FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
PHOENIX, ARIZONA

RIO VERDE SOUTH FLOODPLAIN DELINEATION STUDY

FCD 93-07

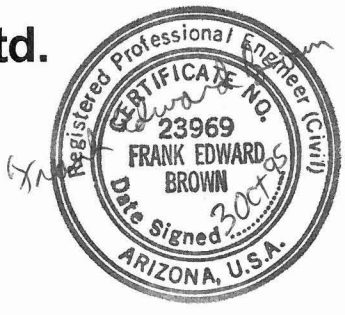
TECHNICAL DATA NOTEBOOK HYDRAULICS Existing Condition

Book 2 of 2

McLaughlin Kmetty Engineers, Ltd.

Phoenix, Arizona

SEPTEMBER 1995



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SECTION 4: HYDRAULIC ANALYSIS

4.1 Method Description

There are four (4) separate washes contained within the study area and approximately 6.9 miles of floodplain is determined. Please refer to the Vicinity Map, Figure 1-2. The four washes studied by detailed hydraulic methods are as follows:

Wash 9 Wash 10 Wash 11 Wash 12

The detailed study method is comprised of the U. S. Army Corps of Engineers (COE) HEC-2 Water Surface Profiles Program, Version 4.6.2 dated May 1991. An enhanced version entitled ProHEC-2, implemented by Dodson and Associates allows for augmented editing and on-screen graphics capabilities.

The starting water surface elevation for Wash 9 is based upon critical depth at the first cross section. The wash reaches normal depth at the downstream limit of study at the Fort McDowell Indian Reservation Boundary. At this location, the water surface elevation from the nearby Verde River has no hydraulic effect on Wash 9. Wash 10 is tributary to Wash 11, thus the starting water surface is based upon the previously calculated mainstream water surface elevation. Wash 11 begins at normal depth as determined by the slope-area method. To be conservative, Wash 12 begins at an approximate water surface elevation from the Verde River. Because the bed profile is steep, the next upstream cross section defaults to critical depth in the HEC-2 model, thus the starting condition has no effect on the remainder of Wash 12.

The floodplains and floodways are prepared using the guidelines in the March 1993 edition of FEMA Document 37, Flood Insurance Study Guidelines and Specification for Study Contractors (FEMA 37) and FIA Document 12, Appeals, Revisions, and Amendments to Flood Insurance Maps, January 1990. Floodways are initially determined using the equal conveyance encroachment method with the final analysis utilizing Encroachment Method 1 (specified encroachment station).

Additional floodway criteria was gleaned from Floodway Determination Using Computer Program HEC-2 , COE Training Document No. 5, January 1988.

4.2 Parameter Estimation

4.2.1 Manning's n Value

4.2.1.1 General

The washes have been separated into reaches that have similar hydraulic characteristics, thus will have the same Manning's n roughness coefficient. Each reach has been identified with a two or three-character identifier. The identifier starts with the wash name which is a one or two digit number and the third character is the reach number; For example, 11B is Wash 11, Reach B. The n value computations are contained in Appendix C.

Exhibit 1 (See Appendix C), entitled "Manning's n Value Map", shows reach limits, the location of photographs, and n values for a reach. The density of vegetation has significant impact on the roughness coefficient and has been considered in the n values. Vegetation within the floodplain has been identified to include the following:

Brittle Bush
Cactus - Barrel, Cholla, Prickly Pear, Saguaro
Catclaw
Creosote Bush
Desert Broom
Mesquite
Native Grasses
Ocotillo
Palo Verde Tree

4.2.1.2 Methodology

Each reach was initially identified from the 1 inch = 200 feet semi-rectified aerial photographs. The discerning characteristics were channel size, apparent similarities in bed material, and vegetation. Each reach was photographed during the field reconnaissance phase at representative and accessible locations. Representatives from the Flood Control District of Maricopa County (District) assisted during one of the field reconnaissance visits.

Manning's roughness coefficients are estimated using the methodology contained in the USGS report on Manning's Roughness Coefficients (Reference 21, Section 6.5). Chow's book, Open Channel Hydraulics (Reference 4, Section 6.5) was also consulted for background on the USGS methodology and photographs of typical channels showing different n values. The basic methodology is to select a base value of Manning's n for the bed material, and then add adjustments for irregularity, obstructions, vegetation and variations in channel cross-section. If sufficient channel meander is present, a multiplier is applied to the sum of the n value enumeration.

A plastic grid is shown in some of the photographs. The outside measures 1.5 feet square. The inside grid measures 1.0 feet square, with 1 inch grids.

4.2.1.3 n Value Determination

Base Roughness Value

The base n value for bed material roughness is selected utilizing a photograph of the grid on the bed material. The dimensions of the grid allowed determination of the size of the bed material. Within the study area, bed material ranged from sandy gravel to riprap, with base n values ranging from 0.024 to 0.050.

Adjustments to Base Value

Based upon field reconnaissance data and the photographs, adjustments are added to the base roughness value. Where washes had a low-flow channel, the side slopes were observed to be moderately eroded.

Obstructions varied from stumps or fallen trees to block walls in backyards. Vegetation was found mainly outside of the low flow channel. In some instances, the low-flow channel had some trees or bushes growing in it. In general, the channel cross section size and side slope varied gradually. A portion of each wash traverses through established golf courses, with a turf n value of 0.030. There were no washes that had enough meander to warrant an adjustment. Overbank n values ranged from 0.020 to 0.070. Throughout the study area, n values for the main channel ranged from 0.030 to 0.050.

4.2.2 Expansion and Contraction Coefficients

The expansion and contraction coefficients are set at 0.1 and 0.3, respectively, for most applications. At culverts, or other constrictions, these values are revised to 0.3 (expansion) and 0.5 (contraction) to account for the increased hydraulic losses.

4.3 Cross Section Description

The majority of the cross sections are determined from the photogrammetric data used to develop the topographic mapping. Field survey data is used at culverts and at a concrete levee near Wash 11 River Mile 2.4. Survey data is also used for cross sections at Wash 11 River Mile 1.831 to 2.011 because of channelization that occurred after the updated aerial mapping. All cross sections are oriented as if looking downstream. Cross section station 10,000 is placed at the thalweg. The thalweg location matches that of the Hydrology study.

4.3.1 Channel and Overbank

Prior to obtaining GR records for exact locations, the channel stations were approximated from field reconnaissance data. The proposed locations of channel bank stations are shown on a sketch contained on each roughness coefficient calculation sheet in Appendix C. The letters "L" and "R" denote the location of the left and right channel bank stations, respectively. Final bank stations are shown on the cross section plots contained in Appendices E through H for each study wash. In general, the majority of washes have a low-flow channel, with vegetation outside of the low-flow channel. Some portions are channelized with railroad ties or block walls. At these locations bank stations are set at the top of wall.

4.3.2 Bridges or Constrictions

4.3.2.1 Minor Hydraulic Structures

The golf cart bridge at Wash 9 River Mile 0.816 has a surveyed low chord elevation (1555.44) that is above the 100-year water surface elevation (1554.46) and therefore is not modeled in the HEC-2 model. Constrictions in a floodplain are caused by culverts at roadway crossings. Culverts smaller than or equal to 36-inch round or equivalent are not included in the HEC-2 model since they would be hydraulically insignificant during a 100-year storm. The culvert at the Wash 9 crossing of Forest Road is in this category. There are four culverts along washes that are analyzed using HEC-2. All of these are multiple barrel concrete box culverts. The culverts appear to be stable from scour and from washing out during a 100-year overtopping event. The upper two culverts on Wash 9 have 0.5 to 1.5 feet of sediment, which is accounted for in the HEC-2 model. Figure 4-1 presents a photograph of the inlet side of each of 4 culverts modeled by the special culvert routine.

FIGURE 4-1

STUDY WASH CULVERTS AND PHOTOGRAPHS

1 Wash 9 3-10′x4′x49.08′ CBC at Via Hermosa Looking Downstream at Inlet NOTE: The Golf Cart Bridge upstream of this culvert is above the 100-year flood level.	2 Wash 9 2-8′x4′x38′ CBC at Vado Court Looking Downstream at Inlet
3 Wash 9 2-8′x4′x33′ CBC at Quail Haven Drive Looking Downstream at Inlet	4 Wash 11 4-10′x4′x38′ CBC at Agua Verde Road Looking Downstream at Inlet

Figure 4-1 (Continued)

4.3.2.2 Major Hydraulic Structures

There are two major hydraulic structures within the study area. An existing riprap-lined flood control levee near Wash 10 River Mile 1.33 diverts the wash in a more northeasterly direction. The levee was evaluated and tested by a geotechnical engineer hired by the Flood Control District. The levee was found to be stable and no further consideration is needed for floodplain delineation. A photograph of this levee is in Appendix C, with the n value photographs for Reach 10D.

The second major hydraulic structure is a concrete levee at River Mile 2.4 in Wash 11. This structure diverts a tributary, that previously flowed into Wash 10, to Wash 11. A photograph of this levee is also found in Appendix C, with the n value photographs for Reach 11G. For ease of reference, this levee is referred to as the Section 36 levee. In conjunction with the Section 36 levee, Wash 11 was channelized from River Mile 1.2 to River Mile 2.0. This earth-lined channel is designed to accommodate the increased runoff from this diversion. The levee structure was constructed after the original aerial photography date of December 1993. Thus it was necessary to survey cross sections for the hydraulic model. The hydrologic effect of the levee is discussed in the Hydrology Report TDN in Section 3.4.3 (page 3-69) (Reference 13, Section 6.5). The hydraulic model also accounts for the levee, since the maximum flow rates in Wash 10 and Wash 11 are established with or without the Section 36 levee. The discharge values are reported in the Summary of Discharges table in the Draft Flood Insurance Study (Table 3-1 in Appendix J).

4.3.2.3 Prior Channel Modifications

Prior to the start of this study, some modifications were made by others to portions of the study washes. These modifications include channel realignment, bank erosion protection, and widening or deepening channels. For example, Wash 11 has been shifted 500 to 600 feet to the north since the Zone A determination shown on the Flood Insurance Rate Map Panel 1300. The mapping, field surveys and field reconnaissance adequately depict the modifications. These conditions are considered an existing condition for the purposes of the Rio Verde South Floodplain Delineation Study.

4.4 Calibration

4.4.1 Special Culvert Routine in HEC-2

Each culvert modeled by the HEC-2 Special Culvert Routine is analyzed by an independent method, the HY-8 (Version 4.0, April 1992) model. The HY-8 computer program is a culvert analysis program developed by the Federal Highway Administration (FHWA). It utilizes standard culvert nomographs developed by the Bureau of Public Roads, as published in Hydraulic Design Series 5. Where there is culvert overtopping, the HY-8 weir overtopping option is implemented, using roadway data from the HEC-2 BT records. Table 4-1 presents the comparison of results. Based upon this comparison, the HEC-2 model presents acceptable results for the floodplain at culverts.

Table 4-1
Summary of HEC-2 Special Culvert Routine Verification

Culvert ID	HEC-2 Cross Section River Mile		HEC-2 Culvert Flowrate cfs	Total Flow Rate cfs	Computed WSEL		Difference in feet (HEC-2 - HY8)	Comment
					HEC-2	HY8		
W9VIAHER	W9	0.762	970	1010	1549.22	1549.44	-0.22	OK
W9VADOCT	W9	1.736	425	660	1641.56	1641.43	+0.13	OK
W9QUAILH	W9	1.796	349	660	1646.35	1646.88	-0.53	OK
W11	W11	1.270	740	740	1593.09	1593.00	+0.09	OK

4.4.2 HEC-2 Model Calibration

The study washes are ungaged watersheds with no stream gage data available. Therefore, calibration to historic events is not possible. Washes 9, 10 and 11 were previously studied by engineers designing channelization and culverts. In general, a comparison to the previous design yields comparable results. For example, there is a block-wall-lined channel from Wash 10 River Mile 0.56 to 0.83. The floodplain is contained within the channel, which agrees with the design computations. In other areas, the mapped floodplain limits were inspected for reasonableness, and found to be appropriate for this area.

4.4.3 Flow Splits

The discussion on flow splits within the study area is in Section 4.5, which discusses special problems.

4.5 Special Problems

Wash 9 near River Mile 1.5

Wash 9 contains an island flow situation near River Mile 1.5. The majority of flood water passes the island on the north side. The thalweg is depicted on the south side because the thalweg location was selected during hydrologic modeling, and it was agreed that the hydrologic and hydraulic models would use the same thalweg. A supercritical analysis is used to determine the amount of split flow. The floodplain is mapped for a subcritical flow regime using the flow rates from the supercritical analyses. Appendix E contains the HEC-2 output for the island flow situation. The floodway is mapped on the north side of the island where the majority of flood water passes, even though the floodway crosses the thalweg. The island is approximately more than 1.0 feet higher than the surrounding floodplain.

Wash 9 near River Miles 1.73 and 1.79

Each culvert near the upstream end of the Wash 9 study limits would be overtopped during a 100-year event. A portion of the overtopping flow would split off to the north. These flow splits are not considered because the flow depth at overtopping is approximately 1.0 feet or less.

Wash 10 near River Mile 1.0

Near Wash 10 River Mile 1.0, five buildings (as of aerial photography date) are within the 100-year floodplain. Even though Wash 10 is channelized through this reach, it is rather shallow and unable to contain the 100-year flood.

Wash 10 and 11 Confluence Area

Prior to its confluence with Wash 11, a portion of Wash 10 flood waters splits off at Forest Road and joins Wash 11. A separate HEC-2 analysis is used to determine the split flow (W10SPLIT.IH2), since the split flow routine is incompatible with floodway encroachment methods. The Wash 10 and 11 confluence area is hydraulically complex, with several separate low flow paths within the mapped 100-year floodplain. This complex situation is typical for this watershed, and is typical of many desert washes where there are several flow paths. While viewing the Wash 10 cross section plots (0.021 and 0.070) contained in Appendix F, an island is evident to the right of the thalweg. Since this island is less than one foot above the 100-year flood, a separate island analysis is not needed, and the entire area is mapped as floodplain.

Wash 12 from River Mile 0.5 to 0.7

The left bank of Wash 12 between Cross Sections 0.488 and 0.748 is composed of a natural ridge or embankment separating it from a smaller wash on the other side. The ridge is overtopped in this vicinity by the 100 year flood. An additional HEC-2 file (W12-ZA.IH2) is used to determine the lateral extent of the Zone A on the non-channel side (left of the left bank station), and is contained in Appendix H. The additional analysis removes the ridge from the GR records, extends the cross section further and uses the full channel discharge. The floodplain in this vicinity is mapped with the full flow on the channel side of the ridge, and the Zone A is mapped from the results of the additional HEC-2 analysis. This depicts the most conservative floodplain representation.

4.6 Floodway Modeling

A floodway is determined for the floodplains of the study washes, based upon equal-conveyance reduction on each side of the floodplain. Initially, the HEC-2 Floodway Method 4 was used to determine the floodway limits, and the final floodway is implemented via Floodway Method 1. In areas where the wash is already channelized, or there are defined historic banks above the flood level, the floodway is set equal to the floodplain. The floodway data for all study washes are shown in the respective Standard Floodway Table found in Appendices E, F, G, and H, at the rear of each HEC-2 output.

4.7 Final Results/Computer Output

The final HEC-2 output for each wash is set forth in a separate Appendix as follows:

Wash 9	Appendix E
Wash 10	Appendix F
Wash 11	Appendix G
Wash 12	Appendix H

The individual cross section plots and the stream profile plots follow the HEC-2 output for each wash. Table 4-2 presents the HEC-2 files used for this study. The file used for floodplain mapping is marked with an asterisk.

4.8 Computer Model Diskette

A computer diskette containing the input files necessary to generate every HEC-2 output appearing in this Technical Data Notebook is contained in a plastic pocket at the rear of this report. The file README.DOC contains explanatory information relevant to the enclosed computer files. Table 4-2 contains the essential parts of the README.DOC file.

TABLE 4-2
HEC - 2 MODELS

	File Name	Description
WASH 9	W9FW1.IH2*	Wash 9, 100-year base flood and Floodway Method 1 analysis.
	W9IS1SUP.IH2	Supercritical island analysis to determine the flow split around the island (north channel).
	W9IS1SUB.IH2*	Subcritical island analysis using flow rate determined from supercritical analysis. Used to define the floodplain in the vicinity of the island (north channel) near River Mile 1.5.
	W9IS2SUP.IH2	Supercritical island analysis to determine the flow split around the island (south channel).
	W9IS2SUB.IH2*	Subcritical island analysis using flow rates determined from supercritical analysis. Used to define the floodplain in the vicinity of the island (south channel) near River Mile 1.5.
WASH 10	W10FW1.IH2*	Wash 10, 100-year base flood and Floodway Method 1 analysis. Flow rates are adjusted to account for a split flow at Forest Rd. (RM 0.444 & RM 0.454).
	W10SPLIT.IH2	Analysis of split flow at Forest Rd. (at RM 0.444 & RM 0.454). Flow leaving Wash 10 is added to Wash 11 at RM 1.201 and subtracted from the downstream flow in 100-year base flood and Floodway Method 1 analysis (W10FW1.IH2). A separate analysis is required because a split flow analysis cannot be run in conjunction with a floodway analysis.
WASH 11	W11FW1.IH2*	Wash 11, 100-year base flood and Floodway Method 1 analysis. Flow rates are adjusted to include inflow from Wash 10 split flow at Forest Rd.
WASH 12	W12FW1.IH2*	Wash 12, 100-year base flood and Floodway Method 1 analysis.
	W12-ZA.IH2*	Wash 12, 100-year analysis to delineate the Zone A floodplain.

* Indicates file used for floodplain mapping.

SECTION 5: EROSION/SEDIMENT TRANSPORT ANALYSIS

Fixed-bed hydraulic modeling is used throughout the study area. Erosion along the washes is not considered, and sediment transport is not analyzed. These issues are outside the Scope of Work for this Study and are not part of this report.

SECTION 6: REFERENCE MATERIALS

6.1 Other Published Flood Studies

There are no other significant published flood studies of record for the study washes.

6.2 Previous FEMA Studies

The previous FEMA study for Washes 9, 10 and 11 contains older hydrologic modeling and approximate-method of floodplain delineation. For these reasons, the previous FEMA study is not pertinent to this study, which uses the current hydrologic modeling and detailed-method floodplain delineation.

6.3 Other Applicable Studies

The Rio Verde North Floodplain Delineation Study should be consulted for other pertinent information in the vicinity. This study covers washes adjacent to the Rio Verde South study area.

6.4 Published and Unpublished Historical Flood Information

Shortly after this study began, it was learned that one or two residential dwellings along the original Wash 10 alignment had been flooded in the past. Since that time, the levee at Wash 10 River Mile 1.33 has been constructed, and there have been no further reports of flooding. There are no other records of published or unpublished flood information for the study washes. The "Rio" fire which occurred within the watershed in July 1995 would have an effect on the hydrologic and hydraulic analyses. Since this would be temporary until vegetation is re-established, the effects of the fire are not considered.

6.5 Bibliography

1. Arizona Department of Water Resources, Engineering Division, Flood Management Section, September 1991. Instructions for Organizing and Submitting Technical Documentation for Flood Studies.

2. Arizona Department of Water Resources, Engineering Division, Flood Management Section, September 1992. Requirement For Floodplain Delineation In Riverine Environments.

3. Burgess & Niple, Inc., 1995. Rio Verde North Floodplain Delineation Study, Technical Data Notebook Hydrology, FCD 93-06.

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7. Federal Emergency Management Agency, September 4, 1991. Maricopa County, Arizona, and Incorporated Areas, Flood Insurance Rate Map, Panel 1300 of 4350.

8. Federal Emergency Management Agency, December 3, 1993. Flood Insurance Study, Maricopa County, Arizona and Incorporated Areas, Volumes 1 through 9.

9. Federal Emergency Management Agency, March, 1993. FEMA 37, Flood Insurance Study Guidelines and Specifications for Study Contractors.

10. Flood Control District of Maricopa County, September, 1992. Drainage Design Manual for Maricopa County, Volume I, Hydrology.

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19. U.S. Department of Transportation, May 1987. HY8 Culvert Analysis Microcomputer Program Applications Guide.

20. U.S. Geological Survey, 1991. Manning's Roughness Coefficients for Stream Channels and Floodplains in Maricopa County, Arizona.

21. U.S. Geological Survey, Water Resources Division, April, 1991. Manning's Roughness Coefficients for Stream Channels and Flood Plains in Maricopa County, Arizona.

6.6 Applicable Improvement Plans, Maps and Related Documents

The Data Collection Report, completed as part of the Scope of Work, follows. It contains a list of improvement plans, drainage reports and related documents pertinent to this study, as well as a brief description of the document. Since development is on-going within the study area, some of the more recent documents will not be included in this list.

FLOOD INSURANCE STUDY
for
RIO VERDE SOUTH
FCD CONTRACT NO. 93-07

SUMMARY REPORT FOR
PHASE I, TASK 2 DATA COLLECTION

March 9, 1994

As part of the Scope of Work for the Flood Insurance Study for Rio Verde South, data collection was performed. Several reference sources were consulted in order to obtain the results of previous studies and other pertinent data to support development of this study. The following is a brief summary of that information.

Summary of Data Collection

1. FEMA/Michael Baker Jr., Inc.:

   a. A report entitle "Floodplain Study of Rio Verde, Arizona", dated May 20, 1988, by Wiley & Associates.

   b. Sheet 1 through 3 of topographic maps entitled "Rio Verde Flood Study", dated May 20, 1988, by Wiley & Associates. Scale: 1"=40'. Shows HEC-2 cross-section locations.

   c. A blueprint of an aerial photograph entitled "Rio Verde Flood Study", showing the Rio Verde Subdivision limits and channel locations, dated February, 1987, by Wiley & Associates. Scale: 1"=410'±.

   d. A drainage map entitled "Tonto Verde, Master Drainage Map", dated November, 1986, Sealed 11/7/86, it is the map for Item 1-e.

e. A drainage map entitled "A Map for Drainage Study, Rio Verde", showing floodplain boundary delineations, dated February, 1987. Scale: 1"=150'. (Not sealed, it is the original drainage study for Rio Verde.)

f. A report entitled "Preliminary Drainage Report, November 1986, Tonto Verde Master Plan", dated November 1986, by Wiley & Associates. For associated map see Item 1-d.

g. A topographic map entitled "McDowell Mountain Park Channel", dated July 1987, by Wiley & Associates. (This is the diversion dike on Wash 10.)

2. Newspaper Articles/Clippings:

a. The Times/Rio Verde

Dates:
- June 9, 1993
- June 16, 1993
- July 21, 1993
- December 15, 1993
- December 22, 1993

3. Development Master Plan for Tonto Vista Contour Map with Golf Course Layout. Scale: 1"=300'. By A. Wayne Smith & Associates dated December 1982.

4. Revised Drainage Master Plan for Tonto Verde. Scale: 1"=300' by Brooks, Hersey & Assoc. dated June 22, 1993, showing Drainage Basin Number, D.A. Boundaries, Detention/Detention Basins.

5. Rio Verde Sales Brochure, including:

a. Resale Home - Asking Prices 6/23/93.

b. Alexander Homes - Model Price List 4/7/93.

c. Rio Verde Country Club Membership - Fees and Dues 4/1/93.

d. Resale Lots - Prices 6/24/93.

6. Rio Verde Unit Six. Re-Plat of Lot 491 dated December 23, 1993. The lot is adjacent to Wash 10.

7. Rio Verde Unit 11 from FCD file S38-39.

a. Final Drainage Report by Wiley & Associates dated April 21, 1988.

b. Three 11" x 17" portions of the Final Plat (unsigned, not stamped), by Wiley & Associates.

c. Paving, Grading, Drainage and Sewer Collection Plans - Sheets 1, 2, 3, 4, 5, 6, and 7 of 44 by Wiley & Associates dated April 22, 1988, signed and stamped.

8. Rio Verde Unit One (also labeled as Phase One) from FCD file S93-03.

a. Final Plat Review, Comments and Responses by Brooks, Hersey & Assoc. dated September 28, 1993.

b. Letter from Rio Verde Services, Inc., President David S. Ritchie to Felicia Terry, Flood Control District of Maricopa County (FCDMC) dated June 1, 1993 regarding Tonto Verde, Phase 1 Plat.

c. FCDMC Inter-Office Memo from C.W. Regester to P.A. Calza dated June 8, 1993 regarding Tonto Verde Floodplain Delineation, includes HEC-2 printouts and input data.

d. FCDMC Inter-Office Memo from C.W. Regester to F. Terry dated July 8, 1993, regarding Tonto Verde Preliminary Plat Results of Discussions with Mr. O'Neill of Brooks, Hersey. Subject: HEC-2 Study of FIRM submitted June 25, 1993.

e. FCDMC Inter-Office Memo from S. Story to F. Terry dated July 8, 1993 regarding Tonto Verde Hydrology Final Review Comments.

f. FCDMC Inter-Office Memo from C.W. Regester to F. Terry dated April 19, 1993 regarding Tonto Verde Phase One Preliminary Plat Review Comments. Comments on FIRM Wash 10, FIRM Wash 11.

g. FCDMC Memo to Richard Turner, Director of Planning, from Edward Raleigh, Engineering Division Manager, dated July 13, 1993 regarding Tonto Verde Master Drainage Plan and Preliminary Plat Review.

h. FCDMC Memo to Richard Turner, Director of Planning, from Edward Raleigh, Engineering Division Manager, undated, regarding Tonto Verde - Final Plat.

i. FCDMC Inter-Office Memo from C.W. Regester to C.G. Fernandez dated September 20, 1993 regarding Tonto Verde - Grading and Drainage Plans. Review of Plans and HEC-2 Computations.

j. Scour Calculations and HEC-2 runs for Diversion Structure West of Tonto Verde dated December 8, 1993 from Brooks, Hersey & Assoc. to Cora Fernandez, FCDMC. (Partial Copy. Two pages only.) A complete copy of the engineer's design file has been requested; currently under construction, As-Builts will be sent.

k. Letter to Steve Tucker, FCDMC, from Brooks, Hersey & Assoc. dated December 16, 1993 regarding Tonto Verde, Unit 1, Temporary Club House, Sales Office Site Plan.

l. Final Drainage Report 1 for Tonto Verde Unit I dated September 2, 1993 by Brooks, Hersey & Associates. (Complete Copy.)

m. Memo to Richard Tucker from Edward Raleigh dated October 1, 1993 regarding Tonto Verde Final Plat.

n. FAX-cover to Brooks, Hersey & Assoc. from Cora Fernandez, FCDMC, not dated regarding requesting Calculations for the design and stability of the diversion structure. See Item 8-j.

o. Letter to Steve Tucker from Brooks, Hersey & Assoc dated December 6, 1993 regarding Tonto Verde, Unit 1, Lots 53, 54 and 55 Certification.

p. FAX - Cover Sheet - to Cora Fernandez from Brooks, Hersey & Assoc. dated January 13, 1994 regarding Diversion Structure Details. See Item 8-j

9. Rio Verde Unit 4 from FCD file S78-84.

a. Vicinity Map - No Scale.

10. Rio Verde Units 5 and 5A from FCD file S75-11.

a. Unit 5A - Two partial prints of Plat - 11" x 17" - Title and Vicinity Map.

11. Rio Verde Units 6 and 7 from FCD file S76-16A.

a. Letter from Leslie Bond, FCDMC Chief Hydrologist, to Don McDaniel, FCDMC Planning Department Director, dated May 10, 1978 regarding Final Plat Review for S76-16.

b. Letter from Herb Donald, FCDMC Chief Engineer, to Earle Slider of Wiley & Associates dated July 7, 1977 regarding Unit 6 Paving Plans Review Comments.

c. Unit 7 Partial Plat - 11" x 17" - Title and Vicinity Maps.

d. Unit 6 Paving Plan Title Sheet - 11" x 17" - and Vicinity Map.

12. Rio Verde Unit 8 from FCD file S80-30.

a. Preliminary Plat - Reduced to 11" x 17".

b. Paving and Grading Plan. (Partial)

c. Vicinity Map - No Scale.

d. Typical Channel Section.

e. Sixth Fairway Drainage Study Cross-Sections (11" x 17").

f. Vicinity Map - No Scale.

g. Vicinity Map - No Scale (Contour Map).

h. Drainage Report dated June, 1981 (6 pages).

13. Rio Verde Unit 2 from FCD file S79-1.

a. Vicinity Map (11" x 17").

b. Narrative dated February 24, 1979 describing drainage of Unit 2 (4 pages).

14. Rio Verde Unit 7 from FCD file S76-16B.

    a. Memo from Nick Karan, FCDMC Engineering Division Chief, to Buck Orahood, MCHD Permits Division, dated November 20, 1989 regarding Drainage Easement Abandonment for Lots 633, 634, 635 and 636.

    b. Legal Description for Drainage Easement Abandonments, by Wiley & Associates, regarding Lots 633, 634, 635 and 636 (6 pages, including map).

15. Rio Verde Unit 9 and 9A from FCD file S82-21.

    a. Preliminary Plat - Partial (11" x 17").

    b. Typical Parking - 11" x 17".

    c. Letter from Doug Plasencia, FCDMC Hydrologist to Wiley & Associates dated August 13, 1985 regarding Paving, Grading and Drainage Plan revision requests.

    d. Final Plat and Vicinity Map (11" x 17") - 2 sheets.

    e. Final Drainage Report - Unit 9A dated June 1985 by Wiley & Associates. (Partial Copy, 33 pages).

16. Rio Verde Unit 10 from FCD file S85-40

    a. Final Drainage Report dated April, 1986 by Wiley & Associates. (Complete Copy, 59 pages and map.)

17. Rio Verde Unit 12 from FCD file S89-5.

a. Preliminary Drainage Report dated May, 1989 by Wiley & Associates (Partial Copy, 11 pages).

b. Letter from Wiley & Associates to Tim Murphy, FCDMC, dated April 23, 1990 regarding Minutes of April 4, 1990 Meeting on FCD drainage comments..

c. Revised Master Development Plan dated August 18, 1989 by Wiley & Associates (Partial Copy, 2 pages).

18. Rio Verde Country Club

a. Letter to C. Regester, FCDMC, from Wiley & Associates dated May 20, 1993 regarding Fairway 6, (Wash 10) HEC-2 Analysis showing highwater elevations vs. finished floor elevations.

19. Rio Verde Commercial Park from FCD file S80-32

a. Report to the Planning & Zoning Commission dated July 2, 1981. 2 pages (11" x 17").

b. Portions of Reduced Plat (3)

20. Rio Verde Washes - Flood Insurance Study

a. Final Drainage Report (Partial Copy) dated February, 1990 regarding Unit 12 by Wiley & Associates. Includes:

D.A.'s 1 through 8
FIRM Wash 10
Cultural Resources Survey
Rainfall Intensity Letter
References
Preliminary Drainage Map

b. Tonto Verde Development Master Plan dated July 16, 1992 by Cornoyer-Hedrick, Architects, (Complete Copy).

c. FCDMC Inter-Office Memo from C.W. Regester to C.G. Fernandez dated February 23, 1993 regarding Tonto Verde Final Drainage Report Review Comments.

d. FCDMC Inter-Office Memo from AMM to PAC dated February 16, 1993 regarding explanation of discrepancy in Peak Q estimate at Wash 10.

e. Letter from Joe Tram, FCDMC, to Brad Gordon, Wiley & Associates, dated August 6, 1990 regarding FIRM Wash 10 Channelization Review Comments.

f. FCDMC Inter-Office Memo from Joe Tram to Tim Murphy dated March 16, 1990 regarding nine items of concern about FIRM Channel, Wash 10.

g. Floodplain Study by Wiley & Associates dated May 20, 1988 (Partial Copy, 2 pages, including map).

h. FCDMC Inter-Office Memo from C.W. Regester to C.G. Fernandez dated February 23, 1993, regarding Tonto Verde Final Drainage Report Review Comments.

i. Letter from John Matticks, FEMA, to Fred Koory, Maricopa Board of Supervisors, dated October 3, 1989 regarding Washes 9 and 10 floodplain boundary approval.

j. Letter from John Matticks, FEMA, to Tom Freestone, Maricopa Board of Supervisors, dated December 18, 1988 regarding additional data requests on Washes 9 and 10.

k. Letter from John Matticks, FEMA, to Tom Freestone, Maricopa Board of Supervisors, dated October 14, 1988 regarding acknowledgment of reviewing Wiley & Associates submittal on Washes 9 and 10.

l. Letter from Wiley & Associates to John Matticks, FEMA dated September 8, 1988 regarding explanation of Wash 10 diversion impacts in Wash 11.

m. Letter from Jan Farmer, FCDMC, to Wiley & Associates dated August 29, 1988 regarding Rio Verde FEMA Map Revision Request for Information.

n. Letter from John Matticks, FEMA, to Tom Freestone, Maricopa Board of Supervisors, dated August 8, 1988 regarding Washes 9 and 10, responses to Wiley & Associates submittal.

o. Drainage Report for Rio Verde Unit 3 dated December 17, 1973 by Bellante, Clauss, Miller & Nolan (Partial Copy, 27 pages).

p. Tonto Verde Master Plan Drainage by Wiley & Associates dated August 30, 1986 prepared in 1978, submitted to FCDMC for Sec. 36,31.

q. Revised Master Drainage Plan Tonto Verde dated May, 1993, by Brooks, Hersey & Assoc., including FCDMC review comments by S. Story to F. Terry (Complete Copy).

21. Tonto Verde Development Master Plan dated July 16, 1992, revised August 20, 1992.

22. Tonto Verde from FCDMC file MP 92-02.

a. Letter from David Ritchie, Rio Verde Services to Richard Turner, Maricopa County Planning and Development, dated May 27, 1993 regarding Tonto Verde Development Master Plan, Stipulation "K", wash banks Re-vegetation Plan.

b. Conference Report dated April 8, 1993 by Gregg Kent, Brooks, Hershey & Associates, regarding discussion of Drainage Concerns of Tonto Verde Development with the FCDMC.

c. Letter from David Ritchie, Rio Verde Services, to Richard Turner, Maricopa County Planning and Development dated June 1, 1993 regarding Stipulation "K" FIRM 11 Wash - Re-vegetation Plan.

d. Letter from Tim Dunham, Rio Verde Landscaping to Richard Turner, Maricopa County Planning and Development, dated May 27, 1993 regarding Stipulation "K", wash banks Re-vegetation Plan.

e. Preliminary Drainage Report Tonto Verde Phase I dated April 1993 by Brooks, Hersey & Assoc. (Complete Copy).

f. Revised Drainage Plan and HEC-2 Sections dated May 26, 1993 by Brooks, Hersey & Assoc. (Transmittal letter only from Brooks, Hersey & Assoc. to FCDMC.)

g. Project Memos

1. From Jerry Wensloff, Brooks, Hersey & Assoc., dated April 5, 1993 regarding conversation with C. Regester, FCDMC.

2. Drainage Investigation from Brooks, Hersey & Assoc., to G.K., V.W. (Agency unknown) regarding visual analysis of flow splits dated April 4, 1993.

3. From Jerry Wensloff, Brooks, Hersey & Assoc., dated March 30, 1993 regarding conversation with Lenny Gostinski, Wiley and Associates, about flow splits on Wash 10.

h. Letter from F. Terry, FCDMC, to David Ritchie, Rio Verde Services, dated June 8, 1993 regarding Tonto Verde - Phase I Plat. (Prohibits obstruction in drainage easements.)

i. Letter from David Ritchie, Rio Verde Services, to F. Terry, FCDMC, dated June 1, 1993 regarding Phase I Plat.

j. Letter from Ron Nevitt, FCDMC, to David Ritchie, Rio Verde Services, dated April 23, 1993 regarding staff report on floodplain use permit.

k. Letter from Ed Raleigh, FCDMC to David Ritchie, Rio Verde Services, dated March 3, 1993 regarding request for information to issue drainage clearance.

l. Tonto Verde Master Plan Final Drainage Report dated August 1992 by Wiley & Associates (Cover Only) superseded by May, 1993 Report by Brooks, Hersey & Assoc.

23. Tonto Verde from FCD file MP 90-2.

a. Transmittal Letter dated February 8, 1994 from Brooks, Hersey & Assoc. to FCDMC. Items:

1. Set of semi-rectified aerial photos of new Tonto Verde Golf Course. Scale: 1"=100′.
2. Grading Plan - As Built.
3. Site Plan - Golf Course.

b. Rio Verde Drainage Report dated January, 1974 by Bellante, Clauss regarding Section 6, Township 4 North, Range 7 East D.A.'s P through Z, AA, BB and CC. (Partial Copy, 1 page).

c. Tonto Verde - Existing Zoning Map - 1"=1200′ Reduced prepared by A. Wayne Smith for Rio Verde Services, March 15, 1990.

d. Tonto Verde Development Master Plan dated July 2, 1990, (Partial Copy, 7 Pages). (Superseded by August 20, 1992 Cornoyer-Hedrick Report).

24. Tonto Verde from FCD Accordion file

a. Letter of Transmittal from Brooks, Hersey to FCDMC dated June 24, 1993 - Tonto Verde. Items:

1. Preliminary Plat
2. Golf Course Drainage Plan
3. Revised Master Drainage Plan
4. Roadway Calculations

b. Final Drainage Report dated August, 1992 by Wiley & Associates regarding Tonto Verde Master Plan. (Partial Copy, 9 pages).

1. Memo from Ed Raleigh, FCDMC, to Dennis Zwagerman, Maricopa County Planning and Development, dated September 18, 1992 by Wiley & Associates regarding Tonto Verde Master Plan Approval Conditions.

2. Six pages of Drainage Report (See above title)

c. FCDMC Inter-Office Memo from A.M.M. to P.A.C. & C.W.R. dated February 16, 1993 regarding explanation of discrepancies in peak Q's in Wash 10 between Rio Verde and Tonto Verde Projects.

d. FCDMC Inter-Office Memo from C.W.R. to P.A.C. dated June 8, 1993 regarding Tonto Verde Floodplain Delineation for FIRM Washes 10 and 11 - Review Comments.

e. List of HEC-2 file names and culvert calculations for FIRM 11 Crossing, roadway name not specified.

f. Revised Master Drainage Plan Tonto Verde dated May, 1993 by Brooks, Hersey & Assoc. Complete copy of text, no calculations.

1. FIRM 10 Existing Channel 100-year Q, W.S. Elevations.

2. FIRM 10 Developed Conditions W.S. Elevations.

3. Tonto Verde Unit One W.S. Elevations.

4. FIRM 11 - HEC-2 Results.

5. Master Drainage Area Map for Tonto Verde (2 pages).

25. Tonto Verde 18 hole golf course layout.

26. Sample of Kenney Aerial Maps (2 - 11" x 17") covering Rio Verde and Tonto Verde.

27. Drainage Area Map of Tonto Verde Development dated March 26, 1993 by Brooks, Hersey & Assoc., Wiley & Associates and Cornoyer-Hedrick.

28. Re-Plat of Lot 491, Rio Verde Unit 6 dated December 6, 1993 by Wiley & Associates.

29. Tonto Verde Unit One Improvements Grading Plans dated October 14, 1993 by Brooks, Hersey & Assoc. (Sheet 6 and 7 of 10.)

30. Rio Verde Fairway Six, Grading and Drainage dated April 8, 1993 by Wiley & Associates. (Sheets 1 and 2 of 2.)

31. Tonto Verde Phase One Preliminary Plat dated May 5, 1993 by Brooks, Hersey & Assoc. (Sheets 1 and 2 of 2.)

32. Rio Verde Unit 12 - Offsite Grading from Channel to Inlet dated June 28, 1990 by Wiley & Associates.

33. Final Drainage Map - Rio Verde United 12 dated February 25, 1990 by Wiley & Associates.

34. Tonto Verde Unit One Improvements Grading Plans dated October 14, 1993 by Brooks, Hersey & Assoc. (Sheets 6 and 7 of 10.)

35. Kenney Aerial Maps - Full Size (2 copies) - Golf Course without any other development.

36. Geotechnical Investigation Report, Rio Verde Dike Evaluation, Maricopa County, Arizona, dated January 14, 1994 by SHB Agra Inc., prepared for FCDMC. Discusses geotechnical concerns on Wash 10 dike located within the McDowell Mountain Park.

SECTION 7: CROSS REFERENCE AND LABELING INFORMATION

Not part of this report.

SECTION 8: DRAFT FLOOD INSURANCE STUDY REPORT

See Appendix J.

RIO VERDE SOUTH
FLOODPLAIN DELINEATION STUDY
FCD NO. 93-07

ELEVATION REFERENCE MARKS

Note: All elevations are based on National Geodetic Vertical Datum of 1929

I.D. Num.	Elev. (FT)	Description/Location
ERM#1	1571.265	This station is located approx. 0.17 miles east of Forest Rd. and approx. 67 feet south of the graded road to the Box Bar Ranch. The mark is a brass cap stamped "U.S. Coast and Geodetic Survey".
ERM#2	1544.580	This station is located at the Section Corner (29, 30, 31, 32), T5N, R7E. The mark is a brass cap.
ERM#3	1655.995	This station is located as Section Corner (25, 30, 31, 36). The mark is a one inch iron pin.
ERM#6	1793.980	This station is located at the west quarter corner of Section 36, T5N, R6E. The mark is a B.L.M. brass cap.
ERM#7	1790.870	This station is located at the southeast corner of Section 36, T5N, R6E. The mark is a G.L.O. brass cap.
ERM#8	1654.130	This station is located at the southeast corner of Section 36, T5N, R6E. The mark is a G.L.O. brass cap.
ERM#9	1649.810	This station is located at the southwest corner of Section 6, T4N, R7E. The mark is a G.L.O. brass cap.
ERM#10	1633.600	This station is located approximately 280 feet east of Via Hermosa and Vado Court. The mark is a Maricopa County Highway Department brass cap.

RIO VERDE SOUTH
FLOODPLAIN DELINEATION STUDY
FCD NO. 93-07

ELEVATION REFERENCE MARKS (Continued)
Note: All elevations are based on National Geodetic Vertical Datum of 1929

I.D. Num.	Elev. (FT)	Description/Location
ERM#11	1540.625	This station is located at the southeast corner of Section 6, T4N, R7E. The mark is a B.L.M. brass cap.
ERM#12	1528.290	This station is located east of the north quarter corner of Section 5, T5N, R7E. The mark is a B.L.M. brass cap at witness corner to the meander corner.
ERM#13	1556.905	This station located at the southeast corner of Section 31, T5N, R7E. The mark is a B.L.M. brass cap.
ERM#17	1719.530	This station is located at the south quarter corner of Section 36, T5N, R6E. The mark is a brass cap.

Name .....

.....

Address .....

.....

Phone .....

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I CERTIFY THAT THESE NOTES CORRECTLY REPRESENT A SURVEY MADE UNDER MY SUPERVISION.

Richard Alcocer

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
13168
RICHARD
ALCOCER
Date Signed 6-20-95
ARIZONA, U.S.A.

RIO VERDE SOUTH
FLOOD DELINEATION STUDY

FLOOD CONTROL DISTRICT
OF
MARICOPA COUNTY, ARIZONA
FCD 93-07

WASH 9
&
FOREST RD.

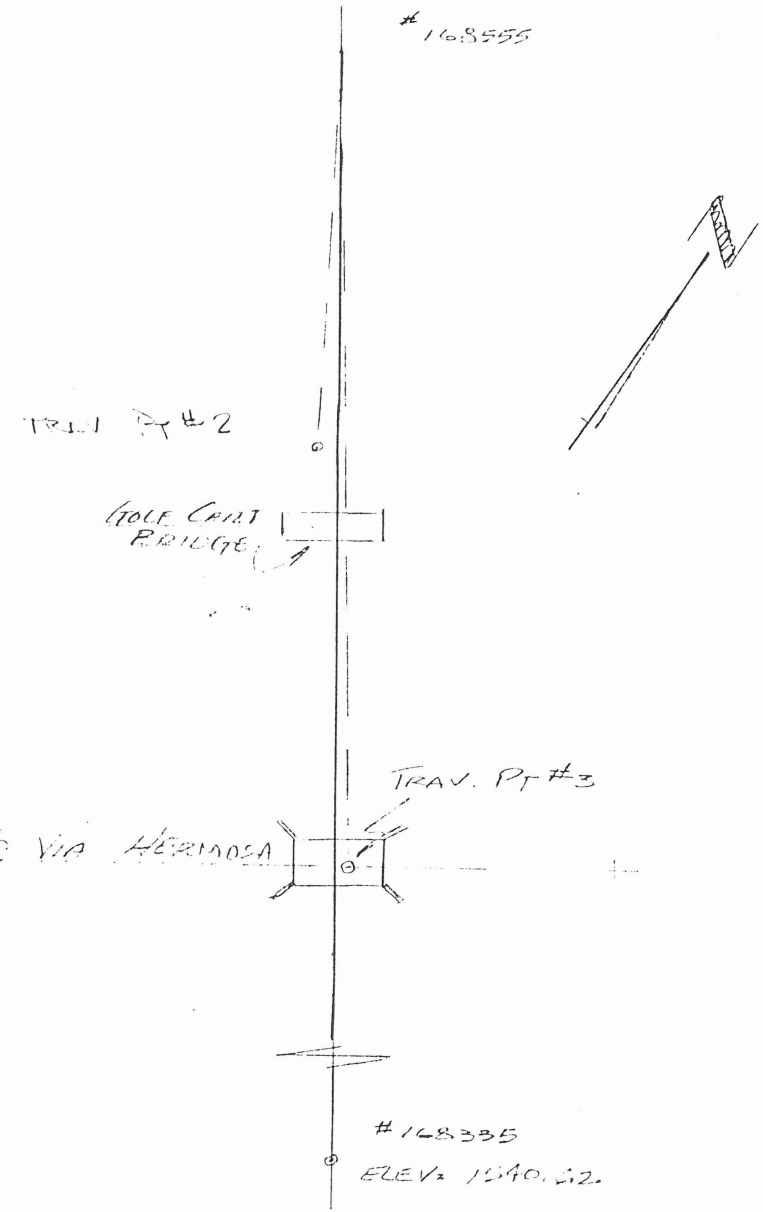
6-9-99
RALDEEN
R AYALA
M VENEGAS

CLEAR - HOT

T AT ℄ PANEL POINT # 168555
BS. ℄ PANEL POINT # 168335
00° 00' 05" DIST: 1351.99'
HI = 4.99' + 1561.65 = 1566.64
TARGET HEIGHT: 7.96'
D.E. = -18.32 ELEV: 1540.56 (-0.08)

F.S. TRAV. POINT # 2
H. ANGLE RT: 00° 05' 05"
H. DIST = 410.47'
TARGET HEIGHT: 4.40
DE: -5.93
ELEV = 1556.91

F.S. TRAV. POINT # 3
H. ANGLE RT = 359° 56' 40"
H. DIST = 835.83'
TARGET HEIGHT: 4.40
DE: -12.56
ELEV = 1549.83



WASH 3

3 - 4'x 10' BOX CULVERT
ALONG
VIA HERMOSA

6-9-92
CLEAR
HOT

T AT TRAV. POINT # 3

B.S. ℄ PANEL POINT # 168555

00° 00' 00" HDIST = 895.83'

HI. 4.90' + 1549.88 = 1554.78

ANGLE RT.	DIST.	TARGET	DE.	ELEV.
86-22-10	119.13	8.64	+4.51	1550.65
86-22-10	85.21		+2.66	1548.80
86-22-10	76.62		+1.62	1547.76
86-22-10	66.74		+2.71	1548.85
86-22-10	51.83		+2.82	1548.96
86-22-10	38.15		+2.63	1548.77
86-22-10	27.0		+2.63	1548.77
266 22-10	57.40		+4.84	1550.98
266-22-10	103.13		+5.17	1551.31
266-22-10	145.90		+5.65	1551.79
266-22-10	191.29		+6.10	1552.89
266-22-10	254.90		+6.79	1552.93
266-22-10	305.0		+7.29	1553.43
266-22-10	356.8		+7.74	1553.88

℄ PROFILE OF VIA HERMOSA

N.G @ R/W OF FOREST ROAD

N.G.

℄ DRAINAGE SWALE

E.P.

℄ FOREST ROAD

E.P.

℄ DRAINAGE SWALE

℄ VIA HERMOSA

CONTINUED

IT AT TRAV. POINT #3

H.I. = 1554.78

ANGLE RT.	DIST.	TARGET	DE.	ELEV.	
356-42-35	51.0	8.64	0.00	1546.14	℄ OF WASH - BOTTOM OF WASH
	41.0	"	0.00	1546.14	TOP OF 6"x 42' CONC. BREAKER WALL
	40.0	"	-0.60	1545.54	BOTTOM OF WASH
	24.65	12.64	+2.06	1544.20	F.L. BOX CULVERT
	23.38	9.06	+7.94	1553.66	TOP OF WALL
	23.10		+3.72	1549.44	TOP OF CULVERT HEADWALL
	15.28		+3.74	1549.46	E.P.
176-42-35	15.80		+3.62	1548.34	E.P.
	23.12		+3.53	1548.25	TOP OF CULVERT HEADWALL
	23.55		+7.87	1553.59	TOP OF WALL
	24.43	12.64	+1.57	1543.71	F.L. BOX CULVERT
	67.08	"	+1.27	1543.41	℄ OF WASH - BOTTOM OF WASH

CENTERLINE PROFILE WASH #7

CONTINUED

T AT TRAV POINT #3

HI = 1554.78

ANGLE RT	DIST.	TARGET	D.E.	ELEV.
214-53-20	85.40	10.40	+4.76	1549.14
197-20-05	73.71		+4.41	1548.79
195-25-30	73.27		+4.01	1548.39
192-16-35	72.37		+1.14	1545.52
176-42-35	71.50		-0.90	1543.48
160-40-50	73.20		-0.70	1543.68
156-46-30	73.55		+3.33	1547.71
156-03-55	74.13		+2.70	1547.08
152-05-10	76.35		+2.15	1546.53
148-26-25	78.80		+2.60	1546.98
141-32-35	91.06		+2.78	1547.16

WASH 9 CROSS SECTION
(20' SOUTH OF CULVERT)

N.G
N.G.
TOP OF BANK (GABION)
BOTTOM OF WASH
℄ OF WASH
BOTTOM OF WASH
TOP OF BANK (GABION)
N.G.
N.G.
E.P
℄ FOREST ROAD

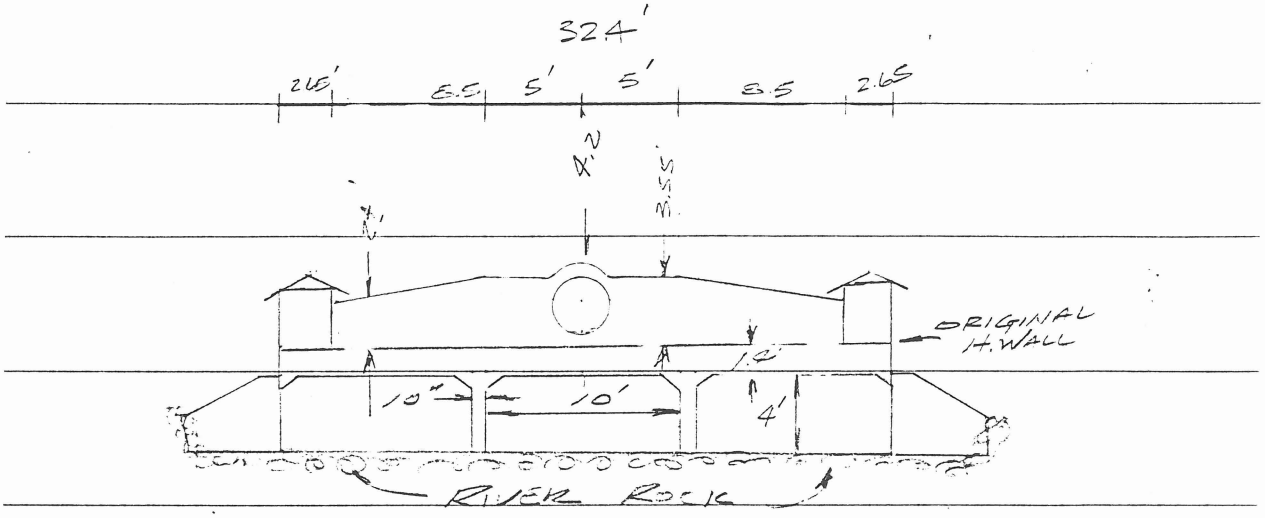
CONTINUED

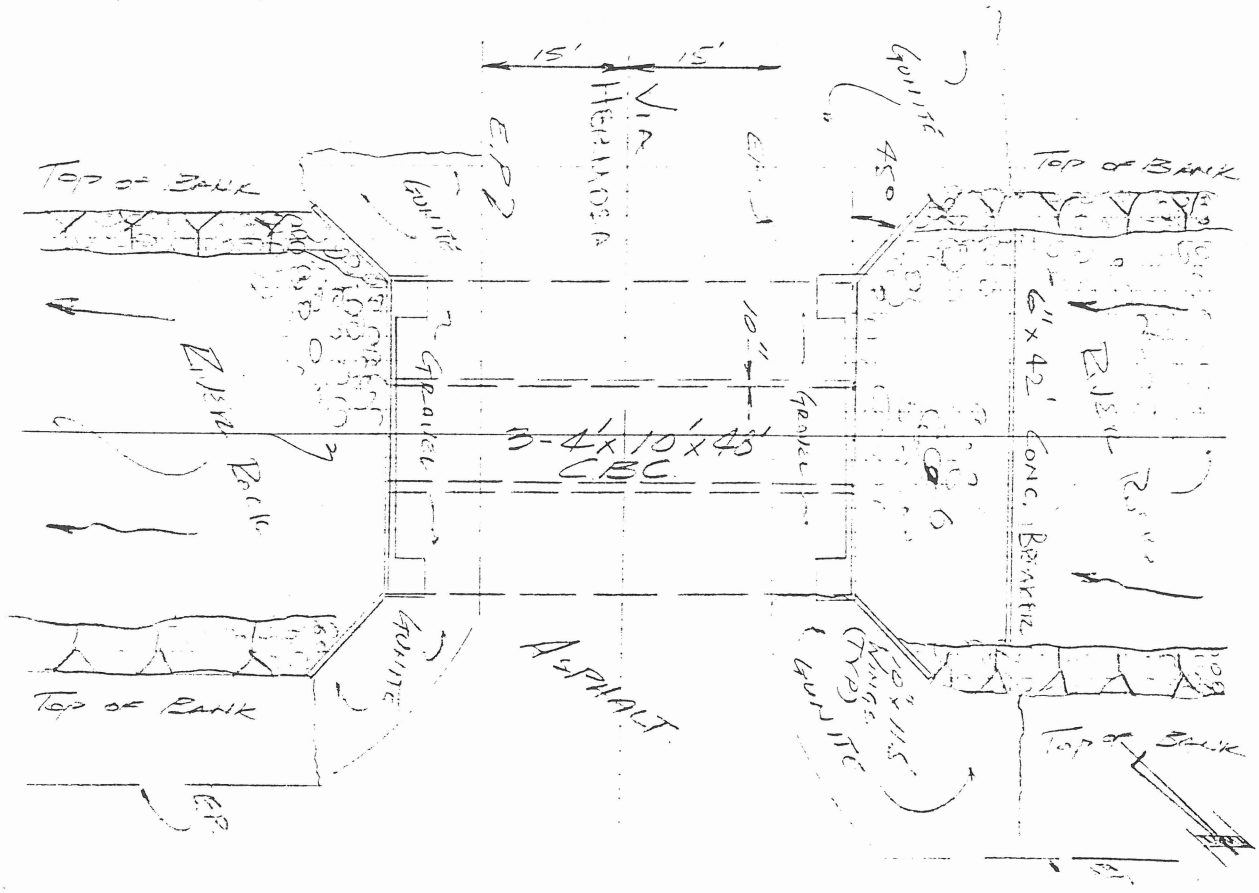
T AT TRAV. POINT #3

H.I. = 1554.78

WASH 9 CROSS SECTION
(10' NORTH OF CULVERT)

ANGLE RT	DIST	TARGET OE	ELEV.	
45-14-35	69.25	10.40	+5.46	1549.54	℄ FOREST RD.
35-28-40	59.90		+5.28	1549.66	EP
29-56-00	56.43		+4.61	1548.99	N.G.
25-37-15	54.20		+5.01	1549.39	N.G.
22-42-10	52.93		+4.86	1549.24	TOP OF BANK (GABION)
18-53-30	52.68		+1.22	1545.60	BOTTOM OF WASH
356-42-35	51.42		+1.92	1546.30	℄ OF WASH
335-14-55	56.30		+1.64	1546.02	BOTTOM OF WASH
331-21-30	57.40		+6.12	1550.50	TOP OF BANK (GABION)
329-23-35	58.40		+6.55	1550.93	N.G.
325-22-40	61.10		+6.44	1550.82	N.G.
317-17-10	66.80		+6.87	1551.25	N.G.


32.4'
2.6'
6.5'
5'
5'
6.5'
2.6'
4'
ORIGINAL H. WALL
10'
10'
4'
RIVER ROCK


15'
15'
VIA HERMOSA
TOP OF BANK
GUNITE
EXP.
10'
GRAVEL
3-4'x10'x45' CBC
6'x42' CONC. BOX
ASPHALT
RIP RAP
TOP OF BANK

WASH 9

7' x 54.8' Conc. & Steel
Pedestrian Bridge
Along
Forest Road

6-10-94
E. Alcocer
E. Ayala
M. Venegas
Clear
Hot

T AT TRAV. POINT #2
BS. ℄ PANEL POINT #168335
00°00'00" DIST- 410.47'
HI: 4.69 + 1556.51 = 1561.20

ANGLE RT	DIST	TARGET	D.E.	ELEV.	
175-40-35	101.38	8.64	+3.88	1556.01	BRIDGE LOCATION
190-49-50	104.53	⎫	+5.26	1557.82	EAST END OF BRIDGE (DECK)
204-09-20	114.52	⎭	+3.91	1561.73	℄ OF GOLF CART BRIDGE (DECK)
					WEST END OF BRIDGE (DECK)
					CONC. SPILLWAY
210-05-25	92.67	8.64	+4.11	1556.67	SOUTH END CONC. SPILLWAY (TOP)
210-46-10	91.69	⎫	+3.44	1556.00	TOE - F.L. SPILLWAY
219-34-50	75.03	⎪	+3.29	1555.85	℄ OF SPILLWAY
239-28-45	58.51	⎪	+3.35	1555.91	TOE - F.L. SPILLWAY
240-55-30	57.44	⎭	+4.09	1556.65	NORTH END CONC. SPILLWAY (TOP)
					CONC. SPILLWAY
178-20-35	80.76	8.64	+3.47	1556.03	SOUTH END CONC. SPILLWAY (TOP
178-44-30	76.51	⎫	+1.79	1554.35	F.L. OF SPILLWAY - 2' BOTTOM
178-37-55	71.51	⎭	+3.81	1556.37	NORTH END CONC. SPILLWAY (TOP)

CONTINUED
IT AT TRAV. POINT #2
HI = 1561.20

ANGLE RT.	DIST.	TARGET	DE.	ELEV	
159-02-10	90.01	8.64	+2.74	1555.30	℄ FOREST ROAD
167-47-55	84.23		+2.46	1555.02	E.P.
178-22-30	83.00		+3.40	1555.96	N.G.
178-56-35	82.48		+3.83	1556.39	TOP OF BANK (ROCK)
181-35-55	81.72		-0.49	1552.07	BOTTOM OF WASH
192-39-15	85.30		-1.01	1551.55	℄ WASH
206-14-40	91.21		-1.14	1551.42	BOTTOM OF WASH
208-34-25	93.88		+3.76	1556.32	TOP OF BANK (ROCK)
209-34-00	95.01		+4.09	1556.65	N.G.
214-40-30	101.81		+2.69	1555.25	N.G.
152-02-55	122.06	8.64	+2.11	1554.67	±5' SOUTH OF BRIDGE
156-55-25	119.07		+2.16	1554.72	N.G.
162-25-30	114.79		+2.43	1554.99	E.P.
169-44-35	112.43		+2.19	1554.75	℄ FOREST ROAD
173-53-55	111.31		+2.88	1554.44	EP
177-29-25	110.71		+3.19	1556.75	N.G
177-49-20	110.99		+3.43	1555.99	N.G.
179-24-25	110.20		-0.79	1551.77	TOP OF BANK (ROCK)
189-18-25	116.80		-1.31	1551.25	BOTTOM OF WASH
					℄ WASH

WASH 9 - CROSS SECTIONS
±25' NORTH OF BRIDGE

CONTINUED

IT AT TRAV. POINT #2

H.I. = 1561.20

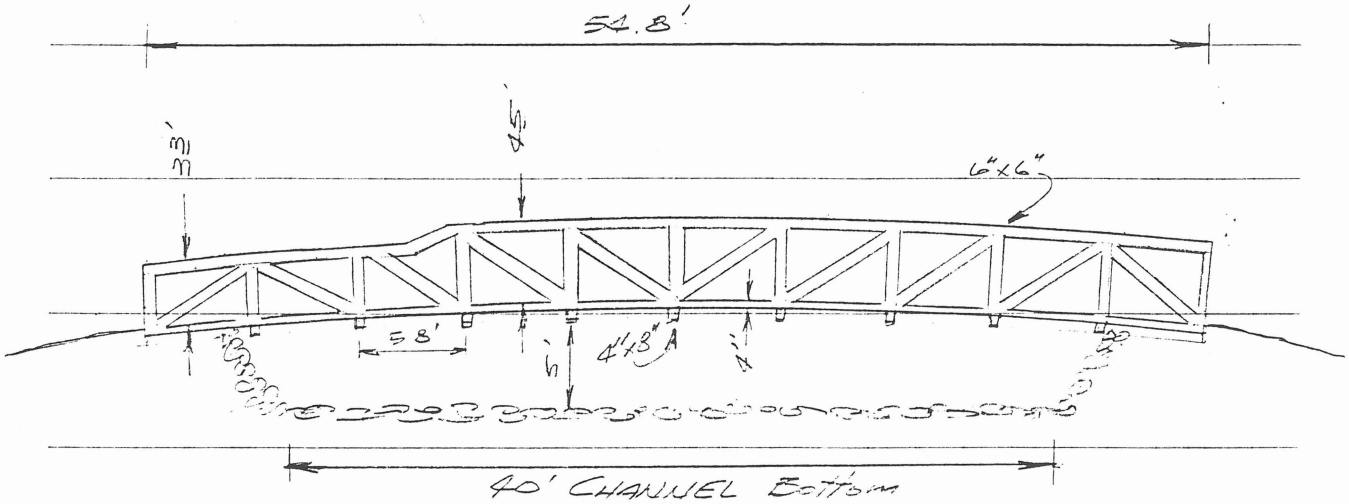
ANGLE RT.	DIST.	TARGET	D.E.	ELEV.	
198-27-15	117.71	6 6 4	-1.96	1559.24	BOTTOM OF DITCH
200-43-20	119.70		+3.02	1565.59	TOP OF ROCK (ROCK)
201-12-15	119.10		+2.98	1565.54	N.G.
202-26-05	120.33		+4.46	1567.04	TOP OF RR TIE WALL
202-26-05	120.30		+3.70	1556.26	G.B. " " "
214-30-15	137.45		+5.23	1567.79	G.B. " " "
214-30-15	137.50		+3.55	1566.11	G.B. " " "
221-40-20	153.07		+5.89	1568.45	G.B. " " "
221-40-25	152.67		+3.87	1566.43	G.B. " " "
224-33-10	161.64		+5.76	1568.32	TOP OF RR TIE WALL
224-33-10	160.32		+3.50	1566.06	E.P.
228-32-25	172.32		+3.77	1566.33	℄ OF ASPHALT DRIVE
232-01-25	185.17		+3.48	1566.04	E.P.
232-06-30	185.50		+4.42	1566.98	TOP OF R.E. WALL
232-19-10	186.11		+4.29	1566.85	N.G.
235-48-30	202.71		+6.51	1569.07	N.G.

CONTINUED
T AT TRAV. POINT #2
HI = 1561.20

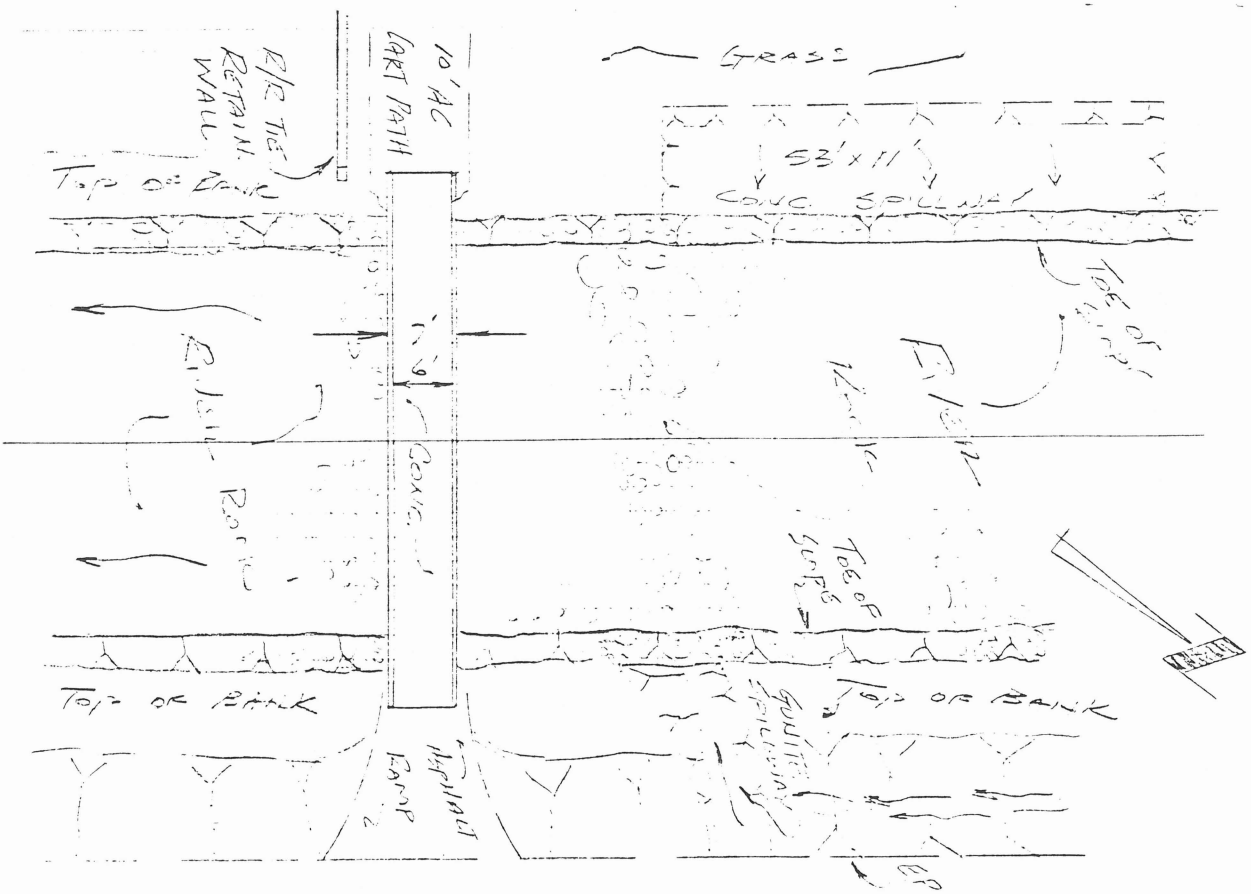
ANGLE RT	DIST.	TARGET	DE.	ELEV.
164-53-20	134.43	8.64	+2.21	1554.77
171-01-20	131.55		+1.97	1554.53
176-36-20	131.10		+2.53	1555.09
177-11-20	130.57		+2.90	1555.46
178-14.45	131.35		-0.99	1551.57
188-16-40	133.06		-1.86	1550.70
195-35-25	138.00		-1.70	1550.86
195-13-50	139.07		+2.94	1555.50
198-02-40	139.38		+3.23	1555.79
203-59-10	144.12		+3.70	1556.26

WASH 9 CROSS SECTION
+25' SOUTH OF BRIDGE

℄ FOREST ROAD.
E.P.
N.G.
TOP OF BANK (ROCK)
BOTTOM OF WASH
℄ WASH
BOTTOM OF WASH
TOP OF BANK (ROCK)
N.G.
N.T.



LOOKING SOUTH



WASH 9

2-4' x 3' x 36.6'
Box Culvert
Along
Vado Court

6-13-94
R. Alcocer
R. Ayala
M. Venegas

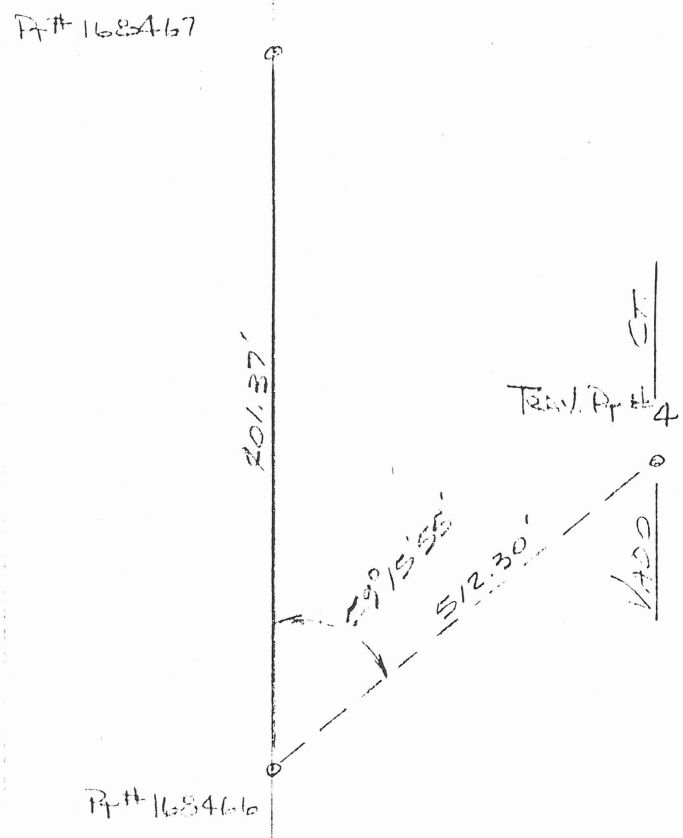
Clear. Not

T AT POINT # 168466
BS. POINT # 168467
00° 00'00" DIST. 401.37'
HI: 5.06 + 1650.64 = 1655.70
TARGET HEIGHT = 8.87'
DE = +2.11

FS TRAV. POINT #4
PK NAIL LT & VADO CT & CULVERT #5
ANGLE RT: =9° 15'55"
DIST = 512.30 TARGET = 5.17
DE = -10.44

HI = 1655.70
DE - 10.44
TARGET - 5.17

TRAV. PT #4 = 1640.09



T AT TRAN. POINT # 4 - ELEV = 1640.09
BS POINT # 1684616
00°00'00" DIST. 512.51'
HI = 4.99 + 1640.09 = 1645.08
FS ℄ BOX CULVERT #1
ANGLE RT = 26° 57' 05"

CENTERLINE WALL PROFILE

ANGLE RT	DIST.	TARGET	DE	ELEV.	
20-04-15	71.92	4.84	-2.51	1637.73	℄ WALL W/ CURB RT. RAIL
27-17-20	40.70		-3.28	1636.56	" " " " "
27-43-45	22.90		-4.45	1635.19	TOP OF GRADE BREAK
27-43-00	22.0		-4.96	1635.28	BOTTOM " "
26-57-05	19.70	8.64	-1.25	1635.19	F.L. BOX CULVERT
26-57-05	18.06	4.84	+0.74	1640.98	TOP HEADWALL
26-57-05	17.17		+0.10	1640.34	PAVEMENT
207-01-10	17.22		-0.27	1639.97	PAVEMENT
207-01-10	17.98		+0.41	1640.65	TOP HEADWALL
207-01-20	18.30	8.64	-1.58	1634.86	F.L. BOX CULVERT
207-02-00	21.60		-1.66	1634.78	BOTTOM OF GRADE BREAK
207-02-00	22.60		-1.12	1635.32	TOP OF "
208-02-15	52.20		-1.53	1634.11	℄ OF WALL

CONTINUED

T AT TRAV. POINT #4

HI. 1645.08

ANGLE RT	DIST	TARGET	DE	ELEV
302-15-20	201.35	4.84	-0.02	1640.22
307-07-05	144.32		+0.92	1641.16
312-14-40	97.65		+1.14	1641.38
321-22-15	51.80		+0.59	1640.83
335-43-00	27.07		+0.28	1640.52
341-30-35	25.25		+0.90	1641.14
2-11-50	21.50		+0.72	1640.96
57-09-20	17.72		+0.76	1641.00
100-21-15	26.80		+0.50	1640.74
104.02-25	28.70		-0.05	1640.19
117-58-35	46.64		+0.06	1640.30
125-22-35	71.60		-0.22	1640.02
130-14-15	119.60		-2.29	1637.95
133-45-45	177.25		-3.54	1636.70
135-45-30	229.38		-0.04	1640.20
137-07-55	290.50		+4.46	1644.70
137-37-00	345.00		+6.19	1646.43

WEST EDGE OF ROAD PROFILE

W. EDGE OF PAVEMT

" " " "

" " " "

" " " "

" " " - END OF CURB

TOP OF CURB AT TRANSITION

S. END OF HEADWALL

N. " " "

TOP OF CURB AT TRANSITION

W. EDGE OF PAVEMT - END OF CURB

W. EDGE OF PAVEMT

CONTINUED

↑ AT TRAV POINT 16.4

HI - 1645.08

ANGLE RT	DIST.	TARGET	D.E.	E.
351-19-25	61.55	4.84	+1.13	1641.37
12-49-50	47.45		-0.44	1639.80
13-03-45	46.9		-3.56	1636.68
25-40-45	42.0		-5.31	1636.93
38-52-20	42.50		-3.51	1636.73
39-33-15	42.60		-0.62	1639.62
46-19-25	43.80		+0.73	1640.97
67-08-40	52.20		+0.58	1640.82
242-14-00	48.20	4.84	-1.13	1639.11
221-12-00	41.70		-2.22	1638.02
220-35-55	41.50		-4.80	1635.44
207-41-55	41.70		-5.10	1635.14
194-34-15	43.25		-4.94	1635.30
194-05-25	43.50		-2.00	1638.24
186-13-10	45.60		-0.57	1639.67
171-17-15	56.1		-0.02	1640.22

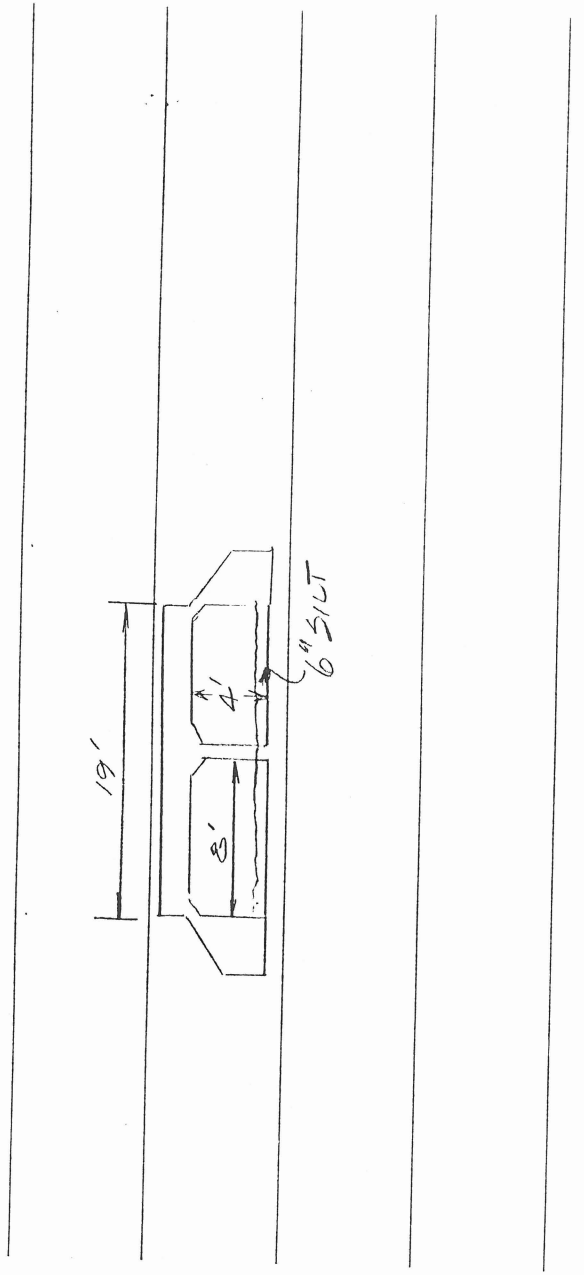
WASH CROSS SECTIONS

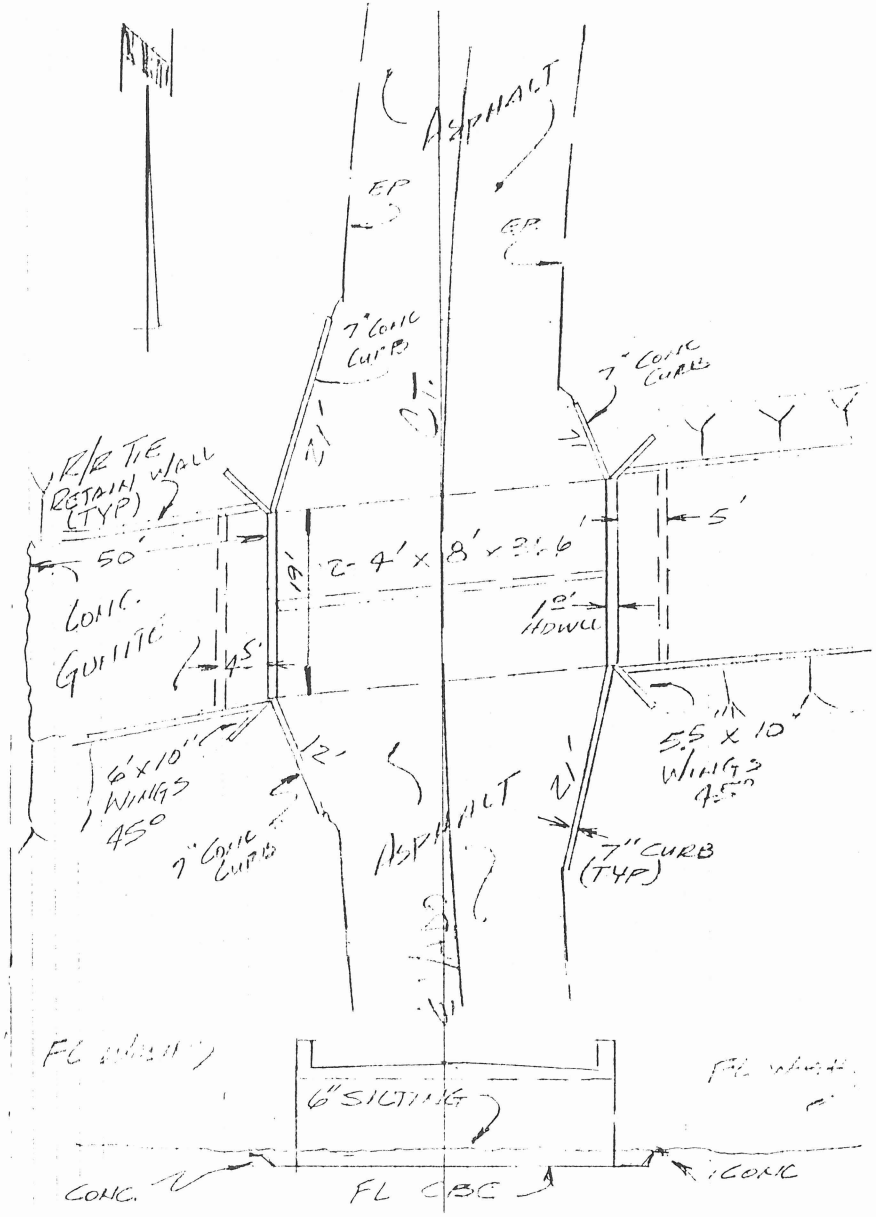
20' WEST OF CULVERT

N.G.
TOP OF R.R. TIE RETAIN. WALL
BOTTOM OF WASH
℄ WASH
BOTTOM OF WASH
TOP OF R.R. TIE RETAIN. WALL
N.G.
N.G.

20' EAST OF CULVERT

NG
TOP RR TIE RETAIN. WALL
BOTTOM OF WASH
℄ WASH
BOTTOM OF WASH
TOP OF RR TIE RETAIN WALL
N.G.
N.G.


19'
4'
9'
6" SILT


ASPHALT
EP
EP
7" CONC CURB
7" CONC CURB
R/R TIE RETAIN WALL (TYP)
50'
CONC. GUTTER
45°
19'
2- 4' x 8' x 3:6
5'
12' HDWL
5.5 x 10' WINGS 45°
6' x 10' WINGS 45°
7" CONC CURB
12'
ASPHALT
7" CURB (TYP)
6" SILTING
CONC.
FL CBC
CONC.

WASH 11

4 - 4' x 10' Box Culvert

ALONG

AGUA VERDE ROAD

6-13-94

CLEAR

HOT

IT AT PANEL POINT # RICH

BS. PANEL POINT # 70

00°00'00" DIST = 975.90' (+17.71)

H.I. = 4.10' + 1584.77 1588.87

D.E. +4.24 TARGET = 4.84

ELEV = 1589.07

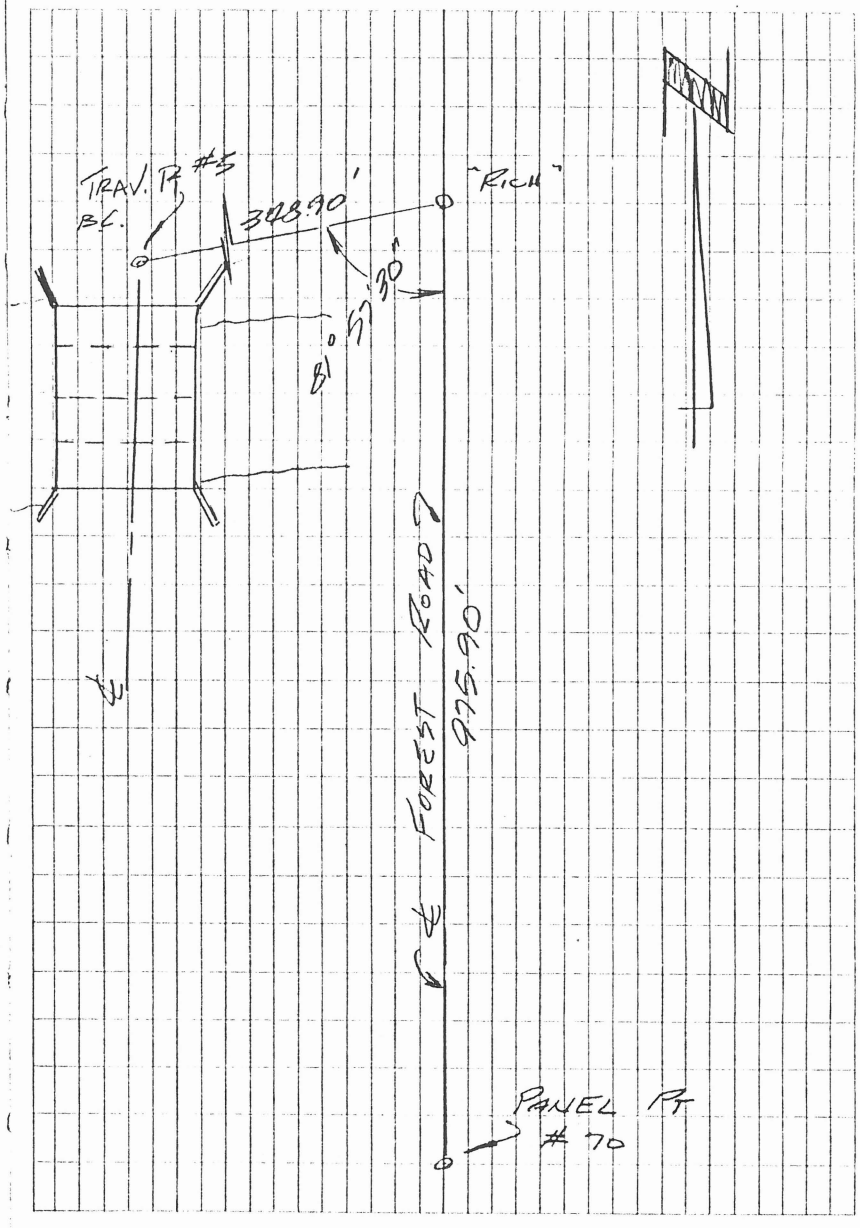
FS TRAV. POINT #5

ANGLE RT = 81°57'30"

DIST = 348.90'

D.E. = +9.86 TARGET = 4.86'

ELEV = 1593.87



T AT TRAN. POINT #5

BS PANEL POINT "RICH"

00°00'00" DIST: 348.71'

TARGET = 4.84'

HI = 5.34' + 1593.81 = 1599.21

ANGLE RT	DIST	TARGET	VE	ELEV.	
111-29-30	229.20	4.84	+1.13	1595.55	TOP OF ROLL CURB
109-03-50	182.93		+0.80	1595.17	"
107-32-30	141.15		+0.62	1594.99	TOP OF CURB @ TRANSITION
107-32-25	138.70		+0.40	1594.77	BEGIN DEPRESSED CURB (SPILLWAY)
107-20-40	92.0		+0.29	1594.08	DEPRESSED CURB "
108-09-35	75.90		+0.33	1594.10	END DEPRESSED CURB "
110-14-00	75.50		+0.26	1594.63	SW COR. CULVERT (TOP
125-16-05	34.15		+0.10	1594.47	NW " " " (SPILLWAY)
121-07-55	32.70		+0.21	1594.58	BEGIN DEPRESSED CURB "
232-03-00	23.50		+0.12	1594.59	END " " "
238-31-50	27.60		+0.67	1595.04	TOP OF CURB @ TRANSITION
259-37-05	72.30		+0.72	1595.09	TOP OF ROLL CURB
264-32-55	120.0		+0.81	1595.18	
266-36-15	169.50		+0.89	1595.26	
267-45-25	218.50		+1.02	1595.39	
268-33-15	268.0		+1.13	1595.50	
269-25-15	316.31		+1.42	1595.79	
271-25-35	413.50		+1.97	1596.34	

WEST TOP OF CURB

CONTINUED

HI = 1593.21

ANGLE	RT	DIST	TARGET	DE	ELEV	
155-54-05		98.50	4.87	-2.54	1591.83	CONTINUED W/SH
129-43-25		60.80		-3.62	1589.55	Top of River Rock
117-05-45		55.35		-4.72	1588.65	F.L. Box Culvert
114-47-55		55.13		+0.16	1594.53	Top of Box Culvert
96-05-15		52.45		-0.10	1593.27	℄ Road
77-46-15		56.56		-0.63	1593.74	Top of Box Culvert
75-11-30		51.70		-5.55	1588.32	F.L. Box Culvert
41-16-40		83.0		-7.63	1588.74	Top of River Rock

CONTINUED

HI = 1599.21

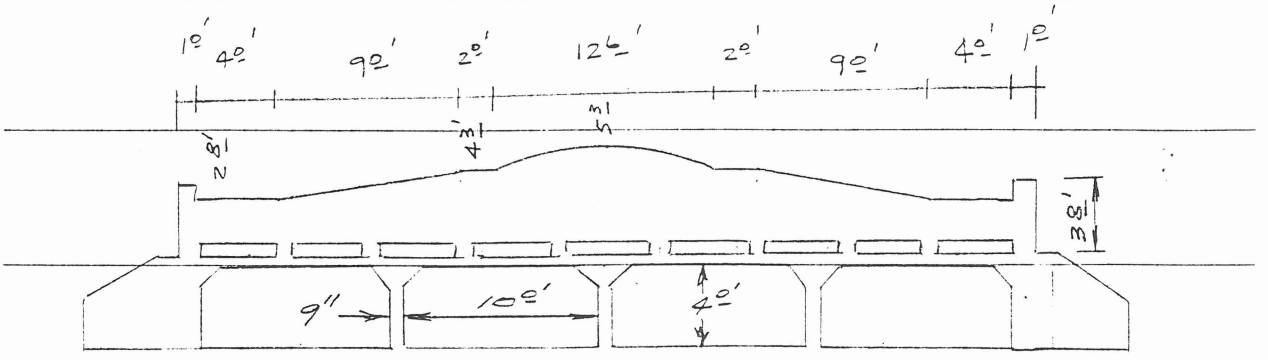
WASH CROSS SECTIONS

EAST OF BOX CULVERT

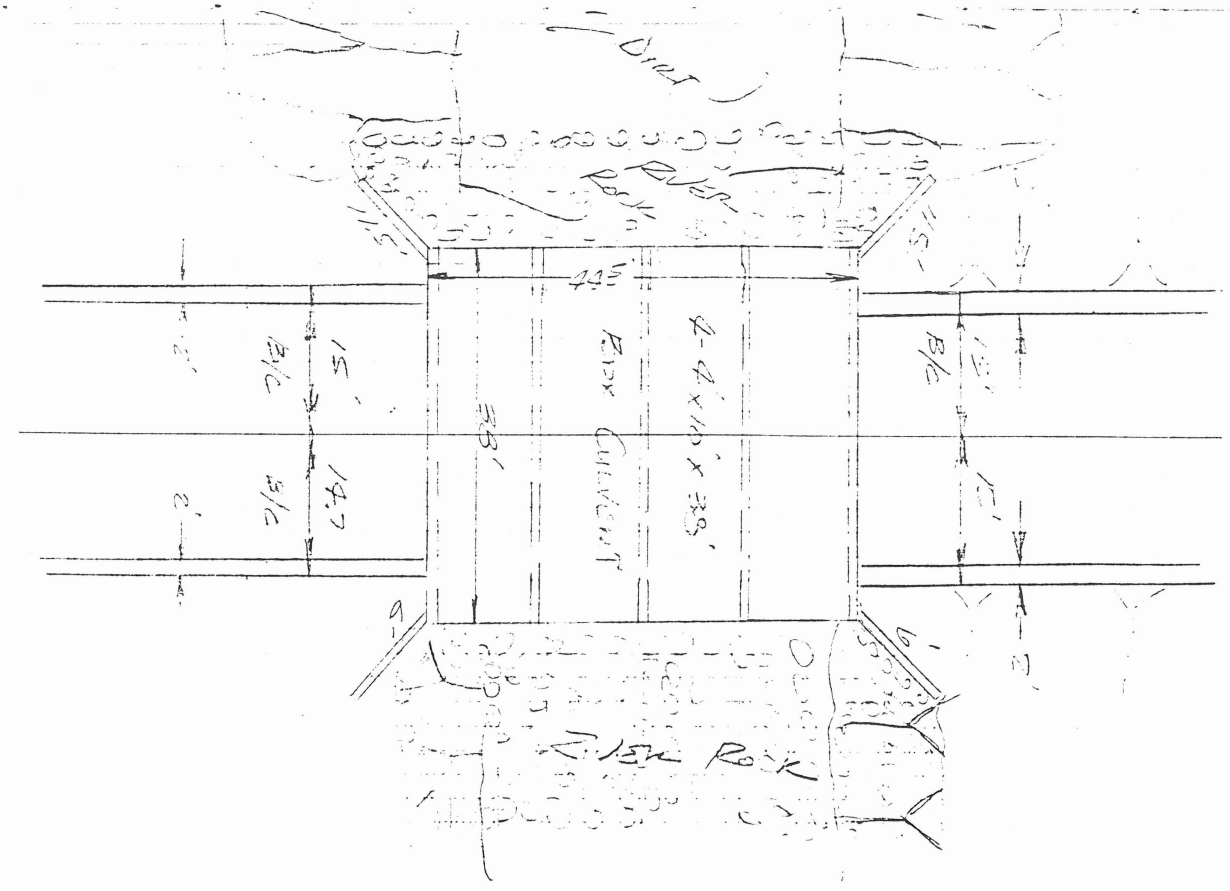
ANGLE RT	DIST	TARGET	DE.		
353-24-20	48.30	4.84	-3.85	1590.52	N.G.
24-36-45	51.30		-3.87	1590.50	Top of BANK (N.G)
26-36-35	52.10		-4.20	1590.17	Top of River Rock
42-41-15	60.0		-8.64	1585.73	Bottom of WASH
56-21-25	70.0		-9.16	1585.21	℄ WASH
62-11-55	83.50		-8.40	1585.97	Bottom of WASH
66-41-15	95.10		-4.46	1589.91	Top of River Rock
66-56-55	98.50		-3.66	1590.71	Top of BANK (NG)
73-38-35	124.40		-7.52	1591.85	N.G.

WEST OF BOX CULVERT

191-37-55	52.70	4.84	-1.20	1593.17	Top of BANK (N.G)
160-02-05	60.20		-3.38	1590.99	TOE of SLOPE
144-13-40	74.4		-3.85	1590.52	℄ of WASH
139-06-15	81.0		-3.69	1590.68	TOE of SLOPE
129-14-45	104.50		-1.12	1593.25	Top of BANK
124-50-35	126.0		-0.24	1594.13	N.G.



NOTE: 9 - 8" x 48" DRAIN OPENINGS



Wright P

2 @ 4' x 3' x 24'

Box Culvert

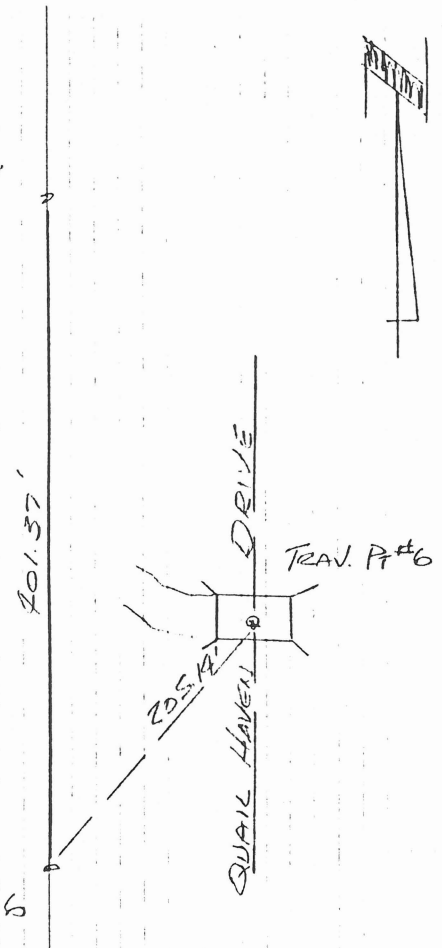
along

Quail Haven Drive

T AT POINT # 1683466
BS. POINT # 1683467
00° 00' 00" DIST = 401.37'
HI = 490 + 1650.64
TARGET HEIGHT = 8.46
D.E. = + 2.04

FS. TRAV POINT # 6
"PK" NAIL AT ℄ QUAIL HAVEN DR.
℄ BOX CULVERT AT WASH 7

ANGLE RT. 47° 45' 20"
DIST = 205.14'
TARGET HEIGHT = 8.46
D.E. = 1.14
ELEV = 1645.64



T AT TRAV. POINT #6
BS. POINT # 16834-66
20° 00' 00" DIST: 401.37
HI: 5.03 + 1645.62 = 1650.67
F.S. ℄ OF BOX CULVERT
ANGLE RT: 27° 11' 25 - ℄ CULVERT
DIST. 18.20

ANGLE RT	DIST.	TARGET	DE.	ELEV	CENTERLINE OF WASH
55-33-55	140.07	4.84	-0.45	1645.38	
43-33-20	85.90	(	-1.80	1644.03	Beg Conc. Rip Rap
34-05-55	56.30	(	-3.03	1641.00	" " "
34-05-55	23.50	(	-.451	1641.32	Top of Conc G.B.
34-05-55	22.7	(	-5.01	1640.82	F.L. Conc. G.B.
27-11-25	19.20	8.64	-1.25	1640.78	F.L Box Culvert
27-11-25	18.20	4.64	+.010	1646.79	℄ Headwall
27-11-25	17.13	(	+.001	1695.90	Pavmt
207-07-35	17.00	(	-.021	1645.62	"
207-07-35	17.96	(	+0.36	1646.19	℄ Headwall
207-07-35	18.60	8.64	-1.62	1640.41	F.L Box Culvert
208-00-00	21.40	4.64	-.543	1640.40	F.L Conc. G.B.
208-00-00	22.50	(	-4.94	1640.89	Top Conc. G.B.
201-16-00	52.15	(	-4.73	1641.10	℄ Wash
206-34-25	108.0	(	-.535	1641.13	"

CONTINUED

HI = 1650.67

ANGLE RT	DIST	TARGET	DE	ELEV
307-25-35	163.83	4.84	+0.39	1646.22
313-52-25	119.20		+1.22	1647.05
321-18-25	72.00		+1.29	1647.12
337-59-30	28.20		+0.44	1646.27
342-44-00	26.50		+1.04	1646.87
3-30-55	21.90		+0.73	1646.56
57-24-10	17.70		+0.67	1646.50
102-56-45	26.10		+0.44	1646.27
106-27-00	28.07		-0.20	1645.62
124-22-20	76.80		-0.35	1645.48
127-52-20	129.0		+0.63	1646.46
128-59-25	177.50		+0.43	1646.26
129-46-30	228.50		-0.48	1645.35

WEST SIDE OF ROAD

W. EDGE PAVEMT

BEG. CONC. CURB

TOP CURB · TRANSITION

S. EDGE · TOP OF HEADWALL

N. EDGE " "

TOP CURB · TRANSITION

W. EDGE PAVEMT

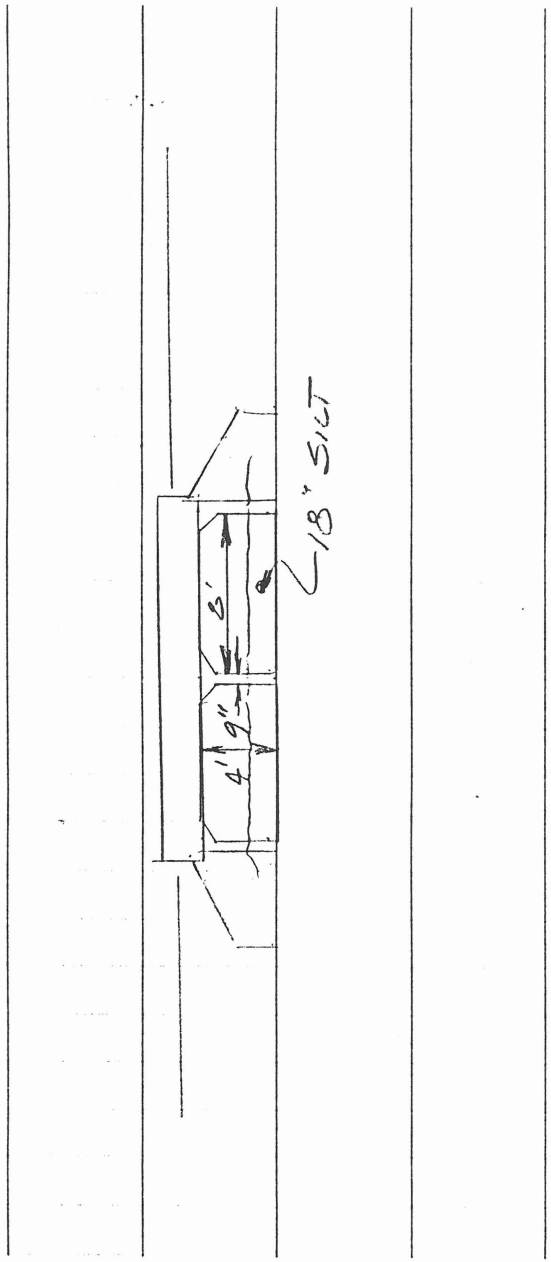
CONTINUED

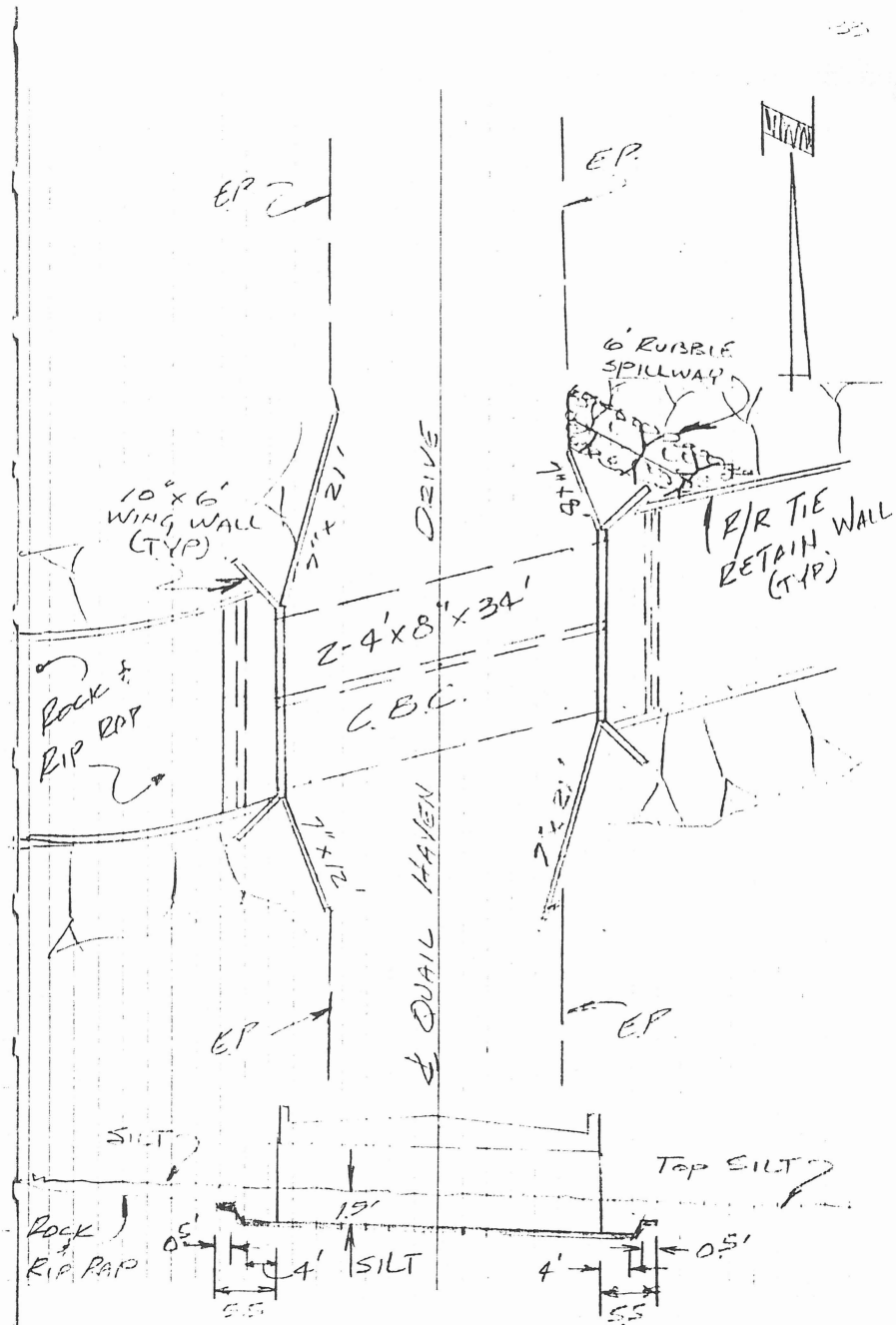
HI = 1650.67

ANGLE RT	DIST	TARGET	D.E.	ELEV.	
67-15-55	25.3	4.84	+0.14	164591	X.G
56-07-05	40.2		+0.07	164590	N.G
50.49 30	28.70		-0.77	164484	N.G.
47-23-40	38.4		-1.03	164460	Top R/R Tie Retain Wall
47-04-20	38.4		-3.33	164250	Bottom of Wash
30-18-35	36.8		-3.34	164297	℄ Wash
14-37-20	38.2		-3.54	164349	Bottom of Wash
13-47-50	37.7		-0.34	164599	Top R/R Tie Retain Wall
6-20-50	40.0		+0.28	164611	
351-30-55	50.40		+0.48	164631	
240-08-50	41.00	4.84	-1.13	164470	N.G.
221-21-45	41.30		-2.28	164395	Top R/R Tie Retain Wall
221-04-55	41.20		-4.27	164156	Bottom Wall
207-44-15	40.50		-4.79	164504	℄ Wash
192-23-10	42.0		-4.33	164150	Bottom Wash
193-26-10	42.0		-2.42	164341	Top R/R Tie Retain Wall
185-12-50	42.80		-2.12	164370	N.G.
176-49-30	50.0		-1.52	164431	N.G.

WASH CROSS SECTIONS
20' WEST SIDE OF CULVERT

20' EAST SIDE OF CULVERT


18" SILT
3'
4'
9"

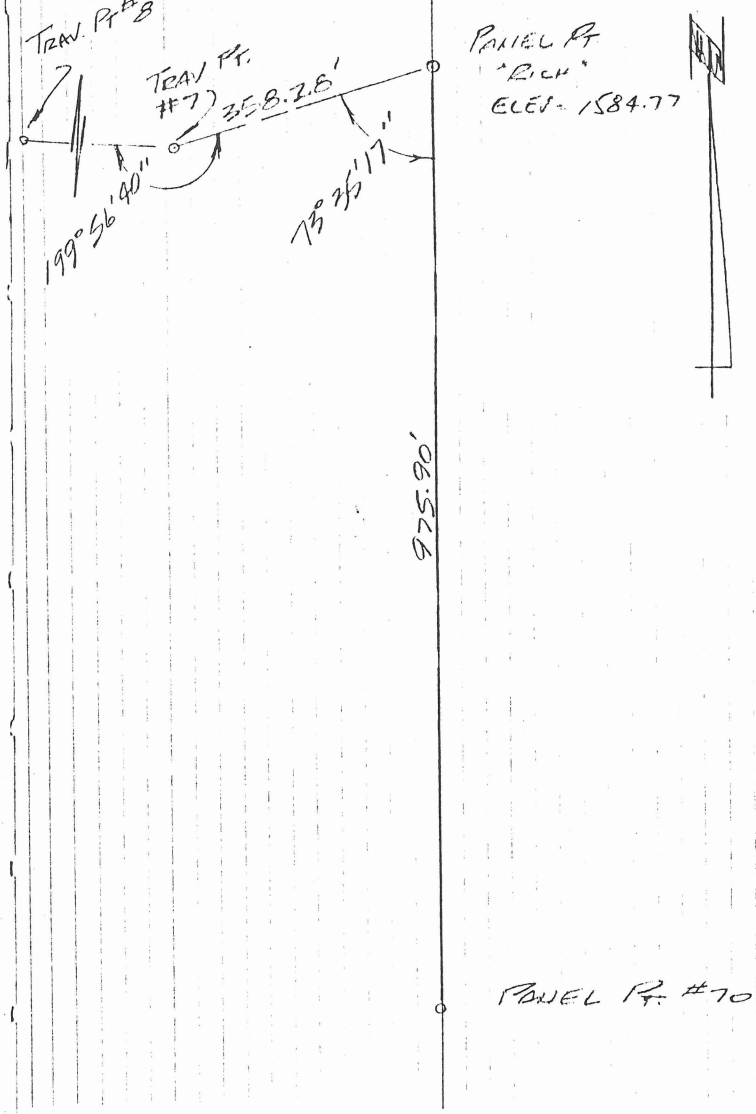

EP
EP
6' RUBBLE SPILLWAY
10' x 6' WING WALL (TYP)
1:1 x 21'
9'±
R/R TIE RETAIN. WALL (TYP)
DRIVE
2-4'x8"x34' C.B.C.
ROCK & RIP RAP
7'±
7'x12'
QUAIL HAVEN
EP
EP
SILT
Top SILT
ROCK & RIP RAP
0.5'
1.5'
4'
SILT
4'
0.5'
5.5
5.5

WASH 11

TRAVERSE TO POINT #10
ALONG AQUILA ROAD

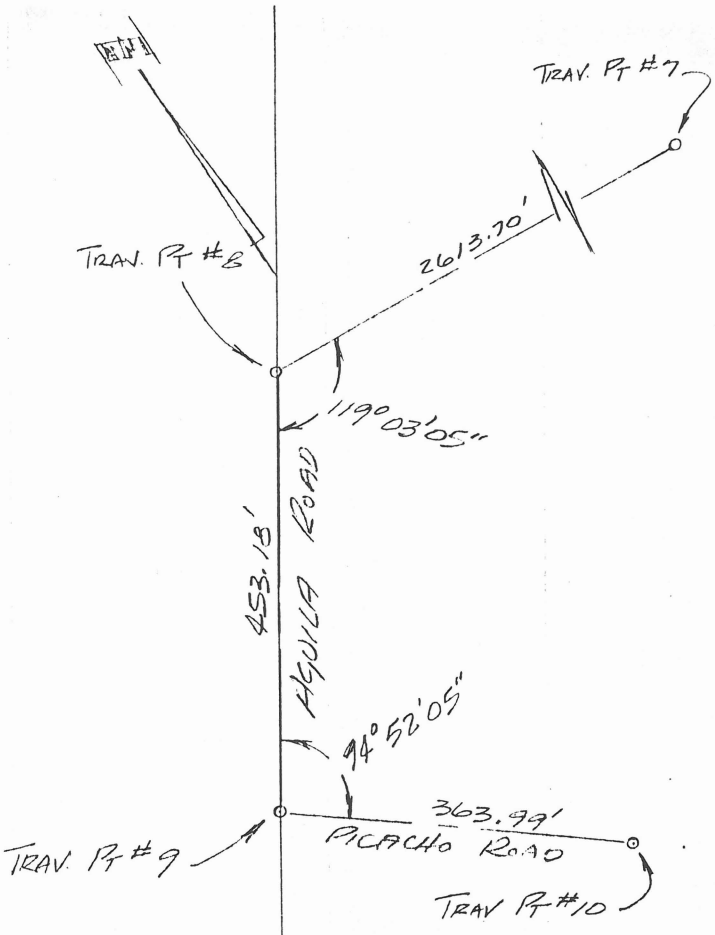
T AT PANEL POINT "RICH"
BS PANEL POINT #70 DIST = 975.90'
HI 4.87 + 1584.77 = 1589.64
FS TRAV. POINT #7
ANGLE RT = 73° 35' 17 TARGET = 4.86
DIST 358.28' DE = + 9.94

T AT TRAV. POINT #7
BS PANEL POINT "RICH"
HI = 4.90 + 1594.22 = 1599.12
FS TRAV. POINT #8
ANGLE RT = 199° 56' 40"
DIST = 2612.70'
TARGET = 6.78'
DE = + 59.41
ELEV = 1532.73



T AT TRAV. POINT # 8
B.S. TRAV. POINT #7
00° 00' 00"
HI = 5.06 + 1532.73 = 1537.79
F.S. TRAV. POINT #9
ANGLE RT = 119° 03' 05"
DIST = 453.18'
TARGET = 4.84'
DE = + 3.89'
ELEV = 1536.84

T AT TRAV. POINT #9
B.S. TRAV. POINT #8
00°00'00"
HI = 5.15 + 1536.84 = 1541.99
F.S. TRAV. POINT #10
ANGLE RT = 94°52'05"
DIST = 363.99'
TARGET = 4.84'
DE = - 7.70
ELEV = 1529.95



WASH 11 TRIBUTARY
(NOT A STUDY WASH)
3- 28" x 40' CMP
AT
AGILA ROAD & PICACHO ROAD

T. AT TRAV. POINT #9
BS. TRAV. POINT #8
=0°00'00"
HI. 5.16 + 1536.84 = 1542.00

ANGLE RT	DIST.	TARGET	DE	ELEV
181-56-15	236.8	4.84	+2.33	
182-57-45	195.58		+1.40	
183-30-00	173.50		+1.27	
185-20-50	123.39		+0.98	
189-31-40	74.13		+0.66	
200-19-00	37.35		+0.48	
201-15-55	35.40		+0.14	
203-46-15	32.0		+0.15	
205-36-35	30.14		+048	
334-07-20	28.25		+0.32	
352-26-55	27.3		+0.14	
356-35-45	129.54		-0.20	
358-17-50	181.7		-0.87	
359-15-35	232.4		-1.52	

TOP OF WEST CURB

NAT'L GROUND
T.C. BEG. CURB
T.C.

F.L. DEPRESSED CURB
F.L. " "
T.C.

CONTINUED

HI = 1542.00

ANGLE RT	DIST.	TARGET	DE	ELEV
257-43-50	100.6	4.84	-1.42	
233-00-25	45.4	4.84	-3.13	
231-54-20	35.9	8.64	+0.71	
227-03-15	38.2	〉	+0.68	
222-55-10	40.8		+0.60	
226-34-25	37.9	4.84	+1.06	
225-10-50	37.2		+0.43	
206-55-45	28.28		+0.47	
204-52-50	27.51		+0.16	
179-48-50	24.11		-0.15	
151-50-04	26.36		-0.64	
149-27-55	27.26		-0.30	
125-31-20	57.35		-1.20	
124-07-50	38.60		-0.16	
118-15-45	36.50		-4.28	
123-39-10	38.86		-4.35	
127-45-35	41.28		-4.36	
117-23-45	46.18		-4.41	
101-05-15	94.4		-4.90	
99-48-50	104.0		-5.37	

℄ PROFILE WASH II

℄ 6' Bottom WASH
F.L. CONC.
F.L. N. CMP (INLET)
FL CENTER CMP "
FL S. CMP "
CENTER HEADWALL (TOP)
N.G.
TOP CURB
GUTTER
℄ ROAD
GUTTER
TOP CURB
N.G.
CENTER HEADWALL - (TOP)
F.L. N. CMP (OUTLET)
FL CENTER CMP
FL S. CMP
FL CONC
℄ 6' Bottom WASH TOP RIVER ROCK
℄ " " " DIRT

CONTINUED

HI = 1542.00

ANGLE RT	DIST	TARGET	DE	ELEV
85-53-20	56.85	4.84	-1.51	
97-11-25	58.70		-1.73	
98-34-00	58.70		-1.43	
100-48-20	59.8		-1.96	
105-22-30	61.6		-4.62	
108-28-30	63.3		-4.30	
112-03-20	65.15		-4.40	
117-05-00	67.65		-2.01	
127-48-50	79.2		-2.35	
257-01-35	45.3		+0.27	
249-14-35	47.2		+0.60	
242-04-20	50.21		-2.50	
239-23-40	53.4		-2.82	
236-03-45	55.0		-2.71	
230-44-15	58.8		+0.50	
219-42-55	71.2		+0.66	

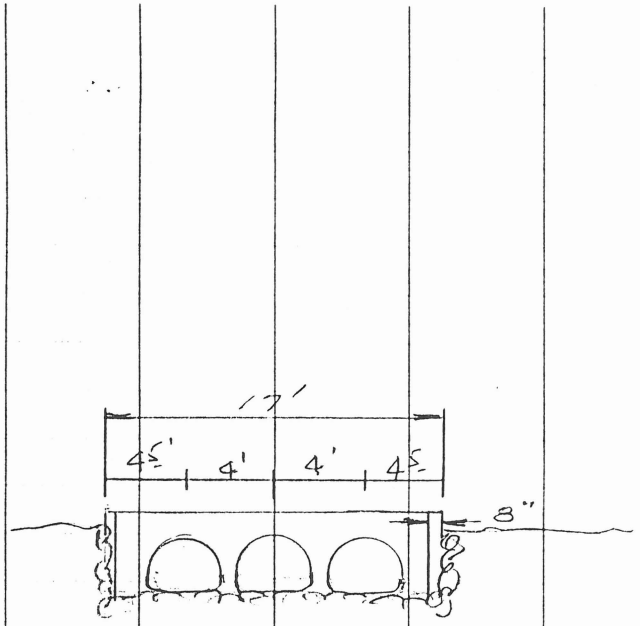
WASH CROSS SECTIONS

20' EAST SIDE of CULVERT

℄ ROAD
GUTTER
TOP CURB
TOP of BANK
BOTTOM WASH (RIVER ROCK)
& WASH
BOTTOM WASH (RIVER ROCK
TOP of BANK
N.G.

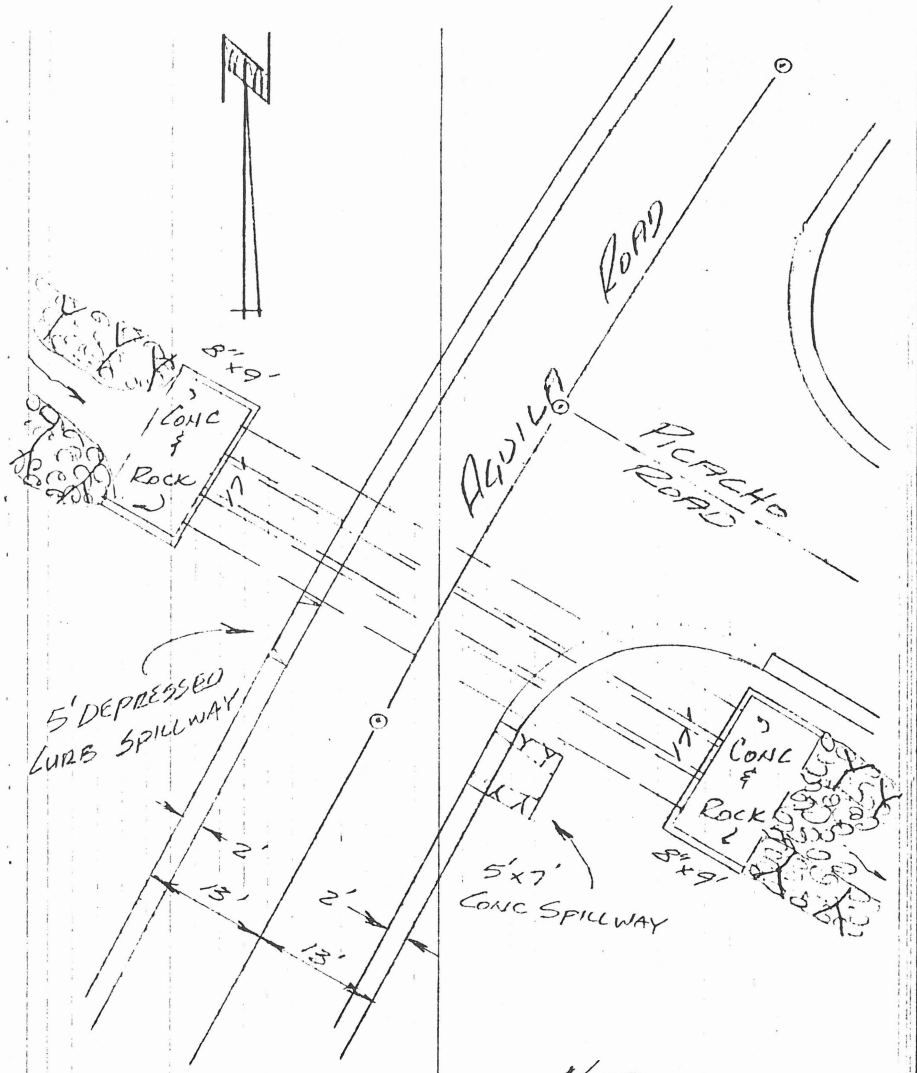
20' WEST SIDE of CULVERT

N.G.
TOP of BANK
BOTTOM WASH (RIVER ROCK)
& WASH
BOTTOM WASH (RIVER ROCK)
TOP of BANK
NG



3- 28" x 40' CMP's

STRUCTURE IS STUCCO MASONRY BLOCK



NOTE
HEADWALL @ 8" STUCCO MASONEY BLOCK

WASH 11 TRIBUTARY
(NOT A STUDY WASH)

CULVERTS @ NORTH END
AVENIDA DEL REY

AT: TRAV POINT #10

BS. TRAV. POINT #9

00°00'00"

HI = 4.97 + 1529.45 = 1534.42

ANGLE RT	DIST	TARGET	DE	ELEV.
10-24-55	89.5	4.84	-1.52	
1-54-35	72.8		-3.02	
18-00-10	15.8		-3.13	
1-51-10	15.2		-3.17	
347-08-20	15.6		-3.02	
1-35-40	14.75		+1.04	
1-03-00	14.9		-0.25	
1-43-25	7.70		-0.07	
181-15-10	7.63		-0.28	
181-15-10	14.3		-0.64	
181-15-10	14.84		+0.44	
166-03-25	15.72		-3.80	
181-15-10	15.21		-3.80	
196-55-45	15.80		-3.74	
180-42-30	37.45		-4.00	
177-24-55	75.0		-4.55	

CENTER OF WASH PROFILE

CENTER WASH

" " BEG CONC RIP RAP

F.L. N CMP

F.L. CENTER CMP

F.L. S. CMP

CENTER HEADWALL (TOP)

N.G.

W. EDGE CONC. CART PATH

E. " " "

N.G.

CENTER HEADWALL (TOP)

FL N CMP

FL CENTER CMP

FL S CMP

CENTER WASH END CONC RIP RAP

CENTER WASH

CONTINUED

HI = 1534.8

ANGLE RT	DIST	TARGET	DC	ELEV
294-47-05	78.9	484	+2.54	
302-51-20	30.3		+042	
320-13-00	20.1		+0.66	
331-41-00	17.15		+0.26	
332-58.40	16.85		+1.09	
30-56-45	17.05		+1.07	
32-31-35	17.2		-0.07	
47-19-00	20.40		+0.25	
74-33-20	53.30		+0.23	
77-25-10	68.0		-0.17	
79-30-00	81.40		+0.05	
79-30-00	83.16		-0.28	
81-18-35	95.70		-0.14	

CROSS SECTION @ HEADWALL

N.G.

TOP S. EDGE HEADWALL

" N " "

N.G.

W. EDGE GOLF CART

E " "

N.G.

T.C.

GUTTER

& ROAD

CONTINUED

H.I = 1534.82

ANGLE RT	DIST	TARGET	DE	ELEV
48-30-50	47.6	4.84	+0.33	
31-12-25	40.5		-0.01	
18-49-40	39.2		+0.05	
10-27-05	39.7		-2.38	
5-56-40	40.2		-2.53	
2-20-10	40.55		-2.50	
350-36-25	42.3		+0.81	
338-36-15	47.5		+1.25	
202-12-15	53.9	4.84	-0.98	
192-26-20	50.8		-0.44	
184-00-15	50.0		-3.60	
180-55-45	49.85		-4.18	
175-47-15	50.1		-4.02	
166-02-30	49.7		-0.96	
149-24-30	55.6		-1.35	

WASH CROSS SECTIONS

20' WEST SIDE OF CULVERT

NG

NG

TOP NORTH BANK

BOTTOM WASH

℄ WASH

BOTTOM WASH

TOP SOUTH BANK

NG

30' EAST SIDE OF CULVERT

NG

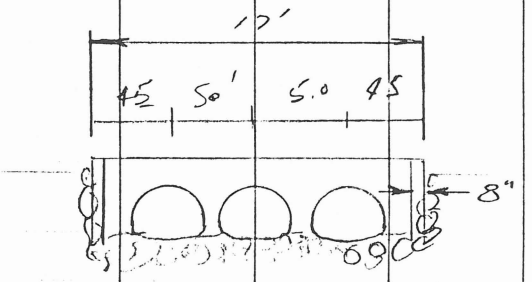
TOP SOUTH BANK

BOTTOM WASH (RIVER ROCK)

℄ WASH

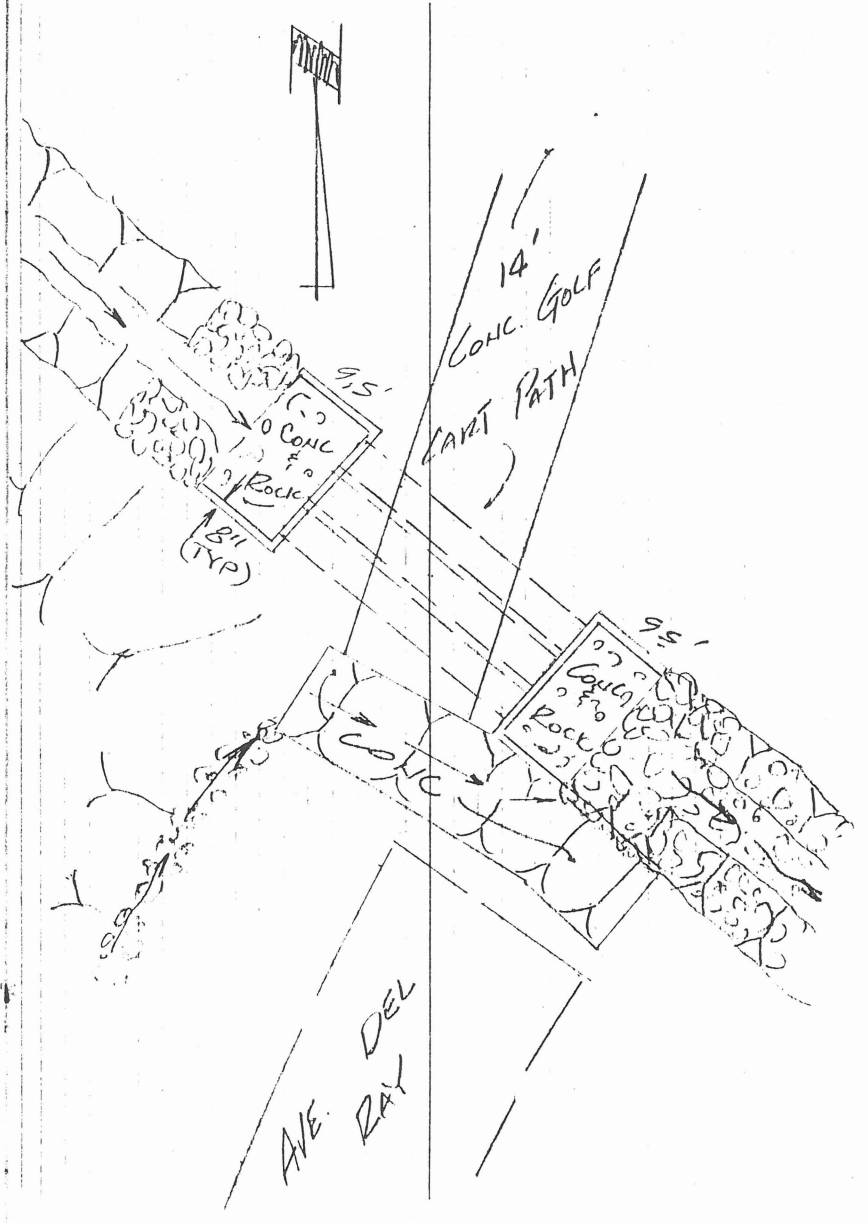
TOP NORTH BANK

NG



3- 40" x 28" CMP's

STRUCTURE IS STUCCO MASONRY BLOCK



ADDITIONAL AERIAL PANEL

3.19.94

R. Alcolea
LA Valley-93

T AT INTERSECTION of FOREST RD & TONTO VERDE DR.

B.S. AERIAL POINT #168470

N: 774399.7774 E: 992516.8753

DIST: 1667.59'

F.S. B.C. AT INTERSECTION TONTO VERDE DR. & CIRCULO DR. (TP#2)

∠ 115-39-25

∠ 462-37-35

M = 115-39-24

DIST = 702.70

N: 776369.812 E: 991877.873

T AT B.C. INTERSECTION TONTO VERDE DR & CIRCULO DR (TP#2)

B.S. INTERSECTION of FOREST RD. & TONTO VERDE DR.

F.S. TRAV. POINT #3 (SET NAIL)

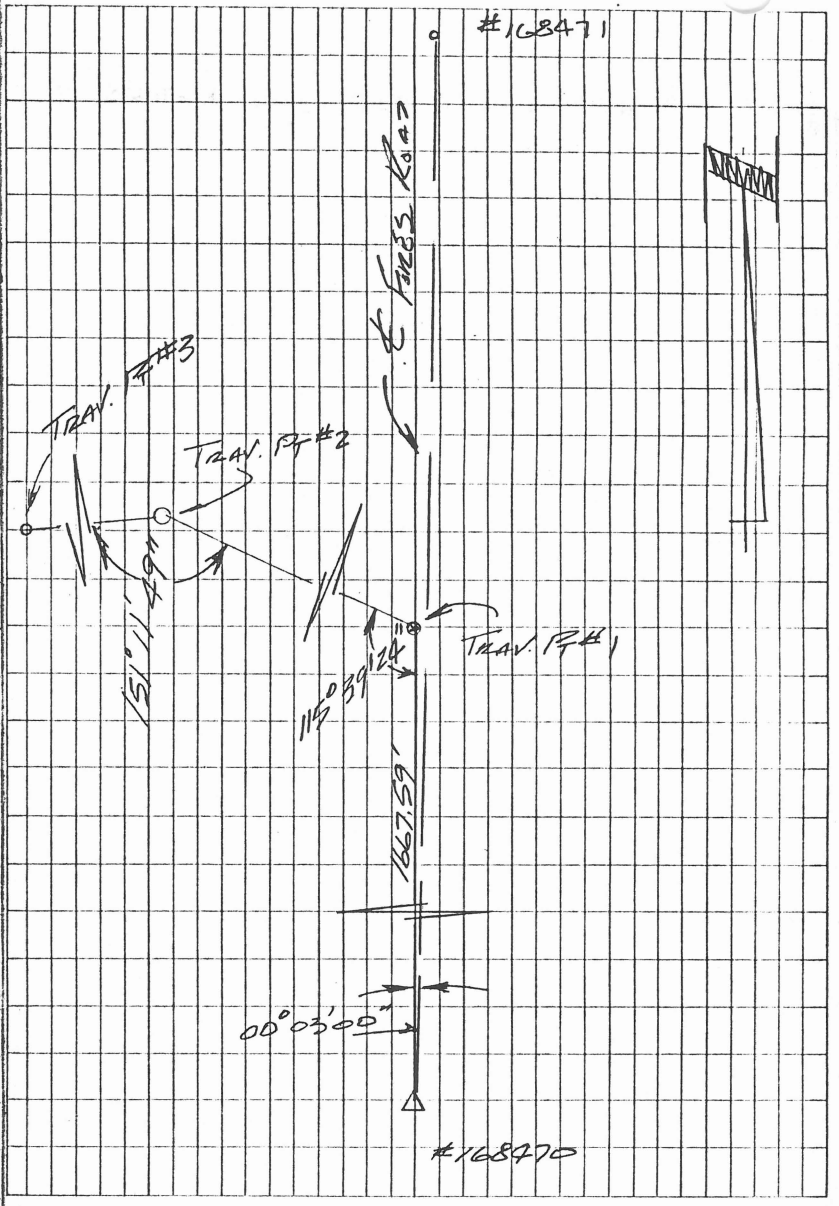
∠ 151-17-55

∠ 605-11-15

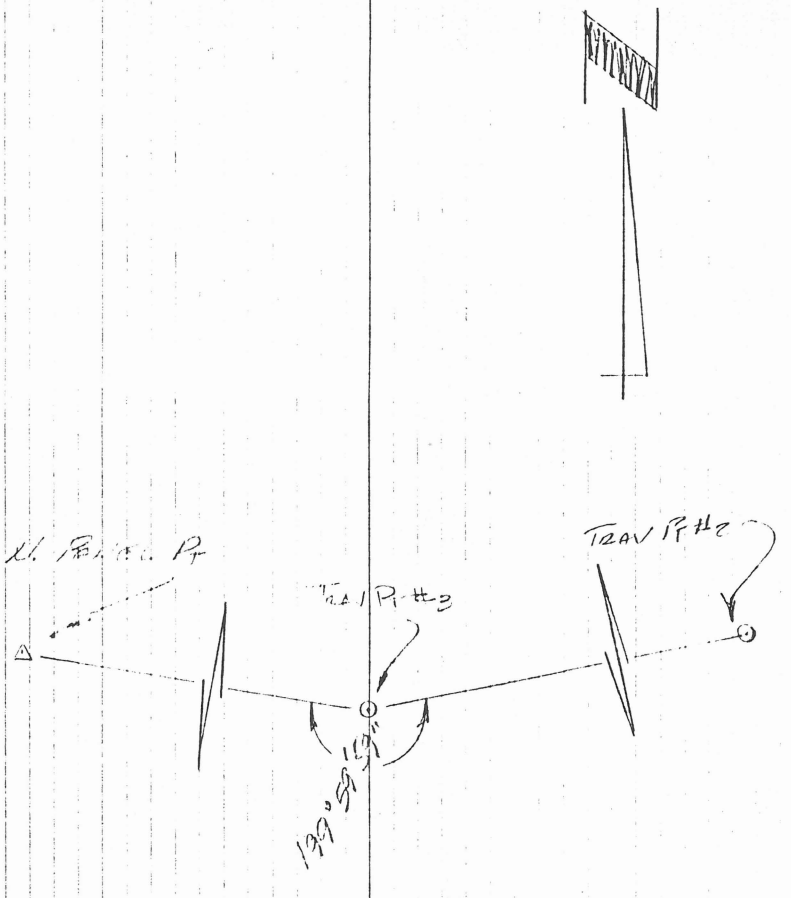
M: 151-11-49

DIST: 1104.19'

N: 776306.085 E: 990775.523



T AT TRAV. POINT #3 (SET NAIL)
BS. INTERSECTION OF TONTO VALLEY DR.
& CIRCULO DR.
FS. NEW PANEL POINT (SET ½" REBAR)
∠ 200-00-00
∠ 199-59-59
∠1 = 199-59-59
DIST = 285.02'
N=776388.807 E=990077.638



STA	+	HI	-	ELEV
#168542				1611.525 ~~1611.725~~
	9.13	1620.855		
T.P.			1.66	1619.245
	8.87	1628.115		
T.P.			1.21	1626.905
	8.13	1635.035		
PANEL PT.			1.24	1633.795 ~~1633.995~~
	RETURN			
	1.64	1635.435		
T.P.			9.41	1626.025
	2.39	1628.415		
TP			9.16	1619.255
	1.24	1620.495		
#168542			8.75	1611.745

FND PANEL POINT 1/2" PIPE

SET 1/2" REBAR

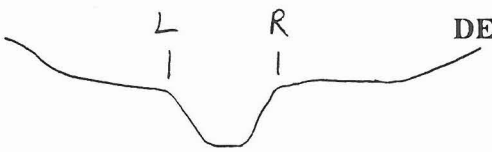
-0.01

NOTE: NEED TO (-) 0.23' DUE TO WRONG STARTING POINT.

Unless otherwise noted, the photographs in Appendix C are arranged in the following sequence:

1 Left Overbank looking upstream or downstream	2 Bed Material
3 Looking upstream or downstream at main channel	4 Right Overbank looking upstream or downstream

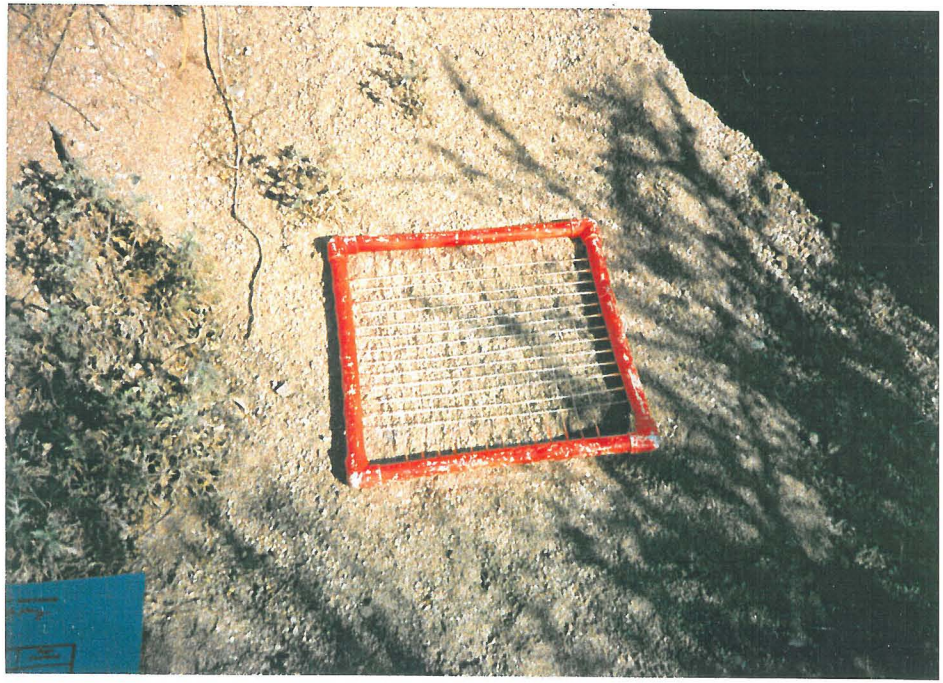
Photograph location and direction are shown on the Exhibit 1 map contained in Appendix C.

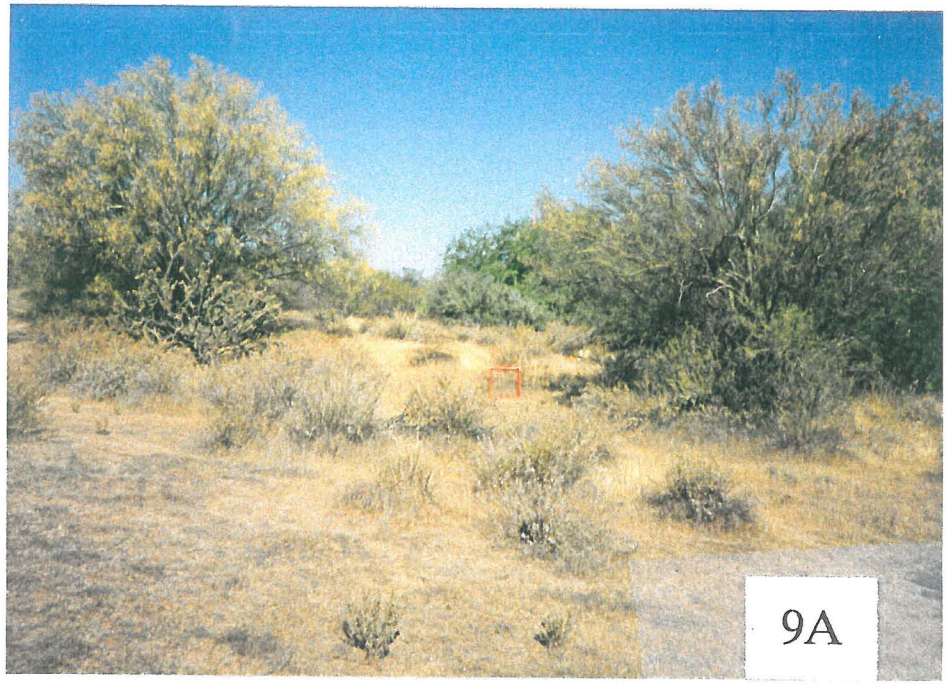


DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

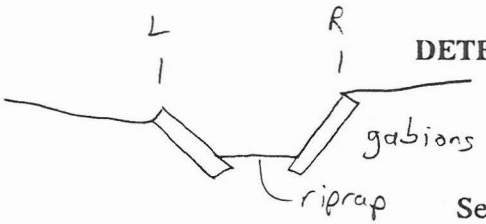
Project: Rio Verde South Flood Delineation Study
Stream: Wash 9
Location: Reach 9A
Photo No.: 9A – 1, 2, 3, 4
Section Description: Incised channel in natural desert. LOB brush, Palo Verde & Mesquite trees, Short grass cover. ROB same as LOB.

Channel Conditions		Manning's n Adjustment		Left Overbank 3/8" gravel	Channel Coarse gravel	Right Overbank gravel
Channel Material		nb		0.030	0.028	0.030
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000	0.0		0.0
	Minor		.001 - .005			
	Moderate		.006 - .010		0.010	
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004		0.0	
	Minor		.005 - .015	0.010		0.010
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.005	
	Medium		.010 - .025	0.025		0.025
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000	0.0		0.0
	Occ. Alt.		.001 - .005		0.002	
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00	1.0	1.0	1.0
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.065	0.045	0.065





9A

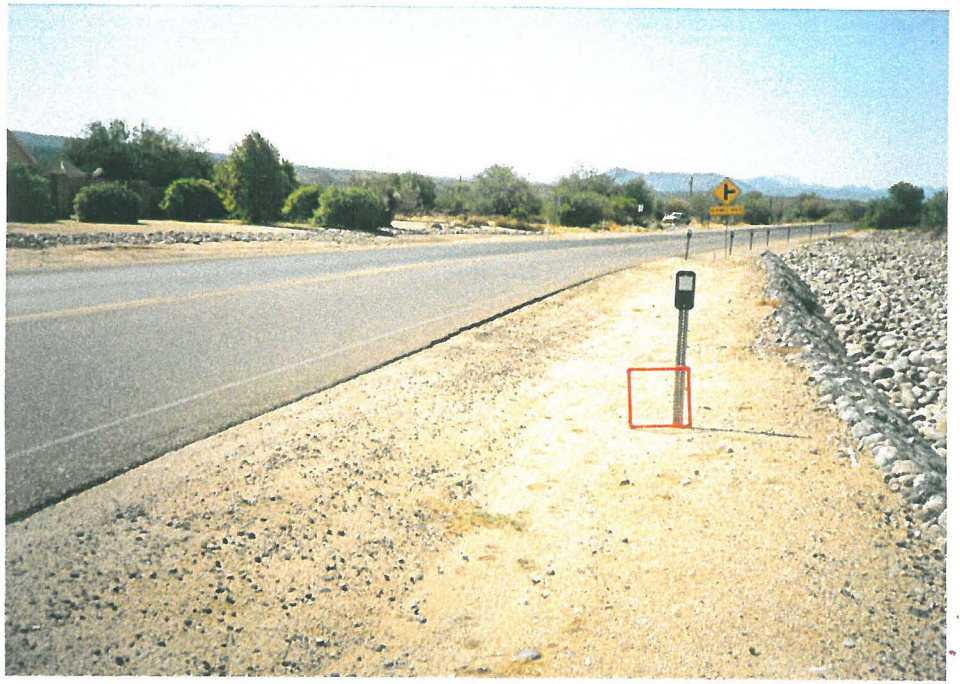


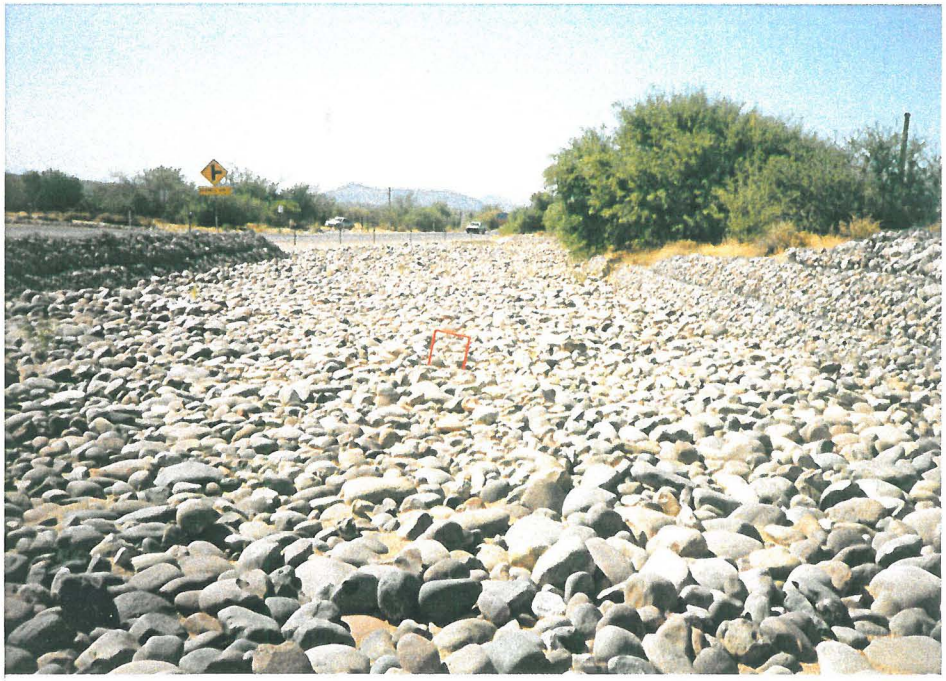
DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

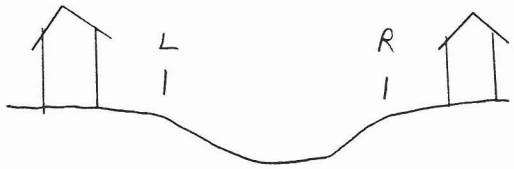
Project: Rio Verde South Flood Delineation Study
Stream: Wash 9
Location: Reach 9B
Photo No.: 9B - 1, 2, 3, 4
Section Description: rip-rap lined channel, LOB is pavement, ROB is desert or golf course

Channel Conditions		Manning's n Adjustment		Left Overbank pavement	Channel d_{50} = 9"	Right Overbank
Channel Material		nb		0.020	0.045	0.030
	Cobble		.030 - .050			
d_{50} = 9"	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000	0.0	0.0	0.0
	Minor		.001 - .005			
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004	0.0	0.0	
	Minor		.005 - .015			0.010
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010	0.0	0.0	
	Medium		.010 - .025			0.025
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000	0.0	0.0	0.0
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00	1.0	1.0	1.0
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.020	0.045	0.065

desert ROB 0.030
golf course ROB







DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

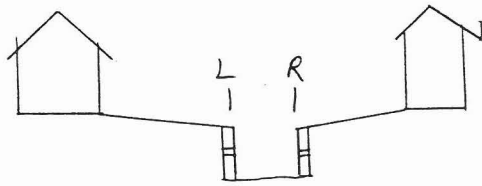
Project: Rio Verde South Flood Delineation Study
Stream: Wash 9
Location: Reach 9C
Photo No.: 9C - 1, 3, 4
Section Description: channel in golf course, LOB is turf, ROB is landscaped backyards, or desert

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	turf	nb		0.030	0.030	gravel 0.028
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000	0.0	0.0	0.0
	Minor		.001 - .005			
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004	0.0	0.0	0.015
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010	0.0	0.0	
	Medium		.010 - .025			0.012
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000	0.0	0.0	0.0
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00	1.0	1.0	
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.030	0.030	0.055

landscaped backyards

same for desert in vacant lots.

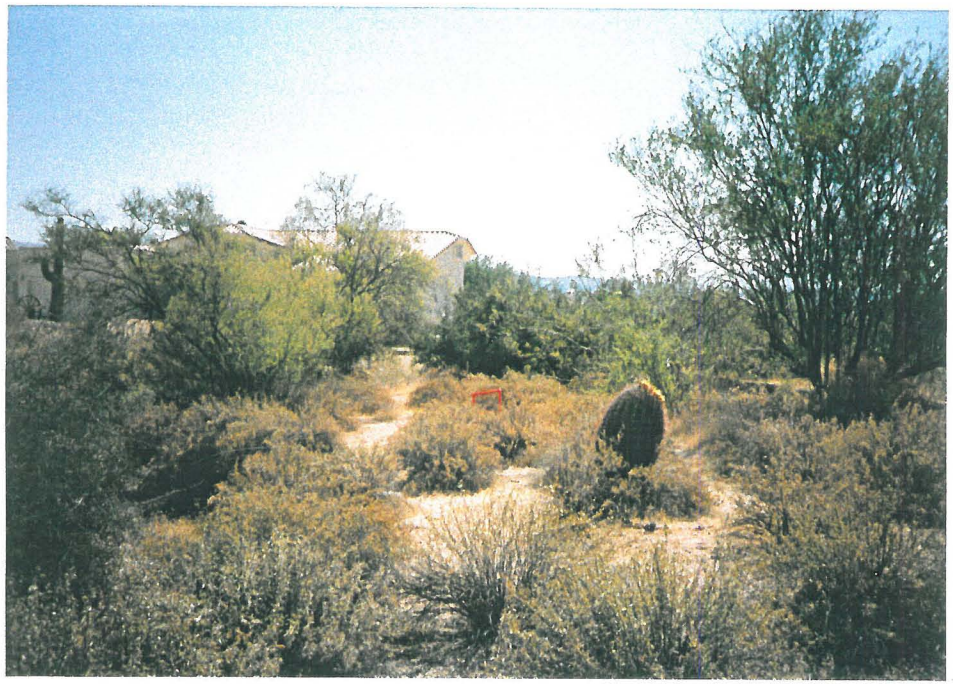
9C



DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde South Flood Delineation Study
Stream: Wash 9
Location: Reach 9D
Photo No.: 9D - 1, 2, 3, 4
Section Description: railroad-tie lined main channel, LOB residential backyards, ROB is backyards, with block walls.

Channel Conditions		Manning's n Adjustment		Left Overbank gravel	Channel Sandy gravel	Right Overbank gravel	Right Overbank
Channel Material		nb		0.030	0.024	0.030	0.030
	Cobble		.030 - .050				
	Boulder		.040 - .070				
Degree of Irregularity	Smooth	n1	.000	0.0	0.0	0.0	0.0
	Minor		.001 - .005				
	Moderate		.006 - .010				
	Severe		.011 - .020				
Effects of Obstruction	Negligible	n2	.000 - .004		0.0		
	Minor		.005 - .015	0.010			0.010
	Appreciable		.020 - .030				
	Severe		.040 - .060			0.060	
Vegetation	Small	n3	.002 - .010		0.006		
	Medium		.010 - .025	0.025		0.020	0.025
	Large		.025 - .050				
	Very Large		.050 - .100				
Variations in Channel Cross Sections	Gradual	n4	.000	0.0	0.0	0.0	0.0
	Occ. Alt.		.001 - .005				
	Freq. Alt.		.010 - .015				
Degree of Meandering	Minor	m	1.00	1.0	1.0		1.0
	Appreciable		1.15				
	Severe		1.30				
n = (nb+n1+n2+n3+n4)m				0.065	0.030	0.110	0.065
				with walls in yards			without walls



9D

DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde South Flood Delineation Study
Stream: Wash 10
Location: Reach 10A
Photo No.: 10A - 1, 2, 3, 4
Section Description: Sandy, gravel bottom, LOB is grass, brush and some cactii. ROB same as LOB

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	gravel + 1-3" rock	nb		0.030	0.030	0.030
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000	0.0		0.0
	Minor		.001 - .005		0.003	
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004		0.003	
	Minor		.005 - .015	0.015		0.015
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.006	
	Medium		.010 - .025	0.025		0.025
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000	0.0		0.0
	Occ. Alt.		.001 - .005		0.003	
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00	1.0	1.0	1.0
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.070	0.045	0.070

10A

DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

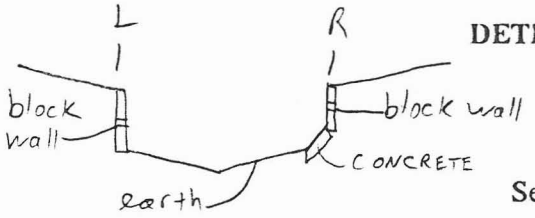
See 10A dwg

Project: Rio Verde South Flood Delineation Study
Stream: Wash 10
Location: Reach 10A where hardpan exists in channel
Photo No.: See Reach 10A description.
Section Description: Some Hardpan is from Forest Road to 950' downstream. Average is 20% of bottom has hardpan.

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel hardpan	Right Overbank
Channel Material		nb			0.020	
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000			
	Minor		.001 - .005		0.003	
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004		0.003	
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.007	
	Medium		.010 - .025			
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000			
	Occ. Alt.		.001 - .005		0.003	
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00		1.0	
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m					0.036	

See 10A

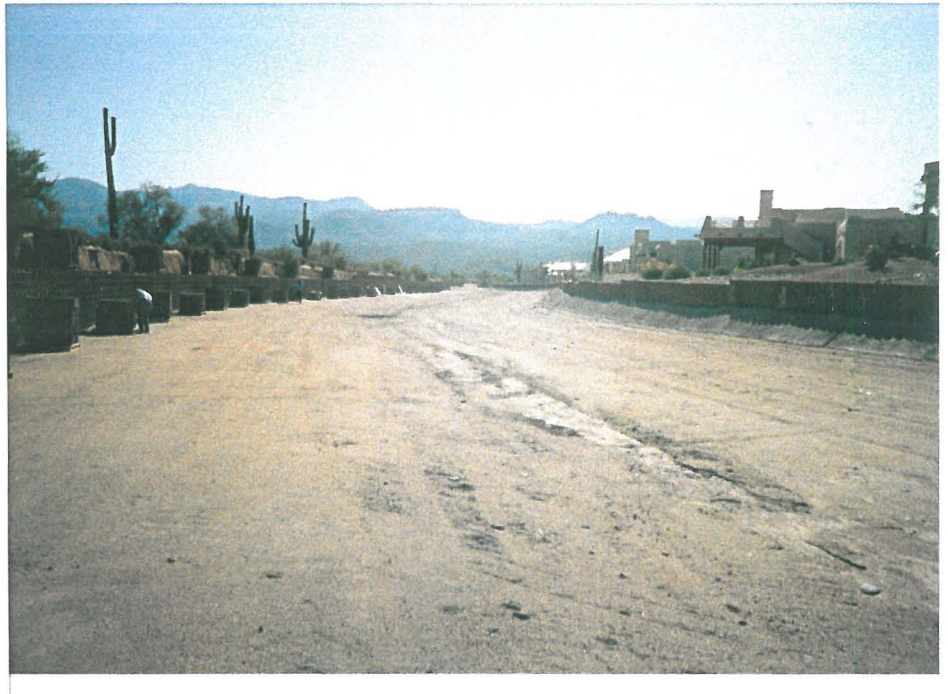
See 10A



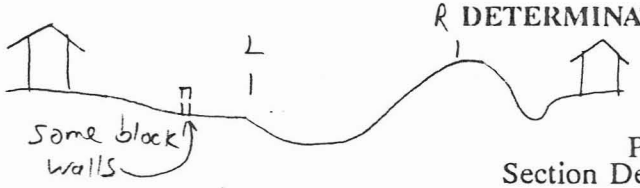
DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde South Flood Delineation Study
Stream: Wash 10
Location: Reach 10B (channelized)
Photo No.: 10B-1, 2, 3, 4
Section Description: Channelized earth lined channel, ROB is landscaped back yards, LOB is natural desert (Soon to be developed).

Channel Conditions		Manning's n Adjustment		Left Overbank gravel	Channel Sandy gravel	Right Overbank gravel
Channel Material		nb		0.030	0.024	0.030
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000	0.0	0.0	0.0
	Minor		.001 - .005			
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004		0.0	
	Minor		.005 - .015	0.010		0.010
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.006	
	Medium		.010 - .025	0.015		0.010
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000	0.0	0.0	0.0
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00	1.0	1.0	1.0
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.055	0.030	0.050



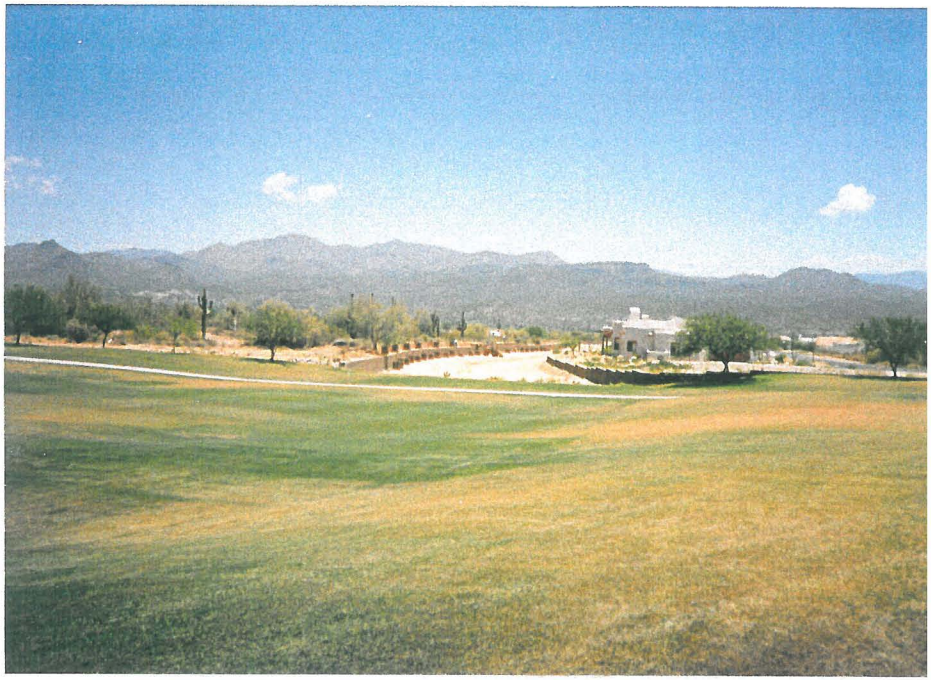
10B



DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde South Flood Delineation Study
Stream: Wash 10
Location: Reach 10C
Photo No.: 10C - 1, 2, 3, 4
Section Description: turf main channel, LOB and ROB is landscaped back yards. Some landscaping is natural desert

Channel Conditions		Manning's n Adjustment		Left Overbank Coarse gravel	Channel turf	Right Overbank Coarse gravel
Channel Material		nb		0.030	0.030	0.030
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000	0.0	0.0	0.0
	Minor		.001 - .005			
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004		0.0	
	Minor		.005 - .015			
	Appreciable		.020 - .030	0.010		0.010
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.0	
	Medium		.010 - .025	0.025		0.025
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000	0.0	0.0	0.0
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00	1.0	1.0	1.0
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.065	0.030	0.065



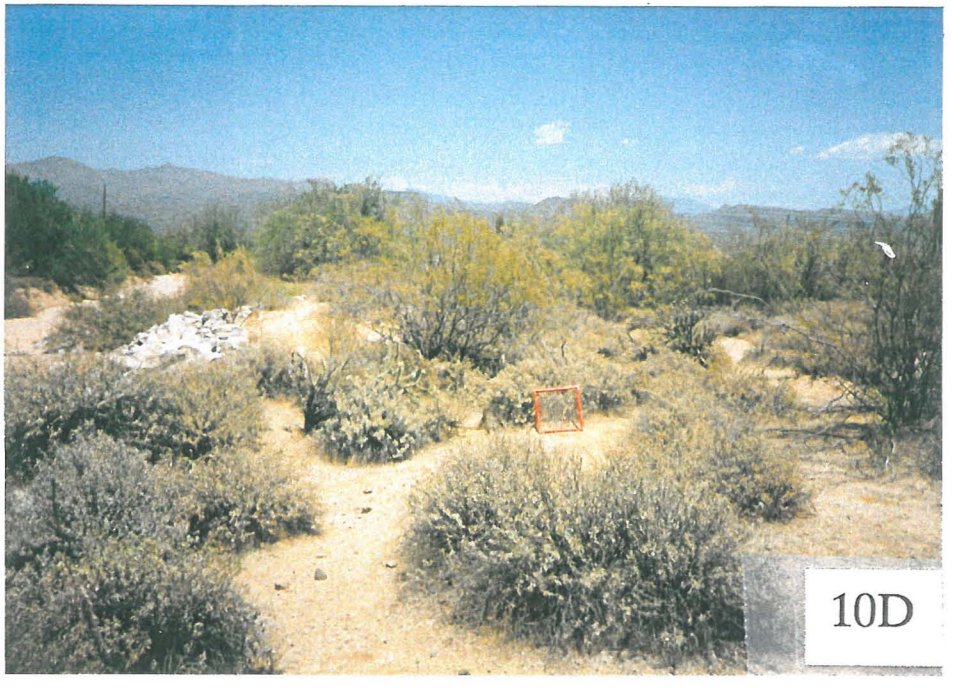
10C

L R

DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

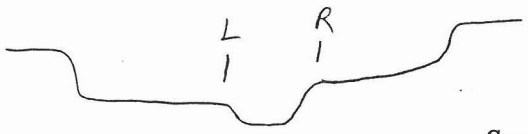
Project: Rio Verde South Flood Delineation Study
Stream: Wash 10
Location: Reach 10D
Photo No.: 10D-1, 2, 3, 4
Section Description: Coarse gravel channel, riprap on Right channel slope occupies 450 LF of this reach. LOB is desert brush, mesquite, Palo Verde + Saguaro. ROB has less trees than LOB.

Channel Conditions		Manning's n Adjustment		Left Overbank gravel	Channel coarse gravel	Right Overbank gravel
Channel Material		nb		0.030	0.028	0.030
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000	0.0		0.0
	Minor		.001 - .005			
	Moderate		.006 - .010		0.010	
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004			
	Minor		.005 - .015			
	Appreciable		.020 - .030	0.010		0.010
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.005	
	Medium		.010 - .025	0.025		0.015
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000	0.0		0.0
	Occ. Alt.		.001 - .005		0.002	
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00	1.0		1.0
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.065	0.045	0.055



10D

DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

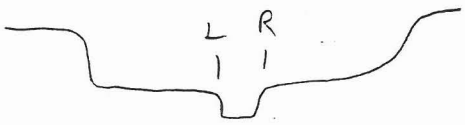


Project: Rio Verde South Flood Delineation Study
Stream: Wash 11
Location: Reach 11A
Photo No.: 11A - 1, 2, 3, 4
Section Description: wide sandy bottom, steep side slopes. LOB grass + mesquite trees. ROB same as LOB.

Channel Conditions		Manning's n Adjustment		Left Overbank clay	Channel coarse gravel	Right Overbank clay
Channel Material		nb		0.020	0.028	0.020
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000	0.0		0.0
	Minor		.001 - .005			
	Moderate		.006 - .010		0.006	
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004		0.002	
	Minor		.005 - .015	0.015		0.015
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.005	
	Medium		.010 - .025	0.025		0.025
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000	0.0		0.0
	Occ. Alt.		.001 - .005		0.001	
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00	1.0	1.0	1.0
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.060	0.042	0.060

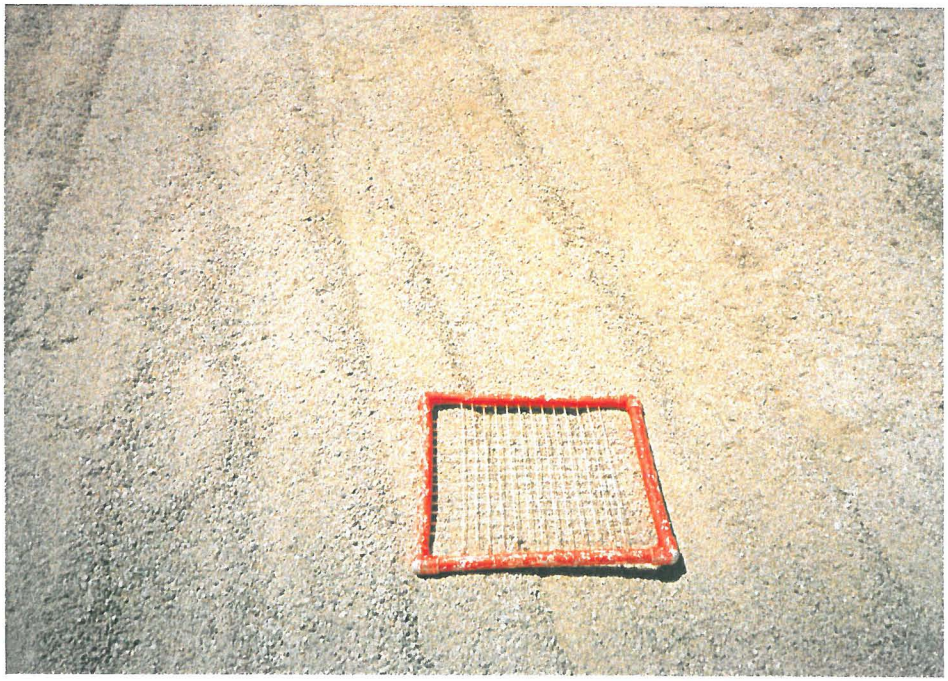
11A

DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

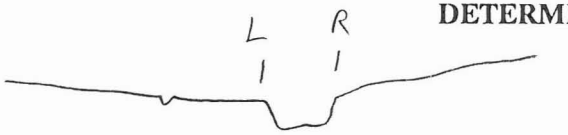


Project: Rio Verde South Flood Delineation Study
Stream: Wash 11
Location: Reach 11B
Photo No.: 11B - 1, 2, 3, 4
Section Description: Wide sandy bottom, steep side slopes. LOB is grass, brush, cactus + trees. ROB same as LOB

Channel Conditions		Manning's n Adjustment		Left Overbank clay	Channel coarse gravel	Right Overbank clay
Channel Material		nb		0.020	0.028	0.020
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000	0.0		0.0
	Minor		.001 - .005			
	Moderate		.006 - .010		0.006	
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004		0.002	
	Minor		.005 - .015	0.015		0.015
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.005	
	Medium		.010 - .025			
	Large		.025 - .050	0.030		0.030
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000	0.0		0.0
	Occ. Alt.		.001 - .005		0.001	
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00	1.0	1.0	1.0
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.065	0.042	0.065



11B

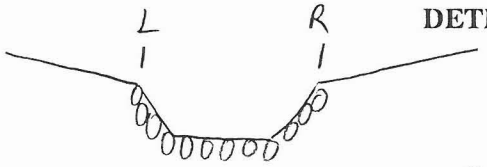


DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde South Flood Delineation Study
Stream: Wash "I"
Location: Reach 11C
Photo No.: 10A-1, 2, 3, 4 (see description)
Section Description: Same as Reach 10A except some mesquite and Palo Verde trees growing along channel bottom.

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	gravel + 1-3" rock	nb		0.030	0.030	0.030
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000	0.0		0.0
	Minor		.001 - .005		0.003	
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004		0.003	
	Minor		.005 - .015	0.015		0.015
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010			
	Medium		.010 - .025	0.025	0.011	0.025
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000	0.0		0.0
	Occ. Alt.		.001 - .005		0.003	
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00	1.0	1.0	1.0
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.070	0.050	0.070

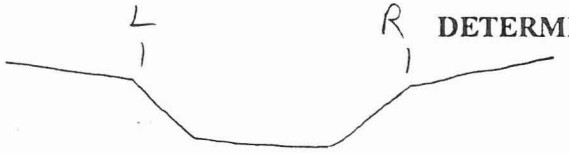
NOTE: NO ADDITIONAL PHOTOGRAPHS FOR REACH 11C
THE PHOTOGRAPHS FOR REACH 10A ARE APPLICABLE



DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde South Flood Delineation Study
Stream: Wash 11
Location: Reach 11D
Photo No.: 11D-1, 2, 3, 4
Section Description: Rip rap lined main channel, natural desert overbanks. LOB is brush and Palo Verde Trees. ROB same as LOB

Channel Conditions		Manning's n Adjustment		Left Overbank gravel	Channel d_{50} = 12"	Right Overbank gravel
Channel Material		nb		0.030	0.050	0.030
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000	0.0	0.0	0.0
	Minor		.001 - .005			
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004		0.0	
	Minor		.005 - .015	0.015		0.015
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.0	
	Medium		.010 - .025	0.025		0.025
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000	0.0	0.0	0.0
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00	1.0	1.0	1.0
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.070	0.050	0.070



DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

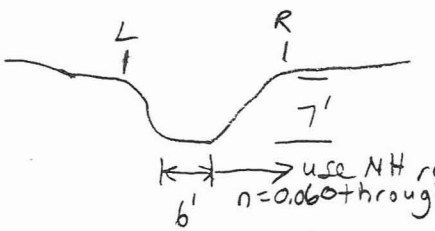
Project: Rio Verde South Flood Delineation Study
Stream: Wash 11
Location: Reach 11E (channelized)
Photo No.: 11E-1, 3, 4
Section Description: Sandy gravel bottom, LOB desert brush and Palo Verde + mesquite trees. ROB same as LOB. In some areas LOB + ROB in turf, but use desert as majority.

Channel Conditions		Manning's n Adjustment		Left Overbank gravel	Channel Sandy gravel	Right Overbank gravel
Channel Material		nb		0.030	0.024	0.030
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000	0.0	0.0	0.0
	Minor		.001 - .005			
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004	0.015	0.0	0.015
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.006	
	Medium		.010 - .025	0.025		0.025
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000	0.0	0.0	0.0
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00	1.0	1.0	1.0
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.070	0.030	0.070

natural desert + golf course = 0.030

natural desert + golf course = 0.030

11E



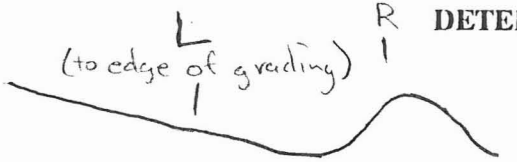
DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde South Flood Delineation Study
Stream: Wash 11
Location: Reach 11F
Photo No.: D14, D15, D16, D17
Section Description: narrow channel with sandy bottom and cobbles LOB & ROB vegetated with grass shrubs and trees

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel 6' Bottom	Right Overbank
Channel Material	Coarse Gravel	nb		0.024	0.024	0.024
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000	0.000		0.000
	Minor		.001 - .005		0.001	
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004			
	Minor		.005 - .015	0.010	0.010	0.010
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010			
	Medium		.010 - .025	0.025	0.015	0.025
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000	0.000		0.000
	Occ. Alt.		.001 - .005		0.001	
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00	1.00	1.00	1.00
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.059	0.051	0.059

use 0.060 → 0.050 use 0.060

11 F

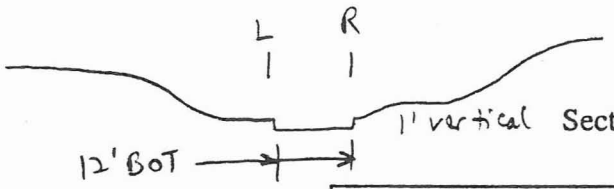


DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde South Flood Delineation Study
Stream: Wash 11
Location: Reach 11G
Photo No.: C15, C17, C19, D19
Section Description: Channel is graded with some small rocks. ROB is concrete gunnite levee. LOB is natural desert with grass, shrubs and some trees.

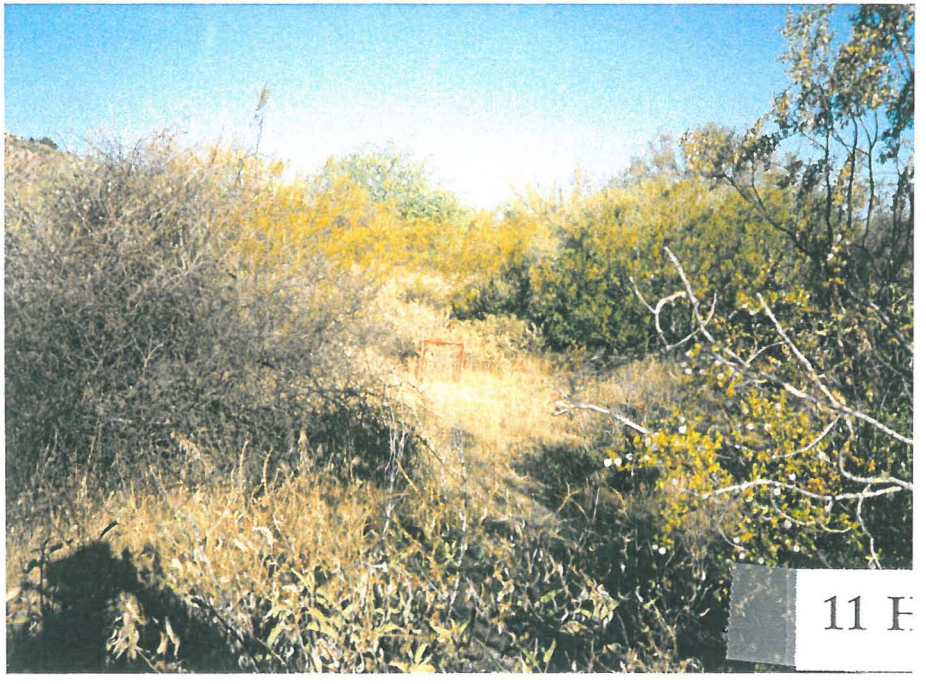
Channel Conditions		Manning's n Adjustment		Left Overbank gravel, rocks	Channel Sandy Gravel	Right Overbank
Channel Material	Coarse Gravel	nb		0.030	0.024	0.024
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000	0.000	0.000	0.000
	Minor		.001 - .005			
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004		0.000	0.000
	Minor		.005 - .015	0.010		
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.000	0.000
	Medium		.010 - .025	0.020		
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000	0.000	0.000	0.000
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00	1.0	1.0	1.0
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.060	0.024	0.024

DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

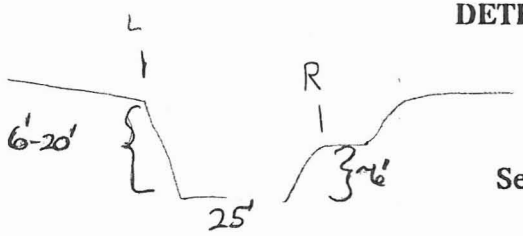


Project: Rio Verde South Flood Delineation Study
Stream: Wash 11
Location: Reach 11H
Photo No.: C11, C12, C13 + C14
Section Description: gravel bed m+l. LOB + ROB are grass, brush + some cacti.

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Coarse Gravel	nb		0.030	0.030	0.030
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000	0.0		0.0
	Minor		.001 - .005		0.003	
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004		0.003	
	Minor		.005 - .015	0.015		0.015
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.006	
	Medium		.010 - .025	0.025		0.025
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000	0.0		0.0
	Occ. Alt.		.001 - .005		0.003	
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00	1.0	1.0	1.0
	Appreciable		1.15			
	Severe		1.30			
n = (nb + n1 + n2 + n3 + n4)m				0.070	0.045	0.070

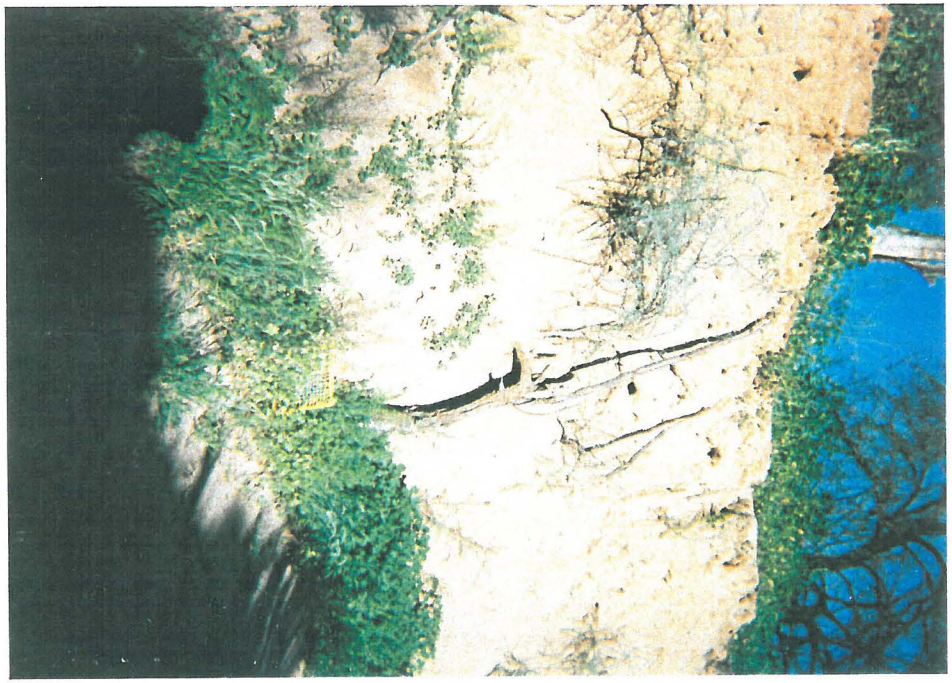


DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

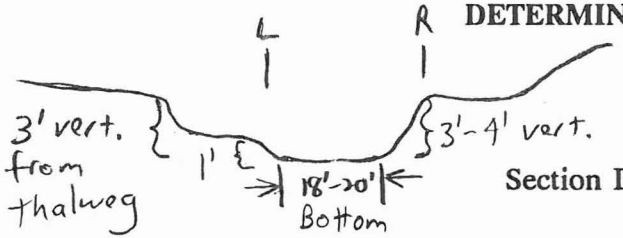


Project: Rio Verde South Flood Delineation Study
Stream: Wash 12
Location: Reach 12A
Photo No.: E21, E22, E23, E24
Section Description: Deep narrow channel. Severely eroded side slopes, Vegetation in channel & overhanging. LOB & ROB well vegetated - grass & trees. Misc. debris also present.

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel sand (coarse)	Right Overbank
Channel Material	Coarse Gravel	nb		0.028	0.028	0.028
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000	0.000		0.000
	Minor		.001 - .005			
	Moderate		.006 - .010		0.008	
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004			
	Minor		.005 - .015	0.010	0.007	0.010
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.008	
	Medium		.010 - .025	.025		.025
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000			
	Occ. Alt.		.001 - .005		0.002	
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00	1.00	1.00	1.00
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.063	0.053	0.063
				use 0.065	use 0.055	use 0.065

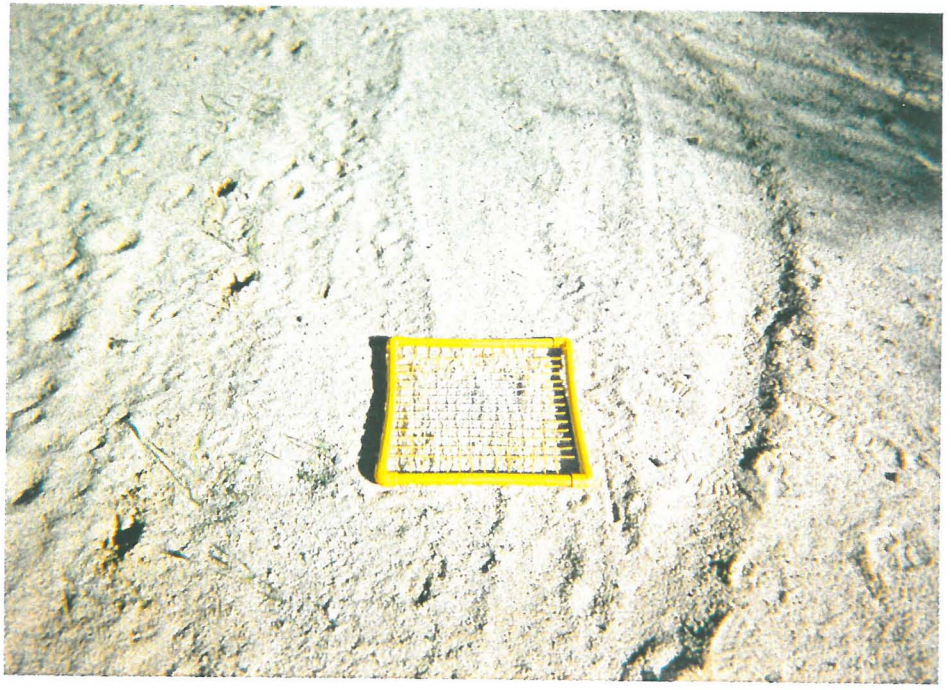


DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

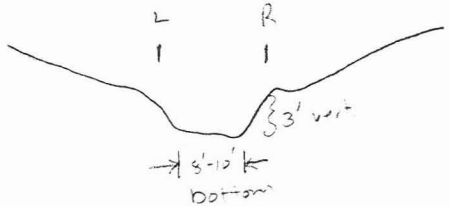


Project: Rio Verde South Flood Delineation Study
Stream: Wash 12
Location: Reach 12B
Photo No.: P1, D2, D3, D4
Section Description: Sandy main channel bottom, fairly wide. LOB and ROB well vegetated with grass, shrubs and trees.

Channel Conditions		Manning's n Adjustment		Left Overbank clay/Sand	Channel Coarse Sand/ Gravel	Right Overbank clay/Sand
Channel Material	Coarse Gravel	nb		0.025	0.028	0.025
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000	0.000		0.000
	Minor		.001 - .005		0.002	
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004		0.003	
	Minor		.005 - .015	0.010		0.010
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.006	
	Medium		.010 - .025	0.025		0.025
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000	0.000		0.000
	Occ. Alt.		.001 - .005		0.001	
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00	1.00	1.00	1.00
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.060	0.040	0.060



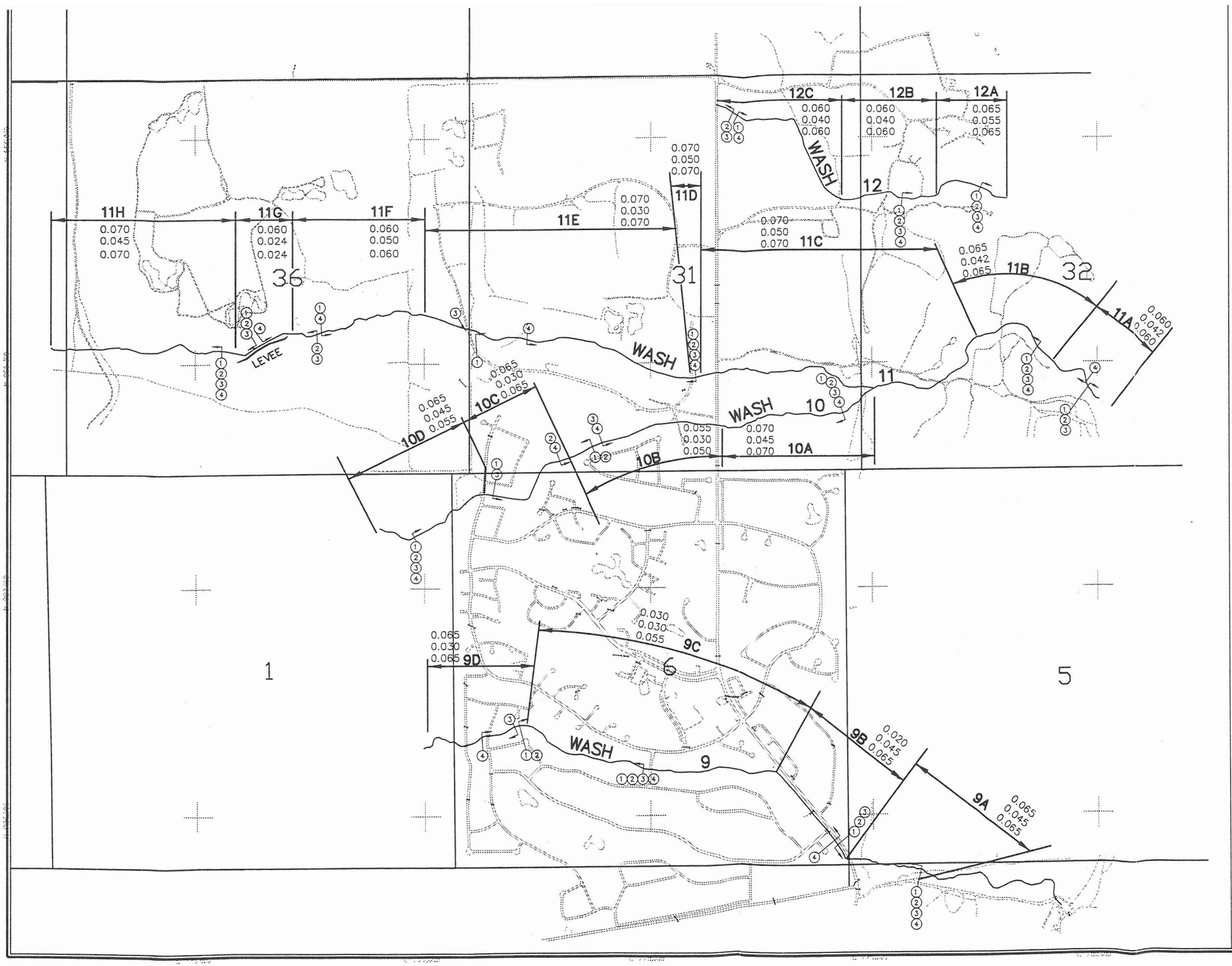
12 B



DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde South Flood Delineation Study
Stream: Wash 12
Location: Reach 12C
Photo No.: D5, D6, D7, D8
Section Description: Relatiely narrow main channel with sandy bottom and overhanging vegetation. LOB & ROB vegetated with grass, trees, cacti, shrubs

Channel Conditions		Manning's n Adjustment		Left Overbank (Sand/Sand)	Channel (Coarse sand and gravel)	Right Overbank (Sand/Sand)
Channel Material	Coarse Gravel	nb		0.025	0.025	0.025
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000	0.000		0.000
	Minor		.001 - .005		0.003	
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004			
	Minor		.005 - .015	0.010	0.005	0.010
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.006	
	Medium		.010 - .025	0.025		0.025
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000	0.000		0.000
	Occ. Alt.		.001 - .005		0.001	
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00	1.00	1.00	1.00
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.060	0.040	0.060



FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF

RIO VERDE SOUTH

F.C.D. CONTRACT NO. 93-07

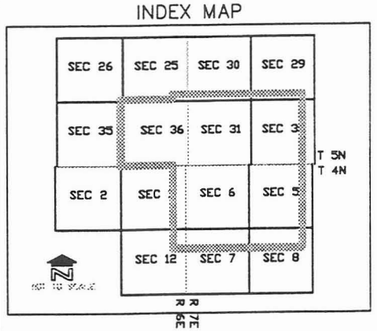
LEGEND

REACH LABEL	9A
PHOTO LOCATION AND DIRECTION	③→
HYDRAULIC BASE LINE	
LEFT OVERBANK n VALUE	0.065
MAIN CHANNEL n VALUE	0.040
RIGHT OVERBANK n VALUE	0.055

NOTES

1. This map prepared from sheets 2 to 8, 1"=200', 2' C.I. maps.

INDEX MAP



600 0' 1200
SCALE: 1"= 1200'

EXHIBIT 1

MANNINGS n VALUE MAP

McLAUGHLIN KMETTY ENGINEERS, Ltd.

DESIGN	BY FEB	DATE 7/94	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	MKE	7/94	
PLANS	PJK	7/94	RECOMMENDED BY: DATE
PLANS CHK.	FEB	7/94	APPROVED BY: DATE
SUBMITTED BY: DATE:			CHIEF ENGINEER AND GENERAL MANAGER
			SHEET OF

Dwg. Name: \PJR\RIOVERDE\ACAD\EX-1-RVs.dwg
Date: REV MAY 11 1995 03:30pm

CURRENT DATE: 08-09-1995 FILE DATE: 02-06-1995
CURRENT TIME: 12:39:22 FILE NAME: W9VIAHER

****
********** FHWA CULVERT ANALYSIS **********
********** HY-8, VERSION 4.0 **********
****

CULV #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	1544.20	1543.70	49.08	3 RCB	10.00	4.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: W9VIAHER DATE: 02-06-1995

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
1544.20	0	0	0	0	0	0	0	0	1
1545.25	101	101	0	0	0	0	0	0	1
1545.86	202	202	0	0	0	0	0	0	1
1546.39	303	303	0	0	0	0	0	0	1
1546.89	404	404	0	0	0	0	0	0	1
1547.35	505	505	0	0	0	0	0	0	1
1547.80	606	606	0	0	0	0	0	0	1
1548.25	707	707	0	0	0	0	0	0	1
1548.69	808	808	0	0	0	0	0	0	1
1549.15	909	909	0	0	0	0	0	0	1
1549.44	970	970	0	0	0	0	0	0	1
1560.00	2338	2338	0	0	0	0	0	OVERTOPPING	

****

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: W9VIAHER DATE: 02-06-1995

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
1544.20	0.00	0	0	0.00
1545.25	0.00	101	0	0.00
1545.86	0.00	202	0	0.00
1546.39	0.00	303	0	0.00
1546.89	0.00	404	0	0.00
1547.35	0.00	505	0	0.00
1547.80	0.00	606	0	0.00
1548.25	0.00	707	0	0.00
1548.69	0.00	808	0	0.00
1549.15	0.00	909	0	0.00
1549.44	0.00	970	0	0.00

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

.

CURRENT DATE: 08-09-1995 FILE DATE: 02-06-1995
CURRENT TIME: 12:39:22 FILE NAME: W9VIAHER

PERFORMANCE CURVE FOR CULVERT # 1 - 3 (10 BY 4) RCB

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRITICAL DEPTH (ft)	OUTLET VEL. (fps)	OUTLET DEPTH (ft)	TAILWATER VEL. (fps)	TAILWATER DEPTH (ft)
0	1544.20	0.00	0.00	0-NF	0.00	0.00	0.00	0.00	0.00	0.00
101	1545.25	1.05	1.05	1-S2n	0.46	0.71	7.32	0.46	5.35	0.47
202	1545.86	1.66	1.66	1-S2n	0.72	1.12	8.42	0.80	7.00	0.72
303	1546.39	2.19	2.19	1-S2n	0.93	1.47	9.41	1.07	8.20	0.92
404	1546.89	2.69	2.69	1-S2n	1.13	1.78	10.15	1.33	9.17	1.10
505	1547.35	3.15	3.15	1-S2n	1.31	2.07	10.79	1.56	9.99	1.26
606	1547.80	3.60	3.60	1-S2n	1.47	2.34	11.30	1.79	10.72	1.41
707	1548.25	4.05	4.05	5-S2n	1.63	2.59	11.77	2.00	11.37	1.55
808	1548.69	4.49	4.49	5-S2n	1.78	2.83	12.19	2.21	11.97	1.68
909	1549.15	4.95	4.95	5-S2n	1.93	3.06	12.58	2.41	12.50	1.81
970	1549.44	5.24	5.24	5-S2n	2.02	3.20	12.80	2.53	12.82	1.88

El. inlet face invert 1544.20 ft El. outlet invert 1543.70 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	49.08
INLET ELEVATION (FT)	1544.20
OUTLET STATION (FT)	0.00
OUTLET ELEVATION (FT)	1543.70
NUMBER OF BARRELS	3
SLOPE (V-FT/H-FT)	0.0102
CULVERT LENGTH ALONG SLOPE (FT)	49.08

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	BOX
BARREL SPAN	10.00 FT
BARREL RISE	4.00 FT
BARREL MATERIAL	CONCRETE
BARREL MANNING'S N	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	1:1 BEVEL (45 DEG. FLARE)
INLET DEPRESSION	NONE

****

.

3

CURRENT DATE: 08-09-1995 FILE DATE: 02-06-1995
CURRENT TIME: 12:39:22 FILE NAME: W9VIAHER

****
********** TAILWATER **********
****

***** USER DEFINED CHANNEL CROSS-SECTION FILE NAME: W9VIAHER
MAIN CHANNEL AND LT & RT OVER BANKS FILE DATE: 02-06-1995
LEFT CHANNEL BOUNDARY 1
RIGHT CHANNEL BOUNDARY 13
MANNING N LEFT OVER BANK 0.020

MANNING N MAIN CHANNEL	0.012
MANNING N RIGHT OVER BAN	0.065
SLOPE OF CHANNEL (FT/FT)	0.0052

CROSS-SECTION COORD. NO.	X (FT)	Y (FT)
1	9880.87	1550.60
2	9914.79	1548.80
3	9947.47	1547.36
4	9962.62	1578.18
5	9968.12	1546.50
6	9973.78	1547.30
7	9974.81	1547.91
8	9979.85	1547.90
9	9979.86	1543.70
10	9982.85	1543.70
11	10017.15	1543.70
12	10020.15	1543.70
13	10020.16	1547.90
14	10026.09	1548.99
15	10052.97	1549.30

******* UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (CFS)	W.S.E. (FT)	FROUDE NUMBER	DEPTH (FT)	VEL. (FPS)	SHEAR (PSF)
0.00	1543.70	0.000	0.00	0.00	0.00
101.00	1544.17	1.368	0.47	5.35	0.15
202.00	1544.42	1.455	0.72	7.00	0.23
303.00	1544.62	1.507	0.92	8.20	0.29
404.00	1544.80	1.543	1.10	9.17	0.34
505.00	1544.96	1.570	1.26	9.99	0.38
606.00	1545.11	1.593	1.41	10.72	0.43
707.00	1545.25	1.611	1.55	11.37	0.47
808.00	1545.38	1.627	1.68	11.97	0.50
909.00	1545.51	1.640	1.81	12.50	0.54
970.00	1545.58	1.647	1.88	12.82	0.56

****
********** ROADWAY OVERTOPPING DATA **********
****

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	1.00
CREST LENGTH (FT)	1.00
OVERTOPPING CREST ELEVATION (FT)	1560.00

****
.

CURRENT DATE: 08-07-1995 FILE DATE: 02-14-1995
CURRENT TIME: 08:46:42 FILE NAME: W9VADOCT

****
********** FHWA CULVERT ANALYSIS **********
********** HY-8, VERSION 4.0 **********
****

CULV #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	1635.69	1635.36	38.00	2 RCB	8.00	3.50	.012	CONVENTIONAL
2								
3								
4								
5								
6								

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: W9VADOCT DATE: 02-14-1995

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
1635.69	0	0	0	0	0	0	0	0	1
1636.89	66	66	0	0	0	0	0	0	1
1637.60	132	132	0	0	0	0	0	0	1
1638.25	198	198	0	0	0	0	0	0	1
1638.84	264	264	0	0	0	0	0	0	1
1639.42	330	330	0	0	0	0	0	0	1
1640.02	396	396	0	0	0	0	0	0	1
1640.65	462	461	0	0	0	0	0	1	4
1640.91	500	486	0	0	0	0	0	11	5
1641.26	594	520	0	0	0	0	0	71	4
1641.43	660	535	0	0	0	0	0	120	3
1640.50	446	446	0	0	0	0	0	OVERTOPPING	

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: W9VADOCT DATE: 02-14-1995

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
1635.69	0.00	0	0	0.00
1636.89	0.00	66	0	0.00
1637.60	0.00	132	0	0.00
1638.25	0.00	198	0	0.00
1638.84	0.00	264	0	0.00
1639.42	0.00	330	0	0.00
1640.02	0.00	396	0	0.00
1640.65	-0.00	462	1	0.15
1640.91	-0.01	500	3	0.66
1641.26	-0.01	594	3	0.51
1641.43	-0.01	660	5	0.70

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

.

CURRENT DATE: 08-07-1995 FILE DATE: 02-14-1995
CURRENT TIME: 08:46:42 FILE NAME: W9VADOCT

****

PERFORMANCE CURVE FOR CULVERT # 1 - 2 (8 BY 3.5) RCB

****

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRITICAL DEPTH (ft)	OUTLET VEL. (fps)	OUTLET DEPTH (ft)	TAILWATER VEL. (fps)	TAILWATER DEPTH (ft)
0	1635.69	0.00	0.00	0-NF	0.00	0.00	0.00	0.00	0.00	0.00
66	1636.89	1.20	1.20	1-S2n	0.55	0.81	7.46	0.55	3.24	0.82
132	1637.60	1.91	1.91	1-S2n	0.88	1.29	8.34	0.99	4.21	1.23
198	1638.25	2.56	2.56	1-S2n	1.15	1.69	9.32	1.33	4.90	1.58
264	1638.84	3.15	3.15	1-S2n	1.39	2.04	10.09	1.63	5.46	1.89
330	1639.42	3.73	3.73	5-S2n	1.62	2.37	10.71	1.92	5.92	2.17
396	1640.02	4.33	4.33	5-S2n	1.83	2.68	11.26	2.20	6.32	2.44
461	1640.64	4.95	4.95	5-S2n	2.04	2.96	11.74	2.45	6.47	2.54
486	1640.90	5.21	5.21	5-S2n	2.11	3.07	11.91	2.55	6.68	2.67
520	1641.26	5.57	5.57	5-S2n	2.21	3.21	12.13	2.68	7.06	2.89
535	1641.43	5.74	5.74	5-S2n	2.26	3.27	12.23	2.73	7.30	3.04

****

El. inlet face invert 1635.69 ft El. outlet invert 1635.36 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

****

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	38.00
INLET ELEVATION (FT)	1635.69
OUTLET STATION (FT)	0.00
OUTLET ELEVATION (FT)	1635.36
NUMBER OF BARRELS	2
SLOPE (V-FT/H-FT)	0.0087
CULVERT LENGTH ALONG SLOPE (FT)	38.00

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	BOX
BARREL SPAN	8.00 FT
BARREL RISE	3.50 FT
BARREL MATERIAL	CONCRETE
BARREL MANNING'S N	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	1:1 BEVEL (45 DEG. FLARE)
INLET DEPRESSION	NONE

****

.

3

CURRENT DATE: 08-07-1995 FILE DATE: 02-14-1995
CURRENT TIME: 08:46:42 FILE NAME: W9VADOCT

****

********** TAILWATER **********

****

***** USER DEFINED CHANNEL CROSS-SECTION FILE NAME: W9VADOCT
MAIN CHANNEL AND LT & RT OVER BANKS FILE DATE: 02-14-1995

LEFT CHANNEL BOUNDARY	8
RIGHT CHANNEL BOUNDARY	11
MANNING N LEFT OVER BANK	0.065

MANNING N MAIN CHANNEL 0.030
MANNING N RIGHT OVER BAN 0.110
SLOPE OF CHANNEL (FT/FT) 0.0063

CROSS-SECTION COORD. NO.	X (FT)	Y (FT)
1	9703.00	1644.70
2	9764.39	1640.20
3	9816.91	1636.70
4	9875.20	1637.95
5	9923.83	1640.02
6	9969.90	1640.19
7	9972.48	1640.74
8	9986.99	1637.90
9	9987.00	1635.40
10	10013.00	1635.36
11	10013.01	1637.90
12	10013.76	1637.90
13	10017.14	1641.10
14	10021.07	1640.52
15	10094.52	1644.70

******* UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (CFS)	W.S.E. (FT)	FROUDE NUMBER	DEPTH (FT)	VEL. (FPS)	SHEAR (PSF)
0.00	1635.36	0.000	0.00	0.00	0.00
66.00	1636.18	0.641	0.82	3.24	0.29
132.00	1636.59	0.674	1.23	4.21	0.44
198.00	1636.94	0.692	1.58	4.90	0.55
264.00	1637.25	0.703	1.89	5.46	0.64
330.00	1637.53	0.711	2.17	5.92	0.73
396.00	1637.80	0.716	2.44	6.32	0.80
462.00	1637.90	0.718	2.54	6.47	0.83
500.00	1638.03	0.724	2.67	6.68	0.87
594.00	1638.25	0.734	2.89	7.06	0.94
660.00	1638.40	0.740	3.04	7.30	0.99

****
********** ROADWAY OVERTOPPING DATA **********
****

WEIR COEFFICIENT 2.63
EMBANKMENT TOP WIDTH (FT) 36.00
***** USER DEFINED ROADWAY PROFILE

CROSS-SECTION COORD. NO.	X (FT)	Y (FT)
1	9972.50	1640.70
2	9990.80	1641.00
3	10009.00	1640.90
4	10017.10	1641.10
5	10021.10	1640.50
6	10047.30	1640.80
7	10094.50	1641.40

****

CURRENT DATE: 08-09-1995 FILE DATE: 02-07-1995
CURRENT TIME: 13:35:47 FILE NAME: W9QUAILH

****
********** FHWA CULVERT ANALYSIS **********
********** HY-8, VERSION 4.0 **********
****

CULV #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	1642.28	1641.90	34.00	2 RCB	8.00	2.50	.012	CONVENTIONAL
2								
3								
4								
5								
6								

****

****
SUMMARY OF CULVERT FLOWS (CFS) FILE: W9QUAILH DATE: 02-07-1995

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
1642.28	0	0	0	0	0	0	0	0	1
1643.48	66	66	0	0	0	0	0	0	1
1644.24	132	132	0	0	0	0	0	0	1
1644.93	198	198	0	0	0	0	0	0	1
1645.63	264	262	0	0	0	0	0	1	4
1646.03	330	295	0	0	0	0	0	33	5
1646.27	396	314	0	0	0	0	0	80	5
1646.46	462	328	0	0	0	0	0	131	5
1646.62	528	330	0	0	0	0	0	195	5
1646.76	594	330	0	0	0	0	0	259	4
1646.88	660	330	0	0	0	0	0	325	4
1645.50	250	250	0	0	0	0	0	OVERTOPPING	

****

****
SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: W9QUAILH DATE: 02-07-1995

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
1642.28	0.00	0	0	0.00
1643.48	0.00	66	0	0.00
1644.24	0.00	132	0	0.00
1644.93	0.00	198	0	0.00
1645.63	-0.01	264	1	0.29
1646.03	-0.00	330	2	0.46
1646.27	-0.01	396	2	0.49
1646.46	-0.01	462	2	0.52
1646.62	-0.01	528	3	0.56
1646.76	-0.01	594	5	0.90
1646.88	-0.01	660	5	0.73

****
<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000
****
.

CURRENT DATE: 08-09-1995 FILE DATE: 02-07-1995
CURRENT TIME: 13:35:47 FILE NAME: W9QUAILH

****

PERFORMANCE CURVE FOR CULVERT # 1 - 2 (8 BY 2.5) RCB

****

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRITICAL DEPTH (ft)	OUTLET VEL. (fps)	OUTLET DEPTH (ft)	TAILWATER VEL. (fps)	TAILWATER DEPTH (ft)
0	1642.28	0.00	0.00	0-NF	0.00	0.00	0.00	0.00	0.00	0.00
66	1643.48	1.20	1.20	1-S2n	0.52	0.81	7.19	0.57	3.40	0.76
132	1644.24	1.96	1.96	1-S2n	0.81	1.29	8.69	0.95	4.42	1.15
198	1644.93	2.65	2.65	5-S2n	1.06	1.69	9.69	1.28	5.15	1.48
262	1645.63	3.35	3.35	5-S2n	1.28	2.03	10.41	1.57	5.73	1.77
295	1646.03	3.75	3.75	5-S2n	1.38	2.20	10.74	1.72	6.22	2.04
314	1646.26	3.98	3.98	5-S2n	1.44	2.29	10.92	1.80	6.64	2.28
328	1646.45	4.17	3.55	4-FFt	1.48	2.36	8.20	2.50	7.02	2.52
330	1646.47	4.19	3.76	4-FFt	1.49	2.37	8.25	2.50	7.38	2.71
330	1646.47	4.19	3.93	4-FFt	1.49	2.37	8.25	2.50	7.69	2.88
330	1646.47	4.19	4.09	4-FFt	1.49	2.37	8.25	2.50	7.97	3.04

****

El. inlet face invert 1642.28 ft El. outlet invert 1641.90 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

****

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	34.00
INLET ELEVATION (FT)	1642.28
OUTLET STATION (FT)	0.00
OUTLET ELEVATION (FT)	1641.90
NUMBER OF BARRELS	2
SLOPE (V-FT/H-FT)	0.0112
CULVERT LENGTH ALONG SLOPE (FT)	34.00

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	BOX
BARREL SPAN	8.00 FT
BARREL RISE	2.50 FT
BARREL MATERIAL	CONCRETE
BARREL MANNING'S N	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	1:1 BEVEL (45 DEG. FLARE)
INLET DEPRESSION	NONE

****

.

3

CURRENT DATE: 08-09-1995 FILE DATE: 02-07-1995
CURRENT TIME: 13:35:47 FILE NAME: W9QUAILH

****

********** TAILWATER **********

****

***** USER DEFINED CHANNEL CROSS-SECTION FILE NAME: W9QUAILH
MAIN CHANNEL AND LT & RT OVER BANKS FILE DATE: 02-07-1995

LEFT CHANNEL BOUNDARY	6
RIGHT CHANNEL BOUNDARY	11
MANNING N LEFT OVER BANK	0.030

MANNING N MAIN CHANNEL 0.020
MANNING N RIGHT OVER BAN 0.055
SLOPE OF CHANNEL (FT/FT) 0.0033

CROSS-SECTION COORD. NO.	X (FT)	Y (FT)
1	9785.35	1645.30
2	9836.41	1646.30
3	9937.46	1645.40
4	9974.10	1644.31
5	9986.13	1644.41
6	9986.87	1644.40
7	9986.88	1641.90
8	9989.88	1641.90
9	10010.12	1641.91
10	10013.12	1641.91
11	10013.13	1644.40
12	10013.88	1644.41
13	10024.71	1644.70
14	10036.60	1646.90

******* UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (CFS)	W.S.E. (FT)	FROUDE NUMBER	DEPTH (FT)	VEL. (FPS)	SHEAR (PSF)
0.00	1641.90	0.000	0.00	0.00	0.00
66.00	1642.66	0.691	0.76	3.40	0.15
132.00	1643.05	0.728	1.15	4.42	0.22
198.00	1643.38	0.748	1.48	5.15	0.27
264.00	1643.67	0.760	1.77	5.73	0.32
330.00	1643.94	0.769	2.04	6.22	0.36
396.00	1644.18	0.776	2.28	6.64	0.40
462.00	1644.42	0.781	2.52	7.02	0.43
528.00	1644.61	0.791	2.71	7.38	0.47
594.00	1644.78	0.799	2.88	7.69	0.50
660.00	1644.94	0.806	3.04	7.97	0.53

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CURRENT DATE: 08-09-1995 FILE DATE: 02-07-1995
CURRENT TIME: 13:35:47 FILE NAME: W9QUAILH

****
********** ROADWAY OVERTOPPING DATA **********
****

WEIR COEFFICIENT 2.63
EMBANKMENT TOP WIDTH (FT) 30.00
***** USER DEFINED ROADWAY PROFILE

CROSS-SECTION COORD. NO.	X (FT)	Y (FT)
1	9885.00	1646.50
2	9937.50	1645.50
3	9972.80	1646.00
4	9977.20	1645.60
5	9988.10	1645.60
6	9990.70	1646.30
7	10009.30	1646.50
8	10027.50	1646.60
9	10036.60	1646.90
10	10039.20	1646.30

```
          11        10084.90    1647.10
          12        10133.40    1647.10
*******************************************************************************
.
```

CURRENT DATE: 02-14-1995
CURRENT TIME: 08:53:42

FILE DATE: 02-14-1995
FILE NAME: W11

****
********** FHWA CULVERT ANALYSIS **********
********** HY-8, VERSION 4.0 **********
****

CULV #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	1589.65	1588.82	38.01	4 RCB	10.00	4.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: W11 DATE: 02-14-1995

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
1589.65	0	0	0	0	0	0	0	0	1
1590.34	74	74	0	0	0	0	0	0	1
1590.75	148	148	0	0	0	0	0	0	1
1591.09	222	222	0	0	0	0	0	0	1
1591.40	296	296	0	0	0	0	0	0	1
1591.68	370	370	0	0	0	0	0	0	1
1591.97	444	444	0	0	0	0	0	0	1
1592.24	518	518	0	0	0	0	0	0	1
1592.50	592	592	0	0	0	0	0	0	1
1592.75	666	666	0	0	0	0	0	0	1
1593.00	740	740	0	0	0	0	0	0	1
1594.94	1311	1311	0	0	0	0	0	OVERTOPPING	

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: W11 DATE: 02-14-1995

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
1589.65	0.00	0	0	0.00
1590.34	0.00	74	0	0.00
1590.75	0.00	148	0	0.00
1591.09	0.00	222	0	0.00
1591.40	0.00	296	0	0.00
1591.68	0.00	370	0	0.00
1591.97	0.00	444	0	0.00
1592.24	0.00	518	0	0.00
1592.50	0.00	592	0	0.00
1592.75	0.00	666	0	0.00
1593.00	0.00	740	0	0.00

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

.

PERFORMANCE CURVE FOR CULVERT # 1 - 4 (10 BY 4) RCB

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRITICAL DEPTH (ft)	OUTLET VEL. (fps)	OUTLET DEPTH (ft)	TAILWATER VEL. (fps)	TAILWATER DEPTH (ft)
0	1589.65	0.00	0.00	0-NF	0.00	0.00	0.00	0.00	0.00	-0.02
74	1590.34	0.69	0.69	1-S2n	0.20	0.47	9.46	0.20	3.32	0.52
148	1590.75	1.10	1.10	1-S2n	0.39	0.75	8.53	0.43	4.36	0.79
222	1591.09	1.44	1.44	1-S2n	0.49	0.99	9.47	0.59	5.12	1.01
296	1591.40	1.75	1.75	1-S2n	0.59	1.20	10.08	0.73	5.74	1.20
370	1591.68	2.03	2.03	1-S2n	0.69	1.39	10.63	0.87	6.27	1.37
444	1591.97	2.32	2.32	1-S2n	0.78	1.57	11.08	1.00	6.75	1.53
518	1592.24	2.59	2.59	1-S2n	0.86	1.74	11.49	1.13	7.16	1.68
592	1592.50	2.85	2.85	1-S2n	0.93	1.90	11.84	1.25	7.55	1.82
666	1592.75	3.10	3.10	1-S2n	1.01	2.05	12.16	1.37	7.91	1.95
740	1593.00	3.35	3.35	1-S2n	1.08	2.20	12.47	1.48	8.24	2.07

El. inlet face invert 1589.65 ft El. outlet invert 1588.82 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	38.00
INLET ELEVATION (FT)	1589.65
OUTLET STATION (FT)	0.00
OUTLET ELEVATION (FT)	1588.82
NUMBER OF BARRELS	4
SLOPE (V-FT/H-FT)	0.0218
CULVERT LENGTH ALONG SLOPE (FT)	38.01

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	BOX
BARREL SPAN	10.00 FT
BARREL RISE	4.00 FT
BARREL MATERIAL	CONCRETE
BARREL MANNING'S N	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	1:1 BEVEL (45 DEG. FLARE)
INLET DEPRESSION	NONE

.

3

********** TAILWATER **********

***** USER DEFINED CHANNEL CROSS-SECTION FILE NAME: W11
MAIN CHANNEL AND LT & RT OVER BANKS FILE DATE: 02-14-1995

LEFT CHANNEL BOUNDARY	4
RIGHT CHANNEL BOUNDARY	7
MANNING N LEFT OVER BANK	0.070
MANNING N MAIN CHANNEL	0.050
MANNING N RIGHT OVER BAN	0.070
SLOPE OF CHANNEL (FT/FT)	0.0289

CROSS-SECTION COORD. NO.	X (FT)	Y (FT)
1	9926.60	1595.00
2	9931.58	1594.59
3	9975.88	1591.32
4	9978.88	1588.82
5	9979.88	1588.82
6	10020.12	1588.80
7	10021.12	1588.82
8	10024.12	1591.32
9	10038.72	1594.08
10	10085.01	1594.77
11	10087.46	1595.00
12	10128.91	1595.17

******* UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (CFS)	W.S.E. (FT)	FROUDE NUMBER	DEPTH (FT)	VEL. (FPS)	SHEAR (PSF)
0.00	1588.80	0.000	-0.02	0.00	0.00
74.00	1589.34	0.802	0.52	3.32	0.96
148.00	1589.61	0.858	0.79	4.36	1.45
222.00	1589.83	0.893	1.01	5.12	1.84
296.00	1590.02	0.919	1.20	5.74	2.18
370.00	1590.19	0.940	1.37	6.27	2.49
444.00	1590.35	0.957	1.53	6.75	2.78
518.00	1590.50	0.971	1.68	7.16	3.04
592.00	1590.64	0.984	1.82	7.55	3.29
666.00	1590.77	0.996	1.95	7.91	3.53
740.00	1590.89	1.006	2.07	8.24	3.76

****
********** ROADWAY OVERTOPPING DATA **********
****

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	1.00
CREST LENGTH (FT)	1.00
OVERTOPPING CREST ELEVATION (FT)	1594.94

****
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Starting Water Surface Elevations and Coincident Peak Consideration

Reference FEMA 37 March 1993 version

pages 5-5,6 discusses coincident peaks.

Wash 9: Starts at critical depth since outside of floodplain mapping area. Channel reaches normal depth within the floodplain mapping area.

Wash 11: Start @ normal depth, first cross section 190 ft upstream of Verde River.

Wash 10: Wash 10 tributary to Wash 11. Verify coincident peaks:

test a: $\frac{\text{W10 drainage area}}{\text{W11 dr. area}} = \frac{13.73}{6.56} = 2.09 > 1.4$ (outside limits)

test b: $\frac{\text{W10 time to peak (24 hr without levee, Appendix G, C543)}}{\text{W11 time to peak (24 hr with levee, Table 3-20, C5452)}} = \frac{12.90 \text{ hr}}{14.27 \text{ hr}}$

peaks are about 1 hour apart

test c: Liklihood of both watersheds covered by same storm being modeled is high. See Hydrology Exhibit A. A storm large enough to cover Wash 11 watershed would probably cover all of Wash 10 watershed.

Conclusion for Wash 10: Even though tests a. and b. could be considered out of range, coincident peaks should be assumed because of the peak flow rate dependence on whether or not the Section 36 levee remains in place or fails (see p. 3-69 Hydrology TDN Book 1 of 2) and because of the complex nature of the intermingling of Wash 10 and Wash 11 runoff in the confluence area.

Wash 12: Wash 12 tributary to Verde River.

$0.6 < \frac{W12}{Verde} > 1.4$ $\frac{8.58}{Verde} = 0.6 \text{ or } 1.4$ Verde = 14.3 mi² or 6.13 mi² which is not true.

CONCLUSION For Wash 12: Coincident peaks cannot be substantiated, nevertheless Wash 12 starts at Verde River approximate WSEL for conservatism. Second cross section is at critical depth.

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1*****************************************
 *  HEC-2 WATER SURFACE PROFILES          *
 *                                        *
 *  Version   4.6.2;  May 1991            *
 *                                        *
 *  RUN DATE    14SEP95    TIME   17:26:15 *
 *****************************************
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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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1

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   14SEP95      17:26:15                                                                    PAGE    1
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                                                                  THIS RUN EXECUTED 14SEP95    17:26:15
 ************************************
  HEC-2 WATER SURFACE PROFILES

  Version   4.6.2;  May 1991
 ************************************
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T1   *  Rio Verde South FIS, Wash 9                    File: W9FW1.IH2
T2   *  For: FCDMC #    93-07       By:MKE, Ltd       FB & EEK 8-23-94
T3   *  Wash 9,100-Yr Floodplain                      Revised: 9-12-95
T4   *  GR data taken from stereo model; received on 9-07-95 from AMC
T5   *  200 scale 2 ft CI mapping flown by AMC on 12-22-93 & 8-22-94
T6   *  with survey control by Burgess & Niple on 10-21-93;11-9-93;12-9-93
T7   *  supplemental cross section data (GR & BT) surveyed by ALS as noted.
T8   *  Source of 100-Yr flowrate from HEC-1 Analysis by GVSCE. Table F-3
T9   *  Special culvert routine used.   Subcritical analysis.

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0         2         0         0        -1         0         0         0      1503

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      1         0        -1         0         0         0        -1         0         0         0


J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    150        101        200

           HEC-1 Concentration Point C570, at confluence w/Verde River.
           Starting WSEL is critical water surface.

           START Hydraulically Similar Reach 9A
           895 ft u/s of confluence w/Verde River


NC    0.065      0.065      0.045        0.1         0.3

QT         2       1140       1140
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```
ET                0       9.1                                                                 9915.34   10020.41

NH        7     0.065    9828.8     0.045    9865.1     0.065    9982.5     0.065    9982.5     0.065
NH   9982.5     0.045   10020.4     0.065   10175.7

          HEC-1 Concentration Point C570, at confluence w/Verde River.
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          Starting WSEL is critical water surface.
          Cross-section .170 is hydraulic distance not thalweg distance.
          START Hydraulically Similar Reach 9A
          895 ft u/s of confluence w/Verde River
X1   0.170       37    9982.5   10020.4         0          0          0
GR  1506.7   9597.8    1506.3    9638.2    1506.2     9652.1    1504.9    9655.9    1505.1    9672.0
GR  1504.7   9680.9    1505.0    9693.9    1505.5     9710.8    1505.1    9724.9    1504.2    9742.4
GR  1504.0   9762.5    1502.8    9776.8    1501.9     9801.1    1502.8    9808.5    1503.0    9819.6
GR  1501.5   9828.8    1500.5    9833.1    1500.6     9851.5    1500.6    9865.1    1502.7    9876.0
GR  1503.1   9889.5    1502.9    9905.8    1502.4     9932.3    1502.5    9950.6    1502.3    9968.0
GR  1502.2   9982.5    1501.4    9991.4    1501.2     9999.5    1501.2   10000.0    1501.3   10004.6
GR  1502.2  10020.4    1503.4   10037.7    1503.9    10063.4    1504.6   10089.4    1505.4   10131.5
GR  1505.7  10163.8    1505.6   10175.7       0.0        0.0        0.0       0.0       0.0       0.0

ET                              9.1                                                           9981.40   10043.23

NH        8     0.065    9874.7      .045    9907.3      .065    9981.4      .065    9981.4     0.065
NH   9981.4      .045   10021.7      .065   10080.8      .065   10187.9

          X-Section extended to the right of STA 10187.9 to contain flows
          Ground points from 1" = 200', 2 ft contour map, by AMC

          X-Section extended to the right of STA 10187.9 to contain flows
          Ground points from 1" = 200', 2 ft contour map, by AMC
X1   0.220       26    9981.4   10021.7       320        200     261.09
GR  1512.1   9784.5    1512.1    9799.9    1509.6     9816.2    1508.4    9826.3    1508.2    9849.0
GR  1507.4   9874.7    1506.3    9890.6    1505.8     9907.3    1507.0    9915.9    1507.4    9923.0
GR  1507.1   9936.0    1506.8    9957.4    1506.2     9975.7    1506.0    9981.4    1504.6    9990.7
GR  1504.3  10000.0    1504.8   10013.6    1505.5    10021.7    1505.9   10040.2    1505.6   10058.6
GR  1505.3  10080.8    1505.1   10100.6    1505.6    10121.3    1506.4   10139.9    1506.6   10159.8
GR  1506.4  10187.9

          HEC-1 Concentration Point C569, near Res. Boundary at R.M 0.265

QT        2      1010      1010

ET                              9.1                                                           9982.79   10018.81

NC   0.065     0.065     0.045

          HEC-1 Concentration Point C569, near Res. Boundary at R.M 0.265
          GR records deleted from Sta 9731.9 to 9963.4 and from
               Sta 10153.4 to 10324.0
                 to restrict flow to effective area without X3 records.
X1   0.302       14    9982.8   10018.8       280        500     436.82
GR  1513.2   9963.4    1512.4    9976.9    1511.5     9982.8    1508.9    9988.6    1508.5   10000.0
GR  1509.1  10007.8    1511.0   10018.8    1510.8    10035.5    1510.9   10051.7    1511.0   10065.5
GR  1512.3  10081.8    1512.4   10103.8    1512.9    10131.9    1513.4   10153.4

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ET                              9.1                                                           9938.66   10017.41

NH        6     0.045    9573.6     0.065    9833.5     0.045    9844.3     0.065    9984.5     0.045
NH   10017.     0.065   10055.1
```

```
          Gr records deleted from Sta 9521.1 to 9640.5 and from
               Sta 10055.1 to 10119.1
                 to restrict flow to effective area without X3 records.
X1    0.402       29    9984.5   10017.4       445       450    528.45
GR   1520.0   9690.5   1519.6    9707.5    1518.5    9721.6    1519.1   9739.5   1519.8   9752.0
GR   1519.7   9770.8   1519.5    9793.4    1519.8    9814.9    1519.3   9824.7   1516.9   9833.5
GR   1518.1   9844.3   1518.7    9862.6    1519.9    9875.5    1519.8   9882.6   1518.1   9898.2
GR   1519.1   9904.2   1519.2    9917.0    1519.5    9933.8    1519.8   9946.5   1519.7   9958.6
GR   1518.9   9967.8   1519.7    9984.5    1518.7    9996.2    1517.8  10000.0   1515.2  10006.2
GR   1515.7  10010.5   1519.3   10017.4    1520.0   10034.1    1520.2  10055.1

ET                     9.1                                                 9947.0  10062.67

NH       9      .065    9440.6      .045    9444.5     0.065    9674.5     0.045   9695.4      .065
NH  9797.1    0.045    9814.5      .065    9995.9      .045   10007.1     0.065  10069.2

          Gr records deleted from Sta 9421.6 to 9660.1 and from
               Sta 10069.2 to 10334.3
                 to restrict flow to effective area without X3 records.
X1    0.493       30    9995.9   10007.1       440       470    478.08
GR   1527.3   9660.1   1526.6    9674.5    1525.1    9687.7    1526.6   9695.4   1527.1   9714.6
GR   1527.1   9739.8   1526.8    9765.1    1526.8    9782.1    1525.9   9797.1   1524.0   9806.0
GR   1525.6   9814.5   1526.9    9829.5    1526.9    9854.1    1526.9   9878.6   1526.8   9906.4
GR   1526.9   9923.6   1526.5    9931.5    1525.5    9937.6    1526.5   9947.0   1526.7   9962.3
GR   1527.0   9981.1   1526.4    9992.3    1525.0    9995.9    1522.9   9998.5   1522.7  10000.0
GR   1525.4  10007.1   1526.1   10012.1    1526.3   10030.4    1527.0  10051.2   1527.3  10069.2

ET                     9.1                                                 9898.90 10006.21

NH       7      .065    9869.4      .045    9880.2     0.065    9991.1      .065   9991.1      .065
NH  9991.1      .045   10006.2     0.065   10231.5

          Gr records deleteds from Sta 9298.5 to 9756.4 and from
               Sta 10231.5 to 10289.7
                 to restrict flow to effective area without X3 records.
X1    0.585       23    9991.1   10006.2       460       460    486.23
GR   1535.5   9756.4   1535.3    9800.9    1534.9    9834.9    1534.1   9854.3   1532.5   9869.4
GR   1532.9   9880.2   1534.4    9893.9    1534.5    9912.9    1534.5   9933.6   1535.0   9956.2
GR   1534.8   9980.0   1534.6    9991.1    1529.4    9999.9    1529.3  10000.0   1534.1  10006.2
GR   1534.4  10019.6   1534.0   10033.2    1534.4   10053.0    1534.6  10086.0   1534.6  10124.4
GR   1535.2  10159.2   1535.4   10198.6    1535.6   10231.5

          HEC-1 concentration Point C568, at Forest Rd., near McDowell Mtn. Rd.
          Culvert under Forest Rd is smaller than FCDMC min. specifications
          thus, all over road.  Change roughness for street flow.

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          START Hydrualically Similar Reach 9B

QT        2       1010       1010

NC    0.020      0.065      0.045

ET                     9.1                                                 9975.51 10027.01

          HEC-1 concentration Point C568, at Forest Rd., near McDowell Mtn. Rd.
          Culvert under Forest Rd is smaller than FCDMC min. specifications
          thus, all over road.  Change roughness for street flow.
          START Hydrualically Similar Reach 9B
          GR records deleted from Sta 9227.7 to 9898.4
                 to restrict flow to effective area without X3 records.
X1    0.691       14    9977.9   10027         380       640    559.77
GR   1542.7   9898.4   1542.1    9915.6    1540.9    9925.7    1541.5   9946.0   1541.7   9961.3
GR   1541.2   9977.9   1540.8    9987.8    1540.2   10000.0    1540.3  10021.6   1543.2  10027.0
GR   1544.6  10043.8   1544.9   10082.2    1545.9   10118.0    1546.3  10140.9      0.0      0.0
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          Special Culvert Section #1   culvert crossing Via Hermosa
          Fully expanded flow, 47.1 ft downstream of culvert.

          Cross-section 0.743 GR data from ALS Survey Book 1, page 7.

ET                          9.1                                                    9974.8    10023.61

          Special Culvert Section #1   culvert crossing Via Hermosa
          Fully expanded flow, 47.1 ft downstream of culvert.
          Cross-section 0.743 GR data from ALS Survey Book 1, page 7.
X1    0.743        11     9974.8    10023.6      273.88      273.88      273.88
GR   1547.1    9947.5     1547.0     9962.6      1546.5      9968.1      1547.1    9973.8    1547.7     9974.8
GR   1543.6    9979.8     1543.5      10000      1545.5     10019.5      1548.4   10023.6    1548.8     10026.1
GR   1549.1   10053.0

          Use NC record to set contraction/expansion coeff. for culvert

NC                                      .3          .5

ET                          9.1                                                    9979.91   10020.21

          Cross-section 0.751 GR data from ALS Survey
          Culvert Outlet     Special Culvert Section #2, xing Via Hermosa
                             3 -10'x4' concrete box culverts
                             cross-section is 4 ft d/s of outlet

          Effective flow area=culvert width+expansion ratio 4:1

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          Use NC record to set contraction/expansion coeff. for culvert
          Cross-section 0.751 GR data from ALS Survey
          Culvert Outlet     Special Culvert Section #2, xing Via Hermosa
                             3 -10'x4' concrete box culverts
                             cross-section is 4 ft d/s of outlet
          Effective flow area=culvert width+expansion ratio 4:1
X1    0.751        16     9979.91    10020.2       42.30       42.30       42.30
X3       10                                                                1548.3    1548.3
GR   1550.6    9880.9     1548.8     9914.8      1547.4      9947.5      1547.2    9962.6    1546.5     9968.1
GR   1547.3    9973.8     1547.9     9974.8      1547.9      9979.9      1543.7   9979.91    1543.7     9982.9
GR   1543.7   10017.2     1543.7    10020.2      1547.9     10020.3      1548.6   10023.6    1549.0     10026.1
GR   1549.3   10053.0


ET                          9.1                                                    9979.90   10020.21

SC    3.012       0.4       2.63          0           4          10       49.08       12.1    1544.2     1543.7

          Cross-section 0.762 GR data from ALS Survey Book 1, page 5.
          Culvert Inlet          Special Culvert Section #3, xing Via Hermosa
                                 4 ft u/s of inlet.

          BT information surveyed by ALS @ CL of Via Hermosa


          BT data adjusted on  left to match GR data.
          GR data adjusted on  right to match BT data.
          This is done to reflect the most probable effective flow area.

          Effective flow area by contraction ratio 1:1

          Cross-section 0.762 GR data from ALS Survey Book 1, page 5.
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```
          Culvert Inlet          Special Culvert Section #3, xing Via Hermosa
                                 4 ft u/s of inlet.
          BT information surveyed by ALS @ CL of Via Hermosa
          BT data adjusted on  left to match GR data.
          GR data adjusted on  right to match BT data.
          This is done to reflect the most probable effective flow area.
          Effective flow area by contraction ratio 1:1
X1   0.762        16    9979.91    10020.2      57.10      57.10      57.10
X2                        2    1548.2    1549.5
X3      10                     9979.9              10020.21

BT      -14     9947.9    1549.1              9948.1     1549.0              9961.9    1548.8
BT              9973      1548.8              9983.8     1549.9              9983.8     1552
BT              10016.     1552               10016.     1549.9              10057.    1551.0
BT              10103.    1551.3              10145.     1551.8              10191.    1552.2
BT              10254.    1552.9               10305     1553.4

GR  1549.1     9947.9    1547.9     9974.8    1547.7     9979.9    1544.2    9979.91   1544.2    10020.2
GR  1547.7    10020.21   1549.8    10024.6    1550.2    10026.8    1550.1    10031.8   1550.6    10042.4
GR   1551      10057     1551.3     10103     1551.8     10145     1552.2     10191    1552.9     10254
GR  1553.4     10305

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          Return contraction/expansion coefficients to normal

NC                                                    .1         .3

ET                          9.1                                                 9976.4    10024.51

          Special culvert section #4   culvert crossing Via Hermosa
          26.77 ft u/s of culvert, fully expanded flow.

          Return contraction/expansion coefficients to normal
          Special culvert section #4   culvert crossing Via Hermosa
          26.77 ft u/s of culvert, fully expanded flow.
X1   0.766        12    9976.4    10024.5      20.35      20.35      20.35
GR  1549.8     9947.8    1549.7     9962.2    1549.0     9968.8    1549.4    9973.5    1549.2     9976.4
GR  1545.6     9979.9    1546.3      10000    1546.0    10020.6    1550.5    10024.5   1550.9    10026.7
GR  1550.8    10031.7    1551.3    10042.3

ET                          9.1                                                 9976.09   10025.31

          Gr records deleted from Sta 9751.6 to 9976.1
                to restrict flow to effective area without X3 records.
          GR point added to allow for ET station.  STA 9976.09 added.

          GR records deleted from Sta 9751.6 to 9976.1
                to restrict flow to effective area without X3 records.
          GR point added to allow for ET station.  STA 9976.09 added.
X1   0.783        15    9976.1    10025.3      92.86      92.86      92.86
GR  1552.3    9976.09    1552.3     9976.1    1548.7     9980.3    1548.7    10000.0   1548.4    10021.6
GR  1553.0    10025.3    1553.1    10037.2    1553.5    10061.9    1554.0    10084.6   1553.3    10109.0
GR  1553.9    10131.3    1554.4    10152.3    1555.9    10159.7    1556.0    10172.7   1556.1    10215.1




          Cross-section 0.812 GR data from ALS Survey Book 1, page 14.
          Next 3 cross-section are from ALS survey data
          Width of bridge = 7 ft.
          Cross-section 29.03 ft d/s of CL bridge.

ET                          9.1                                                 9974.4    10019.21
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          Cross-section 0.812 GR data from ALS Survey Book 1, page 14.
          Next 3 cross-section are from ALS survey data
          Width of bridge = 7 ft.
X1   0.812        10     9974.4    10019.2      153.65      153.65      153.65
GR  1554.7    9945.8     1554.5     9960.3      1555.1      9973.1      1555.5    9974.4     1551.6     9976.8
GR  1550.7     10000     1550.9    10018.0      1555.5     10019.2      1555.8   10024.0     1556.3    10039.4

          Cross-section 0.816 GR data from ALS Survey Book 1, pages 12 & 13.
          Cross-section 8.5 ft d/s of CL bridge.
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          GR point added to allow for ET station.  STA 10023.81 added.


ET                            9.1                                                                   9977.2   10023.81

          Cross-section 29.03 ft d/s of CL bridge.
          Cross-section 0.816 GR data from ALS Survey Book 1, pages 12 & 13.
          Cross-section 8.5 ft d/s of CL bridge.
          GR records deleted from Sta 9924.2 to 9977.2 and from
               Sta 10023.8 to 10149.2
                  to restrict flow to effective area without X3 records.
          GR point added to allow for ET station.  STA 10023.81 added.
X1   0.816        6     9977.2    10023.8      20.53       20.53       20.53
GR  1556.0    9977.2     1551.8     9980.3      1551.3      10000      1550.6    10018.7     1555.5    10023.8
GR  1555.5  10023.81

          Cross-section 0.821 GR data from ALS Survey Book 1, page 12.


ET                            9.1                                                                   9976.9   10023.41

          Cross-section 0.821 GR data from ALS Survey Book 1, page 12.
X1   0.821        10     9976.9    10023.4      26.52       26.52       26.52
GR  1555.3    9946.2     1555.0     9960.6      1556.0      9976.1      1556.4    9976.9     1552.1     9980.7
GR  1551.5     10000     1551.4    10018.8      1556.3     10023.4      1556.7   10025.4     1555.3    10036.5

          GR point added to allow for ET station.  STA 10023.01 added.


ET                            9.1                                                                   9977.7   10023.01

          Gr records deleted from Sta 9841.3 to 9977.7 and from
               Sta 10023.0 to 10180.1
                 to restrict flow to effective area without X3 records.
          GR point added to allow for ET station.  STA 10023.01 added.
X1   0.885        6     9977.7     10023      337.77      337.77      337.77
GR  1560.1    9977.7     1556.1     9982.7      1555.6     10000.0      1556.3   10019.0     1560.0    10023.0
GR  1560.0  10023.01

          HEC-1 Concentration Point C567, at Forest Rd. above White Wing Dr.


QT       2       960        960

ET                            9.1                                                                  9982.49   10011.51

          HEC-1 Concentration Point C567, at Forest Rd. above White Win
          Gr records deleted from Sta 9837.6 to 9929.7
X1   0.947       17     9982.5    10011.5      327.76      327.76      327.76
GR  1564.2    9929.7     1564.1     9945.1      1563.7      9968.6      1564.5    9982.5     1560.7     9986.3
GR  1560.6    9999.2     1560.6    10000.0      1560.7     10008.5      1563.8   10011.5     1564.7    10029.2
GR  1565.7   10058.4     1566.3    10088.3      1568.1     10103.7      1570.2   10118.3     1569.3    10131.1
GR  1570.3   10142.5     1570.6    10162.1

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```
          START Hydraulically Similar Reach 9C

NC     0.03       .055       0.03

ET                          9.1                                                    9926.7     10057.71

          START Hydraulically Similar Reach 9C
          GR records deleted from Sta 9761.3 to 9918.8 and from
               Sta 10124.0 to 10248.1
                 to restrict flow to effective area without X3 records.
X1    1.018         13     9926.7    10056.3         400         300      374.69
GR    1573.1     9918.8     1572.8     9926.7      1571.6      9939.8      1570.2      9955.1      1570.5      9984.6
GR    1570.3    10000.0     1570.4    10031.6      1571.5     10043.4      1571.9     10056.3      1572.2     10076.8
GR    1572.6    10089.2     1574.0    10110.6      1575.0     10124.0

          GR point added to allow for ET station.  STA 10047.91 added.

ET                          9.1                                                    9913.8     10047.91

          Dip Crossing at Danny Lane
          Gr records deleted from Sta 9654.3 to 9913.8 and from
               Sta 10047.9 to 10273.6
                 to restrict flow to effective area without X3 records.
          GR point added to allow for ET station.  STA 10047.91 added.
X1    1.128          7     9913.8    10047.9         590         540      580.98
GR    1583.1     9913.8     1580.8     9947.5      1580.2      9984.4      1580.0      10000.0     1581.9      10033.1
GR    1582.6    10047.9     1582.6    10047.91

          GR point added to allow for ET station.  STA 9936.09 added.
          GR point added to allow for ET station.  STA 10034.01 added.

ET                          9.1                                                    9936.09    10034.01

          GR records deleted from9718.3 to 9936.1 and from
               Sta 10034.0 to 10238.8
                 to restrict flow to effective area without X3 records.
          GR point added to allow for ET station.  STA 9936.09 added.
          GR point added to allow for ET station.  STA 10034.01 added.
X1    1.221         10     9936.1     10034         460         510      488.05
GR    1593.5     9936.09     1593.5     9936.1      1590.4      9948.8      1588.6      9967.0      1589.0      9983.6
GR    1589.2    10000.0     1589.6    10013.0      1591.9     10023.6      1592.0      10034.0     1592.0      10034.01

          Dip Crossing at Danny Lane

NC     .022       .022       .022

          GR point added to allow for ET station.  STA  9916.99 added.

ET                          9.1                                                    9916.99    10092.12

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          GR records deleted from Sta 9738.0 to 10246.4 and from
               Sta 10148.1 to 10246.4
                 to restrict flow to effective area without X3 records.
          GR point added to allow for ET station.  STA  9916.99 added.
X1    1.281          8     9917      10092.1         320         310      316.83
GR    1598.5     9916.99     1598.5     9917.0      1597.8      9952.4      1596.6      9984.2      1596.9      10000.0
GR    1597.2    10040.4     1598.1    10092.1      1598.3     10148.1

NC     0.03       0.055      0.03

ET                          9.1                                                    9969.89    10033.12
```

```
          GR records deleted from Sta 9815.2 to 9903.2 and from
               Sta 10076.1 to 10311.3
                 to restrict flow to effective area without X3 records.
X1   1.321        12     9969.9   10033.1       195       230     213.82
GR   1602.0   9903.2     1601.8    9914.5    1600.7    9930.9    1599.8   9949.9    1599.6   9969.9
GR   1598.4   9983.9     1597.5   10000.0    1597.9   10019.2    1599.5  10033.1    1600.3  10051.5
GR   1602.1  10065.6     1603.3   10076.6

          HEC-1 Concentration Point C566, about 0.1 mile above Danny Ln.


QT        2       760        760

ET                             9.1                                                  9925.99  10042.12

          HEC-1 Concentration Point C566, about 0.1 mile above Danny Ln.
X1   1.399        24     9932.8   10042.1       400       385       410
GR   1610.1   9677.7     1610.5    9694.1    1609.6    9706.9    1610.0   9723.0    1609.7   9810.7
GR   1608.8   9831.8     1608.4    9838.1    1608.4    9857.9    1608.4   9889.4    1607.2   9914.8
GR   1605.9   9932.8     1605.4    9959.8    1605.1    9979.0    1604.9  10000.0    1604.7  10025.1
GR   1606.5  10042.1     1607.2   10067.7    1608.4   10088.9    1608.8  10113.7    1610.1  10128.9
GR   1610.2  10216.1     1610.2   10239.7    1609.1   10255.9    1609.2  10276.7       0.0      0.0


ET                             9.1                                                  9910.5   10069.81

          GR records deleted from Sta 9616.0 to 9868.2 and from
               Sta 10088.8 to 10243.3
                 to restrict flow to effective area without X3 records.
X1   1.462        12     9910.5   10069.8       335       340    336.13
GR   1614.6   9868.2     1614.6    9893.9    1614.2    9910.5    1613.5   9933.6    1611.9   9960.4
GR   1610.9   9986.5     1610.0   10000.0    1610.8   10012.4    1611.8  10027.5    1612.7  10044.7
GR   1614.9  10069.8     1615.1   10088.8

          Flow Passing an Island for next cross-sections 1.494 & 1.543
          (see Island Flow Models Files W9IS1SUB.IH2 & W9IS2SUB.IH2)
          GR data stations for cross-sections 1.494 & 1.543 have been shifted
          from AMC stationing.  Photogrammetry (AMC data) basedon different
          thalweg location.  The actual thalweg is located approximately
1
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          95.3' more north for section 1.494 and 92.9' more north for section
          1.543.  Therefore, these values were subtracted from the AMC
          station values to obtain the used GR data stationing.


NH        1       .03     9958.1

ET                             9.1                                                  9873.19  9930.21

          Flow Passing an Island for next cross-sections 1.494 & 1.543
          (see Island Flow Models Files W9Is1.IH2 and W9Is2.IH2)
          GR data stations for cross-sections 1.494 & 1.543 have been shifted
          from AMC stationing.  AMC stationing is based upon a different
          thalweg location.  The actual thalweg is located approximately
          95.3' more north for section 1.494 and 92.9' more north for section
          1.543.  Therefore, these values were subtracted from the AMC
          station values to obtain the used GR data stationing.
          GR records deleted from Sta 9522.9 to 9789.8 and from
               Sta 10043.2 to 10236.3
                 to restrict flow to effective area without X3 records.
X1   1.494        13     9873.2    9930.2       175       190    168.97
GR   1619.5   9789.8     1618.5    9804.2    1617.5    9821.4    1617.1   9838.4    1616.5   9851.7
GR   1616.3   9873.2     1614.9    9892.8    1614.1    9904.7    1614.5   9916.4    1617.0   9930.2
GR   1620.0   9941.3     1621.4    9949.8    1621.5    9958.1
```

```
NH        1       0.03       9952

            GR point 9952.01 added in order to set ET station.

ET                           9.1                                                    9880.9     9952.01


            GR records deleted from Sta 947.6 to 9861.8 and from
                 Sta 10210.5 to 10325.3
                   to restrict flow to effective area without X3 records.
             GR point 9952.01 added in order to set ET station.
X1    1.543         10     9880.9     9952.0        225        245      256.95
GR   1623.7     9861.8     1623.6     9880.9     1623.0     9889.9     1619.2     9907.1     1619.3     9914.0
GR   1620.1     9922.6     1622.8     9932.8     1623.6     9941.0     1624.1     9952.0     1624.1     9952.01


NC      .03       .055        .03

            GR point added to allow for ET station. STA 10040.71 added.

ET                           9.1                                                    9941.09    10040.71

            GR records deleted from Sta 9526.4 to 9861.8 and from
1
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                 Sta 10040.7 to 10257.6
                   to restrict flow to effective area without X3 records.
            GR point added to allow for ET station. STA 10040.71 added.
X1    1.592         13     9941.1    10040.7        235        255      257.56
GR   1632.0     9843.8     1631.7     9899.1     1631.1     9910.6     1629.1     9920.0     1626.9     9941.1
GR   1624.7     9964.1     1624.2     9976.9     1624.4     9987.6     1623.7    10000.0     1624.1    10009.1
GR   1625.3    10021.7     1628.2    10040.7     1628.2    10040.71

            START Hydraulically Similar Reach 9D

            Cross-section data consists of photogrammetric data up to
            STA 10096.6.  Stations and elevations from STA 10096.7 to
            10270 come from contour maps.  Included in the data is the
            presence of a house, shown as a vertical extension.


NC      .065       .11        .03

ET                           9.1                                                    9988.50    10010.21

            START Hydraulically Similar Reach 9D
            Cross-section data consists of photogrammetric data up to
            STA 10096.6.  Stations and elevations from STA 10096.7 to
            10270 come from contour maps.  Included in the data is the
            presence of a house, shown as a vertical extension  (natural run only
X1    1.655         36     9988.5    10010.2        390        285      331.27
GR   1641.8     9705.8     1642.2     9717.8     1641.8     9730.3     1642.3     9735.4     1641.7     9750.4
GR   1641.0     9778.0     1639.4     9806.3     1638.3     9827.7     1638.8     9833.2     1640.2     9842.0
GR   1638.5     9853.2     1637.4     9869.6     1637.7     9887.2     1637.3     9904.4     1636.2     9919.6
GR   1634.6     9940.5     1632.3     9955.4     1631.5     9962.2     1630.2     9967.4     1630.5     9972.0
GR   1632.2     9977.6     1632.6     9988.5     1629.8     9990.5     1629.9     9998.7     1630.0    10000.0
GR   1629.8    10008.0     1632.6    10010.2     1632.3    10026.0     1631.0    10048.1     1632.2    10068.5
GR   1632.1    10080.9     1631.8    10096.6       1640    10096.7       1640      10160     1633.2    10160.1
GR     1634      10270

            HEC-1 Concentration Point C565      At Vado Court


QT        2        660        660

ET                           9.1                                                    9989.79    10009.71


            HEC-1 Concentration Point C565      At Vado Court
```

```
          GR records deleted from Sta 9729.8 to 9884.5 and from
               Sta 10035.7 to 10175.1
                 to restrict flow to effective area without X3 records.
X1   1.714        14     9989.8   10009.7       300       320       313
GR   1640.5    9884.5    1638.8    9898.0    1637.3    9911.7    1637.1    9929.8    1637.7    9952.4
GR   1637.7    9971.7    1637.5    9987.2    1637.4    9989.8    1634.9    9990.3    1634.7   10000.0
GR   1634.9   10008.7    1637.3   10009.7    1638.8   10023.7    1640.0   10035.7
```



```
          Cross-section 1.724 GR data from ALS Survey Book 1, page 20,bottom.
          Special Culvert #1   culvert crossing Vado Court
          23.4 ft d/s of culvert, fully expanded flow.

ET                          9.1                                                 9988.23   10018.81

          Cross-section 1.724 GR data from ALS Survey Book 1, page 20,bottom.
          Special Culvert #1   culvert crossing Vado Court
          23.4 ft d/s of culvert, fully expanded flow.
          Use NC record to set contraction/expansion coeff. for culvert
X1   1.724         8     9989.8   10009.8        45        58     51.17
GR   1640.2    9966.5    1639.7    9983.3    1638.2    9989.8    1635.3    9990.2    1635.1   10000.0
GR   1635.4   10009.4    1638.0   10009.8    1639.1   10027.4

          Use NC record to set contraction/expansion coeff. for culvert

NC                                    .3        .5

          Culvert outlet      Special Culvert Section #2, xing Vado Court
                              4 ft d/s of outlet
                              2 - 8' x 4' Concrete Box Culvert
                              0.5 ft of sediment deposition

          Section 1.727 GR data constructed from culvert survey data and
          data from cross-section 1.724.
          Effective flow area by expansion ratio 4:1

NH       3       .065     9986.2       .022     10013.8         .11     10094.5

ET                          9.1                                                 9975.47   10016.06

          Culvert outlet      Special Culvert Section #2, xing Vado Court
                              4 ft d/s of outlet
                              2 - 8' x 4' Concrete Box Culvert
                              0.5 ft of sediment deposition
          Section 1.727 GR data constructed from culvert survey data and
          data from cross-section 1.724.
          GR data truncated to left of Sta. 9972.5 since ineffective flow area.
          Effective flow area by expansion ratio 4:1
X1   1.727        14       9987    10013.0       20.01       20.01       20.01
X3      10                                                              1639.4    1639.4
GR   1640.7    9972.5    1637.9    9986.2    1637.9    9987.0    1635.4    9987.1    1635.4    9990.0
GR   1635.4   10000.0    1635.4   10010.0    1635.4   10013.0    1637.9   10013.0    1637.9   10013.8
GR   1641.1   10017.1    1640.5   10021.1    1640.8   10047.3    1641.3   10094.5
```



```
SC   2.022        0.4      2.63          0         3.5          8          38        12.1    1635.69   1635.36

          Culvert Inlet       Special Culvert Section #3
```

```
                          4 ft u/s of inlet
                          0.5 ft of sediment deposition accounted for

          Section 1.736 GR data constructed from culvert survey data and
          data from cross-section 1.740.

          Effective flow area by contraction ratio 1:1

          BT and GR data adjusted to match at ends according to the
          most probable effective flow area.

NH        3       .065     9986.2       .022     10013.8         .11     10094.5

ET                           9.1                                                    9972.50    10094.50

          Culvert Inlet      Special Culvert Section #3, xing Vado Court
                             4 ft u/s of inlet
                             0.5 ft of sediment deposition accounted for
          Section 1.736 GR data constructed from culvert survey data and
          data from cross-section 1.740.
          GR & BT data truncated to left of Sta. 9972.5 (originally from
          Sta.  9703)  due to ineffective flow area, since overtopping flows at
          90 degrees to main flow (see Sheet 3)
          BT and GR data adjusted to match at ends according to the
          most probable effective flow area.
          Effective flow area by contraction ratio 1:1

X1    1.736         12     9972.5    10017.1       46.16       46.16       46.16
X2                             2     1639.2      1640.7
X3       10                                                   1640.5      1640.5

BT       -7     9972.5     1640.7                 9990.8        1641                10009.     1640.9
BT              10017.1     1641.1                10021.1      1640.5                10047.3    1640.8
BT              10094.5     1641.4

GR    1640.7     9972.5     1638.2     9986.2     1638.2      9987.0      1635.7       9987     1635.7      10000
GR    1635.7      10013     1638.2    10013.0     1638.2     10013.8      1641.1    10017.1     1640.5    10021.1
GR    1640.8    10047.3     1641.4    10094.5

          Return Contraction and Expansion Coefficients to Normal

          Cross-section 1.740 GR data from ALS Survey Book 1, page 20, top.
          Special culvert section #4
          22.32 ft d/s of culvert, fully expanded flow.

          GR record deleted: STA 9954.7
                 to restrict flow to effective area without X3 records.

1
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NC      .065        .11        .03         .1          .3

NH        5         .03     9973.9        .022     9979.6         .03       10000        .022    10000.6        .055
NH    10025

ET                           9.1                                                    9973.90    10023.14

          Cross-section 1.740 GR data from ALS Survey Book 1, page 20, top.
          Return Contraction and Expansion Coefficients to Normal
          Special culvert section #4   culvert crossing Vado Court
          22.32 ft d/s of culvert, fully expanded flow.
          GR record deleted: STA 9954.7
X1    1.740          7     9979.1    10000.6       21.34       21.34       21.34
GR    1641.0     9973.9     1639.6     9979.1     1636.7      9979.6      1636.9     9989.1     1636.6      10000
GR    1639.8    10000.6     1641.4      10025


NC      .065        .11        .03
```

```
ET                          9.1                                                 9958.64   10022.36

          GR records deleted from Sta 9787.3 to 9886.0 and from
               Sta 10025.5 to 10247.6
                 to restrict flow to effective area without X3 records.
X1   1.761        12     9988.7   10011.1       130        85      112.63
GR   1645.0   9886.0     1644.6    9918.4    1644.2    9940.7      1643.0   9961.4   1642.9   9978.0
GR   1641.8   9988.7     1639.6    9989.9    1639.5    9998.6      1639.9  10000.0   1639.9  10008.5
GR   1642.3  10011.1     1643.4   10025.5



          d/s fully expanded flow.     Special Culvert Section #1
                                       22.54 ftd/s of Culvert at Quail Haven

          GR data for cross-section 1.785 extended using topo. data.
          New cross-section extends from Sta 9890 to 10080.

NH       9       .03       9990       .022      9990.3       .022      9990.3       .022     9990.3       .022
NH  9990.3       .03    10009.5       .022     10009.9       .055     10024.7       .055      10080

ET                          9.1                                                 9942.97   10034.46

          d/s fully expanded flow.     Special Culvert Section #1
                                       22.54 ftd/s of Culvert at Quail Haven
          GR data for cross-section 1.785 extended using topo. data.
1
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          New cross-section extends from Sta 9890 to 10080.
X1   1.785        10     9990   10009.9       100       140      122.26
GR    1646      9890     1644.3    9974.1    1643.7    9985.7      1643.4   9990     1641.5   9990.3
GR   1641.0    10000     1641.5   10009.5    1643.5   10009.9      1644.7  10024.7    1646    10080

          Use NC record to set Contraction/Expansion Coeff. for Culvert

NC                                      .3        .5

NH       3       .03     9986.1       .02     10013.9       .055     10036.6

          Culvert Outlet       Special Culvert Section #2, xing Quail Haven
                               4 ft d/s of outlet
                               2 - 8' x 4' Concrete Box Culvert
                               1.5 ft of sediment deposition accounted for

          Section 1.788 GR data constructed from culvert survey data and
          data from cross-section 1.785.

          Effective flow area by using expansion ratio 4:1

ET                          9.1                                                 9951.24   10026.26


          Use NC record to set Contraction/Expansion Coeff. for Culvert
          Culvert Outlet       Special Culvert Section #2, xing Quail Haven
                               4 ft d/s of outlet
                               2 - 8' x 4' Concrete Box Culvert
                               1.5 ft of sediment deposition accounted for
          Section 1.788 GR data constructed from culvert survey data and
          data from cross-section 1.785.
          Effective flow area by using expansion ratio 4:1
X1   1.788        14     9986.9   10013.1     18.58     18.58       18.58
X3      10                                                          1644.5   1644.5
GR   1645.3   9785.4     1646.3    9836.4    1645.4    9937.5      1644.3   9974.1   1644.4   9986.1
GR   1644.4   9986.9     1641.9    9986.9    1641.9    9989.9      1641.9  10010.1   1641.9  10013.1
```

```
GR   1644.4    10013.2     1644.4    10013.9     1644.7    10024.7     1646.9    10036.6

SC    2.022         .4       2.63          0        2.5          8         33       12.1    1642.28    1641.90

           Culvert Inlet       Special Culvert Section #3, xing Quail Haven
                               4 ft u/s of inlet
                               1.5 ft of sediment deposition accounted for

NH         3       .065      9986.1       .022     10013.9        0.11     10133.4

           Cross-section 1.796 BT data from ALS Survey Book 1, page 31.

           Section 1.796 GR data constructed from culvert survey data and
           data from cross-section 1.799.

           Effective flow area by using 1:1 contraction ratio
1
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           BT and GR data adjusted to match at ends according to the
           most probable effective flow area.

ET                              9.1                                                    9892.91    10042.02


           Culvert Inlet       Special Culvert Section #3, xing Quail Haven
                               4 ft u/s of inlet
                               1.5 ft of sediment deposition accounted for
           Cross-section 1.796 BT data from ALS Survey Book 1, page 31.
           Section 1.796 GR data constructed from culvert survey data and
           data from cross-section 1.799.
           GR and BT's truncated to left of Sta. 9985 and right of Sta.  10133.4
           due to ineffective flow areas. (orig. from Sta. 9785.3 to 10133.4)
           Added BT-GR intersection point at Sta. 9977.2 since BT's coded per
           Figure 3-16 (HEC-2, Sep 1990).

           Effective flow area by using 1:1 contraction ratio
X1    1.796         15     9987.0    10013.1       41.48       41.48       41.48
X2                             2      1644.8      1646.0
X3       10                                                                1640.5     1640.5

BT      -12      9885.0     1646.5                 9937.5      1645.5                 9972.8     1646.0
BT               9977.2     1645.6                 9988.1      1645.6                 9990.7     1646.3
BT              10009.3     1646.5                10027.5      1646.6                10036.6     1646.9
BT              10039.2     1646.3                10084.9      1647.1                10133.4     1647.1

GR    1646.5     9885.0     1645.5     9937.5      1646.0      9972.8      1645.6     9977.2     1644.8      9986.1
GR    1644.8     9986.9     1642.3     9987.0      1642.3     10013.1      1644.8    10013.2     1644.7     10013.9
GR    1646.1    10016.3     1646.3    10031.7      1646.3     10039.2      1647.1    10084.9     1647.1     10133.4

           Return Contraction and Expansion Coefficients to Normal

           Cross-section 1.799 GR data from ALS Survey Book 1, page 32.

           Upstream fully expanded flow.  Special Culvert Section #4
                                          18.65 ft u/s of inlet
                                          culvert crossing Quail Haven


NC                                        .1          .3

ET                              9.1                                                    9982.49    10016.31

           Return Contraction and Expansion Coefficients to Normal
           Cross-section 1.799 GR data from ALS Survey Book 1, page 32.
           Upstream fully expanded flow.  Special Culvert Section #4
                                          18.65 ft u/s of inlet
```

```
                                        culvert crossing Quail Haven
X1    1.799        10     9982.5    10016.3      14.52      14.52      14.52
GR     1646     9972.8     1645.9     9982.5     1644.8     9986.4     1644.8     9988.7     1642.5     9988.9
GR   1642.4      10000     1642.5    10010.3     1645.5    10010.7     1646.1    10016.3     1646.3    10031.7

          GR record added to allow for ET station.  STA 10041.61


ET                          9.1                                                                 9976.2   10041.61

          GR records deleted from Sta 9783.3 to 9976.2 and from
               Sta 10041.6 to 10171.1
                 to restrict flow to effective area without X3 records.
          GR record addedto allow for ET station.  STA 10041.61
X1    1.824         9     9976.2    10041.6      134.15     134.15     134.15
GR   1649.7    9976.2     1647.3     9992.9     1644.8     9993.3     1645.7    10000.0     1646.0    10019.7
GR   1645.6   10026.3     1647.6    10028.3     1648.8    10041.6     1648.8   10041.61


1
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```
    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*PROF 1

 CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

 CCHV=     .100 CEHV=     .300
 1490 NH CARD USED
 *SECNO  .170

 3265 DIVIDED FLOW

 3720 CRITICAL DEPTH ASSUMED
           HEC-1 Concentration Point C570, at confluence w/Verde River.
           Starting WSEL is critical water surface.
           Cross-section .170 is hydraulic distance not thalweg distance.
           START Hydraulically Similar Reach 9A
           895 ft u/s of confluence w/Verde River
      .170      2.41   1502.91   1502.91   1503.00   1503.38       .47       .00       .00   1502.20
    1140.0     853.6     280.4       6.0     156.4      49.9       3.7        .0        .0   1502.20
       .00      5.46      5.62      1.63      .049      .045      .065      .000   1500.50   9775.43
   .020079        0.        0.        0.         0         7         0       .00    228.70  10030.71


 1490 NH CARD USED
 *SECNO  .220

 3265 DIVIDED FLOW

 3280 CROSS SECTION       .22 EXTENDED       .59 FEET

           X-Section extended to the right of STA 10187.9 to contain flows
           Ground points from 1" = 200', 2 ft contour map, by AMC
      .220      2.69   1506.99   1506.73       .00   1507.28       .29      3.89       .02   1506.00
    1140.0      90.3     500.0     549.7      39.3      87.3     191.7       1.6       1.6   1505.50
       .02      2.30      5.73      2.87      .052      .045      .065      .000   1504.30   9880.67
   .010777      320.      261.      200.         4         5         0       .00    279.00  10187.90
```

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*SECNO  .302
          HEC-1 Concentration Point C569, near Res. Boundary at R.M 0.265
          GR records deleted from Sta 9731.9 to 9963.4 and from
               Sta 10153.4 to 10324.0
                 to restrict flow to effective area without X3 records.
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


      .302       3.70    1512.20    1512.11        .00    1512.97        .77       5.54        .14    1511.50
    1010.0        2.2      791.6      216.2        1.6      101.7       69.9        4.2        3.5    1511.00
       .04       1.35       7.78       3.09        .065       .045       .065       .000    1508.50    9978.21
    .014303       280.       437.       500.          3         11          0        .00     102.35   10080.55


1490 NH CARD USED
*SECNO  .402

3265 DIVIDED FLOW

          Gr records deleted from Sta 9521.1 to 9640.5 and from
               Sta 10055.1 to 10119.1
                 to restrict flow to effective area without X3 records.
      .402       4.67    1519.87    1519.69        .00    1520.18        .32       7.17        .05    1519.70
    1010.0      588.8      416.7        4.5      187.1       70.1        3.8        6.5        5.8    1519.30
       .07       3.15       5.94       1.19        .059       .049       .065       .000    1515.20    9696.20
    .014627       445.       528.       450.          4         11          0        .00     331.92   10030.90


1490 NH CARD USED
*SECNO  .493
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
          Gr records deleted from Sta 9421.6 to 9660.1 and from
               Sta 10069.2 to 10334.3
                 to restrict flow to effective area without X3 records.
      .493       4.45    1527.15    1527.15        .00    1527.58        .42       6.60        .03    1525.00
    1010.0      620.3      301.2       88.5      185.4       36.9       35.5        9.2        9.5    1525.40
       .10       3.35       8.17       2.49        .052       .045       .065       .000    1522.70    9663.15
    .014390       440.       478.       470.          0          9          0        .00     397.14   10060.29


1490 NH CARD USED
*SECNO  .585
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
          Gr records deleteds from Sta 9298.5 to 9756.4 and from
               Sta 10231.5 to 10289.7
                 to restrict flow to effective area without X3 records.
      .585       5.83    1535.13    1535.13        .00    1535.53        .40       6.43        .00    1534.60
    1010.0      456.7      363.2      190.0      133.7       49.4       92.4       12.1       13.4    1534.10
       .12       3.42       7.35       2.06        .057       .045       .065       .000    1529.30    9815.22
    .013086       460.       486.       460.          0         11          0        .00     340.02   10155.24


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   14SEP95      17:26:15                                                                                    PAGE   20

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST
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*SECNO  .691
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
          HEC-1 concentration Point C568, at Forest Rd., near McDowell Mtn. Rd.
          Culvert under Forest Rd is smaller than FCDMC min. specifications
          thus, all over road.  Change roughness for street flow.
          START Hydrualically Similar Reach 9B
          GR records deleted from Sta 9227.7 to 9898.4
                to restrict flow to effective area without X3 records.
     .691      2.26   1542.46   1542.46       .00   1543.18       .72      5.72       .10   1541.20
  1010.0     534.6     475.4        .0      67.2      90.5        .0      14.5       16.0   1543.20
     .14      7.96      5.25       .00       .020      .045      .000      .000    1540.20   9905.22
 .010934      380.      560.      640.         0        18         0       .00     120.41  10025.63


*SECNO  .743

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
          Special Culvert Section #1   culvert crossing Via Hermosa
          Fully expanded flow, 47.1 ft downstream of culvert.
          Cross-section 0.743 GR data from ALS Survey Book 1, page 7.
     .743      3.21   1546.71   1546.71       .00   1547.93      1.22      4.13       .15   1547.70
  1010.0       1.1    1008.9        .0        .4     113.8        .0      15.4       16.5   1548.40
     .15      2.43      8.87       .00       .020      .045      .000      .000    1543.50   9965.81
 .022066      274.      274.      274.         0        14         0       .00      49.46  10021.21


CCHV=     .300 CEHV=     .500
*SECNO  .751

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.20


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1548.30 ELREA=      1548.30

          Use NC record to set contraction/expansion coeff. for culvert
          Cross-section 0.751 GR data from ALS Survey
1
   14SEP95      17:26:15                                                                    PAGE   21


          Culvert Outlet     Special Culvert Section #2, xing Via Hermosa
                             3 -10'x4' concrete box culverts
                             cross-section is 4 ft d/s of outlet
          Effective flow area=culvert width+expansion ratio 4:1
     .751      4.26   1547.96   1546.39       .00   1548.50       .54       .37       .21   1543.70
  1010.0        .0    1010.0        .0        .0     171.9        .0      15.5       16.6   1543.70
     .15       .00      5.88       .00       .000      .045      .000      .000    1543.70   9979.91
 .004575       42.       42.       42.         2        11         0       .00      40.29  10020.20


SPECIAL CULVERT

SC  CUNO      CUNV      ENTLC      COFQ      RDLEN      RISE      SPAN      CULVLN     CHRT       SCL       ELCHU      ELCHD
     3          .012       .40      2.63       .00      4.00     10.00      49.08       12         1     1544.20    1543.70

CHART 12 - BOX CULVERT; NON-OFFSET FLARED WINGWALLS; 3/4-INCH CHAMFER AT TOP OF INLET
SCALE  1 - WINGWALLS FLARED 45 DEGREES (1:1); INLET NOT SKEWED

*SECNO  .762

SPECIAL CULVERT INLET CONTROL + WEIR FLOW, EG =   1549.61
SPECIAL CULVERT
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     EGIC       EGOC        H4     QWEIR     QCULV       VCH     ACULV     ELTRD    WEIRLN
  1549.79    1549.64      1.11       48.      970.     4.991     120.0   1549.50       33.


3470 ENCROACHMENT STATIONS=     9979.9   10020.2  TYPE=      1  TARGET=       40.310
          Cross-section 0.762 GR data from ALS Survey Book 1, page 5.
          Culvert Inlet          Special Culvert Section #3, xing Via Hermosa
                                 4 ft u/s of inlet.
          BT information surveyed by ALS @ CL of Via Hermosa
          BT data adjusted on  left to match GR data.
          GR data adjusted on  right to match BT data.
          This is done to reflect the most probable effective flow area.
          Effective flow area by contraction ratio 1:1
     .762      5.02   1549.22       .00       .00   1549.61       .39      1.11       .00   1544.20
  1010.0        .0    1010.0        .0        .0    202.4         .0      15.8       16.6   1544.20
     .16       .04      4.99       .00      .020     .045       .000      .000    1544.20   9979.90
 .003106       57.       57.       57.         2        0          0       .00      40.30  10020.20


CCHV=     .300 CEHV=     .100
*SECNO  .766

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
          Return contraction/expansion coefficients to normal
          Special culvert section #4   culvert crossing Via Hermosa
          26.77 ft u/s of culvert, fully expanded flow.
     .766      3.04   1548.64   1548.64       .00   1549.88      1.25       .14       .09   1549.20
  1010.0        .0    1010.0        .0        .0    112.7         .0      15.8       16.7   1550.50
     .16       .00      8.96       .00      .000     .045       .000      .000    1545.60   9976.95
 .023887       20.       20.       20.         0       14          0       .00      45.94  10022.88


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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  .783
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
          GR records deleted from Sta 9751.6 to 9976.1
                to restrict flow to effective area without X3 records.
          GR point added to allow for ET station.  STA 9976.09 added.
     .783      2.80   1551.20   1551.20       .00   1552.43      1.24      2.21       .00   1552.30
  1010.0        .0    1010.0        .0        .0    113.2         .0      16.1       16.8   1553.00
     .16       .00      8.92       .00      .000     .045       .000      .000    1548.40   9977.38
 .023696       93.       93.       93.         0       11          0       .00      46.47  10023.85


*SECNO  .812
          Cross-section 0.812 GR data from ALS Survey Book 1, page 14.
          Next 3 cross-section are from ALS survey data
          Width of bridge = 7 ft.
     .812      3.55   1554.24   1553.63       .00   1555.08       .84      2.53       .12   1555.50
  1010.0        .0    1010.0        .0        .0    137.4         .0      16.5       16.9   1555.50
     .17       .00      7.35       .00      .000     .045       .000      .000    1550.70   9975.17
 .012107      154.      154.      154.         3        8          0       .00      43.70  10018.87


*SECNO  .816
          Cross-section 29.03 ft d/s of CL bridge.
          Cross-section 0.816 GR data from ALS Survey Book 1, pages 12 & 13.
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          Cross-section 8.5 ft d/s of CL bridge.
          GR records deleted from Sta 9924.2 to 9977.2 and from
               Sta 10023.8 to 10149.2
                  to restrict flow to effective area without X3 records.
          GR point added to allow for ET station.  STA 10023.81 added.
     .816      3.86   1554.46   1553.94       .00   1555.35       .89       .26       .01   1556.00
  1010.0         .0   1010.0         .0        .0     133.1         .0      16.6      16.9   1555.50
     .17        .00     7.59        .00      .000      .045      .000      .000   1550.60   9978.34
 .013273       21.       21.       21.         3        11         0       .00     44.37  10022.71


*SECNO  .821
          Cross-section 0.821 GR data from ALS Survey Book 1, page 12.
     .821      3.36   1554.76   1554.35       .00   1555.73       .97       .37       .01   1556.40
  1010.0         .0   1010.0         .0        .0     127.7         .0      16.7      17.0   1556.30
     .17        .00     7.91        .00      .000      .045      .000      .000   1551.40   9978.35
 .014831       27.       27.       27.         2        15         0       .00     43.60  10021.95


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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  .885
          Gr records deleted from Sta 9841.3 to 9977.7 and from
               Sta 10023.0 to 10180.1
                 to restrict flow to effective area without X3 records.
          GR point added to allow for ET station.  STA 10023.01 added.
     .885      3.75   1559.35   1558.72       .00   1560.20       .85      4.43       .04   1560.10
  1010.0         .0   1010.0         .0        .0     136.9         .0      17.7      17.3   1560.00
     .18        .00     7.38        .00      .000      .045      .000      .000   1555.60   9978.63
 .011675      338.      338.      338.         2        11         0       .00     43.67  10022.30


*SECNO  .947
3280 CROSS SECTION       .95 EXTENDED       .46 FEET

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
          HEC-1 Concentration Point C567, at Forest Rd. above White Win
          Gr records deleted from Sta 9837.6 to 9929.7
     .947      4.06   1564.66   1564.66       .00   1565.42       .76      3.57       .03   1564.50
  960.0      188.3     762.1       9.6      33.6     104.2       7.3      18.7      17.8   1563.80
     .19       5.61      7.32      1.31      .020      .045      .065      .000   1560.60   9929.70
 .010126      328.      328.      328.         0         8         0       .00     98.75  10028.45


*SECNO 1.018
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
          START Hydraulically Similar Reach 9C
          GR records deleted from Sta 9761.3 to 9918.8 and from
               Sta 10124.0 to 10248.1
                 to restrict flow to effective area without X3 records.
    1.018      1.72   1571.92   1571.92       .00   1572.56       .64      4.22       .04   1572.80
  960.0         .0    960.0         .0        .0     149.8         .0      20.0      18.8   1571.90
     .21        .00     6.41        .03      .000      .030      .055      .000   1570.20   9936.31
 .012478      400.      375.      300.         0        18         0       .00    121.35  10057.66


*SECNO 1.128
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
          Dip Crossing at Danny Lane
          Gr records deleted from Sta 9654.3 to 9913.8 and from
```

to restrict flow to effective area without X3 records.
GR point added to allow for ET station. STA 10047.91 added.

1.128	2.14	1582.14	1582.14	.00	1582.82	.67	7.17	.00	1583.10
960.0	.0	960.0	.0	.0	145.8	.0	22.0	20.3	1582.60
.24	.00	6.58	.00	.000	.030	.000	.000	1580.00	9927.82
.012209	590.	581.	540.	0	11	0	.00	110.41	10038.24

*SECNO 1.221
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
GR records deleted from9718.3 to 9936.1 and from
Sta 10034.0 to 10238.8
to restrict flow to effective area without X3 records.
GR point added to allow for ET station. STA 9936.09 added.
GR point added to allow for ET station. STA 10034.01 added.

1.221	2.50	1591.10	1591.10	.00	1591.97	.87	5.64	.02	1593.50
960.0	.0	960.0	.0	.0	128.5	.0	23.5	21.4	1592.00
.25	.00	7.47	.00	.000	.030	.000	.000	1588.60	9945.93
.010969	460.	488.	510.	0	8	0	.00	73.99	10019.92

*SECNO 1.281
3280 CROSS SECTION 1.28 EXTENDED .15 FEET

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
GR records deleted from Sta 9738.0 to 10246.4 and from
Sta 10148.1 to 10246.4
to restrict flow to effective area without X3 records.
GR point added to allow for ET station. STA 9916.99 added.

1.281	1.85	1598.45	1598.45	.00	1598.88	.43	2.54	.13	1598.50
960.0	.0	931.3	28.7	.0	174.7	13.8	24.7	22.5	1598.10
.27	.00	5.33	2.08	.000	.022	.022	.000	1596.60	9919.69
.006127	320.	317.	310.	0	19	0	.00	228.41	10148.10

*SECNO 1.321
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
GR records deleted from Sta 9815.2 to 9903.2 and from
Sta 10076.1 to 10311.3
to restrict flow to effective area without X3 records.

1.321	2.79	1600.29	1600.29	.00	1601.04	.75	1.50	.03	1599.60
960.0	41.6	909.0	9.4	14.3	127.6	7.2	25.5	23.3	1599.50
.28	2.90	7.12	1.31	.030	.030	.055	.000	1597.50	9939.54
.008136	195.	214.	230.	0	14	0	.00	111.74	10051.28

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

*SECNO 1.399
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
HEC-1 Concentration Point C566, about 0.1 mile above Danny Ln.

1.399	1.69	1606.39	1606.39	.00	1606.96	.57	3.98	.05	1605.90
760.0	3.6	756.4	.0	1.7	124.6	.0	26.8	24.4	1606.50
.30	2.17	6.07	.00	.030	.030	.000	.000	1604.70	9925.99

.012456	400.	410.	385.	0	14	0	.00	115.09	10041.08

*SECNO 1.462
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
GR records deleted from Sta 9616.0 to 9868.2 and from
Sta 10088.8 to 10243.3
to restrict flow to effective area without X3 records.

1.462	2.61	1612.61	1612.61	.00	1613.25	.64	4.20	.01	1614.20
760.0	.0	760.0	.0	.0	118.2	.0	27.7	25.2	1614.90
.31	.00	6.43	.00	.000	.030	.000	.000	1610.00	9948.55
.012515	335.	336.	340.	0	14	0	.00	94.38	10042.93

1490 NH CARD USED
*SECNO 1.494
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
Flow Passing an Island for next cross-sections 1.494 & 1.543
(see Island Flow Models Files W9Is1.IH2 and W9Is2.IH2)
GR data stations for cross-sections 1.494 & 1.543 have been shifted
from AMC stationing. AMC stationing is based upon a different
thalweg location. The actual thalweg is located approximately
95.3' more north for section 1.494 and 92.9' more north for section
1.543. Therefore, these values were subtracted from the AMC
station values to obtain the used GR data stationing.
GR records deleted from Sta 9522.9 to 9789.8 and from
Sta 10043.2 to 10236.3
to restrict flow to effective area without X3 records.

1.494	2.86	1616.96	1616.96	.00	1617.67	.71	1.76	.01	1616.30
760.0	42.1	717.9	.0	14.4	103.7	.0	28.2	25.5	1617.00
.32	2.93	6.92	.00	.030	.030	.000	.000	1614.10	9841.51
.008802	175.	169.	190.	0	8	0	.00	88.47	9929.98

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

1490 NH CARD USED
*SECNO 1.543
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
GR records deleted from Sta 947.6 to 9861.8 and from
Sta 10210.5 to 10325.3
to restrict flow to effective area without X3 records.
GR point 9952.01 added in order to set ET station.

1.543	3.48	1622.68	1622.68	.00	1623.81	1.12	2.48	.04	1623.60
760.0	.0	760.0	.0	.0	89.4	.0	28.8	25.9	1624.10
.33	.00	8.50	.00	.000	.030	.000	.000	1619.20	9891.34
.010691	225.	257.	245.	0	11	0	.00	41.02	9932.35

*SECNO 1.592
GR records deleted from Sta 9526.4 to 9861.8 and from
Sta 10040.7 to 10257.6
to restrict flow to effective area without X3 records.
GR point added to allow for ET station. STA 10040.71 added.

1.592	2.35	1626.05	1626.03	.00	1626.77	.72	2.84	.12	1626.90
760.0	.0	760.0	.0	.0	111.9	.0	29.4	26.2	1628.20
.34	.00	6.79	.00	.000	.030	.000	.000	1623.70	9949.99
.011389	235.	258.	255.	1	14	0	.00	76.62	10026.61

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*SECNO 1.655
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
          START Hydraulically Similar Reach 9D
          Cross-section data consists of photogrammetric data up to
          STA 10096.6.  Stations and elevations from STA 10096.7 to
          10270 come from contour maps.  Included in the data is the
          presence of a house, shown as a vertical extension  (natural run only
    1.655      3.13   1632.93   1632.93       .00   1633.69       .76      3.27       .00   1632.60
    760.0     133.1     509.4     117.4      45.7      60.7      88.4      30.6      27.1   1632.60
      .35      2.91      8.39      1.33      .065      .030      .110      .000   1629.80   9951.29
  .008557      390.      331.      285.         0        11         0       .00    145.32  10096.61


*SECNO 1.714
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
          HEC-1 Concentration Point C565      At Vado Court
1
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          GR records deleted from Sta 9729.8 to 9884.5 and from
               Sta 10035.7 to 10175.1
                 to restrict flow to effective area without X3 records.
    1.714      3.68   1638.38   1638.38       .00   1639.13       .75      2.19       .00   1637.40
    660.0     123.7     532.6       3.6      76.1      69.2       5.4      31.8      28.0   1637.30
      .37      1.62      7.70       .67      .065      .030      .110      .000   1634.70   9901.87
  .005739      300.      313.      320.         0         8         0       .00    117.88  10019.75


*SECNO 1.724

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
          Cross-section 1.724 GR data from ALS Survey Book 1, page 20,bottom.
          Special Culvert #1   culvert crossing Vado Court
          23.4 ft d/s of culvert, fully expanded flow.
          Use NC record to set contraction/expansion coeff. for culvert
    1.724      3.46   1638.56   1638.56       .00   1640.12      1.56       .39       .08   1638.20
    660.0        .2     658.2       1.6        .3      65.6       2.5      31.9      28.1   1638.00
      .37       .76     10.04       .61      .065      .030      .110      .000   1635.10   9988.22
  .011208        45.       51.       58.         0        11         0       .00     30.59  10018.81


CCHV=     .300 CEHV=     .500
1490 NH CARD USED
*SECNO 1.727

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.42

          Culvert outlet      Special Culvert Section #2, xing Vado Court
                              4 ft d/s of outlet
                              2 - 8' x 4' Concrete Box Culvert
                              0.5 ft of sediment deposition
          Section 1.727 GR data constructed from culvert survey data and
          data from cross-section 1.724.
          GR data truncated to left of Sta. 9972.5 since ineffective flow area.
          Effective flow area by expansion ratio 4:1
    1.727      4.70   1640.10   1638.11       .00   1640.51       .41       .05       .35   1637.90
    660.0      15.1     637.8       7.1      13.6     122.2       4.3      32.0      28.1   1637.90
      .37      1.10      5.22      1.67      .047      .022      .033      .000   1635.40   9975.42
  .000956       20.       20.       20.         4        15         0       .00     40.65  10016.07


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

SPECIAL CULVERT

SC	CUNO	CUNV	ENTLC	COFQ	RDLEN	RISE	SPAN	CULVLN	CHRT	SCL	ELCHU	ELCHD
	2	.022	.40	2.63	.00	3.50	8.00	38.00	12	1	1635.69	1635.36

CHART 12 - BOX CULVERT; NON-OFFSET FLARED WINGWALLS; 3/4-INCH CHAMFER AT TOP OF INLET
SCALE 1 - WINGWALLS FLARED 45 DEGREES (1:1); INLET NOT SKEWED

1490 NH CARD USED
*SECNO 1.736

SPECIAL CULVERT OUTLET CONTROL + WEIR FLOW EG = 1641.72
3280 CROSS SECTION 1.74 EXTENDED .86 FEET

SPECIAL CULVERT

EGIC	EGOC	H4	QWEIR	QCULV	VCH	ACULV	ELTRD	WEIRLN
1643.19	1644.01	1.21	232.	425.	3.316	56.0	1640.70	122.

Culvert Inlet Special Culvert Section #3, xing Vado Court
4 ft u/s of inlet
0.5 ft of sediment deposition accounted for
Section 1.736 GR data constructed from culvert survey data and
data from cross-section 1.740.
GR & BT data truncated to left of Sta. 9972.5 (originally from
Sta. 9703) due to ineffective flow area, since overtopping flows at
90 degrees to main flow (see Sheet 3)
BT and GR data adjusted to match at ends according to the
most probable effective flow area.
Effective flow area by contraction ratio 1:1

1.736	5.86	1641.56	.00	.00	1641.72	.17	1.21	.00	1640.70
660.0	.0	639.5	20.5	.0	192.8	48.4	32.2	28.2	1641.10
.37	.00	3.32	.42	.000	.043	.110	.000	1635.70	9972.50
.001629	46.	46.	46.	2	0	0	.00	122.00	10094.50

CCHV= .100 CEHV= .300
1490 NH CARD USED
*SECNO 1.740
3280 CROSS SECTION 1.74 EXTENDED .28 FEET

Cross-section 1.740 GR data from ALS Survey Book 1, page 20, top.
Return Contraction and Expansion Coefficients to Normal
Special culvert section #4 culvert crossing Vado Court
22.32 ft d/s of culvert, fully expanded flow.
GR record deleted: STA 9954.7

1.740	4.68	1641.28	1639.96	.00	1641.91	.63	.04	.14	1639.60
660.0	17.0	623.5	19.5	5.1	95.3	16.7	32.2	28.2	1639.80
.37	3.34	6.54	1.17	.022	.028	.055	.000	1636.60	9973.90
.002816	21.	21.	21.	2	11	0	.00	49.26	10023.16

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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

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    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

*SECNO 1.761

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
          GR records deleted from Sta 9787.3 to 9886.0 and from
               Sta 10025.5 to 10247.6
                 to restrict flow to effective area without X3 records.
    1.761      3.66   1643.16   1643.16       .00   1644.34      1.18       .49       .16   1641.80
    660.0      17.5     639.2       3.2      12.4      72.3       4.8      32.5      28.4   1642.30
      .38      1.42      8.84       .67      .065      .030      .110      .000   1639.50   9958.64
   .007618      130.      113.       85.         0        12         0       .00     63.73  10022.36


1490 NH CARD USED
*SECNO 1.785
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
          d/s fully expanded flow.     Special Culvert Section #1
                                       22.54 ftd/s of Culvert at Quail Haven
          GR data for cross-section 1.785 extended using topo. data.
          New cross-section extends from Sta 9890 to 10080.
    1.785      3.93   1644.93   1644.93       .00   1645.82       .90       .56       .03   1643.40
    660.0      61.1     582.2      16.7      26.5      72.4      13.4      32.8      28.6   1643.50
      .38      2.31      8.05      1.25      .030      .022      .055      .000   1641.00   9942.98
   .003112      100.      122.      140.         0         8         0       .00     91.47  10034.45


CCHV=     .300 CEHV=     .500
1490 NH CARD USED
*SECNO 1.788
          Use NC record to set Contraction/Expansion Coeff. for Culvert
          Culvert Outlet      Special Culvert Section #2, xing Quail Haven
                              4 ft d/s of outlet
                              2 - 8' x 4' Concrete Box Culvert
                              1.5 ft of sediment deposition accounted for
          Section 1.788 GR data constructed from culvert survey data and
          data from cross-section 1.785.
          Effective flow area by using expansion ratio 4:1
    1.788      3.08   1644.98   1644.89       .00   1645.88       .90       .05       .00   1644.40
    660.0      26.0     628.8       5.2      16.0      80.9       5.5      32.8      28.6   1641.90
      .38      1.63      7.78       .94      .030      .020      .047      .000   1641.90   9951.25
   .002751       19.       19.       19.         0        15         0       .00     75.01  10026.25


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


SPECIAL CULVERT

SC  CUNO      CUNV      ENTLC     COFQ      RDLEN     RISE      SPAN      CULVLN    CHRT      SCL       ELCHU     ELCHD
     2          .022      .40      2.63       .00      2.50      8.00      33.00     12         1      1642.28   1641.90

CHART 12 - BOX CULVERT; NON-OFFSET FLARED WINGWALLS; 3/4-INCH CHAMFER AT TOP OF INLET
SCALE  1 - WINGWALLS FLARED 45 DEGREES (1:1); INLET NOT SKEWED

1490 NH CARD USED
*SECNO 1.796
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SPECIAL CULVERT INLET CONTROL + WEIR FLOW, EG = 1646.85

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.53

SPECIAL CULVERT

EGIC	EGOC	H4	QWEIR	QCULV	VCH	ACULV	ELTRD	WEIRLN
1653.50	1653.00	.97	312.	349.	5.874	40.0	1646.00	184.

Culvert Inlet Special Culvert Section #3, xing Quail Haven
4 ft u/s of inlet
1.5 ft of sediment deposition accounted for
Cross-section 1.796 BT data from ALS Survey Book 1, page 31.
Section 1.796 GR data constructed from culvert survey data and
data from cross-section 1.799.
GR and BT's truncated to left of Sta. 9985 and right of Sta. 10133.4
due to ineffective flow areas. (orig. from Sta. 9785.3 to 10133.4)
Added BT-GR intersection point at Sta. 9977.2 since BT's coded per
Figure 3-16 (HEC-2, Sep 1990).

Effective flow area by using 1:1 contraction ratio

1.796	4.05	1646.35	.00	.00	1646.85	.50	.97	.00	1642.30
660.0	34.2	620.9	4.9	54.3	105.7	6.4	33.0	28.7	1642.30
.38	.63	5.87	.76	.060	.022	.044	.000	1642.30	9892.88
.001171	41.	41.	41.	3	0	0	.00	149.18	10042.05

CCHV= .100 CEHV= .300
*SECNO 1.799
3280 CROSS SECTION 1.80 EXTENDED .14 FEET

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .39

Return Contraction and Expansion Coefficients to Normal
Cross-section 1.799 GR data from ALS Survey Book 1, page 32.

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Upstream fully expanded flow. Special Culvert Section #4
18.65 ft u/s of inlet
culvert crossing Quail Haven

1.799	3.73	1646.13	1645.65	.00	1646.99	.86	.03	.11	1645.90
660.0	1.2	658.8	.0	1.9	88.4	.1	33.0	28.7	1646.10
.39	.65	7.45	.01	.065	.030	.110	.000	1642.40	9972.80
.007517	15.	15.	15.	2	11	0	.00	46.71	10019.51

*SECNO 1.824
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
GR records deleted from Sta 9783.3 to 9976.2 and from
Sta 10041.6 to 10171.1
to restrict flow to effective area without X3 records.
GR record addedto allow for ET station. STA 10041.61

1.824	3.28	1648.08	1648.08	.00	1649.01	.93	1.25	.02	1649.70
660.0	.0	660.0	.0	.0	85.2	.0	33.3	28.9	1648.80
.39	.00	7.75	.00	.000	.030	.000	.000	1644.80	9987.46
.011805	134.	134.	134.	0	11	0	.00	46.17	10033.63

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T1 * Rio Verde South FIS, Wash 9
T2 * For: FCDMC # 93-07 By:MKE, Ltd
T3 * Wash 9,100-Yr Floodway

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 T4   *  GR data taken from stereo model; received on 9-07-95 from AMC
 T5   *  200 scale 2 ft CI mapping flown by AMC on 12-22-93
 T6   *  with survey control by Burgess & Niple on 10-21-93;11-9-93;12-9-93
 T7   *  supplemental cross section data (GR & BT) surveyed by ALS as noted.
 T8   *  Source of 100-Yr flowrate from HEC-1 Analysis by GVSCE. Table F-3
 T9   *  Special culvert routine used.   Subcritical analysis.
 T9   *  Method 1 Encroachment option, & no encroachment at culverts

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0         3         0         0         0         0         0         0   1503.91

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      15         0        -1         0         0         0        -1         0         0         0


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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

 CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

 CCHV=     .100 CEHV=     .300
 1490 NH CARD USED
 *SECNO  .170

 3470 ENCROACHMENT STATIONS=     9915.3   10020.4  TYPE=      1  TARGET=      105.070
           HEC-1 Concentration Point C570, at confluence w/Verde River.
           Starting WSEL is critical water surface.
           Cross-section .170 is hydraulic distance not thalweg distance.
           START Hydraulically Similar Reach 9A
           895 ft u/s of confluence w/Verde River
       .170      3.41   1503.91   1503.85   1502.91   1504.66       .75       .00       .00   1502.20
     1140.0     428.8     711.2        .0     100.0      87.6        .0        .0        .0   1502.20
        .00      4.29      8.12       .00      .065      .045      .000      .000   1500.50   9915.34
    .020992        0.        0.        0.         0         7         0       .00    105.06  10020.40


 1490 NH CARD USED
 *SECNO  .220
 3280 CROSS SECTION       .22 EXTENDED      1.58 FEET


 3470 ENCROACHMENT STATIONS=     9981.4   10043.2  TYPE=      1  TARGET=       61.830
           X-Section extended to the right of STA 10187.9 to contain flows
           Ground points from 1" = 200', 2 ft contour map, by AMC
       .220      3.68   1507.98   1507.44   1506.99   1508.73       .75      4.07       .00   1506.00
     1140.0        .0     942.0     198.0        .0     127.3      48.6       1.1        .5   1505.50
        .01       .00      7.40      4.08      .000      .045      .065      .000   1504.30   9981.40
    .011592      320.      261.      200.         4        11         0       .00     61.83  10043.23


 *SECNO  .302

 3470 ENCROACHMENT STATIONS=     9982.8   10018.8  TYPE=      1  TARGET=       36.020
           HEC-1 Concentration Point C569, near Res. Boundary at R.M 0.265
           GR records deleted from Sta 9731.9 to 9963.4 and from
                Sta 10153.4 to 10324.0
                  to restrict flow to effective area without X3 records.
       .302      4.44   1512.94   1512.26   1512.20   1513.90       .96      5.11       .06   1511.50
```

1010.0	.0	1010.0	.0	.0	128.3	.0	2.7	1.0	1511.00
.03	.02	7.87	.00	.065	.045	.000	.000	1508.50	9982.79
.011492	280.	437.	500.	3	8	0	.00	36.01	10018.80

1

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

1490 NH CARD USED
*SECNO .402
3280 CROSS SECTION .40 EXTENDED .47 FEET

3470 ENCROACHMENT STATIONS= 9938.7 10017.4 TYPE= 1 TARGET= 78.750
Gr records deleted from Sta 9521.1 to 9640.5 and from
Sta 10055.1 to 10119.1
to restrict flow to effective area without X3 records.

.402	5.47	1520.67	1520.62	1519.87	1521.60	.93	7.70	.00	1519.70
1010.0	195.9	814.1	.0	54.1	96.5	.0	4.3	1.7	1519.30
.05	3.62	8.43	.00	.065	.048	.000	.000	1515.20	9938.66
.019774	445.	528.	450.	0	11	0	.00	78.74	10017.40

1490 NH CARD USED
*SECNO .493
3280 CROSS SECTION .49 EXTENDED .86 FEET

3470 ENCROACHMENT STATIONS= 9947.0 10062.7 TYPE= 1 TARGET= 115.670
Gr records deleted from Sta 9421.6 to 9660.1 and from
Sta 10069.2 to 10334.3
to restrict flow to effective area without X3 records.

.493	5.46	1528.16	1528.11	1527.15	1528.81	.65	7.18	.03	1525.00
1010.0	243.4	434.0	332.6	73.9	48.2	91.7	6.3	2.7	1525.40
.07	3.29	9.00	3.62	.065	.045	.065	.000	1522.70	9947.00
.012227	440.	478.	470.	0	6	0	.00	115.67	10062.67

1490 NH CARD USED
*SECNO .585
3280 CROSS SECTION .58 EXTENDED .49 FEET

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9898.9 10006.2 TYPE= 1 TARGET= 107.310
Gr records deleteds from Sta 9298.5 to 9756.4 and from
Sta 10231.5 to 10289.7
to restrict flow to effective area without X3 records.

.585	6.79	1536.09	1536.09	1535.13	1536.83	.74	6.40	.03	1534.60
1010.0	452.7	557.3	.0	129.5	63.8	.0	8.4	3.9	1534.10
.09	3.50	8.73	.00	.065	.045	.000	.000	1529.30	9898.90
.015051	460.	486.	460.	0	12	0	.00	107.30	10006.20

1

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

```
*SECNO  .691

3470 ENCROACHMENT STATIONS=     9975.5   10027.0  TYPE=      1  TARGET=       51.500
          HEC-1 concentration Point C568, at Forest Rd., near McDowell Mtn. Rd.
          Culvert under Forest Rd is smaller than FCDMC min. specifications
          thus, all over road.  Change roughness for street flow.
          START Hydrualically Similar Reach 9B
          GR records deleted from Sta 9227.7 to 9898.4
                to restrict flow to effective area without X3 records.
      .691      3.12   1543.32   1542.93   1542.46   1544.17       .85      7.31       .03   1541.20
    1010.0      46.2     963.8        .0       5.0     132.0        .0      10.3       4.7   1543.20
       .11      9.28      7.30       .00      .020      .045      .000      .000   1540.20   9975.51
   .013388      380.      560.      640.         4        18         0       .00     51.49  10027.00


*SECNO  .743

3470 ENCROACHMENT STATIONS=     9974.8   10023.6  TYPE=      1  TARGET=       48.811
          Special Culvert Section #1   culvert crossing Via Hermosa
          Fully expanded flow, 47.1 ft downstream of culvert.
          Cross-section 0.743 GR data from ALS Survey Book 1, page 7.
      .743      3.57   1547.07   1546.68   1546.71   1548.00       .93      3.81       .02   1547.70
    1010.0        .0    1010.0        .0        .0     130.5        .0      11.1       5.0   1548.40
       .12       .00      7.74       .00      .000      .045      .000      .000   1543.50   9975.56
   .014467      274.      274.      274.         2         5         0       .00     46.17  10021.73


CCHV=     .300 CEHV=     .500
*SECNO  .751

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.64


3470 ENCROACHMENT STATIONS=     9979.9   10020.2  TYPE=      1  TARGET=       40.300

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1548.30 ELREA=      1548.30

          Use NC record to set contraction/expansion coeff. for culvert
          Cross-section 0.751 GR data from ALS Survey
          Culvert Outlet     Special Culvert Section #2, xing Via Hermosa
                             3 -10'x4' concrete box culverts
                             cross-section is 4 ft d/s of outlet
          Effective flow area=culvert width+expansion ratio 4:1
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


      .751      4.22   1547.92   1546.38   1547.96   1548.47       .55       .35       .12   1543.70
    1010.0        .0    1010.0        .0        .0     170.3        .0      11.3       5.1   1543.70
       .12       .00      5.93       .00      .000      .045      .000      .000   1543.70   9979.91
   .005392       42.       42.       42.         2        15         0       .00     40.29  10020.20


SPECIAL CULVERT

SC  CUNO      CUNV      ENTLC     COFQ      RDLEN     RISE      SPAN      CULVLN    CHRT      SCL       ELCHU     ELCHD
    3          .012       .40      2.63        .00      4.00     10.00     49.08     12         1      1544.20   1543.70

CHART 12 - BOX CULVERT; NON-OFFSET FLARED WINGWALLS; 3/4-INCH CHAMFER AT TOP OF INLET
SCALE  1 - WINGWALLS FLARED 45 DEGREES (1:1); INLET NOT SKEWED

*SECNO  .762

SPECIAL CULVERT INLET CONTROL + WEIR FLOW, EG =   1549.60
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 SPECIAL CULVERT

      EGIC       EGOC         H4      QWEIR      QCULV        VCH      ACULV      ELTRD     WEIRLN
   1549.79    1549.60       1.13        48.        969.      4.997      120.0    1549.50        33.


 3470 ENCROACHMENT STATIONS=     9979.9   10020.2  TYPE=      1  TARGET=       40.310
           Cross-section 0.762 GR data from ALS Survey Book 1, page 5.
           Culvert Inlet          Special Culvert Section #3, xing Via Hermosa
                                  4 ft u/s of inlet.
           BT information surveyed by ALS @ CL of Via Hermosa
           BT data adjusted on  left to match GR data.
           GR data adjusted on  right to match BT data.
           This is done to reflect the most probable effective flow area.
           Effective flow area by contraction ratio 1:1
      .762       5.01    1549.21        .00    1549.22    1549.60        .39       1.13        .00    1544.20
    1010.0         .0    1010.0          .0         .0      202.1          .0       11.5         5.1    1544.20
       .12        .04       5.00        .00       .020       .045       .000       .000    1544.20    9979.90
   .003117        57.        57.        57.          2          0          0        .00      40.30   10020.20


 CCHV=      .300 CEHV=      .100
 *SECNO  .766

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9976.4   10024.5  TYPE=      1  TARGET=       48.109
           Return contraction/expansion coefficients to normal
1
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           Special culvert section #4   culvert crossing Via Hermosa
           26.77 ft u/s of culvert, fully expanded flow.
      .766       3.04    1548.64    1548.64    1548.64    1549.88       1.25        .14        .09    1549.20
    1010.0         .0    1010.0          .0         .0      112.7          .0       11.6         5.1    1550.50
       .12        .00       8.96        .00       .000       .045       .000       .000    1545.60    9976.95
   .023883        20.        20.        20.          0         14          0        .00      45.94   10022.88


 *SECNO  .783
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9976.1   10025.3  TYPE=      1  TARGET=       49.220
           GR records deleted from Sta 9751.6 to 9976.1
                 to restrict flow to effective area without X3 records.
           GR point added to allow for ET station.  STA 9976.09 added.
      .783       2.80    1551.20    1551.20    1551.20    1552.43       1.24       2.21        .00    1552.30
    1010.0         .0    1010.0          .0         .0      113.2          .0       11.8         5.2    1553.00
       .13        .00       8.92        .00       .000       .045       .000       .000    1548.40    9977.38
   .023696        93.        93.        93.          0         11          0        .00      46.47   10023.85


 *SECNO  .812

 3470 ENCROACHMENT STATIONS=     9974.4   10019.2  TYPE=      1  TARGET=       44.810
           Cross-section 0.812 GR data from ALS Survey Book 1, page 14.
           Next 3 cross-section are from ALS survey data
           Width of bridge = 7 ft.
      .812       3.55    1554.24    1553.63    1554.24    1555.08        .84       2.53        .12    1555.50
    1010.0         .0    1010.0          .0         .0      137.4          .0       12.3         5.4    1555.50
       .13        .00       7.35        .00       .000       .045       .000       .000    1550.70    9975.17
   .012107       154.       154.       154.          3          8          0        .00      43.70   10018.87


 *SECNO  .816
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3470 ENCROACHMENT STATIONS=     9977.2   10023.8  TYPE=      1  TARGET=       46.609
          Cross-section 29.03 ft d/s of CL bridge.
          Cross-section 0.816 GR data from ALS Survey Book 1, pages 12 & 13.
          Cross-section 8.5 ft d/s of CL bridge.
          GR records deleted from Sta 9924.2 to 9977.2 and from
               Sta 10023.8 to 10149.2
                  to restrict flow to effective area without X3 records.
          GR point added to allow for ET station.  STA 10023.81 added.
     .816      3.86   1554.46   1553.94   1554.46   1555.35       .89       .26       .01   1606.00
    1010.0       .0    1010.0       .0       .0     133.1        .0      12.3       5.4   1555.50
      .13       .00      7.59      .00      .000      .045      .000      .000   1550.60   9978.34
   .013273      21.       21.       21.         3        11         0       .00     44.37  10022.71


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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  .821

3470 ENCROACHMENT STATIONS=     9976.9   10023.4  TYPE=      1  TARGET=       46.510
          Cross-section 0.821 GR data from ALS Survey Book 1, page 12.
     .821      3.36   1554.76   1554.35   1554.76   1555.73       .97       .37       .01   1556.40
    1010.0       .0    1010.0       .0       .0     127.7        .0      12.4       5.4   1556.30
      .13       .00      7.91      .00      .000      .045      .000      .000   1551.40   9978.35
   .014831      27.       27.       27.         2        15         0       .00     43.60  10021.95


*SECNO  .885

3470 ENCROACHMENT STATIONS=     9977.7   10023.0  TYPE=      1  TARGET=       45.310
          Gr records deleted from Sta 9841.3 to 9977.7 and from
               Sta 10023.0 to 10180.1
                 to restrict flow to effective area without X3 records.
          GR point added to allow for ET station.  STA 10023.01 added.
     .885      3.75   1559.35   1558.72   1559.35   1560.20       .85      4.43       .04   1610.10
    1010.0       .0    1010.0       .0       .0     136.9        .0      13.4       5.8   1560.00
      .15       .00      7.38      .00      .000      .045      .000      .000   1555.60   9978.63
   .011675      338.      338.      338.         2        11         0       .00     43.67  10022.30


*SECNO  .947

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9982.5   10011.5  TYPE=      1  TARGET=       29.020
          HEC-1 Concentration Point C567, at Forest Rd. above White Win
          Gr records deleted from Sta 9837.6 to 9929.7
     .947      3.68   1564.28   1564.28   1564.66   1565.93      1.65      5.22       .08   1564.50
    960.0       .0     960.0       .0       .0      93.1        .0      14.3       6.1   1563.80
      .16       .00     10.31      .00      .000      .045      .000      .000   1560.60   9982.72
   .023523      328.      328.      328.         0         5         0       .00     28.78  10011.50


*SECNO 1.018

3301 HV CHANGED MORE THAN HVINS

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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

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9926.7 10057.7 TYPE= 1 TARGET= 131.010
START Hydraulically Similar Reach 9C
GR records deleted from Sta 9761.3 to 9918.8 and from
Sta 10124.0 to 10248.1
to restrict flow to effective area without X3 records.

1.018	1.72	1571.92	1571.92	1571.92	1572.56	.64	6.24	.30	1572.80
960.0	.0	960.0	.0	.0	150.0	.0	15.4	6.7	1571.90
.17	.00	6.40	.03	.000	.030	.055	.000	1570.20	9936.29
.012416	400.	375.	300.	0	14	0	.00	121.42	10057.71

*SECNO 1.128
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9913.8 10047.9 TYPE= 1 TARGET= 134.110
Dip Crossing at Danny Lane
Gr records deleted from Sta 9654.3 to 9913.8 and from
Sta 10047.9 to 10273.6
to restrict flow to effective area without X3 records.
GR point added to allow for ET station. STA 10047.91 added.

1.128	2.14	1582.14	1582.14	1582.14	1582.82	.67	7.15	.00	1633.10
960.0	.0	960.0	.0	.0	145.8	.0	17.3	8.2	1582.60
.20	.00	6.58	.00	.000	.030	.000	.000	1580.00	9927.82
.012209	590.	581.	540.	0	11	0	.00	110.41	10038.24

*SECNO 1.221
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9936.1 10034.0 TYPE= 1 TARGET= 97.920
GR records deleted from9718.3 to 9936.1 and from
Sta 10034.0 to 10238.8
to restrict flow to effective area without X3 records.
GR point added to allow for ET station. STA 9936.09 added.
GR point added to allow for ET station. STA 10034.01 added.

1.221	2.50	1591.10	1591.10	1591.10	1591.97	.87	5.64	.02	1593.50
960.0	.0	960.0	.0	.0	128.5	.0	18.9	9.3	1592.00
.21	.00	7.47	.00	.000	.030	.000	.000	1588.60	9945.93
.010969	460.	488.	510.	0	8	0	.00	73.99	10019.92

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

*SECNO 1.281
3280 CROSS SECTION 1.28 EXTENDED .11 FEET

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9917.0 10092.1 TYPE= 1 TARGET= 175.130
GR records deleted from Sta 9738.0 to 10246.4 and from
Sta 10148.1 to 10246.4

to restrict flow to effective area without X3 records.
GR point added to allow for ET station. STA 9916.99 added.

1.281	1.81	1598.41	1598.41	1598.45	1598.91	.50	2.79	.11	1598.50
960.0	.0	960.0	.0	.0	168.5	.0	19.9	10.2	1598.10
.23	.00	5.70	.06	.000	.022	.022	.000	1596.60	9921.52
.007240	320.	317.	310.	0	19	0	.00	170.60	10092.12

*SECNO 1.321
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9969.9 10033.1 TYPE= 1 TARGET= 63.230
GR records deleted from Sta 9815.2 to 9903.2 and from
Sta 10076.1 to 10311.3
to restrict flow to effective area without X3 records.

1.321	2.68	1600.18	1600.18	1600.29	1601.16	.98	1.88	.05	1599.60
960.0	.0	960.0	.0	.0	120.9	.0	20.7	10.7	1599.50
.24	.05	7.94	.03	.030	.030	.055	.000	1597.50	9969.89
.010861	195.	214.	230.	0	14	0	.00	63.23	10033.12

*SECNO 1.399
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9926.0 10042.1 TYPE= 1 TARGET= 116.130
HEC-1 Concentration Point C566, about 0.1 mile above Danny Ln.

1.399	1.70	1606.40	1606.40	1606.39	1606.96	.57	4.70	.12	1605.90
760.0	3.7	756.3	.0	1.7	125.1	.0	21.8	11.6	1606.50
.26	2.18	6.05	.00	.030	.030	.000	.000	1604.70	9925.99
.012311	400.	410.	385.	0	14	0	.00	115.13	10041.12

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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 1.462
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9910.5 10069.8 TYPE= 1 TARGET= 159.310
GR records deleted from Sta 9616.0 to 9868.2 and from
Sta 10088.8 to 10243.3
to restrict flow to effective area without X3 records.

1.462	2.61	1612.61	1612.61	1612.61	1613.25	.64	4.18	.01	1614.20
760.0	.0	760.0	.0	.0	118.1	.0	22.8	12.4	1614.90
.27	.00	6.44	.00	.000	.030	.000	.000	1610.00	9948.57
.012541	335.	336.	340.	0	14	0	.00	94.35	10042.92

1490 NH CARD USED
*SECNO 1.494
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9873.2 9930.2 TYPE= 1 TARGET= 57.020
Flow Passing an Island for next cross-sections 1.494 & 1.543
(see Island Flow Models Files W9Is1.IH2 and W9Is2.IH2)
GR data stations for cross-sections 1.494 & 1.543 have been shifted
from AMC stationing. AMC stationing is based upon a different
thalweg location. The actual thalweg is located approximately
95.3' more north for section 1.494 and 92.9' more north for section
1.543. Therefore, these values were subtracted from the AMC

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          station values to obtain the used GR data stationing.
          GR records deleted from Sta 9522.9 to 9789.8 and from
               Sta 10043.2 to 10236.3
                 to restrict flow to effective area without X3 records.
    1.494      2.79   1616.89   1616.89   1616.96   1617.79       .90      1.99       .03   1616.30
    760.0        .0     760.0        .0        .0      99.8        .0      23.2      12.7   1617.00
      .28        .05      7.62       .00       .030      .030       .000       .000   1614.10   9873.19
   .011119      175.      169.      190.         0         8         0       .00     56.40   9929.59


1490 NH CARD USED
*SECNO 1.543
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9880.9    9952.0  TYPE=      1  TARGET=       71.109
1
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          GR records deleted from Sta 947.6 to 9861.8 and from
               Sta 10210.5 to 10325.3
                 to restrict flow to effective area without X3 records.
           GR point 9952.01 added in order to set ET station.
    1.543      3.48   1622.68   1622.68   1622.68   1623.81      1.12      2.80       .02   1623.60
    760.0        .0     760.0        .0        .0      89.3        .0      23.7      13.0   1624.10
      .29        .00      8.51       .00       .000      .030       .000       .000   1619.20   9891.34
   .010703      225.      257.      245.         0        11         0       .00     41.01   9932.35


*SECNO 1.592

3470 ENCROACHMENT STATIONS=     9941.1   10040.7  TYPE=      1  TARGET=       99.620
          GR records deleted from Sta 9526.4 to 9861.8 and from
               Sta 10040.7 to 10257.6
                 to restrict flow to effective area without X3 records.
          GR point added to allow for ET station. STA 10040.71 added.
    1.592      2.35   1626.05   1626.03   1626.05   1626.76       .71      2.83       .12   1626.90
    760.0        .0     760.0        .0        .0     112.3        .0      24.3      13.3   1628.20
      .30        .00      6.77       .00       .000      .030       .000       .000   1623.70   9949.93
   .011260      235.      258.      255.         0        14         0       .00     76.71  10026.65


*SECNO 1.655

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9988.5   10010.2  TYPE=      1  TARGET=       21.710
          START Hydraulically Similar Reach 9D
          Cross-section data consists of photogrammetric data up to
          STA 10096.6.  Stations and elevations from STA 10096.7 to
          10270 come from contour maps.  Included in the data is the
          presence of a house, shown as a vertical extension  (natural run only
    1.655      3.69   1633.49   1633.49   1632.93   1635.18      1.70      3.77       .10   1632.60
    760.0        .0     760.0        .0        .0      72.7        .0      25.0      13.7   1632.60
      .30        .00     10.46       .00       .000      .030       .000       .000   1629.80   9988.50
   .011477      390.      331.      285.         0        14         0       .00     21.70  10010.20


*SECNO 1.714
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9989.8   10009.7  TYPE=      1  TARGET=       19.920
          HEC-1 Concentration Point C565      At Vado Court
          GR records deleted from Sta 9729.8 to 9884.5 and from
1
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              Sta 10035.7 to 10175.1
                to restrict flow to effective area without X3 records.
    1.714      3.43   1638.13   1638.13   1638.38   1639.77      1.64      3.64       .02   1637.40
    660.0        .0     660.0        .0        .0      64.3        .0      25.5      13.8   1637.30
      .31       .02     10.27       .00       .065      .030      .000      .000   1634.70   9989.79
   .011791     300.      313.      320.         0        11         0       .00     19.91  10009.70


*SECNO 1.724
3280 CROSS SECTION      1.72 EXTENDED       .32 FEET


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.53


3470 ENCROACHMENT STATIONS=     9988.2   10018.8  TYPE=      1  TARGET=       30.579
          Cross-section 1.724 GR data from ALS Survey Book 1, page 20,bottom.
          Special Culvert #1   culvert crossing Vado Court
          23.4 ft d/s of culvert, fully expanded flow.
          Use NC record to set contraction/expansion coeff. for culvert
    1.724      4.31   1639.41   1638.58   1638.56   1640.35       .94       .38       .21   1638.20
    660.0       2.0     648.0      10.0       1.6      82.6      10.2      25.6      13.9   1638.00
      .31      1.23      7.84       .98       .065      .030      .110      .000   1635.10   9988.23
   .005030      45.       51.       58.         5         5         0       .00     30.58  10018.81


CCHV=     .300 CEHV=     .500
1490 NH CARD USED
*SECNO 1.727

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.33


3470 ENCROACHMENT STATIONS=     9975.5   10016.1  TYPE=      1  TARGET=       40.590
          Culvert outlet      Special Culvert Section #2, xing Vado Court
                              4 ft d/s of outlet
                              2 - 8' x 4' Concrete Box Culvert
                              0.5 ft of sediment deposition
          Section 1.727 GR data constructed from culvert survey data and
          data from cross-section 1.724.
          GR data truncated to left of Sta. 9972.5 since ineffective flow area.
          Effective flow area by expansion ratio 4:1
    1.727      4.75   1640.15   1638.11   1640.10   1640.55       .40       .04       .16   1637.90
    660.0      15.6     637.1       7.3      14.2     123.3       4.4      25.7      13.9   1637.90
      .32      1.10      5.17      1.65       .048      .022      .033      .000   1635.40   9975.47
   .000924      20.       20.       20.         3        14         0       .00     40.59  10016.06


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


SPECIAL CULVERT

SC  CUNO       CUNV       ENTLC      COFQ       RDLEN      RISE       SPAN       CULVLN     CHRT       SCL        ELCHU      ELCHD
    2          .022       .40        2.63       .00        3.50       8.00       38.00      12         1          1635.69    1635.36
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CHART 12 - BOX CULVERT; NON-OFFSET FLARED WINGWALLS; 3/4-INCH CHAMFER AT TOP OF INLET
SCALE  1 - WINGWALLS FLARED 45 DEGREES (1:1); INLET NOT SKEWED

1490 NH CARD USED
*SECNO 1.736

SPECIAL CULVERT OUTLET CONTROL + WEIR FLOW EG =   1641.75
3280 CROSS SECTION      1.74 EXTENDED       .19 FEET

SPECIAL CULVERT

     EGIC      EGOC        H4     QWEIR     QCULV       VCH     ACULV     ELTRD    WEIRLN
  1643.19   1644.06      1.20      243.      422.     3.285      56.0   1640.70      122.



3470 ENCROACHMENT STATIONS=     9972.5   10094.5  TYPE=      1  TARGET=      122.000
          Culvert Inlet       Special Culvert Section #3, xing Vado Court
                              4 ft u/s of inlet
                              0.5 ft of sediment deposition accounted for
          Section 1.736 GR data constructed from culvert survey data and
          data from cross-section 1.740.
          GR & BT data truncated to left of Sta. 9972.5 (originally from
          Sta.  9703)  due to ineffective flow area, since overtopping flows at
          90 degrees to main flow (see Sheet 3)
          BT and GR data adjusted to match at ends according to the
          most probable effective flow area.
          Effective flow area by contraction ratio 1:1

    1.736      5.89   1641.59       .00   1641.56   1641.75       .16      1.20       .00   1690.70
    660.0        .0     638.0      22.0        .0     194.2       50.8      25.9      14.0   1641.10
      .32       .00      3.29       .43       .000      .043      .110      .000   1635.70   9972.50
  .001624       46.       46.       46.         2         0         0       .00    122.00  10094.50


CCHV=     .100 CEHV=     .300
1490 NH CARD USED
*SECNO 1.740

3470 ENCROACHMENT STATIONS=     9973.9   10023.1  TYPE=      1  TARGET=       49.239
          Cross-section 1.740 GR data from ALS Survey Book 1, page 20, top.
          Return Contraction and Expansion Coefficients to Normal
          Special culvert section #4   culvert crossing Vado Court
          22.32 ft d/s of culvert, fully expanded flow.
1
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          GR record deleted: STA 9954.7
    1.740      4.71   1641.31   1639.96   1641.28   1641.93       .61       .04       .14   1639.60
    660.0      17.8     621.3      21.0       5.3      96.2      17.6      26.0      14.0   1639.80
      .32      3.35      6.46      1.19      .022      .028      .055      .000   1636.60   9973.90
  .002712       21.       21.       21.         2        11         0       .00     49.24  10023.14


*SECNO 1.761

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9958.6   10022.4  TYPE=      1  TARGET=       63.721
          GR records deleted from Sta 9787.3 to 9886.0 and from
               Sta 10025.5 to 10247.6
                 to restrict flow to effective area without X3 records.
    1.761      3.68   1643.18   1643.18   1643.16   1644.34      1.16       .48       .16   1641.80
    660.0      18.2     638.4       3.4      12.8      72.6       5.0      26.2      14.2   1642.30
      .32      1.41      8.79       .68      .065      .030      .110      .000   1639.50   9958.64
  .007479       130.      113.       85.         0        15         0       .00     63.72  10022.36
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1490 NH CARD USED
*SECNO 1.785
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9943.0   10034.5  TYPE=      1  TARGET=       91.490
          d/s fully expanded flow.     Special Culvert Section #1
                                       22.54 ftd/s of Culvert at Quail Haven
          GR data for cross-section 1.785 extended using topo. data.
          New cross-section extends from Sta 9890 to 10080.
     1.785      3.97   1644.97   1644.97   1644.93   1645.82       .85       .54       .03   1643.40
     660.0      65.3     576.8      17.8      28.5      73.2      14.4      26.5      14.4   1643.50
       .33      2.29      7.88      1.24      .030      .022      .055      .000   1641.00   9942.97
   .002939      100.      122.      140.         0         8         0       .00     91.49  10034.46


CCHV=     .300 CEHV=     .500
1490 NH CARD USED
*SECNO 1.788

3470 ENCROACHMENT STATIONS=     9951.2   10026.3  TYPE=      1  TARGET=       75.020
          Use NC record to set Contraction/Expansion Coeff. for Culvert
          Culvert Outlet       Special Culvert Section #2, xing Quail Haven
                               4 ft d/s of outlet
                               2 - 8' x 4' Concrete Box Culvert
1
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                               1.5 ft of sediment deposition accounted for
          Section 1.788 GR data constructed from culvert survey data and
          data from cross-section 1.785.
          Effective flow area by using expansion ratio 4:1
     1.788      3.12   1645.02   1644.90   1644.98   1645.88       .86       .05       .00   1644.40
     660.0      28.8     625.4       5.8      17.4      81.9       6.0      26.6      14.4   1641.90
       .33      1.66      7.64       .96      .030      .020      .047      .000   1641.90   9951.24
   .002610       19.       19.       19.         0        15         0       .00     75.02  10026.26


SPECIAL CULVERT

SC  CUNO      CUNV      ENTLC     COFQ      RDLEN     RISE      SPAN      CULVLN    CHRT      SCL       ELCHU     ELCHD
     2          .022      .40      2.63       .00      2.50      8.00      33.00     12         1      1642.28   1641.90

CHART 12 - BOX CULVERT; NON-OFFSET FLARED WINGWALLS; 3/4-INCH CHAMFER AT TOP OF INLET
SCALE  1 - WINGWALLS FLARED 45 DEGREES (1:1); INLET NOT SKEWED

1490 NH CARD USED
*SECNO 1.796

SPECIAL CULVERT INLET CONTROL + WEIR FLOW, EG =   1646.85

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.49

SPECIAL CULVERT

     EGIC      EGOC       H4     QWEIR     QCULV       VCH     ACULV     ELTRD    WEIRLN
   1653.50   1653.04       .98      312.      349.     5.868      40.0   1646.00      184.



3470 ENCROACHMENT STATIONS=     9892.9   10042.0  TYPE=      1  TARGET=      149.109

          Culvert Inlet        Special Culvert Section #3, xing Quail Haven
                               4 ft u/s of inlet
                               1.5 ft of sediment deposition accounted for
          Cross-section 1.796 BT data from ALS Survey Book 1, page 31.
          Section 1.796 GR data constructed from culvert survey data and
          data from cross-section 1.799.
          GR and BT's truncated to left of Sta. 9985 and right of Sta.  10133.4
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          due to ineffective flow areas. (orig. from Sta. 9785.3 to 10133.4)
          Added BT-GR intersection point at Sta. 9977.2 since BT's coded per
          Figure 3-16 (HEC-2, Sep 1990).

          Effective flow area by using 1:1 contraction ratio
    1.796      4.05   1646.35      .00   1646.35   1646.85      .50      .98      .00   1642.30
    660.0      34.4     620.7       4.9      54.6     105.8       6.5     26.7     14.5   1642.30
      .33       .63      5.87       .76      .060      .022      .045      .000  1642.30   9892.91
 .001168        41.      41.       41.         3         0         0      .00   149.11  10042.02


 CCHV=     .100 CEHV=     .300
 *SECNO 1.799
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


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .39


 3470 ENCROACHMENT STATIONS=     9982.5   10016.3  TYPE=      1  TARGET=       33.819
          Return Contraction and Expansion Coefficients to Normal
          Cross-section 1.799 GR data from ALS Survey Book 1, page 32.
          Upstream fully expanded flow.  Special Culvert Section #4
                                         18.65 ft u/s of inlet
                                         culvert crossing Quail Haven
    1.799      3.73   1646.13   1645.65   1646.13   1647.00       .87      .03      .11   1645.90
    660.0        .0     660.0        .0        .0      88.4        .0     26.8     14.5   1646.10
      .33       .02      7.47       .00      .000      .030      .000      .000  1642.40   9982.49
 .007570       15.       15.       15.         2        12         0      .00     33.81  10016.30


 *SECNO 1.824
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9976.2   10041.6  TYPE=      1  TARGET=       65.410
          GR records deleted from Sta 9783.3 to 9976.2 and from
               Sta 10041.6 to 10171.1
                 to restrict flow to effective area without X3 records.
          GR record addedto allow for ET station.  STA 10041.61
    1.824      3.28   1648.08   1648.08   1648.08   1649.01       .93     1.25      .02   1699.70
    660.0        .0     660.0        .0        .0      85.2        .0     27.0     14.7   1648.80
      .34       .00      7.75       .00      .000      .030      .000      .000  1644.80   9987.47
 .011807      134.      134.      134.         0        11         0      .00     46.17  10033.63


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                                                                  THIS RUN EXECUTED 14SEP95    17:26:18
 ************************************
  HEC-2 WATER SURFACE PROFILES

  Version   4.6.2;  May 1991
 ************************************


 NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST
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Wash 9,100-Yr Floodplain

SUMMARY PRINTOUT TABLE 101

	SECNO	EGOC	ELLC	EGIC	ELTRD	QCULV	QWEIR	CLASS	H4	DEPTH	CWSEL	VCH	EG
	.762	1549.64	1548.20	1549.79	1549.50	969.87	48.19	16.00	1.11	5.02	1549.22	4.99	1549.61
	.762	1549.60	1548.20	1549.79	1549.50	968.83	47.70	16.00	1.13	5.01	1549.21	5.00	1549.60
	1.736	1644.01	1639.20	1643.19	1640.70	424.59	231.63	17.00	1.21	5.86	1641.56	3.32	1641.72
	1.736	1644.06	1639.20	1643.19	1640.70	422.23	243.25	17.00	1.20	5.89	1641.59	3.29	1641.75
*	1.796	1653.00	1644.80	1653.50	1646.00	348.96	311.79	16.00	.97	4.05	1646.35	5.87	1646.85
*	1.796	1653.04	1644.80	1653.50	1646.00	349.01	312.20	16.00	.98	4.05	1646.35	5.87	1646.85

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Wash 9,100-Yr Floodplain

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	.170	.00	.00	.00	1500.50	1140.00	1502.91	1502.91	1503.38	200.79	5.62	210.04	80.45
	.170	.00	.00	.00	1500.50	1140.00	1503.91	1503.85	1504.66	209.92	8.12	187.60	78.68
	.220	261.09	.00	.00	1504.30	1140.00	1506.99	1506.73	1507.28	107.77	5.73	318.41	109.82
	.220	261.09	.00	.00	1504.30	1140.00	1507.98	1507.44	1508.73	115.92	7.40	175.91	105.88
	.302	436.82	.00	.00	1508.50	1010.00	1512.20	1512.11	1512.97	143.03	7.78	173.20	84.45
	.302	436.82	.00	.00	1508.50	1010.00	1512.94	1512.26	1513.90	114.92	7.87	128.31	94.21
	.402	528.45	.00	.00	1515.20	1010.00	1519.87	1519.69	1520.18	146.27	5.94	261.06	83.51
	.402	528.45	.00	.00	1515.20	1010.00	1520.67	1520.62	1521.60	197.74	8.43	150.68	71.82
*	.493	478.08	.00	.00	1522.70	1010.00	1527.15	1527.15	1527.58	143.90	8.17	257.79	84.20
	.493	478.08	.00	.00	1522.70	1010.00	1528.16	1528.11	1528.81	122.27	9.00	213.85	91.34
*	.585	486.23	.00	.00	1529.30	1010.00	1535.13	1535.13	1535.53	130.86	7.35	275.49	88.29
*	.585	486.23	.00	.00	1529.30	1010.00	1536.09	1536.09	1536.83	150.51	8.73	193.34	82.33
*	.691	559.77	.00	.00	1540.20	1010.00	1542.46	1542.46	1543.18	109.34	5.25	157.75	96.59
	.691	559.77	.00	.00	1540.20	1010.00	1543.32	1542.93	1544.17	133.88	7.30	136.98	87.29
*	.743	273.88	.00	.00	1543.50	1010.00	1546.71	1546.71	1547.93	220.66	8.87	114.20	67.99
	.743	273.88	.00	.00	1543.50	1010.00	1547.07	1546.68	1548.00	144.67	7.74	130.53	83.97
*	.751	42.30	.00	.00	1543.70	1010.00	1547.96	1546.39	1548.50	45.75	5.88	171.89	149.32
*	.751	42.30	.00	.00	1543.70	1010.00	1547.92	1546.38	1548.47	53.92	5.93	170.29	137.55
	.762	57.10	1549.50	1548.20	1544.20	1010.00	1549.22	.00	1549.61	31.06	4.99	202.39	181.23
	.762	57.10	1549.50	1548.20	1544.20	1010.00	1549.21	.00	1549.60	31.17	5.00	202.16	180.90
*	.766	20.35	.00	.00	1545.60	1010.00	1548.64	1548.64	1549.88	238.87	8.96	112.70	65.35
*	.766	20.35	.00	.00	1545.60	1010.00	1548.64	1548.64	1549.88	238.83	8.96	112.71	65.35
*	.783	92.86	.00	.00	1548.40	1010.00	1551.20	1551.20	1552.43	236.96	8.92	113.25	65.61
*	.783	92.86	.00	.00	1548.40	1010.00	1551.20	1551.20	1552.43	236.96	8.92	113.25	65.61
	.812	153.65	.00	.00	1550.70	1010.00	1554.24	1553.63	1555.08	121.07	7.35	137.43	91.79
	.812	153.65	.00	.00	1550.70	1010.00	1554.24	1553.63	1555.08	121.07	7.35	137.43	91.79
	.816	20.53	.00	.00	1550.60	1010.00	1554.46	1553.94	1555.35	132.73	7.59	133.14	87.67
	.816	20.53	.00	.00	1550.60	1010.00	1554.46	1553.94	1555.35	132.73	7.59	133.14	87.67
	.821	26.52	.00	.00	1551.40	1010.00	1554.76	1554.35	1555.73	148.31	7.91	127.65	82.94
	.821	26.52	.00	.00	1551.40	1010.00	1554.76	1554.35	1555.73	148.31	7.91	127.65	82.94

.885	337.77	.00	.00	1555.60	1010.00	1559.35	1558.72	1560.20	116.75	7.38	136.87	93.48
.885	337.77	.00	.00	1555.60	1010.00	1559.35	1558.72	1560.20	116.75	7.38	136.87	93.48

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	.947	327.76	.00	.00	1560.60	960.00	1564.66	1564.66	1565.42	101.26	7.32	145.07	95.40
*	.947	327.76	.00	.00	1560.60	960.00	1564.28	1564.28	1565.93	235.23	10.31	93.11	62.59
*	1.018	374.69	.00	.00	1570.20	960.00	1571.92	1571.92	1572.56	124.78	6.41	149.79	85.94
*	1.018	374.69	.00	.00	1570.20	960.00	1571.92	1571.92	1572.56	124.16	6.40	150.03	86.15
*	1.128	580.98	.00	.00	1580.00	960.00	1582.14	1582.14	1582.82	122.09	6.58	145.82	86.88
*	1.128	580.98	.00	.00	1580.00	960.00	1582.14	1582.14	1582.82	122.09	6.58	145.82	86.88
*	1.221	488.05	.00	.00	1588.60	960.00	1591.10	1591.10	1591.97	109.69	7.47	128.49	91.66
*	1.221	488.05	.00	.00	1588.60	960.00	1591.10	1591.10	1591.97	109.69	7.47	128.49	91.66
*	1.281	316.83	.00	.00	1596.60	960.00	1598.45	1598.45	1598.88	61.27	5.33	188.48	122.64
*	1.281	316.83	.00	.00	1596.60	960.00	1598.41	1598.41	1598.91	72.40	5.70	168.47	112.83
*	1.321	213.82	.00	.00	1597.50	960.00	1600.29	1600.29	1601.04	81.36	7.12	149.13	106.43
*	1.321	213.82	.00	.00	1597.50	960.00	1600.18	1600.18	1601.16	108.61	7.94	120.92	92.12
*	1.399	410.00	.00	.00	1604.70	760.00	1606.39	1606.39	1606.96	124.56	6.07	126.31	68.10
*	1.399	410.00	.00	.00	1604.70	760.00	1606.40	1606.40	1606.96	123.11	6.05	126.79	68.50
*	1.462	336.13	.00	.00	1610.00	760.00	1612.61	1612.61	1613.25	125.15	6.43	118.18	67.94
*	1.462	336.13	.00	.00	1610.00	760.00	1612.61	1612.61	1613.25	125.41	6.44	118.09	67.86
*	1.494	168.97	.00	.00	1614.10	760.00	1616.96	1616.96	1617.67	88.02	6.92	118.11	81.01
*	1.494	168.97	.00	.00	1614.10	760.00	1616.89	1616.89	1617.79	111.19	7.62	99.81	72.08
*	1.543	256.95	.00	.00	1619.20	760.00	1622.68	1622.68	1623.81	106.91	8.50	89.37	7?
*	1.543	256.95	.00	.00	1619.20	760.00	1622.68	1622.68	1623.81	107.03	8.51	89.33	7?
	1.592	257.56	.00	.00	1623.70	760.00	1626.05	1626.03	1626.77	113.89	6.79	111.90	71.22
	1.592	257.56	.00	.00	1623.70	760.00	1626.05	1626.03	1626.76	112.60	6.77	112.34	71.62
*	1.655	331.27	.00	.00	1629.80	760.00	1632.93	1632.93	1633.69	85.57	8.39	194.86	82.16
*	1.655	331.27	.00	.00	1629.80	760.00	1633.49	1633.49	1635.18	114.77	10.46	72.68	70.94
*	1.714	313.00	.00	.00	1634.70	660.00	1638.38	1638.38	1639.13	57.39	7.70	150.75	87.12
*	1.714	313.00	.00	.00	1634.70	660.00	1638.13	1638.13	1639.77	117.91	10.27	64.30	60.78
*	1.724	51.17	.00	.00	1635.10	660.00	1638.56	1638.56	1640.12	112.08	10.04	68.40	62.34
*	1.724	51.17	.00	.00	1635.10	660.00	1639.41	1638.58	1640.35	50.30	7.84	94.45	93.06
*	1.727	20.01	.00	.00	1635.40	660.00	1640.10	1638.11	1640.51	9.56	5.22	140.08	213.51
*	1.727	20.01	.00	.00	1635.40	660.00	1640.15	1638.11	1640.55	9.24	5.17	141.90	217.16
	1.736	46.16	1640.70	1639.20	1635.70	660.00	1641.56	.00	1641.72	16.29	3.32	241.23	163.52
	1.736	46.16	1640.70	1639.20	1635.70	660.00	1641.59	.00	1641.75	16.24	3.29	244.97	163.77
	1.740	21.34	.00	.00	1636.60	660.00	1641.28	1639.96	1641.91	28.16	6.54	117.12	124.37
	1.740	21.34	.00	.00	1636.60	660.00	1641.31	1639.96	1641.93	27.12	6.46	119.14	126.74

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	1.761	112.63	.00	.00	1639.50	660.00	1643.16	1643.16	1644.34	76.18	8.84	89.50	75.62
*	1.761	112.63	.00	.00	1639.50	660.00	1643.18	1643.18	1644.34	74.79	8.79	90.48	76.32
*	1.785	122.26	.00	.00	1641.00	660.00	1644.93	1644.93	1645.82	31.12	8.05	112.24	118

*	1.785	122.26	.00	.00	1641.00	660.00	1644.97	1644.97	1645.82	29.39	7.88	116.10	121.73
	1.788	18.58	.00	.00	1641.90	660.00	1644.98	1644.89	1645.88	27.51	7.78	102.37	125.83
	1.788	18.58	.00	.00	1641.90	660.00	1645.02	1644.90	1645.88	26.10	7.64	105.30	129.20
*	1.796	41.48	1646.00	1644.80	1642.30	660.00	1646.35	.00	1646.85	11.71	5.87	166.46	192.84
*	1.796	41.48	1646.00	1644.80	1642.30	660.00	1646.35	.00	1646.85	11.68	5.87	166.86	193.12
*	1.799	14.52	.00	.00	1642.40	660.00	1646.13	1645.65	1646.99	75.17	7.45	90.37	76.13
*	1.799	14.52	.00	.00	1642.40	660.00	1646.13	1645.65	1647.00	75.70	7.47	88.39	75.86
*	1.824	134.15	.00	.00	1644.80	660.00	1648.08	1648.08	1649.01	118.05	7.75	85.16	60.74
*	1.824	134.15	.00	.00	1644.80	660.00	1648.08	1648.08	1649.01	118.07	7.75	85.15	60.74

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Wash 9,100-Yr Floodplain

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	.170	1140.00	1502.91	.00	.00	-.09	228.70	.00
	.170	1140.00	1503.91	1.00	.00	1.00	105.06	.00
	.220	1140.00	1506.99	.00	4.08	.00	279.00	261.09
	.220	1140.00	1507.98	.99	4.07	.99	61.83	261.09
	.302	1010.00	1512.20	.00	5.21	.00	102.35	436.82
	.302	1010.00	1512.94	.74	4.96	.74	36.01	436.82
	.402	1010.00	1519.87	.00	7.66	.00	331.92	528.45
	.402	1010.00	1520.67	.81	7.74	.81	78.74	528.45
*	.493	1010.00	1527.15	.00	7.29	.00	397.14	478.08
	.493	1010.00	1528.16	1.01	7.49	1.01	115.67	478.08
*	.585	1010.00	1535.13	.00	7.98	.00	340.02	486.23
*	.585	1010.00	1536.09	.96	7.92	.96	107.30	486.23
*	.691	1010.00	1542.46	.00	7.33	.00	120.41	559.77
	.691	1010.00	1543.32	.86	7.23	.86	51.49	559.77
*	.743	1010.00	1546.71	.00	4.25	.00	49.46	273.88
	.743	1010.00	1547.07	.36	3.76	.36	46.17	273.88
*	.751	1010.00	1547.96	.00	1.25	.00	40.29	42.30
*	.751	1010.00	1547.92	-.04	.85	-.04	40.29	42.30
	.762	1010.00	1549.22	.00	1.26	.00	40.30	57.10
	.762	1010.00	1549.21	-.01	1.29	-.01	40.30	57.10
*	.766	1010.00	1548.64	.00	-.58	.00	45.94	20.35
*	.766	1010.00	1548.64	.00	-.58	.00	45.94	20.35
*	.783	1010.00	1551.20	.00	2.56	.00	46.47	92.86
*	.783	1010.00	1551.20	.00	2.56	.00	46.47	92.86
	.812	1010.00	1554.24	.00	3.05	.00	43.70	153.65
	.812	1010.00	1554.24	.00	3.05	.00	43.70	153.65
	.816	1010.00	1554.46	.00	.21	.00	44.37	20.53
	.816	1010.00	1554.46	.00	.21	.00	44.37	20.53
	.821	1010.00	1554.76	.00	.30	.00	43.60	26.52
	.821	1010.00	1554.76	.00	.30	.00	43.60	26.52
	.885	1010.00	1559.35	.00	4.59	.00	43.67	337.77

.885	1010.00	1559.35	.00	4.59	.00	43.67	337.77

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	.947	960.00	1564.66	.00	5.31	.00	98.75	327.76
*	.947	960.00	1564.28	-.38	4.93	-.38	28.78	327.76
*	1.018	960.00	1571.92	.00	7.26	.00	121.35	374.69
*	1.018	960.00	1571.92	.00	7.64	.00	121.42	374.69
*	1.128	960.00	1582.14	.00	10.22	.00	110.41	580.98
*	1.128	960.00	1582.14	.00	10.22	.00	110.41	580.98
*	1.221	960.00	1591.10	.00	8.96	.00	73.99	488.05
*	1.221	960.00	1591.10	.00	8.96	.00	73.99	488.05
*	1.281	960.00	1598.45	.00	7.35	.00	228.41	316.83
*	1.281	960.00	1598.41	-.04	7.31	-.04	170.60	316.83
*	1.321	960.00	1600.29	.00	1.84	.00	111.74	213.82
*	1.321	960.00	1600.18	-.11	1.77	-.11	63.23	213.82
*	1.399	760.00	1606.39	.00	6.10	.00	115.09	410.00
*	1.399	760.00	1606.40	.00	6.21	.00	115.13	410.00
*	1.462	760.00	1612.61	.00	6.22	.00	94.38	336.13
*	1.462	760.00	1612.61	.00	6.21	.00	94.35	336.13
*	1.494	760.00	1616.96	.00	4.35	.00	88.47	168.97
*	1.494	760.00	1616.89	-.07	4.28	-.07	56.40	168.97
*	1.543	760.00	1622.68	.00	5.72	.00	41.02	256.95
*	1.543	760.00	1622.68	.00	5.79	.00	41.01	256.95
	1.592	760.00	1626.05	.00	3.37	.00	76.62	257.56
	1.592	760.00	1626.05	-.01	3.36	-.01	76.71	257.56
*	1.655	760.00	1632.93	.00	6.88	.00	145.32	331.27
*	1.655	760.00	1633.49	.55	7.44	.55	21.70	331.27
*	1.714	660.00	1638.38	.00	5.44	.00	117.88	313.00
*	1.714	660.00	1638.13	-.25	4.64	-.25	19.91	313.00
*	1.724	660.00	1638.56	.00	.19	.00	30.59	51.17
*	1.724	660.00	1639.41	.85	1.28	.85	30.58	51.17
*	1.727	660.00	1640.10	.00	1.54	.00	40.65	20.01
*	1.727	660.00	1640.15	.04	.73	.04	40.59	20.01
	1.736	660.00	1641.56	.00	1.45	.00	122.00	46.16
	1.736	660.00	1641.59	.03	1.44	.03	122.00	46.16
	1.740	660.00	1641.28	.00	-.28	.00	49.26	21.34
	1.740	660.00	1641.31	.04	-.27	.04	49.24	21.34

1

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	1.761	660.00	1643.16	.00	1.89	.00	63.73	112.63
*	1.761	660.00	1643.18	.02	1.86	.02	63.72	112.63
*	1.785	660.00	1644.93	.00	1.77	.00	91.47	122.26
*	1.785	660.00	1644.97	.04	1.80	.04	91.49	122.26

	1.788	660.00	1644.98	.00	.05	.00	75.01	18.58
	1.788	660.00	1645.02	.04	.05	.04	75.02	18.58
*	1.796	660.00	1646.35	.00	1.37	.00	149.18	41.48
*	1.796	660.00	1646.35	.00	1.33	.00	149.11	41.48
*	1.799	660.00	1646.13	.00	-.21	.00	46.71	14.52
*	1.799	660.00	1646.13	.00	-.22	.00	33.81	14.52
*	1.824	660.00	1648.08	.00	1.95	.00	46.17	134.15
*	1.824	660.00	1648.08	.00	1.95	.00	46.17	134.15

1

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SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= .170 PROFILE= 1 CRITICAL DEPTH ASSUMED

CAUTION SECNO= .493 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= .493 PROFILE= 1 MINIMUM SPECIFIC ENERGY

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CAUTION SECNO= .585 PROFILE= 2 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= .691 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= .691 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= .743 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= .743 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= .751 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= .751 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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CAUTION SECNO= .766 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= .766 PROFILE= 2 MINIMUM SPECIFIC ENERGY

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CAUTION SECNO= .783 PROFILE= 1 MINIMUM SPECIFIC ENERGY
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CAUTION SECNO= .783 PROFILE= 2 MINIMUM SPECIFIC ENERGY

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CAUTION SECNO= .947 PROFILE= 2 MINIMUM SPECIFIC ENERGY

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CAUTION SECNO= 1.221 PROFILE= 2 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1.281 PROFILE= 1 CRITICAL DEPTH ASSUMED

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    14SEP95      17:26:15                                                    PAGE   56


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 CAUTION SECNO=      1.724  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 WARNING SECNO=      1.724  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=      1.727  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      1.727  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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 CAUTION SECNO=      1.785  PROFILE=  1  CRITICAL DEPTH ASSUMED
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    14SEP95      17:26:15                                                    PAGE   57


 WARNING SECNO=      1.796  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      1.796  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=      1.799  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      1.799  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=      1.824  PROFILE=  1  CRITICAL DEPTH ASSUMED
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CAUTION SECNO= 1.824 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 1.824 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.824 PROFILE= 2 MINIMUM SPECIFIC ENERGY

1

FLOODWAY DATA, Wash 9,100-Yr Floodplain
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
.170	105.	188.	6.1	1503.9	1502.9	1.0
.220	62.	176.	6.5	1508.0	1507.0	1.0
.302	36.	128.	7.9	1512.9	1512.2	.7
.402	79.	151.	6.7	1520.7	1519.9	.8
.493	116.	214.	4.7	1528.2	1527.2	1.0
.585	107.	193.	5.2	1536.1	1535.1	1.0
.691	51.	137.	7.4	1543.4	1542.5	.9
.743	46.	131.	7.7	1547.1	1546.7	.4
.751	40.	170.	5.9	1548.0	1548.0	.0
.762	40.	202.	5.0	1549.2	1549.2	.0
.766	46.	113.	9.0	1548.6	1548.6	.0
.783	46.	113.	8.9	1551.2	1551.2	.0
.812	44.	137.	7.3	1554.2	1554.2	.0
.816	44.	133.	7.6	1554.5	1554.5	.0
.821	44.	128.	7.9	1554.8	1554.8	.0
.885	44.	137.	7.4	1559.3	1559.3	.0
.947	29.	93.	10.3	1564.3	1564.7	-.4
1.018	121.	150.	6.4	1571.9	1571.9	.0
1.128	110.	146.	6.6	1582.1	1582.1	.0
1.221	74.	128.	7.5	1591.1	1591.1	.0
1.281	171.	168.	5.7	1598.4	1598.4	.0
1.321	63.	121.	7.9	1600.2	1600.3	-.1
1.399	115.	127.	6.0	1606.4	1606.4	.0
1.462	94.	118.	6.4	1612.6	1612.6	.0
1.494	56.	100.	7.6	1616.9	1617.0	-.1
1.543	41.	89.	8.5	1622.7	1622.7	.0
1.592	77.	112.	6.8	1626.1	1626.1	.0
1.655	22.	73.	10.5	1633.5	1632.9	.6
1.714	20.	64.	10.3	1638.2	1638.4	-.2
1.724	31.	94.	7.0	1639.5	1638.6	.9
1.727	41.	142.	4.7	1640.1	1640.1	.0
1.736	122.	245.	2.7	1641.6	1641.6	.0
1.740	49.	119.	5.5	1641.3	1641.3	.0
1.761	64.	90.	7.3	1643.2	1643.2	.0
1.785	91.	116.	5.7	1644.9	1644.9	.0
1.788	75.	105.	6.3	1645.0	1645.0	.0
1.796	149.	167.	4.0	1646.3	1646.3	.0
1.799	34.	88.	7.5	1646.1	1646.1	.0
1.824	46.	85.	7.8	1648.1	1648.1	.0

WASH 9
HEC-2 ANALYSIS
North Channel
Subcritical Island Flow Analysis

```
1*****************************************
 *  HEC-2 WATER SURFACE PROFILES          *
 *                                        *
 *  Version   4.6.2;  May 1991            *
 *                                        *
 *  RUN DATE    15SEP95    TIME   14:28:46 *
 *****************************************
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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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1
   15SEP95      14:28:46                                                    PAGE    1


                                                    THIS RUN EXECUTED 15SEP95    14:28:46
**************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
**************************************


          GR data stations for cross-sections 1.494 & 1.543 have been shifted
          from AMC stationing.  Photogrammetry (AMC data) based on different
          thalweg location.  The actual thalweg is located approximately
          95.3' more south for section 1.494 and 92.9' more south for section
          1.543.  Therefore, these values were subtracted from the AMC
          station values to obtain the used GR data stationing.

T1   *  Rio Verde South FIS, Wash 9 Island Analysis     File:W9IS1SUB.IH2
T2   *  For: FCDMC #    93-07        By:MKE, Ltd        FB & EEK 8-23-94
T3   *  Wash 9, North Channel 100-Yr Floodplain         Revised: 8-08-95
T4   *  GR data taken from stereo model; received on 9-07-95 from AMC
T5   *  200 scale 2 ft CI mapping flown by AMC on 12-22-93 & 8-22-94
T6   *  with survey control by Burgess & Niple on 10-21-93;11-9-93;12-9-93
T7   *  supplemental cross section data (GR & BT) surveyed by ALS as noted.
T8   *  Source of 100-Yr flowrate from HEC-1 Analysis by GVSCE. Table F-3
T9   *  Sub-critical analysis.
T9   *
T9   *  This is the island analysis for the north channel

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0        2         0         0        -1.         0         0         0    1612.6

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      1         0        -1         0         0         0        -1         0         0         0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    150       101       110       115       200

NC      .03       .055       .03
```

QT	2	760	760							
X1	1.462	29	9910.5	10069.8	335	340	336.13			
X3	10			9893.9		10088.8				
GR	1616.3	9616.0	1616.8	9632.9	1615.9	9646.1	1615.9	9665.7	1615.7	9689.0
GR	1615.9	9767.1	1614.9	9781.3	1612.6	9799.0	1614.0	9820.8	1614.4	9845.0
GR	1614.6	9868.2	1614.6	9893.9	1614.2	9910.5	1613.5	9933.6	1611.9	9960.4
GR	1610.9	9986.5	1610.0	10000.0	1610.8	10012.4	1611.8	10027.5	1612.7	10044.7
GR	1614.9	10069.8	1615.1	10088.8	1615.1	10115.4	1615.0	10142.5	1614.7	10172.2
GR	1614.2	10208.1	1614.3	10220.4	1614.0	10234.5	1614.2	10243.3	0.0	0.0

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QT	2	610	610							
NH	2	.03	10029.6	.055	10236.3					
X1	1.494	44	9873.2	9930.2	175	190	168.97			
X3	10			9789.8		9958.1				
GR	1618.4	9522.9	1617.8	9549.1	1616.7	9560.5	1615.9	9571.1	1616.6	9589.6
GR	1616.8	9611.8	1616.2	9632.4	1616.9	9652.1	1614.6	9652.9	1614.6	9659.4
GR	1617.3	9660.6	1618.4	9673.5	1618.7	9692.6	1619.1	9743.7	1618.9	9762.7
GR	1619.5	9789.8	1618.5	9804.2	1617.5	9821.4	1617.1	9838.4	1616.5	9851.7
GR	1616.3	9873.2	1614.9	9892.8	1614.1	9904.7	1614.5	9916.4	1617.0	9930.2
GR	1620.0	9941.3	1621.4	9949.8	1621.5	9958.1	1620.4	9961.3	1618.5	9981.1
GR	1615.9	9997.5	1615.7	10000.0	1614.7	10015.2	1615.9	10029.6	1618.9	10043.2
GR	1618.8	10055.6	1618.3	10071.3	1617.6	10080.2	1617.7	10105.1	1618.1	10130.0
GR	1618.3	10190.0	1617.2	10214.4	1616.6	10229.2	1617.0	10236.3		
NH	2	0.03	10088.2	.055	10325.3					
X1	1.543	52	9880.9	9952.0	225	245	256.95			
X3	10			9880.9		9952.0				
GR	1624.9	9474.6	1625.2	9495.0	1624.9	9505.0	1624.4	9515.0	1625.1	9538.9
GR	1624.4	9607.5	1624.8	9625.1	1623.2	9637.7	1620.2	9648.4	1620.4	9652.8
GR	1621.6	9662.1	1624.1	9671.9	1624.8	9696.7	1625.3	9708.1	1625.4	9773.8
GR	1625.7	9804.9	1623.9	9814.9	1622.1	9823.0	1621.4	9829.6	1621.7	9843.8
GR	1623.6	9852.9	1623.7	9861.8	1623.6	9880.9	1623.0	9889.9	1619.2	9907.1
GR	1619.3	9914.0	1620.1	9922.6	1622.8	9932.8	1623.6	9941.0	1624.1	9952.0
GR	1624.0	9963.7	1621.5	9976.2	1618.8	9989.9	1619.1	9995.6	1619.4	10000.0
GR	1619.8	10005.5	1621.9	10015.8	1622.0	10023.0	1621.0	10032.1	1620.4	10045.9
GR	1620.6	10067.7	1620.3	10088.2	1621.0	10103.7	1622.4	10120.8	1622.5	10141.1
GR	1623.7	10171.0	1624.5	10210.5	1624.3	10245.8	1624.8	10270.6	1624.7	10294.4
GR	1624.8	10306.7	1625.3	10325.3						
NC	.03	.055	.03							
QT	2	760	760							
X1	1.592	46	9941.1	10040.7	235	255	257.56			
X3	10			9843.8		10161.9				
GR	1627.9	9526.4	1628.1	9541.0	1627.6	9553.5	1627.4	9558.1	1628.5	9564.8
GR	1628.8	9583.6	1628.5	9606.2	1627.9	9628.3	1626.0	9646.4	1625.6	9668.5
GR	1625.5	9686.1	1625.4	9706.3	1625.1	9721.1	1624.0	9726.6	1624.6	9735.2
GR	1626.7	9745.4	1627.1	9761.3	1629.1	9774.7	1630.1	9804.5	1632.0	9828.8
GR	1632.0	9843.8	1631.7	9899.1	1631.1	9910.6	1629.1	9920.0	1626.9	9941.1
GR	1624.7	9964.1	1624.2	9976.9	1624.4	9987.6	1623.7	10000.0	1624.1	10009.1
GR	1625.3	10021.7	1628.2	10040.7	1628.8	10052.5	1629.0	10066.8	1629.1	10084.9
GR	1629.9	10113.0	1629.0	10134.3	1629.9	10150.7	1630.5	10161.9	1630.5	10176.1
GR	1628.4	10185.5	1628.2	10208.1	1629.0	10224.8	1628.7	10234.3	1628.6	10244.5
GR	1628.7	10257.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

1
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```
 NC      .065        .11        .03

 X1     1.655          36     9988.5    10010.2         390         285      331.27


 GR     1641.8      9705.8     1642.2     9717.8      1641.8      9730.3      1642.3      9735.4      1641.7      9750.4
 GR     1641.0      9778.0     1639.4     9806.3      1638.3      9827.7      1638.8      9833.2      1640.2      9842.0
 GR     1638.5      9853.2     1637.4     9869.6      1637.7      9887.2      1637.3      9904.4      1636.2      9919.6
 GR     1634.6      9940.5     1632.3     9955.4      1631.5      9962.2      1630.2      9967.4      1630.5      9972.0
 GR     1632.2      9977.6     1632.6     9988.5      1629.8      9990.5      1629.9      9998.7      1630.0     10000.0
 GR     1629.8     10008.0     1632.6    10010.2      1632.3     10026.0      1631.0     10048.1      1632.2     10068.5
 GR     1632.1     10080.9     1631.8    10096.6     1633.68       10220        1633       10230        1634       10270
 GR     1634.8      10280          0           0        0.0         0.0         0.0         0.0         0.0         0.0


 X1     1.714          30     9989.8    10009.7         300         320         313
 X3        10                             9884.5                 10035.7
 GR     1644.1      9729.8     1642.4     9756.6      1641.7      9773.5      1640.9      9787.4      1640.2      9806.1
 GR     1637.4      9816.5     1635.7     9824.2      1638.0      9831.2      1639.2      9849.8      1640.5      9884.5
 GR     1638.8      9898.0     1637.3     9911.7      1637.1      9929.8      1637.7      9952.4      1637.7      9971.7
 GR     1637.5      9987.2     1637.4     9989.8      1634.9      9990.3      1634.7     10000.0      1634.9     10008.7
 GR     1637.3     10009.7     1638.8    10023.7      1640.0     10035.7      1639.7     10047.3      1639.8     10058.8
 GR     1639.8     10120.9     1639.1    10136.7      1638.3     10149.9      1638.4     10167.1      1638.7     10175.1


1
    15SEP95      14:28:46                                                                                    PAGE    4

     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

 CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

 *SECNO 1.462
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9893.9   10088.8  TYPE=       1  TARGET=      194.899

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1614.20 ELREA=      1614.90

      1.462       2.61    1612.61    1612.61    1612.60    1613.25        .64        .00        .00    1614.20
      760.0         .0      760.0         .0         .0      118.7         .0         .0         .0    1614.90
        .00        .00       6.40        .00       .000       .030       .000       .000    1610.00    9948.46
    .012371       335.       336.       340.          0          4          0        .00      94.58   10043.04


 1490 NH CARD USED
 *SECNO 1.494
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9789.8    9958.1  TYPE=       1  TARGET=      168.300

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1616.30 ELREA=      1617.00

      1.494       2.63    1616.73    1616.73        .00    1617.38        .65       1.82        .00    1616.30
      610.0       16.5      593.5         .0        7.6       90.7         .0         .4         .3    1617.00
        .01       2.16       6.54        .00       .030       .030       .000       .000    1614.10    9846.66
    .009131       175.       169.       190.          0          5          0        .00      82.03    9928.70
```

```
1490 NH CARD USED
*SECNO 1.543
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9880.9    9952.0  TYPE=       1  TARGET=       71.100

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1623.60 ELREA=    100000.00

     1.543      3.14   1622.34   1622.34       .00   1623.35      1.01      2.55       .00   1623.60
     610.0        .0     610.0       .0        .0      75.6        .0        .9        .7 100000.00
       .02       .00      8.07       .00      .000      .030      .000      .000   1619.20   9892.91
   .010889      225.      257.      245.         0        11         0       .00     38.13   9931.04


1
   15SEP95      14:28:46                                                                          PAGE    5

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


*SECNO 1.592
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9843.8   10161.9  TYPE=       1  TARGET=       318.101

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1626.90 ELREA=      1628.20

     1.592      2.33   1626.03   1626.03       .00   1626.77       .74      2.95       .00   1626.90
     760.0        .0     760.0       .0        .0     110.1        .0       1.5       1.0   1628.20
       .03       .00      6.90       .00      .000      .030      .000      .000   1623.70   9950.23
   .011923      235.      258.      255.         0        19         0       .00     76.23  10026.46


*SECNO 1.655
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     1.655      3.13   1632.93   1632.93       .00   1633.59       .66      3.16       .00   1632.60
     760.0     126.9      486.0     147.1      45.7      60.7     130.4       2.8       2.1   1632.60
       .04      2.78       8.01      1.13      .065      .030      .110      .000   1629.80   9951.30
   .007800      390.      331.      285.         0        11         0       .00     219.63  10170.93


*SECNO 1.714
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9884.5   10035.7  TYPE=       1  TARGET=       151.200
     1.714      3.83   1638.53   1638.53       .00   1639.34       .82      2.14       .00   1637.40
     760.0     164.6      590.1       5.3      89.4      72.2       7.0       4.2       3.3   1637.30
       .06      1.84       8.18       .76      .065      .030      .110      .000   1634.70   9900.50
   .006121      300.      313.      320.         0        11         0       .00     120.64  10021.14


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

  Version   4.6.2;  May 1991
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

Wash 9, North Channel 10

SUMMARY PRINTOUT TABLE 101

	SECNO	EGOC	ELLC	EGIC	ELTRD	QCULV	QWEIR	CLASS	H4	DEPTH	CWSEL	VCH	EG

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Wash 9, North Channel 10

SUMMARY PRINTOUT TABLE 110

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
*	1.462	1612.61	.01	1613.25	94.58	.00	760.00	.00	194.90	9893.90	9910.50	10069.80	10088.80
*	1.494	1616.73	.00	1617.38	82.03	16.45	593.55	.00	168.30	9789.80	9873.20	9930.20	9958.10
*	1.543	1622.34	.00	1623.35	38.13	.00	610.00	.00	71.10	9880.90	9880.90	9952.00	9952.00
*	1.592	1626.03	.00	1626.77	76.23	.00	760.00	.00	318.10	9843.80	9941.10	10040.70	10161.90
*	1.655	1632.93	.00	1633.59	219.63	126.94	485.98	147.08	.00	.00	9988.50	10010.20	.00
*	1.714	1638.53	.00	1639.34	120.64	164.60	590.07	5.33	151.20	9884.50	9989.80	10009.70	10035.70

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Wash 9, North Channel 10

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	1.462	.00	.00	.00	1610.00	760.00	1612.61	1612.61	1613.25	123.71	6.40	118.69	68.33
*	1.494	168.97	.00	.00	1614.10	610.00	1616.73	1616.73	1617.38	91.31	6.54	98.30	63.84
*	1.543	256.95	.00	.00	1619.20	610.00	1622.34	1622.34	1623.35	108.89	8.07	75.63	58.46
*	1.592	257.56	.00	.00	1623.70	760.00	1626.03	1626.03	1626.77	119.23	6.90	110.14	69.60
*	1.655	331.27	.00	.00	1629.80	760.00	1632.93	1632.93	1633.59	78.00	8.01	236.75	86.05
*	1.714	313.00	.00	.00	1634.70	760.00	1638.53	1638.53	1639.34	61.21	8.18	168.58	97.14

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Wash 9, North Channel 10

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	1.462	760.00	1612.61	.00	.00	.01	94.58	.00
*	1.494	610.00	1616.73	.00	4.11	.00	82.03	168.97

*	1.543	610.00	1622.34	.00	5.61	.00	38.13	256.95
*	1.592	760.00	1626.03	.00	3.69	.00	76.23	257.56
*	1.655	760.00	1632.93	.00	6.91	.00	219.63	331.27
*	1.714	760.00	1638.53	.00	5.59	.00	120.64	313.00

1

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 1.462 PROFILE= 1 CRITICAL DEPTH ASSUMED

CAUTION SECNO= 1.494 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.494 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1.543 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.543 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1.592 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.592 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1.655 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.655 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1.714 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.714 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WASH 9
HEC-2 ANALYSIS
North Channel
Supercritical Island Flow Analysis

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1*****************************************
 *  HEC-2 WATER SURFACE PROFILES          *
 *                                        *
 *  Version   4.6.2;  May 1991            *
 *                                        *
 *  RUN DATE    15SEP95    TIME   14:29:46 *
 *****************************************
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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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1
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                                                    THIS RUN EXECUTED 15SEP95    14:29:46

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  HEC-2 WATER SURFACE PROFILES

  Version   4.6.2;  May 1991
 ************************************


           GR data stations for cross-sections 1.494 & 1.543 have been shifted
           from AMC stationing.  Photogrammetry (AMC data) based on different
           thalweg location.  The actual thalweg is located approximately
           95.3' more south for section 1.494 and 92.9' more south for section
           1.543.  Therefore, these values were subtracted from the AMC
           station values to obtain the used GR data stationing.

T1   *  Rio Verde South FIS, Wash 9     Island Analysis    File:W9IS1SUP.IH2
T2   *  For: FCDMC # 93-07          By: MKE. Ltd.   FB,EEK & CLJ 8-23-94
T3   *  Wash 9,100-Yr Floodplain North Channel
T4   *  GR data taken from stereo model; received on 9-07-95 from AMC
T5   *  200 scale 2 ft CI mapping flown by AMC on 12-22-93 & 8-22-94
T6   *  with survey control by Burgess & Niple on 10-21-93;11-9-93;12-9-93
T7   *  supplemental cross section data (GR & BT) surveyed by ALS as noted.
T8   *  Source of 100-Yr flowrate from HEC-1 Analysis by GVSCE. Table F-3
T9   *  Supercritical analysis.
T9   *
T9   *  This is the island analysis for the north channel

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0         2         0         1        -1         0         0         0      1638

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       1         0        -1         0         0         0        -1         0         0         0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

      38        43        42         1         2        25         4        13        14        15
```

```
QT        2        760        760

NC      .065       .11        .03

1
    15SEP95      14:29:46                                                    PAGE     2

X1     1.714         30     9989.8    10009.7        300         320         313
X3        10                          9884.5                  10035.7
GR     1644.1     9729.8     1642.4     9756.6     1641.7     9773.5     1640.9     9787.4     1640.2     9806.1
GR     1637.4     9816.5     1635.7     9824.2     1638.0     9831.2     1639.2     9849.8     1640.5     9884.5
GR     1638.8     9898.0     1637.3     9911.7     1637.1     9929.8     1637.7     9952.4     1637.7     9971.7
GR     1637.5     9987.2     1637.4     9989.8     1634.9     9990.3     1634.7    10000.0     1634.9    10008.7
GR     1637.3    10009.7     1638.8    10023.7     1640.0    10035.7     1639.7    10047.3     1639.8    10058.8
GR     1639.8    10120.9     1639.1    10136.7     1638.3    10149.9     1638.4    10167.1     1638.7    10175.1

X1     1.655         36     9988.5    10010.2        390         285      331.27

GR     1641.8     9705.8     1642.2     9717.8     1641.8     9730.3     1642.3     9735.4     1641.7     9750.4
GR     1641.0     9778.0     1639.4     9806.3     1638.3     9827.7     1638.8     9833.2     1640.2     9842.0
GR     1638.5     9853.2     1637.4     9869.6     1637.7     9887.2     1637.3     9904.4     1636.2     9919.6
GR     1634.6     9940.5     1632.3     9955.4     1631.5     9962.2     1630.2     9967.4     1630.5     9972.0
GR     1632.2     9977.6     1632.6     9988.5     1629.8     9990.5     1629.9     9998.7     1630.0    10000.0
GR     1629.8    10008.0     1632.6    10010.2     1632.3    10026.0     1631.0    10048.1     1632.2    10068.5
GR     1632.1    10080.9     1631.8    10096.6    1633.68       10220        1633       10230        1634       10270
GR     1634.8      10280          0          0        0.0         0.0         0.0         0.0         0.0         0.0

NC      .03        .055       .03

X1     1.592         46     9941.1    10040.7        235         255      257.56
X3        10                          9843.8                  10161.9

GR     1627.9     9526.4     1628.1     9541.0     1627.6     9553.5     1627.4     9558.1     1628.5     9564.8
GR     1628.8     9583.6     1628.5     9606.2     1627.9     9628.3     1626.0     9646.4     1625.6     9668.5
GR     1625.5     9686.1     1625.4     9706.3     1625.1     9721.1     1624.0     9726.6     1624.6     9735.2
GR     1626.7     9745.4     1627.1     9761.3     1629.1     9774.7     1630.1     9804.5     1632.0     9828.8
GR     1632.0     9843.8     1631.7     9899.1     1631.1     9910.6     1629.1     9920.0     1626.9     9941.1
GR     1624.7     9964.1     1624.2     9976.9     1624.4     9987.6     1623.7    10000.0     1624.1    10009.1
GR     1625.3    10021.7     1628.2    10040.7     1628.8    10052.5     1629.0    10066.8     1629.1    10084.9
GR     1629.9    10113.0     1629.0    10134.3     1629.9    10150.7     1630.5    10161.9     1630.5    10176.1
GR     1628.4    10185.5     1628.2    10208.1     1629.0    10224.8     1628.7    10234.3     1628.6    10244.5
GR     1628.7    10257.6        0.0        0.0        0.0         0.0         0.0         0.0         0.0         0.0

QT        2        610        610

NH        2       0.03    10088.2       .055    10325.3

X1     1.543         52     9880.9     9952.0        225         245      256.95
X3        10                          9880.9                   9952.0
GR     1624.9     9474.6     1625.2     9495.0     1624.9     9505.0     1624.4     9515.0     1625.1     9538.9
GR     1624.4     9607.5     1624.8     9625.1     1623.2     9637.7     1620.2     9648.4     1620.4     9652.8
GR     1621.6     9662.1     1624.1     9671.9     1624.8     9696.7     1625.3     9708.1     1625.4     9773.8
GR     1625.7     9804.9     1623.9     9814.9     1622.1     9823.0     1621.4     9829.6     1621.7     9843.8
GR     1623.6     9852.9     1623.7     9861.8     1623.6     9880.9     1623.0     9889.9     1619.2     9907.1
GR     1619.3     9914.0     1620.1     9922.6     1622.8     9932.8     1623.6     9941.0     1624.1     9952.0
1
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GR     1624.0     9963.7     1621.5     9976.2     1618.8     9989.9     1619.1     9995.6     1619.4    10000.0
```

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GR   1619.8    10005.5    1621.9    10015.8    1622.0    10023.0    1621.0    10032.1    1620.4    10045.9
GR   1620.6    10067.7    1620.3    10088.2    1621.0    10103.7    1622.4    10120.8    1622.5    10141.1
GR   1623.7    10171.0    1624.5    10210.5    1624.3    10245.8    1624.8    10270.6    1624.7    10294.4
GR   1624.8    10306.7    1625.3    10325.3

NH        2         .03    10029.6        .055    10236.3

X1    1.494          44     9873.2     9930.2         175         190    168.97
X3       10                              9789.8                9958.1
GR   1618.4     9522.9    1617.8     9549.1    1616.7     9560.5    1615.9     9571.1    1616.6     9589.6
GR   1616.8     9611.8    1616.2     9632.4    1616.9     9652.1    1614.6     9652.9    1614.6     9659.4
GR   1617.3     9660.6    1618.4     9673.5    1618.7     9692.6    1619.1     9743.7    1618.9     9762.7
GR   1619.5     9789.8    1618.5     9804.2    1617.5     9821.4    1617.1     9838.4    1616.5     9851.7
GR   1616.3     9873.2    1614.9     9892.8    1614.1     9904.7    1614.5     9916.4    1617.0     9930.2
GR   1620.0     9941.3    1621.4     9949.8    1621.5     9958.1    1620.4     9961.3    1618.5     9981.1
GR   1615.9     9997.5    1615.7    10000.0    1614.7    10015.2    1615.9    10029.6    1618.9    10043.2
GR   1618.8    10055.6    1618.3    10071.3    1617.6    10080.2    1617.7    10105.1    1618.1    10130.0
GR   1618.3    10190.0    1617.2    10214.4    1616.6    10229.2    1617.0    10236.3

QT        2          760        760

NC      .03         .055        .03

X1    1.462           29     9910.5    10069.8         335         340    336.13
X3       10                              9893.9               10088.8

GR   1616.3     9616.0    1616.8     9632.9    1615.9     9646.1    1615.9     9665.7    1615.7     9689.0
GR   1615.9     9767.1    1614.9     9781.3    1612.6     9799.0    1614.0     9820.8    1614.4     9845.0
GR   1614.6     9868.2    1614.6     9893.9    1614.2     9910.5    1613.5     9933.6    1611.9     9960.4
GR   1610.9     9986.5    1610.0    10000.0    1610.8    10012.4    1611.8    10027.5    1612.7    10044.7
GR   1614.9    10069.8    1615.1    10088.8    1615.1    10115.4    1615.0    10142.5    1614.7    10172.2
GR   1614.2    10208.1    1614.3    10220.4    1614.0    10234.5    1614.2    10243.3       0.0       0.0
```

1

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

*PROF 1

 CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

*SECNO 1.714
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9884.5   10035.7  TYPE=      1  TARGET=      151.200
     1.714      3.86   1638.56   1638.56   1638.00   1639.34       .78       .00       .00   1637.40
     760.0     169.5     584.9       5.6      92.5      72.9       7.4        .0        .0   1637.30
       .00      1.83      8.03       .76      .065      .030      .110      .000   1634.70   9900.18
   .005824        0.        0.        0.         0         7         0       .00    121.28  10021.47


*SECNO 1.655

3265 DIVIDED FLOW
```

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.93

1.655	2.15	1631.95	1632.93	.00	1635.32	3.37	4.02	.00	1632.60
760.0	97.3	633.8	28.9	17.4	39.7	16.7	.9	.7	1632.60
.01	5.59	15.97	1.73	.065	.030	.110	.000	1629.80	9958.38
.049906	300.	313.	320.	6	15	0	.00	89.09	10106.43

*SECNO 1.592

3301 HV CHANGED MORE THAN HVINS

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

3470 ENCROACHMENT STATIONS= 9843.8 10161.9 TYPE= 1 TARGET= 318.101

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1626.90 ELREA= 1628.20

1

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
1.592	2.21	1625.91	1626.03	.00	1626.79	.88	8.53	.00	1626.90
760.0	.0	760.0	.0	.0	100.7	.0	1.5	1.4	1628.20
.02	.00	7.54	.00	.000	.030	.000	.000	1623.70	9951.54
.015457	390.	331.	285.	3	8	0	.00	74.10	10025.64

1490 NH CARD USED
*SECNO 1.543

3470 ENCROACHMENT STATIONS= 9880.9 9952.0 TYPE= 1 TARGET= 71.100

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1623.60 ELREA= 100000.00

1.543	3.12	1622.32	1622.34	.00	1623.35	1.04	3.44	.00	1623.60
610.0	.0	610.0	.0	.0	74.7	.0	2.1	1.7	100000.00
.03	.00	8.17	.00	.000	.030	.000	.000	1619.20	9893.02
.011275	235.	258.	255.	0	14	0	.00	37.93	9930.95

1490 NH CARD USED
*SECNO 1.494

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.06

3470 ENCROACHMENT STATIONS= 9789.8 9958.1 TYPE= 1 TARGET= 168.300

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1616.30 ELREA= 1617.00

1.494	1.90	1616.00	1616.72	.00	1618.10	2.09	5.26	.00	1616.30
610.0	.0	610.0	.0	.0	52.6	.0	2.4	1.9	1617.00
.03	.00	11.60	.00	.000	.030	.000	.000	1614.10	9877.36
.048015	225.	257.	245.	6	15	0	.00	47.34	9924.70

*SECNO 1.462

3301 HV CHANGED MORE THAN HVINS

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
1.462	2.40	1612.40	1612.62	.00	1613.31	.91	4.78	.00	1614.20
760.0	.0	760.0	.0	.0	99.1	.0	2.7	2.2	1614.90
.04	.00	7.67	.00	.000	.030	.000	.000	1610.00	9952.07
.020115	175.	169.	190.	4	11	0	.00	86.85	10038.92

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .52

3470 ENCROACHMENT STATIONS= 9893.9 10088.8 TYPE= 1 TARGET= 194.899

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1614.20 ELREA= 1614.90

1
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THIS RUN EXECUTED 15SEP95 14:29:47

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

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

Wash 9,100-Yr Floodplain

SUMMARY PRINTOUT

	SECNO	Q	ELMIN	CWSEL	CRIWS	AREA	TOPWID	QLOB	QCH	QROB
*	1.714	760.00	1634.70	1638.56	1638.56	172.82	121.28	169.54	584.85	5.60
*	1.655	760.00	1629.80	1631.95	1632.93	73.74	89.09	97.31	633.84	28.85
*	1.592	760.00	1623.70	1625.91	1626.03	100.74	74.10	.00	760.00	.00
	1.543	610.00	1619.20	1622.32	1622.34	74.68	37.93	.00	610.00	.00
*	1.494	610.00	1614.10	1616.00	1616.72	52.56	47.34	.00	610.00	.00
*	1.462	760.00	1610.00	1612.40	1612.62	99.15	86.85	.00	760.00	.00

1
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SUMMARY OF ERRORS AND SPECIAL NOTES

```
CAUTION SECNO=      1.714  PROFILE=  1  CRITICAL DEPTH ASSUMED

WARNING SECNO=      1.655  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      1.592  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      1.494  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      1.462  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
```

WASH 9
HEC-2 ANALYSIS
South Channel
Subcritical Island Flow Analysis

```
1*****************************************
 *  HEC-2 WATER SURFACE PROFILES          *
 *                                        *
 *  Version   4.6.2;  May 1991            *
 *                                        *
 *  RUN DATE    15SEP95    TIME   14:29:08 *
 *****************************************
```

```
**************************************
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*  609 SECOND STREET, SUITE D        *
*  DAVIS, CALIFORNIA 95616-4687      *
*         (916) 756-1104             *
**************************************
```

```
X     X  XXXXXXX   XXXXX             XXXXX
X     X  X        X     X           X     X
X     X  X        X                       X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX             XXXXXXX
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1

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THIS RUN EXECUTED 15SEP95 14:29:08

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

 Version   4.6.2;  May 1991
**************************************
```

GR data stations for cross-sections 1.494 & 1.543 have been shifted from AMC stationing. Photogrammetry (AMC data) based on different thalweg location. The actual thalweg is located approximately 95.3' more south for section 1.494 and 92.9' more south for section 1.543. Therefore, these values were subtracted from the AMC station values to obtain the used GR data stationing.

```
T1   *  Rio Verde South FIS, Wash 9 Island Analysis      File:W9IS2SUB.IH2
T2   *  For: FCDMC #    93-07        By:MKE, Ltd        FB & EEK 8-23-94
T3   *  Wash 9, South Channel 100-Yr Floodplain         Revised: 8-08-95
T4   *  GR data taken from stereo model; received on 4-21-95 from AMC
T5   *  200 scale 2 ft CI mapping flown by AMC on 12-22-93
T6   *  with survey control by Burgess & Niple on 10-21-93;11-9-93;12-9-93
T7   *  supplemental cross section data (GR & BT) surveyed by ALS as noted.
T8   *  Source of 100-Yr flowrate from HEC-1 Analysis by GVSCE. Table F-3
T9   *  Sub-critical analysis.
T9   *
T9   *  This is the island analysis for the south channel
```

```
J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0        2         0         0        -1.         0         0         0    1612.6

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       1        0        -1         0         0         0        -1         0         0         0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     150       101       110       115       200
```

```
NC      .03       .055       .03

QT       2        760        760

X1    1.462        29      9910.5    10069.8       335        340      336.13
X3       10                          9893.9                10088.8

GR    1616.3    9616.0     1616.8    9632.9     1615.9     9646.1     1615.9     9665.7     1615.7     9689.0
GR    1615.9    9767.1     1614.9    9781.3     1612.6     9799.0     1614.0     9820.8     1614.4     9845.0
GR    1614.6    9868.2     1614.6    9893.9     1614.2     9910.5     1613.5     9933.6     1611.9     9960.4
GR    1610.9    9986.5     1610.0   10000.0     1610.8    10012.4     1611.8    10027.5     1612.7    10044.7
1
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GR    1614.9   10069.8     1615.1   10088.8     1615.1    10115.4     1615.0    10142.5     1614.7    10172.2
GR    1614.2   10208.1     1614.3   10220.4     1614.0    10234.5     1614.2    10243.3       0.0       0.0

QT       2        150        150

NH       2        .03     10029.6       .055   10236.3

X1    1.494         44      9958.1    10043.2       175        190      168.97
X3       10                          9958.1                10043.2
GR    1618.4    9522.9     1617.8    9549.1     1616.7     9560.5     1615.9     9571.1     1616.6     9589.6
GR    1616.8    9611.8     1616.2    9632.4     1616.9     9652.1     1614.6     9652.9     1614.6     9659.4
GR    1617.3    9660.6     1618.4    9673.5     1618.7     9692.6     1619.1     9743.7     1618.9     9762.7
GR    1619.5    9789.8     1618.5    9804.2     1617.5     9821.4     1617.1     9838.4     1616.5     9851.7
GR    1616.3    9873.2     1614.9    9892.8     1614.1     9904.7     1614.5     9916.4     1617.0     9930.2
GR    1620.0    9941.3     1621.4    9949.8     1621.5     9958.1     1620.4     9961.3     1618.5     9981.1
GR    1615.9    9997.5     1615.7   10000.0     1614.7    10015.2     1615.9    10029.6     1618.9    10043.2
GR    1618.8   10055.6     1618.3   10071.3     1617.6    10080.2     1617.7    10105.1     1618.1    10130.0
GR    1618.3   10190.0     1617.2   10214.4     1616.6    10229.2     1617.0    10236.3

NH       2        0.03    10088.2       .055   10325.3

X1    1.543         52      9952.0    10023.0       225        245      256.95
X3       10                          9952.0                10023.0
GR    1624.9    9474.6     1625.2    9495.0     1624.9     9505.0     1624.4     9515.0     1625.1     9538.9
GR    1624.4    9607.5     1624.8    9625.1     1623.2     9637.7     1620.2     9648.4     1620.4     9652.8
GR    1621.6    9662.1     1624.1    9671.9     1624.8     9696.7     1625.3     9708.1     1625.4     9773.8
GR    1625.7    9804.9     1623.9    9814.9     1622.1     9823.0     1621.4     9829.6     1621.7     9843.8
GR    1623.6    9852.9     1623.7    9861.8     1623.6     9880.9     1623.0     9889.9     1619.2     9907.1
GR    1619.3    9914.0     1620.1    9922.6     1622.8     9932.8     1623.6     9941.0     1624.1     9952.0
GR    1624.0    9963.7     1621.5    9976.2     1618.8     9989.9     1619.1     9995.6     1619.4    10000.0
GR    1619.8   10005.5     1621.9   10015.8     1622.0    10023.0     1621.0    10032.1     1620.4    10045.9
GR    1620.6   10067.7     1620.3   10088.2     1621.0    10103.7     1622.4    10120.8     1622.5    10141.1
GR    1623.7   10171.0     1624.5   10210.5     1624.3    10245.8     1624.8    10270.6     1624.7    10294.4
GR    1624.8   10306.7     1625.3   10325.3

NC      .03       .055       .03

QT       2        760        760

X1    1.592         46      9941.1    10040.7       235        255      257.56
X3       10                          9843.8                10161.9

GR    1627.9    9526.4     1628.1    9541.0     1627.6     9553.5     1627.4     9558.1     1628.5     9564.8
GR    1628.8    9583.6     1628.5    9606.2     1627.9     9628.3     1626.0     9646.4     1625.6     9668.5
GR    1625.5    9686.1     1625.4    9706.3     1625.1     9721.1     1624.0     9726.6     1624.6     9735.2
GR    1626.7    9745.4     1627.1    9761.3     1629.1     9774.7     1630.1     9804.5     1632.0     9828.8
GR    1632.0    9843.8     1631.7    9899.1     1631.1     9910.6     1629.1     9920.0     1626.9     9941.1
GR    1624.7    9964.1     1624.2    9976.9     1624.4     9987.6     1623.7    10000.0     1624.1    10009.1
GR    1625.3   10021.7     1628.2   10040.7     1628.8    10052.5     1629.0    10066.8     1629.1    10084.9
GR    1629.9   10113.0     1629.0   10134.3     1629.9    10150.7     1630.5    10161.9     1630.5    10176.1
GR    1628.4   10185.5     1628.2   10208.1     1629.0    10224.8     1628.7    10234.3     1628.6    10244.5
1
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```
GR   1628.7    10257.6        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0

NC     .065        .11        .03

X1    1.655          36     9988.5    10010.2        390        285     331.27


GR   1641.8     9705.8     1642.2     9717.8     1641.8     9730.3     1642.3     9735.4     1641.7     9750.4
GR   1641.0     9778.0     1639.4     9806.3     1638.3     9827.7     1638.8     9833.2     1640.2     9842.0
GR   1638.5     9853.2     1637.4     9869.6     1637.7     9887.2     1637.3     9904.4     1636.2     9919.6
GR   1634.6     9940.5     1632.3     9955.4     1631.5     9962.2     1630.2     9967.4     1630.5     9972.0
GR   1632.2     9977.6     1632.6     9988.5     1629.8     9990.5     1629.9     9998.7     1630.0    10000.0
GR   1629.8    10008.0     1632.6    10010.2     1632.3    10026.0     1631.0    10048.1     1632.2    10068.5
GR   1632.1    10080.9     1631.8    10096.6    1633.68      10220       1633      10230       1634      10270
GR   1634.8      10280         0          0        0.0        0.0        0.0        0.0        0.0        0.0

X1    1.714          30     9989.8    10009.7        300        320        313
X3       10                           9884.5                  10035.7
GR   1644.1     9729.8     1642.4     9756.6     1641.7     9773.5     1640.9     9787.4     1640.2     9806.1
GR   1637.4     9816.5     1635.7     9824.2     1638.0     9831.2     1639.2     9849.8     1640.5     9884.5
GR   1638.8     9898.0     1637.3     9911.7     1637.1     9929.8     1637.7     9952.4     1637.7     9971.7
GR   1637.5     9987.2     1637.4     9989.8     1634.9     9990.3     1634.7    10000.0     1634.9    10008.7
GR   1637.3    10009.7     1638.8    10023.7     1640.0    10035.7     1639.7    10047.3     1639.8    10058.8
GR   1639.8    10120.9     1639.1    10136.7     1638.3    10149.9     1638.4    10167.1     1638.7    10175.1


1
   15SEP95      14:29:08                                                                                PAGE    4

    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

 CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

 *SECNO 1.462
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9893.9   10088.8  TYPE=      1  TARGET=      194.899

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1614.20 ELREA=      1614.90

     1.462      2.61   1612.61   1612.61   1612.60   1613.25       .64       .00       .00   1614.20
     760.0        .0     760.0        .0        .0     118.7        .0        .0        .0   1614.90
       .00       .00      6.40       .00      .000      .030      .000      .000   1610.00   9948.46
   .012371      335.      336.      340.         0         4         0       .00     94.58  10043.04


 1490 NH CARD USED
 *SECNO 1.494
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9958.1   10043.2  TYPE=      1  TARGET=       85.101

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1621.50 ELREA=    100000.00

     1.494      1.48   1616.18   1616.18       .00   1616.60       .41      2.16       .00   1621.50
     150.0        .0     150.0        .0        .0      29.0        .0        .3        .3 100000.00
```

```
      .01       .00      5.17       .00      .000      .031      .000      .000   1614.70   9995.72
  .015182      175.      169.      190.         0        11         0       .00     35.16  10030.88


1490 NH CARD USED
*SECNO 1.543
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9952.0   10023.0  TYPE=       1  TARGET=       71.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1624.10 ELREA=    100000.00

    1.543      1.66   1620.46   1620.46       .00   1620.95       .49      3.68       .00   1624.10
    150.0        .0     150.0        .0        .0      26.6        .0        .5         .4 100000.00
      .02       .00      5.64       .00      .000      .030      .000      .000   1618.80   9981.50
  .013516      225.      257.      245.         0         8         0       .00     27.22  10008.72


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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 1.592
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9843.8   10161.9  TYPE=       1  TARGET=      318.101

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1626.90 ELREA=      1628.20

    1.592      2.34   1626.04   1626.04       .00   1626.77       .73      3.07       .00   1626.90
    760.0        .0     760.0        .0        .0     111.1        .0        .9         .7   1628.20
      .03       .00      6.84       .00      .000      .030      .000      .000   1623.70   9950.10
  .011626      235.      258.      255.         0        11         0       .00     76.44  10026.54


*SECNO 1.655
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
    1.655      3.13   1632.93   1632.93       .00   1633.59       .66      3.13       .00   1632.60
    760.0     126.9     486.0     147.1      45.7      60.7     130.3       2.1        1.8   1632.60
      .05      2.78      8.01      1.13      .065      .030      .110      .000   1629.80   9951.30
  .007802      390.      331.      285.         0        11         0       .00    219.62  10170.92


*SECNO 1.714
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9884.5   10035.7  TYPE=       1  TARGET=      151.200
    1.714      3.83   1638.53   1638.53       .00   1639.34       .82      2.14       .00   1637.40
    760.0     164.5     590.2       5.3      89.3      72.2       7.0       3.6        3.0   1637.30
      .06      1.84      8.18       .76      .065      .030      .110      .000   1634.70   9900.51
  .006128      300.      313.      320.         0        11         0       .00    120.62  10021.13


1
   15SEP95      14:29:08                                                                        PAGE    6


                                                                        THIS RUN EXECUTED 15SEP95     14:29:10
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HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

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

Wash 9, South Channel 10

SUMMARY PRINTOUT TABLE 101

	SECNO	EGOC	ELLC	EGIC	ELTRD	QCULV	QWEIR	CLASS	H4	DEPTH	CWSEL	VCH	EG

1
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Wash 9, South Channel 10

SUMMARY PRINTOUT TABLE 110

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
*	1.462	1612.61	.01	1613.25	94.58	.00	760.00	.00	194.90	9893.90	9910.50	10069.80	10088.80
*	1.494	1616.18	.00	1616.60	35.16	.00	150.00	.00	85.10	9958.10	9958.10	10043.20	10043.20
*	1.543	1620.46	.00	1620.95	27.22	.00	150.00	.00	71.00	9952.00	9952.00	10023.00	10023.00
*	1.592	1626.04	.00	1626.77	76.44	.00	760.00	.00	318.10	9843.80	9941.10	10040.70	10161.90
*	1.655	1632.93	.00	1633.59	219.62	126.94	486.00	147.06	.00	.00	9988.50	10010.20	.00
*	1.714	1638.53	.00	1639.34	120.62	164.50	590.18	5.32	151.20	9884.50	9989.80	10009.70	10035.70

1
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Wash 9, South Channel 10

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	1.462	.00	.00	.00	1610.00	760.00	1612.61	1612.61	1613.25	123.71	6.40	118.69	68.33
*	1.494	168.97	.00	.00	1614.70	150.00	1616.18	1616.18	1616.60	151.82	5.17	29.02	12.17
*	1.543	256.95	.00	.00	1618.80	150.00	1620.46	1620.46	1620.95	135.16	5.64	26.61	12.90
*	1.592	257.56	.00	.00	1623.70	760.00	1626.04	1626.04	1626.77	116.26	6.84	111.10	70.48
*	1.655	331.27	.00	.00	1629.80	760.00	1632.93	1632.93	1633.59	78.02	8.01	236.72	86.04
*	1.714	313.00	.00	.00	1634.70	760.00	1638.53	1638.53	1639.34	61.28	8.18	168.49	97.09

1
15SEP95 14:29:08 PAGE 9

Wash 9, South Channel 10

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	1.462	760.00	1612.61	.00	.00	.01	94.58	.00
*	1.494	150.00	1616.18	.00	3.57	.00	35.16	168.97
*	1.543	150.00	1620.46	.00	4.27	.00	27.22	256.95
*	1.592	760.00	1626.04	.00	5.58	.00	76.44	257.56
*	1.655	760.00	1632.93	.00	6.89	.00	219.62	331.27
*	1.714	760.00	1638.53	.00	5.59	.00	120.62	313.00

1

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SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 1.462 PROFILE= 1 CRITICAL DEPTH ASSUMED

CAUTION SECNO= 1.494 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.494 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1.543 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.543 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1.592 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.592 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1.655 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.655 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1.714 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.714 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WASH 9
HEC-2 ANALYSIS
South Channel
Supercritical Island Flow Analysis

```
1*****************************************
 *  HEC-2 WATER SURFACE PROFILES          *
 *                                        *
 *  Version   4.6.2;  May 1991            *
 *                                        *
 *  RUN DATE    15SEP95    TIME   14:29:30 *
 *****************************************
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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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1
   15SEP95      14:29:31                                                    PAGE    1


                                                    THIS RUN EXECUTED 15SEP95    14:29:31

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

  Version   4.6.2;  May 1991
 ************************************
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GR data stations for cross-sections 1.494 & 1.543 have been shifted from AMC stationing. Photogrammetry (AMC data) based on different thalweg location. The actual thalweg is located approximately 95.3' more south for section 1.494 and 92.9' more south for section 1.543. Therefore, these values were subtracted from the AMC station values to obtain the used GR data stationing.

```
T1   *  Rio Verde South FIS, Wash 9     Island Analysis         File:W9IS2SUP.IH2
T2   *  For: FCDMC # 93-07      By: MKE, Ltd.   FB & EEK             8-23-94
T3   *  Wash 9,100-Yr Floodplain South Channel
T4   *  GR data taken from stereo model; received on 9-07-95 from AMC
T5   *  200 scale 2 ft CI mapping flown by AMC on 12-22-93 & 8-22-94
T6   *  with survey control by Burgess & Niple on 10-21-93;11-9-93;12-9-93
T7   *  supplemental cross section data (GR & BT) surveyed by ALS as noted.
T8   *  Source of 100-Yr flowrate from HEC-1 Analysis by GVSCE. Table F-3
T9   *  Supercritical analysis.
T9   *
T9   *  This is the island analysis for the south channel

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
       0        2         0         1        -1         0         0         0      1638

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
       1        0        -1         0         0         0        -1         0         0         0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT
      38        43        42         1         2        25         4        13        14        15
```

QT	2	760	760							
NC	.065	.11	.03							

1
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X1	1.714	30	9989.8	10009.7	300	320	313			
X3	10			9884.5		10035.7				
GR	1644.1	9729.8	1642.4	9756.6	1641.7	9773.5	1640.9	9787.4	1640.2	9806.1
GR	1637.4	9816.5	1635.7	9824.2	1638.0	9831.2	1639.2	9849.8	1640.5	9884.5
GR	1638.8	9898.0	1637.3	9911.7	1637.1	9929.8	1637.7	9952.4	1637.7	9971.7
GR	1637.5	9987.2	1637.4	9989.8	1634.9	9990.3	1634.7	10000.0	1634.9	10008.7
GR	1637.3	10009.7	1638.8	10023.7	1640.0	10035.7	1639.7	10047.3	1639.8	10058.8
GR	1639.8	10120.9	1639.1	10136.7	1638.3	10149.9	1638.4	10167.1	1638.7	10175.1
X1	1.655	36	9988.5	10010.2	390	285	331.27			
GR	1641.8	9705.8	1642.2	9717.8	1641.8	9730.3	1642.3	9735.4	1641.7	9750.4
GR	1641.0	9778.0	1639.4	9806.3	1638.3	9827.7	1638.8	9833.2	1640.2	9842.0
GR	1638.5	9853.2	1637.4	9869.6	1637.7	9887.2	1637.3	9904.4	1636.2	9919.6
GR	1634.6	9940.5	1632.3	9955.4	1631.5	9962.2	1630.2	9967.4	1630.5	9972.0
GR	1632.2	9977.6	1632.6	9988.5	1629.8	9990.5	1629.9	9998.7	1630.0	10000.0
GR	1629.8	10008.0	1632.6	10010.2	1632.3	10026.0	1631.0	10048.1	1632.2	10068.5
GR	1632.1	10080.9	1631.8	10096.6	1633.68	10220	1633	10230	1634	10270
GR	1634.8	10280	0	0	0.0	0.0	0.0	0.0	0.0	0.0
NC	.03	.055	.03							
X1	1.592	46	9941.1	10040.7	235	255	257.56			
X3	10			9843.8		10161.9				
GR	1627.9	9526.4	1628.1	9541.0	1627.6	9553.5	1627.4	9558.1	1628.5	9564.8
GR	1628.8	9583.6	1628.5	9606.2	1627.9	9628.3	1626.0	9646.4	1625.6	9668.5
GR	1625.5	9686.1	1625.4	9706.3	1625.1	9721.1	1624.0	9726.6	1624.6	9735.2
GR	1626.7	9745.4	1627.1	9761.3	1629.1	9774.7	1630.1	9804.5	1632.0	9828.8
GR	1632.0	9843.8	1631.7	9899.1	1631.1	9910.6	1629.1	9920.0	1626.9	9941.1
GR	1624.7	9964.1	1624.2	9976.9	1624.4	9987.6	1623.7	10000.0	1624.1	10009.1
GR	1625.3	10021.7	1628.2	10040.7	1628.8	10052.5	1629.0	10066.8	1629.1	10084.9
GR	1629.9	10113.0	1629.0	10134.3	1629.9	10150.7	1630.5	10161.9	1630.5	10176.1
GR	1628.4	10185.5	1628.2	10208.1	1629.0	10224.8	1628.7	10234.3	1628.6	10244.5
GR	1628.7	10257.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
QT	2	150	150							
NH	2	0.03	10088.2	.055	10325.3					
X1	1.543	52	9952.0	10023.0	225	245	256.95			
X3	10			9952.0		10023.0				
GR	1624.9	9474.6	1625.2	9495.0	1624.9	9505.0	1624.4	9515.0	1625.1	9538.9
GR	1624.4	9607.5	1624.8	9625.1	1623.2	9637.7	1620.2	9648.4	1620.4	9652.8
GR	1621.6	9662.1	1624.1	9671.9	1624.8	9696.7	1625.3	9708.1	1625.4	9773.8
GR	1625.7	9804.9	1623.9	9814.9	1622.1	9823.0	1621.4	9829.6	1621.7	9843.8
GR	1623.6	9852.9	1623.7	9861.8	1623.6	9880.9	1623.0	9889.9	1619.2	9907.1
GR	1619.3	9914.0	1620.1	9922.6	1622.8	9932.8	1623.6	9941.0	1624.1	9952.0

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 GR   1624.0     9963.7     1621.5     9976.2     1618.8     9989.9     1619.1     9995.6     1619.4    10000.0
 GR   1619.8    10005.5     1621.9    10015.8     1622.0    10023.0     1621.0    10032.1     1620.4    10045.9
 GR   1620.6    10067.7     1620.3    10088.2     1621.0    10103.7     1622.4    10120.8     1622.5    10141.1
 GR   1623.7    10171.0     1624.5    10210.5     1624.3    10245.8     1624.8    10270.6     1624.7    10294.4
 GR   1624.8    10306.7     1625.3    10325.3

 NH        2         .03    10029.6         .055    10236.3

 X1    1.494          44     9958.1     10043.2          175          190      168.97
 X3       10                               9958.1                    10043.2
 GR   1618.4     9522.9     1617.8     9549.1     1616.7     9560.5     1615.9     9571.1     1616.6     9589.6
 GR   1616.8     9611.8     1616.2     9632.4     1616.9     9652.1     1614.6     9652.9     1614.6     9659.4
 GR   1617.3     9660.6     1618.4     9673.5     1618.7     9692.6     1619.1     9743.7     1618.9     9762.7
 GR   1619.5     9789.8     1618.5     9804.2     1617.5     9821.4     1617.1     9838.4     1616.5     9851.7
 GR   1616.3     9873.2     1614.9     9892.8     1614.1     9904.7     1614.5     9916.4     1617.0     9930.2
 GR   1620.0     9941.3     1621.4     9949.8     1621.5     9958.1     1620.4     9961.3     1618.5     9981.1
 GR   1615.9     9997.5     1615.7    10000.0     1614.7    10015.2     1615.9    10029.6     1618.9    10043.2
 GR   1618.8    10055.6     1618.3    10071.3     1617.6    10080.2     1617.7    10105.1     1618.1    10130.0
 GR   1618.3    10190.0     1617.2    10214.4     1616.6    10229.2     1617.0    10236.3

 QT        2         760         760

 NC      .03         .055        .03

 X1    1.462          29     9910.5     10069.8          335          340      336.13
 X3       10                               9893.9                    10088.8

 GR   1616.3     9616.0     1616.8     9632.9     1615.9     9646.1     1615.9     9665.7     1615.7     9689.0
 GR   1615.9     9767.1     1614.9     9781.3     1612.6     9799.0     1614.0     9820.8     1614.4     9845.0
 GR   1614.6     9868.2     1614.6     9893.9     1614.2     9910.5     1613.5     9933.6     1611.9     9960.4
 GR   1610.9     9986.5     1610.0    10000.0     1610.8    10012.4     1611.8    10027.5     1612.7    10044.7
 GR   1614.9    10069.8     1615.1    10088.8     1615.1    10115.4     1615.0    10142.5     1614.7    10172.2
 GR   1614.2    10208.1     1614.3    10220.4     1614.0    10234.5     1614.2    10243.3        0.0        0.0
```

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1
   15SEP95      14:29:31                                                                          PAGE    4

    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

 CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

 *SECNO 1.714
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9884.5   10035.7  TYPE=      1  TARGET=      151.200
      1.714       3.86    1638.56    1638.56    1638.00    1639.34        .78        .00        .00    1637.40
      760.0      169.5      584.9        5.6       92.5       72.9        7.4         .0         .0    1637.30
        .00       1.83       8.03        .76       .065       .030       .110       .000    1634.70    9900.18
    .005824         0.         0.         0.          0          7          0        .00     121.28   10021.47


 *SECNO 1.655

 3265 DIVIDED FLOW
```

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.93

1.655	2.15	1631.95	1632.93	.00	1635.32	3.37	4.02	.00	1632.60
760.0	97.3	633.8	28.9	17.4	39.7	16.7	.9	.7	1632.60
.01	5.59	15.97	1.73	.065	.030	.110	.000	1629.80	9958.38
.049906	300.	313.	320.	6	15	0	.00	89.09	10106.43

*SECNO 1.592

3301 HV CHANGED MORE THAN HVINS

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

3470 ENCROACHMENT STATIONS= 9843.8 10161.9 TYPE= 1 TARGET= 318.101

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1626.90 ELREA= 1628.20

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
1.592	2.21	1625.91	1626.03	.00	1626.79	.88	8.53	.00	1626.90
760.0	.0	760.0	.0	.0	100.7	.0	1.5	1.4	1628.20
.02	.00	7.54	.00	.000	.030	.000	.000	1623.70	9951.54
.015457	390.	331.	285.	3	8	0	.00	74.10	10025.64

1490 NH CARD USED
*SECNO 1.543

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 12.86

3470 ENCROACHMENT STATIONS= 9952.0 10023.0 TYPE= 1 TARGET= 71.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1624.10 ELREA= 100000.00

1.543	1.12	1619.92	1620.45	.00	1621.88	1.95	4.91	.00	1624.10
150.0	.0	150.0	.0	.0	13.4	.0	1.9	1.6	100000.00
.02	.00	11.22	.00	.000	.030	.000	.000	1618.80	9984.24
.099586	235.	258.	255.	6	19	0	.00	21.83	10006.07

1490 NH CARD USED
*SECNO 1.494

3301 HV CHANGED MORE THAN HVINS

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

3470 ENCROACHMENT STATIONS= 9958.1 10043.2 TYPE= 1 TARGET= 85.101

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1621.50 ELREA= 100000.00

1.494	1.47	1616.17	1616.17	.00	1616.60	.42	8.23	6.98	1621.50
150.0	.0	150.0	.0	.0	28.7	.0	2.0	1.8	100000.00
.04	.00	5.22	.00	.000	.031	.000	.000	1614.70	9995.77
.015599	225.	257.	245.	20	23	0	.00	35.07	10030.84

1

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

*SECNO 1.462

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .23

3470 ENCROACHMENT STATIONS= 9893.9 10088.8 TYPE= 1 TARGET= 194.899

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1614.20 ELREA= 1614.90

1.462	2.40	1612.40	1612.60	.00	1613.32	.92	3.28	.00	1614.20
760.0	.0	760.0	.0	.0	98.7	.0	2.2	2.0	1614.90
.04	.00	7.70	.00	.000	.030	.000	.000	1610.00	9952.15
.020338	175.	169.	190.	4	17	0	.00	86.68	10038.83

1

THIS RUN EXECUTED 15SEP95 14:29:32

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

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

Wash 9,100-Yr Floodplain

SUMMARY PRINTOUT

	SECNO	Q	ELMIN	CWSEL	CRIWS	AREA	TOPWID	QLOB	QCH	QROB
*	1.714	760.00	1634.70	1638.56	1638.56	172.82	121.28	169.54	584.85	5.60
*	1.655	760.00	1629.80	1631.95	1632.93	73.74	89.09	97.31	633.84	28.85
*	1.592	760.00	1623.70	1625.91	1626.03	100.74	74.10	.00	760.00	.00
*	1.543	150.00	1618.80	1619.92	1620.45	13.37	21.83	.00	150.00	.00
*	1.494	150.00	1614.70	1616.17	1616.17	28.74	35.07	.00	150.00	.00
*	1.462	760.00	1610.00	1612.40	1612.60	98.74	86.68	.00	760.00	.00

1

SUMMARY OF ERRORS AND SPECIAL NOTES

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CAUTION SECNO=      1.714  PROFILE=  1  CRITICAL DEPTH ASSUMED

WARNING SECNO=      1.655  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      1.592  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

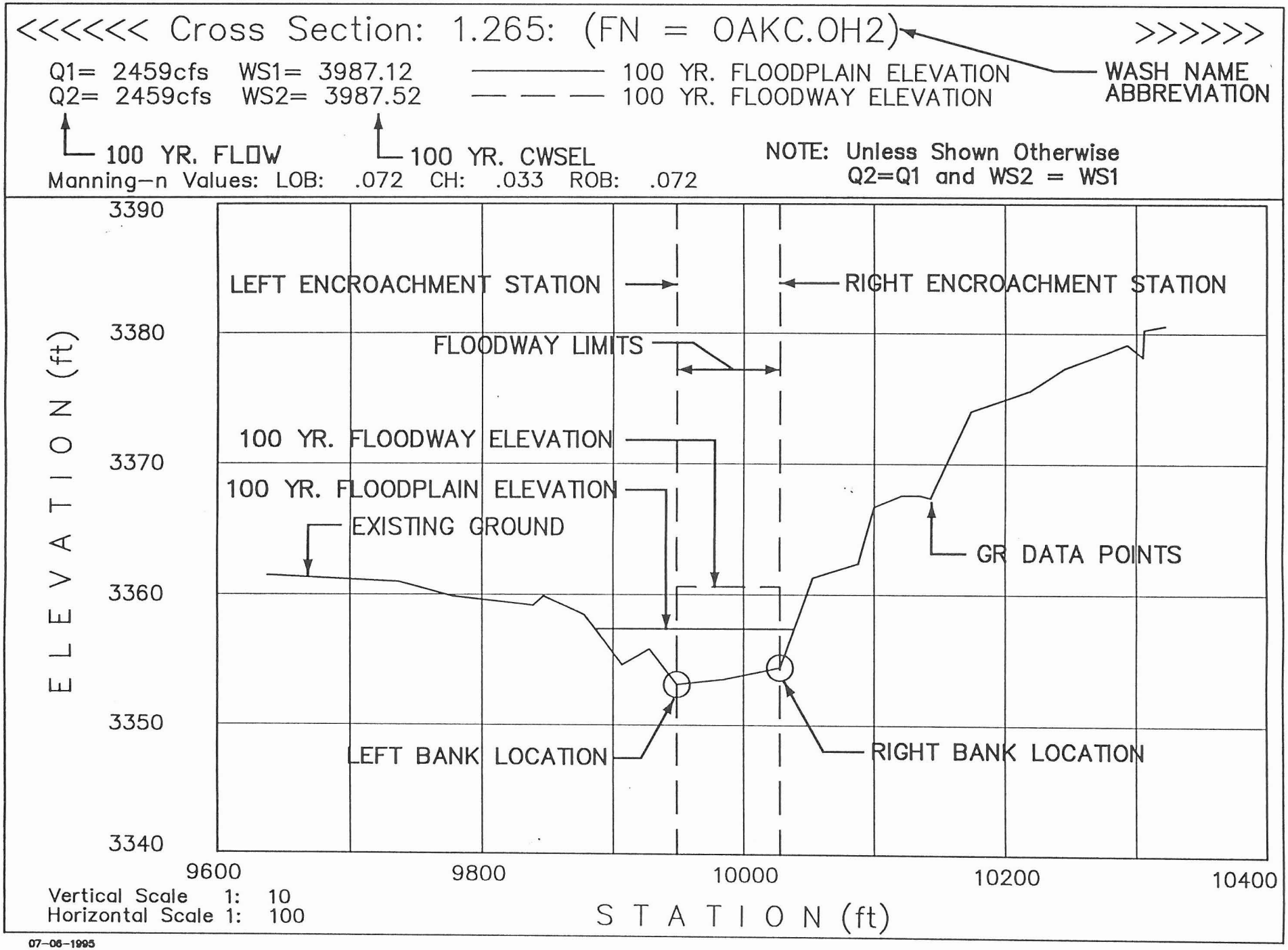
WARNING SECNO=      1.543  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=      1.494  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      1.494  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=      1.494  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO=      1.462  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
```

CROSS SECTIONS

CROSS SECTION LEGEND

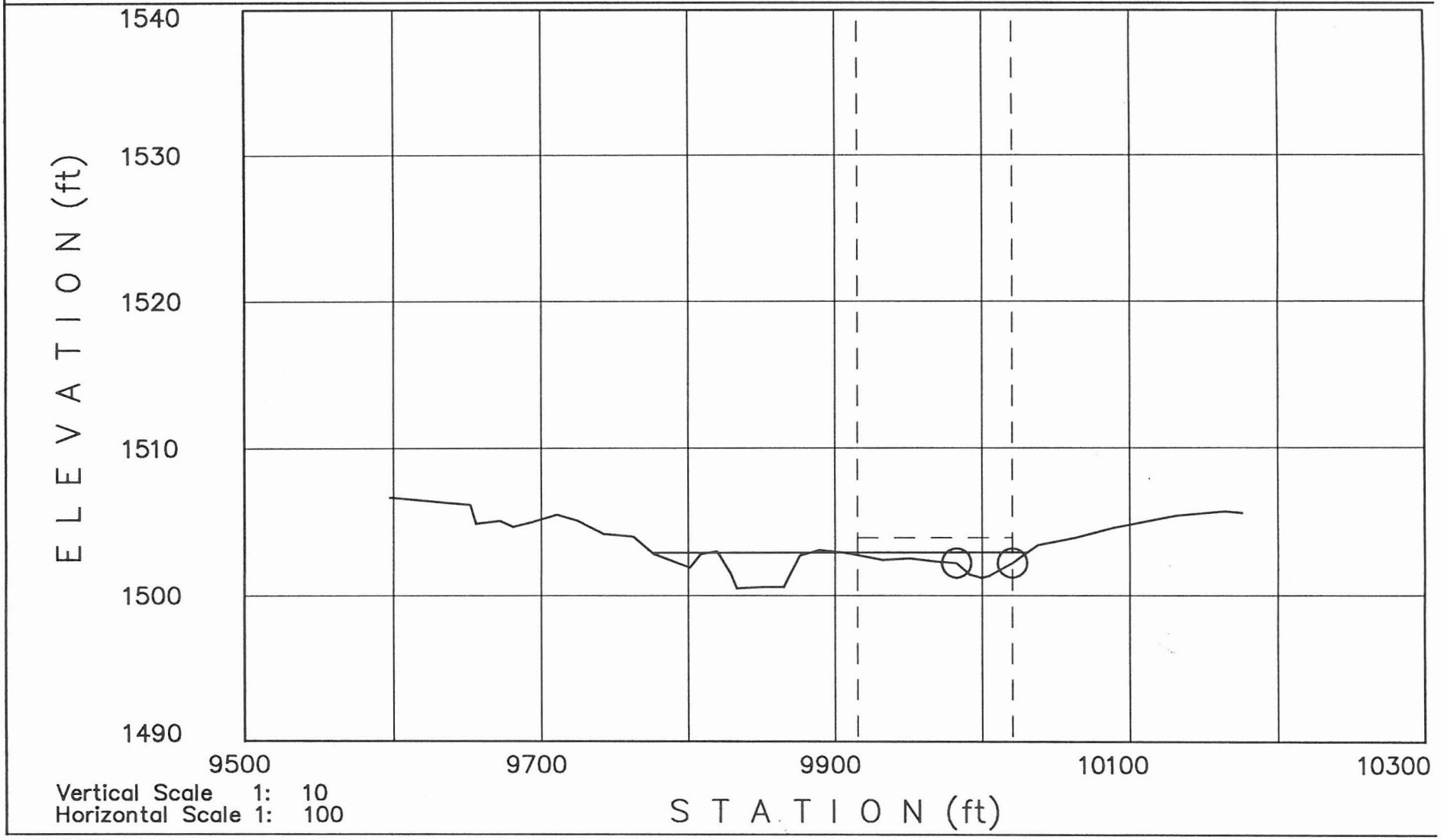


07-06-1995

<<<<<< Cross Section: .17: (FN = W9FW1.0H2) >>>>>>

Q1= 1140cfs WS1= 1502.91
Q2= 1140cfs WS2= 1503.91

Manning-n Values: LOB: .049 - .065 CH: .045 ROB: 0 - .065



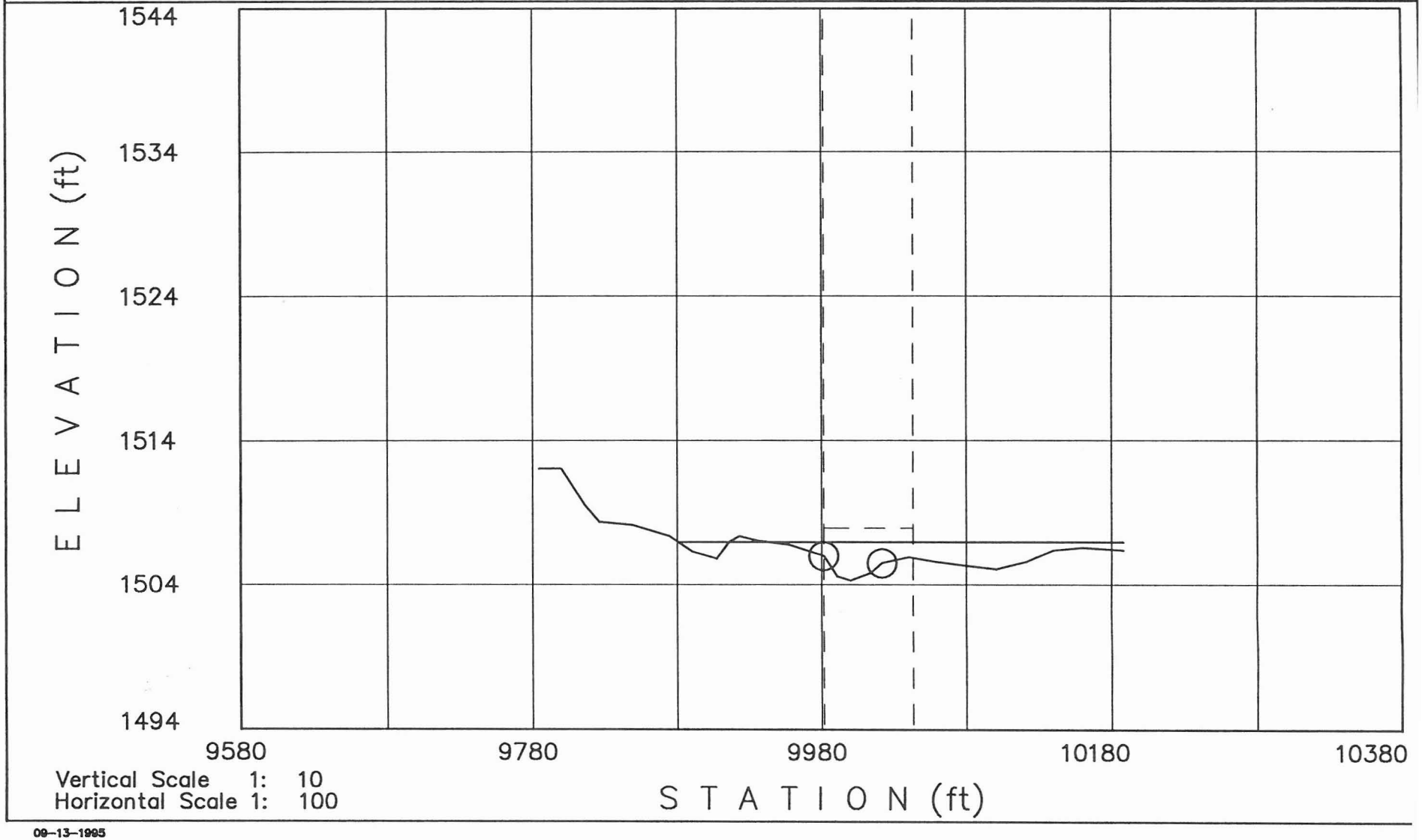
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: .22: (FN = W9FW1.0H2) >>>>>>

Q1= 1140cfs WS1= 1506.99
Q2= 1140cfs WS2= 1507.98

Manning-n Values: LOB: 0 - .052 CH: .045 ROB: .065



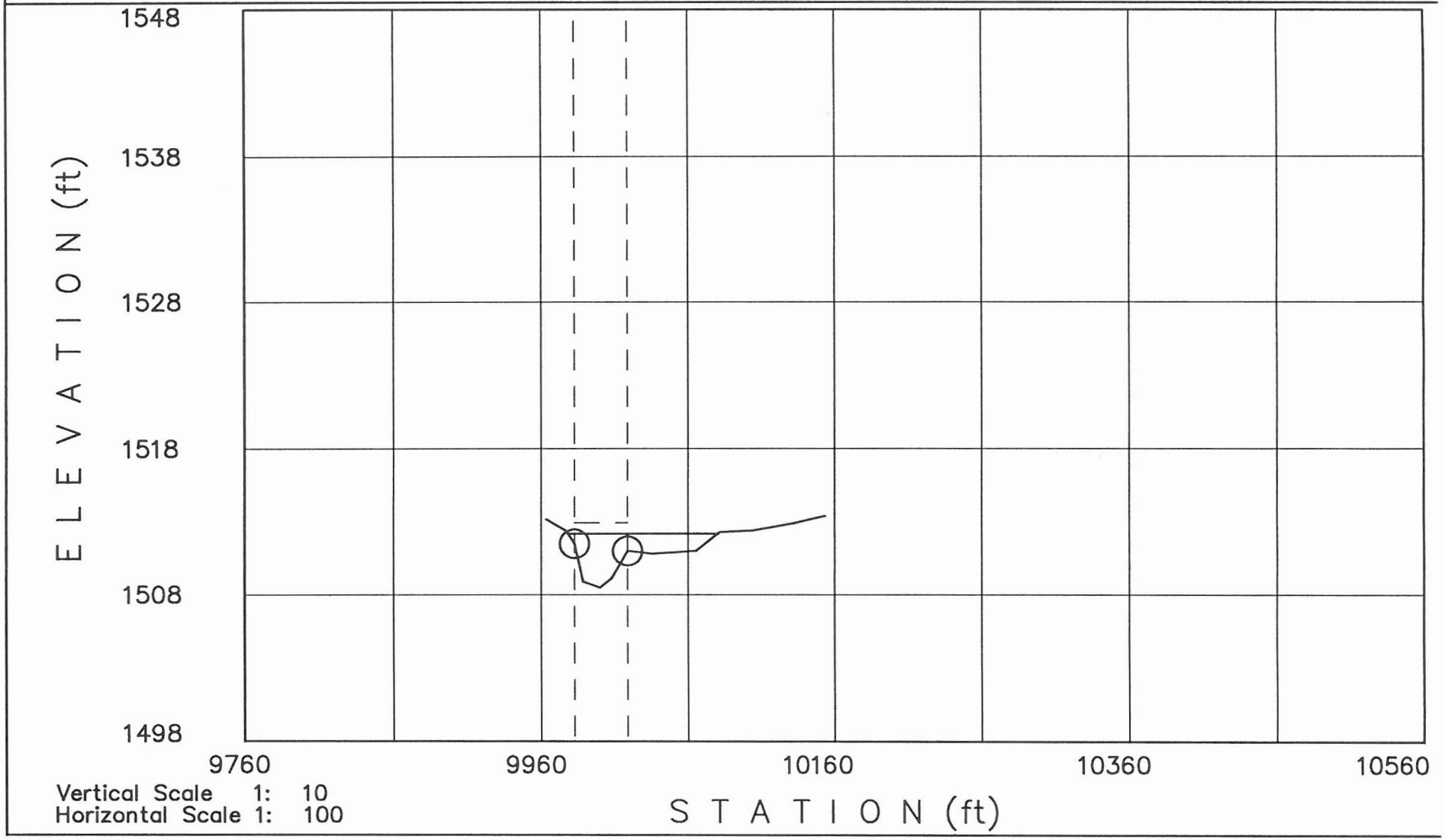
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: .302: (FN = W9FW1.OH2) >>>>>>

Q1= 1010cfs WS1= 1512.2
Q2= 1010cfs WS2= 1512.94

Manning-n Values: LOB: .065 CH: .045 ROB: 0 - .065



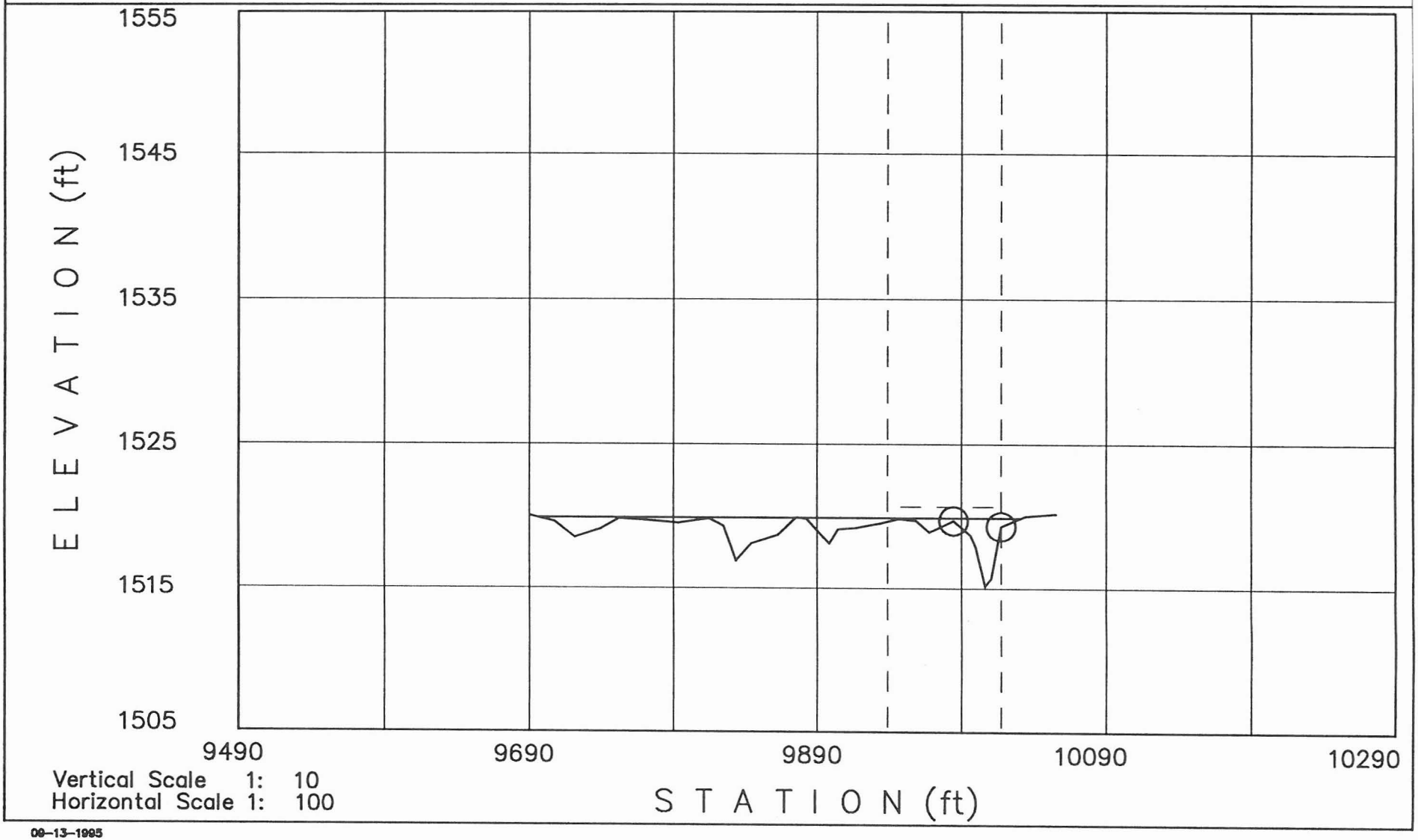
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: .402: (FN = W9FW1.OH2) >>>>>>

Q1= 1010cfs WS1= 1519.87
Q2= 1010cfs WS2= 1520.67

Manning-n Values: LOB: .059 - .065 CH: .048 - .049 ROB: 0 - .065



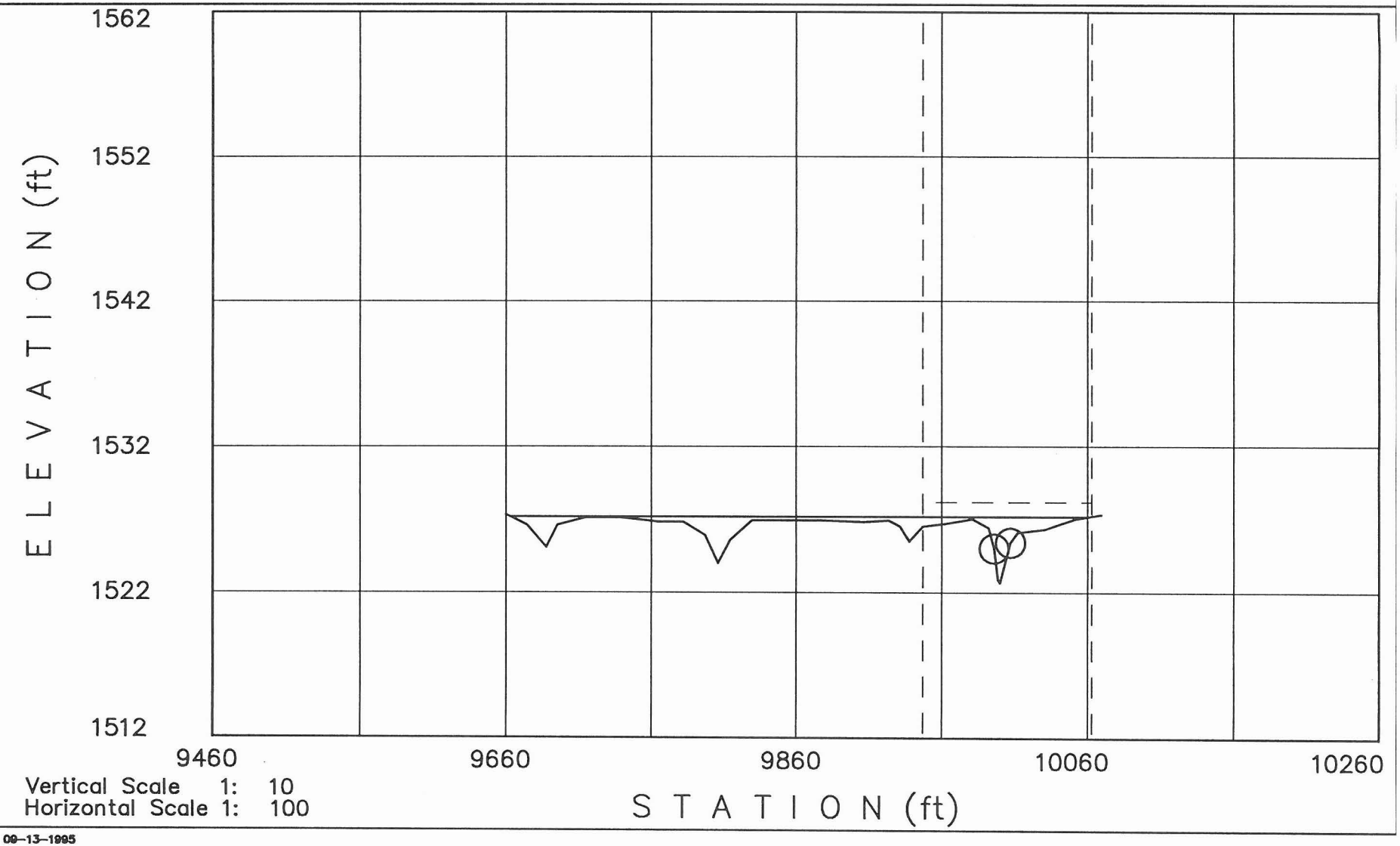
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: .493: (FN = W9FW1.0H2) >>>>>>

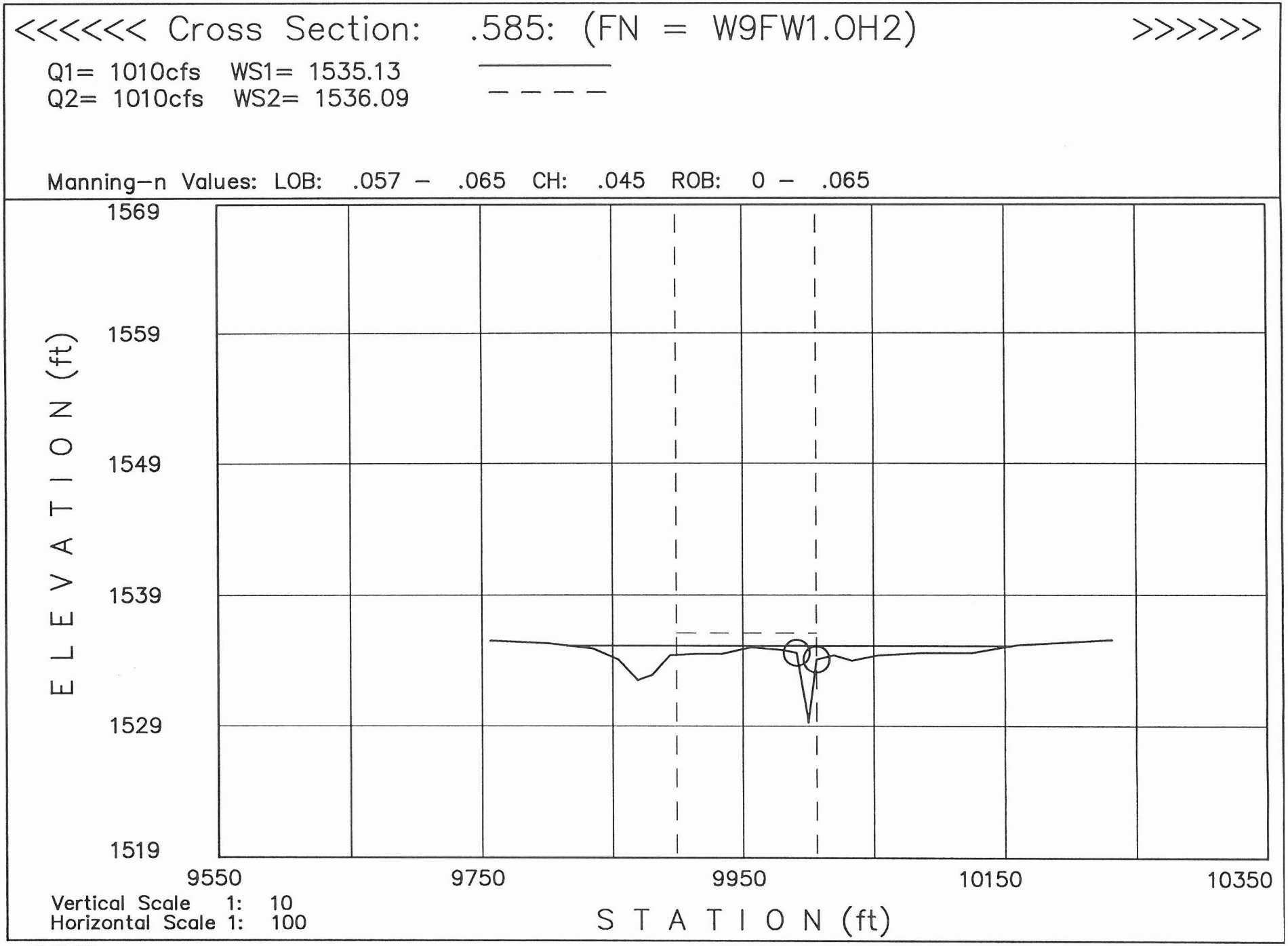
Q1= 1010cfs WS1= 1527.15
Q2= 1010cfs WS2= 1528.16

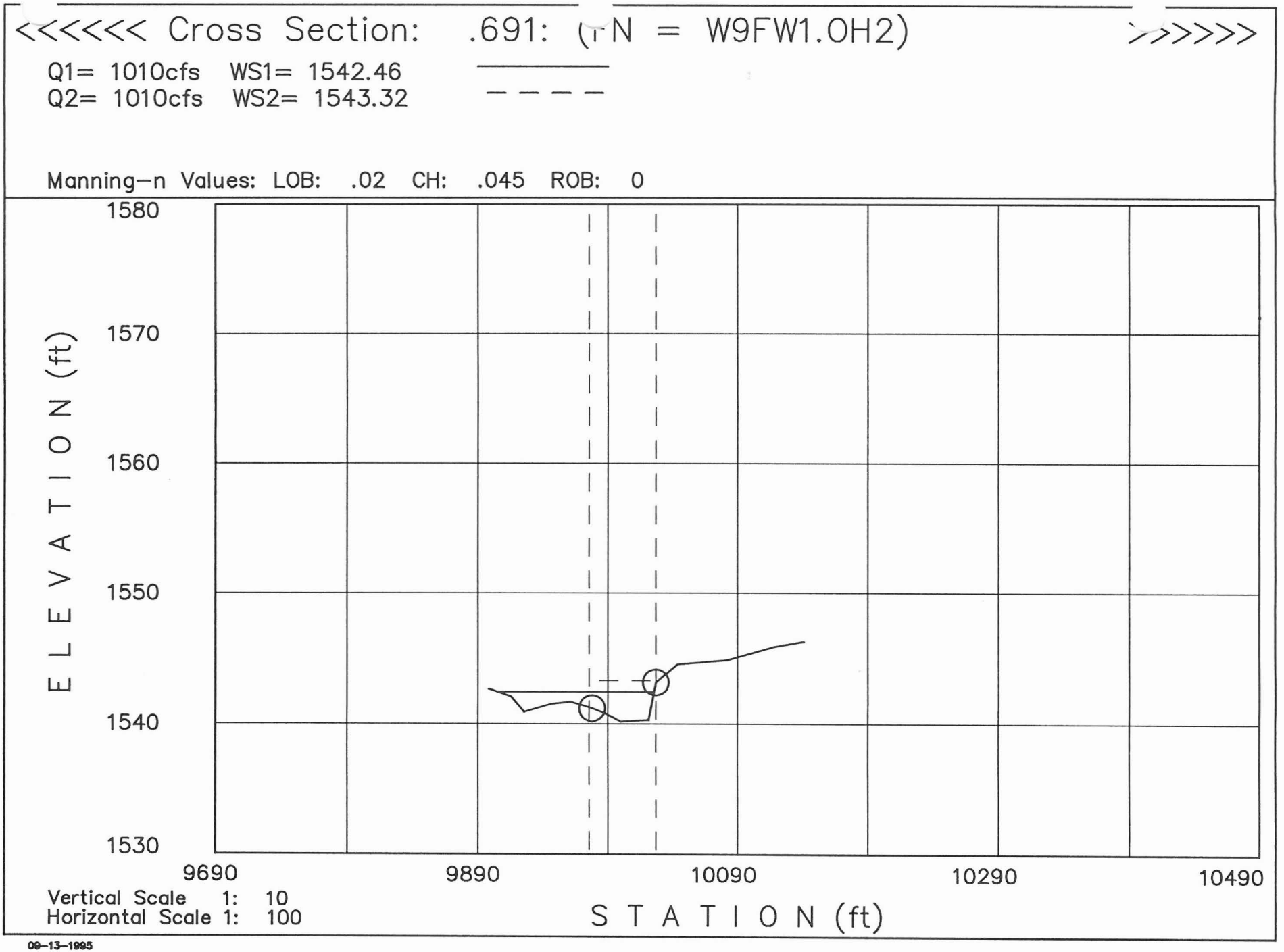
Manning-n Values: LOB: .052 - .065 CH: .045 ROB: .065



Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

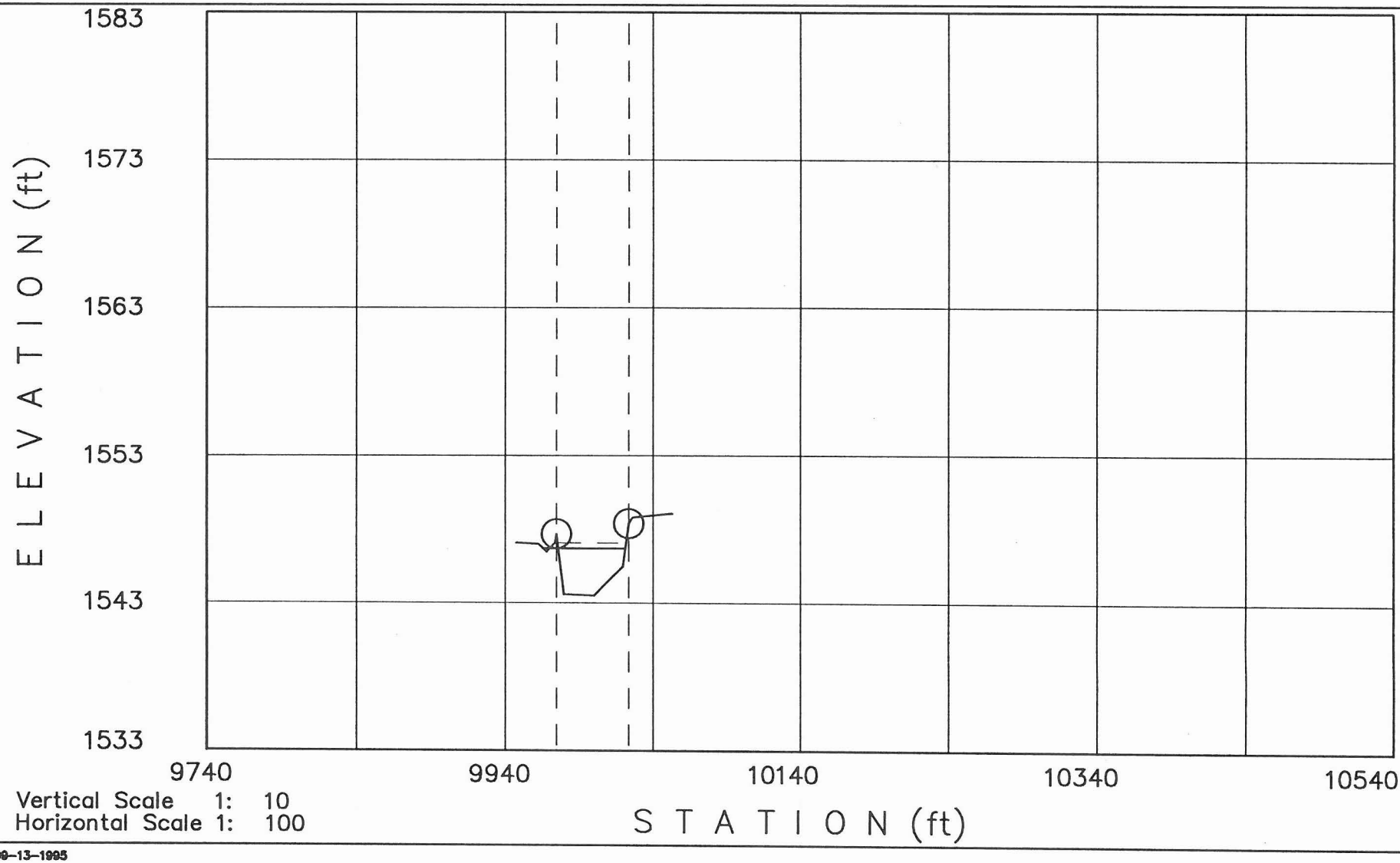

<<<<<< Cross Section: .585: (FN = W9FW1.0H2) >>>>>>
Q1= 1010cfs WS1= 1535.13
Q2= 1010cfs WS2= 1536.09
Manning-n Values: LOB: .057 - .065 CH: .045 ROB: 0 - .065
1569
1559
1549
1539
1529
1519
ELEVATION (ft)
9550
9750
9950
10150
10350
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
09-13-1995


<<<<<< Cross Section: .691: (FN = W9FW1.0H2) >>>>>>
Q1= 1010cfs WS1= 1542.46
Q2= 1010cfs WS2= 1543.32
Manning-n Values: LOB: .02 CH: .045 ROB: 0
1580
1570
1560
1550
1540
1530
ELEVATION (ft)
9690
9890
10090
10290
10490
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
08-13-1995

<<<<<< Cross Section: .743: (FN = W9FW1.0H2) >>>>>>

Q1= 1010cfs WS1= 1546.71
Q2= 1010cfs WS2= 1547.07

Manning-n Values: LOB: 0 - .02 CH: .045 ROB: 0



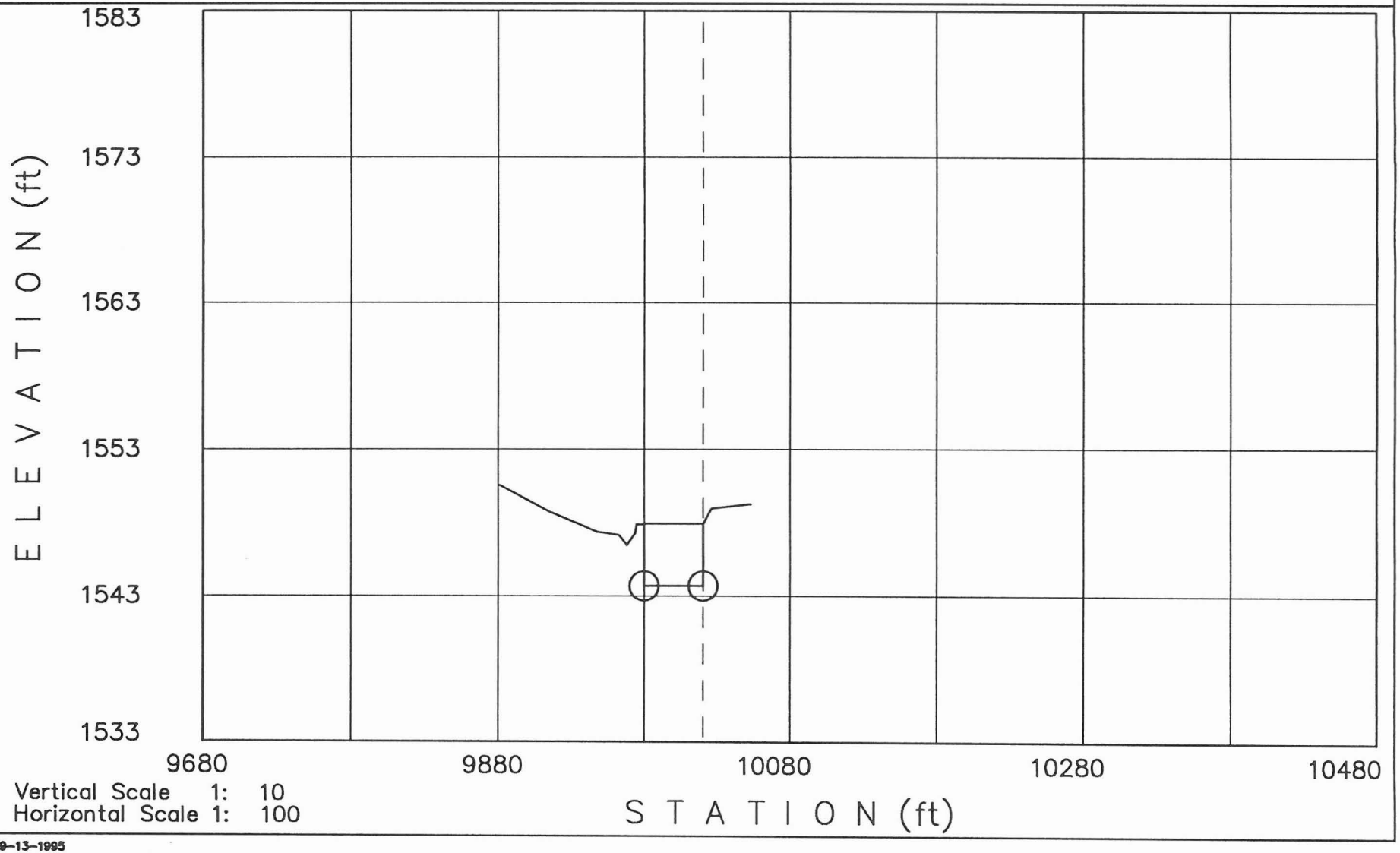
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: .751: (FN = W9FW1.OH2) >>>>>>

Q1= 1010cfs WS1= 1547.96
Q2= 1010cfs WS2= 1547.92

Manning-n Values: LOB: 0 CH: .045 ROB: 0



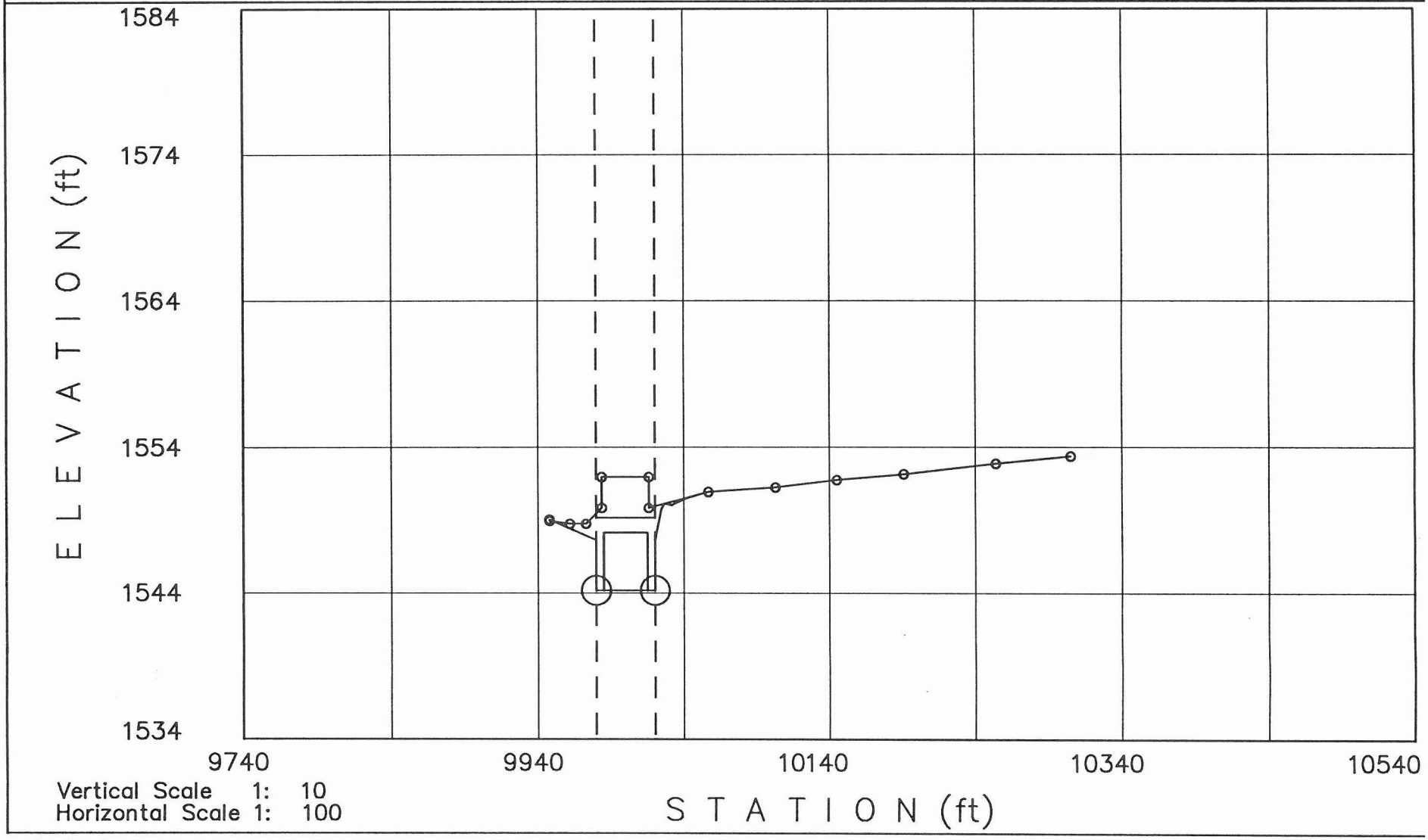
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: .762: (FN = W9FW1.OH2) >>>>>>

Q1= 1010cfs WS1= 1549.22
Q2= 1010cfs WS2= 1549.21

Manning-n Values: LOB: .02 CH: .045 ROB: 0



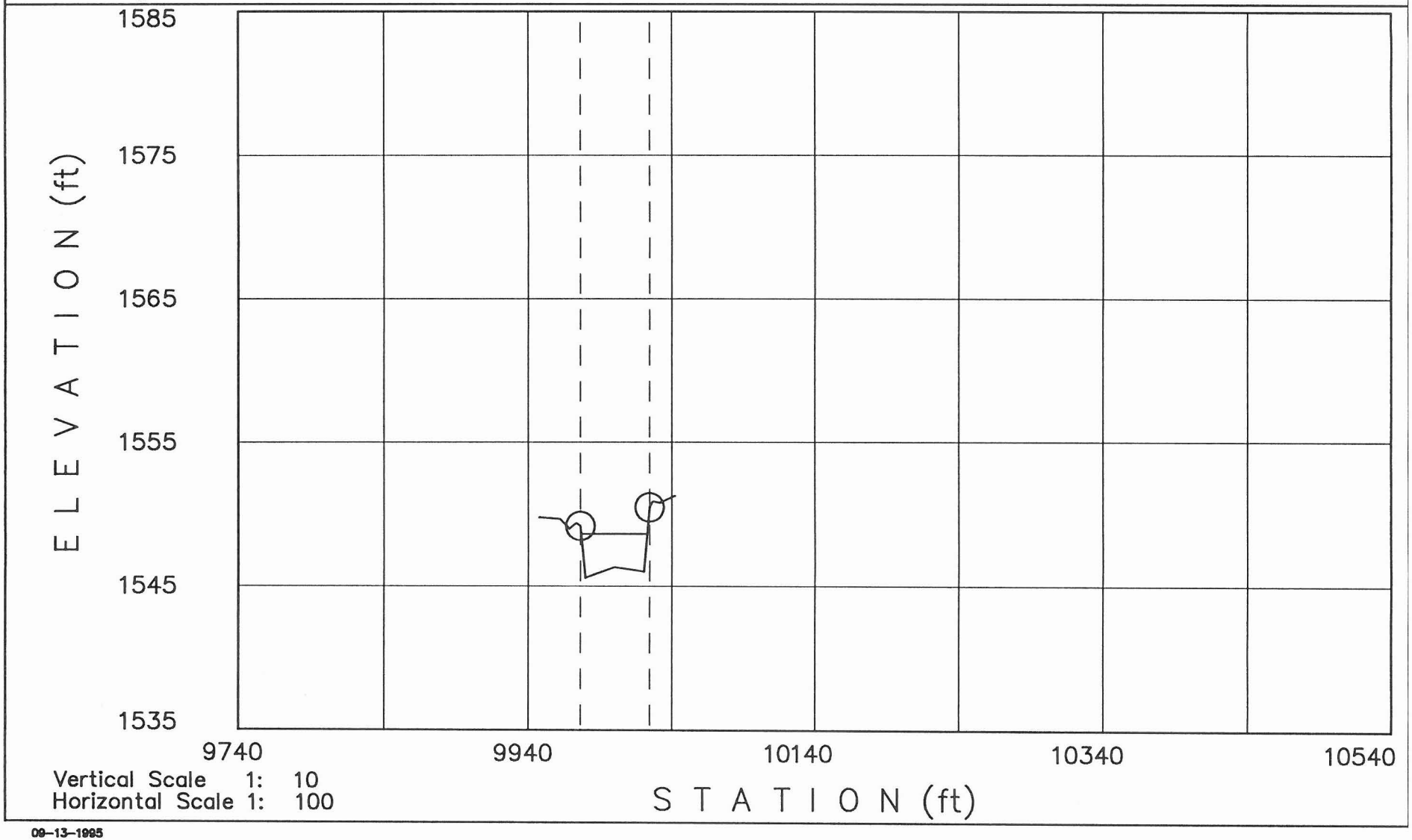
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: .766: (FN = W9FW1.0H2) >>>>>>

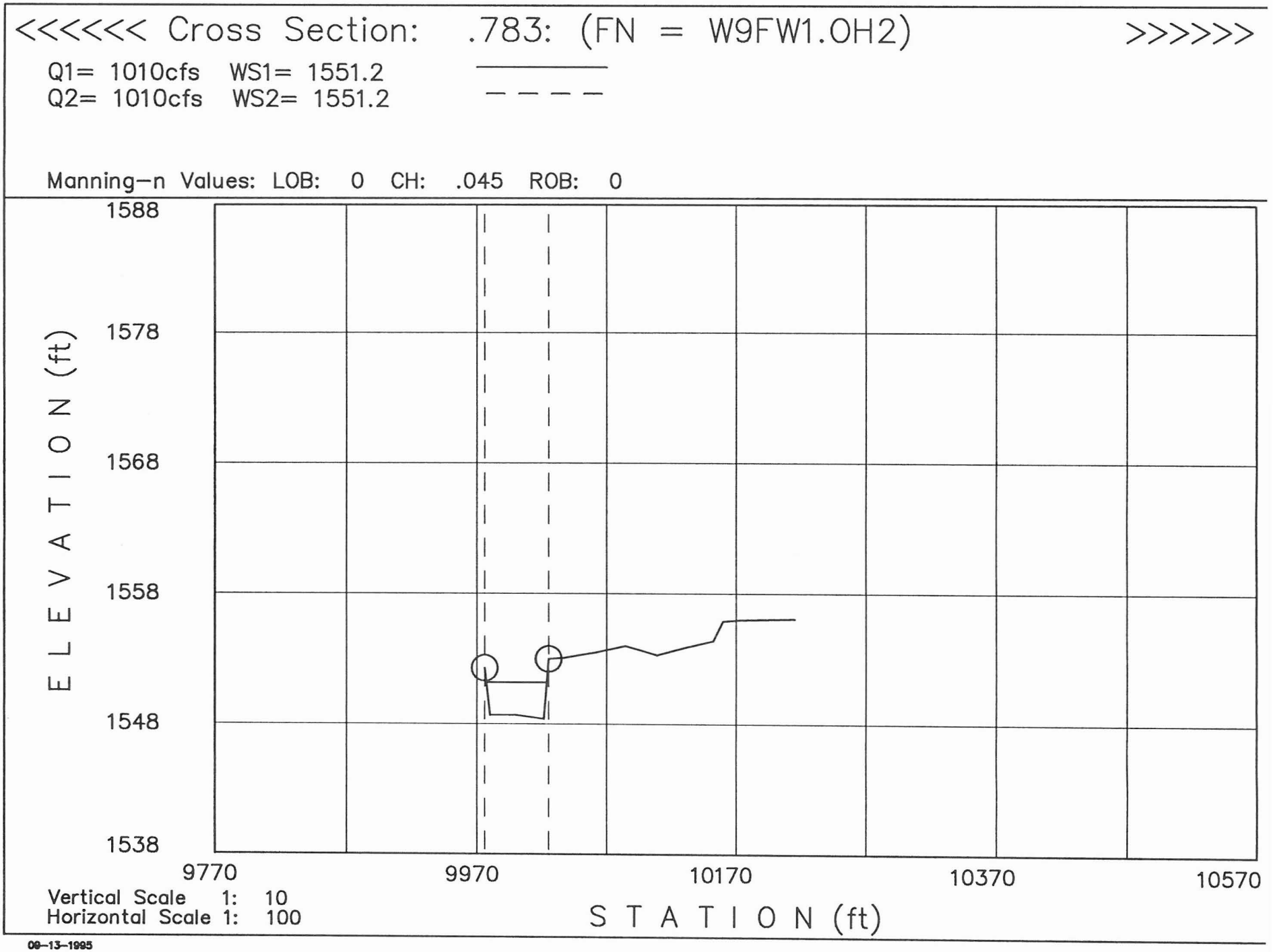
Q1= 1010cfs WS1= 1548.64
Q2= 1010cfs WS2= 1548.64

Manning-n Values: LOB: 0 CH: .045 ROB: 0



Vertical Scale 1: 10
Horizontal Scale 1: 100

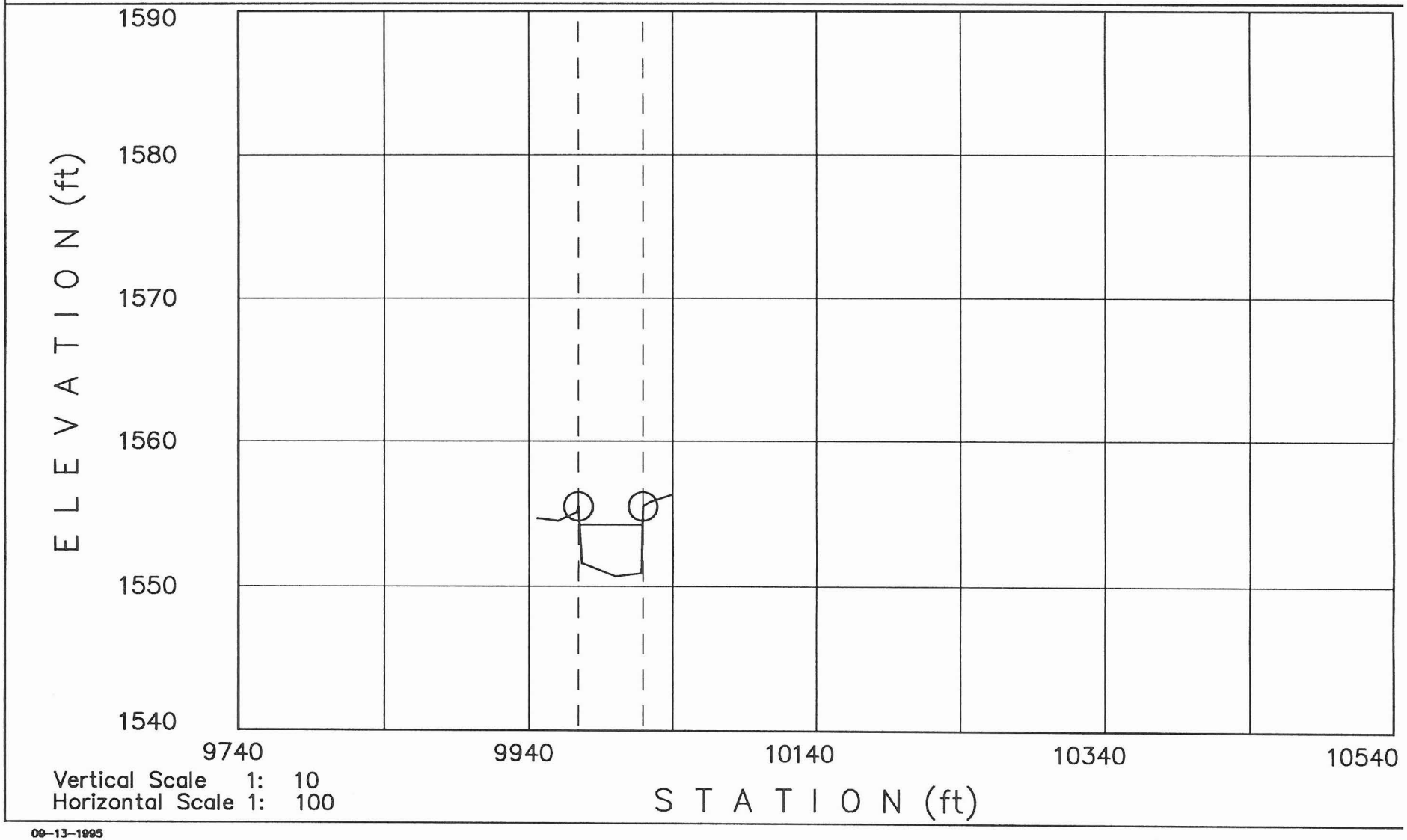
09-13-1995


<<<<<< Cross Section: .783: (FN = W9FW1.0H2) >>>>>>
Q1= 1010cfs WS1= 1551.2
Q2= 1010cfs WS2= 1551.2
Manning-n Values: LOB: 0 CH: .045 ROB: 0
1588
1578
1568
1558
1548
1538
ELEVATION (ft)
9770
9970
10170
10370
10570
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
08-13-1995

<<<<<< Cross Section: .812: (FN = W9FW1.OH2) >>>>>>

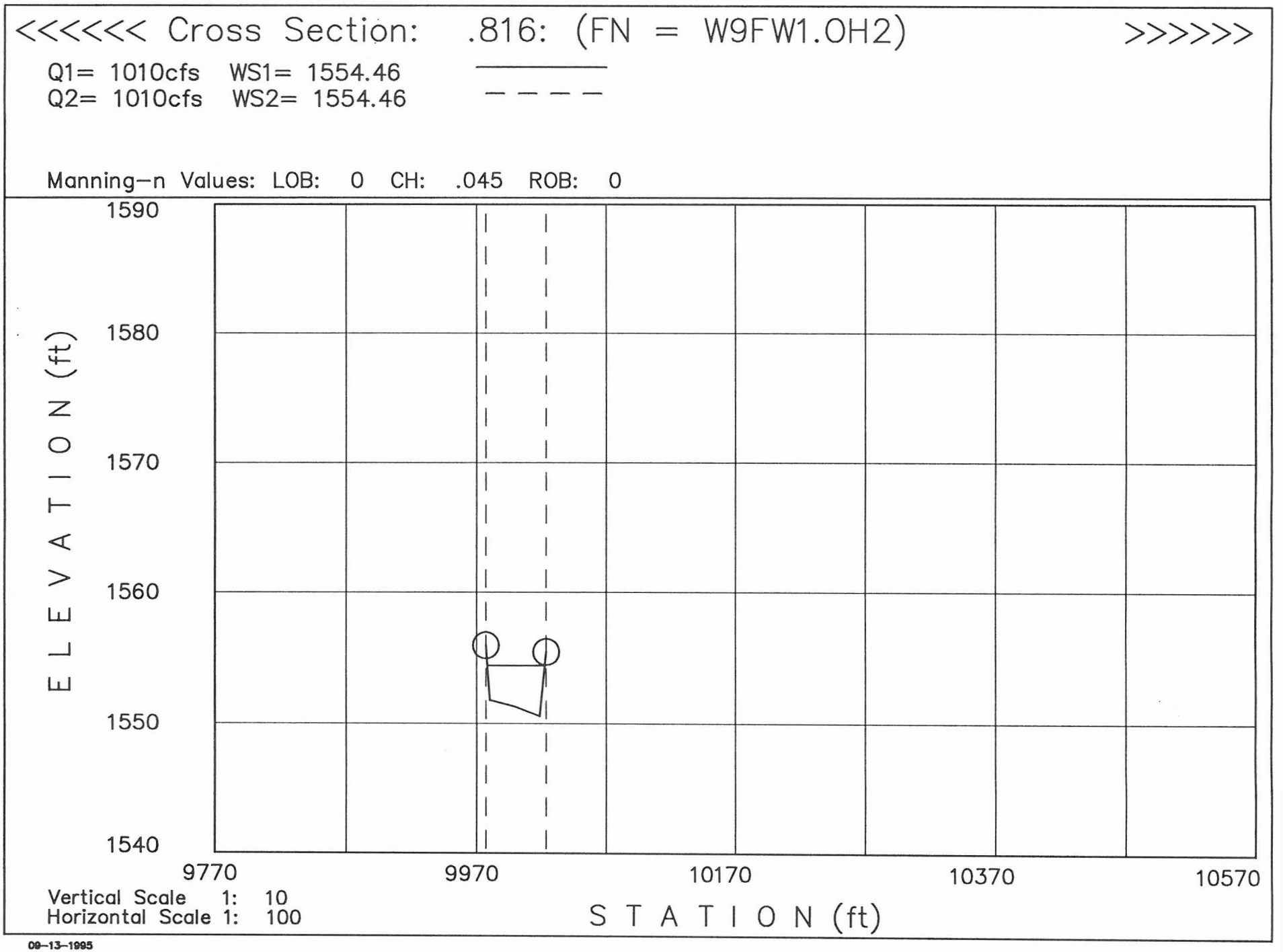
Q1= 1010cfs WS1= 1554.24
Q2= 1010cfs WS2= 1554.24

Manning-n Values: LOB: 0 CH: .045 ROB: 0



Vertical Scale 1: 10
Horizontal Scale 1: 100

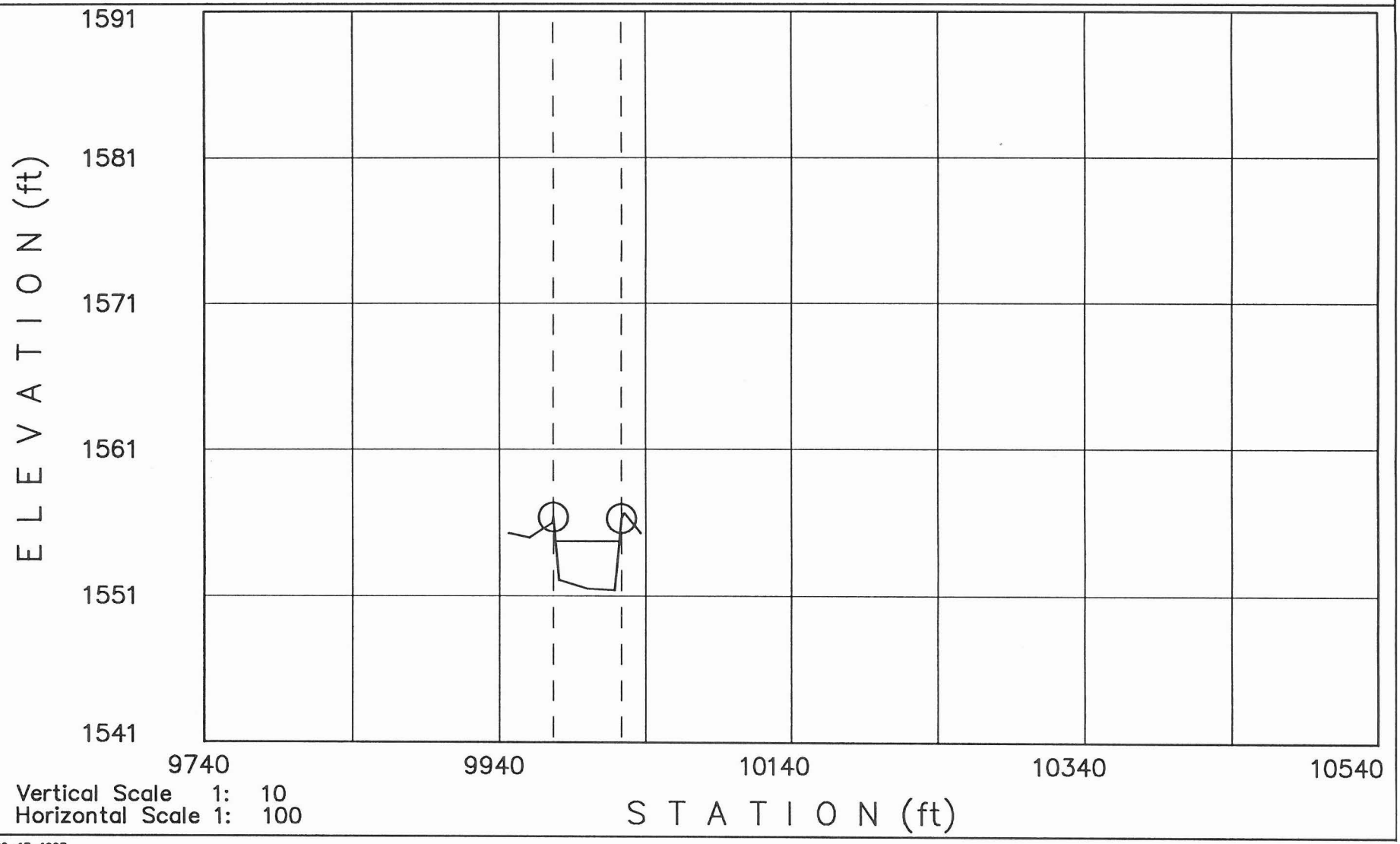
09-13-1995


<<<<<< Cross Section: .816: (FN = W9FW1.0H2) >>>>>>
Q1= 1010cfs WS1= 1554.46
Q2= 1010cfs WS2= 1554.46
Manning-n Values: LOB: 0 CH: .045 ROB: 0
1590
1580
1570
1560
1550
1540
ELEVATION (ft)
9770
9970
10170
10370
10570
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
09-13-1995

<<<<<< Cross Section: .821: (FN = W9FW1.OH2) >>>>>>

Q1= 1010cfs WS1= 1554.76
Q2= 1010cfs WS2= 1554.76

Manning-n Values: LOB: 0 CH: .045 ROB: 0



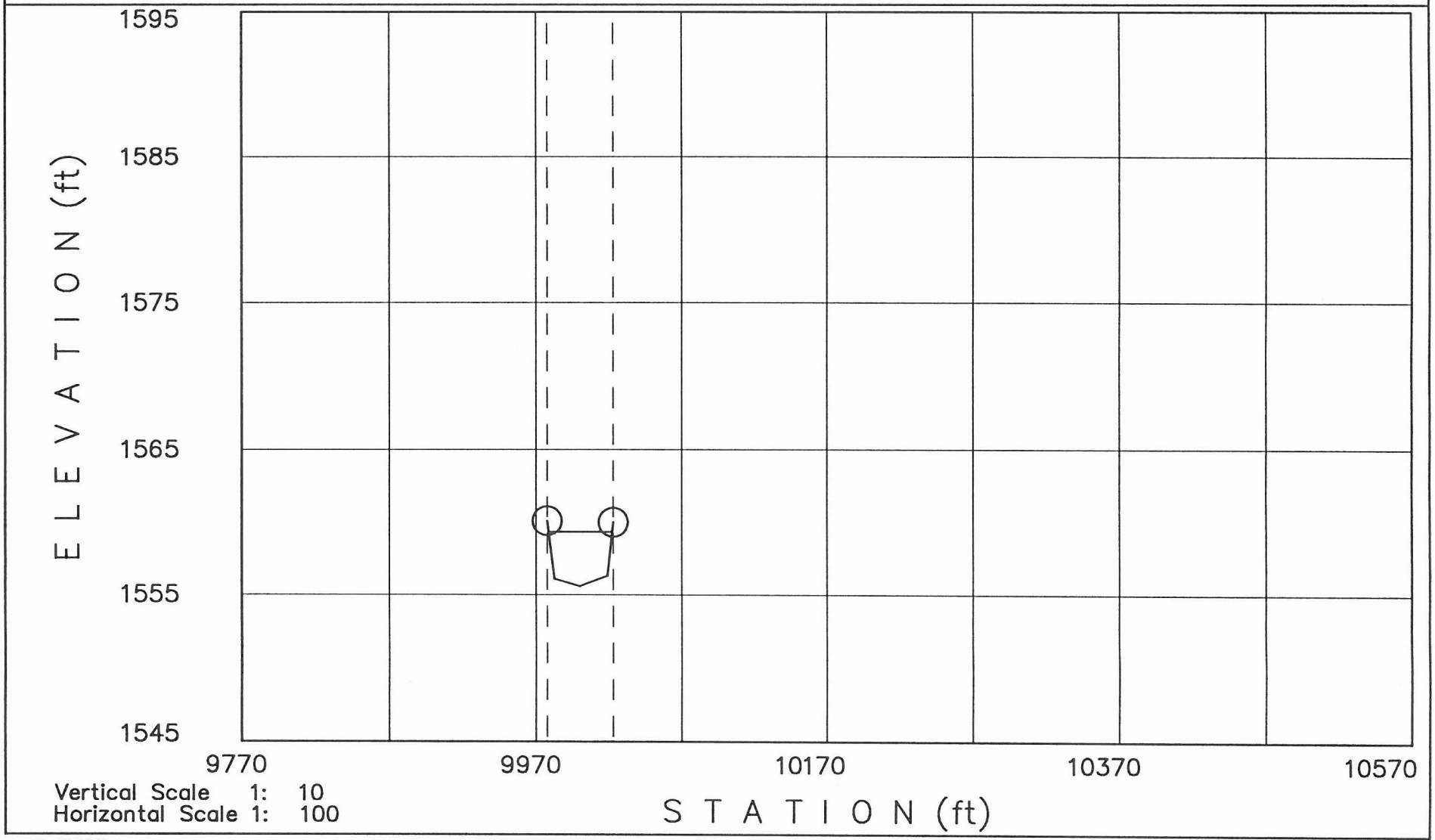
Vertical Scale 1: 10
Horizontal Scale 1: 100

08-13-1985

<<<<<< Cross Section: .885: (FN = W9FW1.0H2) >>>>>>

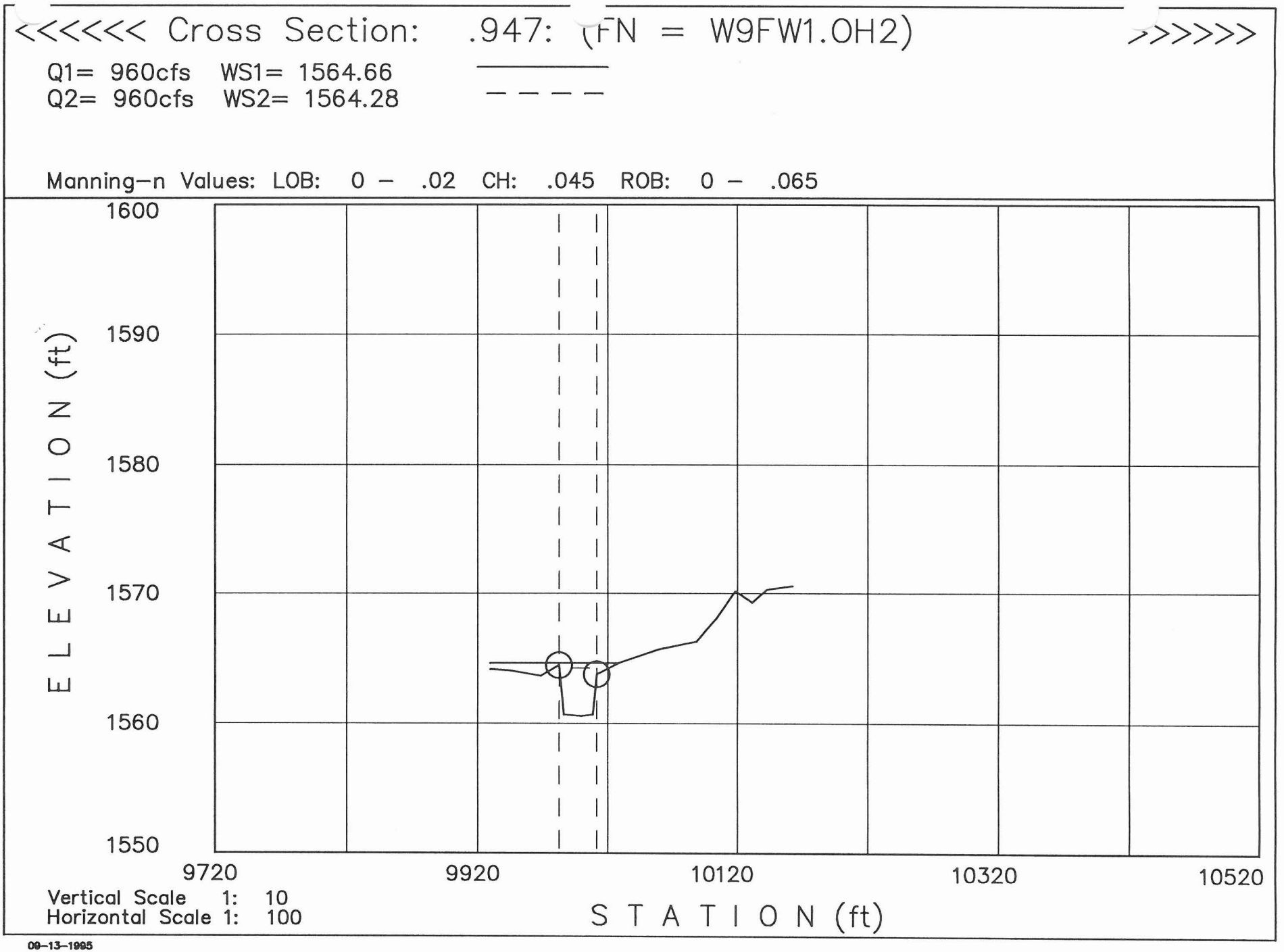
Q1= 1010cfs WS1= 1559.35
Q2= 1010cfs WS2= 1559.35

Manning-n Values: LOB: 0 CH: .045 ROB: 0



Vertical Scale 1: 10
Horizontal Scale 1: 100

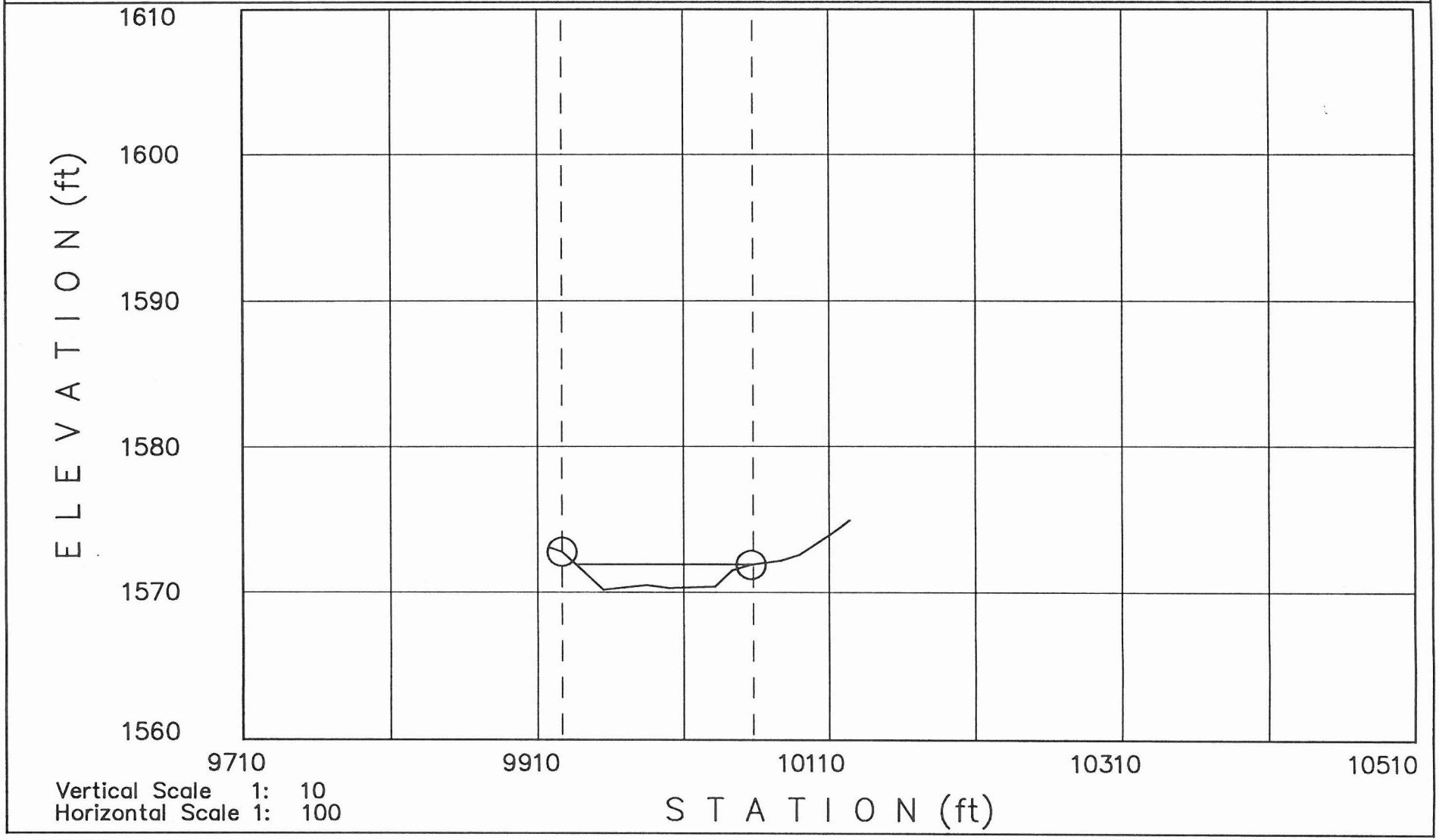
09-13-1995


<<<<<< Cross Section: .947: (FN = W9FW1.0H2) >>>>>>
Q1= 960cfs WS1= 1564.66
Q2= 960cfs WS2= 1564.28
Manning-n Values: LOB: 0 - .02 CH: .045 ROB: 0 - .065
1600
1590
1580
1570
1560
1550
ELEVATION (ft)
9720
9920
10120
10320
10520
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
09-13-1995

<<<<<< Cross Section: 1.018: (FN = W9FW1.0H2) >>>>>>

Q1= 960cfs WS1= 1571.92
Q2= 960cfs WS2= 1571.92

Manning-n Values: LOB: 0 CH: .03 ROB: .055



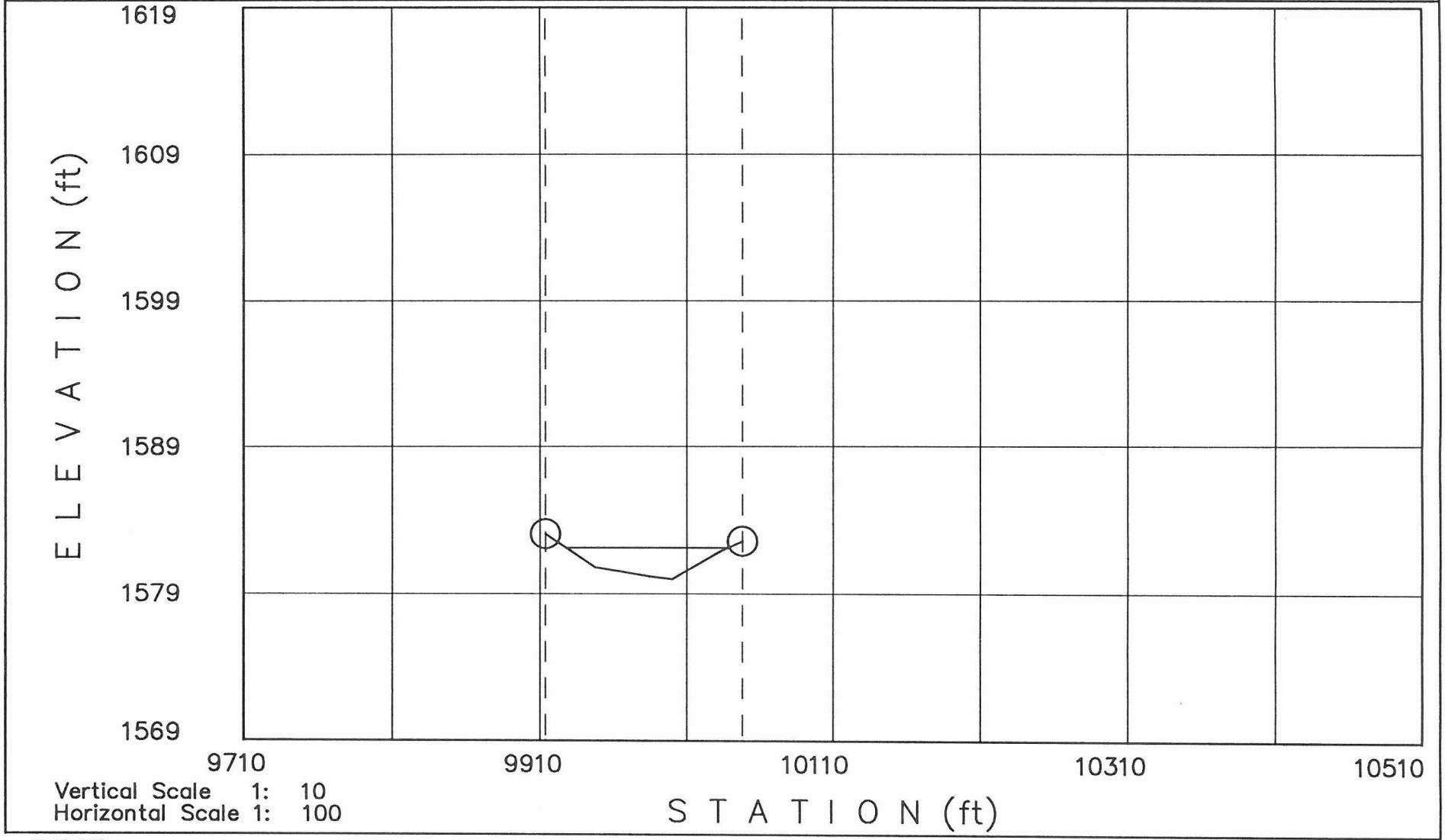
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: 1.128: (FN = W9FW1.0H2) >>>>>>

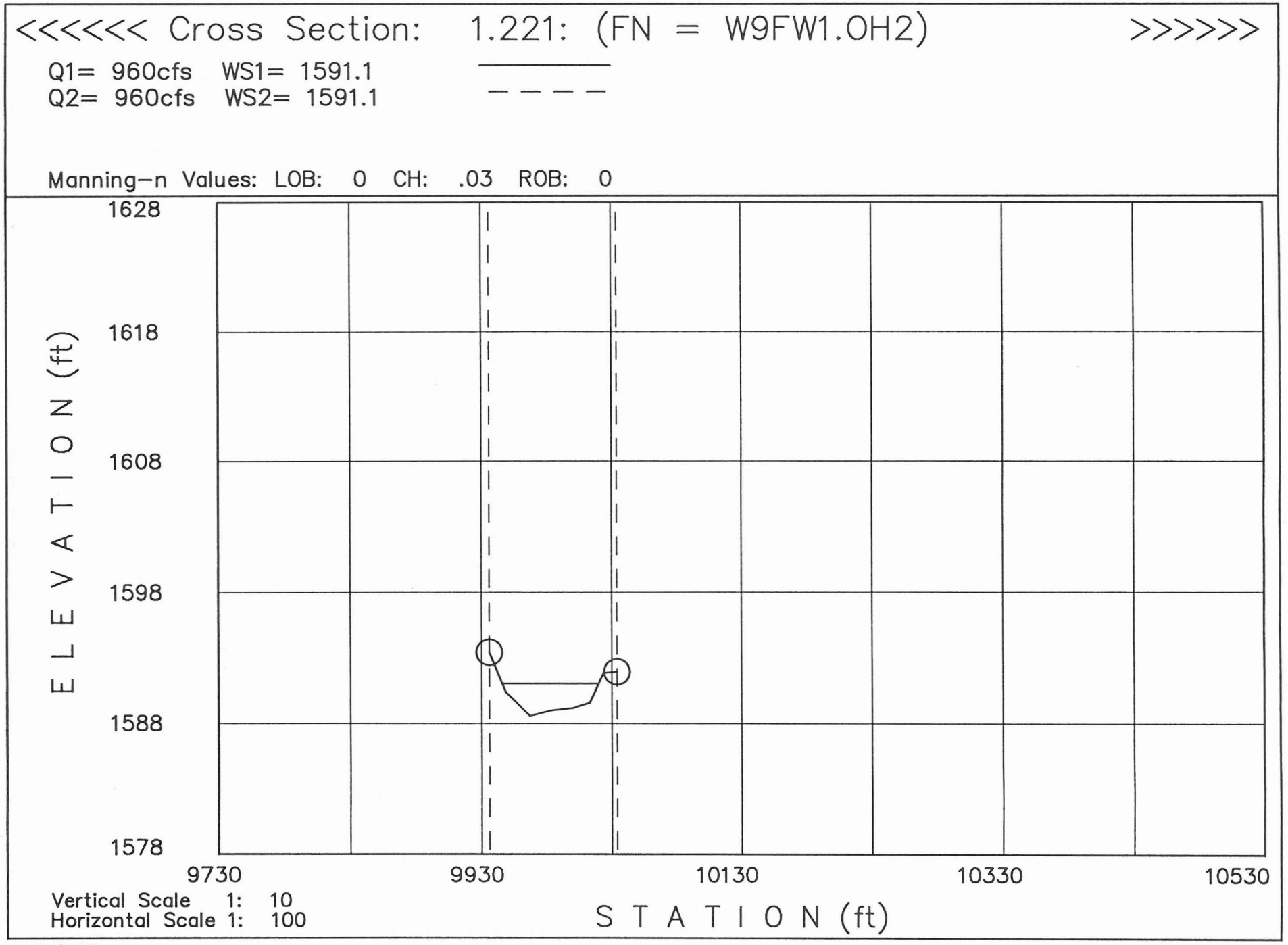
Q1= 960cfs WS1= 1582.14
Q2= 960cfs WS2= 1582.14

Manning–n Values: LOB: 0 CH: .03 ROB: 0



Vertical Scale 1: 10
Horizontal Scale 1: 100

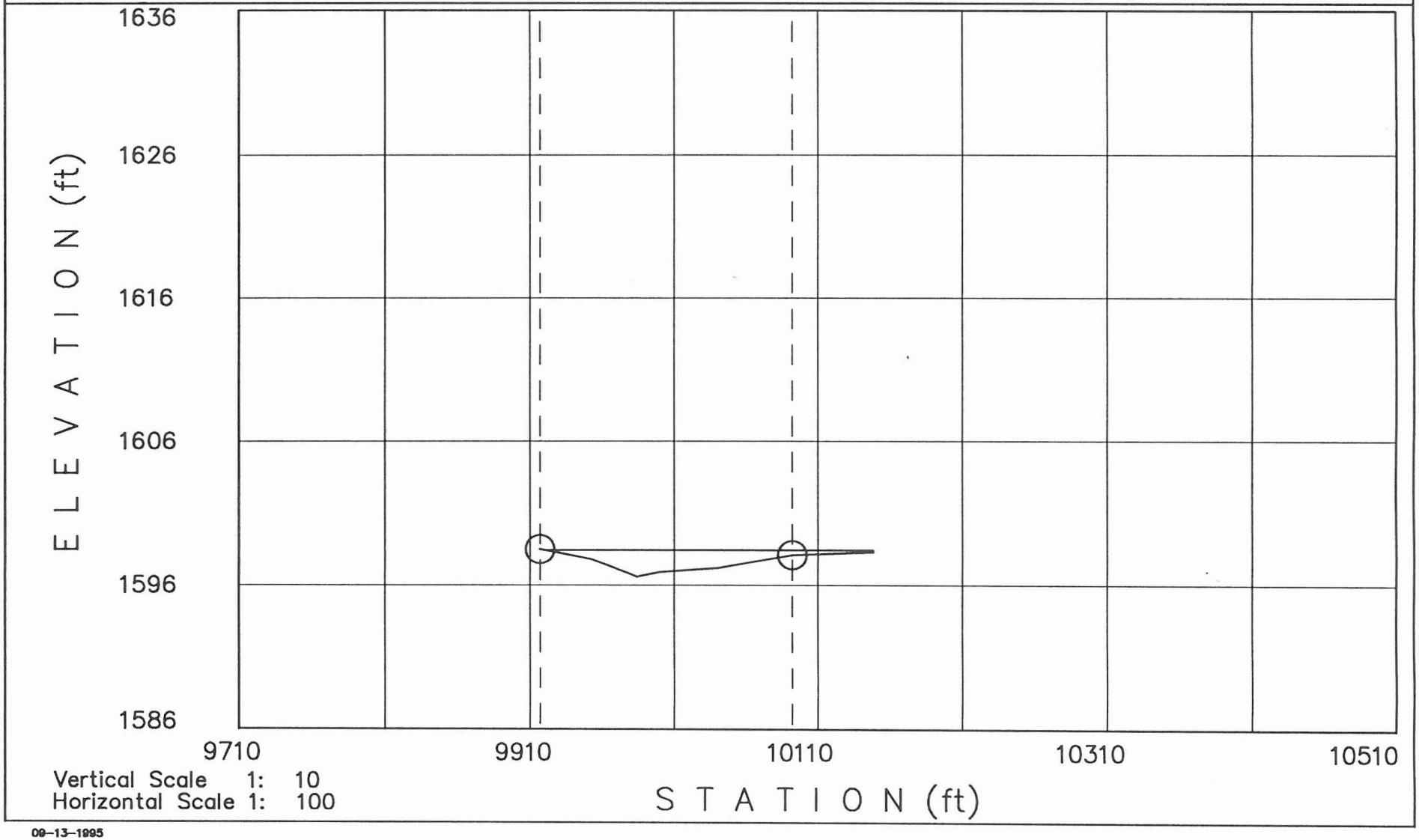
09–13–1995


<<<<<< Cross Section: 1.221: (FN = W9FW1.0H2) >>>>>>
Q1= 960cfs WS1= 1591.1
Q2= 960cfs WS2= 1591.1
Manning-n Values: LOB: 0 CH: .03 ROB: 0
1628
1618
1608
1598
1588
1578
ELEVATION (ft)
9730
9930
10130
10330
10530
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
09-13-1995

<<<<<< Cross Section: 1.281: (FN = W9FW1.0H2) >>>>>>

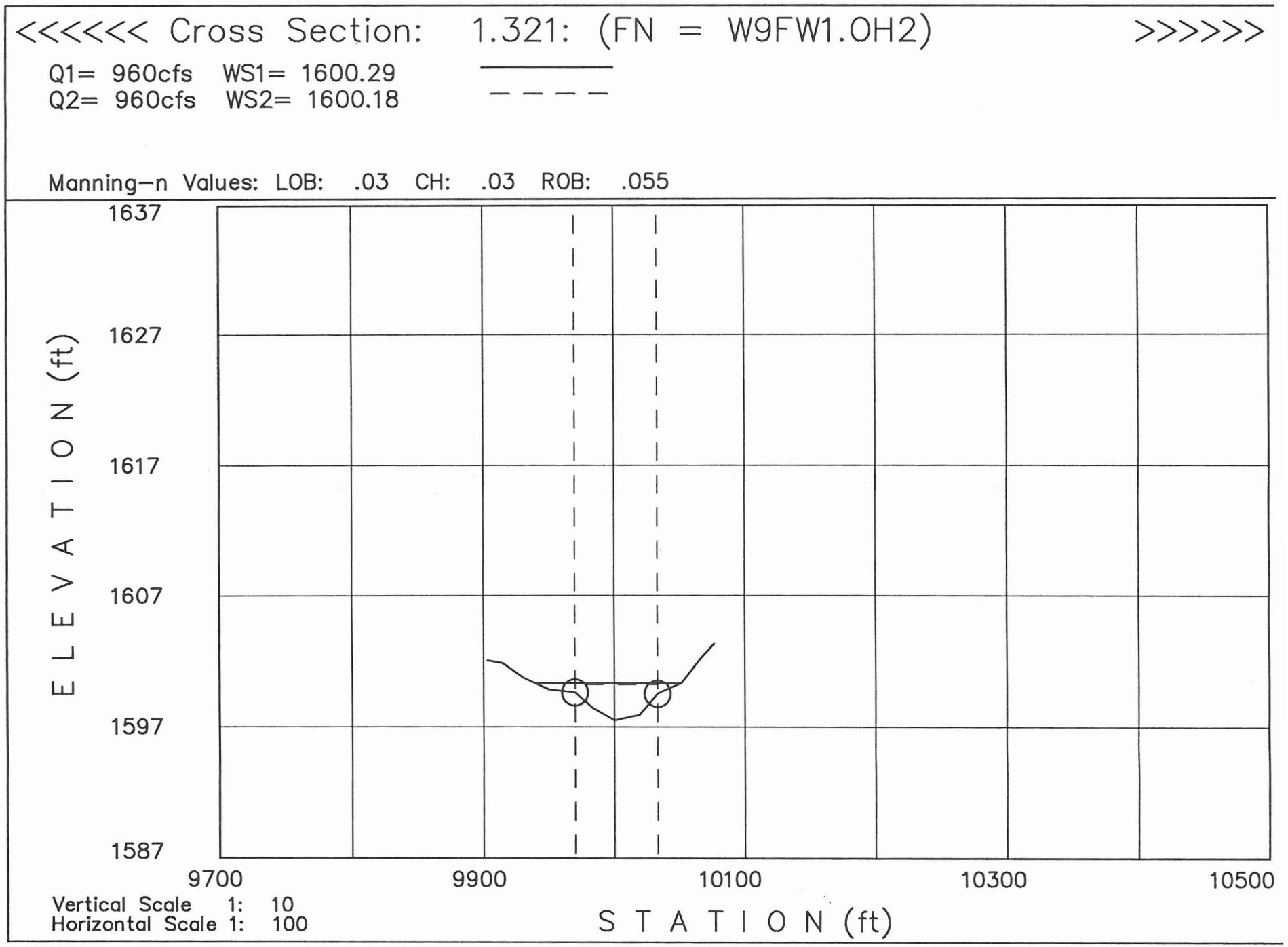
Q1= 960cfs WS1= 1598.45
Q2= 960cfs WS2= 1598.41

Manning–n Values: LOB: 0 CH: .022 ROB: .022



Vertical Scale 1: 10
Horizontal Scale 1: 100

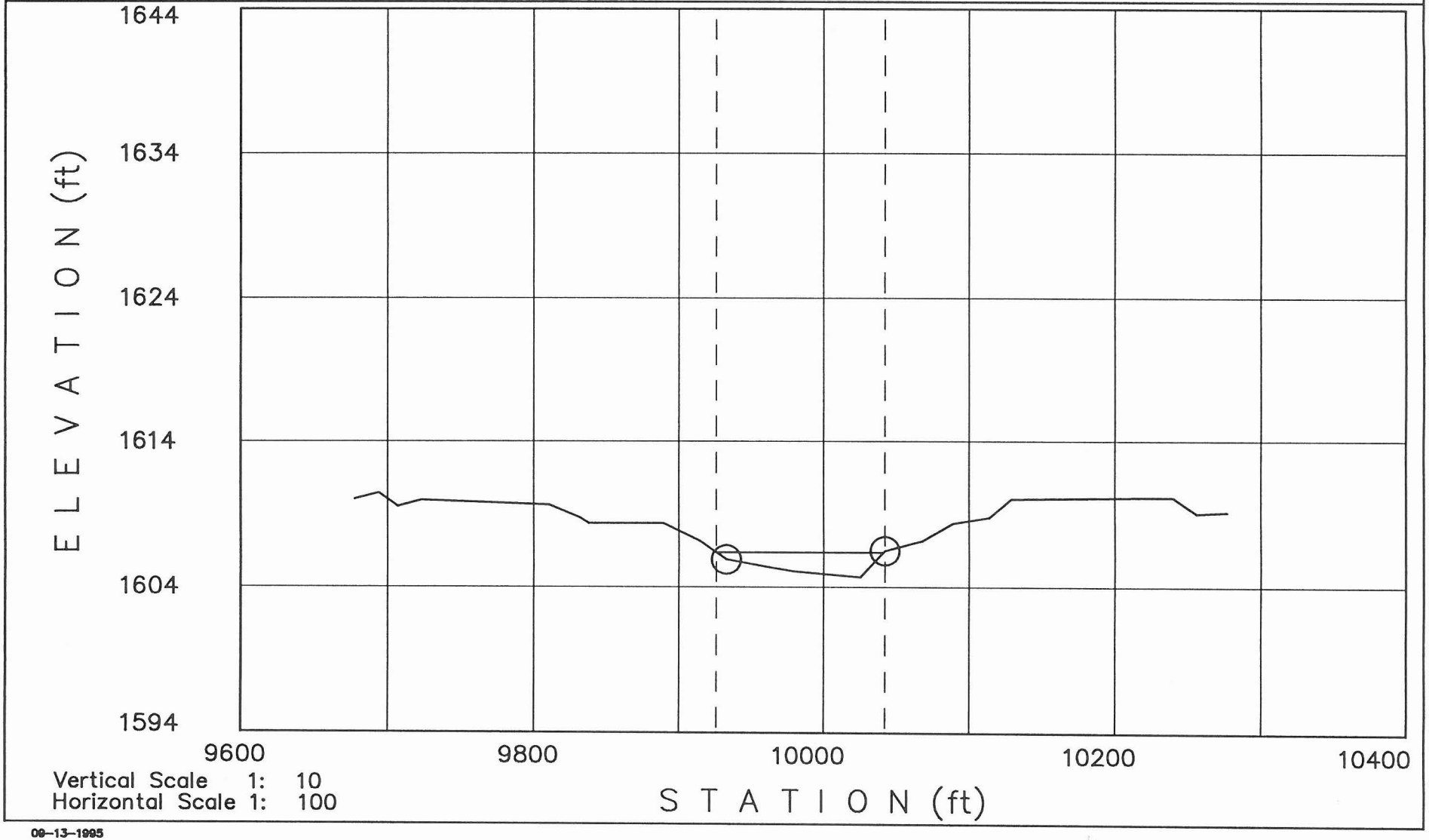
09-13-1995


<<<<<< Cross Section: 1.321: (FN = W9FW1.0H2) >>>>>>
Q1= 960cfs WS1= 1600.29
Q2= 960cfs WS2= 1600.18
Manning-n Values: LOB: .03 CH: .03 ROB: .055
1637
1627
1617
1607
1597
1587
ELEVATION (ft)
9700
9900
10100
10300
10500
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
09-13-1995

<<<<<< Cross Section: 1.399: (FN = W9FW1.0H2) >>>>>>

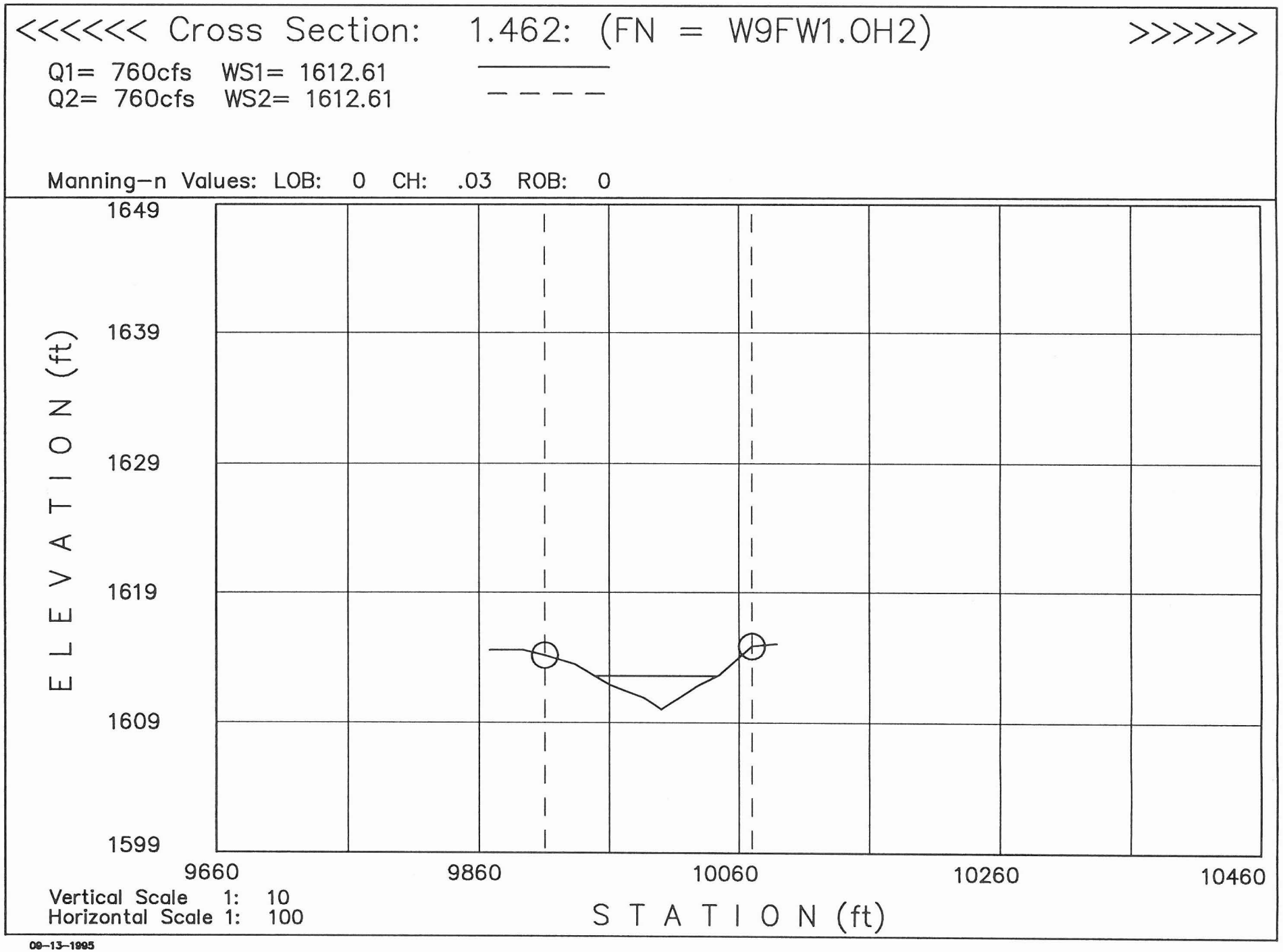
Q1= 760cfs WS1= 1606.39
Q2= 760cfs WS2= 1606.4

Manning-n Values: LOB: .03 CH: .03 ROB: 0



Vertical Scale 1: 10
Horizontal Scale 1: 100

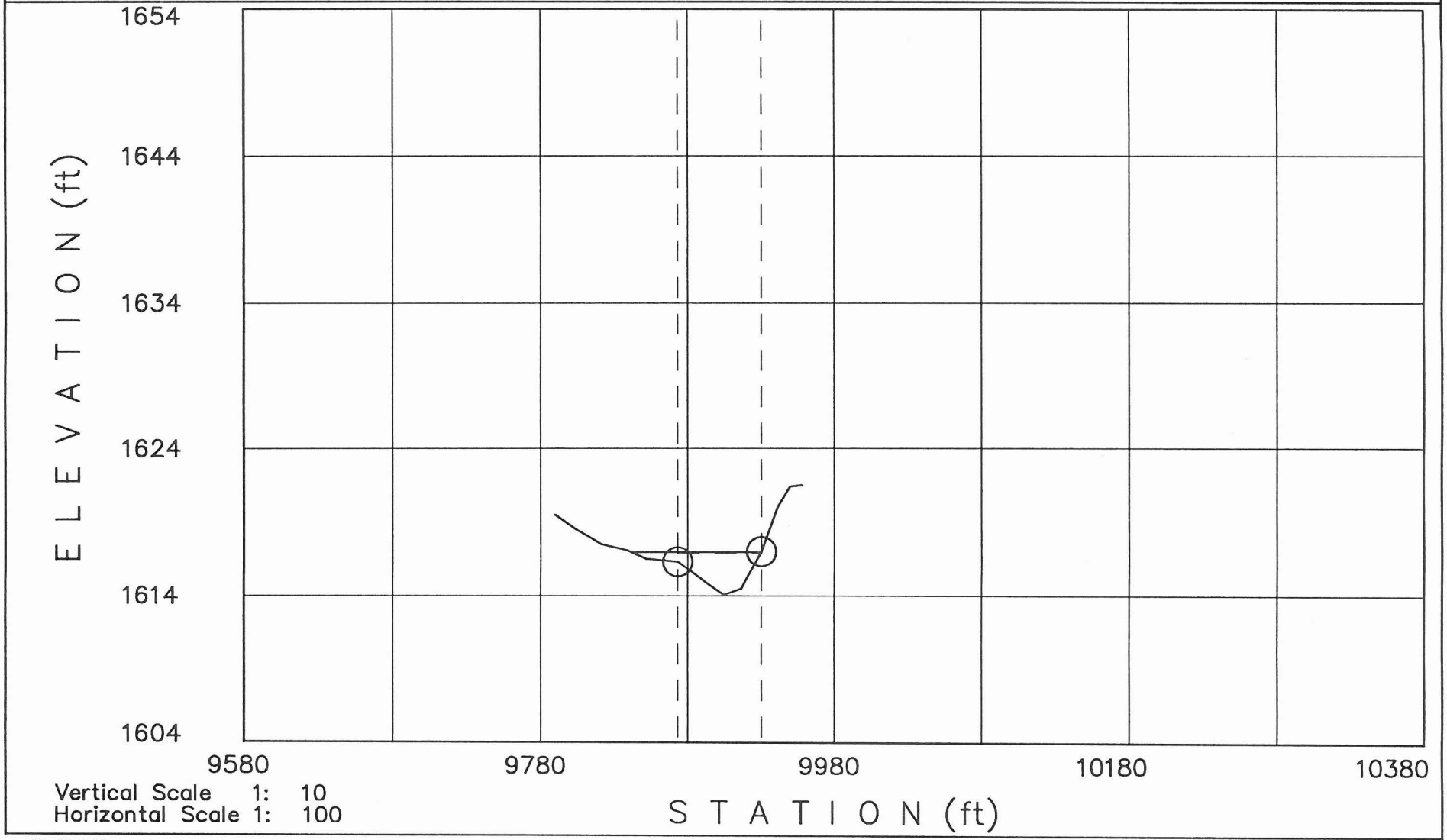
09-13-1995


<<<<<< Cross Section: 1.462: (FN = W9FW1.0H2) >>>>>>
Q1= 760cfs WS1= 1612.61
Q2= 760cfs WS2= 1612.61
Manning-n Values: LOB: 0 CH: .03 ROB: 0
1649
1639
1629
1619
1609
1599
ELEVATION (ft)
9660
9860
10060
10260
10460
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
09-13-1995

<<<<<< Cross Section: 1.494: (FN = W9FW1.0H2) >>>>>>

Q1= 760cfs WS1= 1616.96
Q2= 760cfs WS2= 1616.89

Manning–n Values: LOB: .03 CH: .03 ROB: 0



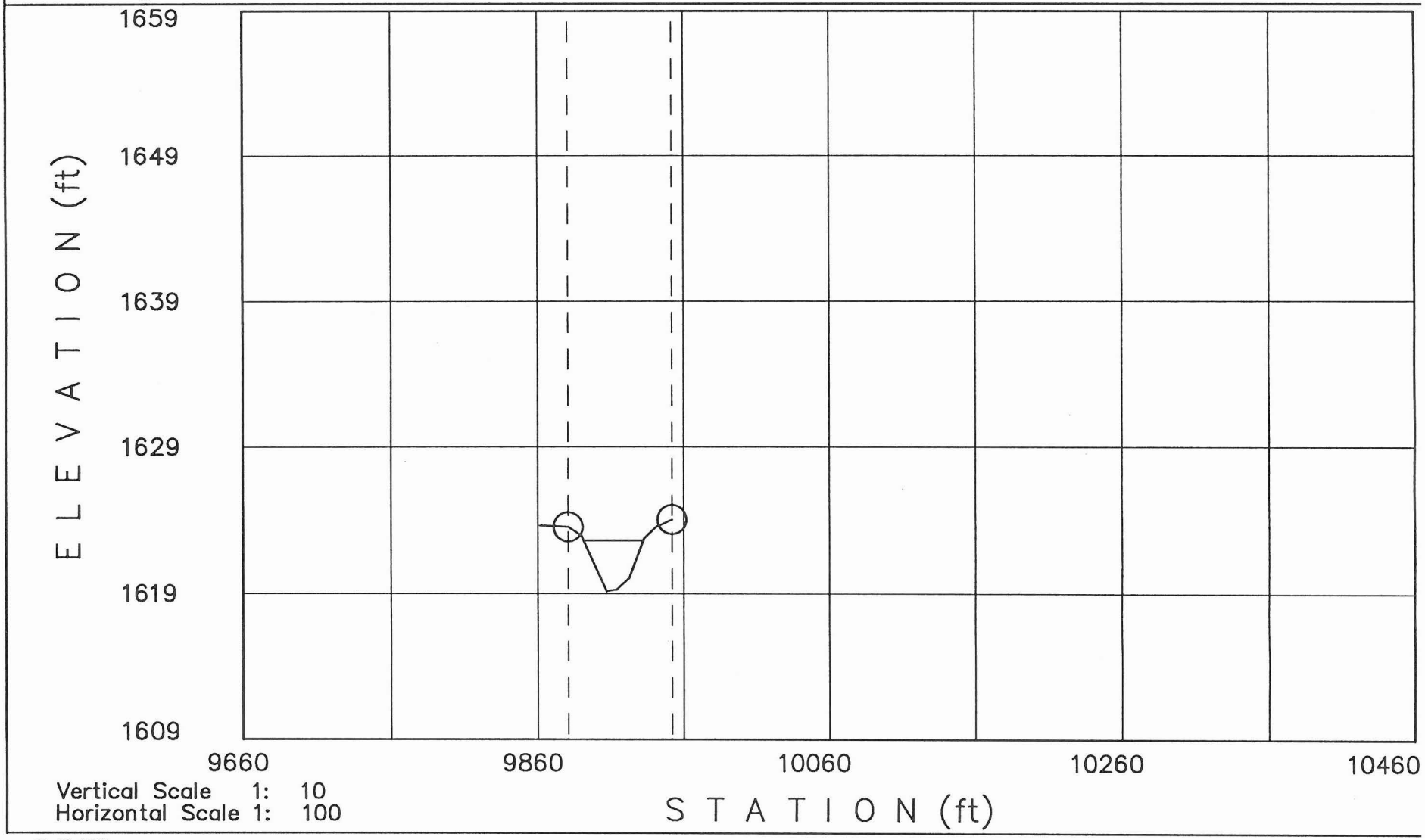
Vertical Scale 1: 10
Horizontal Scale 1: 100

09–13–1995

<<<<<< Cross Section: 1.543: (FN = W9FW1.0H2) >>>>>>

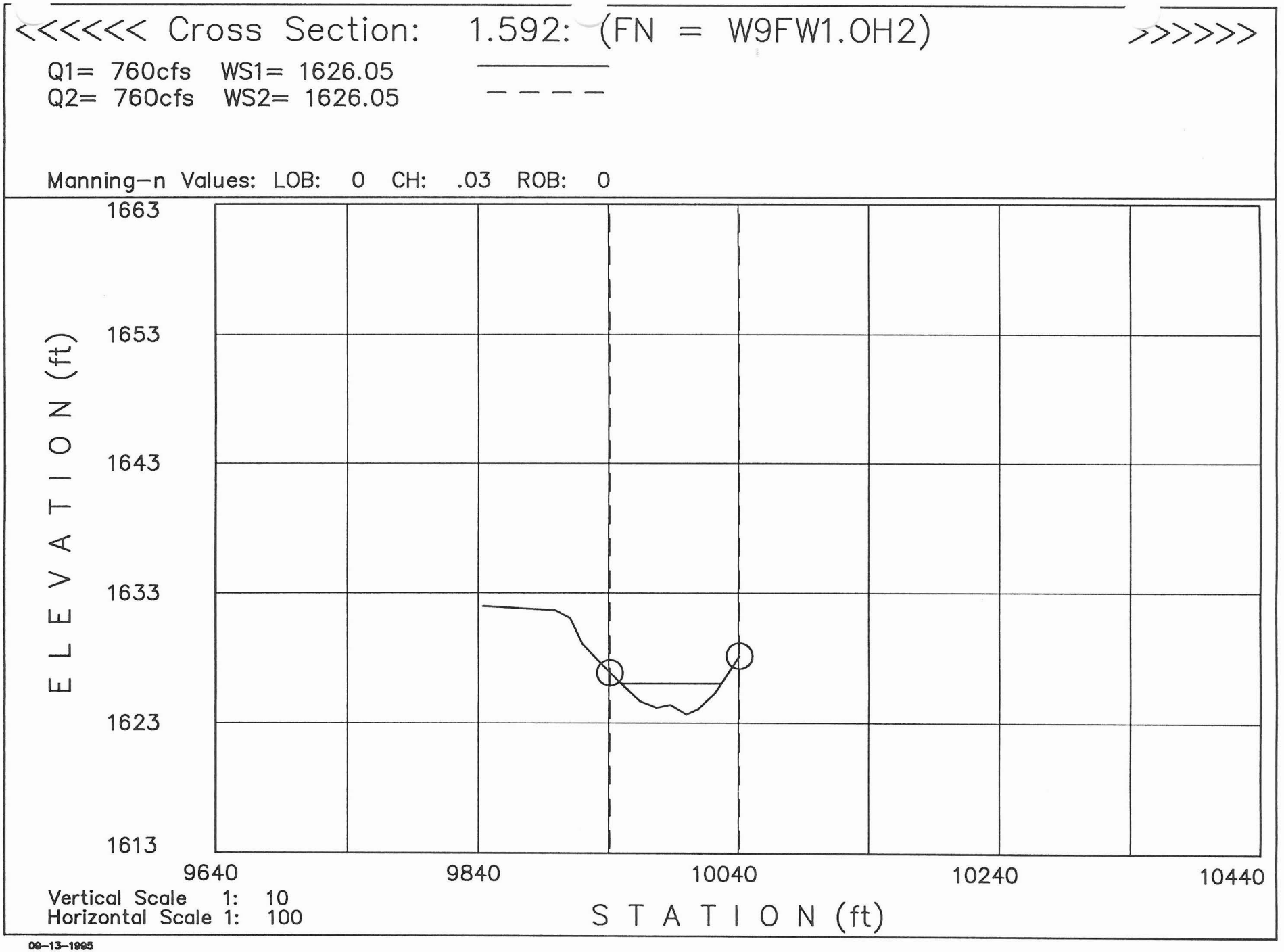
Q1= 760cfs WS1= 1622.68
Q2= 760cfs WS2= 1622.68

Manning-n Values: LOB: 0 CH: .03 ROB: 0



Vertical Scale 1: 10
Horizontal Scale 1: 100

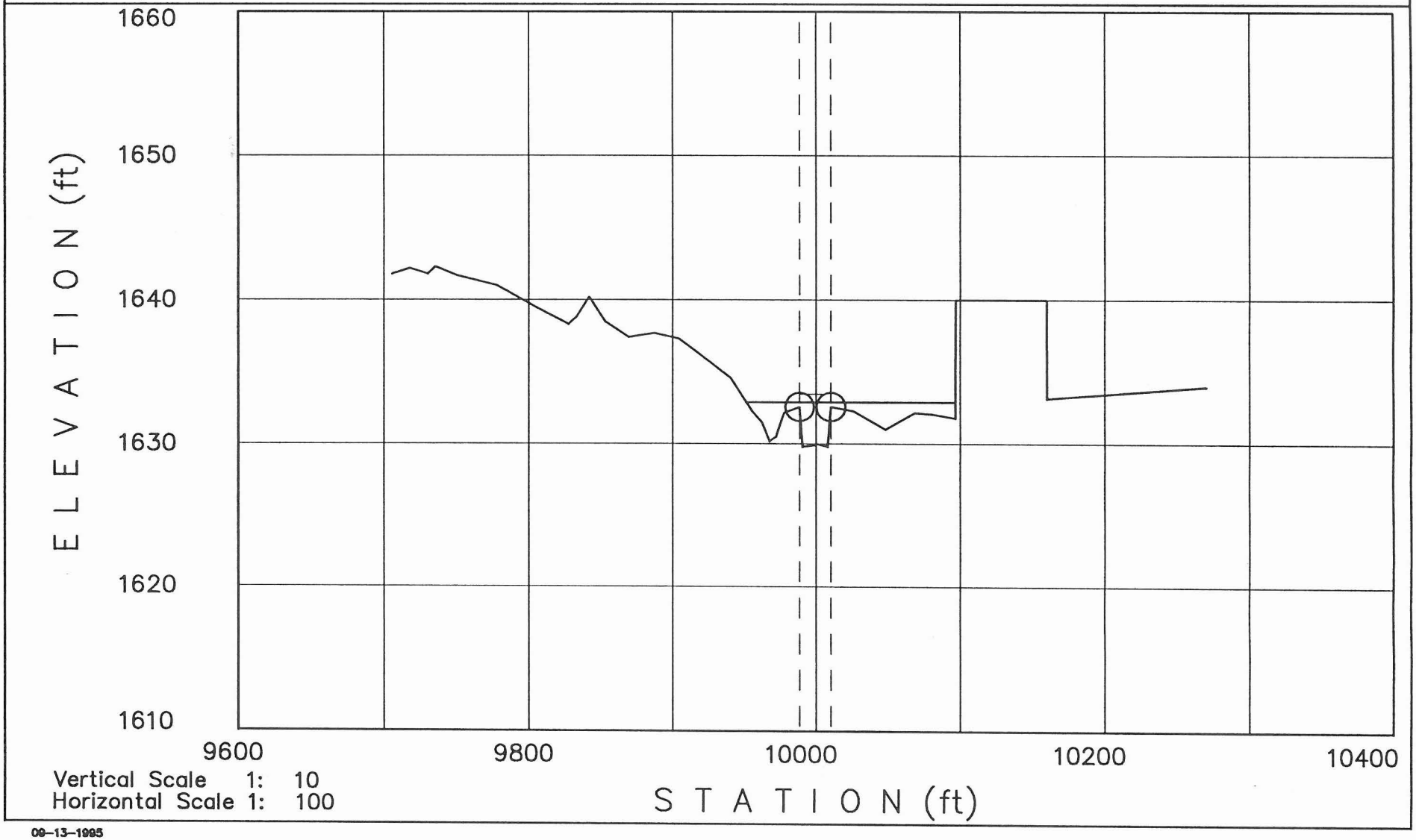
09-13-1995


<<<<<< Cross Section: 1.592: (FN = W9FW1.0H2) >>>>>>
Q1= 760cfs WS1= 1626.05
Q2= 760cfs WS2= 1626.05
Manning-n Values: LOB: 0 CH: .03 ROB: 0
1663
1653
1643
1633
1623
1613
ELEVATION (ft)
9640
9840
10040
10240
10440
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
09-13-1995

<<<<<< Cross Section: 1.655: (FN = W9FW1.OH2) >>>>>>

Q1= 760cfs WS1= 1632.93
Q2= 760cfs WS2= 1633.49

Manning-n Values: LOB: 0 - .065 CH: .03 ROB: 0 - .11



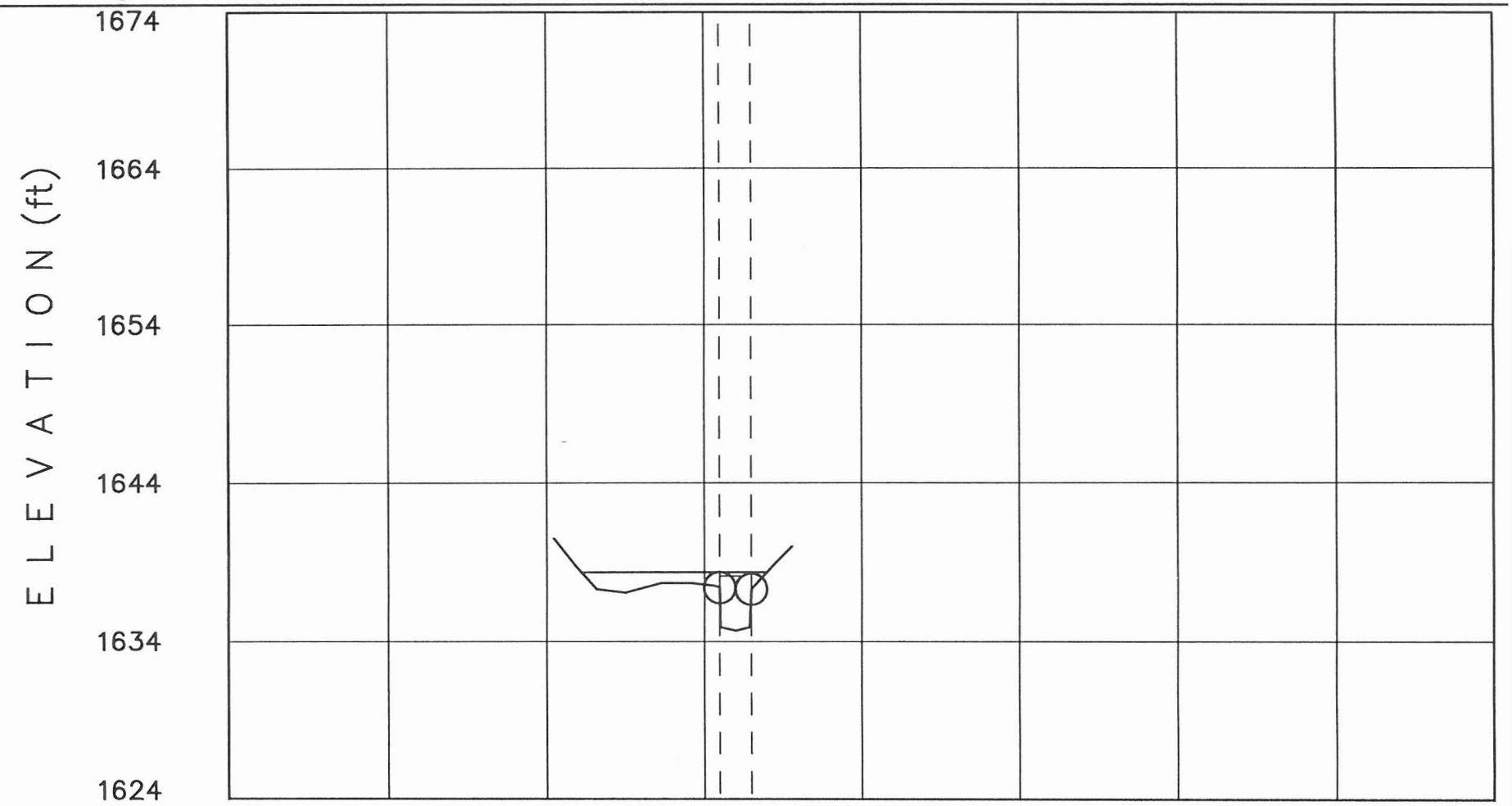
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: 1.714: (FN = W9FW1.0H2) >>>>>>

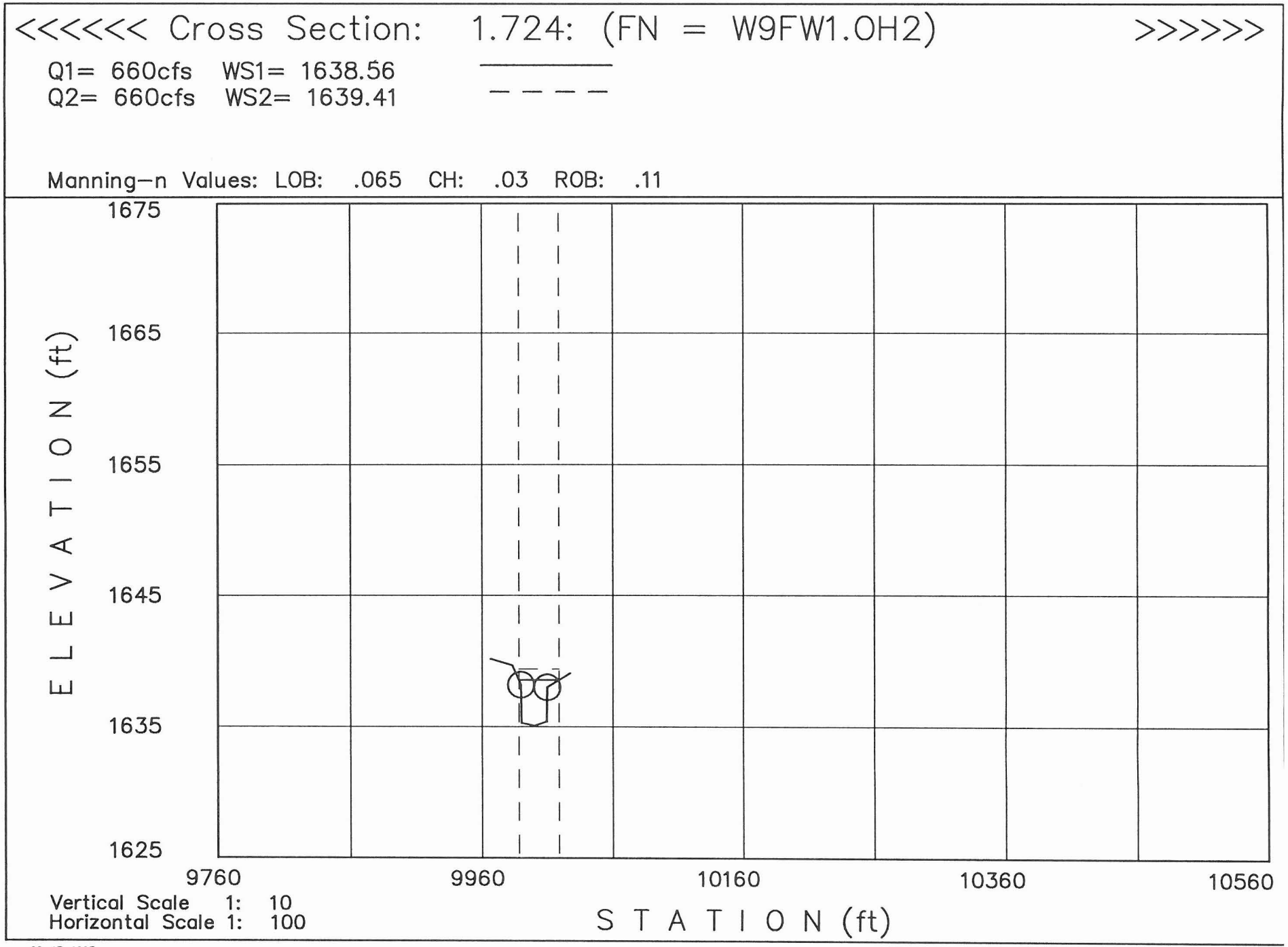
Q1= 660cfs WS1= 1638.38
Q2= 660cfs WS2= 1638.13

Manning–n Values: LOB: .065 CH: .03 ROB: 0 – .11



Vertical Scale 1: 10
Horizontal Scale 1: 100

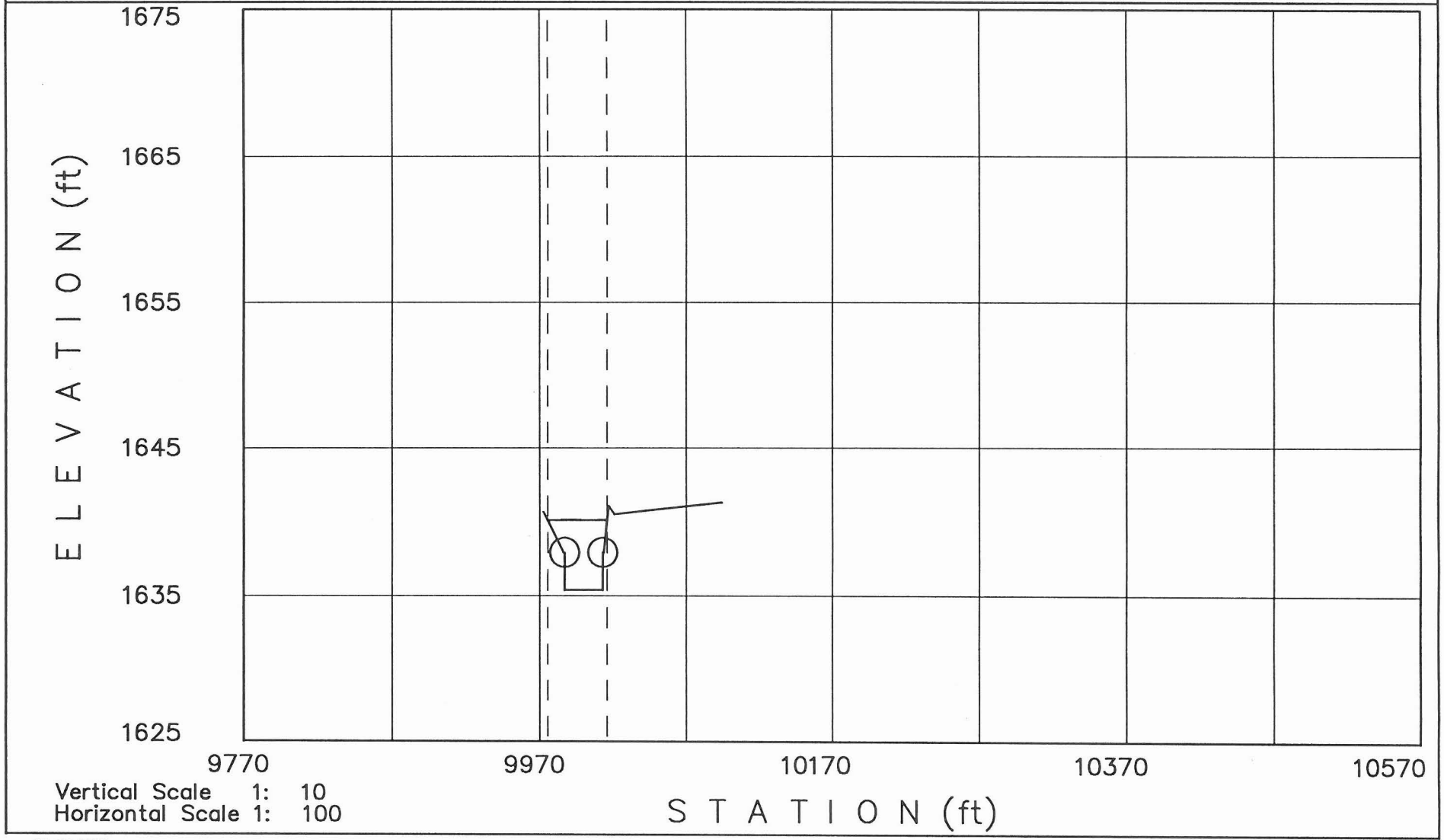
09–13–1995


<<<<<< Cross Section: 1.724: (FN = W9FW1.0H2) >>>>>>
Q1= 660cfs WS1= 1638.56
Q2= 660cfs WS2= 1639.41
Manning-n Values: LOB: .065 CH: .03 ROB: .11
1675
1665
1655
1645
1635
1625
ELEVATION (ft)
9760
9960
10160
10360
10560
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
09-13-1995

<<<<<< Cross Section: 1.727: (FN = W9FW1.0H2) >>>>>>

Q1= 660cfs WS1= 1640.1
Q2= 660cfs WS2= 1640.15

Manning-n Values: LOB: .047 - .048 CH: .022 ROB: .033



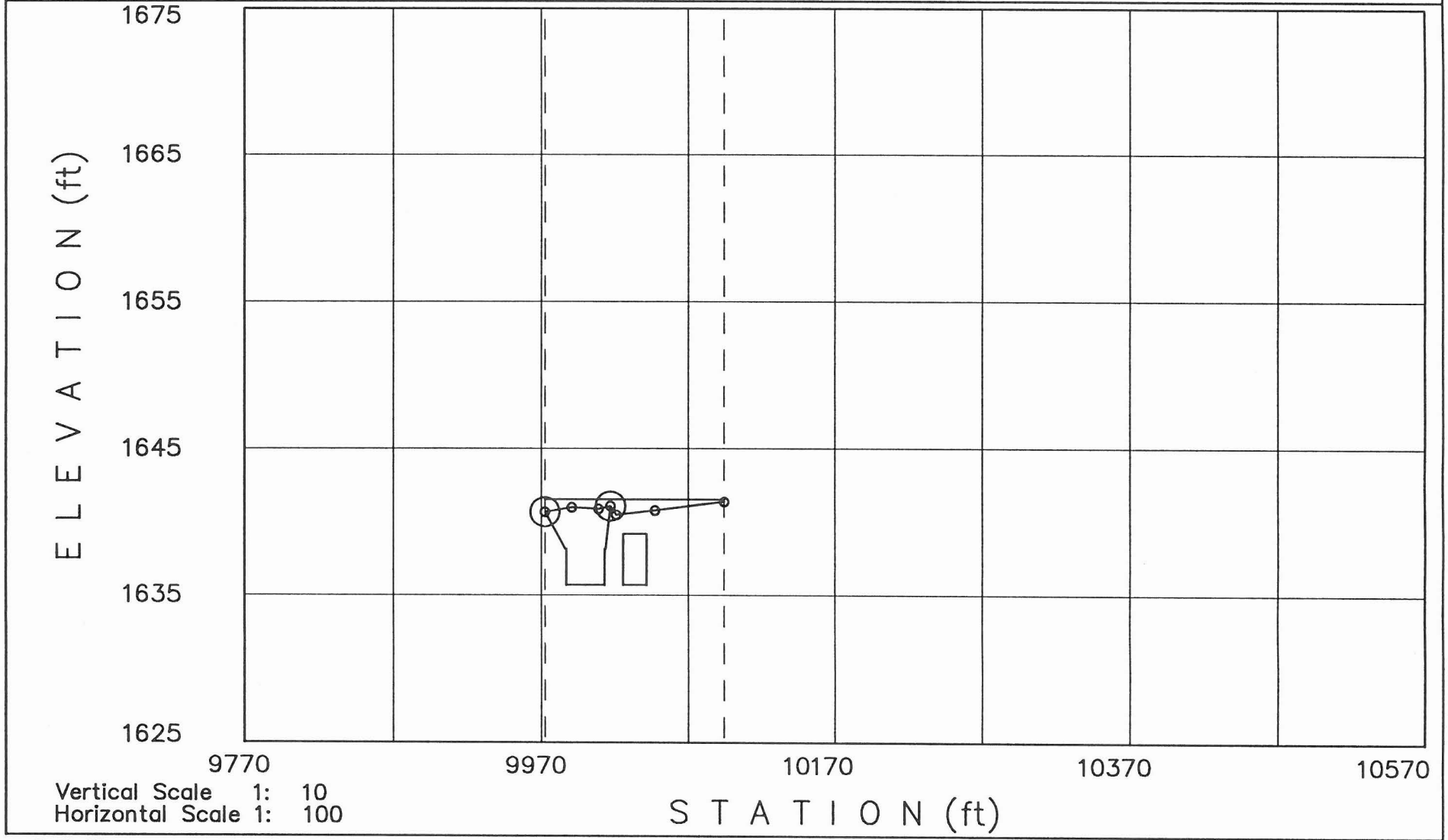
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: 1.736: (FN = W9FW1.0H2) >>>>>>

Q1= 660cfs WS1= 1641.56
Q2= 660cfs WS2= 1641.59

Manning-n Values: LOB: 0 CH: .043 ROB: .11



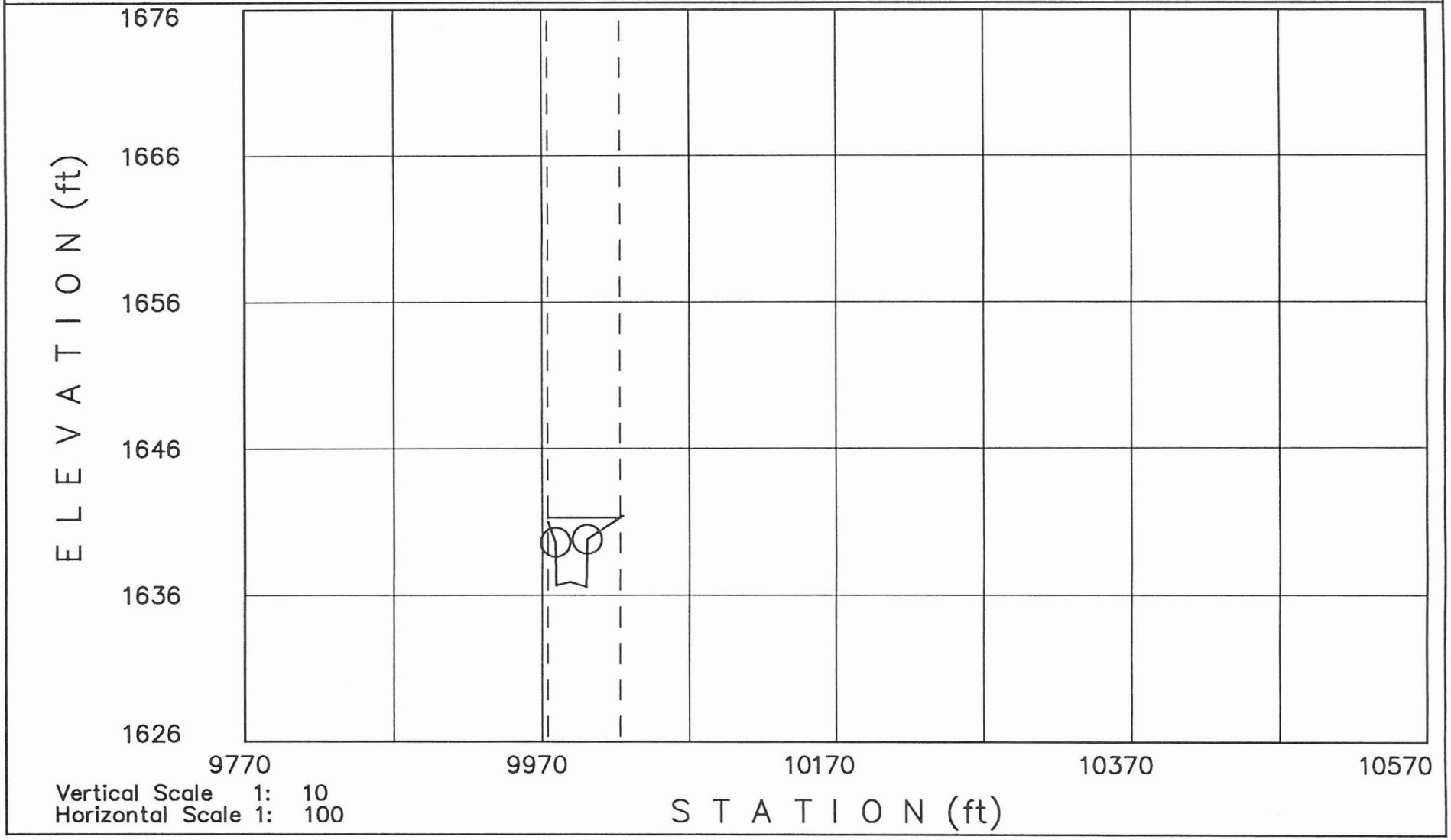
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: 1.74: (FN = W9FW1.0H2) >>>>>>

Q1= 660cfs WS1= 1641.28
Q2= 660cfs WS2= 1641.31

Manning-n Values: LOB: .022 CH: .028 ROB: .055



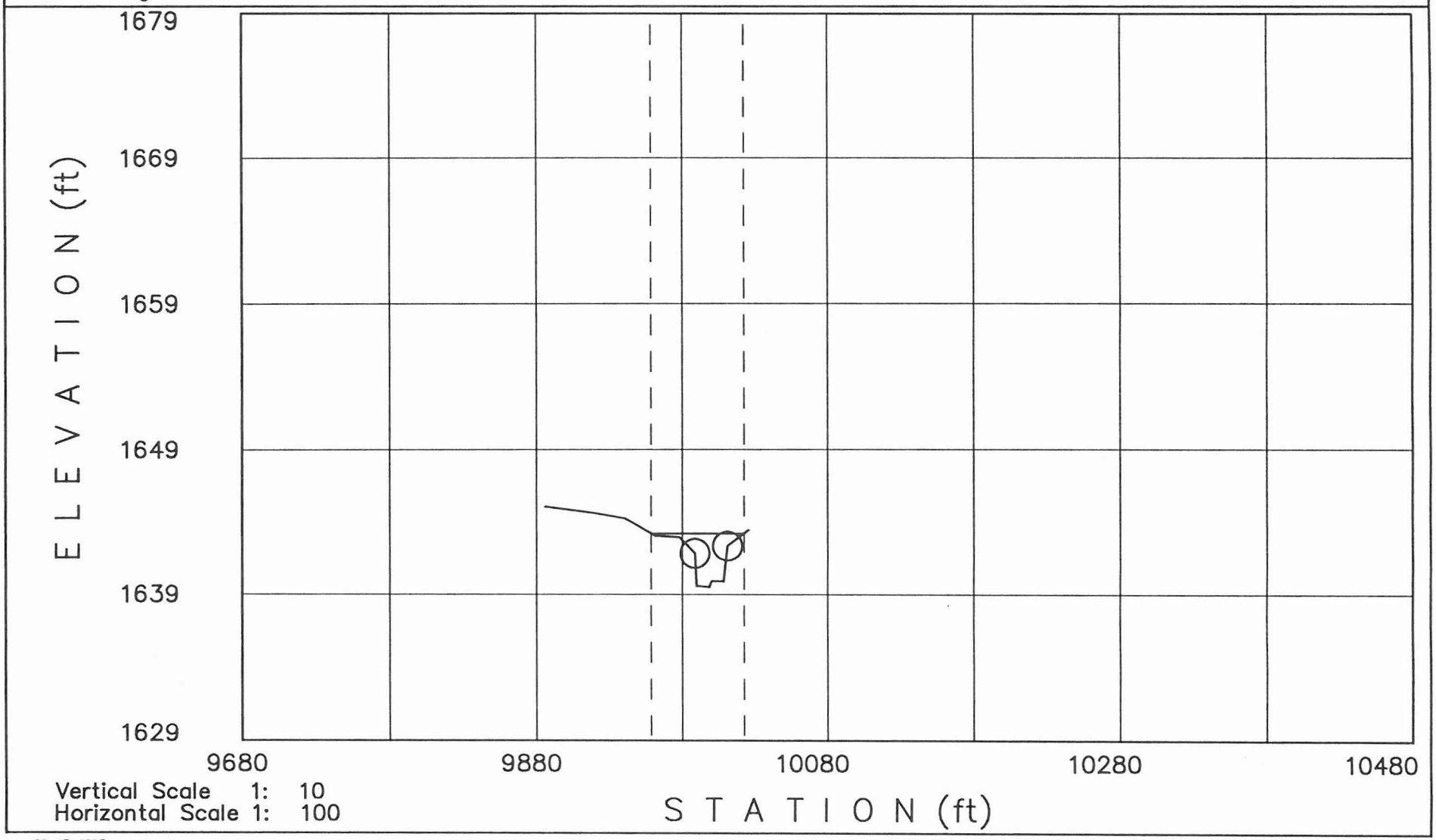
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: 1.761: (FN = W9FW1.0H2) >>>>>>

Q1= 660cfs WS1= 1643.16
Q2= 660cfs WS2= 1643.18

Manning-n Values: LOB: .065 CH: .03 ROB: .11



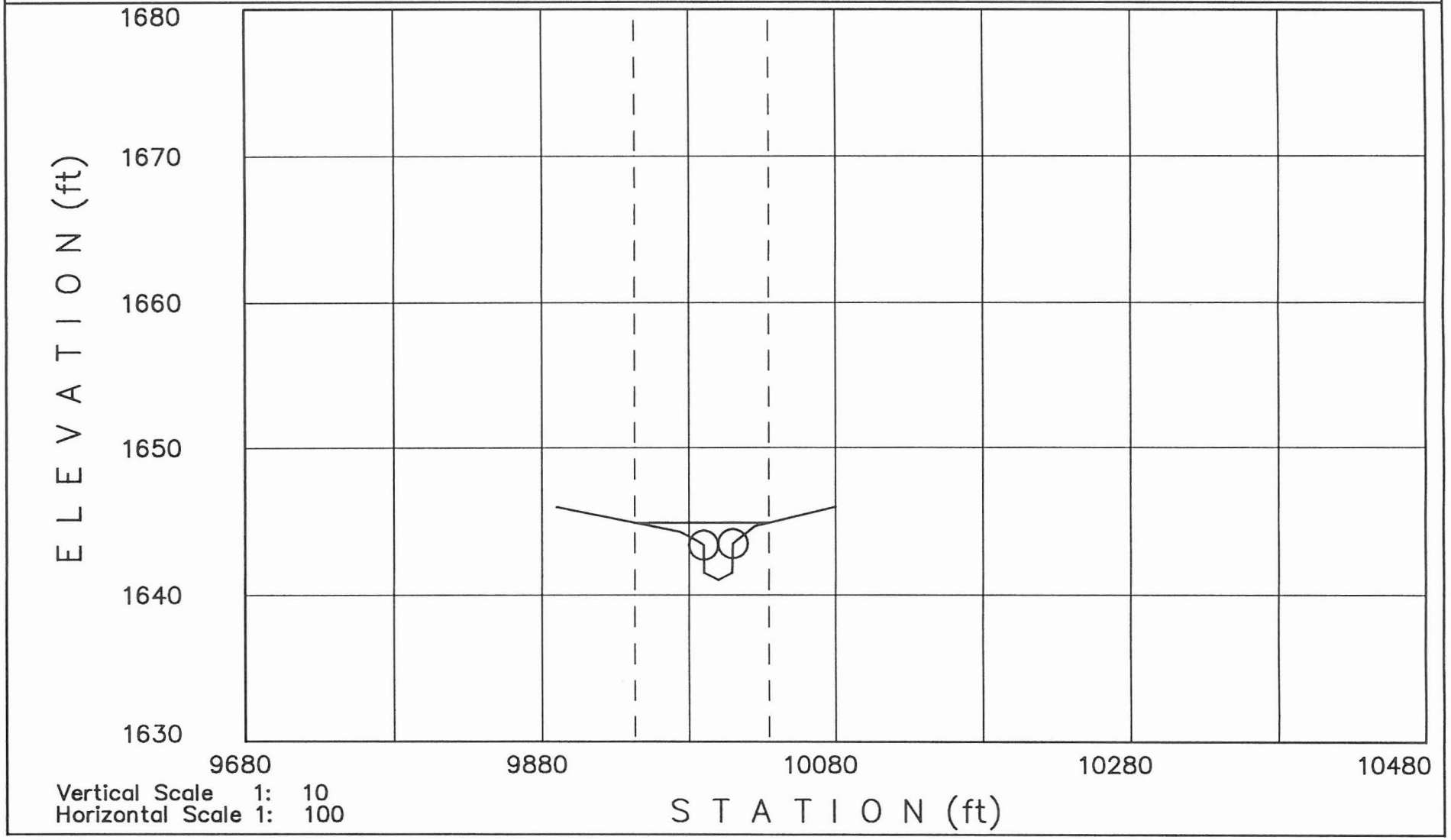
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: 1.785: (FN = W9FW1.0H2) >>>>>>

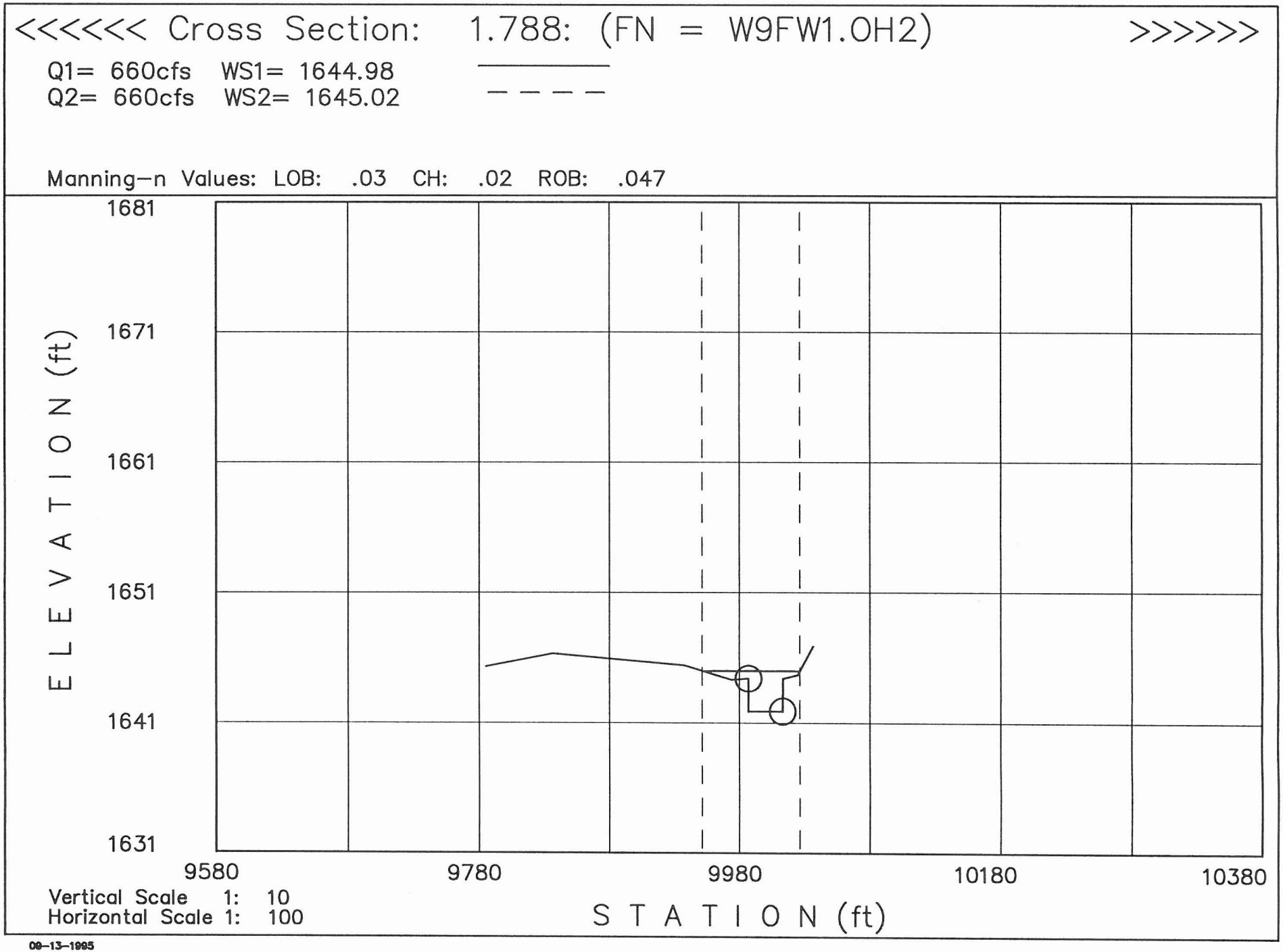
Q1= 660cfs WS1= 1644.93
Q2= 660cfs WS2= 1644.97

Manning-n Values: LOB: .03 CH: .022 ROB: .055



Vertical Scale 1: 10
Horizontal Scale 1: 100

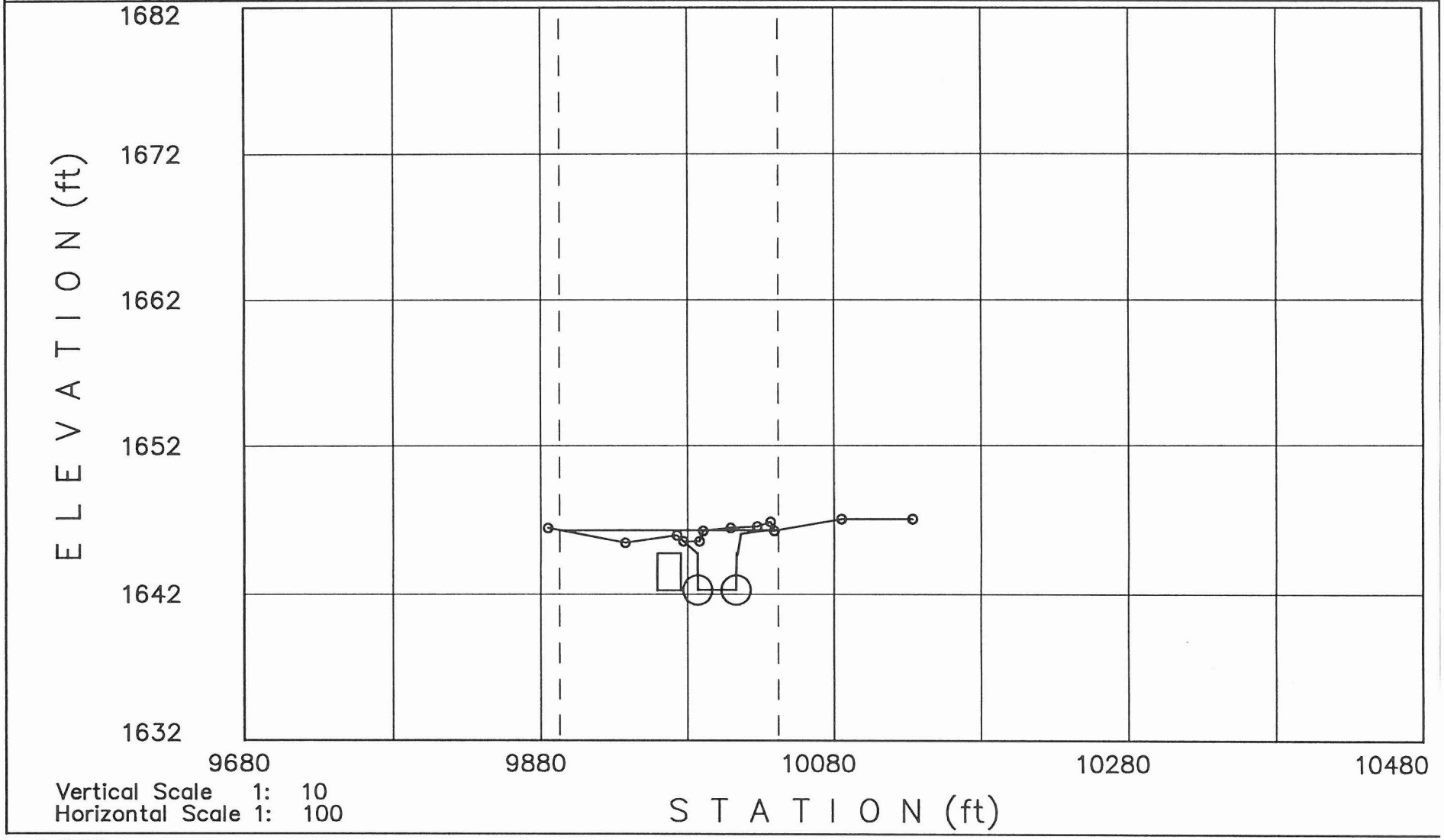
09-13-1995


<<<<<< Cross Section: 1.788: (FN = W9FW1.0H2) >>>>>>
Q1= 660cfs WS1= 1644.98
Q2= 660cfs WS2= 1645.02
Manning-n Values: LOB: .03 CH: .02 ROB: .047
1681
1671
1661
1651
1641
1631
ELEVATION (ft)
9580
9780
9980
10180
10380
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
09-13-1995

<<<<<< Cross Section: 1.796: (FN = W9FW1.0H2) >>>>>>

Q1= 660cfs WS1= 1646.35
Q2= 660cfs WS2= 1646.35

Manning-n Values: LOB: .06 CH: .022 ROB: .044 - .045



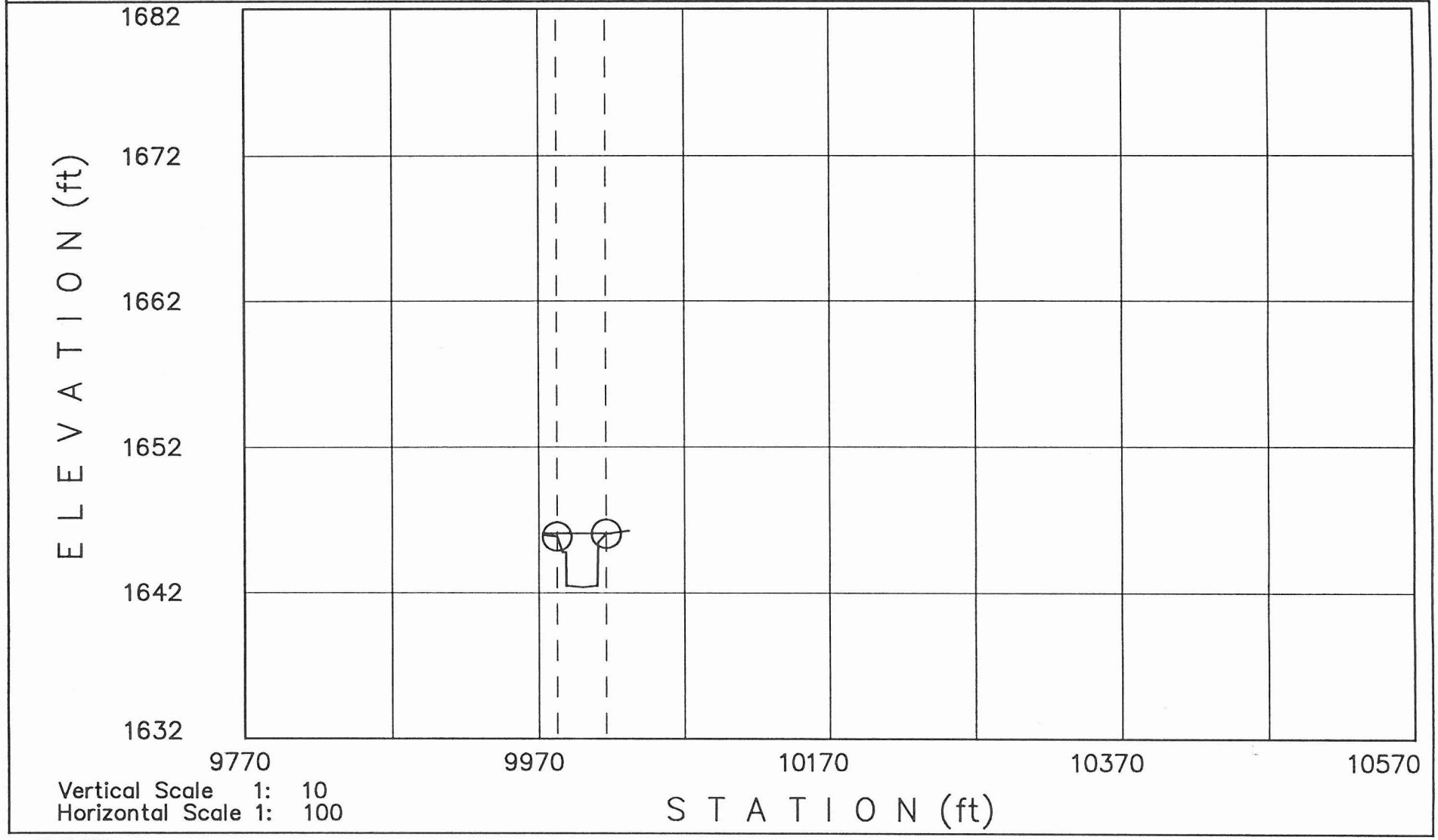
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: 1.799: (FN = W9FW1.0H2) >>>>>>

Q1= 660cfs WS1= 1646.13
Q2= 660cfs WS2= 1646.13

Manning-n Values: LOB: 0 - .065 CH: .03 ROB: 0 - .11



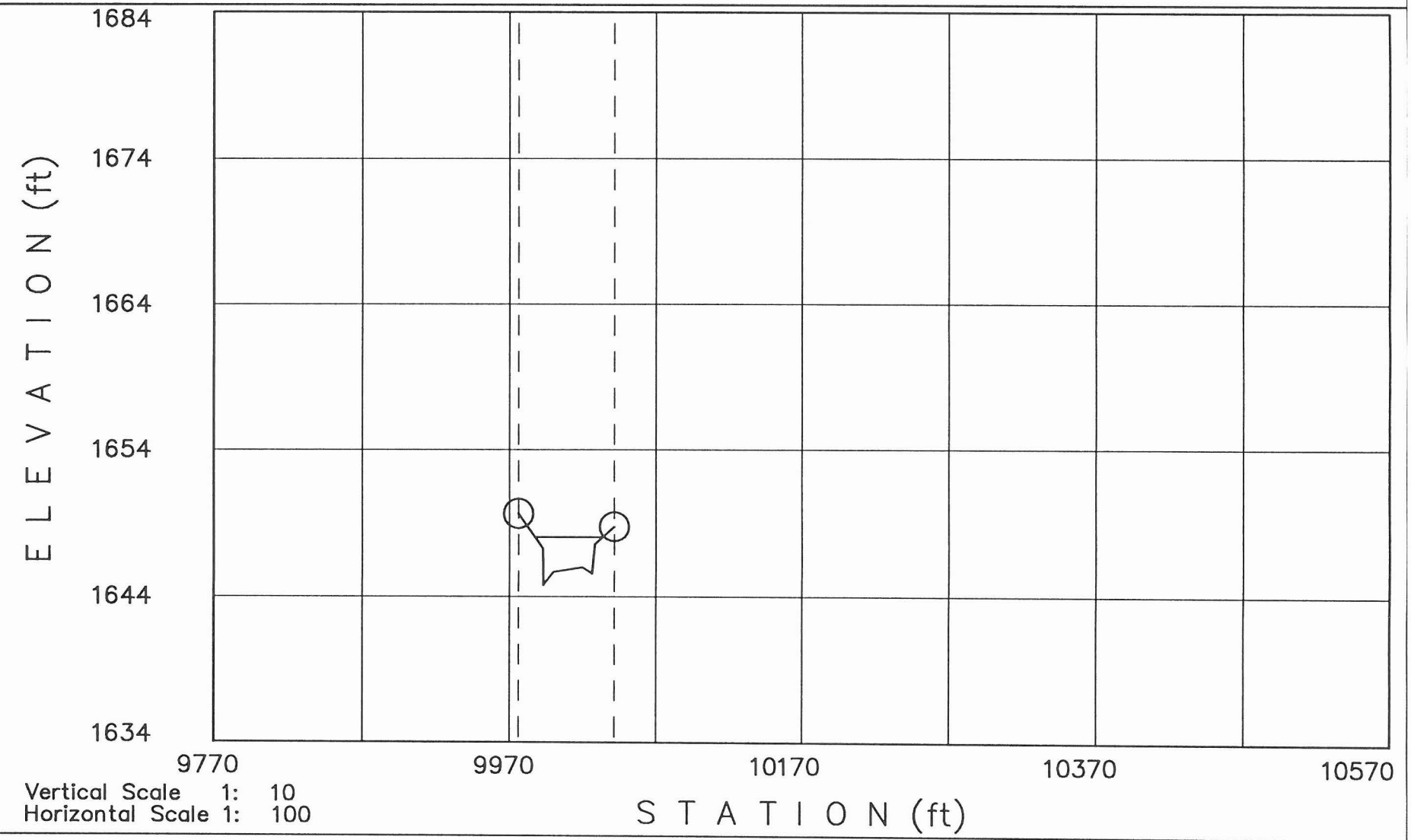
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: 1.824: (FN = W9FW1.0H2) >>>>>>

Q1= 660cfs WS1= 1648.08
Q2= 660cfs WS2= 1648.08

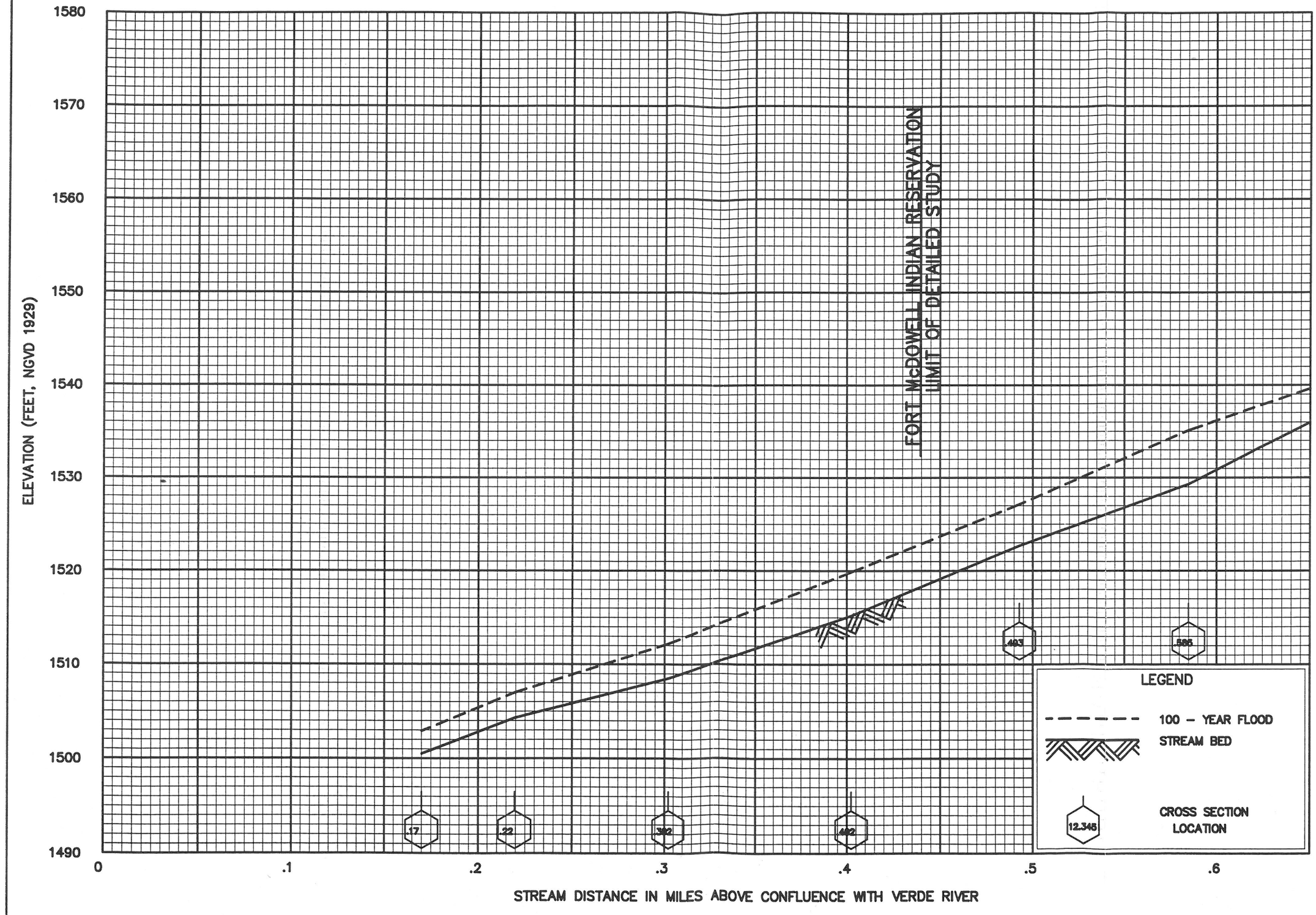
Manning-n Values: LOB: 0 CH: .03 ROB: 0



Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

FLOOD PROFILES



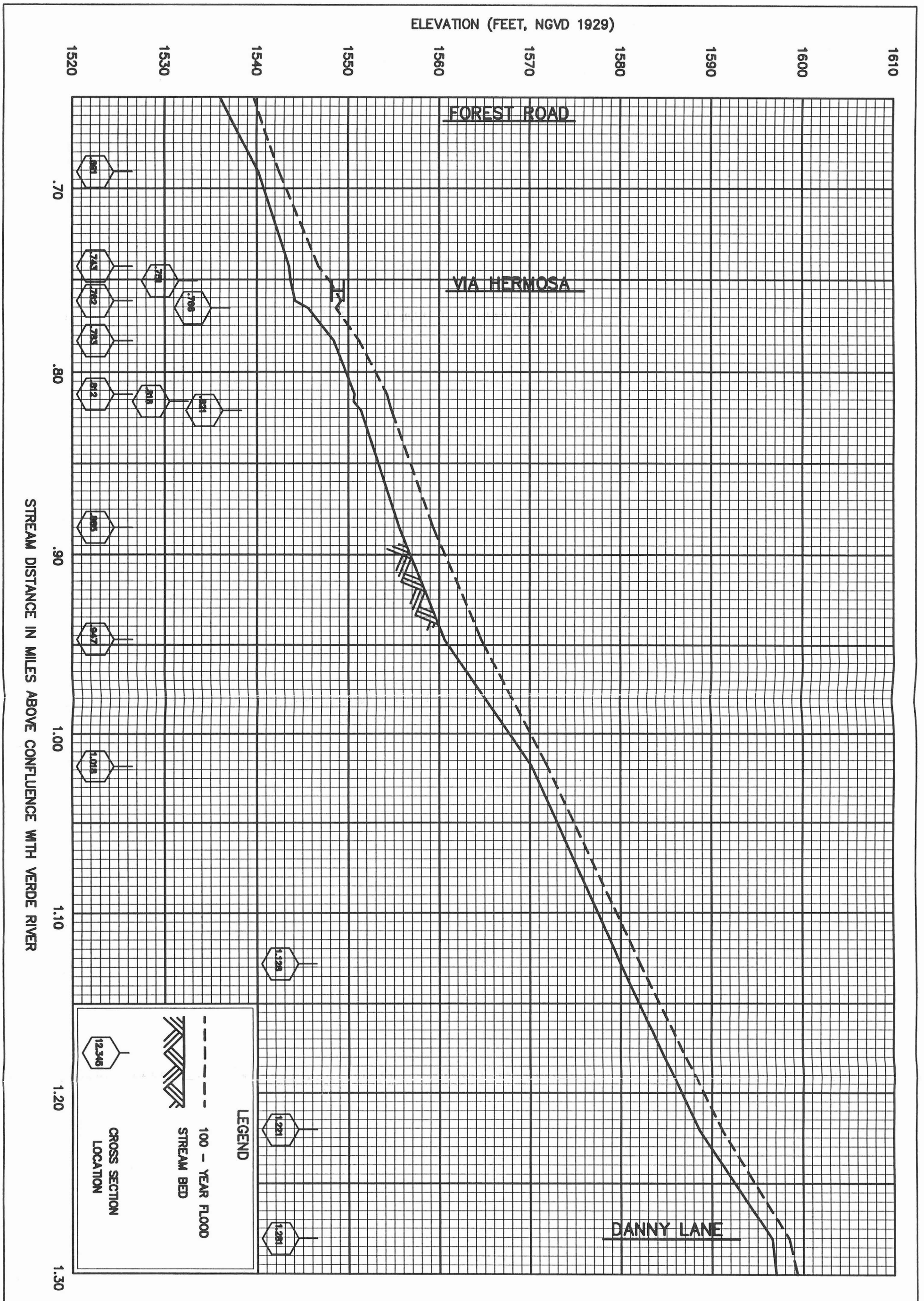
FLOOD PROFILES

WASH 9

(SHEET 1 OF 3)

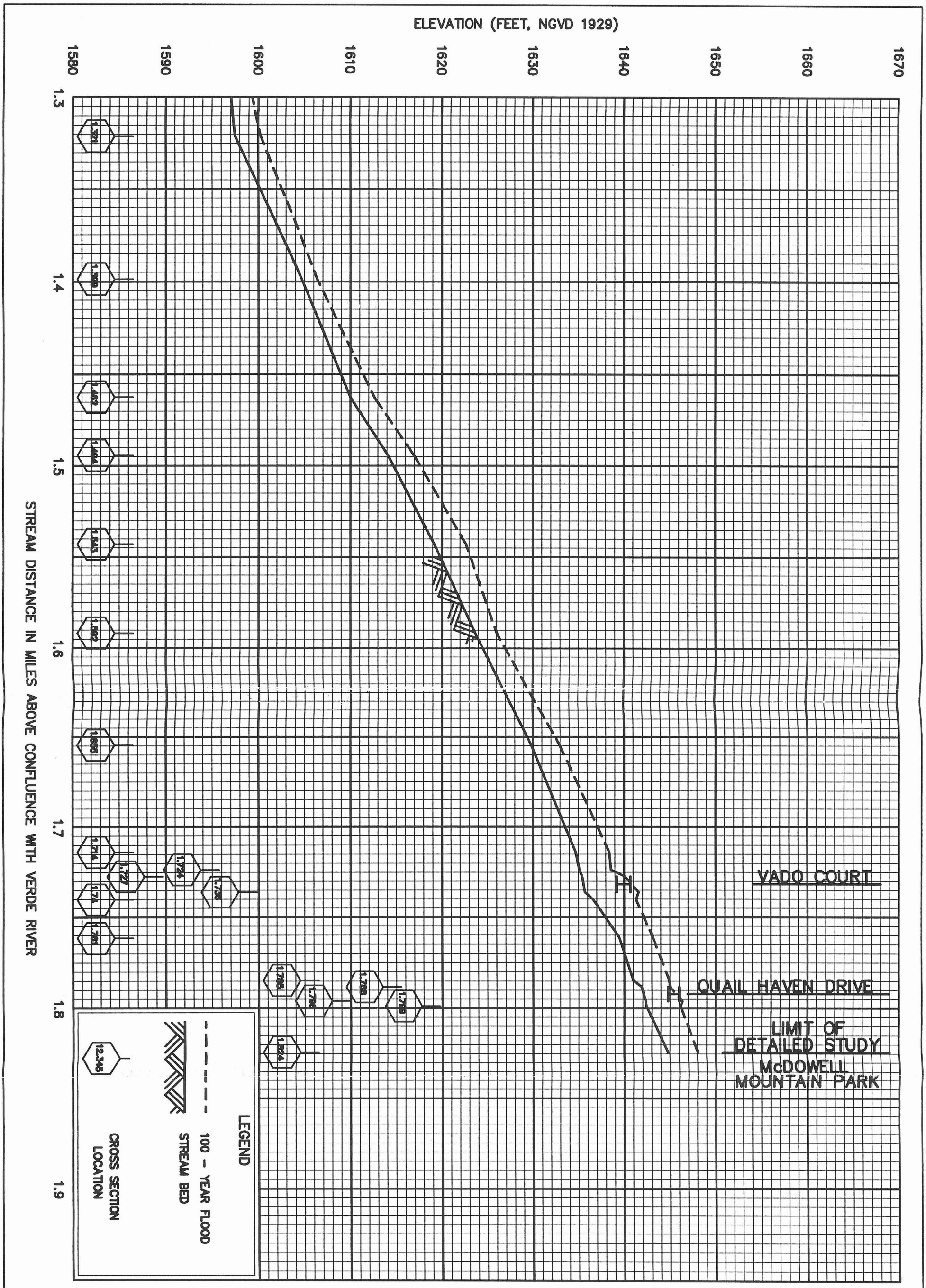
FEDERAL EMERGENCY MANAGEMENT AGENCY
RIO VERDE SOUTH
FLOOD DELINEATION STUDY

Dwg. Name: \P\8940700 3\FEMA\ W9FW1-P.DWG
Date: RFV. SEPT. 13, 1995 05:30 pm



FEDERAL EMERGENCY MANAGEMENT AGENCY RIO VERDE SOUTH FLOOD DELINEATION STUDY	FLOOD PROFILES WASH 9

Dwg. Name: \P\89407003\FEMA\ W9FW1-P.DWG (SHEET 2 OF 3)
Date: REV. SEPT. 13, 1995 05:30 pm



FEDERAL EMERGENCY MANAGEMENT AGENCY RIO VERDE SOUTH FLOOD DELINEATION STUDY	FLOOD PROFILES WASH 9

Dwg. Name: \P\89407003\FEMA\ W9FW1-P.DWG (SHEET 3 OF 3)
Date: REV. SEPT. 13, 1995 05:30 pm

MKE McLaughlin Kmetty Engineers, Ltd.

Project Title _____ Project No. 89-407.003 Date Revised 15 Sep 95 6 Sep 95

Subject _____ Designed TB Page 1

Starting Water Surface Elevations and Coincident Peak Consideration

Reference FEMA 37 March 1993 version

pages 5-5,6 discusses coincident peaks.

Wash 9: Starts at critical depth since outside of floodplain mapping area. Channel reaches normal depth within the floodplain mapping area.

Wash 11: Start @ normal depth, first cross section 190 ft upstream of Verde River.

Wash 10: Wash 10 tributary to Wash 11. Verify coincident peaks:

test a: $\frac{\text{W10 drainage area}}{\text{W11 dr. area}} = \frac{13.73}{6.56} = 2.09 > 1.4$ (outside limits)

test b: $\frac{\text{W10 time to peak (24 hr without levee, Appendix G, C543)}}{\text{W11 time to peak (24 hr with levee, Table 3-20, C545L)}} = \frac{12.90 \text{ hr}}{14.27 \text{ hr}}$

peaks are about 1 hour apart

test c: Liklihood of both watersheds covered by same storm being modeled is high. See Hydrology Exhibit A. A storm large enough to cover Wash 11 watershed would probably cover all of Wash 10 watershed.

Conclusion for Wash 10: Even though tests a. and b. could be considered out of range, coincident peaks should be assumed because of the peak flow rate dependence on whether or not the Section 36 levee remains in place or fails (see p. 3-69 Hydrology TDN Book 1 of 2) and because of the complex nature of the intermingling of Wash 10 and Wash 11 runoff in the confluence area.

Wash 12: Wash 12 tributary to Verde River.

$0.6 < \frac{\text{W12}}{\text{Verde}} > 1.4$ $\frac{8.58}{\text{Verde}} = 0.6$ or 1.4 Verde = 14.3 mi² or 6.13 mi² which is not true.

CONCLUSION For Wash 12: Coincident peaks cannot be substantiated, nevertheless Wash 12 starts at Verde River approximate WSEL for conservatism. Second cross section is at critical depth.

```
1*****************************************
*  HEC-2 WATER SURFACE PROFILES          *
*                                        *
*  Version   4.6.2;  May 1991            *
*                                        *
*  RUN DATE    29SEP95    TIME   16:46:52 *
*****************************************
```

```
*************************************
*  U.S. ARMY CORPS OF ENGINEERS     *
*  HYDROLOGIC ENGINEERING CENTER    *
*  609 SECOND STREET, SUITE D       *
*  DAVIS, CALIFORNIA 95616-4687     *
*          (916) 756-1104           *
*************************************
```

```
X     X  XXXXXXX   XXXXX             XXXXX
X     X  X        X     X           X     X
X     X  X        X                       X
XXXXXXX  XXXX     X         XXXXX    XXXXX
X     X  X        X                 X
X     X  X        X     X           X
X     X  XXXXXXX   XXXXX            XXXXXXX
```

1

THIS RUN EXECUTED 29SEP95 16:46:52

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

 Version   4.6.2;  May 1991
************************************
```

```
T1   *  Rio Verde South FIS, Wash 10                    File:W1OFW1.IH2
T2   *  For: FCDMC #       93-07     By:   MKE, Ltd.    FB,EEK,CLJ 8-23-94
T3   *  Wash 10,100-Yr Floodplain                      Revised:   9-13-95
T4   *  GR data taken from stereo model; received on 9-7-94 from AMC
T5   *  200 scale 2 ft CI mapping flown by AMC on 12-22-93 and 8-22-94
T6   *  with survey control by Burgess & Niple on 10-21-93; 11-9-93; 12-9-93
T7   *  supplemental cross section data (GR & BT) surveyed by ALS as noted.
T8   *  Source of 100-Yr flowrate from HEC-1 Analysis by GVSCE. Table F-3
T9   *                              Subcritical analysis.
T9   *  Main Hec-2 analysis for Wash 10.
T9   *
T9   *  This HEC-2 uses values from the split flow analysis (W1OSPLIT.IH2)
T9   *  Flow rates are adjusted to reflect the loss of flow to Wash 11.
```

```
J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0         2         0         0         0         0         0         0   1547.17         0

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      1         0        -1         0         0         0        -1         0         0         0
```

```
J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    150       200

          Starting WSEL from X section 0.747, Wash 11 HEC-2 (W11FW1.OH2)
          Starting WSEL for floodplain= 1547.17. Start WSEL for FW= 1547.48

    100-Year Discharge at Confluence with Wash 11 = 2010 cfs, from the
    Hydrology Study.
```

```
QT        2       2010       2010

        Hydraulically Similar Reach 11C

ET                          9.1                                                    9961.79     10063.7

NC     0.07       0.07       .050       0.1         0.3

NH        3       0.07     9961.8       0.05    10025.1         0.07    10689.8


1
    29SEP95      16:46:52                                                                          PAGE    2


            of the Wash 10 and Wash 11 confluence.
            GR records deleted from Sta 9620.5 to 9774.3 and from
                 Sta 10689.8 to 10724.9
                to restrict flow to effective area without X3 records.

            Starting WSEL from X section 0.747, Wash 11 HEC-2 (W11FW1.OH2)
            Starting WSEL for floodplain= 1547.17. Start WSEL for FW= 1547.48
            Cross section 0.747 is a Wash 11 cross section just downstream
            of the Wash 10 and Wash 11 confluence.
            GR records deleted from Sta 9620.5 to 9774.3 and from
                 Sta 10689.8 to 10724.9
                to restrict flow to effective area without X3 records.
X1     0.747          45     9961.8    10025.1
X5         2     1547.17    1547.48
GR    1548.6      9774.3     1548.1     9813.2     1547.7     9853.8     1547.5     9890.0     1546.8     9917.9
GR    1546.3      9940.2     1546.6     9961.8     1544.5     9972.0     1543.8     9997.4     1543.9    10000.0
GR    1543.8     10018.5     1545.9    10025.1     1546.6    10063.7     1547.1    10103.1     1547.4    10140.7
GR    1547.3     10150.7     1545.5    10161.1     1546.5    10171.0     1546.3      10176     1545.6    10178.5
GR    1547.0     10194.7     1547.4    10213.1     1547.5    10242.1     1547.5    10243.0     1547.5    10289.2
GR    1547.4     10335.2     1547.3    10369.1     1546.3    10395.2     1545.8    10421.7     1546.6    10445.4
GR    1546.3     10475.5     1546.4    10498.4     1546.0    10514.2     1544.6    10518.1     1544.7    10519.8
GR    1546.3     10530.1     1546.0    10538.2     1545.5    10543.6     1546.1      10552     1546.4    10583.2
GR    1546.8     10618.9     1547.0    10645.3     1546.8    10652.4     1547.6    10671.9     1548.1    10689.8

            Hydraulically Similar Reach 10A (and 11C for a small
                  portion of the next cross section 0.021 which is
                  very close to the confluence)

ET                          9.1                                                    9988.69     10066.21

NC     0.07       0.07       .045       0.1         0.3

NH        4       0.07     9988.7       0.05      10026         0.045   10060.1         0.07    10794.6

           **************************************************************************
             *****                                                            *****
             *****        FROM WASH 10 RIVER MILE 0.0 TO RIVER MILE 0.454     *****
             *****        WASH 10 STATIONS BASED UPON                         *****
             *****        WASH 11 STATIONS BEGINNING AT WASH 11 THALWEG       *****
             *****                                                            *****
           **************************************************************************

           [[[ Wash 10 cross section 0.021 equals Wash 11 cross section 0.783 ]]]
             Hydraulically Similar Reach 10A (and 11C for a small
                  portion of the next cross section 0.021 which is
                  very close to the confluence)
X1     0.021          60      10026    10066.2         180         220       190.0
X5         2     1550.27    1551.29
GR    1551.5      9685.9     1550.6     9692.5     1551.4     9702.2     1551.1     9721.3     1551.2     9747.7
GR    1551.2      9775.5     1550.6     9810.9     1550.5     9845.4     1550.5     9888.1     1550.3     9918.3
GR    1549.7      9931.7     1548.5     9940.9     1547.1     9943.9     1549.0     9953.0     1547.2     9957.6
GR    1548.3      9974.5     1549.2     9988.7     1547.9     9997.3     1547.6    10000.0     1548.7    10011.6
1
    29SEP95      16:46:52                                                                          PAGE    3
```

```
GR   1548.9    10026.0    1548.6    10035.9    1547.8    10046.4    1546.6    10050.0    1546.8    10059.5
GR   1547.4    10060.1    1549.5    10066.2    1549.6    10091.7    1550.1    10134.4    1550.6    10171.8
GR   1550.3    10211.5    1550.0    10228.3    1550.1    10258.6    1550.6    10297.9    1551.0    10342.5
GR   1551.1    10377.2    1550.5    10415.6    1550.3    10450.3    1550.2    10484.7    1549.9    10505.3
GR   1549.9    10512.2    1549.0    10516.5    1550.4    10530.0    1549.0    10533.2    1548.9    10540.2
GR   1549.8    10546.9    1550.0    10581.0    1549.7    10612.5    1550.0    10629.1    1549.4    10645.0
GR   1547.9    10655.8    1549.5    10662.1    1549.9    10674.9    1549.9    10688.8    1547.9    10697.1
GR   1549.8    10703.6    1550.3    10724.5    1550.3    10752.9    1550.5    10782.7    1550.6    10794.6


          GR records deleted from Sta 9615.5 to 9798.9
                      and from station 10793.0    to station    10848.9
               to restrict flow to effective area without X3 records.


ET                              9.1                                                    9995.19   10237.21

NH        5       0.07      9995.2       0.05     10016.2       0.07     10212.7       0.45     10237.2       0.07
NH    10793

        [[[ Wash 10 cross section 0.070 equals Wash 11 cross section 0.815 ]]]
          100-Year Discharge at Confluence with Wash 11 = 2010 cfs,
               Hydraulically Similar Reach 11C
        Starting WSEL for floodplain is from cross section 0.815 Wash 11
          GR records deleted from Sta 9615.5 to 9798.9
                      and from station 10793.0    to station    10848.9
               to restrict flow to effective area without X3 records.
X1    0.070         52    10212.7    10237.2         240         240      254.67
X5        2    1553.72    1554.47
GR   1554.0     9798.9    1553.4     9825.5    1552.8     9869.3    1553.0     9903.3    1552.8     9937.9
GR   1552.5     9972.6    1552.0     9995.2    1549.5    10000.0    1549.5    10008.0    1552.0    10016.2
GR   1552.6    10031.9    1550.9    10045.3    1550.8    10055.6    1552.3    10068.2    1552.7    10093.5
GR   1552.4    10102.1    1553.5    10132.7    1553.2    10157.4    1553.9    10181.4    1553.9    10197.1
GR   1553.7    10212.7    1551.2      10219    1551.3    10225.0    1551.2    10231.4    1553.8    10237.2
GR   1553.9    10257.7    1553.9    10287.6    1554.0    10317.2    1554.3    10339.4    1554.7    10375.1
GR   1554.8    10400.6    1554.5    10432.7    1554.0    10474.8    1554.0    10515.4    1553.9    10552.7
GR   1553.2    10569.6    1552.9    10578.6    1552.2    10585.0    1553.8    10593.7    1553.8    10620.1
GR   1553.8    10627.1    1553.9    10650.5    1553.1    10664.7    1553.2    10673.5    1551.0    10683.4
GR   1553.7    10690.5    1553.5    10707.2    1553.3    10719.9    1553.2    10732.4    1553.6    10751.1
GR   1553.8    10773.7    1554.0    10793.0

    Last two points of Aerial Mapping Company, Inc. were changed,intention
     is to intersect contour line 1560

         Q = flow in the channel less the split at Forest Rd.
        Flow rate is from file W10SPLIT.OH2 : 1698.85 cfs rounded to 1700 cfs.


QT        2       1700       1700

ET                              9.1                                                    10372     10599.7

NH        3       0.07    10523.5       0.045    10545.1       0.07     10959.1

1
   29SEP95       16:46:52                                                                                PAGE    4


        [[[ Wash 10 cross section 0.129 equals Wash 11 cross section 0.894 ]]]
               GR records begin where Wash 11 cross section 0.894 ends@ 10237.8
          Last two points of Aerial Mapping Company, Inc. GR data were changed,
          intention is  to intersect contour line 1560.
         Q = flow in the channel less the split at Forest Rd.
        Flow rate is from file W10SPLIT.OH2 : 1698.85 cfs rounded to 1700 cfs.
X1    0.129         50    10523.5    10545.1         300         300      315.49
GR   1559.4    10237.8    1558.8    10263.1    1558.9    10295.2    1558.6    10311.1    1557.2    10320.8
GR   1559.0    10327.2    1559.3    10346.8    1558.6    10355.8    1557.7    10357.8    1558.0    10365.9
GR   1558.9    10367.7    1558.9    10385.4    1559.4    10424.0    1559.3    10449.4    1559.4    10485.1
GR   1559.3    10511.1    1559.3    10523.5    1557.4    10528.0    1557.3    10531.8    1557.4    10536.9
GR   1559.2    10545.1    1559.2    10553.9    1557.8    10565.3    1558.0    10579.0    1559.4    10590.3
```

```
GR   1559.5    10599.7     1557.7    10607.5     1558.0    10612.8     1559.4    10619.2     1559.3    10627.5
GR   1558.3    10635.1     1559.0    10643.0     1558.7    10652.5     1558.8    10670.5     1558.8    10700.2
GR   1558.3    10722.0     1558.0    10745.8     1557.7    10759.7     1558.5    10781.6     1558.5    10803.1
GR   1558.3    10826.0     1558.7    10852.3     1559.0    10879.4     1559.1    10894.3     1558.4    10905.3
GR   1557.0    10915.0     1558.6    10920.5     1559.3    10934.1       1560    10951.9       1560    10959.1

ET                          9.1                                                   10460.0    10593.87

NH        3        0.07    10566.6       0.045   10582.8         0.07    10656.8

          GR records removed from station  9561.7   to station    10364.7
                        and from station 10656.8   to station    11040.2
                   to restrict flow to effective area without X3 records.

          GR records removed from station  9561.7   to station    10364.7
                        and from station 10656.8   to station    11040.2
                   to restrict flow to effective area without X3 records.
X1    0.226          21    10566.6    10582.8          505          540      513.24
GR   1568.8    10364.7     1568.5    10372.1     1568.4    10396.8     1568.4    10421.6     1567.8    10451.7
GR   1568.0    10488.6     1568.0    10516.9     1567.6    10541.0     1566.2    10546.2     1567.8    10552.8
GR   1567.7    10566.6     1566.2    10568.1     1566.3    10580.1     1568.1    10582.8     1567.7    10598.9
GR   1566.7    10605.5     1566.6    10617.7     1567.1    10625.8     1566.6    10629.4     1568.0    10639.4
GR   1568.4    10656.8

ET                          9.1                                                   10569.09   10650.69

NH        3        0.07    10569.1       0.045   10594.7         0.07    10856.2

     Last Ground Point changed from Elevation 1572.9 to 1573.1
       to reflect highpoint at end of cross section

          GR records removed from station  9575.6   to station    10409.3
                   to restrict flow to effective area without X3 records.

          Last Ground Point changed from Elevation 1572.9 to 1573.1
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          to reflect highpoint at end of cross section
          GR records removed from station  9575.6   to station    10409.3
                   to restrict flow to effective area without X3 records.
X1    0.277          32    10569.1    10594.7          275          260      265.7
GR   1573.4    10409.3     1572.5    10433.1     1572.5    10438.7     1573.0    10450.3     1572.9    10469.6
GR   1572.7    10490.2     1573.0    10513.3     1572.7    10537.1     1572.5    10556.9     1571.9    10569.1
GR   1569.8    10570.0     1569.9    10577.2     1570.1    10589.3     1571.8    10594.7     1572.3    10606.6
GR   1572.5    10623.4     1571.8    10629.5     1570.6    10632.6     1572.2    10638.1     1570.7    10647.2
GR   1571.2    10652.1     1572.4    10654.4     1572.4    10665.4     1572.0    10680.7     1572.4    10704.5
GR   1572.3    10723.6     1572.0    10738.5     1572.5    10756.4     1572.4    10786.1     1572.3    10819.4
GR   1572.9    10844.3     1573.5    10856.2

          GR records removed from station    9580   to station    10368.8
                   to restrict flow to effective area without X3 records.

ET                          9.1                                                   10573.82   10669.03

NH        3        0.07    10602.4       0.045   10623.9         0.07    10949.1

          GR records removed from station    9580   to station    10368.8
                   to restrict flow to effective area without X3 records.
X1    0.321          29    10602.4    10623.9          215          220      232.66
GR   1577.4    10368.8     1577.3    10390.1     1576.5    10396.3     1577.4    10399.4     1577.1    10419.3
GR   1577.4    10447.6     1576.9    10476.1     1576.7    10506.4     1576.4    10542.8     1576.4    10563.8
GR   1575.5    10585.7     1576.7    10597.7     1576.6    10602.4     1572.8    10608.7     1572.9    10611.4
GR   1573.3    10621.4     1576.1    10623.9     1576.6    10640.5     1576.7    10661.7     1574.2    10665.5
GR   1574.3    10670.7     1576.5    10678.7     1576.9    10701.6     1576.5    10742.3     1577.0    10788.1
GR   1577.8    10839.9     1578.0    10890.8     1578.5    10936.3     1578.3    10949.1       0.0       0.0
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```
          GR records removed from station  9746.5   to station    10451.2
                        and from station   10823   to station    10871.3
                  to restrict flow to effective area without X3 records.

ET                          9.1                                                    10615.6    10746.21

NH        3       0.07    10709.2      0.045     10746.2        0.07       10823

          GR records removed from station  9746.5   to station    10451.2
                        and from station   10823   to station    10871.3
                  to restrict flow to effective area without X3 records.
X1    0.368         26    10709.2     10746.2         235         220      250.82
GR   1581.9    10451.2     1581.6     10481.8      1581.2     10513.7      1581.3     10546.8      1581.4     10578.1
GR   1580.9    10587.0     1579.3     10595.3      1580.9     10606.3      1579.8     10611.0      1577.4     10615.6
GR   1577.2    10630.3     1580.8     10638.9      1580.5     10651.6      1578.1     10655.8      1580.5     10662.6
GR   1581.0    10675.6     1581.3     10689.6      1581.0     10709.2      1580.3     10727.9      1578.1     10733.2
GR   1578.6    10739.3     1580.5     10746.2      1580.7     10759.5      1581.1     10778.5      1582.1     10804.5
GR   1582.9    10823.0

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ET                          9.1                                                    10634.15    10773.24

NH        3       0.07    10737.5      0.045     10750.6        0.07       10954.7

          GR records removed from station  9730.0   to station    10503.3
                        and from station 10954.7   to station    10995.2
                  to restrict flow to effective area without X3 records.

          GR records removed from station  9730.0   to station    10503.3
                        and from station 10954.7   to station    10995.2
                  to restrict flow to effective area without X3 records.
X1    0.414         32    10737.5     10750.6         245         230      239.6
GR   1586.5    10503.3     1586.2     10519.5      1585.2     10528.1      1583.3     10535.8      1582.9     10548.3
GR   1585.3    10548.9     1585.5     10560.9      1586.0     10575.4      1585.6     10585.2      1585.3     10592.4
GR   1585.9    10615.3     1585.6     10646.7      1585.5     10677.6      1583.3     10683.7      1583.5     10688.3
GR   1585.3    10699.4     1585.4     10720.0      1585.4     10737.5      1583.9     10740.4      1584.0     10745.9
GR   1585.1    10750.6     1585.5     10765.4      1585.2     10800.1      1585.0     10813.1      1585.4     10826.7
GR   1584.2    10830.6     1584.5     10832.8      1586.2     10850.7      1585.9     10878.1      1586.0     10904.5
GR   1586.3    10927.2     1586.7     10954.7

            Forest Rd. Crossing

          Q = flow in the channel less the split at Forest Rd.
         Flow rate is from file W10SPLIT.OH2 : 1753.18 cfs rounded to 1750 cfs.


QT        2       1750       1750

ET                          9.1                                                    10352.09    10779.01

NC     .022       .022       .022

          GR records removed from station  9682.0   to station    10352.1
                  to restrict flow to effective area without X3 records.
            GR station 10352.09 added to allow for ET station.

          Forest Rd. Crossing
          Q = flow in the channel less the split at Forest Rd.
         Flow rate is from file W10SPLIT.OH2 : 1753.18 cfs rounded to 1750 cfs.
          GR records removed from station  9682.0   to station    10352.1
                  to restrict flow to effective area without X3 records.
            GR station 10352.09 added to allow for ET station.
X1    0.444         17    10352.1       10779         130         158      160.12
GR   1588.7   10352.09     1588.7     10352.1      1588.5     10394.8      1588.5     10438.4      1588.4     10479.6
GR   1588.1    10529.6     1587.8     10568.9      1587.7     10598.5      1588.5     10637.9      1588.7     10679.4
GR   1588.8    10687.0     1589.0     10734.9      1589.2     10779.0      1589.0     10829.6      1589.2     10881.4
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GR   1589.4    10943.9     1589.4    10945.0

         Q=1900 (rounded up from 1890 cfs to acct. for added drainage area)

1
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QT        2       1900       1900

ET                            9.1                                                  10569.89    10731.41

NC    0.055       0.05       0.03        0.1         0.3

         GR records removed from station  9761.0   to station    10293.0
                 to restrict flow to effective area without X3 records.

         Q=1900 (C543 +~10 cfs to account for additional drainage area)
         GR records removed from station  9761.0   to station    10293.0
                 to restrict flow to effective area without X3 records.
X1     .454         24    10569.9    10731.4          50          50       49.74
GR   1589.4    10293.0     1589.0    10323.5      1588.3    10356.2      1588.2    10401.9     1588.6    10448.3
GR   1588.7    10483.8     1588.4    10513.7      1588.6    10541.4      1588.7    10569.9     1588.3    10601.3
GR   1587.9    10617.1     1588.1    10651.4      1588.8    10680.5      1589.1    10708.0     1589.7    10731.4
GR   1589.5    10749.9     1589.0    10773.1      1589.2    10798.8      1588.8    10827.7     1590.0    10849.6
GR   1590.6    10862.9     1590.9    10894.4      1591.0    10924.4      1590.9    10928.1

        START Hydraulically Similar Reach 10B

         GR records removed from station  9814.0   to station     9944.6
                       and from station 10058.3   to station    10237.1
                 to restrict flow to effective area without X3 records.


QT        2       1890       1890

ET                            9.1                                                   9965.69    10034.71

         START Hydraulically Similar Reach 10B
         GR records removed from station  9814.0   to station     9944.6
                 and from station 10058.3   to station    10237.1
                 to restrict flow to effective area without X3 records.
X1    0.551         12     9965.7    10034.7          515         515      516.47
GR   1598.9     9944.6     1596.3     9961.7      1598.9     9965.7      1598.7     9974.1     1594.8     9981.5
GR   1594.1     9999.9     1594.1    10000.0      1594.4    10014.8      1598.8    10020.9     1599.1    10034.7
GR   1595.9    10038.8     1599.1    10058.3

          Cross section 0.567 has been added in order to include the end
          of the channel wall which contains flow in the wash. The
          information was obtained from topo data.


ET                            9.1                                                   9957.29    10030.41

          Cross section 0.567 has been added in order to include the end
          of the channel wall which contains flow in the wash. The GR
1
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          information was obtained from topo data.
X1    0.567          9     9957.3    10030.4          90          90       82.3
GR   1600.7     9896.4     1600.0     9930.7      1600.0     9957.3      1596.0     9957.4     1596.0     9969.7
GR   1595.5      10000     1596.0    10030.3      1600.0    10030.4      1602.0    10090.7

ET                            9.1                                                   9957.89    10029.21

X1    0.642         39     9957.9    10029.2         410         390       400
GR   1610.7     9747.6     1611.6     9759.7      1612.3     9772.8      1611.4     9787.4     1610.4     9798.9
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GR   1609.2     9812.7     1609.3     9823.9     1609.8     9838.6     1610.6     9854.8     1611.0     9862.2
GR   1611.4     9870.6     1611.0     9890.3     1608.1     9904.1     1607.7     9916.0     1605.9     9924.6
GR   1605.0     9932.3     1606.6     9941.7     1607.2     9951.4     1607.2     9957.9     1601.6     9960.6
GR   1600.9     9998.0     1600.7    10000.0     1601.2    10024.0     1607.4    10029.2     1607.5    10038.0
GR   1608.7    10048.8     1609.1    10058.1     1607.9    10066.5     1607.7    10146.7     1607.5    10169.5
GR   1607.2    10173.1     1607.5    10184.9     1607.2    10196.1     1607.6    10213.5     1606.9    10233.0
GR   1606.2    10248.4     1607.2    10262.7     1607.2    10294.5     1606.6    10312.1       0.0       0.0

ET                           9.1                                                              9962.69   10037.71

X1   0.734       36        9962.7    10037.7       475        495      486.51
GR   1620.4     9733.4     1620.0     9758.2     1619.4     9783.0     1619.3     9798.5     1619.2     9809.2
GR   1618.9     9825.8     1618.7     9841.7     1618.3     9865.2     1618.0     9889.8     1617.4     9903.9
GR   1616.7     9910.5     1614.9     9914.7     1615.1     9918.7     1617.0     9921.8     1617.5     9927.8
GR   1617.6     9940.7     1617.2     9955.5     1616.5     9962.7     1609.0     9968.9     1608.1     9987.1
GR   1607.9    10000.0     1608.2    10015.4     1608.7    10032.8     1615.1    10037.7     1615.8    10054.5
GR   1616.1    10065.3     1616.3    10135.8     1616.8    10146.4     1617.8    10158.5     1616.9    10164.8
GR   1616.3    10167.8     1616.7    10180.4     1616.7    10193.2     1616.1    10213.8     1616.2    10237.9
GR   1616.2    10238.2       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0

QT        2        1890       1890

ET                           9.1                                                              9961.99   10038.51

X1   0.829       32         9962     10038.5       505        480      499.88
GR   1629.3     9595.4     1629.1     9638.9     1629.1     9682.5     1627.8     9722.1     1627.5     9763.8
GR   1627.1     9790.3     1625.8     9812.8     1626.1     9846.5     1626.4     9882.1     1625.5     9919.1
GR   1624.8     9945.0     1624.6     9962.0     1622.0     9966.7     1618.4     9967.2     1618.8     9987.5
GR   1619.8    10000.0     1619.8    10012.8     1619.5    10031.5     1619.0    10035.9     1619.3    10037.9
GR   1624.0    10038.5     1623.8    10050.2     1623.5    10076.2     1623.9    10116.8     1624.8    10152.7
GR   1624.6    10176.7     1625.5    10213.5     1625.0    10243.2     1625.1    10280.0     1627.0    10303.0
GR   1626.6    10329.4     1626.4    10334.6       0.0       0.0       0.0       0.0       0.0       0.0

     START Hydraulically Similar Reach 10C

ET                           9.1                                                              9947.4    10063.71

NC   0.065     0.065       0.03

1
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          START Hydraulically Similar Reach 10C
X1   0.838       18         9947.4    10063.7        46         46       46.26
GR   1628.3     9777.9     1627.4     9796.9     1628.1     9833.3     1627.4     9867.4     1626.0     9899.6
GR   1626.2     9925.7     1625.6     9947.4     1624.1     9959.4     1623.6     9969.5     1623.5     9997.0
GR   1623.3    10000.0     1622.8    10031.0     1623.8    10046.5     1625.8    10063.7     1627.2    10089.1
GR   1627.8    10120.0     1628.0    10156.6     1626.7    10176.3       0.0       0.0       0.0       0.0

ET                           9.1                                                              9932.49   10043.12

X1   0.851       17         9932.5    10043.1        70         73       71.26
GR   1631.0     9779.3     1630.9     9811.4     1630.9     9834.6     1629.9     9849.4     1628.6     9865.1
GR   1627.1     9902.0     1626.8     9932.5     1624.9     9954.0     1624.7     9983.5     1624.6    10000.0
GR   1624.7    10028.8     1626.1    10043.1     1628.0    10058.4     1629.3    10073.6     1629.0    10094.0
GR   1628.7    10116.7     1628.9    10117.4       0.0       0.0       0.0       0.0       0.0       0.0

          GR records removed from station 10049.3   to station    10256.4
                  to restrict flow to effective area without X3 records.

ET                           9.1                                                              9900.89   10029.12

          GR records removed from station 10049.3   to station    10256.4
                  to restrict flow to effective area without X3 records.
X1   0.895       14         9900.9    10029.1       234        230      232.15
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GR   1634.8     9789.8     1634.4     9822.0     1634.2     9842.8     1632.6     9859.7     1632.0     9884.1
GR   1632.1     9900.9     1630.3     9922.2     1629.4     9944.7     1630.0     9977.1     1629.4    10000.0
GR   1629.5    10019.2     1631.3    10029.1     1633.3    10039.8     1633.6    10049.3

         GR records removed from station 10043.7   to station    10130.1
                 to restrict flow to effective area without X3 records.
           GR station 10043.71 added to allow for ET station.


ET                              9.1                                                  9967.59    10043.71

         GR records removed from station 10043.7   to station    10130.1
                 to restrict flow to effective area without X3 records.
           GR station 10043.71 added to allow for ET station.
X1    0.949          14      9967.6    10043.7         320         260     284.12
GR   1642.6      9798.1     1638.9     9817.5     1637.2     9831.0     1636.3     9846.0     1636.6     9871.0
GR   1636.3      9886.4     1635.7     9908.8     1635.2     9925.7     1634.5     9940.7     1634.6     9967.6
GR   1633.6     10000.0     1634.7    10027.0     1637.7    10043.7     1637.7    10043.71

         GR records removed from station  9636.4   to station     9909.6
                         and from station 10077.4   to station    10427.8
                 to restrict flow to effective area without X3 records.

1
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ET                              9.1                                                  9952.89    10056.12

         GR records removed from station  9636.4   to station     9909.6
                         and from station 10077.4   to station    10427.8
                 to restrict flow to effective area without X3 records.
X1    1.002          15      9952.9    10056.1         260         300     278.57
GR   1640.2      9909.6     1639.4     9915.4     1638.2     9919.0     1637.9     9928.6     1638.0     9940.3
GR   1637.7      9952.9     1637.1     9967.1     1637.2     9995.7     1637.1    10000.0     1637.1    10024.6
GR   1636.9     10037.1     1638.5    10049.1     1639.7    10056.1     1640.6    10064.0     1640.9    10077.4

         Vertical extensions are added at ends of cross sections (houses).


ET                              9.1                                                  9976.99    10035.01

         Vertical extensions are added at ends of cross sections (houses).
X1    1.034          15        9977      10035         150         180     168.72
GR    1651       9951.4     1641.0     9951.5     1640.8     9963.8     1640.1     9977.0     1639.3     9988.7
GR   1637.9      9997.6     1637.5    10000.0     1638.0    10012.5     1638.7    10017.6     1639.4    10021.6
GR   1640.2     10035.0     1640.9    10056.6     1641.2    10077.7     1641.8    10080.6     1651.8    10080.7

         GR records removed from station  9820.4   to station     9864.6
                 to restrict flow to effective area without X3 records.


ET                              9.1                                                  9980.99    10027.41

         GR records removed from station  9820.4   to station     9864.6
X1    1.074          17        9981      10027.4         214         214     214.26
GR   1645.5      9864.6     1644.4     9879.6     1643.9     9903.1     1643.7     9922.3     1643.9     9946.8
GR   1643.7      9966.4     1643.0     9981.0     1641.5     9991.6     1640.7    10000.0     1640.5    10015.3
GR   1641.3     10027.4     1644.1    10028.9     1646.3    10044.3     1648.1    10113.9     1647.4    10132.5
GR   1646.2     10148.0     1646.1    10169.9


ET                              9.1                                                  9985.99    10024.71

X1    1.096          20        9986      10024.7         115         112     113.64
GR   1648.4      9823.7     1649.0     9848.3     1648.7     9863.9     1648.2     9884.7     1648.3     9899.3
GR   1648.1      9914.6     1647.7     9975.7     1645.2     9986.0     1643.9     9991.2     1642.4     9993.9
GR   1641.2     10000.0     1641.2    10012.2     1641.7    10024.2     1645.8    10024.7     1646.8    10041.9
GR   1648.2     10055.7     1648.8    10112.4     1648.4    10128.8     1647.5    10147.3     1647.2    10168.4
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     HEC-1 Concentration Point C542

 QT        2       1430       1430

     Dip Crossing at Avenida Del Ray

 ET                           9.1                                                    9941.83    10097.09

 NC    0.022       0.022      0.022
1
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          HEC-1 Concentration Point C542
          Dip Crossing at Avenida Del Ray
 X1    1.108         21     9989.9    10034.3         70         70      66.20
 GR   1650.2     9733.5     1650.2     9763.0     1649.9     9797.2     1649.5     9827.1     1649.3     9848.3
 GR   1648.5     9866.6     1646.8     9895.4     1644.8     9920.2     1643.8     9943.0     1643.1     9966.0
 GR   1642.9     9989.9     1642.6    10000.0     1642.9    10034.3     1643.1    10065.3     1643.9    10094.9
 GR   1645.5    10123.8     1646.5    10148.2     1648.1    10181.6     1649.4    10209.2     1650.4    10238.2
 GR   1650.6    10265.5        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0

     START Hydraulically Similar Reach 10D

 ET                           9.1                                                    9980.69    10041.12

 NC    0.065       0.055      0.045

          START Hydraulically Similar Reach 10D
 X1    1.117         39     9980.7    10041.1         48         45      46.62
 GR   1650.3     9729.0     1650.3     9747.1     1650.6     9766.5     1650.8     9784.5     1649.8     9798.9
 GR   1650.3     9812.8     1650.6     9834.5     1650.5     9853.1     1649.9     9869.3     1649.5     9888.4
 GR   1647.7     9906.4     1647.5     9917.4     1647.3     9932.6     1646.5     9948.0     1646.2     9969.5
 GR   1646.0     9980.7     1643.1     9983.3     1643.1    10000.0     1643.5    10024.9     1643.4    10034.8
 GR   1646.0    10041.1     1647.5    10055.4     1647.9    10062.7     1646.2    10070.9     1647.7    10085.0
 GR   1650.7    10104.2     1650.5    10118.9     1650.7    10138.0     1650.6    10159.9     1650.8    10178.2
 GR   1650.7    10191.2     1649.7    10204.8     1650.9    10214.7     1651.5    10223.1     1651.3    10238.8
 GR   1650.7    10249.6     1650.9    10261.0     1652.9    10277.6     1652.9    10280.6        0.0        0.0

          GR records removed from station  9956.8   to station    10138.7
                  to restrict flow to effective area without X3 records.
            GR station 9956.79  added to allow for ET station.

 ET                           9.1                                                    9956.79    10023.21

          GR records removed from station  9956.8   to station    10138.7
                  to restrict flow to effective area without X3 records.
            GR station 9956.79  added to allow for ET station.
 X1    1.175         16     9956.8    10023.2        310        290      303.54
 GR   1653.1     9956.79     1653.1     9956.8     1652.8     9965.2     1650.9     9975.1     1650.9     9994.8
 GR   1650.7    10000.0     1650.4    10015.1     1652.6    10023.2     1652.8    10034.3     1652.5    10049.2
 GR   1652.5    10065.6     1652.9    10083.8     1652.8    10103.3     1653.5    10121.5     1655.0    10131.7
 GR   1655.1    10138.7

          GR records removed from station 10090.5   to station    10404.3
                  to restrict flow to effective area without X3 records.

 ET                           9.1                                                    9940.3     10035.41
1
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          GR records removed from station 10090.5   to station    10404.3
                  to restrict flow to effective area without X3 records.
 X1    1.247         27     9975.5    10035.4        330        353      381.10
```

```
GR   1665.0     9649.0     1665.4     9664.2     1664.3     9689.1     1663.9     9714.2     1663.4     9744.3
GR   1662.8     9770.5     1661.4     9787.3     1661.2     9809.1     1659.8     9828.4     1657.9     9843.4
GR   1656.9     9854.0     1656.6     9862.4     1658.8     9874.3     1659.1     9885.3     1658.1     9898.6
GR   1657.3     9911.4     1658.0     9926.3     1658.9     9940.3     1659.0     9960.3     1659.0     9975.5
GR   1658.5     9989.8     1657.1    10000.0     1657.3    10018.9     1659.7    10035.4     1659.9    10053.9
GR   1660.2    10070.4     1661.3    10090.5

    HEC-1 Concentration Point C540

        GR records removed from station 10054.1   to station    10334.4
                to restrict flow to effective area without X3 records.


QT        2       1420       1420

ET                            9.1                                                          9985.19    10041.61

        HEC-1 Concentration Point C540
        GR records removed from station 10054.1   to station    10334.4
                to restrict flow to effective area without X3 records.
X1    1.305         17     9985.2    10041.6         310         300     304.75
GR   1671.2     9767.7     1670.0     9796.5     1669.0     9832.0     1667.8     9862.6     1665.8     9895.2
GR   1665.0     9926.5     1664.0     9955.0     1664.1     9971.8     1664.9     9985.2     1664.1     9993.1
GR   1661.7     9999.8     1662.0    10000.0     1661.6    10013.7     1661.9    10025.7     1666.0    10041.6
GR   1666.9    10053.8     1667.1    10054.1

        GR records removed from station 10227.3   to station    10278.4
                to restrict flow to effective area without X3 records.
          GR station 10057.31 added to allow for ET station.


ET                            9.1                                                          9964.29    10027.31

        GR records removed from station 10227.3   to station    10278.4
                to restrict flow to effective area without X3 records.
          GR station 10057.31 added to allow for ET station.
X1    1.337         17     9982.7    10027.3         162         172     172.96
GR   1675.3     9874.7     1672.5     9887.7     1668.8     9905.4     1666.1     9918.9     1665.4     9931.7
GR   1665.8     9948.2     1665.9     9955.1     1665.0     9963.0     1666.4     9970.0     1666.4     9982.7
GR   1664.4     9992.7     1664.3    10000.0     1664.1    10008.1     1667.9    10010.9     1667.1    10017.1
GR   1668.1    10027.3     1668.1    10027.31

        Photogrammetric cross-section 1.393 is truncated at 10164.3.


ET                            9.1                                                          9989.69    10020.31

1
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        Photogrammetric cross-section 1.393 is truncated at 10164.3.
X1    1.393         16     9989.7    10020.3         275         285     293.34
GR   1684.2     9939.5     1676.3     9960.1     1670.4     9977.4     1669.3     9989.7     1668.5     9996.5
GR   1668.2    10000.0     1668.7    10013.3     1671.2    10020.3     1672.7    10034.8     1673.0    10050.5
GR   1672.5    10068.9     1671.7    10089.0     1672.2    10108.7     1672.9    10130.5     1674.2    10151.5
GR   1675.6    10164.3


1
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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*PROF 1
```

```
 CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

 CCHV=     .100 CEHV=     .300
 1490 NH CARD USED
 *SECNO  .747
  WATER EL=X5 CARD=   1547.170

 3265 DIVIDED FLOW

           Starting WSEL from X section 0.747, Wash 11 HEC-2 (W11FW1.OH2)
           Starting WSEL for floodplain= 1547.17. Start WSEL for FW= 1547.48
           Cross section 0.747 is a Wash 11 cross section just downstream
           of the Wash 10 and Wash 11 confluence.
           GR records deleted from Sta 9620.5 to 9774.3 and from
                Sta 10689.8 to 10724.9
               to restrict flow to effective area without X3 records.
      .747      3.37   1547.17   1547.12   1547.17   1547.63       .46       .00       .00   1546.60
    2010.0      56.9    1204.8     748.3      32.1     178.6     324.0        .0        .0   1545.90
      .00      1.77      6.75      2.31      .070      .050      .070      .000   1543.80   9903.15
   .013073        0.        0.        0.         0         4         0       .00    548.72  10661.42


 CCHV=     .100 CEHV=     .300
 1490 NH CARD USED
 *SECNO  .021
  WATER EL=X5 CARD=   1550.270

 3265 DIVIDED FLOW


        **************************************************************************
           *****                                                          *****
           *****        FROM WASH 10 RIVER MILE 0.0 TO RIVER MILE 0.454   *****
           *****        WASH 10 STATIONS BASED UPON                       *****
           *****        WASH 11 STATIONS BEGINNING AT WASH 11 THALWEG     *****
           *****                                                          *****
        **************************************************************************

        [[[ Wash 10 cross section 0.021 equals Wash 11 cross section 0.783 ]]]
           Hydraulically Similar Reach 10A (and 11C for a small
1
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                portion of the next cross section 0.021 which is
                very close to the confluence)
      .021      3.67   1550.27   1550.18       .00   1550.71       .44      2.96       .00   1548.90
    2010.0     915.6     661.2     433.2     183.5      94.8     190.6       2.3       2.7   1549.50
      .01      4.99      6.98      2.27      .061      .049      .070      .000   1546.60   9918.97
   .017582      180.      190.      220.         0         8         0       .00    548.01  10723.25


 1490 NH CARD USED
 *SECNO  .070
  WATER EL=X5 CARD=   1553.720

 3265 DIVIDED FLOW

        [[[ Wash 10 cross section 0.070 equals Wash 11 cross section 0.815 ]]]
          100-Year Discharge at Confluence with Wash 11 = 2010 cfs,
                Hydraulically Similar Reach 11C
        Starting WSEL for floodplain is from cross section 0.815 Wash 11
           GR records deleted from Sta 9615.5 to 9798.9
                        and from station 10793.0   to station    10848.9
               to restrict flow to effective area without X3 records.
      .070      4.22   1553.72   1553.44       .00   1553.99       .27      4.31       .02   1553.70
    2010.0    1790.6      30.0     189.4     412.3      45.7      76.0       5.1       5.7   1553.80
      .03      4.34       .66      2.49      .063      .450      .070      .000   1549.50   9811.32
   .017991      240.      255.      240.         0         8         0       .00    536.97  10764.65
```

```
 1490 NH CARD USED
 *SECNO  .129

 3265 DIVIDED FLOW

 3280 CROSS SECTION       .13 EXTENDED       .09 FEET

        [[[ Wash 10 cross section 0.129 equals Wash 11 cross section 0.894 ]]]
               GR records begin where Wash 11 cross section 0.894 ends@ 10237.8
          Last two points of Aerial Mapping Company, Inc. GR data were changed,
          intention is  to intersect contour line 1560.
         Q = flow in the channel less the split at Forest Rd.
        Flow rate is from file W10SPLIT.OH2 : 1698.85 cfs rounded to 1700 cfs.
      .129      2.49   1559.49   1559.29       .00   1559.69       .20      5.70       .01   1559.30
    1700.0     332.1     211.8    1156.1     135.0      34.0     364.3       8.8       9.9   1559.20
       .05      2.46      6.23      3.17      .070      .045      .070      .000   1557.00  10237.80
   .020108      300.      315.      300.         5        11         0       .00    700.58  10939.02


 1490 NH CARD USED
 *SECNO  .226
1
    29SEP95      16:46:52                                                                                PAGE   16


     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


 3280 CROSS SECTION       .23 EXTENDED       .80 FEET

          GR records removed from station  9561.7   to station    10364.7
                        and from station 10656.8   to station    11040.2
                   to restrict flow to effective area without X3 records.
       .226      2.99   1569.19   1569.03       .00   1569.58       .39      9.83       .06   1567.70
    1700.0     782.5     360.2     557.3     237.8      44.2     129.2      14.5      15.9   1568.10
       .08      3.29      8.15      4.31      .070      .045      .070      .000   1566.20  10364.70
   .017548      505.      513.      540.         3         8         0       .00    292.10  10656.80


 1490 NH CARD USED
 *SECNO  .277
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
         Last Ground Point changed from Elevation 1572.9 to 1573.1
         to reflect highpoint at end of cross section
         GR records removed from station  9575.6   to station    10409.3
                   to restrict flow to effective area without X3 records.
       .277      3.58   1573.38   1573.38       .00   1573.87       .49      4.24       .03   1571.90
    1700.0     188.5     675.2     836.2      96.9      81.6     288.5      17.2      18.1   1571.80
       .10      1.95      8.27      2.90      .070      .045      .070      .000   1569.80  10409.92
   .014529      275.      266.      260.         0        11         0       .00    443.84  10853.75


 1490 NH CARD USED
 *SECNO  .321
 3280 CROSS SECTION       .32 EXTENDED       .28 FEET

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
         GR records removed from station    9580   to station    10368.8
                   to restrict flow to effective area without X3 records.
       .321      4.88   1577.68   1577.68       .00   1578.14       .46      2.79       .00   1576.60
    1700.0     480.8     682.0     537.3     207.4      85.2     209.3      19.6      20.4   1576.10
       .11      2.32      8.01      2.57      .070      .045      .070      .000   1572.80  10368.80
   .010757      215.      233.      220.         0        12         0       .00    463.62  10832.42


 1490 NH CARD USED
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*SECNO  .368
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
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```
        GR records removed from station  9746.5   to station   10451.2
                        and from station  10823   to station   10871.3
                  to restrict flow to effective area without X3 records.
    .368     4.31   1581.51   1581.51      .00   1582.09      .58     3.84      .04   1581.00
 1700.0   1169.9     458.3      71.8     208.0      61.2     26.0     21.8     22.4   1580.50
    .12     5.63      7.49      2.76      .070      .045      .070     .000  1577.20  10488.76
.026947     235.      251.      220.         0         9         0      .00   300.47  10789.23


1490 NH CARD USED
*SECNO  .414
3280 CROSS SECTION       .41 EXTENDED       .07 FEET

        GR records removed from station  9730.0   to station   10503.3
                        and from station 10954.7   to station   10995.2
                  to restrict flow to effective area without X3 records.
    .414     3.67   1586.57   1586.26      .00   1586.80      .23     4.67      .03   1585.40
 1700.0   1023.6     196.3     480.1     291.8      29.4     174.8     24.0     24.5   1585.10
    .14     3.51      6.67      2.75      .070      .045      .070     .000  1582.90  10503.30
.014544     245.      240.      230.         5        14         0      .00   442.33  10945.63


*SECNO  .444
3280 CROSS SECTION       .44 EXTENDED       .58 FEET

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
        Forest Rd. Crossing
        Q = flow in the channel less the split at Forest Rd.
       Flow rate is from file W10SPLIT.OH2 : 1753.18 cfs rounded to 1750 cfs.
        GR records removed from station  9682.0   to station   10352.1
                  to restrict flow to effective area without X3 records.
          GR station 10352.09 added to allow for ET station.
    .444     1.58   1589.28   1589.28      .00   1589.64      .37     1.44      .04   1588.70
 1750.0        .0     1717.0      33.0        .0     350.6     19.3     25.4     26.2   1589.20
    .15      .06      4.90      1.71      .022      .022      .022     .000  1587.70  10352.09
.006834     130.      160.      158.         0        18         0      .00   553.91  10906.00


CCHV=     .100 CEHV=     .300
*SECNO  .454
3280 CROSS SECTION       .45 EXTENDED       .38 FEET

        Q=1900 (C543 +~10 cfs to account for additional drainage area)
        GR records removed from station  9761.0   to station   10293.0
                  to restrict flow to effective area without X3 records.
    .454     1.88   1589.78   1589.48      .00   1590.00      .21      .34      .02   1588.70
 1900.0    859.3     925.0     115.7     334.1     198.8     64.8     26.0     26.9   1589.70
    .15     2.57      4.65      1.79      .055      .030      .050     .000  1587.90  10293.00
.006691      50.       50.       50.         3         5         0      .00   552.65  10845.65


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


*SECNO  .551
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3265 DIVIDED FLOW

3280 CROSS SECTION .55 EXTENDED .08 FEET

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
START Hydraulically Similar Reach 10B
GR records removed from station 9814.0 to station 9944.6
and from station 10058.3 to station 10237.1
to restrict flow to effective area without X3 records.

.551	4.88	1598.98	1598.98	.00	1600.12	1.14	3.81	.28	1598.90
1890.0	85.4	1683.5	121.1	29.1	186.9	34.9	31.0	30.8	1599.10
.17	2.94	9.01	3.47	.055	.030	.050	.000	1594.10	9944.60
.008207	515.	516.	515.	0	20	0	.00	107.12	10057.55

*SECNO .567

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.73

Cross section 0.567 has been added in order to include the end
of the channel wall which contains flow in the wash. The GR
information was obtained from topo data.

.567	4.43	1599.93	1598.53	.00	1600.54	.61	.37	.05	1600.00
1890.0	.0	1890.0	.0	.0	302.0	.0	31.5	30.9	1600.00
.17	.00	6.26	.00	.000	.030	.000	.000	1595.50	9957.30
.002751	90.	82.	90.	2	14	0	.00	73.10	10030.40

*SECNO .642

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
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
.642	3.41	1604.10	1604.10	.00	1605.58	1.47	1.89	.26	1607.20
1890.0	.0	1890.0	.0	.0	194.2	.0	33.8	31.6	1607.40
.19	.00	9.73	.00	.000	.030	.000	.000	1600.70	9959.39
.009908	410.	400.	390.	0	15	0	.00	67.04	10026.44

*SECNO .734
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

.734	3.36	1611.26	1611.26	.00	1612.73	1.46	4.81	.00	1616.50
1890.0	.0	1890.0	.0	.0	194.6	.0	36.0	32.3	1615.10
.20	.00	9.71	.00	.000	.030	.000	.000	1607.90	9967.03
.009851	475.	487.	495.	0	5	0	.00	67.74	10034.76

*SECNO .829
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

.829	3.66	1622.06	1622.06	.00	1623.47	1.41	5.08	.01	1624.60
1890.0	.0	1890.0	.0	.0	198.6	.0	38.3	33.1	1624.00

```
      .21       .00      9.51       .00      .000      .030      .000      .000   1618.40   9966.58
   .010491      505.      500.      480.         0         8         0       .00     71.67  10038.25


*SECNO  .838
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
         START Hydraulically Similar Reach 10C
      .838      2.94   1625.74   1625.74       .00   1626.75      1.01       .48       .04   1625.60
    1890.0        .1    1889.9        .0        .4     234.6        .0      38.5      33.2   1625.80
      .22       .40      8.06       .00      .065      .030      .000      .000   1622.80   9942.27
   .010348       46.       46.       46.         0        16         0       .00    120.92  10063.20


*SECNO  .851
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      .851      2.54   1627.14   1627.14       .00   1628.13       .99       .71       .00   1626.80
    1890.0       4.4    1879.3       6.3       5.9     234.7       4.4      38.9      33.5   1626.10
      .22       .74      8.01      1.44      .065      .030      .065      .000   1624.60   9900.95
   .009596       70.       71.       73.         0        11         0       .00    150.54  10051.50


1
   29SEP95      16:46:52                                                                          PAGE   20

    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  .895
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
        GR records removed from station 10049.3   to station    10256.4
                to restrict flow to effective area without X3 records.
      .895      2.47   1631.87   1631.87       .00   1632.82       .96      2.33       .00   1632.10
    1890.0        .0    1889.1        .9        .0     240.8        .9      40.2      34.2   1631.30
      .23       .00      7.85      1.00      .000      .030      .065      .000   1629.40   9903.65
   .010544       234.      232.      230.         0         8         0       .00    128.49  10032.14


*SECNO  .949
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
        GR records removed from station 10043.7   to station    10130.1
                to restrict flow to effective area without X3 records.
          GR station 10043.71 added to allow for ET station.
      .949      3.19   1636.79   1636.79       .00   1637.69       .90      2.84       .01   1634.60
    1890.0     436.7    1453.3        .0     145.8     170.8        .0      42.1      35.3   1637.70
      .24      2.99      8.51       .00      .065      .030      .000      .000   1633.60   9837.79
   .009202       320.      284.      260.         0        11         0       .00    200.86  10038.65


*SECNO 1.002
        GR records removed from station  9636.4   to station     9909.6
                        and from station 10077.4   to station    10427.8
                to restrict flow to effective area without X3 records.
     1.002      2.51   1639.41   1639.40       .00   1640.38       .97      2.67       .02   1637.70
    1890.0     151.9    1738.1        .0      51.9     212.5        .0      43.9      36.4   1639.70
      .25      2.93      8.18       .00      .065      .030      .000      .000   1636.90   9915.35
   .010208       260.      279.      300.         1        15         0       .00    139.04  10054.39


*SECNO 1.034
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
        Vertical extensions are added at ends of cross sections (houses).
     1.034      4.53   1642.03   1642.03       .00   1643.21      1.19      1.47       .07   1640.10
```

1890.0	84.6	1680.6	124.9	34.7	182.1	54.1	44.9	36.9	1640.20
.25	2.44	9.23	2.31	.065	.030	.065	.000	1637.50	9951.49
.007605	150.	169.	180.	0	17	0	.00	129.11	10080.60

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

*SECNO 1.074
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
GR records removed from station 9820.4 to station 9864.6

1.074	4.49	1644.99	1644.99	.00	1646.14	1.16	1.41	.00	1643.00
1890.0	236.8	1644.1	9.1	121.2	178.3	6.2	46.3	37.6	1641.30
.26	1.95	9.22	1.46	.065	.030	.065	.000	1640.50	9871.57
.005785	214.	214.	214.	0	5	0	.00	163.55	10035.12

*SECNO 1.096

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1.096	5.04	1646.24	1646.24	.00	1648.28	2.04	.81	.26	1645.20
1890.0	3.1	1885.6	1.3	2.2	164.4	1.7	46.9	37.9	1645.80
.26	1.37	11.47	.79	.065	.030	.065	.000	1641.20	9981.72
.008971	115.	114.	112.	0	8	0	.00	50.53	10032.25

*SECNO 1.108

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 11.25

HEC-1 Concentration Point C542
Dip Crossing at Avenida Del Ray

1.108	5.87	1648.47	1644.53	.00	1648.49	.02	.01	.20	1642.90
1430.0	489.9	349.5	590.6	431.2	254.0	526.6	48.0	38.2	1642.90
.28	1.14	1.38	1.12	.022	.022	.022	.000	1642.60	9867.09
.000041	70.	66.	70.	2	18	0	.00	322.39	10189.48

*SECNO 1.117

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .15

START Hydraulically Similar Reach 10D

1.117	5.24	1648.34	1646.06	.00	1648.55	.21	.01	.06	1646.00
1430.0	159.2	1186.7	84.1	114.8	294.4	59.1	48.9	38.5	1646.00
.28	1.39	4.03	1.42	.065	.045	.055	.000	1643.10	9899.97
.001875	48.	47.	45.	2	8	0	.00	189.15	10089.12

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

```
*SECNO 1.175
3280 CROSS SECTION      1.17 EXTENDED       .53 FEET


3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
        GR records removed from station  9956.8   to station    10138.7
                to restrict flow to effective area without X3 records.
          GR station 9956.79  added to allow for ET station.
    1.175      3.23   1653.63   1653.63       .00   1654.36       .73      1.27       .15   1653.10
   1430.0        .0    1158.1     271.9        .0     155.4       84.0      51.4       39.7   1652.60
      .29        .03      7.45      3.24      .065      .045       .055      .000   1650.40   9956.79
  .016566      310.      304.      290.         0        14          0       .00    165.57  10122.36


*SECNO 1.247
        GR records removed from station 10090.5   to station    10404.3
                to restrict flow to effective area without X3 records.
    1.247      3.13   1659.73   1659.35       .00   1660.08       .35      5.69       .04   1659.00
   1430.0     848.5     581.5        .0     212.4     101.8         .0      53.6       41.2   1659.70
      .32      4.00      5.71       .03      .065      .045       .055      .000   1656.60   9828.95
  .014827      330.      381.      353.         4        12          0       .00    209.26  10038.21


*SECNO 1.305

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
        HEC-1 Concentration Point C540
        GR records removed from station 10054.1   to station    10334.4
                to restrict flow to effective area without X3 records.
    1.305      3.90   1665.50   1665.50       .00   1666.40       .90      4.83       .16   1664.90
   1420.0     221.1    1198.9        .0      70.9     146.7         .0      55.5       42.4   1666.00
      .33      3.12      8.17       .00      .065      .045       .000      .000   1661.60   9907.06
  .016770      310.      305.      300.         0        11          0       .00    132.59  10039.65


*SECNO 1.337
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


3280 CROSS SECTION      1.34 EXTENDED       .20 FEET

        GR records removed from station 10227.3   to station    10278.4
                to restrict flow to effective area without X3 records.
          GR station 10057.31 added to allow for ET station.
    1.337      4.21   1668.31   1667.70       .00   1668.74       .44      2.30       .05   1666.40
   1420.0     743.6     676.4        .0     171.0     109.5         .0      56.5       42.9   1668.10
      .34      4.35      6.17       .03      .065      .045       .000      .000   1664.10   9907.90
  .011256      162.      173.      172.         1        12          0       .00    119.41  10027.31


*SECNO 1.393

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
        Photogrammetric cross-section 1.393 is truncated at 10164.3.
```

```
     1.393      4.72   1672.92   1672.92       .00   1673.83       .91      3.15       .14   1669.30
    1420.0     213.1    1060.6     146.3      47.0     123.5      62.0      58.2      43.8   1671.20
       .35      4.53      8.59      2.36      .065      .045      .055      .000   1668.20   9970.02
   .010757      275.      293.      285.         0         8         0       .00    153.41  10130.78


1
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 T1   *  Rio Verde South FIS, Wash 10
 T2   *  For: FCDMC #       93-07     By:   MKE, Ltd.
 T3   *  Wash 10,100-Yr Floodway
 T4   *  GR data taken from stereo model; received on 9-7-94 from AMC
 T5   *  200 scale 2 ft CI mapping flown by AMC on 12-22-93 and 8-22-94
 T6   *  with survey control by Burgess & Niple on 10-21-93; 11-9-93; 12-9-93
 T7   *  supplemental cross section data (GR & BT) surveyed by ALS as noted.
 T8   *  Source of 100-Yr flowrate from HEC-1 Analysis by GVSCE. Table F-3
 T9   *                                Subcritical analysis.
 T9   *  Main Hec-2 analysis for Wash 10.
 T9   *
 T9   *  This HEC-2 uses values from the split flow analysis (W10SPLIT.IH2)
 T9   *  Flow rates are adjusted to reflect the loss of flow to Wash 11.
 T9      Floodway Method 1


 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0        3         0         0         0         0         0         0   1547.48         0

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      15        0        -1         0         0         0        -1         0         0         0

1
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     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


 *PROF 2

 CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

 CCHV=     .100 CEHV=     .300
 1490 NH CARD USED
 *SECNO  .747
  WATER EL=X5 CARD=   1547.480
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9961.8   10063.7  TYPE=       1  TARGET=      101.910
           Starting WSEL from X section 0.747, Wash 11 HEC-2 (W11FW1.OH2)
           Starting WSEL for floodplain= 1547.17. Start WSEL for FW= 1547.48
           Cross section 0.747 is a Wash 11 cross section just downstream
           of the Wash 10 and Wash 11 confluence.
           GR records deleted from Sta 9620.5 to 9774.3 and from
                Sta 10689.8 to 10724.9
               to restrict flow to effective area without X3 records.
      .747      3.69   1547.49   1547.49   1547.17   1548.73      1.24       .00       .00   1546.60
    2010.0        .0    1841.4     168.6        .0     198.8      47.8        .0        .0   1545.90
       .00       .03      9.26      3.53      .070      .050      .070      .000   1543.80   9961.79
   .021371        0.        0.        0.         0         4         0       .00    101.91  10063.70


 CCHV=     .100 CEHV=     .300
 1490 NH CARD USED
```

```
*SECNO  .021
 WATER EL=X5 CARD=   1551.290
3280 CROSS SECTION       .02 EXTENDED       .69 FEET


3470 ENCROACHMENT STATIONS=     9988.7   10066.2  TYPE=      1  TARGET=       77.520

        **********************************************************************
           *****                                                          *****
           *****        FROM WASH 10 RIVER MILE 0.0 TO RIVER MILE 0.454   *****
           *****        WASH 10 STATIONS BASED UPON                       *****
           *****        WASH 11 STATIONS BEGINNING AT WASH 11 THALWEG     *****
           *****                                                          *****
        **********************************************************************

        [[[ Wash 10 cross section 0.021 equals Wash 11 cross section 0.783 ]]]
1
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          Hydraulically Similar Reach 10A (and 11C for a small
                portion of the next cross section 0.021 which is
                very close to the confluence)
      .021      4.69   1551.29   1550.92   1550.27   1552.37      1.08      3.67       .02   1548.90
    2010.0     836.4    1173.6        .0     105.4     135.8        .0       1.1        .4   1549.50
       .01      7.93      8.64       .00      .050      .049      .000      .000   1546.60   9988.69
   .017681      180.      190.      220.         0        11         0       .00     77.51  10066.20


1490 NH CARD USED
*SECNO  .070
 WATER EL=X5 CARD=   1554.470
3280 CROSS SECTION       .07 EXTENDED       .47 FEET


3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=     9995.2   10237.2  TYPE=      1  TARGET=      242.020
        [[[ Wash 10 cross section 0.070 equals Wash 11 cross section 0.815 ]]]
          100-Year Discharge at Confluence with Wash 11 = 2010 cfs,
                Hydraulically Similar Reach 11C
        Starting WSEL for floodplain is from cross section 0.815 Wash 11
           GR records deleted from Sta 9615.5 to 9798.9
                       and from station 10793.0   to station    10848.9
                to restrict flow to effective area without X3 records.
      .070      4.97   1554.47   1553.89   1553.72   1554.81       .34      3.62       .07   1553.70
    2010.0    1966.9      43.1        .0     414.7      64.1        .0       3.1        1.3   1553.80
       .02      4.74       .67       .00      .063      .450      .000      .000   1549.50   9995.19
   .012602      240.      255.      240.         0        12         0       .00     242.01  10237.20


1490 NH CARD USED
*SECNO  .129
3280 CROSS SECTION       .13 EXTENDED       .51 FEET

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=    10372.0   10599.7  TYPE=      1  TARGET=      227.700
        [[[ Wash 10 cross section 0.129 equals Wash 11 cross section 0.894 ]]]
               GR records begin where Wash 11 cross section 0.894 ends@ 10237.8
          Last two points of Aerial Mapping Company, Inc. GR data were changed,
          intention is  to intersect contour line 1560.
         Q = flow in the channel less the split at Forest Rd.
        Flow rate is from file W10SPLIT.OH2 : 1698.85 cfs rounded to 1700 cfs.
      .129      3.51   1560.51   1560.51   1559.49   1561.09       .58      4.84       .07   1559.30
    1700.0     693.9     508.8     497.3     189.6      55.9     100.4       5.9        2.9   1559.20
       .04      3.66      9.10      4.95      .070      .045      .070      .000   1557.00  10372.00
   .022159      300.      315.      300.         0        14         0       .00     227.70  10599.70
```

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

1490 NH CARD USED
*SECNO .226
3280 CROSS SECTION .23 EXTENDED 1.62 FEET

3470 ENCROACHMENT STATIONS= 10460.0 10593.9 TYPE= 1 TARGET= 133.870
GR records removed from station 9561.7 to station 10364.7
and from station 10656.8 to station 11040.2
to restrict flow to effective area without X3 records.

.226	3.82	1570.02	1569.66	1569.19	1570.65	.63	9.55	.01	1567.70
1700.0	1082.3	530.4	87.3	238.3	57.5	22.8	9.9	5.0	1568.10
.06	4.54	9.23	3.83	.070	.045	.070	.000	1566.20	10460.00
.015822	505.	513.	540.	5	5	0	.00	133.87	10593.87

1490 NH CARD USED
*SECNO .277
3280 CROSS SECTION .28 EXTENDED .64 FEET

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 10569.1 10650.7 TYPE= 1 TARGET= 81.601
Last Ground Point changed from Elevation 1572.9 to 1573.1
to reflect highpoint at end of cross section
GR records removed from station 9575.6 to station 10409.3
to restrict flow to effective area without X3 records.

.277	4.34	1574.14	1574.13	1573.38	1575.42	1.29	4.58	.20	1571.90
1700.0	.0	1089.1	610.9	.0	101.1	126.1	11.5	5.7	1571.80
.07	.03	10.78	4.85	.070	.045	.070	.000	1569.80	10569.09
.018548	275.	266.	260.	3	8	0	.00	81.60	10650.69

1490 NH CARD USED
*SECNO .321
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 10573.8 10669.0 TYPE= 1 TARGET= 95.210
GR records removed from station 9580 to station 10368.8
to restrict flow to effective area without X3 records.

.321	5.45	1578.25	1578.25	1577.68	1579.48	1.23	3.97	.01	1576.60
1700.0	277.9	1053.8	368.3	63.1	97.3	90.3	12.8	6.2	1576.10
.08	4.40	10.83	4.08	.070	.045	.070	.000	1572.80	10573.82
.016449	215.	233.	220.	0	11	0	.00	95.21	10669.03

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

1490 NH CARD USED
*SECNO .368

```
3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=    10615.6   10746.2  TYPE=      1  TARGET=      130.610
        GR records removed from station  9746.5   to station    10451.2
                         and from station   10823   to station    10871.3
                  to restrict flow to effective area without X3 records.
      .368      5.30   1582.50   1581.74   1581.51   1582.96       .46      3.39       .08   1581.00
    1700.0    1051.8     648.2        .0     233.2      97.7        .0      14.4       6.8   1580.50
       .09      4.51      6.64       .00      .070      .045      .000      .000   1577.20  10615.60
   .012163       235.      251.      220.         3        10         0       .00    130.60  10746.20


1490 NH CARD USED
*SECNO  .414
3280 CROSS SECTION       .41 EXTENDED       .37 FEET

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=    10634.2   10773.2  TYPE=      1  TARGET=      139.090
        GR records removed from station  9730.0   to station    10503.3
                         and from station 10954.7   to station    10995.2
                  to restrict flow to effective area without X3 records.
      .414      4.17   1587.07   1587.07   1586.57   1587.89       .82      4.41       .11   1585.40
    1700.0    1108.8     394.6     196.6     191.9      36.0      38.7      16.0       7.5   1585.10
       .10      5.78     10.96      5.08      .070      .045      .070      .000   1582.90  10634.15
   .030097       245.      240.      230.         0        14         0       .00    139.09  10773.24


*SECNO  .444

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.28


3470 ENCROACHMENT STATIONS=    10352.1   10779.0  TYPE=      1  TARGET=      426.920
        Forest Rd. Crossing
        Q = flow in the channel less the split at Forest Rd.
       Flow rate is from file W10SPLIT.OH2 : 1753.18 cfs rounded to 1750 cfs.
        GR records removed from station  9682.0   to station    10352.1
1
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                  to restrict flow to effective area without X3 records.
          GR station 10352.09 added to allow for ET station.
      .444      1.61   1589.31   1589.25   1589.28   1589.66       .35      1.73       .05   1588.70
    1750.0        .0    1750.0        .0        .0     366.4        .0      17.1       8.5   1589.20
       .11       .05      4.78       .00      .022      .022      .000      .000   1587.70  10352.09
   .006132       130.      160.      158.         4        22         0       .00    426.91  10779.00


CCHV=     .100 CEHV=     .300
*SECNO  .454
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=    10569.9   10731.4  TYPE=      1  TARGET=      161.521
        Q=1900 (C543 +~10 cfs to account for additional drainage area)
        GR records removed from station  9761.0   to station    10293.0
                  to restrict flow to effective area without X3 records.
      .454      2.28   1590.18   1590.18   1589.78   1590.99       .81       .41       .14   1588.70
    1900.0        .0    1900.0        .0        .0     262.6        .0      17.5       8.9   1589.70
       .11       .03      7.24       .00      .055      .030      .000      .000   1587.90  10569.89
   .011211        50.       50.       50.         0        11         0       .00    161.51  10731.40


*SECNO  .551
3280 CROSS SECTION       .55 EXTENDED       .02 FEET
```

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9965.7 10034.7 TYPE= 1 TARGET= 69.020
START Hydraulically Similar Reach 10B
GR records removed from station 9814.0 to station 9944.6
and from station 10058.3 to station 10237.1
to restrict flow to effective area without X3 records.

.551	5.02	1599.12	1599.12	1598.98	1600.56	1.44	5.41	.19	1598.90
1890.0	.0	1890.0	.0	.0	196.4	.0	20.2	10.2	1599.10
.12	.03	9.62	.00	.000	.030	.000	.000	1594.10	9965.69
.009802	515.	516.	515.	0	21	0	.00	69.01	10034.70

*SECNO .567

3301 HV CHANGED MORE THAN HVINS

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

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.31

3470 ENCROACHMENT STATIONS= 9957.3 10030.4 TYPE= 1 TARGET= 73.120
Cross section 0.567 has been added in order to include the end
of the channel wall which contains flow in the wash. The GR
information was obtained from topo data.

.567	4.97	1600.47	1598.53	1599.93	1600.95	.47	.29	.10	1600.00
1890.0	.0	1890.0	.0	.0	342.2	.0	20.7	10.4	1600.00
.13	.01	5.52	.00	.000	.030	.000	.000	1595.50	9957.29
.001832	90.	82.	90.	2	14	0	.00	73.11	10030.40

*SECNO .642

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9957.9 10029.2 TYPE= 1 TARGET= 71.320

.642	3.41	1604.11	1604.11	1604.10	1605.58	1.47	1.43	.30	1607.20
1890.0	.0	1890.0	.0	.0	194.3	.0	23.2	11.0	1607.40
.14	.00	9.73	.00	.000	.030	.000	.000	1600.70	9959.39
.009881	410.	400.	390.	0	19	0	.00	67.05	10026.44

*SECNO .734
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9962.7 10037.7 TYPE= 1 TARGET= 75.020

.734	3.36	1611.26	1611.26	1611.26	1612.73	1.46	4.80	.00	1616.50
1890.0	.0	1890.0	.0	.0	194.6	.0	25.3	11.8	1615.10
.15	.00	9.71	.00	.000	.030	.000	.000	1607.90	9967.03
.009847	475.	487.	495.	0	5	0	.00	67.74	10034.76

*SECNO .829
7185 MINIMUM SPECIFIC ENERGY

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 3720 CRITICAL DEPTH ASSUMED
1
    29SEP95      16:46:52                                                                                    PAGE   31

     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=     9962.0   10038.5  TYPE=      1  TARGET=       76.520
       .829       3.66    1622.06    1622.06    1622.06    1623.47       1.41       5.08        .01    1624.60
     1890.0         .0     1890.0         .0         .0      198.6         .0       27.6       12.6    1624.00
        .17        .00       9.52        .00       .000       .030       .000       .000    1618.40    9966.58
    .010494       505.       500.       480.          0          8          0        .00      71.67   10038.25


 *SECNO  .838
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9947.4   10063.7  TYPE=      1  TARGET=      116.310
          START Hydraulically Similar Reach 10C
       .838       2.93    1625.73    1625.73    1625.74    1626.75       1.02        .49        .04    1625.60
     1890.0         .0     1890.0         .0         .0      232.7         .0       27.8       12.7    1625.80
        .17        .00       8.12        .00       .000       .030       .000       .000    1622.80    9947.40
    .010631         46.        46.        46.          0         15          0        .00     115.66   10063.06


 *SECNO  .851
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9932.5   10043.1  TYPE=      1  TARGET=      110.630
       .851       2.49    1627.09    1627.09    1627.14    1628.15       1.05        .75        .01    1626.80
     1890.0         .0     1890.0         .0         .0      229.3         .0       28.2       12.8    1626.10
        .17        .02       8.24        .02       .000       .030       .065       .000    1624.60    9932.49
    .010493         70.        71.        73.          0         15          0        .00     110.63   10043.12


 *SECNO  .895
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9900.9   10029.1  TYPE=      1  TARGET=      128.230
          GR records removed from station 10049.3   to station    10256.4
                   to restrict flow to effective area without X3 records.
       .895       2.45    1631.85    1631.85    1631.87    1632.82        .98       2.48        .01    1632.10
     1890.0         .0     1890.0         .0         .0      238.5         .0       29.5       13.5    1631.30
        .18        .00       7.93        .02       .000       .030       .065       .000    1629.40    9903.86
    .010876       234.       232.       230.          0          5          0        .00     125.25   10029.12


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    29SEP95      16:46:52                                                                                    PAGE   32

     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  .949
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9967.6   10043.7  TYPE=      1  TARGET=       76.120
          GR records removed from station 10043.7   to station    10130.1
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                to restrict flow to effective area without X3 records.
          GR station 10043.71 added to allow for ET station.
     .949      3.60   1637.20   1637.20   1636.79   1638.58      1.39      2.90       .12   1634.60
  1890.0        .0    1890.0        .0        .0     200.1         .0      30.9      14.1   1637.70
     .19       .02      9.45       .00       .065      .030       .000       .000   1633.60   9967.59
 .009577      320.      284.      260.         0        14          0       .00     73.32  10040.91


*SECNO 1.002

3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=     9952.9   10056.1  TYPE=      1  TARGET=      103.230
        GR records removed from station  9636.4   to station    9909.6
                         and from station 10077.4   to station   10427.8
                  to restrict flow to effective area without X3 records.
    1.002      3.02   1639.92   1639.52   1639.41   1640.71       .79      2.07       .06   1637.70
  1890.0        .0    1890.0        .0        .0     264.7         .0      32.4      14.7   1639.70
     .20       .02      7.14       .02       .065      .030       .000       .000   1636.90   9952.89
 .005934      260.      279.      300.         1        19          0       .00     103.23  10056.12


*SECNO 1.034

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9977.0   10035.0  TYPE=      1  TARGET=       58.020
        Vertical extensions are added at ends of cross sections (houses).
    1.034      4.57   1642.07   1642.07   1642.03   1643.70      1.63      1.25       .25   1640.10
  1890.0        .0    1890.0        .0        .0     184.6         .0      33.2      15.0   1640.20
     .20       .02     10.24       .00       .065      .030       .000       .000   1637.50   9976.99
 .009589      150.      169.      180.         0        14          0       .00      58.01  10035.00


1
   29SEP95      16:46:52                                                                    PAGE   33

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


*SECNO 1.074
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9981.0   10027.4  TYPE=      1  TARGET=       46.420
        GR records removed from station  9820.4   to station    9864.6
    1.074      4.37   1644.87   1644.87   1644.99   1646.73      1.86      2.03       .07   1643.00
  1890.0        .0    1890.0        .0        .0     172.7         .0      34.1      15.3   1641.30
     .21       .02     10.94       .00       .065      .030       .000       .000   1640.50   9980.99
 .009383      214.      214.      214.         0         8          0       .00      46.41  10027.40


*SECNO 1.096
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9986.0   10024.7  TYPE=      1  TARGET=       38.720
    1.096      4.99   1646.19   1646.19   1646.24   1648.29      2.11      1.07       .07   1645.20
  1890.0        .0    1890.0        .0        .0     162.3         .0      34.6      15.4   1645.80
     .21       .02     11.64       .00       .065      .030       .000       .000   1641.20   9985.99
 .009517      115.      114.      112.         0         8          0       .00      38.71  10024.70
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*SECNO 1.108

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  8.83


3470 ENCROACHMENT STATIONS=     9941.8   10097.1  TYPE=      1  TARGET=      155.260
         HEC-1 Concentration Point C542
         Dip Crossing at Avenida Del Ray
     1.108      5.87   1648.47   1644.51   1648.47   1648.52       .05       .02       .21   1642.90
    1430.0     423.7     459.2     547.1     251.8     254.1     326.8      35.3      15.5   1642.90
       .22      1.68      1.81      1.67      .022      .022      .022      .000   1642.60   9941.83
   .000070       70.       66.       70.         2        18         0       .00    155.26  10097.09


*SECNO 1.117
1
   29SEP95      16:46:52                                                                                                PAGE   34

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


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .16


3470 ENCROACHMENT STATIONS=     9980.7   10041.1  TYPE=      1  TARGET=       60.430
         START Hydraulically Similar Reach 10D
     1.117      5.15   1648.25   1646.05   1648.34   1648.63       .38       .01       .10   1646.00
    1430.0        .0    1430.0        .0        .0     288.7        .0      35.9      15.6   1646.00
       .23       .01      4.95       .01      .065      .045      .055      .000   1643.10   9980.69
   .002905       48.       47.       45.         2         8         0       .00     60.43  10041.12


*SECNO 1.175

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9956.8   10023.2  TYPE=      1  TARGET=       66.420
         GR records removed from station  9956.8   to station    10138.7
                  to restrict flow to effective area without X3 records.
           GR station 9956.79  added to allow for ET station.
     1.175      3.30   1653.70   1653.70   1653.63   1654.94      1.23      1.92       .26   1653.10
    1430.0        .0    1430.0        .0        .0     160.5        .0      37.5      16.1   1652.60
       .23       .03      8.91       .00      .065      .045      .000      .000   1650.40   9956.79
   .023153       310.      304.      290.         0        14         0       .00     66.41  10023.20


*SECNO 1.247

3470 ENCROACHMENT STATIONS=     9940.3   10035.4  TYPE=      1  TARGET=       95.110
         GR records removed from station 10090.5   to station    10404.3
                  to restrict flow to effective area without X3 records.
     1.247      4.15   1660.75   1660.39   1659.73   1661.49       .73      6.50       .05   1659.00
    1430.0     235.1    1194.9        .0      62.7     163.0        .0      39.2      16.8   1659.70
       .25      3.75      7.33       .00      .065      .045      .000      .000   1656.60   9940.30
   .013344       330.      381.      353.         4        11         0       .00     95.10  10035.40


*SECNO 1.305
1
   29SEP95      16:46:52                                                                                                PAGE   35
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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


 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9985.2   10041.6  TYPE=      1  TARGET=       56.420
         HEC-1 Concentration Point C540
         GR records removed from station 10054.1   to station    10334.4
                  to restrict flow to effective area without X3 records.
     1.305      3.97   1665.57   1665.57   1665.50   1666.95      1.38      5.10       .19   1664.90
    1420.0       .0    1420.0        .0        .0     150.9        .0      40.5      17.3   1666.00
       .26       .03       9.41      .00       .065      .045      .000      .000   1661.60   9985.19
   .021586      310.      305.      300.         0         8         0       .00     54.75  10039.94


 *SECNO 1.337
 3280 CROSS SECTION      1.34 EXTENDED       .95 FEET


 3470 ENCROACHMENT STATIONS=     9964.3   10027.3  TYPE=      1  TARGET=       63.020
         GR records removed from station 10227.3   to station    10278.4
                  to restrict flow to effective area without X3 records.
           GR station 10057.31 added to allow for ET station.
     1.337      4.95   1669.05   1668.56   1668.31   1669.97       .92      2.97       .05   1666.40
    1420.0     252.4    1167.6        .0      52.1     143.1        .0      41.2      17.5   1668.10
       .27       4.85      8.16      .00       .065      .045      .000      .000   1664.10   9964.29
   .014144      162.      173.      172.         1         8         0       .00     63.01  10027.30


 *SECNO 1.393

 3301 HV CHANGED MORE THAN HVINS


 3470 ENCROACHMENT STATIONS=     9989.7   10020.3  TYPE=      1  TARGET=       30.619
         Photogrammetric cross-section 1.393 is truncated at 10164.3.
     1.393      4.86   1673.06   1672.94   1672.92   1674.98      1.92      4.71       .30   1669.30
    1420.0       .0    1420.0        .0        .0     127.7        .0      42.2      17.8   1671.20
       .27       .03      11.12      .00       .065      .045      .000      .000   1668.20   9989.69
   .018645      275.      293.      285.         2         8         0       .00     30.61  10020.30


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    29SEP95      16:46:52                                                                          PAGE   36


                                                                                THIS RUN EXECUTED 29SEP95    16:46:54

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

  Version   4.6.2;  May 1991
 ************************************


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


 Wash 10,100-Yr Floodplai

 SUMMARY PRINTOUT TABLE  150
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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	.747	.00	.00	.00	1543.80	2010.00	1547.17	1547.12	1547.63	130.73	6.75	534.75	175.80
*	.747	.00	.00	.00	1543.80	2010.00	1547.49	1547.49	1548.73	213.71	9.26	246.61	137.49
*	.021	190.00	.00	.00	1546.60	2010.00	1550.27	1550.18	1550.71	175.82	6.98	468.90	151.59
*	.021	190.00	.00	.00	1546.60	2010.00	1551.29	1550.92	1552.37	176.81	8.64	241.18	151.16
*	.070	254.67	.00	.00	1549.50	2010.00	1553.72	1553.44	1553.99	179.91	.66	533.97	149.86
*	.070	254.67	.00	.00	1549.50	2010.00	1554.47	1553.89	1554.81	126.02	.67	478.82	179.05
	.129	315.49	.00	.00	1557.00	1700.00	1559.49	1559.29	1559.69	201.08	6.23	533.33	119.88
*	.129	315.49	.00	.00	1557.00	1700.00	1560.51	1560.51	1561.09	221.59	9.10	345.96	114.20
	.226	513.24	.00	.00	1566.20	1700.00	1569.19	1569.03	1569.58	175.48	8.15	411.14	128.33
	.226	513.24	.00	.00	1566.20	1700.00	1570.02	1569.66	1570.65	158.22	9.23	318.60	135.15
*	.277	265.70	.00	.00	1569.80	1700.00	1573.38	1573.38	1573.87	145.29	8.27	466.99	141.03
	.277	265.70	.00	.00	1569.80	1700.00	1574.14	1574.13	1575.42	185.48	10.78	227.14	124.83
*	.321	232.66	.00	.00	1572.80	1700.00	1577.68	1577.68	1578.14	107.57	8.01	501.80	163.91
*	.321	232.66	.00	.00	1572.80	1700.00	1578.25	1578.25	1579.48	164.49	10.83	250.78	132.55
*	.368	250.82	.00	.00	1577.20	1700.00	1581.51	1581.51	1582.09	269.47	7.49	295.19	103.56
	.368	250.82	.00	.00	1577.20	1700.00	1582.50	1581.74	1582.96	121.63	6.64	330.88	154.15
	.414	239.60	.00	.00	1582.90	1700.00	1586.57	1586.26	1586.80	145.44	6.67	496.04	140.97
*	.414	239.60	.00	.00	1582.90	1700.00	1587.07	1587.07	1587.89	300.97	10.96	266.59	97.99
*	.444	160.12	.00	.00	1587.70	1750.00	1589.28	1589.28	1589.64	68.34	4.90	369.89	211.69
*	.444	160.12	.00	.00	1587.70	1750.00	1589.31	1589.25	1589.66	61.32	4.78	366.41	223.48
	.454	49.74	.00	.00	1587.90	1900.00	1589.78	1589.48	1590.00	66.91	4.65	597.74	232.28
*	.454	49.74	.00	.00	1587.90	1900.00	1590.18	1590.18	1590.99	112.11	7.24	262.58	179.45

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29SEP95 16:46:52 PAGE 37

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	.551	516.47	.00	.00	1594.10	1890.00	1598.98	1598.98	1600.12	82.07	9.01	250.88	208.63
*	.551	516.47	.00	.00	1594.10	1890.00	1599.12	1599.12	1600.56	98.02	9.62	196.38	190.90
*	.567	82.30	.00	.00	1595.50	1890.00	1599.93	1598.53	1600.54	27.51	6.26	301.97	360.33
*	.567	82.30	.00	.00	1595.50	1890.00	1600.47	1598.53	1600.95	18.32	5.52	342.20	441.56
*	.642	400.00	.00	.00	1600.70	1890.00	1604.10	1604.10	1605.58	99.08	9.73	194.16	189.87
*	.642	400.00	.00	.00	1600.70	1890.00	1604.11	1604.11	1605.58	98.81	9.73	194.32	190.13
*	.734	486.51	.00	.00	1607.90	1890.00	1611.26	1611.26	1612.73	98.51	9.71	194.62	190.42
*	.734	486.51	.00	.00	1607.90	1890.00	1611.26	1611.26	1612.73	98.47	9.71	194.64	190.46
*	.829	499.88	.00	.00	1618.40	1890.00	1622.06	1622.06	1623.47	104.91	9.51	198.64	184.53
*	.829	499.88	.00	.00	1618.40	1890.00	1622.06	1622.06	1623.47	104.94	9.52	198.63	184.50
*	.838	46.26	.00	.00	1622.80	1890.00	1625.74	1625.74	1626.75	103.48	8.06	234.96	185.80
*	.838	46.26	.00	.00	1622.80	1890.00	1625.73	1625.73	1626.75	106.31	8.12	232.71	183.31
*	.851	71.26	.00	.00	1624.60	1890.00	1627.14	1627.14	1628.13	95.96	8.01	245.00	192.94
*	.851	71.26	.00	.00	1624.60	1890.00	1627.09	1627.09	1628.15	104.93	8.24	229.32	184.51
*	.895	232.15	.00	.00	1629.40	1890.00	1631.87	1631.87	1632.82	105.44	7.85	241.67	184.06
*	.895	232.15	.00	.00	1629.40	1890.00	1631.85	1631.85	1632.82	108.76	7.93	238.49	181.23
*	.949	284.12	.00	.00	1633.60	1890.00	1636.79	1636.79	1637.69	92.02	8.51	316.60	197.03
*	.949	284.12	.00	.00	1633.60	1890.00	1637.20	1637.20	1638.58	95.77	9.45	200.12	193.13
	1.002	278.57	.00	.00	1636.90	1890.00	1639.41	1639.40	1640.38	102.08	8.18	264.37	187.07
	1.002	278.57	.00	.00	1636.90	1890.00	1639.92	1639.52	1640.71	59.34	7.14	264.74	245.35

*	1.034	168.72	.00	.00	1637.50	1890.00	1642.03	1642.03	1643.21	76.05	9.23	270.85	216.73
*	1.034	168.72	.00	.00	1637.50	1890.00	1642.07	1642.07	1643.70	95.89	10.24	184.60	193.01
*	1.074	214.26	.00	.00	1640.50	1890.00	1644.99	1644.99	1646.14	57.85	9.22	305.73	248.[illegible]
*	1.074	214.26	.00	.00	1640.50	1890.00	1644.87	1644.87	1646.73	93.83	10.94	172.72	195.
*	1.096	113.64	.00	.00	1641.20	1890.00	1646.24	1646.24	1648.28	89.71	11.47	168.28	199.55
*	1.096	113.64	.00	.00	1641.20	1890.00	1646.19	1646.19	1648.29	95.17	11.64	162.32	193.74
*	1.108	66.20	.00	.00	1642.60	1430.00	1648.47	1644.53	1648.49	.41	1.38	1211.85	2245.55
*	1.108	66.20	.00	.00	1642.60	1430.00	1648.47	1644.51	1648.52	.70	1.81	832.73	1710.50
*	1.117	46.62	.00	.00	1643.10	1430.00	1648.34	1646.06	1648.55	18.75	4.03	468.24	330.21
*	1.117	46.62	.00	.00	1643.10	1430.00	1648.25	1646.05	1648.63	29.05	4.95	288.81	265.32
*	1.175	303.54	.00	.00	1650.40	1430.00	1653.63	1653.63	1654.36	165.66	7.45	239.40	111.10
*	1.175	303.54	.00	.00	1650.40	1430.00	1653.70	1653.70	1654.94	231.53	8.91	160.52	93.98
	1.247	381.10	.00	.00	1656.60	1430.00	1659.73	1659.35	1660.08	148.27	5.71	314.23	117.44
	1.247	381.10	.00	.00	1656.60	1430.00	1660.75	1660.39	1661.49	133.44	7.33	225.72	123.79

1

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	1.305	304.75	.00	.00	1661.60	1420.00	1665.50	1665.50	1666.40	167.70	8.17	217.62	109.65
*	1.305	304.75	.00	.00	1661.60	1420.00	1665.57	1665.57	1666.95	215.86	9.41	150.88	96.65
	1.337	172.96	.00	.00	1664.10	1420.00	1668.31	1667.70	1668.74	112.56	6.17	280.53	133.84
	1.337	172.96	.00	.00	1664.10	1420.00	1669.05	1668.56	1669.97	141.44	8.16	195.14	119.40
*	1.393	293.34	.00	.00	1668.20	1420.00	1672.92	1672.92	1673.83	107.57	8.59	232.49	136.91
	1.393	293.34	.00	.00	1668.20	1420.00	1673.06	1672.94	1674.98	186.45	11.12	127.70	103.99

1

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Wash 10,100-Yr Floodplai

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	.747	2010.00	1547.17	.00	.00	.00	548.72	.00
*	.747	2010.00	1547.49	.32	.00	.32	101.91	.00
*	.021	2010.00	1550.27	.00	3.10	.00	548.01	190.00
*	.021	2010.00	1551.29	1.02	3.80	1.02	77.51	190.00
*	.070	2010.00	1553.72	.00	3.45	.00	536.97	254.67
*	.070	2010.00	1554.47	.75	3.18	.75	242.01	254.67
	.129	1700.00	1559.49	.00	5.77	.00	700.58	315.49
*	.129	1700.00	1560.51	1.01	6.04	1.01	227.70	315.49
	.226	1700.00	1569.19	.00	9.70	.00	292.10	513.24
	.226	1700.00	1570.02	.83	9.51	.83	133.87	513.24
*	.277	1700.00	1573.38	.00	4.19	.00	443.84	265.70
	.277	1700.00	1574.14	.76	4.11	.76	81.60	265.70
*	.321	1700.00	1577.68	.00	4.31	.00	463.62	232.66
*	.321	1700.00	1578.25	.57	4.12	.57	95.21	232.66
*	.368	1700.00	1581.51	.00	3.83	.00	300.47	250.82
	.368	1700.00	1582.50	.99	4.25	.99	130.60	250.82

	.414	1700.00	1586.57	.00	5.05	.00	442.33	239.60
*	.414	1700.00	1587.07	.50	4.57	.50	139.09	239.60
*	.444	1750.00	1589.28	.00	2.71	.00	553.91	160.12
*	.444	1750.00	1589.31	.03	2.24	.03	426.91	160.12
	.454	1900.00	1589.78	.00	.51	.00	552.65	49.74
*	.454	1900.00	1590.18	.39	.87	.39	161.51	49.74
*	.551	1890.00	1598.98	.00	9.19	.00	107.12	516.47
*	.551	1890.00	1599.12	.14	8.94	.14	69.01	516.47
*	.567	1890.00	1599.93	.00	.95	.00	73.10	82.30
*	.567	1890.00	1600.47	.55	1.36	.55	73.11	82.30
*	.642	1890.00	1604.10	.00	4.18	.00	67.04	400.00
*	.642	1890.00	1604.11	.00	3.63	.00	67.05	400.00
*	.734	1890.00	1611.26	.00	7.16	.00	67.74	486.51
*	.734	1890.00	1611.26	.00	7.16	.00	67.74	486.51
*	.829	1890.00	1622.06	.00	10.80	.00	71.67	499.88
*	.829	1890.00	1622.06	.00	10.80	.00	71.67	499.88

1

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	.838	1890.00	1625.74	.00	3.68	.00	120.92	46.26
*	.838	1890.00	1625.73	-.02	3.66	-.02	115.66	46.26
*	.851	1890.00	1627.14	.00	1.40	.00	150.54	71.26
*	.851	1890.00	1627.09	-.05	1.37	-.05	110.63	71.26
*	.895	1890.00	1631.87	.00	4.73	.00	128.49	232.15
*	.895	1890.00	1631.85	-.02	4.76	-.02	125.25	232.15
*	.949	1890.00	1636.79	.00	4.92	.00	200.86	284.12
*	.949	1890.00	1637.20	.41	5.35	.41	73.32	284.12
	1.002	1890.00	1639.41	.00	2.62	.00	139.04	278.57
	1.002	1890.00	1639.92	.51	2.72	.51	103.23	278.57
*	1.034	1890.00	1642.03	.00	2.61	.00	129.11	168.72
*	1.034	1890.00	1642.07	.04	2.15	.04	58.01	168.72
*	1.074	1890.00	1644.99	.00	2.96	.00	163.55	214.26
*	1.074	1890.00	1644.87	-.12	2.80	-.12	46.41	214.26
*	1.096	1890.00	1646.24	.00	1.25	.00	50.53	113.64
*	1.096	1890.00	1646.19	-.05	1.32	-.05	38.71	113.64
*	1.108	1430.00	1648.47	.00	2.23	.00	322.39	66.20
*	1.108	1430.00	1648.47	.00	2.29	.00	155.26	66.20
*	1.117	1430.00	1648.34	.00	-.13	.00	189.15	46.62
*	1.117	1430.00	1648.25	-.09	-.22	-.09	60.43	46.62
*	1.175	1430.00	1653.63	.00	5.29	.00	165.57	303.54
*	1.175	1430.00	1653.70	.08	5.46	.08	66.41	303.54
	1.247	1430.00	1659.73	.00	6.10	.00	209.26	381.10
	1.247	1430.00	1660.75	1.02	7.05	1.02	95.10	381.10
*	1.305	1420.00	1665.50	.00	5.77	.00	132.59	304.75
*	1.305	1420.00	1665.57	.08	4.82	.08	54.75	304.75
	1.337	1420.00	1668.31	.00	2.81	.00	119.41	172.96
	1.337	1420.00	1669.05	.74	3.48	.74	63.01	172.96

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*      1.393   1420.00   1672.92       .00      4.61       .00    153.41    293.34
       1.393   1420.00   1673.06       .14      4.01       .14     30.61    293.34
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SUMMARY OF ERRORS AND SPECIAL NOTES

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NOTE    SECNO=       .747  PROFILE=  1  WSEL BASED ON X5 CARD
CAUTION SECNO=       .747  PROFILE=  2  CRITICAL DEPTH ASSUMED
NOTE    SECNO=       .747  PROFILE=  2  WSEL BASED ON X5 CARD

NOTE    SECNO=       .021  PROFILE=  1  WSEL BASED ON X5 CARD
NOTE    SECNO=       .021  PROFILE=  2  WSEL BASED ON X5 CARD

NOTE    SECNO=       .070  PROFILE=  1  WSEL BASED ON X5 CARD
NOTE    SECNO=       .070  PROFILE=  2  WSEL BASED ON X5 CARD

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    29SEP95      16:46:52                                                    PAGE   43


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1
    29SEP95      16:46:52                                                    PAGE   44


 FLOODWAY DATA,   Wash 10,100-Yr Floodplai
 PROFILE NO.  2

              ------- FLOODWAY -------       WATER SURFACE ELEVATION
```

STATION	WIDTH	SECTION AREA	MEAN VELOCITY	WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
.747	102.	247.	8.2	1547.5	1547.2	.3
.021	78.	241.	8.3	1551.3	1550.3	1.0
.070	242.	479.	4.2	1554.5	1553.7	.8
.129	228.	346.	4.9	1560.5	1559.5	1.0
.226	134.	319.	5.3	1570.0	1569.2	.8
.277	82.	227.	7.5	1574.2	1573.4	.8
.321	95.	251.	6.8	1578.3	1577.7	.6
.368	131.	331.	5.1	1582.5	1581.5	1.0
.414	139.	267.	6.4	1587.1	1586.6	.5
.444	427.	366.	4.8	1589.3	1589.3	.0
.454	162.	263.	7.2	1590.2	1589.8	.4
.551	69.	196.	9.6	1599.1	1599.0	.1
.567	73.	342.	5.5	1600.4	1599.9	.5
.642	67.	194.	9.7	1604.1	1604.1	.0
.734	68.	195.	9.7	1611.3	1611.3	.0
.829	72.	199.	9.5	1622.1	1622.1	.0
.838	116.	233.	8.1	1625.7	1625.7	.0
.851	111.	229.	8.2	1627.1	1627.1	.0
.895	125.	238.	7.9	1631.9	1631.9	.0
.949	73.	200.	9.4	1637.2	1636.8	.4
1.002	103.	265.	7.1	1639.9	1639.4	.5
1.034	58.	185.	10.2	1642.0	1642.0	.0
1.074	46.	173.	10.9	1644.9	1645.0	-.1
1.096	39.	162.	11.6	1646.1	1646.2	-.1
1.108	155.	833.	1.7	1648.5	1648.5	.0
1.117	60.	289.	5.0	1648.2	1648.3	-.1
1.175	66.	161.	8.9	1653.7	1653.6	.1
1.247	95.	226.	6.3	1660.7	1659.7	1.0
1.305	55.	151.	9.4	1665.6	1665.5	.1
1.337	63.	195.	7.3	1669.0	1668.3	.7
1.393	31.	128.	11.1	1673.0	1672.9	.1

WASH 10
HEC-2 ANALYSIS
Flow Split at Forest Rd.

```
1*****************************************
 *  HEC-2 WATER SURFACE PROFILES          *
 *                                        *
 *  Version   4.6.2;  May 1991            *
 *                                        *
 *  RUN DATE    12SEP95    TIME   09:30:12 *
 *****************************************
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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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1
   12SEP95      09:30:13                                                    PAGE    1


                                                        THIS RUN EXECUTED 12SEP95    09:30:13
 ************************************
  HEC-2 WATER SURFACE PROFILES

  Version   4.6.2;  May 1991
 ************************************



 SPLIT FLOW BEING PERFORMED


 SFSplit Flow Option Used


 JC  Qweir by Rating Curve, Length varies w/depth, C=2.4 (adjusted for ground)
 JP     0       0       0      -1      +0

 TC  Split flow just u/s of Forest Road toward Wash 11
 CS     5   0.454   0.454      -1
 CR    66  1589.4   181.8  1589.9   372.5  1590.4   647.2  1590.9  1014.3  1591.4


 JC  Qweir by Rating Curve, Weir Length =  28 ft  Coeff = 2.63
 JP     0       0       0      -1      +0

 TC  Split flow on Forest Rd.    toward Wash 11
 CS     5   0.444   0.444      -1
 CR   8.3  1588.5    34.6    1589    71.0  1589.5   115.3    1590   166.2  1590.5

1
   12SEP95      09:30:13                                                    PAGE    2


 T1   *  Rio Verde South FIS, Wash 10, Split Flow Analysis  File:W10SPLIT.IH2
```

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T2   *  For: FCDMC #       93-07     By: MKE, Ltd. FB, EEK & CLJ 8-23-94
T3   *  Wash 10,100-Yr Floodplain                        Revised:  9-8-95
T4   *  GR data taken from stereo model; received from AMC
T5   *  200 scale 2 ft CI mapping flown by AMC on 12-22-93 & 8-22-94
T6   *  with survey control by Burgess & Niple on 10-21-93;11-9-93;12-9-93
T7   *  supplemental cross section data (GR & BT) surveyed by ALS as noted.
T8   *  Source of 100-Yr flowrate from HEC-1 Analysis by GVSCE. Table F-3
T9   *                              Subcritical analysis.
T9   *
T9   *  HEC-2 Analysis for split flow at Forest Rd.

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0         2         0         0        -1         0         0         0      1570         0

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      1         0        -1         0         0         0        -1         0         0         0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    150       115       200

QT        2      1910      1910

NC      .07       .07      .045        .1        .3

X1    0.226        83   10566.6   10582.8       505       540    513.24                                  15
X2          1568.23
X3       10                      10364.7                 10656.8
GR  1568.8    9561.7    1568.6    9605.0    1567.4    9639.3    1567.4    9671.1    1567.0    9707.8
GR  1565.3    9746.5    1565.3    9759.9    1566.0    9797.8    1565.8    9819.6    1566.0    9825.1
GR  1565.0    9830.4    1565.6    9844.8    1565.7    9862.3    1565.6    9875.3    1564.6    9878.0
GR  1565.3    9885.0    1566.3    9891.0    1566.1    9908.8    1566.5    9938.7    1566.3    9967.8
GR  1566.7    9988.6    1566.0    9996.1    1565.0   10000.0    1565.1   10009.7    1566.8   10012.6
GR  1567.0   10032.6    1566.7   10064.5    1566.7   10097.6    1566.9   10122.5    1566.3   10140.0
GR  1566.5   10153.9    1566.4   10164.1    1566.0   10173.2    1565.7   10179.4    1566.7   10191.4
GR  1567.3   10210.6    1567.9   10232.8    1567.9   10251.5    1567.7   10261.1    1568.2   10280.2
GR  1568.5   10304.1    1568.0   10305.5    1568.6   10317.5    1568.4   10337.2    1568.8   10364.7
GR  1568.5   10372.1    1568.4   10396.8    1568.4   10421.6    1567.8   10451.7    1568.0   10488.6
GR  1568.0   10516.9    1567.6   10541.0    1566.2   10546.2    1567.8   10552.8    1567.7   10566.6
GR  1566.2   10568.1    1566.3   10580.1    1568.1   10582.8    1567.7   10598.9    1566.7   10605.5
GR  1566.6   10617.7    1567.1   10625.8    1566.6   10629.4    1568.0   10639.4    1568.4   10656.8
GR  1567.9   10668.1    1565.9   10675.1    1566.0   10682.3    1567.5   10690.1    1567.9   10706.0
GR  1567.3   10715.7    1565.4   10719.6    1565.6   10729.8    1567.0   10740.8    1568.0   10752.5
GR  1568.3   10784.5    1568.2   10816.7    1568.5   10856.9    1569.0   10904.7    1569.8   10943.8
GR  1569.6   10984.8    1569.4   11035.5    1569.3   11040.2       0.0       0.0       0.0       0.0

1
   12SEP95      09:30:13                                                                  PAGE    3


          Last Ground Point changed from Elevation 1572.9 to 1573.1
             to reflect highpoint at end of cross section
X1    0.277        76   10569.1   10594.7       145       145    152.7
X3       10                      10409.3
GR  1573.2    9575.6    1572.7    9603.9    1571.7    9653.0    1571.2    9693.9    1571.3    9727.7
GR  1570.6    9744.6    1570.0    9759.6    1570.9    9765.4    1571.1    9784.1    1570.4    9799.5
GR  1568.3    9815.8    1570.5    9832.9    1570.9    9856.7    1569.8    9871.9    1569.7    9873.9
GR  1570.9    9881.6    1569.6    9889.4    1570.9    9896.5    1570.8    9911.2    1570.6    9924.3
GR  1569.9    9931.5    1571.1    9942.5    1571.0    9962.3    1571.1    9981.0    1570.9    9992.9
GR  1569.3    9995.6    1569.2   10000.0    1569.4   10008.2    1570.8   10013.2    1571.4   10034.0
GR  1571.5   10072.6    1572.1   10106.6    1572.1   10127.2    1571.6   10148.7    1572.1   10175.1
```

GR	1572.6	10204.9	1573.0	10239.6	1573.5	10287.7	1573.6	10318.5	1572.9	10338.3
GR	1573.6	10357.7	1573.4	10364.1	1573.2	10379.5	1572.8	10392.5	1573.4	10409.3
GR	1572.5	10433.1	1572.5	10438.7	1573.0	10450.3	1572.9	10469.6	1572.7	10490.2
GR	1573.0	10513.3	1572.7	10537.1	1572.5	10556.9	1571.9	10569.1	1569.8	10570.0
GR	1569.9	10577.2	1570.1	10589.3	1571.8	10594.7	1572.3	10606.6	1572.5	10623.4
GR	1571.8	10629.5	1570.6	10632.6	1572.2	10638.1	1570.7	10647.2	1571.2	10652.1
GR	1572.4	10654.4	1572.4	10665.4	1572.0	10680.7	1572.4	10704.5	1572.3	10723.6
GR	1572.0	10738.5	1572.5	10756.4	1572.4	10786.1	1572.3	10819.4	1572.9	10844.3
GR	1573.5	10856.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Extend Cross Section on left (north) side to contain flows

X1	0.321	64	10602.4	10623.9	215	220	232.66			
X3	10			10368.8						
X4	1	1573.9	9670.1							
GR	1576	9580	1573.9	9676.9	1573.0	9694.5	1572.9	9707.1	1572.9	9721.3
GR	1573.6	9741.7	1573.6	9771.5	1573.0	9798.1	1573.3	9818.3	1573.7	9839.2
GR	1573.6	9854.0	1572.4	9858.5	1574.0	9873.0	1574.8	9888.6	1574.7	9922.1
GR	1574.5	9956.6	1574.7	9981.5	1573.9	9994.8	1572.6	10000.0	1573.0	10011.0
GR	1574.5	10021.5	1574.7	10037.0	1573.9	10047.5	1573.4	10057.1	1575.0	10065.3
GR	1575.2	10092.5	1575.4	10117.9	1575.0	10147.3	1574.6	10170.7	1573.7	10189.3
GR	1575.8	10203.3	1576.5	10224.1	1576.8	10258.2	1576.8	10294.4	1577.2	10338.3
GR	1577.4	10368.8	1577.3	10390.1	1576.5	10396.3	1577.4	10399.4	1577.1	10419.3
GR	1577.4	10447.6	1576.9	10476.1	1576.7	10506.4	1576.4	10542.8	1576.4	10563.8
GR	1575.5	10585.7	1576.7	10597.7	1576.6	10602.4	1572.8	10608.7	1572.9	10611.4
GR	1573.3	10621.4	1576.1	10623.9	1576.6	10640.5	1576.7	10661.7	1574.2	10665.5
GR	1574.3	10670.7	1576.5	10678.7	1576.9	10701.6	1576.5	10742.3	1577.0	10788.1
GR	1577.8	10839.9	1578.0	10890.8	1578.5	10936.3	1578.3	10949.1	0.0	0.0

X1	0.368	64	10709.2	10746.2	235	220	250.82			
X3	10			10451.2		10823				
GR	1581.0	9746.5	1581.1	9778.0	1580.7	9805.9	1580.5	9808.8	1579.9	9817.4
GR	1580.5	9828.3	1580.0	9841.0	1579.7	9875.4	1579.2	9915.4	1579.3	9944.8
GR	1579.2	9970.3	1578.9	9990.1	1577.9	9998.1	1578.0	10000.0	1578.1	10005.3
GR	1579.8	10010.2	1579.9	10030.7	1578.0	10034.0	1579.9	10040.7	1579.8	10069.2
GR	1579.9	10104.2	1580.0	10134.7	1579.6	10140.6	1580.4	10150.2	1580.1	10170.1

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GR	1579.5	10182.5	1579.4	10191.3	1579.6	10197.6	1578.6	10202.2	1579.8	10204.1
GR	1579.9	10228.5	1581.2	10267.1	1581.2	10303.4	1580.8	10346.6	1580.9	10384.5
GR	1581.8	10428.9	1581.9	10451.2	1581.6	10481.8	1581.2	10513.7	1581.3	10546.8
GR	1581.4	10578.1	1580.9	10587.0	1579.3	10595.3	1580.9	10606.3	1579.8	10611.0
GR	1577.4	10615.6	1577.2	10630.3	1580.8	10638.9	1580.5	10651.6	1578.1	10655.8
GR	1580.5	10662.6	1581.0	10675.6	1581.3	10689.6	1581.0	10709.2	1580.3	10727.9
GR	1578.1	10733.2	1578.6	10739.3	1580.5	10746.2	1580.7	10759.5	1581.1	10778.5
GR	1582.1	10804.5	1582.9	10823.0	1582.5	10849.1	1582.1	10871.3	0.0	0.0

X1	0.414	71	10737.5	10750.6	245	230	239.6			
X3	10			10503.3		10954.7				
GR	1585.9	9730.0	1586.3	9749.5	1587.3	9781.3	1587.3	9804.6	1586.8	9822.5
GR	1586.2	9839.7	1586.8	9866.8	1586.8	9888.2	1586.3	9912.2	1585.7	9935.2
GR	1584.8	9956.4	1584.6	9978.5	1583.2	9994.2	1581.5	9997.7	1581.8	10000.0
GR	1583.7	10010.8	1584.0	10026.0	1585.0	10051.3	1585.0	10066.3	1585.0	10083.7
GR	1585.3	10116.0	1585.5	10148.9	1585.6	10161.0	1584.5	10164.2	1584.4	10172.4
GR	1585.7	10184.7	1585.5	10201.0	1585.6	10230.2	1586.5	10271.8	1586.7	10317.3
GR	1586.7	10334.8	1586.2	10383.1	1586.1	10423.2	1585.9	10446.8	1585.7	10460.7
GR	1584.1	10470.2	1585.6	10484.8	1586.5	10503.3	1586.2	10519.5	1585.2	10528.1
GR	1583.3	10535.8	1582.9	10548.3	1585.3	10548.9	1585.5	10560.9	1586.0	10575.4
GR	1585.6	10585.2	1585.3	10592.4	1585.9	10615.3	1585.6	10646.7	1585.5	10677.6
GR	1583.3	10683.7	1583.5	10688.3	1585.3	10699.4	1585.4	10720.0	1585.4	10737.5
GR	1583.9	10740.4	1584.0	10745.9	1585.1	10750.6	1585.5	10765.4	1585.2	10800.1
GR	1585.0	10813.1	1585.4	10826.7	1584.2	10830.6	1584.5	10832.8	1586.2	10850.7
GR	1585.9	10878.1	1586.0	10904.5	1586.3	10927.2	1586.7	10954.7	1586.3	10981.4
GR	1586.0	10995.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

```
NC      .022        .022        .022

          Forest Rd. Crossing
X1    0.444         35    10352.1      10779         130         158      160.12
X3                                     10352.1
GR    1587.1      9682.0    1587.4     9724.8      1587.8      9761.2      1587.9      9797.1      1587.7      9837.3
GR    1587.0      9873.7    1586.2     9910.1      1585.2      9949.5      1584.6      9977.1      1584.6      9999.6
GR    1584.7     10000.0    1585.0    10036.0      1586.0     10081.1      1586.6     10137.4      1586.5     10173.2
GR    1586.8     10206.3    1587.7    10255.2      1588.5     10298.9      1588.6     10312.0      1588.7     10352.1
GR    1588.5     10394.8    1588.5    10438.4      1588.4     10479.6      1588.1     10529.6      1587.8     10568.9
GR    1587.7     10598.5    1588.5    10637.9      1588.7     10679.4      1588.8     10687.0      1589.0     10734.9
GR    1589.2     10779.0    1589.0    10829.6      1589.2     10881.4      1589.4     10943.9      1589.4     10945.0

                  Q=C543 + 10 cfs to account for additional drainage area
                                between C543 and Forest Rd.

QT          2        1900        1900

NC      0.055         .05         .03         0.1         0.3

1
    12SEP95       09:30:13                                                                                    PAGE    5


          Q=C543 + 10 cfs to account for additional drainage area
                          between C543 and Forest Rd.
X1      .454          55    10569.9     10731.4          50          50       49.74
X3        10                                 10293
GR    1590.9      9761.0    1590.8     9779.7      1590.6      9803.2      1589.5      9824.2      1588.9      9854.7
GR    1588.3      9883.2    1587.8     9911.8      1587.2      9929.8      1586.8      9951.2      1585.3      9963.3
GR    1585.2      9986.1    1585.0    10000.0      1585.1     10011.8      1587.5     10027.4      1587.7     10046.6
GR    1586.7     10051.4    1586.8    10065.8      1588.4     10070.4      1588.4     10089.4      1588.3     10106.5
GR    1587.9     10114.8    1587.1    10120.7      1587.1     10127.3      1588.5     10132.2      1588.7     10153.9
GR    1588.5     10176.5    1587.0    10183.8      1588.3     10194.2      1588.0     10204.0      1588.0     10230.0
GR    1588.5     10271.2    1589.4    10293.0      1589.0     10323.5      1588.3     10356.2      1588.2     10401.9
GR    1588.6     10448.3    1588.7    10483.8      1588.4     10513.7      1588.6     10541.4      1588.7     10569.9
GR    1588.3     10601.3    1587.9    10617.1      1588.1     10651.4      1588.8     10680.5      1589.1     10708.0
GR    1589.7     10731.4    1589.5    10749.9      1589.0     10773.1      1589.2     10798.8      1588.8     10827.7
GR    1590.0     10849.6    1590.6    10862.9      1590.9     10894.4      1591.0     10924.4      1590.9     10928.1


                  HEC-1 Concentration Point C543


QT          2        1890        1890

          START Hydraulically Similar Reach 10B
          HEC-1 Concentration Point C543
X1    0.551         12     9965.7     10034.7         515         515      516.47
X3       10                                  9944.6                 10058.3
GR    1598.9      9944.6    1596.3     9961.7      1598.9      9965.7      1598.7      9974.1      1594.8      9981.5
GR    1594.1      9999.9    1594.1    10000.0      1594.4     10014.8      1598.8     10020.9      1599.1     10034.7
GR    1595.9     10038.8    1599.1    10058.3

          Cross section 0.567 has been added in order to include the end
          of the channel wall which contains flow in the wash. The
          information was obtained from topo data.


          Cross section 0.567 has been added in order to include the end
          of the channel wall which contains flow in the wash. The
          information was obtained from topo data.
X1    0.567          9     9957.3     10030.4          90          90       82.3
GR    1600.7      9896.4      1600      9930.7        1600      9957.3        1596      9957.4        1596      9969.7
GR    1595.5       10000      1596     10030.3        1600     10030.4        1602     10090.7
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X1    0.642        39     9957.9    10029.2        410        390        400
GR   1610.7    9747.6    1611.6     9759.7     1612.3     9772.8     1611.4     9787.4     1610.4     9798.9
GR   1609.2    9812.7    1609.3     9823.9     1609.8     9838.6     1610.6     9854.8     1611.0     9862.2
GR   1611.4    9870.6    1611.0     9890.3     1608.1     9904.1     1607.7     9916.0     1605.9     9924.6
GR   1605.0    9932.3    1606.6     9941.7     1607.2     9951.4     1607.2     9957.9     1601.6     9960.6
GR   1600.9    9998.0    1600.7    10000.0     1601.2    10024.0     1607.4    10029.2     1607.5    10038.0
GR   1608.7   10048.8    1609.1    10058.1     1607.9    10066.5     1607.7    10146.7     1607.5    10169.5
GR   1607.2   10173.1    1607.5    10184.9     1607.2    10196.1     1607.6    10213.5     1606.9    10233.0
GR   1606.2   10248.4    1607.2    10262.7     1607.2    10294.5     1606.6    10312.1       0.0       0.0
1
    12SEP95      09:30:13                                                                          PAGE     6



1
    12SEP95      09:30:13                                                                          PAGE     7

     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

 CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

 CCHV=     .100 CEHV=     .300
 *SECNO  .226
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=    10364.7   10656.8  TYPE=      1  TARGET=      292.100
       .226      2.85   1569.05   1569.05   1568.23   1569.56       .51       .00       .00   1567.70
     1698.9     743.6     384.9     570.4     207.5      41.8     118.1        .0        .0   1568.10
        .00      3.58      9.22      4.83      .070      .045      .070      .000   1566.20  10364.70
    .024193      505.      513.      540.         0        13         0       .00    292.10  10656.80


 FLOW DISTRIBUTION FOR SECNO=       .23          CWSEL=   1569.05

 STA=   10365.   10422.   10452.   10489.   10517.   10541.   10546.   10553.   10567.   10583.   10599.   10606.   10618.
   PER Q=     4.7      5.4      9.1      6.0      6.8      3.5      4.2      4.2     22.7      4.0      3.6     10.2
    AREA=    33.9     28.6     42.4     29.7     30.1     11.2     13.5     17.9     41.8     18.5     12.2     29.3
     VEL=     2.4      3.2      3.6      3.4      3.8      5.4      5.2      3.9      9.2      3.6      4.9      5.9
   DEPTH=      .6      1.0      1.2      1.1      1.3      2.2      2.1      1.3      2.6      1.2      1.9      2.4

 STA=   10618.   10626.   10639.   10657.
   PER Q=     5.9      7.5      2.5
    AREA=    17.8     25.4     14.8
     VEL=     5.6      5.0      2.9
   DEPTH=     2.2      1.9       .9

 *SECNO  .277
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=    10409.3   10856.2  TYPE=      1  TARGET=   -10409.300
          Last Ground Point changed from Elevation 1572.9 to 1573.1
             to reflect highpoint at end of cross section
       .277      3.61   1573.41   1573.41       .00   1573.87       .46      2.61       .01   1571.90
     1698.9     196.2     661.4     841.3     101.9      82.4     296.5       1.4       1.2   1571.80
        .01      1.93      8.02      2.84      .070      .045      .070      .000   1569.80  10409.30
    .013497      145.      153.      145.         0        11         0       .00    445.07  10854.37
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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 .321
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 10368.8 10949.1 TYPE= 1 TARGET= -10368.800
Extend Cross Section on left (north) side to contain flows

.321	4.87	1577.67	1577.67	.00	1578.14	.47	2.73	.00	1576.60
1698.9	477.0	687.1	534.8	204.3	84.9	206.5	3.9	3.5	1576.10
.02	2.33	8.10	2.59	.070	.045	.070	.000	1572.80	10368.80
.011043	215.	233.	220.	0	16	0	.00	462.76	10831.56

*SECNO .368
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 10451.2 10823.0 TYPE= 1 TARGET= 371.800

.368	3.42	1581.52	1581.52	.00	1582.09	.57	3.87	.03	1581.00
1698.9	1168.0	458.1	72.8	210.3	61.6	26.5	6.0	5.5	1580.50
.03	5.55	7.43	2.75	.070	.045	.070	.000	1578.10	10487.91
.026350	235.	251.	220.	0	9	0	.00	301.59	10789.51

*SECNO .414
3280 CROSS SECTION .41 EXTENDED .56 FEET

3470 ENCROACHMENT STATIONS= 10503.3 10954.7 TYPE= 1 TARGET= 451.400

.414	2.66	1586.56	1586.26	.00	1586.79	.23	4.67	.03	1585.40
1698.9	1023.6	196.8	478.4	290.1	29.3	173.3	8.2	7.6	1585.10
.05	3.53	6.71	2.76	.070	.045	.070	.000	1583.90	10503.30
.014776	245.	240.	230.	5	20	0	.00	441.82	10945.12

*SECNO .444
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 10352.1 10945.0 TYPE= 1 TARGET= -10352.100
Forest Rd. Crossing

.444	4.67	1589.27	1589.27	.00	1589.65	.38	1.49	.04	1588.70
1753.2	.0	1722.0	31.1	.0	347.2	18.3	9.7	9.3	1589.20
.06	.00	4.96	1.70	.000	.022	.022	.000	1584.60	10352.10
.007113	130.	160.	158.	0	18	0	.00	551.42	10903.52

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

CCHV= .100 CEHV= .300
*SECNO .454

3470 ENCROACHMENT STATIONS= 10293.0 10928.1 TYPE= 1 TARGET= -10293.000
Q=C543 + 10 cfs to account for additional drainage area

between C543 and Forest Rd.

.454	4.79	1589.79	1589.56	.00	1590.00	.21	.34	.02	1588.70
1900.0	858.7	924.4	116.8	336.3	200.1	65.7	10.2	10.0	1589.70
.06	2.55	4.62	1.78	.055	.030	.050	.000	1585.00	10293.00
.006542	50.	50.	50.	3	8	0	.00	552.79	10845.79

*SECNO .551
3280 CROSS SECTION .55 EXTENDED .08 FEET

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9944.6 10058.3 TYPE= 1 TARGET= 113.700
START Hydraulically Similar Reach 10B
HEC-1 Concentration Point C543

.551	5.08	1599.18	1599.18	.00	1600.13	.95	3.49	.22	1598.90
1890.0	98.7	1656.7	134.6	33.4	200.7	39.7	15.4	13.9	1599.10
.08	2.96	8.26	3.39	.055	.030	.050	.000	1594.10	9944.60
.007005	515.	516.	515.	0	10	0	.00	113.70	10058.30

*SECNO .567

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.58

Cross section 0.567 has been added in order to include the end
of the channel wall which contains flow in the wash. The
information was obtained from topo data.

.567	4.39	1599.89	1598.53	.00	1600.51	.62	.35	.03	1600.00
1890.0	.0	1890.0	.0	.0	299.9	.0	16.0	14.1	1600.00
.09	.00	6.30	.00	.000	.030	.000	.000	1595.50	9957.30
.002813	90.	82.	90.	2	14	0	.00	73.09	10030.40

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

*SECNO .642

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

.642	3.41	1604.11	1604.11	.00	1605.58	1.47	1.91	.26	1607.20
1890.0	.0	1890.0	.0	.0	194.3	.0	18.2	14.7	1607.40
.10	.00	9.73	.00	.000	.030	.000	.000	1600.70	9959.39
.009883	410.	400.	390.	0	15	0	.00	67.05	10026.44

1
12SEP95 09:30:13 PAGE 11

TC Split flow just u/s of Forest Road toward Wash 11

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
156.82	156.83	.01	156.82	156.83	.01	5	1589.792	1589.792	.454	.454

TC Split flow on Forest Rd. toward Wash 11

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
54.33	54.31	.03	211.15	211.14	.00	5	1589.271	1589.271	.444	.444

1

THIS RUN EXECUTED 12SEP95 09:30:19

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

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

Wash 10,100-Yr Floodplai

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	.226	.00	.00	.00	1566.20	1698.85	1569.05	1569.05	1569.56	241.93	9.22	367.32	109.22
*	.277	152.70	.00	.00	1569.80	1698.85	1573.41	1573.41	1573.87	134.97	8.02	480.82	146.23
*	.321	232.66	.00	.00	1572.80	1698.85	1577.67	1577.67	1578.14	110.43	8.10	495.70	161.66
*	.368	250.82	.00	.00	1578.10	1698.85	1581.52	1581.52	1582.09	263.50	7.43	298.39	104.66
	.414	239.60	.00	.00	1583.90	1698.85	1586.56	1586.26	1586.79	147.76	6.71	492.80	139
*	.444	160.12	.00	.00	1584.60	1753.18	1589.27	1589.27	1589.65	71.13	4.96	365.50	207.87
	.454	49.74	.00	.00	1585.00	1900.00	1589.79	1589.56	1590.00	65.42	4.62	602.13	234.91
*	.551	516.47	.00	.00	1594.10	1890.00	1599.18	1599.18	1600.13	70.05	8.26	273.69	225.82
*	.567	82.30	.00	.00	1595.50	1890.00	1599.89	1598.53	1600.51	28.13	6.30	299.88	356.34
*	.642	400.00	.00	.00	1600.70	1890.00	1604.11	1604.11	1605.58	98.83	9.73	194.32	190.12

1

Wash 10,100-Yr Floodplai

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	.226	1698.85	1569.05	.00	.00	.82	292.10	.00
*	.277	1698.85	1573.41	.00	4.36	.00	445.07	152.70
*	.321	1698.85	1577.67	.00	4.26	.00	462.76	232.66
*	.368	1698.85	1581.52	.00	3.85	.00	301.59	250.82
	.414	1698.85	1586.56	.00	5.04	.00	441.82	239.60
*	.444	1753.18	1589.27	.00	2.71	.00	551.42	160.12

	.454	1900.00	1589.79	.00	.52	.00	552.79	49.74
*	.551	1890.00	1599.18	.00	9.39	.00	113.70	516.47
*	.567	1890.00	1599.89	.00	.71	.00	73.09	82.30
*	.642	1890.00	1604.11	.00	4.21	.00	67.05	400.00

1

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SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= .226 PROFILE= 1 CRITICAL DEPTH ASSUMED

CAUTION SECNO= .277 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= .277 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= .321 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= .321 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= .368 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= .368 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= .444 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= .444 PROFILE= 1 MINIMUM SPECIFIC ENERGY

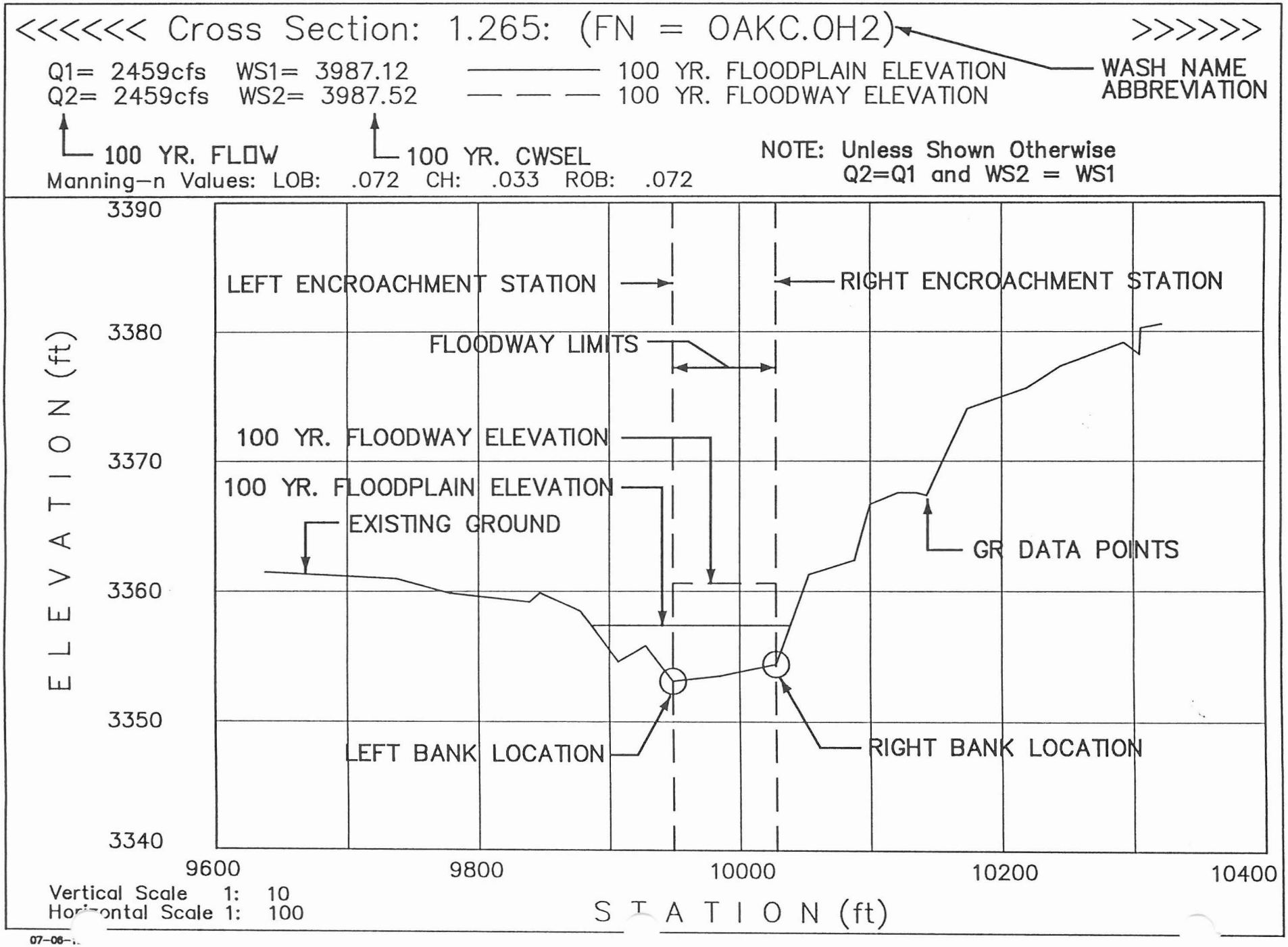
CAUTION SECNO= .551 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= .551 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= .567 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= .642 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= .642 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CROSS SECTIONS

CROSS SECTION LEGEND

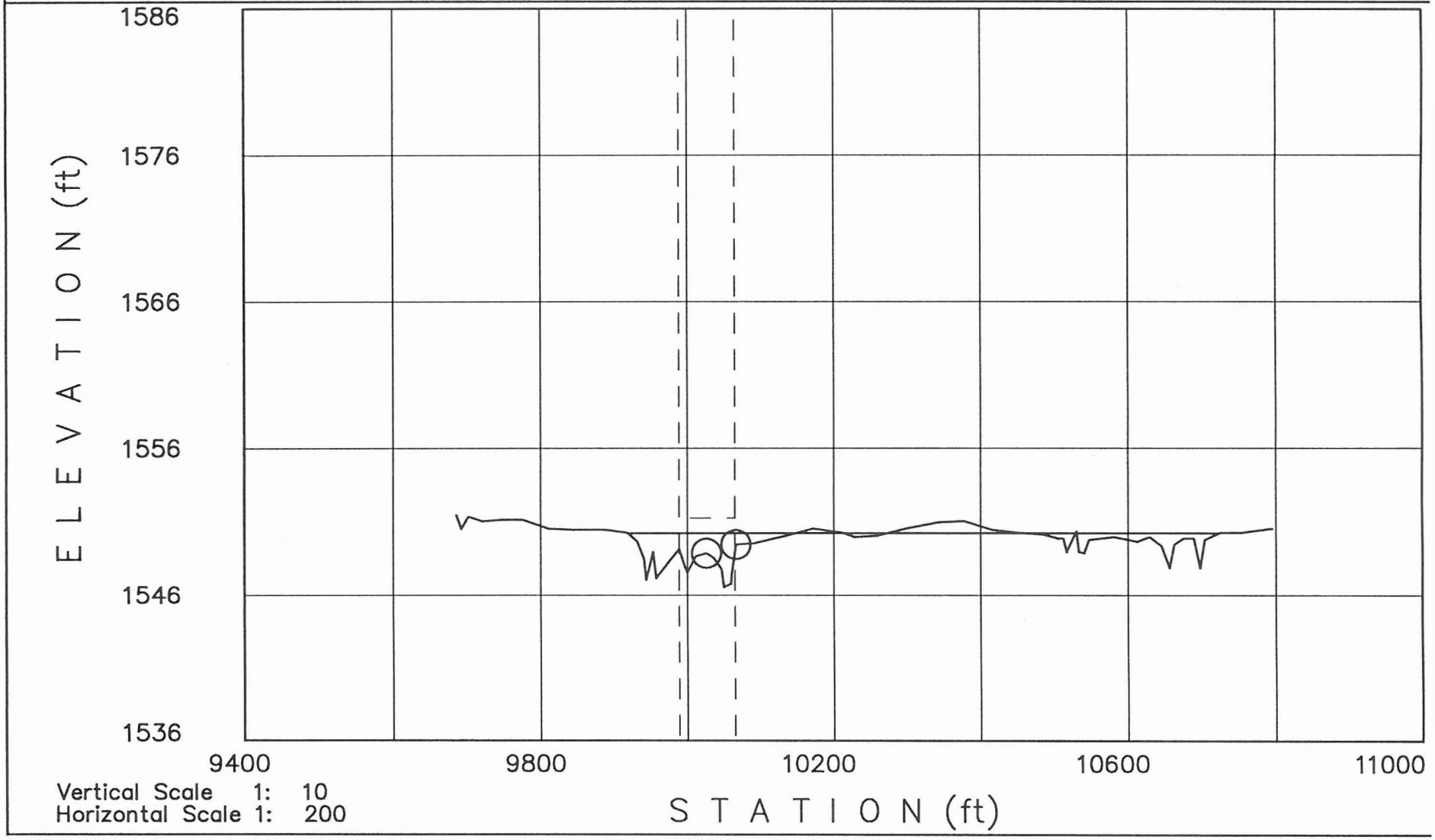


07-08-

<<<<<< Cross Section: .021: (FN = W10FW1.0H2) >>>>>>

Q1= 2010cfs WS1= 1550.27
Q2= 2010cfs WS2= 1551.29

Manning-n Values: LOB: .05 - .061 CH: .049 - .05 ROB: 0 - .07



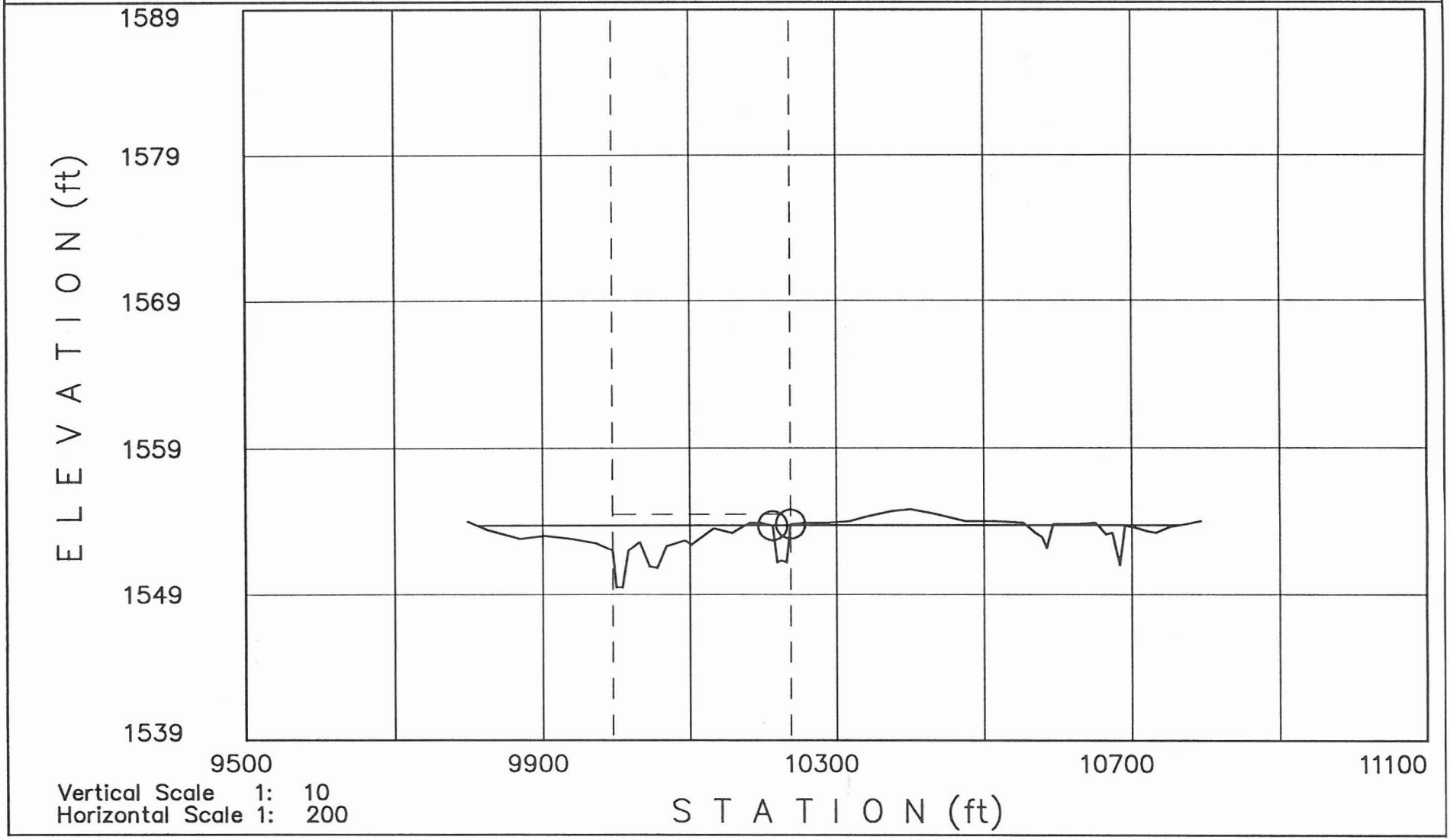
Vertical Scale 1: 10
Horizontal Scale 1: 200

09-13-1995

<<<<<< Cross Section: .07: (FN = W10FW1.0H2) >>>>>>

Q1= 2010cfs WS1= 1553.72
Q2= 2010cfs WS2= 1554.47

Manning-n Values: LOB: .063 CH: .45 ROB: 0 - .07



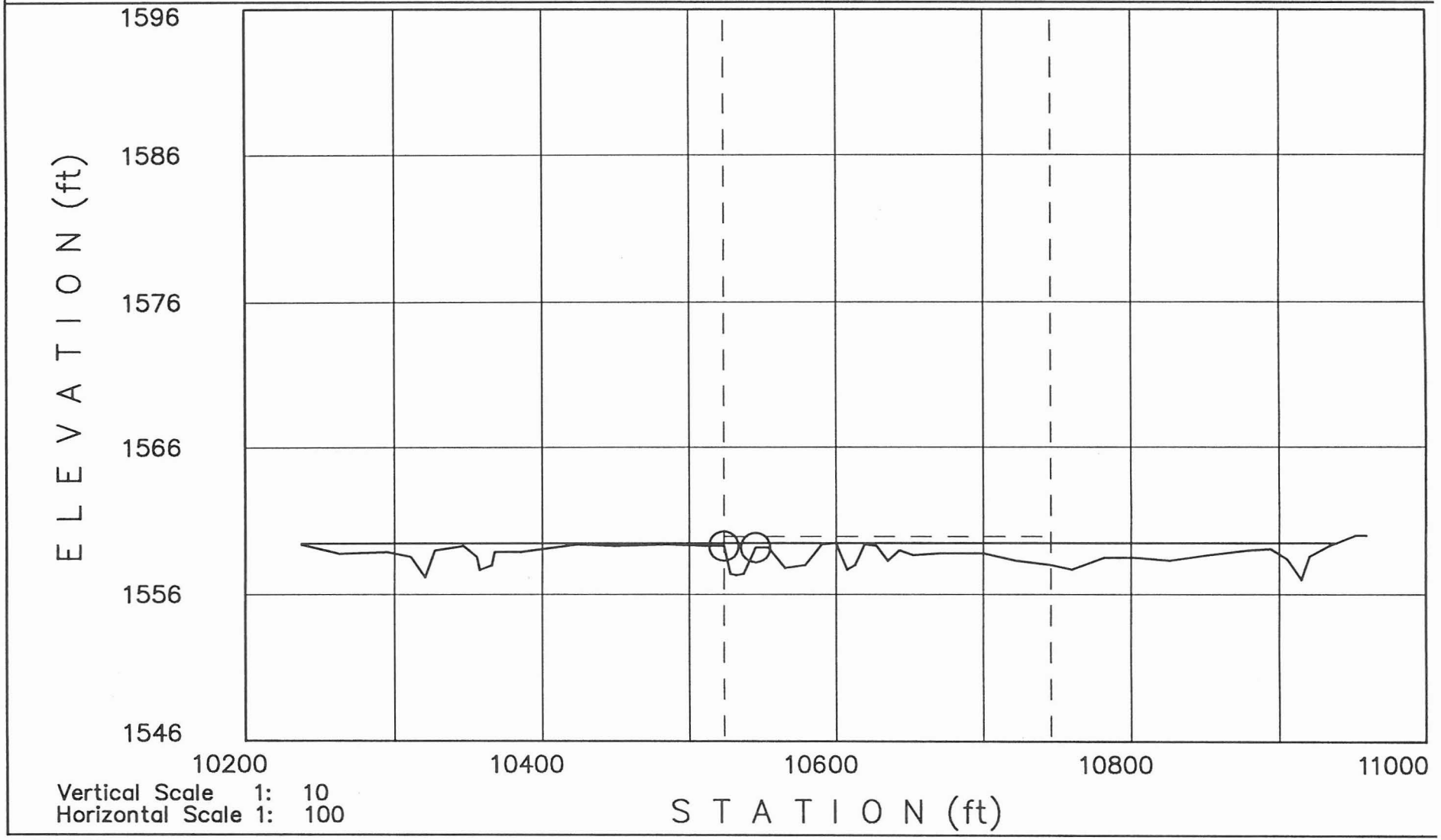
Vertical Scale 1: 10
Horizontal Scale 1: 200

09-13-1995

<<<<<< Cross Section: .129: (FN = W10FW1.0H2) >>>>>>

Q1= 1700cfs WS1= 1559.49
Q2= 1700cfs WS2= 1559.95

Manning-n Values: LOB: 0 - .07 CH: .045 ROB: .07



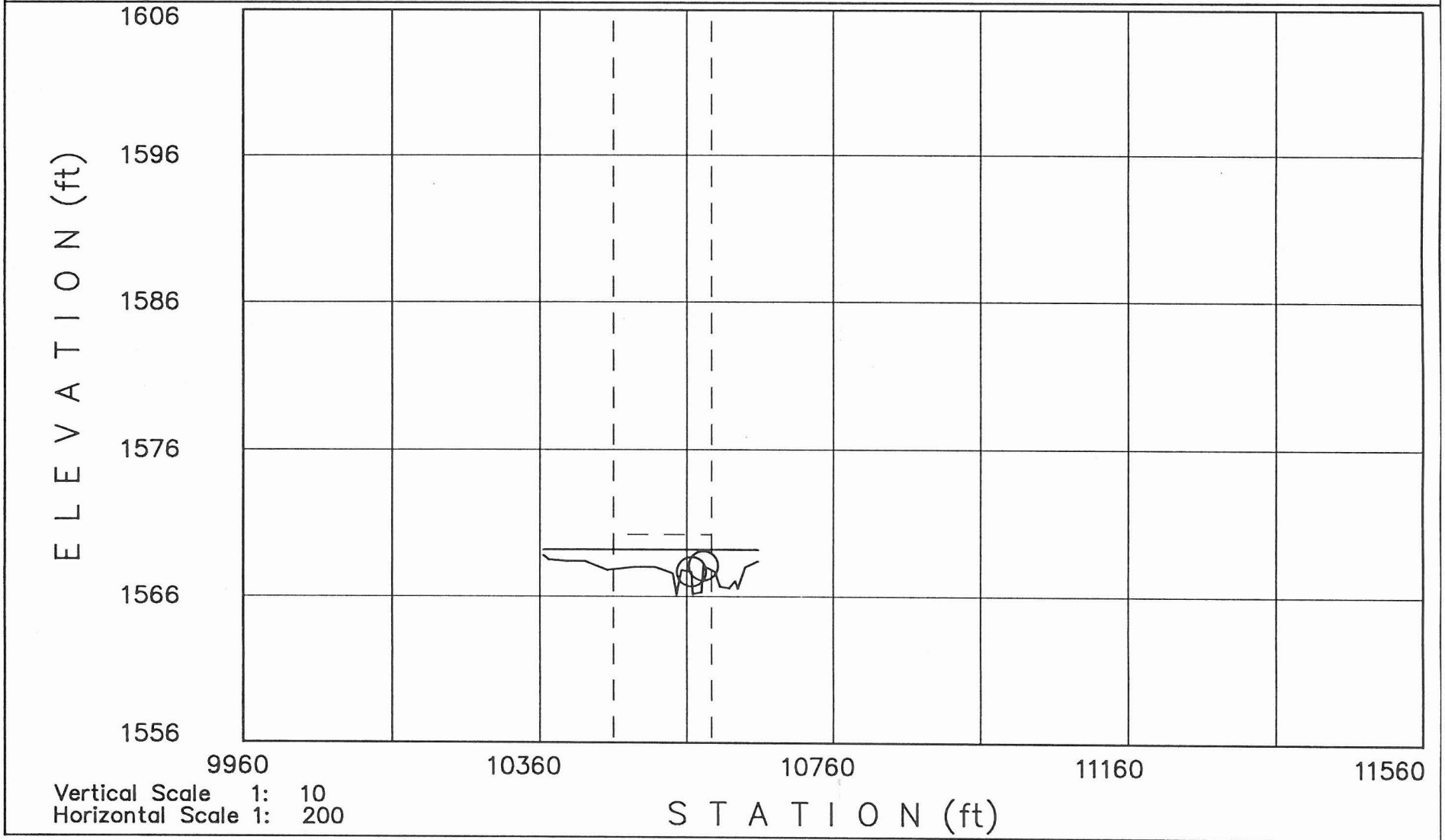
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: .226: (FN = W10FW1.0H2) >>>>>>

Q1= 1700cfs WS1= 1569.19
Q2= 1700cfs WS2= 1570.2

Manning–n Values: LOB: .07 CH: .045 ROB: .07



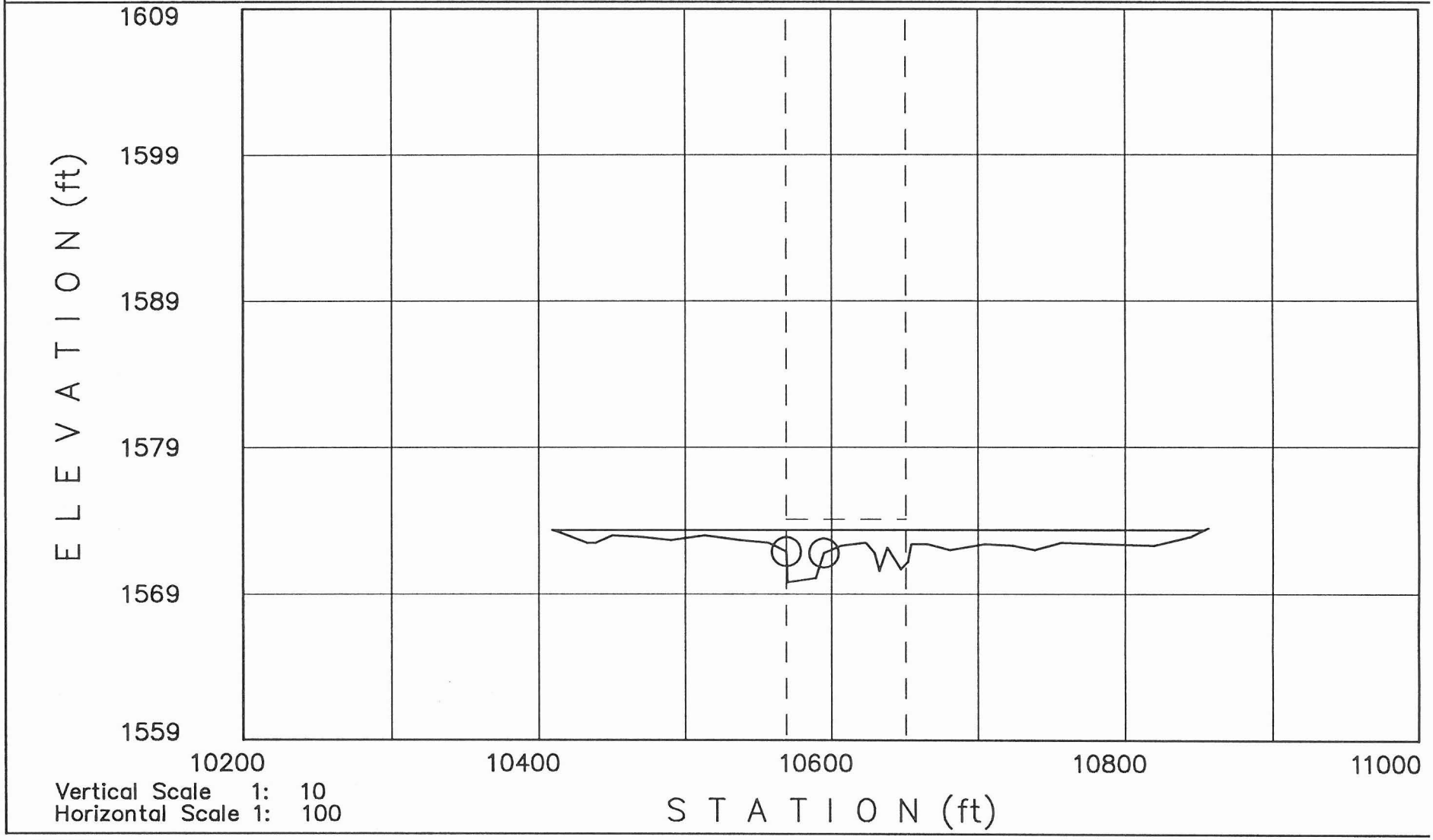
Vertical Scale 1: 10
Horizontal Scale 1: 200

09–13–1995

<<<<<< Cross Section: .277: (FN = W10FW1.OH2) >>>>>>

Q1= 1700cfs WS1= 1573.38
Q2= 1700cfs WS2= 1574.11

Manning-n Values: LOB: .07 CH: .045 ROB: .07



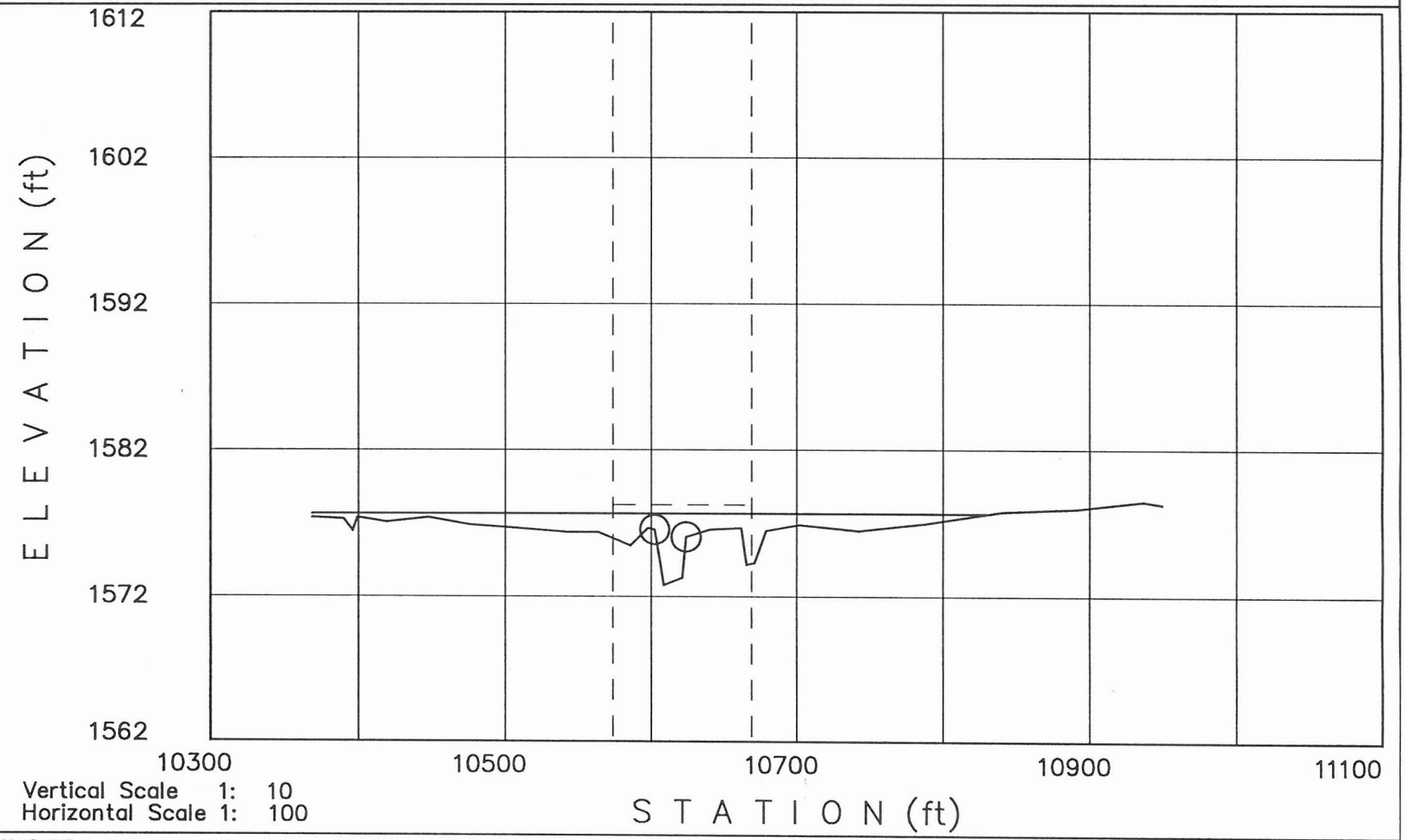
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: .321: (FN = W10FW1.0H2) >>>>>>

Q1= 1700cfs WS1= 1577.68
Q2= 1700cfs WS2= 1578.25

Manning-n Values: LOB: .07 CH: .045 ROB: .07



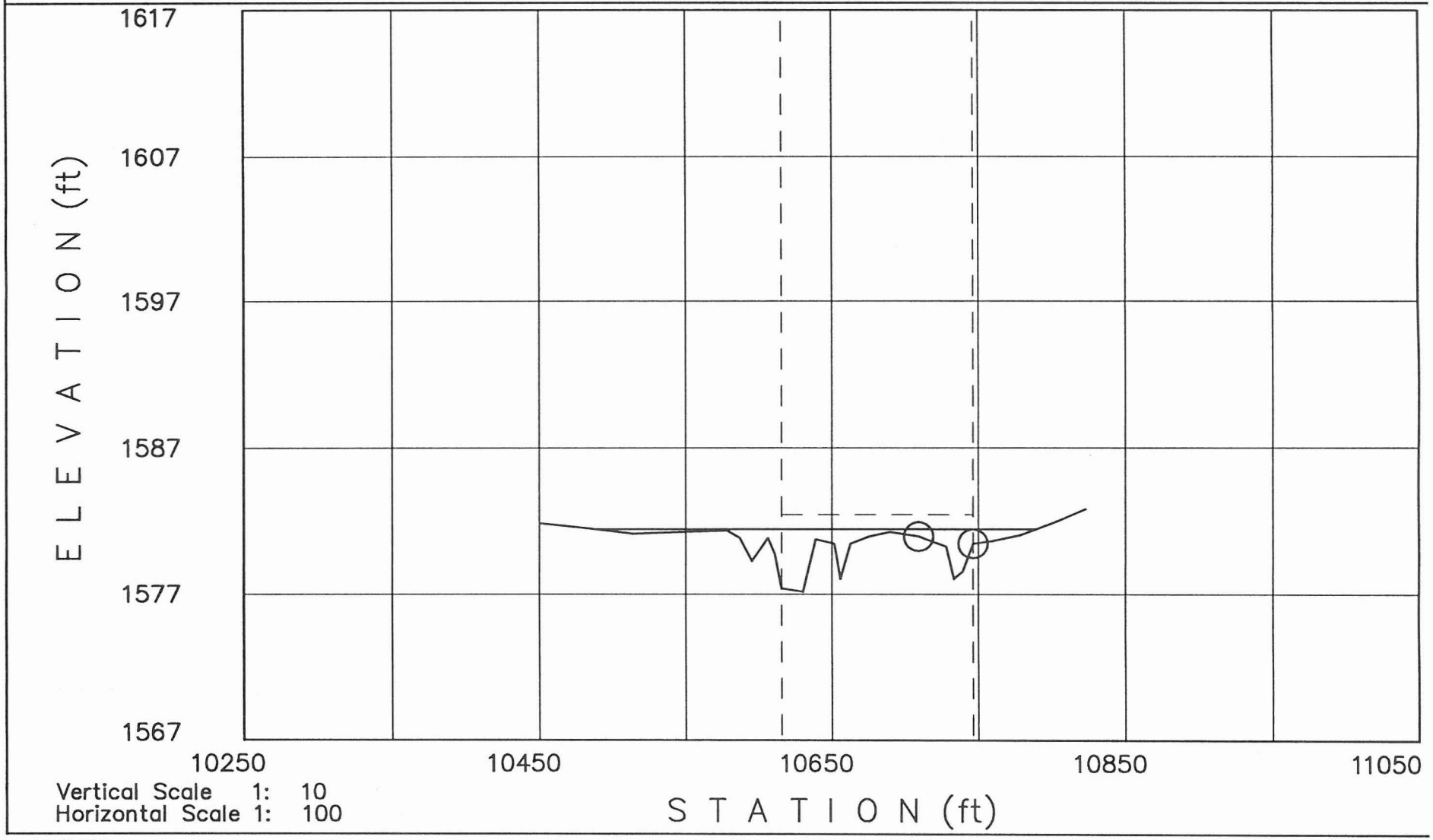
Vertical Scale 1: 10
Horizontal Scale 1: 100

08-13-1995

<<<<<< Cross Section: .368: (FN = W10FW1.OH2) >>>>>>

Q1= 1700cfs WS1= 1581.51
Q2= 1700cfs WS2= 1582.5

Manning-n Values: LOB: .07 CH: .045 ROB: 0 - .07



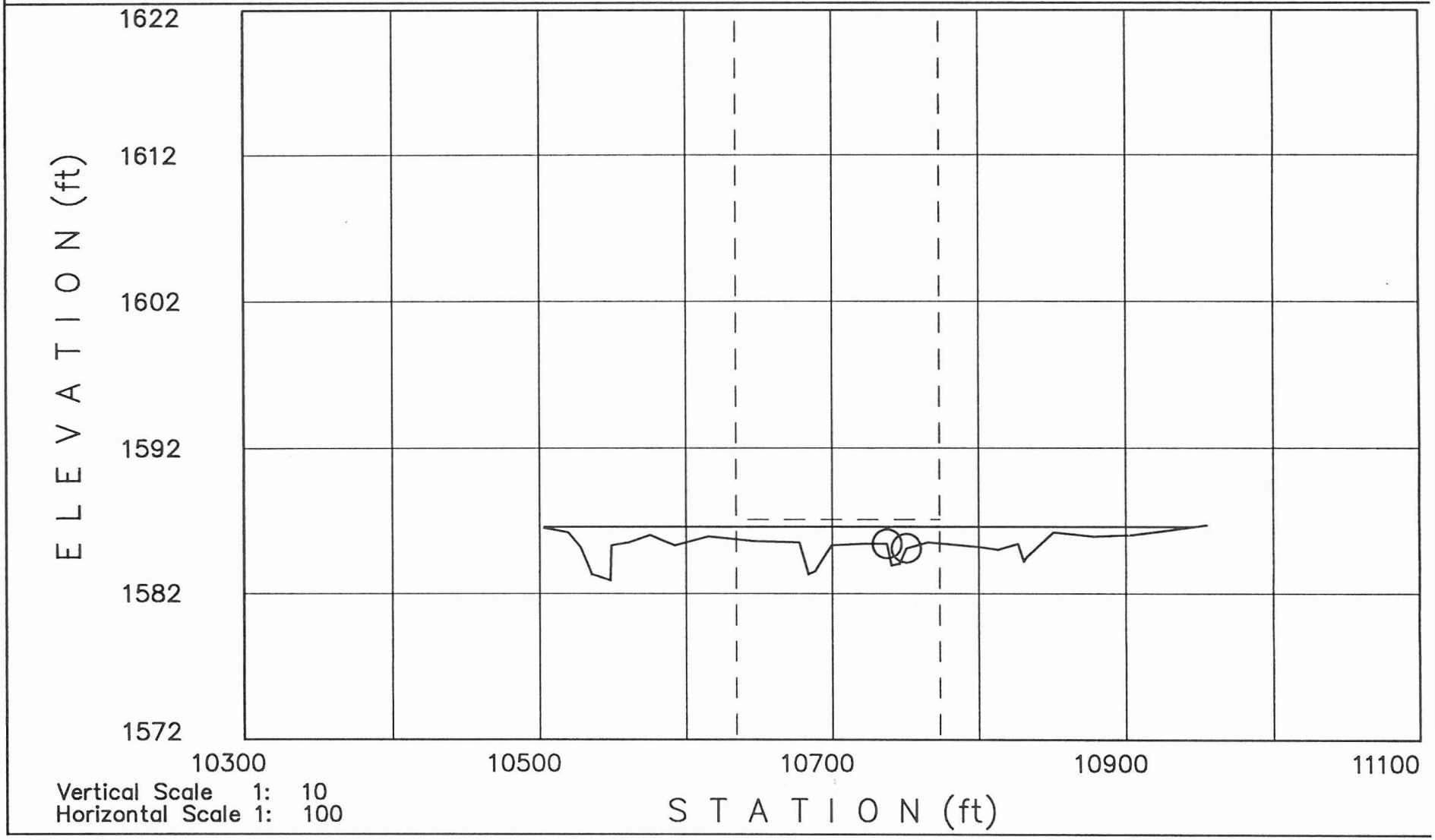
Vertical Scale 1: 10
Horizontal Scale 1: 100

08-13-1995

<<<<<< Cross Section: .414: (FN = W10FW1.0H2) >>>>>>

Q1= 1700cfs WS1= 1586.57
Q2= 1700cfs WS2= 1587.07

Manning-n Values: LOB: .07 CH: .045 ROB: .07



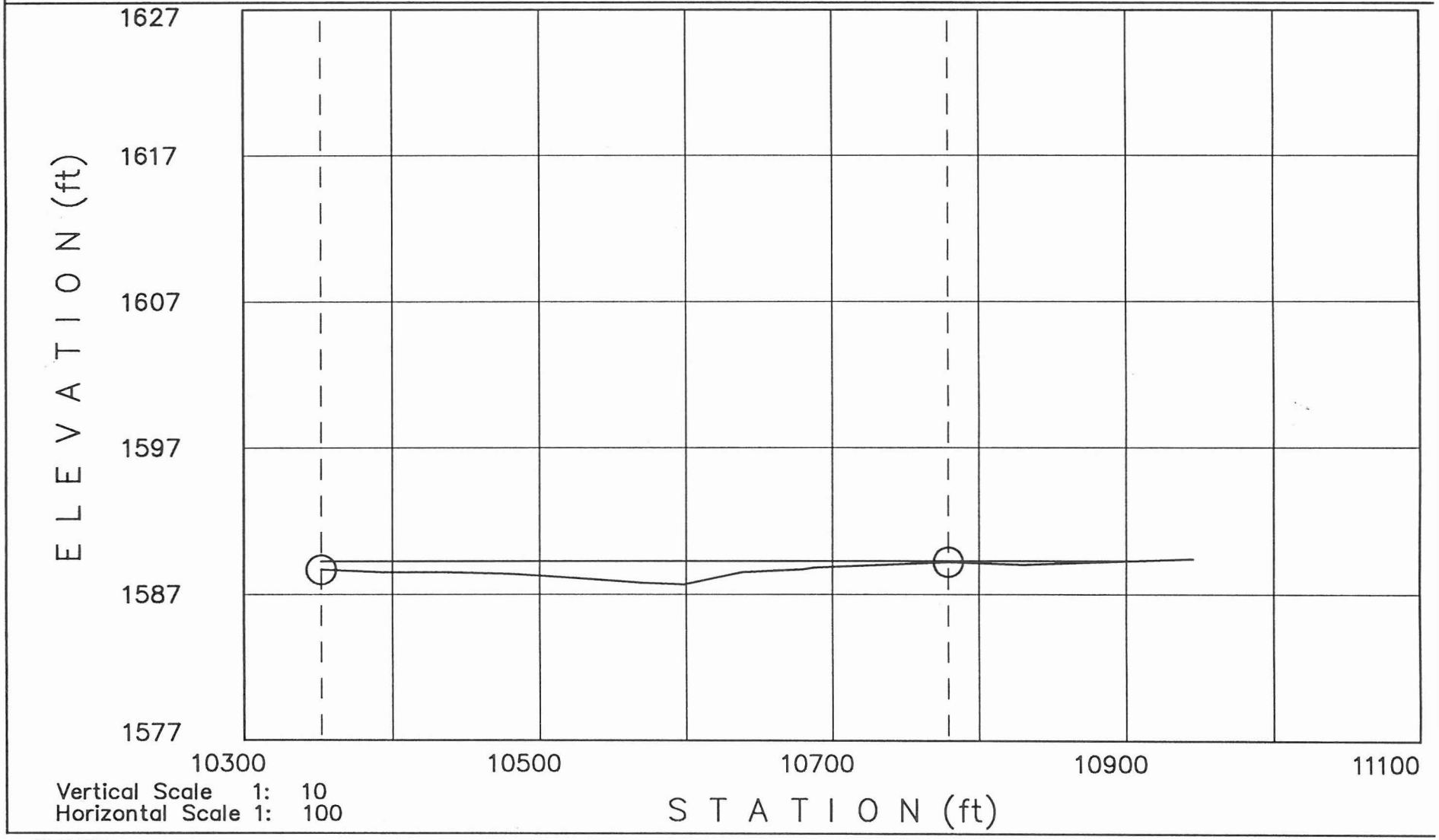
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: .444: (FN = W10FW1.0H2) >>>>>>

Q1= 1750cfs WS1= 1589.28
Q2= 1750cfs WS2= 1589.31

Manning-n Values: LOB: .022 CH: .022 ROB: 0 - .022



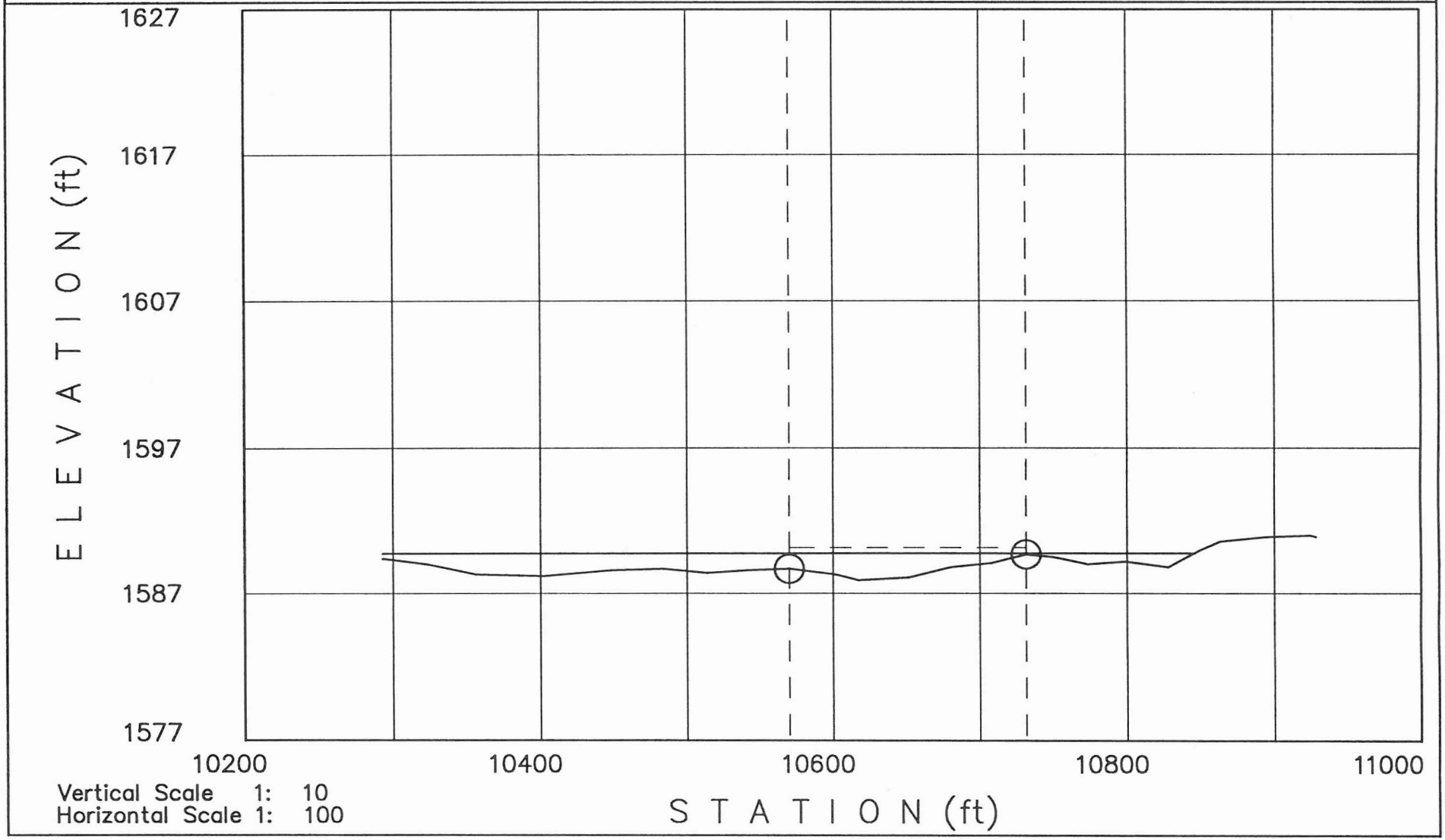
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: .454: (FN = W10FW1.0H2) >>>>>>

Q1= 1900cfs WS1= 1589.78
Q2= 1900cfs WS2= 1590.18

Manning-n Values: LOB: .055 CH: .03 ROB: 0 - .05



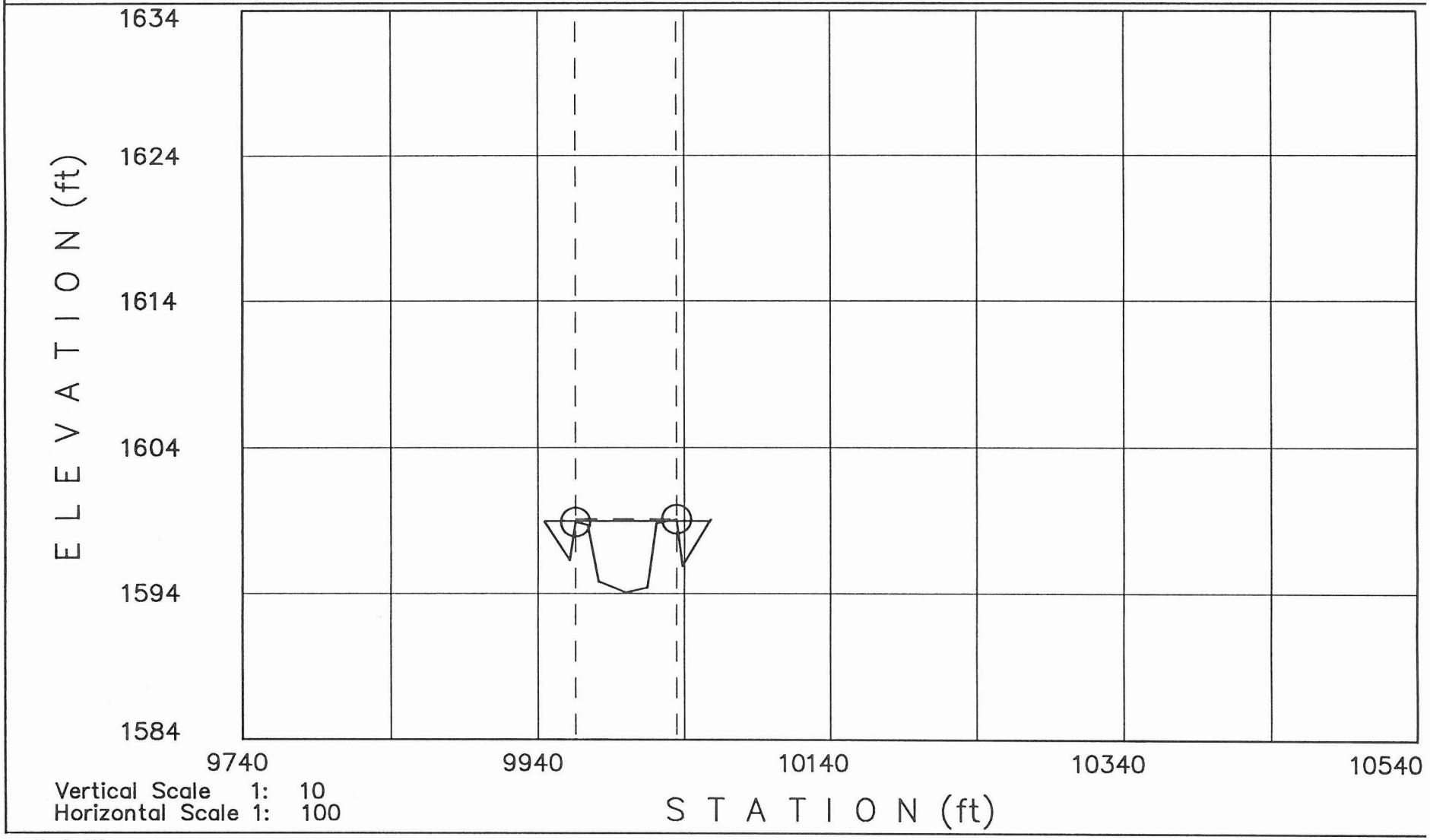
Vertical Scale 1: 10
Horizontal Scale 1: 100

08-13-1985

<<<<<< Cross Section: .551: (FN = W10FW1.0H2) >>>>>>

Q1= 1890cfs WS1= 1598.98
Q2= 1890cfs WS2= 1599.12

Manning-n Values: LOB: 0 - .055 CH: .03 ROB: 0 - .05



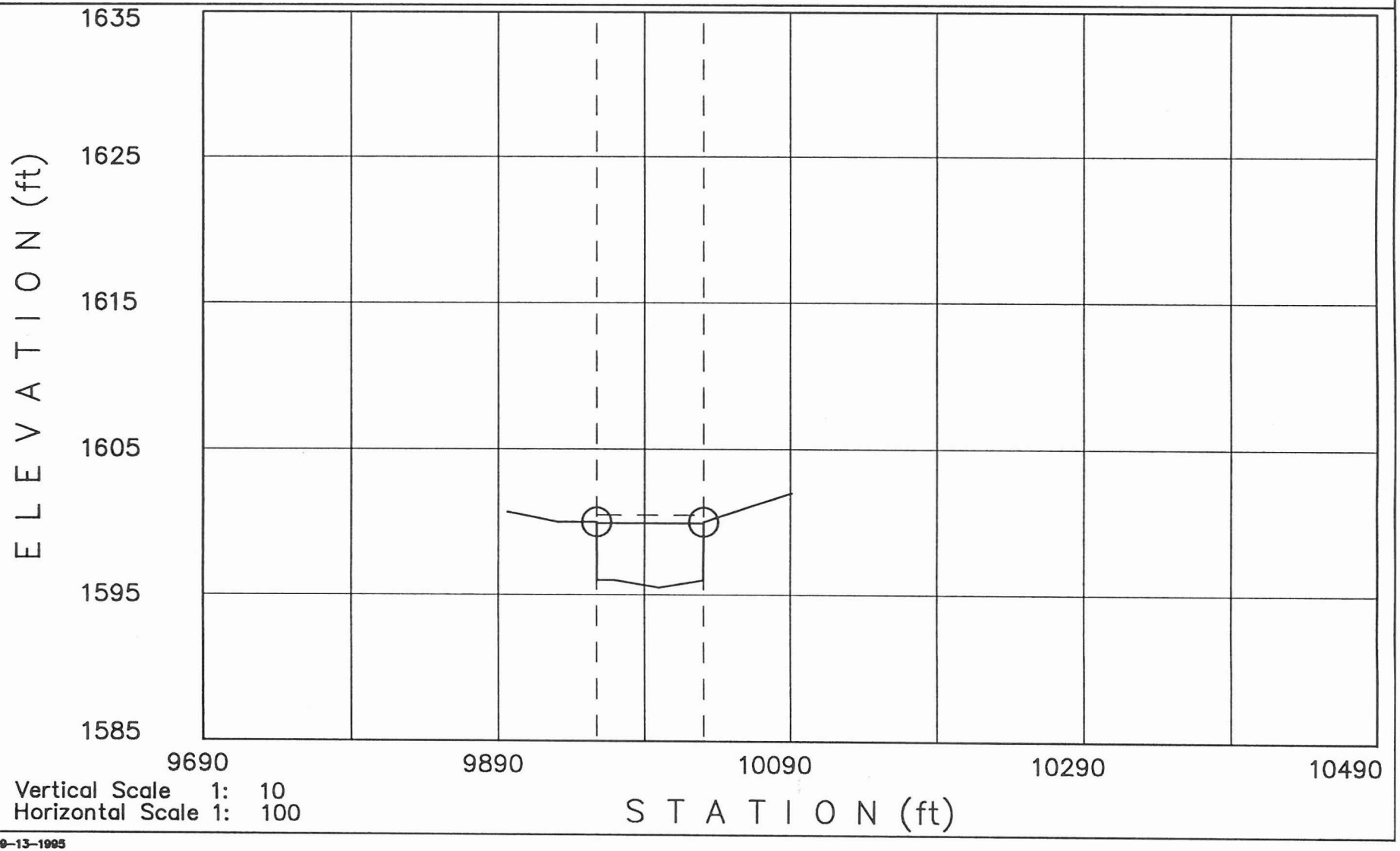
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: .567: (FN = W10FW1.0H2) >>>>>>

Q1= 1890cfs WS1= 1599.93
Q2= 1890cfs WS2= 1600.47

Manning-n Values: LOB: 0 CH: .03 ROB: 0



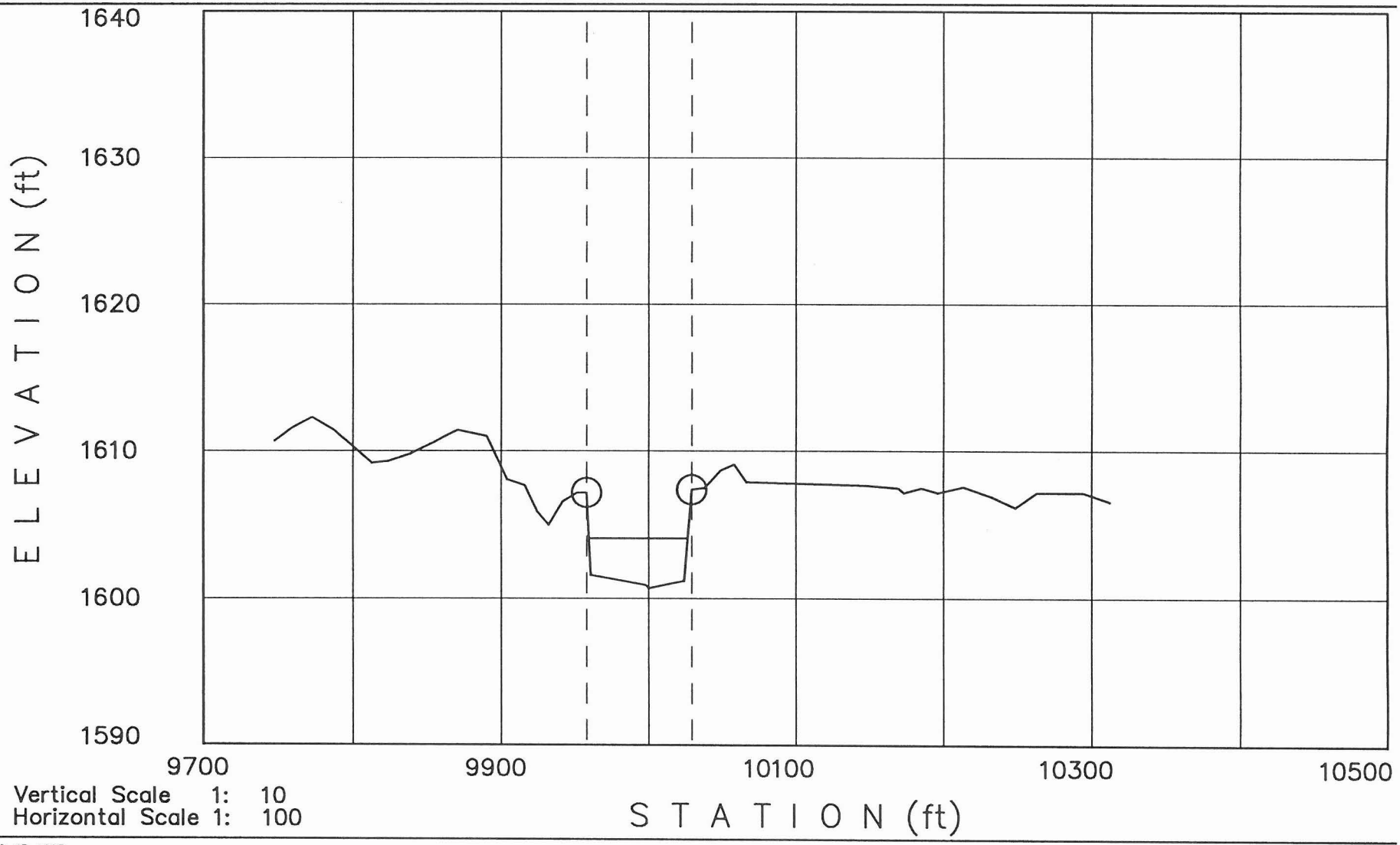
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: .642: (FN = W10FW1.0H2) >>>>>>

Q1= 1890cfs WS1= 1604.1
Q2= 1890cfs WS2= 1604.1

Manning-n Values: LOB: 0 CH: .03 ROB: 0



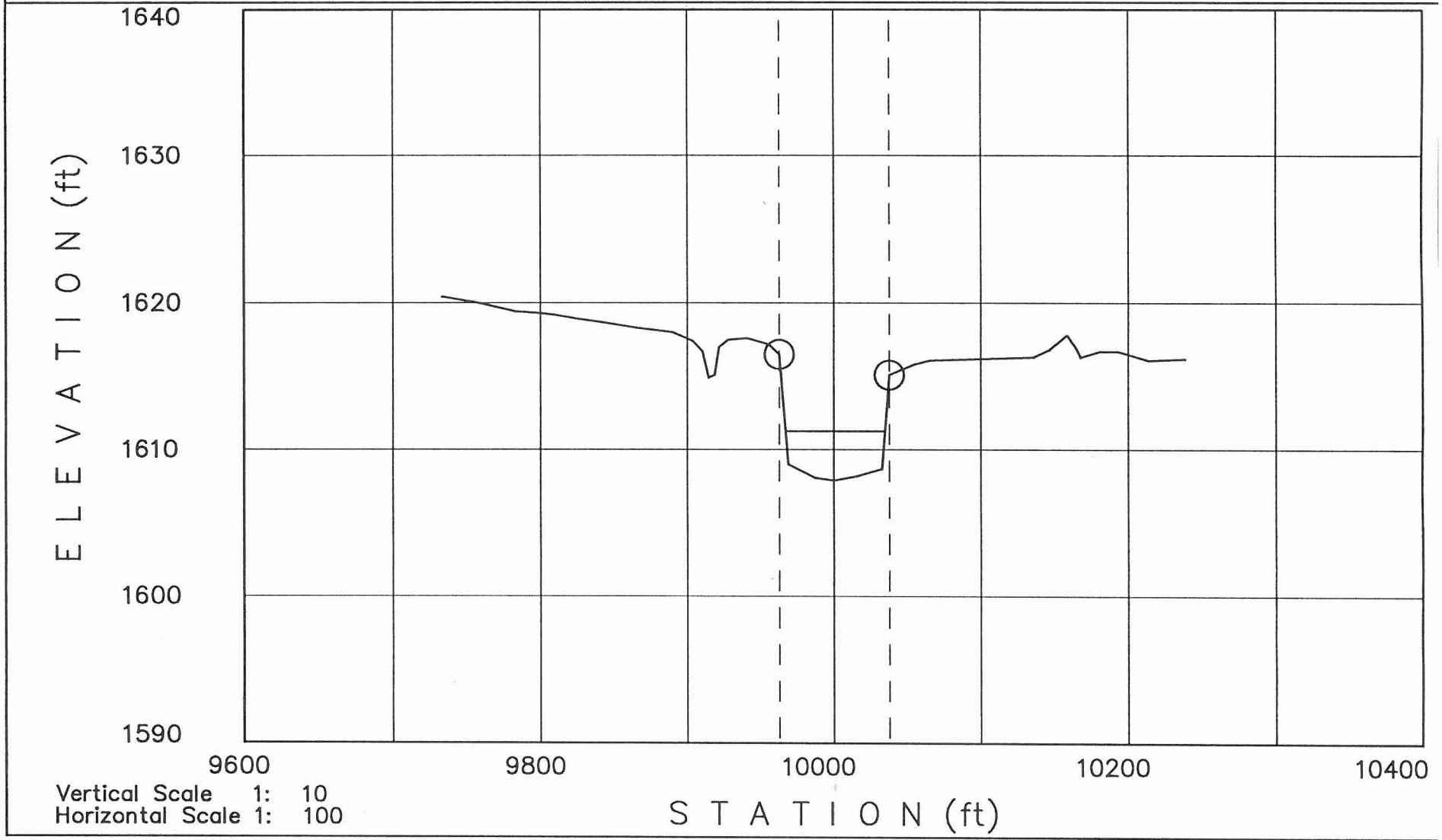
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: .734: (FN = W10FW1.0H2) >>>>>>

Q1= 1890cfs WS1= 1611.26
Q2= 1890cfs WS2= 1611.26

Manning-n Values: LOB: 0 CH: .03 ROB: 0



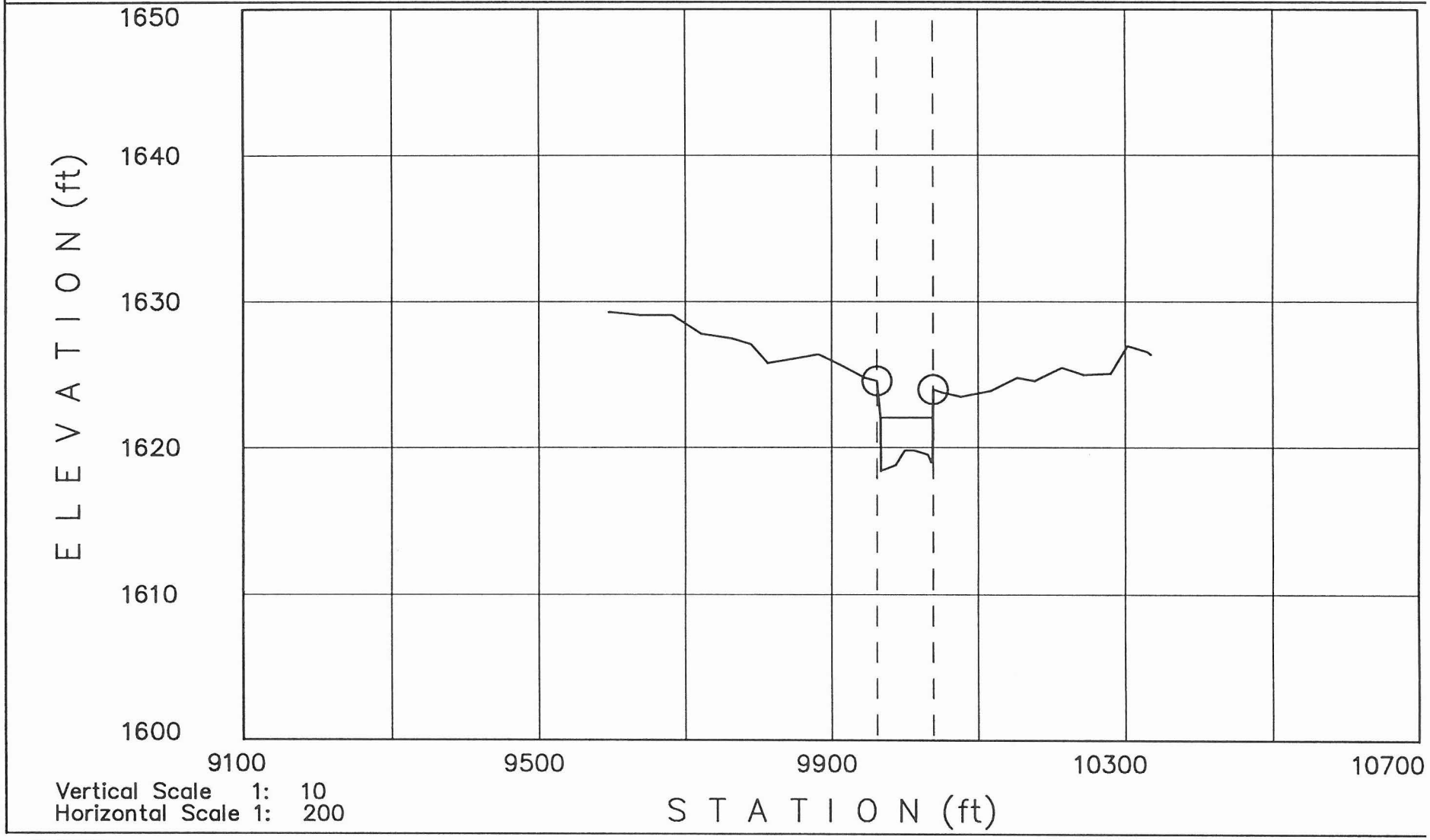
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: .829: (FN = W10FW1.0H2) >>>>>>

Q1= 1890cfs WS1= 1622.06
Q2= 1890cfs WS2= 1622.06

Manning-n Values: LOB: 0 CH: .03 ROB: 0



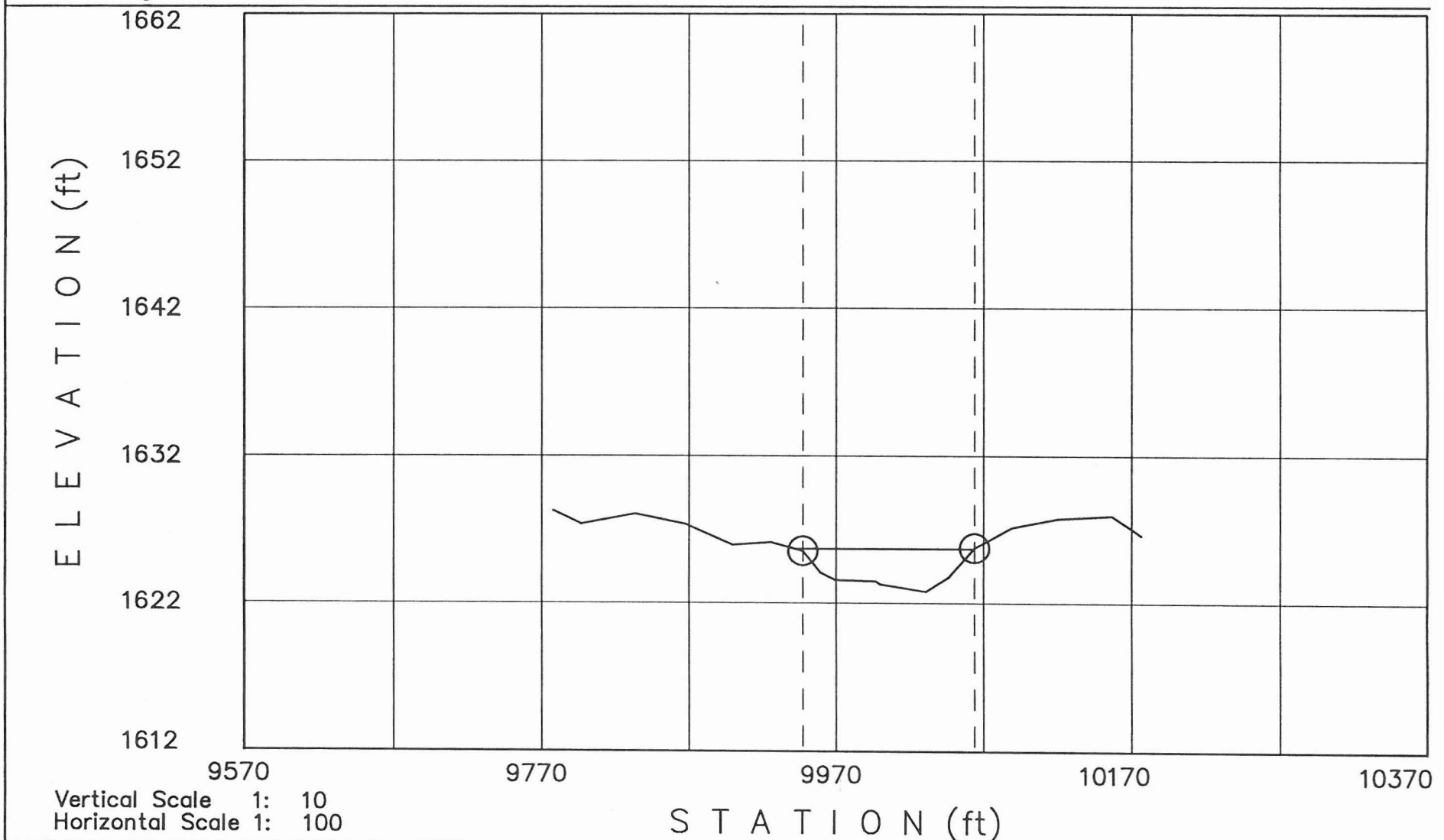
Vertical Scale 1: 10
Horizontal Scale 1: 200

09-13-1995

<<<<<< Cross Section: .838: (FN = W10FW1.0H2) >>>>>>

Q1= 1890cfs WS1= 1625.74
Q2= 1890cfs WS2= 1625.73

Manning-n Values: LOB: 0 - .065 CH: .03 ROB: 0



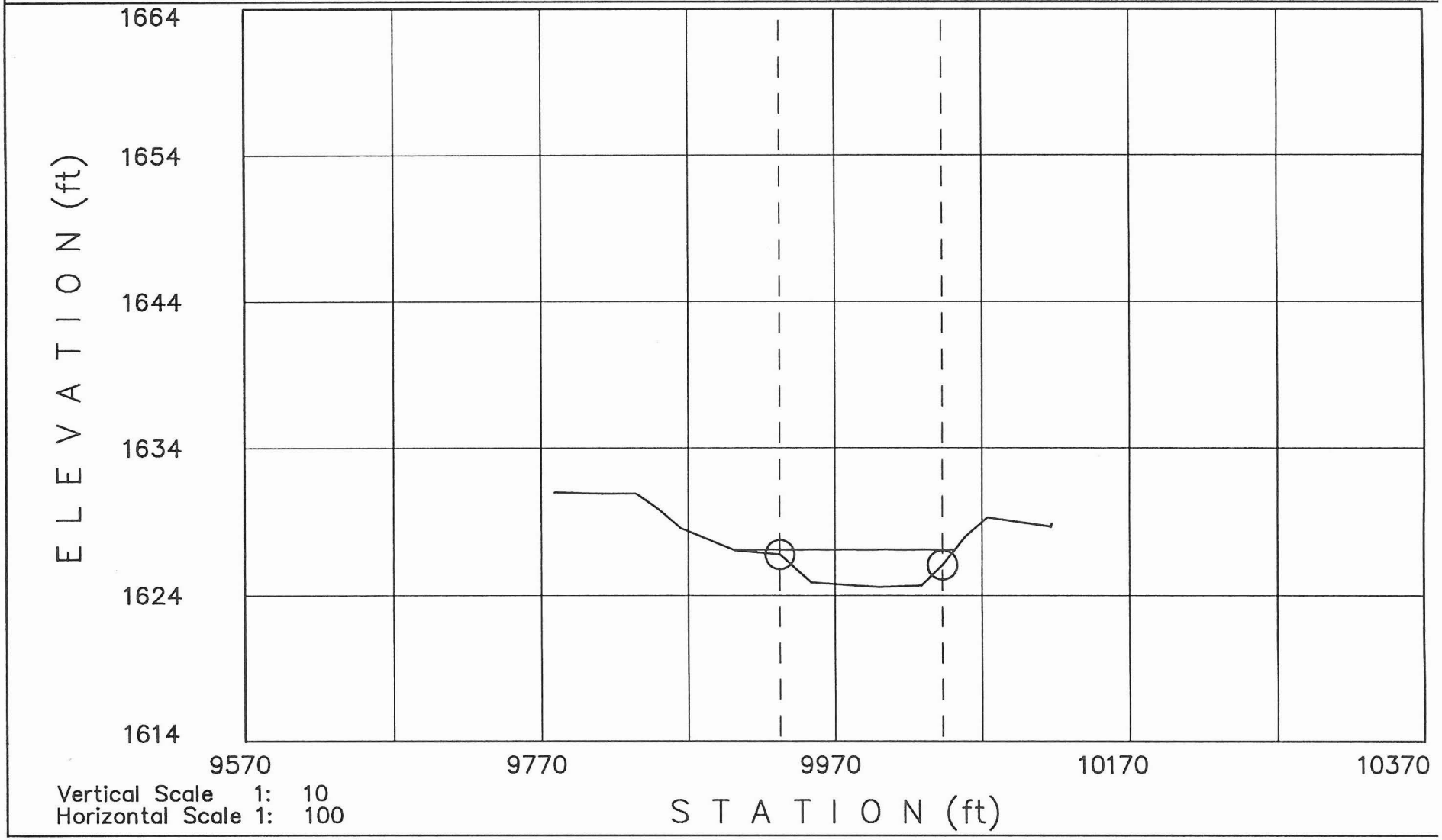
Vertical Scale 1: 10
Horizontal Scale 1: 100

08-13-1995

<<<<<< Cross Section: .851: (FN = W10FW1.0H2) >>>>>>

Q1= 1890cfs WS1= 1627.14
Q2= 1890cfs WS2= 1627.09

Manning-n Values: LOB: 0 - .065 CH: .03 ROB: .065



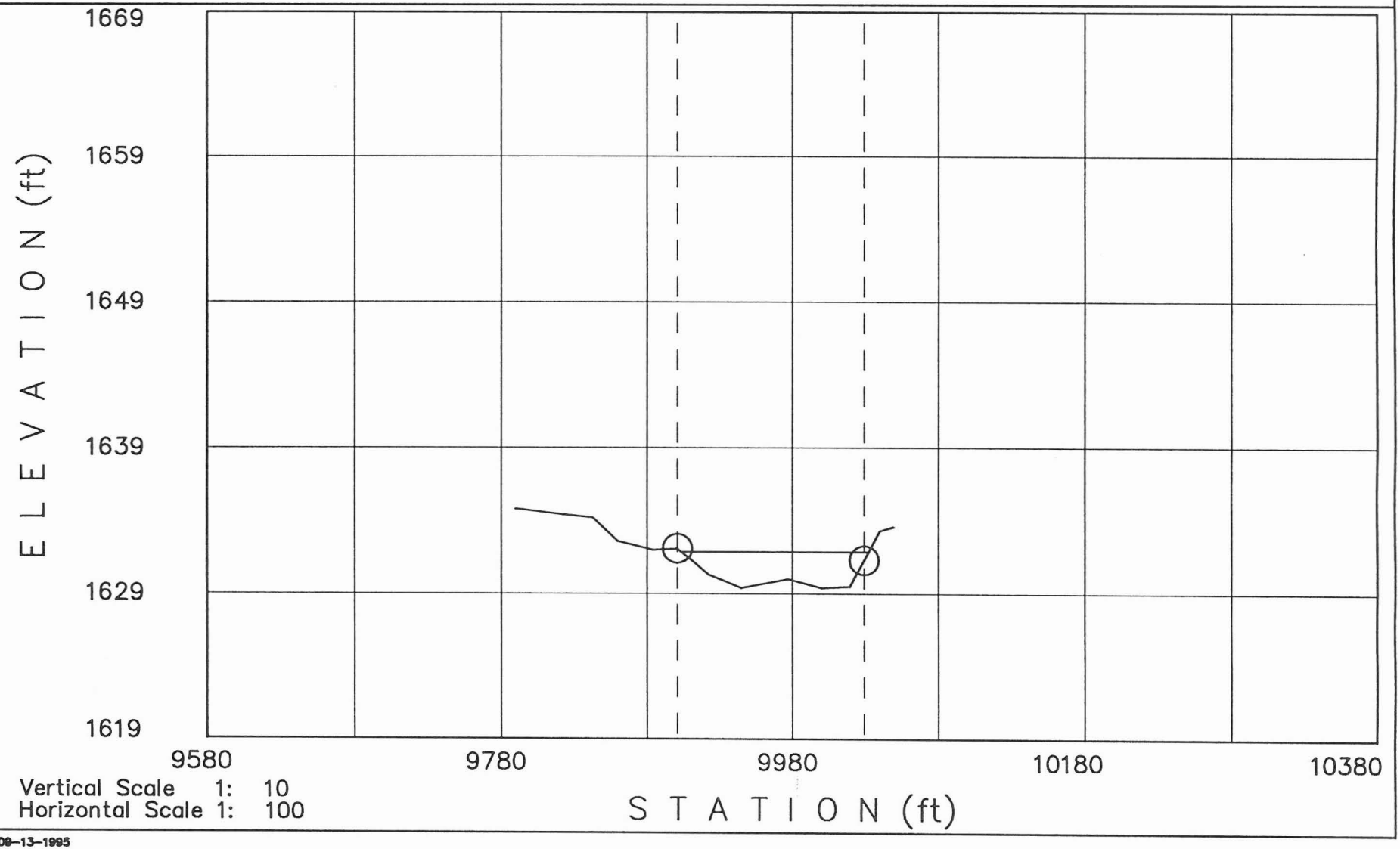
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: .895: (FN = W10FW1.0H2) >>>>>>

Q1= 1890cfs WS1= 1631.87
Q2= 1890cfs WS2= 1631.85

Manning-n Values: LOB: 0 CH: .03 ROB: .065



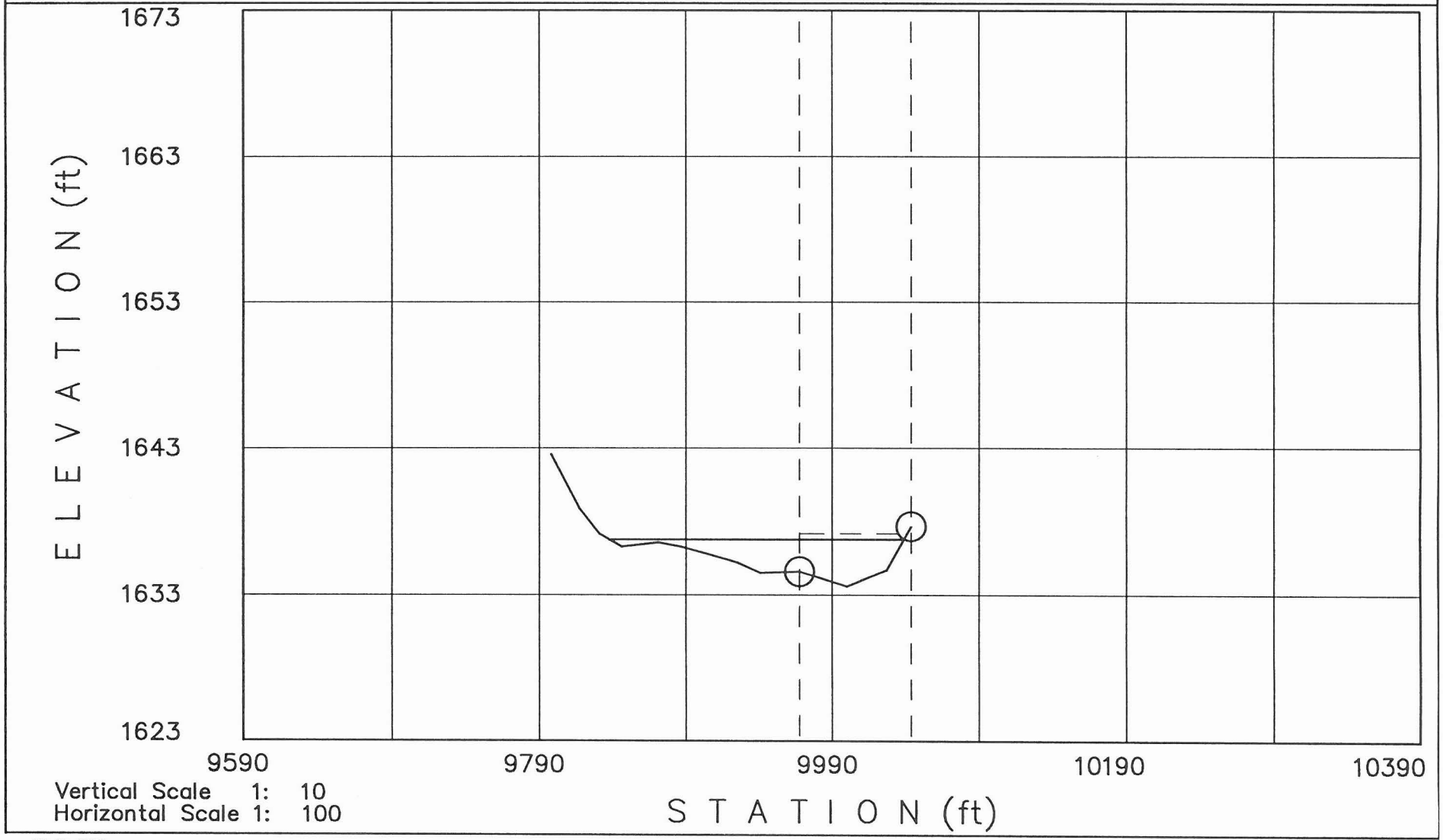
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: .949: (FN = W10FW1.0H2) >>>>>>

Q1= 1890cfs WS1= 1636.79
Q2= 1890cfs WS2= 1637.2

Manning-n Values: LOB: .065 CH: .03 ROB: 0



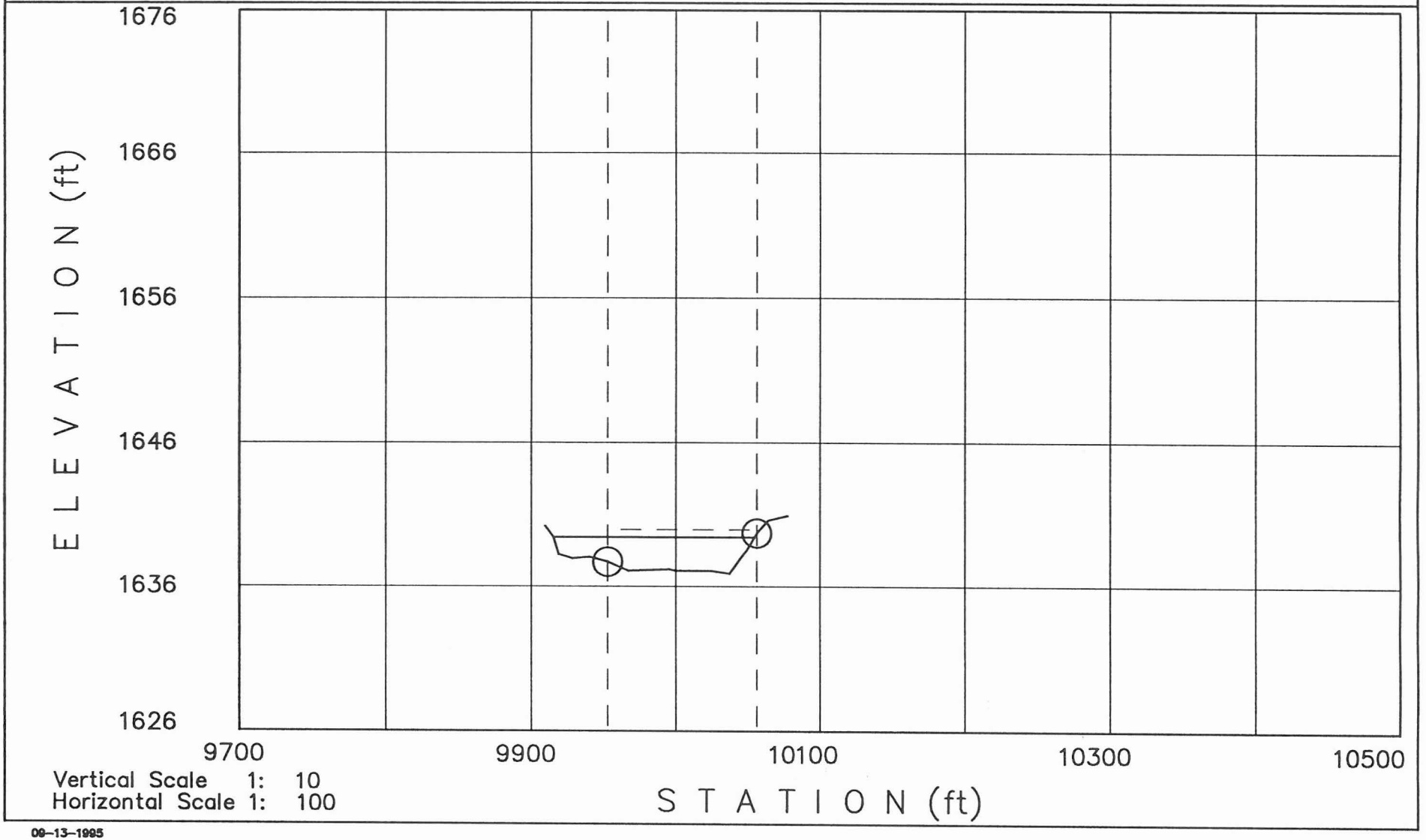
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: 1.002: (FN = W10FW1.0H2) >>>>>>

Q1= 1890cfs WS1= 1639.41
Q2= 1890cfs WS2= 1639.92

Manning–n Values: LOB: .065 CH: .03 ROB: 0



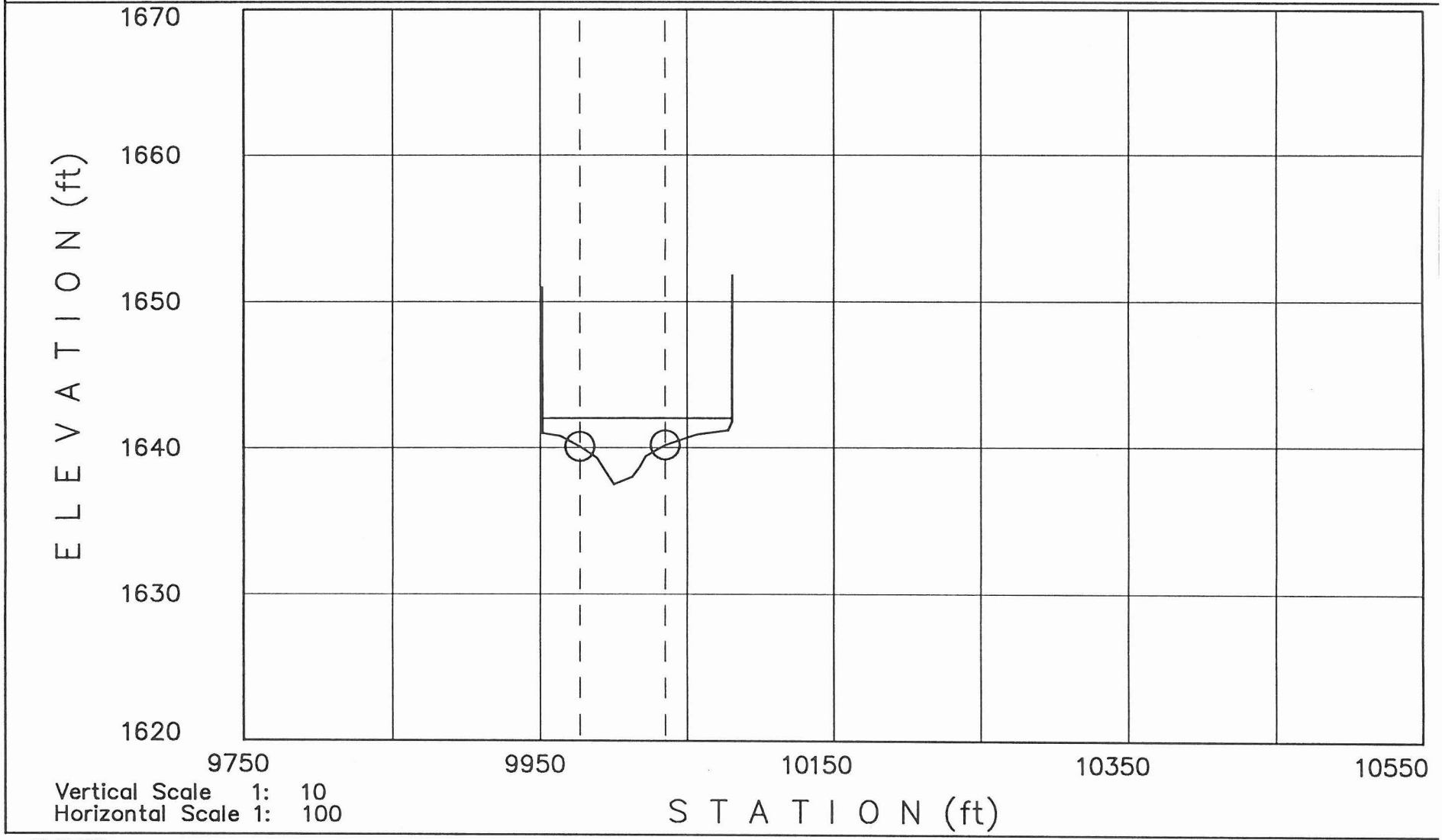
Vertical Scale 1: 10
Horizontal Scale 1: 100

09–13–1995

<<<<<< Cross Section: 1.034: (FN = W10FW1.0H2) >>>>>>

Q1= 1890cfs WS1= 1642.03
Q2= 1890cfs WS2= 1642.07

Manning-n Values: LOB: .065 CH: .03 ROB: 0 - .065



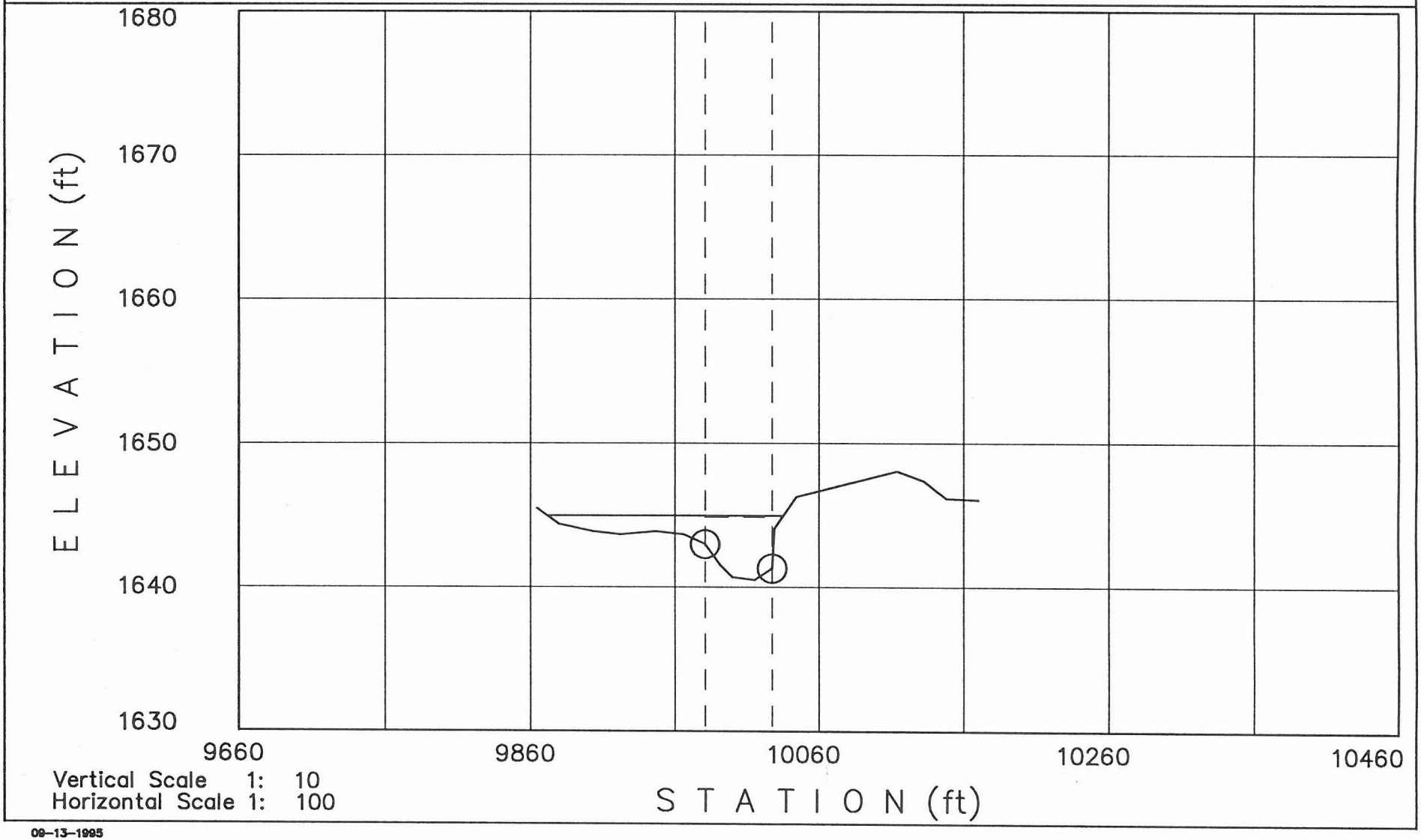
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: 1.074: (FN = W10FW1.0H2) >>>>>>

Q1= 1890cfs WS1= 1644.99
Q2= 1890cfs WS2= 1644.87

Manning-n Values: LOB: .065 CH: .03 ROB: 0 - .065



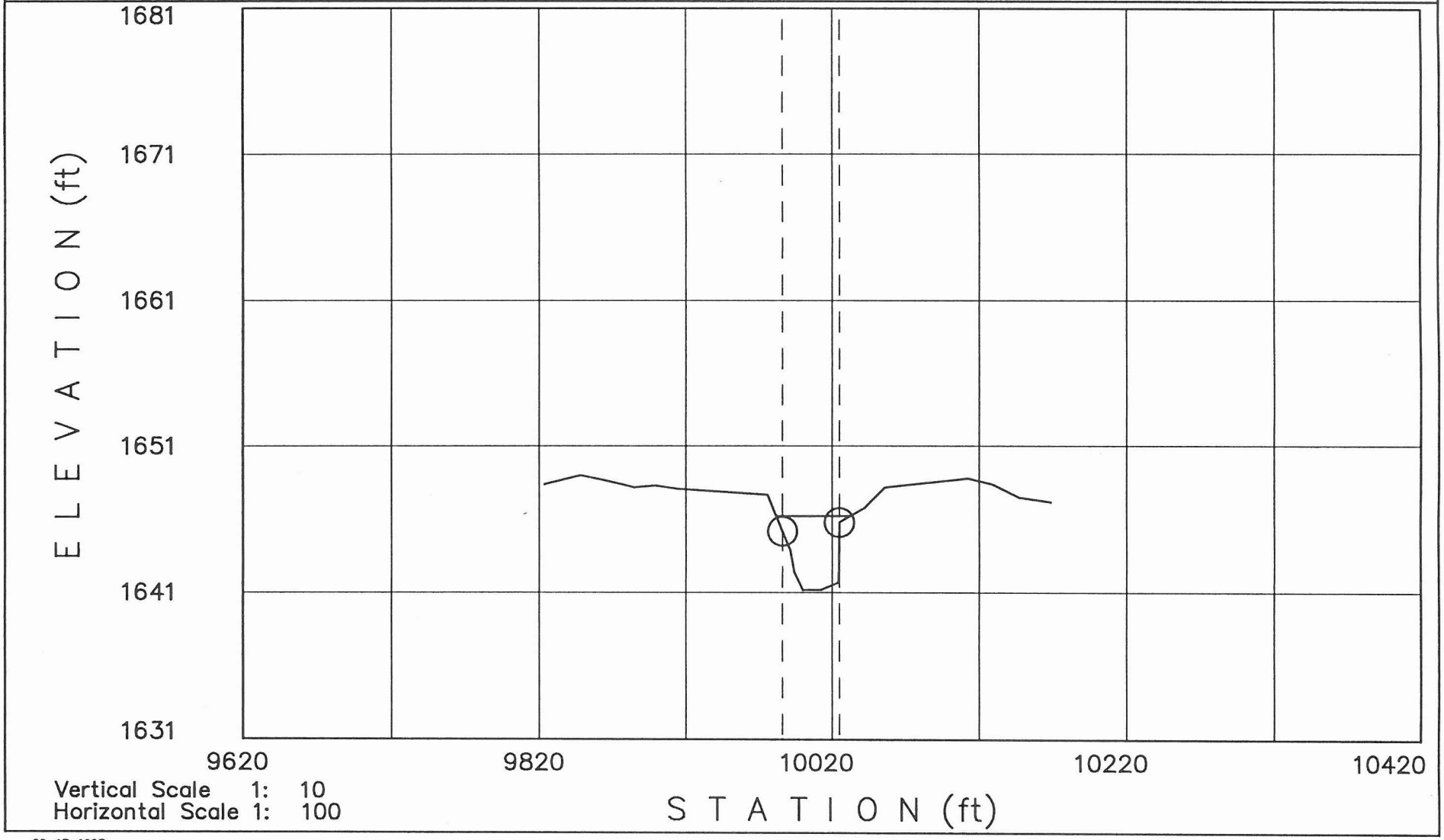
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: 1.096: (FN = W10FW1.0H2) >>>>>>

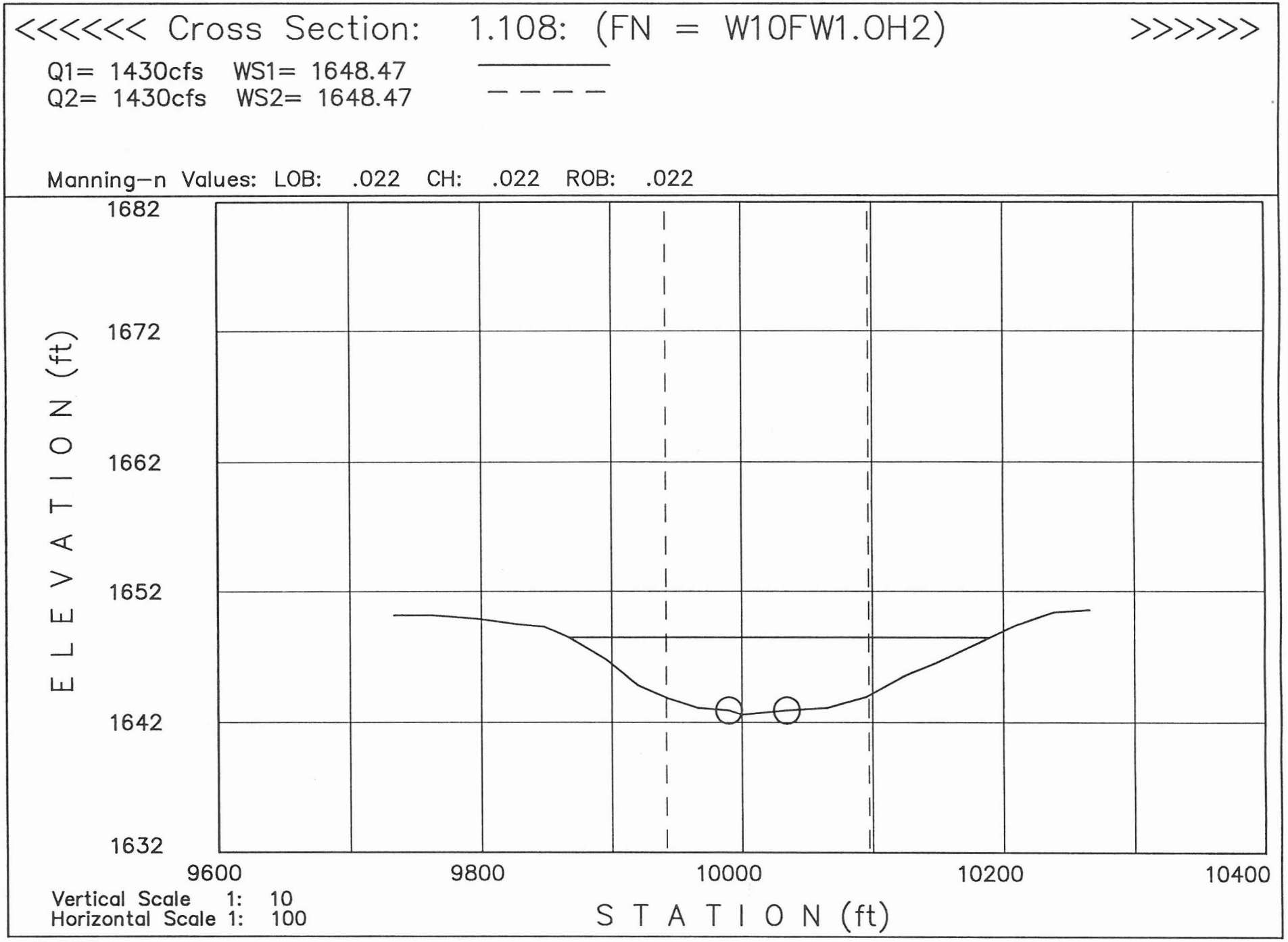
Q1= 1890cfs WS1= 1646.24
Q2= 1890cfs WS2= 1646.19

Manning-n Values: LOB: .065 CH: .03 ROB: 0 - .065



Vertical Scale 1: 10
Horizontal Scale 1: 100

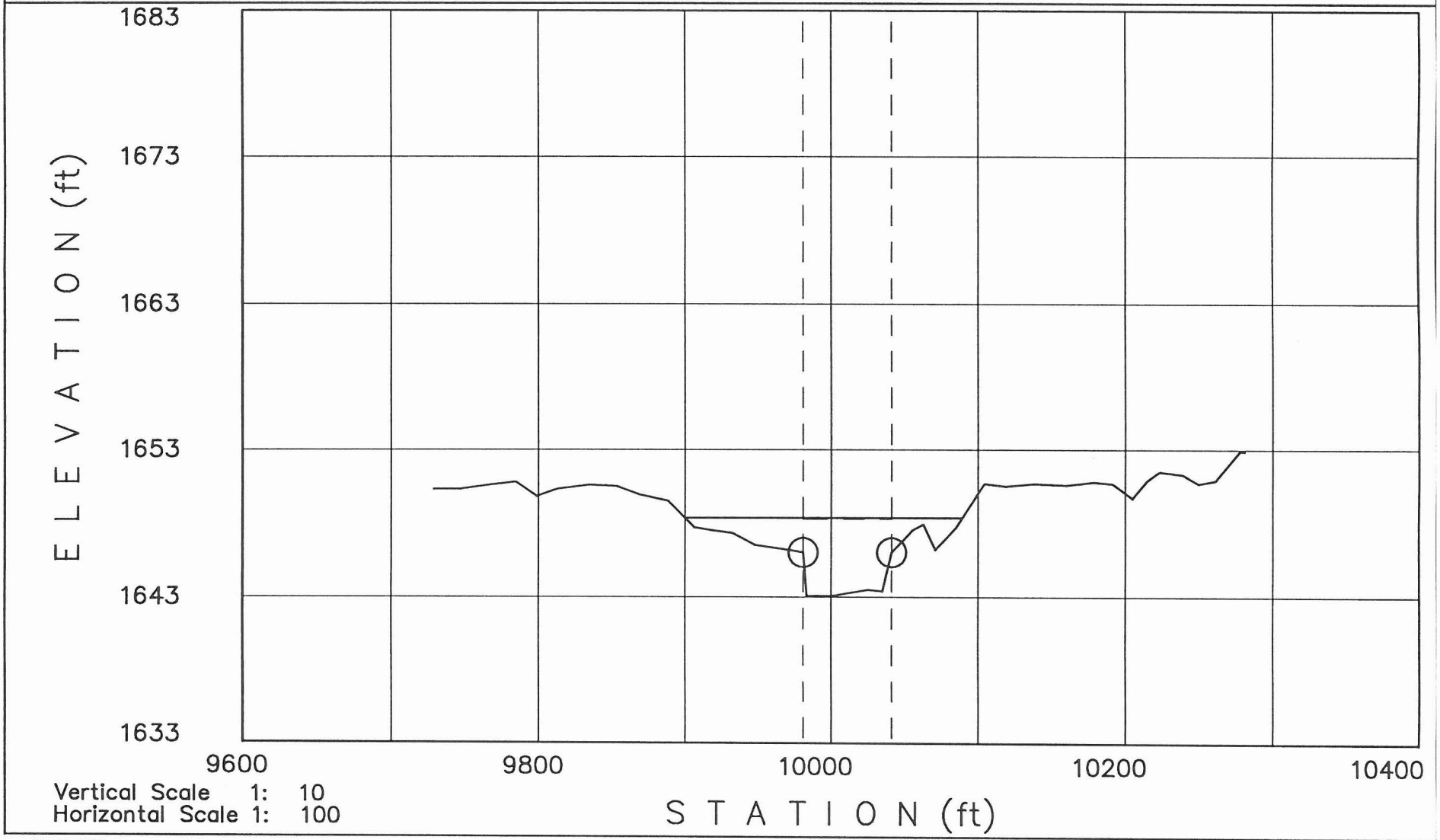
09-13-1995


<<<<<< Cross Section: 1.108: (FN = W10FW1.0H2) >>>>>>
Q1= 1430cfs WS1= 1648.47
Q2= 1430cfs WS2= 1648.47
Manning-n Values: LOB: .022 CH: .022 ROB: .022
1682
1672
1662
1652
1642
1632
ELEVATION (ft)
9600
9800
10000
10200
10400
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
09-13-1995

<<<<<< Cross Section: 1.117: (FN = W10FW1.0H2) >>>>>>

Q1= 1430cfs WS1= 1648.34
Q2= 1430cfs WS2= 1648.25

Manning-n Values: LOB: .065 CH: .045 ROB: .055



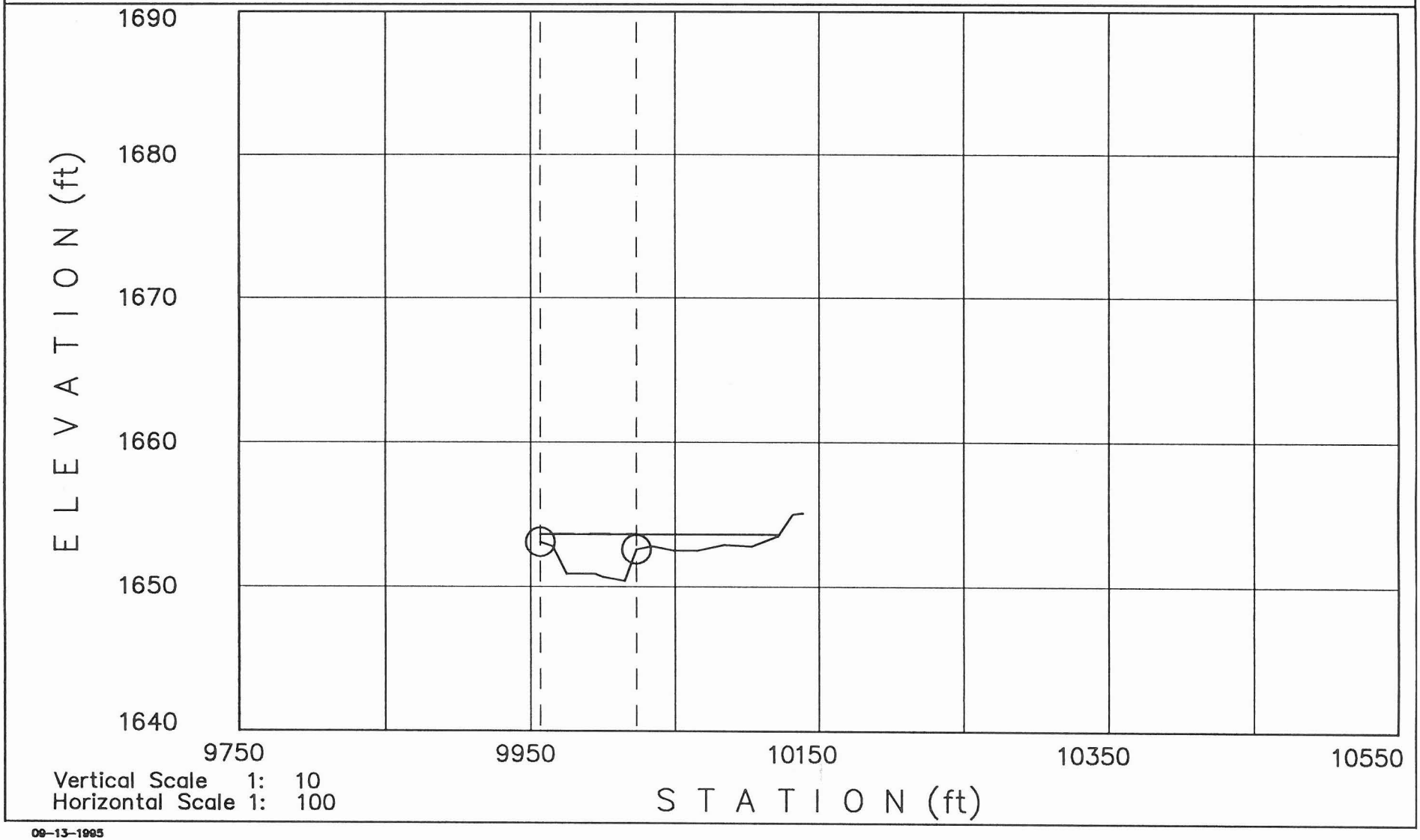
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: 1.175: (FN = W10FW1.0H2) >>>>>>

Q1= 1430cfs WS1= 1653.63
Q2= 1430cfs WS2= 1653.7

Manning–n Values: LOB: .065 CH: .045 ROB: 0 – .055



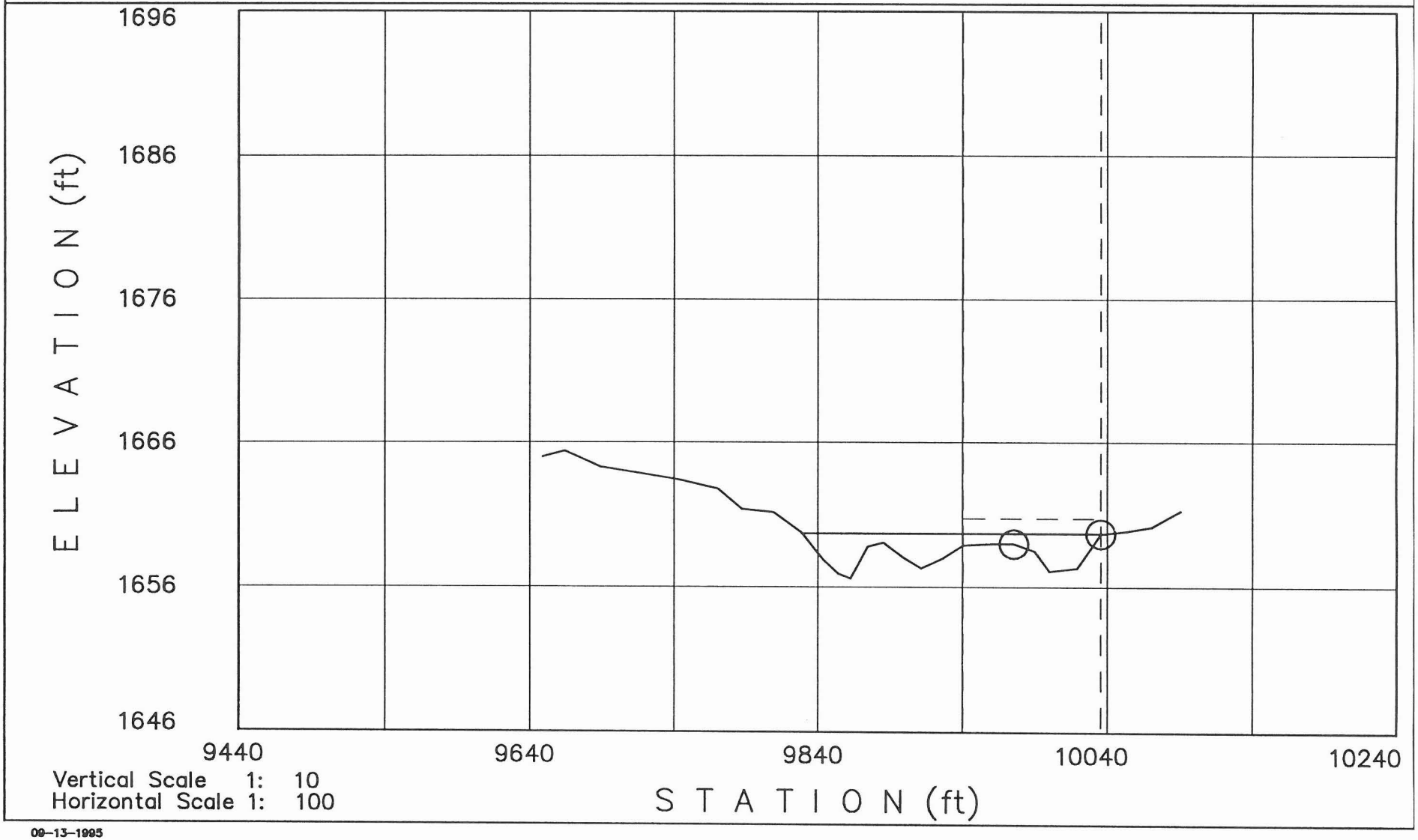
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: 1.247: (FN = W10FW1.0H2) >>>>>>

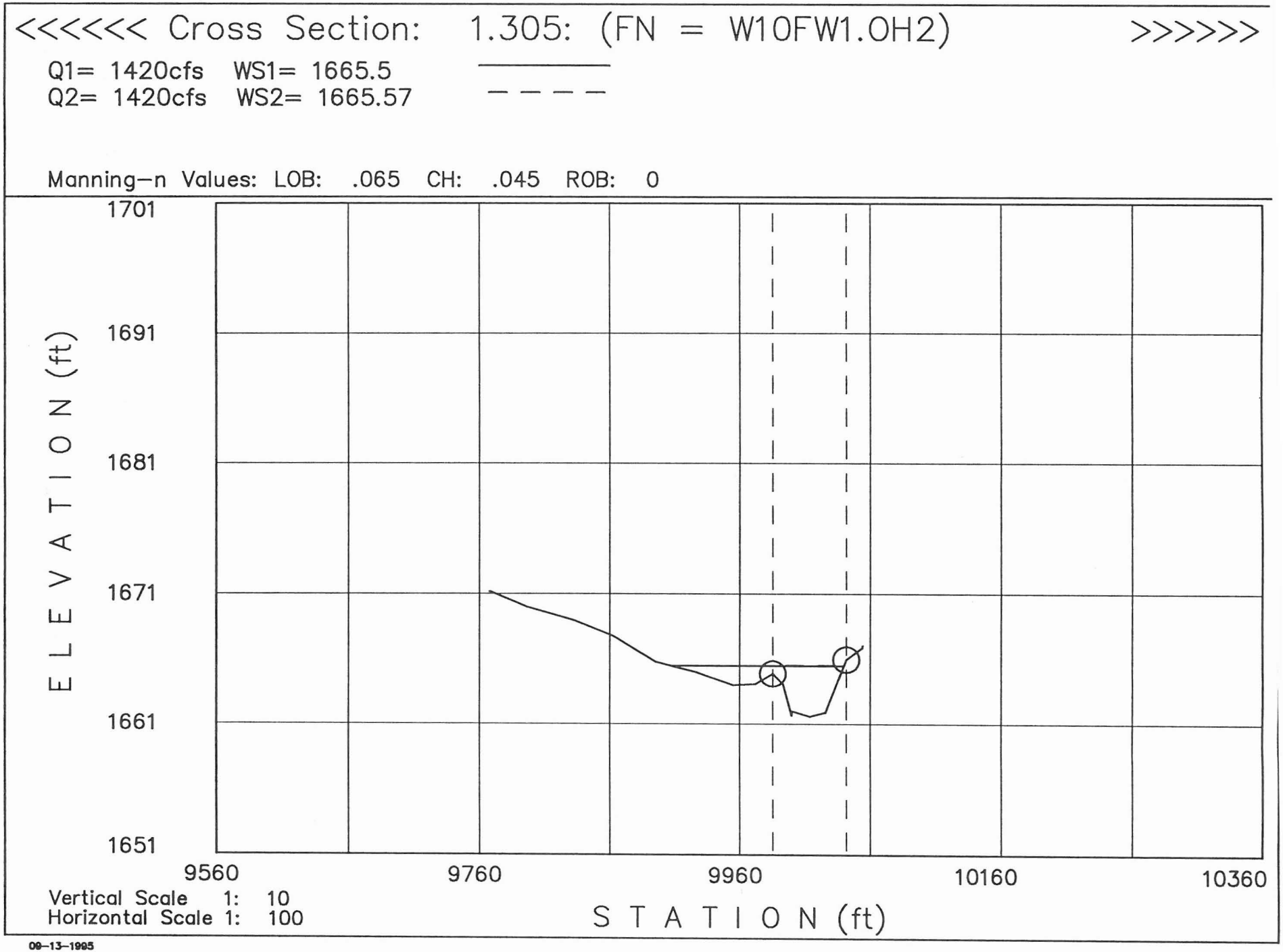
Q1= 1430cfs WS1= 1659.73
Q2= 1430cfs WS2= 1660.75

Manning-n Values: LOB: .065 CH: .045 ROB: 0 - .055



Vertical Scale 1: 10
Horizontal Scale 1: 100

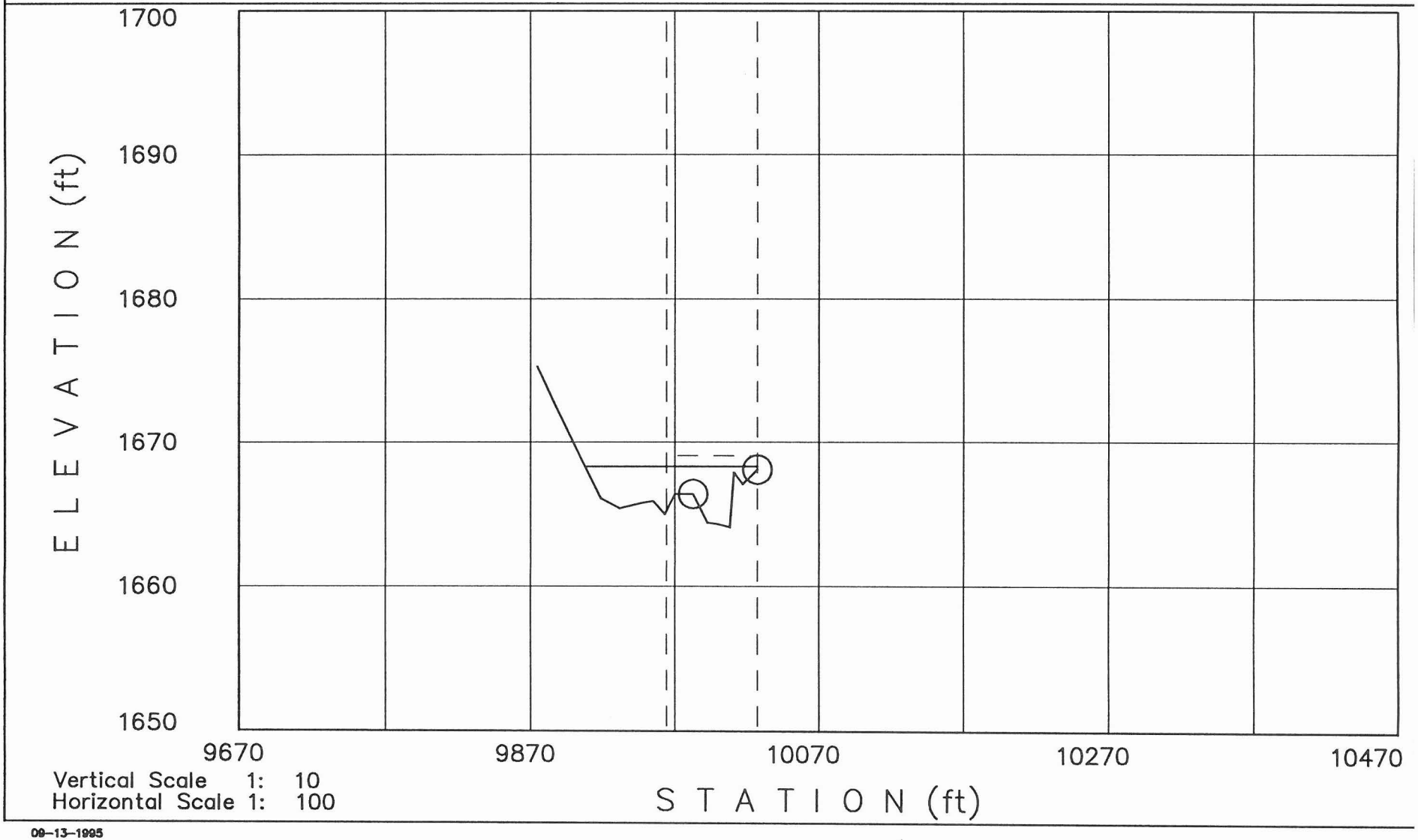
09-13-1995


<<<<<< Cross Section: 1.305: (FN = W10FW1.0H2) >>>>>>
Q1= 1420cfs WS1= 1665.5
Q2= 1420cfs WS2= 1665.57
Manning-n Values: LOB: .065 CH: .045 ROB: 0
1701
1691
1681
1671
1661
1651
ELEVATION (ft)
9560
9760
9960
10160
10360
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
09-13-1995

<<<<<< Cross Section: 1.337: (FN = W10FW1.0H2) >>>>>>

Q1= 1420cfs WS1= 1668.31
Q2= 1420cfs WS2= 1669.05

Manning-n Values: LOB: .065 CH: .045 ROB: 0



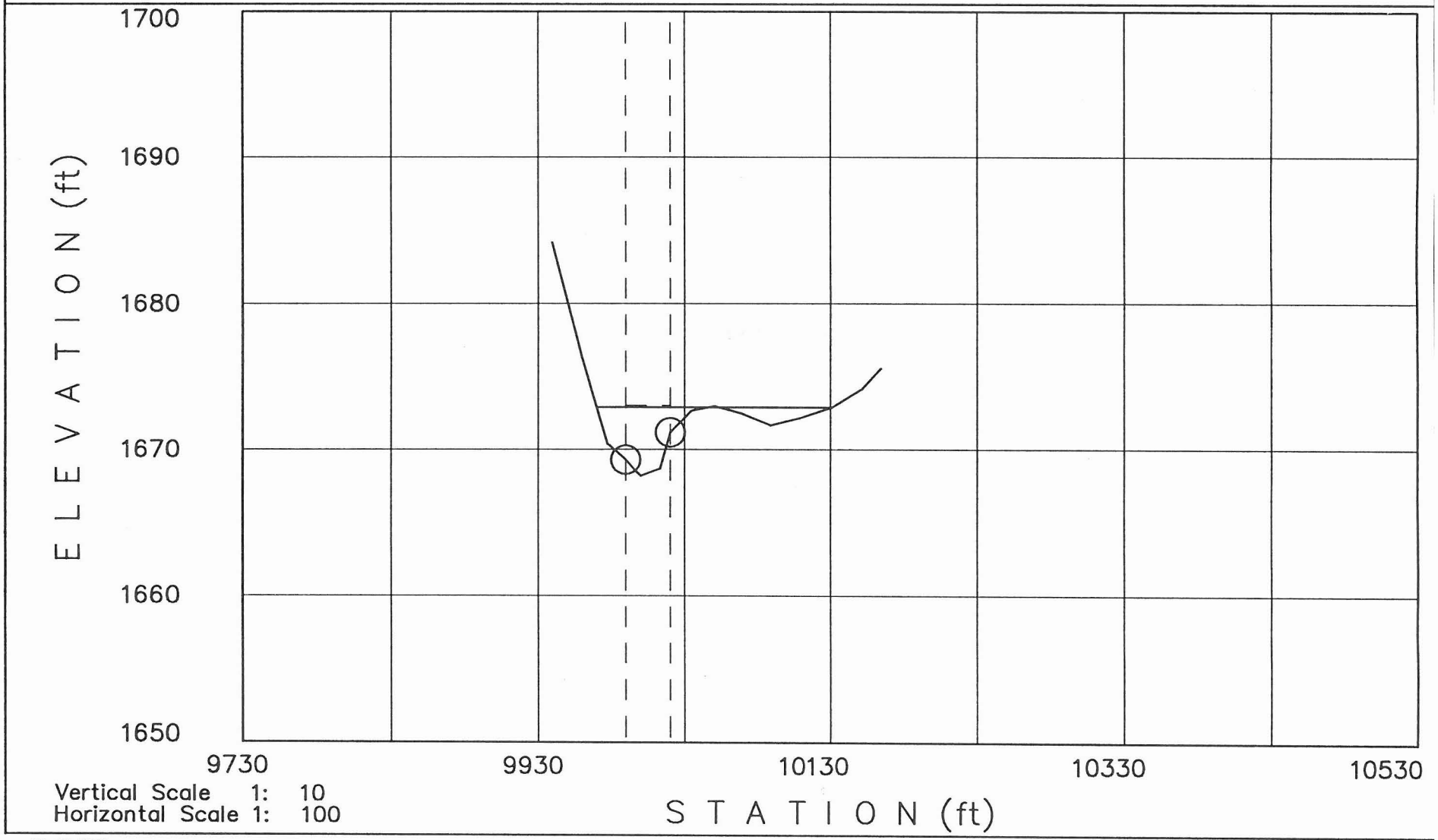
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: 1.393: (FN = W10FW1.0H2) >>>>>>

Q1= 1420cfs WS1= 1672.92
Q2= 1420cfs WS2= 1673.06

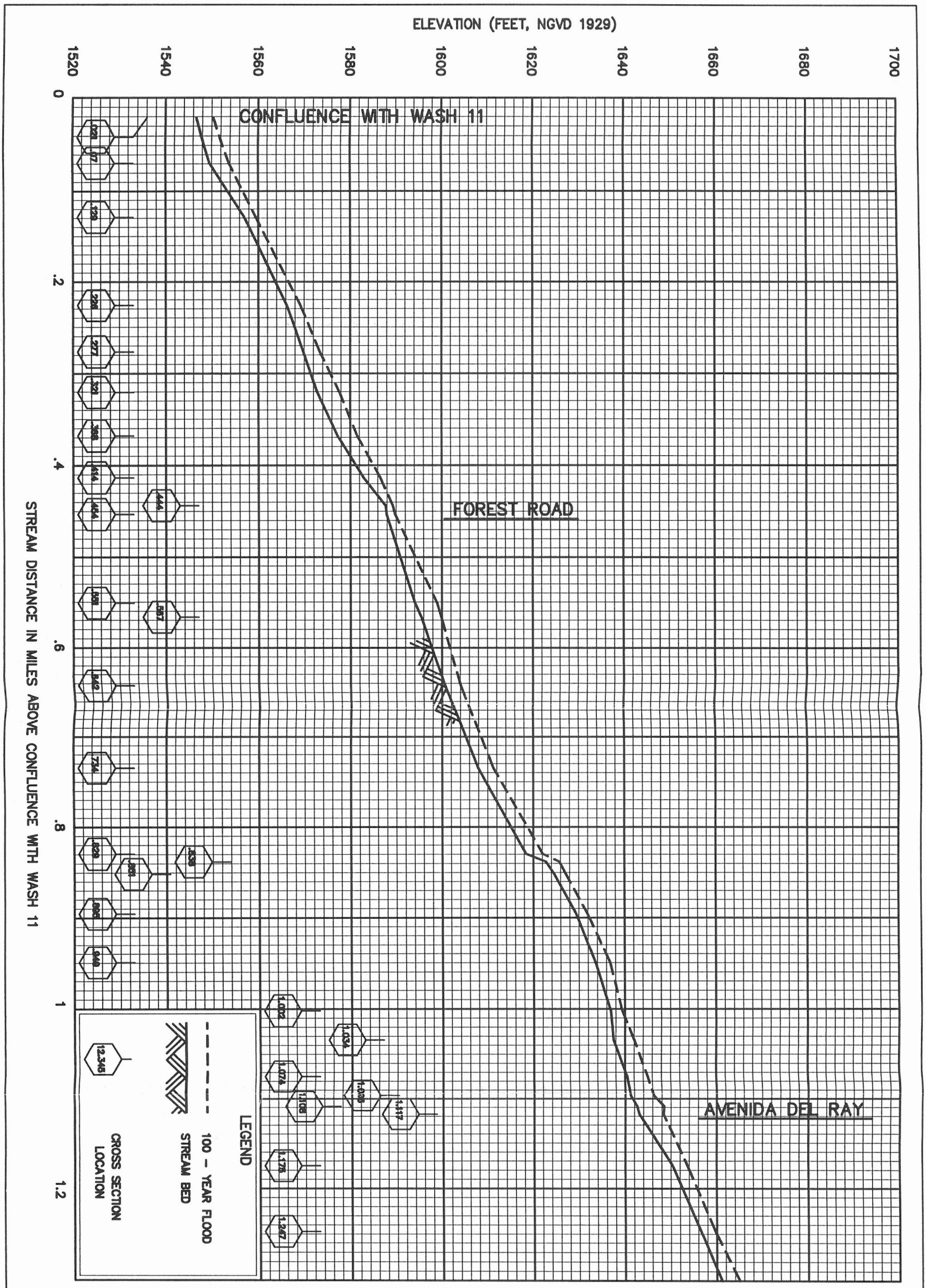
Manning-n Values: LOB: .065 CH: .045 ROB: 0 - .055



Vertical Scale 1: 10
Horizontal Scale 1: 100

08-13-1995

FLOOD PROFILES



	FEDERAL EMERGENCY MANAGEMENT AGENCY RIO VERDE SOUTH FLOOD DELINEATION STUDY	FLOOD PROFILES WASH 10

Dwg. Name: \P\89407003\FEMA\ W10FW1-P.DWG (SHEET 1 OF 2)
Date: REV. SEPT. 29,1995 05:00 pm

ELEVATION (FEET, NGVD 1929)

1640 1660 1680 1700 1720 1740 1760 1780 1800 1820

STREAM DISTANCE IN MILES ABOVE CONFLUENCE WITH WASH 11

1.3 1.5 1.7 1.9 2.1 2.3 2.5

LIMIT OF DETAILED STUDY

1,306

1,337

1,363

LEGEND

100 - YEAR FLOOD

STREAM BED

CROSS SECTION LOCATION

12,345

	FEDERAL EMERGENCY MANAGEMENT AGENCY RIO VERDE SOUTH FLOOD DELINEATION STUDY	FLOOD PROFILES WASH 10

Dwg. Name: \P\89407003\FEMA\ W10FW1-P.DWG (SHEET 2 OF 2)
Date: REV. SEPT. 29, 1995 05:00 pm

MKE McLaughlin Kmetty Engineers, Ltd.

Project Title _____ Project No. 89-407.003 Date Revised 15 Sep 95 / 6 Sep 95

Subject _____ Designed TB Page 1

Starting Water Surface Elevations and Coincident Peak Consideration

Reference FEMA 37 March 1993 version

pages 5-5,6 discusses coincident peaks.

Wash 9: Starts at critical depth since outside of floodplain mapping area. Channel reaches normal depth within the floodplain mapping area.

Wash 11: Start @ normal depth, first cross section 190 ft upstream of Verde River.

Wash 10: Wash 10 tributary to Wash 11. Verify coincident peaks:

test a: $\frac{\text{W10 drainage area}}{\text{W11 dr. area}} = \frac{13.73}{6.56} = 2.09 > 1.4$ (outside limits)

test b: $\frac{\text{W10 time to peak (24 hr without levee, Appendix G, C543)}}{\text{W11 time to peak (24 hr with levee, Table 3-20, C545)}} = \frac{12.90 \text{ hr}}{14.27 \text{ hr}}$

peaks are about 1 hour apart

test c: Liklihood of both watersheds covered by same storm being modeled is high. See Hydrology Exhibit A. A storm large enough to cover Wash 11 watershed would probably cover all of Wash 10 watershed.

Conclusion for Wash 10: Even though tests a. and b. could be considered out of range, coincident peaks should be assumed because of the peak flow rate dependence on whether or not the Section 36 levee remains in place or fails (see p. 3-69 Hydrology TDN Book 1 of 2) and because of the complex nature of the intermingling of Wash 10 and Wash 11 runoff in the confluence area.

Wash 12: Wash 12 tributary to Verde River.

$0.6 < \frac{\text{W12}}{\text{Verde}} > 1.4$ $\quad \frac{8.58}{\text{Verde}} = 0.6 \text{ or } 1.4$ $\quad$ Verde = 14.3 mi² or 6.13 mi² which is not true.

CONCLUSION For Wash 12: Coincident peaks cannot be substantiated, nevertheless Wash 12 starts at Verde River approximate WSEL for conservatism. Second cross section is at critical depth.

```
1*****************************************
*  HEC-2 WATER SURFACE PROFILES           *
*                                         *
*  Version   4.6.2;  May 1991             *
*                                         *
*  RUN DATE    14SEP95    TIME   17:37:45  *
*****************************************
```

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

```
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
```

1

THIS RUN EXECUTED 14SEP95 17:37:45

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

 Version   4.6.2;  May 1991
************************************
```

```
T1   *  Rio Verde South FIS, Wash 11                    File:W11FW1.IH2
T2   *  For: FCDMC #       93-07     By:MKE, Ltd   FB, EEK & CLJ 8-23-94
T3   *  Wash 11,100-Yr Floodplain                    Revised: 9-13-95
T4   *  Phase I GR data taken from stereo model; received on 9-07-94 from AMC
T4   *  Phase II GR data taken from stereo model; received on 4-21-95 from AMC
T5   *  200 scale 2 ft CI mapping flown by AMC on 12-22-93 and 8-22-94
T6   *  with survey control by Burgess & Niple on 10-21-93; 11-9-93; 12-9-93
T7   *  supplemental cross section data (GR & BT) surveyed by ALS as noted.
T8   *  Source of 100-Yr flowrate from HEC-1 Analysis by GVSCE. Table F-3
T9   *  Special culvert routine used.   Subcritical analysis.

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0        2         0         0     0.011         0         0         0      1501         0

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      1         0        -1         0         0         0        -1         0         0         0


J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    150       101       200

    HEC-1 Concentration Point C546      Near confluence with Verde river


QT        2       2100       2100

    START Hydraulically Similar Reach 11A
          190 ft u/s of confluence w/ Verde River

ET                           9.1                                                  9884.79    10038.41
```

```
NC     0.06       0.06       0.042

          HEC-1 Concentration Point C546    Near confluence with Verde River
          START Hydraulically Similar Reach 11A
           190 ft u/s of confluence w/ Verde River
X1    0.038         14     9884.8    10038.4
GR   1509.6    9870.4    1510.1     9884.8    1508.7     9896.9    1505.2     9921.1    1503.5     9942.8
GR   1502.2    9959.8    1500.1     9970.0    1497.9     9979.4    1497.5    10000.0    1497.8    10031.4
GR   1507.4   10038.4    1507.3    10054.6    1510.2    10069.6    1511.9    10080.2       0.0        0.0

1
   14SEP95      17:37:45                                                                          PAGE    2


ET                          9.1                                                      9974.59    10055.01

X1    0.078         17     9974.6    10055      200        220      209.3
GR   1519.3    9936.0    1519.6     9947.1    1512.4     9962.1    1509.3     9974.6    1499.6     9986.4
GR   1499.5   10000.0    1500.5    10027.9    1503.7    10042.7    1505.6    10055.0    1506.1    10082.0
GR   1507.1   10098.8    1507.1    10127.5    1508.1    10156.5    1510.0    10170.5    1513.8    10185.3
GR   1519.4   10205.4    1521.7    10216.6       0.0        0.0       0.0        0.0       0.0        0.0


ET                          9.1                                                      9971.49    10038.31

X1    0.141         17     9971.5    10038.3      360        270      334.4
GR   1521.8    9759.9    1519.5     9774.1    1513.6     9791.0    1509.7     9805.1    1508.8     9827.3
GR   1508.7    9861.3    1508.6     9894.1    1509.1     9926.7    1508.3     9949.6    1507.5     9968.3
GR   1507.1    9971.5    1504.4     9978.7    1503.2     9989.4    1503.2    10000.0    1503.1    10021.1
GR   1515.5   10038.3    1519.8    10054.0       0.0        0.0       0.0        0.0       0.0        0.0


ET                          9.1                                                      9955.39    10054.71

X1    0.203         29     9955.4    10054.7      270        340      327.7
GR   1524.1    9850.7    1523.1     9865.9    1520.8     9881.4    1519.6     9892.9    1518.7     9908.6
GR   1517.1    9919.4    1514.2     9932.3    1511.8     9946.0    1510.3     9955.4    1507.0     9961.2
GR   1507.4    9982.6    1507.1    10000.0    1506.7    10024.7    1507.2    10045.5    1509.9    10054.7
GR   1509.2   10060.9    1509.8    10071.5    1509.8    10075.5    1511.3    10083.3    1511.6    10095.7
GR   1512.2   10114.8    1512.1    10132.4    1512.5    10153.8    1513.1    10176.8    1513.3    10190.2
GR   1513.6   10203.7    1520.4    10221.7    1527.5    10239.1    1529.1    10248.2       0.0        0.0

          START Hydraulically Similar Reach 11B
          GR records removed from station  9802.5   to station     9960.6
                          and from station 10139.3   to station    10260.9
                    to restrict flow to effective area without X3 records.
           GR point added:  STA  9960.59 added for ET record


ET                          9.1                                                      9960.59    10058.01

NC    0.065       0.065       0.042

          START Hydraulically Similar Reach 11B
          GR records removed from station  9802.5   to station     9960.6
                          and from station 10139.3   to station    10260.9
                    to restrict flow to effective area without X3 records.
           GR point added:  STA  9960.59 added for ET record
X1    0.315         11     9960.6      10058      600        550      591.8
GR   1518.5    9960.59    1518.5     9960.6    1514.0     9968.1    1513.8     9995.7    1514.1    10000.0
GR   1514.2   10030.5    1514.3    10045.2    1515.7    10058.0    1516.2    10084.2    1516.4    10114.7
GR   1516.8   10139.3

          GR records removed from station  9666.2   to station     9933.0
                          and from station 10055.8   to station    10249.1
                    to restrict flow to effective area without X3 records.

1
   14SEP95      17:37:45                                                                          PAGE    3
```

```
ET                          9.1                                                 9968.59    10036.21

        GR records removed from station  9666.2   to station     9933.0
                         and from station 10055.8   to station    10249.1
                    to restrict flow to effective area without X3 records.
X1   0.380        10     9968.6    10036.2        350        320       343.5
GR   1522.2     9933.0    1521.8     9952.5     1520.6     9968.6     1518.8     9981.8     1517.9     9995.9
GR   1518.0    10000.0    1517.9    10023.4     1518.3    10031.3     1521.4    10036.2     1522.1    10055.8

    START Hydraulically Similar Reach 11C

ET                          9.1                                                 9952.49    10039.88

NC    0.07       0.07       0.05
NH       5       0.07     9952.5        0.05    10010.3        0.07    10082.8        0.05    10100.1        0.07
NH   10256

          START Hydraulically Similar Reach 11C
X1   0.458        26     9952.5    10010.3        420        370       409.4
GR   1536.2     9899.5    1536.1     9922.3     1535.4     9933.2     1530.5     9952.5     1524.9     9970.3
GR   1522.6     9974.6    1523.2     9990.9     1523.1    10000.0     1525.8    10010.3     1526.0    10026.6
GR   1526.1    10050.9    1526.3    10070.2     1525.8    10076.1     1523.5    10082.8     1523.1    10091.9
GR   1525.8    10100.1    1528.9    10110.5     1529.5    10123.8     1529.6    10131.4     1528.4    10144.0
GR   1528.1    10152.9    1529.5    10166.2     1531.7    10192.1     1533.3    10217.0     1534.7    10241.7
GR   1535.0    10256.0       0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0

    HEC-1 Concentration Point C545

          GR records deleted from Sta 9382.4 to 9522.9
              to restrict flow to effective area without X3 records.

QT        2       2010       2010

ET                          9.1                                                 9935.6     10079.5

NH        3       0.07     9967.2        0.05    10014.2        0.07    10270.2

          HEC-1 Concentration Point C545
            GR records deleted from Sta 9382.4 to 9522.9
                to restrict flow to effective area without X3 records.
X1   0.569        39     9967.2    10014.2        490        520       588.9
GR   1535.5     9522.9    1535.2     9560.8     1534.9     9597.8     1534.7     9648.3     1534.4     9708.0
GR   1534.2     9742.9    1533.5     9764.9     1534.2     9792.9     1533.6     9818.3     1533.8     9836.5
GR   1533.4     9844.3    1530.6     9848.6     1532.9     9856.6     1533.5     9879.8     1533.4     9912.0
GR   1533.2     9934.1    1533.0     9941.1     1531.4     9946.9     1531.6     9960.6     1532.5     9967.2
GR   1532.1     9974.0    1532.1     9984.9     1531.0     9989.8     1531.3    10000.0     1531.5    10006.4
GR   1533.0    10014.2    1532.0    10028.2     1531.4    10040.6     1533.1    10047.6     1533.1    10059.1
GR   1532.2    10067.0    1533.4    10079.5     1533.0    10109.8     1533.3    10143.1     1534.0    10193.6
GR   1533.8    10225.4    1533.6    10238.1     1534.5    10247.1     1534.9    10270.2

          GR records deleted from Sta 10289.3 to 10566.2
1
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              to restrict flow to effective area without X3 records.

ET                          9.1                                                 9961.42    10103.83

NH        3       0.07     9989.8        0.05    10013.3        0.07    10289.3

          GR records deleted from Sta 10289.3 to 10566.2
              to restrict flow to effective area without X3 records.
X1   0.638        49     9989.8    10013.3        330        360       363.7
GR   1541.7     9455.7    1541.4     9475.2     1540.4     9496.4     1539.9     9511.8     1540.3     9531.7
GR   1539.4     9545.8    1539.3     9548.3     1540.6     9558.9     1540.3     9582.8     1539.8     9615.1
GR   1539.3     9656.9    1539.4     9701.4     1539.5     9739.7     1539.5     9769.7     1539.0     9798.0
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 GR   1538.4     9810.4     1538.1     9818.9     1538.7     9833.7     1537.2     9842.4     1538.7     9857.9
 GR   1538.9     9879.5     1539.0     9896.0     1537.0     9905.1     1537.4     9912.1     1538.9     9917.4
 GR   1539.2     9925.0     1538.6     9931.7     1537.1     9938.7     1537.4     9949.0     1538.6     9958.9
 GR   1538.6     9969.9     1537.7     9978.5     1537.9     9989.8     1535.8     9993.2     1535.3     10000.0
 GR   1535.4    10006.5     1537.7    10013.3     1538.2    10037.2     1538.0    10065.4     1538.3     10091.0
 GR   1538.1      10095     1535.3    10100.3     1535.3    10109.4     1535.9    10119.5     1537.5     10132.1
 GR   1538.3    10149.5     1538.9    10190.4     1539.1    10245.8     1539.2    10289.3

           GR records deleted from Sta 10643.7 to 10709.1
               to restrict flow to effective area without X3 records.

 ET                          9.1                                                    9920      10187.6

 NH        3       0.07     9981.6       0.05    10035.1       0.07    10643.7

           GR records deleted from Sta 10643.7 to 10709.1
               to restrict flow to effective area without X3 records.
 X1    0.700          43     9981.6    10035.1         290         330     329.3
 GR   1544.0      9621.7     1544.1     9634.5     1543.2     9642.5     1543.4     9661.3     1543.2     9693.2
 GR   1543.0      9733.0     1542.7     9775.0     1543.1     9811.2     1543.1     9840.1     1542.7     9861.7
 GR   1542.7      9892.4     1542.6     9934.7     1542.5     9962.9     1542.9     9981.6     1540.3     9994.9
 GR   1540.1     10000.0     1540.2    10008.6     1542.2    10011.6     1542.8    10035.1     1542.4    10064.4
 GR   1542.6     10108.5     1543.1    10151.1     1543.8    10187.6     1543.2    10193.1     1542.0    10198.3
 GR   1543.4     10207.4     1543.3    10217.7     1543.1    10228.2     1543.5    10254.5     1543.5    10272.7
 GR   1542.8     10305.8     1542.8    10339.6     1542.8    10372.1     1542.7      10389     1539.4    10392.8
 GR   1541.1     10404.3     1542.0    10426.2     1542.1    10468.5     1542.5    10498.8     1542.9    10535.1
 GR   1543.3     10562.0     1543.4    10595.3     1543.8    10643.7

           GR records deleted from Sta 9620.5 to 9774.3 and from
                Sta 10689.8 to 10724.9
               to restrict flow to effective area without X3 records.

 ET                          9.1                                                  9961.79     10063.7

 NH        3       0.07     9961.8       0.05    10025.1       0.07    10689.8

1
    14SEP95      17:37:45                                                                    PAGE    5


           GR records deleted from Sta 9620.5 to 9774.3 and from
                Sta 10689.8 to 10724.9
               to restrict flow to effective area without X3 records.
 X1    0.747          45     9961.8    10025.1         255         260     246.5
 GR   1548.6      9774.3     1548.1     9813.2     1547.7     9853.8     1547.5     9890.0     1546.8     9917.9
 GR   1546.3      9940.2     1546.6     9961.8     1544.5     9972.0     1543.8     9997.4     1543.9    10000.0
 GR   1543.8     10018.5     1545.9    10025.1     1546.6    10063.7     1547.1    10103.1     1547.4    10140.7
 GR   1547.3     10150.7     1545.5    10161.1     1546.5    10171.0     1546.3      10176     1545.6    10178.5
 GR   1547.0     10194.7     1547.4    10213.1     1547.5    10242.1     1547.5    10243.0     1547.5    10289.2
 GR   1547.4     10335.2     1547.3    10369.1     1546.3    10395.2     1545.8    10421.7     1546.6    10445.4
 GR   1546.3     10475.5     1546.4    10498.4     1546.0    10514.2     1544.6    10518.1     1544.7    10519.8
 GR   1546.3     10530.1     1546.0    10538.2     1545.5    10543.6     1546.1      10552     1546.4    10583.2
 GR   1546.8     10618.9     1547.0    10645.3     1546.8    10652.4     1547.6    10671.9     1548.1    10689.8


 ET                          9.1                                                  9988.69     10066.21

 NH        4       0.07     9988.7       0.05      10026       0.045   10060.1       0.07    10794.6

        [[[ Wash 11 cross section 0.783 equals Wash 10 cross section 0.021]]]
 X1    0.783          60     9988.7      10026         180         220     191.6
 GR   1551.5      9685.9     1550.6     9692.5     1551.4     9702.2     1551.1     9721.3     1551.2     9747.7
 GR   1551.2      9775.5     1550.6     9810.9     1550.5     9845.4     1550.5     9888.1     1550.3     9918.3
 GR   1549.7      9931.7     1548.5     9940.9     1547.1     9943.9     1549.0     9953.0     1547.2     9957.6
 GR   1548.3      9974.5     1549.2     9988.7     1547.9     9997.3     1547.6    10000.0     1548.7    10011.6
 GR   1548.9     10026.0     1548.6    10035.9     1547.8    10046.4     1546.6    10050.0     1546.8    10059.5
 GR   1547.4     10060.1     1549.5    10066.2     1549.6    10091.7     1550.1    10134.4     1550.6    10171.8
 GR   1550.3     10211.5     1550.0    10228.3     1550.1    10258.6     1550.6    10297.9     1551.0    10342.5
```

```
GR   1551.1    10377.2     1550.5    10415.6     1550.3    10450.3     1550.2    10484.7     1549.9    10505.3
GR   1549.9    10512.2     1549.0    10516.5     1550.4    10530.0     1549.0    10533.2     1548.9    10540.2
GR   1549.8    10546.9     1550.0    10581.0     1549.7    10612.5     1550.0    10629.1     1549.4    10645.0
GR   1547.9    10655.8     1549.5    10662.1     1549.9    10674.9     1549.9    10688.8     1547.9    10697.1
GR   1549.8    10703.6     1550.3    10724.5     1550.3    10752.9     1550.5    10782.7     1550.6    10794.6


          GR records deleted from Sta 9615.5 to 9798.9
                      and from station 10793.0   to station   10848.9
              to restrict flow to effective area without X3 records.


ET                          9.1                                                   9995.19     10237.2

NH        5       0.07      9995.2        0.05      10016.2        0.07      10212.7        0.45      10237.2        0.07
NH    10793

        [[[ Wash 11 cross section 0.815 equals Wash 10 cross section 0.070 ]]]
           GR records deleted from Sta 9615.5 to 9798.9
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                          and from station 10793.0   to station   10848.9
                 to restrict flow to effective area without X3 records.
X1    0.815         52     9995.2    10016.2         165         190       169.2
GR   1554.0     9798.9     1553.4     9825.5      1552.8      9869.3      1553.0     9903.3     1552.8     9937.9
GR   1552.5     9972.6     1552.0     9995.2      1549.5     10000.0      1549.5    10008.0     1552.0    10016.2
GR   1552.6    10031.9     1550.9    10045.3      1550.8     10055.6      1552.3    10068.2     1552.7    10093.5
GR   1552.4    10102.1     1553.5    10132.7      1553.2     10157.4      1553.9    10181.4     1553.9    10197.1
GR   1553.7    10212.7     1551.2      10219      1551.3     10225.0      1551.2    10231.4     1553.8    10237.2
GR   1553.9    10257.7     1553.9    10287.6      1554.0     10317.2      1554.3    10339.4     1554.7    10375.1
GR   1554.8    10400.6     1554.5    10432.7      1554.0     10474.8      1554.0    10515.4     1553.9    10552.7
GR   1553.2    10569.6     1552.9    10578.6      1552.2     10585.0      1553.8    10593.7     1553.8    10620.1
GR   1553.8    10627.1     1553.9    10650.5      1553.1     10664.7      1553.2    10673.5     1551.0    10683.4
GR   1553.7    10690.5     1553.5    10707.2      1553.3     10719.9      1553.2    10732.4     1553.6    10751.1
GR   1553.8    10773.7     1554.0    10793.0

        Discharge = 740 (Q100 Wash 11) +   210 (Wash10 split at Forest Rd)
        Discharge =         950

         GR records removed from station  9760.7   to station     9961.8
                      and from station 10237.8   to station    10959.1
                 to restrict flow to effective area without X3 records.


QT        2        950         950

ET                          9.1                                                   9980.19     10049.91

NH        3       0.07      9980.2        0.05      10049.9        0.07      10237.8

        [[[ Wash 11 cross section 0.894 equals Wash 10 cross section 0.129 ]]]
         Discharge=740 (Q100 Wash 11) + 210 (wash10 split at Forest Rd)
         Discharge =         950
         GR records removed from station  9760.7   to station     9961.8
                      and from station 10237.8   to station    10959.1
                 to restrict flow to effective area without X3 records.
X1    0.894         18     9980.2    10049.9         385         335       415.9
GR   1559.4     9961.8     1559.4     9980.2      1558.7      9991.4      1557.0     9995.2     1557.0    10000.0
GR   1557.4    10011.5     1557.1    10026.3      1556.9     10046.5      1558.2    10049.9     1558.3    10061.4
GR   1558.5    10080.7     1557.8    10102.0      1557.0     10105.8      1558.0    10119.6     1558.3    10159.6
GR   1559.1    10188.9     1558.8    10199.3      1559.4     10237.8


ET                          9.1                                                   9800.0      10012.61

NH        3       0.07      9988.6        0.05      10012.6        0.07      10032.6
```

GR records removed from station 10032.6 to station 11040.2
to restrict flow to effective area without X3 records.

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GR records removed from station 10032.6 to station 11040.2
to restrict flow to effective area without X3 records.

```
X1    0.985      26     9988.6   10012.6      425       540      481.0
GR   1568.8  9561.7   1568.6    9605.0   1567.4    9639.3   1567.4   9671.1   1567.0   9707.8
GR   1565.3  9746.5   1565.3    9759.9   1566.0    9797.8   1565.8   9819.6   1566.0   9825.1
GR   1565.0  9830.4   1565.6    9844.8   1565.7    9862.3   1565.6   9875.3   1564.6   9878.0
GR   1565.3  9885.0   1566.3    9891.0   1566.1    9908.8   1566.5   9938.7   1566.3   9967.8
GR   1566.7  9988.6   1566.0    9996.1   1565.0   10000.0   1565.1  10009.7   1566.8  10012.6
GR   1567.0 10032.6

ET                        9.1                                                 9898.17  10013.21

NH       3      0.07     9981.0      0.05    10013.2       0.07    10106.6
```

GR records removed from station 10106.6 to station 10856.2
to restrict flow to effective area without X3 records.

GR records removed from station 10106.6 to station 10856.2
to restrict flow to effective area without X3 records.

```
X1    1.034      32     9981.0   10013.2      250       260      256.2
GR   1573.2  9575.6   1572.7    9603.9   1571.7    9653.0   1571.2   9693.9   1571.3   9727.7
GR   1570.6  9744.6   1570.0    9759.6   1570.9    9765.4   1571.1   9784.1   1570.4   9799.5
GR   1568.3  9815.8   1570.5    9832.9   1570.9    9856.7   1569.8   9871.9   1569.7   9873.9
GR   1570.9  9881.6   1569.6    9889.4   1570.9    9896.5   1570.8   9911.2   1570.6   9924.3
GR   1569.9  9931.5   1571.1    9942.5   1571.0    9962.3   1571.1   9981.0   1570.9   9992.9
GR   1569.3  9995.6   1569.2   10000.0   1569.4   10008.2   1570.8  10013.2   1571.4  10034.0
GR   1571.5 10072.6   1572.1   10106.6

ET                        9.1                                                 9795.0  10021.51

NC     0.07      0.07      0.05
```

Extend Cross Section on left (north) side to contain flows
GR records removed from station 10117.9 to station 10949.1
to restrict flow to effective area without X3 records.

Xsection 1.072 extended on left (north) side to contain flows
GR records removed from station 10117.9 to station 10949.1
to restrict flow to effective area without X3 records.

```
X1    1.072      27     9981.5   10021.5      180       220      202.4
X4        1  1573.9     9670.1
GR   1573.9   9580     1573.9    9676.9   1573.0    9694.5   1572.9   9707.1   1572.9   9721.3
GR   1573.6  9741.7   1573.6    9771.5   1573.0    9798.1   1573.3   9818.3   1573.7   9839.2
GR   1573.6  9854.0   1572.4    9858.5   1574.0    9873.0   1574.8   9888.6   1574.7   9922.1
GR   1574.5  9956.6   1574.7    9981.5   1573.9    9994.8   1572.6  10000.0   1573.0  10011.0
GR   1574.5 10021.5   1574.7   10037.0   1573.9   10047.5   1573.4  10057.1   1575.0  10065.3
GR   1575.2 10092.5   1575.4   10117.9
```

GR records removed from station 9746.5 to station 9828.3
and from station 10150.2 to station 10871.3
to restrict flow to effective area without X3 records.

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```
ET                        9.1                                                 9950.0  10100.0
```

GR records removed from station 9746.5 to station 9828.3
and from station 10150.2 to station 10871.3
to restrict flow to effective area without X3 records.

```
X1    1.128        19     9970.3    10010.2        290        215      297.0
GR    1580.5     9828.3    1580.0     9841.0     1579.7     9875.4    1579.2     9915.4    1579.3     9944.8
GR    1579.2     9970.3    1578.9     9990.1     1577.9     9998.1    1578.0    10000.0    1578.1    10005.3
GR    1579.8    10010.2    1579.9    10030.7     1578.0    10034.0    1579.9    10040.7    1579.8    10069.2
GR    1579.9    10104.2    1580.0    10134.7     1579.6    10140.6    1580.4    10150.2

  Effective flow area at section 1.193 defined by approx. expansion ratio 4:1

        GR records removed from station  9730.0   to station    9978.5
                     and from station 10116.0   to station   10995.2
              to restrict flow to effective area without X3 records.
          GR point added:  STA  9978.49, 10116.01 added for ET record.


ET                          9.1                                                  9978.49    10116.01

        Effective flow area at section 1.193 defined by approx. expansion ratio
        GR records removed from station  9730.0   to station    9978.5
                     and from station 10116.0   to station   10995.2
              to restrict flow to effective area without X3 records.
          GR point added:  STA  9978.49, 10116.01 added for ET record.
X1    1.189        12     9978.5      10026        310        230      318.8
GR    1584.6    9978.49    1584.6     9978.5     1583.2     9994.2    1581.5     9997.7    1581.8    10000.0
GR    1583.7    10010.8    1584.0    10026.0     1585.0    10051.3    1585.0    10066.3    1585.0    10083.7
GR    1585.3    10116.0    1585.3   10116.01
    RM 1.201 = Forest Rd. Crossing


ET                          9.1                                                  9797.09    10137.41

NC     .022       .022       .022

        RM 1.201 = Forest Rd. Crossing
X1    1.201        35     9797.1     10137.4         60        160      63.3
GR    1587.1     9682.0    1587.4     9724.8     1587.8     9761.2    1587.9     9797.1    1587.7     9837.3
GR    1587.0     9873.7    1586.2     9910.1     1585.2     9949.5    1584.6     9977.1    1584.6     9999.6
GR    1584.7    10000.0    1585.0    10036.0     1586.0    10081.1    1586.6    10137.4    1586.5    10173.2
GR    1586.8    10206.3    1587.7    10255.2     1588.5    10298.9    1588.6    10312.0    1588.7    10352.1
GR    1588.5    10394.8    1588.5    10438.4     1588.4    10479.6    1588.1    10529.6    1587.8    10568.9
GR    1587.7    10598.5    1588.5    10637.9     1588.7    10679.4    1588.8    10687.0    1589.0    10734.9
GR    1589.2    10779.0    1589.0    10829.6     1589.2    10881.4    1589.4    10943.9    1589.4    10945.0

    HEC-1 Concentration Point C536      At Forest Rd.

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QT        2        740        740

ET                          9.1                                                  9951.19    10027.41

NC     0.07       0.07       0.05

        GR records removed from station 10046.6   to station   10928.1
                to restrict flow to effective area without X3 records.

        HEC-1 Concentration Point C536      At Forest Rd.
        GR records removed from station 10046.6   to station   10928.1
                to restrict flow to effective area without X3 records.
X1    1.218        15     9951.2     10027.4         90         50      88.6
GR    1590.9     9761.0    1590.8     9779.7     1590.6     9803.2    1589.5     9824.2    1588.9     9854.7
GR    1588.3     9883.2    1587.8     9911.8     1587.2     9929.8    1586.8     9951.2    1585.3     9963.3
GR    1585.2     9986.1    1585.0    10000.0     1585.1    10011.8    1587.5    10027.4    1587.7    10046.6

    START Hydraulically Similar Reach 11D


NC     0.07       0.07       0.05
```

```
   25.67ft downstream of culvert.Fully expanded flow. Special Culvert Section # 1
             GR data is survey data from ALS book 1, page 26, top.

          START Hydraulically Similar Reach 11D
          25.67ft downstream of culvert.Fully expanded flow. Special Culvert Sect
             GR data is survey data from ALS book 1, page 26, top.
X1    1.257          9     9962.3    10032.4         209         210       209.4
GR   1590.5     9935.4     1590.5     9962.3      1590.2      9964.2      1585.7      9981.6      1585.2       10000
GR     1586    10015.6     1589.9    10029.1      1590.7     10032.4      1591.9     10061.2

     Use NC record to set Contraction and Expansion Coefficients for Culvert


ET                  0       0.41

NC                                      .3          .5

     Culvert Outlet              Special Culvert Section # 2
   4 - 4' x 10'   Concrete Box Culvert   crossing Agua Verde Drive
     Cross section 4 ft d/s of outlet

     Effective flow area = culvert width + expansion ratio 4:1
            Cross-section 1.261 GR data constructed from culvert survey data
            and data from cross-section 1.257.

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          Use NC record to set Contraction and Expansion Coefficients for Culvert
          Culvert Outlet              Special Culvert Section # 2
          4 - 4' x 10'   Concrete Box Culvert
          Cross section 4 ft d/s of outlet
          Effective flow area = culvert width + expansion ratio 4:1
            Cross-section 1.261 GR data constructed from culvert survey data
            and data from cross-section 1.257.
X1    1.261          12     9979.9    10020.1       21.73       21.73       21.73
X3       10                                                                 1593.1      1593.1
GR   1595.0     9926.6     1594.6     9931.6      1591.3      9975.9      1588.8      9978.9      1588.8      9979.9
GR   1588.8    10020.1     1588.8    10021.1      1591.3     10024.1      1594.1     10038.7      1594.8     10085.0
GR     1595    10087.5     1595.2    10128.9


SC    4.012         0.4          3          0           4          10          38        12.1      1589.7      1588.8

     Culvert Inlet               Special Culvert Section # 3, 4 ft u/s of inlet
            Cross-section 1.270 GR data constructed from culvert survey data
            and data from cross-section 1.276.
             BT information surveyed by ALS, Book 1, page 24.
            BT and GR's match at ends.

     Effective flow area by contraction ratio 1:1

          Culvert Inlet               Special Culvert Section # 3, 4 ft u/s of in
            Cross-section 1.270 GR data constructed from culvert survey data
            and data from cross-section 1.276.
             BT information surveyed by ALS, Book 1, page 24.

X1    1.270          12     9975.9    10024.1       45.62       45.62       45.62
X2                    2     1593.7     1594.9
X3       10                                                                 1594.5      1594.5

BT       -8     9926.6     1595.0                9931.6      1594.6                  9977.8      1594.6
BT              10021.0     1594.7               10078.4      1594.7                 10085.0      1594.8
BT              10087.5     1595.0               10128.9      1595.2

GR   1595.0     9926.6     1594.6     9931.6      1592.2      9975.9      1589.7      9978.9      1589.7      9979.9
```

```
GR   1589.7    10020.1    1589.7    10021.1      1592.2     10024.1      1594.1     10038.7      1594.8     10085.0
GR     1595    10087.5    1595.2    10128.9

  Return Contraction and Expansion Coefficients to Normal


ET                          9.1                                                                  9945.21    10040.72

NC                                                    .1          .3

            u/s of culvert fully expanded flow. Special culvert section # 4
            GR data is survey data from ALS book 1, page 26, bottom.

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         Effective flow area by contraction ratio 1:1
         Return Contraction and Expansion Coefficients to Normal
            u/s of culvert fully expanded flow.Special culvert section # 4
            GR data is survey data from ALS book 1, page 26, bottom.
X1    1.276          6     9945.2    10037.9       32.59       32.59       32.59
GR   1593.2     9945.2    1591.0     9976.8      1590.5       10000      1590.7     10009.6      1593.3     10037.9
GR   1594.1      10061

    START Hydraulically Similar Reach 11E


ET                          9.1                                                                  9935.69    10052.51

NC     0.07       0.07       0.03

           START Hydraulically Similar Reach 11E
X1    1.310         23     9935.7    10052.5         165         179       177.4
GR   1599.5     9742.7    1599.5     9767.0      1599.3      9798.8      1599.3      9830.3      1598.2      9865.1
GR   1598.2     9899.6    1597.9     9935.7      1597.2      9971.3      1596.4      9987.0      1595.9     10000.0
GR   1596.1    10016.6    1596.4    10036.2      1598.1     10052.5      1597.7     10071.2      1597.1     10093.8
GR   1598.1    10126.5    1598.5    10152.4      1598.9     10176.9      1599.2     10195.0      1598.7     10200.5
GR   1598.9    10207.0    1600.0    10214.7      1599.9     10217.7         0.0         0.0         0.0         0.0


ET                          9.1                                                                  9951.59    10081.71

X1    1.425         23     9951.6    10081.7         580         620       607.6
GR   1614.4     9821.9    1614.9     9838.0      1613.5      9848.8      1610.9      9861.8      1610.0      9871.1
GR   1610.3     9887.5    1610.7     9906.6      1611.6      9929.9      1612.7      9951.6      1609.7      9972.2
GR   1606.9     9986.6    1607.0     9999.3      1606.5     10000.0      1606.7     10014.9      1610.7     10037.0
GR   1612.0    10061.9    1616.7    10081.7      1616.6     10114.0      1616.6     10171.7      1616.2     10198.6
GR   1616.4    10219.8    1616.3    10244.8      1616.5     10259.9         0.0         0.0         0.0         0.0


ET                          9.1                                                                  9942.49    10078.01

X1    1.536         26     9942.5     10078         590         583       586.2
GR   1622.5     9813.9    1622.8     9836.2      1622.2      9850.3      1621.1      9865.8      1621.6      9878.8
GR   1622.2     9889.2    1621.9     9906.2      1622.7      9924.2      1623.0      9938.2      1622.6      9942.5
GR   1619.3     9971.8    1617.5     9988.4      1617.1     10000.0      1617.3     10011.5      1618.0     10027.2
GR   1618.7    10044.1    1621.3    10071.5      1622.1     10078.0      1623.2     10090.6      1623.2     10107.7
GR   1623.0    10119.6    1623.3    10137.1      1623.5     10155.9      1624.5     10169.2      1627.1     10186.6
GR   1627.5    10188.9       0.0        0.0         0.0         0.0         0.0         0.0         0.0         0.0

        GR records removed from station  9815.6   to station     9955.0
                     and from station 10047.6   to station    10196.7
              to restrict flow to effective area without X3 records.
          GR point added:  STA 10047.61 added for ET record
          GR point added:  STA  9954.99 added for ET record

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```
ET                          9.1                                                 9954.99    10047.61

         GR records removed from station  9815.6   to station     9955.0
                 and from station 10047.6   to station    10196.7
                 to restrict flow to effective area without X3 records.
           GR point added:  STA 10047.61 added for ET record
           GR point added:  STA  9954.99 added for ET record
X1   1.635         9       9955    10047.6        565         503       522.0
GR  1634.1    9954.99     1634.1     9955.0     1633.2      9961.5     1630.8     9976.7     1630.3     10000.0
GR  1629.7   10012.4      1634.1    10034.7     1635.4     10047.6     1635.4    10047.61

         GR records removed from station  9584.2   to station     9949.1
                    and from station 10059.2   to station    10227.5
                 to restrict flow to effective area without X3 records.
           GR point added:  STA 10059.21 added for ET record


ET                          9.1                                                 9967.09    10059.21

         GR records removed from station  9584.2   to station     9949.1
                 and from station 10059.2   to station    10227.5
                 to restrict flow to effective area without X3 records.
           GR point added:  STA 10059.21 added for ET record
X1   1.728        11       9975    10059.2        455         495       493.8
GR  1647.0    9949.1      1646.8     9975.0     1645.1      9984.4     1644.1     9996.7     1644.1     10000.0
GR  1644.1   10009.3      1646.3    10024.9     1647.0     10034.9     1648.6    10046.7     1649.3     10059.2
GR  1649.3   10059.21


         GR records removed from station  9646.1   to station     9941.7
                    and from station 10044.6   to station    10239.2
                 to restrict flow to effective area without X3 records.
           GR point added:  STA 10044.61 added for ET record


ET                          9.1                                                 9956.19    10044.61

         GR records removed from station  9646.1   to station     9941.7
                 and from station 10044.6   to station    10239.2
                 to restrict flow to effective area without X3 records.
           GR point added:  STA 10044.61 added for ET record
X1   1.831         8       9956.2    10044.6        560.0       565.0       541.8
GR  1660.0    9941.7      1659.4     9956.2     1657.3      9972.4     1656.0     9987.6     1655.8     10000.0
GR  1656.3   10025.8      1659.6    10044.6     1659.6     10044.61

  Elevation for Sta 10000 was interpolated for the following X-section
         GR records removed from station  9844.8   to station     9963.3
                    and from station 10027.5   to station    10122.7
                 to restrict flow to effective area without X3 records.
           GR point added:  STA  9963.29 added for ET record
           GR point added:  STA 10027.51 added for ET record

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ET                          9.1                                                 9963.29    10027.51

         Elevation for Sta 10000 was interpolated for the following X-section
         cross section data surveyed by Alcocer Land Surveyors.
         GR records removed from station  9844.8   to station     9963.3
                 and from station 10027.5   to station    10122.7
                 to restrict flow to effective area without X3 records.
           GR point added:  STA  9963.29 added for ET record
           GR point added:  STA 10027.51 added for ET record
X1   1.889         8       9963.3    10027.5        310.0       310.0       305.5
GR  1667.3    9963.29     1667.3     9963.3     1664.2      9982.8     1664.2    10000.0     1664.1     10001.7
GR  1663.8   10013.5      1666.4    10027.5     1666.4     10027.51
```

```
   Elevation for Sta 10000 was interpolated for the following X-section
         GR records removed from station  9894.5   to station     9969.1
                       and from station 10056.0   to station    10119.3
                  to restrict flow to effective area without X3 records.
           GR point added:  STA  9969.09 added for ET record
           GR point added:  STA 10056.01 added for ET record


ET                              9.1                                                    9969.09    10056.01

          Elevation for Sta 10000 was interpolated for the following X-section
          cross section data surveyed by Alcocer Land Surveyors.
          Elevation for Sta 10000 was interpolated for the following X-section
          GR records removed from station  9894.5   to station     9969.1
                   and from station 10056.0   to station    10119.3
                   to restrict flow to effective area without X3 records.
            GR point added:  STA  9969.09 added for ET record
            GR point added:  STA 10056.01 added for ET record
X1    1.907          9     9969.1    10056.0       100.0       110.0        97.4
GR   1668.4    9969.09     1668.4     9969.1      1666.1      9984.5      1666.0    10000.0      1666.0     10005.4
GR   1666.3   10020.3      1668.3    10040.5      1669.6     10056.0      1669.6   10056.01

   Elevation for Sta 10000 was interpolated for the following X-section
         GR records removed from station  9823.3   to station     9931.3
                       and from station 10032.9   to station    10127.5
                  to restrict flow to effective area without X3 records.
           GR point added:  STA  9931.29 added for ET record
           GR point added:  STA 10032.91 added for ET record


ET                              9.1                                                    9931.29    10032.91

          Elevation for Sta 10000 was interpolated for the following X-section
          cross section data surveyed by Alcocer Land Surveyors.
          Elevation for Sta 10000 was interpolated for the following X-section
1
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          GR records removed from station  9823.3   to station     9931.3
                   and from station 10032.9   to station    10127.5
                   to restrict flow to effective area without X3 records.
            GR point added:  STA  9931.29 added for ET record
            GR point added:  STA 10032.91 added for ET record
X1    1.963          9     9931.3    10032.9       325.0       310.0        293.8
GR   1675.5    9931.29     1675.5     9931.3      1673.2      9967.5      1671.5     9988.6      1671.5     10000.0
GR   1671.4   10002.5      1672.0    10017.5      1675.1     10032.9      1675.1   10032.91

    HEC-1 Concentration Point C575


QT        2        740        740

   Elevation for Sta 10000 was interpolated for the following X-section
         GR records removed from station  9735.0   to station     9925.4
                       and from station 10017.8   to station    10223.9
                  to restrict flow to effective area without X3 records.
           GR point added:  STA 10017.81 added for ET record

ET                              9.1                                                    9950.09    10017.81

          HEC-1 Concentration Point C575
          Elevation for Sta 10000 was interpolated for the following X-section
          cross section data surveyed by Alcocer Land Surveyors.
          GR records removed from station  9735.0   to station     9925.4
                   and from station 10017.8   to station    10223.9
                   to restrict flow to effective area without X3 records.
            GR point added:  STA 10017.81 added for ET record
X1    2.011          8     9950.1    10017.8       230.0       230.0        255.2
GR   1680.4     9925.4     1679.6     9950.1      1676.4      9962.2      1676.4     9978.1      1676.6     10000.0
GR   1676.7    10006.1     1680.5    10017.8      1680.5    10017.81
```

```
     START Hydraulically Similar Reach 11F
          GR records removed from station  9897.0   to station     9979.2
                        and from station 10058.1   to station    10085.0
                  to restrict flow to effective area without X3 records.
            GR point added:  STA  9979.19 added for ET record


ET                              9.1                                                                  9979.19    10024.31

NC      .060        .060         .05

          START Hydraulically Similar Reach 11F
          GR records removed from station  9897.0   to station     9979.2
                  and from station 10058.1   to station    10085.0
                  to restrict flow to effective area without X3 records.
            GR point added:  STA  9979.19 added for ET record
X1     2.109          12     9979.2    10024.3       500.0       480.0       516.7
GR    1690.1     9979.19     1690.1     9979.2      1688.4      9990.6      1686.7     9996.7      1686.5     10000.0
GR    1685.6     10011.3     1685.4     10014.6     1687.6     10019.3      1688.7     10024.3     1689.1     10034.1
GR    1689.3     10045.7     1691.3     10058.1

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          GR records removed from station  9859.8   to station     9972.0
                        and from station 10029.7   to station    10063.1
                  to restrict flow to effective area for without X3 records.
            GR point added:  STA  9971.99 added for ET record
            GR point added:  STA 10029.71 added for ET record


ET                              9.1                                                                  9971.99    10029.71

          GR records removed from station  9859.8   to station     9972.0
                  and from station 10029.7   to station    10063.1
                  to restrict flow to effective area without X3 records.
            GR point added:  STA  9971.99 added for ET record
            GR point added:  STA 10029.71 added for ET record
X1     2.208          12     9972.0    10029.7       515.0       525.0       520.8
GR    1701.1     9971.99     1701.1     9972.0      1700.0      9981.9      1699.0     9988.7      1696.2      9991.5
GR    1696.8      9995.0     1696.7     10000.0     1696.5     10003.6      1699.1     10010.1     1700.1     10019.9
GR    1701.1     10029.7     1701.1    10029.71

ET                              9.1                                                                  9961.89    10059.71

X1     2.299          18     9961.9    10059.7       475.0       500.0       484.9
GR    1714.1      9927.3     1714.8     9937.1      1714.5      9949.1      1713.9     9961.9      1712.3      9978.0
GR    1711.0      9993.1     1710.7     10000.0     1710.5     10000.0      1709.4     10009.5     1710.8     10022.9
GR    1711.7     10033.0     1712.5     10046.6     1713.3     10059.7      1714.5     10074.9     1716.4     10089.6
GR    1717.2     10102.9     1717.7     10113.9     1717.5     10114.2

          GR records removed from station  9873.5   to station     9944.9
                        and from station 10077.2   to station    10219.6
                  to restrict flow to effective area without X3 records.
            GR point added:  STA  9944.89 added for ET record
            GR point added:  STA 10077.21 added for ET record


ET                              9.1                                                                  9944.89    10077.21

          cross section data surveyed by Alcocer Land Surveyors.
          GR records removed from station  9873.5   to station     9944.9
                  and from station 10077.2   to station    10219.6
                  to restrict flow to effective area without X3 records.
            GR point added:  STA  9944.89 added for ET record
            GR point added:  STA 10077.21 added for ET record
X1     2.363           7     9944.9    10077.2       350.0       350.0       338.2
GR    1723.0     9944.89     1723.0     9944.9      1720.4     10000.0      1719.1     10035.5     1719.8     10067.9
```

```
GR   1725.1    10077.2     1725.1   10077.21

     START Hydraulically Similar Reach 11G
          GR records removed from station  9805.6   to station     9902.6
                        and from station 10039.9   to station    10183.6
                   to restrict flow to effective area without X3 records.
            GR point added:  STA 10039.91 added for ET record

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ET                            9.1                                                 9947.29    10039.91

NC      .060       .024       .024

          START Hydraulically Similar Reach 11G
          GR records removed from station  9805.6   to station     9902.6
                   and from station 10039.9   to station    10183.6
                   to restrict flow to effective area without X3 records.
            GR point added:  STA 10039.91 added for ET record
X1    2.406          6     9947.3    10039.9       225.0       215.0       226.4
GR   1729.6     9902.6     1727.8     9947.3      1724.1     10000.0      1724.0     10029.9      1730.6     10039.9
GR   1730.6   10039.91

          GR records removed from station  9862.7   to station     9960.2
                        and from station 10042.6   to station    10065.7
                   to restrict flow to effective area without X3 records.
            GR point added:  STA  9960.19 added for ET record
            GR point added:  STA 10042.61 added for ET record


ET                            9.1                                                 9960.19    10042.61

          GR records removed from station  9862.7   to station     9960.2
                   and from station 10042.6   to station    10065.7
                   to restrict flow to effective area without X3 records.
            GR point added:  STA  9960.19 added for ET record
            GR point added:  STA 10042.61 added for ET record
X1    2.438          6     9960.2    10042.6       175.0       165.0       168.7
GR   1732.7     9960.19     1732.7     9960.2      1727.2     10000.0      1727.9     10033.0      1734.2     10042.6
GR   1734.2   10042.61

     START Hydraulically Similar Reach 11H


ET                            9.1                                                 9922.49    10043.61

NC      .070       .070       .045

          START Hydraulically Similar Reach 11H
          cross section data surveyed by Alcocer Land Surveyors.
X1    2.470          8     9922.5    10043.6       175.0       165.0       165.2
GR   1733.4     9824.9     1733.0     9922.5      1731.1     10000.0      1733.2     10043.6      1738.5     10052.8
GR   1733.9    10077.5     1734.5    10103.1      1734.1     10155.7

          GR records removed from station  9849.9   to station     9949.4
                        and from station 10175.3   to station    10826.1
                   to restrict flow to effective area without X3 records.

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ET                            9.1                                                 9960.69    10093.01

          GR records removed from station  9849.9   to station     9949.4
                   and from station 10175.3   to station    10826.1
                   to restrict flow to effective area without X3 records.
```

```
X1    2.568       25     9960.7   10093.0      520.0      520.0      517.1
GR    1746.0    9949.4   1746.0    9960.7    1745.2     9967.9     1744.6    9977.7    1744.8    9986.3
GR    1744.5    9991.7   1744.2   10000.0    1744.4    10015.0     1744.2   10025.1    1744.8   10027.2
GR    1745.1   10034.9   1744.6   10040.1    1743.8    10043.8     1744.6   10050.0    1745.4   10060.2
GR    1746.4   10068.1   1746.9   10080.4    1747.1    10093.0     1747.1   10109.0    1746.7   10120.8
GR    1746.4   10126.9   1746.9   10133.9    1747.7    10154.5     1748.1   10168.2    1748.7   10175.3

ET                       9.1                                                            9933.99   10049.61

X1    2.675       20     9934.0   10049.6      550.0      550.0      565.8
GR    1763.2    9875.1   1763.1    9886.7    1762.3     9902.1     1760.6    9918.2    1760.2    9934.0
GR    1757.8    9945.4   1757.7    9950.5    1757.8     9960.4     1757.1    9965.6    1757.5    9969.5
GR    1757.9    9980.4   1758.0    9995.8    1757.8    10000.0     1758.0   10016.4    1758.1   10029.3
GR    1759.0   10037.9   1760.1   10049.6    1760.1    10058.1     1760.3   10076.3    1760.2   10084.2

    HEC-1 Concentration Point C574       split flow on left side

QT       2        720       720

ET                       9.1                                                            9975.89   10006.81

        HEC-1 Concentration Point C574       split flow on left side
X1    2.767       40     9975.9   10006.8      500.0      525.0      486.2
X2                                                                                                        15
GR    1773.6    9853.2   1773.2    9880.0    1772.1     9909.0     1771.7    9913.4    1772.1    9921.3
GR    1772.3    9932.2   1771.9    9943.2    1770.3     9946.9     1770.1    9949.3    1771.2    9953.5
GR    1771.7    9962.2   1772.0    9973.2    1772.0     9973.9     1772.0    9975.8    1772.0    9975.9
GR    1771.6    9984.9   1770.7    9991.1    1768.9     9995.1     1769.5   10000.0    1769.6   10003.3
GR    1771.3   10006.8   1771.6   10018.2    1771.9    10029.3     1771.5   10033.7    1771.8   10041.3
GR    1771.3   10049.3   1770.8   10058.4    1770.9    10066.0     1772.0   10070.2    1771.3   10080.0
GR    1772.0   10088.1   1771.4   10094.3    1771.4    10099.4     1771.0   10114.4    1771.8   10120.3
GR    1772.4   10129.3   1773.0   10140.7    1773.6    10150.0     1774.0   10159.3    1773.9   10160.3

        GR records removed from station 10056.9   to station    10347.7
                to restrict flow to effective area without X3 records.

ET                       9.1                                                            9959.66   10004.71

        GR records removed from station 10056.9   to station    10347.7
                to restrict flow to effective area without X3 records.
X1    2.838       27     9987.2   10004.7      375.0      375.0      377.0
X2                                                                                                        15
GR    1783.2    9756.4   1783.1    9778.8    1782.4     9793.4     1782.4    9817.5    1782.3    9836.9
GR    1782.5    9856.7   1782.4    9875.7    1782.3     9892.6     1782.1    9910.1    1782.2    9921.2
GR    1781.7    9929.9   1780.4    9936.2    1780.2     9939.8     1781.8    9945.0    1782.3    9950.7
1
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GR    1782.3    9964.1   1781.9    9977.4    1782.1     9987.2     1781.9    9988.5    1779.7    9991.4
GR    1779.8    9996.6   1779.8   10000.0    1781.9    10004.7     1782.2   10015.1    1782.8   10026.9
GR    1782.8   10035.1   1783.1   10056.9

    HEC-1 Concentration Point C535

QT       2        940       940

ET                       9.1                                                            9985.79     10065

        HEC-1 Concentration Point C535
X1    2.896       41     9985.8   10017.9      300.0      280.0      305.0
X2                                                                                                        15
GR    1789.8    9913.9   1789.8    9931.9    1789.0     9945.9     1789.0    9960.4    1789.2    9977.3
GR    1789.2    9985.8   1787.4    9988.8    1787.5     9997.5     1787.0    9999.4    1787.1   10000.0
GR    1787.5   10003.8   1788.7   10010.6    1789.1    10017.9     1789.1   10029.1    1789.3   10040.1
GR    1789.3   10044.8   1788.1   10046.5    1788.4    10054.7     1788.7   10059.1    1788.8   10072.4
GR    1788.8   10085.7   1788.8   10087.0    1788.6    10099.1     1788.2   10104.1    1788.6   10110.2
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GR   1788.7    10124.3     1787.6    10127.8     1787.4    10135.8     1787.7    10148.2     1788.5    10151.3
GR   1789.2    10162.1     1789.1    10171.2     1788.6    10181.6     1788.1    10184.4     1788.3    10190.3
GR   1788.8    10202.3     1788.1    10217.5     1788.6    10223.3     1788.8    10239.6     1789.1    10264.6
GR   1789.3    10269.0

         GR records removed from station  9813.9   to station     9870.4
                        and from station 10040.6   to station    10193.9
                  to restrict flow to effective area without X3 records.


ET                            9.1                                                          9922.8    10020.81

         GR records removed from station  9813.9   to station     9870.4
                        and from station 10040.6   to station    10193.9
                  to restrict flow to effective area without X3 records.
X1    2.957          24     9980.7    10020.8      320.0       310.0       324.8
X2                                                                                                    15
GR   1795.5    9870.4      1792.0     9875.0     1792.4     9879.7     1794.4     9887.8     1795.0     9897.7
GR   1795.3    9903.6      1792.0     9910.0     1792.2     9916.9     1792.1     9922.8     1792.0     9927.6
GR   1793.3    9933.1      1794.6     9942.0     1795.7     9949.5     1796.0     9962.8     1795.9     9974.6
GR   1795.8    9980.7      1793.0     9987.1     1793.1     9991.7     1793.2     9997.0     1794.3    10000.0
GR   1795.2   10010.9      1795.8    10020.8     1796.0    10034.3     1796.3    10040.6

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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

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

*SECNO  .038
         HEC-1 Concentration Point C546    Near confluence with Verde River
         START Hydraulically Similar Reach 11A
          190 ft u/s of confluence w/ Verde River
      .038      4.27    1501.77    1501.19    1501.00    1502.85       1.08        .00        .00    1510.10
    2100.0        .0     2100.0         .0         .0      252.0         .0         .0         .0    1507.40
       .00        .00       8.33       .00       .000       .042       .000       .000    1497.50    9961.88
   .011004        0.         0.         0.          0          8          4        .00      72.42   10034.30


*SECNO  .078
      .078      4.60    1504.10    1503.86        .00    1505.54       1.44       2.69        .00    1509.30
    2100.0        .0     2100.0         .0         .0      218.0         .0        1.1         .3    1505.60
       .01        .00       9.63       .00       .000       .042       .000       .000    1499.50    9980.94
   .015155       200.       209.       220.          1          8          0        .00      64.28   10045.22


*SECNO  .141
      .141      5.12    1508.22    1507.37        .00    1509.36       1.14       3.82        .00    1507.10
    2100.0       13.3     2086.7         .0        8.8      242.9         .0        2.9         .9    1515.50
       .02       1.51       8.59       .00       .060       .042       .000       .000    1503.10    9951.68
   .008907       360.       334.       270.          1         11          0        .00      76.51   10028.19


*SECNO  .203

3301 HV CHANGED MORE THAN HVINS

      .203      4.22    1510.92    1509.70        .00    1511.41        .48       2.05        .00    1510.30
    2100.0         .9     2037.2       61.9        1.2      360.8       31.4        5.4        1.6    1509.90
       .03        .77       5.65       1.97       .060       .042       .060       .000    1506.70    9951.48
   .004637       270.       328.       340.          3         11          0        .00     129.87   10081.35
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*SECNO  .315
3280 CROSS SECTION       .31 EXTENDED       .06 FEET

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
1
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         START Hydraulically Similar Reach 11B
        GR records removed from station  9802.5   to station    9960.6
                      and from station 10139.3   to station   10260.9
               to restrict flow to effective area without X3 records.
          GR point added:  STA  9960.59 added for ET record
     .315      3.06   1516.86   1516.86       .00   1517.84       .98       4.52       .00   1518.50
   2100.0        .0   1997.8     102.2         .0     245.8      47.2       10.0        3.7   1515.70
     .05       .00      8.13      2.16       .000      .042       .065       .000   1513.80   9963.33
  .014975     600.      592.      550.          0        19          0        .00    175.97  10139.30


*SECNO  .380
        GR records removed from station  9666.2   to station    9933.0
                      and from station 10055.8   to station   10249.1
               to restrict flow to effective area without X3 records.
     .380      3.83   1521.73   1521.69       .00   1523.16      1.43       5.32       .00   1520.60
   2100.0      16.8    2081.9       1.3        8.5     216.1       1.5       12.0        4.7   1521.40
     .06       1.97      9.63       .87       .065      .042       .065       .000   1517.90   9953.47
  .016062     350.      344.      320.          2        11          0        .00     91.91  10045.38


1490 NH CARD USED
*SECNO  .458

3301 HV CHANGED MORE THAN HVINS

         START Hydraulically Similar Reach 11C
     .458      5.01   1527.61   1526.95       .00   1528.18       .57       5.03       .00   1530.50
   2100.0        .0   1240.8     859.2         .0     178.4      193.1       14.7        5.8   1525.80
     .08       .00      6.95      4.45       .000      .050       .059       .000   1522.60   9961.67
  .010037     420.      409.      370.          3         8          0        .00    144.52  10106.19


1490 NH CARD USED
*SECNO  .569
        HEC-1 Concentration Point C545
          GR records deleted from Sta 9382.4 to 9522.9
              to restrict flow to effective area without X3 records.
     .569      3.62   1534.22   1534.01       .00   1534.52       .30       6.34       .00   1532.50
   2010.0     643.7     710.2     656.1      210.5     114.0      226.5       20.4        9.6   1533.00
     .12       3.06      6.23      2.90       .070      .050       .070       .000   1530.60   9739.17
  .013575     490.      589.      520.          3        18          0        .00    505.14  10244.31


1490 NH CARD USED
*SECNO  .638

3265 DIVIDED FLOW

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   14SEP95      17:37:45                                                                    PAGE   21


          GR records deleted from Sta 10289.3 to 10566.2
              to restrict flow to effective area without X3 records.
     .638      3.84   1539.14   1538.98       .00   1539.54       .40       5.02       .00   1537.90
   2010.0     461.1     567.3     981.6      165.0      74.5      253.4       24.6       13.5   1537.70
     .14       2.79      7.62      3.87       .070      .050       .070       .000   1535.30   9790.00
  .014913     330.      364.      360.          3         5          0        .00    471.67  10263.81


1490 NH CARD USED
```

```
*SECNO  .700

3265 DIVIDED FLOW

          GR records deleted from Sta 10643.7 to 10709.1
              to restrict flow to effective area without X3 records.
     .700      4.14   1543.54   1543.25       .00   1543.69       .16      4.15       .00   1542.90
   2010.0     384.5     500.3    1125.2     214.6     103.2     447.9      29.2      18.7   1542.80
      .17      1.79      4.85      2.51      .070      .050      .070      .000   1539.40   9639.51
  .011308      290.      329.      330.         4         5         0       .00    956.05  10611.75


1490 NH CARD USED
*SECNO  .747

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
          GR records deleted from Sta 9620.5 to 9774.3 and from
               Sta 10689.8 to 10724.9
              to restrict flow to effective area without X3 records.
     .747      3.37   1547.17   1547.17       .00   1547.63       .45      3.07       .00   1546.60
   2010.0      57.1    1203.5     749.5      32.2     178.7     325.0      33.0      23.1   1545.90
      .19      1.77      6.73      2.31      .070      .050      .070      .000   1543.80   9903.06
  .013009      255.      247.      260.         0        14         0       .00    549.31  10661.47


1490 NH CARD USED
*SECNO  .783

3265 DIVIDED FLOW

       [[[ Wash 11 cross section 0.783 equals Wash 10 cross section 0.021]]]
     .783      3.67   1550.27   1550.04       .00   1550.57       .30      2.95       .00   1549.20
   2010.0     496.5     377.8    1135.6     116.2      67.4     285.8      35.4      25.8   1548.90
      .20      4.27      5.61      3.97      .070      .050      .055      .000   1546.60   9918.95
  .016270      180.      192.      220.         2         8         0       .00    548.54  10723.28


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   14SEP95      17:37:45                                                                          PAGE   22

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


1490 NH CARD USED
*SECNO  .815

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
       [[[ Wash 11 cross section 0.815 equals Wash 10 cross section 0.070 ]]]
          GR records deleted from Sta 9615.5 to 9798.9
                      and from station 10793.0   to station   10848.9
              to restrict flow to effective area without X3 records.
     .815      4.22   1553.72   1553.72       .00   1554.20       .48      3.07       .00   1552.00
   2010.0     435.0     641.8     933.2     156.5      72.4     306.4      37.5      28.1   1552.00
      .21      2.78      8.86      3.05      .070      .050      .083      .000   1549.50   9811.20
  .018137      165.      169.      190.         0        11         0       .00    537.79  10764.94


1490 NH CARD USED
*SECNO  .894

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .66
```

[[[Wash 11 cross section 0.894 equals Wash 10 cross section 0.129]]]
Discharge=740 (Q100 Wash 11) + 210 (wash10 split at Forest Rd)
Discharge = 950
GR records removed from station 9760.7 to station 9961.8
and from station 10237.8 to station 10959.1
to restrict flow to effective area without X3 records.

.894	2.46	1559.36	1558.94	.00	1559.56	.20	5.36	.00	1559.40
950.0	.0	566.0	384.0	.0	130.8	173.2	41.0	31.3	1558.20
.24	.00	4.33	2.22	.000	.050	.070	.000	1556.90	9980.76
.009170	385.	416.	335.	3	11	0	.00	254.80	10235.56

1490 NH CARD USED
*SECNO .985

3265 DIVIDED FLOW

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

GR records removed from station 10032.6 to station 11040.2

to restrict flow to effective area without X3 records.

.985	2.10	1566.70	1566.58	.00	1566.96	.26	7.40	.00	1566.70
950.0	809.3	140.7	.0	214.7	25.3	.0	44.0	34.3	1566.80
.27	3.77	5.56	.00	.070	.050	.000	.000	1564.60	9714.82
.033230	425.	481.	540.	3	16	0	.00	297.08	10012.42

1490 NH CARD USED
*SECNO 1.034

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

GR records removed from station 10106.6 to station 10856.2
to restrict flow to effective area without X3 records.

1.034	3.26	1571.56	1571.14	.00	1571.70	.14	4.74	.00	1571.10
950.0	741.3	193.0	15.7	281.8	46.6	14.0	45.7	36.4	1570.80
.29	2.63	4.14	1.12	.070	.050	.070	.000	1568.30	9664.37
.012151	250.	256.	260.	5	11	0	.00	411.68	10076.05

*SECNO 1.072

3265 DIVIDED FLOW

3280 CROSS SECTION 1.07 EXTENDED .50 FEET

Xsection 1.072 extended on left (north) side to contain flows
GR records removed from station 10117.9 to station 10949.1
to restrict flow to effective area without X3 records.

1.072	2.01	1574.41	1574.15	.00	1574.56	.16	2.86	.00	1574.70
950.0	791.7	133.3	25.1	262.8	32.6	11.5	47.0	38.0	1574.50
.31	3.01	4.08	2.18	.070	.050	.070	.000	1572.40	9580.00
.020467	180.	202.	220.	4	11	0	.00	356.61	10062.24

*SECNO 1.128
GR records removed from station 9746.5 to station 9828.3
and from station 10150.2 to station 10871.3
to restrict flow to effective area without X3 records.

1.128	2.47	1580.37	1580.31	.00	1580.70	.33	6.14	.00	1579.20
950.0	361.3	408.4	180.3	117.4	65.6	77.1	48.8	40.1	1579.80
.33	3.08	6.22	2.34	.070	.050	.070	.000	1577.90	9831.69
.022871	290.	297.	215.	3	11	0	.00	318.11	10149.80

*SECNO 1.189

3280 CROSS SECTION 1.19 EXTENDED 1.19 FEET

Effective flow area at section 1.193 defined by approx. expansion ratio

GR records removed from station 9730.0 to station 9978.5
and from station 10116.0 to station 10995.2
to restrict flow to effective area without X3 records.
GR point added: STA 9978.49, 10116.01 added for ET record.

1.189	4.28	1585.78	1585.66	.00	1586.34	.56	5.64	.00	1584.60
950.0	.0	749.1	200.9	.0	113.4	78.5	50.3	41.6	1584.00
.34	.03	6.61	2.56	.070	.050	.070	.000	1581.50	9978.49
.015782	310.	319.	230.	3	14	0	.00	137.52	10116.01

*SECNO 1.201

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.27

RM 1.201 = Forest Rd. Crossing

1.201	1.94	1586.54	1586.19	.00	1586.77	.23	.43	.00	1587.90
950.0	.0	949.9	.1	.0	247.5	.4	50.7	42.0	1586.60
.35	.00	3.84	.29	.000	.022	.022	.000	1584.60	9894.49
.003056	60.	63.	160.	3	22	0	.00	257.68	10177.94

*SECNO 1.218

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
HEC-1 Concentration Point C536 At Forest Rd.
GR records removed from station 10046.6 to station 10928.1
to restrict flow to effective area without X3 records.

1.218	1.92	1586.92	1586.92	.00	1587.67	.74	.56	.00	1586.80
740.0	.2	739.8	.0	.4	107.0	.0	51.1	42.3	1587.50
.35	.60	6.91	.00	.070	.050	.000	.000	1585.00	9944.58
.032314	90.	89.	50.	0	5	0	.00	79.07	10023.65

*SECNO 1.257

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.66

START Hydraulically Similar Reach 11D
25.67ft downstream of culvert.Fully expanded flow. Special Culvert Sect
GR data is survey data from ALS book 1, page 26, top.

1.257	4.22	1589.42	1587.84	.00	1589.69	.26	2.02	.00	1590.50
740.0	.0	740.0	.0	.0	179.7	.0	51.8	42.6	1590.70
.37	.00	4.12	.00	.000	.050	.000	.000	1585.20	9967.21
.004567	209.	209.	210.	5	11	0	.00	60.23	10027.44

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

CCHV= .300 CEHV= .500
*SECNO 1.261

```
3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1593.10 ELREA=      1593.10

         Use NC record to set Contraction and Expansion Coefficients for Culvert
         Culvert Outlet              Special Culvert Section # 2
         4 - 4' x 10'   Concrete Box Culvert
         Cross section 4 ft d/s of outlet
         Effective flow area = culvert width + expansion ratio 4:1
           Cross-section 1.261 GR data constructed from culvert survey data
           and data from cross-section 1.257.
    1.261      2.18   1590.98   1590.98       .00   1592.09      1.10       .20       .42   1588.80
    740.0        .0     740.0        .0        .0      87.8        .0      51.9      42.7   1588.80
      .37        .00     8.43       .00      .000      .050      .000      .000   1588.80   9979.90
   .028353      22.       22.       22.         0        14         0       .00     40.20  10020.10


SPECIAL CULVERT

SC  CUNO       CUNV       ENTLC      COFQ       RDLEN      RISE       SPAN       CULVLN     CHRT       SCL        ELCHU      ELCHD
     4          .012       .40       3.00        .00       4.00      10.00      38.00      12          1       1589.70    1588.80

CHART 12 - BOX CULVERT; NON-OFFSET FLARED WINGWALLS; 3/4-INCH CHAMFER AT TOP OF INLET
SCALE  1 - WINGWALLS FLARED 45 DEGREES (1:1); INLET NOT SKEWED

*SECNO 1.270

SPECIAL CULVERT OUTLET CONTROL
EGIC =   1593.177  EGOC =   1593.438  PCWSE=   1590.985  ELTRD=   1594.900


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.26

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


SPECIAL CULVERT

     EGIC       EGOC         H4      QWEIR      QCULV       VCH      ACULV      ELTRD     WEIRLN
   1593.18    1593.44       1.35        0.       740.     4.740      160.0    1594.90         0.


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1594.50 ELREA=      1594.50

         Culvert Inlet               Special Culvert Section # 3, 4 ft u/s of in
           Cross-section 1.270 GR data constructed from culvert survey data
           and data from cross-section 1.276.
            BT information surveyed by ALS, Book 1, page 24.

    1.270      3.39   1593.09       .00       .00   1593.44       .35      1.35       .00   1592.20
    740.0        .0     740.0        .0        .0     156.1        .0      52.0      42.7   1592.20
      .37        .00     4.74       .00      .000      .050      .000      .000   1589.70   9975.90
   .005575      46.       46.       46.         2         0         0       .00     48.20  10024.10


CCHV=      .300 CEHV=      .100
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*SECNO 1.276
3280 CROSS SECTION      1.28 EXTENDED       .20 FEET

        Effective flow area by contraction ratio 1:1
        Return Contraction and Expansion Coefficients to Normal
           u/s of culvert fully expanded flow.Special culvert section # 4
           GR data is survey data from ALS book 1, page 26, bottom.
    1.276      2.89   1593.39   1592.73       .00   1593.69       .30       .24       .02   1593.20
    740.0        .0     740.0        .0        .0     168.9        .1      52.1      42.8   1593.30
      .37       .00      4.38       .28      .000      .050      .070      .000   1590.50   9945.20
  .009829       33.       33.       33.         2        14         0       .00     95.52  10040.72


*SECNO 1.310

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
          START Hydraulically Similar Reach 11E
    1.310      1.98   1597.88   1597.88       .00   1598.37       .48      1.89       .02   1597.90
    740.0        .0     711.9      28.1        .0     125.4      21.8      52.7      43.3   1598.10
      .38       .00      5.68      1.29      .000      .030      .070      .000   1595.90   9936.49
  .011583       165.      177.      179.         0        20         0       .00     170.83  10119.46


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   14SEP95      17:37:45                                                                          PAGE   27

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


*SECNO 1.425
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
    1.425      2.63   1609.13   1609.13       .00   1610.05       .92      6.88       .04   1612.70
    740.0        .0     740.0        .0        .0      96.3        .0      54.4      44.9   1616.70
      .40       .00      7.68       .00      .000      .030      .000      .000   1606.50   9975.12
  .011079       580.      608.      620.         0        11         0       .00     53.22  10028.34


*SECNO 1.536
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
    1.536      2.24   1619.34   1619.34       .00   1620.05       .71      6.79       .06   1622.60
    740.0        .0     740.0        .0        .0     109.7        .0      55.8      45.8   1622.10
      .43       .00      6.75       .00      .000      .030      .000      .000   1617.10   9971.41
  .012118       590.      586.      583.         0        15         0       .00     79.49  10050.89


*SECNO 1.635
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
        GR records removed from station  9815.6   to station     9955.0
                and from station 10047.6   to station    10196.7
                to restrict flow to effective area without X3 records.
          GR point added:  STA 10047.61 added for ET record
          GR point added:  STA  9954.99 added for ET record
    1.635      2.70   1632.40   1632.40       .00   1633.26       .86      6.14       .01   1634.10
    740.0        .0     740.0        .0        .0      99.6        .0      57.1      46.6   1635.40
      .45       .00      7.43       .00      .000      .030      .000      .000   1629.70   9966.55
  .011428       565.      522.      503.         0        11         0       .00     59.55  10026.10


*SECNO 1.728
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
```

GR records removed from station 9584.2 to station 9949.1
and from station 10059.2 to station 10227.5
to restrict flow to effective area without X3 records.
GR point added: STA 10059.21 added for ET record

1.728	2.76	1646.86	1646.86	.00	1647.72	.86	5.56	.00	1646.80
740.0	.1	739.9	.0	.2	99.3	.0	58.2	47.3	1649.30
.47	.22	7.45	.00	.070	.030	.000	.000	1644.10	9967.09
.011111	455.	494.	495.	0	8	0	.00	65.82	10032.92

1

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

*SECNO 1.831
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
GR records removed from station 9646.1 to station 9941.7
and from station 10044.6 to station 10239.2
to restrict flow to effective area without X3 records.
GR point added: STA 10044.61 added for ET record

1.831	2.16	1657.96	1657.96	.00	1658.74	.78	6.16	.02	1659.40
740.0	.0	740.0	.0	.0	104.3	.0	59.5	48.1	1659.60
.49	.00	7.09	.00	.000	.030	.000	.000	1655.80	9967.30
.011637	560.	542.	565.	0	15	0	.00	67.96	10035.26

*SECNO 1.889
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
Elevation for Sta 10000 was interpolated for the following X-section
cross section data surveyed by Alcocer Land Surveyors.
GR records removed from station 9844.8 to station 9963.3
and from station 10027.5 to station 10122.7
to restrict flow to effective area without X3 records.
GR point added: STA 9963.29 added for ET record
GR point added: STA 10027.51 added for ET record

1.889	2.52	1666.32	1666.32	.00	1667.18	.86	3.46	.01	1667.30
740.0	.0	740.0	.0	.0	99.3	.0	60.2	48.6	1666.40
.50	.00	7.45	.00	.000	.030	.000	.000	1663.80	9969.47
.011042	310.	306.	310.	0	8	0	.00	57.60	10027.07

*SECNO 1.907
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
Elevation for Sta 10000 was interpolated for the following X-section
cross section data surveyed by Alcocer Land Surveyors.
Elevation for Sta 10000 was interpolated for the following X-section
GR records removed from station 9894.5 to station 9969.1
and from station 10056.0 to station 10119.3
to restrict flow to effective area without X3 records.
GR point added: STA 9969.09 added for ET record
GR point added: STA 10056.01 added for ET record

1.907	2.14	1668.14	1668.14	.00	1668.92	.78	1.10	.02	1668.40
740.0	.0	740.0	.0	.0	104.3	.0	60.4	48.7	1669.60
.50	.00	7.09	.00	.000	.030	.000	.000	1666.00	9970.87
.011640	100.	97.	110.	0	15	0	.00	67.96	10038.84

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 1.963
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
Elevation for Sta 10000 was interpolated for the following X-section
cross section data surveyed by Alcocer Land Surveyors.
Elevation for Sta 10000 was interpolated for the following X-section
GR records removed from station 9823.3 to station 9931.3
and from station 10032.9 to station 10127.5
to restrict flow to effective area without X3 records.
GR point added: STA 9931.29 added for ET record
GR point added: STA 10032.91 added for ET record

1.963	2.40	1673.80	1673.80	.00	1674.57	.77	3.41	.00	1675.50
740.0	.0	740.0	.0	.0	104.8	.0	61.1	49.2	1675.10
.51	.00	7.06	.00	.000	.030	.000	.000	1671.40	9958.12
.011543	325.	294.	310.	0	8	0	.00	68.31	10026.42

*SECNO 2.011
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
HEC-1 Concentration Point C575
Elevation for Sta 10000 was interpolated for the following X-section
cross section data surveyed by Alcocer Land Surveyors.
GR records removed from station 9735.0 to station 9925.4
and from station 10017.8 to station 10223.9
to restrict flow to effective area without X3 records.
GR point added: STA 10017.81 added for ET record

2.011	2.05	1678.45	1678.45	.00	1679.32	.87	2.89	.01	1679.60
740.0	.0	740.0	.0	.0	99.0	.0	61.7	49.6	1680.50
.52	.00	7.48	.00	.000	.030	.000	.000	1676.40	9954.45
.011075	230.	255.	230.	0	11	0	.00	57.04	10011.49

*SECNO 2.109
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
START Hydraulically Similar Reach 11F
GR records removed from station 9897.0 to station 9979.2
and from station 10058.1 to station 10085.0
to restrict flow to effective area without X3 records.
GR point added: STA 9979.19 added for ET record

2.109	3.95	1689.35	1689.35	.00	1690.30	.95	8.07	.01	1690.10
740.0	.0	728.1	11.9	.0	92.6	6.2	62.9	50.2	1688.70
.54	.00	7.86	1.91	.000	.050	.060	.000	1685.40	9984.21
.023676	500.	517.	480.	0	17	0	.00	61.81	10046.03

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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 2.208
GR records removed from station 9859.8 to station 9972.0
and from station 10029.7 to station 10063.1
to restrict flow to effective area without X3 records.
GR point added: STA 9971.99 added for ET record
GR point added: STA 10029.71 added for ET record

2.208	4.74	1700.94	1700.56	.00	1701.61	.67	11.23	.08	1701.10
740.0	.0	740.0	.0	.0	112.3	.0	64.2	50.9	1701.10
.56	.00	6.59	.00	.000	.050	.000	.000	1696.20	9973.42

```
   .019731      515.      521.      525.         3         8         0       .00     54.72  10028.15


*SECNO 2.299
     2.299      3.26   1712.66   1712.60       .00   1713.36       .70     11.74       .00   1713.90
     740.0        .0     740.0        .0        .0     110.6        .0      65.4      51.7   1713.30
       .58       .00      6.69       .00      .000      .050      .000      .000   1709.40   9974.37
   .030412      475.      485.      500.         3        19         0       .00     74.86  10049.23


*SECNO 2.363
         cross section data surveyed by Alcocer Land Surveyors.
         GR records removed from station  9873.5   to station    9944.9
                 and from station 10077.2   to station    10219.6
                 to restrict flow to effective area without X3 records.
           GR point added:  STA  9944.89 added for ET record
           GR point added:  STA 10077.21 added for ET record
     2.363      2.30   1721.40   1721.16       .00   1721.87       .47      8.45       .07   1723.00
     740.0        .0     740.0        .0        .0     134.2        .0      66.4      52.3   1725.10
       .60       .00      5.51       .00      .000      .050      .000      .000   1719.10   9978.90
   .020889      350.      338.      350.         3        14         0       .00     91.80  10070.70


*SECNO 2.406
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
         START Hydraulically Similar Reach 11G
         GR records removed from station  9805.6   to station    9902.6
                 and from station 10039.9   to station    10183.6
                 to restrict flow to effective area without X3 records.
           GR point added:  STA 10039.91 added for ET record
     2.406      2.25   1726.25   1726.25       .00   1727.06       .81      2.62       .03   1727.80
     740.0        .0     740.0        .0        .0     102.7        .0      67.0      52.7   1730.60
       .61       .00      7.21       .00      .000      .024      .000      .000   1724.00   9969.35
   .007322      225.      226.      215.         0         8         0       .00     63.97  10033.31


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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 2.438
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
         GR records removed from station  9862.7   to station    9960.2
                 and from station 10042.6   to station    10065.7
                 to restrict flow to effective area without X3 records.
           GR point added:  STA  9960.19 added for ET record
           GR point added:  STA 10042.61 added for ET record
     2.438      2.52   1729.72   1729.72       .00   1730.62       .91      1.22       .01   1732.70
     740.0        .0     740.0        .0        .0      96.9        .0      67.4      52.9   1734.20
       .62       .00      7.64       .00      .000      .024      .000      .000   1727.20   9981.79
   .007098      175.      169.      165.         0         8         0       .00     53.97  10035.77


*SECNO 2.470
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
         START Hydraulically Similar Reach 11H
         cross section data surveyed by Alcocer Land Surveyors.
     2.470      2.04   1733.14   1733.14       .00   1733.66       .51      2.07       .12   1733.00
     740.0       1.5     738.5        .0       2.5     128.1        .0      67.8      53.3   1733.20
       .62       .61      5.76       .00      .070      .045      .000      .000   1731.10   9887.45
   .027920      175.      165.      165.         0        15         0       .00    154.99  10042.43
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*SECNO 2.568
        GR records removed from station  9849.9   to station     9949.4
                and from station 10175.3   to station    10826.1
                to restrict flow to effective area without X3 records.
    2.568      2.15   1745.95   1745.84       .00   1746.46       .50     12.79       .00   1746.00
    740.0        .0     740.0        .0        .0     129.9        .0      69.3      54.9   1747.10
      .65        .00      5.70       .00       .000      .045       .000      .000   1743.80   9961.16
   .022078      520.      517.      520.         4         5         0       .00    103.38  10064.54


*SECNO 2.675
    2.675      2.07   1759.17   1759.12       .00   1759.73       .55     13.27       .00   1760.20
    740.0        .0     740.0        .0        .0     124.0        .0      71.0      56.2   1760.10
      .68        .00      5.97       .00       .000      .045       .000      .000   1757.10   9938.84
   .024952      550.      566.      550.         3        11         0       .00    100.98  10039.82


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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 2.767

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
        HEC-1 Concentration Point C574       split flow on left side
    2.767      3.33   1772.23   1772.23       .00   1772.67       .44     12.18       .03   1772.00
    720.0     103.9     349.7     266.4      33.3      50.1      90.2      72.7      58.0   1771.30
      .70        3.11      6.98       2.95       .070      .045       .070      .000   1768.90   9905.64
   .024312      500.      486.      525.         0        14         0       .00    215.12  10126.71


FLOW DISTRIBUTION FOR SECNO=      2.77          CWSEL=   1772.23

STA=    9906.    9947.    9949.    9954.    9973.    9976.   10007.   10018.   10041.   10058.   10066.   10080.   10099.
  PER Q=      3.1      3.6      4.0      3.6       .1     48.6      3.4      3.6      7.4      6.0      3.0      4.2
   AREA=     10.3      4.9      6.6     10.9       .6     50.1      8.9     12.0     16.1     10.5      8.9     12.2
    VEL=      2.2      5.3      4.4      2.4      1.2      7.0      2.8      2.1      3.3      4.1      2.5      2.5
  DEPTH=       .3      2.0      1.6       .6       .2      1.6       .8       .5       .9      1.4       .6       .6

STA=   10099.   10114.   10127.
  PER Q=      7.2      2.2
   AREA=     15.4      6.3
    VEL=      3.4      2.5
  DEPTH=      1.0       .5

*SECNO 2.838
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
        GR records removed from station 10056.9   to station    10347.7
                to restrict flow to effective area without X3 records.
    2.838      3.28   1782.98   1782.98       .00   1783.33       .36      6.57       .02   1782.10
    720.0     379.7     307.9      32.4     161.0      45.2      17.9      74.4      60.1   1781.90
      .73        2.36      6.82       1.81       .070      .045       .070      .000   1779.70   9781.36
   .013155      375.      377.      375.         0         6         0       .00    266.63  10047.98


FLOW DISTRIBUTION FOR SECNO=      2.84          CWSEL=   1782.98

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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


STA=    9781.     9818.     9837.     9876.     9910.     9930.     9936.     9940.     9945.     9964.     9977.     9987.    10005.
  PER Q=     3.8       3.0       4.9       6.5       5.8       6.3       6.3       5.3       4.1       3.6       3.2      42.8
   AREA=    17.4      12.2      21.4      24.2      18.1      12.1       9.6      10.3      14.4      11.7       9.6      45.2
    VEL=     1.6       1.8       1.6       1.9       2.3       3.7       4.7       3.7       2.0       2.2       2.4       6.8
  DEPTH=      .5        .6        .6        .7        .9       1.9       2.7       2.0        .8        .9       1.0       2.6

STA=   10005.    10015.    10048.
  PER Q=     3.1       1.4
   AREA=     9.6       8.2
    VEL=     2.3       1.2
  DEPTH=      .9        .3

*SECNO 2.896
3280 CROSS SECTION      2.90 EXTENDED       .01 FEET

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
        HEC-1 Concentration Point C535
     2.896      2.31   1789.31   1789.31       .00   1789.71       .39      6.14       .00   1789.20
     940.0      14.8     311.4     613.7      10.0      43.5     171.1      75.9      62.1   1789.10
       .74      1.48      7.16      3.59       .070      .045      .070      .000   1787.00   9940.40
   .032342      300.      305.      280.         0        13         0       .00    328.60  10269.00


FLOW DISTRIBUTION FOR SECNO=      2.90          CWSEL=   1789.31

STA=    9940.     9986.    10018.    10055.    10072.    10099.    10110.    10128.    10136.    10148.    10171.    10190.    10202.
  PER Q=     1.6      33.1       4.4       3.2       4.1       3.9       4.7       8.8      13.0       3.1       5.1       3.1
   AREA=    10.0      43.5      13.5      10.9      14.9      10.1      13.4      14.5      21.9      10.3      14.1       9.2
    VEL=     1.5       7.2       3.1       2.8       2.6       3.6       3.3       5.7       5.6       2.8       3.4       3.2
  DEPTH=      .2       1.4        .4        .6        .6        .9        .8       1.8       1.8        .4        .7        .8

STA=   10202.    10218.    10240.    10269.
  PER Q=     4.8       5.1       1.9
   AREA=    13.1      15.6       9.6
    VEL=     3.5       3.1       1.9
  DEPTH=      .9        .7        .3

*SECNO 2.957
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



3265 DIVIDED FLOW

3280 CROSS SECTION      2.96 EXTENDED       .09 FEET


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.58

        GR records removed from station  9813.9   to station     9870.4
                and from station 10040.6   to station    10193.9
                to restrict flow to effective area without X3 records.
     2.957      3.59   1795.59   1794.83       .00   1795.90       .31      6.17       .03   1795.80
     940.0     723.5     216.5        .0     161.6      48.3        .0      77.5      63.7   1795.80
       .76      4.48      4.48       .00       .070      .045      .000      .000   1792.00   9870.40
   .012913      320.      325.      310.         5        11         0       .00    114.57  10017.37
```

```
 FLOW DISTRIBUTION FOR SECNO=      2.96          CWSEL=   1795.59

 STA=    9870.    9875.    9880.    9888.    9898.    9904.    9910.    9917.    9923.    9928.    9933.    9942.    9949.
   PER Q=     2.8      9.2      7.5      2.1       .4      4.6     14.2     11.9     10.1      8.4      5.2       .5
    AREA=     8.5     15.9     17.8      8.8      2.6     12.4     24.1     20.3     17.0     16.2     14.6      3.4
     VEL=     3.1      5.4      4.0      2.2      1.4      3.5      5.6      5.5      5.6      4.9      3.3      1.5
   DEPTH=     1.8      3.4      2.2       .9       .4      1.9      3.5      3.4      3.5      2.9      1.6       .5

 STA=    9949.   10021.
   PER Q=    23.0
    AREA=    48.3
     VEL=     4.5
   DEPTH=     1.3

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 T1   *  Rio Verde South FIS, Wash 11
 T2   *  For: FCDMC #       93-07     By:MKE, Ltd
 T3   *  Wash 11,100-Yr Floodway
 T4   *  Phase I GR data taken from stereo model; received on 9-07-94 from AMC
 T4   *  Phase II GR data taken from stereo model; received on 4-21-95 from AMC
 T5   *  200 scale 2 ft CI mapping flown by AMC on 12-22-93 and 8-22-94
 T6   *  with survey control by Burgess & Niple on 10-21-93; 11-9-93; 12-9-93
 T7   *  supplemental cross section data (GR & BT) surveyed by ALS as noted.
 T8   *  Source of 100-Yr flowrate from HEC-1 Analysis by GVSCE. Table F-3
 T9   *  Special culvert routine used.   Subcritical analysis.
 T9      Floodway Method 1


 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0         3         0         0         0         0         0         0    1501.8         0

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      15         0        -1         0         0         0        -1         0         0         0



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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

 CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

 *SECNO  .038

 3470 ENCROACHMENT STATIONS=     9884.8   10038.4  TYPE=      1  TARGET=      153.620
          HEC-1 Concentration Point C546    Near confluence with Verde River
          START Hydraulically Similar Reach 11A
           190 ft u/s of confluence w/ Verde River
       .038      4.30   1501.80   1501.20   1501.77   1502.86      1.06       .00       .00   1510.10
    2100.0         .0    2100.0         .0        .0     253.9         .0        .0        .0   1507.40
       .00        .00      8.27       .00      .000      .042      .000      .000   1497.50   9961.74
   .010751         0.        0.        0.         0        10         0       .00     72.58  10034.32


 *SECNO  .078
```

```
3470 ENCROACHMENT STATIONS=     9974.6   10055.0  TYPE=      1  TARGET=       80.420
      .078      4.58   1504.08   1503.88   1504.10   1505.54      1.46      2.67       .00   1509.30
    2100.0        .0    2100.0        .0        .0     216.5        .0       1.1        .3   1505.60
       .01       .00      9.70       .00      .000      .042      .000      .000   1499.50   9980.97
   .015439      200.      209.      220.         1         5         0       .00     64.10  10045.07


*SECNO  .141

3470 ENCROACHMENT STATIONS=     9971.5   10038.3  TYPE=      1  TARGET=       66.819
      .141      5.13   1508.23   1507.37   1508.22   1509.38      1.15      3.85       .00   1507.10
    2100.0        .0    2100.0        .0        .0     244.0        .0       2.9        .8   1515.50
       .02       .02      8.61       .00      .060      .042      .000      .000   1503.10   9971.49
   .008902      360.      334.      270.         1        11         0       .00     56.72  10028.21


*SECNO  .203

3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=     9955.4   10054.7  TYPE=      1  TARGET=       99.320
      .203      4.26   1510.96   1509.67   1510.92   1511.48       .51      2.10       .00   1510.30
    2100.0        .0    2100.0        .0        .0     364.8        .0       5.2        1.4   1509.90
       .03       .02      5.76       .00      .060      .042      .000      .000   1506.70   9955.39
   .004815      270.      328.      340.         3        11         0       .00     99.31  10054.70


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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  .315

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9960.6   10058.0  TYPE=      1  TARGET=       97.420
         START Hydraulically Similar Reach 11B
        GR records removed from station  9802.5   to station    9960.6
                      and from station 10139.3   to station   10260.9
                to restrict flow to effective area without X3 records.
          GR point added:  STA  9960.59 added for ET record
      .315      2.93   1516.73   1516.73   1516.86   1517.99      1.25      5.11       .00   1518.50
    2100.0        .0    2100.0        .0        .0     233.6        .0       9.3        2.7   1515.70
       .05       .00      8.99       .00      .000      .042      .000      .000   1513.80   9963.55
   .019801      600.      592.      550.         0        19         0       .00     94.45  10058.00


*SECNO  .380

3470 ENCROACHMENT STATIONS=     9968.6   10036.2  TYPE=      1  TARGET=       67.620
        GR records removed from station  9666.2   to station    9933.0
                      and from station 10055.8   to station   10249.1
                to restrict flow to effective area without X3 records.
      .380      4.13   1522.03   1521.62   1521.73   1523.25      1.22      5.27       .00   1520.60
    2100.0        .0    2100.0        .0        .0     236.6        .0      11.1        3.3   1521.40
       .06       .03      8.87       .00      .065      .042      .000      .000   1517.90   9968.59
   .012231      350.      344.      320.         4        11         0       .00     67.61  10036.20


1490 NH CARD USED
*SECNO  .458
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```
3470 ENCROACHMENT STATIONS=     9952.5   10039.9  TYPE=      1  TARGET=       87.390
         START Hydraulically Similar Reach 11C
      .458      5.30   1527.90   1527.70   1527.61   1529.20      1.30      5.95       .00   1530.50
   2100.0         .0    1854.0     246.0        .0     192.8      57.7      13.4       4.0   1525.80
      .07       .00      9.62      4.26      .000      .050      .070      .000   1522.60   9960.74
   .017751      420.      409.      370.         2        11         0       .00     79.14  10039.88


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

1490 NH CARD USED
*SECNO  .569
3280 CROSS SECTION       .57 EXTENDED       .32 FEET


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.45


3470 ENCROACHMENT STATIONS=     9935.6   10079.5  TYPE=      1  TARGET=      143.900
         HEC-1 Concentration Point C545
           GR records deleted from Sta 9382.4 to 9522.9
               to restrict flow to effective area without X3 records.
      .569      4.62   1535.22   1534.08   1534.22   1535.60       .38      6.40       .00   1532.50
   2010.0      409.5     954.7     645.8     101.2     161.0     177.5      17.7       5.4   1533.00
      .11       4.05      5.93      3.64      .070      .050      .070      .000   1530.60   9935.60
   .007765      490.      589.      520.         4        23         0       .00     143.90  10079.50


1490 NH CARD USED
*SECNO  .638
3280 CROSS SECTION       .64 EXTENDED       .69 FEET


3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9961.4   10103.8  TYPE=      1  TARGET=      142.410
           GR records deleted from Sta 10289.3 to 10566.2
               to restrict flow to effective area without X3 records.
      .638      4.59   1539.89   1539.89   1539.14   1540.83       .94      4.24       .00   1537.90
   2010.0      217.9     944.3     847.8      49.5      92.0     181.1      20.8       6.6   1537.70
      .12       4.40     10.26      4.68      .070      .050      .070      .000   1535.30   9961.42
   .020414      330.      364.      360.         0         6         0       .00     142.41  10103.83


1490 NH CARD USED
*SECNO  .700
1
   14SEP95      17:37:45                                                                                PAGE   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


3280 CROSS SECTION       .70 EXTENDED       .78 FEET
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3301 HV CHANGED MORE THAN HVINS


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


3470 ENCROACHMENT STATIONS=     9920.0   10187.6  TYPE=      1  TARGET=      267.600
          GR records deleted from Sta 10643.7 to 10709.1
              to restrict flow to effective area without X3 records.
      .700      5.18   1544.58   1543.90   1543.54   1544.87       .29      4.03       .00   1542.90
    2010.0     363.5     885.8     760.8     121.3     159.1     264.8      24.1       8.1   1542.80
       .14      3.00      5.57      2.87      .070      .050      .070      .000   1539.40   9920.00
   .008379      290.      329.      330.         5         5         0       .00    267.60  10187.60


1490 NH CARD USED
*SECNO  .747

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9961.8   10063.7  TYPE=      1  TARGET=      101.910
          GR records deleted from Sta 9620.5 to 9774.3 and from
               Sta 10689.8 to 10724.9
              to restrict flow to effective area without X3 records.
      .747      3.68   1547.48   1547.48   1547.17   1548.73      1.25      3.18       .00   1546.60
    2010.0        .0    1842.4     167.6        .0     198.3      47.5      26.4       9.2   1545.90
       .15       .03      9.29      3.53      .070      .050      .070      .000   1543.80   9961.79
   .021575      255.      247.      260.         0        19         0       .00    101.91  10063.70


1490 NH CARD USED
*SECNO  .783
3280 CROSS SECTION       .78 EXTENDED       .70 FEET


3470 ENCROACHMENT STATIONS=     9988.7   10066.2  TYPE=      1  TARGET=       77.520
        [[[ Wash 11 cross section 0.783 equals Wash 10 cross section 0.021]]]
1
   14SEP95      17:37:45                                                                    PAGE   40

    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


      .783      4.70   1551.30   1550.96   1550.27   1552.40      1.10      3.67       .00   1549.20
    2010.0        .0     784.5    1225.5        .0     105.8     136.2      27.5       9.6   1548.90
       .16       .03      7.41      9.00      .070      .050      .047      .000   1546.60   9988.69
   .015583      180.      192.      220.         2        11         0       .00     77.51  10066.20


1490 NH CARD USED
*SECNO  .815
3280 CROSS SECTION       .81 EXTENDED       .45 FEET


3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=     9995.2   10237.2  TYPE=      1  TARGET=      242.010
        [[[ Wash 11 cross section 0.815 equals Wash 10 cross section 0.070 ]]]
          GR records deleted from Sta 9615.5 to 9798.9
                       and from station 10793.0   to station   10848.9
              to restrict flow to effective area without X3 records.
      .815      4.95   1554.45   1554.10   1553.72   1554.96       .52      2.57       .00   1552.00
```

```
    2010.0        .0     740.5    1269.5        .0      87.6     385.4      29.0      10.3   1552.00
       .17        .02      8.45      3.29      .070      .050      .083      .000   1549.50   9995.19
   .012797       165.      169.      190.         2         5         0       .00    242.01  10237.20


1490 NH CARD USED
*SECNO  .894
3280 CROSS SECTION       .89 EXTENDED       .29 FEET


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .43


3470 ENCROACHMENT STATIONS=     9980.2   10049.9  TYPE=      1  TARGET=       69.720
        [[[ Wash 11 cross section 0.894 equals Wash 10 cross section 0.129 ]]]
         Discharge=740 (Q100 Wash 11) + 210 (wash10 split at Forest Rd)
         Discharge =         950
         GR records removed from station  9760.7   to station     9961.8
                        and from station 10237.8   to station    10959.1
                  to restrict flow to effective area without X3 records.
      .894      2.79   1559.69   1559.26   1559.36   1560.29       .59      5.32       .00   1559.40
     950.0        .0     950.0        .0        .0     153.6        .0      31.6      11.6   1558.20
       .18        .03      6.19       .00      .000      .050      .000      .000   1556.90   9980.19
    .015728      385.      416.      335.         2        11         0       .00     69.71  10049.90


1
   14SEP95      17:37:45                                                                          PAGE   41

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


1490 NH CARD USED
*SECNO  .985
3280 CROSS SECTION       .99 EXTENDED       .39 FEET


3470 ENCROACHMENT STATIONS=     9800.0   10012.6  TYPE=      1  TARGET=      212.610
        GR records removed from station 10032.6   to station    11040.2
                  to restrict flow to effective area without X3 records.
      .985      2.79   1567.39   1567.06   1566.70   1567.62       .23      7.33       .00   1566.70
     950.0     950.0      153.0        .0     264.6      42.0        .0      34.0      13.0   1566.80
       .21      3.59       3.64       .03      .070      .050      .070      .000   1564.60   9800.00
    .016677      425.      481.      540.         5        10         0       .00    212.61  10012.61


1490 NH CARD USED
*SECNO 1.034
3280 CROSS SECTION      1.03 EXTENDED       .07 FEET


3470 ENCROACHMENT STATIONS=     9898.2   10013.2  TYPE=      1  TARGET=      115.040
        GR records removed from station 10106.6   to station    10856.2
                  to restrict flow to effective area without X3 records.
     1.034      3.87   1572.17   1572.01   1571.56   1572.73       .56      5.11       .00   1571.10
     950.0     464.6      485.4        .0     111.7      66.2        .0      35.4      13.9   1570.80
       .23      4.16       7.33       .00      .070      .050      .000      .000   1568.30   9898.17
    .025245      250.      256.      260.         3        14         0       .00    115.03  10013.20


*SECNO 1.072

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


3470 ENCROACHMENT STATIONS=     9795.0   10021.5  TYPE=      1  TARGET=      226.510
        Xsection 1.072 extended on left (north) side to contain flows
```

```
        GR records removed from station 10117.9   to station    10949.1
                  to restrict flow to effective area without X3 records.
    1.072      2.96   1575.36   1574.79   1574.41   1575.52       .17      2.79       .00   1574.70
    950.0     658.6     291.4        .0     237.8      70.0        .0      36.4      14.7   1574.50
      .24      2.77      4.16       .00      .070      .050      .000      .000   1572.40   9795.00
   .009677      180.      202.      220.         5        14         0       .00    226.50  10021.50


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


*SECNO 1.128
3280 CROSS SECTION      1.13 EXTENDED       .29 FEET

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9950.0   10100.0  TYPE=      1  TARGET=      150.000
        GR records removed from station  9746.5   to station     9828.3
                        and from station 10150.2   to station    10871.3
                  to restrict flow to effective area without X3 records.
    1.128      2.79   1580.69   1580.69   1580.37   1581.23       .55      4.08       .00   1579.20
    950.0     117.7     560.6     271.8      29.3      78.3      84.2      38.0      15.8   1579.80
      .26      4.01      7.16      3.23      .070      .050      .070      .000   1577.90   9950.00
   .023879      290.      297.      215.         0        10         0       .00    150.00  10100.00


*SECNO 1.189
3280 CROSS SECTION      1.19 EXTENDED       .58 FEET


3470 ENCROACHMENT STATIONS=     9978.5   10116.0  TYPE=      1  TARGET=      137.520
        Effective flow area at section 1.193 defined by approx. expansion ratio
        GR records removed from station  9730.0   to station     9978.5
                        and from station 10116.0   to station    10995.2
                  to restrict flow to effective area without X3 records.
          GR point added:  STA  9978.49, 10116.01 added for ET record.
    1.189      4.39   1585.89   1585.64   1585.78   1586.37       .49      5.14       .00   1584.60
    950.0        .0     733.3     216.7        .0     118.0      87.2      39.3      16.7   1584.00
      .27       .02      6.22      2.48      .070      .050      .070      .000   1581.50   9978.49
   .013243      310.      319.      230.         4        14         0       .00    137.51  10116.00


*SECNO 1.201

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.11


3470 ENCROACHMENT STATIONS=     9797.1   10137.4  TYPE=      1  TARGET=      340.320
        RM 1.201 = Forest Rd. Crossing
    1.201      1.96   1586.56   1586.20   1586.54   1586.78       .22       .41       .00   1587.90
    950.0        .0     950.0        .0        .0     250.5        .0      39.7      17.1   1586.60
      .28       .00      3.79       .00      .000      .022      .000      .000   1584.60   9893.92
   .002966       60.       63.      160.         3        22         0       .00    239.31  10133.23


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
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*SECNO 1.218

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9951.2   10027.4  TYPE=      1  TARGET=       76.220
         HEC-1 Concentration Point C536      At Forest Rd.
         GR records removed from station 10046.6   to station    10928.1
                  to restrict flow to effective area without X3 records.
     1.218      1.91   1586.91   1586.91   1586.92   1587.67       .76       .55       .00   1586.80
     740.0        .0     740.0        .0        .0     106.0        .0      40.1      17.4   1587.50
       .28       .04      6.98       .00      .000      .050      .000      .000   1585.00   9951.19
   .033333       90.       89.       50.         0         5         0       .00     72.37  10023.56


*SECNO 1.257

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.71

         START Hydraulically Similar Reach 11D
         25.67ft downstream of culvert.Fully expanded flow. Special Culvert Sect
            GR data is survey data from ALS book 1, page 26, top.
     1.257      4.23   1589.43   1587.84   1589.42   1589.69       .26      2.03       .00   1590.50
     740.0        .0     740.0        .0        .0     180.2        .0      40.8      17.7   1590.70
       .30       .00      4.11       .00      .000      .050      .000      .000   1585.20   9967.18
   .004533       209.      209.      210.         5        11         0       .00     60.29  10027.47


CCHV=     .300 CEHV=     .500
*SECNO 1.261

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1593.10 ELREA=      1593.10

         Use NC record to set Contraction and Expansion Coefficients for Culvert
         Culvert Outlet              Special Culvert Section # 2
         4 - 4' x 10'   Concrete Box Culvert
1
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         Cross section 4 ft d/s of outlet
         Effective flow area = culvert width + expansion ratio 4:1
           Cross-section 1.261 GR data constructed from culvert survey data
           and data from cross-section 1.257.
     1.261      2.18   1590.98   1590.98   1590.98   1592.09      1.10       .20       .42   1588.80
     740.0        .0     740.0        .0        .0      87.8        .0      40.9      17.7   1588.80
       .30       .00      8.43       .00      .000      .050      .000      .000   1588.80   9979.90
   .028359       22.       22.       22.         0        14         0       .00     40.20  10020.10


SPECIAL CULVERT

SC  CUNO      CUNV      ENTLC     COFQ      RDLEN     RISE      SPAN      CULVLN    CHRT      SCL       ELCHU     ELCHD
     4          .012      .40      3.00       .00      4.00     10.00     38.00     12         1      1589.70   1588.80

CHART 12 - BOX CULVERT; NON-OFFSET FLARED WINGWALLS; 3/4-INCH CHAMFER AT TOP OF INLET
SCALE  1 - WINGWALLS FLARED 45 DEGREES (1:1); INLET NOT SKEWED

*SECNO 1.270

SPECIAL CULVERT OUTLET CONTROL
EGIC =   1593.177  EGOC =   1593.438  PCWSE=   1590.985  ELTRD=   1594.900
```

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.25

SPECIAL CULVERT

EGIC	EGOC	H4	QWEIR	QCULV	VCH	ACULV	ELTRD	WEIRLN
1593.18	1593.44	1.35	0.	740.	4.748	160.0	1594.90	0.

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1594.50 ELREA= 1594.50

Culvert Inlet Special Culvert Section # 3, 4 ft u/s of in
Cross-section 1.270 GR data constructed from culvert survey data
and data from cross-section 1.276.
BT information surveyed by ALS, Book 1, page 24.

1.270	3.39	1593.09	.00	1593.09	1593.44	.35	1.35	.00	1592.20
740.0	.0	740.0	.0	.0	155.8	.0	41.0	17.8	1592.20
.30	.00	4.75	.00	.000	.050	.000	.000	1589.70	9975.90
.005608	46.	46.	46.	0	0	0	.00	48.20	10024.10

CCHV= .300 CEHV= .100
*SECNO 1.276

3470 ENCROACHMENT STATIONS= 9945.2 10040.7 TYPE= 1 TARGET= 95.510
1
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Effective flow area by contraction ratio 1:1
Return Contraction and Expansion Coefficients to Normal
u/s of culvert fully expanded flow.Special culvert section # 4
GR data is survey data from ALS book 1, page 26, bottom.

1.276	2.89	1593.39	1592.73	1593.39	1593.69	.30	.24	.02	1593.20
740.0	.0	740.0	.0	.0	169.0	.1	41.1	17.8	1593.30
.30	.00	4.38	.29	.000	.050	.070	.000	1590.50	9945.20
.009796	33.	33.	33.	2	14	0	.00	95.52	10040.72

*SECNO 1.310
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9935.7 10052.5 TYPE= 1 TARGET= 116.819
START Hydraulically Similar Reach 11E

1.310	1.97	1597.87	1597.87	1597.88	1598.43	.55	1.98	.03	1597.90
740.0	.0	740.0	.0	.0	124.0	.0	41.7	18.3	1598.10
.31	.00	5.97	.00	.000	.030	.000	.000	1595.90	9937.12
.012884	165.	177.	179.	0	14	0	.00	113.19	10050.31

*SECNO 1.425
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9951.6 10081.7 TYPE= 1 TARGET= 130.120

1.425	2.63	1609.13	1609.13	1609.13	1610.05	.92	7.24	.04	1612.70
740.0	.0	740.0	.0	.0	96.3	.0	43.2	19.4	1616.70
.33	.00	7.68	.00	.000	.030	.000	.000	1606.50	9975.11
.011066	580.	608.	620.	0	11	0	.00	53.23	10028.35

*SECNO 1.536
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

```
 3470 ENCROACHMENT STATIONS=     9942.5   10078.0  TYPE=      1  TARGET=      135.520
      1.536      2.25   1619.35   1619.35   1619.34   1620.05       .71      6.78       .06   1622.60
      740.0        .0     740.0        .0        .0     109.7        .0      44.6      20.3   1622.10
        .36       .00      6.74       .00      .000      .030      .000      .000   1617.10   9971.40
     .012099      590.      586.      583.         0        15         0       .00     79.50  10050.90


 *SECNO 1.635
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9955.0   10047.6  TYPE=      1  TARGET=       92.620
1
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         GR records removed from station  9815.6   to station     9955.0
                 and from station 10047.6   to station    10196.7
                 to restrict flow to effective area without X3 records.
           GR point added:  STA 10047.61 added for ET record
           GR point added:  STA  9954.99 added for ET record
      1.635      2.70   1632.40   1632.40   1632.40   1633.26       .86      6.13       .01   1634.10
      740.0        .0     740.0        .0        .0      99.7        .0      45.9      21.2   1635.40
        .37       .00      7.42       .00      .000      .030      .000      .000   1629.70   9966.54
     .011399      565.      522.      503.         0        11         0       .00     59.57  10026.11


 *SECNO 1.728
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9967.1   10059.2  TYPE=      1  TARGET=       92.120
         GR records removed from station  9584.2   to station     9949.1
                 and from station 10059.2   to station    10227.5
                 to restrict flow to effective area without X3 records.
           GR point added:  STA 10059.21 added for ET record
      1.728      2.77   1646.87   1646.87   1646.86   1647.72       .85      5.51       .00   1646.80
      740.0        .1     739.9        .0        .3     100.0        .0      47.0      21.9   1649.30
        .39       .27      7.40       .00      .070      .030      .000      .000   1644.10   9967.09
     .010915      455.      494.      495.         0         5         0       .00     65.98  10033.07


 *SECNO 1.831
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9956.2   10044.6  TYPE=      1  TARGET=       88.420
         GR records removed from station  9646.1   to station     9941.7
                 and from station 10044.6   to station    10239.2
                 to restrict flow to effective area without X3 records.
           GR point added:  STA 10044.61 added for ET record
      1.831      2.16   1657.96   1657.96   1657.96   1658.74       .78      6.11       .02   1659.40
      740.0        .0     740.0        .0        .0     104.3        .0      48.3      22.7   1659.60
        .41       .00      7.09       .00      .000      .030      .000      .000   1655.80   9967.30
     .011639      560.      542.      565.         0        15         0       .00     67.96  10035.26


 *SECNO 1.889
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9963.3   10027.5  TYPE=      1  TARGET=       64.220
         Elevation for Sta 10000 was interpolated for the following X-section
         cross section data surveyed by Alcocer Land Surveyors.
         GR records removed from station  9844.8   to station     9963.3
1
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                 and from station 10027.5   to station    10122.7
                 to restrict flow to effective area without X3 records.
```

```
          GR point added:  STA  9963.29 added for ET record
          GR point added:  STA 10027.51 added for ET record
    1.889      2.52   1666.32   1666.32   1666.32   1667.18       .86      3.46       .01   1667.30
    740.0        .0     740.0        .0        .0      99.3        .0      49.0      23.1   1666.40
      .43        .00     7.45       .00       .000      .030       .000       .000   1663.80   9969.47
   .011037      310.      306.      310.         0         8         0       .00     57.60  10027.07


*SECNO 1.907
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9969.1   10056.0  TYPE=      1  TARGET=       86.920
        Elevation for Sta 10000 was interpolated for the following X-section
        cross section data surveyed by Alcocer Land Surveyors.
        Elevation for Sta 10000 was interpolated for the following X-section
        GR records removed from station  9894.5   to station     9969.1
                and from station 10056.0   to station    10119.3
                to restrict flow to effective area without X3 records.
          GR point added:  STA  9969.09 added for ET record
          GR point added:  STA 10056.01 added for ET record
    1.907      2.14   1668.14   1668.14   1668.14   1668.92       .78      1.10       .02   1668.40
    740.0        .0     740.0        .0        .0     104.4        .0      49.2      23.3   1669.60
      .43        .00     7.09       .00       .000      .030       .000       .000   1666.00   9970.86
   .011614      100.       97.      110.         0        15         0       .00     67.99  10038.85


*SECNO 1.963
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9931.3   10032.9  TYPE=      1  TARGET=      101.620
        Elevation for Sta 10000 was interpolated for the following X-section
        cross section data surveyed by Alcocer Land Surveyors.
        Elevation for Sta 10000 was interpolated for the following X-section
        GR records removed from station  9823.3   to station     9931.3
                and from station 10032.9   to station    10127.5
                to restrict flow to effective area without X3 records.
          GR point added:  STA  9931.29 added for ET record
          GR point added:  STA 10032.91 added for ET record
    1.963      2.40   1673.80   1673.80   1673.80   1674.57       .77      3.40       .00   1675.50
    740.0        .0     740.0        .0        .0     104.8        .0      49.9      23.7   1675.10
      .44        .00     7.06       .00       .000      .030       .000       .000   1671.40   9958.12
   .011543      325.      294.      310.         0         8         0       .00     68.31  10026.42


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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 2.011
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9950.1   10017.8  TYPE=      1  TARGET=       67.720
        HEC-1 Concentration Point C575
        Elevation for Sta 10000 was interpolated for the following X-section
        cross section data surveyed by Alcocer Land Surveyors.
        GR records removed from station  9735.0   to station     9925.4
                and from station 10017.8   to station    10223.9
                to restrict flow to effective area without X3 records.
          GR point added:  STA 10017.81 added for ET record
    2.011      2.05   1678.45   1678.45   1678.45   1679.32       .87      2.89       .01   1679.60
    740.0        .0     740.0        .0        .0      99.0        .0      50.5      24.1   1680.50
      .45        .00     7.48       .00       .000      .030       .000       .000   1676.40   9954.45
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   .011075      230.      255.      230.         0        11         0       .00     57.04  10011.49


*SECNO 2.109
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9979.2   10024.3  TYPE=      1  TARGET=       45.119
        START Hydraulically Similar Reach 11F
        GR records removed from station  9897.0   to station     9979.2
                and from station 10058.1   to station    10085.0
                to restrict flow to effective area without X3 records.
          GR point added:  STA  9979.19 added for ET record
    2.109      3.80   1689.20   1689.20   1689.35   1690.34      1.13      8.86       .03   1690.10
    740.0        .0     740.0        .0        .0      86.6        .0      51.6      24.7   1688.70
      .47       .00      8.55       .00      .000      .050      .000      .000   1685.40   9985.23
   .030064      500.      517.      480.         0        17         0       .00     39.07  10024.30


*SECNO 2.208
3280 CROSS SECTION      2.21 EXTENDED       .01 FEET


3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=     9972.0   10029.7  TYPE=      1  TARGET=       57.720
        GR records removed from station  9859.8   to station     9972.0
1
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                and from station 10029.7   to station    10063.1
                to restrict flow to effective area without X3 records.
          GR point added:  STA  9971.99 added for ET record
          GR point added:  STA 10029.71 added for ET record
    2.208      4.91   1701.11   1700.57   1700.94   1701.68       .57     11.18       .17   1701.10
    740.0        .0     740.0        .0        .0     121.9        .0      52.9      25.3   1701.10
      .49       .00      6.07       .00      .000      .050      .000      .000   1696.20   9971.99
   .016090      515.      521.      525.         5         8         0       .00     57.71  10029.70


*SECNO 2.299
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9961.9   10059.7  TYPE=      1  TARGET=       97.820
    2.299      3.21   1712.61   1712.61   1712.66   1713.36       .74     10.85       .02   1713.90
    740.0        .0     740.0        .0        .0     106.9        .0      54.2      26.0   1713.30
      .51       .00      6.92       .00      .000      .050      .000      .000   1709.40   9974.87
   .033231      475.      485.      500.         0        14         0       .00     73.56  10048.43


*SECNO 2.363

3470 ENCROACHMENT STATIONS=     9944.9   10077.2  TYPE=      1  TARGET=      132.320
        cross section data surveyed by Alcocer Land Surveyors.
        GR records removed from station  9873.5   to station     9944.9
                and from station 10077.2   to station    10219.6
                to restrict flow to effective area without X3 records.
          GR point added:  STA  9944.89 added for ET record
          GR point added:  STA 10077.21 added for ET record
    2.363      2.33   1721.43   1721.16   1721.40   1721.88       .45      8.44       .09   1723.00
    740.0        .0     740.0        .0        .0     137.7        .0      55.1      26.6   1725.10
      .53       .00      5.37       .00      .000      .050      .000      .000   1719.10   9978.10
   .019419      350.      338.      350.         5        14         0       .00     92.67  10070.77


*SECNO 2.406
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
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3470 ENCROACHMENT STATIONS=     9947.3   10039.9  TYPE=      1  TARGET=       92.620
        START Hydraulically Similar Reach 11G
        GR records removed from station  9805.6   to station     9902.6
                and from station 10039.9   to station    10183.6
                to restrict flow to effective area without X3 records.
          GR point added:  STA 10039.91 added for ET record
     2.406      2.25   1726.25   1726.25   1726.25   1727.06       .81      2.54       .04   1727.80
     740.0        .0     740.0        .0        .0     102.7        .0      55.7      27.0   1730.60
       .54       .00      7.20       .00      .000      .024      .000      .000   1724.00   9969.33
   .007308      225.      226.      215.         0         8         0       .00     63.98  10033.31


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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 2.438
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9960.2   10042.6  TYPE=      1  TARGET=       82.420
        GR records removed from station  9862.7   to station     9960.2
                and from station 10042.6   to station    10065.7
                to restrict flow to effective area without X3 records.
          GR point added:  STA  9960.19 added for ET record
          GR point added:  STA 10042.61 added for ET record
     2.438      2.52   1729.71   1729.71   1729.72   1730.62       .91      1.22       .01   1732.70
     740.0        .0     740.0        .0        .0      96.8        .0      56.1      27.3   1734.20
       .54       .00      7.64       .00      .000      .024      .000      .000   1727.20   9981.80
   .007109      175.      169.      165.         0         8         0       .00     53.96  10035.77


*SECNO 2.470
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9922.5   10043.6  TYPE=      1  TARGET=      121.120
        START Hydraulically Similar Reach 11H
        cross section data surveyed by Alcocer Land Surveyors.
     2.470      2.02   1733.12   1733.12   1733.14   1733.66       .54      2.13       .11   1733.00
     740.0        .0     740.0        .0        .0     125.3        .0      56.5      27.6   1733.20
       .55       .04      5.90       .00      .000      .045      .000      .000   1731.10   9922.49
   .030010      175.      165.      165.         0        15         0       .00    119.46  10041.95


*SECNO 2.568

3470 ENCROACHMENT STATIONS=     9960.7   10093.0  TYPE=      1  TARGET=      132.319
        GR records removed from station  9849.9   to station     9949.4
                and from station 10175.3   to station    10826.1
                to restrict flow to effective area without X3 records.
     2.568      2.17   1745.97   1745.85   1745.95   1746.46       .48     12.78       .02   1746.00
     740.0        .0     740.0        .0        .0     132.6        .0      58.1      28.9   1747.10
       .58       .00      5.58       .00      .000      .045      .000      .000   1743.80   9960.92
   .020705      520.      517.      520.         5         5         0       .00    103.83  10064.75


*SECNO 2.675
1
   14SEP95      17:37:45                                                                          PAGE   51

    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
```

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     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3470 ENCROACHMENT STATIONS=      9934.0    10049.6  TYPE=       1  TARGET=       115.620
      2.675      2.05    1759.15    1759.12    1759.17    1759.73        .58      13.26        .01    1760.20
      740.0        .0      740.0         .0         .0      121.2         .0       59.7       30.2    1760.10
        .60        .00       6.11       .00       .000       .045       .000       .000    1757.10    9938.97
     .026760      550.       566.       550.          3         11          0        .00     100.55   10039.53


*SECNO 2.767

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=      9975.9    10006.8  TYPE=       1  TARGET=        30.920
         HEC-1 Concentration Point C574        split flow on left side
      2.767      4.24    1773.14    1773.14    1772.23    1774.45       1.31      12.59        .07    1772.00
      720.0        .0      720.0         .0         .0       78.4         .0       60.8       31.0    1771.30
        .62        .03       9.19       .00       .070       .045       .000       .000    1768.90    9975.89
     .025050      500.       486.       525.          0         17          0        .00      30.91   10006.80


FLOW DISTRIBUTION FOR SECNO=       2.77          CWSEL=    1773.14

STA=     9976.    10007.
  PER Q=     100.0
   AREA=      78.4
    VEL=       9.2
  DEPTH=       2.5

*SECNO 2.838
3280 CROSS SECTION       2.84 EXTENDED        .60 FEET

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=      9959.7    10004.7  TYPE=       1  TARGET=        45.050
          GR records removed from station 10056.9    to station    10347.7
                to restrict flow to effective area without X3 records.
      2.838      4.00    1783.70    1783.70    1782.98    1784.79       1.09       8.44        .07    1782.10
      720.0     178.8      541.2         .0       44.2       57.8         .0       61.6       31.3    1781.90
        .63        4.05       9.36       .00       .070       .045       .000       .000    1779.70    9959.66
     .020166      375.       377.       375.          0         11          0        .00      45.04   10004.70


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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


FLOW DISTRIBUTION FOR SECNO=       2.84          CWSEL=    1783.70

STA=     9960.     9964.     9977.     9987.    10005.
  PER Q=       2.7      12.2       9.9      75.2
   AREA=       6.2      21.3      16.7      57.8
    VEL=       3.1       4.1       4.3       9.4
  DEPTH=       1.4       1.6       1.7       3.3

*SECNO 2.896
3280 CROSS SECTION       2.90 EXTENDED       1.04 FEET
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3470 ENCROACHMENT STATIONS=     9985.8   10065.0  TYPE=      1  TARGET=       79.210
         HEC-1 Concentration Point C535
     2.896      3.34   1790.34   1790.32   1789.31   1791.23       .89      6.38       .06   1789.20
     940.0        .0     659.2     280.8        .0      76.4      68.7      62.5      31.7   1789.10
       .64       .03      8.63      4.09      .070      .045      .070      .000   1787.00   9985.79
    .022114      300.      305.      280.         2        15         0       .00     79.21  10065.00


 FLOW DISTRIBUTION FOR SECNO=      2.90          CWSEL=   1790.34

 STA=    9986.    10018.    10029.    10040.    10045.    10047.    10055.    10059.    10065.
   PER Q=     70.1       5.4       4.6       1.7       1.1       9.4       3.9       3.8
    AREA=     76.4      13.9      12.5       4.9       2.8      17.1       7.9       9.5
     VEL=      8.6       3.6       3.4       3.2       3.8       5.2       4.6       3.7
   DEPTH=      2.4       1.2       1.1       1.0       1.6       2.1       1.8       1.6

 *SECNO 2.957
 3280 CROSS SECTION      2.96 EXTENDED       .22 FEET


 3470 ENCROACHMENT STATIONS=     9922.8   10020.8  TYPE=      1  TARGET=       98.010
         GR records removed from station  9813.9   to station     9870.4
                   and from station 10040.6   to station    10193.9
                   to restrict flow to effective area without X3 records.
     2.957      4.52   1796.52   1796.02   1795.59   1796.99       .47      5.64       .12   1795.80
     940.0     401.7     538.3        .0      95.4      84.9        .0      63.6      32.4   1795.80
       .66      4.21      6.34       .00      .070      .045      .000      .000   1792.00   9922.80
    .014243      320.      325.      310.         4        11         0       .00     98.00  10020.80


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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


 FLOW DISTRIBUTION FOR SECNO=      2.96          CWSEL=   1796.52

 STA=    9923.     9928.     9933.     9942.     9950.     9963.     9975.     9981.    10021.
   PER Q=     10.1      13.9      11.5       3.4       1.8       1.2        .8      57.3
    AREA=     21.4      21.3      22.8      10.2       8.9       6.7       4.1      84.9
     VEL=      4.4       6.1       4.7       3.1       1.9       1.7       1.9       6.3
   DEPTH=      4.5       3.9       2.6       1.4        .7        .6        .7       2.1

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    14SEP95      17:37:45                                                                          PAGE   54


                                                                    THIS RUN EXECUTED 14SEP95    17:37:49

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

  Version   4.6.2;  May 1991
 ************************************


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


 Wash 11,100-Yr Floodplai

 SUMMARY PRINTOUT TABLE  101

       SECNO      EGOC       ELLC       EGIC       ELTRD      QCULV      QWEIR      CLASS      H4         DEPTH      CWSEL      VCH
```

*	1.270	1593.44	1593.70	1593.18	1594.90	740.00	.00	7.00	1.35	3.39	1593.09	4.74	1593.44
*	1.270	1593.44	1593.70	1593.18	1594.90	740.00	.00	7.00	1.35	3.39	1593.09	4.75	1593.44

Wash 11,100-Yr Floodplai

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	.038	.00	.00	.00	1497.50	2100.00	1501.77	1501.19	1502.85	110.04	8.33	251.95	200.19
	.038	.00	.00	.00	1497.50	2100.00	1501.80	1501.20	1502.86	107.51	8.27	253.95	202.53
	.078	209.30	.00	.00	1499.50	2100.00	1504.10	1503.86	1505.54	151.55	9.63	217.99	170.58
	.078	209.30	.00	.00	1499.50	2100.00	1504.08	1503.88	1505.54	154.39	9.70	216.54	169.01
	.141	334.40	.00	.00	1503.10	2100.00	1508.22	1507.37	1509.36	89.07	8.59	251.77	222.51
	.141	334.40	.00	.00	1503.10	2100.00	1508.23	1507.37	1509.38	89.02	8.61	243.98	222.58
	.203	327.70	.00	.00	1506.70	2100.00	1510.92	1509.70	1511.41	46.37	5.65	393.45	308.39
	.203	327.70	.00	.00	1506.70	2100.00	1510.96	1509.67	1511.48	48.15	5.76	364.85	302.63
*	.315	591.80	.00	.00	1513.80	2100.00	1516.86	1516.86	1517.84	149.75	8.13	293.02	171.60
*	.315	591.80	.00	.00	1513.80	2100.00	1516.73	1516.73	1517.99	198.01	8.99	233.64	149.24
	.380	343.50	.00	.00	1517.90	2100.00	1521.73	1521.69	1523.16	160.62	9.63	226.18	165.70
	.380	343.50	.00	.00	1517.90	2100.00	1522.03	1521.62	1523.25	122.31	8.87	236.65	189.88
	.458	409.40	.00	.00	1522.60	2100.00	1527.61	1526.95	1528.18	100.37	6.95	371.54	209.61
	.458	409.40	.00	.00	1522.60	2100.00	1527.90	1527.70	1529.20	177.51	9.62	250.53	157.62
	.569	588.90	.00	.00	1530.60	2010.00	1534.22	1534.01	1534.52	135.75	6.23	551.01	172.51
*	.569	588.90	.00	.00	1530.60	2010.00	1535.22	1534.08	1535.60	77.65	5.93	439.79	228.10
	.638	363.70	.00	.00	1535.30	2010.00	1539.14	1538.98	1539.54	149.13	7.62	492.84	164.59
*	.638	363.70	.00	.00	1535.30	2010.00	1539.89	1539.89	1540.83	204.14	10.26	322.55	140.68
	.700	329.30	.00	.00	1539.40	2010.00	1543.54	1543.25	1543.69	113.08	4.85	765.69	189.02
*	.700	329.30	.00	.00	1539.40	2010.00	1544.58	1543.90	1544.87	83.79	5.57	545.21	219.59
*	.747	246.50	.00	.00	1543.80	2010.00	1547.17	1547.17	1547.63	130.09	6.73	535.95	176.22
*	.747	246.50	.00	.00	1543.80	2010.00	1547.48	1547.48	1548.73	215.75	9.29	245.80	136.84
	.783	191.60	.00	.00	1546.60	2010.00	1550.27	1550.04	1550.57	162.70	5.61	469.37	157.58
	.783	191.60	.00	.00	1546.60	2010.00	1551.30	1550.96	1552.40	155.83	7.41	242.05	161.01
*	.815	169.20	.00	.00	1549.50	2010.00	1553.72	1553.72	1554.20	181.37	8.86	535.34	149.25
	.815	169.20	.00	.00	1549.50	2010.00	1554.45	1554.10	1554.96	127.97	8.45	473.00	177.68
*	.894	415.90	.00	.00	1556.90	950.00	1559.36	1558.94	1559.56	91.70	4.33	303.99	99.20
*	.894	415.90	.00	.00	1556.90	950.00	1559.69	1559.26	1560.29	157.28	6.19	153.58	75.75
*	.985	481.00	.00	.00	1564.60	950.00	1566.70	1566.58	1566.96	332.30	5.56	239.98	52.11
	.985	481.00	.00	.00	1564.60	950.00	1567.39	1567.06	1567.62	166.77	3.64	306.68	73.56
*	1.034	256.20	.00	.00	1568.30	950.00	1571.56	1571.14	1571.70	121.51	4.14	342.35	86.18
	1.034	256.20	.00	.00	1568.30	950.00	1572.17	1572.01	1572.73	252.45	7.33	177.90	59.79

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	1.072	202.40	.00	.00	1572.40	950.00	1574.41	1574.15	1574.56	204.67	4.08	306.87	66.41
*	1.072	202.40	.00	.00	1572.40	950.00	1575.36	1574.79	1575.52	96.77	4.16	307.72	96.57

	1.128	297.00	.00	.00	1577.90	950.00	1580.37	1580.31	1580.70	228.71	6.22	260.14	62.82
*	1.128	297.00	.00	.00	1577.90	950.00	1580.69	1580.69	1581.23	238.79	7.16	191.83	61.48
	1.189	318.80	.00	.00	1581.50	950.00	1585.78	1585.66	1586.34	157.82	6.61	191.91	75.
	1.189	318.80	.00	.00	1581.50	950.00	1585.89	1585.64	1586.37	132.43	6.22	205.22	82.55
*	1.201	63.30	.00	.00	1584.60	950.00	1586.54	1586.19	1586.77	30.56	3.84	247.96	171.84
*	1.201	63.30	.00	.00	1584.60	950.00	1586.56	1586.20	1586.78	29.66	3.79	250.53	174.45
*	1.218	88.60	.00	.00	1585.00	740.00	1586.92	1586.92	1587.67	323.14	6.91	107.41	41.17
*	1.218	88.60	.00	.00	1585.00	740.00	1586.91	1586.91	1587.67	333.33	6.98	105.98	40.53
*	1.257	209.40	.00	.00	1585.20	740.00	1589.42	1587.84	1589.69	45.67	4.12	179.71	109.51
*	1.257	209.40	.00	.00	1585.20	740.00	1589.43	1587.84	1589.69	45.33	4.11	180.17	109.91
*	1.261	21.73	.00	.00	1588.80	740.00	1590.98	1590.98	1592.09	283.53	8.43	87.82	43.95
*	1.261	21.73	.00	.00	1588.80	740.00	1590.98	1590.98	1592.09	283.59	8.43	87.82	43.94
*	1.270	45.62	1594.90	1593.70	1589.70	740.00	1593.09	.00	1593.44	55.75	4.74	156.12	99.11
*	1.270	45.62	1594.90	1593.70	1589.70	740.00	1593.09	.00	1593.44	56.08	4.75	155.84	98.82
	1.276	32.59	.00	.00	1590.50	740.00	1593.39	1592.73	1593.69	98.29	4.38	169.00	74.64
	1.276	32.59	.00	.00	1590.50	740.00	1593.39	1592.73	1593.69	97.96	4.38	169.17	74.77
*	1.310	177.40	.00	.00	1595.90	740.00	1597.88	1597.88	1598.37	115.83	5.68	147.19	68.76
*	1.310	177.40	.00	.00	1595.90	740.00	1597.87	1597.87	1598.43	128.84	5.97	123.96	65.19
*	1.425	607.60	.00	.00	1606.50	740.00	1609.13	1609.13	1610.05	110.79	7.68	96.30	70.31
*	1.425	607.60	.00	.00	1606.50	740.00	1609.13	1609.13	1610.05	110.66	7.68	96.34	70.35
*	1.536	586.20	.00	.00	1617.10	740.00	1619.34	1619.34	1620.05	121.18	6.75	109.66	67.22
*	1.536	586.20	.00	.00	1617.10	740.00	1619.35	1619.35	1620.05	120.99	6.74	109.72	67.28
*	1.635	522.00	.00	.00	1629.70	740.00	1632.40	1632.40	1633.26	114.28	7.43	99.62	69.22
*	1.635	522.00	.00	.00	1629.70	740.00	1632.40	1632.40	1633.26	113.99	7.42	99.71	69.31
*	1.728	493.80	.00	.00	1644.10	740.00	1646.86	1646.86	1647.72	111.11	7.45	99.57	70.
*	1.728	493.80	.00	.00	1644.10	740.00	1646.87	1646.87	1647.72	109.15	7.40	100.29	70.[illegible]
*	1.831	541.80	.00	.00	1655.80	740.00	1657.96	1657.96	1658.74	116.37	7.09	104.32	68.60
*	1.831	541.80	.00	.00	1655.80	740.00	1657.96	1657.96	1658.74	116.39	7.09	104.32	68.59
*	1.889	305.50	.00	.00	1663.80	740.00	1666.32	1666.32	1667.18	110.42	7.45	99.33	70.42
*	1.889	305.50	.00	.00	1663.80	740.00	1666.32	1666.32	1667.18	110.37	7.45	99.34	70.44
*	1.907	97.40	.00	.00	1666.00	740.00	1668.14	1668.14	1668.92	116.40	7.09	104.32	68.59
*	1.907	97.40	.00	.00	1666.00	740.00	1668.14	1668.14	1668.92	116.14	7.09	104.40	68.67

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	1.963	293.80	.00	.00	1671.40	740.00	1673.80	1673.80	1674.57	115.43	7.06	104.81	68.88
*	1.963	293.80	.00	.00	1671.40	740.00	1673.80	1673.80	1674.57	115.43	7.06	104.81	68.88
*	2.011	255.20	.00	.00	1676.40	740.00	1678.45	1678.45	1679.32	110.75	7.48	98.95	70.32
*	2.011	255.20	.00	.00	1676.40	740.00	1678.45	1678.45	1679.32	110.75	7.48	98.95	70.32
*	2.109	516.70	.00	.00	1685.40	740.00	1689.35	1689.35	1690.30	236.76	7.86	98.79	48.09
*	2.109	516.70	.00	.00	1685.40	740.00	1689.20	1689.20	1690.34	300.64	8.55	86.57	42.68
	2.208	520.80	.00	.00	1696.20	740.00	1700.94	1700.56	1701.61	197.31	6.59	112.32	52.68
	2.208	520.80	.00	.00	1696.20	740.00	1701.11	1700.57	1701.68	160.90	6.07	121.91	58.34
	2.299	484.90	.00	.00	1709.40	740.00	1712.66	1712.60	1713.36	304.12	6.69	110.56	42.43
*	2.299	484.90	.00	.00	1709.40	740.00	1712.61	1712.61	1713.36	332.31	6.92	106.91	40.59
	2.363	338.20	.00	.00	1719.10	740.00	1721.40	1721.16	1721.87	208.89	5.51	134.21	51.

	2.363	338.20	.00	.00	1719.10	740.00	1721.43	1721.16	1721.88	194.19	5.37	137.70	53.10
*	2.406	226.40	.00	.00	1724.00	740.00	1726.25	1726.25	1727.06	73.22	7.21	102.68	86.48
*	2.406	226.40	.00	.00	1724.00	740.00	1726.25	1726.25	1727.06	73.08	7.20	102.75	86.56
*	2.438	168.70	.00	.00	1727.20	740.00	1729.72	1729.72	1730.62	70.98	7.64	96.89	87.83
*	2.438	168.70	.00	.00	1727.20	740.00	1729.71	1729.71	1730.62	71.09	7.64	96.84	87.76
*	2.470	165.20	.00	.00	1731.10	740.00	1733.14	1733.14	1733.66	279.20	5.76	130.64	44.29
*	2.470	165.20	.00	.00	1731.10	740.00	1733.12	1733.12	1733.66	300.10	5.90	125.33	42.72
	2.568	517.10	.00	.00	1743.80	740.00	1745.95	1745.84	1746.46	220.78	5.70	129.87	49.80
	2.568	517.10	.00	.00	1743.80	740.00	1745.97	1745.85	1746.46	207.05	5.58	132.63	51.43
	2.675	565.80	.00	.00	1757.10	740.00	1759.17	1759.12	1759.73	249.52	5.97	123.96	46.85
	2.675	565.80	.00	.00	1757.10	740.00	1759.15	1759.12	1759.73	267.60	6.11	121.18	45.24
*	2.767	486.20	.00	.00	1768.90	720.00	1772.23	1772.23	1772.67	243.12	6.98	173.70	46.18
*	2.767	486.20	.00	.00	1768.90	720.00	1773.14	1773.14	1774.45	250.50	9.19	78.38	45.49
*	2.838	377.00	.00	.00	1779.70	720.00	1782.98	1782.98	1783.33	131.55	6.82	224.03	62.77
*	2.838	377.00	.00	.00	1779.70	720.00	1783.70	1783.70	1784.79	201.66	9.36	101.98	50.70
*	2.896	305.00	.00	.00	1787.00	940.00	1789.31	1789.31	1789.71	323.42	7.16	224.62	52.27
	2.896	305.00	.00	.00	1787.00	940.00	1790.34	1790.32	1791.23	221.14	8.63	145.08	63.21
*	2.957	324.80	.00	.00	1792.00	940.00	1795.59	1794.83	1795.90	129.13	4.48	209.92	82.72
	2.957	324.80	.00	.00	1792.00	940.00	1796.52	1796.02	1796.99	142.43	6.34	180.34	78.76

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Wash 11,100-Yr Floodplai

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	.038	2100.00	1501.77	.00	.00	.77	72.42	.00
	.038	2100.00	1501.80	.03	.00	.03	72.58	.00
	.078	2100.00	1504.10	.00	2.32	.00	64.28	209.30
	.078	2100.00	1504.08	-.02	2.28	-.02	64.10	209.30
	.141	2100.00	1508.22	.00	4.12	.00	76.51	334.40
	.141	2100.00	1508.23	.02	4.16	.02	56.72	334.40
	.203	2100.00	1510.92	.00	2.71	.00	129.87	327.70
	.203	2100.00	1510.96	.04	2.73	.04	99.31	327.70
*	.315	2100.00	1516.86	.00	5.94	.00	175.97	591.80
*	.315	2100.00	1516.73	-.13	5.77	-.13	94.45	591.80
	.380	2100.00	1521.73	.00	4.87	.00	91.91	343.50
	.380	2100.00	1522.03	.30	5.30	.30	67.61	343.50
	.458	2100.00	1527.61	.00	5.89	.00	144.52	409.40
	.458	2100.00	1527.90	.29	5.87	.29	79.14	409.40
	.569	2010.00	1534.22	.00	6.60	.00	505.14	588.90
*	.569	2010.00	1535.22	1.01	7.32	1.01	143.90	588.90
	.638	2010.00	1539.14	.00	4.92	.00	471.67	363.70
*	.638	2010.00	1539.89	.75	4.66	.75	142.41	363.70
	.700	2010.00	1543.54	.00	4.39	.00	956.05	329.30
*	.700	2010.00	1544.58	1.04	4.69	1.04	267.60	329.30
*	.747	2010.00	1547.17	.00	3.64	.00	549.31	246.50

*	.747	2010.00	1547.48	.31	2.90	.31	101.91	246.50
	.783	2010.00	1550.27	.00	3.10	.00	548.54	191.60
	.783	2010.00	1551.30	1.02	3.81	1.02	77.51	191.60
*	.815	2010.00	1553.72	.00	3.45	.00	537.79	169.20
	.815	2010.00	1554.45	.72	3.15	.72	242.01	169.20
*	.894	950.00	1559.36	.00	5.64	.00	254.80	415.90
*	.894	950.00	1559.69	.33	5.25	.33	69.71	415.90
*	.985	950.00	1566.70	.00	7.34	.00	297.08	481.00
	.985	950.00	1567.39	.69	7.70	.69	212.61	481.00
*	1.034	950.00	1571.56	.00	4.86	.00	411.68	256.20
	1.034	950.00	1572.17	.61	4.78	.61	115.03	256.20

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	1.072	950.00	1574.41	.00	2.85	.00	356.61	202.40
*	1.072	950.00	1575.36	.95	3.19	.95	226.50	202.40
	1.128	950.00	1580.37	.00	5.96	.00	318.11	297.00
*	1.128	950.00	1580.69	.32	5.33	.32	150.00	297.00
	1.189	950.00	1585.78	.00	5.41	.00	137.52	318.80
	1.189	950.00	1585.89	.11	5.20	.11	137.51	318.80
*	1.201	950.00	1586.54	.00	.76	.00	257.68	63.30
*	1.201	950.00	1586.56	.01	.67	.01	239.31	63.30
*	1.218	740.00	1586.92	.00	.38	.00	79.07	88.60
*	1.218	740.00	1586.91	-.01	.35	-.01	72.37	88.60
*	1.257	740.00	1589.42	.00	2.50	.00	60.23	209.40
*	1.257	740.00	1589.43	.01	2.52	.01	60.29	209.40
*	1.261	740.00	1590.98	.00	1.56	.00	40.20	21.73
*	1.261	740.00	1590.98	.00	1.55	.00	40.20	21.73
*	1.270	740.00	1593.09	.00	2.10	.00	48.20	45.62
*	1.270	740.00	1593.09	.00	2.10	.00	48.20	45.62
	1.276	740.00	1593.39	.00	.30	.00	95.52	32.59
	1.276	740.00	1593.39	.00	.31	.00	95.52	32.59
*	1.310	740.00	1597.88	.00	4.49	.00	170.83	177.40
*	1.310	740.00	1597.87	-.01	4.48	-.01	113.19	177.40
*	1.425	740.00	1609.13	.00	11.25	.00	53.22	607.60
*	1.425	740.00	1609.13	.00	11.26	.00	53.23	607.60
*	1.536	740.00	1619.34	.00	10.21	.00	79.49	586.20
*	1.536	740.00	1619.35	.00	10.21	.00	79.50	586.20
*	1.635	740.00	1632.40	.00	13.06	.00	59.55	522.00
*	1.635	740.00	1632.40	.00	13.06	.00	59.57	522.00
*	1.728	740.00	1646.86	.00	14.46	.00	65.82	493.80
*	1.728	740.00	1646.87	.01	14.47	.01	65.98	493.80
*	1.831	740.00	1657.96	.00	11.10	.00	67.96	541.80
*	1.831	740.00	1657.96	.00	11.09	.00	67.96	541.80
*	1.889	740.00	1666.32	.00	8.36	.00	57.60	305.50
*	1.889	740.00	1666.32	.00	8.36	.00	57.60	305.50

*	1.907	740.00	1668.14	.00	1.82	.00	67.96	97.40
*	1.907	740.00	1668.14	.00	1.82	.00	67.99	97.40

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	1.963	740.00	1673.80	.00	5.66	.00	68.31	293.80
*	1.963	740.00	1673.80	.00	5.66	.00	68.31	293.80
*	2.011	740.00	1678.45	.00	4.65	.00	57.04	255.20
*	2.011	740.00	1678.45	.00	4.65	.00	57.04	255.20
*	2.109	740.00	1689.35	.00	10.90	.00	61.81	516.70
*	2.109	740.00	1689.20	-.15	10.75	-.15	39.07	516.70
	2.208	740.00	1700.94	.00	11.59	.00	54.72	520.80
	2.208	740.00	1701.11	.17	11.91	.17	57.71	520.80
	2.299	740.00	1712.66	.00	11.72	.00	74.86	484.90
*	2.299	740.00	1712.61	-.05	11.50	-.05	73.56	484.90
	2.363	740.00	1721.40	.00	8.74	.00	91.80	338.20
	2.363	740.00	1721.43	.03	8.82	.03	92.67	338.20
*	2.406	740.00	1726.25	.00	4.85	.00	63.97	226.40
*	2.406	740.00	1726.25	.00	4.82	.00	63.98	226.40
*	2.438	740.00	1729.72	.00	3.46	.00	53.97	168.70
*	2.438	740.00	1729.71	.00	3.46	.00	53.96	168.70
*	2.470	740.00	1733.14	.00	3.43	.00	154.99	165.20
*	2.470	740.00	1733.12	-.02	3.41	-.02	119.46	165.20
	2.568	740.00	1745.95	.00	12.81	.00	103.38	517.10
	2.568	740.00	1745.97	.02	12.85	.02	103.83	517.10
	2.675	740.00	1759.17	.00	13.22	.00	100.98	565.80
	2.675	740.00	1759.15	-.02	13.18	-.02	100.55	565.80
*	2.767	720.00	1772.23	.00	13.05	.00	215.12	486.20
*	2.767	720.00	1773.14	.91	13.99	.91	30.91	486.20
*	2.838	720.00	1782.98	.00	10.75	.00	266.63	377.00
*	2.838	720.00	1783.70	.72	10.56	.72	45.04	377.00
*	2.896	940.00	1789.31	.00	6.34	.00	328.60	305.00
	2.896	940.00	1790.34	1.03	6.64	1.03	79.21	305.00
*	2.957	940.00	1795.59	.00	6.28	.00	114.57	324.80
	2.957	940.00	1796.52	.92	6.18	.92	98.00	324.80

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SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= .315 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= .315 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= .315 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= .315 PROFILE= 2 MINIMUM SPECIFIC ENERGY

WARNING SECNO= .569 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= .638 PROFILE= 2 CRITICAL DEPTH ASSUMED

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 CAUTION SECNO=       .638  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=       .700  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=       .747  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=       .747  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=       .747  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=       .747  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=       .815  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=       .815  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=       .894  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=       .894  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=       .985  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=      1.034  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=      1.072  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=      1.128  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      1.128  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=      1.201  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      1.201  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=      1.218  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      1.218  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      1.218  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      1.218  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=      1.257  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      1.257  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=      1.261  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      1.261  PROFILE=  1  MINIMUM SPECIFIC ENERGY
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 WARNING SECNO=      1.270  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      1.270  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
1
    14SEP95      17:37:45                                                                PAGE   62


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 CAUTION SECNO=      1.310  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      1.310  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      1.310  PROFILE=  2  MINIMUM SPECIFIC ENERGY

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 CAUTION SECNO=      1.425  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      1.425  PROFILE=  2  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=      1.536  PROFILE=  1  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=      1.536  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      1.536  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=      1.635  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      1.635  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      1.635  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      1.635  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=      1.728  PROFILE=  1  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=      1.728  PROFILE=  2  MINIMUM SPECIFIC ENERGY
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 CAUTION SECNO=      1.831  PROFILE=  1  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=      1.889  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      1.889  PROFILE=  1  MINIMUM SPECIFIC ENERGY
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 CAUTION SECNO=      1.907  PROFILE=  1  CRITICAL DEPTH ASSUMED
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1
    14SEP95      17:37:45                                                    PAGE   63


 CAUTION SECNO=      2.299  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      2.299  PROFILE=  2  MINIMUM SPECIFIC ENERGY

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 CAUTION SECNO=      2.896  PROFILE=  1  CRITICAL DEPTH ASSUMED
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 WARNING SECNO=      2.957  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

1
    14SEP95      17:37:45                                                    PAGE   64
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FLOODWAY DATA, Wash 11,100-Yr Floodplai
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
.038	73.	254.	8.3	1501.8	1501.8	.0
.078	64.	217.	9.7	1504.1	1504.1	.0
.141	57.	244.	8.6	1508.2	1508.2	.0
.203	99.	365.	5.8	1510.9	1510.9	.0
.315	94.	234.	9.0	1516.8	1516.9	-.1
.380	68.	237.	8.9	1522.0	1521.7	.3
.458	79.	251.	8.4	1527.9	1527.6	.3
.569	144.	440.	4.6	1535.2	1534.2	1.0
.638	142.	323.	6.2	1539.8	1539.1	.7
.700	268.	545.	3.7	1544.5	1543.5	1.0
.747	102.	246.	8.2	1547.5	1547.2	.3
.783	78.	242.	8.3	1551.3	1550.3	1.0
.815	242.	473.	4.2	1554.4	1553.7	.7
.894	70.	154.	6.2	1559.7	1559.4	.3
.985	213.	307.	3.1	1567.4	1566.7	.7
1.034	115.	178.	5.3	1572.2	1571.6	.6
1.072	227.	308.	3.1	1575.3	1574.4	.9
1.128	150.	192.	5.0	1580.7	1580.4	.3
1.189	138.	205.	4.6	1585.9	1585.8	.1
1.201	239.	251.	3.8	1586.5	1586.5	.0
1.218	72.	106.	7.0	1586.9	1586.9	.0
1.257	60.	180.	4.1	1589.4	1589.4	.0
1.261	40.	88.	8.4	1591.0	1591.0	.0
1.270	48.	156.	4.7	1593.1	1593.1	.0
1.276	96.	169.	4.4	1593.4	1593.4	.0
1.310	113.	124.	6.0	1597.9	1597.9	.0
1.425	53.	96.	7.7	1609.1	1609.1	.0
1.536	80.	110.	6.7	1619.3	1619.3	.0
1.635	60.	100.	7.4	1632.4	1632.4	.0
1.728	66.	100.	7.4	1646.9	1646.9	.0
1.831	68.	104.	7.1	1658.0	1658.0	.0
1.889	58.	99.	7.4	1666.3	1666.3	.0
1.907	68.	104.	7.1	1668.1	1668.1	.0
1.963	68.	105.	7.1	1673.8	1673.8	.0
2.011	57.	99.	7.5	1678.5	1678.5	.0
2.109	39.	87.	8.5	1689.2	1689.4	-.2
2.208	58.	122.	6.1	1701.1	1700.9	.2
2.299	74.	107.	6.9	1712.7	1712.7	.0
2.363	93.	138.	5.4	1721.4	1721.4	.0
2.406	64.	103.	7.2	1726.3	1726.3	.0
2.438	54.	97.	7.6	1729.7	1729.7	.0
2.470	119.	125.	5.9	1733.1	1733.1	.0

1

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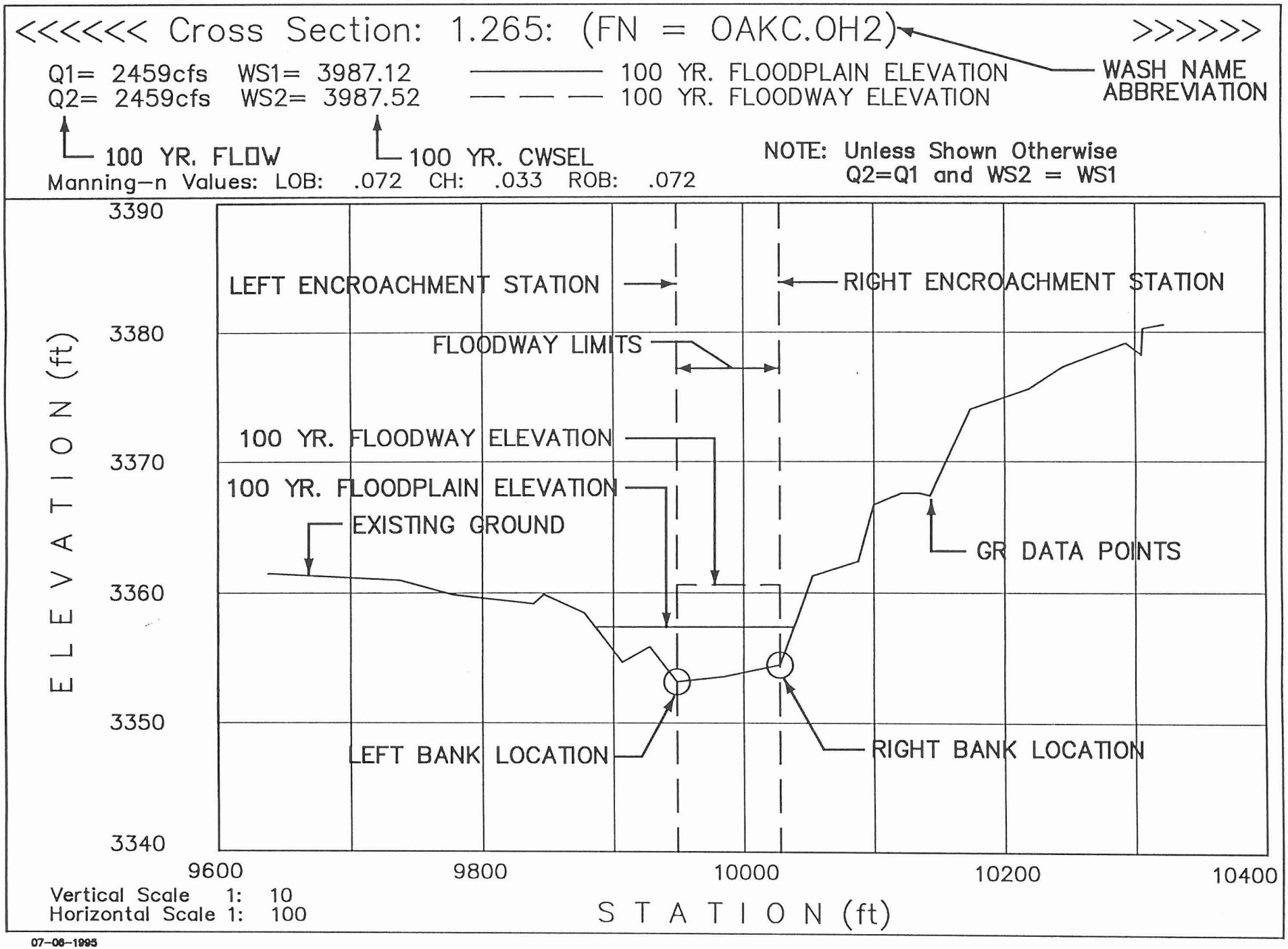
FLOODWAY DATA, Wash 11,100-Yr Floodplai
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
2.568	104.	133.	5.6	1746.0	1746.0	.0
2.675	101.	121.	6.1	1759.2	1759.2	.0
2.767	31.	78.	9.2	1773.1	1772.2	.9
2.838	45.	102.	7.1	1783.7	1783.0	.7
2.896	79.	145.	6.5	1790.3	1789.3	1.0

2.957	98.	180.	5.2	1796.5	1795.6	.9

CROSS SECTIONS

CROSS SECTION LEGEND

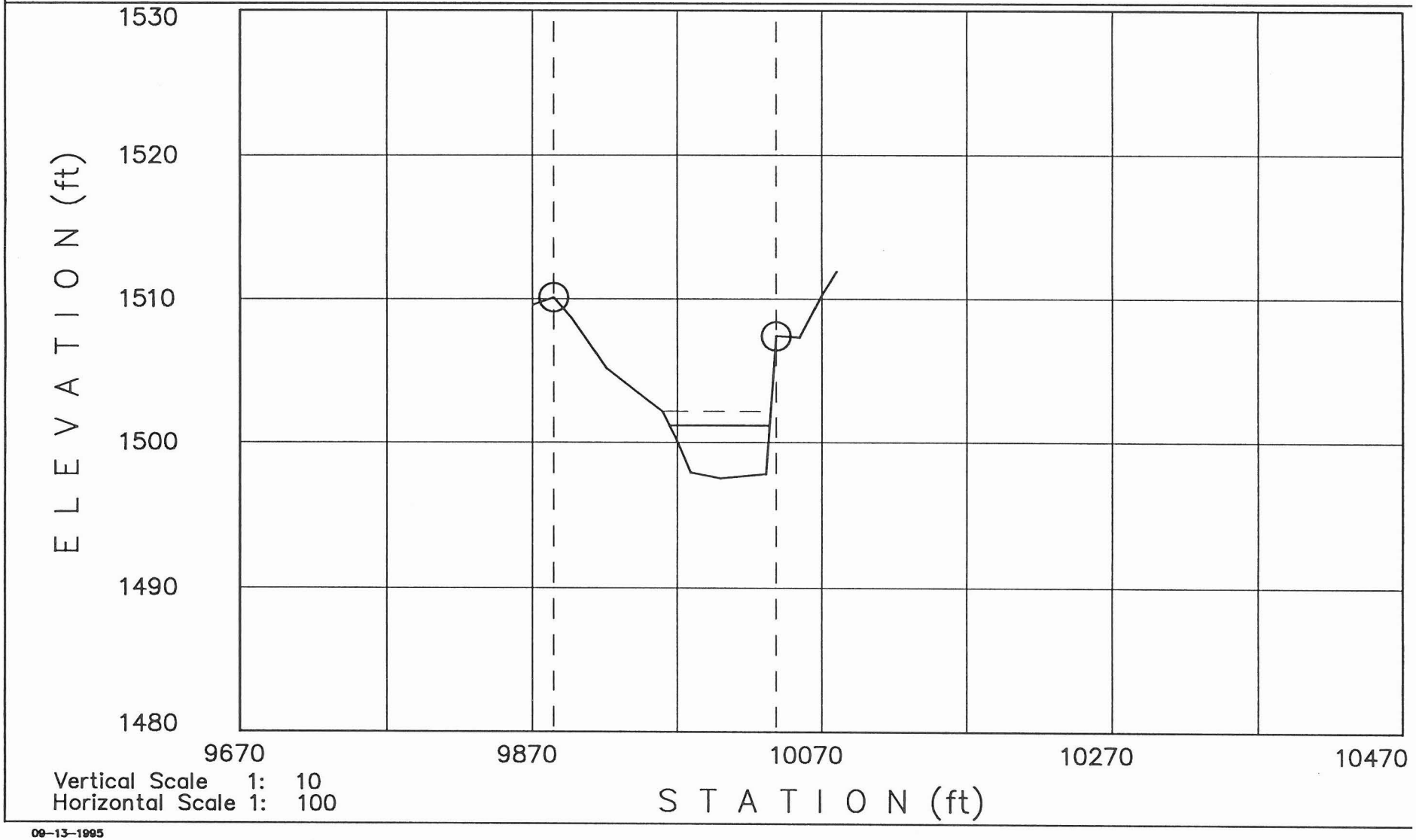


07-06-1995

<<<<<< Cross Section: .038: (FN = W11FW1.0H2) >>>>>>

Q1= 2100cfs WS1= 1501.19
Q2= 2100cfs WS2= 1502.19

Manning–n Values: LOB: 0 CH: .042 ROB: 0



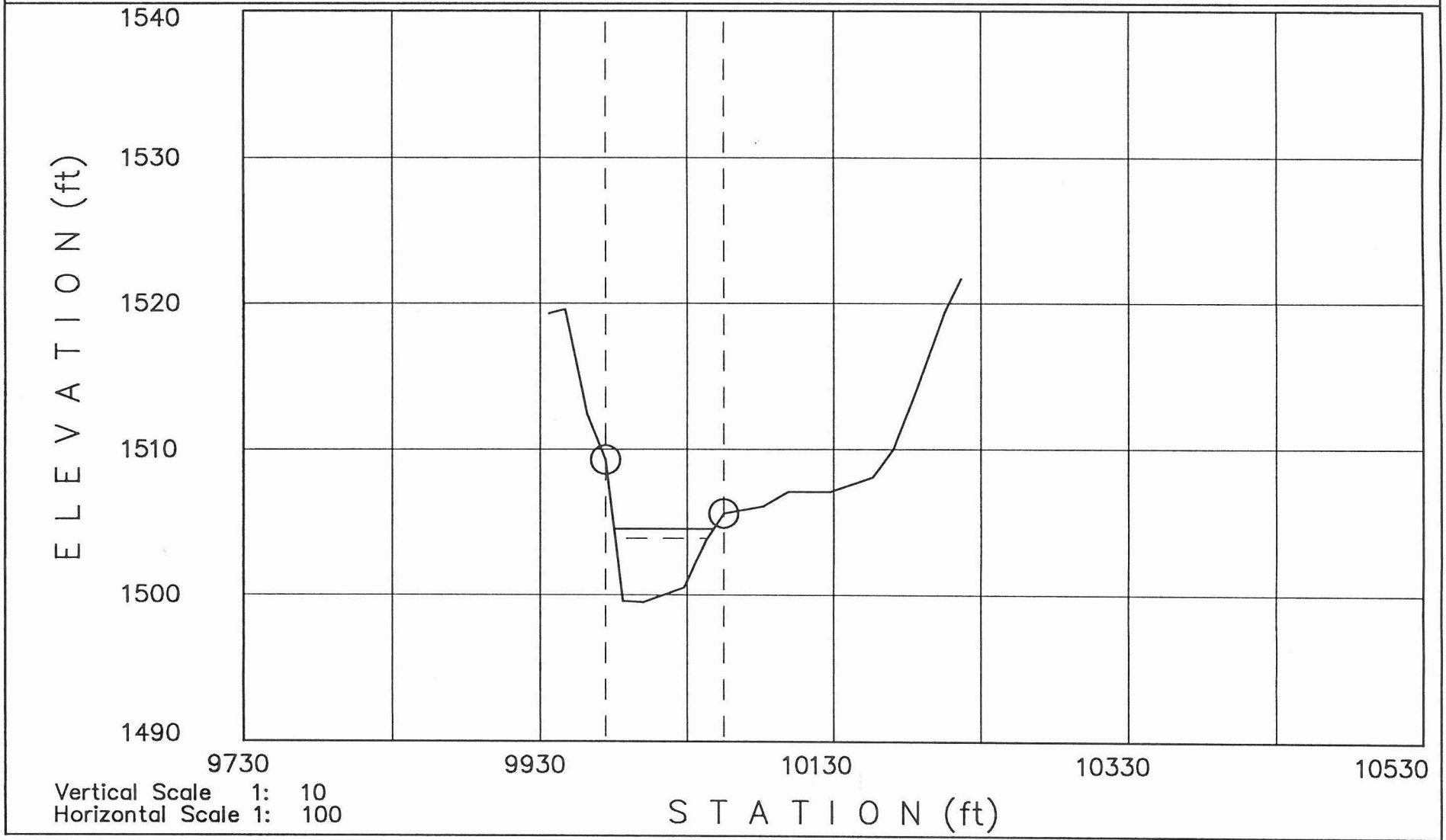
Vertical Scale 1: 10
Horizontal Scale 1: 100

09–13–1995

<<<<<< Cross Section: .078: (FN = W11FW1.OH2) >>>>>>

Q1= 2100cfs WS1= 1504.52
Q2= 2100cfs WS2= 1503.86

Manning-n Values: LOB: 0 CH: .042 ROB: 0



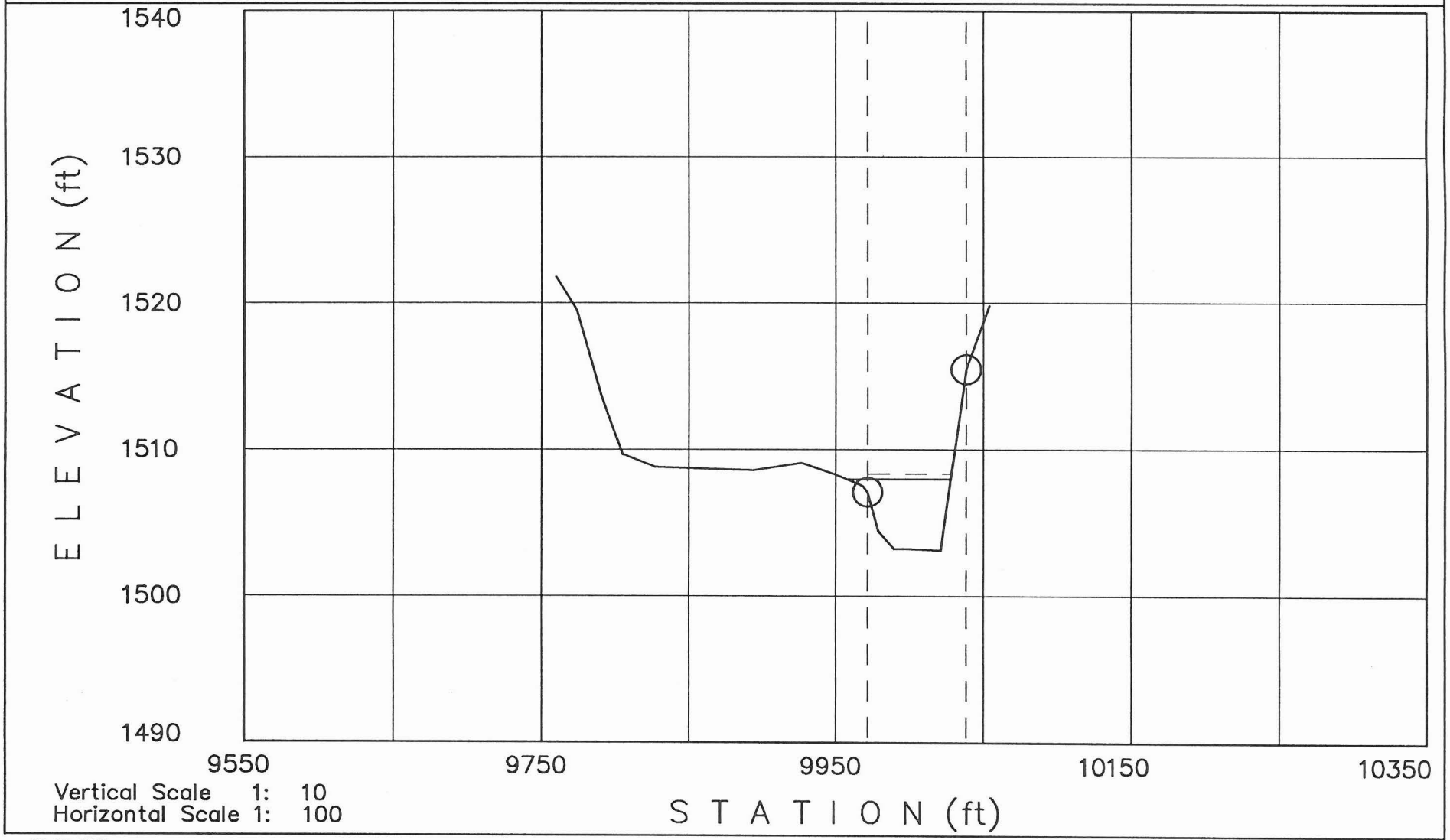
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: .141: (FN = W11FW1.OH2) >>>>>>

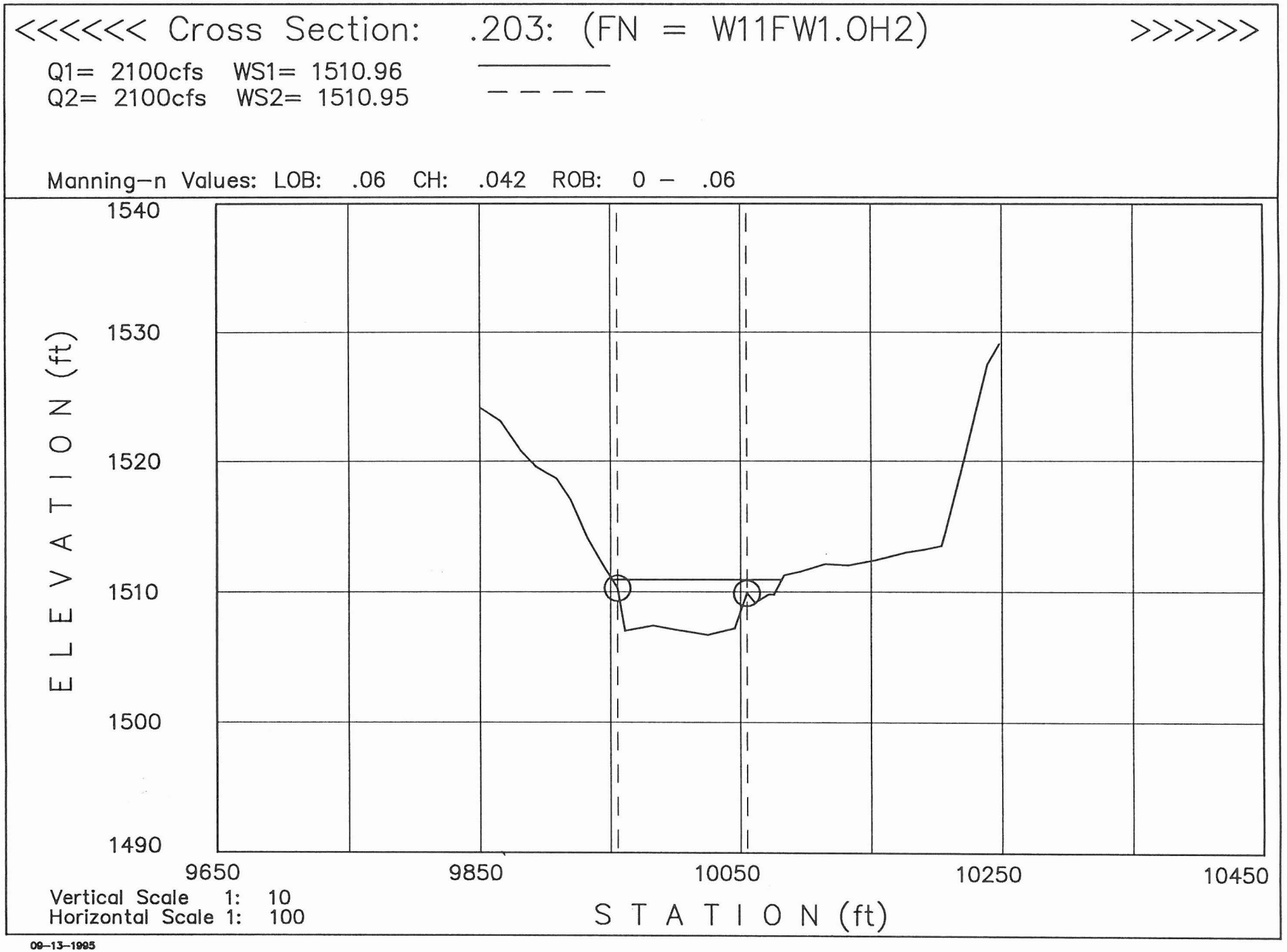
Q1= 2100cfs WS1= 1507.97
Q2= 2100cfs WS2= 1508.35

Manning-n Values: LOB: .06 CH: .042 ROB: 0



Vertical Scale 1: 10
Horizontal Scale 1: 100

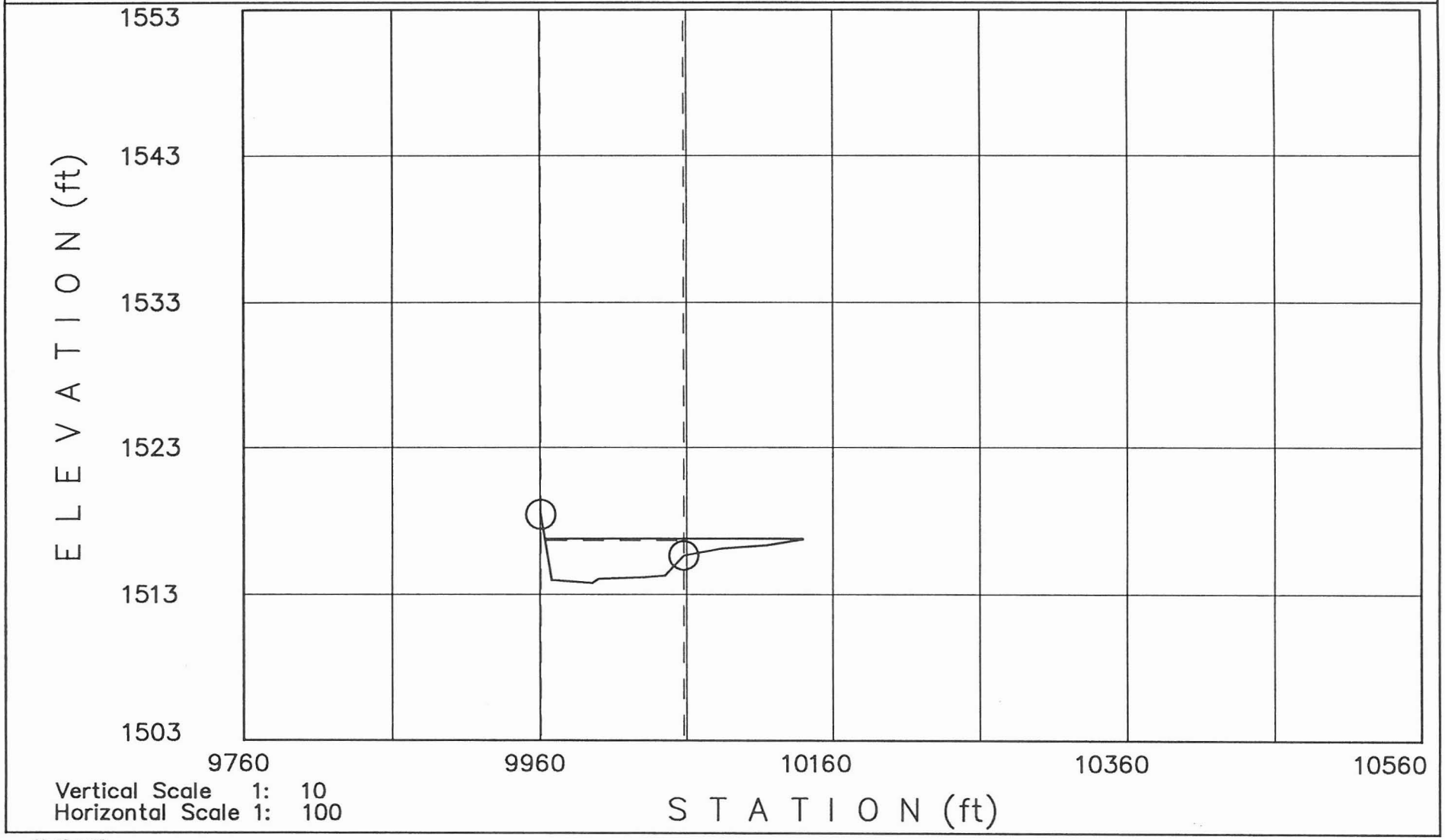
09-13-1995


<<<<<< Cross Section: .203: (FN = W11FW1.0H2) >>>>>>
Q1= 2100cfs WS1= 1510.96
Q2= 2100cfs WS2= 1510.95
Manning-n Values: LOB: .06 CH: .042 ROB: 0 - .06
1540
1530
1520
1510
1500
1490
ELEVATION (ft)
9650
9850
10050
10250
10450
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
09-13-1995

<<<<<< Cross Section: .315: (FN = W11FW1.0H2) >>>>>>

Q1= 2100cfs WS1= 1516.86
Q2= 2100cfs WS2= 1516.73

Manning–n Values: LOB: 0 CH: .042 ROB: 0 – .065



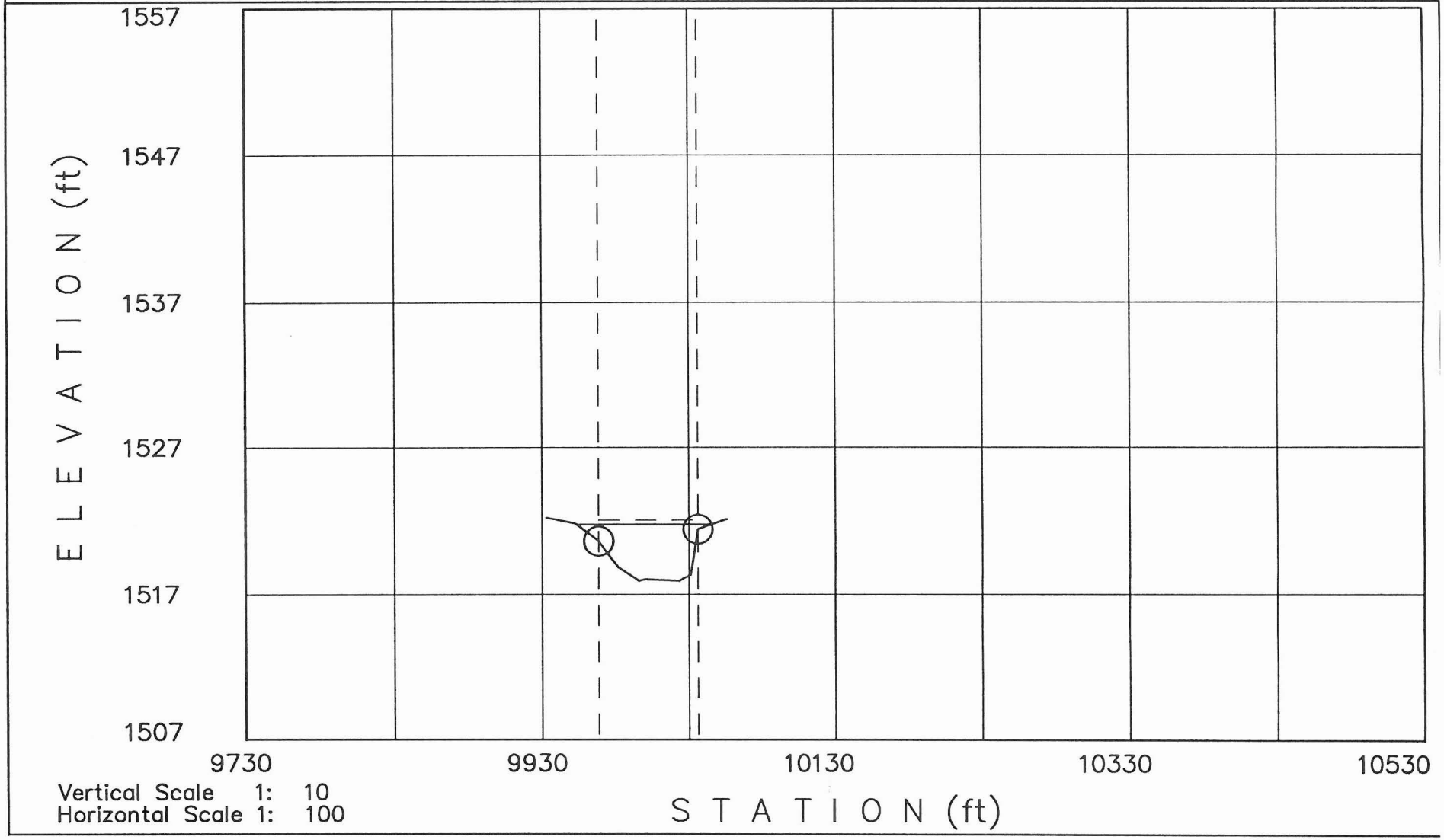
Vertical Scale 1: 10
Horizontal Scale 1: 100

09–13–1995

<<<<<< Cross Section: .38: (FN = W11FW1.0H2) >>>>>>

Q1= 2100cfs WS1= 1521.73
Q2= 2100cfs WS2= 1522.03

Manning–n Values: LOB: .065 CH: .042 ROB: 0 – .065



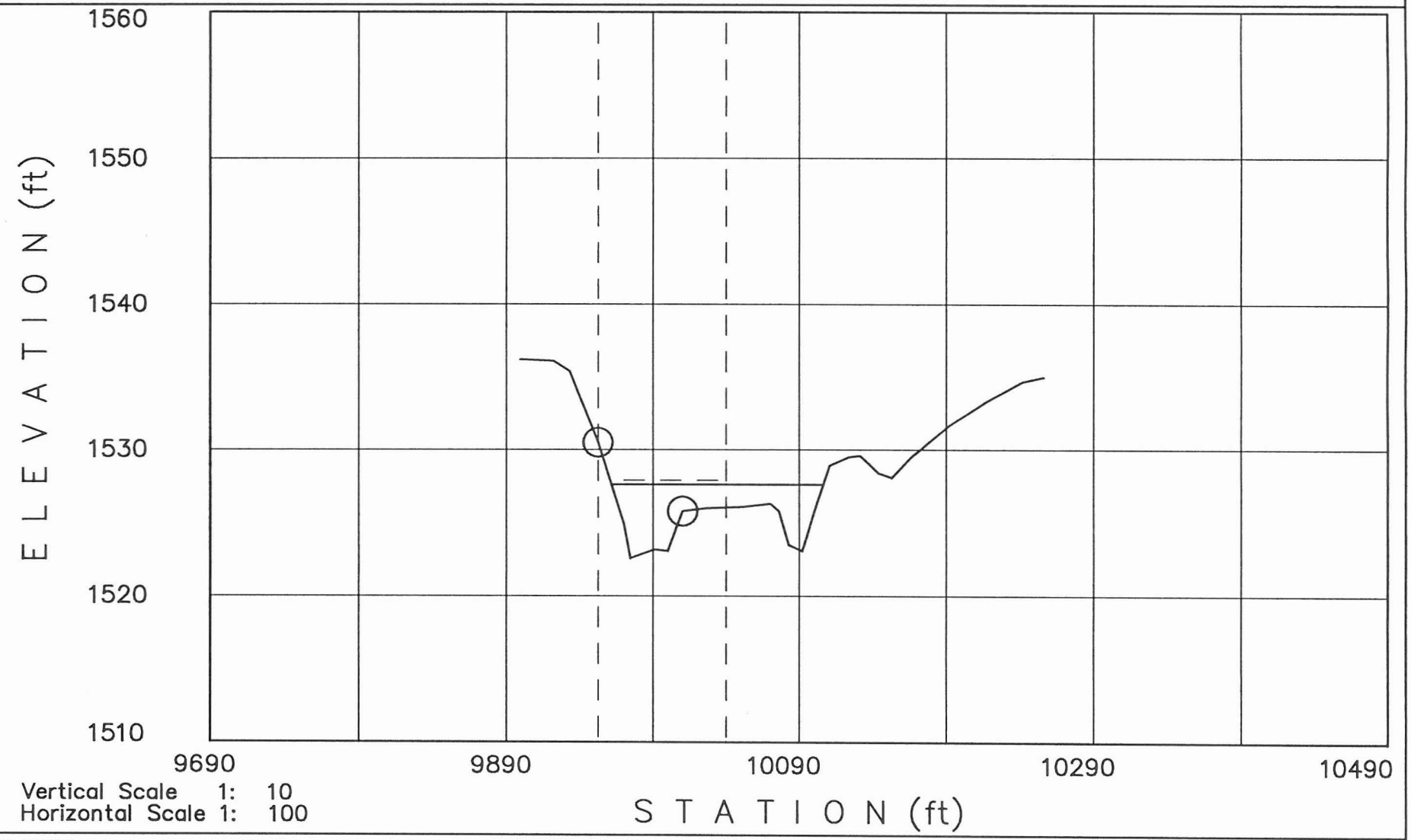
Vertical Scale 1: 10
Horizontal Scale 1: 100

09–13–1995

<<<<<< Cross Section: .458: (FN = W11FW1.0H2) >>>>>>

Q1= 2100cfs WS1= 1527.62
Q2= 2100cfs WS2= 1527.9

Manning-n Values: LOB: 0 CH: .05 ROB: .059 - .07



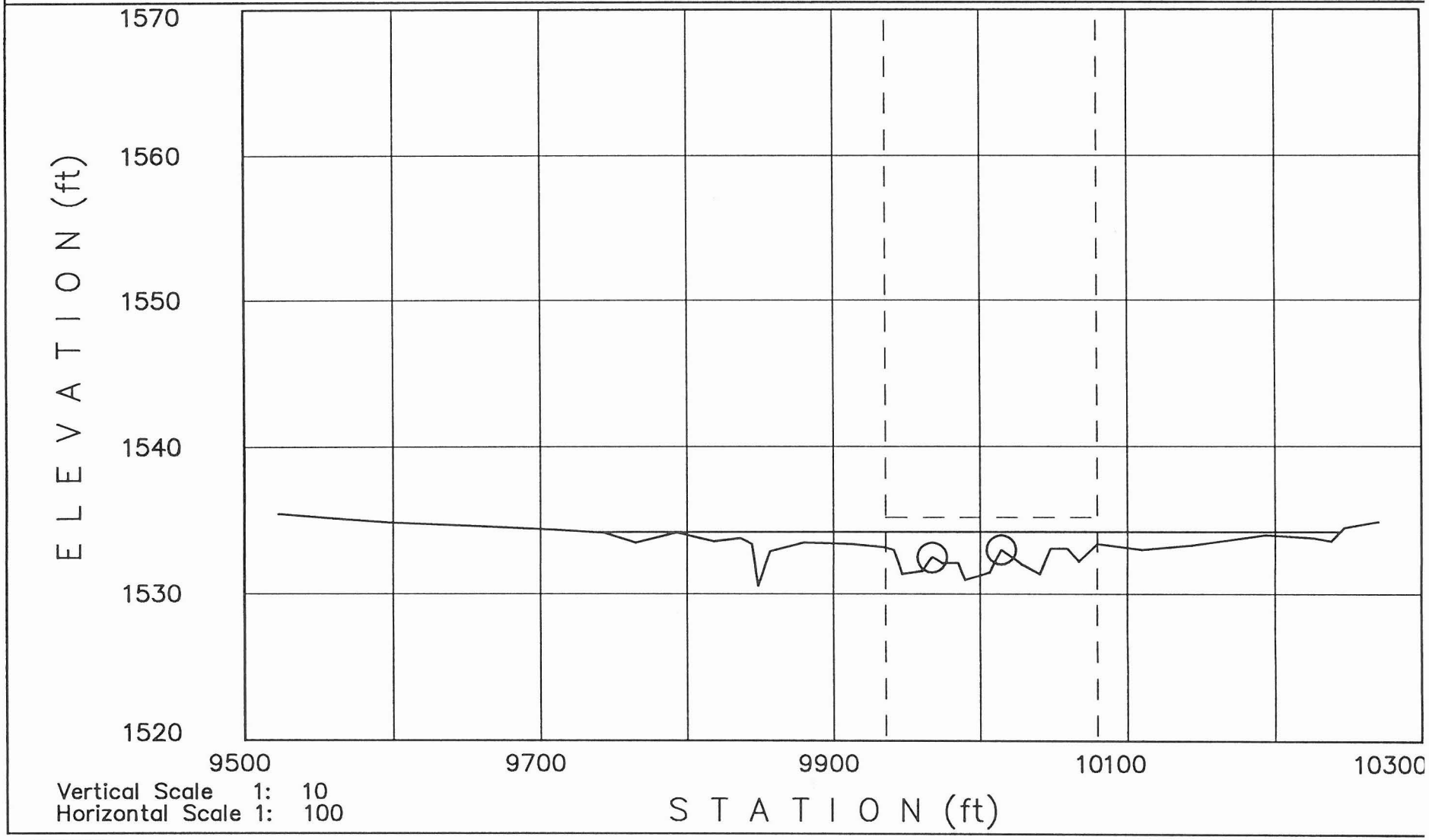
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: .569: (FN = W11FW1.0H2) >>>>>>

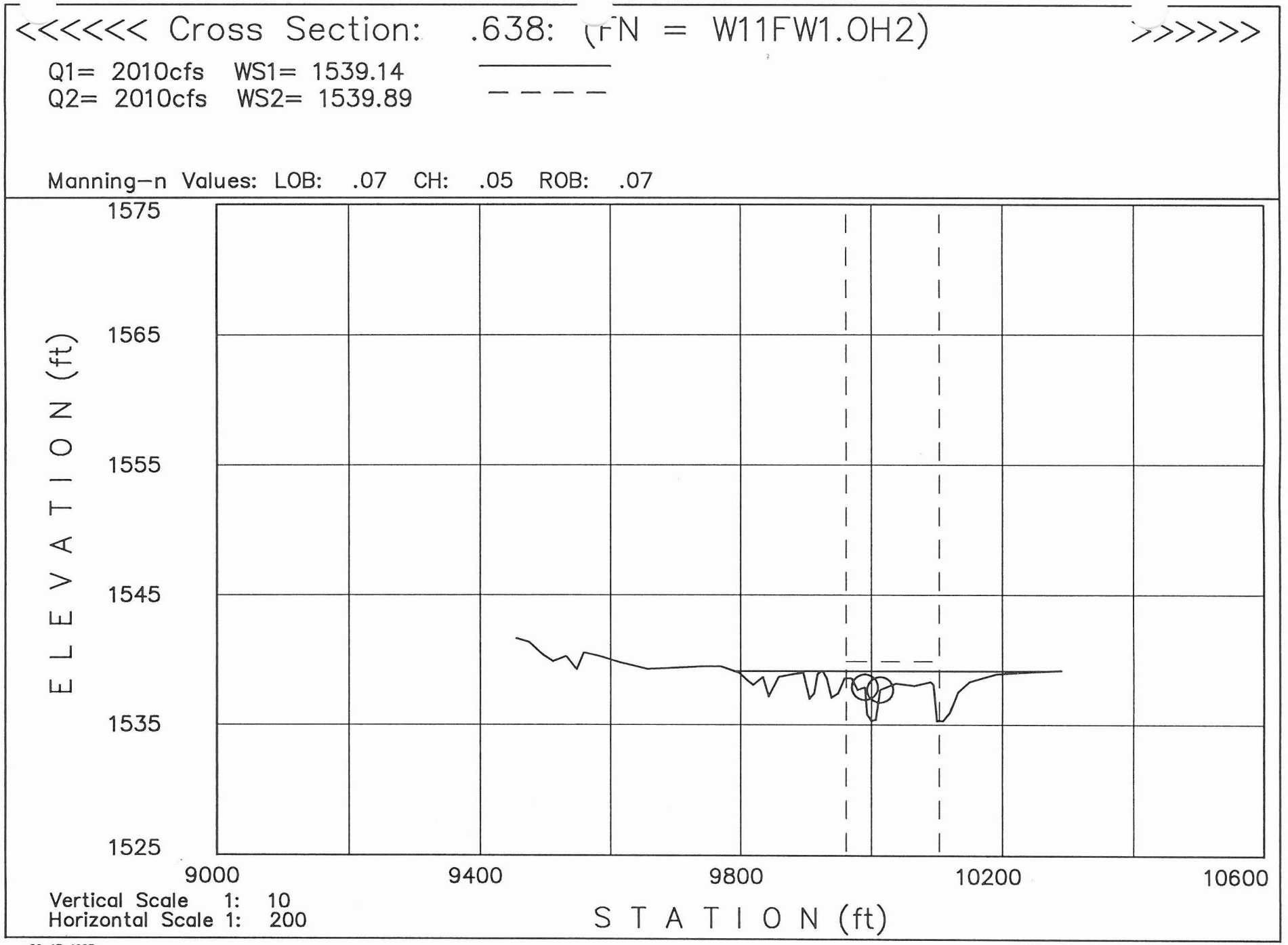
Q1= 2010cfs WS1= 1534.22
Q2= 2010cfs WS2= 1535.23

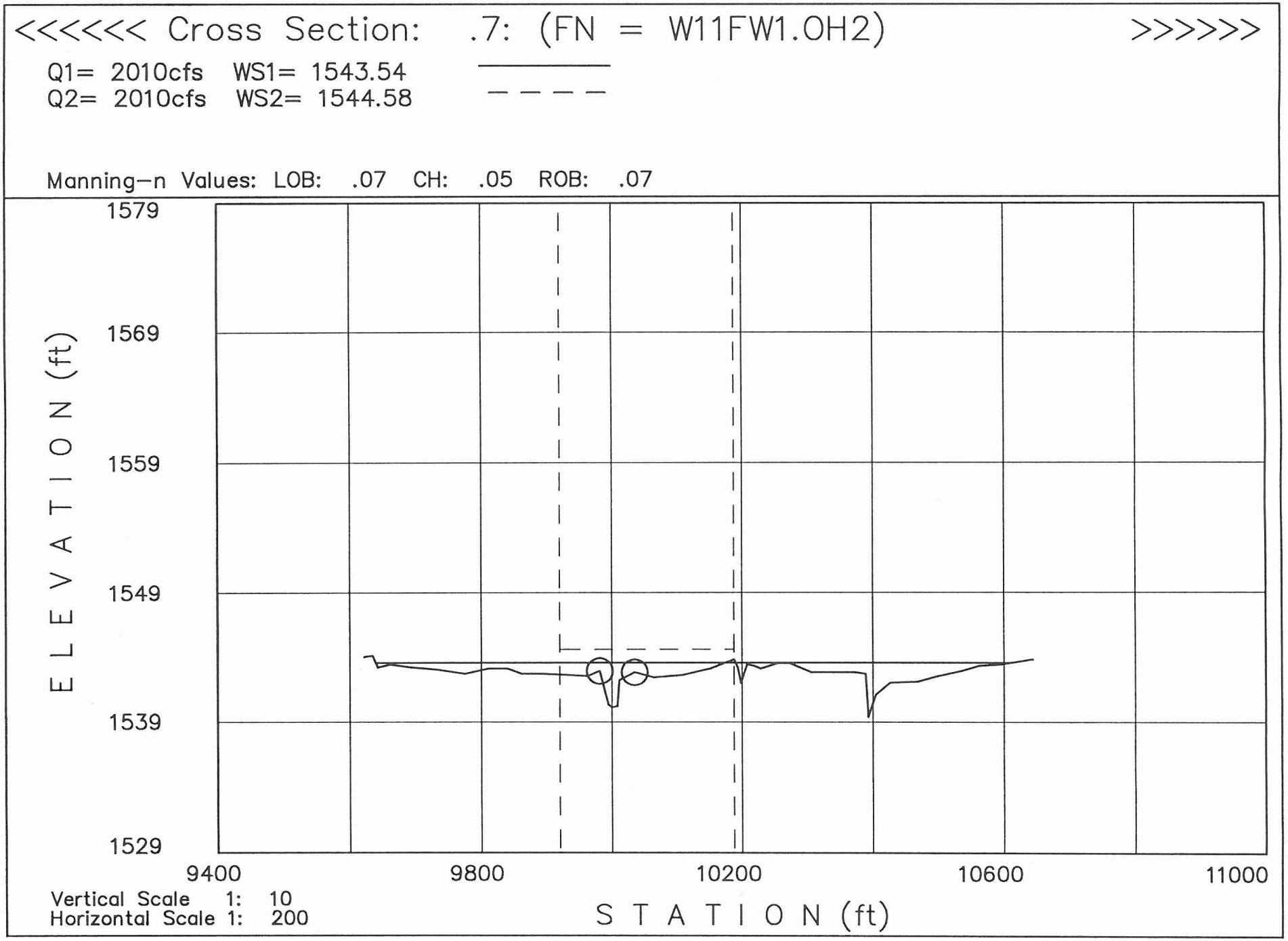
Manning-n Values: LOB: .07 CH: .05 ROB: .07



Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

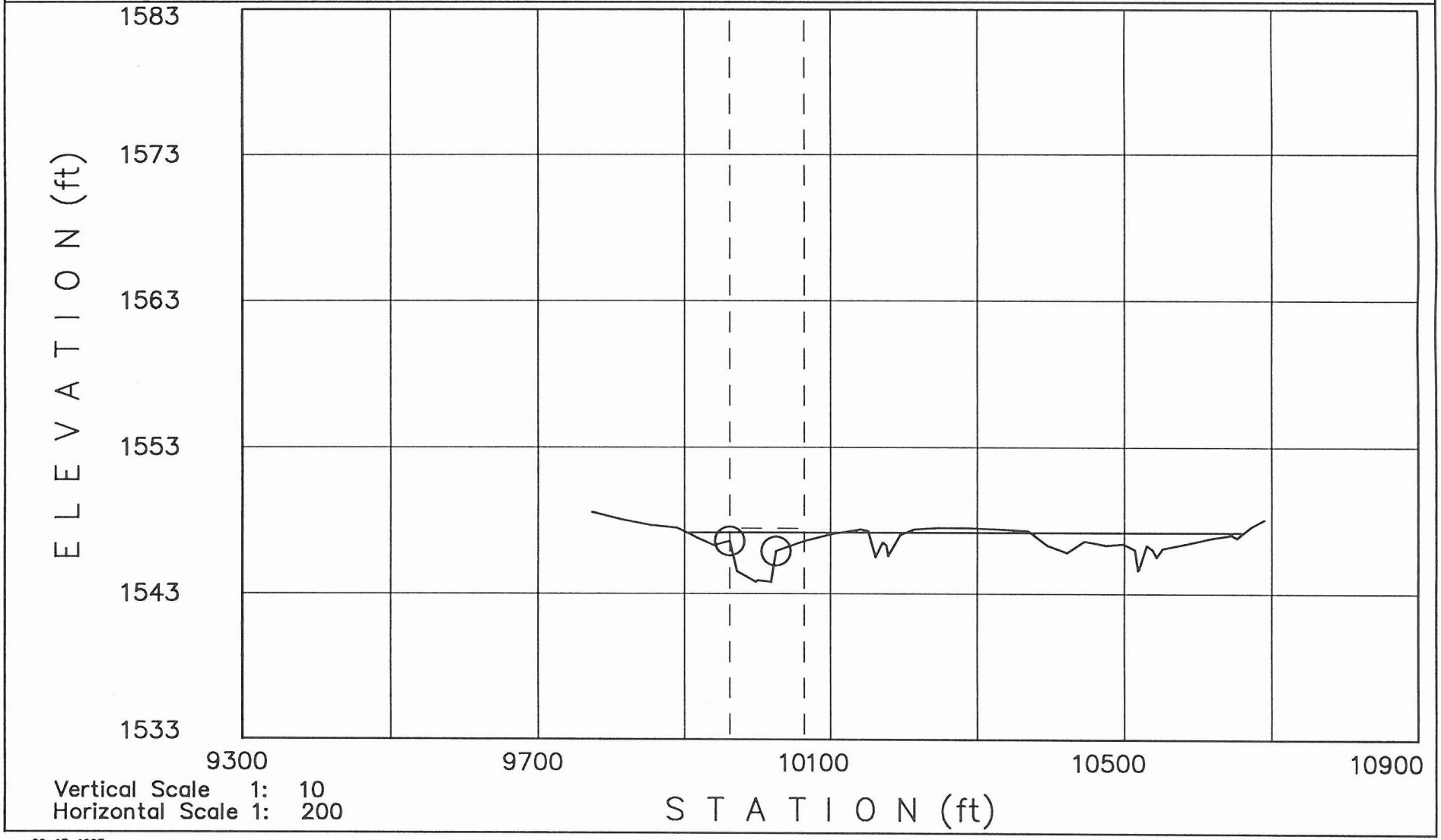

<<<<<< Cross Section: .638: (RN = W11FW1.0H2) >>>>>>
Q1= 2010cfs WS1= 1539.14
Q2= 2010cfs WS2= 1539.89
Manning-n Values: LOB: .07 CH: .05 ROB: .07
1575
1565
1555
1545
1535
1525
ELEVATION (ft)
9000
9400
9800
10200
10600
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 200
09-13-1995


<<<<<< Cross Section: .7: (FN = W11FW1.0H2) >>>>>>
Q1= 2010cfs WS1= 1543.54
Q2= 2010cfs WS2= 1544.58
Manning-n Values: LOB: .07 CH: .05 ROB: .07
1579
1569
1559
1549
1539
1529
ELEVATION (ft)
9400
9800
10200
10600
11000
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 200
09-13-1995

<<<<<< Cross Section: .747: (FN = W11FW1.0H2) >>>>>>

Q1= 2010cfs WS1= 1547.17
Q2= 2010cfs WS2= 1547.48

Manning–n Values: LOB: .07 CH: .05 ROB: .07



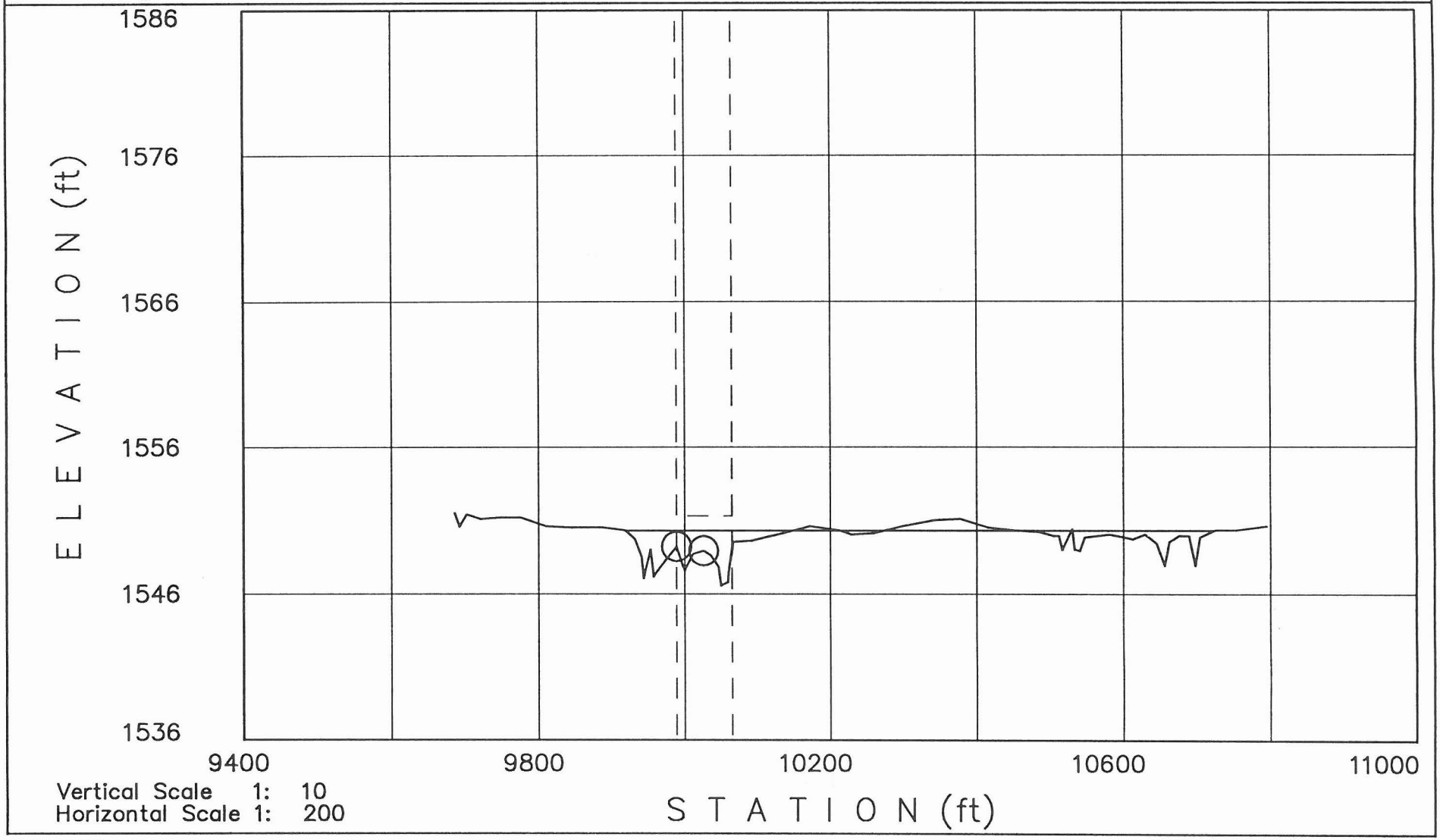
Vertical Scale 1: 10
Horizontal Scale 1: 200

09–13–1995

<<<<<< Cross Section: .783: (FN = W11FW1.0H2) >>>>>>

Q1= 2010cfs WS1= 1550.27
Q2= 2010cfs WS2= 1551.29

Manning-n Values: LOB: .07 CH: .05 ROB: .046 - .055



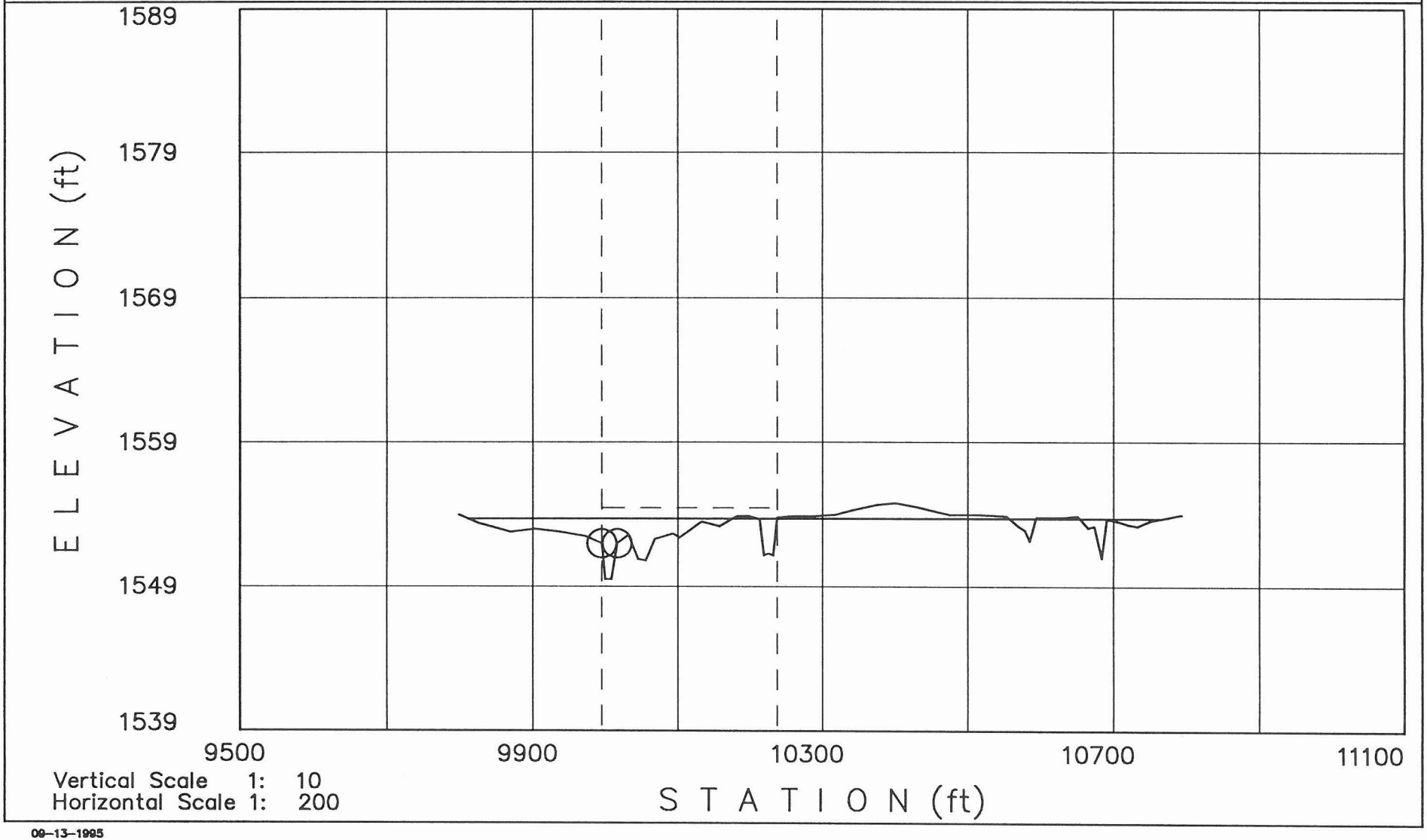
Vertical Scale 1: 10
Horizontal Scale 1: 200

09-13-1995

<<<<<< Cross Section: .815: (FN = W11FW1.0H2) >>>>>>

Q1= 2010cfs WS1= 1553.72
Q2= 2010cfs WS2= 1554.47

Manning-n Values: LOB: .07 CH: .05 ROB: .083



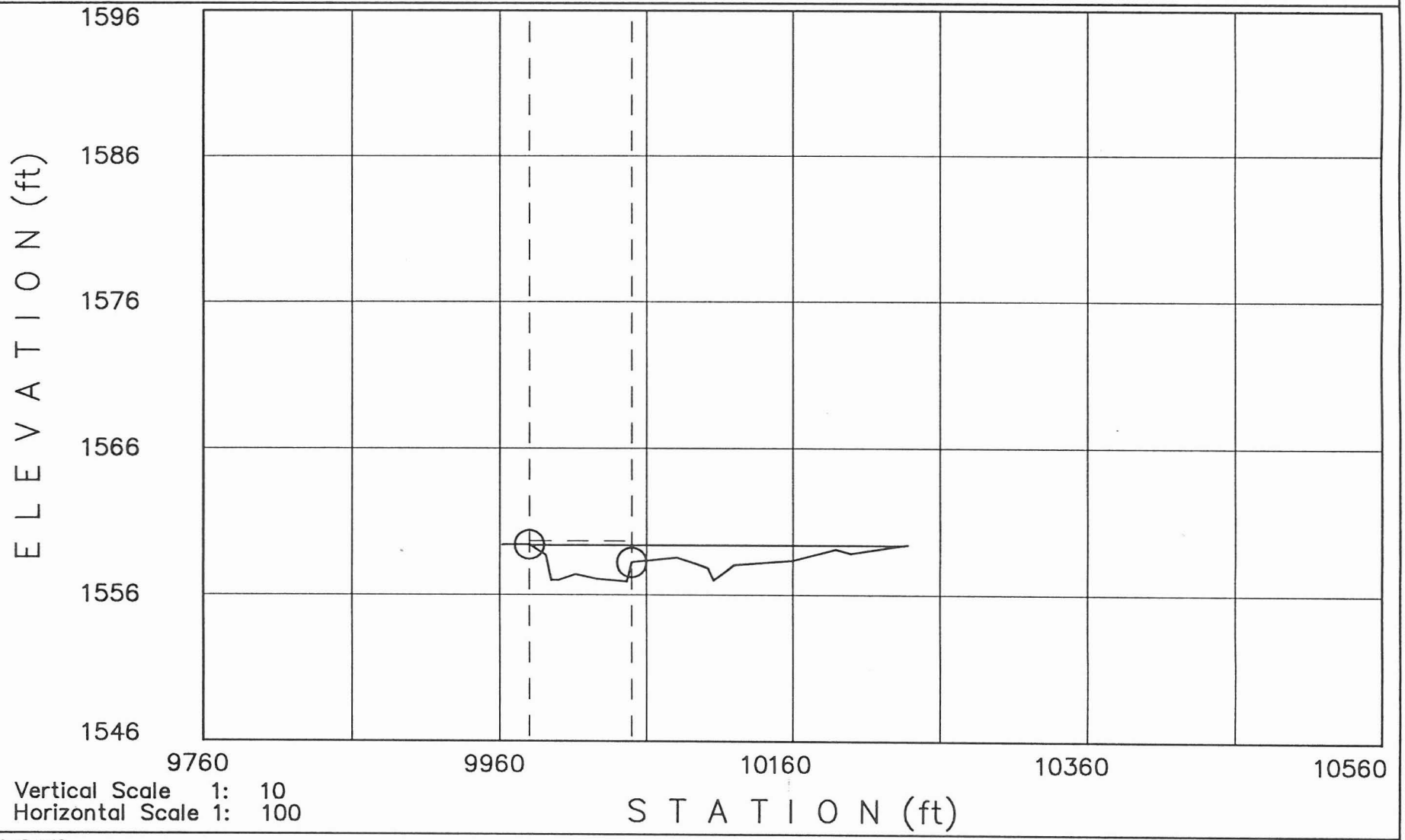
Vertical Scale 1: 10
Horizontal Scale 1: 200

09-13-1995

<<<<<< Cross Section: .894: (FN = W11FW1.0H2) >>>>>>

Q1= 950cfs WS1= 1559.36
Q2= 950cfs WS2= 1559.66

Manning-n Values: LOB: 0 CH: .05 ROB: 0 - .07



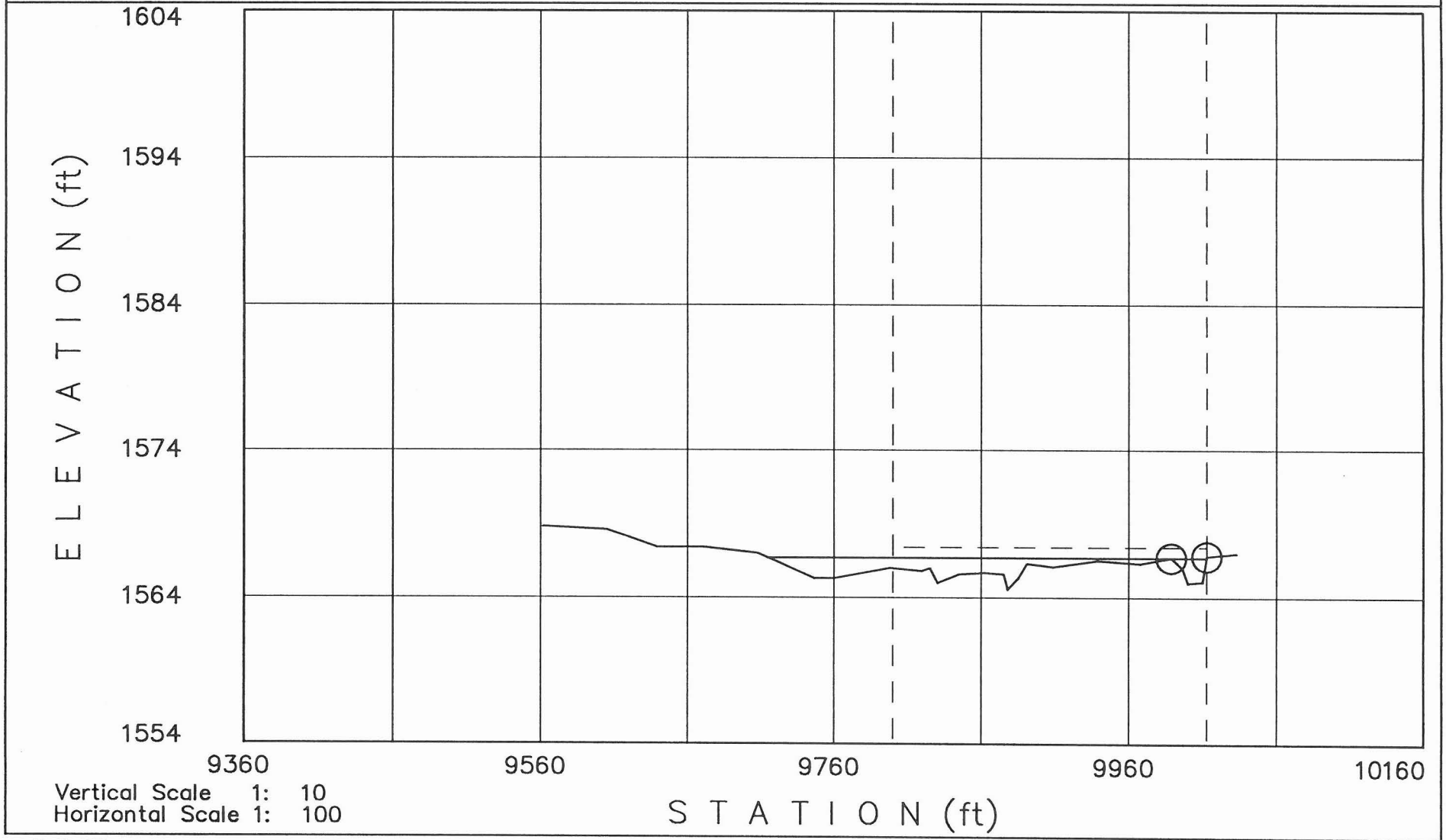
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: .985: (FN = W11FW1.0H2) >>>>>>

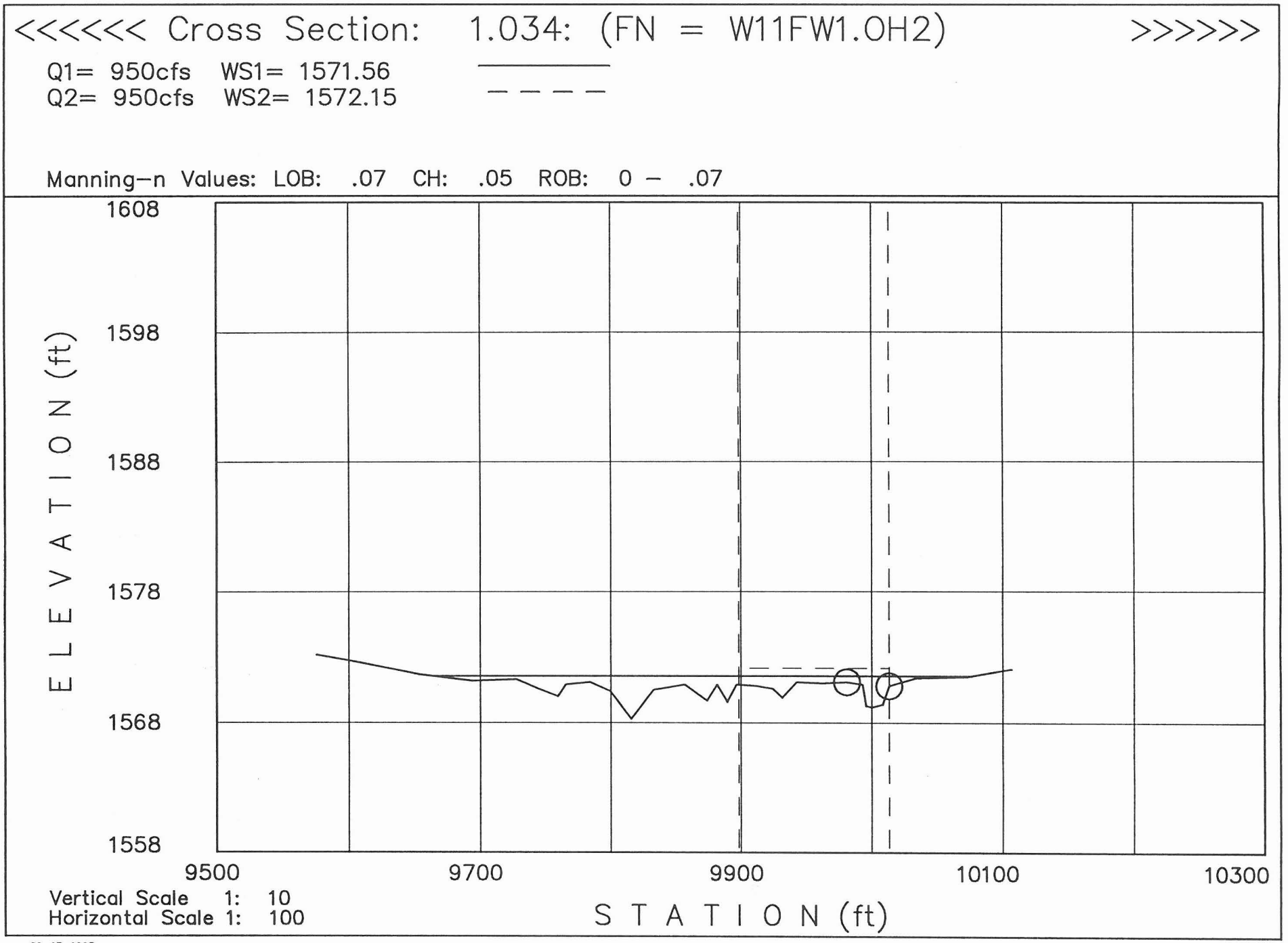
Q1= 950cfs WS1= 1566.7
Q2= 950cfs WS2= 1567.4

Manning–n Values: LOB: .07 CH: .05 ROB: 0 – .07



Vertical Scale 1: 10
Horizontal Scale 1: 100

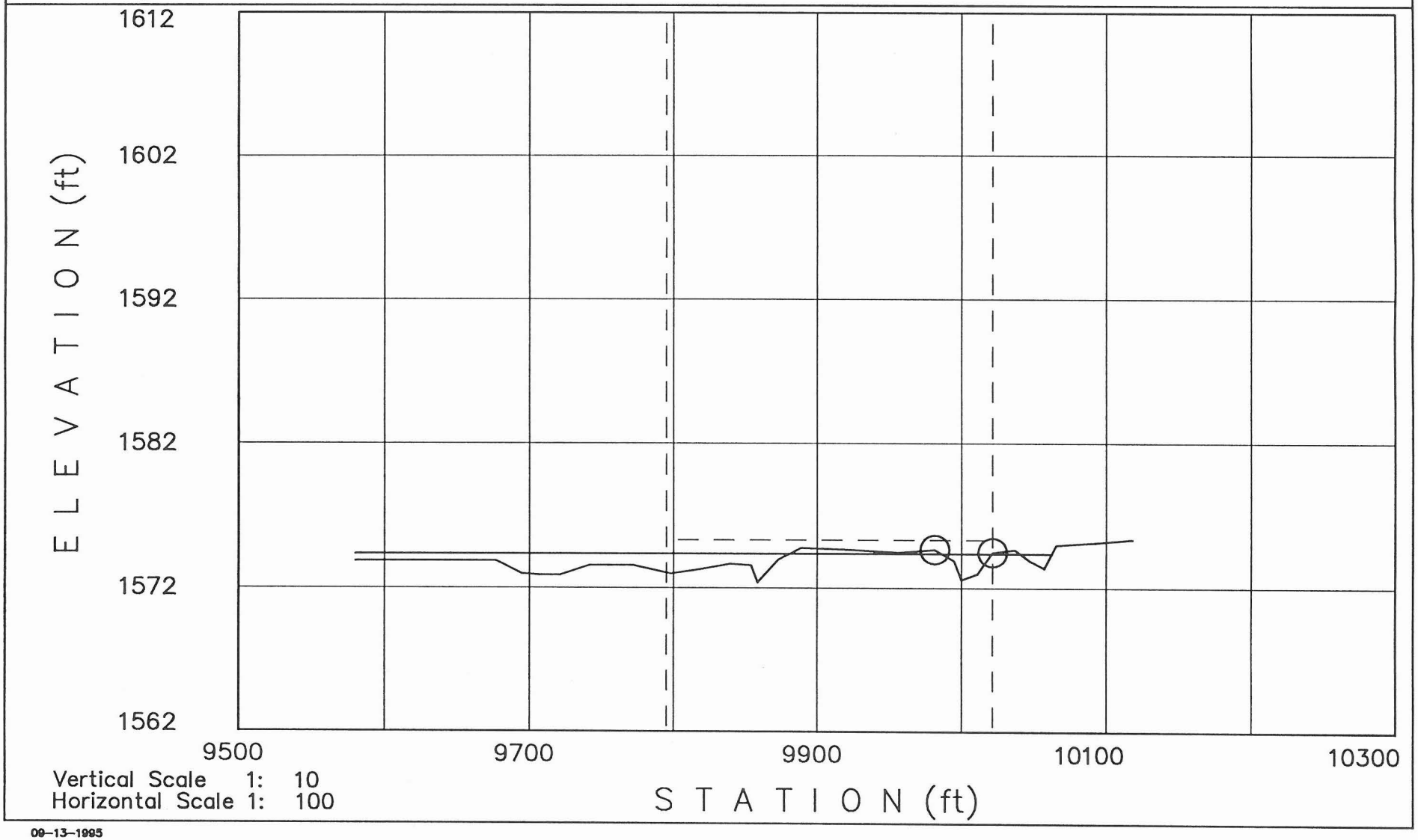
09–13–1995


<<<<<< Cross Section: 1.034: (FN = W11FW1.0H2) >>>>>>
Q1= 950cfs WS1= 1571.56
Q2= 950cfs WS2= 1572.15
Manning-n Values: LOB: .07 CH: .05 ROB: 0 - .07
1608
1598
1588
1578
1568
1558
ELEVATION (ft)
9500
9700
9900
10100
10300
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
09-13-1995

<<<<<< Cross Section: 1.072: (FN = W11FW1.0H2) >>>>>>

Q1= 950cfs WS1= 1574.41
Q2= 950cfs WS2= 1575.36

Manning–n Values: LOB: .07 CH: .05 ROB: 0 – .07



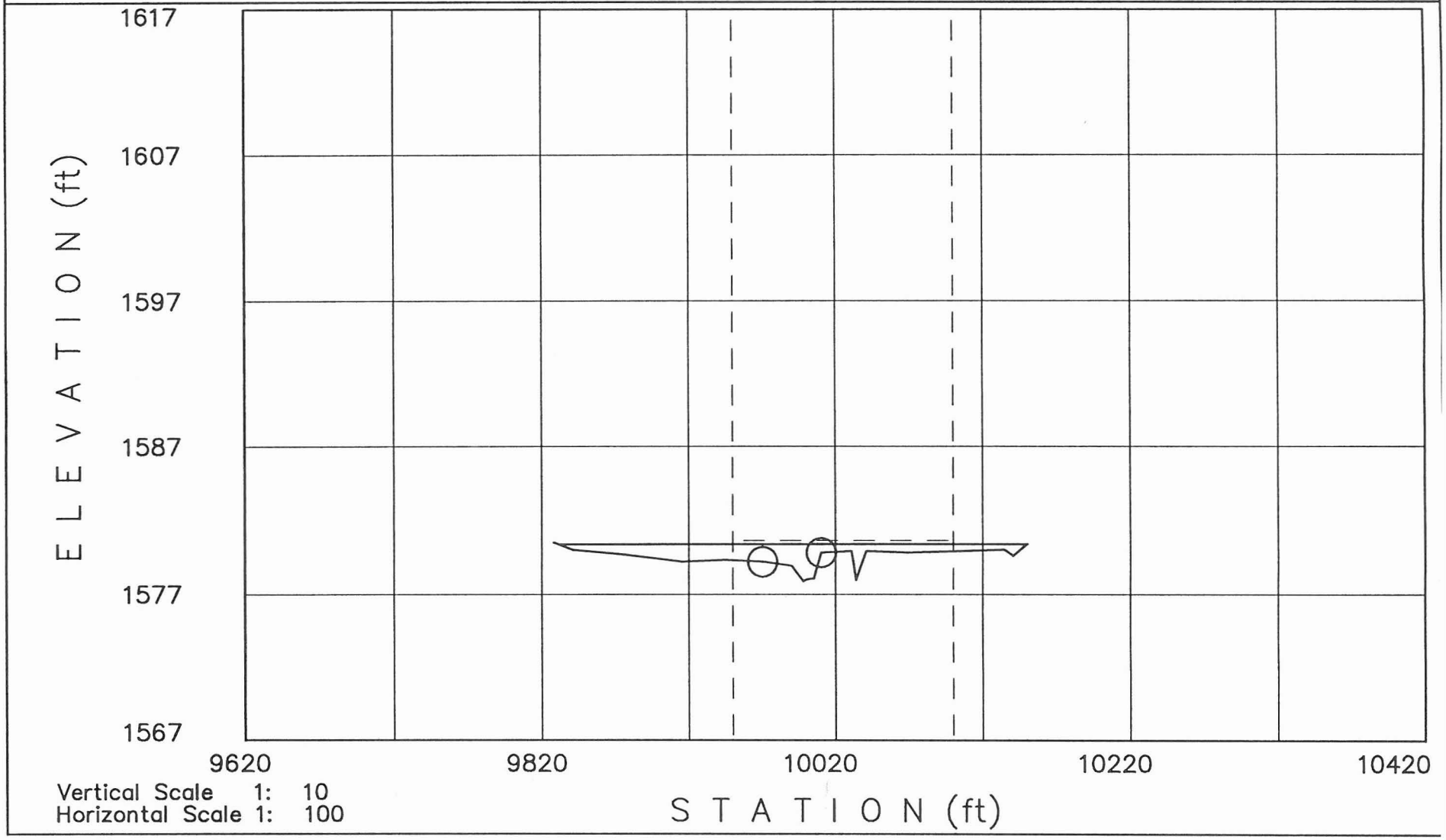
Vertical Scale 1: 10
Horizontal Scale 1: 100

09–13–1995

<<<<<< Cross Section: 1.128: (FN = W11FW1.0H2) >>>>>>

Q1= 950cfs WS1= 1580.37
Q2= 950cfs WS2= 1580.63

Manning-n Values: LOB: .07 CH: .05 ROB: .07



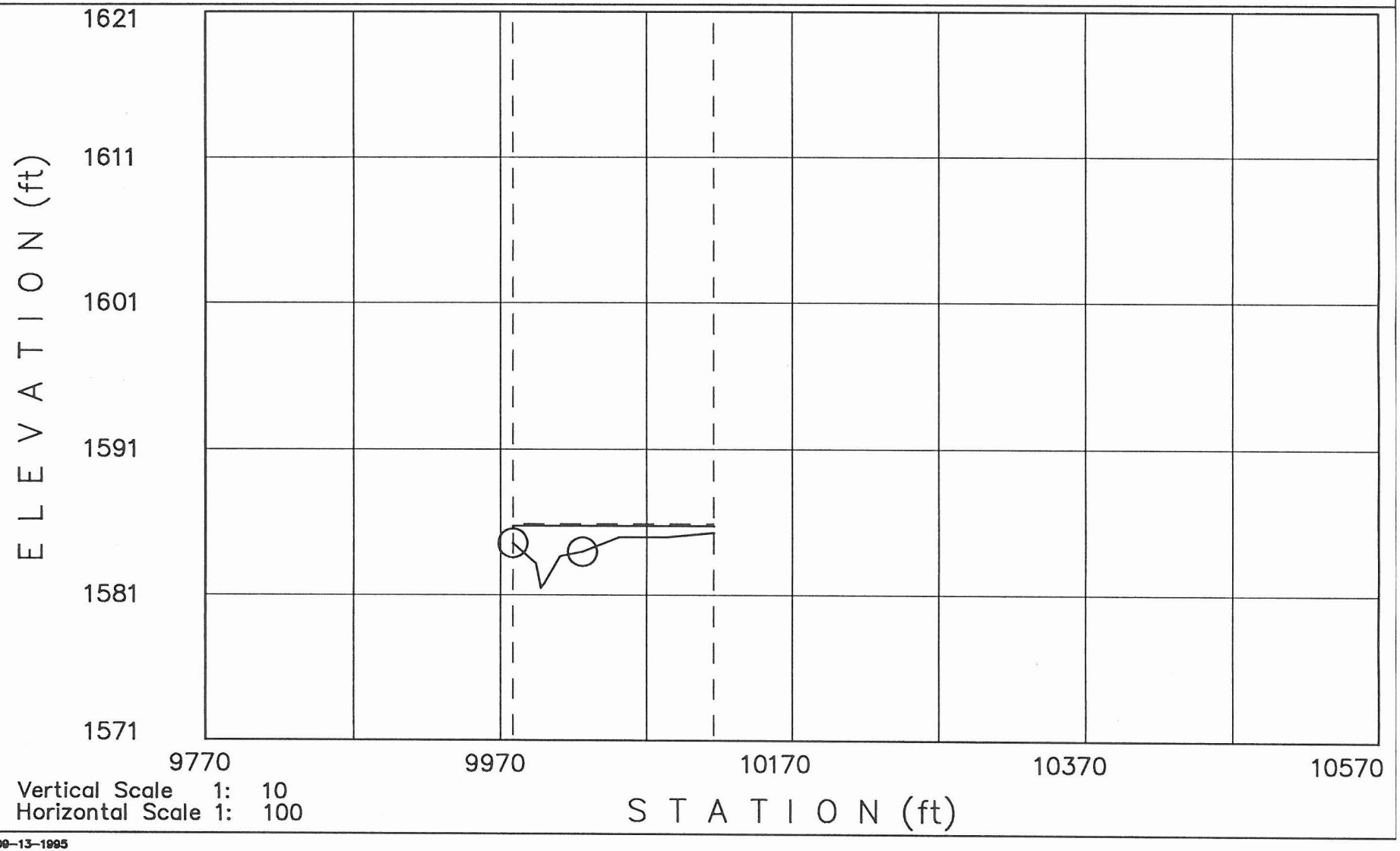
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: 1.189: (FN = W11FW1.0H2) >>>>>>

Q1= 950cfs WS1= 1585.78
Q2= 950cfs WS2= 1585.93

Manning-n Values: LOB: .07 CH: .05 ROB: .07



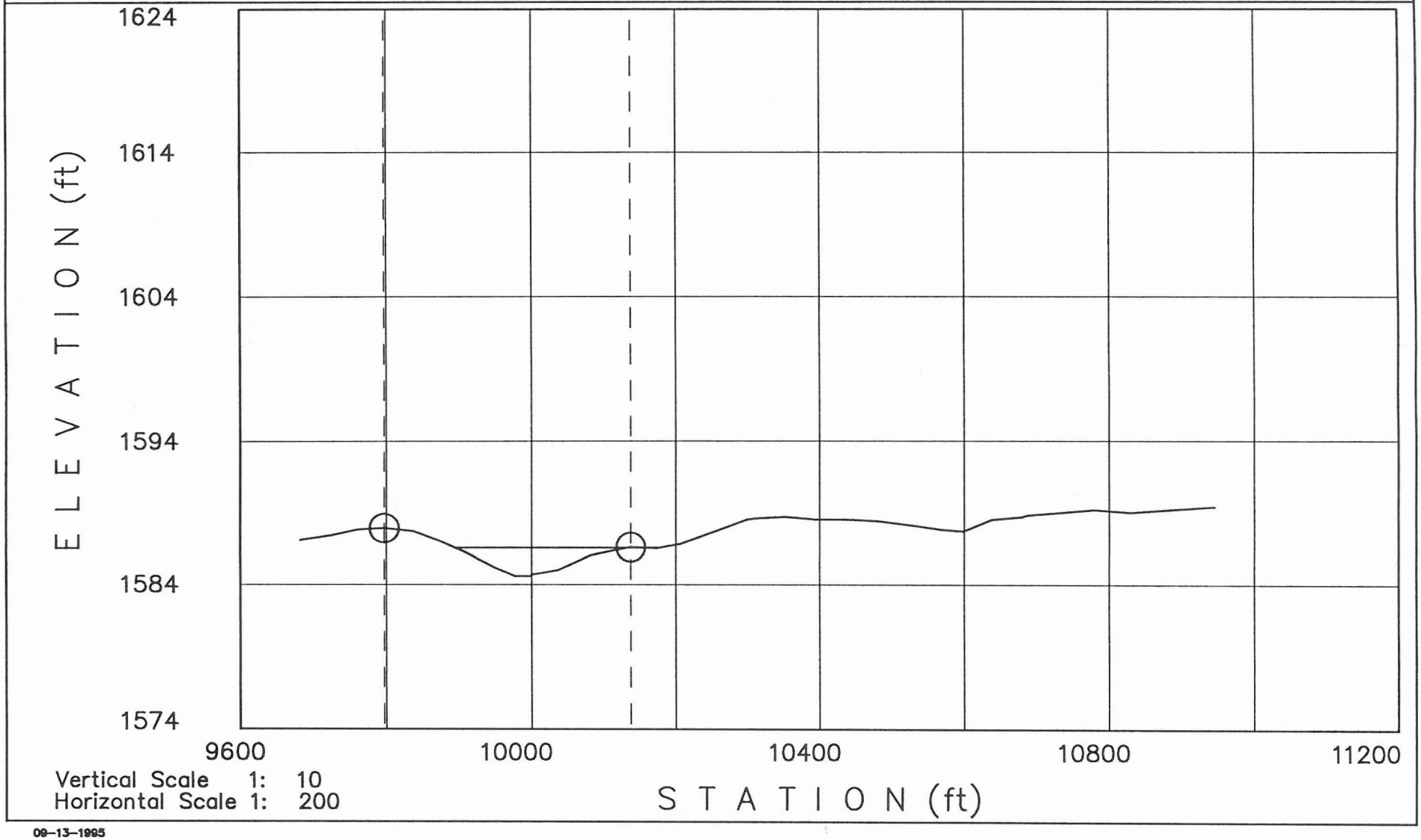
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: 1.201: (FN = W11FW1.0H2) >>>>>>

Q1= 950cfs WS1= 1586.54
Q2= 950cfs WS2= 1586.56

Manning-n Values: LOB: 0 CH: .022 ROB: 0 - .022



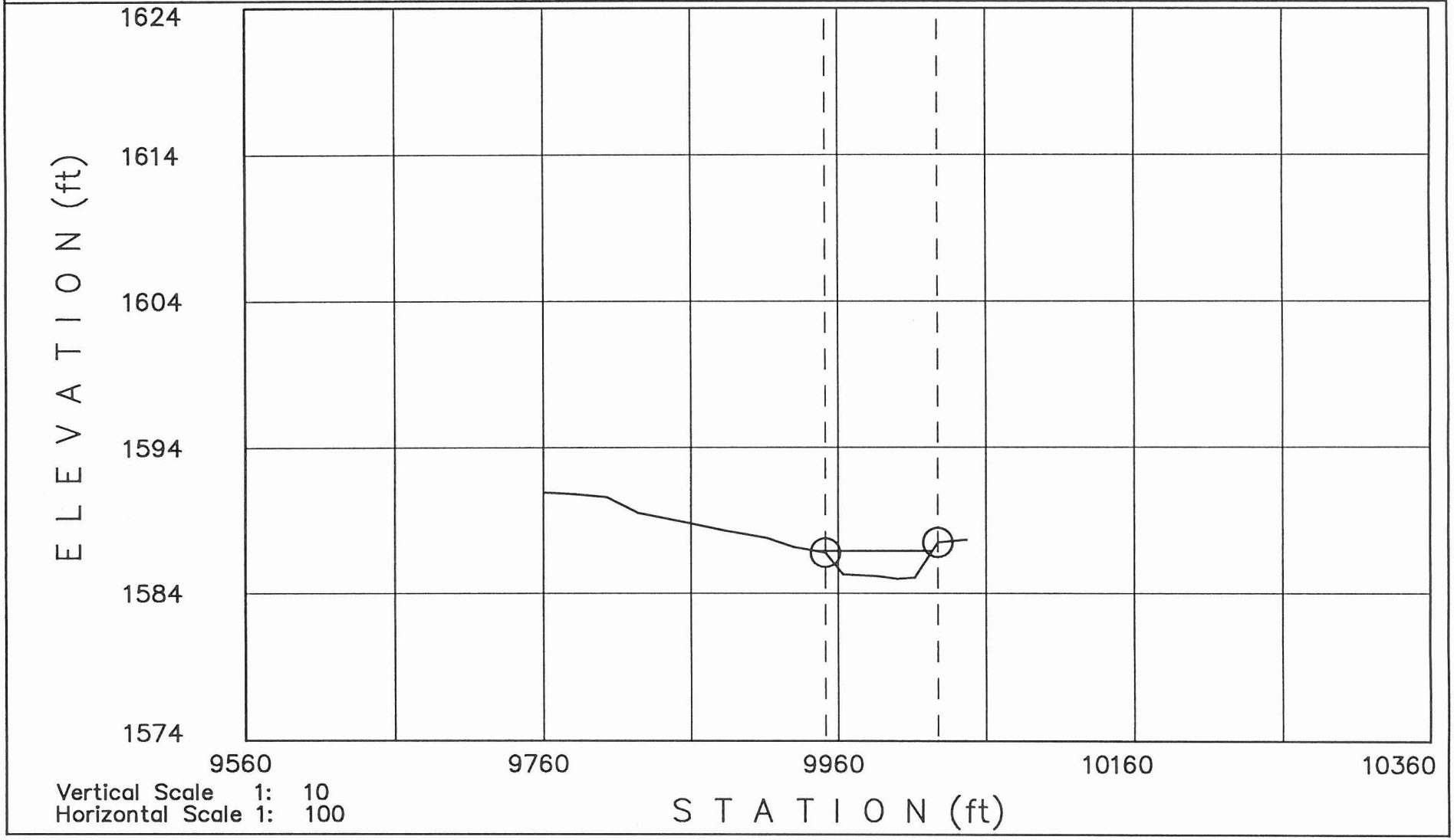
Vertical Scale 1: 10
Horizontal Scale 1: 200

09-13-1995

<<<<<< Cross Section: 1.218: (FN = W11FW1.0H2) >>>>>>

Q1= 740cfs WS1= 1586.92
Q2= 740cfs WS2= 1586.92

Manning-n Values: LOB: 0 - .07 CH: .05 ROB: 0



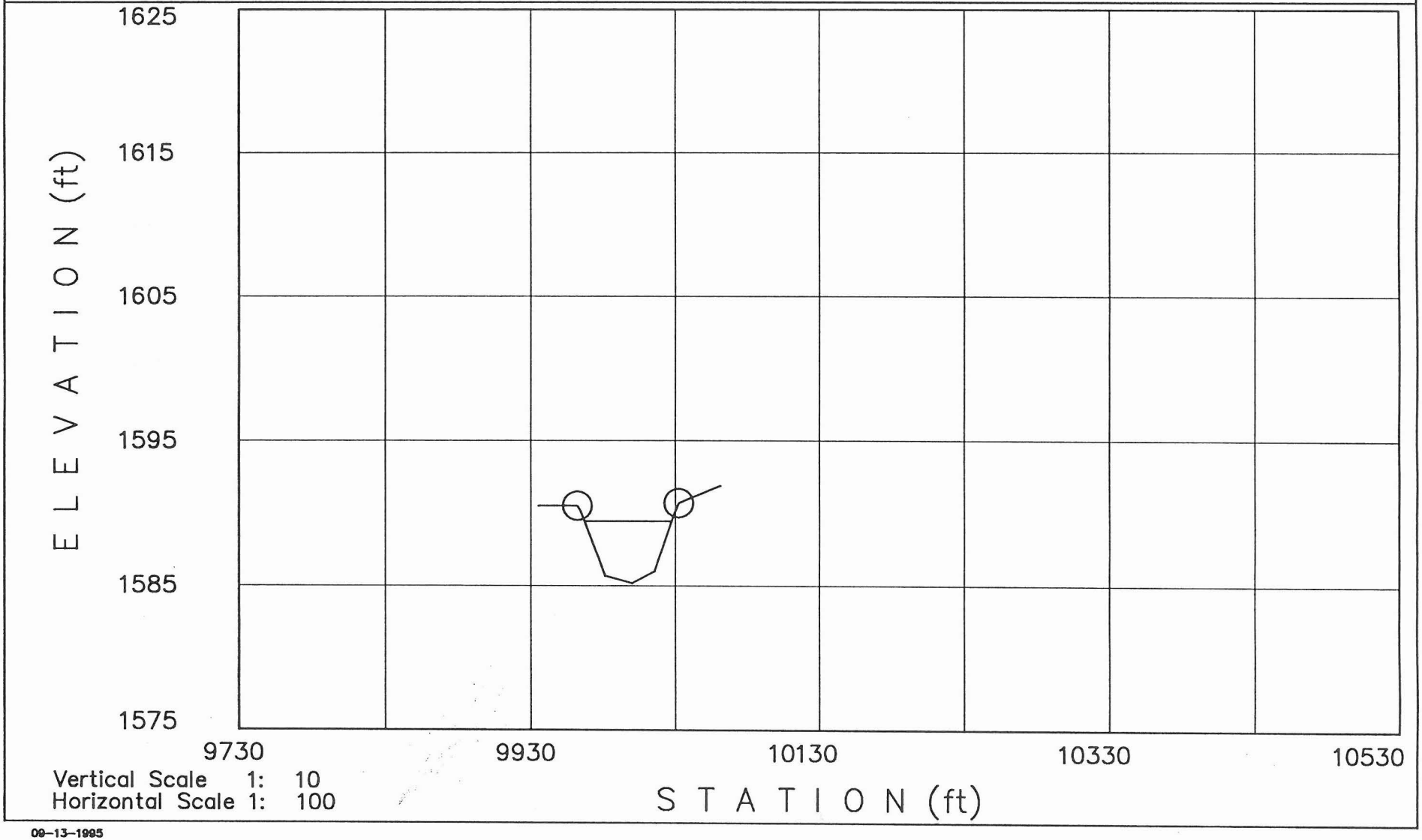
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: 1.257: (FN = W11FW1.0H2) >>>>>>

Q1= 740cfs WS1= 1589.42
Q2= 740cfs WS2= 1589.42

Manning-n Values: LOB: 0 CH: .05 ROB: 0



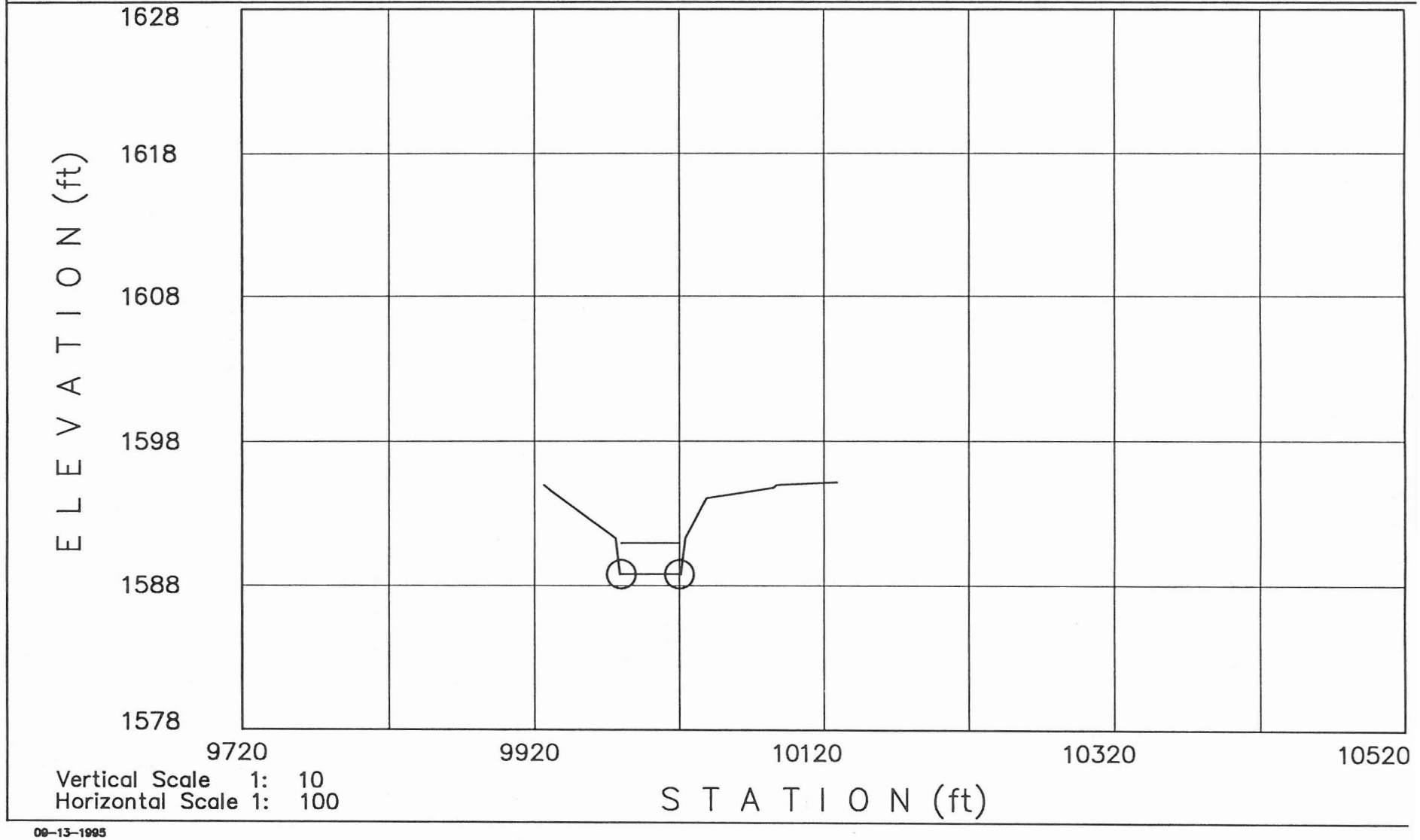
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: 1.261: (FN = W11FW1.0H2) >>>>>>

Q1= 740cfs WS1= 1590.98
Q2= 740cfs WS2= 1590.98

Manning–n Values: LOB: 0 CH: .05 ROB: 0



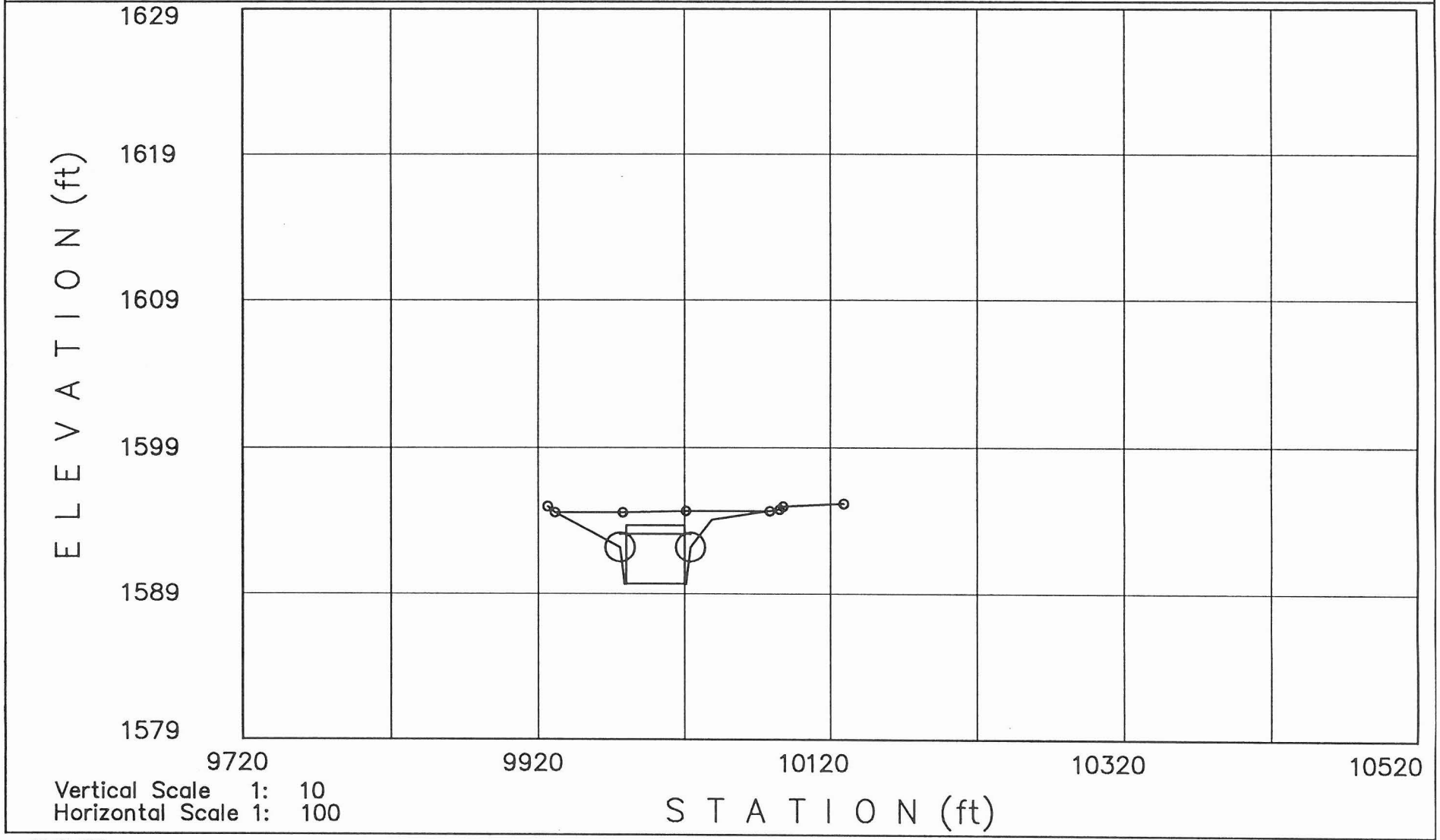
Vertical Scale 1: 10
Horizontal Scale 1: 100

08-13-1995

<<<<<< Cross Section: 1.27: (FN = W11FW1.0H2) >>>>>>

Q1= 740cfs WS1= 1593.09
Q2= 740cfs WS2= 1593.09

Manning–n Values: LOB: 0 CH: .05 ROB: 0



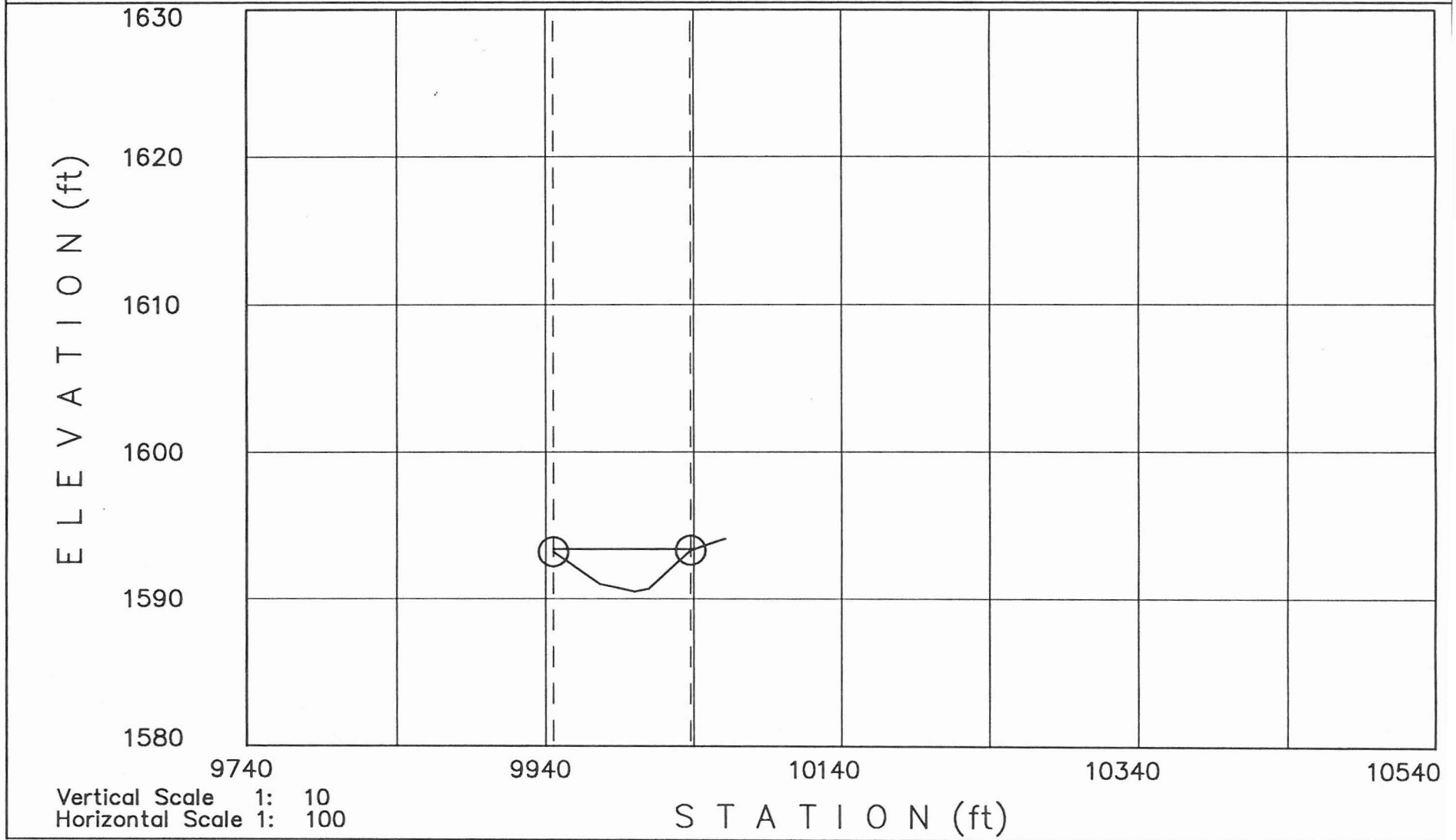
Vertical Scale 1: 10
Horizontal Scale 1: 100

09–13–1995

<<<<<< Cross Section: 1.276: (FN = W11FW1.0H2) >>>>>>

Q1= 740cfs WS1= 1593.39
Q2= 740cfs WS2= 1593.39

Manning–n Values: LOB: 0 CH: .05 ROB: 0 – .07



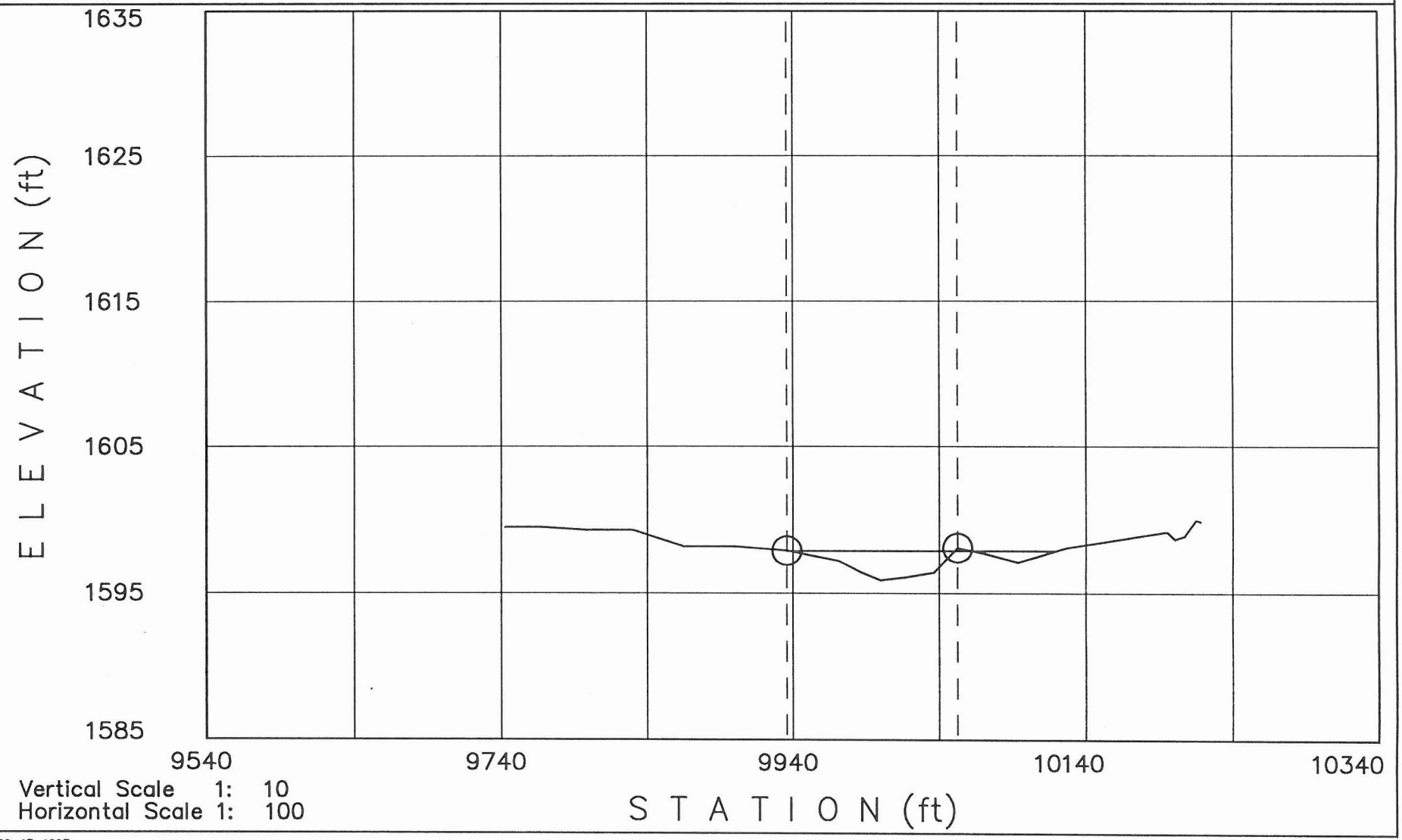
Vertical Scale 1: 10
Horizontal Scale 1: 100

09–13–1995

<<<<<< Cross Section: 1.31: (FN = W11FW1.0H2) >>>>>>

Q1= 740cfs WS1= 1597.88
Q2= 740cfs WS2= 1597.87

Manning-n Values: LOB: 0 CH: .03 ROB: 0 - .07



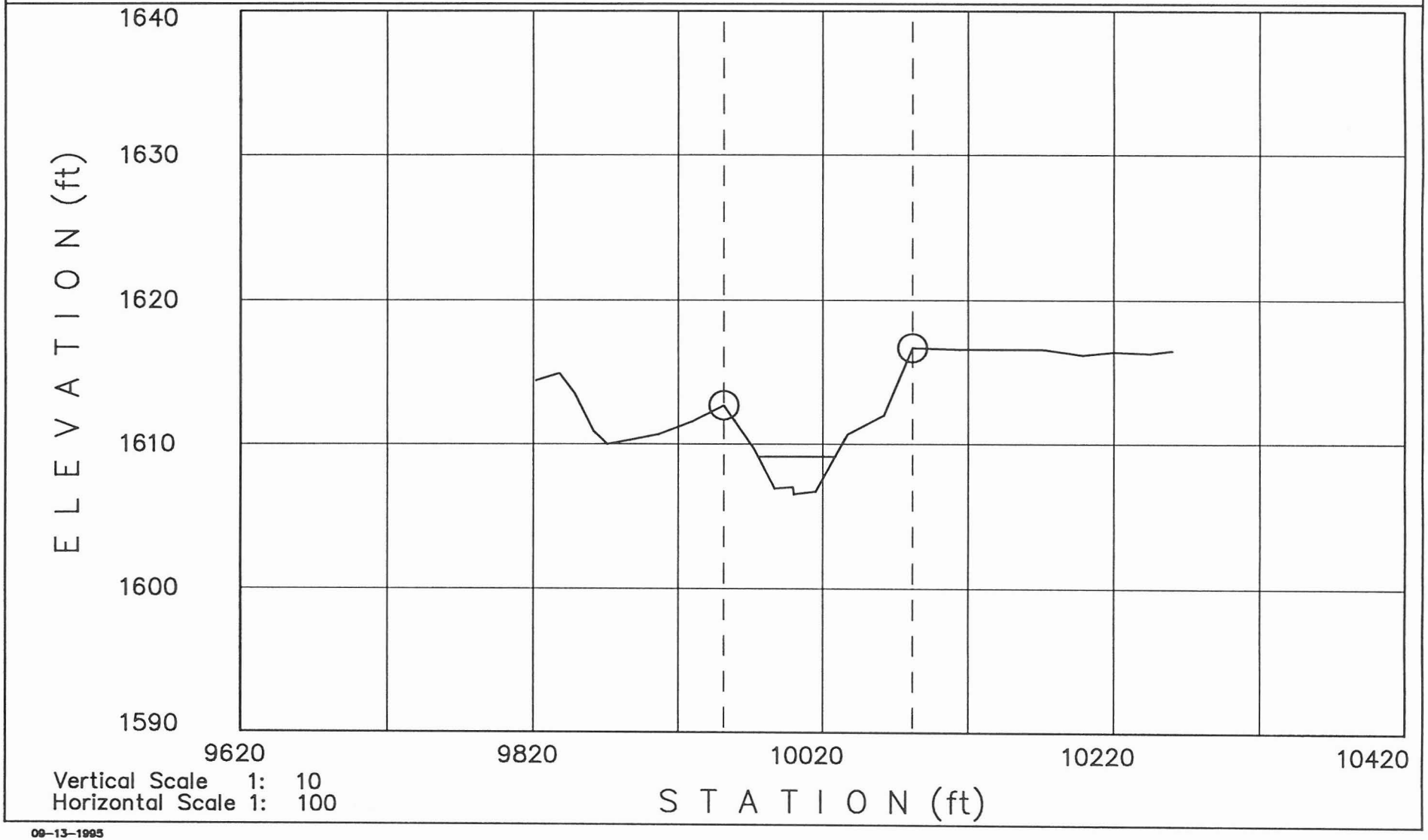
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: 1.425: (FN = W11FW1.0H2) >>>>>>

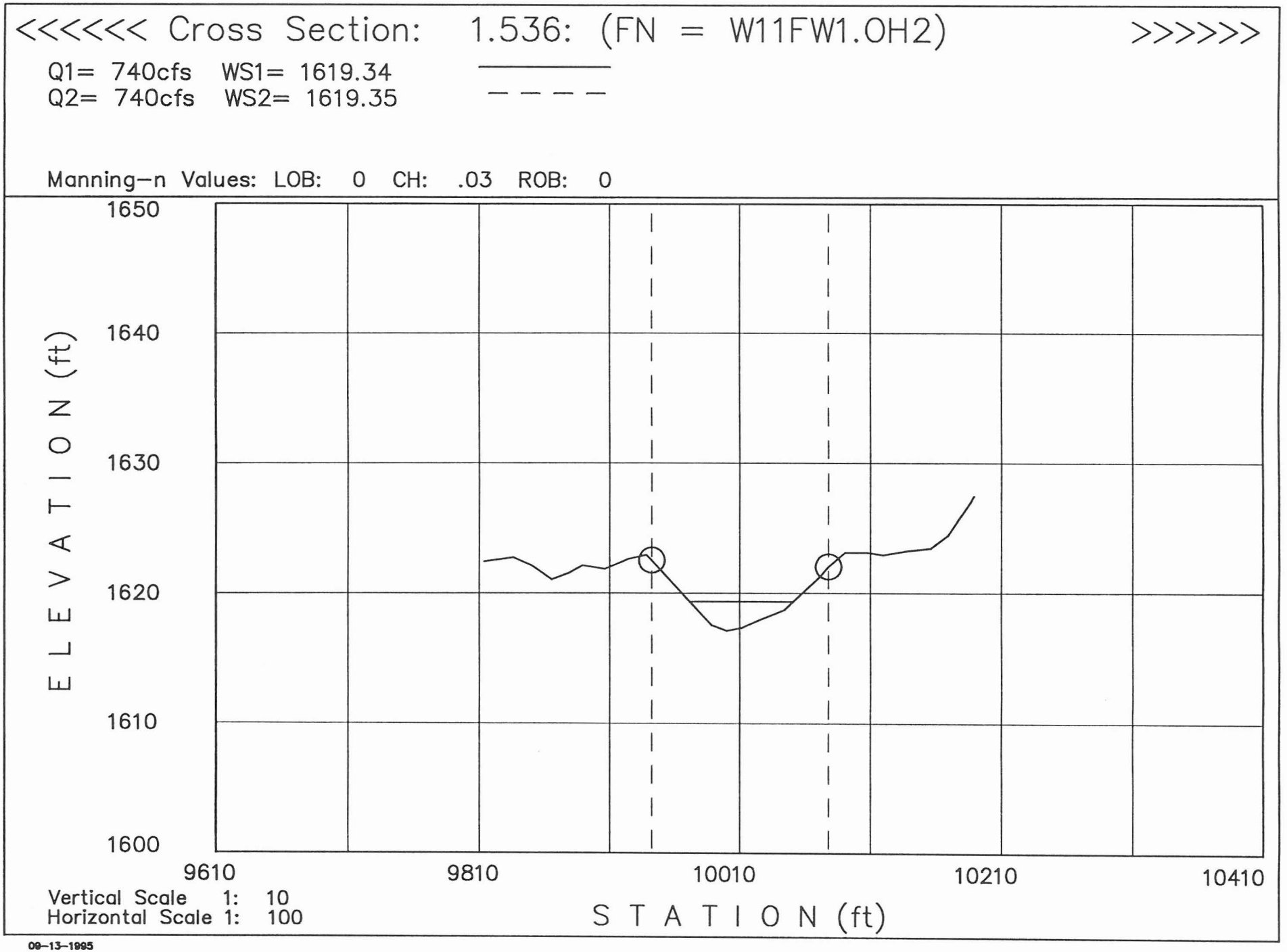
Q1= 740cfs WS1= 1609.13
Q2= 740cfs WS2= 1609.13

Manning–n Values: LOB: 0 CH: .03 ROB: 0



Vertical Scale 1: 10
Horizontal Scale 1: 100

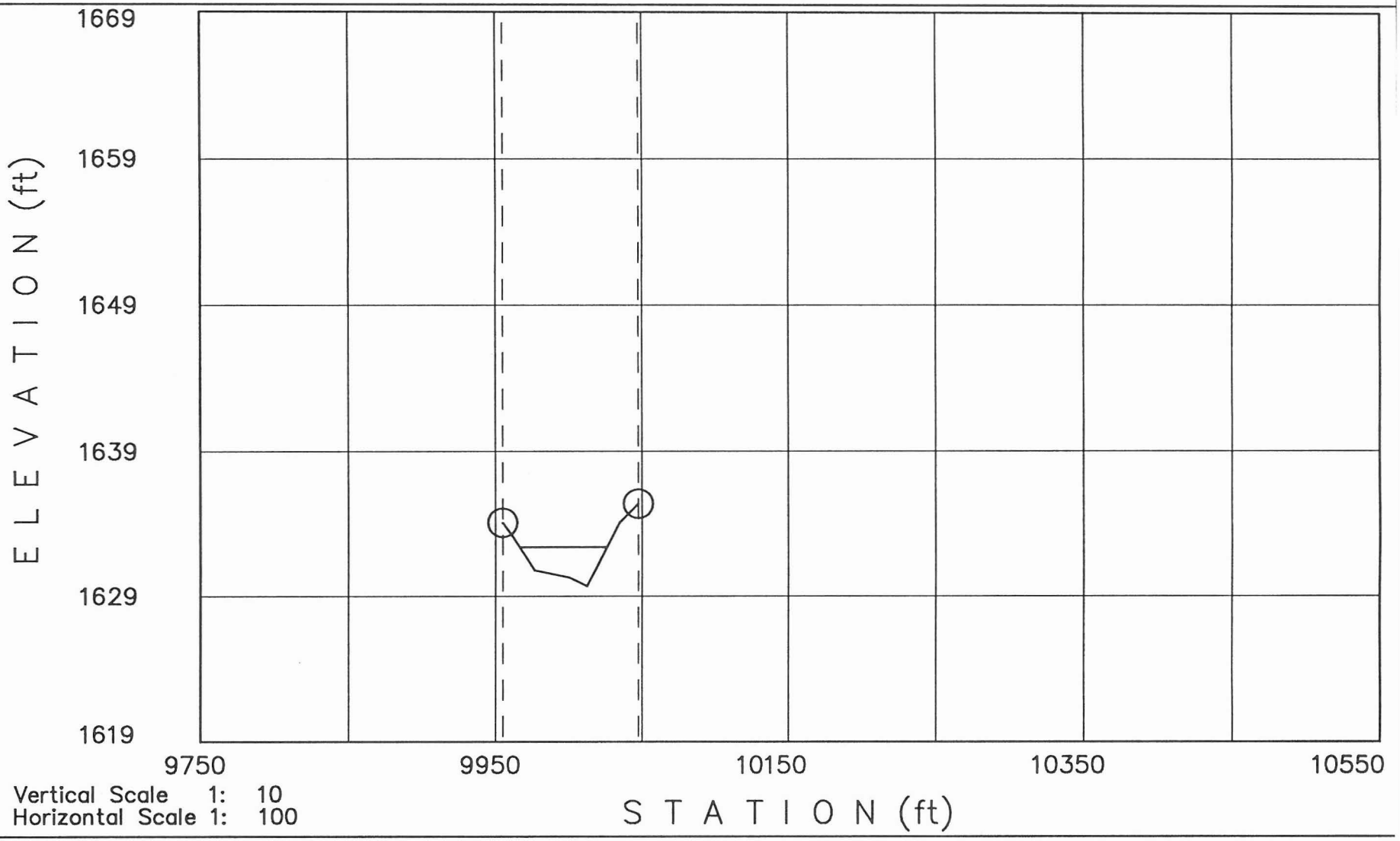
09–13–1995


<<<<<< Cross Section: 1.536: (FN = W11FW1.0H2) >>>>>>
Q1= 740cfs WS1= 1619.34
Q2= 740cfs WS2= 1619.35
Manning-n Values: LOB: 0 CH: .03 ROB: 0
1650
1640
1630
1620
1610
1600
ELEVATION (ft)
9610
9810
10010
10210
10410
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
09-13-1995

<<<<< Cross Section: 1.635: (FN = W11FW1.0H2) >>>>>

Q1= 740cfs WS1= 1632.4
Q2= 740cfs WS2= 1632.4

Manning-n Values: LOB: 0 CH: .03 ROB: 0



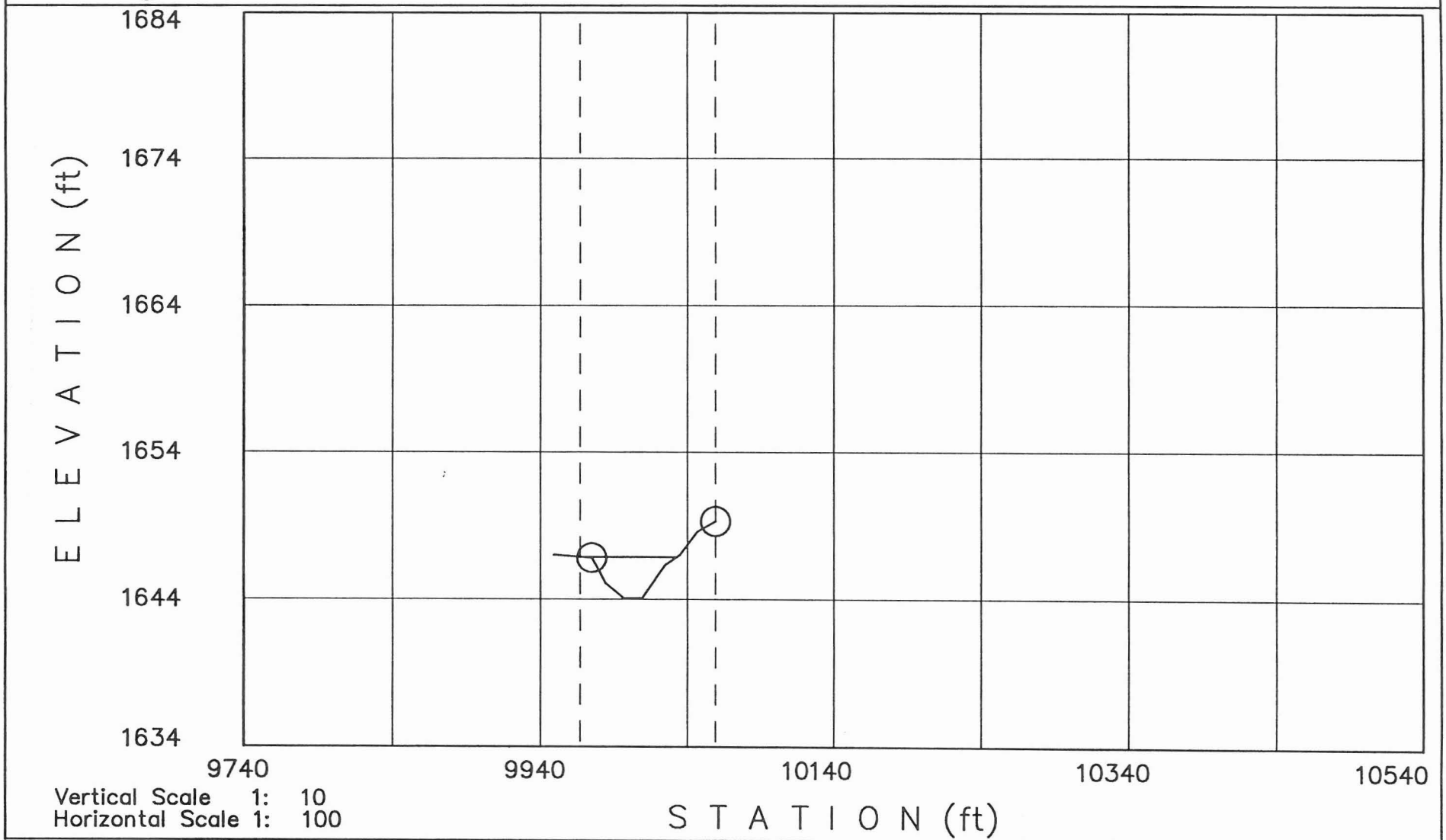
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: 1.728: (FN = W11FW1.0H2) >>>>>>

Q1= 740cfs WS1= 1646.86
Q2= 740cfs WS2= 1646.87

Manning–n Values: LOB: .07 CH: .03 ROB: 0



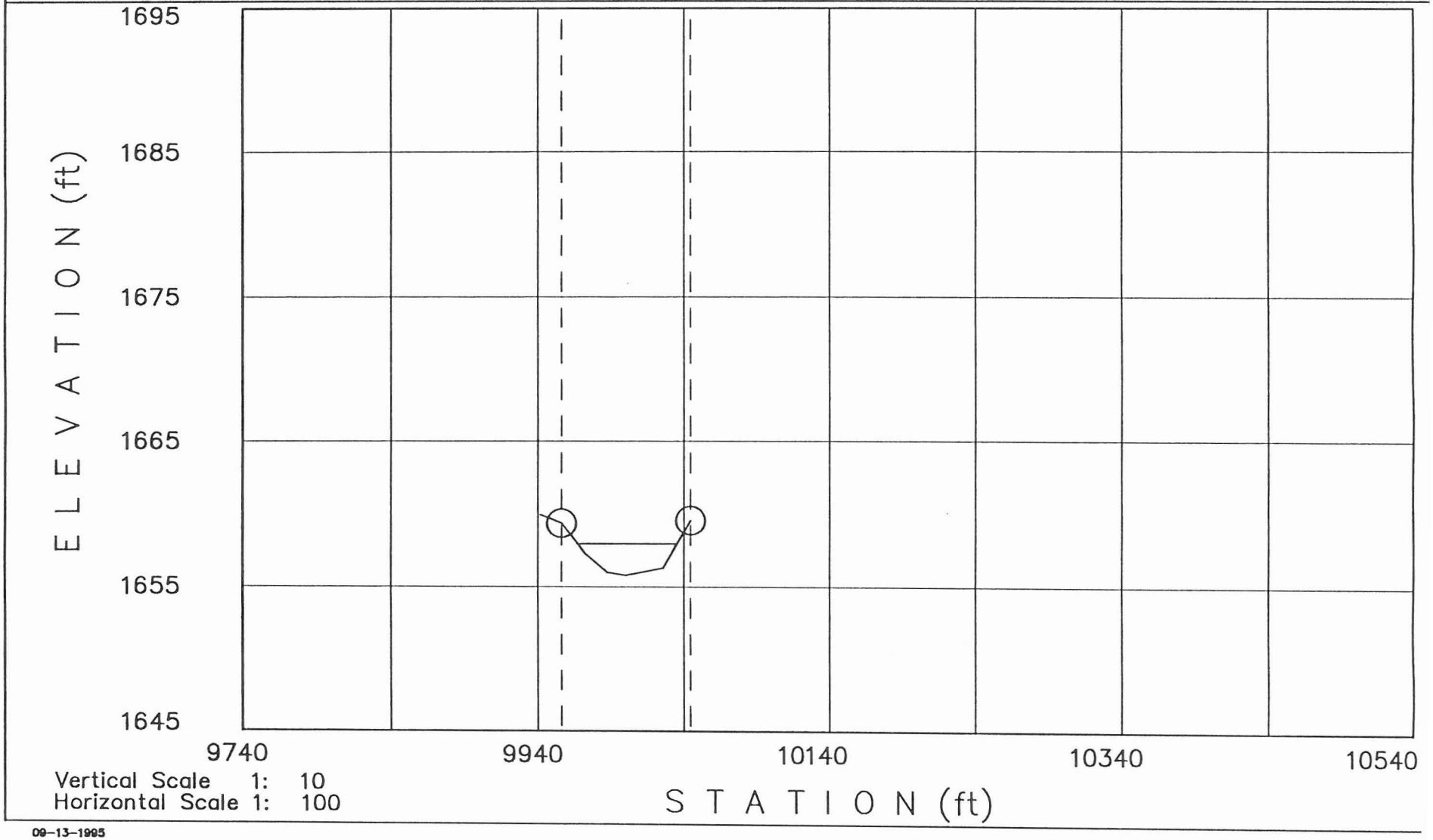
Vertical Scale 1: 10
Horizontal Scale 1: 100

09–13–1995

<<<<<< Cross Section: 1.831: (FN = W11FW1.0H2) >>>>>>

Q1= 740cfs WS1= 1657.96
Q2= 740cfs WS2= 1657.96

Manning–n Values: LOB: 0 CH: .03 ROB: 0



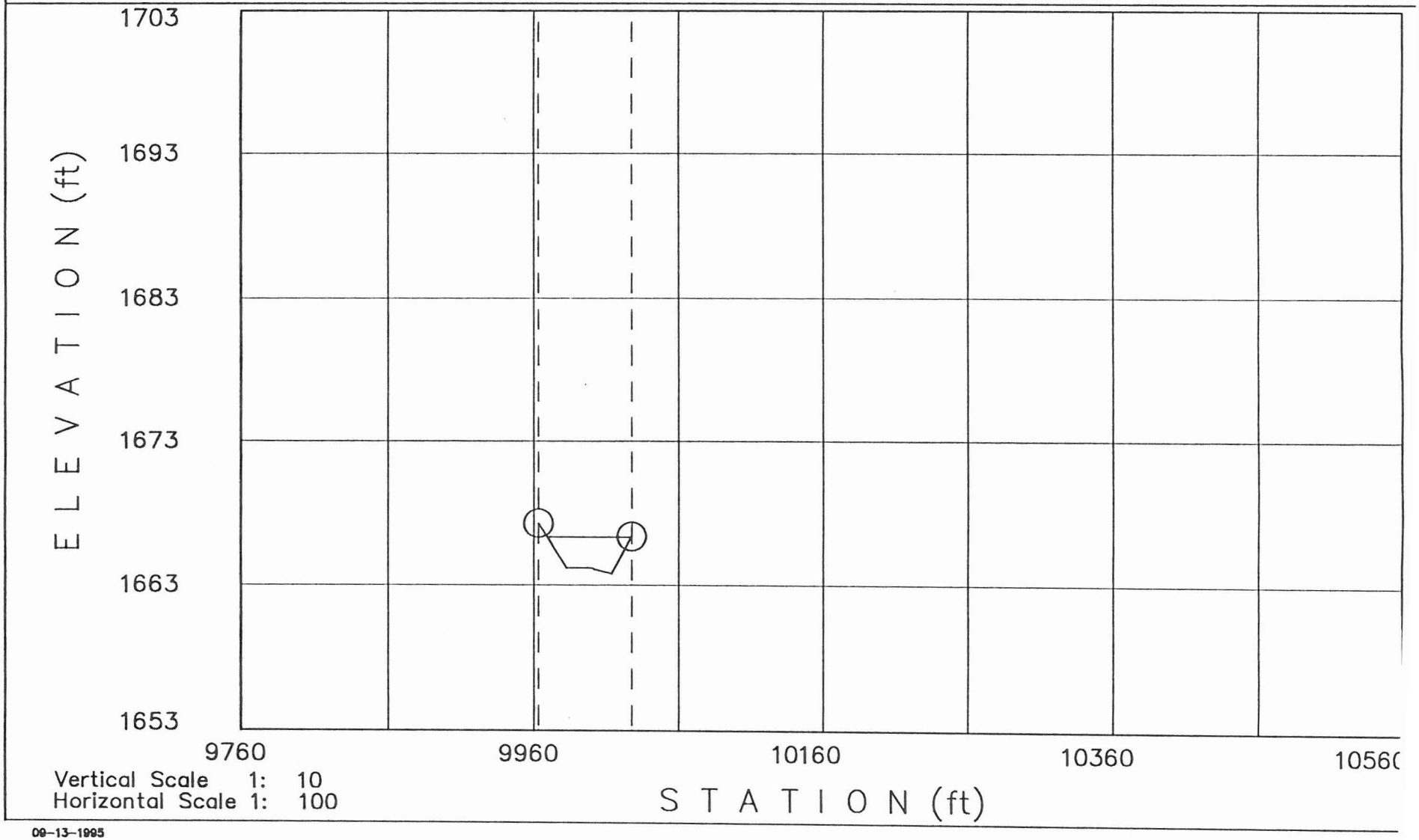
Vertical Scale 1: 10
Horizontal Scale 1: 100

09–13–1995

<<<<<< Cross Section: 1.889: (FN = W11FW1.OH2) >>>>>>

Q1= 740cfs WS1= 1666.32
Q2= 740cfs WS2= 1666.32

Manning-n Values: LOB: 0 CH: .03 ROB: 0



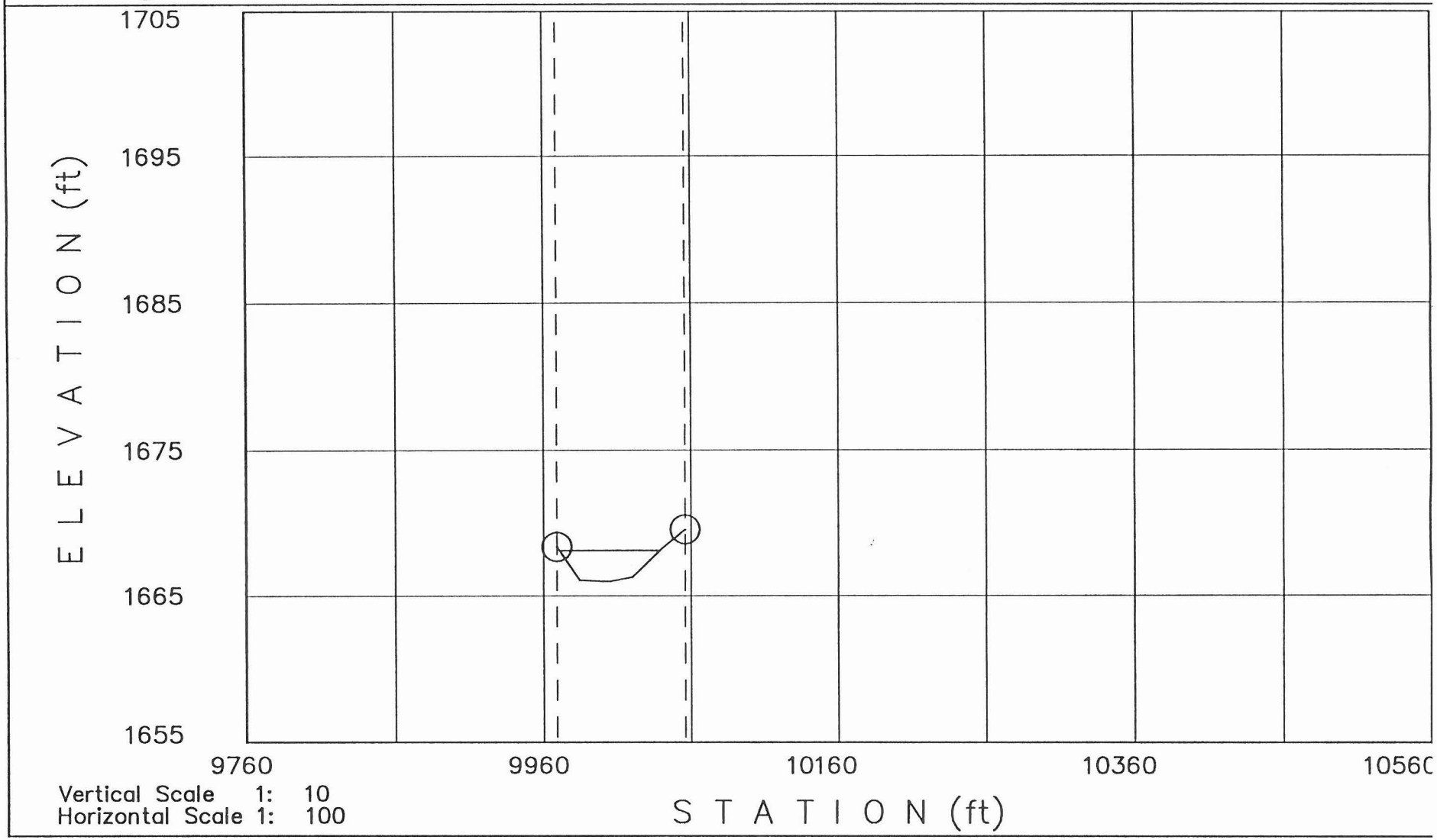
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: 1.907: (FN = W11FW1.0H2) >>>>>>

Q1= 740cfs WS1= 1668.14
Q2= 740cfs WS2= 1668.14

Manning-n Values: LOB: 0 CH: .03 ROB: 0



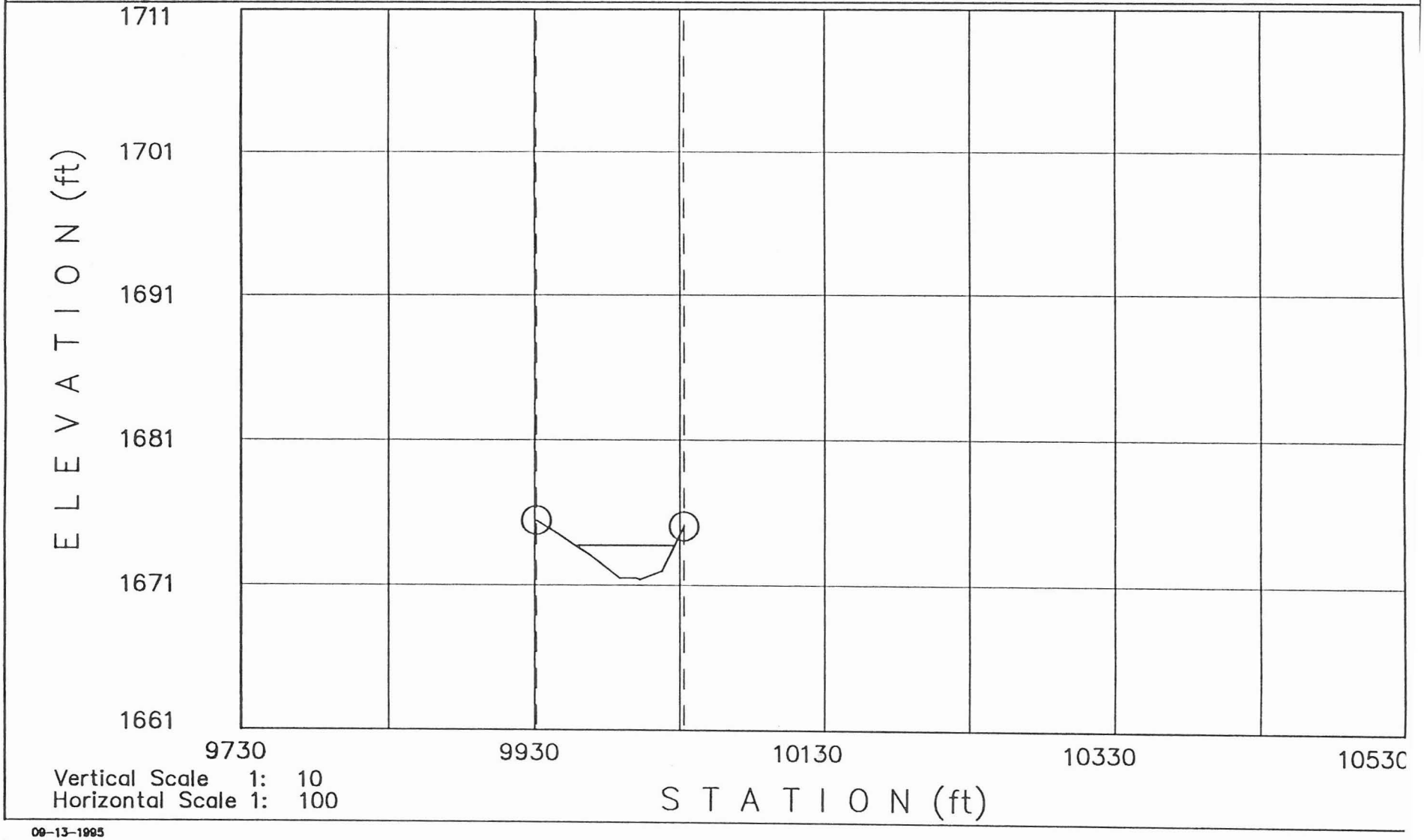
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: 1.963: (FN = W11FW1.0H2) >>>>>>

Q1= 740cfs WS1= 1673.8
Q2= 740cfs WS2= 1673.8

Manning-n Values: LOB: 0 CH: .03 ROB: 0



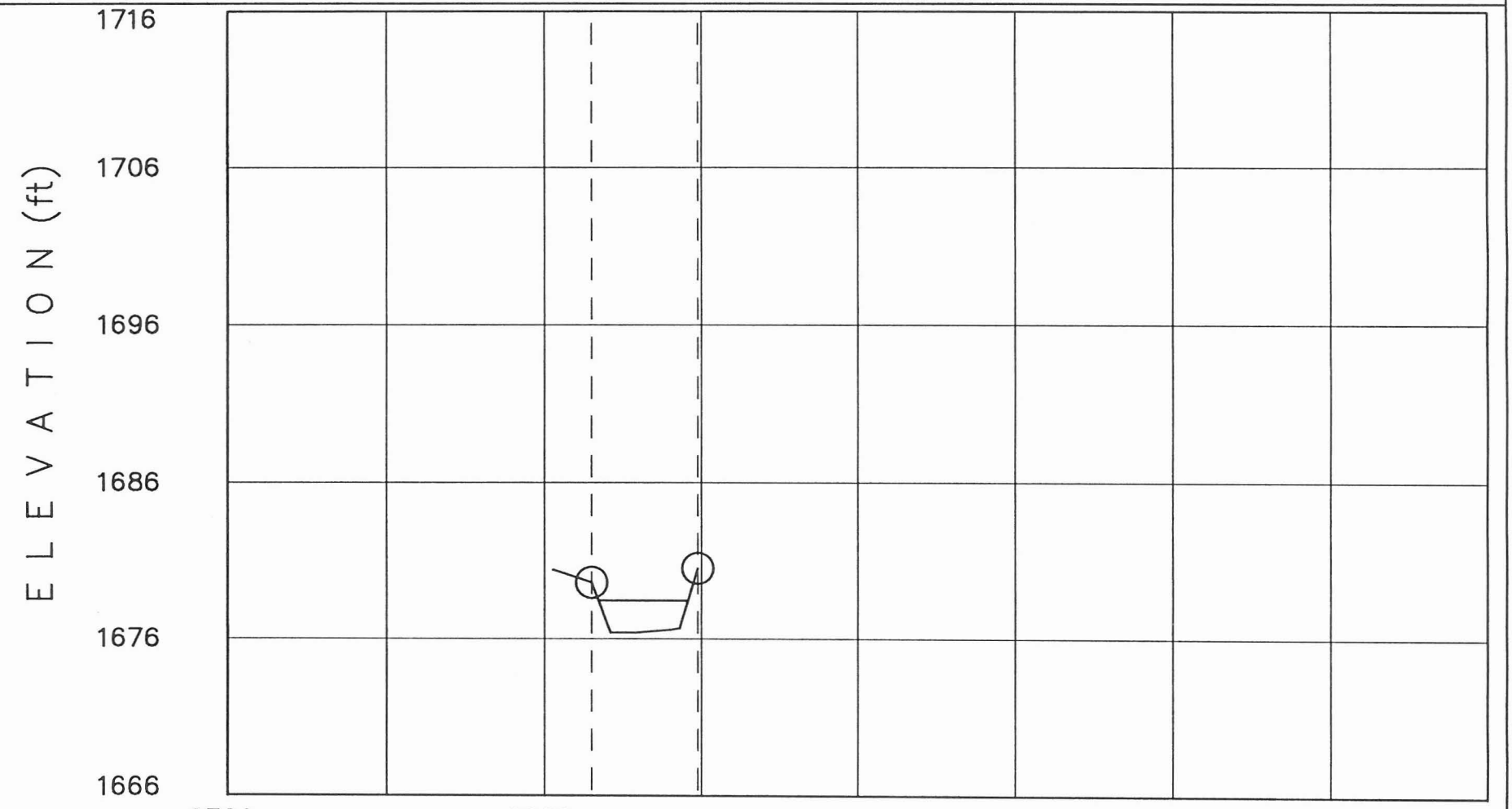
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: 2.011: (FN = W11FW1.0H2) >>>>>>

Q1= 740cfs WS1= 1678.45
Q2= 740cfs WS2= 1678.45

Manning-n Values: LOB: 0 CH: .03 ROB: 0



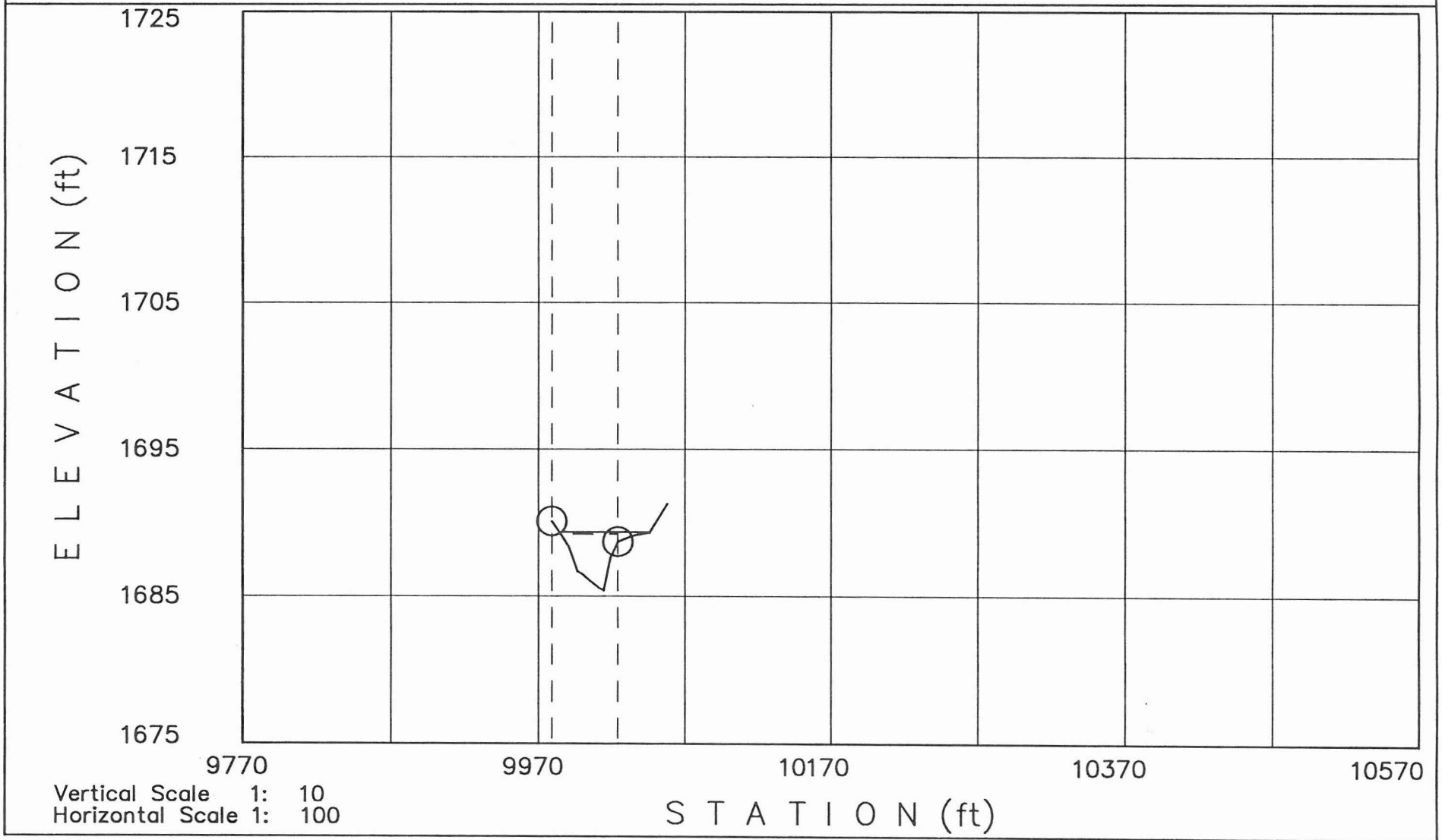
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: 2.109: (FN = W11FW1.OH2) >>>>>>

Q1= 740cfs WS1= 1689.35
Q2= 740cfs WS2= 1689.2

Manning–n Values: LOB: 0 CH: .05 ROB: 0 – .06



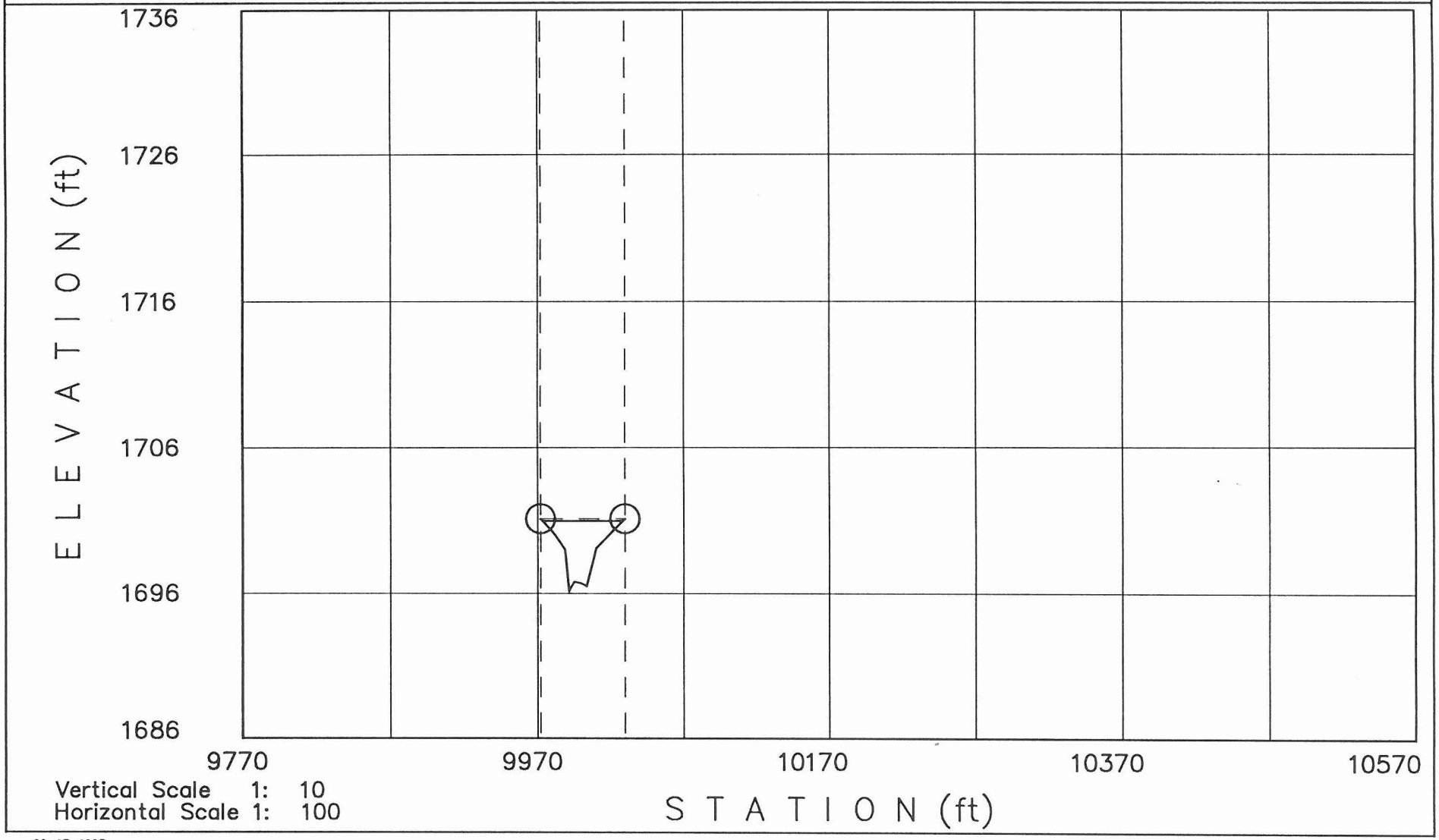
Vertical Scale 1: 10
Horizontal Scale 1: 100

09–13–1995

<<<<<< Cross Section: 2.208: (FN = W11FW1.0H2) >>>>>>

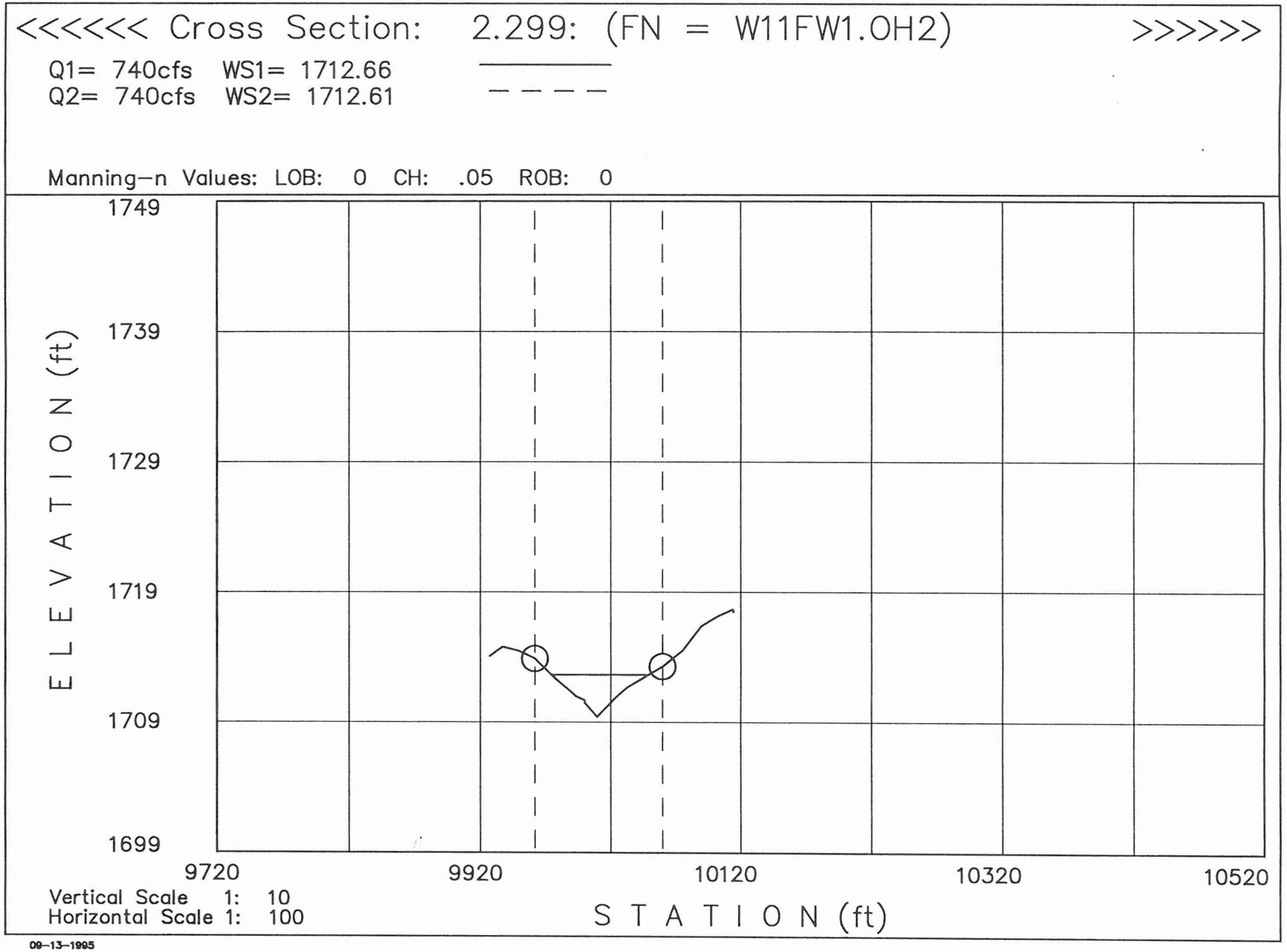
Q1= 740cfs WS1= 1700.94
Q2= 740cfs WS2= 1701.11

Manning–n Values: LOB: 0 CH: .05 ROB: 0



Vertical Scale 1: 10
Horizontal Scale 1: 100

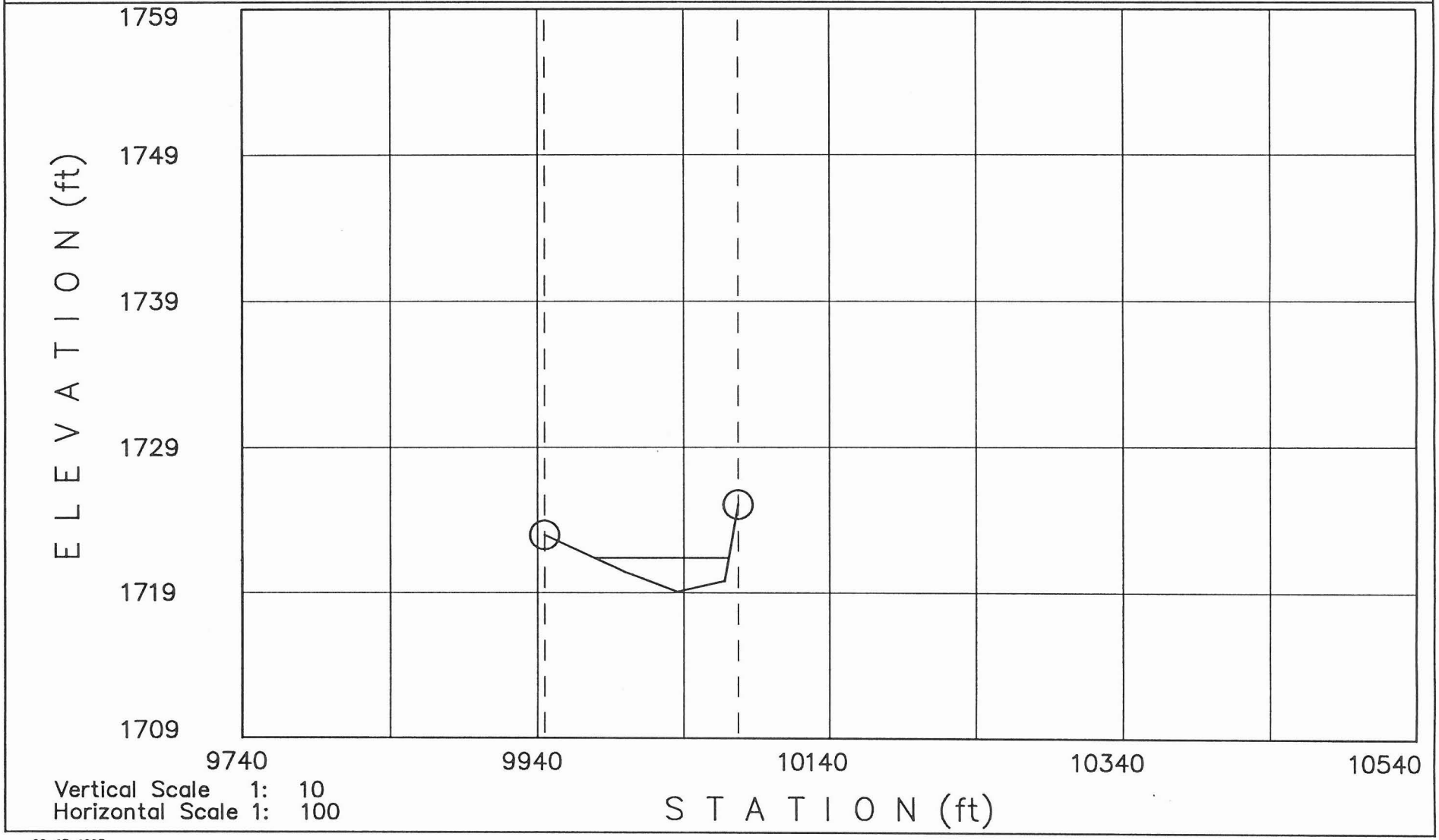
09–13–1995


<<<<<< Cross Section: 2.299: (FN = W11FW1.0H2) >>>>>>
Q1= 740cfs WS1= 1712.66
Q2= 740cfs WS2= 1712.61
Manning-n Values: LOB: 0 CH: .05 ROB: 0
1749
1739
1729
1719
1709
1699
ELEVATION (ft)
9720
9920
10120
10320
10520
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
09-13-1995

<<<<<< Cross Section: 2.363: (FN = W11FW1.0H2) >>>>>>

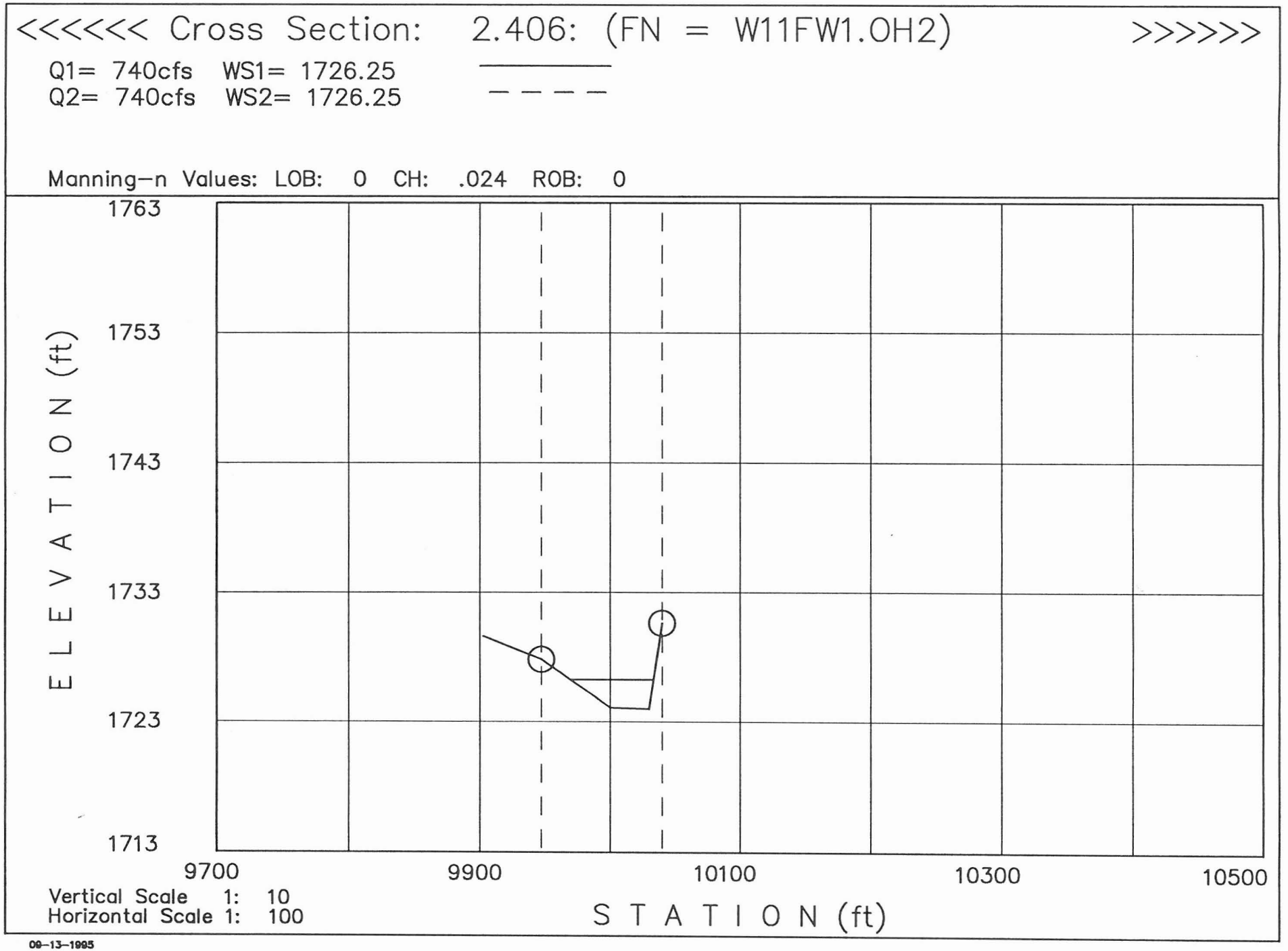
Q1= 740cfs WS1= 1721.4
Q2= 740cfs WS2= 1721.43

Manning–n Values: LOB: 0 CH: .05 ROB: 0



Vertical Scale 1: 10
Horizontal Scale 1: 100

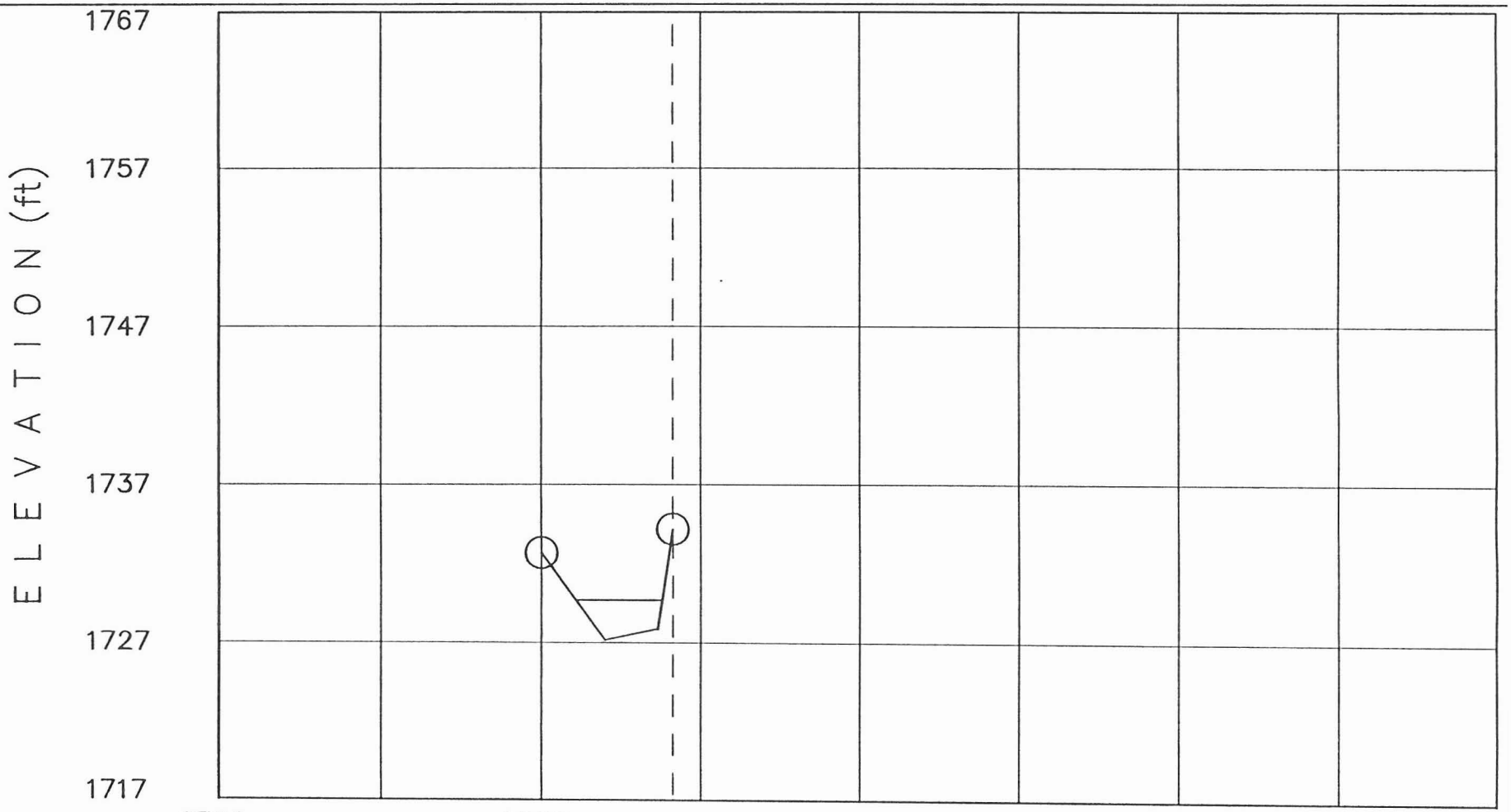
09–13–1995


<<<<<< Cross Section: 2.406: (FN = W11FW1.0H2) >>>>>>
Q1= 740cfs WS1= 1726.25
Q2= 740cfs WS2= 1726.25
Manning-n Values: LOB: 0 CH: .024 ROB: 0
1763
1753
1743
1733
1723
1713
ELEVATION (ft)
9700
9900
10100
10300
10500
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
09-13-1995

<<<<<< Cross Section: 2.438: (FN = W11FW1.0H2) >>>>>>

Q1= 740cfs WS1= 1729.72
Q2= 740cfs WS2= 1729.71

Manning-n Values: LOB: 0 CH: .024 ROB: 0



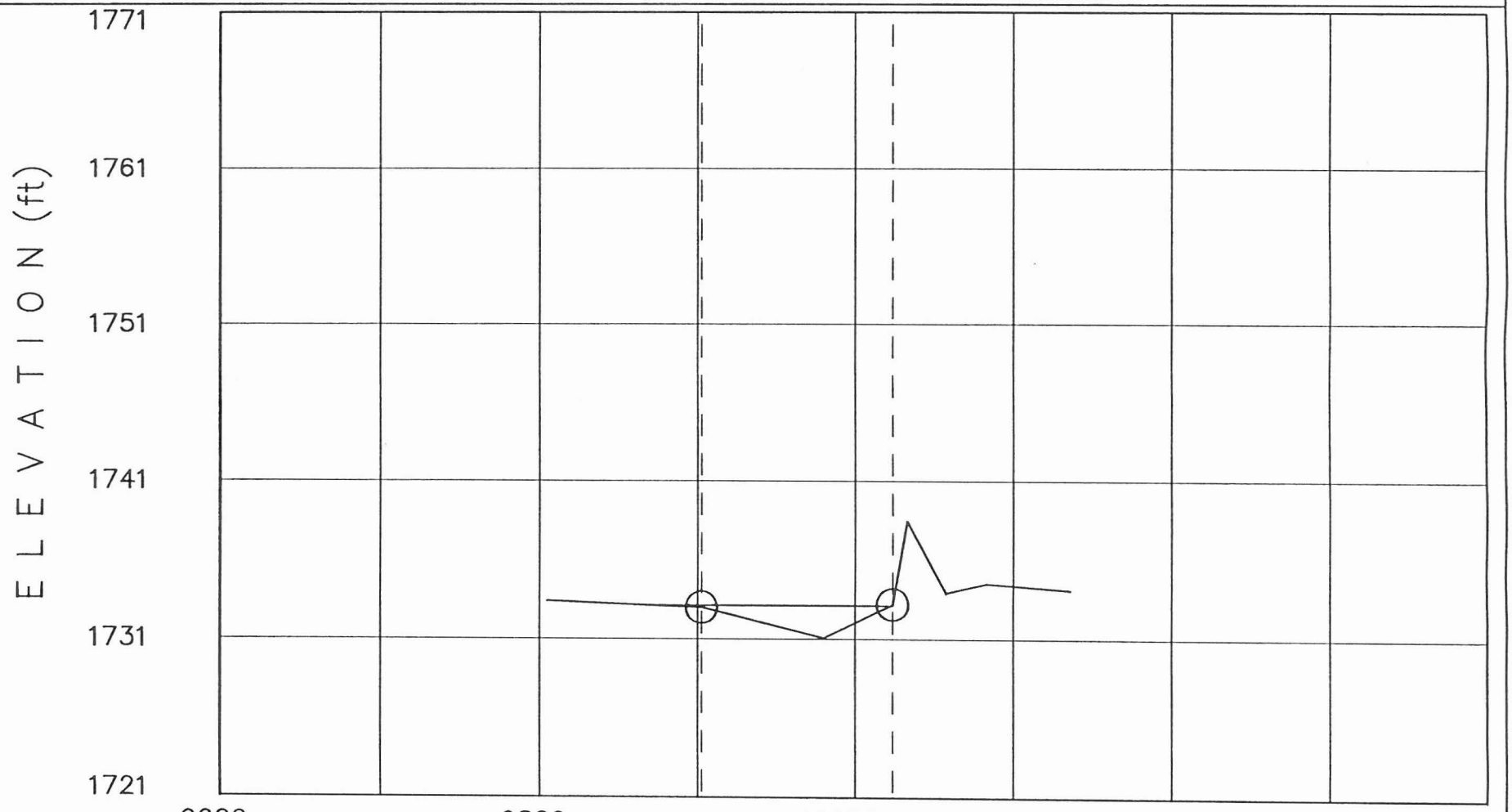
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: 2.47: (FN = W11FW1.OH2) >>>>>>

Q1= 740cfs WS1= 1733.14
Q2= 740cfs WS2= 1733.12

Manning-n Values: LOB: 0 - .07 CH: .045 ROB: 0



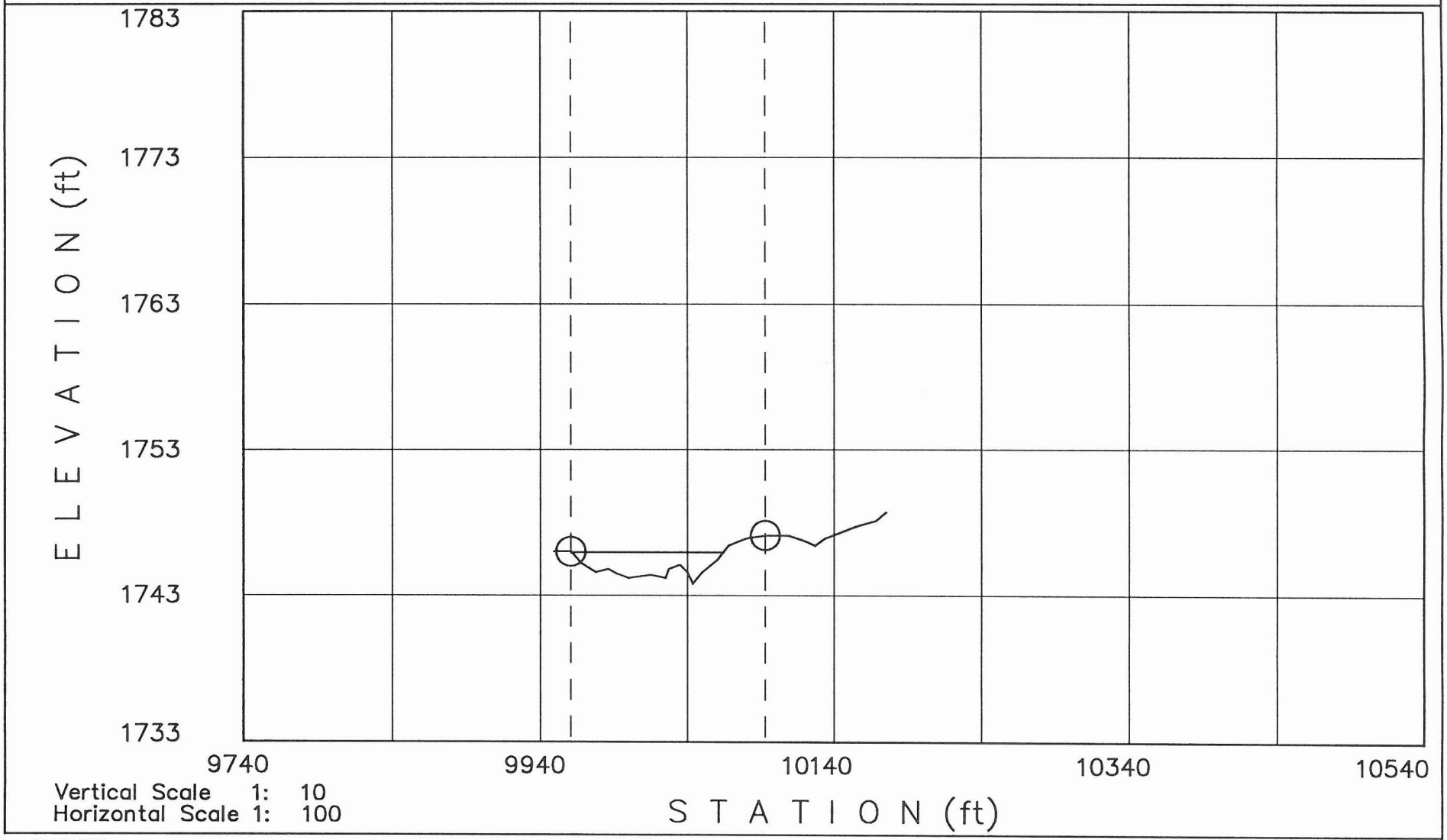
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

<<<<<< Cross Section: 2.568: (FN = W11FW1.0H2) >>>>>>

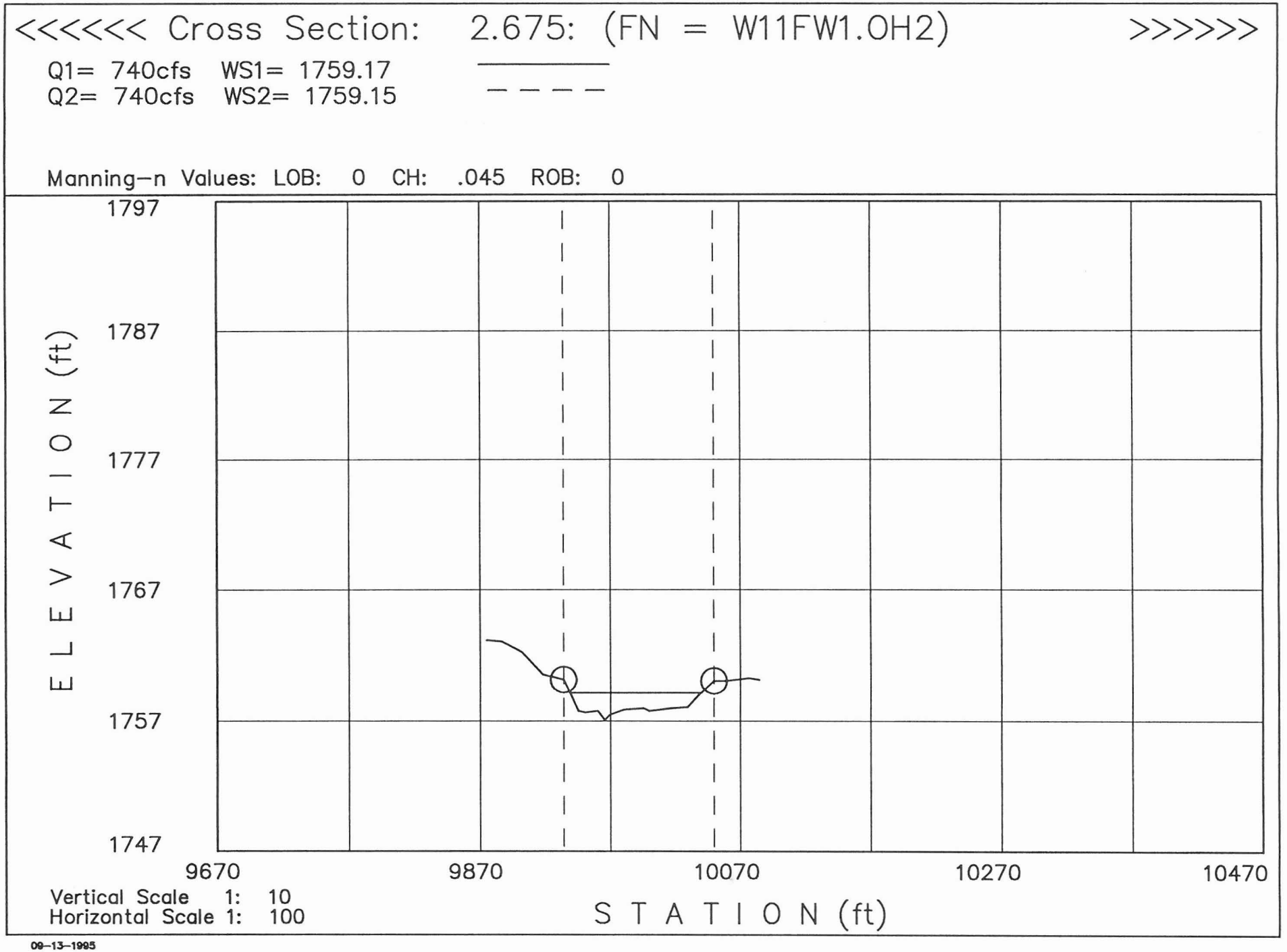
Q1= 740cfs WS1= 1745.95
Q2= 740cfs WS2= 1745.97

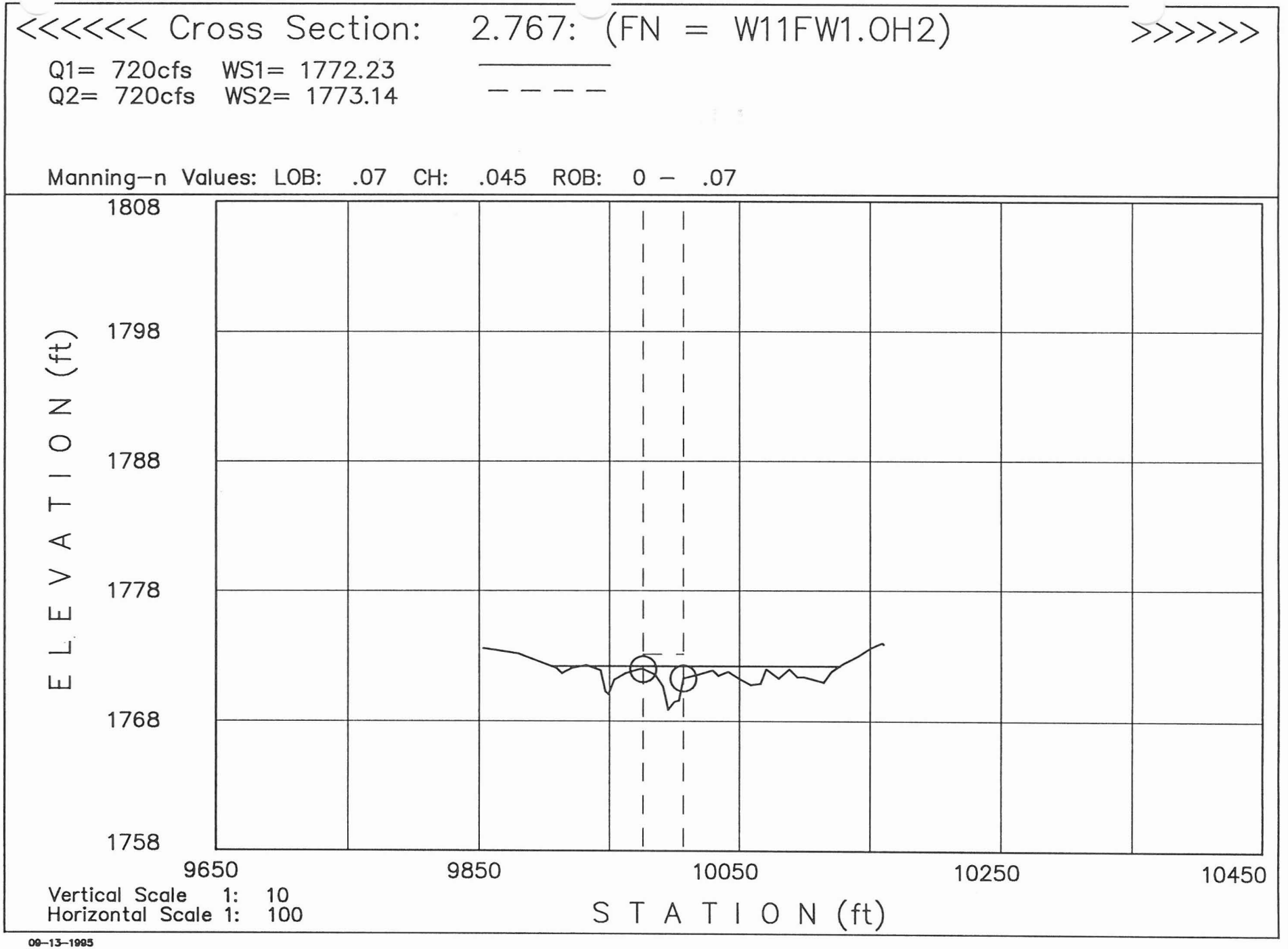
Manning-n Values: LOB: 0 CH: .045 ROB: 0



Vertical Scale 1: 10
Horizontal Scale 1: 100

09-13-1995

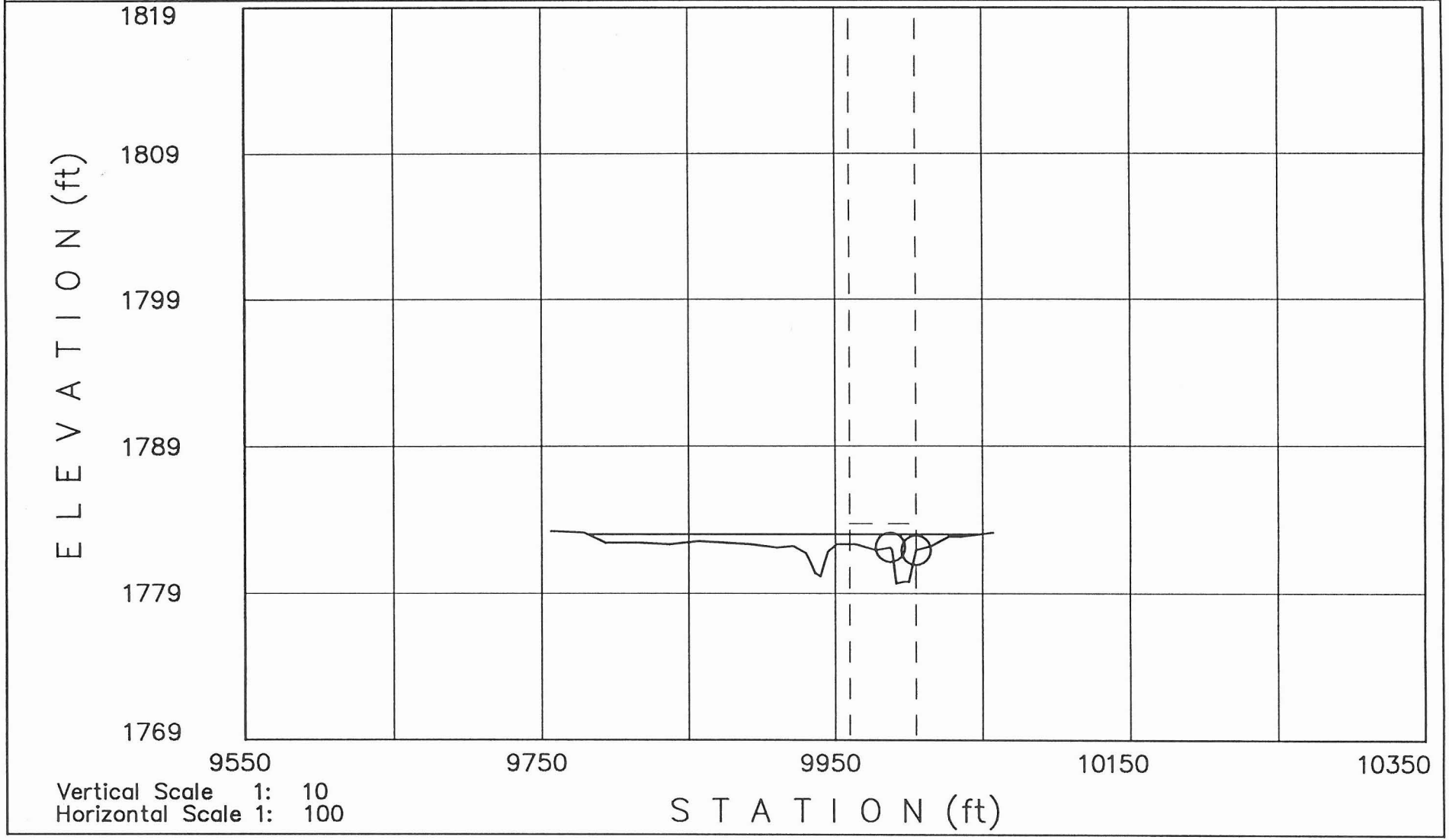

<<<<<< Cross Section: 2.675: (FN = W11FW1.0H2) >>>>>>
Q1= 740cfs WS1= 1759.17
Q2= 740cfs WS2= 1759.15
Manning-n Values: LOB: 0 CH: .045 ROB: 0
1797
1787
1777
1767
1757
1747
ELEVATION (ft)
9670
9870
10070
10270
10470
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
09-13-1995


<<<<<< Cross Section: 2.767: (FN = W11FW1.0H2) >>>>>>
Q1= 720cfs WS1= 1772.23
Q2= 720cfs WS2= 1773.14
Manning-n Values: LOB: .07 CH: .045 ROB: 0 - .07
1808
1798
1788
1778
1768
1758
ELEVATION (ft)
9650
9850
10050
10250
10450
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
09-13-1995

<<<<<< Cross Section: 2.838: (FN = W11FW1.0H2) >>>>>>

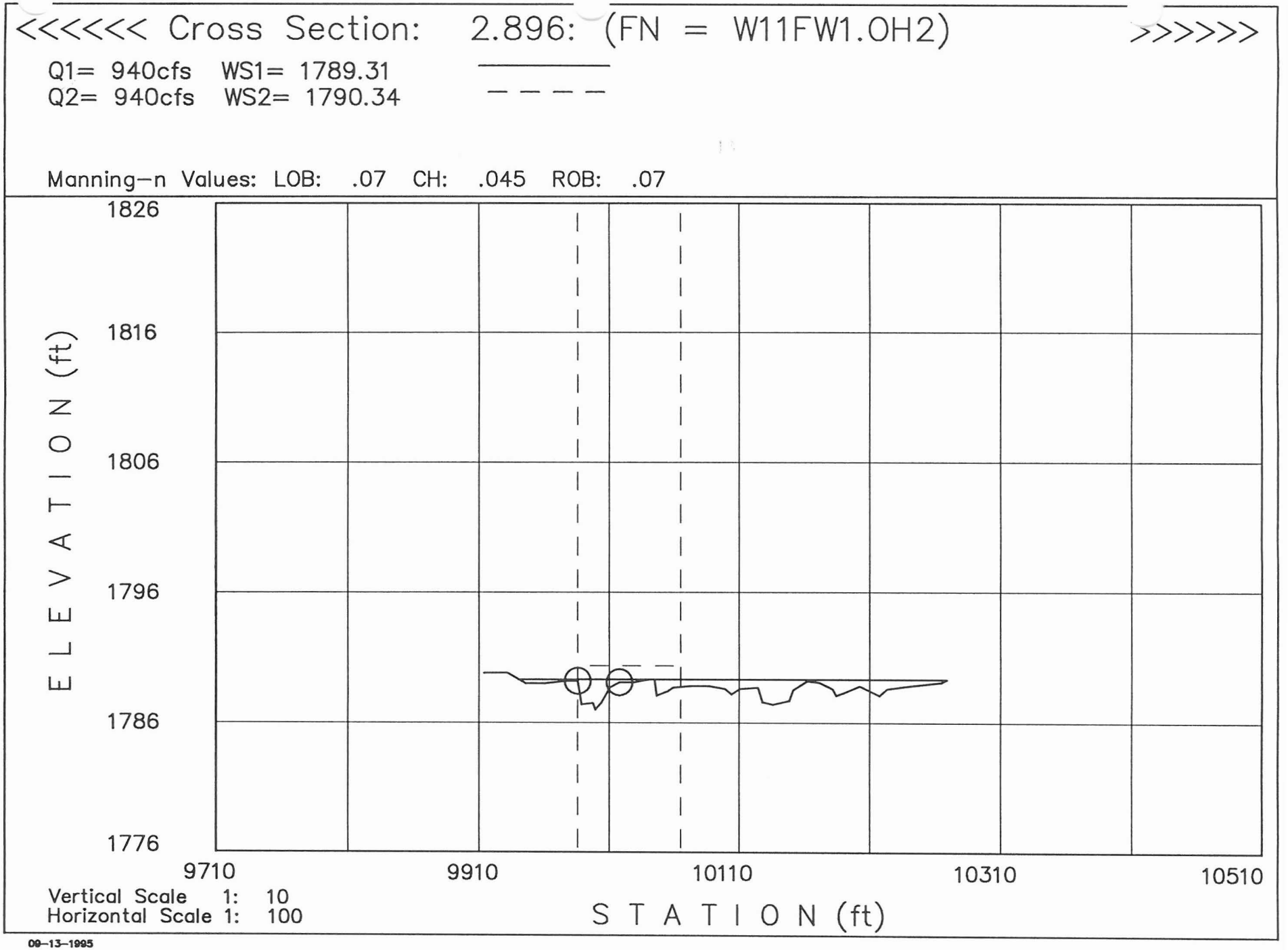
Q1= 720cfs WS1= 1782.98
Q2= 720cfs WS2= 1783.7

Manning-n Values: LOB: .07 CH: .045 ROB: 0 - .07



Vertical Scale 1: 10
Horizontal Scale 1: 100

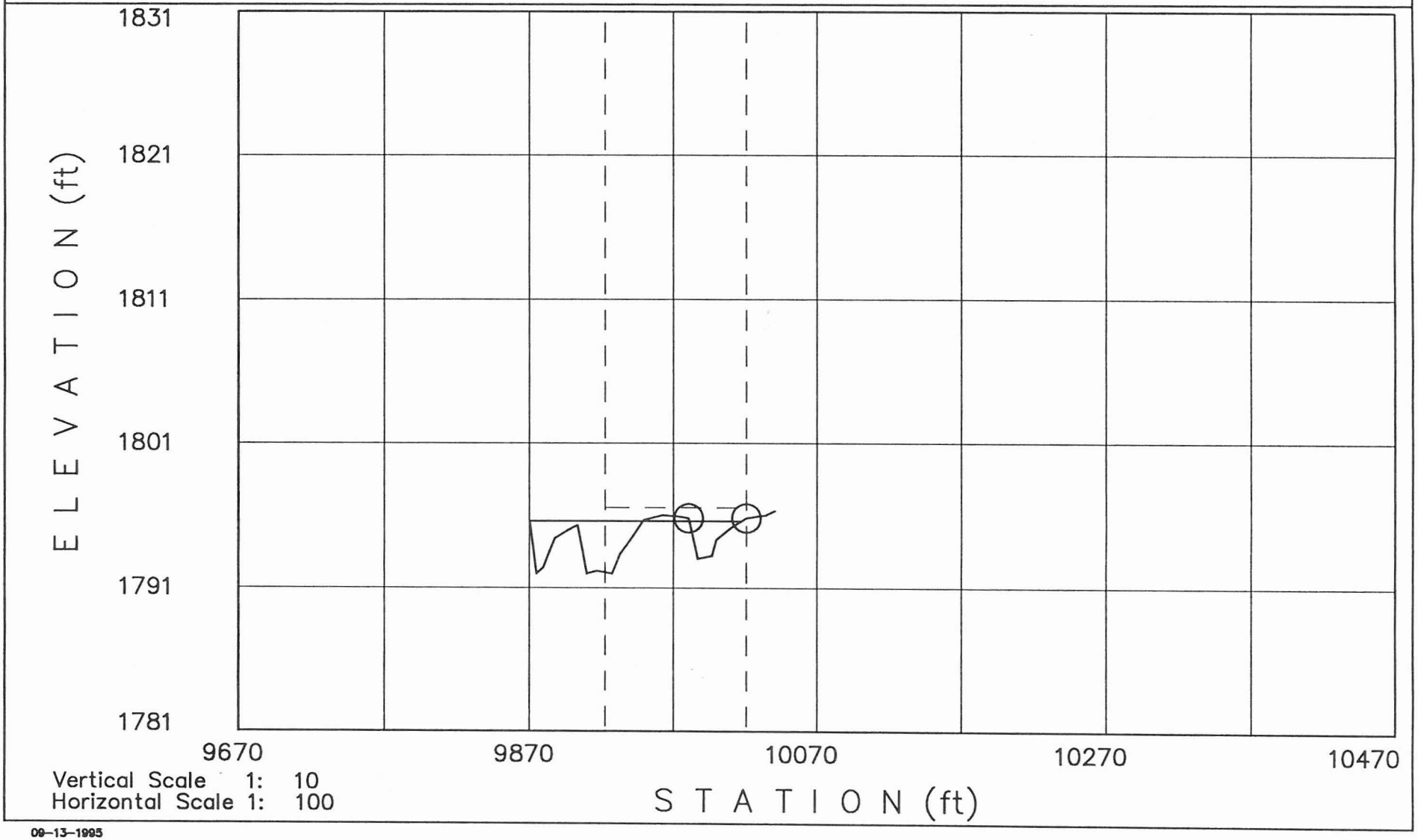
09-13-1995


<<<<<< Cross Section: 2.896: (FN = W11FW1.OH2) >>>>>>
Q1= 940cfs WS1= 1789.31
Q2= 940cfs WS2= 1790.34
Manning-n Values: LOB: .07 CH: .045 ROB: .07
ELEVATION (ft)
1826
1816
1806
1796
1786
1776
9710
9910
10110
10310
10510
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
09-13-1995

<<<<<< Cross Section: 2.957: (FN = W11FW1.OH2) >>>>>>

Q1= 940cfs WS1= 1795.59
Q2= 940cfs WS2= 1796.52

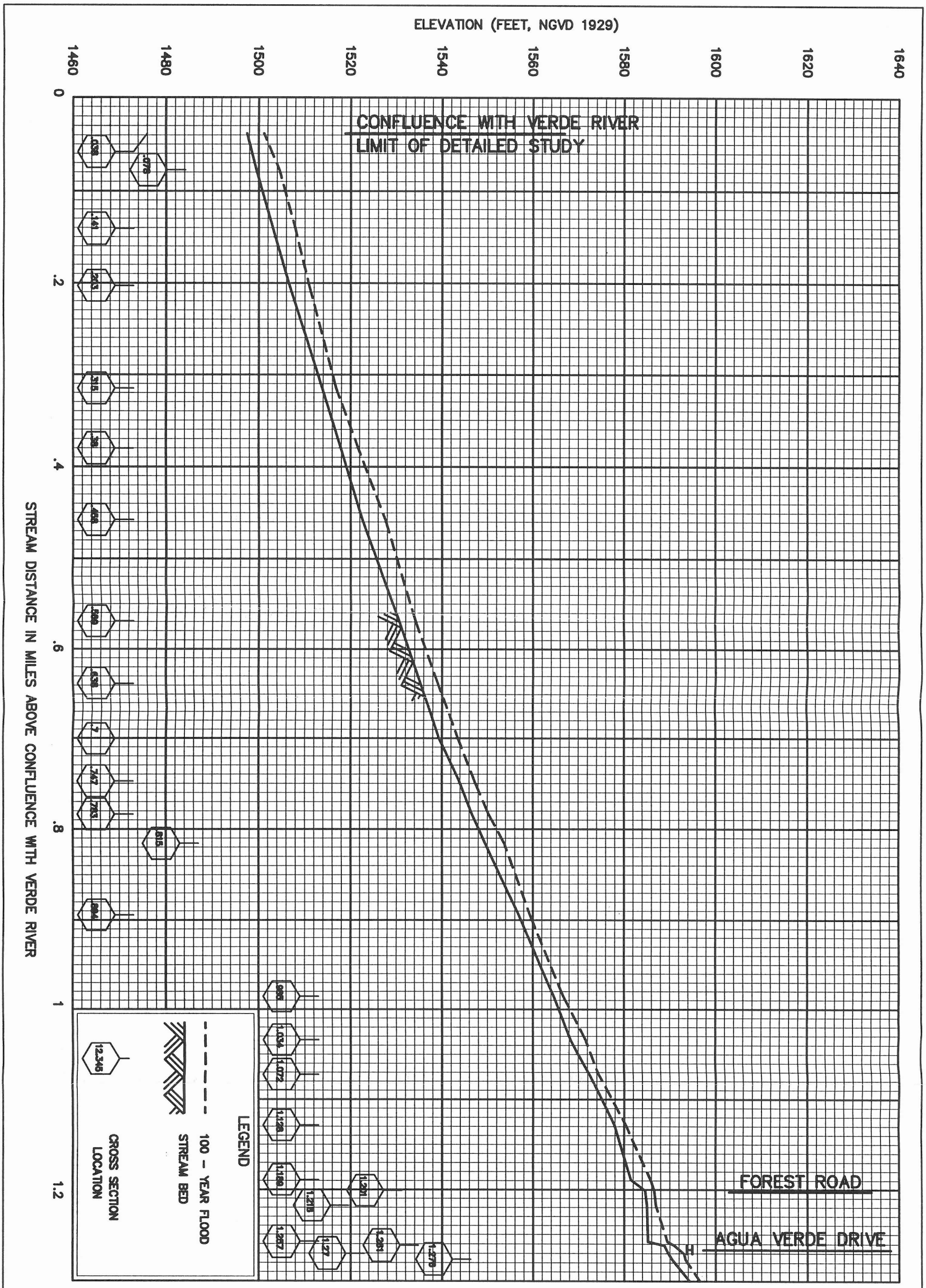
Manning-n Values: LOB: .07 CH: .045 ROB: 0



Vertical Scale 1: 10
Horizontal Scale 1: 100

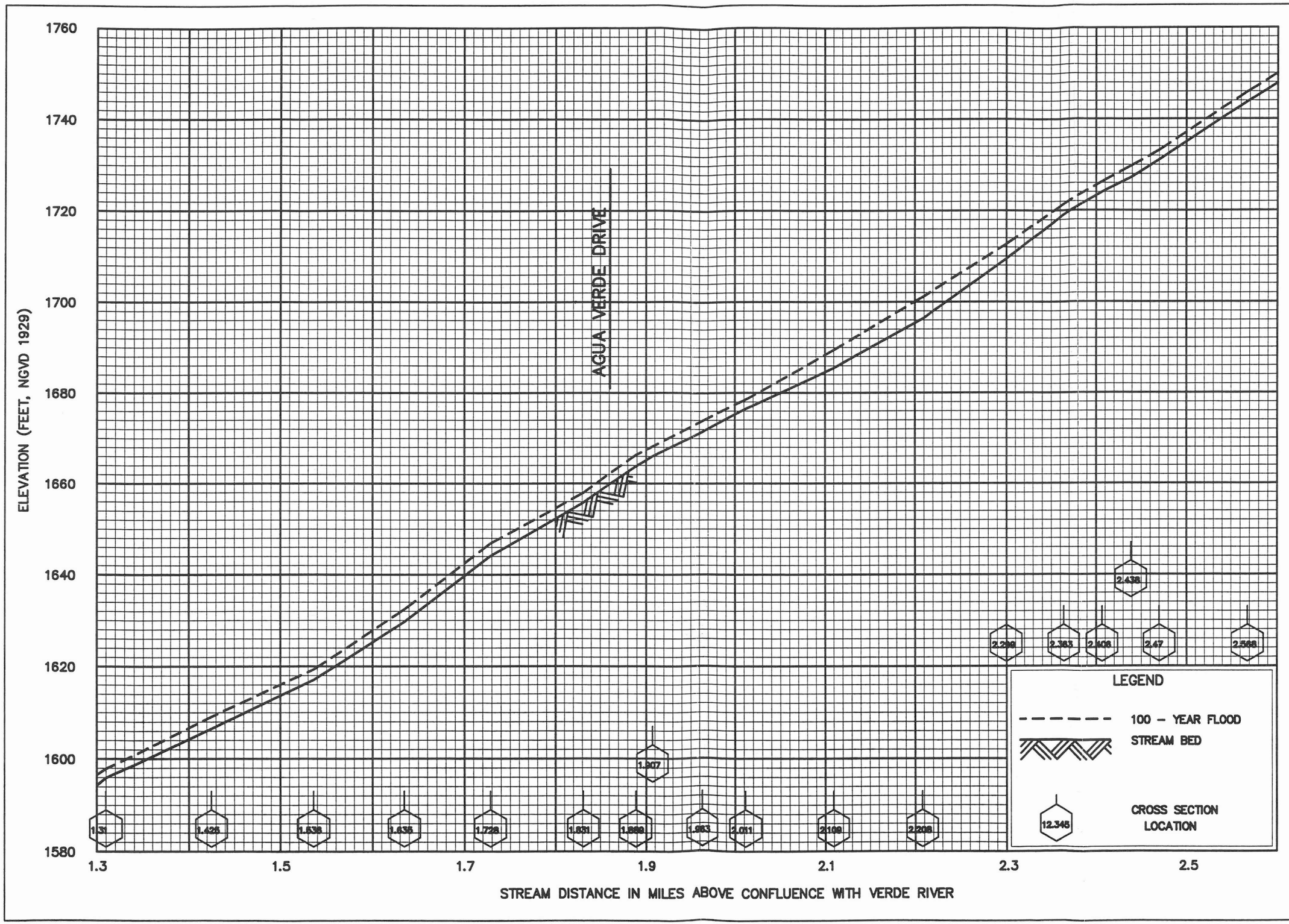
09-13-1995

FLOOD PROFILES



FEDERAL EMERGENCY MANAGEMENT AGENCY RIO VERDE SOUTH FLOOD DELINEATION STUDY	FLOOD PROFILES WASH 11

Dwg. Name: \P\89407003\FEMA\ W11FW1-P.DWG (SHEET 1 OF 3)
Date: REV. SEPT. 29, 1995 01:00 pm



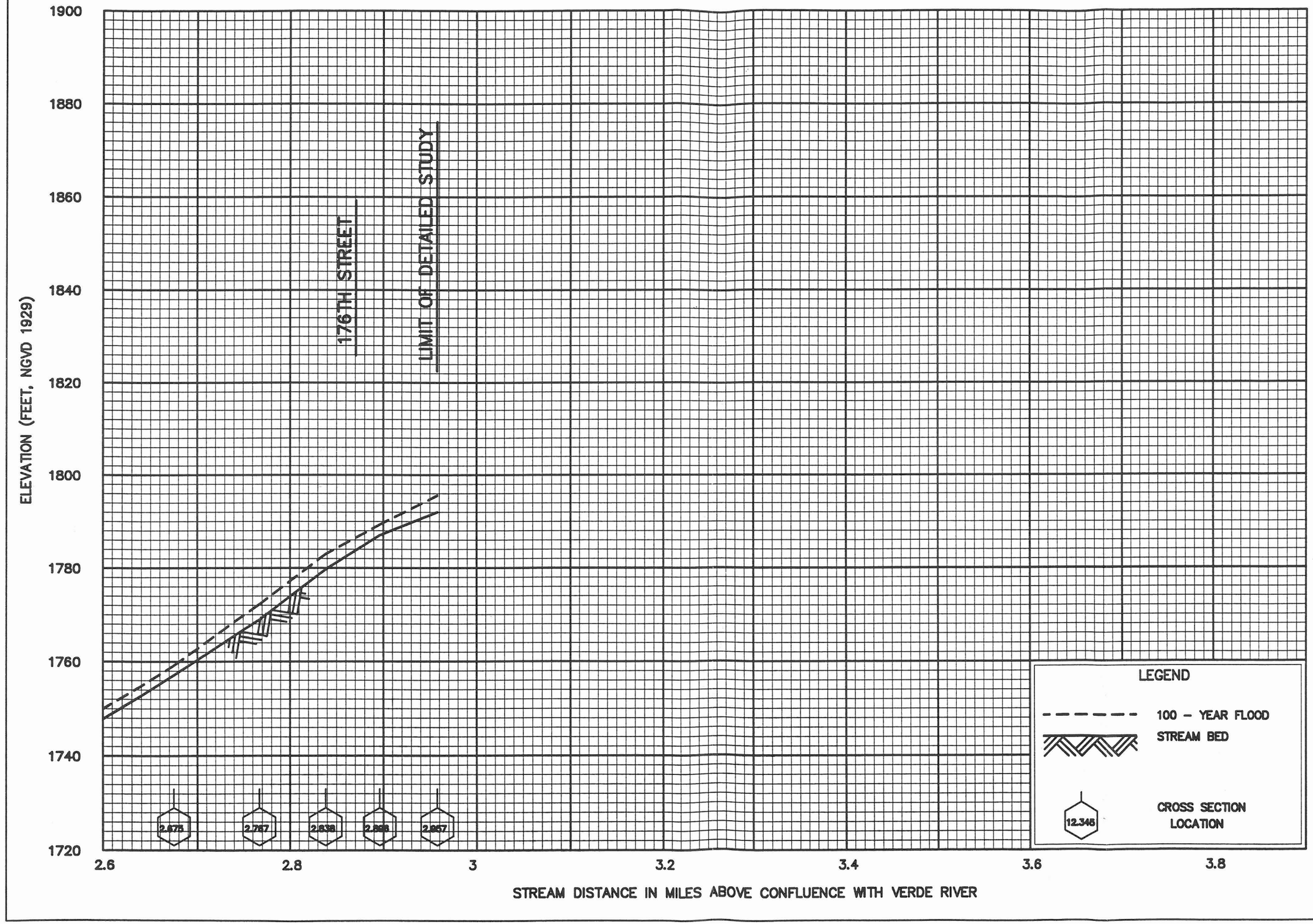
FLOOD PROFILES

WASH 11

FEDERAL EMERGENCY MANAGEMENT AGENCY
RIO VERDE SOUTH
FLOOD DELINEATION STUDY

(SHEET 2 OF 3)

Dwg. Name: \P\89407003\FEMA\ W11FW1-P.DWG
Date: REV. SEPT. 29, 1995 01:00 pm



FLOOD PROFILES

WASH 11

FEDERAL EMERGENCY MANAGEMENT AGENCY
RIO VERDE SOUTH
FLOOD DELINEATION STUDY

Dwg. Name: \P\8940700\3\FEMA\W11FW1-P.DWG (SHEET 3 OF 3)
Date: RFV SEPT. 29, 1995 01:00 pm

MKE McLaughlin Kmetty Engineers, Ltd.

Project Title _____ Project No. 89-407.003 Date Revised 15 Sep 95 / 6 Sep 95

Subject _____ Designed TB Page 1

Starting Water Surface Elevations and Coincident Peak Consideration

Reference FEMA 37 March 1993 version

pages 5-5,6 discusses coincident peaks.

Wash 9: Starts at critical depth since outside of floodplain mapping area. Channel reaches normal depth within the floodplain mapping area.

Wash 11: Start @ normal depth, first cross section 190 ft upstream of Verde River.

Wash 10: Wash 10 tributary to Wash 11. Verify coincident peaks:

test a: $\frac{\text{W10 drainage area}}{\text{W11 dr. area}} = \frac{13.73}{6.56} = 2.09 > 1.4$ (outside limits)

test b: $\frac{\text{W10 time to peak (24 hr without levee, Appendix G, C543)}}{\text{W11 time to peak (24 hr with levee, Table 3-20, C545L)}} = \frac{12.90 \text{ hr}}{14.27 \text{ hr}}$

peaks are about 1 hour apart

test c: Liklihood of both watersheds covered by same storm being modeled is high. See Hydrology Exhibit A. A storm large enough to cover Wash 11 watershed would probably cover all of Wash 10 watershed.

Conclusion for Wash 10: Even though tests a. and b. could be considered out of range, coincident peaks should be assumed because of the peak flow rate dependence on whether or not the Section 36 levee remains in place or fails (see p. 3-69 Hydrology TDN Book 1 of 2) and because of the complex nature of the intermingling of Wash 10 and Wash 11 runoff in the confluence area.

Wash 12: Wash 12 tributary to Verde River.

$0.6 < \frac{W12}{Verde} > 1.4$ $\frac{8.58}{Verde} = 0.6$ or 1.4 Verde = 14.3 mi² or 6.13 mi² which is not true.

CONCLUSION For Wash 12: Coincident peaks cannot be substantiated, nevertheless Wash 12 starts at Verde River approximate WSEL for conservatism. Second cross section is at critical depth.

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1*****************************************
 *  HEC-2 WATER SURFACE PROFILES          *
 *                                        *
 *  Version   4.6.2;  May 1991            *
 *                                        *
 *  RUN DATE    12SEP95    TIME   09:29:08 *
 *****************************************
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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 12SEP95 09:29:08

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

 Version   4.6.2;  May 1991
*************************************
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T1   *  Rio Verde South FIS, Wash 12                    File:W12FW1.IH2
T2   *  For: FCDMC #       93-07     By:MKE, Ltd       FB & CLJ 4-24-95
T3   *  Wash 12,100 Yr Floodplain                      Revised:  9-6-95
T4   *  GR data taken from stereo model; received from AMC
T5   *  200 scale 2 ft CI mapping flown by AMC on 12-22-93 & 8-22-94
T6   *  with survey control by Burgess & Niple on 10-21-93;11-9-93;12-9-93
T7   *  supplemental cross section data (GR & BT) surveyed by ALS as noted.
T8   *  Source of 100-Yr flowrate from HEC-1 Analysis by GVSCE. Table F-3
T9   *  Subcritical analysis.
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J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0         2         0         0         0         0         0         0       1514        0

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      1         0        -1         0         0         0        -1         0         0         0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    150       200

     HEC-1 Concentration Point C523      At confluence with Verde River

QT        2       1110       1110

     START Hydraulically Similar Reach 12A

ET                  0        9.1                                                          9970.9     10049.3

NC     .065       .065       .055       0.1        0.3
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          AMC cross-section modified by removing vertical wall STA  9942.4
X1    0.034        12     9970.9    10048.3         0.0         0.0         0.0
GR   1516.2    9942.4     1515.8     9970.9      1506.7      9976.8      1499.9    9985.8    1499.5    9994.7
GR   1499.5   10000.0     1499.5    10000.0      1499.6     10016.3      1511.6   10048.3    1514.4   10079.5
GR   1514.6   10111.8     1514.6    10111.8

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ET                 0        9.1                                                                 9959.2   10026.21

X1    0.119        30     9959.2    10026.2       450.0       450.0       446.8
GR   1523.5    9912.2     1523.5     9912.2      1523.1      9924.7      1522.8    9946.8    1523.5    9959.2
GR   1522.8    9970.4     1520.9     9976.5      1517.9      9978.8      1517.9    9982.5    1513.9    9984.1
GR   1514.1    9995.2     1514.1    10000.0      1514.1     10009.1      1515.8   10011.8    1519.2   10016.7
GR   1519.7   10022.4     1519.7    10026.2      1518.3     10029.3      1518.4   10038.9    1517.9   10047.4
GR   1517.6   10062.3     1518.6    10082.4      1518.5     10095.5      1522.8   10106.2    1523.4   10125.1
GR   1523.2   10152.1     1523.1    10167.3      1522.9     10176.2      1524.1   10184.6    1524.1   10184.6

         This cross section replaces old cross section .207.  Cross section
         was rotated per review comments.  New cross section is at
         R.M. 0.200 and GR data acquired from topo map info.


ET                 0        9.1                                                                 9957.09  10016.31

         This cross section replaces old cross section .207.  Cross section
         was rotated per review comments.  New cross section is at
         R.M. 0.200 and GR data acquired from topo map information.
X1    0.200        7     9957.1    10016.3         450         375       429.5
GR     1530     9908       1528     9957.1        1524      9974.3      1523.6     10000      1524    10010.3
GR     1528  10016.3       1529      10122

      START Hydraulically Similar Reach 12B
       1000 ft upstream of confluence with Verde River


NC    0.06       0.06      0.040        0.1         0.3

ET                 0        9.1                                                                 9948.8   10042.71

X1    0.244       13     9948.8    10042.7         210         240       235.8
GR   1532.4    9913.0     1532.1     9934.4      1531.4      9948.8      1529.7    9962.3    1528.4    9977.2
GR   1529.4    9988.5     1528.9    10000.0      1528.9     10000.0      1528.8   10014.2    1530.5   10027.2
GR   1531.6   10042.7     1531.7    10055.7      1531.7     10055.7         0.0       0.0       0.0       0.0

      HEC-1 Concentration Point C576


QT        2       1060       1060

ET                 0        9.1                                                                 9952.5   10032.21

X1    0.292       16     9973.7    10030.2       265.0       275.0       252.7
GR   1537.0    9796.6     1536.7     9829.9      1536.2      9873.8      1535.5    9917.8    1535.5    9917.8
GR   1535.3    9952.5     1535.2     9973.7      1533.6      9980.7      1532.4    9989.2    1532.3   10000.0
GR   1532.3   10010.6     1536.8    10017.4      1537.3     10030.2      1537.3   10054.6    1537.8   10081.8
GR   1537.8   10089.1        0.0        0.0         0.0         0.0         0.0       0.0       0.0       0.0

         Levee on right bank is not considered effective during 100 yr. flood.

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ET                 0        9.1                                                                 9945.6   10034.3
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          Levee on right bank is not considered effective during 100 yr. flood.
X1    0.395        26     9970.9    10017.4       540.0       540.0       539.8
GR   1544.8    9859.4     1544.9     9885.5      1543.9      9894.5      1544.8      9904.7      1544.5      9920.8
GR   1544.1    9927.2     1544.1     9927.2      1544.3      9945.6      1543.8      9960.3      1543.9      9970.9
GR   1542.4    9979.7     1542.2     9984.7      1542.2      9997.5      1542.4     10000.0      1542.5     10011.4
GR   1546.2   10017.4     1542.6    10023.4      1543.1     10034.3      1542.5     10045.5      1542.7     10062.6
GR   1542.6   10082.1     1543.0    10102.0      1543.1     10117.6      1543.2     10143.5      1543.4     10161.5
GR   1543.4   10161.5        0.0        0.0         0.0         0.0         0.0         0.0         0.0         0.0

     HEC-1 Concentration Point C520


QT       2       1010       1010

     START Hydraulically Similar Reach 12C
      2000 ft upstream of confluence with Verde River

ET                   0        9.1                                                                 9931.3    10019.12

NC    0.06       0.06      0.040        0.1         0.3

X1    0.488        20     9931.3    10019.1       475.0       500.0       492.5
GR   1553.4    9834.3     1553.1     9859.9      1552.9      9887.2      1552.3      9915.2      1552.3      9931.3
GR   1551.2    9943.4     1550.6     9952.7      1550.5      9962.3      1551.0      9976.3      1550.8      9992.2
GR   1550.5    9997.6     1550.5    10000.0      1550.5     10002.2      1552.1     10008.0      1552.6     10019.1
GR   1552.4   10035.5     1552.6    10055.6      1553.7     10079.8      1553.7     10102.6      1553.7     10110.4

         GR records removed from station  9935.5   to station     9965.1
                        and from station 10085.0   to station    10181.1
                        in order to limit to effective area without X3 records.
         GR point added: STA 9965.0 in order to set ET left station

ET                   0        9.1                                                                 9965.09   10049.31

         GR records removed from station  9935.5   to station     9965.1
                        and from station 10085.0   to station    10181.1
                        in order to limit to effective area without X3 records.
         GR point added: STA 9965.0 in order to set ET left station
X1    0.569        13     9965.1    10049.3       375.0       465.0       430.4
X2                                                                                                                  15
GR   1558.7    9965.0     1558.7     9965.1      1558.5      9971.0      1557.5      9978.0      1557.0      9984.4
GR   1556.8    9992.2     1556.8    10000.0      1556.8     10014.4      1556.7     10021.8      1557.9     10033.2
GR   1558.5   10049.3     1558.6    10065.4      1559.6     10085.0

         GR records removed from station  9653.4   to station     9971.9
                        in order to limit to effective area without X3 records.

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ET                   0        9.1                                                                 9971.9    10043.21

         GR records removed from station  9653.4   to station     9971.9
                        in order to limit to effective area without X3 records.
X1    0.661        22     9971.9    10043.2       465.0       500.0       484.9
X2                                                                                                                  15
GR   1565.3    9971.9     1564.7     9976.9      1563.4      9981.6      1563.3      9992.9      1563.3     10000.0
GR   1563.2   10012.8     1564.1    10020.1      1564.9     10032.7      1565.2     10043.2      1564.9     10055.1
GR   1564.4   10064.7     1563.6    10068.2      1563.4     10070.0      1563.8     10072.7      1564.5     10078.3
GR   1564.9   10078.8     1565.2    10089.7      1565.5     10102.6      1565.2     10118.0      1565.5     10133.3
GR   1565.8   10150.2     1566.1    10156.3

     HEC-1 Concentration Point C512
      3000 ft upstream of confluence with Verde River


QT       2       750        750

ET                   0        9.1                                                                 9998.6    10084.91
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X1    0.748        43     9998.6    10084.9       365.0       500.0       459.4
GR   1572.1    9642.4     1570.9     9685.1      1570.9     9699.5      1571.1    9729.7     1570.2     9757.8
GR   1570.2    9774.8     1570.5     9801.0      1570.2     9814.2      1569.4    9819.7     1571.1     9827.0
GR   1570.7    9836.9     1570.2     9854.1      1569.8     9869.3      1569.2    9877.5     1568.9     9882.0
GR   1569.6    9886.2     1569.9     9892.8      1569.9     9908.8      1570.1    9940.1     1570.0     9969.9
GR   1570.0    9985.1     1569.9     9998.6      1569.6    10000.0      1568.9   10006.2     1569.0    10009.0
GR   1569.9   10011.9     1569.9    10029.1      1569.4    10037.1      1568.5   10042.8     1568.4    10052.3
GR   1568.5   10065.5     1569.7    10069.0      1569.8    10084.9      1569.5   10103.9     1569.6    10132.1
GR   1569.8   10157.5     1570.0    10175.5      1571.1    10195.5      1570.4   10215.0     1570.6    10235.5
GR   1571.0   10258.6     1571.0    10274.9      1571.1    10290.9        0.0        0.0       0.0        0.0

ET                0        9.1                                                                 9961.2    10064.2

X1    0.846        42     9997.2    10027.7       500.0       550.0       515.4
GR   1581.4    9784.3     1581.6     9813.8      1581.7     9844.0      1580.4    9884.2     1579.9     9903.8
GR   1579.8    9930.7     1579.5     9937.9      1579.4     9946.6      1579.5    9952.9     1579.9     9961.2
GR   1579.6    9981.1     1579.3     9997.2      1577.6    10000.0      1577.7   10007.5     1577.7    10012.0
GR   1579.1   10014.3     1579.5    10027.7      1579.1    10038.1      1578.4   10047.5     1579.4    10051.3
GR   1579.9   10064.2     1579.7    10079.0      1579.9    10093.4      1580.3   10110.3     1580.2    10121.9
GR   1577.5   10123.7     1577.6    10130.5      1577.6    10139.1      1580.1   10142.5     1580.1    10156.6
GR   1580.0   10170.0     1580.3    10194.3      1581.0    10210.9      1580.8   10221.3     1580.0    10229.0
GR   1580.0   10230.3     1581.0    10241.8      1581.1    10254.5      1581.1   10266.2     1581.6    10273.9
GR   1581.8   10293.9     1581.8    10295.9        0.0         0.0         0.0        0.0       0.0        0.0

      Survey data along Forest Rd used, replacing photogrammetric data.
      This data better reflects the topography of the road across
      the wash.

     Flow value at Forest Road, interpolated between C512 and C511

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QT        2        730        730

         GR records removed from station  9620.0   to station     9943.7
                      in order to limit to effective area without X3 records.

ET                0        9.1                                                                 9943.7    10524.61

        Forest Rd. survey data used for GR records instead of original GR data.
        Survey Data from Burgess & Niple XSEC5 from Point 168470 to 168471
         GR records removed from station  9620.0   to station     9943.7
                      in order to limit to effective area without X3 records.
X1    0.935        16     9943.7    10524.6         510         370       461.2
GR   1589.2    9943.7     1589.2     9992.2      1589.1    10000.0      1588.7   10038.7     1588.4    10092.3
GR   1588.7   10144.1     1588.0    10192.7      1587.3    10240.7      1587.2   10280.3     1587.3    10292.4
GR   1587.8   10347.8     1587.5    10392.7      1586.9    10439.2      1587.4   10492.4     1587.8    10524.6
GR   1588.2   10592.7

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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

 CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

 CCHV=      .100 CEHV=      .300
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*SECNO  .034
        AMC cross-section modified by removing vertical wall STA  9942.4
      .034     14.50   1514.00   1502.80   1514.00   1514.03       .03       .00       .00   1515.80
    1110.0        .0    1101.0       9.0        .0     822.0      32.1        .0        .0   1511.60
       .00       .00      1.34       .28      .000      .055      .065      .000   1499.50   9972.07
   .000119        0.        0.        0.         0        16         0       .00    102.98  10075.04


*SECNO  .119

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      .119      4.24   1518.14   1518.14       .00   1519.43      1.28       .19       .38   1523.50
    1110.0        .0    1092.9      17.1        .0     119.3       9.3       5.0        .9   1519.70
       .01       .00      9.16      1.83      .000      .055      .065      .000   1513.90   9978.61
   .027344       450.      447.       450.         0        17         0       .00     66.52  10073.22


*SECNO  .200

3301 HV CHANGED MORE THAN HVINS

        This cross section replaces old cross section .207.  Cross section
        was rotated per review comments.  New cross section is at
        R.M. 0.200 and GR data acquired from topo map information.
      .200      3.81   1527.41   1526.70       .00   1528.13       .71      8.64       .06   1528.00
    1110.0        .0    1110.0        .0        .0     163.9        .0       6.5       1.5   1528.00
       .03       .00      6.77       .00      .000      .055      .000      .000   1523.60   9959.62
   .015446       450.      430.       375.         5        15         0       .00     55.80  10015.42


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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


CCHV=      .100 CEHV=      .300
*SECNO  .244
      .244      2.88   1531.28   1531.21       .00   1532.08       .81      3.93       .03   1531.40
    1110.0        .0    1110.0        .0        .0     154.1        .0       7.3       1.8   1531.60
       .04       .00      7.20       .00      .000      .040      .000      .000   1528.40   9949.79
   .018009       210.      236.       240.         3        19         0       .00     88.33  10038.12


*SECNO  .292
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      .292      3.72   1536.02   1536.02       .00   1536.88       .86      3.46       .02   1535.20
    1060.0      82.7     977.3        .0      46.0     126.4        .0       8.3       2.5   1537.30
       .05      1.80      7.74       .00      .060      .040      .000      .000   1532.30   9885.38
   .010588       265.      253.       275.         0        11         0       .00    130.84  10016.21


*SECNO  .395

3265 DIVIDED FLOW

3280 CROSS SECTION       .40 EXTENDED       .66 FEET

        Levee on right bank is not considered effective during 100 yr. flood.
      .395      1.86   1544.06   1543.95       .00   1544.49       .43      7.57       .04   1543.90
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    1060.0       3.7     442.9     613.4       3.5      65.3     159.5      10.8       4.6   1546.20
      .08      1.08      6.78      3.84      .060      .040      .060      .000   1542.20   9893.07
   .019443      540.      540.      540.         3        14         0       .00    205.02  10161.50


 CCHV=     .100 CEHV=     .300
 *SECNO  .488
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
      .488      2.32   1552.82   1552.82       .00   1553.45       .64      8.58       .06   1552.30
    1010.0      24.2     968.9      16.9      14.5     148.2      12.1      13.1       6.7   1552.60
      .10      1.67      6.54      1.40      .060      .040      .060      .000   1550.50   9891.11
   .015483      475.      493.      500.         0        11         0       .00    169.25  10060.36


 *SECNO  .569
 3280 CROSS SECTION       .57 EXTENDED       .49 FEET

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          GR records removed from station  9935.5   to station     9965.1
                        and from station 10085.0   to station    10181.1
                        in order to limit to effective area without X3 records.
          GR point added: STA 9965.0 in order to set ET left station
      .569      2.49   1559.19   1559.07       .00   1559.83       .64      6.38       .00   1558.70
    1010.0        .0     982.8      27.2         .0     150.8      13.8      14.7       8.1   1558.50
      .12       .03      6.52      1.97      .060      .040      .060      .000   1556.70   9965.00
   .014178      375.      430.      465.         3         8         0       .00    112.00  10077.00


 FLOW DISTRIBUTION FOR SECNO=       .57          CWSEL=   1559.19

 STA=    9965.    9965.   10049.   10065.   10077.
   PER Q=       .0     97.3      2.2       .4
    AREA=       .0    150.8     10.3      3.4
     VEL=       .0      6.5      2.2      1.3
   DEPTH=       .5      1.8       .6       .3

 *SECNO  .661
 3280 CROSS SECTION       .66 EXTENDED       .50 FEET

          GR records removed from station  9653.4   to station     9971.9
                        in order to limit to effective area without X3 records.
      .661      2.60   1565.80   1565.64       .00   1566.28       .48      6.43       .02   1565.30
    1010.0        .0     795.9     214.1         .0     130.1      76.2      16.8       9.7   1565.20
      .15       .00      6.12      2.81      .000      .040      .060      .000   1563.20   9971.90
   .012359      465.      485.      500.         4         5         0       .00    178.14  10150.04


 FLOW DISTRIBUTION FOR SECNO=       .66          CWSEL=   1565.80

 STA=    9972.   10043.   10065.   10070.   10078.   10118.   10150.
   PER Q=     78.8      5.3      4.4      6.2      4.0      1.3
    AREA=    130.1     19.9     10.4     15.2     21.4      9.3
     VEL=      6.1      2.7      4.3      4.1      1.9      1.4
   DEPTH=      1.8       .9      2.0      1.8       .5       .3

 *SECNO  .748

 3265 DIVIDED FLOW

      .748      2.16   1570.56   1570.28       .00   1570.69       .14      4.38       .03   1569.90
    750.0     185.6     407.5     156.9     120.4     110.6      83.9      19.5      12.8   1569.80
      .19      1.54      3.69      1.87      .060      .040      .060      .000   1568.40   9746.59
   .007124      365.      459.      500.         5        13         0       .00    442.72  10231.29


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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  .846

 3265 DIVIDED FLOW

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
       .846       2.60    1580.10    1580.10        .00    1580.49        .39       5.42        .08    1579.30
     750.0        80.8      308.4      360.8       41.6       48.5       88.1       22.5       17.1    1579.50
       .22        1.94       6.35       4.09        .060       .040       .060       .000    1577.50    9895.81
    .016349       500.       515.       550.          0          8          0        .00     266.13   10231.49


 *SECNO  .935
         Forest Rd. survey data used for GR records instead of original GR data.
         Survey Data from Burgess & Niple XSEC5 from Point 168470 to 168471
          GR records removed from station  9620.0   to station     9943.7
                        in order to limit to effective area without X3 records.
       .935       1.13    1588.03    1587.95        .00    1588.23        .20       7.72        .02    1589.20
     730.0         .0       726.5        3.5         .0       200.6        4.4       24.4       20.3    1587.80
       .26        .00        3.62        .80        .000        .040       .060       .000    1586.90   10190.81
    .018750       510.       461.       370.          5         18          0        .00     372.47   10563.29


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 T1   *  Rio Verde South FIS, Wash 12
 T2   *  For: FCDMC #    93-07        By:MKE, Ltd
 T3   *  Wash 12,100-Yr Floodway
 T4   *  GR data taken from stereo model; received on 4-21-95 from AMC
 T5   *  200 scale 2 ft CI mapping flown by AMC on 12-22-93
 T6   *  with survey control by Burgess & Niple on 10-21-93;11-9-93;12-9-93
 T7   *  supplemental cross section data (GR & BT) surveyed by ALS as noted.
 T8   *  Source of 100-Yr flowrate from HEC-1 Analysis by GVSCE. Table F-3
 T9   *  Special culvert routine used.   Subcritical analysis.
 T9   *  Method 1 Encroachment option, & no encroachment at culverts

 J1  ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

       0          3          0          0          0          0          0          0     1515.0

 J2  NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

      15          0         -1          0          0          0         -1          0          0          0



1
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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 *PROF 2

 CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0
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CCHV=     .100 CEHV=     .300
*SECNO  .034
3280 CROSS SECTION       .03 EXTENDED       .40 FEET


3470 ENCROACHMENT STATIONS=     9970.9   10049.3  TYPE=      1  TARGET=       78.399
        AMC cross-section modified by removing vertical wall STA  9942.4
      .034     15.50   1515.00   1502.81   1514.00   1515.02       .02       .00       .00   1515.80
    1110.0        .0    1109.4        .6        .0     898.6       3.4        .0        .0   1511.60
       .00       .00      1.23       .18      .000      .055      .065      .000   1499.50   9971.42
   .000091        0.        0.        0.         0        16         0       .00     77.88  10049.30


*SECNO  .119

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9959.2   10026.2  TYPE=      1  TARGET=       67.010
      .119      3.92   1517.82   1517.82   1518.14   1519.46      1.64       .15       .49   1523.50
    1110.0        .0    1110.0        .0        .0     107.9        .0       5.2        .6   1519.70
       .01       .00     10.28       .00      .000      .055      .000      .000   1513.90   9982.53
   .033458      450.      447.      450.         0        11         0       .00     32.18  10014.71


*SECNO  .200

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.58


3470 ENCROACHMENT STATIONS=     9957.1   10016.3  TYPE=      1  TARGET=       59.220
        This cross section replaces old cross section .207.  Cross section
        was rotated per review comments.  New cross section is at
1
   12SEP95      09:29:08                                                                    PAGE   12


        R.M. 0.200 and GR data acquired from topo map information.
      .200      3.96   1527.56   1526.69   1527.41   1528.20       .65      8.64       .10   1528.00
    1110.0        .0    1110.0        .0        .0     172.1        .0       6.6       1.0   1528.00
       .03       .00      6.45       .00      .000      .055      .000      .000   1523.60   9959.00
   .013415      450.      430.      375.         4        15         0       .00     56.64  10015.64


CCHV=     .100 CEHV=     .300
*SECNO  .244

3470 ENCROACHMENT STATIONS=     9948.8   10042.7  TYPE=      1  TARGET=       93.910
      .244      2.81   1531.21   1531.21   1531.28   1532.08       .86      3.81       .07   1531.40
    1110.0        .0    1110.0        .0        .0     148.8        .0       7.4       1.4   1531.60
       .04       .00      7.46       .00      .000      .040      .000      .000   1528.40   9950.27
   .019830      210.      236.      240.         3        19         0       .00     86.99  10037.27


*SECNO  .292
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9952.5   10032.2  TYPE=      1  TARGET=       79.710
      .292      3.53   1535.83   1535.83   1536.02   1536.99      1.16      4.29       .09   1535.20
    1060.0      25.0    1035.0        .0      12.2     118.4        .0       8.2       1.8   1537.30
       .05      2.04      8.74       .00      .060      .040      .000      .000   1532.30   9952.50
   .014611      265.      253.      275.         0         8         0       .00     63.43  10015.93
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*SECNO  .395

3265 DIVIDED FLOW

3280 CROSS SECTION       .40 EXTENDED      1.52 FEET

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9945.6   10034.3  TYPE=      1  TARGET=       88.700
        Levee on right bank is not considered effective during 100 yr. flood.
      .395      2.72   1544.92   1544.92   1544.06   1545.86       .93      8.49       .02   1543.90
    1060.0      75.2     863.5     121.3      24.2     103.1      27.1      10.0       2.7   1546.20
       .07      3.11      8.38      4.48      .060      .040      .060      .000   1542.20   9945.60
   .016971      540.      540.      540.         0        15         0       .00     84.50  10034.30


CCHV=     .100 CEHV=     .300
*SECNO  .488

3470 ENCROACHMENT STATIONS=     9931.3   10019.1  TYPE=      1  TARGET=       87.820
1
   12SEP95      09:29:08                                                                          PAGE   13

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


      .488      2.41   1552.91   1552.72   1552.82   1553.56       .65      7.67       .03   1552.30
    1010.0        .0    1010.0        .0        .0     156.0        .0      11.8       3.7   1552.60
       .09       .00      6.47       .03      .000      .040      .060      .000   1550.50   9931.30
   .014300      475.      493.      500.         4        15         0       .00     87.82  10019.12


*SECNO  .569

3470 ENCROACHMENT STATIONS=     9965.1   10049.3  TYPE=      1  TARGET=       84.220
        GR records removed from station  9935.5   to station     9965.1
                        and from station 10085.0   to station    10181.1
                        in order to limit to effective area without X3 records.
        GR point added: STA 9965.0 in order to set ET left station
      .569      2.49   1559.19   1559.05   1559.19   1559.88       .69      6.31       .01   1558.70
    1010.0        .0    1010.0        .0        .0     151.1        .0      13.3       4.6   1558.50
       .11       .03      6.68       .00      .060      .040      .000      .000   1556.70   9965.09
   .015051      375.      430.      465.         3         8         0       .00     84.21  10049.30


FLOW DISTRIBUTION FOR SECNO=       .57          CWSEL=   1559.19

STA=    9965.   10049.
  PER Q=    100.0
   AREA=    151.1
    VEL=      6.7
  DEPTH=      1.8

*SECNO  .661

3470 ENCROACHMENT STATIONS=     9971.9   10043.2  TYPE=      1  TARGET=       71.310
        GR records removed from station  9653.4   to station     9971.9
                        in order to limit to effective area without X3 records.
      .661      2.85   1566.05   1565.80   1565.80   1566.77       .72      6.88       .01   1615.30
    1010.0        .0    1010.0        .0        .0     147.9        .0      14.9       5.4   1565.20
       .13       .00      6.83       .00      .000      .040      .000      .000   1563.20   9971.90
   .013398      465.      485.      500.         4         8         0       .00     71.30  10043.20


FLOW DISTRIBUTION FOR SECNO=       .66          CWSEL=   1566.05
```

```
 STA=    9972.   10043.
   PER Q=    100.0
    AREA=    147.9
     VEL=      6.8
   DEPTH=      2.1

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


 *SECNO  .748
 3280 CROSS SECTION       .75 EXTENDED       .03 FEET


 3470 ENCROACHMENT STATIONS=     9998.6   10084.9  TYPE=      1  TARGET=       86.311
       .748      2.73   1571.13   1570.59   1570.56   1571.47       .34      4.66       .04   1569.90
      750.0        .0     750.0        .0        .0     159.8        .0      16.6       6.3   1569.80
        .15       .00      4.69       .00      .000      .040      .000      .000   1568.40   9998.60
    .007351      365.      459.      500.         5        19         0       .00     86.30  10084.90


 *SECNO  .846
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9961.2   10064.2  TYPE=      1  TARGET=      103.000
       .846      3.01   1580.51   1580.51   1580.10   1581.16       .65      5.64       .09   1579.30
      750.0      98.3      467.2     184.5      32.0      60.8      46.2      18.3       7.4   1579.50
        .18      3.07      7.69      4.00      .060      .040      .060      .000   1577.50   9961.20
    .017724      500.      515.      550.         0         8         0       .00    103.00  10064.20


 *SECNO  .935

 3470 ENCROACHMENT STATIONS=     9943.7   10524.6  TYPE=      1  TARGET=      580.910
         Forest Rd. survey data used for GR records instead of original GR data.
         Survey Data from Burgess & Niple XSEC5 from Point 168470 to 168471
          GR records removed from station  9620.0   to station     9943.7
                        in order to limit to effective area without X3 records.
       .935      1.19   1588.09   1587.95   1588.03   1588.26       .17      7.05       .05   1639.20
      730.0        .0     730.0        .0        .0     222.0        .0      20.2       9.7   1587.80
        .21       .00      3.29       .03      .000      .040      .000      .000   1586.90  10186.38
    .013731      510.      461.      370.         5        22         0       .00    338.23  10524.61


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                                                                                  THIS RUN EXECUTED 12SEP95    09:29:11

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

  Version   4.6.2;  May 1991
 ************************************


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


 Wash 12,100 Yr Floodplai

 SUMMARY PRINTOUT TABLE  150
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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	.034	.00	.00	.00	1499.50	1110.00	1514.00	1502.80	1514.03	1.19	1.34	854.12	1019.14
	.034	.00	.00	.00	1499.50	1110.00	1515.00	1502.81	1515.02	.91	1.23	901.94	1162.38
*	.119	446.80	.00	.00	1513.90	1110.00	1518.14	1518.14	1519.43	273.44	9.16	128.61	67.13
*	.119	446.80	.00	.00	1513.90	1110.00	1517.82	1517.82	1519.46	334.58	10.28	107.94	60.68
	.200	429.50	.00	.00	1523.60	1110.00	1527.41	1526.70	1528.13	154.46	6.77	163.92	89.31
*	.200	429.50	.00	.00	1523.60	1110.00	1527.56	1526.69	1528.20	134.15	6.45	172.07	95.84
	.244	235.80	.00	.00	1528.40	1110.00	1531.28	1531.21	1532.08	180.09	7.20	154.06	82.71
	.244	235.80	.00	.00	1528.40	1110.00	1531.21	1531.21	1532.08	198.30	7.46	148.76	78.82
*	.292	252.70	.00	.00	1532.30	1060.00	1536.02	1536.02	1536.88	105.88	7.74	172.31	103.02
*	.292	252.70	.00	.00	1532.30	1060.00	1535.83	1535.83	1536.99	146.11	8.74	130.59	87.69
	.395	539.80	.00	.00	1542.20	1060.00	1544.06	1543.95	1544.49	194.43	6.78	228.30	76.02
*	.395	539.80	.00	.00	1542.20	1060.00	1544.92	1544.92	1545.86	169.71	8.38	154.36	81.37
*	.488	492.50	.00	.00	1550.50	1010.00	1552.82	1552.82	1553.45	154.83	6.54	174.79	81.17
	.488	492.50	.00	.00	1550.50	1010.00	1552.91	1552.72	1553.56	143.00	6.47	156.04	84.46
	.569	430.40	.00	.00	1556.70	1010.00	1559.19	1559.07	1559.83	141.78	6.52	164.65	84.82
	.569	430.40	.00	.00	1556.70	1010.00	1559.19	1559.05	1559.88	150.51	6.68	151.10	82.33
	.661	484.90	.00	.00	1563.20	1010.00	1565.80	1565.64	1566.28	123.59	6.12	206.22	90.85
	.661	484.90	.00	.00	1563.20	1010.00	1566.05	1565.80	1566.77	133.98	6.83	147.93	87.26
	.748	459.40	.00	.00	1568.40	750.00	1570.56	1570.28	1570.69	71.24	3.69	314.83	88.86
	.748	459.40	.00	.00	1568.40	750.00	1571.13	1570.59	1571.47	73.51	4.69	159.81	87.47
*	.846	515.40	.00	.00	1577.50	750.00	1580.10	1580.10	1580.49	163.49	6.35	178.31	58.66
*	.846	515.40	.00	.00	1577.50	750.00	1580.51	1580.51	1581.16	177.24	7.69	138.96	56.34

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	.935	461.20	.00	.00	1586.90	730.00	1588.03	1587.95	1588.23	187.50	3.62	204.97	53.31
	.935	461.20	.00	.00	1586.90	730.00	1588.09	1587.95	1588.26	137.31	3.29	222.03	62.30

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Wash 12,100 Yr Floodplai

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	.034	1110.00	1514.00	.00	.00	.00	102.98	.00
	.034	1110.00	1515.00	1.00	.00	1.00	77.88	.00
*	.119	1110.00	1518.14	.00	4.14	.00	66.52	446.80
*	.119	1110.00	1517.82	-.32	2.82	-.32	32.18	446.80
	.200	1110.00	1527.41	.00	9.27	.00	55.80	429.50
*	.200	1110.00	1527.56	.14	9.74	.14	56.64	429.50
	.244	1110.00	1531.28	.00	3.86	.00	88.33	235.80
	.244	1110.00	1531.21	-.06	3.66	-.06	86.99	235.80
*	.292	1060.00	1536.02	.00	4.74	.00	130.84	252.70
*	.292	1060.00	1535.83	-.19	4.61	-.19	63.43	252.70

	.395	1060.00	1544.06	.00	8.04	.00	205.02	539.80
*	.395	1060.00	1544.92	.87	9.10	.87	84.50	539.80
*	.488	1010.00	1552.82	.00	8.76	.00	169.25	492.50
	.488	1010.00	1552.91	.09	7.98	.09	87.82	492.50
	.569	1010.00	1559.19	.00	6.37	.00	112.00	430.40
	.569	1010.00	1559.19	.00	6.28	.00	84.21	430.40
	.661	1010.00	1565.80	.00	6.61	.00	178.14	484.90
	.661	1010.00	1566.05	.25	6.86	.25	71.30	484.90
	.748	750.00	1570.56	.00	4.76	.00	442.72	459.40
	.748	750.00	1571.13	.57	5.08	.57	86.30	459.40
*	.846	750.00	1580.10	.00	9.55	.00	266.13	515.40
*	.846	750.00	1580.51	.40	9.38	.40	103.00	515.40
	.935	730.00	1588.03	.00	7.92	.00	372.47	461.20
	.935	730.00	1588.09	.06	7.59	.06	338.23	461.20

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SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= .119 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= .119 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= .119 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= .119 PROFILE= 2 MINIMUM SPECIFIC ENERGY

WARNING SECNO= .200 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= .292 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= .292 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= .292 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= .292 PROFILE= 2 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= .395 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= .395 PROFILE= 2 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= .488 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= .488 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= .846 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= .846 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= .846 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= .846 PROFILE= 2 MINIMUM SPECIFIC ENERGY

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FLOODWAY DATA, Wash 12,100 Yr Floodplai
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
.034	78.	902.	1.2	1515.0	1514.0	1.0
.119	32.	108.	10.3	1517.8	1518.1	-.3
.200	57.	172.	6.5	1527.5	1527.4	.1
.244	87.	149.	7.5	1531.2	1531.3	-.1

.292	63.	131.	8.1	1535.8	1536.0	-.2
.395	89.	154.	6.9	1545.0	1544.1	.9
.488	88.	156.	6.5	1552.9	1552.8	.1
.569	84.	151.	6.7	1559.2	1559.2	.0
.661	71.	148.	6.8	1566.1	1565.8	.3
.748	86.	160.	4.7	1571.2	1570.6	.6
.846	103.	139.	5.4	1580.5	1580.1	.4
.935	338.	222.	3.3	1588.1	1588.0	.1

WASH 12
HEC-2 ANALYSIS
Zone A Analysis
Between Cross Sections 0.748 and 0.207

W12-ZA.OH2

Wash 12, Zone A analysis between cross sections 0.748 and 0.207

The presence of the ridge along Wash 12 was removed from the GR data and the cross sections were extended to a point which could contain flow. The left boundary of Zone A is set either by the SSTA or if the SSTA is located on the opposite side of the parallel wash (opposite the previous Zone A boundary location) then the WSEL is extended out perpendicular to Wash 12 to the same WSEL on the other side of the parallel wash. This is to avoid the floodplain crossing the thalweg of the parallel wash.

```
1*****************************************
 *  HEC-2 WATER SURFACE PROFILES          *
 *                                        *
 *  Version   4.6.2;  May 1991            *
 *                                        *
 *  RUN DATE    19SEP95    TIME   12:35:45 *
 *****************************************
```

```
*************************************
*  U.S. ARMY CORPS OF ENGINEERS     *
*  HYDROLOGIC ENGINEERING CENTER    *
*  609 SECOND STREET, SUITE D       *
*  DAVIS, CALIFORNIA 95616-4687     *
*          (916) 756-1104           *
*************************************
```

```
X     X  XXXXXXX   XXXXX             XXXXX
X     X  X        X     X           X     X
X     X  X        X                       X
XXXXXXX  XXXX     X         XXXXX    XXXXX
X     X  X        X                 X
X     X  X        X     X           X
X     X  XXXXXXX   XXXXX            XXXXXXX
```

1

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THIS RUN EXECUTED 19SEP95 12:35:45

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

 Version   4.6.2;  May 1991
*************************************
```

```
T1   *  Rio Verde South FIS, Wash 12                    File:W12-ZA.IH2
T2   *  For: FCDMC #       93-07     By:MKE, Ltd       FB & CLJ 4-24-95
T3   *  Wash 12, 100-Yr Floodplain                     Revised:  8-8-95
T4   *  GR data taken from stereo model; received on 4-21-95 from AMC
T5   *  200 scale 2 ft CI mapping flown by AMC on 12-22-93
T6   *  with survey control by Burgess & Niple on 10-21-93;11-9-93;12-9-93
T7   *  supplemental cross section data (GR & BT) surveyed by ALS as noted.
T8   *  Source of 100-Yr flowrate from HEC-1 Analysis by GVSCE. Table F-3
T9   *  Subcritical analysis.
T9   *
T9   *  Zone A analysis for Wash 12 between cross-sections 0.661 and 0.207
T9   *  Some XSections modified to remove ridge and extended per topo map.
T9   *  This analysis used to delineate the left station of the Zone A.

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0         2         0         0         0         0         0         0      1514         0

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      1         0        -1         0         0         0        -1         0         0         0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     38        43        42         1         2        25         4        13        14        15
     55        26        56         0        38        43        42        39        33         3
      5        26        57         8        17        34        11       101
    105

     HEC-1 Concentration Point C523      At confluence with Verde River

QT       2       1110       1110
```

START Hydraulically Similar Reach 12A

NC	.065	.065	.055	0.1	0.3

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AMC cross-section modified by removing vertical wall STA 9942.4

X1	0.034	12	9970.9	10048.3	0.0	0.0	0.0			
GR	1516.2	9942.4	1515.8	9970.9	1506.7	9976.8	1499.9	9985.8	1499.5	9994.7
GR	1499.5	10000.0	1499.5	10000.0	1499.6	10016.3	1511.6	10048.3	1514.4	10079.5
GR	1514.6	10111.8	1514.6	10111.8						
X1	0.119	30	9959.2	10026.2	450.0	450.0	446.8			
GR	1523.5	9912.2	1523.5	9912.2	1523.1	9924.7	1522.8	9946.8	1523.5	9959.2
GR	1522.8	9970.4	1520.9	9976.5	1517.9	9978.8	1517.9	9982.5	1513.9	9984.1
GR	1514.1	9995.2	1514.1	10000.0	1514.1	10009.1	1515.8	10011.8	1519.2	10016.7
GR	1519.7	10022.4	1519.7	10026.2	1518.3	10029.3	1518.4	10038.9	1517.9	10047.4
GR	1517.6	10062.3	1518.6	10082.4	1518.5	10095.5	1522.8	10106.2	1523.4	10125.1
GR	1523.2	10152.1	1523.1	10167.3	1522.9	10176.2	1524.1	10184.6	1524.1	10184.6
X1	0.207	24	9913.4	10016.9	600.0	400.0	467.0			
GR	1531.9	9869.6	1525.9	9878.2	1526.0	9889.3	1527.2	9900.3	1528.1	9913.4
GR	1525.7	9929.0	1525.4	9942.0	1524.5	9953.7	1524.0	9972.3	1524.0	9986.5
GR	1524.0	9999.0	1524.0	10000.0	1524.1	10009.9	1529.9	10016.9	1529.9	10032.1
GR	1529.6	10049.5	1528.9	10069.5	1527.4	10078.2	1528.5	10090.8	1528.2	10112.4
GR	1527.7	10128.1	1528.2	10159.4	1527.7	10183.9	1527.7	10183.9	0.0	0.0

START Hydraulically Similar Reach 12B
1000 ft upstream of confluence with Verde River

NC	0.06	0.06	0.040	0.1	0.3					
X1	0.244	13	9948.8	10042.7	110.0	200.0	198.2			
GR	1532.4	9913.0	1532.1	9934.4	1531.4	9948.8	1529.7	9962.3	1528.4	9977.2
GR	1529.4	9988.5	1528.9	10000.0	1528.9	10000.0	1528.8	10014.2	1530.5	10027.2
GR	1531.6	10042.7	1531.7	10055.7	1531.7	10055.7	0.0	0.0	0.0	0.0

HEC-1 Concentration Point C576

QT	2	1060	1060							
X1	0.292	16	9973.7	10030.2	265.0	275.0	252.7			
GR	1537.0	9796.6	1536.7	9829.9	1536.2	9873.8	1535.5	9917.8	1535.5	9917.8
GR	1535.3	9952.5	1535.2	9973.7	1533.6	9980.7	1532.4	9989.2	1532.3	10000.0
GR	1532.3	10010.6	1536.8	10017.4	1537.3	10030.2	1537.3	10054.6	1537.8	10081.8
GR	1537.8	10089.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Stations: 9790 are extensions

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Stations: 9790 are extensions

X1	0.395	27	9970.9	10017.4	540.0	540.0	539.8			
X3						10017.4	1546.2			
GR	1546	9790	1544.8	9859.4	1544.9	9885.5	1543.9	9894.5	1544.8	9904.7
GR	1544.5	9920.8	1544.1	9927.2	1544.1	9927.2	1544.3	9945.6	1543.8	9960.3
GR	1543.9	9970.9	1542.4	9979.7	1542.2	9984.7	1542.2	9997.5	1542.4	10000.0
GR	1542.5	10011.4	1546.2	10017.4	1542.6	10023.4	1543.1	10034.3	1542.5	10045.5
GR	1542.7	10062.6	1542.6	10082.1	1543.0	10102.0	1543.1	10117.6	1543.2	10143.5
GR	1543.4	10161.5	1543.4	10161.5	0.0	0.0	0.0	0.0	0.0	0.0

HEC-1 Concentration Point C520

```
QT        2       1010       1010

      START Hydraulically Similar Reach 12C
       2000 ft upstream of confluence with Verde River

NC     0.06       0.06      0.040        0.1        0.3

X1    0.488         20     9931.3    10019.1      475.0      500.0      492.5
GR   1553.4     9834.3     1553.1     9859.9     1552.9     9887.2     1552.3     9915.2     1552.3     9931.3
GR   1551.2     9943.4     1550.6     9952.7     1550.5     9962.3     1551.0     9976.3     1550.8     9992.2
GR   1550.5     9997.6     1550.5    10000.0     1550.5    10002.2     1552.1    10008.0     1552.6    10019.1
GR   1552.4    10035.5     1552.6    10055.6     1553.7    10079.8     1553.7    10102.6     1553.7    10110.4

            Stations:     9965.1, 9971.0,  9978.0 altered to remove ridge.
            Stations:       9500    9710    9785    9900    9920 are extensions


            Stations:     9965.1, 9971.0,  9978.0 altered to remove ridge.
            Stations:       9500    9710    9785    9900    9920 are extensions
X1    0.569         25     9965.1    10049.3      375.0      465.0      430.4
GR     1558       9500       1556       9710       1555       9785       1556       9900       1556       9920
GR   1555.7     9935.5     1555.4     9946.9     1556.3     9956.0     1556.5     9965.1     1556.7     9971.0
GR   1556.9     9978.0     1557.0     9984.4     1556.8     9992.2     1556.8    10000.0     1556.8    10014.4
GR   1556.7    10021.8     1557.9    10033.2     1558.5    10049.3     1558.6    10065.4     1559.6    10085.0
GR   1559.0    10101.4     1559.2    10127.8     1560.5    10141.0     1560.5    10174.4     1561.0    10181.1

            Stations:     9963.6, 9971.9, 9976.9  altered to remove ridge.
            Stations:       9490    9510    9532    9570    9600 are extensions


            Stations:     9963.6, 9971.9, 9976.9  altered to remove ridge.
            Stations:       9490    9510    9532    9570    9600 are extensions
X1    0.661         55     9971.9    10043.2      465.0      500.0      484.9
GR     1564       9490     1564.3       9510       1564       9532     1562.7       9570     1563.6       9600
GR   1564.2     9653.4     1563.6     9664.4     1563.7     9685.7     1563.4     9710.7     1563.5     9730.2
GR   1563.8     9746.3     1563.4     9765.4     1563.3     9774.6     1563.6     9785.7     1562.7     9796.1
GR   1563.6     9805.4     1563.6     9810.2     1562.7     9817.7     1562.8     9823.4     1563.7     9833.2
GR   1563.5     9840.7     1563.4     9849.3     1563.3     9853.8     1563.1     9871.2     1562.4     9884.5
GR   1562.6     9891.4     1562.4     9897.7     1563.1     9906.2     1563.4     9917.4     1563.8     9929.0
GR   1563.7     9941.5     1563.7     9954.9     1563.6     9963.6     1563.5     9971.9     1563.4     9976.9
1
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GR   1563.4     9981.6     1563.3     9992.9     1563.3    10000.0     1563.2    10012.8     1564.1    10020.1
GR   1564.9    10032.7     1565.2    10043.2     1564.9    10055.1     1564.4    10064.7     1563.6    10068.2
GR   1563.4    10070.0     1563.8    10072.7     1564.5    10078.3     1564.9    10078.8     1565.2    10089.7
GR   1565.5    10102.6     1565.2    10118.0     1565.5    10133.3     1565.8    10150.2     1566.1    10156.3

      HEC-1 Concentration Point C512
       3000 ft upstream of confluence with Verde River


QT        2        750        750

X1    0.748         43     9998.6    10084.9      365.0      500.0      459.4
GR   1572.1     9642.4     1570.9     9685.1     1570.9     9699.5     1571.1     9729.7     1570.2     9757.8
GR   1570.2     9774.8     1570.5     9801.0     1570.2     9814.2     1569.4     9819.7     1571.1     9827.0
GR   1570.7     9836.9     1570.2     9854.1     1569.8     9869.3     1569.2     9877.5     1568.9     9882.0
GR   1569.6     9886.2     1569.9     9892.8     1569.9     9908.8     1570.1     9940.1     1570.0     9969.9
GR   1570.0     9985.1     1569.9     9998.6     1569.6    10000.0     1568.9    10006.2     1569.0    10009.0
GR   1569.9    10011.9     1569.9    10029.1     1569.4    10037.1     1568.5    10042.8     1568.4    10052.3
GR   1568.5    10065.5     1569.7    10069.0     1569.8    10084.9     1569.5    10103.9     1569.6    10132.1
GR   1569.8    10157.5     1570.0    10175.5     1571.1    10195.5     1570.4    10215.0     1570.6    10235.5
GR   1571.0    10258.6     1571.0    10274.9     1571.1    10290.9        0.0        0.0        0.0        0.0
```

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X1    0.846        42     9997.2    10027.7       500.0       550.0       515.4

GR   1581.4    9784.3    1581.6     9813.8    1581.7      9844.0    1580.4     9884.2    1579.9     9903.8
GR   1579.8    9930.7    1579.5     9937.9    1579.4      9946.6    1579.5     9952.9    1579.9     9961.2
GR   1579.6    9981.1    1579.3     9997.2    1577.6     10000.0    1577.7    10007.5    1577.7    10012.0
GR   1579.1   10014.3    1579.5    10027.7    1579.1     10038.1    1578.4    10047.5    1579.4    10051.3
GR   1579.9   10064.2    1579.7    10079.0    1579.9     10093.4    1580.3    10110.3    1580.2    10121.9
GR   1577.5   10123.7    1577.6    10130.5    1577.6     10139.1    1580.1    10142.5    1580.1    10156.6
GR   1580.0   10170.0    1580.3    10194.3    1581.0     10210.9    1580.8    10221.3    1580.0    10229.0
GR   1580.0   10230.3    1581.0    10241.8    1581.1     10254.5    1581.1    10266.2    1581.6    10273.9
GR   1581.8   10293.9    1581.8    10295.9       0.0         0.0       0.0        0.0       0.0        0.0

      Survey data along Forest Rd used, replacing photogrammetric data.
      This data better reflects the topography of the road across
      the wash.

     Flow value at Forest Road, interpolated between C512 and C511


QT       2       730       730

        Forest Rd. survey data used for GR records instead of original GR data.
        Survey Data from Burgess & Niple XSEC5 from Point 168470 to 168471
X1    0.935        20     9943.7    10524.6         510         370       461.2
X3                                   9943.7      1589.2
GR   1587.1    9620.0    1587.5     9691.9    1588.1      9792.1    1588.5     9892.4    1589.2     9943.7
GR   1589.2    9992.2    1589.1    10000.0    1588.7     10038.7    1588.4    10092.3    1588.7    10144.1
GR   1588.0   10192.7    1587.3    10240.7    1587.2     10280.3    1587.3    10292.4    1587.8    10347.8
GR   1587.5   10392.7    1586.9    10439.2    1587.4     10492.4    1587.8    10524.6    1588.2    10592.7

1
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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

*PROF 1

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

CCHV=     .100 CEHV=     .300
*SECNO  .034
       AMC cross-section modified by removing vertical wall STA  9942.4
      .034     14.50   1514.00   1502.80   1514.00   1514.03       .03       .00       .00   1515.80
    1110.0        .0    1101.0       9.0        .0     822.0      32.1        .0        .0   1511.60
       .00       .00      1.34       .28      .000      .055      .065      .000   1499.50   9972.07
   .000119        0.        0.        0.         0        16         0       .00    102.98  10075.04


*SECNO  .119

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
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      .119      4.24   1518.14   1518.14       .00   1519.43      1.28       .19       .38   1523.50
    1110.0        .0    1092.9      17.1        .0     119.3       9.3       5.0        .9   1519.70
       .01       .00      9.16      1.83       .000      .055      .065      .000   1513.90   9978.61
   .027344       450.      447.       450.         0        17         0       .00     66.52  10073.22


*SECNO  .207

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


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

      .207      2.98   1526.98   1526.27       .00   1527.36       .38      7.84       .09   1528.10
    1110.0      36.3    1073.7        .0      16.7     215.2        .0       7.0       1.9   1529.90
       .04      2.17      4.99       .00       .065      .055      .000      .000   1524.00   9876.65
   .011279       600.      467.       400.         6        11         0       .00     114.37  10013.38


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


CCHV=     .100 CEHV=     .300
*SECNO  .244
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      .244      2.81   1531.21   1531.21       .00   1532.08       .87      2.90       .15   1531.40
    1110.0        .0    1110.0        .0        .0     148.3        .0       7.8       2.3   1531.60
       .05       .00      7.49       .00       .000      .040      .000      .000   1528.40   9950.32
   .020015       110.      198.       200.         0        11         0       .00     86.87  10037.19


*SECNO  .292
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      .292      3.70   1536.00   1536.00       .00   1536.88       .88      3.66       .00   1535.20
    1060.0      80.1     979.9        .0      44.6     125.7        .0       8.8       2.9   1537.30
       .06      1.80      7.79       .00       .060      .040      .000      .000   1532.30   9886.32
   .010815       265.      253.       275.         0        11         0       .00     129.87  10016.19


*SECNO  .395
3280 CROSS SECTION       .40 EXTENDED      1.80 FEET

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=         .0   10017.4  TYPE=      1  TARGET=    10017.400
           Stations:        9790 are extensions
      .395      3.00   1545.20   1545.20       .00   1545.86       .66      5.89       .02   1543.90
    1060.0     224.2     835.8        .0      94.2     115.6        .0      11.1       4.8   1546.20
       .08      2.38      7.23       .00       .060      .040      .000      .000   1542.20   9836.12
   .011026       540.      540.       540.         0        15         0       .00     179.67  10015.78


CCHV=     .100 CEHV=     .300
*SECNO  .488
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      .488      2.32   1552.82   1552.82       .00   1553.45       .64      6.34       .00   1552.30
    1010.0      24.2     968.9      16.8       14.5     148.2      12.0      13.3       6.8   1552.60
```

.10	1.67	6.54	1.40	.060	.040	.060	.000	1550.50	9891.13
.015496	475.	493.	500.	0	15	0	.00	169.23	10060.35

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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 .569

3301 HV CHANGED MORE THAN HVINS

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

Stations: 9965.1, 9971.0, 9978.0 altered to remove ridge.
Stations: 9500 9710 9785 9900 9920 are extensions

.569	2.06	1557.06	1556.39	.00	1557.14	.08	3.63	.06	1556.50
1010.0	992.5	17.5	.0	430.5	15.3	.0	16.1	9.5	1558.50
.15	2.31	1.15	.00	.060	.040	.000	.000	1555.00	9598.44
.005895	375.	430.	465.	5	14	0	.00	426.81	10025.24

*SECNO .661

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

Stations: 9963.6, 9971.9, 9976.9 altered to remove ridge.
Stations: 9490 9510 9532 9570 9600 are extensions

.661	1.53	1563.93	1563.93	.00	1564.19	.26	5.77	.05	1563.50
1010.0	868.1	137.2	4.6	221.7	26.7	2.0	19.8	14.3	1565.20
.18	3.92	5.15	2.36	.060	.040	.060	.000	1562.40	9534.12
.040697	465.	485.	500.	0	14	0	.00	462.29	10073.72

*SECNO .748

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.80

.748	2.16	1570.56	1570.29	.00	1570.69	.13	6.49	.01	1569.90
750.0	186.8	406.1	157.1	122.1	111.2	84.8	22.5	18.4	1569.80
.23	1.53	3.65	1.85	.060	.040	.060	.000	1568.40	9746.36
.006938	365.	459.	500.	8	11	0	.00	444.35	10232.06

1

19SEP95 12:35:45 PAGE 9

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 .846

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY

```
3720 CRITICAL DEPTH ASSUMED
      .846      2.60   1580.10   1580.10       .00   1580.49       .39      5.35       .08   1579.30
     750.0      80.6      308.6     360.9      41.5      48.5      88.0      25.4      22.6   1579.50
       .26      1.94       6.36      4.10      .060      .040      .060      .000   1577.50   9895.86
   .016405      500.       515.      550.         0         8         0       .00    265.90  10231.48


*SECNO  .935

3470 ENCROACHMENT STATIONS=     9943.7   10592.7  TYPE=      1  TARGET=    -9943.700
 ELENCL=   1589.20  ELENCR= 100000.00
        Forest Rd. survey data used for GR records instead of original GR data.
        Survey Data from Burgess & Niple XSEC5 from Point 168470 to 168471
      .935      1.13   1588.03   1587.95       .00   1588.23       .20      7.72       .02   1589.20
     730.0         .0      726.5       3.5         .0      200.8       4.4      27.4      25.9   1587.80
       .29       .00       3.62       .80      .000      .040      .060      .000   1586.90  10190.76
   .018676      510.       461.      370.         5        18         0       .00    372.65  10563.41


1
   19SEP95      12:35:45                                                                          PAGE   10



                                                                                THIS RUN EXECUTED 19SEP95    12:35:46

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

 Version   4.6.2;  May 1991
************************************


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


Wash 12, 100-Yr Floodpla

SUMMARY PRINTOUT

      SECNO        Q       ELMIN     CWSEL     CRIWS      AREA     TOPWID     QLOB       QCH       QROB      VLOB      VCH       VROB
        .034  1110.00   1499.50   1514.00   1502.80    854.12     102.98      .00   1101.00      9.00       .00      1.34      .28
*       .119  1110.00   1513.90   1518.14   1518.14    128.61      66.52      .00   1092.94     17.06       .00      9.16     1.83
*       .207  1110.00   1524.00   1526.98   1526.27    231.96     114.37    36.27   1073.72       .00      2.17      4.99      .00
*       .244  1110.00   1528.40   1531.21   1531.21    148.26      86.87      .00   1110.00       .00       .00      7.49      .00
*       .292  1060.00   1532.30   1536.00   1536.00    170.35     129.87    80.14    979.86       .00      1.80      7.79      .00
*       .395  1060.00   1542.20   1545.20   1545.20    209.78     179.67   224.25    835.75       .00      2.38      7.23      .00
*       .488  1010.00   1550.50   1552.82   1552.82    174.73     169.23    24.23    968.93     16.85      1.67      6.54     1.40
*       .569  1010.00   1555.00   1557.06   1556.39    445.81     426.81   992.45     17.55       .00      2.31      1.15      .00
*       .661  1010.00   1562.40   1563.93   1563.93    250.32     462.29   868.15    137.25      4.60      3.92      5.15     2.36
*       .748   750.00   1568.40   1570.56   1570.29    318.13     444.35   186.84    406.07    157.09      1.53      3.65     1.85
*       .846   750.00   1577.50   1580.10   1580.10    177.98     265.90    80.55    308.56    360.88      1.94      6.36     4.10
        .935   730.00   1586.90   1588.03   1587.95    205.24     372.65      .00    726.48      3.52       .00      3.62      .80


1
   19SEP95      12:35:45                                                                          PAGE   11
```

Wash 12, 100-Yr Floodpla

SUMMARY PRINTOUT

	SECNO	Q	ELMIN	XLCH	K*CHSL	EG	10*KS	VCH	ALPHA	DEPTH	K*XNCH	.01K	HL
	.034	1110.00	1499.50	.00	.00	1514.03	1.19	1.34	1.05	14.50	55.00	1019.14	.00
*	.119	1110.00	1513.90	446.80	32.23	1519.43	273.44	9.16	1.11	4.24	55.00	67.13	.19
*	.207	1110.00	1524.00	467.00	21.63	1527.36	112.79	4.99	1.06	2.98	55.00	104.52	7.84
*	.244	1110.00	1528.40	198.20	22.20	1532.08	200.15	7.49	1.00	2.81	40.00	78.46	2.90
*	.292	1060.00	1532.30	252.70	15.43	1536.88	108.15	7.79	1.46	3.70	40.00	101.93	3.66
*	.395	1060.00	1542.20	539.80	18.34	1545.86	110.26	7.23	1.66	3.00	40.00	100.95	5.89
*	.488	1010.00	1550.50	492.50	16.85	1553.45	154.96	6.54	1.23	2.32	40.00	81.14	6.34
*	.569	1010.00	1555.00	430.40	10.46	1557.14	58.95	1.15	1.02	2.06	40.00	131.54	3.63
*	.661	1010.00	1562.40	484.90	15.26	1564.19	406.97	5.15	1.03	1.53	40.00	50.07	5.77
*	.748	750.00	1568.40	459.40	13.06	1570.69	69.38	3.65	1.53	2.16	40.00	90.04	6.49
*	.846	750.00	1577.50	515.40	17.66	1580.49	164.05	6.36	1.42	2.60	40.00	58.56	5.35
	.935	730.00	1586.90	461.20	20.38	1588.23	186.76	3.62	1.03	1.13	40.00	53.42	7.72

1
19SEP95 12:35:45 PAGE 12

Wash 12, 100-Yr Floodpla

SUMMARY PRINTOUT TABLE 101

SECNO	EGOC	ELLC	EGIC	ELTRD	QCULV	QWEIR	CLASS	H4	DEPTH	CWSEL	VCH	EG

1
19SEP95 12:35:45 PAGE 13

Wash 12, 100-Yr Floodpla

SUMMARY PRINTOUT TABLE 105

SECNO	CWSEL	HL	OLOSS	TOPWID	QLOB	QCH	QROB

1
19SEP95 12:35:45 PAGE 14

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= .119 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= .119 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= .207 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= .244 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= .244 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= .292 PROFILE= 1 CRITICAL DEPTH ASSUMED

```
CAUTION SECNO=      .292  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=      .395  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      .395  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=      .488  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      .488  PROFILE=  1  MINIMUM SPECIFIC ENERGY

WARNING SECNO=      .569  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

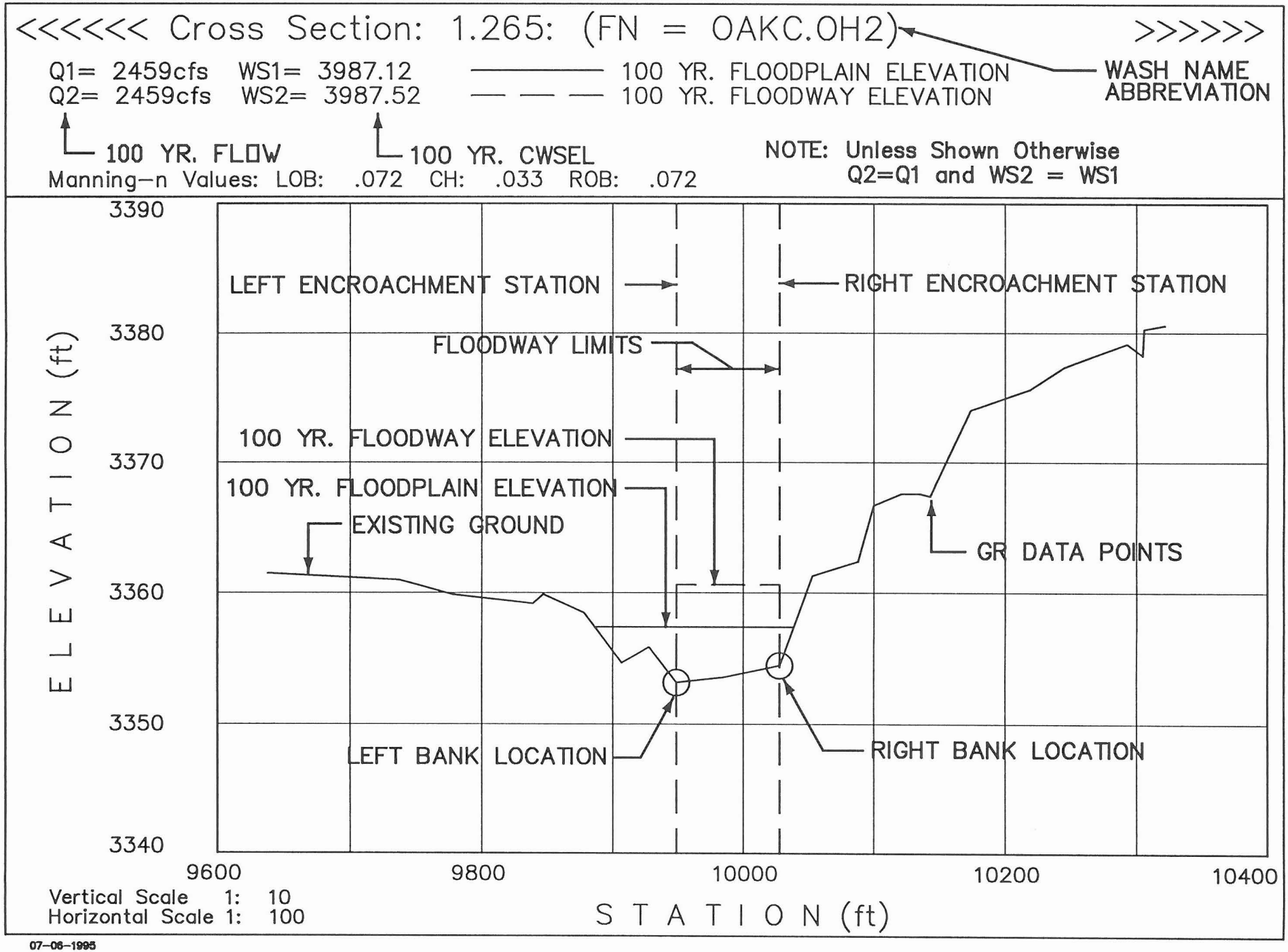
CAUTION SECNO=      .661  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      .661  PROFILE=  1  MINIMUM SPECIFIC ENERGY

WARNING SECNO=      .748  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=      .846  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      .846  PROFILE=  1  MINIMUM SPECIFIC ENERGY
```

CROSS SECTIONS

CROSS SECTION LEGEND

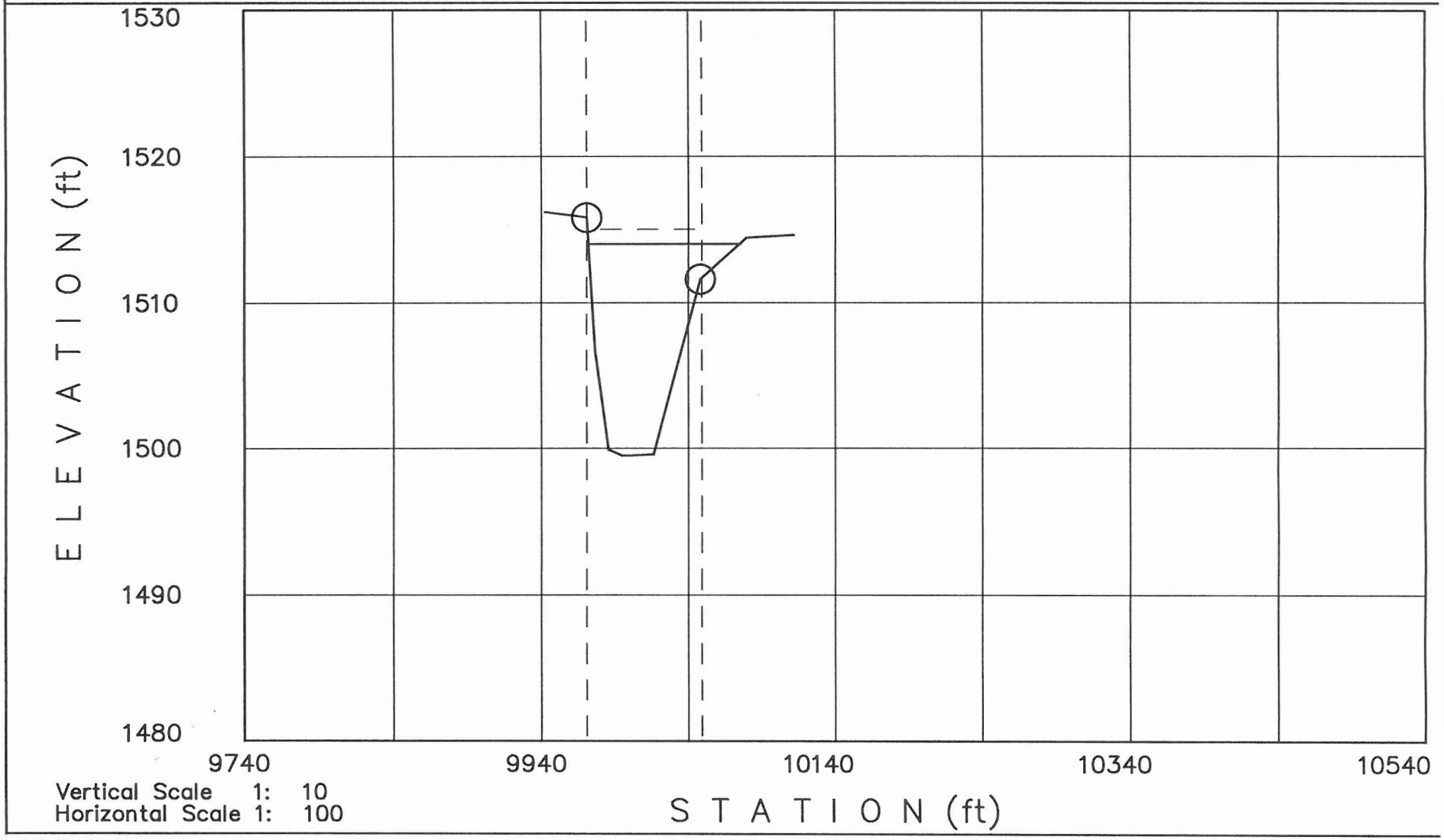


07-06-1995

<<<<<< Cross Section: .034: (FN = W12FW1.0H2) >>>>>>

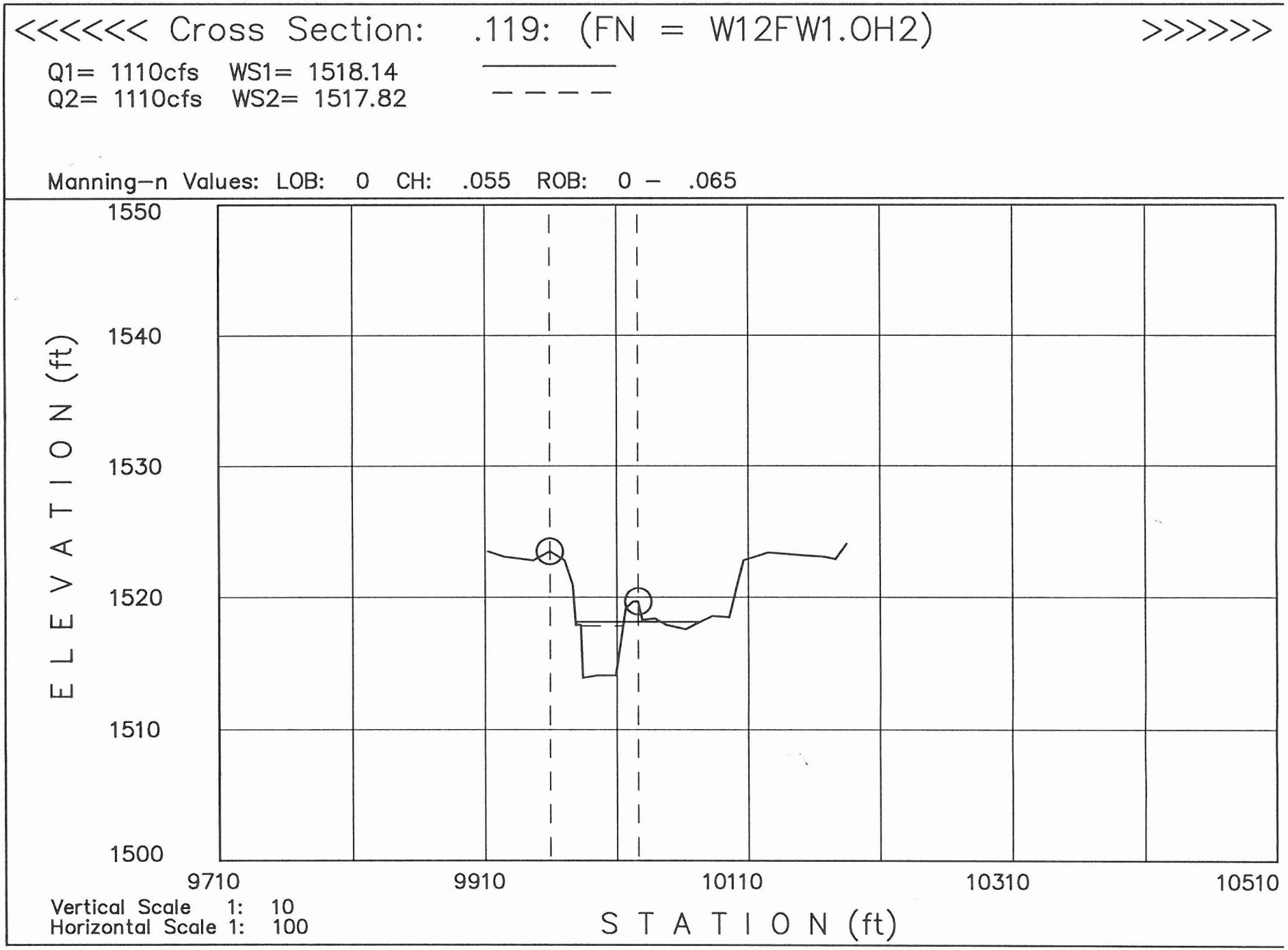
Q1= 1110cfs WS1= 1514
Q2= 1110cfs WS2= 1515

Manning-n Values: LOB: 0 CH: .055 ROB: .065



Vertical Scale 1: 10
Horizontal Scale 1: 100

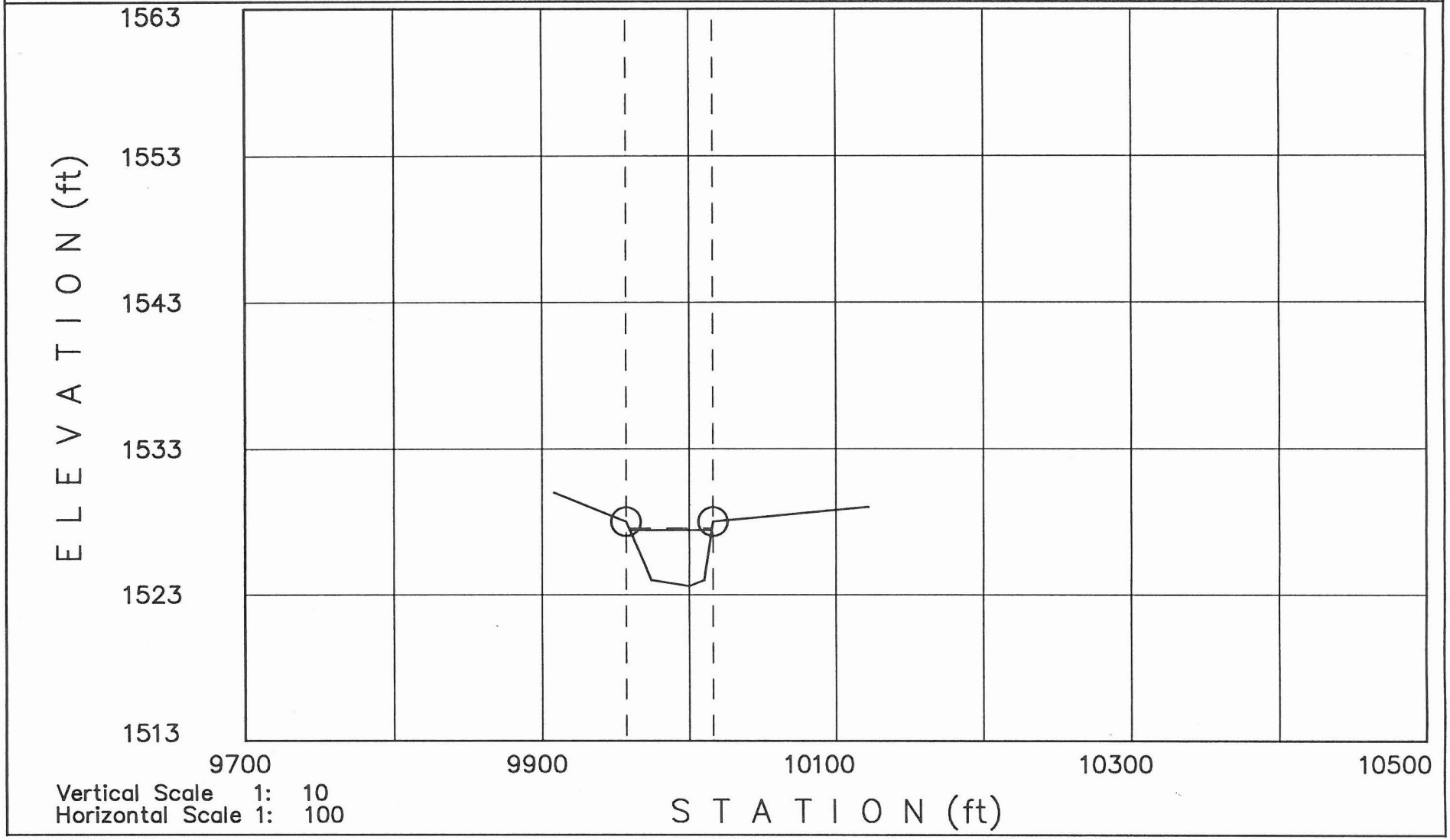
09-07-1995


<<<<<< Cross Section: .119: (FN = W12FW1.0H2) >>>>>>
Q1= 1110cfs WS1= 1518.14
Q2= 1110cfs WS2= 1517.82
Manning-n Values: LOB: 0 CH: .055 ROB: 0 - .065
1550
1540
1530
1520
1510
1500
ELEVATION (ft)
9710
9910
10110
10310
10510
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
09-07-1995

<<<<<< Cross Section: .2: (FN = W12FW1.0H2) >>>>>>

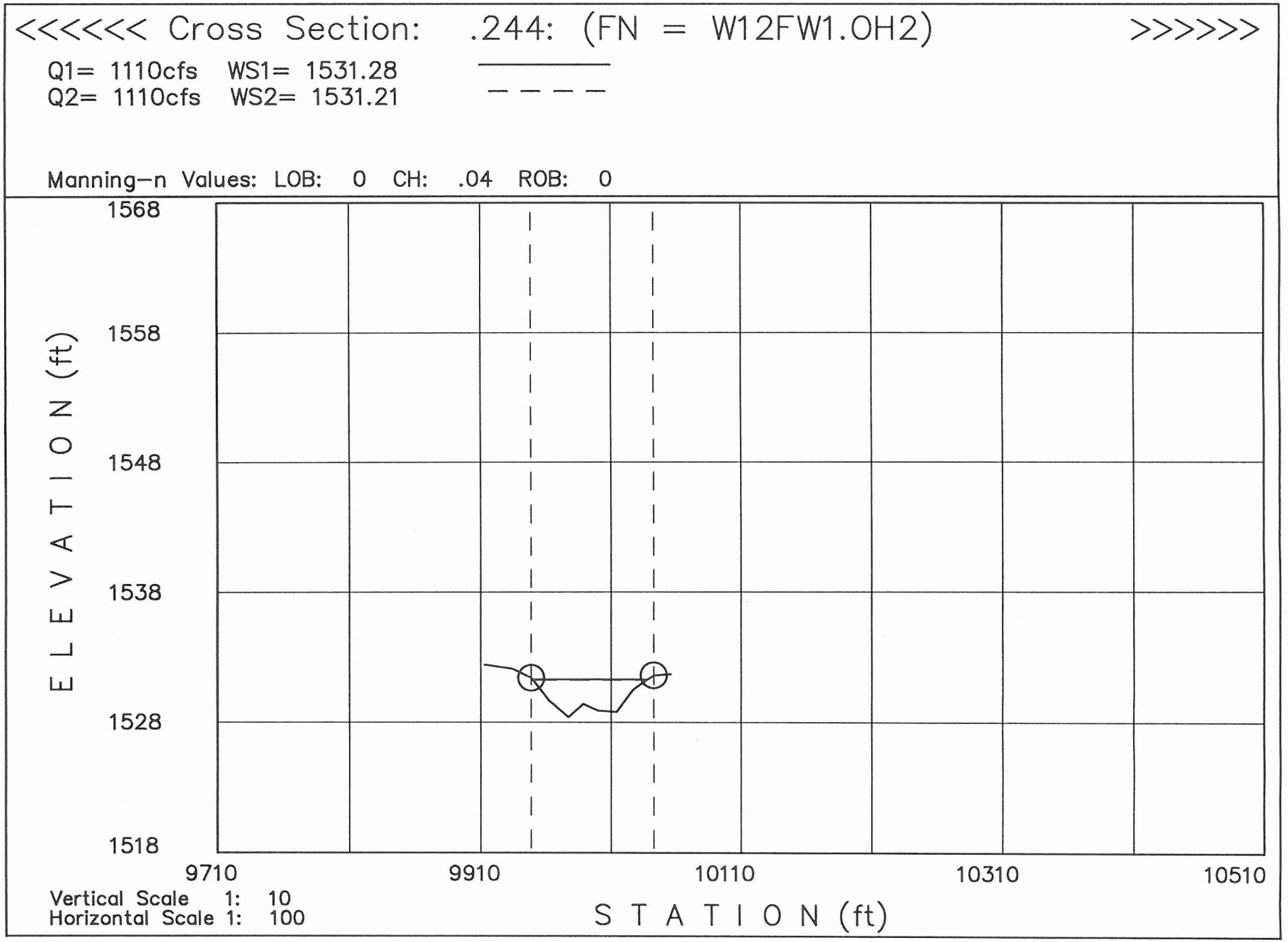
Q1= 1110cfs WS1= 1527.41
Q2= 1110cfs WS2= 1527.56

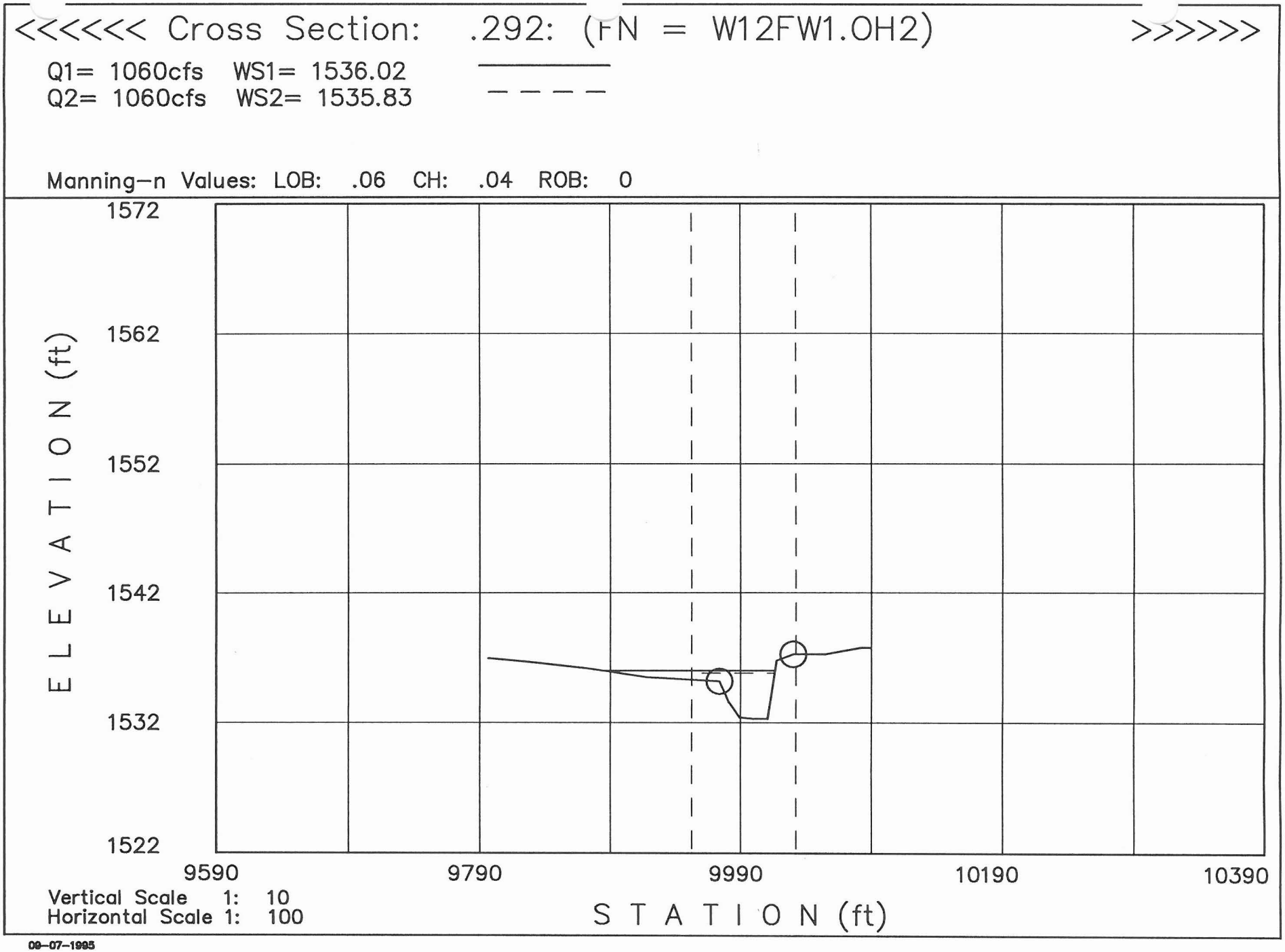
Manning-n Values: LOB: 0 CH: .055 ROB: 0



Vertical Scale 1: 10
Horizontal Scale 1: 100

09-07-1995

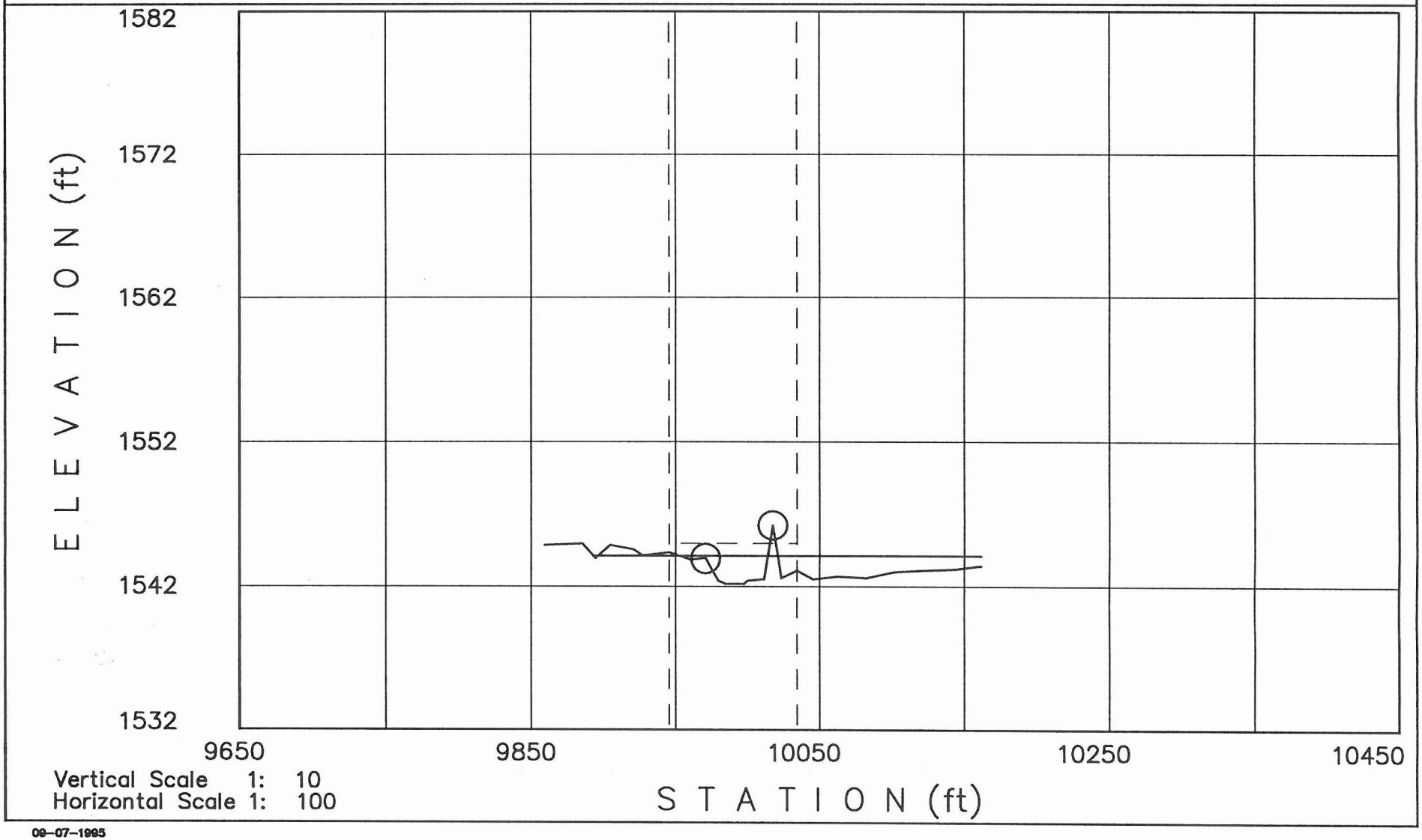

<<<<<< Cross Section: .244: (FN = W12FW1.0H2) >>>>>>
Q1= 1110cfs WS1= 1531.28
Q2= 1110cfs WS2= 1531.21
Manning-n Values: LOB: 0 CH: .04 ROB: 0
1568
1558
1548
1538
1528
1518
ELEVATION (ft)
9710
9910
10110
10310
10510
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
09-07-1995


<<<<<< Cross Section: .292: (FN = W12FW1.0H2) >>>>>>
Q1= 1060cfs WS1= 1536.02
Q2= 1060cfs WS2= 1535.83
Manning-n Values: LOB: .06 CH: .04 ROB: 0
1572
1562
1552
1542
1532
1522
ELEVATION (ft)
9590
9790
9990
10190
10390
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
09-07-1995

<<<<<< Cross Section: .395: (FN = W12FW1.0H2) >>>>>>

Q1= 1060cfs WS1= 1544.06
Q2= 1060cfs WS2= 1544.92

Manning-n Values: LOB: .06 CH: .04 ROB: .06



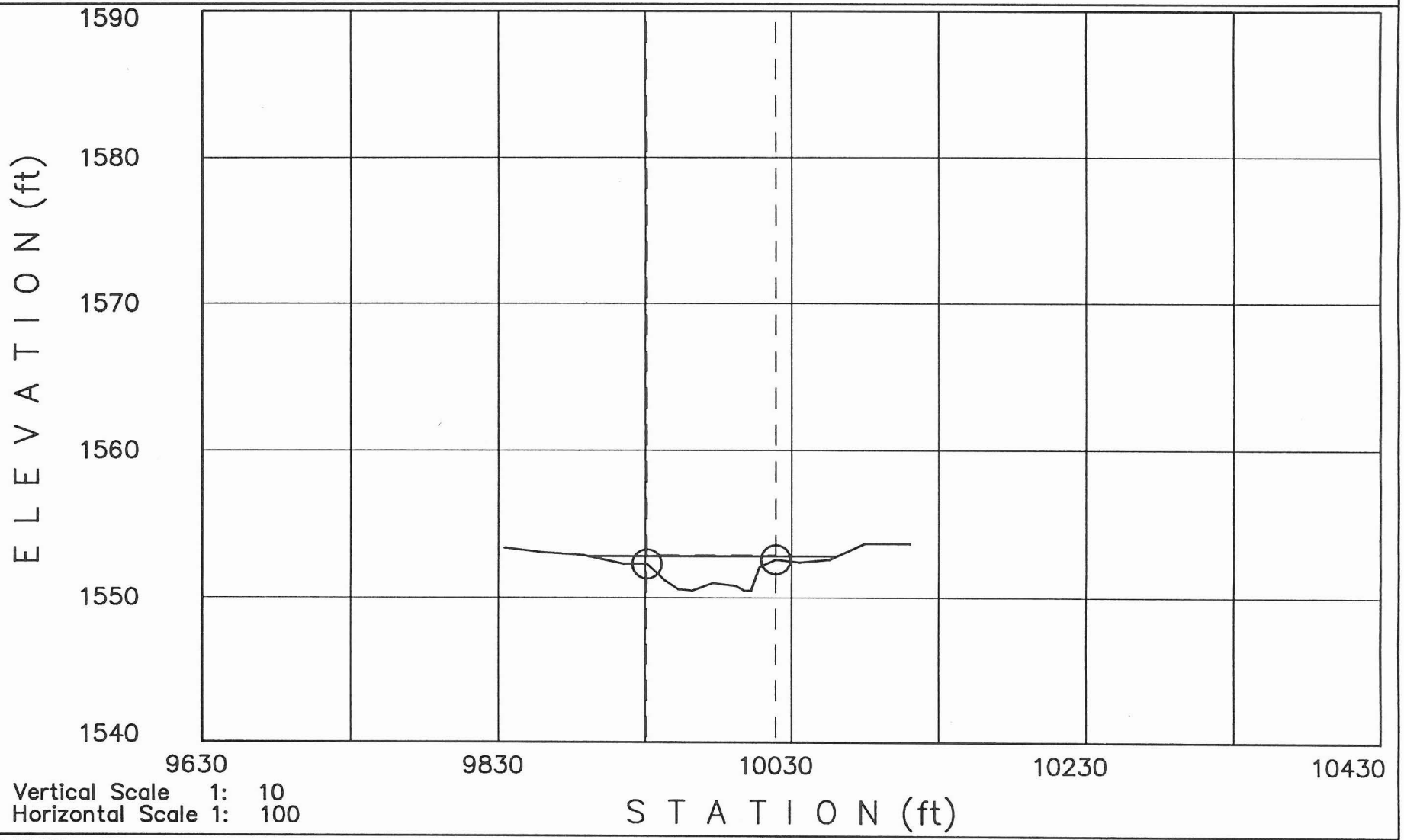
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-07-1995

<<<<<< Cross Section: .488: (FN = W12FW1.0H2) >>>>>>

Q1= 1010cfs WS1= 1552.82
Q2= 1010cfs WS2= 1552.91

Manning-n Values: LOB: 0 - .06 CH: .04 ROB: .06



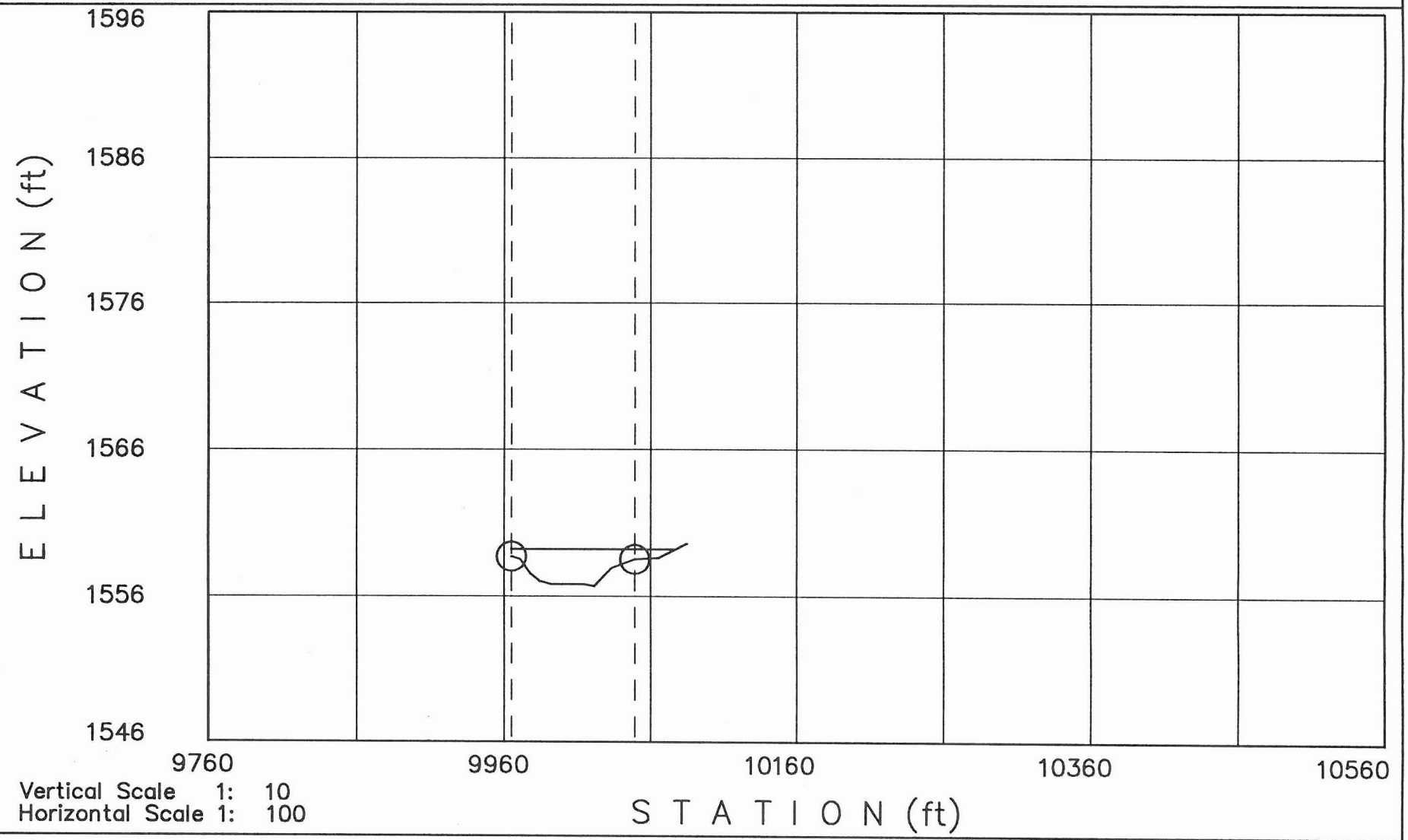
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-07-1995

<<<<<< Cross Section: .569: (FN = W12FW1.0H2) >>>>>>

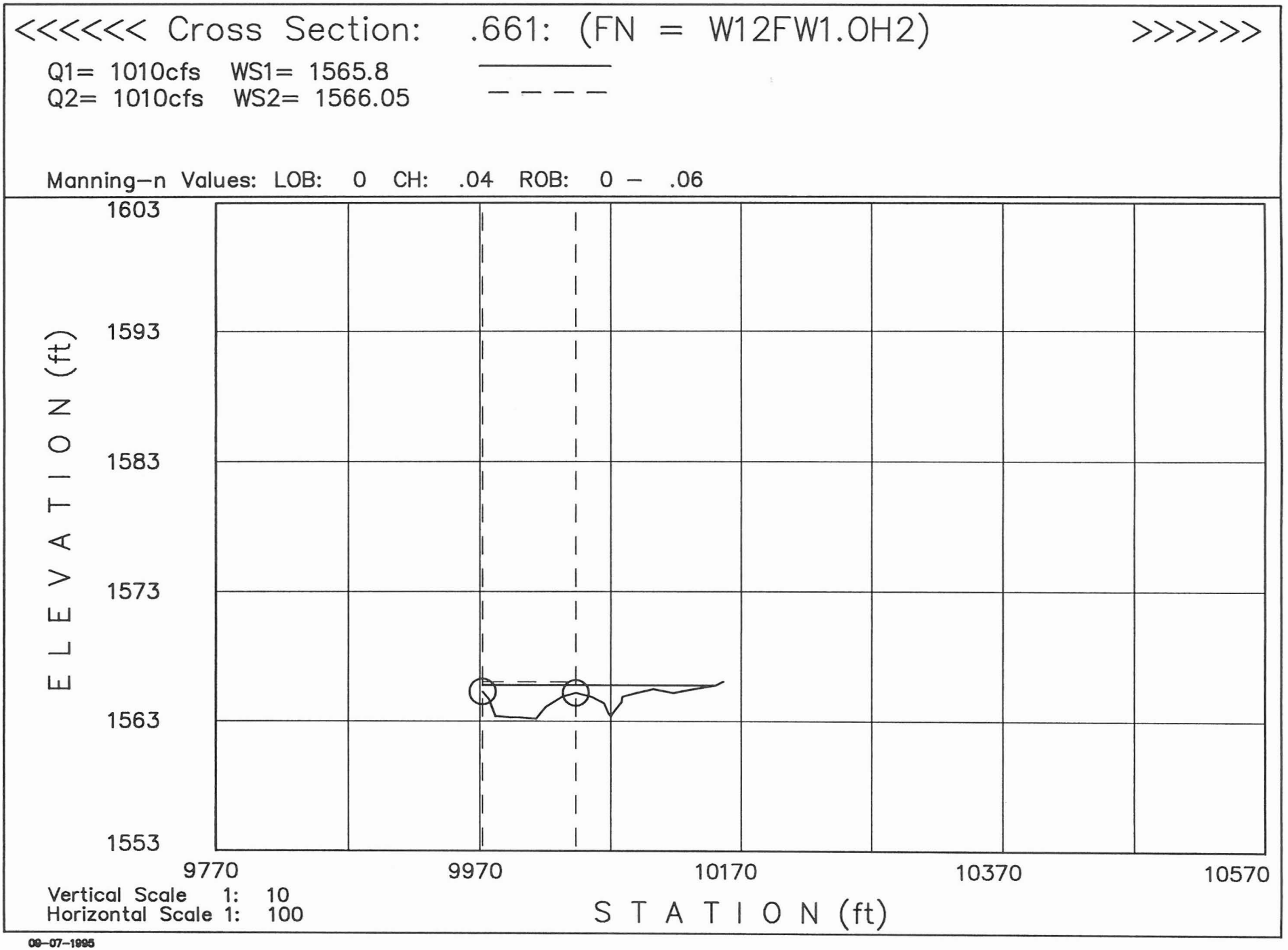
Q1= 1010cfs WS1= 1559.19
Q2= 1010cfs WS2= 1559.19

Manning-n Values: LOB: .06 CH: .04 ROB: 0 - .06



Vertical Scale 1: 10
Horizontal Scale 1: 100

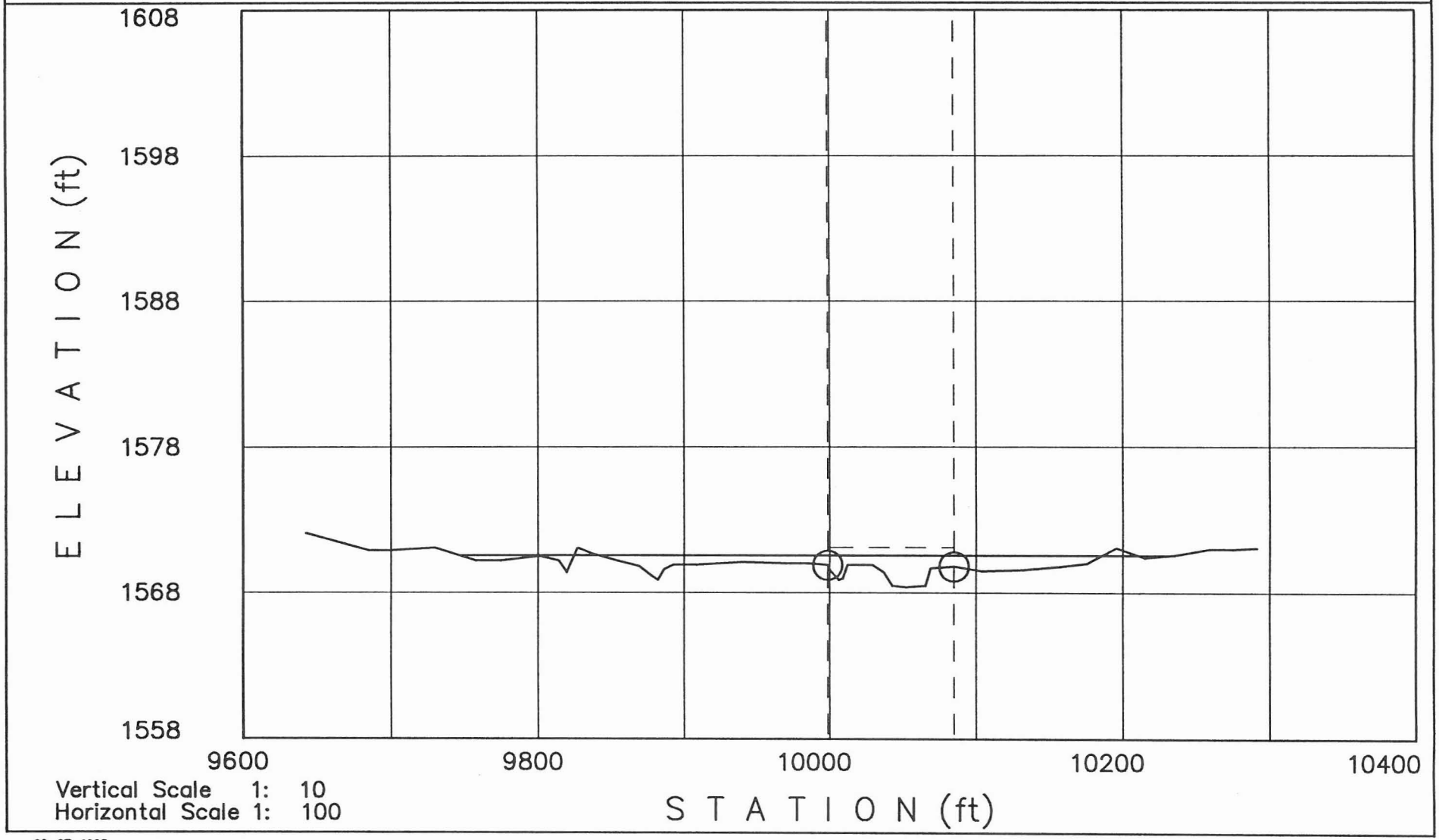
09-07-1995


<<<<<< Cross Section: .661: (FN = W12FW1.0H2) >>>>>>
Q1= 1010cfs WS1= 1565.8
Q2= 1010cfs WS2= 1566.05
Manning-n Values: LOB: 0 CH: .04 ROB: 0 - .06
1603
1593
1583
1573
1563
1553
ELEVATION (ft)
9770
9970
10170
10370
10570
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
09-07-1995

<<<<<< Cross Section: .748: (FN = W12FW1.0H2) >>>>>>

Q1= 750cfs WS1= 1570.56
Q2= 750cfs WS2= 1571.13

Manning-n Values: LOB: 0 - .06 CH: .04 ROB: 0 - .06



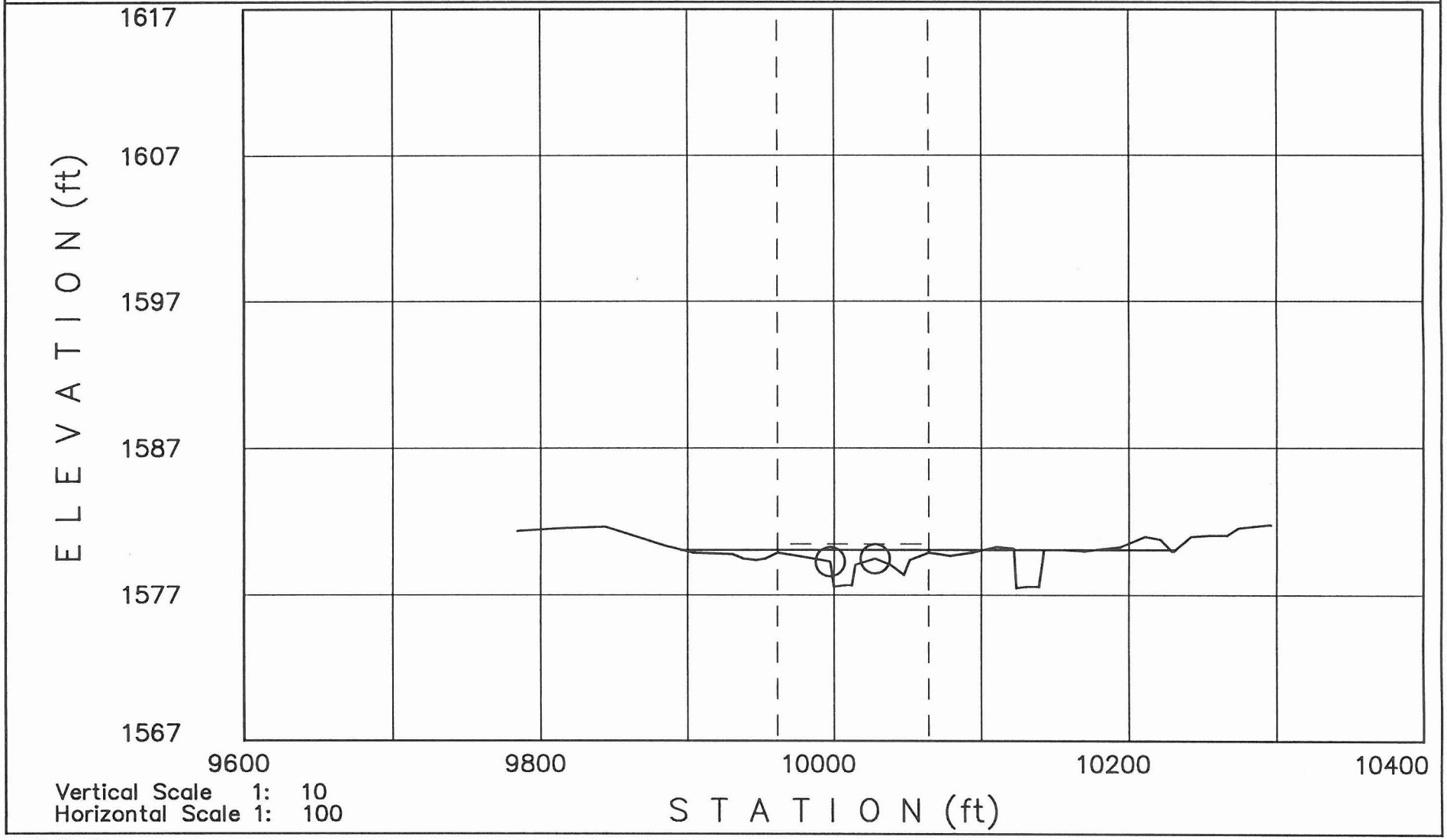
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-07-1995

<<<<<< Cross Section: .846: (FN = W12FW1.OH2) >>>>>>

Q1= 750cfs WS1= 1580.1
Q2= 750cfs WS2= 1580.51

Manning-n Values: LOB: .06 CH: .04 ROB: .06



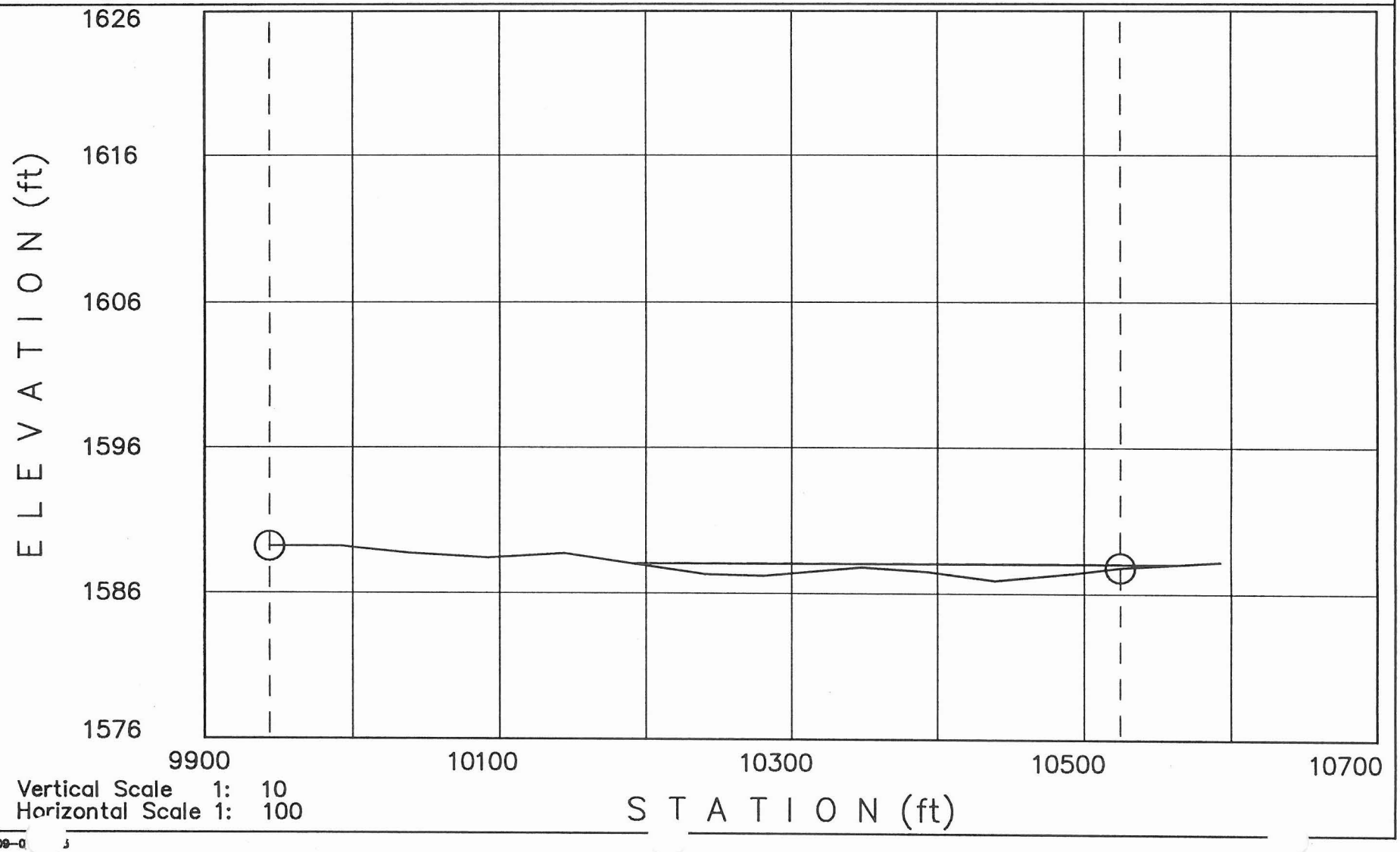
Vertical Scale 1: 10
Horizontal Scale 1: 100

09-07-1995

<<<<<< Cross Section: .935: (FN = W12FW1.0H2) >>>>>>

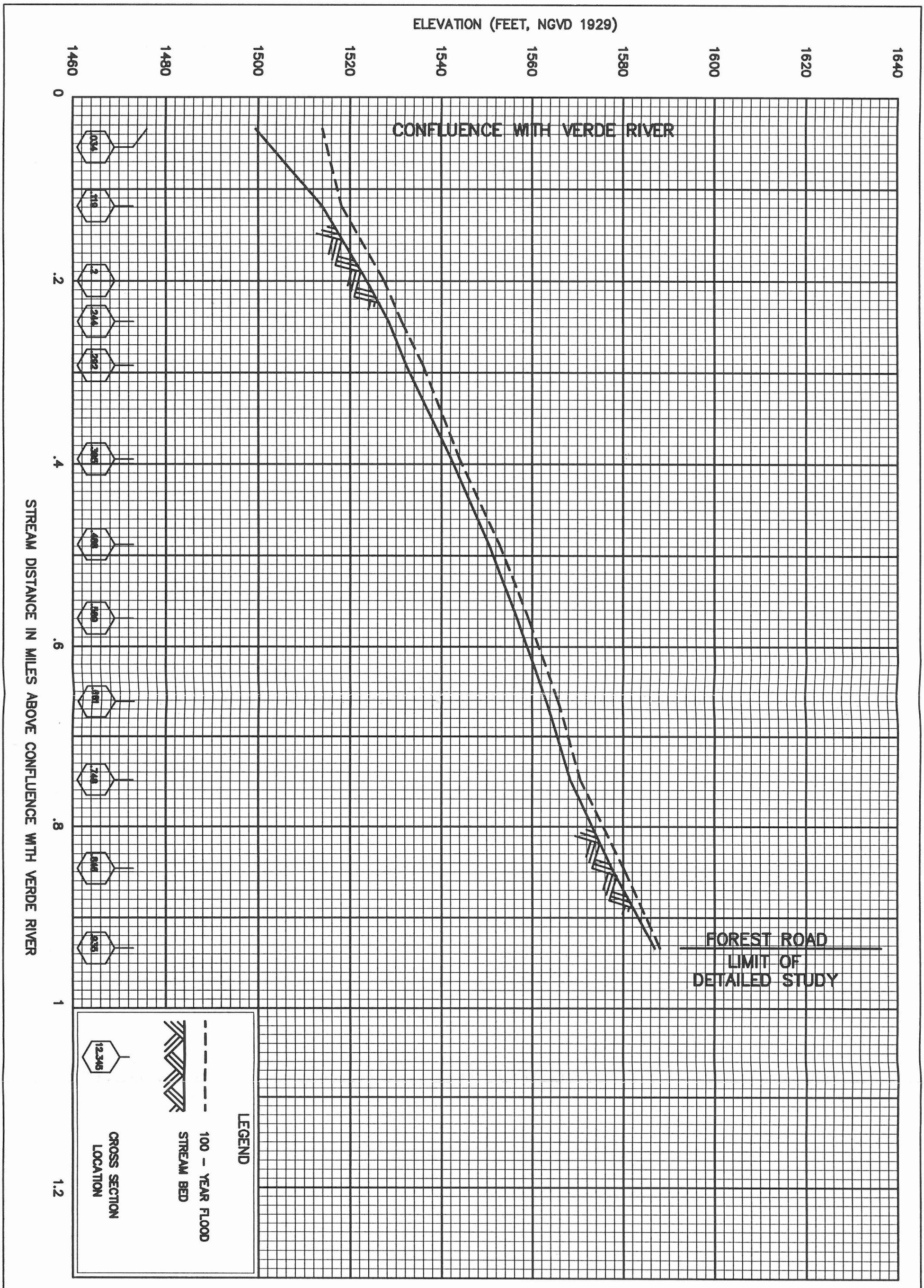
Q1= 730cfs WS1= 1588.03
Q2= 730cfs WS2= 1588.09

Manning–n Values: LOB: 0 CH: .04 ROB: 0 – .06



Vertical Scale 1: 10
Horizontal Scale 1: 100

FLOOD PROFILES



FEDERAL EMERGENCY MANAGEMENT AGENCY RIO VERDE SOUTH FLOOD DELINEATION STUDY	FLOOD PROFILES WASH 12

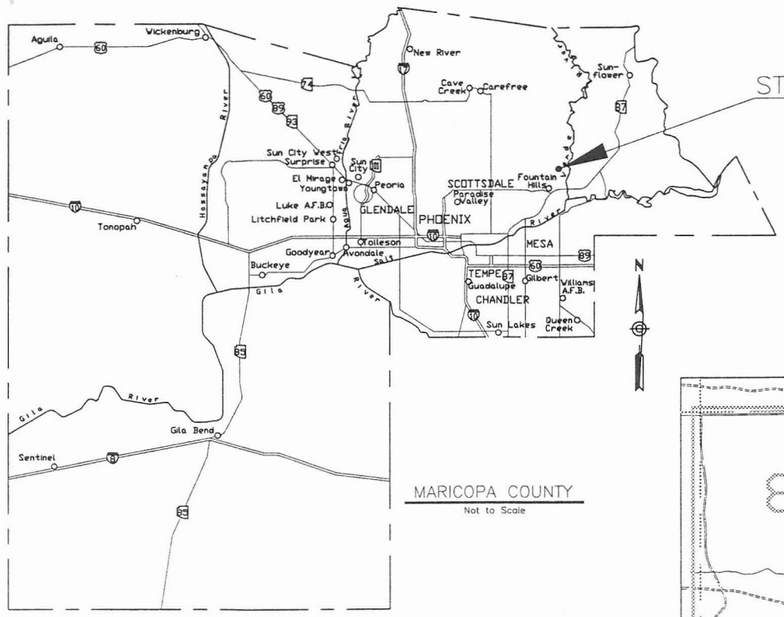
Dwg. Name: \P\89407003\FEMA\ W12FW1-P.DWG (SHEET 1 OF 1)
Date: REV. SEPT. 29, 1995 01:30 pm

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE SOUTH

Flood Delineation Study

FCD 93-07



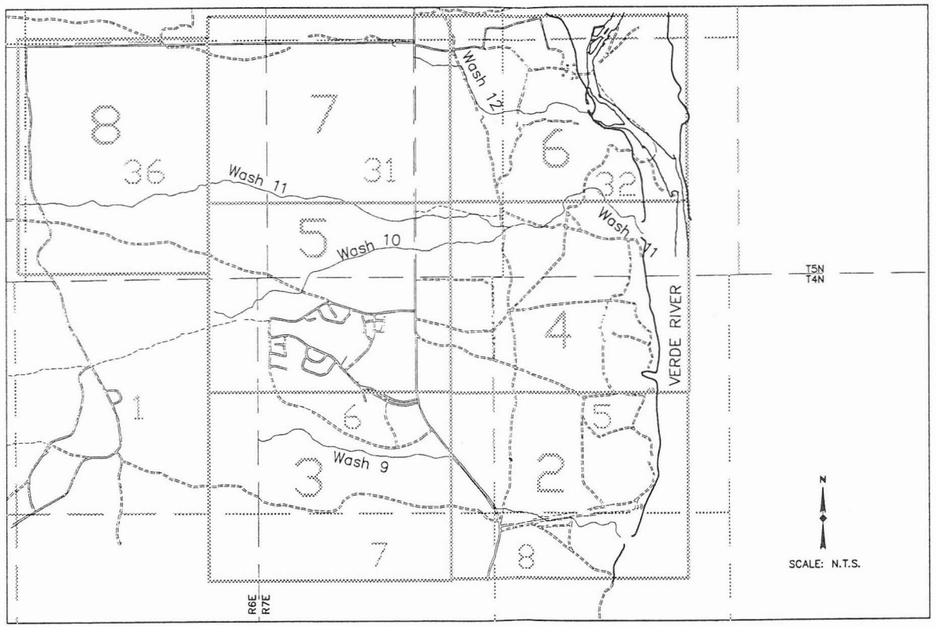
LOCATION MAP

DATUM

HORIZONTAL: North American Datum of 1983
VERTICAL: National Geodetic Vertical Datum of 1929

NOTE

Floodplain Limits in this Study are Plotted at each HEC-2 Cross Section on the Basis of Starting (SSTA) and Ending (ENDST) Stations Unless there is Ineffective Flow Area or a Conflict with Topographic Contours, in which Case, the Contours take Precedence.



STUDY AREA MAP
AND SHEET INDEX

SHEET INDEX

Sheet 2-8 Flood Delineation Study

AERIAL MAPPING

Aerial Mapping Company, Inc.
3141 W. Clarendon Avenue
Phoenix, Arizona 85017 (602) 263-5728

Flight Date: December 22, 1993
Contour Interval: 2 Feet

GROUND CONTROL

Burgess & Niole, Inc.
5025 E. Washington Street
Phoenix, Arizona 85034 (602) 244-8100

ADDITIONAL SURVEY

Alcocer Land Surveyors
3501 N. 16th Street, Suite C
Phoenix, Arizona 85016 (602) 263-7846

HYDROLOGY

George V. Sabol Consulting Engineers, Inc.
7950 E. Acoma Drive, Suite 211
Scottsdale, Arizona 85260-6962 (602) 483-3368

HYDRAULICS

McLaughlin Kmetty Engineers, Ltd.
3501 N. 16th Street
Phoenix, Arizona 85016 (602) 248-7702

LEGEND

Section Label 31

Sheet Limits

Sheet Number 8

Study Wash

Section Line

McLAUGHLIN KMETTY ENGINEERS, LTD.

	BY	DATE
DESIGN	FEB	9/94
DESIGN CHK.	CLJ	9/94
PLANS	PJK,RLP	9/95
PLANS CHK.	FEB	9/95

SUBMITTED BY: DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SHEET 1 OF 8

Dwg. Name: \P\89407003\ACAD\RVCOVER.dwg
Date: REV. SEPT. 15, 1995 09:20am

MATCH SHEET 4 of 8

MATCH SHEET 3 OF 8

①	FP= 1564.66 FW= 1564.28 Q= 960.00	⑤ FP= 1548.64 FW= 1548.64 Q= 1010.00
②	FP= 1554.76 FW= 1554.76 Q= 1010.00	⑥ FP= 1549.22 FW= 1549.21 Q= 1010.00
③	FP= 1554.46 FW= 1554.46 Q= 1010.00	⑦ FP= 1547.96 FW= 1547.92 Q= 1010.00
④	FP= 1554.24 FW= 1554.24 Q= 1010.00	⑧ FP= 1546.71 FW= 1547.07 Q= 1010.00

Limit of Detailed Study

SEC 6 | SEC 5 | SEC 5
SEC 7 | ERM #11 | SEC 8 | SEC 8

ABAND DR
FOREST RD
Via Hermosa
Via Linda
McDOWELL MOUNTAIN RD
WASH 9
VERDE RIVER

FP= 1559.35
FW= 1559.35
Q= 1010.00

FP= 1551.20
FW= 1551.20
Q= 1010.00

FP= 1542.46
FW= 1543.38
Q= 1010.00

FP= 1527.15
FW= 1528.16
Q= 1010.00

FP= 1535.13
FW= 1536.09
Q= 1010.00

FP= 1519.87
FW= 1520.67
Q= 1010.00

FP= 1512.20
FW= 1512.94
Q= 1010.00

FP= 1508.98
FW= 1507.98
Q= 1140.00

FP= 1502.91
FW= 1503.91
Q= 1140.00

Fort McDowell Indian Reservation

N 989,000
N 987,000
N 986,000
E 776,000
E 777,000
E 778,000
E 779,000
E 780,000

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF

RIO VERDE SOUTH

F.C.D. CONTRACT NO. 93-07

LEGEND

100-YR FLOODPLAIN BOUNDARY
FLOODWAY BOUNDARY
HYDRAULIC BASE LINE & RIVER MILE (2.0)
CROSS SECTION (FP=100 Yr WSEL / FW=Floodway WSEL / Q=100 Yr Flow) 5.519
ELEVATION REFERENCE MARK ○ OR △ ERM #2
BASE FLOOD ELEVATIONS 1221
ZONE DESIGNATIONS ZONE AE
INDIAN RESERVATION LIMITS
SECTION LINE

ELEVATION REFERENCE MARKS

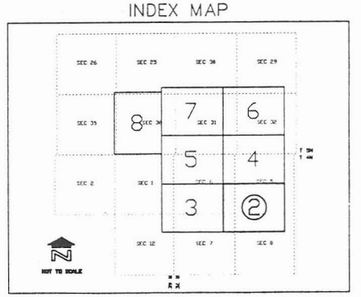
NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

I.D. NUM.	ELEV. (FT)	DESCRIPTION/LOCATION
ERM#11	1540.625	

THIS STATION IS LOCATED AT THE SOUTHEAST CORNER OF SECTION 6 T4N, R7E. THE MARK IS A B.L.M. BRASS CAP.

NOTES

INDEX MAP



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SCALE: 1"= 200'
CONTOUR INTERVAL = 2' FEET

McLAUGHLIN KMETTY ENGINEERS, LTD.

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SUBMITTED BY: DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SHEET 2 OF 8

Dwg. Name: \P\89407003\ACAD\SHEET2.dwg
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DATA PROVIDED BY BURGESS AND NIPLE, INC.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF RIO VERDE SOUTH

F.C.D. CONTRACT NO. 93-07

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE & RIVER MILE	2.0
CROSS SECTION	FP=100 Yr WSEL / FW=Floodway WSEL / Q=100 Yr Flow 5.519
ELEVATION REFERENCE MARK	O OR △ ERM #2
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
INDIAN RESERVATION LIMITS	
SECTION LINE	

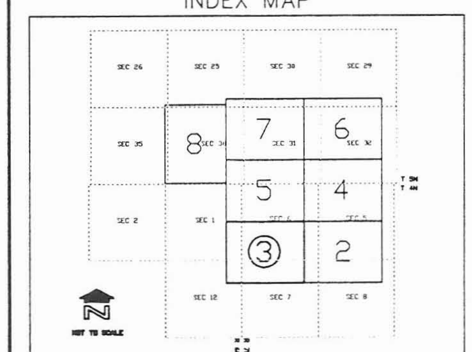
ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

I.D. NUM.	ELEV. (FT)	DESCRIPTION/LOCATION
ERM#9	1649.810	THIS STATION IS LOCATED AT THE SOUTHWEST CORNER OF SECTION 6, T4N, R7E. THE MARK IS A G.L.O. BRASS CAP.
ERM#10	1633.600	THIS STATION IS LOCATED APPROXIMATELY 280 FEET EAST OF VIA HERMOSA AND VADO COURT. THE MARK IS A MARICOPA COUNTY HIGHWAY DEPARTMENT BRASS CAP.

NOTES

INDEX MAP



SCALE: 1"= 200'
CONTOUR INTERVAL = 2' FEET

McLAUGHLIN KMETTY ENGINEERS, LTD.

	BY	DATE
DESIGN	FEB	7/94
DESIGN CHK.	FCDMC	8/94
PLANS	BKE,RLP	9/95
PLANS CHK.	FEB	9/95
SUBMITTED BY:		DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
RECOMMENDED BY: DATE
APPROVED BY: DATE
CHIEF ENGINEER AND GENERAL MANAGER
SHEET 3 OF 8

Dwg. Name: \P\89407003\ACAD\SHEET3.dwg
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SURVEYING AND PHOTOGRAMMETRY
FLIGHT DATE: 12-22-1993

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MATCH SHEET 6 of 8

MATCH SHEET 5 OF 8

MATCH SHEET 2 of 8

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF

RIO VERDE SOUTH

F.C.D. CONTRACT NO. 93-07

LEGEND

- 100-YR FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY
- HYDRAULIC BASE LINE & RIVER MILE (2.0)
- CROSS SECTION (FP=100 Yr WSEL / FW=Floodway WSEL / Q=100 Yr Flow) 5.519
- ELEVATION REFERENCE MARK (O OR △ ERM #2)
- BASE FLOOD ELEVATIONS (1221)
- ZONE DESIGNATIONS (ZONE AE)
- INDIAN RESERVATION LIMITS
- SECTION LINE

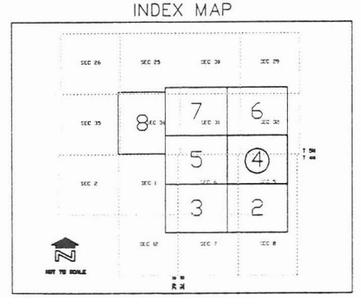
ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

I.D. NUM.	ELEV. (FT)	DESCRIPTION/LOCATION
ERM#12	1528.290	THIS STATION IS LOCATED EAST OF THE NORTH QUARTER CORNER OF SECTION 5 T5N, R7E. THE MARK IS A B.L.M. BRASS CAP AT WITNESS CORNER TO THE MEANDER CORNER.
ERM#13	1556.905	THIS STATION IS LOCATED AT THE SOUTHEAST CORNER OF SECTION 31 T5N, R7E. THE MARK IS A B.L.M. BRASS CAP

NOTES

INDEX MAP



200 0' 200 400

SCALE: 1"= 200'

CONTOUR INTERVAL = 2' FEET

McLAUGHLIN KMETTY ENGINEERS, LTD.

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DESIGN	FEB	7/94
DESIGN CHK.	FCDMC	8/94
PLANS	BKE,RLP	9/95
PLANS CHK.	FEB	9/95

SUBMITTED BY: DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SHEET 4 OF 8

Dwg. Name: \P\89407003\ACAD\SHEET4.dwg
Date: REV. SEPT. 14, 1995 10:25 am

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MATCH SHEET 7 of 8

MATCH SHEET 4 OF 8

MATCH SHEET 3 of 8

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF

RIO VERDE SOUTH

F.C.D. CONTRACT NO. 93-07

LEGEND

- 100-YR FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY
- HYDRAULIC BASE LINE & RIVER MILE (2.0)
- CROSS SECTION — FP=100 Yr WSEL / FW=Floodway WSEL / Q=100 Yr Flow
- ELEVATION REFERENCE MARK — O OR △ ERM #2
- BASE FLOOD ELEVATIONS (1221)
- ZONE DESIGNATIONS — ZONE AE
- INDIAN RESERVATION LIMITS
- SECTION LINE

ELEVATION REFERENCE MARKS

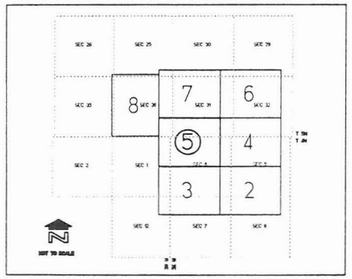
NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

I.D. NUM.	ELEV. (FT)	DESCRIPTION/LOCATION
ERM#8	1654.130	

THIS STATION IS LOCATED AT THE SOUTHEAST CORNER OF SECTION 36 T5N, R6E. THE MARK IS A G.L.O. BRASS CAP.

NOTES

INDEX MAP



N

200 0' 200 400

SCALE: 1"= 200'
CONTOUR INTERVAL = 2' FEET

	FP	FW	Q
1	1648.34	1648.25	1430.00
2	1648.47	1648.47	1430.00
3	1646.24	1646.19	1890.00
4	1636.79	1637.20	1890.00
5	1631.87	1631.85	1890.00
6	1627.14	1627.09	1890.00
7	1625.74	1625.73	1890.00
8	1593.39	1593.39	740.00
9	1593.09	1593.09	740.00
10	1590.98	1590.98	740.00
11	1589.42	1589.43	740.00
12	1586.54	1586.56	950.00

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PLANS CHK.	FEB	9/95
SUBMITTED BY:		DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SHEET 5 OF 8

Dwg. Name: \P\89407003\ACAD\SHEET5.dwg
Date: REV. SEPT. 14, 1995 11:19 am

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DATA PROVIDED BY BURGESS AND NIPLE, INC. AND ALCOCER LAND SURVEYORS

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF

RIO VERDE SOUTH

F.C.D. CONTRACT NO. 93-07

LEGEND

- 100-YR FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY
- HYDRAULIC BASE LINE & RIVER MILE (2.0)
- CROSS SECTION (FP=100 Yr WSEL / FW=Floodway WSEL / Q=100 Yr Flow) 5.519
- ELEVATION REFERENCE MARK (O OR Δ) ERM #2
- BASE FLOOD ELEVATIONS 1221
- ZONE DESIGNATIONS ZONE AE
- INDIAN RESERVATION LIMITS
- SECTION LINE

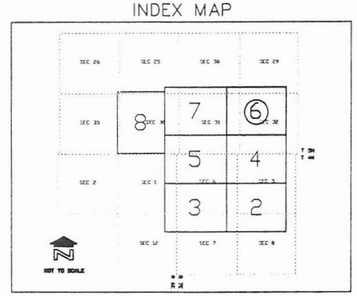
ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

I.D. NUM.	ELEV. (FT)	DESCRIPTION/LOCATION
ERM#1	1571.265	THIS STATION IS LOCATED APPROX. 0.17 MILES EAST OF FOREST RD. AND APPROX. 65 FEET SOUTH OF THE GRADED ROAD TO THE BOX BAR RANCH. THE MARK IS A BRASS CAP STAMPED. U.S. COAST AND GEODETIC SURVEY.
ERM#2	1544.580	THIS STATION IS LOCATED AT THE SECTION CORNER (29, 30, 31, 32). T5N, R7E THE MARK IS A BRASS CAP.

NOTES

INDEX MAP



200 0' 200 400

SCALE: 1"= 200'

CONTOUR INTERVAL = 2' FEET

McLAUGHLIN KMETTY ENGINEERS, LTD.

	BY	DATE
DESIGN	FEB	7/94
DESIGN CHK.	FCDMC	8/94
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PLANS CHK.	FEB	9/95
SUBMITTED BY:		DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SHEET 6 OF 8

Dwg. Name: \P\89407003\ACAD\SHEET6.dwg
Date: REV. SEPT. 14, 1995 06:15 pm

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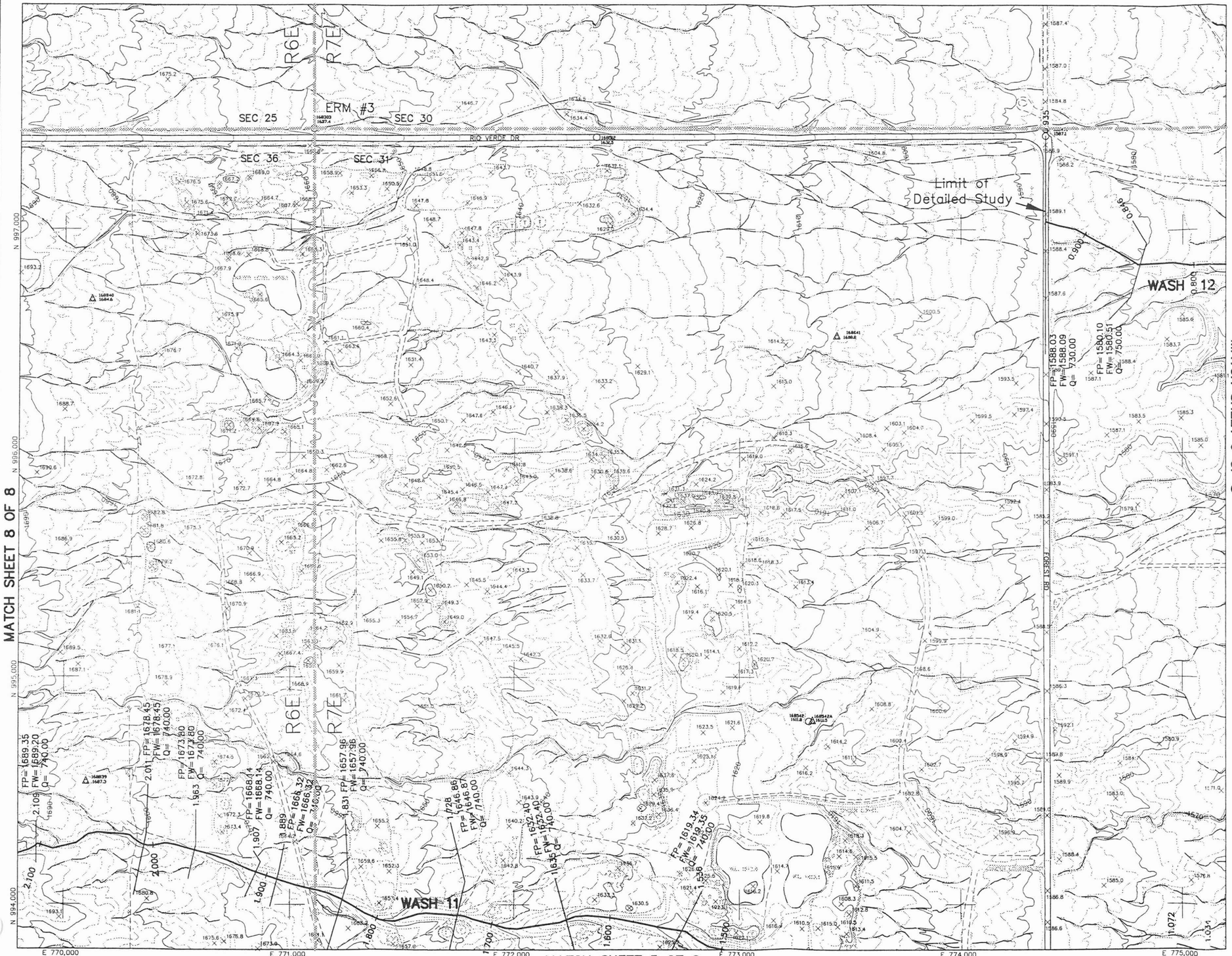
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF

RIO VERDE SOUTH

F.C.D. CONTRACT NO. 93-07



LEGEND

100-YR FLOODPLAIN BOUNDARY	———
FLOODWAY BOUNDARY	- - - - - -
HYDRAULIC BASE LINE & RIVER MILE	2.0
CROSS SECTION	FP=100 Yr WSEL / FW=Floodway WSEL / Q=100 Yr Flow — 5.519
ELEVATION REFERENCE MARK	○ OR △ ERM #2
BASE FLOOD ELEVATIONS	~~1221~~
ZONE DESIGNATIONS	ZONE AE
INDIAN RESERVATION LIMITS	- - - - - -
SECTION LINE	·····

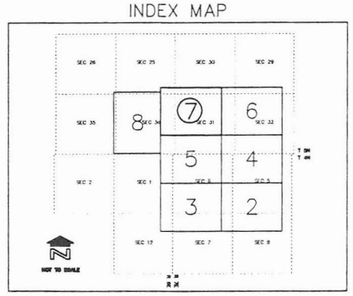
ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

I.D. NUM.	ELEV. (FT)	DESCRIPTION/LOCATION
ERM#3	1655.995	THIS STATION IS LOCATED AT SECTION CORNER (25, 30, 31, 36). THE MARK IS A ONE INCH IRON PIN.

NOTES

INDEX MAP



200 0' 200 400

SCALE: 1"= 200'

CONTOUR INTERVAL = 2' FEET

AERIAL MAPPING COMPANY, INC.
SURVEYING AND PHOTOGRAMMETRY
FLIGHT DATE: 12-22-1993 AND 8-22-94

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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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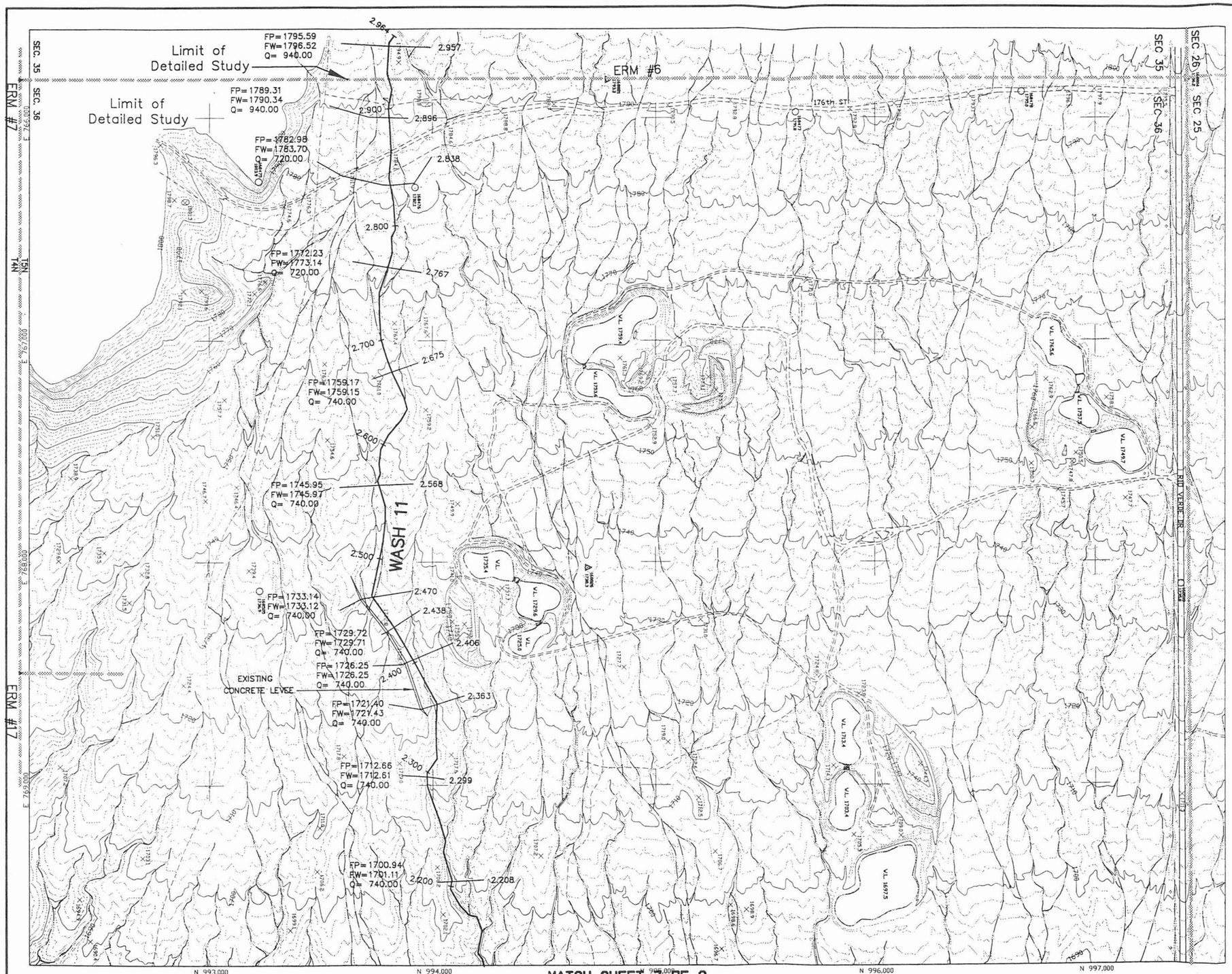
CHIEF ENGINEER AND GENERAL MANAGER

SHEET 7 OF 8

Dwg. Name: \P\89407003\ACAD\SHEET7.dwg
Date: REV. SEPT. 14, 1995 05:05 pm



MATCH SHEET 7 OF 8

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF

RIO VERDE SOUTH

F.C.D. CONTRACT NO. 93-07

LEGEND

- 100-YR FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY
- HYDRAULIC BASE LINE & RIVER MILE (2.0)
- CROSS SECTION (FP=100 Yr WSEL / FW=Floodway WSEL / Q=100 Yr Flow) 5.519
- ELEVATION REFERENCE MARK ○ OR △ ERM #2
- BASE FLOOD ELEVATIONS 1221
- ZONE DESIGNATIONS ZONE AE
- INDIAN RESERVATION LIMITS
- SECTION LINE

ELEVATION REFERENCE MARKS

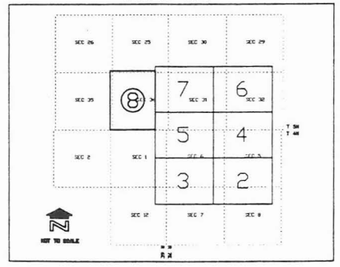
NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

I.D. NUM.	ELEV. (FT)	DESCRIPTION/LOCATION
ERM#6	1793.980	THIS STATION IS LOCATED AT THE WEST QUARTER CORNER OF SECTION 36 T5N, R6E. THE MARK IS A B.L.M. BRASS CAP.
ERM#7	1790.870	THIS STATION IS LOCATED AT THE SOUTHEAST CORNER OF SECTION 36 T5N, R6E. THE MARK IS A G.L.O. BRASS CAP.
ERM#17	1719.530	THIS STATION IS LOCATED AT THE SOUTH QUARTER CORNER OF SECTION 36 T5N, R6E. THE MARK IS A BRASS CAP

NOTES

1. Contours not revised at concrete levee near River mile 2.400, Cross Sections based on survey.

INDEX MAP



200 0' 200 400

SCALE: 1"= 200'
CONTOUR INTERVAL = 2' FEET

McLAUGHLIN KMETTY ENGINEERS, LTD.

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PLANS CHK.	FEB	9/95

SUBMITTED BY: DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SHEET 8 OF 8

Dwg. Name: \P\89407003\ACAD\SHEET8.dwg
Date: REV: SEPT. 14, 1995 10:20 am

AERIAL MAPPING COMPANY, INC.
SURVEYING AND PHOTOGRAMMETRY
FLIGHT DATE: 12-22-1993

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DATA PROVIDED BY BURGESS & NIPLE, INC. AND ALCOCER SURVEYING

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DRAFT FLOOD INSURANCE STUDY

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SECTION 1: INTRODUCTION

1.1 Purpose of Study

There are four major washes that traverse the community of Rio Verde in Maricopa County, Arizona. The intent of this study is to determine the nature and extent of 100 year flooding along these washes. This Flood Insurance Study uses detailed methods to determine 100 year floodplains, and replaces the approximate study previously published for three of the four major washes. The Location Map on Figure 1-1 shows the study area's location with respect to the State of Arizona. Figure 1-2 is a Vicinity Map showing the four study washes.

LOCATION MAP

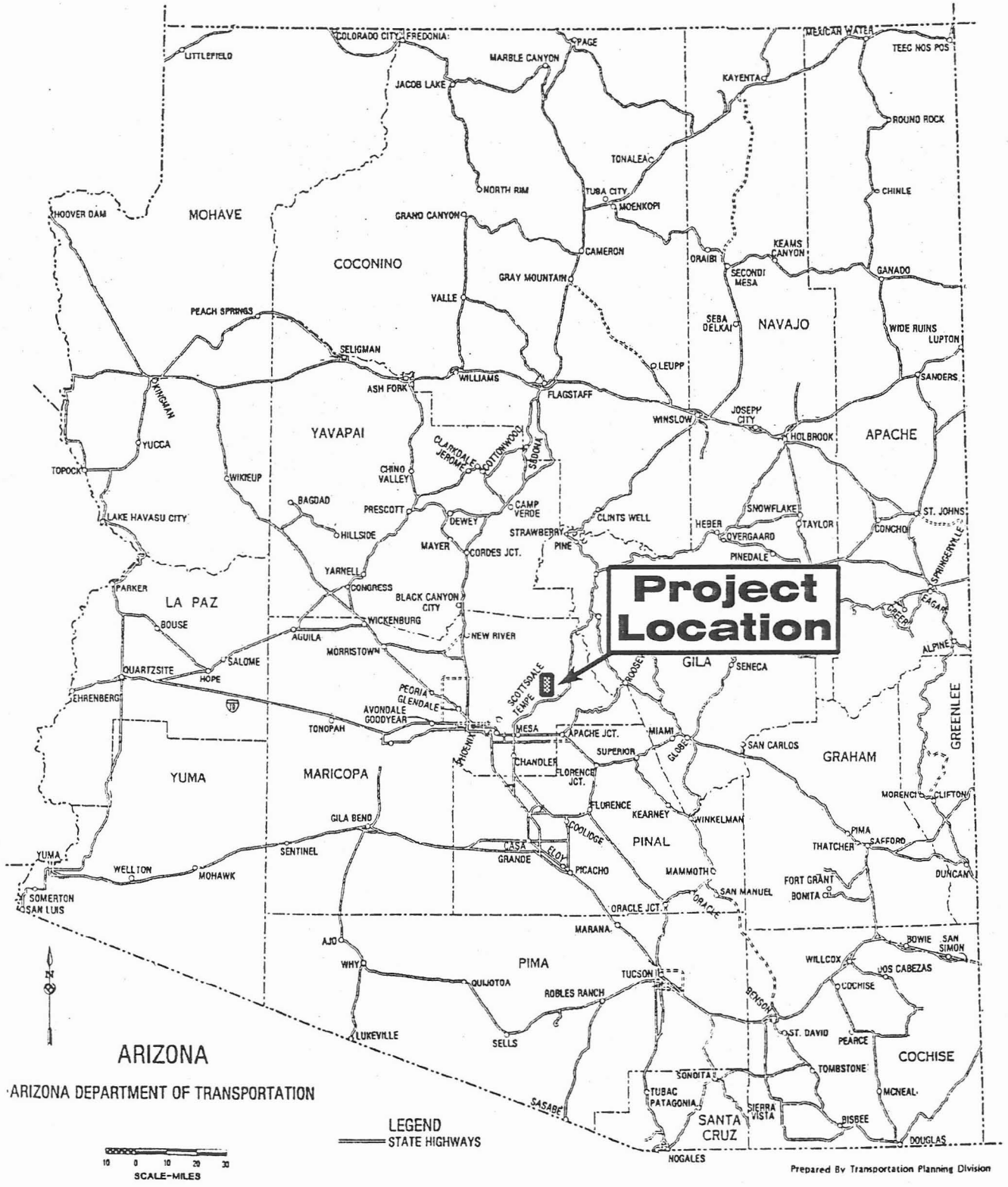

FIGURE 1-1

VICINITY MAP

NOSCALE

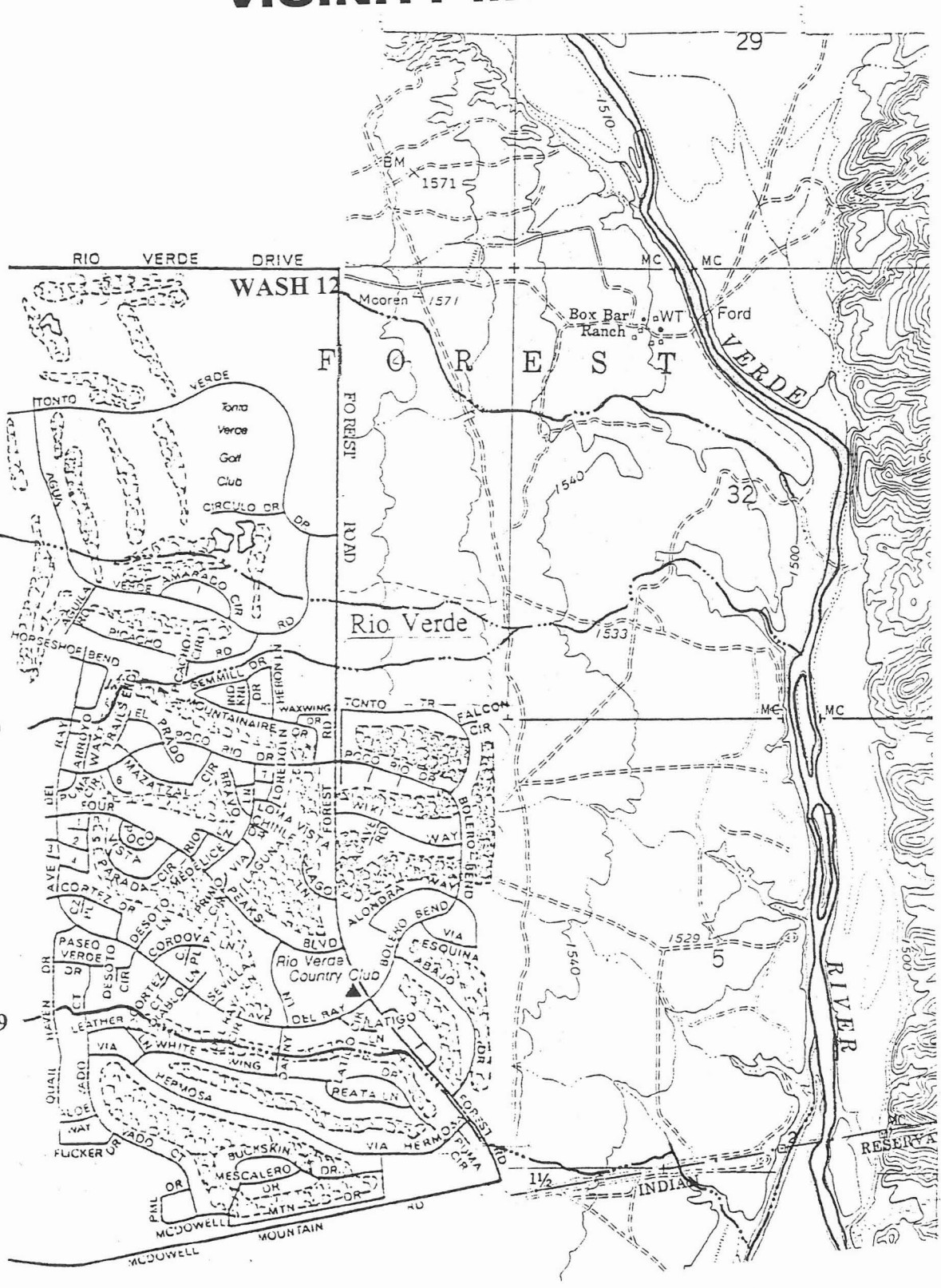

FIGURE 1-2

1.2 Authority for Study

The authority for this study is the Flood Disaster Protection Act of 1973 and the National Flood Insurance Act of 1968, enacted by Title XIII of the Housing and Urban Development Act of 1968 (L. 90-448, 1 August 1968).

This Flood Insurance Study was initiated by the Flood Control District of Maricopa County. The hydrologic and hydraulic analyses were performed by McLaughlin Kmetty Engineers, Ltd. and their subconsultants, under Flood Control District Contract No. 93-07. The hydrologic analyses were completed in December 1994 and the hydraulic analyses completed in September 1995.

1.3 Coordination and Acknowledgments

During the contract period, this study was coordinated with the Flood Control District of Maricopa County, various representatives within Rio Verde, the golf course manager, the developers of the Rio Verde and Tonto Verde subdivisions, the engineers for the subdivisions, and the engineering consultant for the adjacent Rio Verde North Floodplain Delineation Study.

1.4 Public Notification and Contact

An initial public meeting held at the Rio Verde Community center informed the residents about this study and solicited public comment. This public meeting addressed both the Rio Verde South and the Rio Verde North studies. A joint public notice was published in the local newspaper and in one of the main newspapers for the Phoenix metropolitan area. Letters requesting Right-of-Entry for surveying purposes were sent to appropriate individuals and businesses within the study area. A final public meeting is intended to present the study results after FEMA approval.

SECTION 2: AREA STUDIED

2.1 Scope of Study

Approximately 16 square miles of watershed are tributary to the study washes. The community of Rio Verde is located about 45 miles northeast of Phoenix, Arizona. The study area is bounded on the north by the Rio Verde North study area, on the east by the Verde River, on the south by the Fort McDowell Indian reservation, and on the west by the McDowell Mountains. The Vicinity Map (Figure 1-2) presents a general map of the study area, including most of the street transportation network.

Flooding along the following washes were studied by detailed methods:

Wash 9 Wash 10 Wash 11 Wash 12

Three of these washes, namely Wash 9, 10 and 11, were previously studied by approximate methods. Wash 12 is an unnamed wash labeled as Wash 12 for the purposes of this study. The Verde River receives the flood waters from Washes 9, 10 and 12, while Wash 10 is tributary to Wash 11. Approximately 6.6 river miles are within the limits of detailed study, and Table 2-1 presents the limits of study for each wash.

TABLE 2-1. DETAILED-STUDY SOURCES

Flooding Source	Limits of Study
Wash 9	From Fort McDowell Indian Reservation Boundary to R6E/R7E Boundary.
Wash 10	From the confluence with Wash 11 to 0.3 miles above Avenida Del Ray.
Wash 11	From the confluence with Verde River to the west section line of Section 36, T5N, R6E.
Wash 12	From the confluence with Verde River to Forest Road.

2.2 Community Description

Maricopa County is located in south-central Arizona and contains 9,238 square miles. In 1990, the total county population was 2.1 million. The community of Rio Verde has a summer population of approximately one thousand and a winter population of two or three times the summer population. The community is primarily single family residential development generally designed around several golf courses. Rio Verde is an unincorporated community within Maricopa County.

The washes in the study area drain primarily easterly toward the Verde River. The terrain is the relatively steep desert terrace lying east of the McDowell Mountains. The mild, short winters and the long, hot summers are typical of the Sonoran Desert.

2.3 Principal Flood Problems

The main flood problems within the natural desert areas are comprised of wide floodplains flowing along shallow natural washes. Where the washes have been channelized or flow within the golf courses, the flood waters are generally contained within the channel. There are four (4) culverts along the study washes. Two of these culverts are generally adequate to pass the 100 year runoff without overtopping the roadway, and two culverts are found to have some runoff overtopping. There is one flow split situation, and several dip sections where a study wash crosses a road without the benefit of a culvert. One dip section contains a staff (depth) gage, and none of the other dip sections have warning signs indicating potential hazards to vehicular or pedestrian traffic.

2.4 Flood Protection Measures

Prior to the start of this study, some modifications were made by others to portions of the study washes. These modifications include channel realignment, bank erosion protection, and widening or deepening channels. For example, Wash 11 has been shifted 500 to 600 feet to the north since the Zone A determination shown on the Flood Insurance Rate Map Panel 1300. The mapping, field surveys and field reconnaissance adequately depict the modifications. These conditions are considered an existing condition for the purposes of the Rio Verde South Floodplain Delineation Study.

Wash 9 contains flood protection measures in the form of a riprap and gabion-lined channel parallel to Forest Road.

One portion of Wash 10 is channelized using concrete block retaining walls. The entrance to this reach contains gabions (rock-filled wire baskets) and riprap. There is riprap bank protection near the upstream study limit of Wash 10.

Wash 11 contains one reach of earth-lined channel. There is a riprap-lined plunge pool at the culvert crossing Agua Verde Drive that helps to control erosive velocities. There is a concrete levee at River Mile 2.4 in Wash 11. This structure diverts a tributary, that previously flowed into Wash 10, to Wash 11.

A stock watering pond in the upper watershed of Wash 11 is not significant for flood protection, and has been ignored in the hydrologic modeling. The golf course lakes are designed to divert storm runoff around them. There are no regional or local detention/retention ponds within the study area.

SECTION 3: ENGINEERING METHODS

3.1 Hydrologic Analyses

Hydrologic parameters are derived using the methodology contained in the Hydrologic Design Manual for Maricopa County (Reference 8). The watershed is modeled using the U.S. Army Corps of Engineers' HEC-1 computer program (Reference 12). The 100-year storm event, which has a one-percent chance of occurrence in any given year, is modeled in order to obtain peak discharges for the hydraulic analyses. Streamgage data are not available for the study area. Both the 6-hour and 24-hour storm durations were modeled to determine the peak rate of runoff. The 24-hour storm provides the higher peak rate for the majority of the study washes. There are several natural flow diversions due to the shallow depth of channels in the watershed, and these are considered in the hydrologic model. Runoff model input includes the Green and Ampt infiltration loss method, the Clark unit hydrograph method, and the normal depth Modified Puls routing method. A comprehensive discussion of the derivation of input data, assumptions and procedures utilized for the hydrologic model are contained in a separate report, "Rio Verde South Floodplain Delineation Study, Hydrology Report" prepared by McLaughlin Kmetty Engineers, Ltd. in association with George V. Sabol Consulting Engineers, Inc. (Reference 11).

The 100-year peak flow rates, resulting from either the 24-hour or the 6-hour storm, are tabulated in Table 3-1. This table considers the effect of the concrete levee on Wash 11 near River Mile 2.4 (Section 36 levee). The peak discharges presented in this table contain the highest flow rates for Wash 10 and for Wash 11, whether or not the concrete levee remains in place. The other flow splits incorporated into the hydrologic model are discussed in detail in the separate Hydrology Report. The flow split occurring at Forest Road in Wash 10 is limited in extent to a relatively short reach of Wash 10 and Wash 11 and is therefore not hydrologically significant. There are many flow diversions within the watershed. The drainage areas tabulated in Table 3-1 do not consider the additional area associated with the flow diversions, but are simply the sum of subbasin areas directly above the hydrologic concentration point. These drainage area values differ from the HEC-1 hydrology model since HEC-1 included contributing areas from upstream flow splits or diversions.

TABLE 3-1
SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	HYDROLOGIC CONCENTRATION POINT	DRAINAGE AREA* (S. M.)	100-YEAR (cfs)	
Wash 9				
At confluence with Verde River	C570	3.25	1140	
Near Indian Reservation Boundary at River Mile 0.265	C569	2.91	1010	
At Forest Road near McDowell Mountain Road	C568	2.81	1010	
At Forest Road above White Wing Drive	C567	2.70	960	
About 0.1 mile above Danny Lane	C566	2.36	760	
At Vado Court	C565	2.28	660	
Wash 10				
Above confluence with Wash 11	C545R	2.66	1910	**
Above Forest Road near Mountainaire Drive	C543	2.48	1890	**
At Avenida Del Ray	C542	2.24	1430	
About 0.23 miles above Avenida Del Ray	C540	2.12	1420	
Wash 11				
At confluence with Verde River	C546	9.54	2100	**
After confluence with Wash 10	C545	9.23	2010	**
Above confluence with Wash 10	C545L	6.57	740	
At Forest Road	C536	6.52	740	
About 0.2 mile above R6E/R7E Boundary	C575	6.37	740	
At 176th Street	C574	approx 6.09	720	
About 550 feet west of 176th Street	C535	6.09	940	
Wash 12				
At confluence with Verde River	C523	2.91	1110	
Approximately 0.26 miles west of confluence with Verde River	C576	2.79	1060	
Approximately 0.45 miles west of confluence with Verde River	C520	2.61	1010	
Approximately 0.23 miles east of Forest Rd.	C512	2.24	750	
At Forest Rd.	After C511	approx 1.94	730	(Approximated)

* Drainage area reported is total subbasin area directly above the hydrologic concentration point.
These values differ from the HEC-1 hydrology model, since HEC-1 includes contributing areas from upstream flow splits or diversions.

** Maximum flow, with or without Section 36 Levee, whichever produces maximum flow.

3.2 Hydraulic Analyses

Riverine flooding along the study washes comprise a flood hazard to the community. The depth and width of the 100-year floodplain is determined by the HEC-2 Water Surface Profile Program (Reference 13). The floodplains are reported on 1 inch = 200 feet , two foot contour interval maps. Aerial photography was completed in December 1993. An aerial photography update was done in August 1994, for a very limited area. All elevations are on National Geodetic Vertical Datum (NGVD) of 1929, and the coordinate system is based upon North American Datum (NAD) of 1983. Elevation Reference Marks (ERM's) were set by the Rio Verde North study contractor, and are shown on the Floodplain Maps. A listing of the ERM's is contained in Appendix A of the TDN.

The cross sections for the HEC-2 model are derived from photogrammetric methods and from field survey. Complete comment record documentation is found in the HEC-2 output. A very limited number of cross sections are derived from the contour maps. Generally, the contour information takes precedence over photogrammetric data for floodplain mapping. The only exception is at the concrete levee near Wash 11 River Mile 2.4. At this location, the contour map is not revised due to levee construction and field survey data is used.

The significant culverts are analyzed using the HEC-2 Special Culvert Routine, with input data based upon field survey. The golf cart bridge at Wash 9 River Mile 0.816 is not modeled since the low chord elevation is found to be above the 100-year flood depth. The culverts are modeled as unobstructed by flood debris. Two culverts are slightly obstructed by sediment depth, which is considered in the hydraulic model. The flood elevations near the culverts are valid if the structure or roadway does not fail and obstructions do not exceed those already included in the HEC-2 models.

Table 3-2 presents the range of hydraulic roughness coefficients (Mannings n values) used in this study. Photographs of each reach and associated n value calculations are found in Appendix C of the Technical Data Notebook (TDN).

TABLE 3-2
RANGE OF HYDRAULIC ROUGHNESS COEFFICIENTS
(Mannings n)

FLOODING SOURCE	CHANNEL (Min - Max)	OVERBANKS (Min - Max)
Wash 9	0.030 - 0.045	0.020 - 0.065
Wash 10	0.030 - 0.045	0.050 - 0.070
Wash 11	0.024 - 0.050	0.024 - 0.070
Wash 12	0.040 - 0.055	0.060 - 0.065

Cross section spacing averages about 1 cross section every 500 feet. The floodplain maps depict the cross section location in plan view and the flood profile sheets locate the cross sections in profile (refer to the Technical Data Notebook, Hydraulics). Cross sections were located at close intervals above and below bridges in order to compute the significant backwater effects of those structures. All bridges and culverts were investigated and surveyed to obtain as-built elevation data and structural geometry.

The starting water surface elevation for Wash 9 is based upon critical depth, which reaches normal depth at the downstream Limit of Detailed Study at the Fort McDowell Indian Reservation Boundary. The starting water surface elevation for Wash 11 is based upon normal depth as determined by the slope-area method. Wash 12 begins at an estimate of the Verde River flood depth. Wash 10 is tributary to Wash 11, thus begins from the Wash 11 flood depth at a common cross section.

The study was limited to fixed-bed modeling for the hydraulic analyses. However, due to the sandy and gravelly riverbed composition, riverbed changes could occur during a 100-year flood, particularly where the bottom slope is very non-uniform and/or where other structures, such as culverts, cause local increases in the velocity. Therefore, some changes in the water-surface elevations could be expected as a normal occurrence for riverine flooding.

3.3 Problem Areas

Two culverts near the upstream study limit of Wash 9 would be overtopped by 100-year runoff. A portion of the overtopping flow at each culvert would split off to the north and return to

Wash 9 a short distance downstream. The floodplain is depicted without considering these minor split flows, since the flow depth at the split flow location is less than one (1) foot deep.

Forest Road is a major ingress/egress point for Rio Verde and is subject to flooding at the dip section crossings of all four study washes. Including Forest Road, there are a total of 8 dip section road crossings of the study washes. This excludes the unnamed dirt roads.

A portion of Wash 10 runoff splits off at Forest Road and joins Wash 11. The Wash 10 and 11 confluence area is hydraulically complex, with several identifiable flow paths. This complex flow situation is typical for many desert washes where there a several shallow flow channels.

There are 5 existing houses in the 100-year floodplain, as of the date of aerial photography for the floodplain maps. These structures are on Wash 10 near River Mile 1.0. Even though the wash is channelized in this area, the channel is inadequate to contain the flood waters. There is one Zone X delineated within the study area. This is located on Wash 9 near River Mile 1.5, and is comprised of an island which is approximately one foot above the surrounding flood waters.

SECTION 4: FLOODPLAIN MANAGEMENT APPLICATIONS

A prime purpose of the National Flood Insurance Program is to encourage state and local governments to adopt sound floodplain management programs. The Rio Verde South study, therefore, includes a flood boundary map designed to assist communities in developing sound floodplain management measures.

This study has been performed to meet the standards of the National Flood Insurance Program as defined by the Flood Insurance Study Guidelines (Reference 6).

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the Federal Emergency Management Agency (FEMA) as the base flood for the purposes of floodplain management measures. The boundary of the 100-year flood has been delineated using the flood elevation determined at each survey cross section. Between survey cross sections, the boundaries are interpolated using contour information from the topographic maps with contour intervals of 2 feet.

The boundary of the 100-year flood is shown on the Floodplain and Floodway Maps contained in the Technical Data Notebook.

4.2 Floodways

A floodway is used as a floodplain management tool to show the effect of encroachment within the floodplain, without increasing the flood depth more than 1 foot, and without producing hazardous velocities. Examples of encroachment are structures, including walls, fences, or buildings, and fill materials. The 1 foot or less rise in flood depth is according to national and local standards. The floodway must be kept free of encroachment so that the 100-year flood can be safely conveyed.

The floodways shown in this study are based upon equal-conveyance reduction on each side of the floodplain, so that a particular property on one bank is not favored over a property on the other bank. Floodways are shown for all of the washes within the study area. In some locations, the floodway is coincident with the floodplain due to previous channelization, or where the historic bank stations are above the 100-year flood level. At such locations, encroachment would not be feasible. The standard Floodway Tables are contained in Appendices E, F, G, and H of the TDN, at the end of each HEC-2 analysis.

SECTION 5: INSURANCE APPLICATION AND CRS SUMMARY

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. Those zones are as follows:

Zone A: Zone A is the flood insurance rate zone that corresponds to 100-year floodplains that are determined in the Floodplain Delineation Study by approximate methods. No base flood elevations or depths are shown within this zone.

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

Zone AH: Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. The base flood elevations derived from the detailed hydraulic analyses are shown within this zone.

Zone AO: Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.

Zone X: Zone X is the flood insurance rate zone that corresponds to areas outside the 100-year floodplain, and areas of 100-year sheet flow flooding where average depths are less than 1 foot, areas of 100-year stream flooding where the contributing drainage area is less than 1 square mile, or areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

SECTION 6: OTHER STUDIES

There are no other significant published flood studies of record for the study washes. A related study for the Rio Verde North area was performed at the same time as this study (Reference 3).

Flood Delineation Study

This study is authoritative for the purposes of the National Flood Insurance Program (NFIP), and the data presented herein depict the 100-year floodplains and floodways for the community of Rio Verde and adjacent area.

SECTION 7: LOCATION OF DATA

The majority of data generated by this Study is contained in the Technical Data Notebook (TDN), which is a part of this report. Any other survey, hydrologic, hydraulic, and other pertinent data used in this study may be obtained from the Flood Control District of Maricopa County, 2801 West Durango Street, Phoenix, Arizona 85009.

SECTION 8: REFERENCES AND BIBLIOGRAPHY

1. Arizona Department of Water Resources, Engineering Division, Flood Management Section, September 1991. Instructions for Organizing and Submitting Technical Documentation for Flood Studies.

2. Arizona Department of Water Resources, Engineering Division, Flood Management Section, September 1992. Requirement For Floodplain Delineation In Riverine Environments.

3. Burgess & Niple, Inc., 1995. Rio Verde North Floodplain Delineation Study, Technical Data Notebook, FCD 93-06.

4. Chow, V.T., Open Channel Hydraulics, McGraw-Hill, 1959.

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6. Federal Emergency Management Agency, December 3, 1993. Flood Insurance Study, Maricopa County, Arizona and Incorporated Areas, Volumes 1 through 9.

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10. McLaughlin Kmetty Engineers, Ltd., September, 1995. Rio Verde South Floodplain Delineation Study, FCD 93-07, Technical Data Notebook, Hydraulics, Existing Condition.

11. McLaughlin Kmetty Engineers, Ltd., August, 1995. Rio Verde South Floodplain Delineation Study, FCD 93-07, Technical Data Notebook, Hydrology, Existing Condition.

12. U.S. Army Corps of Engineers, September 1990. HEC-1 Flood Hydrograph Package Users Manual.

13. U.S. Army, Corps of Engineers, September, 1990. HEC-2 Water Surface Profiles Users Manual.

14. U.S. Department of Transportation, September, 1985. Hydraulic Design of Highway Culverts, Hydraulic Design Series No. 5, FHWA Report No. 1P-85-15.

15. U.S. Department of Transportation, May 1987. HY8 Culvert Analysis Microcomputer Program Applications Guide.

16. U.S. Geological Survey, 1991. Manning's Roughness Coefficients for Stream Channels and Floodplains in Maricopa County, Arizona.

MATCH SHEET 5 OF 8

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SURVEYING AND PHOTOGRAMMETRY
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THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS 1"= 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS AND BASED ON GROUND CONTROL SURVEY DATA PROVIDED BY BURGESS & NIPLE.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF

RIO VERDE SOUTH

F.C.D. CONTRACT NO. 93-07

LEGEND

- 100-YR FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY
- HYDRAULIC BASE LINE & RIVER MILE (2.0)
- CROSS SECTION (FP=100 Yr WSEL / FW=Floodway WSEL / Q=100 Yr Flow) 5.519
- ELEVATION REFERENCE MARK ○ OR △ ERM #2
- BASE FLOOD ELEVATIONS 1221
- ZONE DESIGNATIONS ZONE AE
- INDIAN RESERVATION LIMITS
- SECTION LINE

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

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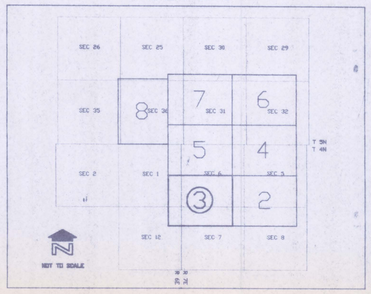
ERM#10	1633.600	THIS STATION IS LOCATED APPROXIMATELY 280 FEET EAST OF VIA HERMOSA AND VADO COURT. THE MARK IS A MARICOPA COUNTY HIGHWAY DEPARTMENT BRASS CAP.

NOTES

INDEX MAP



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PLANS	BKE,RLP	9/95
PLANS CHK.	FEB	9/95
SUBMITTED BY:		DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
RECOMMENDED BY: DATE
APPROVED BY: DATE
CHIEF ENGINEER AND GENERAL MANAGER
SHEET 3 OF 8

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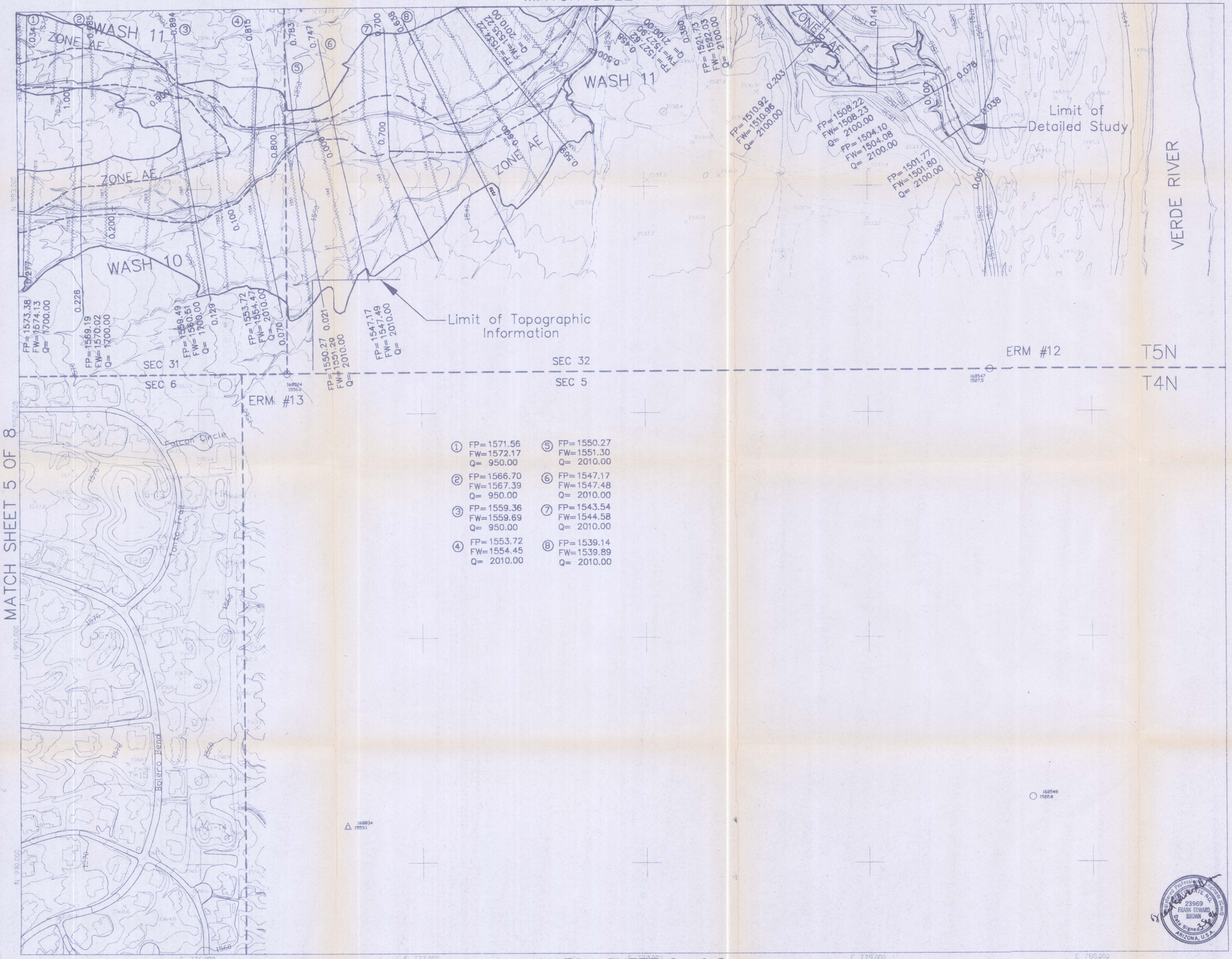

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MATCH SHEET 5 OF 8

MATCH SHEET 2 of 8

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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF

RIO VERDE SOUTH

F.C.D. CONTRACT NO. 93-07

LEGEND

- 100-YR FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY
- HYDRAULIC BASE LINE & RIVER MILE — 20
- CROSS SECTION — FP=100 Yr WSEL / FW=Floodway WSEL / Q=100 Yr Flow — 5.519
- ELEVATION REFERENCE MARK — ○ OR △ ERM #2
- BASE FLOOD ELEVATIONS — 1221
- ZONE DESIGNATIONS — ZONE AE
- INDIAN RESERVATION LIMITS
- SECTION LINE

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

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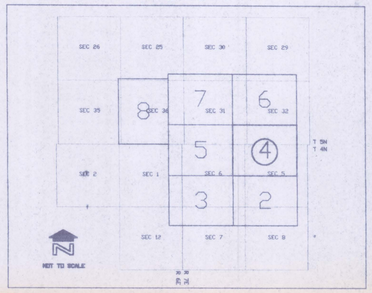
NOTES

INDEX MAP



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SUBMITTED BY:		DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SHEET 4 OF 8

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MATCH SHEET 3 of 8

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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF

RIO VERDE SOUTH

F.C.D. CONTRACT NO. **93-07**

LEGEND

100-YR FLOODPLAIN BOUNDARY
FLOODWAY BOUNDARY
HYDRAULIC BASE LINE & RIVER MILE — 2.0
CROSS SECTION — FP=100 Yr WSEL / FW=Floodway WSEL / Q=100 Yr Flow — 5.519
ELEVATION REFERENCE MARK — O OR △ ERM #2
BASE FLOOD ELEVATIONS — 1221
ZONE DESIGNATIONS — ZONE AE
INDIAN RESERVATION LIMITS
SECTION LINE

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

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NOTES

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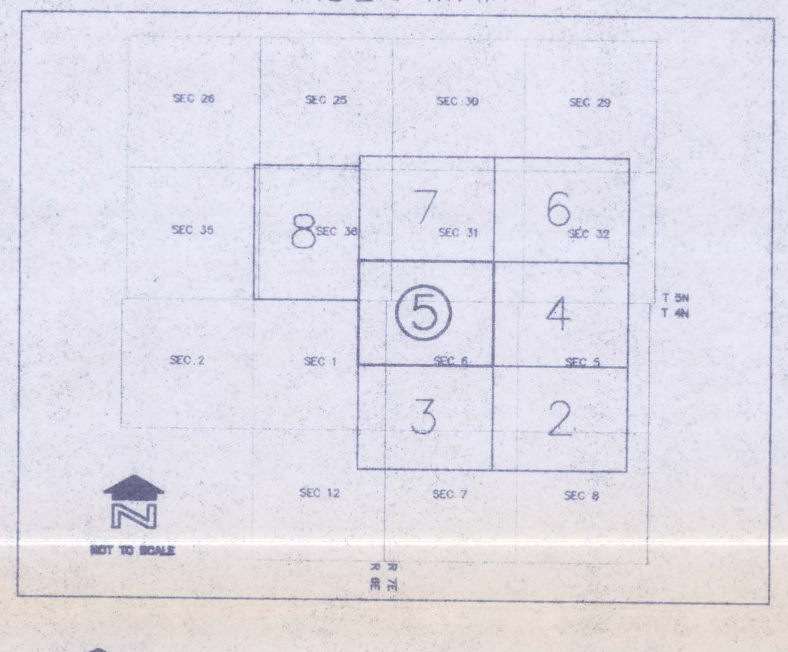

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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
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APPROVED BY: DATE
CHIEF ENGINEER AND GENERAL MANAGER

SHEET 5 OF 8

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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF

RIO VERDE SOUTH

F.C.D. CONTRACT NO. **93-07**

LEGEND

- 100-YR FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY
- HYDRAULIC BASE LINE & RIVER MILE (2.0)
- CROSS SECTION (FP=100 Yr WSEL / FW=Floodway WSEL / Q=100 Yr Flow) 5.519
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- BASE FLOOD ELEVATIONS 1221
- ZONE DESIGNATIONS ZONE AE
- INDIAN RESERVATION LIMITS
- SECTION LINE

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

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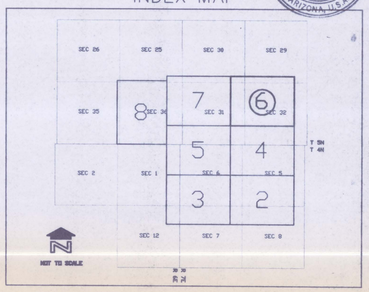
ERM#2	1544.580	THIS STATION IS LOCATED AT THE SECTION CORNER (29, 30, 31, 32). T5N, R7E THE MARK IS A BRASS CAP.

NOTES

23969 FRANK EDWARD BROWN Registered Professional Land Surveyor Date Signed 5-4-95 ARIZONA, U.S.A.

INDEX MAP



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SUBMITTED BY: DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SHEET 6 OF 8

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SURVEYING AND PHOTOGRAMMETRY
FLIGHT DATE: 12-22-1993

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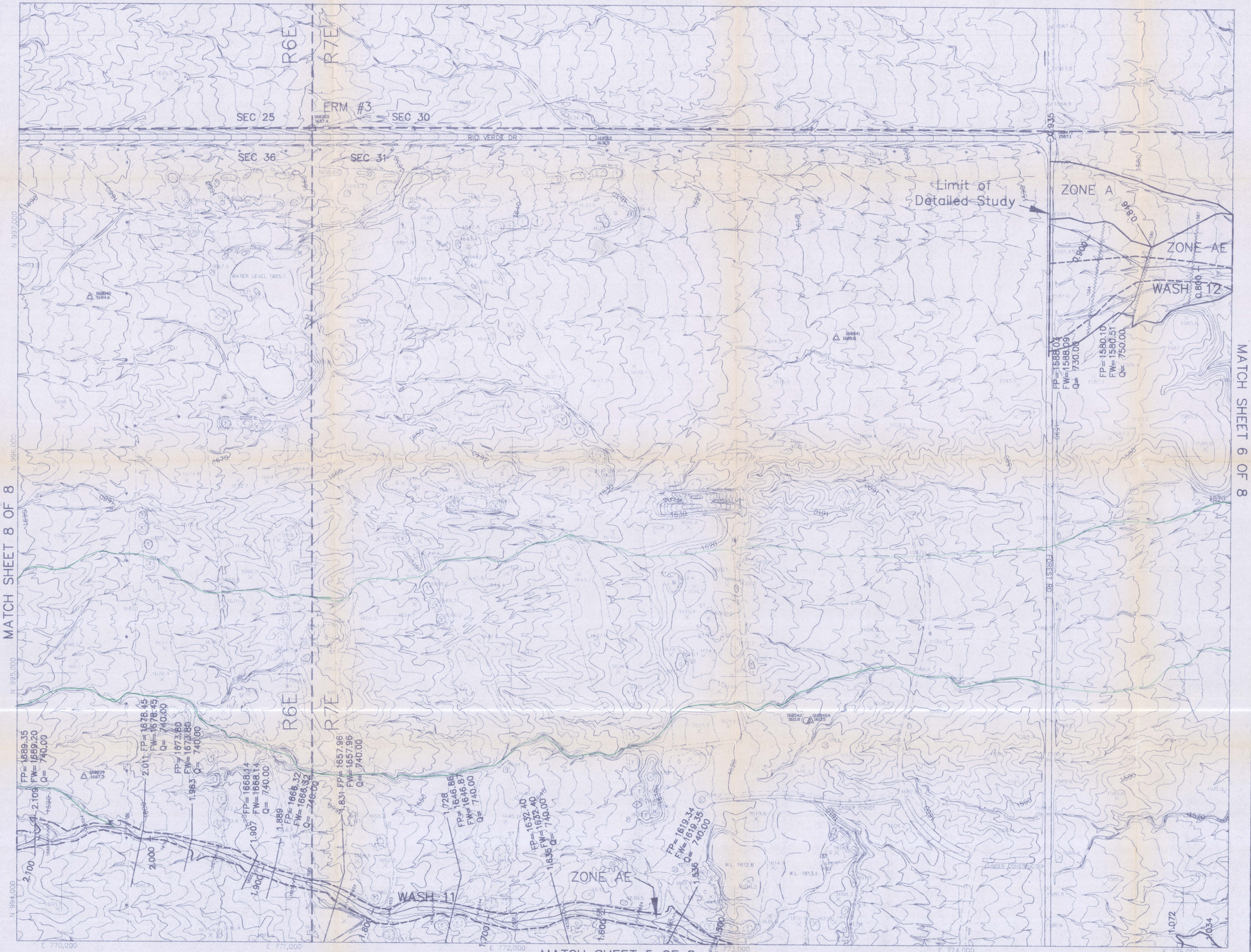
1"= 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS AND BASED ON GROUND CONTROL SURVEY
DATA PROVIDED BY BURGESS AND NIPLE, INC.



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF

RIO VERDE SOUTH

F.C.D. CONTRACT NO. 93-07

LEGEND

- 100-YR FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY
- HYDRAULIC BASE LINE & RIVER MILE (2.0)
- CROSS SECTION (FP=100 Yr WSEL / FW=Floodway WSEL / Q=100 Yr Flow) 5.519
- ELEVATION REFERENCE MARK ○ OR △ ERM #2
- BASE FLOOD ELEVATIONS 1221
- ZONE DESIGNATIONS ZONE AE
- INDIAN RESERVATION LIMITS
- SECTION LINE

ELEVATION REFERENCE MARKS

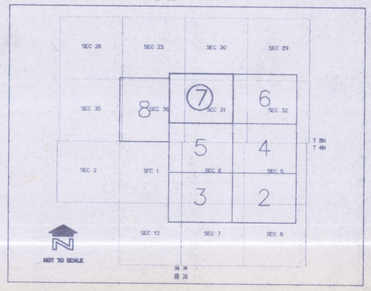
NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

I.D. NUM.	ELEV. (FT)	DESCRIPTION/LOCATION
ERM#3	1655.995	THIS STATION IS LOCATED AT SECTION CORNER (25, 30, 31, 36). THE MARK IS A ONE INCH IRON PIN.

NOTES

Registered Professional Land Surveyor (Arizona)
23969
FRANK EDWARD BROWN
Date Signed 7-5-95
ARIZONA, U.S.A.

INDEX MAP



N

200 0' 200 400

SCALE: 1" = 200'
CONTOUR INTERVAL = 2' FEET

McLAUGHLIN KMETTY ENGINEERS, LTD.

	BY	DATE
DESIGN	FEB	7/94
DESIGN CHK.	FCDMC	8/94
PLANS	BKE,RLP	9/95
PLANS CHK.	FEB	9/95
SUBMITTED BY:		DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

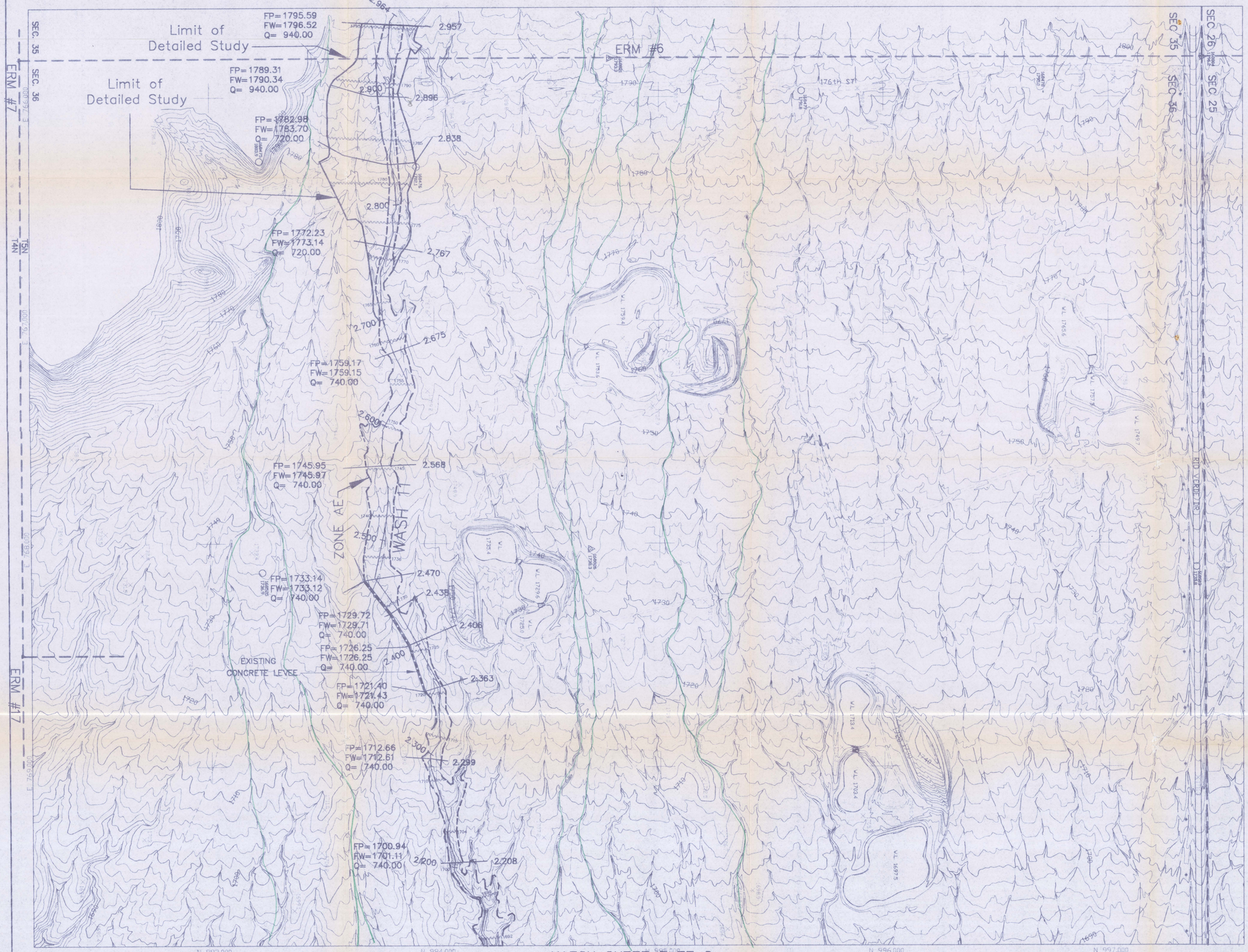
CHIEF ENGINEER AND GENERAL MANAGER

SHEET 7 OF 8

Dwg. Name: \P\89407003\ACAD\SHEET7.dwg
Date: REV. SEPT. 14, 1995 05:05 pm

AERIAL MAPPING COMPANY, INC.
SURVEYING AND PHOTOGRAMMETRY
FLIGHT DATE: 12-22-1993 AND 8-22-94

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS
1"= 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS AND BASED ON GROUND CONTROL SURVEY
DATA PROVIDED BY BURGESS & NIPLE, INC. AND ALCOCER LAND SURVEYORS



MATCH SHEET 7 OF 8

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF

RIO VERDE SOUTH

F.C.D. CONTRACT NO. 93-07

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ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

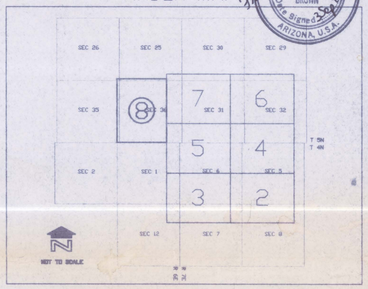
I.D. NUM.	ELEV. (FT)	DESCRIPTION/LOCATION
ERM#6	1793.980	THIS STATION IS LOCATED AT THE WEST QUARTER CORNER OF SECTION 36 T5N, R6E. THE MARK IS A B.L.M. BRASS CAP.
ERM#7	1790.870	THIS STATION IS LOCATED AT THE SOUTHEAST CORNER OF SECTION 36 T5N, R6E. THE MARK IS A G.L.O. BRASS CAP.
ERM#17	1719.530	THIS STATION IS LOCATED AT THE SOUTH QUARTER CORNER OF SECTION 36 T5N, R6E. THE MARK IS A BRASS CAP

NOTES

1. Contours not revised at concrete levee near River mile 2.400. Cross Sections based on survey.

Registered Professional Land Surveyor — 23969 — FRANK EDWARD BROWN — Expires 6-30-96 — ARIZONA, U.S.A.

INDEX MAP



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DESIGN	FEB	7/94
DESIGN CHK.	FCDMC	8/94
PLANS	BKE,RLP	9/95
PLANS CHK.	FEB	9/95

SUBMITTED BY: DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SHEET 8 OF 8

Dwg. Name: \P\89407003\ACAD\SHEET8.dwg
Date: REV. SEPT. 14, 1995 10:20 am

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SURVEYING AND PHOTOGRAMMETRY
FLIGHT DATE: 12-22-1993

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