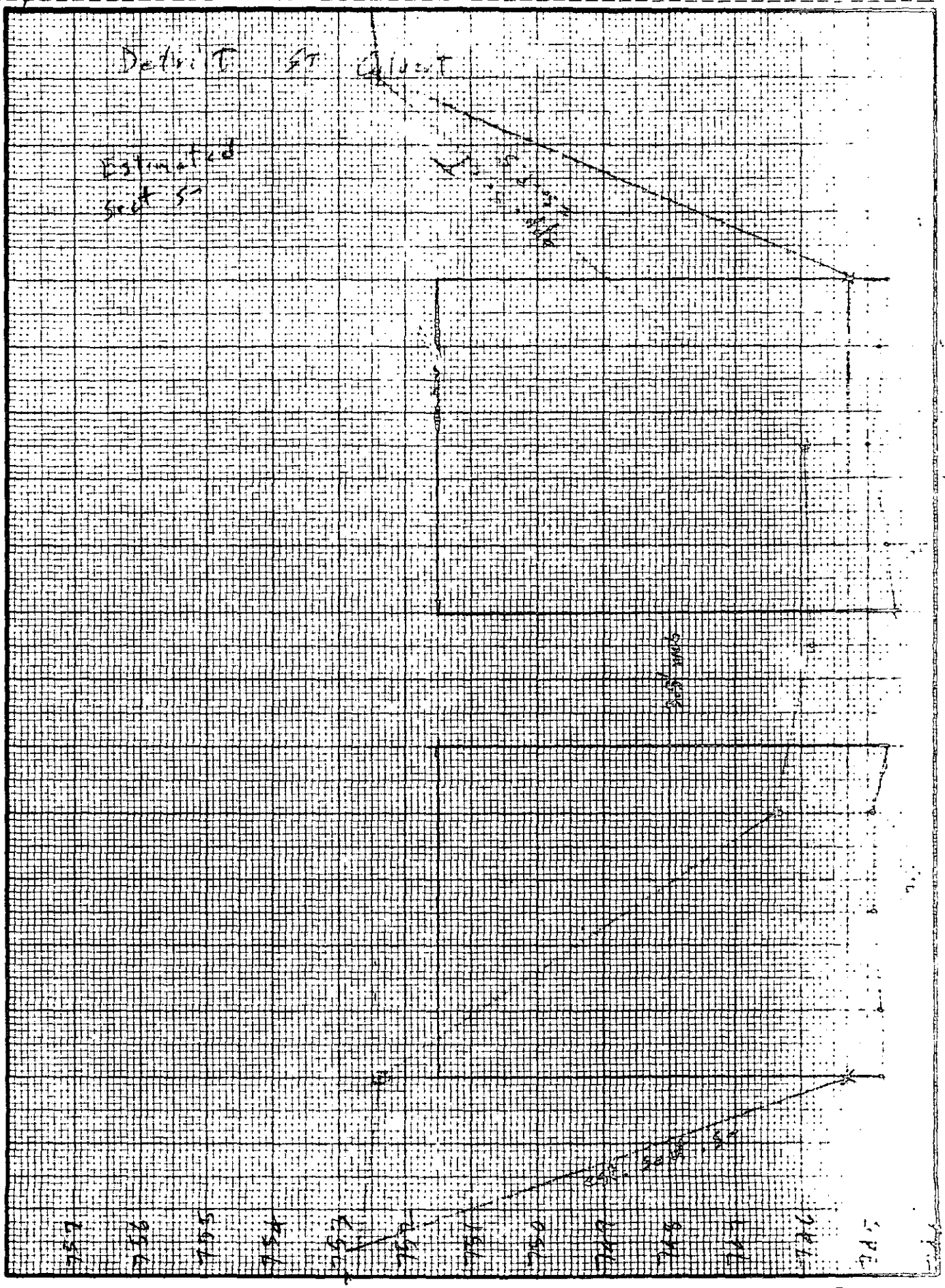


9-213-E
(March 1949)
Cross-Section

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File

Hughes drain



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9-213-E
(March 1949)
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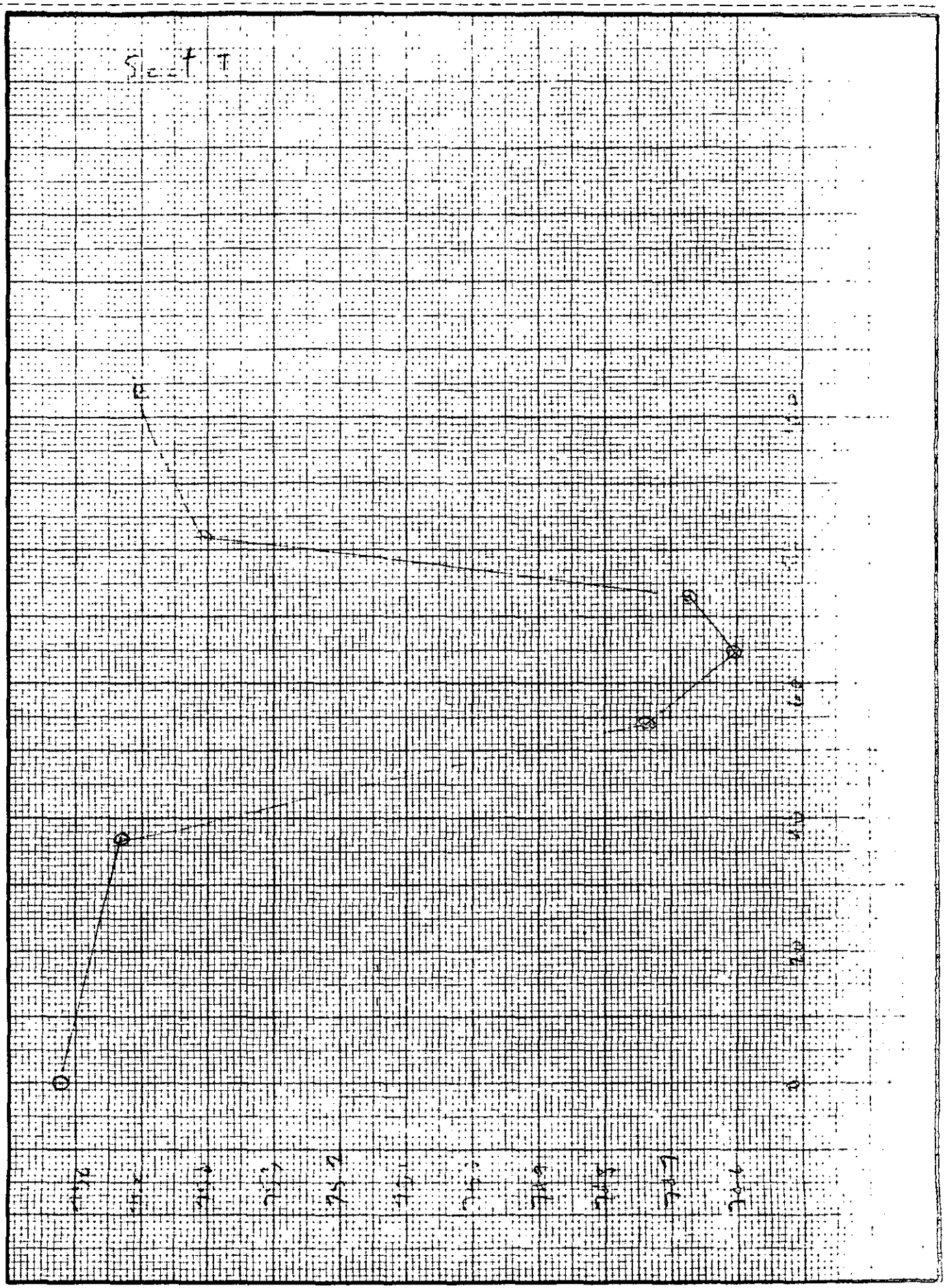
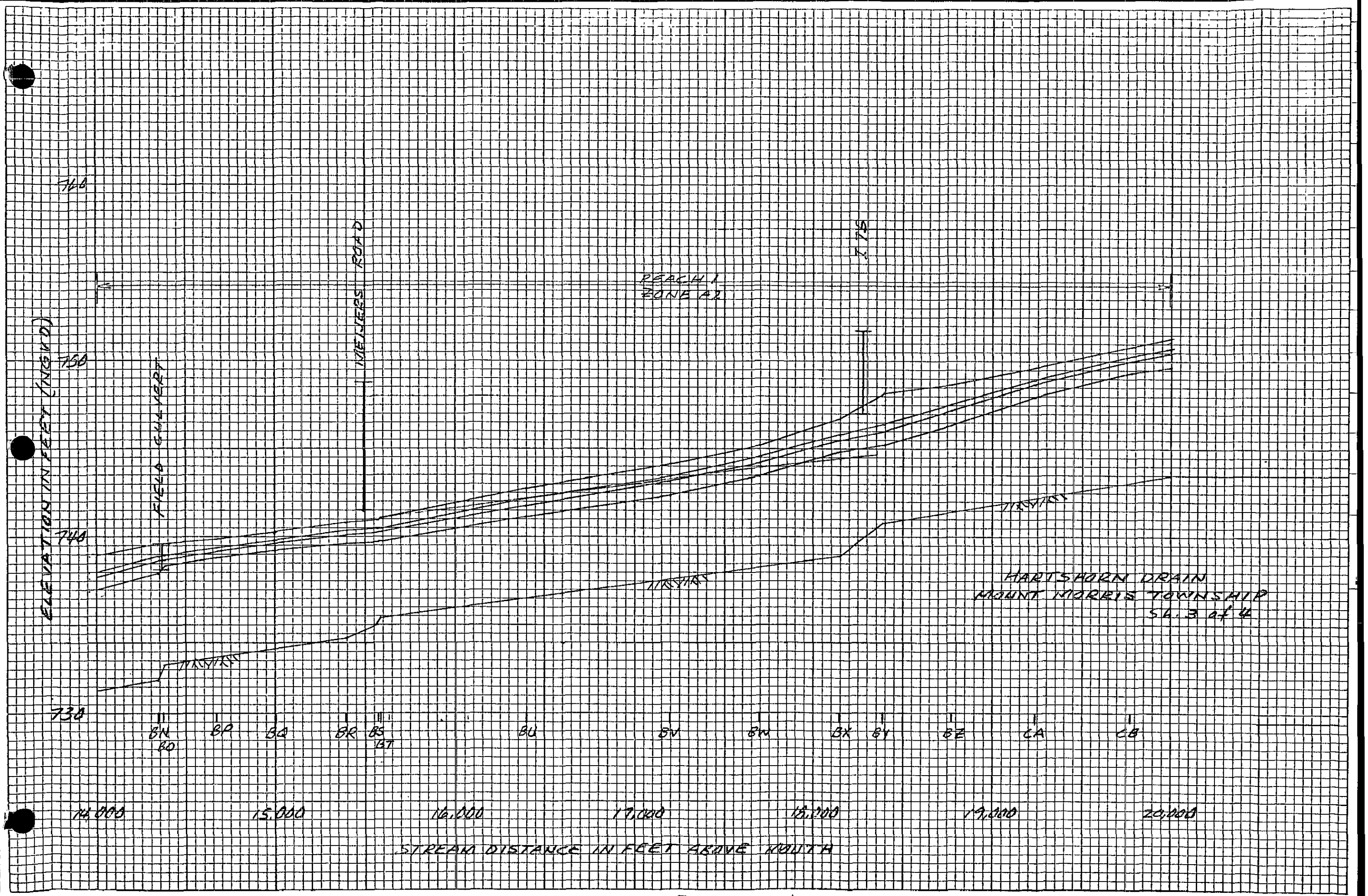
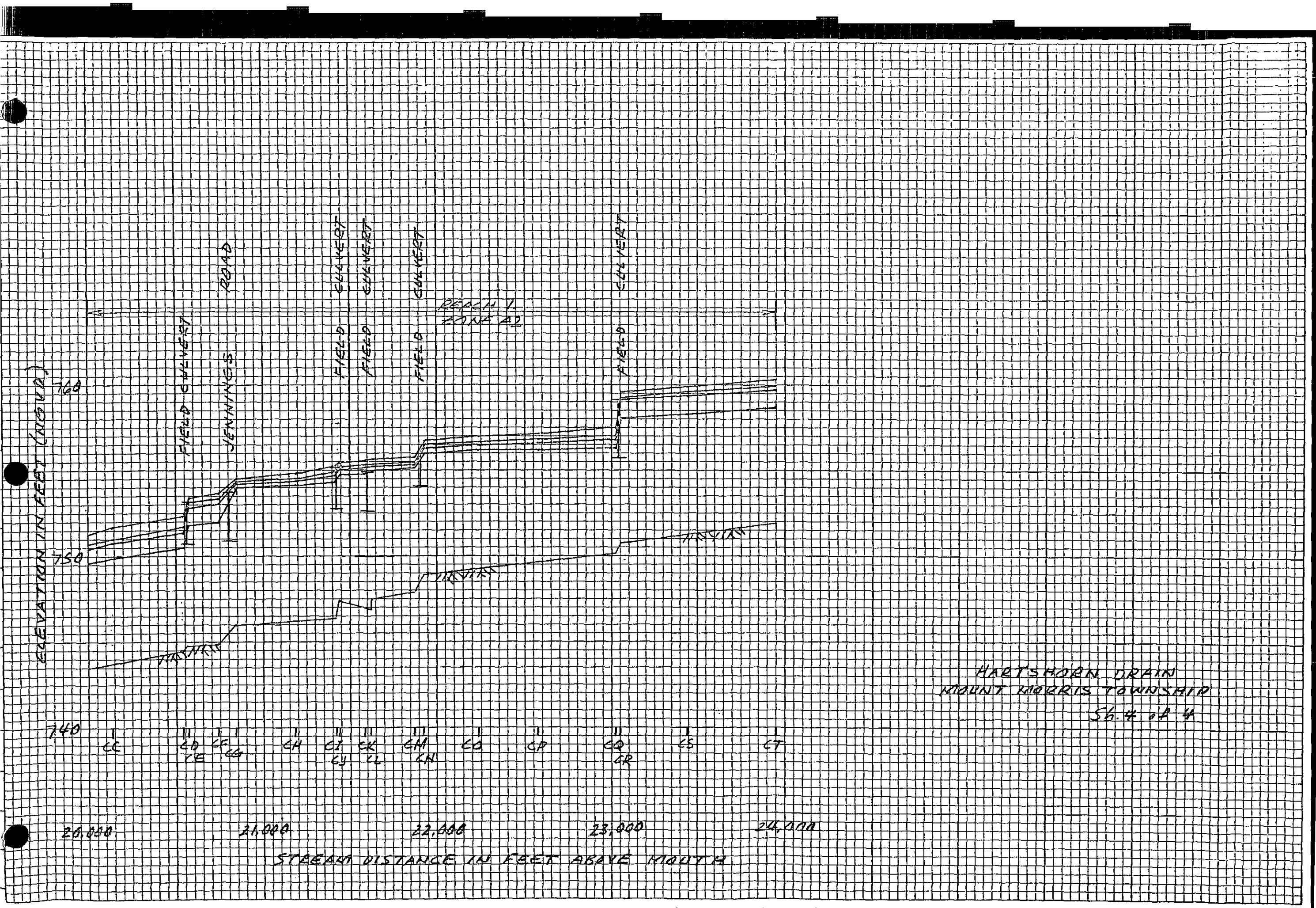
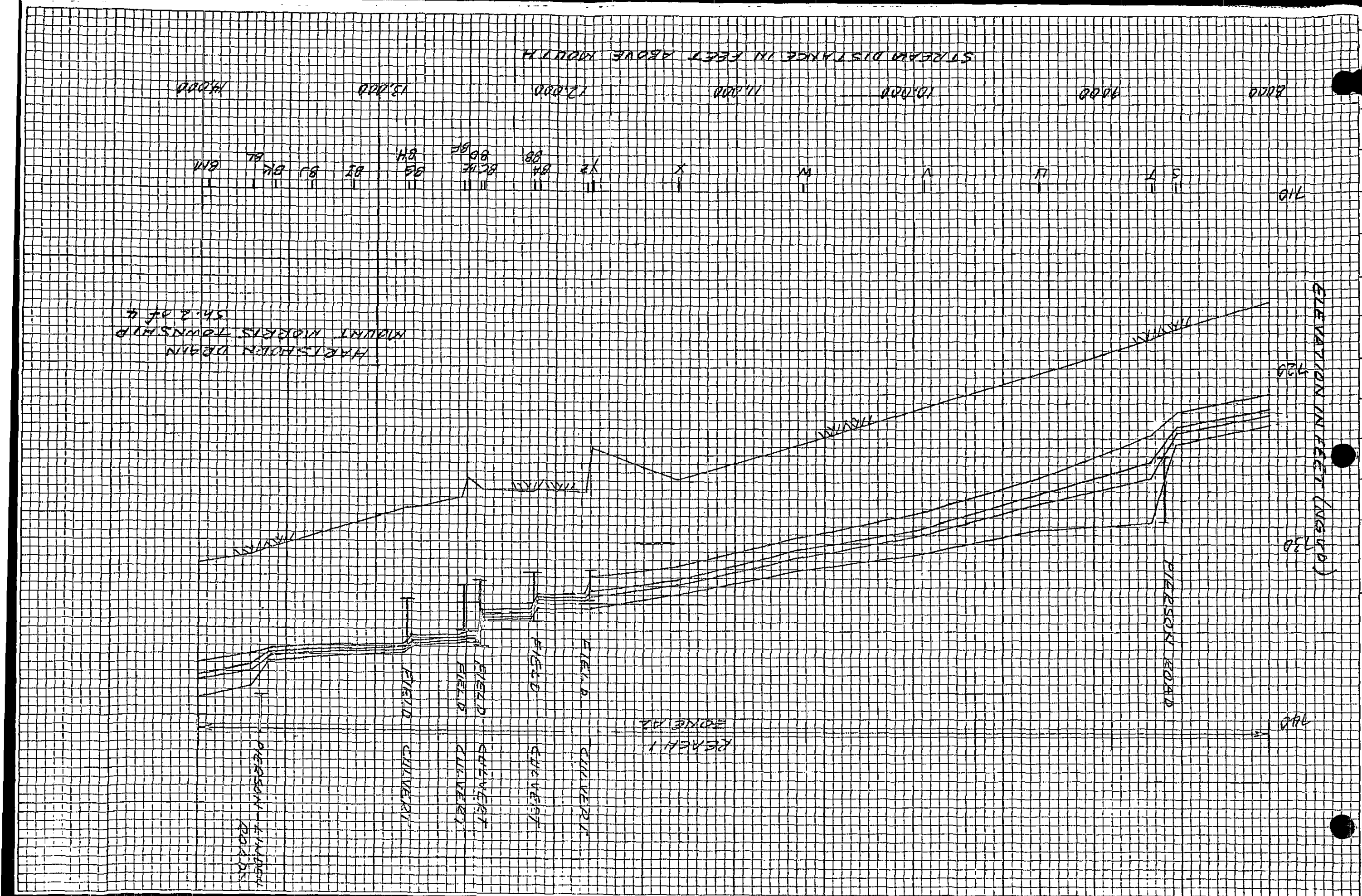
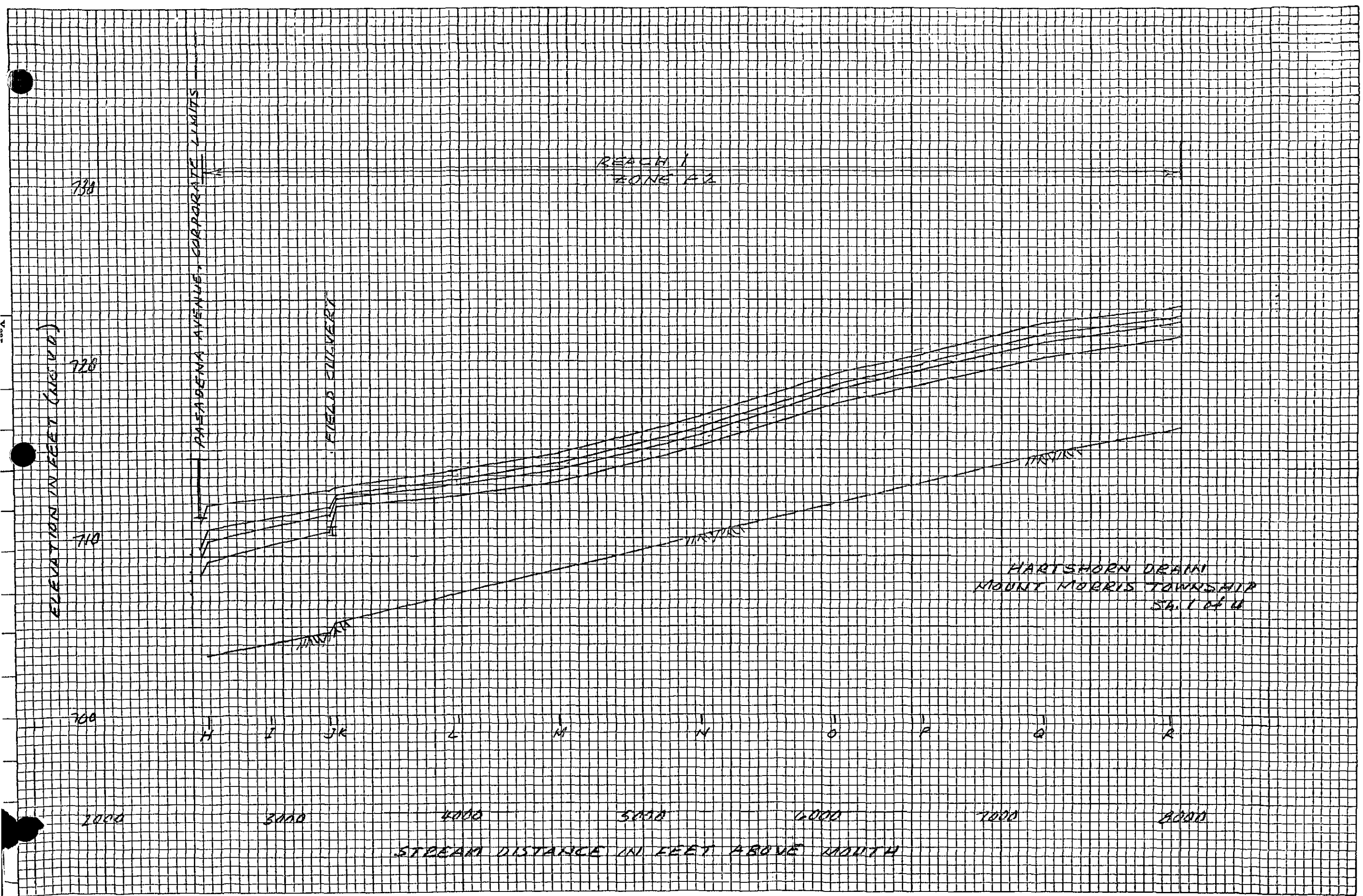



ELEVATION IN FEET
760
750
740
730
FIELD GULLEYERT
MEYERS ROAD
REACH 1
ZONE A2
T.T.S.
HARTSHORN DRAIN
MOUNT MORRIS TOWNSHIP
SH. 3 of 4
BN
BO
BP
BQ
BR
BS
BT
BU
BV
BW
BX
BY
BZ
CA
CB
14,000
15,000
16,000
17,000
18,000
19,000
20,000
STREAM DISTANCE IN FEET ABOVE MOUTH



HARTSHORN DRAIN
MOUNT MORRIS TOWNSHIP
Sh. 4 of 4


HARRISHOLM DRAIN
MOUNT MORRIS TOWNSHIP
SH. 2 of 4
STREAM DISTANCE IN FEET ABOVE MOUTH
8000
9000
10,000
11,000
12,000
13,000
14,000
BM
BL
BK
BJ
BI
BG
BCK
BB
BC
BH
BA
X2
X
M
N
U
T
S
R
710
720
730
740
GLEANINGS (NEET)
PIERSON ROAD
PLEASANT
CHAPEL
FIELD
BELLA
CHAPEL
CHAPEL
FIELD
CHAPEL
CHAPEL
PEACH
ROAD
PEACH 1
ROAD


ELEVATION IN FEET (NGVD)
730
720
710
700
PASADENA AVENUE - CORPORATE LIMITS
FIELD CULVERT
REACH 1
ZONE 1-2
HARTSHORN DRAIN
MOUNT MORRIS TOWNSHIP
Sh. 1 of 4
H
I
JK
L
M
N
O
P
Q
R
2000
3000
4000
5000
6000
7000
8000
STREAM DISTANCE IN FEET ABOVE MOUTH

```
1   191 BRENT RUN. FRANCES RD TO MT MORRIS RD          VH    12  5  2 05 12
2   1     71720  71860  72006  71930  71930
3   193   B   1  17  3  711        38 99 99
4   194     850    1200    1750    1400    1400
5   195       0  1  7300    45  1  7180    62  1  7160   175  1  7140   225  2  7140
5   196     233  2  7118   250  2  7093   260  2  7093   275  2  7109   278  2  7117
5   197     285  2  7123   315  3  7171   350  3  7188   451  3  7200   482  3  7260
5   198     500  3  7280   530  3  7300
6   199  0  1 080 080  0  1 050 050  0  1 080 080
3   223   C   1  15  3  711       540 99 99
4   224     820    1160    1690    1350    1350
5   225       0  1  7300    23  1  7260    59  1  7180    64  1  7160    87  2  7140
5   226      95  2  7116   105  2  7100   115  2  7116   122  3  7140   240  3  7160
5   227     293  3  7160   308  3  7180   347  3  7200   359  3  7220   388  3  7300
6   229  0  1 080 080  0  1 045 045  0  1 070 070
3   253   D   0  15  3  712      1230 99 99
5   255       0  1  7300    28  1  7200    50  1  7147   100  1  7140   110  2  7147
5   256     122  2  7127   123  2  7122   134  2  7111   138  2  7127   139  3  7144
5   257     180  3  7157   206  3  7180   249  3  7200   330  3  7220   450  3  7300
6   259  0  1 080 080  0  1 045 045  0  1 070 070
3   283   E   0  16  3  714      2490 99 99
5   285       0  1  7340    30  1  7320    67  1  7300    88  1  7260   111  1  7200
5   286     116  1  7180   164  2  7160   170  2  7142   177  2  7130   185  2  7142
5   287     192  3  7160   241  3  7180   298  3  7200   324  3  7300   337  3  7320
5   288     347  3  7340
6   290  0  1 085 085  0  1 055 055  0  1 070 070
3   313   F   0  18  3  716      3470 99 99
5   315       0  1  7400    41  1  7380    51  1  7360    76  1  7300    99  1  7200
5   316     215  1  7179   235  1  7180   255  2  7168   260  2  7148   265  2  7144
5   317     270  2  7153   275  2  7161   290  3  7172   315  3  7168   365  3  7173
5   318     594  3  7200   626  3  7300   645  3  7400
6   320  0  1 070 070  0  1 050 050  0  1 075 075
3   343   G   0  18  4  717      4150 99 99
5   345       0  1  7400    60  1  7380   188  1  7360   238  1  7340   335  1  7321
5   346     407  1  7320   418  1  7300   438  2  7200   572  3  7180   576  3  7162
5   347     583  3  7153   591  3  7162   596  4  7180   609  4  7200   670  4  7220
5   348     695  4  7260   730  4  7300   750  4  7400
6   350  0  1 070 070  0  1 060 060  0  1 050 050  0  1 080 080
3   373   H   0  16  3  718      4960 99 99
5   375       0  1  7380    36  1  7360    87  1  7340   124  1  7320   139  1  7300
5   376     165  1  7220   275  2  7197   278  2  7166   280  2  7163   285  2  7173
5   377     292  2  7172   295  3  7203   305  3  7207   423  3  7207   432  3  7300
5   378     475  3  7400
6   380  0  1 085 085  0  1 045 045  0  1 055 055
3   403   I   0  21  4  718      5840 99 99
```

*** INPUT CARD PRINTOUT ***

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5   405       0  1  7380   28  1  7360  113  1  7340  170  1  7320  208  1  7300
5   406     236  1  7240  241  1  7220  290  1  7213  302  2  7200  306  2  7177
5   407     308  2  7168  314  2  7174  316  3  7206  330  3  7201  360  3  7207
5   408     385  4  7220  522  4  7240  552  4  7260  559  4  7280  612  4  7360
5   409     664  4  7380
6   411  0  1 070 070  0  1 050 050  0  1 055 055  0  1 060 060
3   433  J    0  18  4  719     6710 99 99
5   435       0  1  7400   21  1  7380   28  1  7360   35  1  7340   47  1  7300
5   436      68  1  7260   84  1  7240  220  2  7223  364  3  7220  368  3  7188
5   437     375  3  7180  392  3  7188  385  4  7220  394  4  7240  401  4  7260
5   438     409  4  7280  425  4  7300  457  4  7400
6   440  0  1 070 070  0  1 055 055  0  1 045 045  0  1 070 070
3   463  K    0  20  3  720     7530 99 99
5   465       0  1  7400   70  1  7380  110  1  7360  138  1  7320  162  1  7260
5   466     170  1  7250  185  1  7233  225  1  7227  239  2  7224  241  2  7194
5   467     245  2  7191  253  2  7201  259  2  7225  263  2  7215  275  2  7224
5   468     289  3  7235  325  3  7245  531  3  7260  544  3  7300  559  3  7400
6   470  0  1 035 035  0  1 050 050  0  1 080 080
3   493  L    0  14  3  721     8250 99 99
5   495       0  1  7400   70  1  7380  117  1  7360  153  1  7340  183  1  7300
5   496     199  2  7240  203  2  7206  210  2  7196  217  2  7205  220  3  7240
5   497     375  3  7242  414  3  7260  427  3  7300  455  3  7400
6   499  0  1 060 060  0  1 050 050  0  1 060 060
3   523  M    0  18  3  721     8871 99 99
5   525       0  1  7400   63  1  7380  110  1  7360  161  1  7280  240  1  7249
5   526     260  2  7254  274  2  7230  278  2  7210  285  2  7202  292  2  7200
5   527     295  2  7237  305  3  7256  330  3  7274  355  3  7289  393  3  7300
5   528     490  3  7360  510  3  7380  537  3  7400
6   530  0  1 075 075  0  1 050 050  0  1 025 025
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.18 *** PAGE COUNT= 25,DATE=10/11/78

WATER-SURFACE PROFILE FOR: BRENT RUN, FRANCES RD TO MT MORRIS RD VH
PAGE 1 OF 1, PROFILE NUMBER 4, 100 YR UPSTREAM COMPUTATIONS

SECID AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*
B AT	38	0	1400.	1502.	111842.	1.57	40.	392.
719.30	0.02			719.32	0.93	0.09		*IS*
C AT	540	502	1350.	1143.	76663.	1.91	53.	335.
719.40	0.04	0.11	0.01	719.44	1.18	0.08	-0.000	*XS*
D AT	1230	690	1350.	870.	55671.	1.78	29.	242.
719.68	0.07	0.29	0.01	719.75	1.55	0.19	0.000	*XS*
E AT	2490	1260	1350.	664.	36419.	1.62	108.	300.
720.80	0.10	1.13	0.02	720.90	2.03	0.24	0.002	*XS*
F AT	3470	980	1350.	1640.	80512.	1.43	96.	599.
721.50	0.02	0.61	0.0	721.51	0.82	0.07	0.001	*XS*
G AT	4150	680	1350.	621.	34281.	1.51	434.	667.
721.90	0.11	0.45	0.05	722.01	2.18	0.21	0.001	*XS*
H AT	4960	810	1350.	688.	34397.	1.75	161.	425.
723.15	0.10	1.25	0.0	723.25	1.96	0.22	-0.009	*XS*
I AT	5840	880	1350.	724.	38388.	1.47	234.	528.
724.40	0.08	1.21	0.0	724.48	1.86	0.21	0.011	*XS*
J AT	6710	870	1350.	893.	49820.	1.55	74.	398.
725.26	0.06	0.83	0.0	725.31	1.51	0.16	0.002	*XS*
K AT	7530	820	1350.	653.	37842.	1.69	162.	531.
726.01	0.11	0.79	0.03	726.12	2.07	0.23	-0.014	*XS*
L AT	8250	720	1350.	661.	36821.	1.35	191.	417.
726.97	0.09	0.94	0.0	727.06	2.04	0.19	0.001	*XS*
M AT	8871	621	1350.	456.	28372.	1.54	161.	340.
728.00	0.21	1.08	0.06	728.21	2.96	0.32	-0.000	*XS*

100 YR

END OF THIS PROFILE

US STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 39,DATE=10/11/78

WATER-SURFACE PROFILE FOR: BRENT RUN, FRANCES RD TO MT MORRIS RD VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECTD AT	DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / FG	ALPHA / V	LEW / FN	REW / ACC	*ID*
B AT	38 / 719.30	0 / 0.03	1400. /	1202. / 719.33	100165. / 1.16	1.33 / 0.10	115. /	315.	*IS*
C AT	540 / 719.42	502 / 0.05	1350. / 0.13	956. / 0.01	71040. / 719.47	1.70 / 1.41	53. / 0.15	253. / 0.000	*XS*
D AT	1230 / 719.73	690 / 0.06	1350. / 0.31	875. / 0.01	57285. / 719.79	1.70 / 1.54	29. / 0.18	229. / -0.000	*XS*
E AT	2490 / 720.80	1260 / 0.10	1350. / 1.10	665. / 0.02	36502. / 720.91	1.62 / 2.03	108. / 0.24	300. / 0.001	*XS*
F AT	3470 / 721.55	980 / 0.02	1350. / 0.67	1308. / 0.0	72495. / 721.58	1.31 / 1.03	160. / 0.08	490. / -0.007	*XS* FW
G AT	4150 / 721.99	680 / 0.10	1350. / 0.48	642. / 0.04	35854. / 722.09	1.50 / 2.10	434. / 0.20	670. / 0.000	*XS*
H AT	4960 / 723.18	810 / 0.10	1350. / 1.18	681. / 0.0	34799. / 723.28	1.69 / 1.98	175. / 0.21	425. / 0.005	*XS*
I AT	5840 / 724.40	880 / 0.08	1350. / 1.20	698. / 0.0	38392. / 724.48	1.39 / 1.93	234. / 0.21	484. / 0.001	*XS*
J AT	6710 / 725.29	870 / 0.06	1350. / 0.87	785. / 0.0	47516. / 725.36	1.41 / 1.72	150. / 0.16	399. / 0.002	*XS*
K AT	7530 / 726.07	820 / 0.11	1350. / 0.80	615. / 0.02	39267. / 726.18	1.43 / 2.19	162. / 0.23	410. / 0.001	*XS*
L AT	8250 / 727.00	720 / 0.09	1350. / 0.91	630. / 0.0	36535. / 727.10	1.31 / 2.14	191. / 0.19	391. / 0.002	*XS*
M AT	8871 / 728.02	621 / 0.21	1350. / 1.08	461. / 0.06	28764. / 728.23	1.54 / 2.93	161. / 0.31	340. / 0.000	*XS*

END OF THIS PROFILE

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

611  ..ENT RUN MT MORRIS RD TO SECT U                    VH     8  5  2  5 12
612  72751  72880  73078  72950  72952
613   1   1  16  3  724    8969 99 99
614    705   1080   1570   1260   1200
615      33  1  7360    89  1  7340   118  1  7320   128  1  7300   143  1  7280
616     191  1  7238   215  1  7234   233  2  7241   236  2  7217   243  2  7206
617     250  2  7213   260  3  7252   280  3  7269   290  3  7299   314  3  7320
618     344  3  7360
619   0  1 025 025  0  1 050 050  0  1 025 025
643   0   0  20  3  724    9520 99 99
644       0  1  7400    19  1  7360    31  1  7360    39  1  7340    48  1  7320
645      57  1  7300    66  1  7280   102  2  7260   169  2  7222   172  2  7216
646     178  2  7216   181  2  7222   188  3  7260   260  3  7280   293  3  7300
647     343  3  7320   353  3  7340   372  3  7360   383  3  7380   430  3  7400
648   0  1 060 060  0  1 045 045  0  1 080 080
673   2   0  17  4  725   10920 99 99
674       0  1  7400    20  1  7380    42  1  7340    63  1  7300    85  1  7280
675     100  2  7275   150  2  7275   163  3  7267   167  3  7234   173  3  7234
676     177  3  7240   185  4  7270   200  4  7268   225  4  7269   398  4  7280
677     420  4  7300   442  4  7400
678   0  1 030 030  0  1 070 070  0  1 050 050  0  1 080 080
703   9   0  12  3  726   11410 99 99
704       0  1  7420    30  1  7400    72  1  7300   180  1  7280   202  2  7276
705     209  2  7258   215  2  7252   221  2  7258   228  3  7278   438  3  7300
706     459  3  7400   490  3  7420
707   0  1 060 060  0  1 050 050  0  1 080 080
733   8   0  19  4  728   12390 99 99
735       0  1  7440    94  1  7420   140  1  7400   170  1  7340   181  1  7320
736     200  2  7300   267  2  7310   335  3  7296   345  3  7278   353  3  7273
737     358  3  7277   380  4  7290   463  4  7320   475  4  7340   483  4  7360
738     495  4  7380   510  4  7400   518  4  7420   530  4  7440
739   0  1 080 080  0  1 070 070  0  1 045 045  0  1 080 080
763   5   0  20  5  729   13220 99 99
765       0  1  7440     4  1  7420    14  1  7400    48  2  7320    51  2  7300
766      67  2  7300    70  3  7320   158  3  7319   262  3  7320   323  4  7320
767     332  4  7268   338  4  7263   344  4  7268   353  5  7320   369  5  7340
768     389  5  7360   403  5  7380   512  5  7400   680  5  7420   777  5  7440
769   0  1 075 075  0  1 040 040  0  1 055 055  0  1 040 040  0  1 075 075
793   1   0  19  5  730   13690 99 99
795       0  1  7420   115  1  7400   140  2  7320   142  2  7300   158  2  7300
796     160  3  7320   181  3  7320   315  3  7320   358  4  7326   360  4  7293
797     366  4  7285   371  4  7290   376  4  7322   382  5  7328   449  5  7340
798     463  5  7360   473  5  7380   482  5  7400   550  5  7420
799   0  1 075 075  0  1 045 045  0  1 055 055  0  1 040 040  0  1 080 080
823   1   0  17  5  729   13935 99 99
```

WATER-SURFACE PROFILE FOR: BRENT RUN MT MORRIS RD TO SECT U VH
PAGE 1 OF 1. PROFILE NUMBER 4. UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*	
N	AT	8969	0	1260.	707.	97392.	1.07	132.	289.
729.50	0.05			729.55	1.78	0.17		*IS*	
O	AT	9520	551	1260.	658.	38594.	2.07	58.	288.
729.70	0.12	0.23	0.03	729.82	1.92	0.25	-0.000	*XS*	
P	AT	10520	1000	1260.	1118.	54863.	1.54	60.	421.
730.54	0.03	0.75	0.0	730.57	1.13	0.09	0.002	*XS*	
Q	AT	11410	890	1260.	922.	40095.	1.63	67.	440.
731.18	0.05	0.04	0.01	731.22	1.37	0.12	0.003	*XS*	
R	AT	12390	980	1260.	629.	26518.	2.04	178.	467.
732.61	0.13	1.46	0.04	732.73	2.00	0.20	0.005	*XS*	
S	AT	13220	830	1260.	724.	43645.	1.85	40.	367.
733.79	0.09	1.14	0.0	733.87	1.74	0.15	0.003	*XS*	
T	AT	13690	470	1260.	685.	36366.	1.45	133.	451.
734.29	0.08	0.47	0.0	734.36	1.84	0.19	0.019	*XS*	
U	AT	13935	245	1260.	426.	21794.	3.02	210.	509.
734.61	0.41	0.49	0.17	735.02	2.96	0.46	-0.001	*XS*	

100 yr

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: BRENT RUN MT MORRIS RD TO SECT U VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID / WS ELEV	AT / HV	DISTANCE / HF	LENGTH / HF	DISCHARGE / EG	AREA / V	CONVEYANCE / FN	ALPHA / ACC	LEW /	REW / *ID*
N	8969	0	1260.	710.	98039.	1.07	132.		289.
729.52	0.05			729.57	1.77	0.17			*IS*
O	9520	551	1260.	662.	38884.	2.07	58.		288.
729.72	0.12	0.23	0.03	729.83	1.90	0.25	0.000		*XS*
P	10520	1000	1260.	1072.	53910.	1.56	80.		400.
730.56	0.03	0.76	0.0	730.59	1.18	0.09	0.002		*XS*
Q	11410	890	1260.	868.	39805.	1.55	90.		410.
731.21	0.05	0.66	0.01	731.26	1.45	0.12	0.002		*XS*
R	12390	980	1260.	637.	26963.	2.02	178.		467.
732.63	0.12	1.45	0.04	732.75	1.98	0.20	0.006		*XS*
S	13220	830	1260.	720.	43438.	1.83	48.		367.
733.80	0.09	1.13	0.0	733.88	1.75	0.15	0.003		*XS*
T	13690	470	1260.	681.	36553.	1.42	133.		433.
734.30	0.08	0.47	0.0	734.37	1.55	0.19	0.019		*XS*
U	13935	245	1260.	355.	20655.	2.47	250.		450.
734.61	0.48	0.52	0.20	735.09	3.54	0.49	-0.001		*XS*

PW

END OF THIS PROFILE

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1    861 BRENT RUN SECT V TO BB                          VH    7  5  2  5 12
2    862  73423  73459  73502  73476  73476
3    863   V   1  12   4  732  13985 99 99
4    864    675    955   1390   1110   1110
5    865        0  1  7420   23  1  7400   39  2  7331   46  2  7296   53  2  7298
5    866       60  2  7298   64  3  7333   78  3  7331  268  4  7340  287  4  7400
5    867      330  4  7420  360  4  7440
6    868  0  1 075 075  0  1 040 040  0  1 070 070  0  1 075 075
3    893   W   0  13   4  732  14515 99 99
5    895        0  1  7440  140  1  7420  203  1  7400  215  2  7336  222  2  7291
5    896      230  2  7289  238  2  7291  245  3  7336  493  3  7340  612  4  7360
5    897      650  4  7400  670  4  7420  685  4  7440
6    898  0  1 080 080  0  1 045 045  0  1 060 060  0  1 075 075
3    923   X   0  14   4  733  15060 99 99
5    925        0  1  7440  130  1  7420  141  1  7400  156  2  7362  162  2  7304
5    926      171  2  7301  180  2  7301  189  3  7366  208  3  7347  396  4  7360
5    927      508  4  7380  547  4  7400  582  4  7420  668  4  7440
6    928  0  1 080 080  0  1 045 045  0  1 065 065  0  1 075 075
3    953   Y   1  18   5  732  15580 99 99
4    954    475    670    980    785    785
5    955        0  1  7440   39  1  7420   77  1  7400   93  1  7380  111  2  7360
5    956      158  3  7340  196  3  7320  198  3  7308  208  3  7297  218  3  7308
5    957      220  3  7320  224  3  7340  232  4  7352  340  4  7360  389  5  7380
5    958      403  5  7400  440  5  7420  500  5  7440
6    959  0  1 080 080  0  1 085 085  0  1 045 045  0  1 070 070  0  1 080 080
3    983   Z   0  13   3  733  16090 99 99
5    985        0  1  7420   20  1  7400   37  1  7380   60  1  7360  148  2  7359
5    986      155  2  7329  171  2  7315  182  2  7329  204  3  7357  240  3  7360
5    987      255  3  7380  268  3  7400  300  3  7420
6    988  0  1 080 080  0  1 055 055  0  1 070 070
3   1013   BA  0  13   3  733  16720 99 99
5   1015        0  1  7440   20  1  7420   45  1  7400   57  1  7380  122  2  7360
5   1016      140  2  7320  151  2  7314  162  2  7320  169  3  7360  273  3  7380
5   1017      283  3  7400  302  3  7420  320  3  7440
6   1018  0  1 080 080  0  1 040 040  0  1 075 075
3   1043   BB  0  12   5  734  17220 99 99
5   1046        0  1  7440  386  2  7420  433  2  7400  490  2  7400  523  3  7381
5   1047      534  3  7329  545  3  7313  553  3  7330  560  4  7374  720  5  7400
5   1048      737  5  7420  913  5  7440
6   1049  0  1 080 080  0  1 070 070  0  1 050 050  0  1 070 070  0  1 065 065
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 16,DATE= 1/16/79

WATER-SURFACE PROFILE FOR: BRENT RUN SECT V TO BB VH

PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
V AT 13985	0	1110.	363.	16149.	2.79	35.	270.	
734.76	0.41			735.17	3.06	0.54		*IS*
W AT 14515	530	1110.	863.	43803.	2.02	210.	612.	
736.04	0.05	0.92	0.0	736.09	1.29	0.12	0.001	*XS*
X AT 15060	545	1110.	442.	22071.	2.25	154.	432.	
736.65	0.22	0.69	0.08	736.87	2.51	0.35	0.000	*XS*
Y AT 15580	520	785.	691.	44155.	1.80	99.	372.	
737.31	0.04	0.48	0.0	737.35	1.14	0.13	0.001	*XS*
Z AT 16090	510	785.	475.	23079.	1.65	42.	252.	100YY
737.61	0.07	0.31	0.02	737.68	1.65	0.20	0.000	*XS*
BA AT 16720	630	785.	437.	30858.	2.10	56.	274.	
738.13	0.11	0.55	0.02	738.24	1.80	0.22	0.000	*XS*
BB AT 17220	500	785.	238.	16103.	1.43	513.	639.	
738.69	0.24	0.62	0.07	738.93	3.30	0.32	0.000	*XS*

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: BRENT RUN SECT V TO BB VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
V	AT	13985	0	1110.	363.	16149.	2.79	35.	270.
734.76	0.41			735.17	3.06	0.54			*IS*
W	AT	14515	530	1110.	684.	40332.	1.71	210.	459.
736.10	0.07	1.00	0.0	736.17	1.62	0.14	0.002		*XS*
X	AT	15060	545	1110.	459.	23483.	2.16	154.	404.
736.75	0.20	0.71	0.06	736.94	2.42	0.33	0.002		*XS* FW
Y	AT	15580	520	785.	630.	43731.	1.59	110.	310.
737.36	0.04	0.45	0.0	737.40	1.25	0.14	0.001		*XS*
Z	AT	16090	510	785.	394.	21628.	1.42	85.	225.
737.67	0.09	0.33	0.02	737.76	1.99	0.22	0.001		*XS*
BA	AT	16720	630	785.	405.	31845.	1.74	85.	225.
738.23	0.10	0.56	0.01	738.33	1.94	0.21	0.000		*XS*
BB	AT	17220	500	785.	246.	16532.	1.46	512.	643.
738.75	0.23	0.59	0.06	738.98	3.19	0.31	-0.000		*XS*

END OF THIS PROFILE

*** INPUT CARD PRINTOUT ***

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        1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1  1111 AGENT RUN (LAKE DR) SECT BC TO HE              VH     3  4  2  5 12
2  1112  73838  73940  74007  73970  73973
                                    00000                                          **EF
3  1113   BC  1  11  3  734   17255 99 99
4  1114    475    670    980    765    785
                                    000                                            **EF
5  1115      0  1  7440  100  1  7420  160  1  7400  268  2  7372  274  2  7329
5  1116    280  2  7316  290  2  7330  297  3  7375  415  3  7400  440  3  7420
5  1117    622  3  7440
5  1118  0  1 070 070  0  1 050 050  0  1 065 065
3  1143  00  0  11  3  734   17730 99 99
5  1145      0  1  7440   49  1  7420  103  1  7400  265  2  7380  273  2  7330
5  1146    280  2  7315  288  2  7330  295  3  7380  319  3  7400  377  3  7420
5  1147    404  3  7440
5  1148  0  1 060 060  0  1 055 055  0  1 065 065
3  1173  BE  0  15  3  735   18165 99 99
5  1176      0  1  7440   52  1  7420  122  1  7403  142  1  7396  156  1  7392
5  1177    187  2  7403  194  2  7331  200  2  7314  210  2  7332  212  2  7357
5  1178    222  3  7392  272  3  7390  313  3  7400  350  3  7420  392  3  7440
5  1179  0  1 035 035  0  1 065 065  0  1 060 060
```

WATER-SURFACE PROFILE FOR: BRENT RUN (LAKE DR) SECT BC TO BE VH
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECTD AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
BC AT 17255		0	785.	413.	22401.	2.26	172.	401.
739.70	0.13			739.83	1.50	0.23		*IS*
BD AT 17730		475	785.	434.	23476.	1.93	95.	327.
740.29	0.10	0.56	0.0	740.38	1.51	0.20	0.001	*XS*
BE AT 18165		435	785.	413.	21189.	1.41	100.	329.
740.84	0.08	0.54	0.0	740.92	1.50	0.18	0.000	*XS*

100YY

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: BRENT RUN (LAKE DR) SECT BC TO BE VH
PAGE 1 OF 1, PROFILE NUMBER 5. UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECTN AT DISTANCE/ LENGTH/DISCHARGE/ AREA /CONVEYANCE/ ALPHA/ LEW / REW									
WS ELEV /	HV /	HF /	HE /	FG /	V /	FN /	ACC	*ID*	
BC AT 17255 /		0 /	785. /	390. /	22725. /	1.98 /	174. /	350.	
739.73 /	0.12 /		/	739.85 /	2.01 /	0.23/		*IS*	
BD AT 17730 /		475 /	785. /	350. /	22470. /	1.48 /	199. /	319.	FW
740.31 /	0.12 /	0.57 /	0.0 /	740.43 /	2.24 /	0.21 /	0.001	*XS*	
BE AT 18165 /		435 /	785. /	414. /	22105. /	1.33 /	113. /	313.	
740.90 /	0.07 /	0.54 /	0.0 /	740.97 /	1.90 /	0.18 /	0.001	*XS*	

END OF THIS PROFILE

*** INPUT CARD PRINTOUT ***

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1  1231 BRENT RUN (LAKE DR) SECT BF TO CLIO RD      VH     2  5  2  5 12
2  1232  74020  74079  74133  74100  74105
3  1233   BF  1  13  3  736   18215 99 99
4  1234    475    670    980    785    785
5  1235       0  1  7440   84  1  7420  152  1  7402  184  1  7393  202  2  7390
5  1236     209  2  7331  219  2  7318  224  2  7331  237  3  7403  247  3  7396
5  1237     320  3  7400  353  3  7420  407  3  7440
6  1238  0  1 035 035  0  1 065 065  0  1 060 060
3  1263   BG  0  11  3  736   18820 99 99
5  1266       0  1  7420   68  1  7404   77  2  7402   95  2  7334   99  2  7326
5  1267     103  2  7334  116  3  7401  147  3  7400  177  3  7400  191  3  7420
5  1268     203  3  7440
6  1269  0  1 030 030  0  1 040 040  0  1 030 030
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE= 1/18/79

WATER-SURFACE PROFILE FOR: BRENT RUN (LAKE DR) SECT BF TO CLIO RD VH
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
BF	AT	18215	0	785.	411.	22316.	1.38	122.	337.
741.00	0.08				741.08	1.91	0.18		*IS* 100yr
BG	AT	18820	605	785.	352.	31395.	1.27	20.	188.
741.52	0.10	0.53	0.01		741.62	2.23	0.21	-0.000	*XS*

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 15,DATE= 1/18/79

WATER-SURFACE PROFILE FOR: BRENT RUN (LAKE DR) SECT BF TO CLIO RD VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*	
BF	AT	18215	0	785.	418.	23286.	1.33	130.	330.	FW
741.05	0.07				741.12	1.88	0.17		*IS*	
BG	AT	18820	605	785.	357.	31860.	1.27	19.	188.	
741.55	0.10	0.50	0.01		741.65	2.20	0.20	0.009	*XS*	

END OF THIS PROFILE

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1  1331 BRENT RUN (LAKE DR)   CLIO RD TO STANLEY RD   VH   5  5  2  5 12
2  1332  74095  74228  74356  74287  74290
3  1333   BH  1  10  3  738   18960 99 99
4  1334    455    640    830    745    745
5  1335     101  1  7434  110  2  7430  123  2  7340  128  2  7332  132  2  7340
5  1336     146  3  7429  160  3  7419  194  3  7420  232  3  7440  277  3  7460
6  1338  0  1 025 025  0  1 050 050  0  1 065 065
3  1363   BI  1   9  3  740   19150 99 99
4  1364    455    640    930    745    745
5  1365      53  1  7432   60  2  7431   72  2  7347   77  2  7324   83  2  7341
5  1366      94  3  7416  126  3  7416  237  3  7440  277  3  7460
6  1368  0  1 040 040  0  1 040 040  0  1 050 050
3  1378  BI+  0   9  2  740   19300 99 99
5  1379      53  1  7436   60  1  7418   70  1  7350   77  1  7331   85  1  7350
5  1380      95  2  7418  107  2  7420  117  2  7440  265  2  7450
6  1381  0  1 040 040  0  1 050 050
3  1393   BJ  0  10  3  738   19490 99 99
5  1395     -15  1  7439   20  2  7412   30  2  7354   44  2  7339   50  2  7353
5  1396      59  2  7414   79  3  7420  180  3  7420  235  3  7440  265  3  7460
6  1398  0  1 030 030  0  1 060 060  0  1 065 065
3  1423   BK  0   9  3  738   19698 99 99
5  1425      10  1  7440   25  2  7429   32  2  7354   40  2  7345   47  2  7355
5  1426      57  3  7414   70  3  7423  150  3  7440  275  3  7460
6  1428  0  1 030 030  0  1 060 060  0  1 065 065
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 14,DATE= 1/19/79

WATER-SURFACE PROFILE FOR: BRENT RUN (LAKE DR) CLIO RD TO STANLEY RD VH
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
BH AT 18960	0	745.	247.	18191.	1.31	110.	211.	
742.87	0.18			743.05	3.01	0.26		*IS*
BI AT 19150	190	745.	318.	27865.	1.55	59.	196.	
743.12	0.13	0.21	0.0	743.25	2.34	0.22	-0.010	*XS*
BI+ AT 19300	150	745.	258.	27382.	1.10	54.	113.	100yr
743.22	0.14	0.11	0.01	743.37	2.89	0.22	-0.000	*XS*
BJ AT 19490	190	745.	522.	28956.	1.40	-9.	221.	
743.47	0.04	0.13	0.0	743.52	1.43	0.14	0.019	*XS*
BK AT 19698	208	745.	282.	18475.	1.38	15.	133.	
743.64	0.15	0.22	0.05	743.79	2.64	0.22	0.000	*XS*

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: BRENT RUN (LAKE DR) CLIO RD TO STANLEY RD VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
BH AT 18960	0	745.	220.	17795.	1.12	110.	170.	
742.90	0.20			743.10	3.39	0.27		*IS*
BI AT 19150	190	745.	257.	26551.	1.18	60.	120.	
743.15	0.15	0.22	0.0	743.30	2.90	0.23	-0.018	*XS*
BI+ AT 19300	150	745.	261.	27754.	1.10	54.	113.	
743.28	0.14	0.11	0.0	743.42	2.86	0.22	-0.000	*XS*
BJ AT 19490	190	745.	332.	23881.	1.01	10.	80.	
743.50	0.08	0.16	0.0	743.58	2.24	0.17	-0.000	*XS*
BK AT 19698	208	745.	283.	19144.	1.30	20.	110.	
743.72	0.14	0.25	0.03	743.86	2.63	0.21	-0.000	*XS*

FW

END OF THIS PROFILE

*** INPUT CARD PRINTOUT ***

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1  1450 BRENT RUN (LAKE DR) STANLEY RD TO SEC BM    VH     2  5  2  5 12
2  1451  74217  74362  74530  74432  74438 40
3  1453  BL  1  10  3  738   19762 99 99
4  1454    310    435    635    505    505
5  1455       0  1  7440   30  1  7420   94  1  7418  108  2  7413  118  2  7353
5  1456     124  2  7339  128  2  7354  144  2  7430  154  3  7436  164  3  7485
6  1459  0  1 050 050  0  1 050 050  0  1 065 065
3  1483  BM   0  14  5  739   19908 99 99
5  1486    -100  1  7456    0  1  7440   41  2  7420  103  3  7420  106  3  7419
5  1487     110  3  7391  117  3  7348  119  3  7343  124  3  7336  129  3  7348
5  1488     143  3  7418  153  4  7420  288  5  7440  450  5  7460
6  1489  0  1 045 045  0  1 075 075  0  1 065 065  0  1 075 075  0  1 060 060
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 10,DATE= 1/22/79

WATER-SURFACE PROFILE FOR: BRENT RUN (LAKE DR) STANLEY RD TO SEC BM VH
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	HV	HF	HE	EG	V	FN	ALPHA	LEW / ACC	REW *ID*
BL AT 19762 / 744.32	0.02	0	505.	483. / 744.34	33326.	1.05	1.22	0. / 0.10	155. *IS*
BM AT 19908 / 744.36	0.01	146 / 0.03	505. / 0.0	702. / 744.37	33929.	0.72	1.64	-23. / -0.000	317. *XS*

100 yr

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: BRENT RUN (LAKE DR) STANLEY RD TO SEC BM VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*
BL AT	19762	0	505.	493.	34449.	1.19	4.	154.
744.40	0.02			744.42	1.02	0.10		*IS*
BM AT	19908	146	505.	546.	31394.	1.30	30.	180.
744.44	0.02	0.03	0.0	744.45	0.93	0.08	0.000	*XS*

FW

END OF THIS PROFILE

*** INPUT CARD PRINTOUT ***

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          1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1  1550 BRENT RUN (LAKE DRAIN) SEC BN TO SEC BR     VH     6  5  2  5 12
2  1551  74246  74369  74534  74437  74446
3  1553   BN  1  11  5  740   19952 99 99
4  1554    310    435    635    505    505
5  1556    -130  1  7457    0  1  7440   89  2  7415   99  3  7415  106  3  7351
5  1557     110  3  7343  115  3  7350  129  4  7417  257  5  7440  430  5  7458
5  1558     430  5  7490
6  1559  0  1 045 045  0  1 075 075  0  1 065 065  0  1 075 075  0  1 060 060
3  1583   BO  0   9  3  740   20510 99 99
5  1586      25  1  7466  327  2  7440  351  2  7420  362  2  7360  366  2  7348
5  1587     371  2  7360  381  3  7420  510  3  7440  710  3  7459
6  1588  0  1 060 060  0  1 070 070  0  1 060 060
3  1613   BP  0  12  3  741   21180 99 99
5  1616    -170  1  7476    0  1  7460  260  2  7440  283  2  7427  289  2  7365
5  1617     293  2  7358  294  2  7361  301  2  7391  312  2  7424  317  3  7434
5  1618     405  3  7440  850  3  7458
6  1619  0  1 060 060  0  1 070 070  0  1 060 060
3  1643   BQ  0  10  3  742   21730 99 99
5  1646       0  1  7479  172  1  7460  586  2  7440  682  2  7436  692  2  7371
5  1647     697  2  7364  701  2  7371  712  2  7436  740  3  7440 1100  3  7458
6  1648  0  1 060 060  0  1 072 072  0  1 060 060
3  1658  BQ*  0  12  3  742   22090 99 99
5  1660       0  1  7480  240  1  7460  330  1  7440  345  2  7443  350  2  7420
5  1661     356  2  7377  361  2  7369  366  2  7375  377  3  7439  402  3  7440
5  1662     576  3  7460 1120  3  7472
6  1663  0  1 060 060  0  1 072 072  0  1 060 060
3  1673   BR  0  13  3  743   22488 99 99
5  1676    -250  1  7480    0  1  7460  179  2  7446  207  2  7449  216  2  7417
5  1677     219  2  7386  225  2  7374  231  2  7382  236  2  7416  241  2  7442
5  1678     259  3  7442  420  3  7460  490  3  7470
6  1679  0  1 060 060  0  1 072 072  0  1 060 060
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE= 1/23/79

WATER-SURFACE PROFILE FOR: BRENT RUN (LAKE DRAIN) SEC BN TO SEC BR VH
PAGE 1 OF 1, PROFILE NUMBER 4, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*	
BN AT 19952 / 744.37	0 / 0.02	505. /	593. /	28811. / 744.39	1.70 / 0.65	-28. / 0.09	293. /	*IS*	
BO AT 20510 / 744.62	558 / 0.02	505. / 0.25	491. / 0.00	19826. / 744.64	1.40 / 1.03	255. / 0.12	575. / 0.002	*XS*	
BP AT 21180 / 745.09	670 / 0.02	505. / 0.46	574. / 0.0	18557. / 745.11	1.74 / 0.88	119. / 0.12	674. / 0.001	*XS*	100 YR
BQ AT 21730 / 745.43	550 / 0.01	505. / 0.33	806. / 0.0	22933. / 745.44	1.29 / 0.63	289. / 0.09	1027. / 0.003	*XS*	
BQ+ AT 22090 / 745.65	360 / 0.04	505. / 0.23	431. / 0.01	17416. / 745.69	1.68 / 1.17	256. / 0.13	546. / 0.000	*XS*	
BR AT 22488 / 746.01	398 / 0.02	505. / 0.34	529. / 0.0	16934. / 746.03	1.35 / 0.96	-2. / 0.13	421. / 0.002	*XS*	

END OF THIS PROFILE

WATER-SURFACE PROFILE FOR: BRENT RUN (LAKE DRAIN) SEC BN TO SEC BR VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
BN AT 19952	0	505.	492.	28799.	1.33	45.	195.	
744.46	0.02			744.48	1.03	0.09		*IS*
BO AT 20510	558	505.	445.	21099.	1.10	327.	487.	
744.71	0.02	0.23	0.00	744.73	1.14	0.11	0.016	*XS*
BP AT 21180	670	505.	440.	18137.	1.23	230.	450.	
745.16	0.03	0.45	0.00	745.18	1.15	0.13	0.002	*XS*
BQ AT 21730	550	505.	620.	21968.	1.04	515.	835.	
745.53	0.01	0.35	0.0	745.54	0.81	0.10	0.003	*XS*
BQ+ AT 22090	360	505.	438.	18470.	1.57	294.	554.	
745.74	0.03	0.23	0.01	745.77	1.15	0.12	-0.000	*XS*
BR AT 22488	398	505.	481.	17689.	1.13	95.	355.	
746.07	0.02	0.31	0.0	746.09	1.05	0.12	0.002	*XS*

FW

END OF THIS PROFILE

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1  1741 BRENT RUN (LAKE DRAIN) SECT BS TO BT        VH     2  5  2  5 12
2  1742  74547  74585  74640  74603  74609
3  1744   BS  1  12  3  743   22532 99 99
4  1745    310    435    635    505    505
5  1746    -280  1  7480    0  1  7460  294  2  7448  332  2  7448  344  2  7387
5  1747     347  2  7383  353  2  7386  354  2  7405  361  2  7444  388  3  7446
5  1748     610  3  7460  640  3  7470
6  1749  0  1 060 060  0  1 072 072  0  1 060 060
3  1774   BT  0  13  3  744   22940 99 99
5  1776       0  1  7480  290  1  7460  575  1  7460  723  2  7449  748  2  7451
5  1777     763  2  7411  769  2  7388  772  2  7388  775  2  7395  783  2  7401
5  1778     803  2  7422  873  3  7459 1500  3  7460
6  1779  0  1 060 060  0  1 065 065  0  1 075 075
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE=11/20/78

WATER-SURFACE PROFILE FOR: BRENT RUN (LAKE DRAIN) SECT BS TO BT VH
PAGE 1 OF 1, PROFILE NUMBER 1004, YR UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
BS AT 22532	0	505.	586.	15587.	1.37	-4.	611.	
746.03	0.02			746.05	0.86	0.13		*IS*
BT AT 22940	408	505.	887.	28059.	2.00	249.	1500.	
746.28	0.01	0.24	0.0	746.29	0.57	0.09	0.006	*XS*

100 yr

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 16,DATE=11/20/78

WATER-SURFACE PROFILE FOR: BRENT RUN (LAKE DRAIN) SECT BS TO BT VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*	
BS AT	22532	0	505.	440.	14692.	1.08	215.	475.	
746.09	0.02			746.11	1.15	0.14		*IS*	FW
BT AT	22940	408	505.	600.	27038.	1.12	613.	873.	
746.36	0.01	0.26	0.0	746.37	0.84	0.09	0.000	*XS*	

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE=11/21/78

*** INPUT CARD PRINTOUT ***

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1  1801 BRENT RUN (LAKE DR) I-475 TO SECT BW        VH     3  5  2  5 12
2  1802  74591  74637  74704  74660  74668
3  1803  BU    1  13  3  744   23200 99 99
4  1804     310     435     635     505     505
5  1806       0  1  7500  190  1  7480  718  2  7474  735  2  7473  751  2  7440
5  1807     762  2  7415  783  2  7394  788  2  7388  791  2  7391  804  3  7434
5  1808     830  3  7467 1220  3  7480 1340  3  7500
6  1810  0  1 055 055  0  1 070 070  0  1 075 075
3  1833  BV    0  16  3  744   23740 99 99
5  1835       0  1  7500  170  1  7480  475  1  7480  525  1  7475  573  1  7480
5  1836     583  1  7480  592  2  7470  610  2  7415  623  2  7390  628  2  7390
5  1837     632  2  7393  642  2  7435  657  3  7470  669  3  7475  715  3  7480
5  1838     815  3  7500
6  1839  0  1 055 055  0  1 070 070  0  1 070 070
3  1863  BW    0  12  3  745   24340 99 99
5  1866       0  1  7510   98  1  7500  149  1  7480  170  2  7473  196  2  7469
5  1867     210  2  7391  216  2  7391  222  2  7396  235  2  7483  300  3  7478
5  1868     454  3  7500  684  3  7520
6  1869  0  1 055 055  0  1 070 070  0  1 045 045
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE=11/21/78

WATER-SURFACE PROFILE FOR: BRENT RUN (LAKE DR) I-475 TO SECT BW VH
PAGE 1 OF 1, PROFILE NUMBER 1004, YR UPSTREAM COMPUTATIONS

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
BU	AT	23200	0	505.	358.	20196.	1.09	738.	829.
746.60	0.03			746.63	1.41	0.12			*IS*
BV	AT	23740	540	505.	291.	16465.	1.00	592.	657.
747.01	0.05	0.41	0.01	747.05	1.73	0.14	-0.002		*XS*
BW	AT	24340	600	505.	245.	11407.	1.02	154.	302.
747.83	0.07	0.81	0.01	747.90	2.06	0.20	0.020		*XS*

100 YR

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 16,DATE=11/21/78

WATER-SURFACE PROFILE FOR: BRENT RUN (LAKE DR) I-475 TO SECT BW VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*
BU	AT	23200	0	505.	366.	20724.	1.09	738.	830.
746.68	0.03			746.71	1.38	0.12			*IS*
BV	AT	23740	540	505.	295.	16843.	1.00	591.	659.
747.07	0.05	0.39	0.01	747.11	1.71	0.14	-0.000		*XS*
BW	AT	24340	600	505.	248.	11166.	1.03	153.	304.
747.86	0.07	0.81	0.01	747.93	2.04	0.20	-0.009		*XS*

FW

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE=11/22/78

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1  1901 BRENT RUN (LAKE DR) SECT BX TO SECT BY      VH     2  5  2  5 12
2  1902  74712  74796  74860  74819  74822
3  1903  BX    1  13  3  744   24380 99 99
4  1904     310     435     635     505     505
5  1905       0  1  7505   99  1  7500  137  1  7482  157  1  7470  181  2  7472
5  1906     194  2  7401  199  2  7398  203  2  7401  207  2  7429  221  3  7473
5  1907     300  3  7477  400  3  7500  630  3  7520
6  1908  0  1 055 055  0  1 070 070  0  1 065 065
3  1933   BY  0  14  3  746   24868 99 99
5 1936       0  1  7500   20  1  7480  300  1  7473  327  1  7482  365  2  7483
     M                                                                          **E
5  1937     375  2  7409  382  2  7394  388  2  7406  392  2  7441  402  3  7480
**SEQUENCE**
5  1938     427  3  7472  477  3  7470  750  3  7500  813  3  7520
6  1939  0  1 055 055  0  1 065 065  0  1 045 045
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 11,DATE=11/22/78

WATER-SURFACE PROFILE FOR: BRENT RUN (LAKE DR) SECT BX TO SECT BY VH
PAGE 1 OF 1, PROFILE NUMBER 1004, YR UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
BX AT 24380 / 748.19	0 / 0.06	505. /	301. / 748.25	14011. / 1.68	1.44 / 0.17	137. /	321.	*IS*
BY AT 24868 / 748.57	488 / 0.01	505. / 0.33	705. / 0.0	26947. / 748.59	1.69 / 0.72	14. / 0.09	620. / 0.003	*XS*

100 YR

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 15,DATE=11/22/78

WATER-SURFACE PROFILE FOR: BRENT RUN (LAKE DR) SECT BX TO SECT BY VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
BX AT 24380	0	505.	306.	14251.	1.45	137.	323.	FW
748.22	0.06		748.28	1.65	0.17			*IS*
BY AT 24868	488	505.	549.	24736.	1.41	200.	550.	
748.62	0.02	0.35	0.0	748.64	0.92	0.10	0.002	*XS*

END OF THIS PROFILE

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1  1971 BRENT RUN (LAKE DRAIN) SECT BZ TO CA     ,     VH     2 5 2 5 12
2  1972  74769  74837  74894  74858  74864
3  1973   BZ  1  15  3  746   24912 99 99
4  1974    265    370    540    435    435
5  1976       0  1  7500  140  1  7480  317  1  7472  354  2  7486  365  2  7454
5  1977     374  2  7410  385  2  7399  389  2  7406  392  2  7440  402  3  7486
5  1978     417  3  7468  492  3  7472  577  3  7480  785  3  7500  855  3  7520
6  1980  0  1 055 055  0  1 065 065  0  1 045 045
3  2003   CA  0  17  3  747   25360 99 99
5  2006       0  1  7540  140  1  7520  240  1  7500  380  1  7480  425  1  7476
5  2007     458  2  7485  473  2  7485  481  2  7442  485  2  7410  490  2  7403
5  2008     495  2  7410  499  2  7441  506  2  7466  522  3  7487  560  3  7488
5  2009     590  3  7500  657  3  7520
6  2010  0  1 060 060  0  1 075 075  0  1 045 045
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE=11/28/78

WATER-SURFACE PROFILE FOR: BRENT RUN (LAKE DRAIN) SECT BZ TO CA VH
PAGE 1 OF 1, PROFILE NUMBER 4, 100 YR UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
BZ AT 24912 / 748.58	0 / 0.01	435. /	673. / 748.59	26887. / -0.65	1.52 / -0.08	99. /	637.	*IS*
CA AT 25360 / 748.87	448 / 0.04	435. / 0.30	309. / 0.01	10409. / 748.91	1.26 / 1.41	319. / 0.17	562. / 0.001	*XS*

100 yr

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 16,DATE=11/28/78

WATER-SURFACE PROFILE FOR: BRENT RUN (LAKE DRAIN) SECT BZ TO CA VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID AT DISTANCE / WS ELEV	HV	HF	HE	EG	V	FN	LENGTH / DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	ACC	*ID*
BZ AT 24912		0	435.	603.	27540.	1.29	200.	550.						FW
748.64	0.01			748.65	0.72	0.08								*IS*
CA AT 25360		448	435.	289.	10600.	1.12	375.	525.						
748.92	0.04	0.29	0.01	748.96	1.50	0.17	0.001							*XS*

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 1,DATE=11/30/78

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1  2041 BRENT RUN (LAKE DR) SECT CB TO COLDWATER RD  VH   2  5  2  5 12
2  2042  74820  74872  74923  74891  74898
3  2043   CB  1  15  3  747   25400 99 99
4  2044    265   370   540    435    435
5  2046       0  1  7540  160  1  7520  260  1  7500  380  1  7480  420  1  7476
5  2047     454  2  7478  491  2  7461  500  2  7430  506  2  7405  510  2  7410
5  2048     514  2  7433  525  2  7492  541  3  7489  551  3  7489  715  3  7520
6  2049  0  1 060 060  0  1 075 075  0  1 045 045
3  2073  CC   0  10  3  749   26220 99 99
5  2075     -30  1  7540    0  1  7520  457  2  7504  487  2  7490  497  2  7442
5  2076     502  2  7428  508  2  7444  513  2  7462  535  3  7490  599  3  7542
6  2078  0  1 050 050  0  1 065 065  0  1 050 050
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 8,DATE=11/30/78

WATER-SURFACE PROFILE FOR: BRENT RUN (LAKE DR) SECT CB TO COLDWATER RD VH
PAGE 1 OF 1, PROFILE NUMBER 100 YR, UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
CB AT 25400	0	435.	354.	13186.	1.20	325.	552.	
748.91	0.03		748.94	1.23	0.14			*IS* 100 YR
CC AT 26220	820	435.	212.	9242.	1.03	462.	549.	
750.16	0.07	1.27	0.02	750.23	2.06	0.22	-0.004	*XS*

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 12,DATE=11/30/78

WATER-SURFACE PROFILE FOR: BRENT RUN (LAKE DR) SECT CB TO COLDWATER RD VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW	
WS ELEV	HV	HF	HE	EG	V	FN	ACC		*ID*	
CB	AT	25400	0	435.	344.	13781.	1.10	375.	525.	FW
748.98	0.03				749.01	1.26	0.13		*IS*	
CC	AT	26220	820	435.	213.	9294.	1.03	462.	549.	
750.17	0.07	1.21	0.02		750.24	2.05	0.22	0.001	*XS*	

END OF THIS PROFILE

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1  2101 RPFNT RUN (LAKE DR) COLDWATER RD TO SECT CF  VH    3  5  2  5 12
2  2102  74937  75000  75081  75032  75033
3  2103  CD   1  17  3  751   26320 99 99
4  2104    250    355    520    415    415
5  2106       0  1  7560   70  1  7540  213  1  7520  260  1  7515  300  1  7515
5  2107     360  1  7520  475  1  7536  516  2  7536  530  2  7524  540  2  7474
5  2108     548  2  7438  555  2  7430  560  2  7436  564  2  7470  584  2  7521
5  2109     616  3  7546  750  3  7560
6  2110  0  1 060 060  0  1 065 065  0  1 054 054
3  2133  CF   0  19  3  748   26960 99 99
5  2135       0  1  7570   65  1  7560  132  1  7540  240  1  7520  325  1  7511
5  2136     420  1  7507  435  2  7515  454  2  7464  456  2  7441  460  2  7436
5  2137     468  2  7446  471  2  7464  478  3  7500  496  3  7498  560  3  7500
5  2138     595  3  7520  610  3  7540  637  3  7560  670  3  7570
6  2139  0  1 060 060  0  1 060 060  0  1 080 080
3  2163   CF  0  19  4  749   27623 99 99
5  2165       0  1  7580   55  1  7560  115  1  7540  190  1  7520  360  1  7510
5  2166     418  2  7519  432  2  7521  440  3  7517  443  3  7482  451  3  7441
5  2167     458  3  7415  464  3  7443  466  3  7466  478  3  7511  488  4  7506
5  2168     596  4  7520  648  4  7540  695  4  7560  729  4  7580
6  2169  0  1 065 065  0  1 075 075  0  1 085 085  0  1 065 065
```

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 11,DATE=12/14/78

WATER-SURFACE PROFILE FOR: BRENT RUN (LAKE DR) COLDWATER RD TO SECT CF VH
PAGE 1 OF 1, PROFILE NUMBER 4, 100 YR UPSTREAM COMPUTATIONS

SECTD AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
CD AT 26320	0	415.	172.	9444.	1.00	534.	577.	
750.32	0.09		750.41	2.42	0.21			*IS*
CE AT 26960	640	415.	331.	13975.	1.78	315.	581.	
751.20	0.04	0.84	0.0	751.25	1.26	0.16	0.001	*XS*
CF AT 27623	663	415.	377.	12665.	1.59	213.	585.	
751.86	0.03	0.65	0.0	751.89	1.10	0.12	0.000	*XS*

100 YR

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 77.180 *** PAGE COUNT= 15,DATE=12/14/78

WATER-SURFACE PROFILE FOR: BRENT RUN (LAKE DR) COLDWATER RD TO SECT CF VH
PAGE 1 OF 1, PROFILE NUMBER 5, UPSTREAM COMPUTATIONS
*** FLOODWAY ANALYSIS *** HOR FW

SECTD AT DISTANCE/ LENGTH/DISCHARGE/ AREA /CONVEYANCE/ ALPHA/ LEW / REW WS ELEV / HV / HF / HE / FG / V / FN / ACC *ID*										
CD AT	26320 /	0 /	415. /	172. /	9475. /	1.00 /	534. /	577.		
750.33 /	0.09 /			/ 750.42 /	2.41 /	0.21/		*IS*		
CF AT	26960 /	640 /	415. /	289. /	13606. /	1.50 /	400. /	550.	FW	
751.23 /	0.05 /	0.85 /	0.0 /	751.28 /	1.43 /	0.16 /	0.001	*XS*		
CF AT	27623 /	663 /	415. /	326. /	12508. /	1.29 /	340. /	540.		
751.92 /	0.03 /	0.67 /	0.0 /	751.95 /	1.27 /	0.12 /	0.000	*XS*		

END OF THIS PROFILE

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1  2220 BRENT RUN (LAKE DRAIN) SECT CG TO CN        VH    8  5  2  5 12
2  2221  75158  75207  75238  75219  75224
3  2222   CG  1  16  3  748   27657 99 99
4  2224    250    355    520    415    415
5  2225      0  1  7580   93  1  7560  160  1  7540  350  1  7520  400  1  7515
5  2226    429  1  7520  474  2  7515  482  2  7442  488  2  7435  494  2  7442
5  2227    502  3  7508  522  3  7510  595  3  7520  675  3  7540  735  3  7560
5  2228    775  3  7580
6  2230  0  1 060 060  0  1 050 050  0  1 065 065
3  2253   CH  0  11  3  747   28010 99 99
5  2255      0  1  7530   35  1  7520   97  1  7500  153  2  7487  159  2  7446
5  2256    165  2  7441  171  2  7446  177  3  7487  303  3  7500  357  3  7520
5  2257    422  3  7540
6  2258  0  1 060 060  0  1 050 050  0  1 065 065
3  2283   CI  1  14  3  748   28580 99 99
4  2284    230    325    475    380    380
5  2285      0  1  7600   17  1  7580   29  1  7560   51  1  7540   58  1  7520
5  2286    103  1  7500  231  2  7486  236  2  7454  242  2  7452  248  2  7453
5  2287    253  3  7487  347  3  7500  387  3  7520  450  3  7540
6  2288  0  1 080 080  0  1 045 045  0  1 070 070
3  2313   CJ  0  17  5  748   28930 99 99
5  2315     80  1  7600   90  1  7580   97  1  7560  105  1  7540  124  2  7520
5  2316    143  2  7500  196  3  7490  201  3  7455  206  3  7447  210  3  7457
5  2317    215  3  7475  229  3  7480  253  4  7500  280  4  7520  340  5  7540
5  2318    362  5  7560  387  5  7580
6  2319  0  1 060 060  0  1 090 090  0  1 045 045  0  1 070 070  0  1 060 060
3  2343   CK  0  17  3  749   29440 99 99
5  2345      0  1  7600   12  1  7758   22  1  7560   34  1  7540   55  1  7520
5  2346     82  1  7500  128  2  7500  136  2  7493  140  2  7455  146  2  7448
5  2347    152  2  7460  158  3  7506  183  3  7520  235  3  7540  270  3  7560
5  2348    280  3  7580  290  3  7600
6  2349  0  1 100 100  0  1 045 045  0  1 080 080
3  2373   CL  0  13  3  750   29880 99 99
5  2375      0  1  7600   17  1  7580   31  1  7560   53  1  7540   74  1  7520
5  2376    188  2  7513  196  2  7467  202  2  7463  208  2  7462  215  3  7518
5  2377    333  3  7520  349  3  7540  397  3  7560
6  2378  0  1 065 065  0  1 055 055  0  1 065 065
3  2403   CM  0  14  3  751   30280 99 99
5  2405      0  1  7610   50  1  7600  165  1  7580  257  1  7560  263  1  7540
5  2406    310  2  7530  317  2  7473  323  2  7465  330  2  7473  336  3  7530
5  2407    406  3  7540  445  3  7560  477  3  7580  507  3  7590
6  2409  0  1 065 065  0  1 060 060  0  1 070 070
3  2432   CN  0  13  3  752   30610 99 99
5  2435     50  1  7600  205  1  7561  272  1  7537  284  2  7545  292  2  7536
5  2436    302  2  7467  308  2  7456  316  2  7467  325  3  7543  347  3  7531
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
5  2437     455  3  7560  505  3  7580  515  3  7600
6  2439  0  1 100 100  0  1 065 065  0  1 070 070
```

WATER-SURFACE PROFILE FOR: BRENT RUN (LAKE DRAIN) SECT CG TO CN VH
PAGE 1 OF 1, PROFILE NUMBER 4, 100 YR UPSTREAM COMPUTATIONS

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
CG AT 27657	0	415.	305.	17596.	2.11	332.	603.	
752.19	0.06			752.25	1.36	0.15		*IS*
CH AT 28010	353	415.	862.	44187.	1.80	24.	367.	
752.32	0.01	0.08	0.0	752.33	0.48	0.04	0.000	*XS*
CI AT 28580	570	380.	935.	43666.	2.17	57.	399.	
752.37	0.01	0.05	0.0	752.38	0.41	0.03	-0.000	*XS*
CJ AT 28930	350	380.	489.	30651.	1.71	120.	292.	
752.40	0.02	0.04	0.01	752.42	0.78	0.09	-0.000	*XS*
CK AT 29440	510	380.	348.	18758.	2.31	50.	196.	100YR
752.52	0.04	0.13	0.01	752.56	1.09	0.15	0.000	*XS*
CL AT 29880	440	380.	369.	14984.	2.19	66.	339.	
752.77	0.04	0.23	0.0	752.80	1.03	0.15	0.017	*XS*
CM AT 30280	400	380.	125.	7658.	1.04	300.	351.	
753.21	0.15	0.50	0.06	753.36	3.05	0.25	0.000	*XS*
CN AT 30610	330	380.	192.	11027.	1.14	268.	375.	
753.86	0.07	0.56	0.0	753.93	1.98	0.17	-0.001	*XS*

END OF THIS PROFILE

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1      1 FLINT RIVER                                   HOLTSLAG 46  6  2 99 12
2   5295  67620  67803  67873  67990  67657  67879
3   5300 AP     1  28  3  667    38450  1  3
4   5305   9500  13250  14900  17900  10200  14900
5   5310    -350  1  6940 -320  1  6920 -308  1  6900 -285  1  6800 -272  1  6780
5   5311    -255  1  6760 -245  1  6740 -230  2  6720 -220  2  6722 -208  2  6680
5   5312    -195  2  6654 -180  2  6655 -160  2  6656 -140  2  6654 -120  2  6652
5   5313    -100  2  6648  -80  2  6654  -60  2  6654  -48  2  6634  -38  2  6679
5   5314     -18  3  6750    0  3  6749  125  3  6750  230  3  6760  250  3  6780
5   5315     265  3  6800  303  3  6900  345  3  7000
6   5320  1  2 060 060  1  2 032 032  1  2 050 050
3   5400 AQ     0  25  3  668    39370  1  3
5   5410        0  1  6920   30  1  6900   40  1  6880   60  1  6860  125  1  6840
5   5411      150  1  6820  378  1  6800  635  1  6780 1030  1  6760 1100  1  6740
5   5412     1112  1  6720 1140  2  6700 1160  2  6685 1175  2  6670 1195  2  6674
5   5413     1215  2  6669 1230  2  6672 1245  2  6672 1265  2  6672 1285  2  6670
5   5414     1300  2  6686 1318  3  6700 1338  3  6800 1355  3  6900 1372  3  7000
6   5420  1  2 070 070  1  2 032 032  1  2 080 080
3   5500 AR     0  27  3  671    40535  1  3
5   5510        0  1  6900   20  1  6880  100  1  6860  165  1  6840  380  1  6820
5   5511      570  1  6800  680  1  6780  965  1  6780  985  2  6760  992  2  6740
5   5512     1000  2  6713 1015  2  6692 1030  2  6695 1045  2  6693 1060  2  6695
5   5513     1075  2  6694 1090  2  6693 1105  2  6686 1125  2  6694 1140  2  6689
5   5514     1160  2  6692 1185  2  6702 1195  2  6713 1205  3  6720 1235  3  6800
5   5515     1247  3  6900 1272  3  7000
6   5520  1  2 080 080  1  2 034 034  1  2 070 070
3   5600 AS     0  25  3  671    41710  1  3
5   5610     -310  1  6920 -300  1  6900 -290  1  6800 -260  1  6787 -250  2  6764
5   5611     -236  2  6719 -218  2  6698 -200  2  6695 -180  2  6695 -160  2  6701
5   5612     -140  2  6701 -120  2  6699 -100  2  6706  -80  2  6706  -64  2  6719
5   5613      -42  3  6768    0  3  6768   80  3  6760  200  3  6780  410  3  6800
5   5614      570  3  6820  615  3  6840  672  3  6860  730  3  6880  795  3  6900
6   5620  1  2 070 070  1  2 039 039  1  2 050 050
3   5700 AT     0  21  3  673    42695  1  3
5   5710     -300  1  6900 -285  1  6800 -260  2  6774 -252  2  6730 -230  2  6720
5   5711     -210  2  6715 -190  2  6718 -170  2  6716 -150  2  6714 -130  2  6700
5   5712     -110  2  6708  -90  2  6717  -72  2  6730  -56  3  6778    0  3  6794
5   5713      300  3  6800  380  3  6820  542  3  6840  580  3  6860  615  3  6880
5   5714      640  3  6900
6   5720  1  2 070 070  1  2 037 037  1  2 040 040
3   5800 AU     1  31  3  675    43850  1  3
4   5805   9100  12750  14400  17200   9730  14400
5   5810     -265  1  7040 -250  1  7020 -232  1  7000 -218  1  6900 -208  1  6880
5   5811     -200  1  6860 -183  1  6840  -55  1  6820    0  1  6792   86  2  6779
```

AP-6

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

5  5812     104  2  6740  120  2  6721  140  2  6724  160  2  6712  180  2  6714
5  5813     200  2  6722  220  2  6718  240  2  6718  260  2  6723  280  2  6721
5  5814     292  2  6740  300  3  6771  315  3  6820  330  3  6860  345  3  6900
5  5815     380  3  6920  405  3  6940  418  3  6960  435  3  6980  440  3  7000
5  5816     457  3  7020
6  5820  1  2 050 050  1  2 039 039  1  2 040 040
3  5900 AV    0  30  3  673   44640  1  3
5  5910    -765  1  7000 -745  1  6980 -715  1  6960 -530  1  6940 -390  1  6920
5  5911    -340  1  6900 -300  1  6880 -170  1  6860 -155  1  6840 -140  1  6820
5  5912     -55  1  6800  -25  1  6820    0  1  6818   24  2  6807   46  2  6740
5  5913      60  2  6721   75  2  6724   95  2  6720  115  2  6722  135  2  6721
5  5914     155  2  6725  170  2  6724  185  2  6722  195  2  6722  220  2  6740
5  5915     232  3  6760  296  3  6804  320  3  6900  330  3  6960  450  3  6983
6  5920  1  2 050 050  1  2 039 039  1  2 050 050
3  6000 AW    0  35  3  674   45540  1  3
5  6010    -350  1  7000 -270  1  6980 -230  1  6960 -195  1  6940 -160  1  6920
5  6011    -150  1  6900 -135  1  6880 -125  1  6860 -105  1  6840  -62  1  6820
5  6012       0  1  6806   40  1  6793   56  2  6774   60  2  6749   75  2  6721
5  6013      90  2  6716  105  2  6705  120  2  6705  135  2  6707  150  2  6709
5  6014     165  2  6711  180  2  6715  190  2  6716  203  2  6714  210  2  6734
5  6015     218  2  6748  224  3  6783  336  3  6824  350  3  6860  410  3  6880
5  6016     422  3  6900  450  3  6920  530  3  6940  615  3  6960  870  3  6980
6  6020  1  2 050 050  1  2 032 032  1  2 040 040
3  6100 AX    0  30  3  674   46560  1  3
5  6110    -365  1  7100 -355  1  7000 -345  1  6900 -300  2  6810 -270  2  6754
5  6111    -250  2  6732 -230  2  6725 -210  2  6723 -190  2  6720 -170  2  6720
5  6112    -150  2  6728 -130  2  6729 -115  2  6730 -100  2  6733  -80  2  6753
5  6113     -74  3  6786  -46  3  6843    0  3  6831   74  3  6814  180  3  6820
5  6114     240  3  6840  280  3  6860  300  3  6880  330  3  6900  350  3  6920
5  6115     400  3  6940  550  3  6960  595  3  6980  680  3  7000  755  3  7020
6  6120  1  2 060 060  1  2 032 032  1  2 040 040
3  6200 AY    0  39  3  675   47625  1  3
5  6210    -450  1  7100 -440  1  7080 -422  1  7060 -413  1  7040 -400  1  7020
5  6211    -395  1  7000 -380  1  6980 -372  1  6960 -360  1  6940 -352  1  6920
5  6213    -338  1  6900 -320  1  6880 -280  1  6860 -265  1  6840 -255  1  6820
5  6214    -245  1  6800 -228  2  6777 -214  2  6754 -200  2  6722 -185  2  6721
5  6215    -165  2  6723 -145  2  6719 -135  2  6719 -110  2  6721  -90  2  6721
5  6216     -70  2  6728  -56  2  6753  -40  3  6804    0  3  6816  130  3  6800
5  6217     155  3  6820  195  3  6900  215  3  6980  255  3  7000  345  3  7020
5  6218     420  3  7040  450  3  7060  485  3  7080  575  3  7100
6  6220  1  2 060 060  1  2 034 034  1  2 045 045
3  6300 AZ    0  37  3  675   48610  1  3
5  6310    -630  1  7100 -615  1  7080 -592  1  7060 -583  1  7040 -570  1  7020
5  6311    -555  1  7000 -545  1  6980 -530  1  6960 -340  1  6960 -325  1  6920
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

5  6313    -178  2  6757 -165  2  6737 -150  2  6730 -135  2  6725 -120  2  6723
5  6314    -105  2  6724  -90  2  6720  -75  2  6720  -60  2  6739  -44  2  6757
5  6315     -30  3  6815    0  3  6825   86  3  6843   95  3  6860  110  3  6860
5  6316     125  3  6880  148  3  7000  155  3  7020  175  3  7040  245  3  7060
5  6317     290  3  7080  310  3  7100
6  6320  1  2 060 060  1  2 034 034  1  2 045 045
3  6400 BA    0  27  3  675   49640  1  3
5  6410    -490  1  7100 -465  1  7080 -425  1  7060 -405  1  7040 -380  1  7020
5  6411    -375  1  7000 -342  1  6900 -330  1  6880 -320  1  6860 -265  1  6840
5  6412    -212  1  6820 -206  2  6816 -194  2  6760 -180  2  6725 -165  2  6731
5  6413    -145  2  6729 -130  2  6732 -115  2  6736  -95  2  6737  -75  2  6735
5  6414     -60  2  6737  -46  2  6760  -40  3  6801    0  3  6796   25  3  6900
5  6415      40  3  7000   55  3  7020
6  6420  1  2 070 070  1  2 034 034  1  2 050 050
3  6500 BA BR 2  16  1  674   49640       30  7010 1 1
5  6510       6  1  7042    6  1  6980   12  1  6980   56  1  6758   75  1  6744
5  6511      95  1  6730  125  1  6734  150  1  6729  175  1  6729  192  1  6730
5  6512     220  1  6739  247  1  6754  282  1  6926  288  1  6926  288  1  6985
5  6513       6 -9  7042
6  6520  1  2 028 028
3  6600 BA RD 4  10  2   65          1  2          1 1              1
5  6610       0  1  7100   55  1  7080   75  1  7072  250  2  7044  370  2  7015
5  6611     705  2  7020  790  2  7040  880  2  7060  950  2  7080 1050  2  7100
3  6700 BB    5  22  2  675   50090 99  2
5  6710    -230  1  7000 -210  1  6900 -190  1  6880 -174  1  6821 -166  1  6762
5  6711    -134  1  6742 -114  1  6742  -94  1  6748  -68  1  6742  -40  1  6762
5  6712     -28  2  6823    0  2  6829   25  2  6832   50  2  6840   90  2  6860
5  6713     110  2  6880  125  2  6900  133  2  6920  150  2  6940  200  2  6960
5  6714     345  2  6980  400  2  7000
6  6720  1  2 032 032  1  2 050 050
3  6800 BC    0  25  3  675   51030  1  3
5  6810    -265  1  7100 -247  1  7000 -232  1  6900 -226  2  6809 -212  2  6769
5  6811    -192  2  6755 -164  2  6745 -138  2  6738 -114  2  6739  -90  2  6736
5  6812     -68  2  6740  -48  2  6770  -20  3  6845    0  3  6846   50  3  6860
5  6813     202  3  6880  217  3  6900  225  3  6920  235  3  6940  242  3  6960
5  6814     255  3  6980  325  3  7000  388  3  7020  415  3  7040  430  3  7060
6  6820  1  2 060 060  1  2 034 034  1  2 050 050
3  6900 BD    0  41  3  675   51805  1  3
5  6910    -450  1  7200 -430  1  7180 -402  1  7160 -395  1  7140 -382  1  7120
5  6911    -372  1  7100 -360  1  7080 -338  1  7060 -317  1  7040 -285  1  7020
5  6912    -250  1  7000 -235  1  6980 -225  1  6940 -218  1  6920 -205  1  6900
[illegible]  [illegible]  3  6800 -164  3  6772 -160  2  6741 -145  2  6738 -130  2  6734
```

```
AU     AT   43850 /  1155 /   9100. /  2220. /  326350. / 1.17 /  -43. /  313.
   68[illegible]40 /   0.31 /   1.11 /   0.0  /  681.71[illegible]  4.10 /   0.27 /  0.000  *XS*
-----------------------------------------------------------------------------------
AV     AT   44640 /   790 /   9100. /  2242. /  324787. / 1.21 / -140. /  300.
   682.02 /   0.31 /   0.62 /   0.00 /  682.33 /   4.06 /   0.27 /  0.002  *XS*
-----------------------------------------------------------------------------------
AW     AT   45540 /   900 /   9100. /  2296. /  430352. / 1.35 /  -74. /  337.
   682.54 /   0.33 /   0.53 /   0.01 /  682.87 /   3.96 /   0.26 / -0.000  *XS*
-----------------------------------------------------------------------------------
AX     AT   46560 /  1020 /   9100. /  2379. /  442378. / 1.19 / -310. /  211.
   683.04 /   0.27 /   0.44 /   0.0  /  683.31 /   3.82 /   0.24 / -0.003  *XS*
-----------------------------------------------------------------------------------
AY     AT   47625 /  1065 /   9100. /  2564. /  436672. / 1.35 / -263. /  163.
   683.51 /   0.26 /   0.46 /   0.0  /  683.77 /   3.55 /   0.24 /  0.001  *XS*
-----------------------------------------------------------------------------------
AZ     AT   48610 /   985 /   9100. /  1913. /  351420. / 1.13 / -245. /   70.
   683.97 /   0.40 /   0.53 /   0.07 /  684.37 /   4.76 /   0.29 / -0.000  *XS*
-----------------------------------------------------------------------------------
BA     AT   49640 /  1030 /   9100. /  2083. /  384618. / 1.21 / -283. /   12.
   684.64 /   0.36 /   0.63 /   0.0  /  685.00 /   4.37 /   0.27 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BA BR AT   49640 /       /   9100. /  1966. /  552971. / 1.00 /   38. /  266.
   684.64 /   0.33 /       ...1...  (-.001)    /   4.63 /   0.26 /          *BO*
-----------------------------------------------------------------------------------
 NO ROAD OVERFLOW                                                            *RG*
-----------------------------------------------------------------------------------
BB     AT   50090 /   450 /   9100. /  1537. /  282556. / 1.15 / -181. /   67.
   684.85 /   0.63 /   0.34 /   0.13 /  685.47 /   5.92 /   0.38 / -0.000  *AS*
-----------------------------------------------------------------------------------
```

10-YR

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 25,DATE= 2/10/77

```
===================================================================================
WATER-SURFACE PROFILE FOR: FLINT RIVER                                  HOLTSLAG
PAGE  2 OF  4
===================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
      ELEV /    HV  /    HE  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
```

```
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==================================================================================
   M = 0.02 / E = 0.0  / K* = 0.03 /  1540. /  283112. / 1.15 / -181. /    67.
   684.86 /   0.62 /                 /  685.48 /    5.91 /   0.37 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
BC     AT   51030 /   940 /   9100. /  2149. /  427785. / 1.05 / -229. /    44.
   685.83 /   0.29 /   0.64 /   0.0  /  686.13 /    4.23 /   0.24 / -0.000  *XS*
----------------------------------------------------------------------------------
BD     AT   51805 /   775 /   9100. /  1826. /  362108. / 1.13 / -195. /    45.
   686.18 /   0.44 /   0.41 /   0.07 /  686.61 /    4.98 /   0.28 /  0.000  *XS*
----------------------------------------------------------------------------------
BE     AT   52605 /   800 /   9100. /  1996. /  414010. / 1.08 /   -7. /   233.
   686.70 /   0.35 /   0.44 /   0.0  /  687.05 /    4.56 /   0.25 /  0.000  *XS*
----------------------------------------------------------------------------------
BF     AT   53400 /   795 /   9100. /  2133. /  456159. / 1.08 /   -7. /   232.
   687.10 /   0.31 /   0.35 /   0.0  /  687.40 /    4.27 /   0.23 / -0.000  *XS*
----------------------------------------------------------------------------------
BG     AT   54355 /   955 /   9100. /  2317. /  507438. / 1.08 /   -8. /   271.
   687.49 /   0.26 /   0.34 /   0.0  /  687.75 /    3.93 /   0.21 / -0.000  *XS*
----------------------------------------------------------------------------------
BH     AT   55510 /  1155 /   9100. /  2142. /  407053. / 1.27 / -143. /   230.
   687.90 /   0.36 /   0.46 /   0.05 /  688.26 /    4.25 /   0.26 / -0.000  *XS*
----------------------------------------------------------------------------------
BI     AT   56410 /   900 /   9100. /  1940. /  385468. / 1.28 /  -71. /   242.
   688.34 /   0.44 /   0.47 /   0.04 /  688.77 /    4.69 /   0.27 / -0.000  *XS*
----------------------------------------------------------------------------------
BJ     AT   57500 /  1090 /   9100. /  2397. /  385539. / 1.66 /   25. /   446.
   689.01 /   0.37 /   0.61 /   0.0  /  689.38 /    3.80 /   0.27 / -0.000  *XS*
----------------------------------------------------------------------------------
BK     AT   58410 /   910 /   9100. /  1886. /  398138. / 1.22 /   62. /   287.
   689.46 /   0.44 /   0.49 /   0.03 /  689.91 /    4.83 /   0.27 / -0.000  *XS*
----------------------------------------------------------------------------------
BL     AT   59060 /   650 /   9100. /  2086. /  377644. / 1.49 /   96. /   612.
   689.83 /   0.44 /   0.36 /   0.0  /  690.27 /    4.36 /   0.28 /  0.003  *XS*
----------------------------------------------------------------------------------
BM     AT   59930 /   870 /   9100. /  2167. /  433354. / 1.12 / -260. /    -6.
   690.40 /   0.31 /   0.44 /   0.0  /  690.71 /    4.20 /   0.23 / -0.000  *XS*
----------------------------------------------------------------------------------
BN     AT   60930 /  1000 /   9100. /  2433. /  318952. / 1.20 / -296. /    45.
   691.05 /   0.26 /   0.60 /   0.0  /  691.31 /    3.74 /   0.24 /  0.000  *XS*
----------------------------------------------------------------------------------
BO     AT   61650 /   720 /   9100. /  2423. /  379703. / 1.25 / -237. /    78.
   691.55 /   0.28 /   0.49 /   0.01 /  691.82 /    3.76 /   0.23 /  0.014  *XS*
----------------------------------------------------------------------------------
BP     AT   62460 /   810 /   9100. /  2276. /  456025. / 1.18 /   59. /   374.
```

10-4V

```
==========================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==========================================================================
AP    AT   38450 /     0 /  13250. /  3286. /  619859. / 1.43 / -272. /  250.
   678.03 /   0.36 /                 /  678.39 /   4.03 /   0.26/          *IS*
--------------------------------------------------------------------------
AQ    AT   39370 /   920 /  13250. /  3103. /  475067. / 2.01 /  574. / 1335.
   678.47 /   0.57 /   0.55 /   0.10 /  679.04 /   4.27 /   0.34 / -0.000  *XS*
--------------------------------------------------------------------------
AR    AT   40535 /  1165 /  13250. /  2756. /  437265. / 1.50 /  599. / 1233.
   679.47 /   0.54 /   0.98 /   0.0  /  680.01 /   4.81 /   0.34 / -0.017  *XS*
--------------------------------------------------------------------------
AS    AT   41710 /  1175 /  13250. /  3457. /  434752. / 1.61 / -291. /  468.
   680.72 /   0.37 /   1.09 /   0.0  /  681.09 /   3.83 /   0.30 / -0.005  *XS*
--------------------------------------------------------------------------
AT    AT   42695 /   985 /  13250. /  2855. /  407349. / 1.44 / -287. /  366.
   681.64 /   0.48 /   0.98 /   0.06 /  682.13 /   4.64 /   0.33 /  0.000  *XS*
--------------------------------------------------------------------------
AU    AT   43850 /  1155 /  12750. /  2767. /  429880. / 1.25 / -108. /  318.
   682.83 /   0.41 /   1.11 /   0.0  /  683.24 /   4.61 /   0.29 /  0.000  *XS*
--------------------------------------------------------------------------
AV    AT   44640 /   790 /  12750. /  2920. /  444877. / 1.29 / -151. /  304.
   683.53 /   0.38 /   0.67 /   0.0  /  683.91 /   4.37 /   0.28 / -0.000  *XS*
--------------------------------------------------------------------------
AW    AT   45540 /   900 /  12750. /  2961. /  571305. / 1.45 / -106. /  343.
   684.09 /   0.42 /   0.58 /   0.02 /  684.51 /   4.31 /   0.28 / -0.000  *XS*
--------------------------------------------------------------------------
AX    AT   46560 /  1020 /  12750. /  3230. /  610339. / 1.35 / -318. /  253.
   684.66 /   0.33 /   0.48 /   0.0  /  684.98 /   3.95 /   0.25 / -0.000  *XS*
--------------------------------------------------------------------------
AY    AT   47625 /  1065 /  12750. /  3271. /  591965. / 1.39 / -274. /  171.
   685.14 /   0.33 /   0.48 /   0.0  /  685.46 /   3.90 /   0.25 /  0.001  *XS*
--------------------------------------------------------------------------
AZ    AT   48610 /   985 /  12750. /  2494. /  473603. / 1.26 / -289. /   93.
   685.61 /   0.51 /   0.57 /   0.09 /  686.13 /   5.11 /   0.31 / -0.000  *XS*
--------------------------------------------------------------------------
BA    AT   49640 /  1030 /  12750. /  2626. /  507289. / 1.32 / -322. /   16.
   686.34 /   0.48 /   0.70 /   0.0  /  686.82 /   4.86 /   0.29 /  0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BA BR AT   49640 /        /  12750. /  2306. /  705944. / 1.00 /   35. /  269.
   686.34 /   0.48 /       ...1...  (-.001)    /   5.53 /   0.29 /          *BO*
--------------------------------------------------------------------------
 NO ROAD OVERFLOW
                                                                          *RG*
--------------------------------------------------------------------------
BB    AT   50090 /   450 /  12750. /  1995. /  382928. / 1.24 / -186. /   96.
   686.56 /   0.79 /   0.38 /   0.15 /  687.35 /   6.39 /   0.40 / -0.001  *AS*
--------------------------------------------------------------------------
```

50-YV

```
==================================================================================
WATER-SURFACE PROFILE FOR: FLINT RIVER                                  HOLTSLAG
PAGE  2 OF  4
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
   M = 0.05 / E = 0.0  / K* = 0.08 /  2008. /  385793. / 1.24 / -186. /   96.
   686.61 /   0.78 /                 /  687.39 /    6.35 /   0.39 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
BC     AT   51030 /   940 /  12750. /  2775. /  575418. / 1.19 / -230. /  178.
   687.69 /   0.39 /   0.69 /   0.0  /  688.08 /    4.59 /   0.26 / -0.000  *XS*
----------------------------------------------------------------------------------
BD     AT   51805 /   775 /  12750. /  2374. /  482853. / 1.29 / -200. /  146.
   688.05 /   0.58 /   0.45 /   0.10 /  688.63 /    5.37 /   0.31 / -0.000  *XS*
----------------------------------------------------------------------------------
BE     AT   52605 /   800 /  12750. /  2563. /  552380. / 1.21 /   -9. /  315.
   688.65 /   0.47 /   0.49 /   0.0  /  689.11 /    4.98 /   0.27 / -0.000  *XS*
----------------------------------------------------------------------------------
BF     AT   53400 /   795 /  12750. /  2659. /  600193. / 1.18 /  -16. /  266.
   689.08 /   0.42 /   0.39 /   0.0  /  689.50 /    4.79 /   0.25 / -0.000  *XS*
----------------------------------------------------------------------------------
BG     AT   54355 /   955 /  12750. /  2990. /  672032. / 1.24 /  -12. /  359.
   689.54 /   0.35 /   0.38 /   0.0  /  689.89 /    4.26 /   0.23 / -0.000  *XS*
----------------------------------------------------------------------------------
BH     AT   55510 /  1155 /  12750. /  2954. /  570976. / 1.47 / -165. /  234.
   689.99 /   0.43 /   0.49 /   0.04 /  690.42 /    4.32 /   0.26 / -0.000  *XS*
----------------------------------------------------------------------------------
BI     AT   56410 /   900 /  12750. /  2755. /  525212. / 1.65 / -209. /  245.
   690.42 /   0.55 /   0.49 /   0.06 /  690.96 /    4.63 /   0.29 / -0.000  *XS*
----------------------------------------------------------------------------------
BJ     AT   57500 /  1090 /  12750. /  3337. /  547588. / 1.83 /   23. /  476.
   691.17 /   0.42 /   0.62 /   0.0  /  691.58 /    3.82 /   0.27 /  0.001  *XS*
----------------------------------------------------------------------------------
BK     AT   58410 /   910 /  12750. /  2498. /  523061. / 1.50 /   48. /  427.
   691.59 /   0.61 /   0.52 /   0.10 /  692.19 /    5.10 /   0.29 / -0.000  *XS*
----------------------------------------------------------------------------------
BL     AT   59060 /   650 /  12750. /  3246. /  555011. / 1.93 /   88. /  616.
   692.09 /   0.46 /   0.36 /   0.0  /  692.55 /    3.93 /   0.28 / -0.007  *XS*
----------------------------------------------------------------------------------
```

50-yr

```
AR     AT   40535 /  1165 /  14900. /  3191. /  408428. / 1.66 /  557. / 1235.
   68[illegible]4 /   0.56 /   0.95 /   0.0  /  680.70 /[illegible] 4.67 /   0.34 /  0.000  *XS*
AS     AT   41710 /  1175 /  14900. /  3980. /  506907. / 1.66 / -291. /  521.
   681.39 /   0.36 /   1.03 /   0.0  /  681.75 /   3.74 /   0.29 /  0.017  *XS*
AT     AT   42695 /   985 /  14900. /  3258. /  470587. / 1.47 / -288. /  400.
   682.25 /   0.48 /   0.92 /   0.06 /  682.73 /   4.57 /   0.33 /  0.000  *XS*
AU     AT   43850 /  1155 /  14400. /  3012. /  474369. / 1.29 / -143. /  320.
   683.38 /   0.46 /   1.11 /   0.0  /  683.84 /   4.78 /   0.30 / -0.000  *XS*
AV     AT   44640 /   790 /  14400. /  3193. /  498347. / 1.30 / -156. /  305.
   684.13 /   0.41 /   0.69 /   0.0  /  684.54 /   4.51 /   0.29 /  0.008  *XS*
AW     AT   45540 /   900 /  14400. /  3237. /  634274. / 1.47 / -112. /  345.
   684.70 /   0.45 /   0.59 /   0.02 /  685.15 /   4.45 /   0.28 / -0.000  *XS*
AX     AT   46560 /  1020 /  14400. /  3597. /  689163. / 1.39 / -321. /  266.
   685.29 /   0.35 /   0.48 /   0.0  /  685.63 /   4.00 /   0.26 / -0.000  *XS*
AY     AT   47625 /  1065 /  14400. /  3564. /  661349. / 1.39 / -278. /  174.
   685.79 /   0.35 /   0.48 /   0.00 /  686.14 /   4.04 /   0.25 /  0.019  *XS*
AZ     AT   48610 /   985 /  14400. /  2763. /  529846. / 1.32 / -301. /  112.
   686.29 /   0.56 /   0.58 /   0.10 /  686.85 /   5.21 /   0.32 /  0.019  *XS*
BA     AT   49640 /  1030 /  14400. /  2864. /  563647. / 1.35 / -325. /   18.
   687.04 /   0.53 /   0.72 /   0.0  /  687.57 /   5.03 /   0.30 /  0.009  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BA BR AT   49640 /        /  14400. /  2448. /  773429. / 1.00 /   34. /  271.
   687.04 /   0.54 /        ...1...  (-.001)    /   5.88 /   0.30 /          *BO*
 NO ROAD OVERFLOW
                                                                            *RG*
BB     AT   50090 /   450 /  14400. /  2197. /  429690. / 1.27 / -188. /  103.
   687.27 /   0.85 /   0.39 /   0.16 /  688.11 /   6.56 /   0.40 / -0.000  *AS*
```

100-yr [illegible]

↓ Two of [illegible]

```
==================================================================================
WATER-SURFACE PROFILE FOR: FLINT RIVER                                  HOLTSLAG
PAGE  2 OF  4
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
   M = 0.07 / E = 0.0  / K* = 0.10 /  2216. /  434162. / 1.27 / -188. /  103.
   687.33 /   0.83 /                 /  688.17 /    6.50 /   0.40 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
BC     AT   51030 /   940 /  14400. /  3098. /  646139. / 1.25 / -231. /  205.
   688.44 /   0.42 /   0.69 /   0.0  /  688.86 /    4.65 /   0.26 / -0.000  *XS*
----------------------------------------------------------------------------------
BD     AT   51805 /   775 /  14400. /  2641. /  540369. / 1.36 / -202. /  163.
   688.80 /   0.63 /   0.46 /   0.10 /  689.42 /    5.45 /   0.31 / -0.000  *XS*
----------------------------------------------------------------------------------
BE     AT   52605 /   800 /  14400. /  2814. /  615573. / 1.25 /   -9. /  324.
   689.41 /   0.51 /   0.50 /   0.0  /  689.92 /    5.12 /   0.28 / -0.000  *XS*
----------------------------------------------------------------------------------
BF     AT   53400 /   795 /  14400. /  2880. /  662361. / 1.21 /  -19. /  271.
   689.86 /   0.47 /   0.40 /   0.0  /  690.33 /    5.00 /   0.26 / -0.000  *XS*
----------------------------------------------------------------------------------
BG     AT   54355 /   955 /  14400. /  3305. /  746927. / 1.31 /  -13. /  381.
   690.36 /   0.39 /   0.40 /   0.0  /  690.74 /    4.36 /   0.23 /  0.014  *XS*
----------------------------------------------------------------------------------
BH     AT   55510 /  1155 /  14400. /  3288. /  645307. / 1.51 / -172. /  235.
   690.82 /   0.45 /   0.50 /   0.03 /  691.27 /    4.38 /   0.26 / -0.001  *XS*
----------------------------------------------------------------------------------
BI     AT   56410 /   900 /  14400. /  3140. /  592123. / 1.77 / -230. /  246.
   691.24 /   0.58 /   0.49 /   0.06 /  691.82 /    4.59 /   0.29 / -0.000  *XS*
----------------------------------------------------------------------------------
BJ     AT   57500 /  1090 /  14400. /  3719. /  617902. / 1.87 /   21. /  490.
   691.99 /   0.44 /   0.62 /   0.0  /  692.43 /    3.87 /   0.27 / -0.012  *XS*
----------------------------------------------------------------------------------
BK     AT   58410 /   910 /  14400. /  2836. /  580975. / 1.65 /   36. /  472.
   692.41 /   0.66 /   0.53 /   0.11 /  693.07 /    5.08 /   0.30 /  0.000  *XS*
----------------------------------------------------------------------------------
BL     AT   59060 /   650 /  14400. /  3713. /  639743. / 1.98 /   85. /  618.
   692.97 /   0.46 /   0.36 /   0.0  /  693.43 /    3.88 /   0.27 / -0.000  *XS*
----------------------------------------------------------------------------------
BM     AT   59930 /   870 /  14400. /  3113. /  662704. / 1.28 / -273. /   81.
```

```
SECID  AT  DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
 WS EL  /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==========================================================================
AP     AT   38450 /     0 /  17900. /  4287. /  847244. / 1.52 / -284. /  264.
   679.90 /   0.41 /                 /  680.31 /    4.18 /   0.26/          *IS*
--------------------------------------------------------------------------
AQ     AT   39370 /   920 /  17900. /  4738. /  676956. / 2.62 /  341. / 1339.
   680.33 /   0.58 /   0.51 /   0.09 /  680.91 /    3.78 /   0.33 / -0.000  *XS*
--------------------------------------------------------------------------
AR     AT   40535 /  1165 /  17900. /  3984. /  608989. / 1.91 /  454. / 1236.
   681.23 /   0.60 /   0.91 /   0.01 /  681.83 /    4.49 /   0.34 / -0.000  *XS*
--------------------------------------------------------------------------
AS     AT   41710 /  1175 /  17900. /  4873. /  640118. / 1.67 / -292. /  580.
   682.44 /   0.35 /   0.97 /   0.0  /  682.79 /    3.67 /   0.28 / -0.000  *XS*
--------------------------------------------------------------------------
AT     AT   42695 /   985 /  17900. /  3966. /  584267. / 1.52 / -290. /  479.
   683.22 /   0.48 /   0.84 /   0.07 /  683.70 /    4.51 /   0.32 /  0.000  *XS*
--------------------------------------------------------------------------
AU     AT   43850 /  1155 /  17200. /  3462. /  557903. / 1.34 / -185. /  324.
   684.29 /   0.52 /   1.09 /   0.02 /  684.81 /    4.97 /   0.31 / -0.000  *XS*
--------------------------------------------------------------------------
AV     AT   44640 /   790 /  17200. /  3620. /  586832. / 1.31 / -163. /  308.
   685.04 /   0.46 /   0.71 /   0.0  /  685.50 /    4.75 /   0.30 / -0.020  *XS*
--------------------------------------------------------------------------
AW     AT   45540 /   900 /  17200. /  3671. /  738379. / 1.49 / -121. /  349.
   685.63 /   0.51 /   0.61 /   0.02 /  686.14 /    4.69 /   0.29 /  0.000  *XS*
--------------------------------------------------------------------------
AX     AT   46560 /  1020 /  17200. /  4183. /  823172. / 1.42 / -326. /  283.
   686.27 /   0.37 /   0.50 /   0.0  /  686.64 /    4.11 /   0.26 / -0.000  *XS*
--------------------------------------------------------------------------
AY     AT   47625 /  1065 /  17200. /  4017. /  771346. / 1.41 / -295. /  179.
   686.77 /   0.40 /   0.50 /   0.01 /  687.17 /    4.28 /   0.26 /  0.018  *XS*
--------------------------------------------------------------------------
AZ     AT   48610 /   985 /  17200. /  3172. /  622010. / 1.37 / -304. /  120.
   687.27 /   0.63 /   0.61 /   0.11 /  687.89 /    5.42 /   0.32 /  0.005  *XS*
--------------------------------------------------------------------------
BA     AT   49640 /  1030 /  17200. /  3203. /  647615. / 1.39 / -330. /   20.
   688.02 /   0.62 /   0.76 /   0.0  /  688.64 /    5.37 /   0.31 / -0.008  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BA BR AT   49640 /        /  17200. /  2651. /  872421. / 1.00 /   32. /  273.
   688.02 /   0.65 /       ...1...  (-.001)    /    6.49 /   0.32 /          *BO*
--------------------------------------------------------------------------
 NO ROAD OVERFLOW
                                                                          *RG*
--------------------------------------------------------------------------
BB     AT   50090 /   450 /  17200. /  2494. /  498133. / 1.29 / -193. /  112.
   688.27 /   0.95 /   0.41 /   0.16 /  689.22 /    6.90 /   0.42 /  0.002  *AS*
--------------------------------------------------------------------------
```

500-Y

WATER-SURFACE PROFILE FOR: FLINT RIVER HOLTSLAG

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
M = 0.09	E = 0.0	K* = 0.13	2526.	504744.	1.29	-194.	113.	
688.37	0.93			689.30	6.81	0.41		*AS*
END BRIDGE ANALYSIS								
BC AT 51030	940	17200.	3589.	762857.	1.32	-232.	214.	
689.55	0.47	0.72	0.0	690.02	4.79	0.27	-0.000	*XS*
BD AT 51805	775	17200.	3063.	633908.	1.44	-205.	188.	
689.91	0.70	0.47	0.12	690.62	5.62	0.32	0.000	*XS*
BE AT 52605	800	17200.	3201.	717520.	1.30	-12.	334.	
690.55	0.58	0.52	0.0	691.14	5.37	0.29	-0.000	*XS*
BF AT 53400	795	17200.	3226.	760136.	1.27	-23.	289.	
691.01	0.56	0.43	0.0	691.57	5.33	0.27	-0.000	*XS*
BG AT 54355	955	17200.	3787.	866654.	1.39	-15.	396.	
691.55	0.44	0.43	0.0	692.00	4.54	0.24	-0.000	*XS*
BH AT 55510	1155	17200.	3797.	764928.	1.56	-182.	238.	
692.05	0.50	0.52	0.03	692.55	4.53	0.27	0.011	*XS*
BI AT 56410	900	17200.	3751.	701973.	1.93	-264.	248.	
692.48	0.63	0.50	0.07	693.11	4.59	0.30	-0.000	*XS*
BJ AT 57500	1090	17200.	4325.	737464.	1.90	20.	501.	
693.27	0.47	0.62	0.0	693.74	3.98	0.28	-0.000	*XS*
BK AT 58410	910	17200.	3423.	682577.	1.87	17.	510.	
693.67	0.73	0.53	0.13	694.40	5.02	0.31	-0.000	*XS*
BL AT 59060	650	17200.	4424.	780891.	2.01	80.	621.	
694.29	0.47	0.36	0.0	694.77	3.89	0.27	-0.000	*XS*
BM AT 59930	870	17200.	3584.	781784.	1.33	-279.	100.	

500-yr

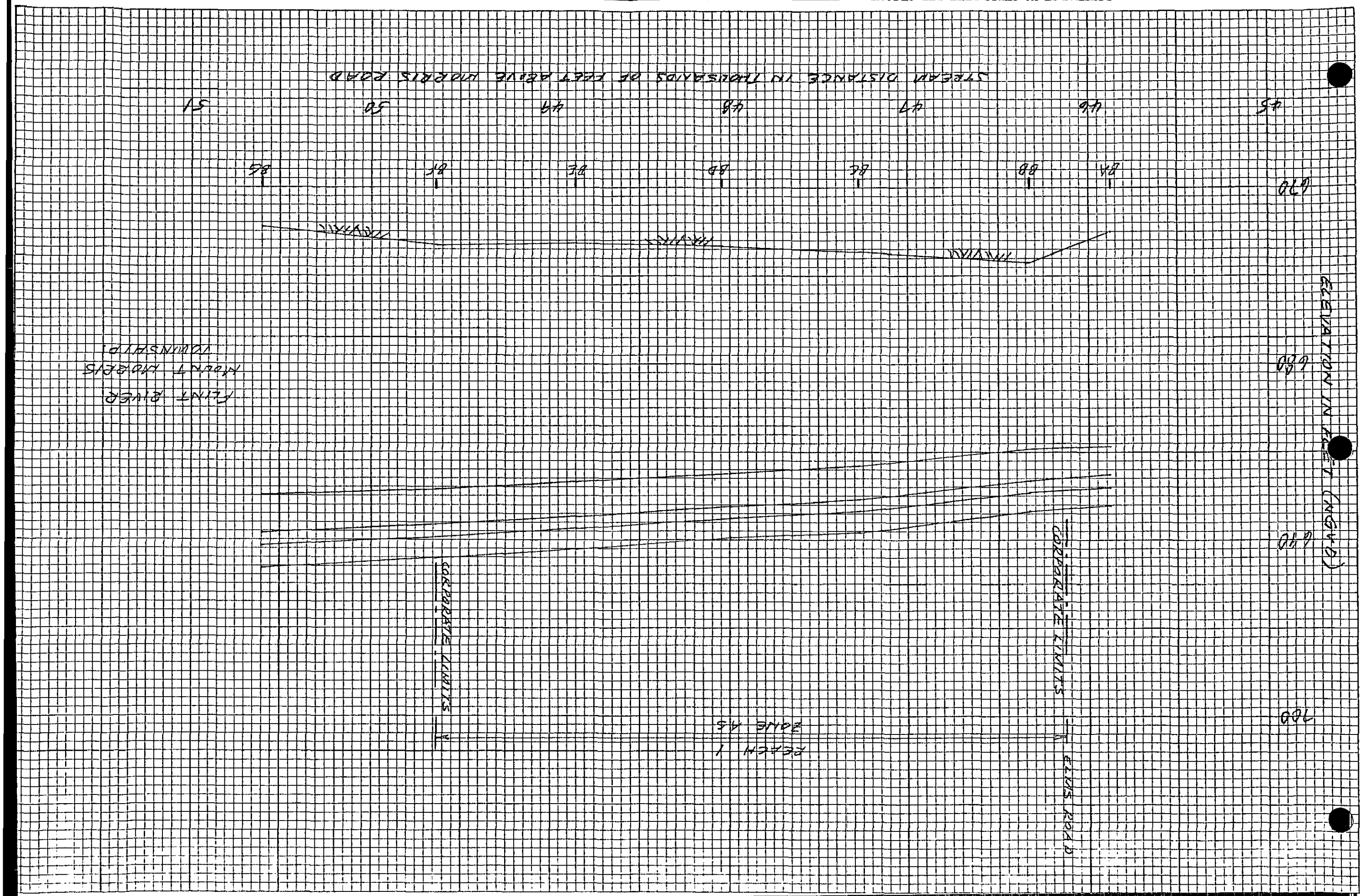
```
==========================================================================
SEC  AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC   *ID*
==========================================================================
AP    AT   38450 /     0 /  14900. /  3645. /  707304. / 1.44 / -270. /  230.
   678.79 /   0.38 /                 /  679.17 /    4.09 /   0.26/          *IS*
--------------------------------------------------------------------------
AQ    AT   39370 /   920 /  14900. /  3261. /  546884. / 1.78 /  836. / 1336.
   679.22 /   0.58 /   0.53 /   0.10 /  679.80 /    4.57 /   0.34 / -0.000  *XS*
--------------------------------------------------------------------------
AR    AT   40535 /  1165 /  14900. /  2965. /  496686. / 1.46 /  735. / 1235.
   680.18 /   0.57 /   0.95 /   0.0  /  680.75 /    5.03 /   0.34 /  0.002  *XS*
--------------------------------------------------------------------------
AS    AT   41710 /  1175 /  14900. /  3451. /  498653. / 1.34 / -290. /  210.
   681.43 /   0.39 /   1.05 /   0.0  /  681.82 /    4.32 /   0.30 /  0.012  *XS*
--------------------------------------------------------------------------
AT    AT   42695 /   985 /  14900. /  2985. /  463845. / 1.32 / -280. /  220.
   682.31 /   0.51 /   0.95 /   0.06 /  682.82 /    4.99 /   0.33 /  0.000  *XS*
--------------------------------------------------------------------------
AU    AT   43850 /  1155 /  14400. /  3054. /  484697. / 1.28 / -135. /  315.
   683.48 /   0.44 /   1.10 /   0.0  /  683.92 /    4.72 /   0.30 / -0.000  *XS*
--------------------------------------------------------------------------
AV    AT   44640 /   790 /  14400. /  3214. /  504896. / 1.29 / -150. /  300.
   684.19 /   0.40 /   0.67 /   0.0  /  684.59 /    4.48 /   0.29 / -0.000  *XS*
--------------------------------------------------------------------------
AW    AT   45540 /   900 /  14400. /  3256. /  640397. / 1.46 / -110. /  340.
   684.75 /   0.44 /   0.58 /   0.02 /  685.19 /    4.42 /   0.28 / -0.000  *XS*
--------------------------------------------------------------------------
AX    AT   46560 /  1020 /  14400. /  3280. /  669689. / 1.26 / -320. /  130.
   685.31 /   0.38 /   0.49 /   0.0  /  685.69 /    4.39 /   0.26 / -0.000  *XS*
--------------------------------------------------------------------------
AY    AT   47625 /  1065 /  14400. /  3387. /  647990. / 1.34 / -275. /  125.
   685.81 /   0.38 /   0.51 /   0.0  /  686.18 /    4.25 /   0.26 / -0.010  *XS*
--------------------------------------------------------------------------
AZ    AT   48610 /   985 /  14400. /  2768. /  532794. / 1.31 / -300. /  100.
   686.31 /   0.55 /   0.59 /   0.09 /  686.86 /    5.20 /   0.31 / -0.004  *XS*
--------------------------------------------------------------------------
BA    AT   49640 /  1030 /  14400. /  2849. /  565472. / 1.33 / -315. /   10.
   687.06 /   0.53 /   0.71 /   0.0  /  687.59 /    5.05 /   0.30 /  0.020  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BA BR AT   49640 /       /  14400. /  2452. /  775354. / 1.00 /   34. /  271.
   687.06 /   0.54 /       ...1...  (-.001)    /    5.87 /   0.30 /          *BO*
--------------------------------------------------------------------------
 NO ROAD OVERFLOW
                                                                          *RG*
--------------------------------------------------------------------------
BB    AT   50090 /   450 /  14400. /  2202. /  431111. / 1.27 / -188. /  102.
   687.29 /   0.84 /   0.38 /   0.16 /  688.13 /    6.54 /   0.40 /  0.000  *AS*
--------------------------------------------------------------------------
```

FW

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 62,DATE= 2/10/77

```
==================================================================================
WATER-SURFACE PROFILE FOR: FLINT RIVER                                  HOLTSLAG
PAGE  2 OF  4
*** FLOODWAY ANALYSIS *** HOR FW
==================================================================================
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
  WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==================================================================================
   M = 0.07 / E = 0.0  / K* = 0.10 /  2221. /  435889. / 1.27 / -188. /  102.
   687.35 /   0.83 /                 /  688.18 /    6.48 /   0.40 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
BC    AT   51030 /   940 /  14400. /  3020. /  646740. / 1.19 / -230. /  120.
   688.45 /   0.42 /   0.69 /   0.0  /  688.87 /    4.77 /   0.26 / -0.000  *XS*
----------------------------------------------------------------------------------
BD    AT   51805 /   775 /  14400. /  2582. /  541995. / 1.29 / -200. /  100.
   688.81 /   0.62 /   0.46 /   0.10 /  689.43 /    5.58 /   0.31 /  0.000  *XS*
----------------------------------------------------------------------------------
BE    AT   52605 /   800 /  14400. /  2747. /  609567. / 1.23 /    0. /  300.
   689.41 /   0.52 /   0.50 /   0.0  /  689.93 /    5.24 /   0.28 / -0.000  *XS*
----------------------------------------------------------------------------------
BF    AT   53400 /   795 /  14400. /  2885. /  663661. / 1.21 /  -19. /  271.
   689.87 /   0.47 /   0.41 /   0.0  /  690.34 /    4.99 /   0.26 /  0.000  *XS*
----------------------------------------------------------------------------------
BG    AT   54355 /   955 /  14400. /  3276. /  749374. / 1.28 /  -10. /  340.
   690.37 /   0.38 /   0.40 /   0.0  /  690.75 /    4.40 /   0.23 /  0.015  *XS*
----------------------------------------------------------------------------------
BH    AT   55510 /  1155 /  14400. /  3163. /  641864. / 1.43 / -120. /  230.
   690.83 /   0.46 /   0.50 /   0.04 /  691.29 /    4.55 /   0.27 / -0.000  *XS*
----------------------------------------------------------------------------------
BI    AT   56410 /   900 /  14400. /  3057. /  593867. / 1.67 / -160. /  240.
   691.26 /   0.58 /   0.49 /   0.06 /  691.84 /    4.71 /   0.29 / -0.000  *XS*
----------------------------------------------------------------------------------
BJ    AT   57500 /  1090 /  14400. /  3581. /  620504. / 1.75 /   25. /  425.
   692.01 /   0.44 /   0.61 /   0.0  /  692.45 /    4.02 /   0.27 / -0.001  *XS*
----------------------------------------------------------------------------------
BK    AT   58410 /   910 /  14400. /  2830. /  584236. / 1.62 /   45. /  445.
   692.43 /   0.65 /   0.52 /   0.11 /  693.08 /    5.09 /   0.30 / -0.000  *XS*
----------------------------------------------------------------------------------
BL    AT   59060 /   650 /  14400. /  3339. /  612085. / 1.81 /  165. /  615.
   692.93 /   0.52 /   0.38 /   0.0  /  693.45 /    4.31 /   0.28 / -0.006  *XS*
```

FW


ELEVATION IN FEET (NGVD)
680
690
700
710
720
730
CORPORATE LIMITS
ELLIS ROAD
CORPORATE LIMITS
ZONE AE
ZONE A
FLINT RIVER
MOUNT MORRIS
TOWNSHIP
STREAM DISTANCE IN THOUSANDS OF FEET ABOVE MORRIS ROAD
45
46
47
48
49
50
51
84
86
88
90
92
94
96
98

```
1     1 SHIAWASSEE BYRON TO MC CASLIN RD          RWL DJH 68  5  2  5 12
2     2  82870  82940  82970  82950  82960
3   100     C 1   8  3  821    3800 99 99
4   105   1530   2120   2900   2370   2370
5   110       0  1  8350  120  1  8318  148  1  8318  150  2  8208  350  2  8201
5   111     450  2  8208  460  3  8288  480  3  8388
6   129  1  2 060 060  1  2 055 055  1  2 080 080
3   200     D 0   8  3  822    4800 99 99
5   210       0  1  8358   70  1  8300  110  2  8215  220  2  8218  220  2  8215
5   211     225  3  8308  330  3  8308  880  3  8400
6   229  1  2 058 058  1  2 060 060  1  2 058 058
3   300     E 0   9  3  823    5800 99 99
5   310     -20  1  8400  100  1  8338  120  1  8300  122  2  8224  190  2  8219
5   311     240  2  8224  245  3  8273  440  3  8300  580  3  8400
6   329  1  2 060 060  1  2 057 057  1  2 100 100
3   400     F 0   8  3  823    6240 99 99
5   410       0  1  8400   30  1  8300   34  2  8228   84  2  8224  110  2  8228   A
5   411     115  3  8288  420  3  8300  480  3  8400
6   429  1  2 055 055  1  2 050 050  1  2 120 120
3   500     G 0  15  3  822    6690 99 99
5   510       0  1  8360   28  1  8340   36  1  8300   43  1  8280   53  2  8260
5   511      55  2  8218   78  2  8210   92  2  8218   93  2  8240   96  3  8250   B
5   512     100  3  8260  412  3  8280  424  3  8300  514  3  8320  548  3  8340
6   529  1  2 090 090  1  2 050 050  1  2 130 130
3   600     H 0  15  3  823    7290 99 99
5   610       0  1  8340   72  1  8320   74  1  8300   76  1  8280   83  2  8260
5   611      88  2  8240   90  2  8223  110  2  8225  112  2  8240  120  3  8260   C
5   612     150  3  8260  163  3  8280  168  3  8300  174  3  8320  203  3  8340
6   629  1  2 055 055  1  2 050 050  1  2 120 120
3   700    HH 0  18  3  822    7870 99 99
5   710       0  1  8400   28  1  8300   41  1  8280  102  1  8280  188  1  8280
5   711     208  1  8260  214  2  8240  218  2  8221  250  2  8216  273  2  8221   D
5   712     275  2  8240  280  3  8240  288  3  8260  560  3  8280  573  3  8300
5   713     600  3  8320  640  3  8340  700  3  8400
6   729  1  2 100 100  1  2 055 055  1  2 120 120
3   800     I 0  17  3  819    8360 99 99
5   810       0  1  8380   10  1  8360   42  1  8340   55  1  8320   62  1  8300
5   811      72  2  8280   79  2  8260   82  2  8240   85  2  8220  106  2  8186   E
5   812     126  2  8220  128  3  8240  134  3  8260  420  3  8280  506  3  8300
5   813     540  3  8320  560  3  8340
6   829  1  2 055 055  1  2 050 050  1  2 090 090
3   900 BR  I 2  14  1  822    8360        0  8324 1 1
5   910       0  1  8324    0  1  8270    5  1  8253   10  1  8222   15  1  8220   BRIDGE
5   911      20  1  8213   25  1  8209   30  1  8220   35  1  8225   40  1  8231
5   912      45  1  8253   47  1  8254   47  1  8324    0 -9  8324
```

```
929  1   045 045
1000 RD  I 4   9  3   25          1  3          2 2 2                1
1010     -80  1  8347  -50  2  8335    0  2  8334    1  3  8333   60  3  8310
1011      86  3  8298  240  3  8297  290  3  8297  290  3  8350
1100     J 5  21  3  822    8410  1  3
1110       0  1  8400   28  1  8300   40  1  8258   44  2  8245   51  2  8223
1111      55  2  8220   59  2  8218   63  2  8220   67  2  8220   71  2  8222
1112      75  2  8225   79  2  8231   83  2  8234   87  2  8238   91  2  8250
1113      92  3  8260  570  3  8280  580  3  8300  612  3  8320  770  3  8340
1114     780  3  8360
1129  1  2 060 060  1  2 050 050  1  2 090 090
1200    JJ 0  14  3  823    8940 99 99
1210       0  1  8400   12  1  8300   28  1  8280   93  2  8260   98  2  8240
1211     100  2  8230  130  2  8227  151  2  8230  161  3  8260  306  3  8280
1213     533  3  8300  568  3  8320  733  3  8340  955  3  8360
1229  1  2 090 090  1  2 050 050  1  2 100 100
1300     K 0  18  3  825    9630 99 99
1310       0  1  8400   12  1  8380   31  1  8360   64  1  8340  154  1  8320
1311     283  1  8300  295  1  8280  344  1  8260  402  2  8260  412  2  8243
1312     466  2  8243  470  3  8260  482  3  8280  522  3  8300  542  3  8320
1313     566  3  8340  700  3  8360  810  3  8380
1329  1  2 080 080  1  2 040 040  1  2 070 070
1400     L 0  19  3  825   10430 99 99
1410       0  1  8400   22  1  8380   48  1  8360   77  1  8340  133  1  8320
1411     151  1  8300  168  2  8280  172  2  8260  174  2  8248  220  2  8248
1412     232  2  8260  282  3  8260  312  3  8280  325  3  8300  351  3  8320
1413     398  3  8340  426  3  8360  443  3  8380  458  3  8400
1429  1  2 060 060  1  2 040 040  1  2 070 070
1500    LL 0  16  3  825   10740 99 99
1510       0  1  8400   13  1  8380   33  1  8300   38  2  8280   49  2  8260
1511      51  2  8248  103  2  8248  106  2  8260  122  2  8280  130  3  8280
1512     217  3  8300  247  3  8320  302  3  8340  333  3  8360  358  3  8380
1513     368  3  8400
1529  1  2 060 060  1  2 040 040  1  2 080 080
1600     M 0  18  3  825   11130 99 99
1610       0  1  8400   32  1  8380   68  1  8360  142  1  8340  149  2  8320
1611     156  2  8295  170  2  8280  178  2  8260  180  2  8247  230  2  8247
1612     236  2  8260  253  3  8280  283  3  8300  297  3  8320  304  3  8340
1613     323  3  8360  338  3  8380  354  3  8400
1629  1  2 060 060  1  2 045 045  1  2 065 065
1700    MM 0  15  3  827   11610 99 99
1710       0  1  8400   42  1  8380   54  1  8360   92  1  8340  172  1  8320
1711     182  1  8300  260  1  8300  283  1  8300  293  2  8280  302  2  8260
1712     342  2  8260  346  2  8280  353  2  8300  355  3  8320  373  3  8400
1729  1  2 060 060  1  2 048 048  1  2 050 050
```

F

G

H

I

J

K

L

```
1800     N 0  16  3  827   11960 99 99
1810       0  1  8400    3  1  8380   18  1  8300   53  2  8300   63  2  8300
1811      72  2  8299   78  2  8262  119  2  8262  122  2  8270  129  2  8286
1812     200  3  8300  314  3  8320  343  3  8340  396  3  8360  420  3  8380
1813     504  3  8400
1829  1  2 070 070  1  2 045 045  1  2 090 090
1900    NN 0  15  3  827   12380 99 99
1910       0  1  8400    8  2  8300   13  2  8280   15  2  8260   18  2  8258
1911      64  2  8258   66  2  8260   67  2  8280  102  3  8300  163  3  8300
1912     173  3  8320  202  3  8340  385  3  8360  492  3  8380  603  3  8400
1929  1  2 060 060  1  2 050 050  1  2 080 080
2000     O 0  14  3  826   12810 99 99
2010       0  1  8464    8  1  8400   20  2  8300   22  2  8280   24  2  8255
2011      61  2  8255   68  2  8260   98  3  8280  153  3  8300  180  3  8320
2012     285  3  8340  442  3  8360  536  3  8380  733  3  8400
2029  1  2 090 090  1  2 047 047  1  2 120 120
2100     P 0  15  3  826   13630 99 99
2110       0  1  8420   28  1  8400   52  1  8380   90  1  8360  210  2  8363
2111     219  2  8290  221  2  8260  246  2  8250  273  2  8280  290  3  8300
2112     370  3  8320  398  3  8340  428  3  8360  447  3  8380  472  3  8400
2129  1  2 080 080  1  2 046 046  1  2 100 100
2200    PP 0  18  3  826   14720 99 99
2210       0  1  8400   17  1  8380   78  1  8360  414  1  8340  427  1  8300
2211     432  2  8280  442  2  8260  448  2  8256  486  2  8256  488  2  8260
2212     498  3  8280  630  3  8300  768  3  8300  830  3  8320  837  3  8340
2213     846  3  8360  851  3  8380  862  3  8400
2229  1  2 080 080  1  2 050 050  1  2 120 120
2300     Q 0  15  3  826   15180 99 99
2310       0  1  8400   15  1  8380   52  1  8360  341  1  8340  370  1  8320
2311     450  2  8300  464  2  8280  466  2  8259  506  2  8259  508  2  8280
2312     526  2  8300  554  3  8320  600  3  8340  640  3  8360  900  3  8395
2329  1  2 070 070  1  2 050 050  1  2 120 120
2400     R 0  13  3  827   15990 99 99
2410       2  1  8400   23  2  8300   32  2  8280   34  2  8263   70  2  8263
2411      72  2  8280   85  2  8300  256  3  8320  355  3  8340  445  3  8360
2412     752  3  8361  886  3  8380 1038  3  8400
2429  1  2 060 060  1  2 050 050  1  2 120 120
2500     S 0  20  3  828   17180 99 99
2510       0  1  8400    4  1  8380   38  1  8360   55  1  8340   65  1  8320
2511     213  1  8300  240  1  8280  310  1  8280  320  1  8300  930  2  8300
2512     944  2  8280  947  2  8270  997  2  8270 1000  2  8280 1010  3  8300
2513    1014  3  8320 1026  3  8340 1032  3  8360 1040  3  8380 1058  3  8400
2529  1  2 100 100  1  2 050 050  1  2 100 100
2600    SS 0  25  3  828   18100 99 99
2610      20  1  8400   32  1  8380   52  1  8360   67  1  8340   76  1  8320
```

M

N

Ø

P

Q

R

S

T

U

```
2611      50  1  8320  172  1  8340  178  1  8360  193  1  8362  224  1  8360
2612     228  1  8340  242  1  8320  283  1  8300  308  1  8300  512  2  8300   U
2613     520  2  8280  522  2  8276  570  2  8276  576  2  8280  586  2  8300
2614     650  3  8320 1060  3  8340 1110  3  8360 1168  3  8380 1204  3  8400
2629  1  2 100 100  1  2 049 049  1  2 060 060
2700     T 0  14  3  829   19040 99 99
2710       0  1  8400  120  1  8380  198  1  8360  388  1  8340  440  2  8320   V
2711     478  2  8320  495  2  8300  498  2  8282  547  2  8282  562  2  8340
2712     567  2  8360  586  3  8380  626  3  8400  671  3  8420
2729  1  2 048 048  1  2 045 045  1  2 043 043
2750    TT 0  14  3  829   19330 99 99
2761     -23  1  8400  102  1  8380  142  1  8360  177  1  8340  186  1  8320   W
2762     196  2  8300  198  2  8282  244  2  8282  246  2  8300  256  3  8320
2763     284  3  8340  288  3  8360  297  3  8380  313  3  8400
2770  1  2 060 060  1  2 045 045  1  2 070 070
2780   TTT 0  13  3  829   19840 99 99
2781       0  1  8400   14  1  8380   22  1  8360   43  1  8340   51  2  8320   X
2782      60  2  8300   62  2  8282   96  2  8282   97  2  8300  107  3  8320
2783     178  3  8360  196  3  8380  232  3  8400
2789  1  2 060 060  1  2 045 045  1  2 060 060
2800     U 0  14  3  829   19920 99 99
2810       0  1  8400   17  1  8380   26  1  8360   30  1  8340   34  1  8320   Y
2811      40  2  8300   42  2  8282   80  2  8282   82  2  8300   90  2  8320
2812      98  3  8340  102  3  8360  115  3  8380  122  3  8400
2829  1  2 050 050  1  2 044 044  1  2 050 050
2900 HR  U 2  12  1  829   19920        0  8360 3 1
2910       0  1  8360    0  1  8298    5  1  8295   10  1  8293   15  1  8292
2911      20  1  8287   25  1  8288   30  1  8298   35  1  8291   40  1  8288
2912      40  1  8360    0 -9  8360
2929  1  2 042 042
3000     V 5  19  3  828   19970  1  3
3011     -40  1  8400  -30  1  8380  -25  1  8360  -18  1  8348    1  2  8305
3012       5  2  8293    9  2  8289   15  2  8282   17  2  8279   23  2  8279   Z
3013      29  2  8279   35  2  8281   41  3  8295   43  3  8303   53  3  8334
3014      63  3  8354   73  3  8350   80  3  8380   90  3  8400
3029  1  2 050 050  1  2 045 045  1  2 060 060
3050   VIV 0  13  3  829   20050 99 99
3061       0  1  8420    7  1  8380   12  1  8360   24  1  8340   32  2  8300   AA
3062      33  2  8280   72  2  8280   74  2  8300   78  3  8320  140  3  8340
3063     173  3  8360  207  3  8380  222  3  8420
3069  1  2 050 050  1  2 045 045  1  2 060 060
3100    VV 0  15  3  829   20640 99 99
3110       0  1  8460   44  1  8440   52  1  8400   61  2  8320   72  2  8300
3111      75  2  8285  108  2  8285  110  2  8300  122  3  8320  266  3  8340   AB
3112     288  3  8360  351  3  8380  392  3  8400  427  3  8420  478  3  8440
```

```
6  3129  1   060 060  1  2 050 050  1  2 070 070
3  3200     W 0  17  3  830   21290 99 99
5  3210       0  1  8420  220  1  8400  232  1  8380  236  1  8360  245  1  8340
5  3211     276  1  8340  283  2  8360  324  2  8332  328  2  8306  354  2  8291   AC
5  3212     380  2  8306  388  3  8337  390  3  8340  396  3  8360  406  3  8380
5  3213     412  3  8400  415  3  8420
6  3229  1  2 080 080  1  2 050 050  1  2 080 080
3  3300    WW 0  15  3  830   22090 99 99
5  3310     100  1  8420  140  1  8400  193  1  8380  264  1  8360  330  1  8360
5  3311     338  2  8340  348  2  8320  352  2  8300  375  2  8290  390  2  8306   AD
5  3312     406  3  8320  577  3  8340  693  3  8360  712  3  8400  732  3  8440
6  3329  1  2 080 080  1  2 050 050  1  2 100 100
3  3400     X 0  12  3  829   22420 99 99
5  3410       0  1  8430   28  1  8409   38  2  8380   52  2  8308   78  2  8289
5  3411     110  2  8308  118  3  8327  200  3  8340  510  3  8360  553  3  8400   AE
5  3412     582  3  8420  593  3  8440
5  3429  1  2 100 100  1  2 050 050  1  2 070 070
3  3500    XX 0  15  3  830   23340 99 99
5  3510       0  1  8430   52  1  8420  180  1  8400  328  1  8380  548  1  8360
5  3511     552  2  8340  608  2  8320  610  2  8310  656  2  8295  690  2  8310   AF
5  3512     695  3  8320  736  3  8340  918  3  8360  926  3  8400  939  3  8500
5  3529  1  2 120 120  1  2 050 050  1  2 080 080
3  3600     Y 0  16  3  831   23900 99 99
5  3610       0  1  8455   23  1  8440   82  1  8420   94  1  8400  122  1  8380
5  3611     234  1  8360  238  2  8340  256  2  8320  258  2  8300  290  2  8300   AG
5  3612     293  2  8320  333  3  8340  657  3  8360  691  3  8380  700  3  8400
5  3613     713  3  8500
5  3629  1  2 100 100  1  2 050 050  1  2 100 100
3  3700    YY 0  17  3  831   24650 99 99
5  3710       0  1  8440   48  1  8420   92  1  8400  134  1  8380  152  1  8360
5  3711     265  1  8340  318  2  8340  363  2  8320  365  2  8304  412  2  8304   AH
5  3712     416  2  8320  426  3  8340  662  3  8340  700  3  8360  712  3  8380
5  3713     724  3  8400  747  3  8500
5  3729  1  2 090 090  1  2 050 050  1  2 100 100
3  3800     Z 0  18  3  831   25100 99 99
5  3810       0  1  8460   28  1  8440   67  1  8420  119  1  8400  157  1  8380
5  3811     184  1  8360  583  2  8340  594  2  8320  597  2  8309  656  2  8309   AI
5  3612     658  2  8320  670  2  8340  673  3  8360  682  3  8380  692  3  8400
5  3813     706  3  8420  722  3  8440  758  3  8500
5  3829  1  2 100 100  1  2 048 048  1  2 060 060
3  3900    1A 0  18  3  832   25910 99 99
5  3910       0  1  8460   26  1  8420   47  1  8400   59  1  8360   76  1  8340
5  3911      79  2  8333   99  2  8326  122  2  8316  136  2  8326  143  2  8339   AJ
5  3912     157  3  8350  300  3  8360  500  3  8360  560  3  8380  610  3  8400
5  3913     660  3  8420  760  3  8420  772  3  8440
```

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6  3929  1  2 054 054  1  2 048 048  1  2 090 090
3  4000   1  0  21  3  832   26820 99 99
5  4010      0  1  8440   30  1  8420  100  1  8400  110  1  8380  118  1  8360
5  4011    124  1  8360  180  1  8350  192  2  8340  194  2  8316  254  2  8316
5  4012    258  2  8340  262  3  8340  347  3  8360  640  3  8370  680  3  8360
5  4013    800  3  8360  880  3  8380  930  3  8400  950  3  8420  975  3  8420
5  4014   1020  3  8420
6  4029  1  2 100 100  1  2 048 048  1  2 090 090
3  4100   1H 0  13  3  832   27490 99 99
5  4110      0  1  8420   77  1  8400  138  1  8380  572  1  8360  574  2  8360
5  4111    592  2  8340  594  2  8316  640  2  8316  642  2  8340  646  2  8360
5  4112    662  3  8400  668  3  8420  760  3  8440
6  4129  1  2 090 090  1  2 050 050  1  2 060 060
3  4200   1C 0  13  3  832   28330 99 99
5  4210      0  1  8440  120  1  8420  202  1  8400  298  1  8380  318  1  8360
5  4211    333  2  8340  336  2  8319  422  2  8319  425  2  8340  436  3  8380
5  4212    446  3  8400  458  3  8420  474  3  8440
6  4229  1  2 070 070  1  2 048 048  1  2 080 080
3  4300   1D 0  14  3  833   29100 99 99
5  4310      0  1  8440  178  1  8420  253  1  8400  300  1  8380  310  1  8360
5  4311    316  2  8347  342  2  8334  374  2  8314  407  2  8334  408  2  8340
5  4312    432  3  8359  440  3  8400  450  3  8420  474  3  8440
6  4329  1  2 090 090  1  2 047 047  1  2 050 050
3  4400   1E 0  15  3  833   29900 99 99
5  4410      0  1  8462  165  1  8460  188  1  8440  200  1  8420  210  1  8400
5  4411    224  2  8340  260  2  8320  288  2  8340  303  3  8360  342  3  8360
5  4412    368  3  8360  436  3  8380  474  3  8400  540  3  8420  638  3  8440
6  4429  1  2 060 060  1  2 045 045  1  2 070 070
3  4440   1EE 0  15  3  833   30270 99 99
5  4451      0  1  8460   23  1  8440   32  1  8420   41  1  8400   50  1  8380
5  4452     58  2  8360   60  2  8320  102  2  8320  104  3  8330  178  3  8340
5  4453    180  3  8360  198  3  8380  216  3  8400  304  3  8420  512  3  8440
6  4459  1  2 060 060  1  2 045 045  1  2 070 070
3  4500   1F 0  15  3  832   30390 99 99
5  4510      0  1  8440   22  1  8420   31  1  8400   42  1  8380   51  2  8360
5  4511     53  2  8340   55  2  8318  104  2  8318  106  2  8340  108  3  8380
5  4512    165  3  8380  208  3  8400  222  3  8400  314  3  8420  540  3  8440
6  4529  1  2 050 050  1  2 045 045  1  2 065 065
3  4600 BR 1F 2  11  1  832   30390        0  8397 3 1
5  4610      0  1  8397    0  1  8316    5  1  8316   10  1  8324   15  1  8330
5  4611     20  1  8330   25  1  8328   30  1  8324   32  1  8324   32  1  8397
5  4612      0 -9  8397
6  4629  1  2 043 043
3  4700 BD 1F 4   9  3   30          1  3          2 2 2              1
5  4710   -300  1  8452 -174  1  8439  -84  1  8429  -20  2  8423   18  2  8421
```

AK

AL

AM

AN

AØ

AP

AQ

```
5  4711     19  3  8421  138  3  8410  302  3  8432  426  3  8451
3  4800      5 21  3  832   30460  1  3
5  4810    -35  1  8440   -5  1  8410   15  1  8364   26  1  8338   35  1  8325
5  4811     36  2  8325   45  2  8321   50  2  8319   55  2  8318   60  2  8322
5  4812     65  2  8323   69  2  8325   70  3  8325   75  3  8326   80  3  8338
5  4813     90  3  8345  110  3  8371  170  3  8380  200  3  8400  220  3  8420
5  4814    235  3  8440
6  4829  1  2 070 070  1  2 045 045  1  2 065 065
3  4850   1GG 0  14  3  833   30610 99 99
5  4851      0  1  8460   34  1  8440   78  1  8420  106  1  8400  116  1  8380
5  4852    124  1  8340  136  2  8320  196  2  8320  200  3  8340  238  3  8360
5  4853    282  3  8380  304  3  8400  373  3  8420  424  3  8440
6  4859  1  2 070 070  1  2 046 046  1  2 065 065
3  4900   1H 0  17  3  833   31380 99 99
5  4910      0  1  8460   72  1  8440   98  1  8420  113  1  8400  124  1  8380
5  4911    132  2  8360  142  2  8340  144  2  8327  174  2  8327  176  2  8340
5  4912    188  3  8360  250  3  8360  322  3  8380  334  3  8400  361  3  8420
5  4913    462  3  8440  488  3  8460
6  4929  1  2 060 060  1  2 047 047  1  2 070 070
3  5000   1T 0  15  3  834   32210 99 99
5  5010      0  1  8460   76  1  8440  216  1  8420  282  1  8400  298  1  8380
5  5011    310  2  8360  322  2  8351  360  2  8333  392  2  8351  417  2  8373
5  5012    427  2  8380  444  3  8400  458  3  8420  472  3  8440  491  3  8460
6  5029  1  2 070 070  1  2 045 045  1  2 050 050
3  5100   1J 0  16  3  834   33220 99 99
5  5110      0  1  8458   63  1  8440  116  1  8420  202  1  8400  272  1  8380
5  5111    282  1  8360  354  2  8340  356  2  8334  420  2  8334  423  2  8340
5  5112    436  3  8360  452  3  8380  480  3  8400  498  3  8420  520  3  8440
5  5113    550  3  8460
6  5129  1  2 100 100  1  2 055 055  1  2 070 070
3  5200   1K 0  20  3  834   34320 99 99
5  5210     16  1  8460   33  1  8440   51  1  8420  102  1  8420  147  1  8440
5  5211    216  1  8440  225  1  8420  232  1  8400  243  2  8360  262  2  8340
5  5212    264  2  8334  322  2  8334  326  2  8340  337  3  8360  700  3  8365
5  5213    700  3  8450 1040  3  8450 1062  3  8450 1085  3  8450 1100  3  8460
6  5229  1  2 060 060  1  2 055 055  1  2 120 120
3  5300   1L 0  20  3  834   35040 99 99
5  5310      0  1  8480   18  1  8460   67  1  8440  275  1  8440  338  1  8420
5  5311    353  1  8400  404  1  8380  421  2  8380  444  2  8360  448  2  8340
5  5312    450  2  8336  508  2  8336  510  2  8340  533  3  8360  543  3  8380
5  5313    597  3  8400  606  3  8420  612  3  8440  642  3  8460  660  3  8480
6  5329  1  2 100 100  1  2 060 060  1  2 080 080
3  5400   1M 0  15  3  835   35520 99 99
5  5410      0  1  8500    8  1  8400   21  1  8380   37  2  8360   38  2  8358
5  5411     42  2  8340   65  2  8340   73  2  8358  102  3  8380  164  3  8400
```

AR

AS

AT

AU

AV

AW

AX

AY

```
5  5412     93  3  8420  232  3  8440  260  3  8460  283  3  8480  303  3  8500
6  5429  1  2 090 090  1  2 050 050  1  2 070 070
3  5500   1MM 0  13  3  834   35890 99 99
5  5510      0  1  8500   23  1  8480   38  1  8460   63  1  8440  102  1  8420
5  5511    112  1  8400  188  2  8380  253  2  8362  274  2  8339  292  2  8361
5  5512    322  3  8380  372  3  8400  393  3  8500
6  5529  1  2 090 090  1  2 050 050  1  2 065 065
3  5600  1MMM 0  14  3  835   36450 99 99
5  5610      0  1  8500   18  1  8480   33  1  8460   53  1  8440   93  1  8420
5  5611    118  1  8400  480  1  8390  722  1  8380  752  2  8362  782  2  8341
5  5612    800  2  8360  802  2  8380  808  3  8400  830  3  8500
6  5629  1  2 100 100  1  2 050 050  1  2 060 060
3  5700    1N 0  15  3  835   37140 99 99
5  5710     15  1  8500   32  1  8480   48  1  8460   68  1  8440  113  1  8420
5  5711    123  1  8400  160  2  8380  175  2  8363  190  2  8342  208  2  8363
5  5712    232  3  8380  372  3  8400  388  3  8420  397  3  8440  416  3  8500
6  5729  1  2 080 080  1  2 050 050  1  2 070 070
3  5800    1O 0  14  3  835   37400 99 99
5  5810      0  1  8500    6  1  8400   14  2  8380   27  2  8364   53  2  8343
5  5811     78  2  8364   88  2  8380   90  3  8380  196  3  8400  292  3  8420
5  5812    303  3  8440  314  3  8460  323  3  8480  334  3  8500
6  5829  1  2 070 070  1  2 050 050  1  2 070 070
3  5900    1P 0  13  3  835   37790 99 99
5  5910      0  1  8500    9  1  8480   18  1  8460   43  1  8440   72  1  8420
5  5911    102  1  8400  258  2  8380  274  2  8366  297  2  8344  320  2  8366
5  5912    324  3  8380  341  3  8400  348  3  8500
5  5929  1  2 080 080  1  2 046 046  1  2 060 060
3  6000    1Q 0  14  3  835   38290 99 99
5  6010      0  1  8500    7  1  8400   13  2  8380   27  2  8367   56  2  8346
5  6011     92  2  8367   95  3  8370  125  3  8380  192  3  8400  218  3  8420
5  6012    258  3  8440  307  3  8460  367  3  8480  388  3  8500
6  6029  1  2 090 090  1  2 050 050  1  2 150 150
3  6100    1R 0  18  3  835   38980 99 99
5  6110      0  1  8500    4  1  8480   24  1  8460   42  1  8440   62  1  8420
5  6111     72  2  8400   89  2  8380   91  2  8369  102  2  8349  130  2  8369
5  6112    132  3  8380  276  3  8380  291  3  8400  308  3  8420  314  3  8440
5  6113    325  3  8460  343  3  8480  358  3  8500
6  6129  1  2 100 100  1  2 050 050  1  2 180 180
3  6200   1RR 0  25  3  836   39460 99 99
5  6210      0  1  8500   11  1  8480   22  1  8460   36  1  8440   46  1  8420
5  6211     78  1  8420   86  1  8440  128  1  8440  148  1  8420  167  1  8400
5  6212    252  1  8390  254  1  8390  264  1  8390  370  1  8390  558  2  8390
5  6213    563  2  8369  584  2  8349  602  2  8369  604  3  8380  642  3  8400
5  6214    650  3  8420  666  3  8490  673  3  8460  678  3  8480  683  3  8500
6  6229  1  2 150 150  1  2 050 050  1  2 120 120
```

AZ

BA

BB

BC

BD

BE

BF

BG

```
1      1 S AWASSEE RIVER  MCCASLIN RD - HOGAN RD HO SLAG 50  5 02 05 12
2      2  84380  84505  84629  84548  84558
3  6300     1S 1  10  3  835   39950 99 99
4  6304   1530   2120   2900   2370   2370
5  6311     500  1  8500  500  1  8390  952  2  8390  962  2  8376  980  2  8344
5  6312     994  2  8376  998  2  8380 1010  3  8400 1018  3  8420 1045  3  8500
6  6329  1  2 150 150  1  2 055 055  1  2 065 065
3  6350 1SS   1   9  3  836   40250  1  3
4  6354    550    580    790    650    650
5  6361       0  1  8500    0  1  8390  155  2  8390  160  2  8344  180  2  8344
5  6362     183  3  8380  215  3  8400  250  3  8480  270  3  8500
6  6369  1  2 150 150  1  2 050 050  1  2 065 065
3  6400    1T 0  23  3  835   40690 99 99
5  6410       0  1  8500   24  1  8480   38  1  8460   52  1  8440  104  1  8420
5  6411     120  1  8400  136  2  8380  142  2  8370  147  2  8355  152  2  8346
5  6412     157  2  8346  162  2  8346  167  2  8344  172  2  8344  177  2  8346
5  6413     182  2  8380  197  3  8400  360  3  8400  388  3  8420  420  3  8440
5  6414     434  3  8460  448  3  8480  458  3  8500
6  6429  1  2 090 090  1  2 050 050  1  2 080 080
3  6500 RR 1T 2  12  1  835   40690        15  8425 3 1
5  6510       0  1  8425    0  1  8366    5  1  8355   10  1  8346   15  1  8346
5  6511      20  1  8346   25  1  8344   30  1  8344   35  1  8346   40  1  8376
5  6512      40  1  8425    0 -9  8425
6  6529  1  2 046 046
3  6600 RD 1T 4  20  3   30          1  3          1 1 1                1
5  6610     -90  1  8500  -75  1  8458  -26  1  8450  -25  2  8449    0  2  8450
5  6611      25  2  8453   26  3  8452   40  3  8450   60  3  8448   80  3  8445
5  6612      98  3  8443  120  3  8442  140  3  8441  160  3  8440  170  3  8439
5  6613     180  3  8441  200  3  8445  220  3  8450  236  3  8453  270  3  8480
3  6700    1U 5  22  3  834   40750  1  3
5  6710     -50  1  8500  -46  1  8480  -34  1  8460    0  1  8429   12  1  8401
5  6711      28  2  8376   32  2  8362   36  2  8352   40  2  8348   44  2  8344
5  6712      56  2  8339   66  2  8348   68  3  8350   70  3  8353   75  3  8367
5  6713     105  3  8400  125  3  8391  280  3  8400  292  3  8420  300  3  8440
5  6714     310  3  8460  316  3  8480
6  6729  1  2 050 050  1  2 045 045  1  2 090 090
3  6800   1UU 0  15  3  836   41240 99 99
5  6810     205  1  8500  228  1  8420  242  1  8400  320  1  8394  448  1  8380
5  6811     458  2  8360  482  2  8350  510  2  8360  515  3  8380  532  3  8400
5  6812     552  3  8420  562  3  8440  573  3  8460  584  3  8480  592  3  8500
6  6829  1  2 150 150  1  2 055 055  1  2 080 080
3  6900    1V 0  14  3  836   41690 99 99
5  6911     300  1  8500  300  1  8400  470  1  8399  472  2  8380  475  2  8360
5  6912     503  2  8354  512  2  8360  526  3  8380  564  3  8400  580  3  8420
5  6913     634  3  8440  692  3  8460  712  3  8480  728  3  8500
```

BH

BI

BJ

BK

BL

BM

```
6  6929  1  2 150 150  1  2 055 055  1  2 080 080
3  6950 1VV  1  15  3  838   41820  1  3
4  6954    420    580    790    650    650
5  6960      0  1  8490  115  1  8480  130  1  8460  140  1  8440  170  1  8420
5  6961    190  1  8400  220  2  8380  225  2  8355  260  2  8355  265  3  8380
5  6962    360  3  8400  390  3  8420  440  3  8440  500  3  8460  515  3  8480
6  6963  1  2 150 150  1  2 055 055  1  2 080 080
3  7000    1W 0  10  3  837   42400 99 99
5  7012    1300  1  8408 1700  1  8406 1710  2  8400 1718  2  8380 1742  2  8365
5  7013    1762  2  8380 1772  3  8400 1800  3  8500 1815  3  8520 1828  3  8540
6  7029  1  2 150 150  1  2 060 060  1  2 070 070
3  7100    1X 0  15  3  837   43520 99 99
5  7111    600  1  8420  750  1  8408 1020  1  8408 1028  2  8400 1033  2  8380
5  7112   1053  2  8365 1073  2  8385 1090  3  8400 1108  3  8420 1138  3  8440
5  7113   1200  3  8460 1378  3  8480 1415  3  8500 1432  3  8520 1451  3  8540
6  7129  1  2 150 150  1  2 060 060  1  2 150 150
3  7200    1Y 0  17  3  838   45200 99 99
5  7210     24  1  8540   40  1  8520   52  1  8500   60  1  8480   64  1  8460
5  7211     82  1  8440  148  1  8420  253  1  8400  254  2  8400  268  2  8380
5  7212    288  2  8372  313  2  8380  330  3  8400  482  3  8460  492  3  8500
5  7213    563  3  8500  600  3  8520
6  7229  1  2 150 150  1  2 050 050  1  2 120 120
3  7300    1Z 0  18  3  838   45890 99 99
5  7310      0  1  8520   90  1  8500  116  1  8480  118  1  8460  126  1  8440
5  7311    132  1  8420  141  2  8400  148  2  8380  172  2  8376  188  3  8380
5  7312    200  3  8400  250  3  8410  402  3  8420  408  3  8440  418  3  8460
5  7313    428  3  8480  448  3  8500  454  3  8520
6  7359  1  2 090 090  1  2 055 055  1  2 070 070
3  7400    2A 0  17  3  838   46530 99 99
5  7410      0  1  8560   27  1  8540  122  1  8520  282  1  8500  287  2  8400
5  7411    298  2  8392  326  2  8379  342  2  8392  358  3  8400  648  3  8420
5  7412    675  3  8440  688  3  8460  702  3  8480  723  3  8500  732  3  8520
5  7413    739  3  8540  753  3  8560
6  7429  1  2 080 080  1  2 060 060  1  2 150 150
3  7500    2B 0  22  3  839   47130 99 99
5  7510      0  1  8540    8  1  8520   13  1  8500   23  2  8480   53  2  8420
5  7511     56  2  8395   60  2  8380   94  2  8395   96  3  8400  246  3  8420
5  7512    318  3  8440  336  3  8460  363  3  8480  378  3  8500  420  3  8518
5  7513    468  3  8500  497  3  8480  522  3  8460  702  3  8460  767  3  8480
5  7514    838  3  8500  854  3  8520
6  7529  1  2 060 060  1  2 055 055  1  2 120 120
3  7600 BQ 2B 2  13  1  838   47130      30  8442 3 1
5  7610      0  1  8445    0  1  8378    1  1  8379    3  1  8379    6  1  8381
5  7611      9  1  8382   12  1  8381   15  1  8381   18  1  8383   21  1  8385
5  7612     24  1  8386   24  1  8441    0 -9  8445
```

BN

BØ

BP

BQ

BR

BS

BT

```
6  7629  1  2 042 042
3  7700 RO 2R 4  10  3   34          1  3          1 1 1                1
5  7710    -108  1  8520  -68  1  8498  -12  1  8480  -12  2  8507   24  2  8503
5  7711      25  3  8474   76  3  8455  160  3  8443  180  3  8443  180  3  8500
3  7800    2C 5  20  3  837   47220  1  3
5  7810     -82  1  8520  -27  1  8500  -23  1  8480  -15  1  8472   -5  1  8453
5  7811       6  1  8415    8  1  8390   10  2  8386   12  2  8382   18  2  8372
5  7812      22  2  8369   26  2  8368   30  2  8373   34  2  8386   35  3  8399
5  7813      36  3  8393   40  3  8425   46  3  8440  195  3  8440  205  3  8480
6  7829  1  2 080 080  1  2 055 055  1  2 100 100
3  7900   2CC 0  18  3  839   47840 99 99
5  7910     203  1  8540  222  1  8520  259  1  8500  263  1  8480  272  1  8460
5  7911     315  1  8440  380  1  8430  510  1  8420  608  2  8399  630  2  8383
5  7912     653  2  8399  656  3  8400  712  3  8420  748  3  8440  750  3  8460
5  7913     764  3  8480  768  3  8500  988  3  8520
6  7929  1  2 120 120  1  2 055 055  1  2 080 080
3  8000    2D 0  17  3  839   48020 99 99
5  8010     500  1  8540  500  1  8520  500  1  8520  500  1  8520  600  1  8520
5  8011     600  1  8430  825  1  8420  835  2  8410  848  2  8399  872  2  8383
5  8012     893  2  8399  908  3  8420 1016  3  8440 1058  3  8460 1065  3  8480
5  8013    1078  3  8500 1260  3  8520
6  8029  1  2 120 120  1  2 055 055  1  2 070 070
3  8100    2E 0  15  3  839   48800 99 99
5  8110       0  1  8500   12  1  8480   20  1  8460   27  1  8440   32  1  8420
5  8111      47  2  8400   49  2  8398   73  2  8387  107  2  8399  116  3  8420
5  8112     200  3  8440  270  3  8460  400  3  8460  418  3  8480  432  3  8500
6  8129  1  2 065 065  1  2 050 050  1  2 100 100
3  8200    2F 0  16  3  839   49440 99 99
5  8210       0  1  8500   22  1  8500   42  1  8500  126  1  8500  242  1  8500
5  8211     253  1  8440  286  2  8420  298  2  8398  324  2  8386  342  2  8399
5  8212     344  3  8420  350  3  8440  410  3  8440  448  3  8460  460  3  8480
5  8213     676  3  8500
6  8229  1  2 065 065  1  2 055 055  1  2 100 100
3  8300 AR 2F 2  10  1  839   49440        0  8459 3 1
5  8310       0  1  8459    0  1  8384    5  1  8385   10  1  8388   15  1  8386
5  8311      20  1  8388   25  1  8392   32  1  8396   32  1  8459    0 -9  8459
6  8329  1  2 038 038
3  8400 RO 2F 4  10  3   38          1  3          2 2 2                1
5  8410    -288  1  8483 -224  1  8461 -148  1  8459  -84  1  8470  -20  2  8482
5  8411      16  2  8482   17  3  8481   50  3  8473  106  3  8457  106  3  8500
3  8500    2G 5  20  3  839   49500  1  3
5  8511     -22  1  8480   -8  1  8460    0  1  8431   85  1  8422   88  1  8396
5  8512      94  2  8387  100  2  8382  105  2  8381  110  2  8380  115  2  8380
5  8513     120  2  8382  126  3  8386  130  3  8396  135  3  8413  140  3  8453
5  8514     145  3  8470  200  3  8480  222  3  8500  270  3  8500  298  3  8480
```

BU

BV

BW

BX

BY

BZ

```
6  8529  1   060 060  1  2 050 050  1  2 100 100
3  8600   2GG 0  12  3  839   49720 99 99
5  8610       0  1  8520   33  1  8500   48  1  8480  104  1  8460  168  1  8440
5  8611     222  2  8420  233  2  8399  260  2  8389  278  2  8399  285  3  8420
5  8612     310  3  8500  318  3  8520
6  8629  1  2 060 060  1  2 050 050  1  2 080 080
3  8700   2H 0  14  3  840   50000 99 99
5  8710       0  1  8540   11  1  8500   18  1  8480   26  1  8460   32  1  8440
5  8711      39  2  8420   52  2  8399   82  2  8391  112  2  8399  118  2  8420
5  8712     120  3  8440  142  3  8500  146  3  8520  162  3  8560
6  8729  1  2 060 060  1  2 055 055  1  2 100 100
3  8800   2I 0  17  3  840   50360 99 99
5  8810       0  1  8540    6  1  8520   32  1  8500   47  1  8480   58  1  8460
5  8811      68  1  8440   78  2  8420   93  2  8400  140  2  8391  176  2  8400
5  8812     183  2  8420  188  3  8440  196  3  8460  199  3  8480  207  3  8500
5  8813     238  3  8520  288  3  8540
6  8829  1  2 055 055  1  2 050 050  1  2 080 080
3  8900   2II 0  15  3  840   50820 99 99
5  8910     300  1  8540  312  1  8520  322  1  8500  358  1  8480  373  1  8460
5  8911     382  1  8440  436  2  8420  457  2  8400  512  2  8393  553  2  8400
5  8912     592  3  8420  706  3  8420  900  3  8420 1000  3  8420 1000  3  8500
6  8929  1  2 100 100  1  2 050 050  1  2 120 120
3  9000   2J 0  20  3  840   51810 99 99
5  9010       0  1  8540   12  1  8520   18  1  8500  130  1  8480  158  1  8460
5  9011     206  1  8440  235  1  8420  395  2  8400  412  2  8393  432  2  8400
5  9012     438  3  8400  506  3  8420  536  3  8440  552  3  8460  568  3  8480
5  9013     577  3  8500  593  3  8520  660  3  8540  672  3  8600  687  3  8600
6  9029  1  2 120 120  1  2 050 050  1  2 120 120
3  9100   2K 0  15  3  840   52260 99 99
5  9113    1108  1  8600 1158  1  8500 1183  1  8440 1294  1  8420 1398  2  8400
5  9114    1420  2  8394 1448  2  8400 1460  3  8400 1535  3  8420 1655  3  8420
5  9115    1750  3  8440 1780  3  8460 1818  3  8480 1853  3  8500 1884  3  8520
6  9129  1  2 120 120  1  2 050 050  1  2 120 120
3  9200   2L 0  15  3  840   53160 99 99
5  9213    1010  1  8600 1106  1  8600 1300  1  8500 1305  1  8440 1306  1  8420
5  9214    1358  2  8400 1555  2  8396 1674  3  8400 2000  3  8420 2000  3  8480
5  9215    2458  3  8480 2472  3  8480 2488  3  8500 2500  3  8520 2508  3  8540
6  9229  1  2 120 120  1  2 050 050  1  2 120 120
3  9300   2M 0  19  3  840   55230 99 99
5  9310       0  1  8540   17  1  8520   42  1  8500   90  1  8480  111  1  8460
5  9311     222  1  8440  612  1  8420  614  2  8420  632  2  8400  650  2  8398
5  9312     668  2  8400  690  3  8420  900  3  8420 1060  3  8440 1132  3  8460
5  9313    1158  3  8480 1190  3  8500 1203  3  8520 1216  3  8540
6  9329  1  2 120 120  1  2 050 050  1  2 120 120
3  9400   2N 0  17  3  840   56280 99 99
```

CA

CB

CC

CD

CE

CF

CG

CH

```
5  9410     0  1  8540   10  1  8520   98  1  8500   29  1  8480  137  1  8460
5  9411   144  1  8440  152  2  8420  161  2  8400  182  2  8399  208  2  8400
5  9412   224  3  8420  488  3  8440  523  3  8460  540  3  8480  550  3  8500
5  9413   574  3  8520  612  3  8540
6  9429  1  2 080 080  1  2 050 050  1  2 080 080
3  9500   20 0  20  3  841   57000 99 99
5  9510   -26  1  8540    0  1  8520    8  1  8500   38  1  8480   48  1  8455
5  9511    82  1  8456  116  2  8466  118  2  8433  126  2  8407  136  2  8402
5  9512   141  2  8407  145  2  8415  146  3  8432  147  3  8452  178  3  8443
5  9513   200  3  8460  215  3  8480  228  3  8500  247  3  8560  263  3  8580
6  9529  1  2 080 080  1  2 050 050  1  2 080 080
3  9600   2P 0  15  3  841   57260 99 99
5  9610     0  1  8540   32  1  8520   57  1  8500  146  1  8480  160  1  8460
5  9611   208  1  8440  310  1  8440  321  2  8434  328  2  8420  345  2  8404
5  9612   363  2  8420  374  3  8440  378  3  8460  386  3  8500  393  3  8540
6  9629  1  2 110 110  1  2 055 055  1  2 080 080
3  9700   2N 0  22  3  840   58340 99 99
5  9710     0  1  8560   37  1  8540   82  1  8520  138  1  8500  198  1  8480
5  9711   216  1  8460  223  2  8434  233  2  8422  257  2  8399  292  2  8422
5  9712   295  3  8424  309  3  8439  428  3  8440  453  3  8460  458  3  8480
5  9713   504  3  8500  534  3  8503  634  3  8480  755  3  8480  778  3  8500
5  9714   788  3  8520  820  3  8540
6  9729  1  2 090 090  1  2 050 050  1  2 100 100
3  9800   2R 0  17  3  841   58750 99 99
5  9810    42  1  8560   72  1  8540  122  1  8520  213  1  8500  232  1  8480
5  9811   248  1  8460  418  1  8440  420  2  8440  442  2  8420  468  2  8403
5  9812   492  2  8420  506  3  8440  510  3  8460  526  3  8500  544  3  8520
5  9813   562  3  8540  572  3  8560
6  9829  1  2 120 120  1  2 060 060  1  2 070 070
3  9900   2S 0  21  3  841   59330 99 99
5  9910  -202  1  8560 -166  1  8540 -113  1  8520  -58  1  8498  -28  1  8467
5  9911   -17  2  8467  -15  2  8420    0  2  8409   16  2  8420   18  2  8460
5  9912    20  3  8463   26  3  8463  114  3  8440  184  3  8438  200  3  8440
5  9913   266  3  8460  295  3  8480  308  3  8500  334  3  8520  357  3  8540
5  9914   365  3  8560
6  9929  1  2 080 080  1  2 060 060  1  2 140 140
3 10000   2T 0  22  3  841   59750 99 99
5 10010     0  1  8560   30  1  8540   47  1  8520  112  1  8500  123  1  8480
5 10011   146  1  8460  220  1  8440  280  1  8430  282  2  8426  318  2  8407
5 10012   340  2  8426  360  3  8430  375  3  8440  436  3  8460  472  3  8499
5 10013   506  3  8460  587  3  8460  602  3  8480  622  3  8500  637  3  8520
5 10014   648  3  8540  673  3  8560
6 10029  1  2 090 090  1  2 060 060  1  2 120 120
3 10100   20 0  20  3  843   61080 99 99
5 10110     0  1  8560   32  1  8540   47  1  8520  122  1  8500  148  1  8480
```

CI

CJ

CK

CL

CM

CN

CØ

```
5 10111     290  1  8480  550  1  8480  629  1  8460  666  1  8460  682  2  8440
5 10112       2  2  8420  719  2  8420  736  3  8440    2  3  8440  984  3  8440
5 10113    1024  3  8460 1092  3  8480 1116  3  8500 1160  3  8520 1174  3  8540
6 10129  1  2 100 100  1  2 060 060  1  2 100 100
3 10200    2v 0  20  3  843   61950 99 99
5 10210      0  1  8560   15  1  8540   46  1  8520  164  1  8500  182  1  8480
5 10211    483  1  8480  520  1  8485  559  1  8480  572  1  8460  735  1  8450
5 10212    738  2  8440  753  2  8424  798  2  8424  805  3  8440 1126  3  8460
5 10213   1136  3  8480 1158  3  8500 1172  3  8520 1193  3  8540 1203  3  8560
6 10229  1  2 100 100  1  2 055 055  1  2 120 120
3 10300    2w 0  17  3  844   62600 99 99
5 10310      0  1  8560   15  1  8540   27  1  8520   49  1  8500   66  1  8480
5 10311     93  1  8480  250  1  8480  300  1  8460  305  2  8460  316  2  8434
5 10312    364  2  8434  370  3  8440  886  3  8460  950  3  8460  986  3  8480
5 10313   1023  3  8500 1038  3  8600
6 10329  1  2 090 090  1  2 055 055  1  2 140 140
3 10400   2ww 0  18  3  845   63030 99 99
5 10410     14  1  8560   26  1  8540  111  1  8520  122  1  8500  150  1  8480
5 10411    204  1  8480  273  1  8480  282  2  8460  302  2  8440  304  2  8438
5 10412    343  2  8438  348  3  8440  479  3  8460  486  3  8480  722  3  8500
5 10413    736  3  8520  753  3  8540  768  3  8560
6 10429  1  2 090 090  1  2 050 050  1  2 100 100
3 10500    2x 0  15  3  845   63660 99 99
5 10510      0  1  8560   11  1  8540   18  1  8520   37  1  8500   42  1  8480
5 10511    180  1  8461  263  1  8460  280  2  8460  284  2  8445  313  2  8445
5 10512    320  3  8450  368  3  8460  382  3  8480  392  3  8500  421  3  8600
6 10529  1  2 090 090  1  2 050 050  1  2 100 100
3 10600    2Y 0  11  3  845   64190 99 99
5 10610      0  1  8600   12  1  8500   21  2  8460   27  2  8447   58  2  8447
5 10611     62  3  8460  162  3  8480  203  3  8500  246  3  8520  303  3  8540
5 10612    362  3  8560
6 10629  1  2 070 070  1  2 045 045  1  2 100 100
3 10700   2YY 0  12  3  845   64450 99 99
5 10710      0  1  8600   22  1  8500   30  2  8463   41  2  8438   61  2  8438
5 10711     65  3  8440   70  3  8460  118  3  8480  142  3  8500  183  3  8520
5 10712    224  3  8540  290  3  8560
6 10729  1  2 080 080  1  2 050 050  1  2 120 120
3 10800 BN2YY 2   9  1  845   64450        0  8503 1 1
5 10810      0  1  8503    0  1  8453    3  1  8447    6  1  8441    9  1  8441
5 10811     12  1  8443   13  1  8453   13  1  8503    0 -9  8503
6 10829  1  2 040 040
3 10900 BN2YY 4  11  3   16          1  3          2 2 2                1
5 10910    -50  1  8589   -4  1  8510    0  2  8509   14  2  8505   16  3  8502
5 10911     36  3  8493   60  3  8478   94  3  8502  124  3  8518  163  3  8540
5 10912    223  3  8560
```

CP

CQ

CR

CS

CT

CU

CV

```
3 11000  2Y  5  16  3  845   64490  1  3
5 11010     -16  1  8560   -9  1  8519    0  1  8463    2  2  8460    5  2  8451
5 11011      10  2  8449   15  3  8451   20  3  8451   25  3  8462   26  3  8468
5 11012      36  3  8469   78  3  8480  119  3  8500  139  3  8520  171  3  8540
5 11013     224  3  8560
6 11029  1  2 070 070  1  2 045 045  1  2 100 100
3 11100    27 0  13  3  846   65040 99 99
5 11110       0  1  8560   67  1  8540  107  1  8520  117  1  8500  158  2  8479
5 11111     168  2  8465  170  2  8451  206  2  8466  216  3  8478  358  3  8500
5 11112     372  3  8520  378  3  8540  386  3  8560
6 11129  1  2 080 080  1  2 050 050  1  2 100 100
3 11200    3A 0  12  3  846   65360 99 99
5 11210       0  1  8560   53  1  8540   84  1  8520   97  1  8500  146  1  8490
5 11211     150  2  8488  156  2  8471  165  2  8453  178  2  8471  186  2  8486
5 11212     191  3  8500  202  3  8600
6 11229  1  2 100 100  1  2 047 047  1  2 080 080
3 11300    3B 0  10  3  846   65810 99 99
5 11310       0  1  8590    8  2  8540   17  2  8489   32  2  8459   47  2  8486
5 11311      49  3  8490   70  3  8500   86  3  8520   98  3  8540  114  3  8560
6 11329  1  2 100 100  1  2 055 055  1  2 080 080
3 11400    3C 0  16  3  847   66480 99 99
5 11410       0  1  8600   12  1  8560   22  1  8540   33  1  8520   45  1  8500
5 11411      84  1  8480   90  2  8480   94  2  8476   96  2  8469  120  2  8465
5 11412     150  2  8476  155  3  8480  177  3  8500  338  3  8520  422  3  8540
5 11413     506  3  8560
6 11429  1  2 110 110  1  2 055 055  1  2 080 080
3 11500    3D 0  16  3  848   67050 99 99
5 11510       0  1  8580   35  1  8560   85  1  8540  132  1  8520  140  2  8500
5 11511     148  2  8480  153  2  8478  163  2  8476  173  2  8475  178  2  8469
5 11512     182  2  8480  193  3  8500  213  3  8520  236  3  8540  248  3  8560
5 11513     258  3  8580
6 11529  1  2 090 090  1  2 050 050  1  2 100 100
3 11600 BR 3D 2  10  1  848   67050        0  8541 3 1
5 11610       0  1  8541    0  1  8485    5  1  8478   10  1  8475   15  1  8476
5 11611      20  1  8476   25  1  8474   32  1  8469   32  1  8541    0 -9  8541
6 11629  1  2 042 042
3 11700 BD 3D 4  12  3   30          1  3          2 2 2              1
5 11710    -230  1  8598 -174  1  8578 -122  1  8565  -72  1  8562  -18  1  8564
5 11711     -17  2  8564   17  2  8565   18  3  8565   74  3  8565  126  3  8566
5 11712     180  3  8575  253  3  8588
3 11800    3E 5  21  3  847   67130  1  3
5 11810    -148  1  8580 -129  1  8560  -89  1  8540  -68  1  8520    0  1  8502
5 11811       5  1  8496   10  1  8491   15  1  8480   18  2  8472   25  2  8468
5 11812      30  2  8467   35  2  8465   40  2  8463   45  2  8464   50  3  8471
5 11813      55  3  8477   75  3  8498   88  3  8520  122  3  8540  142  3  8560
```

CW

CX

CY

CZ

```
 WS ELEV /    HV  /    HF  /    HE  /     EG  /     V  /    FN  /   ACC    *ID*
==========================================================================
  C AT    3800 /     0 /   2370. /  2769. /  319817. / 1.00 /  148. /  461.
 829.50 /   0.01 /                 / 829.51 /    0.86 /   0.05/          *IS*
--------------------------------------------------------------------------
  D AT    4800 /  1000 /   2370. /  1054. /   95580. / 1.04 /   72. /  224.
 829.65 /   0.08 /   0.18 /   0.04 / 829.73 /    2.25 /   0.15 / 0.000  *XS*
--------------------------------------------------------------------------
  E AT    5800 /  1000 /   2370. /  1289. /  106815. / 1.46 /  119. /  443.
 830.20 /   0.08 /   0.55 /   0.0  / 830.28 /    1.84 /   0.14 / -0.000 *XS*
--------------------------------------------------------------------------
  F AT    6240 /   440 /   2370. /   959. /   74949. / 1.97 /   29. /  423.
 830.45 /   0.19 /   0.31 /   0.06 / 830.64 /    2.47 /   0.23 / -0.004 *XS*
--------------------------------------------------------------------------
  G AT    6690 /   450 /   2370. /  1739. /   84067. / 3.82 /   34. /  466.
 830.93 /   0.11 /   0.40 /   0.0  / 831.04 /    1.36 /   0.20 / -0.000 *XS*
--------------------------------------------------------------------------
  H AT    7290 /   600 /   2370. /   589. /   46528. / 1.77 /   72. /  173.
 831.63 /   0.45 /   0.86 /   0.17 / 832.07 /    4.02 /   0.37 / -0.000 *XS*
--------------------------------------------------------------------------
 HH AT    7870 /   580 /   2370. /  3165. /  179408. / 2.64 /   21. /  609.
 832.44 /   0.02 /   0.39 /   0.0  / 832.46 /    0.75 /   0.09 / 0.000  *XS*
--------------------------------------------------------------------------
  I AT    8360 /   490 /   2370. /  2637. /  181089. / 2.27 /   52. /  545.
 832.52 /   0.03 /   0.08 /   0.00 / 832.55 /    0.90 /   0.05 / -0.000 *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR I AT    8360 /       /    779. /   445. /   37784. / 1.00 /    0. /   47.
 832.40 /   0.05 /       ...3...  (-.001)    /    1.75 /   0.10 /         *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT     1577. /            *RG*
--------------------------------------------------------------------------
  J AT    8410 /    50 /   2370. /  3307. /  198997. / 2.00 /   21. /  655.
 832.54 /   0.02 /   0.01 /   0.0  / 832.56 /    0.72 /   0.05 / 0.000  *AS*
--------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /  3332. /  200718. / 2.00 /   21. /  658.
 832.58 /   0.02 /                 / 832.60 /    0.71 /   0.04 /         *AS*
========================== END BRIDGE ANALYSIS ============================
 JJ AT    8940 /   530 /   2370. /  2799. /  167001. / 2.65 /    9. /  623.
 832.66 /   0.03 /   0.09 /   0.01 / 832.69 /    0.85 /   0.11 / 0.000  *XS*
--------------------------------------------------------------------------
  K AT    9630 /   690 /   2370. /  1803. /  139686. / 2.51 /  118. /  552.
 832.81 /   0.07 /   0.17 /   0.02 / 832.88 /    1.31 /   0.16 / -0.000 *XS*
--------------------------------------------------------------------------
  L AT   10430 /   800 /   2370. /  1280. /  141256. / 1.48 /  104. /  375.
 833.03 /   0.08 /   0.23 /   0.01 / 833.11 /    1.85 /   0.15 / 0.000  *XS*
--------------------------------------------------------------------------
 LL AT   10740 /   310 /   2370. /  1151. /  113405. / 1.72 /   25. /  278.
 833.12 /   0.11 /   0.11 /   0.02 / 833.24 /    2.06 /   0.19 / -0.001 *XS*
--------------------------------------------------------------------------
```

A B C D E F G H I J

100-YR

	WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*
K	M AT 11130	390	2370.	903[illegible]	97273.	1.17	144.	302.	
	833.32	0.13	0.20	0.01	833.44	2.63	0.20	-0.000	*XS*
L	MM AT 11610	480	2370.	939.	72221.	1.52	104.	359.	
	833.69	0.15	0.38	0.01	833.84	2.52	0.24	-0.000	*XS*
M	N AT 11960	350	2370.	1365.	106933.	1.51	10.	344.	
	834.02	0.07	0.25	0.0	834.09	1.74	0.17	-0.000	*XS*
N	NN AT 12380	420	2370.	1005.	83807.	1.46	5.	227.	
	834.27	0.13	0.26	0.03	834.40	2.36	0.20	0.014	*XS*
O	O AT 12810	430	2370.	1243.	96998.	2.33	15.	330.	
	834.57	0.13	0.30	0.00	834.70	1.91	0.19	0.000	*XS*
P	P AT 13030	820	2370.	1009.	88455.	1.72	211.	414.	
	835.10	0.15	0.54	0.01	835.24	2.35	0.21	0.000	*XS*
Q	PP AT 14720	1090	2370.	2897.	167741.	2.91	141.	844.	
	835.63	0.03	0.41	0.0	835.66	0.82	0.11	0.000	*XS* 100-YR
R	Q AT 15180	460	2370.	1614.	112474.	2.07	89.	635.	
	835.74	0.07	0.14	0.02	835.81	1.47	0.15	0.000	*XS*
S	R AT 15990	810	2370.	1845.	145516.	1.48	10.	606.	
	836.05	0.04	0.28	0.0	836.09	1.28	0.11	-0.002	*XS*
T	S AT 17180	1190	2370.	6211.	358390.	1.66	34.	1033.	
	836.21	0.00	0.13	0.0	836.22	0.38	0.02	0.000	*XS*
U	SS AT 18100	920	2370.	4509.	266409.	1.73	49.	1118.	
	836.27	0.01	0.05	0.00	836.27	0.53	0.07	-0.000	*XS*
V	T AT 19040	940	2370.	1225.	103072.	1.35	181.	571.	
	836.42	0.08	0.19	0.04	836.50	1.93	0.18	-0.000	*XS*
W	TT AT 19330	290	2370.	722.	71267.	1.46	131.	291.	
	836.56	0.25	0.22	0.08	836.81	3.28	0.27	-0.000	*XS*
X	837.14	0.23	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Y	U AT 19920	80	2370.	535.	64484.	1.12	21.	110.	
	837.18	0.34	0.10	0.06	837.52	4.43	0.30	-0.000	*XS*

100-YR

```
 WS ELEV /    HV  /    HF  /    HE  /    EG  /     V  /    FN  /   ACC    *ID*
==========================================================================
========================= BEGIN BRIDGE ANALYSIS =========================
BR  U AT   19920 /       /  2370. /   272. /  19591. / 1.00 /    0. /   40.
  836.00 /   1.19 /       ...3...  (-.001)    /   8.73 /  0.59 /          *BO*
--------------------------------------------------------------------------
    NO EMBANKMENT CROSS SECTION
--------------------------------------------------------------------------
   V AT   19970 /    50 /  2370. /   576. /  62523. / 1.37 /  -28. /   78.
  837.24 /   0.36 /   0.07 /   0.01 /  837.60 /   4.12 /  0.32 /  0.000  *AS*
--------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /   751. /  88199. / 1.39 /  -34. /   84.
  838.81 /   0.22 /                  /  839.03 /   3.16 /  0.23 /          *AS*
========================= END BRIDGE ANALYSIS ===========================
  V1V AT   20050 /    80 /  2370. /  1174. / 121653. / 1.54 /    5. /  211.
  838.97 /   0.10 /   0.04 /   0.0  /  839.07 /   2.02 /  0.16 / -0.000  *XS*
--------------------------------------------------------------------------
   VV AT   20640 /   590 /  2370. /  1766. / 147178. / 1.62 /   53. /  376.
  839.22 /   0.05 /   0.19 /   0.0  /  839.27 /   1.34 /  0.12 /  0.012  *XS*
--------------------------------------------------------------------------
    W AT   21290 /   650 /  2370. /  1106. / 103489. / 1.28 /  223. /  410.
  839.44 /   0.09 /   0.24 /   0.02 /  839.53 /   2.14 /  0.17 / -0.000  *XS*
--------------------------------------------------------------------------
   WW AT   22090 /   800 /  2370. /  2880. / 181898. / 2.15 /  147. /  711.
  839.75 /   0.02 /   0.24 /   0.0  /  839.77 /   0.82 /  0.05 / -0.000  *XS*
--------------------------------------------------------------------------
    X AT   22420 /   330 /  2370. /  2817. / 218173. / 1.47 /   32. /  551.
  839.80 /   0.02 /   0.05 /   0.0  /  839.82 /   0.84 /  0.05 /  0.000  *XS*
--------------------------------------------------------------------------
   XX AT   23340 /   920 /  2370. /  3198. / 233327. / 2.04 /  187. /  926.
  839.90 /   0.02 /   0.10 /   0.00 /  839.92 /   0.74 /  0.08 / -0.000  *XS*
--------------------------------------------------------------------------
    Y AT   23900 /   560 /  2370. /  2871. / 173972. / 2.22 /   94. /  700.
  839.97 /   0.02 /   0.08 /   0.00 /  840.00 /   0.83 /  0.10 / -0.000  *XS*
--------------------------------------------------------------------------
   YY AT   24650 /   750 /  2370. /  3579. / 232738. / 1.91 /   90. /  724.
  840.09 /   0.01 /   0.10 /   0.0  /  840.10 /   0.66 /  0.08 / -0.000  *XS*
--------------------------------------------------------------------------
    Z AT   25100 /   450 /  2370. /  2988. / 190768. / 2.29 /  115. /  693.
  840.14 /   0.02 /   0.06 /   0.00 /  840.16 /   0.79 /  0.10 / -0.000  *XS*
--------------------------------------------------------------------------
   1A AT   25910 /   810 /  2370. /  2528. / 152588. / 2.03 /   44. /  617.
  840.30 /   0.03 /   0.16 /   0.00 /  840.32 /   0.94 /  0.06 /  0.000  *XS*
--------------------------------------------------------------------------
  1AA AT   26820 /   910 /  2370. /  3705. / 204494. / 2.40 /   83. /  935.
  840.47 /   0.02 /   0.16 /   0.0  /  840.49 /   0.64 /  0.04 /  0.000  *XS*
--------------------------------------------------------------------------
   1B AT   27490 /   670 /  2370. /  2292. / 125420. / 2.14 /   54. /  664.
  840.61 /   0.04 /   0.15 /   0.01 /  840.64 /   1.03 /  0.13 / -0.000
```

Z

AA

AB

AC

AD

AE

AF

AG

AH

AI

AJ

AK

A L

100-YR

```
SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
 WS ELEV /    HV   /    HF   /    HE   /     EG   /     V   /    FN   /   ACC    *ID*
==========================================================================================
  1C AT   28330 /   840 /   2370. /  1259. /  124912. / 1.49 /  166. /  451.
  840.89 /   0.08 /   0.30 /   0.02 /  840.97 /   1.88 /   0.15 / -0.000  *XS*
------------------------------------------------------------------------------------------
  1D AT   29100 /   770 /   2370. /  1146. /  120628. / 1.34 /  209. /  446.
  841.17 /   0.09 /   0.29 /   0.00 /  841.26 /   2.07 /   0.15 /  0.000  *XS*
------------------------------------------------------------------------------------------
  1E AT   29900 /   800 /   2370. /  1500. /  128445. / 1.73 /  203. /  523.
  841.48 /   0.07 /   0.29 /   0.0  /  841.55 /   1.58 /   0.15 /  0.000  *XS*
------------------------------------------------------------------------------------------
 1EE AT   30270 /   370 /   2370. /  1305. /  111211. / 1.78 /   34. /  287.
  841.62 /   0.09 /   0.15 /   0.01 /  841.71 /   1.82 /   0.17 / -0.000  *XS*
------------------------------------------------------------------------------------------
  1F AT   30390 /   120 /   2370. /  1027. /   96092. / 1.82 /   24. /  298.
  841.65 /   0.15 /   0.06 /   0.03 /  841.80 /   2.31 /   0.20 / -0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR 1F AT   30390 /       /   1570. /   232. /   16367. / 1.00 /    0. /   32.
  839.70 /   0.71 /       ...3...  (-.001)    /   6.78 /   0.44 /          *BO*
------------------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       14. / RIGHT      767. /              *RG*
------------------------------------------------------------------------------------------
  1G AT   30460 /    70 /   2370. /  1179. /   99563. / 1.78 /  -12. /  217.
  841.73 /   0.11 /   0.04 /   0.0  /  841.84 /   2.01 /   0.20 / -0.000  *AS*
------------------------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /  1407. /  125002. / 1.75 /  -22. /  225.
  842.69 /   0.08 /                  /  842.76 /   1.68 /   0.16 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
 1GG AT   30610 /   150 /   2370. /  1706. /  163198. / 1.87 /   61. /  392.
  842.75 /   0.06 /   0.04 /   0.0  /  842.81 /   1.39 /   0.12 / -0.000  *XS*
------------------------------------------------------------------------------------------
  1H AT   31380 /   770 /   2370. /  1628. /  134491. / 1.72 /   86. /  409.
  842.95 /   0.06 /   0.20 /   0.00 /  843.00 /   1.46 /   0.14 / -0.000  *XS*
------------------------------------------------------------------------------------------
  1I AT   32210 /   830 /   2370. /  1396. /  143574. / 1.43 /  132. /  466.
  843.20 /   0.06 /   0.24 /   0.00 /  843.26 /   1.70 /   0.13 /  0.012  *XS*
------------------------------------------------------------------------------------------
  1J AT   33220 /  1010 /   2370. /  2317. /  163155. / 2.03 /   77. /  514.
  843.47 /   0.03 /   0.24 /   0.0  /  843.50 /   1.02 /   0.10 /  0.000  *XS*
------------------------------------------------------------------------------------------
  1K AT   34320 /  1100 /   2370. /  3812. /  244667. / 1.96 /   36. /  700.
  843.65 /   0.01 /   0.15 /   0.0  /  843.66 /   0.62 /   0.03 / -0.000  *XS*
------------------------------------------------------------------------------------------
  1L AT   35040 /   720 /   2370. /  1803. /  141455. / 1.54 /  283. /  611.
  843.75 /   0.04 /   0.12 /   0.01 /  843.79 /   1.31 /   0.11 /  0.000  *XS*
------------------------------------------------------------------------------------------
  1M AT   35520 /   480 /   2370. /  1153. /   96259. / 1.60 /    5. /  230.
  843.92 /   0.11 /   0.20 /   0.03 /  844.02 /   2.05 /   0.18 / -0.000  *XS*
------------------------------------------------------------------------------------------
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100-YR

	SECID AT DISTANCE/ LENGTH/DISCHARGE/ AREA /CONVEYANCE/ ALPHA/ LEW / REW										
	WS ELEV /	HV /	HF /	HE /	G /	V /	FN /	ACC	*ID*		
AZ	1MM AT 35890 /	370 /	2370. /	1761. /	153648. /	1.43 /	61. /	381.			
	844.12 /	0.04 /	0.14 /	0.0 /	844.16 /	1.35 /	0.11 /	-0.000	*XS*		
BA	1MMM AT 36450 /	560 /	2370. /	3960. /	209701. /	2.03 /	51. /	817.			
	844.25 /	0.01 /	0.10 /	0.0 /	844.26 /	0.60 /	0.04 /	-0.000	*XS*		
BB	1N AT 37140 /	690 /	2370. /	1696. /	131654. /	1.52 /	64. /	398.			
	844.37 /	0.05 /	0.14 /	0.02 /	844.42 /	1.40 /	0.13 /	0.000	*XS*		
BC	1O AT 37400 /	260 /	2370. /	1619. /	134035. /	1.50 /	3. /	305.			
	844.45 /	0.05 /	0.08 /	0.00 /	844.50 /	1.46 /	0.13 /	-0.000	*XS*		
BD	1P AT 37790 /	390 /	2370. /	1689. /	135362. /	1.77 /	36. /	344.			
	844.57 /	0.05 /	0.12 /	0.00 /	844.63 /	1.40 /	0.14 /	-0.000	*XS*	100-YR	
BE	1Q AT 38290 /	500 /	2370. /	1535. /	112587. /	2.42 /	4. /	276.			
	844.74 /	0.09 /	0.18 /	0.02 /	844.83 /	1.54 /	0.16 /	-0.000	*XS*		
BF	1R AT 38980 /	690 /	2370. /	1781. /	95535. /	3.21 /	32. /	320.			
	845.10 /	0.09 /	0.36 /	0.0 /	845.19 /	1.33 /	0.18 /	0.001	*XS*		
BG	1RR AT 39460 /	480 /	2370. /	3493. /	148419. /	3.69 /	27. /	658.			
	845.35 /	0.03 /	0.19 /	0.0 /	845.38 /	0.68 /	0.04 /	-0.002	*XS*		
BH	1S AT 39950 /	490 /	2370. /	3468. /	155948. /	2.44 /	500. /	1030.			
	845.48 /	0.02 /	0.12 /	0.0 /	845.50 /	0.68 /	0.04 /	0.000	*XS*		

END OF THIS PROFILE

100-YR

```
SECID AT DISTANCE/ LENGTH/DISCHARGE/   AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
 S ELEV /    HV  /    HF  /    HE  /      S  /      V  /    FN  /   ACC   *ID*
==================================================================================
  1S AT   39950 /     0 /   2370. /  3469. /  156012. / 2.44 /  500. / 1030.
  845.48 /   0.02 /                 /  845.50 /    0.68 /   0.04/          *IS*
----------------------------------------------------------------------------------
1SS   AT   40250 /   300 /    650. /  1585. /   91483. / 2.63 /    0. /  239.
  845.54 /   0.01 /   0.05 /   0.0  /  845.55 /    0.41 /   0.05 / -0.000  *XS*
----------------------------------------------------------------------------------
  1T AT   40690 /   440 /    650. /  2004. /  144346. / 1.89 /   41. /  431.
  845.54 /   0.00 /   0.01 /   0.0  /  845.54 /    0.32 /   0.03 / -0.018  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR 1T AT   40690 /       /    261. /   291. /   20712. / 1.00 /    0. /   40.
  842.50 /   0.01 /       ...3...  (-.001)    /    0.90 /   0.06 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       14. / RIGHT     376. /                *RG*
----------------------------------------------------------------------------------
  1U AT   40750 /    60 /    650. /  2040. /  158160. / 2.15 /  -29. /  308.
  845.55 /   0.00 /   0.00 /   0.02 /  845.55 /    0.32 /   0.02 / -0.011  *AS*
----------------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /  2042. /  158397. / 2.15 /  -29. /  308.
  845.56 /   0.00 /                 /  845.56 /    0.32 /   0.02 /          *AS*
============================ END BRIDGE ANALYSIS ================================
 1UU AT   41240 /   490 /    650. /  2302. /  132253. / 2.69 /  218. /  571.
  845.56 /   0.00 /   0.01 /   0.0  /  845.56 /    0.28 /   0.03 / -0.010  *XS*
----------------------------------------------------------------------------------
  1V AT   41690 /   450 /    650. /  1971. /  110908. / 2.68 /  300. /  679.
  845.56 /   0.00 /   0.01 /   0.00 /  845.56 /    0.33 /   0.04 / -0.013  *XS*
----------------------------------------------------------------------------------
1VV   AT   41820 /   130 /    650. /  1734. /  107661. / 2.18 /  132. /  487.
  845.56 /   0.00 /   0.00 /   0.00 /  845.56 /    0.37 /   0.04 / -0.005  *XS*
----------------------------------------------------------------------------------
  1W AT   42400 /   580 /    650. /  2533. /  105843. / 2.68 / 1300. / 1788.
  845.58 /   0.00 /   0.02 /   0.0  /  845.58 /    0.26 /   0.01 / -0.000  *XS*
----------------------------------------------------------------------------------
  1X AT   43520 /  1120 /    650. /  2652. /  102402. / 2.95 /  600. / 1188.
  845.62 /   0.00 /   0.04 /   0.00 /  845.63 /    0.25 /   0.01 /  0.000  *XS*
----------------------------------------------------------------------------------
  1Y AT   45200 /  1680 /    650. /  1673. /   91864. / 3.13 /   67. /  474.
  845.70 /   0.01 /   0.08 /   0.00 /  845.70 /    0.39 /   0.05 /  0.000  *XS*
----------------------------------------------------------------------------------
  1Z AT   45890 /   690 /    650. /  1439. /   98395. / 1.35 /  119. /  417.
  845.73 /   0.00 /   0.03 /   0.0  /  845.74 /    0.45 /   0.03 / -0.000  *XS*
----------------------------------------------------------------------------------
  2A AT   46530 /   640 /    650. /  1959. /   82826. / 2.51 /  284. /  686.
  845.77 /   0.00 /   0.03 /   0.00 /  845.77 /    0.33 /   0.05 /  0.000  *XS*
----------------------------------------------------------------------------------
  2B AT   47130 /   600 /    650. /  1273. /   56260. / 1.89 /   34. /  334.
  845.83 /   0.01 /   0.05 /   0.00 /  845.83 /    0.51 /   0.03 /  0.002  *XS*
```

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============================ BEGIN BRIDGE ANALYSIS ============================
HB 2B AT   47130 /        /    291. /   127.    8010. / 1.00 /    0. /   24.
  844.50 /   0.08 /        ...3...  (-.001)   /   2.29 /   0.16 /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT     354. /              *RG*
-----------------------------------------------------------------------------
  2C AT   47220 /    90 /    650. /   579. /   31711. / 2.84 /   -8. /  200.
  845.83 /   0.06 /   0.02 /   0.05 /  845.89 /   1.12 /   0.14 / -0.011  *AS*
-----------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /   592. /   32449. / 2.84 /   -8. /  200.
  845.89 /   0.05 /                  /  845.95 /   1.10 /   0.13 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
 2CC AT   47840 /   620 /    650. /  1893. /   84523. / 2.26 /  272. /  750.
  846.04 /   0.00 /   0.10 /   0.0  /  846.04 /   0.34 /   0.02 / -0.000  *XS*
-----------------------------------------------------------------------------
  2D AT   48020 /   180 /    650. /  1675. /   81311. / 2.11 /  600. / 1058.
  846.04 /   0.00 /   0.01 /   0.00 /  846.04 /   0.39 /   0.05 / -0.011  *XS*
-----------------------------------------------------------------------------
  2E AT   48800 /   780 /    650. /   905. /   58770. / 2.16 /   20. /  401.
  846.10 /   0.02 /   0.07 /   0.01 /  846.12 /   0.72 /   0.08 / -0.000  *XS*
-----------------------------------------------------------------------------
  2F AT   49440 /   640 /    650. /   688. /   45367. / 1.67 /  249. /  449.
  846.20 /   0.02 /   0.10 /   0.00 /  846.22 /   0.94 /   0.09 /  0.000  *XS*
============================ BEGIN BRIDGE ANALYSIS ============================
BR 2F AT   49440 /        /    586. /   226. /   17968. / 1.00 /    0. /   32.
  845.90 /   0.10 /        ...3...  (-.001)   /   2.60 /   0.17 /          *BO*
-----------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       53. / RIGHT      12. /              *RG*
-----------------------------------------------------------------------------
  2G AT   49500 /    60 /    650. /   704. /   54914. / 1.52 /   -9. /  143.
  846.21 /   0.02 /   0.01 /   0.01 /  846.23 /   0.92 /   0.09 / -0.011  *AS*
-----------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /   724. /   57111. / 1.52 /  -10. /  143.
  846.35 /   0.02 /                  /  846.36 /   0.90 /   0.08 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
 2GG AT   49720 /   220 /    650. /   714. /   54669. / 1.49 /   93. /  299.
  846.38 /   0.02 /   0.03 /   0.00 /  846.39 /   0.91 /   0.08 /  0.000  *XS*
-----------------------------------------------------------------------------
  2H AT   50000 /   280 /    650. /   569. /   50536. / 1.08 /   24. /  129.
  846.42 /   0.02 /   0.04 /   0.00 /  846.44 /   1.14 /   0.08 / -0.000  *XS*
-----------------------------------------------------------------------------
  2I AT   50360 /   360 /    650. /   774. /   75818. / 1.07 /   55. /  197.
  846.47 /   0.01 /   0.04 /   0.0  /  846.48 /   0.84 /   0.06 / -0.000  *XS*
-----------------------------------------------------------------------------
 2II AT   50820 /   460 /    650. /  3022. /  168294. / 2.14 /  369. / 1000.
  846.49 /   0.00 /   0.02 /   0.0  /  846.49 /   0.22 /   0.03 / -0.000  *XS*
-----------------------------------------------------------------------------
  2J AT   51810 /   990 /    650. /  1860. /   83024. / 2.52 /  151. /  556.
  846.52 /   0.00 /   0.03 /   0.00 /  846.53 /   0.35 /   0.02 / -0.000  *XS*
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100-YR

	SECID	AT	DISTANCE / ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE /	ALPHA / V	LEW / FN	REW / ACC	*ID*
CF	2K	AT	52260	450	650.	2750.	120108.	2.58	1172.	1790.	
	846.54		0.00	0.02	0.0	846.54	0.24	0.04		-0.000	*XS*
CG	2L	AT	53160	900	650.	4232.	307103.	1.66	1303.	2000.	
	846.54		0.00	0.01	0.0	846.54	0.15	0.02		-0.012	*XS*
CH	2M	AT	55230	2070	650.	3680.	135757.	2.82	105.	1139.	
	846.56		0.00	0.02	0.00	846.56	0.18	0.01		-0.000	*XS*
CI	2N	AT	56280	1050	650.	1501.	88770.	1.74	135.	528.	
	846.60		0.01	0.04	0.00	846.60	0.43	0.05		-0.000	*XS*
CJ	2O	AT	57000	720	650.	328.	17674.	2.04	43.	205.	
	846.73		0.12	0.19	0.06	846.86	1.98	0.24		-0.000	*XS*
CK	2P	AT	57260	260	650.	731.	34270.	2.08	153.	380.	
	847.01		0.03	0.18	0.0	847.04	0.89	0.12		-0.000	*XS*
CL	2Q	AT	58340	1080	650.	962.	58324.	1.91	205.	456.	
	847.26		0.01	0.23	0.0	847.28	0.68	0.08		0.009	*XS*
CM	2R	AT	58750	410	650.	887.	44491.	1.88	237.	515.	
	847.33		0.02	0.07	0.00	847.34	0.73	0.08		-0.000	*XS*
CN	2S	AT	59330	580	650.	926.	29010.	2.72	-36.	288.	
	847.52		0.02	0.19	0.00	847.54	0.70	0.05		0.000	*XS*
CØ	2T	AT	59750	420	650.	1301.	58828.	2.01	127.	599.	
	847.63		0.01	0.10	0.0	847.64	0.50	0.06		0.000	*XS*
CP	2U	AT	61080	1330	650.	1569.	60424.	1.78	558.	1085.	
	847.80		0.00	0.16	0.0	847.80	0.41	0.03		0.000	*XS*
CQ	2V	AT	61950	870	650.	1702.	62656.	2.49	560.	1135.	
	847.90		0.01	0.10	0.00	847.90	0.38	0.07		0.003	*XS*
CR	2W	AT	62600	650	650.	2037.	56684.	2.72	251.	986.	
	847.98		0.00	0.08	0.0	847.98	0.32	0.03		0.000	*XS*
CS	2WW	AT	63030	430	650.	685.	31136.	1.76	149.	494.	
	848.07		0.02	0.10	0.01	848.09	0.95	0.14		=0.000	*XS*
CT	2X	AT	63660	630	650.	734.	25526.	2.14	41.	384.	
	848.40		0.03	0.33	0.00	848.43	0.89	0.17		0.002	*XS*

100-YR

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SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
WS ELEV /    HV  /    HF  /    HE  /     G  /     V  /    FN  /   ACC   *ID*
==========================================================================
   C AT    3800 /     0 /   2370. /  2801. /  325816. / 1.00 /  148. /  462.
829.60 /   0.01 /                  /  829.61 /    0.85 /  0.05/          *IS*
--------------------------------------------------------------------------
   D AT    4800 /  1000 /   2370. /  1068. /   97550. / 1.04 /   71. /  224.
829.74 /   0.08 /   0.18 /   0.03 /  829.82 /    2.22 /  0.15 / 0.000  *XS*
--------------------------------------------------------------------------
   E AT    5800 /  1000 /   2370. /  1312. /  108821. / 1.47 /  119. /  444.
830.28 /   0.07 /   0.53 /   0.0  /  830.35 /    1.81 /  0.14 / -0.000 *XS*
--------------------------------------------------------------------------
   F AT    6240 /   440 /   2370. /   962. /   76470. / 1.92 /   30. /  380.
830.53 /   0.18 /   0.30 /   0.05 /  830.71 /    2.46 /  0.22 / 0.006  *XS*
--------------------------------------------------------------------------
   G AT    6690 /   450 /   2370. /  1634. /   85032. / 3.34 /   35. /  385.
830.99 /   0.11 /   0.39 /   0.0  /  831.10 /    1.45 /  0.20 / -0.000 *XS*
--------------------------------------------------------------------------
   H AT    7290 /   600 /   2370. /   593. /   46974. / 1.77 /   73. /  173.
831.67 /   0.44 /   0.84 /   0.17 /  832.11 /    4.00 /  0.37 / 0.000  *XS*
--------------------------------------------------------------------------
  HH AT    7870 /   580 /   2370. /  2498. /  160429. / 2.32 /   75. /  475.
832.51 /   0.03 /   0.43 /   0.0  /  832.54 /    0.95 /  0.10 / 0.000  *XS*
--------------------------------------------------------------------------
   I AT    8360 /   490 /   2370. /  2228. /  171568. / 1.97 /   52. /  402.
832.61 /   0.03 /   0.10 /   0.00 /  832.64 /    1.06 /  0.10 / -0.000 *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR I AT    8360 /      /    781. /   445. /   37784. / 1.00 /    0. /   47.
832.40 /   0.05 /        ...3...  (-.001)  /    1.75 /  0.10 /         *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT    1609. /           *RG*
--------------------------------------------------------------------------
   J AT    8410 /    50 /   2370. /  2268. /  161612. / 1.76 /   25. /  375.
832.62 /   0.03 /   0.01 /   0.01 /  832.65 /    1.05 /  0.06 / -0.011 *AS*
--------------------------------------------------------------------------
   M = **** / E = **** / K* = **** /  2280. /  162968. / 1.75 /   25. /  375.
832.65 /   0.03 /                  /  832.68 /    1.04 /  0.06 /         *AS*
========================== END BRIDGE ANALYSIS ============================
  JJ AT    8940 /   530 /   2370. /  2706. /  173920. / 2.31 /   10. /  510.
832.76 /   0.03 /   0.11 /   0.0  /  832.79 /    0.88 /  0.10 / -0.000 *XS*
--------------------------------------------------------------------------
   K AT    9630 /   690 /   2370. /  1680. /  148003. / 1.95 /  240. /  540.
832.89 /   0.06 /   0.15 /   0.02 /  832.95 /    1.41 /  0.15 / 0.000  *XS*
--------------------------------------------------------------------------
   L AT   10430 /   800 /   2370. /  1269. /  145953. / 1.36 /  120. /  345.
833.09 /   0.07 /   0.21 /   0.01 /  833.17 /    1.87 /  0.15 / -0.000 *XS*
--------------------------------------------------------------------------
  LL AT   10740 /   310 /   2370. /  1149. /  116512. / 1.63 /   25. /  250.
833.18 /   0.11 /   0.10 /   0.02 /  833.29 /    2.06 /  0.19 / -0.000 *XS*
```

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FW

SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
	S ELEV	HV	HF	HE		V	FN	ACC	*ID*
M	AT	11130	390	2370.	905.	97823.	1.15	150.	300.
	833.36	0.12	0.19	0.01	833.49	2.62	0.19	-0.000	*XS*
MM	AT	11610	480	2370.	949.	73563.	1.50	108.	358.
	833.73	0.15	0.37	0.01	833.87	2.50	0.24	0.000	*XS*
N	AT	11960	350	2370.	1336.	107803.	1.44	10.	310.
	834.05	0.07	0.25	0.0	834.12	1.77	0.17	-0.000	*XS*
NN	AT	12380	420	2370.	1012.	84635.	1.45	5.	225.
	834.30	0.12	0.26	0.03	834.43	2.34	0.20	0.018	*XS*
O	AT	12810	430	2370.	1240.	94838.	2.25	20.	320.
	834.60	0.13	0.30	0.00	834.73	1.91	0.19	0.001	*XS*
P	AT	13630	820	2370.	1016.	89627.	1.72	213.	413.
	835.14	0.15	0.54	0.01	835.28	2.33	0.20	-0.000	*XS*
PP	AT	14720	1090	2370.	2427.	154636.	2.63	240.	740.
	835.68	0.04	0.44	0.0	835.72	0.98	0.12	-0.000	*XS*
Q	AT	15180	460	2370.	1641.	116805.	1.97	125.	625.
	835.81	0.06	0.14	0.01	835.88	1.44	0.15	-0.000	*XS*
R	AT	15990	810	2370.	1846.	150935.	1.37	12.	412.
	836.10	0.04	0.26	0.0	836.14	1.28	0.11	0.000	*XS*
S	AT	17180	1190	2370.	5311.	322943.	1.65	230.	1030.
	836.27	0.01	0.14	0.0	836.27	0.45	0.03	-0.000	*XS*
SS	AT	18100	920	2370.	3363.	234068.	1.47	250.	850.
	836.33	0.01	0.07	0.00	836.35	0.70	0.07	0.000	*XS*
T	AT	19040	940	2370.	1241.	108063.	1.29	220.	570.
	836.51	0.07	0.21	0.03	836.59	1.91	0.17	0.000	*XS*
TT	AT	19330	290	2370.	732.	73231.	1.43	140.	290.
	836.64	0.23	0.21	0.08	836.87	3.24	0.26	-0.000	*XS*
TTT	AT	19840	510	2370.	762.	72991.	1.49	18.	188.
	837.18	0.22	0.54	0.0	837.41	3.11	0.26	-0.000	*XS*
U	AT	19920	80	2370.	539.	65119.	1.12	21.	110.
	837.22	0.34	0.09	0.06	837.56	4.40	0.30	-0.000	*XS*

K L M N Ø P Q R S T U V W X Y

FW

FW

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SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
 WS ELEV /    HV  /    HF  /    HE  /    ES  /     V  /    FN  /   ACC    *ID*
==========================================================================
============================ BEGIN BRIDGE ANALYSIS ============================
BR  U AT   19920 /        /   2370. /   272. /   19591. / 1.00 /    0. /   40.
   836.00 /   1.19 /        ...3...  (-.001)    /   8.73 /   0.59 /          *BO*
--------------------------------------------------------------------------
     NO EMBANKMENT CROSS SECTION
--------------------------------------------------------------------------
    V AT   19970 /    50 /   2370. /   580. /   63179. / 1.37 /  -28. /   78.
   837.28 /   0.35 /   0.07 /   0.01 /  837.64 /   4.08 /   0.31 /  0.001  *AS*
--------------------------------------------------------------------------
    M = **** / E = **** / K* = **** /   750. /   89014. / 1.39 /  -34. /   84.
   838.86 /   0.21 /                  /  839.07 /   3.13 /   0.23 /          *AS*
============================ END BRIDGE ANALYSIS ==============================
   V1V AT   20050 /    80 /   2370. /  1180. /  123321. / 1.53 /    8. /  208.
   839.02 /   0.10 /   0.04 /   0.0  /  839.11 /   2.01 /   0.16 / -0.000  *XS*
--------------------------------------------------------------------------
   VV AT   20640 /   590 /   2370. /  1767. /  151413. / 1.54 /   55. /  355.
   839.27 /   0.04 /   0.18 /   0.0  /  839.31 /   1.34 /   0.12 /  0.020  *XS*
--------------------------------------------------------------------------
    W AT   21290 /   650 /   2370. /  1112. /  104582. / 1.28 /  225. /  410.
   839.47 /   0.09 /   0.23 /   0.02 /  839.56 /   2.13 /   0.16 / -0.000  *XS*
--------------------------------------------------------------------------
   WW AT   22090 /   800 /   2370. /  2389. /  167703. / 1.91 /  200. /  600.
   839.79 /   0.03 /   0.26 /   0.0  /  839.82 /   0.99 /   0.11 / -0.000  *XS*
--------------------------------------------------------------------------
    X AT   22420 /   330 /   2370. /  2827. /  223203. / 1.43 /   32. /  532.
   839.85 /   0.02 /   0.05 /   0.0  /  839.87 /   0.84 /   0.05 /  0.000  *XS*
--------------------------------------------------------------------------
   XX AT   23340 /   920 /   2370. /  2653. /  209894. / 1.92 /  250. /  800.
   839.96 /   0.02 /   0.11 /   0.00 /  839.98 /   0.89 /   0.08 / -0.000  *XS*
--------------------------------------------------------------------------
    Y AT   23900 /   560 /   2370. /  2679. /  172418. / 2.05 /  150. /  650.
   840.05 /   0.02 /   0.09 /   0.00 /  840.07 /   0.88 /   0.10 /  0.000  *XS*
--------------------------------------------------------------------------
   YY AT   24650 /   750 /   2370. /  3206. /  225295. / 1.75 /  150. /  650.
   840.17 /   0.01 /   0.11 /   0.0  /  840.18 /   0.74 /   0.08 / -0.000  *XS*
--------------------------------------------------------------------------
    Z AT   25100 /   450 /   2370. /  2424. /  175620. / 1.98 /  290. /  690.
   840.22 /   0.03 /   0.06 /   0.01 /  840.25 /   0.98 /   0.10 /  0.000  *XS*
--------------------------------------------------------------------------
   1A AT   25910 /   810 /   2370. /  2481. /  158810. / 1.86 /   50. /  550.
   840.39 /   0.03 /   0.16 /   0.0  /  840.42 /   0.96 /   0.06 /  0.000  *XS*
--------------------------------------------------------------------------
  1AA AT   26820 /   910 /   2370. /  3732. /  212747. / 2.26 /  100. /  900.
   840.55 /   0.01 /   0.15 /   0.0  /  840.57 /   0.64 /   0.04 /  0.000  *XS*
--------------------------------------------------------------------------
   1B AT   27490 /   670 /   2370. /  2162. /  127223. / 1.93 /  160. /  660.
```

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SECID AT DISTANCE/ LENGTH/DISCHARGE/   AREA   /CONVEYANCE/ ALPHA/   LEW   /   REW
WS ELEV /    HV   /    HF   /    HE   /     G   /     V    /    FN   /   ACC    *ID*
==========================================================================================
  1C AT   28330 /   840 /   2370. /  1260. /  128008. / 1.42 /  200. /  450.
 840.95 /   0.08 /   0.29 /   0.02 /  841.03 /    1.88 /   0.14 /  0.000  *XS*
------------------------------------------------------------------------------------------
  1D AT   29100 /   770 /   2370. /  1138. /  122761. / 1.28 /  245. /  445.
 841.22 /   0.09 /   0.28 /   0.00 /  841.31 /    2.08 /   0.15 / -0.000  *XS*
------------------------------------------------------------------------------------------
  1E AT   29900 /   800 /   2370. /  1256. /  124134. / 1.39 /  205. /  405.
 841.53 /   0.08 /   0.29 /   0.0  /  841.60 /    1.89 /   0.16 / -0.000  *XS*
------------------------------------------------------------------------------------------
 1EE AT   30270 /   370 /   2370. /  1284. /  119987. / 1.49 /   35. /  235.
 841.66 /   0.08 /   0.14 /   0.00 /  841.74 /    1.85 /   0.16 /  0.000  *XS*
------------------------------------------------------------------------------------------
  1F AT   30390 /   120 /   2370. /   977. /   98116. / 1.58 /   25. /  225.
 841.69 /   0.14 /   0.06 /   0.03 /  841.83 /    2.43 /   0.19 / -0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 1F AT   30390 /       /   1558. /   232. /   16367. / 1.00 /    0. /   32.
 839.70 /   0.70 /       ...3...  (-.001)    /    6.73 /   0.44 /          *BO*
------------------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       16. / RIGHT     790. /                  *RG*
------------------------------------------------------------------------------------------
  1G AT   30460 /    70 /   2370. /  1122. /  100325. / 1.63 /  -13. /  180.
 841.76 /   0.11 /   0.04 /   0.0  /  841.87 /    2.11 /   0.20 / -0.000  *AS*
------------------------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /  1308. /  124210. / 1.60 /  -20. /  180.
 842.71 /   0.08 /                  /  842.79 /    1.81 /   0.16 /          *AS*
========================== END BRIDGE ANALYSIS ============================
 1GG AT   30610 /   150 /   2370. /  1531. /  169560. / 1.43 /  100. /  300.
 842.77 /   0.05 /   0.04 /   0.0  /  842.83 /    1.55 /   0.12 / -0.000  *XS*
------------------------------------------------------------------------------------------
  1H AT   31380 /   770 /   2370. /  1385. /  133252. / 1.37 /  100. /  300.
 842.96 /   0.06 /   0.19 /   0.00 /  843.02 /    1.71 /   0.14 / -0.000  *XS*
------------------------------------------------------------------------------------------
  1I AT   32210 /   830 /   2370. /  1271. /  143922. / 1.19 /  250. /  450.
 843.21 /   0.06 /   0.24 /   0.00 /  843.27 /    1.86 /   0.13 /  0.008  *XS*
------------------------------------------------------------------------------------------
  1J AT   33220 /  1010 /   2370. /  2077. /  165647. / 1.62 /  200. /  500.
 843.48 /   0.03 /   0.24 /   0.0  /  843.51 /    1.14 /   0.10 / -0.000  *XS*
------------------------------------------------------------------------------------------
  1K AT   34320 /  1100 /   2370. /  3172. /  219189. / 1.86 /  230. /  630.
 843.67 /   0.02 /   0.17 /   0.0  /  843.68 /    0.75 /   0.08 /  0.000  *XS*
------------------------------------------------------------------------------------------
  1L AT   35040 /   720 /   2370. /  1486. /  131320. / 1.30 /  350. /  550.
 843.79 /   0.05 /   0.14 /   0.02 /  843.84 /    1.60 /   0.11 / -0.000  *XS*
------------------------------------------------------------------------------------------
  1M AT   35520 /   480 /   2370. /  1140. /   98376. / 1.52 /   10. /  210.
 843.97 /   0.10 /   0.21 /   0.03 /  844.08 /    2.08 /   0.18 / -0.000  *XS*
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	SECID	AT	DISTANCE	LENGTH	DISCHARGE	AREA	CONVEYANCE	ALPHA	LEW	REW
			HV	HF	HE		V	FN	ACC	*ID*
AZ	1MM	AT	35890	370	2370.	1403.	139999.	1.20	150.	350.
	844.17		0.05	0.15	0.0	844.23	1.69	0.12	-0.000	*XS*
BA	1MMM	AT	36450	560	2370.	3685.	206228.	1.92	160.	810.
	844.32		0.01	0.11	0.0	844.34	0.64	0.04	-0.000	*XS*
BB	1N	AT	37140	690	2370.	1642.	131965.	1.47	70.	370.
	844.45		0.05	0.14	0.02	844.50	1.44	0.13	-0.000	*XS*
BC	1O	AT	37400	260	2370.	1324.	123342.	1.32	5.	205.
	844.53		0.07	0.09	0.01	844.60	1.79	0.14	0.000	*XS*
BD	1P	AT	37790	390	2370.	1359.	124536.	1.52	140.	340.
	844.67		0.07	0.14	0.00	844.74	1.74	0.15	-0.000	*XS*
BE	1Q	AT	38290	500	2370.	1439.	116055.	2.03	5.	205.
	844.86		0.09	0.19	0.01	844.94	1.65	0.15	-0.000	*XS*
BF	1R	AT	38980	690	2370.	1731.	97210.	3.00	45.	295.
	845.20		0.09	0.34	0.00	845.29	1.37	0.18	0.000	*XS*
BG	1RR	AT	39460	480	2370.	3249.	150765.	3.20	140.	640.
	845.45		0.03	0.18	0.0	845.48	0.73	0.04	0.005	*XS*
BH	1S	AT	39950	490	2370.	3402.	147388.	2.21	500.	1000.
	845.58		0.02	0.12	0.0	845.60	0.70	0.04	0.000	*XS*

FW

END OF THIS PROFILE

FW

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SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
 S ELEV /    HV  /    HF  /    HE  /       /     V    /    FN  /   ACC    *ID*
==================================================================================
BH  1S AT   39950 /     0 /   2370. /  3399. /  147240. / 2.21 /  500. / 1000.
    845.58 /   0.02 /                 / 845.60 /    0.70 /   0.04/          *IS*
----------------------------------------------------------------------------------
BI  1SS   AT   40250 /   300 /    650. /  1573. /   92917. / 2.58 /    5. /  235.
    845.64 /   0.01 /   0.05 /    0.0  / 845.65 /    0.41 /   0.05 / 0.000  *XS*
----------------------------------------------------------------------------------
BJ  1T AT   40690 /   440 /    650. /  1348. /  111414. / 1.43 /  140. /  340.
    845.64 /   0.01 /   0.02 /    0.0  / 845.65 /    0.48 /   0.04 / -0.020  *XS*
============================ BEGIN BRIDGE ANALYSIS ==============================
BR  1T AT   40690 /       /    233. /   291. /   20712. / 1.00 /    0. /   40.
    842.50 /   0.01 /       ...3...  (-.001)    /    0.80 /   0.05 /          *BO*
----------------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       18. / RIGHT     394. /                *RG*
----------------------------------------------------------------------------------
    1U AT   40750 /    60 /    650. /  1439. /  131684. / 1.87 /  -10. /  190.
    845.65 /   0.01 /   0.00 /   0.02 / 845.66 /    0.45 /   0.04 / -0.011  *AS*
----------------------------------------------------------------------------------
BK  M = **** / E = **** / K* = **** /  1439. /  131684. / 1.87 /  -10. /  190.
    845.65 /   0.01 /                 / 845.66 /    0.45 /   0.04 /          *AS*
============================ END BRIDGE ANALYSIS ================================
BL  1UU AT   41240 /   490 /    650. /  2334. /  135276. / 2.67 /  220. /  570.
    845.65 /   0.00 /   0.01 /   0.0  / 845.65 /    0.28 /   0.03 / -0.014  *XS*
----------------------------------------------------------------------------------
BM  1V AT   41690 /   450 /    650. /  1892. /  110855. / 2.55 /  320. /  670.
    845.65 /   0.00 /   0.01 /   0.00 / 845.65 /    0.34 /   0.04 / -0.012  *XS*
----------------------------------------------------------------------------------
BN  1VV   AT   41820 /   130 /    650. /  1715. /  113994. / 1.92 /  150. /  450.
    845.65 /   0.00 /   0.00 /   0.0  / 845.65 /    0.38 /   0.04 / -0.005  *XS*
----------------------------------------------------------------------------------
BØ  1W AT   42400 /   580 /    650. /  2421. /  104144. / 2.65 / 1330. / 1780.
    845.67 /   0.00 /   0.02 /   0.0  / 845.67 /    0.27 /   0.01 /  0.000  *XS*
----------------------------------------------------------------------------------
BP  1X AT   43520 /  1120 /    650. /  2546. /  103087. / 2.77 /  600. / 1100.
    845.72 /   0.00 /   0.04 /   0.0  / 845.72 /    0.26 /   0.01 / -0.000  *XS*
----------------------------------------------------------------------------------
BQ  1Y AT   45200 /  1680 /    650. /  1490. /   91980. / 2.57 /  150. /  450.
    845.79 /   0.01 /   0.07 /   0.00 / 845.80 /    0.44 /   0.05 / -0.000  *XS*
----------------------------------------------------------------------------------
BR  1Z AT   45890 /   690 /    650. /  1433. /  100491. / 1.32 /  120. /  400.
    845.82 /   0.00 /   0.03 /   0.0  / 845.83 /    0.45 /   0.03 / -0.000  *XS*
----------------------------------------------------------------------------------
BS  2A AT   46530 /   640 /    650. /  1428. /   71735. / 2.11 /  285. /  535.
    845.86 /   0.01 /   0.04 /   0.00 / 845.87 /    0.46 /   0.05 / -0.000  *XS*
----------------------------------------------------------------------------------
BT  2B AT   47130 /   600 /    650. /  1049. /   54238. / 1.70 /   40. /  240.
    845.93 /   0.01 /   0.07 /   0.00 / 845.93 /    0.62 /   0.07 / 0.000  *XS*
```

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---------------------------------------------------------------------------
========================== BEGIN BRIDGE ANALYSIS ==========================
B 2B AT   47130 /       /    271. /   127.      8010. / 1.00 /    0. /   24.
  844.50 /   0.07 /        ...3...  (-.001)    /  2.13 /   0.15 /          *BO*
---------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT     377. /              *RG*
---------------------------------------------------------------------------
  2C AT   47220 /    90 /    650. /   595. /   32971. / 2.78 /   -5. /  195.
  845.93 /   0.05 /   0.02 /   0.04 /  845.99 /   1.09 /   0.13 / -0.011  *AS*
---------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /   605. /   33567. / 2.78 /   -5. /  195.
  845.98 /   0.05 /                  /  846.03 /   1.07 /   0.13 /          *AS*
========================== END BRIDGE ANALYSIS ============================
 2CC AT   47840 /   620 /    650. /  1800. /   86282. / 2.03 /  350. /  750.
  846.12 /   0.00 /   0.09 /   0.0  /  846.12 /   0.36 /   0.02 / -0.000  *XS*
---------------------------------------------------------------------------
  2D AT   48020 /   180 /    650. /  1629. /   82546. / 2.02 /  600. / 1000.
  846.12 /   0.01 /   0.01 /   0.00 /  846.13 /   0.40 /   0.05 / -0.010  *XS*
---------------------------------------------------------------------------
  2E AT   48800 /   780 /    650. /   911. /   62909. / 1.86 /   20. /  270.
  846.18 /   0.01 /   0.06 /   0.00 /  846.19 /   0.71 /   0.07 /  0.000  *XS*
---------------------------------------------------------------------------
  2F AT   49440 /   640 /    650. /   631. /   45207. / 1.46 /  250. /  400.
  846.27 /   0.02 /   0.10 /   0.00 /  846.29 /   1.03 /   0.09 / -0.000  *XS*
========================== REGIN BRIDGE ANALYSIS ==========================
BR 2F AT   49440 /       /    566. /   226. /   17968. / 1.00 /    0. /   32.
  845.90 /   0.10 /        ...3...  (-.001)    /  2.51 /   0.17 /          *BO*
---------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT       67. / RIGHT      15. /              *RG*
---------------------------------------------------------------------------
  2G AT   49500 /    60 /    650. /   713. /   56168. / 1.51 /  -10. /  140.
  846.28 /   0.02 /   0.01 /   0.01 /  846.30 /   0.91 /   0.09 / -0.011  *AS*
---------------------------------------------------------------------------
  M = **** / E = **** / K* = **** /   731. /   58322. / 1.50 /  -10. /  140.
  846.40 /   0.02 /                  /  846.42 /   0.89 /   0.08 /          *AS*
========================== END BRIDGE ANALYSIS ============================
 2GG AT   49720 /   220 /    650. /   675. /   55963. / 1.30 /  140. /  290.
  846.43 /   0.02 /   0.03 /   0.00 /  846.45 /   0.96 /   0.08 / -0.000  *XS*
---------------------------------------------------------------------------
  2H AT   50000 /   280 /    650. /   573. /   51314. / 1.07 /   25. /  125.
  846.47 /   0.02 /   0.04 /   0.00 /  846.49 /   1.13 /   0.08 / -0.000  *XS*
---------------------------------------------------------------------------
  2I AT   50360 /   360 /    650. /   771. /   76877. / 1.05 /   60. /  190.
  846.52 /   0.01 /   0.04 /   0.0  /  846.53 /   0.84 /   0.06 / -0.000  *XS*
---------------------------------------------------------------------------
 2II AT   50820 /   460 /    650. /  2239. /  143378. / 1.90 /  370. /  820.
  846.55 /   0.00 /   0.02 /   0.0  /  846.55 /   0.29 /   0.03 / -0.000  *XS*
---------------------------------------------------------------------------
  2J AT   51810 /   990 /    650. /  1818. /   86570. / 2.25 /  200. /  550.
  846.58 /   0.00 /   0.03 /   0.00 /  846.59 /   0.36 /   0.03 / -0.000  *XS*
```

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	SECTIO AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / WG	ALPHA / V	LEW / FN	REW / ACC	*ID*
CF	2K AT 52260	450	650.	2138.	107452.	2.24	1300.	1700.	
	846.60	0.00	0.02	0.0	846.61	0.30	0.04	-0.000	*XS*
CG	2L AT 53160	900	650.	3697.	268308.	1.63	1400.	2000.	
	846.60	0.00	0.01	0.0	846.60	0.18	0.02	-0.016	*XS*
CH	2M AT 55230	2070	650.	3043.	128629.	2.39	300.	1000.	
	846.63	0.00	0.03	0.00	846.63	0.21	0.04	-0.000	*XS*
CI	2N AT 56280	1050	650.	1315.	85063.	1.58	135.	435.	
	846.67	0.01	0.04	0.00	846.67	0.49	0.05	-0.000	*XS*
CJ	2O AT 57000	720	650.	332.	18312.	1.96	45.	195.	
	846.81	0.12	0.20	0.06	846.92	1.96	0.23	0.000	*XS*
CK	2P AT 57260	260	650.	647.	33202.	1.84	205.	380.	
	847.06	0.03	0.18	0.0	847.09	1.00	0.12	-0.019	*XS*
CL	2Q AT 58340	1080	650.	768.	53063.	1.63	210.	385.	
	847.31	0.02	0.26	0.0	847.32	0.85	0.09	-0.020	*XS*
CM	2R AT 58750	410	650.	856.	42749.	1.84	250.	500.	
	847.39	0.02	0.08	0.0	847.40	0.76	0.09	0.000	*XS*
CN	2S AT 59330	580	650.	925.	29980.	2.57	-35.	265.	
	847.58	0.02	0.19	0.00	847.59	0.70	0.05	-0.000	*XS*
CO	2T AT 59750	420	650.	1071.	53925.	1.82	220.	570.	
	847.69	0.01	0.11	0.0	847.70	0.61	0.07	0.000	*XS*
CP	2U AT 61080	1330	650.	1463.	62418.	1.56	600.	1000.	
	847.87	0.00	0.17	0.0	847.87	0.44	0.03	0.000	*XS*
CQ	2V AT 61950	870	650.	1343.	56539.	2.18	570.	970.	
	847.97	0.01	0.10	0.00	847.98	0.48	0.07	0.000	*XS*
CR	2W AT 62600	650	650.	1341.	46382.	2.27	250.	650.	
	848.08	0.01	0.10	0.00	848.08	0.48	0.03	0.000	*XS*
CS	2WW AT 63030	430	650.	688.	33348.	1.61	280.	480.	
	848.19	0.02	0.12	0.01	848.21	0.94	0.13	0.000	*XS*
CT	2X AT 63660	630	650.	731.	27022.	1.95	80.	380.	
	848.48	0.02	0.30	0.00	848.51	0.89	0.16	0.001	*XS*

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SECID AT DISTANCE/ LENGTH/DISCHARGE/  AREA  /CONVEYANCE/ ALPHA/  LEW  /  REW
WS ELEV /    HV  /    HF  /    HE  /     G  /     V  /    FN  /   ACC   *ID*
==========================================================================
   2Y AT   64190 /   530 /    650. /   335. /   16595. / 1.98 /   25. /  150.
   848.94 /   0.12 /   0.50 /   0.05 /  849.05 /   1.94 /   0.27 /  0.001  *XS*
--------------------------------------------------------------------------
  2YY AT   64450 /   260 /    650. /   325. /   18775. / 1.94 /   25. /  125.
   849.29 /   0.12 /   0.35 /   0.00 /  849.41 /   2.00 /   0.24 /  0.001  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR2YY AT   64450 /       /    437. /    63. /    4784. / 1.00 /    0. /   13.
   849.29 /   0.75 /       ...1...  (-.001)    /   6.05 /   0.56 /         *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT     209. /              *RG*
--------------------------------------------------------------------------
 2YYY AT   64490 /    40 /    650. /   221. /    8429. / 2.91 /    0. /  100.
   849.30 /   0.39 /   0.11 /   0.18 /  849.69 /   2.94 /   0.57 / -0.011  *AS*
--------------------------------------------------------------------------
   M = 0.25 / E = 0.11 / K* = 0.39 /   264. /   10735. / 2.74 /    0. /  100.
   849.73 /   0.26 /                 /  849.98 /   2.46 /   0.45 /         *AS*
========================== END BRIDGE ANALYSIS ============================
   2Z AT   65040 /   550 /    650. /   475. /   26542. / 1.64 /  130. /  280.
   850.75 /   0.05 /   0.82 /   0.0  /  850.80 /   1.37 /   0.16 /  0.001  *XS*
==========================================================================
   3A AT   65360 /   320 /    650. /   238. /   13651. / 1.63 /   97. /  187.
   851.06 /   0.19 /   0.37 /   0.07 /  851.24 /   2.73 /   0.32 /  0.000  *XS*
--------------------------------------------------------------------------
   3B AT   65810 /   450 /    650. /   234. /   13303. / 1.30 /   12. /   87.
   852.14 /   0.16 /   1.05 /   0.0  /  852.29 /   2.78 /   0.29 /  0.001  *XS*
--------------------------------------------------------------------------
   3C AT   66480 /   670 /    650. /   780. /   45954. / 1.60 /   50. /  250.
   852.74 /   0.02 /   0.46 /   0.0  /  852.76 /   0.83 /   0.09 /  0.000  *XS*
--------------------------------------------------------------------------
   3D AT   67050 /   570 /    650. /   323. /   23024. / 1.34 /  120. /  220.
   852.93 /   0.08 /   0.23 /   0.03 /  853.02 /   2.01 /   0.19 /  0.000  *XS*
========================== BEGIN BRIDGE ANALYSIS ==========================
BR 3D AT   67050 /       /    650. /   172. /   15423. / 1.00 /    0. /   32.
   852.93 /   0.22 /       ...1...  (-.001)    /   3.79 /   0.29 /         *BO*
--------------------------------------------------------------------------
EMBANKMENT OVERFLOW (CFS) / LEFT        0. / RIGHT       0. /              *RG*
--------------------------------------------------------------------------
   3E AT   67130 /    80 /    650. /   539. /   30000. / 2.40 /  -60. /   90.
   853.01 /   0.05 /   0.05 /   0.0  /  853.07 /   1.20 /   0.15 / -0.000  *AS*
--------------------------------------------------------------------------
   M = 0.32 / E = 0.75 / K* = 0.70 /   563. /   31738. / 2.39 /  -60. /   90.
   853.17 /   0.05 /                 /  853.22 /   1.15 /   0.15 /         *AS*
========================== END BRIDGE ANALYSIS ============================

                    END OF THIS PROFILE
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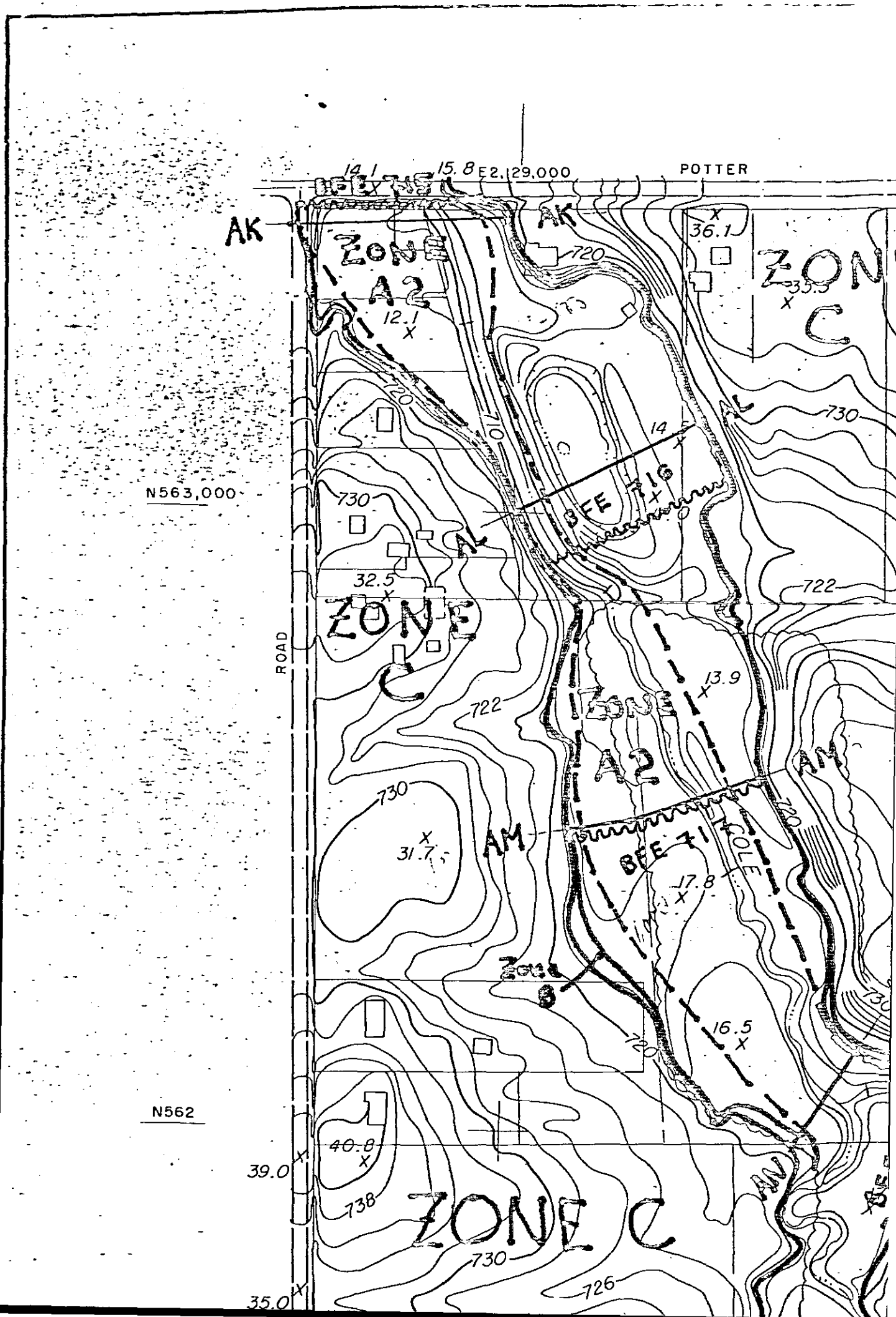
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32.5
722
ROAD
13.9
ZONE A2
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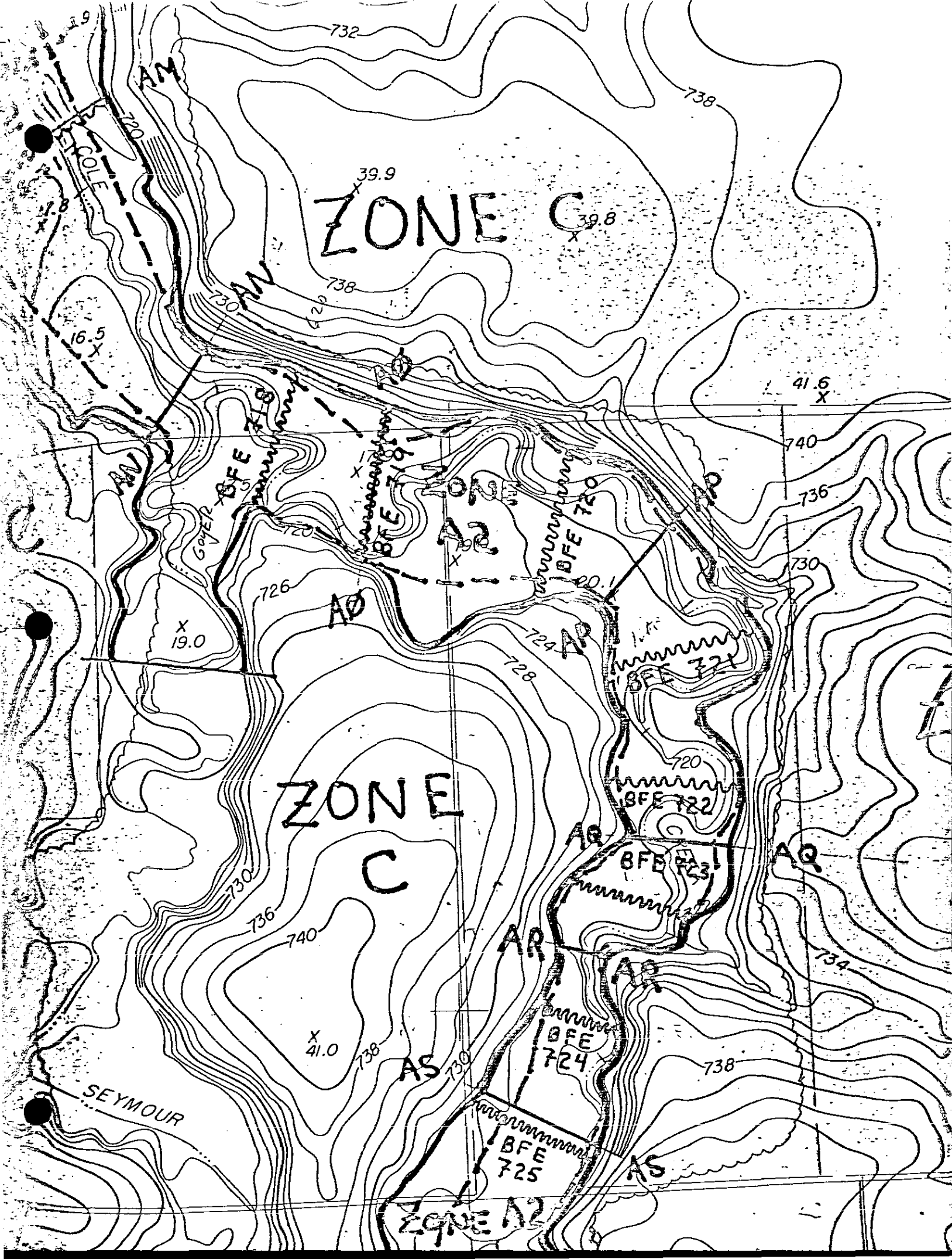
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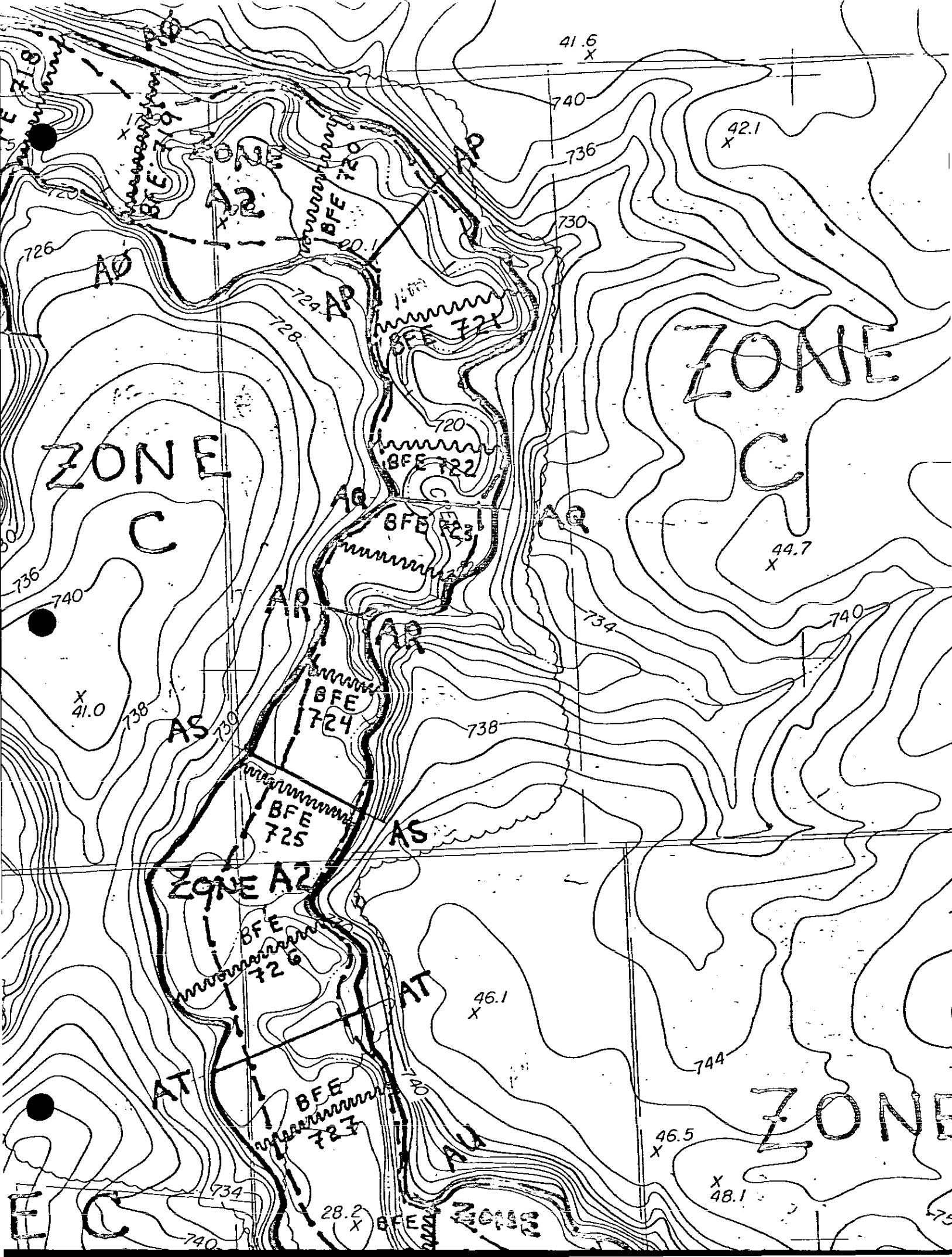
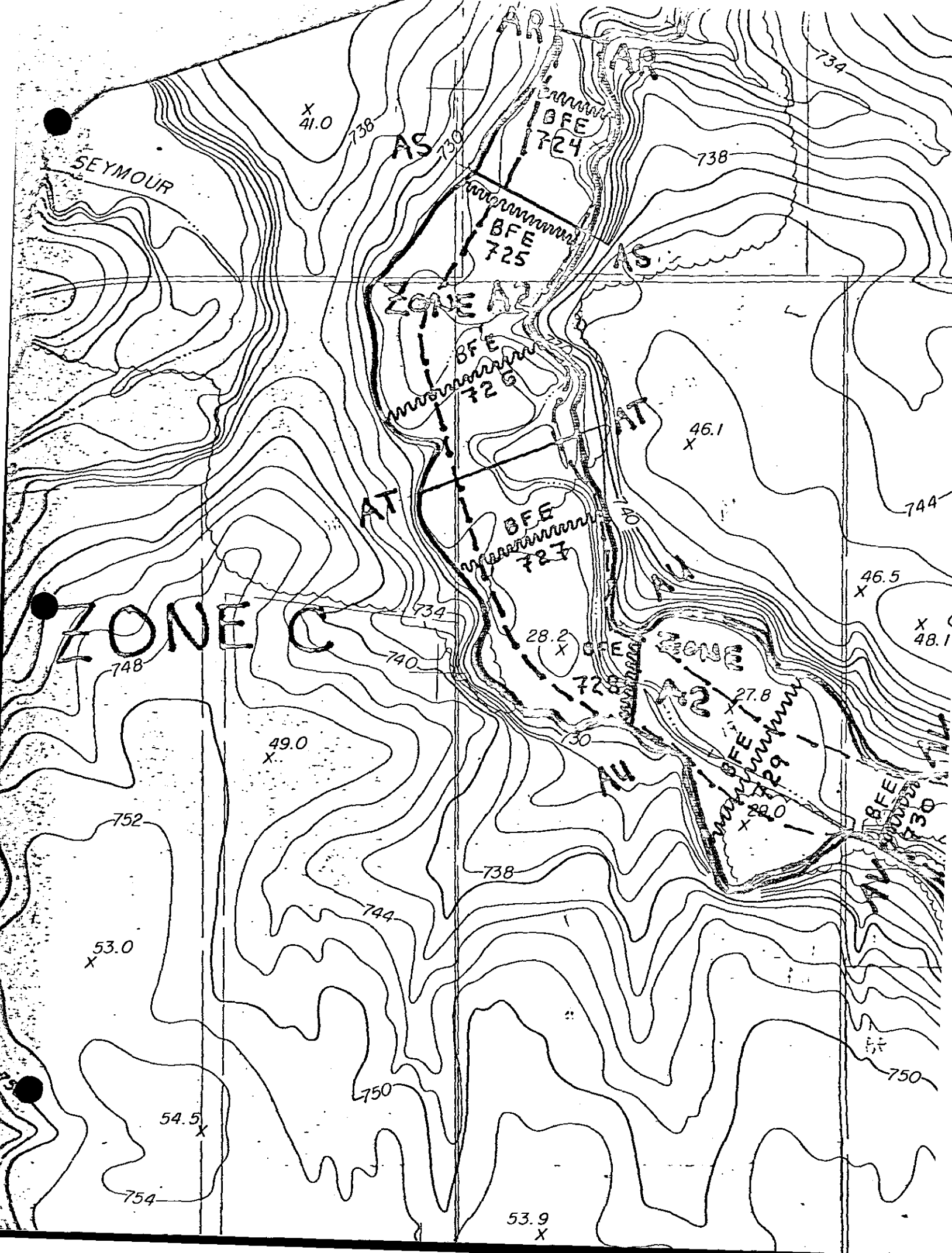
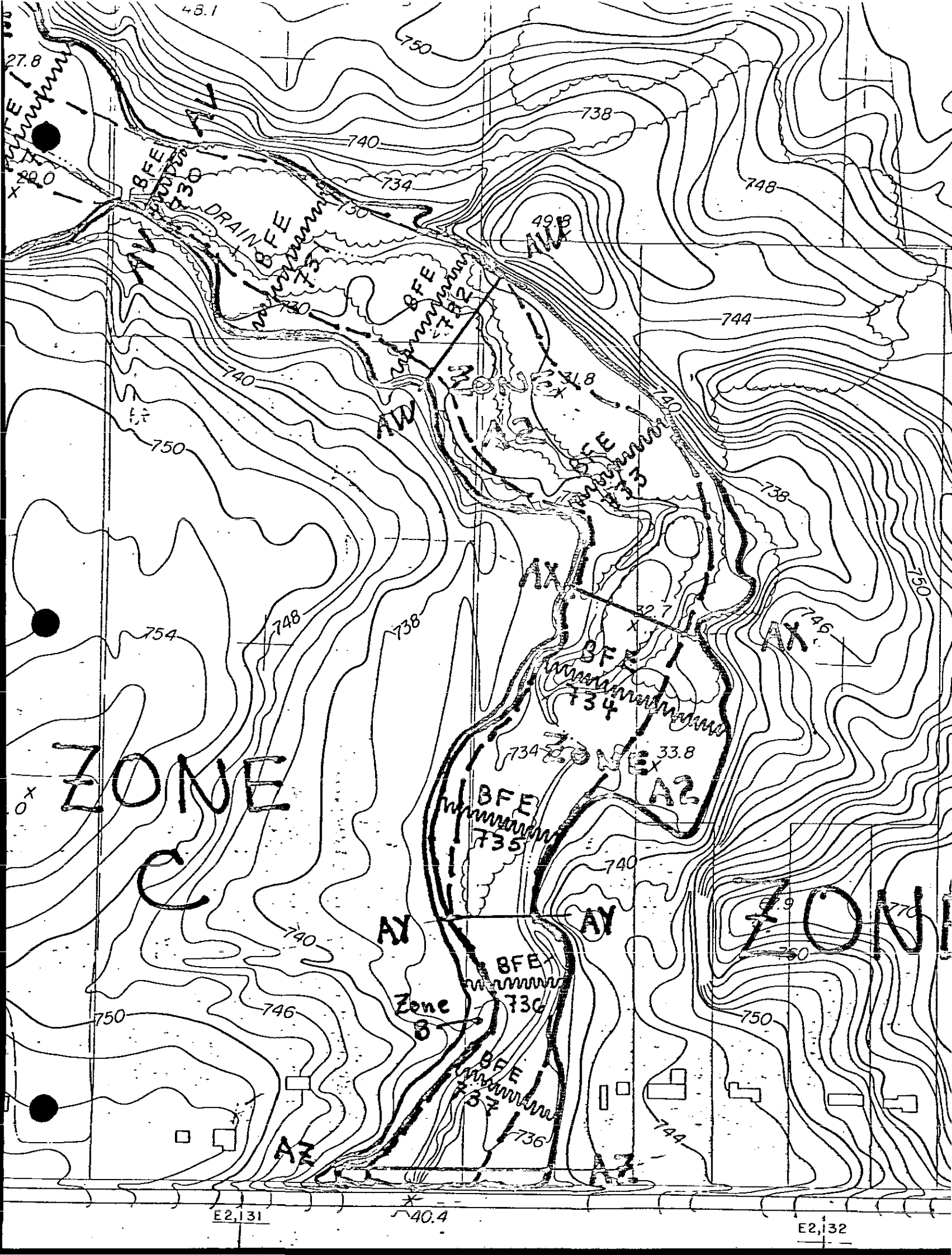
19.0
41.0

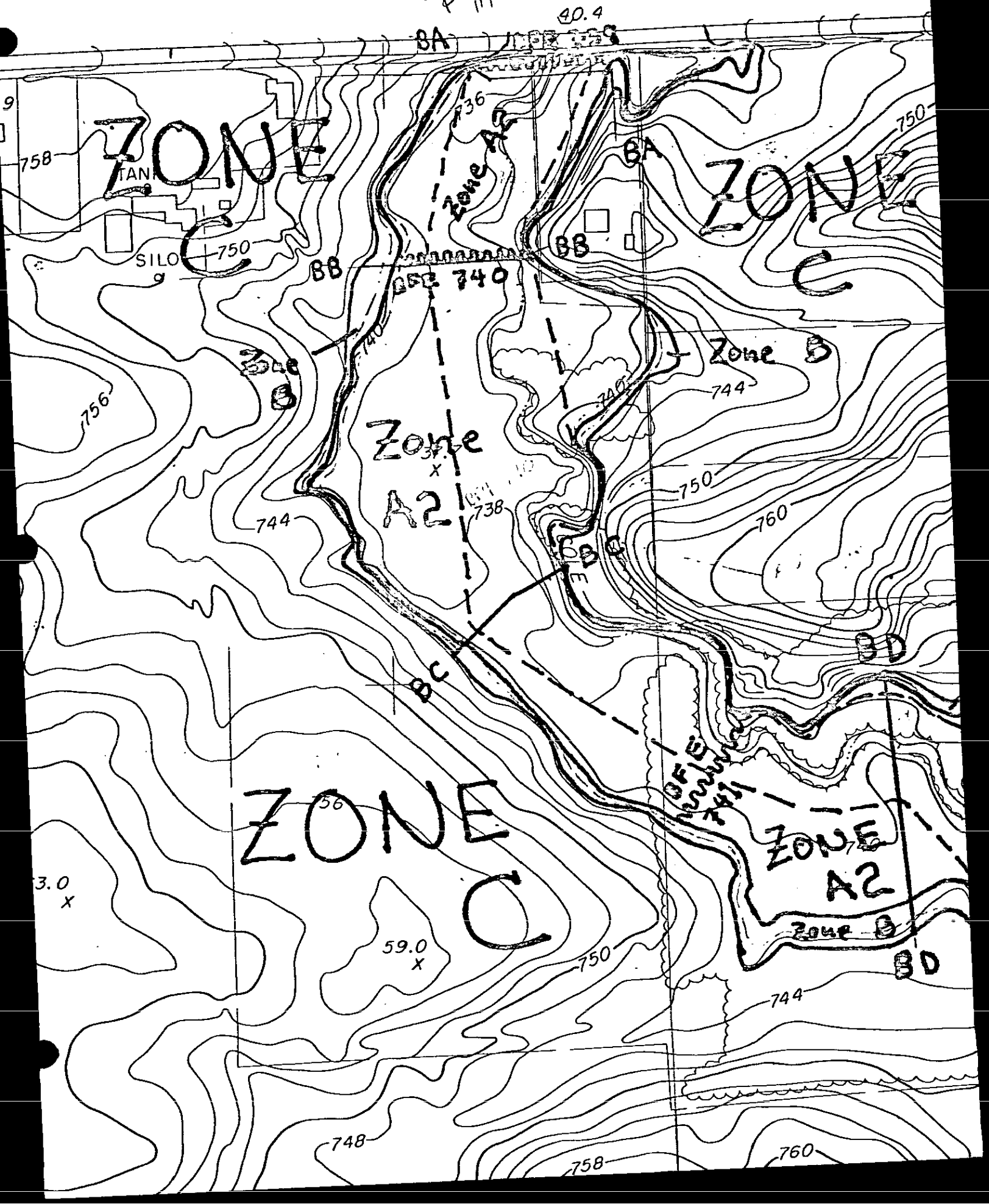

ZONE C
ZONE C
ZONE C
ZONE A2
ZONE
BFE 719
BFE 720
BFE 721
BFE 722
BFE 723
BFE 724
BFE 725
BFE 726
BFE 727
AP
AQ
AR
AS
AT
41.6
42.1
44.7
41.0
46.1
46.5
48.1
28.2
740
736
730
726
724
728
720
734
738
744

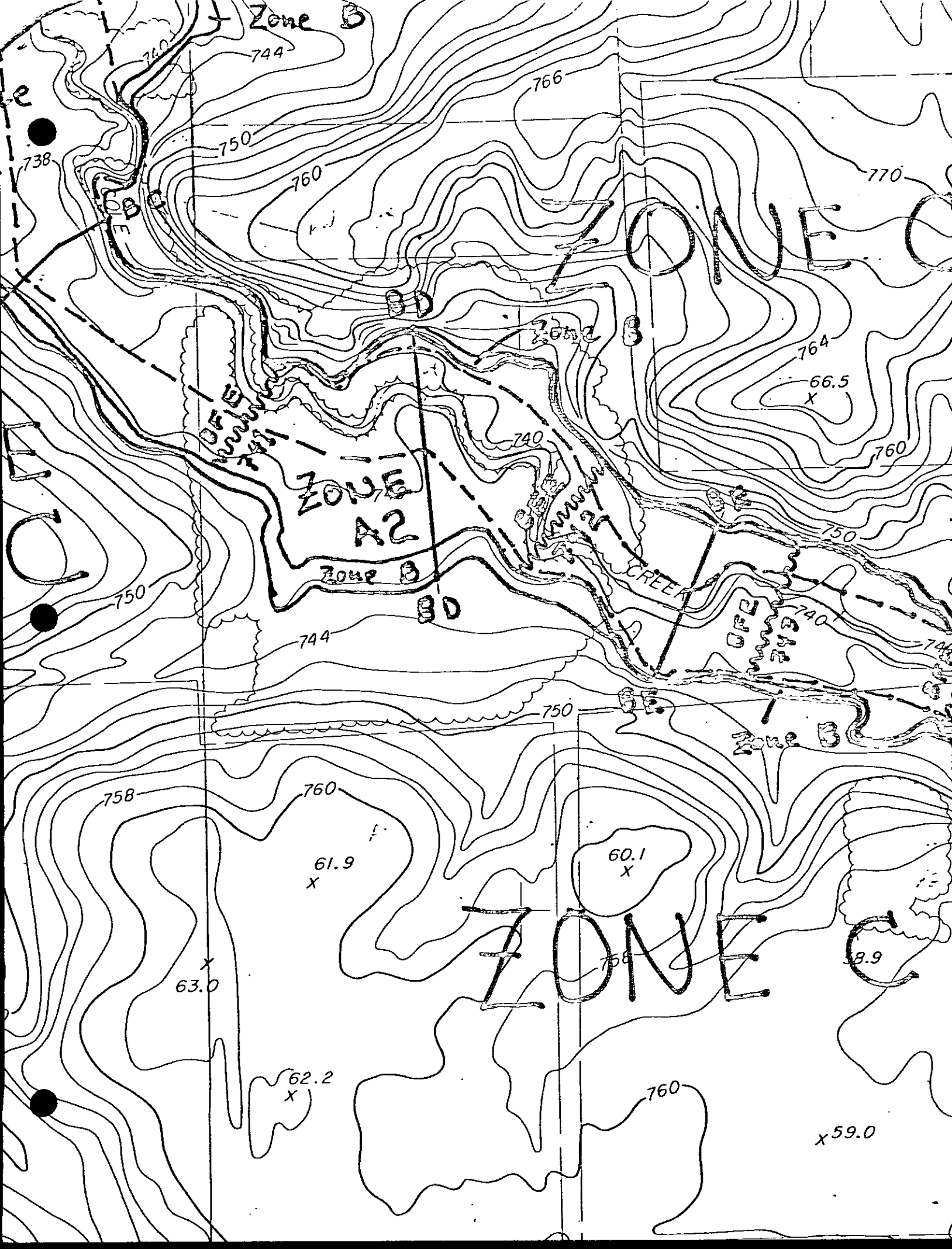

SEYMOUR
ZONE C
ZONE A2
AR
AS
AT
BFE 724
BFE 725
BFE 726
BFE 727
BFE 728
BFE 729
BFE 730
41.0
46.1
46.5
48.1
28.2
27.8
49.0
53.0
54.5
53.9
734
738
740
744
748
750
752
754

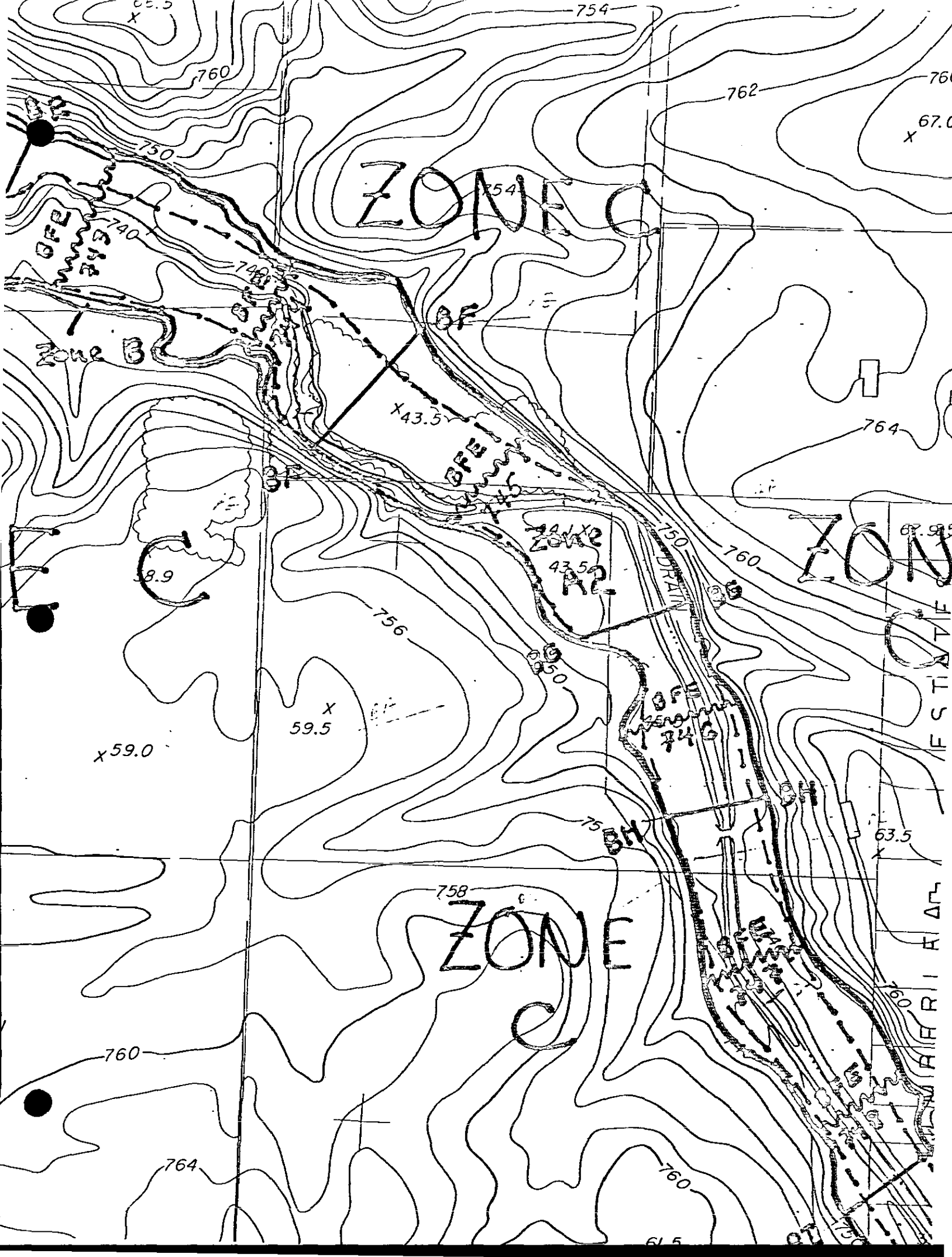

ZONE C
ZONE
AW
AX
AY
AZ
BFE
730
731
732
733
734
735
736
DRAINE
Zone B
750
748
746
744
740
738
734
754
E2,131
E2,132
40.4

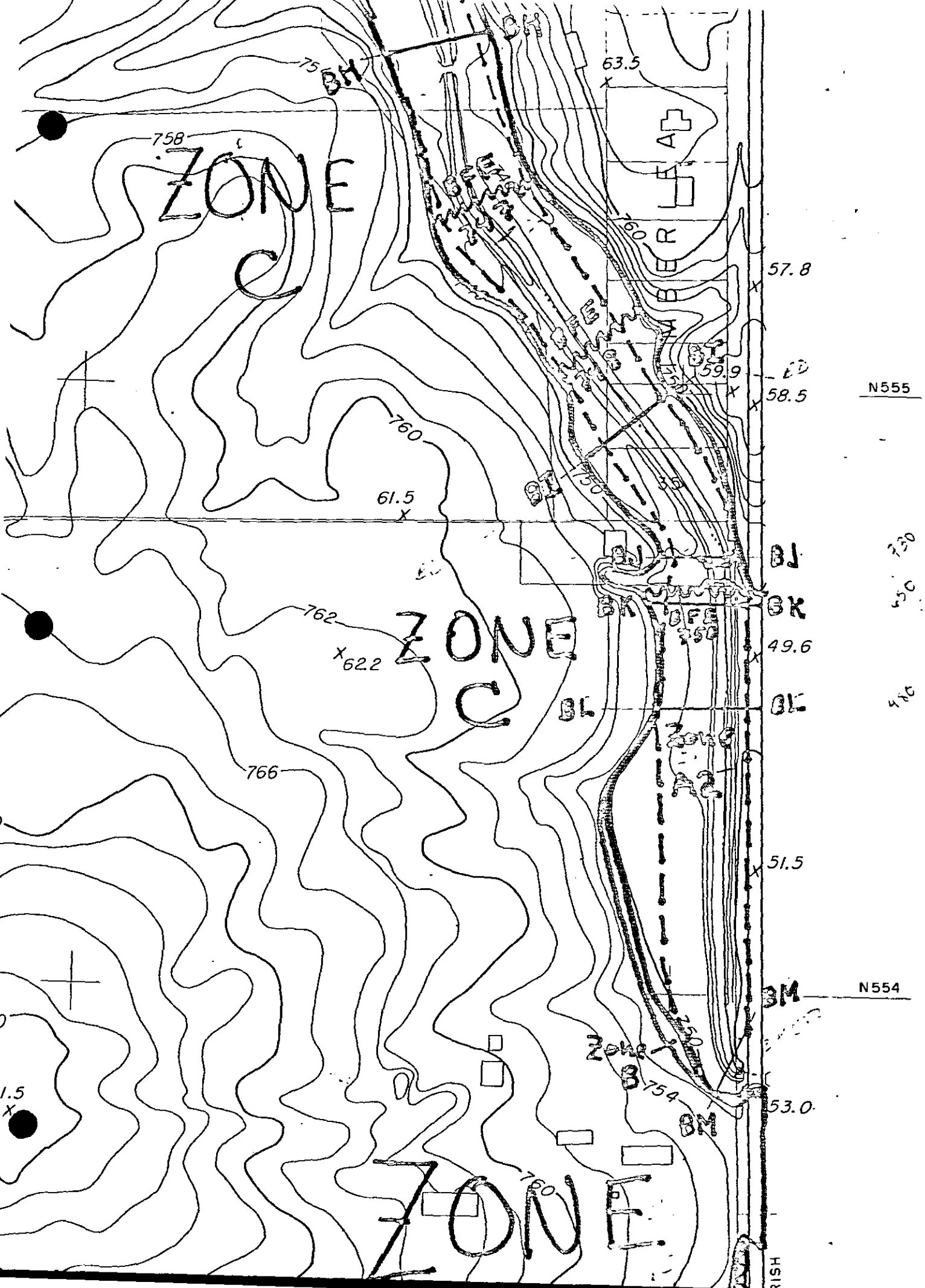
E2,131

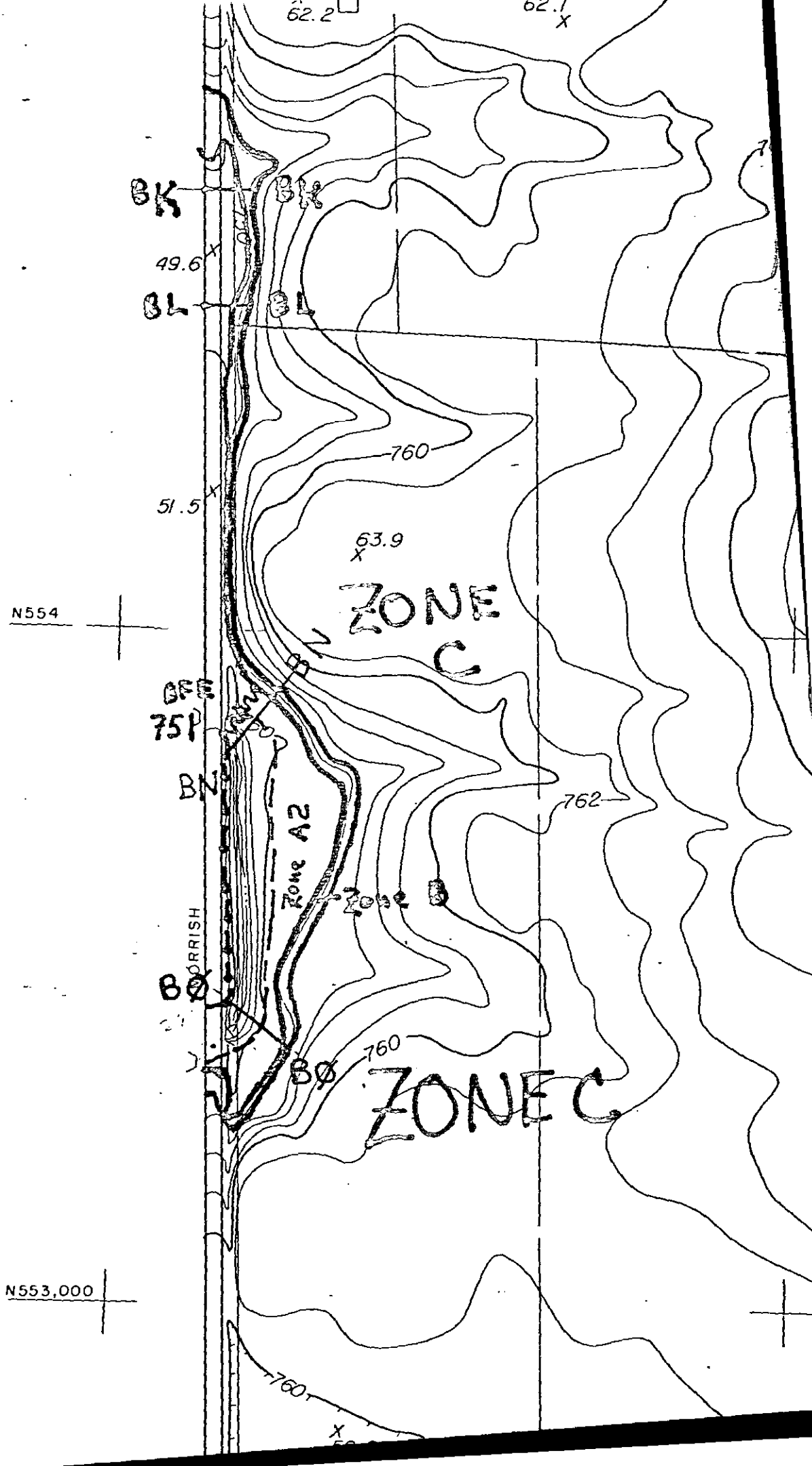
Revised 11/78

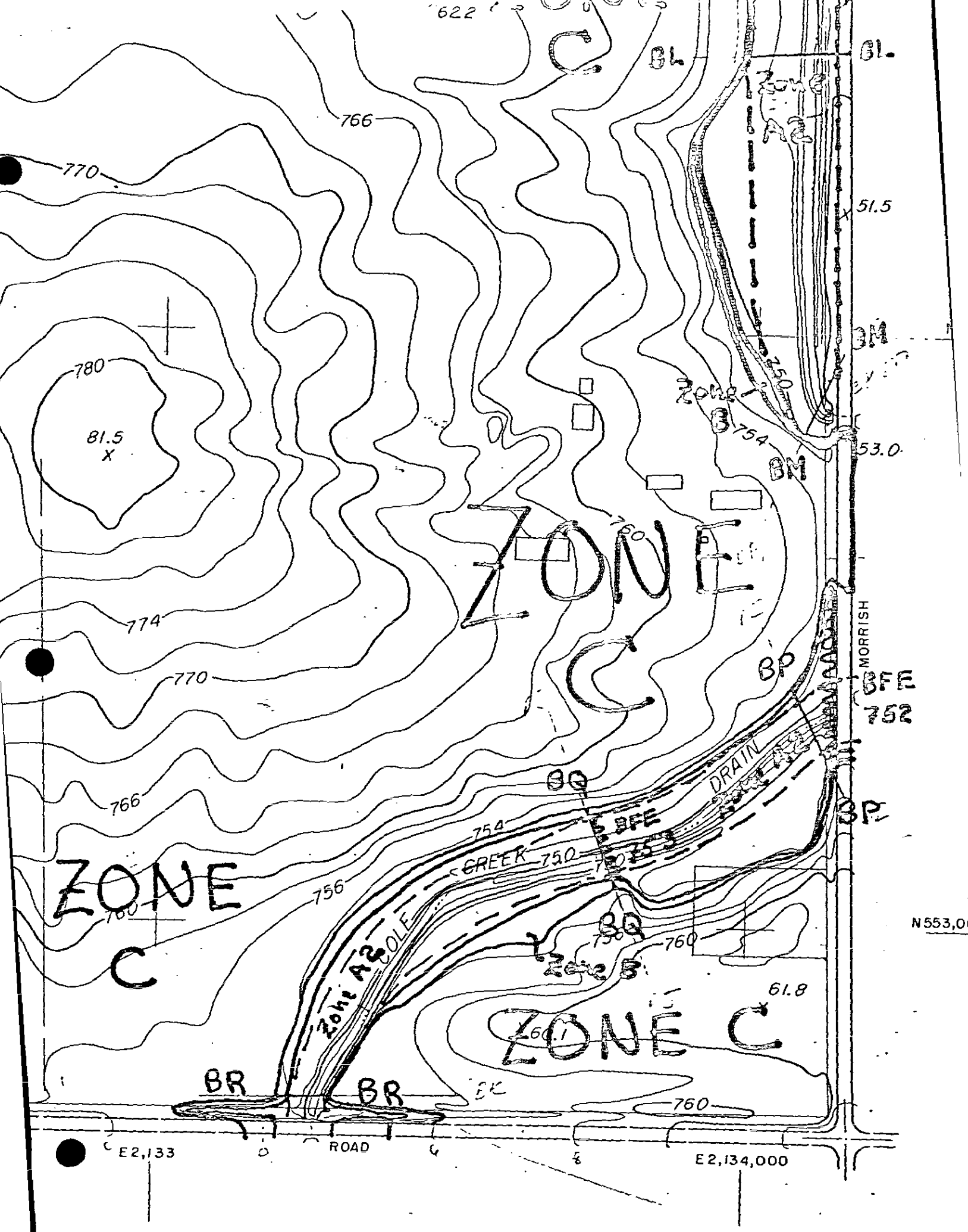


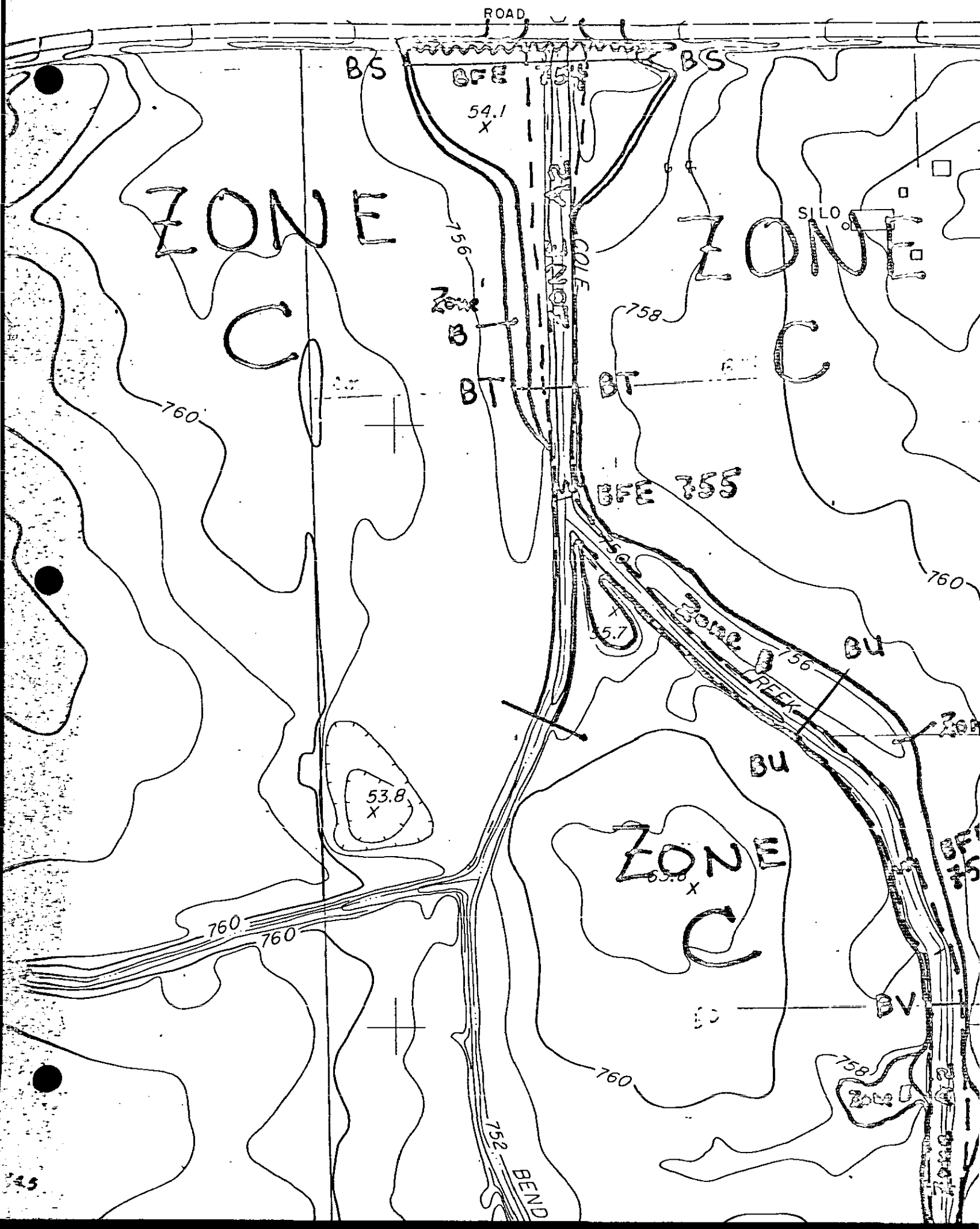

Zone B
740
744
766
750
738
760
770
ZONE C
BD
Zone B
764
66.5
740
ZONE A2
Zone B
BD
750
CREEK
740
744
750
Zone B
758
760
61.9
60.1
ZONE C
63.0
758
58.9
62.2
760
59.0

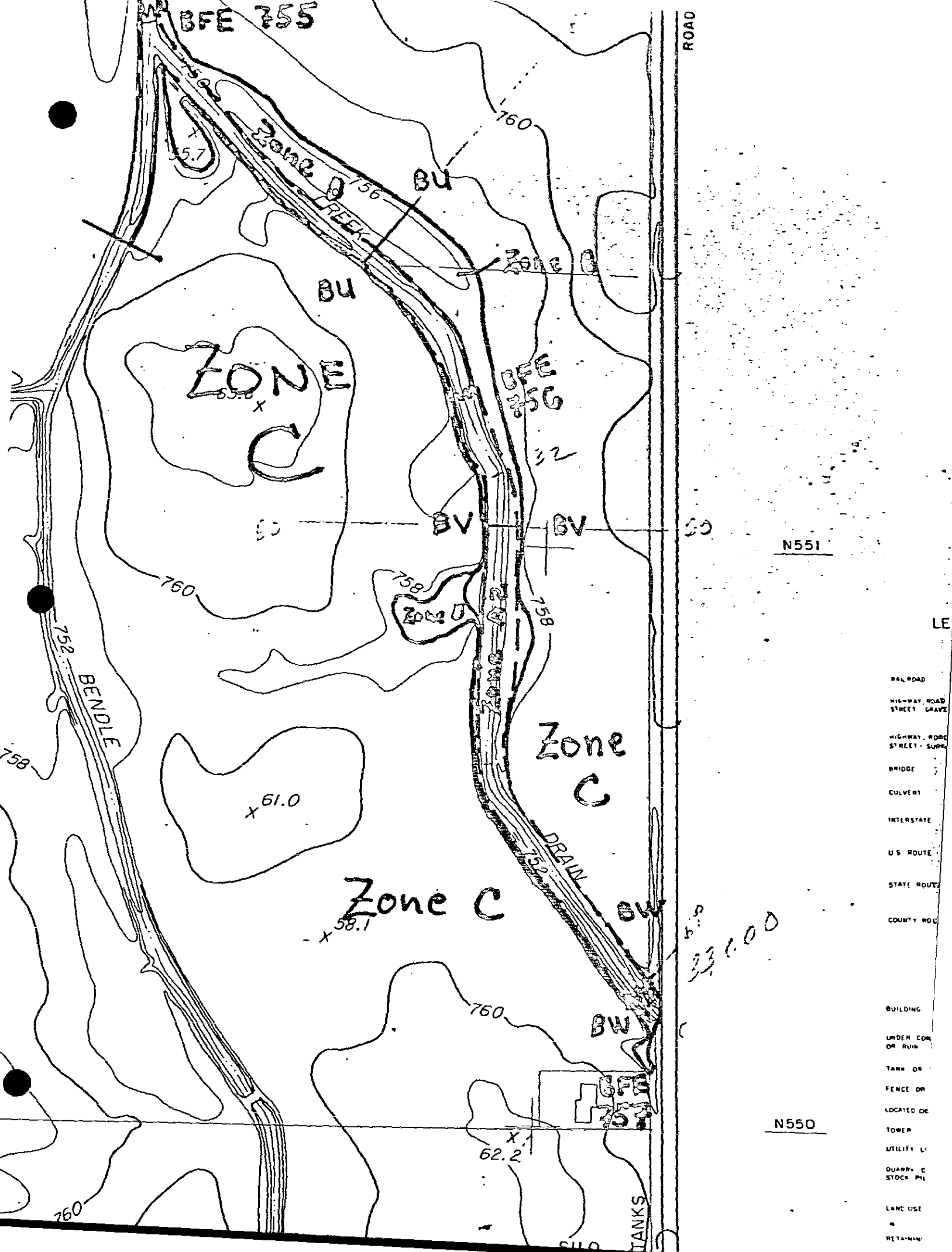

ZONE C
ZONE B
ZONE A2
ZONE C
ZONE C
754
760
762
750
740
748
756
758
764
43.5
43.5
59.5
59.0
63.5
BF
BH
DRAIN

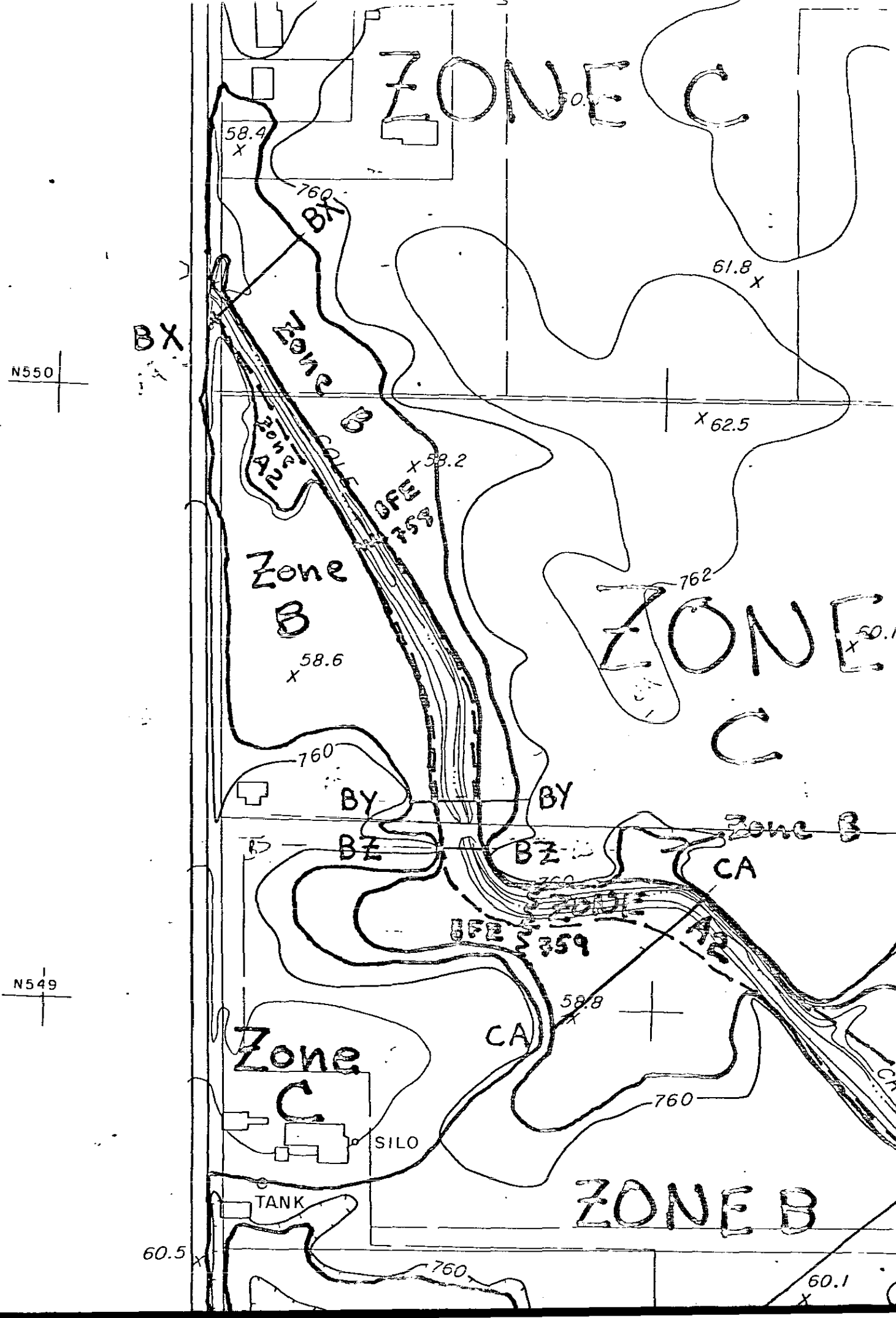

ZONE C
ZONE C
ZONE
Zone A2
Zone B
BH
BJ
BK
BL
BM
N555
N554
63.5
57.8
59.9
58.5
61.5
62.2
49.6
51.5
53.0
758
760
762
766
754
750

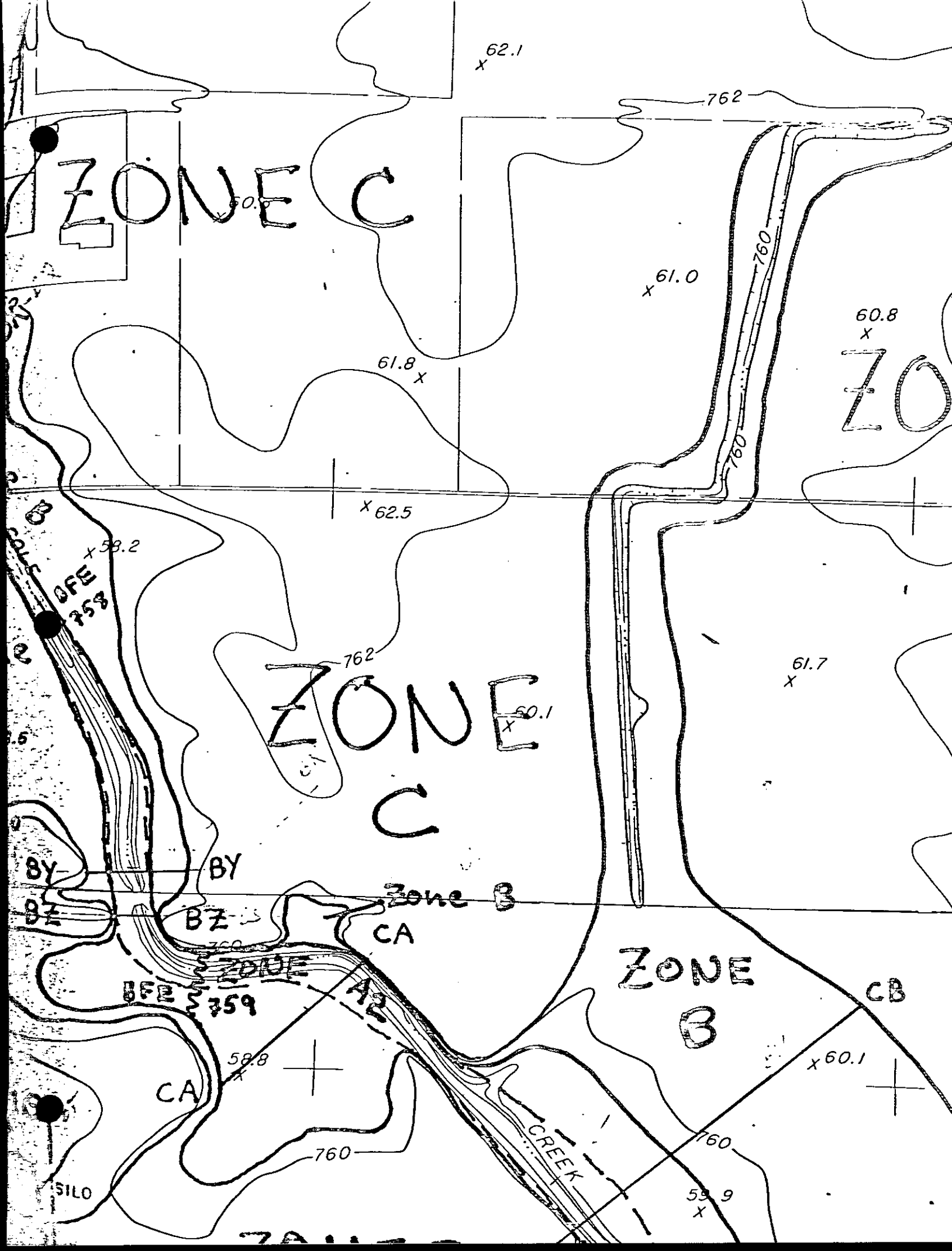

62.2
62.1
BK
BK
49.6
BL
BL
760
51.5
63.9
ZONE C
N554
BFE
75P
BN
762
Zone A2
Zone B
BØ
BØ
760
ZONE C
N553,000
760

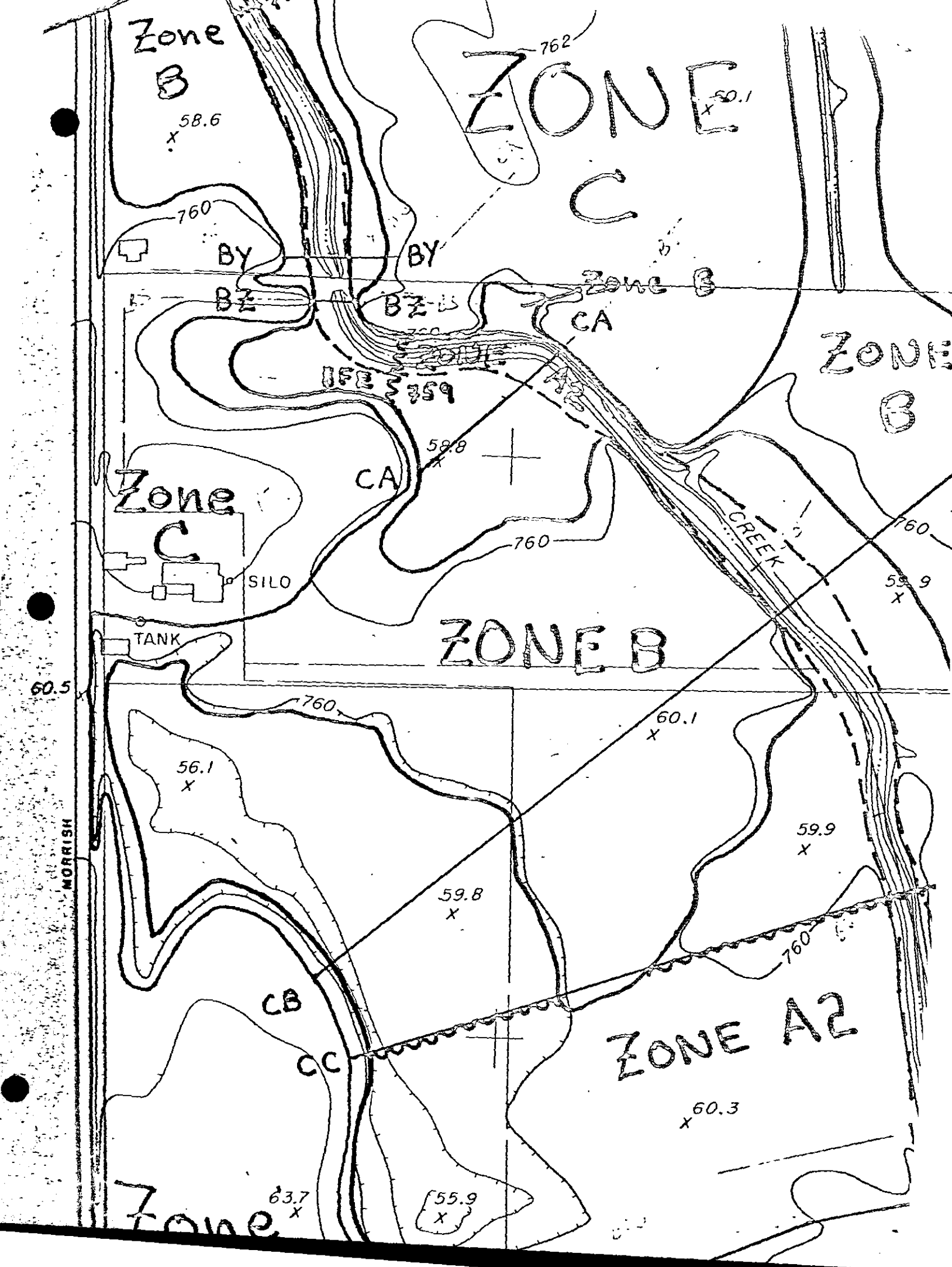

622
C
BL
BL
Zone A2
766
770
51.5
BM
780
81.5
750
Zone B
754
53.0
BM
ZONE
760
774
770
MORRISH
BP
BFE
752
DRAIN
BQ
766
754
BFE
BP
CREEK
750
752
ZONE
C
756
760
N553,0
BQ
750
760
Zone A2
COLE
Zone B
61.8
ZONE C
60.1
BR
BR
BL
760
E2,133
ROAD
E2,134,000

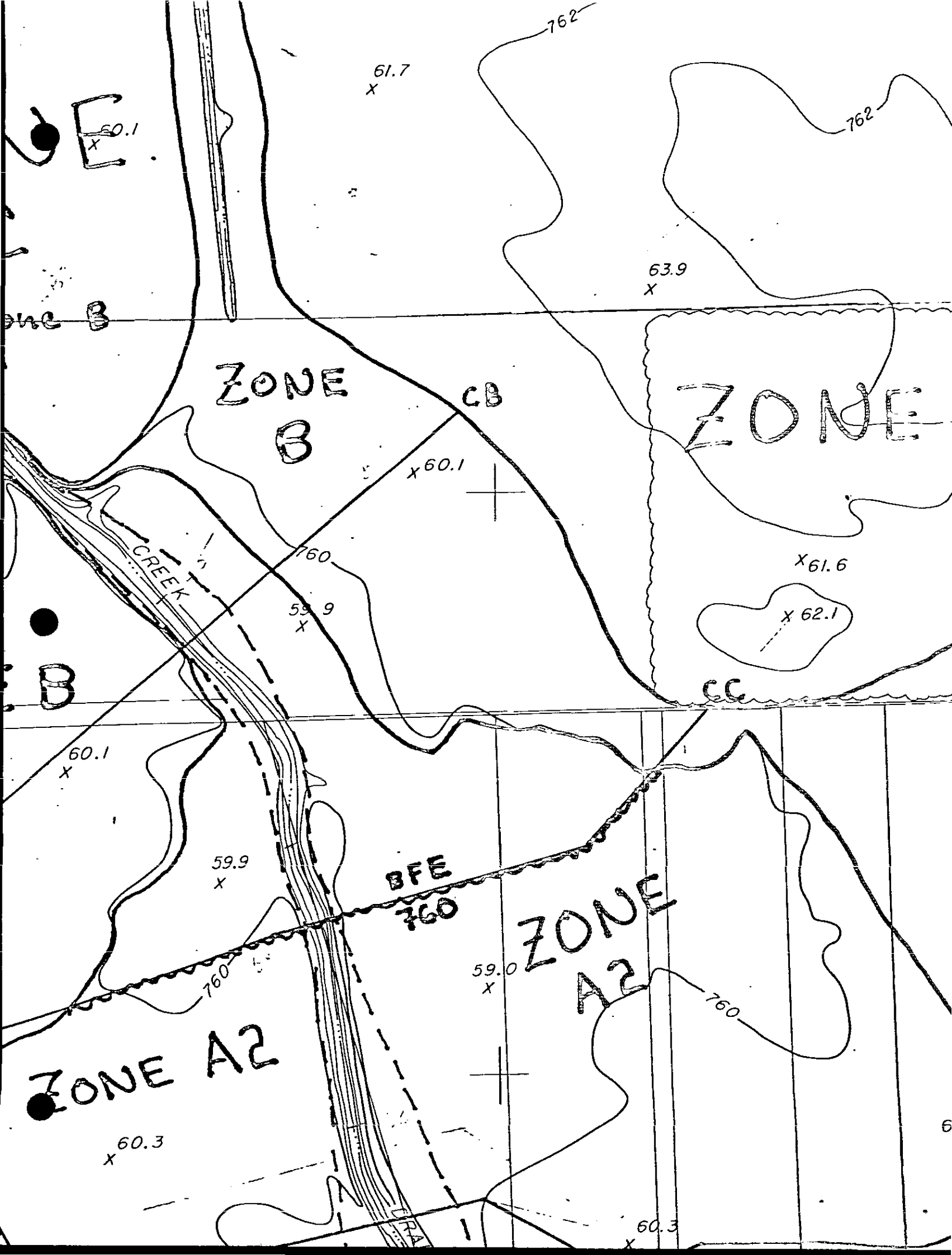

ROAD
BS
BFE
BS
54.1
ZONE
C
ZONE
C
SILO
756
758
Zone
B
BT
BT
760
BFE
755
Zone
B
BU
BU
53.8
ZONE
C
760
760
BV
758
760
752
BEND

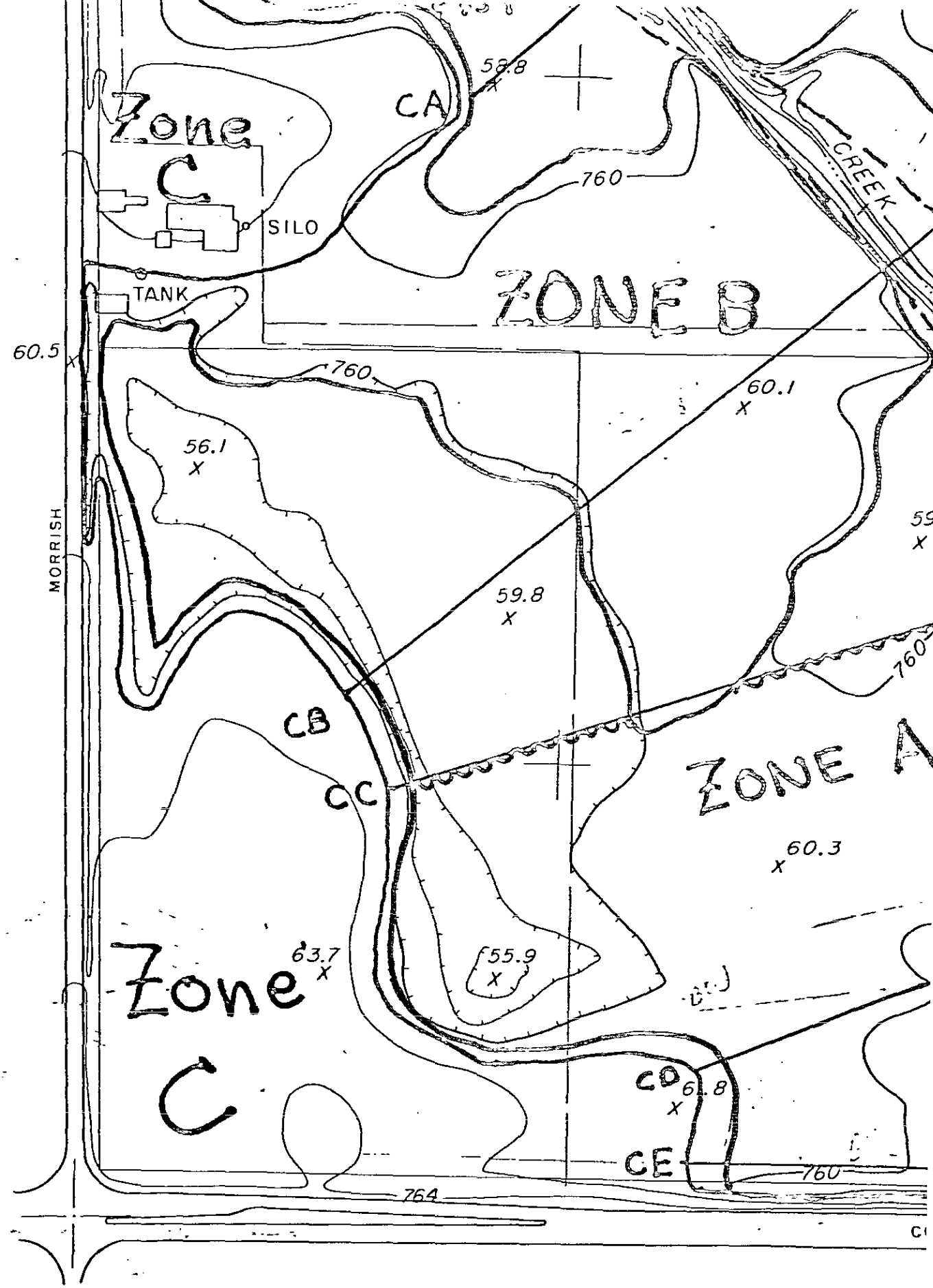

BFE 755
ROAD
760
Zone D
CREEK
756
BU
Zone C
BU
ZONE
C
BFE
756
BV
BV
N551
760
758
Zone D
758
752
BENDLE
758
Zone
C
61.0
DRAIN
752
Zone C
58.1
BW
760
BW
BFE
753
N550
62.2
760
TANKS


ZONE C
58.4
760
BX
61.8
BX
N550
Zone B
Zone A2
GOLF
58.2
BFE 759
62.5
Zone B
58.6
762
ZONE C
760
BY
BY
Zone B
BZ
BZ
CA
BFE 759
A2
N549
58.8
CA
Zone C
760
SILO
TANK
ZONE B
60.5
760
60.1


62.1
762
ZONE C
60.0
61.0
760
60.8
61.8
ZO
760
62.5
58.2
OFE 758
762
ZONE C
61.7
60.1
BY
BY
BZ
BZ
Zone B
CA
ZONE A2
BFE 759
ZONE B
CB
58.8
60.1
CA
760
CREEK
760
SILO
59.9


Zone B
58.6
762
ZONE C
60.1
760
BY
BY
BZ
BZ
Zone B
CA
ZONE
IFE 759
A2
ZONE B
59.8
CA
Zone C
760
SILO
TANK
CREEK
760
59.9
ZONE B
60.5
760
60.1
56.1
59.9
MORRISH
59.8
760
CB
CC
ZONE A2
60.3
Zone
63.7
55.9


762
61.7
60.1
762
63.9
ZONE B
CB
ZONE
60.1
CREEK
760
59.9
61.6
62.1
CC
60.1
59.9
BFE 760
ZONE A2
59.0
760
760
ZONE A2
60.3
60.3


N549
Zone C
CA
58.8
760
CREEK
SILO
TANK
ZONE B
60.5
760
60.1
56.1
MORRISH
59.8
760
CB
CC
ZONE A
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Zone C
63.7
55.9
CD
61.8
CE
760
764
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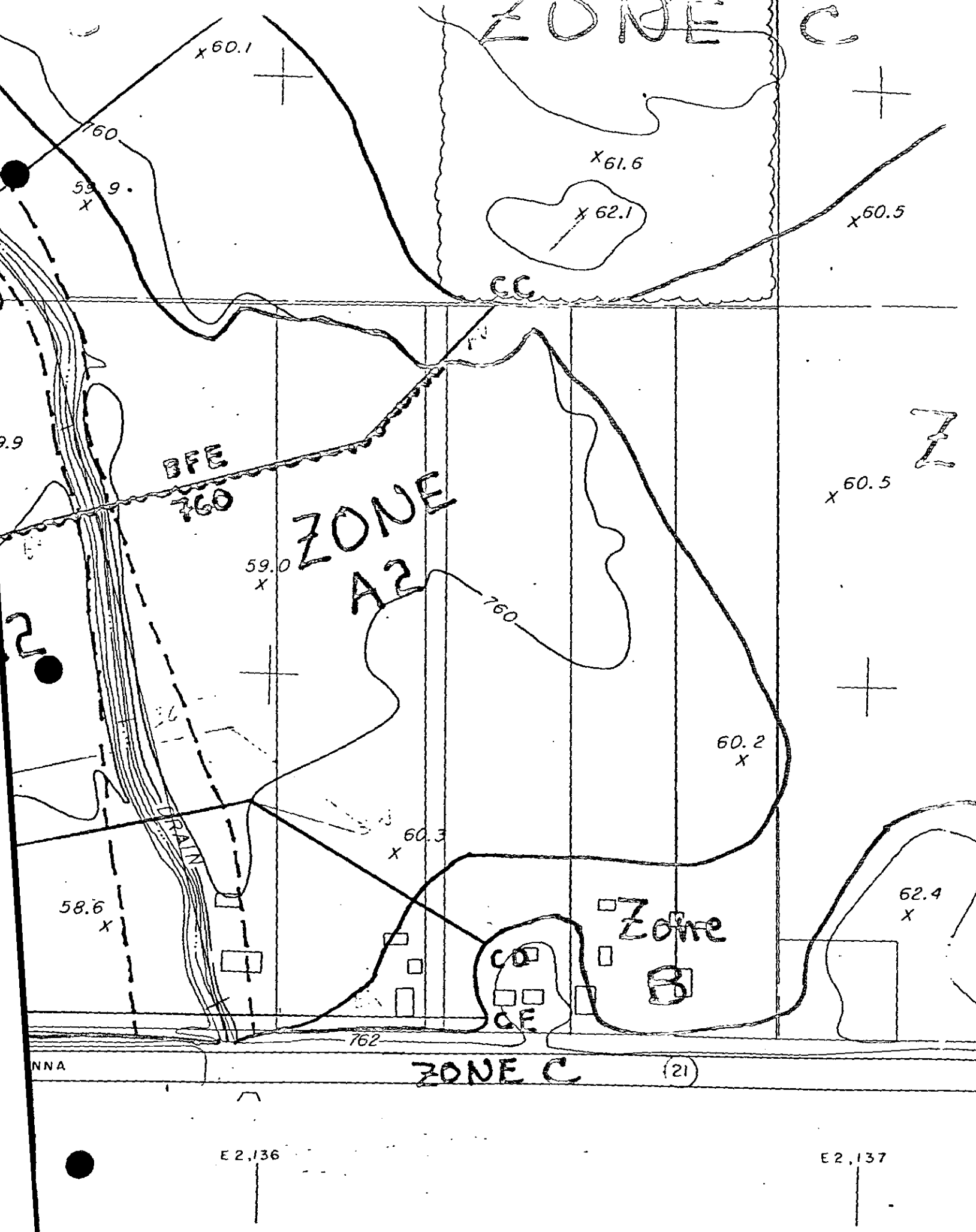
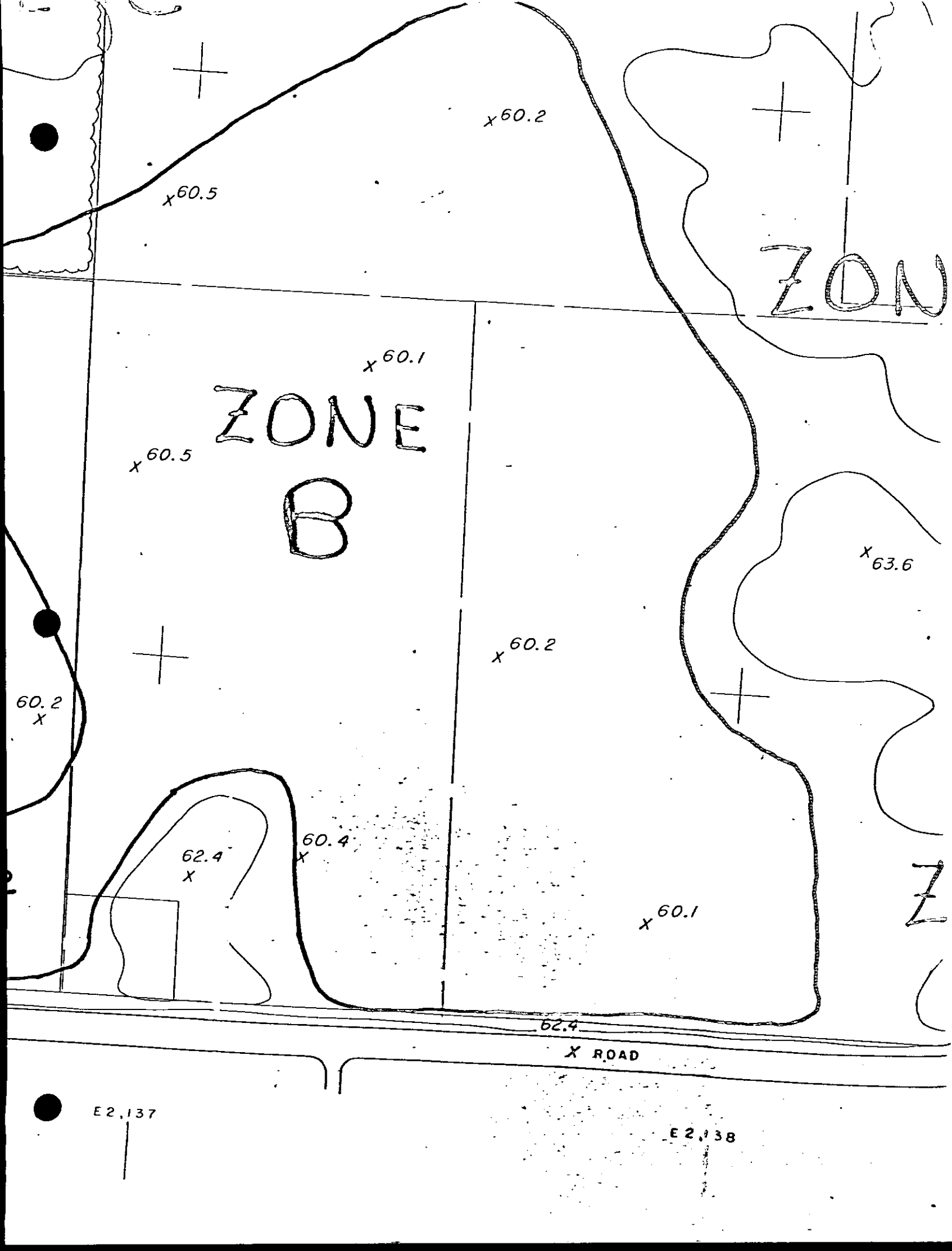
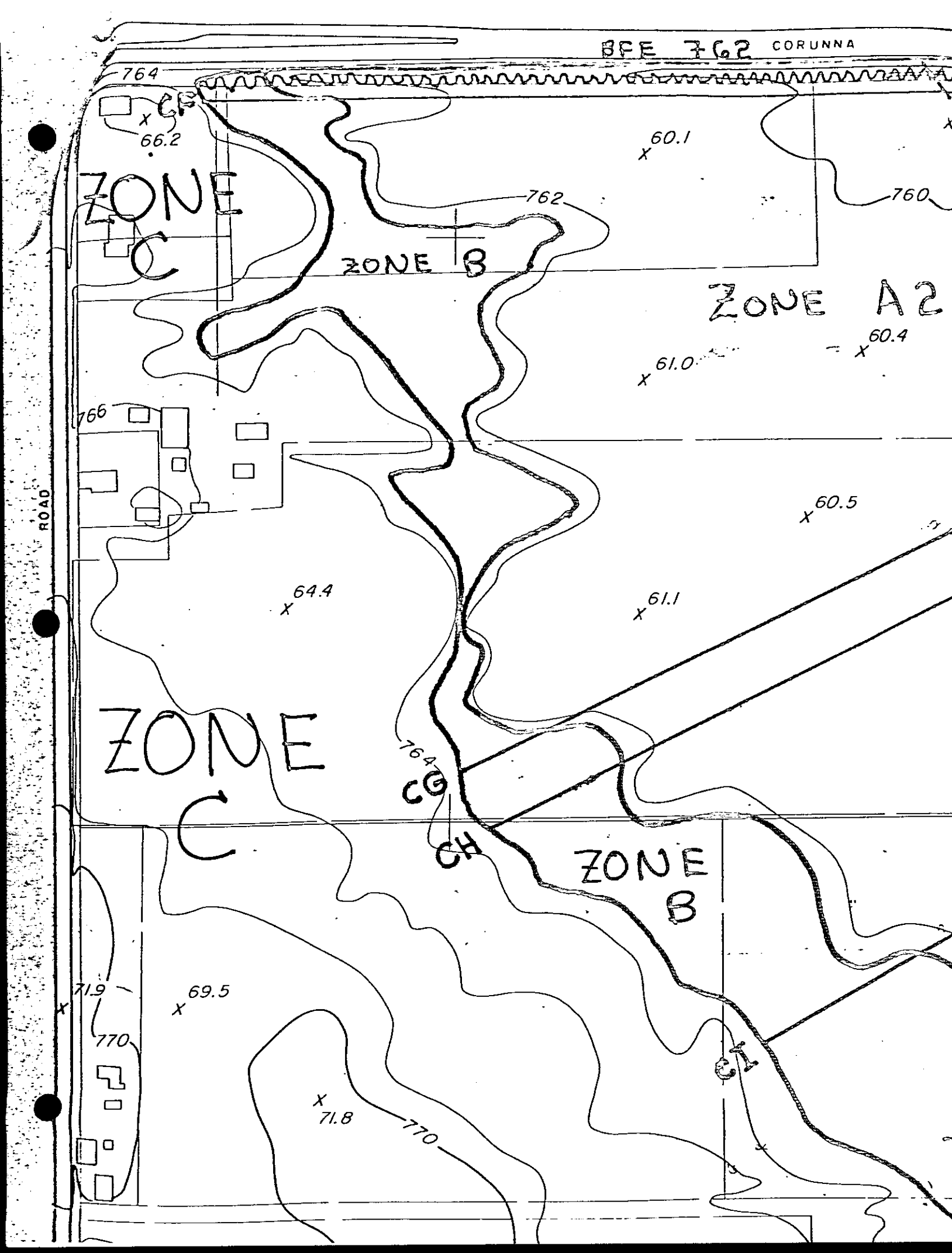
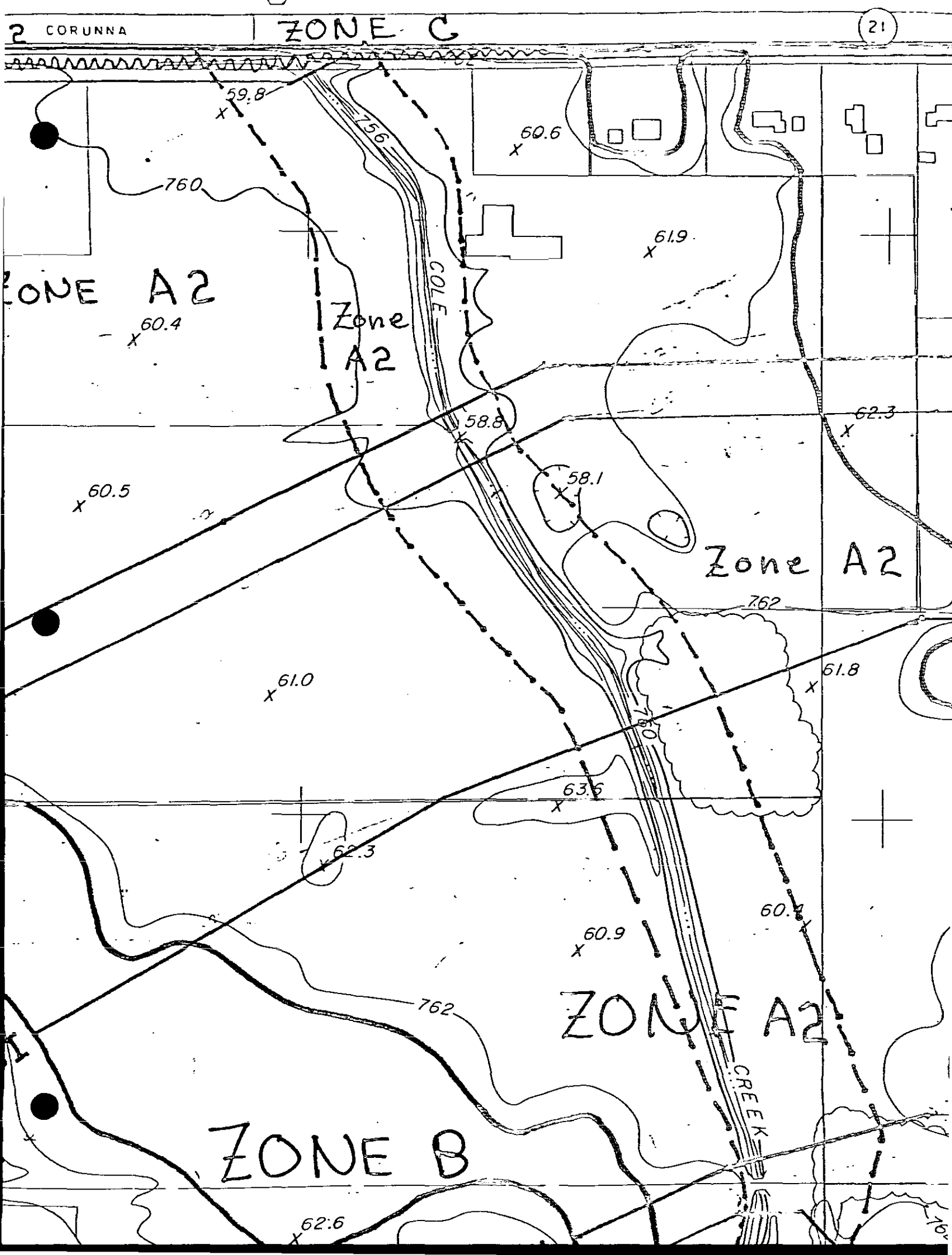
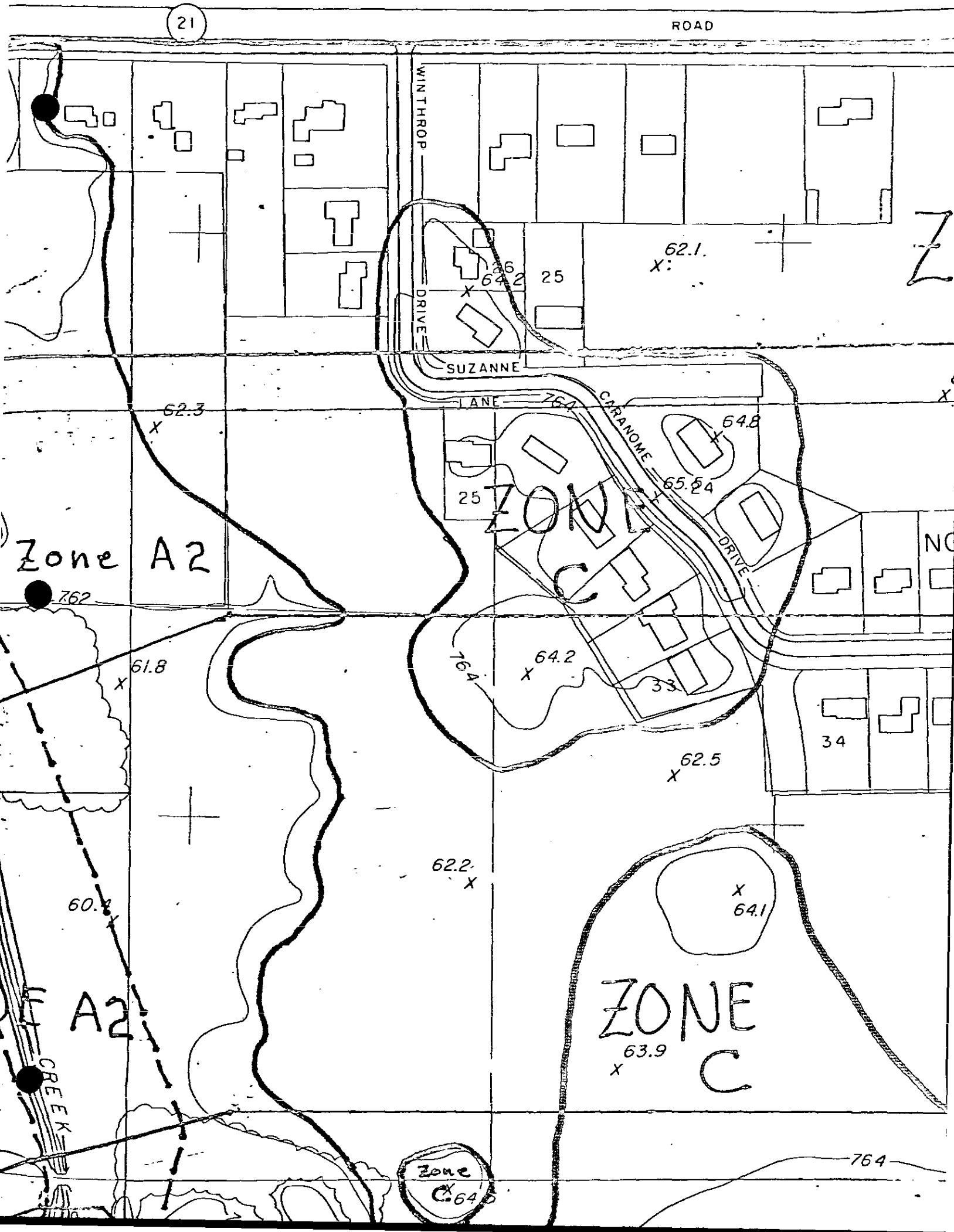
E 2,135,000

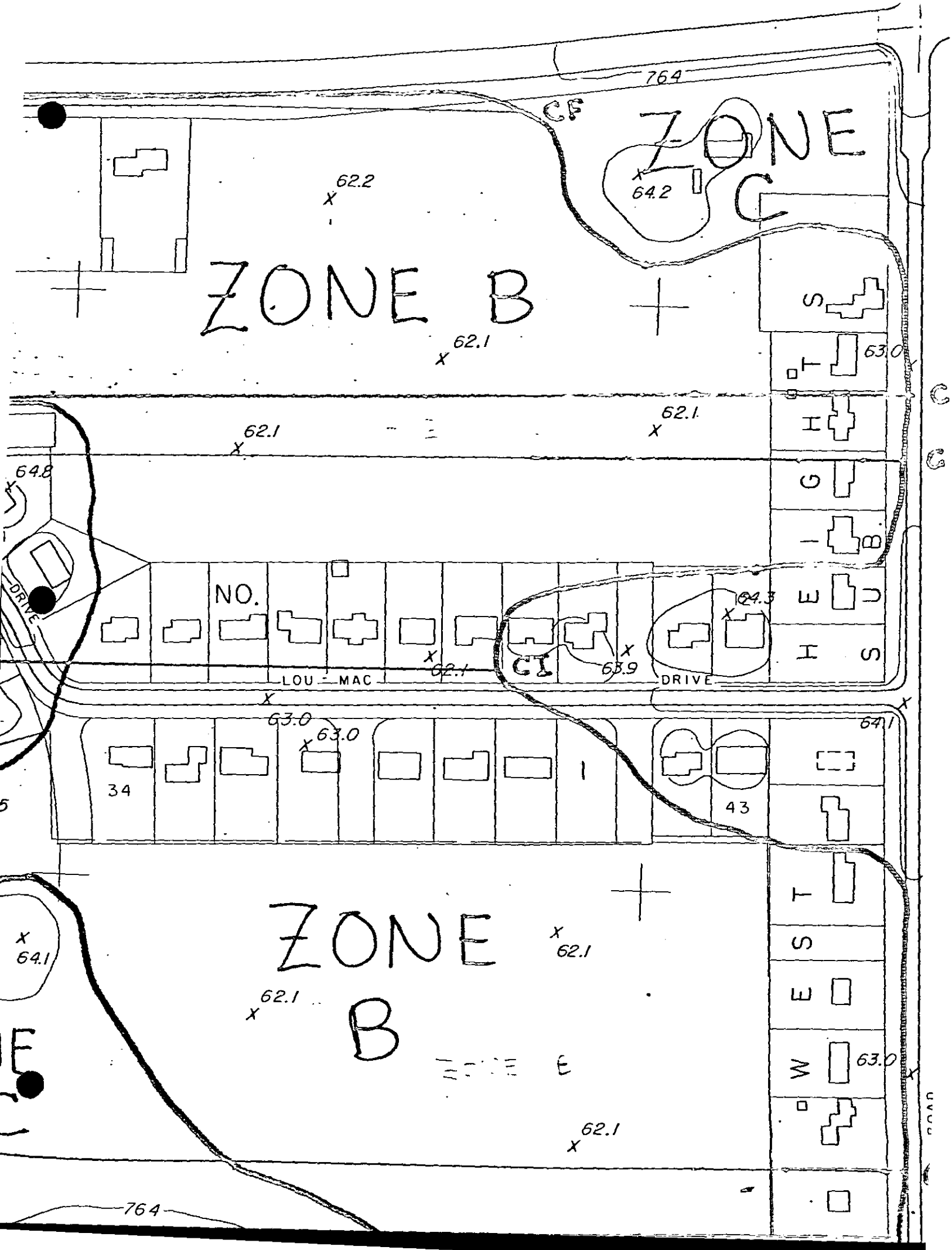

ZONE C
60.1
760
59.9
61.6
62.1
60.5
CC
BFE
760
ZONE
A2
59.0
760
60.5
60.2
60.3
DRAIN
58.6
62.4
Zone
B
CE
762
ZONE C
(21)
E 2,136
E 2,137

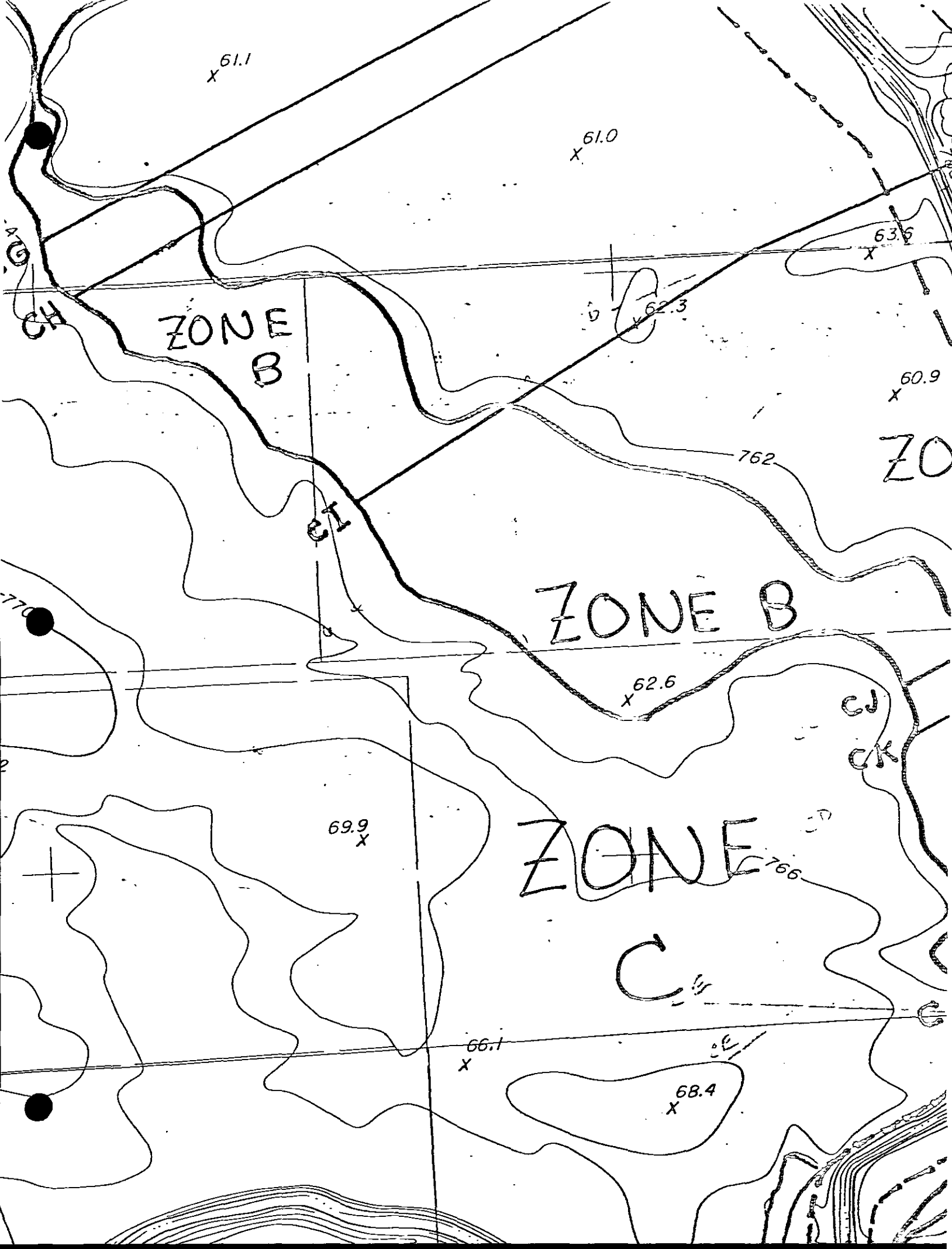

60.2
60.5
ZON
60.1
ZONE
B
60.5
63.6
60.2
60.2
62.4
60.4
60.1
Z
62.4
ROAD
E2,137
E2,138

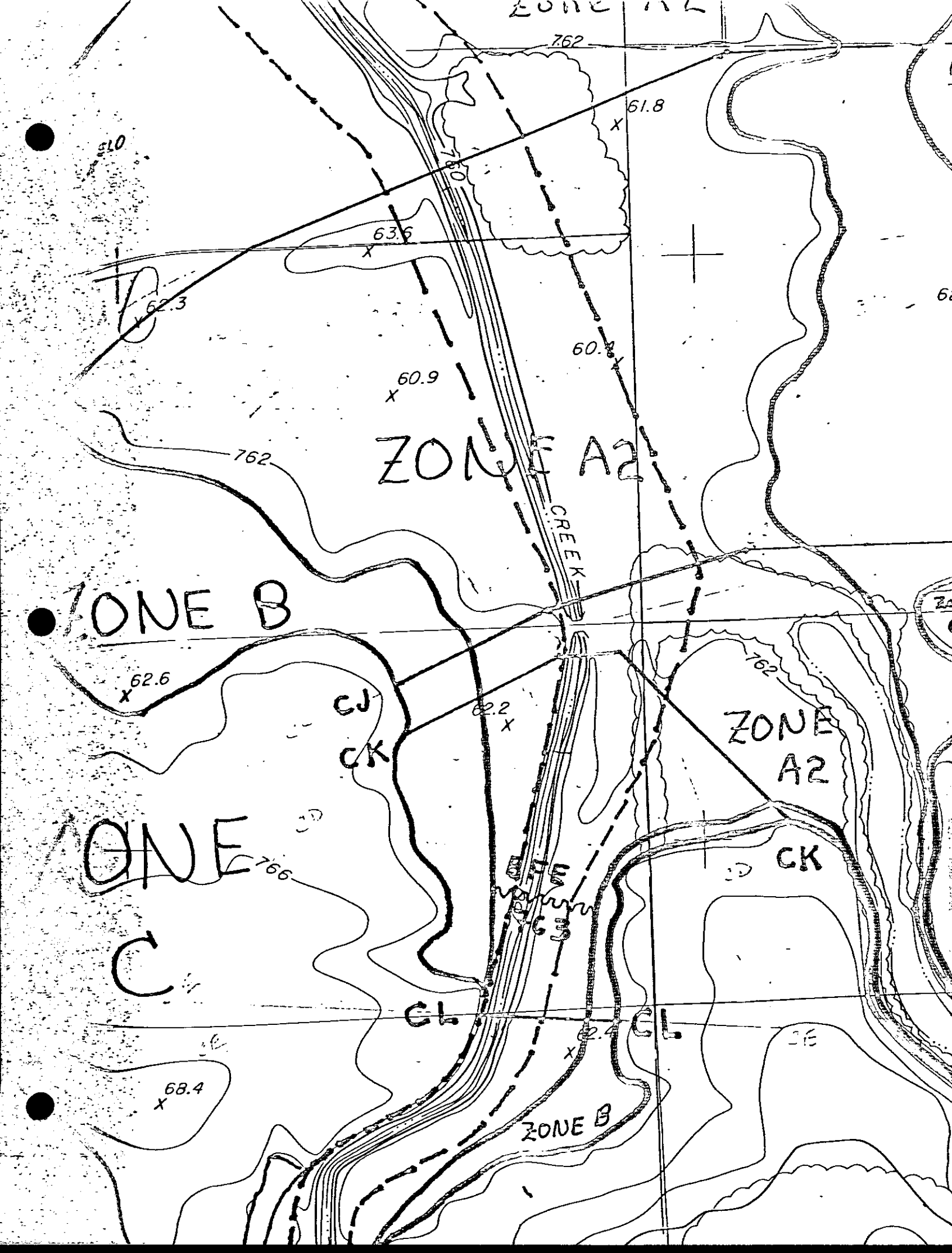

BFE 762
CORUNNA
764
CF
66.2
60.1
ZONE C
762
760
ZONE B
ZONE A2
60.4
61.0
766
ROAD
60.5
64.4
61.1
ZONE C
764
CG
CH
ZONE B
71.9
69.5
770
CI
71.8
770

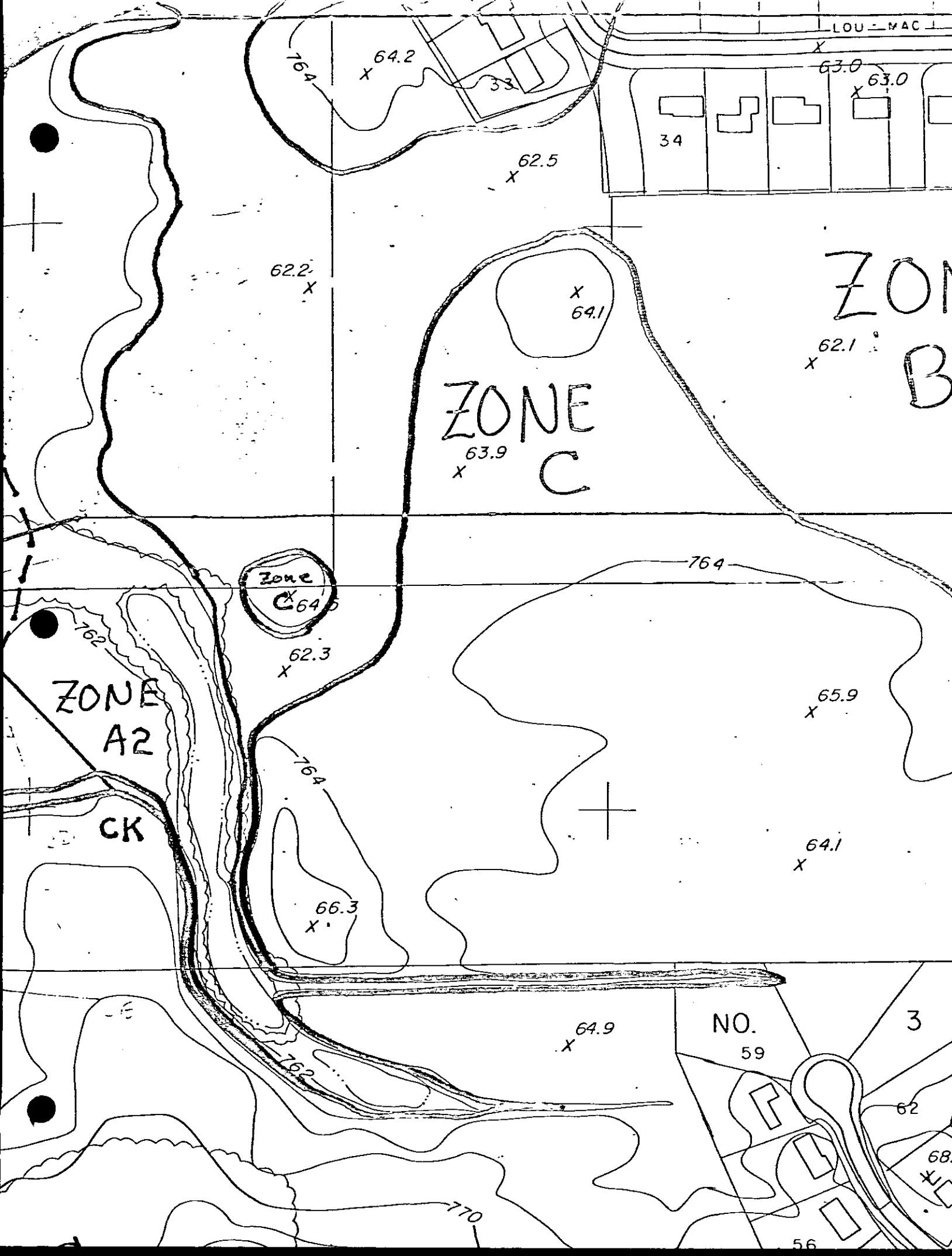

2 CORUNNA
ZONE C
21
59.8
756
60.6
760
61.9
ZONE A2
60.4
Zone A2
COLE
58.8
62.3
58.1
60.5
Zone A2
762
61.8
61.0
780
63.6
62.3
60.9
762
ZONE A2
CREEK
ZONE B
62.6


21
ROAD
WINTHROP
DRIVE
SUZANNE
LANE
CARANOME
DRIVE
26
25
25
33
34
62.1
64.2
62.3
64.8
65.5
64.2
62.5
62.2
64.1
63.9
61.8
60.2
764
762
Zone A2
ZONE C
ZONE C
Zone A2
CREEK
Zone C
64.5


764
CF
ZONE C
64.2
62.2
ZONE B
62.1
63.0
62.1
62.1
64.8
NO.
64.3
CI
63.9
62.1
LOU - MAC
DRIVE
63.0
63.0
64.1
34
1
43
ZONE B
62.1
62.1
64.1
63.0
62.1
764


61.1
61.0
63.6
62.3
60.9
ZONE B
CH
762
ZONE B
62.6
CJ
CK
69.9
ZONE C
766
66.1
68.4


ZONE A2
762
61.8
63.6
62.3
60.9
762
ZONE A2
CREEK
ZONE B
62.6
CJ
CK
62.2
762
ZONE
A2
ZONE
766
CK
C
CL
CL
68.4
ZONE B


LOU — MAC
64.2
764
33
63.0
63.0
34
62.5
62.2
64.1
ZONE
B
62.1
ZONE
C
63.9
764
Zone
C
64.5
762
62.3
ZONE
A2
65.9
764
CK
64.1
66.3
64.9
NO.
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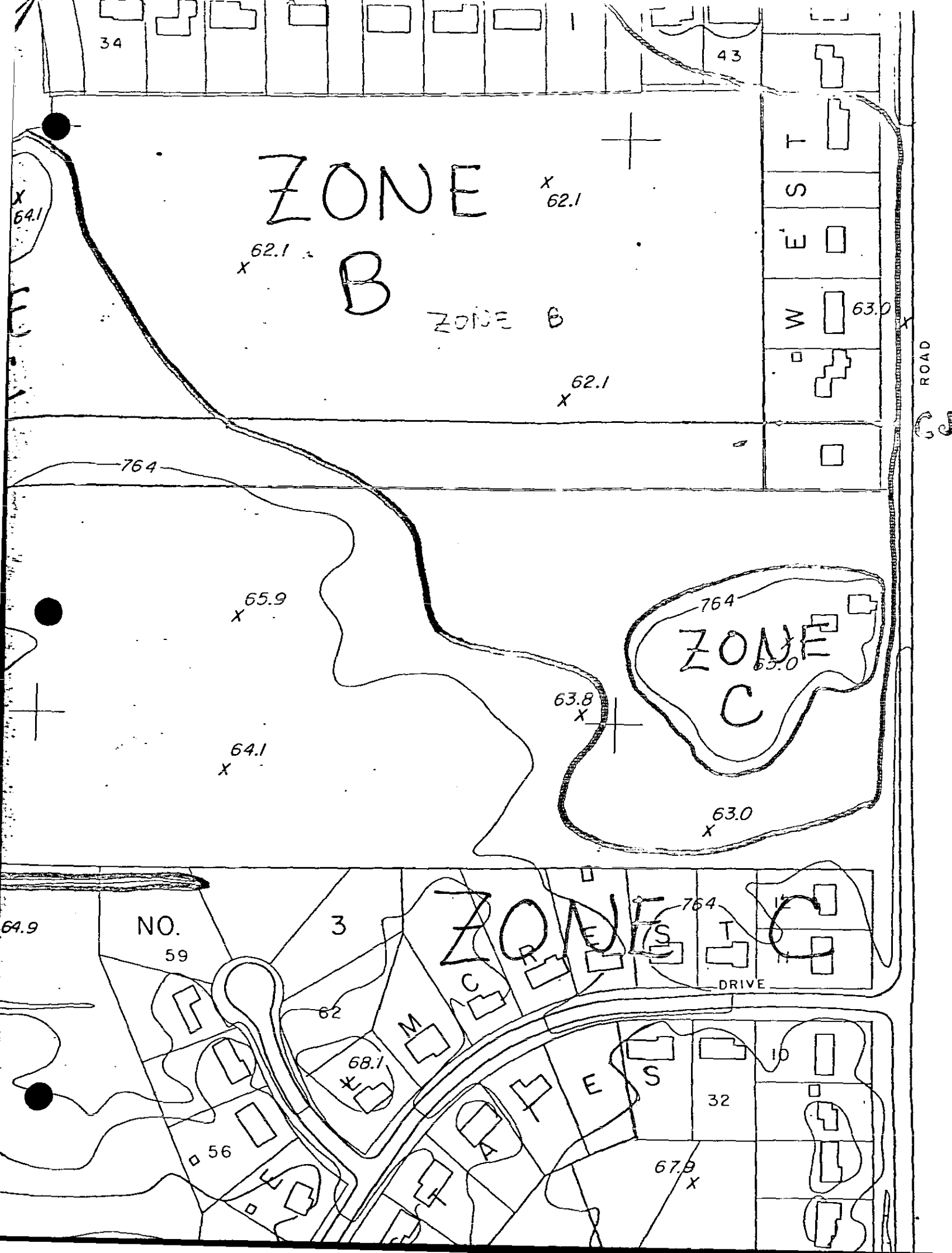
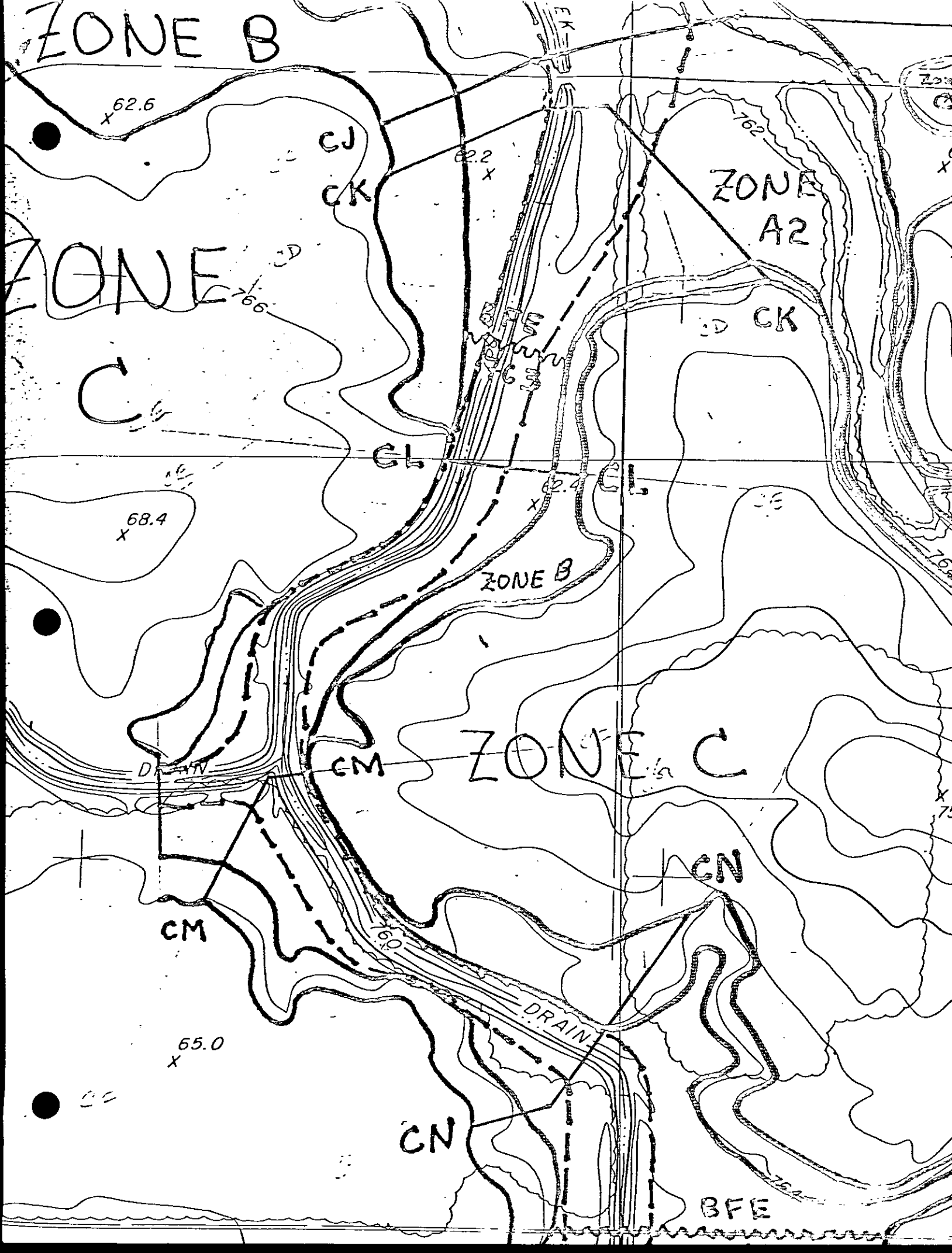
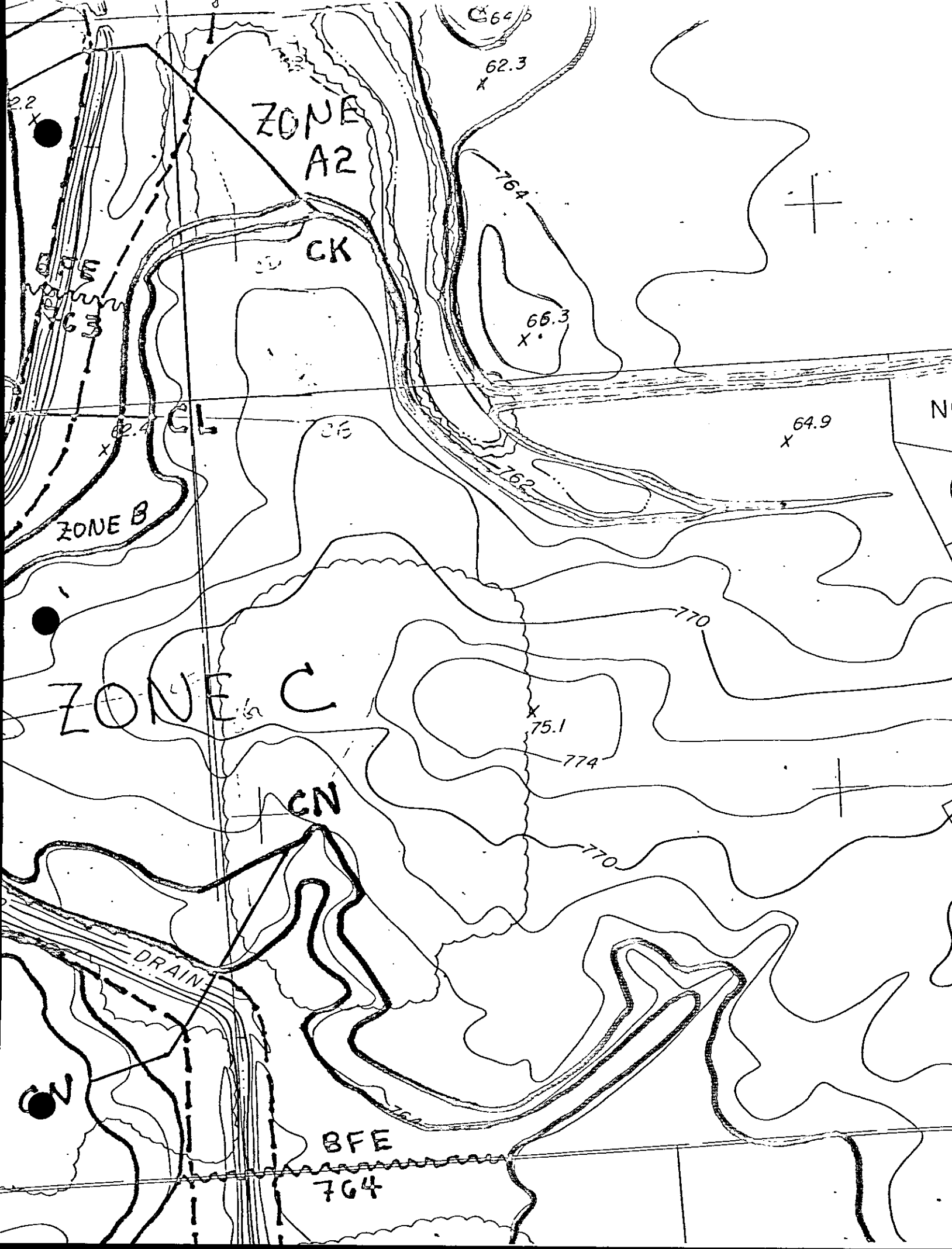
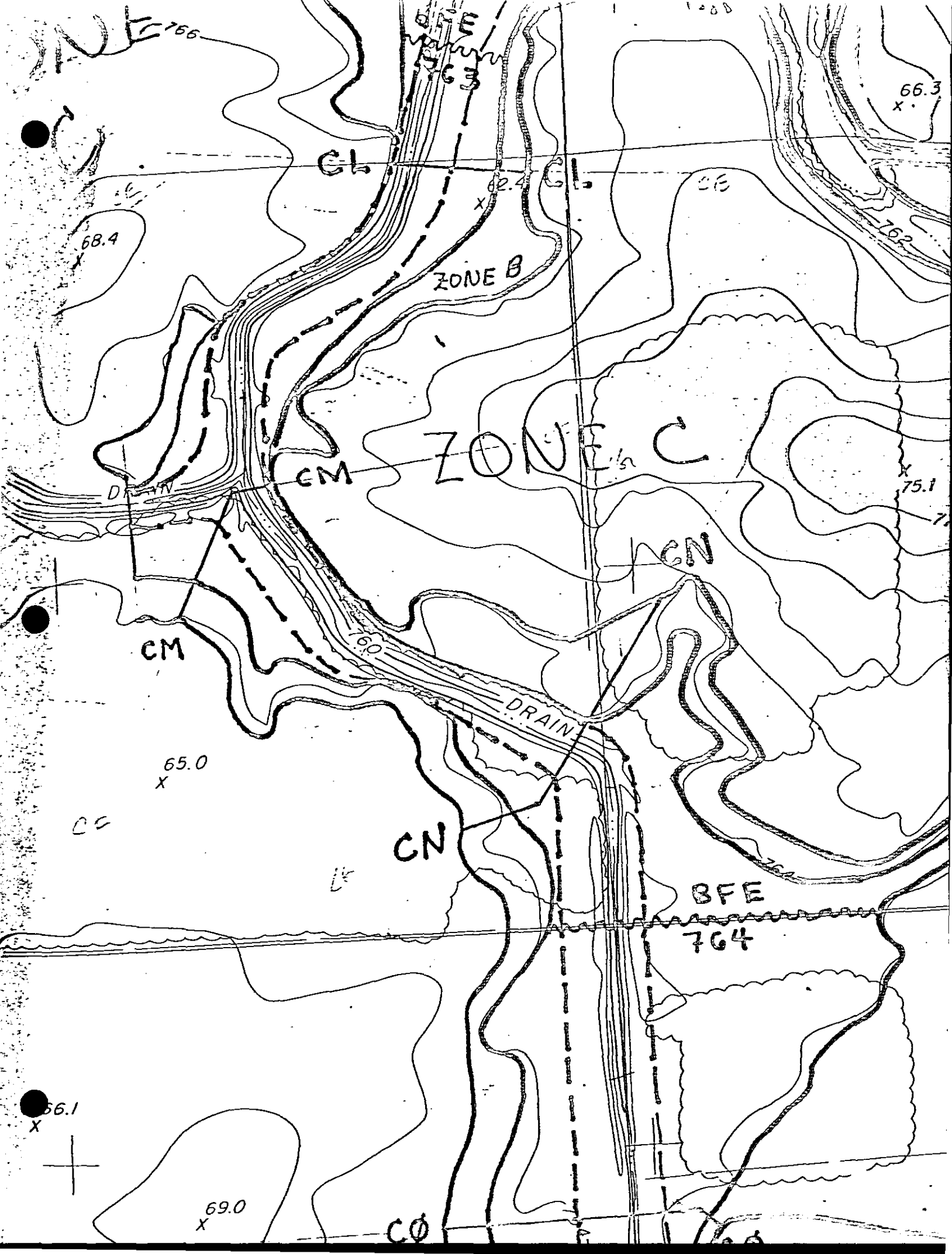
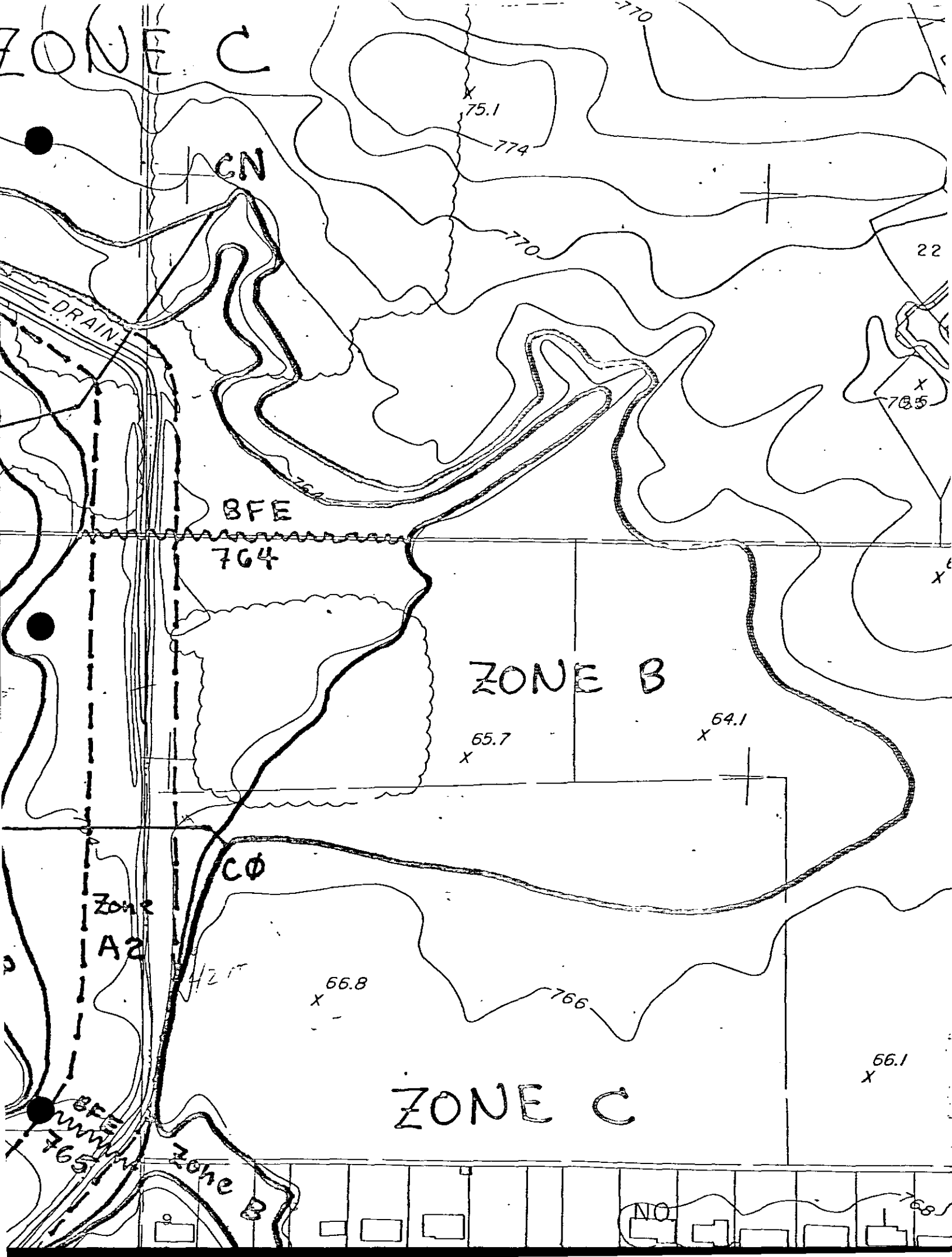
3
762
62
770
56

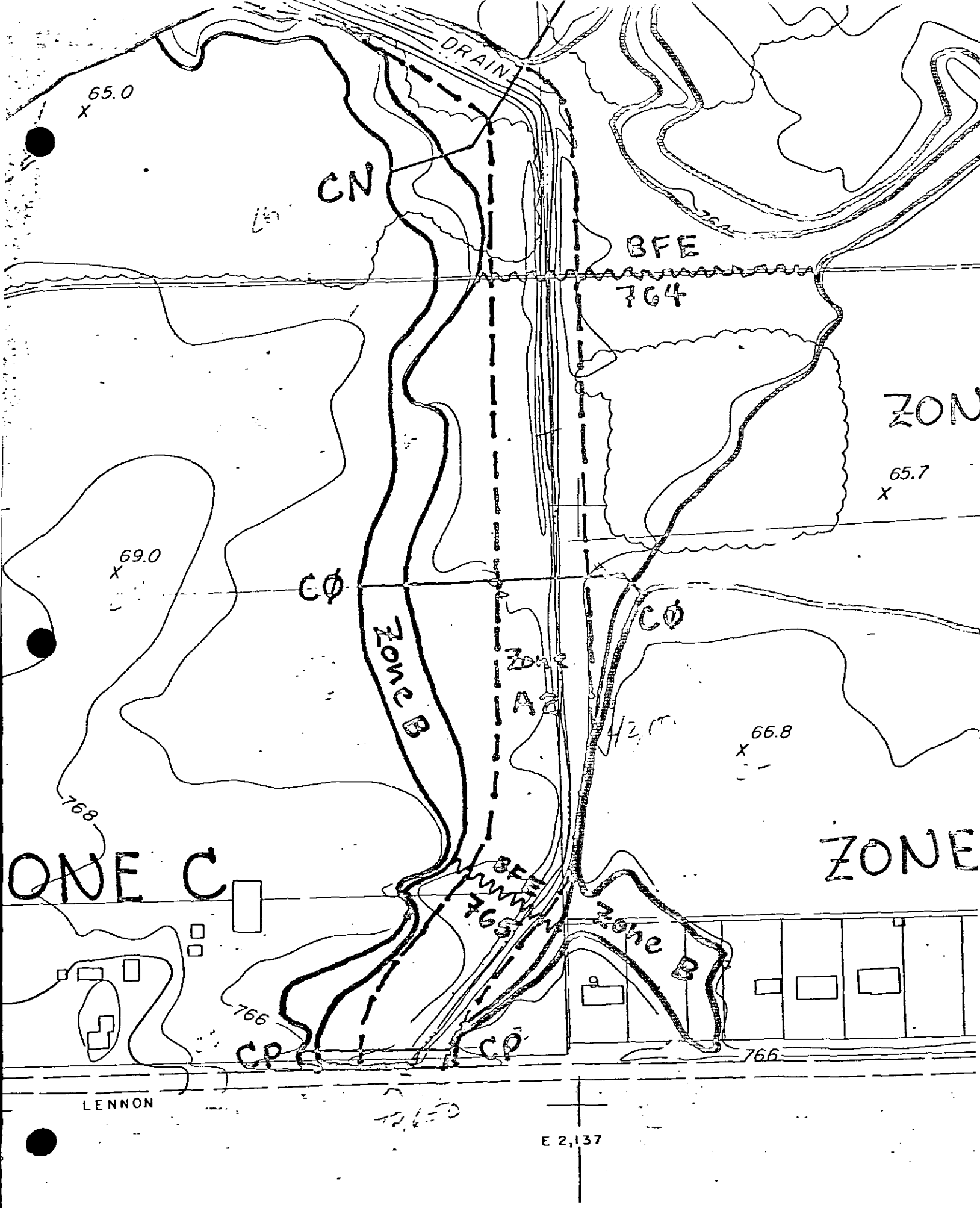

34
43
ZONE
B
ZONE B
62.1
62.1
62.1
64.1
WEST
63.0
ROAD
764
65.9
ZONE
C
764
63.0
63.8
64.1
63.0
64.9
NO.
59
3
ZONE C
764
WESTCRESTA DRIVE
62
68.1
56
32
10
67.9


ZONE B
62.6
CJ
CK
62.2
ZONE A2
ZONE C
66
CK
CL
62.4
CL
68.4
ZONE B
ZONE C
DRAIN
CM
CM
CN
CN
76.0
DRAIN
65.0
BFE


ZONE A2
CK
62.3
66.3
64.9
764
762
770
774
75.1
ZONE B
ZONE C
CN
DRAIN
BFE
764


BFE
763
66.3
CL
62.4
CL
68.4
ZONE B
ZONE C
CM
DRAIN
75.1
CN
CM
760
DRAIN
65.0
CN
BFE
764
66.1
69.0
CO


ZONE C
CN
DRAIN
75.1
774
770
770
22
BFE
764
ZONE B
65.7
64.1
CØ
Zone
A2
66.8
766
66.1
ZONE C
BFE
765
Zone
B
NO


DRAIN
65.0
CN
BFE
764
ZON
65.7
69.0
CØ
CØ
Zone B
Zone A2
66.8
768
ONE C
ZONE
BFE
765
Zone B
766
CP
CP
766
LENNON
E 2,137