RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

CHECKED _____ DATE _____ PROJECT NO. _____

APPROVED _____ DATE _____ SHEET _____ OF _____

TITLE _____ BY _____ DATE _____

HEC-2 INPUT FILES, SUMMARY TABLES & CROSS SECTION PLOTS

FOR ARROYO "B" OR SOUTH BRANCH

(EAST OF I-25 ONLY)

(SUPER-CRITICAL & SUB-CRITICAL)

```
T1
T1     HEC-2 FILENAME:   NDBCL_B1.HC2
T1         (10-YR & 100-YR DISCHARGES. EXISTING CONDITIONS)
T1
T1 ************************************************************************
T1    RTI PROJECT NO.    94-200-1 (TASK 3)
T1
T1    PURPOSE: SUBMITTAL OF LOMR FOR NORTH DOMINGO ARROYO (IN ALBUQUERQUE. NM)
T1             FROM LOWER NORTH DOMINGO BACA DETENTION DAM TILL IT MEETS WITH
T1             SOUTH DOMINGO BACA ARROYO WEST OF I-25.
T1
T1    FLOODING SOURCE:   NORTH DOMINGO BACA ARROYO (SOUTH BRANCH)
T1
T1    CLIENT:          ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY
T1                     (AMAFCA)
T1                     2600 PROSPECT. NE
T1                     ALBUQUERQUE. NM 87107
T1
T1    CONSULTANTS:     RESOURCE TECHNOLOGY. INC.
T1                     2129. OSUNA RD. NE. SUITE 200
T1                     ALBUQUERQUE. NM 87113
T1                     PH: (505)345-3115
T1                     FAX: (505)345-4132
T1
T1    FINAL MODEL RUN DATE:  00/00/1995
T1
T1    INPUT FILENAME:  NDBCL_B1.HC2
T1    OUTPUT FILENAME: NDBCL_B1.OUT
T1 ************************************************************************
T1     DATE: 07/18/1994. 07/21. 07/26. 07/27. 07/28. 08/02. 06/10
T1           04/20/1995
T1
T1     ORIGIN OF THIS FILE:
T1        THIS FILE IS COPIED FROM DBB1.DAT ("NORTH AND SOUTH DOMINGO BACA
T1        ARROYOS AND PASEO DEL NORTE CORRIDOR DRAINAGE MANAGEMENT PLAN -BY
T1        RESOURCE TECHNOLOGY. INC. DECEMBER 1991")
T1
T1     THIS HEC-2 INPUT FILE COVERS SOUTH BRANCH OF NORTH DOMINGO BACA ARROYO
T1     FROM IMMEDIATELY DOWNSTREAM OF LOUISIANA BLVD. TILL UPSTREAM FACE OF
T1     STRUCTURE NO. 2 AT I-25.
T1
T1     MODIFICATIONS MADE TO THIS FILE AFTER COPYING IT FROM ORIGINAL FILE:
T1        1. INSTEAD OF USING FOUR 4' X 9' CULVERTS AT I-25. ONLY
T1           TWO SOUTHMOST CULVERTS ARE USED BECAUSE STORM SEWER DRAIN PIPE
T1           UNDERNEATH ANAHEIM AVE. CONNECTS TO SECOND CULVERT FROM NORTH SIDE
T1           THUS SEPARATING TWO SOUTHMOST CULVERTS FROM THE NORTHMSOT CULVERT.
T1        2. RTI SURVEYED 11 CROSS SECTIONS (900 THROUGH 910) UPSTREAM OF
T1           CULVERTS NEAR (EAST OF) I-25. (JUNE 20. 1994)
T1        3. CHANGES TO REFLECT EXISTING FIELD CONDITIONS WHEREVER NECESSARY.
T1
T2      FILENAME: NDBCL_B1.HC2  SUPER-CRITICAL  10-YR RETURN PERIOD
T3      NDB-B1
J1     0      2      0      1     -1      0      0      0 5304.5      0
J2     1      0     -1      0      0      0     -1      0      0      0
J3    36     42     66      1      2      3     39      4     43     13
J3    15     26      8             38     43     16     17     18     21
J3    22     53     54     58     33            33     43     10     11
J3    12     25     66     67     69
```

```
* DOWNSTREAM CROSSTHRU
*
NC  .035    .035    .030     0.1     0.3
QT     2      15      38
X12136.7      72    6544    6632      95      95      95
X3    10
GR5307.8    6064  5307.3    6084  5307.3    6104  5307.3    6124  5307.2    6144
GR5307.1    6164  5307.1    6184  5307.2    6204  5307.2    6224  5307.3    6244
GR5307.5    6264  5307.4    6284  5306.9    6304  5305.9    6324  5305.2    6344
GR5304.9    6364  5305.1    6384  5305.0    6392  5306.0    6404  5305.8    6424
GR5305.7    6444  5305.6    6464  5306.3    6484  5306.0    6504  5305.6    6524
GR5305.5    6532  5306.2    6544  5306.5    6548  5306.1    6564  5305.1    6572
GR5304.5    6576  5304.1    6580  5304.4    6584  5304.7    6588  5304.5    6604
GR5304.3    6616  5304.3    6620  5305.1    6624  5305.9    6628  5306.8    6632
GR5306.9    6636  5306.9    6640  5306.9    6644  5306.6    6664  5305.8    6684
GR5305.6    6704  5305.7    6724  5305.8    6744  5305.8    6764  5305.9    6784
GR5305.9    6804  5305.9    6824  5306.0    6844  5306.0    6864  5305.8    6884
GR5305.2    6904  5304.8    6924  5303.7    6944  5302.4    6964  5301.4    6984
GR5301.2    6988  5301.0    6992  5301.3    6996  5301.9    7004  5301.8    7024
GR5301.0    7036  5300.6    7040  5301.0    7044  5301.6    7052  5301.7    7056
GR5301.7    7064  5302.6    7084
*
QT     2      15      38
X12136.0      77    6500    6632     200     200     200
X3    10
GR5306.5    6060  5306.9    6080  5306.4    6100  5305.8    6120  5305.5    6140
GR5305.3    6160  5305.1    6180  5304.8    6200  5304.4    6220  5304.4    6240
GR5304.6    6260  5304.6    6280  5304.4    6300  5304.0    6320  5303.9    6340
GR5302.9    6360  5302.5    6380  5302.6    6384  5304.2    6392  5304.3    6396
GR5304.2    6400  5303.8    6420  5303.4    6440  5303.6    6460  5304.2    6480
GR5304.9    6500  5304.7    6520  5303.1    6532  5303.7    6536  5303.9    6540
GR5303.4    6544  5303.0    6548  5302.5    6552  5302.9    6556  5303.4    6560
GR5304.3    6564  5304.0    6568  5303.2    6572  5302.5    6576  5301.8    6580
GR5302.5    6588  5302.3    6592  5301.8    6600  5302.4    6620  5303.4    6624
GR5304.4    6628  5304.8    6632  5304.8    6636  5304.7    6640  5304.1    6660
GR5303.7    6680  5303.5    6700  5303.4    6720  5303.4    6740  5303.4    6760
GR5303.4    6780  5303.6    6800  5303.5    6820  5303.6    6840  5303.7    6860
GR5303.4    6880  5303.0    6900  5302.7    6920  5302.4    6940  5301.9    6960
GR5301.4    6980  5300.8    7000  5300.5    7020  5300.2    7028  5300.1    7032
GR5299.1    7040  5298.6    7044  5298.4    7048  5298.7    7052  5299.0    7056
GR5299.6    7060  5300.4    7080
*
QT     2      15      38
X12134.0      95    6500    6632     200     200     200
X3    10
GR5301.0    6100  5300.8    6120  5300.6    6140  5300.4    6160  5299.5    6180
GR5299.0    6188  5298.8    6192  5299.0    6200  5299.5    6220  5299.4    6240
GR5299.4    6244  5298.0    6260  5297.7    6264  5297.4    6268  5297.4    6272
GR5297.7    6276  5298.0    6280  5298.7    6288  5298.8    6292  5298.9    6300
GR5299.2    6320  5299.3    6324  5298.1    6332  5297.8    6336  5297.8    6340
GR5297.8    6360  5297.3    6380  5297.2    6384  5297.1    6388  5297.0    6392
GR5297.5    6396  5298.3    6400  5298.5    6404  5298.0    6420  5298.8    6440
GR5298.9    6460  5298.9    6480  5298.9    6500  5298.8    6520  5298.3    6532
GR5297.5    6536  5298.6    6540  5297.8    6548  5297.3    6552  5297.3    6556
GR5298.0    6560  5298.6    6564  5298.0    6568  5297.3    6572  5296.5    6576
GR5295.8    6580  5296.2    6584  5296.8    6588  5296.7    6592  5296.6    6600
GR5296.7    6612  5296.7    6616  5297.5    6620  5298.2    6624  5299.0    6628
GR5299.6    6632  5299.4    6636  5299.1    6640  5298.0    6660  5297.4    6680
GR5297.2    6700  5297.3    6720  5297.2    6740  5297.0    6760  5296.9    6780
GR5296.7    6800  5296.6    6804  5296.6    6808  5296.1    6812  5295.1    6820
GR5296.5    6832  5296.8    6840  5297.2    6860  5297.2    6872  5296.7    6880
GR5295.8    6892  5295.4    6896  5295.6    6900  5296.1    6904  5296.4    6908
GR5296.4    6912  5296.3    6920  5296.1    6940  5295.8    6960  5295.4    6980
GR5295.1    7000  5295.1    7020  5295.1    7040  5294.0    7060  5293.8    7080
*
QT     2      15      38
```

```
X1132.00     60    6524    6552     210     210     210
X3    10
GR5292.3    6092  5293.5    6096  5291.3    6100  5292.4    6104  5293.8    6108
GR5294.2    6112  5294.4    6116  5294.7    6120  5294.9    6124  5294.7    6144
GR5294.6    6164  5294.8    6184  5294.8    6204  5294.8    6224  5294.7    6244
GR5294.5    6264  5294.0    6284  5293.6    6304  5291.4    6324  5290.9    6328
GR5290.9    6332  5290.9    6344  5291.8    6364  5292.3    6368  5292.4    6372
GR5291.4    6380  5291.6    6384  5291.9    6404  5292.3    6424  5292.9    6432
GR5292.9    6436  5292.9    6444  5292.7    6464  5292.6    6484  5292.6    6504
GR5292.5    6524  5292.1    6536  5291.6    6540  5292.3    6544  5291.8    6548
GR5291.4    6552  5291.0    6556  5290.8    6560  5291.3    6564  5291.7    6568
GR5291.3    6572  5290.9    6576  5290.1    6584  5290.8    6588  5290.9    6592
GR5290.8    6596  5290.8    6604  5291.7    6624  5292.1    6628  5292.5    6632
GR5292.4    6636  5291.8    6640  5291.4    6644  5291.2    6648  5291.9    6664
GR5291.7    6684  5291.4    6704  5291.1    6724  5290.9    6744  5290.6    6764
GR5290.6    6784  5290.4    6804  5290.1    6824  5289.9    6844  5289.8    6848
GR5289.5    6852  5288.9    6856  5287.7    6864  5287.1    6868  5287.6    6872
GR5288.1    6876  5289.1    6884  5288.9    6904  5288.9    6908  5288.8    6912
*
BT     2      15      38
X1130.00      55    6524    6568     210     210     210
X3    10
GR5288.2    6224  5288.1    6244  5288.2    6264  5288.6    6284  5289.1    6304
GR5289.1    6324  5287.7    6344  5286.9    6356  5286.9    6364  5285.2    6384
GR5285.0    6404  5285.8    6424  5285.6    6428  5285.6    6432  5285.5    6436
GR5285.7    6440  5286.2    6444  5286.7    6448  5286.6    6452  5286.5    6456
GR5285.7    6464  5285.5    6468  5285.2    6472  5285.2    6476  5285.7    6480
GR5286.1    6484  5286.1    6488  5285.9    6492  5284.7    6504  5286.8    6524
GR5285.7    6528  5284.4    6532  5284.6    6536  5284.2    6544  5284.2    6548
GR5285.8    6564  5286.4    6568  5286.2    6572  5285.8    6576  5284.9    6584
GR5285.6    6592  5285.6    6604  5285.7    6612  5285.7    6616  5285.7    6620
GR5286.9    6624  5287.9    6628  5288.0    6632  5288.2    6636  5288.3    6640
GR5288.2    6644  5288.0    6664  5287.8    6684  5287.2    6704  5286.6    6724
*
BT     2      15      38
X1128.00      30    6492    6560     210     210     210
X3    10
GR5282.5    6224  5282.9    6244  5283.2    6264  5283.4    6284  5283.5    6304
GR5283.6    6324  5283.6    6344  5283.3    6364  5282.7    6384  5282.0    6404
GR5281.5    6424  5281.1    6444  5280.4    6464  5280.1    6484  5280.0    6492
GR5278.8    6504  5278.5    6524  5278.3    6544  5278.4    6548  5278.7    6552
GR5281.3    6560  5281.1    6564  5280.7    6572  5279.3    6584  5279.6    6604
GR5280.3    6624  5280.6    6644  5280.9    6664  5280.9    6684  5280.8    6704
*
BT     2      15      38
X1126.00      25    6468    6564     420     420     420
X3    10
GR5276.0    6224  5276.1    6244  5276.1    6264  5276.2    6284  5276.2    6304
GR5276.1    6324  5276.1    6344  5276.0    6364  5275.8    6384  5275.6    6404
GR5275.4    6424  5274.7    6444  5274.2    6464  5274.1    6468  5272.0    6480
GR5272.1    6484  5272.4    6504  5273.0    6524  5274.2    6544  5274.9    6564
GR5273.3    6584  5274.0    6604  5274.5    6624  5274.4    6644  5274.2    6664
*
BT     2      15      38
X12122.0      38    6344    6448     220     220     220
X3    10
GR5264.4    6264  5264.3    6284  5264.2    6304  5263.9    6324  5263.6    6344
GR5263.2    6364  5262.8    6384  5262.6    6392  5261.5    6404  5261.8    6424
GR5261.9    6428  5262.0    6432  5262.4    6436  5263.0    6440  5263.6    6444
GR5263.9    6448  5263.5    6464  5263.4    6484  5263.4    6504  5263.6    6524
GR5264.0    6544  5264.2    6556  5263.9    6564  5262.8    6580  5262.9    6584
GR5264.0    6604  5263.9    6624  5264.0    6644  5264.1    6664  5264.1    6684
GR5264.1    6704  5264.0    6724  5263.4    6744  5262.5    6764  5262.9    6784
GR5263.4    6804  5263.4    6824  5263.3    6844
*
BT     2      15      38
```

```
X12120.0    30    6380    6560    200    200    200
X3    10
GR5257.3    6000    5257.2    6020    5257.0    6040    5256.4    6060    5255.0    6080
GR5254.4    6088    5254.0    6092    5254.2    6096    5254.7    6100    5255.6    6108
GR5256.2    6112    5256.3    6116    5256.3    6120    5256.2    6140    5256.1    6160
GR5256.0    6180    5255.9    6200    5256.4    6220    5257.2    6240    5257.9    6260
GR5257.1    6280    5256.2    6300    5256.6    6320    5256.9    6340    5257.2    6360
GR5257.2    6380    5256.3    6400    5256.4    6420    5256.4    6440    5256.9    6460
GR5257.4    6480    5257.7    6500    5258.1    6520    5258.5    6540    5258.8    6560
GR5257.8    6580    5258.1    6600    5258.5    6620    5258.7    6640    5258.9    6660
GR5258.9    6680    5258.9    6700    5258.6    6720    5258.1    6740    5257.7    6760
GR5257.4    6768    5257.7    6780    5258.6    6800    5258.6    6820    5258.4    6840
$
BT    2    15    38
X12118.0    52    6380    6564    215    215    215
X3    10
GR5252.1    6000    5252.1    6020    5252.1    6040    5252.1    6060    5252.0    6068
GR5251.7    6072    5251.0    6080    5249.5    6096    5249.5    6100    5249.3    6120
GR5249.1    6124    5249.0    6128    5249.5    6140    5249.6    6160    5249.4    6180
GR5249.4    6200    5249.3    6220    5249.3    6240    5249.3    6260    5249.5    6280
GR5250.3    6300    5251.0    6320    5251.7    6340    5252.4    6360    5252.8    6380
GR5252.5    6400    5252.2    6420    5251.9    6440    5251.6    6460    5251.4    6480
GR5251.4    6488    5250.5    6500    5250.3    6508    5250.6    6520    5252.1    6540
GR5253.1    6560    5253.1    6564    5252.8    6568    5251.7    6580    5252.7    6600
GR5253.4    6620    5253.5    6640    5253.7    6660    5253.7    6680    5253.6    6700
GR5253.2    6720    5252.7    6740    5252.3    6760    5252.9    6780    5253.3    6800
GR5253.0    6820    5252.7    6840
$
BT    2    15    38
X12116.0    78    6416    6460    250    250    250
X3    10
GR5237.0    5724    5237.3    5744    5237.6    5764    5237.8    5780    5238.2    5784
GR5241.5    5804    5244.8    5824    5245.5    5828    5246.1    5832    5246.1    5836
GR5246.3    5844    5246.6    5864    5246.9    5884    5247.3    5904    5247.9    5924
GR5248.0    5944    5247.8    5964    5247.9    5984    5247.7    6004    5247.1    6024
GR5246.6    6044    5246.3    6064    5245.8    6084    5245.5    6104    5245.3    6124
GR5245.1    6144    5245.0    6164    5244.9    6184    5244.9    6204    5244.9    6224
GR5244.3    6244    5243.4    6264    5244.0    6284    5244.5    6304    5244.3    6324
GR5244.2    6344    5244.4    6364    5244.5    6384    5245.0    6404    5245.2    6412
GR5245.4    6416    5245.3    6420    5244.7    6424    5244.1    6428    5244.0    6432
GR5244.2    6436    5244.5    6444    5244.8    6452    5245.8    6456    5246.3    6460
GR5246.3    6464    5246.7    6484    5247.2    6504    5247.7    6524    5248.2    6544
GR5248.5    6560    5248.3    6564    5247.2    6572    5246.7    6576    5246.1    6580
GR5246.4    6584    5247.1    6592    5247.2    6596    5247.4    6604    5247.5    6624
GR5247.6    6644    5247.7    6664    5247.6    6684    5247.4    6704    5247.1    6724
GR5246.7    6744    5246.5    6764    5246.8    6776    5247.3    6784    5247.5    6804
GR5247.3    6824    5247.2    6844    5247.0    6864
$
BT    2    38    95
X12114.0    74    6280    6340    200    200    200
X3    10
GR5237.2    5788    5238.1    5808    5238.8    5828    5238.9    5832    5239.1    5836
GR5239.8    5840    5240.7    5844    5241.5    5848    5242.4    5852    5243.2    5856
GR5244.0    5860    5244.4    5864    5244.4    5868    5244.8    5888    5244.8    5908
GR5245.1    5928    5245.5    5948    5245.6    5968    5245.6    5988    5245.7    6008
GR5245.6    6028    5245.1    6048    5244.7    6068    5243.6    6088    5242.8    6108
GR5242.2    6128    5241.8    6148    5241.6    6168    5241.5    6188    5241.4    6208
GR5241.1    6228    5240.9    6248    5240.6    6268    5240.4    6276    5240.2    6280
GR5239.8    6284    5239.2    6288    5238.1    6296    5237.6    6300    5237.4    6304
GR5237.4    6308    5237.5    6328    5238.6    6332    5239.5    6336    5240.1    6340
GR5239.9    6344    5239.7    6348    5240.2    6368    5240.8    6388    5241.4    6408
GR5241.9    6428    5242.0    6448    5242.2    6468    5242.3    6488    5242.1    6508
GR5242.0    6528    5241.8    6548    5241.3    6568    5241.0    6576    5241.6    6588
GR5242.1    6608    5242.3    6628    5242.5    6648    5242.6    6668    5242.4    6688
GR5242.0    6708    5241.8    6728    5241.2    6748    5241.5    6768    5241.8    6788
```

```
*
NC  .035   .035   .030    .1    .3
QT    2     38     95
X12112.0    67   6284   6324   110   110   110
X3   10
GR5236.7  5848  5237.9  5868  5237.9  5888  5237.9  5908  5237.8  5928
GR5237.9  5948  5238.0  5968  5238.0  5988  5238.0  6008  5238.1  6028
GR5238.2  6048  5238.7  6068  5238.9  6088  5239.1  6108  5239.2  6128
GR5239.3  6148  5238.7  6168  5238.1  6188  5237.5  6208  5238.0  6228
GR5238.5  6248  5238.4  6268  5238.3  6272  5238.3  6276  5238.3  6280
GR5238.3  6284  5236.7  6288  5235.0  6292  5233.2  6296  5232.2  6300
GR5232.4  6304  5233.1  6308  5235.3  6316  5236.5  6320  5237.0  6324
GR5237.0  6328  5237.1  6348  5237.2  6368  5237.3  6388  5237.4  6408
GR5237.4  6428  5237.4  6448  5237.4  6468  5237.2  6488  5237.1  6508
GR5236.9  6528  5236.7  6548  5236.5  6568  5236.0  6576  5236.2  6580
GR5236.5  6588  5237.0  6608  5237.4  6628  5237.6  6648  5237.6  6668
GR5237.4  6688  5237.1  6708  5236.8  6728  5236.4  6748  5236.0  6768
GR5236.4  6788  5238.1  6808  5238.5  6812  5238.6  6816  5238.6  6828
GR5238.5  6848  5238.4  6868
*
* CENTERLINE SAN PEDRO
* (2-CMPs, PROBABLY 24" DIA, ARE MODELLED AS PLUGGED)
*
NC  0.02   0.02   0.02    0.1    0.5
QT    2     38     95
X12110.7    51   6264   6464    25    25    25
X3   10     0      0      0     0     0     0  5234.5  5234.5
GR5232.7  5864  5232.9  5884  5233.0  5904  5233.1  5924  5233.2  5944
GR5233.3  5964  5233.4  5984  5233.4  6004  5233.5  6024  5233.5  6044
GR5233.5  6064  5233.6  6084  5234.0  6104  5233.9  6124  5234.0  6144
GR5234.0  6164  5234.0  6184  5234.0  6204  5233.9  6224  5234.0  6244
GR5234.0  6264  5233.8  6284  5233.6  6304  5233.6  6324  5233.6  6344
GR5233.6  6364  5233.7  6384  5233.7  6404  5233.8  6424  5233.9  6444
GR5234.0  6464  5233.9  6484  5233.9  6504  5233.9  6524  5233.9  6544
GR5233.7  6564  5234.0  6584  5234.2  6604  5234.3  6624  5234.1  6644
GR5234.1  6664  5234.0  6684  5233.9  6704  5233.7  6724  5233.5  6744
GR5233.4  6764  5233.4  6784  5233.5  6804  5233.3  6824  5233.5  6844
GR5233.5  6864
*
* DOWNSTREAM SAN PEDRO
*
NC  .035   .035   .030
QT    2     38     95
X12110.5    62   6272   6332    75    75    75
X3   10     0      0      0     0     0     0
GR5233.0  5872  5233.1  5892  5233.2  5912  5233.3  5932  5233.4  5952
GR5233.3  5972  5233.3  5992  5233.3  6012  5232.9  6032  5232.8  6052
GR5233.0  6072  5233.0  6084  5233.6  6092  5234.1  6112  5234.2  6132
GR5234.9  6152  5235.2  6172  5235.1  6192  5235.0  6212  5234.9  6232
GR5234.5  6252  5230.8  6272  5229.3  6280  5228.5  6284  5228.1  6288
GR5228.1  6292  5228.0  6296  5228.6  6300  5230.3  6312  5231.7  6332
GR5232.1  6352  5231.5  6372  5231.4  6392  5231.0  6400  5231.1  6404
GR5231.5  6412  5232.7  6432  5233.9  6440  5234.5  6444  5234.6  6448
GR5234.7  6452  5235.2  6472  5235.0  6492  5234.7  6512  5234.4  6532
GR5233.8  6552  5233.3  6572  5233.0  6580  5233.4  6592  5233.8  6612
GR5233.6  6632  5233.6  6652  5233.4  6672  5233.2  6692  5232.9  6712
GR5232.7  6732  5232.5  6752  5232.4  6772  5232.8  6792  5232.9  6812
GR5233.0  6832  5232.7  6852
*
QT    2     38     95
X12110.0    58   6276   6452   225   225   225
X3   10
GR5232.3  5892  5232.4  5912  5232.5  5932  5232.5  5952  5232.4  5972
GR5232.3  5992  5231.7  6012  5231.2  6032  5231.3  6052  5231.6  6072
GR5231.9  6092  5232.4  6112  5232.9  6132  5233.1  6152  5233.2  6172
```

```
GR5232.7   6276   5232.3   6280   5231.8   6284   5230.1   6272   5227.4   6278
GR5228.7   6300   5228.0   6304   5227.8   6308   5227.9   6312   5227.9   6332
GR5228.0   6352   5228.7   6372   5229.0   6392   5230.1   6412   5231.4   6432
GR5232.0   6452   5232.2   6472   5232.4   6492   5232.5   6512   5232.2   6532
GR5231.9   6552   5231.0   6572   5232.0   6592   5232.3   6612   5232.6   6632
GR5232.1   6652   5232.4   6672   5232.0   6692   5231.6   6712   5231.1   6732
GR5231.3   6752   5231.0   6760   5231.0   6764   5230.8   6772   5231.8   6792
GR5231.5   6812   5231.3   6832   5231.2   6852
[illegible]
[illegible]
X1 2408.00   [illegible]   6376   6452   200   200   200
X3   10
GR5228.3   6144   5228.4   6164   5228.5   6184   5228.6   6204   5228.5   6224
GR5228.2   6244   5227.8   6264   5227.4   6284   5227.0   6304   5226.5   6324
GR5226.1   6344   5225.5   6364   5225.1   6376   5224.8   6380   5224.2   6384
GR5223.1   6392   5222.6   6396   5222.5   6400   5222.5   6404   5222.4   6424
GR5222.4   6428   5222.9   6432   5224.4   6444   5224.9   6448   5225.2   6452
GR5225.3   6456   5225.4   6464   5225.7   6484   5226.0   6504   5226.0   6524
GR5225.8   6528   5225.6   6532   5226.1   6536   5226.6   6540   5227.1   6544
GR5227.4   6548   5227.4   6552   5227.5   6556   5227.2   6564   5226.8   6572
GR5226.7   6576   5227.0   6584   5227.2   6604   5227.5   6624   5227.5   6644
GR5227.3   6664   5226.9   6684   5226.5   6704   5226.2   6724   5225.7   6744
GR5225.4   6764   5225.4   6768   5225.5   6772   5225.8   6776   5226.8   6784
GR5227.0   6804   5227.2   6824   5226.8   6844   5226.1   6864
*
BT   2   38   95
X1 106.00   55   6352   6552   160   160   160
X3   10
GR5221.7   5992   5221.7   6012   5221.9   6032   5222.4   6052   5222.8   6072
GR5223.5   6092   5224.0   6112   5224.1   6132   5224.0   6152   5223.8   6172
GR5223.7   6192   5223.5   6212   5223.4   6232   5223.2   6252   5223.0   6272
GR5222.8   6292   5222.6   6312   5222.3   6332   5222.3   6352   5221.5   6372
GR5220.6   6392   5219.7   6412   5218.5   6432   5218.5   6452   5218.5   6464
GR5219.0   6472   5220.0   6492   5220.9   6512   5221.7   6532   5222.1   6552
GR5221.4   6572   5221.7   6592   5222.5   6612   5222.9   6632   5222.6   6652
GR5222.1   6672   5221.5   6692   5221.0   6712   5220.5   6732   5219.9   6752
GR5220.2   6772   5221.4   6784   5221.7   6792   5222.0   6812   5220.4   6824
GR5219.9   6832   5219.8   6852   5219.4   6872   5219.0   6892   5218.6   6912
GR5218.5   6932   5218.9   6952   5219.3   6972   5219.7   6992   5219.9   7012
*
* CROSS SECTIONS 900 THROUGH 910 ARE SURVEYED BY RTI ON 06/20/1994.
*
BT    2     38     95
X1   910     13   47.06  170.22    180    140    166
X3    10
GR5218.6   0.00 5217.45   18.84 5215.59   47.06 5214.09   51.00 5214.23   65.39
GR5215.1  70.14 5215.08   93.70 5214.34   98.05 5214.19  119.07 5215.49  138.54
GR5218.0 170.22 5216.73  184.86 5216.65  213.95    0.00    0.00    0.00    0.00
*
BT    2     38     95
X1   909     14   36.50  149.27    135    140    136
X3    10
GR5215.1   0.00 5213.65   36.50 5210.28   49.40 5210.37   59.01 5210.37   59.01
GR5211.9  70.01 5212.89  102.79 5209.66  117.54 5210.52  126.87 5211.32  138.23
GR5213.7 149.27 5213.50  156.59 5212.40  170.51 5212.63  196.22    0.00    0.00
*
BT    2     38     95
X1   908     11   78.51  136.45     45     42     42
X3    10
GR5211.8   0.00 5209.76   78.51 5206.88   86.84 5207.01   97.95 5208.09  102.37
GR5207.9 106.22 5206.32  112.56 5206.85  127.99 5209.90  136.45 5208.64  154.32
GR5209.0 180.71    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
*
BT    2     38     95
X1   907      8   85.89  126.86    108    110    108
X3    10
```

```
GR5211.1    0.00 5207.11   83.87 5205.70   73.07 5205.79  119.78 5206.78  120.88
GR5207.7  135.79 5207.78  144.30 5208.03  169.29    0.00    0.00    0.00    0.00
*
BT    2     70    143
AD
X1  906      9  98.02  120.20    157    152    152
X3   10
GR5208.1    0.00 5207.46   75.22 5206.03   98.02 5203.86  104.26 5203.39  108.84
GR5206.7  120.20 5206.41  139.32 5204.98  156.93 5205.93  177.36    0.00    0.00
*
X1  905      9  98.50  109.70    112    112
X3   10
AC
GR5205.8    0.00 5203.83   47.22 5202.25   58.09 5202.19   98.50 5201.22  102.21
GR5201.2  103.77 5202.85  109.70 5203.07  142.74 5203.57  142.75    0.00    0.00
*
X1  904      7  15.08   37.71      7      3      4
X3   10
AB
GR5201.4    0.00 5201.17   15.08 5199.94   23.03 5198.72   25.03 5199.96   27.38
GR5201.6   37.70 5202.10   37.71    0.00    0.00    0.00    0.00    0.00    0.00
*
X1  903      6  14.61   35.87     48     52     50
X3   10
AA
GR5201.5    0.00 5201.10   14.61 5199.44   22.30 5196.41   23.40 5199.81   25.88
GR5201.4   35.87    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
*
X1  902     15 114.58  163.53     20     13     20
X3   10
2
GR5200.5    0.00 5198.88  114.58 5196.19  149.46 5195.37  150.93 5195.56  153.14
GR5196.5  153.63 5200.48  163.53 5200.41  172.64 5195.02  181.49 5194.03  181.65
GR5194.0  183.28 5195.01  183.55 5198.48  191.01 5200.40  282.92 5201.13  333.81
*
NC  .035   .035   .030     0.3     0.3
X1  901     14 140.30  170.98     16      9      9
X3   10
GR5199.6    0.00 5197.85  140.30 5194.95  148.08 5194.53  148.09 5194.52  170.84
GR5198.7  170.98 5198.63  180.33 5193.97  180.43 5193.97  195.04 5194.64  195.74
GR5199.0  203.40 5199.36  221.09 5200.09  275.81 5200.94  337.33    0.00    0.00
*
* CROSS SECTIONS 900 THROUGH 910 ARE SURVEYED BY RTI ON 06/20/1994.
* X-SECTION 900 IS UPSTREAM FACE OF CULVERT STRUCTURE NO. 2.
X
*
NC 0.015  0.015  0.015    0.1    0.3
X1  900     16    0.0  18.75
X3   10 5193.42
BT    2      0   5201   5197  38.25   5201  5197.0
GR5197.0    0.00 5193.00    0.01 5193.00    8.99 5197.00     9.0 5197.00    9.75
GR5193.0    9.76 5193.00   18.74 5197.00   18.75 5197.00   19.50 5193.00   19.51
GR5193.0   28.49 5197.00   28.50 5197.00   29.25 5193.00   29.26 5193.00   38.24
GR5197.0   38.25
*
EJ
T1      RESOURCE TECHNOLOGY INC., ALBUQUERQUE, NM
T1      LOMR (SOUTH BRANCH OF NORTH DOMINGO BACA ARROYO, ALBUQUERQUE, NM)
T1      SUBMITTAL TO FEMA  (DATE: APRIL 1995)
T2      FILENAME: NDBCL_B1.HC2  SUPER-CRITICAL  100-YR RETURN PERIOD
T3      NDB-B1
J1   -10      3      0     -1     -1      0      0      0   5304      0
J2     2      0     -1      0      0      0     -1      0      0      0


ER
```

THIS RUN EXECUTED 20APR95 11:43:26

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

NDB-B1

SUMMARY PRINTOUT

		SECNO	ELMIN	CUMDS	CWSEL	CRIWS	EG	XLCH	TOPWID	Q	BLOB	BROB	VCH	DEPTH
	*	2136.700	5304.10	4227.00	5304.57	5304.57	5304.67	0.00	33.35	15.00	0.00	0.00	2.51	0.47
	*	2136.700	5304.10	4227.00	5304.73	5304.73	5304.87	0.00	47.63	38.00	0.00	0.00	3.03	0.63
		2136.000	5301.80	4132.00	5302.21	5302.21	5302.32	95.00	27.39	15.00	0.00	0.00	2.66	0.41
AY		2136.000	5301.80	4132.00	5302.36	5302.40	5302.55	95.00	38.29	38.00	0.00	0.00	3.49	0.56
		2134.000	5295.80	3932.00	5296.47	5296.55	5296.77	200.00	9.60	15.00	0.00	0.00	4.43	0.67
AX		2134.000	5295.80	3932.00	5296.80	5296.82	5296.98	200.00	42.04	38.00	0.00	0.00	3.45	1.00
	*	132.000	5290.10	3732.00	5290.80	5290.88	5291.04	200.00	11.00	15.00	0.00	0.00	3.90	0.70
AW		132.000	5290.10	3732.00	5291.01	5291.04	5291.20	200.00	40.03	38.00	0.00	0.00	3.51	0.91
		130.000	5284.20	3517.00	5284.61	5284.64	5284.78	215.00	20.67	15.00	0.00	0.00	3.30	0.41
AV		130.000	5284.20	3517.00	5284.79	5284.86	5285.08	215.00	23.20	38.00	0.00	0.00	4.33	0.59
		128.000	5278.30	3307.00	5278.62	5278.62	5278.72	210.00	34.48	15.00	0.00	0.00	2.46	0.32
AU		128.000	5278.30	3307.00	5278.75	5278.78	5278.93	210.00	44.18	38.00	0.00	0.00	3.43	0.45
		126.000	5272.00	3097.00	5272.41	5272.43	5272.56	210.00	26.44	15.00	0.00	0.00	3.03	0.41
AT		126.000	5272.00	3097.00	5272.58	5272.62	5272.80	210.00	33.21	38.00	0.00	0.00	3.75	0.58
	*	2122.000	5261.50	2677.00	5261.89	5261.89	5261.99	420.00	27.74	15.00	0.00	0.00	2.62	0.39
AS		2122.000	5261.50	2677.00	5262.05	5262.07	5262.23	420.00	34.56	38.00	0.00	0.00	3.47	0.55
	*	2120.000	5256.30	2457.00	5256.53	5256.53	5256.60	220.00	50.09	15.00	0.00	0.00	2.16	0.23
AR		2120.000	5256.30	2457.00	5256.63	5256.65	5256.77	220.00	56.74	38.00	0.00	0.00	3.00	0.33
		2118.000	5250.30	2257.00	5250.67	5250.69	5250.82	200.00	22.96	15.00	0.00	0.00	3.11	0.37
AQ		2118.000	5250.30	2257.00	5250.84	5250.90	5251.10	200.00	27.64	38.00	0.00	0.00	4.10	0.54
		2116.000	5244.00	2042.00	5244.48	5244.50	5244.64	215.00	17.69	15.00	0.00	0.00	3.26	0.48
AP		2116.000	5244.00	2042.00	5244.68	5244.74	5244.96	215.00	24.67	38.00	0.00	0.00	4.21	0.68

		SECNO	ELMIN	CUMDS	CWSEL	CRIWS	EG	XLCH	TOPWID	Q	QLOB	QROB	VCH	DEPT
	*	2114.000	5237.40	1792.00	5237.80	5237.83	5238.03	250.00	30.63	38.00	0.00	0.00	3.31	0.4
AO	*	2114.000	5237.40	1792.00	5238.06	5238.14	5238.48	250.00	33.62	95.00	0.00	0.00	5.21	0.5
		2112.000	5232.20	1592.00	5233.23	5233.26	5233.60	200.00	12.54	38.00	0.00	0.00	4.86	1.1
AN		2112.000	5232.20	1592.00	5233.76	5233.83	5234.36	200.00	15.63	95.00	0.00	0.00	6.24	1.5
	*	2110.700	5233.53	1482.00	5233.79	5233.79	5233.85	110.00	136.03	38.00	0.00	0.00	2.09	0.1
AM	*	2110.700	5233.60	1482.00	5233.90	5233.90	5234.01	110.00	171.46	95.00	0.00	0.00	2.62	0.3
	*	2110.500	5228.00	1457.00	5228.30	5228.75	5232.46	25.00	12.02	38.00	0.00	0.00	16.41	0.7
AL	*	2110.500	5228.00	1457.00	5228.55	5229.20	5232.85	25.00	15.84	95.00	0.00	0.00	16.84	0.5
	*	2110.000	5227.80	1382.00	5228.18	5228.18	5229.31	75.00	54.19	38.00	0.00	0.00	2.87	0.7
AK	*	2110.000	5227.30	1382.00	5228.39	5228.39	5228.61	75.00	61.49	95.00	0.00	0.00	3.72	0.5
		2108.000	5222.40	1157.00	5222.78	5222.80	5222.98	225.00	36.45	38.00	0.00	0.00	3.52	0.3
AJ		2108.000	5222.40	1157.00	5222.98	5223.08	5223.39	225.00	39.65	95.00	0.00	0.00	5.16	0.5
	*	106.000	5218.50	957.00	5218.83	5218.83	5218.98	200.00	42.88	38.00	0.00	0.00	3.05	0.7
I	*	106.000	5218.50	957.00	5219.08	5219.08	5219.32	200.00	51.38	95.00	0.00	0.00	3.92	0.5
		910.000	5214.09	797.00	5214.48	5214.53	5214.70	160.00	42.99	38.00	0.00	0.00	3.72	0.3
AH	*	910.000	5214.09	797.00	5214.64	5214.78	5215.09	160.00	47.67	95.00	0.00	0.00	5.41	0.5
	*	909.000	5209.66	631.00	5210.63	5210.63	5210.83	166.00	28.03	38.00	0.00	0.00	3.59	0.7
AG	*	909.000	5209.66	631.00	5210.97	5210.97	5211.26	166.00	38.38	95.00	0.00	0.00	4.30	1.3
		908.000	5206.32	495.00	5207.04	5207.10	5207.31	136.00	30.50	38.00	0.00	0.00	4.17	0.7
AF	*	908.000	5206.32	495.00	5207.23	5207.40	5207.83	136.00	33.16	95.00	0.00	0.00	6.23	0.9
	*	907.000	5205.79	453.00	5206.25	5206.25	5206.46	42.00	26.88	38.00	0.00	0.00	3.62	0.4
AE	*	907.000	5205.79	453.00	5206.59	5206.59	5206.94	42.00	28.68	95.00	0.00	0.00	4.76	0.8
	*	906.000	5203.79	345.00	5205.20	5205.20	5205.67	108.00	13.93	70.00	0.00	0.00	5.50	1.4
AD	*	906.000	5203.79	345.00	5205.81	5205.81	5206.44	108.00	18.10	143.00	0.00	0.00	6.33	2.0
		905.000	5201.20	193.00	5202.45	5202.59	5202.89	152.00	51.57	70.00	23.11	0.00	6.23	1.2
AC	*	905.000	5201.20	193.00	5202.60	5202.82	5203.33	152.00	53.09	143.00	66.26	0.00	8.54	1.4
	*	904.000	5198.72	83.00	5200.96	5200.96	5201.37	110.00	17.24	70.00	0.00	0.00	5.16	2.2
AB	*	904.000	5198.72	83.00	5201.55	5201.55	5201.97	110.00	37.41	143.00	7.15	0.00	5.31	2.8
	*	903.000	5196.41	79.00	5200.04	5200.43	5201.20	4.00	7.82	70.00	0.00	0.00	8.62	3.6
AA	*	903.000	5196.41	79.00	5200.82	5201.12	5201.84	4.00	16.39	143.00	0.00	0.00	8.11	4.4
		902.000	5195.37	29.00	5196.83	5197.24	5198.13	50.00	13.18	70.00	0.00	0.00	9.15	1.4
	*	902.000	5195.37	29.00	5197.14	5197.71	5199.17	50.00	17.99	143.00	0.00	0.00	11.44	1.7
		901.000	5194.52	9.00	5194.86	5195.19	5196.09	20.00	22.77	70.00	0.00	0.00	8.90	0.3
Y		901.000	5194.52	9.00	5195.09	5195.60	5197.04	20.00	23.14	143.00	0.00	0.00	11.21	0.5

	SECNO	ELMIN	CUMDS	CWSEL	CRIWS	EG	XLCH	TOPWID	Q	QLOB	QROB	VCH	DEPT
*	900.000	5193.42	0.00	5193.30	5194.19	5195.42	9.00	17.97	70.00	0.00	0.00	10.20	0.[illegible]
*	900.000	5193.42	0.00	5194.06	5194.67	5196.47	9.00	17.97	143.00	0.00	0.00	12.46	0.[illegible]

NDB-B1

SUMMARY PRINTOUT

	SECNO	Q	K*XNL	K*XNCH	K*XNR	STCHL	STCHR	SSTA	ENDST	KRATIO	K*CHSL
*	2136.700	15.00	0.00	30.00	0.00	6544.00	6632.00	6575.55	6621.33	0.00	0.00
*	2136.700	38.00	0.00	30.00	0.00	6544.00	6632.00	6574.50	6622.13	0.00	0.00
	2136.000	15.00	0.00	30.00	0.00	6500.00	6632.00	6577.65	6613.73	0.96	-24.21
	2136.000	38.00	0.00	30.00	0.00	6500.00	6632.00	6576.73	6619.06	1.10	-24.21
	2134.000	15.00	0.00	30.00	0.00	6500.00	6632.00	6576.18	6585.79	1.17	-30.00
	2134.000	38.00	0.00	30.00	0.00	6500.00	6632.00	6574.48	6616.52	1.04	-30.00
*	132.000	15.00	0.00	30.00	0.00	6524.00	6632.00	6577.00	6588.00	0.88	-28.50
	132.000	38.00	0.00	30.00	0.00	6524.00	6632.00	6555.80	6608.88	1.00	-28.50
	130.000	15.00	0.00	30.00	0.00	6524.00	6568.00	6531.37	6552.04	1.15	-27.44
	130.000	38.00	0.00	30.00	0.00	6524.00	6568.00	6530.78	6553.97	0.99	-27.44
	128.000	15.00	0.00	30.00	0.00	6492.00	6560.00	6516.38	6550.86	0.86	-28.10
	128.000	38.00	0.00	30.00	0.00	6492.00	6560.00	6507.94	6552.12	1.04	-28.10
	126.000	15.00	0.00	30.00	0.00	6468.00	6564.00	6477.69	6504.13	1.18	-30.00
	126.000	38.00	0.00	30.00	0.00	6468.00	6564.00	6476.70	6509.91	0.96	-30.00
*	2122.000	15.00	0.00	30.00	0.00	6344.00	6448.00	6399.77	6427.51	1.30	-25.00
	2122.000	38.00	0.00	30.00	0.00	6344.00	6448.00	6397.97	6432.53	0.90	-25.00
*	2120.000	15.00	0.00	30.00	0.00	6380.00	6560.00	6394.97	6445.06	1.10	-23.64
	2120.000	38.00	0.00	30.00	0.00	6380.00	6560.00	6392.59	6449.34	1.09	-23.64
	2118.000	15.00	0.00	30.00	0.00	6380.00	6564.00	6497.85	6520.81	1.09	-30.00
	2118.000	38.00	0.00	30.00	0.00	6380.00	6564.00	6495.51	6523.15	1.04	-30.00
	2116.000	15.00	0.00	30.00	0.00	6416.00	6460.00	6425.53	6443.22	0.91	-29.30
	2116.000	38.00	0.00	30.00	0.00	6416.00	6460.00	6424.13	6448.81	0.97	-29.30
*	2114.000	38.00	0.00	30.00	0.00	6280.00	6340.00	6298.44	6329.07	0.40	-26.40
*	2114.000	95.00	0.00	30.00	0.00	6280.00	6340.00	6296.39	6330.01	0.38	-26.40
	2112.000	38.00	0.00	30.00	0.00	6284.00	6324.00	6295.93	6308.47	0.84	-26.00
	2112.000	95.00	0.00	30.00	0.00	6284.00	6324.00	6294.76	6310.39	0.82	-26.00
*	2110.700	38.00	0.00	20.00	0.00	6264.00	6464.00	6285.32	6421.35	1.29	12.73
*	2110.700	95.00	0.00	20.00	0.00	6264.00	6464.00	6273.51	6444.98	1.23	12.73
*	2110.500	38.00	0.00	30.00	0.00	6272.00	6332.00	6285.99	6298.01	9.22	-224.00
*	2110.500	95.00	0.00	30.00	0.00	6272.00	6332.00	6283.78	6299.62	6.71	-224.00
*	2110.000	38.00	0.00	30.00	0.00	6276.00	6452.00	6302.97	6357.16	0.23	-2.67
*	2110.000	95.00	0.00	30.00	0.00	6276.00	6452.00	6301.75	6363.24	0.31	-2.67

	SECNO	Q	K*XNL	K*XNCH	K*XNR	STCHL	STCHR	SSTA	ENDST	KRATIO	K*CHSL
	2108.000	38.00	0.00	30.00	0.00	6376.00	6452.00	6394.57	6431.03	1.08	-24.00
	2108.000	95.00	0.00	30.00	0.00	6376.00	6452.00	6392.78	6432.63	1.29	-24.00
*	106.000	38.00	0.00	30.00	0.00	6352.00	6552.00	6426.45	6469.33	1.24	-19.50
*	106.000	95.00	0.00	30.00	0.00	6352.00	6552.00	6422.28	6473.66	1.07	-19.50
	910.000	38.00	0.00	30.00	0.00	47.06	170.22	49.97	123.43	1.40	-27.56
*	910.000	95.00	0.00	30.00	0.00	47.06	170.22	49.55	125.85	1.63	-27.56
*	909.000	38.00	0.00	30.00	0.00	36.50	149.27	48.07	128.36	0.78	-26.68
*	909.000	95.00	0.00	30.00	0.00	36.50	149.27	46.74	133.31	0.66	-26.68
	908.000	38.00	0.00	30.00	0.00	78.51	136.45	86.39	128.51	1.36	-24.56
*	908.000	95.00	0.00	30.00	0.00	78.51	136.45	85.83	129.04	1.68	-24.56
*	907.000	38.00	0.00	30.00	0.00	85.89	126.86	92.30	119.18	1.12	-12.61
*	907.000	95.00	0.00	30.00	0.00	85.89	126.86	91.54	120.21	0.87	-12.61
*	906.000	70.00	0.00	30.00	0.00	98.02	120.20	100.41	114.34	0.74	-18.52
*	906.000	143.00	0.00	30.00	0.00	98.02	120.20	98.64	116.74	0.98	-18.52
	905.000	70.00	35.00	30.00	0.00	98.50	109.70	56.70	108.27	1.27	-17.04
*	905.000	143.00	35.00	30.00	0.00	98.50	109.70	55.70	108.79	1.71	-17.04
*	904.000	70.00	0.00	30.00	0.00	15.08	37.71	16.44	33.67	1.70	-22.55
*	904.000	143.00	35.00	30.00	0.00	15.08	37.71	0.00	37.41	1.12	-22.55
*	903.000	70.00	0.00	30.00	0.00	14.61	35.87	19.52	27.33	1.77	-577.51
*	903.000	143.00	0.00	30.00	0.00	14.61	35.87	15.88	32.27	1.80	-577.51
	902.000	70.00	0.00	30.00	0.00	114.58	163.53	141.25	154.43	1.25	-20.80
*	902.000	143.00	0.00	30.00	0.00	114.58	163.53	137.21	155.21	1.68	-20.80
	901.000	70.00	0.00	30.00	0.00	140.30	170.98	148.08	170.85	1.34	-42.50
	901.000	143.00	0.00	30.00	0.00	140.30	170.98	147.72	170.86	1.14	-42.50
*	900.000	70.00	0.00	15.00	0.00	0.00	18.75	0.01	18.74	0.56	-122.23
*	900.000	143.00	0.00	15.00	0.00	0.00	18.75	0.01	18.74	0.54	-122.23

NDB-B1

SUMMARY PRINTOUT

	SECNO	Q	HV	HL	OLOSS	AREA	FRCH	SHEAR	POWER
*	2136.700	15.00	0.10	0.00	0.00	5.96	1.23	0.21	0.52
*	2136.700	38.00	0.14	0.00	0.00	12.55	1.04	0.36	1.10
	2136.000	15.00	0.11	2.34	0.00	5.64	1.18	0.23	0.62
	2136.000	38.00	0.19	2.31	0.00	10.88	1.21	0.43	1.50
	2134.000	15.00	0.30	5.53	0.02	3.38	1.32	0.72	3.18
	2134.000	38.00	0.18	5.57	0.00	11.02	1.19	0.47	1.64
*	132.000	15.00	0.24	5.73	0.02	3.85	1.16	0.55	2.16
	132.000	38.00	0.19	5.78	0.00	10.83	1.37	0.37	1.29
	130.000	15.00	0.17	6.24	0.02	4.55	1.24	0.46	1.51
	130.000	38.00	0.29	6.11	0.01	8.78	1.24	0.66	2.87
	128.000	15.00	0.09	6.04	0.02	6.09	1.03	0.28	0.68
	128.000	38.00	0.18	6.12	0.03	11.08	1.21	0.47	1.63
	126.000	15.00	0.14	6.16	0.00	4.96	1.23	0.41	1.23
	126.000	38.00	0.22	6.12	0.00	10.13	1.20	0.53	2.00
*	2122.000	15.00	0.11	11.73	7.00	5.73	1.01	0.30	0.77
	2122.000	38.00	0.19	10.56	0.01	10.96	1.08	0.45	1.56
*	2120.000	15.00	0.07	5.41	0.15	6.95	1.02	0.23	0.49
	2120.000	38.00	0.14	5.45	0.01	12.66	1.12	0.38	1.13
	2118.000	15.00	0.15	5.77	0.01	4.82	1.20	0.41	1.29
	2118.000	38.00	0.26	5.66	0.01	9.26	1.25	0.62	2.54
	2116.000	15.00	0.17	6.17	0.00	4.60	1.13	0.43	1.39
	2116.000	38.00	0.27	6.14	0.00	9.04	1.22	0.63	2.65
*	2114.000	38.00	0.23	6.61	0.01	9.97	1.18	0.54	2.05
*	2114.000	95.00	0.42	6.46	0.01	18.22	1.25	0.85	4.44
	2112.000	38.00	0.37	4.42	0.01	7.79	1.09	0.73	3.54
	2112.000	95.00	0.61	4.10	0.02	15.22	1.11	1.03	6.46
*	2110.700	38.00	0.07	1.60	1.12	18.14	1.01	0.10	0.20
*	2110.700	95.00	0.11	1.40	1.08	36.31	1.00	0.13	0.34
*	2110.500	38.00	4.18	0.95	0.41	2.31	6.59	11.91	195.52
*	2110.500	95.00	4.30	0.74	0.42	5.71	4.88	9.95	165.49
*	2110.000	38.00	0.13	5.00	7.59	13.24	1.02	0.34	0.96
*	2110.000	95.00	0.21	3.77	5.47	25.55	1.02	0.47	1.75

	SECNO	Q	HV	HL	OLOSS	AREA	FRCH	SHEAR	POWER
	2108.000	38.00	0.19	5.33	0.01	10.81	1.14	0.47	1.66
	2108.000	95.00	0.41	5.20	0.02	18.41	1.33	0.88	4.53
*	106.000	38.00	0.14	4.46	1.79	12.47	1.00	0.36	1.09
*	106.000	95.00	0.24	4.46	2.01	24.22	1.01	0.50	1.97
	910.000	38.00	0.21	4.27	0.01	10.23	1.75	0.33	1.24
*	910.000	95.00	0.45	4.21	0.02	17.55	1.99	0.65	3.53
*	909.000	38.00	0.20	4.41	0.49	10.58	1.74	0.16	0.57
*	909.000	95.00	0.29	4.17	0.63	22.11	1.50	0.25	1.09
	908.000	38.00	0.27	3.51	0.01	9.11	1.58	0.48	2.02
*	908.000	95.00	0.60	3.40	0.03	15.26	1.85	0.99	6.17
*	907.000	38.00	0.20	1.06	0.62	10.50	1.02	0.46	1.66
*	907.000	95.00	0.35	1.02	0.63	19.95	1.01	0.66	3.14
*	906.000	70.00	0.47	1.70	1.32	12.74	1.01	0.82	4.52
*	906.000	143.00	0.62	1.47	1.15	22.60	1.00	0.99	6.25
	905.000	70.00	0.43	2.76	0.02	17.02	1.25	1.12	7.00
*	905.000	143.00	0.74	3.09	0.01	24.66	1.61	2.02	17.26
*	904.000	70.00	0.41	2.10	2.07	13.57	1.02	0.78	4.01
*	904.000	143.00	0.42	1.93	2.69	29.63	0.87	0.72	3.83
*	903.000	70.00	1.15	0.10	0.07	8.12	1.49	3.21	27.70
*	903.000	143.00	1.02	0.07	0.06	17.63	1.38	2.20	17.82
	902.000	70.00	1.30	3.05	0.01	7.65	2.12	2.78	25.48
*	902.000	143.00	2.03	2.58	0.10	12.50	2.42	4.02	46.01
	901.000	70.00	1.23	2.02	0.02	7.87	2.67	2.98	26.53
	901.000	143.00	1.95	2.10	0.02	12.75	2.66	4.12	46.23
*	900.000	70.00	1.62	0.64	0.04	6.86	2.97	0.98	9.95
*	900.000	143.00	2.41	0.52	0.05	11.48	2.81	1.31	16.36

SUMMARY OF ERRORS AND SPECIAL NOTES

```
CAUTION SECNO=   2136.700  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   2136.700  PROFILE=  2  CRITICAL DEPTH ASSUMED

CAUTION SECNO=    132.000  PROFILE=  1  WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO=    132.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=   2122.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   2122.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   2122.000  PROFILE=  1  WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO=   2122.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=   2120.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   2120.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   2120.000  PROFILE=  1  WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO=   2120.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO=   2114.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=   2114.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=   2110.700  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   2110.700  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   2110.700  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=   2110.700  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   2110.700  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   2110.700  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=   2110.500  PROFILE=  1  WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO=   2110.500  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=   2110.500  PROFILE=  1  SLOPE TOO STEEP
CAUTION SECNO=   2110.500  PROFILE=  2  SLOPE TOO STEEP
WARNING SECNO=   2110.500  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=   2110.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   2110.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   2110.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=   2110.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   2110.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   2110.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=    106.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    106.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    106.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=    106.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    106.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    106.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO=    910.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=    909.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    909.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
```

```
CAUTION SECNO=    909.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    909.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    909.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO=    908.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=    907.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    907.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    907.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=    907.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    907.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    907.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=    906.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    906.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    906.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=    906.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    906.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    906.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO=    905.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=    904.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    904.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    904.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=    904.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    904.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    904.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO=    903.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    903.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    902.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    900.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    900.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
```

```
T1
T1     HEC-2 FILENAME:   SUB_B1.HC2
T1         (10-YR & 100-YR DISCHARGES. EXISTING CONDITIONS)
T1
T1 ************************************************************************
T1    RTI PROJECT NO.    94-200-1 (TASK 3)
T1
T1    PURPOSE: SUBMITTAL OF LOMR FOR NORTH DOMINGO ARROYO (IN ALBUQUERQUE, NM)
T1             FROM LOWER NORTH DOMINGO BACA DETENTION DAM TILL IT MEETS WITH
T1             SOUTH DOMINGO BACA ARROYO WEST OF I-25.
T1
T1    FLOODING SOURCE:   NORTH DOMINGO BACA ARROYO (SOUTH BRANCH)
T1
T1    CLIENT:          ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY
T1                     (AMAFCA)
T1                     2600 PROSPECT. NE
T1                     ALBUQUERQUE, NM 87107
T1
T1    CONSULTANTS:     RESOURCE TECHNOLOGY, INC.
T1                     2129. OSUNA RD. NE. SUITE 200
T1                     ALBUQUERQUE. NM 87113
T1                     PH: (505)345-3115
T1                     FAX: (505)345-4132
T1
T1    FINAL MODEL RUN DATE:  00/00/1995
T1
T1    INPUT FILENAME:  SUB_B1.HC2
T1    OUTPUT FILENAME: SUB_B1.OUT
T1 ************************************************************************
T1     DATE: 07/18/1994, 07/21, 07/26, 07/27, 07/28, 08/02, 08/10, 08/13
T1           04/20/1995
T1
T1     ORIGIN OF THIS FILE:
T1        THIS FILE IS COPIED FROM DBB1.DAT ("NORTH AND SOUTH DOMINGO BACA
T1        ARROYOS AND PASEO DEL NORTE CORRIDOR DRAINAGE MANAGEMENT PLAN -BY
T1        RESOURCE TECHNOLOGY, INC. DECEMBER 1991")
T1
T1     THIS HEC-2 INPUT FILE COVERS SOUTH BRANCH OF NORTH DOMINGO BACA ARROYO
T1     FROM IMMEDIATELY DOWNSTREAM OF LOUISIANA BLVD. TILL UPSTREAM FACE OF
T1     STRUCTURE NO. 2 AT I-25.
T1
T1     STARTING ELEVATIONS IN THIS FILE ARE COMPUTED USING CULVERT CHARTS.
T1
T1     MODIFICATIONS MADE TO THIS FILE AFTER COPYING IT FROM ORIGINAL FILE:
T1        1. INSTEAD OF USING FOUR 4' X 9' CULVERTS AT I-25. ONLY
T1           TWO SOUTHMOST CULVERTS ARE USED BECAUSE STORM SEWER DRAIN PIPE
T1           UNDERNEATH ANAHEIM AVE. CONNECTS TO SECOND CULVERT FROM NORTH SIDE
T1           THUS SEPARATING TWO SOUTHMOST CULVERTS FROM THE NORTHMSOT CULVERT.
T1        2. RTI SURVEYED 11 CROSS SECTIONS (900 THROUGH 910) UPSTREAM OF
T1           CULVERTS NEAR (EAST OF) I-25.
T1        3. CHANGES TO REFLECT EXISTING FIELD CONDITIONS WHEREVER NECESSARY.
T1
T2      FILENAME: SUB_B1.HC2  SUB-CRITICAL  10-YR RETURN PERIOD
T3      NDB-B1(SUB)
J1          2          0                                  5194.65
J2    1          -1                          -1
J3   38     42     66     1     2     3     39     4     43     13
J3   15     26      8           38    43     16    17     18     21
J3   22     53     54    58     33           38    43     10     11
```

```
*
* CROSS SECTIONS 900 THROUGH 910 ARE SURVEYED BY RTI ON 06/20/1994.
* X-SECTION 900 IS UPSTREAM FACE OF CULVERT STRUCTURE NO. 2.
*
NC  .035    .035    .030     0.3     0.3
BT     2      70     143
X1   900      16           18.75
X3    10 5193.42
BT     2           5201    5197   38.25    5201  5197.0
GR5197.0        5193.00    0.01 5193.00    8.99 5197.00     9.0 5197.00    9.75
GR5193.0    9.76 5193.00   18.74 5197.00   18.75 5197.00   19.50 5193.00   19.51
GR5193.0   28.49 5197.00   28.50 5197.00   29.25 5193.00   29.26 5193.00   38.24
GR5197.0   36.25
*
X1   901      14  140.30  170.98      16       9       9
X3    10
GR5199.6        5197.85  140.30 5194.95  148.08 5194.53  148.09 5194.52  170.84
GR5198.7  170.98 5198.63  180.33 5193.97  180.43 5193.97  195.04 5194.64  195.74
GR5199.0  203.40 5199.36  221.09 5200.09  275.81 5200.94  337.33
*
NC  .035    .035    .030     0.1     0.3
X1   902      15  114.58  163.53      20      13      20
X3    10
GR5200.5        5198.88  114.58 5196.19  149.46 5195.37  150.93 5195.56  153.14
GR5196.5  153.63 5200.48  163.53 5200.41  172.64 5195.02  181.49 5194.03  181.65
GR5194.0  183.28 5195.01  183.55 5198.48  191.01 5200.40  282.92 5201.13  333.81
*
NC  .035    .035    .030     0.1     0.3
X1   903       6   14.61   35.87      48      52      50
X3    10
GR5201.5        5201.10   14.61 5199.44   22.30 5196.41   23.40 5199.81   25.38
GR5201.4   35.87
*
NC  .035    .035    .030     0.1     0.3
X1   904       7   15.08   37.71       7       3       4
X3    10
GR5201.4        5201.17   15.08 5199.94   23.03 5198.72   25.03 5199.96   27.38
GR5201.6   37.70 5202.10   37.71
*
NC  .035    .035    .030     0.1     0.3
X1   905       9   98.50  109.70     112     112     110
X3    10
GR5205.8        5203.83   47.22 5202.25   58.09 5202.19   98.50 5201.22  102.21
GR5201.2  103.77 5202.85  109.70 5203.07  142.74 5203.57  142.75
*
NC  .035    .035    .030     0.1     0.3
X1   906       9   98.02  120.20     157     152     152
X3    10
GR5208.1        5207.46   75.22 5206.03   98.02 5203.86  104.26 5203.79  108.84
GR5206.7  120.20 5206.41  139.32 5204.98  156.93 5205.93  177.36
*
NC  .035    .035    .030     0.1     0.3
BT     2      38      95
X1   907       8   85.89  126.86     108     110     108
X3    10
GR5211.1        5209.11   85.89 5205.90   93.09 5205.79  117.78 5208.78  126.86
GR5207.7  135.79 5207.78  144.30 5208.03  169.29
*
NC  .035    .035    .030     0.1     0.3
X1   908      11   78.51  136.45      45      42      42
X3    10
GR5211.8        5209.76   78.51 5206.88   86.84 5207.01   97.95 5208.09  102.37
GR5207.9  106.22 5206.32  112.56 5206.85  127.99 5209.90  136.45 5208.64  154.32
GR5209.0  180.71
*
```

```
X1   909      14   36.50  149.27     135     140     136
AG X3   10
GR5215.1         5213.65   36.50 5210.28   49.40 5210.37   59.01 5210.37   59.01
GR5211.9   70.01 5212.89  102.79 5209.66  117.54 5210.52  126.87 5211.32  138.23
GR5213.7  149.27 5213.50  156.59 5212.40  170.51 5212.63  196.22
*
* CROSS SECTIONS 900 THROUGH 910 ARE SURVEYED BY RTI ON 06/20/1994.
*
NC  .035    .035    .030     0.1     0.3
X1   910      13   47.06  170.22     180     140     166
AH
X3   10
GR5218.6         5217.45   18.84 5215.59   47.06 5214.09   51.00 5214.23   65.39
GR5215.1   70.14 5215.08   93.70 5214.34   98.05 5214.19  119.07 5215.49  138.54
GR5218.0  170.22 5216.73  184.86 5216.65  213.95
*
NC  .035    .035    .030     0.1     0.3
X1106.00      55    6352    6552     160     160     160
AI
X3   10
GR5221.7    5992  5221.7    6012  5221.9    6032  5222.4    6052  5222.8    6072
GR5223.5    6092  5224.0    6112  5224.1    6132  5224.0    6152  5223.8    6172
GR5223.7    6192  5223.5    6212  5223.4    6232  5223.2    6252  5223.0    6272
GR5222.8    6292  5222.6    6312  5222.3    6332  5222.3    6352  5221.5    6372
GR5220.6    6392  5219.7    6412  5218.5    6432  5218.5    6452  5218.5    6464
GR5219.0    6472  5220.0    6492  5220.9    6512  5221.7    6532  5222.1    6552
GR5221.4    6572  5221.7    6592  5222.5    6612  5222.9    6632  5222.6    6652
GR5222.1    6672  5221.5    6692  5221.0    6712  5220.5    6732  5219.9    6752
GR5220.2    6772  5221.4    6784  5221.7    6792  5222.0    6812  5220.4    6824
GR5219.9    6832  5219.8    6852  5219.4    6872  5219.0    6892  5218.6    6912
GR5218.5    6932  5218.9    6952  5219.3    6972  5219.7    6992  5219.9    7012
*
NC  .035    .035    .030     0.1     0.3
X12108.0      59    6376    6452     200     200     200
X3   10
GR5228.3    6144  5228.4    6164  5228.5    6184  5228.6    6204  5228.5    6224
GR5228.2    6244  5227.8    6264  5227.4    6284  5227.0    6304  5226.5    6324
GR5226.1    6344  5225.5    6364  5225.1    6376  5224.8    6380  5224.2    6384
GR5223.1    6392  5222.6    6396  5222.5    6400  5222.5    6404  5222.4    6424
GR5222.4    6428  5222.9    6432  5224.4    6444  5224.9    6448  5225.2    6452
GR5225.3    6456  5225.4    6464  5225.7    6484  5226.0    6504  5226.0    6524
GR5225.8    6528  5225.6    6532  5226.1    6536  5226.6    6540  5227.1    6544
GR5227.4    6548  5227.4    6552  5227.5    6556  5227.2    6564  5226.8    6572
GR5226.7    6576  5227.0    6584  5227.2    6604  5227.5    6624  5227.5    6644
GR5227.3    6664  5226.9    6684  5226.5    6704  5226.2    6724  5225.7    6744
GR5225.4    6764  5225.4    6768  5225.5    6772  5225.8    6776  5226.8    6784
GR5227.0    6804  5227.2    6824  5226.8    6844  5226.1    6864
*
NC  .035    .035    .030     0.1     0.3
AK
X12110.0      58    6276    6452     225     225     225
X3   10
GR5232.3    5892  5232.4    5912  5232.5    5932  5232.5    5952  5232.4    5972
GR5232.3    5992  5231.7    6012  5231.2    6032  5231.3    6052  5231.6    6072
GR5231.9    6092  5232.4    6112  5232.9    6132  5233.1    6152  5233.2    6172
GR5233.2    6192  5233.2    6212  5233.1    6232  5233.0    6252  5232.8    6272
GR5232.7    6276  5232.3    6280  5231.6    6284  5230.1    6292  5229.4    6296
GR5228.7    6300  5228.0    6304  5227.8    6308  5227.9    6312  5227.9    6332
GR5228.0    6352  5228.7    6372  5229.0    6392  5230.1    6412  5231.4    6432
GR5232.0    6452  5232.2    6472  5232.4    6492  5232.5    6512  5232.2    6532
GR5231.9    6552  5231.0    6572  5232.0    6592  5232.3    6612  5232.6    6632
GR5232.6    6652  5232.4    6672  5232.0    6692  5231.6    6712  5231.1    6732
GR5230.7    6752  5231.0    6760  5231.0    6764  5230.8    6772  5231.8    6792
GR5231.7    6812  5231.6    6832  5231.2    6852
*
* DOWNSTREAM SAN PEDRO
*
AL
NC  .035    .035    .030     0.1     0.3
```

```
AL  X3    10
    GR5233.0   5872  5233.1   5892  5233.2   5912  5233.3   5932  5233.4   5952
    GR5233.3   5972  5233.3   5992  5233.3   6012  5232.9   6032  5232.8   6052
    GR5233.0   6072  5233.0   6084  5233.6   6092  5234.1   6112  5234.6   6132
    GR5234.9   6152  5235.2   6172  5235.1   6192  5235.0   6212  5234.9   6232
    GR5234.5   6252  5230.8   6272  5229.3   6280  5228.5   6284  5228.1   6288
    GR5228.1   6292  5228.0   6296  5228.6   6300  5230.3   6312  5231.7   6332
    GR5232.1   6352  5231.5   6372  5231.4   6392  5231.0   6400  5231.1   6404
    GR5231.5   6412  5232.7   6432  5233.9   6440  5234.5   6444  5234.6   6448
    GR5234.7   6452  5235.2   6472  5235.0   6492  5234.7   6512  5234.4   6532
    GR5233.8   6552  5233.3   6572  5233.0   6580  5233.4   6592  5233.8   6612
    GR5233.6   6632  5233.6   6652  5233.4   6672  5233.2   6692  5232.9   6712
    GR5232.7   6732  5232.5   6752  5232.4   6772  5232.8   6792  5232.9   6812
    GR5233.0   6832  5232.7   6852
    *
    * CENTERLINE SAN PEDRO
    * (2-CMPs. PROBABLY 24" DIA. ARE MODELLED AS PLUGGED)
    *
    NC  0.02    0.02    0.02     0.1     0.3
AM  X12110.7     51    6264    6464     25      25      25
    X3    10                                            5234.5  5234.5
    GR5232.7   5864  5232.9   5884  5233.0   5904  5233.1   5924  5233.2   5944
    GR5233.3   5964  5233.4   5984  5233.4   6004  5233.5   6024  5233.5   6044
    GR5233.5   6064  5233.6   6084  5234.0   6104  5233.9   6124  5234.0   6144
    GR5234.0   6164  5234.0   6184  5234.0   6204  5233.9   6224  5234.0   6244
    GR5234.0   6264  5233.8   6284  5233.6   6304  5233.6   6324  5233.6   6344
    GR5233.6   6364  5233.7   6384  5233.7   6404  5233.8   6424  5233.9   6444
    GR5234.0   6464  5233.9   6484  5233.9   6504  5233.9   6524  5233.9   6544
    GR5233.7   6564  5234.0   6584  5234.2   6604  5234.3   6624  5234.1   6644
    GR5234.1   6664  5234.0   6684  5233.9   6704  5233.7   6724  5233.5   6744
    GR5233.4   6764  5233.4   6784  5233.5   6804  5233.3   6824  5233.5   6844
    GR5233.5   6864
    *
    NC  .035    .035    .030     .1      .5
AN  X12112.0     67    6284    6324    110     110     110
    X3    10
    GR5236.7   5848  5237.9   5868  5237.9   5888  5237.9   5908  5237.8   5928
    GR5237.9   5948  5238.0   5968  5238.0   5988  5238.0   6008  5238.1   6028
    GR5238.2   6048  5238.7   6068  5238.9   6088  5239.1   6108  5239.2   6128
    GR5239.1   6148  5238.7   6168  5238.1   6188  5237.5   6208  5238.0   6228
    GR5238.5   6248  5238.4   6268  5238.3   6272  5238.3   6276  5238.3   6280
    GR5238.4   6284  5236.7   6288  5235.0   6292  5233.2   6296  5232.2   6300
    GR5232.4   6304  5233.1   6308  5235.3   6316  5236.5   6320  5237.0   6324
    GR5237.0   6328  5237.1   6348  5237.2   6368  5237.3   6388  5237.4   6408
    GR5237.4   6428  5237.4   6448  5237.4   6468  5237.2   6488  5237.1   6508
    GR5236.9   6528  5236.7   6548  5236.5   6568  5236.0   6576  5236.2   6580
    GR5236.5   6588  5237.0   6608  5237.4   6628  5237.6   6648  5237.6   6668
    GR5237.4   6688  5237.1   6708  5236.8   6728  5236.4   6748  5236.0   6768
    GR5236.4   6788  5238.1   6808  5238.5   6812  5238.6   6816  5238.6   6828
    GR5238.5   6848  5238.4   6868
    *
    * DOWNSTREAM LOUISIANA
AO/A *
    NC  .035    .035    .030     0.1     0.3
    X12114.0     74    6280    6340    200     200     200
    X3    10
    GR5237.2   5788  5238.1   5808  5238.8   5828  5238.9   5832  5239.1   5836
    GR5239.8   5840  5240.7   5844  5241.5   5848  5242.4   5852  5243.2   5856
    GR5244.0   5860  5244.4   5864  5244.4   5868  5244.8   5888  5244.8   5908
    GR5245.1   5928  5245.5   5948  5245.6   5968  5245.6   5988  5245.7   6008
    GR5245.6   6028  5245.1   6048  5244.7   6068  5243.6   6088  5242.8   6108
    GR5242.2   6128  5241.8   6148  5241.6   6168  5241.5   6188  5241.4   6208
    GR5241.1   6228  5240.9   6248  5240.6   6268  5240.4   6276  5240.2   6280
    GR5239.8   6284  5239.2   6288  5238.1   6296  5237.6   6300  5237.4   6304
    GR5237.4   6308  5237.5   6328  5238.6   6332  5239.5   6336  5240.1   6340
```

```
GR5241.7    6428  5242.0    6448  5242.2    6468  5242.3    6486  5242.1    6508
GR5242.0    6528  5241.8    6548  5241.3    6568  5241.0    6576  5241.6    6588
GR5242.1    6608  5242.3    6628  5242.5    6648  5242.6    6668  5242.4    6688
GR5242.0    6708  5241.6    6728  5241.2    6748  5241.5    6768  5241.8    6788
GR5242.4    6808  5242.8    6828  5243.1    6848  5243.2    6868
*
NC  .035    .035    .030     0.1     0.3
QT     2      15      38
X12116.0       78    6416    6460     250     250     250
X3    10
GR5237.0    5724  5237.3    5744  5237.6    5764  5237.8    5780  5238.2    5784
GR5241.5    5804  5244.8    5824  5245.5    5828  5246.1    5832  5246.1    5836
GR5246.3    5844  5246.6    5864  5246.9    5884  5247.3    5904  5247.9    5924
GR5248.0    5944  5247.8    5964  5247.9    5984  5247.7    6004  5247.1    6024
GR5246.6    6044  5246.3    6064  5245.8    6084  5245.5    6104  5245.3    6124
GR5245.1    6144  5245.0    6164  5244.9    6184  5244.9    6204  5244.9    6224
GR5244.3    6244  5243.4    6264  5244.0    6284  5244.5    6304  5244.3    6324
GR5244.2    6344  5244.4    6364  5244.5    6384  5245.0    6404  5245.2    6412
GR5245.4    6416  5245.3    6420  5244.7    6424  5244.1    6428  5244.0    6432
GR5244.2    6436  5244.5    6444  5244.8    6452  5245.8    6456  5246.3    6460
GR5246.3    6464  5246.7    6484  5247.2    6504  5247.7    6524  5248.2    6544
GR5248.5    6560  5248.3    6564  5247.2    6572  5246.7    6576  5246.1    6580
GR5246.4    6584  5247.1    6592  5247.2    6596  5247.4    6604  5247.5    6624
GR5247.6    6644  5247.7    6664  5247.6    6684  5247.4    6704  5247.1    6724
GR5246.7    6744  5246.5    6764  5246.8    6776  5247.3    6784  5247.5    6804
GR5247.3    6824  5247.2    6844  5247.0    6864
*
NC  .035    .035    .030     0.1     0.3
X12118.0       52    6380    6564     215     215     215
X3    10
GR5252.1    6000  5252.1    6020  5252.1    6040  5252.1    6060  5252.0    6068
GR5251.7    6072  5251.0    6080  5249.5    6096  5249.5    6100  5249.3    6120
GR5249.1    6124  5249.0    6128  5249.5    6140  5249.6    6160  5249.4    6180
GR5249.4    6200  5249.3    6220  5249.3    6240  5249.3    6260  5249.5    6280
GR5250.3    6300  5251.0    6320  5251.7    6340  5252.4    6360  5252.8    6380
GR5252.5    6400  5252.2    6420  5251.9    6440  5251.6    6460  5251.4    6480
GR5251.4    6488  5250.5    6500  5250.3    6508  5250.6    6520  5252.1    6540
GR5253.1    6560  5253.1    6564  5252.8    6568  5251.7    6580  5252.7    6600
GR5253.4    6620  5253.5    6640  5253.7    6660  5253.7    6680  5253.6    6700
GR5253.2    6720  5252.7    6740  5252.3    6760  5252.9    6780  5253.3    6800
GR5253.0    6820  5252.7    6840
*
NC  .035    .035    .030     0.1     0.3
X12120.0       50    6380    6560     200     200     200
X3    10
GR5257.3    6000  5257.2    6020  5257.0    6040  5256.4    6060  5255.0    6080
GR5254.4    6088  5254.0    6092  5254.2    6096  5254.7    6100  5255.6    6108
GR5256.2    6112  5256.3    6116  5256.3    6120  5256.2    6140  5256.1    6160
GR5256.0    6180  5255.9    6200  5256.4    6220  5257.2    6240  5257.9    6260
GR5257.1    6280  5256.2    6300  5256.6    6320  5256.9    6340  5257.2    6360
GR5257.2    6380  5256.3    6400  5256.4    6420  5256.4    6440  5256.9    6460
GR5257.4    6480  5257.7    6500  5258.1    6520  5258.5    6540  5258.8    6560
GR5257.4    6580  5258.1    6600  5258.5    6620  5258.7    6640  5258.9    6660
GR5258.9    6680  5258.9    6700  5258.6    6720  5258.1    6740  5257.7    6760
GR5257.4    6768  5257.7    6780  5258.6    6800  5258.6    6820  5258.4    6840
*
NC  .035    .035    .030     0.1     0.3
X12122.0       38    6344    6448     220     220     220
X3    10
GR5264.4    6264  5264.3    6284  5264.2    6304  5263.9    6324  5263.6    6344
GR5263.2    6364  5262.8    6384  5262.6    6392  5261.5    6404  5261.8    6424
GR5261.9    6428  5262.0    6432  5262.4    6436  5263.0    6440  5263.6    6444
GR5263.9    6448  5263.5    6464  5263.4    6484  5263.4    6504  5263.6    6524
GR5264.0    6544  5264.2    6556  5263.9    6564  5262.8    6580  5262.9    6584
GR5264.0    6604  5263.9    6624  5264.0    6644  5264.1    6664  5264.1    6684
```

```
GR5263.4    6304  5263.4    6324  5263.3    6344
*
NC  .035    .035    .030     0.1     0.3
X1126.00      25    6468    6564     420     420     420
X3    10
GR5276.0    6224  5276.1    6244  5276.1    6264  5276.2    6284  5276.2    6304
GR5276.1    6324  5276.1    6344  5276.0    6364  5275.8    6384  5275.6    6404
GR5275.4    6424  5274.7    6444  5274.2    6464  5274.1    6468  5272.0    6480
GR5272.1    6484  5272.4    6504  5273.0    6524  5274.2    6544  5274.9    6564
GR5273.3    6584  5274.0    6604  5274.5    6624  5274.4    6644  5274.2    6664
*
NC  .035    .035    .030     0.1     0.3
X1128.00      30    6492    6560     210     210     210
X3    10
GR5282.5    6224  5282.9    6244  5283.2    6264  5283.4    6284  5283.5    6304
GR5283.6    6324  5283.6    6344  5283.3    6364  5282.7    6384  5282.0    6404
GR5281.5    6424  5281.1    6444  5280.4    6464  5280.1    6484  5280.0    6492
GR5278.8    6504  5278.5    6524  5278.3    6544  5278.4    6548  5278.7    6552
GR5281.3    6560  5281.1    6564  5280.7    6572  5279.3    6584  5279.6    6604
GR5280.3    6624  5280.6    6644  5280.9    6664  5280.9    6684  5280.8    6704
*
NC  .035    .035    .030     0.1     0.3
X1130.00      55    6524    6568     210     210     210
X3    10
GR5288.2    6224  5288.1    6244  5288.2    6264  5288.6    6284  5289.1    6304
GR5289.1    6324  5287.7    6344  5286.9    6356  5286.9    6364  5285.2    6384
GR5285.0    6404  5285.3    6424  5285.6    6428  5285.6    6432  5285.5    6436
GR5285.7    6440  5286.2    6444  5286.7    6448  5286.6    6452  5286.5    6456
GR5285.7    6464  5285.5    6468  5285.2    6472  5285.2    6476  5285.7    6480
GR5286.1    6484  5286.1    6488  5285.9    6492  5284.7    6504  5286.3    6524
GR5285.7    6528  5264.4    6532  5284.6    6536  5284.2    6544  5284.2    6548
GR5285.8    6564  5286.4    6568  5286.2    6572  5285.8    6576  5284.9    6584
GR5285.6    6592  5285.6    6604  5285.7    6612  5285.7    6616  5285.7    6620
GR5286.9    6624  5287.9    6628  5288.0    6632  5288.2    6636  5288.3    6640
GR5288.2    6644  5288.0    6664  5287.8    6684  5287.2    6704  5286.6    6724
*
NC  .035    .035    .030     0.1     0.3
X1132.00      80    6524    6632     215     215     215
X3    10
GR5292.3    6092  5293.5    6096  5291.3    6100  5292.4    6104  5293.8    6108
GR5294.2    6112  5294.4    6116  5294.7    6120  5294.9    6124  5294.7    6144
GR5294.6    6164  5294.8    6184  5294.8    6204  5294.8    6224  5294.7    6244
GR5294.5    6264  5294.0    6284  5293.6    6304  5291.4    6324  5290.9    6328
GR5290.9    6332  5290.9    6344  5291.8    6364  5292.3    6368  5292.4    6372
GR5291.4    6380  5291.6    6384  5291.9    6404  5292.3    6424  5292.9    6432
GR5292.9    6436  5292.9    6444  5292.7    6464  5292.6    6484  5292.6    6504
GR5292.5    6524  5292.1    6536  5291.6    6540  5292.3    6544  5291.8    6548
GR5291.4    6552  5291.0    6556  5290.8    6560  5291.3    6564  5291.7    6568
GR5291.3    6572  5290.9    6576  5290.1    6584  5290.8    6588  5290.9    6592
GR5290.8    6596  5290.8    6604  5291.7    6624  5292.1    6628  5292.5    6632
GR5292.4    6636  5291.8    6640  5291.4    6644  5291.2    6648  5291.9    6664
GR5291.7    6684  5291.4    6704  5291.1    6724  5290.9    6744  5290.6    6764
GR5290.6    6784  5290.4    6804  5290.1    6824  5289.9    6844  5289.8    6848
GR5289.5    6852  5288.9    6856  5287.7    6864  5287.1    6868  5287.6    6872
GR5288.1    6876  5289.1    6884  5288.9    6904  5288.9    6908  5288.8    6912
*
NC  .035    .035    .030     0.1     0.3
X12134.0      95    6500    6632     200     200     200
X3    10
GR5301.0    6100  5300.8    6120  5300.6    6140  5300.4    6160  5299.5    6180
GR5299.0    6188  5298.8    6192  5299.0    6200  5299.5    6220  5299.4    6240
GR5299.4    6244  5298.0    6260  5297.7    6264  5297.4    6268  5297.4    6272
GR5297.7    6276  5298.0    6280  5298.7    6288  5298.8    6292  5298.9    6300
GR5299.2    6320  5299.3    6324  5298.1    6332  5297.8    6336  5297.8    6340
GR5297.8    6360  5297.3    6380  5297.2    6384  5297.1    6388  5297.0    6392
```

AT

AU

AV

AW

```
GR5298.9    6460  5295.9    6480  5293.9    6500  5298.8    6520  5298.3    6532
GR5297.5    6536  5298.6    6540  5297.8    6546  5297.3    6552  5297.3    6556
GR5298.0    6560  5298.6    6564  5298.0    6568  5297.3    6572  5296.5    6576
GR5295.8    6580  5296.2    6584  5296.8    6588  5296.7    6592  5296.6    6600
GR5296.7    6612  5296.7    6616  5297.5    6620  5298.2    6624  5299.0    6628
GR5299.6    6632  5299.4    6636  5299.1    6640  5298.0    6660  5297.4    6680
GR5297.2    6700  5297.3    6720  5297.2    6740  5297.0    6760  5296.9    6780
GR5296.7    6800  5296.6    6804  5296.6    6808  5296.1    6812  5295.1    6820
GR5296.5    6832  5296.8    6840  5297.2    6860  5297.2    6872  5296.7    6880
GR5295.8    6892  5295.4    6896  5295.6    6900  5296.1    6904  5296.4    6908
GR5296.4    6912  5296.3    6920  5296.1    6940  5295.8    6960  5295.4    6980
GR5295.1    7000  5295.1    7020  5295.1    7040  5294.0    7060  5292.8    7080
*
NC  .035    .035    .030     0.1     0.3
X12136.0      77    6500    6632     200     200     200
X3    10
GR5306.5    6060  5306.9    6080  5306.4    6100  5305.8    6120  5305.5    6140
GR5305.3    6160  5305.1    6180  5304.8    6200  5304.4    6220  5304.4    6240
GR5304.6    6260  5304.6    6280  5304.4    6300  5304.0    6320  5303.9    6340
GR5302.9    6360  5302.5    6380  5302.6    6384  5304.2    6392  5304.3    6396
GR5304.2    6400  5303.8    6420  5303.4    6440  5303.6    6460  5304.2    6480
GR5304.9    6500  5304.7    6520  5303.1    6532  5303.7    6536  5303.9    6540
GR5303.4    6544  5303.0    6548  5302.5    6552  5302.9    6556  5303.4    6560
GR5304.3    6564  5304.0    6568  5303.2    6572  5302.5    6576  5301.8    6580
GR5302.5    6588  5302.3    6592  5301.8    6600  5302.4    6620  5303.4    6624
GR5304.4    6628  5304.8    6632  5304.8    6636  5304.7    6640  5304.1    6660
GR5303.7    6680  5303.5    6700  5303.4    6720  5303.4    6740  5303.4    6760
GR5303.4    6780  5303.6    6800  5303.5    6820  5303.6    6840  5303.7    6860
GR5303.4    6880  5303.0    6900  5302.7    6920  5302.4    6940  5301.9    6960
GR5301.4    6980  5300.8    7000  5300.5    7020  5300.2    7028  5300.1    7032
GR5299.1    7040  5298.6    7044  5298.4    7048  5298.7    7052  5299.0    7056
GR5299.6    7060  5300.4    7080
*
NC  .035    .035    .030     0.1     0.3
X12136.7      72    6544    6632      95      95      95
X3    10
GR5307.8    6064  5307.3    6084  5307.3    6104  5307.3    6124  5307.2    6144
GR5307.1    6164  5307.1    6184  5307.2    6204  5307.2    6224  5307.3    6244
GR5307.5    6264  5307.4    6284  5306.9    6304  5305.9    6324  5305.2    6344
GR5304.9    6364  5305.1    6384  5305.0    6392  5306.0    6404  5305.8    6424
GR5305.7    6444  5305.6    6464  5306.3    6484  5306.0    6504  5305.6    6524
GR5305.5    6532  5306.2    6544  5306.5    6548  5306.1    6564  5305.1    6572
GR5304.5    6576  5304.1    6580  5304.4    6584  5304.7    6588  5304.5    6604
GR5304.3    6616  5304.3    6620  5305.1    6624  5305.9    6628  5306.8    6632
GR5306.9    6636  5306.9    6640  5306.9    6644  5306.6    6664  5305.8    6684
GR5305.6    6704  5305.7    6724  5305.8    6744  5305.8    6764  5305.9    6784
GR5305.9    6804  5305.9    6824  5306.0    6844  5306.0    6864  5305.8    6884
GR5305.2    6904  5304.8    6924  5303.7    6944  5302.4    6964  5301.4    6984
GR5301.2    6988  5301.0    6992  5301.3    6996  5301.9    7004  5301.8    7024
GR5301.0    7036  5300.6    7040  5301.0    7044  5301.6    7052  5301.7    7056
GR5301.7    7064  5302.6    7084
*
EJ
T1      RESOURCE TECHNOLOGY INC., ALBUQUERQUE, NM
T1      LOMR (SOUTH BRANCH OF NORTH DOMINGO BACA ARROYO, ALBUQUERQUE, NM)
T1      SUBMITTAL TO FEMA  (DATE: APRIL 1995)
T2      FILENAME: SUB_B1.HC2  SUB-CRITICAL  100-YR RETURN PERIOD
T3      NDB-B1(SUB)
J1   -10       3              0                                  5195.35
J2     2              -1                              -1
```

A4

A2

ER

THIS RUN EXECUTED 20APR95 13:17:33

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2: May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

NDB-B1(SUB)

SUMMARY PRINTOUT

		SECNO	ELMIN	CUMDS	CWSEL	CRIWS	EG	XLCH	TOPWID	Q	QLOB	QROB	VCH	DEPT
		900.000	5193.42	0.00	5194.65	5194.19	5194.81	0.00	17.98	70.00	0.00	0.00	3.17	1.2
		900.000	5193.42	0.00	5195.35	5194.67	5195.61	0.00	17.98	143.00	0.00	0.00	4.12	1.9
	*	901.000	5194.52	9.00	5195.19	5195.19	5195.52	9.00	23.43	70.00	0.00	0.00	4.59	0.8
Y	*	901.000	5194.52	9.00	5195.59	5195.59	5196.11	9.00	24.52	143.00	0.00	0.00	5.74	1.0
	*	902.000	5195.37	29.00	5197.22	5197.22	5197.60	20.00	19.32	70.00	0.00	0.00	4.96	1.8
Z	*	902.000	5195.37	29.00	5197.71	5197.71	5198.20	20.00	26.90	143.00	0.00	0.00	5.62	2.3
	*	903.000	5196.41	79.00	5200.43	5200.43	5200.96	50.00	12.07	70.00	0.00	0.00	5.84	4.0
AA	*	903.000	5196.41	79.00	5201.14	5201.14	5201.73	50.00	20.97	143.00	0.00	0.00	6.15	4.7
	*	904.000	5198.72	83.00	5200.97	5200.97	5201.37	4.00	17.37	70.00	0.00	0.00	5.09	2.2
AB	*	904.000	5198.72	83.00	5201.53	5201.53	5201.97	4.00	37.26	143.00	6.39	0.00	5.45	2.8
	*	905.000	5201.20	193.00	5202.58	5202.58	5202.77	110.00	52.86	70.00	31.33	0.00	4.41	1.3
AC		905.000	5201.20	193.00	5202.87	5202.79	5203.11	110.00	59.12	143.00	84.21	0.00	4.92	1.6
	*	906.000	5203.79	345.00	5205.20	5205.20	5205.67	152.00	13.91	70.00	0.00	0.00	5.51	1.4
AD	*	906.000	5203.79	345.00	5205.81	5205.81	5206.44	152.00	18.05	143.00	0.00	0.00	6.37	2.0
		907.000	5205.79	453.00	5206.50	5206.25	5206.58	108.00	28.21	38.00	0.00	0.00	2.18	0.7
AE		907.000	5205.79	453.00	5207.05	5206.60	5207.17	108.00	31.07	95.00	0.00	0.00	2.84	1.2
	*	908.000	5206.32	495.00	5207.10	5207.10	5207.28	42.00	31.41	38.00	0.00	0.00	3.40	0.7
AF	*	908.000	5206.32	495.00	5207.40	5207.40	5207.71	42.00	35.51	95.00	0.00	0.00	4.50	1.0
	*	909.000	5209.66	631.00	5210.63	5210.63	5210.83	136.00	28.11	38.00	0.00	0.00	3.57	0.9
?	*	909.000	5209.66	631.00	5210.96	5210.96	5211.26	136.00	37.98	95.00	0.00	0.00	4.40	1.2
	*	910.000	5214.09	797.00	5214.53	5214.53	5214.68	166.00	44.39	38.00	0.00	0.00	3.08	0.4
AH	*	910.000	5214.09	797.00	5214.77	5214.77	5215.02	166.00	51.40	95.00	0.00	0.00	3.97	0.6

	SECND	ELMIN	CUMDS	CWSEL	CRIWS	EG	XLCH	TOPWID	Q	GLOB	GROB	VCH	DEPT
*	2136.700	5304.10	4227.00	5304.57	5304.57	5304.66	95.00	34.12	15.00	0.00	0.00	2.41	0.4
*	2136.700	5304.10	4227.00	5304.73	5304.73	5304.87	95.00	47.63	38.00	0.00	0.00	3.03	0.6

NDB-B1(SUB)

SUMMARY PRINTOUT

	SECNO	Q	K*XNL	K*XNCH	K*XNR	STCHL	STCHR	SSTA	ENDST	KRATIO	K*CHSL
	900.000	70.00	0.00	30.00	0.00	0.00	18.75	0.01	18.74	0.00	0.00
	900.000	143.00	0.00	30.00	0.00	0.00	18.75	0.00	18.75	0.00	0.00
*	901.000	70.00	0.00	30.00	0.00	140.30	170.98	147.43	170.86	0.51	122.23
*	901.000	143.00	0.00	30.00	0.00	140.30	170.98	146.35	170.88	0.57	122.23
*	902.000	70.00	0.00	30.00	0.00	114.58	163.53	136.10	155.42	1.00	42.50
*	902.000	143.00	0.00	30.00	0.00	114.58	163.53	129.74	156.64	0.99	42.50
*	903.000	70.00	0.00	30.00	0.00	14.61	35.87	17.71	29.78	0.89	20.80
*	903.000	143.00	35.00	30.00	0.00	14.61	35.87	13.25	34.22	0.76	20.80
*	904.000	70.00	0.00	30.00	0.00	15.08	37.71	16.37	33.74	1.16	577.51
*	904.000	143.00	35.00	30.00	0.00	15.08	37.71	0.00	37.26	1.21	577.51
*	905.000	70.00	35.00	30.00	0.00	98.50	109.70	55.85	108.71	1.23	22.55
	905.000	143.00	35.00	30.00	35.00	98.50	109.70	53.81	112.93	1.07	22.55
*	906.000	70.00	0.00	30.00	0.00	98.02	120.20	100.42	114.33	0.84	17.04
*	906.000	143.00	0.00	30.00	0.00	98.02	120.20	98.66	116.71	0.86	17.04
	907.000	38.00	0.00	30.00	0.00	85.89	126.86	91.74	119.95	1.07	18.52
	907.000	95.00	0.00	30.00	0.00	85.89	126.86	90.52	121.59	1.37	18.52
*	908.000	38.00	0.00	30.00	0.00	78.51	136.45	86.19	128.69	0.44	12.61
*	908.000	95.00	0.00	30.00	0.00	78.51	136.45	85.33	129.52	0.43	12.61
*	909.000	38.00	0.00	30.00	0.00	36.50	149.27	48.06	128.42	1.00	24.56
*	909.000	95.00	0.00	30.00	0.00	36.50	149.27	46.79	133.13	0.99	24.56
*	910.000	38.00	0.00	30.00	0.00	47.06	170.22	49.85	124.15	0.95	26.68
*	910.000	95.00	0.00	30.00	0.00	47.06	170.22	49.21	127.78	0.97	26.68
*	106.000	38.00	0.00	30.00	0.00	6352.00	6552.00	6426.47	6469.31	1.04	27.56
*	106.000	95.00	0.00	30.00	0.00	6352.00	6552.00	6422.29	6473.65	1.02	27.56
*	2108.000	38.00	0.00	30.00	0.00	6376.00	6452.00	6394.37	6431.23	1.01	19.50
*	2108.000	95.00	0.00	30.00	0.00	6376.00	6452.00	6392.13	6433.47	1.04	19.50
*	2110.000	38.00	0.00	30.00	0.00	6276.00	6452.00	6302.95	6357.26	0.97	24.00
*	2110.000	95.00	0.00	30.00	0.00	6276.00	6452.00	6301.75	6363.24	0.94	24.00
*	2110.500	38.00	0.00	30.00	0.00	6272.00	6332.00	6281.71	6302.53	1.86	2.67
	2110.500	95.00	0.00	30.00	0.00	6272.00	6332.00	6279.92	6305.05	1.36	2.67
*	2110.700	38.00	0.00	20.00	0.00	6264.00	6464.00	6285.32	6421.35	0.72	224.00
*	2110.700	95.00	0.00	20.00	0.00	6264.00	6464.00	6273.51	6444.98	1.00	224.00

	SECNO	Q	K*XNL	K*XNCH	K*XNR	STCHL	STCHR	SSTA	ENDST	KRATIO	K*CHSL
*	2113.000	38.00	0.00	30.00	0.00	6284.00	6324.00	6294.00	6311.64	3.24	-12.73
*	2112.000	95.00	0.00	30.00	0.00	6284.00	6324.00	6293.23	6312.70	1.73	-12.73
*	2114.000	38.00	0.00	30.00	0.00	6280.00	6340.00	6298.18	6329.19	0.24	26.00
*	2114.000	95.00	0.00	30.00	0.00	6280.00	6340.00	6295.70	6330.33	0.46	26.00
*	2116.000	15.00	0.00	30.00	0.00	6416.00	6460.00	6425.35	6443.95	0.39	26.40
*	2116.000	38.00	0.00	30.00	0.00	6416.00	6460.00	6423.74	6450.38	0.37	26.40
*	2118.000	15.00	0.00	30.00	0.00	6380.00	6564.00	6497.47	6521.19	0.96	29.30
*	2118.000	38.00	0.00	30.00	0.00	6380.00	6564.00	6494.73	6523.74	1.00	29.30
*	2120.000	15.00	0.00	30.00	0.00	6380.00	6560.00	6394.97	6445.06	0.90	30.00
*	2120.000	38.00	0.00	30.00	0.00	6380.00	6560.00	6392.26	6449.94	0.91	30.00
*	2122.000	15.00	0.00	30.00	0.00	6344.00	6448.00	6399.74	6427.61	1.09	23.64
*	2122.000	38.00	0.00	30.00	0.00	6344.00	6448.00	6397.81	6432.67	1.06	23.64
*	126.000	15.00	0.00	30.00	0.00	6468.00	6564.00	6477.53	6505.07	0.99	25.00
*	126.000	38.00	0.00	30.00	0.00	6468.00	6564.00	6476.48	6511.21	1.00	25.00
*	128.000	15.00	0.00	30.00	0.00	6492.00	6560.00	6516.12	6550.91	0.98	30.00
*	128.000	38.00	0.00	30.00	0.00	6492.00	6560.00	6505.40	6552.24	0.99	30.00
*	130.000	15.00	0.00	30.00	0.00	6524.00	6568.00	6531.26	6552.41	1.07	28.10
*	130.000	38.00	0.00	30.00	0.00	6524.00	6568.00	6530.58	6554.61	1.08	28.10
*	132.000	15.00	0.00	30.00	0.00	6524.00	6632.00	6558.39	6605.79	0.92	27.44
*	132.000	38.00	0.00	30.00	0.00	6524.00	6632.00	6555.32	6609.95	0.99	27.44
*	2134.000	15.00	0.00	30.00	0.00	6500.00	6632.00	6575.81	6586.25	1.12	28.50
*	2134.000	38.00	0.00	30.00	0.00	6500.00	6632.00	6574.41	6616.59	0.85	28.50
*	2136.000	15.00	0.00	30.00	0.00	6500.00	6632.00	6577.63	6613.83	0.92	30.00
*	2136.000	38.00	0.00	30.00	0.00	6500.00	6632.00	6576.56	6620.01	1.10	30.00
*	2136.700	15.00	0.00	30.00	0.00	6544.00	6632.00	6575.51	6621.37	0.99	24.21
*	2136.700	38.00	0.00	30.00	0.00	6544.00	6632.00	6574.50	6622.13	0.96	24.21

NDB-B1(SUB)

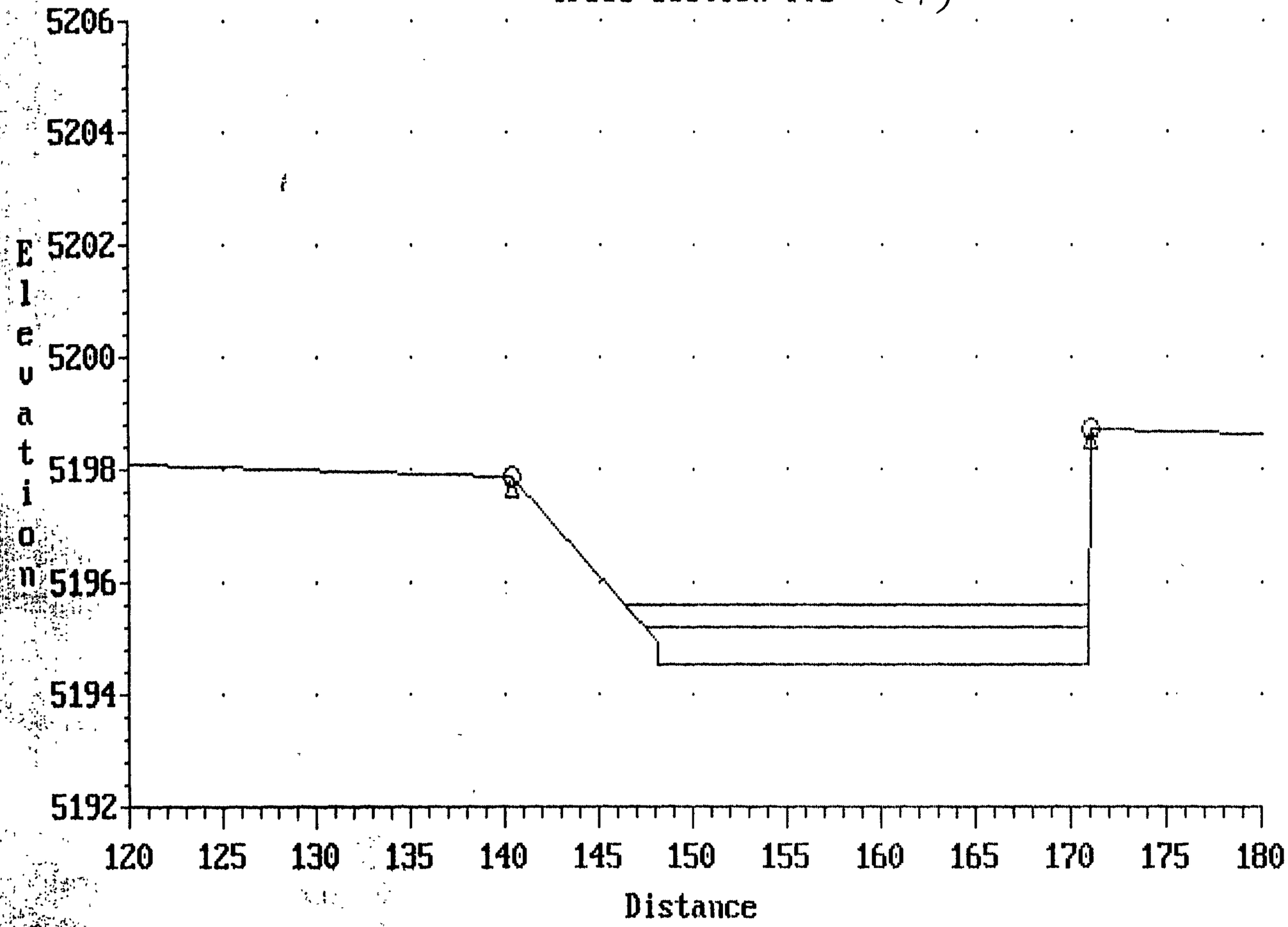
SUMMARY PRINTOUT

	SECNO	Q	HV	HL	DLOSS	AREA	FRCH	SHEAR	POWER
	900.000	70.00	0.16	0.00	0.00	22.10	0.51	0.32	1.00
	900.000	143.00	0.26	0.00	0.00	34.69	0.53	0.54	2.21
*	901.000	70.00	0.33	0.07	0.05	15.25	1.00	0.66	3.02
*	901.000	143.00	0.51	0.07	0.07	24.90	1.00	0.91	5.20
*	902.000	70.00	0.38	0.32	0.02	14.11	1.02	0.74	3.68
*	902.000	143.00	0.49	0.29	0.00	25.45	1.02	0.86	4.85
*	903.000	70.00	0.53	0.91	0.04	11.99	1.03	1.27	7.42
*	903.000	143.00	0.59	0.76	0.03	23.27	1.00	1.17	7.22
*	904.000	70.00	0.40	0.07	0.01	13.75	1.01	0.76	3.85
*	904.000	143.00	0.44	0.05	0.01	28.78	0.90	0.76	4.16
*	905.000	70.00	0.20	1.36	0.02	23.50	0.84	0.54	2.40
	905.000	143.00	0.24	1.12	0.02	39.63	0.84	0.63	3.10
*	906.000	70.00	0.47	1.84	0.08	12.69	1.02	0.83	4.57
*	906.000	143.00	0.63	1.68	0.12	22.45	1.01	1.00	6.37
	907.000	38.00	0.07	0.87	0.04	17.45	0.49	0.14	0.31
	907.000	95.00	0.12	0.69	0.05	33.49	0.48	0.20	0.58
*	908.000	38.00	0.18	0.30	0.03	11.16	1.17	0.31	1.06
*	908.000	95.00	0.31	0.25	0.06	21.13	1.15	0.50	2.24
*	909.000	38.00	0.20	2.59	0.01	10.65	1.73	0.16	0.56
*	909.000	95.00	0.30	2.29	0.00	21.61	1.55	0.26	1.16
*	910.000	38.00	0.15	3.35	0.01	12.34	1.33	0.22	0.68
*	910.000	95.00	0.24	2.89	0.01	23.94	1.27	0.34	1.35
*	106.000	38.00	0.15	3.30	0.00	12.43	1.00	0.36	1.10
*	106.000	95.00	0.24	2.80	0.00	24.20	1.01	0.50	1.98
*	2108.000	38.00	0.16	3.95	0.01	11.74	1.01	0.39	1.27
*	2108.000	95.00	0.27	3.31	0.01	22.68	1.00	0.55	2.29
*	2110.000	38.00	0.12	4.58	0.00	13.42	1.00	0.33	0.92
*	2110.000	95.00	0.21	3.83	0.01	25.55	1.02	0.47	1.75
*	2110.500	38.00	0.13	0.77	0.00	13.31	0.63	0.24	0.69
	2110.500	95.00	0.30	0.98	0.03	21.50	0.84	0.53	2.33
*	2110.700	38.00	0.07	0.21	0.01	18.14	1.01	0.10	0.20
*	2110.700	95.00	0.11	0.25	0.02	36.31	1.00	0.13	0.34

	SECNO	Q	HV	HL	OLOSS	AREA	FRCH	SHEAR	POWER
*	2112.000	38.00	0.05	0.29	0.00	20.92	0.29	0.08	0.15
*	2112.000	95.00	0.19	0.58	0.04	27.38	0.52	0.29	0.99
*	2114.000	38.00	0.19	0.58	0.04	10.99	1.02	0.43	1.49
*	2114.000	95.00	0.31	1.24	0.04	21.29	1.00	0.60	2.67
*	2116.000	15.00	0.13	4.90	0.01	5.10	0.99	0.34	1.00
*	2116.000	38.00	0.20	4.07	0.01	10.55	1.01	0.45	1.62
*	2118.000	15.00	0.12	4.45	0.00	5.48	1.00	0.31	0.85
*	2118.000	38.00	0.19	3.92	0.00	10.94	1.00	0.43	1.48
*	2120.000	15.00	0.07	4.76	0.00	6.95	1.02	0.23	0.49
*	2120.000	38.00	0.12	4.02	0.01	13.53	1.02	0.33	0.91
*	2122.000	15.00	0.10	5.31	0.01	5.80	1.00	0.29	0.74
*	2122.000	38.00	0.17	4.61	0.01	11.47	1.02	0.41	1.34
*	126.000	15.00	0.11	9.44	0.00	5.72	1.01	0.30	0.78
*	126.000	38.00	0.17	8.29	0.00	11.45	1.02	0.41	1.35
*	128.000	15.00	0.09	4.86	0.00	6.22	1.00	0.26	0.63
*	128.000	38.00	0.14	4.19	0.00	12.81	1.00	0.34	1.02
*	130.000	15.00	0.12	4.61	0.01	5.32	0.99	0.32	0.91
*	130.000	38.00	0.21	3.93	0.02	10.28	1.00	0.46	1.72
*	132.000	15.00	0.10	4.80	0.00	5.83	1.29	0.19	0.48
*	132.000	38.00	0.14	3.77	0.01	12.82	1.08	0.26	0.77
*	2134.000	15.00	0.21	4.34	0.03	4.08	1.03	0.48	1.75
*	2134.000	38.00	0.17	4.14	0.01	11.62	1.10	0.42	1.37
*	2136.000	15.00	0.11	4.21	0.01	5.72	1.16	0.23	0.59
*	2136.000	38.00	0.15	4.46	0.00	12.05	1.06	0.35	1.11
*	2136.700	15.00	0.09	2.18	0.00	6.21	1.16	0.20	0.47
*	2136.700	38.00	0.14	2.03	0.00	12.53	1.04	0.37	1.11

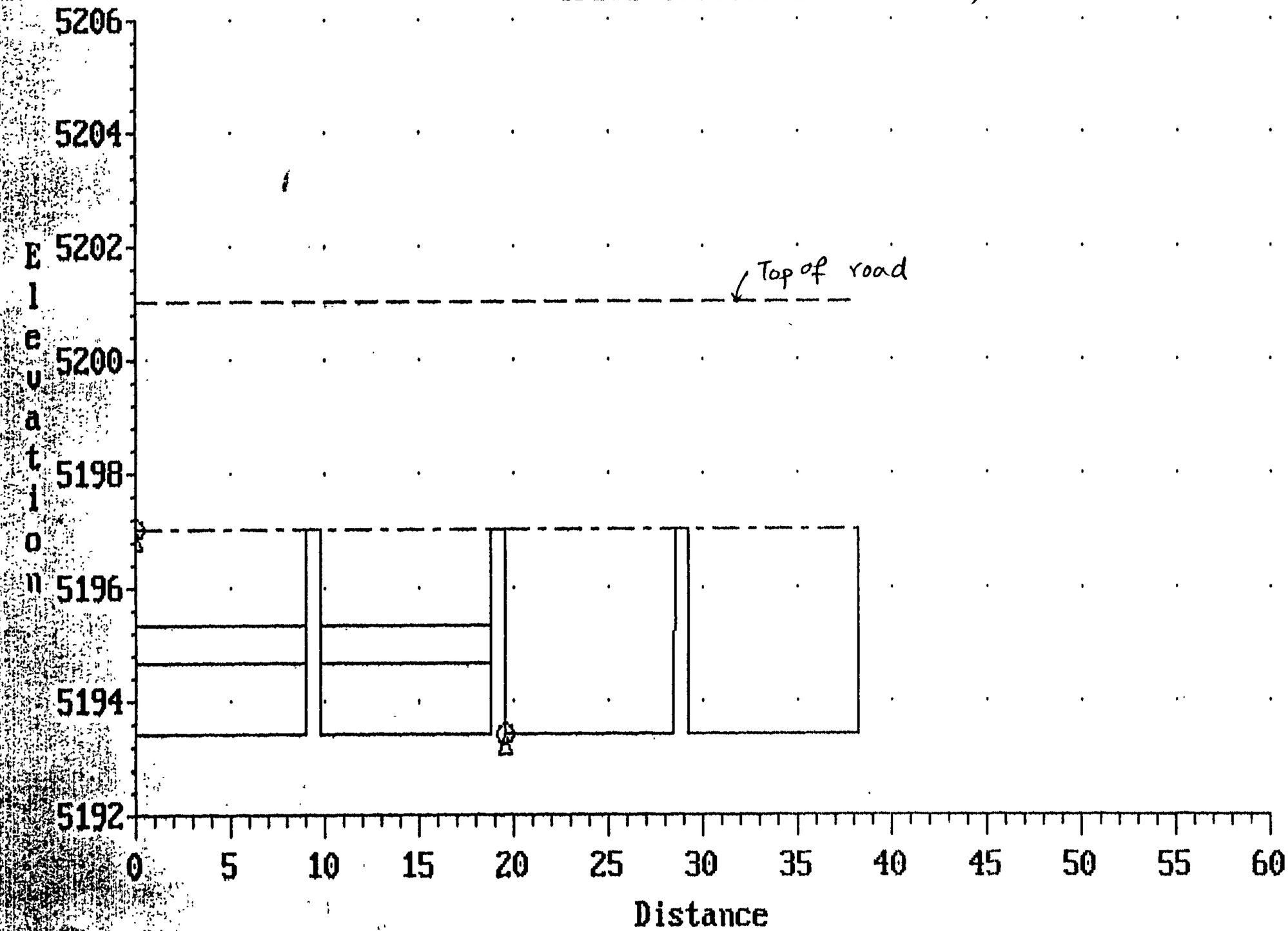
NDB-B1(SUB)

Cross section 901 (Y)



NDB-B1(SUB)

Cross section 900 (x)



RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

CHECKED _____ DATE _____ PROJECT NO. _____

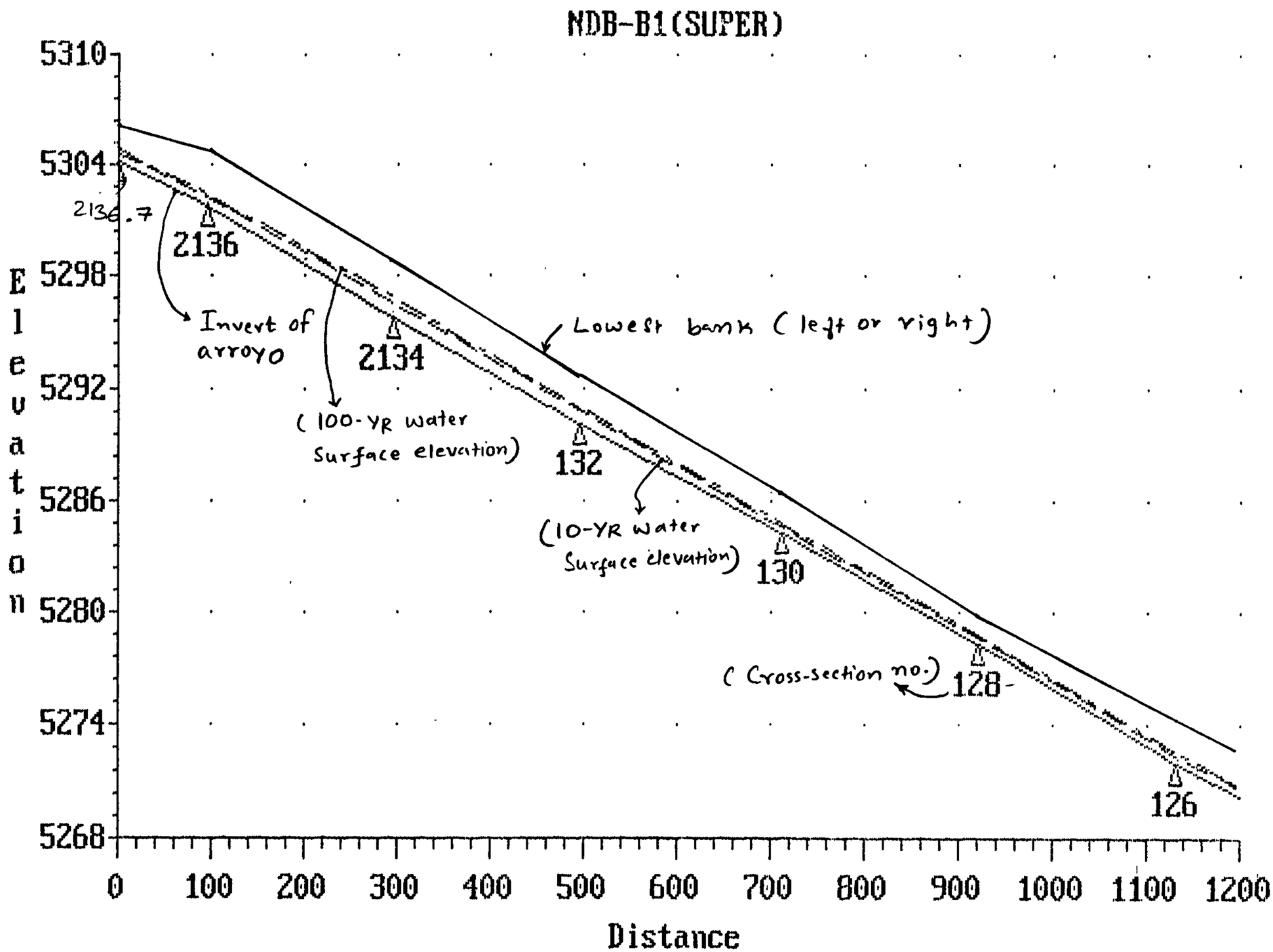
APPROVED _____ DATE _____ SHEET _____ OF _____

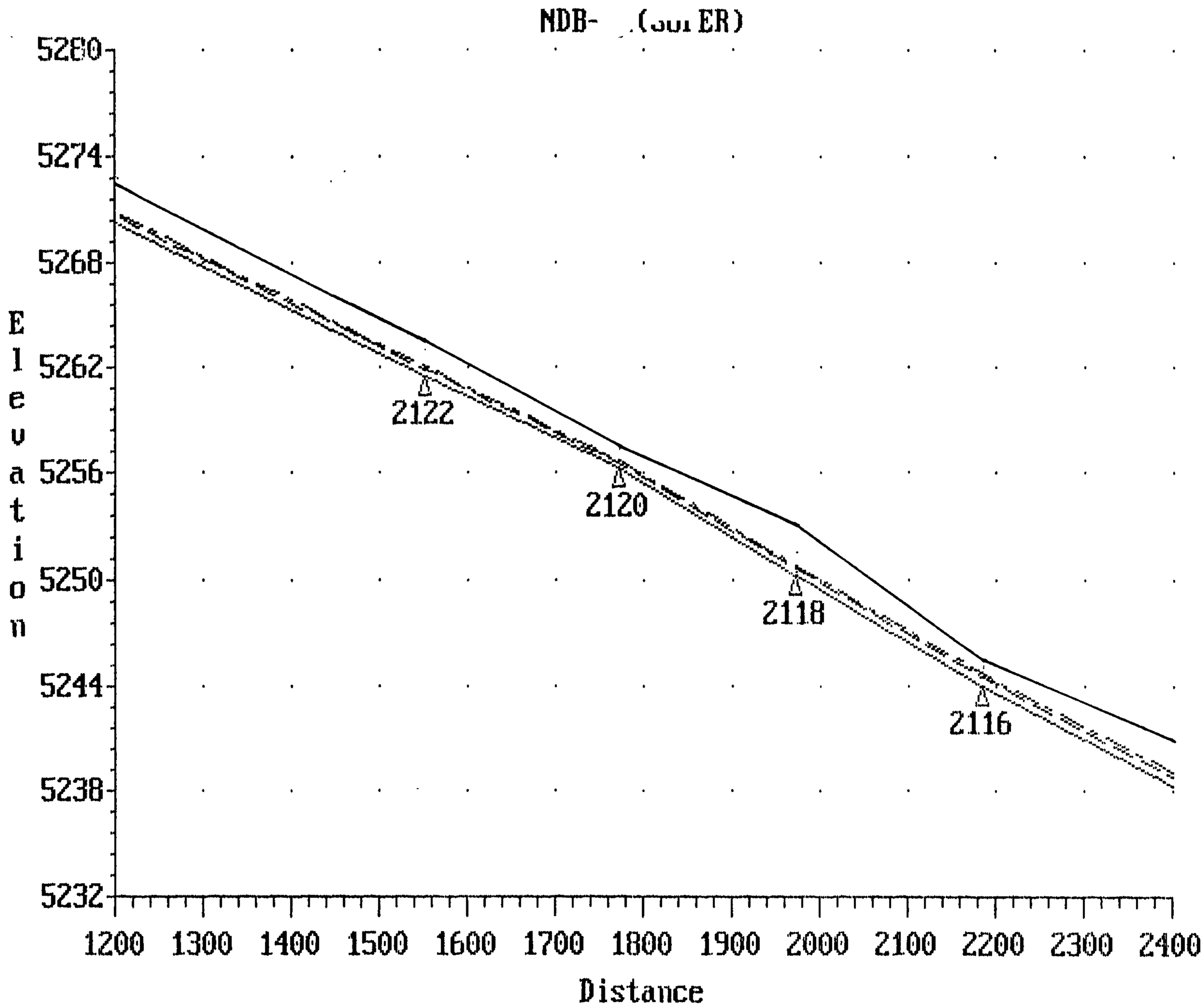
TITLE _____ BY _____ DATE _____

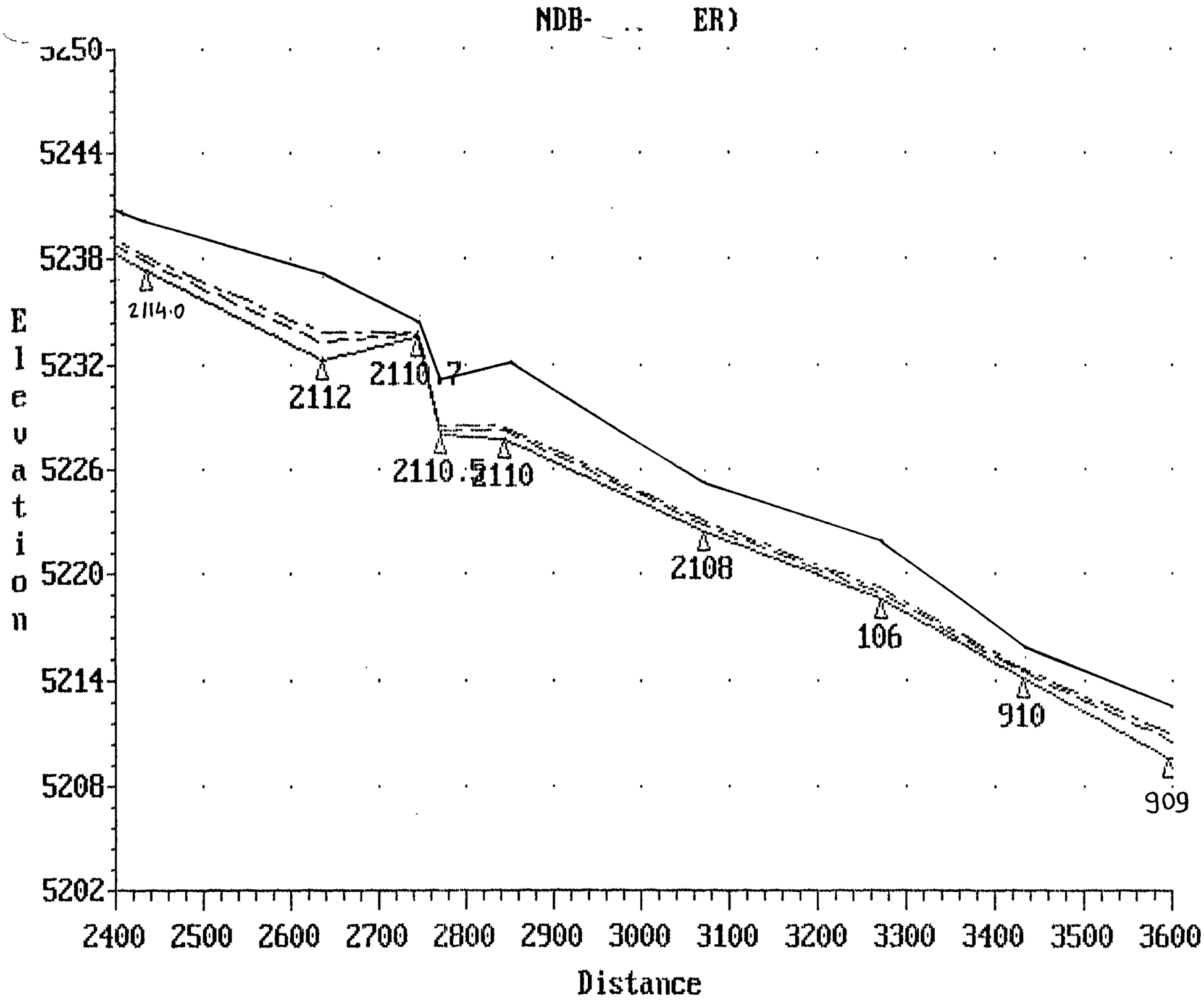
PROFILES

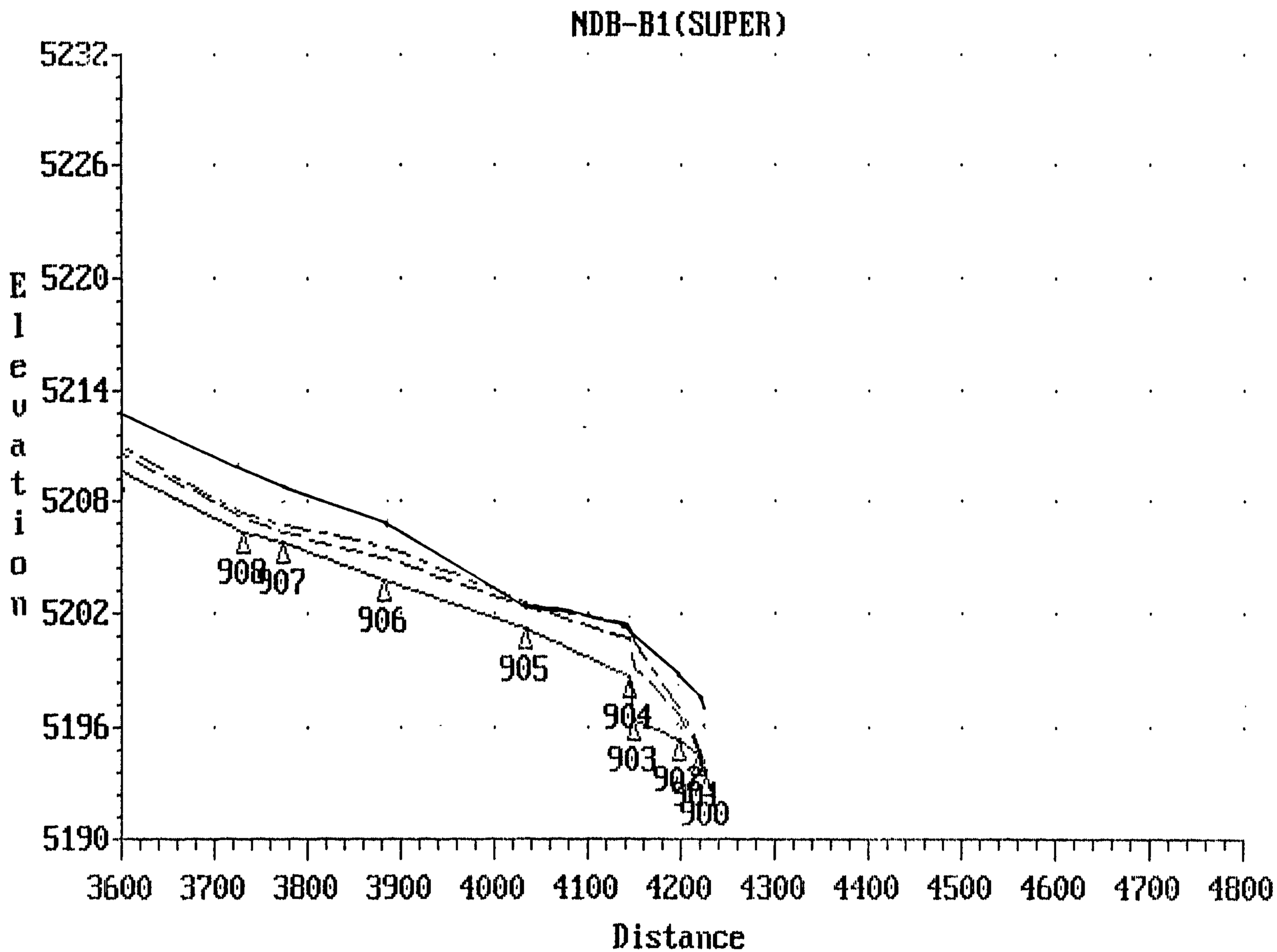
ARROYO: "B" OR SOUTH BRANCH

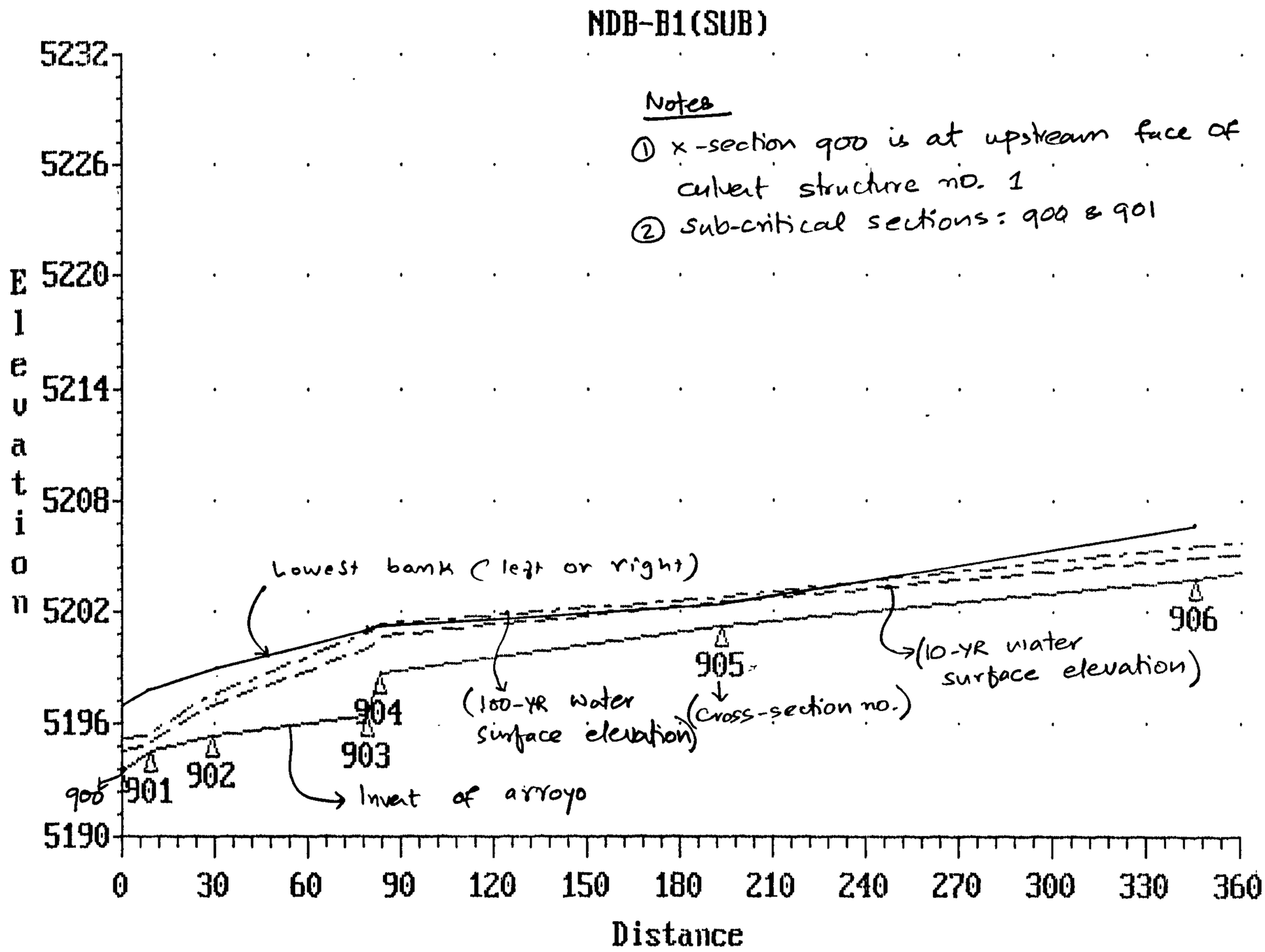
REACH: EAST OF I-25


NDB-B1(SUPER)
5310
5304
5298
5292
5286
5280
5274
5268
Elevation
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
Distance
2136.7
2136
Invert of arroyo
2134
(100-YR water Surface elevation)
132
(10-YR water Surface elevation)
130
Lowest bank (left or right)
(Cross-section no.)
128
126


NDB- (SOUTER)
5280
5274
5268
5262
5256
5250
5244
5238
5232
Elevation
2122
2120
2118
2116
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
2300
2400
Distance


NDB- .. ER)
5250
5244
5238
5232
5226
5220
5214
5208
5202
Elevation
2114.0
2112
2110.7
2110.5
2110
2108
106
910
909
2400 2500 2600 2700 2800 2900 3000 3100 3200 3300 3400 3500 3600
Distance


NDB-B1(SUPER)
Elevation
5232
5226
5220
5214
5208
5202
5196
5190
908
907
906
905
904
903
900
3600
3700
3800
3900
4000
4100
4200
4300
4400
4500
4600
4700
4800
Distance


NDB-B1(SUB)
Notes
① x-section 900 is at upstream face of culvert structure no. 1
② sub-critical sections: 900 & 901
Elevation
5232
5226
5220
5214
5208
5202
5196
5190
Lowest bank (left or right)
(10-YR water surface elevation)
(100-YR water surface elevation)
(cross-section no.)
Invert of arroyo
900
901
902
903
904
905
906
0
30
60
90
120
150
180
210
240
270
300
330
360
Distance

RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

CHECKED _____ DATE _____ PROJECT NO. _____

APPROVED _____ DATE _____ SHEET _____ OF _____

TITLE _____ BY _____ DATE _____

HEC-2 INPUT FILE, SUMMARY TABLES & CROSS SECTION PLOTS

FOR ARROYO "B" OR SOUTH BRANCH

(WEST OF I-25; BETWEEN STRUCTURES ② & ④)

(SUB-CRITICAL)

```
T1
T1     HEC-2 FILENAME:   SUB_B24.HC2
T1         (10-YR & 100-YR DISCHARGES. EXISTING CONDITIONS)
T1
T1 ************************************************************************
T1    RTI PROJECT NO.    94-200-1 (TASK 3)
T1
T1    PURPOSE: SUBMITTAL OF CLOMR FOR NORTH DOMINGO ARROYO (IN ALBUQUERQUE, NM)
T1             FROM LOWER NORTH DOMINGO BACA DETENTION DAM TILL IT MEETS WITH
T1             SOUTH DOMINGO BACA ARROYO WEST OF I-25.
T1
T1    FLOODING SOURCE:   NORTH DOMINGO BACA ARROYO (SOUTH BRANCH)
T1
T1    CLIENT:          ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY
T1                     (AMAFCA)
T1                     2600 PROSPECT. NE
T1                     ALBUQUERQUE. NM 87107
T1
T1    CONSULTANTS:     RESOURCE TECHNOLOGY, INC.
T1                     2129. COUNA RD. NE. SUITE 200
T1                     ALBUQUERQUE, NM 87113
T1                     PH: (505)345-3115
T1                     FAX: (505)345-4132
T1
T1    FINAL MODEL RUN DATE:  00/00/1994
T1
T1    INPUT FILENAME:  SUB_B24.HC2
T1    OUTPUT FILENAME: SUB_B24.OUT
T1 ************************************************************************
T1     DATE: 07/18/1994, 07/21, 07/26, 07/27. 07/28, 08/02, 08/03. 08/10
T1
T1     ORIGIN OF THIS FILE:
T1        THIS FILE IS COPIED FROM DB91.DAT ("NORTH AND SOUTH DOMINGO BACA
T1        ARROYOS AND PASEO DEL NORTE CORRIDOR DRAINAGE MANAGEMENT PLAN -BY
T1        RESOURCE TECHNOLOGY. INC. IN DECEMBER 1991")
T1
T1     THIS HEC-2 INPUT FILE COVERS SOUTH BRANCH OF NORTH DOMINGO BACA ARROYO
T1     TO THE WEST OF I-25 BETWEEN STRUCTURE NOS. 2 & 4.
T1
T1     STARTING ELEVATIONS IN THIS FILE ARE COMPUTED FROM CULVERT CHARTS.
T1
T1     MODIFICATIONS MADE TO THIS FILE AFTER COPYING IT FROM ORIGINAL FILE:
T1        1. INSTEAD OF USING FOUR 4' X 9' CULVERTS AT I-25, ONLY
T1           TWO SOUTHMOST CULVERTS ARE USED BECAUSE STORM SEWER DRAIN PIPE
T1           UNDERNEATH ANAHEIM AVE. CONNECTS TO SECOND CULVERT FROM NORTH SIDE
T1           THUS SEPARATING TWO SOUTHMOST CULVERTS FROM THE NORTHMSOT CULVERT.
T1        2. CHANGES TO REFLECT EXISTING FIELD CONDITIONS WHEREVER NECESSARY.
T1
T2      FILENAME: SUB_B24.HC2  SUB-CRITICAL  10-YR RETURN PERIOD
T3      NDB-B24(SUB)
J1            2              0                                    5186.0
J2    1             -1                            -1
J3   38      42      66      1      2      3      39      4      43      13
J3   15      26       8             38     43      16     17      18      21
J3   22      53      54     58      33             38     43      10      11
J3   12      25      68     67      69
*
* X-SECTION NO. 89.23 IS UPSTREAM FACE OF CULVERT STRUCTURE NO. 4.
* 2-CMP ARCH CULVERTS ARE CONVERTED TO BOX CULVERTS USING EQUIVALENT CONVEYANCE.
```

```
NC .060    .060    .024     0.1     0.3
BT     2     161     261
S X1 89.23      8    6700  6717.2
X3    10
BT     2    6700 5190.00  5189.0  6717.2  5190.0    5189
GR5190.0  6700.0 5183.30 6700.01 5183.30 6706.59  5189.0 6706.60  5159.0  6710.6
GR5183.3 6710.61  5183.3 6717.19  5190.0  6717.2
*
BT     2     161     261
T X12093.5     25    6715    6759      10      10      10
X3    10
GR5191.2    6631  5191.4    6651  5191.1    6671  5191.4    6691  5191.1    6711
GR5191.1    6715  5191.1    6719  5189.9    6723  5188.7    6727  5187.6    6731
GR5184.5    6735  5183.7    6739  5184.4    6743  5187.5    6747  5188.4    6751
GR5189.6    6755  5190.7    6759  5190.9    6763  5190.9    6767  5190.8    6771
GR5190.0    6791  5189.7    6811  5189.5    6831  5189.2    6851  5189.0    6871
*
NC .060    .060    .024     0.1     0.3
BT     2     161     261
U X1 94.28     60    6711    6775      60      60      60
X3    10
GR5192.3    6148  5192.4    6168  5192.7    6188  5193.0    6208  5193.6    6227
GR5194.2    6247  5194.6    6267  5194.9    6287  5195.3    6307  5195.2    6327
GR5195.1    6347  5194.8    6367  5194.2    6387  5194.9    6407  5195.5    6427
GR5195.9    6447  5196.1    6467  5195.8    6487  5194.9    6507  5194.5    6515
GR5194.5    6519  5194.7    6527  5194.9    6547  5194.6    6567  5194.7    6583
GR5193.8    6603  5193.4    6623  5193.2    6643  5192.9    6663  5193.2    6683
GR5193.5    6703  5193.5    6707  5193.6    6711  5193.2    6715  5192.1    6719
GR5191.1    6723  5186.3    6743  5186.4    6747  5191.0    6763  5192.1    6767
GR5192.2    6771  5192.1    6775  5192.0    6783  5191.7    6803  5191.5    6823
GR5191.4    6843  5191.1    6863  5190.9    6883  5190.5    6903  5190.2    6923
GR5189.9    6943  5189.6    6963  5189.3    6983  5189.1    7003  5189.1    7023
GR5189.1    7043  5189.1    7047  5188.8    7051  5187.4    7055  5185.9    7059
*
NC .060    .060    .024     0.1     0.3
BT     2      44     110
V X12093.4     25    6703    6755      55      55      55
X3    10
GR5195.0    6576  5194.2    6595  5194.1    6615  5194.1    6635  5194.1    6655
GR5194.1    6675  5193.7    6695  5191.1    6703  5189.7    6707  5188.1    6711
GR5188.0    6715  5188.3    6735  5190.5    6743  5191.6    6747  5192.5    6751
GR5192.8    6755  5192.9    6775  5193.1    6795  5193.2    6815  5193.5    6835
GR5193.2    6855  5193.0    6875  5192.7    6895  5192.3    6915  5192.0    6935
*
NC 0.060   0.060   0.024     0.1     0.5
BT     2      44     110
W X1 93.30     16           18.75      10      10      10
X3    10 5188.42
BT     2         5196.00 5192.00   38.25 5196.00 5192.00
GR5192.0         5188.00    0.01 5188.00    8.99 5192.00     9.0 5192.00    9.75
GR5188.0    9.76 5188.00   18.74 5192.00   18.75 5192.00   19.50 5188.00   19.51
GR5188.0   28.49 5192.00   28.50 5192.00   29.25 5188.00   29.26 5188.00   38.24
GR5192.0   38.25
*
EJ
T1      RESOURCE TECHNOLOGY INC.. ALBUQUERQUE. NM
T1      CLOMR (SOUTH BRANCH OF NORTH DOMINGO BACA ARROYO, ALBUQUERQUE, NM)
T1      SUBMITTAL TO FEMA  (DATE: AUGUST 1994)
T2      FILENAME: SUB_B24.HC2  SUB-CRITICAL  100-YR RETURN PERIOD
T3      NDB-B24(SUB)
J1   -10      3              0                                  5187.0
J2     2            -1                              -1
```

THIS RUN EXECUTED 24AUG94 13:44:08

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2: May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

NDB-B24(SUB)

SUMMARY PRINTOUT

	SECNO	ELMIN	CUMDS	CWSEL	CRIWS	EG	XLCH	TOPWID	Q	QLOB	QROB	VCH	DEP
	89.230	5183.30	0.00	5186.00	5184.96	5186.32	0.00	13.18	161.00	0.00	0.00	4.53	2.7
	89.230	5183.30	0.00	5187.00	5185.59	5187.45	0.00	13.18	261.00	0.00	0.00	5.35	3.7
*	2093.500	5183.70	10.00	5186.24	5186.24	5187.11	10.00	12.63	161.00	0.00	0.00	7.49	2.9
*	2093.500	5183.70	10.00	5186.97	5186.97	5188.05	10.00	14.49	261.00	0.00	0.00	8.34	3.2
*	94.280	5186.30	70.00	5188.44	5188.44	5189.08	60.00	19.99	161.00	0.00	0.00	6.42	2.1
*	94.280	5186.30	70.00	5188.97	5188.97	5189.75	60.00	24.04	261.00	0.00	0.00	7.10	2.4
	2093.400	5188.00	125.00	5189.28	5188.59	5189.31	55.00	30.46	44.00	0.00	0.00	1.43	1.2
	2093.400	5188.00	125.00	5189.50	5188.98	5189.97	55.00	34.44	110.00	0.00	0.00	2.14	1.5
*	93.300	5188.42	135.00	5189.23	5188.99	5189.37	10.00	17.97	44.00	0.00	0.00	3.00	0.8
*	93.300	5188.42	135.00	5189.80	5189.47	5190.10	10.00	17.98	110.00	0.00	0.00	4.42	1.3

NDB-B24(SUB)

SUMMARY PRINTOUT

SECNO	Q	A*XNL	A*XNCH	A*XNR	STCHL	STCHR	ESTA	ENDST	A*RATIO	A*CHSL
89.230	161.00	0.00	24.00	0.00	6700.00	6717.20	6700.01	6717.19	0.00	0.00
89.230	261.00	0.00	24.00	0.00	6700.00	6717.20	6700.00	6717.20	0.00	0.00
* 2093.500	161.00	0.00	24.00	0.00	6715.00	6759.00	6732.75	6745.38	0.62	40.04
* 2093.500	261.00	0.00	24.00	0.00	6715.00	6759.00	6731.82	6746.31	0.68	40.04
* 94.280	161.00	0.00	24.00	0.00	6711.00	6775.00	6734.09	6754.09	1.00	43.33
* 94.280	261.00	0.00	24.00	0.00	6711.00	6775.00	6731.89	6755.93	0.99	43.33
2093.400	44.00	0.00	24.00	0.00	6703.00	6755.00	6708.07	6738.53	1.07	30.91
2093.400	110.00	0.00	24.00	0.00	6703.00	6755.00	6706.41	6740.84	1.39	30.91
* 93.300	44.00	0.00	24.00	0.00	0.00	18.75	0.01	18.74	0.37	41.99
* 93.300	110.00	0.00	24.00	0.00	0.00	18.75	0.01	18.74	0.39	41.99

NDB-B24(SUB)

SUMMARY PRINTOUT

	SECND	Q	HV	HL	DLOSS	AREA	FRCH	SHEAR	POWER
	89.230	161.00	0.32	0.00	0.00	35.56	0.55	0.41	1.85
	89.230	261.00	0.45	0.00	0.00	48.74	0.56	0.63	3.38
*	2093.500	161.00	0.87	0.05	0.17	21.50	1.01	0.88	6.56
*	2093.500	261.00	1.08	0.05	0.17	31.30	1.00	1.03	8.56
*	94.280	161.00	0.64	0.49	0.02	25.09	1.01	0.64	4.13
*	94.280	261.00	0.75	0.46	0.03	36.74	1.01	0.74	5.26
	2093.400	44.00	0.03	0.17	0.06	30.76	0.25	0.03	0.05
	2093.400	110.00	0.07	0.15	0.07	51.36	0.31	0.07	0.14
*	93.300	44.00	0.14	0.01	0.05	14.65	0.60	0.19	0.57
*	93.300	110.00	0.30	0.01	0.12	24.87	0.68	0.39	1.73

SUMMARY OF ERRORS AND SPECIAL NOTES

```
CAUTION SECNO=   2093.500  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   2093.500  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   2093.500  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   2093.500  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     94.280  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     94.280  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     94.280  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     94.280  PROFILE=  2  MINIMUM SPECIFIC ENERGY

WARNING SECNO=     93.300  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=     93.300  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
```

Resource Technology, In

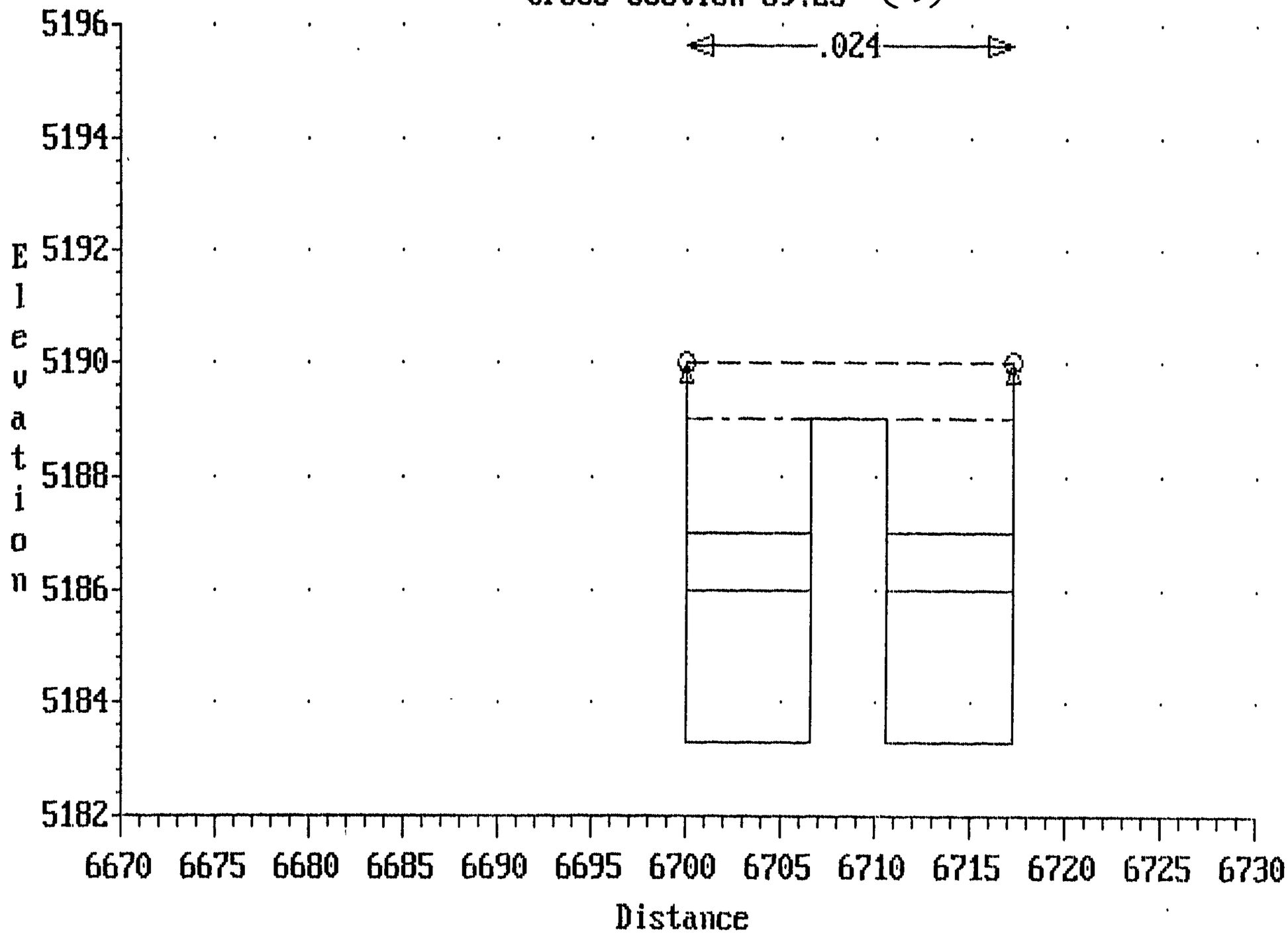
CROSS-SECTION PLOT PARAMATERS

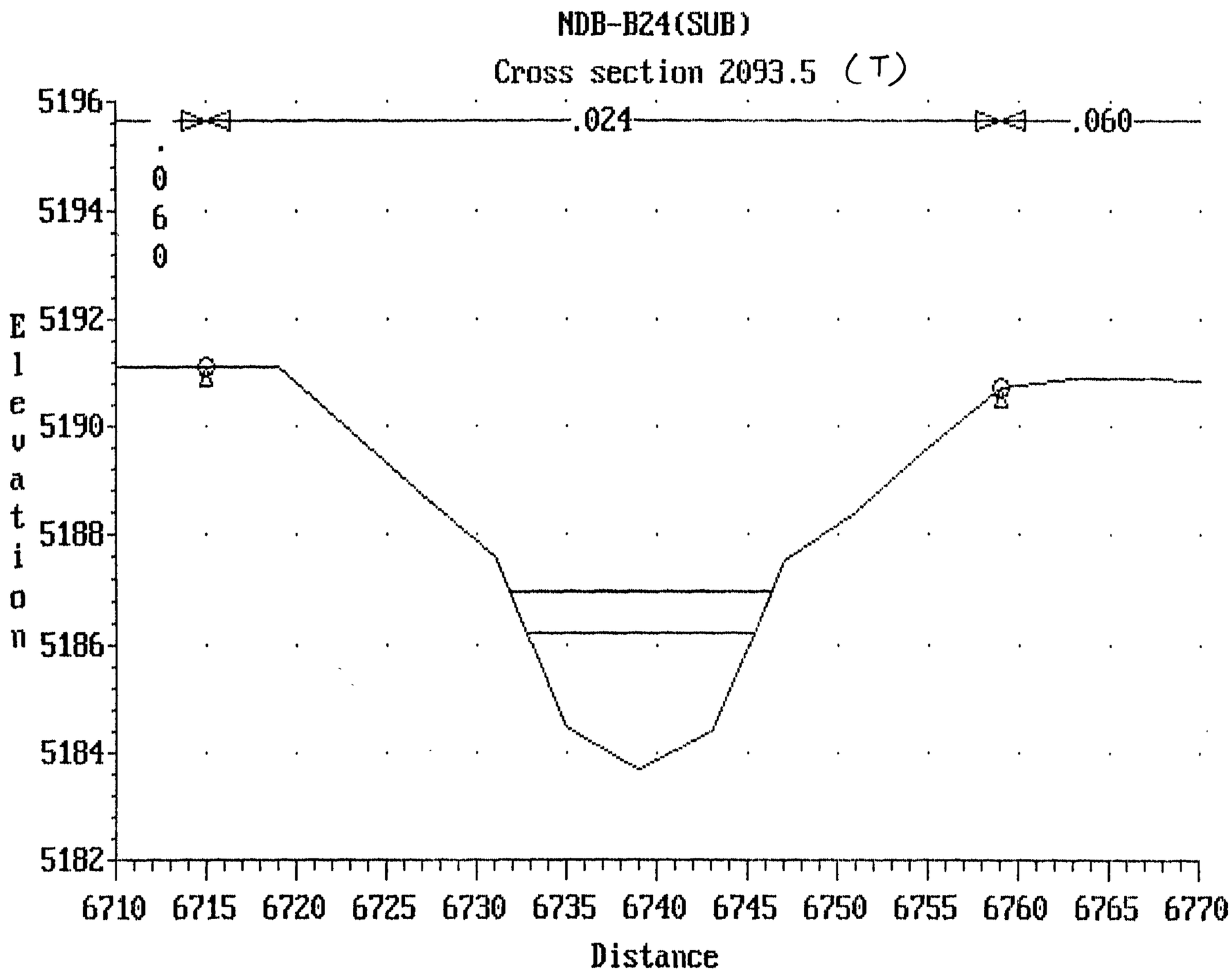
AREA Between structures nos. (2) & (4) ARROYO "B" or South Branch DATE 08/24/94

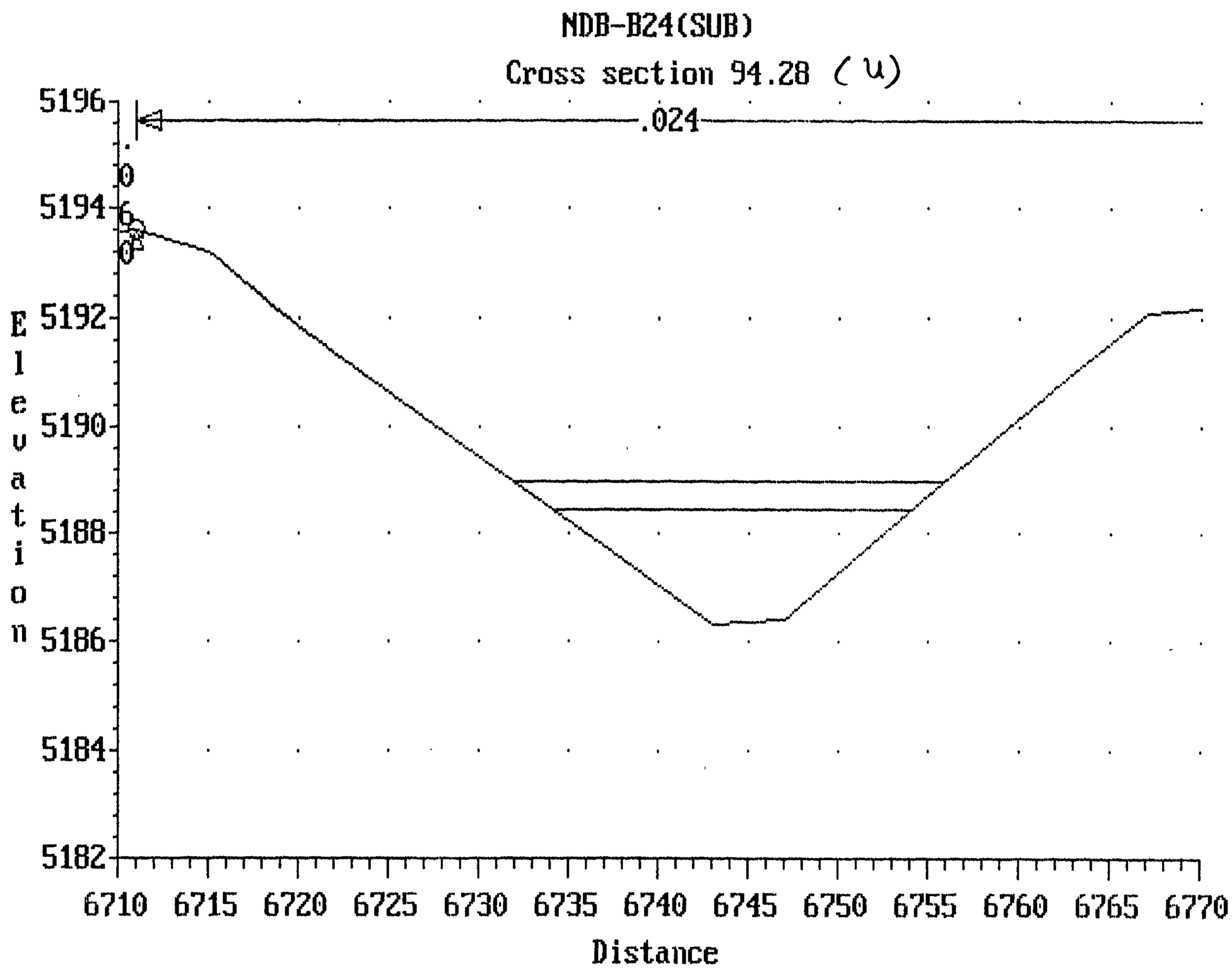
X-SEC. LETTER	X-SEC. NO.	X RANGE	X BEGIN	X END	Y RANGE	Y BEGIN	Y END
S	89.23	18	6700	6718	7	5183	5190
T	2093.5	40	6720	6760	5	5183	5188
U	94.28	40	6720	6760	4	5186	5190
V	2093.4	60	6690	6750	2	5188	5190
W	93.3	20	0	20	9	5188	5197

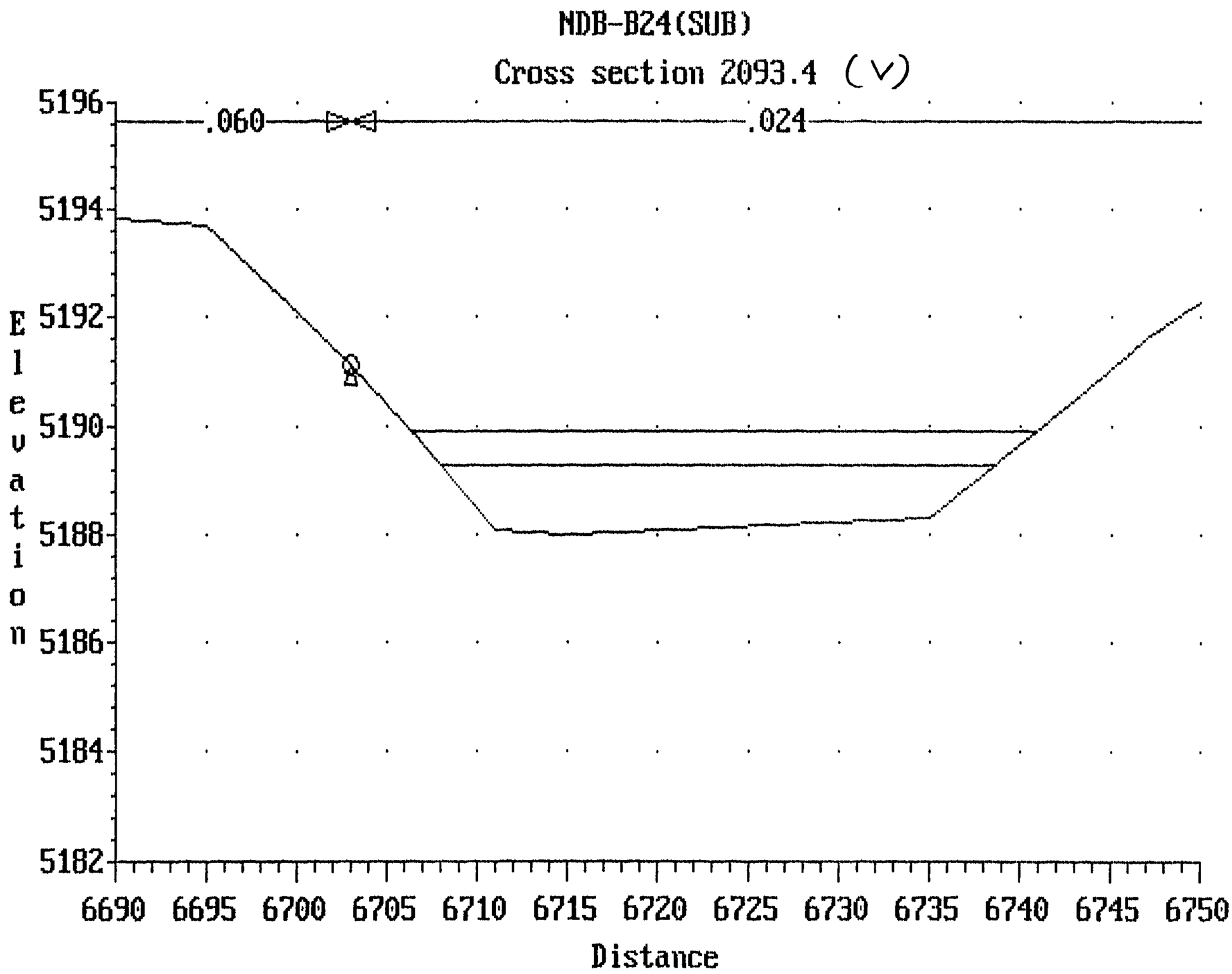
NDB-B24(SUB)

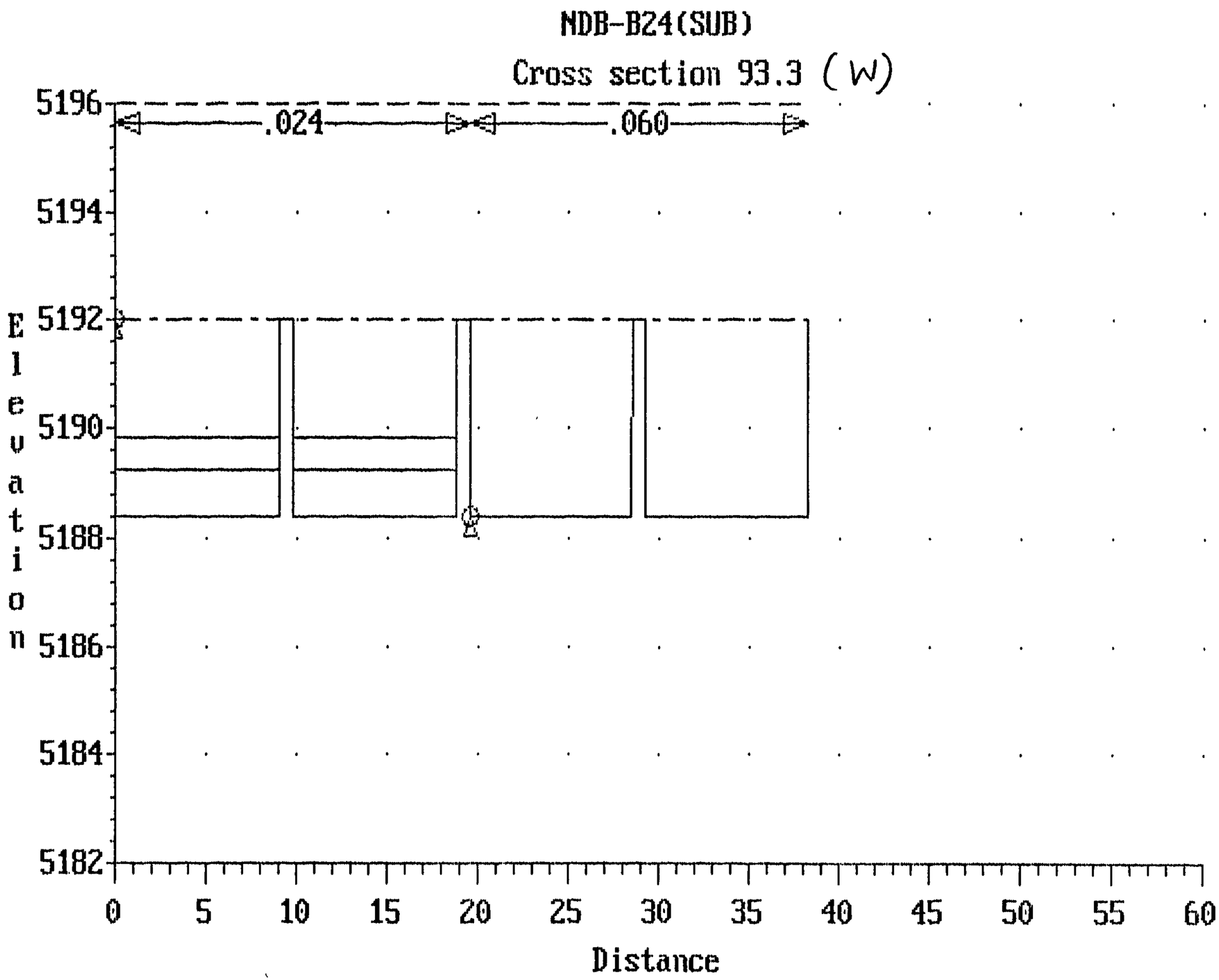
Cross section 89.23 (S)




NDB-B24(SUB)
Cross section 2093.5 (T)
.024
.060
.060
5196
5194
5192
5190
5188
5186
5184
5182
Elevation
6710
6715
6720
6725
6730
6735
6740
6745
6750
6755
6760
6765
6770
Distance


NDB-B24(SUB)
Cross section 94.28 (u)
.024
5196
5194
5192
5190
5188
5186
5184
5182
Elevation
6710
6715
6720
6725
6730
6735
6740
6745
6750
6755
6760
6765
6770
Distance


NDB-B24(SUB)
Cross section 2093.4 (V)
.060
.024
5196
5194
5192
5190
5188
5186
5184
5182
Elevation
6690
6695
6700
6705
6710
6715
6720
6725
6730
6735
6740
6745
6750
Distance


NDB-B24(SUB)
Cross section 93.3 (W)
.024
.060
5196
5194
5192
5190
5188
5186
5184
5182
Elevation
0
5
10
15
20
25
30
35
40
45
50
55
60
Distance

RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

CHECKED _____ DATE _____ PROJECT NO. _____

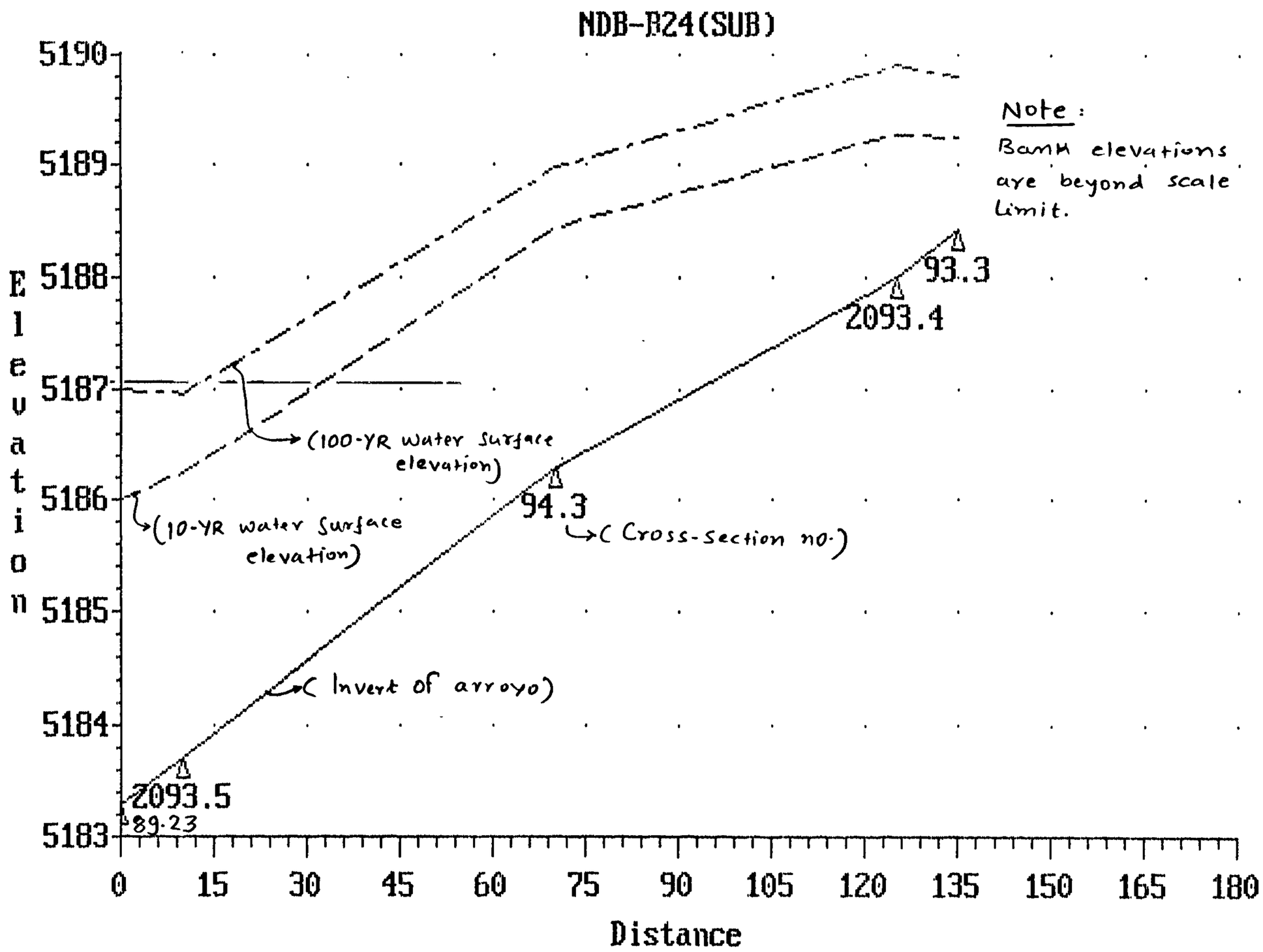
APPROVED _____ DATE _____ SHEET _____ OF _____

TITLE _____ BY _____ DATE _____

PROFILES

ARROYO: "B" OR SOUTH BRANCH

REACH: BETWEEN STRUCTURES NOS. 2 & 4.


NDB-B24(SUB)
Note:
Bank elevations are beyond scale limit.
93.3
2093.4
(100-YR water surface elevation)
94.3
(10-YR water surface elevation)
(Cross-section no.)
(Invert of arroyo)
2093.5
89.23
Elevation
5190
5189
5188
5187
5186
5185
5184
5183
0
15
30
45
60
75
90
105
120
135
150
165
180
Distance

RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

CHECKED _____ DATE _____ PROJECT NO. _____

APPROVED _____ DATE _____ SHEET _____ OF _____

TITLE _____ BY _____ DATE _____

HEC-2 INPUT FILES, SUMMARY TABLES & CROSS SECTION PLOTS

FOR ARROYO "B" OR SOUTH BRANCH

(WEST OF I-25; BETWEEN STRUCTURES 4 & 6)

(SUPER-CRITICAL & SUB-CRITICAL)

```
T1
T1     HEC-2 FILENAME:   NDBCL_B2.HC2
T1         (10-YR & 100-YR DISCHARGES. EXISTING CONDITIONS)
T1
T1 ***********************************************************************
T1    ATI PROJECT NO.    94-200-1 (TASK 3)
T1
T1    PURPOSE: SUBMITTAL OF CLOMR FOR NORTH DOMINGO ARROYO (IN ALBUQUERQUE, NM)
T1             FROM LOWER NORTH DOMINGO BACA DETENTION DAM TILL IT MEETS WITH
T1             SOUTH DOMINGO BACA ARROYO WEST OF I-25.
T1
T1    FLOODING SOURCE:   NORTH DOMINGO BACA ARROYO (SOUTH BRANCH)
T1
T1    CLIENT:          ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY
T1                     (AMAFCA)
T1                     2600 PROSPECT, NE
T1                     ALBUQUERQUE, NM 87107
T1
T1    CONSULTANTS:     RESOURCE TECHNOLOGY, INC.
T1                     2129, OSUNA RD, NE, SUITE 200
T1                     ALBUQUERQUE, NM 87113
T1                     PH: (505)345-3115
T1                     FAX: (505)345-4132
T1
T1    FINAL MODEL RUN DATE:  00/00/1994
T1
T1    INPUT FILENAME:  NDBCL_B2.HC2
T1    OUTPUT FILENAME: NDBCL_B2.OUT
T1 ***********************************************************************
T1     DATE: 07/18/1994, 07/21, 07/26, 07/27, 07/28, 08/02, 08/10
T1
T1     ORIGIN OF THIS FILE:
T1        THIS FILE IS COPIED FROM DBB1.DAT ("NORTH AND SOUTH DOMINGO BACA
T1        ARROYOS AND PASEO DEL NORTE CORRIDOR DRAINAGE MANAGEMENT PLAN -BY
T1        RESOURCE TECHNOLOGY, INC. IN DECEMBER 1991")
T1
T1     THIS HEC-2 INPUT FILE COVERS THE SOUTH BRANCH OF NORTH DOMINGO BACA
T1     ARROYO TO THE WEST OF I-25 BETWEEN STRUCTURE NOS. 4 AND 6.
T1
T1     MODIFICATIONS MADE TO THIS FILE AFTER COPYING IT FROM ORIGINAL FILE:
T1        1. CHANGES TO REFLECT EXISTING FIELD CONDITIONS WHEREVER NECESSARY.
T1
T2      FILENAME: NDBCL_B2.HC2  SUPER-CRITICAL  10-YR RETURN PERIOD
T3      NDB-B2
J1     0      2      0      1     -1      0      0      0 5184.01      0
J2     1      0     -1      0      0      0     -1      0      0      0
J3    38     42     66      1      2      3     39      4     43     13
J3    15     26      8             38     43     16     17     18     21
J3    22     53     54     58     33            38     43     10     11
J3    12     25     68     67     69
*
* X-SECTION 91.55 IS DOWNSTREAM FACE OF CULVERT STRUCTURE NO. 4.
* 2-CMP ARCH CULVERTS ARE CONVERTED TO BOX CULVERTS USING EQUIVALENT CONVEYANCE.
*
NC  .060   .060   .024    0.1    0.5
BT     2    164    261
R  X1 91.55     8   6700  6717.2     30     30     30
X3    10
BT     2   6700 5190.00  5188.1  6717.2  5190.0  5188.1
```

```
GR5182.8 5179.6  5182.8 5177.17  5170.0  5177.2
*
NC  .060    .060    .024     0.1     0.3
QT     2     164     261
X1 91.85      60    6672    6736     190     190     190
X3    10
GR5184.4    6156  5184.5    6176  5184.7    6196  5184.9    6216  5185.1    6236
GR5185.3    6256  5185.3    6276  5185.5    6296  5185.8    6316  5186.0    6336
GR5186.2    6356  5186.5    6376  5186.8    6396  5187.1    6416  5187.4    6436
GR5187.6    6456  5187.8    6476  5188.1    6496  5188.2    6516  5188.6    6536
GR5188.8    6536  5189.0    6576  5188.9    6596  5188.7    6616  5188.6    6636
GR5183.5    6656  5188.5    6672  5188.5    6692  5182.1    6712  5181.3    6716
GR5182.6    6720  5184.0    6724  5185.5    6728  5186.9    6732  5188.0    6736
GR5187.9    6740  5187.9    6744  5187.8    6752  5187.5    6772  5187.2    6792
GR5187.0    6812  5186.5    6832  5186.4    6852  5186.2    6872  5186.0    6892
GR5185.9    6912  5185.8    6932  5185.7    6952  5185.6    6972  5185.5    6976
GR5185.2    6980  5185.0    6984  5183.8    6988  5182.7    6992  5181.4    6996
GR5180.1    7000  5180.7    7004  5181.7    7008  5182.7    7012  5183.4    7016
*
QT     2     164     261
X1 90.08      45    6626    6670     240     240     240
X3    10
GR5181.5    6360  5181.5    6364  5181.6    6384  5181.6    6404  5182.0    6424
GR5182.7    6444  5183.5    6464  5183.9    6484  5184.1    6504  5184.1    6524
GR5184.2    6544  5184.3    6564  5184.3    6584  5184.1    6604  5183.7    6622
GR5183.6    6626  5182.5    6630  5181.4    6634  5179.2    6642  5178.1    6646
GR5177.0    6650  5178.3    6654  5179.8    6658  5181.3    6662  5182.7    6666
GR5183.4    6670  5183.4    6674  5183.3    6678  5183.3    6682  5183.0    6702
GR5182.8    6722  5182.5    6742  5182.3    6762  5182.2    6782  5181.5    6802
GR5181.3    6822  5181.1    6842  5181.0    6862  5180.9    6882  5180.7    6902
GR5180.7    6906  5180.7    6910  5180.7    6914  5180.3    6918  5179.0    6922
*
QT     2     177     281
X12088.1      19    6553    6605     165     165     165
X3    10
GR5179.1    6493  5179.2    6513  5179.2    6533  5179.2    6549  5178.9    6553
GR5173.5    6573  5172.3    6577  5172.9    6581  5173.9    6585  5175.0    6589
GR5176.0    6593  5177.0    6597  5178.0    6601  5179.0    6605  5179.0    6609
GR5179.0    6613  5178.8    6632  5178.7    6652  5178.5    6672
*
QT     2     177     281
X12086.5      23    6487    6547     240     225     235
X3    10
GR5175.0    6420  5175.1    6439  5175.1    6459  5175.1    6479  5175.1    6483
GR5175.1    6487  5174.3    6491  5173.4    6495  5172.6    6499  5171.8    6503
GR5170.9    6507  5170.0    6511  5169.2    6515  5170.0    6519  5174.1    6539
GR5175.0    6543  5175.6    6547  5175.6    6551  5175.6    6555  5175.6    6559
GR5175.5    6577  5175.7    6597  5175.8    6617
*
QT     2     177     281
X1 84.11      45    6408    6448      30      30      30
X3    10
GR5165.4    6136  5165.4    6156  5165.6    6176  5165.8    6196  5165.9    6216
GR5166.0    6236  5166.0    6256  5166.0    6276  5166.0    6296  5166.0    6316
GR5166.0    6336  5166.2    6356  5166.4    6376  5166.5    6396  5166.5    6400
GR5166.4    6404  5166.4    6408  5165.5    6412  5164.4    6416  5163.4    6420
GR5163.9    6424  5164.5    6428  5165.1    6432  5165.8    6436  5166.4    6440
GR5167.0    6444  5167.2    6448  5167.2    6452  5167.2    6456  5167.2    6476
GR5167.2    6496  5167.1    6516  5167.2    6536  5167.2    6556  5167.2    6576
GR5167.2    6596  5167.2    6616  5167.2    6636  5167.2    6656  5167.2    6676
GR5167.2    6696  5167.3    6716  5167.3    6736  5167.4    6756  5167.4    6776
*
* GRADE CONTROL (CONCRETE) DROP FROM X-SECTION 83.93 TO X-SECTION 83.83.
*
QT     2     177     281
```

```
X3    10
GR5164.5    6036  5164.6    6056  5164.7    6076  5164.7    6096  5164.8    6116
GR5164.8    6136  5164.9    6156  5164.9    6176  5165.1    6196  5165.2    6216
GR5165.2    6236  5165.3    6256  5165.3    6276  5165.3    6296  5165.3    6316
GR5165.3    6336  5165.4    6356  5165.7    6376  5165.9    6396  5164.5    6400
GR5162.3    6404  5159.5    6408  5159.6    6412  5160.5    6416  5163.6    6424
GR5164.6    6428  5165.5    6432  5165.7    6436  5166.0    6456  5166.0    6476
GR5166.0    6496  5166.1    6516  5166.1    6536  5166.2    6556  5166.2    6576
GR5166.2    6596  5166.4    6616  5166.4    6636  5166.4    6656  5166.4    6676
GR5166.5    6696  5166.6    6716  5166.7    6736  5166.7    6756  5166.8    6776
*
BT     2     177     281
X1 83.33      45    6376    6436      25      25      25
X3    10
GR5164.5    6036  5164.6    6056  5164.7    6076  5164.7    6096  5164.8    6116
GR5164.8    6136  5164.9    6156  5164.9    6176  5165.1    6196  5165.2    6216
GR5165.2    6236  5165.3    6256  5165.3    6276  5165.3    6296  5165.3    6316
GR5165.3    6336  5165.4    6356  5165.7    6376  5165.9    6396  5164.5    6400
GR5162.3    6404  5159.5    6408  5159.6    6412  5160.5    6416  5163.6    6424
GR5164.6    6428  5165.5    6432  5165.7    6436  5166.0    6456  5166.0    6476
GR5166.0    6496  5166.1    6516  5166.1    6536  5166.2    6556  5166.2    6576
GR5166.2    6596  5166.4    6616  5166.4    6636  5166.4    6656  5166.4    6676
GR5166.5    6696  5166.6    6716  5166.7    6736  5166.7    6756  5166.8    6776
*
NC     0       0       0     0.3     0.3
BT     2     177     281
X12083.5      26    6380    6424      19      19      19
X3    10
GR5164.7    6316  5164.7    6336  5164.8    6356  5164.9    6376  5164.9    6380
GR5165.0    6384  5164.7    6388  5163.3    6392  5161.8    6396  5158.2    6400
GR5158.1    6404  5159.0    6408  5161.9    6412  5162.8    6416  5163.8    6420
GR5164.4    6424  5164.5    6428  5164.5    6432  5164.6    6436  5164.8    6456
GR5165.0    6476  5165.1    6496  5165.2    6516  5165.2    6536  5165.3    6556
GR5165.4    6576
*
* X-SECTION 83.3 IS DOWNSTREAM FACE OF CULVERT STRUCTURE NO. 6.
* 2-CMP ARCH CULVERTS ARE CONVERTED TO BOX CULVERTS USING EQUIVALENT CONVEYANCE.
* (n=0.024 - BECAUSE OF SEDIMENT DEPOSITION)
*
NC     0       0       0     0.1     0.3
BT     2     177     281
X1  83.3       8    6400  6417.5
X3    10
BT     2    6400    5163  5161.4  6417.5    5163  5161.4
GR5163.0  6400.0  5157.1  6400.1  5157.1  6406.6  5161.4  6406.7  5161.4  6410.7
GR5157.1  6410.8  5157.1  6417.4  5163.0  6417.5
*
EJ
T1      RESOURCE TECHNOLOGY INC.. ALBUQUERQUE, NM
T1      CLOMR (SOUTH BRANCH OF NORTH DOMINGO BACA ARROYO, ALBUQUERQUE, NM)
T1      SUBMITTAL TO FEMA  (DATE: AUGUST, 1994)
T2      FILENAME: NDBCL_B2.HC2  SUPER-CRITICAL  100-YR RETURN PERIOD
T3      NDB-B2
J1   -10       3       0       1      -1       0       0       0 5184.64       0
J2     2       0      -1       0       0       0      -1       0       0       0


ER
```

THIS RUN EXECUTED 24AUG94 13:51:19

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

NDB-22

SUMMARY PRINTOUT

	SECNO	ELMIN	CUMDS	CWSEL	CRIWS	EG	XLCH	TOPWID	Q	GLOB	GROB	VCH	DEPT
*	91.550	5182.50	935.00	5184.18	5184.18	5185.03	0.00	13.17	164.00	0.00	0.00	7.40	1.[illegible]
*	91.550	5182.50	935.00	5184.79	5184.79	5185.95	0.00	13.17	261.00	0.00	0.00	8.65	2.[illegible]
	91.850	5181.30	905.00	5183.72	5183.91	5184.66	30.00	16.27	164.00	0.00	0.00	7.78	2.[illegible]
	91.850	5181.30	905.00	5184.07	5184.49	5185.50	30.00	18.36	261.00	0.00	0.00	9.61	2.[illegible]
*	90.080	5177.00	715.00	5179.08	5179.72	5181.05	190.00	13.71	164.00	0.00	0.00	11.27	2.[illegible]
	90.080	5177.00	715.00	5179.60	5180.26	5181.72	190.00	16.92	261.00	0.00	0.00	11.69	2.[illegible]
*	2088.100	5172.30	475.00	5174.51	5174.80	5175.62	240.00	17.91	177.00	0.00	0.00	8.44	2.[illegible]
	2088.100	5172.30	475.00	5174.87	5175.35	5176.42	240.00	20.63	281.00	0.00	0.00	10.00	2.[illegible]
	2086.500	5169.20	310.00	5171.18	5171.60	5172.51	165.00	19.01	177.00	0.00	0.00	9.24	1.9
	2086.500	5169.20	310.00	5171.60	5172.11	5173.20	165.00	22.83	281.00	0.00	0.00	10.14	2.4
	84.110	5163.40	75.00	5165.21	5165.68	5166.66	235.00	19.53	177.00	0.00	0.00	9.67	1.8
	84.110	5163.40	75.00	5165.55	5166.17	5167.44	235.00	22.72	281.00	0.00	0.00	11.05	2.1
	83.930	5162.70	45.00	5164.22	5164.71	5165.74	30.00	22.09	177.00	0.00	0.00	9.87	1.5
	83.930	5162.70	45.00	5164.53	5165.11	5166.46	30.00	27.79	281.00	0.00	0.00	11.16	1.5
*	83.830	5159.50	44.00	5160.90	5161.97	5165.39	1.00	11.03	177.00	0.00	0.00	17.00	1.4
	83.830	5159.50	44.00	5161.37	5162.61	5166.13	1.00	12.92	281.00	0.00	0.00	17.50	1.3
	2083.500	5158.10	19.00	5159.61	5160.62	5163.34	25.00	10.40	177.00	0.00	0.00	15.51	1.5
	2083.500	5158.10	19.00	5160.06	5161.32	5164.58	25.00	11.55	281.00	0.00	0.00	17.07	1.9
	83.300	5157.10	0.00	5157.96	5158.87	5161.81	19.00	13.17	177.00	0.00	0.00	15.75	0.8
	83.300	5157.10	0.00	5158.30	5159.51	5163.20	19.00	13.20	281.00	0.00	0.00	17.76	1.2

NDB-BI

SUMMARY PRINTOUT

	SECNO	Q	K*XNL	K*XNCH	K*XNR	STCHL	STCHR	SSTA	ENDST	KRATIO	K*CHSL
*	91.550	164.00	0.00	24.00	0.00	6700.00	6717.20	6700.01	6717.19	0.00	0.00
*	91.550	281.00	0.00	24.00	0.00	6700.00	6717.20	6700.01	6717.19	0.00	0.00
	91.850	164.00	0.00	24.00	0.00	6692.00	6736.00	6706.93	6723.20	0.98	-40.01
	91.850	281.00	0.00	24.00	0.00	6692.00	6736.00	6705.84	6724.19	1.08	-40.01
*	90.030	164.00	0.00	24.00	0.00	6626.00	6670.00	6642.40	6656.11	1.06	-22.63
	90.030	281.00	0.00	24.00	0.00	6626.00	6670.00	6640.55	6657.46	1.31	-22.63
*	2088.100	177.00	0.00	24.00	0.00	6553.00	6605.00	6569.29	6587.19	0.64	-19.58
	2088.100	281.00	0.00	24.00	0.00	6553.00	6605.00	6567.91	6588.54	0.77	-19.58
	2086.500	177.00	0.00	24.00	0.00	6487.00	6547.00	6505.75	6524.76	1.20	-18.79
	2086.500	281.00	0.00	24.00	0.00	6487.00	6547.00	6503.93	6526.76	1.09	-18.79
	84.110	177.00	0.00	24.00	0.00	6408.00	6448.00	6413.07	6432.60	1.10	-24.68
	84.110	281.00	0.00	24.00	0.00	6408.00	6448.00	6411.81	6434.53	1.15	-24.68
	83.930	177.00	0.00	24.00	0.00	6396.00	6436.00	6404.41	6426.50	1.13	-23.32
	83.930	281.00	0.00	24.00	0.00	6396.00	6436.00	6399.92	6427.71	1.16	-23.32
*	83.830	177.00	0.00	24.00	0.00	6396.00	6436.00	6406.00	6417.03	1.59	-3200.20
	83.830	281.00	0.00	24.00	0.00	6396.00	6436.00	6405.33	6416.25	1.31	-3200.20
	2083.500	177.00	0.00	24.00	0.00	6380.00	6424.00	6398.44	6408.84	0.84	-56.00
	2083.500	281.00	0.00	24.00	0.00	6380.00	6424.00	6397.93	6409.47	0.91	-56.00
	83.300	177.00	0.00	24.00	0.00	6400.00	6417.50	6400.09	6417.41	1.33	-52.63
	83.300	281.00	0.00	24.00	0.00	6400.00	6417.50	6400.08	6417.42	1.34	-52.63

NDB-B2

SUMMARY PRINTOUT

	SECNO	Q	HV	HL	DLOSS	AREA	FRCH	SHEAR	POWER
*	91.550	164.00	0.85	0.00	0.00	22.16	1.15	1.00	7.37
*	91.550	261.00	1.16	0.00	0.00	30.19	1.15	1.43	12.36
	91.850	164.00	0.94	0.36	0.01	21.07	1.21	0.96	7.46
	91.850	261.00	1.43	0.42	0.03	27.16	1.39	1.40	13.46
*	90.080	164.00	1.97	3.50	0.10	14.55	1.93	2.15	24.25
	90.080	261.00	2.12	3.72	0.07	22.33	1.79	2.15	25.19
*	2088.100	177.00	1.11	5.18	0.26	20.96	1.38	1.15	9.69
	2088.100	281.00	1.55	5.13	0.17	28.11	1.51	1.53	15.29
	2086.500	177.00	1.33	3.09	0.02	19.15	1.62	1.43	13.19
	2086.500	281.00	1.60	3.22	0.00	27.72	1.62	1.61	16.35
	84.110	177.00	1.45	5.83	0.01	18.30	1.76	1.59	15.42
	84.110	281.00	1.90	5.72	0.03	25.43	1.84	1.96	21.71
	83.930	177.00	1.51	0.92	0.01	17.94	1.93	1.75	17.26
	83.930	281.00	1.93	0.98	0.00	25.18	2.07	2.15	24.03
*	83.830	177.00	4.49	0.05	0.30	10.41	3.08	5.16	87.71
	83.830	281.00	4.76	0.05	0.28	16.05	2.77	5.05	88.42
	2083.500	177.00	3.73	1.82	0.23	11.41	2.61	4.21	65.26
	2083.500	281.00	4.52	1.48	0.07	16.46	2.52	4.79	81.77
	83.300	177.00	3.85	1.52	0.01	11.24	3.45	4.38	68.98
	83.300	281.00	4.90	1.34	0.04	15.82	3.28	5.53	98.23

SUMMARY OF ERRORS AND SPECIAL NOTES

```
CAUTION SECNO=     91.550  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     91.550  PROFILE=  2  CRITICAL DEPTH ASSUMED

WARNING SECNO=     90.080  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=   2088.100  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     83.830  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
```

```
T1
T1     HEC-2 FILENAME:   SUB_B2.HC2
T1         (10-YR & 100-YR DISCHARGES. EXISTING CONDITIONS)
T1
T1 ***********************************************************************
T1    RTI PROJECT NO.    94-200-1 (TASK 3)
T1
T1    PURPOSE: SUBMITTAL OF CLOMR FOR NORTH DOMINGO ARROYO (IN ALBUQUERQUE, NM)
T1             FROM LOWER NORTH DOMINGO BACA DETENTION DAM TILL IT MEETS WITH
T1             SOUTH DOMINGO BACA ARROYO WEST OF I-25.
T1
T1    FLOODING SOURCE:   NORTH DOMINGO BACA ARROYO (SOUTH BRANCH)
T1
T1    CLIENT:          ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY
T1                     (AMAFCA)
T1                     2600 PROSPECT, NE
T1                     ALBUQUERQUE, NM 87107
T1
T1    CONSULTANTS:     RESOURCE TECHNOLOGY, INC.
T1                     2129, OSUNA RD. NE, SUITE 200
T1                     ALBUQUERQUE, NM 87113
T1                     PH: (505)345-3115
T1                     FAX: (505)345-4132
T1
T1    FINAL MODEL RUN DATE:  00/00/1994
T1
T1    INPUT FILENAME:  SUB_B2.HC2
T1    OUTPUT FILENAME: SUB_B2.OUT
T1 ***********************************************************************
T1     DATE: 07/18/1994, 07/21, 07/26, 07/27, 07/28, 08/02, 08/10
T1
T1     ORIGIN OF THIS FILE:
T1        THIS FILE IS COPIED FROM DBB1.DAT ("NORTH AND SOUTH DOMINGO BACA
T1        ARROYOS AND PASEO DEL NORTE CORRIDOR DRAINAGE MANAGEMENT PLAN -BY
T1        RESOURCE TECHNOLOGY, INC. IN DECEMBER 1991")
T1
T1     THIS HEC-2 INPUT FILE COVERS THE SOUTH BRANCH OF NORTH DOMINGO BACA
T1     ARROYO TO THE WEST OF I-25 BETWEEN STRUCTURE NOS. 4 AND 6.
T1
T1     STARTING WSEL IN THIS FILE CAME FROM CULVERT CHARTS.
T1
T1     MODIFICATIONS MADE TO THIS FILE AFTER COPYING IT FROM ORIGINAL FILE:
T1        1. CHANGES TO REFLECT EXISTING FIELD CONDITIONS WHEREVER NECESSARY.
T1
T2      FILENAME: SUB_B2.HC2  SUB-CRITICAL  10-YR RETURN PERIOD
T3      NDB-B2(SUB)
J1            2              0                                  5159.68
J2     1             -1                            -1
J3    38     42     66      1      2      3     39      4     43     13
J3    15     26      8             38     43     16     17     18     21
J3    22     53     54     58     33            38     43     10     11
J3    12     25     68     67     69
*
* X-SECTION NO. 23.3 IS UPSTREAM FACE OF STRUCTURE NO. 6.
* 2-CMP ARCH CULVERTS ARE CONVERTED TO BOX CULVERTS USING EQUIVALENT CONVEYANCE.
*
NC  .060    .060    .024     0.3     0.3
QT     2     177     281
X1  83.3       8    6400  6417.5
```

```
GT     2     177     281
GR5161.4  6400.0  5157.1  6400.1  5157.1  6406.6  5161.4  6406.7  5161.4  6410.7
GR5157.1  6410.6  5157.1  6417.4  5161.4  6417.6
*
GT     2     177     281
X12063.5     25    6380    6424      19      19      19
X3    10
GR5164.7    6316  5164.7    6336  5164.8    6356  5164.9    6376  5164.9    6380
GR5165.0    6384  5164.7    6388  5163.3    6392  5161.8    6396  5163.2    6400
GR5162.1    6404  5159.0    6408  5161.9    6412  5162.8    6416  5163.6    6420
GR5164.4    6424  5164.5    6428  5164.5    6432  5164.6    6436  5164.3    6456
GR5165.0    6476  5165.1    6496  5165.2    6516  5165.2    6536  5165.3    6556
GR5165.4    6576
*
NC  .060    .060    .024     0.1     0.3
GT     2     177     281
X1 83.83     45    6396    6436      25      25      25
X3    10
GR5164.5    6036  5164.6    6056  5164.7    6076  5164.7    6096  5164.8    6116
GR5164.8    6136  5164.9    6156  5164.9    6176  5165.1    6196  5165.2    6216
GR5165.2    6236  5165.3    6256  5165.3    6276  5165.3    6296  5165.3    6316
GR5165.3    6336  5165.4    6356  5165.7    6376  5165.9    6396  5164.5    6400
GR5164.4    6404  5159.5    6408  5159.6    6412  5160.5    6416  5163.6    6424
GR5164.6    6428  5165.5    6432  5165.7    6436  5166.0    6456  5166.0    6476
GR5166.0    6496  5166.1    6516  5166.1    6536  5166.2    6556  5166.2    6576
GR5166.2    6596  5166.4    6616  5166.4    6636  5166.4    6656  5166.4    6676
GR5166.5    6696  5166.6    6716  5166.7    6736  5166.7    6756  5166.8    6776
*
* GRADE CONTROL (CONCRETE) DROP FROM X-SECTION 83.93 TO X-SECTION 83.83.
*
NC  .060    .060    .024     0.1     0.3
GT     2     177     281
X1 83.93     45    6396    6436       1       1       1
X3    10
GR5164.5    6036  5164.6    6056  5164.7    6076  5164.7    6096  5164.8    6116
GR5164.8    6136  5164.9    6156  5164.9    6176  5165.1    6196  5165.2    6216
GR5165.2    6236  5165.3    6256  5165.3    6276  5165.3    6296  5165.3    6316
GR5165.3    6336  5165.4    6356  5165.7    6376  5165.9    6396  5164.5    6400
GR5164.4    6404  5162.7    6408  5162.8    6412  5163.7    6416  5163.6    6424
GR5164.6    6428  5165.5    6432  5165.7    6436  5166.0    6456  5166.0    6476
GR5166.0    6496  5166.1    6516  5166.1    6536  5166.2    6556  5166.2    6576
GR5166.2    6596  5166.4    6616  5166.4    6636  5166.4    6656  5166.4    6676
GR5166.5    6696  5166.6    6716  5166.7    6736  5166.7    6756  5166.8    6776
*
NC  .060    .060    .024     0.1     0.3
GT     2     177     281
X1 84.11     45    6408    6448      30      30      30
X3    10
GR5165.4    6136  5165.4    6156  5165.6    6176  5165.8    6196  5165.9    6216
GR5166.0    6236  5166.0    6256  5166.0    6276  5166.0    6296  5166.0    6316
GR5166.0    6336  5166.2    6356  5166.4    6376  5166.5    6396  5166.5    6400
GR5166.4    6404  5166.4    6408  5165.5    6412  5164.4    6416  5163.4    6420
GR5163.9    6424  5164.5    6428  5165.1    6432  5165.8    6436  5166.4    6440
GR5167.0    6444  5167.2    6448  5167.2    6452  5167.2    6456  5167.2    6476
GR5167.2    6496  5167.1    6516  5167.2    6536  5167.2    6556  5167.2    6576
GR5167.2    6596  5167.2    6616  5167.2    6636  5167.2    6656  5167.2    6676
GR5167.2    6696  5167.3    6716  5167.3    6736  5167.4    6756  5167.4    6776
*
NC  .060    .060    .024     0.1     0.3
GT     2     177     281
X12086.5     23    6487    6547     240     225     235
X3    10
GR5175.0    6420  5175.1    6439  5175.1    6459  5175.1    6479  5175.1    6483
GR5175.1    6487  5174.3    6491  5173.4    6495  5172.6    6499  5171.8    6503
GR5170.9    6507  5170.0    6511  5169.2    6515  5170.0    6519  5174.1    6539
```

```
GR5178.8    6577  5178.7    6597  5178.5    6617
*
NC  .060    .060    .024     0.1     0.3
QT     2     177     281
O  X1 88.1     19    6553    6605     165     165     165
X3    10
GR5179.1    6493  5179.2    6513  5179.2    6533  5179.2    6549  5178.9    6553
GR5173.5    6573  5172.3    6577  5172.9    6581  5173.9    6585  5175.0    6589
GR5176.0    6593  5177.0    6597  5178.0    6601  5179.0    6605  5179.0    6609
GR5179.0    6613  5178.8    6632  5178.7    6652  5178.5    6672
*
NC  .060    .060    .024     0.1     0.3
QT     2     164     261
P  X1 90.05     45    6626    6670     240     240     240
X3    10
GR5181.5    6360  5181.5    6364  5181.6    6384  5181.6    6404  5182.0    6424
GR5182.7    6444  5183.5    6464  5183.9    6484  5184.1    6504  5184.1    6524
GR5184.2    6544  5184.3    6564  5184.3    6584  5184.1    6604  5183.7    6622
GR5183.6    6626  5182.5    6630  5181.4    6634  5179.2    6642  5178.1    6646
GR5177.0    6650  5178.3    6654  5179.5    6658  5181.3    6662  5182.7    6666
GR5183.4    6670  5183.4    6674  5183.3    6678  5183.3    6682  5183.0    6702
GR5182.8    6722  5182.5    6742  5182.3    6762  5182.2    6782  5181.5    6802
GR5181.3    6822  5181.1    6842  5181.0    6862  5180.9    6882  5180.7    6902
GR5180.7    6906  5180.7    6910  5180.7    6914  5180.3    6918  5179.0    6922
*
NC  .060    .060    .024     0.1     0.3
QT     2     164     261
Q  X1 91.85     60    6692    6736     190     190     190
X3    10
GR5184.4    6156  5184.5    6176  5184.7    6196  5184.9    6216  5185.1    6236
GR5185.3    6256  5185.3    6276  5185.5    6296  5185.8    6316  5186.0    6336
GR5186.2    6356  5186.5    6376  5186.8    6396  5187.1    6416  5187.4    6436
GR5187.6    6456  5187.8    6476  5188.1    6496  5188.2    6516  5188.6    6536
GR5188.8    6556  5189.0    6576  5188.9    6596  5188.7    6616  5188.6    6636
GR5188.5    6656  5188.5    6672  5188.5    6692  5182.1    6712  5181.3    6716
GR5182.6    6720  5184.0    6724  5185.5    6728  5186.9    6732  5188.0    6736
GR5187.9    6740  5187.9    6744  5187.8    6752  5187.5    6772  5187.2    6792
GR5187.0    6812  5186.5    6832  5186.4    6852  5166.2    6872  5186.0    6892
GR5185.9    6912  5185.8    6932  5185.7    6952  5185.6    6972  5185.5    6976
GR5185.2    6980  5185.0    6984  5183.8    6988  5182.7    6992  5181.4    6996
GR5180.1    7000  5180.7    7004  5181.7    7008  5182.7    7012  5183.4    7016
*
* X-SECTION 91.55 IS DOWNSTREAM FACE OF CULVERT STRUCTURE NO. 4.
* 2-CMP ARCH CULVERTS ARE CONVERTED TO BOX CULVERTS USING EQUIVALENT CONVEYANCE.
*
NC  .060    .060    .024     0.1     0.5
QT     2     164     261
R  X1 91.55      8    6700  6717.2      30      30      30
X3    10
BT     2    6700 5190.00  5188.1  6717.2  5190.0  5188.1
GR5190.0  6700.0  5182.5 6700.01 5182.50 6706.59  5188.1 6706.60  5188.1  6710.6
GR5182.5 6710.61  5182.5 6717.19  5190.0  6717.2
*
EJ
T1      RESOURCE TECHNOLOGY INC., ALBUQUERQUE, NM
T1      CLOMR (SOUTH BRANCH OF NORTH DOMINGO BACA ARROYO, ALBUQUERQUE, NM)
T1      SUBMITTAL TO FEMA  (DATE: AUGUST, 1994)
T2      FILENAME: SUB_B2.HC2  SUB-CRITICAL  100-YR RETURN PERIOD
T3      NDB-B2(SUB)
J1   -10      3      0      0              0      0      0 5160.76      0
J2     2      0     -1      0      0       0     -1      0      0      0
```

THIS RUN EXECUTED 24AUG94 13:51:04

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

NOB-B2(SUB)

SUMMARY PRINTOUT

	SECNO	ELMIN	CUMDS	CWSEL	CRIWS	EG	XLCH	TOPWID	Q	GLOB	GROB	VCH	DEP
	83.300	5157.10	0.00	5159.68	5158.88	5160.10	0.00	13.34	177.00	0.00	0.00	5.19	2.
	83.300	5157.10	0.00	5160.76	5159.51	5161.28	0.00	13.44	281.00	0.00	0.00	5.79	3.
*	2083.500	5158.10	19.00	5160.62	5160.62	5161.52	19.00	12.92	177.00	0.00	0.00	7.63	2.
*	2083.500	5158.10	19.00	5161.32	5161.32	5162.45	19.00	14.66	281.00	0.00	0.00	8.55	3.
*	83.830	5159.50	44.00	5161.98	5161.98	5162.78	25.00	15.35	177.00	0.00	0.00	7.20	2.
*	83.830	5159.50	44.00	5162.62	5162.62	5163.60	25.00	18.04	281.00	0.00	0.00	7.96	3.
*	83.930	5162.70	45.00	5164.70	5164.70	5165.24	1.00	29.01	177.00	0.00	0.00	5.89	2.
*	83.930	5162.70	45.00	5165.12	5165.12	5165.79	1.00	32.08	281.00	0.00	0.00	6.55	2.
*	84.110	5163.40	75.00	5165.68	5165.68	5166.27	30.00	24.10	177.00	0.00	0.00	6.19	2.
*	84.110	5163.40	75.00	5166.16	5166.16	5166.87	30.00	29.35	281.00	0.00	0.00	6.77	2.
*	2086.500	5169.20	310.00	5171.60	5171.60	5172.22	235.00	22.92	177.00	0.00	0.00	6.34	2.
*	2086.500	5169.20	310.00	5172.09	5172.09	5172.84	235.00	27.67	281.00	0.00	0.00	6.96	2.
*	2088.100	5172.30	475.00	5174.80	5174.80	5175.49	165.00	20.11	177.00	0.00	0.00	6.64	2.
*	2088.100	5172.30	475.00	5175.35	5175.35	5176.17	165.00	24.23	281.00	0.00	0.00	7.26	3.
*	90.080	5177.00	715.00	5179.72	5179.72	5180.42	240.00	17.67	164.00	0.00	0.00	6.72	2.
*	90.080	5177.00	715.00	5180.27	5180.27	5181.13	240.00	21.17	261.00	0.00	0.00	7.42	3.
*	91.850	5181.30	905.00	5183.92	5183.92	5184.62	190.00	17.46	164.00	0.00	0.00	6.71	2.
*	91.850	5181.30	905.00	5184.48	5184.48	5185.34	190.00	20.74	261.00	0.00	0.00	7.41	3.
*	91.550	5182.50	935.00	5184.18	5184.18	5185.03	30.00	13.17	164.00	0.00	0.00	7.40	1.
*	91.550	5182.50	935.00	5184.79	5184.79	5185.95	30.00	13.17	261.00	0.00	0.00	8.65	2.

WDB-B2(EUS)

SUMMARY PRINTOUT

	EECNO	Q	K*XNL	K*XNCH	K*XNR	STCHL	STCHR	SSTA	ENDST	KRATIO	K*CHSL
	83.300	177.00	0.00	24.00	0.00	6400.00	6417.50	6400.04	6417.46	0.00	0.00
	83.300	281.00	0.00	24.00	0.00	6400.00	6417.50	6400.02	6417.48	0.00	0.00
*	2083.500	177.00	0.00	24.00	0.00	6380.00	6424.00	6397.31	6410.23	0.73	52.63
*	2083.500	281.00	0.00	24.00	0.00	6380.00	6424.00	6396.53	6411.20	0.73	52.63
*	83.830	177.00	0.00	24.00	0.00	6396.00	6436.00	6404.46	6419.81	1.01	56.00
*	83.830	281.00	0.00	24.00	0.00	6396.00	6436.00	6403.42	6421.47	1.02	56.00
*	83.930	177.00	0.00	24.00	0.00	6396.00	6436.00	6399.43	6428.44	0.95	3200.20
*	83.930	281.00	0.00	24.00	0.00	6396.00	6436.00	6398.23	6430.31	0.98	3200.20
*	84.110	177.00	0.00	24.00	0.00	6408.00	6448.00	6411.21	6435.31	1.04	23.32
*	84.110	281.00	0.00	24.00	0.00	6408.00	6448.00	6409.06	6438.41	1.01	23.32
*	2086.500	177.00	0.00	24.00	0.00	6487.00	6547.00	6503.89	6526.81	0.99	24.68
*	2086.500	281.00	0.00	24.00	0.00	6487.00	6547.00	6501.54	6529.21	0.99	24.68
*	2088.100	177.00	0.00	24.00	0.00	6553.00	6605.00	6568.17	6588.28	1.00	18.79
*	2088.100	281.00	0.00	24.00	0.00	6553.00	6605.00	6566.16	6590.39	1.01	18.79
*	90.080	164.00	0.00	24.00	0.00	6626.00	6670.00	6640.11	6657.79	0.93	19.58
*	90.080	261.00	0.00	24.00	0.00	6626.00	6670.00	6638.09	6659.27	0.92	19.58
*	91.850	164.00	0.00	24.00	0.00	6692.00	6736.00	6706.31	6723.77	1.01	22.63
*	91.850	261.00	0.00	24.00	0.00	6692.00	6736.00	6704.55	6725.29	1.01	22.63
*	91.550	164.00	0.00	24.00	0.00	6700.00	6717.20	6700.01	6717.19	0.80	40.01
*	91.550	261.00	0.00	24.00	0.00	6700.00	6717.20	6700.01	6717.19	0.76	40.01

NDB-B2(SUB)

SUMMARY PRINTOUT

SECNO	Q	HV	HL	DLOSS	AREA	FRCH	SHEAR	POWER
33.300	177.00	0.42	0.00	0.00	34.11	0.65	0.52	2.70
83.300	281.00	0.52	0.00	0.00	48.56	0.61	0.72	4.15
* 2033.500	177.00	0.90	0.11	0.15	23.21	1.00	0.91	6.71
* 2083.500	281.00	1.14	0.10	0.18	32.86	1.01	1.08	9.26
* 33.830	177.00	0.80	0.20	0.01	24.60	1.00	0.79	5.71
* 33.830	281.00	0.98	0.19	0.02	35.30	1.00	0.91	7.28
* 83.930	177.00	0.54	0.01	0.03	30.06	1.02	0.57	3.38
* 83.930	281.00	0.67	0.01	0.03	42.91	1.00	0.65	4.28
* 84.110	177.00	0.59	0.26	0.02	28.60	1.00	0.60	3.74
* 84.110	281.00	0.71	0.23	0.01	41.49	1.00	0.68	4.62
* 2086.500	177.00	0.62	1.93	0.01	27.93	1.01	0.63	3.99
* 2086.500	281.00	0.75	1.83	0.01	40.37	1.02	0.72	4.98
* 2088.100	177.00	0.68	1.36	0.02	26.67	1.02	0.68	4.52
* 2088.100	281.00	0.82	1.28	0.02	38.73	1.01	0.76	5.55
* 90.080	164.00	0.70	1.96	0.01	24.41	1.01	0.70	4.71
* 90.080	261.00	0.85	1.85	0.01	35.19	1.01	0.80	5.96
* 91.850	164.00	0.70	1.53	0.00	24.43	1.00	0.70	4.67
* 91.850	261.00	0.85	1.45	0.00	35.21	1.00	0.80	5.91
* 91.550	164.00	0.85	0.29	0.08	22.16	1.15	1.00	7.37
* 91.550	261.00	1.16	0.29	0.15	30.19	1.15	1.43	12.36

SUMMARY OF ERRORS AND SPECIAL NOTES

```
CAUTION SECNO=   2083.500  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   2083.500  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   2083.500  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   2083.500  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     83.830  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     83.830  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     83.830  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     83.830  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     83.930  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     83.930  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     83.930  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     83.930  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     84.110  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     84.110  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     84.110  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     84.110  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=   2086.500  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   2086.500  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   2086.500  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   2086.500  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=   2088.100  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   2088.100  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   2088.100  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   2088.100  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     90.080  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     90.080  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     90.080  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     90.080  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     91.850  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     91.850  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     91.850  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     91.850  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     91.550  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     91.550  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     91.550  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     91.550  PROFILE=  2  MINIMUM SPECIFIC ENERGY
```

Resource Technology, Inc

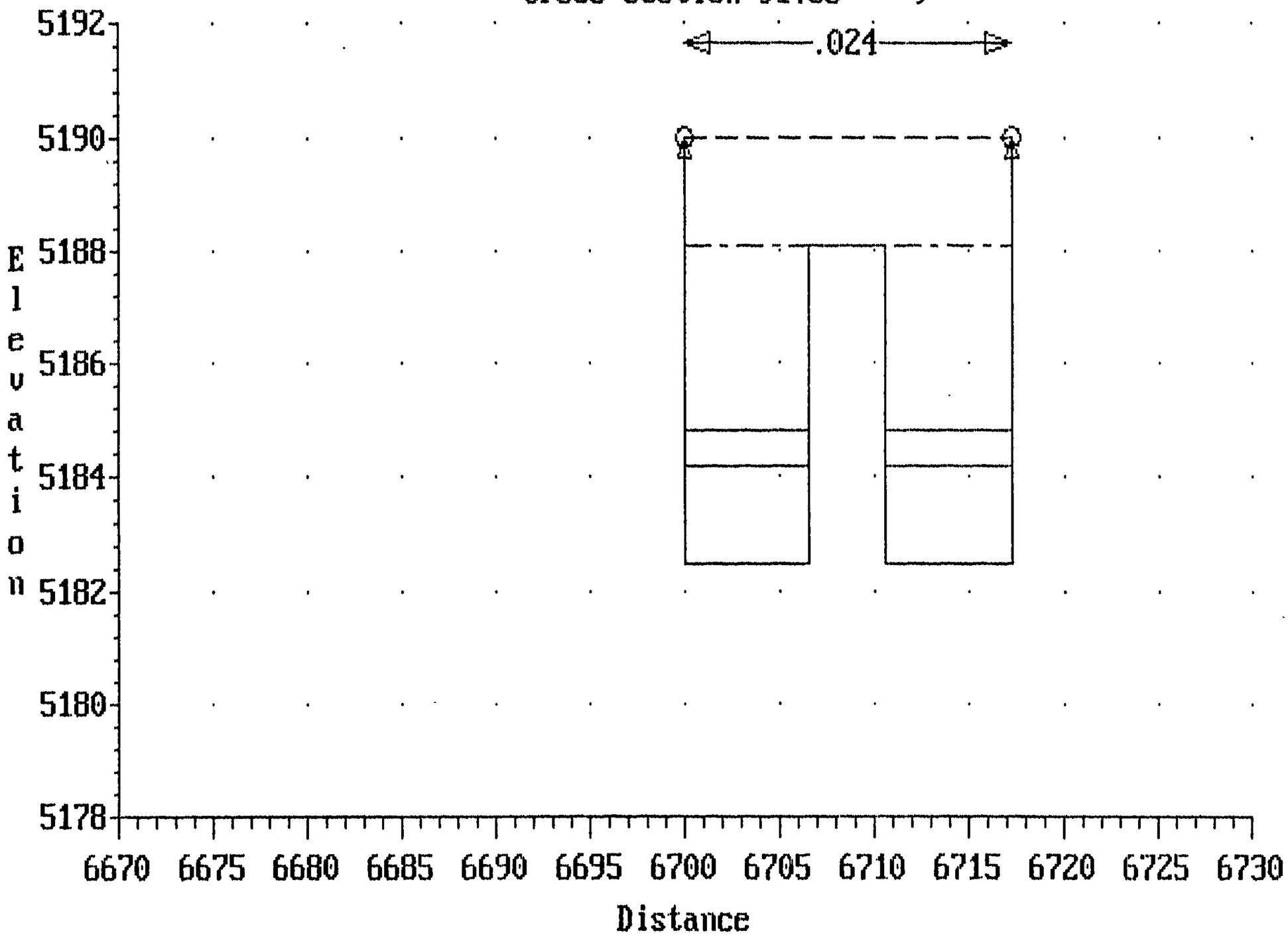
CROSS-SECTION PLOT PARAMATERS

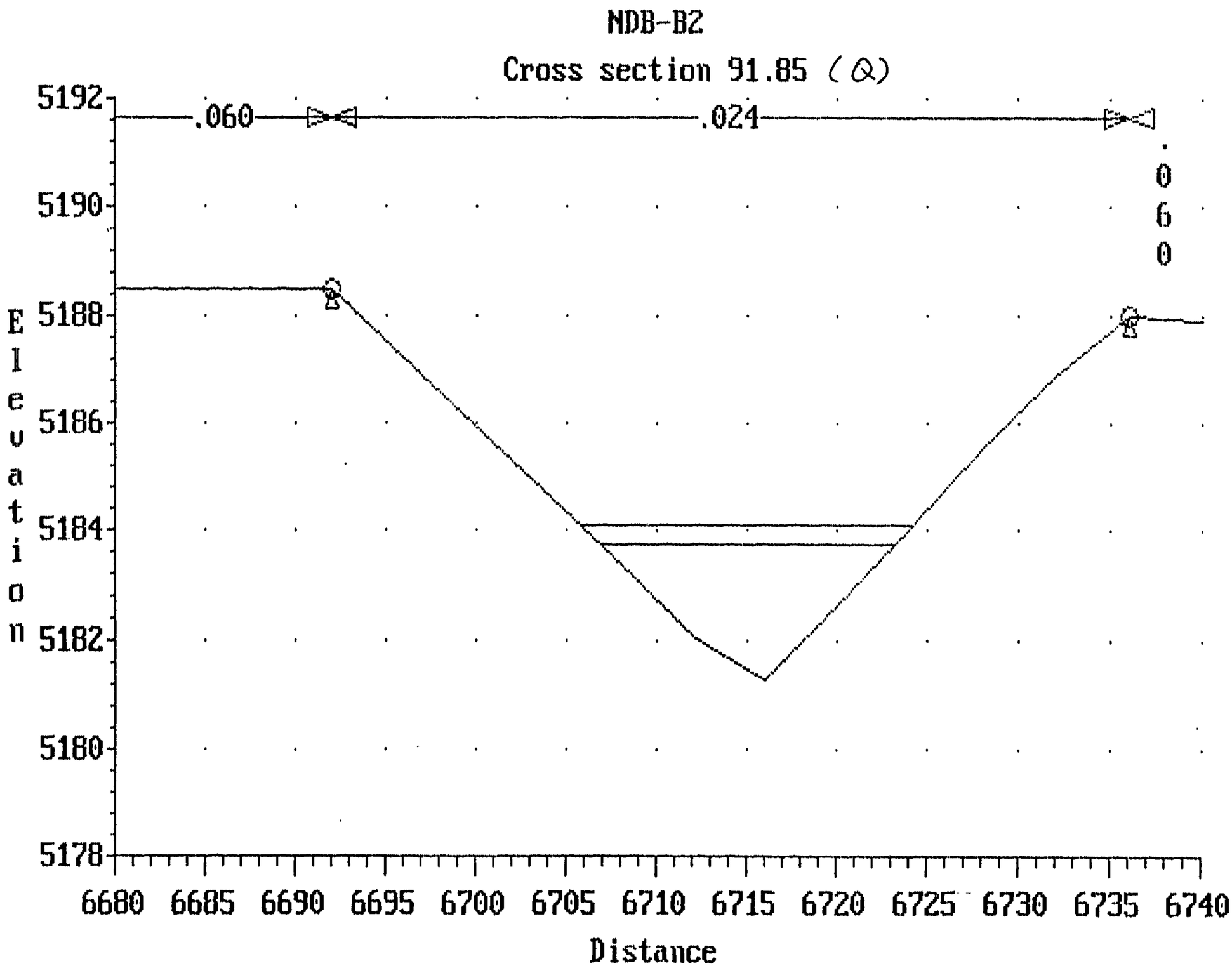
AREA Between Structures (4) & (6) ARROYO "B" or South Branch DATE

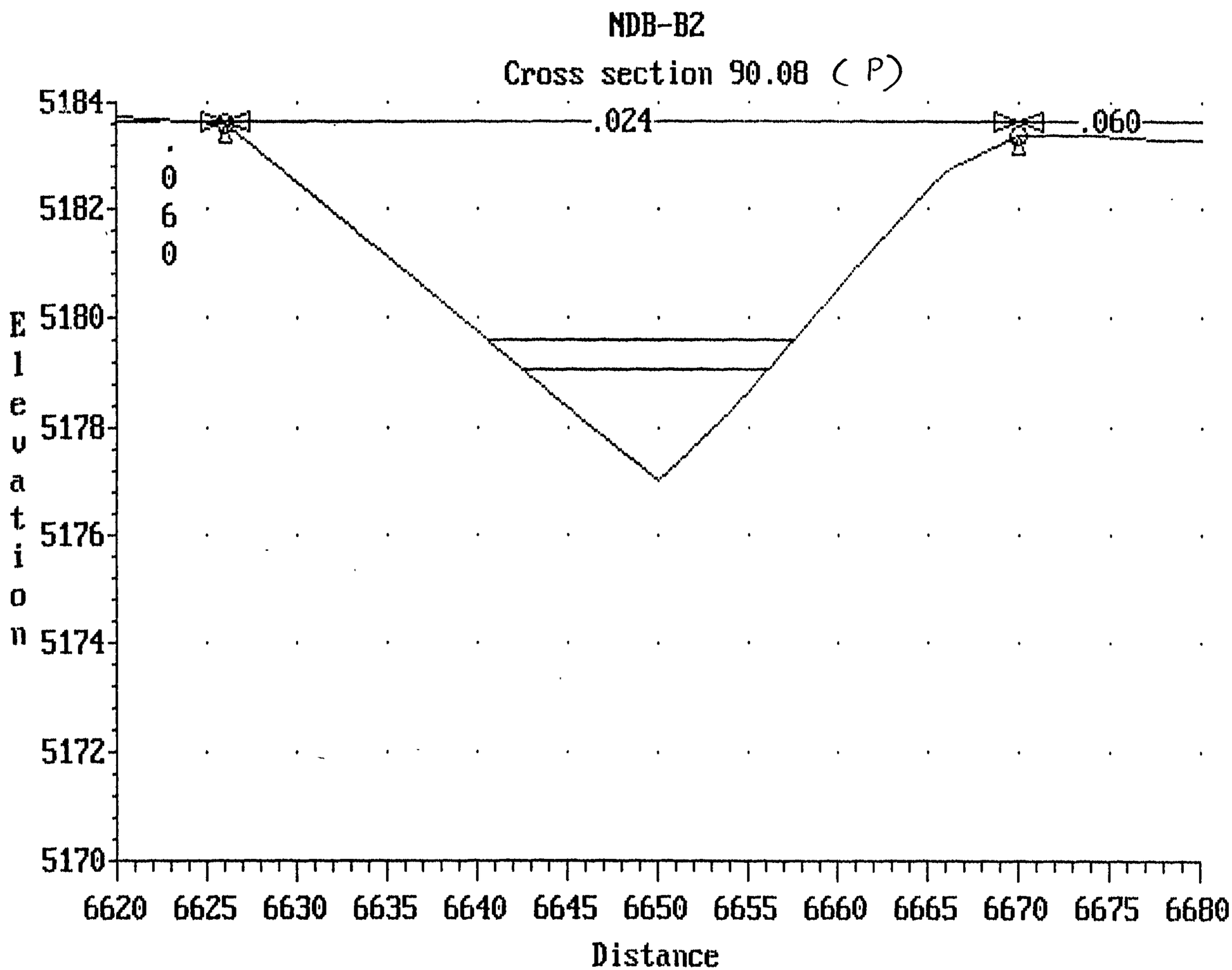
X-SEC. LETTER	X-SEC. NO.	X RANGE	X BEGIN	X END	Y RANGE	Y BEGIN	Y END
R	91.55	18	6700	6718	9	5182	5191
Q	91.85	60	6680	6740	7	5181	5186
P	90.08	60	6620	6680	6	5176	5182
O	2088.1	30	6560	6590	4	5172	5176
N	2086.5	40	6500	6540	3	5169	5172
M	84.11	60	6390	6450	3	5163	5166
L	83.93	60	6380	6440	3	5162	5165
K	83.83	60	6380	6440	3	5159	5162
J	2083.5	30	6390	6420	3	5158	5161
I	83.3	18	6400	6418	7	5157	5164

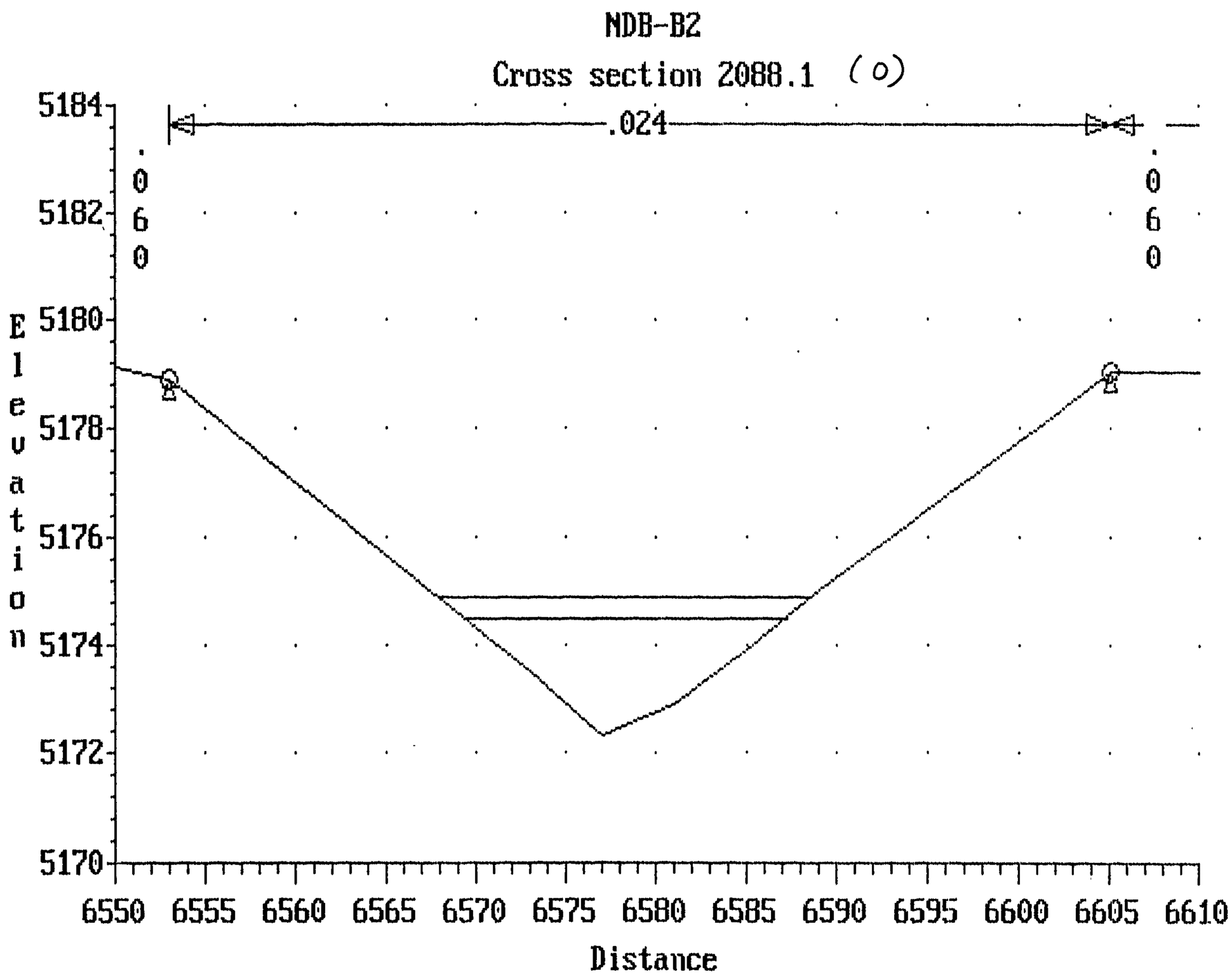
NDB-B2

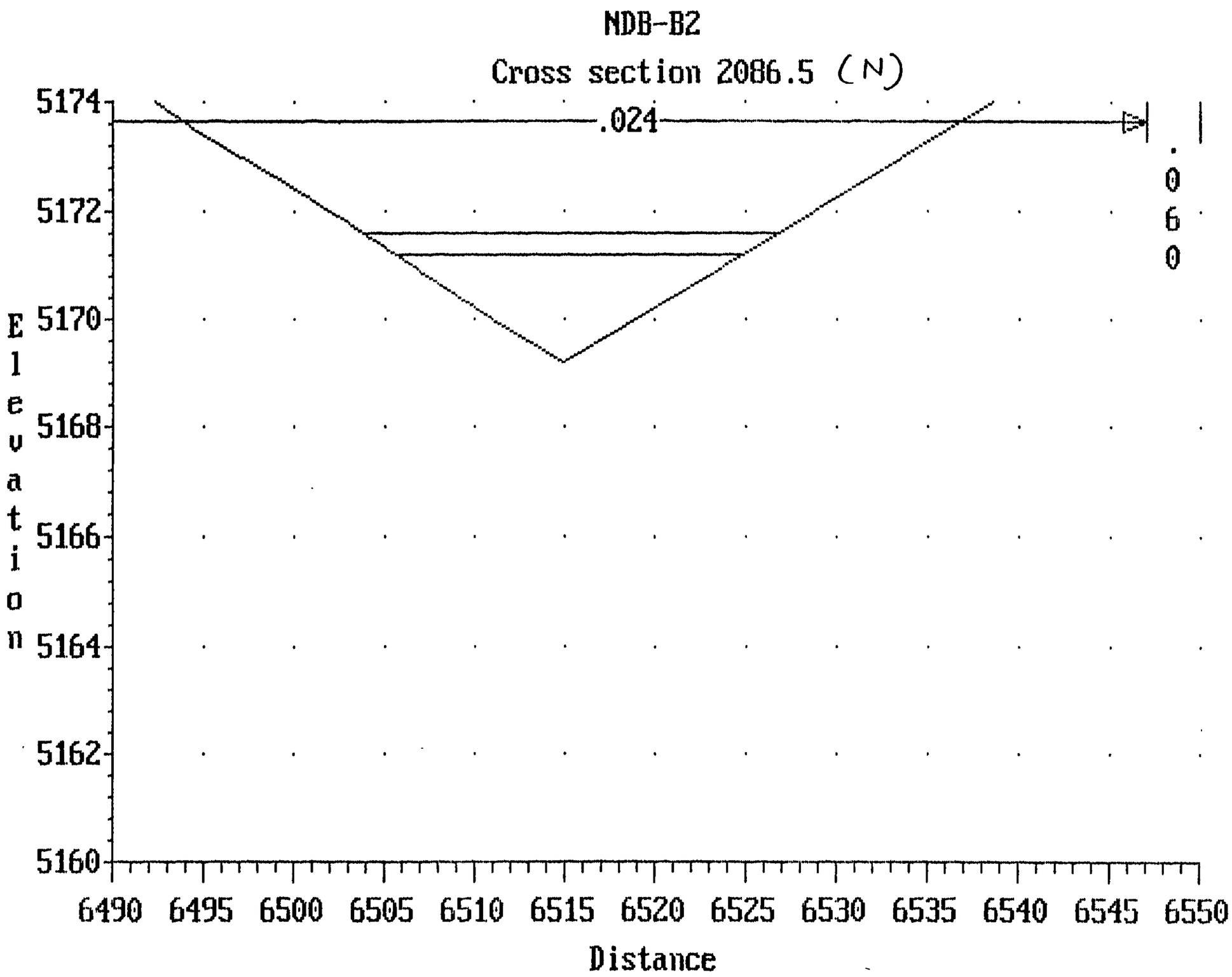
Cross section 91.55 (R)

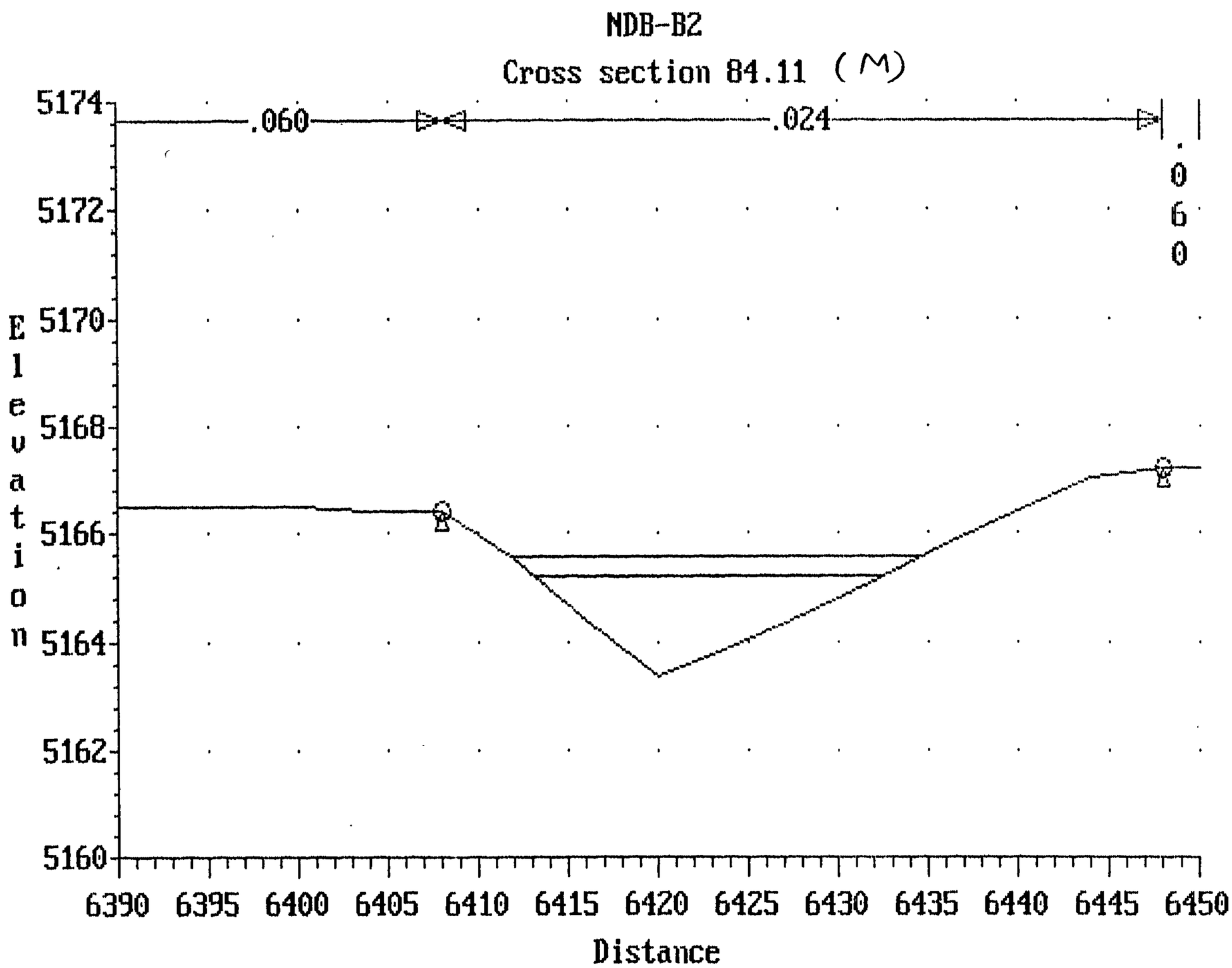


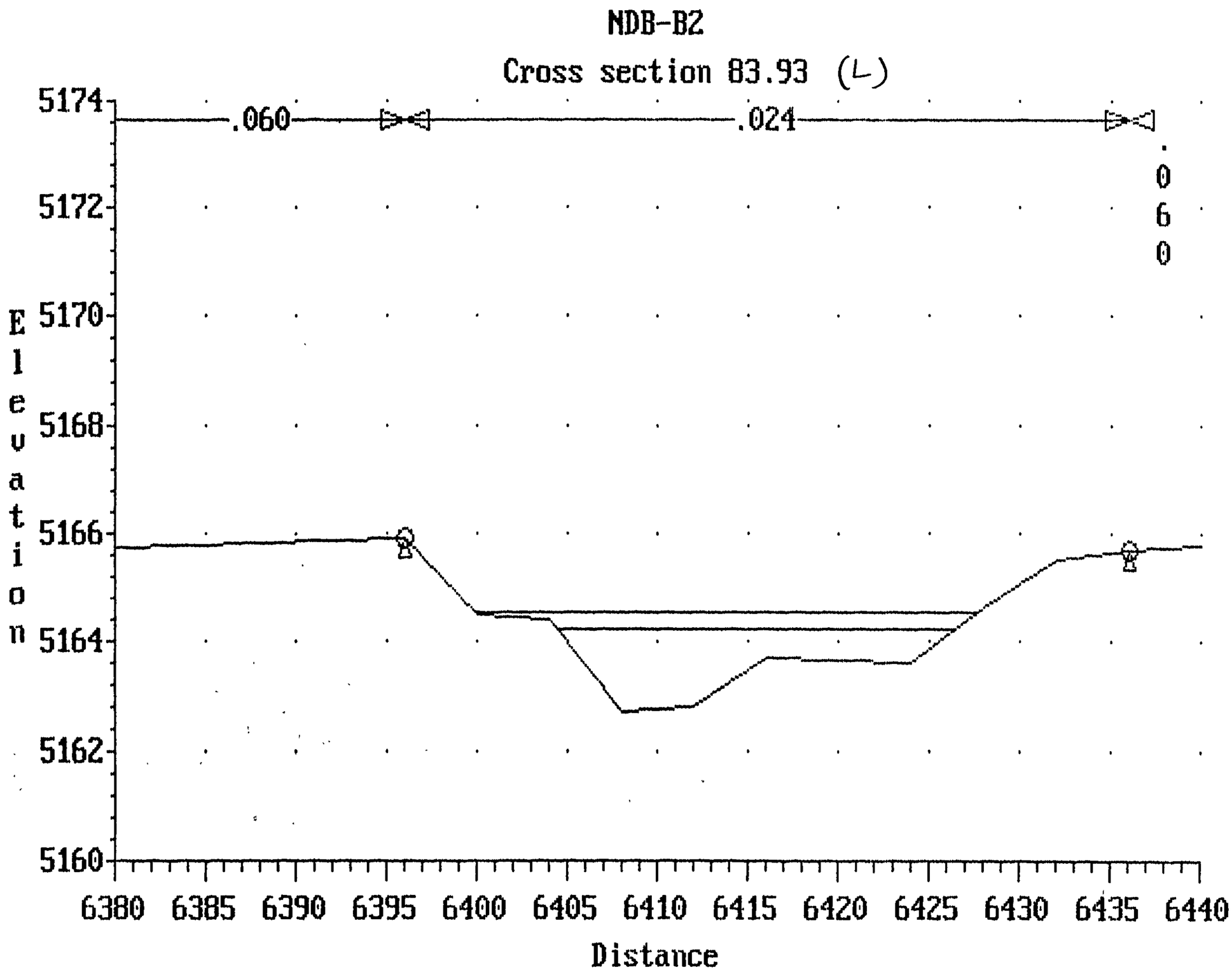

NDB-B2
Cross section 91.85 (Q)
.060
.024
.060
5192
5190
5188
5186
5184
5182
5180
5178
Elevation
6680
6685
6690
6695
6700
6705
6710
6715
6720
6725
6730
6735
6740
Distance

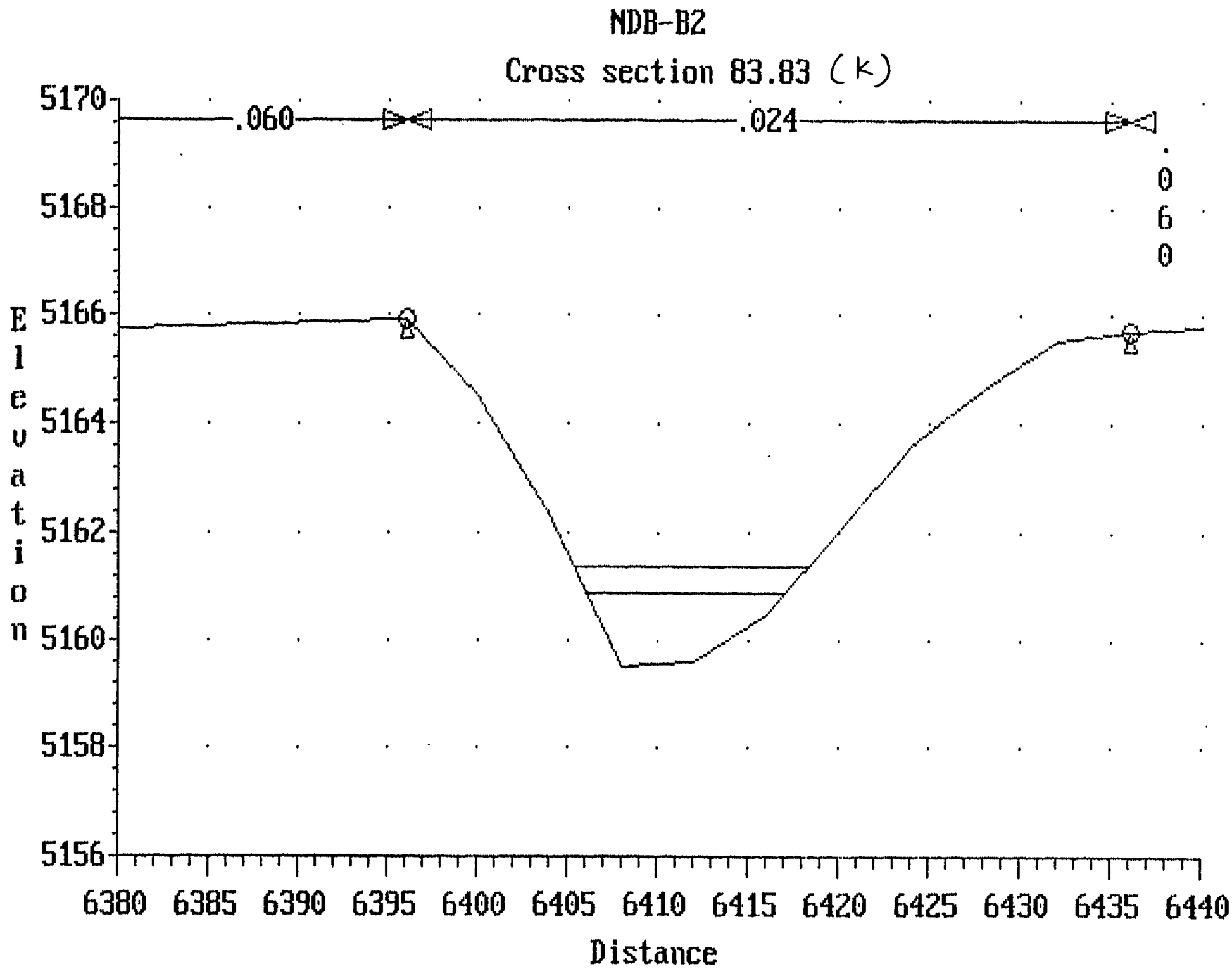

NDB-B2
Cross section 90.08 (P)
.024
.060
.060
5184
5182
5180
5178
5176
5174
5172
5170
Elevation
6620
6625
6630
6635
6640
6645
6650
6655
6660
6665
6670
6675
6680
Distance

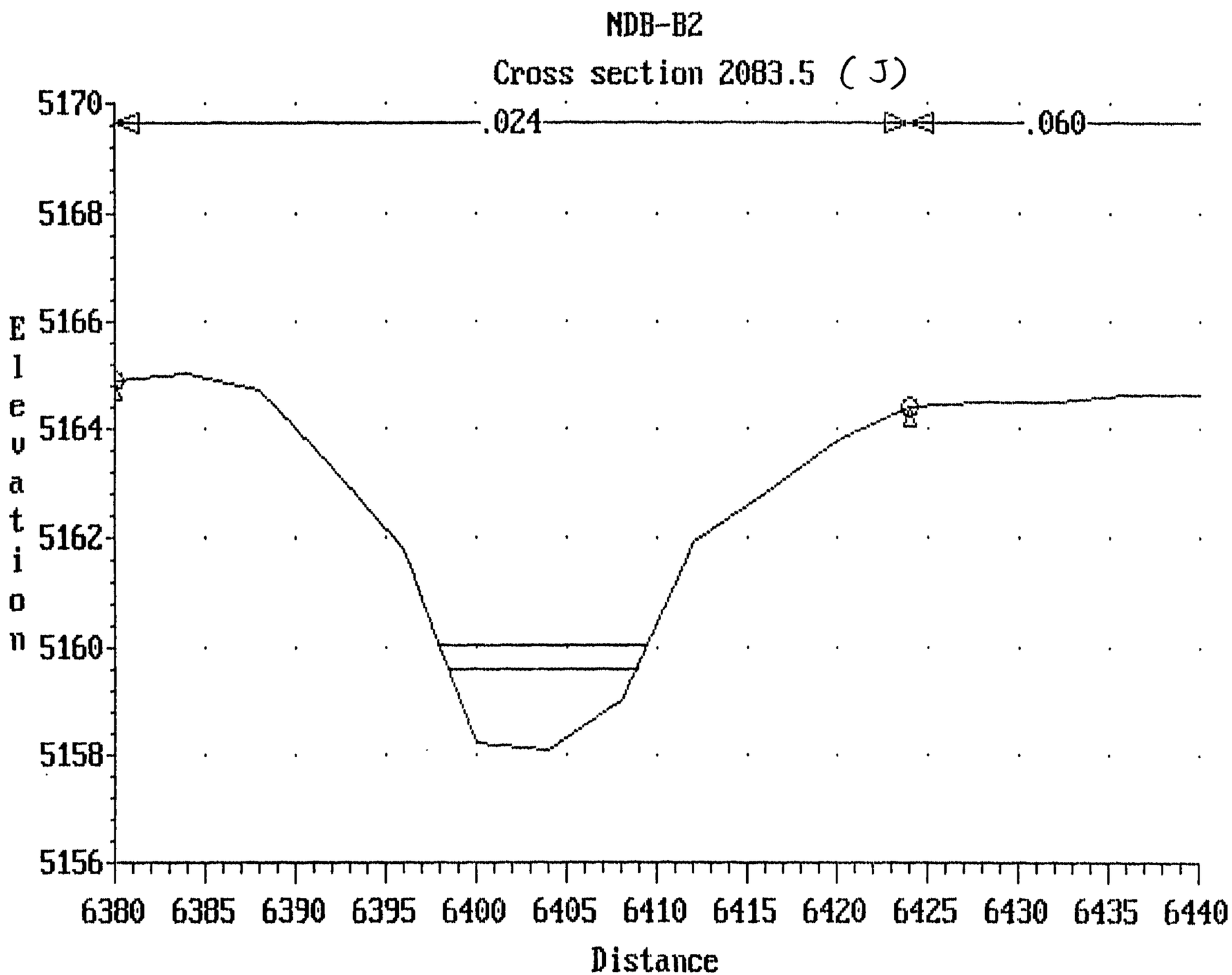

NDB-B2
Cross section 2088.1 (o)
.024
.060
.060
5184
5182
5180
5178
5176
5174
5172
5170
Elevation
6550 6555 6560 6565 6570 6575 6580 6585 6590 6595 6600 6605 6610
Distance

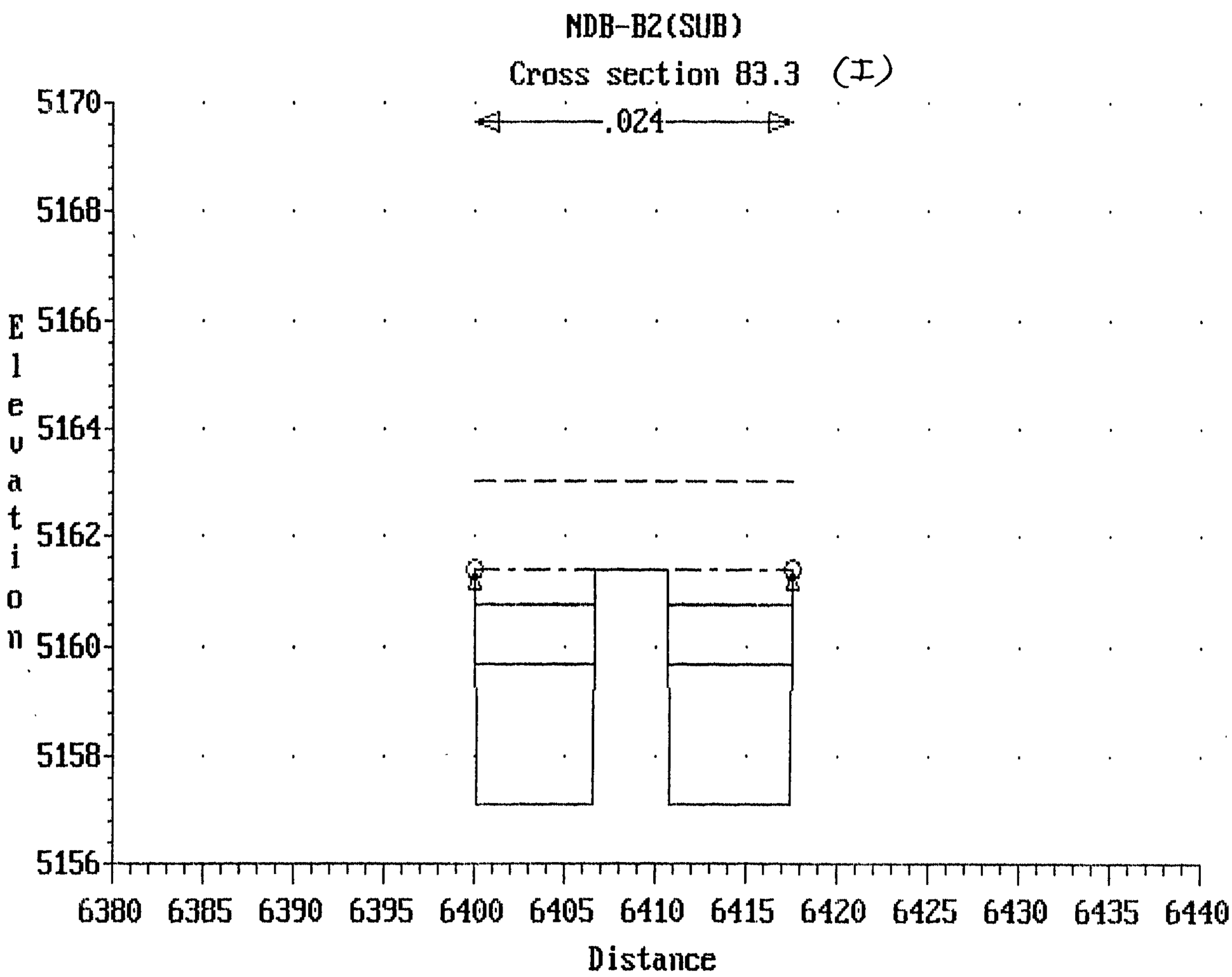

NDB-B2
Cross section 2086.5 (N)
.024
.060
5174
5172
5170
5168
5166
5164
5162
5160
Elevation
6490
6495
6500
6505
6510
6515
6520
6525
6530
6535
6540
6545
6550
Distance


NDB-B2
Cross section 84.11 (M)
.060
.024
.060
5174
5172
5170
5168
5166
5164
5162
5160
Elevation
6390
6395
6400
6405
6410
6415
6420
6425
6430
6435
6440
6445
6450
Distance


NDB-B2
Cross section 83.93 (L)
.060
.024
.060
5174
5172
5170
5168
5166
5164
5162
5160
Elevation
6380
6385
6390
6395
6400
6405
6410
6415
6420
6425
6430
6435
6440
Distance


NDB-B2
Cross section 83.83 (K)
.060
.024
.060
5170
5168
5166
5164
5162
5160
5158
5156
Elevation
6380
6385
6390
6395
6400
6405
6410
6415
6420
6425
6430
6435
6440
Distance


NDB-B2
Cross section 2083.5 (J)
.024
.060
5170
5168
5166
5164
5162
5160
5158
5156
Elevation
6380
6385
6390
6395
6400
6405
6410
6415
6420
6425
6430
6435
6440
Distance


NDB-B2(SUB)
Cross section 83.3 (工)
.024
5170
5168
5166
5164
5162
5160
5158
5156
Elevation
6380
6385
6390
6395
6400
6405
6410
6415
6420
6425
6430
6435
6440
Distance

RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

CHECKED _____ DATE _____ PROJECT NO. _____

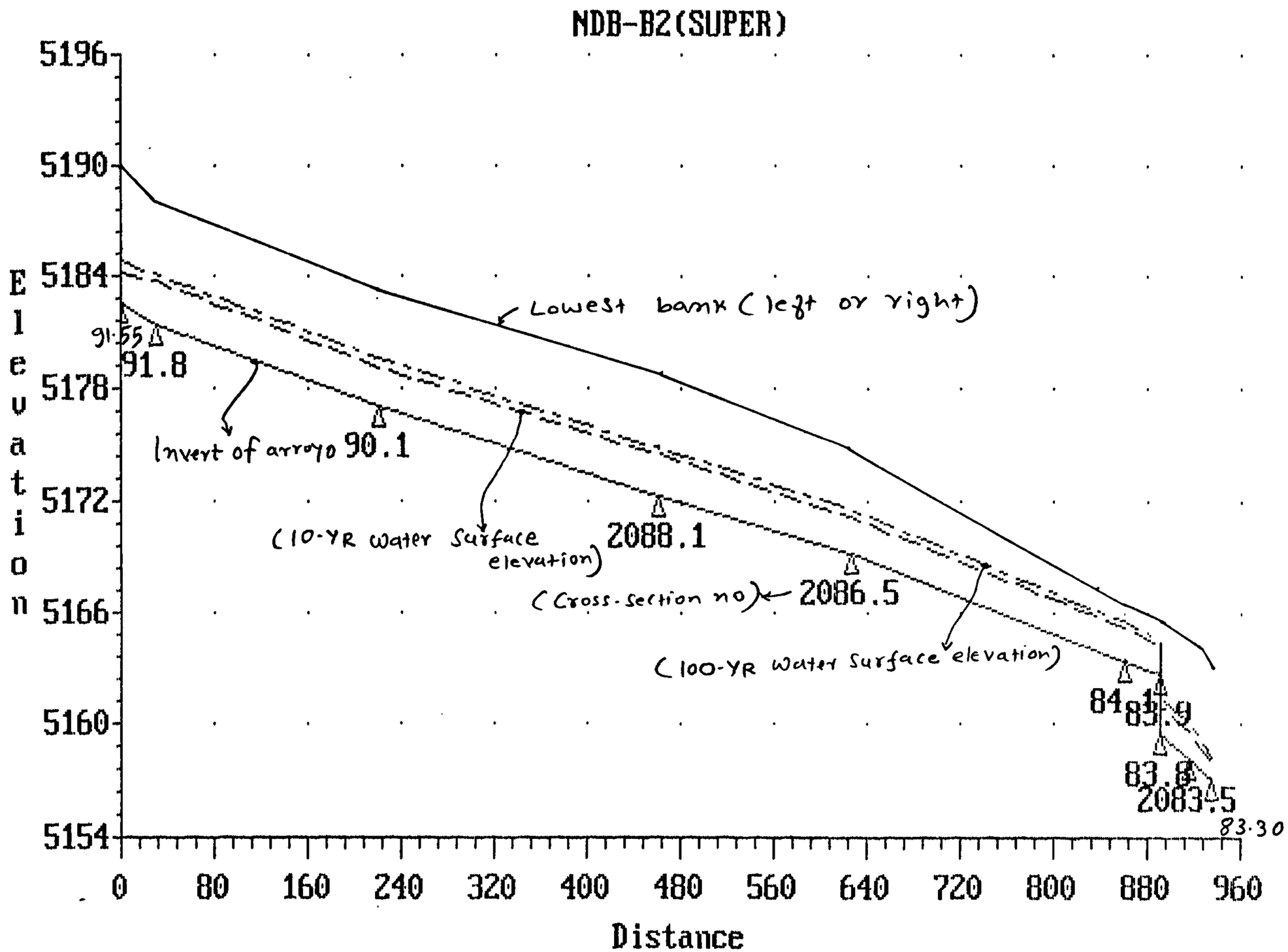
APPROVED _____ DATE _____ SHEET _____ OF _____

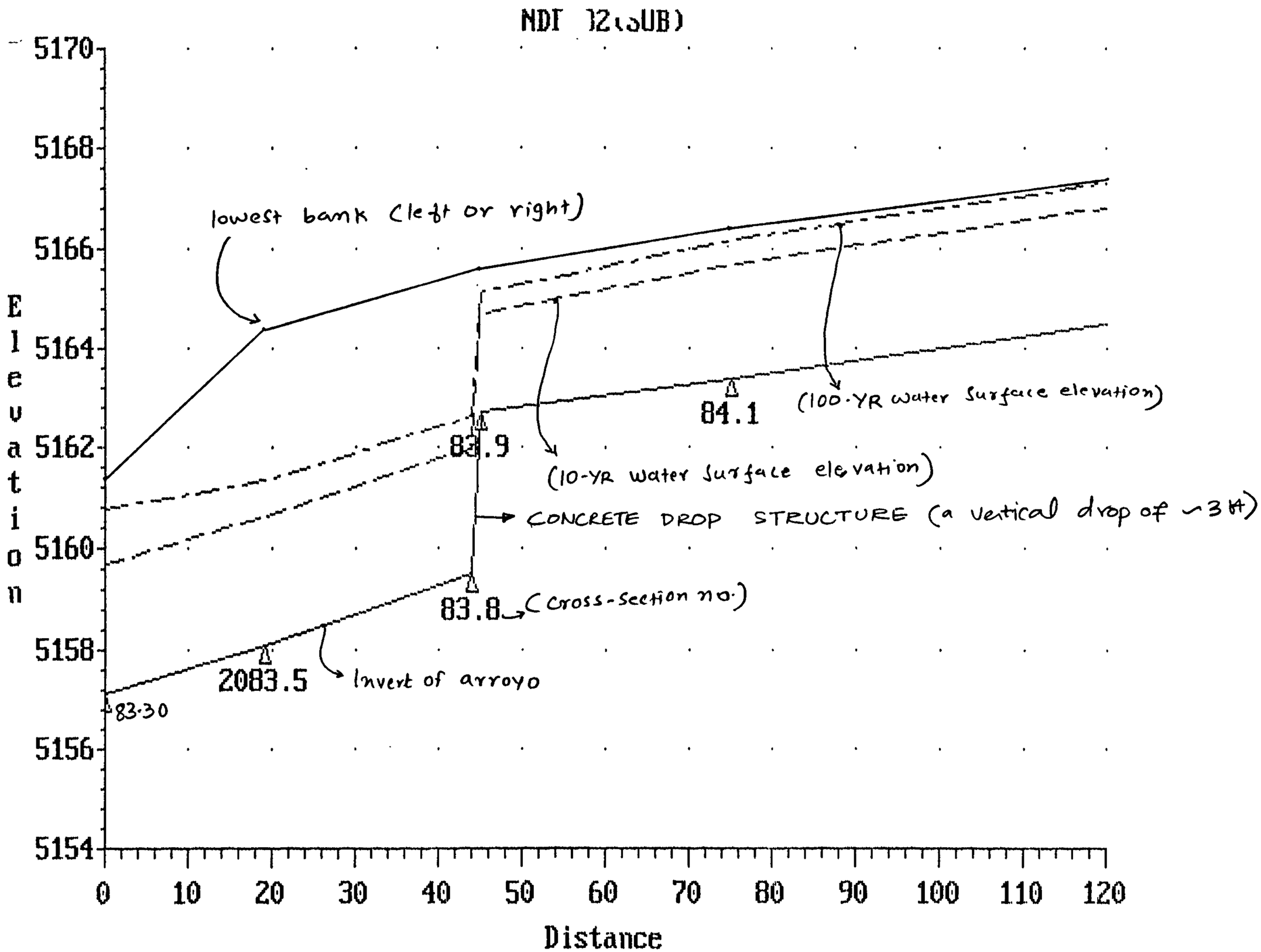
TITLE _____ BY _____ DATE _____

PROFILES

ARROYO: "B" OR SOUTH BRANCH

REACH: BETWEEN STRUCTURES 4 & 6


NDB-B2(SUPER)
Elevation
5196
5190
5184
5178
5172
5166
5160
5154
0
80
160
240
320
400
480
560
640
720
800
880
960
Distance
Lowest bank (left or right)
91.55
91.8
Invert of arroyo
90.1
(10-YR water surface elevation)
2088.1
(Cross-section no)
2086.5
(100-YR water surface elevation)
84.1
83.9
83.8
2083.5
83.30


NDT 12(SUB)
5170
5168
5166
5164
5162
5160
5158
5156
5154
Elevation
0
10
20
30
40
50
60
70
80
90
100
110
120
Distance
lowest bank (left or right)
(100-YR water surface elevation)
84.1
83.9
(10-YR water surface elevation)
CONCRETE DROP STRUCTURE (a vertical drop of ~3 ft)
83.8
(cross-section no.)
2083.5
Invert of arroyo
83.30

RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

CHECKED _____ DATE _____ PROJECT NO. _____

APPROVED _____ DATE _____ SHEET _____ OF _____

TITLE _____ BY _____ DATE _____

HEC-2 INPUT FILE, SUMMARY TABLES & CROSS SECTION PLO

FOR ARROYO "B" OR SOUTH BRANCH

(WEST OF I-25; BETWEEN STRUCTURES ⑥ & ⑦).

(SUB-CRITICAL)

```
T1
T1     HEC-2 FILENAME:   SUB_B3.HC2
T1         (10-YR & 100-YR DISCHARGES. EXISTING CONDITIONS)
T1
T1 ************************************************************************
T1    RTI PROJECT NO.   94-200-1 (TASK 3)
T1
T1    PURPOSE: SUBMITTAL OF CLOMR FOR NORTH DOMINGO ARROYO (IN ALBUQUERQUE. NM)
T1             FROM LOWER NORTH DOMINGO BACA DETENTION DAM TILL IT MEETS WITH
T1             SOUTH DOMINGO BACA ARROYO WEST OF I-25.
T1
T1    FLOODING SOURCE:   NORTH DOMINGO BACA ARROYO (SOUTH BRANCH)
T1
T1    CLIENT:          ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY
T1                     (AMAFCA)
T1                     2600 PROSPECT. NE
T1                     ALBUQUERQUE. NM 87107
T1
T1    CONSULTANTS:     RESOURCE TECHNOLOGY. INC.
T1                     2129. OSUNA RD. NE. SUITE 200
T1                     ALBUQUERQUE. NM 87113
T1                     PH: (505)345-3115
T1                     FAX: (505)345-4132
T1
T1    FINAL MODEL RUN DATE:  00/00/1994
T1
T1    INPUT FILENAME:  SUB_B3.HC2
T1    OUTPUT FILENAME: SUB_B3.OUT
T1 ************************************************************************
T1     DATE: 07/18/1994. 07/21. 07/26. 07/27. 07/28. 08/02. 08/10
T1
T1     ORIGIN OF THIS FILE:
T1        THIS FILE IS COPIED FROM DBB1.DAT ("NORTH AND SOUTH DOMINGO BACA
T1        ARROYOS AND PASEO DEL NORTE CORRIDOR DRAINAGE MANAGEMENT PLAN -BY
T1        RESOURCE TECHNOLOGY. INC. IN DECEMBER 1991")
T1
T1     THIS HEC-2 INPUT FILE COVERS SOUTH BRANCH OF NORTH DOMINGO ARROYO TO THE
T1     WEST I-25 BETWEEN STRUCTURE NOS. 6 AND 7.
T1
T1     STARTING ELEVATIONS USED IN THIS FILE ARE COMPUTED FROM CULVERT CHARTS.
T1
T1     MODIFICATIONS MADE TO THIS FILE AFTER COPYING IT FROM ORIGINAL FILE:
T1        1. CHANGES TO REFLECT EXISTING FIELD CONDITIONS WHEREVER NECESSARY.
T1
T2      FILENAME: SUB_B3.HC2  SUB-CRITICAL  10-YR RETURN PERIOD
T3      NDB-B3(SUB)
J1            2             0                                  5157.18
J2     1            -1                            -1
J3    38     42     66     1     2     3    39     4    43    13
J3    15     26      8           38    43    16    17    18    21
J3    22     53     54    58    33          38    43    10    11
J3    12     25     68    67    69
*
* X-SECTION 80.93 IS UPSTREAM FACE OF CULVERT STRUCTURE NO. 7.
* 1-CMP ARCH CULVERT IS CONVERTED TO BOX CULVERT USING EQUIVALENT CONVEYANCE.
*
NC  .060   .060   .024    0.3    0.3
QT     2    177    281
X1 80.93      4   6350  6360.3
```

```
BT     2    [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]
GR5161.0  6350.0 5153.10  6350.1 5157.10  6360.2  5161.0  6360.3
*
BT     2    177    281
E X1 81.33     45   6332   6396     35     35     35
X3    10
GR5161.2   6096  5161.0   6116  5161.0   6136  5161.1   6156  5161.3   6176
GR5161.5   6196  5161.6   6216  5161.8   6236  5161.8   6256  5161.9   6276
GR5162.1   6296  5162.3   6316  5162.4   6324  5162.4   6328  5162.5   6332
GR5161.6   6336  5160.0   6340  5158.3   6344  5155.3   6348  5153.6   6352
GR5154.5   6356  5157.3   6360  5159.1   6364  5160.9   6368  5162.1   6372
GR5162.2   6376  5162.3   6396  5162.4   6416  5162.4   6436  5162.5   6456
GR5162.7   6476  5162.8   6496  5163.0   6516  5163.2   6536  5163.3   6556
GR5163.5   6576  5163.6   6596  5163.8   6616  5163.9   6636  5163.8   6654
GR5163.4   6674  5163.1   6694  5159.5   6714  5158.7   6718  5158.0   6722
*
NC  .060   .060   .024    0.1    0.3
BT     2    177    281
F X1 81.73     40   6332   6376     30     30     30
X3    10
GR5161.7   6116  5161.6   6136  5161.9   6156  5162.0   6176  5162.1   6196
GR5162.2   6216  5162.4   6236  5162.5   6256  5162.6   6276  5162.8   6296
GR5163.0   6316  5163.1   6324  5163.1   6328  5163.1   6332  5162.0   6336
GR5160.5   6340  5159.0   6344  5157.5   6348  5154.2   6352  5154.1   6356
GR5156.5   6360  5160.1   6364  5161.9   6368  5162.8   6372  5162.8   6376
GR5162.9   6396  5162.9   6416  5163.0   6436  5163.0   6456  5163.0   6476
GR5163.1   6496  5163.2   6516  5163.4   6536  5163.6   6556  5163.6   6576
GR5163.6   6596  5163.7   6616  5163.8   6636  5163.9   6656  5163.8   6676
*
NC  .060   .060   .024    0.1    0.3
BT     2    177    281
G X1 82.72     40   6348   6392    105    105    105
X3    10
GR5163.4   6176  5163.4   6196  5163.4   6216  5163.4   6236  5163.4   6256
GR5163.5   6276  5163.6   6296  5163.7   6316  5163.7   6336  5163.7   6340
GR5163.7   6344  5163.7   6348  5163.8   6352  5162.5   6356  5161.2   6360
GR5159.9   6364  5157.0   6368  5155.8   6372  5156.2   6376  5159.5   6380
GR5161.2   6384  5162.9   6388  5163.5   6392  5163.5   6396  5163.6   6416
GR5163.6   6436  5163.7   6456  5163.8   6476  5163.9   6496  5164.0   6516
GR5164.0   6536  5164.2   6556  5164.2   6576  5164.4   6596  5164.5   6616
GR5164.6   6636  5164.7   6656  5164.8   6676  5164.9   6696  5165.1   6716
*
* X-SECTION 83.42 IS DOWNSTREAM FACE OF CULVERT STRUCTURE NO. 6.
* 2-CMP ARCH CULVERTS ARE CONVERTED TO BOX CULVERTS USING EQUIVALENT CONVEYANCE.
*
NC  .060   .060   .024    0.1    0.5
BT     2    177    281
H X1 83.42      8   6400  6417.5     30     30     30
X3    10
BT     2   6400   5163  5160.6  6417.5   5163  5160.6
GR5163.0  6400.0  5156.2  6400.1  5156.2  6406.6  5160.6  6406.7  5160.6  6410.7
GR5156.2  6410.8  5156.2  6417.4  5163.0  6417.5
EJ
T1      RESOURCE TECHNOLOGY INC., ALBUQUERQUE, NM
T1      CLOMR (SOUTH BRANCH OF NORTH DOMINGO BACA ARROYO, ALBUQUERQUE, NM)
T1      SUBMITTAL TO FEMA  (DATE: AUGUST 1994)
T2      FILENAME: SUB_B3.HC2  SUB-CRITICAL  100-YR RETURN PERIOD
T3      NDB-B3(SUB)
J1   -10      3      0      0              0      0      0 5159.10      0
J2     2      0     -1      0      0       0     -1      0      0      0


ER
```

THIS RUN EXECUTED 13AUG94 12:26:26

```
**************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2:  May 1991
**************************************
```

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

NDB-B3(SUB)

SUMMARY PRINTOUT

	SECNO	ELMIN	CUMDS	CWSEL	CRIWS	EG	XLCH	TOPWID	Q	QLOB	QROB	VCH	DEP
	80.930	5153.10	0.00	5157.18	5155.22	5157.48	0.00	10.20	177.00	0.00	0.00	4.36	4.
	80.930	5153.10	0.00	5158.70	5155.97	5159.44	0.00	10.24	281.00	0.00	0.00	6.92	5.
	81.330	5153.60	35.00	5157.14	5156.59	5157.66	35.00	14.22	177.00	0.00	0.00	5.83	3.
*	81.330	5153.60	35.00	5159.44	5157.32	5159.67	35.00	23.45	281.00	0.00	0.00	3.85	5.
	81.730	5154.10	65.00	5157.06	5156.94	5157.91	30.00	12.11	177.00	0.00	0.00	7.40	2.
	81.730	5154.10	65.00	5159.41	5157.72	5159.74	30.00	20.35	281.00	0.00	0.00	4.58	5.
*	82.720	5155.80	170.00	5159.50	5158.50	5159.41	105.00	12.85	177.00	0.00	0.00	7.66	2.
*	82.720	5155.80	170.00	5159.20	5159.20	5160.34	105.00	14.67	281.00	0.00	0.00	8.57	3.
*	83.420	5156.20	200.00	5159.31	5157.97	5159.60	30.00	13.33	177.00	0.00	0.00	4.31	3.
*	83.420	5156.20	200.00	5160.10	5158.61	5160.56	30.00	13.39	281.00	0.00	0.00	5.44	3.

NDB-62-SUB)

SUMMARY PRINTOUT

	SECNO	Q	K*XNL	K*XNCH	K*XNR	STCHL	STCHR	SSTA	ENDST	KRATIO	K*CHSL
	80.930	177.00	0.00	24.00	0.00	6350.00	6360.30	6350.05	6360.25	0.00	0.00
	80.930	281.00	0.00	24.00	0.00	6350.00	6360.30	6350.03	6360.27	0.00	0.00
	81.330	177.00	0.00	24.00	0.00	6332.00	6376.00	6345.55	6359.77	0.90	14.29
*	81.330	281.00	0.00	24.00	0.00	6332.00	6376.00	6341.31	6364.76	2.78	14.29
	81.730	177.00	0.00	24.00	0.00	6332.00	6376.00	6348.52	6360.63	0.74	16.67
	81.730	281.00	0.00	24.00	0.00	6332.00	6376.00	6342.89	6363.24	0.31	16.67
*	82.720	177.00	0.00	24.00	0.00	6348.00	6392.00	6365.94	6378.78	0.93	16.19
*	82.720	281.00	0.00	24.00	0.00	6348.00	6392.00	6364.97	6379.64	0.44	16.19
*	83.420	177.00	0.00	24.00	0.00	6400.00	6417.50	6400.05	6417.45	1.77	13.35
*	83.420	281.00	0.00	24.00	0.00	6400.00	6417.50	6400.04	6417.46	1.48	13.35

NDB-B3(SUB)

SUMMARY PRINTOUT

	SECNO	Q	HV	HL	DLOSS	AREA	FRCH	SHEAR	POWER
	80.930	177.00	0.30	0.00	0.00	40.60	0.39	0.76	3.32
	80.930	281.00	0.74	0.00	0.00	40.60	0.61	1.91	13.22
	81.330	177.00	0.53	0.12	0.07	30.34	0.70	0.51	2.97
*	81.330	281.00	0.23	0.08	0.15	72.94	0.38	0.19	0.75
	81.730	177.00	0.85	0.15	0.10	23.92	0.93	0.86	6.39
	81.730	281.00	0.33	0.04	0.03	51.40	0.46	0.29	1.32
*	82.720	177.00	0.91	0.79	0.02	23.11	1.01	0.91	6.97
*	82.720	281.00	1.14	0.31	0.24	32.79	1.01	1.08	9.28
*	83.420	177.00	0.29	0.13	0.06	41.05	0.49	0.38	1.63
*	83.420	281.00	0.46	0.15	0.07	51.62	0.56	0.65	3.56

SUMMARY OF ERRORS AND SPECIAL NOTES

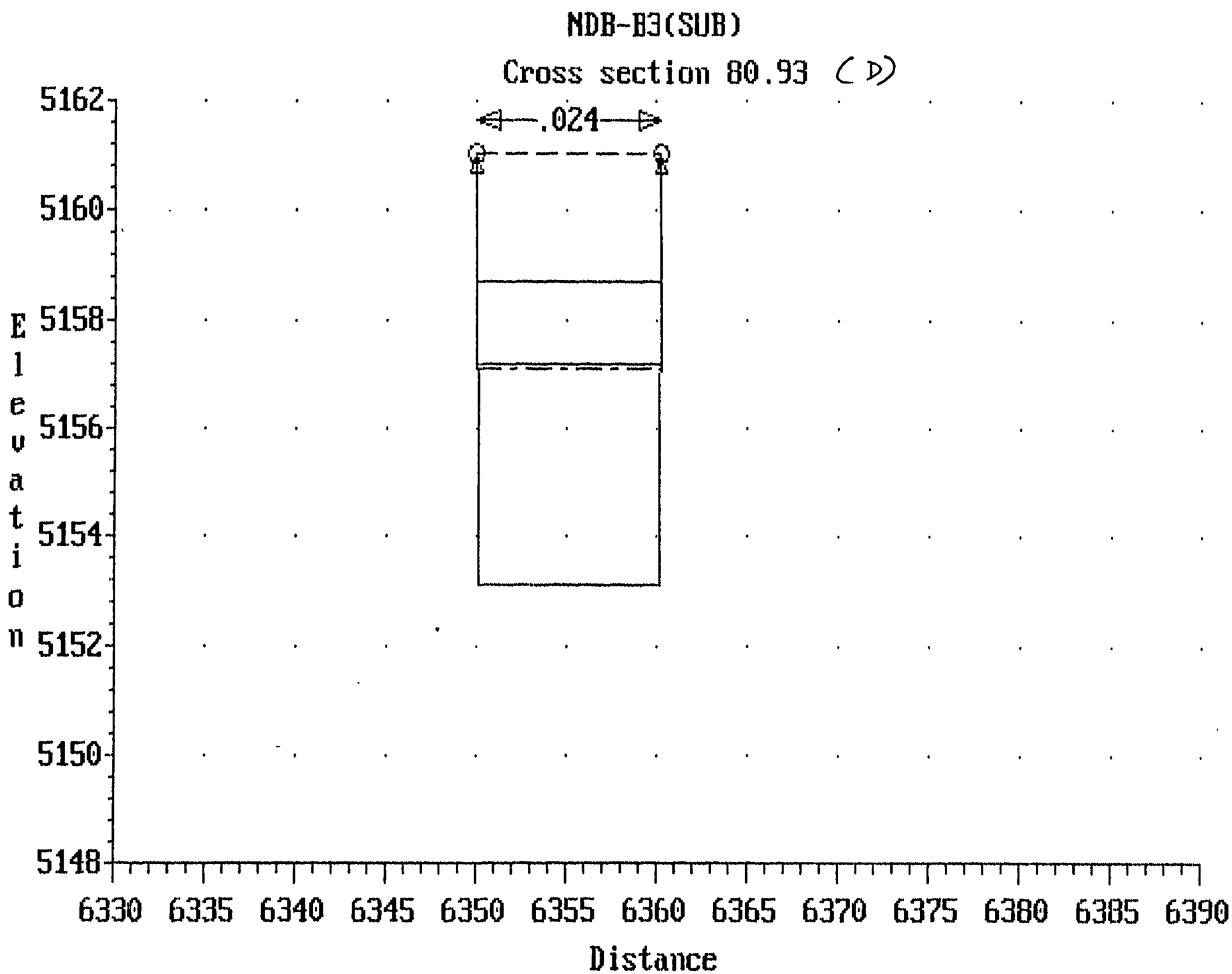
```
WARNING SECNO=     81.330  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=     82.720  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     82.720  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     82.720  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     82.720  PROFILE=  2  MINIMUM SPECIFIC ENERGY

WARNING SECNO=     83.420  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=     83.420  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
```

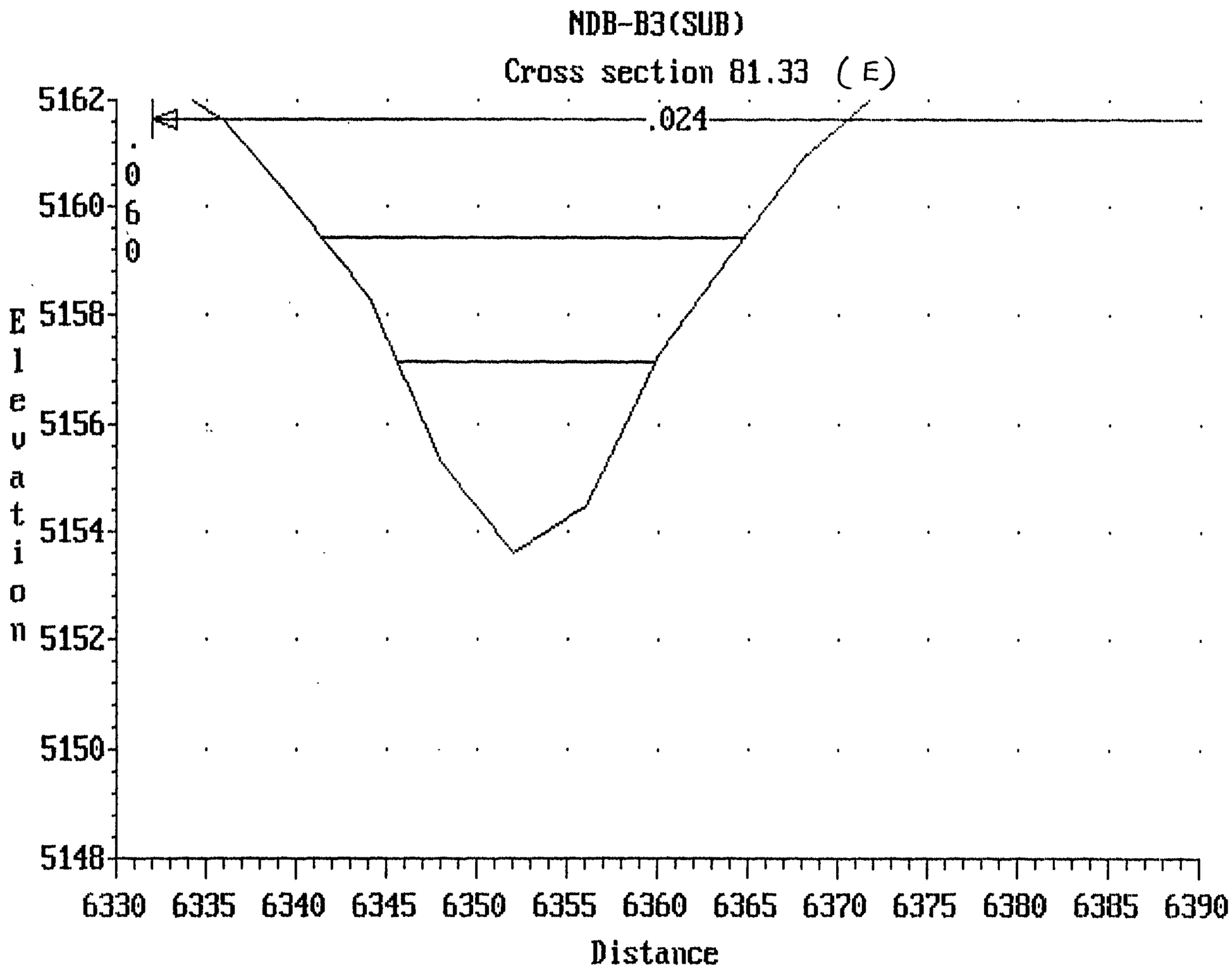
Resource Technology

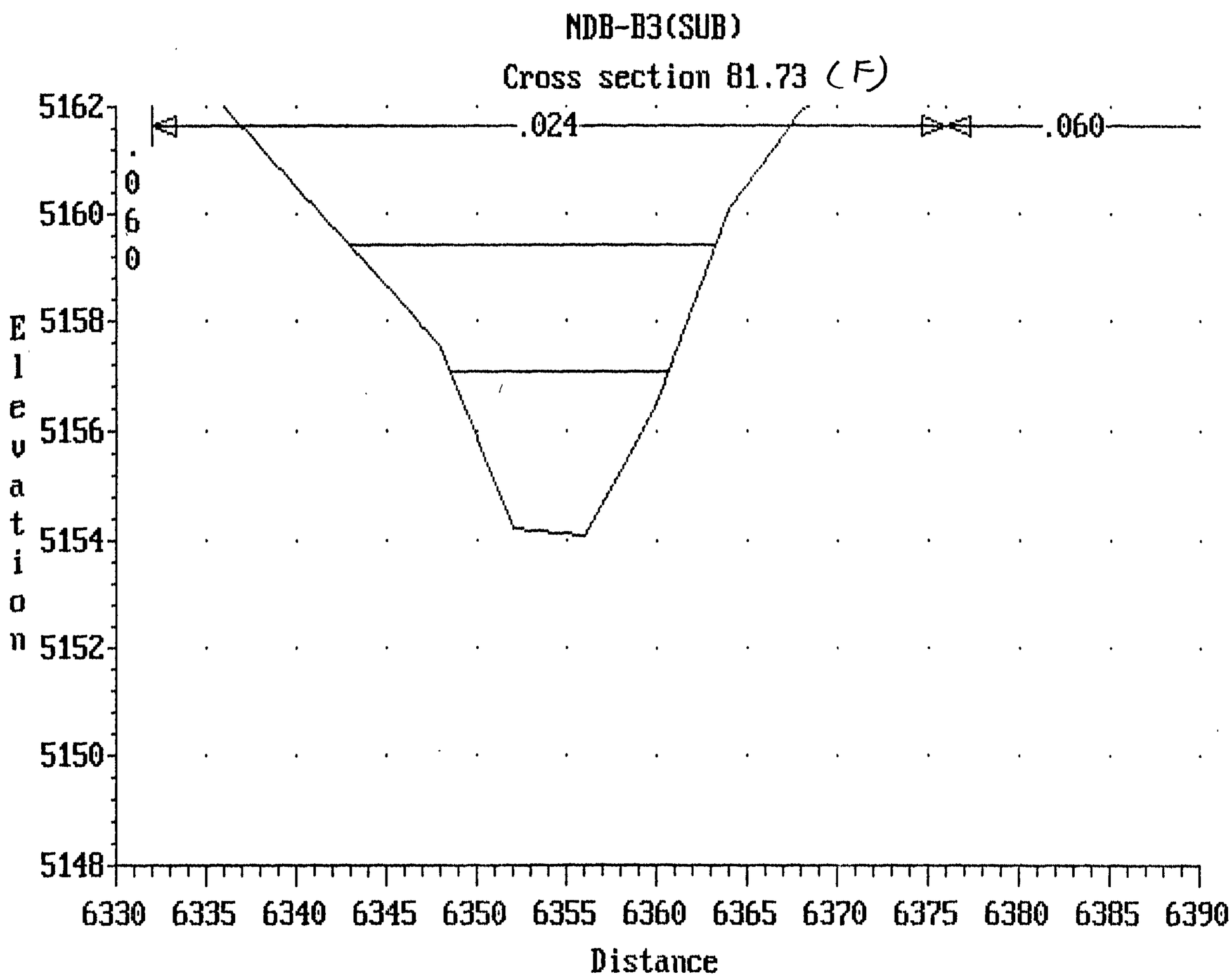
CROSS-SECTION PLOT PARAMATERS

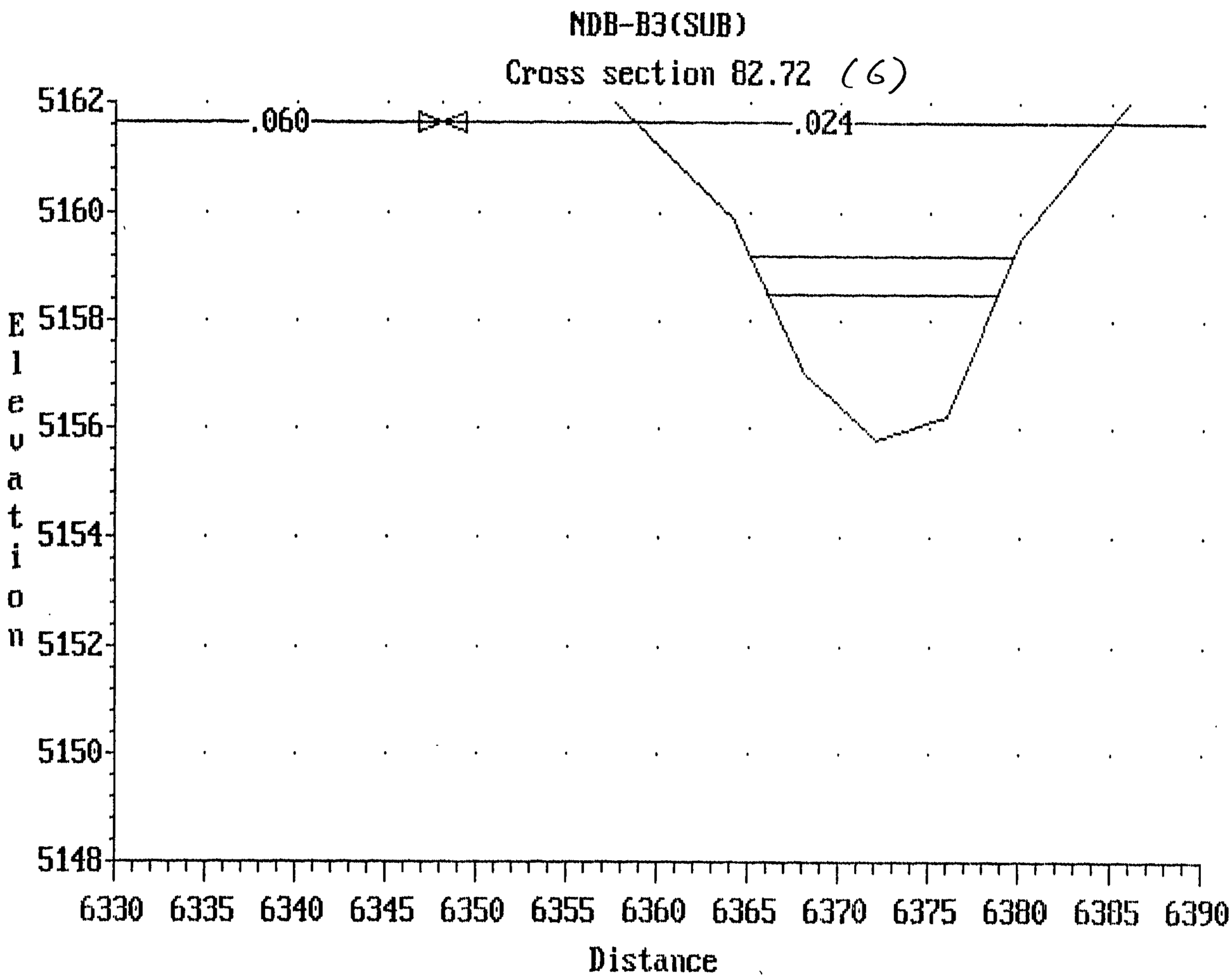
AREA Between structures Nos. 7 & 6 ARROYO "B" or South Branch DATE 08/24/94

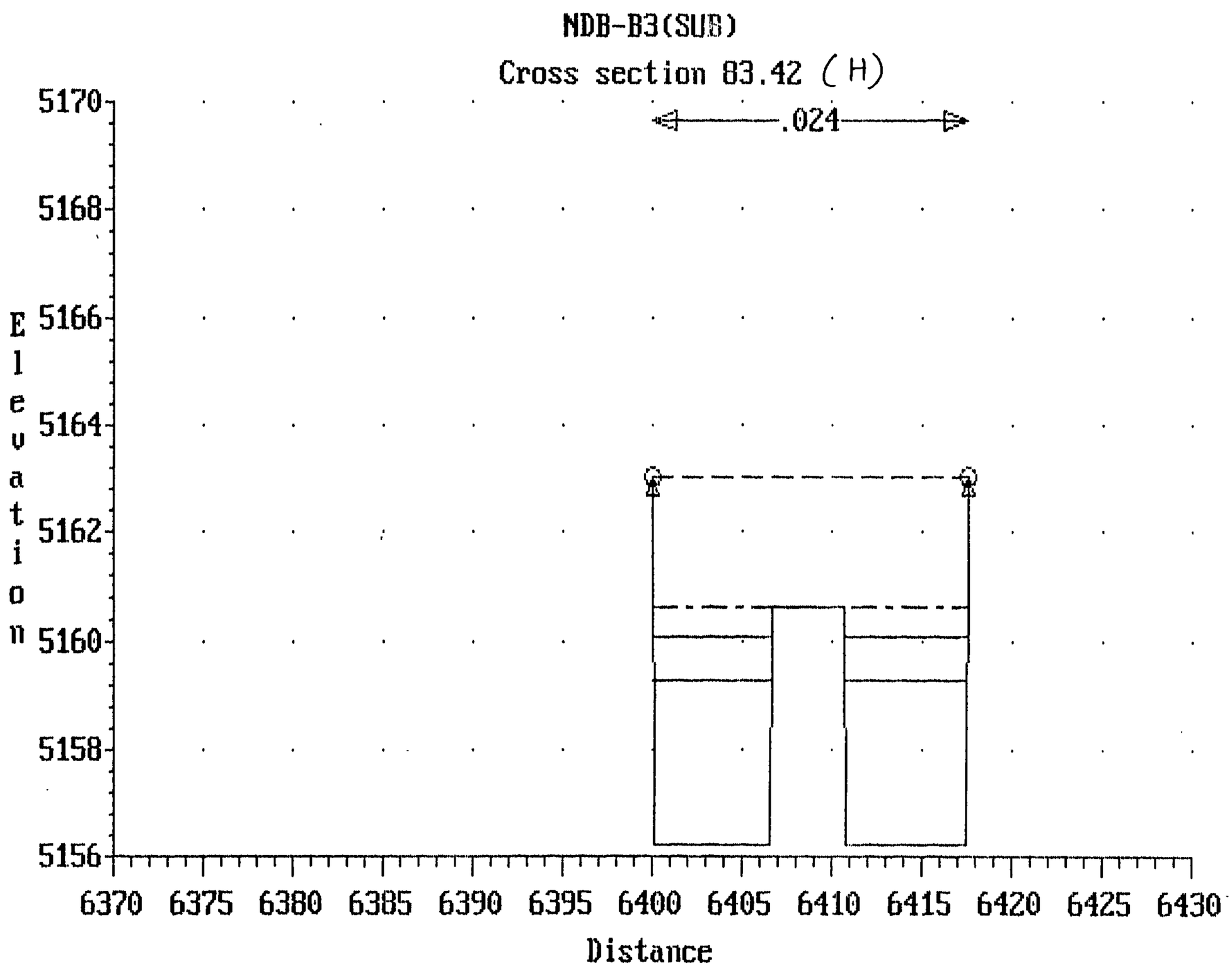
X-SEC. LETTER	X-SEC. NO.	X RANGE	X BEGIN	X END	Y RANGE	Y BEGIN	Y END
D	80.93	11	6350	6361	10	5152	5162
E	81.33	60	6325	6385	7	5153	5160
F	81.73	60	6320	6380	6	5154	5160
G	82.72	50	6350	6400	5	5155	5160
H	83.42	18	6400	6418	7	5156	5163


NDB-B3(SUB)
Cross section 80.93 (D)
.024
5162
5160
5158
5156
5154
5152
5150
5148
Elevation
6330
6335
6340
6345
6350
6355
6360
6365
6370
6375
6380
6385
6390
Distance


NDB-B3(SUB)
Cross section 81.33 (E)
.024
.060
5162
5160
5158
5156
5154
5152
5150
5148
Elevation
6330
6335
6340
6345
6350
6355
6360
6365
6370
6375
6380
6385
6390
Distance


NDB-B3(SUB)
Cross section 81.73 (F)
.024
.060
.060
5162
5160
5158
5156
5154
5152
5150
5148
Elevation
6330
6335
6340
6345
6350
6355
6360
6365
6370
6375
6380
6385
6390
Distance


NDB-B3(SUB)
Cross section 82.72 (6)
.060
.024
5162
5160
5158
5156
5154
5152
5150
5148
Elevation
6330
6335
6340
6345
6350
6355
6360
6365
6370
6375
6380
6385
6390
Distance


NDB-B3(SUB)
Cross section 83.42 (H)
.024
5170
5168
5166
5164
5162
5160
5158
5156
Elevation
6370
6375
6380
6385
6390
6395
6400
6405
6410
6415
6420
6425
6430
Distance

RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

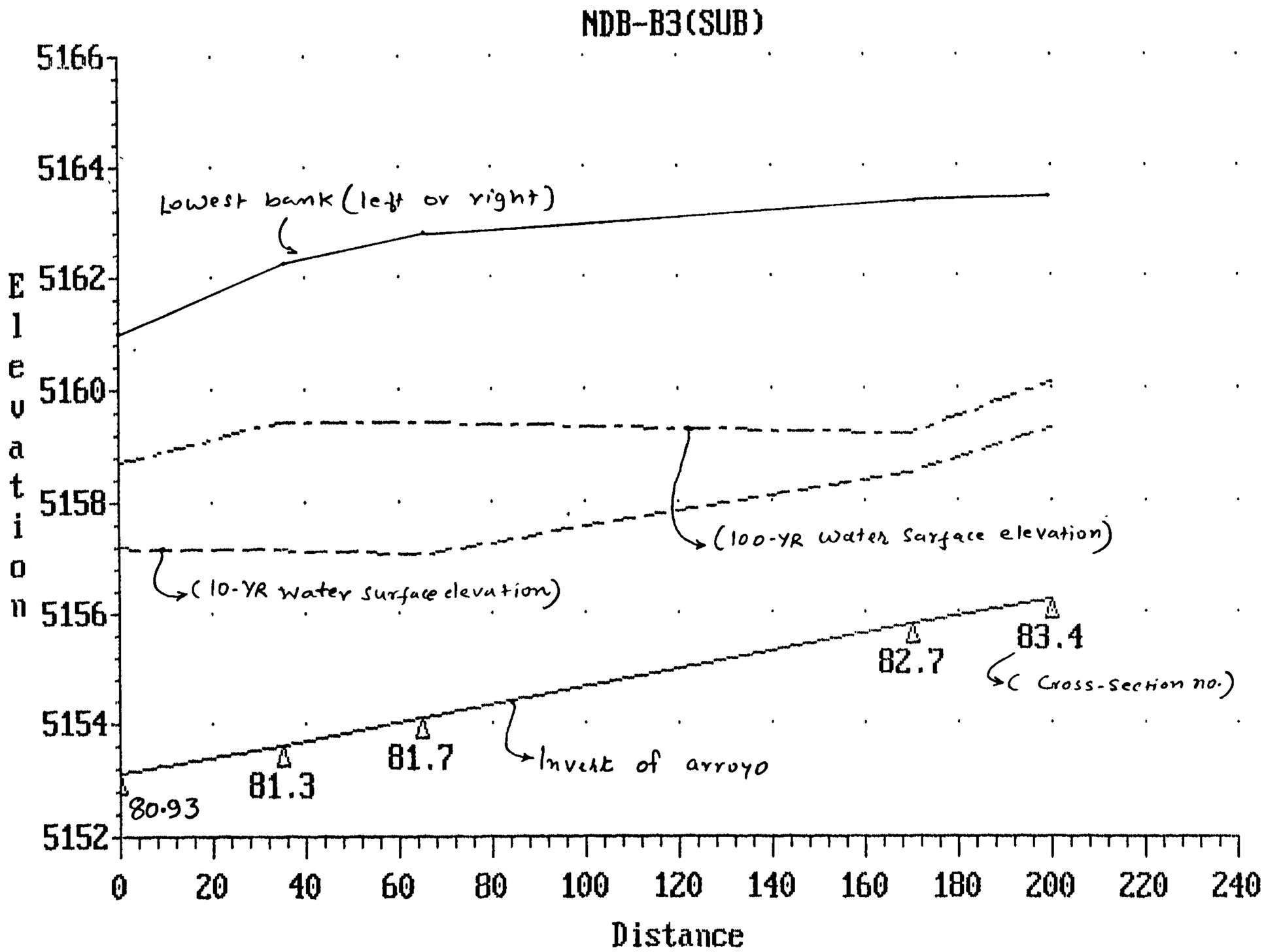
CHECKED _____ DATE _____
APPROVED _____ DATE _____
TITLE _____

PROJECT NO. _____
SHEET _____ OF _____
BY _____ DATE _____

PROFILES

ARROYO: "B" OR SOUTH BRANCH

REACH: BETWEEN STRUCTURES 6 & 7


NDB-B3(SUB)
5166
5164
5162
5160
5158
5156
5154
5152
Elevation
Lowest bank (left or right)
(100-YR water surface elevation)
(10-YR water surface elevation)
83.4
82.7
81.7
81.3
80.93
(Cross-section no.)
Invert of arroyo
0
20
40
60
80
100
120
140
160
180
200
220
240
Distance

RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

CHECKED _____ DATE _____
APPROVED _____ DATE _____
TITLE _____

PROJECT NO. _____
SHEET _____ OF _____
BY _____ DATE _____

HEC-2 INPUT FILE, SUMMAR TABLES & CROSS SECTION PLOTS

FOR ARROYO "B" or SOUTH BRANCH

(WEST OF I-25; DOWNSTREAM OF STRUCTURE NO. 7)

(SUPER-CRITICAL)

```
T1
T1     HEC-2 FILENAME:   NDBCL_B4.HC2
T1          10-YR & 100-YR DISCHARGES. EXISTING CONDITIONS)
T1
T1 ************************************************************************
T1    RTI PROJECT NO.    94-200-1 (TASK 3)
T1
T1    PURPOSE: SUBMITTAL OF CLOMR FOR NORTH DOMINGO ARROYO (IN ALBUQUERQUE. NM)
T1             FROM LOWER NORTH DOMINGO BACA DETENTION DAM TILL IT MEETS WITH
T1             SOUTH DOMINGO BACA ARROYO WEST OF I-25.
T1
T1    FLOODING SOURCE:   NORTH DOMINGO BACA ARROYO (SOUTH BRANCH)
T1
T1    CLIENT:          ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY
T1                     (AMAFCA)
T1                     2600 PROSPECT. NE
T1                     ALBUQUERQUE. NM 87107
T1
T1    CONSULTANTS:     RESOURCE TECHNOLOGY. INC.
T1                     2129. OSUNA RD. NE. SUITE 200
T1                     ALBUQUERQUE. NM 87113
T1                     PH: (505)345-3115
T1                     FAX: (505)345-4132
T1
T1    FINAL MODEL RUN DATE:  00/00/1994
T1
T1    INPUT FILENAME:  NDBCL_B4.HC2
T1    OUTPUT FILENAME: NDBCL_B4.OUT
T1 ************************************************************************
T1     DATE: 07/18/1994. 07/21. 07/26. 07/27. 07/28. 08/02. 08/10
T1
T1     ORIGIN OF THIS FILE:
T1        THIS FILE IS COPIED FROM DBB1.DAT ("NORTH AND SOUTH DOMINGO BACA
T1        ARROYOS AND PASEO DEL NORTE CORRIDOR DRAINAGE MANAGEMENT PLAN -BY
T1        RESOURCE TECHNOLOGY. INC. IN DECEMBER 1991")
T1
T1     STARTING WATER SURFACE ELEVATIONS IN THIS FILE ARE CRITICAL COMPUTED
T1     WATER DEPTHS FROM CULVERT CHARTS. (MORE REALISTIC CRITICAL WATER DEPTHS
T1     ARE CALCULATED SO AS AVOID ERRORS IN CRITICAL DEPTH COMPUTATIONS
T1     BY HEC-2 FOR DOWNSTREAM FACE X-SECTION OF CULVERT STRUCTURE NO. 7)
T1
T1     MODIFICATIONS MADE TO THIS FILE AFTER COPYING IT FROM ORIGINAL FILE:
T1        1. CHANGES TO REFLECT EXISTING FIELD CONDITIONS WHEREVER NECESSARY.
T1
T2      FILENAME: NDBCL_B4.HC2  SUPER-CRITICAL  10-YR RETURN PERIOD
T3      NDB-B4
J1     0      2      0      1     -1      0      0      0 5154.91      0
J2     1      0     -1      0      0      0     -1      0      0      0
J3    38     42     66      1      2      3     39      4     43     13
J3    15     26      8             38     43     16     17     18     21
J3    22     53     54     58     33            38     43     10     11
J3    12     25     68     67     69
*
* X-SECTION 80.44 IS UPSTREAM FACE OF CULVERT STRUCTURE NO. 7.
* 1-CMP ARCH CULVERT IS CONVERTED TO BOX CULVERT USING EQUIVALENT CONVEYANCE.
*
NC  .060   .060   .024    0.1    0.5
QT     2   177    281
X1 80.44     4   6350  6360.3     10     10     10
```

```
BT     2    3360    2181   5158.4   5160.3    2181   5158.4
GR5161.0  6350.0 5152.90  6350.1 5152.90  6360.2  5161.0  6360.3
*
NC  .060    .060    .024     0.1     0.3
BT     2     177     281
X1 80.34      50    6328    6376      45      45      45
X3    10
GR5159.4    6056  5159.5    6076  5159.6    6096  5159.6    6116  5159.7    6136
GR5159.7    6156  5159.8    6176  5159.8    6196  5159.9    6216  5160.1    6236
GR5160.3    6256  5160.4    6276  5160.5    6296  5160.3    6316  5160.2    6324
GR5160.1    6328  5160.0    6332  5159.4    6336  5157.7    6340  5156.1    6344
GR5154.3    6348  5152.7    6352  5152.7    6356  5161.0    6376  5161.1    6396
GR5161.0    6414  5160.8    6434  5160.4    6454  5160.2    6458  5159.4    6462
GR5157.1    6474  5153.4    6494  5153.5    6502  5153.5    6506  5153.9    6510
GR5154.5    6514  5155.0    6518  5155.5    6522  5156.0    6526  5156.2    6530
GR5155.9    6534  5154.0    6554  5153.5    6574  5153.0    6594  5152.4    6614
GR5151.8    6634  5151.3    6654  5150.8    6674  5150.9    6694  5150.6    6714
*
* X-SECTION 79.84 IS BEFORE CONFLUENCE OF NORTH AND SOUTH BRANCHES OF NORTH
* DOMINGO BACA ARROYO.
*
BT     2     177     281
X1 79.84      55    6328    6380      90      90      90
X3    10
GR5158.5    5976  5158.5    5996  5158.5    6016  5158.6    6036  5158.7    6056
GR5158.8    6076  5158.9    6096  5159.0    6116  5159.1    6136  5159.3    6156
GR5159.4    6176  5159.4    6196  5159.5    6216  5159.6    6236  5159.7    6256
GR5159.7    6276  5159.8    6296  5159.9    6316  5160.0    6320  5160.0    6324
GR5160.0    6328  5160.1    6332  5158.6    6336  5155.5    6344  5153.8    6348
GR5152.1    6352  5151.7    6356  5159.1    6376  5160.1    6380  5160.1    6381
GR5159.6    6385  5158.9    6389  5158.1    6393  5154.1    6413  5153.2    6417
GR5152.5    6421  5152.6    6425  5152.6    6429  5152.6    6433  5152.8    6437
GR5155.3    6453  5155.6    6457  5155.3    6461  5154.9    6465  5154.2    6473
GR5153.6    6493  5153.1    6513  5152.4    6533  5151.7    6553  5151.0    6573
GR5150.3    6593  5149.9    6613  5149.6    6633  5149.4    6653  5149.2    6673
*
EJ
T1      RESOURCE TECHNOLOGY INC.. ALBUQUERQUE. NM
T1      CLOMR (SOUTH BRANCH OF NORTH DOMINGO BACA ARROYO. ALBUQUERQUE. NM)
T1      SUBMITTAL TO FEMA  (DATE: AUGUST. 1994)
T2      FILENAME: NDBCL_B4.HC2  SUPER-CRITICAL  100-YR RETURN PERIOD
T3      NDB-B4
J1   -10      3      0      1     -1      0      0      0 5155.61      0
J2     2      0     -1      0      0      0     -1      0      0      0


ER
```

B

A

THIS RUN EXECUTED 13AUG94 16:57:43

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

NDB-B4

SUMMARY PRINTOUT

	SECNO	ELMIN	CUMDS	CWSEL	CRIWS	EG	XLCH	TOPWID	Q	QLOB	QROB	VCH	DEP
*	80.440	5152.90	145.00	5155.01	5155.01	5156.08	0.00	10.15	177.00	0.00	0.00	8.28	2.
*	80.440	5152.90	145.00	5155.77	5155.77	5157.22	0.00	10.17	281.00	0.00	0.00	9.65	2.
*	80.340	5152.70	135.00	5155.18	5155.18	5155.96	10.00	15.95	177.00	0.00	0.00	7.09	2.
	80.340	5152.70	135.00	5155.26	5155.79	5157.05	10.00	16.29	281.00	0.00	0.00	10.75	2.
*	79.840	5151.70	90.00	5153.88	5154.33	5155.37	45.00	14.09	177.00	0.00	0.00	9.79	2.
	79.840	5151.70	90.00	5154.39	5154.95	5156.23	45.00	16.62	281.00	0.00	0.00	10.90	2.

NDB-B4

SUMMARY PRINTOUT

	SECND	Q	K*XNL	K*XNCH	K*XNR	STCHL	STCHR	SSTA	ENDST	KRATIO	K*CHSL
*	80.440	177.00	0.00	24.00	0.00	6350.00	6360.30	6350.07	6360.23	0.00	0.00
*	80.440	281.00	0.00	24.00	0.00	6350.00	6360.30	6350.06	6360.24	0.00	0.00
*	80.340	177.00	0.00	24.00	0.00	6329.00	6376.00	6346.04	6361.98	1.98	-19.97
	80.340	281.00	0.00	24.00	0.00	6329.00	6376.00	6345.87	6362.16	1.27	-19.97
*	79.840	177.00	0.00	24.00	0.00	6328.00	6380.00	6347.81	6361.90	1.57	-22.22
	79.840	281.00	0.00	24.00	0.00	6328.00	6380.00	6346.63	6363.25	1.04	-22.22

NDB-B4

SUMMARY PRINTOUT

	SECNO	Q	HV	HL	GLOSS	AREA	FRCH	SHEAR	POWER
*	80.440	177.00	1.07	0.00	0.00	21.37	1.01	1.38	11.42
*	80.440	281.00	1.45	0.00	0.00	29.12	1.00	1.93	18.59
*	80.340	177.00	0.78	0.09	0.25	24.97	1.00	0.76	5.41
	80.340	281.00	1.79	0.13	0.03	26.15	1.49	1.74	18.71
*	79.840	177.00	1.49	0.52	0.07	18.09	1.52	1.54	15.07
	79.240	281.00	1.85	0.81	0.01	25.77	1.54	1.60	19.65

SUMMARY OF ERRORS AND SPECIAL NOTES

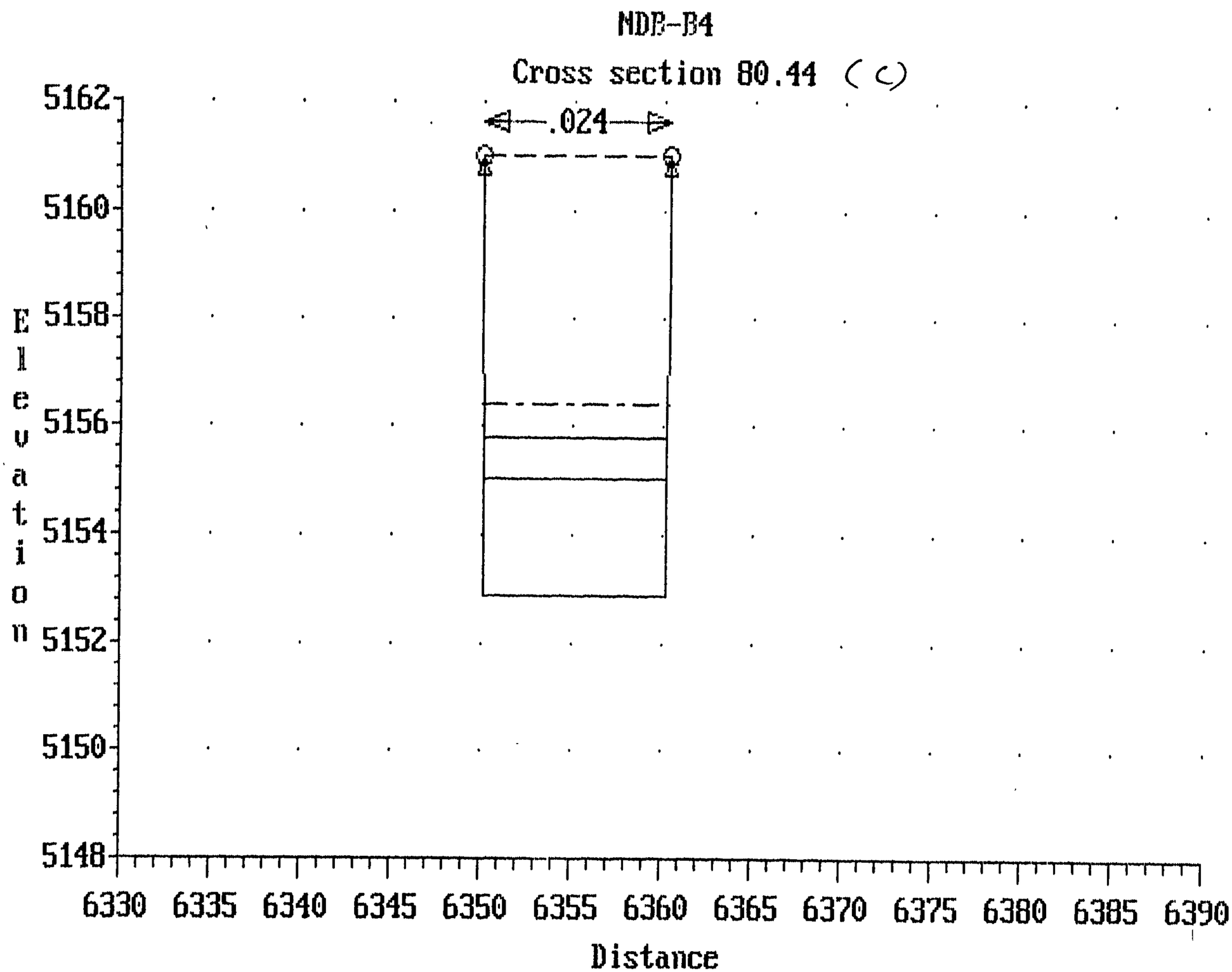
```
CAUTION SECNO=     80.440  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     80.440  PROFILE=  2  CRITICAL DEPTH ASSUMED

CAUTION SECNO=     80.340  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     80.340  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     80.340  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO=     79.840  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
```

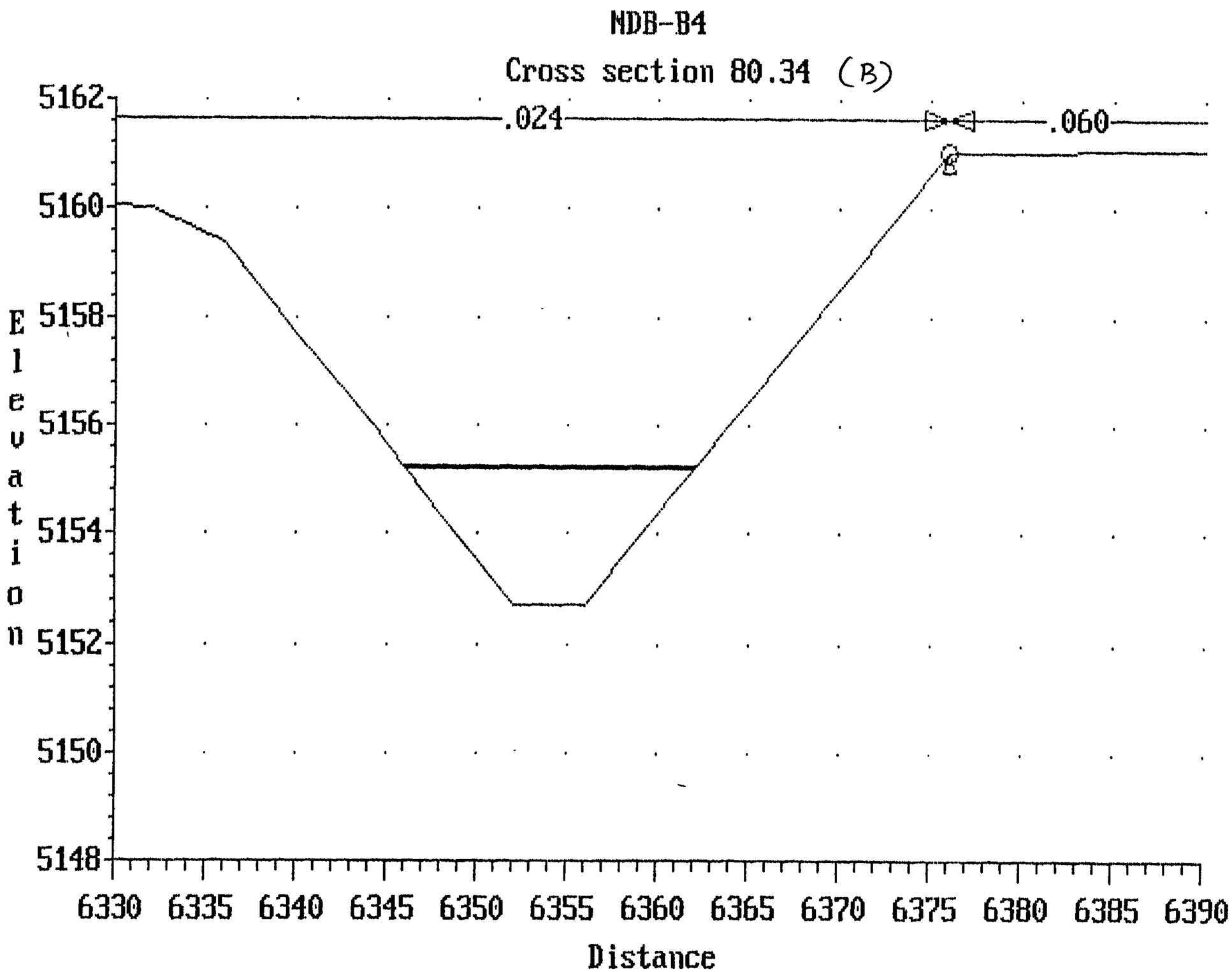
Resource Technology

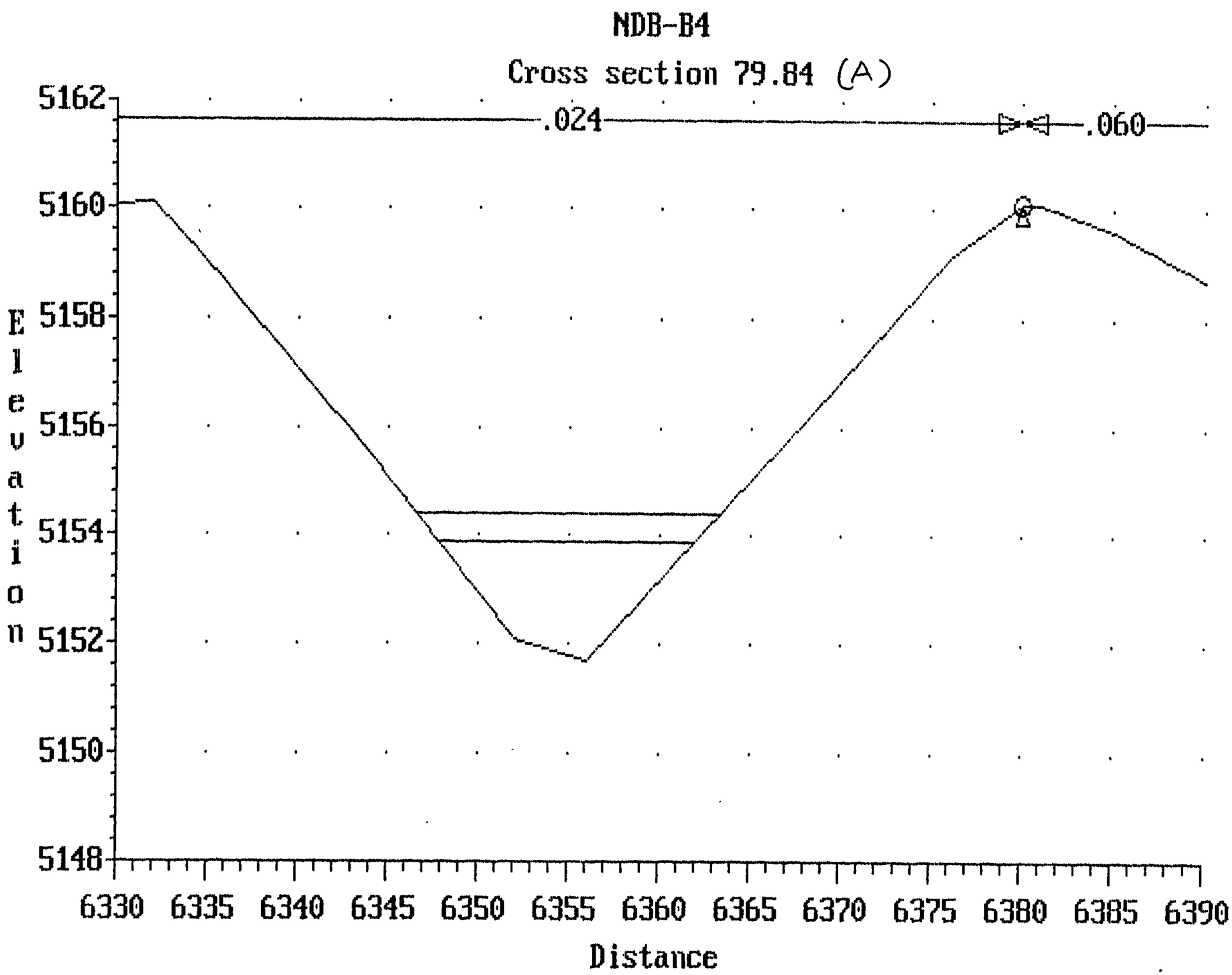
CROSS-SECTION PLOT PARAMATERS

AREA Downs beam of structure ⑦ and before meeting with "North Branch" or Arroyo A ARROYO "B" or South Branch DATE 08/24/94

X-SEC. LETTER	X-SEC. NO.	X RANGE	X BEGIN	X END	Y RANGE	Y BEGIN	Y END
C	80.44	11	6350	6361	10	5152	5162
B	80.34	60	6320	6380	6	5152	5158
A	79.84	60	6310	6370	5	5151	5156


MDB-B4
Cross section 80.44 (c)
.024
5162
5160
5158
5156
5154
5152
5150
5148
Elevation
6330
6335
6340
6345
6350
6355
6360
6365
6370
6375
6380
6385
6390
Distance


MDB-B4
Cross section 80.34 (B)
.024
.060
5162
5160
5158
5156
5154
5152
5150
5148
Elevation
6330
6335
6340
6345
6350
6355
6360
6365
6370
6375
6380
6385
6390
Distance


NDB-B4
Cross section 79.84 (A)
.024
.060
5162
5160
5158
5156
5154
5152
5150
5148
Elevation
6330
6335
6340
6345
6350
6355
6360
6365
6370
6375
6380
6385
6390
Distance

RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

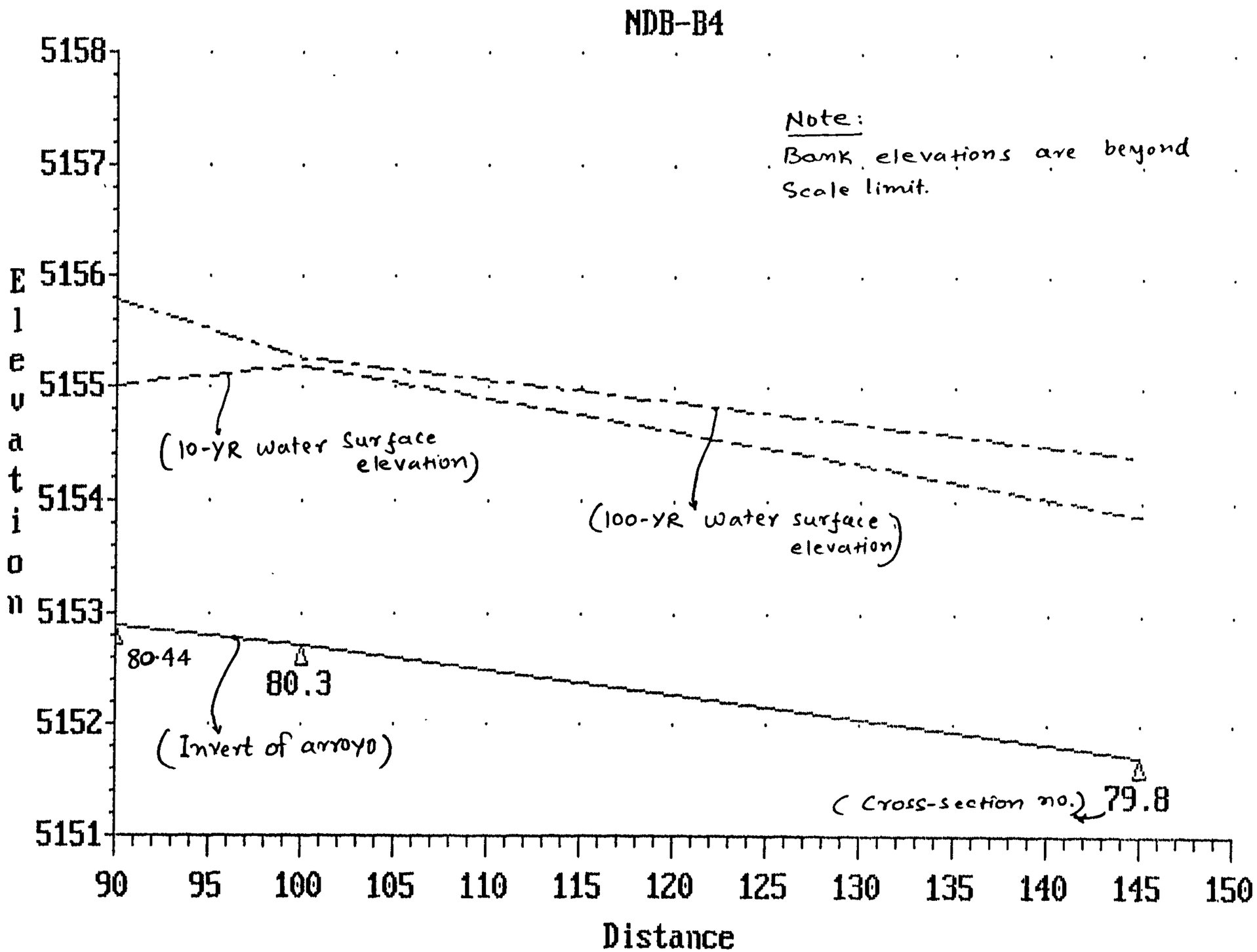
CHECKED _____ DATE _____
APPROVED _____ DATE _____
TITLE _____

PROJECT NO. _____
SHEET _____ OF _____
BY _____ DATE _____

PROFILES

ARROYO: "B" OR SOUTH BRANCH

REACH: BETWEEN STRUCTURE NO. 7 AND CONFLUENCE OF NORTH ("A") AND SOUTH ("B") BRANCHES


NDB-B4
Note:
Bank elevations are beyond Scale limit.
(10-YR water surface elevation)
(100-YR water surface elevation)
80.44
80.3
(Invert of arroyo)
(Cross-section no.) 79.8
Elevation
5158
5157
5156
5155
5154
5153
5152
5151
90
95
100
105
110
115
120
125
130
135
140
145
150
Distance

RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

CHECKED _____ DATE _____ PROJECT NO. _____

APPROVED _____ DATE _____ SHEET _____ OF _____

TITLE _____ BY _____ DATE _____

HEC-2 INPUT FILE, SUMMARY TABLES & CROSS SECTION PLOTS FOR ARROYO "C" ON SOUTH BRANCH TRIBUTARY (SUPER-CRITICAL)

```
T1
T1     -EE-I FILENAME:   NDBCL_C.HC2
T1         (10-YR & 100-YR DISCHARGES. EXISTING CONDITIONS)
T1
T1 ***********************************************************************
T1    RTI PROJECT NO.    94-200-1 (TASK 3)
T1
T1    PURPOSE: SUBMITTAL OF CLOMR FOR NORTH DOMINGO ARROYO (IN ALBUQUERQUE, NM)
T1             FROM LOWER NORTH DOMINGO BACA DETENTION DAM TILL IT MEETS WITH
T1             SOUTH DOMINGO BACA ARROYO WEST OF I-25.
T1
T1    FLOODING SOURCE:  TRIBUTARY TO SOUTH BRANCH OF NORTH DOMINGO BACA ARROYO
T1
T1    CLIENT:          ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY
T1                     (AMAFCA)
T1                     2600 PROSPECT, NE
T1                     ALBUQUERQUE, NM 87107
T1
T1    CONSULTANTS:     RESOURCE TECHNOLOGY, INC.
T1                     2129, OSUNA RD. NE, SUITE 200
T1                     ALBUQUERQUE, NM 87113
T1                     PH: (505)345-3115
T1                     FAX: (505)345-4132
T1
T1    FINAL MODEL RUN DATE:  00/00/1994
T1
T1    INPUT FILENAME:  NDBCL_C.HC2
T1    OUTPUT FILENAME: NDBCL_C.OUT
T1 ***********************************************************************
T1     DATE: 07/18/1994, 07/21, 07/26, 07/27, 07/28, 08/02, 08/10
T1
T1     ORIGIN OF THIS FILE:
T1        THIS FILE IS COPIED FROM DRC1.DAT ("NORTH AND SOUTH DOMINGO BACA
T1        ARROYOS AND PASEO DEL NORTE CORRIDOR DRAINAGE MANAGEMENT PLAN -BY
T1        RESOURCE TECHNOLOGY, INC. IN DECEMBER 1991")
T1
T1     THIS HEC-2 INPUT FILE COVERS TRIBUTARY TO SOUTH BRANCH OF NORTH DOMINGO
T1     BACA ARROYO FROM APPROXIMATELY 300 FT UPSTREAM OF LOUISIANA BLVD. TILL
T1     TRIBUTARY CONFLUENCE WITH SOUTH BRANCH OF NORTH DOMINGO BACA ARROYO.
T1
T1        1. CHANGES TO REFLECT EXISTING FIELD CONDITIONS WHEREVER NECESSARY.
T1
T2      FILENAME: NDBCL_C.HC2  SUPER-CRITICAL  10-YR RETURN PERIOD
T3      NDB-C
J1     0      2      0      1     -1      0      0      0 5304.5      0
J2     1      0     -1      0      0      0     -1      0      0      0
J3    38     42     66      1      2      3     39      4     43     13
J3    15     26      8             38     43     16     17     18     21
J3    22     53     54     58     33            38     43     10     11
J3    12     25     68     67     69
*
NC  .035   .035   .030     .1     .3
QT     2     26     66
X13140.0     76   5800   5924    220    220    220
X3    10
GR5322.5   5284 5321.9   5304 5322.1   5324 5322.0   5344 5320.4   5364
GR5320.1   5368 5320.0   5372 5320.1   5376 5320.5   5384 5321.5   5404
GR5321.5   5408 5320.8   5412 5320.2   5416 5318.9   5424 5318.3   5428
GR5317.8   5432 5317.3   5436 5317.8   5440 5318.3   5444 5320.2   5464
```

```
GR5321.8    5246  5321.6    5282  5321.5    5286  5321.4    5306  5321.3    5324
GR5321.3    5364  5321.7    5404  5321.6    5424  5321.2    5444  5320.8    5464
GR5320.5    5484  5320.4    5504  5320.3    5524  5320.2    5544  5320.1    5564
GR5320.0    5584  5319.6    5600  5319.4    5604  5317.5    5624  5317.0    5632
GR5316.9    5636  5317.0    5644  5317.5    5664  5317.2    5684  5317.0    5688
GR5316.9    5692  5316.7    5696  5317.2    5900  5317.7    5904  5318.2    5908
GR5318.4    5912  5318.7    5924  5318.7    5944  5318.1    5964  5317.7    5984
GR5318.4    6004  5318.8    6024  5319.2    6044  5318.8    6064  5317.6    6072
GR5317.2    6076  5317.3    6080  5317.4    6084  5318.4    6096  5318.4    6100
GR5318.2    6104  5317.8    6124  5317.9    6144  5317.5    6164  5317.2    6184
GR5317.0    6204
*
NC  .035    .025    .030     .1      .3
X13138.0      58    5772    5960      60      60      60
X3    10
GR5316.3    5340  5316.2    5360  5314.6    5380  5312.9    5400  5312.0    5420
GR5311.8    5428  5311.8    5432  5312.2    5440  5313.2    5460  5314.5    5480
GR5315.1    5500  5315.3    5520  5315.2    5540  5314.9    5544  5314.7    5548
GR5314.8    5552  5315.4    5560  5314.8    5580  5314.9    5600  5315.1    5620
GR5315.3    5640  5315.6    5660  5315.5    5680  5315.6    5700  5315.6    5720
GR5315.6    5740  5315.4    5760  5315.4    5764  5315.4    5768  5315.3    5772
GR5314.7    5776  5314.0    5780  5313.1    5784  5312.3    5788  5311.7    5792
GR5311.2    5796  5311.2    5800  5311.5    5820  5310.9    5840  5310.4    5860
GR5310.5    5880  5311.1    5900  5311.9    5920  5312.7    5940  5312.7    5960
GR5312.6    5980  5312.5    6000  5312.4    6020  5312.0    6040  5311.5    6060
GR5310.5    6080  5311.7    6092  5311.7    6096  5311.6    6100  5310.9    6120
GR5311.3    6140  5311.2    6160  5311.0    6180
*
* UPSTREAM OF LOUISIANA
*
NC  .020    .020    .020     .1      .3
X13137.8      51    5764    5980      18      18      18
X3    10
GR5315.7    5340  5315.3    5360  5313.7    5380  5312.8    5400  5312.2    5420
GR5311.5    5440  5312.5    5460  5313.3    5480  5314.1    5500  5314.4    5520
GR5314.7    5532  5314.4    5540  5314.1    5560  5314.0    5580  5314.1    5600
GR5314.3    5620  5314.6    5640  5315.0    5660  5315.1    5680  5315.1    5700
GR5315.2    5720  5315.1    5740  5315.2    5760  5315.2    5764  5315.1    5768
GR5314.3    5772  5313.5    5776  5312.7    5780  5311.9    5784  5311.1    5788
GR5310.8    5792  5311.0    5796  5311.1    5800  5310.8    5820  5310.2    5840
GR5309.8    5860  5309.7    5880  5310.0    5900  5310.5    5920  5311.6    5940
GR5312.0    5960  5312.1    5980  5312.1    6000  5311.8    6020  5311.5    6040
GR5311.1    6060  5310.6    6080  5311.0    6100  5310.2    6120  5310.4    6140
GR5310.8    6160
*
* CENTERLINE OF LOUISIANA
*
NC  .020    .020    .020     .1      .3
X13137.2      42    5704    6024      18      18      18
X3    10
GR5313.1    5344  5312.7    5364  5312.4    5384  5312.1    5404  5311.9    5424
GR5311.8    5444  5311.7    5464  5311.6    5484  5311.7    5504  5311.7    5524
GR5311.7    5544  5311.7    5564  5311.9    5584  5312.1    5604  5312.2    5624
GR5312.2    5644  5312.2    5664  5312.2    5684  5312.2    5704  5312.0    5724
GR5311.7    5744  5311.3    5764  5310.8    5784  5310.3    5804  5309.6    5824
GR5309.3    5844  5309.1    5864  5308.9    5884  5309.0    5904  5309.3    5924
GR5309.5    5944  5309.7    5964  5309.9    5984  5310.0    6004  5310.0    6024
GR5310.0    6044  5309.9    6064  5309.8    6084  5309.7    6104  5309.5    6124
GR5309.4    6144  5309.3    6164
*
* DOWNSTREAM OF LOUISIANA
*
NC  .035    .035    .030     .1      .3
BT     2      26      66
X13136.7      57    5800    6012     370     370     370
```

```
GR5310.1    5384  5307.6    5384  5310.0    5404  5307.3    5424  5307.0    5444
GR5310.3    5464  5311.2    5484  5311.2    5504  5310.8    5524  5310.0    5532
GR5309.2    5536  5309.5    5540  5309.5    5544  5309.7    5564  5309.8    5584
GR5309.7    5596  5309.7    5600  5310.2    5604  5310.4    5624  5310.5    5644
GR5310.3    5664  5311.4    5684  5311.9    5704  5312.2    5724  5312.5    5744
GR5312.5    5764  5311.9    5784  5311.7    5800  5311.3    5804  5311.0    5808
GR5310.2    5812  5309.3    5816  5307.4    5824  5306.5    5828  5306.1    5832
GR5305.9    5836  5305.7    5844  5305.5    5864  5305.3    5884  5305.2    5904
GR5305.1    5924  5305.4    5944  5306.0    5964  5308.0    5972  5309.1    5976
GR5309.9    5980  5310.0    5984  5310.4    6004  5310.6    6012  5310.2    6024
GR5308.9    6044  5307.8    6064  5307.3    6084  5307.3    6104  5307.3    6124
GR5307.2    6144  5307.1    6164
*
I  Y13134.0     60    5876    6064     425     425     425
   X3    10
GR5304.6    5420  5304.8    5440  5305.0    5446  5305.0    5452  5304.6    5460
GR5303.9    5480  5303.0    5500  5302.0    5520  5300.2    5532  5300.0    5536
GR5300.1    5540  5300.3    5552  5299.8    5560  5299.0    5580  5298.5    5600
GR5297.8    5620  5300.9    5640  5301.8    5660  5302.5    5680  5303.2    5700
GR5303.6    5720  5303.2    5740  5303.8    5760  5304.1    5768  5304.6    5772
GR5304.0    5776  5303.8    5780  5303.5    5788  5303.8    5800  5303.7    5820
GR5303.5    5840  5303.4    5860  5303.4    5868  5303.4    5872  5303.4    5876
GR5302.6    5880  5298.8    5900  5298.1    5904  5297.9    5908  5297.1    5920
GR5296.2    5940  5295.8    5960  5295.5    5980  5295.5    6000  5296.0    6020
GR5296.1    6024  5297.1    6028  5298.0    6032  5300.0    6040  5301.1    6044
GR5301.6    6048  5301.8    6052  5302.1    6060  5302.3    6064  5300.6    6068
GR5301.0    6072  5301.3    6080  5301.0    6100  5300.8    6120  5300.6    6140
*
NC  .035    .035    .030      .1      .3
H  X13130.0     62    6004    6124     430     430     430
   X3    10
GR5291.5    5484  5292.5    5504  5293.2    5524  5292.4    5536  5292.5    5544
GR5292.7    5564  5292.5    5584  5292.0    5604  5291.3    5624  5290.9    5632
GR5290.4    5636  5289.4    5644  5286.9    5664  5286.4    5668  5285.9    5672
GR5285.8    5676  5286.0    5680  5286.3    5684  5287.7    5704  5289.0    5724
GR5289.8    5744  5289.9    5764  5290.4    5784  5290.7    5804  5290.7    5824
GR5290.5    5844  5290.3    5852  5289.4    5864  5288.0    5884  5288.3    5904
GR5288.6    5924  5288.8    5936  5288.6    5944  5288.0    5964  5287.9    5984
GR5287.8    5996  5287.3    6004  5286.0    6024  5285.0    6044  5284.1    6056
GR5283.9    6060  5284.0    6064  5284.2    6080  5284.7    6084  5285.4    6088
GR5286.1    6092  5286.8    6096  5287.5    6100  5286.8    6104  5286.5    6108
GR5287.9    6112  5288.3    6116  5288.8    6124  5289.8    6144  5289.9    6164
GR5289.4    6184  5288.8    6204  5288.2    6224  5288.1    6244  5288.2    6264
GR5288.6    6284  5289.1    6304
*
G  X13126.0     60    6004    6104     200     200     200
   X3    10
GR5271.8    5512  5272.4    5516  5273.4    5524  5273.9    5528  5273.9    5532
GR5272.9    5536  5271.9    5540  5271.8    5544  5272.5    5564  5273.2    5584
GR5273.8    5604  5274.4    5624  5277.8    5644  5278.5    5648  5278.9    5652
GR5279.7    5656  5278.6    5660  5278.5    5664  5278.1    5684  5278.1    5704
GR5278.2    5724  5278.2    5744  5278.2    5764  5278.1    5784  5278.0    5804
GR5277.8    5824  5277.8    5844  5278.1    5864  5278.0    5884  5277.7    5904
GR5277.8    5924  5277.8    5944  5277.8    5964  5277.7    5984  5277.4    6004
GR5276.8    6008  5273.0    6024  5272.1    6028  5271.1    6032  5270.5    6036
GR5271.4    6040  5272.2    6044  5273.0    6048  5273.2    6052  5273.4    6056
GR5273.8    6064  5274.6    6084  5275.4    6104  5275.6    6124  5275.4    6144
GR5275.1    6164  5275.2    6184  5275.7    6204  5276.0    6224  5276.1    6244
GR5276.1    6264  5276.2    6284  5276.2    6304  5276.1    6324  5276.1    6344
*
F  X1124.00     80    6004    6136     220     220     220
   X3    10
GR5272.5    5504  5272.4    5508  5271.9    5512  5270.0    5524  5268.3    5536
GR5267.8    5540  5267.7    5544  5267.6    5564  5268.0    5584  5268.3    5604
GR5268.6    5624  5268.8    5644  5268.9    5664  5269.1    5684  5269.3    5704
```

```
GR5267.0    5824  5267.2    5844  5267.3    5864  5267.2    5884  5267.1    5904
GR5267.1    5924  5267.2    5944  5269.4    5964  5269.6    5984  5269.3    6004
GR5269.0    6008  5267.9    6012  5266.6    6016  5264.5    6024  5263.3    6028
GR5263.0    6032  5264.2    6036  5264.7    6040  5265.3    6044  5265.9    6048
GR5266.5    6052  5266.7    6056  5266.3    6064  5267.4    6084  5266.6    6104
GR5269.7    6124  5270.3    6136  5270.2    6144  5270.0    6164  5269.9    6184
GR5269.9    6204  5270.0    6224  5270.2    6244  5270.3    6264  5270.4    6284
GR5270.4    6304  5270.1    6324  5269.9    6344  5269.7    6364  5269.4    6384
GR5268.9    6404  5268.1    6424  5267.8    6444  5267.5    6464  5267.6    6484
GR5267.5    6504  5267.4    6508  5267.8    6512  5268.3    6516  5269.4    6524
GR5269.3    6544  5269.0    6564  5267.9    6584  5268.8    6604  5269.0    6624
GR5269.1    6644  5269.1    6664  5269.1    6684  5268.9    6704  5268.7    6724
*
X13120.0      47    6056    6204     210     210     210
X3    10
GR5263.9    5584  5264.0    5604  5263.1    5624  5262.4    5644  5261.7    5664
GR5261.4    5684  5261.4    5704  5261.6    5724  5261.8    5744  5261.9    5764
GR5261.9    5772  5262.2    5776  5262.9    5784  5263.3    5788  5263.7    5792
GR5263.9    5796  5263.8    5800  5263.7    5804  5263.0    5824  5262.5    5844
GR5262.1    5864  5261.8    5884  5261.8    5904  5261.9    5924  5262.0    5944
GR5262.2    5964  5262.4    5984  5262.4    6004  5262.4    6024  5262.3    6044
GR5262.2    6056  5261.6    6064  5259.7    6084  5259.3    6088  5258.9    6092
GR5258.5    6096  5259.0    6100  5259.4    6104  5261.4    6124  5261.9    6144
GR5262.5    6164  5263.3    6184  5264.2    6204  5264.4    6224  5264.4    6244
GR5264.4    6264  5264.3    6284
*
X13120.0      70    6060    6116     200     200     200
X3    10
GR5253.2    5680  5252.9    5700  5253.1    5720  5253.3    5740  5253.4    5760
GR5253.6    5780  5253.8    5788  5254.0    5792  5254.8    5800  5256.1    5812
GR5256.3    5816  5256.4    5820  5256.6    5840  5256.9    5860  5256.9    5880
GR5256.9    5900  5257.0    5920  5257.0    5940  5257.2    5960  5257.4    5980
GR5257.3    6000  5257.2    6020  5257.0    6040  5256.4    6060  5255.0    6080
GR5254.4    6088  5254.0    6092  5254.2    6096  5254.7    6100  5255.6    6108
GR5256.2    6112  5256.3    6116  5256.3    6120  5256.2    6140  5256.1    6160
GR5256.0    6180  5255.9    6200  5256.4    6220  5257.2    6240  5257.9    6260
GR5257.1    6280  5256.2    6300  5256.6    6320  5256.9    6340  5257.2    6360
GR5257.2    6380  5256.3    6400  5256.4    6420  5256.4    6440  5256.9    6460
GR5257.4    6480  5257.7    6500  5258.1    6520  5258.5    6540  5258.8    6560
GR5257.4    6580  5258.1    6600  5258.5    6620  5258.7    6640  5258.9    6660
GR5258.9    6680  5258.9    6700  5258.6    6720  5258.1    6740  5257.7    6760
GR5257.4    6768  5257.7    6780  5258.6    6800  5258.6    6820  5258.4    6840
*
X1118.00      70    6068    6380     230     230     230
X3    10
GR5246.6    5620  5245.9    5640  5245.2    5660  5244.6    5680  5244.9    5700
GR5245.3    5720  5245.5    5740  5246.0    5760  5246.4    5780  5246.5    5788
GR5246.6    5792  5246.8    5796  5247.4    5800  5250.3    5820  5251.0    5824
GR5251.1    5828  5251.0    5832  5250.8    5840  5250.5    5860  5250.4    5880
GR5250.5    5900  5250.6    5920  5251.0    5940  5252.2    5960  5252.2    5980
GR5252.1    6000  5252.1    6020  5252.1    6040  5252.1    6060  5252.0    6068
GR5251.7    6072  5251.0    6080  5249.5    6096  5249.5    6100  5249.3    6120
GR5249.1    6124  5249.0    6128  5249.5    6140  5249.6    6160  5249.4    6180
GR5249.4    6200  5249.3    6220  5249.3    6240  5249.3    6260  5249.5    6280
GR5250.3    6300  5251.0    6320  5251.7    6340  5252.4    6360  5252.8    6380
GR5252.5    6400  5252.2    6420  5251.9    6440  5251.6    6460  5251.4    6480
GR5251.4    6488  5250.5    6500  5250.3    6508  5250.6    6520  5252.1    6540
GR5253.1    6560  5253.1    6564  5252.8    6568  5251.7    6580  5252.7    6600
GR5253.4    6620  5253.5    6640  5253.7    6660  5253.7    6680  5253.6    6700
*
X13116.0      79    6224    6304     230     230     230
X3    10
GR5237.4    5704  5237.0    5724  5237.3    5744  5237.6    5764  5237.8    5780
GR5238.2    5784  5241.5    5804  5244.8    5824  5245.5    5828  5246.1    5832
GR5246.1    5836  5246.3    5844  5246.6    5864  5246.9    5884  5247.3    5904
```

```
GR5247.1    5124  5245.8    5944  5246.3    5984  5245.8    5984  5243.5    6104
GR5245.2    5124  5245.1    6144  5245.0    6164  5244.9    6184  5244.9    6204
GR5244.9    5124  5244.3    6244  5243.4    6264  5244.0    6284  5244.5    6304
GR5244.3    5124  5244.2    6344  5244.4    6364  5244.5    6384  5245.0    6404
GR5245.2    6412  5245.4    6416  5245.3    6420  5244.7    6424  5244.1    6428
GR5244.0    6432  5244.2    6436  5244.5    6444  5244.6    6452  5245.9    6456
GR5246.3    6460  5246.3    6464  5246.7    6484  5247.2    6504  5247.7    6524
GR5248.2    6544  5248.5    6560  5248.3    6564  5247.2    6572  5246.7    6576
GR5246.1    6580  5246.4    6584  5247.1    6592  5247.2    6596  5247.4    6604
GR5247.5    6624  5247.6    6644  5247.7    6664  5247.6    6684  5247.4    6704
GR5247.1    6724  5246.7    6744  5246.5    6764  5246.6    6776  5247.3    6784
GR5247.5    6804  5247.3    6824  5247.2    6844  5247.0    6864
*
A  XS114.0     74    6280    6340       0       0       0
X3    10
GR5237.2    5738  5238.1    5808  5238.6    5828  5238.9    5832  5239.1    5836
GR5239.3    5840  5240.7    5844  5241.5    5848  5242.4    5852  5243.2    5856
GR5244.0    5860  5244.4    5864  5244.4    5868  5244.8    5868  5244.8    5908
GR5245.1    5928  5245.5    5948  5245.6    5968  5245.6    5988  5245.7    6008
GR5245.6    6028  5245.1    6048  5244.7    6068  5243.6    6088  5242.8    6108
GR5242.2    6128  5241.8    6148  5241.6    6168  5241.5    6188  5241.4    6208
GR5241.1    6228  5240.9    6248  5240.6    6268  5240.4    6276  5240.2    6280
GR5239.8    6284  5239.2    6288  5238.1    6296  5237.6    6300  5237.4    6304
GR5237.4    6308  5237.5    6328  5238.6    6332  5239.5    6336  5240.1    6340
GR5239.9    6344  5239.7    6348  5240.2    6368  5240.8    6388  5241.4    6408
GR5241.5    6428  5242.0    6446  5242.2    6468  5242.3    6488  5242.1    6508
GR5242.0    6528  5241.8    6548  5241.3    6568  5241.0    6576  5241.6    6588
GR5242.1    6608  5242.3    6628  5242.5    6648  5242.6    6668  5242.4    6688
GR5242.0    6708  5241.6    6728  5241.2    6748  5241.5    6768  5241.8    6788
GR5242.4    6808  5242.8    6828  5243.1    6846  5243.2    6868
*
EJ
T1      RESOURCE TECHNOLOGY INC., ALBUQUERQUE, NM
T1      CLOMR (SOUTH BRANCH TRIBUTARY, ALBUQUERQUE, NM)
T1      SUBMITTAL TO FEMA  (DATE: AUGUST 1994)
T2      FILENAME: NDBCL_C.HC2  SUPER-CRITICAL  100-YR RETURN PERIOD
T3      NDB-C
J1   -10      3      0      1     -1      0      0      0   5304      0
J2     2      0     -1      0      0      0     -1      0      0      0


ER
```

THIS RUN EXECUTED 31AUG94 21:28:46

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2: May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

NDB-C

SUMMARY PRINTOUT

	SECNO	ELMIN	CUMDS	CWSEL	CRIWS	EG	XLCH	TOPWID	Q	QLOB	QROB	VCH	DEI
*	3140.000	5316.70	2831.00	5317.24	5317.24	5317.35	0.00	44.06	26.00	0.00	0.00	2.69	0.
*	3140.000	5316.70	2831.00	5317.44	5317.44	5317.59	0.00	69.97	66.00	0.00	0.00	3.15	0.
	3138.000	5310.40	2611.00	5310.70	5310.75	5310.88	220.00	39.11	26.00	0.00	0.00	3.37	0.
*	3138.000	5310.40	2611.00	5310.85	5310.96	5311.18	220.00	50.07	66.00	0.00	0.00	4.59	0.
*	3137.800	5309.70	2551.00	5310.03	5310.03	5310.12	60.00	52.28	26.00	0.00	0.00	2.52	0.
*	3137.800	5309.70	2551.00	5310.20	5310.20	5310.36	60.00	68.19	66.00	0.00	0.00	3.15	0.
*	3137.200	5308.90	2533.00	5309.08	5309.20	5309.63	18.00	43.02	26.00	0.00	0.00	5.97	0.
*	3137.200	5308.90	2533.00	5309.16	5309.35	5309.93	18.00	59.79	66.00	0.00	0.00	6.93	0.
*	3136.700	5305.10	2515.00	5305.28	5305.40	5305.84	18.00	48.10	26.00	0.00	0.00	6.00	0.
*	3136.700	5305.10	2515.00	5305.35	5305.54	5306.50	18.00	60.24	66.00	0.00	0.00	8.60	0.
*	3134.000	5295.50	2145.00	5295.79	5295.79	5295.89	370.00	50.90	26.00	0.00	0.00	2.53	0.
*	3134.000	5295.50	2145.00	5295.96	5295.96	5296.12	370.00	66.79	66.00	0.00	0.00	3.21	0.
	3130.000	5283.90	1720.00	5284.34	5284.38	5284.55	425.00	28.31	26.00	0.00	0.00	3.60	0.
	3130.000	5283.90	1720.00	5284.53	5284.64	5284.93	425.00	32.38	66.00	0.00	0.00	5.08	0.
	3126.000	5270.50	1290.00	5271.48	5271.57	5271.88	430.00	9.86	26.00	0.00	0.00	5.12	0.
	3126.000	5270.50	1290.00	5271.94	5272.07	5272.54	430.00	14.01	66.00	0.00	0.00	6.24	1.
	124.000	5263.30	1090.00	5264.06	5264.26	5264.68	200.00	9.61	26.00	0.00	0.00	6.31	0.
*	124.000	5263.30	1090.00	5264.39	5264.74	5265.47	200.00	13.22	66.00	0.00	0.00	8.33	1.
*	3122.000	5258.50	870.00	5259.38	5259.38	5259.59	220.00	16.51	26.00	0.00	0.00	3.69	0.
*	3122.000	5258.50	870.00	5259.76	5259.76	5260.07	220.00	24.19	66.00	0.00	0.00	4.45	1.
	3120.000	5254.00	660.00	5254.71	5254.77	5255.00	210.00	16.05	26.00	0.00	0.00	4.31	0.
*	3120.000	5254.00	660.00	5254.99	5255.14	5255.50	210.00	22.48	66.00	0.00	0.00	5.68	0.

	SECND	ELMIN	CUMDS	CWSEL	CRIWS	ES	XLCH	TOPWID	Q	QLOB	QROB	VCH	DEF
1	118.000	5249.00	460.00	5249.42	5249.42	5249.49	200.00	125.18	26.00	0.00	0.00	2.00	0.
	118.000	5249.00	460.00	5249.53	5249.53	5249.62	200.00	161.70	66.00	0.00	0.00	2.43	0.
2	3116.000	5243.40	230.00	5243.96	5243.96	5244.10	230.00	31.06	26.00	0.00	0.00	2.99	0.
	3116.000	5243.40	230.00	5244.20	5244.48	5244.41	230.00	45.58	66.00	0.00	0.00	3.71	0.
4	3114.000	5237.40	0.00	5237.70	5237.75	5237.91	230.00	29.49	26.00	0.00	0.00	3.70	0.
	3114.000	5237.40	0.00	5237.69	5237.99	5238.30	230.00	31.65	66.00	0.00	0.00	5.19	0.

NDB-C

SUMMARY PRINTOUT

	SECNO	Q	K*XNL	K*XNCH	K*XNR	STCHL	STCHR	SSTA	ENDST	KRATIO	K*CHSL
*	3140.000	26.00	0.00	30.00	0.00	5800.00	5924.00	5828.20	5900.30	0.00	0.00
*	3140.000	66.00	0.00	30.00	0.00	5800.00	5924.00	5825.03	5901.68	0.00	0.00
	3138.000	26.00	0.00	30.00	0.00	5772.00	5960.00	5847.75	5886.87	1.35	-28.64
*	3138.000	66.00	0.00	30.00	0.00	5772.00	5960.00	5841.78	5891.85	1.50	-28.64
*	3137.800	26.00	0.00	20.00	0.00	5764.00	5930.00	5848.73	5901.02	0.80	-11.66
*	3137.800	66.00	0.00	20.00	0.00	5764.00	5920.00	5839.92	5908.11	0.45	-11.66
*	3137.200	26.00	0.00	20.00	0.00	5704.00	6024.00	5866.20	5909.21	3.69	-44.46
*	3137.200	66.00	0.00	20.00	0.00	5704.00	6024.00	5856.13	5915.92	3.42	-44.46
*	3136.700	26.00	0.00	30.00	0.00	5800.00	6012.00	5887.92	5936.02	1.63	-211.10
*	3136.700	66.00	0.00	30.00	0.00	5800.00	6012.00	5879.85	5940.09	2.16	-211.10
*	3134.000	26.00	0.00	30.00	0.00	5876.00	6064.00	5960.68	6011.58	0.36	-25.95
*	3134.000	66.00	0.00	30.00	0.00	5876.00	6064.00	5951.78	6018.57	0.31	-25.95
	3130.000	26.00	0.00	30.00	0.00	6004.00	6124.00	6052.80	6081.12	1.22	-27.29
	3130.000	66.00	0.00	30.00	0.00	6004.00	6124.00	6050.26	6082.64	1.33	-27.29
	3126.000	26.00	0.00	30.00	0.00	6004.00	6104.00	6030.51	6040.37	0.90	-31.16
	3126.000	66.00	0.00	30.00	0.00	6004.00	6104.00	6028.66	6042.67	0.82	-31.16
	124.000	26.00	0.00	30.00	0.00	6004.00	6136.00	6025.46	6035.07	1.39	-36.00
*	124.000	66.00	0.00	30.00	0.00	6004.00	6136.00	6024.35	6037.57	1.55	-36.00
*	3122.000	26.00	0.00	30.00	0.00	6056.00	6204.00	6087.24	6103.76	0.58	-21.82
*	3122.000	66.00	0.00	30.00	0.00	6056.00	6204.00	6083.39	6107.58	0.84	-21.82
	3120.000	26.00	0.00	30.00	0.00	6060.00	6116.00	6083.97	6100.02	1.27	-21.43
*	3120.000	66.00	0.00	30.00	0.00	6060.00	6116.00	6080.11	6102.59	1.43	-21.43
*	118.000	26.00	0.00	30.00	0.00	6068.00	6380.00	6107.66	6272.34	1.25	-25.00
	118.000	66.00	0.00	30.00	0.00	6068.00	6380.00	6095.76	6280.57	0.90	-25.00
*	3116.000	26.00	0.00	30.00	0.00	6224.00	6304.00	6251.57	6282.63	1.27	-24.35
	3116.000	66.00	0.00	30.00	0.00	6224.00	6304.00	6246.29	6291.87	0.87	-24.35
	3114.000	26.00	0.00	30.00	0.00	6280.00	6340.00	6299.23	6328.72	1.38	-26.09
	3114.000	66.00	0.00	30.00	0.00	6280.00	6340.00	6297.74	6329.39	1.37	-26.09

NDB-C

SUMMARY PRINTOUT

	SECNO	Q	HV	HL	CLOSS	AREA	FRCH	SHEAR	POWER
*	3140.000	26.00	0.11	0.00	0.00	9.67	1.29	0.19	0.50
*	3140.000	66.00	0.15	0.00	0.00	20.98	1.06	0.34	1.08
	3138.000	26.00	0.18	6.46	0.01	7.70	1.34	0.50	1.68
*	3138.000	66.00	0.33	6.39	0.02	14.37	1.51	0.81	3.74
*	3137.800	26.00	0.10	1.08	0.83	10.30	1.00	0.12	0.31
*	3137.800	66.00	0.15	1.01	0.10	20.98	1.00	0.17	0.52
*	3137.200	26.00	0.55	0.45	0.05	4.35	3.31	0.86	5.16
*	3137.200	66.00	0.75	0.37	0.06	7.52	3.06	1.00	6.94
*	3136.700	26.00	0.56	3.79	0.00	4.33	3.53	2.05	12.29
*	3136.700	66.00	1.15	3.39	0.04	7.68	4.24	3.74	32.12
*	3134.000	26.00	0.10	21.07	16.15	10.26	0.99	0.28	0.70
*	3134.000	66.00	0.16	20.51	18.09	20.56	1.02	0.39	1.25
	3130.000	26.00	0.20	11.33	0.01	7.22	1.26	0.52	1.88
	3130.000	66.00	0.40	11.17	0.02	12.99	1.41	0.89	4.53
	3126.000	26.00	0.41	12.64	0.02	5.08	1.26	0.85	4.36
	3126.000	66.00	0.60	12.37	0.02	10.58	1.27	1.12	6.58
	124.000	26.00	0.62	7.18	0.02	4.12	1.70	1.37	8.67
*	124.000	66.00	1.08	7.03	0.05	7.92	1.90	2.14	17.84
*	3122.000	26.00	0.21	6.13	0.13	7.04	1.00	0.46	1.71
*	3122.000	66.00	0.31	5.94	4.70	14.82	1.00	0.60	2.67
	3120.000	26.00	0.29	4.58	0.01	6.03	1.24	0.66	2.83
*	3120.000	66.00	0.50	4.55	0.02	11.61	1.39	1.03	5.85
*	118.000	26.00	0.06	6.13	0.85	12.97	1.26	0.17	0.33
	118.000	66.00	0.09	5.75	0.12	27.14	1.12	0.24	0.58
*	3116.000	26.00	0.14	5.87	3.84	8.68	1.00	0.35	1.05
	3116.000	66.00	0.21	5.19	0.01	17.77	1.05	0.48	1.79
	3114.000	26.00	0.21	6.18	0.01	7.02	1.34	0.56	2.09
	3114.000	66.00	0.42	6.09	0.02	12.71	1.44	0.93	4.85

SUMMARY OF ERRORS AND SPECIAL NOTES

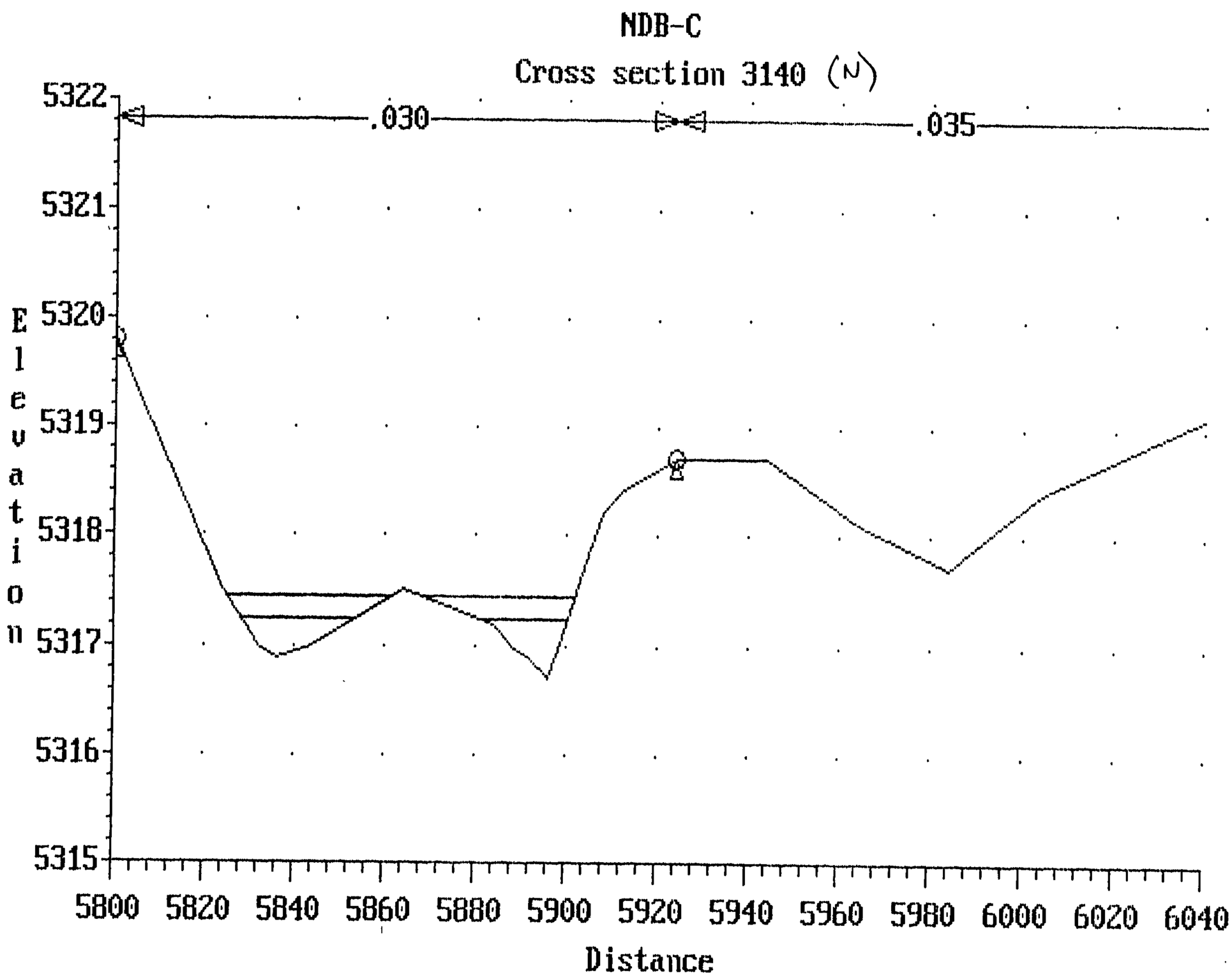
```
CAUTION SECNO=   3140.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   3140.000  PROFILE=  2  CRITICAL DEPTH ASSUMED

WARNING SECNO=   3138.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=   3137.800  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   3137.800  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   3137.800  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=   3137.800  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   3137.800  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   3137.800  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO=   3137.200  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=   3137.200  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=   3136.700  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO=   3136.700  PROFILE=  2  SLOPE TOO STEEP
WARNING SECNO=   3136.700  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=   3134.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   3134.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   3134.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=   3134.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   3134.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   3134.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO=    124.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=   3122.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   3122.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   3122.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=   3122.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   3122.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   3122.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO=   3120.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=    118.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    118.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    118.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=   3116.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   3116.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   3116.000  PROFILE=  1  WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO=   3116.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
```

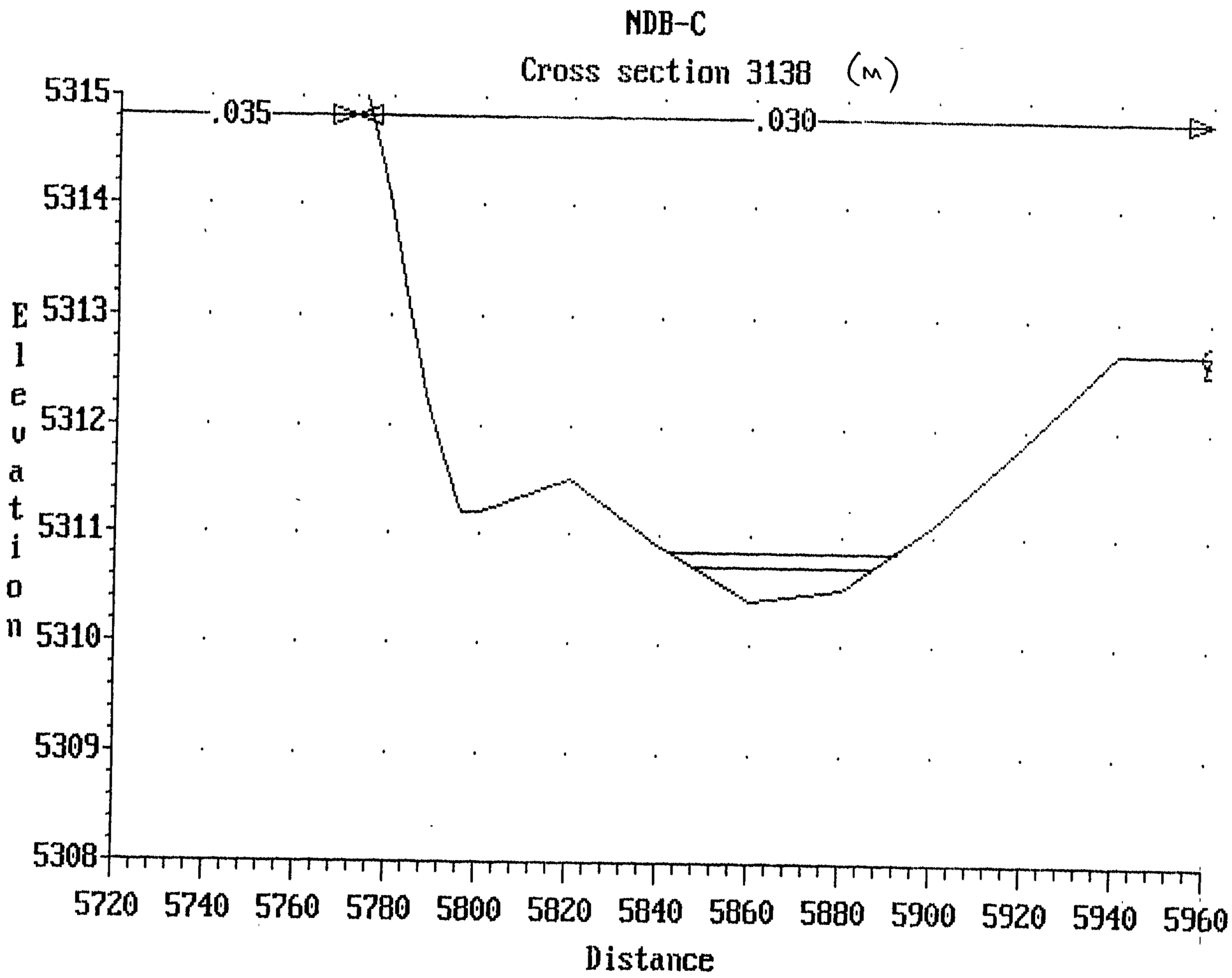
Resource Technology, I

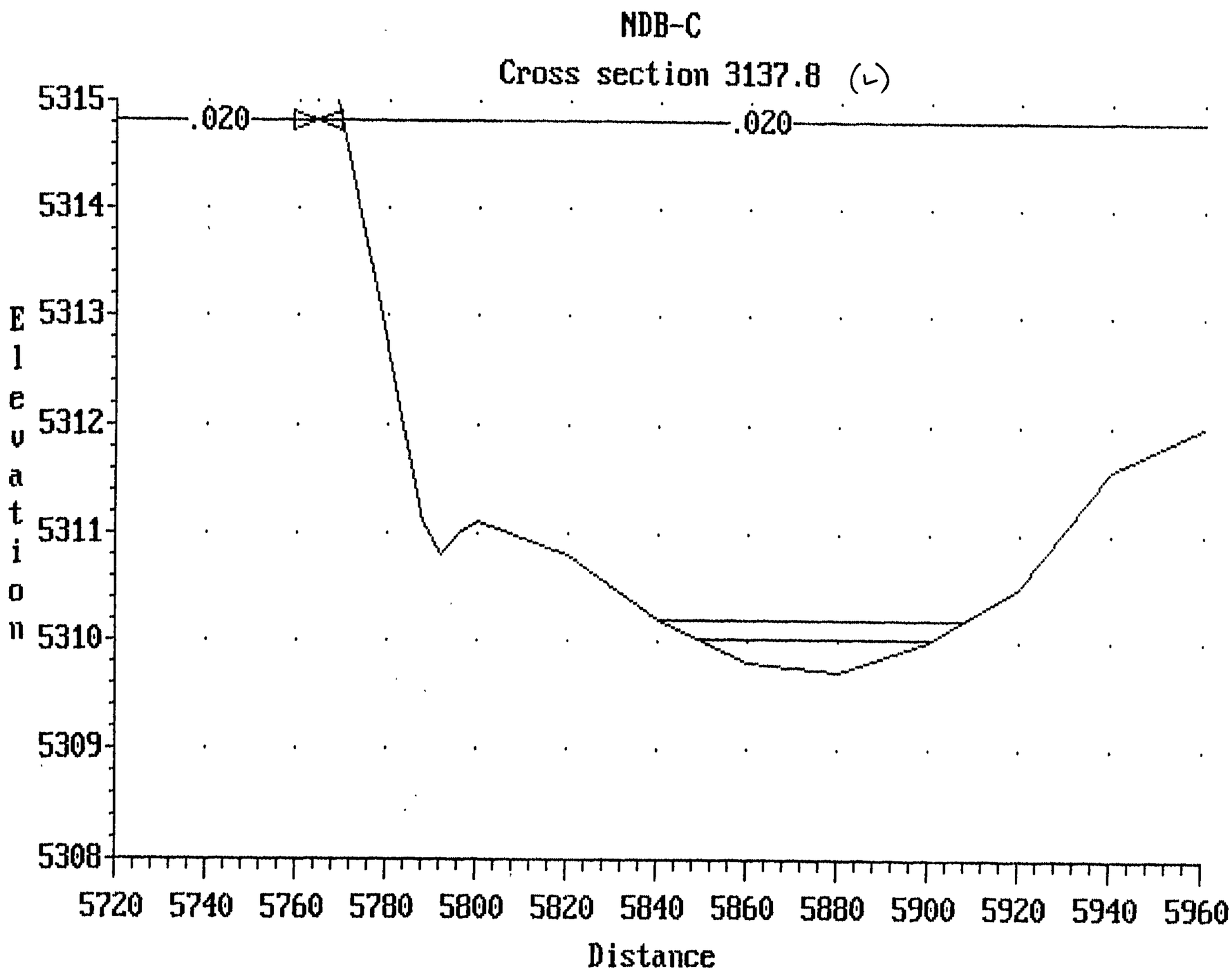
CROSS-SECTION PLOT PARAMATERS

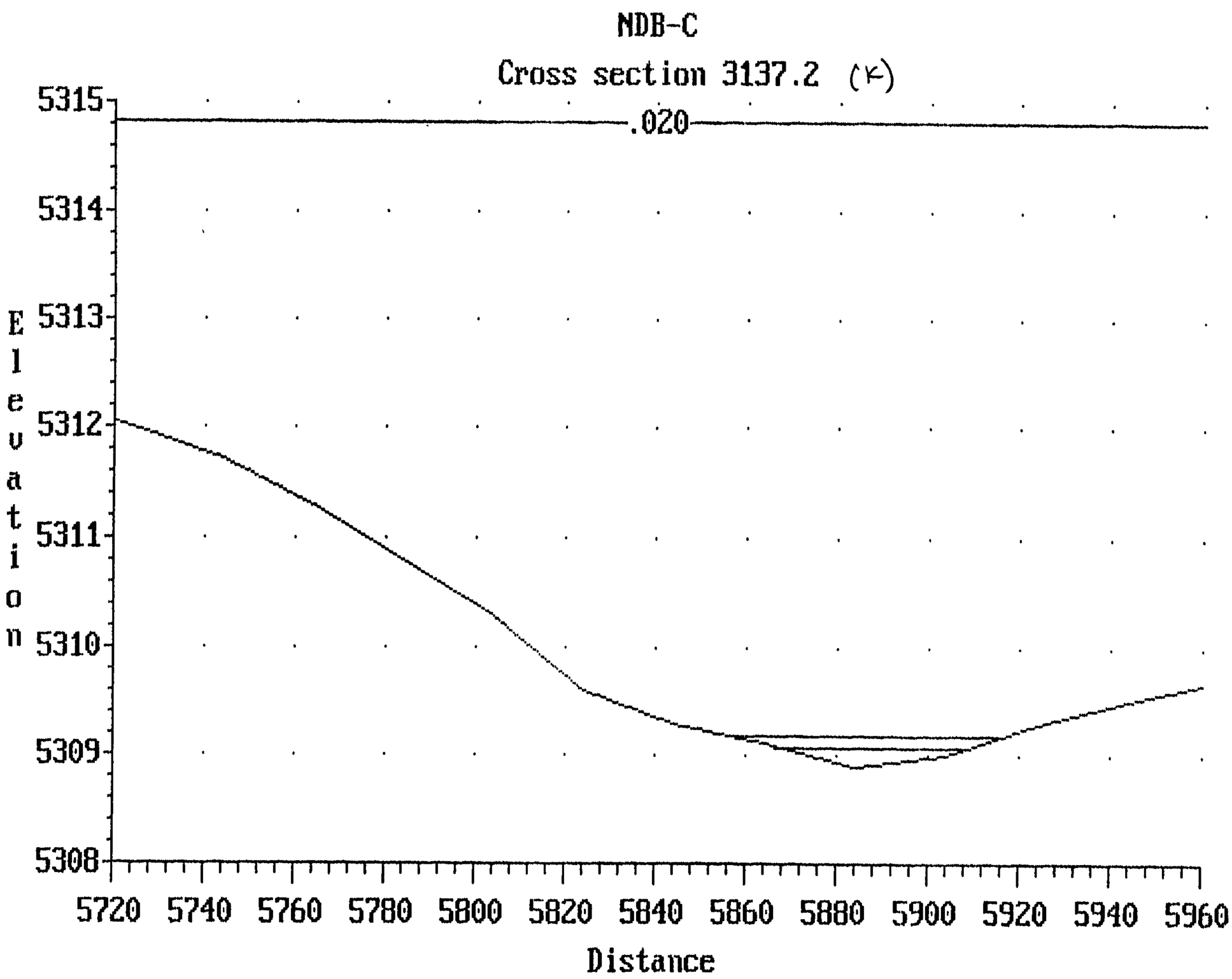
AREA East of I-25 ARROYO "C" or South Branch Tributary DATE 08/26/94

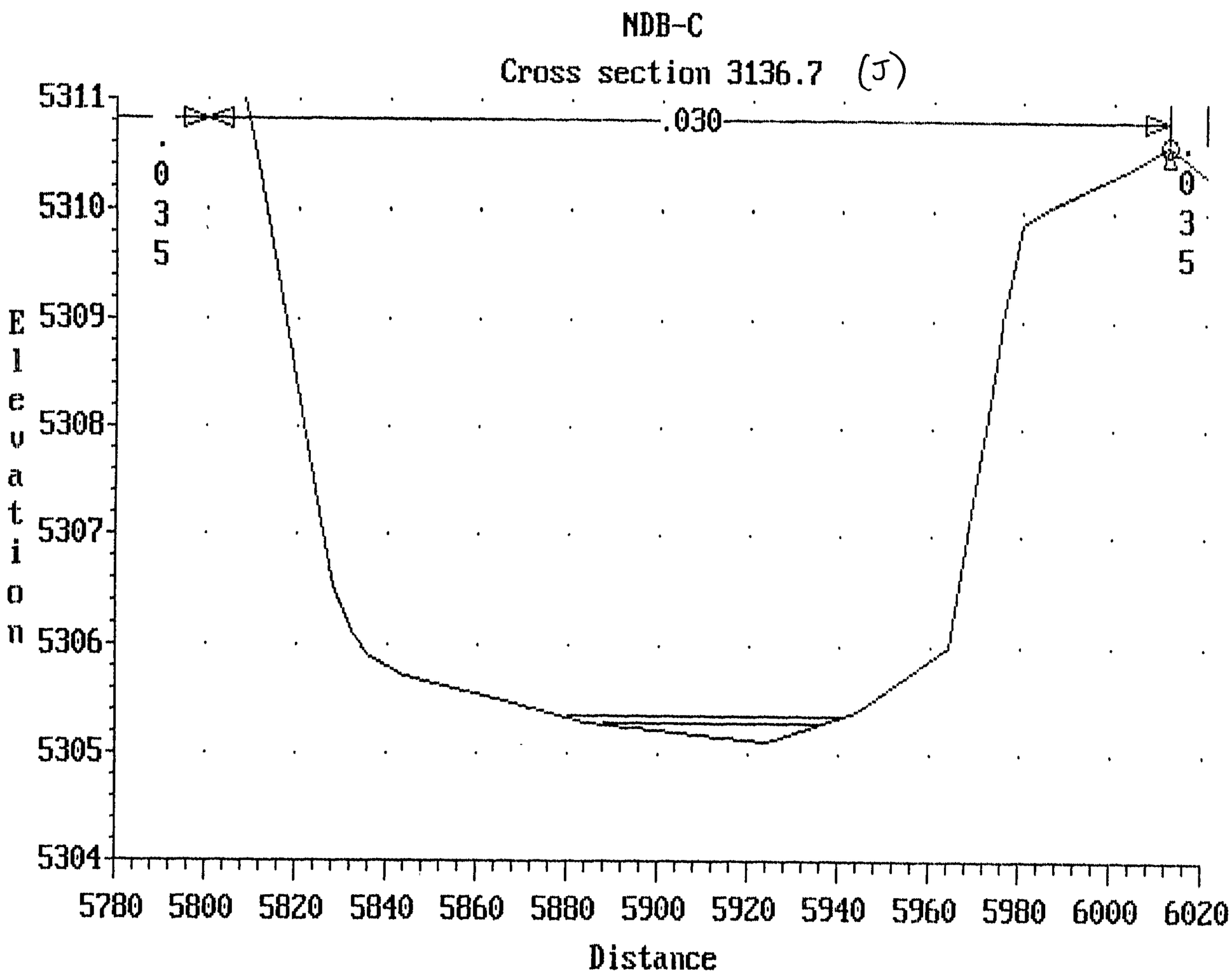
X-SEC. LETTER	X-SEC. NO.	X RANGE	X BEGIN	X END	Y RANGE	Y BEGIN	Y END
J	3136.7	120	5840	5960	2	5304	5306
I	3134	120	5920	6040	2	5295	5297
H	3130	70	6040	6110	2	5283	5285
G	3126	60	6010	6070	2	5270	5272
F	124	60	5990	6050	2	5263	5265
E	3122	60	6060	6120	2	5258	5260
D	3120	90	6040	6130	3	5253	5256
C	118	230	6070	6300	2	5248	5250
B	3116	100	6200	6300	2	5243	5245
A/AO	3114	80	6270	6350	2	5237	5239
N	3140	120	5800	5920	2	5316	5318
M	3138	120	5800	5920	1	5310	5311
L	3137.8	120	5810	5930	2	5309	5311
K	3137.2	140	5820	5960	2	5308	5310

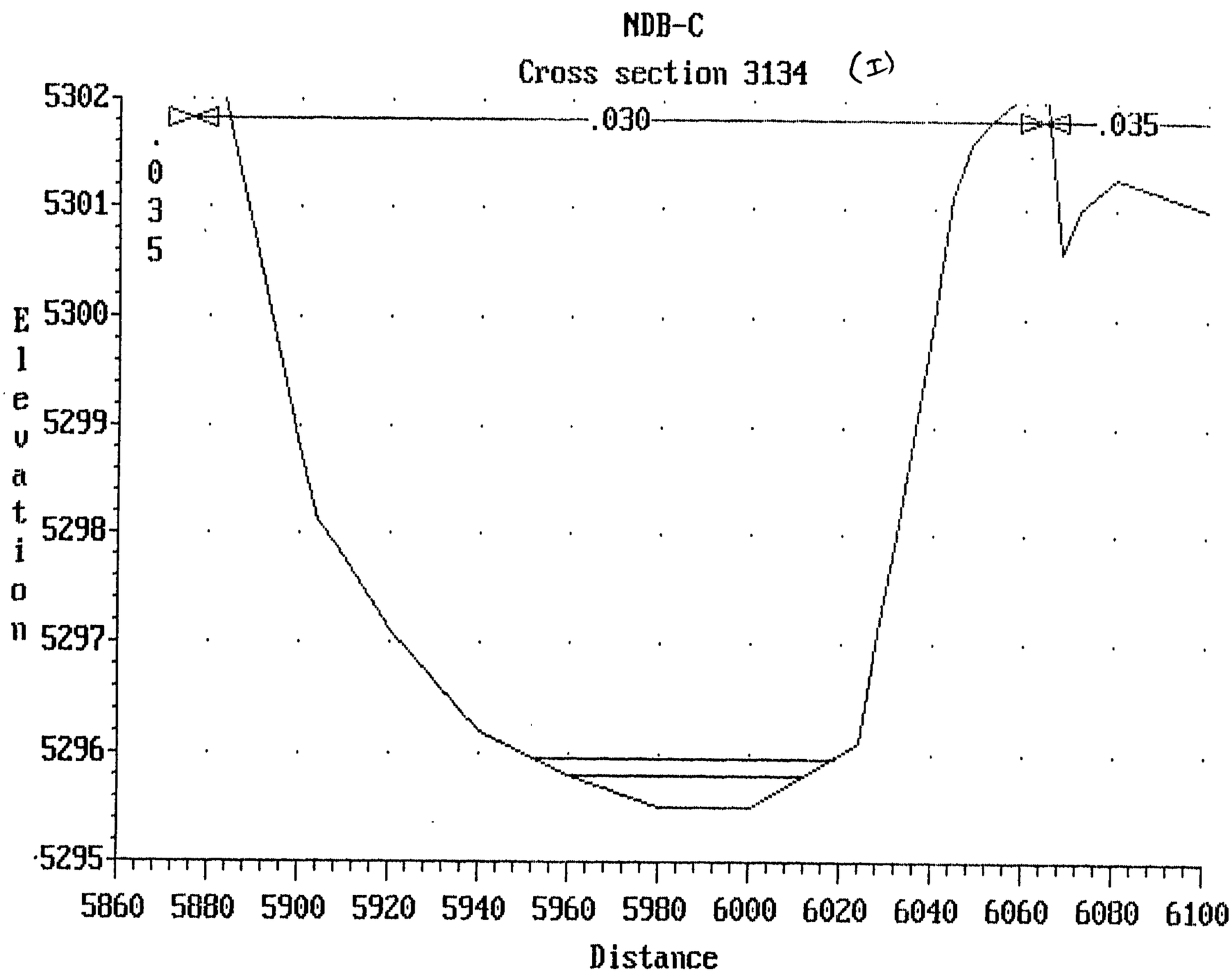

NDB-C
Cross section 3140 (N)
.030
.035
5322
5321
5320
5319
5318
5317
5316
5315
Elevation
5800
5820
5840
5860
5880
5900
5920
5940
5960
5980
6000
6020
6040
Distance

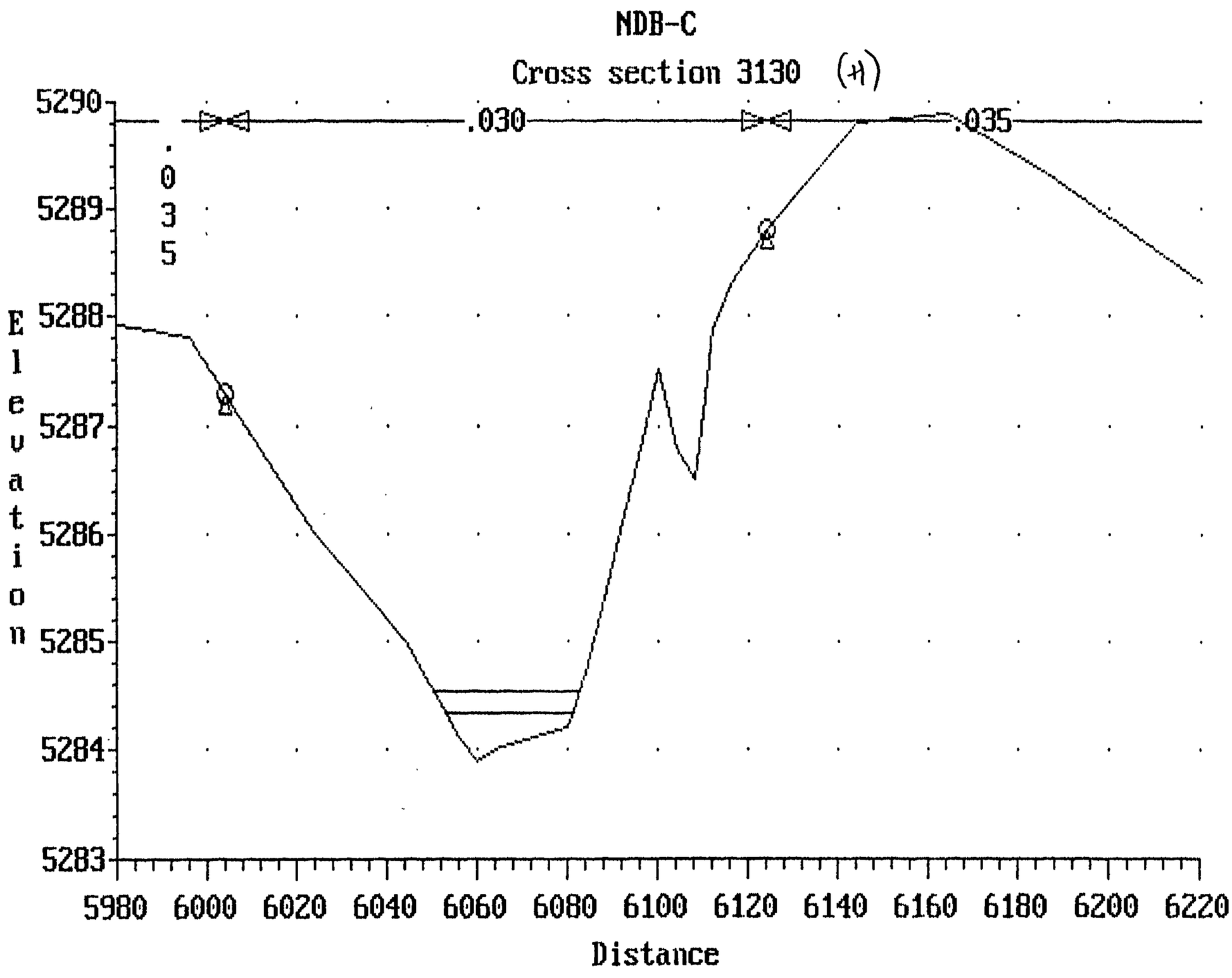

NDB-C
Cross section 3138 (M)
.035
.030
5315
5314
5313
5312
5311
5310
5309
5308
Elevation
5720
5740
5760
5780
5800
5820
5840
5860
5880
5900
5920
5940
5960
Distance

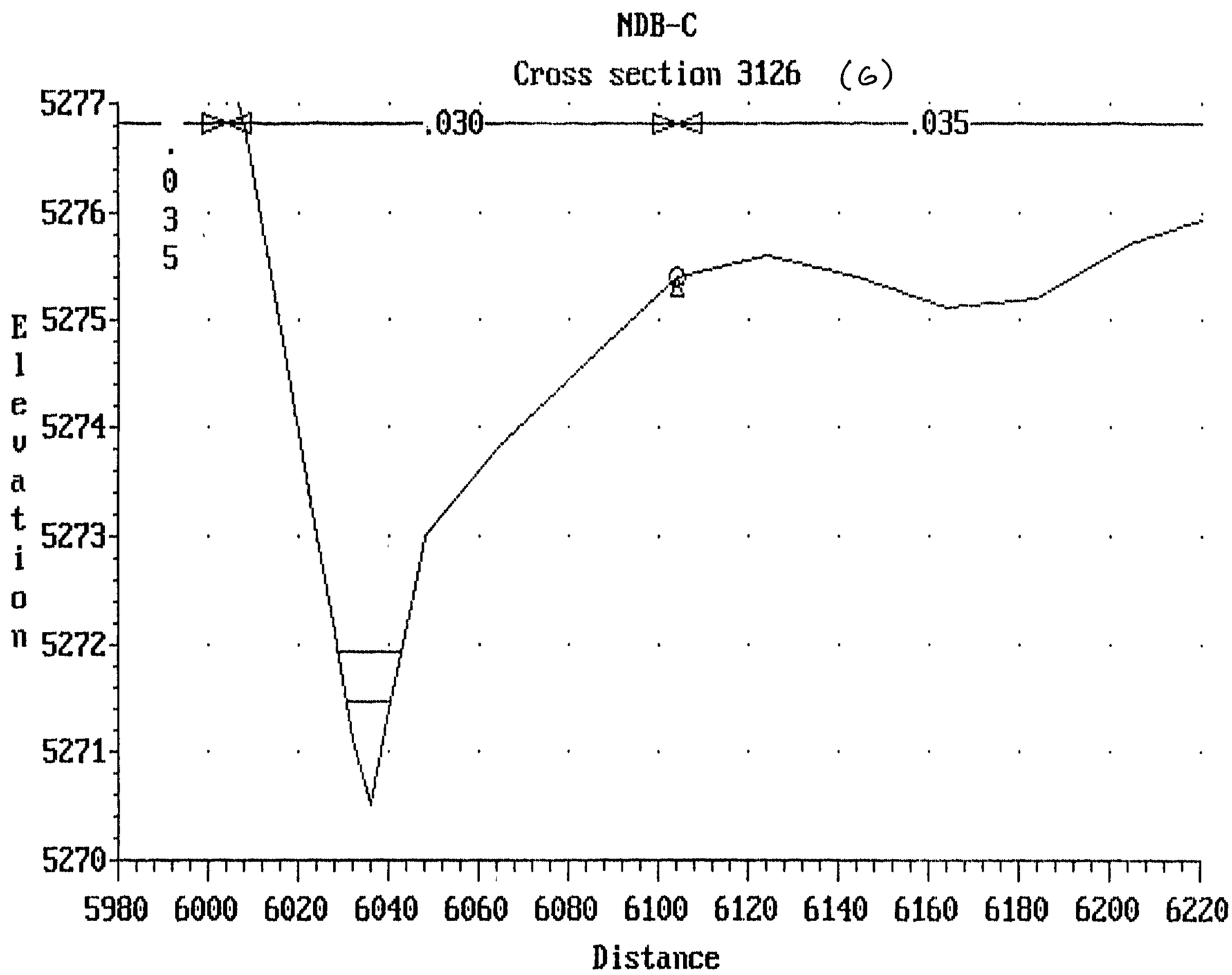

NDB-C
Cross section 3137.8 (L)
.020
.020
5315
5314
5313
5312
5311
5310
5309
5308
Elevation
5720
5740
5760
5780
5800
5820
5840
5860
5880
5900
5920
5940
5960
Distance

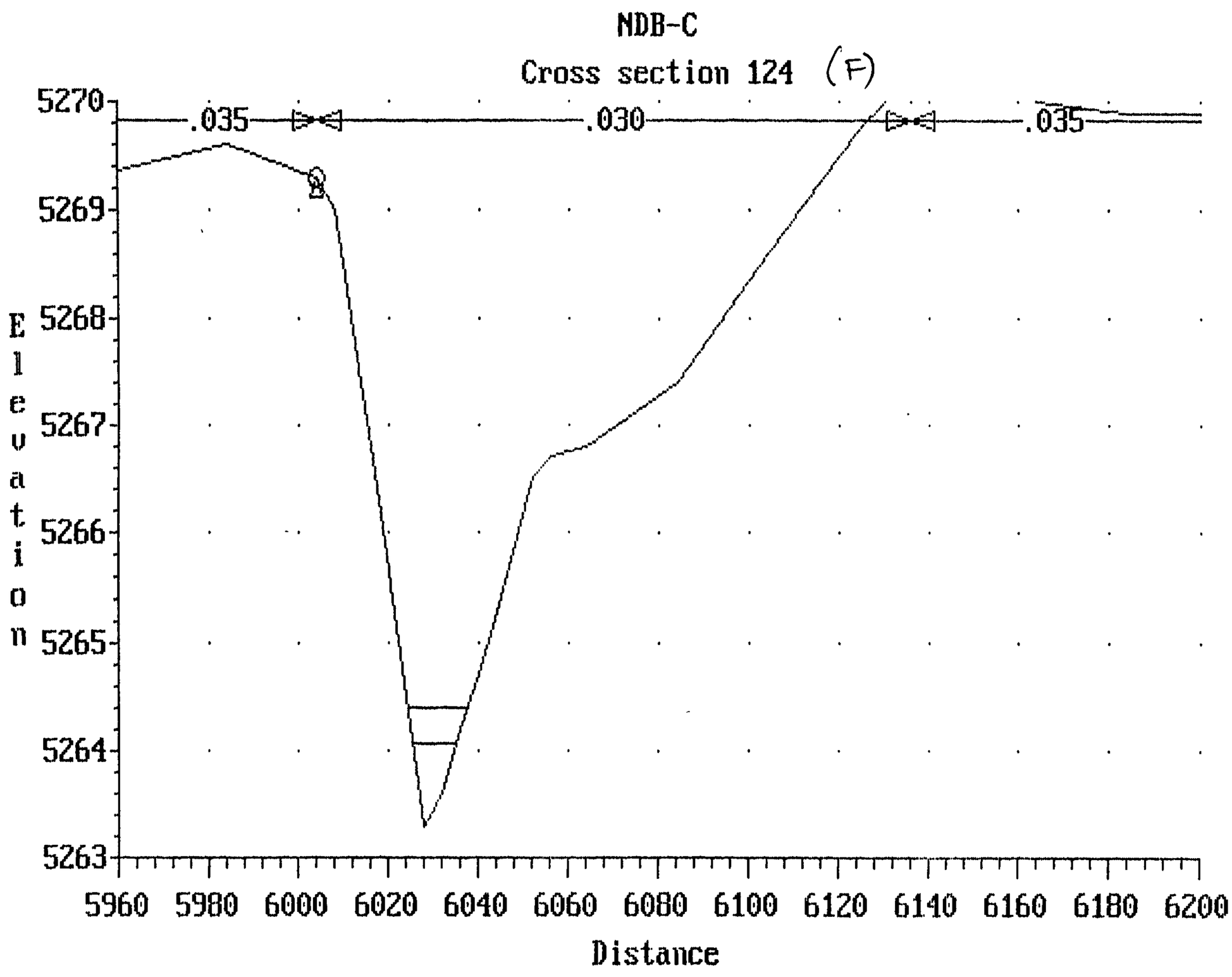

NDB-C
Cross section 3137.2 (K)
.020
5315
5314
5313
5312
5311
5310
5309
5308
Elevation
5720
5740
5760
5780
5800
5820
5840
5860
5880
5900
5920
5940
5960
Distance

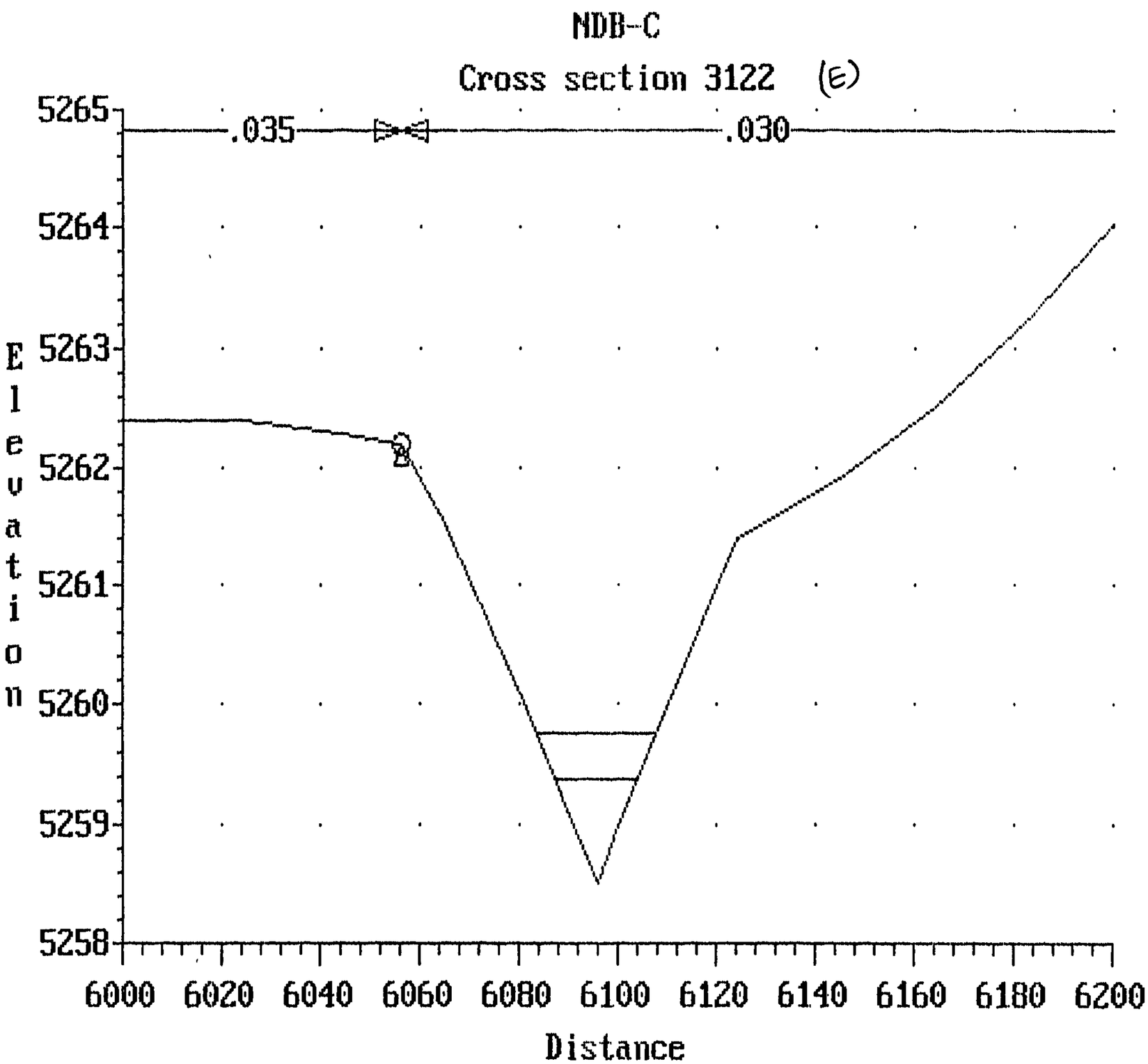

NDB-C
Cross section 3136.7 (J)
.030
.035
.035
5311
5310
5309
5308
5307
5306
5305
5304
Elevation
5780
5800
5820
5840
5860
5880
5900
5920
5940
5960
5980
6000
6020
Distance

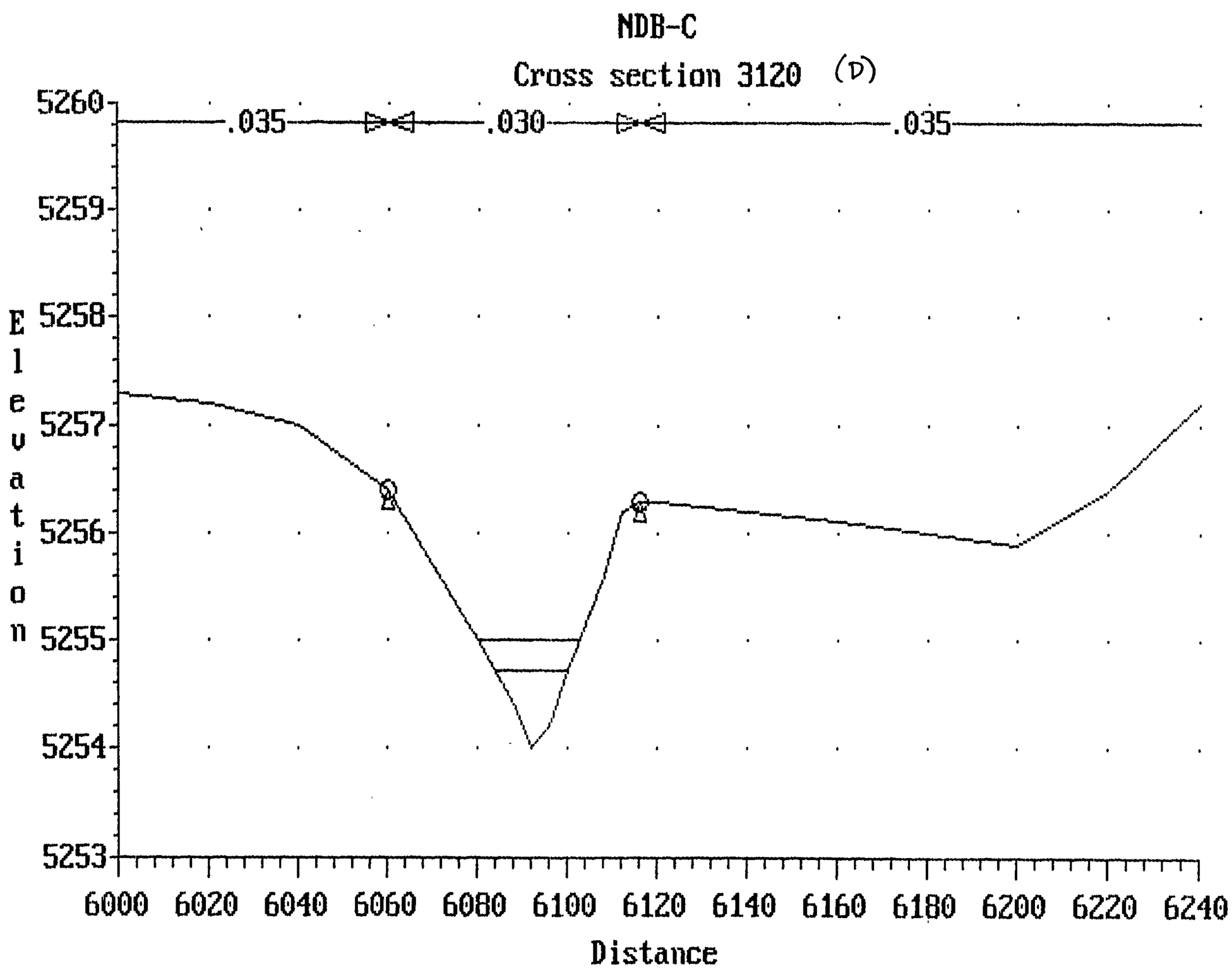

NDB-C
Cross section 3134 (I)
.030
.035
.035
5302
5301
5300
5299
5298
5297
5296
5295
Elevation
5860 5880 5900 5920 5940 5960 5980 6000 6020 6040 6060 6080 6100
Distance

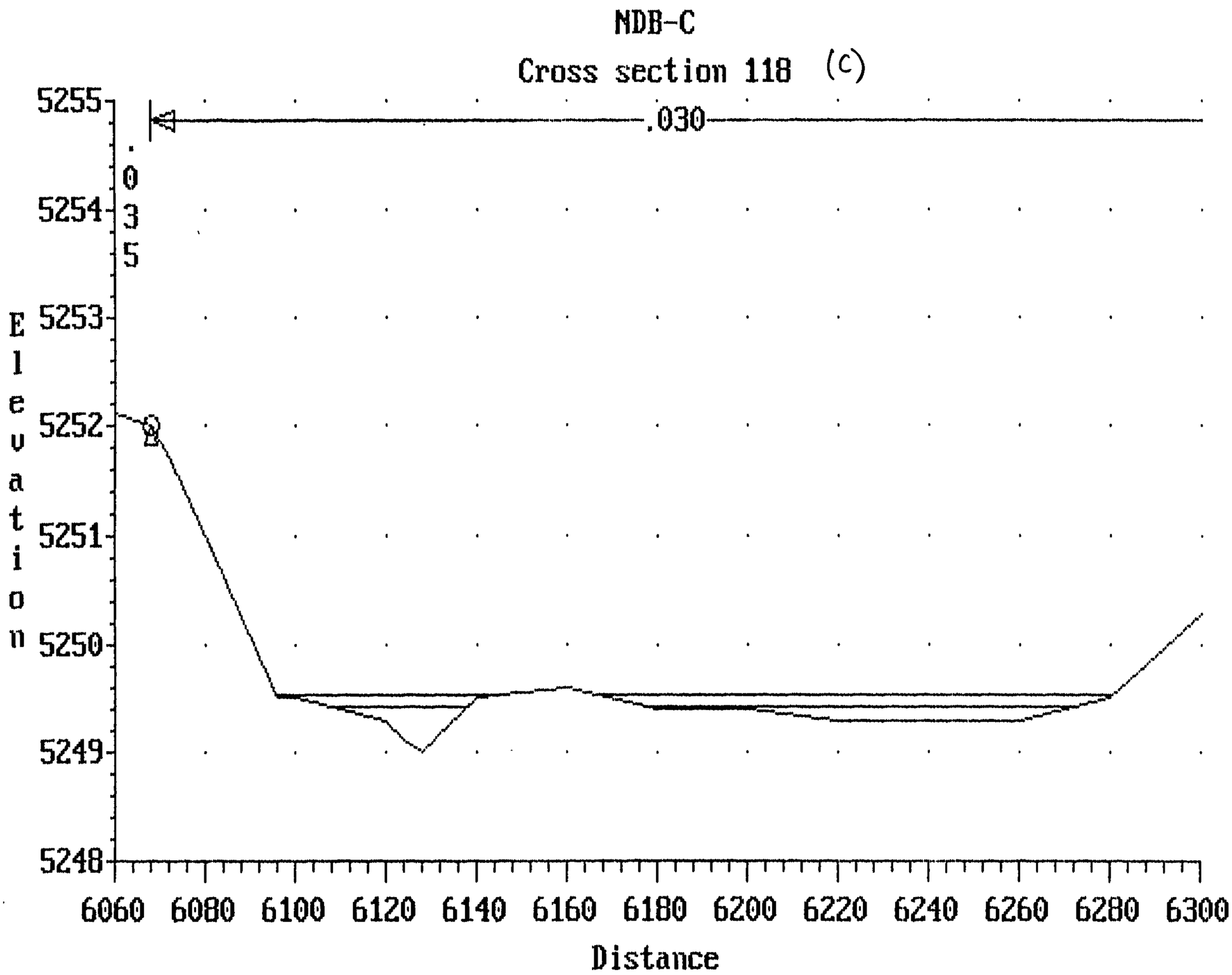

NDB-C
Cross section 3130 (H)
.030
.035
.035
Elevation
5290
5289
5288
5287
5286
5285
5284
5283
5980
6000
6020
6040
6060
6080
6100
6120
6140
6160
6180
6200
6220
Distance

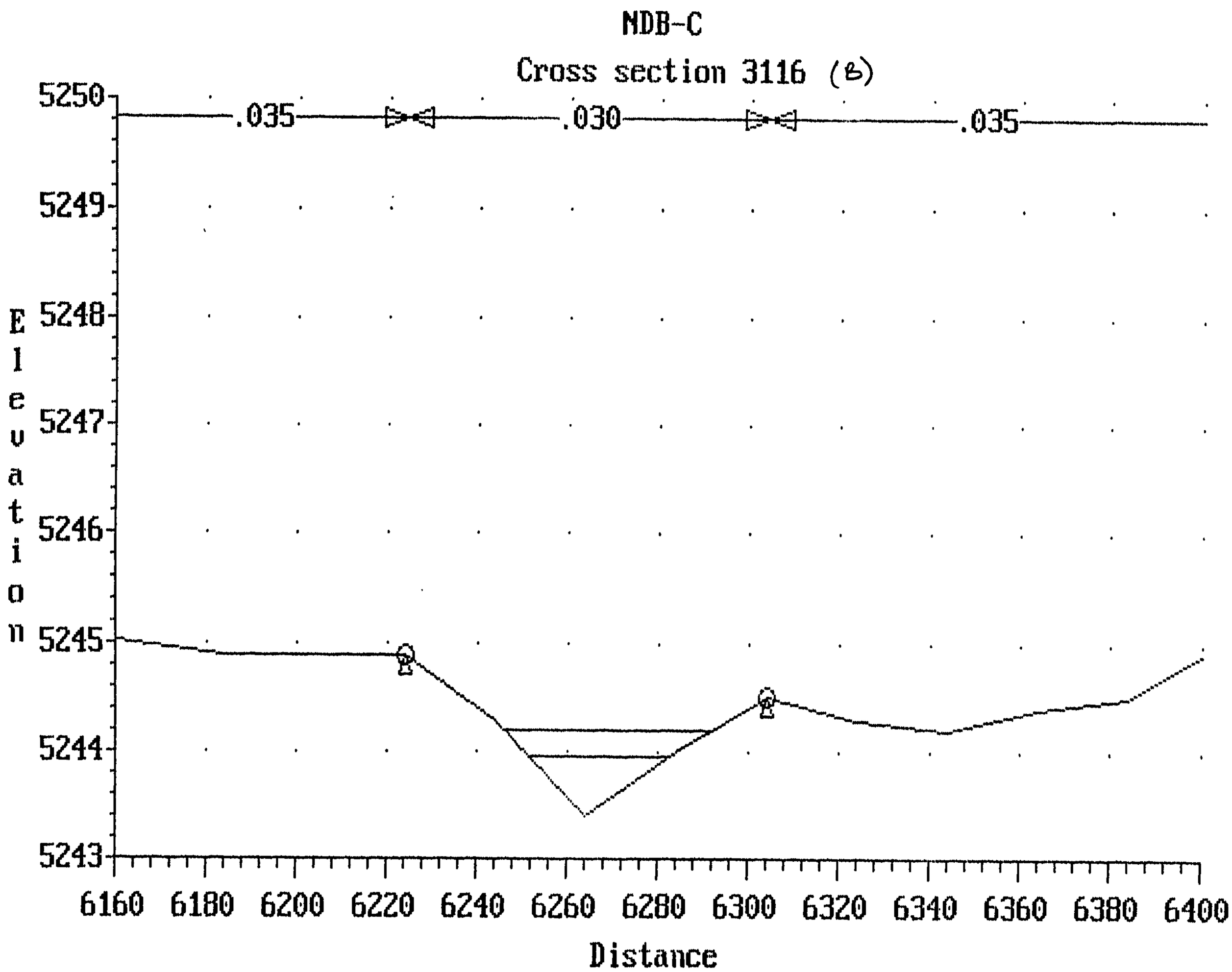

NDB-C
Cross section 3126 (6)
.030
.035
.035
5277
5276
5275
5274
5273
5272
5271
5270
Elevation
5980
6000
6020
6040
6060
6080
6100
6120
6140
6160
6180
6200
6220
Distance

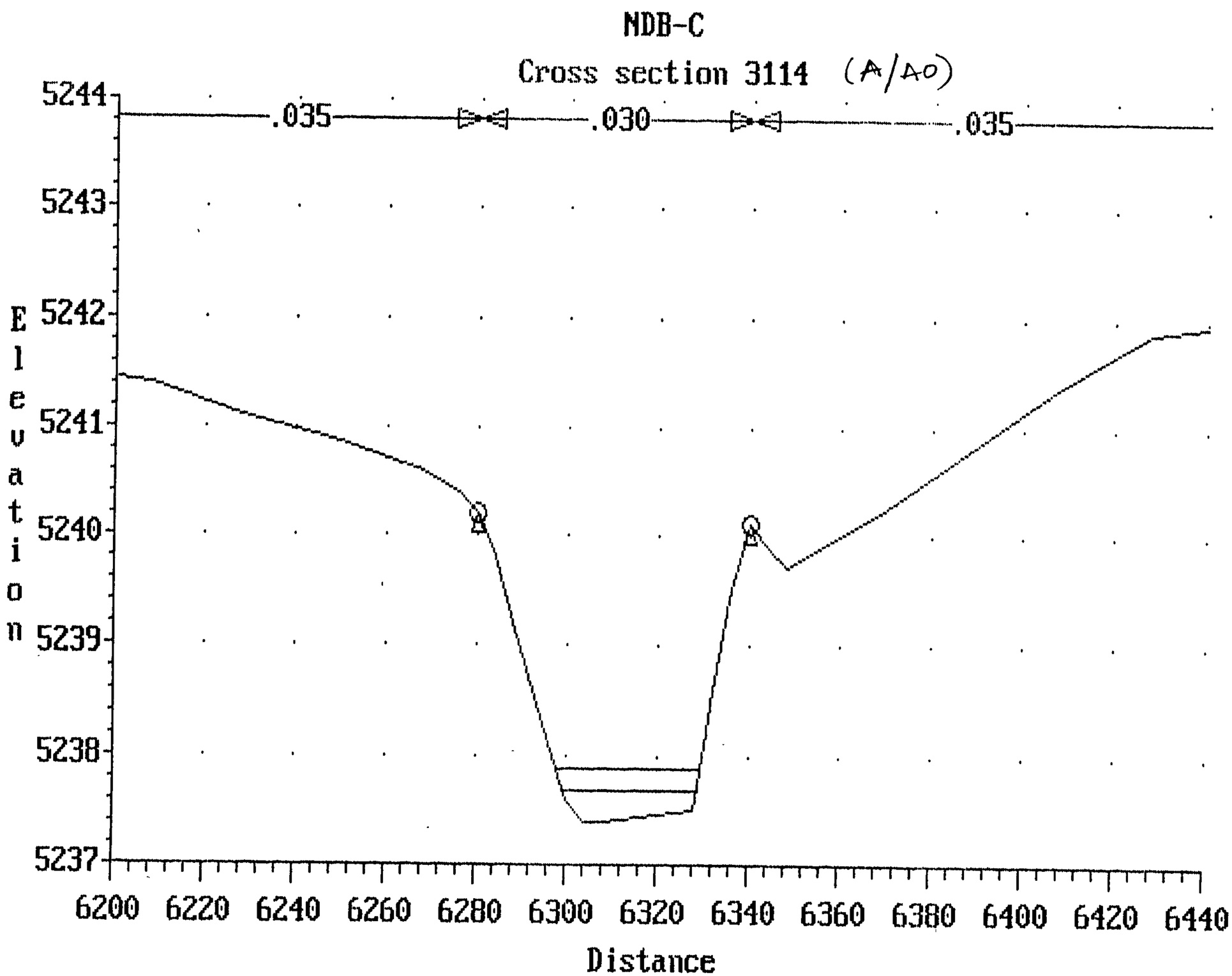

NDB-C
Cross section 124 (F)
.035
.030
.035
5270
5269
5268
5267
5266
5265
5264
5263
Elevation
5960
5980
6000
6020
6040
6060
6080
6100
6120
6140
6160
6180
6200
Distance


NDB-C
Cross section 3122 (E)
.035
.030
5265
5264
5263
5262
5261
5260
5259
5258
Elevation
6000
6020
6040
6060
6080
6100
6120
6140
6160
6180
6200
Distance


NDB-C
Cross section 3120 (D)
.035
.030
.035
5260
5259
5258
5257
5256
5255
5254
5253
Elevation
6000
6020
6040
6060
6080
6100
6120
6140
6160
6180
6200
6220
6240
Distance


NDB-C
Cross section 118 (c)
.030
.035
5255
5254
5253
5252
5251
5250
5249
5248
Elevation
6060
6080
6100
6120
6140
6160
6180
6200
6220
6240
6260
6280
6300
Distance


NDB-C
Cross section 3116 (B)
.035
.030
.035
5250
5249
5248
5247
5246
5245
5244
5243
Elevation
6160
6180
6200
6220
6240
6260
6280
6300
6320
6340
6360
6380
6400
Distance


NDB-C
Cross section 3114 (A/AO)
.035
.030
.035
5244
5243
5242
5241
5240
5239
5238
5237
Elevation
6200
6220
6240
6260
6280
6300
6320
6340
6360
6380
6400
6420
6440
Distance

RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

CHECKED _____ DATE _____

APPROVED _____ DATE _____

TITLE _____

PROJECT NO. _____

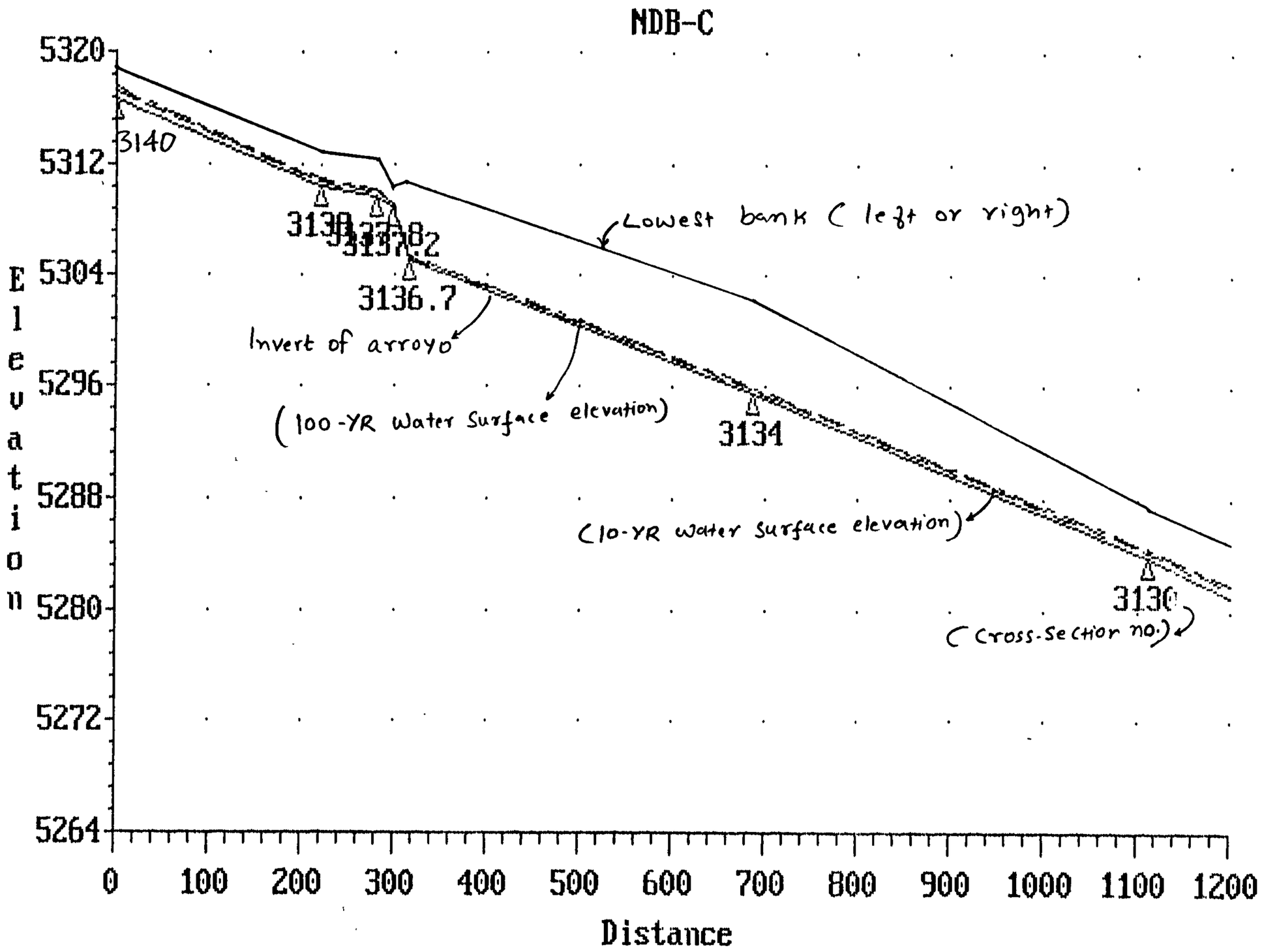
SHEET _____ OF _____

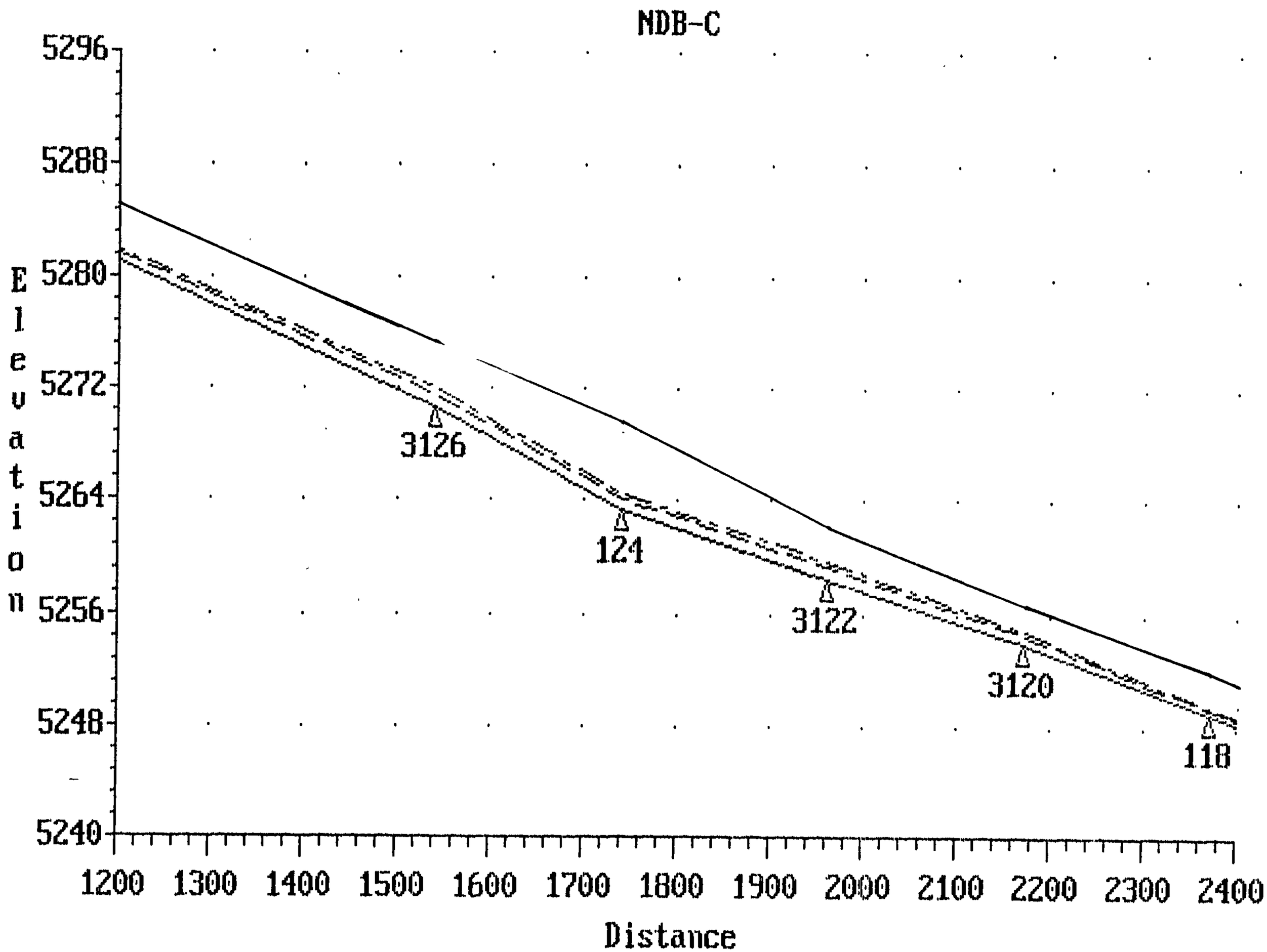
BY _____ DATE _____

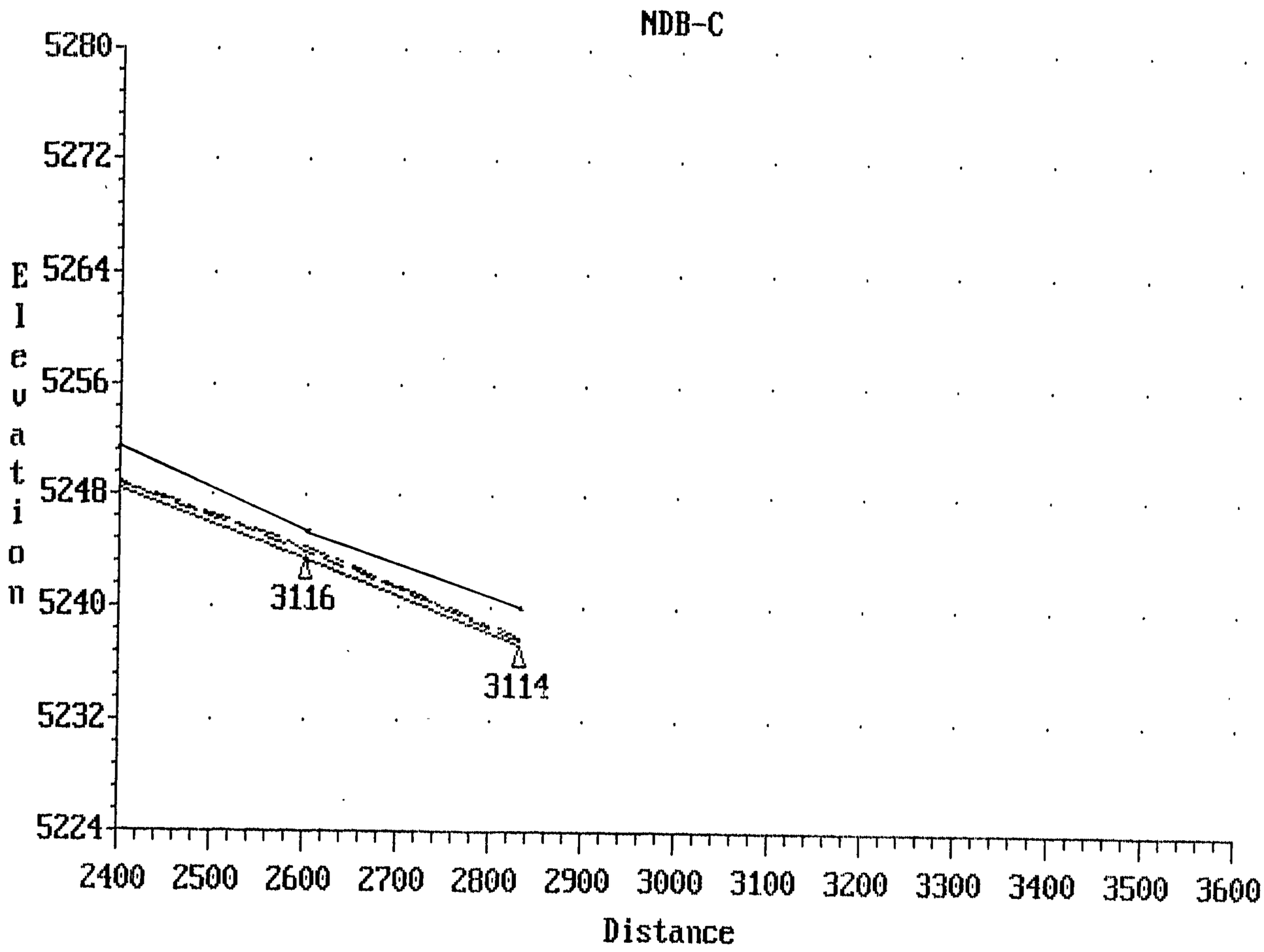
PROFILES

ARROYO: "C" OR SOUTH BRANCH TRIBUTARY

REACH: EAST OF I-25 (WHOLE REACH OF ARROYO "C")


NDB-C
5320
5312
5304
5296
5288
5280
5272
5264
Elevation
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
Distance
3140
3136.7
3134
3130
Lowest bank (left or right)
Invert of arroyo
(100-YR Water Surface elevation)
(10-YR water surface elevation)
(Cross-Section no.)


NDB-C
5296
5288
5280
5272
5264
5256
5248
5240
Elevation
3126
124
3122
3120
118
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
2300
2400
Distance


NDB-C
5280
5272
5264
5256
5248
5240
5232
5224
Elevation
3116
3114
2400
2500
2600
2700
2800
2900
3000
3100
3200
3300
3400
3500
3600
Distance

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE/COASTAL MAPPING FORM**	*O M B Burden No 3067-0148* *Expires July 31, 1997*	*FEMA USE ONLY*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: City of Albuquerque

Flooding Source: North Domingo Baca Arroyos

Project Name/Identifier: Lower North Domingo Baca Detention Dam (see Figure 5-1 at the end of this form)

1. MAPPING CHANGES

1. A topographic work map of suitable scale, contour interval, and planimetric definition must be submitted showing *(indicate N/A when not applicable)*:

		Included		
A.	Revised approximate 100-year floodplain boundaries (Zone A)	☒ Yes	☐ No	☐ N/A
B.	Revised detailed 100- and 500-year floodplain boundaries	☐ Yes	☒ No	☐ N/A
C.	Revised 100-year floodway boundaries	☐ Yes	☐ No	☒ N/A
D.	Location and alignment of all cross sections used in the revised hydraulic model with stationing control indicated *	☒ Yes	☐ No	☐ N/A
E.	Stream alignments, road and dam alignments	☒ Yes	☐ No	☐ N/A
F.	Current community boundaries	☒ Yes	☐ No	☐ N/A
G.	Effective 100- and 500-year floodplain and 100-year floodway boundaries from the FIRM/FBFM reduced or enlarged to the scale of the topographic work map	☒ Yes	☐ No	☐ N/A
H.	Tie-ins between the effective and revised 100- and 500-year floodplains and 100-year floodway boundaries	☐ Yes	☐ No	☒ N/A
I.	The requestor's property boundaries and community easements	☒ Yes	☐ No	☐ N/A
J.	The signed certification of a registered professional engineer	☒ Yes	☐ No	☐ N/A
K.	Location and description of reference marks	☒ Yes	☐ No	☐ N/A
L.	Vertical datum (example: NGVD, NAVD etc.)	☒ Yes	☐ No	☐ N/A
M.	Coastal zone designations tie into adjacent areas not being revised	☐ Yes	☐ No	☒ N/A
N.	Location and alignment of all coastal transects used to revise the coastal analyses	☐ Yes	☐ No	☒ N/A

* Actually new hydraulics.

If any of the items above are marked no or N/A, please explain: B & C) Only 100-yr floodplain is studied. H) Supporting documentation for effective FIS is not available. M & N) Study area is not in Coastal Zone.

2. What is the source and date of the updated topographic information *(example: orthophoto maps, July 1985; field survey, May 1979, beach profiles, June 1987, etc.)*? Orthophoto maps (May 1990) & Field Survey on June 20, 1994 and on 04/21/95.

3. What is the scale and contour interval of the following workmaps?

   a. Effective FIS 1" = 500' scale 2 ft Contour interval

   b. Revision Request 1" = 200' scale 2 ft Contour interval

NOTE: Revised topographic information must be of equal or greater detail.

4. Attach an annotated FIRM and FBFM at the scale of the effective FIRM and FBFM showing the revised 100-year and 500-year floodplains and the 100-year floodway boundaries and how they tie into those shown on the effective FIRM and FBFM downstream and upstream of the revision or adjacent to the area of revision for coastal studies.

Attach additional pages if needed. (see figure 5-2, this form)

5. Flood Boundaries and 100-year water surface elevations: (a)

Has the 100-year floodplain been shifted or increased or the 100-year water surface elevation increased at any location on property other than the requestor's or community's ? ☐ Yes ☒ No

If yes, please give the location of shift or increase and an explanation for the increase.

a. Have the affected property owners been notified of this shift or increase and the effect it will have on their property? ..... ☐ Yes ☐ No

If yes, please attach letters from these property owners stating they have no objections to the revised flood boundaries if a LOMR is being requested.

b. What is the number of insurable structures that will be impacted by this shift or increase? _____

6. Have the floodway boundaries shifted or increased at any location compared to those shown on the effective FBFM or FIRM? ..... ☐ Yes ☐ No N/A

If yes, explain:

7. If a V- zone has been designated, has it been delineated to extend landward to the heel of the primary frontal dune? ☐ Yes ☐ No N/A

If no, explain:

8. Manual or digital map submission:

☒ Manual

☐ Digital

Digital map submissions may be used to update digital FIRMs (DFIRMs). For updating DFIRMs, these submissions must be coordinated with FEMA Headquarters as far in advance of submission as possible.

(a) Supporting documentation for effective FIS is not available.

2. EARTH FILL PLACEMENT (Not Available)

1. The fill is: ☐ Existing ☐ Proposed

2. Has fill been/will be placed in the regulatory floodway? ..... ☐ Yes ☐ No
   If yes, please attach completed Riverine Hydraulic Analysis Form.

3. Has fill been/will be placed in floodway fringe *(area between the floodway and 100-year floodplain boundaries)*? ..... ☐ Yes ☐ No

   If yes, then complete A, B, C, and D below.

   A. Are fill slopes for granular materials steeper than one vertical on one-and-one-half horizontal? ..... ☐ Yes ☐ No

   If yes, justify steeper slopes _____

   _____

   B. Is adequate erosion protection provided for fill slopes exposed to moving flood waters? *(Slopes exposed to flows with velocities of up to 5 feet per second (fps) during the 100-year flood must, at a minimum, be protected by a cover of grass, vines, weeds, or similar vegetation; slopes exposed to flows with velocities greater than 5 fps during the 100-year flood must, at a minimum, be protected by stone or rock riprap.)* ..... ☐ Yes ☐ No

   If no, describe erosion protection provided _____

   _____

   C. Has all fill placed in revised 100-year floodplain been compacted to 95 percent of the maximum density obtainable with the Standard Proctor Test Method or acceptable equivalent method? ☐ Yes ☐ No

   D. Can structures conceivably be constructed on the fill at any time in the future? ☐ Yes ☐ No

   If yes, provide certification of fill compaction (item C. above) by the community's NFIP permit official, a registered professional engineer, or an accredited soils engineer.

4. Has fill been/will be placed in a V-zone? ☐ Yes ☐ No

   If yes, is the fill protected from erosion by a flood control structure such as a revetment or seawall? ☐ Yes ☐ No

   If yes, attach the coastal structures form.

FEDERAL EMERGENCY MANAGEMENT AGENCY **CHANNELIZATION FORM**	O.M.B Burden No 3067 0148 Expires July 31, 1997	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1.75 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: City of Albuquerque

Flooding Source: North Domingo Baca Arroyos

Project Name/Identifier: Lower North Domingo Baca Detention Dam

1. EXTENT OF CHANNELIZATION

Downstream limit: Confluence of North & South Domingo Baca Arroyos

Upstream limit: Interstate 25

2. CHANNEL DESCRIPTION

1. Describe the inlet to the channel See Text

2. Briefly describe the shape of the channel (*both cross sectional and planimetric configuration*) and its lining (*channel bottom and sides*) Trapezoidal with approximately 1V:2H slope. Channel bottom and sides are made of earth materail.

3. Describe the outlet from the channel Channel for North Domingo Baca Arroyo meets with the channel for South Domingo Baca Arroyo.

4. The channelization includes:

   - ☐ Levees (*Attach Levee Form*)
   - ☒ Drop structures (see Text)
   - ☐ Superelevated sections
   - ☐ Transitions in cross sectional geometry
   - ☐ Debris basin/detention basin
   - ☐ Energy dissipater
   - ☐ Other

5. Attach the following:

   a. Certified engineering drawings showing channel alignment and locations of inlet, outlet, and items checked in item 4 (not available)

   b. Typical cross sections and profiles of channel banks and invert (see Form 4)

3. HYDRAULIC CONSIDERATIONS

1. What is the 100-year discharge? ..... See Text cfs

2. Do the cross sections in the hydraulic model match the typical cross sections in the plans? ☐ Yes ☐ No N/A
(Plans are not available)

3. Are the channel banks higher than the 100- year flood elevations everywhere? ..... ☐ Yes ☒ No

4. Are the channel banks higher than the 100-year flood energy grade lines everywhere? .. ☐ Yes ☒ No

5. Is the land on both sides of the channel above the adjacent 100-year flood elevation at all points along the channel? ..... ☐ Yes ☒ No

6. What is the range of freeboard? ..... 0 – 9 feet

7. What is the range of the 100-year flood velocities? ..... <1 – 19 ft/sec

8. What is the lining type? (both bottom and sides) see channel description (page 1 of 3, this form)

Explain how the channel lining prevents erosion and maintains channel stability (*attach documentation*)
No channel lining, however, no signs of erosion.

9. What is the design elevation in the channel based on? (Design calculations are not available)

☐ Subcritical flow
☐ Critical flow
☐ Supercritical flow
☐ Energy grade line

Is 100-year flood profile based on the above type of flow? ..... ☐ Yes ☐ No

If no, explain: _____

10. Is there the potential for a hydraulic jump at the following locations?

Inlet to channel ..... ☐ Yes ☒ No
Outlet of channel ..... ☐ Yes ☒ No
At Drop Structures ..... ☐ Yes ☒ No
At Transitions ..... ☐ Yes ☒ No
Other locations. Explain: See Text

If the answer to any of the above is yes, please explain how the hydraulic jump is controlled and the effects of the hydraulic jump on the stability of the channel.

Explain: See Text

A. Is there any indication from historical records that sediment transport (including scour and deposition) can affect the 100-year water surface elevations and/or the capacity of the channel? ..... ☐ Yes ☒ No

B. Based on the conditions of the watershed and stream bed, is there a potential for sediment transport (including scour and deposition) to affect the 100-year water surface elevations and /or the capacity of the channel? ..... ☐ Yes ☒ No

2. If the answer to either 1A or 1B is yes: (see Exhibit 7-1)

A. What is the estimated sediment (bed) load?
_____cfs (attach gradation curve)

Explain method used to estimate load_____

_____

_____

_____

B. Is the 100-year flood velocity anywhere within the channel less than the 100-year flood velocity of the inlet? ☐ Yes ☒ No

C. Will sediment accumulate anywhere within the channel? ☐ Yes ☒ No

D. Will deposition or scour occur at or near the inlet? (a) ☒ Yes ☐ No

E. Will deposition or scour occur at or near the outlet? ☐ Yes ☒ No

Attach documentation showing affects on the Hydrologic and Hydraulic analyses

(see Exhibit 7-1)

(a) Valid for culvert structure no 1 only

FORM 6
CHANNELIZATION FORM

CHANNEL DESCRIPTION (Form 6, Page 1 of 3)

Item 1. **Describe the inlet to the channel**

NOTE: See schematic drawing included in Exhibit 6-1.

North Branch of North Domingo Baca Arroyo (Arroyo "A") beginning at I-25.
Eight - 4 ft dia Reinforced Concrete Pipe culverts at inlet & Corrugated Metal Pipe culverts at outlet.

South Branch of North Domingo Baca Arroyo (Arroyo "B") beginning at I-25.
Four - 4 ft (height) x 9 ft (width) Reinforced Concrete Box Culverts. The two southern most box culverts and the northern most box culvert are available for surface flow. The outfall pipe from Lower North Domingo Baca Detention Dam is connected to second box culvert from north side thus separating the northern most culvert from the two southern most box culverts.

CHANNEL DESCRIPTION (Form 6, Page 1 of 3)

Item 4. **Drop structures**

NOTE: See schematic drawing included in Exhibit 6-1.

South Branch of North Domingo Baca Arroyo (Arroyo "B"):
There is a concrete grade control structure of about 3 ft vertical drop approximately 45 ft upstream of culvert structure no. 6.

HYDRAULIC CONSIDERATION (Form 6, Page 2 of 3)

Item 1. **100-year peak discharges**

North Branch of North Domingo Baca Arroyo (Arroyo "A"):
100-year discharges range from 277 cfs (at Interstate 25) to 326 cfs (before confluence with south branch)

South Branch of North Domingo Baca Arroyo (Arroyo "B"):
100-year discharges range from 253 cfs (at Interstate 25) to 274 cfs (before confluence with north branch)

At the confluence of North and South Branches of North Domingo Baca Arroyo:
100-year discharge is 600 cfs.

Item 10. **Is there the potential for hydraulic jump at following locations ?**
Note: See schematic diagram in Exhibit 6-1.

North Branch (Arroyo "A")

For the reach between culvert structures nos. 1 & 3:
Since this reach is modelled as a reservoir, there is no potential for hydraulic jump.

For the reach between culvert structure nos. 3 & 5:
There will be a hydraulic jump at cross-section 402. But the calculations in Exhibit 6-2 show that this jump will be contained in the channel.

For the reach downstream of culvert structure no. 5 till South Domingo Baca Arroyo:
Since the flow regime in this whole reach is super-critical, there is no potential for hydraulic jump.

South Branch (Arroyo "B")

For the reach between culvert structures nos. 2 & 4:
Since the flow regime in this whole reach is sub-critical, there is no potential for hydraulic jump.

For the reach between culvert structures nos. 4 & 6:
The flow regime at all cross-sections except the one at the face of culvert structure no. 6 is super-critical. The flow regime at cross-section 83.3 which is at the upstream face of culvert structure no. 6 is sub-critical. But the water surface elevation at first upstream cross-section (2083.5) from cross-section 83.3 is assumed same as that at cross-section no. 83.3 because of backwater effect. The flow depths at cross-sections 83.3 and 2083.5 are similar. Also the flow depth at cross-section 83.30 which is at the face of culvert structure no. 6 is below the soffit. Therefore there is no potential for hydraulic jump.

Drop structure

Drop structure in this reach extends from cross-section 83.93 to 83.83. The water surface elevation at cross-section 83.83 (5161.37 - super-critical) is very similar to that (5161.32 - sub-critical) at cross-section 2083.5. Therefore there is no potential for hydraulic jump.

For the reach between culvert structures nos. 7 & 6:
Since the flow regime in this reach is either sub-critical or critical, there is no potential for hydraulic jump.

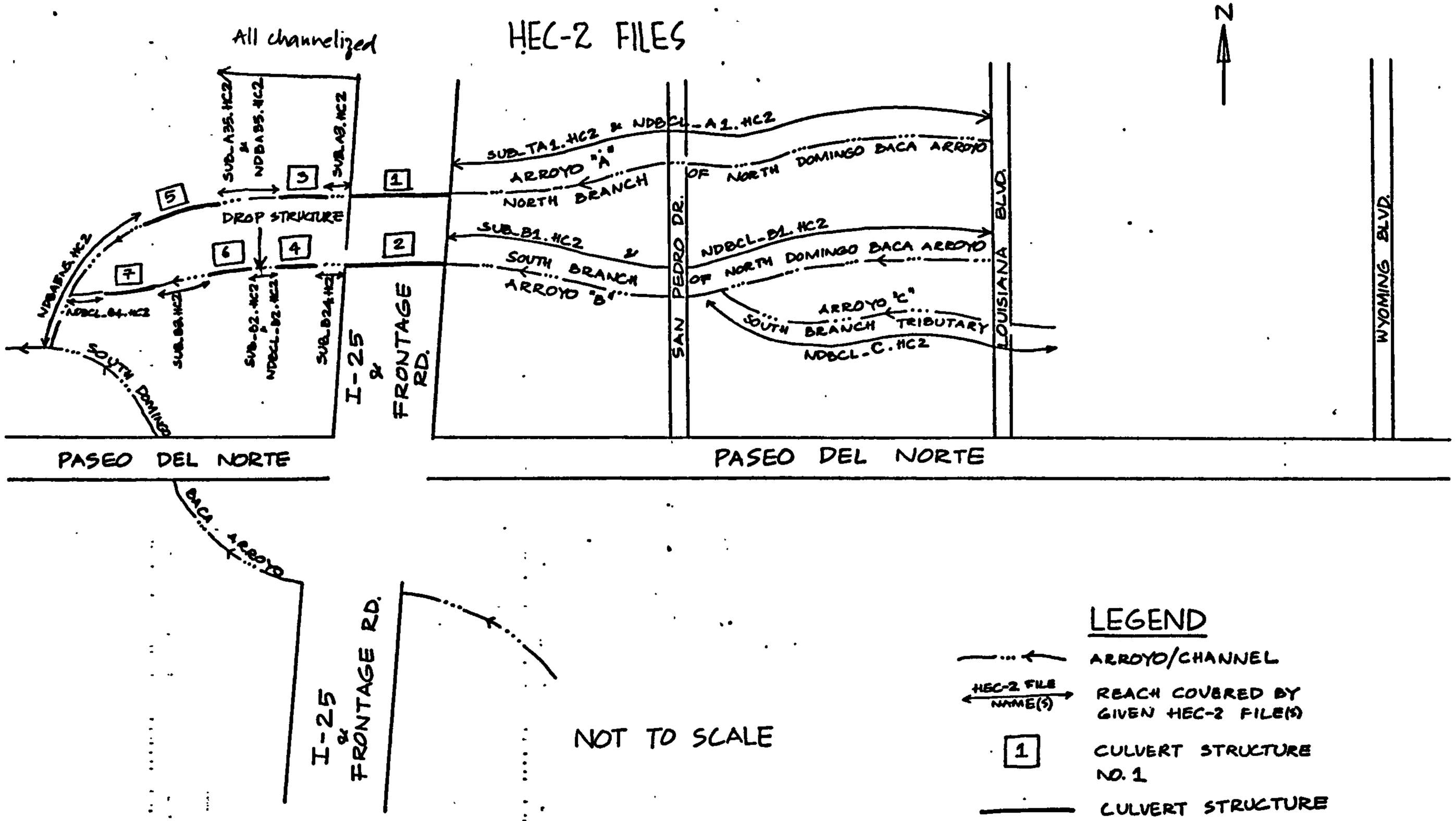
For the reach downstream of culvert structure 7 till confluence of North and South branches:
Since the flow regime in this whole reach is super-critical, there is no potential for hydraulic jump.

EXHIBIT 6-1

Contains:

1. Schematic drawing of culvert structures, drop structures and channels.

SCHEMATIC DIAGRAM ILLUSTRATING CULVERT STRUCTURES AND REACHES COVERED BY HEC-2 FILES



RESOURCE TECHNOLOGY, INC.
LOMR FOR NORTH DOMINGO BACA ARROYOS
RTI PROJECT NO. 94-20D-1-3

RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

CHECKED _____ DATE _____ PROJECT NO. _____

APPROVED _____ DATE _____ SHEET 1 OF 1

TITLE _____ BY RR DATE 08/03/94

DESCRIPTION OF CULVERT STRUCTURES

Structure No.	Quantity	Opening Size (a)	Description	Inlet Invert Elev. (c)	Outlet Invert Elev. (c)	Existing available flow depth (ft) Inlet	Outlet
1	8	4ft dia (L = 350 ft)	RCP @ Inlet CMP @ Outlet	5194.80	5185.90	4	4
2	4	4ft (H) x 9ft (W) (L = 300ft)	Concrete Box Culverts	5193.42	5188.42	3.58	3.58
3	1	5.8ft (R) x 7.5' (S) (L = 30ft)	CMP-Arch (Structural Plate)	5180.20	5180.20	5.8	5.8
4	2	5.6ft (R) x 9.0' (S) (L = 30ft)	CMP-Arch (Struct. Plate)	5183.30	5182.50	5.6	5.6
5	1	5.9ft (R) x 8.5' (S) (L = 480 ft)	CMP-Arch (Struct. Plate)	5170.30	(b)	5.9	(b)
6	2	4.3ft (R) x 9.5' (S) (L = 30ft)	CMP-Arch (Struct. Plate)	5157.10	5156.20	4.3	4.4
7	1	4.0ft (R) x 12.4 (S) (L = 35ft)	CMP-Arch (Struct. Plate)	5153.10	5152.90	4.0	3.50

(a) The given sizes are "actual size" available for flow.
(b) Since the culvert is filled with sediment, data is not available.
(c) These inlet and outlet invert elevations represent elevations of tops of sediment deposition in culverts. If there was no sediment deposition in culvert, these elevations represent true invert elevations. If the rise or height in "Opening Size" column is equal to existing available flow depth, it means that there is no sediment in it (for the particular structure.)

Top elev. of opening for struct ② = 5193.42 + 3.58 = 5197.0

Note: There was no sediment deposition in culverts structures nos. ①, ③, ④ & ⑤.

EXHIBIT 6-2

Contains:

1. Hydraulic Jump Calculations.

EXHIBIT-6-2

RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

CHECKED _____ DATE _____
APPROVED _____ DATE _____
TITLE _____

PROJECT NO. _____
SHEET 1 OF 3
BY RR DATE 5/1/95

EXHIBIT 6-2

Hydraulic Jump calculations:

Hydraulic Jump program in "BASIC".

```
5 INPUT "X-SECTION=":XS$
10 INPUT "A=":A
20 INPUT "WT=":WT
30 INPUT "Q=":Q
40 INPUT "D=":D
42 LPRINT
50 INPUT "ELMIN=":EL
60 Y=A/WT
64 LPRINT XS$
65 PRINT "Y=":Y
70 F=(Q/A)/((32.2*Y)^.5)
75 PRINT "F=":F
80 DS=D+.5*Y*(((1+8*F^2)^.5)-3)
90 LPRINT "DS=":DS
91 LPRINT "D=":D
92 LPRINT "A=":A
93 LPRINT "WT=":WT
94 LPRINT "ELMIN=":EL
95 ES=EL+DS
96 LPRINT "ESEQ=":ES
97 LPRINT "F=":F
99 LPRINT
100 END
```

Reach between culvert structure nos. 3 & 5

402
DS= 4.462753
D= 2.03
A= 20.06
WT= 11.65
ELMIN= 5170.93
ENEG= 5175.393 < 5175.98 (Lowest Bank)
F= 2.203006

Sequent Depth

Therefore jump will be contained in the channel.

FEDERAL EMERGENCY MANAGEMENT AGENCY

BRIDGE/CULVERT FORM

O.M.B. Burden No. 3067-0148
Expires July 31, 1997

FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: City of Albuquerque

Flooding Source: North Domingo Baca Arroyo (North Branch)

Project Name/Identifier: Lower North Domingo Baca Detention Dam

1. IDENTIFIER (Culvert Structure No. 1)

1. **Name of roadway, railroad, etc.:** Interstate 25
2. **Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier):**
   Between cross-sections 96.3 & 93.3
3. **This revision reflects** *(check one of the following)*:
   - ☐ New bridge/culvert not modeled in the FIS
   - ☒ Modified bridge/culvert previously modeled in the FIS
   - ☐ New analysis of bridge/culvert previously modeled in the FIS

   (Explain why new analysis was performed)

2. BACKGROUND

Provide the following information about the structure:

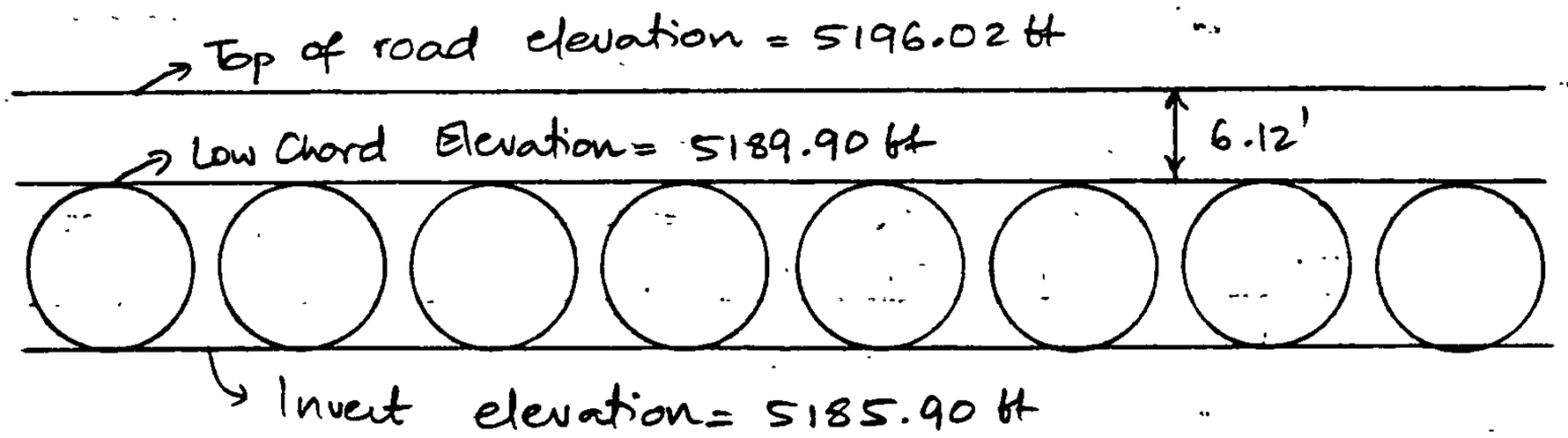
1. Dimension, material, and shape (e.g. two 10 x 5 feet reinforced concrete box culvert; three 30-foot span bridge with 2 rows of two 3- foot diameter circular piers; 40-foot wide ogee shape spillway) Eight - 4 ft dia Reinforced Concrete Pipes @ Inlet and Corrugated Metal Pipes @ Outlet
2. Entrance geometry of culvert/type of bridge opening (e.g. 30° - 75° wing walls with square top edge, sloping embankments and vertical abutments)
   Headwall without wingwalls
3. Hydraulic model used to analyze the structure (*e.g., HEC-2 with special bridge routine, WSPRO, HY8*)
   See Text

If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structure(s). *(Attach justification)*

See Text

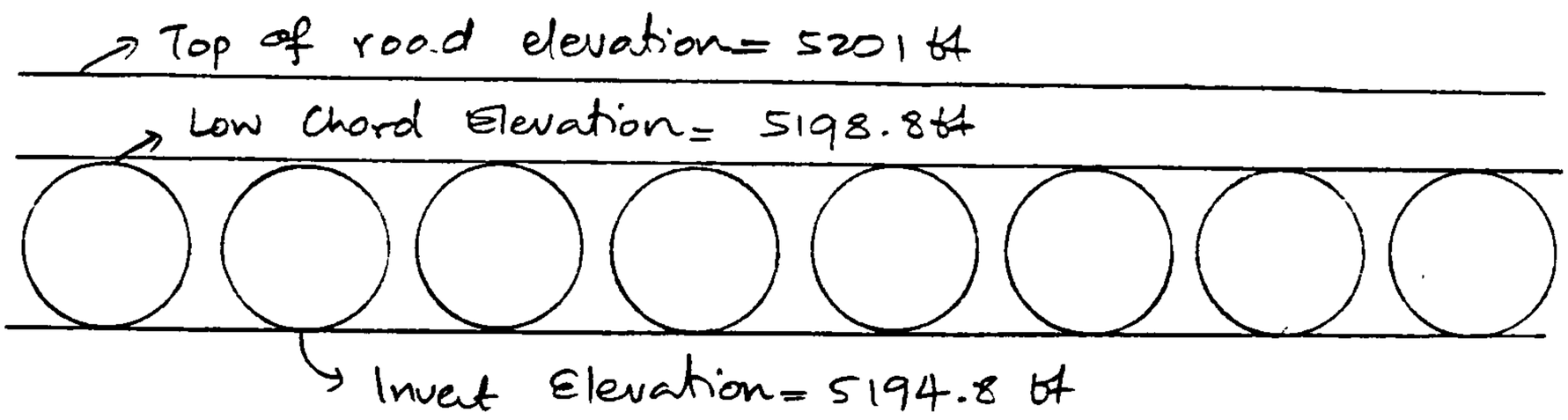
Note: If any items do not apply to submitted hydraulic analysis, indicate by N/A
*** One form per new/revised bridge/culvert**

Sketch the downstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, minimum top of road elevation, and ineffective flow widths.



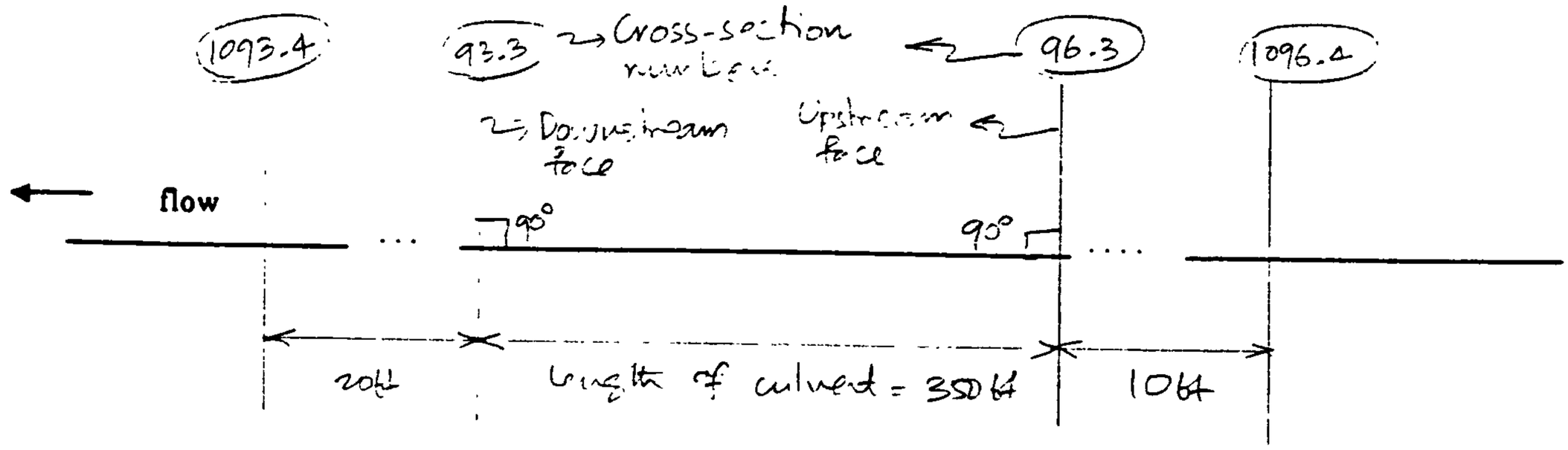
8 - 4 ft dia RCP @ Upstream end
CMP @ Downstream end

Sketch the upstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, and minimum top of road elevation.



8 - 4 ft dia RCP @ Upstream end
CMP @ Downstream end

Sketch the plan view of the structure(s) Show, at a minimum, the skew angle, cross-section locations, distances between cross sections, and length of structure (s).



Attach plans of the structure (s) certified by a registered Professional Engineer. (Not Available)

Culvert length or bridge width (ft)	350
Calculated culvert/bridge area (ft²) by the hydraulic model, if applicable	NA*
Total culvert/bridge area (ft²)	100.53

* Since circular culverts are modelled as equivalent box culverts, area computed by hydrualic model is not accurate (see Form 4).

Elevations Above Which Flow is Effective for Overbanks (ft)

	Left Overbank	Right Overbank
Upstream face	5198.80	5198.80
Downstream face	5189.90	5189.90

Minimum Top of Road Elevation (ft)

	Left Overbank	Right Overbank
Upstream face	5201	5201
Downstream face	5196.02	5196.02

100-Year Elevations (ft)	Water Surface Elevations	Energy Gradient Elevations
Upstream face	5197.28 (a)	5197.53 (a)
Downstream face	5186.50	5186.50

Discharge	Low Flow	Pressure Flow	Weir Flow	Total Flow
Amount of flow through/over the structure (s) (cfs)	277	0	0	277

The maximum depth of flow over the roadway/railroad (ft.) 0

Weir length (ft.) 0

Top Widths (ft)	Total Floodplain Width	Total Effective Flow Width	Floodway Width
Upstream face	87.73 (a)	56.7 (a)	NA
Downstream face	35.00	35.0	NA

(a) See Exhibit 7-1

Loss Coefficients

Entrance loss coefficient	0.5
Manning's "n" value assigned to the structure(s)	0.019
Friction loss coefficient through structure (s)	NA
Other loss coefficients (e.g., bend manhole, etc.)	NA
Total loss coefficient	NA
Weir coefficient	NA
Pier coefficient	NA
Contraction loss coefficient	0.3
Expansion loss coefficient	0.3

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. A. Is there any indication from historical records that sediment transport *(including scour and deposition)* can affect the 100-year water surface elevations? ..... ☐ Yes ☒ No

   B Based on the conditions *(such as geomorphology, vegetative cover and development of the watershed and stream bed, and bank conditions)*, is there a potential for debris and sediment transport *(including scour and deposition)* to affect the 100-year water surface elevations and/or conveyance capacity through the bridge/culvert? ..... ☒ Yes ☐ No

2. If the answer to either 1A or 1B is yes:

   A. What is the estimated sediment *(bed material)* load?
   _____cfs *(attach gradation curve)*

   Explain method used to estimate the sediment transport and the depth of scour and/or deposition _____
   (See Exhibit 7-1)

   B. Will sediment accumulate anywhere through the bridge/culvert? ☐ Yes ☒ No

   If yes, explain the impact on the conveyance capacity through the bridge/culvert? _____

5. FLOODWAY ANALYSIS (Not Applicable)

Explain method of bridge encroachment (floodway run) _____

Comments (*explain any unusual situations*):

Attach analysis.

FORM 7
BRIDGE/CULVERT FORM

(For culvert structures 1 through 7)

BACKGROUND (Page 1 of 6)

Item 3. Hydraulic model used to analyze the structure

Shapes of culverts in this study are circular, arch and box. The HEC-2 program does not have built-in arch culvert charts to use in SC card option. Therefore culvert charts are used manually to compute head water depths in front of culverts. To maintain consistency, culvert charts are used at all culverts irrespective of shape of culverts.

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT FORM**	*O.M.B Burden No. 3067-0148* *Expires July 31, 1997*	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: City of Albuquerque

Flooding Source: North Domingo Baca Arroyos (South Branch)

Project Name/Identifier: Lower North Domingo Baca Detention Dam

1. IDENTIFIER (Culvert Structure No. 2)

1. Name of roadway, railroad, etc.: Interstate 25
2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier): Between cross-sections 900 & 93.3
3. This revision reflects (*check one of the following*):
   - ☐ New bridge/culvert not modeled in the FIS
   - ☒ Modified bridge/culvert previously modeled in the FIS
   - ☐ New analysis of bridge/culvert previously modeled in the FIS

   (*Explain why new analysis was performed*)

2. BACKGROUND

Provide the following information about the structure:

1 Dimension, material, and shape (e.g. two 10 x 5 feet reinforced concrete box culvert; three 30-foot span bridge with 2 rows of two 3- foot diameter circular piers; 40-foot wide ogee shape spillway)
Four 9 ft (width) X 4 ft (height) reinforced concrete box culverts

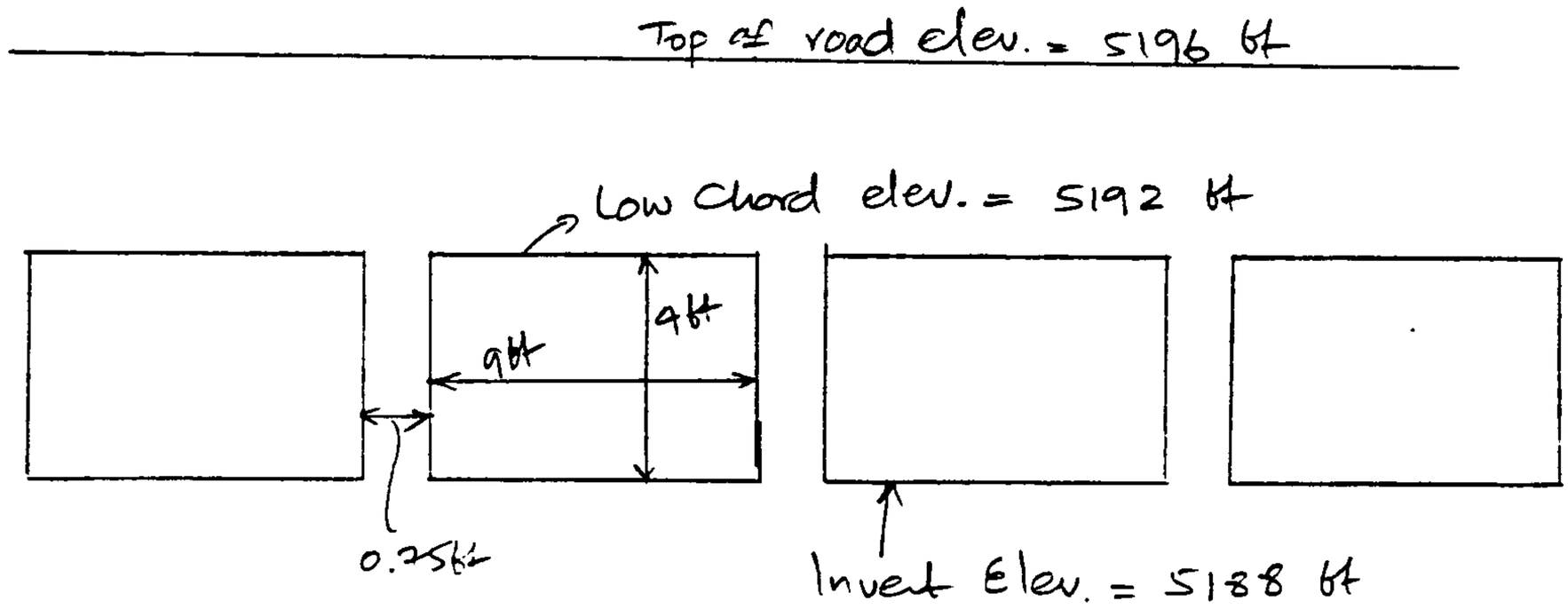
2. Entrance geometry of culvert/type of bridge opening (e.g. 30° - 75° wing walls with square top edge, sloping embankments and vertical abutments)
30 deg to 75 deg wingwalls with square edge top

3. Hydraulic model used to analyze the structure (*e.g., HEC-2 with special bridge routine, WSPRO, HY8*)
See Text

If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structure(s). (*Attach justification*)
See Text

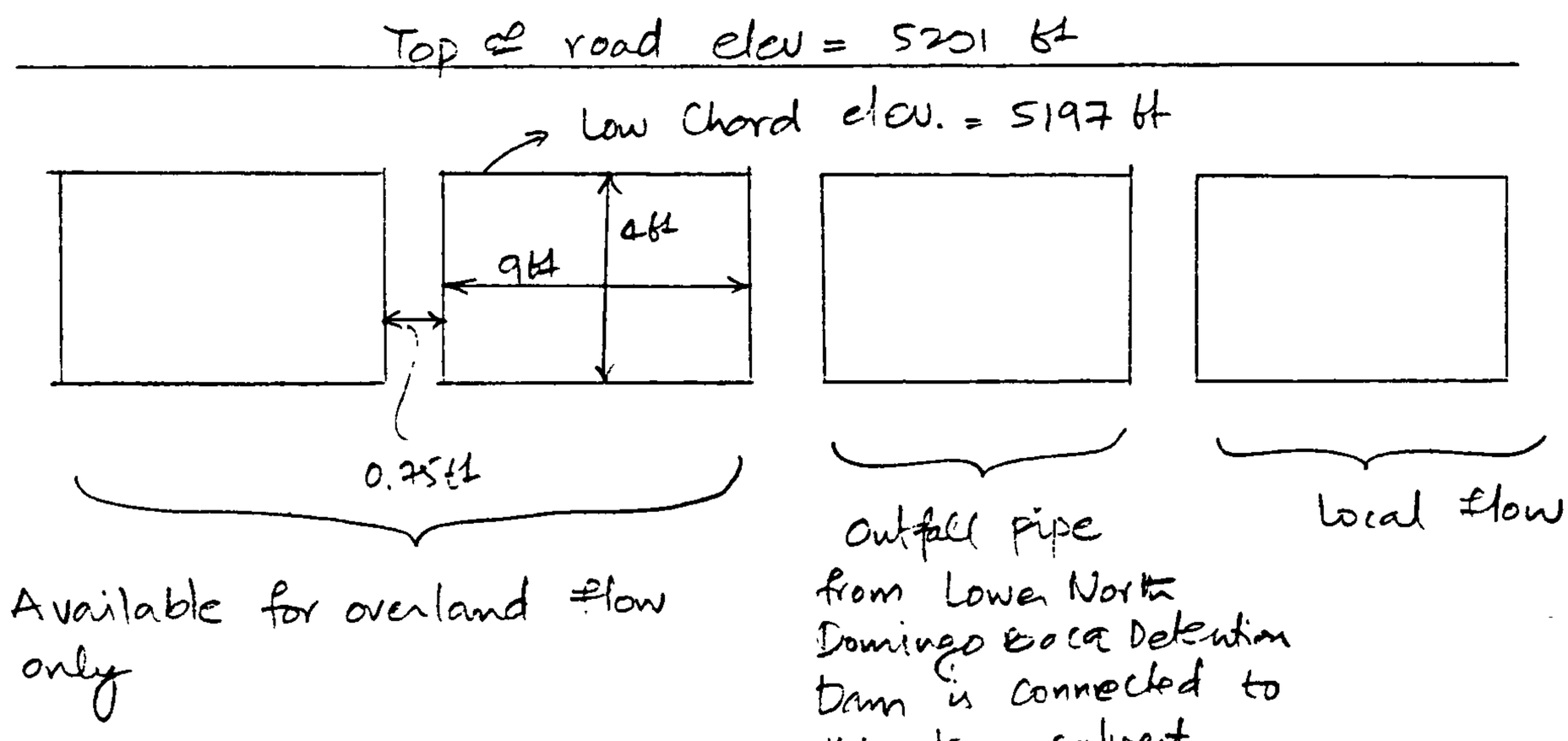
Note: If any items do not apply to submitted hydraulic analysis, indicate by N/A
*** One form per new/revised bridge/culvert**

Sketch the downstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, minimum top of road elevation, and ineffective flow widths.



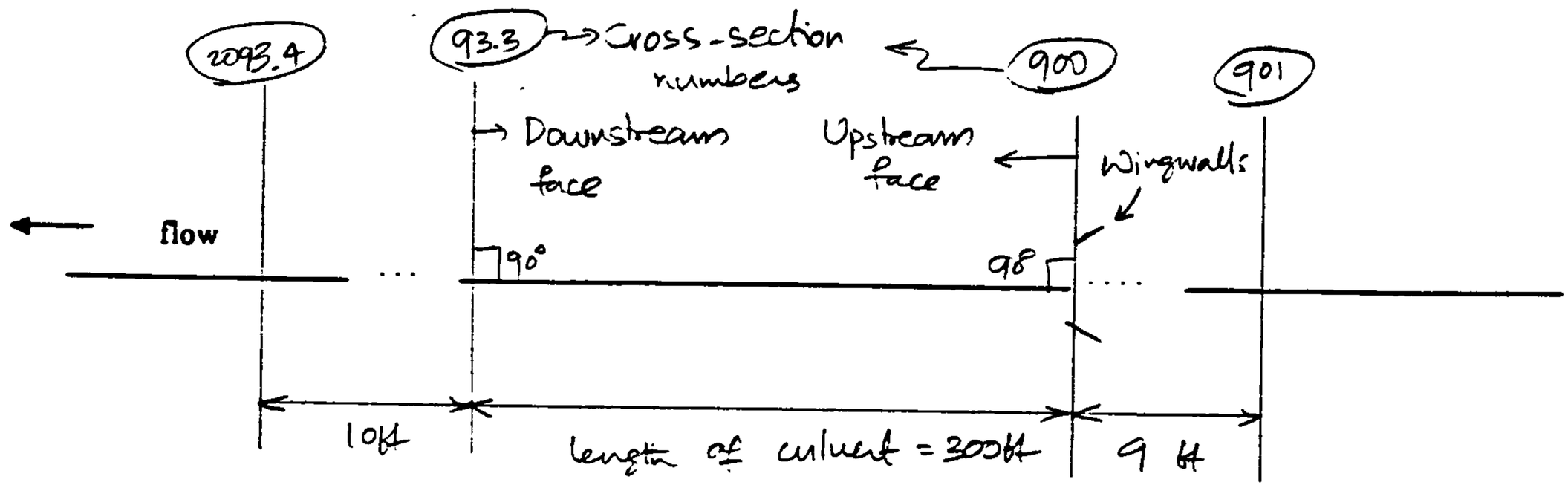
Four reinforced concrete box culverts

Sketch the upstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, and minimum top of road elevation.



Four reinforced concrete box culverts

Sketch the plan view of the structure(s) Show, at a minimum, the skew angle, cross-section locations, distances between cross sections, and length of structure (s).



Attach plans of the structure (s) certified by a registered Professional Engineer. (Not Available)

Culvert length or bridge width (ft)	300
Calculated culvert/bridge area (ft^2) by the hydraulic model, if applicable	31.45 (a)
Total culvert/bridge area (ft^2)	72 (a)

(a) This area includes only two southern most culverts which are available for overland flow (see Form 4).

Elevations Above Which Flow is Effective for Overbanks (ft)

	Left Overbank	Right Overbank
Upstream face	5197	5197
Downstream face	5192	5192

Minimum Top of Road Elevation (ft)

	Left Overbank	Right Overbank
Upstream face	5201	5201
Downstream face	5196	5196

100-Year Elevations (ft)	Water Surface Elevations	Energy Gradient Elevations
Upstream face	5195.35	5195.67
Downstream face	5189.80	5190.10

Discharge	Low Flow	Pressure Flow	Weir Flow	Total Flow
Amount of flow through/over the structure (s) (cfs)	143	0	0	143

The maximum depth of flow over the roadway/railroad (ft.) 0

Weir length (ft.) 0

Top Widths	Total Floodplain Width	Total Effective Flow Width	Floodway Width
Upstream face	24.52	18.75	NA
Downstream face	34.44	38.25	NA

Loss Coefficients

Entrance loss coefficient	0.4
Manning's "n" value assigned to the structure(s)	0.015
Friction loss coefficient through structure (s)	NA
Other loss coefficients (e.g., bend manhole, etc.)	NA
Total loss coefficient	NA
Weir coefficient	NA
Pier coefficient	NA
Contraction loss coefficient	0.3
Expansion loss coefficient	0.3

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. A. Is there any indication from historical records that sediment transport (*including scour and deposition*) can affect the 100-year water surface elevations? ..... ☐ Yes ☒ No

   B Based on the conditions (*such as geomorphology, vegetative cover and development of the watershed and stream bed, and bank conditions*), is there a potential for debris and sediment transport (*including scour and deposition*) to affect the 100-year water surface elevations and/or conveyance capacity through the bridge/culvert? ..... ☐ Yes ☒ No

2. If the answer to either 1A or 1B is yes:

   A. What is the estimated sediment (*bed material*) load?
   _____cfs (*attach gradation curve*)

   Explain method used to estimate the sediment transport and the depth of scour and/or deposition _____

   B. Will sediment accumulate anywhere through the bridge/culvert? ☐ Yes ☐ No

   If yes, explain the impact on the conveyance capacity through the bridge/culvert? _____

5. FLOODWAY ANALYSIS (Not Applicable)

Explain method of bridge encroachment (floodway run) _____

Comments *(explain any unusual situations)*:

Attach analysis.

FORM 7
BRIDGE/CULVERT FORM

(For culvert structures 1 through 7)

BACKGROUND (Page 1 of 6)

Item 3. Hydraulic model used to analyze the structure

Shapes of culverts in this study are circular, arch and box. The HEC-2 program does not have built-in arch culvert charts to use in SC card option. Therefore culvert charts are used manually to compute head water depths in front of culverts. To maintain consistency, culvert charts are used at all culverts irrespective of shape of culverts.

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT FORM**	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1997*	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: City of Albuquerque

Flooding Source: North Domingo Baca Arroyos (North Branch)

Project Name/Identifier: Lower North Domingo Baca Detention Dam

1. IDENTIFIER

(Culvert Structure No. 3)

1. Name of roadway, railroad, etc.: _____

2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier): _____
   Between Cross-sections 92.99 & 93.3

3. This revision reflects *(check one of the following)*:
   - ☐ New bridge/culvert not modeled in the FIS
   - ☒ Modified bridge/culvert previously modeled in the FIS
   - ☐ New analysis of bridge/culvert previously modeled in the FIS

   (Explain why new analysis was performed) _____

2. BACKGROUND

Provide the following information about the structure:

1 Dimension, material, and shape (e.g. two 10 x 5 feet reinforced concrete box culvert; three 30-foot span bridge with 2 rows of two 3- foot diameter circular piers; 40-foot wide ogee shape spillway) _____
One - 5.8 ft (rise) x 7.5 ft (span) CMP Structural Plate Arch Culvert

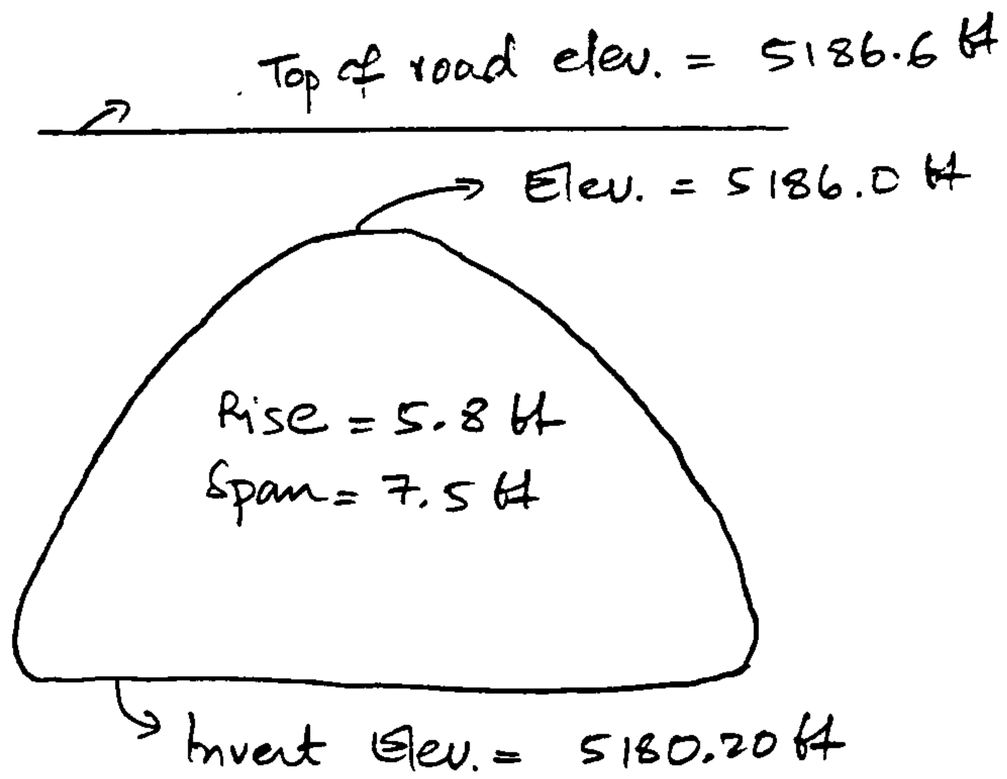
2. Entrance geometry of culvert/type of bridge opening (e.g. 30° - 75° wing walls with square top edge, sloping embankments and vertical abutments) _____
Mitered to confirm slope

3. Hydraulic model used to analyze the structure (*e.g., HEC-2 with special bridge routine, WSPRO, HY8*) _____
See Text

If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structure(s). *(Attach justification)*
See Text

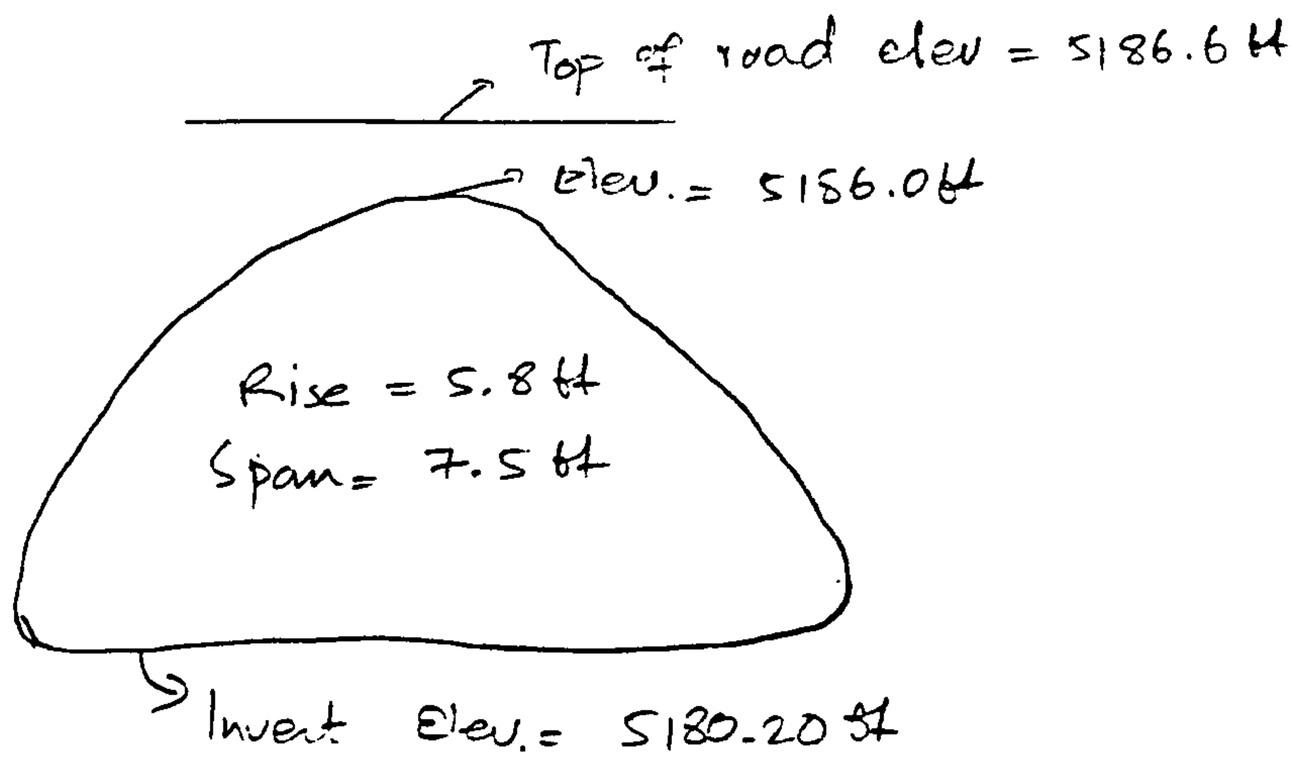
Note: If any items do not apply to submitted hydraulic analysis, indicate by N/A
• One form per new/revised bridge/culvert

Sketch the downstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, minimum top of road elevation, and ineffective flow widths.



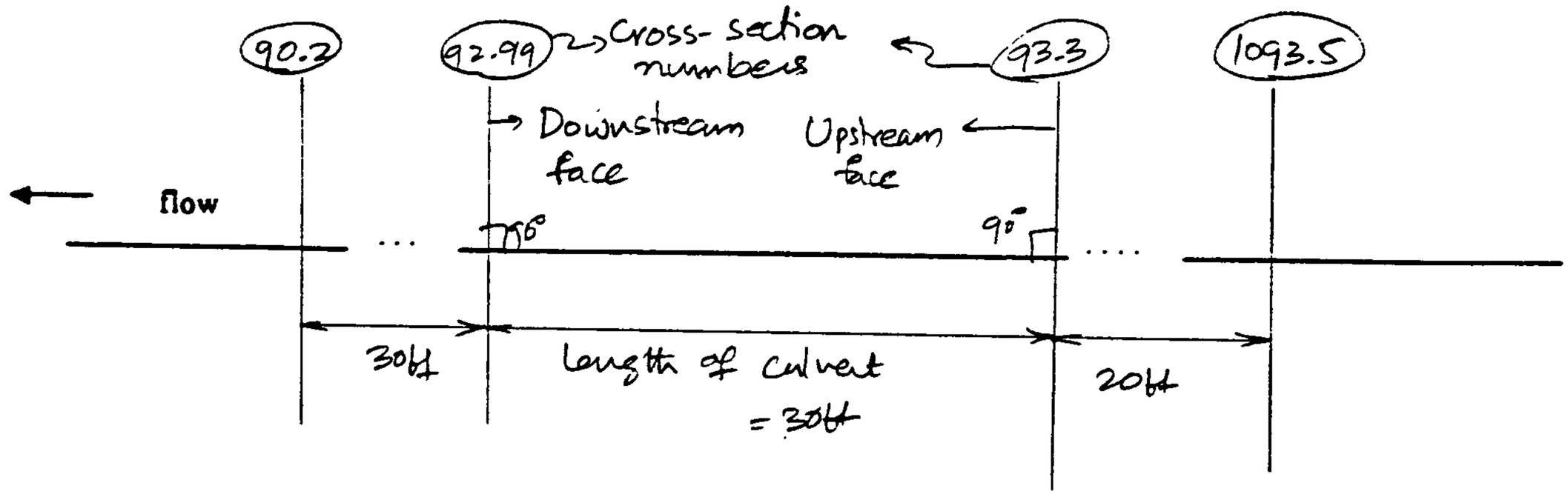
One CMP Structural Plate Arch Culvert

Sketch the upstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, and minimum top of road elevation.



One CMP Structural Plate Arch Culvert

Sketch the plan view of the structure(s) Show, at a minimum, the skew angle, cross-section locations, distances between cross sections, and length of structure (s).



Attach plans of the structure (s) certified by a registered Professional Engineer. (Not Available)

Culvert length or bridge width (ft)	30
Calculated culvert/bridge area (ft^2) by the hydraulic model, if applicable	(a)
Total culvert/bridge area (ft^2)	29.15 (b)

(a) Arch culvert is modelled as equivalent box culvert. Therefore, area computed by hydraulic model will not be accurate (see Form 4).

(b) Computed as 2/3 * span * rise

Elevations Above Which Flow is Effective for Overbanks (ft)

	Left Overbank	Right Overbank
Upstream face	5186.60	5186.60
Downstream face	5186.60	5186.60

Minimum Top of Road Elevation (ft)

	Left Overbank	Right Overbank
Upstream face	5186.60	5186.60
Downstream face	5186.60	5186.60

100-Year Elevations (ft)	Water Surface Elevations	Energy Gradient Elevations
Upstream face	5186.48	5186.48
Downstream face	5183.87	5185.70

Discharge	Low Flow	Pressure Flow	Weir Flow	Total Flo
Amount of flow through/over the structure (s) (cfs)	-	277	0	277

The maximum depth of flow over the roadway/railroad (ft.)	0
Weir length (ft.)	0

Top Widths	Total Floodplain Width	Total Effective Flow Width	Floodway Width
Upstream face	35	35	NA
Downstream face	16.98	7.02	NA

Loss Coefficients

Entrance loss coefficient	NA*
Manning's "n" value assigned to the structure(s)	0.033
Friction loss coefficient through structure (s)	NA*
Other loss coefficients (e.g., bend manhole, etc.)	NA
Total loss coefficient	NA
Weir coefficient	NA
Pier coefficient	NA
Contraction loss coefficient	NA*
Expansion loss coefficient	NA*

* Modelled with AHYMO (hydrology model)

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. A. Is there any indication from historical records that sediment transport (*including scour and deposition*) can affect the 100-year water surface elevations? ..... ☐ Yes ☒ No

   B Based on the conditions (*such as geomorphology, vegetative cover and development of the watershed and stream bed, and bank conditions*), is there a potential for debris and sediment transport (*including scour and deposition*) to affect the 100-year water surface elevations and/or conveyance capacity through the bridge/culvert? ..... ☐ Yes ☒ No

2. If the answer to either 1A or 1B is yes:

   A. What is the estimated sediment (*bed material*) load?
   _____cfs (*attach gradation curve*)

   Explain method used to estimate the sediment transport and the depth of scour and/or deposition _____

   B. Will sediment accumulate anywhere through the bridge/culvert? ☐ Yes ☐ No

   If yes, explain the impact on the conveyance capacity through the bridge/culvert? _____

5. FLOODWAY ANALYSIS (Not Applicable)

Explain method of bridge encroachment (floodway run) _____

Comments *(explain any unusual situations)*:

Attach analysis.

FORM 7
BRIDGE/CULVERT FORM

(For culvert structure no. 3)

BACKGROUND (Form 7, Page 1 of 6)

Item 3. Hydraulic model used to analyze the structure

HEC-2 modelling with water surface elevations computed from culvert charts produced constant water surface elevations at all most all cross sections between structure no. 3 & 1. Therefore this reach is modelled with "reservoir" routing option in AHYMO (hydrology model).

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT FORM**	O.M.B Burden No 3067-0148 Expires July 31, 1997	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: City of Albuquerque

Flooding Source: North Domingo Baca Arroyos

Project Name/Identifier: Lower North Domingo Baca Detention Dam

1. IDENTIFIER

(Culvert Structure No. 4)

1. Name of roadway, railroad, etc.: _____

2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier): Between cross-sections 89.23 & 91.55

3. This revision reflects *(check one of the following)*:

   ☐ New bridge/culvert not modeled in the FIS

   ☒ Modified bridge/culvert previously modeled in the FIS

   ☐ New analysis of bridge/culvert previously modeled in the FIS

   (Explain why new analysis was performed) _____

2. BACKGROUND

Provide the following information about the structure:

1. Dimension, material, and shape (e.g. two 10 x 5 feet reinforced concrete box culvert; three 30-foot span bridge with 2 rows of two 3- foot diameter circular piers; 40-foot wide ogee shape spillway)
   Two - 5.6 ft (rise) x 9.0 ft (span) CMP Structural Plate Arch Culverts

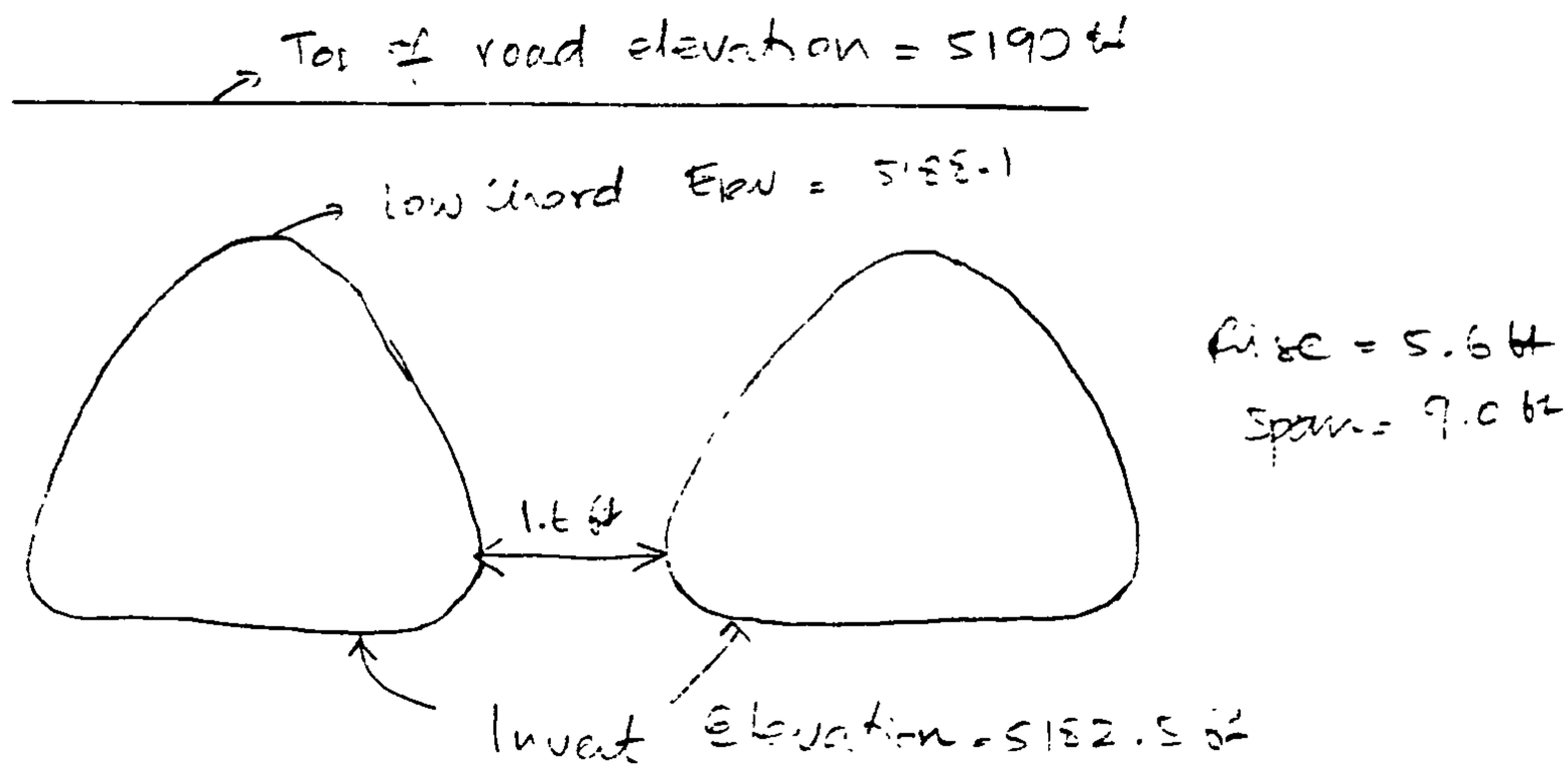
2. Entrance geometry of culvert/type of bridge opening (e.g. 30° - 75° wing walls with square top edge, sloping embankments and vertical abutments)
   Mitered to embankment

3. Hydraulic model used to analyze the structure (*e.g., HEC-2 with special bridge routine, WSPRO, HY3*)
   See Text

   If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structure(s). *(Attach justification)*
   See Text

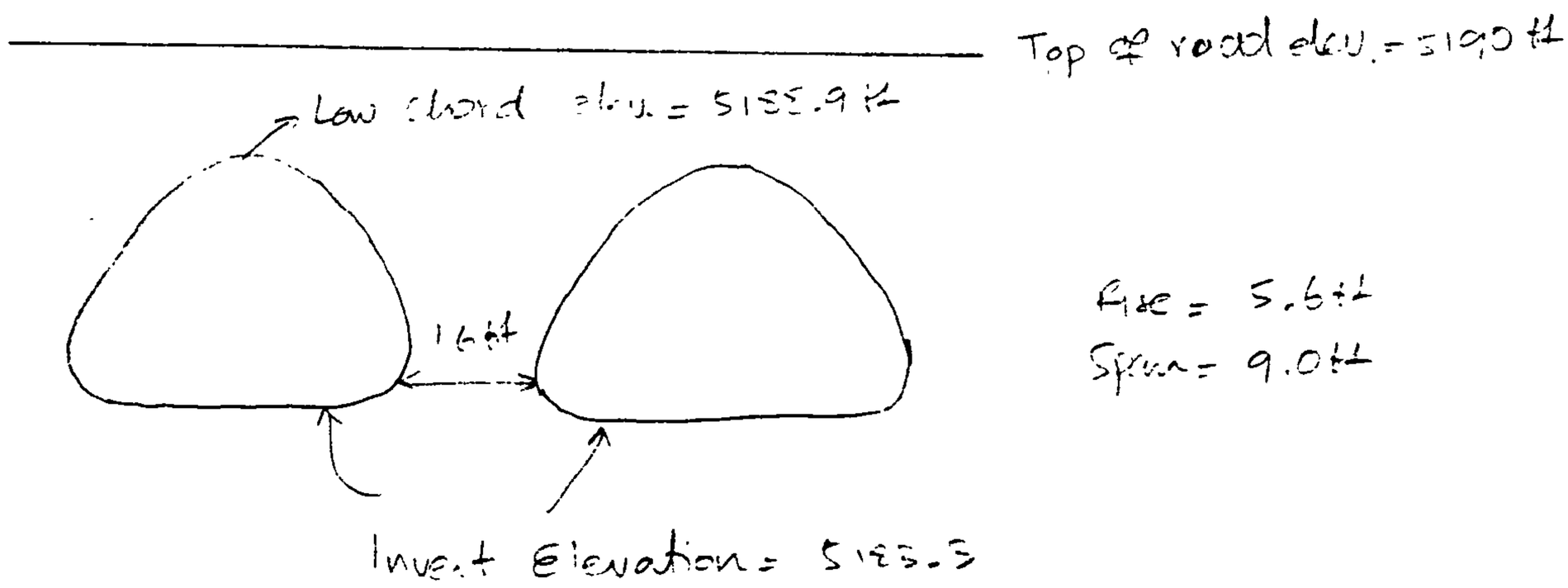
Note: If any items do not apply to submitted hydraulic analysis, indicate by N/A
*** One form per new/revised bridge/culvert**

Sketch the downstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, minimum top of road elevation, and ineffective flow widths.



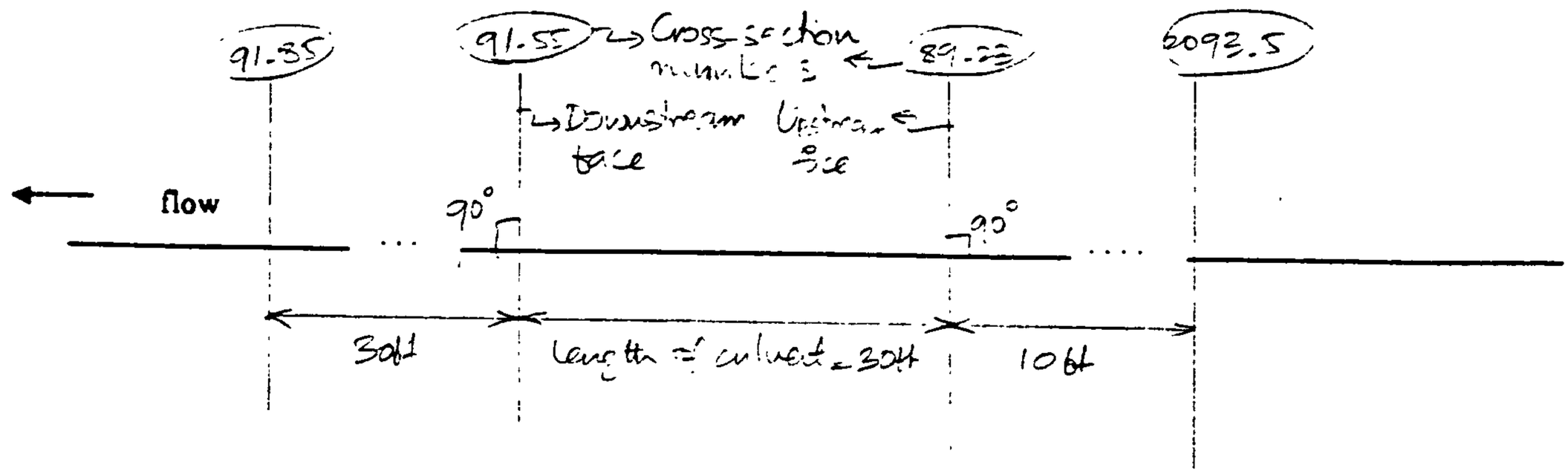
Two - CMP Structural Plate Arch Culverts

Sketch the upstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, and minimum top of road elevation.



Two - CMP Structural Plate Arch Culverts

Sketch the plan view of the structure(s) Show, at a minimum, the skew angle, cross-section locations, distances between cross sections, and length of structure (s).



Attach plans of the structure (s) certified by a registered Professional Engineer. (Not Available)

Culvert length or bridge width (ft)	30
Calculated culvert/bridge area (ft^2) by the hydraulic model, if applicable	(a)
Total culvert/bridge area (ft^2)	33.6 (b)

(a) Arch culverts are modelled as equivalent box culverts. Therefore, area computed by hydraulic model will not be accurate (see Form 4).

(b) Computed as 2/3 * span * rise

Elevations Above Which Flow is Effective for Overbanks (ft)

	Left Overbank	Right Overbank
Upstream face	5190	5190
Downstream face	5190	5190

Minimum Top of Road Elevation (ft)

	Left Overbank	Right Overbank
Upstream face	5190	5190
Downstream face	5190	5190

100-Year Elevations (ft)	Water Surface Elevations	Energy Gradient Elevations
Upstream face	5187	5187.45
Downstream face	5184.79	5185.95

Discharge	Low Flow	Pressure Flow	Weir Flow	Total Flow
Amount of flow through/over the structure(s) (cfs)		261		261

The maximum depth of flow over the roadway/railroad (ft.) .....

Weir length (ft.) .....

Top Widths (ft)	Total Floodplain Width	Total Effective Flow Width	Floodway Width
Upstream face	14.78	14.78	NA
Downstream face	14.77	14.77	NA

Loss Coefficients

Entrance loss coefficient	0.7
Manning's "n" value assigned to the structure(s)	0.033
Friction loss coefficient through structure (s)	NA
Other loss coefficients (e.g., bend manhole, etc.)	NA
Total loss coefficient	NA
Weir coefficient	NA
Pier coefficient	NA
Contraction loss coefficient	0.3
Expansion loss coefficient	0.3

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. A. Is there any indication from historical records that sediment transport (*including scour and deposition*, can affect the 100-year water surface elevations? ..... ☐ Yes ☒ No

   B Based on the conditions (*such as geomorphology, vegetative cover and development of the watershed and stream bed, and bank conditions*), is there a potential for debris and sediment transport (*including scour and deposition*) to affect the 100-year water surface elevations and/or conveyance capacity through the bridge/culvert? ..... ☐ Yes ☒ No

2. If the answer to either 1A or 1B is yes:

   A. What is the estimated sediment (*bed material*) load?
   _____cfs (*attach gradation curve*)

   Explain method used to estimate the sediment transport and the depth of scour and/or deposition _____

   B. Will sediment accumulate anywhere through the bridge/culvert? ☐ Yes ☐ No

   If yes, explain the impact on the conveyance capacity through the bridge/culvert? _____

5. FLOODWAY ANALYSIS (Not Applicable)

Explain method of bridge encroachment (floodway run) _____

Comments *(explain any unusual situations)*:

Attach analysis.

FORM 7
BRIDGE/CULVERT FORM

(For culvert structures 1 through 7)

BACKGROUND (Page 1 of 6)

Item 3. Hydraulic model used to analyze the structure

Shapes of culverts in this study are circular, arch and box. The HEC-2 program does not have built-in arch culvert charts to use in SC card option. Therefore culvert charts are used manually to compute head water depths in front of culverts. To maintain consistency, culvert charts are used at all culverts irrespective of shape of culverts.

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT FORM**	*O.M.B Burden No. 3067-0148* *Expires July 31, 1997*	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: City of Albuquerque

Flooding Source: North Domingo Baca Arroyos

Project Name/Identifier: Lower North Domingo Baca Detention Dam

1. IDENTIFIER (culvert Structure No.5)

1. Name of roadway, railroad, etc.: _____
2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier): _____
   Between cross-sections 1082.3 & 400
3. This revision reflects (*check one of the following*):
   - ☐ New bridge/culvert not modeled in the FIS
   - ☒ Modified bridge/culvert previously modeled in the FIS
   - ☐ New analysis of bridge/culvert previously modeled in the FIS

   (*Explain why new analysis was performed*) _____

2. BACKGROUND

Provide the following information about the structure:

1 Dimension, material, and shape (e.g. two 10 x 5 feet reinforced concrete box culvert; three 30-foot span bridge with 2 rows of two 3- foot diameter circular piers; 40-foot wide ogee shape spillway) _____
One - 5.9 ft (rise) x 8.5 ft (span) CMP Structural Plate Arch Culvert.

2. Entrance geometry of culvert/type of bridge opening (e.g. 30° - 75° wing walls with square top edge, sloping embankments and vertical abutments) _____
Mitered to embankment

3. Hydraulic model used to analyze the structure (*e.g., HEC-2 with special bridge routine, WSPRO, HY8*) _____
See Text

If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structure(s). (*Attach justification*)

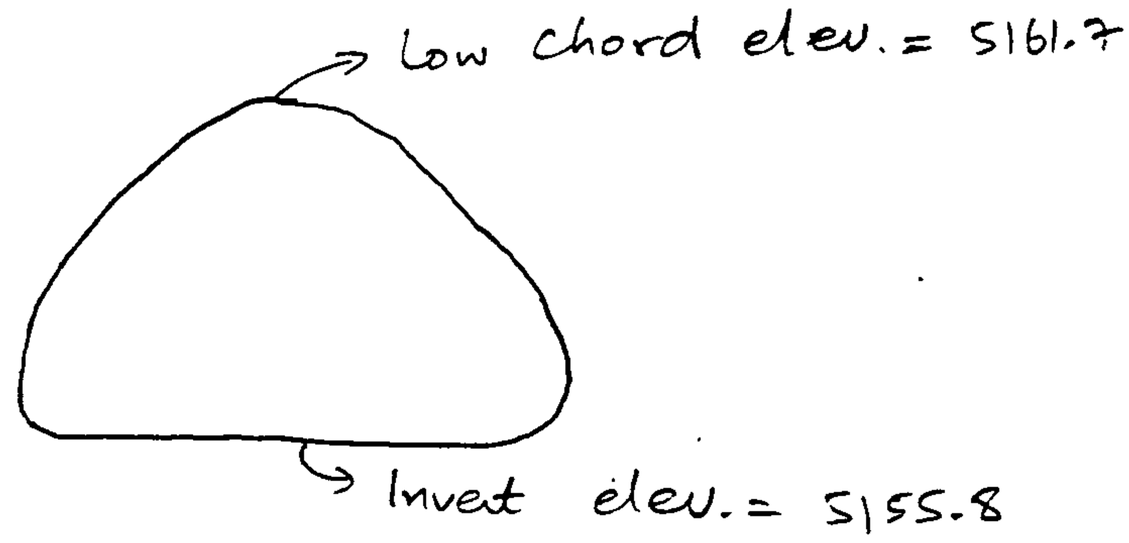
See Text

Note: If any items do not apply to submitted hydraulic analysis, indicate by N/A
• One form per new/revised bridge/culvert

Sketch the downstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, minimum top of road elevation, and ineffective flow widths.

Rise = 5.9 ft

Span = 8.5 ft

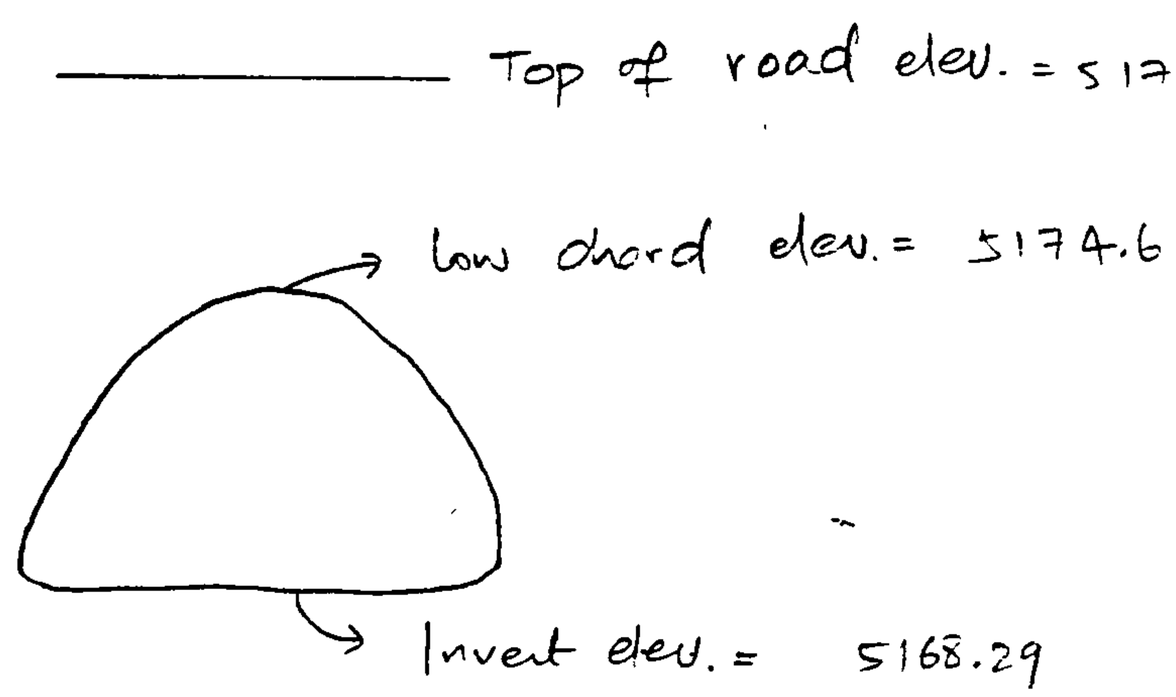


One - CMP structural Plate Arch Culvert

Sketch the upstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, and minimum top of road elevation.

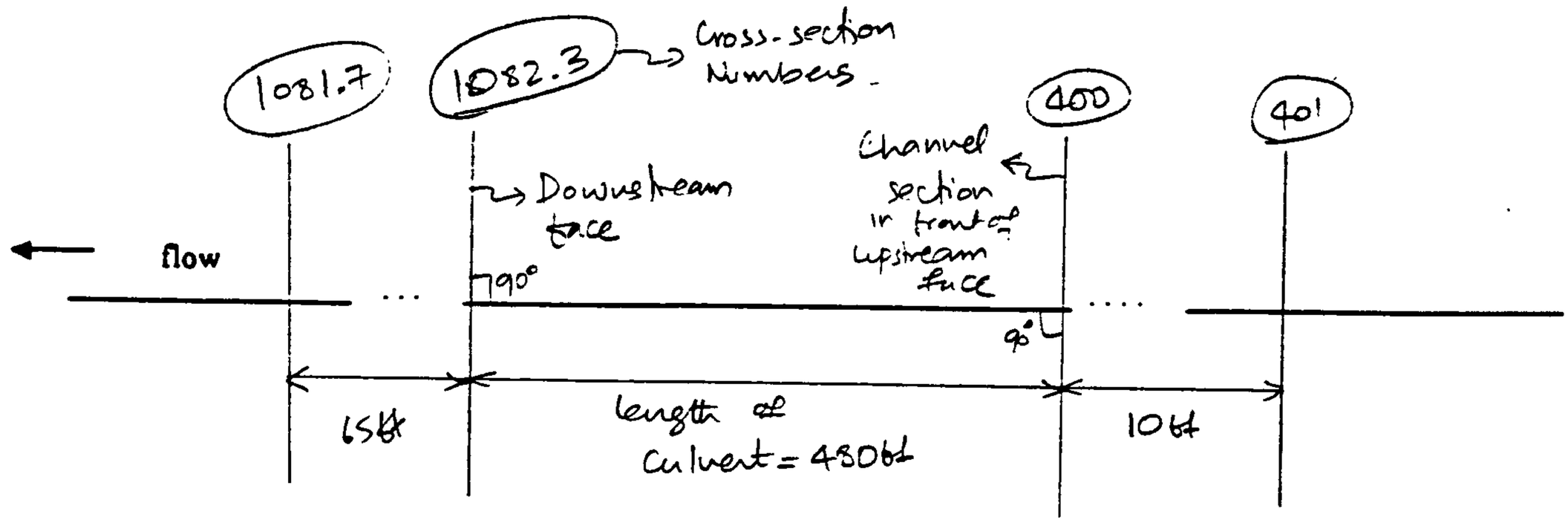
Rise = 5.9 ft

Span = 8.5 ft



One - CMP structural Plate Arch Culvert

Sketch the plan view of the structure(s) Show, at a minimum, the skew angle, cross-section locations, distances tween cross sections, and length of structure (s).



Attach plans of the structure (s) certified by a registered Professional Engineer. (not available)

Culvert length or bridge width (ft)	30
Calculated culvert/bridge area (ft^2) by the hydraulic model, if applicable	(a)
Total culvert/bridge area (ft^2)	33.6 (b)

(a) Arch culvert is modelled as equivalent box culvert. Therefore, area computed by hydraulic model may not be accurate (see Form 4).
(b) Computed as 2/3 * Span * rise

Elevations Above Which Flow is Effective for Overbanks (ft)

	Left Overbank	Right Overbank
Upstream face	5174.60	5174.88
Downstream face	5161.70	5161.70

Minimum Top of Road Elevation (ft)

	Left Overbank	Right Overbank
Upstream face	5174.70	5174.70
Downstream face	(a)	(a)

100-Year Elevations (ft)	Water Surface Elevations	Energy Gradient Elevations
Upstream face	5174.60	5174.75
Downstream face	5159.41	5161.22

Discharge	Low Flow	Pressure Flow	Weir Flow	Total Flow
Amount of flow through/over the structure(s) (cfs)	326	---	---	326

The maximum depth of flow over the roadway/railroad (ft.)	0
Weir length (ft.)	0

Top Widths	Total Floodplain Width	Total Effective Flow Width	Floodway Width
Upstream face	7.02	7.02	N/A
Downstream face	8.42	8.42	N/A

(a) Not available but greater than 5161.7

3. ANALYSIS (Cont'd)

Loss Coefficients

Entrance loss coefficient	N/A
Manning's "n" value assigned to the structure(s)	0.033
Friction loss coefficient through structure (s)	N/A
Other loss coefficients (e.g., bend manhole, etc.)	N/A
Total loss coefficient	N/A
Weir coefficient	N/A
Pier coefficient	N/A
Contraction loss coefficient	0.3
Expansion loss coefficient	0.3

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. A. Is there any indication from historical records that sediment transport (*including scour and deposition*) can affect the 100-year water surface elevations? ☐ Yes ☒ No

   B Based on the conditions (*such as geomorphology, vegetative cover and development of the watershed and stream bed, and bank conditions*), is there a potential for debris and sediment transport (*including scour and deposition*) to affect the 100-year water surface elevations and/or conveyance capacity through the bridge/culvert? ☐ Yes ☒ No

2. If the answer to either 1A or 1B is yes:

   A. What is the estimated sediment (*bed material*) load?
   _____cfs (*attach gradation curve*)

   Explain method used to estimate the sediment transport and the depth of scour and/or deposition _____

   B. Will sediment accumulate anywhere through the bridge/culvert? ☐ Yes ☐ No

   If yes, explain the impact on the conveyance capacity through the bridge/culvert? _____

5. FLOODWAY ANALYSIS (not available)

Explain method of bridge encroachment (floodway run) _____

Comments (*explain any unusual situations*):

Attach analysis.

FORM 7
BRIDGE/CULVERT FORM

(For culvert structures 1 through 7)

BACKGROUND (Page 1 of 6)

Item 3. Hydraulic model used to analyze the structure

Shapes of culverts in this study are circular, arch and box. The HEC-2 program does not have built-in arch culvert charts to use in SC card option. Therefore culvert charts are used manually to compute head water depths in front of culverts. To maintain consistency, culvert charts are used at all culverts irrespective of shape of culverts.

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT FORM**	O.M.B Burden No. 3067-0148 Expires July 31, 1997	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: City of Albuquerque

Flooding Source: North Domingo Baca Arroyos (South Branch)

Project Name/Identifier: Lower North Domingo Baca Detention Dam

1. IDENTIFIER (Culvert Structure No. 6)

1. Name of roadway, railroad, etc.: _____

2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier): Between cross-sections 83.83 & 83.42

3. This revision reflects *(check one of the following)*:

   ☐ New bridge/culvert not modeled in the FIS

   ☒ Modified bridge/culvert previously modeled in the FIS

   ☐ New analysis of bridge/culvert previously modeled in the FIS

   (Explain why new analysis was performed) _____

2. BACKGROUND

Provide the following information about the structure:

1 Dimension, material, and shape (e.g. two 10 x 5 feet reinforced concrete box culvert; three 30-foot span bridge with 2 rows of two 3- foot diameter circular piers; 40-foot wide ogee shape spillway) One 4.3 ft (rise) x 9.5 ft (span) CMP Structural Plate Arch Culvert

2. Entrance geometry of culvert/type of bridge opening (e.g. 30° - 75° wing walls with square top edge, sloping embankments and vertical abutments) Headwall without wingwalls

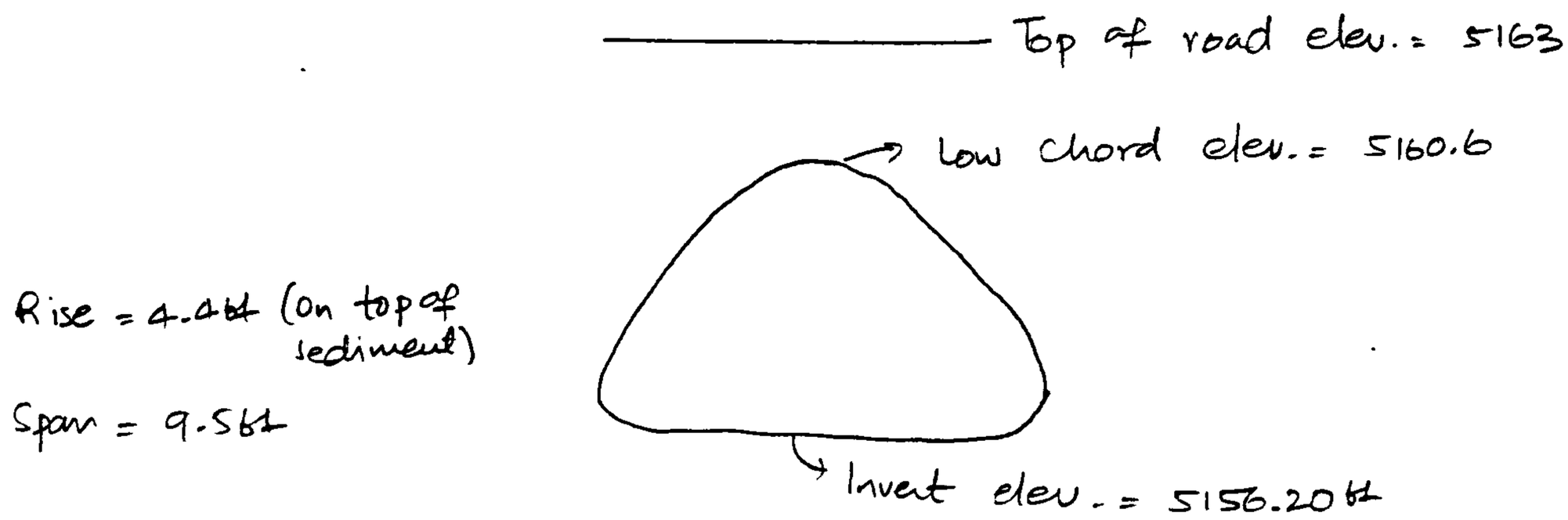
3. Hydraulic model used to analyze the structure (*e.g., HEC-2 with special bridge routine, WSPRO, HY8*) See Text

If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structure(s). *(Attach justification)*

See Text

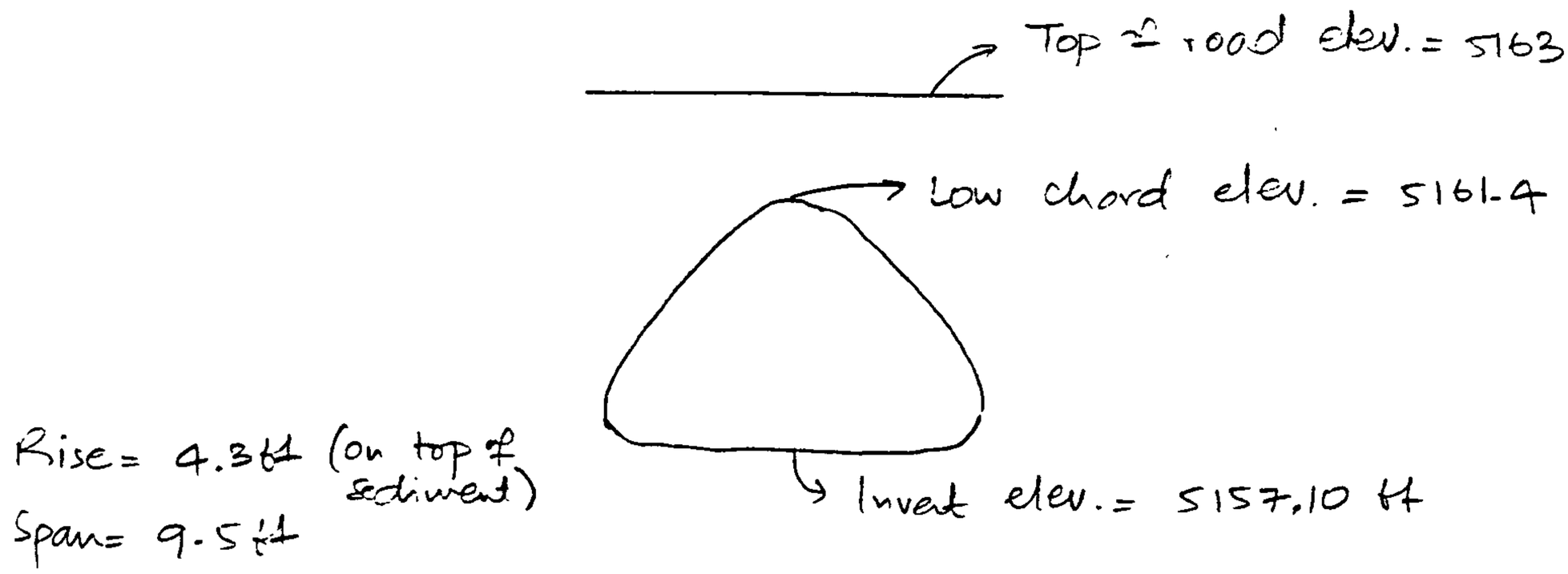
Note: If any items do not apply to submitted hydraulic analysis, indicate by N/A
• One form per new/revised bridge/culvert

Sketch the downstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, minimum top of road elevation, and ineffective flow widths.



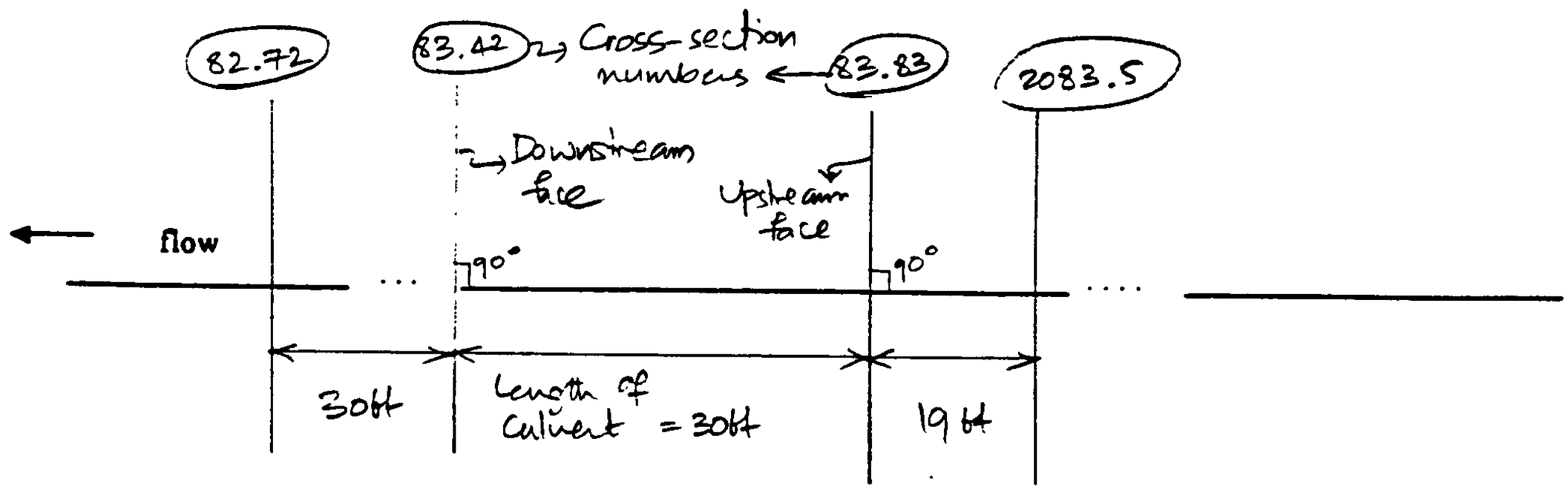
One - CMP Structural Plate Arch Culvert

Sketch the upstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, and minimum top of road elevation.



One - CMP Structural Plate Arch Culvert

Sketch the plan view of the structure(s) Show, at a minimum, the skew angle, cross-section locations, distances tween cross sections, and length of structure (s).



Attach plans of the structure (s) certified by a registered Professional Engineer. (Not Available)

Culvert length or bridge width (ft)	30
Calculated culvert/bridge area (ft²) by the hydraulic model, if applicable	(a)
Total culvert/bridge area (ft²)	27 (b)

(a) Arch culvert is modelled as equivalent box culvert. Therefore area computed by hydraulic model will not be accurate.

(b) Computed as 2/3 * span * rise

Elevations Above Which Flow is Effective for Overbanks (ft)

	Left Overbank	Right Overbank
Upstream face	5163	5163
Downstream face	5163	5163

Minimum Top of Road Elevation (ft)

	Left Overbank	Right Overbank
Upstream face	5163	5163
Downstream face	5163	5163

100-Year Elevations	Water Surface Elevations	Energy Gradient Elevations
Upstream face	5160.76	5161.28
Downstream face	5160.10	5160.56

Discharge	Low Flow	Pressure Flow	Weir Flow	Total Flo
Amount of flow through/over the structure (s) (cfs)	281	-	-	281

The maximum depth of flow over the roadway/railroad (ft.) ..... -

Weir length (ft.) ..... -

Top Widths (ft)	Total Floodplain Width	Total Effective Flow Width	Floodway Width
Upstream face	14.66	9.5	NA
Downstream face	14.67	9.5	NA

3. ANALYSIS (Cont'd)

Loss Coefficients

Entrance loss coefficient	0.5
Manning's "n" value assigned to the structure(s)	0.024 (sediment at bottom)
Friction loss coefficient through structure (s)	NA
Other loss coefficients (e.g., bend manhole, etc.)	NA
Total loss coefficient	NA
Weir coefficient	NA
Pier coefficient	NA
Contraction loss coefficient	0.3
Expansion loss coefficient	0.3

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. A. Is there any indication from historical records that sediment transport (*including scour and deposition*) can affect the 100-year water surface elevations? ..... ☐ Yes ☒ No

   B Based on the conditions (*such as geomorphology, vegetative cover and development of the watershed and stream bed, and bank conditions*), is there a potential for debris and sediment transport (*including scour and deposition*) to affect the 100-year water surface elevations and/or conveyance capacity through the bridge/culvert? ..... ☐ Yes ☒ No

2. If the answer to either 1A or 1B is yes:

   A. What is the estimated sediment (*bed material*) load?
   _____cfs (*attach gradation curve*)

   Explain method used to estimate the sediment transport and the depth of scour and/or deposition _____

   B. Will sediment accumulate anywhere through the bridge/culvert? ☐ Yes ☐ No

   If yes, explain the impact on the conveyance capacity through the bridge/culvert? _____

5. FLOODWAY ANALYSIS (Not Applicable)

Explain method of bridge encroachment (floodway run) _____

Comments (*explain any unusual situations*):

Attach analysis.

FORM 7
BRIDGE/CULVERT FORM

(For culvert structures 1 through 7)

BACKGROUND (Page 1 of 6)

Item 3. Hydraulic model used to analyze the structure

Shapes of culverts in this study are circular, arch and box. The HEC-2 program does not have built-in arch culvert charts to use in SC card option. Therefore culvert charts are used manually to compute head water depths in front of culverts. To maintain consistency, culvert charts are used at all culverts irrespective of shape of culverts.

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT FORM**	*O.M.B Burden No. 3067-0148* *Expires July 31, 1997*	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

ublic reporting burden for this form is estimated to average 2 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: City of Albuquerque

Flooding Source: North Domingo Baca Arroyos (South Branch)

Project Name/Identifier: Lower North Domingo Baca Detention Dam

1. IDENTIFIER (Culvert Structure No. 7)

1. Name of roadway, railroad, etc.: _____

2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier): _____
   Between cross-sections 80.44 & 80.93

3. This revision reflects *(check one of the following)*:
   - ☐ New bridge/culvert not modeled in the FIS
   - ☒ Modified bridge/culvert previously modeled in the FIS
   - ☐ New analysis of bridge/culvert previously modeled in the FIS

   (Explain why new analysis was performed) _____

2. BACKGROUND

Provide the following information about the structure:

1. Dimension, material, and shape (e.g. two 10 x 5 feet reinforced concrete box culvert; three 30-foot span bridge with 2 rows of two 3- foot diameter circular piers; 40-foot wide ogee shape spillway) _____
   One 4 ft (rise) x 12.4 (span) CMP Structural Plate Arch Culvert

2. Entrance geometry of culvert/type of bridge opening (e.g. 30° - 75° wing walls with square top edge, sloping embankments and vertical abutments) _____
   Projecting CMP

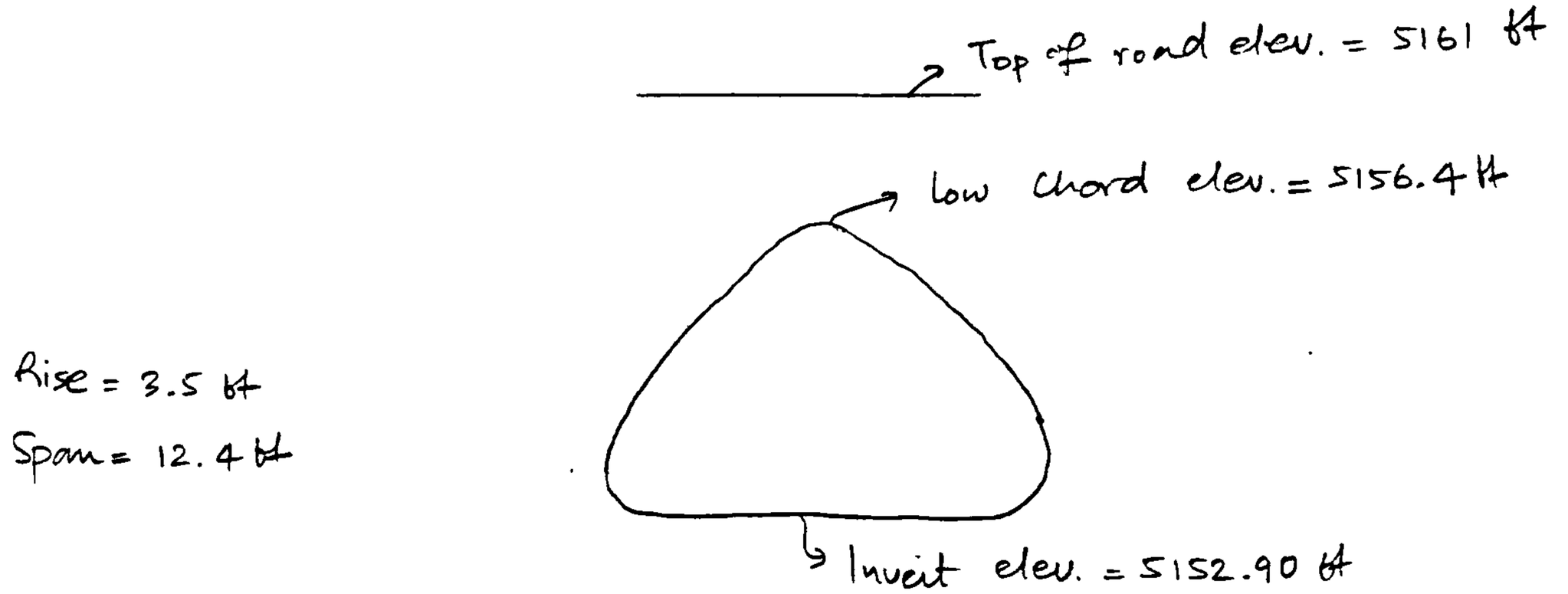
3. Hydraulic model used to analyze the structure (*e.g., HEC-2 with special bridge routine, WSPRO, HY8*) _____
   See Text

If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structure(s). *(Attach justification)*

See Text

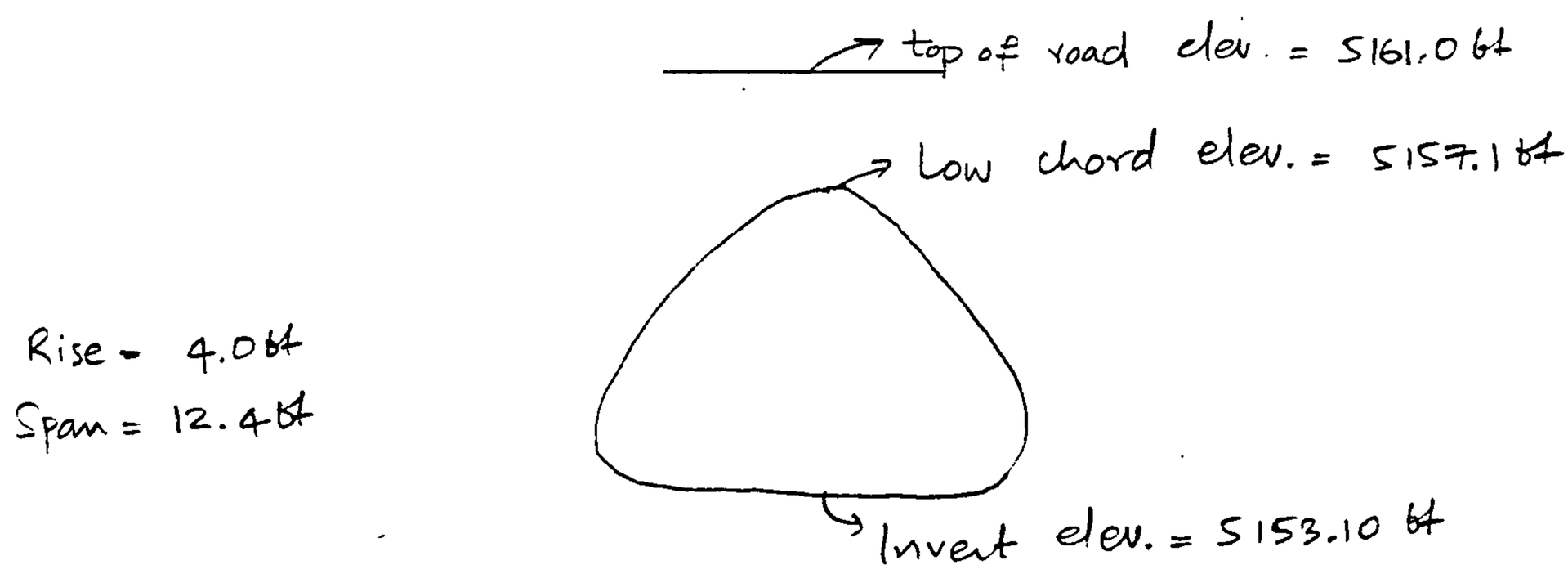
Note: If any items do not apply to submitted hydraulic analysis, indicate by N/A
*** One form per new/revised bridge/culvert**

Sketch the downstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, minimum top of road elevation, and ineffective flow widths.



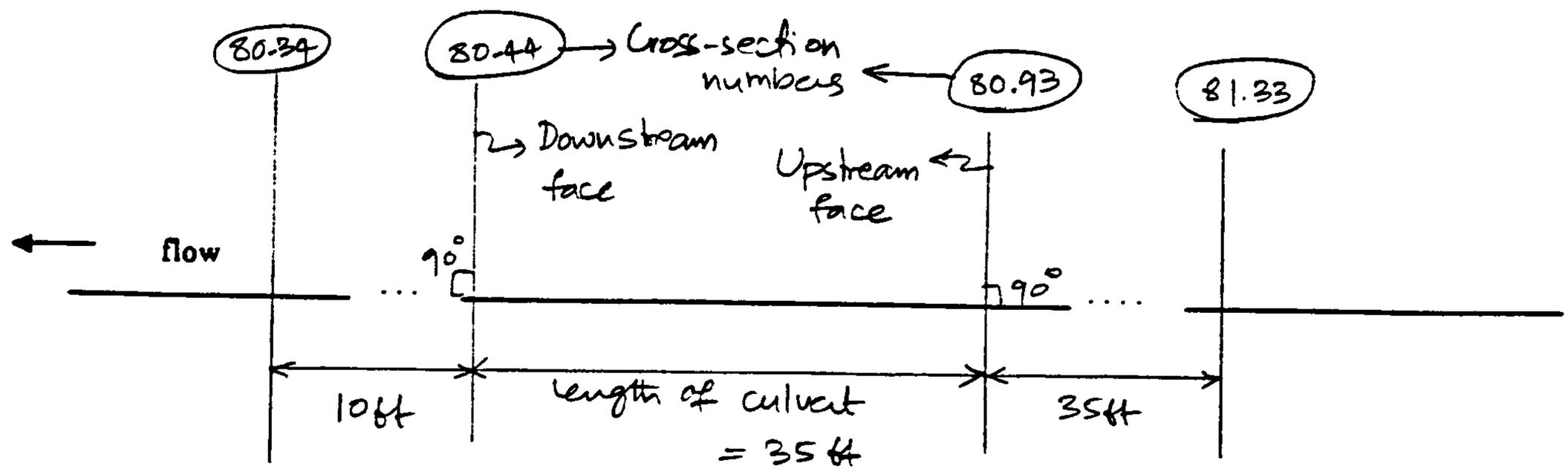
One - CMP Structural Plate Arch Culvert

Sketch the upstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, and minimum top of road elevation.



One - CMP structural Plate Arch Culvert

Sketch the plan view of the structure(s) Show, at a minimum, the skew angle, cross-section locations, distances between cross sections, and length of structure (s).



Attach plans of the structure (s) certified by a registered Professional Engineer.

Culvert length or bridge width (ft)	35
Calculated culvert/bridge area (ft^2) by the hydraulic model, if applicable	(a)
Total culvert/bridge area (ft^2)	33 (b)

(a) Arch culvert is modelled as equivalent box culvert. Therefore area computed by hydraulic model will be innaccurate.

(b) Computed as 2/3 x span x rise.

Elevations Above Which Flow is Effective for Overbanks (ft)

	Left Overbank	Right Overbank
Upstream face	5161	5161
Downstream face	5161	5161

Minimum Top of Road Elevation (ft)

	Left Overbank	Right Overbank
Upstream face	5161	5161
Downstream face	5161	5161

100-Year Elevations (ft)	Water Surface Elevations	Energy Gradient Elevations
Upstream face	5158.70 (a)	5159.44 (a)
Downstream face	5155.77 (a)	5157.22 (a)

Discharge	Low Flow	Pressure Flow	Weir Flow	Total Flow
Amount of flow through/over the structure(s) (cfs)	-	281	-	281

The maximum depth of flow over the roadway/railroad (ft.)	-
Weir length (ft.)	-

Top Widths (ft)	Total Floodplain Width	Total Effective Flow Width	Floodway Width
Upstream face	23.45	12.4 (a)	N/A
Downstream face	16.29	12.4	N/A

(a) See Exhibit 7-1

Loss Coefficients

Entrance loss coefficient	0.9
Manning's "n" value assigned to the structure(s)	0.024 (sediment at bottom)
Friction loss coefficient through structure (s)	N/A
Other loss coefficients (e.g., bend manhole, etc.)	N/A
Total loss coefficient	N/A
Weir coefficient	N/A
Pier coefficient	N/A
Contraction loss coefficient	0.3
Expansion loss coefficient	0.3

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. A. Is there any indication from historical records that sediment transport (*including scour and deposition*) can affect the 100-year water surface elevations? ..... ☐ Yes ☒ No

   B Based on the conditions (*such as geomorphology, vegetative cover and development of the watershed and stream bed, and bank conditions*), is there a potential for debris and sediment transport (*including scour and deposition*) to affect the 100-year water surface elevations and/or conveyance capacity through the bridge/culvert? ..... ☐ Yes ☒ No

2. If the answer to either 1A or 1B is yes:

   A. What is the estimated sediment (*bed material*) load?

   _____cfs (*attach gradation curve*)

   Explain method used to estimate the sediment transport and the depth of scour and/or deposition _____

   B. Will sediment accumulate anywhere through the bridge/culvert? ☐ Yes ☐ No

   If yes, explain the impact on the conveyance capacity through the bridge/culvert? _____

5. FLOODWAY ANALYSIS (Not Applicable)

Explain method of bridge encroachment (floodway run) _____

Comments *(explain any unusual situations)*:

Attach analysis.

FORM 7
BRIDGE/CULVERT FORM

(For culvert structures 1 through 7)

BACKGROUND (Page 1 of 6)

Item 3. Hydraulic model used to analyze the structure

Shapes of culverts in this study are circular, arch and box. The HEC-2 program does not have built-in arch culvert charts to use in SC card option. Therefore culvert charts are used manually to compute head water depths in front of culverts. To maintain consistency, culvert charts are used at all culverts irrespective of shape of culverts.

EXHIBIT 7-1

Contains:

1. Sediment transport calculations.

The sediment wash load is defined as fine silt and clay which will wash through the reach and deposit. Evidence suggests that the sediment transport capacity is increased due to wash load.

AHYM0194 program is used in this study for sediment transport analysis. The documentation of "SED WASH LOAD" and "SEDIMENT TRANS" commands in AHYM0194 program is given at the end of calculations. The "SED WASH LOAD" command utilizes the MUSLE equation whereas "SEDIMENT TRANS" command utilizes the unit sediment transport equation. Data needed for SEDIMENT TRANS command includes the average velocity, top-width of the cross-sections within the required sub-reach for the discharges (ranging from less than 10-year to 100-year return period) in the arroyo/channel. Above information is obtained from HEC-2 model output.

TABLE
SEDIMENT WASH LOAD DATA

AHYMO 194 FILENAME	ANALYSIS POINT / DESCRIPTION	SED WASH LOAD (COMMAND DATA) IN AHYMO 194 MODEL							WASH LOAD FACTOR ***
		* K	* C	* P	* L	* S	* LS	IMPERVIOUSNESS % **	
SDBCL100.EXT	942.99	0.15	0.24	1	240	5	0.83	31	3
"	940	"	"	"	"	"	"	10	3
"	943.81	"	"	"	"	"	"	23	3
"	945.99	"	"	"	"	"	"	30	3

* MUSLE equation parameters [Adopted from "Preliminary Design Analysis Report for Lower North Domingo Baca Detention Dam" - by Resource Technology, Inc. (March, 1994). A copy of the page from where values are adopted is attached]

** See attached notes on imperviousness %.

*** See attached pages (at the end of calculations) on SED WASH LOAD command in AHYMO194 program

~~(a) See Exhibit~~ _____ ~~(map)~~
~~(b) See text for discussion (this Exhibit)~~

TABLE 3-8.2
MUSLE EQUATION DATA AND RESULTS
EXISTING DEVELOPED CONDITION WATERSHED DRAINING TO THE
PROPOSED DAM EXCLUDING THE AREA DRAINING TO THE
EXISTING NORTH DOMINGO BACA DAM

MUSLE EQUATION FACTORS								RESULTS											
Rw (e)	K (f)	S % (q)	m	L FT (g)	LS (h)	C (i)	P	TONS (d,m)	Cs PPM (n)	TONS / SQ MI	TONS / ACRE	AC-FT (d)	AC-FT / SQ MI	CU FT (d)	DRAINAGE AREA TOTAL SQ MI	TONS TOTAL	Cs PPM (n)	AC-FT TOTAL	CU FT TOTAL
461	0.15	5	0.5	240	0.83	0.24	1	13.0	32494	226.6	0.35	0.00598	0.10403	261	1.552	351.6	877066	0.16145	7,033
1,165	0.15	5	0.5	240	0.83	0.24	1	32.9	37258	572.4	0.89	0.01511	0.26281	658	1.552	888.4	1005643	0.40789	17,768
1,941	0.15	5	0.5	240	0.83	0.24	1	54.9	40691	954.1	1.49	0.02519	0.43805	1097	1.552	1,480.7	1098300	0.67986	29,615
3,067	0.15	5	0.5	240	0.83	0.24	1	86.7	43984	1,507.4	2.36	0.03980	0.69211	1734	1.552	2,339.5	1187180	1.07416	46,790
4,290	0.15	5	0.5	240	0.83	0.24	1	121.3	45753	2,108.8	3.29	0.05567	0.96820	2425	1.552	3,272.8	1234923	1.50265	65,456
5,675	0.15	5	0.5	240	0.83	0.24	1	160.4	48588	2,789.5	4.36	0.07364	1.28078	3208	1.552	4,329.4	1311459	1.98777	86,587

NOTE - SEE TABLE 3-8.1 FOR FOOTNOTES

SOURCE: Preliminary Design Analysis Report For Lower North Domingo Baca Detention Dam - By Resource Technology, Inc, March 1994.

RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

CHECKED _____ DATE _____
APPROVED _____ DATE _____
TITLE _____

PROJECT NO. _____
SHEET 1 OF 2
BY KR DATE 08/16/94

Imperviousness %:

Imperviousness is computed as below:

Basin No.	Area (sq. mi.)	Land treatment factors* (B+D) %	Contributing to Arroyo
929	0.0200	80	A
931	0.0400	95	A
934	0.0325	10	A
940	0.0776	10	B
939.1	0.028	70	A (50%) & B (50%)
943.1	0.012	80	B
943.2	0.013	0	B
945	0.015	85	B
933	0.053	5	A
938	0.020	0	A
941	0.008	45	A
939.2	0.056	0	A
942	0.030	40	A
944	0.036	75	A
total	0.4411		

$$\text{Weighted imperviousness \%} = \frac{\Sigma\,(\text{area})(B+D\%)}{\Sigma(\text{area})}$$

* Land treatment factor B accounts for landscape. Therefore it will not contribute to sediment. Factor D accounts for impervious structures. Therefore it will not contribute to sediment.

RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

CHECKED _____ DATE _____ PROJECT NO. _____

APPROVED _____ DATE _____ SHEET 2 OF 2

TITLE _____ BY _____ DATE _____

(Analysis point)

For AP 942.99, consider all basins contributing to arroyo "A" except basin no. 944.

$$\text{Imperviousness } \% = \frac{(0.02)(80) + (0.04)(95) + (0.0325)(10) + (0.028)(70)(0.5) + (0.053)*(5) + (0.02)(0) + (0.008)(45) + (0.056)(0) + (0.030)(40)}{0.02 + 0.04 + 0.0325 + (0.028)(0.5) + (0.053) + 0.02 + 0.008 + 0.056 + 0.03}$$

$$= \frac{8.53}{0.2735} = 31\%$$

For AP 940, Imperviousness % = .10

For AP 943.81, consider all basins contributing to arroyo "B" except basin no. 945.

$$\text{Imperviousness } \% = \frac{0.0776(10) + (0.5)(0.028)(70) + (0.012)(80) + (0.013)(0) +}{0.0776 + 0.5(0.028) + (0.012) + (0.013)}$$

$$= \frac{2.716}{0.1166} = 23$$

For AP 945.99, consider all basins contributing to arroyo "6".

$$\text{Imperviousness } \% = \frac{2.716 + (0.015)(85)}{0.1166 + 0.015} = \frac{3.991}{0.1316} = 30$$

RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

CHECKED _____ DATE _____ PROJECT NO. _____
APPROVED _____ DATE _____ SHEET _____ OF _____
TITLE _____ BY _____ DATE _____

Determining imperviousness percent for Analysis Points on Arroyo "B" or South Branch:

Proposed Lower North Domingo Baca Detention Dam have the capacity for incoming silt. Therefore dam's outfall pipe will carry sediment-free-runoff. Thus use of imperviousness (determined from the hydrology basins downsteam of proposed dam) in the Analysis Points for hydrology basins downsteam of proposed dam will overestimate the sediment transport capacity for these Analysis Points by huge margin. To eliminate this trouble, compute the imperviousness as follows.

① Compute the ratio of area for Analysis Point which represent dam outflow to area for Analysis Point where sediment wash load is to be computed.

② Compute the imperviousness ratio for the hydrology basin downstream of proposed dam. upto the required Analysis Point.

③ Substract area of Analysis Point for dam outflow from area of required Analysis Point located downstream of dam

④ Multiply ③ & ②. Divide the result by area of required Analysis Point located downstream of dam.

⑤ Add ① & ④. This is total imperviousness for the required Analysis Point located downstream of dam.

RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

CHECKED _____ DATE _____ PROJECT NO. _____

APPROVED _____ DATE _____ SHEET _____ OF _____

TITLE _____ BY _____ DATE _____

For Analysis Point with Area = A & imperviousness (measured from dam only) = i:

① Imperviousness till dam ratio = $\frac{\text{Area for AP } 930.87}{\text{Area for required AP}} = \frac{4.2197}{A}$

② i

③ $(A - 4.2197)$

④ $\frac{i * (A - 4.2197)}{A}$

⑤ Required imperviousness ratio = $\frac{4.2197}{A} + \left(\frac{A - 4.2197}{A}\right) i$

$= \frac{4.2197}{A}(1 - i) + i$

For Analysis Point 943.81 ($A = 4.3483$ sq. mi & $i = 0.23$):

Imperviousness ratio = $\frac{4.2197}{4.3483}(1 - 0.23) + 0.23$

$= 0.98$

For Analysis Point 945.99 ($A = 4.3633$ sq mi & $i = 0.30$)

Imperviousness ratio = $\frac{4.2197}{4.3633}(1 - 0.30) + 0.30$

$= 0.98$

RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

CHECKED _____ DATE _____ PROJECT NO. _____
APPROVED _____ DATE _____ SHEET _____ OF _____
TITLE _____ BY _____ DATE _____

① Data for "SEDIMENT TRANS" command:

- D_{50} from attached graph = 1.1 mm.
- From fig 3.10 ("sediment and erosion guide" by Resource Consultants & Engineers, Inc. — related pages are included later in this exhibit):

for D_{50} = 1.1 mm

$a = 6.5 \times 10^{-10}$
$b = 5.45$
$c = -0.38$
$d = -2.4$.

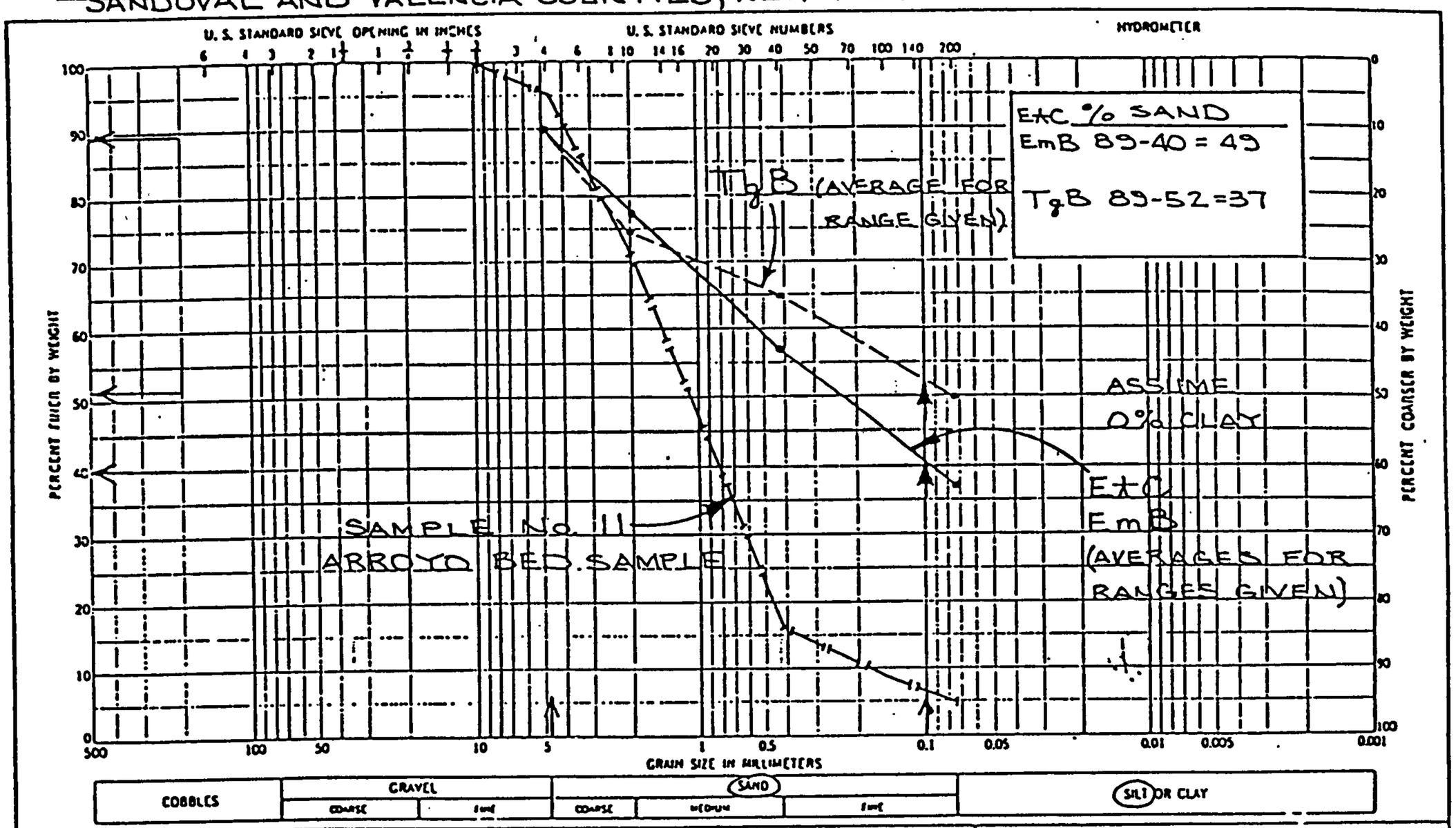
- NUMB = -1
- WASH LOAD = 0
- NUMB SECTIONS = Depend on no of discharges.

② Hydrographs to be used for subreaches in ATHYMO model.

Subreach #	Related Hydrograph No. in ATHYMO file	Description
		ATRYS
1	942.99	Upstream of structure no. 1 (A or North Branch)
2	942.99	Upstream of structure no. 3 (")
3	940	Upstream of structure no. 2 (B or South Branch)
4	943.81	Upstream of structure no. 4 (")
5	945.99	Upstream of structure no. 6 (")
6	945.99	Upstream of structure no. 7 (")

③ ATHYMO sediment file: NDBS0100.EXT

~~* SOURCE: SOIL SURVEY OF BERNALILLO COUNTY AND PARTS OF SANDOVAL AND VALENCIA COUNTIES, NEW MEXICO~~



SOIL TYPE	% PASSING No. 4	No. 10	No. 40	No. 200	PERM.	IN/HR.	% SAND	% SILT
E+C	85-95	70-85	40-75	25-50	.06	.20	49	40
EmB	"	"	"	"	"	"	49	40
TgB	80-100	60-90	50-80	35-65	0.60	2.0	37	52

GRADATION CURVES

SOIL GRADATIONS * FOR 3 SOIL TYPES LOCATED IN DRAINAGE AREA BELOW NORTH DOMINGO BACA DAM TO PROPOSED NORTH DOMINGO BACA DAM

SOURCE: PRELIMINARY DESIGN ANALYSIS REPORT FOR LOWER NORTH DOMINGO BACA DETENTION DAM. (RESOURCE TECHNOLOGY, INC. March 1994)

Soil Gradation Curves for Three Soil Types and One Arroyo Bed Sample

FIGURE 3-8

RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

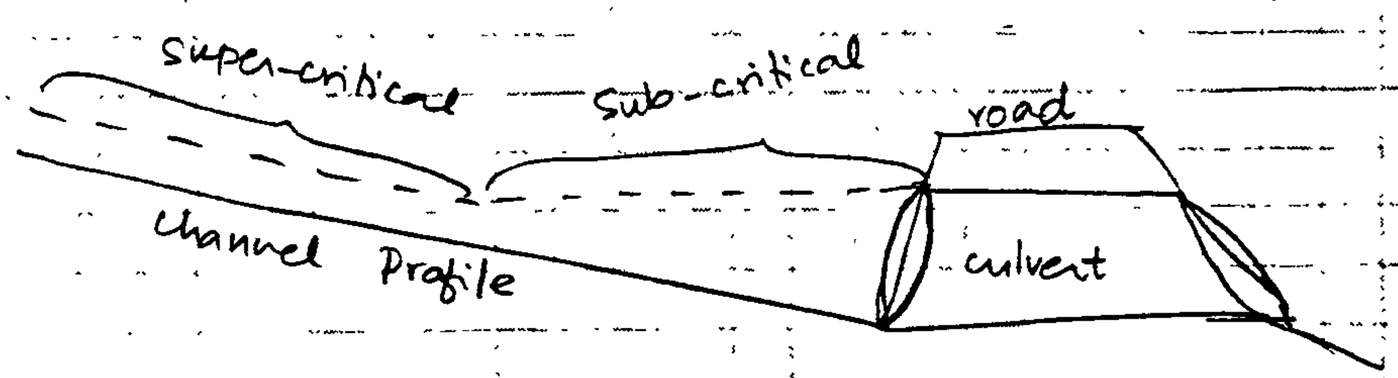
CHECKED _____ DATE _____ PROJECT NO. _____
APPROVED _____ DATE _____ SHEET _____ OF _____
TITLE _____ BY _____ DATE _____

Methodology for sediment calculations near culverts:

① If flow depth in the arroyo/channel is approximately equal to flow depth in the culvert (computed from culvert charts) and topwidth does not increase abruptly in front of culvert, modeling of sediment transport with AHYMO is not performed as culvert will not be plugged in these conditions.

② If the flow depth in the arroyo/channel is not equal to flow depth in the culvert and flow is not below the soffit of culvert, modeling with AHYMO194 is performed.

③ Modeling of sediment transport with AHYMO:



(i) One x-section is selected in sub-critical region.

(ii) One x-section is selected in super-critical region.

(iii) Parameters required for AHYMO (Q, velocity & TW) are obtained for above cross-sections from HEC-2 run(s).

(iv) After AHYMO file is run, total sediment computed in super-critical region is compared with that computed in sub-critical region. If former is greater than latter, there will be aggradation (deposition) in front of culvert. If former is

RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

CHECKED _____ DATE _____ PROJECT NO. _____

APPROVED _____ DATE _____ SHEET _____ OF _____

TITLE _____ BY _____ DATE _____

less than latter, there will be degradation or scour in front of culvert. If the difference between two capacities is zero or insignificant comparing to the capacities, no change takes place in channel profile in front of culvert.

(v) Then we will prove whether the culvert will be plugged with sediment or not.

④ Once the flow gets into the culvert, the flow will be moving faster because of less area available. Therefore there will be no deposition of sediment in culvert.

RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

CHECKED _____ DATE _____ PROJECT NO. _____
APPROVED _____ DATE _____ SHEET 1 OF 9
TITLE _____ BY RR DATE 08/15/94

To determine starting WSEL for range of discharges (required for HYMO sediment transport analysis) other than 10 and 100 year return periods. (related culvert charts are attached)

[Even though 10-yr & 100-yr Qs do not match the ones in HYMO file, the difference is minor after dividing the Q per culvert. Also we just need the range of discharges here.]

a) Upstream of structure no. 1 (4 ft dia) WSEL = 5194.8 + H

Qi	Overall Discharge (cfs)	Q per Culvert (cfs)	H/D	H (ft)	WSEL (ft)
Q_{10}	115	15	0.50	2.00	5196.80
Q_1	200	25	0.53	2.12	5196.92
Q_{100}	258	33	0.62	2.48	5197.28

b) Upstream of structure no. 3 (D = 5.8') WSEL = 5180.20 + H

Qi	Overall Q (cfs)	Q per Culvert (cfs)	H/D	H (ft)	WSEL (ft)
Q_1	40	40	0.36	2.09	5182.29
Q_2	60	60	0.45	2.61	5182.81
Q_{10}	115	115	0.64	3.71	5183.91
Q_3	180	180	0.85	4.93	5185.13
Q_{100}	258	258	1.18	6.84	5187.04

c) Upstream of structure no. 2 (D = 3.5') WSEL = 5193.42 + H

Qi	Overall Q (cfs)	Q per Culvert/W (cfs)	H/D	H (ft)	WSEL (ft)
Q_{10}	44	3	0.30	1.05	5194.47
Q_1	70	4	0.35	1.23	5194.65
Q_{100}	110	7	0.50	1.75	5195.17

d) Upstream of structure no. 4 (D = 5.6') WSEL = 5183.30 + H

Qi	Overall Q (cfs)	Q per Culvert (cfs)	H/D	H (ft)	WSEL (ft)
Q_1	80	40	0.3	1.68	5184.98
Q_2	120	60	0.38	2.13	5185.43
Q_{10}	164	82	0.48	2.70	5186.00
Q_{100}	261	131	0.66	3.70	5187.00

RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

CHECKED _____ DATE _____ PROJECT NO. _____
APPROVED _____ DATE _____ SHEET 2 OF 9
TITLE _____ BY _____ DATE _____

e) Upstream of structure no. 6 (D= 4.3') WSEL= 5157.1+ H

Qi	Overall Q (cfs)	Q per Culvert (cfs)	H/D	H (ft)	WSEL (ft)
Q_1	70	35	0.30	1.29	5158.39
Q_2	110	55	0.42	1.81	5158.91
Q_{10}	177	89	0.60	2.58	5159.68
Q_4	210	105	0.68	2.92	5160.02
Q_{100}	281	141	0.85	3.66	5160.76

f) Upstream of structure no. 7 (D= 4') WSEL= 5153.1 + H

Qi	Overall Q (cfs)	Q per Culvert (cfs)	H/D	H (ft)	WSEL (ft)
Q_1	50	50	0.37	1.48	5154.58
Q_2	70	70	0.47	1.88	5154.98
Q_{10}	177	177	1.02	4.08	5157.18
Q_3	210	210	1.20	4.80	5157.90
Q_{100}	281	281	1.50	6.00	5159.10

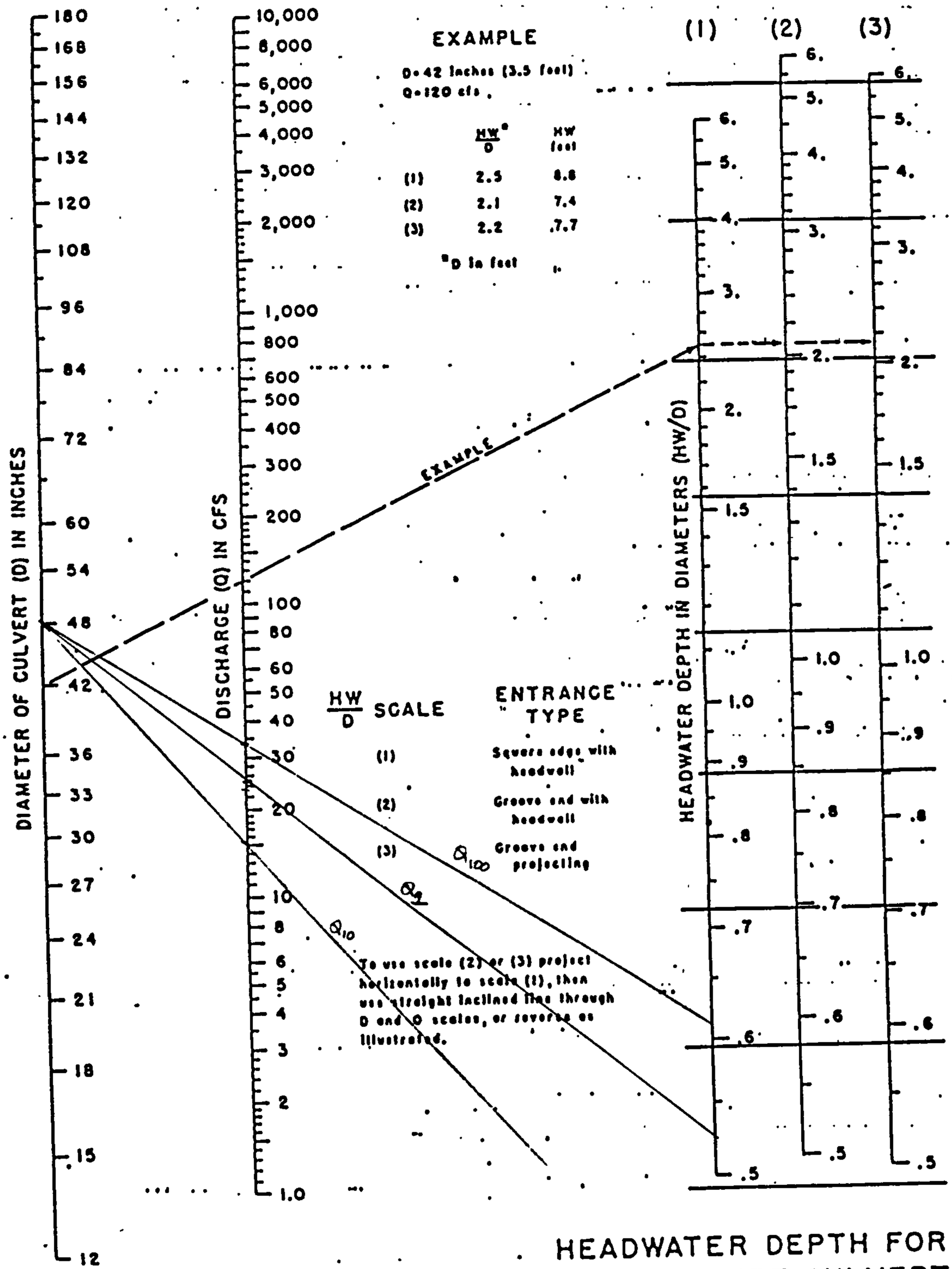
g) Upstream of structure no. 5 (D= 5.75') WSEL= 5170.30+ H

Qi	Overall Q (cfs)	Q per Culvert (cfs)	H/D	H (ft)	WSEL (ft)
Q_1	40	40	0.35 (assume)	2.01	5172.31
Q_2	70	70	0.45	2.59	5172.89
Q_{10}	138	138	0.65	3.74	5174.04
Q_3	200	200	0.83	4.77	5175.07
Q_{100}	307	307	1.20	6.90	5177.2

STRUCT. NO. 1

DESCRIPTION 8-ft dia RCPs (at upstream end)

3/9



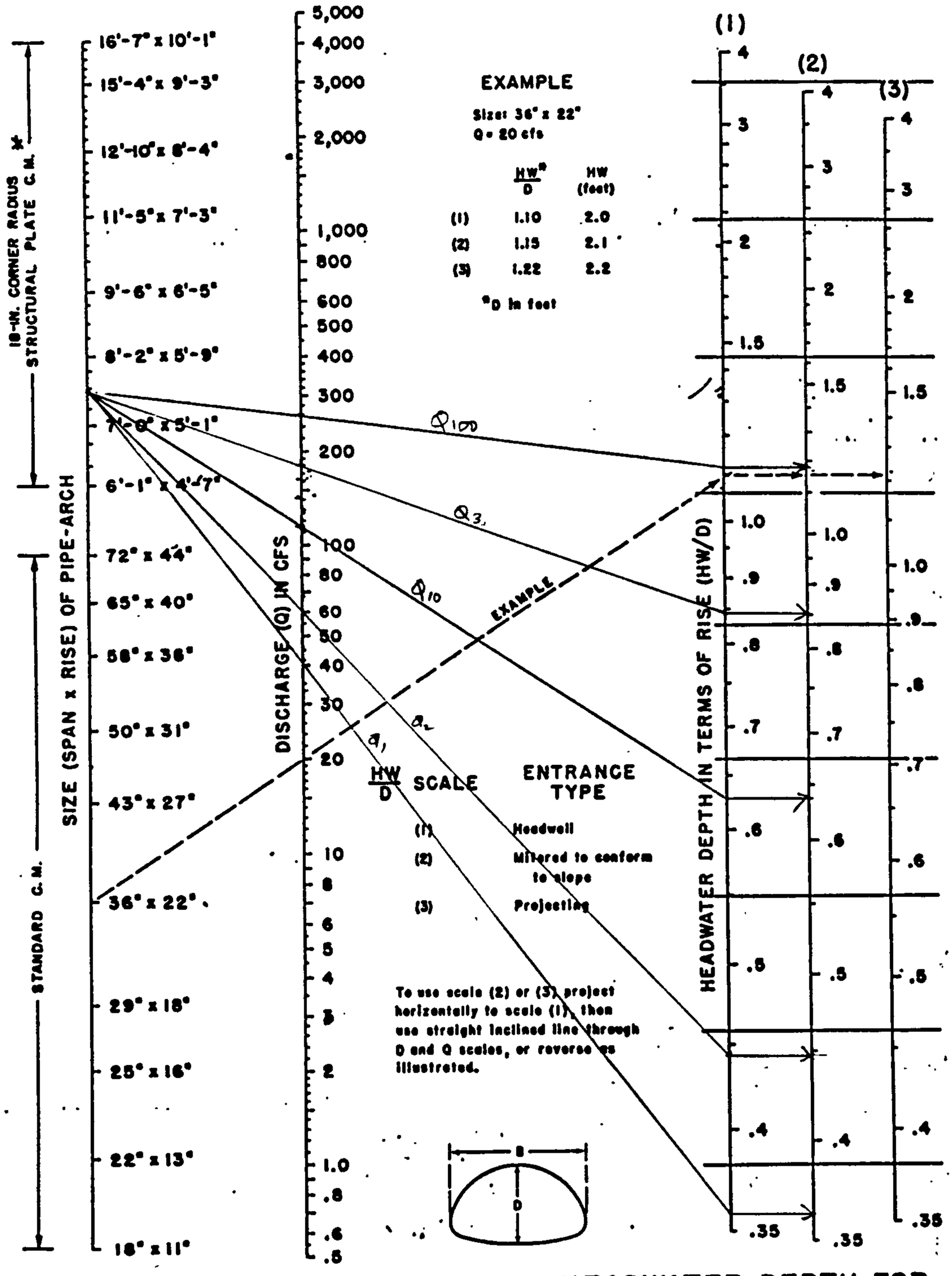
HEADWATER DEPTH FOR CONCRETE PIPE CULVERTS WITH INLET CONTROL

FHWA

NOMOGRAPH 1

Structure No. 3

2 4/9



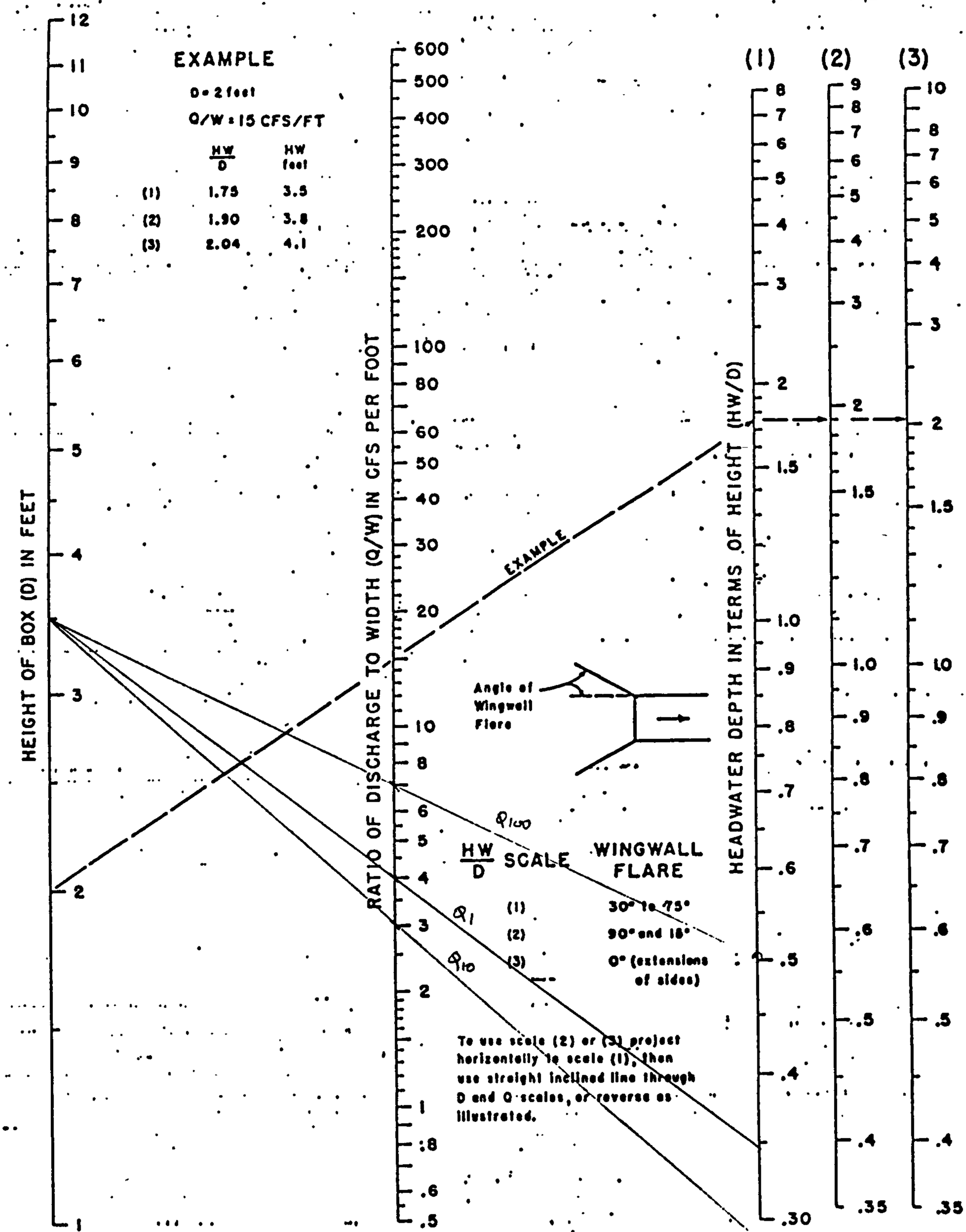
FHWA

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

NOMOGRAPH V

Structure No. 2

5/9
~~5/2~~



FHWA

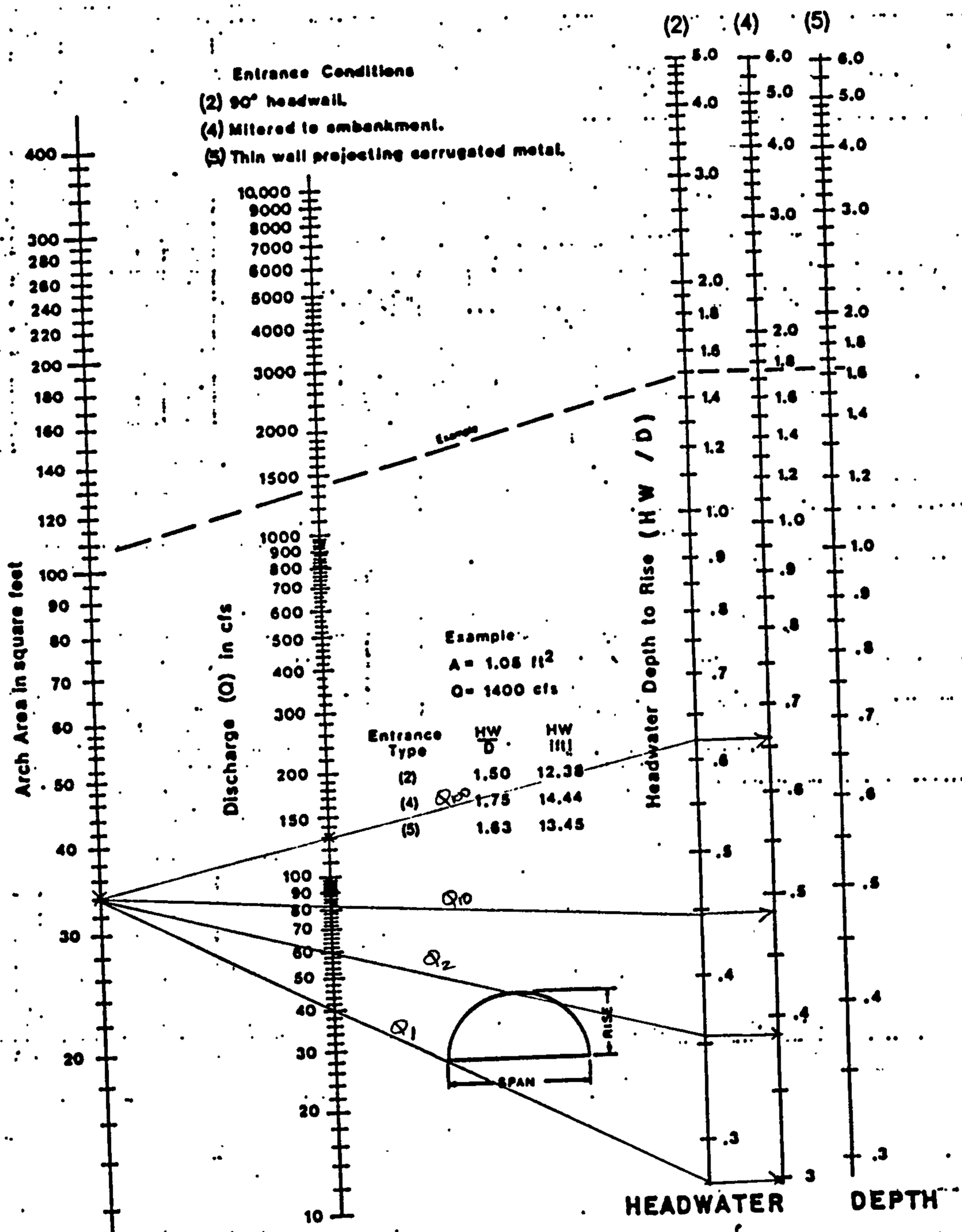
HEADWATER DEPTH FOR BOX CULVERTS WITH INLET CONTROL

NOMOGRAPH C

Structure No. 4

6/9

CHART 43



HEADWATER DEPTH
FOR C.M. ARCH CULVERTS
0.5 ≤ RISE / SPAN
WITH INLET CONTROL

Nomographs adapted from material furnished by Kaiser Aluminum and Chemical Corporation

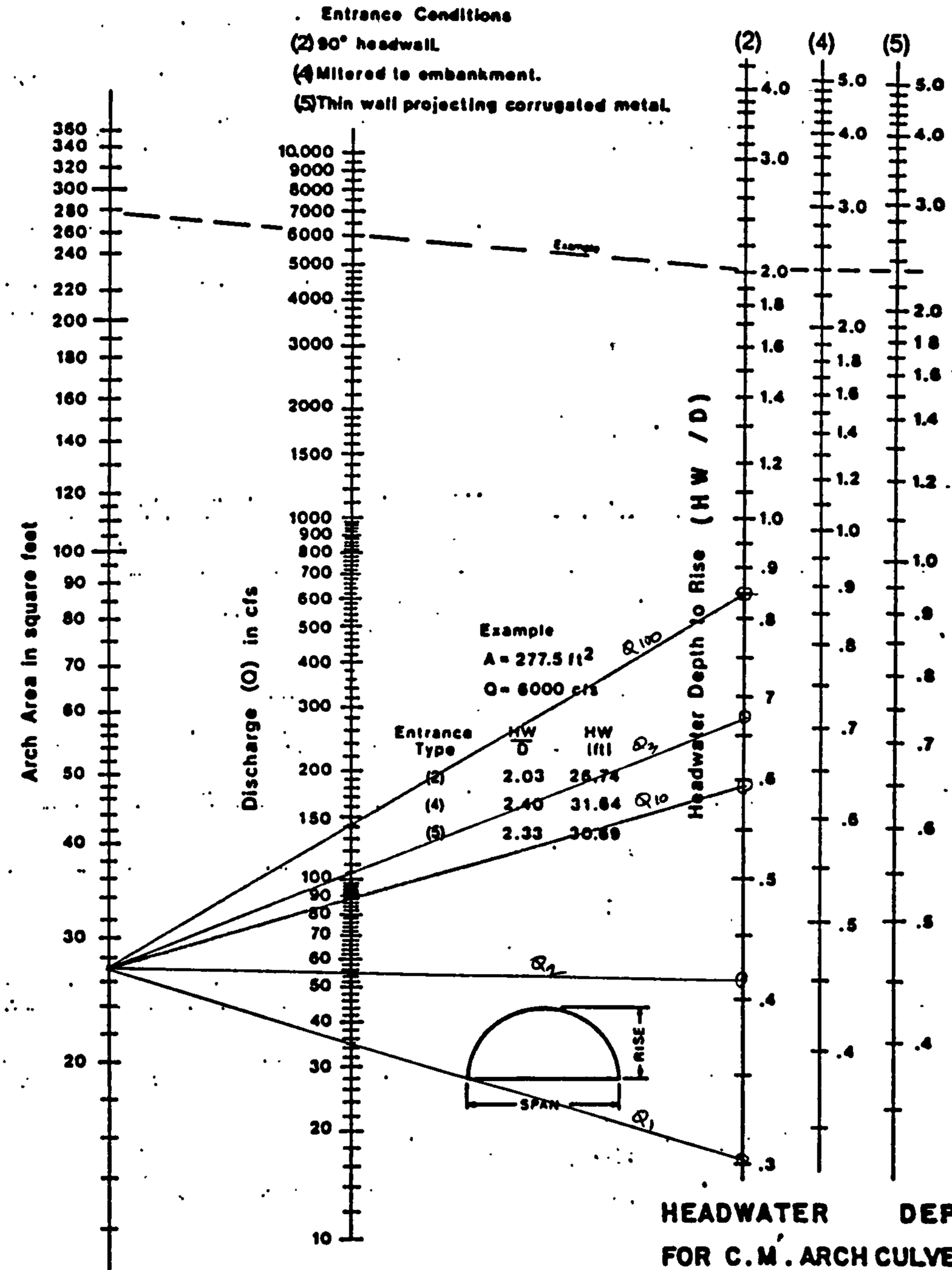
Duplication of this nomograph may distort scale

Structure No. 6

7/9

3/2

CHART 42



Nomographs adapted from material furnished by Kaiser Aluminum and Chemical Corporation

Duplication of this nomograph may distort scale

HEADWATER DEPTH
FOR C.M. ARCH CULVERTS
0.4 ≤ RISE / SPAN < 0.5
WITH INLET CONTROL

Structure No. 7

8/9

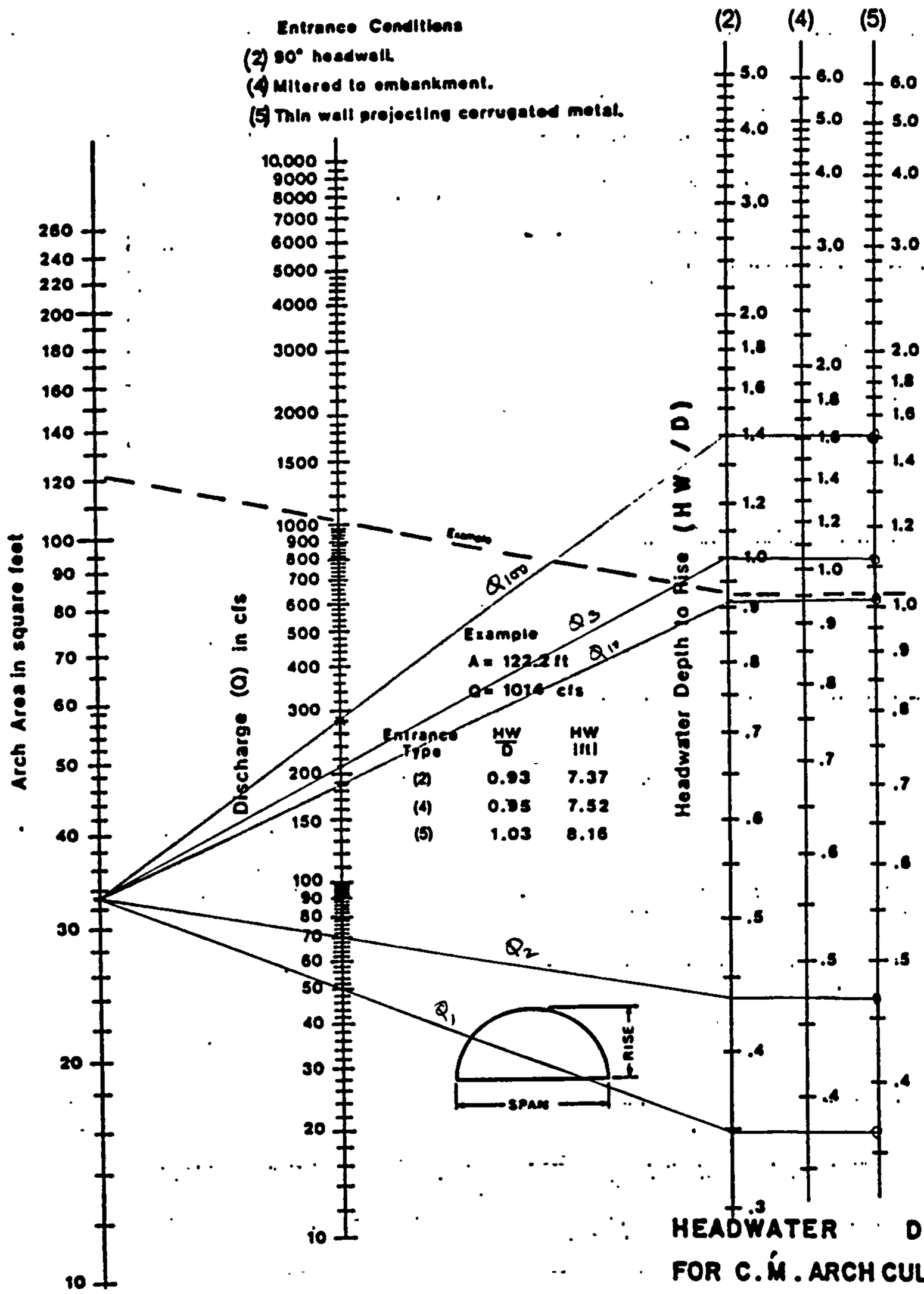
CHART 41

Entrance Conditions

(2) 90° headwall.

(4) Mitered to embankment.

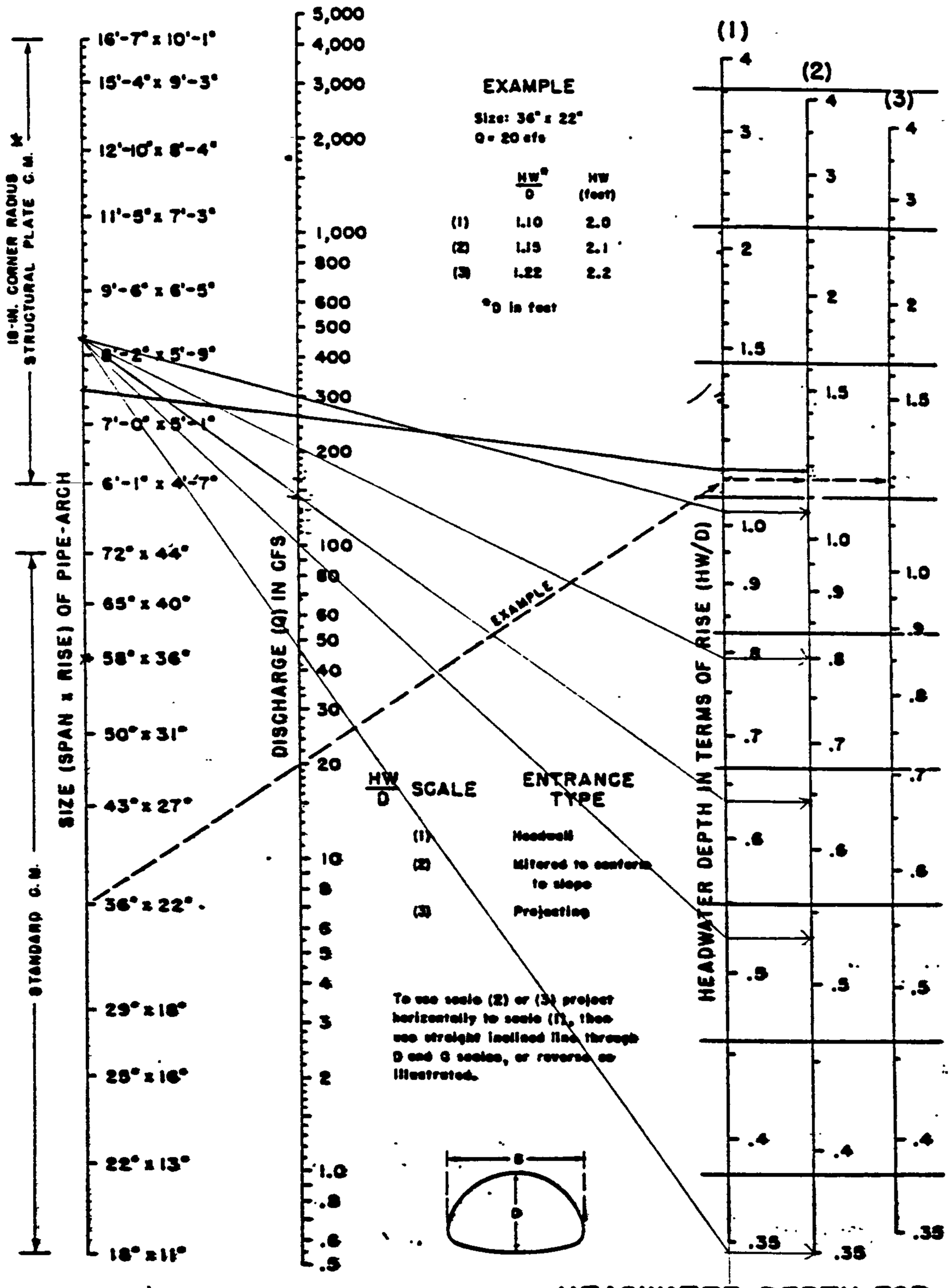
(5) Thin wall projecting corrugated metal.



HEADWATER DEPTH
FOR C.M. ARCH CULVERTS
0.3 ≤ RISE/SPAN < 0.4
WITH INLET CONTROL

Duplication of this nomograph may distort scale

Nomographs adapted from material furnished by Kaiser Aluminum and Chemical Corporation



FHWA

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

NOMOGRAPH V

Subreach 1: Upstream of I-25 (Arroyo "A"):

Head water depth at culvert is approximately half of culvert depth. Cross-section 1096.4 is selected to represent sub-critical conditions. Cross-section 97.35 is selected for super-critical conditions.

Output summary table is attached for subcritical and super-critical conditions.

Results from AHYMO run are attached:

Total sediment.

contributing reach (from x-section 97.35) = 1173 tons
= 0.54 ac-ft

Receiving reach (from x-section 1096.4) = 705 tons
= 0.33 ac-ft

Deposition volume = 0.54 − 0.33 = 0.21 ac-ft
= 9148 ft³

Distance from cross-section 97.35 (contributing reach) to upstream end of culvert is 75 ft. Average top width of the channel is approximately 80 ft.

Average Area = 80 × 75 = 6000 ft²

Average depth of deposition: $\frac{9148}{6000}$ = 1.52 ft

Culvert opening size is 4 ft dia.
Therefore these culverts will not be plugged with sediment. Also there were no signs of deposition

RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

CHECKED _____ DATE _____ PROJECT NO. _____

APPROVED _____ DATE _____ SHEET _____ OF _____

TITLE _____ BY _____ DATE _____

Add this height of deposition (1.52 ft) to water surface elevations (WSEL) of the cross-sections in this reach to represent actual elevations.

x-section #	WSEL previously	WSEL Now
96.3	5197.28	5198.80
1096.4	5196.21	5197.73
1096.7	5198.28	5199.80
97.35	5199.48	5201.00

Use modified elevations in plotting FLOODPLAIN near this structure.

SUB_REACH 1

THIS RUN EXECUTED 16AUG94 9:24:04

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2: May 1991
****

SUB-CRITICAL

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

NDB-A1(SUB)

SUMMARY PRINTOUT

	SECNO	ELMIN	CUMDS	CWSEL	CRIWS	EG	XLCH	TOPWID	Q	QLOB	QROB	VCH	DEPT
	96.300	5194.80	0.00	5196.80	5195.61	5196.87	0.00	27.90	115.00	0.00	0.00	2.09	2.(
	96.300	5194.80	0.00	5196.92	5195.99	5197.10	0.00	27.95	200.00	0.00	0.00	3.43	2.1
	96.300	5194.80	0.00	5197.28	5196.21	5197.50	0.00	28.09	258.00	0.00	0.00	3.77	2.4
	1096.400	5196.00	10.00	5196.81	5196.52	5196.90	10.00	70.48	115.00	0.00	0.00	2.33	0.8
	1096.400	5196.00	10.00	5197.01	5196.74	5197.16	10.00	75.22	200.00	0.00	0.00	3.17	1.0
*	1096.400	5196.00	10.00	5197.47	5196.87	5197.57	10.00	86.72	258.00	0.00	0.00	2.57	1.4
*	1096.700	5197.10	40.00	5198.00	5198.00	5198.20	30.00	82.05	115.00	0.00	0.00	3.58	0.9
*	1096.700	5197.10	40.00	5198.18	5198.18	5198.45	30.00	88.33	200.00	0.00	0.00	4.23	1.0
*	1096.700	5197.10	40.00	5198.28	5198.28	5198.60	30.00	92.09	258.00	0.00	0.00	4.52	1.1
*	97.350	5197.90	75.00	5199.16	5199.16	5199.39	35.00	72.59	115.00	0.00	0.00	3.81	1.2
*	97.350	5197.90	75.00	5199.36	5199.36	5199.66	35.00	81.74	200.00	0.00	0.00	4.36	1.4
*	97.350	5197.90	75.00	5199.48	5199.48	5199.81	35.00	87.06	258.00	0.00	0.00	4.64	1.5

SUB_REACH 1

THIS RUN EXECUTED 23AUG94 8:47:40

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2: May 1991
****

SUPER-CRITICAL

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

NDB-A1

SUMMARY PRINTOUT

	SECNO	ELMIN	CUMDS	CWSEL	CRIWS	EG	XLCH	TOPWID	Q	QLOB	QROB	VCH	DEPTH
*	99.980	5208.30	430.00	5208.96	5208.96	5209.12	0.00	85.11	89.00	0.00	0.00	3.22	0.6
*	99.980	5208.30	430.00	5209.10	5209.10	5209.31	0.00	94.64	150.00	0.00	0.00	3.73	0.8
*	99.980	5208.30	430.00	5209.16	5209.16	5209.41	0.00	95.43	184.00	0.00	0.00	4.01	0.8
*	97.970	5203.70	275.00	5204.35	5204.59	5205.12	155.00	36.94	89.00	0.00	0.00	7.02	0.6
*	97.970	5203.70	275.00	5204.51	5204.81	5205.50	155.00	44.44	150.00	0.00	0.00	7.99	0.8
*	97.970	5203.70	275.00	5204.58	5204.90	5205.66	155.00	47.95	184.00	0.00	0.00	8.35	0.8
*	97.350	5197.90	75.00	5199.17	5199.17	5199.39	200.00	73.05	115.00	0.00	0.00	3.72	1.2
*	97.350	5197.90	75.00	5199.37	5199.37	5199.66	200.00	82.09	200.00	0.00	0.00	4.30	1.4
*	97.350	5197.90	75.00	5199.47	5199.49	5199.81	200.00	86.88	258.00	0.00	0.00	4.67	1.5
*	1096.700	5197.10	40.00	5197.86	5198.01	5198.30	35.00	70.13	115.00	0.00	0.00	5.32	0.7
*	1096.700	5197.10	40.00	5198.00	5198.18	5198.60	35.00	81.91	200.00	0.00	0.00	6.26	0.9
*	1096.700	5197.10	40.00	5198.08	5198.28	5198.77	35.00	84.90	258.00	0.00	0.00	6.66	0.9
	1096.400	5196.00	10.00	5196.39	5196.52	5196.82	30.00	59.90	115.00	0.00	0.00	5.28	0.3
	1096.400	5196.00	10.00	5196.57	5196.74	5197.18	30.00	63.98	200.00	0.00	0.00	6.28	0.5
	1096.400	5196.00	10.00	5196.65	5196.87	5197.38	30.00	66.14	258.00	0.00	0.00	6.88	0.6
	96.300	5194.80	0.00	5195.31	5195.61	5196.42	10.00	27.30	115.00	0.00	0.00	8.48	0.5
*	96.300	5194.80	0.00	5195.61	5195.99	5196.86	10.00	27.43	200.00	0.00	0.00	8.96	0.8
*	96.300	5194.80	0.00	5195.85	5196.21	5197.10	10.00	27.52	258.00	0.00	0.00	8.97	1.0

```
*
** FOR SUBREACH 1 - SEDIMENT TRANSPORT ANALYSIS
*  UPSTREAM OF I-25 (ARROYO "A")
*  DATA FROM X-SECTION 97.35 (REPRESENTING CONTRIBUTING REACH)
*
SED WASH LOAD        ID=2   SOIL K=0.15  CROP C=0.24
                     EROSION PRACTICE P=1.0    LS=0.83
                     PER IMPERV=31   WASH LOAD FACTOR=3.0
        SEDIMENT YIELD (Wash Mat.) =      673.7 (TONS)   WASH LOAD CONCENTRATION =      28057 (ppm-w)
        PERCENTAGE IMPERVIOUS AREA =     31.000          WASH LOAD FACTOR =    3.00000

**  THE FOLLOWING FLOW VEL. AND WIDTH INFO ARE FROM SUBREACH AVERAGES FROM
**  HEC-2 RESULTS FOR VARIOUS Q'S INCLUDING 10-YR. Qp AND 100-YR. Qp
SEDIMENT TRANS       ID=2  IDS=2  Code=20
                     A FACT=0.0000065  B EXP=5.45   C EXP=-0.38   D EXP=-2.4
                     NUMBER WASH=-1  WASH CONC=   PPM      Number Sections=3
                     Flow        Velocity      Width
                     (CFS)      (Feet/Sec)      (FT)
                      115           3.72         73.05
                      200           4.30         82.09
                      258           4.67         86.88
                Use wash load from SED WASH LOAD command - Concentration =      28057 (PPM-w)

* * * * * * * * * * * * * * * *
```

TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	28057.	.00	0.	28057.	1.0000	.00
1.000	.00	.000	.000	.00	28057.	.00	0.	28057.	1.0000	.00
2.000	120.03	3.763	.433	73.59	28057.	.96	20850.	47765.	1.0189	631.03
3.000	11.90	2.542	.239	19.56	28057.	.04	8374.	35970.	1.0141	1034.90
4.000	4.59	1.892	.154	15.79	28057.	.01	4165.	31992.	1.0125	1062.24
5.000	2.92	1.616	.121	14.92	28057.	.00	2623.	30762.	1.0120	1074.97
6.000	2.72	1.576	.117	14.82	28057.	.00	2697.	30605.	1.0119	1084.64
7.000	2.44	1.512	.110	14.67	28057.	.00	2457.	30376.	1.0118	1093.97
8.000	2.20	1.457	.104	14.55	28057.	.00	2239.	30172.	1.0117	1102.07
9.000	1.99	1.403	.098	14.44	28057.	.00	2048.	29992.	1.0117	1109.34
10.000	1.81	1.355	.093	14.34	28057.	.00	1885.	29836.	1.0116	1115.88
11.000	1.65	1.309	.088	14.26	28057.	.00	1736.	29697.	1.0115	1121.82
12.000	1.51	1.267	.084	14.19	28057.	.00	1608.	29577.	1.0115	1127.22
13.000	1.39	1.228	.080	14.13	28057.	.00	1492.	29466.	1.0115	1132.16
14.000	1.29	1.193	.077	14.08	28057.	.00	1393.	29373.	1.0114	1136.71
15.000	1.19	1.158	.074	14.03	28057.	.00	1299.	29284.	1.0114	1140.91
16.000	1.11	1.127	.071	13.98	28057.	.00	1218.	29207.	1.0114	1144.80
17.000	1.04	1.096	.068	13.95	28057.	.00	1145.	29138.	1.0113	1148.43
18.000	.98	1.075	.066	13.80	28057.	.00	1089.	29086.	1.0113	1151.82
19.000	.92	1.060	.064	13.50	28057.	.00	1051.	29050.	1.0113	1155.00
20.000	.87	1.045	.063	13.22	28057.	.00	1017.	29018.	1.0113	1158.01
21.000	.83	1.031	.062	12.96	28057.	.00	986.	28986.	1.0113	1160.85
22.000	.79	1.019	.061	12.72	28057.	.00	957.	28961.	1.0113	1163.54
23.000	.75	1.007	.060	12.50	28057.	.00	931.	28936.	1.0112	1166.10
24.000	.72	.995	.059	12.28	28057.	.00	905.	28912.	1.0112	1168.55
25.000	.37	.782	.041	8.56	28057.	.00	511.	28539.	1.0111	1169.94
26.000	.22	.742	.038	7.90	28057.	.00	450.	28482.	1.0111	1170.73
27.000	.19	.710	.035	7.41	28057.	.00	406.	28440.	1.0110	1171.40
28.000	.16	.680	.033	6.94	28057.	.00	366.	28403.	1.0110	1171.96
29.000	.13	.651	.031	6.50	28057.	.00	330.	28369.	1.0110	1172.42

AT PEAK FLOW OF 277.112 WITH TIME AT 1.60 HOURS: BEDMAT = 171.12 (TONS) = .0786 (AC-FT bulked)
TOTAL SED = 340.19 (TONS) = .1562 (AC-FT bulked)

PEAK BULKING FACTOR = 1.023975 = 59737. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	673.69	.1871	.3093	28057.	
BEDMAT =	499.11	.1386	.2292	20939.	
TOTAL SEDIMENT =	1172.80	.3256	.5385	47849.	1.018964

SEDIMENT TRANSPORT CAPACITY: 1.96883 AC-FT/SQ MI (bulked) = 6.7002 TONS/ACRE (at Porosity=0.395)

```
*
** FOR SUBREACH 1 - SEDIMENT TRANSPORT ANALYSIS
*  UPSTREAM OF I-25 (ARROYO "A")
*  DATA FROM X-SECTION 1096.4 (REPRESENTING RECEIVING REACH)
*
SED WASH LOAD        ID=2   SOIL K=0.15  CROP C=0.24
                     EROSION PRACTICE P=1.0    LS=0.83
                     PER IMPERV=31   WASH LOAD FACTOR=3.0
        SEDIMENT YIELD (Wash Mat.) =      673.7 (TONS)   WASH LOAD CONCENTRATION =      28057 (ppm-w)
        PERCENTAGE IMPERVIOUS AREA =     31.000          WASH LOAD FACTOR =    3.00000

**  THE FOLLOWING FLOW VEL. AND WIDTH INFO ARE FROM SUBREACH AVERAGES FROM
**  HEC-2 RESULTS FOR VARIOUS Q'S INCLUDING 10-YR. Qp AND 100-YR. Qp
SEDIMENT TRANS       ID=2  IDS=1  Code=20
                     A FACT=0.0000065  B EXP=5.45   C EXP=-0.38   D EXP=-2.4
                     NUMBER WASH=-1  WASH CONC=   PPM      Number Sections=3
                     Flow          Velocity      Width
                     (CFS)       (Feet/Sec)      (FT)
                      115            2.33         70.48
                      200            3.17         75.22
                      256            2.57         86.72
            Use wash load from SED WASH LOAD command - Concentration =      28057 (PPM-w)

 * * * * * * * * * * * * * * *
```

TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	28057.	.00	0.	28057.	1.0000	.00
1.000	.00	.000	.000	.00	28057.	.00	0.	28057.	1.0000	.00
2.000	120.03	2.391	.709	70.76	28057.	.06	1431.	29409.	1.0114	443.76
3.000	11.90	1.607	.401	16.45	28057.	.00	537.	28564.	1.0111	577.57
4.000	4.59	1.200	.259	14.76	28057.	.00	268.	28310.	1.0110	600.46
5.000	2.92	1.026	.205	13.92	28057.	.00	184.	28231.	1.0110	611.95
6.000	2.72	1.000	.197	13.82	28057.	.00	174.	28221.	1.0110	621.03
7.000	2.44	.962	.186	13.68	28057.	.00	158.	28207.	1.0110	629.45
8.000	2.20	.925	.175	13.56	28057.	.00	144.	28193.	1.0109	636.98
9.000	1.99	.891	.166	13.45	28057.	.00	132.	28182.	1.0109	643.78
10.000	1.81	.861	.157	13.36	28057.	.00	122.	28172.	1.0109	649.93
11.000	1.65	.831	.149	13.28	28057.	.00	112.	28163.	1.0109	655.54
12.000	1.51	.805	.142	13.21	28057.	.00	104.	28155.	1.0109	660.67
13.000	1.39	.780	.136	13.15	28057.	.00	96.	28148.	1.0109	665.37
14.000	1.29	.758	.130	13.10	28057.	.00	90.	28142.	1.0109	669.72
15.000	1.19	.736	.124	13.05	28057.	.00	84.	28136.	1.0109	673.74
16.000	1.11	.716	.119	13.01	28057.	.00	79.	28131.	1.0109	677.48
17.000	1.04	.696	.115	12.97	28057.	.00	74.	28127.	1.0109	680.97
18.000	.98	.684	.111	12.84	28057.	.00	70.	28123.	1.0109	684.25
19.000	.92	.674	.109	12.56	28057.	.00	68.	28121.	1.0109	687.33
20.000	.87	.664	.107	12.32	28057.	.00	66.	28119.	1.0109	690.22

22.000	.79	.647	.103	11.83	28057.	.00	62.	28115.	1.0109	695.60
23.000	.75	.640	.101	11.63	28057.	.00	60.	28114.	1.0109	698.08
24.000	.72	.632	.099	11.42	28057.	.00	58.	28112.	1.0109	700.46
25.000	.27	.497	.069	7.96	28057.	.00	33.	28088.	1.0109	701.82
26.000	.22	.471	.064	7.35	28057.	.00	29.	28084.	1.0109	702.60
27.000	.19	.451	.060	6.89	28057.	.00	26.	28082.	1.0109	703.26
28.000	.16	.432	.056	6.45	28057.	.00	24.	28079.	1.0109	703.81
29.000	.13	.414	.052	6.04	28057.	.00	21.	28077.	1.0109	704.27

AT PEAK FLOW OF 277.112 WITH TIME AT 1.60 HOURS: BEDMAT = 7.91 (TONS) = .0036 (AC-FT bulked)
TOTAL SED = 176.98 (TONS) = .0813 (AC-FT bulked)

PEAK BULKING FACTOR = 1.012338 = 31661. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	673.69	.1871	.3093	28057.	
BEDMAT =	30.95	.0086	.0142	1325.	
TOTAL SEDIMENT =	704.64	.1956	.3235	29308.	1.011394

SEDIMENT TRANSPORT CAPACITY: 1.18291 AC-FT/SQ MI (bulked) = 4.0256 TONS/ACRE (at Porosity=0.395)

Subreach 2 : Upstream of culvert structure no. 3 (Arroyo "A"):

Since the reach to East of I-25 is depositing near upstream of the culvert structure no. 1, there will not be any bed material entering this reach. Owing to the low velocities in this reservoir reach, there would be hardly any bed-material collected in this reach. Therefore this culvert will not be plugged with sediment.

(Also see the related pages from "Sediment and erosion design guide at the end of section on subreach 7 and Form 7)

(Also see the reservoir modeling of this reach at the end of HEC-2 output summary, cross section and profile plots. for this reach at the end of Form 4).

RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

CHECKED _____ DATE _____ PROJECT NO. _____
APPROVED _____ DATE _____ SHEET _____ OF _____
TITLE _____ BY _____ DATE _____

Subreach 3: Upstream of culvert structure no. 2 at I-25 (Arroyo "B").

x-section 900 is at upstream face of culvert structure no. 2 at I-25. As we can see from the attached summary output table for subcritical conditions, the depth at culvert opening (x-section 900) is similar to the depth at upstream x-sections. [Since there is a drop (erosion cut extended from culvert) from x-section 904 to 903, one needs to look at x-sections upstream of 904].

Therefore this culvert will not be plugged with sediment.

SUB_REACH 3

THIS RUN EXECUTED 20APR95 13:17:33

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2: May 1991
****

SUB-CRITICAL

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

NDB-B1(SUB)

SUMMARY PRINTOUT

	SECNO	ELMIN	CUMDS	CWSEL	CRIWS	EG	XLCH	TOPWID	Q	QLOB	QROB	VCH	DEP
	900.000	5193.42	0.00	5194.65	5194.19	5194.31	0.00	17.98	70.00	0.00	0.00	3.17	1.[illegible]
	900.000	5193.42	0.00	5195.35	5194.67	5195.61	0.00	17.98	143.00	0.00	0.00	4.12	1.[illegible]
*	901.000	5194.52	9.00	5195.19	5195.19	5195.52	9.00	23.43	70.00	0.00	0.00	4.59	0.[illegible]
*	901.000	5194.52	9.00	5195.59	5195.59	5196.11	9.00	24.52	143.00	0.00	0.00	5.74	1.[illegible]
*	902.000	5195.37	29.00	5197.22	5197.22	5197.60	20.00	19.32	70.00	0.00	0.00	4.76	1.[illegible]
*	902.000	5195.37	29.00	5197.71	5197.71	5198.20	20.00	26.70	143.00	0.00	0.00	5.62	2.[illegible]
*	903.000	5196.41	79.00	5200.43	5200.43	5200.96	50.00	12.07	70.00	0.00	0.00	5.84	4.[illegible]
*	903.000	5196.41	79.00	5201.14	5201.14	5201.73	50.00	20.97	143.00	0.00	0.00	6.15	4.7
*	904.000	5198.72	83.00	5200.97	5200.97	5201.37	4.00	17.37	70.00	0.00	0.00	5.09	2.[illegible]
*	904.000	5198.72	83.00	5201.53	5201.53	5201.97	4.00	37.26	143.00	6.39	0.00	5.45	2.[illegible]
*	905.000	5201.20	193.00	5202.58	5202.58	5202.77	110.00	52.86	70.00	31.33	0.00	4.41	1.[illegible]
	905.000	5201.20	193.00	5202.87	5202.79	5203.11	110.00	59.12	143.00	84.21	0.00	4.92	1.[illegible]
*	906.000	5203.79	345.00	5205.20	5205.20	5205.67	152.00	13.91	70.00	0.00	0.00	5.51	1.[illegible]
*	906.000	5203.79	345.00	5205.81	5205.81	5206.44	152.00	18.05	143.00	0.00	0.00	6.37	2.[illegible]
	907.000	5205.79	453.00	5206.50	5206.25	5206.58	108.00	28.21	38.00	0.00	0.00	2.18	0.[illegible]
	907.000	5205.79	453.00	5207.05	5206.60	5207.17	108.00	31.07	95.00	0.00	0.00	2.84	1.[illegible]
*	908.000	5206.32	495.00	5207.10	5207.10	5207.28	42.00	31.41	38.00	0.00	0.00	3.40	0.[illegible]
*	908.000	5206.32	495.00	5207.40	5207.40	5207.71	42.00	35.51	95.00	0.00	0.00	4.50	1.[illegible]
*	909.000	5209.66	631.00	5210.63	5210.63	5210.83	136.00	28.11	38.00	0.00	0.00	3.57	0.9
*	909.000	5209.66	631.00	5210.96	5210.96	5211.26	136.00	37.98	95.00	0.00	0.00	4.40	1.[illegible]
*	910.000	5214.09	797.00	5214.53	5214.53	5214.68	166.00	44.39	38.00	0.00	0.00	3.08	0.4
*	910.000	5214.09	797.00	5214.77	5214.77	5215.02	166.00	51.40	95.00	0.00	0.00	3.97	0.6

RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

CHECKED _____ DATE _____ PROJECT NO. _____
APPROVED _____ DATE _____ SHEET _____ OF _____
TITLE _____ BY _____ DATE _____

Subreach 4 : Upstream of culvert structure no. ④ (Arroyo "B")

Flow depth at the culvert is below the soffit. The depth of flow in the culvert is similar to the depth in the channel

Output summary table is attached. Also flow type is supercritical upto the culvert excluding x-section at the face of culvert.

Therefore this culvert will not be plugged with sediment.

* x-section 8923 is at face of culvert structure no. ④

SUB-REACH 4

THIS RUN EXECUTED 16AUG94 9:30:28

```
**********************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2:  May 1991
**********************************
```

SUB-CRITICAL

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

NDB-B24(SUB)

SUMMARY PRINTOUT

	SECNO	ELMIN	CUMDS	CWSEL	CRIWS	EG	XLCH	TOPWID	Q	QLOB	QROB	VCH	DEF
	89.230	5183.30	0.00	5184.98	5184.35	5185.18	0.00	13.17	80.00	0.00	0.00	3.62	1.
	89.230	5183.30	0.00	5185.43	5184.67	5185.71	0.00	13.17	120.00	0.00	0.00	4.28	2.
	89.230	5183.30	0.00	5186.00	5184.96	5186.32	0.00	13.18	161.00	0.00	0.00	4.53	2.
	89.230	5183.30	0.00	5187.00	5185.59	5187.45	0.00	13.18	261.00	0.00	0.00	5.35	3.
*	2093.500	5183.70	10.00	5185.49	5185.49	5186.10	10.00	10.69	80.00	0.00	0.00	6.28	1.
*	2093.500	5183.70	10.00	5185.89	5185.89	5186.65	10.00	11.72	120.00	0.00	0.00	6.97	2.
*	2093.500	5183.70	10.00	5186.24	5186.24	5187.11	10.00	12.63	161.00	0.00	0.00	7.49	2.
*	2093.500	5183.70	10.00	5186.97	5186.97	5188.05	10.00	14.49	261.00	0.00	0.00	8.34	3.
*	94.280	5186.30	70.00	5187.83	5187.83	5188.31	60.00	15.37	80.00	0.00	0.00	5.56	1.
*	94.280	5186.30	70.00	5188.16	5188.16	5188.73	60.00	17.87	120.00	0.00	0.00	6.05	1.
*	94.280	5186.30	70.00	5188.44	5188.44	5189.08	60.00	19.99	161.00	0.00	0.00	6.42	2.
*	94.280	5186.30	70.00	5188.97	5188.97	5189.75	60.00	24.04	261.00	0.00	0.00	7.10	2.

RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

CHECKED _____ DATE _____ PROJECT NO. _____

APPROVED _____ DATE _____ SHEET _____ OF _____

TITLE _____ BY _____ DATE _____

Subreach 5: Upstream of culvert structure no. 6 (Arroyo "B")

x-section 83.3 is at upstream face of structure no. 6. (Flow depth at the face of culvert is below the soffit) The immediate upstream x-section from 83.3 is 2083.5. Flow is supercritical starting from x-section 2083.5 and for upstream cross-sections. The flow depth near the culvert is similar to depth at 2083.5.* The reach from x-section 2083.5 to 83.3 is 19 ft. This is a short reach for the sediment to take place in the channel. Also the velocity at culvert is not too low comparing to velocity at x-section 2083.5

Therefore it is assumed that this culvert will not be plugged with sediment.

* Depth for x-section 2083.5 is taken from sub-critical run because of backwater effect.

SUB-REACH 5

THIS RUN EXECUTED 16AUG94 9:29:46

```
*************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2:  May 1991
*************************************
```

SUB-CRITICAL

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

NDB-B2(SUB)

SUMMARY PRINTOUT

	SECNO	ELMIN	CUMDS	CWSEL	CRIWS	EG	XLCH	TOPWID	Q	QLOB	QROB	VCH	DEPT
	83.300	5157.10	0.00	5158.39	5158.06	5158.65	0.00	13.22	70.00	0.00	0.00	4.12	1.2
	83.300	5157.10	0.00	5158.91	5158.39	5159.24	0.00	13.27	110.00	0.00	0.00	4.61	1.8
	83.300	5157.10	0.00	5159.68	5158.88	5160.10	0.00	13.34	177.00	0.00	0.00	5.19	2.5
	83.300	5157.10	0.00	5160.02	5159.08	5160.46	0.00	13.37	210.00	0.00	0.00	5.43	2.9
	83.300	5157.10	0.00	5160.76	5159.51	5161.28	0.00	13.44	281.00	0.00	0.00	5.79	3.6
*	2083.500	5158.10	19.00	5159.63	5159.63	5160.19	19.00	10.45	70.00	0.00	0.00	6.03	1.5
*	2083.500	5158.10	19.00	5160.05	5160.05	5160.76	19.00	11.50	110.00	0.00	0.00	6.78	1.9
*	2083.500	5158.10	19.00	5160.62	5160.62	5161.52	19.00	12.92	177.00	0.00	0.00	7.63	2.5
*	2083.500	5158.10	19.00	5160.85	5160.85	5161.84	19.00	13.50	210.00	0.00	0.00	7.99	2.7
*	2083.500	5158.10	19.00	5161.32	5161.32	5162.45	19.00	14.66	281.00	0.00	0.00	8.55	3.2
*	83.830	5159.50	44.00	5161.05	5161.05	5161.57	25.00	11.63	70.00	0.00	0.00	5.79	1.5
*	83.830	5159.50	44.00	5161.44	5161.44	5162.09	25.00	13.21	110.00	0.00	0.00	6.48	1.9
*	83.830	5159.50	44.00	5161.96	5161.98	5162.78	25.00	15.35	177.00	0.00	0.00	7.20	2.4
*	83.830	5159.50	44.00	5162.19	5162.19	5163.06	25.00	16.21	210.00	0.00	0.00	7.50	2.6
*	83.830	5159.50	44.00	5162.62	5162.62	5163.60	25.00	18.04	281.00	0.00	0.00	7.96	3.1
*	83.930	5162.70	45.00	5164.07	5164.07	5164.43	1.00	21.10	70.00	0.00	0.00	4.81	1.3
*	83.930	5162.70	45.00	5164.33	5164.33	5164.79	1.00	22.73	110.00	0.00	0.00	5.45	1.6
*	83.930	5162.70	45.00	5164.70	5164.70	5165.24	1.00	29.01	177.00	0.00	0.00	5.89	2.0
*	83.930	5162.70	45.00	5164.84	5164.84	5165.43	1.00	30.02	210.00	0.00	0.00	6.15	2.1
*	83.930	5162.70	45.00	5165.12	5165.12	5165.79	1.00	32.08	281.00	0.00	0.00	6.55	2.4
*	84.110	5163.40	75.00	5164.95	5164.95	5165.36	30.00	17.03	70.00	0.00	0.00	5.12	1.5
*	84.110	5163.40	75.00	5165.27	5165.27	5165.76	30.00	20.14	110.00	0.00	0.00	5.61	1.8
*	84.110	5163.40	75.00	5165.68	5165.68	5166.27	30.00	24.10	177.00	0.00	0.00	6.19	2.2
*	84.110	5163.40	75.00	5165.85	5165.85	5166.48	30.00	25.84	210.00	0.00	0.00	6.41	2.4
*	84.110	5163.40	75.00	5166.16	5166.16	5166.87	30.00	29.35	281.00	0.00	0.00	6.77	2.7

Drop

Subreach 6 : Upstream of culvert structure no. 7 (Arroyo "B")

cross-section 80.93 is at upstream face of culvert structure no. 7. Results from output summary table for subcritical conditions indicate that flow-type in this reach is subcritical, AHYMO model is run because the flow depth at the face of culvert is above the soffit. X-section 81.33 is selected to represent receiving reach and x-section 82.72 is selected for contributing reach.

Results from AHYMO are attached.

Total sediment:

contributing reach ⇒ 19144 tons
8.7896 ac-ft

Receiving reach ⇒ 6755 tons
3.1014 ac-ft

Deposition ⇒ 8.8 - 3.1 = 5.7 ac-ft

Even though the tendency is towards deposition, a quick look at the numbers reveal that 8.7 ac-ft of bed-material can not be generated in this reach from practical point of view. Therefore we present the same logical approach as we did for the Subreach 7. (Please see the subreach 7 analysis).

Subreach 6 : Upstream of culvert structure no. 7 (Arroyo "B")

cross-section 80.93 is at upstream face of culvert structure no. 7. Results from output summary table for subcritical conditions indicate that flow-type in this reach is subcritical. AHYMO model is run because the flow depth at the face of culvert is above the soffit. X-section 81.33 is selected to represent receiv reach and x-section 82.72 is selected for contributing reach

Results from AHYMO are attached.

Total sediment:

contributing reach ⇒ 18814 tons
8.6382 ac-ft

Receiving reach ⇒ 6745 tons
3.0967 ac-ft

Deposition ⇒ 8.6 - 3.1 = 5.5 ac-ft

Since these calculations show the general tendency as to whether there is a deposition or scour in the channel, above calculations show that there will be deposition in front up to culvert. Therefore this culvert will be plugged. Floodplain is shown accordingly.

SUB-REACH 6

THIS RUN EXECUTED 16AUG94 9:30:50

```
***********************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2:  May 1991
***********************************
```

SUB-CRITICAL

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

NDB-B3(SUB)

SUMMARY PRINTOUT

	SECNO	ELMIN	CUMDS	CWSEL	CRIWS	EG	XLCH	TOPWID	Q	QLOB	QROB	VCH	DEPT
	80.930	5153.10	0.00	5154.58	5154.01	5154.75	0.00	10.14	50.00	0.00	0.00	3.34	1.4
	80.930	5153.10	0.00	5154.98	5154.24	5155.19	0.00	10.15	70.00	0.00	0.00	3.68	1.8
	80.930	5153.10	0.00	5157.18	5155.22	5157.43	0.00	10.20	177.00	0.00	0.00	4.36	4.0
	80.930	5153.10	0.00	5157.90	5155.47	5158.32	0.00	10.22	210.00	0.00	0.00	5.17	4.8
	80.930	5153.10	0.00	5159.10	5155.97	5159.84	0.00	10.25	281.00	0.00	0.00	6.92	6.0
*	81.330	5153.60	35.00	5155.31	5155.31	5155.79	35.00	9.16	50.00	0.00	0.00	5.61	1.7
*	81.330	5153.60	35.00	5155.56	5155.56	5156.15	35.00	9.87	70.00	0.00	0.00	6.16	1.9
	81.330	5153.60	35.00	5157.14	5156.59	5157.66	35.00	14.22	177.00	0.00	0.00	5.83	3.5
*	81.330	5153.60	35.00	5158.11	5156.84	5158.44	35.00	17.54	210.00	0.00	0.00	4.60	4.5
*	81.330	5153.60	35.00	5159.90	5157.31	5160.07	35.00	25.58	281.00	0.00	0.00	→ 3.33	6.3
*	81.730	5154.10	65.00	5155.56	5155.56	5156.09	30.00	8.08	50.00	0.00	0.00	5.86	1.4
*	81.730	5154.10	65.00	5155.85	5155.85	5156.48	30.00	8.91	70.00	0.00	0.00	6.37	1.7
	81.730	5154.10	65.00	5157.06	5156.94	5157.91	30.00	12.11	177.00	0.00	0.00	7.40	2.9
	81.730	5154.10	65.00	5158.06	5157.21	5158.55	30.00	15.24	210.00	0.00	0.00	5.62	3.9
	81.730	5154.10	65.00	5159.88	5157.73	5160.12	30.00	22.09	281.00	0.00	0.00	3.95	5.7
*	82.720	5155.80	170.00	5157.23	5157.23	5157.72	105.00	9.56	50.00	0.00	0.00	5.61	1.4
*	82.720	5155.80	170.00	5157.50	5157.50	5158.07	105.00	10.27	70.00	0.00	0.00	6.03	1.7
*	82.720	5155.80	170.00	5158.50	5158.50	5159.41	105.00	12.85	177.00	0.00	0.00	7.66	2.7
*	82.720	5155.80	170.00	5158.75	5158.75	5159.73	105.00	13.49	210.00	0.00	0.00	7.96	2.9
*	82.720	5155.80	170.00	5159.73	5159.20	5160.46	105.00	16.34	281.00	0.00	0.00	6.84	3.9
*	83.420	5156.20	200.00	5157.75	5156.97	5157.85	30.00	13.22	50.00	0.00	0.00	2.44	1.5
*	83.420	5156.20	200.00	5158.08	5157.16	5158.21	30.00	13.24	70.00	0.00	0.00	2.82	1.8
*	83.420	5156.20	200.00	5159.31	5157.97	5159.60	30.00	13.33	177.00	0.00	0.00	4.31	3.1
*	83.420	5156.20	200.00	5159.58	5158.19	5159.93	30.00	13.35	210.00	0.00	0.00	4.69	3.3
	83.420	5156.20	200.00	5160.16	5158.61	5160.60	30.00	13.40	281.00	0.00	0.00	5.35	3.9

```
*
* FOR SUBREACH 6 - SEDIMENT TRANSPORT ANALYSIS
*  UPSTREAM OF CULVERT STRUCTURE NO. 7
*  X-SECTION NO. 81.73 (CONTRIBUTING REACH)
*
SED WASH LOAD        ID=14   SOIL K=0.15  CROP C=0.24
                     EROSION PRACTICE P=1.0    LS=0.83
                     PER IMPERV=98   WASH LOAD FACTOR=3.0
        SEDIMENT YIELD (Wash Mat.) =       97.3 (TONS)   WASH LOAD CONCENTRATION =       235 (ppm-w)
        PERCENTAGE IMPERVIOUS AREA =     98.000          WASH LOAD FACTOR =    3.00000

**  THE FOLLOWING FLOW VEL. AND WIDTH INFO ARE FROM SUBREACH AVERAGES FROM
**  HEC-2 RESULTS FOR VARIOUS Q'S INCLUDING 10-YR. Qp AND 100-YR. Qp
SEDIMENT TRANS       ID=14  IDS=1  Code=20
                     A FACT=0.0000065  B EXP=5.45   C EXP=-0.38   D EXP=-2.4
                     NUMBER WASH=-1  WASH CONC=   PPM      Number Sections=5
                     Flow        Velocity      Width
                     (CFS)       (Feet/Sec)    (FT)
                      50           5.86         8.08
                      70           6.37         8.91
                     177           7.40        12.11
                     210           5.62        15.24
                     281           3.95        22.09
                Use wash load from SED WASH LOAD command - Concentration =       235 (PPM-w)

* * * * * * * * * * * * * * *
```

TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	235.	.00	0.	235.	1.0000	.00
1.000	.00	.190	.006	.05	235.	.00	12.	247.	1.0001	.00
2.000	224.82	5.166	2.611	16.67	235.	.58	6791.	7022.	1.0027	131.85
3.000	179.15	7.259	2.004	12.31	235.	3.02	42816.	43031.	1.0170	842.91
4.000	176.80	7.281	2.000	12.26	235.	3.07	43517.	43732.	1.0173	1756.14
5.000	176.24	7.318	1.992	12.23	235.	3.15	44670.	44885.	1.0177	2685.40
6.000	177.59	7.361	1.983	12.17	235.	3.24	46070.	46285.	1.0182	3640.56
7.000	176.88	7.358	1.974	12.10	235.	3.31	47363.	47577.	1.0185	4620.13
8.000	175.69	7.352	1.969	12.07	235.	3.30	47350.	47563.	1.0186	5614.32
9.000	174.63	7.386	1.964	12.04	235.	3.27	47335.	47549.	1.0186	6596.52
10.000	173.49	7.379	1.958	12.00	235.	3.25	47320.	47533.	1.0188	7572.23
11.000	172.18	7.371	1.952	11.97	235.	3.23	47301.	47515.	1.0188	8540.72
12.000	170.75	7.362	1.945	11.92	235.	3.20	47282.	47495.	1.0186	9501.05
13.000	169.20	7.352	1.938	11.86	235.	3.17	47260.	47474.	1.0188	10452.60
14.000	167.50	7.341	1.929	11.83	235.	3.13	47237.	47450.	1.0188	11394.57
15.000	165.60	7.329	1.920	11.77	235.	3.10	47211.	47424.	1.0188	12325.97
16.000	163.47	7.315	1.909	11.71	235.	3.05	47181.	47394.	1.0186	13245.56
17.000	160.01	7.292	1.891	11.60	235.	2.99	47133.	47347.	1.0188	14150.06
18.000	154.85	7.257	1.864	11.45	235.	2.89	47062.	47276.	1.0187	15027.75
19.000	149.17	7.217	1.833	11.28	235.	2.78	46985.	47199.	1.0187	15873.41
20.000	143.30	7.173	1.800	11.10	235.	2.66	46907.	47120.	1.0187	16685.87
21.000	135.96	7.115	1.756	10.88	235.	2.52	46811.	47025.	1.0186	17461.54
22.000	123.57	7.009	1.677	10.51	235.	2.28	46662.	46875.	1.0186	18178.63
23.000	106.27	6.840	1.554	9.99	235.	1.96	46496.	46709.	1.0185	18813.04
24.000	14.21	4.867	.799	3.65	235.	.14	26148.	26371.	1.0102	19083.46
25.000	10.21	4.519	.715	3.16	235.	.09	22016.	22240.	1.0086	19116.41
26.000	6.70	4.051	.607	2.72	235.	.04	17054.	17281.	1.0066	19136.30
27.000	2.41	2.937	.375	2.19	235.	.01	8005.	8236.	1.0031	19142.62
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

AT PEAK FLOW OF 275.718 WITH TIME AT 1.65 HOURS: BEDMAT = 91.99 (TONS) = .0422 (AC-FT bulked)
TOTAL SED = 93.72 (TONS) = .0430 (AC-FT bulked)

PEAK BULKING FACTOR = 1.018852 = 47581. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	96.97	.0269	.0445	235.	
BEDMAT =	19046.76	5.2885	8.7451	44135.	
TOTAL SEDIMENT =	19143.74	5.3154	8.7896	44350.	1.017512

SEDIMENT TRANSPORT CAPACITY: 2.01999 AC-FT/SQ MI (bulked) = 6.8743 TONS/ACRE (at Porosity=0.395)

```
** FOR SUBREACH 6 - SEDIMENT TRANSPORT ANALYSIS
*  UPSTREAM OF CULVERT STRUCTURE NO. 7
*  X-SECTION NO. 81.33 (RECEIVING REACH)
*
SED WASH LOAD        ID=14   SOIL K=0.15  CROP C=0.24
                     EROSION PRACTICE P=1.0    LS=0.83
                     PER IMPERV=98   WASH LOAD FACTOR=3.0
        SEDIMENT YIELD (Wash Mat.) =      97.3 (TONS)   WASH LOAD CONCENTRATION =       235 (ppm-w)
        PERCENTAGE IMPERVIOUS AREA =    96.000          WASH LOAD FACTOR =    3.00000

**  THE FOLLOWING FLOW VEL. AND WIDTH INFO ARE FROM SUBREACH AVERAGES FROM
**  HEC-2 RESULTS FOR VARIOUS Q'S INCLUDING 10-YR. Qp AND 100-YR. Qp
SEDIMENT TRANS       ID=14  IDS=2  Code=20
                     A FACT=0.0000065  B EXP=5.45   C EXP=-0.38   D EXP=-2.4
                     NUMBER WASH=-1  WASH CONC=   PPM      Number Sections=5
                     Flow          Velocity      Width
                     (CFS)       (Feet/Sec)      (FT)
                       50            5.61          9.16
                       70            6.16          9.87
                      177            5.83         14.22
                      210            4.60         17.54
                      281            [illegible]  25.88
            Use wash load from SEI WASH LOAD command - Concentration =       235 (PPM-w)

 * * * * * * * * * * * * * * * *
```

TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	235.	.00	0.	235.	1.0000	.00
1.000	.00	.178	.006	.06	235.	.00	10.	245.	1.0001	.00
2.000	224.82	4.252	2.743	19.28	235.	.23	2677.	2911.	1.0011	69.39
3.000	179.15	5.734	2.164	14.44	235.	.95	13865.	14117.	1.0054	302.65
4.000	178.80	5.749	2.160	14.40	235.	.96	14094.	14322.	1.0055	593.06
5.000	178.24	5.774	2.152	14.35	235.	.96	14431.	14660.	1.0056	887.80
6.000	177.59	5.803	2.143	14.28	235.	1.01	14840.	15068.	1.0058	1189.52
7.000	176.66	5.831	2.133	14.21	235.	1.03	15248.	15476.	1.0059	1499.49
8.000	175.69	5.832	2.126	14.17	235.	1.03	15332.	15560.	1.0060	1811.40
9.000	174.63	5.834	2.119	14.12	235.	1.03	15424.	15652.	1.0060	2123.29
10.000	173.49	5.837	2.112	14.08	235.	1.03	15525.	15753.	1.0060	2435.17
11.000	172.18	5.839	2.103	14.02	235.	1.03	15644.	15871.	1.0061	2747.05
12.000	170.75	5.842	2.093	13.97	235.	1.03	15775.	16003.	1.0061	3058.94
13.000	169.20	5.845	2.082	13.90	235.	1.03	15920.	16148.	1.0062	3370.84
14.000	167.50	5.848	2.070	13.83	235.	1.03	16083.	16311.	1.0063	3682.77
15.000	165.60	5.852	2.057	13.76	235.	1.03	16270.	16498.	1.0063	3994.76
16.000	163.47	5.856	2.042	13.67	235.	1.03	16467.	16714.	1.0064	4306.81
17.000	160.91	5.863	2.017	13.53	235.	1.04	16757.	17000.	1.0064	4618.95

19.000	149.17	5.887	1.936	13.09	235.	1.04	18132.	18359.	1.0071	5244.52
20.000	143.30	5.900	1.890	12.85	235.	1.04	18924.	19150.	1.0074	5558.32
21.000	135.96	5.919	1.830	12.55	235.	1.05	20032.	20257.	1.0078	5873.26
22.000	123.57	5.952	1.723	12.05	235.	1.06	22272.	22496.	1.0087	6190.76
23.000	106.27	6.006	1.560	11.34	235.	1.09	26490.	26713.	1.0104	6513.83
24.000	14.21	4.626	.729	4.22	235.	.13	23764.	23988.	1.0093	6700.47
25.000	10.21	4.287	.650	3.66	235.	.08	19907.	20132.	1.0078	6730.30
26.000	6.70	3.834	.550	3.18	235.	.04	15328.	15556.	1.0060	6748.22
27.000	2.41	2.768	.337	2.59	235.	.01	7118.	7350.	1.0028	6754.06
28.000	.65	1.806	.178	2.04	235.	.00	2587.	2821.	1.0011	6754.80
29.000	.13	1.217	.098	1.13	235.	.00	1013.	1248.	1.0005	6754.88

AT PEAK FLOW OF 275.718 WITH TIME AT 1.65 HOURS: BEDMAT = 50.51 (TONS) = .0232 (AC-FT bulked)
TOTAL SED = 52.24 (TONS) = .0240 (AC-FT bulked)

PEAK BULKING FACTOR = 1.015952 = 40559. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	96.96	.0269	.0445	235.	
BEDMAT =	6657.93	1.8486	3.0569	15884.	
TOTAL SEDIMENT =	6754.88	1.8756	3.1014	16111.	1.006179

SEDIMENT TRANSPORT CAPACITY: .71276 AC-FT/SQ MI (bulked) = 2.4256 TONS/ACRE (at Porosity=0.395)

Subreach 7 : Upstream of culvert structure no. 5 (Arroyo "A")

Cross-section 400 is just upstream from culvert face. x-section 92.99 is at the downstream face of culvert structure no. 3. Therefore results from this x-section are not used in this analysis. Results from x-sections 400, 401, 402 are averaged to represent sub-critical conditions. Results from x-sections 1090.1 and 90.2 are averaged to represent super-critical conditions. Then these mean values are input into HYMO model. Also hydrograph used for sediment transport in this reach is unbulked.

Results from HYMO are attached.

Total sediment:

Contributing reach: 2.9862 ac-ft

Receiving reach: 0.3065 ac-ft

But these numbers are unrealistic for following reasons.

1) This reach can not generate 2.7192 ac-ft of bed-material (out of 2.9862 ac-ft) from practical point of view.

2) Since the reach upstream i.e., the reach between culvert structure nos. 1 & 3 is acting as a reservoir therefore, the velocities in this reach are very low to collect the significant bed material. And suspended material is carried in flow.

→

3) The reach to the east of I-25 is experiencing minor deposition conditions. Since only the wash load is carried in the flow, there is no bed-material coming into the reach between culvert structures no. 1 & 3.

Therefore whatever bed-material carrying capacity this present reach has, all of this material must be generated in this reach.

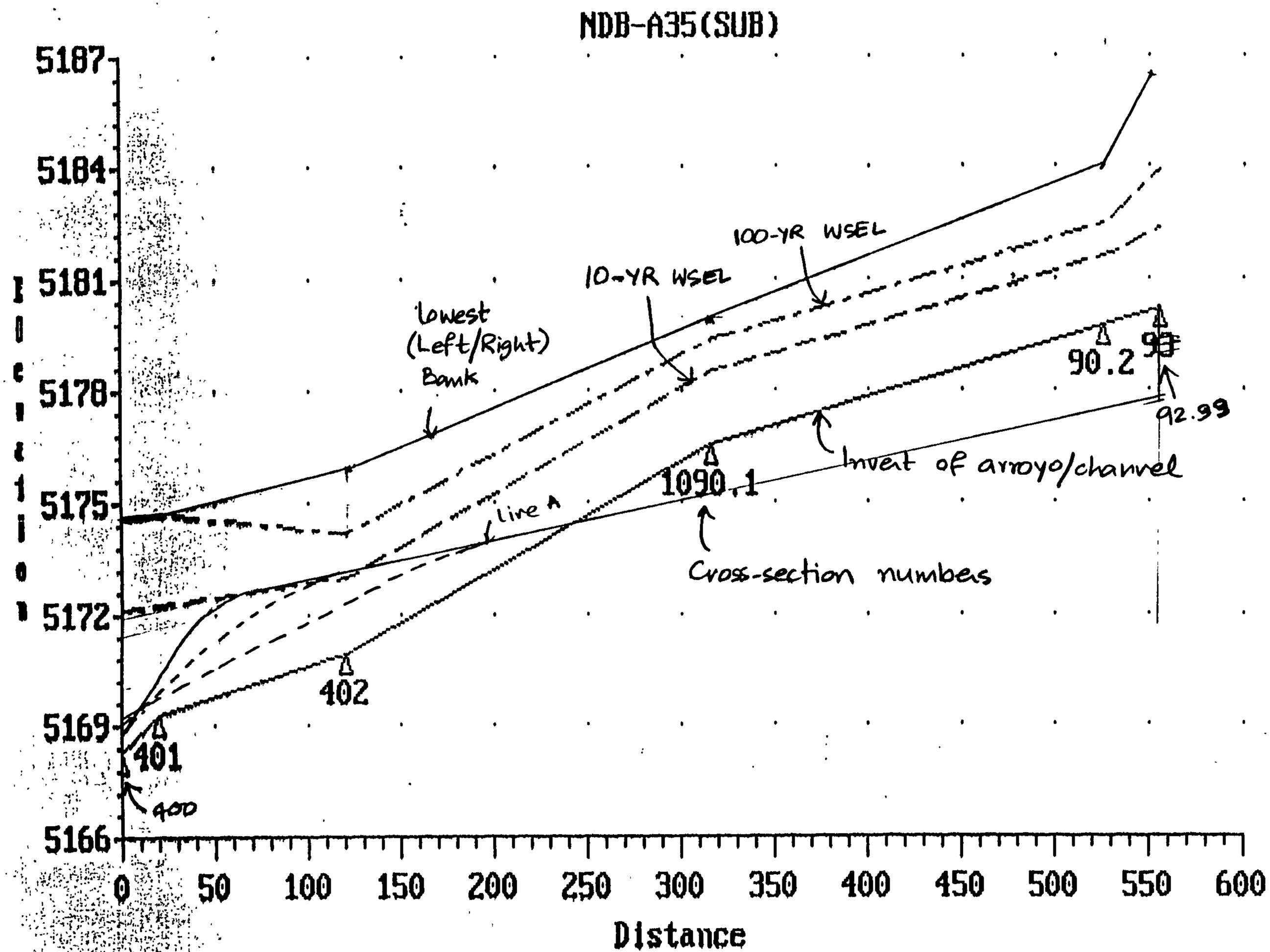
Therefore we present following approach:

As the upper part of this reach starts eroding and depositing upstream of culvert, the aggradation and degradation would follow the line A in the profile attached, thereby creating slope of channel bed equal to that in equilibrium. Notice that there is not significant deposition right at upstream invert of the culvert. This is due to the fact the velocities in culverts tend to be higher than those present just infront of culvert. During this transition, the energy gradient line infront of the culvert becomes very steep. At this time, the flow will start eroding the deposits infront of culvert and the erosion will proceed upstream. Thus the channel bed gets back to its original position.

This concept is in agreement with "Sediment and Erosion Guide" developed particularly for "City of Albuquerque" by Resource Consultants, Inc. Pertinent pages are attached at the end of this section.*

In the middle of the above described process, there might be shallow flooding in the vicinity of this reach. When we inspected the channel reach, we did not see any deposition in front of the culvert. Since this culvert is big enough to carry the debris or weeds in it, we do not except blocking of this entrance thereby plugging the culvert.

* Other pertinent pages are also attached at the end of form 7.


NDB-A35(SUB)
5187
5184
5181
5178
5175
5172
5169
5166
0
50
100
150
200
250
300
350
400
450
500
550
600
Distance
100-YR WSEL
10-YR WSEL
lowest (Left/Right) Bank
90.2
92.99
Invert of arroyo/channel
1090.1
Cross-section numbers
402
401
400

4/8

5/14

SUB-REACH 7

THIS RUN EXECUTED 27APR95 11:20:19

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2: May 1991
****

SUB-CRITICAL

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

NDB-A35(SUB)

SUMMARY PRINTOUT

	SECNO	ELMIN	CUMDS	CWSEL	CRIWS	EG	XLCH	TOPWID	Q	QLOB	QROB	VCH	DEPT
	400.000	5168.29	0.00	5170.36	5169.67	5170.49	0.00	11.68	46.00	0.00	0.00	2.94	2.0
	400.000	5168.29	0.00	5171.42	5170.32	5171.59	0.00	15.51	100.00	0.00	0.00	3.33	3.1
	400.000	5168.29	0.00	5172.13	5170.71	5172.31	0.00	18.08	142.00	0.00	0.00	3.38	3.8
	400.000	5168.29	0.00	5173.01	5171.20	5173.20	0.00	21.26	207.00	0.00	0.00	3.49	4.7
	400.000	5168.29	0.00	5174.60	5171.80	5174.75	0.00	27.01	304.00	0.00	0.00	3.11	6.3
*	401.000	5169.29	19.71	5170.46	5169.94	5170.54	19.71	19.71	46.00	0.00	0.00	2.25	1.1
*	401.000	5169.29	19.71	5171.54	5170.34	5171.62	19.71	22.74	100.00	0.00	0.00	2.30	2.2
*	401.000	5169.29	19.71	5172.25	5170.60	5172.33	19.71	24.72	142.00	0.00	0.00	2.36	2.9
*	401.000	5169.29	19.71	5173.13	5170.94	5173.22	19.71	27.18	207.00	0.00	0.00	2.49	3.8
*	401.000	5169.29	19.71	5174.68	5171.38	5174.77	19.71	31.54	304.00	0.00	0.00	2.36	5.3
*	402.000	5170.93	120.06	5172.02	5172.02	5172.45	100.35	10.47	46.00	0.00	0.00	5.22	1.0
*	402.000	5170.93	120.06	5172.62	5172.62	5173.25	100.35	12.50	100.00	0.00	0.00	6.39	1.6
*	402.000	5170.93	120.06	5172.98	5172.98	5173.73	100.35	13.73	142.00	0.00	0.00	6.96	2.0
*	402.000	5170.93	120.06	5173.45	5173.45	5174.35	100.35	15.32	207.00	0.00	0.00	7.62	2.3
*	402.000	5170.93	120.06	5174.15	5174.03	5175.10	100.35	17.77	304.00	0.00	0.00	7.79	3.2
*	1090.100	5176.50	316.06	5177.65	5177.65	5178.03	196.00	12.11	46.00	0.00	0.00	4.99	1.1
*	1090.100	5176.50	316.06	5178.20	5178.20	5178.73	196.00	16.12	100.00	0.00	0.00	5.87	1.7
*	1090.100	5176.50	316.06	5178.51	5178.51	5179.13	196.00	18.39	142.00	0.00	0.00	6.35	2.0
*	1090.100	5176.50	316.06	5178.92	5178.92	5179.63	196.00	21.40	207.00	0.00	0.00	6.78	2.4
*	1090.100	5176.50	316.06	5179.37	5179.37	5180.23	196.00	24.62	304.00	0.00	0.00	7.43	2.8
*	90.200	5179.70	526.06	5180.76	5180.76	5181.13	210.00	11.50	40.00 (a)	0.00	0.00	4.87	1.0
*	90.200	5179.70	526.06	5181.29	5181.29	5181.80	210.00	15.35	88.00 (a)	0.00	0.00	5.73	1.5
*	90.200	5179.70	526.06	5181.59	5181.59	5182.18	210.00	17.56	125.00	0.00	0.00	6.15	1.8
*	90.200	5179.70	526.06	5181.98	5181.98	5182.68	210.00	20.41	185.00 (a)	0.00	0.00	6.68	2.2
*	90.200	5179.70	526.06	5182.47	5182.47	5183.27	210.00	23.92	277.00	0.00	0.00	7.19	2.7

(a) Discharges estimated.

SUB-REACH 7

THIS RUN EXECUTED 27APR95 11:22:15

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2: May 1991
****

SUPER-CRITICAL

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

NDB-A35(SUPER)

SUMMARY PRINTOUT

	SECNO	ELMIN	CUMDS	CWSEL	CRIWS	EG	XLCH	TOPWID	Q	QLOB	QROB	VCH	DEPT-
*	92.990	5180.20	556.06	5181.21	5181.21	5181.72	0.00	6.93	40.00 (a)	0.00	0.00	5.73	1.[illegible]
*	92.990	5180.20	556.06	5181.91	5181.91	5182.77	0.00	6.95	38.00	0.00	0.00	7.43	1.[illegible]
*	92.990	5180.20	556.06	5182.36	5182.36	5183.44	0.00	6.97	125.00	0.00	0.00	8.36	2.1[illegible]
*	92.990	5180.20	556.06	5183.00	5183.00	5184.41	0.00	6.99	185.00 (a)	0.00	0.00	9.52	2.3[illegible]
*	92.990	5180.20	556.06	5183.87	5183.87	5185.70	0.00	7.02	277.00	0.00	0.00	10.83	3.[illegible]
	90.200	5179.70	526.06	5180.55	5180.76	5181.22	30.00	10.11	40.00	0.00	0.00	6.56	0.[illegible]
*	90.200	5179.70	526.06	5180.88	5181.29	5182.17	30.00	12.35	88.00	0.00	0.00	9.13	1.1[illegible]
*	90.200	5179.70	526.06	5181.04	5181.59	5182.78	30.00	13.54	125.00	0.00	0.00	10.59	1.[illegible]
*	90.200	5179.70	526.06	5181.27	5181.98	5183.66	30.00	15.14	185.00	0.00	0.00	12.40	1.[illegible]
*	90.200	5179.70	526.06	5181.52	5182.47	5184.83	30.00	16.98	277.00	0.00	0.00	14.60	1.[illegible]
*	1090.100	5176.50	316.06	5177.61	5177.65	5178.03	210.00	11.87	46.00	0.00	0.00	5.21	1.1[illegible]
*	1090.100	5176.50	316.06	5178.16	5178.21	5178.74	210.00	15.84	100.00	0.00	0.00	6.09	1.[illegible]
*	1090.100	5176.50	316.06	5178.46	5178.51	5179.14	210.00	18.05	142.00	0.00	0.00	6.60	1.[illegible]
*	1090.100	5176.50	316.06	5178.81	5178.91	5179.64	210.00	20.62	207.00	0.00	0.00	7.32	2.[illegible]
*	1090.100	5176.50	316.06	5179.21	5179.37	5180.26	210.00	23.44	304.00	0.00	0.00	8.23	2.[illegible]
*	402.000	5170.93	120.06	5171.56	5172.02	5173.32	196.00	8.88	46.00	0.00	0.00	10.66	0.[illegible]
*	402.000	5170.93	120.06	5171.92	5172.63	5174.55	196.00	10.09	100.00	0.00	0.00	13.03	0.[illegible]
*	402.000	5170.93	120.06	5172.16	5172.98	5175.15	196.00	10.92	142.00	0.00	0.00	13.88	1.[illegible]
*	402.000	5170.93	120.06	5172.50	5173.45	5175.80	196.00	12.10	207.00	0.00	0.00	14.57	1.[illegible]
*	402.000	5170.93	120.06	5172.96	5174.04	5176.52	196.00	13.65	304.00	0.00	0.00	15.15	2.[illegible]
*	401.000	5169.29	19.71	5169.90	5169.93	5170.24	100.35	18.15	46.00	0.00	0.00	4.64	0.[illegible]
*	401.000	5169.29	19.71	5170.16	5170.34	5170.88	100.35	18.87	100.00	0.00	0.00	6.81	0.[illegible]
*	401.000	5169.29	19.71	5170.30	5170.60	5171.32	100.35	19.29	142.00	0.00	0.00	8.09	1.0
*	401.000	5169.29	19.71	5170.51	5170.94	5171.97	100.35	19.84	207.00	0.00	0.00	9.69	1.2[illegible]
	401.000	5169.29	19.71	5170.75	5171.38	5172.83	100.35	20.51	304.00	0.00	0.00	11.59	1.4[illegible]

(a) Discharges estimated.

SUBCRITICAL X-SECTIONS

AVG. VCH	AVG. TW
3.47	13.95
4.01	16.92
4.23	18.84
4.53	21.25
4.42	25.44

SUPERCRITICAL X-SECTIONS

AVG. VCH	AVG. TW	AVG. Q
5.89	10.99	43
7.61	14.10	94
8.60	15.80	134
9.86	17.88	196
11.42	20.21	291

RESOURCE TECHNOLOGY, INC.
ENGINEERS & ENVIRONMENTAL SCIENTISTS
2129 Osuna Road, NE Suite 200
Albuquerque, NM 87113
Phone: (505) 345-3115
Fax: (505) 345-4132

CHECKED _____ DATE _____
APPROVED _____ DATE _____
TITLE _____

PROJECT NO. LOMR-DB
SHEET 8 OF 14
BY RR DATE 4/27/95

Unbulked flow for use in sediment computations.

Basin	Area (sq. mi.)	Percent Bulking Factor used
929	0.02	0
931	0.04	0
939.1	0.028/2	9
933	0.053	16
938	0.020	17
941	0.008	12
939.2	0.056	17
942	0.030	12
944	0.036	9

All the basins listed above contribute to AP 942.99 except basin 944:

Area weighted percent bulking factor used for AP 942.99 =

$$\frac{(0.02*0)+(0.04*0)+(0.028/2*9)+(0.053*16)+(0.020*17)+(0.008*12)+(0.056*17)+(0.03*12)+(0.036*9)}{(0.02+0.04+\frac{0.028}{2}+0.053+0.020+0.008+0.056+0.030+0.036)}$$

$$= \frac{3.046}{0.277} = 11$$

$1.11\,x = y$

$x = \frac{y}{1.11} = 0.9y$ [If Q_p from bulked AP 942.99 is multiplied by 0.9 or 90%, we get clean Q_p for AP 942.99]

HYDROGRAPH FROM AREA 999.98

RUNOFF VOLUME = 1.24866 INCHES = 17.8826 ACRE-FEET
PEAK DISCHARGE RATE = 273.40 CFS AT 1.600 HOURS BASIN AREA = .2685 SQ. MI.

```
*
** FOR SUBREACH 7 - SEDIMENT TRANSPORT ANALYSIS
*  UPSTREAM OF CULVERT STRUCTURE NO. 5 (ARROYO "A")
*  DATA FROM AVERAGED X-SECTIONS  (REPRESENTING CONTRIBUTING REACH)
*
SED WASH LOAD        ID=2   SOIL K=0.15  CROP C=0.24
                     EROSION PRACTICE P=1.0    LS=0.83
                     PER IMPERV=33   WASH LOAD FACTOR=3.0
        SEDIMENT YIELD (Wash Mat.) =      581.3 (TONS)   WASH LOAD CONCENTRATION =      26932 (ppm-w)
        PERCENTAGE IMPERVIOUS AREA =     33.000          WASH LOAD FACTOR =    3.00000

** THE FOLLOWING FLOW VEL. AND WIDTH INFO ARE FROM SUBREACH AVERAGES FROM
** HEC-2 RESULTS FOR VARIOUS Q'S INCLUDING 10-YR. Qp AND 100-YR. Qp
SEDIMENT TRANS       ID=2  IDS=2  Code=20
                     A FACT=0.0000065  B EXP=5.45   C EXP=-0.38   D EXP=-2.4
                     NUMBER WASH=-1  WASH CONC=   PPM      Number Sections=5
                     Flow          Velocity      Width
                     (CFS)        (Feet/Sec)      (FT)
                       43            5.89          10.99
                       94            7.61          14.10
                      134            8.60          15.80
                      196            9.86          17.88
                      291           11.42          20.21
            Use wash load from SED WASH LOAD command - Concentration =      26932 (PPM-w)

 * * * * * * * * * * * * * * * *
```

TIME (HRS)	WATER FLOW (CFS)	HYD. VELOCITY (FT/SEC)	DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	26932.	.00	0.	26932.	1.0000	.00
1.000	.00	.000	.000	.00	26932.	.00	0.	26932.	1.0000	.00
2.000	108.03	8.000	.919	14.70	26932.	8.80	177542.	195847.	1.0919	5746.87
3.000	10.71	4.772	.485	4.63	26932.	.21	49789.	74139.	1.0302	6322.02
4.000	4.13	3.717	.333	3.34	26932.	.05	28088.	53548.	1.0214	6369.42
5.000	2.63	3.220	.269	3.04	26932.	.02	20127.	46000.	1.0182	6387.76
6.000	2.45	3.146	.259	3.00	26932.	.02	19061.	44990.	1.0178	6401.08
7.000	2.20	3.033	.245	2.96	26932.	.01	17497.	43507.	1.0172	6413.19
8.000	1.98	2.923	.232	2.91	26932.	.01	16058.	42143.	1.0166	6423.63
9.000	1.79	2.822	.220	2.87	26932.	.01	14785.	40937.	1.0161	6432.77
10.000	1.63	2.730	.210	2.84	26932.	.01	13677.	39887.	1.0157	6440.81
11.000	1.48	2.641	.199	2.81	26932.	.01	12657.	38921.	1.0153	6447.95
12.000	1.36	2.562	.191	2.79	26932.	.01	11779.	38088.	1.0149	6454.32
13.000	1.25	2.485	.182	2.77	26932.	.01	10968.	37320.	1.0146	6460.05
14.000	1.16	2.417	.175	2.75	26932.	.00	10271.	36660.	1.0144	6465.23
15.000	1.08	2.350	.167	2.73	26932.	.00	9609.	36033.	1.0141	6469.94
16.000	1.00	2.289	.161	2.72	26932.	.00	9033.	35488.	1.0139	6474.25
17.000	.94	2.250	.157	2.65	26932.	.00	8675.	35148.	1.0137	6478.23
18.000	.88	2.215	.153	2.59	26932.	.00	8358.	34848.	1.0136	6481.92

20.000	.73	2.122	.147	2.48	26932.	.00	7809.	34323.	1.0134	6453.56
21.000	.74	2.124	.144	2.43	26932.	.00	7574.	34105.	1.0133	6471.32
22.000	.71	2.098	.141	2.39	26932.	.00	7353.	33876.	1.0132	6484.47
23.000	.67	2.073	.139	2.35	26932.	.00	7153.	33706.	1.0132	6497.18
24.000	.64	2.049	.136	2.31	26932.	.00	6956.	33520.	1.0131	6499.75
25.000	.25	1.611	.095	1.61	26932.	.00	3934.	30658.	1.0119	6501.15
26.000	.20	1.527	.088	1.48	26932.	.00	3469.	30217.	1.0118	6501.91
27.000	.17	1.462	.082	1.39	26932.	.00	3129.	29895.	1.0116	6502.55
28.000	.14	1.400	.077	1.30	26932.	.00	2822.	29604.	1.0115	6503.07
29.000	.12	1.341	.072	1.22	26932.	.00	2545.	29342.	1.0114	6503.51

10/14

AT PEAK FLOW OF 249.400 WITH TIME AT 1.60 HOURS: BEDMAT = 2274.55 (TONS) = 1.0443 (AC-FT bulked)
TOTAL SED = 2420.45 (TONS) = 1.1113 (AC-FT bulked)

PEAK BULKING FACTOR = 1.225422 = 373970. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	581.34	.1614	.2669	26932.	
BEDMAT =	5922.52	1.6444	2.7192	219952.	
TOTAL SEDIMENT =	6503.86	1.8059	2.9862	236437.	1.116849

SEDIMENT TRANSPORT CAPACITY: 12.13147 AC-FT/SQ MI (bulked) = 41.2849 TONS/ACRE (at Porosity=0.395)

```
*
** FOR SUBREACH 7 - SEDIMENT TRANSPORT ANALYSIS
*  UPSTREAM OF CULVERT STRUCTURE NO. 5 (ARROYO "A")
*  DATA FROM AVERAGED X-SECTIONS (REPRESENTING RECEIVING REACH)
*
SED WASH LOAD        ID=2   SOIL K=0.15  CROP C=0.24
                     EROSION PRACTICE P=1.0    LS=0.83
                     PER IMPERV=33   WASH LOAD FACTOR=3.0
        SEDIMENT YIELD (Wash Mat.) =      581.3 (TONS)   WASH LOAD CONCENTRATION =      26932 (ppm-w)
        PERCENTAGE IMPERVIOUS AREA =    33.000           WASH LOAD FACTOR =    3.00000

**  THE FOLLOWING FLOW VEL. AND WIDTH INFO ARE FROM SUBREACH AVERAGES FROM
**  HEC-2 RESULTS FOR VARIOUS Q'S INCLUDING 10-YR. Qp AND 100-YR. Qp
SEDIMENT TRANS       ID=2  IDS=1  Code=20
                     A FACT=0.0000065  B EXP=5.45   C EXP=-0.38   D EXP=-2.4
                     NUMBER WASH=-1  WASH CONC=   PPM      Number Sections=5
                     Flow          Velocity      Width
                     (CFS)         (Feet/Sec)    (FT)
                      46             3.47         13.95
                     100             4.01         16.92
                     142             4.23         18.84
                     207             4.53         21.25
                     304             4.42         25.44
                Use wash load from SED WASH LOAD command - Concentration =      26932 (PPM-w)

* * * * * * * * * * * * * * * *
```

TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	26932.	.00	0.	26932.	1.0000	.00
1.000	.00	.000	.000	.00	26932.	.00	0.	26932.	1.0000	.00
2.000	108.03	4.059	1.540	17.29	26932.	.21	5140.	31800.	1.0124	424.48
3.000	10.71	2.733	.664	5.90	26932.	.01	2829.	29611.	1.0115	554.66
4.000	4.13	2.099	.447	4.40	26932.	.00	1512.	28363.	1.0110	575.65
5.000	2.63	1.810	.358	4.06	26932.	.00	1063.	27939.	1.0108	585.93
6.000	2.45	1.767	.345	4.02	26932.	.00	1004.	27883.	1.0108	593.99

8.000	1.96	1.640	.339	3.91	26932.	.00	840.	27773.	1.0108	608.14
9.000	1.79	1.582	.293	3.86	26932.	.00	771.	27682.	1.0107	614.15
10.000	1.63	1.529	.278	3.83	26932.	.00	712.	27605.	1.0107	619.53
11.000	1.48	1.479	.264	3.79	26932.	.00	657.	27554.	1.0107	624.52
12.000	1.36	1.433	.252	3.77	26932.	.00	610.	27510.	1.0107	629.02
13.000	1.25	1.390	.241	3.74	26932.	.00	567.	27469.	1.0107	633.16
14.000	1.16	1.351	.231	3.72	26932.	.00	530.	27434.	1.0106	636.97
15.000	1.08	1.313	.221	3.70	26932.	.00	495.	27401.	1.0106	640.49
16.000	1.00	1.279	.213	3.68	26932.	.00	465.	27372.	1.0106	643.77
17.000	.94	1.257	.207	3.59	26932.	.00	447.	27355.	1.0106	646.82
18.000	.88	1.237	.202	3.51	26932.	.00	430.	27339.	1.0106	649.69
19.000	.83	1.219	.198	3.43	26932.	.00	415.	27325.	1.0106	652.38
20.000	.78	1.202	.194	3.36	26932.	.00	402.	27312.	1.0106	654.92
21.000	.74	1.187	.190	3.30	26932.	.00	389.	27301.	1.0106	657.32
22.000	.71	1.172	.187	3.24	26932.	.00	378.	27290.	1.0106	659.60
23.000	.67	1.158	.183	3.18	26932.	.00	368.	27280.	1.0106	661.77
24.000	.64	1.145	.180	3.12	26932.	.00	358.	27271.	1.0106	663.84
25.000	.25	.900	.125	2.18	26932.	.00	202.	27123.	1.0105	665.02
26.000	.20	.853	.116	2.01	26932.	.00	178.	27100.	1.0105	665.70
27.000	.17	.817	.109	1.88	26932.	.00	160.	27084.	1.0105	666.27
28.000	.14	.782	.102	1.76	26932.	.00	144.	27069.	1.0105	666.75
29.000	.12	.749	.095	1.65	26932.	.00	130.	27055.	1.0105	667.15

AT PEAK FLOW OF 249.400 WITH TIME AT 1.60 HOURS: BEDMAT = 24.78 (TONS) = .0114 (AC-FT bulked)
TOTAL SED = 170.68 (TONS) = .0784 (AC-FT bulked)

PEAK BULKING FACTOR = 1.012445 = 31928. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	581.33	.1614	.2669	26932.	
BEDMAT =	86.14	.0239	.0395	4084.	
TOTAL SEDIMENT =	667.47	.1853	.3065	30800.	1.011992

SEDIMENT TRANSPORT CAPACITY: 1.24502 AC-FT/SQ MI (bulked) = 4.2369 TONS/ACRE (at Porosity=0.395)

12/14

SEDIMENT AND EROSION DESIGN GUIDE

Prepared for

Albuquerque Metropolitan Arroyo
Flood Control Authority
(AMAFCA)

Prepared by

Robert A. Mussetter
Peter F. Lagasse
Michael D. Harvey

Resource Consultants & Engineers, Inc.
3665 John F. Kennedy Parkway
Building 2, Suite 300
Fort Collins, Colorado 80525

RCE Ref. No. 90-560

March 1994

RCE RESOURCE CONSULTANTS & ENGINEERS, INC.
A KLH Engineering Group Company

downstream channel and the attendant effects on channel stability. The high velocity jet that normally occurs at the outlet of the culvert can cause local scour which may further aggravate channel instability and may endanger the stability of the crossing, itself. Numerous examples of these effects can be seen throughout the Albuquerque area. Evaluation of this problem requires consideration of four basic factors:

1. The potential for sediment deposition in the channel upstream of the culvert resulting from backwater due to energy losses at the culvert entrance and/or expansion of the upstream channel,

2. The sediment transport capacity of the culvert and resulting potential for excessive head loss and/or plugging,

3. Reduction of bed material sediment supply and resulting bed degradation in the downstream channel, and

4. Local scour at the culvert outlet.

A qualitative discussion of the first three processes is presented below. A method for computing the size of the local scour hole for noncohesive bed material is presented in Section 3.5.5.

Sediment Deposition Upstream of Culverts

The potential for sediment deposition in the channel upstream of a culvert is related to the configuration of the channel and amount of energy loss that occurs as the flow enters the culvert. Backwater caused by the energy loss reduces the flow velocity and thus, sediment transport capacity, of the upstream channel. The magnitude of the backwater and its effect on the channel velocity can be evaluated using standard computations that consider the hydraulics of the culvert entrance and upstream channel [e.g., "Hydraulic Design of Highway Culverts" (FHWA, 1985) and HEC-2 (USCOE, 1982)]. An expansion of the channel upstream of the culvert will also cause deposition. This has occurred, for example, at crossings where the arroyo banks leading to the culvert are not continuous across the roadside drainage ditch. In most such cases, degradation of the channel downstream of the crossing will occur.

The magnitude of the deposition upstream of the culvert must be evaluated on a case-by-case basis using the sediment continuity concepts presented in previous sections. If the backwater creates a significant ponding effect (i.e., reduce the average channel velocities to less than 1 to 2 fps in the backwater zone), trap efficiency calculations may be necessary to determine the amount of the inflowing sediment load that will be carried into the culvert. If the backwater effect is less significant, sediment routing may be required to evaluate the dynamic effects of backwater and channel bed changes through the storm hydrograph. In certain instances, backwater during the peak flows may cause deposition upstream of the culvert which will steepen the energy gradient into the culvert at lower flows during the recession limb of the hydrograph. This,

in turn, will re-entrain all or part of the deposited sediment and return the channel bed toward its original elevation.

The above process appears to have occurred upstream of the Tramway Road crossing of a tributary to La Cueva Arroyo just north of Modesto Avenue. Hydraulic calculations indicate significant backwater at higher flows, yet the existing channel upstream of the crossing shows little or no evidence of aggradation, in spite of a large storm flow that occurred in 1991 (estimated to be about a 10-year event). Detailed analyses of the reach showed analytically that deposition probably occurred during the peak flows, but were subsequently eroded during the recession (RCE, 1994). A sediment routing study by Anderson (1992) using the Corps of Engineers HEC-6 model (USCOE, 1991) indicated that significant deposition may occur during the 100-year event that may not be removed during the recessional flows. Significant features of this particular crossing that may reduce the tendency for upstream deposition and increase the likelihood that the deposits will be removed during recessional flows include the relatively large size of the culverts (2 - 6 foot x 6 foot box culverts) and the relatively continuous channel geometry through the backwater region.

Other similar locations exist in this same area where significant deposition has occurred and persists upstream of the culvert entrance. These locations are generally characterized by smaller culvert size which increases the extent of the backwater and, in some cases, flow expansion because the arroyo banks are not continuous through the roadside ditch. In any case, the potential for blockage of the culvert entrance by debris during the flood must be considered. Such blockage would have potentially serious consequences in terms of overbank flooding, instability of both the up- and downstream arroyo, and the crossing itself.

Sediment Transport in Culverts

The ability of the culvert to carry the sediment passing through the culvert entrance is basically a sediment transport capacity problem. A comprehensive treatment of sediment transport in closed conduits is beyond the scope of this Design Guide. General information is provided here to give the reader a general introduction to the subject and to provide guidance regarding the need to employ more sophisticated methods. More detailed treatment of the problem can be found in several references, including ASCE Manual No. 54 (Vanoni, 1977) and Graf (1984).

Figure 3.16 is a conceptual plot taken from ASCE Manual No. 54 (Vanoni, 1977) illustrating the various modes of sediment transport through a closed conduit. This figure shows that the transport mode depends on the particle size and flow velocity in the pipe. Information by Graf (1984) indicates that it is also a function of pipe size. In general, the transport mode can range from an essentially homogeneous mixture the sediment being uniformly distributed throughout the fluid for high velocities and small particle sizes to an armored bottom with the no-sediment motion on the bottom of the conduit.

AHYMO Computer Program

Users Manual

(AMAFCA Hydrologic Model)

AMAFCA's Version of the A.R.S.
HYMO Computer Program

by the
Albuquerque Metropolitan Arroyo
Flood Control Authority (AMAFCA)
2600 Prospect NE
Albuquerque, NM 87107

September 1993

Copyright 1993, Albuquerque Metropolitan
Arroyo Flood Control Authority

G.27 SED WASH LOAD (SEDIMENT YIELD)

The SED WASH LOAD command computes the wash load sediment yield, in tons, from a watershed area based on a basin hydrograph using the Modified Universal Soil Loss Equation (MUSLE). The command was called SEDIMENT YIELD in ARS HYMO and in earlier versions of this program, but was renamed to more clearly identify the command applicability. The original command name may be used with the current version to provide compatibility with previous input file structures. The command is followed by: Hydrograph ID number for the watershed area, a soil factor (K), a cropping management factor (C), an erosion control practice factor (P), a watershed length and gradient factor (LS), a percentage of impervious watershed treatment, and a wash load factor.

Recent tests in the Albuquerque area suggest that the MUSLE equation may be used to estimate wash load (suspended fine sediment load, but not including any transport of bed material) when the sediment yield from the MUSLE equation is multiplied by three (3.0). The WASH LOAD FACTOR in this command is used to input this multiplication value. If a wash load factor of 0.0 is specified, the program uses the default multiplication value of 3.0. To eliminate the wash load factor, specify a value of 1.0.

The SED WASH LOAD command should only be used when local calibration is available, and only for conditions applicable for the MUSLE equation. In the arid southwest, sediment from bed load may be substantially greater than the wash load, so that the SED WASH LOAD command cannot be used to directly compute total sediment yield. If appropriate, local factors are available, the SEDIMENT TRANS command may be used to compute the bed material load and total sediment load that can be transported in a channel section.

EXAMPLES:

```
* PREFERRED FORM
SED WASH LOAD          ID=5  SOIL K=0.34  CROP C=0.5
                       EROSION PRACTICE P=0.6  LS=1.3
                       PER IMPERV=10  WASH LOAD FACTOR=3.0

* ALTERNATE FORM
SEDIMENT YIELD         ID=5  SOIL K=0.34  CROP C=0.5
                       EROSION PRACTICE P=0.6  LS=1.3
                       PER IMPERV=10  WASH LOAD FACTOR=3.0
```

G.28 SEDIMENT TRANS

The SEDIMENT TRANS command computes the bed material transport capacity of an arroyo or channel section. The command uses a power function of the following form:

$$q_s = a\, V^b\, Y^c\, (1 - C_f)^d$$

where:	q_s	=	unit bed material load (cfs/ft)
	V	=	average velocity (fps)
	Y	=	hydraulic depth (feet) = area/top width
	C_f	=	fine sediment or wash load (silt and clay) concentration by weight expressed as a fraction (ie: 0.020)
	a, b, c and d	=	factors or coefficients defined for local soil conditions.

For the Albuquerque Area, factors and coefficients (a, b, c and d) have been developed for the Meyer-Peter and Muller bed load equation, combined with the Einstein suspended sediment method, and Woo's method for computing suspended sediment concentration (Resource Consultants & Engineers, for AMAFCA, Sediment and Erosion Design Guide, September 1993 (draft)). The factors for the MPM-Einstein-Woo Method will vary based on the gradation of the bed material. Other forms of the equation coefficients are described in Engineering Analysis of Fluvial Systems (Simons, Li and Associates, 1982) and in Design Guidelines for Channels and Hydraulic Structures on Sandy Soils (Simons, Li and Associates, 1981, for Urban Drainage and Flood Control District, Denver, Colorado). Zeller and Fullerton developed a relationship for channels with very low fine sediment loads ("A Theoretically Derived Sediment Transport Equation for Sand-Bed Channels in Arid Regions" Proc. of the D.B. Simons Symposium on Erosion and Sedimentation, 1983) with the following form:

$$q_s = 0.0064\, n^{1.77} V^{4.32} G^{0.45} Y^{-0.30} D_{50}^{-0.61}$$

where:	n	=	Manning's Roughness Coefficient
	D_{50}	=	Average bed material gradation (mm)
	G	=	gradation coefficient of bed material

The power function equation of the SEDIMENT TRANS command can then be applied by use of the following relation:

$$a = 0.0064\, n^{1.77} G^{0.45} D_{50}^{-0.61}$$
$$b = 4.32$$
$$c = -0.30$$
$$d = 0.0$$

SEDIMENT TRANS

For the Albuquerque area the MPM-Einstein-Woo method and coefficients should be used.

The change in sediment volume of a channel reach estimated from the following equation:

$$dv=[q_s(\text{inflow})-q_s(\text{outflow})]\ dt$$

where:	dv	=	volume of sediment stored(+) or lost(-) in the channel reach.
	$q_{s(\text{inflow})}$	=	sediment transport rate into the reach from upstream and lateral sources.
	$q_s(\text{outflow})$	=	sediment transport rate out of reach.
	dt	=	incremental time for volume change

The SEDIMENT TRANS command is followed by the following data items:

ID = Internal storage value for the hydrograph being rated through the channel (1 to 99).

IDS = A sediment storage location for sediment data (1 to 6).

CODE = A code to determine the frequency of printing the hydrograph values and sediment transport factors (use Code=1 to print every hydrograph value, CODE=2 prints every 2nd value, etc).

a Coef
b Exp
c Exp
d Exp = The coefficient and exponent factors for the power function equation.

NUMB WASH = Number of elements in the table of wash load concentration values. If this value is 1 only a single concentration value is required, if it is -1, the concentration is obtained from the previous SED WASH LOAD command, and no concentration values are specified.

WASH LOAD concentration table = A table of flow rates and wash load concentrations (PPM-w). The first flow rate is set by the program to zero (0.0) and is not input. Up to 10 flow rate/concentration elements are allowed.

Number of section elements = Number of elements in the section properties table. If this value is negative, (CID=-1 to -6) the section properties are obtained from the from the previous COMPUTE RATING CURVE command for the CID identified.

Section Properties Table (Flow, Velocity & Width) = A table of section properties used to describe a channel section, defined as flow (cfs), velocity (ft/sec) and top width (ft). It is recommended that the section properties be based on a channel analysis using various flow rates and a standard step water surface profile analysis (using HEC-2 or WSPRO). Use of section properties based on the Manning's equation in the COMPUTE RATING CURVE command may provide a poor estimate of the sediment transport capacity of a channel reach.

The SEDIMENT TRANS command uses a maximum wash load concentration of 60,000 PPM-w when computing bed material transport rate, when the wash load concentration comes from the SED WASH LOAD command (NUMB WASH=-1). In this case, higher concentrations are set to 60,000 PPM-w in the power function equation, but the higher concentration is included in the wash load and total sediment computations. If wash load concentrations are directly input into the command, these input values are used even if they exceed 60,000 PPM-w. Bed material concentrations are not allowed to exceed 650,000 PPM-w. This is the approximate upper limit for mud flooding, and above this value, the water/sediment mixture is no longer a Newtonian Fluid and the basic hydraulic and sediment transport assumptions no longer apply.

EXAMPLES:

```
* Using wash load concentration table and
* section properties from COMPUTE RATING CURVE command
SEDIMENT TRANS        ID=41    IDS=2    CODE=10
                      A FACT=0.0000015    B EXP=5.75
                      C EXP=-0.6    D EXP=2.1    NUMBER WASH=4
                                    CONC=10000 at ZERO cfs
                      AT Q=1000 cfs    CONC=20000 PPM
                      AT Q=3000 cfs    CONC=30000 PPM
                      AT Q=10000 cfs   CONC=40000 PPM    CID=-1
```

```
* Using a single wash load concentration and
* section properties table based on a HEC-2 Analysis
SEDIMENT TRANS        ID=41  IDS=1  Code=1
                      A FACT=0.0000015  B EXP=5.75
                      C EXP=0.6  D EXP=-2.1   NUMBER WASH=1
                      WASH CONC=22000 PPM   Number Sections=6
                      Flow        Velocity      Width
                      (CFS)     (Feet/Sec)      (FT)
                      25            4.02        18.1
                      50            5.22        18.3
                      100           6.68        19.1
                      350           9.96        24.1
                      680          12.18        26.9
                      1050         13.72        28.6

* Using wash load concentration from SED WASH LOAD command
* and section properties from COMPUTE RATING CURVE command
SEDIMENT TRANS        ID=25  IDS=3   CODE=20
                      A COEF=0.0000015  B EXP=5.75
                      C EXP=-0.6  D EXP=-2.1
                      NUMBER WASH=-1   CID=-1
```

SEDIMENT AND EROSION DESIGN GUIDE

Prepared for

Albuquerque Metropolitan Arroyo
Flood Control Authority
(AMAFCA)

Prepared by

Robert A. Mussetter
Peter F. Lagasse
Michael D. Harvey

Resource Consultants & Engineers, Inc.
3665 John F. Kennedy Parkway
Building 2, Suite 300
Fort Collins, Colorado 80525

RCE Ref. No. 90-560

March 1994

RCE RESOURCE CONSULTANTS & ENGINEERS, INC.
A KLH Engineering Group Company

Colby's Method

Colby (1964) developed the graphical procedure shown in **Figures 3.8 and 3.9** for determining bed material discharge (tons/day of dry sediment) in sand-bed channels. In developing his computational curves, Colby was guided by Einstein's bed-load function (Einstein, 1950) and an immense amount of data from streams and flumes (Simons and Richardson, 1966). However, it should be understood that all curves for the 100-foot depth, most curves of the 10-foot depth, and some of the curves of 1.0-foot and 0.1-foot depths (Figure 3.8) are not based entirely on data, but are developed from limited data and theory.

In utilizing Figures 3.8 and 3.9 to compute the bed material discharge, the following procedure is used:

1. Estimate the mean velocity (V), depth (Y), median-size bed material (D_{50}), water temperature, and fine-sediment concentration (C_f):

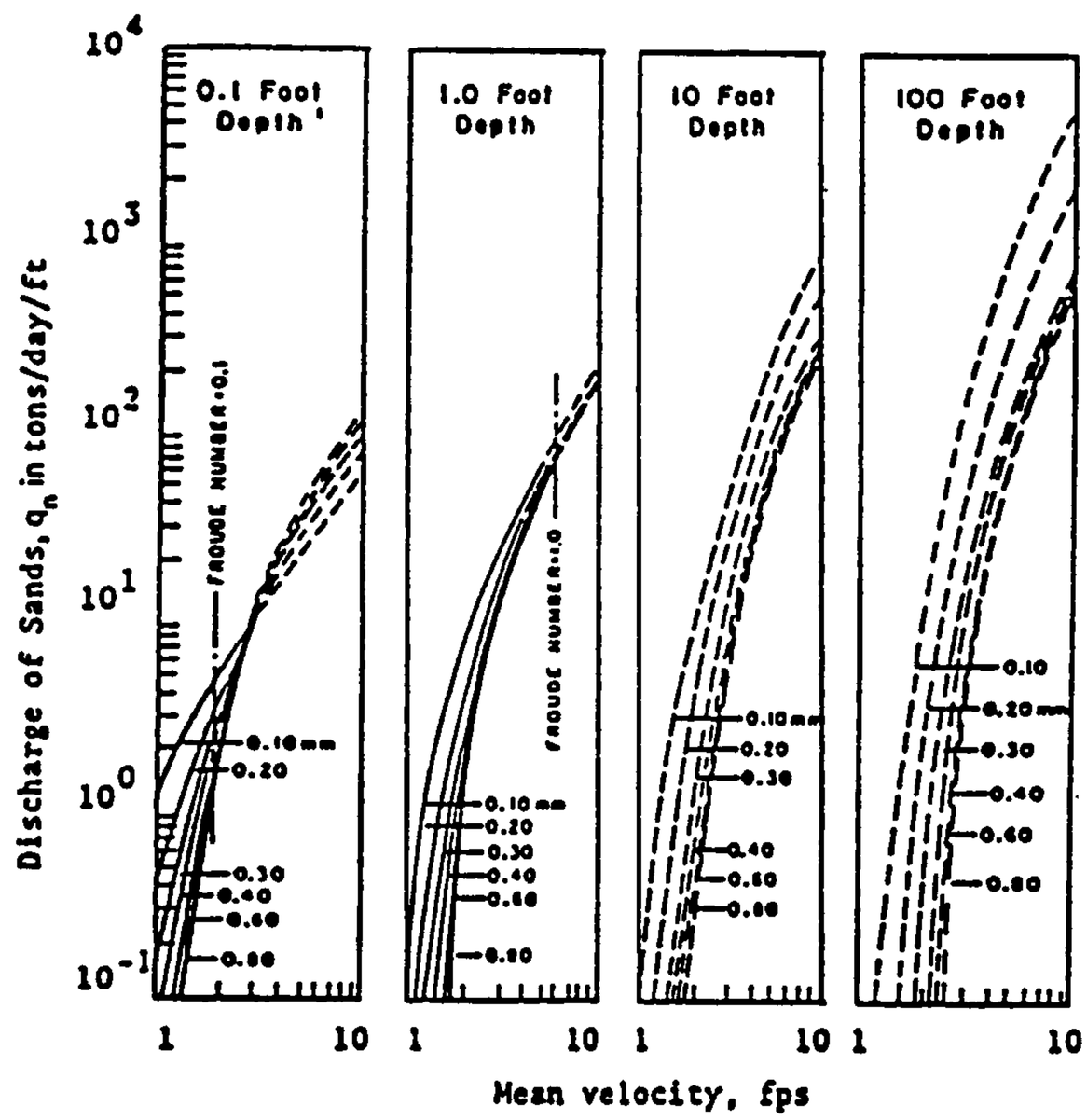


Figure 3.8. Colby's curves for discharge of source vs. mean velocity for various increments of flow depth (Colby, 1964).

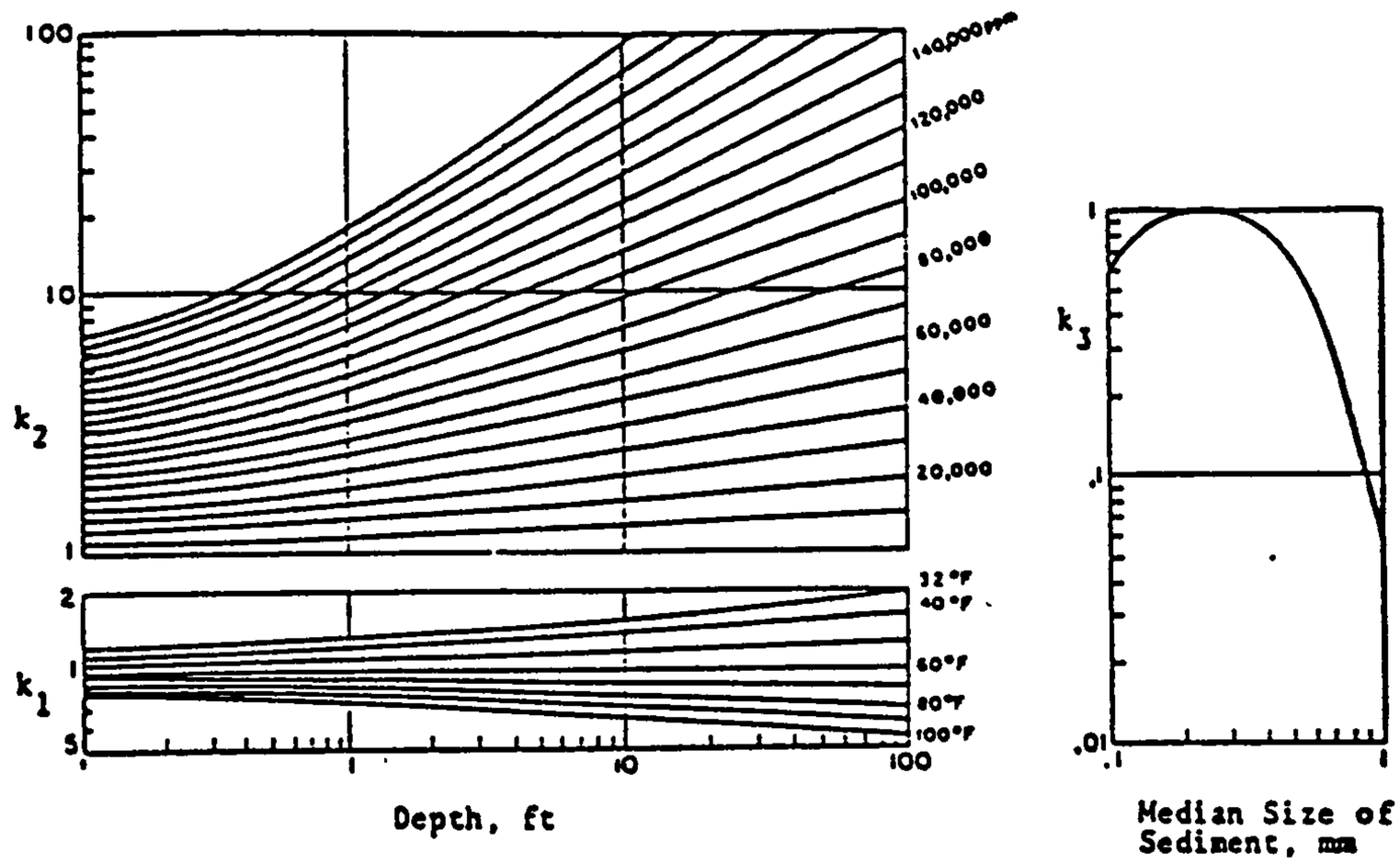


Figure 3.9. Colby's corrections factors (Colby, 1964).

2. Estimate the uncorrected bed material discharge for V and D_{50} from Figure 3.8 for the two depths that bracket Y. Use logarithmic interpolation between the two depths to determine the uncorrected unit bed material discharge (q_{si}) for the given conditions.

3. Estimate the correction factors for water temperature (k_1), fine sediment concentration (k_2), and sediment size (k_3) from Figures 3.9a and 3.9b. Compute the corrected unit bed material discharge using the following relation:

$$Q_s = [1 + (K_1K_2 - 1)k_3]\ q_{si} \tag{3.38}$$

The fine sediment concentration refers to the concentration by weight of silt and clay-sized sediment (wash load) in the water/sediment mixture and can be derived from the watershed sediment yield analysis. As shown in Figure 3.9a, k_1 = 1 when the temperature is 60° F, k_2 = 1 when the concentration of fine sediment is negligible, and k_3 = 1 when D_{50} lies between 0.2 and 0.3 mm.

Power Function Relations

To simplify calculations associated with the channel stability analyses, the bed material transport capacity for a range of flow and bed material conditions can be computed using one of the previous methods and power function relations of the following form developed using multiple regression:

$$q_s = aY^bV^c \tag{3.39}$$

where q_s = unit width bed material transport capacity
Y = hydraulic depth
V = average velocity

Zeller and Fullerton Relation. One such relationship was developed by Zeller and Fullerton (1983) for low fine sediment loads. This relationship is given by:

$$q_s = 0.0064 \frac{n^{1.77}\ V^{4.32}\ G^{0.45}}{Y^{0.30}\ D_{50}^{0.81}} \tag{3.40}$$

where G = gradation coefficient of the bed material, given by Equation 3.14.

(Note that D_{50} in Equation 3.40 is in millimeters; all other variables are in the foot-pound-second system. Also note that Equation 3.40 is identical to Equation 3.39 for a given channel resistance (n) and bed material gradation (D_{50}, G).) Table 3.5 summarizes the range of conditions for which Equation 3.40 was developed.

Effect of Fine Sediment Concentration on Bed Material Transport Capacity

Leopold and Miller (1956) observed suspended sediment concentrations in arroyos in north central New Mexico approaching 200,000 ppm by weight (9 percent by volume). Nordin (1963) reported concentrations in the Rio Puerco, Paria, and Little Colorado Rivers as high as 650,000 ppm by weight (41 percent by volume), with sand concentrations up to nearly 450,000 ppm by weight (24 percent by volume). Others (Beverage and Culbertson, 1964; Lane, 1974) have reported similar observations. Based on the watershed sediment yield discussions in Chapter 2, similar concentrations may occur in the arroyos in the Albuquerque area during large storm events.

Table 3.5. Range of Conditions for Which Equation 3.40 is Applicable.	
Parameter	Range
Velocity	3-30 (ft/sec)
Manning's n	0.018-0.035
Bed Slope	0.001-0.040
Unit Discharge	10-200 (cfs/ft)
Particle Size	0.05 mm ≤ D_{50} ≤ 10 mm
Depth	1-20 ft
Gradation Coefficient	2-5

The presence of high concentrations of fine suspended sediment enhances the capacity of the stream to transport coarser sediments (Vanoni, 1977). As a result, the bed material loads computed from the relationships discussed in the previous section should be adjusted accordingly. The following procedure is recommended:

1. Compute the bed material load (q_{sl}) using one of the previous relationships,

2. Estimate the fine sediment concentration based on the watershed sediment yield relationships discussed in Chapter 2, or from field data, and

3. Use Figure 3.9 and Equation 3.38 from Colby's procedure to correct the clear water estimate of bed material load for the presence of high suspended sediment concentrations.

Transport Equation for High Suspended Sediment Concentrations

The above relations were developed primarily for channels carrying relatively low concentrations of suspended sediment. Under intense flow conditions in steep, sand bed streams, the suspended sand concentration can be very large. The presence of silt and clay in the mixture can result in further significant increases in the suspended sand concentration. The Einstein suspended sediment method (see MPM-Einstein method above) is based on Rouse's (1937) equation for the suspended sediment concentration profile, which was derived from the diffusion equation.

For suspended sediment concentrations less than about 4 percent by weight, the original derivation provides reasonable results for most conditions. Einstein and Chien (1955) however, found that the vertical distribution of sands in the water column deviates significantly from that predicted by the original Einstein method for suspended sediment concentrations above approximately 4 percent, The concentration profile becomes progressively more uniform with depth with increasing concentration. Based on their experimental results, they suggested a correction for the exponent on the concentration profile equation to partially compensate for the differences. Subsequent investigators (Chien and Wan, 1965; Ordonez, 1970; Lavelle and Thacker, 1978, van Rijn, 1984; Woo, 1985 and Woo et al., 1988) considered the effects of fall velocity reduction, fluid viscosity, and fluid density on the suspended sand concentration profile. The work of Woo (1985) and Woo et al. (1988) resulted in a complex differential equation that appears to account for the significant changes in fluid characteristics with increasing sediment concentration, and converges to essentially the same solution as obtained from Rouse's (1937) equation at low concentrations. Results obtained from the application of this relationship match the available measured data well.

Mussetter (1993, in-press) linked Woo's (1985) relationship for computing the suspended sediment concentration with the MPM bed-load equation to obtain a method for computing bed material load in streams carrying high concentrations of suspended sediment. Results obtained from this method were compared with the results from other available relations and, to the extent possible, measured sediment yield data. This comparison indicates that the new method may provide more realistic results over the range of flow and sediment transport conditions encountered in arroyos in the Albuquerque area.

The MPM-Woo method was used to estimate bed material transport capacities for a broad range of hydraulic and bed material conditions (see **Table 3.6**) typical of the Albuquerque area. The results of these computations were then used to develop the following power function relation using multiple regression:

$$q_s = aV^b\ Y^c\ (1-C_f/10^6)^d \qquad (3.41)$$

Table 3.6. Range of Conditions for which Equation 3.41 was Developed.

q (cfs)	V (vps)	Y (ft)	S_o	C_f (ppm)	D_{50} (mm)
1	1.9	0.3	0.005	0	0.2
80*	20.8*	7.2*	0.04*	60,000*	4.0*

where q_s = unit width bed material load in cfs/ft
V = average velocity in fps
Y = hydraulic depth in feet
C_f = fine sediment (silt and clay) concentration by weight.
S_o = channel slope

Values for the coefficient (a) and exponents (b, c, and d) are shown in **Figure 3.10** as a function of the median bed material size. **In applying Equation 3.41, the predicted bed material concentration (C_s) should not exceed the maximum concentration given by the equation:**

$$C_{s_{max}} = 510{,}000 - 65{,}000\ D_{50} \tag{3.42}$$

where D_{50} = medium bed material size in mm
C_s = computed from the relation:

$$C_s = \frac{2.65 \times 10^6 Q_s}{(Q + 2.65 Q_s)} \tag{3.43}$$

and

$$Q_s = q_s W \tag{3.44}$$

When C_{smax}, as given by Equation 3.42 is exceeded, non-Newtonian flow conditions are indicated and the assumptions upon which Equation 3.41 (and the other bed material transport equations presented in this Design Guide) is based are no longer valid. For these conditions, procedures applicable for non-Newtonian fluids (e.g., mudflows) should be considered.

Note that Equation 3.41 predicts bed material load only; the total sediment load is computed by adding the bed material and fine sediment loads, where the fine sediment load is computed from:

$$Q_{s_f} = \frac{C_f Q}{2.65 \times 10^6} \tag{3.45}$$

and the total sediment load is given by:

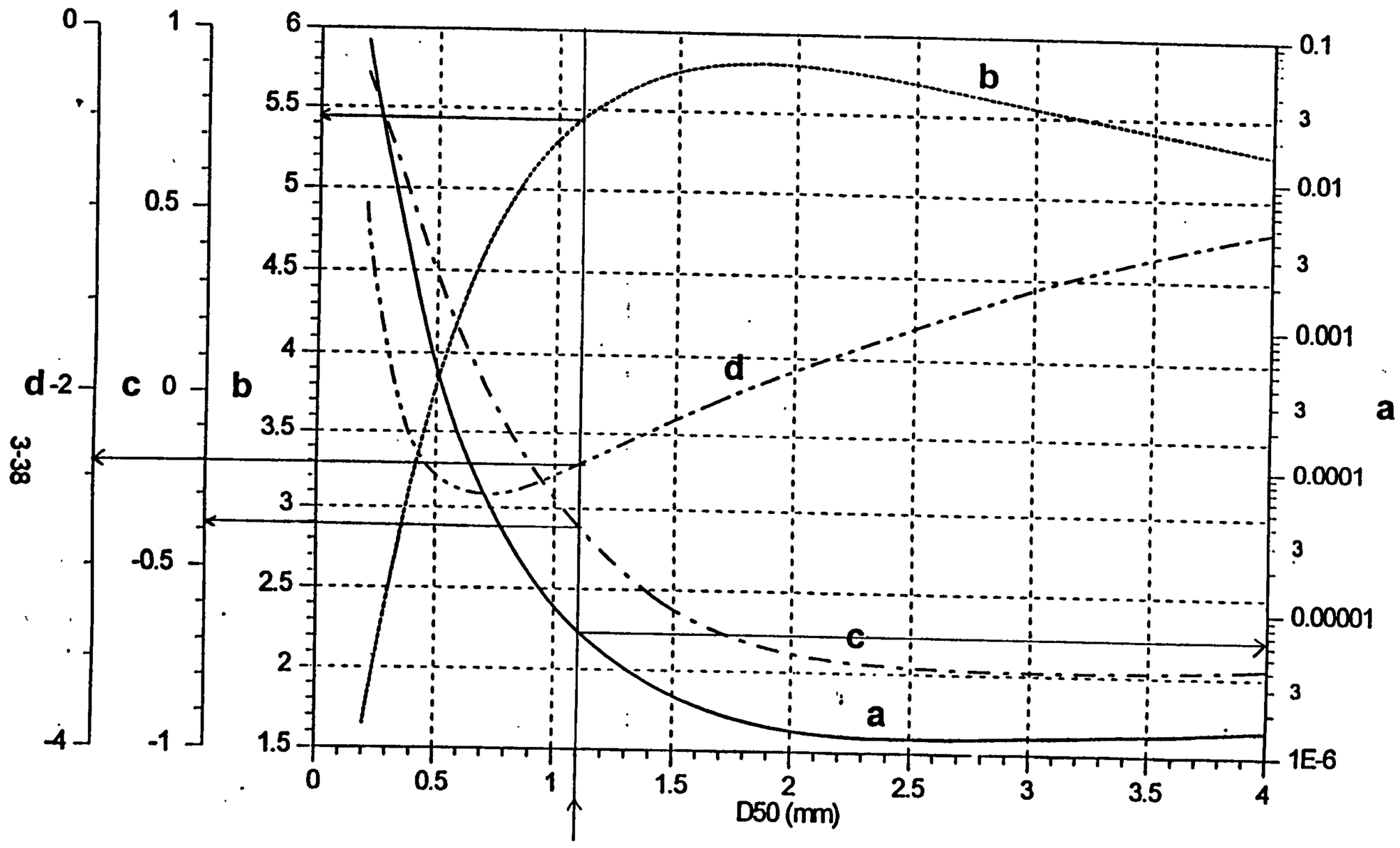


Figure 3.10. Coefficient and exponents for Equation 3.41, developed using MPM-Woo method.

$$Q_{s_{total}} = Q_s + Q_{s_f} \tag{3.46}$$

Derivation of Equation 3.41 and Figure 3.10 involved the following assumptions:

1. The bed load was computed by size fraction using the MPM bed-load equation.

2. The suspended sediment load is computed for the median size only due to the mathematical formulation of the differential equation used in the computation.

3. The bed layer thickness used to estimate the reference concentration for the suspended sediment computations was assumed to vary as a function of the ratio of the shear velocity (V_*) to the critical shear velocity (V_{*cr}) for the median particle size, following Karim and Kennedy (1983), limited to values between $2D_{50}$ and $2D_{84}$. The reference bed layer concentration was limited to values not exceeding 650,000 ppm by weight.

4. The viscosity of the fine sediment/water mixture was estimated using the following empirical relationship suggested by O'Brien and Julien (1989), and Julien and Lan (1991):

$$\mu = \alpha e^{\beta C_v} \tag{3.47}$$

where μ = dynamic viscosity in lb-s/ft^2

The values of α and β of 2.38×10^{-5} and 9.21, respectively, were developed from Figure 2 in Julien and Lan (1991) for the data sets excluding O'Brien and Julien (1989). These data were excluded because they were based on highly bentonitic clays in suspension which, as indicated by the figure have a significant effect on the viscosity of the fluid which would not be expected to occur for materials in the Albuquerque area (Julien, 1992, personal communication). The kinematic viscosity used in the suspended load computation was computed from:

$$\nu = \frac{\mu}{\rho_f} \tag{3.48}$$

where ρ_f = bulk density of the water sediment mixture computed from:

$$\rho_f = \rho \; [1-(1-S)\; C_v/10^6] \tag{3.49}$$

where C_v = sediment concentration by volume

C_v is related to the fine sediment concentration by weight (C_f) by the relation:

$$C_v = \frac{C_f/10^6}{SG-(C_F/10^6)\;(SG-1)} \tag{3.50}$$

5. The fall velocity of the sediment was computed using Ruby's equation (Simons and Senturk, 1976) for clear water adjusted for the presence of fine sediment using the relation suggested by Maude and Whitmore (1958) given by:

$$\omega_s = \omega \; (1-C_v/10^6)^{3.5} \tag{3.51}$$

where ω = fall velocity in clear water
ω_s = fall velocity in the water/sediment mixture;

To prevent unrealistically high bed material concentrations, the reference bed layer concentration is limited to values less than 650,000 ppm by weight. As discussed in the previous section, this is the approximate upper limit for mud flooding. Above this value, the water/sediment mixture is no longer a Newtonian fluid and the basic hydraulic and sediment transport assumptions no longer apply. Mud and debris flows occur at higher concentrations. Based on field evidence in the Albuquerque area, mud and debris flows have occurred in the past in steeper areas at the base of the Sandia front, but are of very limited extent and probably are of limited time during the passage of any given hydrograph. The 650,000 ppm limitation is, therefore considered to be reasonable for conditions where the analysis procedures in this Design Guide are applicable.

3.3.5 Effect of Sediment Load on Fluid Characteristics

The bed material sediment yield associated with individual storms in incising arroyos is limited by the capability of the water to carry the available sediment. Sediment transport relationships can be used to estimate the capacity of a given channel to carry sediment under approximately steady conditions. In steep channels with very erodible material, extremely high concentrations of sediment can occur. Additionally, due to the unsteady nature of the flow during major storm events, sediment concentrations can significantly exceed those predicted by the equations.

FEDERAL EMERGENCY MANAGEMENT AGENCY **DAM FORM**	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1997*	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 0.5 hour per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: City of Albuquerque

Flooding Source: North Domingo Baca Arroyos

Project Name/Identifier: Lower North Domingo Baca Detention Dam

IDENTIFIER

Name of Dam: Lower North Domingo Baca Detention Dam

Location of dam along flood source (in terms of stream distance or cross section identifier):

13 miles from top of Sandia Mountains

Check one of the following:

- ☐ Existing dam
- ☒ New dam
- ☐ Modifications of existing dam (describe modifications) _____

Was the dam designed by _____ Federal agency _____ State agency

_____ Local government agency _____X_____ Private organization?

BACKGROUND

Does the dam have dedicated flood control storage? ☒ Yes ☐ No

Does the project involve revised hydrology? ☐ Yes ☐ No

If yes, complete Hydrologic Analysis Form and include calculations of the 100-year inflow flood hydrograph routed through the dam with the beginning pool at the normal pool elevation (spillway crest elevation for ungated spillway). Include any inflow hydrograpn bulking by watershed sediment yield and provide necessary debris and sediment yield analysis. (a)

Does the revised hydrology affect the 100-year water-surface elevation behind the dam or downstream of the dam? N/A (a) ☐ Yes ☐ No

If yes, complete the Riverine Hydraulic Analysis Form and complete the table shown on the following page.

(a) Hydrology is new, not revised. See Form 3, Exhibit 3-7 for complete documentation of sediment yield analysis into the dam.

* Authorized and paid for by the Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA)

RESULTS

	Stillwater Elevation Behind the Dam	
	FIS	Revised
10-year	N/A	-
50-year	N/A	-
100-year	N/A	5316.95
500-year	N/A	-
Normal Pool Elevation	N/A	5298

Was long term sediment accumulation taken into consideration in determining the normal pool elevation? ☒ Yes ☐ No

Was the dam designed to withstand the hydrostatic and hydrodynamic forces associated with floods greater than the 100-year flood? ☒ Yes ☐ No

If no, and the dam has a reasonable probability of failure during the 100-year flood, please attach dam break analysis.

Provide the following data on the dam:

Dimensional Height: 33.5

Crest Elevation of top of dam: 5331.50 ft. a.m.s.l.

100-year flood storage capacity: 60.5 ac-ft

Freeboard (measured from 100-year water surface elevation): 14.55 ft.

Spillway(s):

Type: ☐ gated ☒ ungated

Dimensional Width: 50.5 ft.

Dimensional Height: 8 ft.

Crest Elevation of top of spillway: 5323.30 ft (a.m.s.l.)

Outlet(s): (Principal Spillway)

Type: ☐ gated ☒ ungated

Width: N/A

Height N/A

Diameter: 48-inch (a)

Invert Elevation: 5298 ft. (a.m.s.l.

Explain flow regulation plan: (a) 40-inch orifice plate on outlet structure which joins to a 48-inch concrete cylinder pipe. The orifice plate will prevent pressure flow in 48-inch pipe. See as-builts, in map tube.

Are the project features, including the emergency spillway, designed to accommodate the 100-year flood discharge without overtopping the dam? ☒ Yes ☐ No

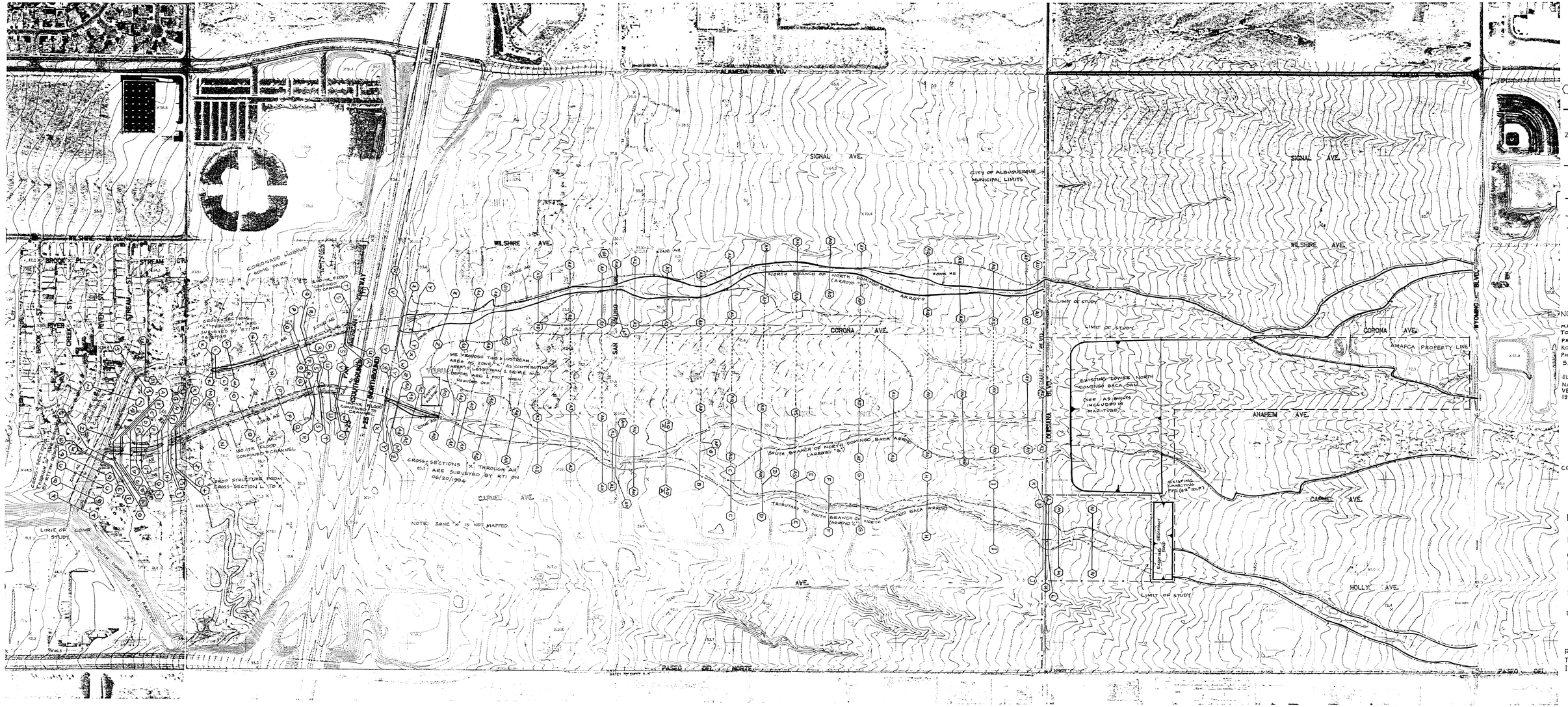
Was the dam designed in accordance with all currently applicable local, State, and Federal regulations? ☒ Yes ☐ No

If no, please provide explanation.

FEMA may request a list of regulations that have been complied with and supporting document demonstrating compliance with these regulations.

Attach copy of formal operation and maintenance plan (see Form 1) See general AMAFCA Inspection, Maintenance, Operation and Emergency Action Plans

Answer N/A to any questions which are not applicable



LEGEND

- HEC-2 CROSS SECTION
- REVISED 100-YR FLOOD PLAIN BOUNDARY
- ZONE AE — ZONE DESIGNATIONS
- △ BENCH MARK
- EFFECTIVE FIRM'S 100-YR FLOODPLAIN BOUNDARY
- AMAFCA PROPERTY LINE
- FLOW LINE
- CITY OF ALBUQUERQUE MUNICIPAL LIMIT

NOTES:

MAP BASED ON 1" = 200' TOPOGRAPHIC MAPPING PREPARED BY KOOGLE & PAULS ENG. FROM PHOTOGRAPH TAKEN 5/1990

ELEVATIONS BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929.

N

SCALE: 1" = 200'
CONTOUR INTERVAL 2.0

LOMR FOR
LOWER NORTH DOMINGO BACA DETENTION DAM

CITY OF ALBUQUERQUE
BERNALILLO COUNTY
NEW MEXICO.

FLOODPLAIN MAP

FIGURE 5-1

DATE: MAY 1995

RESOURCE TECHNOLOGY, INC.