US Army Corps
of Engineers

Sacramento District
South Pacific Division

An Analysis of the Levee System at Redstone, Colorado

Section 22 Planning Assistance to the State of Colorado

Prepared for
The Colorado Water Conservation Board
State of Colorado

May 1992

AN ANALYSIS OF THE LEVEE SYSTEM AT REDSTONE, COLORADO

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By
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U.S. Army Corps of Engineers

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AN ANALYSIS OF THE LEVEE SYSTEM AT REDSTONE, COLORADO

AUTHORITY

The analysis was conducted under authority of Section 22 of Public Law 93-251, Planning Assistance to States. The study was initiated at the request of the Colorado Water Conservation Board, State of Colorado for Pitkin County, Colorado.

INTRODUCTION AND BACKGROUND

The Crystal River flows generally north through Pitkin County, high in the Rocky Mountains of western Colorado (Attachment 1, Crystal River Basin and Study Limit Map). The reach in the vicinity of Redstone has a documented history of flooding. Over the past 75 years, 14 floods have occurred, with the most recent flooding resulting mostly from heavy snowmelt runoff.

Because the existing levee system does not meet Federal Emergency Management Agency (FEMA) standards, most of Redstone is identified within the FEMA 100-year flood plain (Attachment 2, FEMA Flood Insurance Rate Map for Pitkin County, Colorado).

PREVIOUS STUDIES AND REPORTS

There have been three previous studies and one inspection report dealing with the Crystal River at Redstone. The title, completion date, authoring entity, and a short description of each follow.

Flood Insurance Study - Pitkin County, Colorado and Incorporated Areas (3 volumes), Revised September 30, 1988, by The Federal Emergency Management Agency. This study was originally done in 1984/85 and completed in April of 1985. The effective date of the final report was June 4, 1987. The 1988 revision dealt with the town of Snowmass, and no changes were made affecting the Crystal River at Redstone.

Report on Inspection of Non-Federal Levees, May 17, 1988, by the Sacramento District, Corps of Engineers (Corps). This report involved an inspection of the existing levee at Redstone for geotechnical and structural adequacy to meet minimum Corps standards for its rehabilitation program. It was determined that the levee did not meet the established minimum criteria.

Floodplain Information Report - Crystal River and Coal Creek, Pitkin County, October 1979, by Wright Water Engineers, Inc. for Pitkin County and the Colorado Water Conservation Board. The purpose of the report was ". . . to provide information relative to the occurrence of floods and to guide local officials in the planning and regulation of the floodplain areas."

Crystal River, Colorado Hydrology - Internal Office Report, February 1979, by the Corps. This study used a regional analysis of streamflow data collected at gaging stations within the basin to develop the combined snowmelt and rainflood flow-frequency relationships for Crystal River and its tributaries.

PURPOSE AND DESCRIPTION

The purpose of this analysis was to estimate the existing level of flood protection provided by the Redstone levee system and to scope potential levee improvements for increasing the level of protection.

The study area extended from the county bridge leading into town at the upstream end to the sewage treatment facility downstream of Redstone, a distance of approximately 1 mile. The present hydraulic conditions at Redstone were analyzed based on a resurvey of critical cross sections by Pitkin County in early 1991. Although a detailed geotechnical evaluation of the existing levee was not conducted, data from past studies and reports (including some geotechnical evaluation) were included. The analysis was conducted in four steps. The first step was to identify pertinent available hydrologic data for the river system (water surface profiles and velocity estimates). Second, the hydrologic data were used to define hydraulic conditions by comparison with FEMA requirements (3 feet minimum freeboard, etc.). Third, existing bank and levee conditions were defined along with an indication of likely locations for levee modification and construction. Finally, data from similar projects were used to develop an order-of-magnitude estimate of quantities and costs to upgrade the Redstone levee system.

HYDROLOGY

The most recent hydrology from the 1988 FEMA study was used as a basis for the hydraulic modeling in this study. Apparently, hydrologic data used in the FEMA study were adopted from the 1979 flood plain information report. The hydrology for the 1979 report came from the 1979 Corps hydrology office report. Peak flow values identified in the three reports and shown below were used in this study.

	FLOW (cfs)			
	10-YR	50-YR	100-YR	500-YR
Crystal River above Coal Creek	2,600	3,200	3,650	6,000
Crystal River below Coal Creek	3,000	3,700	4,200	6,800

HYDRAULIC CONDITIONS

Water-surface elevations were computed using the latest version of the Corps HEC-2 step-backwater computer program (Version 4.6.0, dated February 1991). Basic input was that used in the FEMA study and obtained through FEMA headquarters in Washington, D.C. These data contained cross sections upstream and downstream of the recently surveyed cross sections (as well as basic information such as reach lengths and other variables). The cross-section locations of the recent survey coincide with those of the 1988 FEMA study and the 1979 county/state study. The cross section locations (and flood plains from the two studies) are shown on Attachments 2 and 3. The hydraulic analysis consisted of the following:

- Develop computer model.
- Update and run the model using current information.
- Vary "n" values in the model to determine sensitivity.
- Revise the model to reflect potential project conditions.

The original FEMA information was used to create an executable computer file. All of the data were entered exactly as originally written, including the old cross sections, flows, etc. The file was then run and debugged until it compared very closely with the original output for the 100-year water-surface profile. The few remaining differences were due to changes made to the HEC-2 program itself (the original FEMA model being run with a March 1982 version of the program). The water-surface profile for the run is shown on the first page of Appendix A (Crystal River Water Surface Profiles). The HEC-2 file, identified as "OLDRS.OUT," is included in Appendix B (HEC-2 Input and Output Files).

The computer model was revised to include current information on (1) revised peak flows, (2) the newly surveyed cross sections, and (3) revised Manning's "n" values. The peak flows used are those identified in the Hydrology section above. Although the flows used are slightly higher than those used in the 1984 FEMA HEC-2 model, they were believed appropriate since they were identified in the three study reports and would also yield a more conservative water-surface profile. Because the flows were slightly higher than those in the old model, the resulting water-surface elevations were just a little higher, as

expected. The profile is shown on the second page of Appendix A. The HEC-2 file is identified as "OLDRSNWQ.OUT" in Appendix B.

The model was then revised (January 1991) to include newly surveyed cross sections (87 to 91.5 on Attachment 2) to reflect existing conditions adjacent to Redstone. (See Appendix E.) As mentioned, the location of the cross sections correspond to those of the previous studies with the exception of one additional cross section (cross section 91.5) which was added just upstream of the existing levee. A minor discrepancy was noted in that the channel invert at cross section 86 (old survey) was slightly higher than the next upstream cross section (new survey). Adjacent highway elevations at both sections were checked to confirm that the cross sections had been taken at the same locations indicated on the mapping. Pitkin County, which is responsible for stream maintenance, indicated that some channel clearing had been done in this reach and also that the sediment regime fluctuates greatly on the Crystal River. To compensate for the discrepancy, the downstream cross section was lowered slightly (to be just lower than the upstream section). Also, a few minor code changes were made to the input deck as recommended by the Corps Hydrologic Engineering Center.

Manning's "n" values were raised slightly at some cross sections to reflect present conditions. To aid in this evaluation, a series of photographs and video recordings were taken at each cross section. A general "n" value determination was also made for the channel using the methodology described in a U.S Geological Survey publication entitled "Determination of Roughness Coefficients for Streams in Colorado" and a technical paper by Robert Jarrett entitled "Hydraulics of High-Gradient Streams" published in the November 1984 Journal of Hydraulic Engineering. This procedure resulted in a general "n" value of 0.05 for the channel. Slight variations were incorporated where physical differences (dense brush, etc.) in the channel were identified. Overbank "n" values were based on the classification chart in "Open-Channel Hydraulics" by Ven Te Chow (and also included in the above references).

The resulting water-surface profile is shown on the third page of Appendix A. The HEC-2 file was identified as "NEWRS.OUT" and is included in Appendix B. Cross sections of the channel and overbank areas showing the resulting 100- and 500- year water-surface elevations were subsequently plotted. These are included in Appendix C (Flood Plain Cross Sections).

The sensitivity of the water-surface profiles was checked by varying the Manning's "n" values. A channel "n" of 0.6 and overbank "n's" of 1.0 were inserted into the model. These values were higher than all previous flood studies and are believed the

upward bound of possible "n" values based on observed existing conditions. The resulting water-surface profile revealed a negligible increase. The HEC-2 file is included in Appendix B as "NEWRSN61.OUT".

The model was run containing the 100-year and 500-year flow events to the main channel and left overbank area. This was done to estimate the required height to contain these floodflows with either raising the existing levee or constructing a new levee along the right bank within the study reach. The results shown on the summary table below, as well as the fourth water-surface profile in Appendix A, indicate only a slight rise (0 to 0.7 feet) under the encroached conditions throughout the study reach. This is because (1) flows were contained within the levee system under existing conditions between cross sections 87-DF and 91-DF even though FEMA criteria is violated and (2) the right overbank area is relatively non-effective for additional flow capacity in the existing non-leveed reaches. The data indicate that flanking a new levee at the upstream end would not be a problem as long as any levee improvements are tied to high ground. Also, the water surface rise upstream and downstream as the result of levee improvements would be very minimal. The HEC-2 file is included as "NEWRSENC.OUT" in Appendix B. Cross sections under encroached conditions were plotted and are included in the second half of Appendix C.

The table below lists the following information for each cross section (starting at the downstream end): cross section number and corresponding FEMA designation; the 100- and 500-year peak flows (in cubic feet per second, as identified in the flood insurance study); the average channel velocity (in feet per second) under encroached conditions; the existing and encroached water-surface elevations at each cross section; the existing right bank (or existing levee crown) elevation; existing freeboard on the bank or levee above the 100- and 500-year events; and, finally, how much higher a flood control structure (presumably a levee) would have to be than the existing bank or levee to have 3 feet of freeboard above the 100- and 500-year water-surface elevations. (NOTE: This last column should not be misinterpreted; based on available data, the levee in its present state would likely not be a viable flood control structure by simply adding a few feet of embankment material on top of the levee.)

SUMMARY TABLE - CRYSTAL RIVER, REDSTONE, COLORADO

Cross Section	100/ 500-Year Flow (cfs)	Encroached[1] Vel (fps)	Existing Water Surface Elev[2](ft)	Encroached[1] Water Surface Elev (ft)	Rt Bank/ Levee Elev (ft)	Existing Freeboard (ft)	Required Increase (ft)
Computer Code	(cfs)	(fps)	(NWS)	(EWS)	(RB)	(RB-NWS)	(EWS-RB+3)
82-DA	4200	10.2	7133.7[3]	7133.7[3]	7132.9	-0.8	3.8
	6800	9.2	7135.7[3]	7135.7[3]	"	-2.8	5.8
83-DB	4200	3.1	7139.2	7139.6	7138.7	-0.5	3.9
	6800	5.1	7142.8	7143.2	"	-1.7	5.2
84-DC	4200	4.3	7141.2	7141.9	7140.0	-1.2	4.9
	6800	5.1	7142.8	7143.2	"	-2.8	6.2
85-DD	4200	3.0	7144.9	7144.9	7145.4	0.5	2.5
	6800	3.5	7146.0	7146.0	"	-0.6	3.6
86-DE	4200	2.6	7146.6	7146.7	7144.2	-2.4	5.5
	6800	3.3	7147.7	7147.9	"	-3.5	6.7
87-DF[4]	4200	3.8	7147.6	7147.8	7145.9	-1.7	4.9
	6800	4.4	7148.6	7148.9	"	-2.7	6.0
88-DG[4]	4200	7.7	7152.1	7152.1	7153.5	1.4	1.6
	6800	9.7	7153.0	7153.2	"	0.5	2.7
89-DH[4]	4200	6.9	7156.8	7156.8	7159.4	2.4	0.4
	6800	7.1	7158.7	7158.7	"	0.7	2.3
90-DI[4]	4200	6.4	7163.5	7163.5	7165.4	1.9	1.1
	6800	7.2	7164.4	7164.5	"	1.0	2.1
91-DJ[4]	3650	7.8	7166.8	7166.8	7167.7	0.9	2.1
	6000	10.6	7167.9	7167.9	"	-0.2	3.2
91.5[5]	3650	6.5	7168.0	7168.0	7168.8	0.8	2.2
	6000	7.9	7170.0	7170.0	"	-1.2	4.2
92-DK	3650	8.4	7170.5	7170.5	7073.6	3.1	0.0
	6000	8.2	7172.1	7172.1	"	1.5	1.5
93-DL	3650	7.1	7174.0	7174.0	7176.9	2.9	0.1
	6000	9.9	7174.9	7174.9	"	2.0	1.0

[1] Flow confined to channel and left overbank.
[2] Existing condition.
[3] Assumed starting water surface elevation.
[4] Resurveyed cross sections.
[5] New cross sections.

EXISTING BANK/LEVEE CONDITIONS AND LIKELY REQUIRED IMPROVEMENTS

As indicated in the summary table, the existing bank adjacent to the sewage lagoon and fire station (between cross sections 82 and 83) is slightly below the 100-year flood elevation. However, the sewage lagoon berm itself appears to be slightly higher than the adjacent natural bank and Pitkin County indicated that it is not concerned about the flood threat to the lagoon (which was not flooded in 1985). Therefore, no potential project quantities or costs were developed for this site. Nonetheless, it would be advisable to include this area in any future detailed analyses to verify that it is not vulnerable to flooding.

The existing levee extends from just upstream of cross-section 87 to the Coal Creek confluence between cross sections 90 and 91 (Attachment 3). The upstream 1,550 feet of the levee was originally built at the turn of the century and has been periodically enlarged since. Following the 1985 flood, the Soil Conservation Service (SCS) constructed a 250-foot emergency levee downstream of the existing levee and Pitkin County built an additional 400-foot levee beyond that. These two levees were apparently constructed to a large extent from the adjacent riverbed materials. The levee lacks adequate freeboard for both the 100- and 500-year events. Immediately downstream of the levee (cross-section 87) where the 100- and 500-year flood elevations would exceed the bank elevation by 1.7 and 2.7 feet. Therefore, it would be important to have any future levee improvements tie in to high ground, especially at the downstream end, to prevent backwater flooding (and at the upstream end to prevent flanking).

FEMA standards (Appendix D) require a minimum 3 feet of freeboard (as well as various other criteria). The existing levee has a freeboard range of -1.7 to +2.4 feet for the 100-year event and -2.7 feet to 1 foot for a 500-year event. Therefore, a significant increase in levee height would be required to meet FEMA standards.

The 29 supplemental cross sections of the levee which were surveyed by Pitkin County (under contract) for this study verify that the levee not only lacks sufficient height but also lacks structural integrity through much of its length. These cross sections along with a profile of the crown elevations were plotted and are compiled in Appendix E. Further, previous studies make reference to the levee being composed of unconsolidated material and could be eroded by the sustained high flows of a snowmelt flood. The recent Corps Non-Federal Levee Inspection Report (Appendix F) substantiates this. As part of the inspection, a limited geotechnical analysis was made. The

analysis indicated that the levee, especially the downstream segments, lacks adequate density and cross-section geometry as evidenced by the water which was observed seeping through the levee during the inspection. Extensive waterside slope erosion was also noted in some segments of the levee, highlighting the need for riprap (or other form of erosion protection) in any future improvements. The report also identifies sloughing, voids, crown depressions, and animal burrows, as well as dense vegetation and brush growing in some portions of the levee.

Given this information, it would appear ill-advised to proceed to raise the existing levee, at least without further geotechnical analysis. It is possible that some segments of the levee could be raised. However, extensive subsurface explorations (including a determination of foundation conditions) along the entire levee should be done to determine if any sections are viable.

POTENTIAL PROJECT QUANTITIES AND COSTS

The following quantities and costs are based on similar levee analyses in western Colorado, including Grand Junction and Lake City. Some costs may be higher due to the relatively remote location or unknown subsurface geotechnical conditions; other costs may be lower. These estimates should be used as a guide only since there may be substantial variation for the cost of feasibility studies, design work (and associated geotechnical studies and testing); preparation of plans and specifications; and for the construction supervision and administration.

The quantities listed below assume the following cross-section geometry and construction methods (typical of Corps levees) as shown on Attachment 4.

- A 12-foot crown with a 6-inch layer of aggregate road base to provide an inspection/maintenance road.
- A 1V on 3H waterside slope.
- A 1V on 2H landside slope.
- Soil stripping and an inspection/cutoff trench equal to the levee height.
- A riprap/filter blanket 15 inches thick for 100-year protection and 18 inches thick for 500-year protection with adequate toe protection against erosive velocities.
- Tie-ins to high ground at the upstream and downstream ends.
- Dust control measures during construction and seeding of the landside slope to prevent erosion following construction.

ITEM	100-YEAR Protection Project	500-YEAR Protection Project
Excavation (stripping, inspection, & toe trenches) (cubic yards)	6,000	9,000
Embankment Material (cubic yards)	5,000	8,000
Stone Protection (tons)	6,000	8,000
Filter Fabric (square yards)	7,000	9,000
Seeding & Dust Control (acres)	2	2.5
Stabilized Aggregate Road Base (tons)	700	700

Based on unit costs developed by the Corps for other recent projects in western Colorado, the total project cost estimate range for 100- and 500-year protection would be approximately $400,000 to $500,000 and $500,000 to $600,000, respectively. These estimates used a 25 percent contingency and included the cost of relocation for a utility pole presently in the levee alignment. The lower portion of the range estimate assumed an additional 12 percent was included for planning, engineering, and design and 8 percent for construction management. The higher portion of the range is to account for unforeseen difficulties in construction. The estimates did not include any real estate costs. Pitkin County indicated that for purposes of this report, the assumption should be made that all necessary easements are in place. The project cost could be somewhat less if some of the existing levee materials are determined to be suitable for reuse.

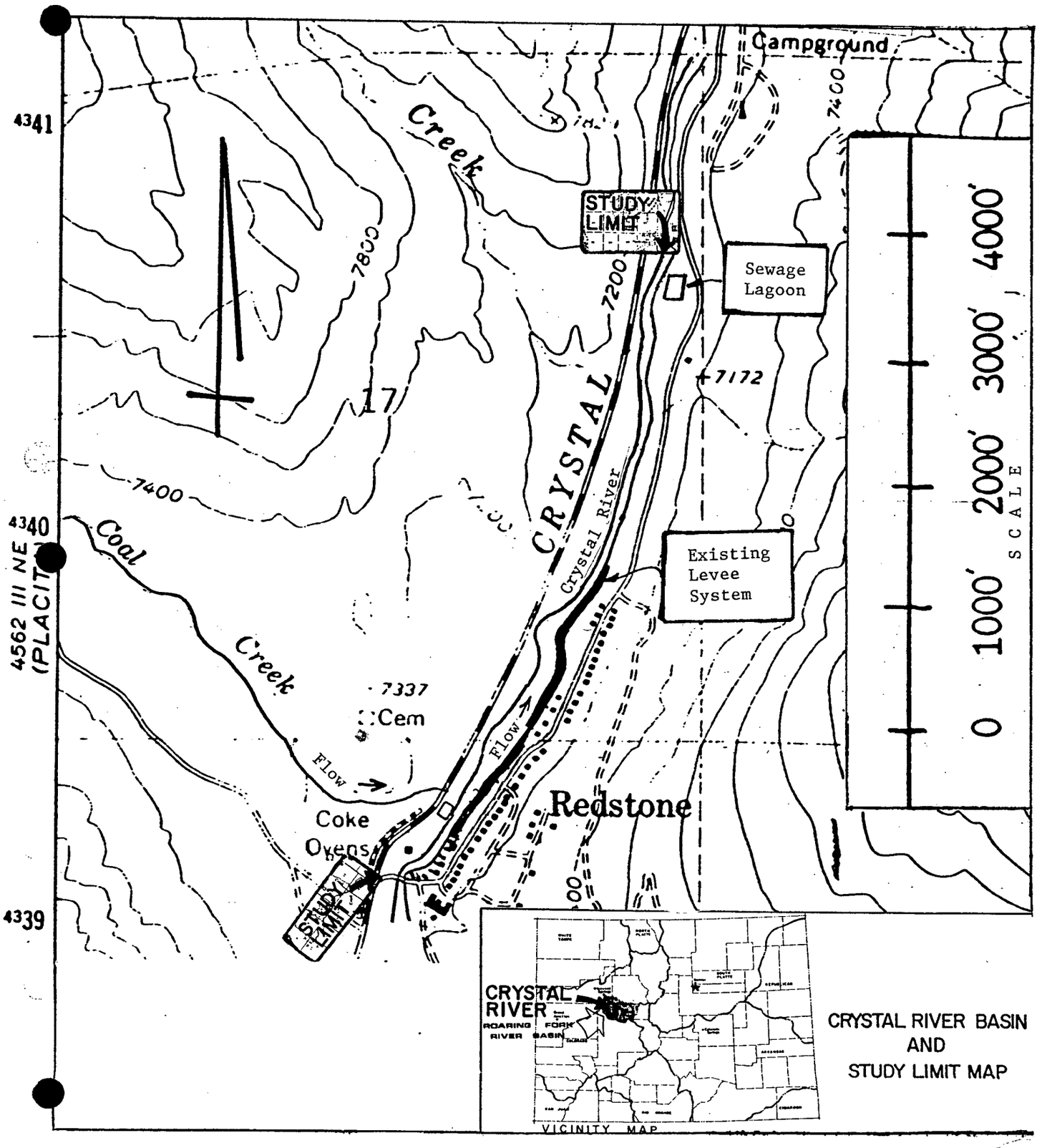
SUMMARY AND CONCLUSIONS

This analysis indicated that the expected water-surface profiles for the 100- and 500-year flood events are very similar to those developed by FEMA in the 1980's. Consequently, the FEMA flood plain (shown on Attachment 2) should still be considered reliable.

The existing levee should not be considered adequate to raise given its present condition (at least not without a detailed geotechnical investigation). Data developed to date indicate the compaction and design of the existing levee to be generally inadequate. The levee lacks sufficient height and/or freeboard, erosion protection, proper side slopes, crown width and cover, and interior drainage provisions through much of the levee reach. Proper design of any future levee improvements should consist of an extensive engineering effort, including a feasibility level analysis (to include testing of the levee embankment soils and foundation and a sediment transport analysis), design and cost estimates, and plans and

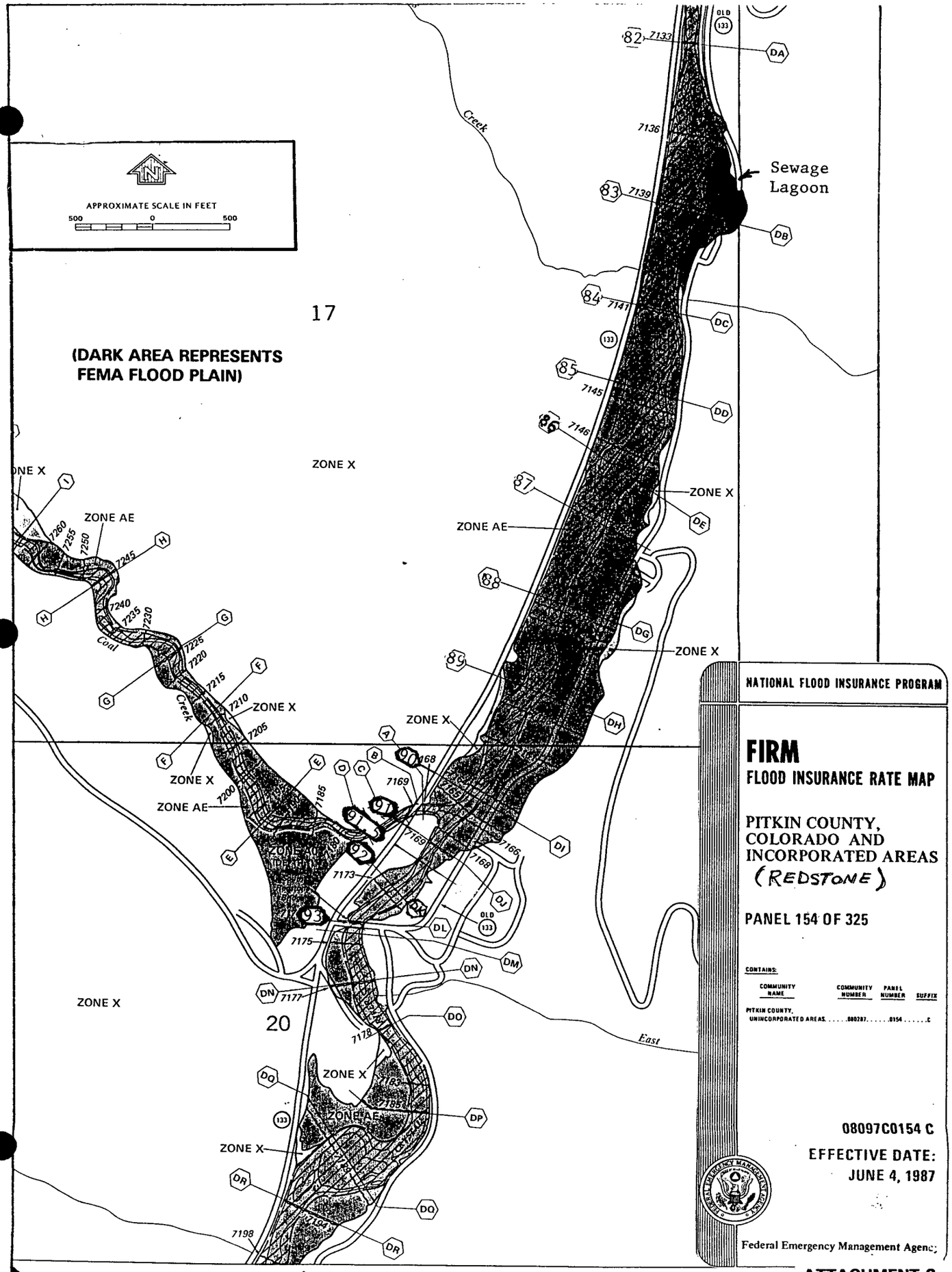
specifications. All design work for the improvements should be based, at a minimum, on FEMA standards so that once complete, the levee system will be acceptable to FEMA as a viable flood control structure.

Design and construction costs will likely range from $400,000 to $500,000 and $500,000 to $600,000 replace the existing levee with an adequate (and safe) levee system which has sufficient erosion protection and meets FEMA criteria to provide a 100- to 500-year level of protection, respectively.



CRYSTAL RIVER BASIN
AND
STUDY LIMIT MAP

ATTACHMENT 1



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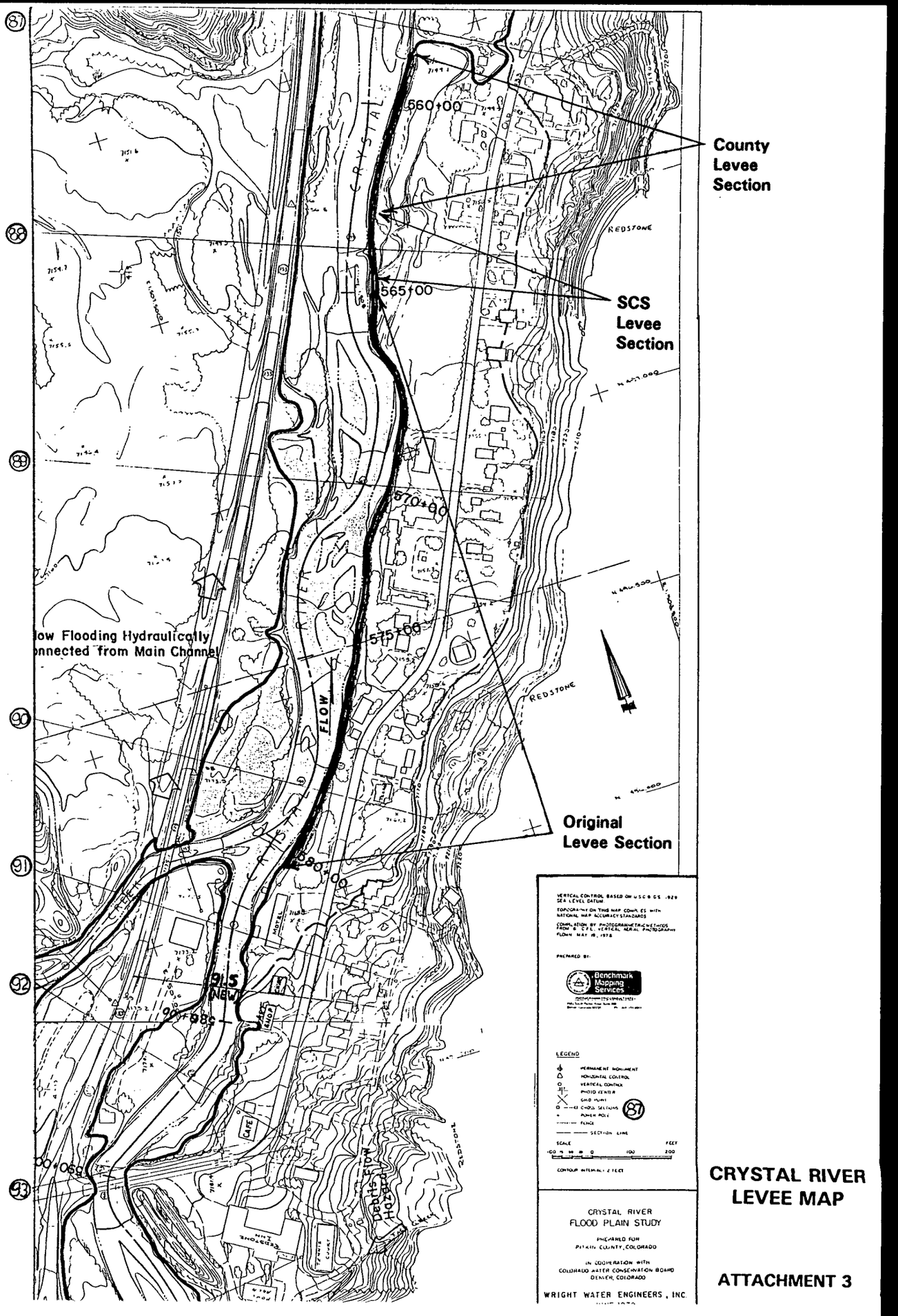
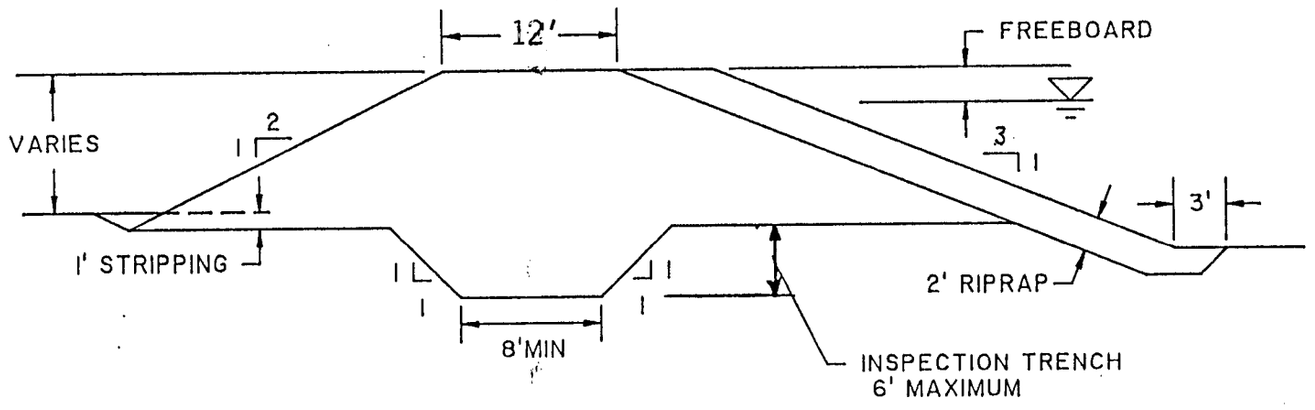


CRYSTAL RIVER LEVEE MAP

ATTACHMENT 3



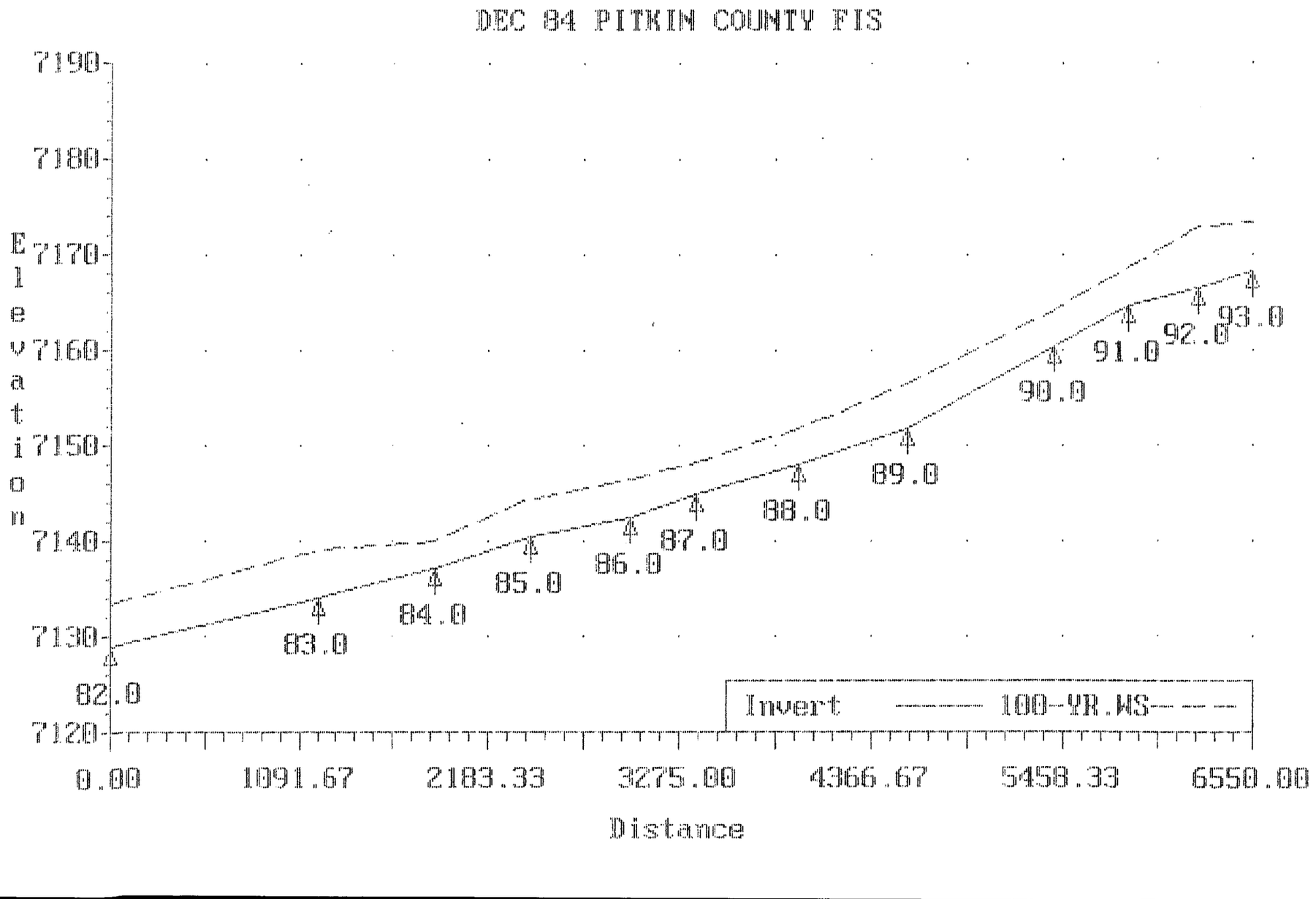
POTENTIAL LEVEE SECTION

SCALE: 1" = 10'

ATTACHMENT 4

APPENDIX A

CRYSTAL RIVER
WATER SURFACE PROFILES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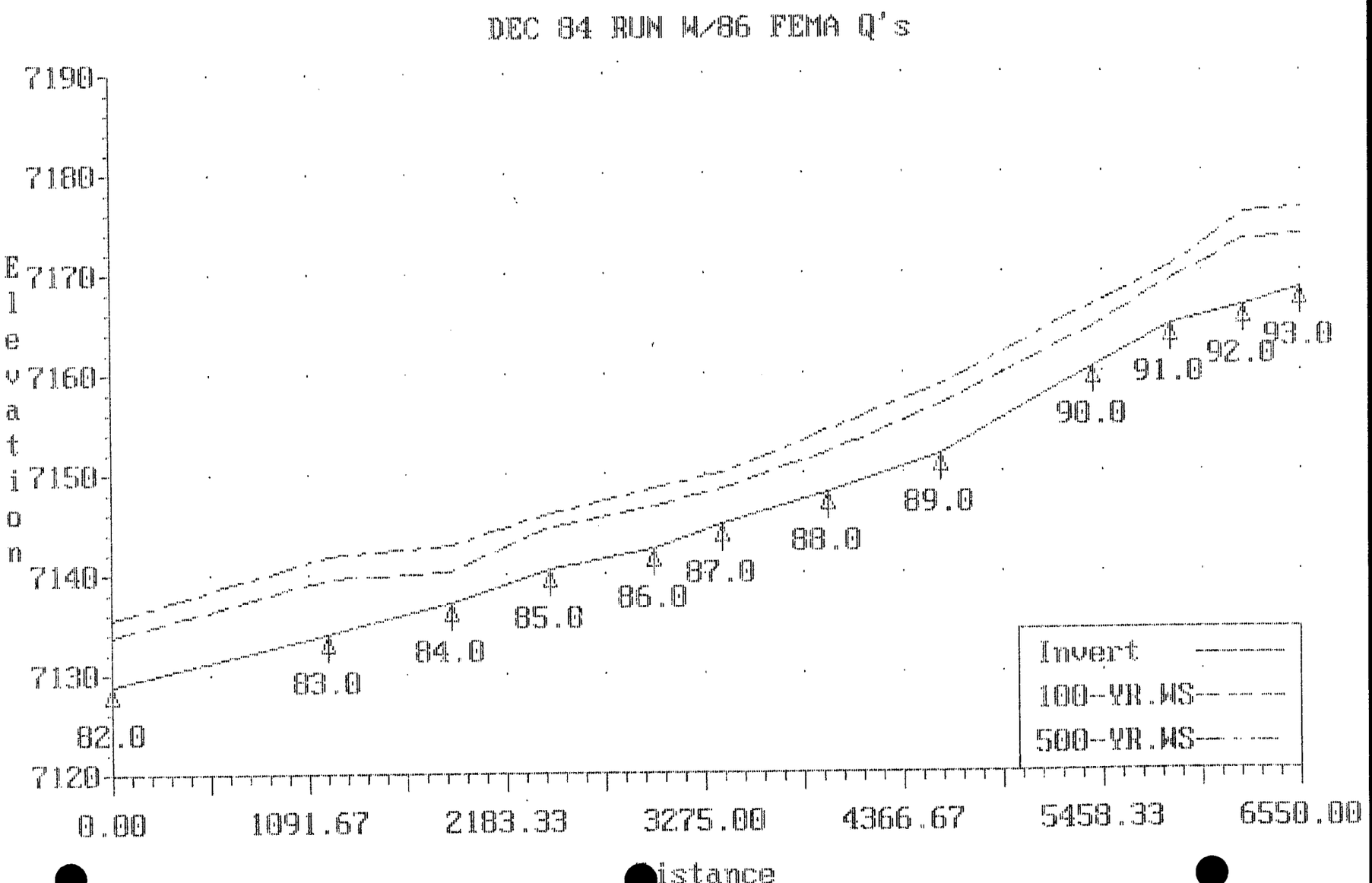
Distance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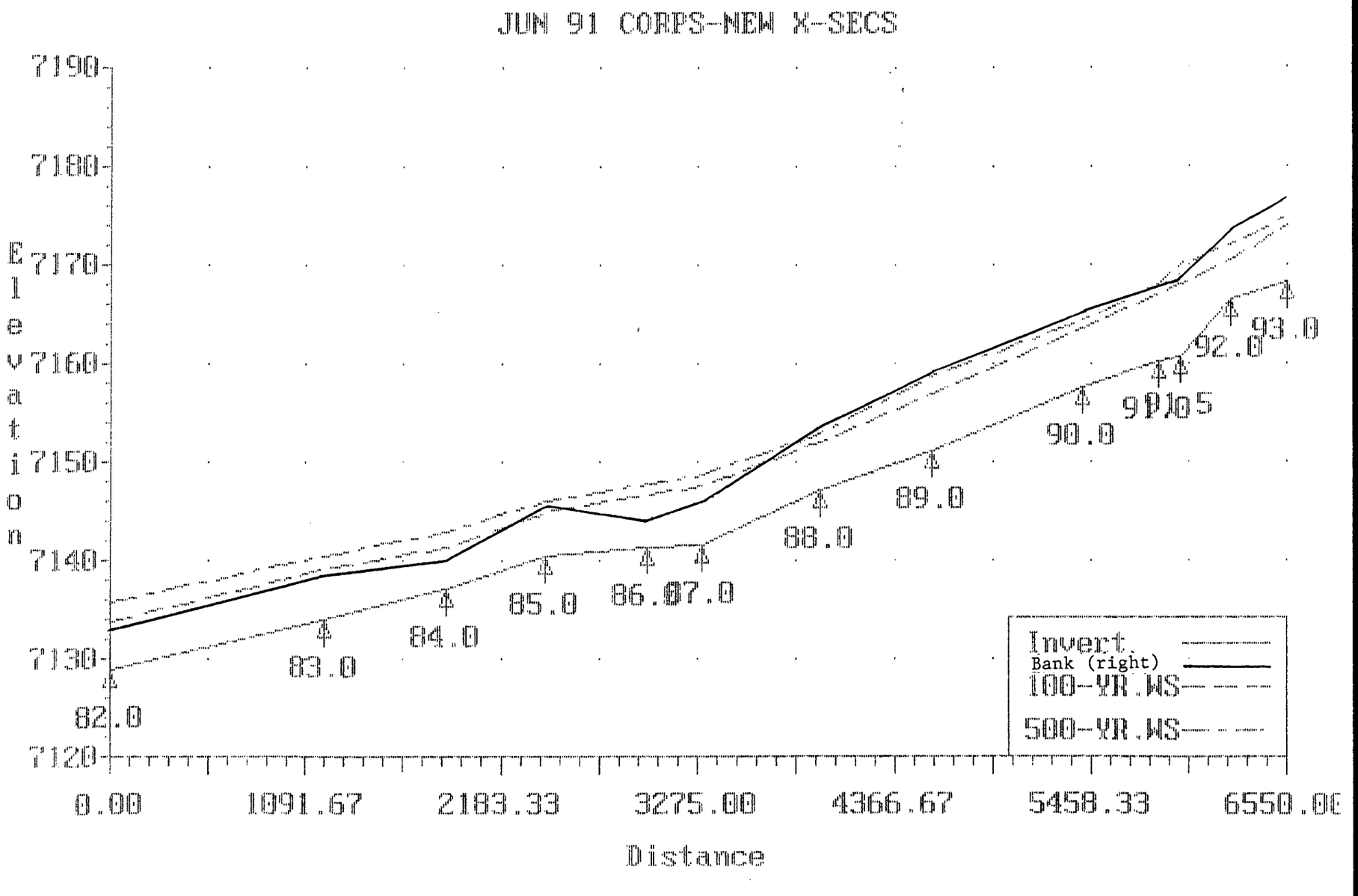
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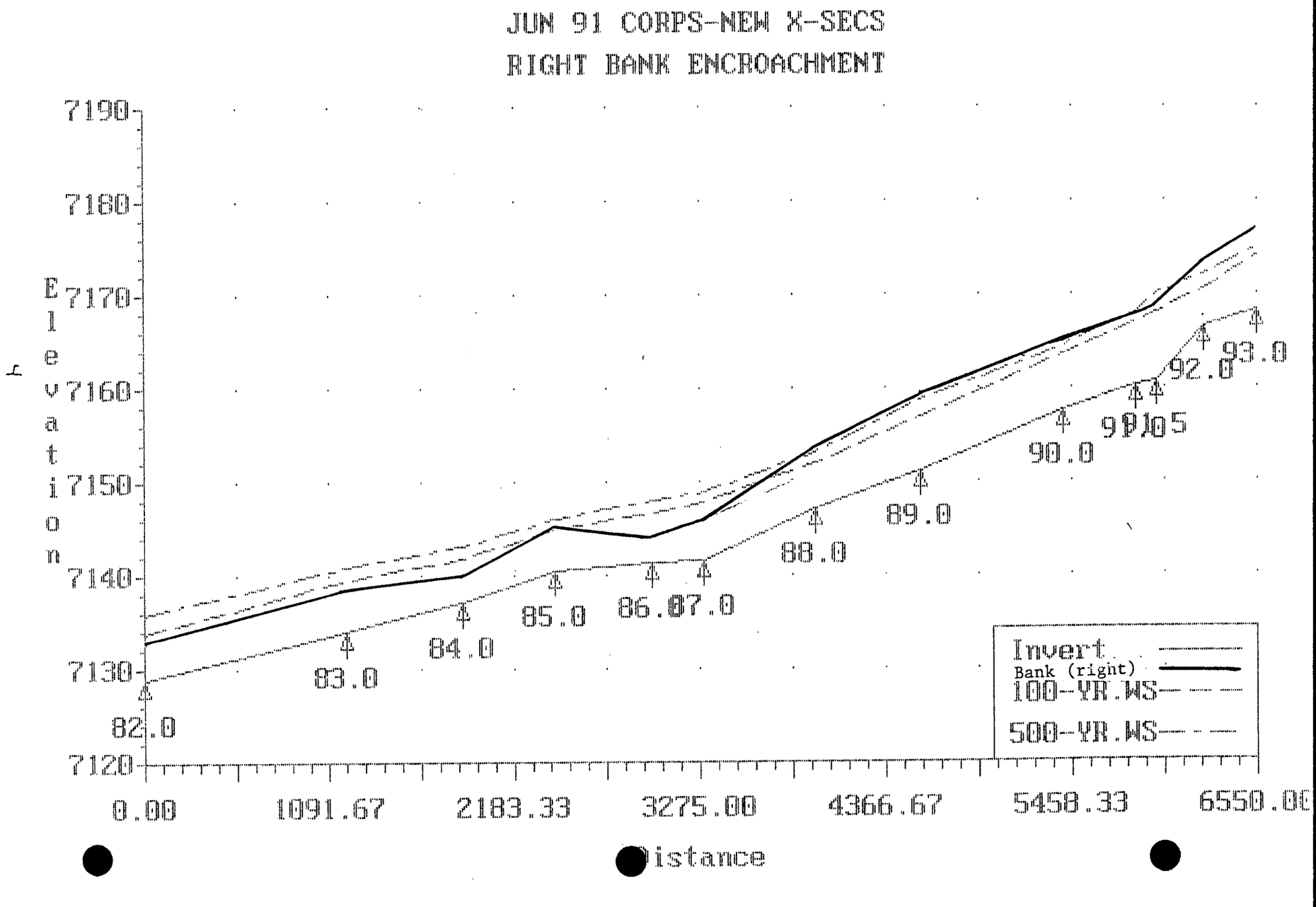
Distance
Invert
Bank (right)
100-YR.WS
500-YR.WS


JUN 91 CORPS-NEW X-SECS
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87.0
88.0
89.0
90.0
91.0
92.0
93.0
Invert
Bank (right)
100-YR.WS
500-YR.WS
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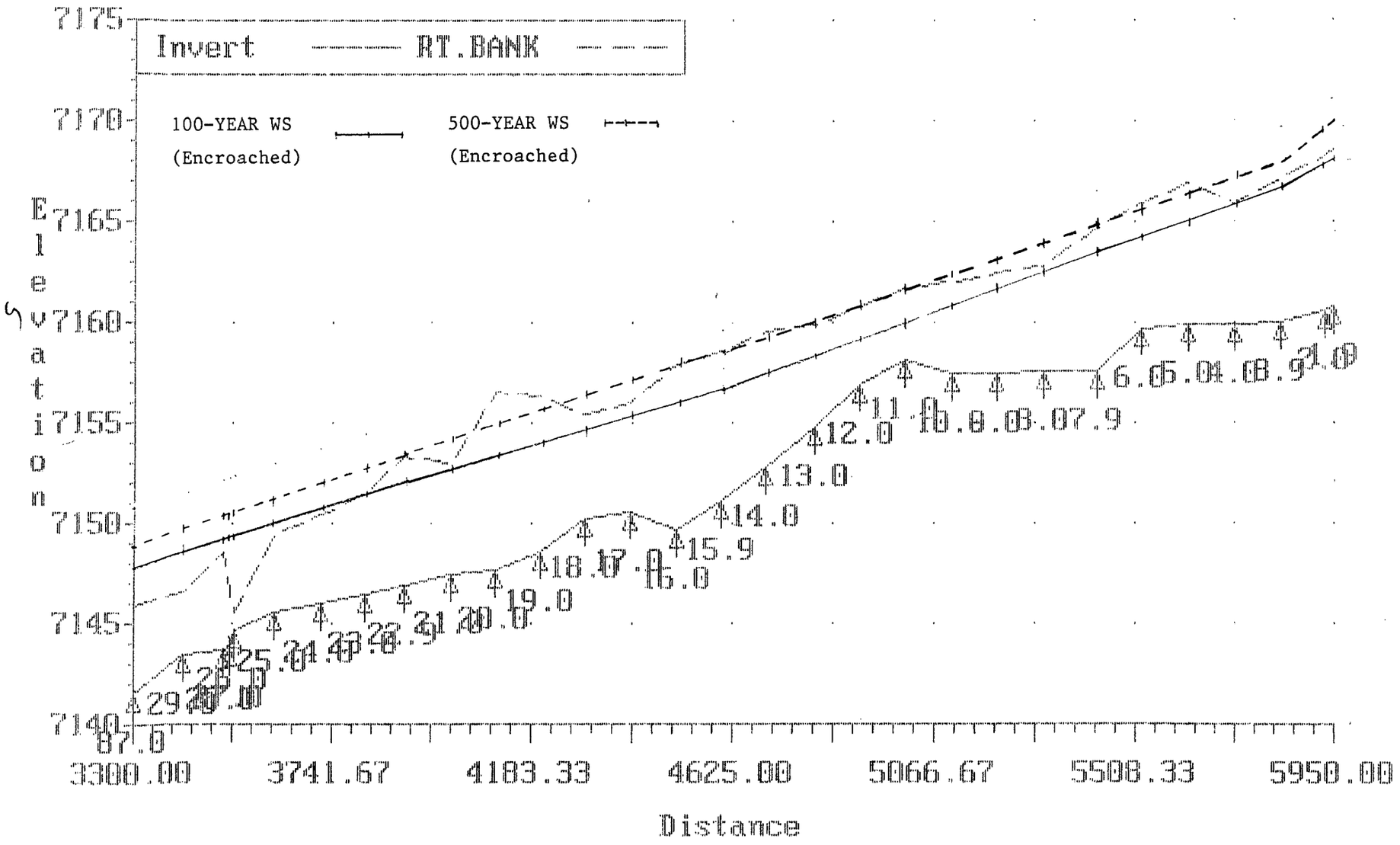
6550.00
Distance

SUPPLEMENTAL LEVEE

X-SECS 1 TO 29



APPENDIX B

HEC-2 INPUT AND OUTPUT

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*  HYDROLOGIC ENGINEERING CENTER        *
*  609 SECOND STREET, SUITE D           *
*  DAVIS, CALIFORNIA 95616-4687         *
*        (916) 756-1104                 *
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26JUN91 11:48:12 PAGE 1

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 HEC-2 WATER SURFACE PROFILES

 Version   4.6.0:  February 1991
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T3      DEC 84 PITKIN COUNTY FIS                    3250 cfs u/s of Coal Cr)

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J3  VARIABLE CODES FOR SUMMARY PRINTOUT

       38        43        39        42     1.000     2.000     3.000        52        36     4.000
       53        54     0.000   200.000     0.000     0.000     0.000     0.000     0.000     0.000

QT    1.000      3700
NC    0.060     0.065     0.050     0.600     0.100       0.0       0.0       0.0       0.0       0.0
X1       82        15.     1091      1157      1050.     1050.     995.
GR    7159.1    1000      7133.7    1020      7134.0    1026      7134.0    1055      7133.6    1083
GR    7128.9    1091      7128.8    1157      7132.9    1170      7133.8    1182      7134.1    1198
GR    7144.1    1220      7144.1    1242      7143.6    1247      7151.6    1286      7154.1    1300

NC    0.060     0.060       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
ET       0.        0.       7.1       9.1       0.        0.     1236.0    1520.0    1236.0    1520.0
X1       83        32.     1236      1495      1100.     1300.     1200.
X3       10.       0.        0.        0.        0.        0.       0.     7141.0    7138.7       0.
GR    7155.4    1000      7134.4    1034      7133.0    1106      7136.3    1144      7133.6    1155
GR    7134.9    1172      7140.8    1190      7140.9    1221      7134.8    1236      7134.5    1306
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GR	7138.2	1308	7134.9	1351	7134.8	1394	7134.8	1382	7135.1	1308
GR	7134.6	1450	7134.2	1493	7134.0	1495	7138.7	1513	7138.7	1550
GR	7134.4	1544	7137.5	1635	7136.6	1661	7137.7	1676	7137.9	1694
GR	7136.1	1707	7135.8	1750	7139.4	1775	7148.0	1306	7148.6	1316
GR	7135.5	1850	7156.7	1870						
ET	0.	0.	7.1	9.1	0.	0.	1449.0	1693.0	1449.0	1693.0
X1	84	30.	1449	1693	750.	660.	680.			
GR	7165.1	1000	7162.0	1076	7158.0	1105	7155.3	1174	7152.6	1263
GR	7149.5	1345	7144.8	1383	7145.1	1390	7145.5	1416	7137.6	1449
GR	7137.9	1461	7137.0	1473	7137.0	1482	7140.6	1498	7137.2	1518
GR	7137.3	1535	7140.6	1555	7139.1	1568	7138.2	1605	7137.6	1606
GR	7137.9	1693	7140.0	1705	7140.2	1723	7140.8	1736	7140.8	1774
GR	7146.3	1779	7151.0	1823	7158.8	1885	7164.7	1920		

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ET	0	0	7.1	9.1	0	0	1660.	1925.0	1660.	1925.0
X1	85.0	43	1587.0	2033.0	540.	550.	540.	0	0.	0.
X3	10.0	0.	0.	0.	0.	0.0	0.	7149.0	0.	0.
GR	7166.2	1000	7158.0	1015	7154.7	1030	7154.4	1069	7152.1	1123
GR	7150.9	1199	7149.9	1273	7148.5	1361	7147.6	1411	7146.2	1440
GR	7145.5	1483	7141.4	1494	7141.1	1521	7144.6	1528	7148.4	1539
GR	7149.1	1556	7149.0	1571	7141.6	1587	7141.4	1634	7141.6	1658
GR	7140.4	1664	7141.8	1673	7141.6	1706	7141.8	1748	7142.1	1787
GR	7141.9	1815	7140.6	1820	7140.6	1891	7141.9	1897	7142.9	1905
GR	7141.9	1914	7140.9	1923	7142.1	1955	7142.1	1988	7143.6	2016
GR	7145.4	2033	7145.6	2043	7145.4	2061	7147.5	2065	7150.0	2081
GR	7154.4	2109	7161.0	2152	7161.9	2160	0.	0.	0.	0.
ET	0.	0.	7.1	9.1	0.	0.	1618.0	1909.0	1618.0	1909.0
X1	86.0	51	1618	1909	510	600	580.	0.	0.	0.
X3	10.0	0.	0.	0.	0.	0.	0.	7151	7142.9	0.
GR	7181.9	1000	7172.2	1017	7155.4	1048	7148.6	1076	7146.7	1133
GR	7145.7	1212	7145.4	1279	7145.2	1339	7145.0	1387	7145.3	1426
GR	7144.0	1441	7144.9	1465	7145.2	1480	7144.8	1500	7148.2	1509
GR	7150.8	1517	7151.7	1534	7151.7	1549	7146.9	1560	7144.2	1588
GR	7144.3	1616	7142.5	1618	7142.5	1636	7144.1	1656	7144.2	1681
GR	7143.1	1696	7143.1	1725	7144.5	1730	7144.2	1758	7144.4	1792
GR	7143.4	1800	7143.6	1817	7143.5	1886	7144.4	1895	7143.2	1909
GR	7142.9	1941	7144.8	1942	7145.4	1953	7144.6	1960	7144.1	1972
GR	7145.7	2002	7146.6	2031	7147.2	2065	7147.6	2090	7148.2	2111
GR	7148.2	2131	7149.0	2139	7149.9	2164	7153.5	2193	7157.3	2224
GR	7160.1	2250	0							
ET	0.0	0.	7.1	9.1	0.	0.	1240	1490	1240	1490
X1	87	47	1238	1481	400.	350.	370	0.	0.	0.
X3	10.	0	0.	0.	0.	0.	0.	7154.0	7144.5	0.
GR	7166.1	1000	7157.7	1025	7149.2	1049	7145.7	1064	7145.7	1079
GR	7143.5	1091	7145.9	1105	7146.5	1132	7146.2	1159	7146.6	1177
GR	7149.4	1182	7153.5	1193	7154.0	1209	7153.8	1226	7148.4	1238
GR	7145.9	1249	7145.9	1279	7146.1	1312	7146.5	1325	7145.9	1326
GR	7145.9	1398	7146.6	1422	7144.8	1446	7145.2	1470	7147.8	1481
GR	7145.9	1489	7145.5	1516	7144.8	1536	7144.5	1564	7145.1	1587
GR	7147.2	1611	7147.8	1633	7146.9	1639	7147.5	1667	7148.2	1702
GR	7148.5	1728	7149.3	1747	7150.2	1760	7149.7	1772	7148.1	1781
GR	7149.8	1811	7151.1	1843	7153.1	1871	7154.2	1886	7155.9	1914
GR	7158.9	1942	7160.2	1950						
ET	0.	0.	7.1	9.1	0.	0.	2193.0	2385.0	2193.0	2385.0
X1	88.	79	2193	2385	600	600	585	0.	0.	0.
X3	10.	0.	0.	0.	0.	0.	0.	7157.0	7149.1	0.
GR	7175.2	1000	7156.2	1027	7154.1	1046	7154.4	1085	7153.9	1111
GR	7154.9	1144	7154.7	1170	7153.8	1201	7153.5	1235	7153.5	1270

GR	7157.7	1309	7153.8	1348	7153.6	1384	7155.6	1421	7153.9	1465
GR	7153.2	1479	7149.7	1488	7151.1	1504	7150.9	1520	7153.6	1546
GR	7153.2	1589	7152.9	1583	7153.6	1603	7151.6	1639	7153.4	1657
GR	7153.2	1699	7153.3	1763	7153.4	1803	7153.1	1844	7152.6	1877
GR	7148.2	1887	7148.2	1894	7149.9	1901	7149.0	1914	7148.4	1936
GR	7149.9	1955	7148.6	1972	7149.0	2003	7149.3	2025	7149.3	2044

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GR	7147.7	2052	7149.0	2063	7149.9	2079	7150.3	2099	7149.3	2110
GR	7149.5	2124	7153.3	2132	7156.4	2143	7157.1	2161	7156.8	2175
GR	7155.0	2185	7151.7	2193	7148.6	2204	7149.5	2229	7149.6	2254
GR	7149.9	2280	7147.9	2290	7147.9	2358	7149.6	2364	7152.3	2372
GR	7152.8	2385	7149.1	2396	7149.1	2447	7151.8	2456	7153.6	2482
GR	7149.3	2496	7150.4	2514	7149.7	2544	7150.4	2578	7150.6	2610
GR	7151.4	2632	7152.0	2654	7151.9	2680	7152.0	2744	7152.1	2779
GR	7153.9	2800	7156.2	2827	7261.2	2834	7173.9	2850		
ET	0.	5.1	7.1	9.1	1846.0	2570.0	2000.0	2187.0	2000.0	2187
X1	89	44	2032	2187	630.0	630.0	615.0	0.	0.	0.
X3	10.	0.	0.	0.	0.	0.	0.	7158.7	7154.8	0.
GR	7184.4	1000	7157.6	1033	7157.1	1051	7157.5	1074	7156.5	1086
GR	7157.8	1103	7157.7	1174	7156.5	1234	7157.8	1262	7156.0	1348
GR	7156.9	1364	7157.1	1441	7157.8	1464	7156.5	1486	7156.6	1502
GR	7158.6	1527	7158.7	1627	7158.5	1738	7157.8	1774	7155.0	1787
GR	7162.6	1818	7162.6	1846	7157.8	1858	7157.7	1926	7156.6	1985
GR	7158.6	2020	7158.6	2032	7151.7	2047	7153.2	2077	7152.7	2087
GR	7153.1	2144	7154.1	2152	7153.6	2176	7158.1	2187	7157.9	2193
GR	7155.7	2203	7155.4	2229	7156.5	2301	7156.9	2339	7156.8	2356
GR	7156.1	2434	7154.8	2524	7158.6	2545	7171.3	2570		
NH	3	0.06	1794	0.05	1903	0.06	2190	0.	0.	0.
ET	0.	5.1	7.1	9.1	1589	2190.0	1685	1903	1780	1903.0
X1	90	35	1685.0	1903.0	870	850.0	840	0.	0.	0.
X3	10.	0.	0.	0.	0.	0.	0.	7164.3	7161.4	0.
GR	7184.1	1000	7164.6	1038	7163.1	1076	7164.4	1129	7162.9	1144
GR	7165.5	1157	7167.3	1222	7166.8	1235	7168.8	1287	7168.9	1349
GR	7170.4	1383	7169.5	1409	7170.6	1443	7169.1	1495	7166.8	1519
GR	7167.2	1531	7173.6	1551	7173.7	1580	7172.2	1589	7162.9	1614
GR	7161.7	1660	7164.3	1685	7162.7	1777	7162.7	1794	7161.0	1809
GR	7160.5	1897	7165.3	1903	7164.7	1926	7161.4	1939	7163.2	1969
GR	7163.2	1990	7162.6	2034	7161.8	2099	7161.7	2140	7185.1	2190
QT	1.	3250				0.	0.	0.	0.	0.
ET	0.	0.	-5.4	-8.4	0.	0.	0.	0.	0.	0.
NC	0.060	0.060	0.050	0.0	0.	0.	0.	0.	0.	0.
X1	91	39	1448.0	1538	420.0	420.0	420.0	0.	0.	0.
X3	10.0	0.	0.	0.	0.	0.	0.	7175.0	0.	0.
GR	7188.9	1000	7187.1	1018	7173.7	1045	7175.7	1105	7177.0	1153
GR	7179.4	1160	7179.0	1172	7169.8	1195	7169.8	1230	7174.2	1244
GR	7172.3	1251	7175.1	1265	7175.0	1291	7172.2	1309	7172.7	1341
GR	7173.7	1413	7172.5	1448	7164.6	1458	7164.6	1525	7168.3	1538
GR	7168.3	1543.0	7174.0	1543.1	7174.0	1557.9	7168.4	1558	7168.4	1577
GR	7168.4	1580	7188.0	1580.1	7188.0	1618	7168.5	1618.1	7169.5	1654
GR	7170.9	1690	7171.1	1715	7170.7	1720	7175.8	1759	7178.2	1797
GR	7180.1	1848	7183.7	1879	7184.2	1915	7185.3	1920		
X1	92.0	19	1262	1331.0	420.0	450.0	410.0	0.	0.	0.
GR	7176.6	1000	7176.1	1017	7173.4	1033	7175.9	1050	7175.8	1073
GR	7172.7	1093	7171.2	1139	7171.6	1193	7170.1	1234	7170.4	1253
GR	7166.4	1262	7166.4	1331	7168.7	1375	7173.6	1387	7179.8	1451
GR	7180.8	1495	7179.9	1517	7181.0	1552	7188.9	1600		

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X1      93.0        28.0      1555.0      1674.0       350.0        280        310.0          0.          0.          0.
X3      10.0          0.         0.          0.          0.         0.          0.     7176.0      7176.0          0.
GR   7180.3        1000      7185.4        1060      7183.1        1074      7181.9        1108      7179.4        1119
GR   7178.7        1176      7182.1        1200      7181.0        1267      7182.1        1328      7185.9        1342
GR   7182.8        1362      7192.5        1368      7193.3        1388      7179.3        1403      7178.9        1430
GR   7180.1        1473      7177.7        1509      7176.1        1555      7168.5        1585      7168.5        1660
GR   7176.9        1674      7172.6        1785      7178.0        1895      7180.2        1987      7179.8        2010
GR   7180.9        2053      7187.1        2094      7191.0        2140
```


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

```
 *PROF 1
0

 CCHV=      .600 CEHV=      .100
 *SECNO 82.000
 3720 CRITICAL DEPTH ASSUMED
     82.000       4.51   7133.31   7133.31   7133.30   7135.29      1.98       .00       .00   7128.90
     3700.0       90.8    3421.7     187.5      16.5     294.2      33.1        .0        .0   7128.80
        .00       5.49     11.63      5.67      .060      .050      .065      .000   7128.80   1083.50
    .020863      1050.      995.      1050.         0         4         0       .00     91.95   1175.44


 *SECNO 83.000

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE.  KRATIO =  5.03


 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      7141.00 ELREA=      7138.70

     83.000       5.15   7139.15       .00       .00   7139.22       .07      2.79      1.15   7134.80
     3700.0         .0    2715.9     984.1         .0    1167.3     705.5      31.4       9.0   7134.00
        .16        .00      2.33      1.39      .000      .050      .060      .000   7134.00   1236.00
    .000824      1100.      1200.     1300.         7         0         0       .00    537.31   1773.31


 *SECNO 84.000

 3265 DIVIDED FLOW


 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
     84.000       3.02   7140.02   7140.02       .00   7140.98       .96      1.64       .09   7137.60
     3700.0       57.9    3585.5      56.6      12.3     451.2      12.9      49.5      15.1   7137.90
        .19       4.72      7.95      4.38      .060      .050      .060      .000   7137.00   1438.88
    .029184       750.       680.      660.         4        14         0       .00    253.74   1707.15
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 85.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = 3.46

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7149.00 ELREA= 7145.40

85.000	4.11	7144.51	.00	.00	7144.65	.14	3.17	.49	7141.60
3700.0	.0	3700.0	.0	.0	1252.6	.0	60.3	19.4	7145.40
.24	.00	2.95	.00	.000	.050	.000	.000	7140.40	1587.00
.002437	540.	540.	550.	4	0	0	.00	437.65	2024.65

*SECNO 86.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7151.00 ELREA= 7142.90

86.000	3.86	7146.36	.00	.00	7146.58	.23	1.93	.01	7142.50
3700.0	.0	3079.1	620.9	.0	779.3	206.5	75.2	25.0	7143.20
.28	.00	3.95	3.01	.000	.050	.060	.000	7142.50	1618.00
.004761	510.	580.	600.	5	0	0	.00	405.20	2023.20

*SECNO 87.000

3265 DIVIDED FLOW

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7154.00 ELREA= 7144.50

87.000	3.45	7148.25	.00	.00	7148.46	.22	1.87	.01	7148.40
3700.0	.0	2164.7	1535.3	.0	559.6	437.9	83.5	28.7	7147.80
.31	.00	3.87	3.51	.000	.050	.060	.000	7144.80	1238.67
.005575	400.	370.	350.	3	0	0	.00	470.98	1783.62

*SECNO 88.000

3265 DIVIDED FLOW

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

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7157.00 ELREA= 7149.10

88.000	3.88	7151.78	.00	.00	7152.09	.31	3.61	.01	7161.70
3700.0	.0	2523.3	1176.7	.0	512.2	375.8	96.3	34.6	7152.80
.34	.00	4.93	3.13	.000	.050	.060	.000	7147.90	2193.00
.006748	600.	585.	600.	3	0	0	.00	403.84	2645.86

*SECNO 89.000

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS= 1846.0 2570.0 TYPE= 1 TARGET= 724.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7158.70 ELREA= 7154.80

89.000	4.85	7156.55	.00	.00	7157.17	.61	5.05	.03	7158.60
3700.0	.0	3262.9	437.1	.0	492.0	190.3	107.5	40.4	7158.10
.37	.00	6.63	2.30	.000	.050	.060	.000	7151.70	2036.45
.010086	630.	615.	630.	3	0	0	.00	403.69	2533.68

1490 NH CARD USED
*SECNO 90.000

3265 DIVIDED FLOW

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3710 WSEL ASSUMED BASED ON MIN DIFF

3470 ENCROACHMENT STATIONS= 1589.0 2190.0 TYPE= 1 TARGET= 601.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7164.30 ELREA= 7161.40

90.000	3.80	7164.30	7163.63	.00	7164.61	.31	7.45	4.54	7164.30
3700.0	.0	2288.1	1411.9	.0	458.9	409.5	122.5	48.6	7165.30
.43	.00	4.99	3.45	.000	.043	.060	.000	7160.50	1685.00
.007823	870.	840.	850.	20	14	0	.00	434.73	2145.55

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

*SECNO 91.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7175.00 ELREA= 7168.30

91.000	4.09	7168.69	7168.69	.00	7170.33	1.65	4.98	.13	7172.50
3250.0	.0	3235.9	14.1	.0	313.7	9.0	128.2	51.2	7168.30
.44	.00	10.32	1.58	.000	.050	.060	.000	7164.60	1452.82
.021826	420.	420.	420.	4	8	0	00	118.99	1624.90

*SECNO 93.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = 3.41

92.000	6.42	7172.82	.00	.00	7173.05	.23	1.87	.85	7166.40
3250.0	487.3	1974.0	788.7	286.5	443.1	252.8	134.5	53.2	7166.40
.47	1.70	4.45	3.12	.060	.050	.060	.000	7166.40	1092.21
.001582	420.	410.	450.	5	0	0	.00	292.88	1385.10

*SECNO 93.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = .46

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7176.00 ELREA= 7176.00

93.000	5.07	7173.37	.00	.00	7174.21	.84	1.10	.06	7176.10
3250.0	.0	3250.0	.0	.0	441.0	.0	139.6	54.7	7176.90
.48	.00	7.37	.00	.000	.050	.000	.000	7168.30	1565.76
.009024	350.	310.	280.	3	0	0	.00	102.50	1668.26

THIS RUN EXECUTED 26JUN91 11:48:18

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.0: February 1991
****

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

DEC 84 PITKIN COUNTY FIS

SUMMARY PRINTOUT

	SECNO	Q	XLCH	ELMIN	CWSEL	CRIWS	EG	DIFKWS	PERENC	TOPWID	SSTA	ENDST
*	82.000	3700.00	.00	7128.80	7133.31	7133.31	7135.29	.01	.00	91.95	1083.50	1175.44
*	83.000	3700.00	1200.00	7134.00	7139.15	.00	7139.22	.00	.00	537.31	1236.00	1773.31
*	84.000	3700.00	680.00	7137.00	7140.02	7140.02	7140.98	.00	.00	253.74	1438.88	1707.15
*	85.000	3700.00	540.00	7140.40	7144.51	.00	7144.65	.00	.00	437.65	1587.00	2024.65
	86.000	3700.00	580.00	7142.50	7146.36	.00	7146.58	.00	.00	405.20	1618.00	2023.20
	87.000	3700.00	370.00	7144.80	7148.25	.00	7148.46	.00	.00	470.98	1238.67	1783.62

	88.000	3700.00	585.00	7147.90	7151.78	.00	7152.09	.00	.00	402.84	2193.00	2648.84
	89.000	3700.00	615.00	7151.70	7156.55	.00	7157.17	.00	724.00	403.69	2026.40	2553.68
*	90.000	3700.00	840.00	7160.50	7164.30	7163.63	7164.61	.00	601.00	434.73	1685.00	2148.55
*	91.000	3250.00	420.00	7164.60	7168.69	7168.69	7170.33	.00	.00	118.79	1482.80	1624.90
*	92.000	3250.00	410.00	7166.40	7172.82	.00	7173.05	.00	.00	292.88	1092.21	1385.10
*	93.000	3250.00	310.00	7168.30	7173.37	.00	7174.21	.00	.00	102.50	1565.76	1668.26

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 82.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

WARNING SECNO= 83.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 84.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 84.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 85.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 90.000 PROFILE= 1 WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO= 90.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 91.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 91.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 92.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 93.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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*****************************************
*  HEC-2 WATER SURFACE PROFILES         *
*                                       *
*  Version   4.6.0:  February 1991      *
*                                       *
*  RUN DATE     26JUN91     TIME    12:02:46   *
*****************************************
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*****************************************
*  U.S. ARMY CORPS OF ENGINEERS         *
*  HYDROLOGIC ENGINEERING CENTER        *
*  609 SECOND STREET, SUITE D           *
*  DAVIS, CALIFORNIA 95616-4687         *
*           (916) 756-1104              *
*****************************************
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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                  X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX              XXXXXXX
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THIS RUN EXECUTED 26JUN91 12:02:47

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

 Version   4.6.0:  February 1991
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T1      PITKIN COUNTY FIS (Orig Dec 84 run with '86 FEMA Q's file:oldrsnwq.dat)
T2      FEMA/DENVER ENG..124.006 - 100-YR (4200 cfs below Coal Cr, 3650 above)
T3      DEC 84 RUN W/86 FEMA Q's

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
      0.        2.        0.        0.        0.1       0.0       0.0       0.0     7133.3    0.000

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
    1.000     0.000    -1.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

      38        43        39        42      1.000     2.000     3.000        52        36      4.000
      53        54     0.000   200.000     0.000     0.000     0.000     0.000     0.000     0.000

QT    2.000     4200      6800
NC    0.060     0.065     0.050     0.600     0.100     0.0       0.0       0.0       0.0       0.0
X1      82       15.      1091      1157      1050.     1050.     995.
GR    7159.1    1000      7133.7    1020      7134.0    1026      7134.0    1055      7133.6    1083
GR    7128.9    1091      7128.8    1157      7132.9    1170      7133.8    1182      7134.1    1198
GR    7144.1    1220      7144.1    1242      7143.6    1247      7151.6    1286      7154.1    1300

NC    0.060     0.060     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
ET      0.        0.      7.1       9.1       0.        0.      1236.0    1520.0    1236.0    1520.0
X1      83       32.      1236      1495      1100.     1300.     1200.
X3      10        0.        0.        0.        0.        0.        0.      7141.0    7138.7      0.
GR    7155.4    1000      7134.4    1034      7133.0    1106      7136.3    1144      7133.6    1155
GR    7134.9    1172      7140.8    1190      7140.9    1221      7134.8    1236      7134.5    1306
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GR	7135.3	1308	7134.9	1351	7134.5	1394	7134.5	1388	7134.1	1388
GR	7134.6	1450	7134.2	1493	7134.0	1476	7138.7	1414	7138.7	1530
GR	7134.4	1544	7137.5	1635	7136.6	1661	7137.7	1676	7137.7	1694
GR	7136.1	1707	7135.8	1750	7139.4	1775	7148.0	1806	7148.6	1816
GR	7135.5	1850	7156.7	1870						
ET	0.	0.	7.1	9.1	0.	0.	1449.0	1693.0	1449.0	1693.0
X1	34	25.	1449	1693	750.	660	680.			
GR	7165.1	1000	7162.0	1076	7158.0	1105	7155.3	1174	7152.6	1260
GR	7149.5	1345	7144.8	1383	7145.1	1390	7145.3	1416	7137.6	1449
GR	7137.9	1481	7137.0	1473	7137.0	1482	7140.6	1498	7137.3	1518
GR	7137.3	1535	7140.6	1555	7139.1	1568	7138.2	1605	7137.6	1608
GR	7137.9	1673	7140.0	1705	7140.2	1723	7143.8	1736	7143.5	1774
GR	7146.3	1779	7151.0	1823	7158.8	1885	7164.7	1926		

ET	0	0	7.1	9.1	0	0	1660.	1925.0	1660.	1925.0
X1	85.0	43	1587.0	2033.0	540.	550.	540.	0	0.	0.
X3	10.0	0.	0.	0.	0.	0.0	0.	7149.0	0.	0.
GR	7166.2	1000	7158.0	1015	7154.7	1030	7154.4	1069	7152.1	1123
GR	7150.9	1199	7149.9	1273	7148.5	1361	7147.6	1411	7146.2	1440
GR	7145.5	1483	7141.4	1494	7141.1	1521	7144.6	1528	7148.4	1539
GR	7149.1	1556	7149.0	1571	7141.6	1587	7141.4	1634	7141.6	1650
GR	7140.4	1664	7141.8	1673	7141.6	1706	7141.8	1748	7142.1	1787
GR	7141.9	1815	7140.6	1820	7140.6	1891	7141.9	1897	7142.9	1905
GR	7141.9	1914	7140.9	1923	7142.1	1955	7142.1	1988	7143.6	2016
GR	7145.4	2033	7145.6	2043	7145.4	2061	7147.5	2065	7150.0	2082
GR	7154.4	2109	7161.0	2152	7161.9	2160	0.	0.	0.	0.
ET	0.	0.	7.1	9.1	0.	0.	1618.0	1909.0	1618.0	1909.0
X1	86.0	51	1618	1909	510	600	580.	0.	0.	0.
X3	10.0	0.	0.	0.	0.	0.	0.	7151	7142.9	0.
GR	7181.9	1000	7172.2	1017	7155.4	1048	7148.6	1076	7146.7	1133
GR	7145.7	1212	7145.4	1279	7145.2	1339	7145.0	1387	7145.3	1426
GR	7144.0	1441	7144.9	1465	7145.2	1480	7144.8	1500	7148.2	1509
GR	7150.8	1517	7151.7	1534	7151.7	1549	7146.9	1560	7144.2	1588
GR	7144.3	1616	7142.5	1618	7142.5	1636	7144.1	1656	7144.2	1681
GR	7143.1	1696	7143.1	1725	7144.5	1730	7144.2	1758	7144.4	1792
GR	7143.4	1800	7143.6	1817	7143.5	1886	7144.4	1895	7143.2	1909
GR	7142.9	1941	7144.8	1942	7145.4	1953	7144.6	1960	7144.1	1972
GR	7145.7	2002	7146.6	2031	7147.2	2065	7147.6	2090	7148.2	2111
GR	7148.2	2131	7149.0	2139	7149.9	2164	7153.5	2193	7157.3	2224
GR	7160.1	2250	0							
ET	0.0	0.	7.1	9.1	0.	0.	1240	1490	1240	1490
X1	87	47	1238	1481	400.	350.	370	0.	0.	0.
X3	10	0	0.	0.	0.	0.	0.	7154.0	7144.5	0.
GR	7166.1	1000	7157.7	1025	7149.2	1049	7145.7	1064	7145.7	1079
GR	7143.5	1091	7145.9	1105	7146.5	1132	7146.2	1159	7146.6	1177
GR	7149.4	1182	7153.5	1193	7154.0	1209	7153.8	1226	7148.4	1238
GR	7145.9	1249	7145.9	1279	7146.1	1312	7146.5	1325	7145.9	1326
GR	7145.9	1398	7146.6	1422	7144.8	1446	7145.2	1470	7147.8	1481
GR	7145.9	1489	7145.5	1516	7144.8	1536	7144.5	1564	7145.1	1587
GR	7147.2	1611	7147.8	1633	7146.9	1639	7147.5	1667	7148.2	1702
GR	7148.5	1728	7149.3	1747	7150.2	1760	7149.7	1772	7148.1	1781
GR	7149.8	1811	7151.1	1843	7153.1	1871	7154.2	1886	7155.9	1914
GR	7158.9	1942	7160.2	1950						
ET	0.	0.	7.1	9.1	0.	0.	2193.0	2385.0	2193.0	2385.0
X1	88.	79	2193	2385	600	600	585	0.	0.	0.
X3	10.	0.	0.	0.	0.	0.	0.	7157.0	7149.1	0.
GR	7175.2	1000	7156.2	1027	7154.1	1048	7154.4	1085	7153.9	1111
GR	7154.9	1144	7154.7	1170	7153.8	1201	7153.5	1235	7153.5	1270

GR	7151.9	1309	7153.8	1348	7153.4	1384	7153.6	1421	7153.9	1455
GR	7153.2	1479	7149.7	1488	7151.1	1504	7153.9	1520	7153.6	1546
GR	7153.2	1569	7152.9	1583	7153.5	1603	7151.5	1635	7153.4	1657
GR	7153.2	1699	7153.3	1763	7153.4	1803	7153.1	1844	7152.6	1877
GR	7148.2	1887	7148.2	1894	7149.9	1901	7149.0	1914	7148.4	1936
GR	7149.0	1955	7148.6	1972	7149.0	2003	7149.5	2025	7149.3	2044

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GR	7147.7	2052	7149.0	2063	7149.9	2079	7150.3	2099	7149.8	2110
GR	7149.5	2124	7153.3	2132	7156.4	2143	7157.1	2161	7156.8	2175
GR	7155.0	2185	7151.7	2193	7148.6	2204	7149.5	2229	7149.6	2254
GR	7149.9	2280	7147.9	2290	7147.9	2358	7149.6	2364	7152.3	2372
GR	7152.8	2385	7149.1	2396	7149.1	2447	7151.8	2456	7153.6	2481
GR	7149.3	2496	7150.4	2514	7149.7	2544	7150.4	2578	7150.6	2610
GR	7151.4	2632	7152.0	2654	7151.9	2680	7152.0	2744	7152.1	2779
GR	7153.9	2800	7156.2	2827	7261.2	2834	7173.9	2850		
ET	0.	5.1	7.1	9.1	1846.0	2570.0	2000.0	2187.0	2000.0	2187
X1	89	44	2032	2187	630.0	630.0	615.0	0.	0.	0.
X3	10.	0.	0.	0.	0.	0.	0.	7158.7	7154.8	0.
GR	7184.4	1000	7157.6	1033	7157.1	1051	7157.5	1074	7156.5	1086
GR	7157.8	1103	7157.7	1174	7156.5	1234	7157.8	1262	7156.0	1348
GR	7156.9	1364	7157.1	1441	7157.8	1464	7156.5	1486	7156.6	1502
GR	7158.6	1527	7158.7	1627	7158.5	1738	7157.8	1774	7155.0	1787
GR	7162.6	1818	7162.6	1846	7157.8	1858	7157.7	1926	7156.6	1985
GR	7158.6	2020	7158.6	2032	7151.7	2047	7153.2	2077	7152.7	2087
GR	7153.1	2144	7154.1	2152	7153.6	2176	7158.1	2187	7157.9	2193
GR	7155.7	2203	7155.4	2229	7156.5	2301	7156.9	2339	7156.8	2356
GR	7156.1	2434	7154.8	2524	7158.6	2545	7171.3	2570		
NH	3	0.06	1794	0.05	1903	0.06	2190	0.	0.	0.
ET	0.	5.1	7.1	9.1	1589	2190.0	1685	1903	1780	1903.0
X1	90	35	1685.0	1903.0	870	850.0	840	0.	0.	0.
X3	10	0.	0.	0.	0.	0.	0.	7164.3	7161.4	0.
GR	7184.1	1000	7164.6	1038	7163.1	1076	7164.4	1129	7162.9	1144
GR	7165.5	1157	7167.3	1222	7166.8	1235	7168.8	1287	7168.9	1349
GR	7170.4	1383	7169.5	1409	7170.6	1443	7169.1	1495	7166.8	1519
GR	7167.2	1531	7173.6	1551	7173.7	1580	7172.2	1589	7162.9	1614
GR	7161.7	1660	7164.3	1685	7162.7	1777	7162.7	1794	7161.0	1809
GR	7160.5	1897	7165.3	1903	7164.7	1926	7161.4	1939	7163.2	1969
GR	7163.2	1990	7162.6	2034	7161.8	2099	7161.7	2140	7185.1	2190
QT	2.	3650	6000			0.	0.	0.	0.	0.
ET	0.	0.	-5.4	-8.4	0.	0.	0.	0.	0.	0.
NC	0.060	0.060	0.050	0.0	0.	0.	0.	0.	0.	0.
X1	91	39	1448.0	1538	420.0	420.0	420.0	0.	0.	0.
X3	10.0	0.	0.	0.	0.	0.	0.	7175.0	0.	0.
GR	7188.9	1000	7187.1	1018	7173.7	1045	7175.7	1105	7177.0	1153
GR	7179.4	1160	7179.0	1172	7169.8	1195	7169.8	1230	7174.2	1244
GR	7172.3	1251	7175.1	1265	7175.0	1291	7172.2	1309	7172.7	1341
GR	7173.7	1413	7172.5	1448	7164.6	1458	7164.6	1525	7168.3	1538
GR	7168.3	1543.0	7174.0	1543.1	7174.0	1557.9	7168.4	1558	7168.4	1577
GR	7168.4	1580	7188.0	1580.1	7188.0	1618	7168.5	1618.1	7169.5	1654
GR	7170.9	1690	7171.1	1715	7170.7	1720	7175.8	1759	7178.2	1797
GR	7180.1	1848	7183.7	1879	7184.2	1915	7185.3	1920		
X1	92.0	19	1262	1331.0	420.0	450.0	410.0	0.	0.	0.
GR	7176.6	1000	7176.1	1017	7173.4	1033	7175.9	1050	7175.8	1073
GR	7172.7	1093	7171.2	1139	7171.6	1193	7170.1	1234	7170.4	1253
GR	7166.4	1262	7166.4	1331	7168.7	1375	7173.6	1387	7179.8	1451
GR	7180.8	1495	7179.9	1517	7181.0	1552	7188.9	1600		

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X1	93.0	28.0	1555.0	1674.0	350.0	280	310.0	0.	0.	0.
X3	10.0	0.	0.	0.	0.	0.	0.	7176.0	7176.0	0.
GR	7189.3	1000	7185.4	1060	7183.1	1074	7181.9	1108	7179.4	1119
GR	7178.7	1176	7182.1	1200	7181.0	1267	7182.1	1328	7185.9	1342
GR	7182.8	1362	7192.5	1368	7193.3	1388	7179.3	1408	7178.9	1450
GR	7180.1	1478	7177.7	1509	7176.1	1555	7168.5	1585	7168.3	1660
GR	7176.9	1674	7172.5	1785	7178.0	1895	7180.2	1987	7179.8	2010
GR	7180.9	2053	7187.1	2094	7191.0	2140				

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

*PROF 1

CCHV= .600 CEHV= .100
*SECNO 82.000

3265 DIVIDED FLOW

3720 CRITICAL DEPTH ASSUMED

82.000	4.91	7133.71	7133.71	7133.30	7135.80	2.09	.00	.00	7128.90
4200.0	113.4	3845.6	241.0	20.1	320.8	41.6	.0	.0	7128.80
.00	5.64	11.99	5.80	.060	.050	.065	.000	7128.80	1019.99
.019758	1050.	995.	1050.	0	8	0	.00	105.75	1180.81

*SECNO 83.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = 5.06

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7141.00 ELREA= 7138.70

83.000	5.55	7139.55	.00	.00	7139.62	.07	2.61	1.21	7134.80
4200.0	.0	3012.7	1187.3	.0	1267.8	814.0	34.9	9.2	7134.00
.16	.00	2.38	1.46	.000	.050	.060	.000	7134.00	1236.00
.000770	1100.	1200.	1300.	6	0	0	.00	539.52	1775.52

*SECNO 84.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = .17

84.000	3.26	7140.26	7140.21	.00	7141.23	.96	1.52	.09	7137.60
4200.0	70.6	4050.7	78.7	14.9	507.6	18.8	55.2	15.5	7137.90
.18	4.75	7.98	4.19	.060	.050	.060	.000	7137.00	1437.86
.026055	750.	680.	660.	8	14	0	.00	276.96	1723.24

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

*SECNO 85.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = 3.22

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7149.00 ELREA= 7145.40

85.000	4.32	7144.72	.00	.00	7144.87	.15	3.16	.49	7141.60
4200.0	.0	4200.0	.0	.0	1342.3	.0	66.9	20.0	7145.40
.23	.00	3.13	.00	.000	.050	.000	.000	7140.40	1587.00
.002508	540.	540.	550.	4	0	0	.00	439.58	2026.58

*SECNO 86.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7151.00 ELREA= 7142.90

86.000	4.08	7146.58	.00	.00	7146.82	.24	1.94	.01	7142.50
4200.0	.0	3480.8	719.2	.0	843.7	232.5	83.0	25.7	7143.20
.27	.00	4.13	3.09	.000	.050	.060	.000	7142.50	1618.00
.004671	510.	580.	600.	5	0	0	.00	412.32	2030.32

*SECNO 87.000

3265 DIVIDED FLOW

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7154.00 ELREA= 7144.50

87.000	3.64	7148.44	.00	.00	7148.68	.23	1.84	.01	7148.40
4200.0	.0	2463.4	1736.6	.0	607.6	485.3	92.1	29.4	7147.80
.30	.00	4.05	3.58	.000	.050	.060	.000	7144.80	1238.00
.005508	400.	370.	350.	2	0	0	.00	493.40	1787.11

*SECNO 88.000

3265 DIVIDED FLOW

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

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7157.00 ELREA= 7149.10

38.000	4.07	7151.07	.00	.00	7152.30	.33	5.61	.01	7151.70
4200.0	.0	2813.5	1586.5	.0	545.4	421.0	106.1	36.0	7152.30
.33	.00	5.16	3.29	.000	.050	.060	.000	7147.90	2193.00
.006833	600.	585.	600.	3	0	0	.00	473.21	2721.52

*SECNO 89.000

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS= 1846.0 2570.0 TYPE= 1 TARGET= 724.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7158.70 ELREA= 7154.80

89.000	5.06	7156.76	.00	.00	7157.39	.63	5.07	.03	7158.60
4200.0	.0	3575.8	624.2	.0	522.6	248.4	118.4	42.6	7158.10
.36	.00	6.84	2.51	.000	.050	.060	.000	7151.70	2036.00
.009997	630.	615.	630.	3	0	0	.00	449.70	2534.83

1490 NH CARD USED
*SECNO 90.000

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS= 1589.0 2190.0 TYPE= 1 TARGET= 601.000

90.000	3.90	7164.40	.00	.00	7164.68	.28	7.07	.21	7164.30
4200.0	426.1	2314.9	1459.0	134.4	480.1	430.8	136.1	52.0	7165.30
.42	3.17	4.82	3.39	.060	.044	.060	.000	7160.50	1609.97
.007117	870.	840.	850.	6	0	0	.00	510.47	2145.76

*SECNO 91.000

3265 DIVIDED FLOW

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

3301 HV CHANGED MORE THAN HVINS

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

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7175.00 ELREA= 7168.30

91.000	4.45	7169.05	7169.05	.00	7170.72	1.67	4.53	.14	7172.50
3650.0	.0	3596.6	53.4	.0	344.2	23.3	142.9	55.1	7168.30
.43	.00	10.45	2.29	.000	.050	.060	.000	7164.60	1452.37
.019968	420.	420.	420.	20	8	0	.00	132.27	1637.72

*SECNO 92.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = 3.28

92.000	6.76	7173.16	.00	.00	7173.39	.24	1.82	.86	7166.40
3650.0	636.1	2139.2	874.7	344.7	466.7	271.4	149.9	57.2	7166.40
.46	1.85	4.58	3.22	.060	.050	.060	.000	7166.40	1090.01
.001860	420.	440.	460.	4	0	0	.00	205.92	1385.93

*SECNO 93.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = .44

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7176.00 ELREA= 7176.00

93.000	5.33	7173.63	.00	.00	7174.57	.94	1.11	.07	7176.10
3650.0	.0	3650.0	.0	.0	468.1	.0	155.5	58.6	7176.90
.47	.00	7.80	.00	.000	.050	.000	.000	7168.30	1564.72
.009513	350.	310.	280.	3	0	0	.00	103.97	1668.69

T1 PITKIN COUNTY FIS (OLD DEC 84 RUN - NEW Q)
T2 SECOND PROFILE - 86 FEMA 500-YR Q
T3 CRYSTAL RIVER

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		3			0.1				7137	

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	15									

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

*PROF 2

CCHV= .600 CEHV= .100
*SECNO 82.000
3720 CRITICAL DEPTH ASSUMED

82.000	6.76	7135.56	7135.56	7137.00	7137.55	1.99	.00	.00	7128.90
6800.0	668.7	5466.9	664.4	140.8	443.0	115.9	.0	.0	7128.80
.00	4.75	12.34	5.73	.060	.050	.065	.000	7128.80	1018.53
.013616	1050.	995.	1050.	0	15	0	.00	182.68	1201.22

*SECNO 83.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = 3.49

3470 ENCROACHMENT STATIONS= 1236.0 1520.0 TYPE= 1 TARGET= 284.000

83.000	7.68	7141.68	.00	7139.55	7141.87	.19	3.25	1.07	7134.80
6800.0	.0	6517.0	283.0	.0	1820.0	121.4	36.5	6.4	7134.00
.09	.00	3.58	2.33	.000	.050	.060	.000	7134.00	1236.00
.001118	1100.	1200.	1300.	6	0	0	.00	284.00	1520.00

*SECNO 84.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = .44

3470 ENCROACHMENT STATIONS= 1449.0 1693.0 TYPE= 1 TARGET= 244.000

84.000	5.80	7142.80	.00	7140.26	7143.37	.57	1.46	.04	7137.60
6800.0	.0	6800.0	.0	.0	1124.7	.0	60.4	10.5	100000.00
.13	.00	6.05	.00	.000	.050	.000	.000	7137.00	1449.00
.005729	750.	680.	660.	3	0	0	.00	244.00	1693.00

*SECNO 85.000

3470 ENCROACHMENT STATIONS= 1660.0 1925.0 TYPE= 1 TARGET= 265.000

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

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7149.00 ELREA= 100000.00

85.000	5.49	7145.89	.00	7144.72	7146.41	.52	3.01	.03	100000.00
6800.0	.0	6800.0	.0	.0	1177.9	.0	74.7	13.7	100000.00
.15	.00	5.77	.00	.000	.050	.000	.000	7140.40	1660.00
.005431	540.	540.	550.	3	0	0	.00	265.00	1925.00

*SECNO 86.000

3470 ENCROACHMENT STATIONS= 1618.0 1909.0 TYPE= 1 TARGET= 291.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7151.00 ELREA= 7142.90

86.000	6.05	7148.55	.00	7146.58	7148.91	.36	2.40	.10	7142.50
6800.0	.0	6800.0	.0	.0	1415.2	.0	91.9	17.4	100000.00
.19	.00	4.81	.00	.000	.050	.000	.000	7142.50	1618.00
.003257	510.	580.	600.	2	0	0	.00	291.00	1909.00

*SECNO 87.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = .64

3470 ENCROACHMENT STATIONS= 1240.0 1490.0 TYPE= TARGET= 250.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7154.00 ELREA= 7144.50

87.000	5.23	7150.03	.00	7148.44	7150.73	.70	1.79	.03	100000.00
6800.0	.0	6672.6	127.4	.0	989.7	29.6	102.3	19.7	7147.80
.20	.00	6.74	4.30	.000	.050	.060	.000	7144.80	1240.00
.007948	400.	370.	350.	2	0	0	.00	250.00	1490.00

*SECNO 88.000

3470 ENCROACHMENT STATIONS= 2193.0 2385.0 TYPE= 1 TARGET= 192.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7157.00 ELREA= 7149.10

88.000	6.30	7154.20	.00	7151.97	7154.97	.77	4.23	.01	7151.70
6800.0	.0	6800.0	.0	.0	967.1	.0	115.6	22.7	100000.00
.22	.00	7.03	.00	.000	.050	.000	.000	7147.90	2193.00
.006605	600.	585.	600.	3	0	0	.00	192.00	2385.00

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

*SECNO 89.000

3470 ENCROACHMENT STATIONS= 2000.0 2187.0 TYPE= 1 TARGET= 187.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7158.70 ELREA= 7154.80

89.000	6.94	7158.64	.00	7156.76	7159.74	1.10	4.74	.03	7158.60
6800.0	.0	6800.0	.0	.0	807.9	.0	128.1	25.1	100000.00
.24	.00	8.42	.00	.000	.050	.000	.000	7151.70	2032.00
.009109	630.	615.	630.	1	0	0	.00	155.00	2187.00

1490 NH CARD USED
*SECNO 90.000
1530 MANNINGS N VALUES FOR CHANNEL COMPOSITED

3470 ENCROACHMENT STATIONS= 1685.0 1903.0 TYPE= 1 TARGET= 218.000

90.000	6.26	7166.76	.00	7164.40	7167.48	.73	7.52	.22	7164.30
6800.0	.0	6800.0	.0	.0	993.9	.0	145.5	28.7	100000.00
.28	.00	6.84	.00	.000	.055	.000	.000	7160.50	1685.00
.008791	870.	840.	850.	4	0	0	.00	218.00	1903.00

*SECNO 91.000
2800 NAT Q1= 258.30 WSEL= 7169.05 ENC Q1= 307.78 WSEL= 7169.55 RATIO= -.1915
NAT Q1= 319. RATIOS LOB, CH, ROB= .0000 .9650 .0350 WSEL= 7169.55

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = .56

3470 ENCROACHMENT STATIONS= 1448.0 1538.0 TYPE= 4 TARGET= .035

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7175.00 ELREA= 7168.30

91.000	5.85	7170.45	7170.37	7169.05	7173.03	2.58	5.36	.19	7172.50
6000.0	.0	6000.0	.0	.0	465.7	.0	152.5	30.2	7168.30
.29	.00	12.88	.00	.000	.050	.000	.000	7164.60	1450.59
.021659	420.	420.	420.	6	11	0	.00	87.41	1538.00

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

*SECNO 92.000
2800 NAT Q1= 846.36 WSEL= 7173.16 ENC Q1= 846.36 WSEL= 7173.66 RATIO= .0000
NAT Q1= 999. RATIOS LOB, CH, ROB= .2065 .5582 .2353 WSEL= 7173.66

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 3.46

3470 ENCROACHMENT STATIONS= 1182.0 1362.7 TYPE= 4 TARGET= .153

92.000	9.39	7175.79	.00	7173.16	7176.16	.37	1.81	1.32	7166.40
6000.0	1319.3	3647.8	1032.9	420.6	647.8	271.0	161.2	31.5	7166.40
.31	3.14	5.63	3.81	.060	.050	.060	.000	7166.40	1182.02
.001812	420.	410.	450.	2	0	0	.00	180.63	1362.66

*SECNO 93.000
2800 NAT Q1= 374.23 WSEL= 7173.63 ENC Q1= 437.71 WSEL= 7174.13 RATIO= -.1696
NAT Q1= 438. RATIOS LOB, CH, ROB= .0000 1.0000 .0000 WSEL= 7174.13

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .54

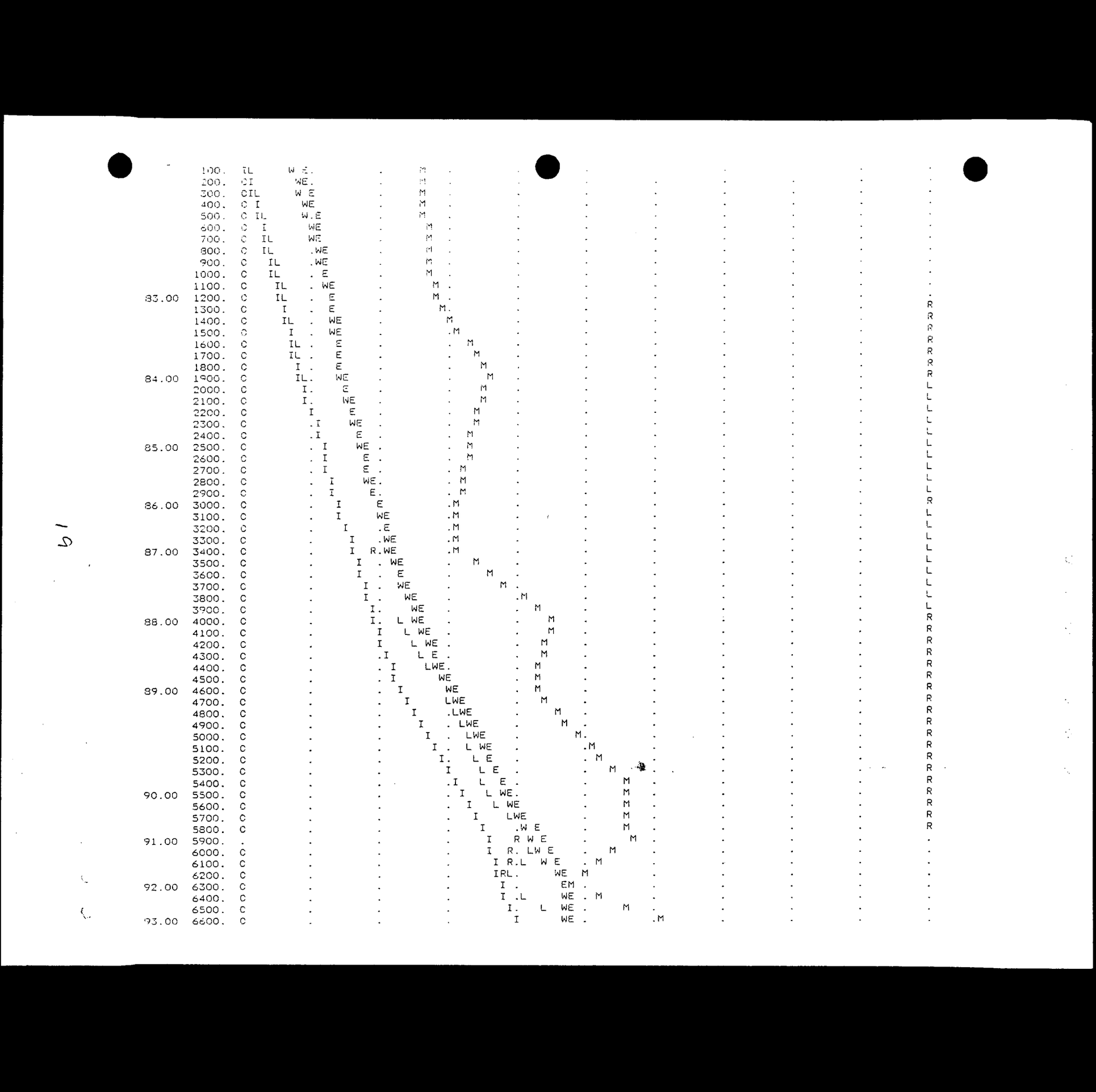
3470 ENCROACHMENT STATIONS= 1555.0 1674.0 TYPE= 4 TARGET= .000

93.000	7.89	7176.19	.00	7173.63	7177.18	.99	.96	.06	7176.10
6000.0	.0	6000.0	.0	.0	752.4	.0	168.8	32.6	7176.90
.32	.00	7.97	.00	.000	.050	.000	.000	7168.30	1555.00
.006305	350.	310.	280.	3	0	0	.00	117.85	1672.85

1
PROFILE FOR STREAM CRYSTAL RIVER

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

ELEVATION	7129.	7139.	7149.	7159.	7169.	7179.	7189.	7199.	7209.	7219.
SECNO CUMDIS										
82.00 0.	I	W E.		.	M	.	.	.	.	.



THIS RUN EXECUTED 26JUN91 12:02:56

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.0: February 1991
****

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

DEC 84 RUN W/86 FEMA Q's

SUMMARY PRINTOUT

	SECNO	Q	XLCH	ELMIN	CWSEL	CRIWS	EG	DIFKWS	PERENC	TOPWID	SSTA	ENDST
*	82.000	4200.00	.00	7128.80	7133.71	7133.71	7135.80	.41	.00	105.75	1019.99	1180.81
*	82.000	6800.00	.00	7128.80	7135.56	7135.56	7137.55	-1.44	.00	182.68	1018.53	1201.22
*	83.000	4200.00	1200.00	7134.00	7139.55	.00	7139.62	.00	.00	539.52	1236.00	1775.52
*	83.000	6800.00	1200.00	7134.00	7141.68	.00	7141.87	2.13	284.00	284.00	1236.00	1520.00
*	84.000	4200.00	680.00	7137.00	7140.26	7140.21	7141.23	.00	.00	276.96	1437.86	1723.24
*	84.000	6800.00	680.00	7137.00	7142.80	.00	7143.37	2.54	244.00	244.00	1449.00	1693.00
*	85.000	4200.00	540.00	7140.40	7144.72	.00	7144.87	.00	.00	439.58	1587.00	2026.58
	85.000	6800.00	540.00	7140.40	7145.89	.00	7146.41	1.18	265.00	265.00	1660.00	1925.00
	86.000	4200.00	580.00	7142.50	7146.58	.00	7146.82	.00	.00	412.32	1618.00	2030.32
	86.000	6800.00	580.00	7142.50	7148.55	.00	7148.91	1.97	291.00	291.00	1618.00	1909.00
	87.000	4200.00	370.00	7144.80	7148.44	.00	7148.68	.00	.00	493.40	1238.00	1787.11
*	87.000	6800.00	370.00	7144.80	7150.03	.00	7150.73	1.59	250.00	250.00	1240.00	1490.00
	88.000	4200.00	585.00	7147.90	7151.97	.00	7152.30	.00	.00	473.21	2193.00	2721.52
	88.000	6800.00	585.00	7147.90	7154.20	.00	7154.97	2.24	192.00	192.00	2193.00	2385.00
	89.000	4200.00	615.00	7151.70	7156.76	.00	7157.39	.00	724.00	449.70	2036.00	2534.83
	89.000	6800.00	615.00	7151.70	7158.64	.00	7159.74	1.88	187.00	155.00	2032.00	2187.00
	90.000	4200.00	840.00	7160.50	7164.40	.00	7164.68	.00	601.00	510.47	1609.97	2145.76
	90.000	6800.00	840.00	7160.50	7166.76	.00	7167.48	2.36	218.00	218.00	1685.00	1903.00
*	91.000	3650.00	420.00	7164.60	7169.05	7169.05	7170.72	.00	.00	132.27	1452.37	1637.72
*	91.000	6000.00	420.00	7164.60	7170.45	7170.37	7173.03	1.40	.03	87.41	1450.59	1538.00
*	92.000	3650.00	410.00	7166.40	7173.16	.00	7173.39	.00	.00	295.92	1090.01	1385.93
*	92.000	6000.00	410.00	7166.40	7175.79	.00	7176.16	2.63	.15	180.63	1182.02	1362.66

	SECNO	Q	XLCH	ELMIN	CWSEL	CRIWS	EG	DIFKWS	PERENC	TOPWID	SSTA	ENDST
*	93.000	3650.00	310.00	7168.30	7173.63	.00	7174.57	.00	.00	103.97	1564.72	1668.69
	93.000	6000.00	310.00	7168.30	7176.19	.00	7177.18	2.56	.00	117.85	1555.00	1672.85

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 82.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 82.000 PROFILE= 2 CRITICAL DEPTH ASSUMED

WARNING SECNO= 83.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 83.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 84.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 84.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 85.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 87.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 91.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 91.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 91.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
WARNING SECNO= 91.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 92.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 92.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 93.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 93.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

2

1

FLOODWAY DATA, DEC 84 RUN W/86 FEMA Q's
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
82.000	183.	700.	9.7	7135.6	7133.7	1.9
83.000	284.	1941.	3.5	7141.6	7139.5	2.1
84.000	244.	1125.	6.0	7142.8	7140.3	2.5
85.000	265.	1178.	5.8	7145.9	7144.7	1.2
86.000	291.	1415.	4.8	7148.6	7146.6	2.0
87.000	250.	1019.	6.7	7150.0	7148.4	1.6
88.000	192.	967.	7.0	7154.2	7152.0	2.2
89.000	155.	808.	8.4	7158.7	7156.8	1.9
90.000	218.	994.	6.8	7166.8	7164.4	2.4
91.000	87.	466.	12.9	7170.4	7169.0	1.4
92.000	181.	1339.	4.5	7175.8	7173.2	2.6
93.000	118.	752.	8.0	7176.2	7173.6	2.6

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*****************************************
*  HEC-2 WATER SURFACE PROFILES         *
*                                       *
*  Version   4.6.0:  February 1991      *
*                                       *
*  RUN DATE    16JUL91     TIME   09:42:39  *
*****************************************
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*****************************************
*  U.S. ARMY CORPS OF ENGINEERS         *
*  HYDROLOGIC ENGINEERING CENTER        *
*  609 SECOND STREET, SUITE D           *
*  DAVIS, CALIFORNIA 95616-4687         *
*        (916) 756-1104                 *
*****************************************
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X     X  XXXXXXX   XXXXX                 XXXXX
X     X  X        X     X               X     X
X     X  X              X                     X
XXXXXXX  XXXX           X          XXXXX   XXXXX
X     X  X              X                X
X     X  X              X     X          X
X     X  XXXXXXX   XXXXX                 XXXXXXX
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THIS RUN EXECUTED 16JUL91 09:42:39

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

 Version   4.6.0:  February 1991
*****************************************
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T1      COE SECTION 22 AT REDSTONE      (new June 1991 run, file:newrs.dat)
T2      FEMA/DENVER ENG..124.006 -100YR (4200 cfs below Coal Cr, 3650 above)
T3      JUN 91 CORPS-NEW X-SECS

J1  ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
       0.       2.        0.        0.        0.       0.0       0.0       0.0     7133.7    0.000

J2  NPROF      IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
    1.000     0.000    -1.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000

J3  VARIABLE CODES FOR SUMMARY PRINTOUT
       38        43        39        42     1.000     2.000     3.000        52        36     4.000
       53        54     0.000   200.000     0.000     0.000     0.000     0.000     0.000     0.000

J6  IHLEQ      ICOPY     SUBDIV    STRTDS    RMILE
        1

QT    2.000      4200      6800
NC    0.020     0.060     0.050     0.600     0.100       0.0       0.0       0.0       0.0       0.0
X1       82       15.      1083      1170     1050.     1050.      995.
GR  7159.1      1000    7133.7      1020    7134.0      1026    7134.0      1055    7133.6      1083
GR  7128.9      1091    7128.8      1157    7132.9      1170    7133.8      1182    7134.1      1198
GR  7144.1      1220    7144.1      1242    7143.6      1247    7151.6      1286    7154.1      1300

NC      .06       .07       .05
X1       83       32.      1221      1515      1100.     1300.     1200.
X3      10.
GR  7155.4      1000    7134.4      1034    7133.0      1106    7136.3      1144    7133.6      1155
GR  7154.9      1172    7140.8      1190    7140.9      1221    7134.8      1236    7134.5      1306
GR  7135.2      1308    7134.9      1351    7134.5      1354    7134.5      1382    7135.0      1383
GR  7134.6      1450    7134.2      1453    7134.0      1495    7138.7      1515    7138.7      1530
GR  7134.4      1544    7137.5      1635    7136.6      1661    7137.7      1676    7137.9      1694
GR  7136.1      1707    7135.8      1750    7139.4      1775    7148.0      1806    7148.6      1816
GR  7155.5      1850    7156.7      1870                                                    7
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NC .1 .1 .06 1705 760 440 430

GR	[illegible]	1000	7162.0	1073	7158.0	1105	7155.5	1174	7150.6	1295
GR	7149.3	1145	7144.8	1382	7143.1	1390	7146.5	1416	7147.6	1440
GR	7137.3	1461	7137.0	1470	7137.0	1482	7140.6	1498	7137.6	1518
GR	7137.5	1535	7140.6	1555	7139.1	1568	7138.2	1605	7137.6	1608
GR	7137.9	1690	7140.0	1705	7140.2	1723	7143.8	1736	7143.8	1774
GR	7146.3	1779	7151.0	1823	7158.8	1885	7164.7	1920		
NC	.1	.1	.07							
X1	85.0	45	1871.0	2033.0	540.	550.	540.	0	0.	0.
X3	10.									
GR	7166.2	1000	7158.0	1013	7154.7	1030	7154.4	1069	7152.1	1123
GR	7150.9	1199	7149.9	1273	7148.5	1361	7147.6	1413	7146.2	1440
GR	7145.5	1483	7141.4	1494	7141.1	1521	7144.6	1528	7148.4	1539
GR	7149.1	1556	7149.0	1571	7141.6	1587	7141.4	1634	7141.6	1650
GR	7140.4	1664	7141.8	1673	7141.6	1706	7141.8	1748	7142.1	1787
GR	7141.9	1815	7140.6	1820	7140.6	1891	7141.9	1897	7142.6	1905
GR	7141.9	1914	7140.9	1923	7142.1	1955	7142.1	1988	7143.6	2016
GR	7145.4	2033	7145.6	2043	7145.4	2061	7147.5	2065	7150.0	2080
GR	7154.4	2109	7161.0	2152	7161.9	2160	0.	0.	0.	0.
NC	.1	.06	.07							
X1	86.0	51	1549	1953	510	600	580.	0.	-1.2	0.
X3	10.									
GR	7170.0	1000	7160.0	1017	7155.4	1048	7148.6	1076	7146.7	1133
GR	7145.7	1212	7145.4	1279	7145.2	1339	7145.0	1387	7145.5	1426
GR	7144.0	1441	7144.9	1465	7145.2	1480	7144.8	1500	7148.2	1509
GR	7150.8	1517	7151.7	1534	7151.7	1549	7146.9	1560	7144.2	1588
GR	7144.3	1616	7142.5	1618	7142.5	1636	7144.1	1656	7144.2	1681
GR	7143.1	1696	7143.1	1725	7144.5	1730	7144.2	1758	7144.4	1792
GR	7143.4	1800	7143.6	1817	7143.5	1886	7144.4	1895	7143.2	1909
GR	7142.9	1941	7144.8	1942	7145.4	1953	7144.6	1960	7144.1	1972
GR	7145.7	2002	7146.6	2031	7147.2	2065	7147.6	2090	7148.2	2111
GR	7148.2	2131	7149.0	2139	7149.9	2164	7153.5	2193	7157.3	2224
GR	7160.1	2250	0							
NC	.06	.1	.06							
X1	87	24	1019	1421	250.	300.	300	0.	0.	0.
GR	7152.7	1000	7152.6	1015	7152.4	1019	7145.7	1032	7146.4	1046
GR	7143.3	1058	7144.4	1084	7146.1	1100	7146.6	1205	7145.6	1222
GR	7146.5	1246	7145.1	1268	7145.3	1312	7143.9	1336	7141.8	1376
GR	7141.6	1413	7145.9	1421	7146.2	1427	7145.7	1474	7147.7	1567
GR	7148.5	1590	7148.6	1612	7152.2	1631	7167.3	1740		
NC	.10	.06	.05							
X1	88.	24	1089	1205	650	600	655	0.	0.	0.
X3	10.									
GR	7156.2	1000	7156.1	1015	7155.5	1018	7149.0	1045	7150.8	1049
GR	7150.3	1059	7150.7	1089	7147.2	1101	7147.1	1195	7153.5	1205
GR	7153.2	1212	7153.5	1223	7151.5	1228	7151.9	1233	7148.6	1238
GR	7147.7	1264	7150.0	1304	7150.1	1374	7150.8	1482	7151.3	1502
GR	7150.5	1555	7151.5	1598	7159.5	1669	7170.5	1687		

NC	.1	.1	.05						
X1	89	27	1197	1339	630.0	630.0	615.0	0.	0.	0.
X3	10.									
GR	7161.3	1000	7161.2	1015	7161.4	1019	7156.5	1028	7156.4	1053
GR	7155.8	1060	7155.9	1103	7155.4	1190	7158.2	1197	7158.0	1205
GR	7153.3	1210	7151.2	1216	7151.1	1313	7156.6	1321	7158.6	1326
GR	7158.8	1328	7159.3	1333	7159.4	1339	7159.2	1343	7156.4	1359
GR	7156.5	1510	7156.9	1536	7155.7	1598	7154.8	1679	7156.5	1705
GR	7163.1	1721	7165.6	1726						
NC	.06	.06	.05							
X1	90	23	1119	1342	870	850.0	840	0.	0.	0.
X3	10.									
GR	7173.1	1000	7173.0	1015	7172.5	1022	7161.9	1056	7161.4	1089
GR	7163.9	1119	7162.6	1132	7161.3	1223	7160.8	1232	7160.3	1236
GR	7157.6	1247	7157.6	1315	7164.7	1328	7165.0	1332	7165.4	1342
GR	7165.3	1349	7161.6	1374	7162.7	1407	7162.7	1427	7161.6	1514
GR	7160.0	1530	7160.9	1574	7172.9	1617				
QT	2.	3650	6000			0.	0.	0.	0.	0.
NC	.06	.06	.05	0.0	0.	0.	0.	0.	0.	0.
X1	91	18	1158	1265	420.0	420.0	420.0	0.	0.	0.
GR	7174.6	1000	7174.5	1015	7172.8	1028	7172.8	1158	7172.0	1166
GR	7160.2	1182	7160.4	1241	7165.8	1254	7167.7	1265	7168.6	1327
GR	7170.5	1422	7170.7	1445	7172.0	1465	7175.9	1489	7182.2	1597
GR	7184.6	1637	7185.1	1648	7188.8	1694				

NC	.06	.10	.05					0.	0.	0.
X1	91.5	20	1132	1286	120	120	120	1034	7172.1	1132
GR	7175.6	1000	7175.9	1017	7175.9	1018	7172.7	1286	7168.5	1292
GR	7160.7	1201	7160.8	1266	7168.5	1281	7168.8	1444	7171.9	1460
GR	7169.9	1276	7170.1	1341	7172.2	1423	7172.2	1639	7186.4	1647
GR	7174.6	1485	7179.2	1567	7181.8	1573	7186.1			
NC	.03	.10	.05					0.	0.	0.
X1	92.0	19	1253	1387	300.0	330.0	290.0	1050	7175.8	1073
GR	7176.6	1000	7176.1	1017	7173.4	1033	7175.9	1234	7170.4	1253
GR	7172.7	1093	7171.2	1139	7171.6	1193	7170.1	1387	7179.8	1451
GR	7166.4	1262	7166.4	1331	7168.7	1375	7173.6	1600		
GR	7180.8	1495	7179.9	1517	7181.0	1552	7188.9			
NC	.06	.07	.05							
X1	93.0	28.0	1555.0	1674.0	350.0	280	310.0	0.	0.	0.
X3	10.									
GR	7189.3	1000	7185.4	1060	7183.1	1074	7181.9	1108	7179.4	1119
GR	7178.7	1176	7182.1	1200	7181.0	1267	7182.1	1328	7185.9	1342
GR	7182.9	1362	7192.5	1368	7193.3	1388	7179.3	1408	7178.9	1450
GR	7180.1	1478	7177.7	1509	7176.1	1555	7168.5	1585	7168.3	1660
GR	7176.9	1674	7172.6	1785	7178.0	1895	7180.2	1987	7179.8	2010
GR	7180.9	2053	7187.1	2094	7191.0	2140				

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

*PROF 1

IHLEQ = 1. THEREFORE FRICTION LOSS (HL) IS CALCULATED AS A FUNCTION OF PROFILE TYPE, WHICH CAN VARY FROM REACH TO REACH. SEE DOCUMENTATION FOR DETAILS.

0

CCHV= .600 CEHV= .100

*SECNO 82.000

82.000	4.90	7133.70	7133.55	7133.70	7135.62	1.92	.00	.00	7133.60
4200.0	.5	4191.3	8.2	.4	376.8	4.3	.0	.0	7132.90
.00	1.44	11.12	1.92	.020	.050	.060	.000	7128.80	1075.99
.020427	1050.	995.	1050.	0	9	0	.00	104.68	1180.67

*SECNO 83.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 4.29

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7140.90 ELREA= 7138.70

83.000	5.18	7139.18	.00	.00	7139.27	.09	2.55	1.10	7140.90
4200.0	.0	3285.4	914.6	.0	1253.4	655.3	32.3	9.3	7138.70
.14	.00	2.62	1.40	.000	.050	.070	.000	7134.00	1225.23
.001112	1100.	1200.	1300.	8	0	0	.00	548.24	1773.47

*SECNO 84.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .32

84.000	4.23	7141.23	.00	.00	7141.65	.42	2.35	.03	7145.50
4200.0	.0	4164.5	35.5	.0	794.2	22.1	53.4	15.8	7140.00
.18	.00	5.24	1.61	.000	.060	.100	.000	7137.00	1433.87
.010789	750.	680.	660.	5	0	0	.00	292.83	1726.69

*SECNO 85.000

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV

TIME SLOPE	VLOB XLOBL	VCH XLCH	VROB XLOBR	XNL ITRIAL	XNCH IDC	XNR ICONT	WTN CORAR	ELMIN TOPWID	SSTA ENDST

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = 1.62

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7149.00 ELREA= 7145.40

85.000	4.49	7144.89	.00	.00	7145.03	.13	3.20	.17	7149.00
4200.0	.0	4200.0	.0	.0	1430.6	.0	67.3	20.4	7145.40
.23	.00	2.94	.00	.000	.070	.000	.000	7140.40	1579.88
.004090	540.	540.	550.	4	0	0	.00	448.35	2028.23

*SECNO 86.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7150.50 ELREA= 7144.20

86.000	5.28	7146.58	.00	.00	7146.67	.09	1.61	.03	7150.50
4200.0	.0	3739.1	460.9	.0	1550.5	234.9	88.8	27.0	7144.20
.30	.00	2.41	1.96	.000	.070	.060	.000	7141.30	1557.97
.002102	510.	580.	600.	4	0	0	.00	338.47	2096.44

*SECNO 87.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = .56

87.000	5.99	7147.59	.00	.00	7147.80	.22	1.12	.01	7152.40
4200.0	.0	3960.1	239.9	.0	1033.8	168.6	99.1	30.7	7145.90
.32	.00	3.83	1.42	.000	.060	.100	.000	7141.60	1028.34
.006630	250.	300.	300.	2	0	0	.00	533.30	1561.64

*SECNO 88.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7150.70 ELREA= 7153.50

88.000	5.00	7152.10	.00	.00	7152.98	.89	5.11	.07	7150.70
4200.0	177.8	4022.2	.0	92.0	522.0	.0	112.6	35.7	7153.50
.35	1.93	7.71	.00	.100	.050	.000	.000	7147.10	1032.15
.009021	650.	655.	600.	3	0	0	.00	170.66	1202.80

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

*SECNO 89.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7158.20 ELREA= 7159.40

89.000	5.72	7156.82	.00	.00	7157.56	.74	4.49	.09	7158.20
4200.0	.0	4200.0	.0	.0	607.8	.0	121.3	37.9	7159.40
.37	.00	6.91	.00	.000	.050	.000	.000	7151.10	1206.25
.006130	630.	615.	630.	2	0	0	.00	115.30	1321.55

*SECNO 90.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7163.90 ELREA= 7165.40

90.000	5.88	7163.48	.00	.00	7164.11	.63	6.49	.06	7163.90
4200.0	.0	4200.0	.0	.0	657.6	.0	133.5	41.0	7165.40
.41	.00	6.39	.00	.000	.050	.000	.000	7157.60	1123.22
.009727	870.	840.	850.	4	0	0	.00	202.54	1325.76

*SECNO 91.000

91.000	6.62	7166.82	.00	.00	7167.78	.95	3.63	.03	7172.80
3650.0	.0	3650.0	.0	.0	465.8	.0	138.9	42.4	7167.70
.42	.00	7.84	.00	.000	.050	.000	.000	7160.20	1173.02

.007771	420	420.	420.	1	0	0	.00	88.88	1259

*SECNO 91.500

91.500	7.28	7167.98	.00	.00	7168.63	.65	.67	.18	7172.10
3650.0	.0	3650.0	.0	.0	564.9	.0	140.3	42.6	7168.00
.43	.00	6.46	.00	.000	.050	.000	.000	7160.70	1188.86
.004381	120.	120.	120.	2	0	0	.00	91.14	1280.00

*SECNO 92.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .53

92.000	4.08	7170.48	.00	.00	7171.57	1.09	2.89	.04	7170.40
3650.0	14.7	3635.3	.0	6.5	433.7	.0	143.7	43.4	7173.60
.44	2.26	8.38	.00	.030	.050	.000	.000	7166.40	1223.47
.015566	300.	290.	330.	4	0	0	.00	155.90	1379.37

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

*SECNO 93.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.46

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7176.10 ELREA= 7176.90

93.000	5.74	7174.04	.00	.00	7174.84	.79	3.09	.18	7176.10
3650.0	.0	3650.0	.0	.0	510.7	.0	147.1	44.4	7176.90
.45	.00	7.15	.00	.000	.050	.000	.000	7168.30	1563.12
.007334	350.	310.	280.	2	0	0	.00	106.23	1669.33

26

1 PAGE 8

16JUL91 09:42:39

T1 SECOND PROFILE
T2 500-YR Q = 6,800 CFS BELOW COAL CREEK, 6,000 CFS ABOVE
T3 CRYSTAL RIVER

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		3			0.				7135.7	
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	15									

1 PAGE 9

16JUL91 09:42:39

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

*PROF 2

IHLEQ = 1. THEREFORE FRICTION LOSS (HL) IS CALCULATED AS A FUNCTION OF PROFILE TYPE, WHICH CAN VARY FROM REACH TO REACH. SEE DOCUMENTATION FOR DETAILS.

0

CCHV= .600 CEHV= .100

*SECNO 82.000									
82.000	6.90	7135.70	.00	7135.70	7137.18	1.48	.00	.00	7133.60
6500.0	1222.8	5354.5	222.7	115.2	550.9	50.0	0	0	7132.80

.00	10.62	9.72	5.77	.020	.050	.060	.000	7138.30	1016.40
.009404	1050.	995.	1050.	0	0	0	.00	183.10	1201.51

*SECNO 83.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = 1.83

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7140.90 ELREA= 7138.70

83.000	6.38	7140.38	.00	.00	7140.51	.13	2.52	.81	7140.90
6800.0	.0	5060.5	1739.5	.0	1603.8	969.7	46.5	10.4	7138.70
.12	.00	3.16	1.79	.000	.050	.070	.000	7134.00	1202.27
.001177	1100.	1200.	1300.	6	0	0	.00	556.27	1778.54

*SECNO 84.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = .42

84.000	5.78	7142.78	.00	.00	7143.24	.45	2.70	.03	7145.50
6800.0	.0	6668.7	131.3	.0	1222.6	60.4	76.3	17.1	7140.00
.15	.00	5.45	2.17	.000	.060	.100	.000	7137.00	1427.34
.006782	750.	680.	660.	3	0	0	.00	304.99	1732.33

*SECNO 85.000

1

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

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7149.00 ELREA= 7145.40

85.000	5.57	7145.97	.00	.00	7146.16	.19	2.77	.16	7149.00
6800.0	.0	6792.4	7.6	.0	1916.7	13.4	96.3	22.0	7145.40
.20	.00	3.54	.57	.000	.070	.100	.000	7140.40	1577.56
.004123	540.	540.	550.	3	0	0	.00	484.52	2062.08

*SECNO 86.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7150.50 ELREA= 7144.20

86.000	6.43	7147.73	.00	.00	7147.85	.12	1.65	.04	7150.50
6800.0	.0	5785.3	1014.7	.0	2005.1	430.3	125.4	29.2	7144.20
.25	.00	2.89	2.36	.000	.070	.060	.000	7141.30	1555.35
.002157	510.	580.	600.	3	0	0	.00	582.97	2138.31

*SECNO 87.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = .63

87.000	7.02	7148.63	.00	.00	7148.89	.27	1.02	.01	7152.40
6800.0	.0	6195.0	605.0	.0	1440.9	332.8	139.9	33.2	7145.90
.27	.00	4.30	1.82	.000	.060	.100	.000	7141.60	1026.34
.005405	250.	300.	300.	0	0	0	.00	585.76	1612.10

*SECNO 88.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = .64

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7150.70 ELREA= 7153.50

88.000	5.85	7152.95	.00	.00	7154.50	1.55	5.48	.13	7150.70
6800.0	424.6	6375.4	.0	141.9	619.5	.0	158.8	38.8	7153.50
.39	3.99	10.29	.00	.100	.050	.000	.000	7147.10	1028.61
.013039	650.	655.	600.	3	0	0	.00	175.53	1204.14

16JUL91 09:42:39

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

*SECNO 89.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = 1.65

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7158.20 ELREA= 7159.40

89.000	7.60	7158.70	.00	.00	7159.35	.65	4.32	.54	7158.20
6800.0	987.0	5813.0	.0	480.3	835.6	.0	173.5	42.2	7159.40
.32	2.05	5.96	.00	.100	.050	.000	.000	7151.10	1023.96
.004789	630.	615.	630.	1	0	0	.00	303.06	1327.01

*SECNO 90.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7163.90 ELREA= 7165.40

90.000	6.84	7164.44	.00	.00	7165.19	.75	5.83	.01	7163.90
6800.0	642.4	6157.6	.0	156.0	856.2	.0	196.2	47.9	7165.40
.35	4.12	7.19	.00	.060	.050	.000	.000	7157.60	1047.86
.009032	870.	840.	850.	3	0	0	.00	279.66	1327.52

*SECNO 91.000

3301 HV CHANGED MORE THAN HVINS

91.000	7.74	7167.94	.00	.00	7169.67	1.74	4.38	.10	7172.80
6000.0	.0	5998.7	1.3	.0	567.3	2.0	203.8	49.8	7167.70
.37	.00	10.57	.66	.000	.050	.060	.000	7160.20	1171.51
.012056	420.	420.	420.	3	0	0	.00	109.98	1281.48

*SECNO 91.500

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = 1.56

16JUL91 09:42:39

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
91.500	9.33	7170.03	.00	.00	7170.99	.95	.84	.47	7172.10
6000.0	.0	5984.9	15.1	.0	763.8	16.0	205.7	50.1	7168.80
.37	.00	7.84	.94	.000	.050	.100	.000	7160.70	1185.44
.004933	120.	120.	120.	3	0	0	.00	145.68	1331.12

*SECNO 92.000									
92.000	5.69	7172.09	.00	.00	7173.08	.99	2.09	.00	7170.40
6000.0	708.9	5291.1	.0	135.2	639.7	.0	210.9	51.6	7173.60
.38	5.24	8.27	.00	.030	.050	.000	.000	7166.40	1111.70
.002436	300.	300.	300.	1	0	0	.00	271.40	1382.30

*SECNO 83.000

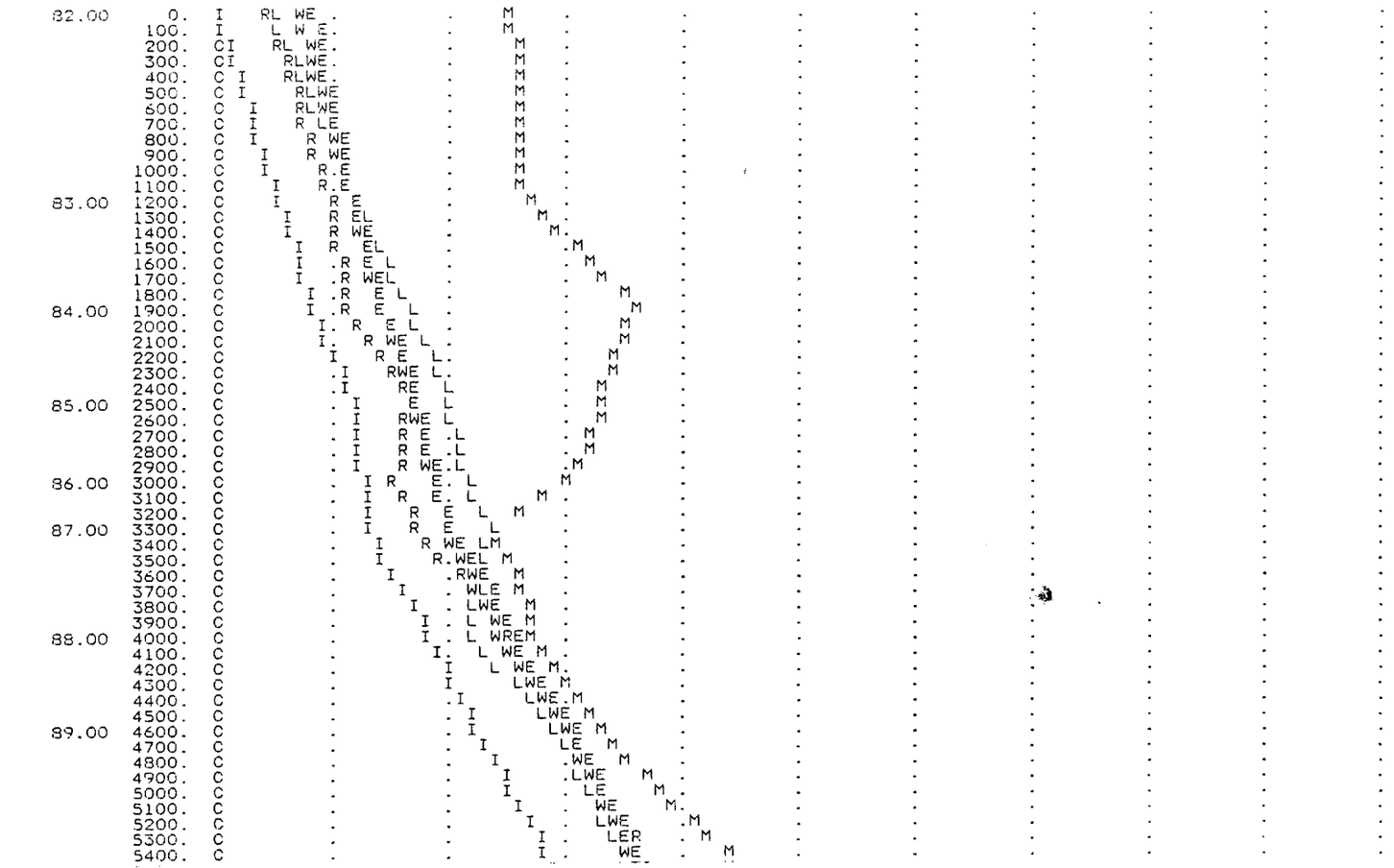
3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7176.10 ELREA= 7176.90

83.000	6.62	7174.92	.00	.00	7176.45	1.32	3.33	.05	7176.10
6000.0	.0	6000.0	.0	.0	605.6	.0	215.9	53.0	7176.90
.39	.00	9.91	.00	.000	.050	.000	.000	7168.30	1559.67
.011953	350.	310.	280.	2	0	0	.00	111.10	1670.77

1
PROFILE FOR STREAM CRYSTAL RIVER

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



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 90.00  5500.  C      .      .      I      LER  .    M      .      .      .      .      .      .
        5600.  C      .      .      I.      WE  .    M      .      .      .      .      .      .
        5700.  C      .      .       I       WRE.    M      .      .      .      .      .      .
        5800.  C      .      .      .I        W EL   M      .      .      .      .      .      .
 91.00  5900.  C      .      .      .I         W.E  L M     .      .      .      .      .      .
 91.50  6000.  C      .      .      . I         RWEL   M    .      .      .      .      .      .
        6100.  C      .      .      .   I      . WE    M    .      .      .      .      .      .
        6200.  C      .      .      .     I    . LWE   M    .      .      .      .      .      .
 92.00  6300.  C      .      .      .       I . LWER  M     .      .      .      .      .      .
        6400.  C      .      .      .       I .  LWER     . M    .      .      .      .      .
        6500.  C      .      .      .        I.    WER    .         M  .      .      .      .
 93.00  6600.  C      .      .      .         I     WLE   .          .M      .      .      .
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THIS RUN EXECUTED 16JUL91 09:42:47

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HEC-2 WATER SURFACE PROFILES

Version 4.6.0: February 1991
****

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

JUN 91 CORPS-NEW X-SECS

SUMMARY PRINTOUT

	SECNO	Q	XLCH	ELMIN	CWSEL	CRIWS	EG	DIFKWS	PERENC	TOPWID	SSTA	ENDST
	82.000	4200.00	.00	7128.80	7133.70	7133.55	7135.62	.00	.00	104.68	1075.99	1180.67
	82.000	6800.00	.00	7128.80	7135.70	.00	7137.18	.00	.00	183.10	1018.43	1201.52
*	83.000	4200.00	1200.00	7134.00	7139.18	.00	7139.27	.00	.00	548.24	1225.23	1773.47
*	83.000	6800.00	1200.00	7134.00	7140.38	.00	7140.51	.00	.00	556.27	1222.27	1778.54
*	84.000	4200.00	680.00	7137.00	7141.23	.00	7141.65	.00	.00	292.83	1433.87	1726.69
*	84.000	6800.00	680.00	7137.00	7142.78	.00	7143.24	.00	.00	304.99	1427.34	1732.33
*	85.000	4200.00	540.00	7140.40	7144.89	.00	7145.03	.00	.00	448.35	1579.88	2028.23
	85.000	6800.00	540.00	7140.40	7145.97	.00	7146.16	.00	.00	484.52	1577.56	2062.08
	86.000	4200.00	580.00	7141.30	7146.58	.00	7146.67	.00	.00	538.47	1557.97	2096.44
	86.000	6800.00	580.00	7141.30	7147.73	.00	7147.85	.00	.00	582.97	1555.35	2138.31
*	87.000	4200.00	300.00	7141.60	7147.59	.00	7147.80	.00	.00	533.30	1028.34	1561.64
*	87.000	6800.00	300.00	7141.60	7148.63	.00	7148.89	.00	.00	585.76	1026.34	1612.10
	88.000	4200.00	655.00	7147.10	7152.10	.00	7152.98	.00	.00	170.66	1032.15	1202.80
*	88.000	6800.00	655.00	7147.10	7152.95	.00	7154.50	.00	.00	175.53	1028.61	1204.14
	89.000	4200.00	615.00	7151.10	7156.82	.00	7157.56	.00	.00	115.30	1206.25	1321.55
*	89.000	6800.00	615.00	7151.10	7158.70	.00	7159.35	.00	.00	303.06	1023.96	1327.01
	90.000	4200.00	840.00	7157.60	7163.48	.00	7164.11	.00	.00	202.54	1123.22	1325.76
	90.000	6800.00	840.00	7157.60	7164.44	.00	7165.19	.00	.00	279.66	1047.86	1327.52
	91.000	3650.00	420.00	7160.20	7166.82	.00	7167.78	.00	.00	86.88	1173.02	1259.91
	91.000	6000.00	420.00	7160.20	7167.94	.00	7169.67	.00	.00	109.98	1171.51	1281.48
	91.500	3650.00	120.00	7160.70	7167.98	.00	7168.63	.00	.00	91.14	1188.86	1280.00
*	91.500	6000.00	120.00	7160.70	7170.03	.00	7170.99	.00	.00	145.68	1185.44	1331.12

	SECNO	Q	XLCH	ELMIN	CWSEL	CRIWS	EG	DIFKWS	PERENC	TOPWID	SSTA	ENDST
*	92.000	3650.00	290.00	7166.40	7170.48	.00	7171.57	.00	.00	155.90	1223.47	1379.37
	92.000	6000.00	290.00	7166.40	7172.09	.00	7173.08	.00	.00	271.60	1111.70	1383.30
*	93.000	3650.00	310.00	7168.30	7174.04	.00	7174.84	.00	.00	106.23	1563.12	1669.35
	93.000	6000.00	310.00	7168.30	7174.92	.00	7176.45	.00	.00	111.10	1559.67	1670.77

SUMMARY OF ERRORS AND SPECIAL NOTES

WARNING SECNO= 83.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 83.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 84.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 84.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 85.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 87.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 87.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 88.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 89.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 91.500 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 92.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 93.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

FLOODWAY DATA. JUN 91 CORPS-NEW X-SECS
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
82.000	183.	725.	9.4	7135.7	7133.7	2.0
83.000	556.	2573.	2.6	7140.4	7139.2	1.2
84.000	305.	1283.	5.3	7142.8	7141.2	1.6
85.000	485.	1930.	3.5	7146.0	7144.9	1.1
86.000	583.	2435.	2.8	7147.7	7146.6	1.1
87.000	586.	1774.	3.8	7148.6	7147.6	1.0
88.000	176.	761.	8.9	7152.9	7152.1	.8
89.000	303.	1316.	5.2	7158.7	7156.8	1.9
90.000	280.	1012.	6.7	7164.5	7163.5	1.0
91.000	110.	569.	10.5	7167.9	7166.8	1.1
91.500	146.	780.	7.7	7170.0	7168.0	2.0
92.000	272.	775.	7.7	7172.1	7170.5	1.6
93.000	111.	606.	9.9	7174.9	7174.0	.9

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*****************************************
*  HEC-2 WATER SURFACE PROFILES         *
*                                       *
*  Version   4.6.0:  February 1991      *
*                                       *
*  RUN DATE    16JUL91    TIME   09:55:46  *
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*****************************************
*  U.S. ARMY CORPS OF ENGINEERS         *
*  HYDROLOGIC ENGINEERING CENTER        *
*  609 SECOND STREET, SUITE D           *
*  DAVIS, CALIFORNIA 95616-4687         *
*        (916) 756-1104                 *
*****************************************
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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X           X     X
X     X  X        X                 X     X
XXXXXXX  XXXX     X           XXXXX   XXXXX
X     X  X        X                 X
X     X  X        X     X           X
X     X  XXXXXXX   XXXXX            XXXXXXX
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1

16JUL91 09:55:46 PAGE 1

THIS RUN EXECUTED 16JUL91 09:55:46

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

 Version   4.6.0:  February 1991
*****************************************
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T1      COE SECTION 22 AT REDSTONE      (new June 1991  run, file:newrsn61.dat)
T2      FEMA/DENVER ENG..124.006 -100YR (4200 cfs below Coal Cr. 3650 above)
T3      JUN 91 CORPS-NEW X-SECS   (CHANNEL N=0.06, OBERBANK N=0.1)

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
        0.       2.        0.        0.        0.       0.0       0.0       0.0    7133.7     0.000
J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
    1.000     0.000    -1.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000

J3  VARIABLE CODES FOR SUMMARY PRINTOUT
       38        43        39        42     1.000     2.000     3.000        52        36     4.000
       53        54     0.000   200.000     0.000     0.000     0.000     0.000     0.000     0.000

J6  IHLEQ     ICOPY     SUBDIV    STRTDS    RMILE
        1

QT    2.000      4200      6800
NC    0.100     0.100     0.060     0.600     0.100       0.0       0.0       0.0       0.0       0.0
X1       82       15.      1083      1170      1050.     1050.      995.
GR  7159.1      1000    7133.7      1020    7134.0      1026    7134.0      1055    7133.6      1083
GR  7128.9      1091    7128.8      1157    7132.9      1170    7133.6      1182    7134.1      1198
GR  7144.1      1220    7144.1      1242    7143.6      1247    7151.6      1286    7154.1      1300

X1       83       32.      1221      1515      1100.     1300.     1200.
X3       10.                         1221
GR  7155.4      1000    7134.4      1034    7133.0      1106    7136.3      1144    7133.6      1155
GR  7134.9      1172    7140.8      1190    7140.9      1221    7134.8      1236    7134.5      1306
GR  7135.2      1308    7134.9      1351    7134.5      1354    7134.5      1382    7135.0      1383
GR  7134.6      1450    7134.2      1453    7134.0      1495    7138.7      1515    7138.7      1530
GR  7134.4      1544    7137.5      1635    7136.6      1661    7137.7      1676    7137.9      1694
GR  7136.1      1707    7135.8      1750    7139.4      1775    7148.0      1806    7148.6      1816
GR  7155.5      1850    7156.7      1870

X1       84       29.      1416      1705       750.     660.      680.
GR  7165.1      1000    7162.0      1076    7158.0      1105    7155.3      1174    7152.6      1263
GR  7149.5      1345    7144.8      1383    7145.1      1390    7145.5      1416    7137.6      1449
GR  7137.9      1461    7137.0      1473    7137.0      1482    7140.6      1498    7137.3      1518
GR  7137.3      1535    7140.6      1555    7139.1      1568    7138.2      1605    7137.6      1608
GR  7137.9      1693    7140.0      1705    7140.2      1723    7143.8      1736    7143.5      1774
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GR	7146.3	1779	7151.0	1823	7158.8	1885	7164.7	1920		
X1	85.0	43	1571.0	2033.0	540.	550.	540.	0	0.	0.
X3	10.									
GR	7166.2	1000	7158.0	1015	7154.7	1030	7154.4	1069	7152.1	1123
GR	7150.9	1196	7149.9	1273	7148.5	1361	7147.6	1411	7146.3	1440
GR	7145.5	1483	7141.4	1494	7141.1	1521	7144.6	1528	7148.4	1539
GR	7149.1	1556	7149.0	1571	7141.6	1587	7141.4	1634	7141.6	1658
GR	7140.4	1664	7141.8	1673	7141.6	1706	7141.8	1748	7142.1	1787
GR	7141.9	1815	7140.6	1820	7140.6	1891	7141.9	1897	7142.9	1905
GR	7141.9	1914	7140.9	1923	7142.1	1955	7142.1	1988	7143.6	2016
GR	7145.4	2033	7145.6	2043	7145.4	2061	7147.5	2065	7150.0	2082
GR	7154.4	2109	7161.0	2152	7161.9	2160	0.	0.	0.	0.
X1	86.0	51	1549	1953	510	600	580.	0.	0.	0.
X3	10.									
GR	7170.0	1000	7160.0	1017	7155.4	1048	7148.6	1076	7146.7	1133
GR	7145.7	1212	7145.4	1279	7145.2	1339	7145.0	1387	7145.3	1426
GR	7144.0	1441	7144.9	1465	7145.2	1480	7144.8	1500	7148.2	1509
GR	7150.8	1517	7151.7	1534	7151.7	1549	7146.9	1560	7144.2	1588
GR	7144.3	1616	7142.5	1618	7142.5	1636	7144.1	1656	7144.2	1681
GR	7143.1	1696	7143.1	1725	7144.5	1730	7144.2	1758	7144.4	1792
GR	7143.4	1800	7143.6	1817	7143.5	1886	7144.4	1895	7143.2	1909
GR	7142.9	1941	7144.8	1942	7145.4	1953	7144.6	1960	7144.1	1972
GR	7145.7	2002	7146.6	2031	7147.2	2065	7147.6	2090	7148.2	2111
GR	7148.2	2131	7149.0	2139	7149.9	2164	7153.5	2193	7157.3	2224
GR	7160.1	2250	0							
X1	87	24	1019	1421	320.	280.	300	0.	0.	0.
GR	7152.7	1000	7152.6	1015	7152.4	1019	7145.7	1032	7146.4	1046
GR	7143.3	1058	7144.4	1084	7146.1	1100	7146.6	1205	7145.6	1222
GR	7146.5	1246	7145.1	1268	7145.3	1312	7143.9	1336	7141.9	1376
GR	7141.6	1413	7145.9	1421	7146.2	1427	7145.7	1474	7147.7	1567
GR	7148.5	1590	7148.6	1612	7152.2	1631	7167.3	1740		
X1	88.	24	1089	1205	650	600	655	0.	0.	0.
X3	10.									
GR	7156.2	1000	7156.1	1015	7155.5	1018	7149.0	1045	7150.8	1049
GR	7150.3	1059	7150.7	1089	7147.2	1101	7147.1	1195	7153.5	1205
GR	7153.2	1212	7153.5	1223	7151.5	1228	7151.9	1233	7148.6	1238
GR	7147.7	1264	7150.0	1304	7150.1	1374	7150.8	1482	7151.3	1502
GR	7150.5	1555	7151.5	1598	7159.5	1669	7170.5	1687		
X1	89	27	1197	1339	630.0	630.0	615.0	0.	0.	0.
X3	10.									
GR	7161.3	1000	7161.2	1015	7161.4	1019	7156.5	1028	7156.4	1053
GR	7155.8	1060	7155.9	1103	7155.4	1190	7158.2	1197	7158.0	1205
GR	7153.3	1210	7151.2	1216	7151.1	1313	7156.6	1321	7158.6	1326
GR	7158.8	1328	7159.3	1333	7159.4	1339	7159.2	1343	7156.4	1359
GR	7156.5	1510	7156.9	1536	7155.7	1598	7154.8	1679	7156.5	1705
GR	7161.1	1721	7165.6	1726						

X1	90	23	1119	1342	870	850.0	840	0.	0.	0.
X3	10.									
GR	7173.1	1000	7173.0	1015	7172.5	1022	7161.9	1056	7161.4	1089
GR	7163.9	1119	7162.6	1132	7161.3	1223	7160.8	1232	7160.3	1236
GR	7157.6	1247	7157.6	1315	7164.7	1328	7165.0	1332	7165.4	1342
GR	7165.3	1349	7161.6	1374	7162.7	1407	7162.7	1427	7161.6	1514
GR	7160.0	1530	7160.9	1574	7172.9	1617				
QT	2.	3650	6000			0.	0.	0.	0.	0.
X1	91	18	1158	1265	420.0	420.0	420.0	0.	0.	0.
GR	7174.6	1000	7174.5	1015	7172.8	1028	7172.8	1158	7172.0	1166
GR	7160.2	1182	7160.4	1241	7165.8	1254	7167.7	1265	7168.6	1327
GR	7170.5	1422	7170.7	1445	7172.0	1465	7175.9	1489	7182.2	1597
GR	7184.6	1637	7185.1	1648	7188.8	1694				
X1	91.5	20	1182	1286	120	120	120	0.	0.	0.
GR	7175.6	1000	7175.9	1017	7175.9	1018	7172.7	1034	7172.1	1182
GR	7160.7	1201	7160.8	1266	7168.5	1281	7168.8	1286	7168.5	1292
GR	7169.8	1296	7170.1	1341	7172.2	1423	7172.2	1444	7171.9	1460
GR	7174.6	1485	7179.2	1567	7181.8	1573	7186.1	1639	7186.4	1647
X1	92.0	19	1253	1387	300.0	330.0	290.0	0.	0.	0.
GR	7176.6	1000	7176.1	1017	7173.4	1033	7175.9	1050	7175.8	1073
GR	7172.7	1093	7171.2	1139	7171.6	1193	7170.1	1234	7170.4	1253

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GR	7166.4	1262	7166.4	1331	7168.7	1375	7173.6	1387	7179.8	1451
GR	7180.8	1495	7179.9	1517	7181.0	1552	7188.9	1600		
X1	93.0	28.0	1555.0	1674.0	350.0	280	310.0	0.	0.	0.
X3	10.									
GR	7189.3	1000	7185.4	1060	7183.1	1074	7181.9	1108	7179.4	1119
GR	7178.7	1176	7182.1	1200	7181.0	1267	7182.1	1328	7185.8	1342
GR	7182.8	1362	7192.5	1368	7193.3	1388	7179.3	1408	7178.9	1450
GR	7180.1	1478	7177.7	1509	7176.1	1555	7168.5	1585	7168.3	1660
GR	7176.9	1674	7170.6	1785	7178.0	1895	7180.2	1987	7179.8	2010
GR	7180.9	2053	7187.1	2094	7191.0	2140				

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

*PROF 1

IHLEQ = 1. THEREFORE FRICTION LOSS (HL) IS CALCULATED AS A FUNCTION OF PROFILE TYPE, WHICH CAN VARY FROM REACH TO REACH. SEE DOCUMENTATION FOR DETAILS.

0

CCHV= .600 CEHV= .100

*SECNO 82.000

82.000	4.90	7133.70	7133.49	7133.70	7135.62	1.92	.00	.00	7133.60
4200.0	.1	4194.0	5.9	.4	376.8	4.3	.0	.0	7132.90
.00	.35	11.13	1.38	.100	.060	.100	.000	7128.80	1075.99
.029452	1050.	995.	1050.	0	8	0	.00	104.68	1180.67

*SECNO 83.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 4.84

3470 ENCROACHMENT STATIONS= 1221.0 1870.0 TYPE= 1 TARGET= -1221.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7140.90 ELREA= 7138.70

83.000	5.56	7139.56	.00	.00	7139.64	.08	2.92	1.11	7140.90
4200.0	.0	3351.2	848.8	.0	1366.2	756.2	35.4	9.3	7138.70
.15	.00	2.45	1.12	.000	.060	.100	.000	7134.00	1224.28
.001256	1100.	1200.	1300.	8	0	0	.00	551.33	1775.61

*SECNO 84.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .46

84.000	4.80	7141.80	.00	.00	7142.09	.29	2.43	.02	7145.50
4200.0	.0	4145.6	54.4	.0	952.0	35.3	59.5	15.9	7140.00
.20	.00	4.35	1.54	.000	.060	.100	.000	7137.00	1431.45
.005913	750.	680.	660.	6	0	0	.00	297.34	1728.79

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

*SECNO 85.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7149.00 ELREA= 7145.40

85.000	4.21	7144.61	.00	.00	7144.77	.16	2.60	.08	7149.00
4200.0	.0	4200.0	.0	.0	1303.4	.0	73.7	20.5	7145.40
.24	.00	3.22	.00	.000	.060	.000	.000	7140.40	1580.49
.004057	540.	540.	550.	4	0	0	.00	445.05	2025.54

*SECNO 86.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7151.70 ELREA= 7145.40

86.000	4.44	7146.94	.00	.00	7147.10	.16	2.33	.00	7151.70
4200.0	.0	4014.6	185.4	.0	1217.1	131.8	91.3	26.8	7145.40
.29	.00	3.30	1.41	.000	.060	.100	.000	7142.50	1559.91
.003963	510.	580.	600.	2	0	0	.00	490.23	2050.14

*SECNO 87.000

87.000	6.49	7148.09	.00	.00	7148.23	.15	1.12	.01	7152.40
4200.0	.0	3890.6	309.4	.0	1231.9	244.1	101.0	30.3	7145.90
.32	.00	3.16	1.27	.000	.060	.100	.000	7141.60	1027.37
.003580	320.	300.	280.	2	0	0	.00	550.81	1578.18

*SECNO 88.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = .57

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7150.70 ELREA= 7153.50

88.000	5.19	7152.29	.00	.00	7153.07	.78	4.77	.06	7150.70
4200.0	235.7	3964.3	.0	103.1	544.2	.0	116.8	35.6	7153.50
.35	2.29	7.29	.00	.100	.060	.000	.000	7147.10	1031.34
.011033	650.	655.	600.	3	0	0	.00	171.77	1203.11

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

*SECNO 89.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7158.20 ELREA= 7159.40

89.000	6.37	7157.47	.00	.00	7158.05	.59	4.87	.12	7158.20
4200.0	.0	4200.0	.0	.0	683.1	.0	126.2	37.7	7159.40
.38	.00	6.15	.00	.000	.060	.000	.000	7151.10	1205.57
.006164	630.	615.	630.	3	0	0	.00	117.60	1323.17

*SECNO 90.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7163.90 ELREA= 7165.40

90.000	6.30	7163.90	.00	.00	7164.32	.42	6.17	.10	7163.90
4200.0	243.0	3957.0	.0	118.3	744.4	.0	141.1	41.5	7165.40
.42	2.05	5.32	.00	.100	.060	.000	.000	7157.60	1049.58
.008500	870.	840.	850.	4	0	0	.00	276.96	1326.54

*SECNO 91.000

91.000	7.04	7167.24	.00	.00	7168.06	.82	3.70	.04	7172.80
3650.0	.0	3650.0	.0	.0	502.6	.0	147.7	43.3	7167.70
.44	.00	7.26	.00	.000	.060	.000	.000	7160.20	1172.46
.009114	420.	420.	420.	2	0	0	.00	89.86	1262.32

*SECNO 91.500

91.500	7.73	7168.43	.00	.00	7169.00	.56	.79	.15	7172.10
3650.0	.0	3650.0	.0	.0	606.1	.0	149.2	43.5	7168.80
.44	.00	6.02	.00	.000	.060	.000	.000	7160.70	1188.11
.005120	120.	120.	120.	2	0	0	.00	92.76	1280.87

*SECNO 92.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = .60

92.000	4.80	7171.00	.00	.00	7171.81	.81	2.79	.02	7170.40
3650.0	32.2	3617.8	.0	25.3	499.0	.0	153.0	44.4	7173.60
.45	1.27	7.25	.00	.100	.060	.000	.000	7166.40	1209.42
.014100	300.	290.	330.	3	0	0	.00	171.22	1380.63

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

*SECNO 93.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7176.10 ELREA= 7176.90

93.000	6.15	7174.45	.00	.00	7175.13	.67	3.23	.08	7176.10
3650.0	.0	3650.0	.0	.0	554.6	.0	156.9	45.4	7176.90
.47	.00	6.58	.00	.000	.060	.000	.000	7168.30	1561.51
.008265	350.	310.	280.	2	0	0	.00	108.51	1670.01

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T1 SECOND PROFILE
T2 500-YR Q - 6.800 CFS BELOW COAL CREEK, 6.000 CFS ABOVE
T3 CRYSTAL RIVER

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		3			0.				7135.7	

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	15									

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

*PROF 2

IHLEQ = 1. THEREFORE FRICTION LOSS (HL) IS CALCULATED AS A FUNCTION OF PROFILE TYPE, WHICH CAN VARY FROM REACH TO REACH. SEE DOCUMENTATION FOR DETAILS.

0

CCHV= .600 CEHV= .100

*SECNO 82.000

82.000	6.90	7135.70	7135.44	7135.70	7137.57	1.87	.00	.00	7133.60
6800.0	343.6	6268.7	187.7	115.2	550.8	59.0	.0	.0	7132.90
.00	2.98	11.38	3.18	.100	.060	.100	.000	7128.80	1018.43
.018560	1050.	995.	1050.	0	7	0	.00	183.10	1201.52

*SECNO 83.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = 4.01

3470 ENCROACHMENT STATIONS= 1221.0 1870.0 TYPE= 1 TARGET= -1221.000

83.000	7.15	7141.15	.00	.00	7141.25	.10	2.63	1.06	7140.90
6800.0	.0	5169.4	1630.6	.0	1827.5	1171.6	52.6	10.5	7138.70
.14	.00	2.83	1.39	.000	.060	.100	.000	7134.00	1221.00
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*SECNO 84.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = .46

84.000	6.10	7143.10	.00	.00	7143.50	.39	2.21	.03	7145.50
6800.0	.0	5656.5	143.5	.0	1311.5	69.3	86.5	17.2	7140.00
.17	.00	5.08	2.07	.000	.060	.100	.000	7137.00	1426.01
.005383	750.	680.	660.	8	0	0	.00	307.47	1733.49

*SECNO 85.000

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

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7149.00 ELREA= 7145.40

85.000	5.33	7145.73	.00	.00	7145.95	.22	2.35	.10	7147.00
6800.0	.0	6797.7	2.3	.0	1812.7	6.8	106.3	22.1	7145.40
.21	.00	3.75	.34	.000	.060	.100	.000	7140.40	1578.05
.003648	540.	540.	550.	2	0	0	.00	483.59	2061.65

*SECNO 86.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7151.70 ELREA= 7145.40

86.000	5.43	7147.93	.00	.00	7148.17	.23	2.21	.00	7151.70
6800.0	.0	6375.3	424.7	.0	1607.4	255.9	130.9	29.0	7145.40
.26	.00	3.97	1.66	.000	.060	.100	.000	7142.50	1557.64
.003987	510.	580.	600.	2	0	0	.00	545.84	2101.48

*SECNO 87.000

87.000	7.50	7149.10	.00	.00	7149.30	.20	1.12	.02	7152.40
6800.0	.0	6110.0	690.0	.0	1627.1	423.4	144.2	32.8	7145.90
.28	.00	3.76	1.63	.000	.060	.100	.000	7141.60	1025.42
.003519	320.	300.	280.	1	0	0	.00	589.17	1614.59

*SECNO 88.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = .45

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7150.70 ELREA= 7153.50

88.000	5.95	7153.05	.00	.00	7154.48	1.43	5.06	.12	7150.70
6800.0	521.0	6279.0	.0	148.2	631.5	.0	165.2	38.5	7153.50
.30	3.51	9.94	.00	.100	.060	.000	.000	7147.10	1028.17
.017124	650.	655.	600.	10	0	0	.00	176.12	1204.30

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

*SECNO 89.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = 1.88

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7158.20 ELREA= 7159.40

89.000	8.16	7159.26	.00	.00	7159.72	.47	4.66	.58	7163.20
6800.0	1339.1	5460.8	.0	576.8	909.4	.0	181.3	41.9	7159.40
.33	2.32	5.00	.00	.100	.060	.000	.000	7151.10	1022.94
.004846	630.	615.	630.	4	0	0	.00	309.63	1332.57

*SECNO 90.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7163.90 ELREA= 7165.40

90.000	7.39	7164.99	.00	.00	7165.59	.60	5.85	.01	7163.90
6800.0	550.4	6249.6	.0	195.9	972.5	.0	207.2	47.8	7165.40
.37	2.81	6.43	.00	.100	.060	.000	.000	7157.60	1046.08
.009009	870.	840.	850.	4	0	0	.00	285.82	1331.90

*SECNO 91.000

3301 HV CHANGED MORE THAN HVINS

91.000	8.47	7168.67	.00	.00	7170.03	1.36	4.37	.08	7172.80
6000.0	.0	5967.4	32.6	.0	634.8	31.6	216.1	49.9	7167.70
.38	.00	9.40	1.03	.000	.060	.100	.000	7160.20	1170.53
.012007	420.	420.	420.	2	0	0	.00	159.35	1329.88

*SECNO 91.500

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.42

1

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
91.500	9.76	7170.46	.00	.00	7171.30	.84	.95	.31	7172.10
6000.0	.0	5957.0	43.0	.0	806.7	41.5	218.1	50.4	7168.80
.39	.00	7.38	1.04	.000	.060	.100	.000	7160.70	1184.73
.005926	120.	120.	120.	2	0	0	.00	170.30	1355.03

*SECNO 92.000

92.000	6.36	7172.76	.00	.00	7173.59	.82	2.28	.01	7170.40
6000.0	487.3	5512.7	.0	237.1	727.9	.0	224.2	51.9	7173.60
.40	2.06	7.57	.00	.100	.060	.000	.000	7166.40	1092.60
.009759	300.	290.	330.	3	0	0	.00	292.35	1384.95

*SECNO 93.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE ELLEA= 7176.10 ELREA= 7176.90

93.000	7.45	7175.75	.00	.00	7176.89	1.14	3.27	.03	7176.10
6000.0	.0	6000.0	.0	.0	699.0	.0	230.3	53.5	7176.90
.41	.00	8.58	.00	.000	.060	.000	.000	7168.30	1556.42
.011292	350.	310.	280.	2	0	0	.00	115.69	1672.11

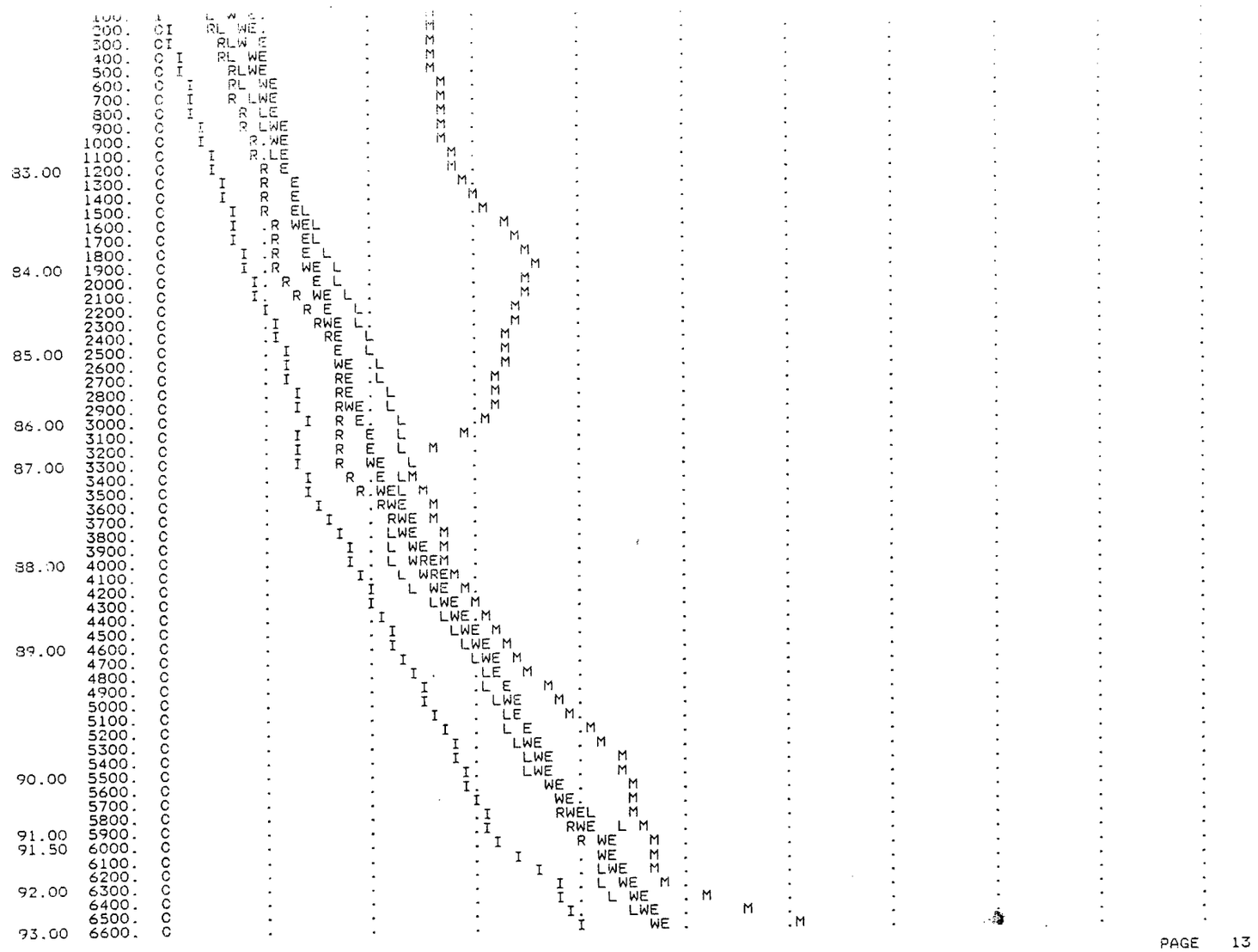
1

PROFILE FOR STREAM CRYSTAL RIVER

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

ELEVATION 7129. 7139. 7149. 7159. 7169. 7179. 7189. 7199. 7209. 7219.
SECNO CUMDIS

82.00 0. I RL W E. M



THIS RUN EXECUTED 16JUL91 09:55:53

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.0: February 1991
****

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

SUMMARY PRINTOUT

	SECNO	Q	XLCH	ELMIN	CWSEL	CRIWS	EG	DIFKWS	PERENC	TOPWID	SSTA	ENDST
	82.000	4200.00	.00	7128.80	7133.70	7133.49	7135.62	.00	.00	104.68	1075.99	1180.67
	82.000	6800.00	.00	7128.80	7135.70	7135.44	7137.57	.00	.00	183.10	1018.43	1201.52
*	83.000	4200.00	1200.00	7134.00	7139.56	.00	7139.64	.00	-1221.00	551.33	1224.28	1775.61
*	83.000	6800.00	1200.00	7134.00	7141.15	.00	7141.25	.00	-1221.00	560.29	1221.00	1781.29
*	84.000	4200.00	680.00	7137.00	7141.80	.00	7142.09	.00	.00	297.34	1431.45	1728.79
*	84.000	6800.00	680.00	7137.00	7143.10	.00	7143.50	.00	.00	307.47	1426.01	1733.49
	85.000	4200.00	540.00	7140.40	7144.61	.00	7144.77	.00	.00	446.05	1580.49	2026.54
	85.000	6800.00	540.00	7140.40	7145.73	.00	7145.95	.00	.00	483.39	1578.06	2061.45
	86.000	4200.00	580.00	7142.50	7146.94	.00	7147.10	.00	.00	490.23	1559.91	2050.14
	86.000	6800.00	580.00	7142.50	7147.93	.00	7148.17	.00	.00	543.84	1557.64	2101.48
	87.000	4200.00	300.00	7141.60	7148.09	.00	7148.23	.00	.00	550.81	1027.37	1578.18
	87.000	6800.00	300.00	7141.60	7149.10	.00	7149.30	.00	.00	589.17	1025.42	1614.59
*	88.000	4200.00	655.00	7147.10	7152.29	.00	7153.07	.00	.00	171.77	1031.34	1203.11
*	88.000	6800.00	655.00	7147.10	7153.05	.00	7154.48	.00	.00	176.12	1028.17	1204.30
	89.000	4200.00	615.00	7151.10	7157.47	.00	7158.05	.00	.00	117.60	1205.57	1323.17
*	89.000	6800.00	615.00	7151.10	7159.26	.00	7159.72	.00	.00	309.63	1022.94	1332.57
	90.000	4200.00	840.00	7157.60	7163.90	.00	7164.32	.00	.00	276.96	1049.58	1326.54
	90.000	6800.00	840.00	7157.60	7164.99	.00	7165.59	.00	.00	285.82	1046.08	1331.90
	91.000	3650.00	420.00	7160.20	7167.24	.00	7168.06	.00	.00	89.86	1172.46	1262.32
	91.000	6000.00	420.00	7160.20	7168.67	.00	7170.03	.00	.00	159.35	1170.53	1329.88
	91.500	3650.00	120.00	7160.70	7168.43	.00	7169.00	.00	.00	92.76	1188.11	1280.87
*	91.500	6000.00	120.00	7160.70	7170.46	.00	7171.30	.00	.00	170.30	1184.73	1355.03

	SECNO	Q	XLCH	ELMIN	CWSEL	CRIWS	EG	DIFKWS	PERENC	TOPWID	SSTA	ENDST
*	92.000	3650.00	290.00	7166.40	7171.00	.00	7171.81	.00	.00	171.22	1209.42	1380.63
	92.000	6000.00	290.00	7166.40	7172.76	.00	7173.59	.00	.00	292.35	1092.60	1384.95
	93.000	3650.00	310.00	7168.30	7174.45	.00	7175.13	.00	.00	108.51	1561.51	1670.01
	93.000	6000.00	310.00	7168.30	7175.75	.00	7176.89	.00	.00	115.69	1556.42	1672.11

SUMMARY OF ERRORS AND SPECIAL NOTES

WARNING SECNO= 83.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 83.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 84.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 84.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 88.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 88.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 89.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 91.500 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 92.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

FLOODWAY DATA TUN 91 CORPS-NEW X-SECS

PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
82.000	183.	725.	9.4	7135.7	7133.7	2.0
83.000	560.	2997.	2.3	7141.2	7139.6	1.6
84.000	307.	1581.	4.9	7143.1	7141.8	1.3
85.000	484.	1820.	3.7	7145.7	7144.6	1.1
86.000	544.	1865.	3.6	7147.9	7146.9	1.0
87.000	589.	2050.	3.3	7149.1	7148.1	1.0
88.000	176.	780.	8.7	7153.1	7152.3	.8
89.000	310.	1486.	4.6	7159.3	7157.5	1.8
90.000	286.	1168.	5.8	7165.0	7163.9	1.1
91.000	159.	666.	9.0	7168.6	7167.2	1.4
91.500	170.	848.	7.1	7170.4	7168.4	2.0
92.000	292.	965.	6.2	7172.8	7171.0	1.8
93.000	116.	699.	8.6	7175.8	7174.5	1.3

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**********************************************
*  HEC-2 WATER SURFACE PROFILES              *
*                                            *
*  Version   4.6.0:  February 1991           *
*                                            *
*  RUN DATE    16JUL91     TIME   14:50:51   *
**********************************************
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**********************************
*  U.S. ARMY CORPS OF ENGINEERS  *
*  HYDROLOGIC ENGINEERING CENTER *
*  609 SECOND STREET, SUITE D    *
*  DAVIS, CALIFORNIA 95616-4687  *
*        (916) 756-1104          *
**********************************
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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                  X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX              XXXXXXX
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16JUL91 14:50:51 PAGE 1

THIS RUN EXECUTED 16JUL91 14:50:51

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

 Version   4.6.0:  February 1991
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T1      COE SECTION 22 AT REDSTONE      (new June 1991  run, file:newrsenc.dat)
T2      FEMA/DENVER ENG.,124.006 -100YR (4200 cfs below Coal Cr, 3650 above)
T3      JUN 91 CORPS-NEW X-SECS (X3.6 encroachment on rt bank for req'd levee ht

J1  ICHECK    INQ      NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
      0.       2.        0.        0.        0.       0.0       0.0       0.0     7134.0    0.000

J2  NPROF     IPLOT    PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
    1.000     0.000   -1.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000

J3  VARIABLE CODES FOR SUMMARY PRINTOUT
       38        43        39        42     1.000     2.000     3.000        52        36     4.000
       53        54     0.000   200.000     0.000     0.000     0.000     0.000     0.000     0.000

J6  IHLEQ     ICOPY    SUBDIV    STRTDS    RMILE
      1

QT    2.000     4200      6800
NC    0.020    0.060     0.050     0.600     0.100       0.0       0.0       0.0       0.0       0.0
X1       82      15.      1083      1170      1050.     1050.      995.
X3      10.                                            1170
GR  7159.1      1000    7133.7      1020    7134.0      1026    7134.0      1055    7133.6      1083
GR  7128.9      1091    7128.8      1157    7132.9      1170    7133.8      1182    7134.1      1198
GR  7144.1      1220    7144.1      1242    7143.6      1247    7151.6      1286    7154.1      1300

NC      .06       .07       .05
X1       83       32.      1221      1515      1100.     1300.     1200.
X3      10.                                            1515
GR  7155.4      1000    7134.4      1034    7133.0      1106    7136.3      1144    7133.6      1155
GR  7134.9      1172    7140.8      1190    7140.9      1221    7134.8      1236    7134.5      1306
GR  7135.2      1308    7134.9      1351    7134.5      1354    7134.5      1382    7135.0      1383
GR  7134.6      1450    7134.2      1453    7134.0      1495    7138.7      1515    7138.7      1530
GR  7134.4      1544    7137.5      1635    7136.6      1661    7137.7      1676    7137.9      1694
GR  7136.1      1707    7135.8      1750    7139.4      1775    7148.0      1806    7148.6      1816
GR  7155.5      1850    7156.7      1870                                            7
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NC .1 .1 .06

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	84	27.	1416	1705	750.	850.	850.			
	10.					1705				
GR	7165.1	1000	7162.0	1076	7158.0	1105	7155.3	1174	7152.6	1243
GR	7149.5	1345	7144.8	1383	7145.1	1390	7145.5	1416	7137.6	1449
GR	7137.9	1461	7137.0	1473	7137.0	1482	7140.6	1498	7137.3	1519
GR	7137.5	1535	7140.6	1555	7139.1	1568	7138.2	1605	7137.6	1608
GR	7137.9	1693	7140.0	1705	7140.2	1723	7143.8	1736	7143.5	1774
GR	7146.3	1779	7151.0	1823	7158.8	1885	7164.7	1920		
NC	.1	.1	.07							
X1	35.0	43	1571.0	2033.0	540.	550.	540.	0	0.	0.
X3	10.					2033				
GR	7166.2	1000	7158.0	1015	7154.7	1030	7154.4	1069	7152.1	1123
GR	7150.9	1199	7149.9	1273	7148.5	1361	7147.6	1411	7146.2	1440
GR	7145.5	1483	7141.4	1494	7141.1	1521	7144.6	1528	7148.4	1539
GR	7149.1	1556	7149.0	1571	7141.6	1587	7141.4	1634	7141.6	1658
GR	7140.4	1664	7141.8	1673	7141.6	1706	7141.8	1748	7142.1	1787
GR	7141.9	1815	7140.6	1820	7140.6	1891	7141.9	1897	7142.9	1905
GR	7141.9	1914	7140.9	1923	7142.1	1955	7142.1	1988	7143.6	2016
GR	7145.4	2033	7145.6	2043	7145.4	2061	7147.5	2065	7150.0	2082
GR	7154.4	2109	7161.0	2152	7161.9	2160	0.	0.	0.	0.
NC	.1	.06	.07							
X1	86.0	51	1549	1953	510	600	580.	0.	-1.2	0.
X3	10.					1953				
GR	7170.0	1000	7160.0	1017	7155.4	1048	7148.6	1076	7146.7	1133
GR	7145.7	1212	7145.4	1279	7145.2	1339	7145.0	1387	7145.3	1426
GR	7144.0	1441	7144.9	1465	7145.2	1480	7144.8	1500	7148.2	1509
GR	7150.8	1517	7151.7	1534	7151.7	1549	7146.9	1560	7144.2	1558
GR	7144.3	1616	7142.5	1618	7142.5	1636	7144.1	1656	7144.2	1681
GR	7143.1	1696	7143.1	1725	7144.5	1730	7144.2	1758	7144.4	1792
GR	7143.4	1800	7143.6	1817	7143.5	1886	7144.4	1895	7143.2	1909
GR	7142.9	1941	7144.8	1942	7145.4	1953	7144.6	1960	7144.1	1973
GR	7145.7	2002	7146.6	2031	7147.2	2065	7147.6	2090	7148.2	2111
GR	7148.2	2131	7149.0	2139	7149.9	2164	7153.5	2193	7157.3	2224
GR	7160.1	2250	0							
NC	.06	.1	.06							
X1	87	24	1019	1421	250.	300.	300	0.	0.	0.
X3	10.					1421				
GR	7152.7	1000	7152.6	1015	7152.4	1019	7145.7	1032	7146.4	1046
GR	7143.3	1058	7144.4	1084	7146.1	1100	7146.6	1205	7145.6	1222
GR	7146.5	1246	7145.1	1268	7145.3	1312	7143.9	1336	7141.9	1376
GR	7141.6	1413	7145.9	1421	7146.2	1427	7145.7	1474	7147.7	1567
GR	7148.5	1590	7148.6	1612	7152.2	1631	7167.3	1740		
NC	.10	.06	.05							
X1	88.	24	1089	1205	650	600	655	0.	0.	0.
X3	10.					1205				
GR	7156.2	1000	7156.1	1015	7155.5	1018	7149.0	1045	7150.8	1049
GR	7150.3	1059	7150.7	1089	7147.2	1101	7147.1	1195	7153.5	1205
GR	7153.2	1212	7153.5	1223	7151.5	1228	7151.9	1233	7148.6	1238

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GR	7147.7	1264	7150.0	1304	7150.1	1374	7150.8	1482	7151.3	1502
GR	7150.5	1555	7151.5	1598	7159.5	1669	7170.5	1687		
NC	.1	.1	.05							
X1	89	27	1197	1339	630.0	630.0	615.0	0.	0.	0.
X3	10.					1339				
GR	7161.3	1000	7161.2	1015	7161.4	1019	7156.5	1028	7156.4	1053
GR	7155.8	1060	7155.9	1103	7155.4	1190	7158.2	1197	7158.0	1205
GR	7153.3	1210	7151.2	1216	7151.1	1313	7156.6	1321	7158.6	1326
GR	7158.8	1328	7159.3	1333	7159.4	1339	7159.2	1343	7156.4	1359
GR	7156.5	1510	7156.9	1536	7155.7	1598	7154.8	1679	7156.5	1705
GR	7161.1	1721	7165.6	1726						
NC	.06	.06	.05							
X1	90	23	1119	1342	870	850.0	840	0.	0.	0.
X3	10.					1342				
GR	7173.1	1000	7173.0	1015	7172.5	1022	7161.9	1056	7161.4	1089
GR	7163.9	1119	7162.6	1132	7161.3	1223	7160.8	1232	7160.3	1236
GR	7157.6	1247	7157.6	1315	7164.7	1328	7165.0	1332	7165.4	1342
GR	7165.3	1349	7161.6	1374	7162.7	1407	7162.7	1427	7161.6	1514
GR	7160.0	1530	7160.9	1574	7172.9	1617				
QT	2.	3650	6000			0.	0.	0.	0.	0.
NC	.06	.06	.05	0.0	0.	0.	0.	0.	0.	0.
X1	91	18	1158	1265	420.0	420.0	420.0	0.	0.	0.
X3	10.					1265				
GR	7174.6	1000	7174.5	1015	7172.8	1028	7172.8	1158	7172.0	1166

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GR   7160.2      1182     7160.4      1241     7165.8      1254     7167.7      1365     7168.6      1527
GR   7170.3      1422     7170.7      1445     7172.0      1465     7175.9      1489     7182.2      1597
GR   7184.6      1637     7185.1      1648     7188.8      1694

NC       .06       .10       .05
X1      91.5        20      1182        1286         120         120         120          0.          0.          0.
X3       10.                                                    1286
GR   7175.6      1000     7175.9      1017     7175.9      1018     7172.7      1034     7172.1      1182
GR   7160.7      1201     7160.8      1266     7168.5      1281     7168.8      1286     7168.5      1292
GR   7169.8      1296     7170.1      1341     7172.2      1423     7172.2      1444     7171.9      1460
GR   7174.6      1485     7179.2      1567     7181.8      1573     7186.1      1639     7186.4      1647

NC       .03       .10       .05
X1      92.0        19      1253        1387         300.0       330.0       290.0          0.          0.          0.
X3       10.                                                    1387
GR   7176.6      1000     7176.1      1017     7173.4      1033     7175.9      1050     7175.8      1073
GR   7172.7      1093     7171.2      1139     7171.6      1193     7170.1      1234     7170.4      1253
GR   7166.4      1262     7166.4      1331     7168.7      1375     7173.6      1387     7179.8      1451
GR   7180.8      1495     7179.9      1517     7181.0      1552     7188.9      1600

NC       .06       .07       .05
X1      93.0      28.0      1555.0      1674.0         350.0         280         310.0          0.          0.          0.
X3       10.                                                    1674
GR   7189.3      1000     7185.4      1060     7183.1      1074     7181.9      1108     7179.4      1119
GR   7178.7      1176     7182.1      1200     7181.0      1267     7182.1      1328     7185.9      1342
GR   7182.8      1362     7192.5      1368     7193.3      1388     7179.3      1408     7178.9      1450
GR   7180.1      1478     7177.7      1509     7176.1      1555     7168.5      1585     7168.3      1660
1                                                                                                   PAGE    4
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GR   7176.9      1674     7172.6      1785     7178.0      1895     7180.2      1987     7179.8      2010
GR   7180.9      2053     7187.1      2094     7191.0      2140
1                                                                                                   PAGE    5
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     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

 *PROF 1

 IHLEQ = 1.  THEREFORE FRICTION LOSS (HL) IS CALCULATED AS A FUNCTION OF
 PROFILE TYPE, WHICH CAN VARY FROM REACH TO REACH.  SEE DOCUMENTATION FOR
 DETAILS.
0

 CCHV=     .600 CEHV=     .100
 *SECNO 82.000
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=          .0    1170.0  TYPE=       1  TARGET=     1169.999

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      7133.60 ELREA=    100000.00

     82.000      5.25   7134.05   7134.05   7134.00   7135.67      1.62       .00       .00   7133.60
     4200.0      31.6    4168.4        .0       9.7     407.2        .0        .0        .0 100000.00
        .00      3.26     10.24       .00      .020      .050      .000      .000   7128.80   1019.72
    .015867     1050.      995.     1050.         0         4         0       .00    150.27   1170.00


 *SECNO 83.000

 3301 HV CHANGED MORE THAN HVINS

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE.  KRATIO =  3.34

 3470 ENCROACHMENT STATIONS=          .0    1515.0  TYPE=       1  TARGET=     1514.999

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      7140.90 ELREA=    100000.00

     83.000      5.52   7139.52       .00       .00   7139.67       .15      3.13       .88   7140.90
     4200.0        .0    4200.0        .0        .0    1353.1        .0      24.4       6.0 100000.00
        .11       .00      3.10       .00      .000      .050      .000      .000   7134.00   1224.39
    .001419     1100.     1200.     1300.         6         0         0       .00    290.61   1515.00

 *SECNO 84.000
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3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = .49

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

3470 ENCROACHMENT STATIONS= .0 1705.0 TYPE= 1 TARGET= 1704.999

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7145.50 ELREA= 100000.00

84.000	4.85	7141.85	.00	.00	7142.14	.29	2.46	.01	7145.50
4200.0	.0	4200.0	.0	.0	967.8	.0	42.5	10.4	100000.00
.15	.00	4.34	.00	.000	.060	.000	.000	7137.00	1431.21
.005805	750.	680.	660.	7	0	0	.00	273.79	1705.00

*SECNO 85.000

3470 ENCROACHMENT STATIONS= .0 2033.0 TYPE= 1 TARGET= 2032.999

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7149.00 ELREA= 100000.00

85.000	4.41	7144.81	.00	.00	7144.95	.14	2.72	.09	7149.00
4200.0	.0	4200.0	.0	.0	1393.9	.0	57.1	14.9	100000.00
.20	.00	3.01	.00	.000	.070	.000	.000	7140.40	1580.05
.004448	540.	540.	550.	4	0	0	.00	447.40	2027.45

*SECNO 86.000

3470 ENCROACHMENT STATIONS= .0 1953.0 TYPE= 1 TARGET= 1952.999

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7150.50 ELREA= 100000.00

86.000	5.39	7146.69	.00	.00	7146.80	.11	1.83	.02	7150.50
4200.0	.0	4200.0	.0	.0	1594.1	.0	77.0	20.5	100000.00
.26	.00	2.63	.00	.000	.070	.000	.000	7141.30	1557.72
.002441	510.	580.	600.	3	0	0	.00	395.28	1953.00

*SECNO 87.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .63

3470 ENCROACHMENT STATIONS= .0 1421.0 TYPE= 1 TARGET= 1420.999

1

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

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7152.40 ELREA= 100000.00

87.000	6.15	7147.75	.00	.00	7147.98	.23	1.16	.01	7152.40
4200.0	.0	4200.0	.0	.0	1097.9	.0	86.3	23.2	100000.00
.28	.00	3.83	.00	.000	.060	.000	.000	7141.60	1028.03
.006149	250.	300.	300.	2	0	0	.00	392.97	1421.00

*SECNO 88.000

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= .0 1205.0 TYPE= 1 TARGET= 1204.999

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7150.70 ELREA= 100000.00

88.000	5.00	7152.10	.00	.00	7152.99	.88	4.94	.07	7150.70
4200.0	178.9	4021.1	.0	92.5	523.2	.0	99.2	27.4	100000.00
.31	1.93	7.69	.00	.100	.050	.000	.000	7147.10	1032.10
.008952	650.	655.	600.	3	0	0	.00	170.72	1202.82

*SECNO 89.000

3470 ENCROACHMENT STATIONS= .0 1339.0 TYPE= 1 TARGET= 1338.999

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7158.20 ELREA= 100000.00

89.000	5.71	7156.81	.00	.00	7157.56	.74	4.49	.08	7158.20
4200.0	.0	4200.0	.0	.0	606.9	.0	107.8	29.5	100000.00
.33	.00	6.92	.00	.000	.050	.000	.000	7151.10	1206.26
.006158	630.	615.	630.	1	0	0	.00	115.27	1321.53

*SECNO 90.000

3470 ENCROACHMENT STATIONS= .0 1342.0 TYPE= 1 TARGET= 1341.999

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7163.90 ELREA= 100000.00

90.000	5.88	7163.48	.00	.00	7164.11	.63	6.49	.07	7163.90
4200.0	.0	4200.0	.0	.0	658.4	.0	120.0	32.5	100000.00
.37	.00	6.38	.00	.000	.050	.000	.000	7157.60	1123.18
.009691	870.	840.	850.	4	0	0	.00	202.59	1325.77

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

*SECNO 91.000

3470 ENCROACHMENT STATIONS= .0 1265.0 TYPE= 1 TARGET= 1264.999

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7172.80 ELREA= 100000.00

91.000	6.62	7166.82	.00	.00	7167.78	.95	3.63	.03	7172.80
3650.0	.0	3650.0	.0	.0	465.7	.0	125.4	33.9	100000.00
.38	.00	7.84	.00	.000	.050	.000	.000	7160.20	1173.03
.007797	420.	420.	420.	1	0	0	.00	86.87	1259.90

*SECNO 91.500

3470 ENCROACHMENT STATIONS= .0 1286.0 TYPE= 1 TARGET= 1285.999

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7172.10 ELREA= 100000.00

91.500	7.28	7167.98	.00	.00	7168.63	.65	.67	.18	7172.10
3650.0	.0	3650.0	.0	.0	564.6	.0	126.8	34.2	100000.00
.39	.00	6.46	.00	.000	.050	.000	.000	7160.70	1188.86
.004388	120.	120.	120.	2	0	0	.00	91.13	1279.99

*SECNO 92.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .53

3470 ENCROACHMENT STATIONS= .0 1387.0 TYPE= 1 TARGET= 1386.999

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7170.40 ELREA= 100000.00

92.000	4.08	7170.48	.00	.00	7171.57	1.09	2.89	.04	7170.40
3650.0	14.7	3635.3	.0	6.5	433.7	.0	130.2	35.0	100000.00
.40	2.26	8.38	.00	.030	.050	.000	.000	7166.40	1223.47
.015566	300.	290.	330.	4	0	0	.00	155.90	1379.37

*SECNO 93.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = 1.46

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

3470 ENCROACHMENT STATIONS= .0 1674.0 TYPE= 1 TARGET= 1673.999

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7176.10 ELREA= 100000.00

93.000	5.74	7174.04	.00	.00	7174.84	.79	3.09	.18	7176.10
3650.0	.0	3650.0	.0	.0	510.7	.0	133.6	35.9	100000.00
.41	.00	7.15	.00	.000	.050	.000	.000	7168.30	1563.12
.007334	350.	310.	280.	2	0	0	.00	106.23	1669.35

T1 SECOND PROFILE
T2 500-YR Q - 6,800 CFS BELOW COAL CREEK, 6,000 CFS ABOVE
T3 CRYSTAL RIVER

	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
J1		3			0.				7136.0	
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	15									

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

*PROF 2

IHLEQ = 1. THEREFORE FRICTION LOSS (HL) IS CALCULATED AS A FUNCTION OF PROFILE TYPE, WHICH CAN VARY FROM REACH TO REACH. SEE DOCUMENTATION FOR DETAILS.

0

CCHV= .600 CEHV= .100

*SECNO 82.000

3470 ENCROACHMENT STATIONS= .0 1170.0 TYPE= 1 TARGET= 1169.999

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7133.60 ELREA= 100000.00

82.000	7.20	7136.00	.00	7136.00	7137.44	1.44	.00	.00	7133.60
6800.0	1485.9	5314.1	.0	134.6	576.9	.0	.0	.0	100000.00
.00	11.04	9.21	.00	.020	.050	.000	.000	7128.80	1018.19
.008310	1050.	995.	1050.	0	0	0	.00	151.81	1170.00

*SECNO 83.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3710 WSEL ASSUMED BASED ON MIN DIFF

3470 ENCROACHMENT STATIONS= .0 1515.0 TYPE= 1 TARGET= 1514.999

3470 ENCROACHMENT STATIONS= .0 [illegible] TYPE= 1 TARGET= [illegible]

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7140.90 ELREA= 100000.00

83.000	6.90	7140.90	7137.36	.00	7141.13	.23	1.90	15.95	7140.90
6800.0	.0	6800.0	.0	.0	1755.6	.0	33.8	6.1	100000.00
.09	.00	3.87	.00	.000	.050	.000	.000	7134.00	1221.00
.001598	1100.	1200.	1300.	20	14	0	.00	294.00	1515.00

*SECNO 84.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .54

3470 ENCROACHMENT STATIONS= .0 1705.0 TYPE= 1 TARGET= 1704.999

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

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7145.50 ELREA= 100000.00

84.000	6.16	7143.16	.00	.00	7143.57	.41	2.42	.02	7145.50
6800.0	.0	6800.0	.0	.0	1324.9	.0	57.9	10.5	100000.00
.12	.00	5.13	.00	.000	.060	.000	.000	7137.00	1425.81
.005517	750.	680.	660.	4	0	0	.00	279.19	1705.00

*SECNO 85.000

3470 ENCROACHMENT STATIONS= .0 2033.0 TYPE= 1 TARGET= 2032.999

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7149.00 ELREA= 100000.00

85.000	5.61	7146.01	.00	.00	7146.20	.19	2.50	.13	7149.00
6800.0	.0	6800.0	.0	.0	1937.0	.0	78.1	15.1	100000.00
.16	.00	3.51	.00	.000	.070	.000	.000	7140.40	1577.46
.003998	540.	540.	550.	3	0	0	.00	455.54	2033.00

*SECNO 86.000

3470 ENCROACHMENT STATIONS= .0 1953.0 TYPE= 1 TARGET= 1952.999

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7150.50 ELREA= 100000.00

86.000	6.61	7147.91	.00	.00	7148.08	.17	1.86	.02	7150.50
6800.0	.0	6800.0	.0	.0	2077.9	.0	104.8	20.8	100000.00
.21	.00	3.27	.00	.000	.070	.000	.000	7141.30	1554.93
.002682	510.	580.	600.	3	0	0	.00	398.07	1953.00

*SECNO 87.000

3470 ENCROACHMENT STATIONS= .0 1421.0 TYPE= 1 TARGET= 1420.999

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7152.40 ELREA= 100000.00

87.000	7.31	7148.91	.00	.00	7149.21	.30	1.11	.01	7152.40
6800.0	.0	6800.0	.0	.0	1554.9	.0	117.3	23.5	100000.00
.23	.00	4.37	.00	.000	.060	.000	.000	7141.60	1025.78
.005115	250.	300.	300.	2	0	0	.00	395.22	1421.00

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

*SECNO 88.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = .68

3470 ENCROACHMENT STATIONS= .0 1205.0 TYPE= 1 TARGET= 1204.999

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7150.70 ELREA= 100000.00

88.000	6.11	7153.21	.00	.00	7154.59	1.38	5.28	.11	7150.70
6800.0	463.1	6336.9	.0	158.3	650.5	.0	135.1	27.8	100000.00
.25	2.93	9.74	.00	.100	.050	.000	.000	7147.10	1027.49
.011010	650.	655.	600.	3	0	0	.00	177.06	1204.55

*SECNO 89.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = 1.48

3470 ENCROACHMENT STATIONS= .0 1339.0 TYPE= 1 TARGET= 1338.999

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7158.20 ELREA= 100000.00

89.000	7.50	7158.60	.00	.00	7159.28	.68	4.27	.42	7158.20
6800.0	954.5	5845.5	.0	462.9	822.6	.0	150.0	31.2	100000.00
.28	2.06	7.11	.00	.100	.050	.000	.000	7151.10	1024.14
.005052	630.	615.	630.	3	0	0	.00	301.86	1326.00

*SECNO 90.000

3470 ENCROACHMENT STATIONS= .0 1342.0 TYPE= 1 TARGET= 1341.999

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7163.90 ELREA= 100000.00

90.000	6.85	7164.45	.00	.00	7165.20	.75	5.91	.01	7163.90
6800.0	644.3	6155.7	.0	156.7	858.3	.0	172.4	36.9	100000.00
.31	4.11	7.17	.00	.060	.050	.000	.000	7157.60	1047.82
.008953	870.	840.	850.	4	0	0	.00	279.71	1327.54

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

*SECNO 91.000

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= .0 1265.0 TYPE= 1 TARGET= 1264.999

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7172.80 ELREA= 100000.00

91.000	7.73	7167.93	.00	.00	7169.67	1.74	4.37	.10	7172.80
6000.0	.0	6000.0	.0	.0	567.2	.0	180.0	38.7	100000.00
.32	.00	10.58	.00	.000	.050	.000	.000	7160.20	1171.51
.012110	420.	420.	420.	2	0	0	.00	93.49	1265.00

*SECNO 91.500

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE. KRATIO = 1.55

3470 ENCROACHMENT STATIONS= .0 1286.0 TYPE= 1 TARGET= 1285.999

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7172.10 ELREA= 100000.00

91.500	9.33	7170.03	.00	.00	7170.99	.96	.85	.47	7172.10
6000.0	.0	6000.0	.0	.0	763.3	.0	181.8	39.0	100000.00
.33	.00	7.86	.00	.000	.050	.000	.000	7160.70	1185.45
.005045	120.	120.	120.	3	0	0	.00	100.55	1286.00

*SECNO 92.000

3470 ENCROACHMENT STATIONS= .0 1387.0 TYPE= 1 TARGET= 1386.999

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE. ELLEA= 7170.40 ELREA= 100000.00

92.000	5.70	7172.10	.00	.00	7173.08	.98	2.09	.00	7170.40
6000.0	717.3	5282.7	.0	136.9	641.2	.0	187.0	40.2	100000.00
.34	5.24	8.24	.00	.030	.050	.000	.000	7166.40	1111.34
.009330	300.	290.	330.	4	0	0	.00	271.99	1383.33

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

*SECNO 93.000

3301 HV CHANGED MORE THAN HVINS

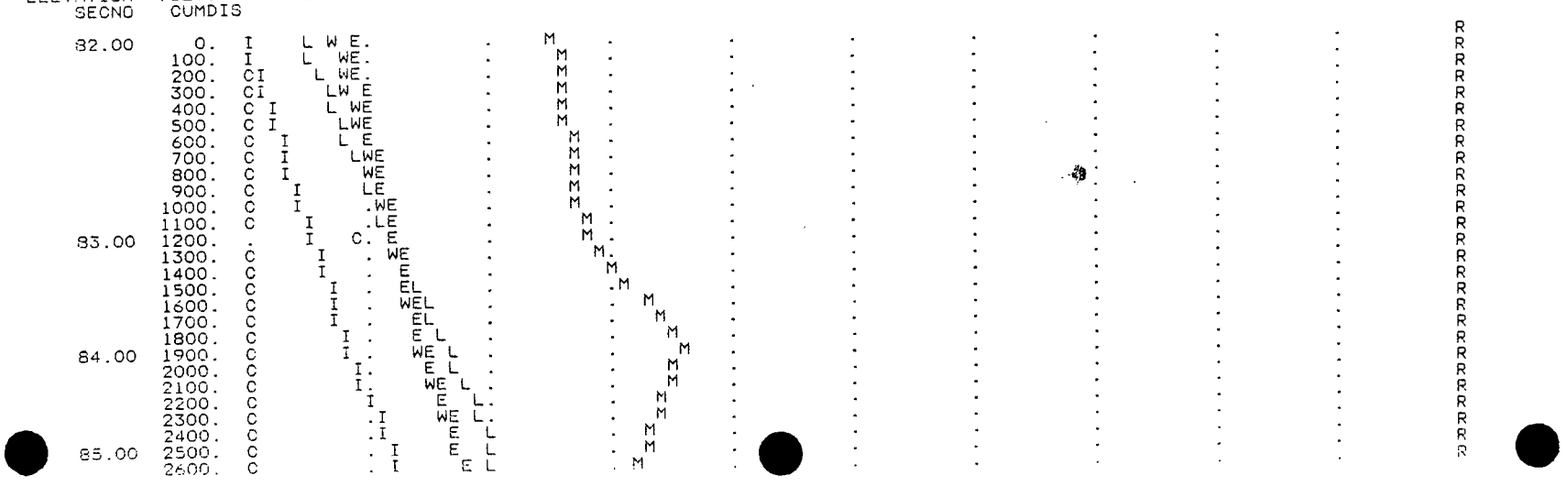
3470 ENCROACHMENT STATIONS= .0 1674.0 TYPE= 1 TARGET= 1673.999

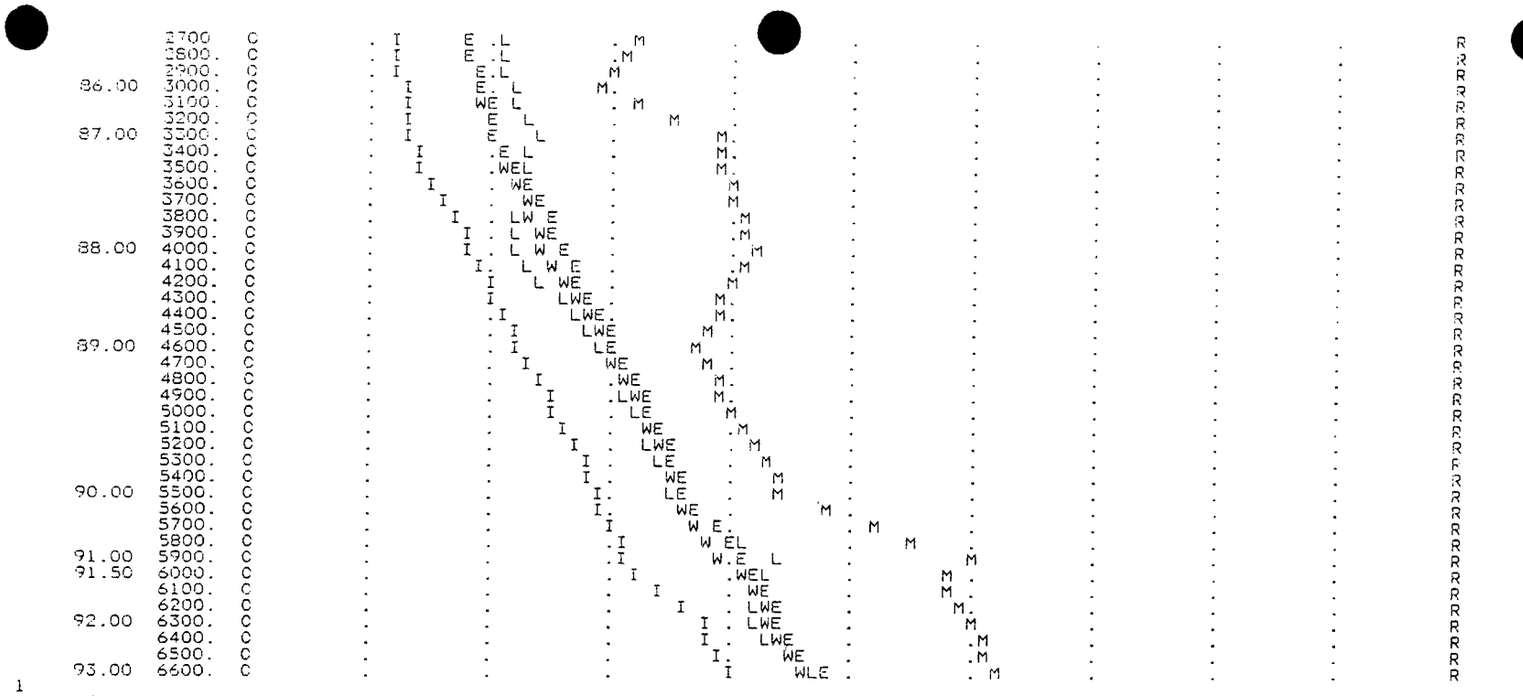
3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 7176.10 ELREA= 100000.00

93.000	6.61	7174.91	.00	.00	7176.44	1.53	3.31	.06	7176.10
6000.0	.0	6000.0	.0	.0	604.7	.0	192.0	41.7	100000.00
.35	.00	9.92	.00	.000	.050	.000	.000	7168.30	1559.71
.012010	350.	310.	280.	2	0	0	.00	111.05	1670.76

1 PROFILE FOR STREAM CRYSTAL RIVER

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





THIS RUN EXECUTED 16JUL91 14:50:59

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.0; February 1991
****

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

JUN 91 CORPS-NEW X-SECS

SUMMARY PRINTOUT

	SECNO	Q	XLCH	ELMIN	CWSEL	CRIWS	EG	DIFKWS	PERENC	TOPWID	SSTA	ENDST
*	82.000	4200.00	.00	7128.80	7134.05	7134.05	7135.67	.05	1170.00	150.27	1019.72	1170.00
	82.000	6800.00	.00	7128.80	7136.00	.00	7137.44	.00	1170.00	151.81	1018.19	1170.00
*	83.000	4200.00	1200.00	7134.00	7139.52	.00	7139.67	.00	1515.00	290.61	1224.39	1515.00
*	83.000	6800.00	1200.00	7134.00	7140.90	7137.36	7141.13	.00	1515.00	294.00	1221.00	1515.00
*	84.000	4200.00	680.00	7137.00	7141.85	.00	7142.14	.00	1705.00	273.79	1431.21	1705.00
*	84.000	6800.00	680.00	7137.00	7143.16	.00	7143.57	.00	1705.00	279.19	1425.81	1705.00
	85.000	4200.00	540.00	7140.40	7144.81	.00	7144.95	.00	2033.00	447.40	1580.05	2027.45
	85.000	6800.00	540.00	7140.40	7146.01	.00	7146.20	.00	2033.00	455.54	1577.46	2033.00
	86.000	4200.00	580.00	7141.30	7146.69	.00	7146.80	.00	1953.00	395.28	1557.72	1953.00
	86.000	6800.00	580.00	7141.30	7147.91	.00	7148.08	.00	1953.00	398.07	1554.93	1953.00
*	87.000	4200.00	300.00	7141.60	7147.75	.00	7147.98	.00	1421.00	392.97	1028.03	1421.00
	87.000	6800.00	300.00	7141.60	7148.91	.00	7149.21	.00	1421.00	395.22	1025.78	1421.00

	88.000	4200.00	655.00	7147.10	7152.17	.00	7152.17	.00	1205.00	177.08	1027.49	1204.57
K	88.000	6800.00	655.00	7147.10	7153.21	.00	7154.59	.00	1205.00	177.08	1027.49	1204.55
	89.000	4200.00	615.00	7151.10	7156.81	.00	7157.56	.00	1339.00	115.27	1206.26	1321.53
K	89.000	6800.00	615.00	7151.10	7158.60	.00	7159.28	.00	1339.00	301.86	1024.14	1326.00
	90.000	4200.00	840.00	7157.60	7163.48	.00	7164.11	.00	1342.00	202.59	1123.18	1325.77
	90.000	6800.00	840.00	7157.60	7164.45	.00	7165.20	.00	1342.00	279.71	1047.82	1327.54
	91.000	3650.00	420.00	7160.20	7166.82	.00	7167.78	.00	1265.00	86.87	1173.03	1259.90
	91.000	6000.00	420.00	7160.20	7167.93	.00	7169.67	.00	1265.00	93.49	1171.51	1265.00
	91.500	3650.00	120.00	7160.70	7167.98	.00	7168.63	.00	1286.00	91.13	1188.86	1279.99
K	91.500	6000.00	120.00	7160.70	7170.03	.00	7170.99	.00	1286.00	100.55	1185.45	1286.00

	SECNO	Q	XLCH	ELMIN	CWSEL	CRIWS	EG	DIFKWS	PERENC	TOPWID	SSTA	ENDST
K	92.000	3650.00	290.00	7166.40	7170.48	.00	7171.57	.00	1387.00	155.90	1223.47	1379.37
	92.000	6000.00	290.00	7166.40	7172.10	.00	7173.08	.00	1387.00	271.99	1111.34	1383.33
K	93.000	3650.00	310.00	7168.30	7174.04	.00	7174.84	.00	1674.00	106.23	1563.12	1669.35
	93.000	6000.00	310.00	7168.30	7174.91	.00	7176.44	.00	1674.00	111.05	1559.71	1670.76

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO=	82.000	PROFILE= 1	CRITICAL DEPTH ASSUMED
WARNING SECNO=	83.000	PROFILE= 1	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO=	83.000	PROFILE= 2	WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO=	83.000	PROFILE= 2	20 TRIALS ATTEMPTED TO BALANCE WSEL
WARNING SECNO=	84.000	PROFILE= 1	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=	84.000	PROFILE= 2	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=	87.000	PROFILE= 1	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=	88.000	PROFILE= 2	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=	89.000	PROFILE= 2	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=	91.500	PROFILE= 2	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=	92.000	PROFILE= 1	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=	93.000	PROFILE= 1	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

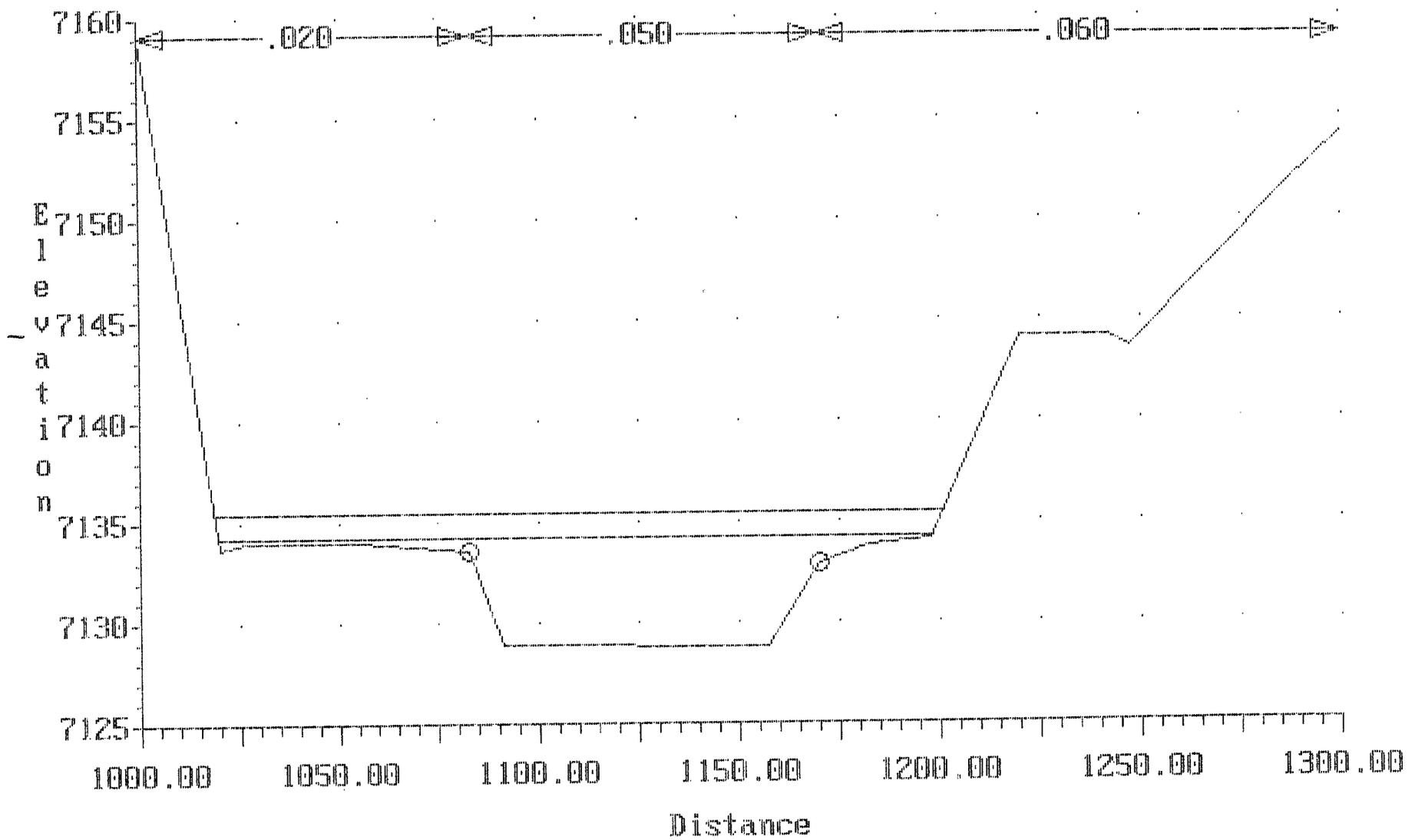
FLOODWAY DATA, JUN 91 CORPS-NEW X-SECS
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WATER SURFACE ELEVATION WITHOUT FLOODWAY	DIFFERENCE
82.000	152.	711.	9.6	7136.0	7134.0	2.0
83.000	294.	1756.	3.9	7140.9	7139.5	1.4
84.000	279.	1325.	5.1	7143.2	7141.9	1.3
85.000	456.	1937.	3.5	7146.0	7144.8	1.2
86.000	398.	2078.	3.3	7147.9	7146.7	1.2
87.000	395.	1555.	4.4	7148.9	7147.7	1.2
88.000	177.	809.	8.4	7153.2	7152.1	1.1
89.000	302.	1285.	5.3	7158.6	7156.8	1.8
90.000	280.	1015.	6.7	7164.5	7163.5	1.0
91.000	93.	567.	10.6	7167.9	7166.8	1.1
91.500	101.	763.	7.9	7170.0	7168.0	2.0
92.000	272.	778.	7.7	7172.1	7170.5	1.6

APPENDIX C

CROSS SECTIONS (EXISTING CONDITIONS)
(Pages 1 to 12)

CROSS SECTIONS (ENCROACHED CONDITIONS)
(Pages 13 to 24)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7160
7155
7150
7145
7140
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Elevation
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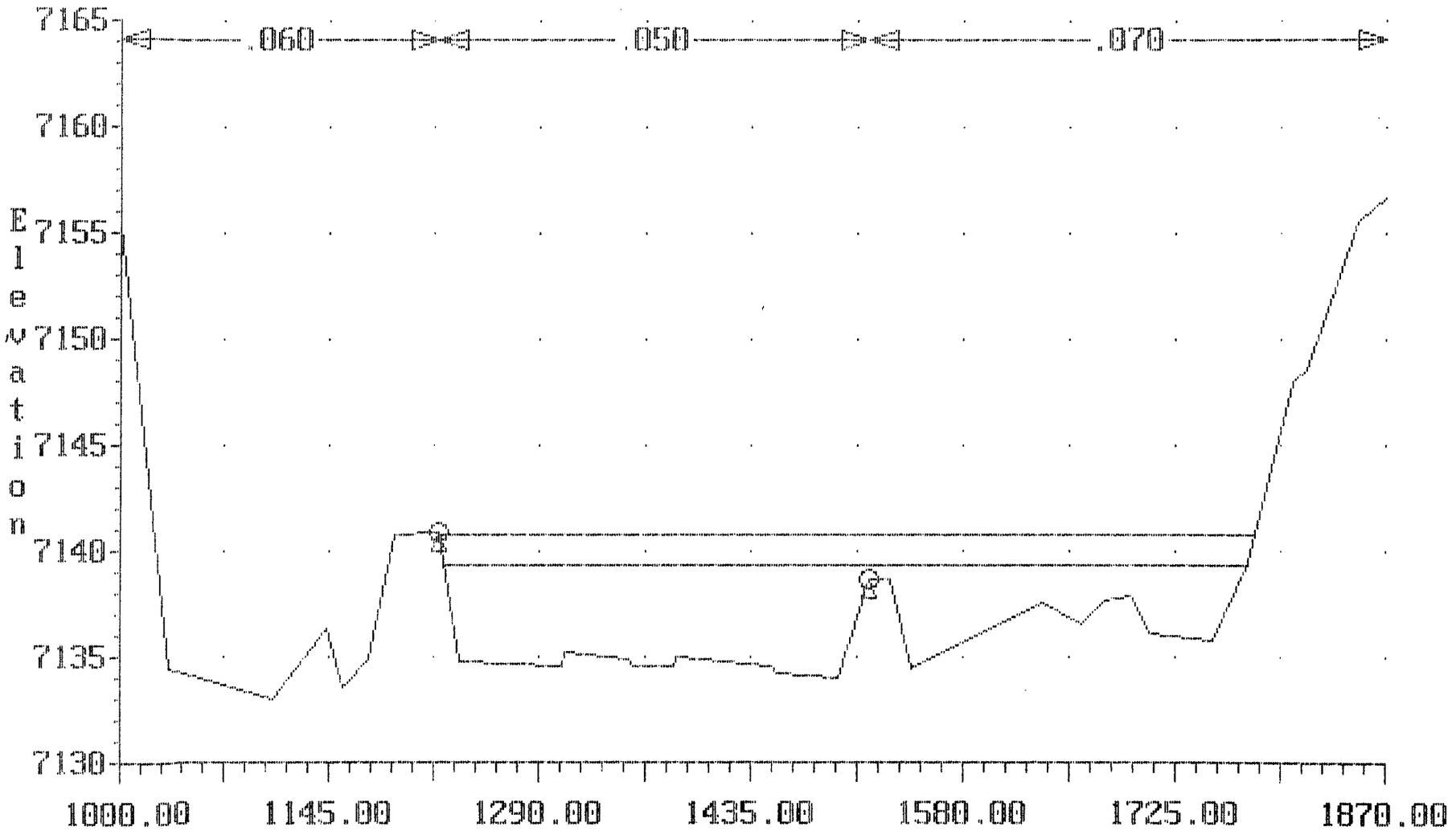
Distance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Cross-section 83.000
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.070
7165
7160
7155
7150
7145
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Elevation
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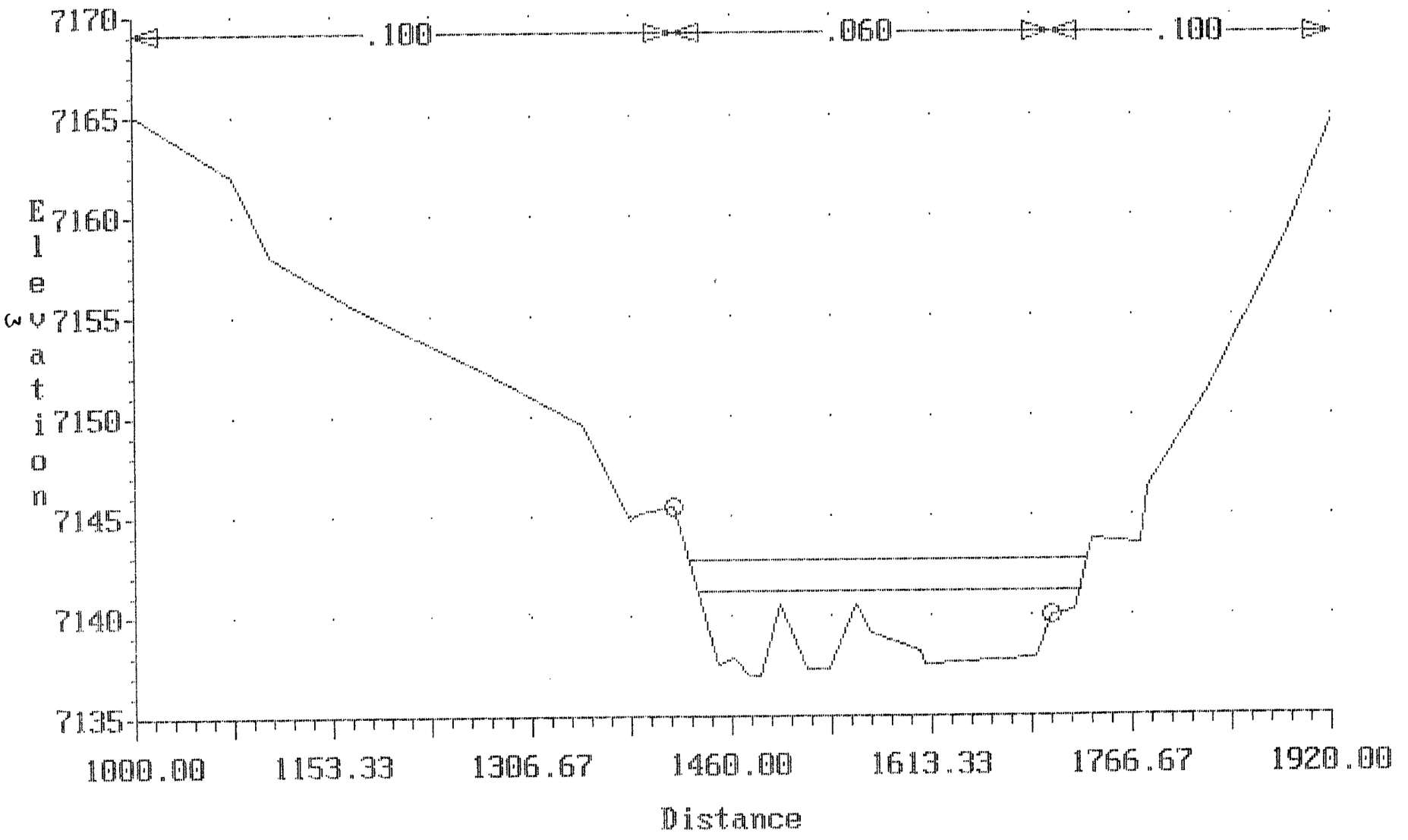
Distance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.060
.100
7170
7165
7160
7155
7150
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7135
Elevation
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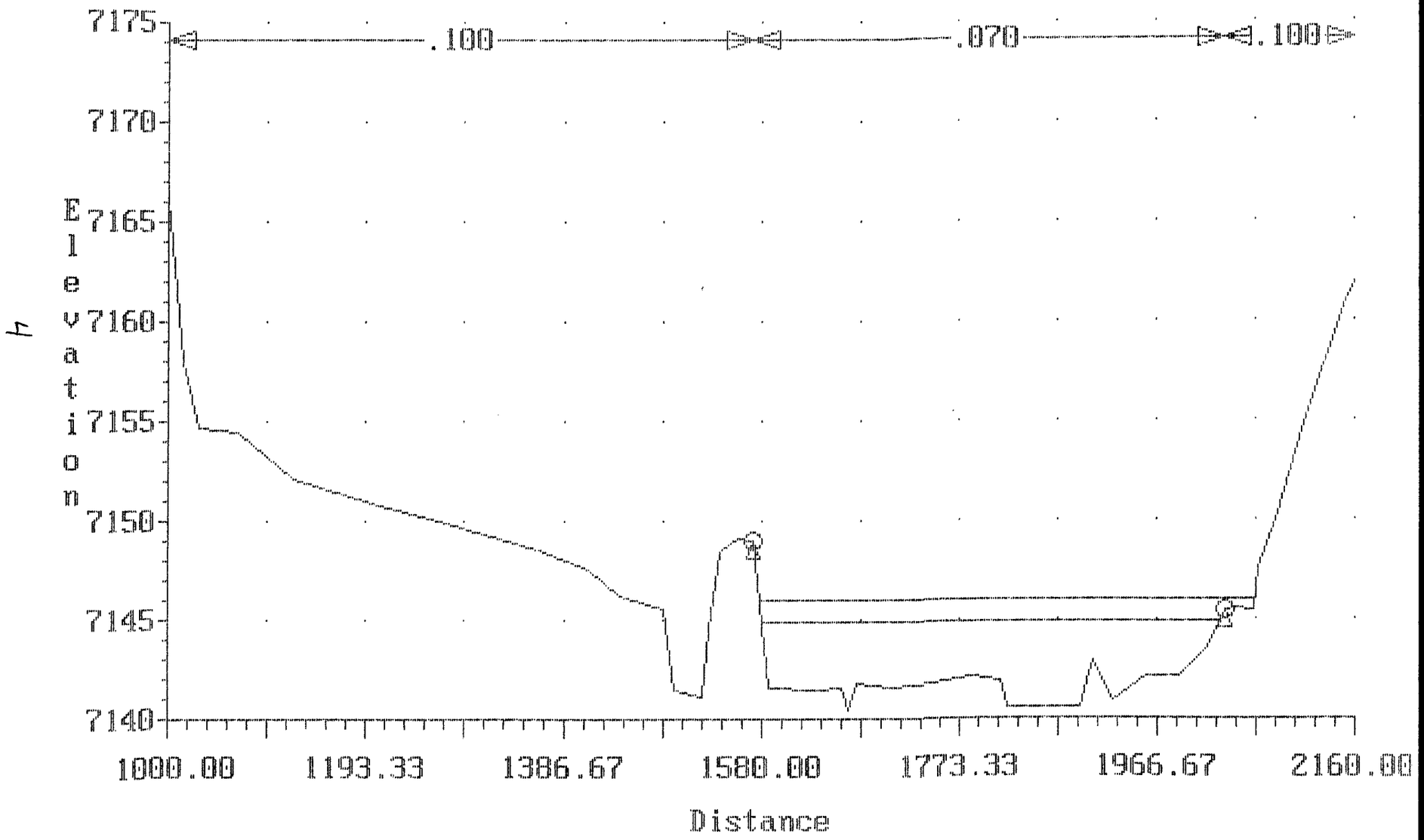
Distance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7170
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Elevation
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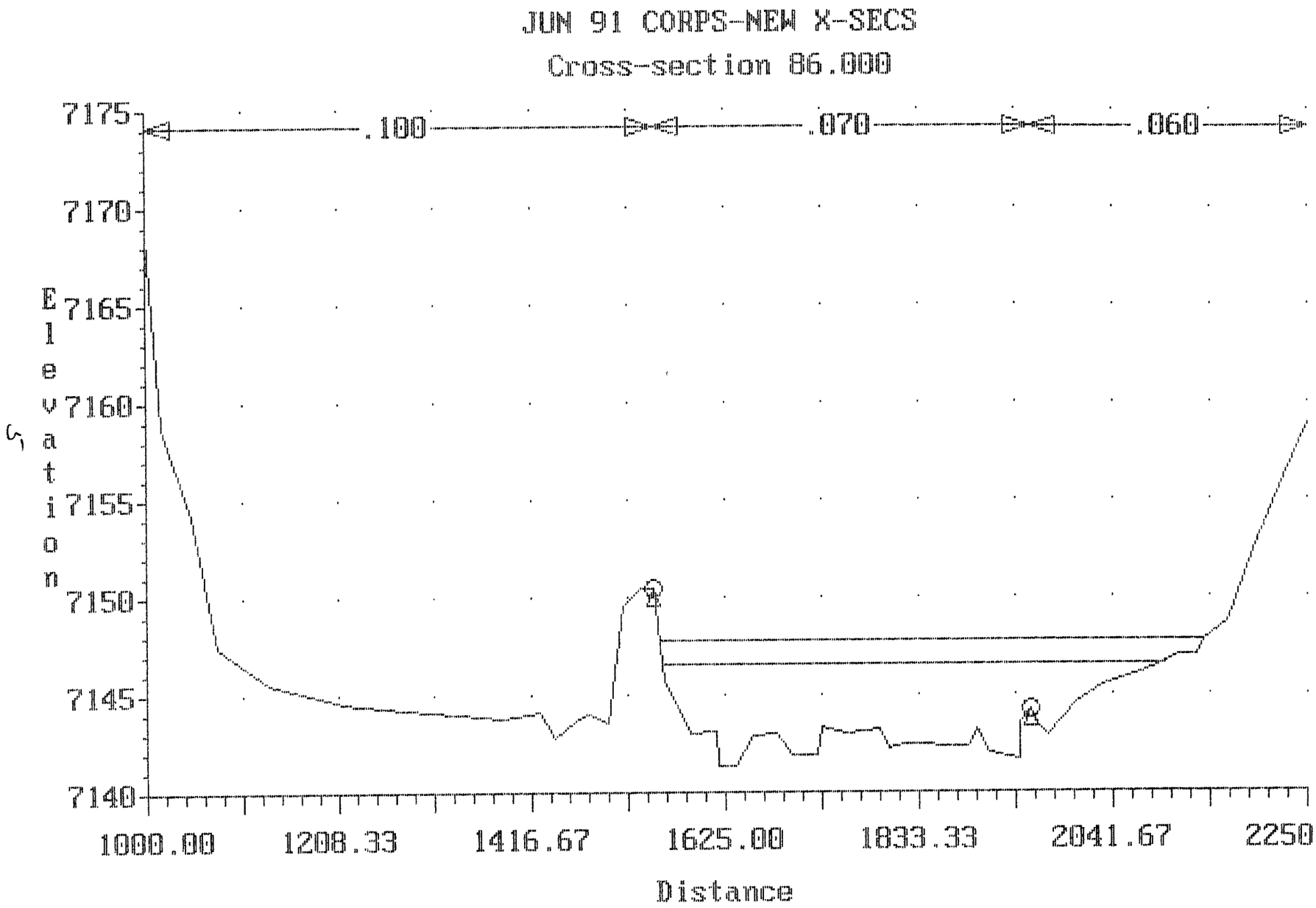
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7170
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Elevation
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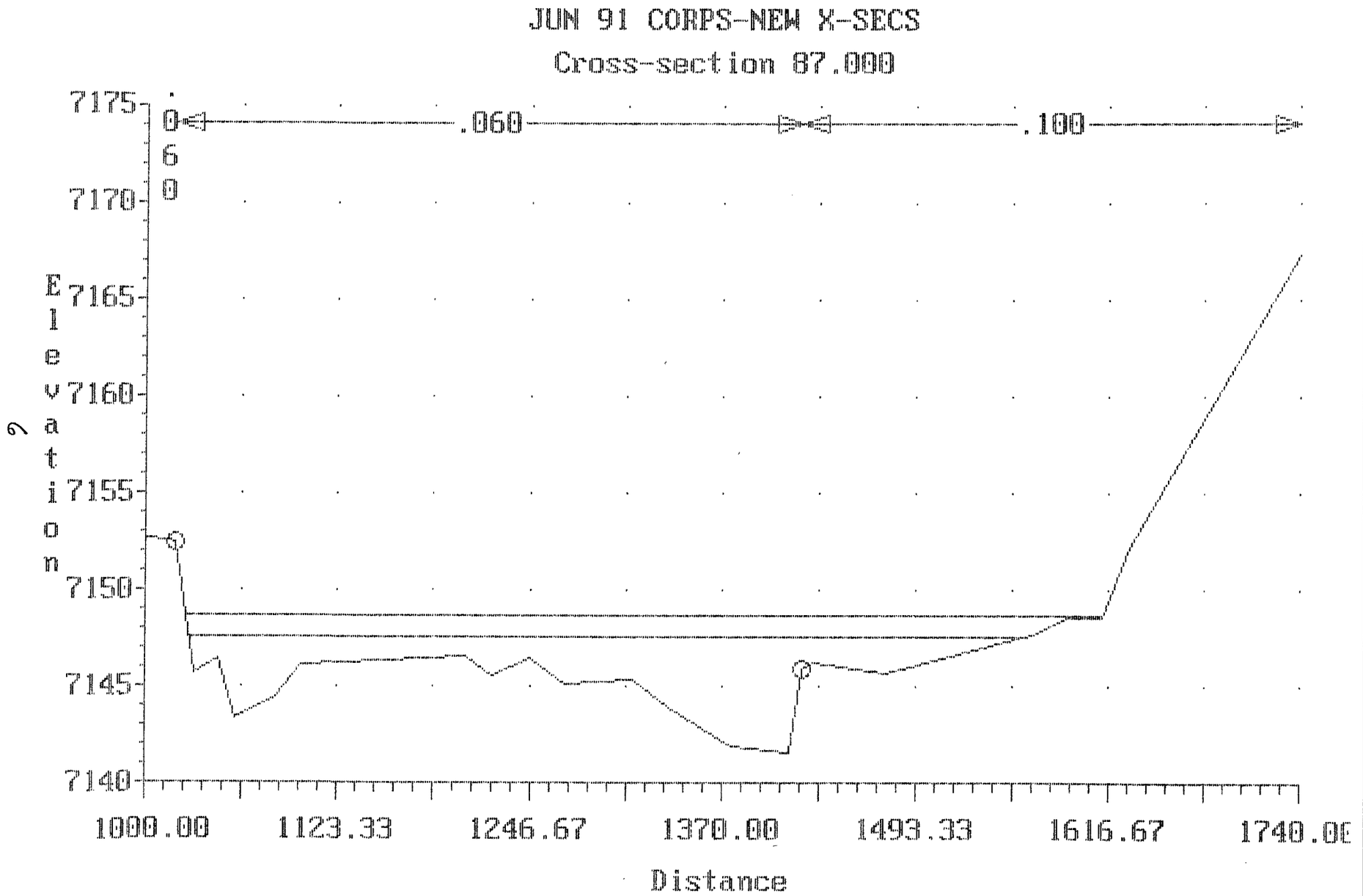
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7155
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Elevation
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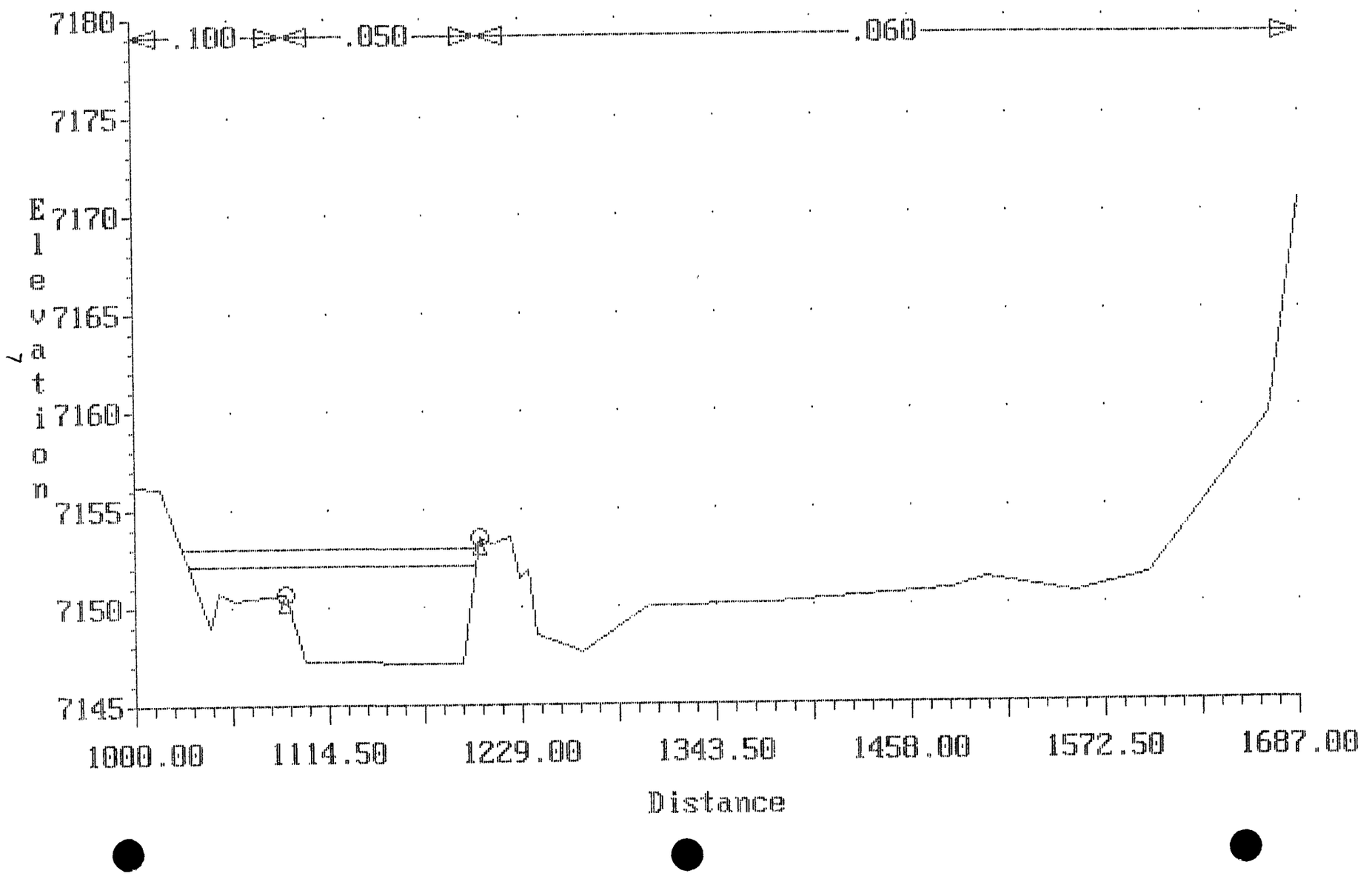
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Cross-section 88.000
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7175
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7165
7160
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Elevation
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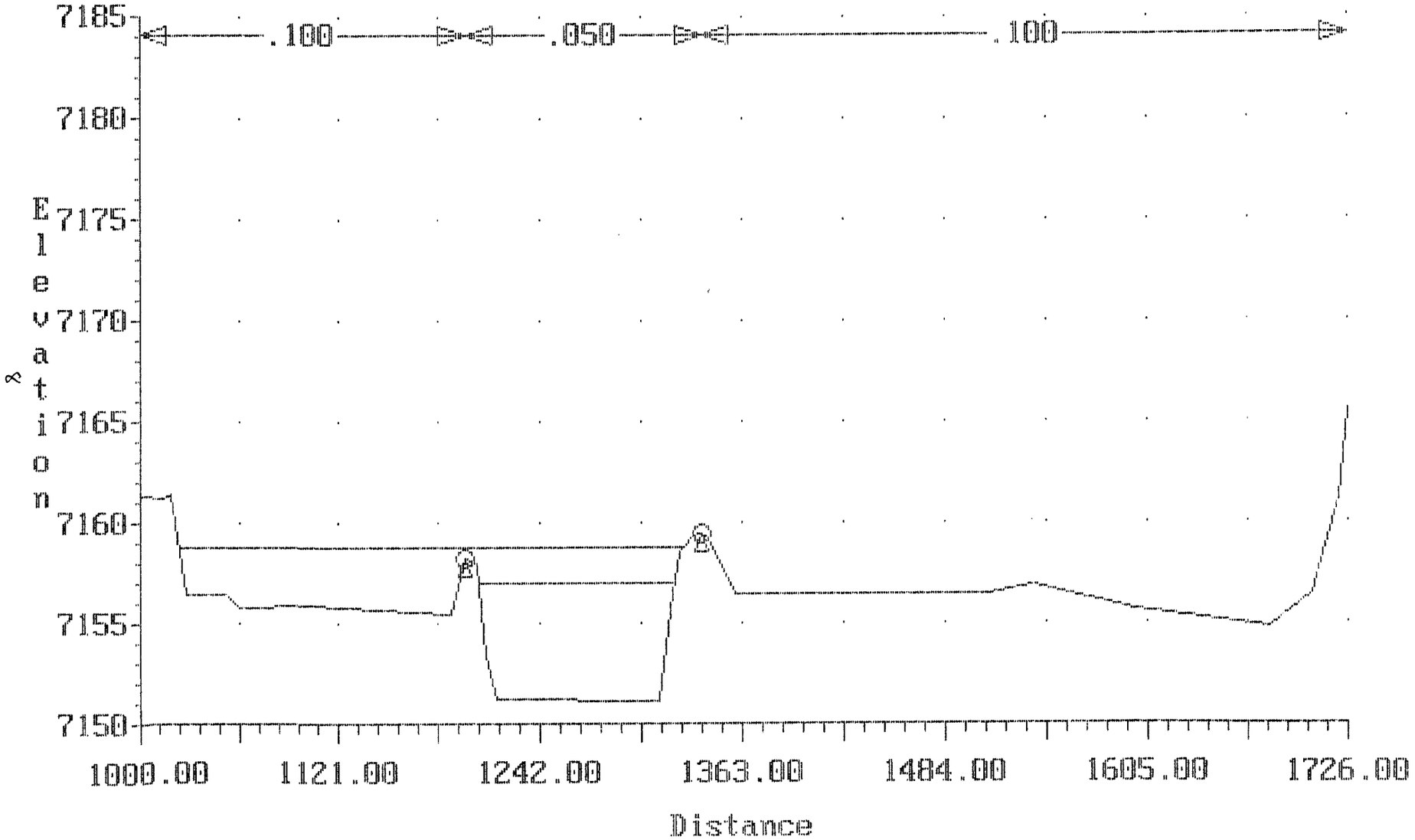
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.100
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7170
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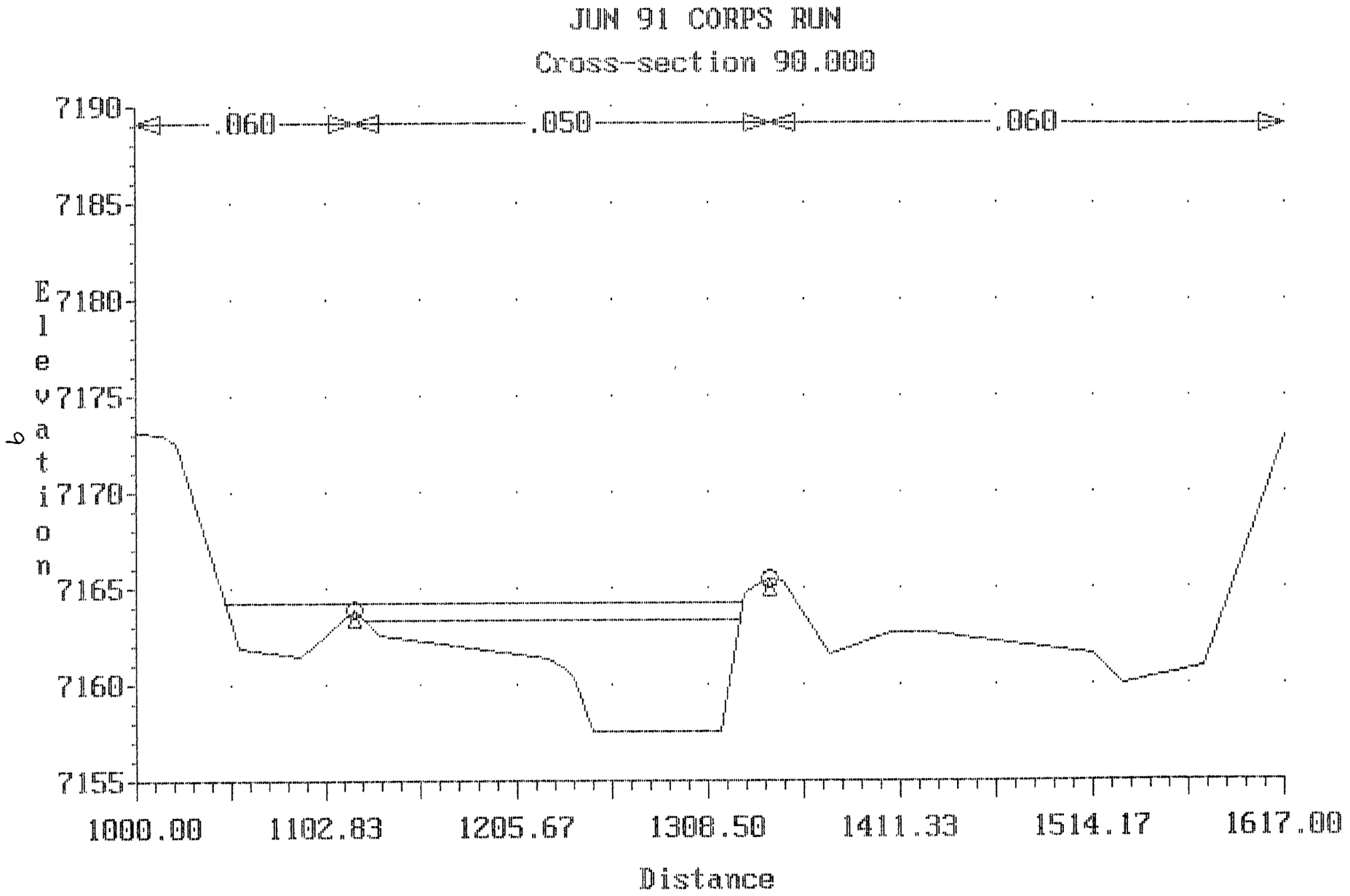
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.060
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Elevation
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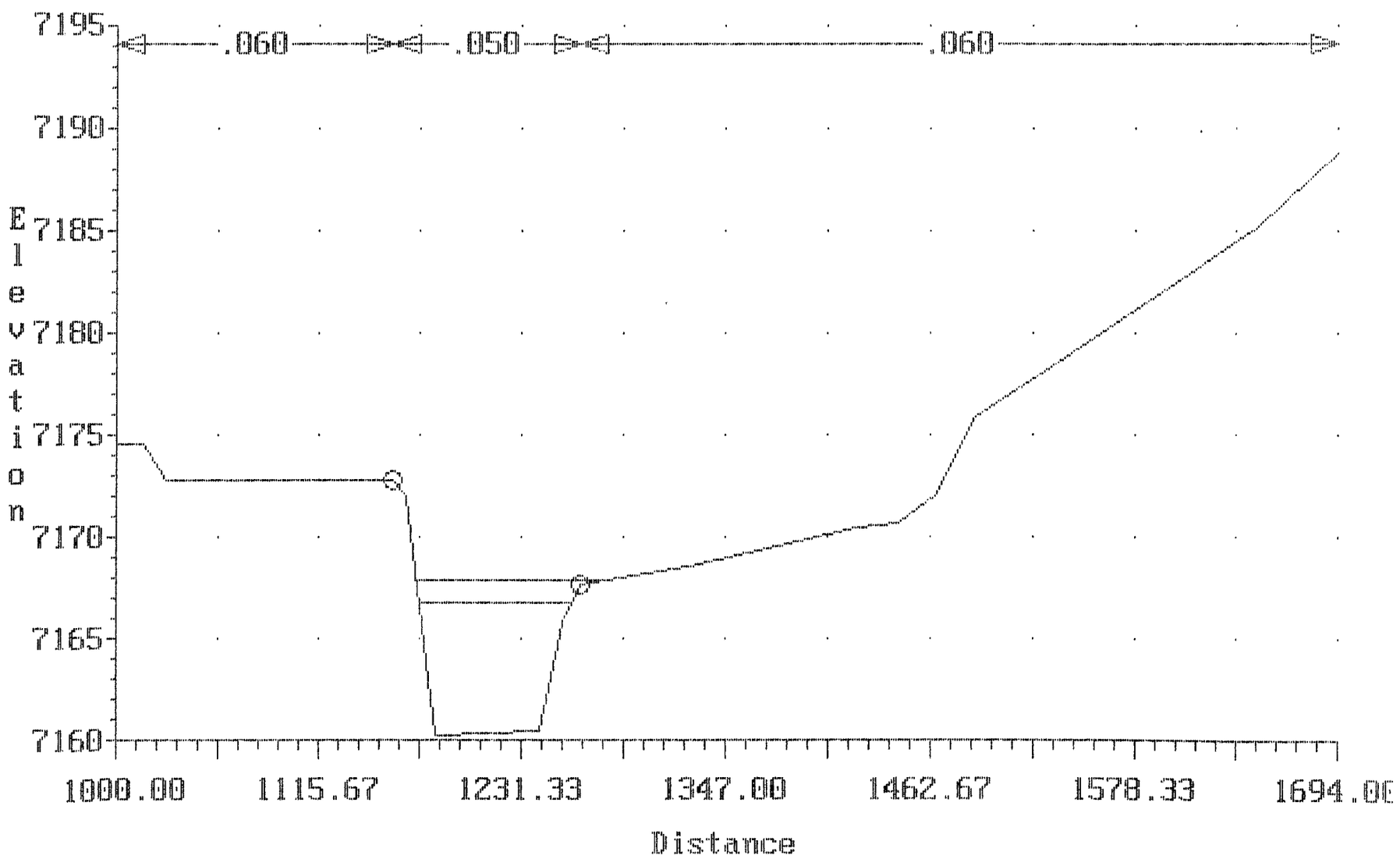
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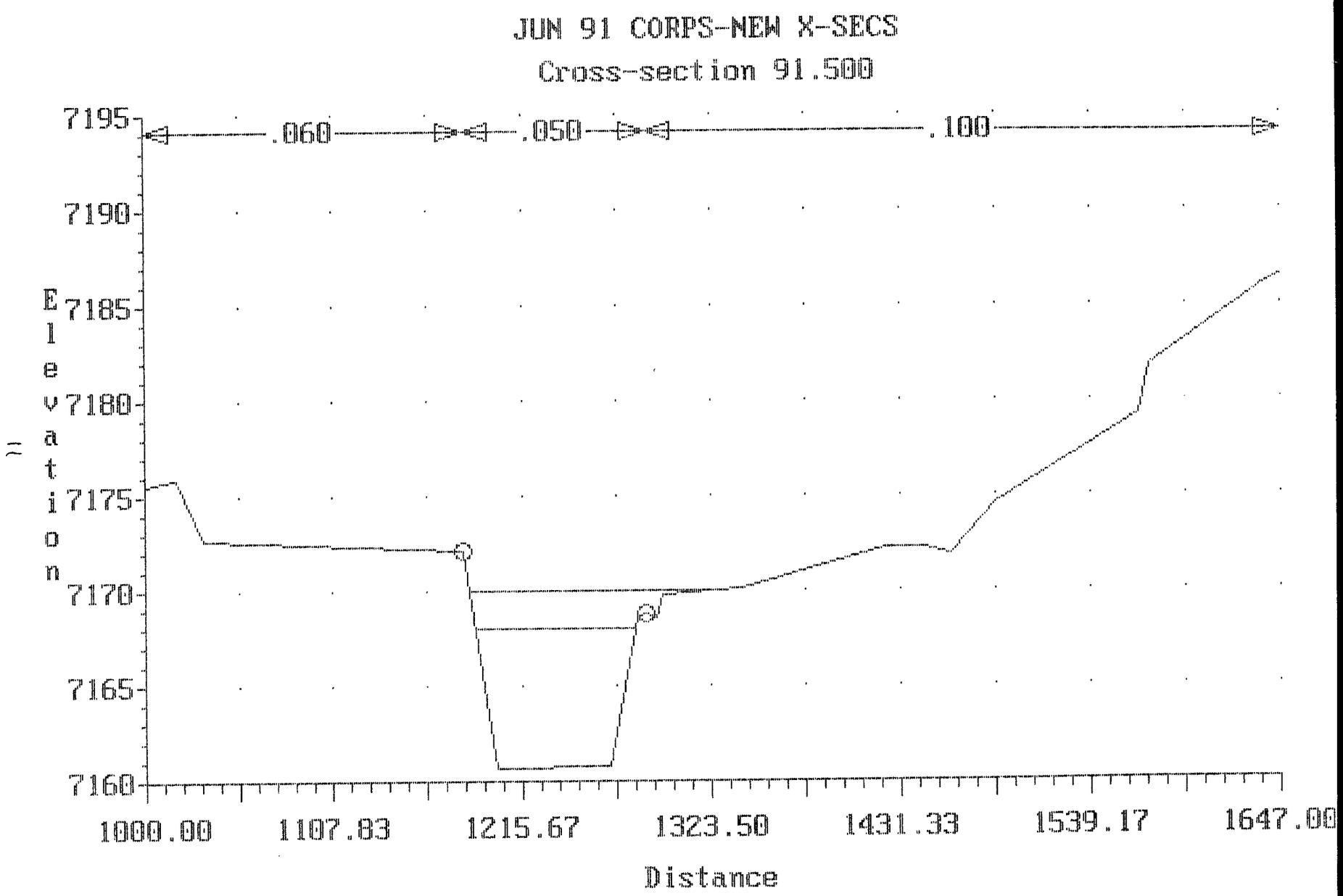
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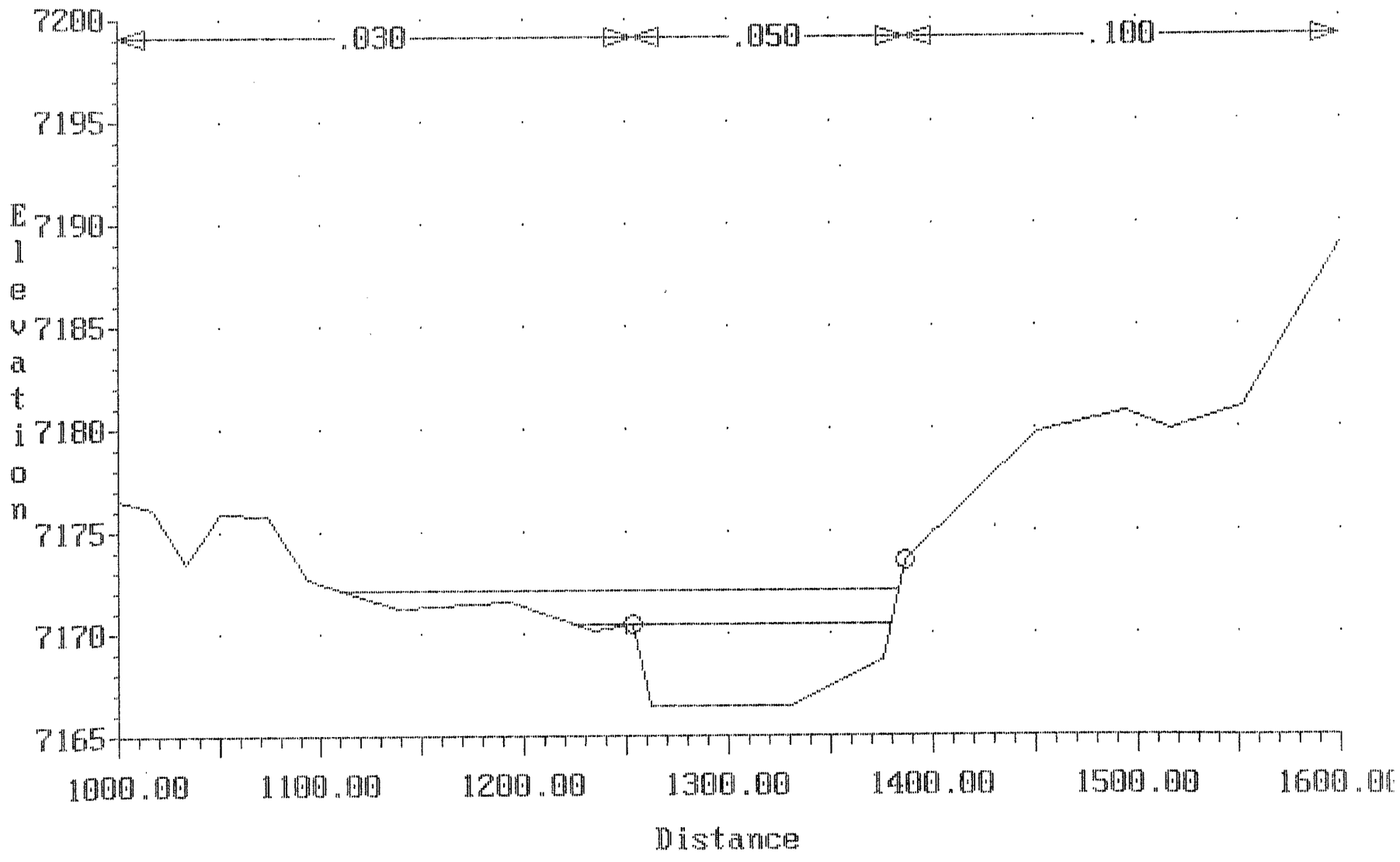
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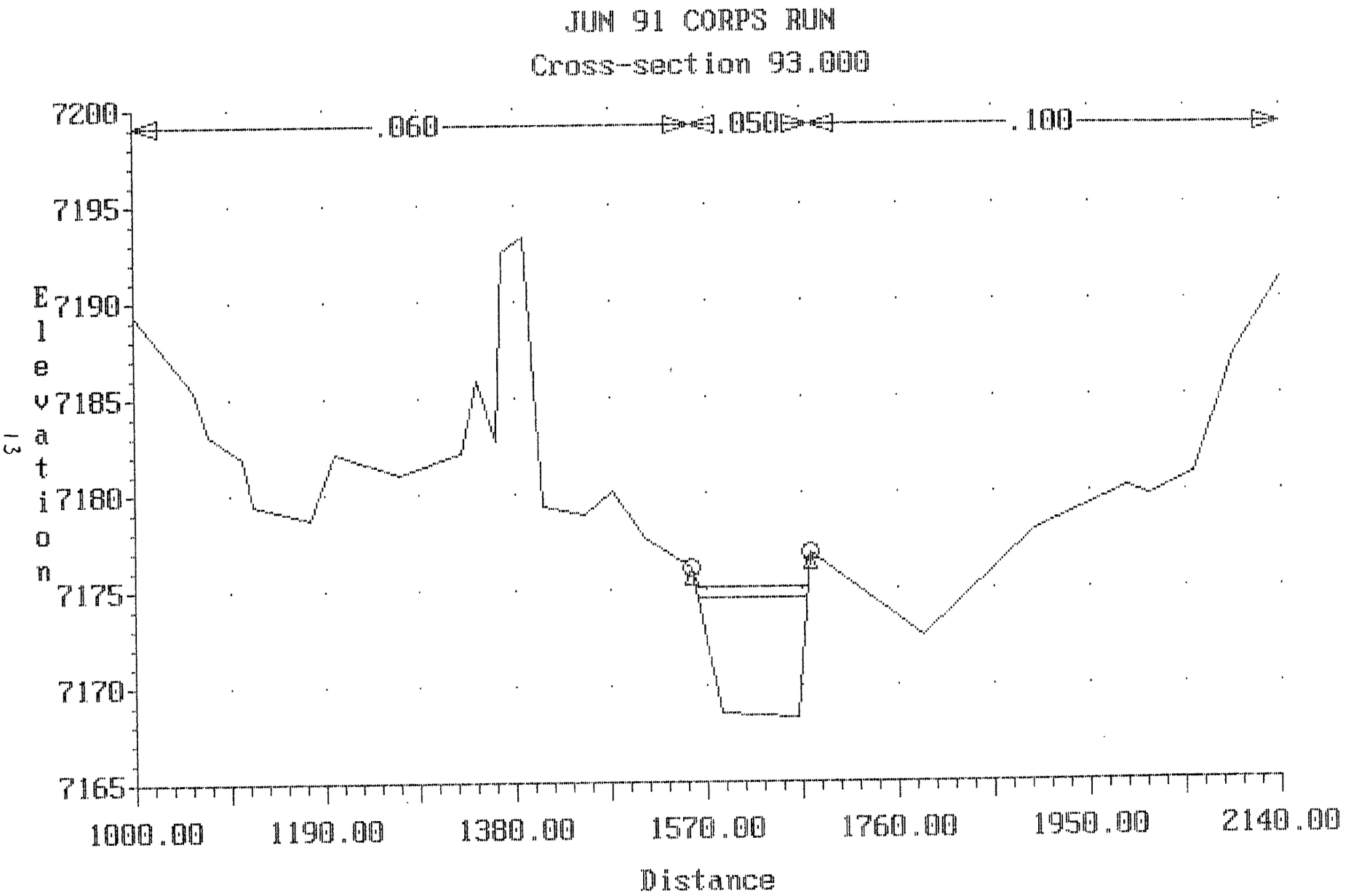
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Elevation
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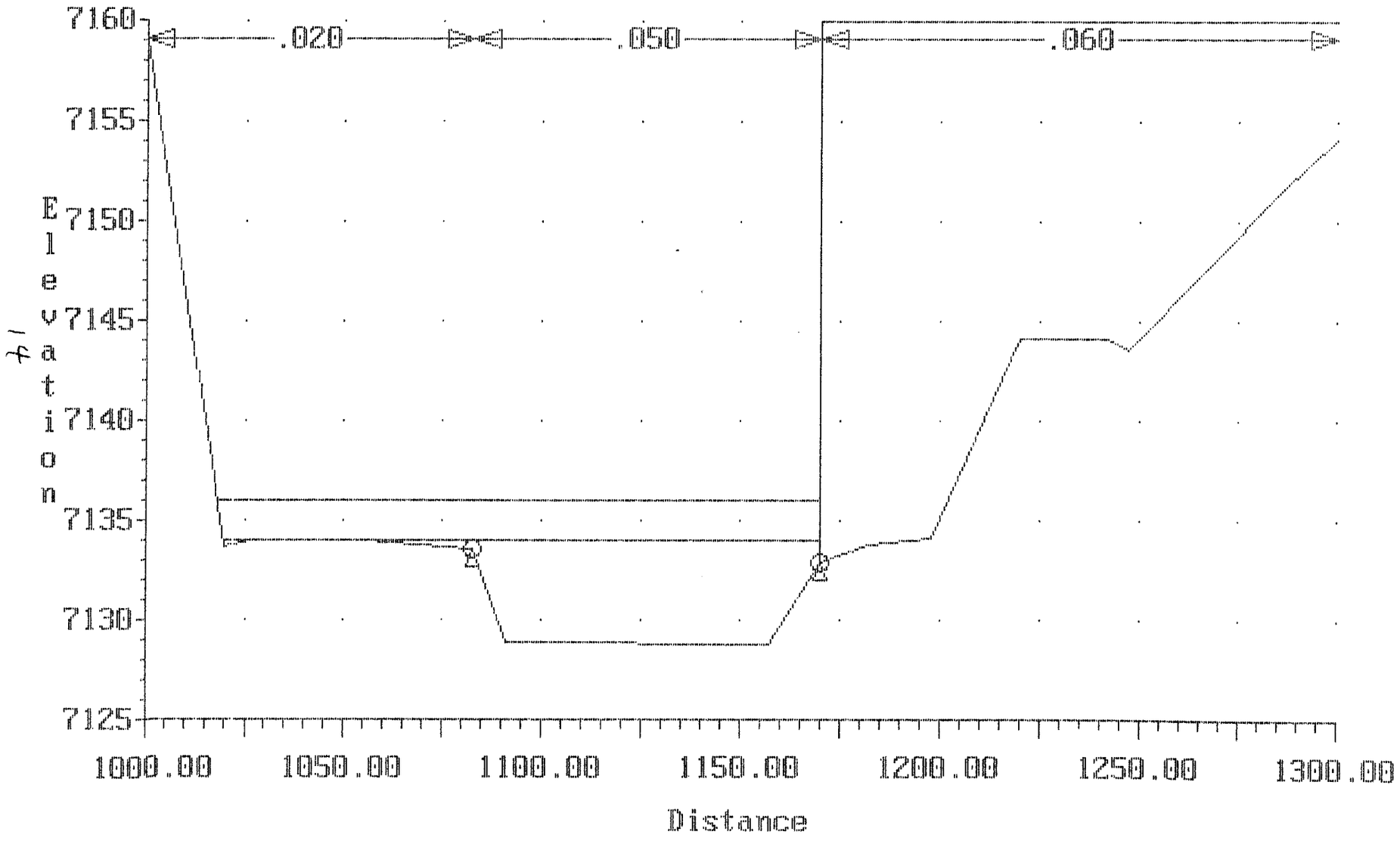
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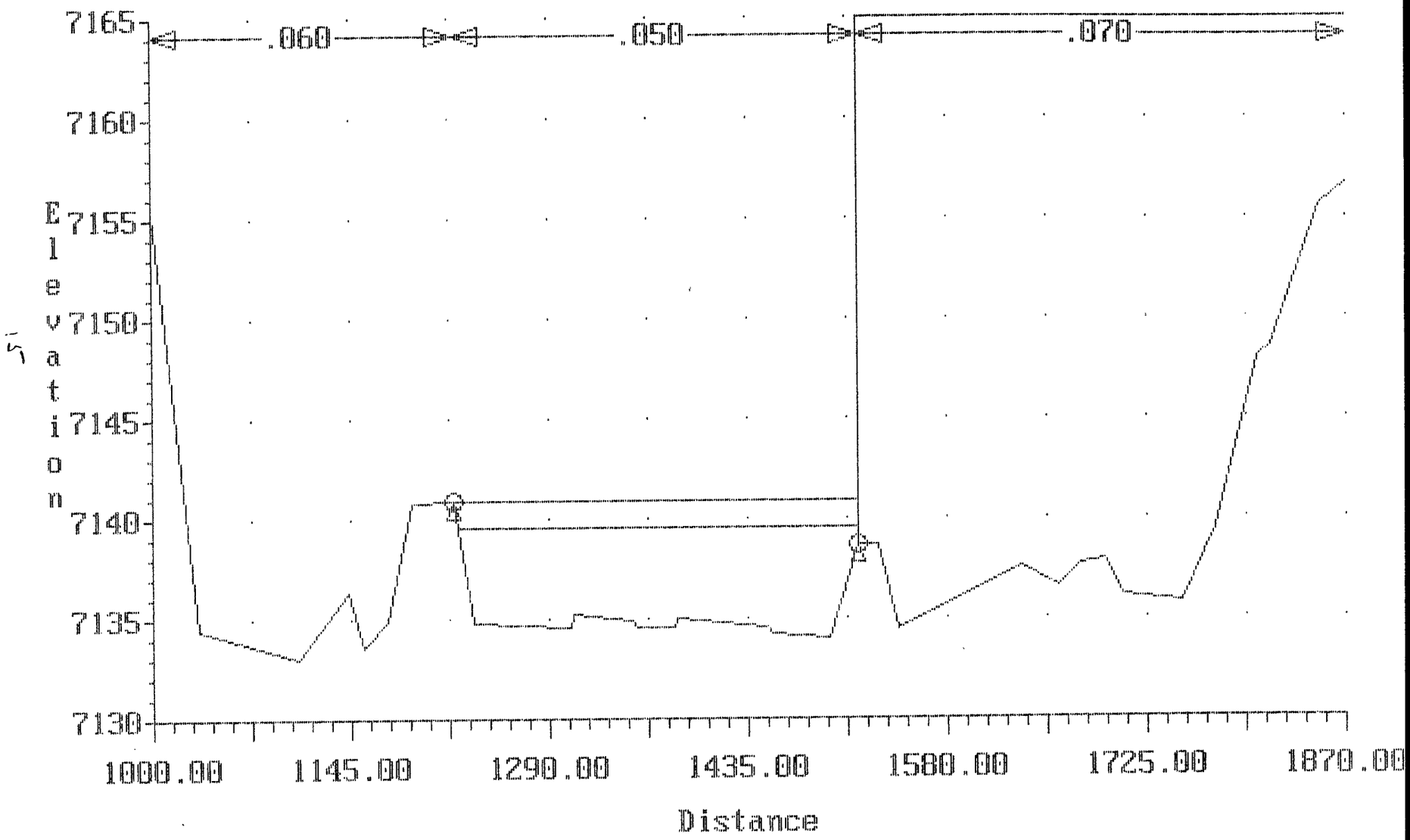
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RIGHT BANK ENCROACHMENT
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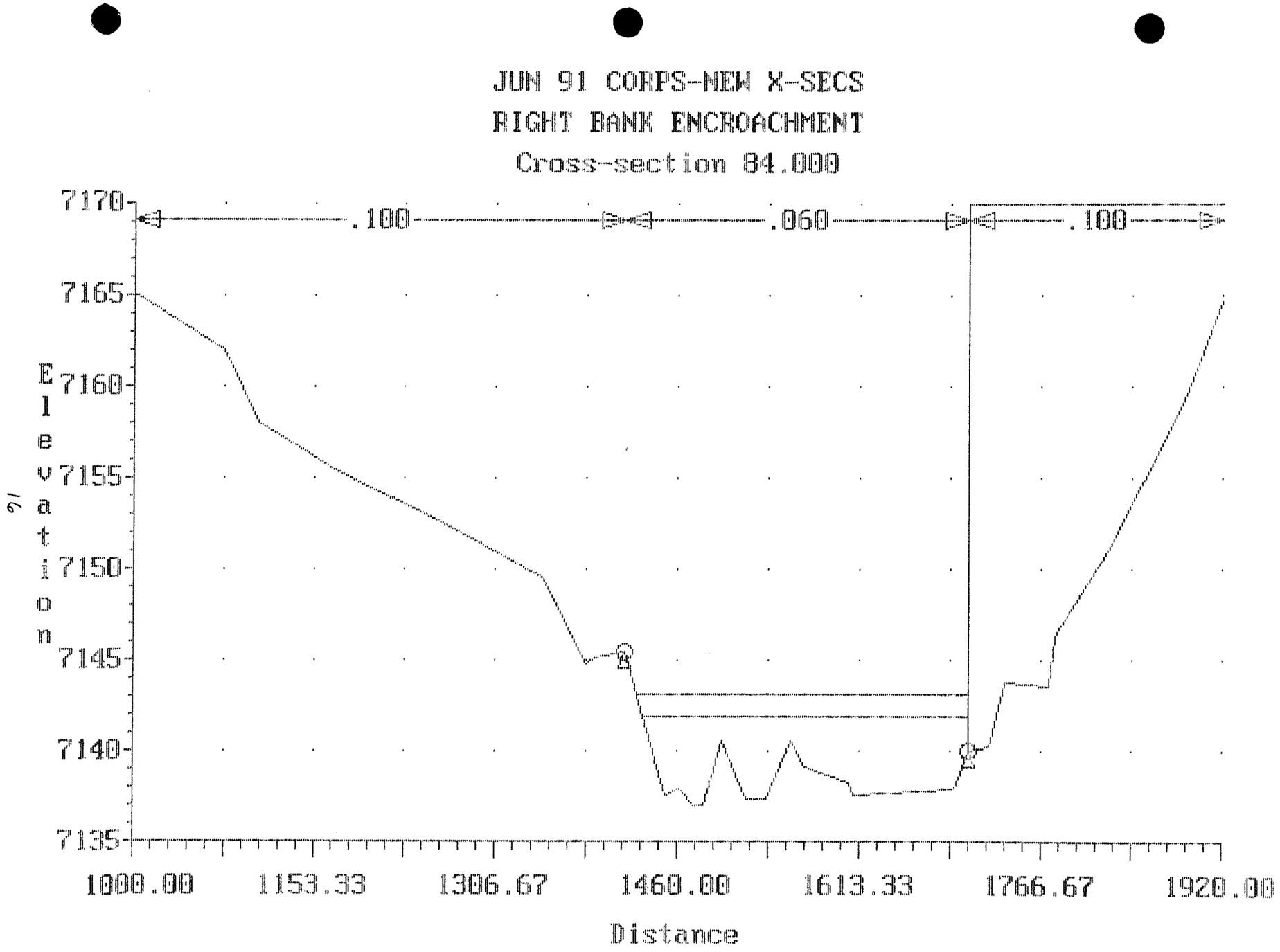
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7140
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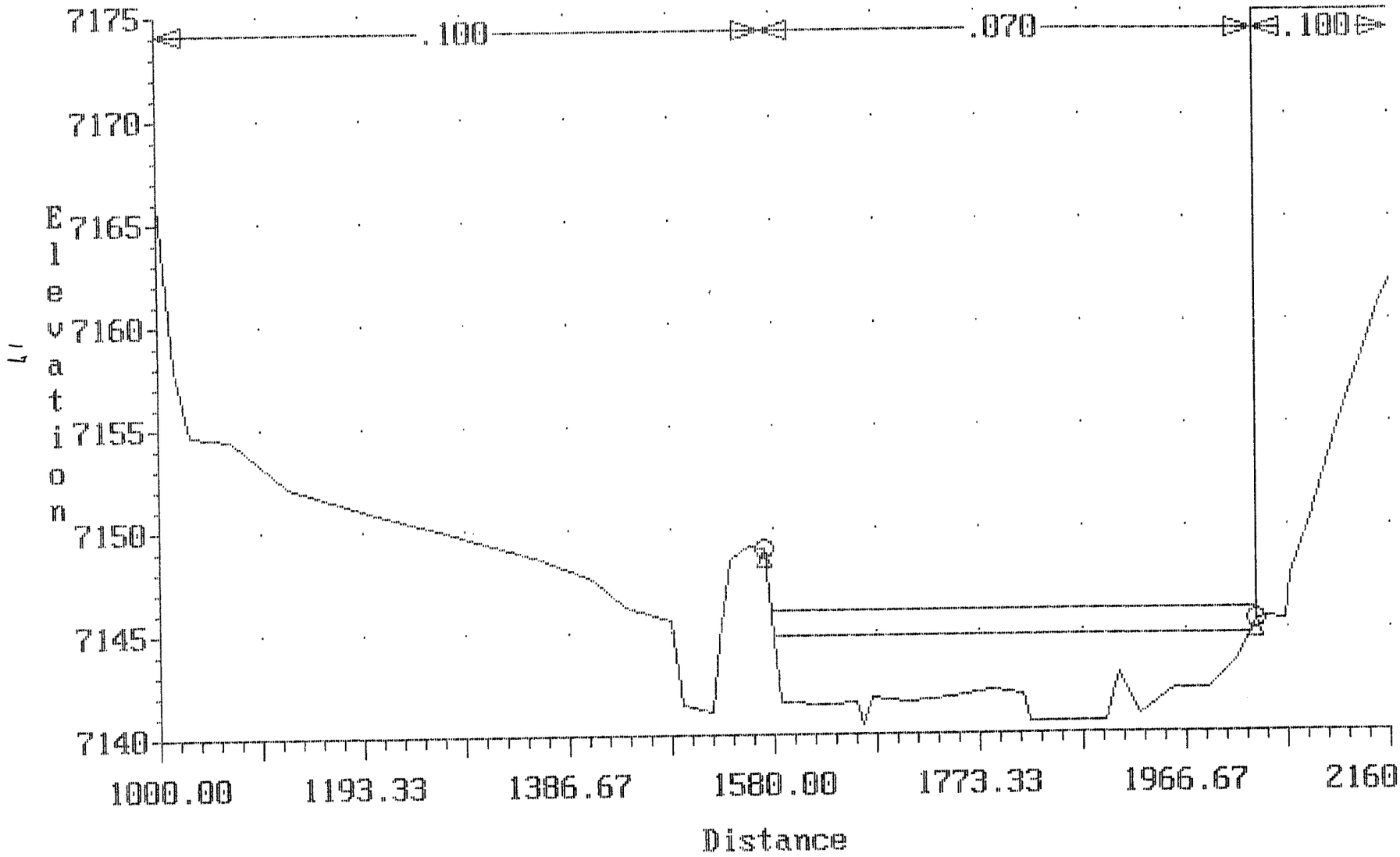
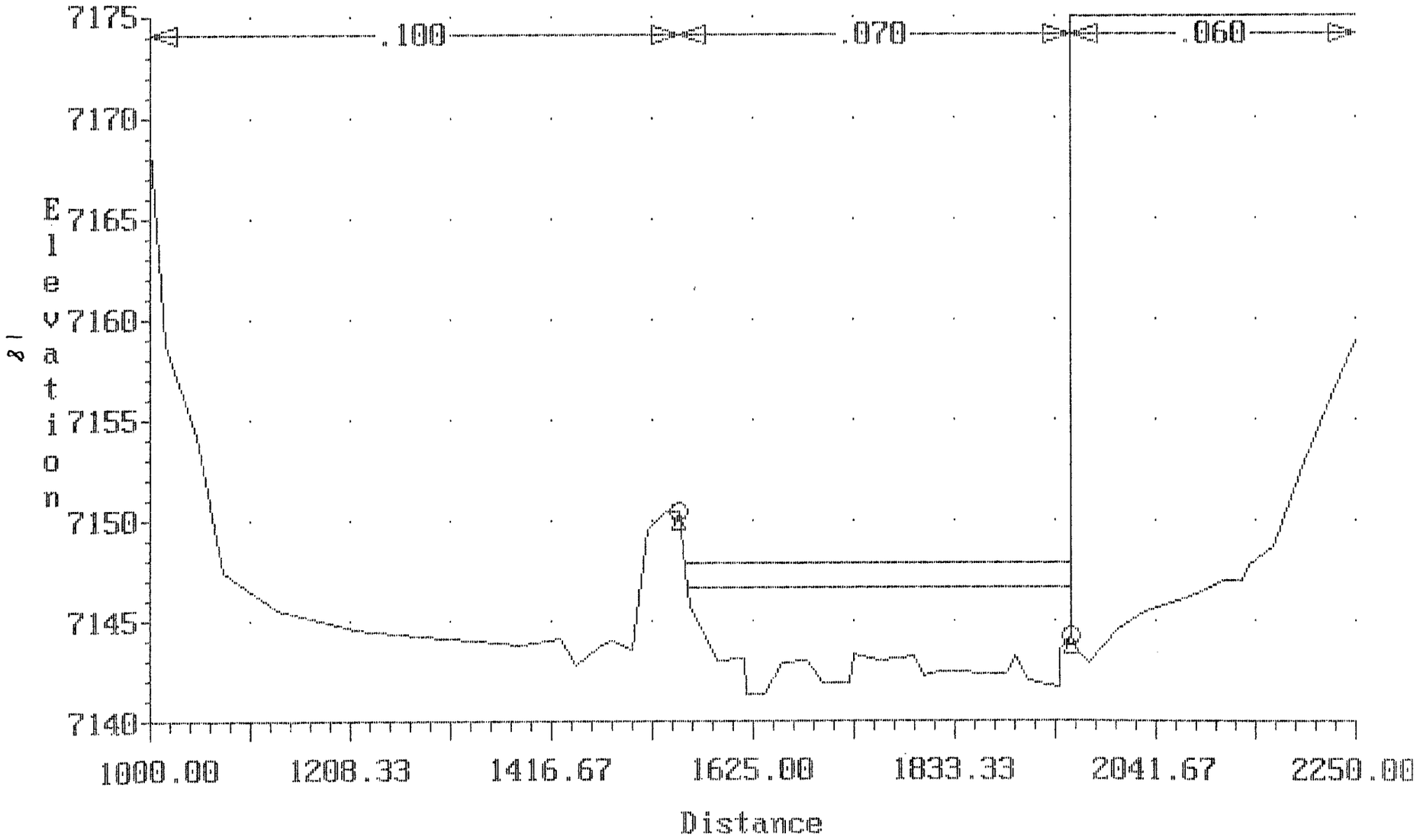
RIGHT BANK ENCROACHMENT
Cross-section 85.000

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RIGHT BANK ENCROACHMENT
Cross-section 86.000
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7155
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Elevation
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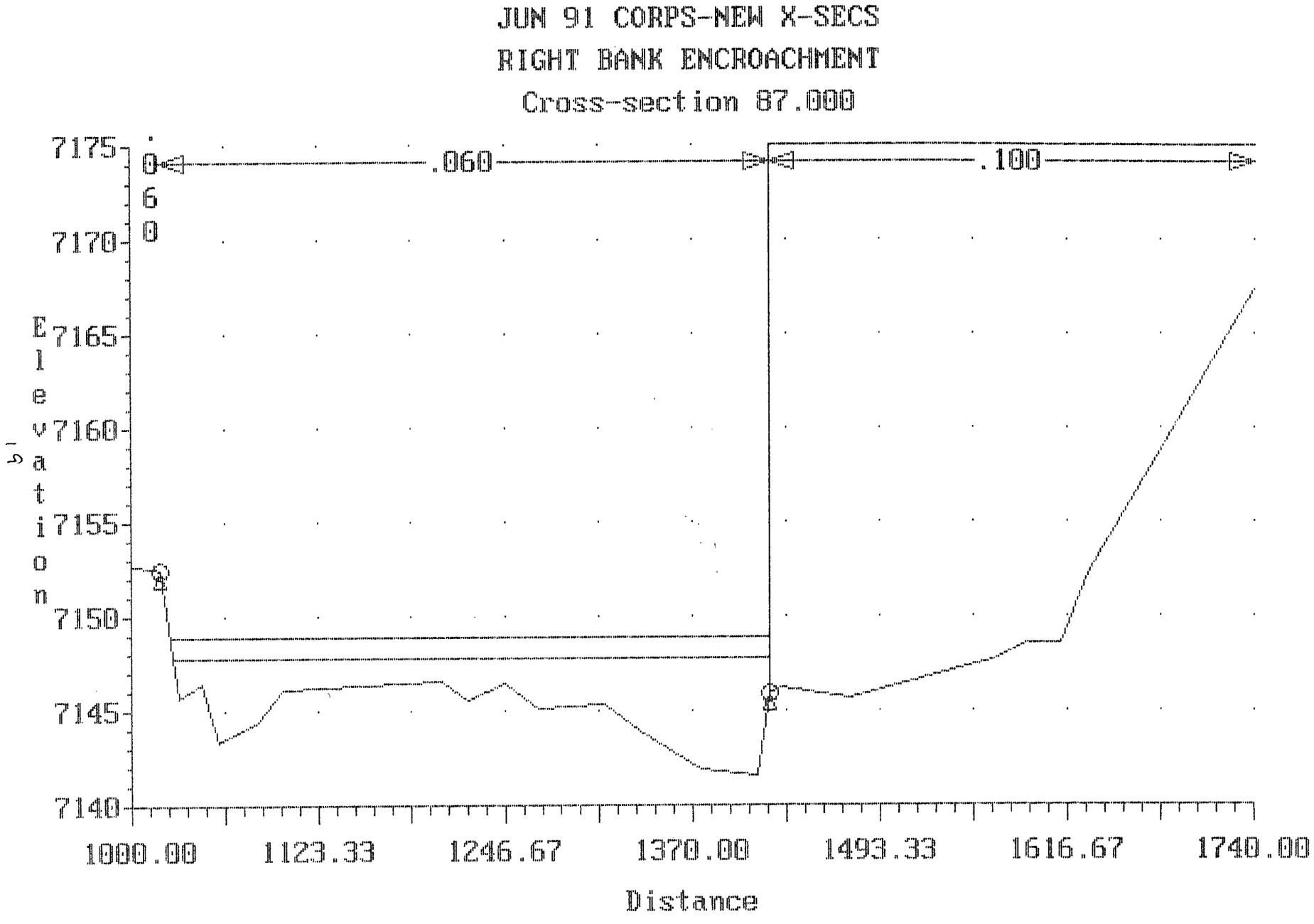
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RIGHT BANK ENCROACHMENT
Cross-section 87.000
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.100
7175
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7160
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7150
7145
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Elevation
1000.00
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1370.00
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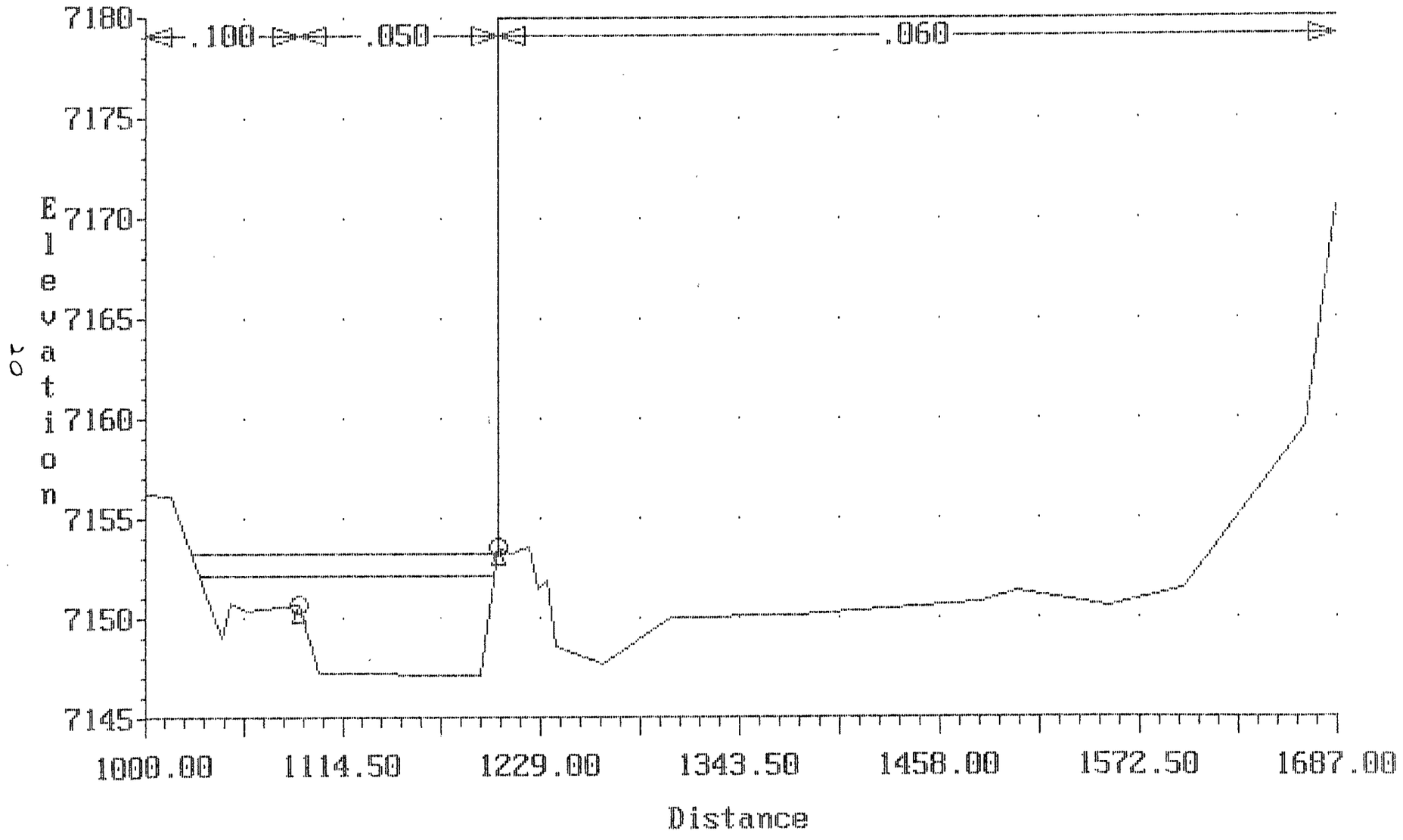
Distance


JUN 91 CORPS-NEW X-SECS
RIGHT BANK ENCROACHMENT
Cross-section 88.000
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.050
.060
7180
7175
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7160
7155
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Elevation
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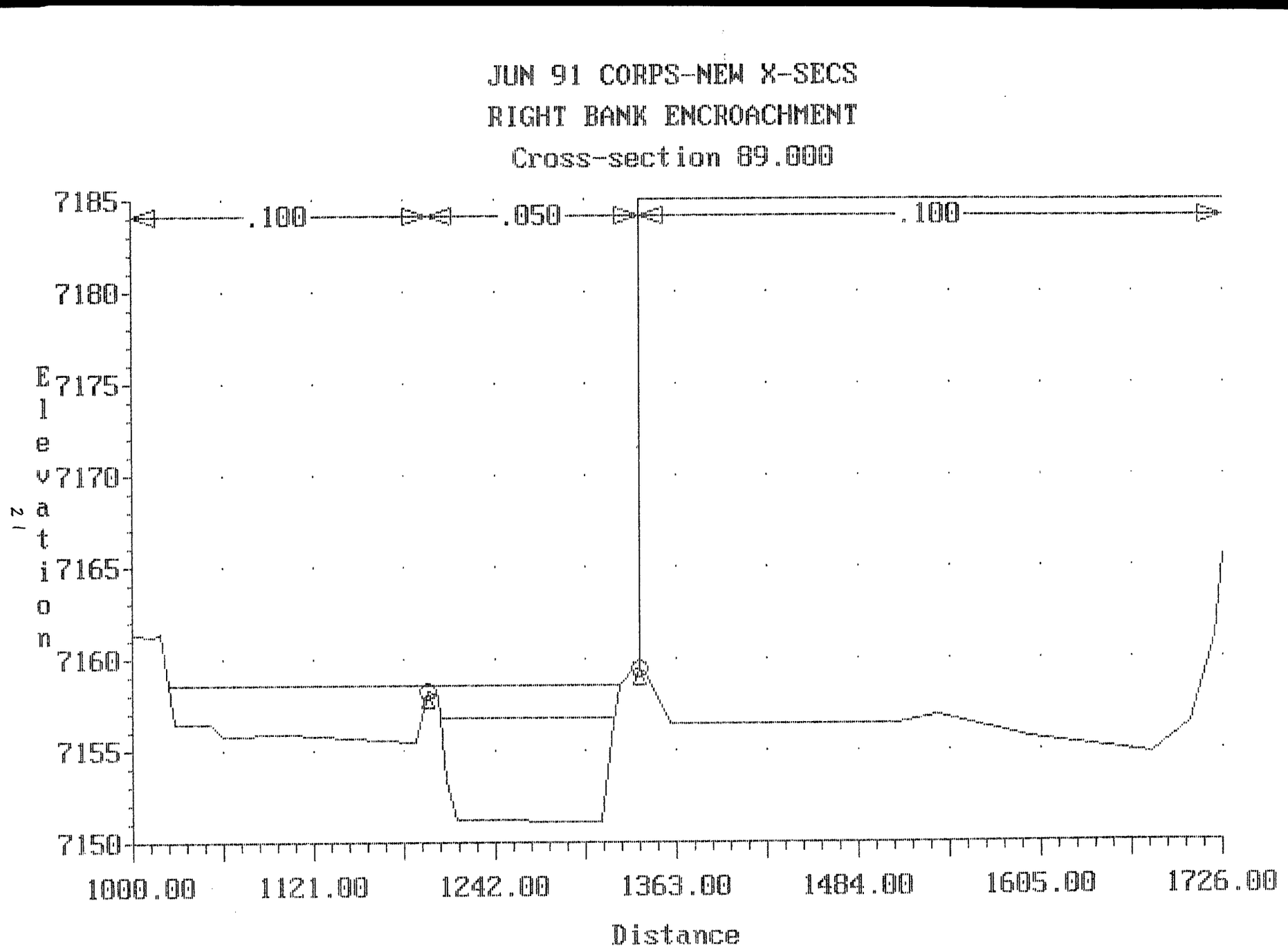
Distance


JUN 91 CORPS-NEW X-SECS
RIGHT BANK ENCROACHMENT
Cross-section 89.000
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.050
.100
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7180
7175
7170
7165
7160
7155
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Elevation
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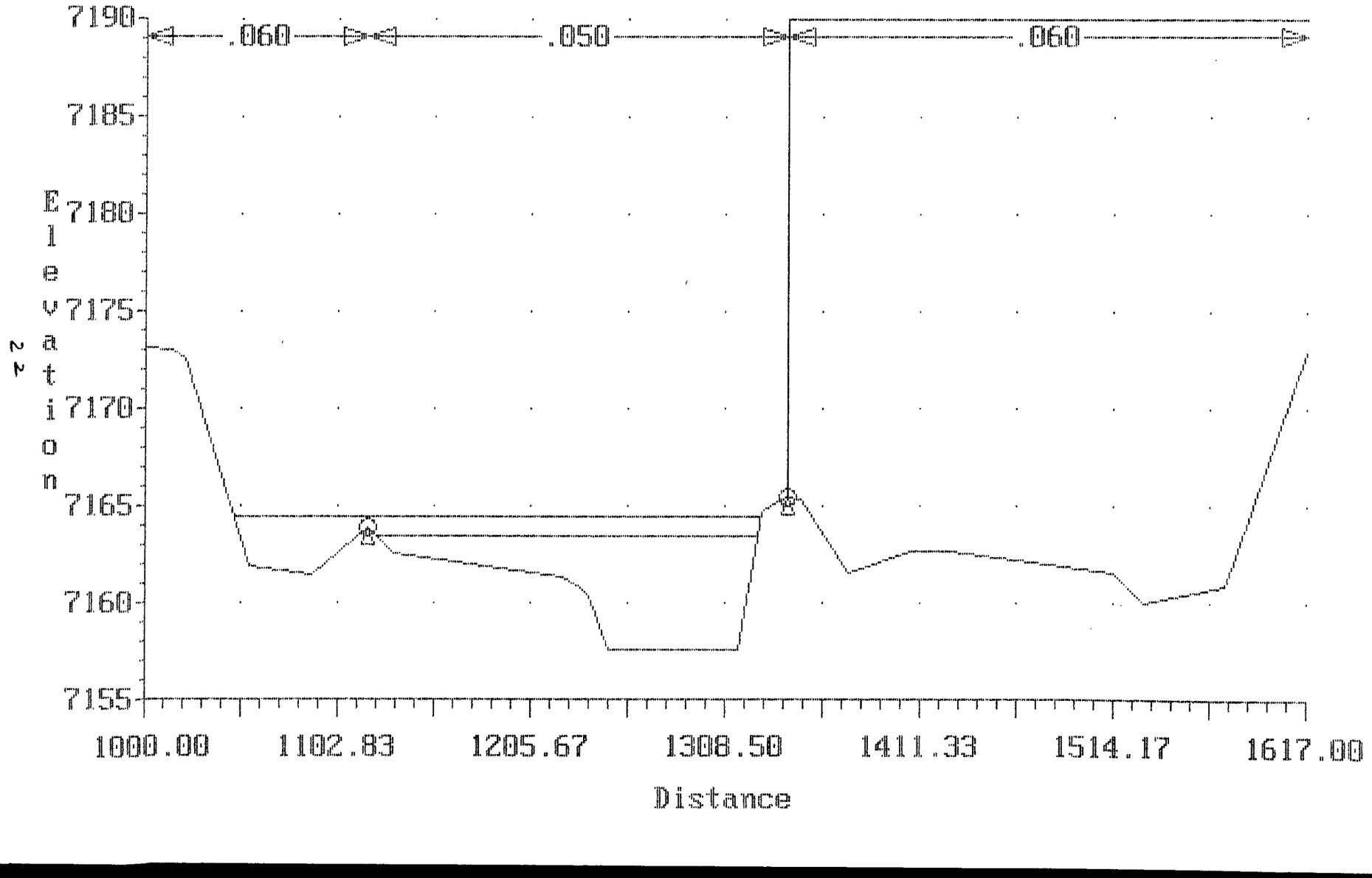
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1411.33
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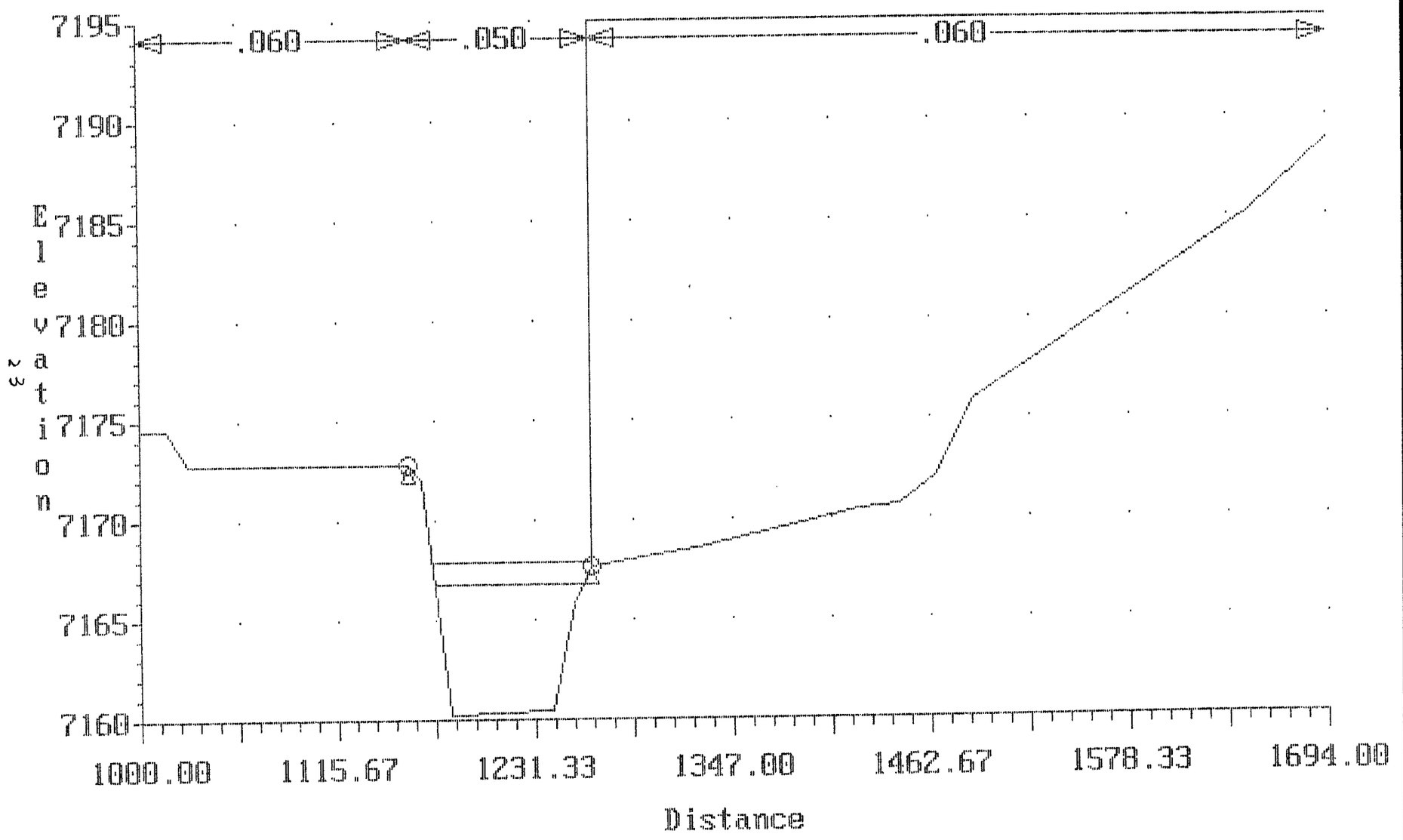
1617.00
Distance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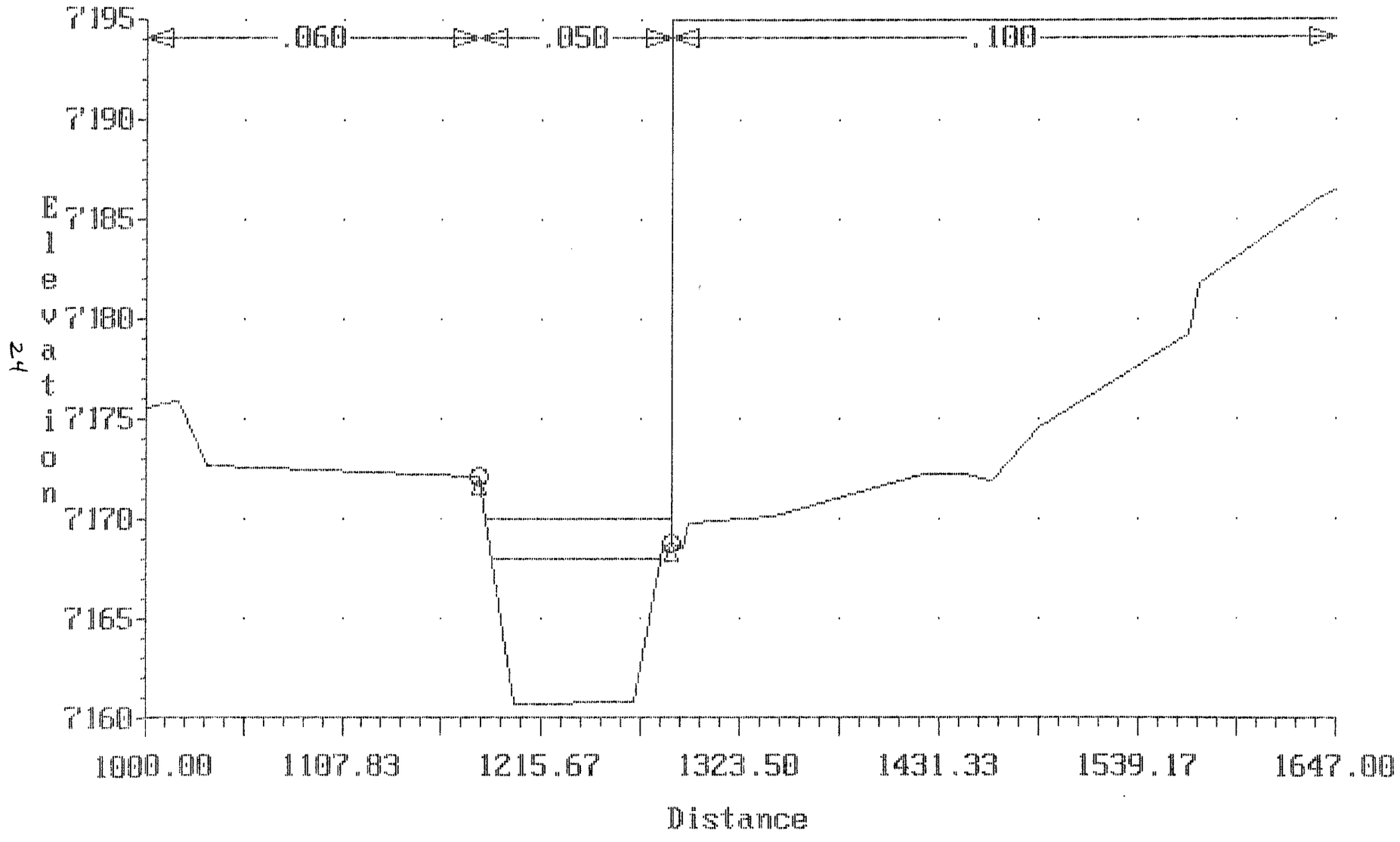
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7'170
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Elevation
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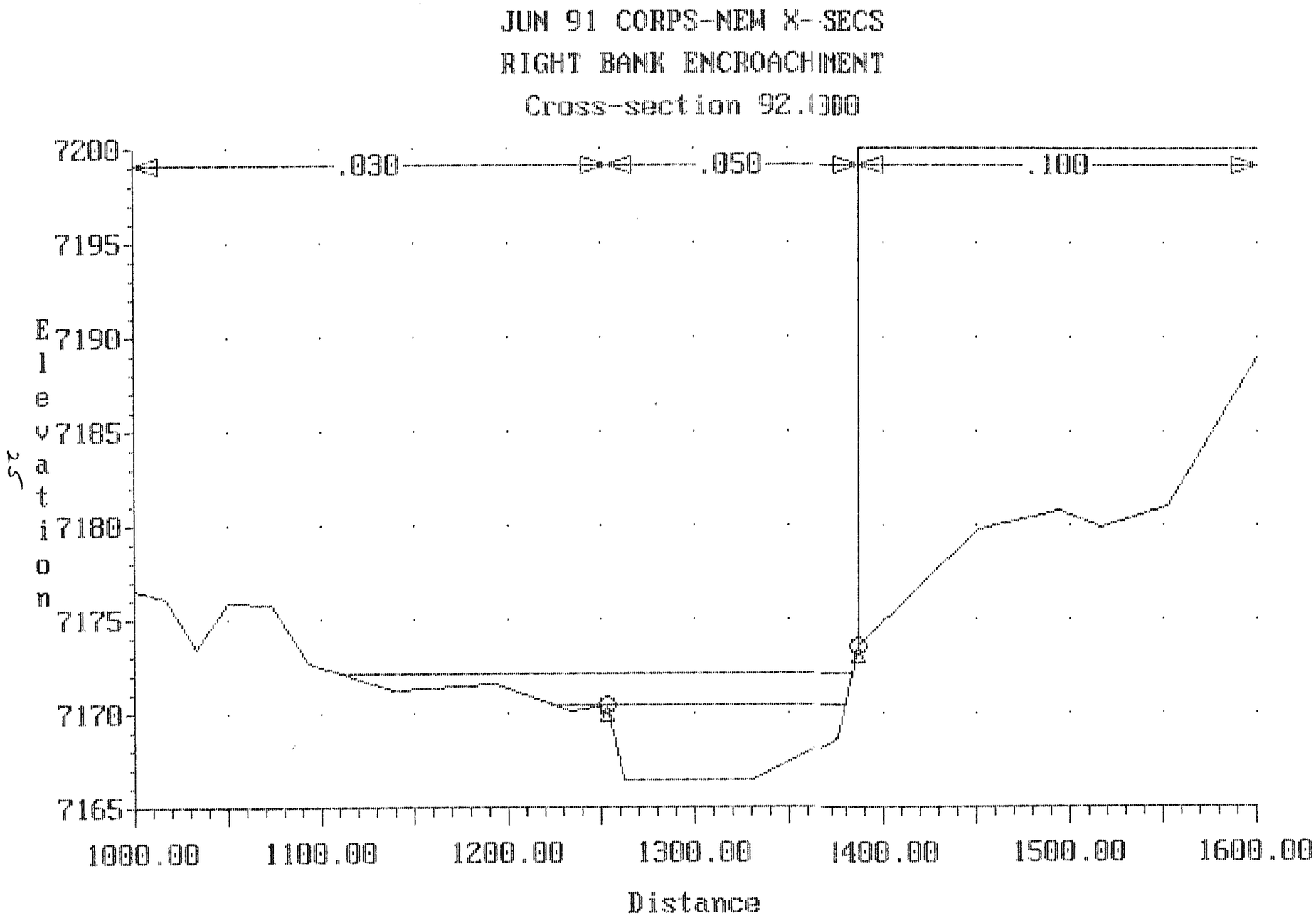
Distance

24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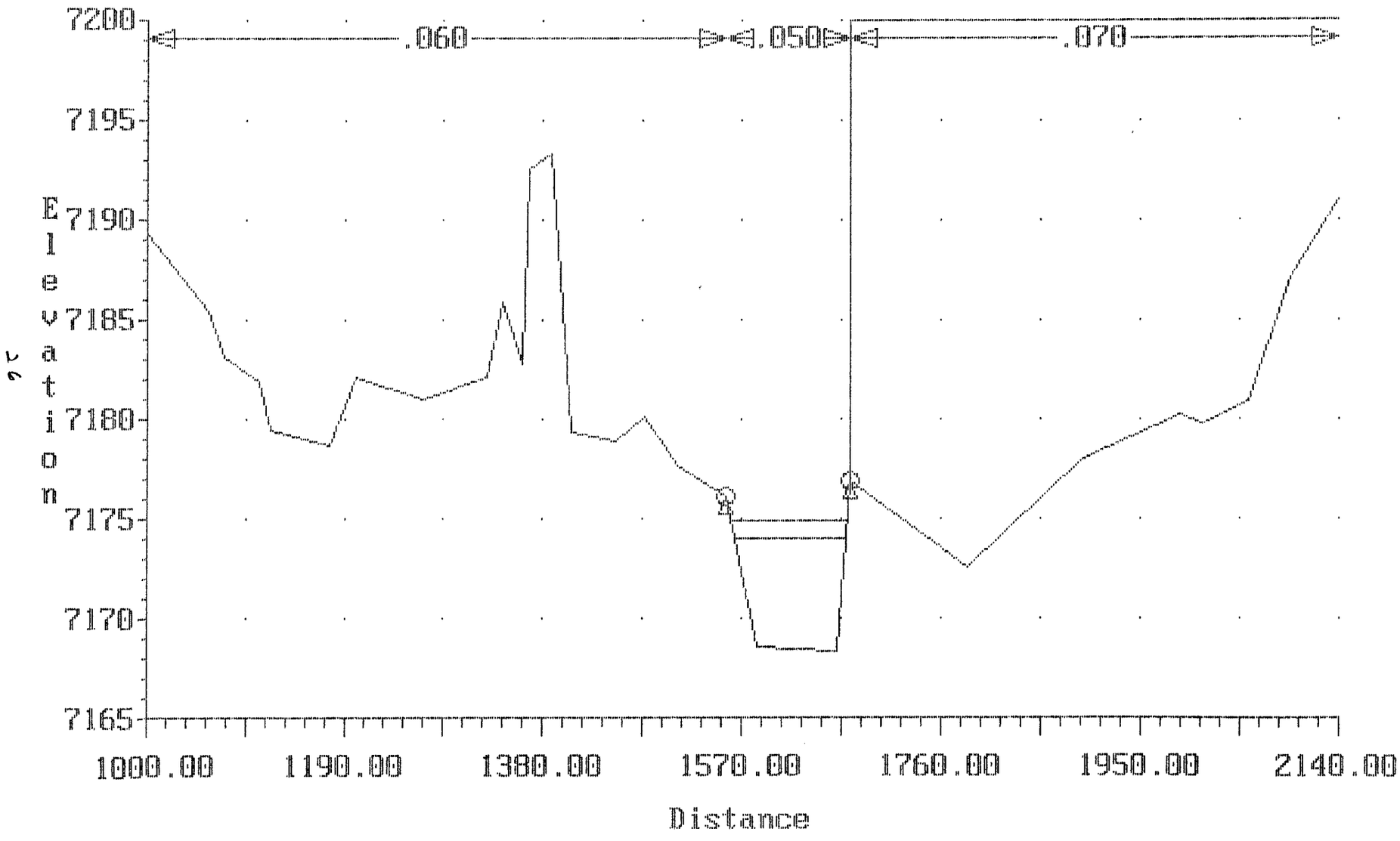
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Distance

APPENDIX D

FEMA LEVEE REQUIREMENTS

FLOOD INSURANCE STUDY FEMA 37

Guidelines and Specifications for Study Contractors

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

September 1985

Floodways are not delineated in coastal high hazard areas (Zones V1-30, VE, and V). The computation of floodways on rivers in coastal flood plains should be based on the 100-year flood discharge and elevations of the rivers only and should terminate at the boundary of the V1-30, VE, or V zone or where the mean high tide exceeds the 100-year flood elevation from a riverine-only flood, whichever occurs further upstream.

The Study Contractor shall begin to coordinate all floodway determinations with State and community officials as early as possible. Where the flood plain is entirely contained within one community, the location of the floodway is negotiable and should be coordinated with the State Coordinating Agency, the community, and the CCO. This negotiation shall not be a reason for delay of the FIS. If the Study Contractor is unable to arrive at a final floodway determination prior to the final community coordination meeting, the floodway shall be determined as described above.

Floodways adopted from an earlier FIS normally should not be revised in restudies. For streams identified for restudy, the Study Contractor should evaluate the existing floodway configuration to assure that it meets acceptable surcharge limits under present conditions. Where surcharge limits are exceeded, the floodway should be expanded. However, the floodway normally should not be reduced in size or changed in configuration. The exception would be where specific structural measures or channel improvements significantly reduce flood discharges or elevations within the community. In any event, the PO shall be notified in writing when the Study Contractor has determined that a floodway revision is justified.

Where a new floodway configuration is established during a restudy, the surcharge, when combined with the cumulative effects of encroachments that have occurred since the original floodway was established, should not exceed the allowable maximum. This is necessary to avoid the cumulative effects of encroachment over time, which would occur if the allowable surcharge was applied to existing conditions each time a new floodway was developed.

e. Evaluation of Local Flood-Control Structures

When local flood-control structures are to be considered in the FIS, the Study Contractor must obtain concurrence from the PO on how such structures are to be analyzed.

The following paragraphs describe procedures for evaluating earthen riverine levees. Procedures for evaluating concrete dikes, floodwalls, seawalls, and other structures shall be coordinated with and approved by the PO.

In evaluating the ability of levee systems to provide protection against the 100-year flood, the following criteria and procedures shall be used.

(1) Ownership. Privately owned, operated, or maintained levee systems will not be considered unless the community has a legal responsibility to assure operation and maintenance. Levees for which the community, State, or Federal government has responsibility for operation and maintenance will be considered provided that the criteria discussed below are met.

(2) Freeboard. A minimum levee freeboard of 3 feet shall be necessary, with an additional 1 foot of freeboard within 100 feet of either side of structures within the levee or wherever the flow is constricted, such as at bridges. An additional 0.5 foot above this minimum is also required at the upstream end, tapering to the minimum at the downstream end of the levee.

(3) Field Inspection and Maintenance. The Study Contractor must make a field inspection to verify that the levee appears structurally sound and adequately maintained. Certification from a Federal agency, State agency, or a registered professional engineer that the levee meets the minimum freeboard criteria above and that it appears, on visual inspection, to be structurally sound and adequately maintained may be used in lieu of a site-specific inspection by the Study Contractor. Levees that have obvious structural defects, or that are obviously lacking in proper maintenance, will not be considered.

(4) Internal Drainage. Where credit will be given to levees providing 100-year flood protection, the adequacy of interior drainage systems will be evaluated. Areas subject to flooding from inadequate interior drainage behind levees will be mapped using standard procedures. Often, shallow flooding zones (AO or AH), or Zone AE, may be applicable in these instances.

(5) Human Intervention and Operation. In general, levee evaluation shall not consider human intervention (e.g., capping of levees by sandbagging, earthfill, or flashboards) for the purpose of increasing a levee's design level of protection during an imminent flood. Human intervention will only be accepted for the operation of closure structures (e.g., gates or stoplogs) in a levee system designed to provide at least 100-year flood protection, including adequate freeboard as described earlier. Where levee closures are involved, FIA must review and approve the operation plan prior to the Study Contractor's assumption that protection against the 100-year flood does exist.

The Study Contractor shall bring the need for such review and approval to the attention of the PO as soon as possible. Where review and approval cannot be obtained by the PO in sufficient time to avoid a delay in study submittal, the Study Contractor shall proceed with the study under the assumption that such protection does not exist.

(6) Analysis. For the area protected by a levee (inside) providing less than 100-year protection, the base flood elevation shall be computed as if the levee did not exist. For the area outside of such a levee, the elevations to be shown are those obtained from either the flood profile that would exist at the time levee overtopping begins or the profile computed as if the levee did not exist, whichever is higher.

This procedure recognizes the increase in flood elevation in the unprotected area that is caused by the levee itself. This procedure may result in flood elevations being shown as several feet higher on one side of the levee than on the other. Both profiles should be shown in the study report and labeled as "before levee overtopping" and "after levee overtopping," respectively. Separate Floodway Data Tables should be prepared for each side of the levee, and these tables should be adequately labeled. The FIRM work map should show

a line, running along the levee centerline, separating the areas of different base flood elevations.

Floodways will be delineated at the landside toe of mainline and tributary levees that are credited on a map. This will assure that communities will properly regulate development on the outside of the levee, which may jeopardize the levee's integrity or effectiveness.

(7) Certification. During the course of a FIS, when the Study Contractor determines that an area of a community has no special flood hazards because it is protected by a flood-control structure, the Study Contractor must obtain from the agency responsible for the structure a written statement that the structure is properly designed, constructed, maintained, and operated to provide protection from the 100-year flood. This certification must be accompanied by copies of the applicable operation and maintenance plans and forwarded to the PO for approval as soon as possible.

(8) Exception Procedures. FIA will accept certification from another Federal agency that an existing levee system is designed, constructed, maintained, and operated to provide protection against the 100-year flood in lieu of the specific requirements of items (2), (3), and (5) above. Under certain circumstances, FIA may also grant exceptions to the above requirements or approve alternate analysis techniques. The Study Contractor must obtain written approval of all such exceptions or alternate analyses from the PO before proceeding.

2-8 FLOOD INSURANCE RATE ZONES

To assist the insurance agent in determining actuarial flood insurance rates for specific properties, each community studied is divided into flood risk zones that are based on the flood plain boundaries determined in a FIS. Areas within the 100-year flood plain boundary are termed Special Flood Hazard Areas; areas between the 100- and 500-year flood plain boundaries are termed Areas of Moderate Flood Hazard; and remaining areas above the 500-year flooding are termed Areas of Minimal Flood Hazard.

The areas are subdivided into flood risk zones according to the following criteria:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year flood plains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year flood plains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

APPENDIX E

LEVEE CROSS SECTION LOCATION MAP
Page 1

LEVEE CROSS SECTIONS
Pages 2 to 30

LEVEE (AND CHANNEL) SURVEY NOTES
Pages 31 to end

BANNER ASSOCIATES INC.
605 EAST MAIN ST. ASPEN, CO 81611

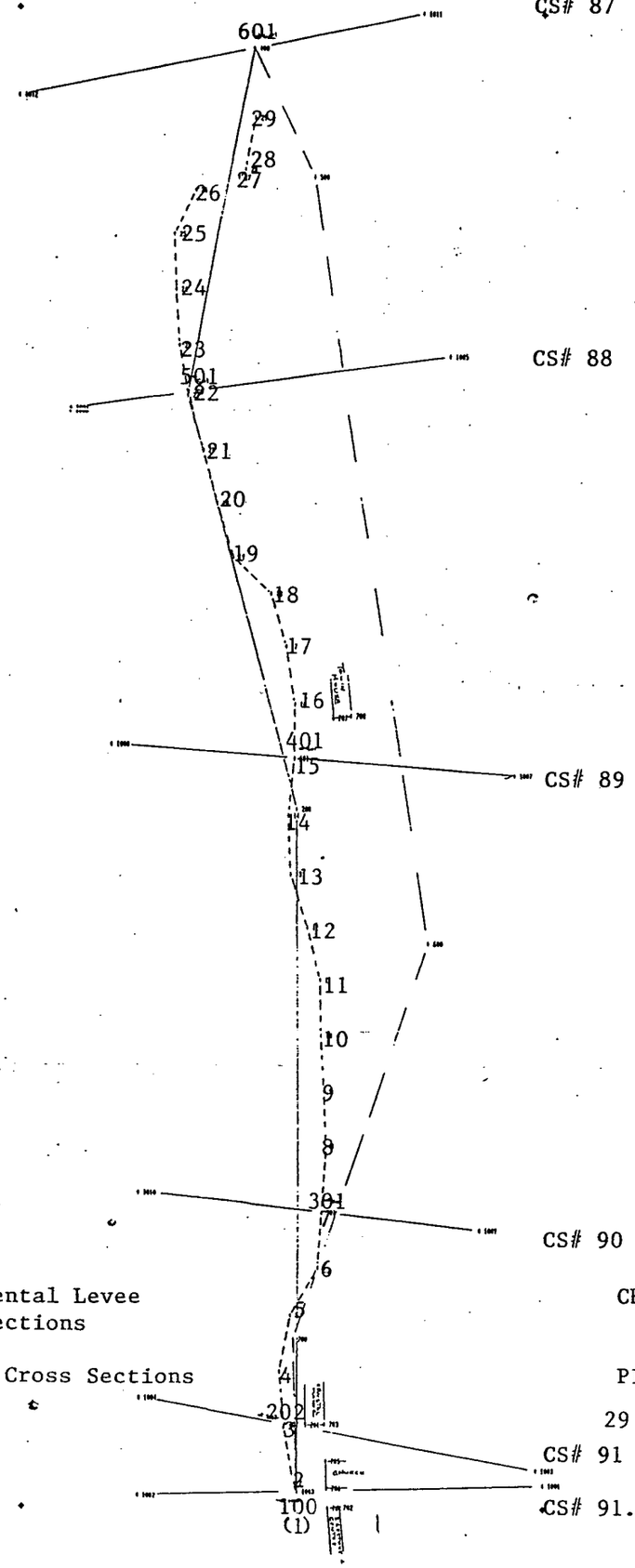
JOB NUMBER: 9404-003.2a

SCALE: 1 INCH = 300 FEET

COORDINATE BOUNDARIES:
NORTHING = 9970.0053 TO 12652.5216
EASTING = 9306.4993 TO 10443.0084

HEC-2--
Cross Section

CS# 87



CS# 88

CS# 89

CS# 90

CS# 91

CS# 91.5

1 TO 29 Supplemental Levee Cross Sections

100 TO 601 Channel Cross Sections

CHANNEL/LEVEE SURVEY FOR PITKIN COUNTY

29 January 1991

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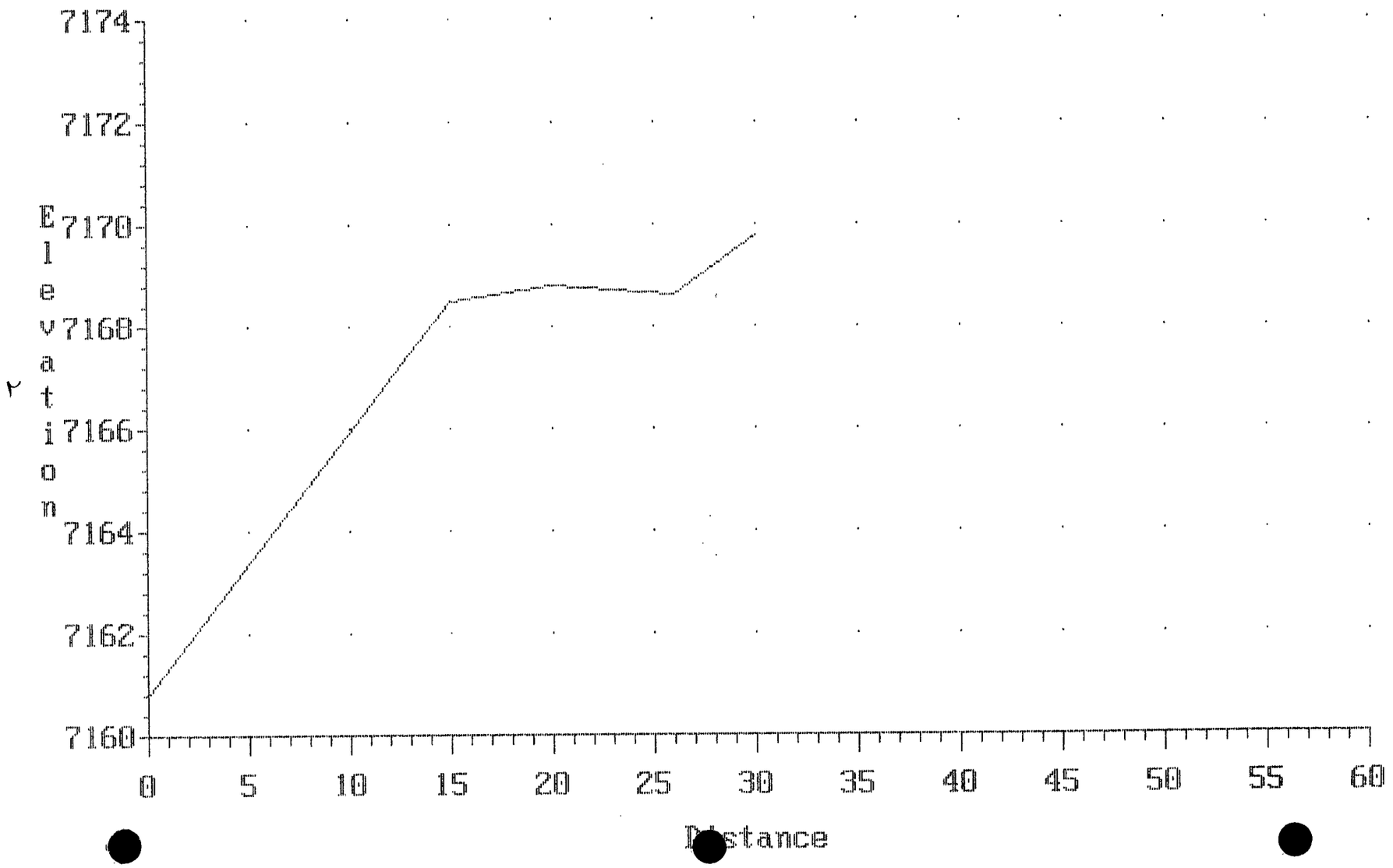
CROSS-SECTIONS
Cross-section 1.000



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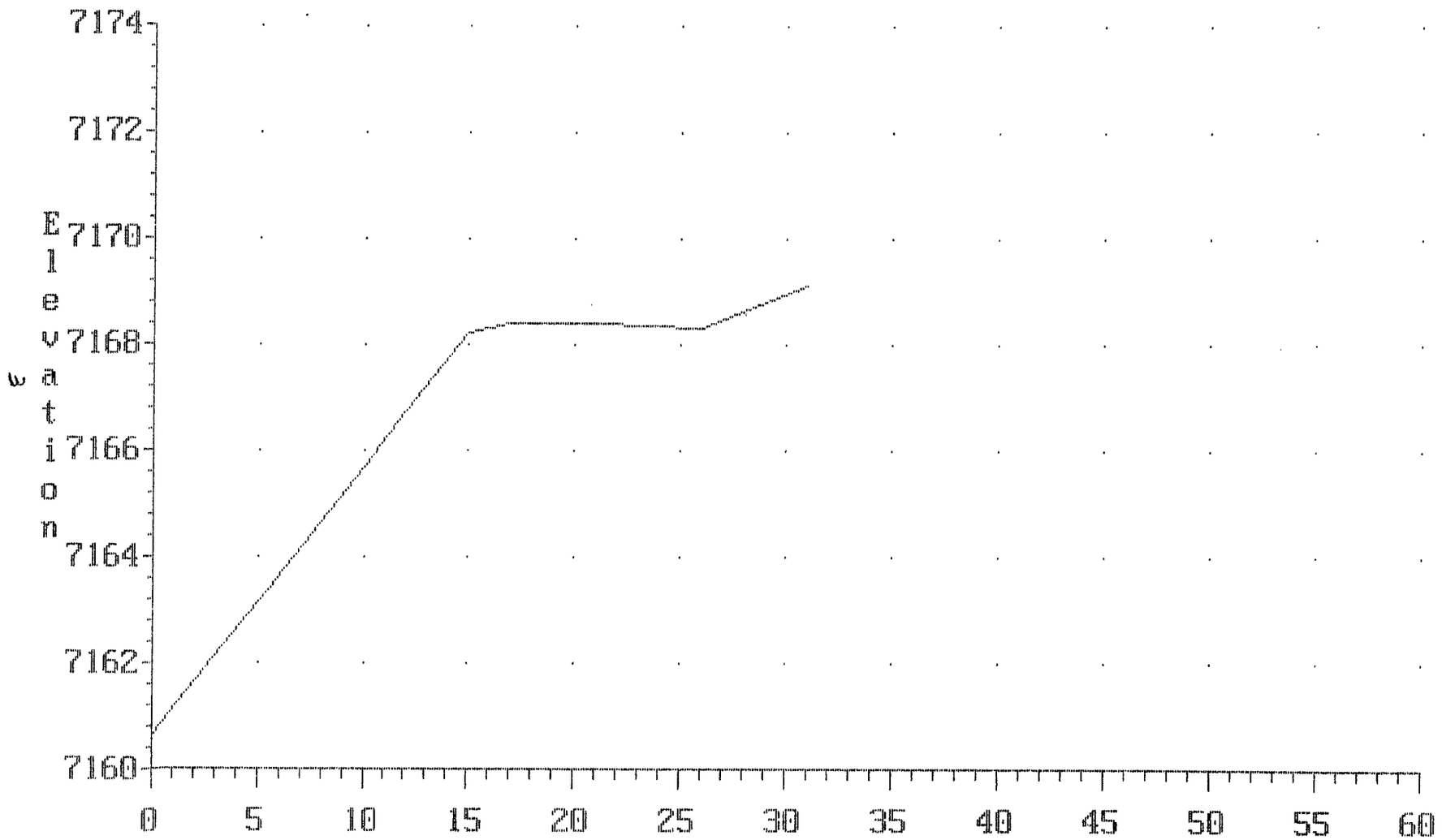

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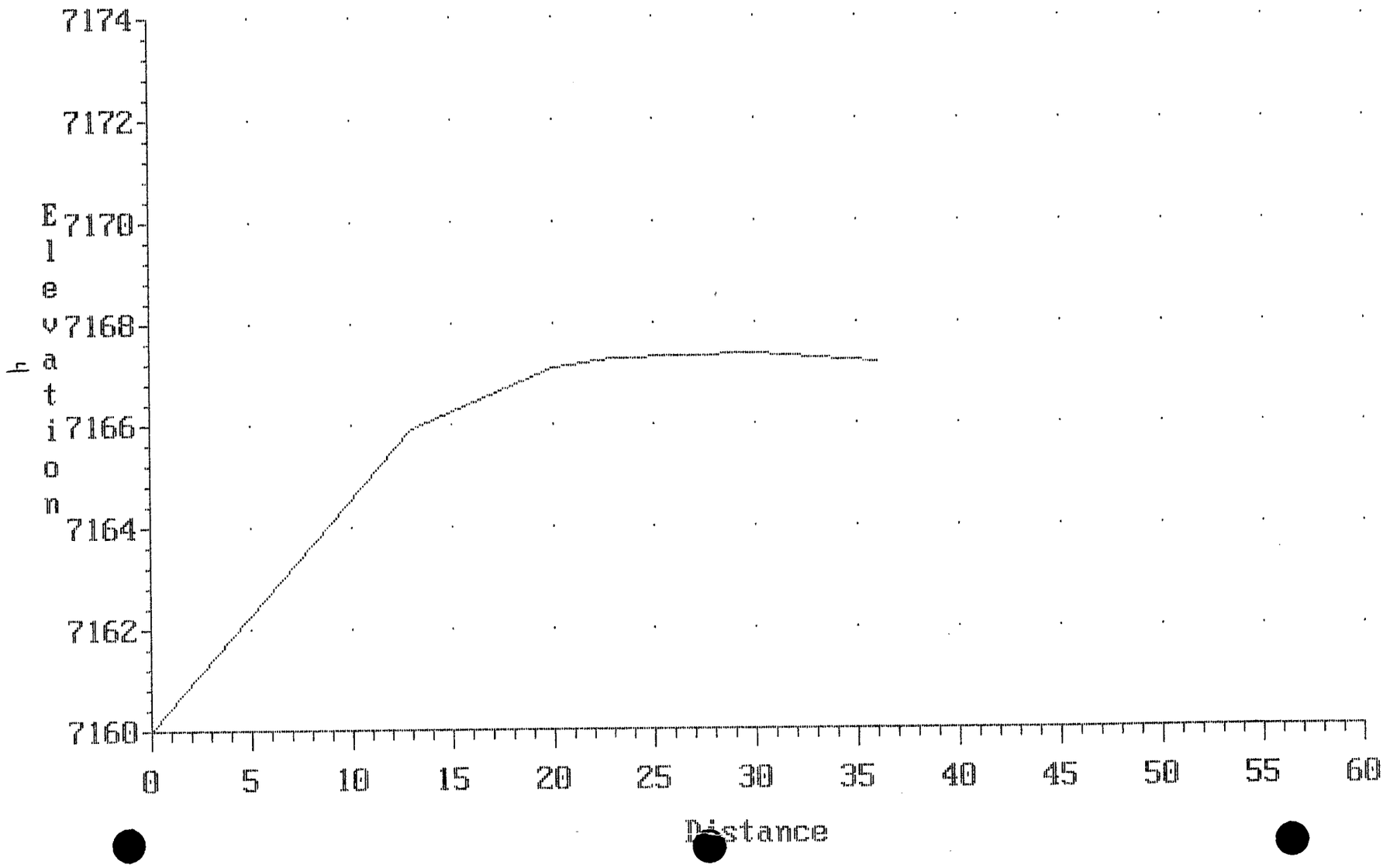

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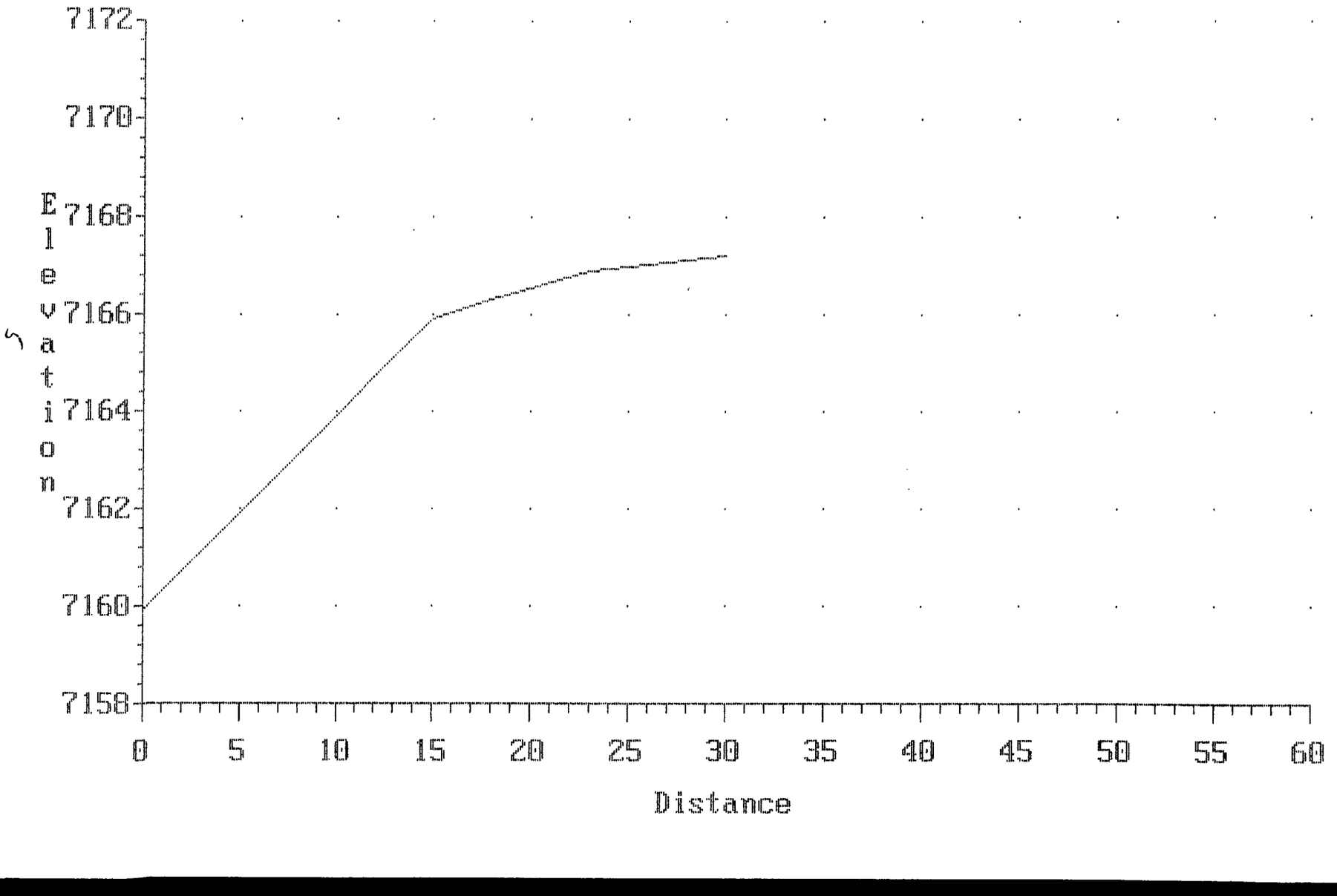

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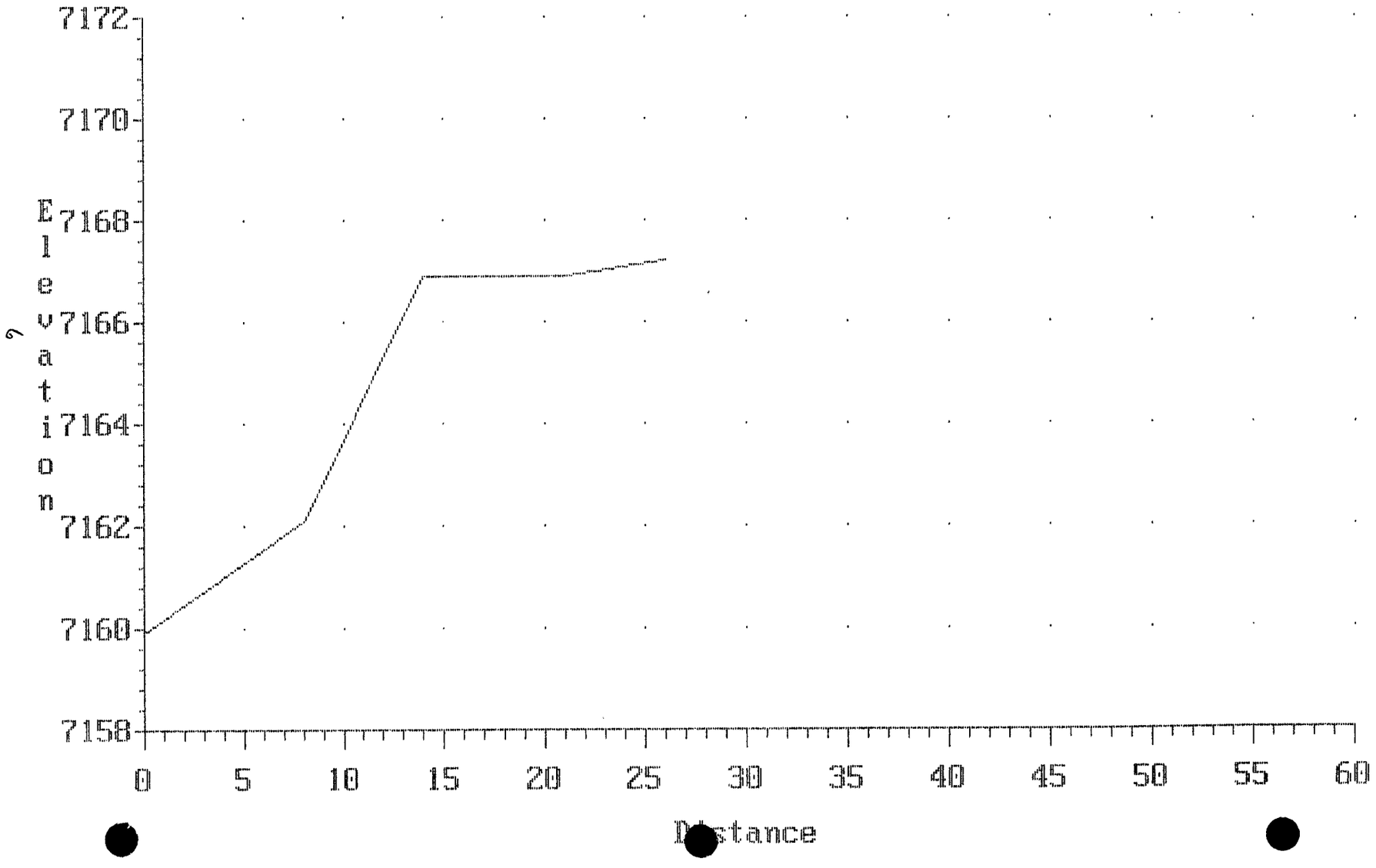

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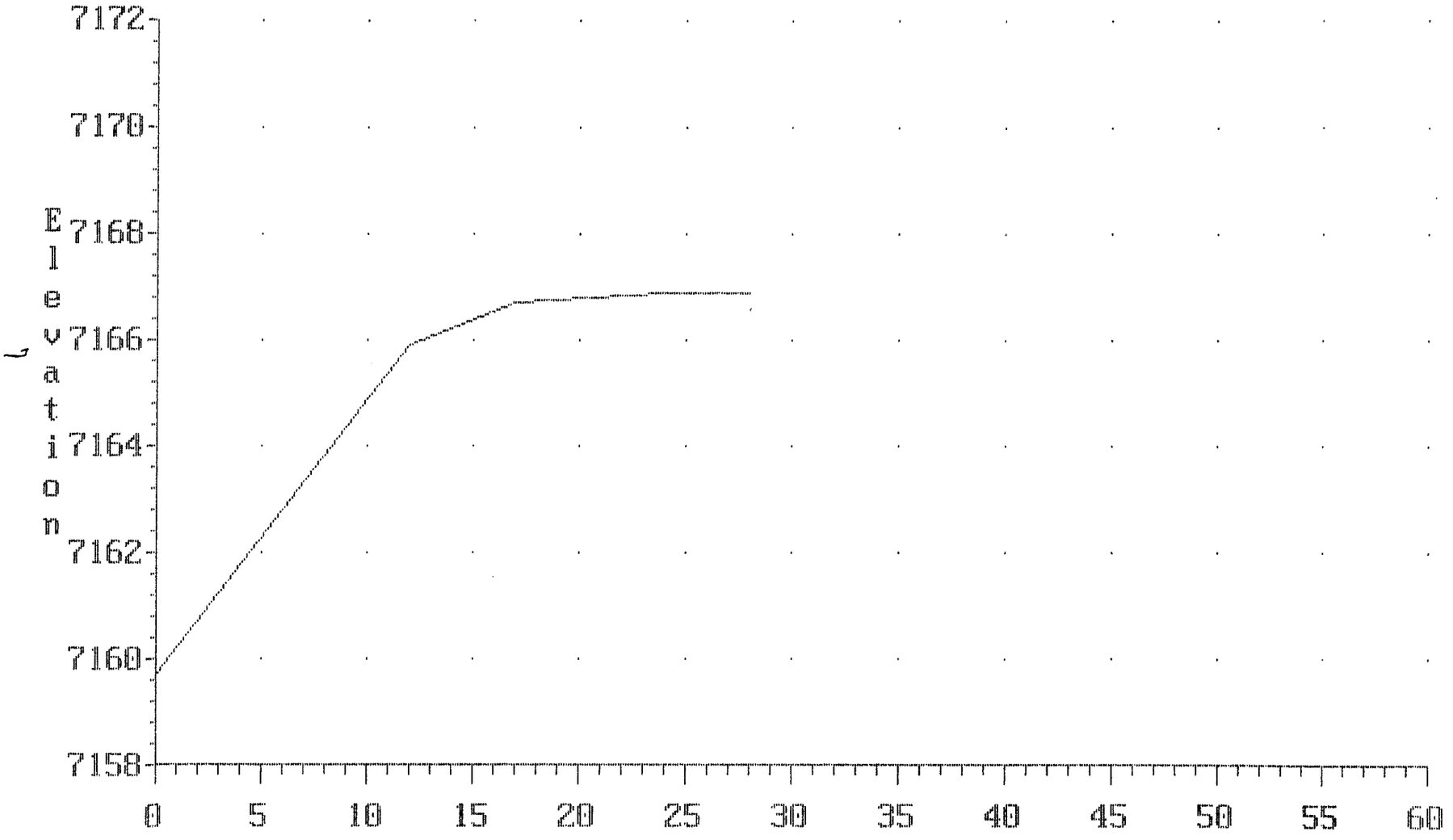

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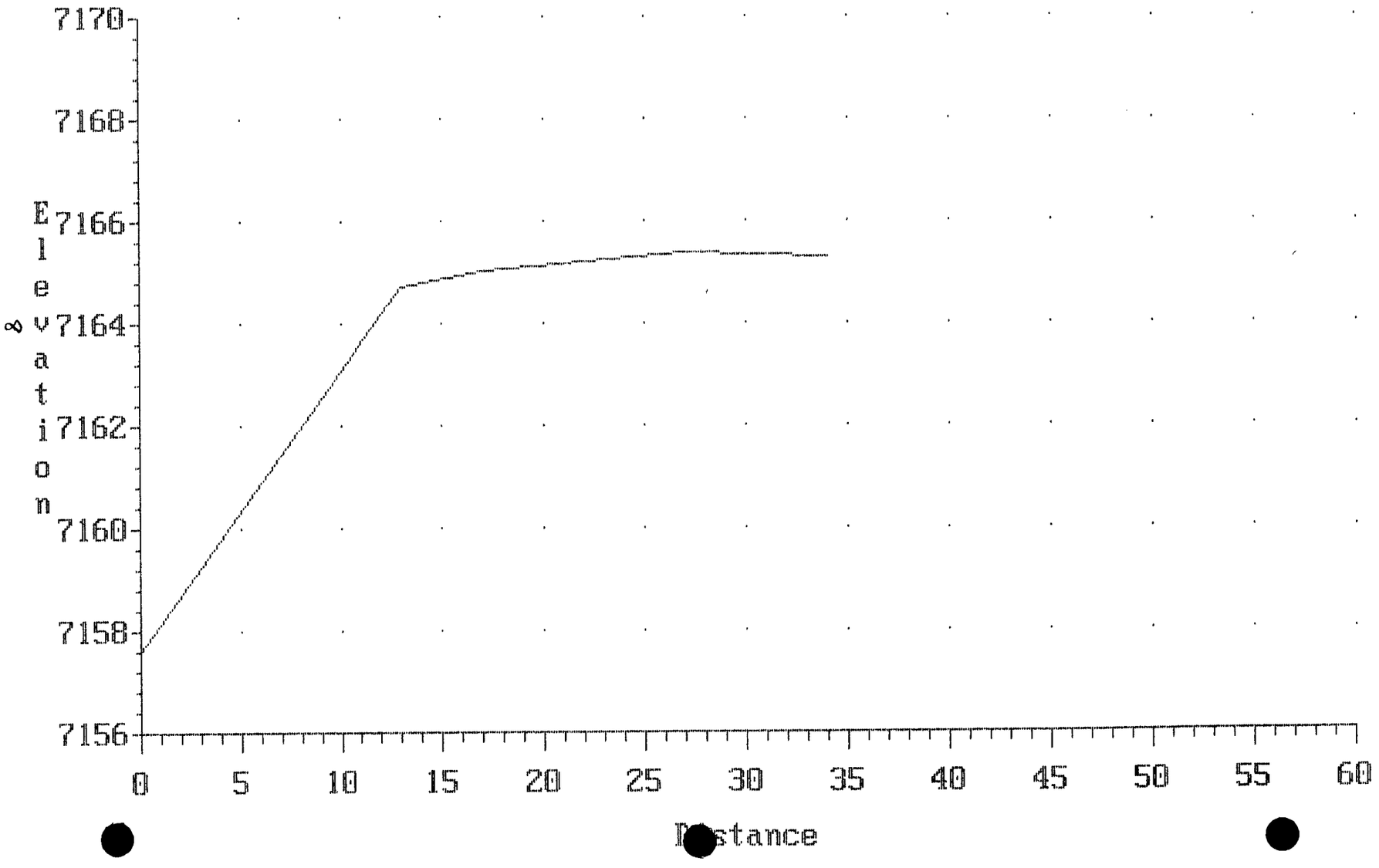

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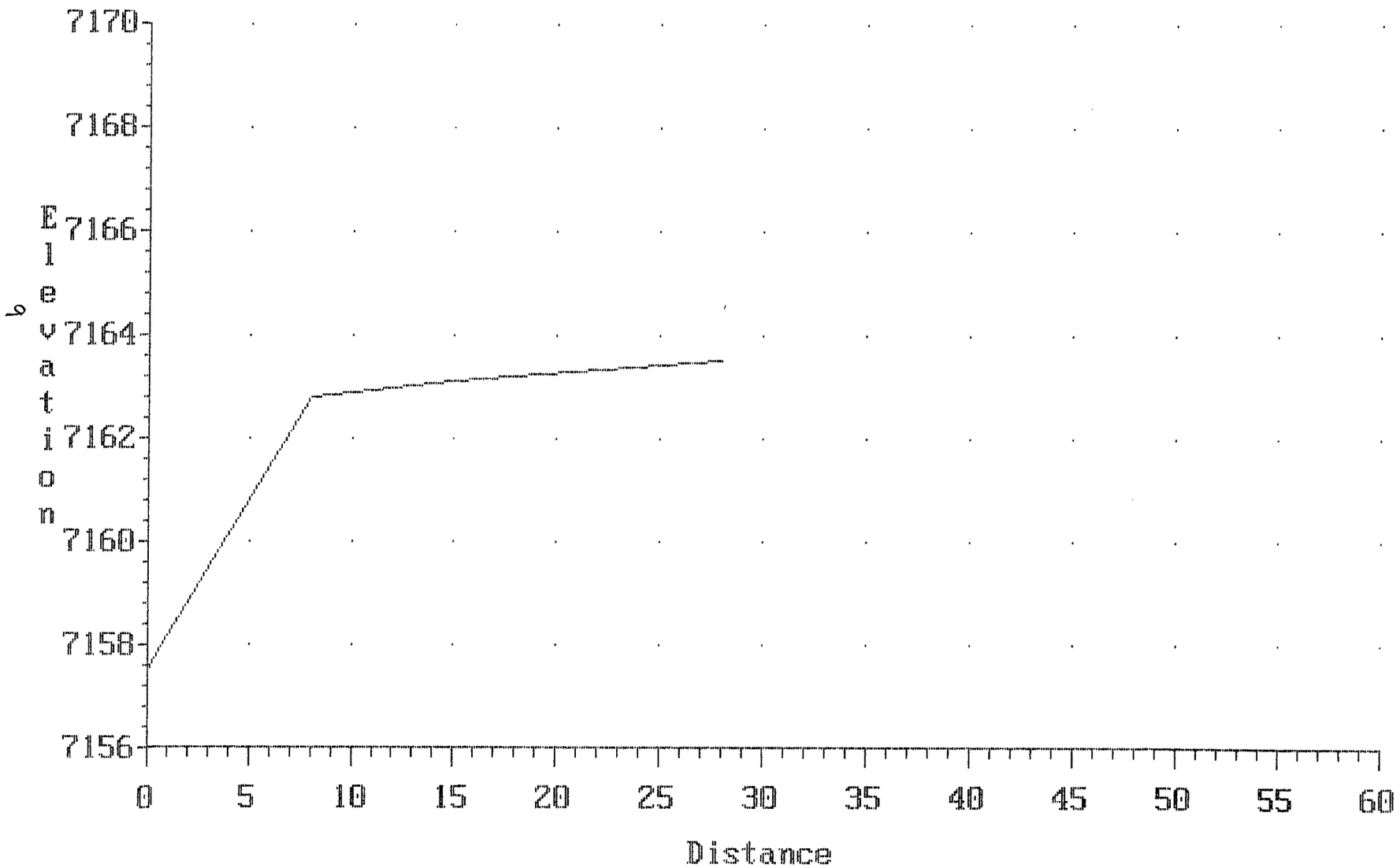

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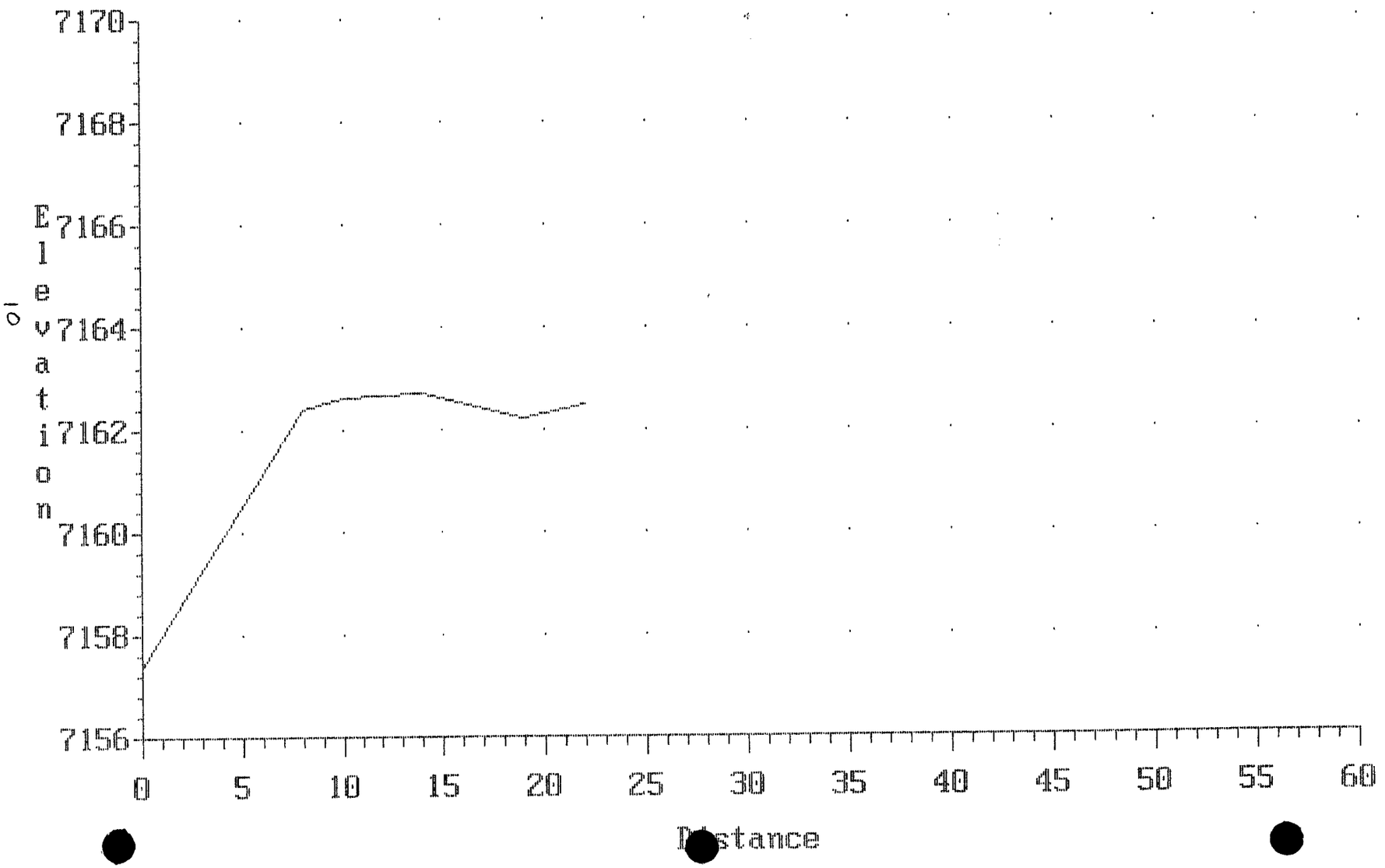

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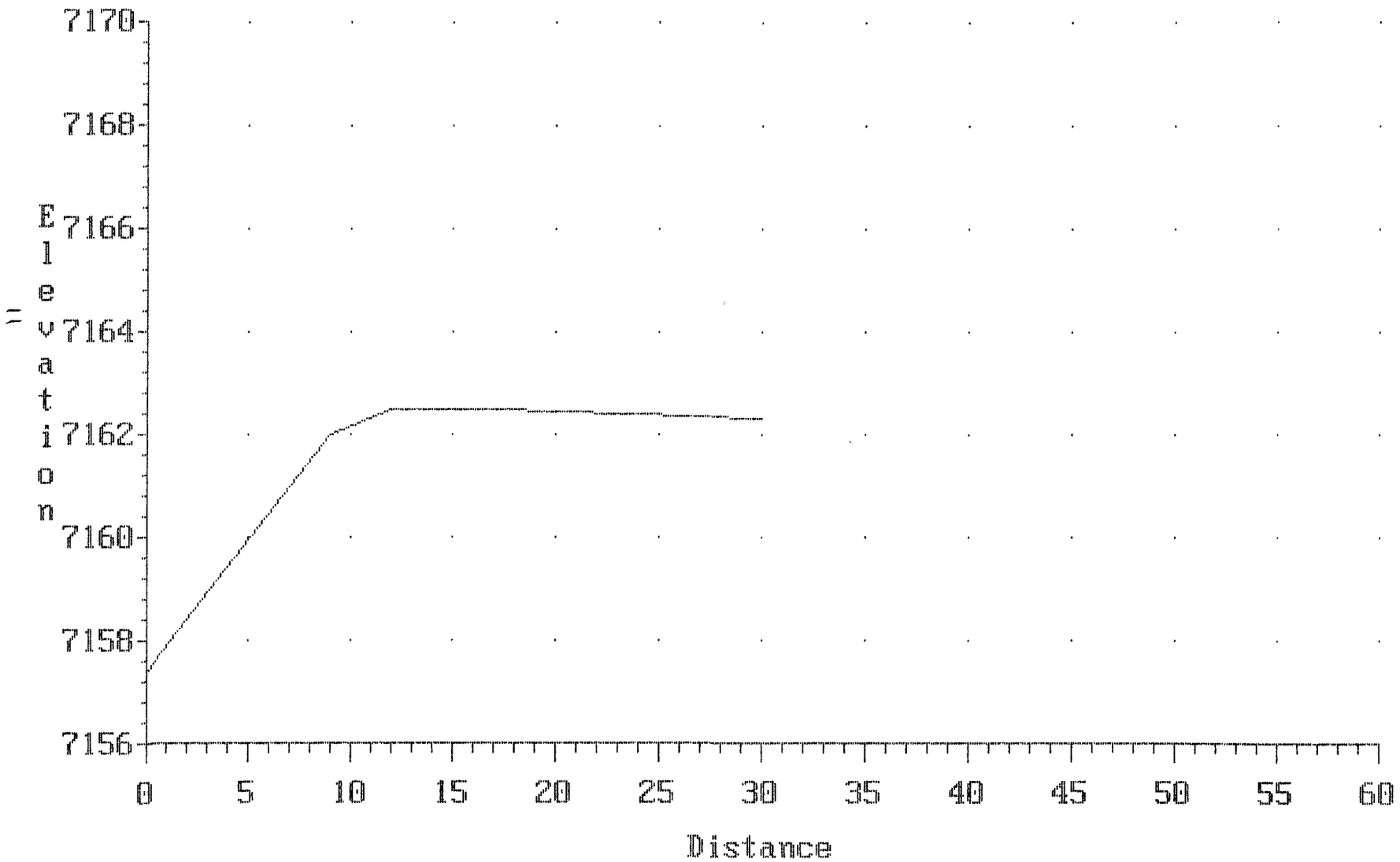

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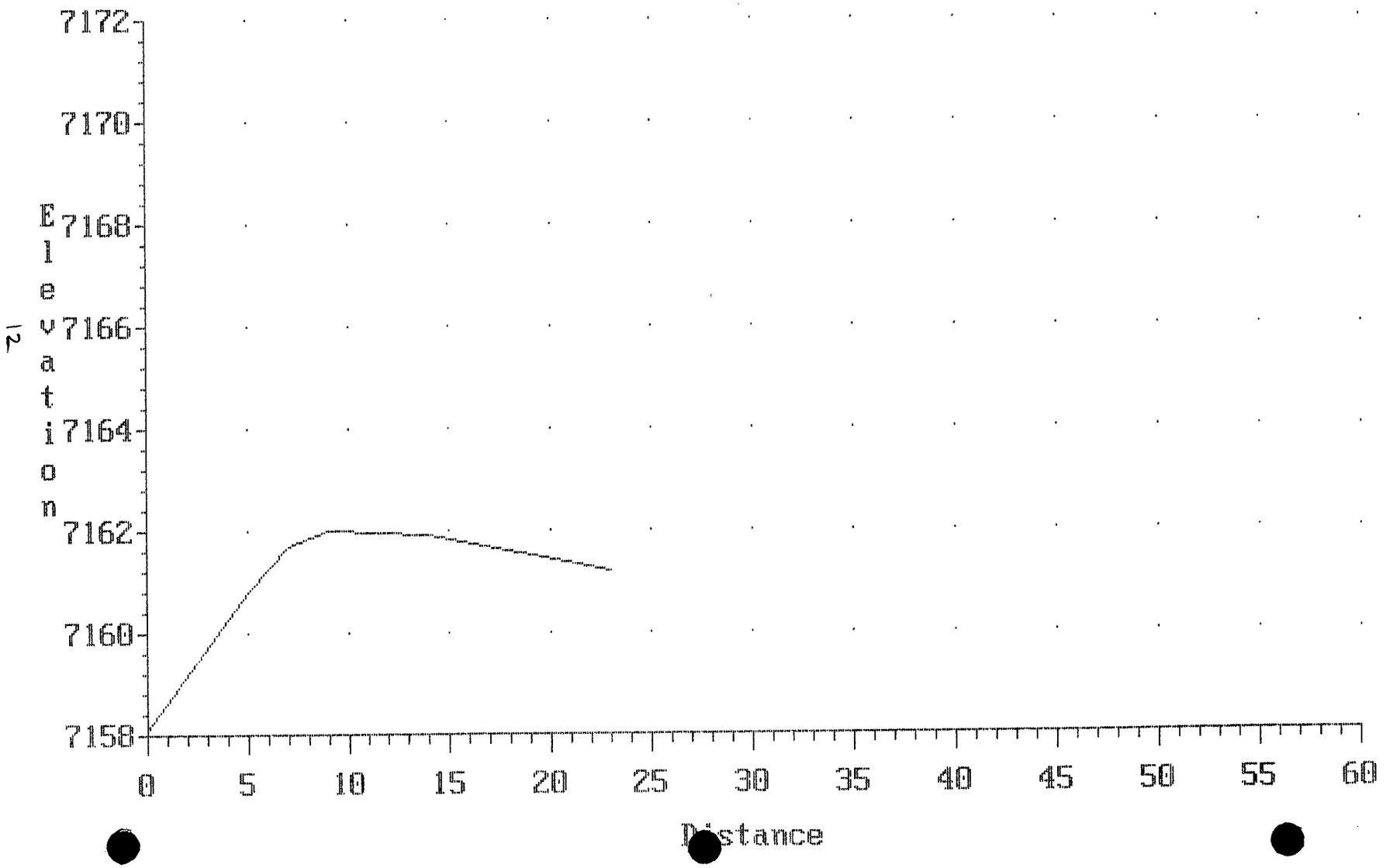

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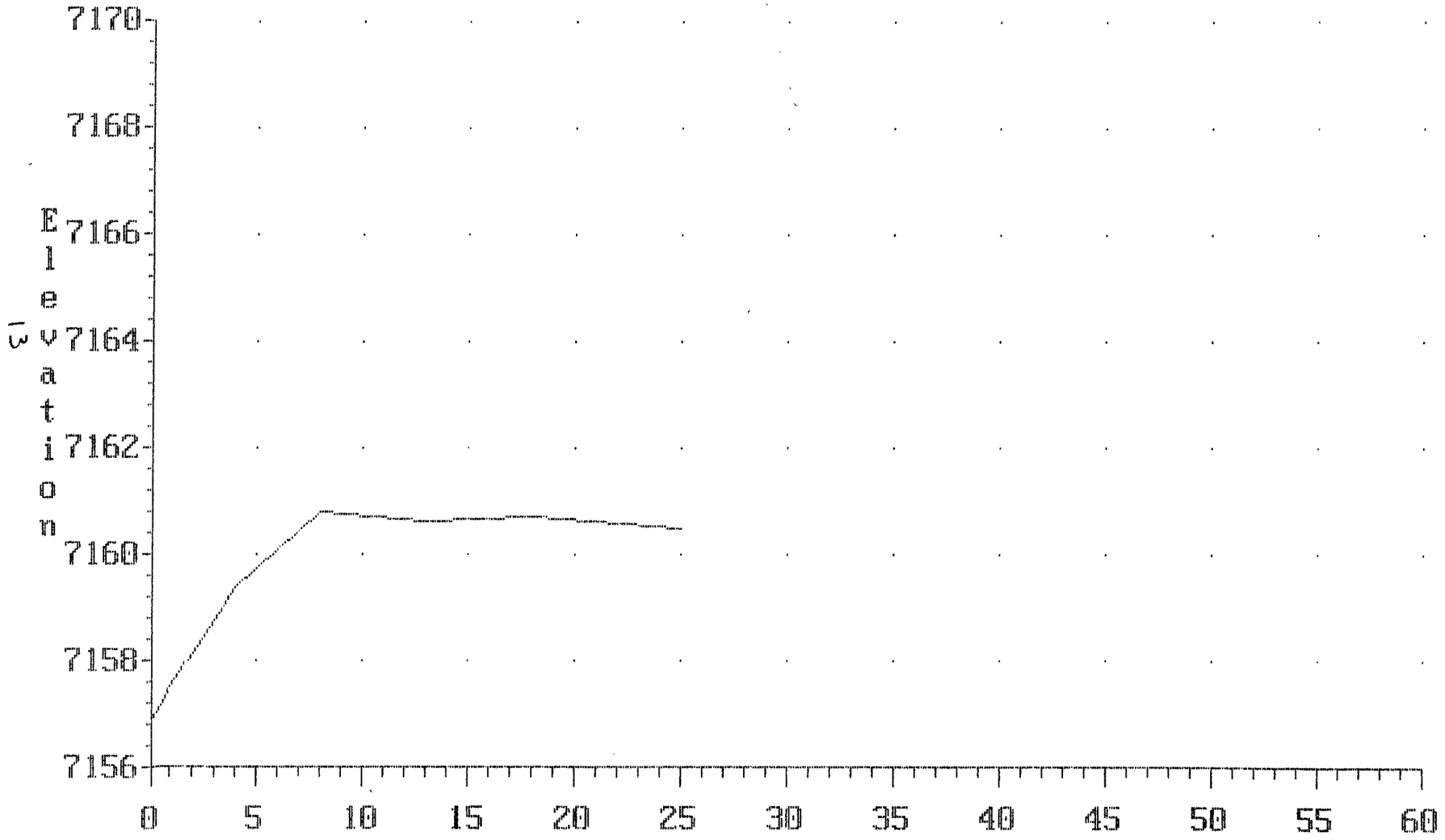

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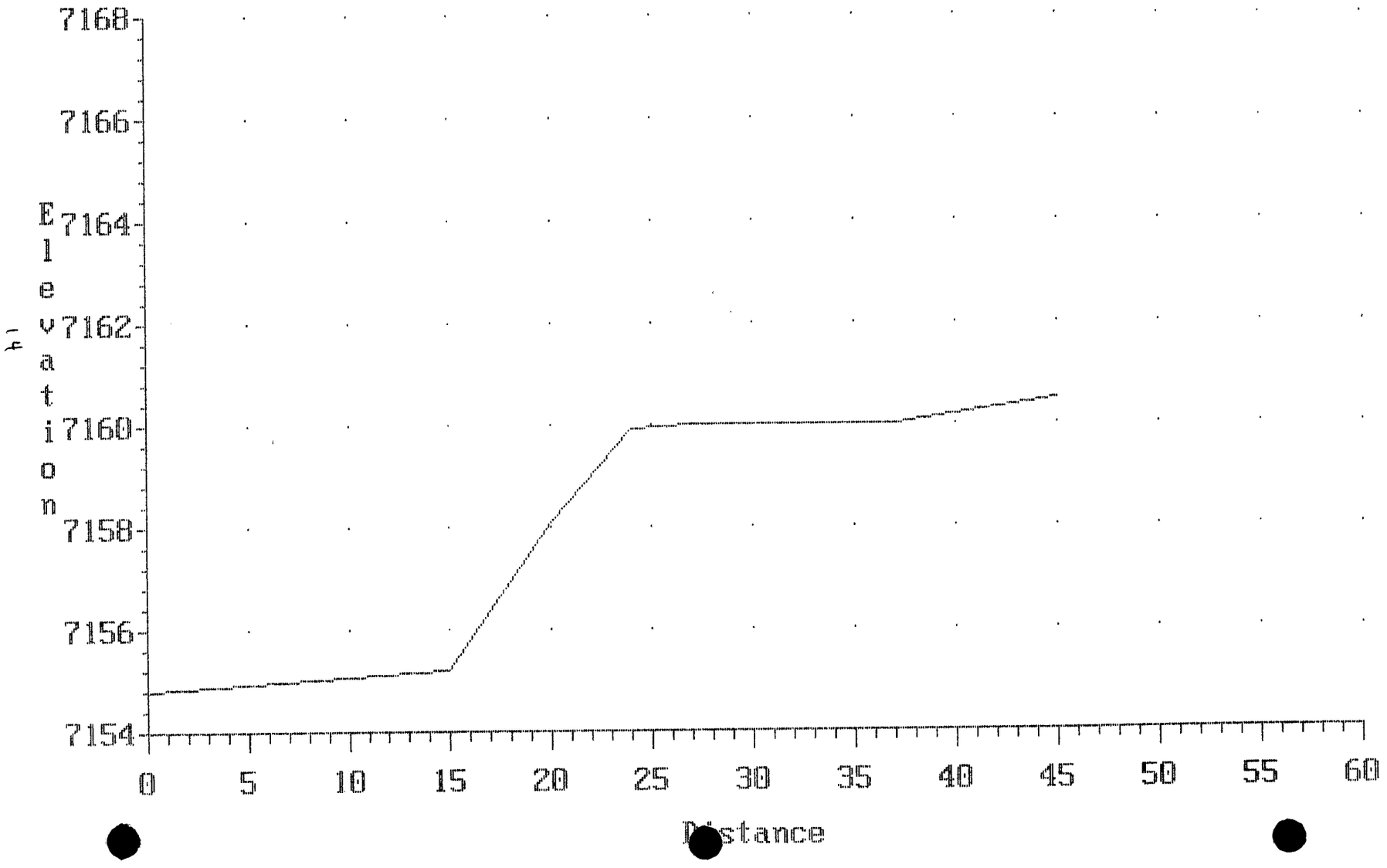

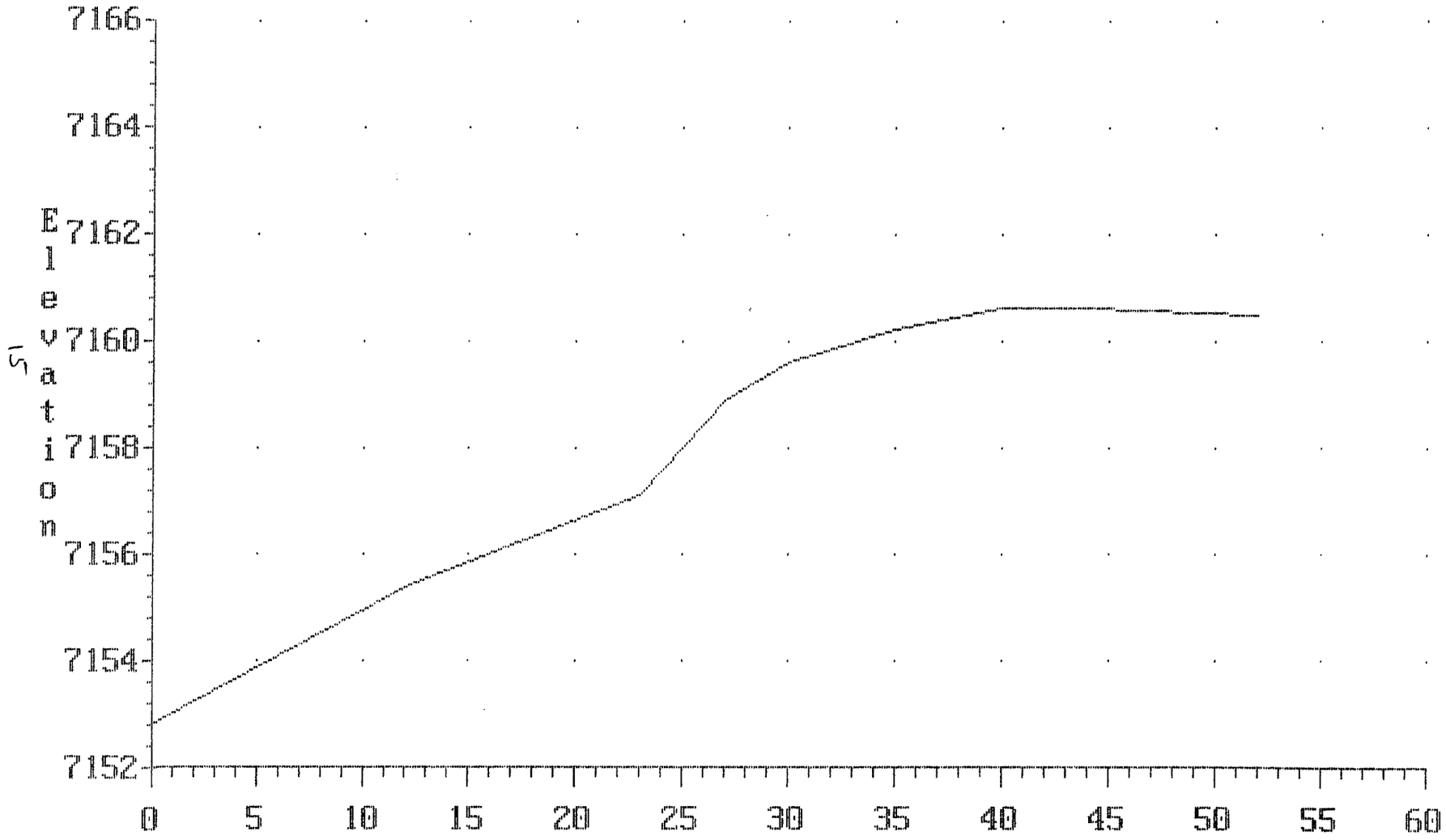
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Distance

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CROSS-SECTIONS
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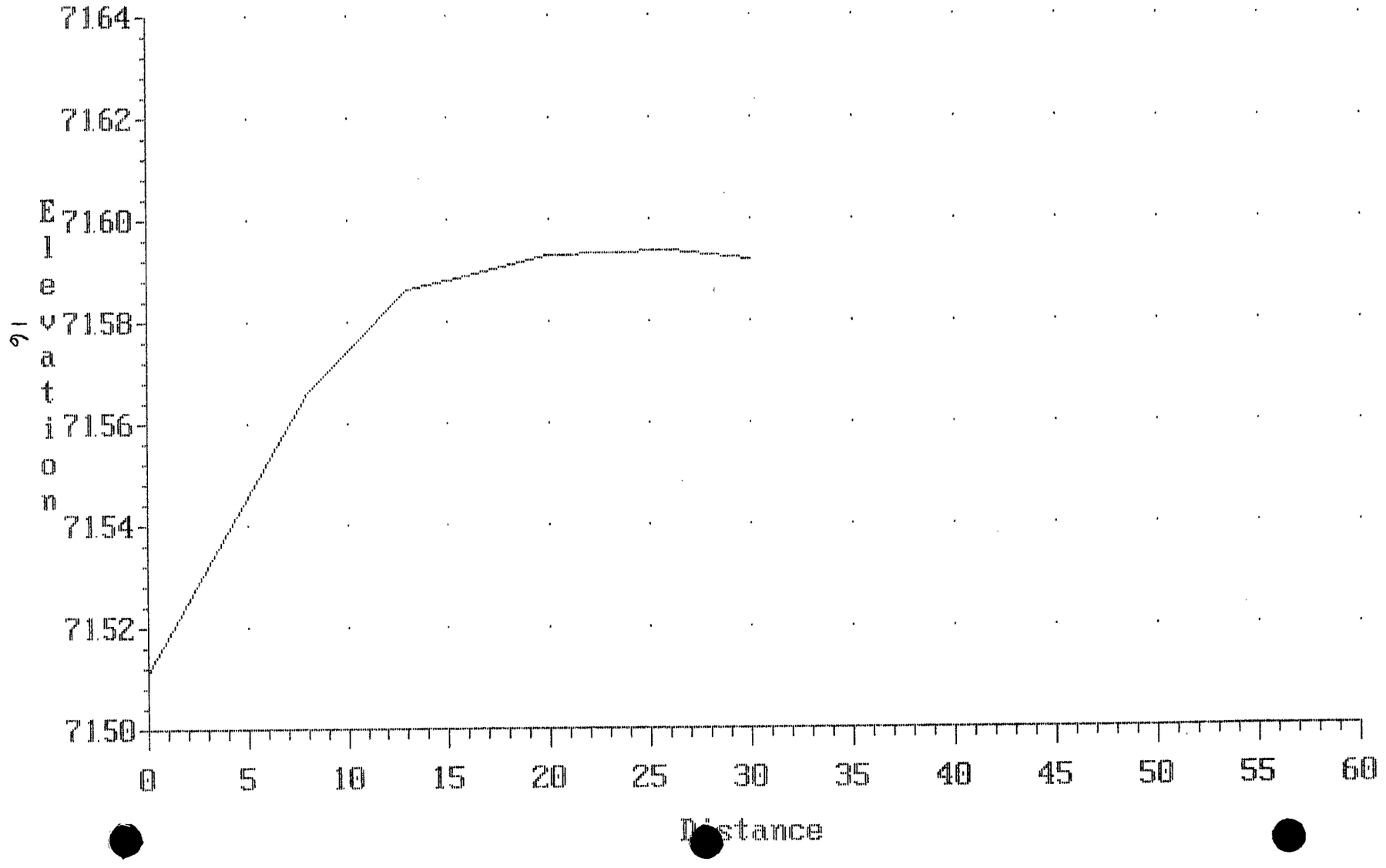

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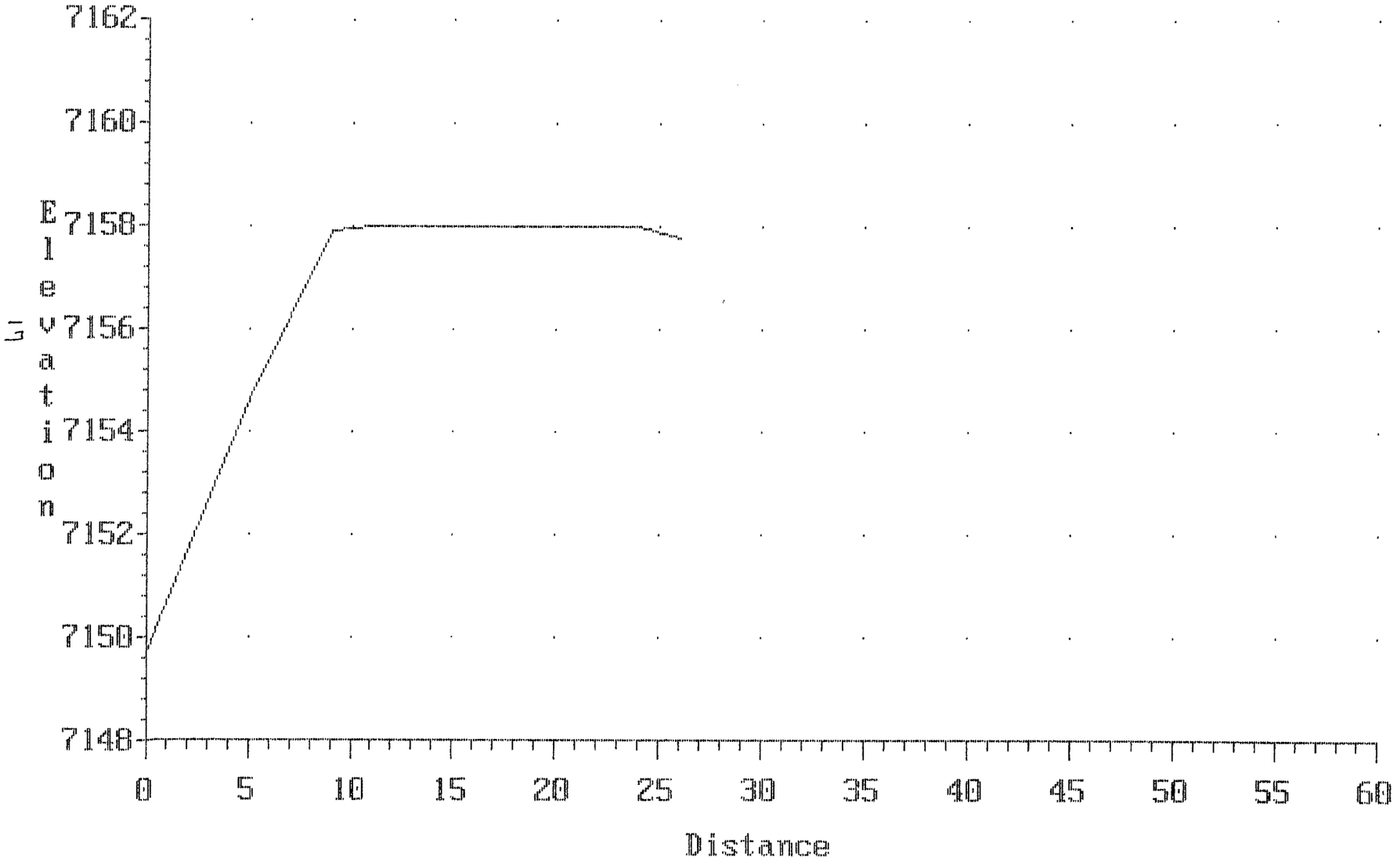

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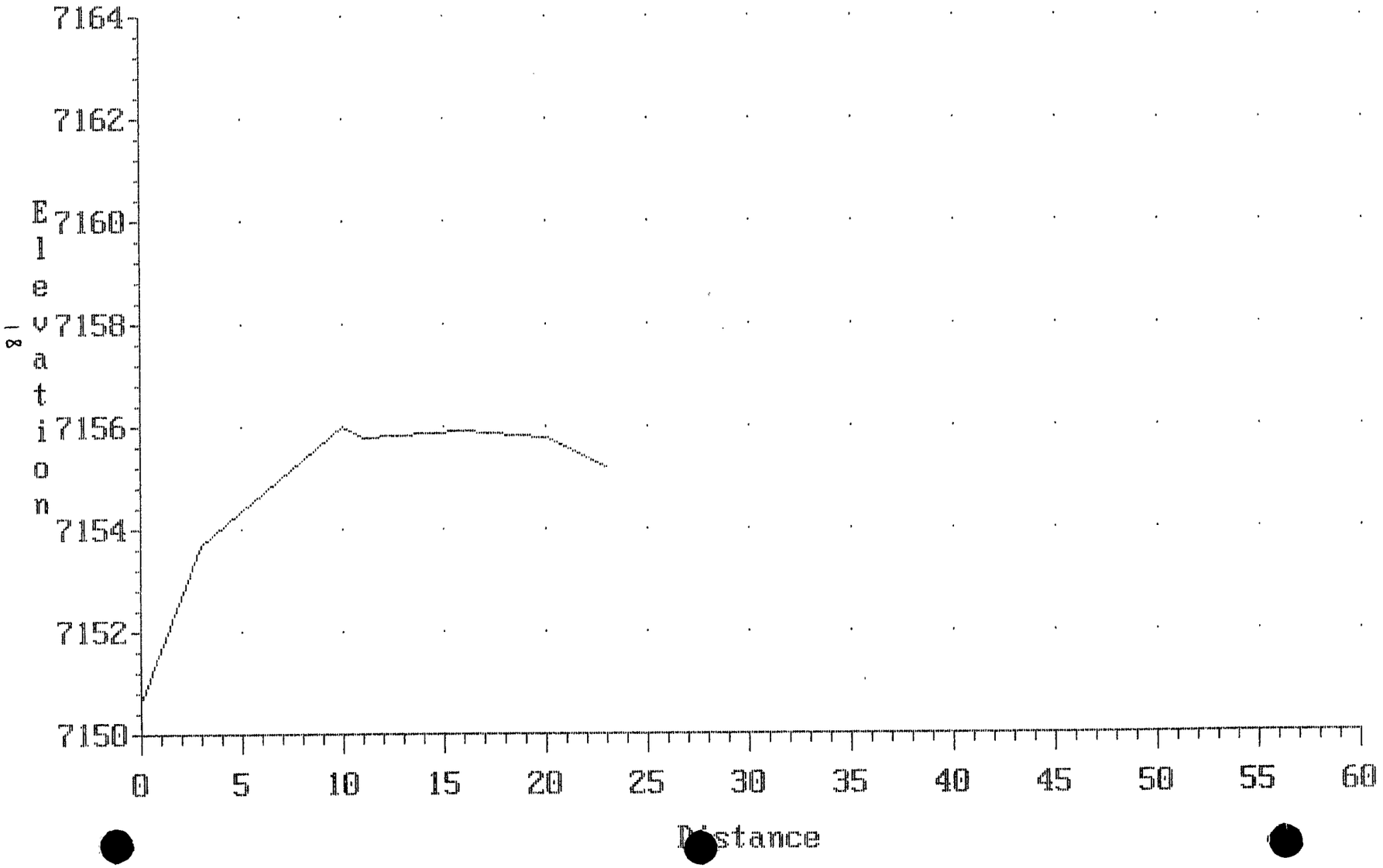

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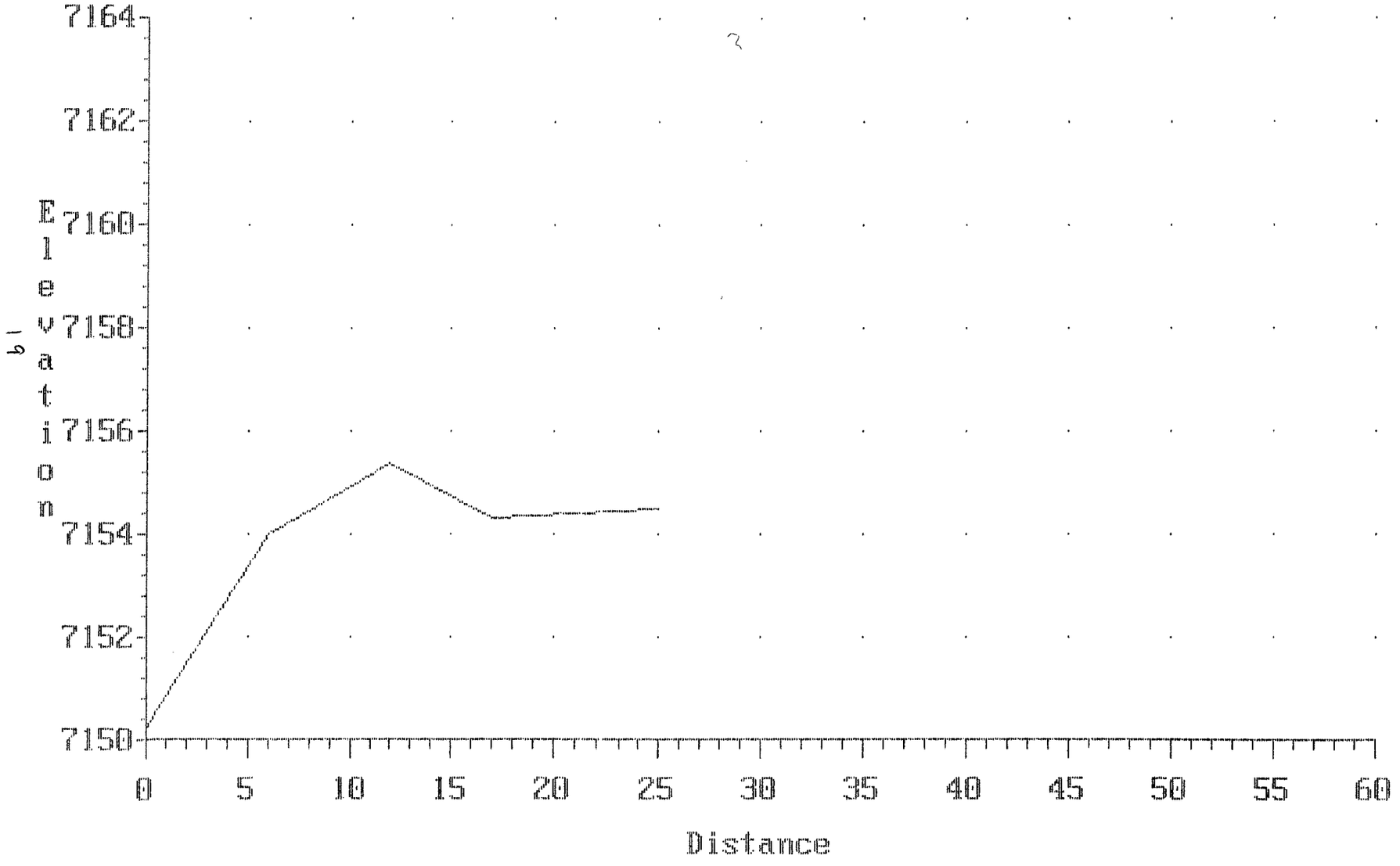

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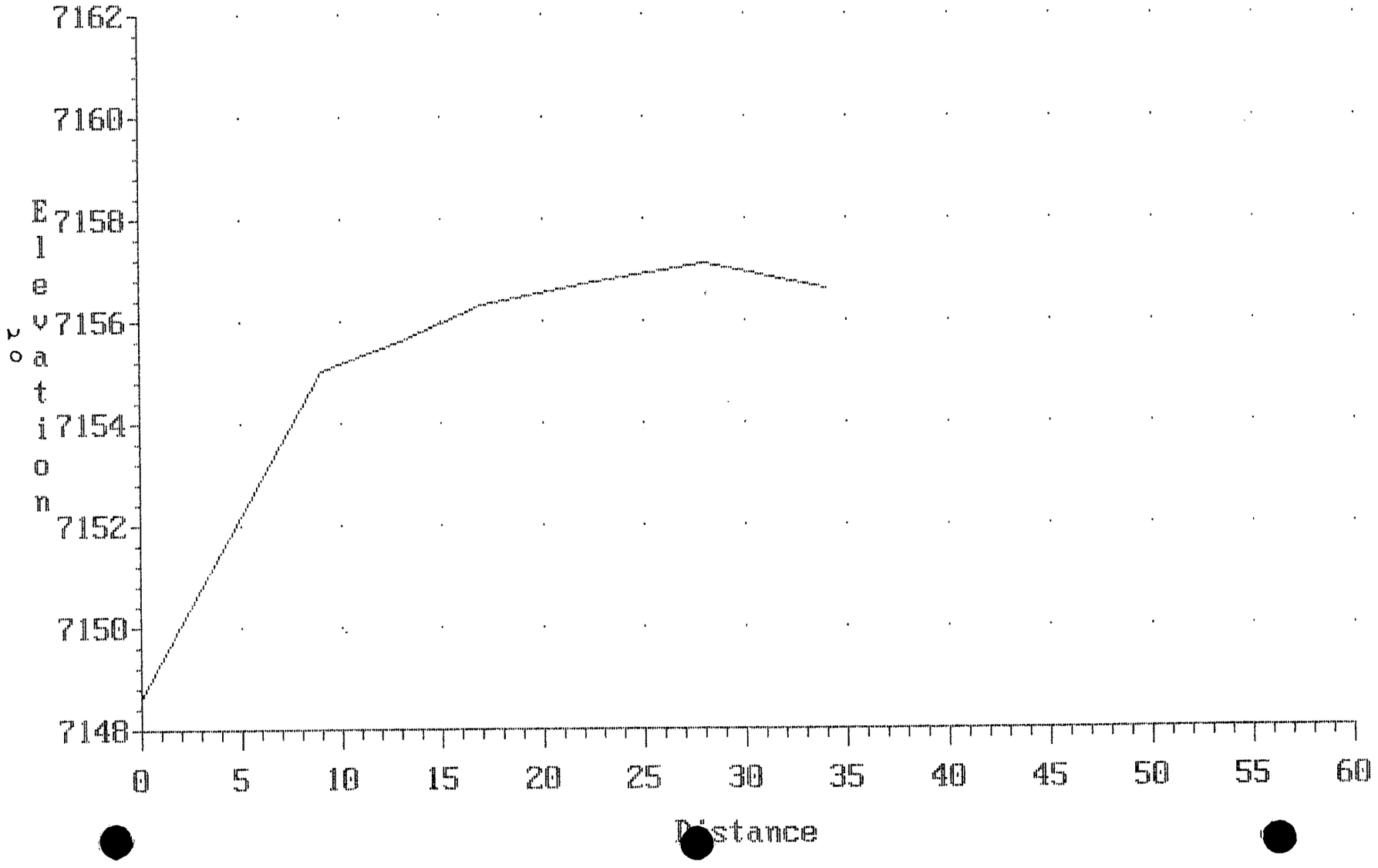

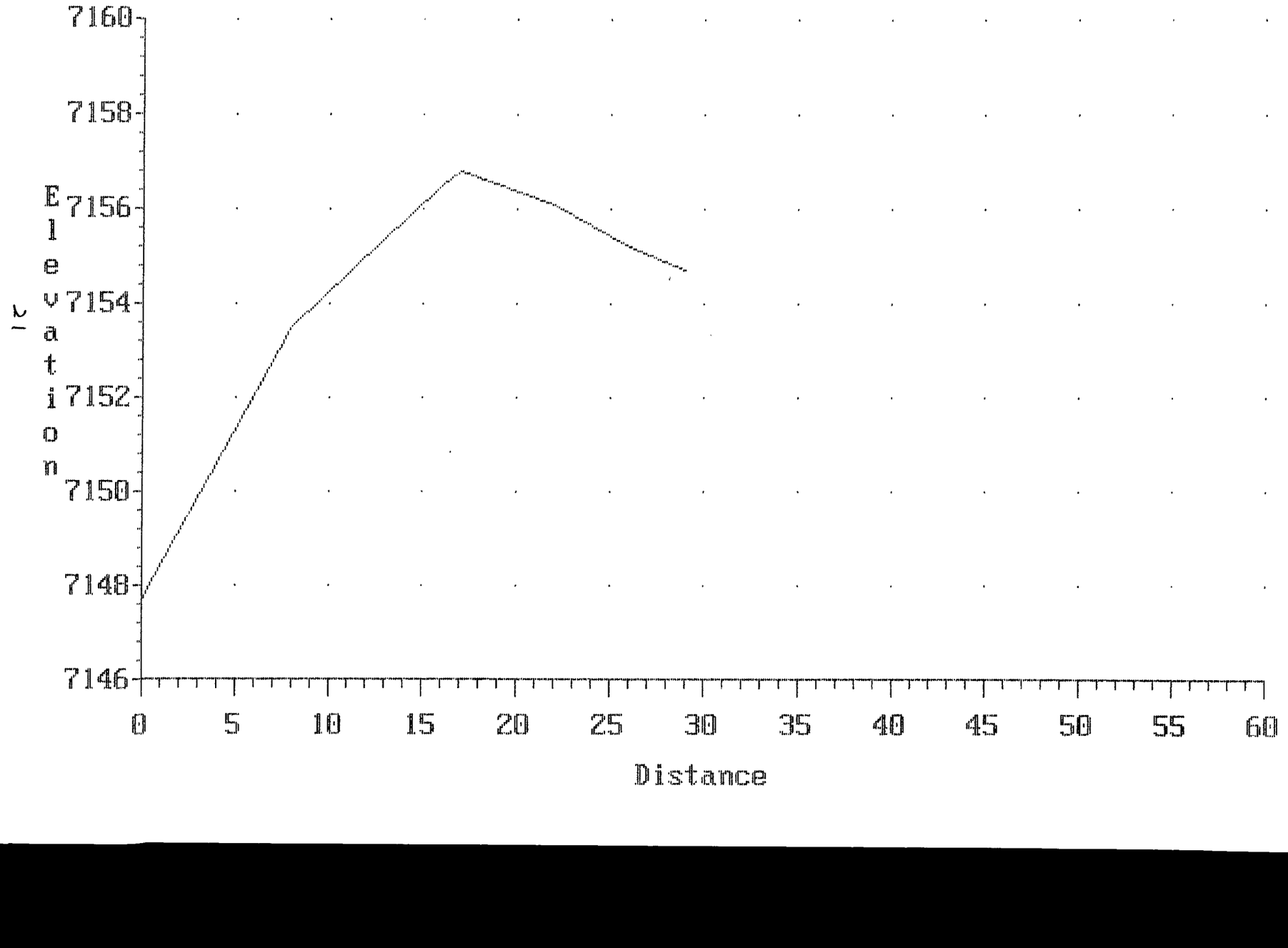
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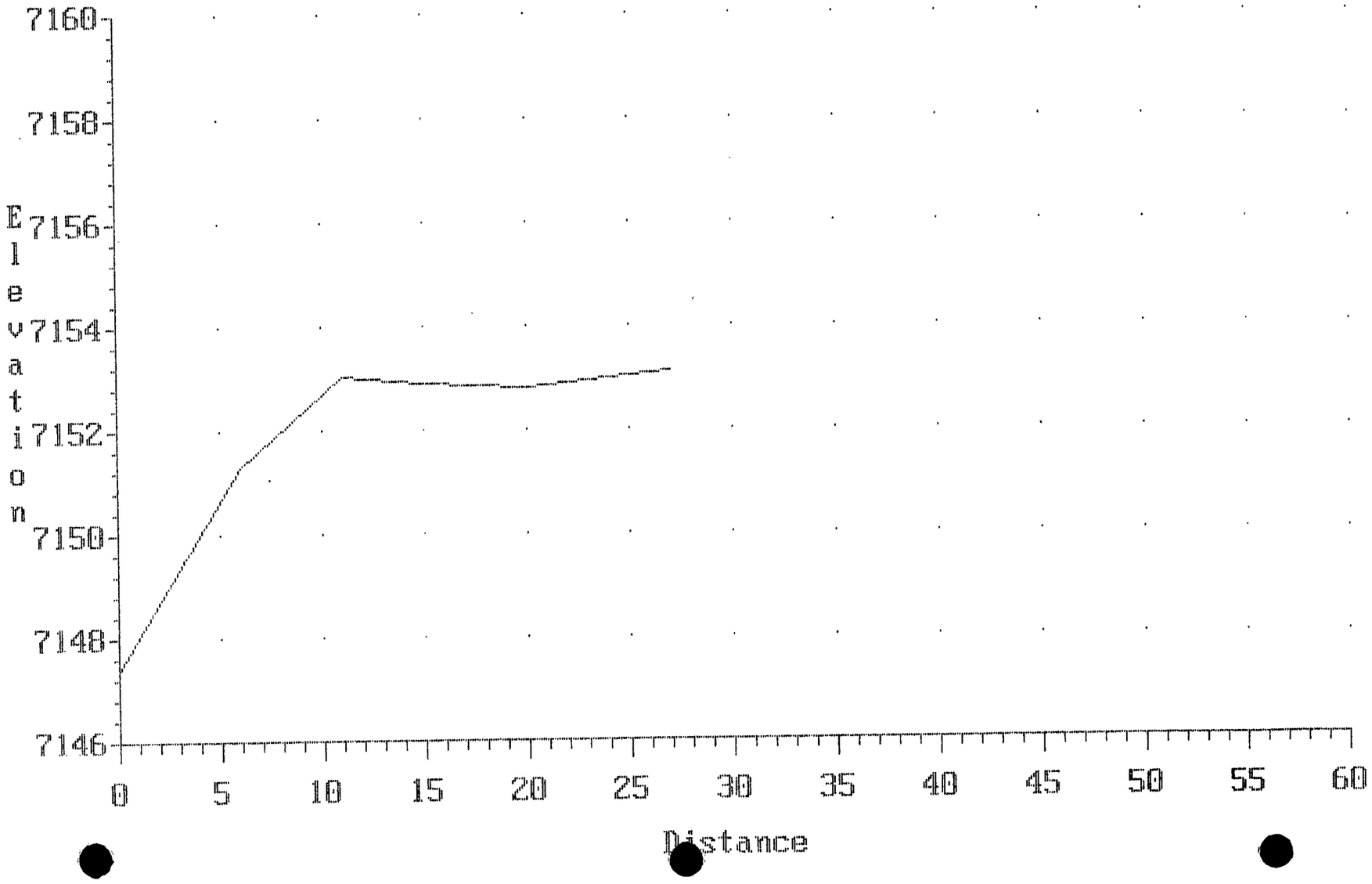

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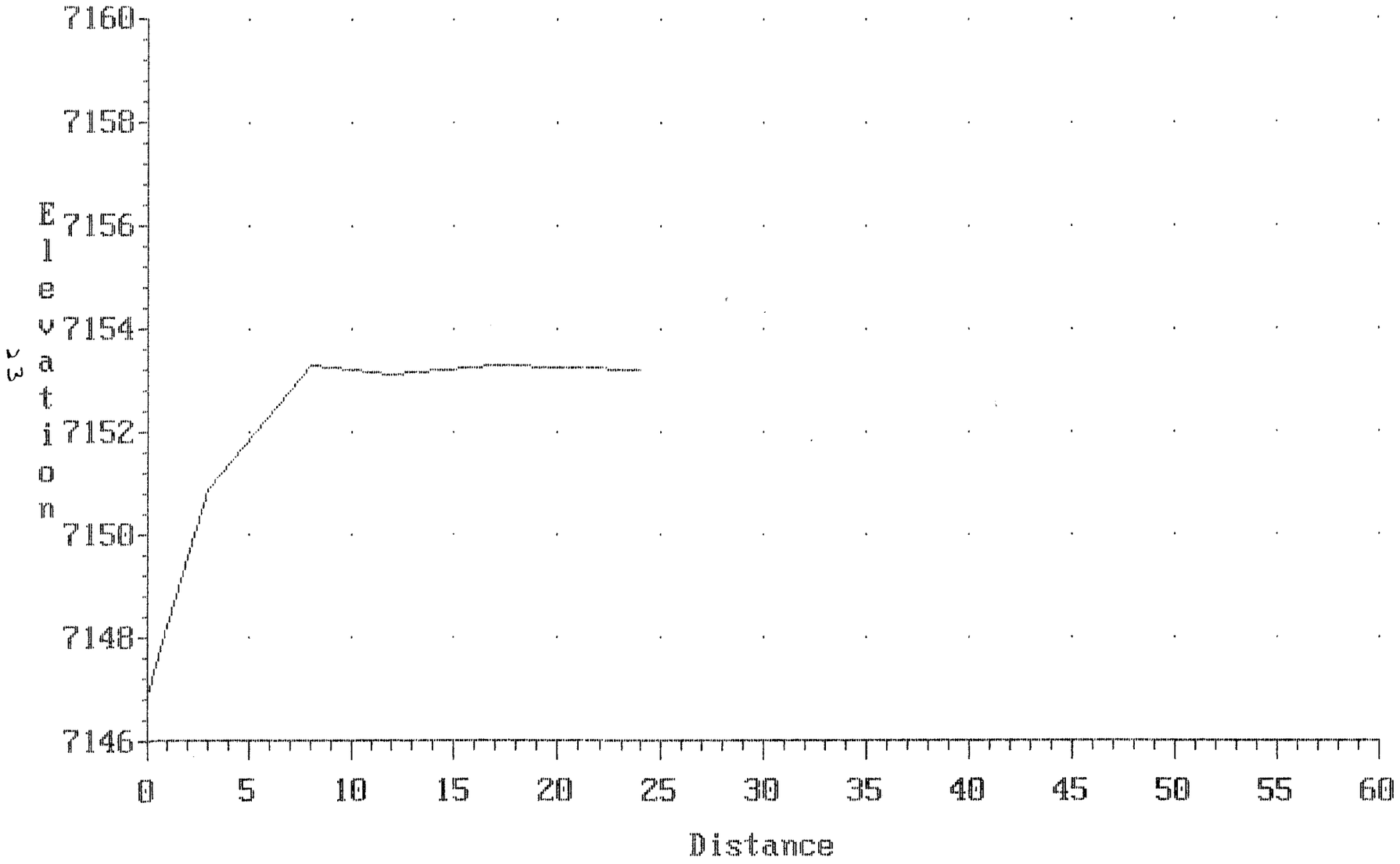

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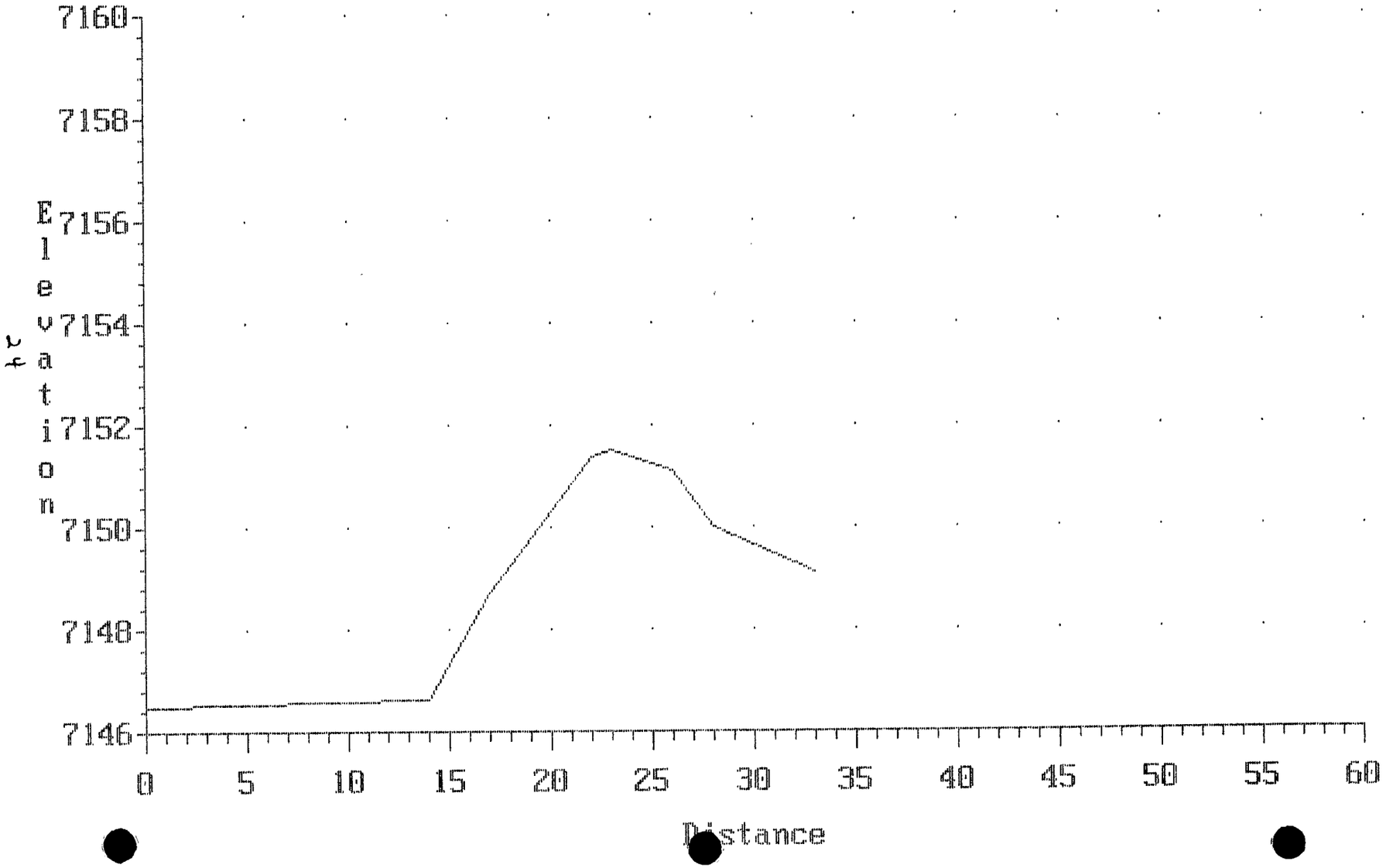

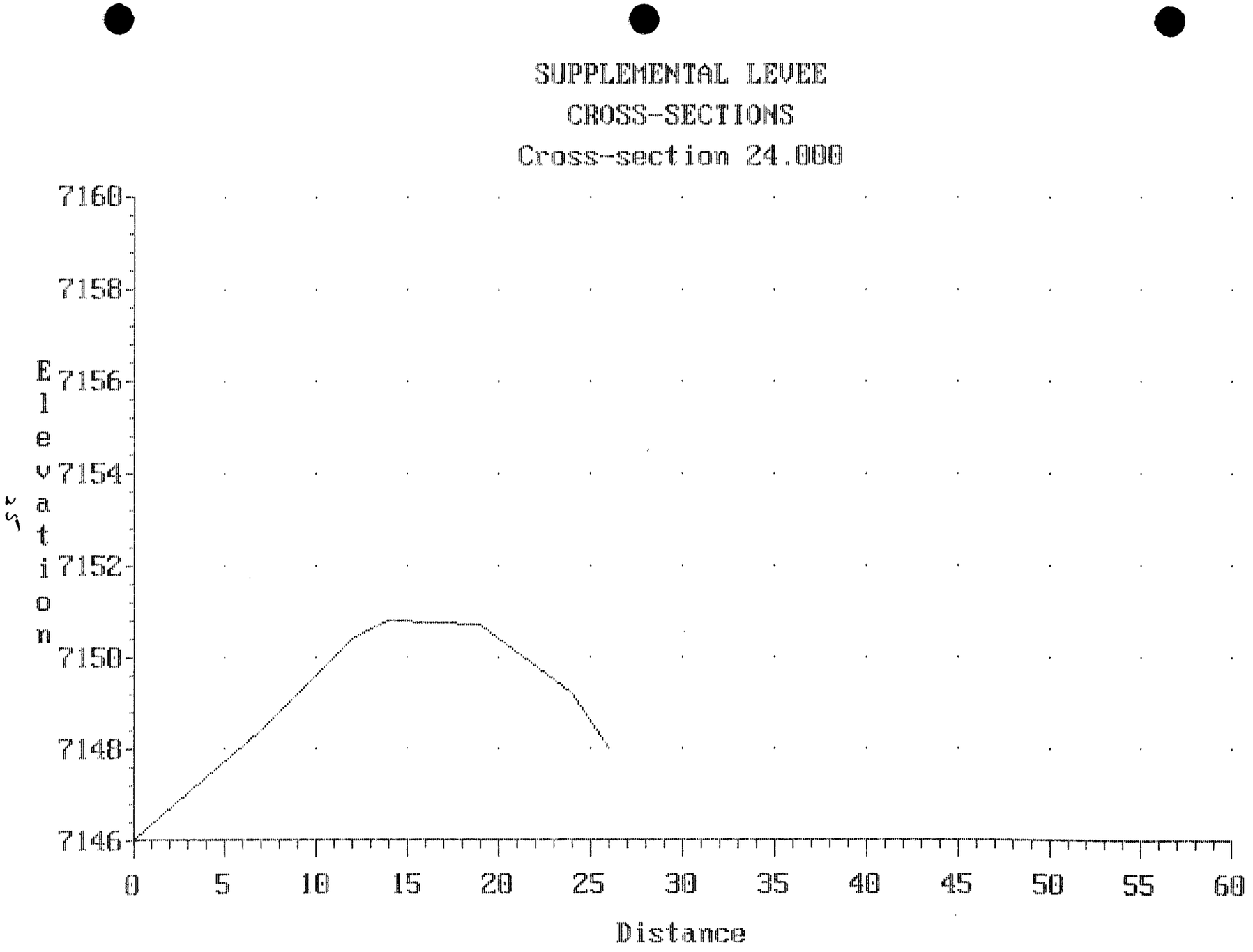
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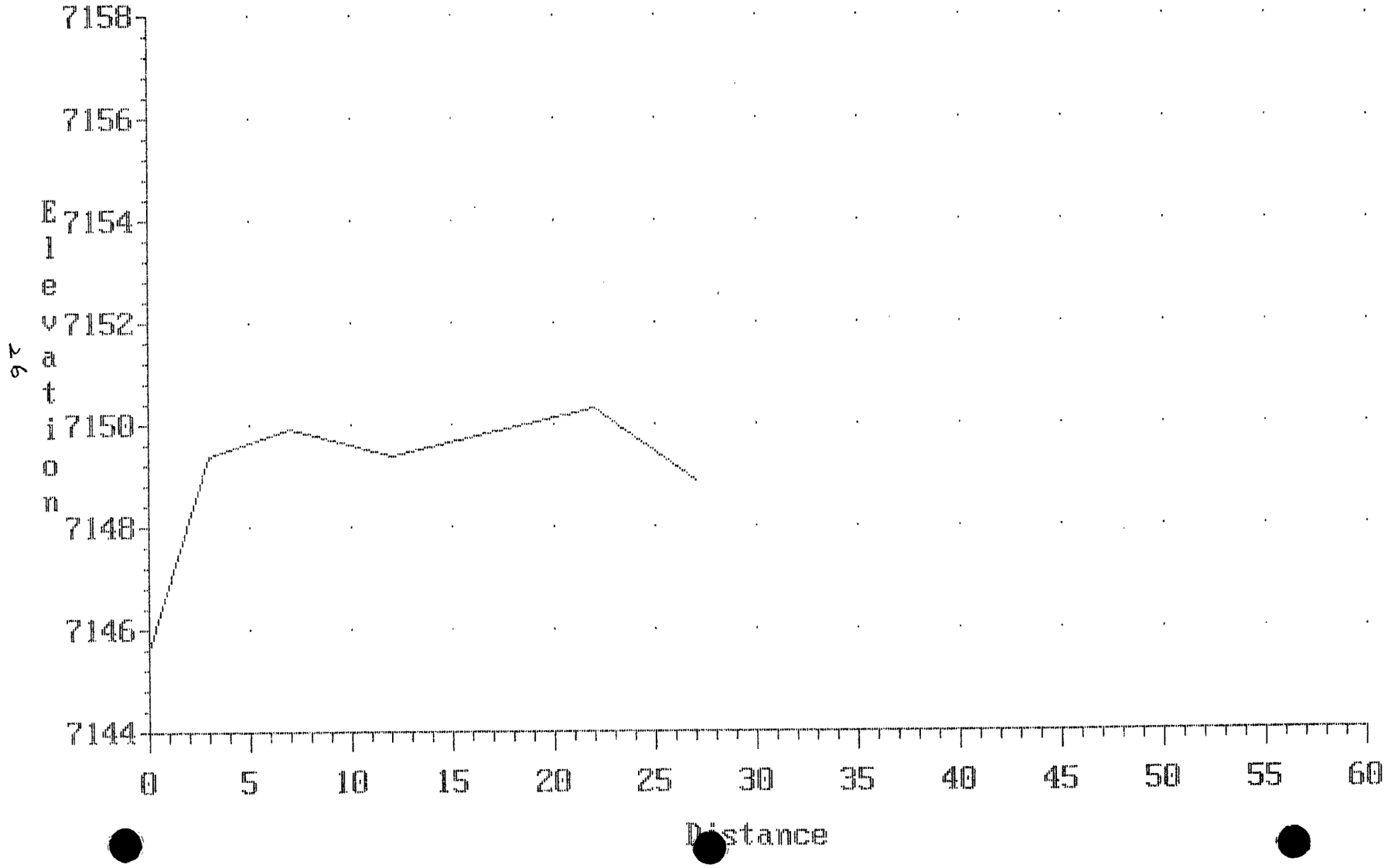

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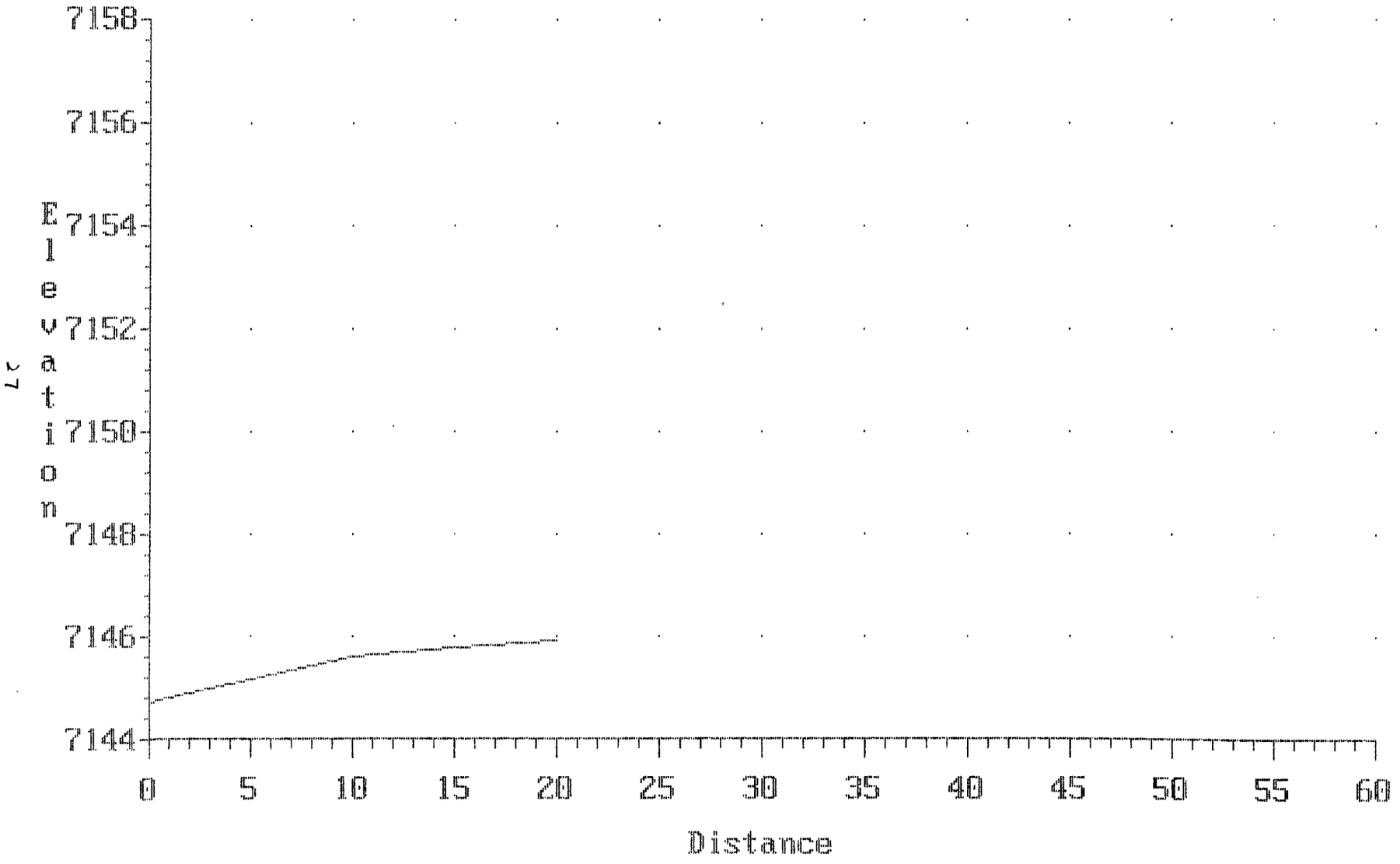

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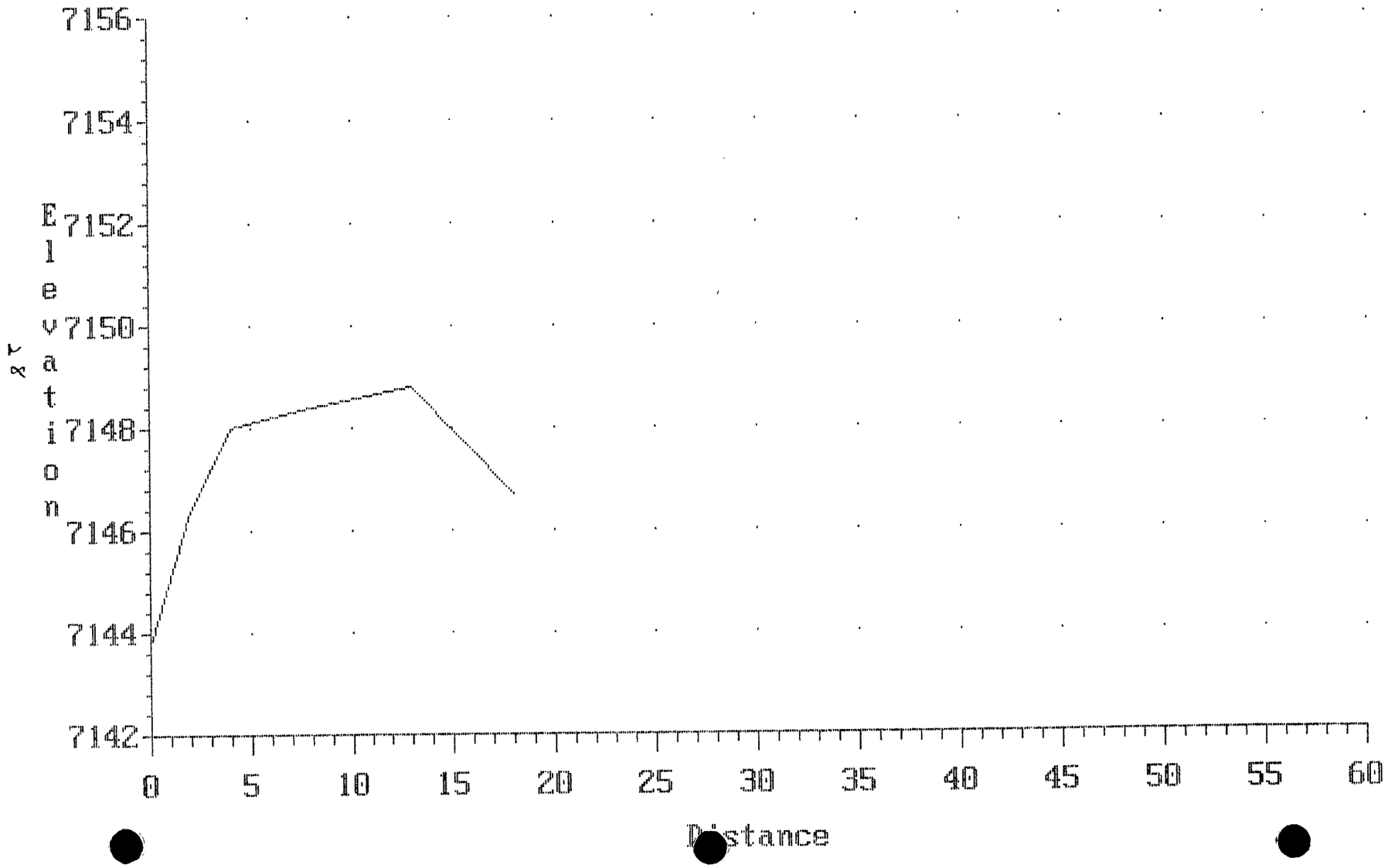

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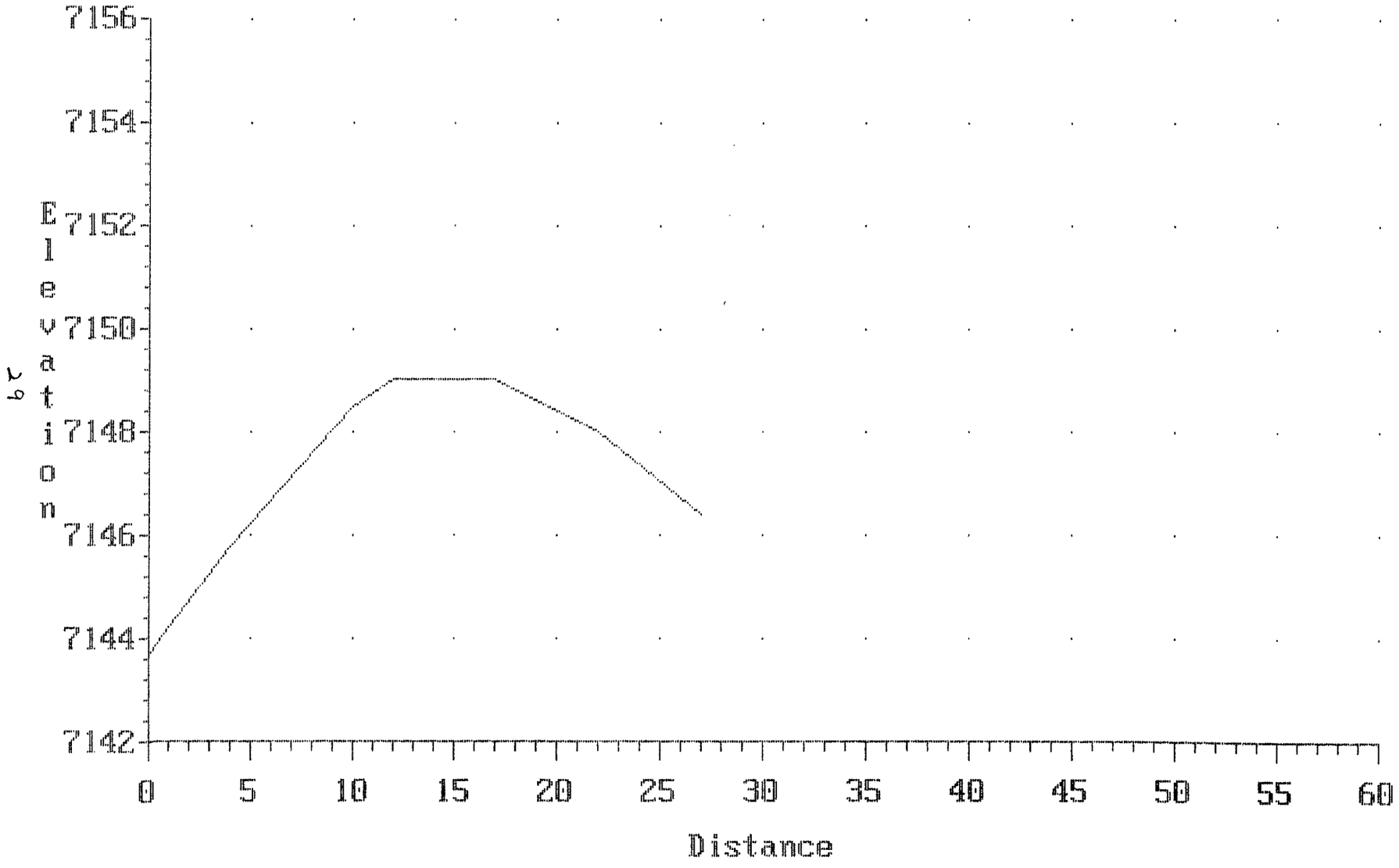

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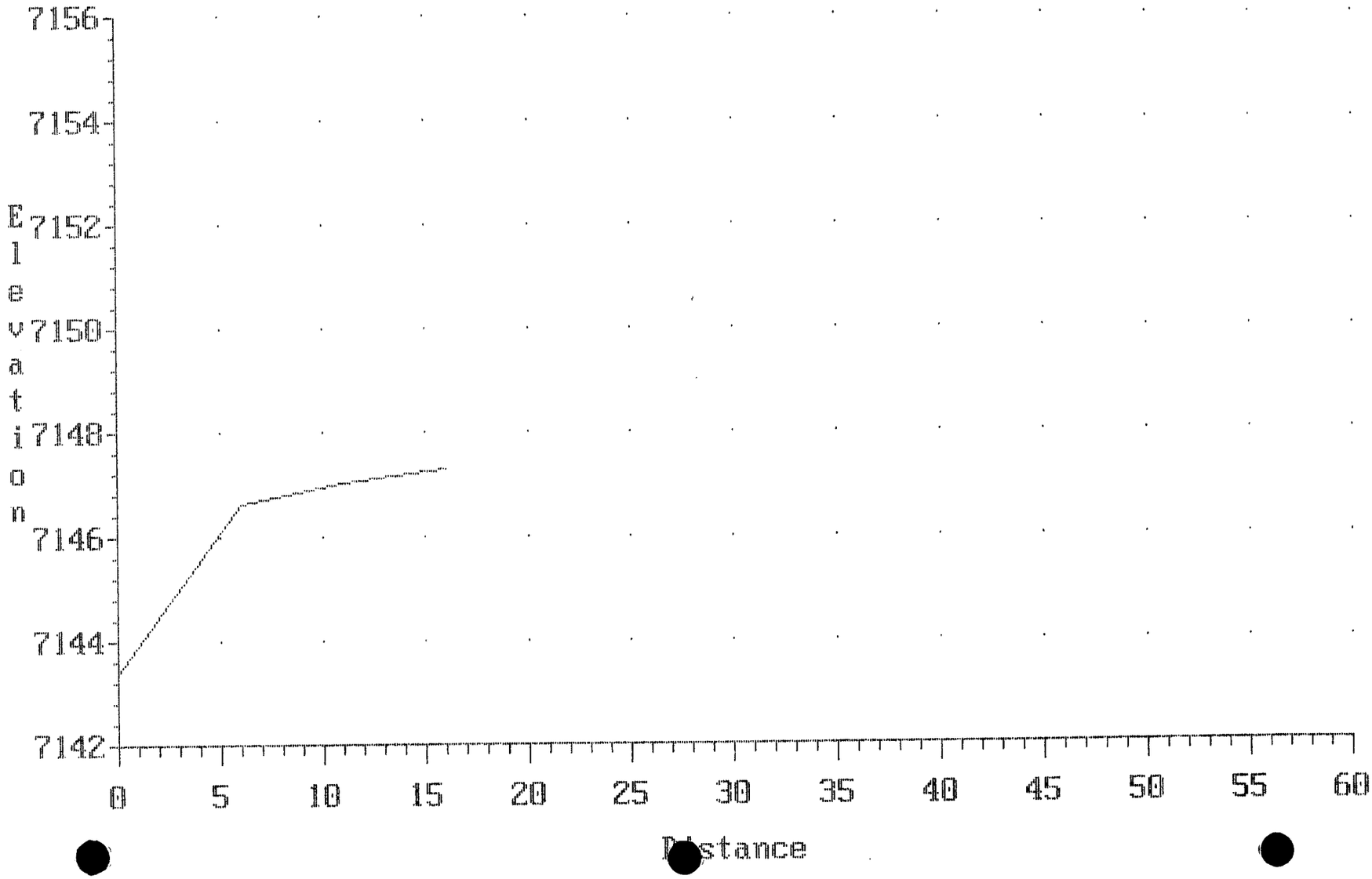
CROSS-SECTIONS
Cross-section 29.000



30

BANNER

CONSULTING ENGINEERS & ARCHITECTS

BANNER ASSOCIATES, INC.
2777 Crossroads Boulevard
Grand Junction, Colorado 81506
(303) 243-2242
FAX (303)243-3810

605 East Main, Suite 6
Aspen, Colorado 81611
(303) 925-5857

April 2, 1991

Mr. Tom Newland
Assistant County Manager
Pitkin County
530 E. Main St.
Aspen, CO. 81611

RE: REDSTONE LEVEE SURVEY
PITKIN COUNTY, COLORADO

Dear Tom:

In accordance with our agreement for services, we have completed the as-built cross sections for the Redstone Levee project. Enclosed for your use and submittal are the following items:

1. Field notes stamped and signed by a Colorado Registered Professional Land Surveyor.
2. A computer point plot showing the cross-sections and the closed traverse.
3. A computer print out showing the coordinates for the cross-sections and traverse.
4. Two marked up blueprints of the original flood study showing the major cross-sections in plan view.

The major cross sections were taken as close as practical to the previous sections. Due to the existence of structures and improvements, exact replication was not possible in all instances.

Please feel free to contact me with any comments or questions. Thank you for the opportunity to work with you on this project.

Sincerely,

Robert E. Daniel, Jr., P.E.
Aspen Projects Director
BANNER ASSOCIATES, INC.

Enclosure
RED/clk
wp-doc\8053-23.ab

REDSTONE

1/29/91

JESSUP
BOSNA

LEVEE PROJECT

COLORADO REGISTERED
WALLACE E.
BEEDLE
20632
P.E. AND P.L.S.

Wallace E. Beedle

March 27, 1991

NOTE: USE 1" AS THICKNESS
OF ICE UNLESS OTHERWISE
NOTED.

BS	∠	FS	H∠	∠	SD	HD
#20	#100			90-24-30	1[illegible]-16	1221-73
〃	〃	NW (701) RED ART CTR. BLD COR	117-38-50	88-28-00	64-46	64-64
〃	〃	〃 (702) N E	110-27-10	87-59-40	82-66	82-61
〃	〃	NE (703) CRYSTAL MANOR BLD COR	23-19-10	90-11-30	129-66	129-68
〃	〃	〃 (704) NW	7-16-30 ~~7-86-30~~	90-23-40	118-82	118-82
〃	〃	NW (705) CHURCH BD COR	44-44-70	89-24-40	76-46	76-46
〃	〃	SW (706) 〃	83-58-40	81-25-00	55-66	55-68
	*	LEVEE	344-05-00	93-15-00	16-26	16-17
〃	〃	HUB #2				
〃	〃	#3	348-20-40	90-59-10	116-92	116-90
〃	〃	#4	351-10-00	87-33-40	215-92	215-72
〃	〃	#5	357-45-20	81-16-45	315-00	314-98

BS	∠	FS	H∠	V∠	SD	HD
#100	#200			89-26-55	1221 60	1221 74
		Levee Hill				
"	"	#6	357-23-10	89-19-55	821 30	821 24
"	"	#7	356-30-~~00~~ 10	89-~~41-40~~ 41-40	722 ~~42~~	722 41
"	"	#8	354-58-56	89-25-50	603 28	603 25
"	"	#9	354-28-17	89-22-[illegible]	503 52	503 49
"	"	#10	353-40-52	89-14-10	403 02	402 98
"	"	#11	352-07-10	89-57-40	304 29	304 28
"	"	#12	354-49-08	90-06-10	206 68	206 68
"	"	#13	5-49-38	90-36-20	113 08	113 07
"	"	#14	51-37-30	93-45-10	17 88	17 84
"	"	#15	177-56-~~22~~ 10	91-~~30 00~~ 91-~~55 15~~	89 ~~44~~	89 41
		TOWNHOUSE (707)				
"	"	SW BLD COR	202-56-58	91-21-40	175 08	175 03
		" (706)				
"	"	SE BLD COR	211-24-50	90-55-00	192 86	192 83

BS	T	FS	Hz	V∠	SD	HD
#100	#200	#16	179-48-20	91-00-50	186.56	186.47
"	"	#17	176-43-02	91-03-20	286.62	286.77
"	"	#18	173-35-52	90-53-02	383.50	383.45
"	"	#19	166-11-48	90-37-40	459.36	459.33
"	"	#20	165-42-20	90-27-30	560.58	560.56
"	"	#300	165-37-52	90-19-22	764.37	764.36
#200	#300					
"	"	#21	359-36-10	90-20-10	104.62	104.62
"	"	#22	27-21-50	74-24-40	5.78	5.76
"	"	#23	182-52-26	91-30-00	85.56	85.53
"	"	#24	187-20-02	89-42-30	186.46	186.46
"	"	#400	204-37-10	90-39-50	633.~~60~~67	633.63

Levee (ground)

STA	+	H.I.	Hub −	Elev	
	1 66	7173 00		7171 34	
#100 91.5			4 20	7168 80	(spike) ℄
#2			4 58	7168 42	
#3 (or 91)			5 70	7167 30	
T/P	2 24	7172 92	2 32	7170 60	
#4			6 62	7166 30	
T/P	2 63	7172 10	3 45	7169 47	

* Dist — 25/4 5 → (−) 5

	(West) Left	Elev	(East) Right	Elev	
NW Cor:	+0/3 2	Top Concrete Fence	6°/4 45	Bench Top 7168 55	@ Church
	5°/4 5	T.B. 7168 50	10/3 2	Fence 7169 80	
	20°/10 7	Toe/T. Ice 7162 30		TB?	
	−15 = 7160 8			~~Fence~~	
	2 5/4 75	T.B. 7168 25	14°/3 9	Fence 7169 10	
	17°/10 9	Toe/T. Ice 7162 10	9°/4 7	Toe 7168 30	
		−1 60 = 7160 60	4°/4 6	Top ? 7168 40	
	3°/5 9	G.B. 7167 10	7°/5 6	Top 7167 40	
	10°/7 1	T.B. 7165 90	13°/5 8	7167 20	
	22 6/11 5	Toe/T. Ice 7161 50			
		−1 50 = 7160 0			
	3°/7°	T.B. 9 7165	5°/6°	Lath 9 7166	
	18°/11 5	Toe/T. Ice 7161 4	10°/5 8	7167 1	
		−1 5 = 7159 9	12°/5 7	7167 2	

Note: Ice is Approx. 1 5 thick

* ; Rights and Lefts are measured from Levee Hubs

	#	Hi	LEVER HUB	Elev
#5		7172.10	5.17	7166.93
#6			5.36	7166.74
T/P	3.32	7169.98	5.44	7166.66
#7			4.94	7165.04
#8			6.90	7163.08
T/P	5.56	7168.15	7.39	7162.59
#9			5.55	7162.60
#10			5.67	7162.48

	WEST Left	Elev	EAST Right	Elev
	2.5/5.2	T.B. 7166.9	5.0/5.20	LATH 7166.9
	8.0/10.0	Toe/T. ice 7162.10	10.0/4.9	7167.2
	16.0/10.7	E. Brush T/ice 7161.4 −1.5 = 7159.9		
	5.0/6.15	T.B. 7165.9	7.0/5.2	7166.9
	17.0/10.9	Toe/T. ice 7161.2 −1.5	11.0/5.2	7166.9
	=	7159.7		
	4.0/5.25	T.B. 7164.7	10.0/4.55	7165.4
	17.0/10.9	Toe/T. ice 7159.5 −1	17.0/4.7	7165.3
	=	7157.6		
	7.0/7.20	T.B. 7162.8	13.0/6.50	7163.5
	15.0/11.0	Toe/T. ice 7158		
		7159.0	−1.5 = 7157.5	
	2.0/5.7	T.B. 7162.4	4.0/5.4	LATH 7162.7
	10.0/9.2	Toe/T. ice 7158.95	9.0/5.9	Toe 7162.2
	=	7157.4	12.0/5.6	G.B. 7162.5
	3.0/6.1	T.B. 7162.0	5.0/5.6	LATH 7162.5
	12.0/9.2	T.E/T. ice 7158.95	18.0/5.8	7162.3
	=	7157.4		

STA	+	H.	LEVER HUB —	Elev	
T/P			2.09	7166.06	✓
	4.82	7170.88			
T/P			1.88	7169.00	
	6.16	7175.16			
ck in			3.83	7171.33	.01
	3.40			7166.06	
T/P			6.27		
	3.45	7166.64			
#11			4.60	7162.04	
#12			5.8	7160.84	T.B.
T/P			4.83	7161.81	
	4.61	7166.42			

WEST Left Elev EAST Right Elev

Top Flange St. Lamp Post @ General Store

Same As Start

Top Flange St. Lamp Post @ General Store

2.0/4.9	T.B. 7161.7	5.0/4.75	LATH 7161.9	
4.0/5.8	7160.8	14.0/5.4	7161.2	
9.0/7.2	Toe/T. Ice 7159.4 − 1.2 = 7158.1			Ice Thick = 1.2
3.6/7.2	7159.4	5.0/6.0	LATH 7160.6	
8.0/8.4	Toe/T. Ice 7158.2 − 1.3 = 7156.9	10.0/5.9	B.B. 7160.7	
		17.0/6.1	7160.5	

St	+	H.I.	LEVEE HUB	Elev
		7166 42		
#13			6 40	7160 02
#14			6 25	7160 17
#200			6 06	7160 36 SPIKE
T/P			6 06	7160 36
	2 87	7163 23		
#15			4 40	7158 83
#16			5 25	7157 98

	West Left	Elev	East Right	Elev	
	3°/6 5	T.B. 7159 9	5°/6 4	7160 0	
	7°/8 3	7158 1	10°/6 2	7160 2	
	12°/9 7	Toe - T. Ice 7156 7	18°/5 9	7160 5	
	27°/10 1	T. Ice 7156 3	= 7155 2		
			= 7154 8		
	5°/6 8	T.B. 7159 6	5°/5 85	7160 6	
	8°/7 5	7158 9	9°/5 8	7160 6	
	12°/9 3	7157 1	17°/5 9	7160 5	
	23°/11 0	Toe 7155 4			
	35°/12 1	G.B./T. Ice 7154 3			
		-1 5			
		7152 8			
	2°/4 6	T.B. 7158 6	5°/3 9	LATH 7159 3	
	7°/6 6	7156 6	11°/3 8	7159 4	
	15°/10 6	Toe - T. Ice 7152 6	15°/4 0	7159 2	
		- 1 5			
		= 7151 1			
	2°/5 3	T.B. 7157 9	5°/5 2	LATH 7158 0	
	6°/8 6	7154 6	13°/5 2	7158 0	
	11 1/12°	Toe - T. Ice 7151 3	15°/5 4	7157 8	
		1 5			
		7149 7			

STA	+	HI	LEVEE HUB	Elev	
#17		7163 23	7 25	7155 78	
T/P	4 22	7160 97	6 48	7156 75	
#18			5 60	T.B. 7155 37	BEGIN BRUSH
~~#19~~					
T/P	5 15	7162 27	3 85	7157 12	
#19			6 0	7156 27	T.B.
#20			5 5	7156 77	
T/P	1 52	7158 93	4 86	7157 41	Top STAKE #20
#21			6 0	7152 93	

WEST Left	Elev	EAST Right	Elev	9
1°/7 2	T.B. 7156 0	5°/7 3	LATH 7155 9	
8°/9 5	Rocks 7153 7	9°/7 4	7155 8	
11°/11 1	Toe-T.Ice 7152 1 − 1 5 = 7150 6	12°/8°	7155 2	
6°/7°	G.B. 7153 97	5°/6 7	LATH 7154 3	
12°/9 3	Toe/T.Ice 7151 9 − 1 5 = 7150 2	13°/6 5	7154 5	
4°/6 7	G.B. 7155 6	5°/5 6	LATH 7156 7	
8°/7 3	G.B. 7154 97	11°/5 2	7157 1	
17°/12 2	Toe-T.Ice 7150 1 − 1 5 = 7148 6	17°/5 7	~~#16~~ 7156 6	
1°/5 8	T.B. 7156 5	5°/6 2	LATH 7156 1	
9°/8 8	Rocks 7153 5	9°/7 1	7155 2	
17°/13 1	Toe/T.Ice 7149 2 − 1 5 = 7147 7	12°/7 6	7154 7	
4°/5 2	T.B. (Rocks) 7153 0	5°/6 1	7152 8	
9°/7 6	7151 3	12°/5 8	7153 1	
15°/10°	Toe T.Ice 7148 9 − 1 5 = 7147 4			

	+	H.I.	LEVIZE HUB	Elev
#22		7158 93	5 8	7153 13
#300			5 77	7153 16
T/P			5 77	7153 16
	3 90	7157 06		
#23			5 6	7151 46
F/P			5 58	7151 48
	1 99	7153 47		
#24			2 7	7150 77
#25			3 6	7149 87
F/P			5 75	7147 72
	3 43	7151 15		

	WEST Left	Elev	EAST Right	Elev	
	4°/5 6	T.B. 7153 3	5°/5 6	7153 3	
	9°/8 0	7150 9	12°/5 7	7153 2	
	12°/10 5	Toe T. ICE ~~7148 4~~ 1 5 ~~7146 9~~			
	1°/5 7	T.B. 7151 4	3°/6 0	~~Elev~~ 7151 1	
	6°/8 4	7148 7	5°/7 1	LATH 7150 0	
	9°/9 0	Toe-T. ICE ~~7148 1~~	10°/8 0	Toe 7149 1	
	~~23~~°/9 1	T. ICE ~~7148 0~~ ℄ = 7146 5	7146 6		
	2°/3 1	T.B. 7150 4	5°/2 8	LATH 7150 7	
	7°/5 1	Rocks 7148 4	10°/4 3	7149 2	
	14°/6 0	Toe-T. ICE ~~7147 5~~ 1 5 7146 0	12°/5 5	Toe 7148 0	
	4°/4 1	T.B. 7149 4	5°/4 1	LATH 7149 4	
	7°/6 4	Toe-T. ICE ~~7147 1~~	~~FS~~		
	1	-1 5 7145 6	15°/3 2	7150 3	
			20°/4 6	7148 9	

10

STA	+	N.	LEVER HUB	Elev
#26		7151 15	5 6	7145 55
#27			2 7	7148 45
#28			2 2	7148 95
#29			4 6	7146 55 T.B.
T/P			2 14	7149 01
	4 37	7153 38		
T/P			3 69	7149 69
	5 43	7155 12		
T/P			3 93	7151 19
	6 34	7157 53		
T/P			1 20	7156 33
	5 20	7161 53		

	WEST Left	Elev	EAST Right	Elev	
	10°/4 9	T. ICE 7146 E 1 5 7144 7	5°/5 3	LATH 7145 8	
			10°/5 2	7145 9	No BEEN Between HERE
	4°/3 1	T.B. 7148 0	5°/2 3	LATH T.B. 7148 3	
	6°/4 7	7146 4	10°/4 4	7146 7	
	7 5/5 8	Toe T. ICE 7145 3 E 1 5 7143 8			
	2°/2 6	T.B. 7148 5	5°/2 1	LATH 7149 0	
	8°/5 3	T.B. 7145 8	10°/3 1	7148 0	
	12°/5 9	Toe T.B. T. ICE 7145 2 1 5 7143 7	15°/4 7	Toe 7146 4	
	6°/6 2	Toe-T. ICE 7144 9 1 5 7143 4	5°/4 1	LATH 7147 0	END
			10°/3 8	7147 3	
	SOUTH Top Flange BOLT ON F-H @ N. END TOWN (House # 0654)				
	COVER FLANGE ST. Light Post			Across from (0530) House	

STA	+	Ht.	−	Elev	
T/P			1.56	7159.97	
	4.21	7164.18			
T/P			3.32	7160.86	
	5.93	7166.79			
CK IN			0.71	7166.08	.02

7166.06 Same As START

BS	T	FS	H ∠	V ∠
#200	#M-100	#2M (#202)	349-27-00	90-48-20
			88-19-00	EAST
"	"	Cross Section Line #100M	268-19-00	WEST
#100M	#2M (#202)	Cross Section Line #2M	290-28-40	EAST
			110-28-40	WEST
—	—	—	—	—
#300	#400			
"	"	#25	12-09-52	88-15-20
"	"	#26	11-10-02	90-15-20
"	"	#27	355-29-20	89-35-40
"	"	#28	352-59-55	88-27-40
"	"	#29	347-55-10	90-02-30

SD	HD				
$121\frac{10}{-}$	$121\frac{09}{-}$				NOTE: (M) = MAIN CROSS SECTION POINTS
(#1001)					
(#1002)					
					USE CONTROL PT #100 AS A MAIN CROSS SECTION POINT
(#1003)					
(#1004)					
$367\frac{04}{-}$	$366\frac{87}{-}$				
$277\frac{54}{-}$	$277\frac{54}{-}$				
$235\frac{39}{-}$	$235\frac{37}{-}$				
$219\frac{08}{-}$	$219\frac{00}{-}$				
$126\frac{60}{-}$	$126\frac{60}{-}$				

STA	+	H.	−	Elev	
657	7+69	7177.91		7131.34	NW COR Top Cone. BENCH @ CHURCH
M. #100	(#100)				
EAST					
+55.2			7.8	7170.1	
+136.3			5.76	7172.15	E. RD.
+157.2			5.7	7172.2	E. RD. } SEE #100 pg 5 FOR LEVEL SECTION
+173.6			6.0	7171.9	C.B.
+198.4			3.3	7174.6	C.B. * #100 = 2+86.4
T/P			3.13	7174.78	
	16.37	7191.15			
+280.2			12.0	7179.15	
+286.4			9.3	7181.8	TOE
+352.5			5.0	7186.1	TOP
+361.0			4.7	7186.4	E. Alley
T/P			6.29	7184.86	E. Alley
	16.38	7201.24			
+419.2			10.8	7190.4	
+444.0			2.6	7198.6	TOE
M-2 (#202)	EAST				on Slope
~~+422.3~~	+459.8		3.5	7197.7	on Slope
+429.3			12.4	7188.8	" "
+382.9			16.1	7185.1	
+371.9			16.6	7184.6	TOE
T/P			16.30	7184.94	E. Alley
	4.20	7189.14			E. Alley

STA	+	H.I.	−	ELEV	
+332.1		7189.14	6.9	7182.2	G.B.
+224.4			13.2	7175.9	G.B.
+200.0			17.1	7172.0	G.B
+180.1			18.4	7170.7	E. RD.
T/P			17.40	7171.74	
	3.11	7174.85			
+156.5			4.3	7170.5	E. RD
+62.4			6.2	7168.6	IN PKY LOT
#2M(#202)			7.16	7167.69	Spike
T/P			7.16	7167.69	
#2M(#202) 9.64 WEST		7177.33			
+11.0			11.5	7165.8	TIB
+24.0			15.4	7161.9	TOE Top ICE
+83.5			15.6	7161.7	" " "
+98.7			5.3	7172.0	G.B.
+107.5			4.5	7172.8	Top
+236.5			4.5	7172.8	Fence TOE
+250.1			2.82	7174.51	E. RD Top
+265.0			2.68	7174.65	℄ RD (Hwy)
T/P			2.82	7174.51	
	3.58	7178.09			

CONT. Next pg.

	+	H.	−	Flow	Sta HWY
+226.4		7178.09	2.52	7175.6	0+00
+269.5			2.2	7175.9	0+16.9
+218.5			2.2	7175.9	0+17.9
+252.8			5.4	7172.7	0+33.6
+104.4			6.0	7172.1	1+82.0
+85.3			~~7.1~~ 15.9	7162.2	2+01.10
T/P	1.57	7173.09	5.72	7171.37	
CL IN			2.62	7171.32	.02

Sand As Start

℄ RD. (HWY) #1002
ED RD
Top
Toe Fence
Top
Toe Top, ice 7162.2 − 1.5 = 7160.7
H20 Level

BS	T	FS	H ∠	V ∠	SD	HD
#300	#400	#500	323-45-17	89-52-20	256.66	256.84
1						
#200	#300	CROSS SECTION LINE (#501)	276-06-03 96-06-03 5M		EAST (#1005) WEST (#1006)	
#100	#200	#301	356-30-00 3M	89-41-40	M=220.20 ft: 722.42	722.41
"	"	#401	177-50-10 4M	91-30-00	89.44	89.41
"	"	~~#5M~~ = #(22)	~~165-25-25~~	~~90 18 40~~	~~759.41~~	(USE CIR PT #300 FOR MAIN CROSS SECTION PT. #501)
#200	#401	CROSS SECTION LINE	276-20-40 -180° 96-20-40	EAST WEST	(#1007) (#1008)	
#200	#301	CROSS SECTION LINE	99-28-50 +180° 279-28-50	EAST WEST	(#1009) (#1010)	

Sta	+	Elev	−	Elev
T/P	7 43	7160 61	3 16	7153 13
West #501				
+110 3			11 4	7149 2
+123 9			9 9	7150 7
+153 0			10 3	7150 3
+162 6			9 8	7150 8
+167 9			11 6	7149 0
+176 6				
+193 6			5 1	7155 5
+196 4			4 5	7156 1
+211 6			4 95	7156 1
T/P	1 68	7157 41	4 88	7155 73
#6M (#601)				
West				
+426 8			4 75	7152 66
+411 8			4 80	7152 6
+407 4			5 0	7152 4
+394 8			11 7	7145 7
+380 5			11 0	7146 4
+368 5			14 1	7143 3
+342 4			13 0	7144 4

Site #	300 (#501)
Toe	
Top	
Low Pt	
G.B.	
Toe	
G.B.	
E. RD	
℄ Hwy	
℄ Hwy	
E. RD	
Top	
Toe	
GB	
Toe	

STA	+	H.I.	−	Elev	
+326 7		7157 41	11 3	7146 1	
+221 8			10 8	7146 6	
+205 0			11 8	7145 6	
+181 0			10 9	7146 5	
+158 5			12 3	7145 1	
+114 8			12 1	7145 3	
+90 4			13 5	7143 9	
+51 2			14 0	7143 4	
T/P	7 27	7153 43	11 25	7146 16	
+06 0			7 5	7145 9	
+14 0			10 3	7143 1	
EAST					
+47 3			7 7	7145 7	
+140 5			5 7	7147 7	
+163 0			4 9	7148 5	
+185 5			4 8	7148 6	
T/P	20 44	7169 05	4 82	7148 6	
+204 5			16 8	7152 2	
	CHECK #400		22 90		
+312 9			1 7	7167 3	
T/P	5 59	7153 53	21 11	7147 94	
CK IN			3 82	7149 71	.02

GB
Top
GB
Top
Toe
Top
Toe
Toe Twice
#400 (#cal)
Top
Toe Twice
℄ ROAD
E. RD
E RD
Toe
~~#1 90~~
22 @ #400
GB
FH @ 0654

Check BM

STA	+	HI	−	Elev
	3^{32}			7171^{34}
T/P			7^{17}	
T/P	1^{32}		2^{74}	7166^{01} ✓
	8^{42}			
BM 11			2^{31}	✓

24

Bench @ Church

Top Hand St W. @ General Store

Same As START

STATIONS FROM ℄ HWY *

MAIN CROSS SECTION #100

STA.	ELEV.	DESC.
0+00	7175.6	℄ HWY #1002
0+16.9	7175.9	EDGE ROAD
0+17.9	7175.9	TOP
0+33.6	7172.7	TOE, FENCE
1+82.9	7172.1	TOP
2+01.1	7160.7	TOE ± H_2O level
2+66.4	7160.8	TOE ± H_2O level
2+81.4	7168.5	TOP
2+86.4	7168.80	w/ 100 SPIKE HUB TOP Level
2+92.4	7168.5	TOE
2+96.4	7169.89	FENCE
3+41.6	7170.1	
4+22.7	7172.15	EDGE ROAD
4+43.6	7172.2	" "
4+60.0	7171.9	G.B.
4+84.8	7174.6	"
5+66.6	7179.15	TOE
5+72.8	7181.8	TOP
6+38.9	7186.1	EDGE ALLEY
6147.4	7186.4	" "
7+05.6	7190.4	TOE
7+30.4	7198.6	ON SLOPE

MAIN CROSS SECTION # 202

STA	ELEV	DESC.
0+00	7174.65	℄ HWY # 1004
0+14.9	7174.5	EDGE ROAD
0+28.5	7172.8	TOE, FENCE
1+57.5	7172.8	TOP
1+66.3	7172.0	G.B.
1+81.5	7160.7	TOE ± H_2O
2+41.0	7160.4	TOE ± H_2O
2+54.0	7165.8	TOP
2+65.0	7167.69	TOP (SPIKE) #202
3+27.4	7168.6	IN PKY. LOT
4+21.5	7170.5	EDGE ROAD
4+45.1	7176.7	" "
4+65.0	7172.0	G.B.
4+89.4	7175.9	"
5+97.1	7182.2	"
6+36.9	7184.6	EDGE ALLEY
6+47.9	7185.1	" "
6+94.3	7188.8	TOE
7+24.8	7197.7	ON SLOPE

MAIN CROSS SECTION
301

STA.	ELEV.	DESC.
0+00	7173.1	C-HWY #1010
0+15	7173.0	EDGE ROAD
0+22	7172.5	TOP
0+55.7	7161.9	TOE
0+88.7	7161.4	BOTTOM
1+18.7	7163.9	TOP
1+31.7	7162.6	TOE
2+23.1	7161.3	G.B.
2+32.1	7160.8	
2+35.9	7160.3	G.B.
2+46.9	7158.5 USE 7157.6	TOE ± H₂O Level
3+15.1	7157.6	TOE ± " "
3+28.1	7164.7	TOP
3+32.1	7165.04	#301 SPIKE HUB TOP levee
3+42.1	7165.4	
3+49.1	7165.3	
3+73.9	7161.6	TOE
4+06.7	7162.7	EDGE ROAD
4+27.3	7162.7	" "
5+14.0	7161.6	G.B.
5+29.6	7160.0	TOE
5+74.4	7160.9	TOE
6+17.4	7172.9	ON SLOPE

MAIN CROSS SECTION
401

STA.	ELEV.	DESC.
0+00	7161.3	#1008 C-HWY
0+15	7161.2	EDGE ROAD
0+19.3	7161.4	TOP
0+27.5	7156.5	TOE
0+52.6	7156.4	G.B.
0+59.6	7155.8	"
1+05.4	7155.9	"
1+85.5	7155.4	TOE
1+96.8	7158.2	TOP
2+05.3	7158.0	G.B.
2+10.1	7153.3	TOE
2+16.3	7151.2	TOE ± H₂O
3+12.8	7151.1	" "
3+20.8	7156.4	
3+25.8	7158.6	TOP
3+27.8	7158.83	#401 HUB TOP levee
3+32.8	7159.3	TOP
3+38.8	7159.4	
3+42.8	7159.2	
3+58.8	7156.4	TOE

CONT. NEXT PG.

#401 (CONT.)

STA	ELEV.	DESC.
5+10 2	7156 5	EDGE ROAD
5+36 1	7156 9	" "
5+98 2	7155 7	G.B.
6+79 3	7154 8	"
7+05 3	7155 6	TOE
7+21 4	7161 1	
7+25 8	7165 6	#1007 ON Slope

MAIN CROSS SECTION #501

STA	ELEV	DESC.
0+00	7156 16	℄ HWY #1006
0+15	7156 1	EDGE ROAD
0+18	7155 5	G.B.
0+44 6	7149 0	TOE
0+49 0	7150 8	G.B.
0+58 6	7150 3	LOW PT.
0+88 6	7150 7	TOP
1+01 3	7147 2	TOE ± H2O level
1+94 6	7147 1	" " "
2+04 6	7153 5	TOP
2+11 6	7153 18	" #501
2+22 6	7153 5	TOP
2+27 6	7151 5	TOE
2+32 6	7151 9	TOP
2+37 6	7148 6	TOE
2+64 1	7147 7	LOW PT.
3+04 4	7150 0	TOP
3+74 5	7150 1	
4+81 7	7150 8	EDGE ROAD
5+02 3	7151 3	" "

CONT. NEXT Pg.

± 501 (CONT.)

STA	ELEV	DESC.
5+54.6	7150.5	
5+98.2	7151.5	
6+69.3	7159.5	TOE ± 100S ON SLOPE
6+86.7	7170.5	

MAIN CROSS SECTION
± 601

STA	ELEV	DESC.
0+00	7152.46	℄ HWY # 1012.
0+15	7152.6	EDGE ROAD
0+19.4	7152.4	TOP
0+32.0	7145.7	TOE
0+46.3	7146.4	G.B.
0+58.3	7143.3	TOE
0+84.4	7144.4	
1+00.1	7146.1	G.B.
2+05.0	7146.6	TOP
2+21.8	7145.6	G.B.
2+45.8	7146.5	TOP
2+68.3	7145.1	TOE
3+12.0	7145.3	TOP
3+36.4	7143.9	TOE
3+75.6	7141.9	TOE ± H_2O LEVEL
4+12.8	7141.6	TOE ± " "
4+20.8	7145.9	TOP
4+26.8	7146.16	± 601
4+74.1	7145.7	ON DIET ℄ ROAD
5+67.3	7147.7	EDGE ROAD

CONT. NEXT P.

℄ 601 (CONT.)

STA	ELEV	DESC.
5+89.8	7148.5	EDGE ROAD
6+12.3	7148.6	TOE
6+31.3	7152.2	G.B.
7+39.7	7167.3	

BS	FS	H	V	SD	HD
#300	#400	247-22-20	EAST	(#1011)	
	=#601 Cross Section Line 6M	67-22-20	WEST	(#1012)	
#400	#500	#600	197-35-37	89-34-20	1381.43 1381.39
#500	#600	#700	207-12-44 35	89-21-18	757.10 757.05
#600	#700	#100 #(1013)	159-30-07	89-48-20	271.68 271.68
#700	#100 #1013	#200	1-39-02		

18

15

STA	+	H.I.	−	Elev	
#200	5^{27}	7165^{63}		7160^{36}	
					SPIKE
#401 EAST					
+31			9^{2}	7156^{4}	TOE
+182			9^{1}	7156^{5}	E. RD.
+208			8^{7}	7156^{9}	E. RD. 0 THICK ICE
+270			9^{9}	7155^{7}	G.B.
+351			10^{8}	7154^{8}	G.B.
+377		10^{9}	~~10~~	7155^{6}	Toe
+393			4^{5}	7161^{1}	ON Slope
+398			0^{0}	7165^{6}	ON Slope
#401 WEST					
+111			12^{9}	7152^{7}	−1 Toe THICK ICE
+117			12^{3}	7153^{3}	G.B. Toe
+122			7^{6}	7158^{0}	Top
+131			7^{4}	7158^{2}	Top G.B.
+138			10^{2}	7155^{4}	Toe
T/P			6^{28}	7159^{35}	
	6^{28}	7165^{63}			
+224			9^{7}	7155^{9}	~~Top~~ G.B.
+268			9^{8}	7155^{8}	~~Top~~ G.B.
+275			9^{2}	7156^{4}	G.B.

STA	+	H.	−	ELEV	
+300 3		7165 43	9 1	7156 5	
+308 5			4 25	7161 4	
+312 8			4 4	7161 2	
+327 8			4 3	7161 3	
PK IN			5 27	7160 36	.00
+301					
EAST	1 39	7167 45		7166 06	
+41 8			5 8	7161 6	
+74 6			4 7	7162 7	
+95 2			4 7	7162 7	
+161 9			5 8	7161 6	
+197 5			7 4	7160 0	
+242 3			6 5	7160 9	
T/P			1 20	7166 25	
	9 57	7175 82			
+285 3			2 9	7172 9	
T/P			10 00	7165 82	
	1 50	7167 32			
T/P			2 23	7165 09	
	5 20	7170 29			
	CONT. Next pg				

Toe
T.B
E. ROAD
℄ Hwy
Same As START

Top FLANGE ST. IT. POST @ General Store

Toe
E. RD.
E. RD
Co. B.
Toe
Toe

on Slope

STA	+	HI	−	Elev		
		7170^{29}				
#301						
WEST						
$+85^{2}$			10^{3}	7160^{0}		Toe T. Ice (Can't Go Into River This Swale
$+96^{2}$			10^{0}	7160^{3}		G.B
$+100^{0}$			9^{5}	7160^{8}		
$+109^{0}$			9^{0}	7161^{3}		G.B
$+200^{4}$			7^{7}	7162^{6}		TOE
$+213^{4}$			6^{4}	7163^{9}		Top
$+243^{4}$			8^{9}	7161^{4}		center Swale
$+276^{4}$			8^{4}	7161^{9}		Toe
T/P			1^{63}	7168^{66}		
T/P	9^{02}	7177^{68}				
$+310^{1}$			5^{2}	7172^{5}		Top
$+317^{1}$			4^{7}	7173^{0}		E.RD.
$+332^{1}$			4^{55}	7173^{1}		℄ HWY
CK IN			11^{65}	7166^{03}	$.03$	Same As Start

(TIE BRIDGE BM)

STA	+	HI	−	ELEV
				7171.34 ADJ
	8.51			
T/P			1.88	
	7.16			
T/P			5.09	7165.02
	5.00			
T/P			5.45	
	0.39			
CK BM			8.60	.04

Sign @ Bridge
Says 7203

NW Conc. Curb. Bench @ Church

NE Cor Bridge (Chisel X Orange Paint) BM
About.

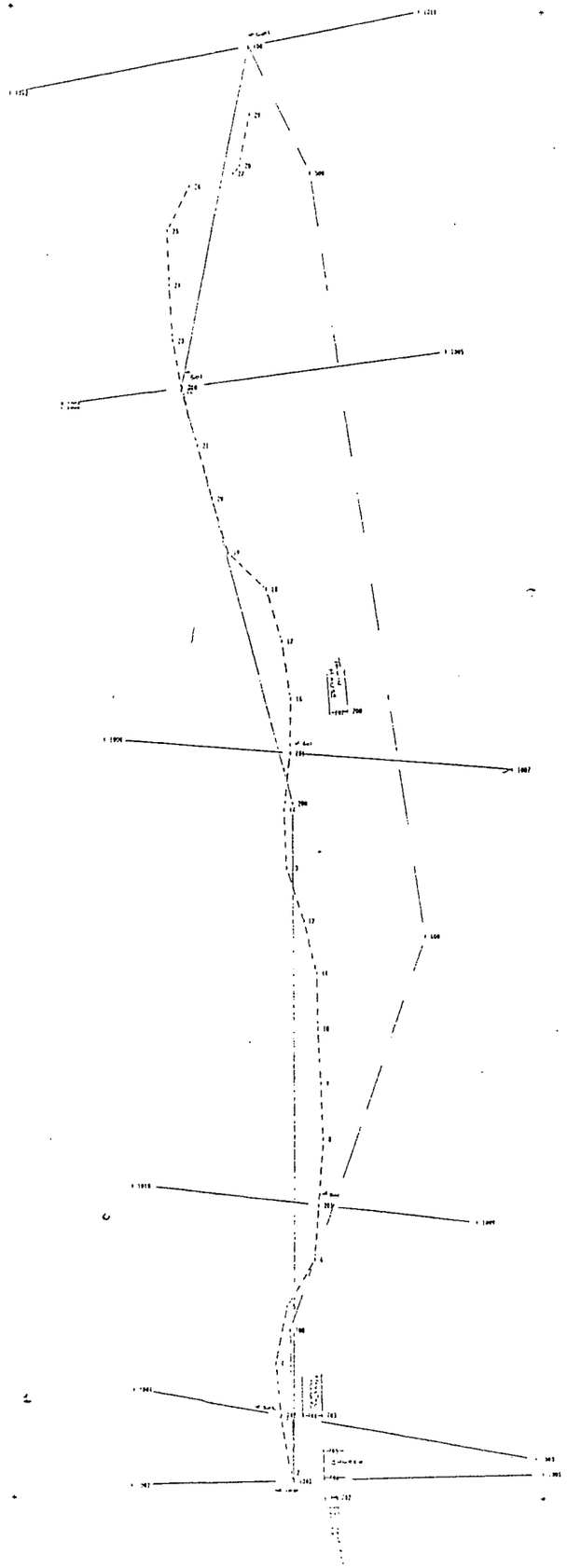
Same As START

15.47
21.04 21.02

71.71.32
71.71.36

22

STA	+	H.	-	ELEV	Left Elev Right Elev
					South Top RANGE Bolt EN @ House 0634
...	6 84	7156 53		7149 69	
T/P			1 80	7154 73	
	19 19	7173 92			
#501					
EAST					
+475 1			3 4	7170 5	ON Slope
+457 7			14 4	7159 5	Toe
+386 6			22 4	7151 5	
T/P			22 47	7151 45	
	4 89	7156 34			
+343 0			5 8	7150 5	
+290 7			5 0	7151 3	E. RD
+270 1			5 5	7150 8	E. RD
+169 2			6 2 ~~6 5~~	7150 1	
+92 8			6 3	7150 0	
+52 5			8 6	7147 7	Top
+26 0			7 7	7148 6	Low PT
+21 0			4 4	7151 9	Toe
+16 0			4 8	7151 5	Top
+11 0			2 8	7153 5	Toe
WEST #501					Top
+7 0			2 8	7153 5	Top
~~+10 0~~	17 0		7 7	7148 6	Toe T. ICE
				-15	



[illegible]
[illegible]

JOB NUMBER: ~~[illegible]~~
Sussex [illegible]

PT.#	NORTHING	EASTING	ELEVATION	DESCRIPTION
[illegible]	10019.[illegible]	[illegible]		
	10111.6[illegible]	[illegible]		
[illegible]	10[illegible].1711	9[illegible].8702		
[illegible]	10[illegible]14.7[illegible]61	99[illegible]		
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14	11210.6748	[illegible].0141		
15	11311.0990	99[illegible].7900		
16	11408.1989	99[illegible]		
17	11508.0[illegible]	9903.5784		
18	11602.7[illegible]	[illegible]57.2425		
19	11667.7217	9820.4085		
20	11764.9349	9861.5942		
21	11841.0145	9836.2783		
22	11956.5668	9809.0182		
23	12045.9792	9[illegible].2696		
24	12147.2[illegible]	[illegible]87.4[illegible]		
25	12246.[illegible]1	[illegible]		
26	12327.3115	9801.9[illegible]		
27	12351.4539	9809.7582		
28	12366.9825	[illegible]10.8298		
29	12459.1172	[illegible].1129		
100	10000.0000	10000.0000		
200	11[illegible]	10000.0000		
[illegible]	1011[illegible]	[illegible]		
300	119[illegible]	[illegible]10.[illegible]		
401	10500.6674	10044.1021		
300	12580.6302	[illegible].4[illegible]		
401	11311.0896	[illegible]25.7900		
500	1[illegible]354.6[illegible]	10035.8720		
[illegible]	10898.0[illegible]	[illegible]		
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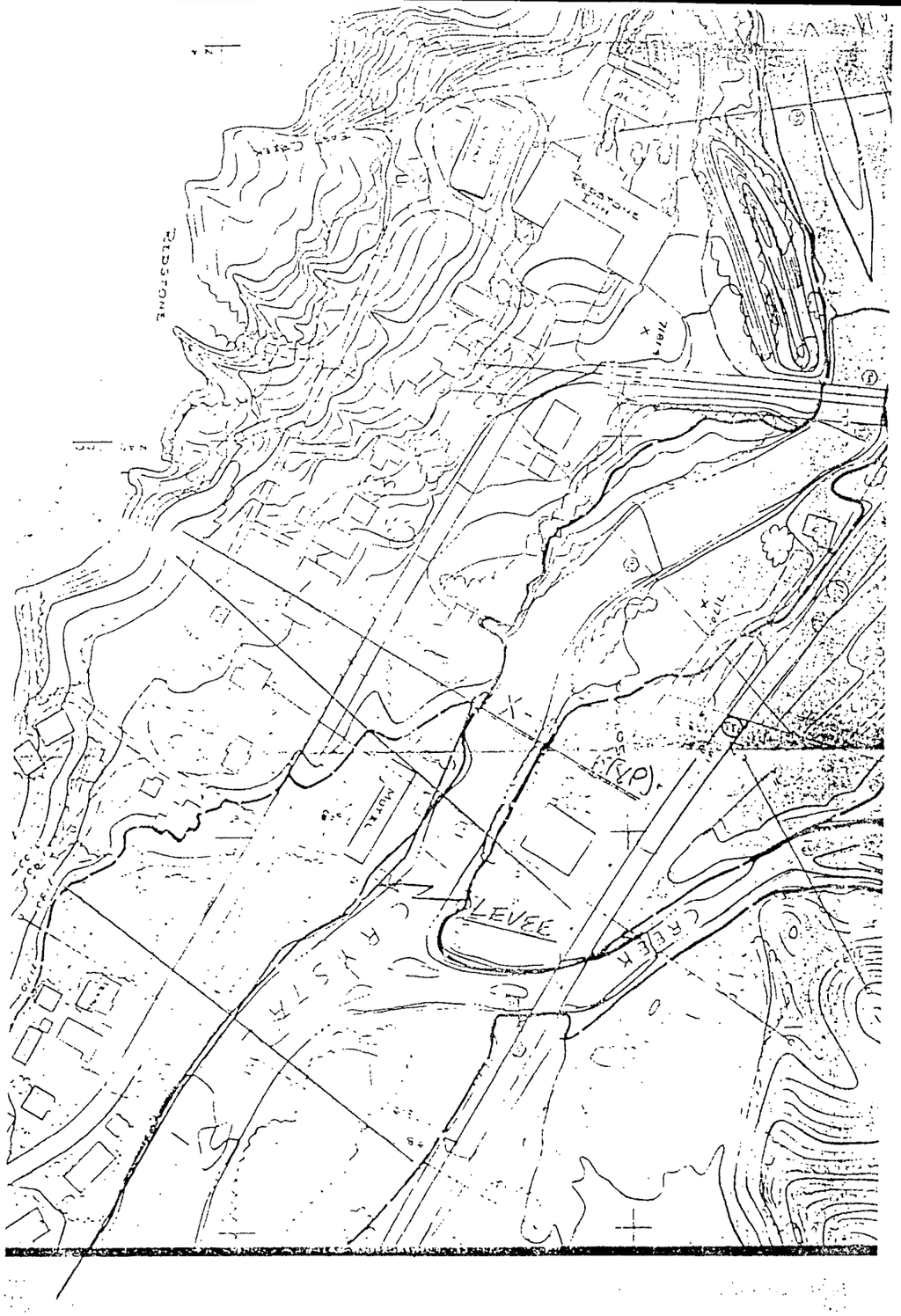
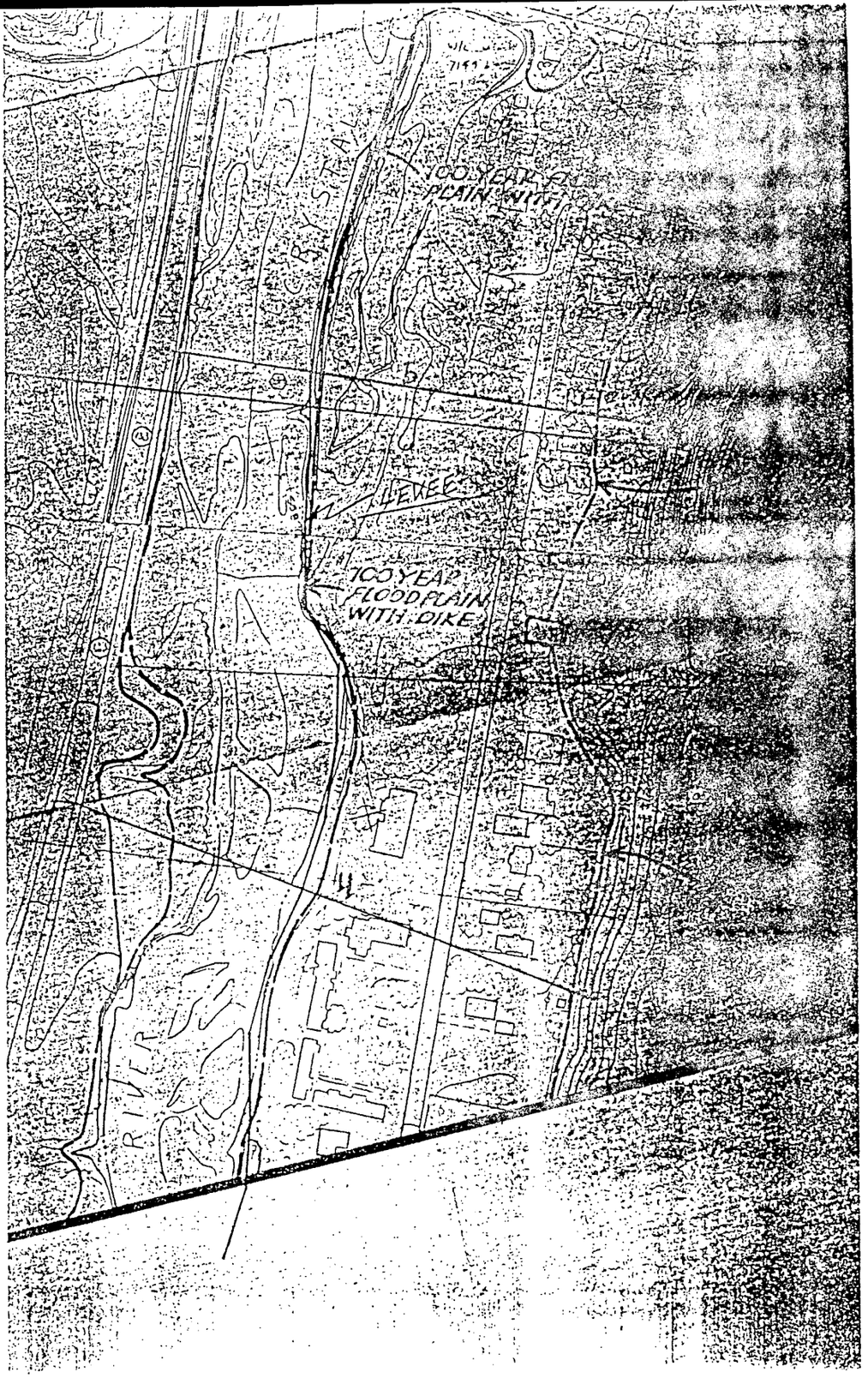
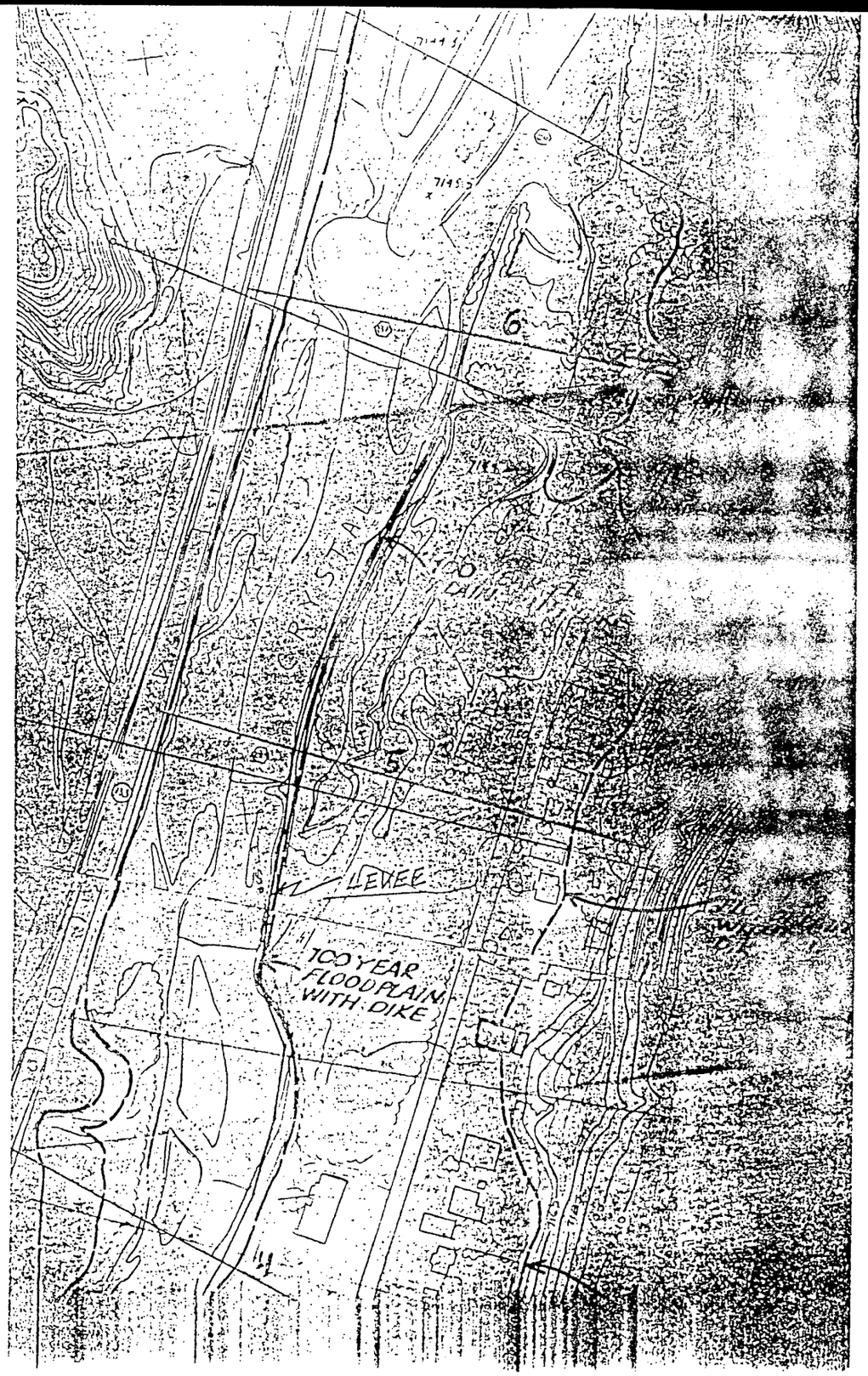
[illegible]	[illegible]	[illegible]		

64


LEVEE
CREEK
(TYP)


100 YEAR FLOOD PLAIN WITH
LEVEE
100 YEAR FLOOD PLAIN WITH DIKE
RIVER


6
5
LEVEE
100 YEAR
FLOODPLAIN
WITH DIKE

APPENDIX F

REPORT ON INSPECTION OF NON-FEDERAL LEVEE

Corps of Engineers, Sacramento District

REPORT ON INSPECTION OF NON-FEDERAL LEVEES

Location of Levees: Crystal River, Redstone, Pitkin County, Colorado

Date of Inspection: May 17, 1988

Corps of Engineers Inspection Team Members:

Nick Mezei, Planning
Ken Finch, Hydrology
Joe Sciandrone, Soil Design

The Corps of Engineers team accompanied Messrs. Tom Newland, Land Use Engineer and Flood Plain Administrator, and Larry Lang, Colorado Water Conservation Board, to a levee site on the Crystal River in Redstone. John Cook of Emergency Management also accompanied the inspection team in the field.

The levee was inspected to determine its potential eligibility for participation in the Federal levee rehabilitation program and to review the adequacy of levee maintenance, using new guidelines derived from Public Law (PL) 84-99. This report presents the inspection findings. A template showing Corps of Engineers guideline criteria for levee side slopes and crown is attached, along with a pamphlet describing the PL 84-99 rehabilitation program. No past Assurance Agreements have been signed with the Corps of Engineers.

The levee, which primarily protects a residential and commercial area from a 100-year event, is on the right side of the Crystal River at Redstone. FEMA, however, has not accepted the 100-year protection because of the lack of freeboard through portions of the levee system. The levee extends about 2,200 feet downstream from approximately the confluence of the Crystal River with Coal Creek. About 1,550 feet of levee at the upstream end was originally built at the turn of the century. In 1985, as a result of flooding to six houses and street ponding, the county constructed an additional 650 feet of levee and enlarged the original levee. At the upstream terminus, the levee has been enlarged and widened and serves as a small community park. At the park, the levee has a 37-foot crown width, 1V on 2H landside and waterside slopes, and an average height of 3.2 feet. A surface sample of the embankment showed levee material of primarily poorly graded sand (SP). About 230 feet downstream, the levee section has a 10-foot crown width and 1V on 2H landside and 1V on 1.3H waterside slopes.

The inspection revealed that the levee system does not meet minimum PL 84-99 rehabilitation guideline criteria. Of the additional 650 feet, one segment, by the old railroad bridge

abutment, cannot provide protection for a 10 percent occurrence, and other downstream segments are not engineered for density or geometry. In addition, vegetative growth and a utility pole obstruction exist on the levee crown through the downstream portions of the system. Animal burrows and erodible waterside slopes are present throughout the system. Heavy vegetation areas on the levee side slopes and crown need to be cleared.

In order to classify the levee as eligible for future Federal rehabilitation assistance under PL 84-99, the following improvements and maintenance are needed:

a. The sponsor should complete the levee system by providing an engineered levee system in the downstream 700 feet of the existing protection system.

b. Animal burrows and erodible waterside slopes need to be addressed by the sponsor. Engineered armoring would be appropriate throughout the system.

c. Levee crown depressions and soil mounds need to be leveled.

Should Pitkin County, sponsor of this levee, desire to participate in the PL 84-99 levee rehabilitation program, it will be necessary to notify the Emergency Management Division in writing at the address below when the deficiencies noted are corrected. The guidelines also require that (1) a public agency, such as your office or a local agency, act as the sponsor and request the assistance; (2) cost sharing of 20 percent local (80 percent Federal) will be assessed when any future levee rehabilitation assistance is approved; and (3) a new assurance agreement with the Corps of Engineers will be developed and signed by both parties before any emergency rehabilitation work is undertaken.

Any questions regarding this report may be directed to Jerry Kanenaga at (916) 551-2539.

U.S. Army Corps of Engineers
Sacramento District
Emergency Management Division
650 Capitol Mall
Sacramento, California 95814

Enclosures

CESPK-EM

17 May 1988

REPORT ON INSPECTION OF NON-FEDERAL LEVEES
COLORADO

Subject: Crystal River, Redstone, Pitkin County, Colorado

On 17 May 1988, a Planning/Engineering Division team consisting of Kenneth Finch, Hydrology; Joe Sciandrone, Soil Design; and Nick Mezei, Planning Division, inspected a levee site on the Crystal River in Redstone. The levee inspection was accomplished in response to a letter dated 14 January 1988 from the Colorado Water Conservation Board. No past Assurance Agreements have been signed with the Corps of Engineers.

The team accompanied Messrs. Tom Newland, Land Use Engineer and Flood Plain Administrator, and Larry Lang, Colorado Water Conservation Board. Pitkin County, the sponsor, operates and maintains this levee. John Cook was also present in the field. Dorothy Cornell, Planning Division, coordinated with the team in preparing the inspection reports. This report has been prepared as a result of the inspection.

1. Background. The Crystal River, which originates near Redstone at McClure Pass, is a tributary to the Roaring Fork River. The Roaring Fork River enters the Colorado River at Glenwood Springs. The Town of Redstone is located on Highway 133 about 28 miles from Glenwood Springs. The levee on the right side of the Crystal River extends about 2,200 feet downstream from the confluence with Coal Creek. About 1,550 feet of the levee at the upstream end was originally built at the turn of the century. In November 1985, about six houses were flooded and ponding occurred in the streets. As a consequence, in 1986 and 1987 the county constructed an additional 650 feet of levee and enlarged the original levee. The levee is intended to protect a residential and commercial area from a 100-year event. FEMA has not accepted the 100-year protection because of the lack of freeboard through portions of the levee system.

2. Field Reconnaissance. Information on hydrologic and hydraulic characteristics of the Crystal River at the subject site was obtained from the Colorado Water Conservation Board and the Sacramento District. Criteria used for the inspection is derived from Public Law (PL) 84-99 Rating Rehabilitation Guidelines and additional rating guidelines developed within the Sacramento District. Two soil samples were obtained from the levee embankment at the approximate locations shown on Enclosure 1. Other enclosures include photographs at the subject site (Enclosure 2), a levee inspection checklist (Enclosure 3), a soils report (Enclosure 4), a typical cross section of the levee (Enclosure 5), and a plan view of the levee (Enclosure 6).

3. Field Inspection. The upstream portion of the levee is tied into high ground at the approximate location where Coal Creek enters into the Crystal River. The downstream end of the levee currently ends as a spur, sufficiently downstream of structures to preclude backwater flooding.

At the upstream terminus, the levee has been enlarged and widened and serves as a small community park. The area in the center of the levee is

passable for maintenance, as tables and benches were set to the sides. In the park area, the crown also contains sprinklers for the park. The waterside of the levee near the confluence with Coal Creek is riprapped with rocks up to 3 feet in diameter, most of which are rounded or semi-rounded and not keyed together. The riprap appears to serve as erosion protection against the inflows of Coal Creek. Redstone Boulevard parallels the river approximately 100 feet to the east of the river. The levee crown exhibits unevenness due to mounds of gravel and cobbly material, and at other places depressions exist. The fines in the levee fill at the toe on the waterside have been washed out in many places where no armoring exists. The Pitkin County representative stated that it is the sponsor's intention to riprap the entire levee system in the near future. Vegetation along the upstream 1,500 feet of the levee occurs only at the toe of the landside and on the land behind it. The slope of the levee appears to be about 1V on 2H on the waterside. Downstream of the first 1,500 feet there is a segment of levee about 100 feet long by an old bridge abutment, and this levee segment is totally covered with vegetation; no vehicular access is possible. In addition, in this segment a utility pole is located in the crown with a guidewire going to the edge of the riverbank. Downstream from this 100-foot section of old levee, there exists about a 300-foot section of piled material which is riprapped. It is the intention of Redstone, Pitkin County, to convert this into a true levee section acceptable for PL 84-99. Some minor seepage comes through this fill material during high flows. The last 250 feet of levee, constructed by the Soil Conservation Service, consists of an earthen mound that gradually blends into the existing riverbank. This earthen mound is overgrown by brush on the landside which covers the crown and makes it impassable. It is the intention of Pitkin County to convert this earthen mound into an engineered levee and tie into high ground at the nearby railroad embankment.

4. Levee Embankment. The upstream reach of the levees at the park was assessed to have a typical section of a 37-foot crown width, 1V on 2H landside and 1V on 2H waterside slopes. Average levee landside height is 3.2 feet. The surface sample of embankment material consists of primarily poorly graded sand, approximately 75 percent medium to coarse grained sand, approximately 15 percent rounded gravel to 2-inch size, approximately 10 percent low plasticity fines, and scattered cobbles to 6 inches. Enclosure 4 is a complete description of the soil sample. From the crown to about two-thirds down the waterside slope, animal burrows and voids were present between some of the cobbles. Erosion was along the waterside slope where there are cobbles and boulders. The landside crown and waterside slope have grass cover. Approximately 230 feet downstream, the typical levee section was assessed to have a 10-foot crown width and 1V on 2H landside and 1V on 1.3H waterside slopes. The embankment material samples at the typical section are similar to the upstream levee. This levee section is not stable because of extensive waterside slope erosion. The combined slope steepness and erodibility of the material at flow velocities greater than 5 fps makes the slope unstable. The lower portion of the levee reach constructed by the Soil Conservation Service had seepage at the landside toe. At the downstream end of the levee, approximately 1 to 2 gpm seeps through the levee fill into the adjacent land fill operation. The seepage could be the result of large size material with voids around the material in the embankment, which indicates a lack of densification in the embankment material.

5. Hydrology/Hydraulics. The Crystal River, a tributary of Roaring Fork River, lies in west central Colorado near the Continental Divide. It has its

headwaters in the Elk Mountains and is bounded by the Gunnison River basin to the south and Roaring Fork River to the south. Elevations range from about 7,200 feet to over 14,000 feet. The terrain is steep with occasional low-lying valleys along the river. Vegetation consists of alpine meadows and alpine forests of spruce, pine, fir, aspen, and grasses. The basin has an area of 229 square miles at Redstone. Snowmelt floods are the principal source of major floods. Thunderstorms can be a cause of major floods over a smaller area, such as in July 1951 when the flow reached 1,280 cfs. The largest known flood was the June 1949 flood, a snowmelt event with 3,960 cfs. The stream at Redstone just downstream of Coal Creek is very steep at about 0.007 feet per foot. The channel is generally clear, with an "n" value of 0.03 for floodflows. The flow velocities in the channel can average 11 to 16 feet per second. The level of protection is limited by a low levee section in the center of the system that results in less than protection to the 10 percent level of reoccurrence. If this section of levee is raised consistent to the rest of the system, the degree of protection would be increased above the 10 percent chance level. The final level of protection determination will require more detailed data and a backwater computation.

6. Conclusions. Due to the following deficiencies, this levee system does not meet the minimum PL 84-99 Rehabilitation Guideline criteria.

a. The levee system contains a segment which cannot provide protection for a 10 percent occurrence.

b. The levee system has segments which are not engineered for density or geometry.

c. Vegetative growth and a utility pole obstruction exist on the levee crown through the downstream portions of the system.

d. Animal burrows and erodible waterside slopes exist through the system.

e. Heavy vegetation areas in the levee side slopes and crown need to be cleared.

f. Depression areas in the levee crown need to be filled with compacted material and bladed to a uniform elevation throughout the entire levee system.

7. Recommendations. It is recommended that the owner-sponsor be informed that his levee system does not meet the minimum PL 84-99 criteria. Improvements and maintenance needed to classify the levee as eligible for future Federal rehabilitation assistance under Public Law 84-99 include the following:

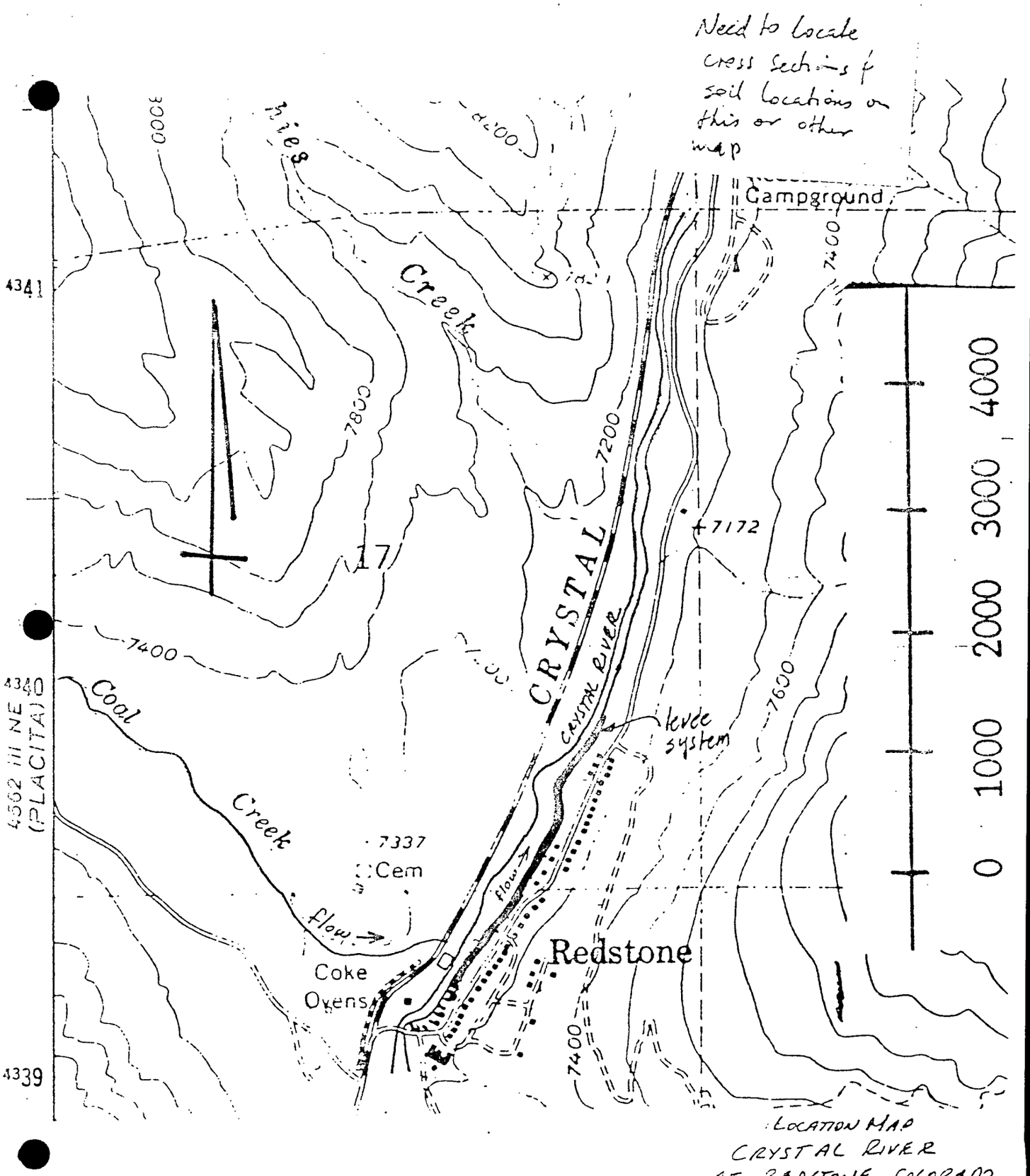
a. The sponsor should complete the levee system by providing an engineered levee system in the downstream 700 feet of the existing protection system.

b. Animal burrows and erodible waterside slopes need to be addressed by the sponsor. Engineered armoring would be appropriate throughout the system.

c. Levee crown depressions and soil mounds need to be leveled.

Encls
1. Map
2. Photos
3. Soils Rept
4. Inspection Checklist
5. Typical Cross Section
6. Plan View

NICK MEZEI
Civil Engineer



LOCATION MAP
CRYSTAL RIVER
AT REDSTONE, COLORADO
FL 94-99 LEVEE INSPECTION

Encl 1

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

NON - FEDERAL LEVEE INSPECTION CHECKLIST

Assurance No.	Applicant PITKIN COUNTY	Date of Inspection 5-17-88
Length ±2000'	Levee Location Redstone, Co.	Stream Name CRYSTAL RIVER

	Rating			Remarks
Inspector/Inspection Team	A	M	U	
A. Levee Embankment				
1. Levee Depressions			✓	
2. Levee Surface Erosion			✓	erosion by park boundary
3. Slope Stability			✓	downstream of park
4. Animal Burrows			✓	voids in slope by park?
5. Levee Growth			✓	segments downstream
6. Encroachments	✓			
7. Levee Crown			✓	needs even blading, raising etc
B. Channel/Floodway				N/A
1. Riprap/Revetment Protection			✓	~~where erosion evident is needed~~
a. Waterside Levee Slope				
b. Slope Toe				
c. Channel Bank				
2. Channel Capacity				to be determined
C. Structures				
1. Concrete Displacement				N/A
a. Floodwalls				N/A
2. Culverts				N/A
a. No breaks, holes, e.g.				N/A

End 3 (SHT

INSPECTION CHECKLIST CONTINUED

b. Debris				
3. Gates				N/A
4. Fences				N/A
5. Crossings				N/A
Total: A,M or U				

Rating Code Description:

A - Acceptable	No immediate work required.
M - Minimally Acceptable	A deficient condition exists which needs to be improved by the owner/ sponsor.
U - Unacceptable Items	Items which may render the levee ineligible for rehabilitation under PL 84-99 unless immediate corrective action is taken by owner/sponsor.

Remarks Should continue replenishing any rip rapped areas where needed. Verbal recommendations were given regarding:
- vegetative control
- rip-rap in places
- widening & base in places
- tying levee into high ground at lower end
- leveling crown

Local Representative's Signature

Inspector's Signature Nick A Lee

Date 11-17-88

N/A

N/A

N/A

Encl 3 (SHT 2

REPORT ON INSPECTION OF NON-FEDERAL LEVEES
REPAIRED UNDER AUTHORITY OF PL 84-99

SOIL CLASSIFICATION - EMBANKMENT MATERIALS

Date: May 17, 1988

Assurance No. _____ Applicant: Town of Redstone

Stream: _____ County: Pitkin

Site No: 1 Lt. Bank: _____ Rt. Bank: ✓

Soil Sample No: 1 Depth: 0 - 0.2 ft.

Identification based on visual examination and manual tests:

POORLY GRADED SAND (SP); gray, dry, approx. 75 % medium to coarse grained sand, approx. 15 % rounded gravel to 2-inch size, approx. 10 % low plasticity fines, scattered cobbles to 6-inch size.

Remarks:

The sample was taken near the surface; cobbles prevent sampling deeper.

NOTE: Classification based on visual examination and identification (ASTM D 2488-84) of disturbed samples taken with a 2-inch auger or post-hole digger to depths indicated above. The embankment material is assumed to be homogeneous throughout the levee section and the soil samples taken are assumed to be representative of the entire levee section at the location of the test hole. All bore holes were backfilled and tamped to approximate original density.

Encl 4

COMPUTATION SHEET

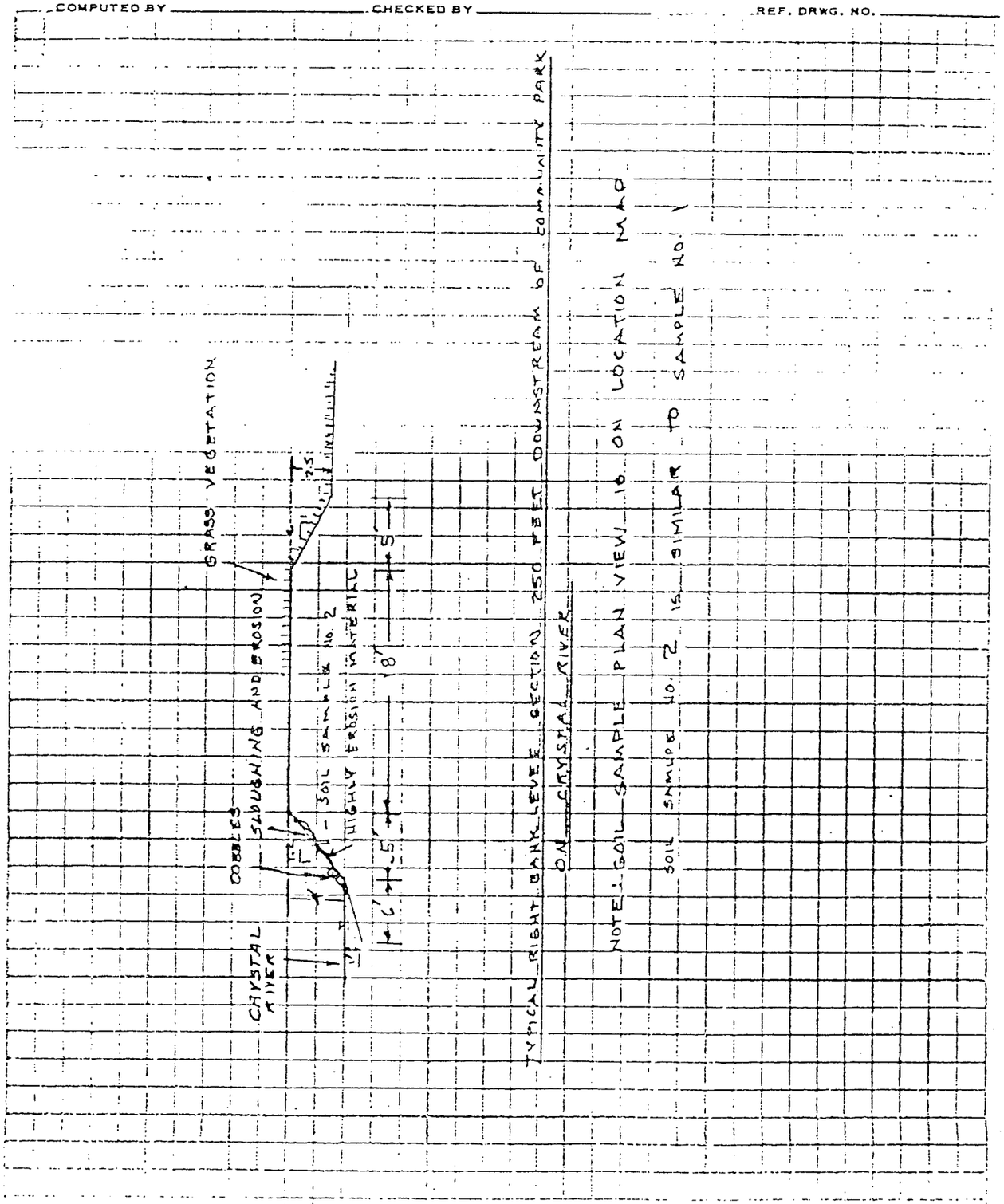
PROJECT TYPICAL SECTION 750 FEET DOWNSTREAM OF COMMUNITY PARK

SHEET NO. 1 OF 1 SHEETS

DATE May 17 19 88

FILE

COMPUTED BY CHECKED BY REF. DRWG. NO.



COMPUTATION SHEET

PROJECT TYPICAL LEVEE SECTION AT SMALL

ITEM COMMUNITY PARK

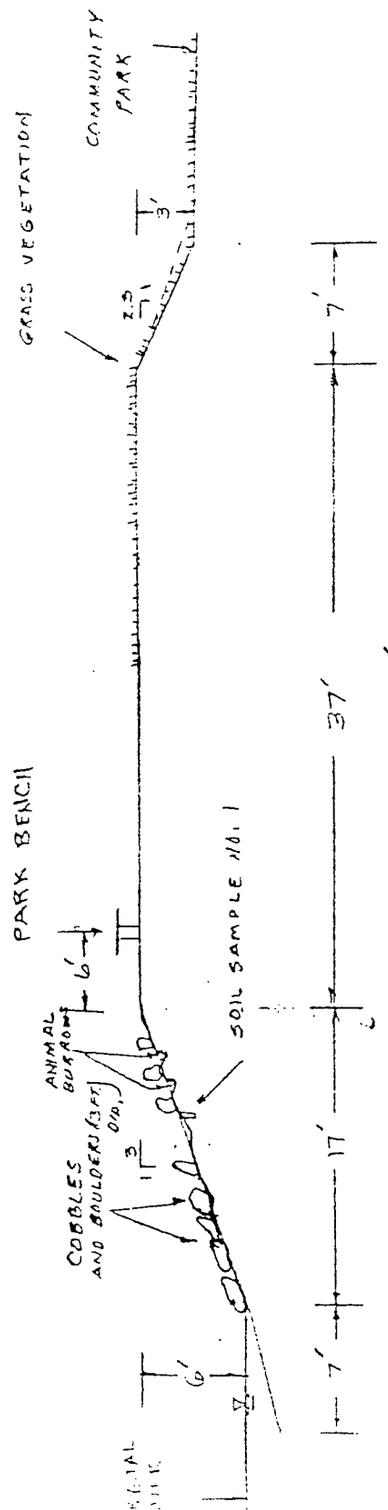
COMPUTED BY _____ CHECKED BY _____

SHEET NO. 1 OF 1 SHEETS

DATE May 17 19[redacted]

FILE _____

REF. DRWG. NO. _____



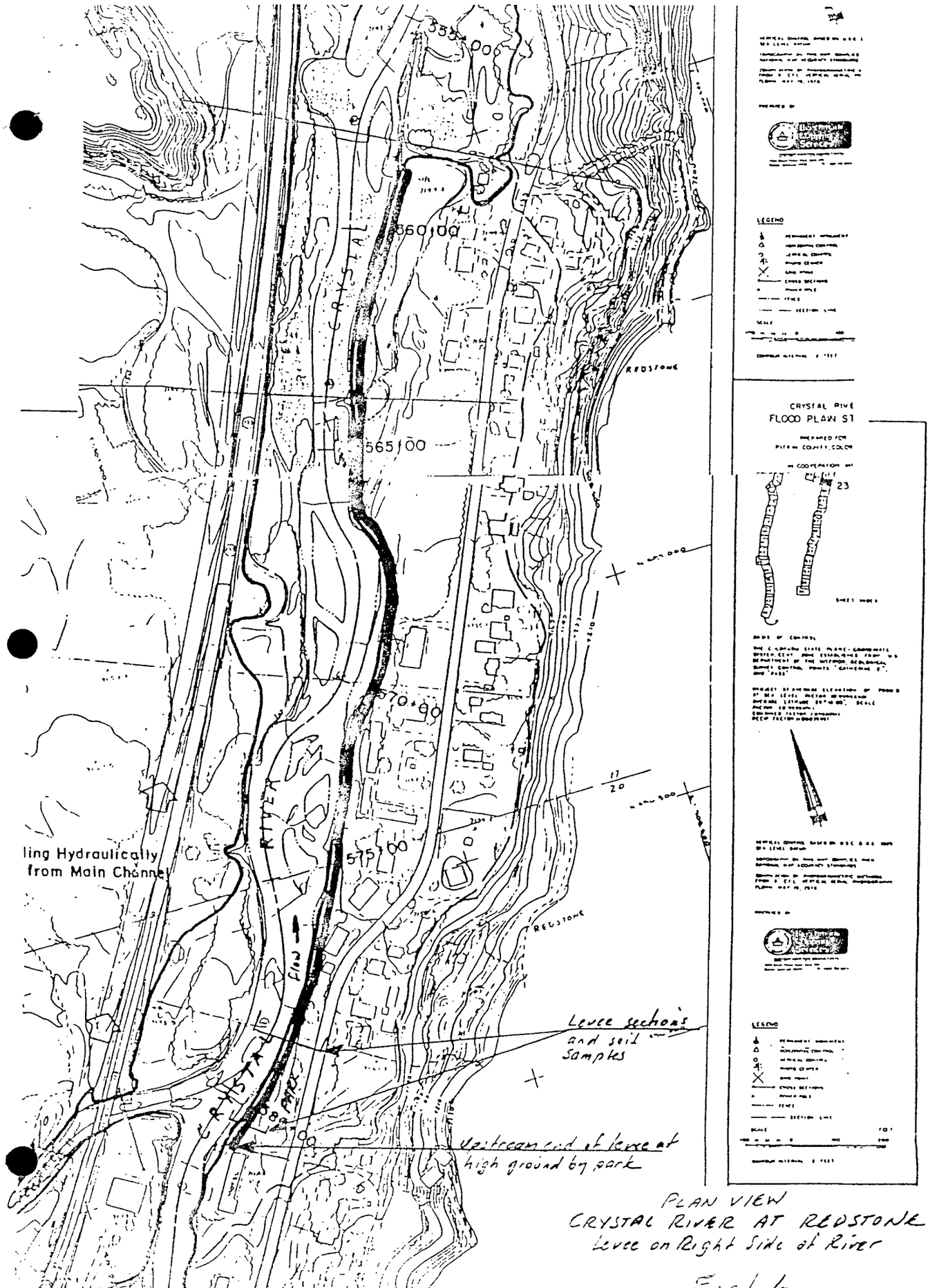
TYPICAL LEVEE SECTION AT SMALL COMMUNITY PARK - RIGHT BANK

NOTE: SOIL SAMPLE PLAN VIEW IS ON LOCATION MAP.

--- GUIDELINE CRITERIA (DOES NOT HAVE TO BE MET IF SLOPES ARE ASSESSED TO BE STABLE IN REPORT)

SPD FORM 1 OCT 74 284 EDITION OF 15 DEC 59 WILL BE USED UNTIL EXHAUSTED

Sheet 5



PLAN VIEW
CRYSTAL RIVER AT REDSTONE
Levee on Right Side of River

Encl. 6