DEVELOPING A MATHEMATICAL FLOW SIMULATION MODEL FOR THE PEACE-ATHABASCA DELTA

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SYNOPSIS

This report has been prepared to review the development of mathematical models for simulating natural conditions in the Peace-Athabasca Delta and to indicate the applicability of the latest model in evaluating present and future influences on the Delta. Mathematical models have filled an important role in studies to restore to the Delta the natural water levels that were interrupted when regulation of the Peace River for power production commenced in 1967. The first model used 5-day average values to simulate outflow from Lake Athabasca using a functional relationship between Lake Athabasca levels and Peace River levels. It was this model that was instrumental in the design of two control structures in the northern outflow channels to produce the desired levels. It became evident, however, that an improved model would be needed to evaluate the performance of these structures and to integrate with a daily flow model which was under development for the Mackenzie River Basin. The present model is a one-dimensional hydrodynamic model, already tested in St. Lawrence River studies, which is able to recreate both levels and discharges for the various flow and control alternatives. This model is also able to determine the influence of further flow regulation on the system. The study technique and the simulation results are given at a technical level with application being made to specific case studies.

1. INTRODUCTION

1.1 Historical Background to the Study

1.1.1 Flow Regulation on the Peace River

Flow regulation commenced on the Peace River in December 1967 coincident with the initial filling of Williston Lake created by the W.A.C. Bennett Dam. Although it is located some 730 miles upstream of the Peace-Athabasca Delta, the Bennett Dam effectively controls 50 percent of the flow in the Peace River at its point of influence on Lake Athabasca. Since the Peace River level influences the outflow from Lake Athabasca, low water levels on the Peace River during this filling period resulted in low water levels in the Delta. As a consequence, studies were initiated to determine the mechanics of the flow regime of the Delta. Figure 1 shows the setting of the study area.

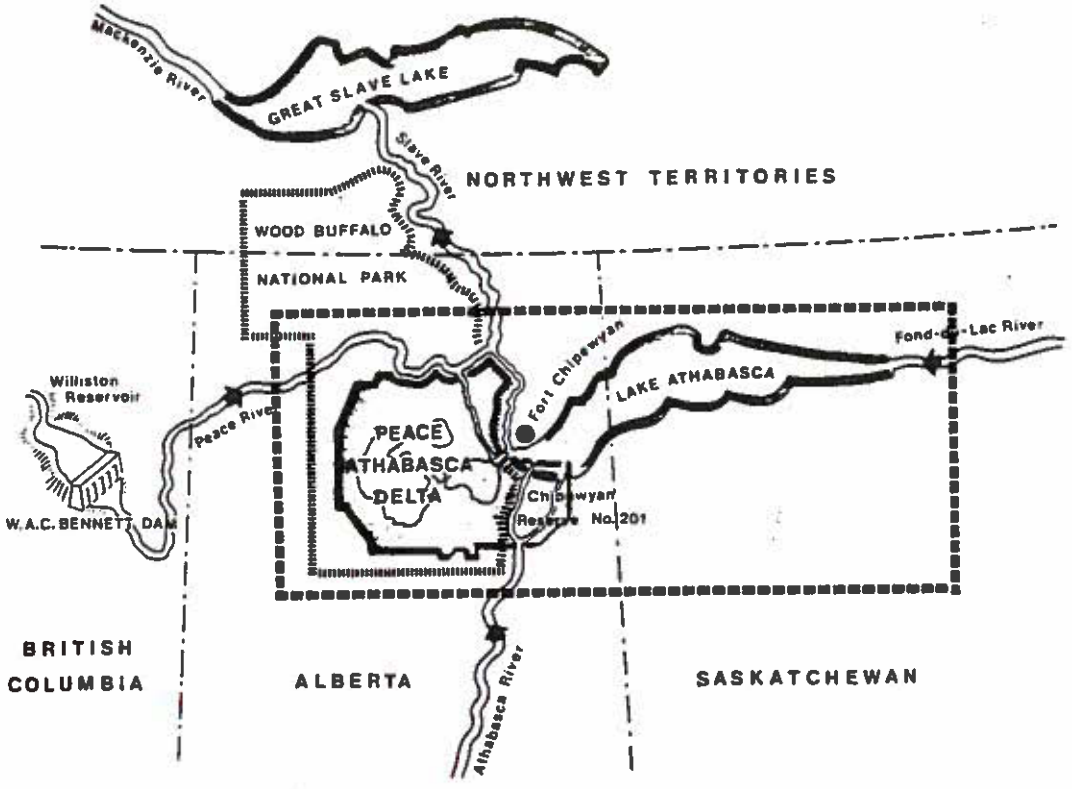

Figure 1 Major Study Area Elements

1.1.2 Previous Studies

All previous studies are outlined in "Technical Report, Peace-Athabasca Delta Project, 1973".[1] The project group integrated and refined results from those studies to develop a mathematical model to simulate Lake Athabasca water levels. Their model defined flow in the outflow channels from Lake Athabasca by a functional relationship between Lake Athabasca levels and Peace River levels. Provision for control structures in the outflow channels was included in the model. Their model used 5-day average values as input at the boundaries of the model. Simulation results from that model are presented in the 1973 report.

One of the objectives of the Peace-Athabasca Delta study is the development of a mathematical model which can be integrated with other similar models being developed for the major tributaries, into one overall model for the Mackenzie River system. On the basis of simplicity in application, economy in operation and easiness in modification, a decision was made to use the SIMPACK Model as the basic tool to form the overall model. The SIMPACK Model uses a similar flow or reservoir routing technique as adapted by the U.S. Corps of Engineers' SSARR Model, but with a fixed computational increment of 24 hours. In other words, only daily flows or water levels are inputted or outputted. A reasonable amount of effort had been spent on trying to apply the SSARR Model to the Peace-Athabasca Delta. Difficulties were found in simulating the water levels and flows in the channels and on the secondary lakes within the Delta. Problems such as overland floodings, channel reversal flows, channel and lake storages, ice conditions, and flows through structures, were unsolveable. With

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1 "Technical Report, Peace-Athabasca Delta Project", Queens Printer, Edmonton, 1973.

these obstacles in mind, searching for another method to simulate the delta was urged and hopefully a new technique could be found and merged into or lined to the SIMPACK Model.

1.1.3 Current Developments

Since 1973 much additional data have been gathered within the Peace-Athabasca Delta. These data were analyzed by Alberta Environment to modify and improve the mathematical model developed by the Peace-Athabasca Delta Group. The analysis showed that outflow from Lake Athabasca on Riviere des Rochers was controlled by the constriction at the Little Rapids site and that this constriction was further controlled by submergence due to backwater from the Peace River. This fact alone indicated that the previous flow functions used in the five-day model were not the most suitable means of representating flow out of Lake Athabasca.

As a result of the flow regulation on the Peace River, a rockfill weir on Revillon Coupe and a buildup of the natural weir on Riviere des Rochers at the Little Rapids site was constructed (between June 1975 and March 1976) to restore water levels in the Delta to approximate historic conditions. A method was required to evaluate the performance of these structures in meeting their intended objective.

In addition, a Mackenzie River Basin Study was initiated in 1976. One of its objectives was to develop a daily flow model for the Mackenzie River Basin. The need for a daily flow model for the Peace-Athabasca Delta was required for integration into the Mackenzie River model.

On learning that the one-dimensional hydrodynamic model had been successfully applied to the St. Lawrence River and that its capabilities of handling complex river system with or without control structures were excellent, it was proposed to try that model to simulate the behaviour of the Peace-Athabasca Delta (PAD). In the overall system of Mackenzie River Basin, the PAD hydrodynamic model will be considered as a sub-system which will be run separately. Its outputs will then be combined with the overall system.

This daily flow model selected for modelling the Peace-Athabasca Delta was the one-dimensional hydrodynamic model developed at the Massachusetts Institute of Technology by D.J. Gunaratnam and F.E. Perkins. Further improvements were made by Surveyer, Nenniger and Chenevert Incorporated in their study of the St. Lawrence River. The model uses a finite difference scheme to integrate the St. Venant equations over a wide range of transient flow conditions.

1.2 Reasons for the Study

1.2.1 Evaluation of Present and Future Influences on the Peace-Athabasca Delta

The evaluation of the performance of the weirs installed to restore natural water levels in the Delta is only possible through accurate modelling techniques. The one-dimensional hydrodynamic model for the Delta is able to recreate levels and discharges for the various flow and control alternatives.

The model will also be a very useful tool in determining the influence of further flow regulation on the system. Variable boundary conditions on

the Peace River, Athabasca River or Slave River can be incorporated in the model and the simulation will give the resulting levels and discharges.

1.2.2 Identification of Essential Data Requirements for the Peace-Athabasca Delta

Since 1969, data collection in the Delta has expanded from a very limited quantity to a very substantial quantity. Development of a mathematical model would not have been possible without this field data for calibration. A good simulation model would permit the abolition of many gauging sites currently in operation, since only those stations providing essential data input or verification to the model would be required.

1.3 Scope of the Study

1.3.1 Definition of the Study Area

The study area is the Peace-Athabasca Delta. The north boundary is defined by the Peace and Slave Rivers. This boundary intercepts the outflow channels of the Lake Athabasca system. These channels are Chenal des Quatre Fourches, Riviere des Rochers and Revillon Coupe. The south boundary is defined by the reach extending from the Birch River to Lake Athabasca at Crackingstone Point. The Lake Athabasca outflow channels, leaving this boundary to join the north boundary, are Chenal des Quatre Fourches and Riviere des Rochers. Athabasca River inflow into the south boundary is represented as a point inflow into Lake Athabasca. The reach-node connectivity schematic is depicted in Figure 2.

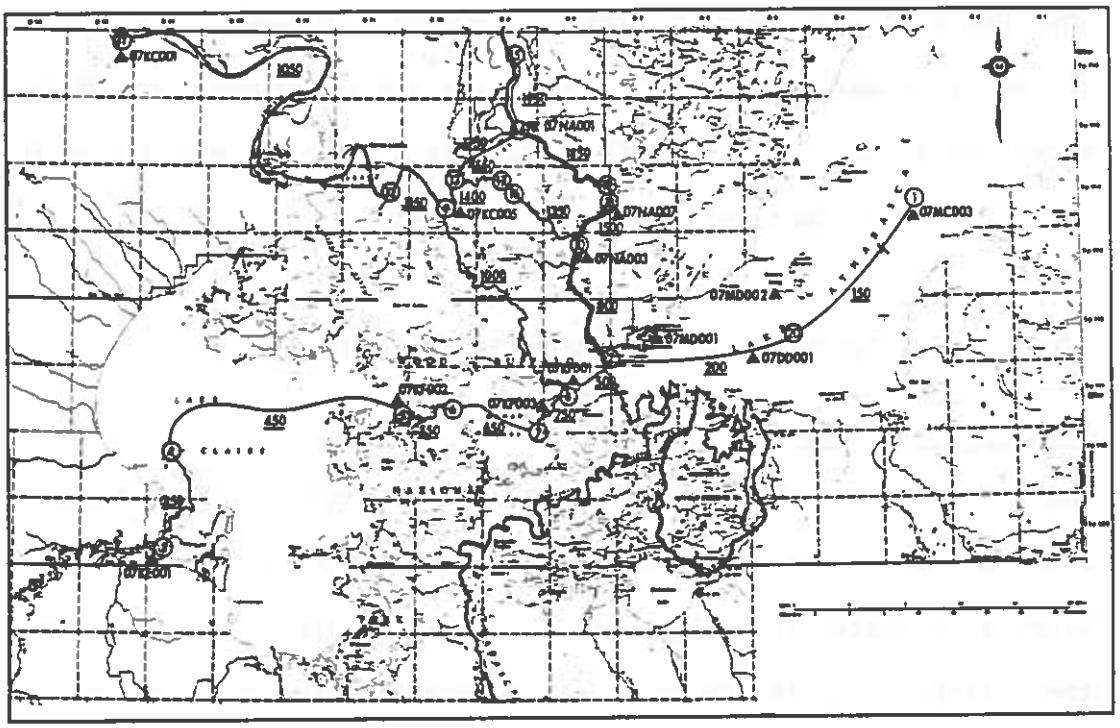


Figure 2 Reach-Node Connectivity Schematic

1.3.2 Limitations of the Study

The study is limited to the presentation of the one-dimensional hydrodynamic model for presently existing open-water conditions in the Peace-Athabasca Delta. Some refinements to the model may still be necessary after a long period simulation run has been executed. At present, the bulk data handling capabilities of the model are being altered to permit such a simulation. Calibration and testing of the model for the natural control condition on the Lake Athabasca outflow channels is an ongoing study. Factors such as ice and wind effects on the system may also require future considerations.

The model is presented to show its applicability in evaluating present and future influences on the Delta. Topics discussed are the responsibilities of the study participants, background to the one-dimensional hydrodynamic model, data input to the model, model simulation and evaluation for the test period and cost estimates of simulation.

2. STUDY PARTICIPANTS AND RESPECTIVE RESPONSIBILITIES

2.1 Government of Alberta

The Alberta Government has taken an active interest in the Peace-Athabasca Delta since changes in the Delta affect both its territory and its people. Alberta initiated investigations in 1968 when low water levels threatened the well-being of the Delta. Active participation and support of the Peace-Athabasca Delta Project Group continued in 1971. When the Project Group disbanded in 1973, Alberta Environment established a regional office in Fort Chipewyan to carry out follow-up studies. In 1975, Alberta was involved in the construction of the Rochers-Coupe weirs, in which they share responsibility for operation and maintenance. Modelling of the Delta was required to evaluate the impact of the weirs and in 1978, Alberta Environment participated in the formulation and calibration of the mathematical model being presented.

The duties of the various participants are outlined below:

- Mr. J.R. Card. Branch Head, initiated the development of a daily flow model for the Peace-Athabasca Delta. His experience with the Delta system indicated the need for a model which defines presently existing flow conditions in the Delta.

- Personnel at the Fort Chipewyan regional office provided much of the field data used in the model. They measured the discharges and levels used in the calibration of the weirs, they operated the recording water level stations in the Delta, and provided cross-section surveys where data was required.

- Mr. C. Abraham, technologist, prepared the field data to conform to the model requirements. He also constructed the cross-sections derived from spot depth soundings in the lakes of the Delta.

- Mr. A. DeBoer, Hydrologist, was the project coordinator for Alberta in the formulation of the model. He actively participated in the model calibration. Mr. DeBoer was involved in the preparation and writing of the final report.

2.2 Government of Canada - Western Region

The Water Survey of Canada, at Calgary, a component of the federal Department of Fisheries and Environment, monitors and collects the surface water data on most of the gauging stations in Alberta and the Northwest Territories, and has been involved in a study of the hydrologic system which was formed under the Mackenzie River Basin Study Program.

The purpose of this last mentioned study is to provide a better understanding of the existing hydrologic system of the Mackenzie River Basin, including water quality and sedimentation. This understanding is required to assist in assessing the results of the changes in the hydrologic system which might result from potential developments. The study area covers the entire

Mackenzie River Basin. Attention, however, will focus on the main streams, lakes and deltas, and the main meteorological features, which determine the behaviour of the hydrometeorological system.

The persons who were assigned to assist the modelling of the Peace-Athabasca Delta are Messrs. Walter Nemanishen, a senior project engineer, and Ted Cheng, a systems and project engineer, both under the directions of the regional chief, Mr. G.H. Morton of Water Survey of Canada, Calgary District Office. They were responsible for supplying all the required hydrometric data on the delta and on its inflow and outflow channels. Assistance was also made to improve or modify the techniques used in the model and to evaluate the results generated by the model.

The Calgary Office of Water Survey of Canada has reimbursed Water Planning and Management (Ottawa) for the cost of computer time required for the initial calibration of the HYDRODYNAMIC Model.

2.3 Government of Canada - Ottawa

The Systems Operations Section in Ottawa, was brought into the study because it had already gained wide experience in the use of a one-dimensional hydrodynamic flow simulation model. The model was originally developed for application to the St. Lawrence River below Cornwall. This model had been employed (along with a water quality feature) on a complex channel network in steady-state or unsteady-state mode.

The personnel involved in carrying out specific tasks were all within the same section. The general tasks undertaken by each are outlined below:

- Mr. D. Farley, Section Head, provided input into the assessment of both weir formulas and the calibration of subcritical and submerged conditions. He has had experience in the assessment of the design structures carried out by the various consultant or government groups in the original Peace-Athabasca Delta Study. Mr. Farley had generally reviewed the results obtained by Willard Boutot, and had originally directed the manner in which the data was to be analyzed.

- Willard Boutot, Systems Engineer, carried out the various curve-fitting required for the weir equations through the use of a B.M.D. curve-fitting package. He also designed and wrote the necessary Fortran programs and documents for the work described in Appendix C.

- Mrs. A.K. Emery, Programmer Analyst, was involved in the correction and updating of the Model documentation and the transfer of programs and test data during the various phases of the study. She had also carried out several investigations into the potential improvements envisaged for the model.

- Mr. M. Sydor, Senior Systems Engineer, was involved in the basic model re-structing and revision work necessary to incorporate the weir subroutine option. He was also involved in assessing the various results obtained from the model and provided explanation to problems as they arose. In the study process, he was required to provide advice as to the potential and feasibility of various proposed features that various members of the study team envisaged the model should have. Mr. Sydor was involved in the preparation and writing of the final report.

3. THE ONE-DIMENSIONAL HYDRODYNAMIC MODEL

3.1 Theoretical Considerations

The model equations are based upon the theory of long waves in open channels described by St. Venant. The equations of motion take into account the principles of conservation of mass and momentum of fluid movement in open channels. The flow is assumed to obey the following conditions. The flow is sub-critical; motion is assumed to be in one-dimension; pressure is hydrostatic over the fluid, and the boundary resistance forces are introduced by the Chezy friction factor.

The input data is measured cross-sections, given as a set of tables, with control structures such as dams, weirs, and rapids described by rating curves. The computation made can be either transient (unsteady state) or steady-state. Boundary conditions can be one of the various structures given above, discharge or elevation hydrograph and fixed stage, discharge or stage-discharge relationships.

Output from the model is made available in various forms. Initially upon demand during the program execution, a print out of the various point locations can be provided with alternative graphical displays of hydrographs and profiles at as many locations or times as required. In turn, the solution file generated during a simulation run can be stored for future analysis.

The model can presently be run on either a CDC or IBM computer facility. The detailed description of the model theory, data preparation and plot output process are given in Appendix A and E.

4. DATA INPUT TO THE MODEL

4.1 Model Operation

The reach-node connectivity schematic for the Peace-Athabasca Delta Model is shown in Figure 2 and the users manual for setting up the model is provided in Appendix A. Solution options, time parameters and network topology initially define the network. This is followed by a hydraulic description of the reaches, lateral inflow data and hydraulic boundary conditions at the nodes. Finally, hydraulic output parameters, such as hydrographs and water surface profile, are specified.

The first step in modelling is the determination of residual inflow to the system for recorded conditions. This can be described by a simplified water balance computation.

For Lake Athabasca:

$$O = I_B + I_A + I_R \pm \Delta S \qquad (1)$$

O = lake outflow

I_B = lake inflow from the Birch River

I_A = lake inflow from the Athabasca River

I_R = net residual inflow into the lake

ΔS = change in storage in the lake

Lake Athabasca levels at Crackingstone Point - station number 07MC003 are inserted as the boundary condition at node 1. These levels determine both the outflow from the lake and the change of storage of the lake. Thus, the net residual inflow is computed to keep the system in balance. Variables

included in the net residual inflow include ungauged inflow, ground water inflow, precipitation, evaporation and wind effects. The computed net residual inflow is inserted as the boundary condition at node 1 when simulating various alternatives for the Delta System.

4.2 Hydrometric Data

Four existing hydrometric stations provide essential data input to the model. Recorded discharges at station 07KC001 - Peace River at Peace Point are inserted as the boundary condition at node 11. Node 3 also requires discharge to be specified at its boundary. The discharges of station 07KE001 - Birch River below Alice Creek were increased by 50% and lagged two days for input to this boundary. The discharges provided by station 07DD001 - Athabasca River at Embarras Airport were lagged one day and inserted as lateral inflow to reach 200. Recorded levels at station 07MC003 - Lake Athabasca at Crackingstone Point are introduced at node 1 for the computation of residual inflow.

The channel roughness characteristics in the Delta System were determined to reflect both surface water elevations and discharges as provided by the hydrometric stations shown in Figure 2. The calibrated system can now model the interior stations within the network. However, several of these stations should be continued for both a check on the model simulation and for possible future model modifications. Station 07MD001 - Lake Athabasca at Fort Chipewyan often exhibits water levels different from Lake Athabasca near Crackingstone Point. This station will prove useful in modelling wind effects on the lake. Station 07KF002 - Lake Claire near outlet to Prairie River will be required to determine inflow volume from the Peace

River during flood stages. Station 07NA001 - Riviere des Rochers above Slave River provides a check on possible channel shifts which may affect the stage-discharge boundary controlling the Slave River flow. Station 07NA007 - Riviere des Rochers East of Little Rapids provides a check on the calibration and stability of the Rochers weir.

4.3 Description of the Reaches

The reaches of the Delta network are shown in Figure 2 and are described in detail in Appendix B. Each reach includes a map showing the cross-section locations, a description sheet of pertinent facts, cross-section diagrams and cross-section elevation parameters. Additional information such as roughness coefficients and cross-section bottom elevations can be located in Appendix D, where samples of the data input and data output for the residual inflow computation are given.

4.4 Description of the Weirs

Prior to June 1975, natural control regulated outflow from Lake Athabasca. A natural submerged weir existed on Riviere des Rochers at Little Rapids. The site location is depicted in Figure 2 where the upstream side of the weir is at node 18 and the downstream side of the weir is at node 19. For this period, no control structure existed on Revillon Coupe. When simulating the natural control condition, reaches 1350 and 1550 must be combined into a single reach in the interior of the network.

After March 1976, the Rochers weir was altered and a submerged weir was completed on Revillon Coupe. The Coupe weir is located at node 16 for the

upstream side and at node 17 for the downstream side. Figure 2 shows this present outflow control condition.

All of the weirs are submerged and are constructed of natural bedrock or rock fill. Measured discharges and levels at the weirs exhibited definite weir characteristics. The flow through the weirs is described mathematically by the free overflow and submerged weir equations which are:

$$Q = C_f \left[H_1 - HCREST\right]^P \quad (2)$$

$$Q = C_s \left[-\log S\right]^{N_s} \left[H_1 - H_2\right]^{N_f} \quad (3)$$

where: Q = discharge in cubic feet per second

H_1 = upstream stage in feet

H_2 = downstream stage in feet

HCREST = weir crest elevation in feet

$S = \left[\frac{H_2 - HCREST}{H_1 - HCREST}\right]$ = degree of submergence

The data input and resulting coefficients for the weirs are given in Appendix C.

5. MODEL SIMULATION AND EVALUATION

5.1 Computation of Residual Inflow

The period selected for testing the model was from September 10, 1977 to September 23, 1977. The starting date was used for calibration of the model since steady flow conditions existed in the Delta system at this date. The simulation period was limited to 13 days because this period occupied the available storage capabilities of the existing model.

The model computes elevation and discharge at all locations throughout the system. Therefore, if a surface water elevation is prescribed at a boundary, the model will compute a corresponding discharge which will satisfy the system. The discharge computed in this manner is termed the residual inflow. Recorded Lake Athabasca levels at Crackingstone Point are input into the model and the discharges to satisfy this input are computed. These computed discharges are then re-introduced as the boundary condition when simulating other alternatives. The specified lake levels incorporate gains and losses resulting from precipitation to or evaporation from the lake surface. The residual inflow computed is the net sum of all the unknown losses and gains to the system.

The area of ungauged inflow into Lake Athabasca for the model is 38,500 square miles. In this area, 19,000 square miles are gauged at hydrometric station number 07LE002 - Fond-du-Lac-River at outlet of Black Lake, 3,300 square miles are gauged at station number 07MB001 - MacFarlane River at outlet of Davey Lake and 1,140 square miles are gauged at station number 07DD002 - Richardson River near the mouth. The mean inflow from surface water runoff for this area is estimated as the mean specific flow for 19,500 square miles, determined by the average specific runoff at stations 07MB001 and 07DD002, plus the mean recorded flow for station 07LE002.

Table 1 shows the computed residual inflow for the test period as well as flow data available in the ungauged area. Since lake level fluctuations influence the computed daily residual inflows, mean inflows for the test period are compared to show the validity of the residual inflow computation.

TABLE 1 Ungauged inflow into Lake Athabasca

Sept. 1977	Computed Inflow (CFS)	Fond-du-lac 07LE002 (CFS)	Macfarlane 07MB001 (CFS)	Richardson 07DD002 (CFS)	07MC003 (FEET)
10	-3,930	20,900	2,610	565	687.97
11	31,200	20,800	2,630	560	687.95
12	19,100	20,900	2,650	560	687.93
13	10,800	20,900	2,660	560	687.86
14	27,400	20,900	2,680	565	687.82
15	41,900	20,800	2,700	575	687.81
16	48,300	20,800	2,710	590	687.82
17	47,600	20,700	2,700	605	687.82
18	46,100	20,700	2,700	615	687.84
19	20,700	20,600	2,690	620	687.81
20	28,900	20,600	2,690	620	687.74
21	46,100	20,500	2,670	615	687.74
22	36,000	20,400	2,650	610	687.73
23	25,700	20,400	2,640	605	687.69
MEAN	32,300	20,700	2,670	590	

The mean specific inflow for the 19,500 square mile area is estimated to be 0.66 cfs/square mile or 12,900 cubic feet per second (cfs). This is the average of 0.81 cfs/square mile for station 07MB001 and 0.52 cfs/square mile for station 07DD002. Adding to this, the mean flow of 20,700 cfs for station 07LE002 gives an estimated ungauged inflow of 33,600 cfs from surface water runoff for the test period. This compares favorably with the computed mean residual inflow of 32,300 cfs. The estimates indicate that the residual inflow is mainly comprised of surface water runoff from the ungauged drainage area.

5.2 Lake Athabasca Water Levels

For recorded conditions, levels for Lake Athabasca at Crackingstone Point can always be identically reproduced because the residual inflow input into the model satisfies the recorded lake levels; as outlined in the computation of residual inflow.

5.3 Slave River Discharge

The simulation of Slave River discharge is illustrated in Figure 3. For the test period, the average simulated discharge is 135,000 cubic feet per second (cfs). For this same period, the average recorded discharge, determined from station 07NB001 - Slave River at Fitzgerald, is 145,000 cfs. The simulation error is about 9.3 percent. Since the Peace River discharge is relatively constant for this period, the error is a result of outflow from Lake Athabasca.

Table 2 compares measured discharges with simulated discharges on September 21, 1977 for the outflow channels of Lake Athabasca. The error in the outflow is distributed between Riviere des Rochers, Chenal des Quatre Fourches and Revillon Coupe.

The simulated discharge in Riviere des Rochers is 4.2 percent less than the measured discharge. The simulated discharge is dependant on the weir calibration and the error is within the calibration limits.

The simulated discharge in Chenal des Quatre Fourches is 42.4 percent less than the measured discharge. This reduction represents about 60 percent of the total discharge deficit. Since this reach is in the interior of

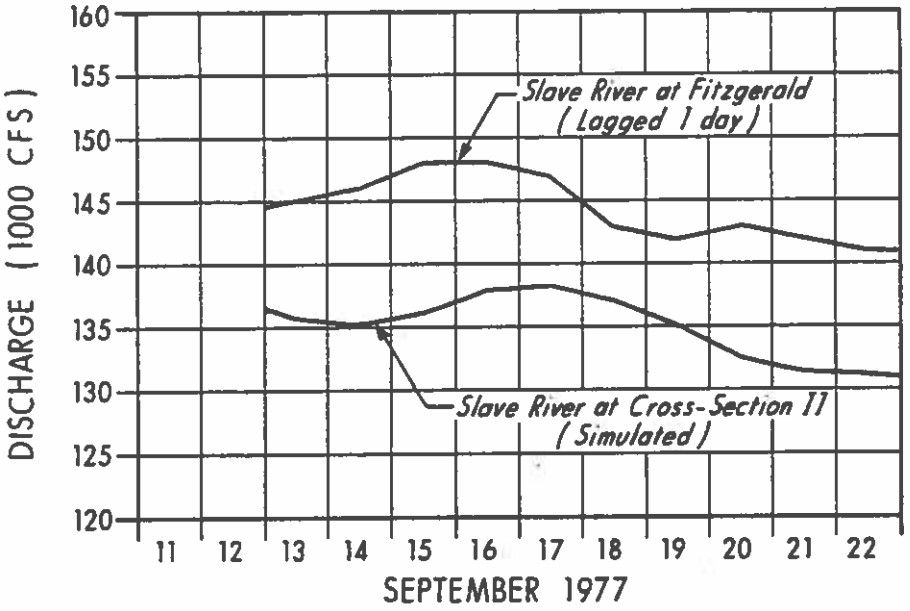


FIG. 3 - FLOW SIMULATION OF SLAVE RIVER DISCHARGE

Table 2-Measured and Simulated Discharges in Lake Athabasca Outflow Channels - September 21, 1977

Stream	Measured Discharge (cfs)	Simulated Discharge (cfs)
Peace River	59,000	59,000
Chenal des Quatre Fourches	13,200	7,600
Revillon Coupe	3,500	2,500
Riviere des Rochers	64,700	62,000
Total (Slave River)	140,500	131,100

the network, its discharge is controlled by the channel geometry and the channel roughness. Of these two parameters, the channel geometry would contribute the greatest influence. Since 1970 cross-section data was used as input to the model, investigations are required to determine whether erosion is occurring in Chenal des Quatre Fourches due to the influence of the Rochers-Coupe weirs.

The simulated discharge in Revillon Coupe is 28.6 percent less than the measured discharge. The weir calibration has the greatest influence on discharge for this channel. Improvement on the weir calibration should be considered. However, discharge errors in Revillon Coupe generally represents less than 1 percent of Slave River discharge indicating that this channel has minimal influence on the Lake Athabasca outflow system.

5.4 Peace River Flood

A hypothetical flood was imposed on the Peace River and routed through the channels of the Delta to show the capability of the model in simulating the complicated flow reversal which can occur in the system. The resulting levels are illustrated in Figure 4 and the resulting discharges are depicted in Figure 5.

A major inflow from the Peace River toward Lake Athabasca has not occurred since the construction of the Rochers-Coupe weirs. Thus, a simulation of this process could not be compared to a recorded event. However, the major components of the Slave River flow are well defined. The Peace River flow is provided as input, the Slave River flow is controlled by a well

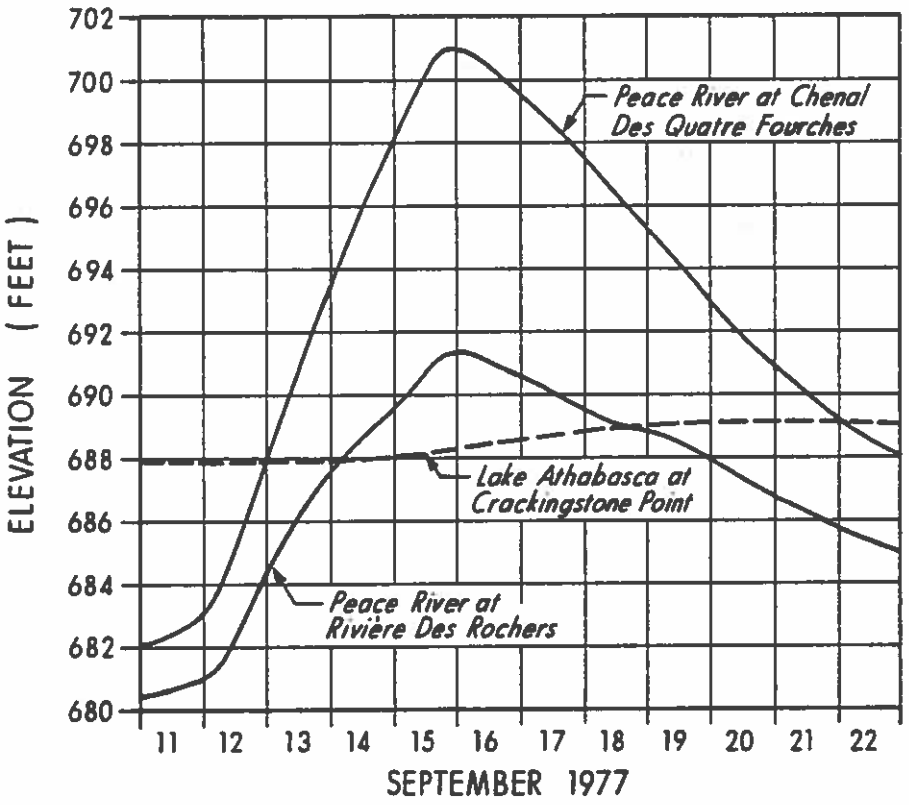


FIG. 4 - LEVEL SIMULATION OF A FLOOD ON THE PEACE RIVER

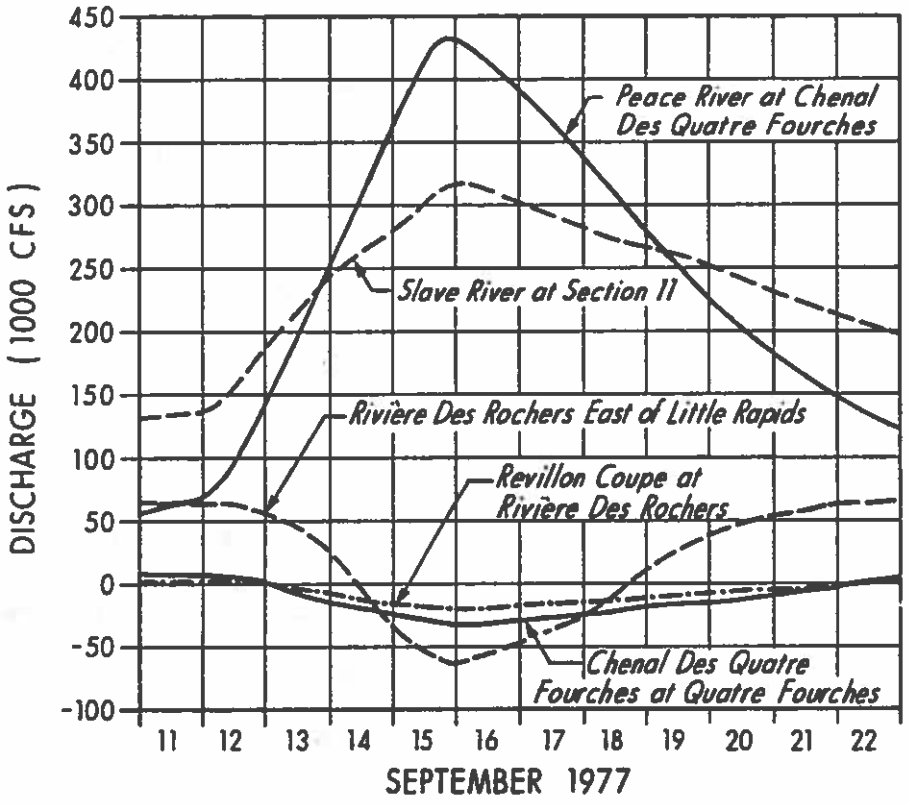


FIG. 5 - FLOW SIMULATION OF A FLOOD ON THE PEACE RIVER

defined stage-discharge relationship and the flow in Riviere des Rochers is within the limits of the weir calibration. In the minor outflow channels, the flow in Revillon Coupe is within the limits of the weir calibration and the flow in Chenal des Quatre Fourches is controlled by the channel geometry, the channel roughness and the influence of Lake Athabasca and Peace River levels. Personal knowledge of the Delta system indicates that the levels and discharges provided by the simulation approximate the flow reversal process.

COMPUTER RUN COSTS

The one-dimensional hydrodynamic model costs can be estimated in a simple manner. This will allow a potential user to generally compute the computer run costs of the model. It should be pointed out that the model costs do not reflect the additional steps required in establishing the model dimensions, compilation and data input generation.

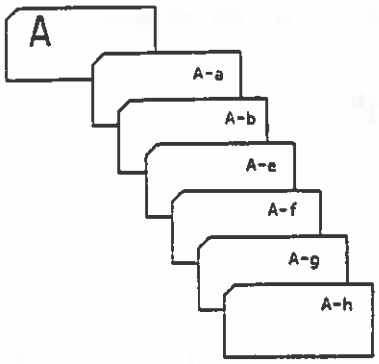
On the IBM/Data Crown computer, the job run will take approximately 30 cpu seconds for 48 time-step calculations. Also 10 cpu seconds is used up initially to arrange the internal cross-section tables and other tasks. The remaining 20 cpu seconds are utilized in actual execution of the hydrodynamic solution. For example, a typical run to simulate one month at a two-hour time-step interval would take $10 + 360 \times (30-10)/48 = 160$ cpu seconds, or approximately 2.5 cpu minutes. In dollars, if we take various system charges and ignore the speed of each machine as well as some peripheral costs, this would give the following costs:

Data Crown - (IBM)	$55.00 / day-time priority
EMR (CYBER '74)	$30.00 / day-time priority
Gov't of Alberta (IBM)	$50.00 / day-time priority
Univ. of Calgary	$52.00 / day-time priority

APPENDIX A

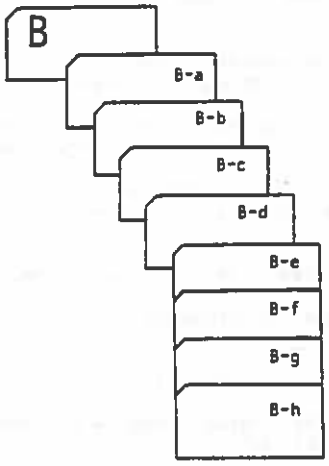
MODEL USER'S MANUAL

Descriptions of the Card Groups .



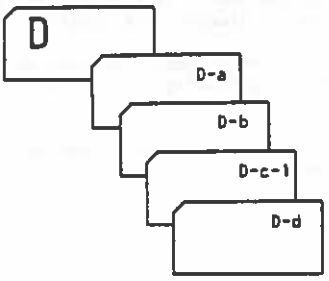
SOLUTION OPTIONS, TIME PARAMETERS, NETWORK TOPOLOGY

- Title card
- Hydraulic solution options
- Prototype time parameters
- Network parameters
- Reach-Node connectivity cards
- Control structure identification cards



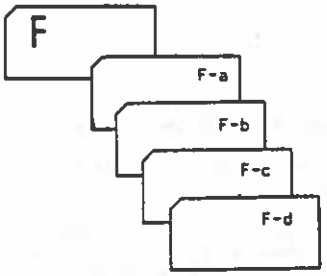
HYDRAULIC DESCRIPTIONS OF THE REACHES

- Reach identification
- Reach characterization card
- Reach parameters
- Elevation table parameters
- Cross-section geometry parameters
  - option 1: Irregular cross-section, constant or variable top width
    OR
  - option 2: Irregular cross-section, constant top width
    OR
  - option 3: Irregular cross-section, variable top width



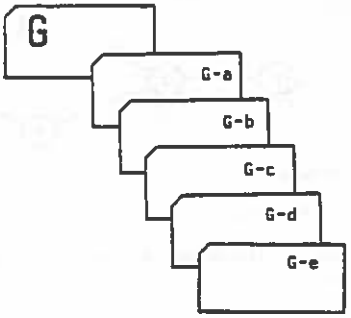
LATERAL INFLOW DATA

- Lateral inflow identification card
- Number of lateral inflows
- Lateral inflow parameters
- Lateral inflow



HYDRAULIC BOUNDARY CONDITIONS AT THE NODES

- Identify card for hydraulic boundary conditions
- Node parameters
- Boundary node conditions
- Boundary node condition



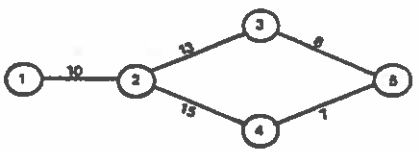
HYDRAULIC OUTPUT PARAMETERS

- Identity card
- Number of hydrographs
- Hydrograph Parameters
- Number of Hydraulic Profiles
- Profile Parameters

DESCRIPTION OF CARD GROUP - A

	VARIABLE	COLUMN	FORMAT	DESCRIPTION
Card A-a	Header	01-80	20A4	description of run identifying output for later reference
Card A-b	IOPT(1)	00-10	I10	= 1, solution computations executed 2, solution computations deleted
	IOPT(2)	11-20	I10	= 1, steady-state solution 2, transient solution
	IOPT(3)	21-30	I10	= 1, solution storage executed 2, solution storage deleted
	IOPT(4)	31-40	I10	= 1, river network 2, estuary network
	IOPT(5)	41-50	I10	= 1, hydraulic initialization read from sequential data set on tape 2, hydraulic initialization taken from data deck
Card A-e	NPER	01-10	I10	= number of periods the solution is to propogate. Specify 1 in the case of a steady-state solution, or in the case of a river system.
	NINC	11-20	I10	= number of time increments within each period for the hydraulic model. Δt = PERIOD/NINC. (See card B-c and discussion at beginning of manual.)
	PERIOD	21-30	F10.0	= length of prototype time period in seconds. In estuaries, it is convenient to use the tidal period. For river systems, this is the total time being modeled.
	RATIO	31-40	F10.0	= ratio of the water quality time increment to the hydraulic time increment $\frac{\Delta t_{WQ}}{\Delta t_H}$, such that number of water quality increments = $\frac{\text{(number of hydraulic increments)}}{\text{ratio}}$ (May be left blank if water quality computation is to be deleted.)
	MAXITR	41-50	I10	= maximum number of periods allowed the program to compute a steady-state initial condition. (Only for hydraulics.)
	EPS	51-60	F10.5	= the maximum allowed change in the discharges at each mesh point from one tidal period to the next. This defines a steady-state initial condition.
	LPER	61-70	I10	= number of lead-in periods of hydraulics to be read from tape before solution starts. This parameter is only used for extending file containing hydraulic solution.
	NRINC	71-80	I10	= number of time increments of lead-in for river studies (excluding initial data). Use only if file is being extended.
Card A-f	NREACH	01-10	I10	= number of reaches in the network
	NNODE	11-20	I10	= number of nodes in the network
	NCTR	21-30	I10	= number of control structures
Card A-g	K	01-10	I10	= sequence number of reach numbers
	IRCH(K)	11-20	I10	= numerical identification of the reach to which the information applies
	IREACH(K,1)	21-30	I10	= number of the node at the upstream end of the reach (the end from which the distances are given is the upstream end).
	IREACH(K,2)	31-40	I10	= number of the node at the downstream end of the reach. Repeat the connectivity cards for all reaches. The reaches can be given any numerical number, however, the nodes in any network must be numbered consecutively from 1 to n.

K	IRCH	IREACH(K,1)	IREACH(K,2)
1	10	1	2
2	13	2	3
3	15	2	4
4	8	3	5
5	7	4	5



Card A-h	ICRS(I,1)	01-10	I10	= node at upstream end of control structure
	ICRS(I,2)	11-20	I10	= node at downstream end of control structure

This card must be repeated according to the number of control structures, NCTR, indicated on card A-f.

DESCRIPTION OF CARD GROUP B

	VARIABLE	COLUMN	FORMAT	DESCRIPTION
Card B-a	HHEAD	01-80	20A4	= descriptive identification of the reach.
Card B-b	JK	01-10	I10	= numerical identification (IRCH(K)) of the reach to which the information applies; the reaches must be in the same order as that specified by reach-node connectivity table.
	IS(K)	11-20	I10	= specifies the shape of the channel cross-section within the reach. 1, irregular 2, rectangular 3, trapezoidal 4, circular
	IP(K)	21-30	I10	= 1, prismatic channel along the length of the reach 2, non-prismatic channel (varying width of land depth)
	ISL(K)	31-40	I10	= 1, bottom slope of reach constant and given 2, bottom slope variable and computed from bottom elevations at each secti
	IF(K)	41-50	I10	= 1, Manning's coefficient given 2,
	ICE(K)	51-60	I10	= 0 or blank, no ice cover 1, ice cover; hydraulic radius will take cover into account
	IDTABL(K)	61-70	I10	= 1, print interpolated tables 0, no table printouts -1, no printout of input cross-section tables except first section of each reach
Card B-c	SL(K)	01-10	F10.5	= bottom slope of the channel if it is to be specified. Can be left blank if ISL(K)=2.
	SS(K)	11-20	F10.5	= side slope for a trapezoidal channel. Can be left blank if IS(K)≠3 (SS = vertical per unit horizontal.)
	XMANN(K)	21-30	F10.5	= Manning coefficient, for the entire reach. This can be overridden at individual sections (Card B-e)
	TL(K)	41-50	F10.5	= total length of the reach from upstream to downstream node
	DX(K)	51-60	F10.5	= initial estimate of the computational mesh spacing in reach K. Final value of DX(K) is computed in the program to make sure that the reach length is divided into equal increments (in feet). DX(K) must be compatible with the hydraulic time increment Δt, N NC. card A-e. See calculation procedure at beginning of manual.
Card B-d	NS(K)	01-10	I10	= number of cross-sections in the reach at which geometric information is provided. It must be atleast 1, as will be seen in the discussion preceding the definitions of cross-section geometry parameters.
	ITZ(K)	11-20	I10	= number of entries in elevation tables of geometric parameters.
	H1(K)	21-30	F10.5	= minimum elevation entry for reach K in the case where the elevation tables are to be calculated for a rectangular, trapezoidal, circular, or constant top width irregular cross-section. This is the minimum expected water surface elevation for the reach.
	H2(K)	31-40	F10.5	= maximum elevation entry for reach K in the same cases. This is the maximum expected water surface elevation.
	Adj	41-50	F10.5	= cross-section table adjustment, used to raise or lower elevation tables to account for reference datum error, degradation, aggradation. (HEAD(K,J,I)+ADJ) = new value of HEAD)

An internal table of parameters as a function of elevation will be generated. IIZ is the number of entries in this table, and should be a number sufficient to permit reasonable interpolation of values from the table. H1(K) and H2(K) represent the expected minimum and maximum water surface elevations.

DESCRIPTION OF CARD GROUP B (CONTINUED)

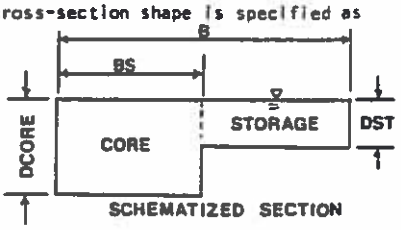
	VARIABLE	COLUMN	FORMAT	DESCRIPTION
Card B-e	TLX(K,J)	01-10	F10.5	= distance from upstream end in feet to cross-section J in reach K.
	BW(K,J)	11-20	F10.5	= bottom width at TLX(K,J). Supplied for rectangular and trapezoidal cross-section shapes. Fill in if IS(K)=2 or 3, otherwise, leave blank.
	BEL(K,J)	21-30	F10.5	= bottom elevation at TLX(K,J). Required when bottom slope is not specified, and required at final cross-section when slope is specified.
	R(K,J)	31-40	F10.5	= pipe radius at TLX(K,J). Leave blank if channel shape is not circular. (At present, the program allows only a constant radius pipe.)
	Z(K,J)	41-50	F10.5	= estimate of initial water surface elevation at TLX(K,J)
	Q(K,J)	51-60	F10.5	= estimate of initial discharge at TLX(K,J)
	FCOEF(K,J)	61-70	F10.5	= Manning's coefficient for this section. This value will replace the value (if any) specified for the entire reach. Can be left blank if coefficient defined on Card B-c.

Cards B-e, B-f, B-g and B-h constitute the cross-section subpackage, which must be supplied for each data cross-section indicated by the parameter NS(K). For a prismatic cross-section of regular geometric shape (IP(K)=1) only card B-e is necessary. Cards B-f, and either B-g or B-h are supplied only if the cross-section shape is specified as irregular (IS(K)=1).

Card B-f	ITW	01-10	I10	= 1, for constant top width 2, for variable width

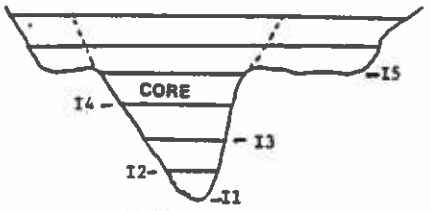
Card B-f is supplied only if the cross-section shape is specified as irregular, thus IS(K)=1.

Card B-g	B	01-10	F10.5	= total topwidth in feet
	BS	11-20	F10.5	= core topwidth in feet
	DST	21-30	F10.5	= schematized depth of storage area
	DCORE	31-40	F10.5	= schematized depth of core area



Card B-g is supplied only if IS(K)=1 and ITW=1. Refer to figure below for procedure of calculating section parameters.

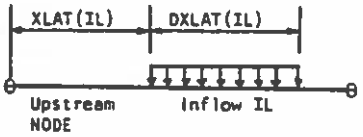
Card B-h	HEAD(K,J,I)	01-10	F10.5	= water surface elevation entry I for cross-section J in reach K, where I ranges from 1 to IIZ(K)
	TW(K,J,I)	11-20	F10.5	= total top width for entry I
	CW(K,J,I)	21-30	F10.5	= core width for entry I
	AREA(K,J,I)	31-40	F10.5	= core area for entry I
	WPERM(K,J,I)	41-50	F10.5	= wetted perimeter along core for entry I
	TAREA(K,J,I)	51-60	F10.5	= total cross-sectional area for entry I (area of core plus area of storage)



Card B-h is supplied only if IS(K)=1 and ITW=2. This card is to be repeated, corresponding to the number of elevation entries indicated by IIZ(K). These cards must be arranged in order to increasing depth.

DESCRIPTION OF CARD GROUP D

	VARIABLE	COLUMN	FORMAT	DESCRIPTION
Card D-a	Header	01-80	20A4	- description of the lateral inflows - Lateral inflows can be either inflows of streams from sub-basins or inflows of quality constituents. - After the identification card, D-a, there is a package of cards which is repeated for all lateral inflows.
Card D-b	NLAT	01-10	I10	= total number of lateral inflows. - If there are no lateral inflows, NLAT = 0, the computer will skip to the next card group. Otherwise, it will expect the lateral inflow data from cards D-c and D-d.
Card D-C-1	IL	01-10	I10	= number of the inflow to which the information applies.
	KLAT(IL)	11-20	I10	= number of the reach in which inflow IL is located
	XLAT(IL)	21-30	F10.5	= distance to upstream end of inflow IL
	DXLAT(IL)	31-40	F10.5	= width of inflow IL. (A point inflow can be defined by a width of 0.0)
	ILAT(IL)	41-50	I10	= 1, constant lateral inflow 2, variable lateral inflow
	IL(IL)	51-60	I10	= number of table entries for inflow IL. One entry is necessary for constant lateral inflow, with more as needed to describe variable lateral inflow.
Card D-d	TIL(IL,I)	01-10	F10.5	= time in seconds for table entry I, relative to the beginning of the period.
	CLAT(IL,I)	11-20	F10.5	= magnitude of the inflow in cfs/ft for a distributed lateral inflow or cfs for a point inflow. One entry describes constant inflow and further entries describe variable lateral inflow.

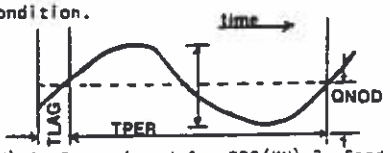


Cards D-c and D-d constitute a package and must be repeated according to the number of lateral inflows, NLAT.

DESCRIPTION OF CARD GROUP F

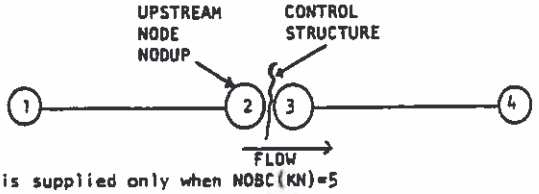
	VARIABLE	COLUMN	FORMAT	DESCRIPTION
Card F-a	Header	01-80	29A4	- Hydraulic descriptions of the nodes. - After the identification card, F-a, there is a package of cards which is repeated for each node.
Card F-b	KN	01-10	I10	= number of the node for the following information.
	NOBC(KN)	11-20	I10	= indicates the type of condition to be applied at node KN. 0. junction or interior node 1. water surface elevation prescribed 2. discharge prescribed 3. stage-routing boundary condition 4. rating curve (z vs Q. - table) 5. downstream end of control structure - WIERS - 6. Rivière des Rochers (structure) 7. Revillon Coupé (structure) 8. Rivière des Rochers (natural)
	IBC(KN)	21-30	I10	= indicates the time dependence of the boundary condition at node KN. In a junction node, or a downstream side of control node, the information is ignored by the computation. 1. constant with time 2. variable with time 3. sinusoidal with time (see card F-c)
	ITX(KN)	31-40	I10	= number of table entries for the boundary condition specifications. For constant boundary conditions, and downstream side of control structure, onl one card is required. Sinusoidal boundary conditions are handled with one card also, where space is provided for the height and period of oscillation More table entries are required is IBC(KN)=2.
	INT(KN)	41-50	I10	= 1. linear interpolation of variable boundary condition data. Only if IBC(KN 2. cosine interpolation of variable boundary condition data. Only if IBC(KN
	STIME	51-60	I10	= starting time of first data read in. (W.S.C. format for 15 minute values)
	TIME	61-70	I10	= time increment between data point (in seconds) Cards E-b, E-c or E-d constitute a package and must be repeated for each node. For interior nodes and the stage-routing cases, NOBEC(KN)=0 or 3, no more information is required and the computer will skip to the next Node Parameter Card. For NOBC(KN)=1, 2 or 4 card F-c is required. For NOBC(KN)=5 card F-d is required.
Card F-c *	TIME	01-10	F10.5	= prototype time in seconds relative to the beginning of each individual peri If the boundary condition is constant or sinusoidal, no value need be specified.
	ZNODE	11-20	F10.5	= water surface elevation, if constant, the water surface elevation is assign the value for J=1. If the time dependence is sinusoidal, the mean value abo which the surface elevation oscillates, is assigned the value for J=1. (J i the subscript of time increment.)
	QNODE	21-30	F10.5	= discharge at node KN at time TI(KN,J). If the time dependence is constant, discharge is assigned the value for J=1. If the time dependence is sinusoid the mean discharge, about which the discharge oscillates, is assigned the value for J=1.
	TPER	31-40	F10.5	= period of oscillation for the sinusoidal boundary condition at node KN.
	PEAK	41-50	F10.5	= height of oscillation for the sinusoidal boundary condition at node KN.
	TLAG	51-60	F10.5	= time lag for the sinusoidal boundary condition.

SINUSOIDAL BOUNDARY CONDITION



This card is supplied only when NOBC(KN)=1, 2, or 4 and for IBC(KN)=3. Card F-c also allows the user to specify a sinusoidal boundary condition as show in the sketch below..

Card F-d	NODUP	01-10	F10.5	= the number of the node on the upstream side of the control structure. The discharge of the downstream node is taken from that of the upstream node. There are four cases: 1) the upstream node has discharge, Q, specified. In this case, the program takes this value directly. 2) the upstream node is a z versus Q, or rating curve type boundary. In this case, the program sets t discharge of the downstream node equal to that determined by the program fo the upstream node at the end of the previous time step. 3) the upstream noc is a stage-routine type boundary. The discharge is handled as in Case 2. 4) the upstream node is of the z-specified type. The discharge is handled a in Case 2.



This card is supplied only when NOBC(KN)=5

*Note: Card F-c is changed to the W.S.C. format
- Discharge is (I1, 15X, 6F10.0)
- Elevation is (I1, 15X, 8F8.3)
I1 value is set to '1' for Discharge and '4' for Elevation.

DESCRIPTION OF CARD GROUP G

	VARIABLE	COLUMN	FORMAT	DESCRIPTION
Card G-a	Header	01-80	20A4	= hydraulic output parameters
Card G-b	NHYD	01-10	I10	= number of hydrographs requested. Cards G-b and G-c constitute a package, however, if the user does not wish to see the hydrographs it is not necessary to include card G-c.
Card G-c	KHYD	01-10	I10	= reach in which hydrograph IH is to be produced.
	XHYD	11-20	F10.5	= desired location in the reach for the hydrograph. The program will find the nearest computational mesh point to this location and produce the hydrograph there. (No interpolation.)
	IHPER	21-30	I10	= period over which the desired hydrograph is to be produced. In a steady-state solution, all hydrographs must be produced in the same period due to programming considerations. In a transient solution, this value should be the number of the current period. The retrieval system is awkward; however, it is felt that comprehensive output is best obtained by storing the solution on tape or disk, and searching it later. Output can then be produced graphically as in the plotting program. Card G-c must be repeated for the number of hydrographs, NHYD, requested.
Card G-d	NPRO	01-10	I10	= number of hydraulic profiles requested. Cards G-d and G-e constitute a package; if the user does not wish to see the hydraulic profiles it is not necessary to include card G-e.
Card G-e	KPRO(IPHY)	01-10	I10	= reach in which profile IPHY is to be printed.
	INCHY(IPHY)	11-20	I10	= time increment at which profile IPHY is to be printed, refer to card A-e for total number of increments, NINC.
	IPPER(IPHY)	21-30	I10	= period in which profile IPHY is to be printed, refer to card G-c for further definition IHPER. The profiles must be specified consecutively with time. Card G-e must be repeated for the number of hydraulic profiles, NPRO, requested.

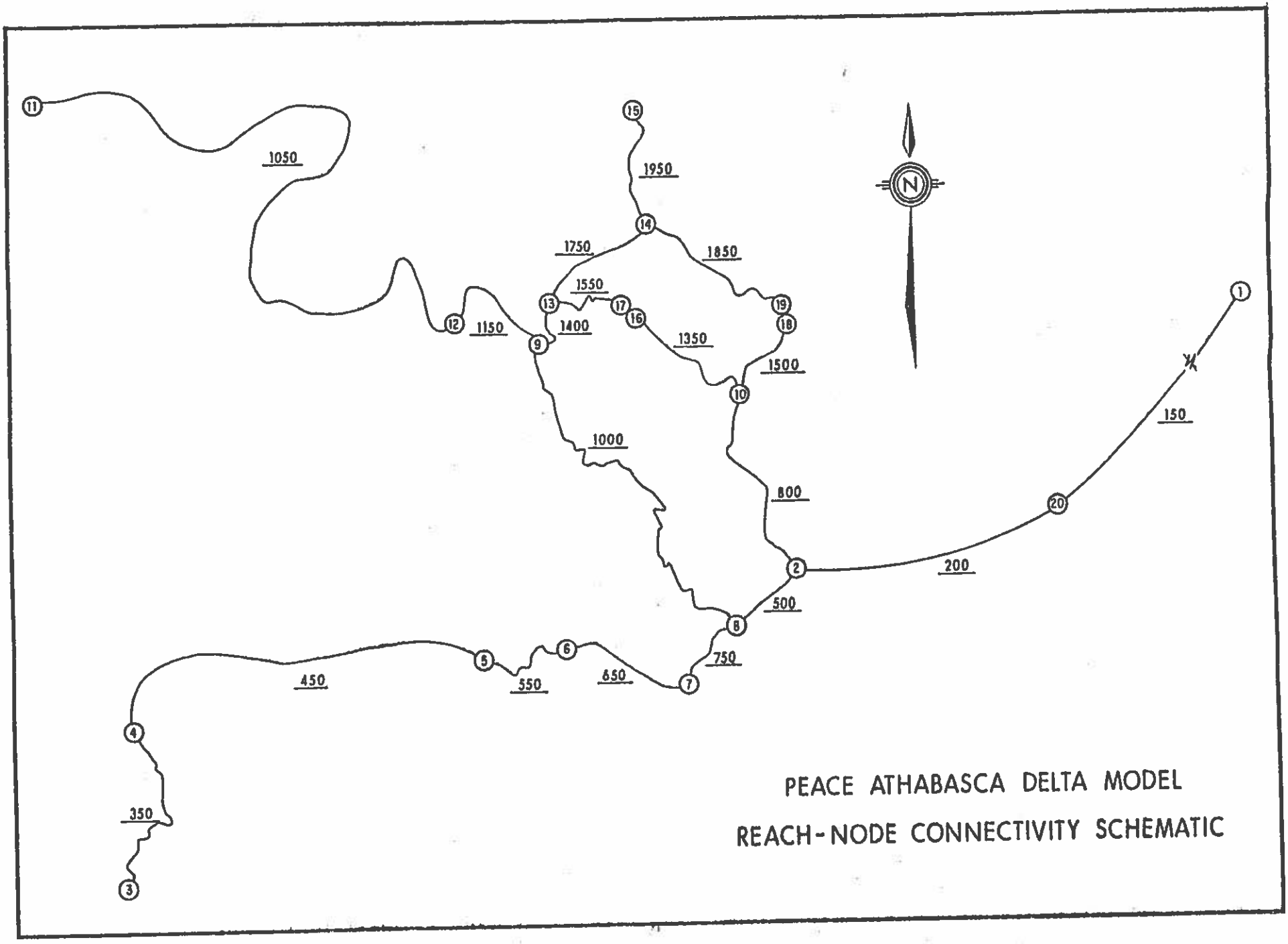
DESCRIPTION OF INPUT CARDS TO PLOTTING PROGRAM

	VARIABLE	COLUMN	FORMAT	DESCRIPTION
PLOT-1				PLOT IDENTIFICATION CARD
	IDENT	01-08	A8	one to eight character identification of the plot.
				TIME PARAMETERS
PLOT-2	NPER	01-10	I10	number of tidal periods ('1' in the case of river flow).
	NINC	11-20	I10	number of time increments within each tidal period.
	RATIO	21-30	F10.0	ratio of water quality time increment to hydraulic time increment.
	DT	31-40	F10.0	actual measure of time increment.
				NUMBER OF REACHES
PLOT-3	NREACH	01-10	I10	number of reaches.
				REACH PARAMETER CARDS (ONE CARD FOR EACH REACH)
PLOT-4	K	01-10	I10	the numerical identification of the reach.
	NSN(K)	11-20	I10	number of hydraulic sections (mesh points) in reach K.
	MESHPT(K)	21-30	I10	number of water quality sections in reach K.
				PLOT SELECTION VS DISTANCE
PLOT-5D	blanks	01-09		columns left blank.
	L	10	A1	letter 'D' in column 10.
	I1 or PER	11-20	I10	tidal period of profile.
	F2	21-30	F10.0	increment within PER of profile (not applicable for tidal range or high and low water planes).
	PL	31-40	F10.0	plot length (X-axis in inches).
	YMIN	41-50	F10.0	minimum value of Y-axis.
	YMAX	51-60	F10.0	maximum value of Y-axis.
	NPTS	61-70	I10	number of individual points to be plotted (if ≠0 supply c PLOT-7 after PLOT-6D).
	SIGN	71-80	F10.0	change sign for discharges (=1.0,0.0,-1.0).
				PARAMETER SELECTION CARD
PLOT-6D	PARAM	01-04	A4	symbols should be left justified. S(salinity), T(temperat BOD(biochemical oxygen demand), ON(organic nitrogen), N(inorganic nitrogen), OP(organic phosphate), P(inorganic phosphate), CP(phytoplankton), CZ(zooplankton), DO(dissol oxygen), FCOL(fecal coliforms), CLIG(conservative lignins DLIG(decaying lignins), Z(surface elevation), Q(discharge R(tidal range), W(high and low water planes).
	blanks	05-10		columns left blank.
	REACH	11-20	I10	reach number.
	S1	21-30	I10	starting section number.
	S2	31-40	I10	ending section number.
	DX	41-50	F10.0	increment length between sections (feet)(Hydraulics only)
	MULTI	51-60	I10	=0, or blank; a single variable is being plotted. =1; this variable plotted with others (same frame). =9; this is the last of several variables being plotted together. NOTE: When MULTI≠0, corresponding card 5D is needed for e variable being plotted.
				PLOT SELECTION VS TIME
PLOT-5T	blanks	01-09		columns left blank.
	L	10	A1	letter 'T' in column 10.
	I1	11-20	I10	the reach number.
	F2	21-30	F10.0	distance of the point of interest from the upstream end. (program will take closest computational section).
	PL	31-40	F10.0	plot length (X-axis).
	YMIN	41-50	F10.0	minimum value for Y-axis.
	YMAX	51-60	F10.0	maximum value for Y-axis.
	NPTS	61-70	I10	no. of individual points to be plotted. (if ≠0 supply car PLOT-7 after card PLOT-6T).
	SIGN	71-80	F10.0	change sign for discharges (=1.0, 0.0, -1.0).

	VARIABLE	COLUMN	FORMAT	DESCRIPTION
				PARAMETER SELECTION CARD
PLOT-6T	PARAM	01-04	A4	symbols should be left justified. S(salinity), T(temperature) BOD(biochemical oxygen demand), ON(organic nitrogen), N(inorganic nitrogen), OP(organic phosphate), P(inorganic phosphate), CP(phytoplankton), CZ (zooplankton), DO(dissolved oxygen), FCOL(fecal coliforms), CLIG(conservative lignins), DLIG(decaying lignins), Z(surface elevation), Q(discharge), R(tidal range), W(high and low water planes).
	IFREQ	05-07	I3	frequency of marking a value on a graph with a special symbol.
	ISYM	08-10	I3	an integer equivalent of the symbol to be plotted.
	PER1	11-20	I10	tidal period at start
	T1	21-30	I10	increment within tidal period at start: the first increment of 1st period is 0, all other periods is 1.
	PER2	31-40	I10	tidal period at finish.
	T2	41-50	I10	increment within tidal period at finish (for a river, the maximum time increment=number of increments-1).
	DX	51-60	F10.0	increment length between sections if constant (hydraulics only)
	MULTI	61-70	I10	=0, or blanks; a single variable is being plotted =1, this variable plotted with others (same frame) =9, this is the last of several variables being plotted together. NOTE: when MULTI≠0, corresponding card 5T is needed for each variable being plotted.
	blanks	71-79		columns left blank.
	IPQ	80	A1	If IPQ='P' the corresponding values of abscissa and ordinate will be outputed to unit 9.
				INDIVIDUAL DATA POINTS CARDS
PLOT-7				the card is supplied only if NPTS≠0 on card PLOT-5T or PLOT-5D. One card per point and these cards follow card PLOT-6.
	U	01-10	F10.0	abscissa, time in seconds from the beginning of the plot (PER1,T1) or distance in feet from beginning (S1).
	V	11-20	F10.0	ordinate value.
	NUSER	21-30	I10	integer code corresponding to the geometric point being plotted. If not defined, the previously defined value will be used. If no value is given a default of 11 will be taken which is an asterisk (*).

APPENDIX B

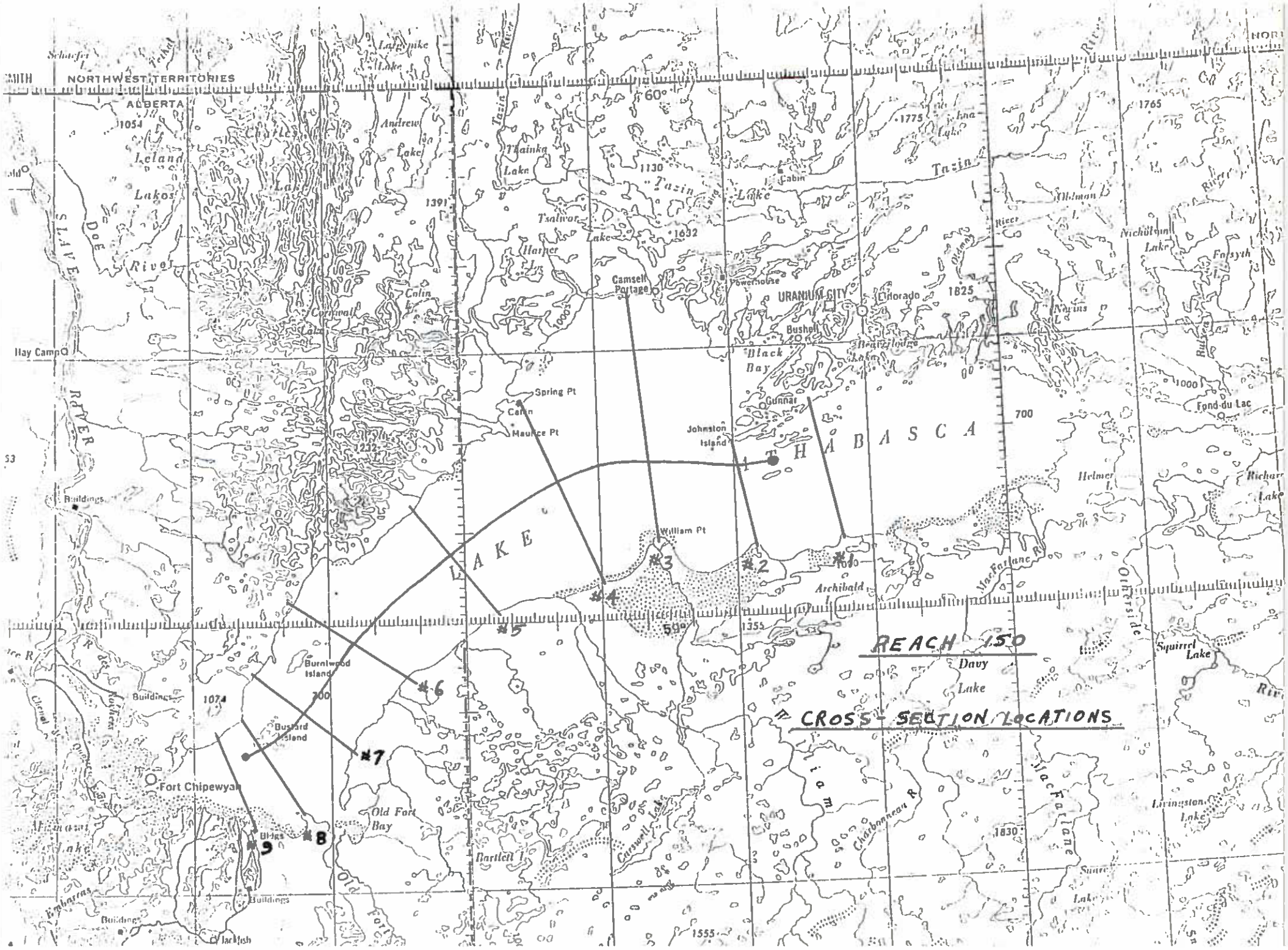
DETAILED DESCRIPTION OF THE REACHES


11
1050
15
1950
14
1750
1850
1550
13
17
19
16
18
12
1150
1400
1350
9
1500
10
1
150
1000
800
20
2
200
500
8
750
6
5
450
550
650
7
4
350
3
N
PEACE ATHABASCA DELTA MODEL
REACH-NODE CONNECTIVITY SCHEMATIC

PEACE-ATHABASCA DELTA MODEL

REACH NODE CONNECTIVITY DESCRIPTION

Reach Number	Reach Description	Upstream Node Number	Downstream Node Number	Reach Length (feet)
150	Lake Athabasca from Crackingstone Point to Bustard Island	1	20	443,059
200	Lake Athabasca from Bustard Island to Riviere des Rochers	20	2	78,900
350	Birch River	3	4	66,634
450	Lake Claire	4	5	139,128
500	Athabasca Channel from Lake Athabasca to Chenal des Quatre Fourches	2	8	26,000
550	Prairie River from Lake Claire to Lake Mamawi	5	6	36,700
650	Lake Mamawi	6	7	56,390
750	Mamawi Lake Channel from Lake Mamawi to Chenal des Quatre Fourches	7	8	25,000
800	Riviere des Rochers from Lake Athabasca to Revillon Coupe	2	10	63,300
1000	Chenal des Quatre Fourches	8	9	144,513
1050	Peace River from Peace Point to Baril River	11	12	226,000
1150	Peace River from Baril River to Chenal des Quatre Fourches	12	9	43,000
1350	Revillon Coupe from Riviere des Rochers to the Structure	10	16	52,100
1400	Peace River from Chenal des Quatre Fourches to Revillon Coupe	9	13	16,700
1500	Riviere des Rochers from Revillon Coupe to the Structure	10	18	34,100
1550	Revillon Coupe from the Structure to the Peace River	17	13	31,700
1750	Peace River from Revillon Coupe to Riviere des Rochers	13	14	40,800
1850	Riviere des Rochers from the Structure to the Peace River	19	14	57,100
1950	Slave River	14	15	39.072


NORTHWEST TERRITORIES
ALBERTA
SLAVE
RIVER
LAKE
ATHABASCA
URANIUM CITY
Fort Chipewyan
Camsell Portage
Spring Pt
Maurice Pt
Johnston Island
William Pt
Gunnar
Bushell
Black Bay
Archibald
Burntwood Island
Bustard Island
Old Fort Bay
Carswell Lake
Bartlett I
Davy Lake
Fond-du Lac
Hay Camp
Buildings
#1
#2
#3
#4
#5
#6
#7
#8
#9
REACH 150
CROSS-SECTION LOCATIONS

REACH NUMBER - 150

DESCRIPTION - Lake Athabasca from Crackingstone Point to Bustard Island

REACH LENGTH - 443,059 feet

UPSTREAM NODE - 1

DOWNSTREAM NODE - 20

CROSS-SECTIONS - 9

Section Number	Distance from Upstream Node (ft)
1	-35,640
2	22,440
3	89,760
4	147,840
5	240,240
6	326,304
7	389,664
8	430,584
9	455,559

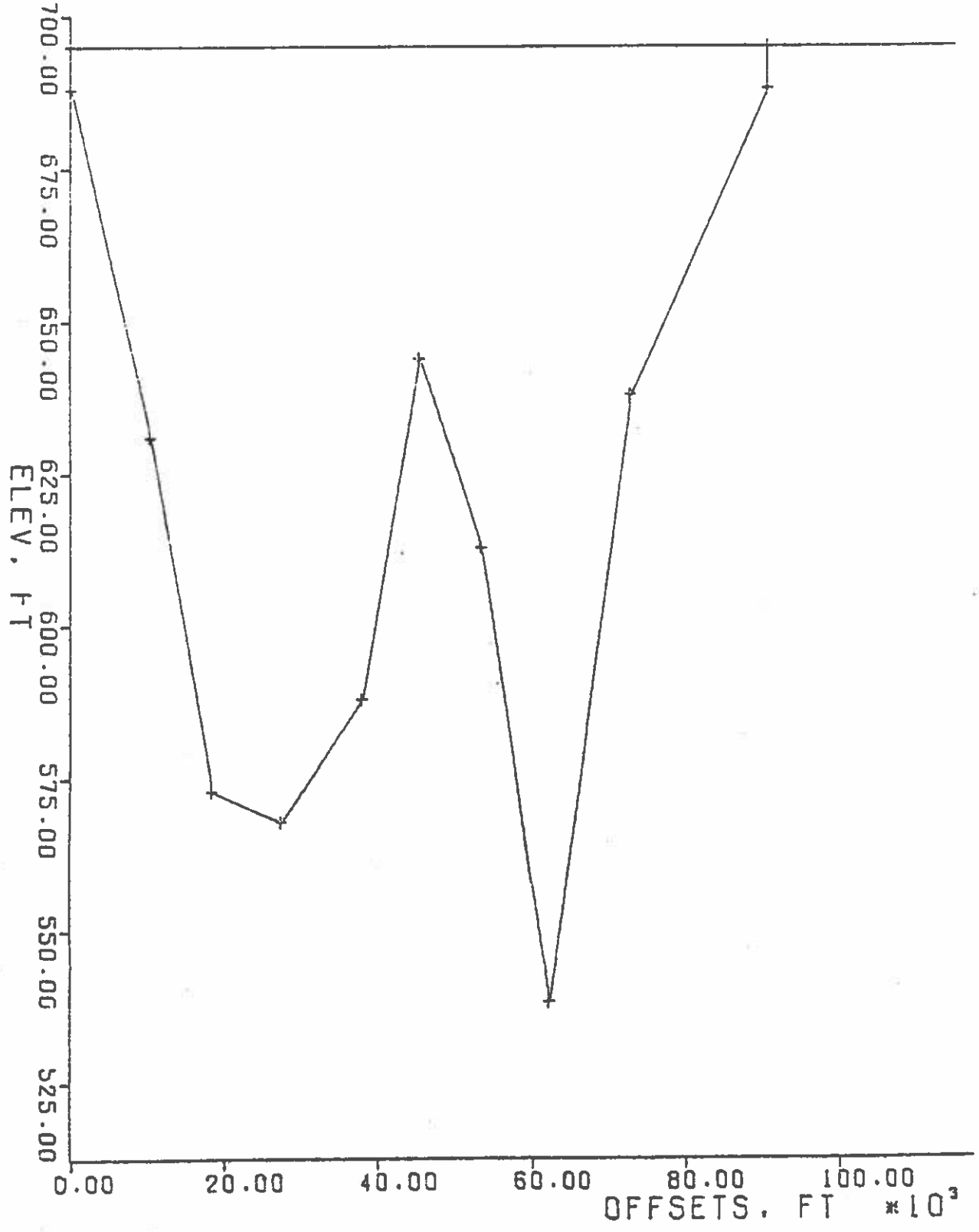
REMARKS: These cross-sections were produced from the 1962 edition of "Depth Soundings of Lake Athabasca" by the Canadian Hydrographic Service, Marine Sciences Branch, Department of Mines and Technical Surveys.

A hydraulic boundary condition at node 1 is required to be specified. Recorded Lake Athabasca levels at hydrometric station 07MC003 - Lake Athabasca near Crackingstone Point are initially inserted. This enables the model to compute net supply discharges to satisfy the recorded conditions. The net supply discharges computed would then be inserted when various alternative investigations are modelled.

REACH 150

CROSS-SECTION 1

DISTANCE = 35,640 ft.



REACH 150

CROSS-SECTION 1

DISTANCE -35,640 ft.

LEGEND

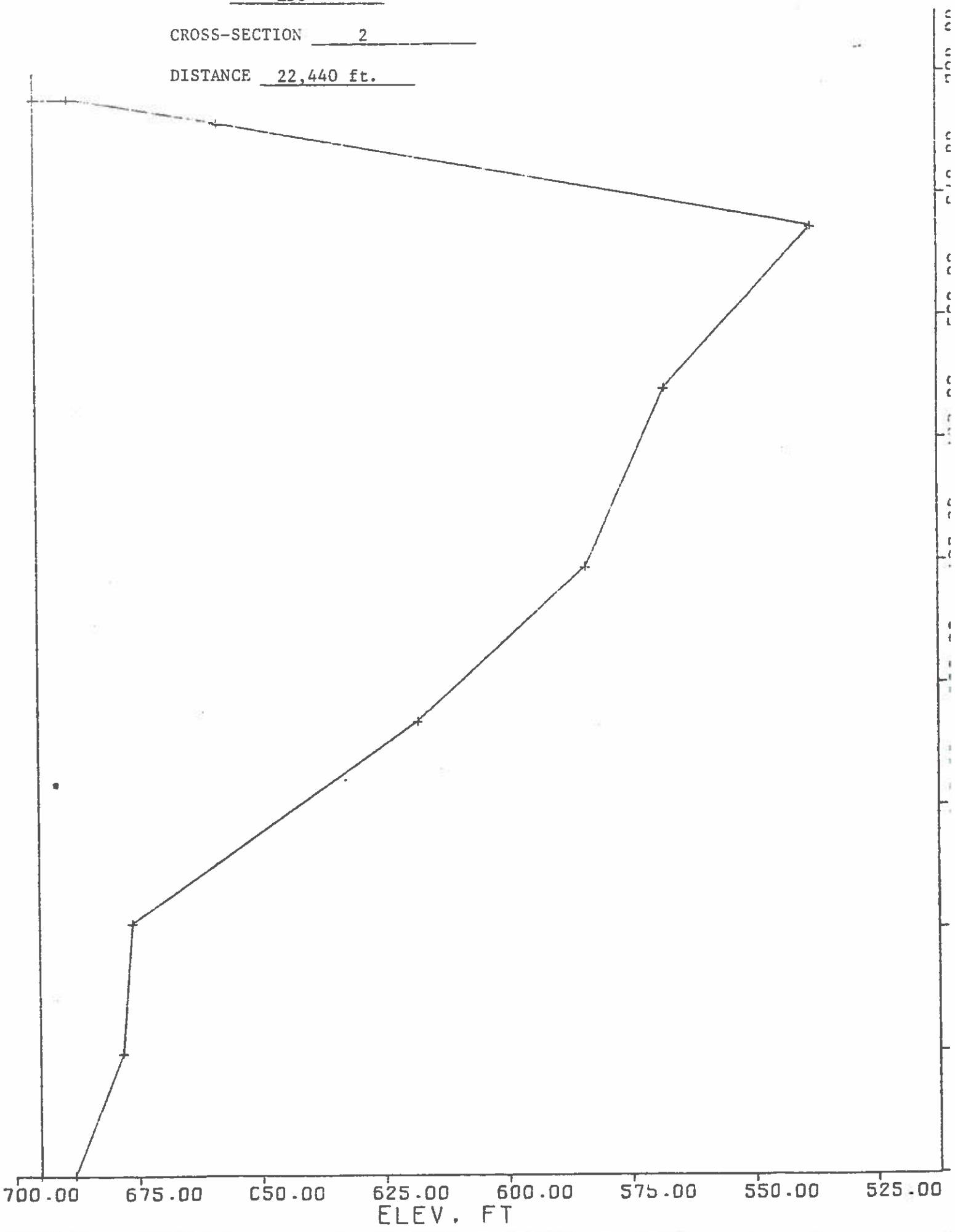
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	83800.	83800.	5596598.	83802.	5596598.
675.500	84070.	84070.	5638566.	84072.	5638566.
676.000	84340.	84340.	5680668.	84341.	5680668.
676.500	84610.	84610.	5722906.	84611.	5722906.
677.000	84880.	84880.	5765278.	84881.	5765278.
677.500	85149.	85149.	5807785.	85151.	5807785.
678.000	85419.	85419.	5850428.	85421.	5850428.
678.500	85689.	85689.	5893205.	85691.	5893205.
679.000	85959.	85959.	5936117.	85960.	5936117.
679.500	86229.	86229.	5979164.	86230.	5979164.
680.000	86499.	86499.	6022345.	86500.	6022345.
680.500	86768.	86768.	6065662.	86770.	6065662.
681.000	87038.	87038.	6109114.	87040.	6109114.
681.500	87308.	87308.	6152701.	87310.	6152701.
682.000	87578.	87578.	6196422.	87579.	6196422.
682.500	87848.	87848.	6240279.	87849.	6240279.
683.000	88118.	88118.	6284270.	88119.	6284270.
683.500	88387.	88387.	6328396.	88389.	6328396.
684.000	88657.	88657.	6372657.	88659.	6372657.
684.500	88927.	88927.	6417053.	88928.	6417053.
685.000	89197.	89197.	6461585.	89198.	6461585.
685.500	89467.	89467.	6506250.	89468.	6506250.
686.000	89737.	89737.	6551051.	89738.	6551051.
686.500	90006.	90006.	6595987.	90008.	6595987.
687.000	90276.	90276.	6641058.	90278.	6641058.
687.500	90546.	90546.	6686263.	90545.	6686263.
688.000	90816.	90816.	6731604.	90818.	6731604.
688.500	90816.	90816.	6777012.	90819.	6777012.
689.000	90816.	90816.	6822420.	90820.	6822420.
689.500	90816.	90816.	6867828.	90821.	6867828.
690.000	90816.	90816.	6913236.	90822.	6913236.
690.500	90816.	90816.	6958644.	90823.	6958644.
691.000	90816.	90816.	7004052.	90824.	7004052.
691.500	90816.	90816.	7049460.	90825.	7049460.
692.000	90816.	90816.	7094868.	90826.	7094868.
692.500	90816.	90816.	7140276.	90827.	7140276.
693.000	90816.	90816.	7185684.	90828.	7185684.
693.500	90816.	90816.	7231092.	90829.	7231092.
694.000	90816.	90816.	7276500.	90830.	7276500.
694.500	90816.	90816.	7321908.	90831.	7321908.
695.000	90816.	90816.	7367316.	90832.	7367316.

REACH 150

CROSS-SECTION 2

DISTANCE 22,440 ft.



REACH 150

CROSS-SECTION 2

DISTANCE 22,440 ft.

LEGEND

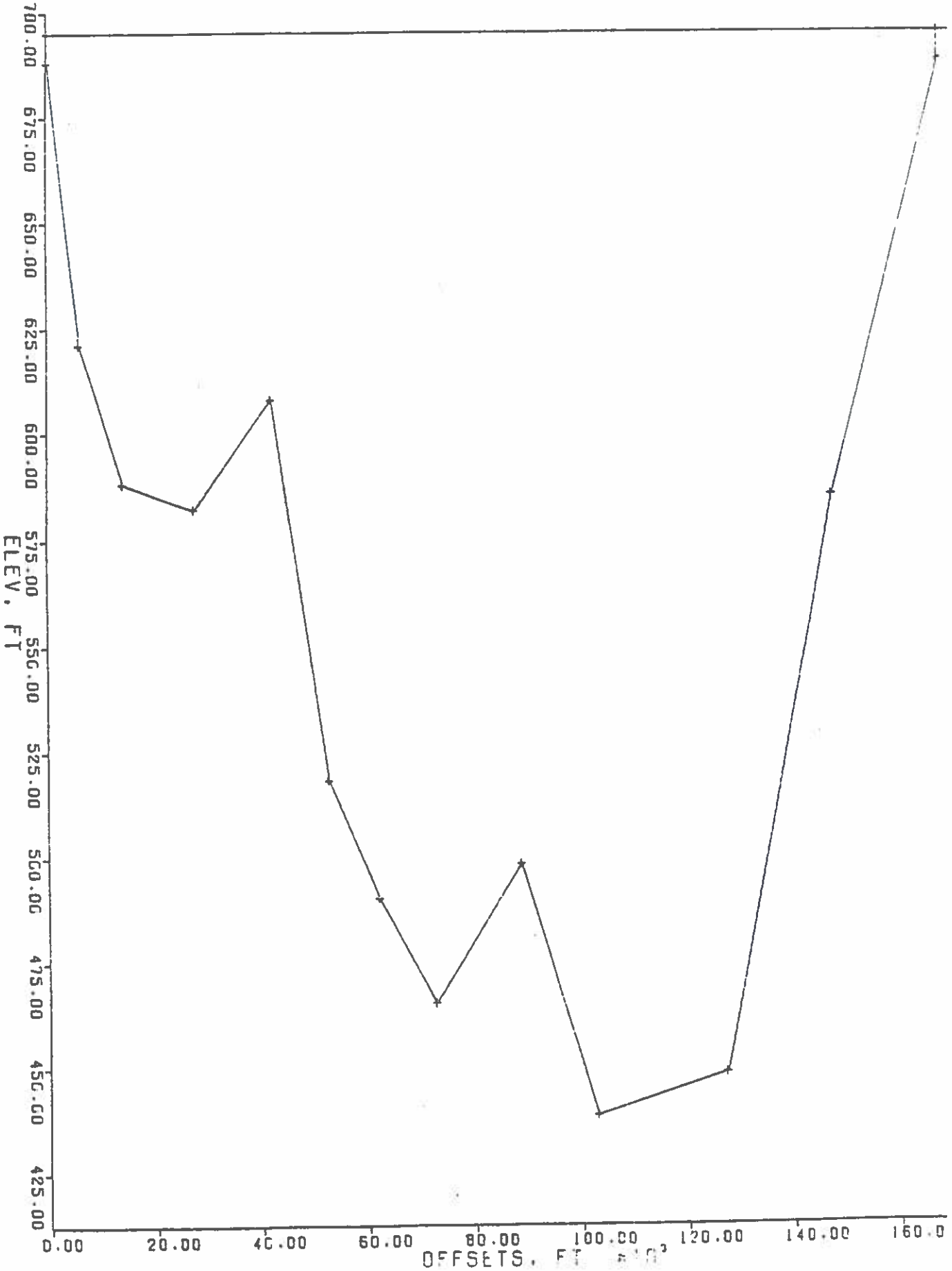
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	52942.	52942.	4086543.	52943.	4086543.
675.500	53082.	53082.	4113049.	53084.	4113049.
676.000	53222.	53222.	4139626.	53224.	4139626.
676.500	55361.	55361.	4166771.	55362.	4166771.
677.000	57499.	57499.	4194985.	57501.	4194986.
677.500	59638.	59638.	4224271.	59639.	4224271.
678.000	61776.	61776.	4254624.	61777.	4254624.
678.500	62198.	62198.	4285518.	62200.	4285518.
679.000	62621.	62621.	4316822.	62622.	4316822.
679.500	63043.	63043.	4348238.	63045.	4348238.
680.000	63466.	63466.	4379866.	63467.	4379866.
680.500	63888.	63888.	4411704.	63890.	4411704.
681.000	64310.	64310.	4443754.	64312.	4443754.
681.500	64733.	64733.	4476014.	64734.	4476014.
682.000	65155.	65155.	4508486.	65157.	4508486.
682.500	65578.	65578.	4541170.	65579.	4541170.
683.000	66000.	66000.	4574064.	66002.	4574064.
683.500	66422.	66422.	4607170.	66424.	4607170.
684.000	66845.	66845.	4640486.	66846.	4640486.
684.500	67267.	67267.	4674014.	67269.	4674014.
685.000	67690.	67690.	4707754.	67691.	4707754.
685.500	68112.	68112.	4741704.	68114.	4741704.
686.000	68534.	68534.	4775866.	68536.	4775866.
686.500	68957.	68957.	4810238.	68958.	4810238.
687.000	69379.	69379.	4844822.	69381.	4844822.
687.500	69802.	69802.	4879618.	69803.	4879618.
688.000	70224.	70224.	4914624.	70226.	4914624.
688.500	70224.	70224.	4949736.	70227.	4949736.
689.000	70224.	70224.	4984848.	70228.	4984848.
689.500	70224.	70224.	5019960.	70229.	5019960.
690.000	70224.	70224.	5055072.	70230.	5055072.
690.500	70224.	70224.	5090184.	70231.	5090184.
691.000	70224.	70224.	5125296.	70232.	5125296.
691.500	70224.	70224.	5160408.	70233.	5160408.
692.000	70224.	70224.	5195520.	70234.	5195520.
692.500	70224.	70224.	5230632.	70235.	5230632.
693.000	70224.	70224.	5265744.	70236.	5265744.
693.500	70224.	70224.	5300856.	70237.	5300856.
694.000	70224.	70224.	5335968.	70238.	5335968.
694.500	70224.	70224.	5371080.	70239.	5371080.
695.000	70224.	70224.	5406192.	70240.	5406192.

REACH 150

CROSS-SECTION 3

DISTANCE 89,760 ft.



REACH 150

CROSS-SECTION 3

DISTANCE 89,760 ft.

LEGEND

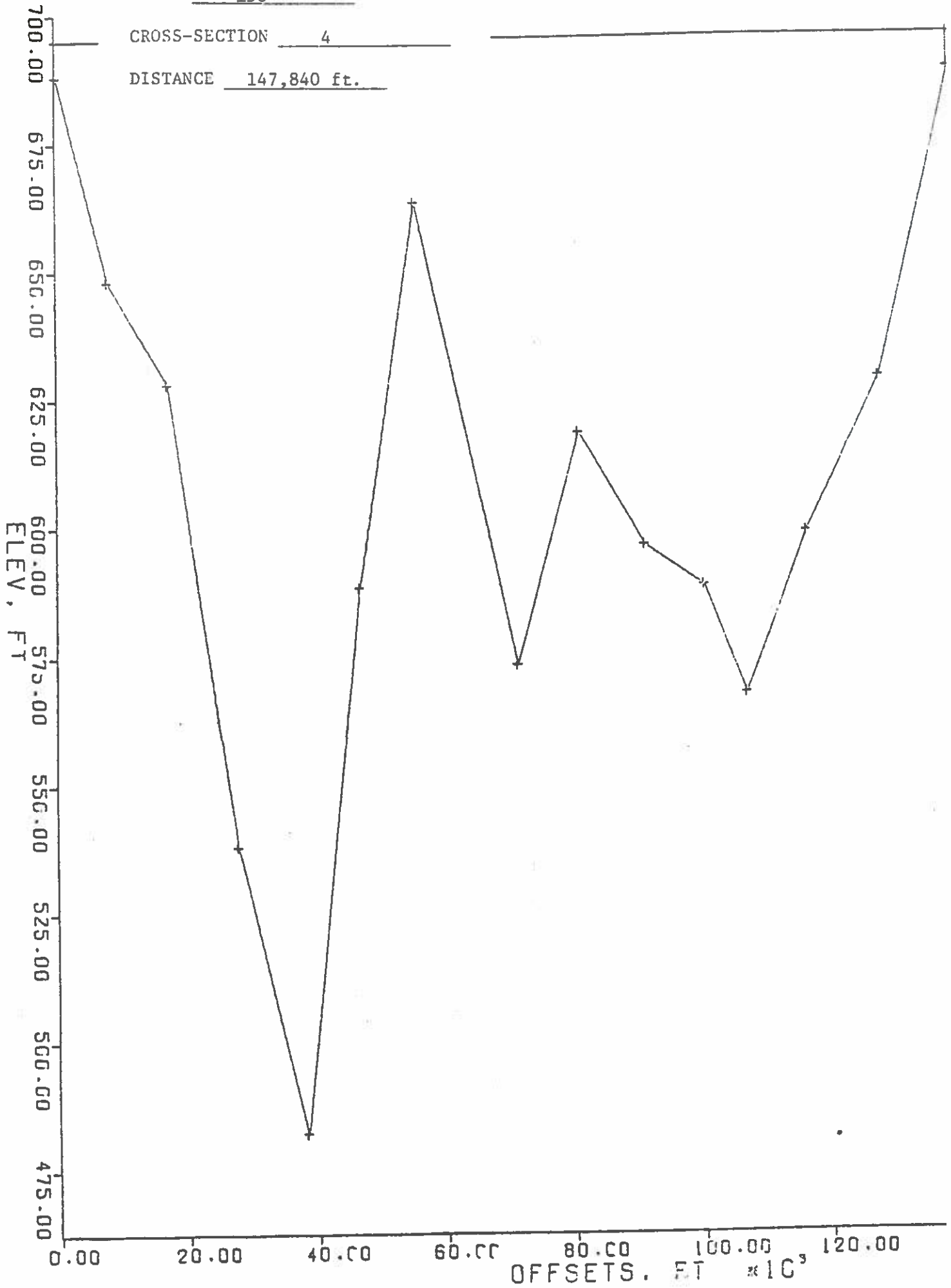
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	164194.	164194.	23485514.	164195.	23485514.
675.500	164336.	164336.	23767347.	164338.	23767347.
676.000	164479.	164479.	23849850.	164481.	23849850.
676.500	164622.	164622.	23932126.	164623.	23932126.
677.000	164764.	164764.	24014472.	164766.	24014472.
677.500	164907.	164907.	24096890.	164909.	24096890.
678.000	165050.	165050.	24179379.	165051.	24179379.
678.500	165192.	165192.	24261940.	165194.	24261940.
679.000	165335.	165335.	24344572.	165337.	24344572.
679.500	165478.	165478.	24427275.	165480.	24427275.
680.000	165621.	165621.	24510050.	165622.	24510050.
680.500	165763.	165763.	24592896.	165765.	24592896.
681.000	165906.	165906.	24675813.	165908.	24675813.
681.500	166049.	166049.	24758802.	166050.	24758802.
682.000	166191.	166191.	24841862.	166195.	24841862.
682.500	166334.	166334.	24924993.	166335.	24924993.
683.000	166477.	166477.	25008195.	166479.	25008195.
683.500	166620.	166620.	25091470.	166621.	25091470.
684.000	166762.	166762.	25174815.	166764.	25174815.
684.500	166905.	166905.	25258232.	166907.	25258232.
685.000	167048.	167048.	25341720.	167050.	25341720.
685.500	167190.	167190.	25425280.	167192.	25425280.
686.000	167333.	167333.	25508911.	167335.	25508911.
686.500	167476.	167476.	25592613.	167478.	25592613.
687.000	167619.	167619.	25676387.	167620.	25676387.
687.500	167761.	167761.	25760232.	167763.	25760232.
688.000	167904.	167904.	25844148.	167905.	25844148.
688.500	167904.	167904.	25928136.	167907.	25928100.
689.000	167904.	167904.	26012052.	167908.	26012052.
689.500	167904.	167904.	26096004.	167909.	26095004.
690.000	167904.	167904.	26179956.	167910.	26179956.
690.500	167904.	167904.	26263908.	167911.	26263908.
691.000	167904.	167904.	26347860.	167912.	26347860.
691.500	167904.	167904.	26431812.	167913.	26431812.
692.000	167904.	167904.	26515764.	167914.	26515764.
692.500	167904.	167904.	26599716.	167915.	26599716.
693.000	167904.	167904.	26683668.	167916.	26683668.
693.500	167904.	167904.	26767620.	167917.	26767620.
694.000	167904.	167904.	26851572.	167918.	26851572.
694.500	167904.	167904.	26935524.	167919.	26935524.
695.000	167904.	167904.	27019476.	167920.	27019476.

REACH 150

CROSS-SECTION 4

DISTANCE 147,840 ft.



REACH 150

CROSS-SECTION 4

DISTANCE 147,840 ft.

LEGEND

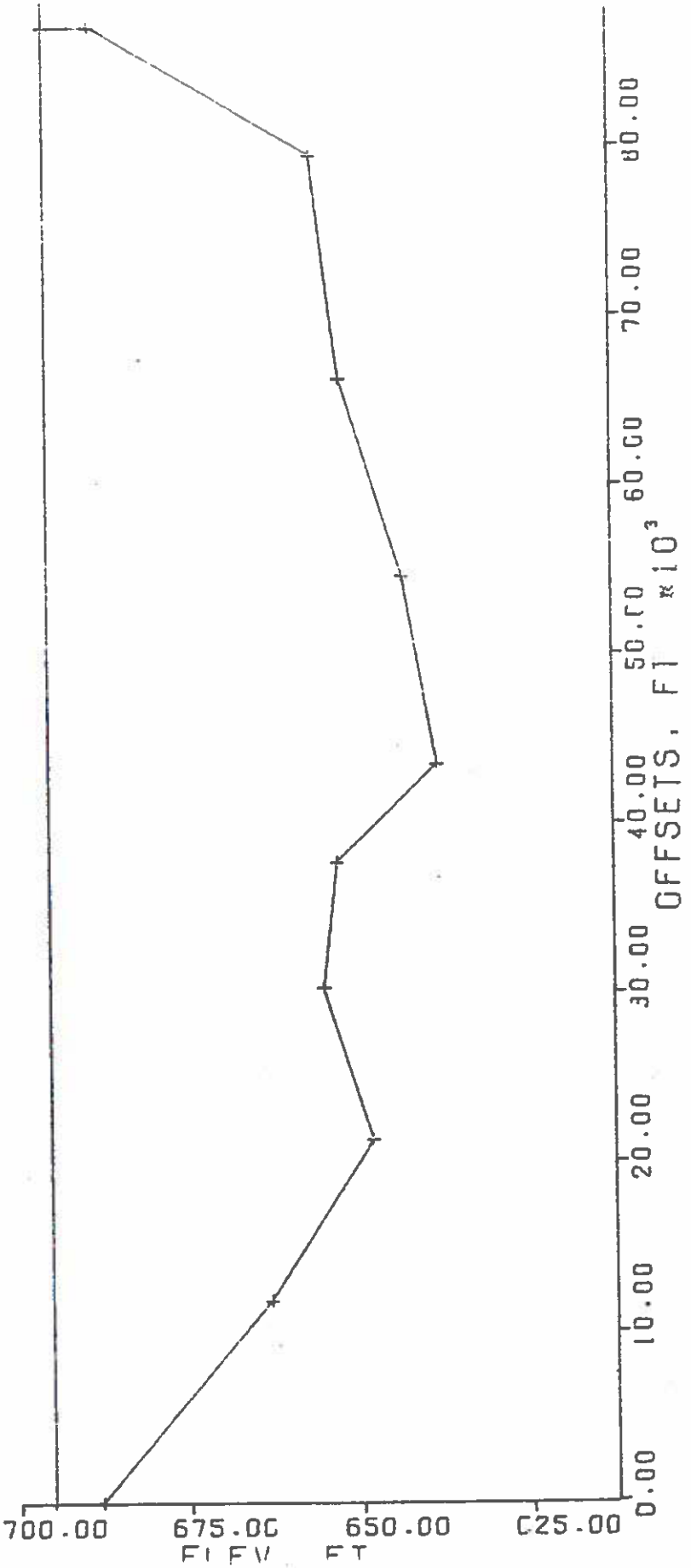
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	133624.	133624.	10273567.	133626.	10273567.
675.500	133615.	133615.	10340426.	133617.	10340426.
676.000	134006.	134006.	10407382.	134009.	10407382.
676.500	134198.	134193.	10474433.	134200.	10474433.
677.000	134389.	134389.	10541579.	134391.	10541579.
677.500	134581.	134581.	10608822.	134583.	10608822.
678.000	134772.	134772.	10676160.	134774.	10676160.
678.500	134963.	134963.	10743594.	134966.	10743594.
679.000	135155.	135155.	10811123.	135157.	10811123.
679.500	135346.	135346.	10878749.	135348.	10878749.
680.000	135538.	135538.	10946470.	135540.	10946470.
680.500	135729.	135729.	11014286.	135731.	11014286.
681.000	135920.	135920.	11082199.	135923.	11082199.
681.500	136112.	136112.	11150207.	136114.	11150207.
682.000	136303.	136303.	11218310.	136305.	11218310.
682.500	136495.	136495.	11286510.	136497.	11286510.
683.000	136686.	136685.	11354805.	136688.	11354805.
683.500	136877.	136877.	11423196.	136880.	11423196.
684.000	137069.	137069.	11491682.	137071.	11491682.
684.500	137260.	137260.	11560265.	137263.	11560265.
685.000	137452.	137452.	11628943.	137454.	11628943.
685.500	137643.	137643.	11697716.	137645.	11697716.
686.000	137834.	137834.	11766586.	137837.	11766586.
686.500	138026.	138026.	11835551.	138028.	11835551.
687.000	138217.	138217.	11904611.	138220.	11904611.
687.500	138409.	138409.	11973768.	138411.	11973768.
688.000	138600.	138600.	12043020.	138602.	12043020.
688.500	138600.	138600.	12112320.	138603.	12112320.
689.000	138600.	138600.	12181620.	138604.	12181620.
689.500	138600.	138600.	12250920.	138605.	12250920.
690.000	138600.	138600.	12320220.	138605.	12320220.
690.500	138600.	138600.	12389520.	138607.	12389520.
691.000	138600.	138600.	12458820.	138608.	12458820.
691.500	138600.	138600.	12528120.	138609.	12528120.
692.000	138600.	138600.	12597420.	138610.	12597420.
692.500	138600.	138600.	12666720.	138611.	12666720.
693.000	138600.	138600.	12736020.	138612.	12736020.
693.500	138600.	138600.	12805320.	138613.	12805320.
694.000	138600.	138600.	12874620.	138614.	12874620.
694.500	138600.	138600.	12943920.	138615.	12943920.
695.000	138600.	138600.	13013220.	138616.	13013220.

REACH 150

CROSS-SECTION 5

DISTANCE 240,240 ft.



REACH 150

CROSS-SECTION 5

DISTANCE 240,240 ft.

LEGEND

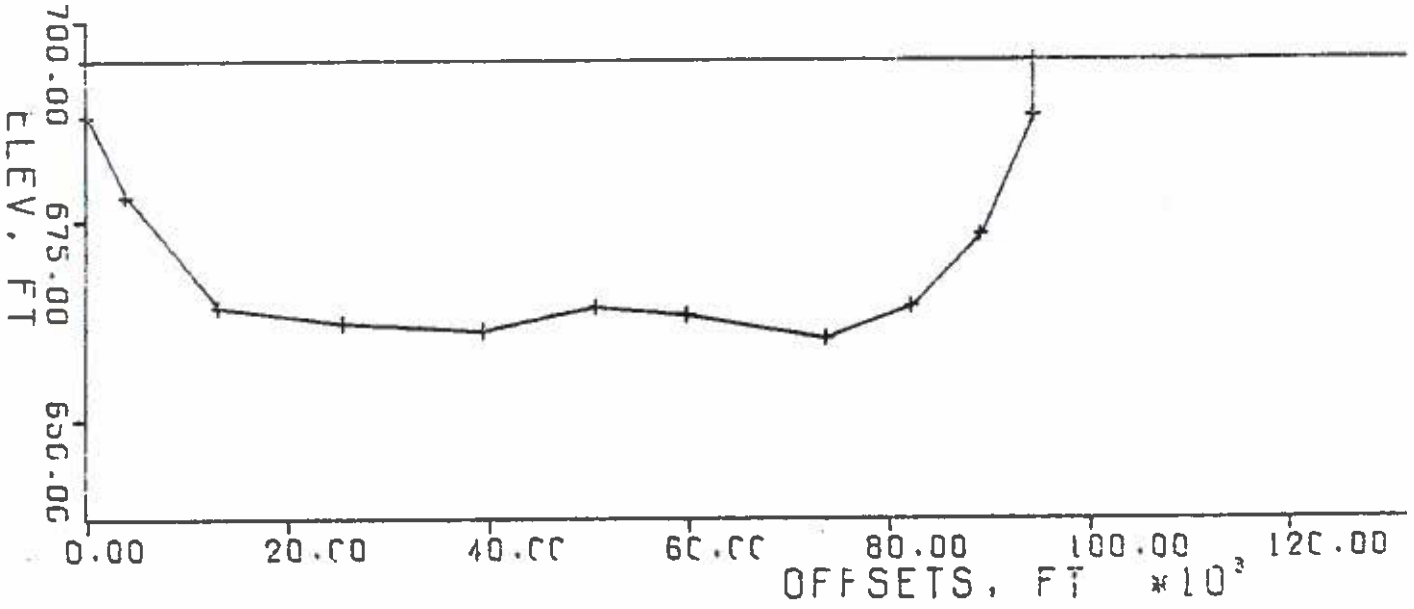
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	77832.	77832.	1779407.	77832.	1779407.
675.500	78189.	78189.	1818412.	78189.	1818412.
676.000	78547.	78547.	1857589.	78547.	1857589.
676.500	78904.	78904.	1896959.	78904.	1896959.
677.000	79261.	79261.	1936500.	79261.	1936500.
677.500	79618.	79618.	1976220.	79618.	1976220.
678.000	79976.	79976.	2016119.	79976.	2016119.
678.500	80333.	80333.	2056196.	80333.	2056196.
679.000	80690.	80690.	2096451.	80690.	2096451.
679.500	81047.	81047.	2136886.	81047.	2136886.
680.000	81404.	81404.	2177498.	81405.	2177498.
680.500	81762.	81762.	2218290.	81762.	2218290.
681.000	82119.	82119.	2259260.	82119.	2259260.
681.500	82476.	82476.	2300409.	82476.	2300409.
682.000	82833.	82833.	2341736.	82833.	2341736.
682.500	83191.	83191.	2383242.	83191.	2383242.
683.000	83548.	83548.	2424927.	83548.	2424927.
683.500	83905.	83905.	2466790.	83905.	2466790.
684.000	84262.	84262.	2508832.	84262.	2508832.
684.500	84619.	84619.	2551052.	84620.	2551052.
685.000	84977.	84977.	2593451.	84977.	2593451.
685.500	85334.	85334.	2636029.	85334.	2636029.
686.000	85691.	85691.	2678785.	85691.	2678785.
686.500	86048.	86048.	2721720.	86048.	2721720.
687.000	86406.	86406.	2764833.	86406.	2764833.
687.500	86763.	86763.	2808125.	86763.	2808125.
688.000	87120.	87120.	2851596.	87120.	2851596.
688.500	87120.	87120.	2895156.	87121.	2895156.
689.000	87120.	87120.	2938716.	87122.	2938716.
689.500	87120.	87120.	2982276.	87123.	2982276.
690.000	87120.	87120.	3025836.	87124.	3025836.
690.500	87120.	87120.	3069396.	87125.	3069396.
691.000	87120.	87120.	3112956.	87126.	3112956.
691.500	87120.	87120.	3156516.	87127.	3156516.
692.000	87120.	87120.	3200076.	87128.	3200076.
692.500	87120.	87120.	3243636.	87129.	3243636.
693.000	87120.	87120.	3287196.	87130.	3287196.
693.500	87120.	87120.	3330756.	87131.	3330756.
694.000	87120.	87120.	3374316.	87132.	3374316.
694.500	87120.	87120.	3417876.	87133.	3417876.
695.000	87120.	87120.	3461436.	87134.	3461436.

REACH 150

CROSS-SECTION 6

DISTANCE 326,304 ft.



REACH 150

CROSS-SECTION 6

DISTANCE 326.304 ft.

LEGEND

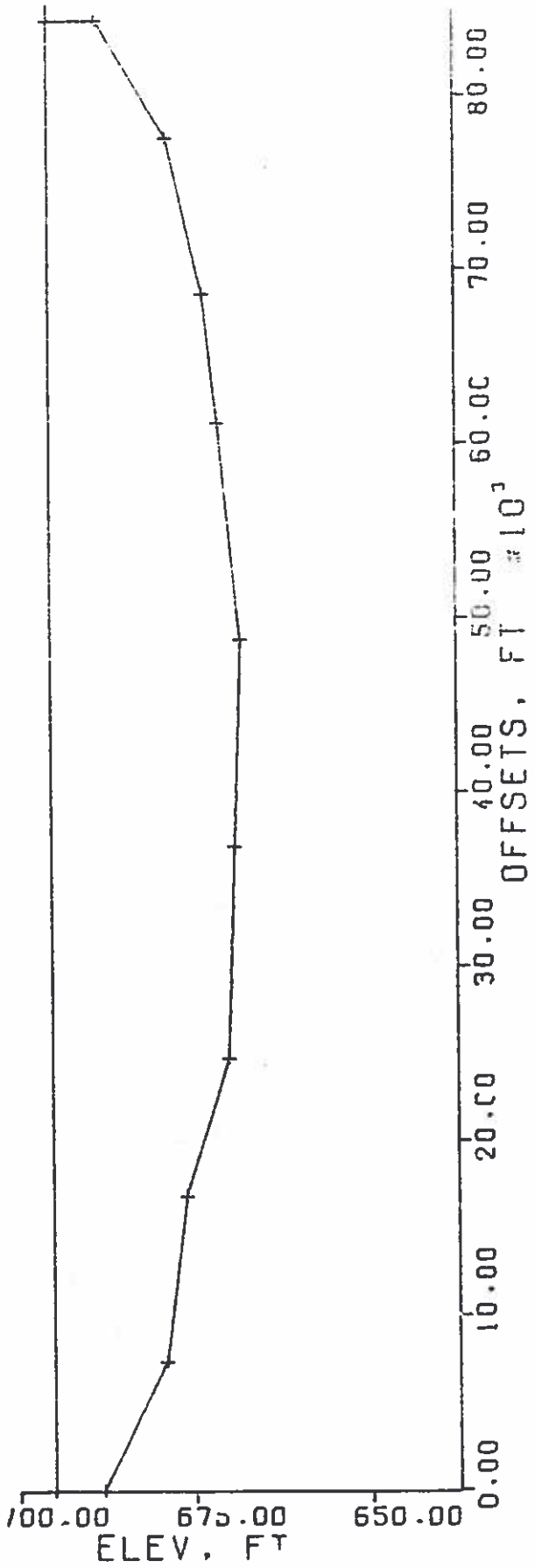
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	83996.	83996.	966878.	83996.	966878.
675.500	84502.	84502.	1009003.	84502.	1009003.
676.000	85008.	85008.	1051380.	85008.	1051380.
676.500	85514.	85514.	1094011.	85514.	1094011.
677.000	86020.	86020.	1136894.	86020.	1136894.
677.500	86526.	86526.	1180031.	86526.	1180031.
678.000	87032.	87032.	1223420.	87032.	1223420.
678.500	87406.	87406.	1267030.	87406.	1267030.
679.000	87780.	87780.	1310826.	87780.	1310826.
679.500	88154.	88154.	1354810.	88154.	1354810.
680.000	88528.	88528.	1398980.	88528.	1398980.
680.500	88902.	88902.	1443338.	88902.	1443338.
681.000	89276.	89276.	1487882.	89276.	1487882.
681.500	89650.	89650.	1532614.	89650.	1532614.
682.000	90024.	90024.	1577532.	90024.	1577532.
682.500	90398.	90398.	1622638.	90398.	1622638.
683.000	90772.	90772.	1667930.	90772.	1667930.
683.500	91146.	91146.	1713410.	91146.	1713410.
684.000	91520.	91520.	1759076.	91520.	1759076.
684.500	91894.	91894.	1804930.	91894.	1804930.
685.000	92268.	92268.	1850970.	92268.	1850970.
685.500	92642.	92642.	1897198.	92642.	1897198.
686.000	93016.	93016.	1943612.	93016.	1943612.
686.500	93390.	93390.	1990214.	93390.	1990214.
687.000	93764.	93764.	2037002.	93764.	2037002.
687.500	94138.	94138.	2083978.	94138.	2083978.
688.000	94512.	94512.	2131140.	94512.	2131140.
688.500	94512.	94512.	2178396.	94513.	2178396.
689.000	94512.	94512.	2225652.	94514.	2225652.
689.500	94512.	94512.	2272908.	94515.	2272908.
690.000	94512.	94512.	2320164.	94516.	2320164.
690.500	94512.	94512.	2367420.	94517.	2367420.
691.000	94512.	94512.	2414676.	94518.	2414676.
691.500	94512.	94512.	2461932.	94519.	2461932.
692.000	94512.	94512.	2509188.	94520.	2509188.
692.500	94512.	94512.	2556444.	94521.	2556444.
693.000	94512.	94512.	2603700.	94522.	2603700.
693.500	94512.	94512.	2650956.	94523.	2650956.
694.000	94512.	94512.	2698212.	94524.	2698212.
694.500	94512.	94512.	2745468.	94525.	2745468.
695.000	94512.	94512.	2792724.	94526.	2792724.

REACH 150

CROSS-SECTION 7

DISTANCE 389.664 ft.



REACH 150

CROSS-SECTION 7

DISTANCE 389,664

LEGEND

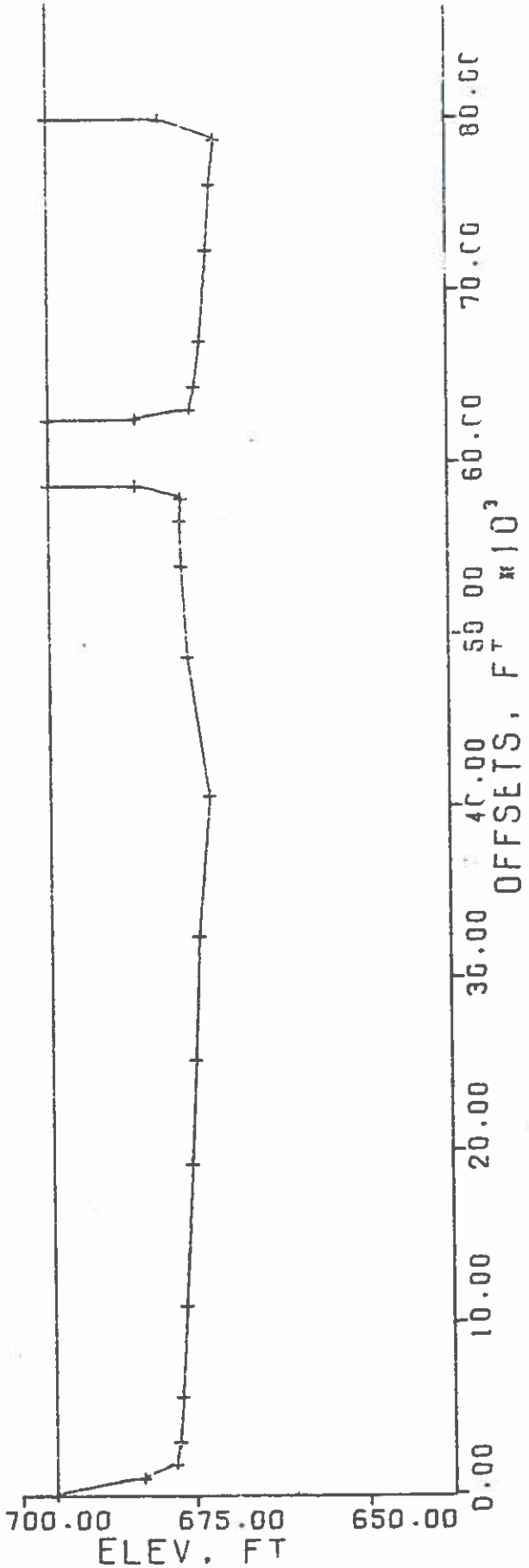
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	54014.	54014.	254522.	54014.	254522.
675.500	55572.	55572.	261919.	55572.	261919.
676.000	57130.	57130.	310094.	57130.	310094.
676.500	59611.	59611.	339280.	59611.	339280.
677.000	62093.	62093.	369706.	62093.	369706.
677.500	64574.	64574.	401372.	64574.	401372.
678.000	67056.	67056.	434280.	67056.	434280.
678.500	68983.	68983.	468290.	68983.	468290.
679.000	70910.	70910.	503263.	70910.	503263.
679.500	71664.	71664.	538907.	71664.	538907.
680.000	72418.	72418.	574927.	72418.	574927.
680.500	73172.	73172.	611325.	73172.	611325.
681.000	73926.	73926.	648099.	73926.	649099.
681.500	74680.	74680.	685251.	74680.	685251.
682.000	75434.	75434.	722779.	75434.	722779.
682.500	76187.	76187.	760684.	76187.	760664.
683.000	76941.	76941.	798967.	76941.	798967.
683.500	77695.	77695.	837626.	77695.	837626.
684.000	78449.	78449.	876662.	78449.	876662.
684.500	79203.	79203.	916075.	79203.	916075.
685.000	79957.	79957.	955865.	79957.	955865.
685.500	80711.	80711.	996032.	80711.	996032.
686.000	81465.	81465.	1036575.	81465.	1036575.
686.500	82218.	82218.	1077496.	82218.	1077496.
687.000	82972.	82972.	1118794.	82972.	1118794.
687.500	83726.	83726.	1160468.	83726.	1160468.
688.000	84480.	84480.	1202520.	84480.	1202520.
688.500	84480.	84480.	1244760.	84481.	1244760.
689.000	84480.	84480.	1287000.	84482.	1287000.
689.500	84480.	84480.	1329240.	84483.	1329240.
690.000	84480.	84480.	1371480.	84484.	1371480.
690.500	84480.	84480.	1413720.	84485.	1413720.
691.000	84480.	84480.	1455960.	84486.	1455960.
691.500	84480.	84480.	1498200.	84487.	1498200.
692.000	84480.	84480.	1540440.	84488.	1540440.
692.500	84480.	84480.	1582680.	84489.	1582680.
693.000	84480.	84480.	1624920.	84490.	1624920.
693.500	84480.	84480.	1667160.	84491.	1667160.
694.000	84480.	84480.	1709400.	84492.	1709400.
694.500	84480.	84480.	1751640.	84493.	1751640.
695.000	84480.	84480.	1793880.	84494.	1793880.

REACH 150

CROSS-SECTION 8

DISTANCE 430,584 ft.



REACH 150

CROSS-SECTION 8

DISTANCE 430,584 ft.

LEGEND

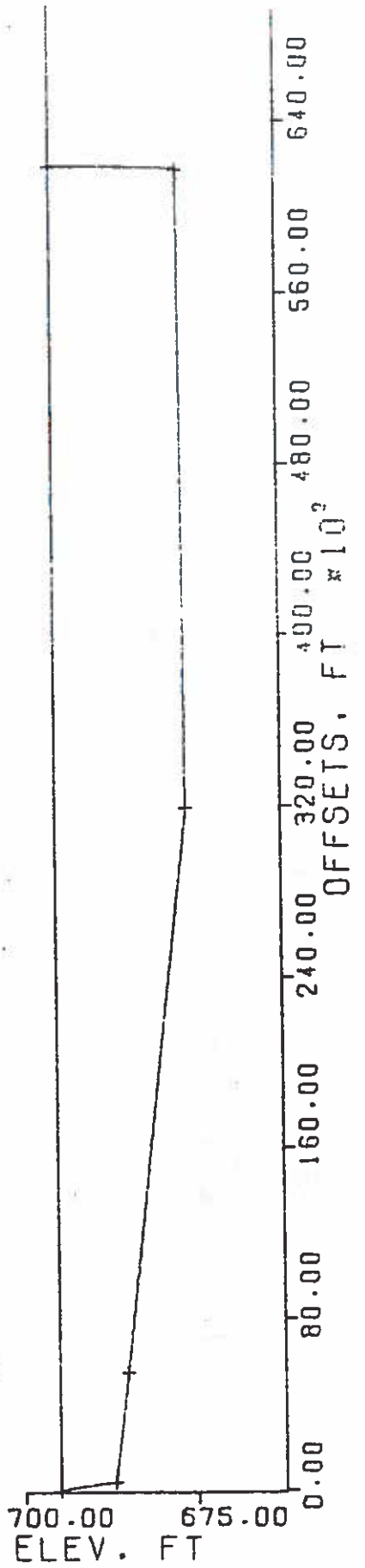
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	43577.	43577.	73907.	43577.	73907.
675.500	50390.	50390.	97291.	50390.	97291.
676.000	57920.	57920.	124368.	57920.	124368.
676.500	65955.	65955.	155952.	65955.	155952.
677.000	69796.	69796.	189909.	69796.	189909.
677.500	72374.	72374.	225584.	72374.	225584.
678.000	73423.	73423.	262075.	73423.	262073.
678.500	73675.	73675.	298848.	73675.	298848.
679.000	73900.	73900.	335746.	73900.	335746.
679.500	74081.	74081.	372741.	74081.	372741.
680.000	74262.	74262.	409826.	74262.	409826.
680.500	74443.	74443.	447003.	74444.	447003.
681.000	74625.	74625.	484270.	74625.	484270.
681.500	74806.	74806.	521627.	74805.	521627.
682.000	74987.	74987.	559075.	74987.	559075.
682.500	75168.	75168.	596614.	75169.	596614.
683.000	75214.	75214.	634210.	75214.	634210.
683.500	75259.	75259.	671828.	75260.	671828.
684.000	75304.	75304.	709469.	75305.	709469.
684.500	75349.	75349.	747132.	75351.	747132.
685.000	75395.	75395.	784818.	75396.	784818.
685.500	75440.	75440.	822527.	75442.	822527.
686.000	75485.	75485.	860258.	75487.	860258.
686.500	75530.	75530.	898012.	75533.	898012.
687.000	75576.	75576.	935788.	75578.	935788.
687.500	75621.	75621.	973587.	75624.	973587.
688.000	75666.	75666.	1011409.	75669.	1011409.
688.500	75712.	75712.	1049254.	75715.	1049254.
689.000	75757.	75757.	1087121.	75760.	1087121.
689.500	75802.	75802.	1125010.	75806.	1125010.
690.000	75847.	75847.	1162923.	75851.	1162923.
690.500	75893.	75893.	1200858.	75897.	1200858.
691.000	75938.	75938.	1238815.	75942.	1238815.
691.500	75985.	75985.	1276796.	75988.	1276796.
692.000	76028.	76028.	1314798.	76033.	1314798.
692.500	76074.	76074.	1352824.	76079.	1352824.
693.000	76119.	76119.	1390872.	76124.	1390872.
693.500	76164.	76164.	1428943.	76170.	1428943.
694.000	76209.	76209.	1467038.	76215.	1467036.
694.500	76255.	76255.	1505156.	76261.	1505156.
695.000	76300.	76300.	1543291.	76306.	1543291.

REACH 150

CROSS-SECTION 9

DISTANCE 455,559 ft.



REACH 150

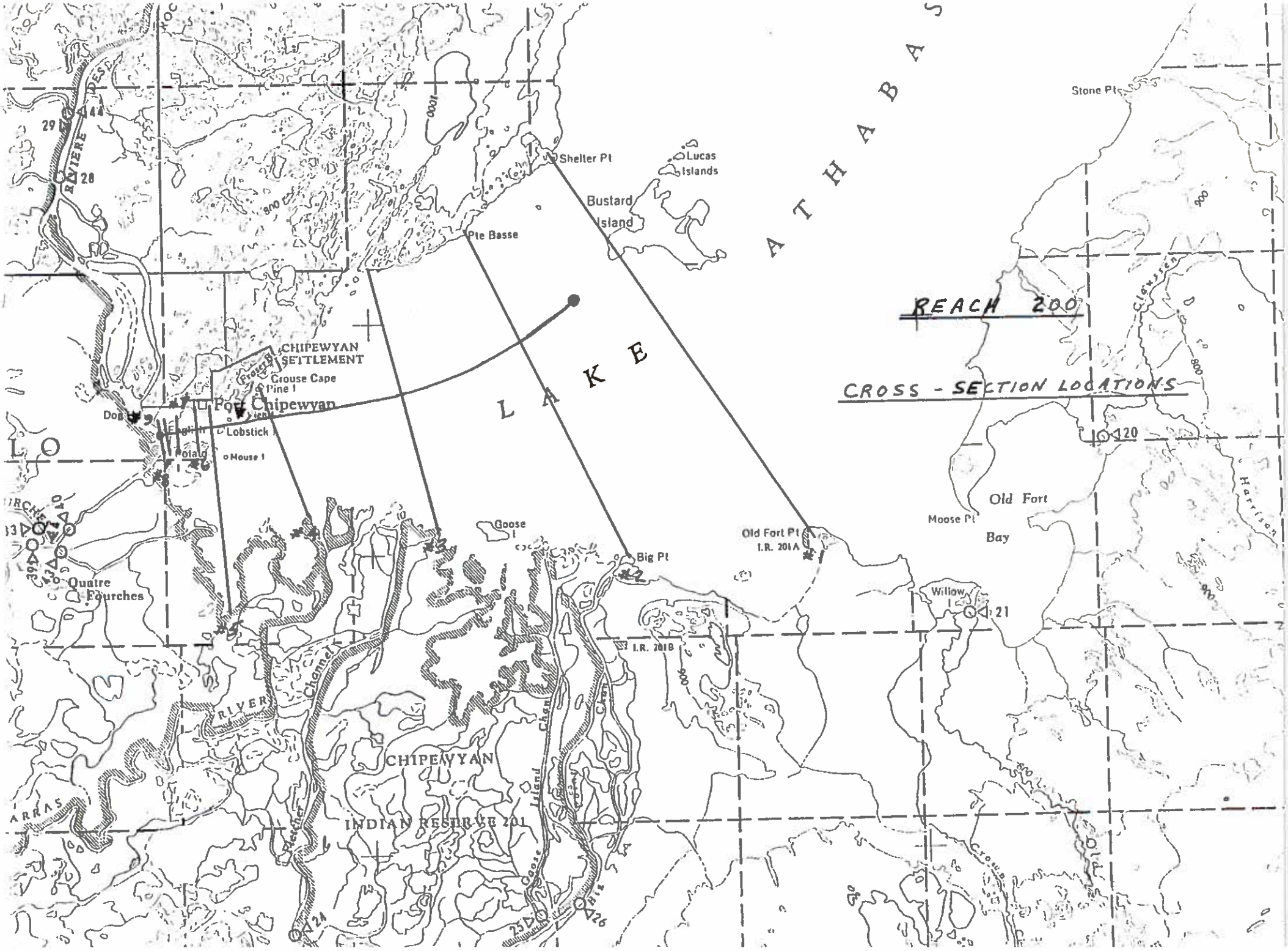
CROSS-SECTION 9

DISTANCE 455,559 ft.

LEGEND

E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	1.	1.	1.	1.	1.
675.500	1.	1.	1.	1.	1.
676.000	1.	1.	1.	1.	1.
676.500	31272.	31272.	7818.	31272.	7818.
677.000	32750.	32750.	23824.	32750.	23824.
677.500	34227.	34227.	40568.	34228.	40568.
678.000	35705.	35705.	58051.	35705.	58051.
678.500	37183.	37183.	76273.	37183.	76273.
679.000	38660.	38660.	95234.	38660.	95234.
679.500	40138.	40138.	114933.	40138.	114933.
680.000	41616.	41616.	135372.	41616.	135372.
680.500	43093.	43093.	156549.	43093.	156549.
681.000	44571.	44571.	178465.	44571.	178465.
681.500	46048.	46048.	201120.	46049.	201120.
682.000	47526.	47526.	224514.	47526.	224514.
682.500	49004.	49004.	248646.	49004.	248646.
683.000	50481.	50481.	273517.	50482.	273517.
683.500	51959.	51959.	299127.	51959.	299127.
684.000	53437.	53437.	325476.	53437.	325476.
684.500	54914.	54914.	352564.	54915.	352564.
685.000	56392.	56392.	380391.	56392.	380391.
685.500	57672.	57672.	408907.	57673.	408907.
686.000	58953.	58953.	438063.	58953.	438063.
686.500	60233.	60233.	467859.	60234.	467859.
687.000	61514.	61514.	498296.	61514.	498296.
687.500	61544.	61544.	529060.	61544.	529060.
688.000	61574.	61574.	559840.	61575.	559840.
688.500	61605.	61605.	590635.	61605.	590635.
689.000	61635.	61635.	621445.	61635.	621445.
689.500	61666.	61666.	652270.	61666.	652270.
690.000	61696.	61696.	683110.	61697.	683110.
690.500	61726.	61726.	713966.	61727.	713966.
691.000	61757.	61757.	744836.	61757.	744836.
691.500	61787.	61787.	775722.	61788.	775722.
692.000	61818.	61818.	806624.	61819.	806624.
692.500	61848.	61848.	837540.	61849.	837540.
693.000	61878.	61878.	868472.	61879.	868472.
693.500	61909.	61909.	899418.	61910.	899418.
694.000	61939.	61939.	930380.	61940.	930380.
694.500	61970.	61970.	961358.	61971.	961358.
695.000	62000.	62000.	992350.	62001.	992350.


ATHABASCA
LAKE
REACH 200
CROSS - SECTION LOCATIONS
Stone Pt
Shelter Pt
Lucas Islands
Bustard Island
Pte Basse
CHIPEWYAN SETTLEMENT
Grouse Cape
Pine I
Fraser R
Fort Chipewyan
Dog
Lobstick
Potato
Mouse I
Goose I
Big Pt
Old Fort Pt
I.R. 201A
Old Fort Bay
Moose Pt
Willow I
I.R. 201B
Quatre Fourches
RIVER
Peace
Channel
CHIPEWYAN INDIAN RESERVE 201
Goose Island
Island Channel
Harrison
Clearwater
Crowduck
120
21
24
25
26

REACH NUMBER - 200

DESCRIPTION - Lake Athabasca from Bustard Island to Riviere des Rochers

REACH LENGTH - 78,900 feet

UPSTREAM NODE - 20

DOWNSTREAM NODE - 2

CROSS-SECTION - 9

Section Number	Distance from Upstream Node (ft)
1	-12,500
2	12,500
3	37,700
4	58,500
5	68,900
6	71,700
7	74,900
8	78,000
9	78,900

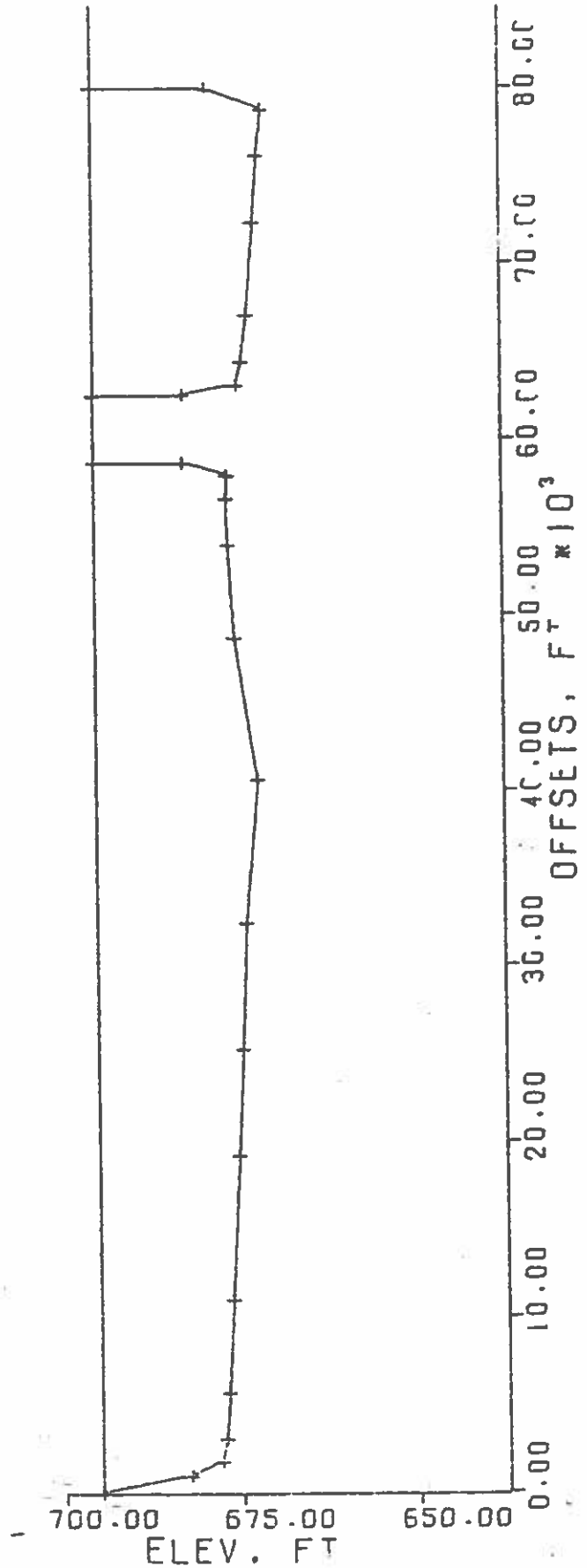
REMARKS: These cross-sections were surveyed by the Technical Services Division of Alberta Environment in 1970 and 1978. Cross-section 8 was transposed to the end of the reach and relabelled as cross-section 9.

A lateral inflow is inserted into reach 200 at 7628 feet from the upstream node to represent inflow from the Athabasca River system. It is recommended that recorded flows at hydrometric station 07DD001 - Athabasca River at Embarras Airport be lagged by 1 day and inserted.

REACH 200

CROSS-SECTION 1

DISTANCE - 12,500 ft.



REACH 200

CROSS-SECTION 1

DISTANCE - 12,500 ft.

LEGEND

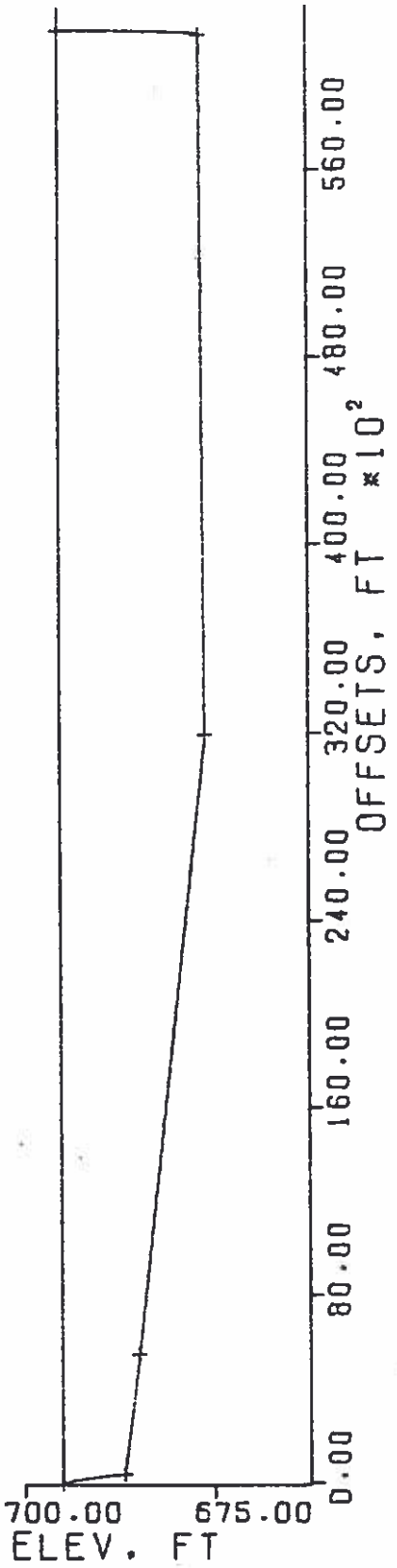
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	43577.	43577.	73907.	43577.	73907.
675.500	50390.	50390.	97291.	50390.	97291.
676.000	57920.	57920.	124568.	57920.	124568.
676.500	65955.	65955.	155652.	65955.	155652.
677.000	69796.	69796.	189909.	69796.	189909.
677.500	72374.	72374.	225584.	72374.	225584.
678.000	73423.	73423.	262073.	73423.	262073.
678.500	73675.	73675.	298848.	73675.	298848.
679.000	73900.	73900.	335746.	73900.	335746.
679.500	74081.	74081.	372741.	74081.	372741.
680.000	74262.	74262.	409826.	74262.	409826.
680.500	74443.	74443.	447003.	74444.	447003.
681.000	74625.	74625.	484270.	74625.	484270.
681.500	74806.	74806.	521627.	74806.	521627.
682.000	74987.	74987.	559075.	74987.	559075.
682.500	75168.	75168.	596614.	75169.	596614.
683.000	75214.	75214.	634210.	75214.	634210.
683.500	75259.	75259.	671828.	75260.	671828.
684.000	75304.	75304.	709469.	75305.	709469.
684.500	75349.	75349.	747132.	75351.	747132.
685.000	75395.	75395.	784818.	75396.	784818.
685.500	75440.	75440.	822527.	75442.	822527.
686.000	75485.	75485.	860259.	75487.	860259.
686.500	75530.	75530.	898012.	75533.	898012.
687.000	75576.	75576.	935788.	75578.	935788.
687.500	75621.	75621.	973587.	75624.	973587.
688.000	75666.	75666.	1011409.	75669.	1011409.
688.500	75712.	75712.	1049254.	75715.	1049254.
689.000	75757.	75757.	1087121.	75760.	1087121.
689.500	75802.	75802.	1125010.	75806.	1125010.
690.000	75847.	75847.	1162923.	75851.	1162923.
690.500	75893.	75893.	1200858.	75897.	1200858.
691.000	75938.	75938.	1238815.	75942.	1238815.
691.500	75983.	75985.	1276796.	75988.	1276796.
692.000	76028.	76028.	1314798.	76033.	1314798.
692.500	76074.	76074.	1352824.	76079.	1352824.
693.000	76119.	76119.	1390872.	76124.	1390872.
693.500	76164.	76164.	1428943.	76170.	1428943.
694.000	76209.	76209.	1467038.	76215.	1467038.
694.500	76255.	76255.	1505156.	76261.	1505156.
695.000	76300.	76300.	1543291.	76306.	1543291.

REACH 200

CROSS-SECTION 2

DISTANCE 12,500 ft.



REACH 200

CROSS-SECTION 2

DISTANCE 12,500 ft.

LEGEND

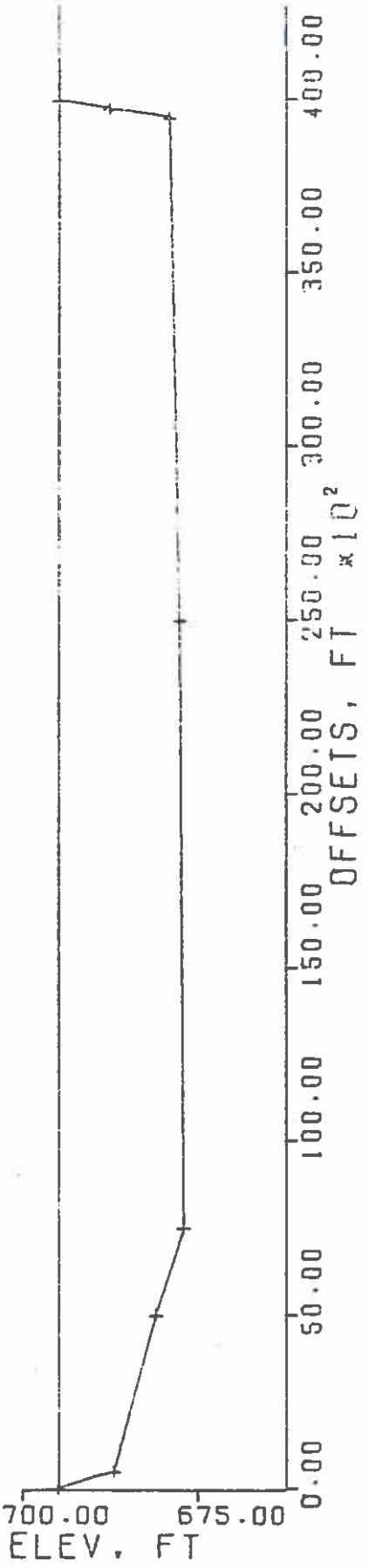
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	1.	1.	1.	1.	1.
675.500	1.	1.	1.	1.	1.
676.000	1.	1.	1.	1.	1.
676.500	31272.	31272.	7818.	31272.	7818.
677.000	32750.	32750.	23824.	32750.	23824.
677.500	34227.	34227.	40568.	34228.	40568.
678.000	35705.	35705.	58051.	35705.	58051.
678.500	37183.	37183.	76273.	37183.	76273.
679.000	38660.	38660.	95234.	38660.	95234.
679.500	40138.	40138.	114933.	40138.	114933.
680.000	41616.	41616.	135372.	41616.	135372.
680.500	43093.	43093.	156549.	43093.	156549.
681.000	44571.	44571.	178465.	44571.	178465.
681.500	46048.	46048.	201120.	46049.	201120.
682.000	47526.	47526.	224514.	47526.	224514.
682.500	49004.	49004.	248646.	49004.	248646.
683.000	50481.	50481.	273517.	50482.	273517.
683.500	51959.	51959.	299127.	51959.	299127.
684.000	53437.	53437.	325476.	53437.	325476.
684.500	54914.	54914.	352564.	54915.	352564.
685.000	56392.	56392.	380391.	56392.	380391.
685.500	57872.	57872.	408907.	57873.	408907.
686.000	59353.	59353.	438063.	59353.	438063.
686.500	60833.	60833.	467859.	60834.	467859.
687.000	61514.	61514.	498296.	61514.	498296.
687.500	61544.	61544.	529060.	61544.	529060.
688.000	61574.	61574.	559840.	61575.	559840.
688.500	61605.	61605.	590635.	61605.	590635.
689.000	61635.	61635.	621445.	61636.	621445.
689.500	61666.	61666.	652270.	61666.	652270.
690.000	61696.	61696.	683110.	61697.	683110.
690.500	61726.	61726.	713966.	61727.	713966.
691.000	61757.	61757.	744835.	61757.	744835.
691.500	61787.	61787.	775722.	61788.	775722.
692.000	61818.	61818.	806624.	61818.	806624.
692.500	61848.	61848.	837540.	61849.	837540.
693.000	61878.	61878.	868472.	61879.	868472.
693.500	61909.	61909.	899418.	61910.	899418.
694.000	61939.	61939.	930380.	61940.	930380.
694.500	61970.	61970.	961358.	61971.	961358.
695.000	62000.	62000.	992350.	62001.	992350.

REACH 200

CROSS-SECTION 3

DISTANCE 37,700



REACH 200

CROSS-SECTION 3

DISTANCE 37,700 ft.

LEGEND

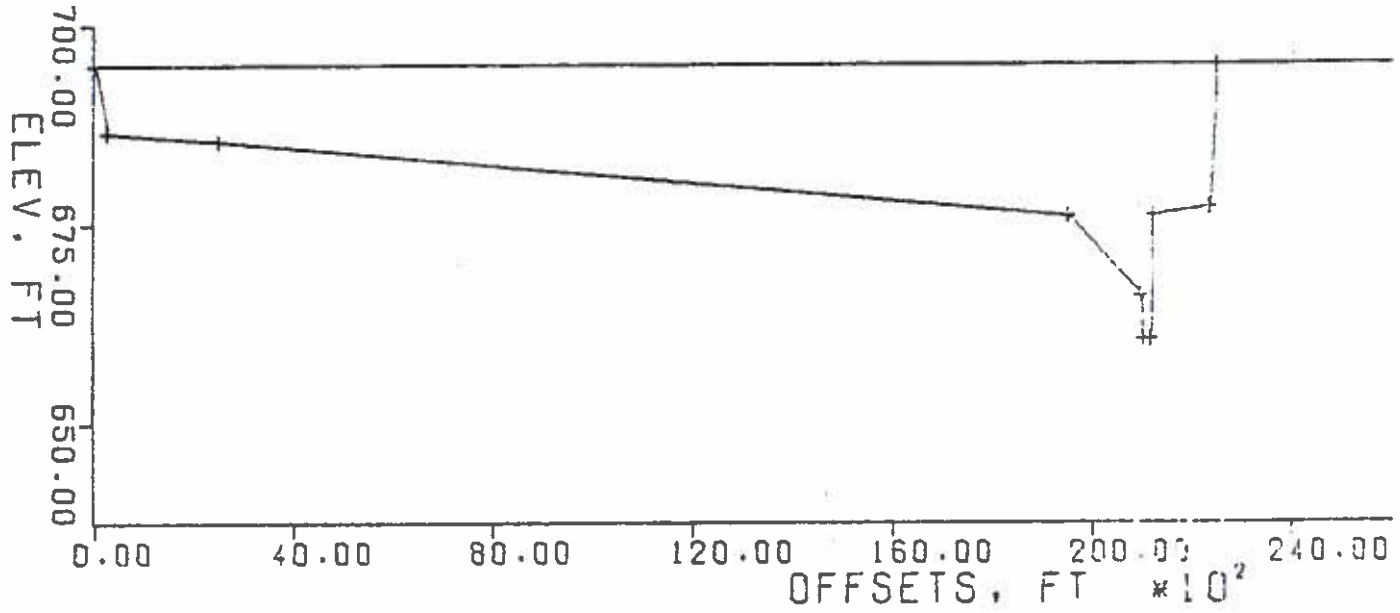
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	1.	1.	1.	1.	1.
675.500	1.	1.	1.	1.	1.
676.000	1.	1.	1.	1.	1.
676.500	1.	1.	1.	1.	1.
677.000	1.	1.	1.	1.	1.
677.500	17813.	17813.	4453.	17813.	4453.
678.000	22958.	22958.	14646.	22958.	14646.
678.500	28104.	28104.	27411.	28104.	27411.
679.000	33250.	33250.	42750.	33250.	42750.
679.500	33577.	33577.	59457.	33577.	59457.
680.000	33904.	33904.	76327.	33904.	76327.
680.500	34232.	34232.	93561.	34232.	93561.
681.000	34559.	34559.	110559.	34559.	110559.
681.500	34949.	34949.	127936.	34949.	127936.
682.000	35338.	35338.	145507.	35338.	145507.
682.500	35728.	35728.	163274.	35728.	163274.
683.000	36118.	36118.	181235.	36118.	181235.
683.500	36507.	36507.	199392.	36507.	199392.
684.000	36897.	36897.	217743.	36897.	217743.
684.500	37287.	37287.	236289.	37287.	236289.
685.000	37676.	37676.	255029.	37677.	255029.
685.500	38066.	38066.	273965.	38046.	273965.
686.000	38456.	38456.	293096.	38456.	293096.
686.500	38846.	38846.	312421.	38846.	312421.
687.000	39235.	39235.	331941.	39235.	331941.
687.500	39281.	39281.	351570.	39281.	351570.
688.000	39329.	39329.	371223.	39329.	371223.
688.500	39377.	39377.	390899.	39377.	390899.
689.000	39425.	39425.	410600.	39425.	410600.
689.500	39473.	39473.	430324.	39473.	430324.
690.000	39521.	39521.	450073.	39521.	450073.
690.500	39569.	39569.	469845.	39569.	469845.
691.000	39617.	39617.	489642.	39517.	489642.
691.500	39665.	39665.	509462.	39665.	509462.
692.000	39713.	39715.	529306.	39715.	529306.
692.500	39760.	39760.	549174.	39761.	549174.
693.000	39808.	39808.	569067.	39809.	569067.
693.500	39856.	39856.	588983.	39857.	588983.
694.000	39904.	39904.	608923.	39904.	608923.
694.500	39952.	39952.	628887.	39952.	628887.
695.000	40000.	40000.	648875.	40000.	648875.

REACH 200

CROSS-SECTION 4

DISTANCE 58,500



REACH 200

CROSS-SECTION 4

DISTANCE 58,500 ft.

LEGEND

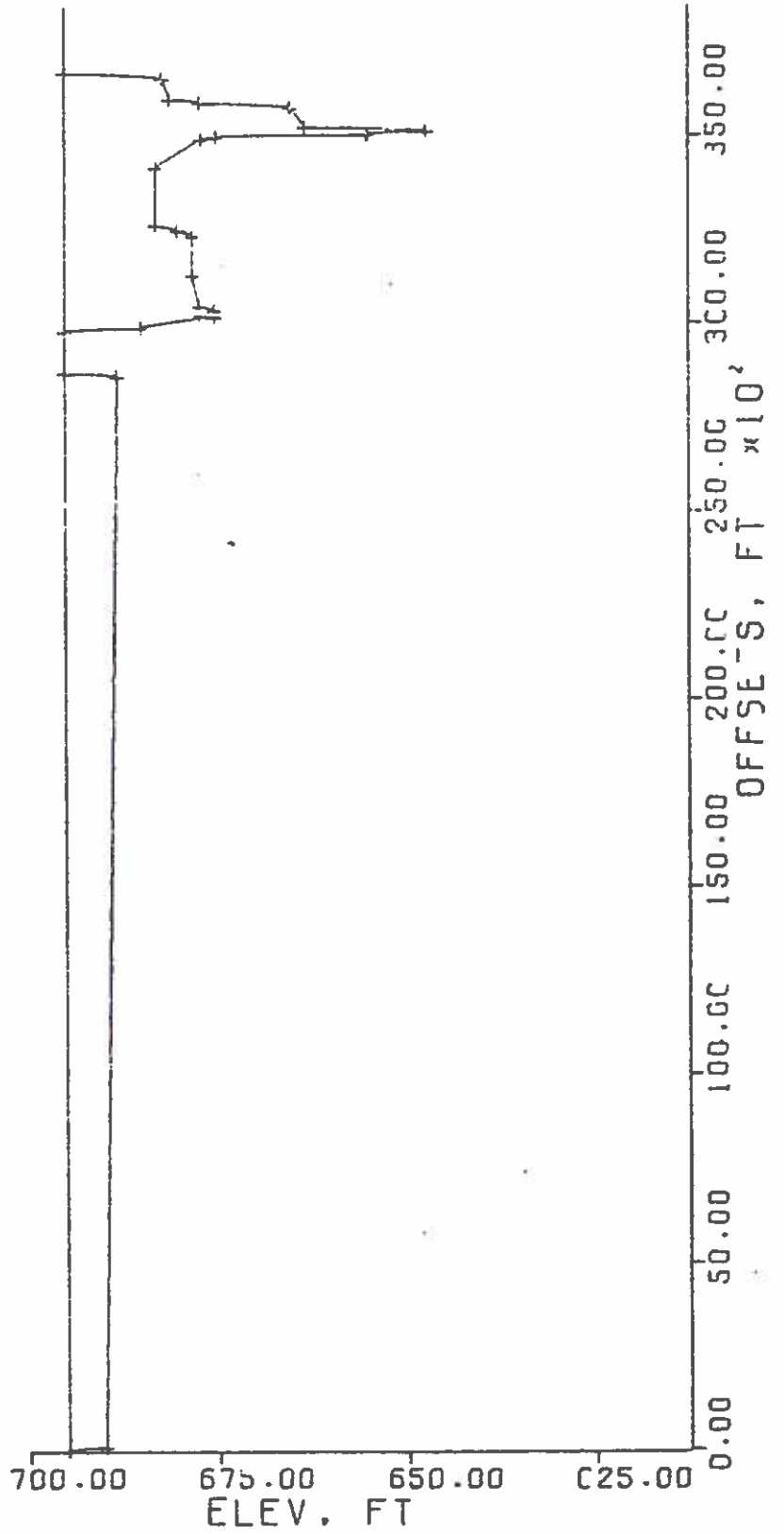
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	1597.	1597.	9177.	1599.	9177.
675.500	1673.	1675.	9994.	1676.	9994.
676.000	1750.	1750.	10850.	1753.	10850.
676.500	3207.	3207.	12089.	3210.	12089.
677.000	4664.	4664.	14057.	4667.	14057.
677.500	5563.	5563.	16614.	5565.	16614.
678.000	6461.	6461.	19620.	6464.	19520.
678.500	7359.	7359.	23075.	7362.	23075.
679.000	8257.	8257.	26979.	8260.	26979.
679.500	9156.	9156.	31332.	9158.	31332.
680.000	10054.	10054.	36135.	10057.	36135.
680.500	10952.	10952.	41386.	10955.	41386.
681.000	11850.	11850.	47086.	11853.	47086.
681.500	12748.	12748.	53236.	12751.	53236.
682.000	13647.	13647.	59835.	13650.	59835.
682.500	14545.	14545.	66883.	14548.	66883.
683.000	15443.	15443.	74380.	15446.	74380.
683.500	16341.	16341.	82326.	16344.	82326.
684.000	17239.	17239.	90721.	17243.	90721.
684.500	18138.	18138.	99565.	18141.	99565.
685.000	19036.	19036.	108858.	19039.	108858.
685.500	19934.	19934.	118601.	19937.	118601.
686.000	21063.	21063.	128850.	21066.	128850.
686.500	22191.	22191.	139963.	22194.	139963.
687.000	22209.	22209.	150763.	22213.	150763.
687.500	22227.	22227.	161873.	22231.	161873.
688.000	22246.	22246.	172991.	22249.	172991.
688.500	22264.	22264.	184118.	22267.	184118.
689.000	22282.	22282.	195254.	22285.	195254.
689.500	22300.	22300.	206400.	22304.	206400.
690.000	22318.	22318.	217554.	22322.	217554.
690.500	22336.	22336.	228718.	22340.	228718.
691.000	22355.	22355.	239891.	22358.	239891.
691.500	22373.	22373.	251075.	22377.	251075.
692.000	22391.	22391.	262264.	22395.	262264.
692.500	22409.	22409.	273464.	22413.	273464.
693.000	22427.	22427.	284675.	22431.	284675.
693.500	22445.	22445.	295891.	22449.	295891.
694.000	22464.	22464.	307118.	22468.	307118.
694.500	22482.	22482.	318355.	22486.	318355.
695.000	22500.	22500.	329600.	22504.	329600.

REACH 200

CROSS-SECTION 5

DISTANCE 68,900



REACH 200

CROSS-SECTION 5

DISTANCE 68,900 ft.

LEGEND

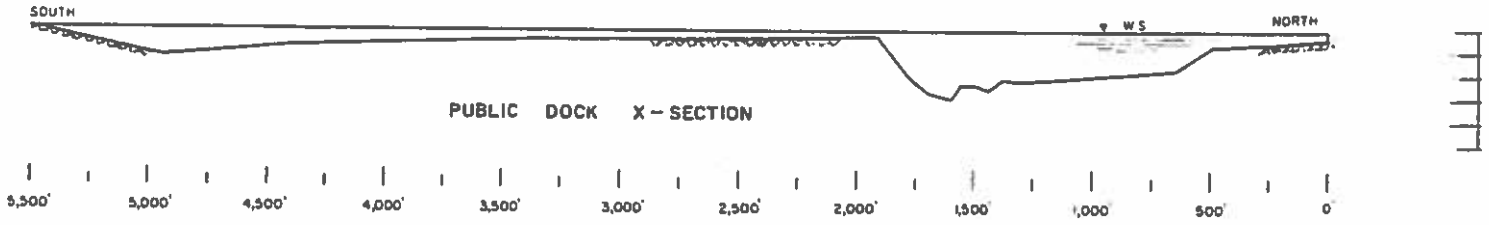
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	908.	908.	11432.	913.	11432.
675.500	1011.	1011.	11911.	1016.	11911.
676.000	1113.	1113.	12442.	1118.	12442.
676.500	1216.	1216.	13025.	1221.	13025.
677.000	1318.	1318.	13658.	1323.	13658.
677.500	1612.	1612.	14441.	1617.	14441.
678.000	2305.	2306.	15470.	2311.	15470.
678.500	3493.	3493.	17185.	3498.	17185.
679.000	3619.	3619.	18963.	3624.	18963.
679.500	3746.	3746.	20804.	3751.	20804.
680.000	3873.	3873.	22709.	3878.	22709.
680.500	3984.	3984.	24673.	3989.	24673.
681.000	4096.	4096.	26693.	4101.	26693.
681.500	4476.	4476.	28836.	4481.	28836.
682.000	4959.	4959.	31169.	4962.	31169.
682.500	4962.	4962.	33623.	4968.	33623.
683.000	5068.	5068.	36131.	5074.	36131.
683.500	6628.	6628.	39440.	6634.	39440.
684.000	6648.	6648.	42759.	6654.	42759.
684.500	6668.	6668.	46088.	6674.	46088.
685.000	6688.	6689.	49428.	6694.	49428.
685.500	6699.	6699.	52775.	6705.	52775.
686.000	6710.	6710.	56127.	6715.	56127.
686.500	6720.	6720.	59484.	6726.	59484.
687.000	6731.	6731.	62847.	6736.	62847.
687.500	6741.	6741.	66215.	6747.	66215.
688.000	6752.	6752.	69588.	6758.	69588.
688.500	13665.	13665.	74750.	13900.	74750.
689.000	21037.	21037.	83483.	21045.	83483.
689.500	26180.	26180.	95787.	26186.	95787.
690.000	35323.	35323.	111663.	35329.	111653.
690.500	35351.	35351.	129331.	35357.	129331.
691.000	35378.	35378.	147014.	35384.	147014.
691.500	35406.	35406.	164710.	35412.	164710.
692.000	35434.	35434.	182419.	35440.	182419.
692.500	35461.	35461.	200143.	35468.	200143.
693.000	35489.	35489.	217881.	35495.	217881.
693.500	35517.	35517.	235632.	35523.	235632.
694.000	35545.	35545.	253398.	35551.	253398.
694.500	35572.	35572.	271177.	35579.	271177.
695.000	35600.	35600.	288970.	35607.	288970.

REACH 200

CROSS-SECTION 6

DISTANCE 71,700



REACH 200

CROSS-SECTION 6

DISTANCE 71,700 ft.

LEGEND

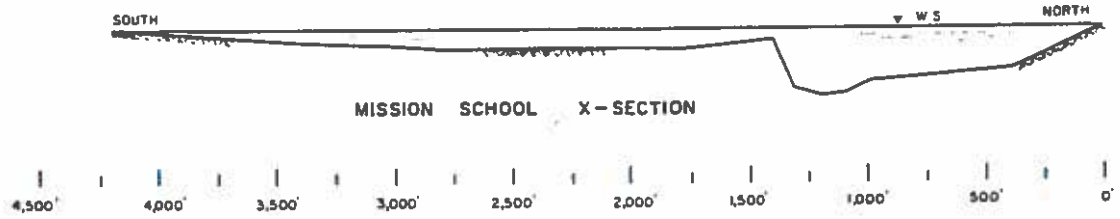
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	1645.	1645.	14581.	1647.	14581.
675.500	1737.	1737.	15427.	1739.	15427.
676.000	1830.	1830.	16319.	1832.	16319.
676.500	1923.	1923.	17257.	1925.	17257.
677.000	2015.	2015.	18241.	2018.	18241.
677.500	2108.	2108.	19272.	2110.	19272.
678.000	2201.	2201.	20349.	2203.	20349.
678.500	2518.	2518.	21529.	2521.	21529.
679.000	2836.	2836.	22868.	2839.	22868.
679.500	3154.	3154.	24365.	3156.	24365.
680.000	3472.	3472.	26022.	3474.	26022.
680.500	3670.	3670.	27807.	3673.	27807.
681.000	3869.	3869.	29692.	3872.	29692.
681.500	4616.	4616.	31815.	4619.	31815.
682.000	5363.	5363.	34308.	5366.	34308.
682.500	5392.	5392.	36997.	5394.	36997.
683.000	5420.	5420.	39700.	5423.	39700.
683.500	5448.	5448.	42417.	5451.	42417.
684.000	5477.	5477.	45148.	5480.	45148.
684.500	5505.	5505.	47894.	5508.	47894.
685.000	5533.	5533.	50653.	5536.	50653.
685.500	5542.	5542.	53422.	5545.	53422.
686.000	5550.	5550.	56195.	5553.	56195.
686.500	5559.	5559.	58972.	5562.	58972.
687.000	5567.	5567.	61753.	5570.	61753.
687.500	5575.	5575.	64539.	5578.	64539.
688.000	5583.	5583.	67328.	5587.	67328.
688.500	5592.	5592.	70122.	5595.	70122.
689.000	5600.	5600.	72920.	5604.	72920.
689.500	5608.	5608.	75722.	5612.	75722.
690.000	5617.	5617.	78528.	5620.	78528.
690.500	5625.	5625.	81339.	5629.	81339.
691.000	5633.	5633.	84153.	5637.	84153.
691.500	5642.	5642.	86972.	5646.	86972.
692.000	5650.	5650.	89795.	5654.	89795.
692.500	5658.	5658.	92622.	5662.	92622.
693.000	5667.	5667.	95453.	5671.	95453.
693.500	5675.	5675.	98289.	5679.	98289.
694.000	5683.	5683.	101128.	5687.	101128.
694.500	5692.	5692.	103972.	5696.	103972.
695.000	5700.	5700.	106820.	5704.	106820.

REACH 200

CROSS-SECTION 7

DISTANCE 74,900



REACH 200

CROSS-SECTION 7

DISTANCE 74,900 ft.

LEGEND

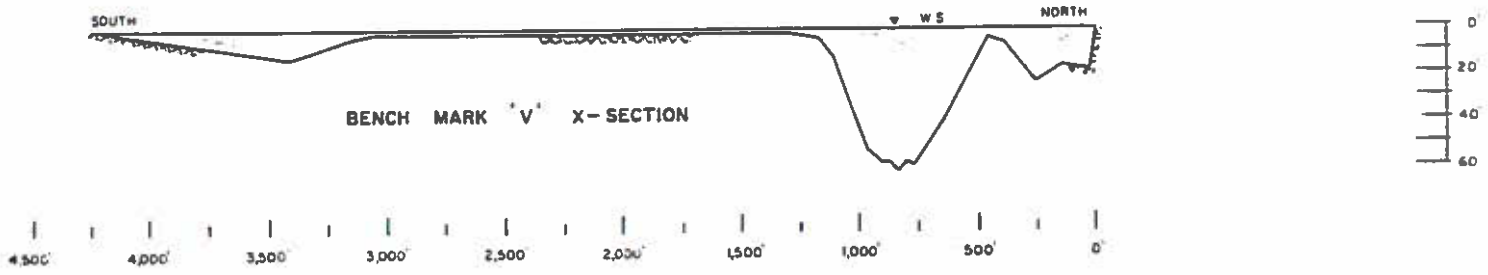
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	1167.	1167.	13229.	1170.	13229.
675.500	1180.	1180.	13816.	1182.	13816.
676.000	1195.	1195.	14409.	1195.	14409.
676.500	1559.	1558.	15097.	1560.	15097.
677.000	1923.	1923.	15967.	1926.	15967.
677.500	2558.	2558.	17215.	2561.	17215.
678.000	2684.	2684.	18526.	2686.	18526.
678.500	2911.	2911.	19925.	2914.	19925.
679.000	3139.	3139.	21437.	3142.	21437.
679.500	3280.	3280.	23042.	3283.	23042.
680.000	3422.	3422.	24718.	3425.	24718.
680.500	3511.	3511.	26451.	3514.	26451.
681.000	3501.	3501.	28229.	3504.	28229.
681.500	3690.	3690.	30051.	3693.	30051.
682.000	3779.	3779.	31919.	3782.	31919.
682.500	3868.	3868.	33831.	3871.	33831.
683.000	3958.	3958.	35787.	3961.	35787.
683.500	4018.	4018.	37781.	4021.	37781.
684.000	4079.	4079.	39806.	4082.	39806.
684.500	4139.	4139.	41860.	4143.	41860.
685.000	4200.	4200.	43945.	4203.	43945.
685.500	4210.	4210.	46048.	4213.	46048.
686.000	4220.	4220.	48155.	4223.	48155.
686.500	4230.	4230.	50268.	4233.	50268.
687.000	4240.	4240.	52385.	4243.	52385.
687.500	4250.	4250.	54500.	4253.	54508.
688.000	4260.	4260.	56635.	4263.	56635.
688.500	4270.	4270.	58768.	4273.	58768.
689.000	4280.	4280.	60905.	4283.	60905.
689.500	4290.	4290.	63048.	4294.	63048.
690.000	4300.	4300.	65195.	4304.	65195.
690.500	4310.	4310.	67348.	4314.	67348.
691.000	4320.	4320.	69505.	4324.	69505.
691.500	4330.	4330.	71668.	4334.	71668.
692.000	4340.	4340.	73835.	4344.	73835.
692.500	4350.	4350.	76008.	4354.	76008.
693.000	4360.	4360.	78185.	4364.	78185.
693.500	4370.	4370.	80368.	4374.	80368.
694.000	4380.	4380.	82555.	4384.	82555.
694.500	4390.	4390.	84748.	4394.	84748.
695.000	4400.	4400.	86945.	4404.	86945.

REACH 200

CROSS-SECTION 8

DISTANCE 78,000



REACH 200

CROSS-SECTION 8

DISTANCE 78,000 ft.

LEGEND

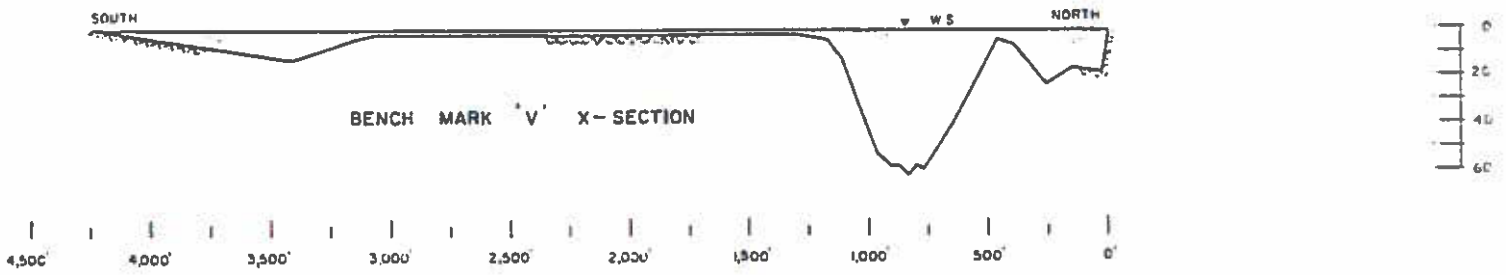
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	1606.	1606.	23827.	1618.	23827.
675.500	1686.	1686.	24650.	1698.	24650.
676.000	1766.	1766.	25513.	1778.	25513.
676.500	1846.	1846.	26416.	1858.	26416.
677.000	1925.	1925.	27359.	1938.	27359.
677.500	2005.	2005.	28341.	2018.	28341.
678.000	2085.	2085.	29364.	2098.	29364.
678.500	2165.	2165.	30426.	2178.	30426.
679.000	2244.	2244.	31528.	2257.	31528.
679.500	2338.	2338.	32674.	2351.	32674.
680.000	2431.	2431.	33866.	2445.	33866.
680.500	2525.	2525.	35105.	2538.	35105.
681.000	2618.	2618.	36391.	2632.	36391.
681.500	2731.	2731.	37728.	2744.	37728.
682.000	2843.	2843.	39122.	2856.	39122.
682.500	2955.	2955.	40571.	2969.	40571.
683.000	3068.	3068.	42077.	3081.	42077.
683.500	4873.	4873.	44500.	4887.	44500.
684.000	4929.	4929.	46951.	4942.	46951.
684.500	4984.	4984.	49429.	4998.	49429.
685.000	5040.	5040.	51935.	5053.	51935.
685.500	5055.	5055.	54459.	5069.	54459.
686.000	5070.	5070.	56990.	5084.	56990.
686.500	5085.	5085.	59529.	5099.	59529.
687.000	5100.	5100.	62075.	5114.	62075.
687.500	5115.	5115.	64629.	5129.	64629.
688.000	5130.	5130.	67190.	5144.	67190.
688.500	5145.	5145.	69759.	5159.	69759.
689.000	5160.	5160.	72335.	5174.	72335.
689.500	5175.	5175.	74919.	5189.	74919.
690.000	5190.	5190.	77510.	5204.	77510.
690.500	5205.	5205.	80109.	5219.	80109.
691.000	5220.	5220.	82715.	5234.	82715.
691.500	5235.	5235.	85329.	5249.	85329.
692.000	5250.	5250.	87950.	5264.	87950.
692.500	5265.	5265.	90579.	5279.	90579.
693.000	5280.	5280.	93215.	5294.	93215.
693.500	5295.	5295.	95858.	5309.	95858.
694.000	5310.	5310.	98510.	5324.	98510.
694.500	5325.	5325.	101169.	5339.	101169.
695.000	5340.	5340	103835.	5354	103835.

REACH 200

CROSS-SECTION 9

DISTANCE 78,900



REACH 200

CROSS-SECTION 9

DISTANCE 78,900 ft.

LEGEND

E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	1606.	1606.	23827.	1618.	23827.
675.500	1686.	1686.	24650.	1698.	24650.
676.000	1766.	1766.	25513.	1778.	25513.
676.500	1846.	1846.	26416.	1858.	26416.
677.000	1925.	1925.	27359.	1938.	27359.
677.500	2005.	2005.	28341.	2018.	28341.
678.000	2085.	2085.	29364.	2098.	29364.
678.500	2165.	2165.	30426.	2178.	30426.
679.000	2244.	2244.	31528.	2257.	31528.
679.500	2338.	2338.	32674.	2351.	32674.
680.000	2431.	2431.	33866.	2445.	33866.
680.500	2525.	2525.	35105.	2538.	35105.
681.000	2618.	2618.	36391.	2632.	36391.
681.500	2731.	2731.	37728.	2744.	37728.
682.000	2843.	2843.	39122.	2856.	39122.
682.500	2955.	2955.	40571.	2969.	40571.
683.000	3068.	3068.	42077.	3081.	42077.
683.500	4873.	4873.	44500.	4887.	44500.
684.000	4929.	4929.	46951.	4942.	46951.
684.500	4984.	4984.	49429.	4998.	49429.
685.000	5040.	5040.	51935.	5053.	51935.
685.500	5055.	5055.	54459.	5069.	54459.
686.000	5070.	5070.	56990.	5084.	56990.
686.500	5085.	5085.	59529.	5099.	59529.
687.000	5100.	5100.	62075.	5114.	62075.
687.500	5115.	5115.	64629.	5129.	64629.
688.000	5130.	5130.	67190.	5144.	67190.
688.500	5145.	5145.	69759.	5159.	69759.
689.000	5160.	5160.	72335.	5174.	72335.
689.500	5175.	5175.	74919.	5189.	74919.
690.000	5190.	5190.	77510.	5204.	77510.
690.500	5205.	5205.	80109.	5219.	80109.
691.000	5220.	5220.	82715.	5234.	82715.
691.500	5235.	5235.	85329.	5249.	85329.
692.000	5250.	5250.	87950.	5264.	87950.
692.500	5265.	5265.	90579.	5279.	90579.
693.000	5280.	5280.	93215.	5294.	93215.
693.500	5295.	5295.	95859.	5309.	95859.
694.000	5310.	5310.	98510.	5324.	98510.
694.500	5325.	5325.	101169.	5339.	101169.
695.000	5340.	5340	103835.	5354	103835.

REACH 350
CROSS SECTION LOCATIONS
#2
#1
I O N A L P A R K
R I V E R
Johnson L.
Spruce Pt
822
805
764
731
717
713

REACH NUMBER - 350

DESCRIPTION - Birch River

REACH LENGTH - 66,634 feet

UPSTREAM NODE - 3

DOWNSTREAM NODE - 4

CROSS-SECTION - 2

Section Number	Distance from Upstream Node (ft)
1	0
2	66,634

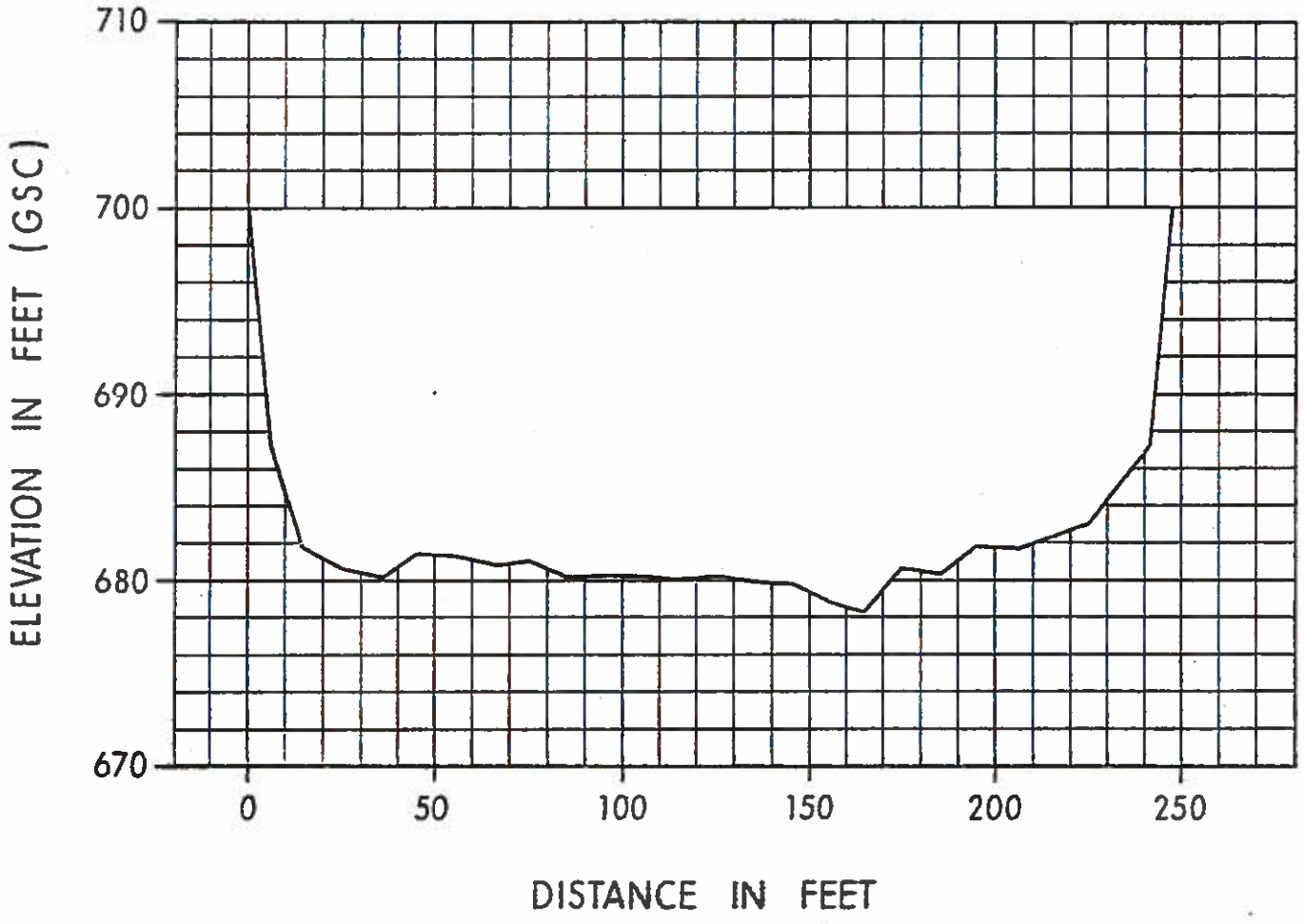
REMARKS: Cross-section 1 was surveyed by the Technical Services Division of Alberta Environment in 1978. The section was then transposed to the end of the reach and relabelled as cross-section 2.

The hydraulic boundary condition for node 3 requires discharge to be specified. It is recommended that this discharge be 1.5 times greater than recorded discharges at hydrometric station 07KE001 - Birch River below Alice Creek and lagged by 2 days.

REACH 350

CROSS-SECTION 1

DISTANCE 0 ft.



REACH 350

CROSS-SECTION 1

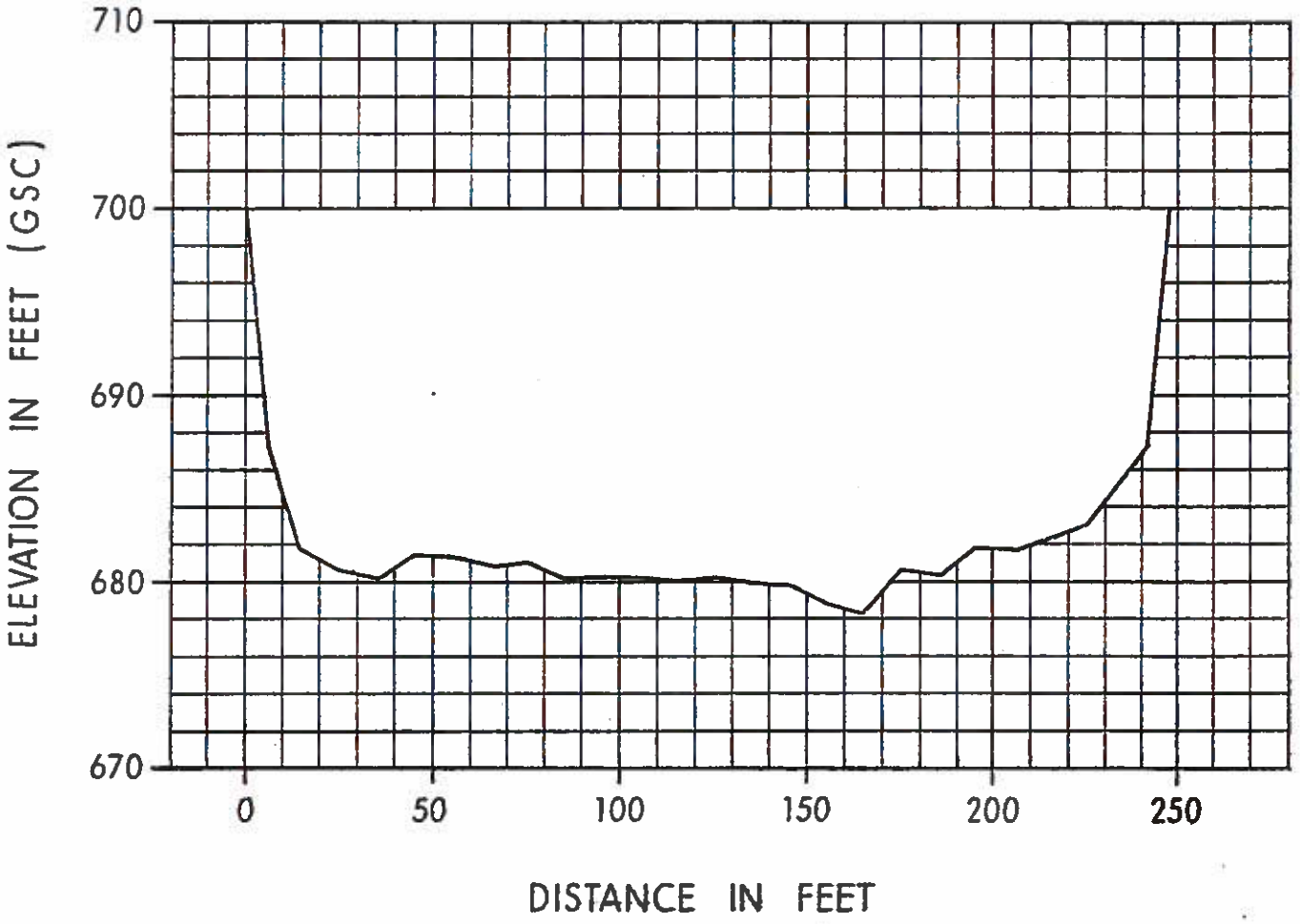
DISTANCE 0 ft.

ELEVATION (Feet)	WIDTH (Feet)	AREA BELOW (Feet^2)	WETTED PERIMETER (Feet)
678.5	9.4	3.0	9.6
679.0	15.8	7.9	16.5
679.5	22.5	17.0	24.5
680.0	34.7	33.1	36.0
680.5	105.0	80.0	105.7
681.0	148.3	133.6	152.4
681.5	177.9	206.0	181.6
682.0	198.4	313.7	204.2
682.5	205.0	416.5	209.9
683.0	217.9	521.9	224.0
683.5	224.7	630.5	230.6
684.0	227.8	744.8	233.9
684.5	229.6	858.0	235.9
685.0	231.7	974.8	238.6
685.5	232.1	1,089.0	241.2
686.0	233.0	1,207.0	241.7
686.5	234.2	1,321.8	243.7
687.0	234.8	1,440.9	243.9
687.5	235.3	1,526.3	245.0
688.0	235.7	1,614.8	246.1
688.5	236.2	1,730.7	247.2
689.0	236.7	1,851.0	248.4
689.5	237.2	1,967.7	249.5
690.0	237.7	2,088.2	250.7
690.5	238.2	2,205.4	251.7
691.0	238.7	2,326.4	252.9
691.5	239.2	2,444.1	254.0
692.0	239.7	2,565.6	255.1
692.5	240.2	2,683.8	256.2
693.0	240.7	2,805.8	257.3
693.5	241.2	2,924.5	258.4
694.0	241.7	3,047.0	259.6
694.5	242.2	3,166.2	260.7
695.0	242.7	3,289.2	261.8
695.5	243.2	3,408.9	262.9
696.0	243.7	3.532.4	264.1
696.5	244.2	3,652.5	265.2
697.0	244.7	3,776.6	266.3
697.5	245.2	3,897.5	267.4
698.0	245.7	4,021.8	268.5
698.5	246.2	4,143.2	269.6
699.0	246.7	4,268.0	270.8
699.5	247.2	4,390.1	271.9
700.0	247.7	4,515.2	273.0

REACH 350

CROSS-SECTION 2

DISTANCE 66,634 ft.

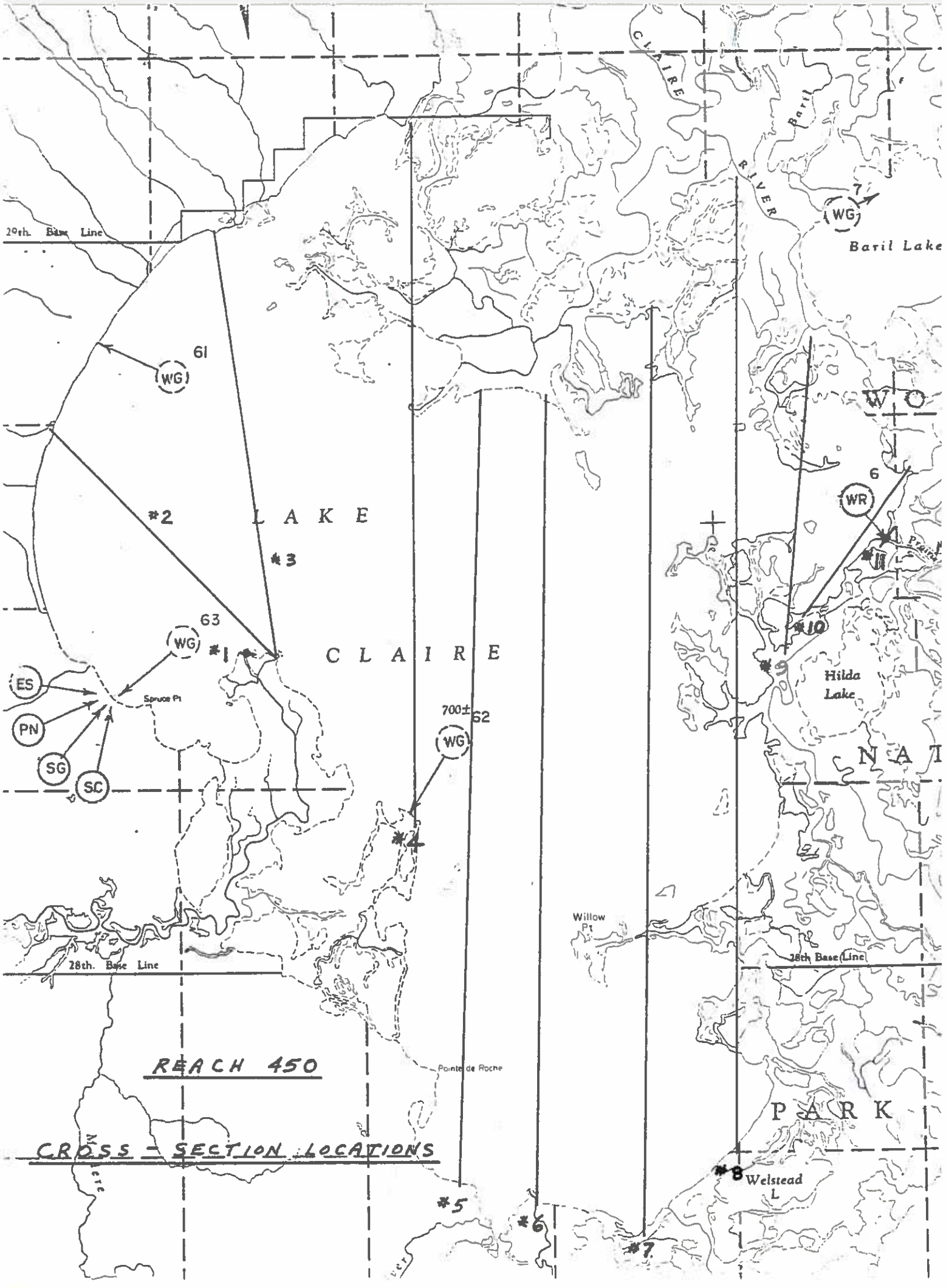


REACH 350

CROSS-SECTION 2

DISTANCE 66,634 ft.

ELEVATION (Feet)	WIDTH (Feet)	AREA BELOW (Feet^2)	WETTED PERIMETER (Feet)
678.5	9.4	3.0	9.6
679.0	15.8	7.9	16.5
679.5	22.5	17.0	24.5
680.0	34.7	33.1	36.0
680.5	105.0	80.0	105.7
681.0	148.3	133.6	152.4
681.5	177.9	206.0	181.6
682.0	198.4	313.7	204.2
682.5	205.0	416.5	209.9
683.0	217.9	521.9	224.0
683.5	224.7	630.5	230.6
684.0	227.8	744.8	233.9
684.5	229.6	858.0	235.9
685.0	231.7	974.8	238.6
685.5	232.1	1,089.0	241.2
686.0	233.0	1,207.0	241.7
686.5	234.2	1,321.8	243.7
687.0	234.8	1,440.9	243.9
687.5	235.3	1,526.3	245.0
688.0	235.7	1,614.8	246.1
688.5	236.2	1,730.7	247.2
689.0	236.7	1,851.0	248.4
689.5	237.2	1,967.7	249.5
690.0	237.7	2,088.2	250.7
690.5	238.2	2,205.4	251.7
691.0	238.7	2,326.4	252.9
691.5	239.2	2,444.1	254.0
692.0	239.7	2,565.6	255.1
692.5	240.2	2,683.8	256.2
693.0	240.7	2,805.8	257.3
693.5	241.2	2,924.5	258.4
694.0	241.7	3,047.0	259.6
694.5	242.2	3,166.2	260.7
695.0	242.7	3,289.2	261.8
695.5	243.2	3,408.9	262.9
696.0	243.7	3.532.4	264.1
696.5	244.2	3,652.5	265.2
697.0	244.7	3,776.6	266.3
697.5	245.2	3,897.5	267.4
698.0	245.7	4,021.8	268.5
698.5	246.2	4,143.2	269.6
699.0	246.7	4,268.0	270.8
699.5	247.2	4,390.1	271.9
700.0	247.7	4,515.2	273.0



CROSS - SECTION LOCATIONS

REACH NUMBER - 450

DESCRIPTION - Lake Claire

REACH LENGTH - 139,128 feet

UPSTREAM NODE - 4

DOWNSTREAM NODE - 5

CROSS-SECTION - 11

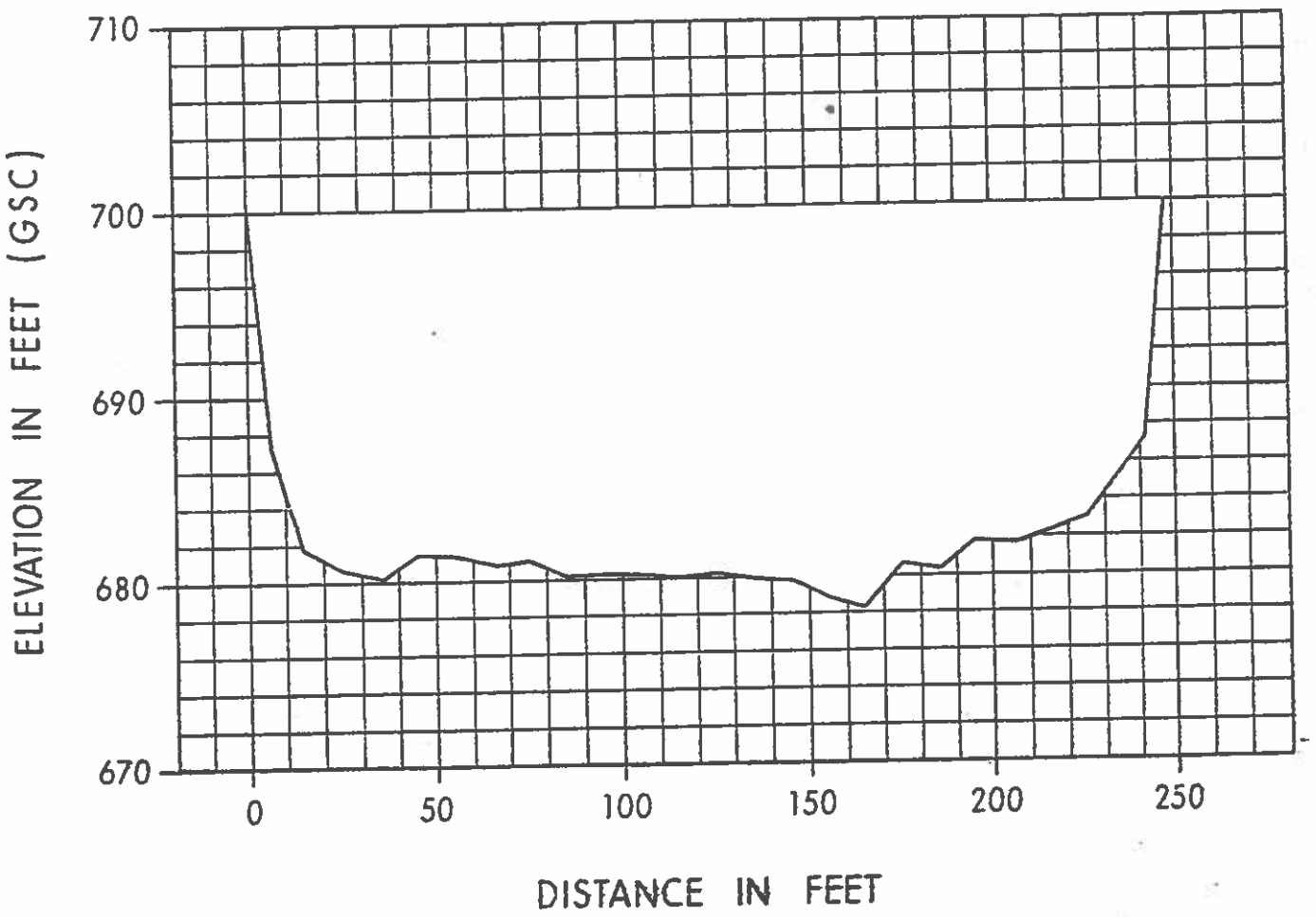
Section Number	Distance from Upstream Node (ft)
1	0
2	10,771
3	27,297
4	54,014
5	64,257
6	76,507
7	93,878
8	108,715
9	119,645
10	132,053
11	139,128

REMARKS: These cross-sections were produced from depth soundings taken in 1971 by Canadian Engineerings Surveys Company Limited for the Peace-Athabasca Delta Project. The Birch River cross-section from reach 350 has been transposed to cross-section 1 and the Prairie River cross-section from reach 550 has been transposed to cross-section 11.

REACH 450

CROSS-SECTION 1

DISTANCE 0 ft.



REACH 450

CROSS-SECTION 1

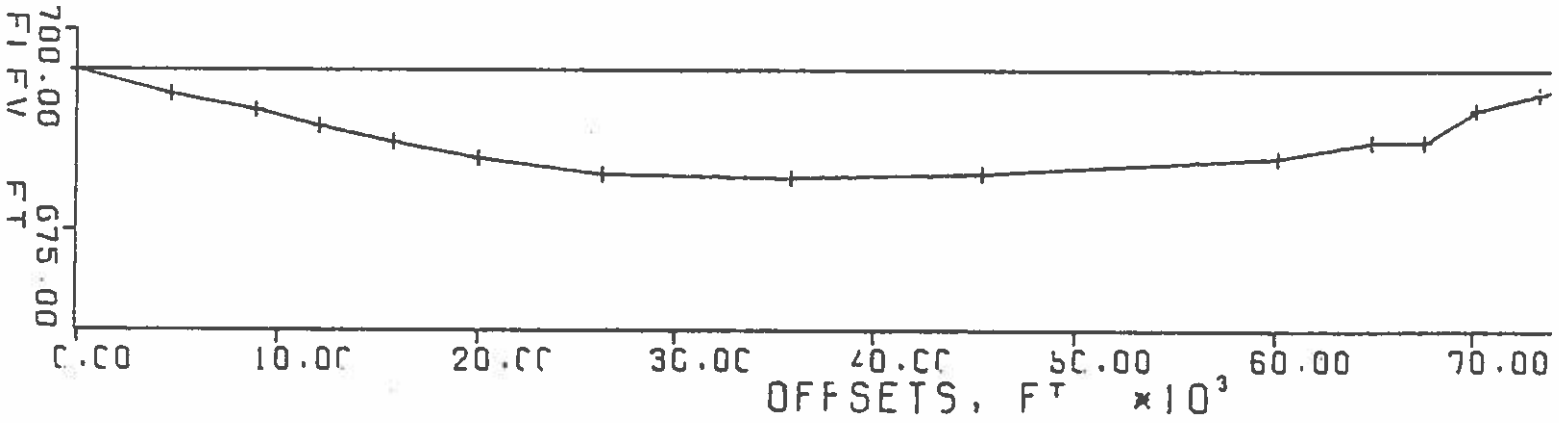
DISTANCE 0 ft.

ELEVATION (Feet)	WIDTH (Feet)	AREA BELOW (Feet^2)	WETTED PERIMETER (Feet)
678.5	9.4	3.0	9.6
679.0	15.8	7.9	16.5
679.5	22.5	17.0	24.5
680.0	34.7	33.1	36.0
680.5	105.0	80.0	105.7
681.0	148.3	133.6	152.4
681.5	177.9	206.0	181.6
682.0	198.4	313.7	204.2
682.5	205.0	416.5	209.9
683.0	217.9	521.9	224.0
683.5	224.7	630.5	230.6
684.0	227.8	744.8	233.9
684.5	229.6	858.0	235.9
685.0	231.7	974.8	238.6
685.5	232.1	1,089.0	241.2
686.0	233.0	1,207.0	241.7
686.5	234.2	1,321.8	243.7
687.0	234.8	1,440.9	243.9
687.5	235.3	1,526.3	245.0
688.0	235.7	1,614.8	246.1
688.5	236.2	1,730.7	247.2
689.0	236.7	1,851.0	248.4
689.5	237.2	1,967.7	249.5
690.0	237.7	2,088.2	250.7
690.5	238.2	2,205.4	251.7
691.0	238.7	2,326.4	252.9
691.5	239.2	2,444.1	254.0
692.0	239.7	2,565.6	255.1
692.5	240.2	2,683.8	256.2
693.0	240.7	2,805.8	257.3
693.5	241.2	2,924.5	258.4
694.0	241.7	3,047.0	259.6
694.5	242.2	3,166.2	260.7
695.0	242.7	3,289.2	261.8
695.5	243.2	3,408.9	262.9
696.0	243.7	3.532.4	264.1
696.5	244.2	3,652.5	265.2
697.0	244.7	3,776.6	266.3
697.5	245.2	3,897.5	267.4
698.0	245.7	4,021.8	268.5
698.5	246.2	4,143.2	269.6
699.0	246.7	4,268.0	270.8
699.5	247.2	4,390.1	271.9
700.0	247.7	4,515.2	273.0

REACH 450

CROSS-SECTION 2

DISTANCE 10,771 ft.



REACH 450

CROSS-SECTION 2

DISTANCE 10771 ft.

LEGEND

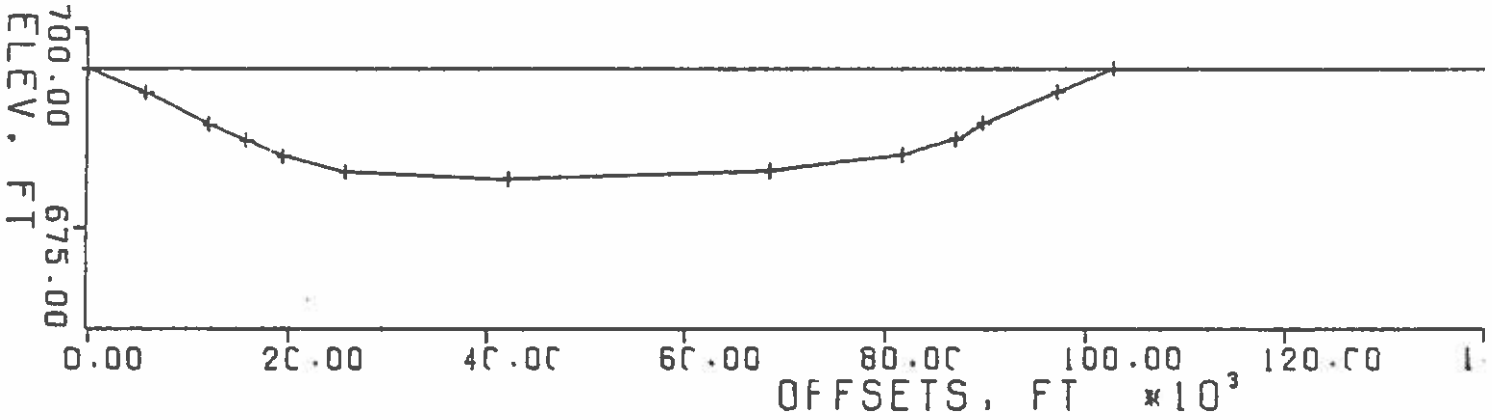
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	1.	1.	1.	1.	1.
675.500	1.	1.	1.	1.	1.
676.000	1.	1.	1.	1.	1.
676.500	1.	1.	1.	1.	1.
677.000	1.	1.	1.	1.	1.
677.500	1.	1.	1.	1.	1.
678.000	1.	1.	1.	1.	1.
678.500	1.	1.	1.	1.	1.
679.000	1.	1.	1.	1.	1.
679.500	1.	1.	1.	1.	1.
680.000	1.	1.	1.	1.	1.
680.500	1.	1.	1.	1.	1.
681.000	1.	1.	1.	1.	1.
681.500	1.	1.	1.	1.	1.
682.000	19008.	1000.	486.	1001.	4752.
682.500	24288.	1000.	986.	1002.	15576.
683.000	29568.	1000.	1486.	1003.	29040.
683.500	34848.	1000.	1986.	1004.	45144.
684.000	40128.	1000.	2486.	1005.	63888.
684.500	42372.	1000.	2986.	1006.	84513.
685.000	44616.	1000.	3486.	1007.	106260.
685.500	46860.	1000.	3986.	1008.	129129.
686.000	49104.	1000.	4486.	1009.	153120.
686.500	52998.	1000.	4986.	1010.	179306.
687.000	54252.	1000.	5486.	1011.	206118.
687.500	55506.	1000.	5986.	1012.	233558.
688.000	56760.	1000.	6486.	1013.	261624.
688.500	57882.	1000.	6986.	1014.	290285.
689.000	59004.	1000.	7486.	1015.	319506.
689.500	60126.	1000.	7986.	1016.	349289.
690.000	61248.	1000.	8486.	1017.	379632.
690.500	63096.	1000.	8986.	1018.	410718.
691.000	64944.	1000.	9486.	1019.	442728.
691.500	66792.	1000.	9986.	1020.	475662.
692.000	68640.	1000.	10486.	1021.	509520.
692.500	70136.	1000.	10986.	1022.	544214.
693.000	71632.	1000.	11486.	1023.	579656.
693.500	73128.	1000.	11986.	1024.	615846.
694.000	74624.	1000.	12486.	1025.	652784.
694.500	76120.	1000.	12986.	1026.	690470.
695.000	77616.	1000.	13486.	1027.	728904.

REACH 450

CROSS-SECTION 3

DISTANCE 27,297 ft.



REACH 450

CROSS-SECTION 3

DISTANCE 27,297 ft.

LEGEND

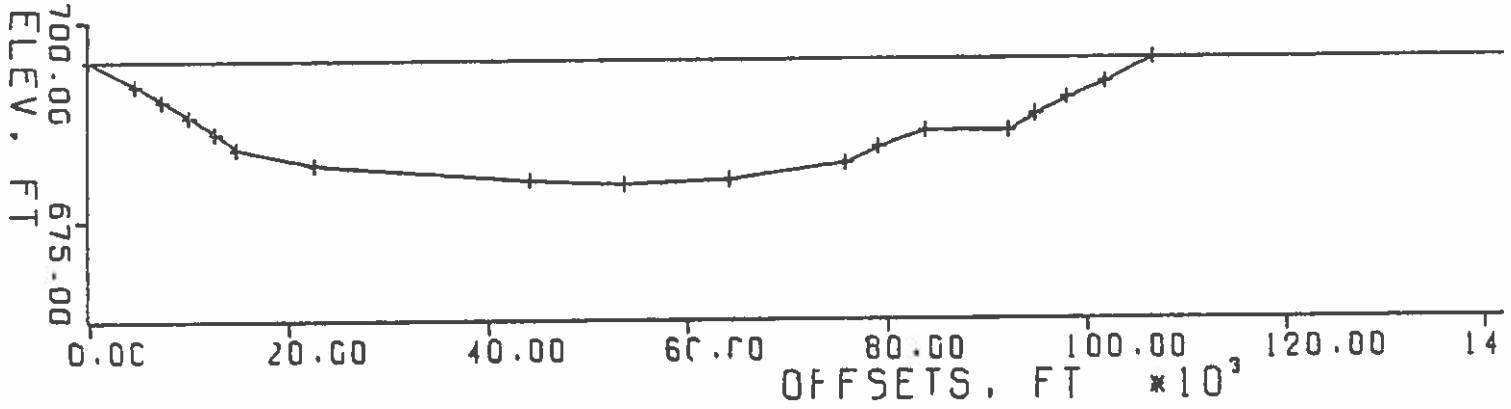
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	1.	1.	1.	1.	1.
675.500	1.	1.	1.	1.	1.
676.000	1.	1.	1.	1.	1.
676.500	1.	1.	1.	1.	1.
677.000	1.	1.	1.	1.	1.
677.500	1.	1.	1.	1.	1.
678.000	1.	1.	1.	1.	1.
678.500	1.	1.	1.	1.	1.
679.000	1.	1.	1.	1.	1.
679.500	1.	1.	1.	1.	1.
680.000	1.	1.	1.	1.	1.
680.500	1.	1.	1.	1.	1.
681.000	1.	1.	1.	1.	1.
681.500	21384.	3000.	1389.	3001.	5346.
682.000	42768.	3000.	2889.	3002.	21384.
682.500	47652.	3000.	4389.	3003.	43989.
683.000	52535.	3000.	5889.	3004.	69036.
683.500	57419.	3000.	7389.	3005.	96524.
684.000	62302.	3000.	8889.	3006.	126454.
684.500	64547.	3000.	10389.	3007.	158166.
685.000	66791.	3000.	11889.	3008.	191001.
685.500	69036.	3000.	13389.	3009.	224957.
686.000	71280.	3000.	14889.	3010.	260036.
686.500	72864.	3000.	16389.	3011.	296072.
687.000	74448.	3000.	17889.	3012.	332900.
687.500	76032.	3000.	19389.	3013.	370520.
688.000	77616.	3000.	20889.	3014.	408932.
688.500	79332.	3000.	22389.	3015.	448169.
689.000	81048.	3000.	23889.	3016.	488264.
689.500	82764.	3000.	25389.	3017.	529217.
690.000	84480.	3000.	26889.	3018.	571028.
690.500	86196.	3000.	28389.	3019.	613697.
691.000	87912.	3000.	29889.	3020.	657224.
691.500	89628.	3000.	31389.	3021.	701609.
692.000	91344.	3000.	32889.	3022.	746852.
692.500	93280.	3000.	34389.	3023.	793008.
693.000	95216.	3000.	35889.	3024.	840132.
693.500	97152.	3000.	37389.	3025.	888224.
694.000	99088.	3000.	38889.	3026.	937284.
694.500	101024.	3000.	40389.	3027.	987312.
695.000	102960.	3000.	41889.	3028.	1038308.

REACH 450

CROSS-SECTION 4

DISTANCE 54,014 ft.



REACH 450

CROSS-SECTION 4

DISTANCE 54,014 ft.

LEGEND

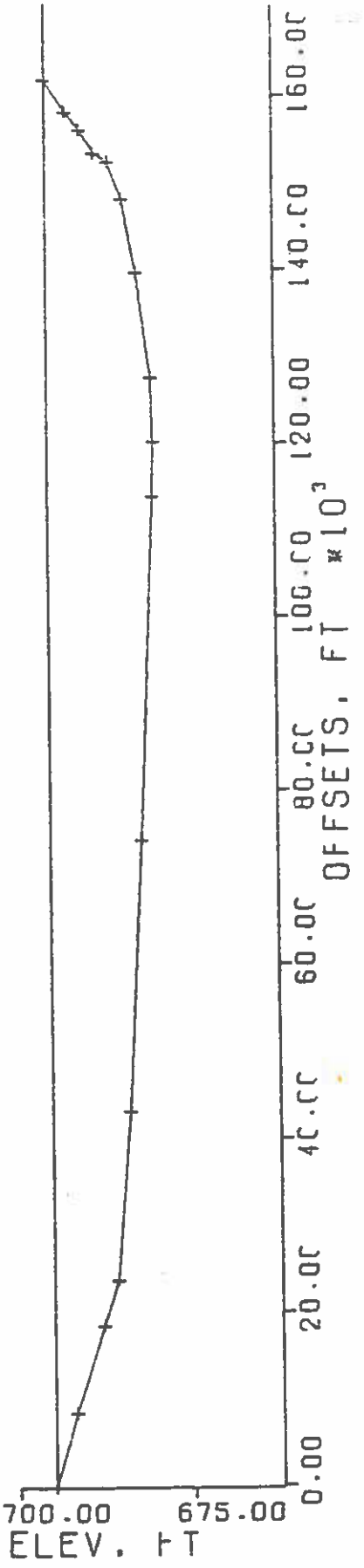
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	1.	1.	1.	1.	1.
675.500	1.	1.	1.	1.	1.
676.000	1.	1.	1.	1.	1.
676.500	1.	1.	1.	1.	1.
677.000	1.	1.	1.	1.	1.
677.500	1.	1.	1.	1.	1.
678.000	1.	1.	1.	1.	1.
678.500	1.	1.	1.	1.	1.
679.000	1.	1.	1.	1.	1.
679.500	1.	1.	1.	1.	1.
680.000	20064.	5000.	2188.	5001.	5016.
680.500	28380.	5000.	4688.	5002.	17127.
681.000	36696.	5000.	7188.	5003.	33396.
681.500	45012.	5000.	9688.	5004.	53823.
682.000	53328.	5000.	12188.	5005.	78408.
682.500	56100.	5000.	14688.	5006.	105765.
683.000	58872.	5000.	17188.	5007.	134508.
683.500	61644.	5000.	19688.	5008.	164637.
684.000	64416.	5000.	22188.	5009.	196152.
684.500	66132.	5000.	24688.	5010.	228789.
685.000	67848.	5000.	27188.	5011.	262284.
685.500	69564.	5000.	29688.	5012.	296637.
686.000	71280.	5000.	32188.	5013.	331848.
686.500	81048.	5000.	34688.	5014.	372042.
687.000	82368.	5000.	37188.	5015.	412896.
687.500	83688.	5000.	39688.	5016.	454410.
688.000	85008.	5000.	42188.	5017.	496584.
688.500	86460.	5000.	44688.	5018.	539451.
689.000	87912.	5000.	47188.	5019.	583044.
689.500	89364.	5000.	49688.	5020.	627363.
690.000	90816.	5000.	52188.	5021.	672408.
690.500	92400.	5000.	54688.	5022.	718212.
691.000	93984.	5000.	57188.	5023.	764808.
691.500	95568.	5000.	59688.	5024.	812196.
692.000	97152.	5000.	62188.	5025.	860376.
692.500	98736.	5000.	64688.	5026.	909348.
693.000	100320.	5000.	67188.	5027.	959112.
693.500	101904.	5000.	69688.	5028.	1009668.
694.000	103488.	5000.	72188.	5029.	1061016.
694.500	105072.	5000.	74688.	5030.	1113156.
695.000	106656.	5000.	77188.	5031.	1166088.

REACH 450

CROSS-SECTION 5

DISTANCE 64,257 ft.



REACH 450

CROSS-SECTION 5

DISTANCE 64,257 ft.

LEGEND

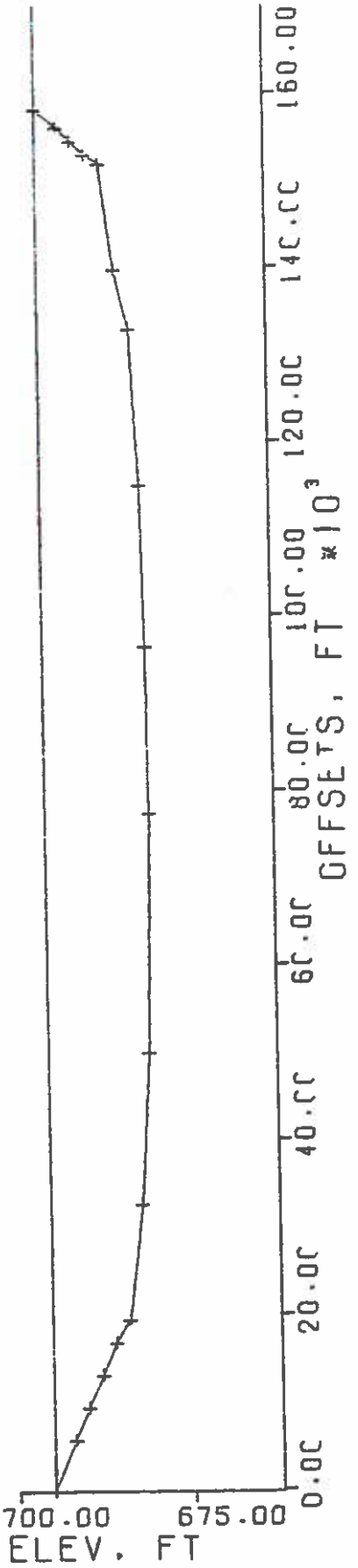
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	1.	1.	1.	1.	1.
675.500	1.	1.	1.	1.	1.
676.000	1.	1.	1.	1.	1.
676.500	1.	1.	1.	1.	1.
677.000	1.	1.	1.	1.	1.
677.500	1.	1.	1.	1.	1.
678.000	1.	1.	1.	1.	1.
678.500	1.	1.	1.	1.	1.
679.000	1.	1.	1.	1.	1.
679.500	1.	1.	1.	1.	1.
680.000	13728.	5000.	818.	5000.	1373.
680.500	26664.	5000.	3318.	5001.	11471.
681.000	39600.	5000.	5818.	5002.	28037.
681.500	52536.	5000.	8318.	5003.	51071.
682.000	65472.	5000.	10818.	5004.	80573.
682.500	75372.	5000.	13318.	5005.	115784.
683.000	85272.	5000.	15818.	5006.	155945.
683.500	95172.	5000.	18318.	5007.	201056.
684.000	105072.	5000.	20818.	5008.	251117.
684.500	111012.	5000.	23318.	5009.	305138.
685.000	116952.	5000.	25818.	5010.	362129.
685.500	122892.	5000.	28318.	5011.	422090.
686.000	128832.	5000.	30818.	5012.	485021.
686.500	130416.	5000.	33318.	5013.	549833.
687.000	132000.	5000.	35818.	5014.	615437.
687.500	133584.	5000.	38318.	5015.	681833.
688.000	135168.	5000.	40818.	5016.	749021.
688.500	137082.	5000.	43318.	5017.	817083.
689.000	138996.	5000.	45818.	5018.	886103.
689.500	140910.	5000.	48318.	5019.	956079.
690.000	142824.	5000.	50818.	5020.	1027013.
690.500	144606.	5000.	53318.	5021.	1098870.
691.000	146388.	5000.	55818.	5022.	1171619.
691.500	148170.	5000.	58318.	5023.	1245258.
692.000	149952.	5000.	60818.	5024.	1319789.
692.500	151976.	5000.	63318.	5025.	1395271.
693.000	154000.	5000.	65818.	5026.	1471765.
693.500	156024.	5000.	68318.	5027.	1549271.
694.000	158048.	5000.	70818.	5028.	1627789.
694.500	160072.	5000.	73318.	5029.	1707319.
695.000	162096.	5000.	75818.	5030.	1787861.

REACH 450

CROSS-SECTION 6

DISTANCE 76,507 ft.



REACH 450

CROSS-SECTION 6

DISTANCE 76,507 ft.

LEGEND

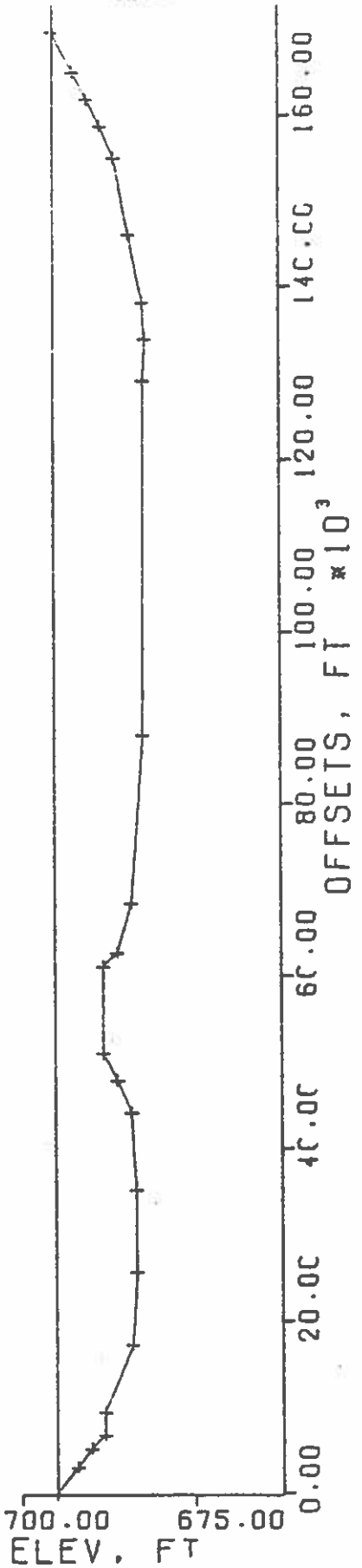
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	1.	1.	1.	1.	1.
675.500	1.	1.	1.	1.	1.
676.000	1.	1.	1.	1.	1.
676.500	1.	1.	1.	1.	1.
677.000	1.	1.	1.	1.	1.
677.500	1.	1.	1.	1.	1.
678.000	1.	1.	1.	1.	1.
678.500	1.	1.	1.	1.	1.
679.000	1.	1.	1.	1.	1.
679.500	1.	1.	1.	1.	1.
680.000	1.	1.	1.	1.	1.
680.500	40102.	5000.	1408.	5001.	6504.
681.000	71957.	5000.	3908.	5002.	36701.
681.500	86138.	5000.	6408.	5003.	76225.
682.000	100320.	5000.	8908.	5004.	122839.
682.500	105336.	5000.	11408.	5005.	174253.
683.000	110352.	5000.	13908.	5006.	228175.
683.500	115368.	5000.	16408.	5007.	284605.
684.000	120384.	5000.	18908.	5008.	343543.
684.500	124080.	5000.	21408.	5009.	404659.
685.000	127776.	5000.	23908.	5010.	467623.
685.500	131472.	5000.	26408.	5011.	532435.
686.000	135168.	5000.	28908.	5012.	599095.
686.500	136356.	5000.	31408.	5013.	666976.
687.000	137544.	5000.	33908.	5014.	735451.
687.500	138732.	5000.	36408.	5015.	804520.
688.000	139920.	5000.	38908.	5016.	874183.
688.500	141240.	5000.	41408.	5017.	944473.
689.000	142560.	5000.	43908.	5018.	1015423.
689.500	143880.	5000.	46408.	5019.	1087033.
690.000	145200.	5000.	48908.	5020.	1159303.
690.500	146520.	5000.	51408.	5021.	1232233.
691.000	147840.	5000.	53908.	5022.	1305823.
691.500	149160.	5000.	56408.	5023.	1380073.
692.000	150480.	5000.	58908.	5024.	1454983.
692.500	151800.	5000.	61408.	5025.	1530553.
693.000	153120.	5000.	63908.	5026.	1606783.
693.500	154440.	5000.	66408.	5027.	1683673.
694.000	155760.	5000.	68908.	5028.	1761223.
694.500	157080.	5000.	71408.	5029.	1839433.
695.000	158400.	5000.	73908.	5030.	1918303.

REACH 450

CROSS-SECTION 7

DISTANCE 93,878 ft.



REACH 450

CROSS-SECTION 7

DISTANCE 93,878 ft.

LEGEND

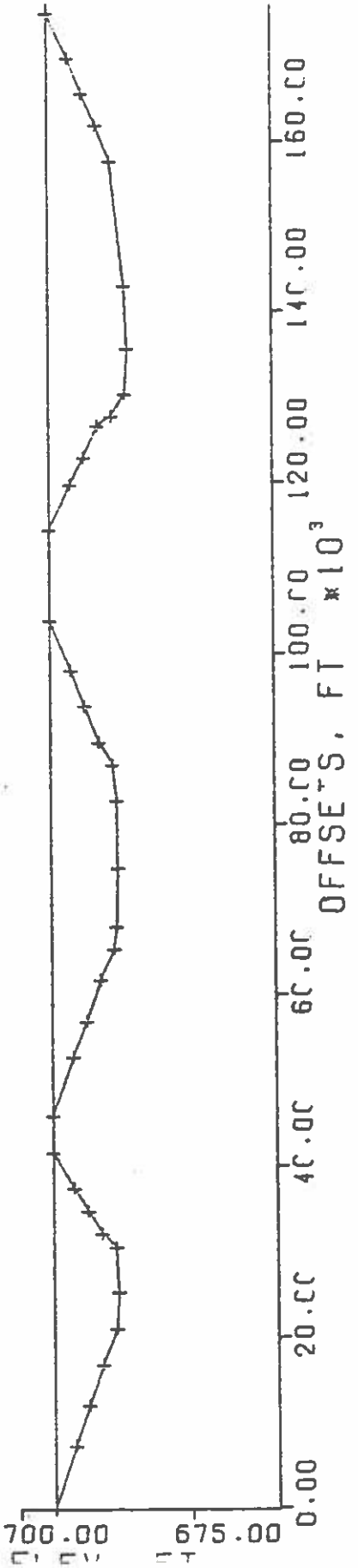
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	1.	1.	1.	1.	1.
675.500	1.	1.	1.	1.	1.
676.000	1.	1.	1.	1.	1.
676.500	1.	1.	1.	1.	1.
677.000	1.	1.	1.	1.	1.
677.500	1.	1.	1.	1.	1.
678.000	1.	1.	1.	1.	1.
678.500	1.	1.	1.	1.	1.
679.000	1.	1.	1.	1.	1.
679.500	1.	1.	1.	1.	1.
680.000	1.	1.	1.	1.	1.
680.500	1.	1.	1.	1.	1.
681.000	1.	1.	1.	1.	1.
681.500	1.	1.	1.	1.	1.
682.000	8976.	5000.	1082.	5000.	1346.
682.500	55396.	5000.	3582.	5001.	23291.
683.000	62803.	5000.	6082.	5002.	52841.
683.500	82617.	5000.	8582.	5003.	87190.
684.000	104544.	5000.	11082.	5004.	133980.
684.500	110154.	5000.	13582.	5005.	187654.
685.000	115764.	5000.	16082.	5006.	244134.
685.500	121374.	5000.	18582.	5007.	303418.
686.000	126984.	5000.	21082.	5008.	365508.
686.500	130086.	5000.	23582.	5009.	429775.
687.000	133188.	5000.	26082.	5010.	495594.
687.500	136290.	5000.	28582.	5011.	562963.
688.000	139392.	5000.	31082.	5012.	631884.
688.500	153252.	5000.	33582.	5013.	708213.
689.000	154440.	5000.	36082.	5014.	785136.
689.500	155628.	5000.	38582.	5015.	862653.
690.000	156816.	5000.	41082.	5016.	940764.
690.500	158136.	5000.	43582.	5017.	1019502.
691.000	159456.	5000.	46082.	5018.	1098900.
691.500	160776.	5000.	48582.	5019.	1178958.
692.000	162096.	5000.	51082.	5020.	1259676.
692.500	163416.	5000.	53582.	5021.	1341054.
693.000	164736.	5000.	56082.	5022.	1423092.
693.500	166056.	5000.	58582.	5023.	1505790.
694.000	167376.	5000.	61082.	5024.	1589148.
694.500	168696.	5000.	63582.	5025.	1673166.
695.000	170016.	5000.	66082.	5026.	1757844.

REACH 450

CROSS-SECTION 8

DISTANCE 108,715 ft.



REACH 450

CROSS-SECTION 8

DISTANCE 108,715 ft.

LEGEND

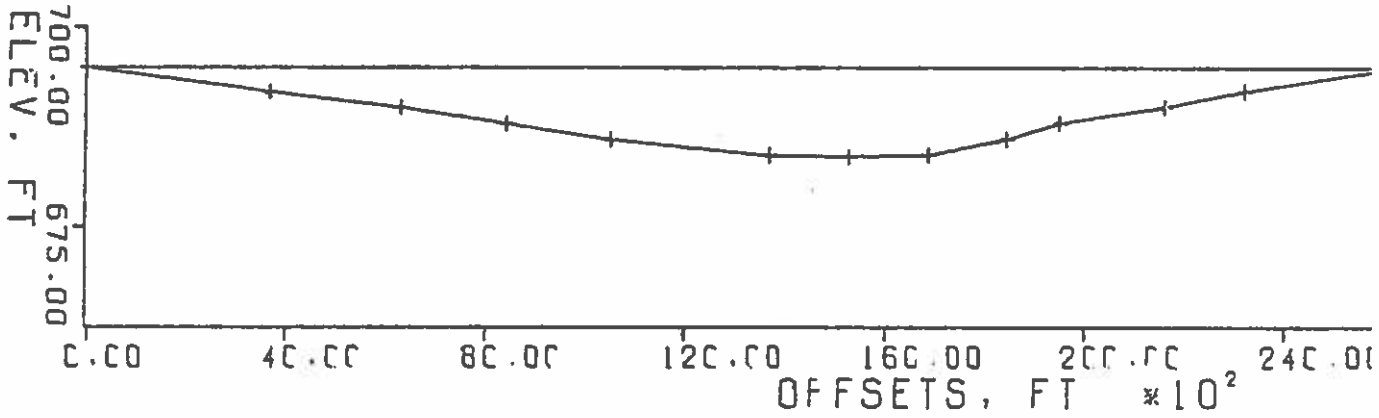
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	1.	1.	1.	1.	1.
675.500	1.	1.	1.	1.	1.
676.000	1.	1.	1.	1.	1.
676.500	1.	1.	1.	1.	1.
677.000	1.	1.	1.	1.	1.
677.500	1.	1.	1.	1.	1.
678.000	1.	1.	1.	1.	1.
678.500	1.	1.	1.	1.	1.
679.000	1.	1.	1.	1.	1.
679.500	1.	1.	1.	1.	1.
680.000	1.	1.	1.	1.	1.
680.500	1.	1.	1.	1.	1.
681.000	1.	1.	1.	1.	1.
681.500	1.	1.	1.	1.	1.
682.000	1.	1.	1.	1.	1.
682.500	1.	1.	1.	1.	1.
683.000	1.	1.	1.	1.	1.
683.500	1.	1.	1.	1.	1.
684.000	12672.	5000.	1580.	5000.	2534.
684.500	17028.	5000.	4080.	5001.	9959.
685.000	21384.	5000.	6580.	5002.	19562.
685.500	37092.	5000.	9080.	5003.	31911.
686.000	61248.	5000.	11580.	5004.	56100.
686.500	65604.	5000.	14080.	5005.	87813.
687.000	69960.	5000.	16580.	5006.	121704.
687.500	74316.	5000.	19080.	5007.	157773.
688.000	78672.	5000.	21580.	5008.	196020.
688.500	84612.	5000.	24080.	5009.	236841.
689.000	90552.	5000.	26580.	5010.	280632.
689.500	96492.	5000.	29080.	5011.	327393.
690.000	102432.	5000.	31580.	5012.	377124.
690.500	108240.	5000.	34080.	5013.	429792.
691.000	114048.	5000.	36580.	5014.	485364.
691.500	119856.	5000.	39080.	5015.	543840.
692.000	125664.	5000.	41580.	5016.	605220.
692.500	131472.	5000.	44080.	5017.	669504.
693.000	137280.	5000.	46580.	5018.	736692.
693.500	143088.	5000.	49080.	5019.	806784.
694.000	148896.	5000.	51580.	5020.	879780.
694.500	154704.	5000.	54080.	5021.	955680.
695.000	160512.	5000.	56580.	5022.	1034484.

REACH 450

CROSS-SECTION 9

DISTANCE 119,645 ft.



REACH 450

CROSS-SECTION 9

DISTANCE 119,645 ft.

LEGEND

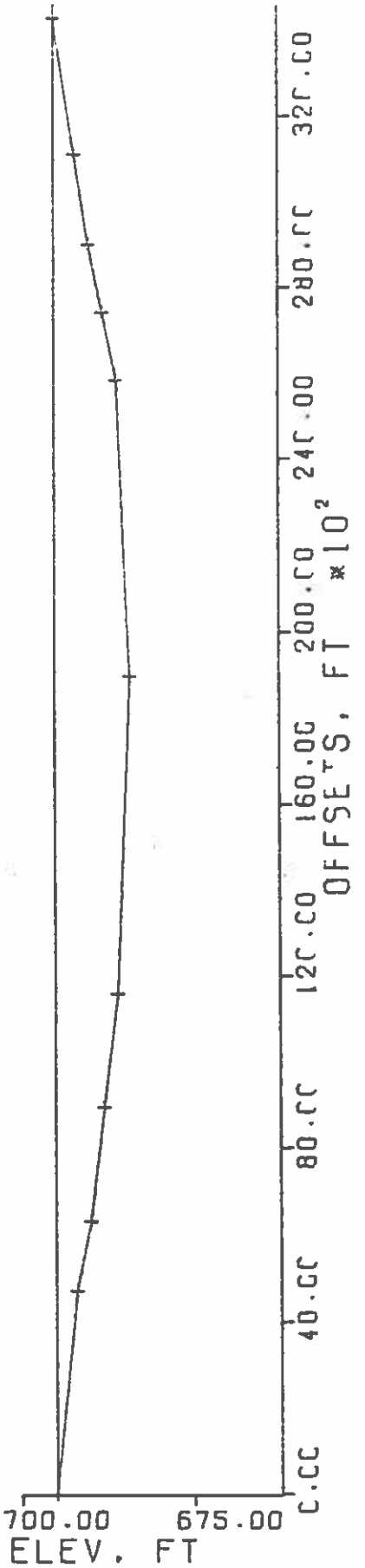
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	1.	1.	1.	1.	1.
675.500	1.	1.	1.	1.	1.
676.000	1.	1.	1.	1.	1.
676.500	1.	1.	1.	1.	1.
677.000	1.	1.	1.	1.	1.
677.500	1.	1.	1.	1.	1.
678.000	1.	1.	1.	1.	1.
678.500	1.	1.	1.	1.	1.
679.000	1.	1.	1.	1.	1.
679.500	1.	1.	1.	1.	1.
680.000	1.	1.	1.	1.	1.
680.500	1.	1.	1.	1.	1.
681.000	1.	1.	1.	1.	1.
681.500	1.	1.	1.	1.	1.
682.000	1.	1.	1.	1.	1.
682.500	1.	1.	1.	1.	1.
683.000	1.	1.	1.	1.	1.
683.500	6900.	3000.	1243.	3001.	2370.
684.000	8409.	3000.	2743.	3002.	6309.
684.500	8939.	3000.	4243.	3003.	10681.
685.000	9117.	3000.	5743.	3004.	15195.
685.500	9296.	3000.	7243.	3005.	19798.
686.000	9474.	3000.	8743.	3006.	24490.
686.500	9877.	3000.	10243.	3007.	29328.
687.000	10281.	3000.	11743.	3008.	34368.
687.500	10684.	3000.	13243.	3009.	39609.
688.000	11088.	3000.	14743.	3010.	45052.
688.500	12144.	3000.	16243.	3011.	50860.
689.000	13200.	3000.	17743.	3012.	57196.
689.500	14256.	3000.	19243.	3013.	64060.
690.000	15312.	3000.	20743.	3014.	71452.
690.500	16368.	3000.	22243.	3015.	79372.
691.000	17424.	3000.	23743.	3016.	87820.
691.500	18480.	3000.	25243.	3017.	96796.
692.000	19536.	3000.	26743.	3018.	106300.
692.500	20680.	3000.	28243.	3019.	116354.
693.000	21624.	3000.	29743.	3020.	126980.
693.500	22968.	3000.	51243.	3021.	138178.
694.000	24112.	3000.	32743.	3022.	149948.
694.500	25256.	3000.	34243.	3023.	162290.
695.000	26400.	3000.	35743.	3024.	175204.

REACH 450

CROSS-SECTION 10

DISTANCE 132,053 ft.



REACH 450

CROSS-SECTION 10

DISTANCE 132,053 ft.

LEGEND

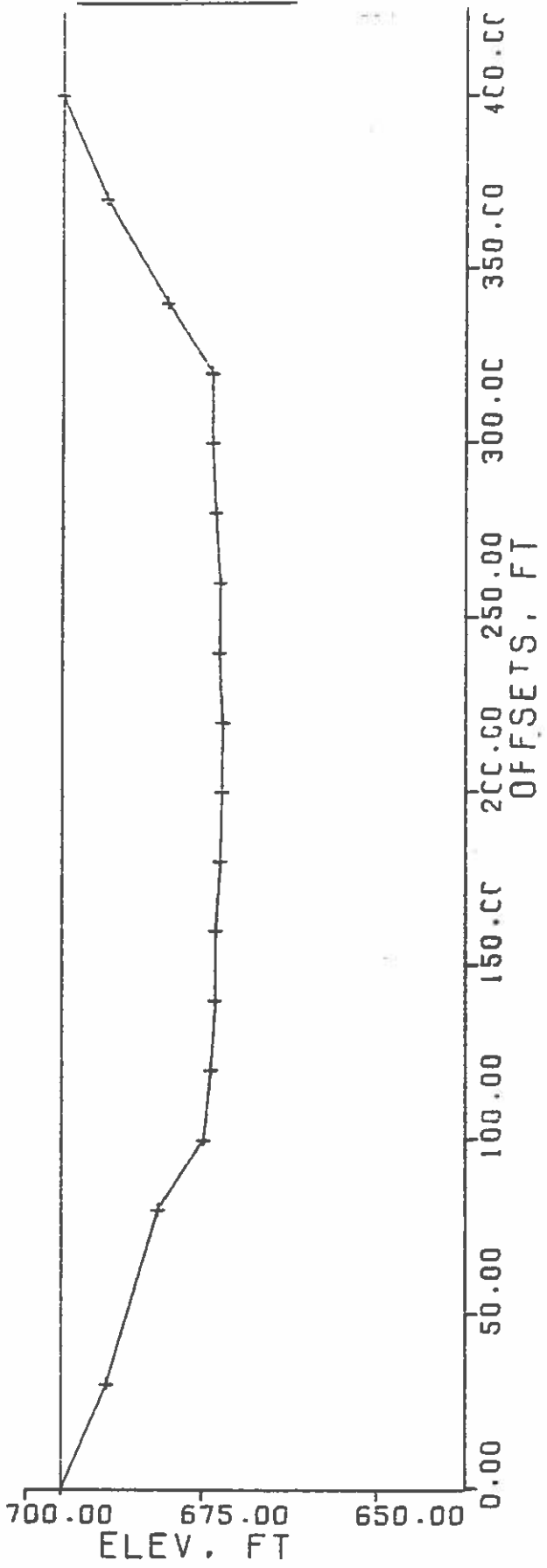
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	1.	1.	1.	1.	1.
675.500	1.	1.	1.	1.	1.
676.000	1.	1.	1.	1.	1.
676.500	1.	1.	1.	1.	1.
677.000	1.	1.	1.	1.	1.
677.500	1.	1.	1.	1.	1.
678.000	1.	1.	1.	1.	1.
678.500	1.	1.	1.	1.	1.
679.000	1.	1.	1.	1.	1.
679.500	1.	1.	1.	1.	1.
680.000	1.	1.	1.	1.	1.
680.500	1.	1.	1.	1.	1.
681.000	1.	1.	1.	1.	1.
681.500	1.	1.	1.	1.	1.
682.000	1.	1.	1.	1.	1.
682.500	1.	1.	1.	1.	1.
683.000	1812.	1.	1.	1.	453.
683.500	3625.	1.	1.	1.	1812.
684.000	4006.	1.	1.	1.	2720.
684.500	9059.	1000.	54.	1000.	6490.
685.000	12807.	1000.	554.	1001.	11840.
685.500	14714.	1000.	1054.	1002.	18720.
686.000	16620.	1000.	1554.	1003.	26554.
686.500	17085.	1000.	2054.	1004.	34990.
687.000	17550.	1000.	2554.	1005.	43639.
687.500	18015.	1000.	3054.	1006.	52530.
688.000	18480.	1000.	3554.	1007.	61654.
688.500	19536.	1000.	4054.	1008.	71158.
689.000	20592.	1000.	4554.	1009.	81190.
689.500	21648.	1000.	5054.	1010.	91750.
690.000	22704.	1000.	5554.	1011.	102838.
690.500	23628.	1000.	6054.	1012.	114421.
691.000	24552.	1000.	6554.	1013.	126466.
691.500	25476.	1000.	7054.	1014.	138973.
692.000	26400.	1000.	7554.	1015.	151942.
692.500	27720.	1000.	8054.	1016.	165472.
693.000	29040.	1000.	8554.	1017.	179662.
693.500	30360.	1000.	9054.	1018.	194512.
694.000	31680.	1000.	9554.	1019.	210022.
694.500	33000.	1000.	10054.	1020.	226192.
695.000	34320.	1000.	10554.	1021.	243022.

REACH 450

CROSS-SECTION 11

DISTANCE 139,128 ft.



REACH 450

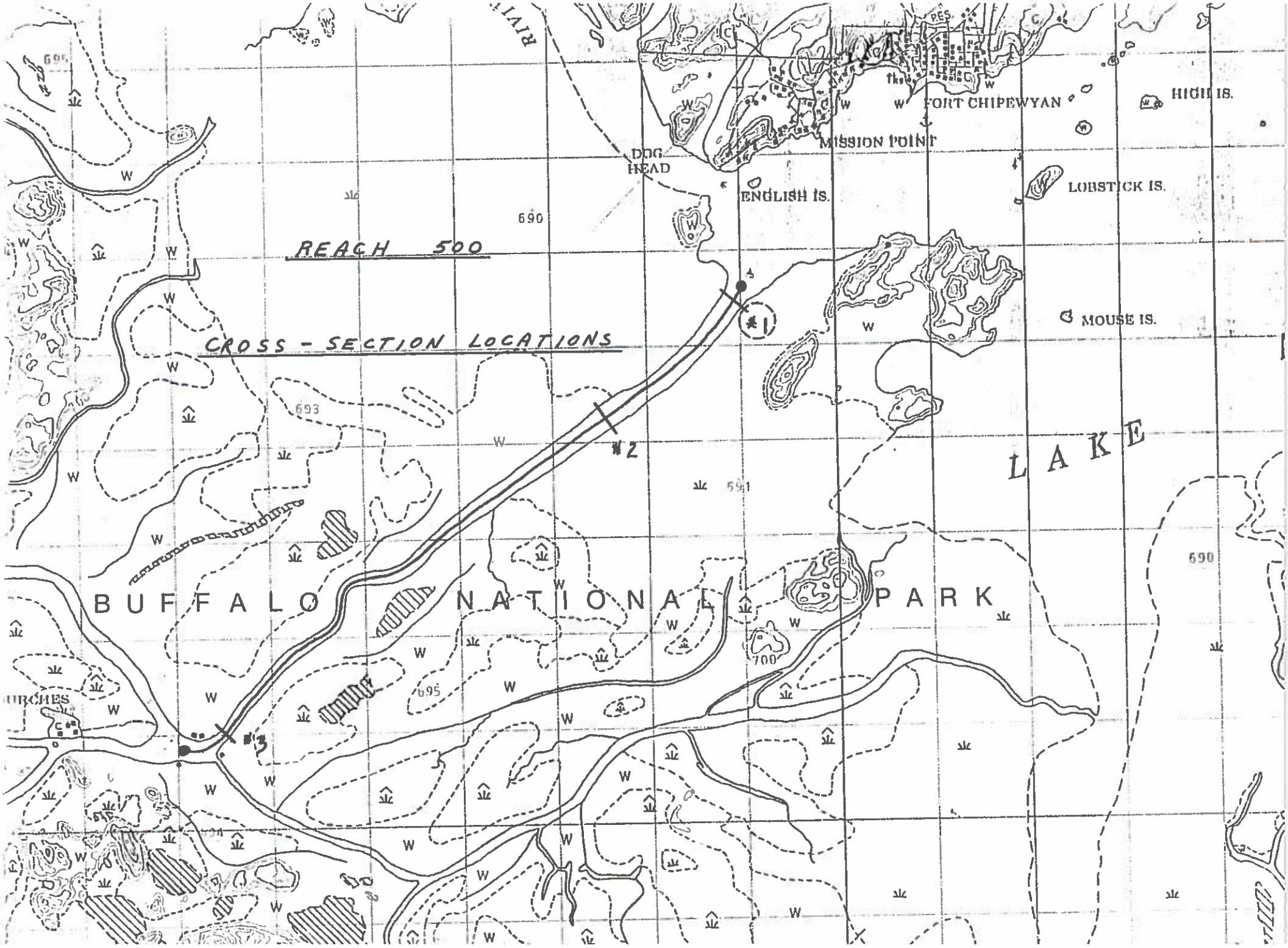
CROSS-SECTION 11

DISTANCE 139,128 ft.

LEGEND

E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	226.	226.	470.	226.	470.
675.500	229.	229.	583.	229.	583.
676.000	232.	232.	699.	233.	699.
676.500	235.	235.	815.	236.	815.
677.000	238.	238.	934.	239.	934.
677.500	241.	241.	1053.	242.	1053.
678.000	244.	244.	1175.	246.	1175.
678.500	248.	248.	1298.	249.	1298.
679.000	251.	251.	1422.	252.	1422.
679.500	254.	254.	1549.	256.	1549.
680.000	257.	257.	1676.	259.	1676.
680.500	260.	260.	1806.	262.	1806.
681.000	264.	264.	1937.	266.	1937.
681.500	268.	268.	2069.	270.	2069.
682.000	273.	273.	2205.	276.	2205.
682.500	278.	278.	2342.	281.	2342.
683.000	283.	283.	2483.	286.	2483.
683.500	289.	289.	2626.	291.	2626.
684.000	294.	294.	2771.	297.	2771.
684.500	299.	299.	2919.	302.	2919.
685.000	304.	304.	3070.	307.	3070.
685.500	309.	309.	3223.	312.	3223.
686.000	314.	314.	3379.	318.	3379.
686.500	319.	319.	3538.	323.	3538.
687.000	325.	325.	3699.	328.	3699.
687.500	330.	330.	3862.	333.	3862.
688.000	335.	335.	4028.	339.	4028.
688.500	340.	340.	4197.	344.	4197.
689.000	345.	345.	4368.	349.	4368.
689.500	349.	349.	4542.	353.	4542.
690.000	354.	354.	4717.	358.	4717.
690.500	358.	358.	4895.	363.	4895.
691.000	363.	363.	5076.	367.	5076.
691.500	368.	368.	5259.	372.	5259.
692.000	372.	372.	5444.	377.	5444.
692.500	377.	377.	5631.	382.	5631.
693.000	382.	382.	5820.	386.	5620.
693.500	386.	386.	6012.	391.	6012.
694.000	391.	391.	6207.	396.	6207.
694.500	395.	395.	6403.	401.	6403.
695.000	400.	400.	6602.	405.	6602.


REACH 500
CROSS - SECTION LOCATIONS
#1
#2
#3
DOG HEAD
ENGLISH IS.
MISSION POINT
FORT CHIPEWYAN
HIGH IS.
LOBSTICK IS.
MOUSE IS.
LAKE
BUFFALO NATIONAL PARK
690
693
695
700

REACH NUMBER - 500

DESCRIPTION - Athabasca Channel from Lake Athabasca to Chenal des Quatre Fourches

REACH LENGTH - 26,000 feet

UPSTREAM NODE - 2

DOWNSTREAM NODE - 8

CROSS-SECTION - 3

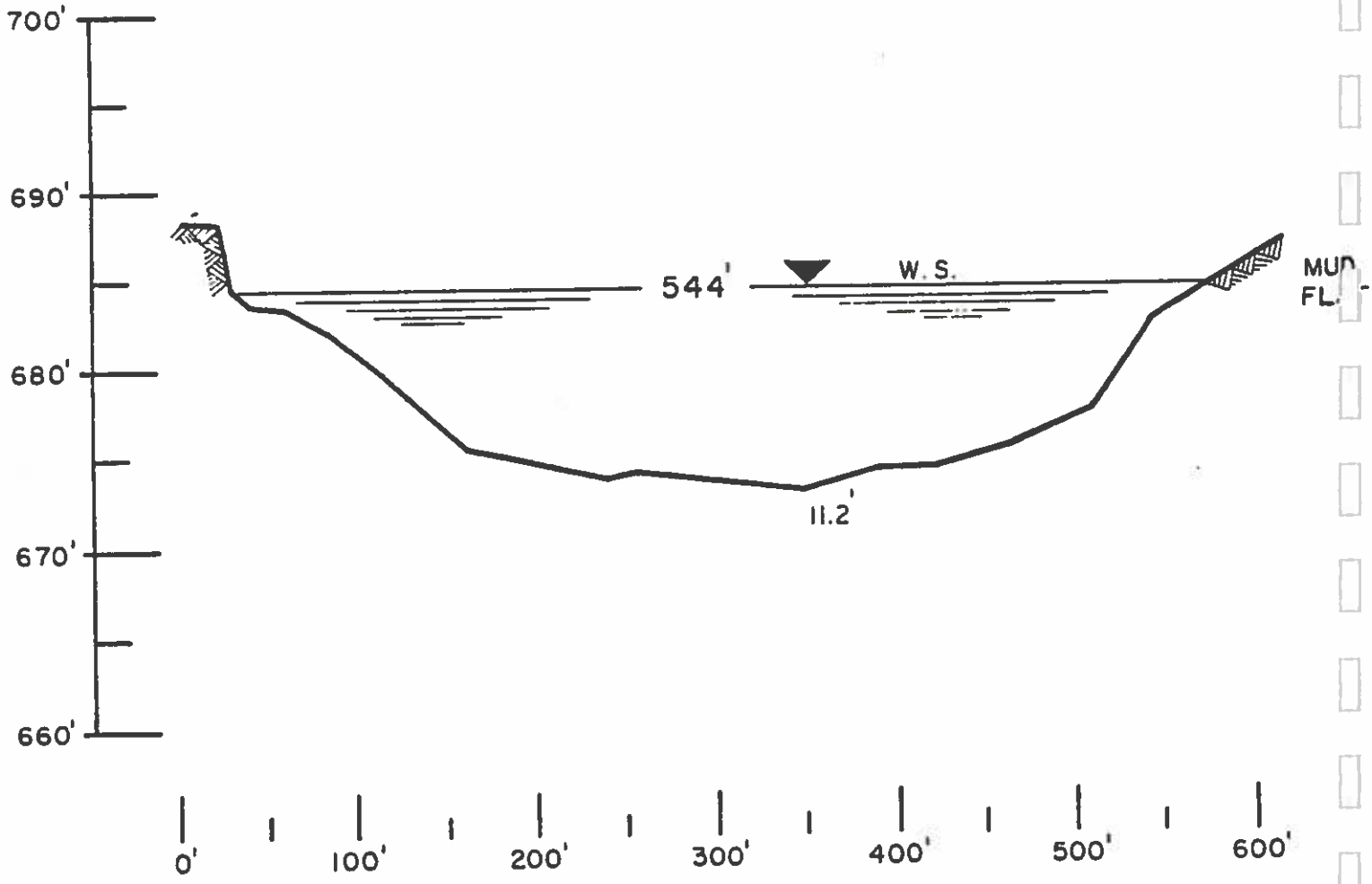
Section Number	Distance from Upstream Node (ft)
1	723
2	13,342
3	24,483

REMARKS: These cross-sections were surveyed by Technical Services Division of Alberta Environment in 1970.

REACH 500

CROSS-SECTION 1

DISTANCE 723 ft.



X – SECTION # 1

MAIN ATHABASCA CHANNEL

11 JULY 1970 Q = 5,220 C.F.S.

REACH 500

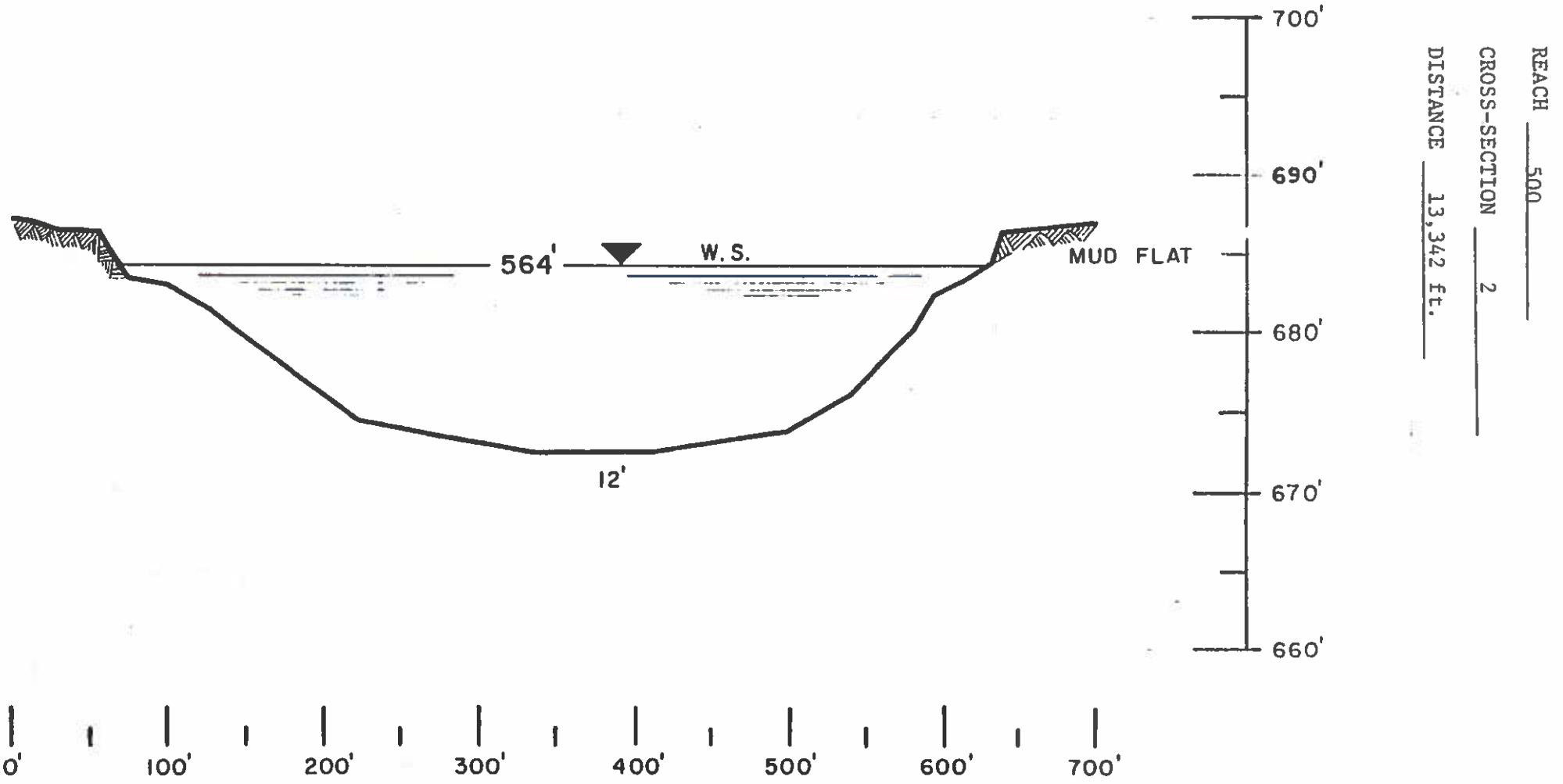
CROSS-SECTION 1

DISTANCE 723 ft.

LEGEND

E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	1.	1.	1.	1.	1.
670.500	1.	1.	1.	1.	1.
671.000	1.	1.	1.	1.	1.
671.500	1.	1.	1.	1.	1.
672.000	1.	1.	1.	1.	1.
672.500	1.	1.	1.	1.	1.
673.000	1.	1.	1.	1.	1.
673.500	61.	61.	15.	61.	15.
674.000	159.	159.	64.	159.	64.
674.500	222.	222.	163.	222.	163.
675.000	261.	261.	284.	261.	284.
675.500	300.	300.	425.	300.	425.
676.000	318.	318.	579.	318.	579.
676.500	336.	336.	743.	337.	743.
677.000	355.	355.	915.	355.	915.
677.500	373.	373.	1097.	373.	1097.
678.000	382.	382.	1286.	382.	1286.
678.500	390.	390.	1479.	391.	1479.
679.000	399.	399.	1676.	399.	1676.
679.500	408.	408.	1878.	408.	1878.
680.000	417.	417.	2084.	417.	2084.
680.500	426.	426.	2295.	426.	2295.
681.000	434.	434.	2510.	435.	2510.
681.500	443.	443.	2729.	444.	2729.
682.000	452.	452.	2953.	453.	2953.
682.500	464.	464.	3182.	465.	3182.
683.000	480.	480.	3418.	480.	3418.
683.500	513.	513.	3662.	514.	3662.
684.000	525.	525.	3922.	526.	3922.
684.500	539.	539.	4188.	540.	4188.
685.000	549.	549.	4460.	550.	4460.
685.500	559.	559.	4737.	560.	4737.
686.000	569.	569.	5019.	571.	5019.
686.500	579.	579.	5306.	581.	5306.
687.000	589.	589.	5598.	591.	5598.
687.500	591.	591.	5894.	593.	5894.
688.000	594.	594.	6190.	596.	6190.
688.500	596.	596.	6487.	598.	6487.
689.000	598.	598.	6786.	601.	6786.
689.500	600.	600.	7085.	603.	7085.
690.000	603.	603.	7386.	606.	7386.
690.500	605.	605.	7688.	608.	7688.
691.000	607.	607.	7991.	610.	7991.
691.500	609.	609.	8295.	613.	8295.
692.000	611.	611.	8600.	615.	8600.
692.500	614.	614.	8906.	618.	8906.
693.000	616.	616.	9213.	620.	9213.
693.500	618.	618.	9522.	623.	9522.
694.000	620.	620.	9831.	625.	9831.
694.500	622.	622.	10142.	627.	10142.
695.000	625.	625.	10454.	630.	10454.
695.500	627.	627.	10767.	633.	10767.
696.000	630.	630.	11081.	635.	11081.
696.500	632.	632.	11396.	638.	11396.
697.000	635.	635.	11713.	641.	11713.
697.500	637.	637.	12031.	644.	12031.
698.000	640.	640.	12350.	646.	12350.
698.500	642.	642.	12671.	649.	12671.
699.000	645.	645.	12993.	652.	12993.
699.500	647.	647.	13316.	654.	13316.
700.000	650.	650.	13640.	657.	13640.



X — SECTION # 2

MAIN ATHABASCA CHANNEL

11 JULY 1970 Q = 5,220 C.F.S.

REACH 500

CROSS-SECTION 2

DISTANCE 13,342 ft.

LEGEND

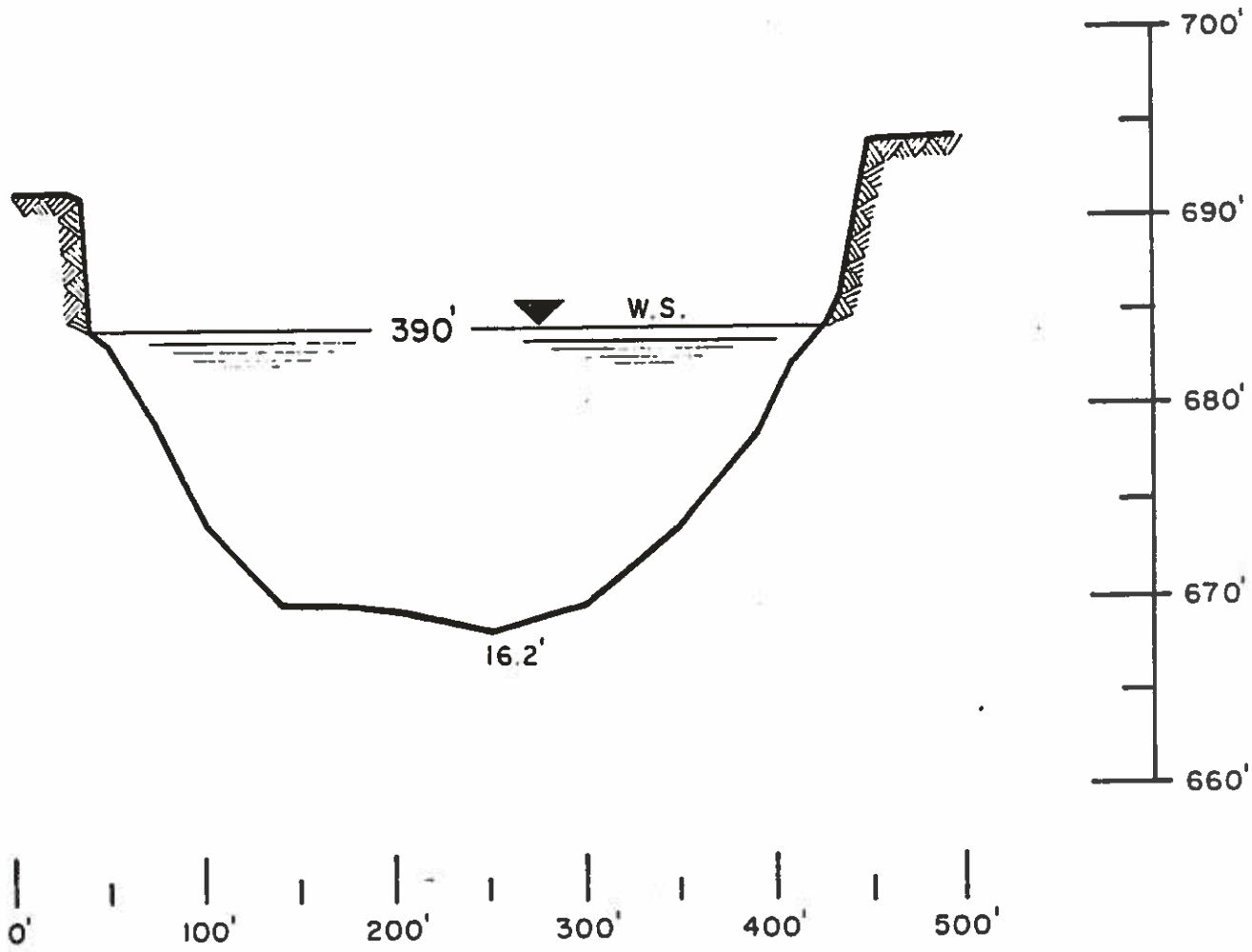
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	1.	1.	1.	1.	1.
670.500	1.	1.	1.	1.	1.
671.000	1.	1.	1.	1.	1.
671.500	1.	1.	1.	1.	1.
672.000	1.	1.	1.	1.	1.
672.500	1.	1.	1.	1.	1.
673.000	137.	137.	54.	137.	54.
673.500	195.	195.	137.	195.	137.
674.000	253.	253.	248.	253.	248.
674.500	289.	289.	384.	289.	384.
675.000	304.	304.	532.	304.	532.
675.500	319.	319.	688.	320.	688.
676.000	335.	335.	851.	335.	851.
676.500	349.	349.	1022.	348.	1022.
677.000	360.	360.	1200.	360.	1200.
677.500	371.	371.	1382.	372.	1382.
678.000	383.	383.	1571.	385.	1571.
678.500	394.	394.	1765.	394.	1765.
679.000	405.	405.	1965.	405.	1965.
679.500	416.	416.	2170.	417.	2170.
680.000	427.	427.	2381.	428.	2381.
680.500	438.	438.	2597.	439.	2597.
681.000	448.	448.	2819.	449.	2819.
681.500	458.	458.	3045.	458.	3045.
682.000	472.	472.	3277.	473.	3277.
682.500	493.	493.	3518.	494.	3518.
683.000	499.	499.	3766.	501.	3766.
683.500	536.	536.	4024.	537.	4024.
684.000	547.	547.	4296.	548.	4296.
684.500	555.	555.	4571.	556.	4571.
685.000	560.	560.	4850.	561.	4850.
685.500	564.	564.	5131.	566.	5131.
686.000	569.	569.	5414.	571.	5414.
686.500	574.	574.	5700.	576.	5700.
687.000	578.	578.	5988.	580.	5988.
687.500	583.	583.	6278.	585.	6278.
688.000	589.	588.	6571.	590.	6571.
688.500	592.	592.	6866.	595.	6866.
689.000	597.	597.	7163.	599.	7163.
689.500	602.	602.	7463.	604.	7463.
690.000	606.	606.	7765.	609.	7765.
690.500	611.	611.	8069.	614.	8069.
691.000	616.	616.	8376.	619.	8376.
691.500	620.	620.	8685.	623.	8685.
692.000	625.	625.	8997.	628.	8997.
692.500	630.	630.	9310.	633.	9310.
693.000	635.	635.	9626.	638.	9626.
693.500	639.	639.	9945.	643.	9945.
694.000	644.	644.	10266.	647.	10266.
694.500	649.	649.	10589.	652.	10589.
695.000	653.	653.	10914.	657.	10914.
695.500	658.	658.	11242.	662.	11242.
696.000	663.	663.	11572.	666.	11572.
696.500	667.	667.	11905.	671.	11905.
697.000	672.	672.	12239.	676.	12239.
697.500	677.	677.	12576.	681.	12576.
698.000	681.	681.	12916.	686.	12916.
698.500	686.	686.	13258.	690.	13258.
699.000	691.	691.	13602.	695.	13602.
699.500	695.	695.	13948.	700.	13948.
700.000	700.	700.	14297.	705.	14297.

REACH 500

CROSS-SECTION 3

DISTANCE 24,483 ft.



X — SECTION # 3

MAIN ATHABASCA CHANNEL

11 JULY 1970 Q = 5,220 C.F.S.

REACH 500

CROSS-SECTION 3

DISTANCE 24,483 ft.

LEGEND

E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	171.	171.	169.	171.	169.
670.500	183.	183.	257.	183.	257.
671.000	194.	194.	351.	194.	351.
671.500	205.	205.	451.	205.	451.
672.000	216.	216.	556.	217.	556.
672.500	228.	228.	667.	228.	667.
673.000	239.	239.	784.	239.	784.
673.500	250.	250.	906.	250.	906.
674.000	257.	257.	1033.	257.	1033.
674.500	264.	264.	1163.	264.	1163.
675.000	271.	271.	1297.	271.	1297.
675.500	278.	278.	1434.	278.	1434.
676.000	285.	285.	1574.	286.	1574.
676.500	292.	292.	1719.	293.	1719.
677.000	299.	299.	1866.	300.	1866.
677.500	306.	306.	2017.	307.	2017.
678.000	313.	313.	2172.	314.	2172.
678.500	318.	318.	2329.	319.	2329.
679.000	323.	323.	2489.	324.	2489.
679.500	328.	328.	2652.	329.	2652.
680.000	333.	333.	2817.	334.	2817.
680.500	338.	338.	2984.	340.	2984.
681.000	344.	344.	3155.	345.	3155.
681.500	349.	349.	3328.	351.	3328.
682.000	354.	354.	3504.	356.	3504.
682.500	362.	362.	3683.	364.	3683.
683.000	370.	370.	3866.	372.	3866.
683.500	379.	379.	4053.	381.	4053.
684.000	387.	387.	4245.	389.	4245.
684.500	390.	390.	4439.	392.	4439.
685.000	393.	393.	4635.	396.	4635.
685.500	396.	396.	4832.	399.	4832.
686.000	397.	397.	5030.	401.	5030.
686.500	399.	399.	5229.	402.	5229.
687.000	400.	400.	5429.	404.	5429.
687.500	401.	401.	5629.	406.	5629.
688.000	402.	402.	5830.	407.	5830.
688.500	403.	403.	6031.	409.	6031.
689.000	405.	405.	6233.	410.	6233.
689.500	406.	406.	6436.	412.	6436.
690.000	407.	407.	6639.	414.	6639.
690.500	408.	408.	6843.	415.	6843.
691.000	410.	410.	7047.	417.	7047.
691.500	416.	416.	7253.	423.	7253.
692.000	418.	418.	7461.	426.	7461.
692.500	421.	421.	7671.	429.	7671.
693.000	424.	424.	7882.	432.	7882.
693.500	426.	426.	8095.	435.	8095.
694.000	429.	429.	8309.	437.	8309.
694.500	431.	431.	8524.	440.	8524.
695.000	434.	434.	8740.	443.	8740.
695.500	437.	437.	8958.	446.	8958.
696.000	439.	439.	9177.	449.	9177.
696.500	442.	442.	9397.	451.	9397.
697.000	444.	444.	9618.	454.	9618.
697.500	447.	447.	9841.	457.	9841.
698.000	450.	450.	10065.	460.	10065.
698.500	452.	452.	10291.	463.	10291.
699.000	455.	455.	10518.	466.	10518.
699.500	457.	457.	10746.	468.	10746.
700.000	460.	460.	10975.	471.	10975.

MAMAWI
LAKE
RIVER
PRAIRIE
*1
*2
DISTRICT
24
REACH 550
CROSS - SECTION LOCATIONS

REACH NUMBER - 550

DESCRIPTION - Prairie River from Lake Claire to Lake Mamawi

REACH LENGTH - 36,700 feet

UPSTREAM NODE - 5

DOWNSTREAM NODE - 6

CROSS-SECTION - 2

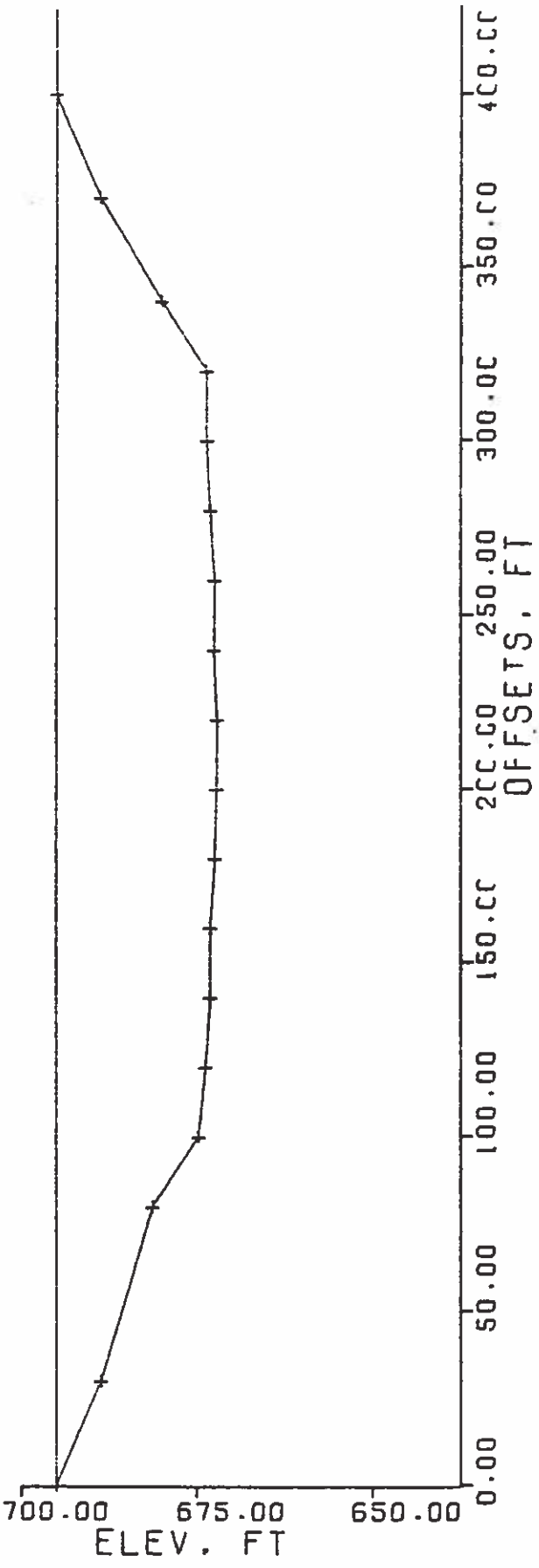
Section Number	Distance from Upstream Node (ft)
1	528
2	36,700

REMARKS: Cross-section 1 was surveyed by Technical Services Division of Alberta Environment in 1977. The section was then transposed to the end of the reach and relabelled as cross-section 2.

REACH 550

CROSS-SECTION 1

DISTANCE 528 ft.



REACH 550

CROSS-SECTION 1

DISTANCE 528 ft.

LEGEND

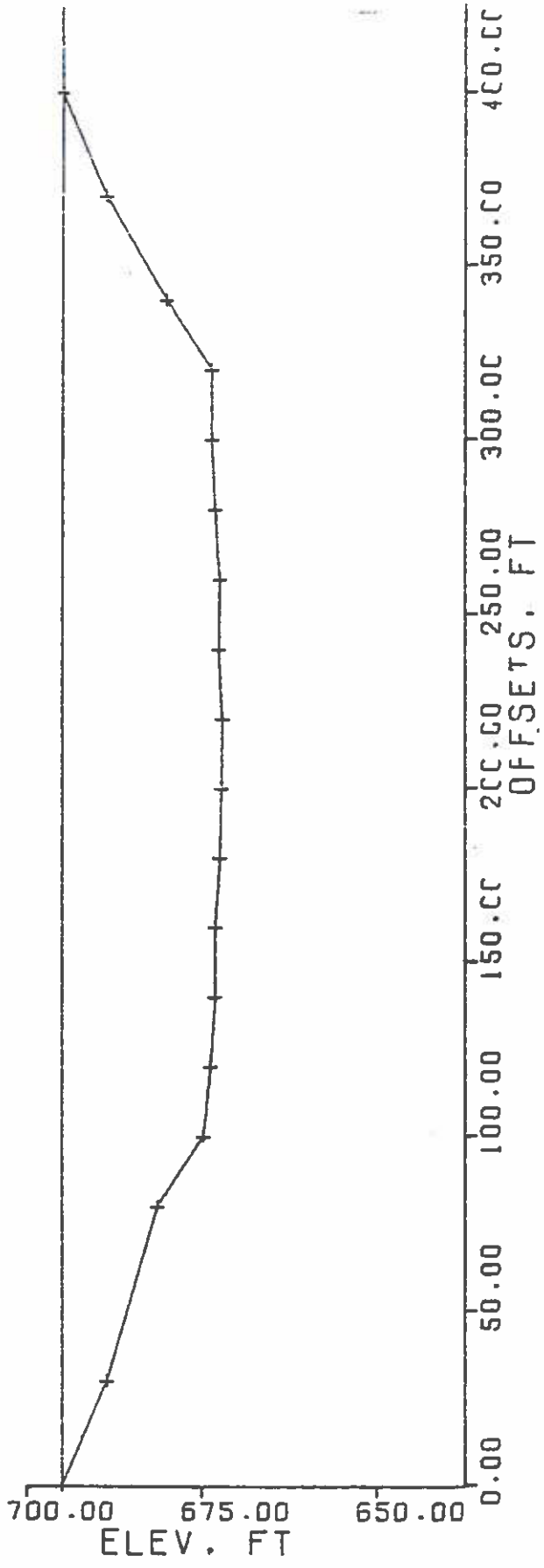
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	226.	226.	470.	226.	470.
675.500	229.	229.	583.	229.	583.
676.000	232.	232.	699.	233.	699.
676.500	235.	235.	815.	239.	815.
677.000	238.	238.	934.	239.	934.
677.500	241.	241.	1053.	242.	1053.
678.000	244.	244.	1175.	246.	1175.
678.500	248.	248.	1298.	249.	1298.
679.000	251.	251.	1422.	252.	1422.
679.500	254.	254.	1549.	256.	1549.
680.000	257.	257.	1676.	259.	1676.
680.500	260.	260.	1806.	262.	1806.
681.000	264.	264.	1937.	266.	1937.
681.500	268.	268.	2069.	270.	2069.
682.000	273.	273.	2205.	276.	2205.
682.500	278.	278.	2342.	281.	2342.
683.000	283.	283.	2483.	286.	2483.
683.500	289.	289.	2626.	291.	2626.
684.000	294.	294.	2771.	297.	2771.
684.500	299.	299.	2919.	302.	2919.
685.000	304.	304.	3070.	307.	3070.
685.500	309.	309.	3223.	312.	3223.
686.000	314.	314.	3379.	318.	3379.
686.500	319.	319.	3538.	323.	3538.
687.000	325.	325.	3699.	328.	3699.
687.500	330.	330.	3862.	333.	3862.
688.000	335.	335.	4028.	339.	4028.
688.500	340.	340.	4197.	344.	4197.
689.000	345.	345.	4368.	349.	4368.
689.500	349.	349.	4542.	353.	4542.
690.000	354.	354.	4717.	358.	4717.
690.500	358.	358.	4895.	363.	4895.
691.000	363.	363.	5076.	367.	5076.
691.500	368.	368.	5259.	372.	5259.
692.000	372.	372.	5444.	377.	5444.
692.500	377.	377.	5631.	382.	5631.
693.000	382.	382.	5820.	386.	5820.
693.500	386.	386.	6012.	391.	6012.
694.000	391.	391.	6207.	396.	6207.
694.500	395.	395.	6403.	401.	6403.
695.000	400.	400.	6602.	405.	6602.

REACH 550

CROSS-SECTION 2

DISTANCE 36,700 ft.



REACH 550

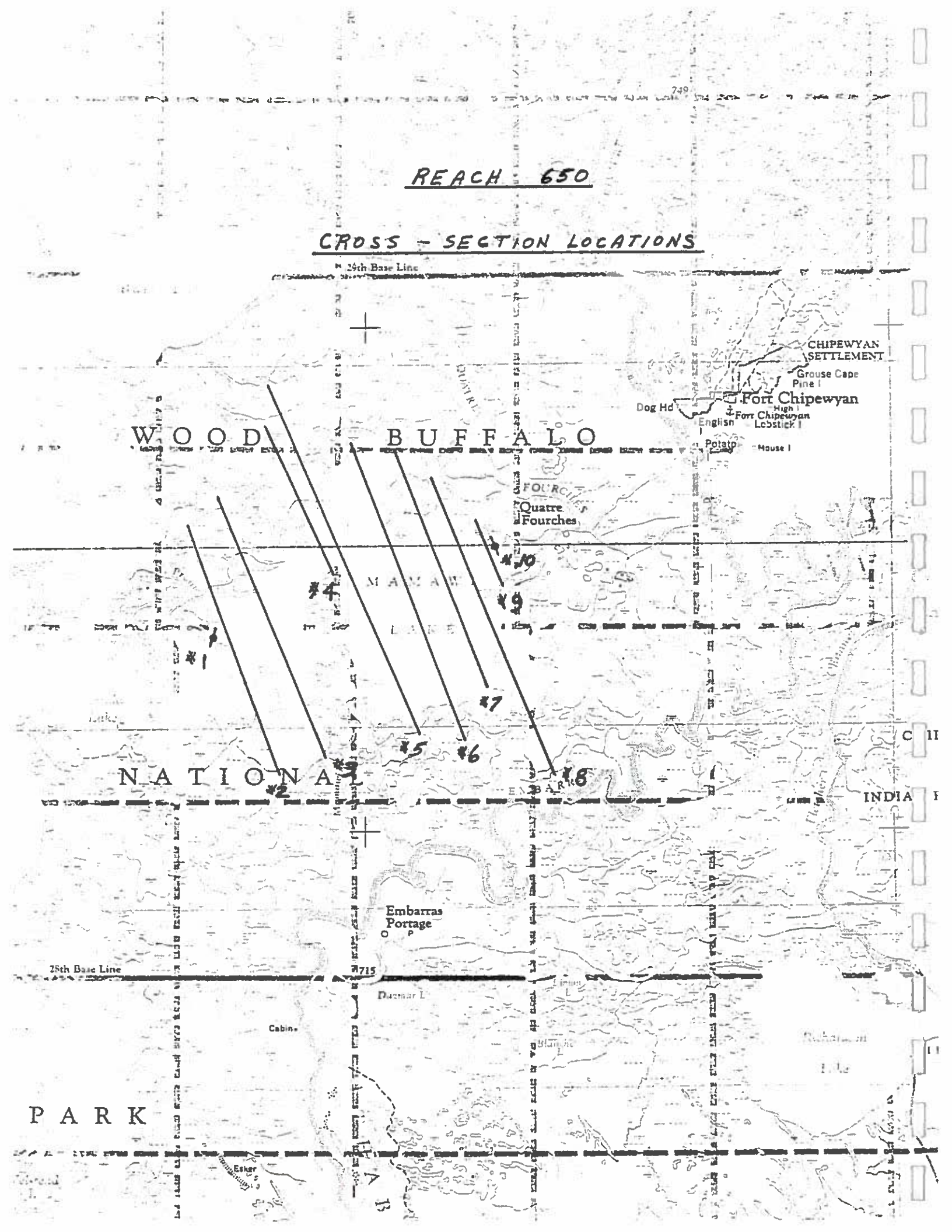
CROSS-SECTION 2

DISTANCE 36,700 ft.

LEGEND

E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	226.	224.	470.	226.	470.
675.500	229.	229.	583.	229.	583.
676.000	232.	232.	699.	233.	699.
676.500	235.	235.	815.	235.	815.
677.000	238.	238.	934.	239.	934.
677.500	241.	241.	1053.	242.	1053.
678.000	244.	244.	1175.	246.	1175.
678.500	248.	248.	1298.	249.	1298.
679.000	251.	251.	1422.	252.	1422.
679.500	254.	254.	1549.	256.	1549.
680.000	257.	257.	1676.	259.	1676.
680.500	260.	260.	1806.	262.	1806.
681.000	264.	264.	1937.	266.	1937.
681.500	268.	268.	2069.	270.	2069.
682.000	273.	273.	2205.	276.	2205.
682.500	278.	278.	2342.	281.	2342.
683.000	283.	283.	2483.	286.	2483.
683.500	289.	289.	2626.	291.	2626.
684.000	294.	294.	2771.	297.	2771.
684.500	299.	299.	2919.	302.	2919.
685.000	304.	304.	3070.	307.	3070.
685.500	309.	309.	3223.	312.	3223.
686.000	314.	314.	3379.	318.	3379.
686.500	319.	319.	3538.	323.	3538.
687.000	325.	325.	3699.	328.	3699.
687.500	330.	330.	3862.	333.	3862.
688.000	335.	335.	4028.	339.	4028.
688.500	340.	340.	4197.	344.	4197.
689.000	345.	345.	4368.	349.	4368.
689.500	349.	349.	4542.	353.	4542.
690.000	354.	354.	4717.	358.	4717.
690.500	358.	358.	4895.	363.	4895.
691.000	363.	363.	5076.	367.	5076.
691.500	368.	368.	5259.	372.	5259.
692.000	372.	372.	5444.	377.	5444.
692.500	377.	377.	5631.	382.	5631.
693.000	382.	382.	5820.	386.	5820.
693.500	386.	386.	6012.	391.	6012.
694.000	391.	391.	6207.	396.	6207.
694.500	395.	395.	6403.	401.	6403.
695.000	400.	400.	6602.	405.	6602.


REACH 650
CROSS - SECTION LOCATIONS
29th Base Line
CHIPEWYAN SETTLEMENT
Grouse Cape
Pine I
Fort Chipewyan
Dog Hd
High I
Fort Chipewyan
English
Leństick I
Potato
Mouse I
WOOD BUFFALO
FOURCHES
Quatre Fourches
MAMAWI LAKE
#1
#2
#3
#4
#5
#6
#7
#8
#9
#10
NATIONAL
INDIA
Embarras Portage
29th Base Line
715
Cabin
PARK
Esker

REACH NUMBER - 650

DESCRIPTION - Lake Mamawi

REACH LENGTH - 56,390

UPSTREAM NODE - 6

DOWNSTREAM NODE - 7

CROSS-SECTION - 10

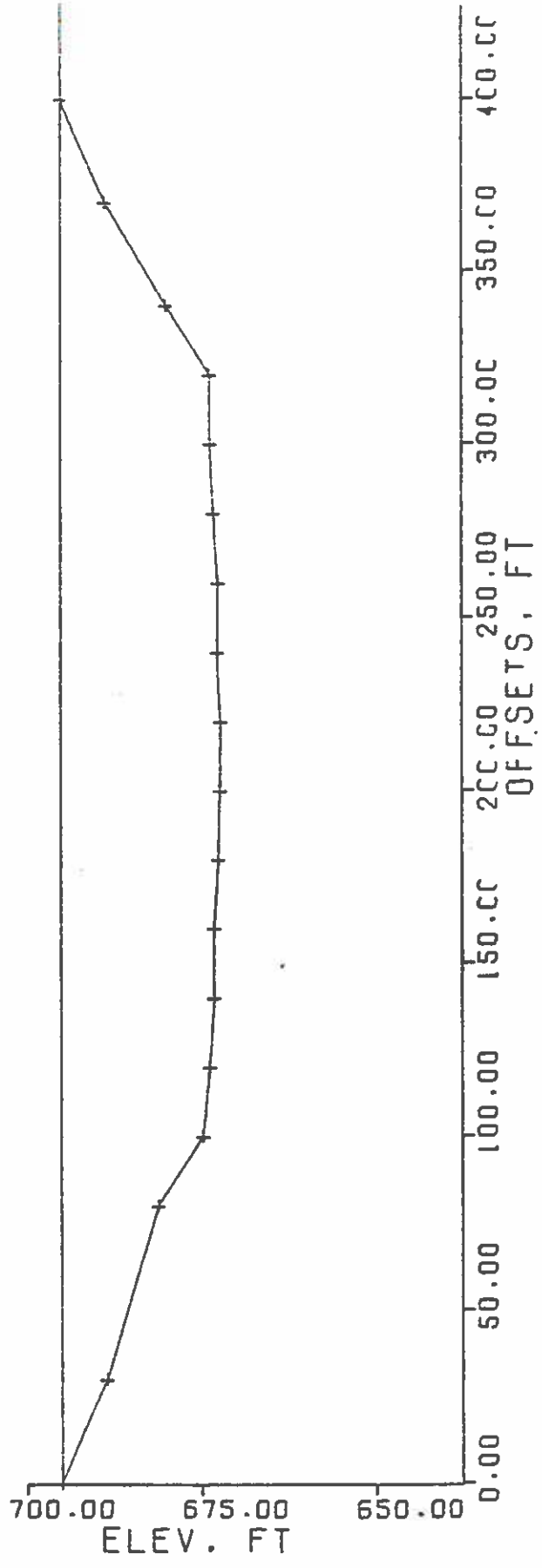
Section Number	Distance from Upstream Node (ft)
1	0
2	2,429
3	10,454
4	25,397
5	29,410
6	37,224
7	44,722
8	49,896
9	55,968
10	56,390

REMARKS: These cross-sections were produced from depth soundings taken in 1971 by Canadian Engineering Surveys Company Limited for the Peace-Athabasca Delta Project. The Prairie River cross-section from reach 550 has been transposed to cross-section 1 and the Mamawi Lake Channel cross-section from reach 750 has been transposed to cross-section 10.

REACH 650

CROSS-SECTION 1

DISTANCE 0 ft.



REACH 650

CROSS-SECTION 1

DISTANCE 0 ft.

LEGEND

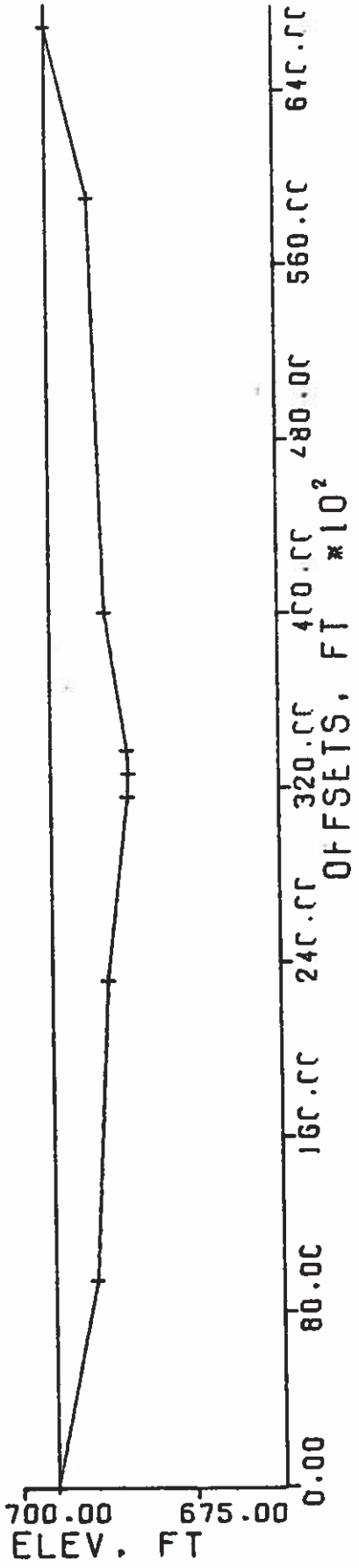
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	226.	226.	470.	226.	470.
675.500	229.	229.	583.	228.	583.
676.000	232.	232.	699.	233.	699.
676.500	235.	235.	815.	239.	815.
677.000	238.	238.	934.	239.	934.
677.500	241.	241.	1053.	242.	1053.
678.000	244.	244.	1175.	246.	1175.
678.500	248.	248.	1298.	249.	1298.
679.000	251.	251.	1422.	252.	1422.
679.500	254.	254.	1549.	255.	1549.
680.000	257.	257.	1676.	259.	1676.
680.500	260.	260.	1806.	262.	1806.
681.000	264.	264.	1937.	266.	1937.
681.500	268.	268.	2069.	270.	2069.
682.000	273.	273.	2205.	276.	2205.
682.500	278.	278.	2342.	281.	2342.
683.000	283.	283.	2483.	286.	2483.
683.500	289.	289.	2626.	291.	2626.
684.000	294.	294.	2771.	297.	2771.
684.500	299.	299.	2919.	302.	2919.
685.000	304.	304.	3070.	307.	3070.
685.500	309.	309.	3223.	312.	3223.
686.000	314.	314.	3379.	318.	3379.
686.500	319.	319.	3538.	323.	3538.
687.000	325.	325.	3699.	328.	3699.
687.500	330.	330.	3862.	333.	3862.
688.000	335.	335.	4028.	339.	4028.
688.500	340.	340.	4197.	344.	4197.
689.000	345.	345.	4368.	349.	4368.
689.500	349.	349.	4542.	353.	4542.
690.000	354.	354.	4717.	358.	4717.
690.500	358.	358.	4895.	362.	4895.
691.000	363.	363.	5076.	367.	5076.
691.500	368.	368.	5259.	372.	5259.
692.000	372.	372.	5444.	377.	5444.
692.500	377.	377.	5631.	382.	5631.
693.000	382.	382.	5820.	386.	5820.
693.500	386.	386.	6012.	391.	6012.
694.000	391.	391.	6207.	396.	6207.
694.500	395.	395.	6403.	401.	6403.
695.000	400.	400.	6602.	405.	6602.

REACH 650

CROSS-SECTION 2

DISTANCE 2429 ft.



REACH 650

CROSS-SECTION 2

DISTANCE 2429 ft.

LEGEND

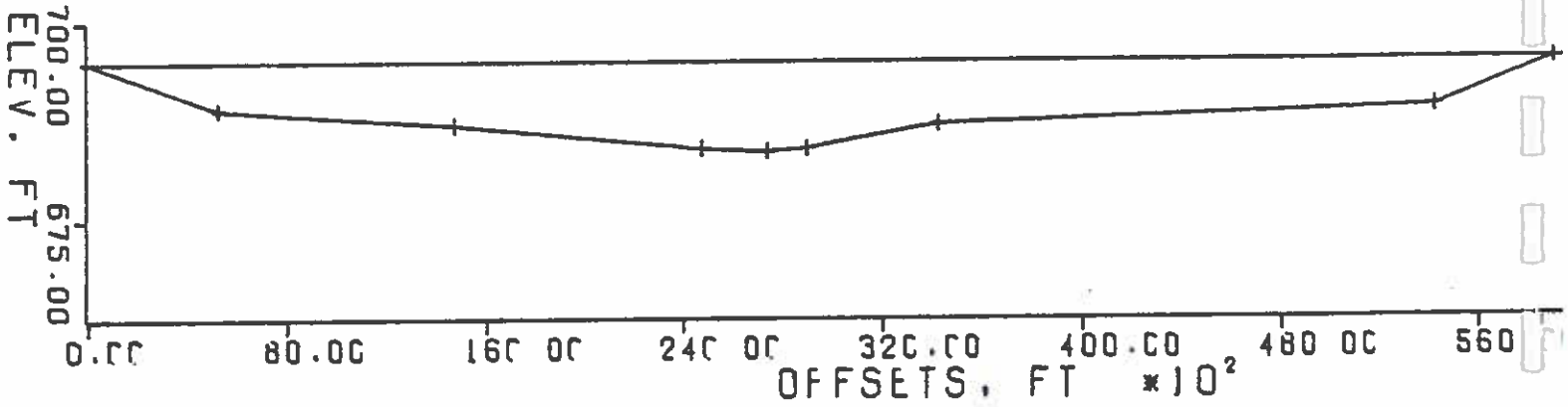
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	1.	1.	1.	1.	1.
675.500	1.	1.	1.	1.	1.
676.000	1.	1.	1.	1.	1.
676.500	1.	1.	1.	1.	1.
677.000	1.	1.	1.	1.	1.
677.500	1.	1.	1.	1.	1.
678.000	1.	1.	1.	1.	1.
678.500	1.	1.	1.	1.	1.
679.000	1.	1.	1.	1.	1.
679.500	1.	1.	1.	1.	1.
680.000	1.	1.	1.	1.	1.
680.500	1.	1.	1.	1.	1.
681.000	1.	1.	1.	1.	1.
681.500	1.	1.	1.	1.	1.
682.000	1.	1.	1.	1.	1.
682.500	1.	1.	1.	1.	1.
683.000	1.	1.	1.	1.	1.
683.500	1.	1.	1.	1.	1.
684.000	2112.	1000.	153.	1000.	211.
684.500	4576.	1000.	653.	1001.	1883.
685.000	7040.	1000.	1153.	1002.	4787.
685.500	9504.	1000.	1653.	1003.	8923.
686.000	11968.	1000.	2153.	1004.	14291.
686.500	14432.	1000.	2653.	1005.	20891.
687.000	16896.	1000.	3153.	1006.	28723.
687.500	25080.	1000.	3653.	1007.	39217.
688.000	33264.	1000.	4153.	1008.	53803.
688.500	41448.	1000.	4653.	1009.	72481.
689.000	49632.	1000.	5153.	1010.	95251.
689.500	51084.	1000.	5653.	1011.	120430.
690.000	52536.	1000.	6153.	1012.	146335.
690.500	53988.	1000.	6653.	1013.	172966.
691.000	55440.	1000.	7153.	1014.	200323.
691.500	56892.	1000.	7653.	1015.	228406.
692.000	58344.	1000.	8153.	1016.	257215.
692.500	59796.	1000.	8653.	1017.	286750.
693.000	61248.	1000.	9153.	1018.	317011.
693.500	62700.	1000.	9653.	1019.	347998.
694.000	64152.	1000.	10153.	1020.	379711.
694.500	65604.	1000.	10653.	1021.	412150.
695.000	67056.	1000.	11153.	1022.	445315.

REACH 650

CROSS-SECTION 3

DISTANCE 10,454 ft.



REACH 650

CROSS-SECTION 3

DISTANCE 10454 ft.

LEGEND

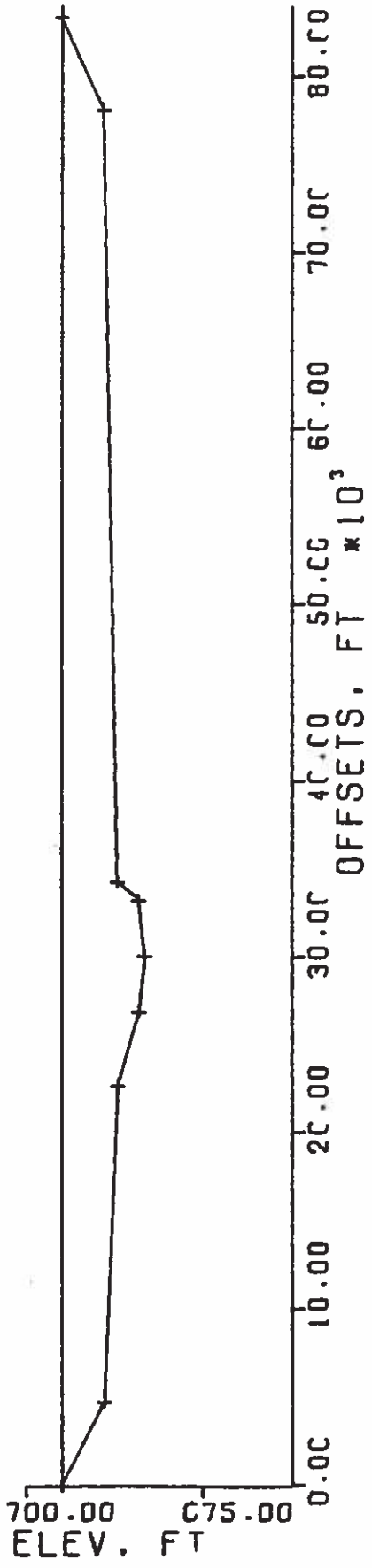
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	1.	1.	1.	1.	1.
675.500	1.	1.	1.	1.	1.
676.000	1.	1.	1.	1.	1.
676.500	1.	1.	1.	1.	1.
677.000	1.	1.	1.	1.	1.
677.500	1.	1.	1.	1.	1.
678.000	1.	1.	1.	1.	1.
678.500	1.	1.	1.	1.	1.
679.000	1.	1.	1.	1.	1.
679.500	1.	1.	1.	1.	1.
680.000	1.	1.	1.	1.	1.
680.500	1.	1.	1.	1.	1.
681.000	1.	1.	1.	1.	1.
681.500	1.	1.	1.	1.	1.
682.000	1.	1.	1.	1.	1.
682.500	1.	1.	1.	1.	1.
683.000	1.	1.	1.	1.	1.
683.500	1.	1.	1.	1.	1.
684.000	4224.	3000.	740.	3000.	845.
684.500	6776.	3000.	2240.	3001.	3595.
685.000	9328.	3000.	3740.	3002.	7621.
685.500	11880.	3000.	5240.	3003.	12923.
686.000	14432.	3000.	6740.	3004.	19501.
686.500	16984.	3000.	8240.	3005.	27355.
687.000	19536.	3000.	9740.	3006.	36485.
687.500	26928.	3000.	11240.	3007.	48101.
688.000	34320.	3000.	12740.	3008.	63413.
688.500	41712.	3000.	14240.	3009.	82421.
689.000	49104.	3000.	15740.	3010.	105125.
689.500	49940.	3000.	17240.	3011.	129886.
690.000	50776.	3000.	18740.	3012.	155065.
690.500	51612.	3000.	20240.	3013.	180662.
691.000	52448.	3000.	21740.	3014.	206677.
691.500	53284.	3000.	23240.	3015.	233110.
692.000	54120.	3000.	24740.	3016.	259961.
692.500	54956.	3000.	26240.	3017.	287230.
693.000	55792.	3000.	27740.	3018.	314917.
693.500	56628.	3000.	29240.	3019.	343022.
694.000	57464.	3000.	30740.	3020.	371545.
694.500	58300.	3000.	32240.	3021.	400486.
695.000	59136.	3000.	33740.	3022.	429845.

REACH 650

CROSS-SECTION 4

DISTANCE 25,397 ft.



REACH 650

CROSS-SECTION 4

DISTANCE 25397 ft.

LEGEND

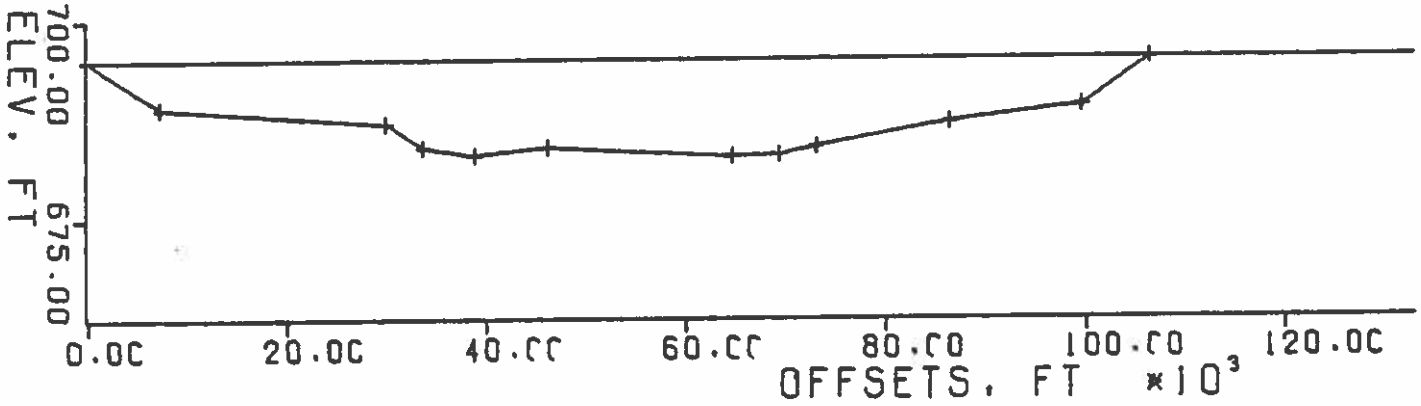
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	1.	1.	1.	1.	1.
675.500	1.	1.	1.	1.	1.
676.000	1.	1.	1.	1.	1.
676.500	1.	1.	1.	1.	1.
677.000	1.	1.	1.	1.	1.
677.500	1.	1.	1.	1.	1.
678.000	1.	1.	1.	1.	1.
678.500	1.	1.	1.	1.	1.
679.000	1.	1.	1.	1.	1.
679.500	1.	1.	1.	1.	1.
680.000	1.	1.	1.	1.	1.
680.500	1.	1.	1.	1.	1.
681.000	1.	1.	1.	1.	1.
681.500	1.	1.	1.	1.	1.
682.000	1.	1.	1.	1.	1.
682.500	1.	1.	1.	1.	1.
683.000	1.	1.	1.	1.	1.
683.500	2376.	2376.	356.	2376.	356.
684.000	6336.	5000.	2419.	5000.	2534.
684.500	7216.	5000.	4919.	5001.	5922.
685.000	8096.	5000.	7419.	5002.	9750.
685.500	8976.	5000.	9919.	5003.	14018.
686.000	9856.	5000.	12419.	5004.	18726.
686.500	10736.	5000.	14919.	5005.	23874.
687.000	11616.	5000.	17419.	5006.	29462.
687.500	27060.	5000.	19919.	5007.	39131.
688.000	42504.	5000.	22419.	5008.	56522.
688.500	57948.	5000.	24919.	5009.	81635.
689.000	73392.	5000.	27419.	5010.	114470.
689.500	74228.	5000.	29919.	5011.	151375.
690.000	75064.	5000.	32419.	5012.	188698.
690.500	75900.	5000.	34919.	5013.	226439.
691.000	76736.	5000.	37419.	5014.	264598.
691.500	77572.	5000.	39919.	5015.	303175.
692.000	78408.	5000.	42419.	5016.	342170.
692.500	79244.	5000.	44919.	5017.	381583.
693.000	80080.	5000.	47419.	5018.	421414.
693.500	80916.	5000.	49919.	5019.	461663.
694.000	81752.	5000.	52419.	5020.	502330.
694.500	82588.	5000.	54919.	5021.	543415.
695.000	83424.	5000.	57419.	5022.	584918.

REACH 650

CROSS-SECTION 5

DISTANCE 29,410 ft.



REACH 650

CROSS-SECTION 5

DISTANCE 29410 ft.

LEGEND

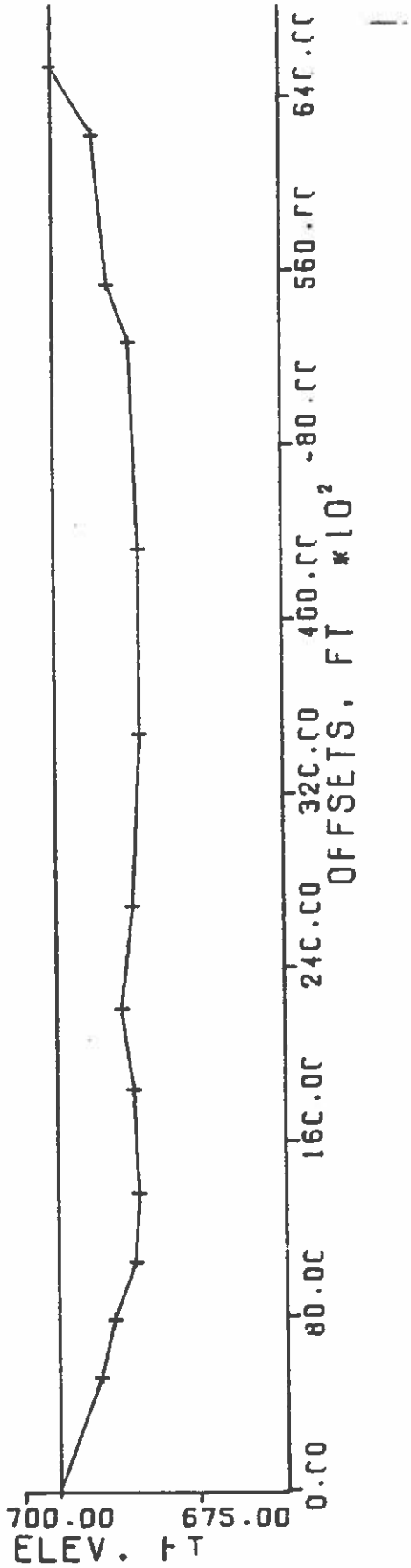
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	1.	1.	1.	1.	1.
675.500	1.	1.	1.	1.	1.
676.000	1.	1.	1.	1.	1.
676.500	1.	1.	1.	1.	1.
677.000	1.	1.	1.	1.	1.
677.500	1.	1.	1.	1.	1.
678.000	1.	1.	1.	1.	1.
678.500	1.	1.	1.	1.	1.
679.000	1.	1.	1.	1.	1.
679.500	1.	1.	1.	1.	1.
680.000	1.	1.	1.	1.	1.
680.500	1.	1.	1.	1.	1.
681.000	1.	1.	1.	1.	1.
681.500	1.	1.	1.	1.	1.
682.000	1.	1.	1.	1.	1.
682.500	1.	1.	1.	1.	1.
683.000	7832.	5000.	668.	5000.	783.
683.500	23716.	5000.	3168.	5001.	8670.
684.000	39600.	5000.	5668.	5002.	24499.
684.500	42416.	5000.	8168.	5003.	45003.
685.000	45232.	5000.	10668.	5004.	66915.
685.500	48048.	5000.	13168.	5005.	90235.
686.000	50864.	5000.	15668.	5006.	114963.
686.500	53680.	5000.	18168.	5007.	141099.
687.000	56496.	5000.	20668.	5008.	168643.
687.500	65472.	5000.	23168.	5009.	199135.
688.000	74448.	5000.	25668.	5010.	234115.
688.500	83424.	5000.	28168.	5011.	273583.
689.000	92400.	5000.	30668.	5012.	317539.
689.500	93588.	5000.	33168.	5013.	364036.
690.000	94776.	5000.	35668.	5014.	411127.
690.500	95964.	5000.	38168.	5015.	458812.
691.000	97152.	5000.	40668.	5016.	507091.
691.500	98340.	5000.	43168.	5017.	555964.
692.000	99528.	5000.	45668.	5018.	605431.
692.500	100716.	5000.	48168.	5019.	655492.
693.000	101904.	5000.	50668.	5020.	706147.
693.500	103092.	5000.	53168.	5021.	757396.
694.000	104280.	5000.	55668.	5022.	809239.
694.500	105468.	5000.	58168.	5023.	861676.
695.000	106656.	5000.	60668.	5024.	914707.

REACH 650

CROSS-SECTION 6

DISTANCE 37,224 ft.



REACH 650

CROSS-SECTION 6

DISTANCE 37224 ft.

LEGEND

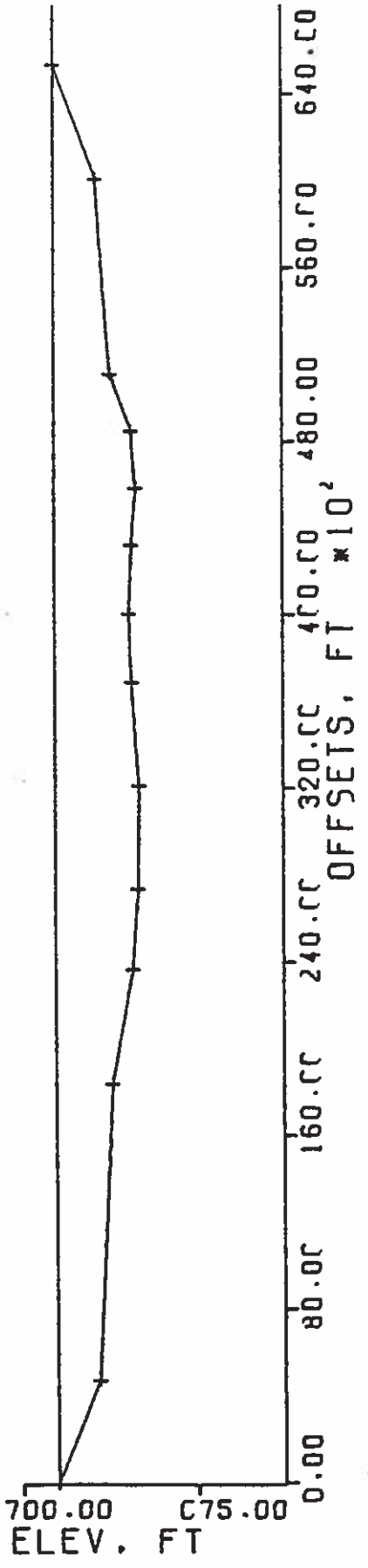
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	1.	1.	1.	1.	1.
675.500	1.	1.	1.	1.	1.
676.000	1.	1.	1.	1.	1.
676.500	1.	1.	1.	1.	1.
677.000	1.	1.	1.	1.	1.
677.500	1.	1.	1.	1.	1.
678.000	1.	1.	1.	1.	1.
678.500	1.	1.	1.	1.	1.
679.000	1.	1.	1.	1.	1.
679.500	1.	1.	1.	1.	1.
680.000	1.	1.	1.	1.	1.
680.500	1.	1.	1.	1.	1.
681.000	1.	1.	1.	1.	1.
681.500	1.	1.	1.	1.	1.
682.000	1.	1.	1.	1.	1.
682.500	1.	1.	1.	1.	1.
683.000	11352.	7000.	1390.	7000.	1980.
683.500	19932.	7000.	4890.	7001.	9537.
684.000	33792.	7000.	8390.	7002.	22968.
684.500	37157.	7000.	11690.	7003.	40705.
685.000	40521.	7000.	15390.	7004.	60125.
685.500	43886.	7000.	18890.	7005.	81227.
686.000	45760.	7000.	22390.	7006.	103787.
686.500	46640.	7000.	25890.	7007.	126887.
687.000	47520.	7000.	29390.	7008.	150427.
687.500	49696.	7000.	32890.	7009.	174781.
688.000	52272.	7000.	36390.	7010.	200325.
688.500	54648.	7000.	39890.	7011.	227055.
689.000	57024.	7000.	43390.	7012.	254971.
689.500	57728.	7000.	46890.	7013.	283659.
690.000	58432.	7000.	50390.	7014.	312699.
690.500	59136.	7000.	53890.	7015.	342091.
691.000	59840.	7000.	57390.	7016.	371835.
691.500	60544.	7000.	60890.	7017.	401931.
692.000	61248.	7000.	64390.	7018.	432379.
692.500	61952.	7000.	67890.	7019.	463179.
693.000	62656.	7000.	71390.	7020.	494331.
693.500	63360.	7000.	74890.	7021.	525835.
694.000	64064.	7000.	78390.	7022.	557691.
694.500	64768.	7000.	81890.	7023.	589899.
695.000	65472.	7000.	85390.	7024.	622459.

REACH 650

CROSS-SECTION 7

DISTANCE 44,722 ft.



REACH 650

CROSS-SECTION 7

DISTANCE 44722 ft.

LEGEND

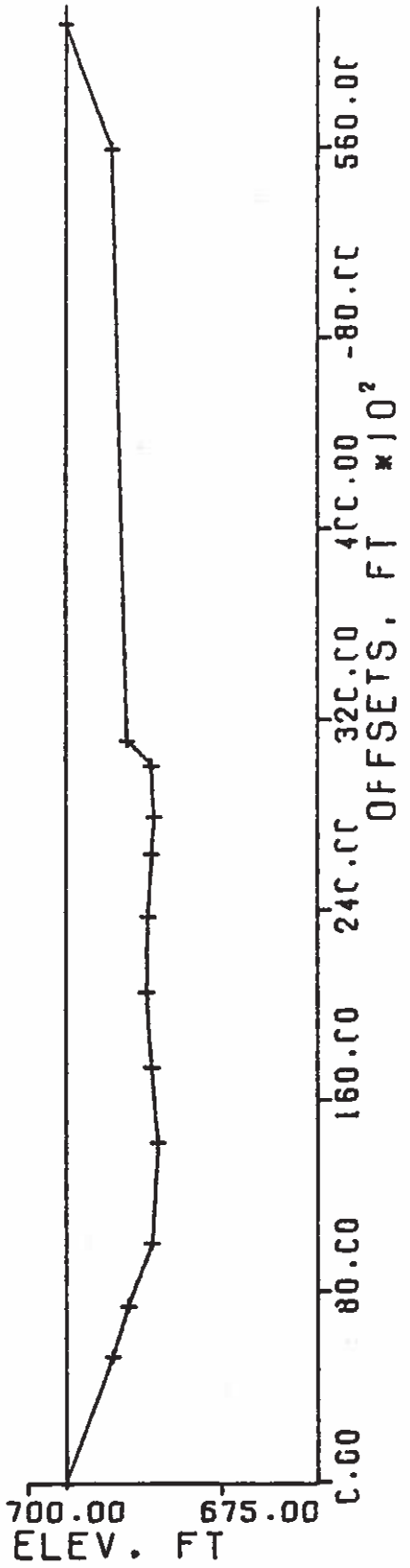
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	1.	1.	1.	1.	1.
675.500	1.	1.	1.	1.	1.
676.000	1.	1.	1.	1.	1.
676.500	1.	1.	1.	1.	1.
677.000	1.	1.	1.	1.	1.
677.500	1.	1.	1.	1.	1.
678.000	1.	1.	1.	1.	1.
678.500	1.	1.	1.	1.	1.
679.000	1.	1.	1.	1.	1.
679.500	1.	1.	1.	1.	1.
680.000	1.	1.	1.	1.	1.
680.500	1.	1.	1.	1.	1.
681.000	1.	1.	1.	1.	1.
681.500	1.	1.	1.	1.	1.
682.000	1.	1.	1.	1.	1.
682.500	1.	1.	1.	1.	1.
683.000	1.	1.	1.	1.	1.
683.500	9394.	4594.	1599.	4594.	2747.
684.000	18480.	5000.	4082.	5001.	9715.
684.500	26136.	5000.	6582.	5002.	21186.
685.000	27456.	5000.	9082.	5003.	34584.
685.500	28776.	5000.	11582.	5004.	48642.
686.000	30096.	5000.	14082.	5005.	63360.
686.500	31416.	5000.	16582.	5006.	78738.
687.000	32736.	5000.	19082.	5007.	94776.
687.500	38412.	5000.	21582.	5008.	112563.
688.000	44088.	5000.	24082.	5009.	133188.
688.500	49764.	5000.	26582.	5010.	156651.
689.000	55440.	5000.	29082.	5011.	182952.
689.500	56276.	5000.	31582.	5012.	210881.
690.000	57112.	5000.	34082.	5013.	239228.
690.500	57948.	5000.	36582.	5014.	267993.
691.000	58784.	5000.	39082.	5015.	297176.
691.500	59620.	5000.	41582.	5016.	326777.
692.000	60456.	5000.	44082.	5017.	356796.
692.500	61292.	5000.	46582.	5018.	387233.
693.000	62128.	5000.	49082.	5019.	418088.
693.500	62964.	5000.	51582.	5020.	449361.
694.000	63800.	5000.	54082.	5021.	481052.
694.500	64636.	5000.	56582.	5022.	513161.
695.000	65472.	5000.	59082.	5023.	545688.

REACH 650

CROSS-SECTION 8

DISTANCE 49,896 ft.



REACH 650

CROSS-SECTION 8

DISTANCE 49896 ft.

LEGEND

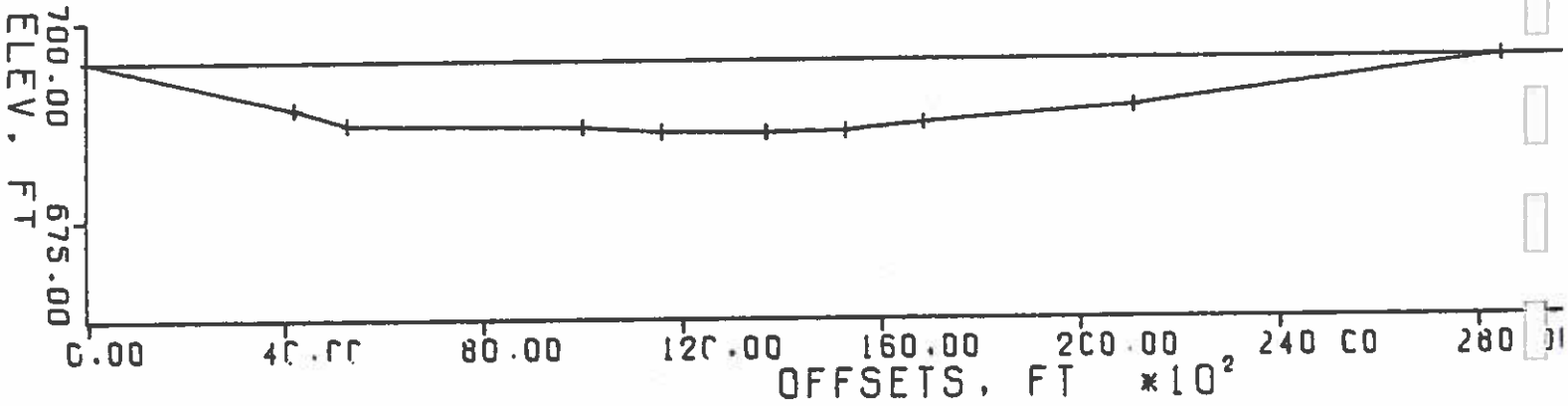
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	1.	1.	1.	1.	1.
675.500	1.	1.	1.	1.	1.
676.000	1.	1.	1.	1.	1.
676.500	1.	1.	1.	1.	1.
677.000	1.	1.	1.	1.	1.
677.500	1.	1.	1.	1.	1.
678.000	1.	1.	1.	1.	1.
678.500	1.	1.	1.	1.	1.
679.000	1.	1.	1.	1.	1.
679.500	1.	1.	1.	1.	1.
680.000	1.	1.	1.	1.	1.
680.500	1.	1.	1.	1.	1.
681.000	1.	1.	1.	1.	1.
681.500	1.	1.	1.	1.	1.
682.000	1.	1.	1.	1.	1.
682.500	1.	1.	1.	1.	1.
683.000	1.	1.	1.	1.	1.
683.500	2772.	2454.	406.	2454.	416.
684.000	11088.	3000.	1869.	3001.	3511.
684.500	16984.	3000.	3369.	3002.	10529.
685.000	21296.	3000.	4869.	3003.	20838.
685.500	21912.	3000.	6369.	3004.	31640.
686.000	22528.	3000.	7869.	3005.	42750.
686.500	23144.	3000.	9369.	3006.	54168.
687.000	23760.	3000.	10869.	3007.	65894.
687.500	30492.	3000.	12369.	3008.	79457.
688.000	37224.	3000.	13869.	3009.	96386.
688.500	43956.	3000.	15369.	3010.	116681.
689.000	50688.	3000.	16869.	3011.	140342.
689.500	51568.	3000.	18369.	3012.	165906.
690.000	52448.	3000.	19869.	3013.	191910.
690.500	53328.	3000.	21369.	3014.	218354.
691.000	54208.	3000.	22869.	3015.	245238.
691.500	55088.	3000.	24369.	3016.	272562.
692.000	55968.	3000.	25869.	3017.	300326.
692.500	56848.	3000.	27369.	3018.	328530.
693.000	57728.	3000.	28869.	3019.	357174.
693.500	58608.	3000.	30369.	3020.	386258.
694.000	59488.	3000.	31869.	3021.	415782.
694.500	60368.	3000.	33369.	3022.	445746.
695.000	61248.	3000.	34869.	3023.	476150.

REACH 650

CROSS-SECTION 9

DISTANCE 55,968 ft.



REACH 650

CROSS-SECTION 9

DISTANCE 55968 ft.

LEGEND

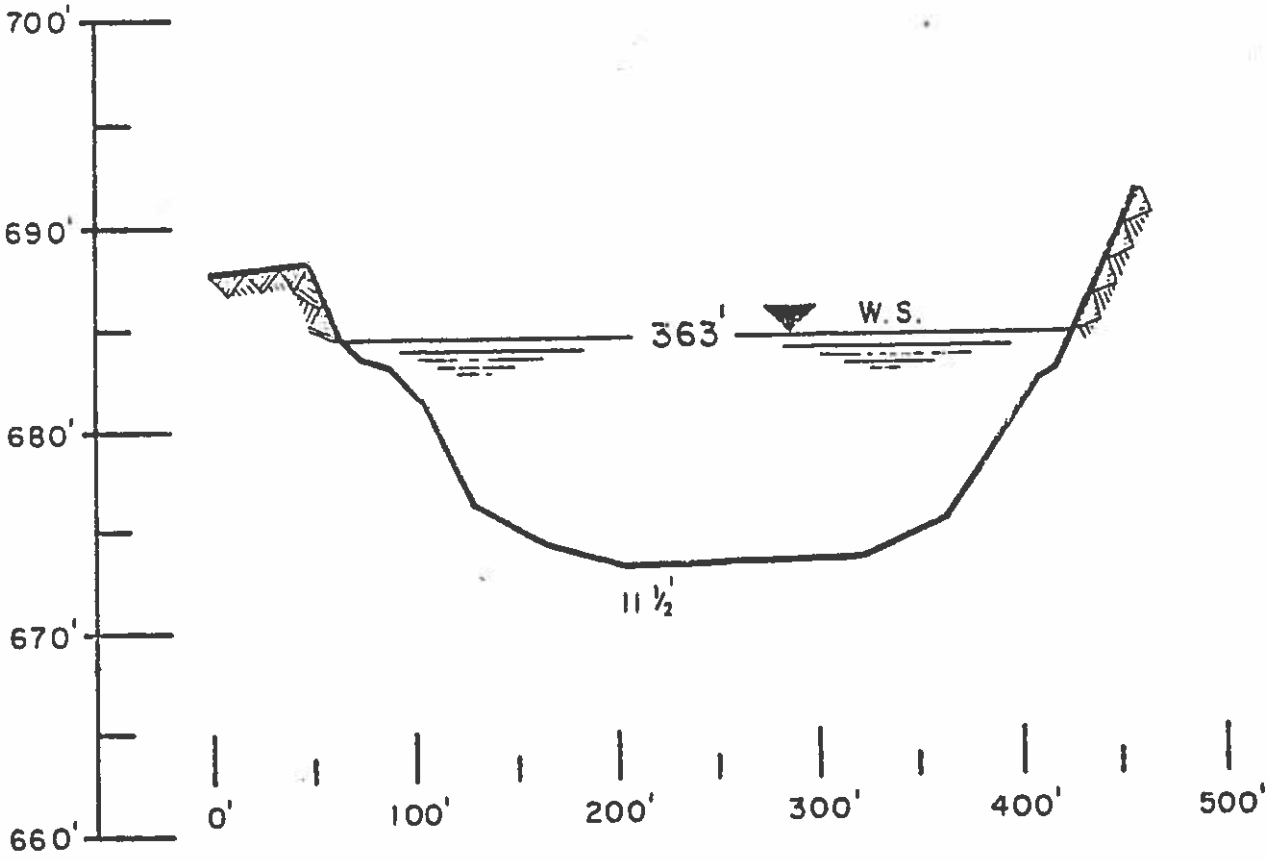
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	1.	1.	1.	1.	1.
675.500	1.	1.	1.	1.	1.
676.000	1.	1.	1.	1.	1.
676.500	1.	1.	1.	1.	1.
677.000	1.	1.	1.	1.	1.
677.500	1.	1.	1.	1.	1.
678.000	1.	1.	1.	1.	1.
678.500	1.	1.	1.	1.	1.
679.000	1.	1.	1.	1.	1.
679.500	1.	1.	1.	1.	1.
680.000	1.	1.	1.	1.	1.
680.500	1.	1.	1.	1.	1.
681.000	1.	1.	1.	1.	1.
681.500	1.	1.	1.	1.	1.
682.000	1.	1.	1.	1.	1.
682.500	1.	1.	1.	1.	1.
683.000	1.	1.	1.	1.	1.
683.500	1.	1.	1.	1.	1.
684.000	1.	1.	1.	1.	1.
684.500	5524.	1000.	283.	1001.	1279.
685.000	6742.	1000.	783.	1002.	4346.
685.500	7961.	1000.	1283.	1003.	8022.
686.000	9179.	1000.	1783.	1004.	12306.
686.500	10398.	1000.	2283.	1005.	17201.
687.000	11616.	1000.	2783.	1006.	22704.
687.500	12936.	1000.	3285.	1007.	28842.
688.000	14256.	1000.	3783.	1008.	35640.
688.500	15576.	1000.	4283.	1009.	43098.
689.000	16896.	1000.	4783.	1010.	51216.
689.500	17864.	1000.	5283.	1011.	59906.
690.000	18832.	1000.	5783.	1012.	69080.
690.500	19800.	1000.	6283.	1013.	78738.
691.000	20768.	1000.	6783.	1014.	88880.
691.500	21736.	1000.	7283.	1015.	99506.
692.000	22704.	1000.	7783.	1016.	110616.
692.500	23672.	1000.	8283.	1017.	122210.
693.000	24640.	1000.	8783.	1018.	134288.
693.500	25608.	1000.	9283.	1019.	146850.
694.000	26576.	1000.	9783.	1020.	159896.
694.500	27544.	1000.	10283.	1021.	173426.
695.000	28512.	1000.	10783.	1022.	187440.

REACH 650

CROSS-SECTION 10

DISTANCE 56,390 ft.



X — SECTION

MAMAWI LAKE CHANNEL

11 JULY 1970 Q = 2,690 C.F.S.

REACH 650

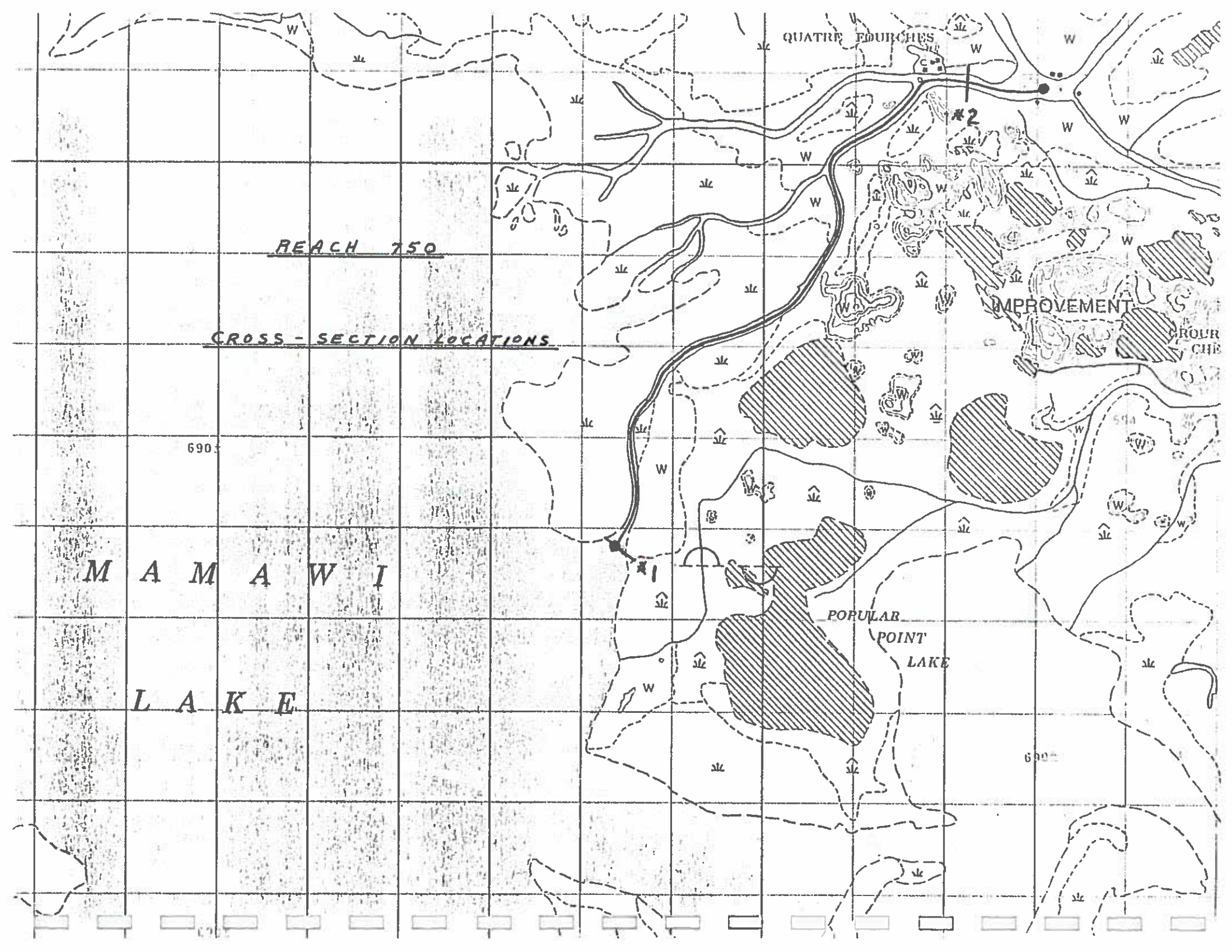
CROSS-SECTION 10

DISTANCE 56390 ft.

LEGEND

E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	216.	216.	330.	216.	330.
675.500	235.	235.	443.	235.	443.
676.000	250.	250.	564.	250.	564.
676.500	256.	256.	691.	256.	691.
677.000	261.	261.	820.	262.	820.
677.500	267.	267.	952.	268.	952.
678.000	273.	273.	1087.	274.	1087.
678.500	279.	279.	1225.	280.	1225.
679.000	285.	285.	1366.	286.	1366.
679.500	291.	291.	1510.	291.	1510.
680.000	297.	297.	1657.	297.	1657.
680.500	302.	302.	1807.	303.	1807.
681.000	308.	308.	1959.	309.	1959.
681.500	315.	315.	2115.	316.	2115.
682.000	323.	323.	2275.	324.	2275.
682.500	336.	336.	2439.	337.	2439.
683.000	342.	342.	2609.	343.	2609.
683.500	361.	361.	2787.	362.	2787.
684.000	365.	365.	2968.	367.	2968.
684.500	370.	370.	3152.	371.	3152.
685.000	375.	375.	3338.	377.	3338.
685.500	380.	380.	3527.	382.	3527.
686.000	385.	385.	3718.	387.	3718.
686.500	390.	390.	3912.	392.	3912.
687.000	395.	395.	4108.	397.	4108.
687.500	400.	400.	4307.	402.	4307.
688.000	405.	405.	4508.	408.	4508.
688.500	409.	409.	4712.	412.	4712.
689.000	413.	413.	4918.	416.	4918.
689.500	418.	418.	5125.	420.	5125.
690.000	422.	422.	5335.	425.	5335.
690.500	426.	426.	5547.	429.	5547.
691.000	430.	430.	5761.	433.	5761.
691.500	433.	433.	5977.	437.	5977.
692.000	437.	437.	6194.	440.	6194.
692.500	440.	440.	6414.	443.	6414.
693.000	443.	443.	6634.	447.	6634.
693.500	447.	447.	6857.	450.	6857.
694.000	450.	450.	7081.	454.	7081.
694.500	453.	453.	7307.	457.	7307.
695.000	457.	457.	7534.	461.	7534.


QUATRE FOURCHES
REACH 750
CROSS - SECTION LOCATIONS
#1
#2
MAMAWI
LAKE
POPULAR
POINT
LAKE
IMPROVEMENT
690
690

REACH NUMBER - 750

DESCRIPTION - Mamawi Lake Channel from Lake Mamawi to Chenal des Quatre Fourches

REACH LENGTH - 25,000 feet

UPSTREAM NODE - 7

DOWNSTREAM NODE - 8

CROSS-SECTION - 2

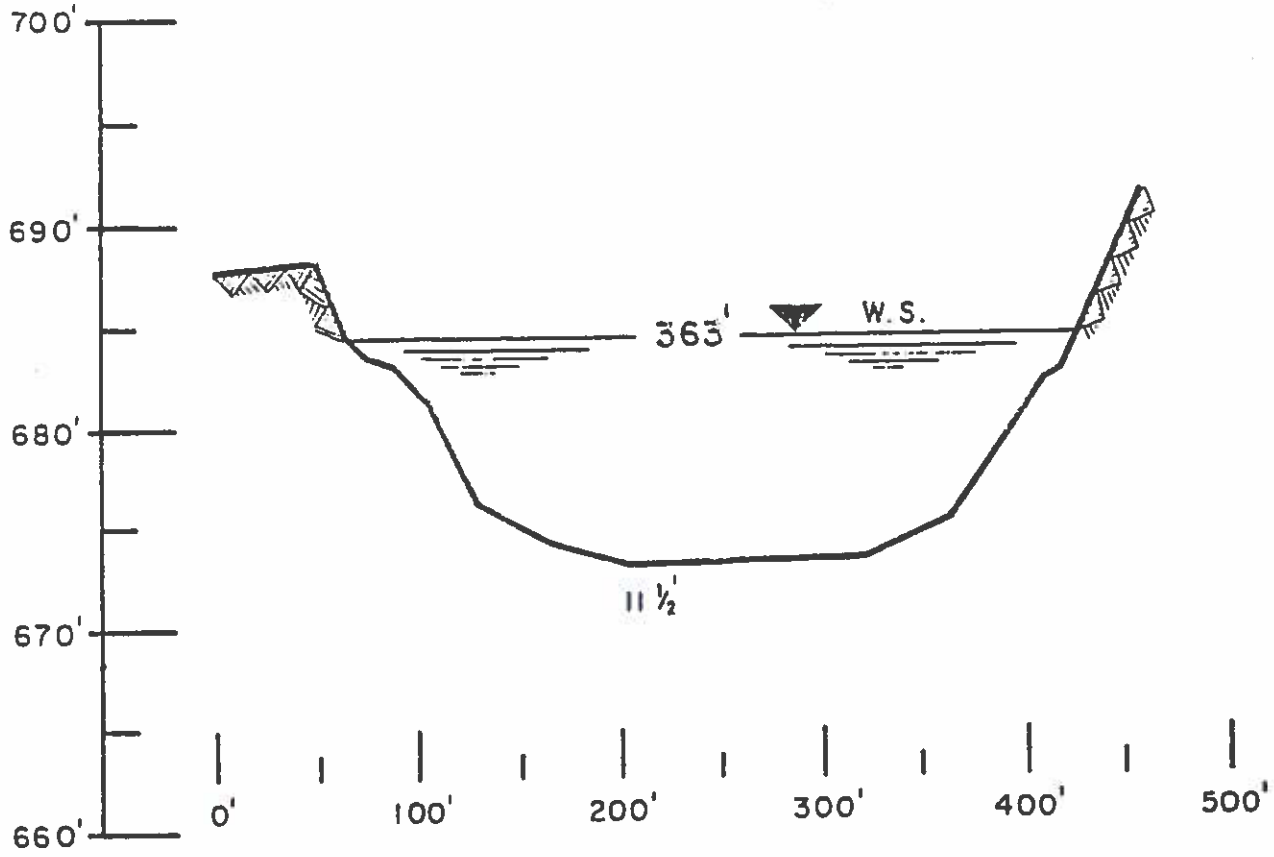
Section Number	Distance from Upstream Node (ft)
1	0
2	23,330

REMARKS: Cross-section 2 was surveyed by the Technical Services Division of Alberta Environment in 1970. The section was then transposed to the beginning of the reach and relabelled as cross-section 1.

REACH 750

CROSS-SECTION 1

DISTANCE 0 ft.



X — SECTION

MAMAWI LAKE CHANNEL

11 JULY 1970 Q = 2,690 C.F.S.

REACH 750

CROSS-SECTION 1

DISTANCE 0 ft.

LEGEND

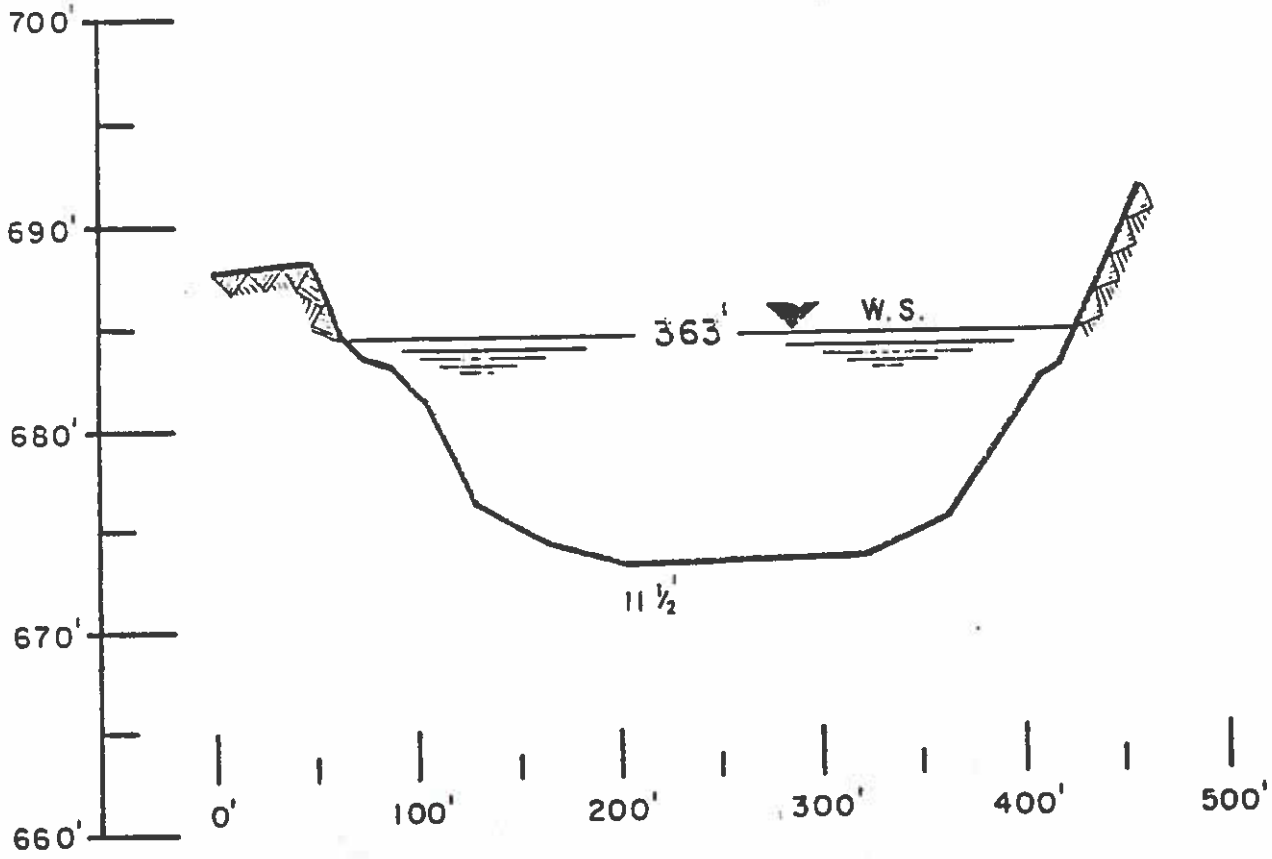
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	216.	216.	330.	216.	330.
675.500	235.	235.	443.	235.	443.
676.000	250.	250.	564.	250.	564.
676.500	256.	256.	691.	256.	691.
677.000	261.	261.	820.	262.	820.
677.500	267.	267.	952.	268.	952.
678.000	273.	273.	1087.	274.	1087.
678.500	279.	279.	1225.	280.	1225.
679.000	285.	285.	1366.	286.	1366.
679.500	291.	291.	1510.	291.	1510.
680.000	297.	297.	1657.	297.	1657.
680.500	302.	302.	1807.	303.	1807.
681.000	308.	308.	1959.	309.	1959.
681.500	315.	315.	2115.	316.	2115.
682.000	323.	323.	2275.	324.	2275.
682.500	336.	336.	2439.	337.	2439.
683.000	342.	342.	2609.	343.	2609.
683.500	361.	361.	2787.	362.	2787.
684.000	365.	365.	2968.	367.	2968.
684.500	370.	370.	3152.	371.	3152.
685.000	375.	375.	3338.	377.	3338.
685.500	380.	380.	3527.	382.	3527.
686.000	385.	385.	3718.	387.	3718.
686.500	390.	390.	3912.	392.	3912.
687.000	395.	395.	4108.	397.	4108.
687.500	400.	400.	4307.	402.	4307.
688.000	405.	405.	4508.	408.	4508.
688.500	409.	409.	4712.	412.	4712.
689.000	413.	413.	4918.	416.	4918.
689.500	418.	418.	5125.	420.	5125.
690.000	422.	422.	5335.	425.	5335.
690.500	426.	426.	5547.	429.	5547.
691.000	430.	430.	5761.	433.	5761.
691.500	433.	433.	5977.	437.	5977.
692.000	437.	437.	6194.	440.	6194.
692.500	440.	440.	6414.	443.	6414.
693.000	443.	443.	6634.	447.	6634.
693.500	447.	447.	6857.	450.	6857.
694.000	450.	450.	7081.	454.	7081.
694.500	453.	453.	7307.	457.	7307.
695.000	457.	457.	7534.	461.	7534.

REACH 750

CROSS-SECTION 2

DISTANCE 23,330 ft.



X — SECTION

MAMAWI LAKE CHANNEL

11 JULY 1970 Q = 2,690 C.F.S.

REACH 750

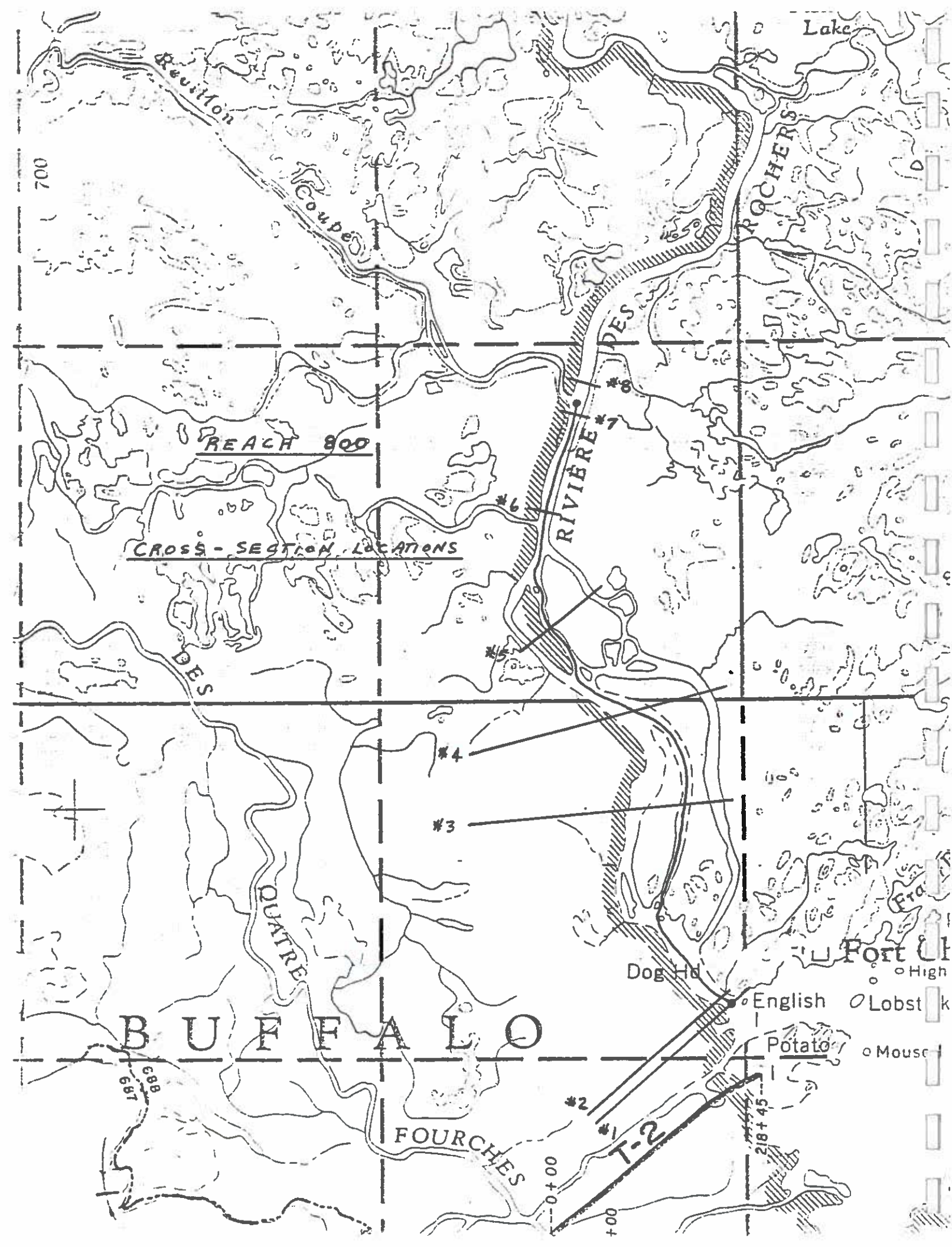
CROSS-SECTION 2

DISTANCE 23,330 ft.

LEGEND

E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
675.000	216.	216.	330.	216.	330.
675.500	235.	235.	443.	235.	443.
676.000	250.	250.	564.	250.	564.
676.500	256.	256.	691.	256.	691.
677.000	261.	261.	820.	262.	820.
677.500	267.	267.	952.	268.	952.
678.000	273.	273.	1087.	274.	1087.
678.500	279.	279.	1225.	280.	1225.
679.000	285.	285.	1366.	286.	1366.
679.500	291.	291.	1510.	291.	1510.
680.000	297.	297.	1657.	297.	1657.
680.500	302.	302.	1807.	303.	1807.
681.000	308.	308.	1959.	309.	1959.
681.500	315.	315.	2115.	316.	2115.
682.000	323.	323.	2275.	324.	2275.
682.500	330.	330.	2439.	337.	2439.
683.000	342.	342.	2609.	343.	2609.
683.500	361.	361.	2787.	362.	2787.
684.000	365.	365.	2968.	367.	2968.
684.500	370.	370.	3152.	371.	3152.
685.000	375.	375.	3338.	377.	3338.
685.500	380.	380.	3527.	382.	3527.
686.000	385.	385.	3718.	387.	3718.
686.500	390.	390.	3912.	392.	3912.
687.000	395.	395.	4108.	397.	4108.
687.500	400.	400.	4307.	402.	4307.
688.000	405.	405.	4508.	408.	4508.
688.500	409.	409.	4712.	412.	4712.
689.000	413.	413.	4918.	416.	4918.
689.500	418.	418.	5125.	420.	5125.
690.000	422.	422.	5335.	425.	5335.
690.500	426.	426.	5547.	429.	5547.
691.000	430.	430.	5761.	433.	5761.
691.500	433.	433.	5977.	437.	5977.
692.000	437.	437.	6194.	440.	6194.
692.500	440.	440.	6414.	443.	6414.
693.000	443.	443.	6634.	447.	6634.
693.500	447.	447.	6857.	450.	6857.
694.000	450.	450.	7081.	454.	7081.
694.500	453.	453.	7307.	457.	7307.
695.000	457.	457.	7534.	461.	7534.


Lake
Reuillon
Coupe
700
ROCHERS
DES
RIVIÈRE
#8
#7
REACH 800
#6
CROSS-SECTION LOCATIONS
#5
DES
#4
#3
QUATRE
Dog Hd
English
Potato
BUFFALO
688
687
#2
#1
T-2
FOURCHES
218+45
0+00
+00

REACH NUMBER - 800

DESCRIPTION - Riviere des Rochers from Lake Athabasca to Revillon Coupe

REACH LENGTH - 63,300 feet

UPSTREAM NODE - 2

DOWNSTREAM NODE - 10

CROSS-SECTION - 8

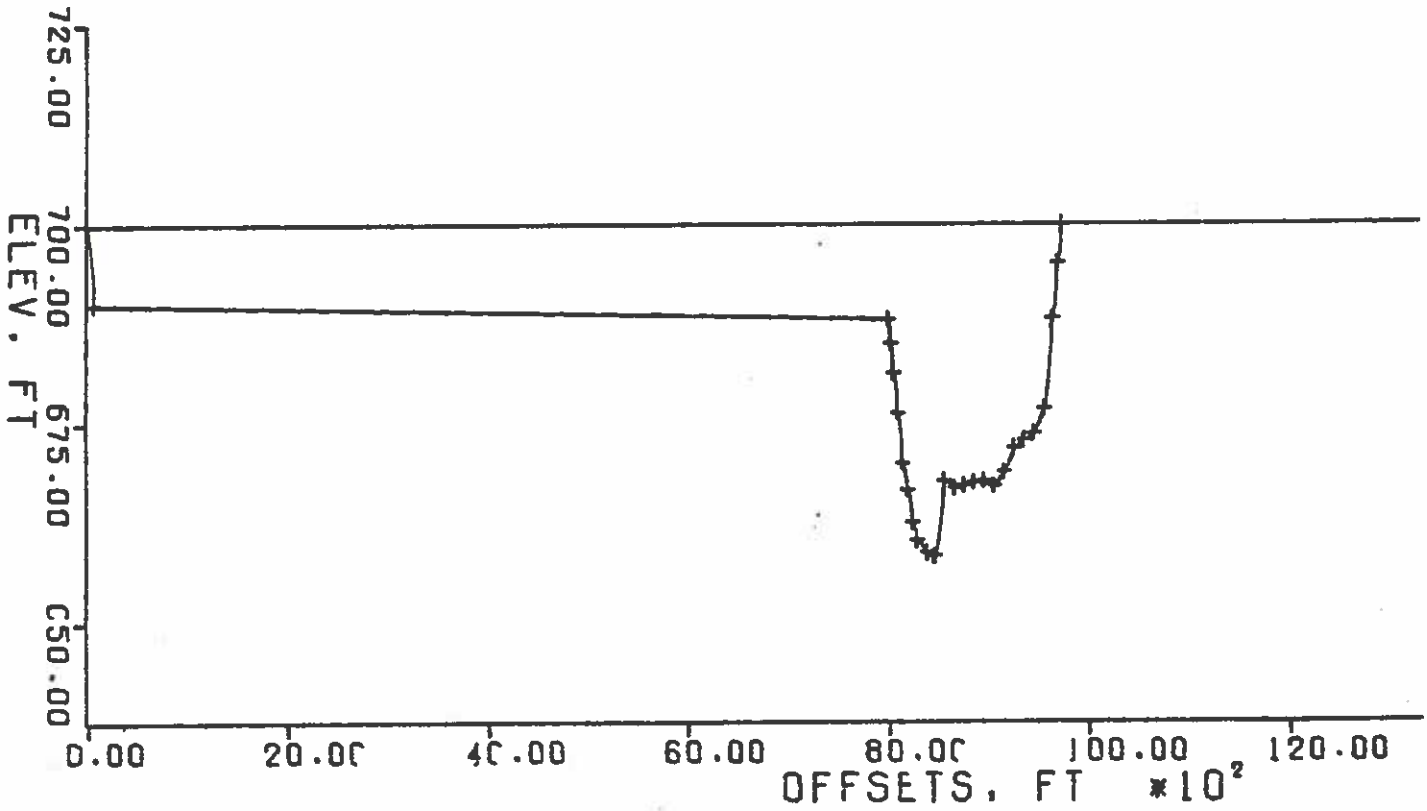
Section Number	Distance from Upstream Node (ft)
1	0
2	2,080
3	20,000
4	30,000
5	43,000
6	52,900
7	62,400
8	64,860

REMARKS: These cross-sections were surveyed by the Technical Services Division of Alberta Environment in 1970. Cross-section 2 was transposed to the beginning of the reach and was relabelled as cross-section 1.

REACH 800

CROSS-SECTION 1

DISTANCE 0 ft.



REACH 800

CROSS-SECTION 1

DISTANCE 0 ft.

LEGEND

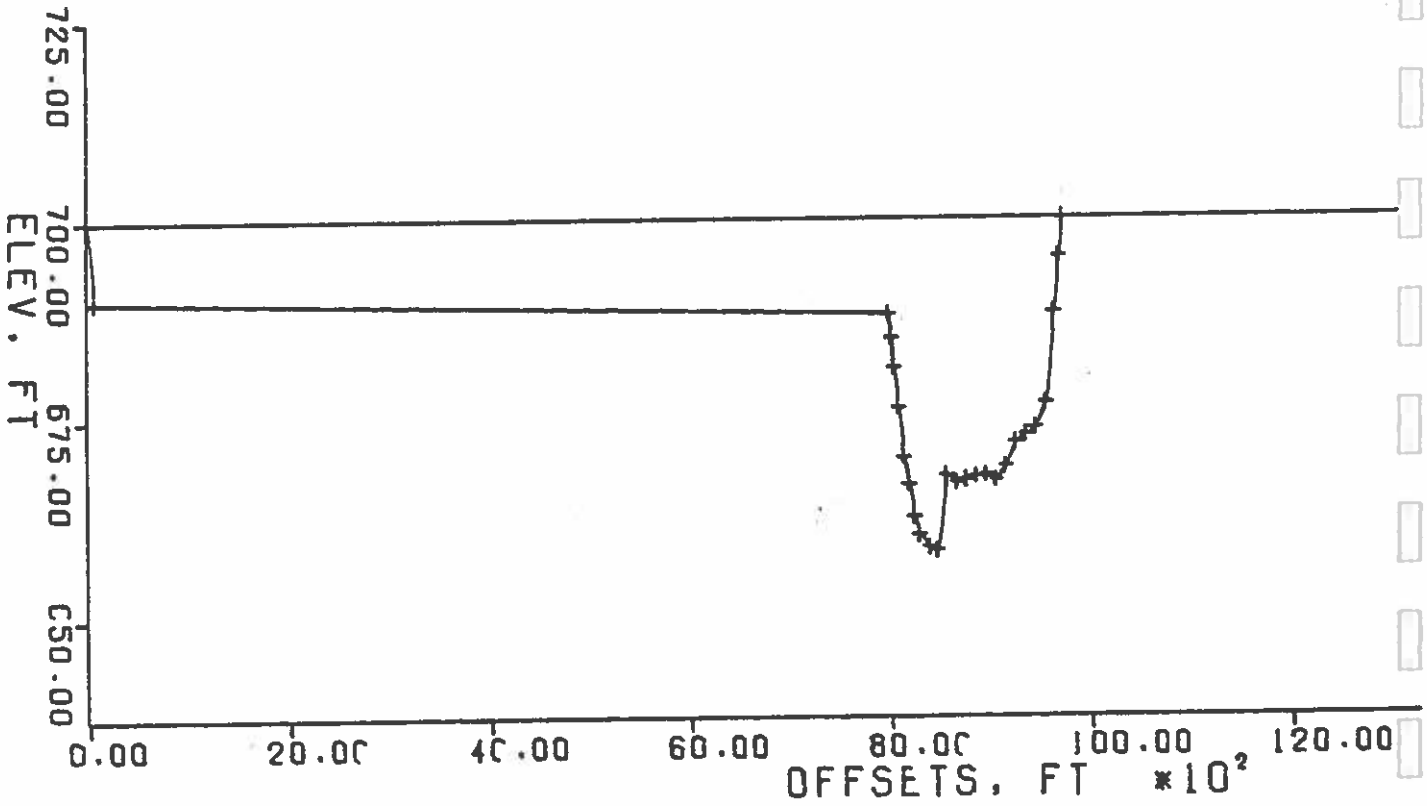
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	1068.	1068.	5062.	1069.	5062.
670.500	1089.	1089.	5601.	1090.	5601.
671.000	1109.	1109.	6150.	1110.	6150.
671.500	1130.	1130.	6710.	1131.	6710.
672.000	1171.	1171.	7283.	1172.	7283.
672.500	1225.	1225.	7882.	1226.	7882.
673.000	1286.	1286.	8509.	1287.	8509.
673.500	1351.	1351.	9168.	1352.	9168.
674.000	1371.	1371.	9848.	1372.	9848.
674.500	1391.	1391.	10539.	1392.	10539.
675.000	1410.	1410.	11239.	1412.	11239.
675.500	1430.	1430.	11949.	1432.	11949.
676.000	1450.	1450.	12669.	1452.	12669.
676.500	1471.	1471.	13400.	1472.	13400.
677.000	1481.	1481.	14138.	1483.	14138.
677.500	1490.	1490.	14881.	1491.	14881.
678.000	1498.	1498.	15628.	1499.	15628.
678.500	1506.	1506.	16379.	1508.	16379.
679.000	1514.	1514.	17134.	1516.	17134.
679.500	1523.	1523.	17893.	1524.	17893.
680.000	1531.	1531.	18657.	1533.	18657.
680.500	1539.	1539.	19424.	1541.	19424.
681.000	1547.	1547.	20196.	1549.	20196.
681.500	1555.	1555.	20971.	1557.	20971.
682.000	1562.	1562.	21751.	1564.	21751.
682.500	1569.	1569.	22533.	1572.	22533.
683.000	1577.	1577.	23320.	1579.	23320.
683.500	1584.	1564.	24110.	1586.	24110.
684.000	1591.	1591.	24904.	1593.	24904.
684.500	1598.	1598.	25701.	1601.	25701.
685.000	1605.	1605.	26502.	1608.	26502.
685.500	1613.	1613.	27307.	1615.	27307.
686.000	1620.	1620.	28115.	1623.	28115.
686.500	1628.	1628.	28927.	1630.	28927.
687.000	1635.	1635.	29743.	1638.	29743.
687.500	1643.	1643.	30562.	1645.	30562.
688.000	1650.	1650.	31385.	1653.	31385.
688.500	3634.	3634.	32706.	3636.	32706.
689.000	5617.	5617.	35019.	5620.	35019.
689.500	7601.	7601.	38323.	7604.	38323.
690.000	9584.	9584.	42620.	9587.	42620.
690.500	9592.	9592.	47414.	9595.	47414.
691.000	9599.	9599.	52211.	9603.	52211.
691.500	9607.	9607.	57013.	9610.	57013.
692.000	9615.	9615.	61818.	9618.	61818.
692.500	9622.	9622.	66628.	9625.	66628.
693.000	9630.	9630.	71441.	9633.	71441.
693.500	9637.	9637.	76257.	9641.	76257.
694.000	9645.	9645.	81078.	9648.	81078.
694.500	9652.	9652.	85902.	9656.	85902.
695.000	9660.	9660.	90730.	9664.	90730.
695.500	9668.	9668.	95562.	9672.	95562.
696.000	9676.	9676.	100398.	9680.	100398.
696.500	9684.	9684.	105238.	9688.	105238.
697.000	9692.	9692.	110082.	9696.	110082.
697.500	9700.	9700.	114930.	9704.	114930.
698.000	9708.	9708.	119782.	9712.	119782.
698.500	9716.	9716.	124638.	9720.	124638.
699.000	9724.	9724.	129498.	9728.	129498.
699.500	9732.	9732.	134362.	9736.	134362.
700.000	9740.	9740.	139230.	9744.	139230.

REACH 800

CROSS-SECTION 2

DISTANCE 2080 ft.



REACH 800

CROSS-SECTION 2

DISTANCE 2,080 ft.

LEGEND

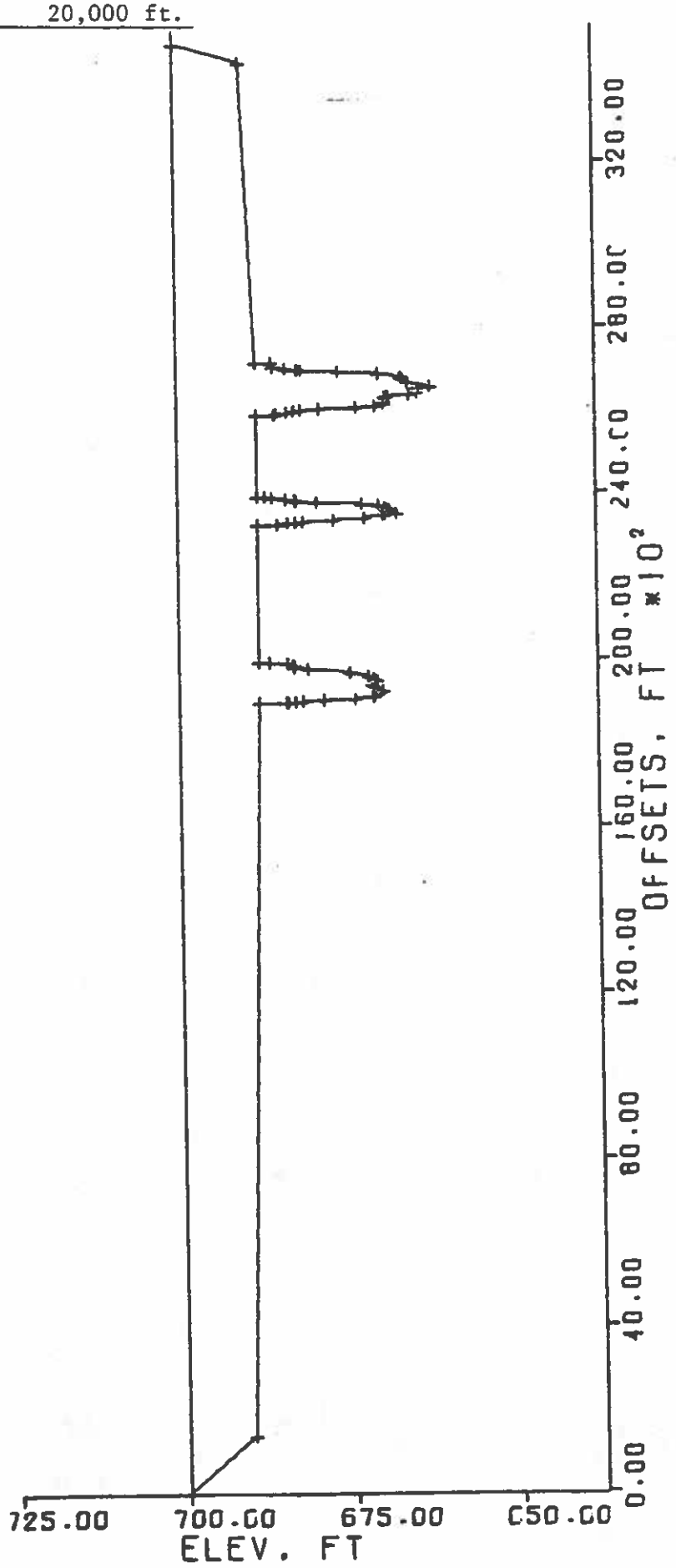
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	1068.	1068.	5062.	1069.	5062.
670.500	1089.	1089.	5601.	1090.	5601.
671.000	1109.	1109.	6150.	1110.	6150.
671.500	1130.	1130.	6710.	1131.	6710.
672.000	1171.	1171.	7283.	1172.	7283.
672.500	1225.	1225.	7882.	1226.	7882.
673.000	1286.	1286.	8509.	1287.	8509.
673.500	1351.	1351.	9168.	1352.	9168.
674.000	1371.	1371.	9848.	1372.	9848.
674.500	1391.	1391.	10539.	1392.	10539.
675.000	1410.	1410.	11239.	1412.	11259.
675.500	1430.	1430.	11949.	1432.	11749.
676.000	1450.	1450.	12669.	1452.	12669.
676.500	1471.	1471.	13400.	1472.	13400.
677.000	1481.	1481.	14138.	1483.	14138.
677.500	1490.	1490.	14881.	1491.	14881.
678.000	1498.	1498.	15628.	1499.	15628.
678.500	1506.	1506.	16379.	1508.	16379.
679.000	1514.	1514.	17134.	1516.	17134.
679.500	1523.	1523.	17893.	1524.	17893.
680.000	1531.	1531.	18657.	1533.	18657.
680.500	1539.	1539.	19424.	1541.	19424.
681.000	1547.	1547.	20196.	1549.	20196.
681.500	1555.	1555.	20971.	1557.	20971.
682.000	1562.	1562.	21751.	1564.	21751.
682.500	1569.	1569.	22533.	1572.	22533.
683.000	1577.	1577.	23320.	1579.	23320.
683.500	1584.	1584.	24110.	1586.	24110.
684.000	1591.	1591.	24904.	1593.	24904.
684.500	1598.	1598.	25701.	1601.	25701.
685.000	1605.	1605.	26502.	1608.	26502.
685.500	1613.	1613.	27307.	1615.	27307.
686.000	1620.	1620.	28115.	1623.	28115.
686.500	1628.	1628.	28927.	1630.	28927.
687.000	1635.	1635.	29743.	1638.	29743.
687.500	1643.	1643.	30562.	1645.	30562.
688.000	1650.	1650.	31385.	1653.	31385.
688.500	3634.	3634.	32706.	3636.	32706.
689.000	5617.	5617.	35019.	5620.	35019.
689.500	7601.	7601.	38323.	7604.	38323.
690.000	9584.	9584.	42620.	9587.	42620.
690.500	9592.	9592.	47414.	9595.	47414.
691.000	9599.	9599.	52211.	9603.	52211.
691.500	9607.	9607.	57013.	9610.	57013.
692.000	9615.	9615.	61818.	9618.	61818.
692.500	9622.	9622.	66628.	9625.	66628.
693.000	9630.	9630.	71441.	9633.	71441.
693.500	9637.	9637.	76257.	9641.	76257.
694.000	9645.	9645.	81078.	9648.	81078.
694.500	9652.	9652.	85902.	9656.	85902.
695.000	9660.	9660.	90730.	9664.	90730.
695.500	9668.	9668.	95562.	9672.	95562.
696.000	9676.	9676.	100398.	9680.	100398.
696.500	9684.	9684.	105238.	9688.	105235.
697.000	9692.	9692.	110082.	9696.	110082.
697.500	9700.	9700.	114930.	9704.	114930.
698.000	9708.	9708.	119782.	9712.	119782.
698.500	9716.	9716.	124638.	9720.	124638.
699.000	9724.	9724.	129498.	9728.	129498.
699.500	9732.	9732.	134362.	9736.	134362.
700.000	9740.	9740.	139230.	9744.	139230.

REACH 800

CROSS-SECTION 3

DISTANCE 20,000 ft.



REACH 800

CROSS-SECTION 3

DISTANCE 20,000 ft.

LEGEND

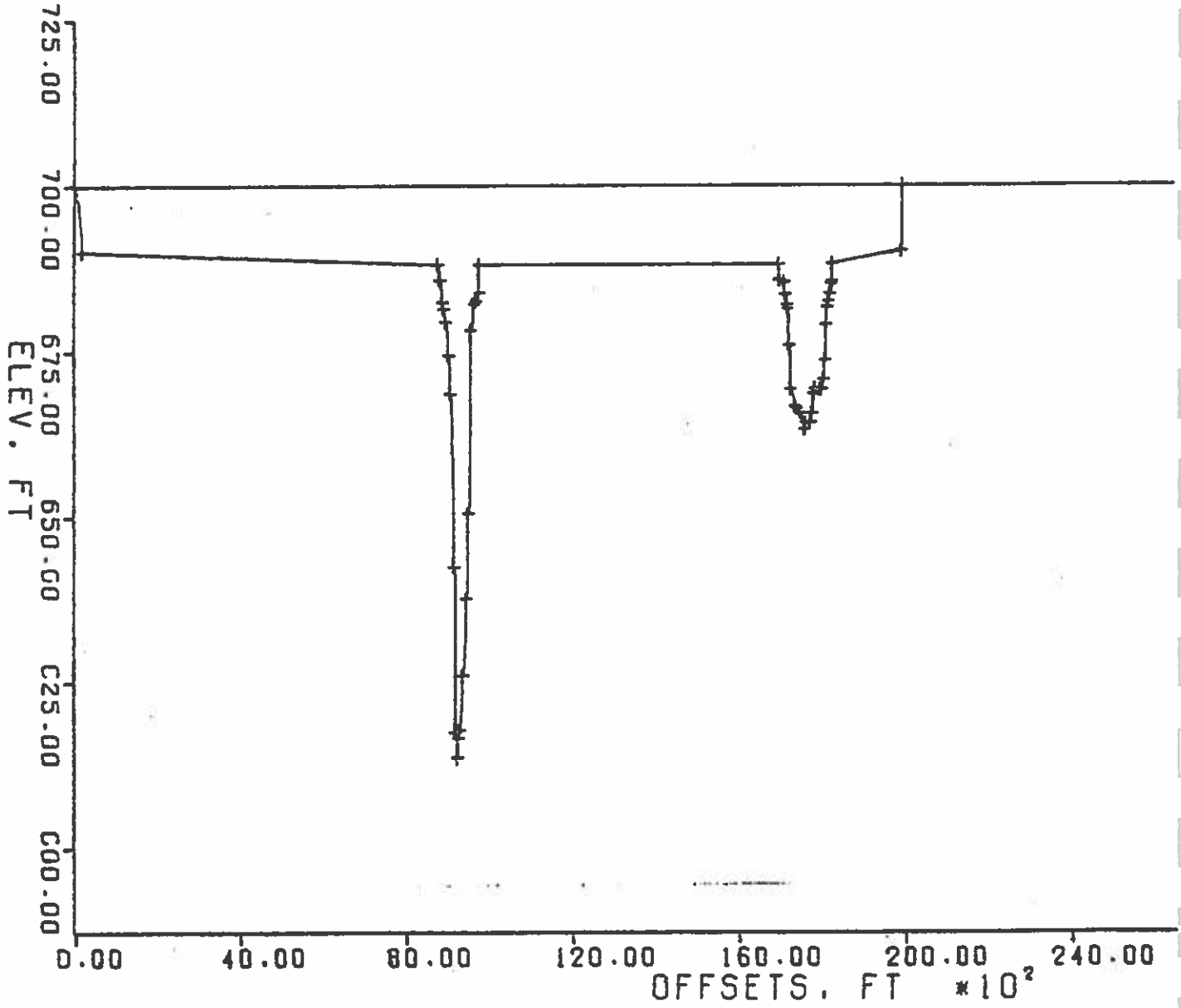
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	1064.	1064.	3046.	1064.	3046.
670.500	1182.	1182.	3606.	1183.	3606.
671.000	1429.	1429.	4256.	1430.	4256.
671.500	1583.	1583.	5017.	1584.	5017.
672.000	1652.	1652.	5827.	1653.	5827.
672.500	1703.	1703.	6666.	1704.	6666.
673.000	1748.	1748.	7529.	1749.	7529.
673.500	1792.	1792.	8414.	1793.	8414.
674.000	1831.	1831.	9320.	1832.	9320.
674.500	1865.	1865.	10244.	1867.	10244.
675.000	1891.	1891.	11183.	1893.	11183.
675.500	1917.	1917.	12135.	1919.	12135.
676.000	1943.	1943.	13100.	1945.	13100.
676.500	1969.	1969.	14078.	1971.	14078.
677.000	1994.	1994.	15069.	1997.	15069.
677.500	2020.	2020.	16072.	2022.	16072.
678.000	2045.	2045.	17088.	2048.	17088.
678.500	2070.	2070.	18117.	2073.	18117.
679.000	2097.	2097.	19158.	2101.	19158.
679.500	2126.	2126.	20214.	2130.	20214.
680.000	2155.	2155.	21285.	2159.	21285.
680.500	2184.	2184.	22369.	2187.	22369.
681.000	2215.	2215.	23469.	2219.	23469.
681.500	2249.	2249.	24584.	2253.	24584.
682.000	2298.	2298.	25721.	2302.	25721.
682.500	2373.	2373.	26889.	2377.	26889.
683.000	2480.	2480.	28101.	2484.	28101.
683.500	2556.	2556.	29360.	2560.	29360.
684.000	2615.	2615.	30654.	2620.	30654.
684.500	2665.	2665.	31974.	2670.	31974.
685.000	2715.	2715.	33319.	2720.	33319.
685.500	2805.	2805.	34691.	2811.	34691.
686.000	2870.	2870.	36120.	2878.	36120.
686.500	2884.	2884.	37559.	2893.	37559.
687.000	2893.	2893.	39003.	2905.	39003.
687.500	2898.	2898.	40451.	2911.	40451.
688.000	2902.	2902.	41901.	2917.	41901.
688.500	14399.	14399.	47546.	14414.	47546.
689.000	20616.	20616.	56300.	20630.	56300.
689.500	26832.	26832.	68162.	26847.	68162.
690.000	33049.	33049.	83132.	33064.	83132.
690.500	33141.	33141.	99680.	33156.	99680.
691.000	33233.	33233.	116273.	33248.	116273.
691.500	33325.	33325.	132913.	33340.	132913.
692.000	33417.	33417.	149598.	33432.	149598.
692.500	33509.	33509.	166330.	33524.	166330.
693.000	33601.	33601.	183107.	33616.	183107.
693.500	33693.	33693.	199931.	33708.	199931.
694.000	33785.	33785.	216801.	33800.	216801.
694.500	33877.	33877.	233717.	33892.	233717.
695.000	33970.	33970.	250678.	33984.	250678.
695.500	34062.	34062.	267686.	34077.	267686.
696.000	34154.	34154.	284740.	34169.	284740.
696.500	34246.	34246.	301840.	34261.	301840.
697.000	34338.	34338.	318985.	34353.	318985.
697.500	34430.	34430.	336177.	34445.	336177.
698.000	34522.	34522.	353415.	34537.	353415.
698.500	34614.	34614.	370699.	34629.	370699.
699.000	34706.	34706.	388029.	34721.	388029.
699.500	34798.	34798.	405405.	34813.	405405.
700.000	34890.	34890.	422827.	34905.	422827.

REACH 800

CROSS-SECTION 4

DISTANCE 30,000 ft.



REACH 800

CROSS-SECTION 4

DISTANCE 30,000 ft.

LEGEND

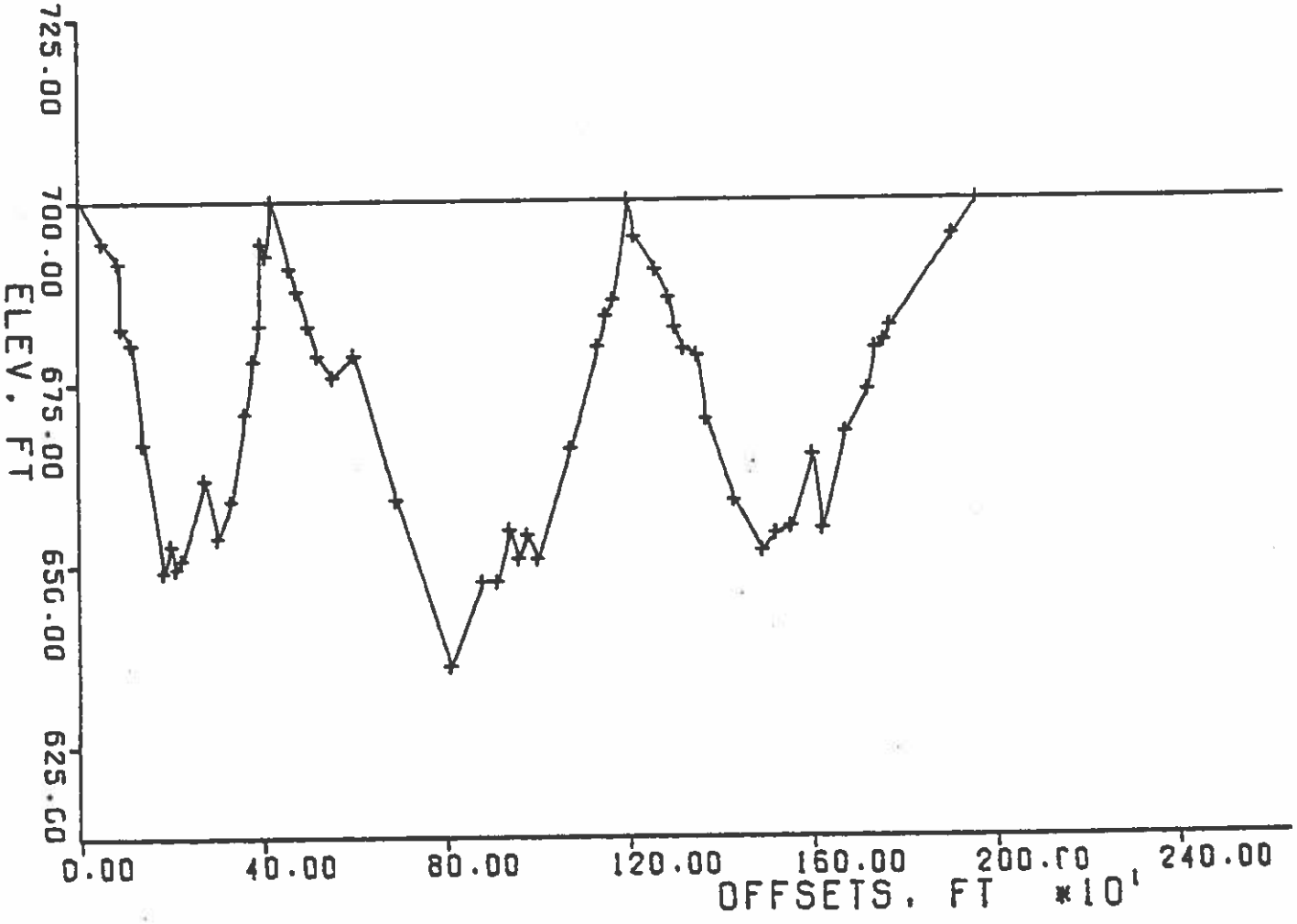
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	1256.	1256.	19236.	1275.	19236.
670.500	1281.	1281.	19871.	1299.	19871.
671.000	1293.	1293.	20514.	1312.	20514.
671.500	1306.	1306.	21164.	1325.	21164.
672.000	1319.	1319.	21820.	1338.	21820.
672.500	1331.	1331.	22483.	1351.	22483.
673.000	1344.	1344.	23152.	1364.	23152.
673.500	1356.	1356.	23827.	1376.	23827.
674.000	1367.	1367.	24508.	1387.	24508.
674.500	1379.	1379.	25194.	1399.	25194.
675.000	1393.	1393.	25886.	1413.	25886.
675.500	1407.	1407.	26586.	1427.	26586.
676.000	1421.	1421.	27293.	1442.	27293.
676.500	1436.	1436.	28007.	1457.	28007.
677.000	1450.	1450.	28729.	1472.	28729.
677.500	1465.	1465.	29458.	1486.	29458.
678.000	1480.	1480.	30194.	1501.	30194.
678.500	1502.	1502.	30939.	1524.	30939.
679.000	1525.	1525.	31696.	1547.	31696.
679.500	1549.	1549.	32464.	1572.	32464.
680.000	1580.	1580.	33246.	1602.	33246.
680.500	1611.	1611.	34044.	1633.	34044.
681.000	1642.	1642.	34857.	1664.	34857.
681.500	1675.	1675.	35686.	1697.	35686.
682.000	1724.	1724.	36536.	1746.	36536.
682.500	1810.	1810.	37419.	1832.	37419.
683.000	1871.	1871.	38339.	1893.	38339.
683.500	1932.	1932.	39290.	1955.	39290.
684.000	1975.	1975.	40269.	1998.	40269.
684.500	2006.	2006.	41264.	2030.	41264.
685.000	2037.	2037.	42275.	2061.	42275.
685.500	2125.	2125.	43306.	2150.	43306.
686.000	2197.	2197.	44398.	2223.	44398.
686.500	2210.	2210.	45500.	2236.	45500.
687.000	2222.	2222.	46608.	2249.	46608.
687.500	2235.	2235.	47722.	2263.	47722.
688.000	2247.	2247.	48842.	2276.	48842.
688.500	12030.	12030.	54218.	12059.	54218.
689.000	14587.	14587.	60872.	14616.	60872.
689.500	17145.	17145.	68805.	17174.	68805.
690.000	19702.	19702.	78016.	19731.	78016.
690.500	19712.	19712.	87870.	19742.	87870.
691.000	19723.	19723.	97726.	19752.	97726.
691.500	19733.	19733.	107592.	19763.	107592.
692.000	19743.	19743.	117461.	19773.	117461.
692.500	19754.	19754.	127336.	19783.	127336.
693.000	19764.	19764.	137215.	19794.	137215.
693.500	19774.	19774.	147099.	19804.	147099.
694.000	19784.	19784.	156989.	19815.	156989.
694.500	19795.	19795.	166884.	19825.	166884.
695.000	19805.	19805.	176784.	19835.	176784.
695.500	19815.	19815.	186689.	19846.	186689.
696.000	19826.	19826.	196599.	19856.	196599.
696.500	19836.	19836.	206514.	19867.	206514.
697.000	19846.	19846.	216435.	19877.	216435.
697.500	19857.	19857.	226361.	19888.	226361.
698.000	19867.	19867.	236291.	19898.	236291.
698.500	19877.	19877.	246227.	19908.	246227.
699.000	19887.	19887.	256168.	19919.	256168.
699.500	19898.	19898.	266115.	19929.	266115.
700.000	19908.	19908.	276066.	19940.	276066.

REACH 800

CROSS-SECTION 5

DISTANCE 43,000 ft.



REACH 800

CROSS-SECTION 5

DISTANCE 43,000 ft.

LEGEND

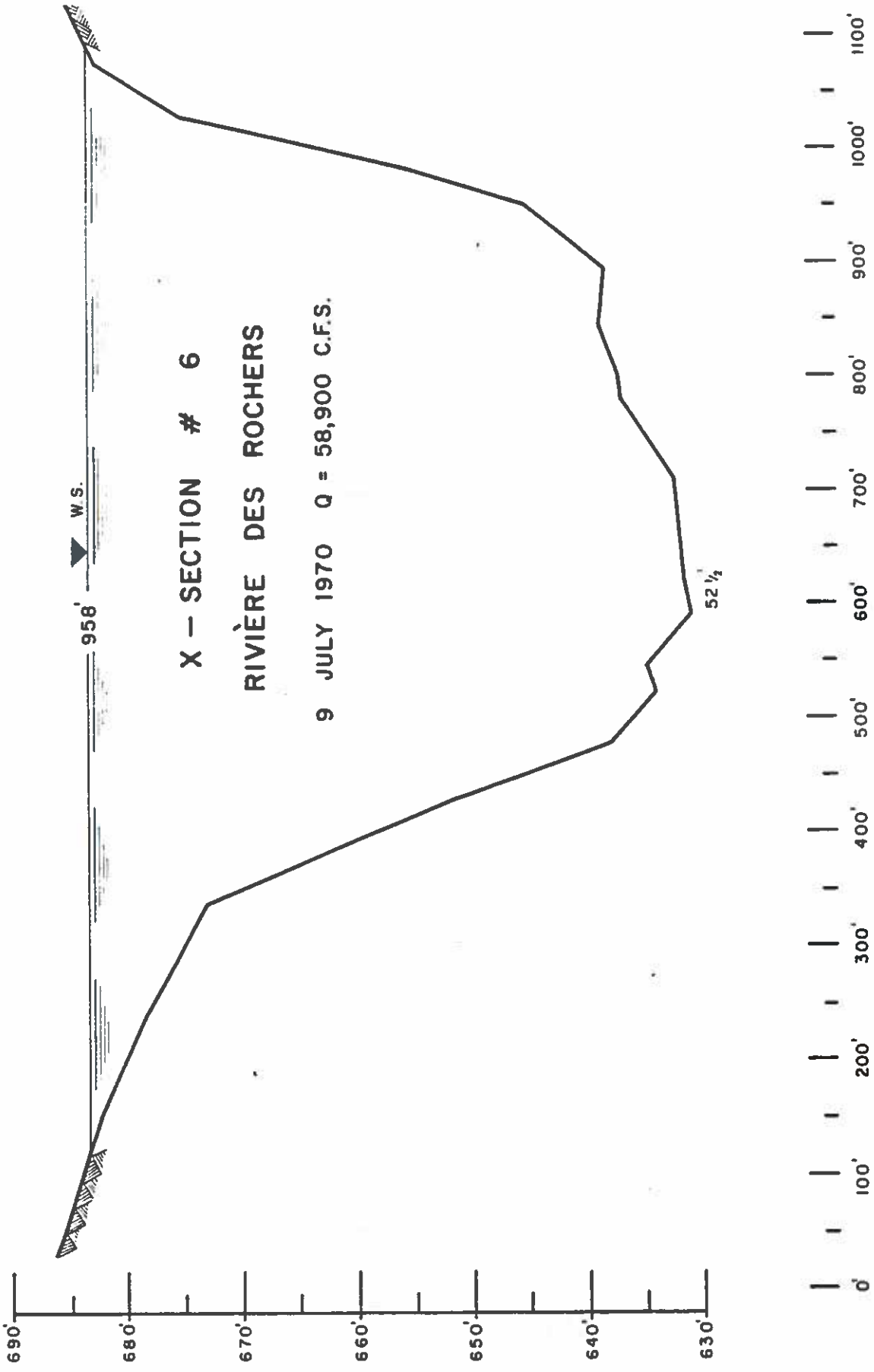
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	996.	996.	14398.	1021.	14398.
670.500	1009.	1009.	14899.	1034.	14899.
671.000	1021.	1021.	15407.	1047.	15407.
671.500	1033.	1033.	15920.	1059.	15920.
672.000	1045.	1045.	16439.	1072.	16439.
672.500	1057.	1057.	16965.	1084.	16965.
673.000	1069.	1069.	17496.	1097.	17496.
673.500	1081.	1081.	18033.	1109.	18033.
674.000	1092.	1092.	18576.	1120.	18576.
674.500	1101.	1101.	19125.	1130.	19125.
675.000	1110.	1110.	19677.	1140.	19677.
675.500	1119.	1119.	20235.	1150.	20235.
676.000	1134.	1134.	20797.	1165.	20797.
676.500	1157.	1157.	21370.	1188.	21370.
677.000	1179.	1179.	21954.	1211.	21954.
677.500	1202.	1202.	22549.	1235.	22549.
678.000	1225.	1225.	23156.	1258.	23156.
678.500	1247.	1247.	23774.	1281.	23774.
679.000	1274.	1274.	24404.	1308.	24404.
679.500	1299.	1299.	25048.	1334.	25048.
680.000	1322.	1322.	25704.	1357.	25704.
680.500	1342.	1342.	26370.	1378.	26370.
681.000	1360.	1360.	27045.	1395.	27045.
681.500	1377.	1377.	27729.	1413.	27729.
682.000	1394.	1394.	28422.	1430.	28422.
682.500	1411.	1411.	29123.	1448.	29123.
683.000	1426.	1426.	29833.	1463.	29833.
683.500	1438.	1438.	30549.	1476.	30549.
684.000	1450.	1450.	31270.	1489.	31270.
684.500	1464.	1464.	31999.	1503.	31999.
685.000	1477.	1477.	32734.	1518.	32734.
685.500	1491.	1491.	33476.	1532.	33476.
686.000	1505.	1505.	34225.	1547.	34225.
686.500	1517.	1517.	34980.	1560.	34980.
687.000	1530.	1530.	35742.	1573.	35742.
687.500	1543.	1543.	36510.	1588.	36510.
688.000	1556.	1556.	37285.	1602.	37285.
688.500	1569.	1569.	38066.	1616.	38066.
689.000	1583.	1583.	38854.	1630.	38854.
689.500	1596.	1596.	39648.	1644.	39648.
690.000	1609.	1609.	40450.	1658.	40450.
690.500	1622.	1622.	41257.	1672.	41257.
691.000	1637.	1637.	42072.	1688.	42072.
691.500	1651.	1651.	42894.	1703.	42894.
692.000	1670.	1670.	43724.	1722.	43724.
692.500	1690.	1690.	44564.	1743.	44564.
693.000	1715.	1715.	45415.	1768.	45415.
693.500	1739.	1739.	46279.	1794.	46279.
694.000	1763.	1763.	47154.	1819.	47154.
694.500	1786.	1786.	48042.	1842.	48042.
695.000	1805.	1805.	48940.	1862.	48940.
695.500	1821.	1821.	49846.	1877.	49846.
696.000	1836.	1836.	50760.	1893.	50760.
696.500	1851.	1851.	51682.	1909.	51682.
697.000	1867.	1867.	52612.	1925.	52612.
697.500	1882.	1882.	53549.	1941.	53549.
698.000	1897.	1897.	54494.	1956.	54494.
698.500	1913.	1913.	55446.	1972.	55446.
699.000	1928.	1928.	56406.	1988.	56406.
699.500	1944.	1944.	57374.	2004.	57374.
700.000	1959.	1959.	58350.	2020.	58350.

REACH 800

CROSS-SECTION 6

DISTANCE 52,900 ft.



REACH 800

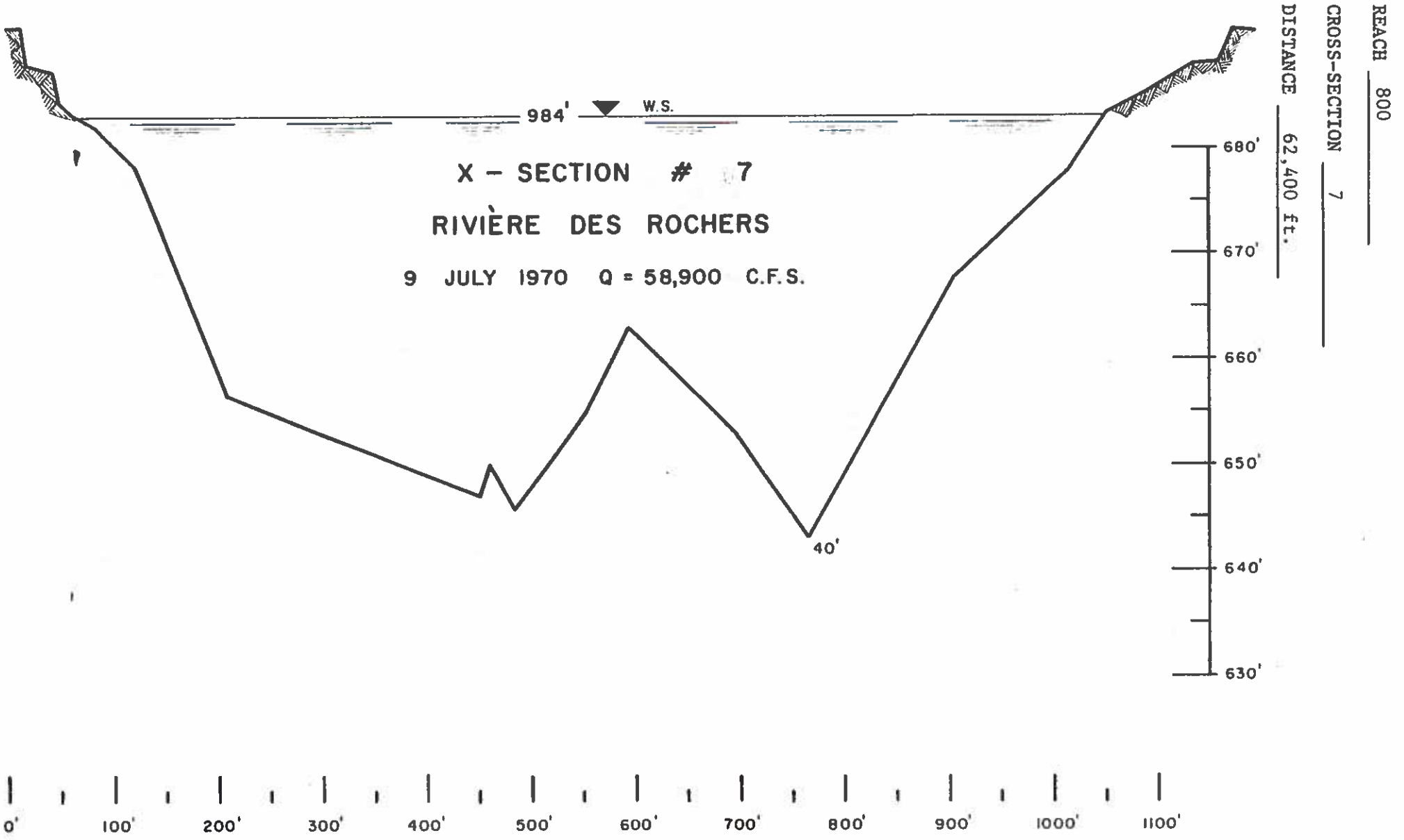
CROSS-SECTION 6

DISTANCE 52,900 ft.

LEGEND

E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	662.	662.	18978.	672.	18978.
670.500	666.	666.	19310.	675.	19310.
671.000	669.	669.	19644.	679.	19644.
671.500	672.	672.	19979.	682.	19979.
672.000	675.	675.	20316.	686.	20316.
672.500	679.	679.	20654.	689.	20654.
673.000	682.	682.	20994.	693.	20994.
673.500	693.	693.	21338.	703.	21338.
674.000	703.	703.	21687.	714.	21687.
674.500	714.	714.	22041.	725.	22041.
675.000	724.	724.	22401.	735.	22401.
675.500	735.	735.	22766.	746.	22766.
676.000	748.	748.	23136.	759.	23136.
676.500	760.	760.	23513.	771.	23513.
677.000	773.	773.	23897.	784.	23897.
677.500	785.	785.	24286.	797.	24286.
678.000	798.	798.	24682.	809.	24682.
678.500	812.	812.	25085.	824.	25085.
679.000	826.	826.	25494.	838.	25494.
679.500	841.	841.	25911.	852.	25911.
680.000	855.	855.	26335.	866.	26335.
680.500	869.	869.	26766.	880.	26766.
681.000	883.	883.	27204.	895.	27204.
681.500	897.	897.	27649.	909.	27649.
682.000	911.	911.	28101.	923.	28101.
682.500	925.	925.	28560.	937.	28560.
683.000	945.	945.	29027.	957.	29027.
683.500	970.	970.	29506.	981.	29506.
684.000	996.	996.	29997.	1008.	29997.
684.500	1022.	1022.	30501.	1034.	30501.
685.000	1048.	1048.	31019.	1060.	31019.
685.500	1075.	1075.	31550.	1087.	31550.
686.000	1103.	1103.	32094.	1115.	32094.
686.500	1131.	1131.	32653.	1143.	32653.
687.000	1159.	1159.	33225.	1171.	33225.
687.500	1187.	1187.	33812.	1199.	33812.
688.000	1205.	1205.	34410.	1217.	34410.
688.500	1211.	1211.	35014.	1223.	35014.
689.000	1217.	1217.	35621.	1229.	35621.
689.500	1223.	1223.	36231.	1235.	36231.
690.000	1229.	1229.	36844.	1241.	36844.
690.500	1235.	1235.	37459.	1247.	37459.
691.000	1241.	1241.	38078.	1253.	38078.
691.500	1269.	1269.	38708.	1282.	38708.
692.000	1278.	1278.	39345.	1290.	39345.
692.500	1286.	1286.	39986.	1299.	39986.
693.000	1295.	1295.	40631.	1308.	40631.
693.500	1304.	1304.	41281.	1317.	41281.
694.000	1313.	1313.	41935.	1326.	41935.
694.500	1321.	1321.	42593.	1334.	42593.
695.000	1330.	1330.	43256.	1343.	43256.
695.500	1339.	1339.	43924.	1352.	43924.
696.000	1348.	1348.	44595.	1361.	44595.
696.500	1357.	1357.	45272.	1370.	45272.
697.000	1366.	1366.	45952.	1379.	45952.
697.500	1375.	1375.	46638.	1389.	46638.
698.000	1384.	1384.	47327.	1398.	47327.
698.500	1393.	1393.	48022.	1407.	48022.
699.000	1402.	1402.	48720.	1416.	48720.
699.500	1411.	1411.	49424.	1425.	49424.
700.000	1420.	1420.	50131.	1434.	50131.


984'
W.S.
X - SECTION # 7
RIVIÈRE DES ROCHERS
9 JULY 1970 Q = 58,900 C.F.S.
40'
680'
670'
660'
650'
640'
630'
0'
100'
200'
300'
400'
500'
600'
700'
800'
900'
1000'
1100'
REACH 800
CROSS-SECTION 7
DISTANCE 62,400 ft.

REACH 800

CROSS-SECTION 7

DISTANCE 62,400 ft.

LEGEND

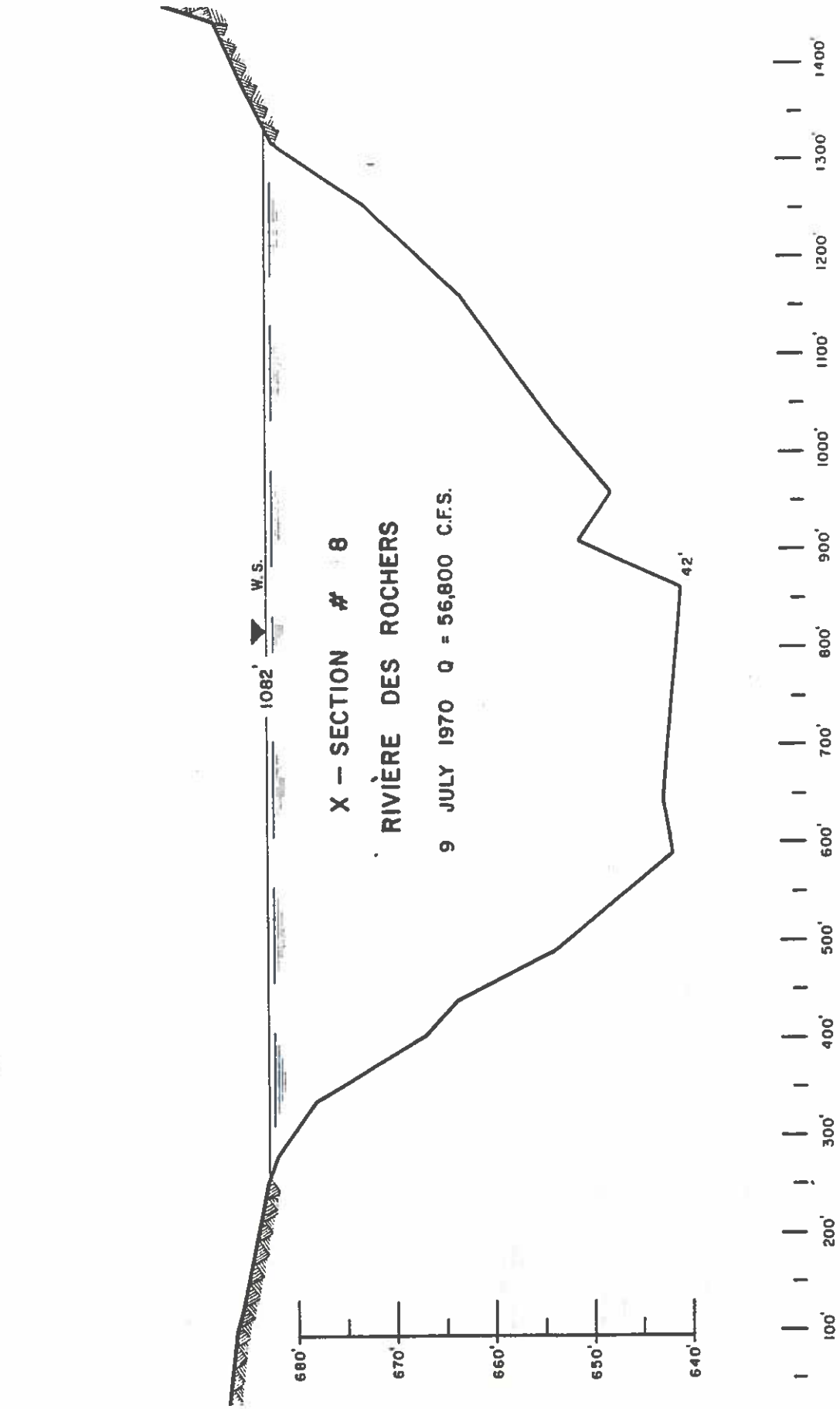
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	769.	769.	12001.	777.	12001.
670.500	777.	777.	12587.	784.	12587.
671.000	784.	784.	12777.	792.	12777.
671.500	792.	792.	13171.	799.	13171.
672.000	799.	799.	13569.	807.	13569.
672.500	806.	806.	13970.	814.	13970.
673.000	814.	814.	14375.	822.	14375.
673.500	821.	821.	14784.	829.	14784.
674.000	829.	829.	15197.	837.	15197.
674.500	836.	836.	15613.	844.	15613.
675.000	843.	843.	16033.	852.	16033.
675.500	851.	851.	16456.	859.	16456.
676.000	858.	858.	16884.	867.	16884.
676.500	866.	866.	17315.	874.	17315.
677.000	873.	873.	17749.	882.	17749.
677.500	880.	880.	18188.	889.	18188.
678.000	888.	888.	18630.	897.	18630.
678.500	894.	894.	19075.	903.	19075.
679.000	903.	903.	19524.	912.	19524.
679.500	911.	911.	19978.	920.	19978.
680.000	920.	920.	20435.	929.	20435.
680.500	928.	928.	20897.	937.	20897.
681.000	937.	937.	21364.	946.	21364.
681.500	945.	945.	21834.	954.	21834.
682.000	953.	953.	22309.	963.	22309.
682.500	965.	965.	22788.	975.	22788.
683.000	978.	978.	23274.	988.	23274.
683.500	994.	994.	23767.	1003.	23767.
684.000	1007.	1007.	24267.	1017.	24267.
684.500	1021.	1021.	24774.	1030.	24774.
685.000	1031.	1031.	25287.	1040.	25267.
685.500	1041.	1041.	25805.	1050.	25805.
686.000	1051.	1051.	26328.	1060.	26328.
686.500	1061.	1061.	26856.	1070.	26856.
687.000	1070.	1070.	27389.	1080.	27389.
687.500	1088.	1088.	27927.	1098.	27927.
688.000	1124.	1124.	28479.	1134.	28479.
688.500	1139.	1139.	29047.	1149.	29047.
689.000	1141.	1141.	29617.	1152.	29617.
689.500	1144.	1144.	30188.	1155.	30188.
690.000	1146.	1146.	30761.	1157.	30761.
690.500	1149.	1149.	31335.	1160.	31335.
691.000	1151.	1151.	31910.	1163.	31910.
691.500	1176.	1176.	32495.	1188.	32495.
692.000	1195.	1195.	33089.	1207.	33089.
692.500	1200.	1200.	33688.	1212.	33688.
693.000	1204.	1204.	34289.	1216.	34289.
693.500	1208.	1208.	34892.	1221.	34892.
694.000	1213.	1213.	35497.	1225.	35497.
694.500	1217.	1217.	36104.	1230.	36104.
695.000	1221.	1221.	36714.	1234.	36714.
695.500	1226.	1226.	37326.	1239.	37326.
696.000	1230.	1230.	37940.	1243.	37940.
696.500	1234.	1234.	38556.	1248.	38556.
697.000	1239.	1239.	39174.	1252.	39174.
697.500	1243.	1243.	39795.	1257.	39795.
698.000	1248.	1248.	40417.	1261.	40417.
698.500	1252.	1252.	41042.	1266.	41042.
699.000	1256.	1256.	41669.	1270.	41669.
699.500	1261.	1261.	42298.	1275.	42298.
700.000	1265.	1265.	42930.	1279.	42930.

REACH 800

CROSS-SECTION 8

DISTANCE 64,860 ft.



REACH 800

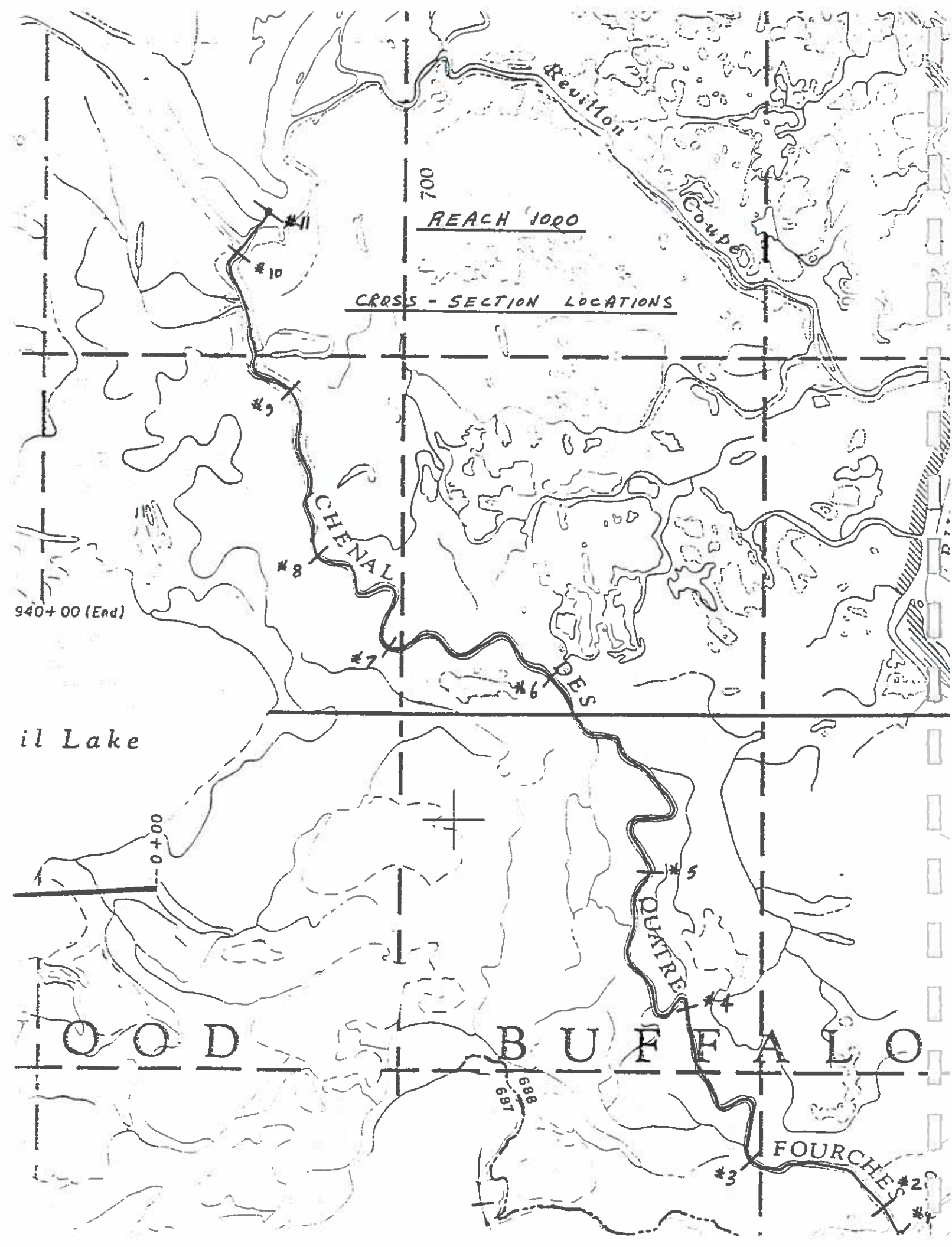
CROSS-SECTION 8

DISTANCE 64,860 ft.

LEGEND

E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	841.	841.	15774.	845.	15774.
670.500	849.	849.	16197.	853.	16197.
671.000	856.	856.	16623.	860.	16623.
671.500	864.	864.	17053.	868.	17053.
672.000	871.	871.	17487.	876.	17487.
672.500	879.	879.	17924.	883.	17924.
673.000	886.	886.	18365.	891.	18365.
673.500	893.	893.	18810.	898.	18810.
674.000	899.	899.	19258.	904.	19258.
674.500	906.	906.	19709.	910.	19709.
675.000	912.	912.	20164.	917.	20164.
675.500	918.	918.	20621.	923.	20621.
676.000	925.	925.	21082.	930.	21082.
676.500	931.	931.	21546.	936.	21546.
677.000	938.	938.	22013.	943.	22013.
677.500	944.	944.	22484.	949.	22484.
678.000	950.	950.	22957.	956.	22957.
678.500	961.	961.	23435.	967.	23435.
679.000	972.	972.	23919.	978.	23919.
679.500	983.	983.	24408.	989.	24408.
680.000	994.	994.	24902.	1000.	24902.
680.500	1005.	1005.	25402.	1011.	25402.
681.000	1016.	1016.	25907.	1022.	25907.
681.500	1027.	1027.	26418.	1033.	26418.
682.000	1038.	1038.	26934.	1044.	26934.
682.500	1057.	1057.	27458.	1063.	27458.
683.000	1080.	1080.	27992.	1086.	27992.
683.500	1113.	1113.	28540.	1119.	28540.
684.000	1146.	1146.	29105.	1152.	29105.
684.500	1180.	1180.	29686.	1185.	29686.
685.000	1213.	1213.	30284.	1219.	30284.
685.500	1246.	1246.	30899.	1252.	30899.
686.000	1279.	1279.	31531.	1285.	31531.
686.500	1320.	1320.	32179.	1326.	32179.
687.000	1376.	1376.	32853.	1382.	32853.
687.500	1408.	1408.	33551.	1415.	33551.
688.000	1426.	1426.	34260.	1432.	34260.
688.500	1438.	1438.	34976.	1445.	34976.
689.000	1446.	1446.	35698.	1453.	35698.
689.500	1453.	1453.	36423.	1460.	36423.
690.000	1461.	1461.	37151.	1467.	37151.
690.500	1468.	1468.	37883.	1474.	37883.
691.000	1475.	1475.	38619.	1482.	38619.
691.500	1483.	1483.	39359.	1489.	39359.
692.000	1498.	1498.	40103.	1505.	40103.
692.500	1519.	1519.	40857.	1526.	40857.
693.000	1540.	1540.	41622.	1547.	41622.
693.500	1556.	1556.	42396.	1563.	42396.
694.000	1567.	1567.	43177.	1574.	43177.
694.500	1577.	1577.	43963.	1584.	43963.
695.000	1587.	1587.	44754.	1595.	44754.
695.500	1598.	1598.	45550.	1605.	45550.
696.000	1608.	1608.	46351.	1615.	46351.
696.500	1618.	1618.	47158.	1626.	47158.
697.000	1629.	1629.	47970.	1636.	47970.
697.500	1639.	1639.	48787.	1647.	48787.
698.000	1650.	1650.	49609.	1657.	49609.
698.500	1660.	1660.	50436.	1668.	50436.
699.000	1670.	1670.	51269.	1678.	51269.
699.500	1681.	1681.	52107.	1688.	52107.
700.000	1691.	1691.	52950.	1699.	52950.


Revillon
Coupe
700
REACH 1000
CROSS - SECTION LOCATIONS
#11
#10
#9
#8
#7
#6
#5
#4
#3
#2
#1
CHENAL
DES
QUATRE
FOURCHES
940+00 (End)
0+00
il Lake
OOD
BUFFALO
688
687

REACH NUMBER - 1000

DESCRIPTION - Chenal des Quatre Fourches

REACH LENGTH - 144,513

UPSTREAM NODE - 8

DOWNSTREAM NODE - 9

CROSS-SECTION - 11

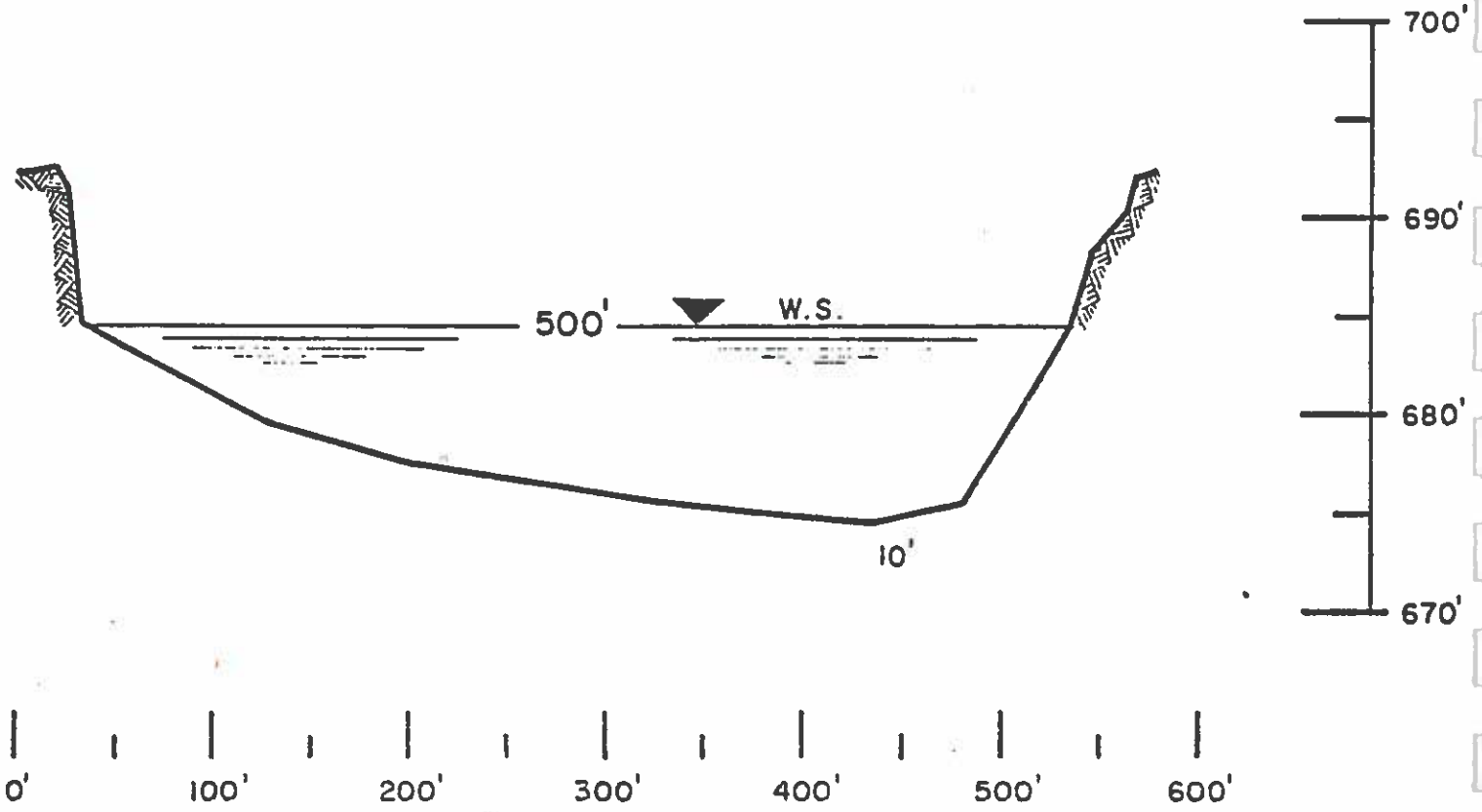
Section Number	Distance from Upstream Node (ft)
1	0
2	2,851
3	17,741
4	34,637
5	52,219
6	77,563
7	94,459
8	108,926
9	124,027
10	140,131
11	144,513

REMARKS: These cross-sections were surveyed by the Technical Services Division of Alberta Environment in 1970. Cross-section 2 was transposed to the beginning of the reach and relabelled as cross-section 1 and cross-section 10 was transposed to the end of the reach and was relabelled as cross-section 11.

REACH 1000

CROSS-SECTION 1

DISTANCE 0 ft.



X — SECTION

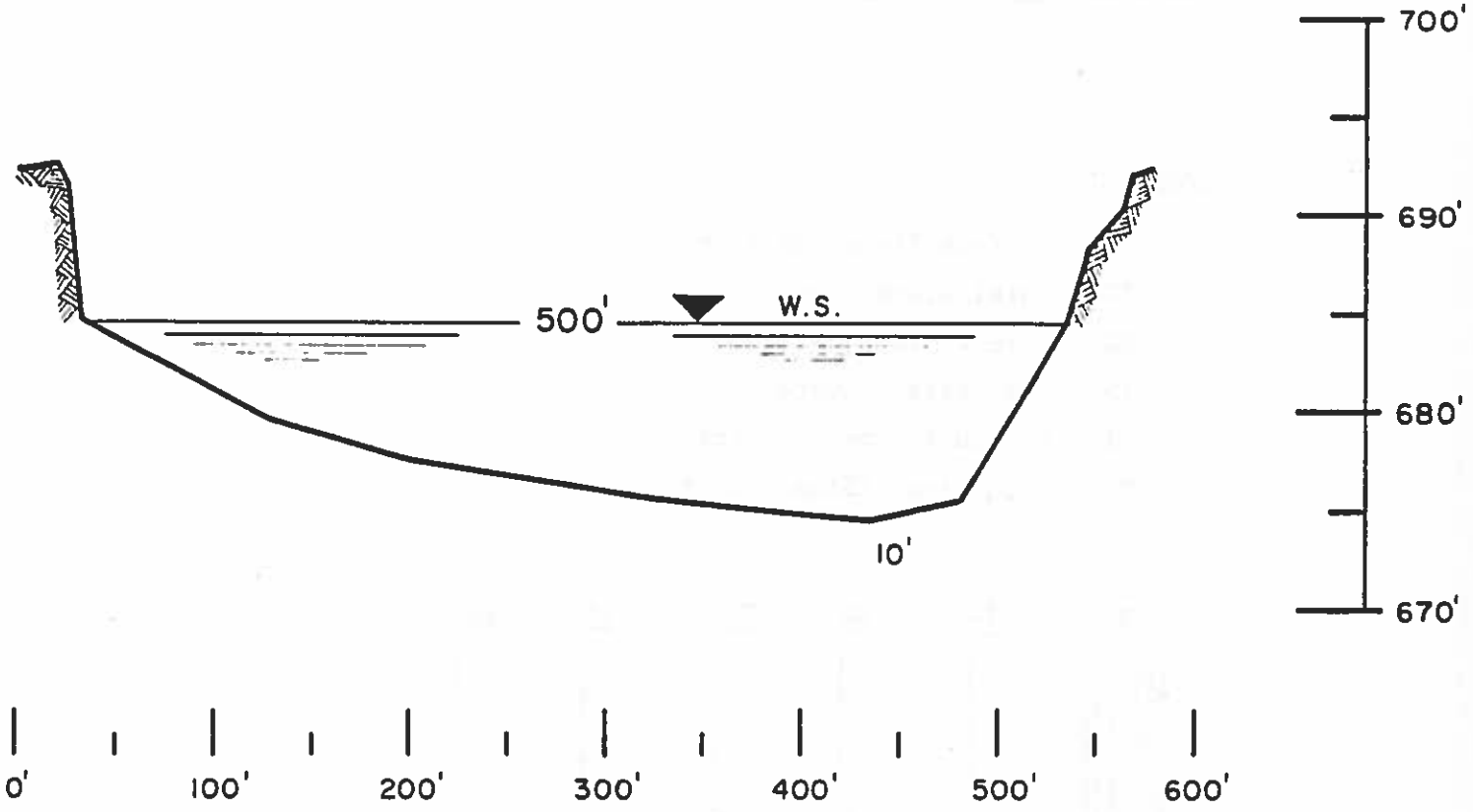
CHENAL DES QUATRE FOURCHES

11 JULY 1970 Q = 5,100 C.F.S.

REACH 1000

CROSS-SECTION 2

DISTANCE 2851 ft.



X — SECTION

CHENAL DES QUATRE FOURCHES

11 JULY 1970 Q = 5,100 C.F.S.

REACH 1000

CROSS-SECTION 1

DISTANCE 0 ft.

LEGEND

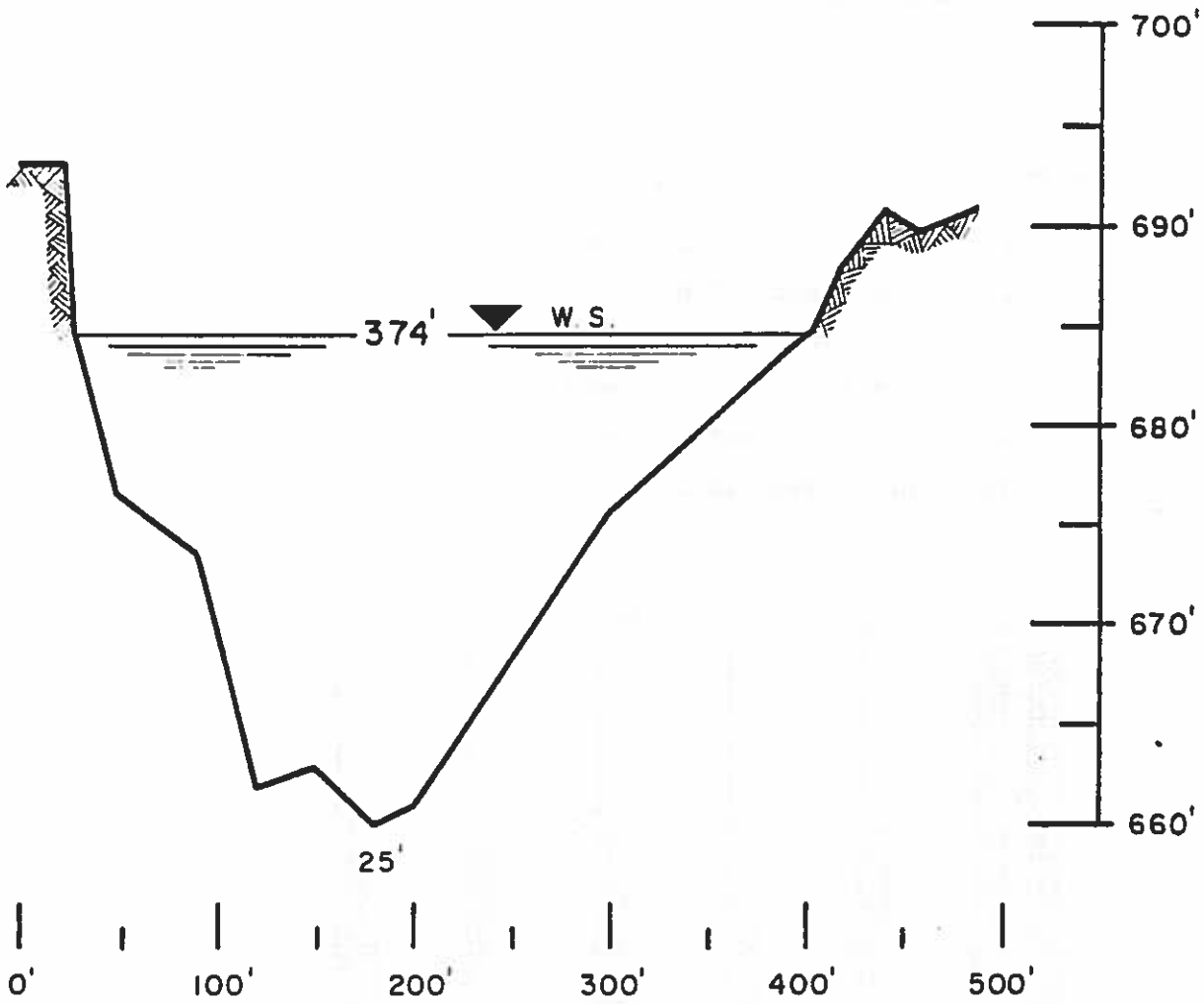
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	1.	1.	1.	1.	1.
670.500	1.	1.	1.	1.	1.
671.000	1.	1.	1.	1.	1.
671.500	1.	1.	1.	1.	1.
672.000	1.	1.	1.	1.	1.
672.500	1.	1.	1.	1.	1.
673.000	1.	1.	1.	1.	1.
673.500	1.	1.	1.	1.	1.
674.000	1.	1.	1.	1.	1.
674.500	1.	1.	1.	1.	1.
675.000	98.	98.	24.	98.	24.
675.500	150.	150.	86.	150.	86.
676.000	184.	184.	170.	184.	170.
676.500	217.	217.	270.	218.	270.
677.000	251.	251.	387.	251.	387.
677.500	285.	285.	521.	285.	521.
678.000	309.	309.	670.	310.	670.
678.500	331.	331.	830.	332.	830.
679.000	353.	353.	1002.	354.	1002.
679.500	375.	375.	1184.	376.	1184.
680.000	388.	388.	1375.	388.	1375.
680.500	400.	400.	1572.	401.	1572.
681.000	413.	413.	1775.	413.	1775.
681.500	425.	425.	1984.	426.	1984.
682.000	437.	437.	2200.	438.	2200.
682.500	450.	450.	2422.	450.	2422.
683.000	462.	462.	2650.	463.	2650.
683.500	474.	474.	2883.	475.	2883.
684.000	486.	486.	3124.	487.	3124.
684.500	498.	498.	3370.	499.	3370.
685.000	502.	502.	3620.	503.	3620.
685.500	504.	504.	3872.	506.	3572.
686.000	506.	506.	4125.	508.	4125.
686.500	508.	508.	4378.	510.	4378.
687.000	510.	510.	4633.	513.	4633.
687.500	512.	512.	4889.	515.	4889.
688.000	514.	514.	5145.	517.	5145.
688.500	518.	518.	5403.	521.	5403.
689.000	523.	523.	5663.	526.	5663.
689.500	527.	527.	5926.	530.	5926.
690.000	532.	532.	6190.	535.	6190.
690.500	536.	536.	6457.	540.	6457.
691.000	539.	539.	6726.	543.	6726.
691.500	541.	541.	6996.	546.	6996.
692.000	545.	545.	7267.	549.	7267.
692.500	548.	548.	7540.	552.	7540.
693.000	551.	551.	7815.	556.	7815.
693.500	554.	554.	8091.	559.	8091.
694.000	558.	558.	8369.	563.	8369.
694.500	561.	561.	8649.	566.	8649.
695.000	564.	564.	8930.	569.	8930.
695.500	568.	568.	9213.	573.	9213.
696.000	571.	571.	9498.	577.	9498.
696.500	575.	575.	9784.	581.	9784.
697.000	578.	578.	10073.	584.	10073.
697.500	582.	582.	10363.	588.	10363.
698.000	586.	586.	10655.	592.	10655.
698.500	589.	589.	10948.	596.	10948.
699.000	593.	593.	11244.	599.	11244.
699.500	596.	596.	11541.	603.	11541.
700.000	600.	600.	11840.	607.	11840.

REACH 1000

CROSS-SECTION 3

DISTANCE 17,741 ft.



X — SECTION

CHENAL DES QUATRE FOURCHES

10 JULY 1970 Q = 5,100 C.F.S.

REACH 1000

CROSS-SECTION 2

DISTANCE 2851 ft.

LEGEND

E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	1.	1.	1.	1.	1.
670.500	1.	1.	1.	1.	1.
671.000	1.	1.	1.	1.	1.
671.500	1.	1.	1.	1.	1.
672.000	1.	1.	1.	1.	1.
672.500	1.	1.	1.	1.	1.
673.000	1.	1.	1.	1.	1.
673.500	1.	1.	1.	1.	1.
674.000	1.	1.	1.	1.	1.
674.500	1.	1.	1.	1.	1.
675.000	98.	98.	24.	98.	24.
675.500	150.	150.	86.	150.	86.
676.000	184.	184.	170.	184.	170.
676.500	217.	217.	270.	218.	270.
677.000	251.	251.	387.	251.	387.
677.500	285.	285.	521.	285.	521.
678.000	309.	309.	670.	310.	670.
678.500	331.	331.	830.	332.	830.
679.000	353.	353.	1002.	354.	1002.
679.500	375.	375.	1184.	376.	1184.
680.000	388.	388.	1375.	388.	1375.
680.500	400.	400.	1572.	401.	1572.
681.000	413.	413.	1775.	413.	1775.
681.500	425.	425.	1984.	426.	1984.
682.000	437.	437.	2200.	438.	2200.
682.500	450.	450.	2422.	450.	2422.
683.000	462.	462.	2650.	463.	2650.
683.500	474.	474.	2883.	475.	2883.
684.000	486.	486.	3124.	487.	3124.
684.500	498.	498.	3370.	499.	3370.
685.000	502.	502.	3620.	503.	3620.
685.500	504.	504.	3872.	506.	3872.
686.000	506.	506.	4125.	508.	4125.
686.500	508.	508.	4378.	510.	4378.
687.000	510.	510.	4633.	513.	4633.
687.500	512.	512.	4889.	515.	4889.
688.000	514.	514.	5145.	517.	5145.
688.500	518.	518.	5403.	521.	5403.
689.000	523.	523.	5663.	526.	5663.
689.500	527.	527.	5926.	530.	5926.
690.000	532.	532.	6190.	535.	6190.
690.500	536.	536.	6457.	540.	6457.
691.000	539.	539.	6726.	543.	6726.
691.500	541.	541.	6996.	546.	6996.
692.000	545.	545.	7267.	549.	7267.
692.500	548.	548.	7540.	552.	7540.
693.000	551.	551.	7815.	556.	7815.
693.500	554.	554.	8091.	559.	8091.
694.000	558.	558.	8369.	563.	8369.
694.500	561.	561.	8649.	566.	8649.
695.000	564.	564.	8930.	569.	8930.
695.500	568.	568.	9213.	573.	9213.
696.000	571.	571.	9498.	577.	9498.
696.500	575.	575.	9784.	581.	9784.
697.000	578.	578.	10073.	584.	10073.
697.500	582.	582.	10363.	588.	10363.
698.000	586.	586.	10655.	592.	10655.
698.500	589.	589.	10948.	596.	10948.
699.000	593.	593.	11244.	599.	11244.
699.500	596.	596.	11541.	603.	11541.
700.000	600.	600.	11840.	607.	11840.

REACH 1000

CROSS-SECTION 3

DISTANCE 17,741 ft.

LEGEND

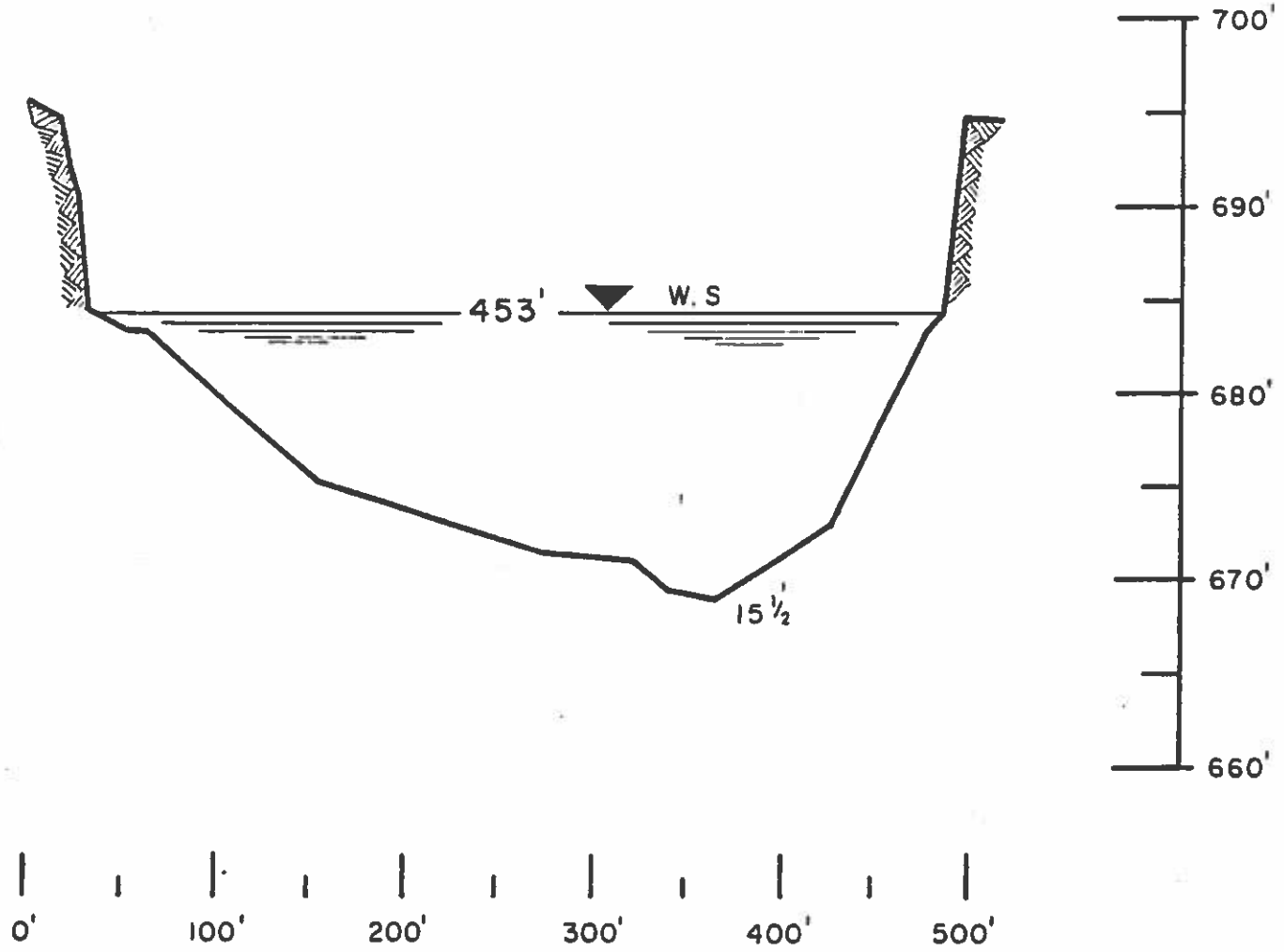
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	167.	167.	1130.	169.	1130.
670.500	171.	171.	1215.	174.	1215.
671.000	176.	176.	1301.	179.	1301.
671.500	180.	180.	1390.	183.	1390.
672.000	185.	185.	1482.	188.	1482.
672.500	190.	190.	1575.	193.	1575.
673.000	194.	194.	1671.	198.	1671.
673.500	200.	200.	1770.	203.	1770.
674.000	211.	211.	1872.	214.	1872.
674.500	221.	221.	1980.	225.	1980.
675.000	232.	232.	2093.	235.	2093.
675.500	243.	243.	2212.	247.	2212.
676.000	256.	256.	2337.	260.	2337.
676.500	265.	265.	2468.	269.	2468.
677.000	272.	272.	2602.	276.	2602.
677.500	279.	279.	2740.	283.	2740.
678.000	286.	286.	2881.	290.	2881.
678.500	293.	293.	3026.	297.	3026.
679.000	300.	300.	3174.	304.	3174.
679.500	307.	307.	3326.	311.	3326.
680.000	314.	314.	3481.	318.	3481.
680.500	321.	321.	3640.	325.	3640.
681.000	328.	328.	3802.	332.	3802.
681.500	334.	334.	3967.	339.	3967.
682.000	341.	341.	4136.	346.	4136.
682.500	348.	348.	4309.	353.	4309.
683.000	355.	355.	4484.	360.	4484.
683.500	363.	363.	4664.	368.	4664.
684.000	370.	370.	4847.	376.	4847.
684.500	376.	376.	5034.	382.	5034.
685.000	379.	379.	5222.	385.	5222.
685.500	381.	381.	5412.	387.	5412.
686.000	384.	384.	5603.	390.	5603.
686.500	386.	386.	5796.	393.	5796.
687.000	389.	389.	5990.	396.	5990.
687.500	392.	392.	6185.	399.	6185.
688.000	396.	396.	6381.	404.	6381.
688.500	400.	400.	6580.	408.	6580.
689.000	404.	404.	6781.	413.	6781.
689.500	413.	413.	6984.	422.	6984.
690.000	441.	441.	7198.	450.	7198.
690.500	463.	463.	7424.	472.	7424.
691.000	464.	464.	7656.	474.	7656.
691.500	466.	466.	7889.	476.	7889.
692.000	467.	467.	8122.	478.	8122.
692.500	469.	469.	8356.	480.	8356.
693.000	471.	471.	8591.	482.	8591.
693.500	473.	473.	8827.	485.	8827.
694.000	475.	475.	9064.	487.	9064.
694.500	477.	477.	9302.	490.	9302.
695.000	480.	480.	9541.	492.	9541.
695.500	482.	482.	9782.	495.	9782.
696.000	484.	484.	10023.	497.	10023.
696.500	487.	487.	10266.	500.	10266.
697.000	489.	489.	10510.	503.	10510.
697.500	492.	492.	10756.	505.	10756.
698.000	494.	494.	11002.	508.	11002.
698.500	497.	497.	11250.	511.	11250.
699.000	499.	499.	11499.	513.	11499.
699.500	502.	502.	11749.	516.	11749.
700.000	504.	504.	12000.	519.	12000.

REACH 1000

CROSS-SECTION 4

DISTANCE 34,637 ft.



X — SECTION

CHENAL DES QUATRE FOURCHES

10 JULY 1970 Q = 5,100 C.F.S.

REACH 1000

CROSS-SECTION 4

DISTANCE 34,637 ft.

LEGEND

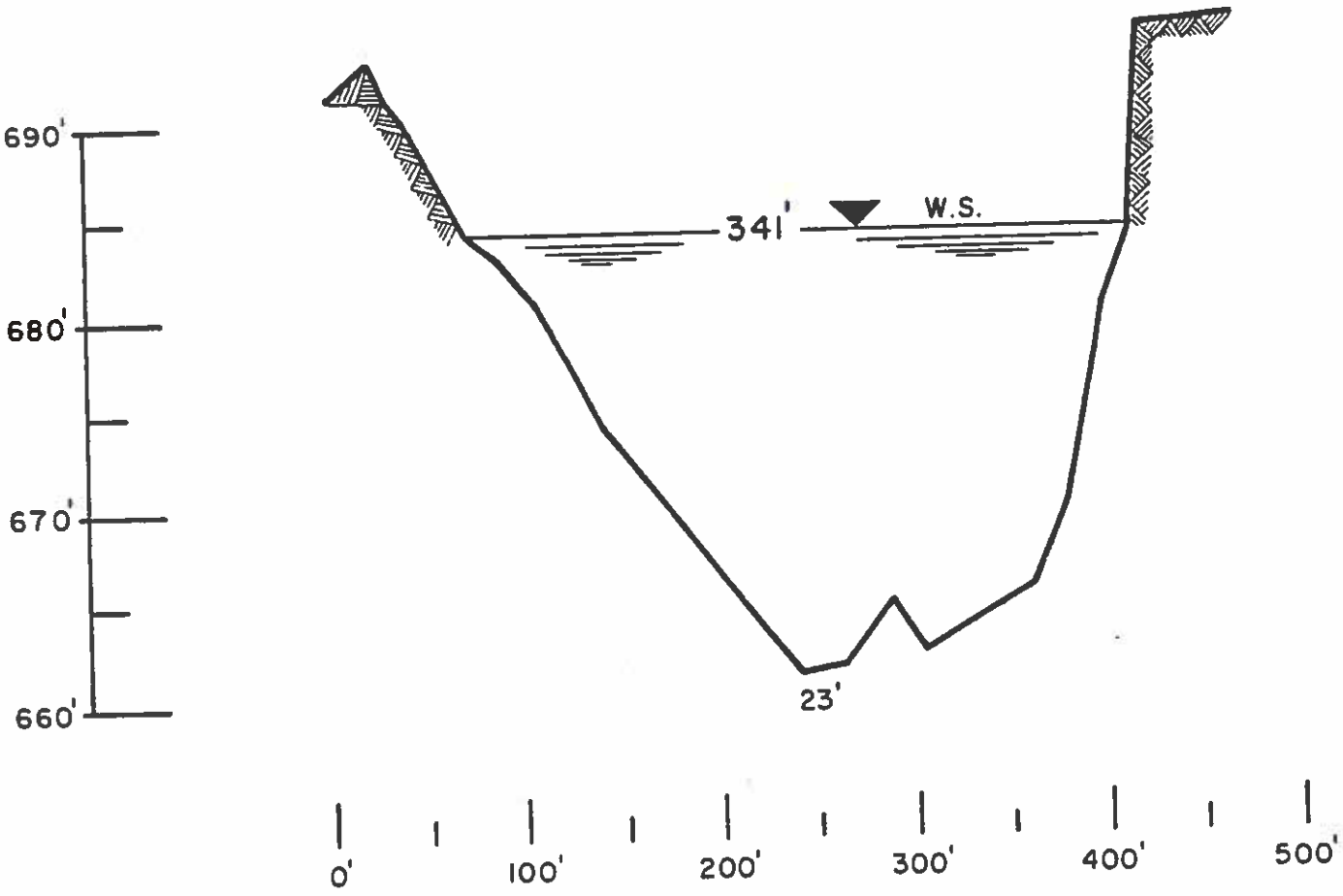
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	50.	50.	31.	50.	31.
670.500	63.	63.	60.	64.	60.
671.000	77.	77.	95.	77.	95.
671.500	136.	136.	150.	136.	150.
672.000	160.	160.	224.	160.	224.
672.500	184.	184.	310.	184.	310.
673.000	206.	206.	408.	207.	408.
673.500	225.	225.	515.	225.	515.
674.000	244.	244.	633.	244.	633.
674.500	262.	262.	759.	263.	759.
675.000	281.	281.	895.	282.	895.
675.500	289.	289.	1038.	290.	1038.
676.000	297.	297.	1184.	298.	1184.
676.500	305.	305.	1335.	306.	1335.
677.000	313.	313.	1489.	314.	1489.
677.500	321.	321.	1648.	322.	1648.
678.000	329.	329.	1810.	330.	1810.
678.500	337.	337.	1976.	338.	1976.
679.000	345.	345.	2147.	346.	2147.
679.500	353.	353.	2321.	354.	2321.
680.000	361.	361.	2499.	362.	2499.
680.500	369.	369.	2682.	370.	2682.
681.000	376.	376.	2868.	378.	2868.
681.500	384.	384.	3058.	386.	3058.
682.000	392.	392.	3252.	394.	3252.
682.500	400.	400.	3450.	402.	3450.
683.000	408.	408.	3652.	410.	3652.
683.500	427.	427.	3860.	429.	3860.
684.000	442.	442.	4078.	443.	4078.
684.500	452.	452.	4302.	454.	4302.
685.000	453.	453.	4528.	456.	4528.
685.500	455.	455.	4755.	457.	4755.
686.000	456.	456.	4983.	459.	4983.
686.500	457.	457.	5211.	461.	5211.
687.000	458.	458.	5440.	462.	5440.
687.500	460.	460.	5670.	464.	5670.
688.000	461.	461.	5900.	465.	5900.
688.500	462.	462.	6130.	467.	6130.
689.000	463.	463.	6362.	468.	6362.
689.500	464.	464.	6593.	469.	6593.
690.000	465.	465.	6825.	471.	6825.
690.500	466.	466.	7058.	472.	7058.
691.000	467.	467.	7291.	474.	7291.
691.500	470.	470.	7525.	477.	7525.
692.000	473.	473.	7761.	481.	7761.
692.500	474.	474.	7998.	482.	7998.
693.000	475.	475.	8235.	484.	8235.
693.500	476.	476.	8473.	485.	8473.
694.000	477.	477.	8712.	487.	8712.
694.500	479.	479.	8951.	488.	8951.
695.000	512.	512.	9201.	522.	9201.
695.500	526.	526.	9460.	535.	9460.
696.000	535.	535.	9726.	545.	9726.
696.500	544.	544.	9995.	554.	9995.
697.000	554.	554.	10270.	564.	10270.
697.500	563.	563.	10549.	573.	10549.
698.000	573.	573.	10833.	583.	10833.
698.500	582.	582.	11122.	592.	11122.
699.000	591.	591.	11415.	601.	11418.
699.500	601.	601.	11713.	611.	11713.
700.000	610.	610.	12016.	620.	12016.

REACH 1000

CROSS-SECTION 5

DISTANCE 52,219 ft.



X – SECTION

CHENAL DES QUATRE FOURCHES

10 JULY 1970 Q = 5,100 C.F.S.

REACH 1000

CROSS-SECTION 5

DISTANCE 52,219 ft.

LEGEND

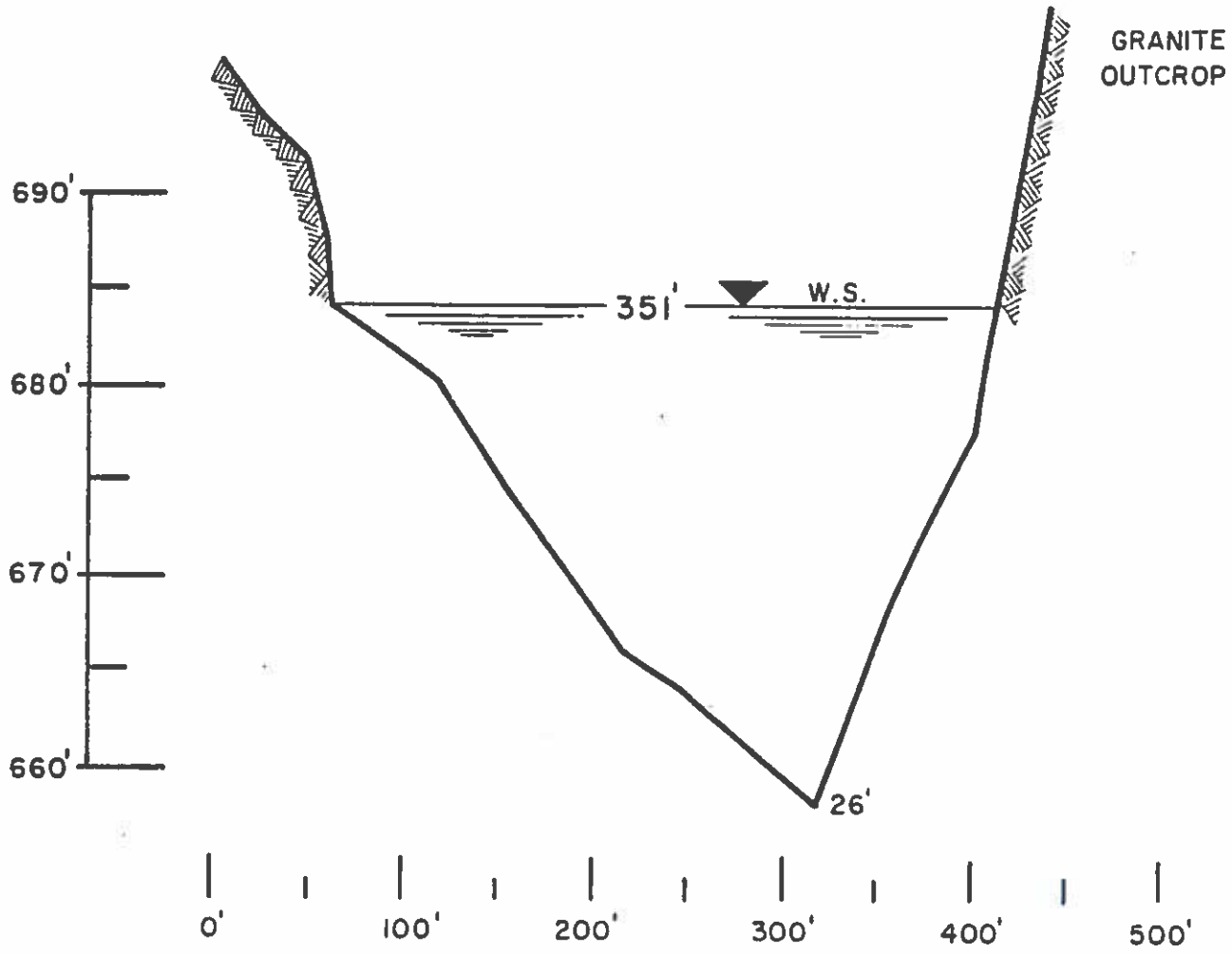
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	205.	205.	1108.	207.	1108.
670.500	210.	210.	1212.	212.	1212.
671.000	215.	215.	1318.	217.	1318.
671.500	219.	219.	1427.	221.	1427.
672.000	224.	224.	1538.	226.	1538.
672.500	229.	229.	1651.	231.	1651.
673.000	233.	233.	1767.	236.	1767.
673.500	238.	238.	1884.	241.	1884.
674.000	243.	243.	2005.	246.	2005.
674.500	247.	247.	2127.	250.	2127.
675.000	251.	251.	2252.	254.	2252.
675.500	254.	254.	2378.	258.	2378.
676.000	258.	258.	2506.	261.	2506.
676.500	261.	261.	2636.	265.	2636.
677.000	264.	264.	2767.	268.	2767.
677.500	268.	268.	2900.	272.	2900.
678.000	271.	271.	3035.	275.	3035.
678.500	274.	274.	3171.	279.	3171.
679.000	278.	278.	3309.	283.	3309.
679.500	281.	281.	3449.	286.	3449.
680.000	285.	285.	3590.	290.	3590.
680.500	289.	289.	3733.	294.	3733.
681.000	294.	294.	3879.	299.	3879.
681.500	301.	301.	4028.	306.	4028.
682.000	308.	308.	4180.	313.	4180.
682.500	315.	315.	4335.	320.	4335.
683.000	321.	321.	4494.	327.	4494.
683.500	329.	329.	4657.	335.	4657.
684.000	337.	337.	4823.	342.	4823.
684.500	343.	343.	4993.	349.	4993.
685.000	346.	346.	5166.	352.	5166.
685.500	349.	349.	5339.	356.	5339.
686.000	352.	352.	5514.	359.	5514.
686.500	355.	355.	5691.	363.	5691.
687.000	358.	358.	5870.	366.	5870.
687.500	361.	361.	6050.	370.	6050.
688.000	365.	365.	6231.	373.	6231.
688.500	368.	368.	6414.	377.	6414.
689.000	371.	371.	6599.	380.	6599.
689.500	374.	374.	6785.	384.	6785.
690.000	377.	377.	6973.	387.	6973.
690.500	380.	380.	7162.	391.	7162.
691.000	383.	383.	7353.	394.	7353.
691.500	386.	386.	7545.	397.	7545.
692.000	388.	388.	7738.	400.	7738.
692.500	391.	391.	7933.	404.	7933.
693.000	394.	394.	8130.	407.	8130.
693.500	396.	396.	8327.	409.	8327.
694.000	397.	397.	8525.	411.	8525.
694.500	398.	398.	8724.	412.	8724.
695.000	450.	450.	8931.	464.	8931.
695.500	455.	455.	9157.	470.	9157.
696.000	460.	460.	9386.	475.	9386.
696.500	465.	465.	9617.	480.	9617.
697.000	470.	470.	9851.	485.	9851.
697.500	475.	475.	10087.	490.	10087.
698.000	480.	480.	10326.	495.	10326.
698.500	485.	485.	10567.	500.	10567.
699.000	490.	490.	10811.	505.	10811.
699.500	495.	495.	11057.	510.	11057.
700.000	500.	500.	11306.	515.	11306.

REACH 1000

CROSS-SECTION 6

DISTANCE 77,563 ft.



X — SECTION

CHENAL DES QUATRE FOURCHES

10 JULY 1970 Q = 5,100 C.F.S.

REACH 1000

CROSS-SECTION 6

DISTANCE 77.563 ft.

LEGEND

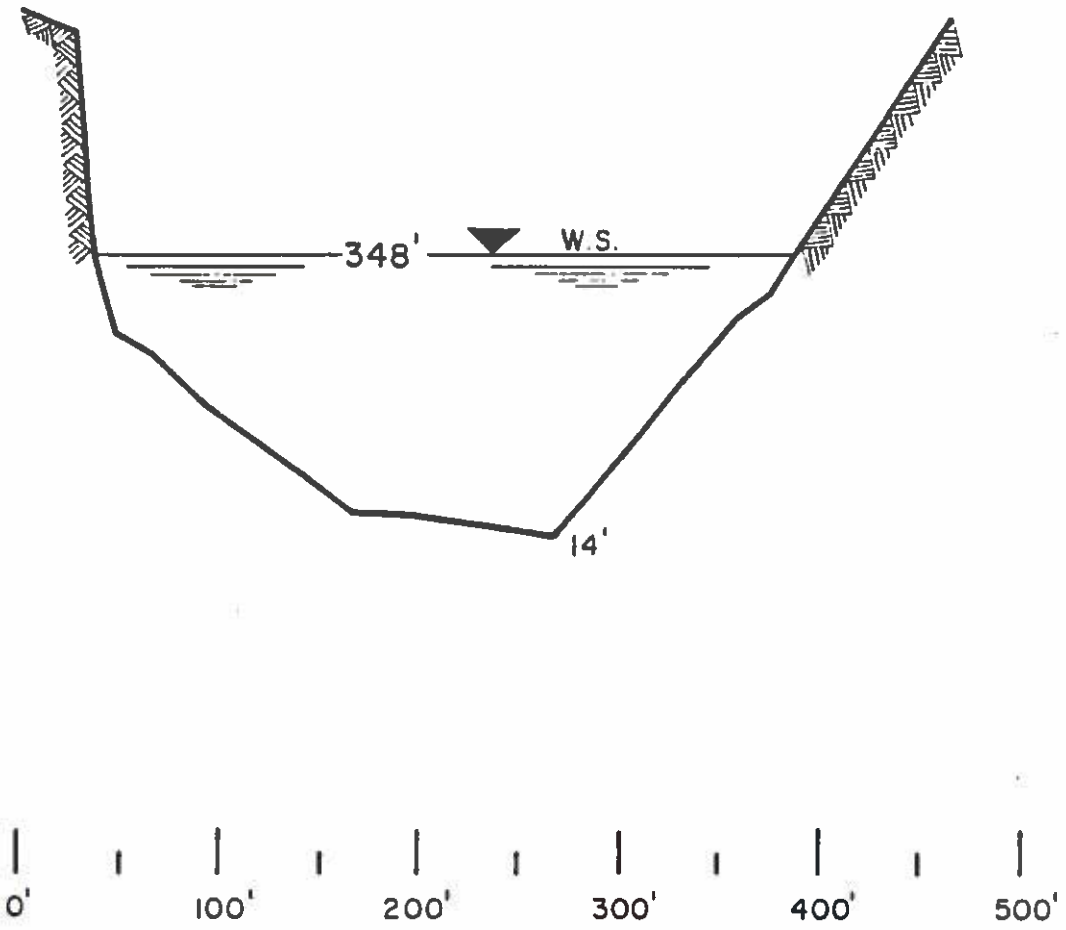
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	174.	174.	1084.	177.	1084.
670.500	181.	181.	1173.	183.	1173.
671.000	187.	187.	1265.	189.	1265.
671.500	193.	193.	1360.	195.	1360.
672.000	199.	199.	1458.	202.	1458.
672.500	205.	205.	1559.	208.	1559.
673.000	211.	211.	1663.	214.	1663.
673.500	218.	218.	1771.	220.	1771.
674.000	224.	224.	1881.	227.	1881.
674.500	230.	230.	1994.	233.	1994.
675.000	236.	236.	2111.	239.	2111.
675.500	242.	242.	2230.	245.	2230.
676.000	247.	247.	2352.	250.	2352.
676.500	253.	253.	2478.	256.	2478.
677.000	259.	259.	2606.	262.	2606.
677.500	265.	265.	2736.	268.	2736.
678.000	269.	269.	2870.	272.	2670.
678.500	273.	273.	3005.	276.	3005.
679.000	277.	277.	3142.	281.	3142.
679.500	281.	281.	3282.	285.	3282.
680.000	285.	285.	3425.	289.	3425.
680.500	290.	290.	3566.	294.	3566.
681.000	297.	297.	3713.	302.	3713.
681.500	305.	305.	3864.	309.	3864.
682.000	312.	312.	4018.	317.	4018.
682.500	319.	319.	4176.	325.	4176.
683.000	327.	327.	4337.	332.	4337.
683.500	334.	334.	4502.	340.	4502.
684.000	343.	343.	4672.	349.	4672.
684.500	351.	351.	4846.	357.	4846.
685.000	352.	352.	5021.	359.	5021.
685.500	353.	353.	5198.	360.	5198.
686.000	355.	355.	5375.	362.	5375.
686.500	356.	356.	5552.	364.	5552.
687.000	357.	357.	5731.	365.	5731.
687.500	358.	358.	5910.	367.	5910.
688.000	359.	359.	6089.	368.	6089.
688.500	362.	362.	6269.	371.	6269.
689.000	364.	364.	6451.	373.	6451.
689.500	366.	366.	6633.	376.	6633.
690.000	368.	368.	6817.	378.	6817.
690.500	371.	371.	7001.	381.	7001.
691.000	373.	373.	7187.	383.	7187.
691.500	375.	375.	7374.	385.	7374.
692.000	377.	377.	7562.	388.	7562.
692.500	382.	382.	7752.	393.	7752.
693.000	389.	389.	7945.	400.	7945.
693.500	396.	396.	8141.	408.	8141.
694.000	403.	403.	8341.	415.	8341.
694.500	408.	408.	8544.	420.	8544.
695.000	412.	412.	8749.	423.	8749.
695.500	416.	416.	8956.	428.	8956.
696.000	420.	420.	9165.	432.	9165.
696.500	425.	425.	9377.	437.	9377.
697.000	428.	428.	9590.	441.	9590.
697.500	432.	432.	9805.	445.	9805.
698.000	437.	437.	10023.	450.	10023.
698.500	442.	442.	10242.	455.	10242.
699.000	447.	447.	10465.	460.	10465.
699.500	452.	452.	10689.	465.	10689.
700.000	457.	457.	10917.	471.	10917.

REACH 1000

CROSS-SECTION 7

DISTANCE 94,459 ft.



X – SECTION

CHENAL DES QUATRE FOURCHES

10 JULY 1970 Q = 5,100 C.F.S.

REACH 1000

CROSS-SECTION 7

DISTANCE 94,459 ft.

LEGEND

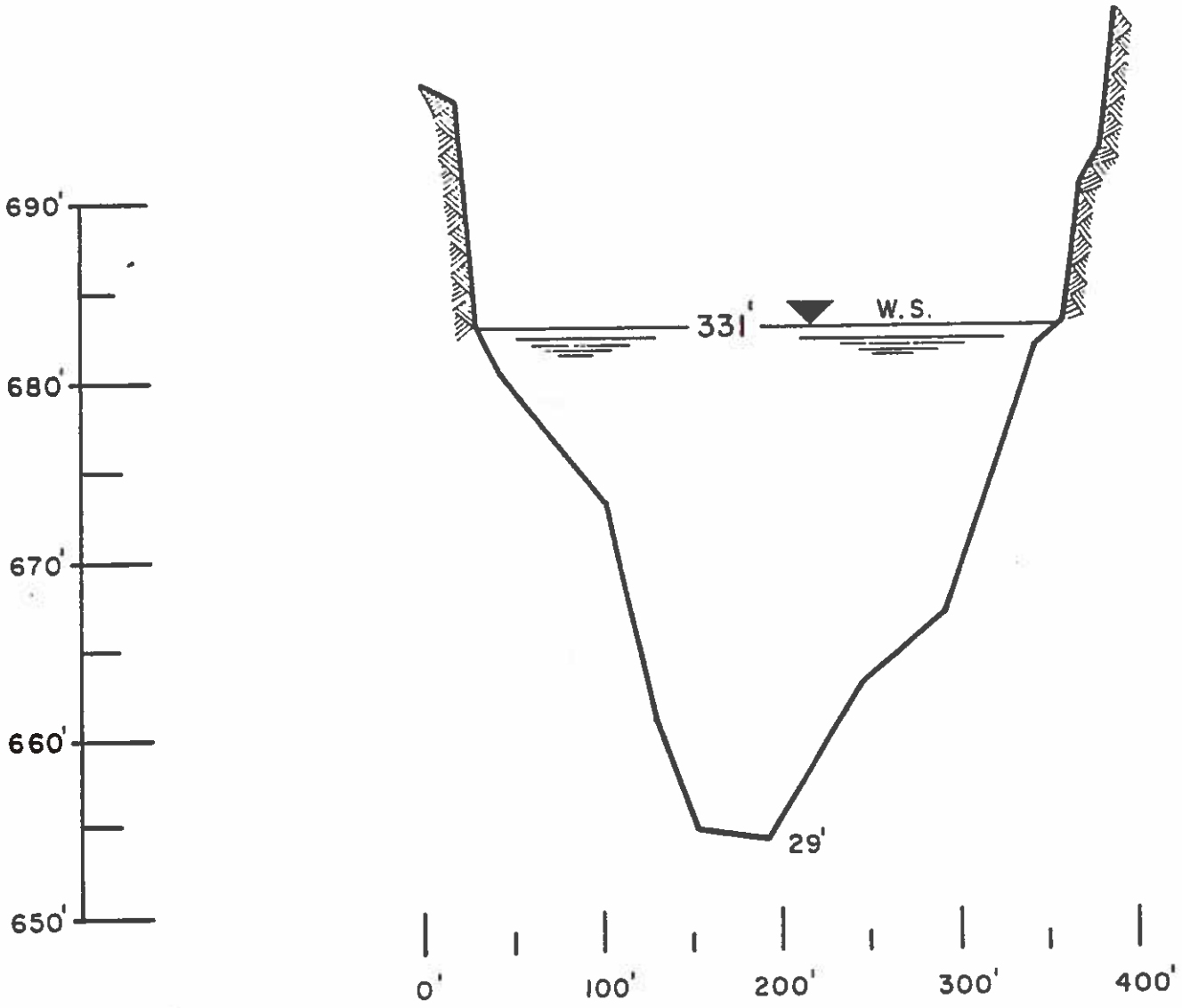
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	1.	1.	1.	1.	1.
670.500	8.	8.	0.	8.	0.
671.000	48.	48.	14.	48.	14.
671.500	108.	108.	49.	108.	49.
672.000	119.	119.	106.	119.	106.
672.500	130.	130.	168.	130.	168.
673.000	141.	141.	236.	141.	236.
673.500	152.	152.	310.	152.	310.
674.000	163.	163.	388.	163.	388.
674.500	174.	174.	472.	174.	472.
675.000	185.	185.	562.	185.	562.
675.500	195.	195.	657.	196.	657.
676.000	206.	206.	757.	207.	757.
676.500	217.	217.	863.	218.	863.
677.000	228.	228.	974.	229.	974.
677.500	239.	239.	1091.	239.	1091.
678.000	249.	249.	1213.	249.	1213.
678.500	258.	258.	1340.	259.	1340.
679.000	268.	268.	1471.	269.	1471.
679.500	278.	278.	1607.	278.	1607.
680.000	293.	293.	1750.	294.	1750.
680.500	306.	306.	1900.	307.	1900.
681.000	312.	312.	2055.	313.	2055.
681.500	319.	319.	2212.	320.	2212.
682.000	326.	326.	2374.	327.	2374.
682.500	333.	333.	2538.	334.	2538.
683.000	338.	338.	2706.	340.	2706.
683.500	342.	342.	2876.	343.	2876.
684.000	346.	346.	3048.	347.	3048.
684.500	349.	349.	3222.	351.	3222.
685.000	353.	353.	3397.	355.	3397.
685.500	357.	357.	3575.	359.	3575.
686.000	361.	361.	3754.	364.	3754.
686.500	365.	365.	3936.	368.	3936.
687.000	368.	368.	4119.	372.	4119.
687.500	372.	372.	4304.	376.	4304.
688.000	376.	376.	4491.	380.	4491.
688.500	380.	380.	4680.	384.	4680.
689.000	384.	384.	4871.	388.	4871.
689.500	387.	387.	5064.	392.	5064.
690.000	391.	391.	5258.	396.	5258.
690.500	395.	395.	5455.	400.	5455.
691.000	399.	399.	5653.	404.	5653.
691.500	402.	402.	5853.	408.	5853.
692.000	406.	406.	6055.	413.	6055.
692.500	410.	410.	6259.	417.	6259.
693.000	414.	414.	6465.	421.	6465.
693.500	417.	417.	6673.	425.	6673.
694.000	421.	421.	6882.	428.	6882.
694.500	424.	424.	7094.	432.	7094.
695.000	428.	428.	7307.	436.	7307.
695.500	431.	431.	7522.	440.	7522.
696.000	457.	457.	7738.	446.	7738.
696.500	454.	454.	7961.	462.	7961.
697.000	469.	469.	8192.	478.	8192.
697.500	481.	481.	8430.	490.	8430.
698.000	493.	493.	8673.	502.	8673.
698.500	505.	505.	8922.	514.	8922.
699.000	516.	516.	9178.	525.	9178.
699.500	528.	528.	9439.	537.	9439.
700.000	540.	540.	9706.	549.	9706.

REACH 1000

CROSS-SECTION 8

DISTANCE 108,926 ft.



X – SECTION

CHENAL DES QUATRE FOURCHES

10 JULY 1970 Q = 5,100 C.F.S.

REACH 1000

CROSS-SECTION 8

DISTANCE 108.926 ft.

LEGEND

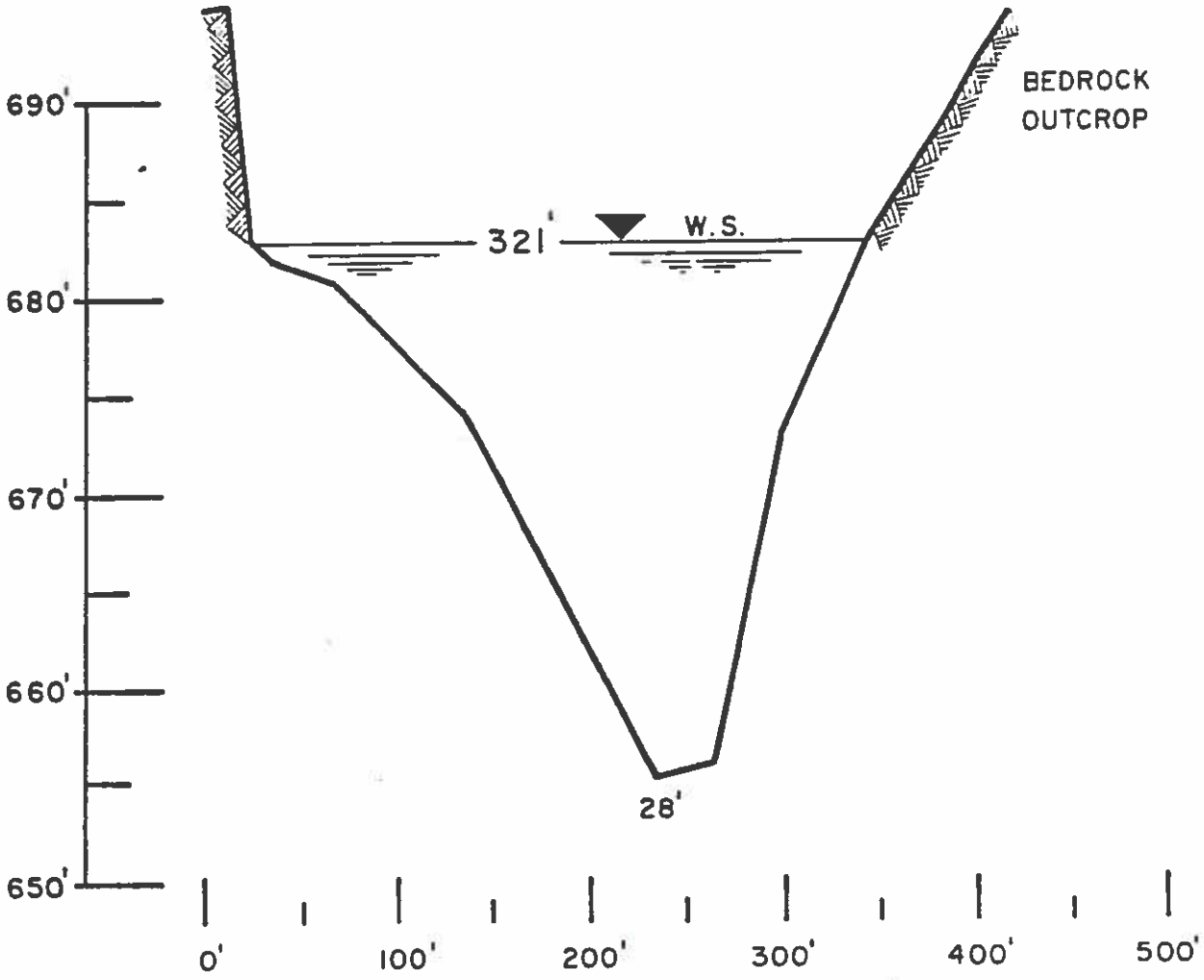
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	195.	195.	1888.	199.	1888.
670.500	198.	198.	1986.	202.	1986.
671.000	200.	200.	2085.	205.	2085.
671.500	203.	203.	2186.	208.	2186.
672.000	206.	206.	2288.	211.	2288.
672.500	208.	208.	2392.	214.	2392.
673.000	211.	211.	2497.	217.	2497.
673.500	216.	216.	2603.	222.	2603.
674.000	222.	222.	2713.	228.	2713.
674.500	228.	228.	2826.	234.	2826.
675.000	234.	234.	2941.	240.	2941.
675.500	240.	240.	3060.	246.	3060.
676.000	246.	246.	3181.	252.	3181.
676.500	252.	252.	3306.	258.	3306.
677.000	258.	258.	3433.	264.	3433.
677.500	264.	264.	3564.	270.	3564.
678.000	270.	270.	3697.	276.	3697.
678.500	275.	275.	3833.	282.	3833.
679.000	281.	281.	3973.	288.	3973.
679.500	287.	287.	4115.	294.	4115.
680.000	293.	293.	4260.	300.	4260.
680.500	297.	297.	4407.	304.	4407.
681.000	302.	302.	4557.	309.	4557.
681.500	306.	306.	4709.	313.	4709.
682.000	310.	310.	4863.	317.	4863.
682.500	319.	319.	5020.	327.	5020.
683.000	328.	328.	5182.	336.	5182.
683.500	332.	332.	5348.	340.	5348.
684.000	333.	333.	5514.	341.	5514.
684.500	334.	334.	5680.	342.	5680.
685.000	335.	335.	5847.	344.	5847.
685.500	336.	336.	6015.	345.	6015.
686.000	337.	337.	6183.	347.	6185.
686.500	338.	338.	6352.	348.	6352.
687.000	339.	339.	6521.	349.	6521.
687.500	340.	340.	6690.	351.	6690.
688.000	340.	340.	6860.	352.	6860.
688.500	341.	341.	7031.	354.	7031.
689.000	342.	342.	7201.	355.	7201.
689.500	343.	343.	7373.	356.	7373.
690.000	344.	344.	7545.	358.	7545.
690.500	345.	345.	7717.	359.	7717.
691.000	346.	346.	7890.	361.	7890.
691.500	349.	349.	8064.	364.	8064.
692.000	353.	353.	8240.	367.	8240.
692.500	356.	356.	8417.	371.	8417.
693.000	358.	358.	8595.	374.	8595.
693.500	359.	359.	8775.	375.	8775.
694.000	360.	360.	8955.	377.	8955.
694.500	361.	361.	9135.	378.	9135.
695.000	363.	363.	9316.	380.	9316.
695.500	364.	364.	9498.	381.	9498.
696.000	371.	371.	9681.	389.	9681.
696.500	383.	383.	9869.	401.	9869.
697.000	392.	392.	10063.	410.	10063.
697.500	400.	400.	10261.	418.	10261.
698.000	408.	408.	10463.	426.	10465.
698.500	416.	416.	10669.	434.	10669.
699.000	424.	424.	10879.	443.	10879.
699.500	432.	432.	11093.	451.	11093.
700.000	440.	440.	11311.	459.	11311.

REACH 1000

CROSS-SECTION 9

DISTANCE 124,027 ft.



X – SECTION

CHENAL DES QUATRE FOURCHES

10 JULY 1970 Q = 5,100 C.F.S.

REACH 1000

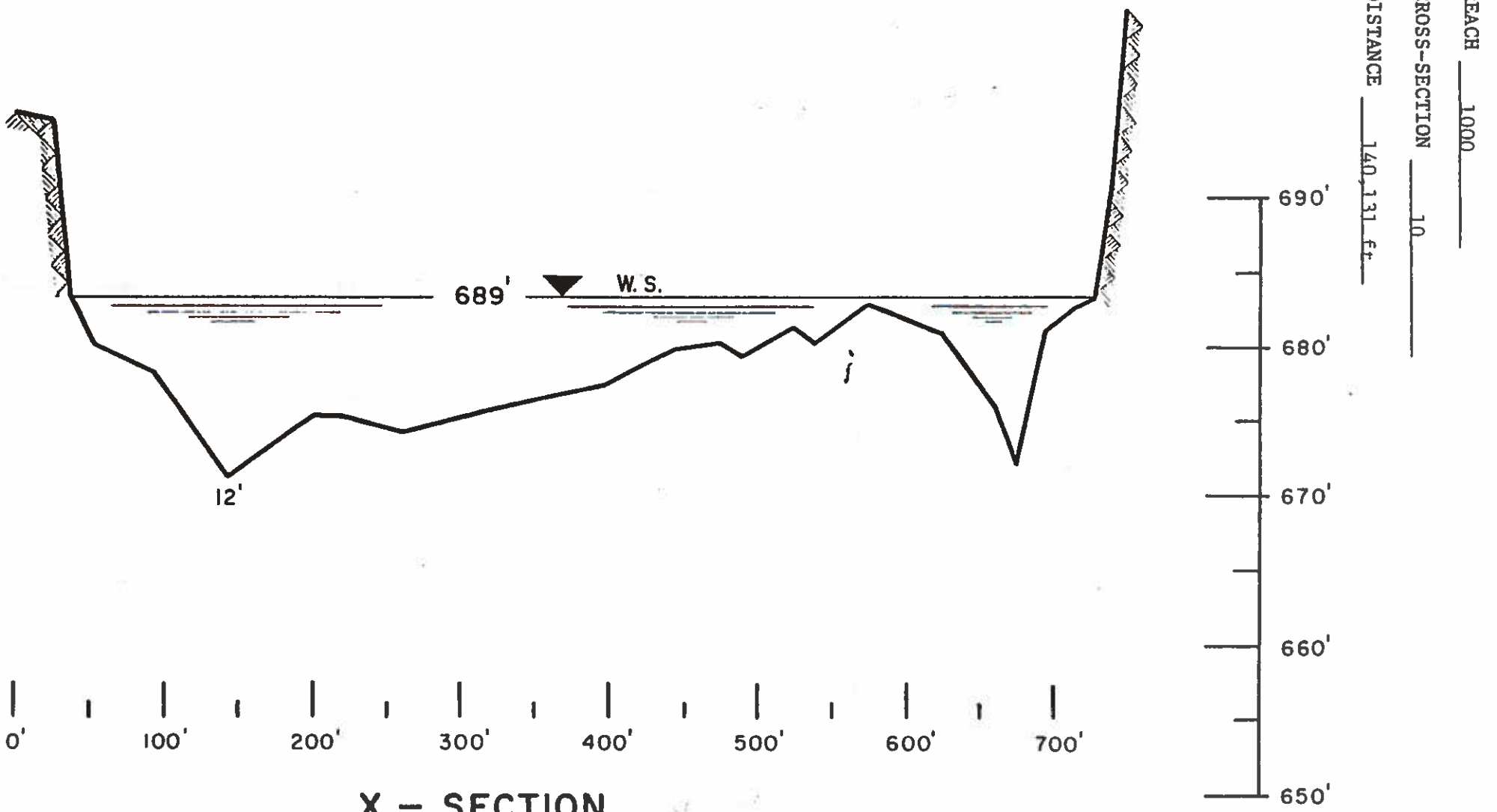
CROSS-SECTION 9

DISTANCE 124,027 ft.

LEGEND

E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	135.	135.	1209.	140.	1209.
670.500	138.	138.	1277.	143.	1277.
671.000	142.	142.	1347.	147.	1347.
671.500	145.	145.	1419.	150.	1419.
672.000	148.	148.	1492.	154.	1492.
672.500	152.	152.	1567.	157.	1567.
673.000	155.	155.	1644.	161.	1644.
673.500	159.	159.	1722.	165.	1722.
674.000	163.	163.	1803.	169.	1803.
674.500	170.	170.	1886.	176.	1886.
675.000	177.	177.	1972.	183.	1972.
675.500	184.	184.	2062.	190.	2062.
676.000	191.	191.	2156.	198.	2156.
676.500	198.	198.	2254.	205.	2254.
677.000	206.	206.	2355.	212.	2355.
677.500	213.	213.	2459.	219.	2459.
678.000	220.	220.	2567.	227.	2567.
678.500	227.	227.	2679.	234.	2679.
679.000	234.	234.	2794.	241.	2794.
679.500	242.	242.	2915.	249.	2913.
680.000	249.	249.	3036.	256.	3036.
680.500	256.	256.	3162.	263.	3162.
681.000	263.	263.	3292.	270.	3292.
681.500	276.	276.	3426.	284.	3426.
682.000	294.	294.	3569.	301.	3569.
682.500	307.	307.	3720.	315.	3720.
683.000	316.	316.	3876.	323.	3876.
683.500	321.	321.	4035.	329.	4035.
684.000	325.	325.	4196.	332.	4196.
684.500	328.	328.	4360.	336.	4360.
685.000	332.	332.	4525.	340.	4525.
685.500	335.	335.	4691.	344.	4691.
686.000	339.	339.	4860.	348.	4860.
686.500	343.	343.	5030.	352.	5030.
687.000	346.	346.	5203.	356.	5203.
687.500	350.	350.	5377.	360.	5377.
688.000	354.	354.	5553.	364.	5553.
688.500	357.	357.	5731.	368.	5731.
689.000	361.	361.	5910.	372.	5910.
689.500	365.	365.	6092.	376.	6092.
690.000	368.	368.	6275.	380.	6275.
690.500	372.	372.	6460.	383.	6460.
691.000	375.	375.	6647.	386.	6647.
691.500	377.	377.	6835.	389.	6835.
692.000	380.	380.	7024.	392.	7024.
692.500	383.	383.	7215.	395.	7215.
693.000	387.	387.	7407.	400.	7407.
693.500	391.	391.	7602.	405.	7602.
694.000	396.	396.	7799.	409.	7799.
694.500	400.	400.	7998.	414.	7998.
695.000	405.	405.	8199.	419.	8199.
695.500	425.	425.	8404.	440.	8404.
696.000	434.	434.	8619.	448.	8619.
696.500	442.	442.	8838.	457.	8838.
697.000	451.	451.	9062.	465.	9062.
697.500	459.	459.	9289.	474.	9289.
698.000	468.	468.	9521.	482.	9521.
698.500	476.	476.	9757.	491.	9757.
699.000	485.	485.	9997.	500.	9997.
699.500	493.	493.	10242.	508.	10242.
700.000	502.	502.	10491.	517.	10491.



REACH 1000

CROSS-SECTION 10

DISTANCE 140,131 ft.

X – SECTION

CHENAL DES QUATRE FOURCHES

10 JULY 1970 Q = 5100 C.F.S.

REACH 1000

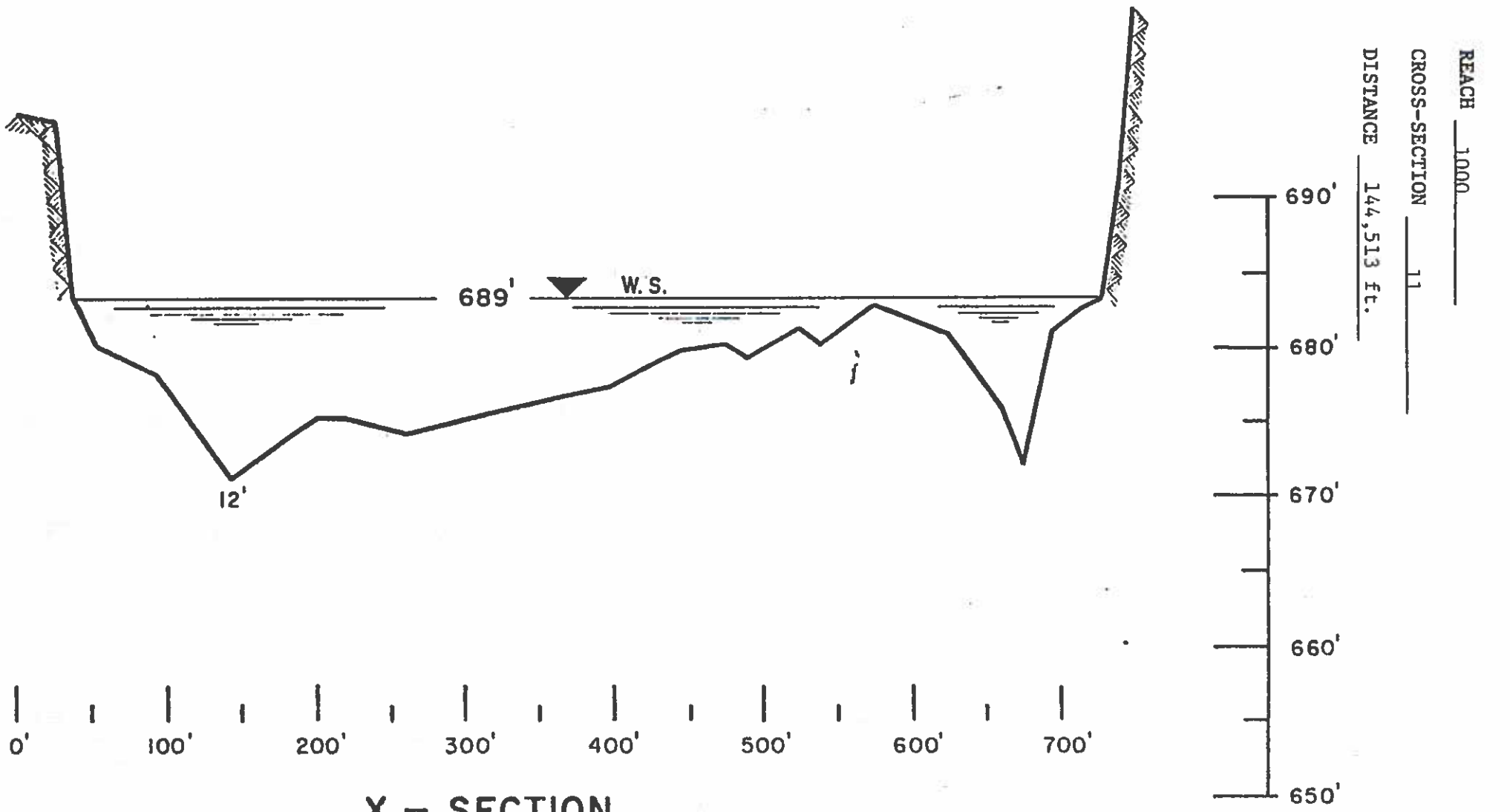
CROSS-SECTION 10

DISTANCE 140,131 ft.

LEGEND

E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	1.	1.	1.	1.	1.
670.500	1.	1.	1.	1.	1.
671.000	1.	1.	1.	1.	1.
671.500	6.	6.	1.	6.	1.
672.000	17.	17.	7.	17.	7.
672.500	31.	31.	19.	31.	19.
673.000	44.	44.	38.	45.	38.
673.500	58.	58.	63.	59.	63.
674.000	72.	72.	96.	73.	96.
674.500	120.	120.	144.	121.	144.
675.000	167.	167.	215.	169.	215.
675.500	224.	224.	315.	226.	315.
676.000	254.	254.	435.	256.	435.
676.500	285.	285.	569.	287.	569.
677.000	316.	316.	720.	318.	720.
677.500	342.	342.	895.	344.	885.
678.000	360.	360.	1061.	363.	1061.
678.500	382.	382.	1246.	385.	1246.
679.000	408.	408.	1443.	410.	1443.
679.500	445.	445.	1655.	448.	1655.
680.000	513.	513.	1892.	516.	1892.
680.500	541.	541.	2155.	544.	2155.
681.000	572.	572.	2433.	576.	2433.
681.500	600.	600.	2727.	604.	2727.
682.000	629.	629.	3034.	653.	3034.
682.500	657.	657.	3355.	661.	3355.
683.000	682.	682.	3691.	686.	3691.
683.500	689.	689.	4034.	693.	4034.
684.000	690.	690.	4379.	695.	4379.
684.500	691.	691.	4724.	696.	4724.
685.000	693.	693.	5070.	698.	5070.
685.500	694.	694.	5417.	700.	5417.
686.000	695.	695.	5764.	701.	5764.
686.500	696.	696.	6112.	703.	6112.
687.000	698.	698.	6460.	704.	6460.
687.500	699.	699.	6809.	706.	6809.
688.000	700.	700.	7159.	708.	7159.
688.500	701.	701.	7510.	709.	7510.
689.000	703.	703.	7861.	711.	7861.
689.500	704.	704.	8212.	712.	8212.
690.000	705.	705.	8565.	714.	8565.
690.500	707.	707.	8918.	716.	8918.
691.000	708.	708.	9271.	717.	9271.
691.500	709.	709.	9625.	719.	9625.
692.000	709.	709.	9980.	720.	9980.
692.500	710.	710.	10335.	721.	10335.
693.000	711.	711.	10690.	723.	10690.
693.500	712.	712.	11046.	724.	11046.
694.000	713.	713.	11402.	725.	11402.
694.500	714.	714.	11759.	727.	11759.
695.000	715.	715.	12117.	728.	12117.
695.500	740.	740.	12480.	754.	12480.
696.000	749.	749.	12853.	762.	12853.
696.500	757.	757.	13229.	771.	13229.
697.000	765.	765.	13609.	779.	13609.
697.500	773.	773.	13994.	788.	13994.
698.000	781.	781.	14382.	796.	14382.
698.500	789.	789.	14775.	804.	14775.
699.000	798.	798.	15172.	813.	15172.
699.500	806.	806.	15573.	821.	15573.
700.000	814.	814.	15978.	830.	15978.



X – SECTION

CHENAL DES QUATRE FOURCHES

10 JULY 1970 Q = 5,100 C.F.S.

REACH 1000

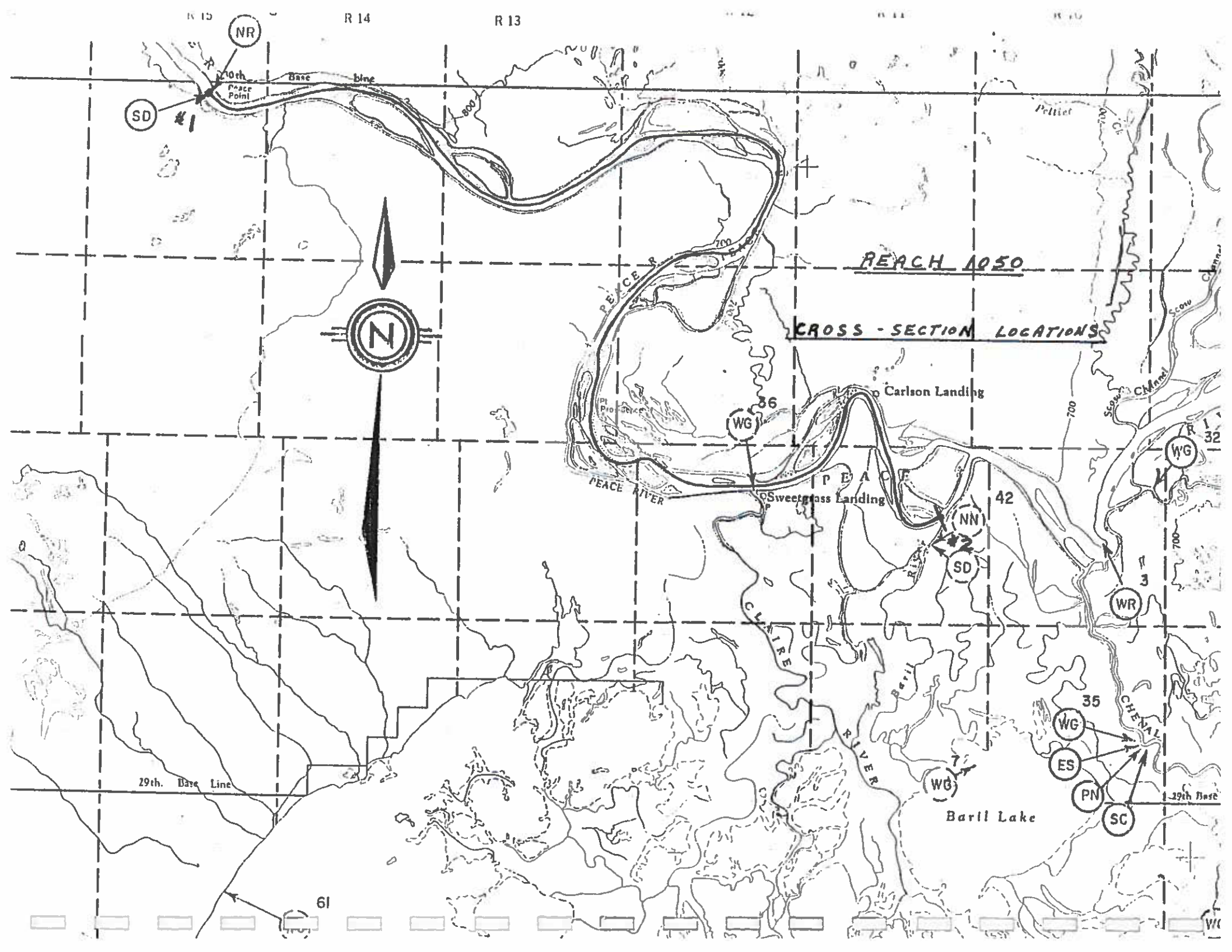
CROSS-SECTION 11

DISTANCE 144,513 ft.

LEGEND

E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

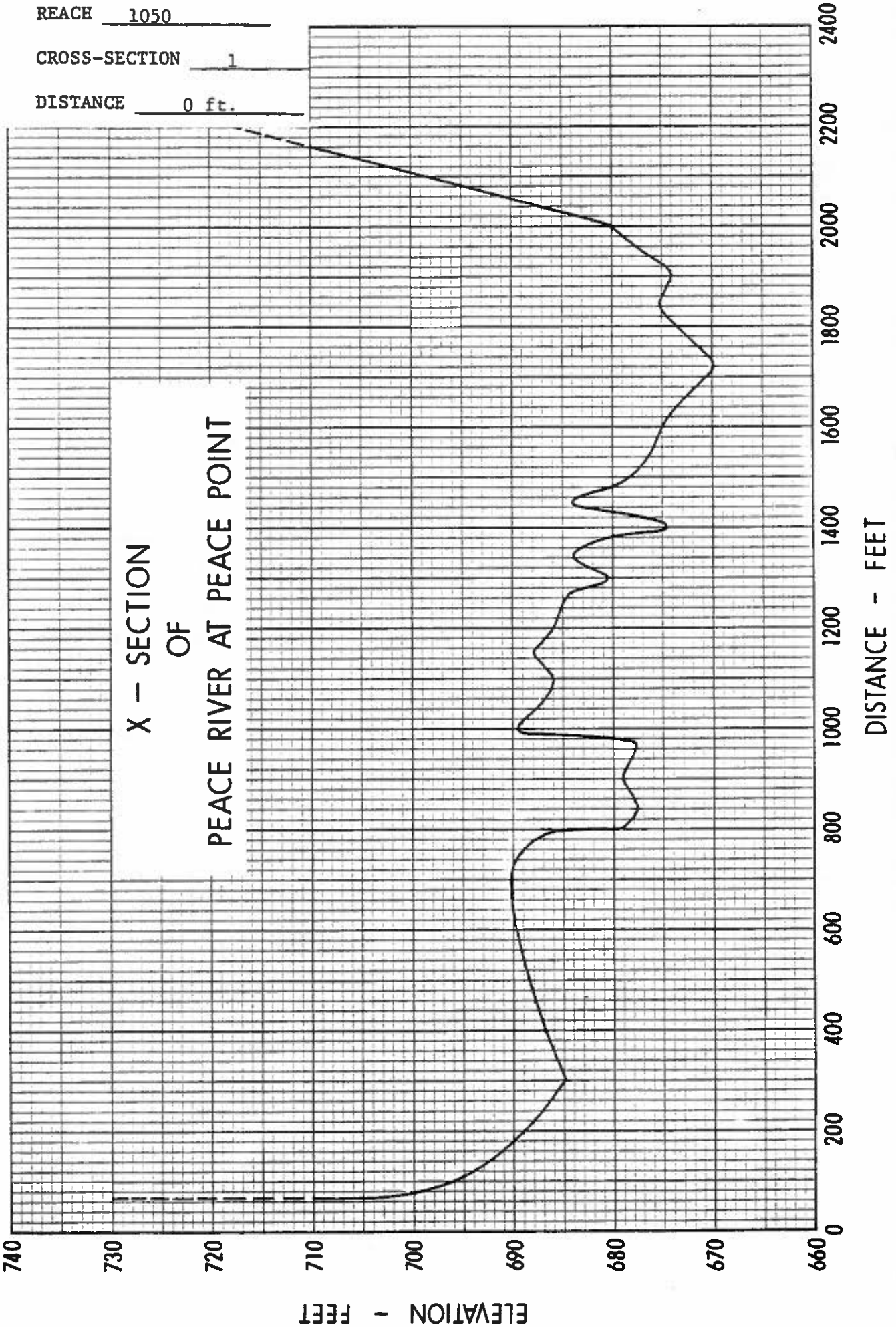
E	TW	CW	CA	WP	TA
670.000	1.	1.	1.	1.	1.
670.500	1.	1.	1.	1.	1.
671.000	1.	1.	1.	1.	1.
671.500	6.	6.	1.	6.	1.
672.000	17.	17.	7.	17.	7.
672.500	31.	31.	19.	31.	19.
673.000	44.	44.	38.	45.	38.
673.500	58.	58.	63.	59.	63.
674.000	72.	72.	96.	73.	96.
674.500	120.	120.	144.	121.	144.
675.000	167.	167.	215.	169.	215.
675.500	224.	224.	315.	226.	315.
676.000	254.	254.	435.	256.	435.
676.500	285.	285.	569.	287.	569.
677.000	316.	316.	720.	318.	720.
677.500	342.	342.	885.	344.	885.
678.000	360.	360.	1061.	363.	1061.
678.500	382.	382.	1246.	385.	1246.
679.000	408.	408.	1443.	410.	1443.
679.500	445.	445.	1655.	448.	1655.
680.000	513.	513.	1892.	516.	1892.
680.500	541.	541.	2155.	544.	2155.
681.000	572.	572.	2433.	576.	2433.
681.500	600.	600.	2727.	604.	2727.
682.000	629.	629.	3034.	633.	3034.
682.500	657.	657.	3355.	661.	3355.
683.000	682.	682.	3691.	686.	3691.
683.500	689.	689.	4034.	693.	4034.
684.000	690.	690.	4379.	695.	4379.
684.500	691.	691.	4724.	696.	4724.
685.000	693.	693.	5070.	698.	5070.
685.500	694.	694.	5417.	700.	5417.
686.000	695.	695.	5764.	701.	5764.
686.500	696.	696.	6112.	703.	6112.
687.000	698.	698.	6460.	704.	6460.
687.500	699.	699.	6809.	706.	6809.
688.000	700.	700.	7159.	708.	7159.
688.500	701.	701.	7510.	709.	7510.
689.000	703.	703.	7861.	711.	7861.
689.500	704.	704.	8212.	713.	8212.
690.000	705.	705.	8565.	714.	8565.
690.500	707.	707.	8918.	716.	8918.
691.000	708.	708.	9271.	717.	9271.
691.500	709.	709.	9625.	719.	9625.
692.000	709.	709.	9980.	720.	9980.
692.500	710.	710.	10335.	721.	10335.
693.000	711.	711.	10690.	723.	10690.
693.500	712.	712.	11046.	724.	11046.
694.000	713.	713.	11402.	725.	11402.
694.500	714.	714.	11759.	727.	11759.
695.000	715.	715.	12117.	728.	12117.
695.500	740.	740.	12480.	754.	12480.
696.000	749.	749.	12853.	762.	12853.
696.500	757.	757.	13229.	771.	13229.
697.000	765.	765.	13609.	779.	13609.
697.500	773.	773.	13994.	788.	13994.
698.000	781.	781.	14382.	796.	14382.
698.500	789.	789.	14775.	804.	14775.
699.000	798.	798.	15172.	813.	15172.
699.500	806.	806.	15573.	821.	15573.
700.000	814.	814.	15978.	830.	15978.


R 15
R 14
R 13
NR
SD #1
10th Base line
Peace Point
REACH 4050
CROSS - SECTION LOCATIONS
N
PEACE RIVER
Carlson Landing
WG 36
Sweetgrass Landing
NN #2
SD
42
WR 3
WG 32
Scow Channel
Pelliet
700
800
CLEARE RIVER
Baril River
Baril Lake
WG 7
WG 35
ES
PN
SC
CHENAL
29th. Base Line
61

REACH 1050

CROSS-SECTION 1

DISTANCE 0 ft.



REACH NUMBER - 1050

DESCRIPTION - Peace River from Peace Point to Baril River

REACH LENGTH - 226,000 feet

UPSTREAM NODE - 11

DOWNSTREAM NODE - 12

CROSS-SECTION - 2

Section Number	Distance from Upstream Node (ft)
1	0
2	226,000

REMARKS: Cross-section 1 was obtained from "Velocity and Cross-Section Data for Selected Alberta Stream Gauging Stations - July 1977" by Water Survey of Canada, Calgary District Office. This section was transposed to the end of the reach, shifted to a new assumed elevation, and was relabelled as cross-section 2.

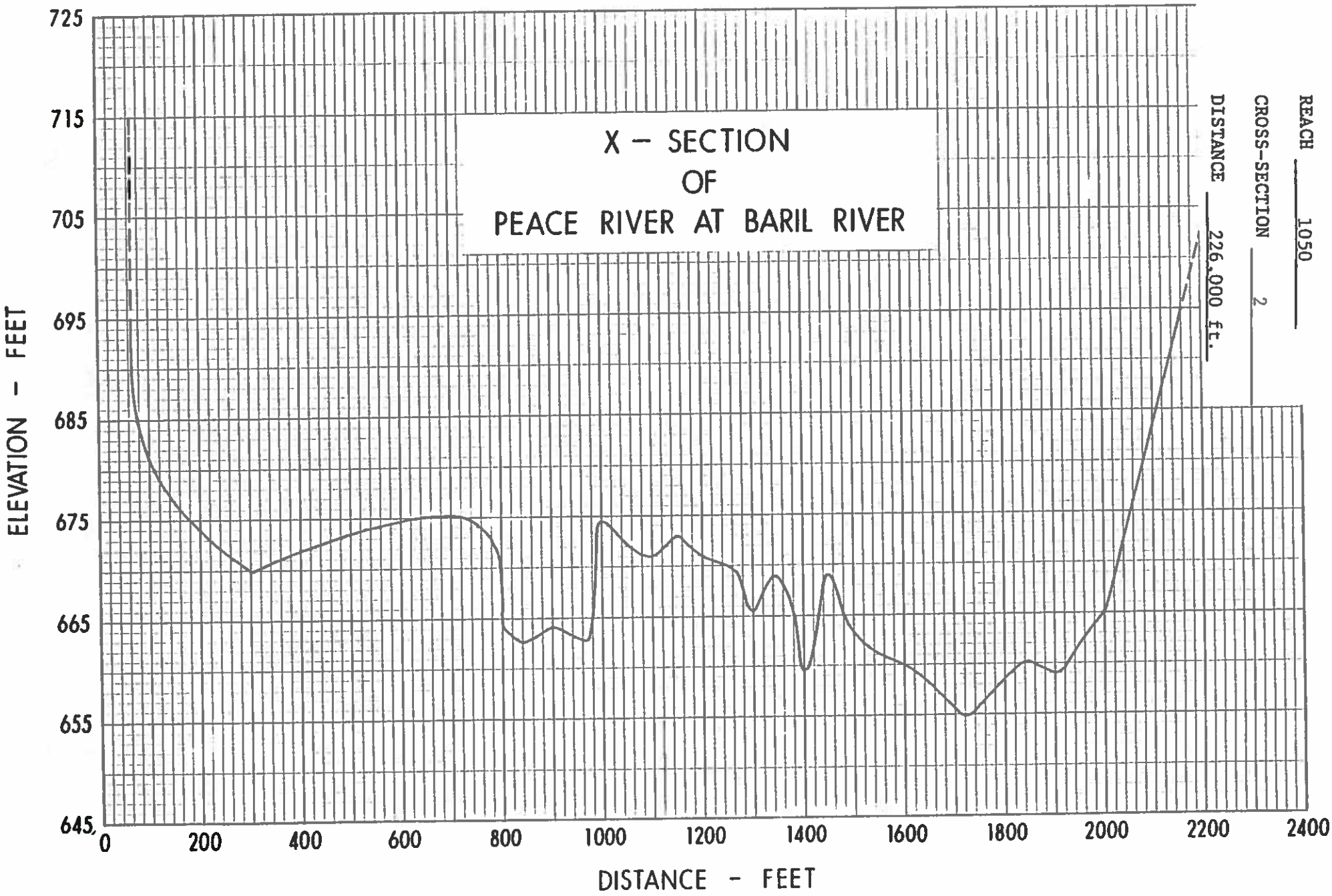
The hydraulic boundary condition for node 11 requires discharge to be specified. Recorded flows for this node may be obtained from hydrometric station 07KC001 - Peace River at Peace Point.

REACH 1050

CROSS-SECTION 1

DISTANCE 0 ft.

ELEVATION	TOP WIDTH	AREA (feet^2)	WETTED PERIMETER
670.0	0.0	0.0	0.0
672.0	100.0	124.0	104.0
674.0	180.0	412.0	188.0
676.0	406.0	1026.0	418.0
678.0	526.0	1970.0	542.0
680.0	744.0	3328.0	764.0
682.0	822.0	4854.0	846.0
684.0	936.0	6616.0	964.0
686.0	1110.0	8642.0	1142.0
688.0	1590.0	11230.0	1626.0
690.0	1876.0	14560.0	1916.0
692.0	1918.0	18316.0	1962.0
694.0	1956.0	22158.0	2004.0
696.0	1986.0	26118.0	2038.0
698.0	2010.0	30034.0	2070.0
700.0	2032.0	34066.0	2092.0
702.0	2048.0	38240.0	2112.0
704.0	2062.0	42276.0	2130.0
706.0	2076.0	46456.0	2148.0
708.0	2084.0	50646.0	2160.0
710.0	2096.0	54778.0	2176.0
712.0	2106.0	58974.0	2190.0
714.0	2116.0	63200.0	2204.0

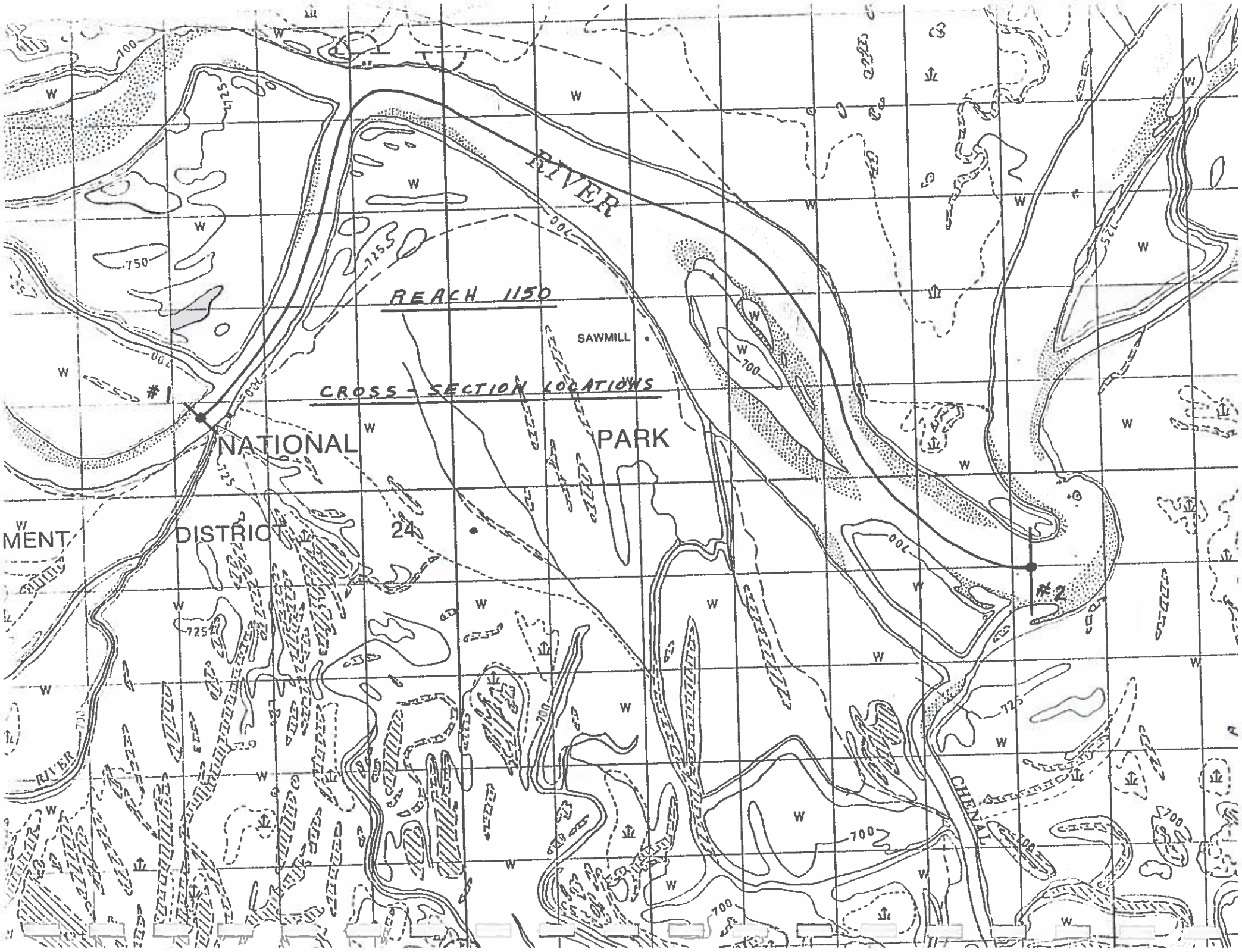

X – SECTION
OF
PEACE RIVER AT BARIL RIVER
REACH 1050
CROSS-SECTION 2
DISTANCE 226,000 ft.
ELEVATION - FEET
725
715
705
695
685
675
665
655
645
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
DISTANCE - FEET

REACH 1050

CROSS-SECTION 2

DISTANCE 226,000 ft.

ELEVATION (feet)	TOP WIDTH (feet)	AREA (feet^2)	WETTED PERIMETER (feet)
670.0	936.0	6616.0	964.0
672.0	1110.0	8642.0	1142.0
674.0	1590.0	11230.0	1626.0
676.0	1876.0	14560.0	1916.0
678.0	1918.0	18316.0	1962.0
680.0	1956.0	22158.0	2004.0
682.0	1986.0	26118.0	2038.0
684.0	2010.0	30034.0	2070.0
686.0	2032.0	34066.0	2092.0
688.0	2048.0	38240.0	2112.0
690.0	2062.0	42276.0	2130.0
692.0	2076.0	46456.0	2148.0
694.0	2084.0	50646.0	2160.0
696.0	2096.0	54778.0	2176.0
698.0	2106.0	58974.0	2190.0
700.0	2116.0	63200.0	2204.0
702.0	2128.0	67382.0	2220.0
704.0	2138.0	71716.0	2234.0
706.0	2150.0	75980.0	2250.0
708.0	2160.0	80398.0	2264.0
710.0	2170.0	84640.0	2278.0
712.0	2180.0	88880.0	2292.0
714.0	2190.0	93340.0	2304.0


RIVER
REACH 1150
SAWMILL
CROSS - SECTION LOCATIONS
#1
#2
NATIONAL
PARK
DISTRICT
24
CHENAL
RIVER

REACH NUMBER - 1150

DESCRIPTION - Peace River from Baril River to Chenal des Quatre Fourches

REACH LENGTH - 43,000 feet

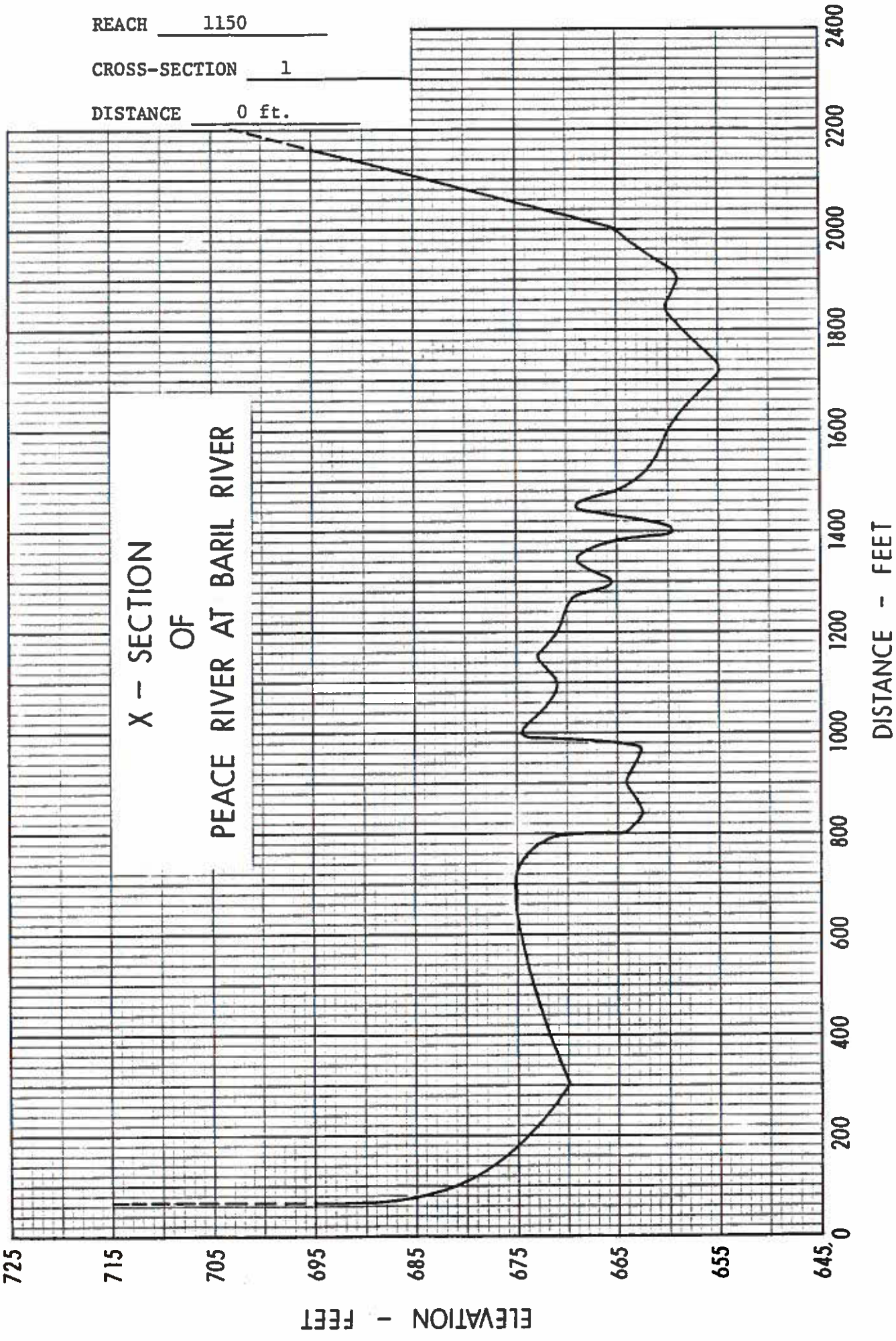
UPSTREAM NODE - 12

DOWNSTREAM NODE - 9

CROSS-SECTION - 2

Section Number	Distance from Upstream Node (ft)
1	0
2	43,000

REMARKS: Cross-section 1 is the same section as cross-section 2 in reach 1050. Cross-section 1 was transposed to the end of the reach, shifted to a new assumed elevation, and was relabelled as cross-section 2.

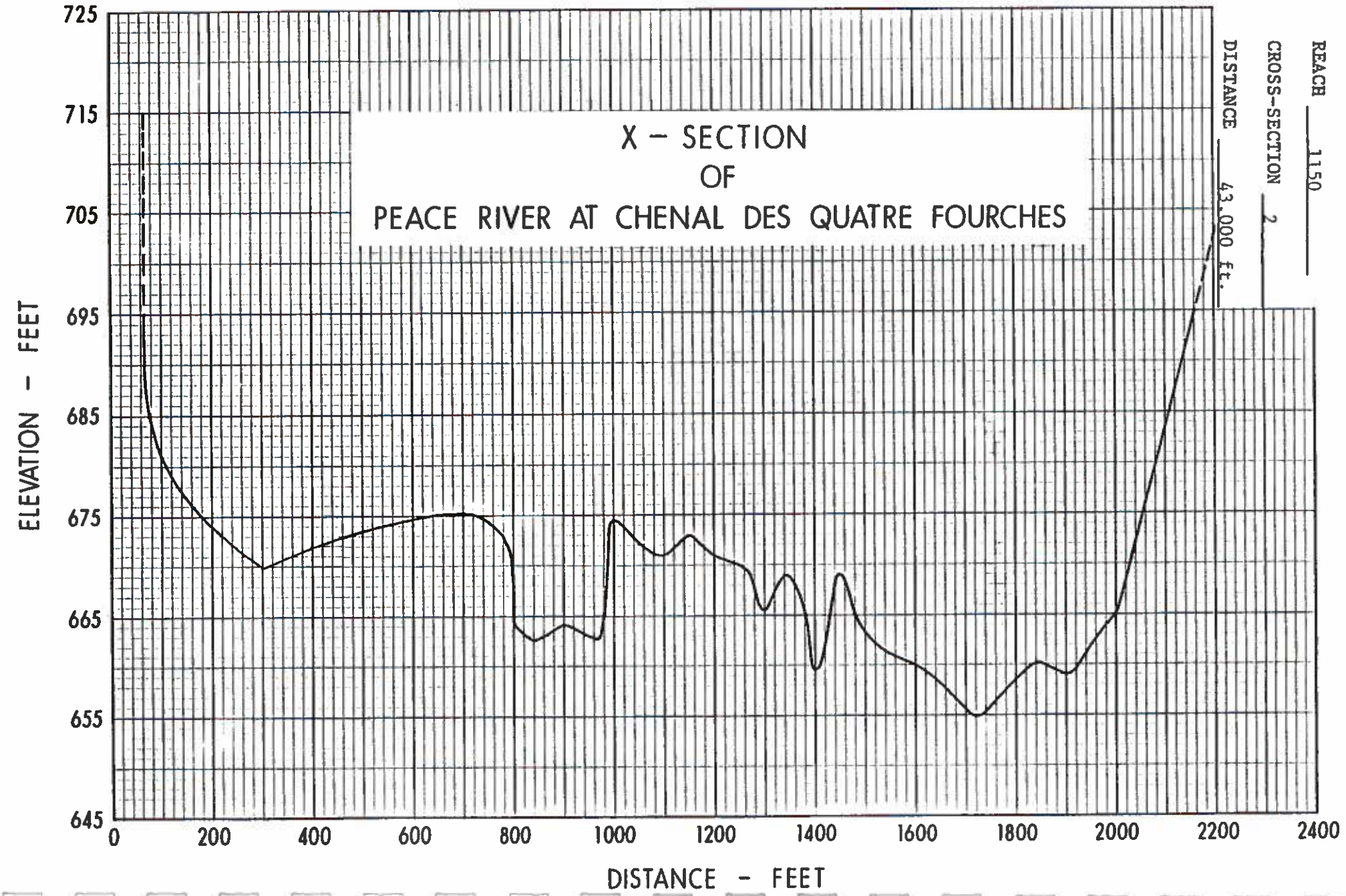

REACH 1150
CROSS-SECTION 1
DISTANCE 0 ft.
X - SECTION
OF
PEACE RIVER AT BARIL RIVER
ELEVATION - FEET
725
715
705
695
685
675
665
655
645
DISTANCE - FEET
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400

REACH 1150

CROSS-SECTION 1

DISTANCE 0 ft.

ELEVATION (feet)	TOP WIDTH (feet)	AREA (feet^2)	WETTED PERIMETER (feet)
670.0	936.0	6616.0	964.0
672.0	1110.0	8642.0	1142.0
674.0	1590.0	11230.0	1626.0
676.0	1876.0	14560.0	1916.0
678.0	1918.0	18316.0	1962.0
680.0	1956.0	22158.0	2004.0
682.0	1986.0	26118.0	2038.0
684.0	2010.0	30034.0	2070.0
686.0	2032.0	34066.0	2092.0
688.0	2048.0	38240.0	2112.0
690.0	2062.0	42276.0	2130.0
692.0	2076.0	46456.0	2148.0
694.0	2084.0	50646.0	2160.0
696.0	2096.0	54778.0	2176.0
698.0	2106.0	58974.0	2190.0
700.0	2116.0	63200.0	2204.0
702.0	2128.0	67382.0	2220.0
704.0	2138.0	71716.0	2234.0
706.0	2150.0	75980.0	2250.0
708.0	2160.0	80398.0	2264.0
710.0	2170.0	84640.0	2278.0
712.0	2180.0	88880.0	2292.0
714.0	2190.0	93340.0	2304.0

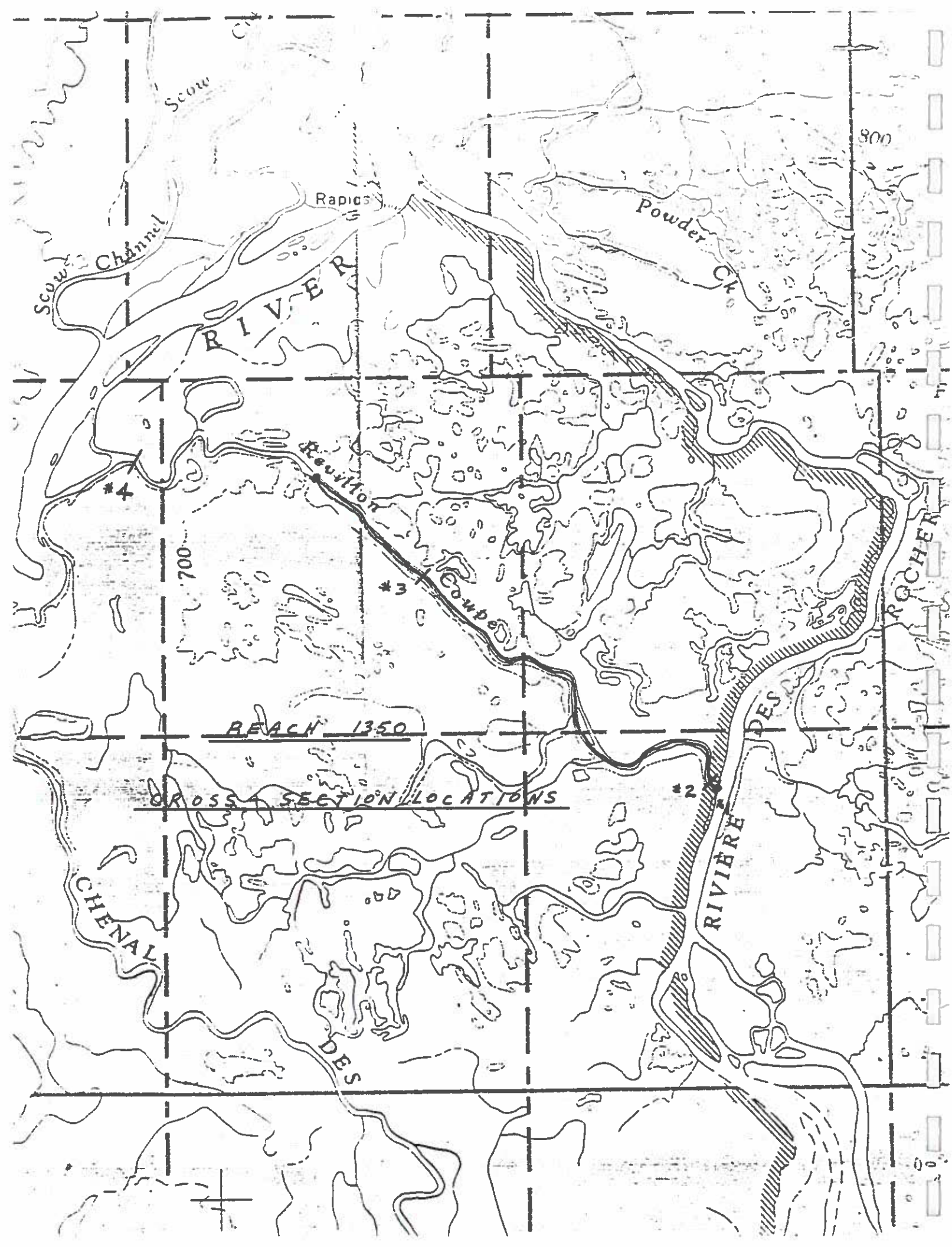

X – SECTION
OF
PEACE RIVER AT CHENAL DES QUATRE FOURCHES
REACH 1150
CROSS-SECTION 2
DISTANCE 43,000 ft.
ELEVATION – FEET
725
715
705
695
685
675
665
655
645
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
DISTANCE – FEET

REACH 1150

CROSS-SECTION 2

DISTANCE 43,000 ft.

ELEVATION (feet)	TOP WIDTH (feet)	AREA (feet^2)	WETTED PERIMETER (feet)
670.0	1110.0	8642.0	1142.0
672.0	1590.0	11230.0	1626.0
674.0	1876.0	14560.0	1916.0
676.0	1918.0	18316.0	1962.0
678.0	1956.0	22158.0	2004.0
680.0	1986.0	26118.0	2038.0
682.0	2010.0	30034.0	2070.0
684.0	2032.0	34066.0	2092.0
686.0	2048.0	38240.0	2112.0
688.0	2062.0	42276.0	2130.0
690.0	2076.0	46456.0	2148.0
692.0	2084.0	50646.0	2160.0
694.0	2096.0	54778.0	2176.0
696.0	2106.0	58974.0	2190.0
698.0	2116.0	63200.0	2204.0
700.0	2128.0	67382.0	2220.0
702.0	2138.0	71716.0	2234.0
704.0	2150.0	75980.0	2250.0
706.0	2160.0	80398.0	2264.0
708.0	2170.0	84640.0	2278.0
710.0	2180.0	88880.0	2292.0
712.0	2190.0	93340.0	2304.0
714.0	2200.0	97760.0	2320.0


Scow Ch
Scow Channel
Rapids
RIVER
Powder Ck
800
Revillon
Coupe
#4
#3
#2
700
ROCHER
REACH 1350
CROSS SECTION LOCATIONS
CHENAL DES
RIVIÈRE DES

REACH NUMBER - 1350

DESCRIPTION - Revillon Coupe from Riviere des Rochers to the Structure

REACH LENGTH - 52,100 feet

UPSTREAM NODE - 10

DOWNSTREAM NODE - 16

CROSS-SECTION - 4

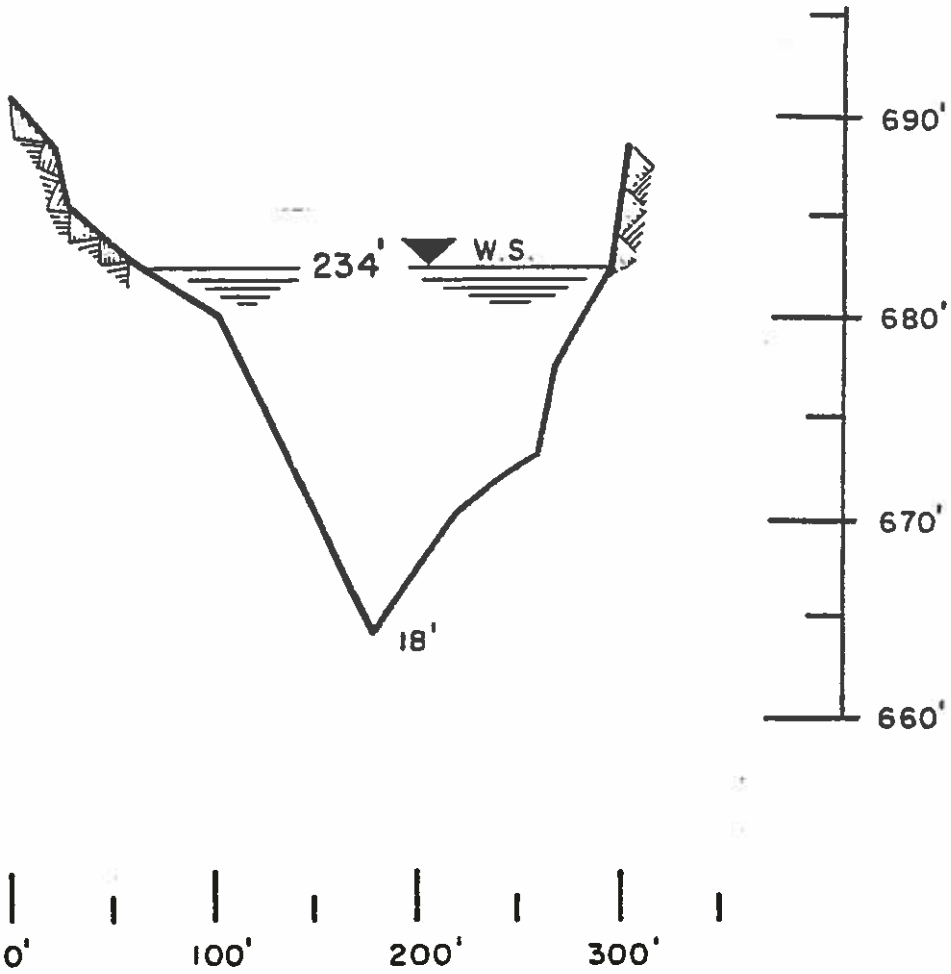
Section Number	Distance from Upstream Node (ft)
1	0
2	1,690
3	39,400
4	75,900

REMARKS: These cross-sections were surveyed by the Technical Services Division of Alberta Environment in 1970. Cross-section 2 was transposed to the beginning of the reach and was relabelled as cross-section 1.

REACH 1350

CROSS-SECTION 1

DISTANCE 0 ft.



X — SECTION

REVILLON COUPÉ

10 JULY 1970 Q = 2100 C.F.S.

REACH 1350

CROSS-SECTION 1

DISTANCE 0 ft.

LEGEND

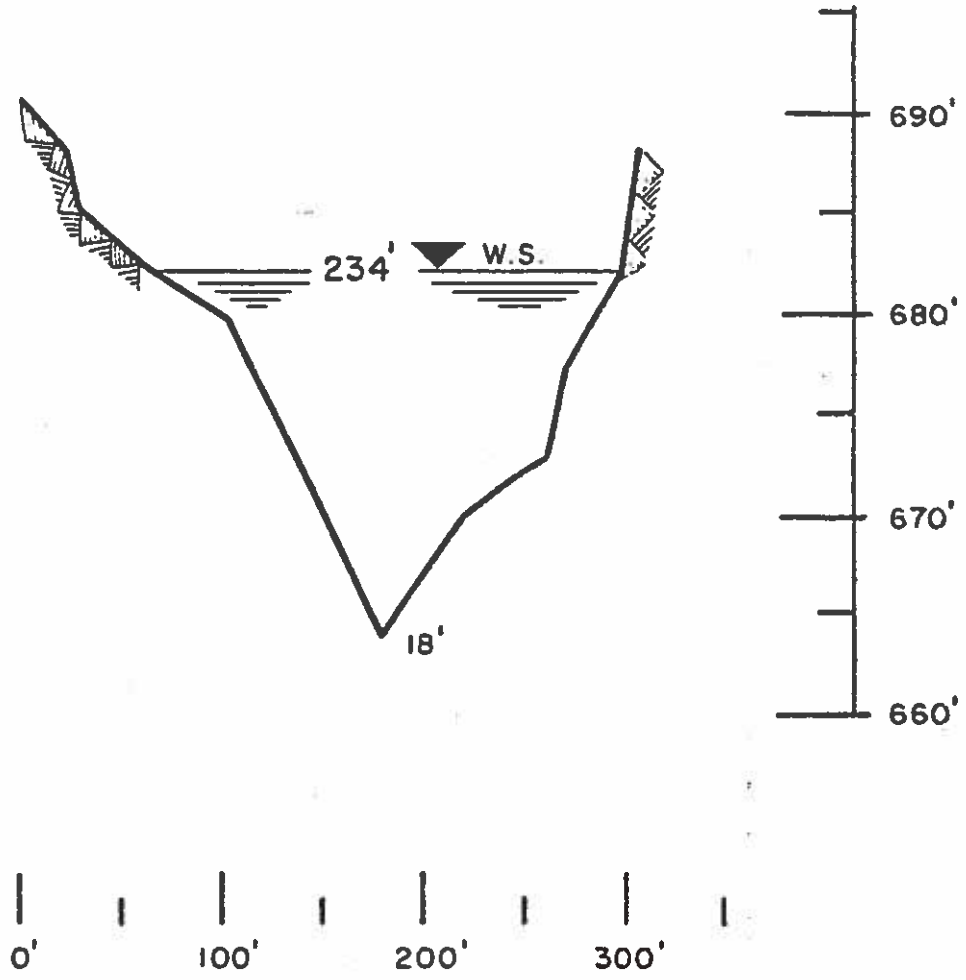
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	65.	65.	183.	66.	183.
670.500	72.	72.	217.	73.	217.
671.000	80.	80.	255.	82.	255.
671.500	89.	89.	297.	90.	297.
672.000	97.	97.	344.	98.	344.
672.500	106.	106.	395.	107.	395.
673.000	122.	122.	451.	124.	451.
673.500	126.	126.	513.	127.	513.
674.000	130.	130.	577.	131.	577.
674.500	133.	133.	643.	135.	643.
675.000	137.	137.	711.	139.	711.
675.500	141.	141.	780.	143.	780.
676.000	145.	145.	852.	147.	852.
676.500	148.	148.	925.	151.	925.
677.000	152.	152.	1000.	155.	1000.
677.500	156.	156.	1077.	159.	1077.
678.000	161.	161.	1156.	164.	1156.
678.500	167.	167.	1238.	170.	1238.
679.000	172.	172.	1323.	175.	1323.
679.500	178.	178.	1410.	181.	1410.
680.000	183.	183.	1501.	186.	1501.
680.500	192.	192.	1594.	195.	1594.
681.000	202.	202.	1693.	206.	1693.
681.500	213.	213.	1796.	216.	1796.
682.000	223.	223.	1905.	227.	1905.
682.500	233.	233.	2020.	237.	2020.
683.000	240.	240.	2138.	244.	2138.
683.500	247.	247.	2260.	251.	2260.
684.000	254.	254.	2385.	258.	2385.
684.500	261.	261.	2514.	265.	2514.
685.000	268.	268.	2646.	272.	2646.
685.500	274.	274.	2781.	278.	2781.
686.000	276.	276.	2919.	280.	2919.
686.500	277.	277.	3057.	283.	3057.
687.000	279.	279.	3196.	285.	3196.
687.500	281.	281.	3336.	287.	3336.
688.000	283.	283.	3477.	289.	3477.
688.500	286.	286.	3619.	292.	3619.
689.000	291.	291.	3763.	298.	3763.
689.500	296.	296.	3910.	303.	3910.
690.000	302.	302.	4060.	308.	4060.
690.500	307.	307.	4212.	314.	4212.
691.000	312.	312.	4366.	319.	4366.
691.500	316.	316.	4523.	324.	4523.
692.000	321.	321.	4683.	328.	4683.
692.500	325.	325.	4844.	333.	4844.
693.000	330.	330.	5008.	338.	5008.
693.500	334.	334.	5174.	342.	5174.
694.000	339.	339.	5342.	347.	5342.
694.500	343.	343.	5512.	352.	5512.
695.000	347.	347.	5685.	356.	5685.
695.500	352.	352.	5860.	361.	5860.
696.000	356.	356.	6037.	366.	6037.
696.500	361.	361.	6216.	370.	6216.
697.000	365.	365.	6397.	375.	6397.
697.500	370.	370.	6581.	380.	6581.
698.000	374.	374.	6767.	384.	6767.
698.500	379.	379.	6955.	389.	6955.
699.000	383.	383.	7146.	394.	7146.
699.500	388.	388.	7338.	398.	7338.
700.000	392.	392.	7533.	403.	7533.

REACH 1350

CROSS-SECTION 2

DISTANCE 1690 ft.



X — SECTION

REVILLON COUPÉ

10 JULY 1970 Q = 2100 C.F.S.

REACH 1350

CROSS-SECTION 2

DISTANCE 1690 ft.

LEGEND

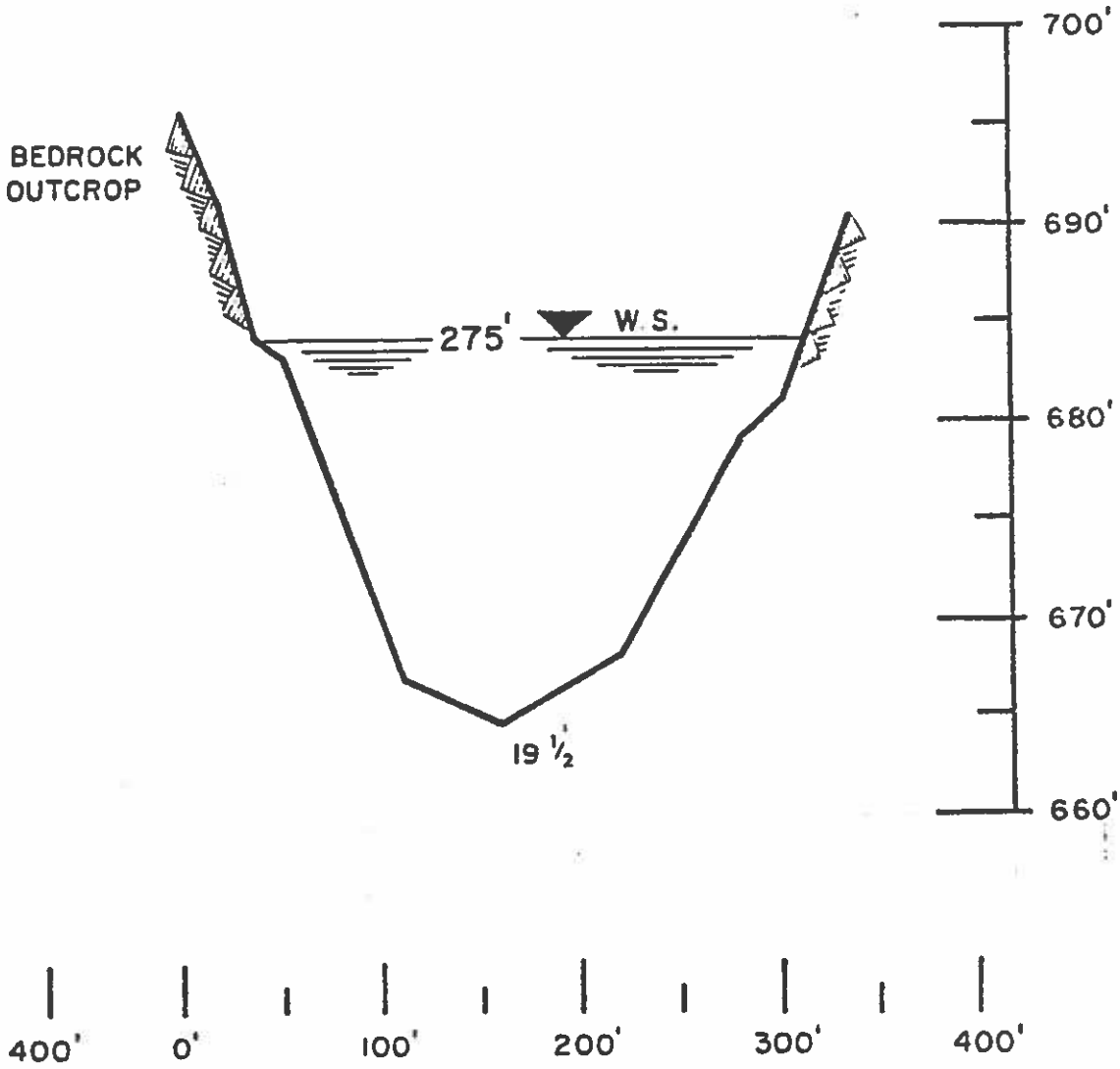
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	65.	65.	183.	66.	183.
670.500	72.	72.	217.	73.	217.
671.000	80.	80.	255.	82.	255.
671.500	89.	89.	297.	90.	297.
672.000	97.	97.	344.	98.	344.
672.500	106.	106.	395.	107.	395.
673.000	122.	122.	451.	124.	451.
673.500	126.	126.	513.	127.	513.
674.000	130.	130.	577.	131.	577.
674.500	133.	133.	643.	135.	643.
675.000	137.	137.	711.	139.	711.
675.500	141.	141.	780.	143.	780.
676.000	145.	145.	852.	147.	852.
676.500	148.	148.	925.	151.	925.
677.000	152.	152.	1000.	155.	1000.
677.500	156.	156.	1077.	159.	1077.
678.000	161.	161.	1156.	164.	1156.
678.500	167.	167.	1238.	170.	1238.
679.000	172.	172.	1323.	175.	1323.
679.500	178.	178.	1410.	181.	1410.
680.000	183.	183.	1501.	186.	1501.
680.500	192.	192.	1594.	195.	1594.
681.000	202.	202.	1693.	206.	1693.
681.500	213.	213.	1796.	216.	1796.
682.000	223.	223.	1905.	227.	1905.
682.500	233.	233.	2020.	237.	2020.
683.000	240.	240.	2138.	244.	2138.
683.500	247.	247.	2260.	251.	2260.
684.000	254.	254.	2385.	258.	2385.
684.500	261.	261.	2514.	265.	2514.
685.000	268.	268.	2646.	272.	2646.
685.500	274.	274.	2781.	278.	2781.
686.000	276.	276.	2919.	280.	2919.
686.500	277.	277.	3057.	283.	3057.
687.000	279.	279.	3196.	285.	3196.
687.500	281.	281.	3336.	287.	3336.
688.000	283.	283.	3477.	289.	3477.
688.500	286.	286.	3619.	292.	3619.
689.000	291.	291.	3763.	298.	3763.
689.500	296.	296.	3910.	303.	3910.
690.000	302.	302.	4060.	308.	4060.
690.500	307.	307.	4212.	314.	4212.
691.000	312.	312.	4366.	319.	4366.
691.500	316.	316.	4523.	324.	4523.
692.000	321.	321.	4683.	328.	4683.
692.500	325.	325.	4844.	333.	4844.
693.000	330.	330.	5008.	338.	5008.
693.500	334.	334.	5174.	342.	5174.
694.000	339.	339.	5342.	347.	5342.
694.500	343.	343.	5512.	352.	5512.
695.000	347.	347.	5685.	355.	5685.
695.500	352.	352.	5850.	361.	5850.
696.000	356.	356.	6037.	366.	6037.
696.500	361.	361.	6216.	370.	6216.
697.000	365.	365.	6397.	375.	6397.
697.500	370.	370.	6581.	380.	6581.
698.000	374.	374.	6767.	384.	6767.
698.500	379.	379.	6955.	389.	6955.
699.000	383.	383.	7146.	394.	7146.
699.500	388.	388.	7338.	398.	7338.
700.000	392.	392.	7533.	403.	7533.

REACH 1350

CROSS-SECTION 3

DISTANCE 39,400 ft.



X — SECTION

REVILLON COUPÉ

10 JULY 1970 Q = 2100 C.F.S.

REACH 1350

CROSS-SECTION 3

DISTANCE 39,400 ft.

LEGEND

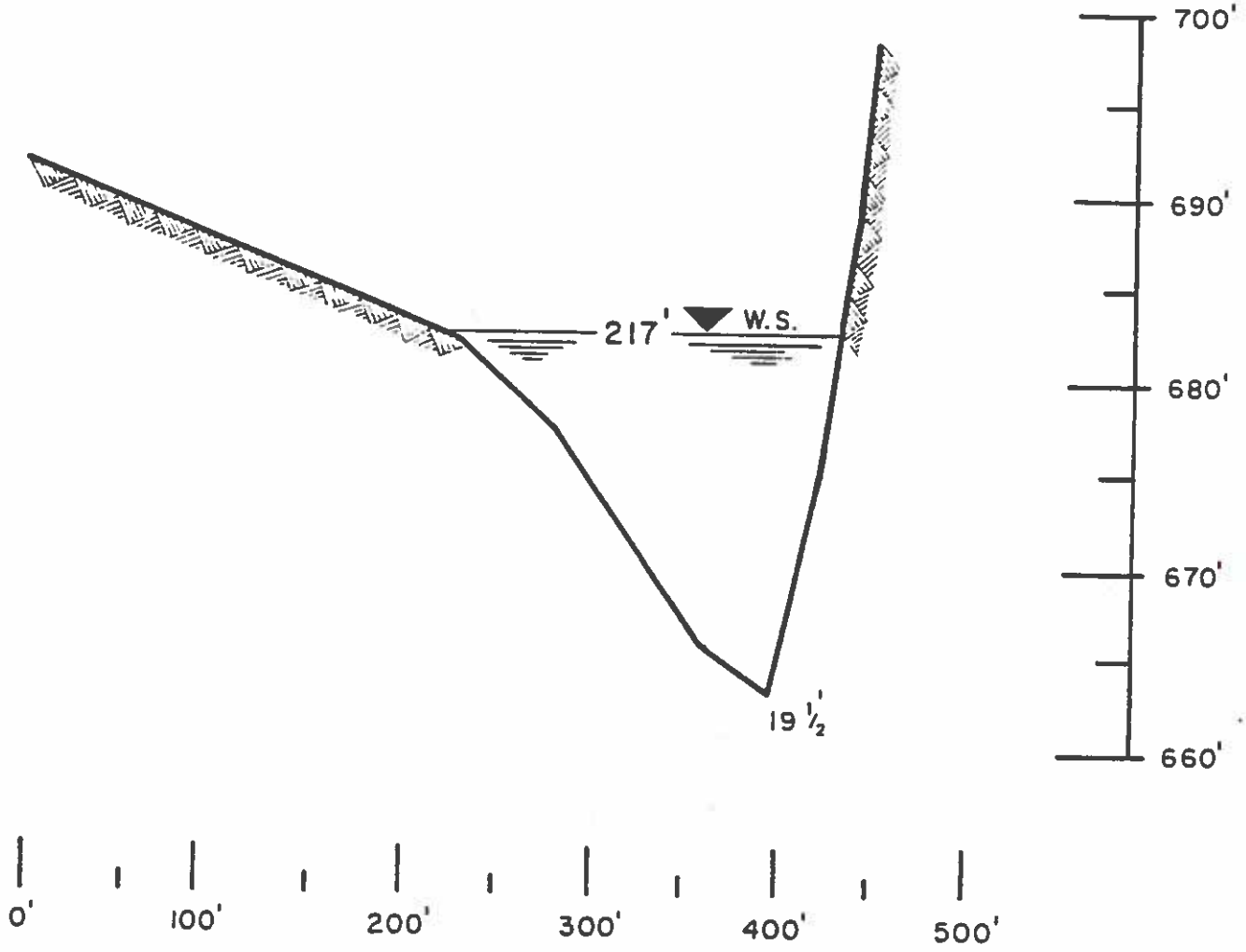
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	131.	131.	460.	132.	460.
670.500	135.	135.	526.	136.	526.
671.000	140.	140.	595.	141.	595.
671.500	145.	145.	666.	146.	666.
672.000	149.	149.	740.	150.	740.
672.500	154.	154.	815.	155.	815.
673.000	159.	159.	894.	160.	894.
673.500	163.	163.	974.	165.	974.
674.000	168.	168.	1057.	169.	1057.
674.500	172.	172.	1142.	174.	1142.
675.000	177.	177.	1229.	179.	1229.
675.500	182.	182.	1319.	184.	1319.
676.000	186.	186.	1411.	188.	1411.
676.500	191.	191.	1505.	193.	1505.
677.000	195.	195.	1601.	198.	1601.
677.500	200.	200.	1700.	202.	1700.
678.000	205.	205.	1801.	207.	1801.
678.500	209.	209.	1905.	212.	1905.
679.000	214.	214.	2010.	217.	2010.
679.500	220.	220.	2119.	223.	2119.
680.000	227.	227.	2230.	230.	2230.
680.500	233.	233.	2345.	236.	2345.
681.000	240.	240.	2464.	243.	2464.
681.500	245.	245.	2585.	248.	2585.
682.000	249.	249.	2709.	252.	2709.
682.500	252.	252.	2834.	256.	2834.
683.000	256.	256.	2961.	259.	2961.
683.500	263.	263.	3090.	267.	3090.
684.000	272.	272.	3224.	275.	3224.
684.500	277.	277.	3361.	281.	3361.
685.000	280.	280.	3501.	284.	3501.
685.500	283.	283.	3641.	288.	3641.
686.000	286.	286.	3784.	291.	3784.
686.500	290.	290.	3928.	294.	3928.
687.000	293.	293.	4073.	297.	4073.
687.500	296.	296.	4221.	301.	4221.
688.000	299.	299.	4369.	304.	4369.
688.500	302.	302.	4520.	307.	4520.
689.000	305.	305.	4671.	311.	4671.
689.500	309.	309.	4825.	314.	4825.
690.000	312.	312.	4980.	317.	4980.
690.500	315.	315.	5137.	321.	5137.
691.000	318.	318.	5295.	324.	5295.
691.500	322.	322.	5455.	328.	5455.
692.000	326.	326.	5617.	332.	5617.
692.500	330.	330.	5780.	336.	5780.
693.000	334.	334.	5946.	340.	5946.
693.500	338.	338.	6114.	344.	6114.
694.000	341.	341.	6284.	348.	6284.
694.500	345.	345.	6455.	352.	6455.
695.000	349.	349.	6629.	356.	6629.
695.500	353.	353.	6805.	360.	6805.
696.000	357.	357.	6982.	365.	6982.
696.500	361.	361.	7162.	369.	7162.
697.000	366.	366.	7344.	373.	7344.
697.500	370.	370.	7528.	377.	7528.
698.000	374.	374.	7713.	381.	7713.
698.500	378.	378.	7901.	386.	7901.
699.000	382.	382.	8091.	390.	8091.
699.500	386.	386.	8283.	394.	8283.
700.000	390.	390.	8477.	398.	8477.

REACH 1350

CROSS-SECTION 4

DISTANCE 75,900 ft.



X — SECTION

REVILLON COUPÉ

10 JULY 1970 Q = 2100 C.F.S.

REACH 1350

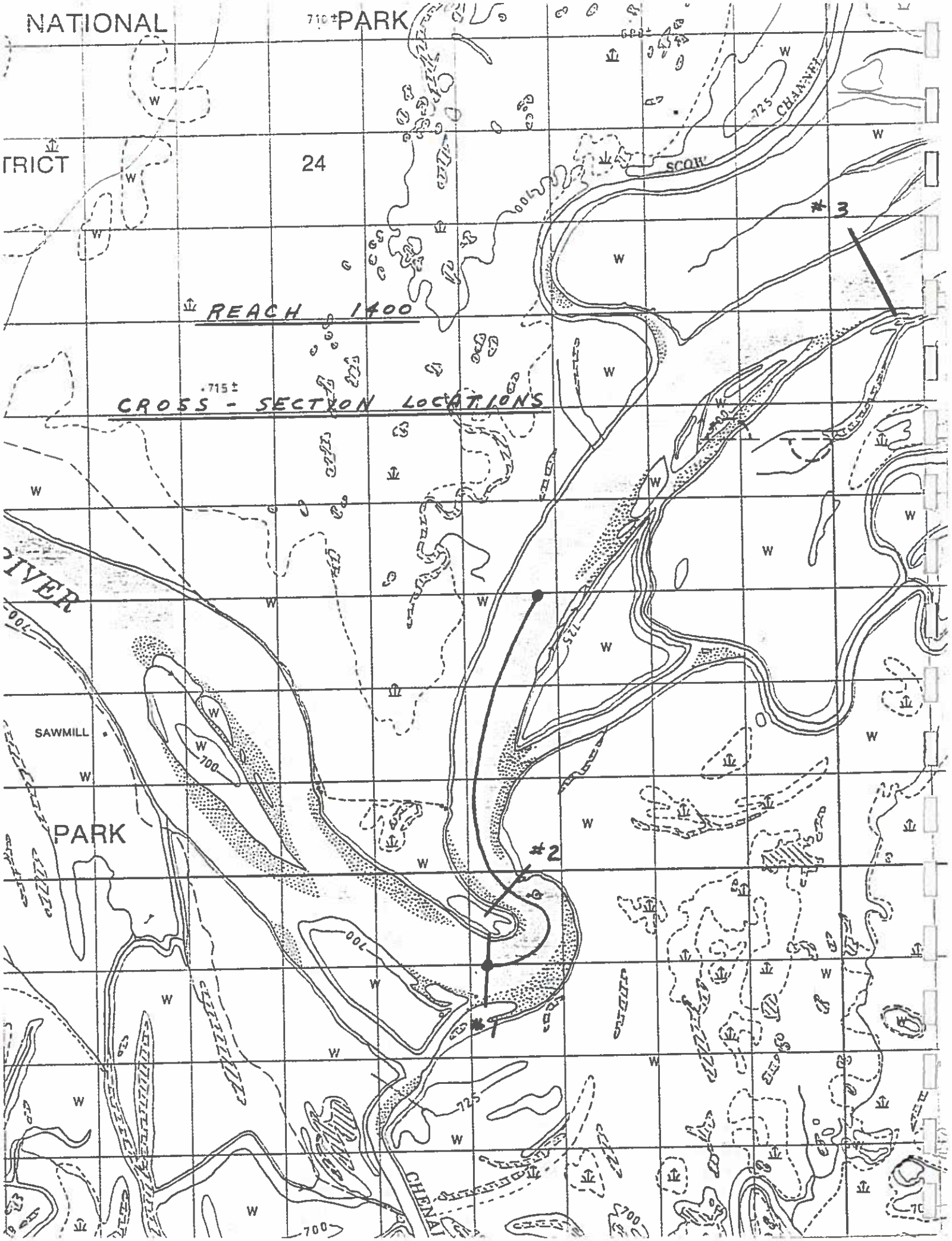
CROSS-SECTION 4

DISTANCE 75,900 ft.

LEGEND

E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	80.	80.	320.	82.	320.
670.500	85.	85.	361.	87.	361.
671.000	89.	89.	405.	92.	405.
671.500	94.	94.	451.	96.	451.
672.000	98.	98.	499.	101.	499.
672.500	103.	103.	549.	105.	549.
673.000	107.	107.	602.	110.	602.
673.500	112.	112.	656.	115.	656.
674.000	116.	116.	713.	119.	713.
674.500	121.	121.	773.	124.	773.
675.000	125.	125.	834.	128.	834.
675.500	129.	129.	898.	132.	898.
676.000	133.	133.	963.	137.	963.
676.500	137.	137.	1031.	141.	1031.
677.000	141.	141.	1100.	145.	1100.
677.500	145.	145.	1172.	149.	1172.
678.000	151.	151.	1246.	156.	1246.
678.500	158.	158.	1323.	162.	1323.
679.000	164.	164.	1403.	169.	1403.
679.500	170.	170.	1487.	175.	1487.
680.000	176.	176.	1573.	182.	1573.
680.500	182.	182.	1663.	188.	1663.
681.000	189.	189.	1756.	194.	1756.
681.500	195.	195.	1851.	201.	1851.
682.000	201.	201.	1950.	207.	1950.
682.500	215.	215.	2054.	221.	2054.
683.000	228.	228.	2165.	234.	2165.
683.500	241.	241.	2282.	247.	2282.
684.000	253.	253.	2406.	260.	2406.
684.500	266.	266.	2535.	273.	2535.
685.000	278.	278.	2671.	285.	2671.
685.500	291.	291.	2814.	298.	2814.
686.000	304.	304.	2963.	311.	2963.
686.500	316.	316.	3118.	324.	3118.
687.000	329.	329.	3279.	336.	3279.
687.500	341.	341.	3446.	349.	3446.
688.000	354.	354.	3620.	362.	3620.
688.500	367.	367.	3800.	375.	3800.
689.000	379.	379.	3987.	387.	3987.
689.500	391.	391.	4179.	399.	4179.
690.000	403.	403.	4378.	412.	4378.
690.500	416.	416.	4582.	425.	4582.
691.000	429.	429.	4794.	438.	4794.
691.500	442.	442.	5012.	452.	5012.
692.000	455.	455.	5236.	465.	5236.
692.500	468.	468.	5467.	478.	5467.
693.000	481.	481.	5704.	492.	5704.
693.500	494.	494.	5948.	505.	5948.
694.000	507.	507.	6199.	518.	6199.
694.500	521.	521.	6456.	532.	6456.
695.000	534.	534.	6719.	545.	6719.
695.500	545.	545.	6989.	557.	6989.
696.000	557.	557.	7265.	569.	7265.
696.500	569.	569.	7546.	581.	7546.
697.000	581.	581.	7833.	593.	7833.
697.500	592.	592.	8127.	605.	8127.
698.000	604.	604.	8426.	617.	8426.
698.500	616.	616.	8731.	629.	8731.
699.000	628.	628.	9041.	641.	9041.
699.500	639.	639.	9358.	653.	9358.
700.000	651.	651.	9681.	665.	9681.


NATIONAL
PARK
TRICT
24
REACH 1400
CROSS - SECTION LOCATIONS
#1
#2
#3
SAWMILL
PARK
CHANNEL
SCOW
CHENAL
700
725

REACH NUMBER - 1400

DESCRIPTION - Peace River from Chenal des Quatre Fourches to Revillon Coupe

REACH LENGTH - 16,700 feet

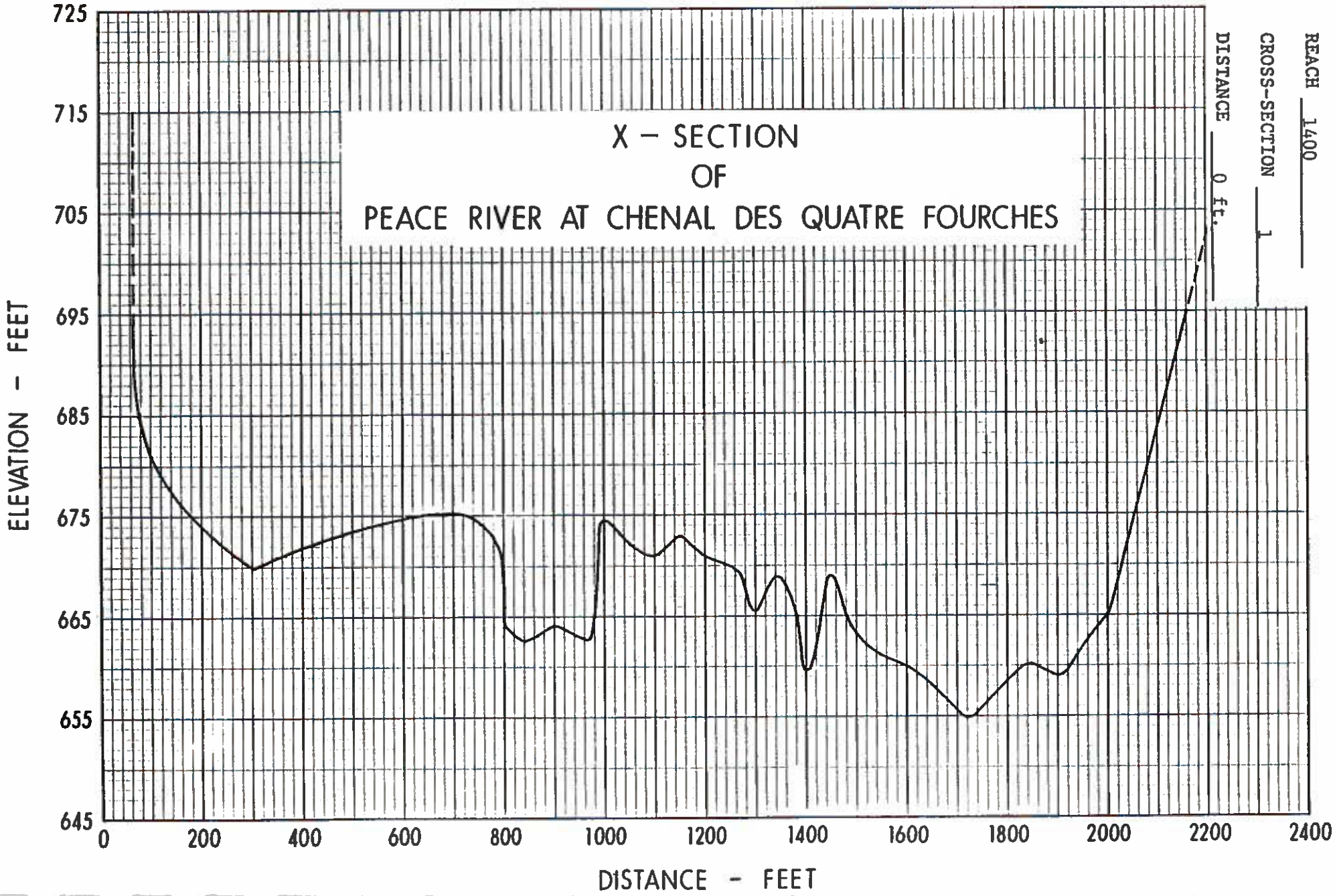
UPSTREAM NODE - 9

DOWNSTREAM NODE - 13

CROSS-SECTION - 3

Section Number	Distance from Upstream Node (ft)
1	0
2	5,000
3	33,400

REMARKS: Cross-sections 2 and 3 were surveyed by the Technical Services Division of Alberta Environment in 1970. Cross-section 1 is the same as cross-section 2 in reach 1150.


X – SECTION
OF
PEACE RIVER AT CHENAL DES QUATRE FOURCHES
REACH 1400
CROSS-SECTION 1
DISTANCE 0 ft.
ELEVATION - FEET
725
715
705
695
685
675
665
655
645
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
DISTANCE - FEET

REACH 1400

CROSS-SECTION 1

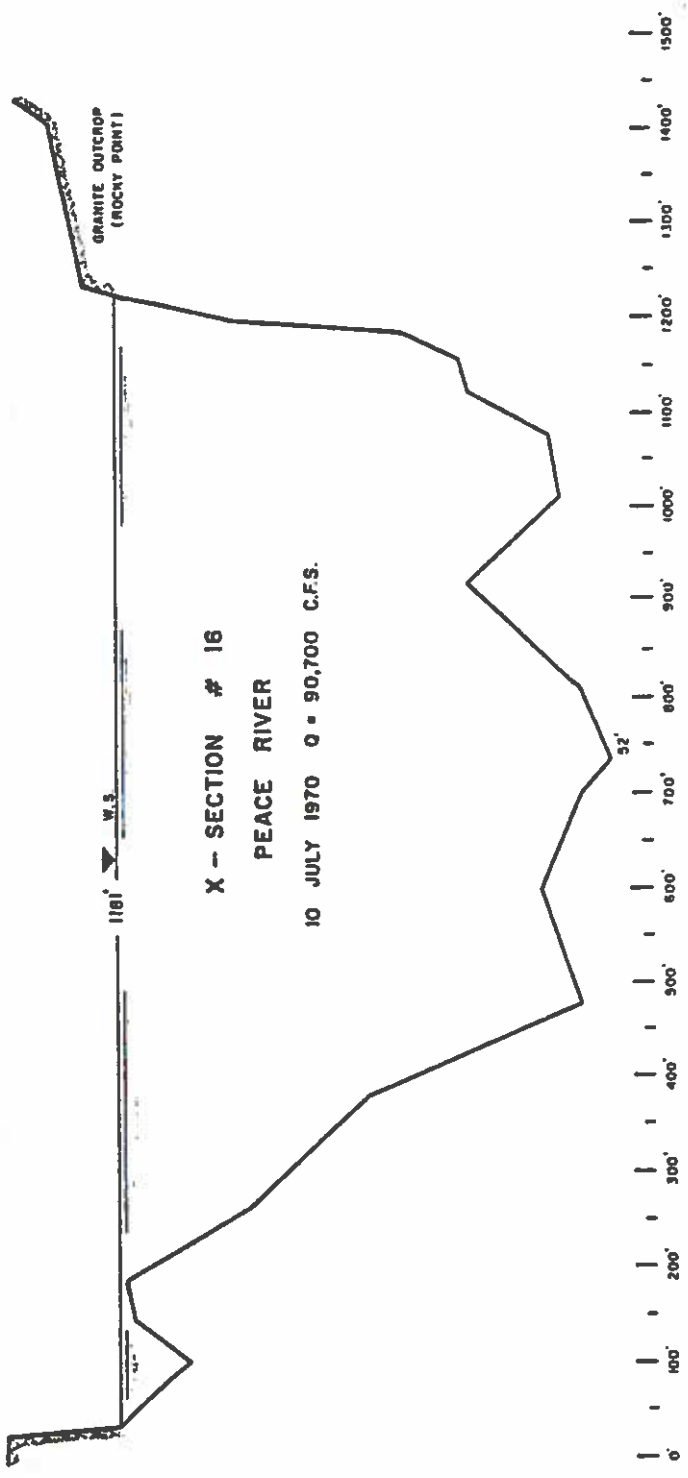
DISTANCE 0 ft.

ELEVATION (feet)	TOP WIDTH (feet)	AREA (feet^2)	WETTED PERIMETER (feet)
670.0	1110.0	8642.0	1142.0
672.0	1590.0	11230.0	1626.0
674.0	1876.0	14560.0	1916.0
676.0	1918.0	18316.0	1962.0
678.0	1956.0	22158.0	2004.0
680.0	1986.0	26118.0	2038.0
682.0	2010.0	30034.0	2070.0
684.0	2032.0	34066.0	2092.0
686.0	2048.0	38240.0	2112.0
688.0	2062.0	42276.0	2130.0
690.0	2076.0	46456.0	2148.0
692.0	2084.0	50646.0	2160.0
694.0	2096.0	54778.0	2176.0
696.0	2106.0	58974.0	2190.0
698.0	2116.0	63200.0	2204.0
700.0	2128.0	67382.0	2220.0
702.0	2138.0	71716.0	2234.0
704.0	2150.0	75980.0	2250.0
706.0	2160.0	80398.0	2264.0
708.0	2170.0	84640.0	2278.0
710.0	2180.0	88880.0	2292.0
712.0	2190.0	93340.0	2304.0
714.0	2200.0	97760.0	2320.0

REACH 1400

CROSS-SECTION 2

DISTANCE 5000 ft.



REACH 1400

CROSS-SECTION 2

DISTANCE 5,000 ft.

LEGEND

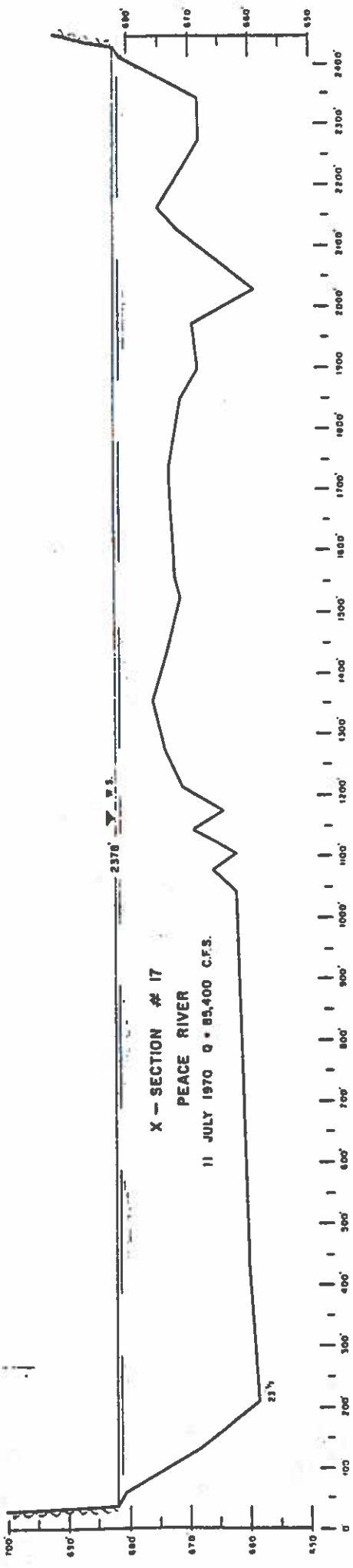
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	934.	934.	26191.	950.	26191.
670.500	937.	937.	26659.	954.	26659.
671.000	941.	941.	27129.	958.	27129.
671.500	946.	946.	27600.	962.	27600.
672.000	950.	950.	28074.	967.	28074.
672.500	954.	954.	28550.	971.	28550.
673.000	958.	958.	29028.	975.	29028.
673.500	962.	962.	29508.	979.	29508.
674.000	966.	966.	29990.	984.	29990.
674.500	970.	970.	30474.	988.	30474.
675.000	974.	974.	30960.	992.	30960.
675.500	986.	986.	31451.	1004.	31451.
676.000	998.	998.	31946.	1016.	31946.
676.500	1009.	1009.	32448.	1027.	32448.
677.000	1021.	1021.	32956.	1039.	32956.
677.500	1032.	1032.	33469.	1051.	33469.
678.000	1044.	1044.	33988.	1063.	33988.
678.500	1056.	1056.	34512.	1075.	34512.
679.000	1068.	1068.	35043.	1087.	35043.
679.500	1080.	1080.	35580.	1100.	35580.
680.000	1092.	1092.	36123.	1112.	36123.
680.500	1104.	1104.	36673.	1125.	36673.
681.000	1117.	1117.	37228.	1137.	37228.
681.500	1145.	1145.	37792.	1166.	37792.
682.000	1172.	1172.	38373.	1195.	38373.
682.500	1178.	1178.	38960.	1199.	38960.
683.000	1181.	1181.	39550.	1202.	39550.
683.500	1183.	1183.	40141.	1204.	40141.
684.000	1184.	1184.	40733.	1206.	40733.
684.500	1186.	1186.	41325.	1209.	41325.
685.000	1188.	1188.	41919.	1211.	41919.
685.500	1190.	1190.	42515.	1213.	42515.
686.000	1191.	1191.	43108.	1215.	43108.
686.500	1215.	1215.	43710.	1239.	43710.
687.000	1240.	1240.	44324.	1264.	44324.
687.500	1264.	1264.	44950.	1288.	44950.
688.000	1288.	1288.	45587.	1312.	45587.
688.500	1312.	1312.	46237.	1337.	46237.
689.000	1336.	1336.	46899.	1361.	46899.
689.500	1360.	1360.	47573.	1385.	47573.
690.000	1372.	1372.	48258.	1398.	48258.
690.500	1376.	1376.	48945.	1402.	48945.
691.000	1380.	1380.	49634.	1406.	49634.
691.500	1384.	1384.	50324.	1410.	50324.
692.000	1387.	1387.	51017.	1414.	51017.
692.500	1391.	1391.	51712.	1418.	51712.
693.000	1395.	1395.	52408.	1423.	52408.
693.500	1399.	1399.	53107.	1427.	53107.
694.000	1403.	1403.	53807.	1431.	53807.
694.500	1422.	1422.	54510.	1450.	54510.
695.000	1440.	1440.	55229.	1469.	55229.
695.500	1444.	1444.	55950.	1473.	55950.
696.000	1447.	1447.	56672.	1477.	56672.
696.500	1451.	1451.	57397.	1481.	57397.
697.000	1454.	1454.	58123.	1485.	58123.
697.500	1458.	1458.	58851.	1489.	58851.
698.000	1461.	1461.	59580.	1493.	59580.
698.500	1465.	1465.	60312.	1497.	60312.
699.000	1468.	1468.	61045.	1501.	61045.
699.500	1472.	1472.	61780.	1505.	61780.
700.000	1475.	1475.	62516.	1509.	62516.

REACH 1400

CROSS-SECTION 3

DISTANCE 33,400 ft.



REACH 1400

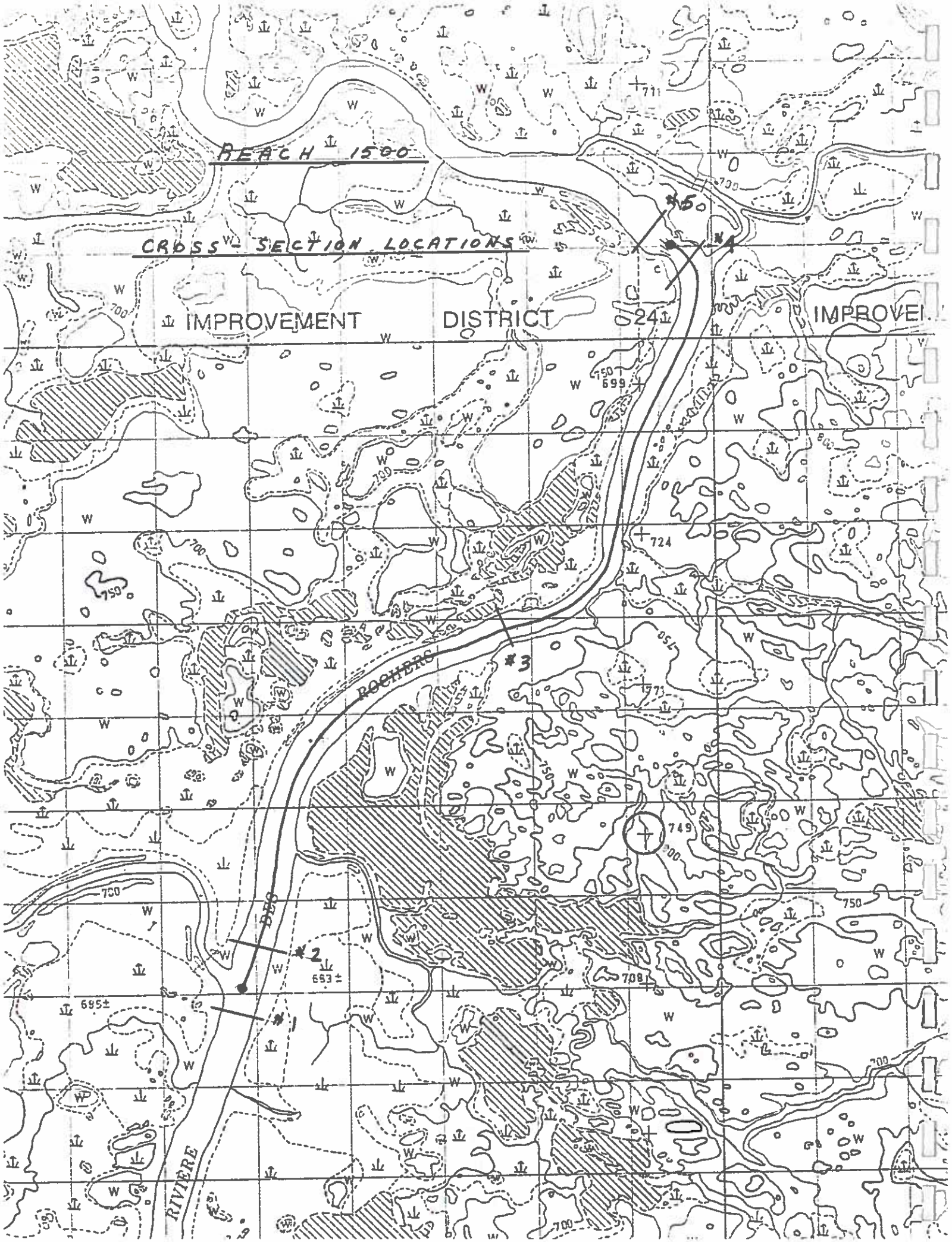
CROSS-SECTION 3

DISTANCE 33,400 ft.

LEGEND

E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	1441.	1441.	10171.	1446.	10171.
670.500	1470.	1470.	10899.	1475.	10899.
671.000	1498.	1498.	11641.	1503.	11641.
671.500	1579.	1579.	12407.	1584.	12407.
672.000	1675.	1675.	13221.	1680.	13221.
672.500	1844.	1844.	14101.	1849.	14101.
673.000	2013.	2013.	15065.	2019.	15065.
673.500	2058.	2058.	16082.	2064.	16082.
674.000	2107.	2107.	17123.	2113.	17123.
674.500	2162.	2162.	18190.	2168.	18190.
675.000	2216.	2216.	19285.	2222.	19285.
675.500	2258.	2258.	20403.	2264.	20403.
676.000	2285.	2285.	21541.	2291.	21541.
676.500	2291.	2291.	22685.	2297.	22685.
677.000	2296.	2296.	23832.	2303.	23832.
677.500	2302.	2302.	24981.	2309.	24981.
678.000	2307.	2307.	26133.	2314.	26133.
678.500	2313.	2313.	27288.	2320.	27288.
679.000	2319.	2319.	28446.	2326.	28446.
679.500	2324.	2324.	29607.	2331.	29607.
680.000	2330.	2330.	30771.	2337.	30771.
680.500	2335.	2335.	31937.	2343.	31937.
681.000	2341.	2341.	33106.	2348.	33106.
681.500	2359.	2359.	34281.	2366.	34281.
682.000	2377.	2377.	35465.	2384.	35465.
682.500	2378.	2378.	36654.	2386.	36654.
683.000	2379.	2379.	37843.	2387.	37843.
683.500	2380.	2380.	39032.	2389.	39032.
684.000	2381.	2381.	40223.	2390.	40223.
684.500	2382.	2382.	41413.	2392.	41413.
685.000	2382.	2382.	42604.	2393.	42604.
685.500	2383.	2383.	43796.	2394.	43795.
686.000	2384.	2384.	44987.	2396.	44987.
686.500	2385.	2385.	46180.	2397.	46180.
687.000	2386.	2386.	47373.	2399.	47373.
687.500	2388.	2388.	48566.	2401.	48566.
688.000	2389.	2389.	49760.	2403.	49760.
688.500	2390.	2390.	50955.	2404.	50955.
689.000	2392.	2392.	52151.	2406.	52151.
689.500	2393.	2393.	53347.	2408.	53347.
690.000	2395.	2395.	54544.	2410.	54544.
690.500	2397.	2397.	55742.	2412.	55742.
691.000	2398.	2398.	56941.	2414.	56941.
691.500	2400.	2400.	58140.	2416.	58140.
692.000	2401.	2401.	59341.	2418.	59341.
692.500	2402.	2402.	60542.	2420.	60542.
693.000	2403.	2403.	61743.	2421.	61743.
693.500	2404.	2404.	62945.	2422.	62945.
694.000	2405.	2405.	64147.	2424.	64147.
694.500	2406.	2406.	65349.	2425.	65349.
695.000	2406.	2406.	66552.	2427.	66552.
695.500	2408.	2408.	67756.	2429.	67756.
696.000	2410.	2410.	68961.	2431.	68961.
696.500	2412.	2412.	70166.	2434.	70166.
697.000	2414.	2414.	71373.	2436.	71373.
697.500	2416.	2416.	72580.	2439.	72580.
698.000	2418.	2418.	73789.	2441.	73789.
698.500	2420.	2420.	74999.	2443.	74999.
699.000	2422.	2422.	76209.	2446.	76209.
699.500	2424.	2424.	77421.	2448.	77421.
700.000	2426.	2426.	78633.	2451.	78633.


REACH 1500
CROSS-SECTION LOCATIONS
#5
#4
#3
#2
#1
IMPROVEMENT DISTRICT
IMPROVEI
ROCHERE
RIVIERE
DES
24
711
724
749
699
693±
695±
700
750

REACH NUMBER - 1500

DESCRIPTION - Riviere des Rochers from Revillon Coupe to the Structure

REACH LENGTH - 34,100 feet

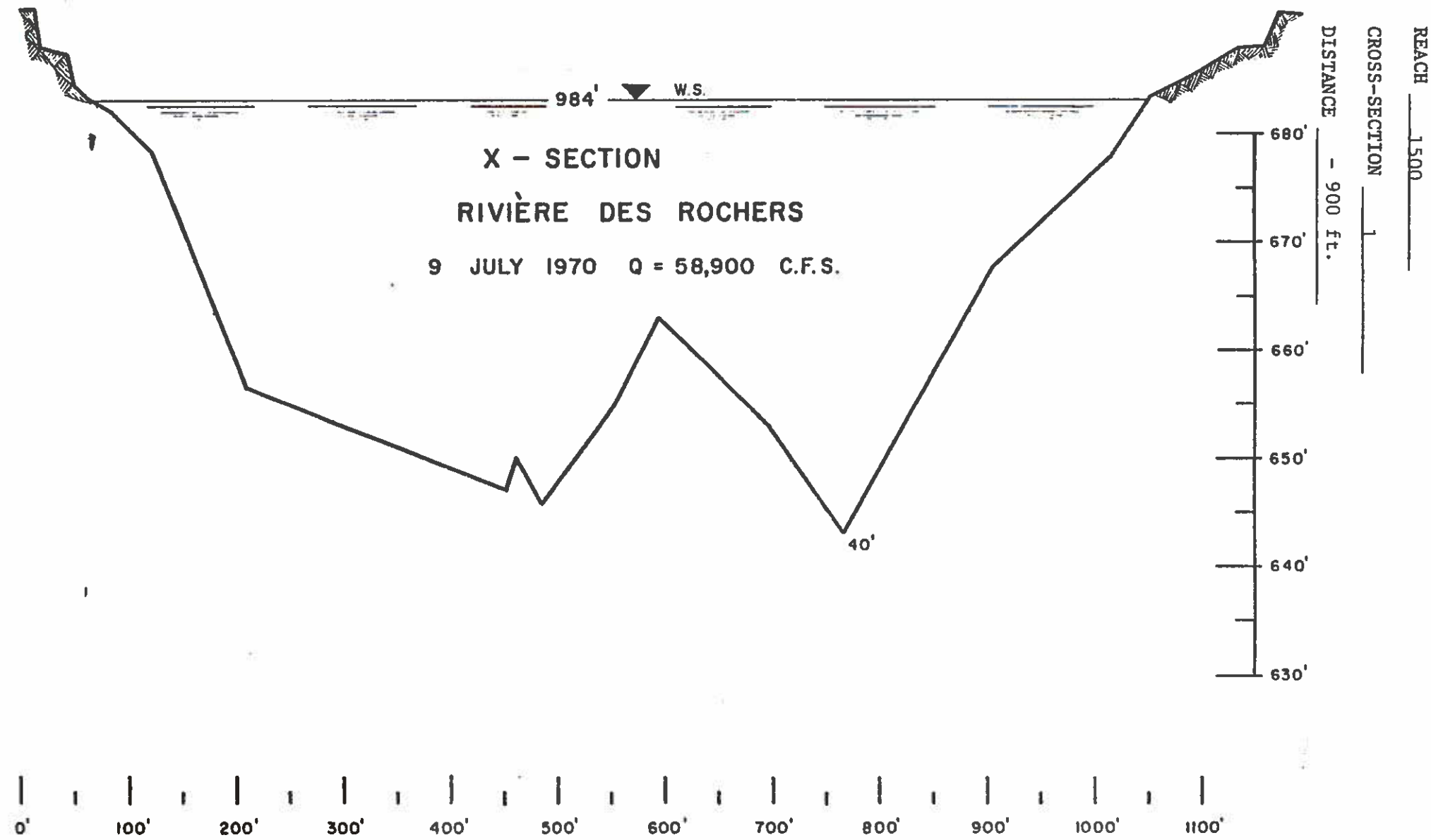
UPSTREAM NODE - 10

DOWNSTREAM NODE - 18

CROSS-SECTION - 5

Section Number	Distance from Upstream Node (ft)
1	-900
2	1,560
3	16,790
4	33,200
5	35,000

REMARKS: These cross-sections were surveyed by the Technical Services Division of Alberta Environment in 1970.


984'
W.S.
X – SECTION
RIVIÈRE DES ROCHERS
9 JULY 1970 Q = 58,900 C.F.S.
40'
680'
670'
660'
650'
640'
630'
0'
100'
200'
300'
400'
500'
600'
700'
800'
900'
1000'
1100'
REACH 1500
CROSS-SECTION 1
DISTANCE - 900 ft.

REACH 1500

CROSS-SECTION 1

DISTANCE -900 ft.

LEGEND

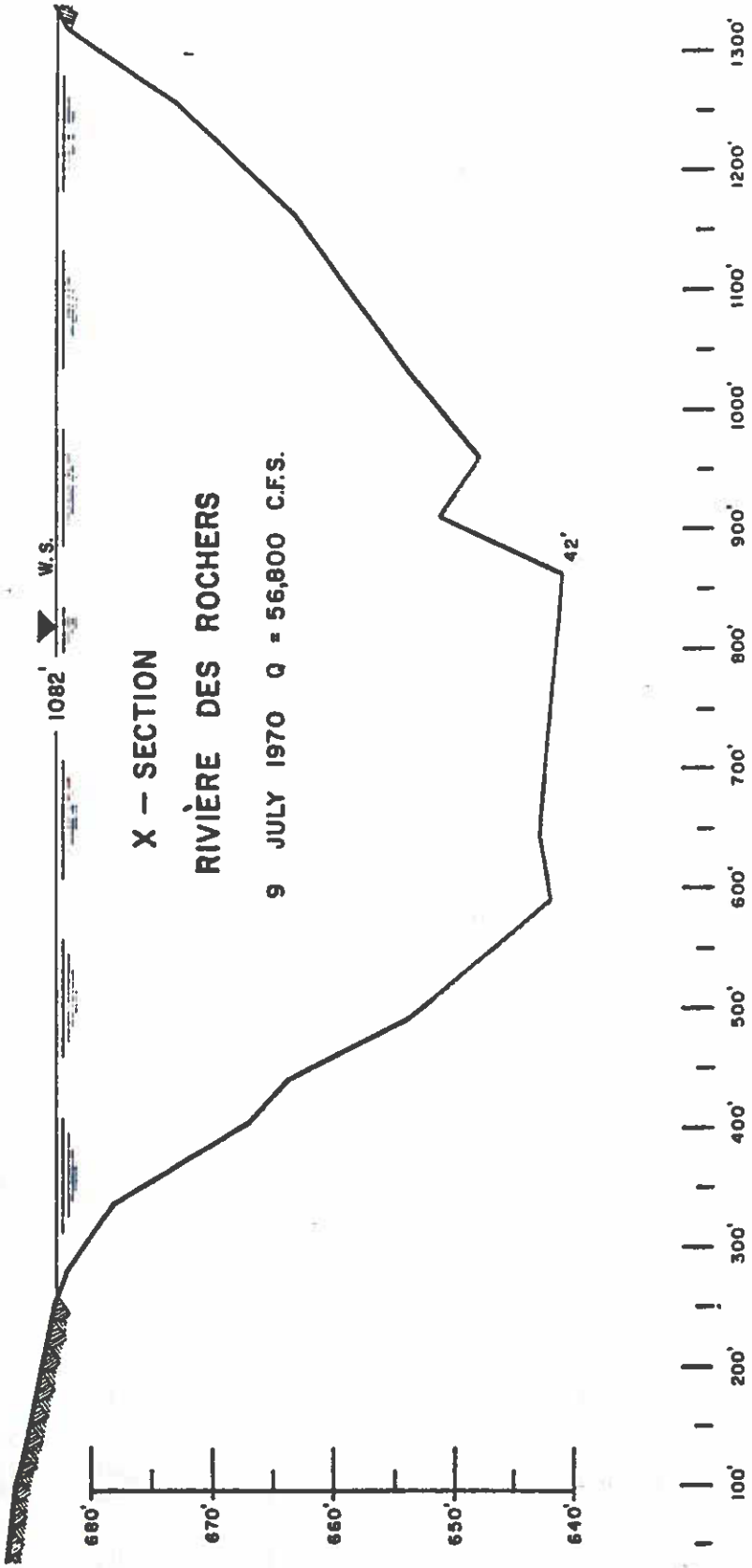
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	769.	769.	12001.	777.	12001.
670.500	777.	777.	12387.	784.	12387.
671.000	784.	784.	12777.	792.	12777.
671.500	792.	792.	13171.	799.	13171.
672.000	799.	799.	13569.	807.	13569.
672.500	806.	806.	13970.	814.	13970.
673.000	814.	814.	14375.	822.	14375.
673.500	821.	821.	14784.	829.	14784.
674.000	829.	829.	15197.	837.	15197.
674.500	836.	836.	15613.	844.	15613.
675.000	843.	843.	16033.	852.	16033.
675.500	851.	851.	16456.	859.	16456.
676.000	858.	858.	16884.	867.	16884.
676.500	866.	866.	17315.	874.	17315.
677.000	873.	873.	17749.	882.	17749.
677.500	880.	880.	18188.	889.	18188.
678.000	888.	888.	18630.	897.	18630.
678.500	894.	894.	19075.	905.	19075.
679.000	903.	903.	19524.	912.	19524.
679.500	911.	911.	19978.	920.	19978.
680.000	920.	920.	20435.	929.	20435.
680.500	928.	928.	20897.	937.	20897.
681.000	937.	937.	21364.	946.	21364.
681.500	945.	945.	21834.	954.	21834.
682.000	953.	953.	22309.	963.	22309.
682.500	965.	965.	22788.	975.	22788.
683.000	978.	978.	23274.	988.	23274.
683.500	994.	994.	23767.	1003.	23767.
684.000	1007.	1007.	24267.	1017.	24267.
684.500	1021.	1021.	24774.	1030.	24774.
685.000	1031.	1031.	25287.	1040.	25287.
685.500	1041.	1041.	25805.	1050.	25805.
686.000	1051.	1051.	26328.	1060.	26328.
686.500	1061.	1061.	26856.	1070.	26856.
687.000	1070.	1070.	27389.	1080.	27389.
687.500	1088.	1088.	27927.	1098.	27927.
688.000	1124.	1124.	28479.	1134.	28479.
688.500	1139.	1139.	29047.	1149.	29047.
689.000	1141.	1141.	29617.	1152.	29617.
689.500	1144.	1144.	30188.	1155.	30188.
690.000	1146.	1146.	30761.	1157.	30761.
690.500	1149.	1149.	31335.	1160.	31335.
691.000	1151.	1151.	31910.	1163.	31910.
691.500	1176.	1176.	32495.	1188.	32495.
692.000	1195.	1195.	33089.	1207.	33089.
692.500	1200.	1200.	33688.	1212.	33688.
693.000	1204.	1204.	34289.	1216.	34289.
693.500	1208.	1208.	34892.	1221.	34892.
694.000	1213.	1213.	35497.	1225.	35497.
694.500	1217.	1217.	36104.	1230.	36104.
695.000	1221.	1221.	36714.	1234.	36714.
695.500	1226.	1226.	37326.	1239.	37326.
696.000	1230.	1230.	37940.	1243.	37940.
696.500	1234.	1234.	38556.	1248.	38556.
697.000	1239.	1239.	39174.	1252.	39174.
697.500	1243.	1243.	39795.	1257.	39795.
698.000	1248.	1248.	40417.	1261.	40417.
698.500	1252.	1252.	41042.	1266.	41042.
699.000	1256.	1256.	41669.	1270.	41669.
699.500	1261.	1261.	42298.	1275.	42298.
700.000	1265.	1265.	42930.	1279.	42930.

REACH 1500

CROSS-SECTION 2

DISTANCE 1560 ft.



REACH 1500

CROSS-SECTION 2

DISTANCE 1,560 ft.

LEGEND

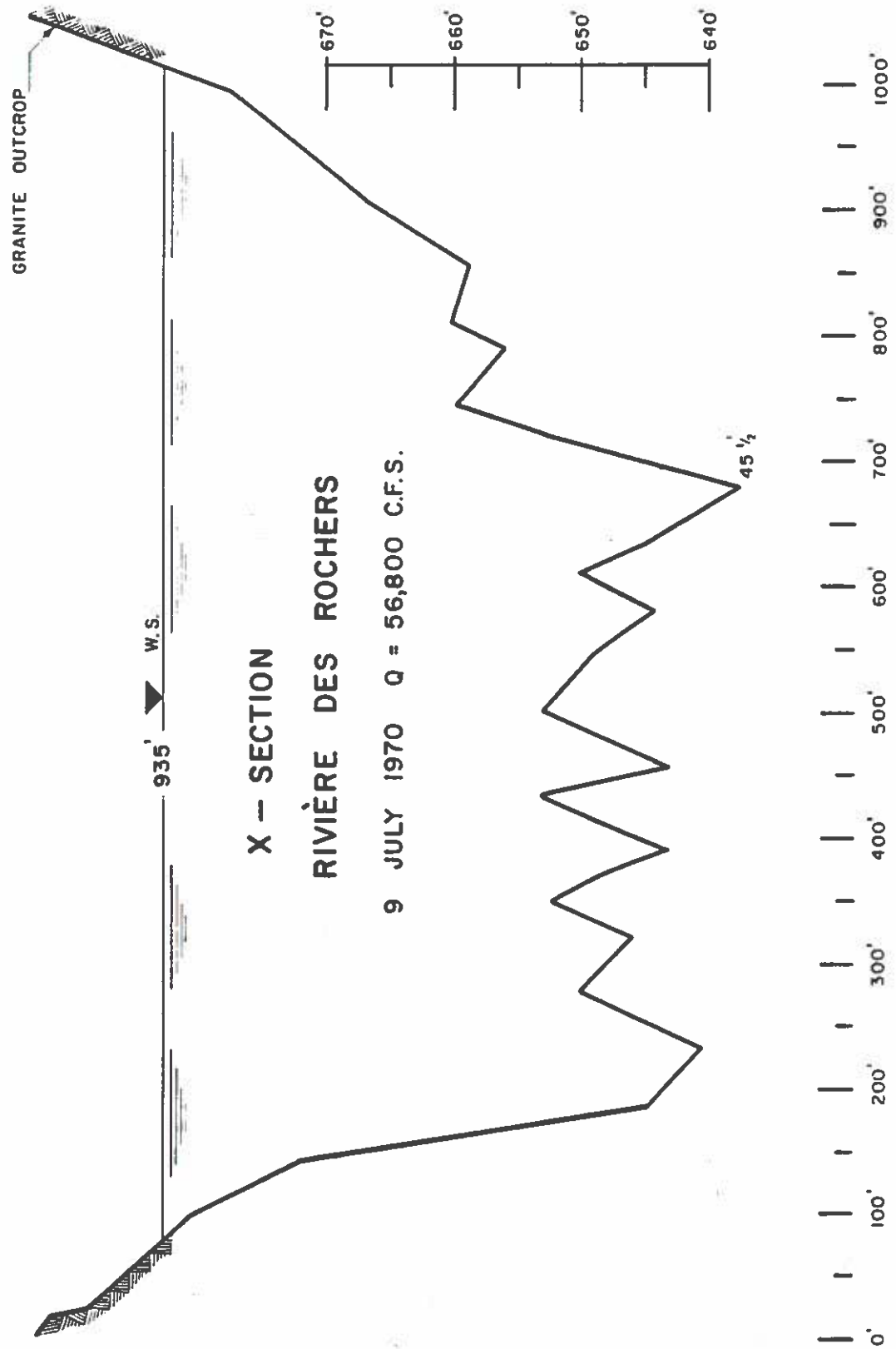
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	841.	841.	15774.	845.	15774.
670.500	849.	849.	16197.	853.	16197.
671.000	856.	856.	16623.	860.	16623.
671.500	864.	864.	17053.	868.	17053.
672.000	871.	871.	17487.	876.	17487.
672.500	879.	879.	17924.	883.	17924.
673.000	886.	886.	18365.	891.	18365.
673.500	893.	893.	18810.	898.	18810.
674.000	899.	899.	19258.	904.	19258.
674.500	906.	906.	19709.	910.	19709.
675.000	912.	912.	20164.	917.	20164.
675.500	918.	918.	20621.	923.	20621.
676.000	925.	925.	21082.	930.	21082.
676.500	931.	931.	21546.	936.	21546.
677.000	938.	938.	22013.	943.	22013.
677.500	944.	944.	22484.	949.	22484.
678.000	950.	950.	22957.	956.	22957.
678.500	961.	961.	23435.	967.	23435.
679.000	972.	972.	23919.	978.	23919.
679.500	983.	983.	24408.	989.	24408.
680.000	994.	994.	24902.	1000.	24902.
680.500	1005.	1005.	25402.	1011.	25402.
681.000	1016.	1016.	25907.	1022.	25907.
681.500	1027.	1027.	26418.	1033.	26418.
682.000	1038.	1038.	26934.	1044.	26934.
682.500	1057.	1057.	27458.	1063.	27458.
683.000	1080.	1080.	27992.	1086.	27992.
683.500	1113.	1113.	28540.	1119.	28540.
684.000	1146.	1146.	29105.	1152.	29105.
684.500	1180.	1180.	29686.	1185.	29686.
685.000	1213.	1213.	30284.	1219.	30284.
685.500	1246.	1246.	30899.	1252.	30899.
686.000	1279.	1279.	31531.	1285.	31531.
686.500	1320.	1320.	32179.	1326.	32179.
687.000	1376.	1376.	32853.	1382.	32853.
687.500	1408.	1408.	33551.	1415.	33551.
688.000	1426.	1426.	34260.	1432.	34260.
688.500	1438.	1438.	34976.	1445.	34976.
689.000	1446.	1446.	35698.	1453.	35698.
689.500	1453.	1453.	36423.	1460.	36423.
690.000	1461.	1461.	37151.	1467.	37151.
690.500	1468.	1468.	37883.	1474.	37883.
691.000	1475.	1475.	38619.	1482.	38619.
691.500	1483.	1483.	39359.	1489.	39359.
692.000	1498.	1498.	40103.	1505.	40103.
692.500	1519.	1519.	40857.	1526.	40857.
693.000	1540.	1540.	41622.	1547.	41622.
693.500	1556.	1556.	42396.	1563.	42396.
694.000	1567.	1567.	43177.	1574.	43177.
694.500	1577.	1577.	43963.	1584.	43963.
695.000	1587.	1587.	44754.	1595.	44754.
695.500	1598.	1598.	45550.	1605.	45550.
696.000	1608.	1608.	46351.	1615.	46351.
696.500	1618.	1618.	47158.	1626.	47158.
697.000	1629.	1629.	47970.	1636.	47970.
697.500	1639.	1639.	48787.	1647.	48787.
698.000	1650.	1650.	49609.	1657.	49609.
698.500	1660.	1660.	50436.	1668.	50436.
699.000	1670.	1670.	51269.	1678.	51269.
699.500	1681.	1681.	52107.	1688.	52107.
700.000	1691.	1691.	52950.	1699.	52950.

REACH 1500

CROSS-SECTION 3

DISTANCE 16,790 ft.



REACH 1500

CROSS-SECTION 3

DISTANCE 16,790 ft.

LEGEND

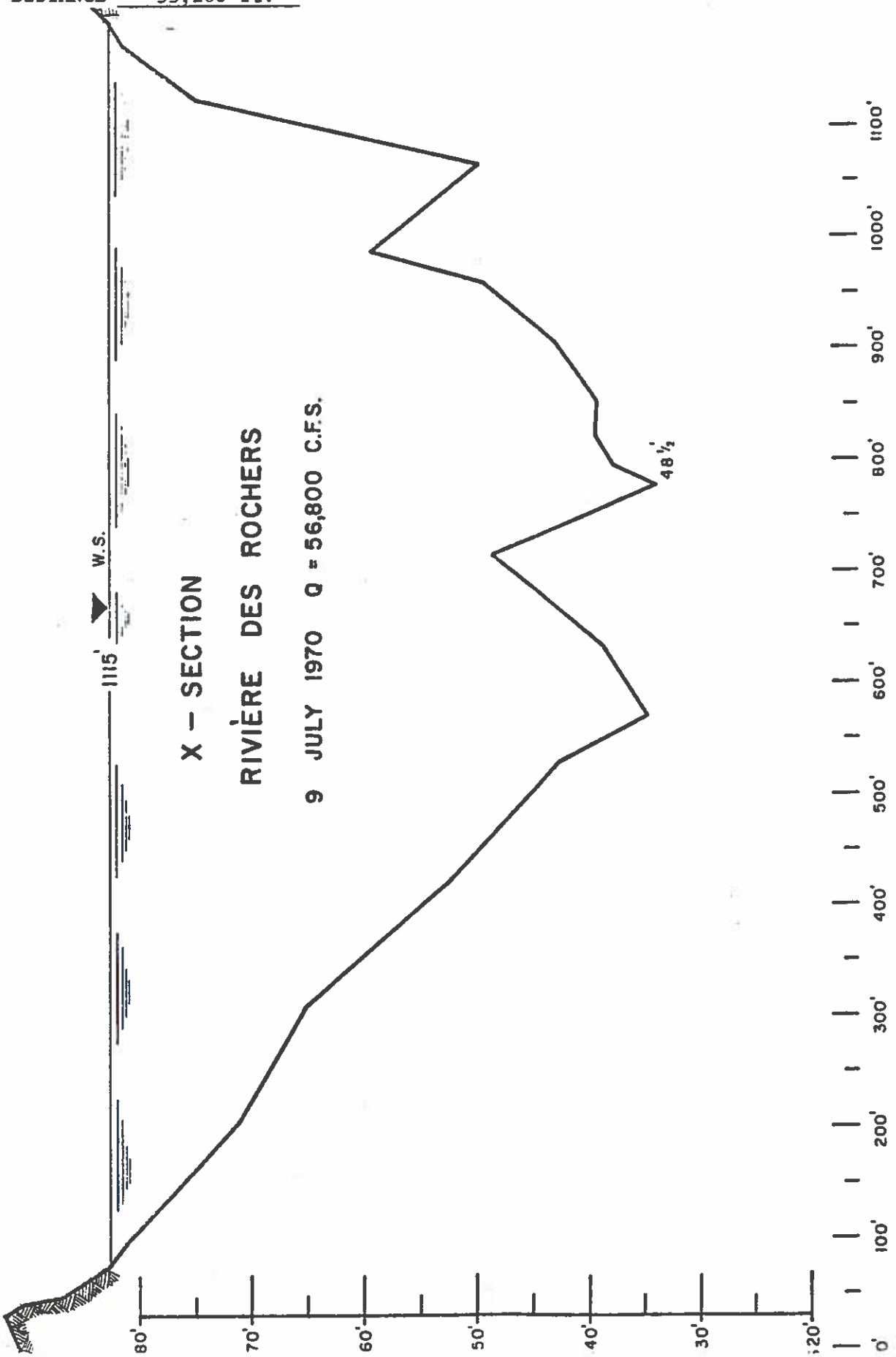
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	787.	787.	15061.	810.	15061.
670.500	792.	792.	15455.	815.	15455.
671.000	797.	797.	15853.	820.	15853.
671.500	801.	801.	16252.	825.	16252.
672.000	807.	807.	16654.	830.	16654.
672.500	813.	813.	17059.	837.	17059.
673.000	820.	820.	17467.	844.	17467.
673.500	827.	827.	17879.	851.	17879.
674.000	833.	833.	18294.	857.	18294.
674.500	840.	840.	18713.	864.	18713.
675.000	847.	847.	19134.	871.	19134.
675.500	853.	853.	19559.	877.	19559.
676.000	860.	860.	19987.	884.	19987.
676.500	867.	867.	20419.	891.	20419.
677.000	873.	873.	20854.	897.	20854.
677.500	880.	880.	21292.	904.	21292.
678.000	884.	884.	21733.	909.	21733.
678.500	889.	889.	22177.	913.	22177.
679.000	893.	893.	22622.	918.	22622.
679.500	898.	898.	23070.	923.	23070.
680.000	902.	902.	23520.	927.	23520.
680.500	907.	907.	23972.	932.	23972.
681.000	913.	913.	24427.	938.	24427.
681.500	920.	920.	24885.	945.	24885.
682.000	926.	926.	25347.	952.	25347.
682.500	933.	933.	25811.	958.	25811.
683.000	940.	940.	26280.	965.	26280.
683.500	946.	946.	26751.	972.	26751.
684.000	953.	953.	27226.	979.	27226.
684.500	959.	959.	27704.	985.	27704.
685.000	966.	966.	28185.	992.	28185.
685.500	973.	973.	28670.	999.	28670.
686.000	979.	979.	29158.	1005.	29158.
686.500	986.	986.	29649.	1012.	29649.
687.000	992.	992.	30144.	1018.	30144.
687.500	998.	998.	30641.	1025.	30641.
688.000	1005.	1005.	31142.	1031.	31142.
688.500	1011.	1011.	31646.	1037.	31646.
689.000	1016.	1016.	32153.	1042.	32153.
689.500	1019.	1019.	32661.	1045.	32661.
690.000	1022.	1022.	33171.	1049.	33171.
690.500	1024.	1024.	33683.	1052.	33683.
691.000	1027.	1027.	34196.	1055.	34196.
691.500	1030.	1030.	34710.	1058.	34710.
692.000	1036.	1036.	35227.	1064.	35227.
692.500	1044.	1044.	35747.	1072.	35747.
693.000	1052.	1052.	36271.	1080.	36271.
693.500	1059.	1059.	36799.	1087.	36799.
694.000	1066.	1066.	37330.	1094.	37330.
694.500	1073.	1073.	37865.	1101.	37865.
695.000	1080.	1080.	38403.	1108.	38403.
695.500	1087.	1087.	38945.	1115.	38945.
696.000	1094.	1094.	39490.	1123.	39490.
696.500	1101.	1101.	40039.	1130.	40039.
697.000	1108.	1108.	40592.	1137.	40592.
697.500	1115.	1115.	41147.	1144.	41147.
698.000	1122.	1122.	41707.	1151.	41707.
698.500	1129.	1129.	42269.	1158.	42269.
699.000	1136.	1136.	42836.	1165.	42836.
699.500	1143.	1143.	43405.	1172.	43405.
700.000	1150.	1150.	43979.	1179.	43979.

REACH 1500

CROSS-SECTION 4

DISTANCE 33,200 ft.



REACH 1500

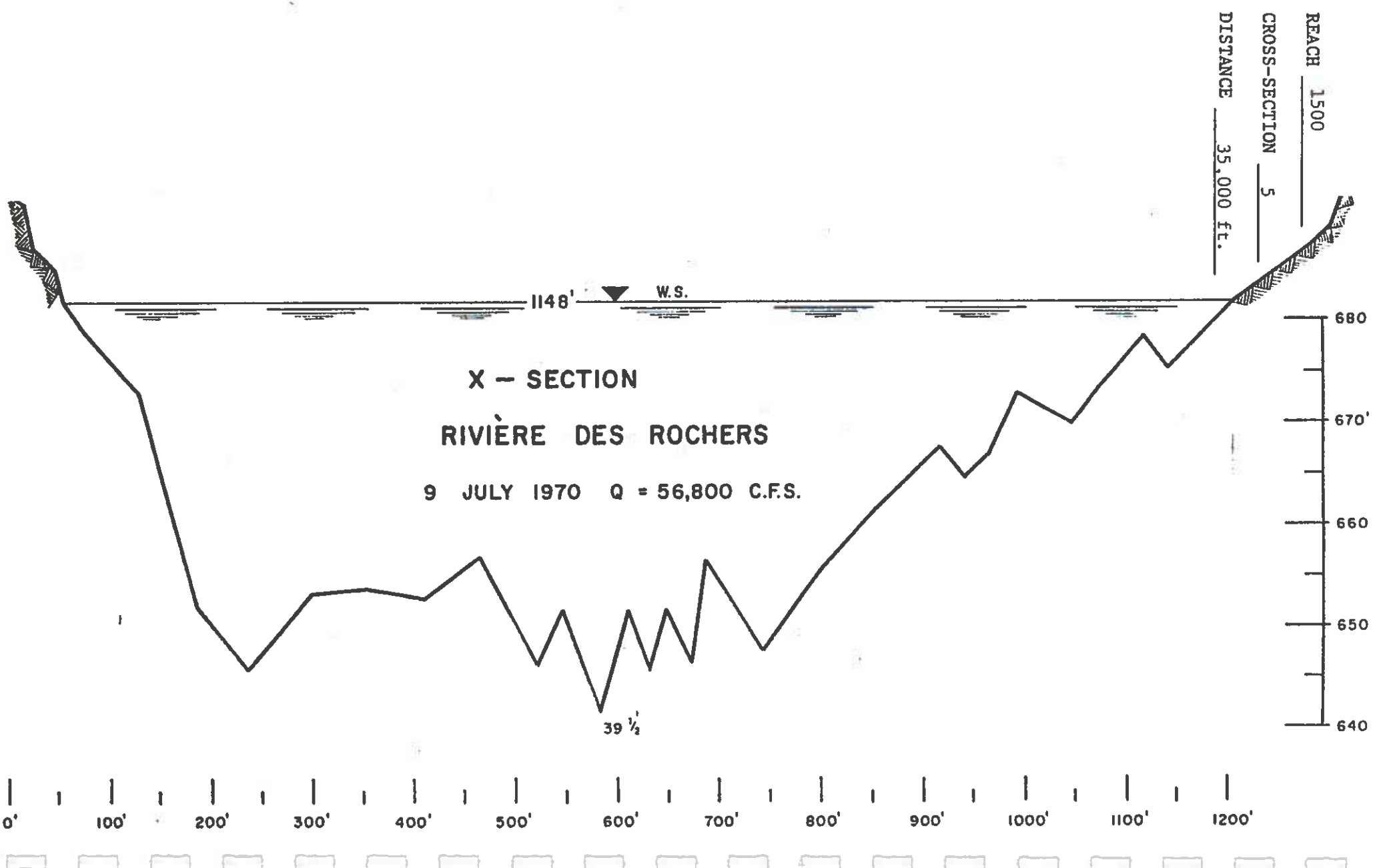
CROSS-SECTION 4

DISTANCE 33,200 ft.

LEGEND

E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	881.	881.	18374.	893.	18374.
670.500	892.	892.	18817.	904.	18817.
671.000	902.	902.	19266.	914.	19266.
671.500	911.	911.	19719.	923.	19719.
672.000	917.	917.	20176.	930.	20176.
672.500	924.	924.	20636.	936.	20636.
673.000	930.	930.	21100.	943.	21100.
673.500	937.	937.	21566.	950.	21566.
674.000	943.	943.	22036.	956.	22036.
674.500	949.	949.	22509.	963.	22509.
675.000	957.	957.	22986.	971.	22986.
675.500	967.	967.	23467.	980.	23467.
676.000	976.	976.	23952.	989.	23952.
676.500	985.	985.	24443.	998.	24443.
677.000	994.	994.	24937.	1008.	24937.
677.500	1003.	1003.	25437.	1017.	25437.
678.000	1012.	1012.	25940.	1026.	25940.
678.500	1021.	1021.	26449.	1035.	26449.
679.000	1030.	1030.	26962.	1044.	26962.
679.500	1040.	1040.	27479.	1053.	27479.
680.000	1049.	1049.	28001.	1063.	28001.
680.500	1058.	1058.	28528.	1072.	28528.
681.000	1067.	1067.	29059.	1081.	29059.
681.500	1076.	1076.	29595.	1090.	29595.
682.000	1091.	1091.	30136.	1105.	30136.
682.500	1107.	1107.	30686.	1121.	30686.
683.000	1119.	1119.	31243.	1133.	31243.
683.500	1127.	1127.	31805.	1141.	31805.
684.000	1135.	1135.	32370.	1150.	32370.
684.500	1143.	1143.	32940.	1158.	32940.
685.000	1151.	1151.	33513.	1166.	33513.
685.500	1159.	1159.	34091.	1174.	34091.
686.000	1167.	1167.	34673.	1182.	34673.
686.500	1175.	1175.	35258.	1190.	35258.
687.000	1183.	1183.	35848.	1198.	35848.
687.500	1190.	1190.	36441.	1205.	36441.
688.000	1196.	1196.	37038.	1211.	37038.
688.500	1202.	1202.	37637.	1217.	37637.
689.000	1208.	1208.	38240.	1223.	38240.
689.500	1213.	1213.	38845.	1229.	38845.
690.000	1217.	1217.	39453.	1232.	39453.
690.500	1219.	1219.	40062.	1235.	40062.
691.000	1224.	1224.	40672.	1240.	40672.
691.500	1232.	1232.	41286.	1248.	41286.
692.000	1240.	1240.	41904.	1256.	41904.
692.500	1246.	1246.	42526.	1262.	42526.
693.000	1252.	1252.	43150.	1268.	43150.
693.500	1258.	1258.	43778.	1274.	43778.
694.000	1264.	1264.	44408.	1280.	44408.
694.500	1270.	1270.	45042.	1287.	45042.
695.000	1276.	1276.	45678.	1293.	45678.
695.500	1282.	1282.	46318.	1299.	46318.
696.000	1288.	1288.	46960.	1305.	46960.
696.500	1294.	1294.	47606.	1311.	47606.
697.000	1300.	1300.	48254.	1317.	48254.
697.500	1306.	1306.	48906.	1323.	48906.
698.000	1312.	1312.	49560.	1329.	49560.
698.500	1318.	1318.	50217.	1335.	50217.
699.000	1324.	1324.	50878.	1341.	50878.
699.500	1329.	1329.	51541.	1347.	51541.
700.000	1335.	1335.	52207.	1353.	52207.


REACH 1500
CROSS-SECTION 5
DISTANCE 35,000 ft.
1148'
W.S.
X – SECTION
RIVIÈRE DES ROCHERS
9 JULY 1970 Q = 56,800 C.F.S.
39 ½'
680
670'
660
650
640
0'
100'
200'
300'
400'
500'
600'
700'
800'
900'
1000'
1100'
1200'

REACH 1500

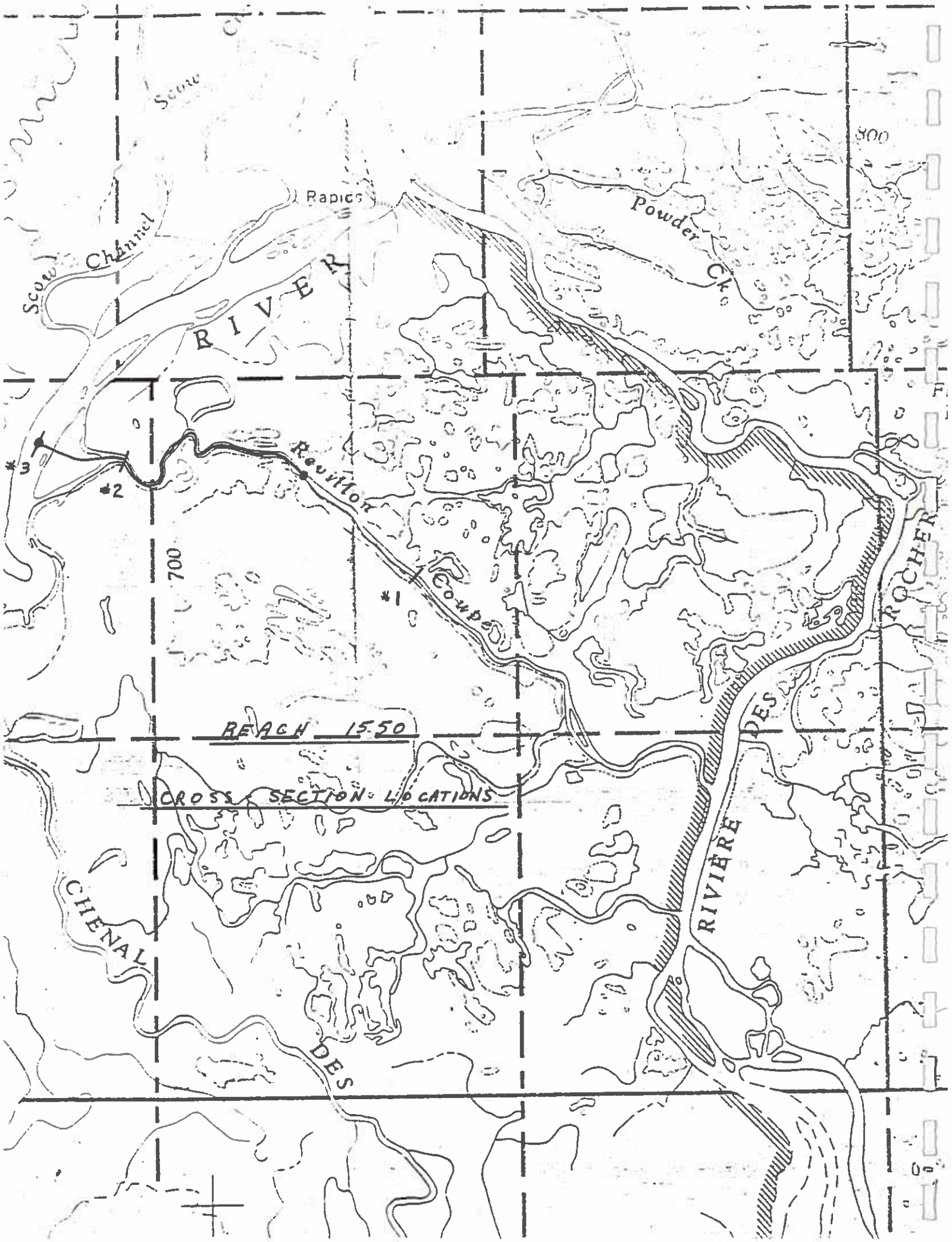
CROSS-SECTION 5

DISTANCE 35,000 ft.

LEGEND

E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	843.	843.	13281.	859.	13281.
670.500	859.	859.	13707.	876.	13707.
671.000	875.	875.	14140.	892.	14140.
671.500	891.	891.	14582.	908.	14582.
672.000	908.	908.	15032.	925.	15032.
672.500	924.	924.	15489.	941.	15489.
673.000	936.	936.	15955.	953.	15955.
673.500	944.	944.	16425.	962.	16425.
674.000	954.	954.	16899.	971.	16899.
674.500	963.	963.	17378.	981.	17378.
675.000	972.	972.	17862.	990.	17862.
675.500	985.	985.	18351.	1003.	18351.
676.000	1003.	1003.	18848.	1021.	18848.
676.500	1021.	1021.	19354.	1039.	19354.
677.000	1039.	1039.	19868.	1057.	19868.
677.500	1056.	1056.	20392.	1075.	20392.
678.000	1074.	1074.	20925.	1093.	20925.
678.500	1091.	1091.	21466.	1109.	21466.
679.000	1100.	1100.	22014.	1118.	22014.
679.500	1108.	1108.	22566.	1127.	22566.
680.000	1116.	1116.	23122.	1135.	23122.
680.500	1125.	1125.	23682.	1144.	23682.
681.000	1134.	1134.	24247.	1153.	24247.
681.500	1143.	1143.	24816.	1162.	24816.
682.000	1151.	1151.	25390.	1170.	25390.
682.500	1159.	1159.	25967.	1178.	25967.
683.000	1167.	1167.	26549.	1186.	26549.
683.500	1175.	1175.	27134.	1194.	27134.
684.000	1183.	1183.	27723.	1202.	27723.
684.500	1191.	1191.	28317.	1211.	28317.
685.000	1199.	1199.	28914.	1219.	28914.
685.500	1212.	1212.	29517.	1232.	29517.
686.000	1225.	1225.	30126.	1245.	30126.
686.500	1238.	1238.	30742.	1258.	30742.
687.000	1250.	1250.	31364.	1270.	31364.
687.500	1257.	1257.	31991.	1278.	31991.
688.000	1264.	1264.	32622.	1284.	32622.
688.500	1270.	1270.	33255.	1291.	33255.
689.000	1276.	1276.	33892.	1297.	33892.
689.500	1279.	1279.	34530.	1300.	34530.
690.000	1282.	1282.	35171.	1303.	35171.
690.500	1284.	1284.	35812.	1306.	35812.
691.000	1287.	1287.	36455.	1308.	36455.
691.500	1292.	1292.	37099.	1313.	37099.
692.000	1300.	1300.	37747.	1322.	37747.
692.500	1309.	1309.	38399.	1331.	38399.
693.000	1313.	1313.	39055.	1336.	39055.
693.500	1319.	1319.	39713.	1341.	39713.
694.000	1324.	1324.	40374.	1347.	40374.
694.500	1330.	1330.	41037.	1352.	41037.
695.000	1335.	1335.	41703.	1358.	41703.
695.500	1341.	1341.	42372.	1363.	42372.
696.000	1346.	1346.	43044.	1369.	43044.
696.500	1352.	1352.	43719.	1375.	43719.
697.000	1357.	1357.	44396.	1380.	44396.
697.500	1363.	1363.	45076.	1386.	45076.
698.000	1368.	1368.	45758.	1391.	45758.
698.500	1374.	1374.	46444.	1397.	46444.
699.000	1379.	1379.	47132.	1402.	47132.
699.500	1385.	1385.	47823.	1408.	47823.
700.000	1390.	1390.	48516.	1414.	48516.


Scow Channel
Rapids
RIVER
Powder Ck
800
700
Revillon
Coupe
#1
#2
#3
REACH 1550
CROSS SECTION LOCATIONS
CHENAL DES
RIVIÈRE DES
ROCHER

REACH NUMBER - 1550

DESCRIPTION - Revillon Coupe from the Structure to the Peace River

REACH LENGTH - 31,700 feet

UPSTREAM NODE - 17

DOWNSTREAM NODE - 13

CROSS-SECTION - 3

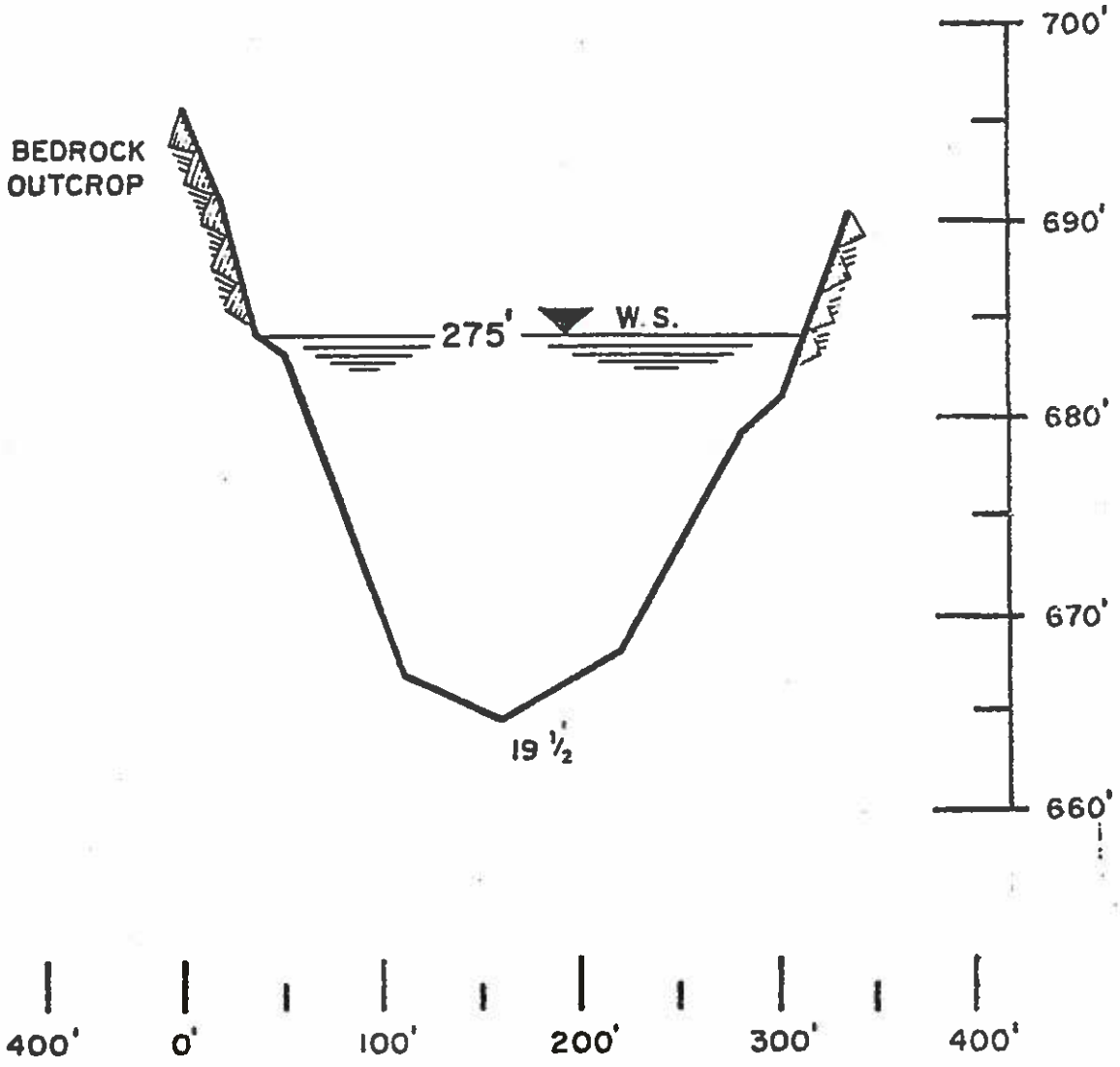
Section Number	Distance from Upstream Node (ft)
1	-12,700
2	23,800
3	31,700

REMARKS: Cross-sections 1 and 2 were surveyed in 1970 by the Technical Services Division of Alberta Environment. Cross-section 2 was transposed to the end of the reach and was relabelled as cross-section 3.

REACH 1550

CROSS-SECTION 1

DISTANCE - 12,700 ft.



X — SECTION

REVILLON COUPÉ

10 JULY 1970 Q = 2100 C.F.S.

REACH 1550

CROSS-SECTION 1

DISTANCE -12,700 ft.

LEGEND

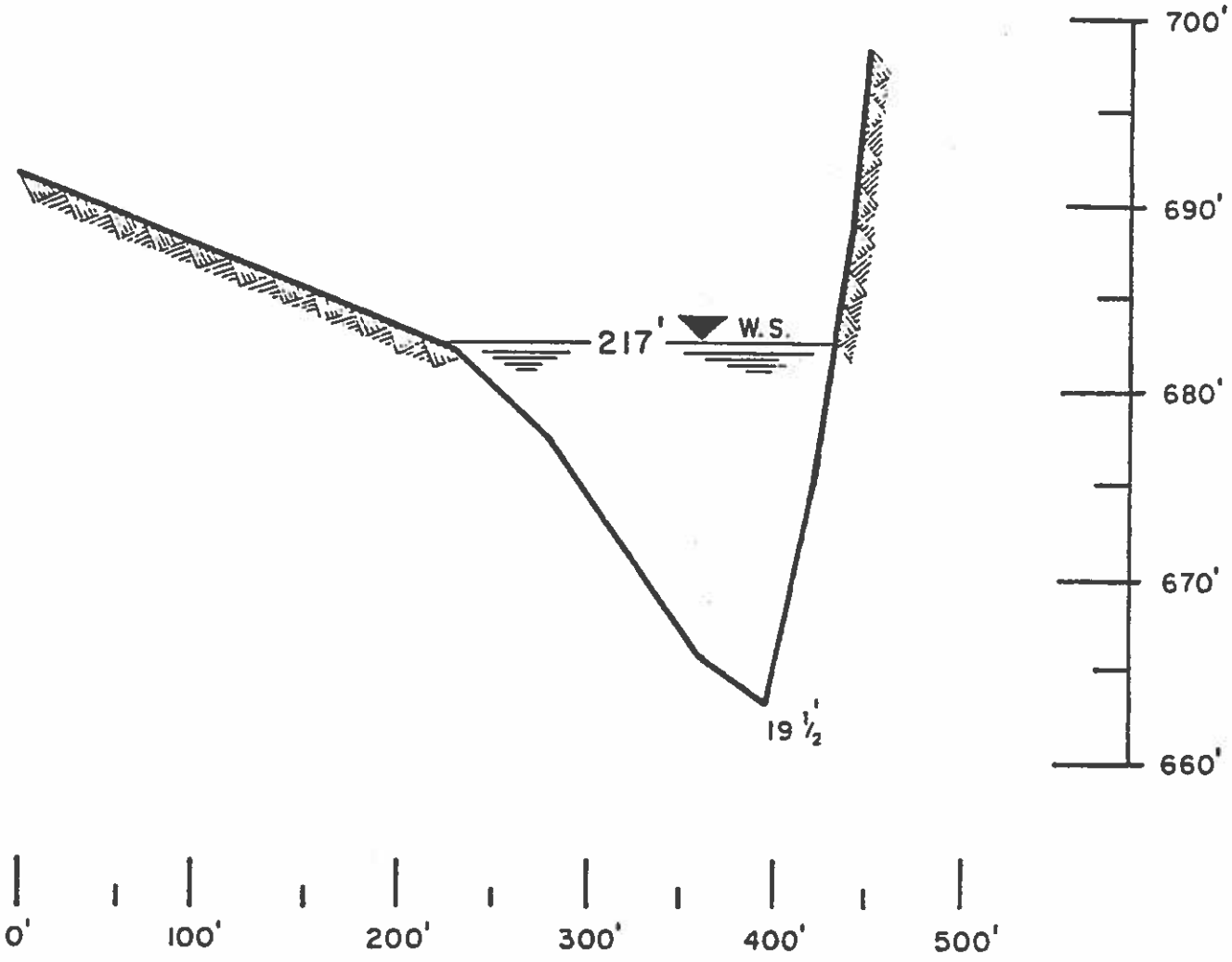
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	131.	131.	460.	132.	460.
670.500	135.	135.	526.	136.	526.
671.000	140.	140.	595.	141.	595.
671.500	145.	145.	666.	146.	666.
672.000	149.	149.	740.	150.	740.
672.500	154.	154.	815.	155.	815.
673.000	159.	159.	894.	160.	894.
673.500	163.	163.	974.	165.	974.
674.000	168.	168.	1057.	169.	1057.
674.500	172.	172.	1142.	174.	1142.
675.000	177.	177.	1229.	179.	1229.
675.500	182.	182.	1319.	184.	1319.
676.000	186.	186.	1411.	188.	1411.
676.500	191.	191.	1505.	193.	1505.
677.000	195.	195.	1601.	198.	1601.
677.500	200.	200.	1700.	202.	1700.
678.000	205.	205.	1801.	207.	1801.
678.500	209.	209.	1905.	212.	1905.
679.000	214.	214.	2010.	217.	2010.
679.500	220.	220.	2119.	223.	2119.
680.000	227.	227.	2230.	230.	2230.
680.500	233.	233.	2345.	236.	2345.
681.000	240.	240.	2464.	243.	2464.
681.500	245.	245.	2585.	248.	2585.
682.000	249.	249.	2709.	252.	2709.
682.500	252.	252.	2834.	256.	2834.
683.000	256.	256.	2961.	259.	2961.
683.500	263.	263.	3090.	267.	3090.
684.000	272.	272.	3224.	275.	3224.
684.500	277.	277.	3361.	281.	3361.
685.000	280.	280.	3501.	284.	3501.
685.500	283.	283.	3641.	288.	3641.
686.000	286.	286.	3784.	291.	3784.
686.500	290.	290.	3928.	294.	3928.
687.000	293.	293.	4073.	297.	4073.
687.500	296.	296.	4221.	301.	4221.
688.000	299.	299.	4369.	304.	4369.
688.500	302.	302.	4520.	307.	4520.
689.000	305.	305.	4671.	311.	4671.
689.500	309.	309.	4825.	314.	4825.
690.000	312.	312.	4980.	317.	4980.
690.500	315.	315.	5137.	321.	5137.
691.000	318.	318.	5295.	324.	5295.
691.500	322.	322.	5455.	328.	5455.
692.000	326.	326.	5617.	332.	5617.
692.500	330.	330.	5780.	336.	5780.
693.000	334.	334.	5946.	340.	5946.
693.500	338.	338.	6114.	344.	6114.
694.000	341.	341.	6284.	348.	6284.
694.500	345.	345.	6455.	352.	6455.
695.000	349.	349.	6629.	356.	6629.
695.500	353.	353.	6805.	360.	6805.
696.000	357.	357.	6982.	365.	6982.
696.500	361.	361.	7162.	369.	7162.
697.000	366.	366.	7344.	373.	7344.
697.500	370.	370.	7528.	377.	7528.
698.000	374.	374.	7713.	381.	7713.
698.500	378.	378.	7901.	386.	7901.
699.000	382.	382.	8091.	390.	8091.
699.500	386.	386.	8283.	394.	8283.
700.000	390.	390.	8477.	398.	8477.

REACH 1550

CROSS-SECTION 2

DISTANCE 23,800 ft.



X — SECTION

REVILLON COUPÉ

10 JULY 1970 Q = 2100 C.F.S.

REACH 1550

CROSS-SECTION 2

DISTANCE 23,800 ft.

LEGEND

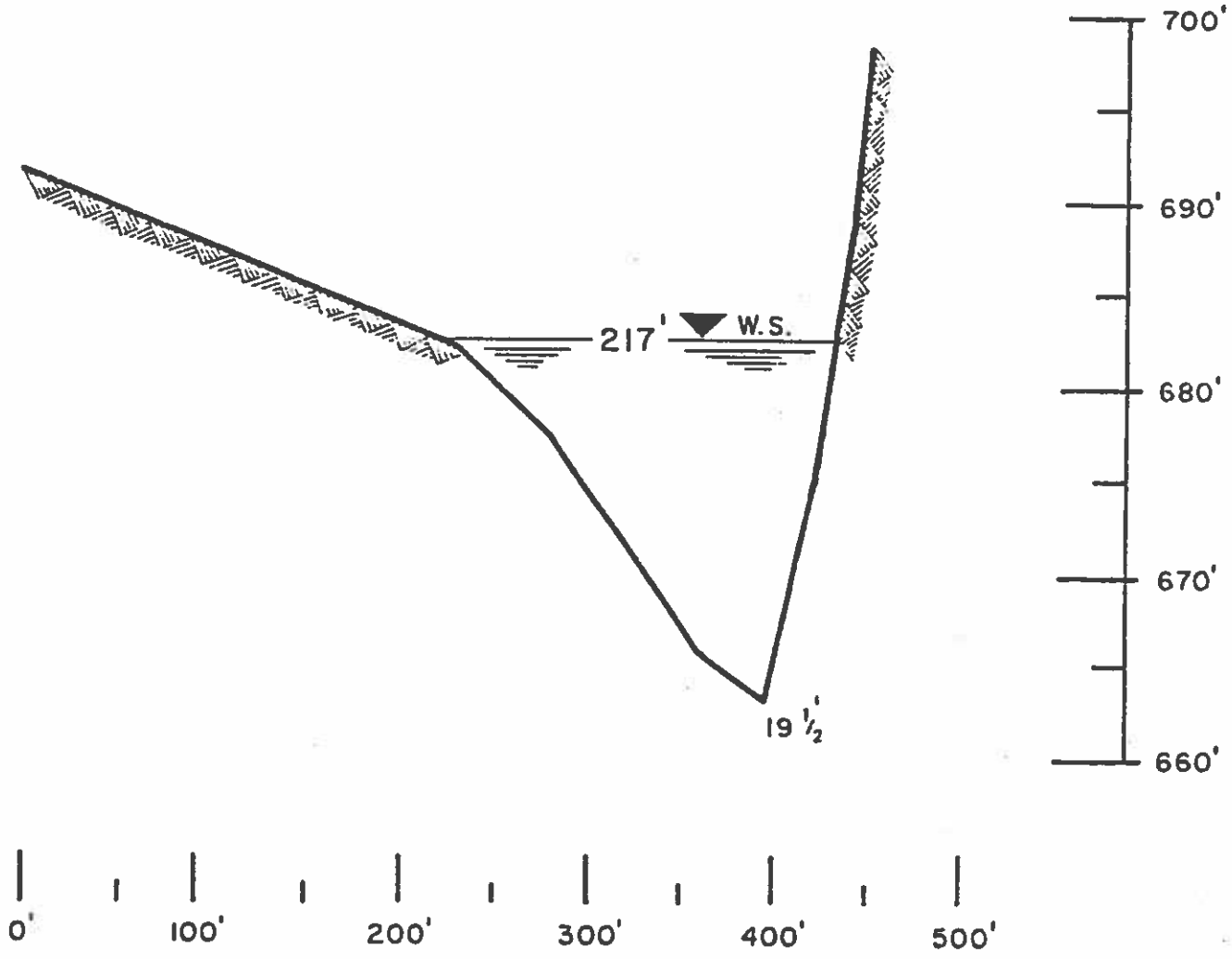
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	80.	80.	320.	82.	320.
670.500	85.	85.	361.	87.	361.
671.000	89.	89.	405.	92.	405.
671.500	94.	94.	451.	96.	451.
672.000	98.	98.	499.	101.	499.
672.500	103.	103.	549.	105.	549.
673.000	107.	107.	602.	110.	602.
673.500	112.	112.	656.	115.	656.
674.000	116.	116.	713.	119.	713.
674.500	121.	121.	773.	124.	773.
675.000	125.	125.	834.	128.	834.
675.500	129.	129.	898.	132.	898.
676.000	133.	133.	963.	137.	963.
676.500	137.	137.	1031.	141.	1031.
677.000	141.	141.	1100.	145.	1100.
677.500	145.	145.	1172.	149.	1172.
678.000	151.	151.	1246.	156.	1246.
678.500	158.	158.	1323.	162.	1323.
679.000	164.	164.	1403.	169.	1403.
679.500	170.	170.	1487.	175.	1487.
680.000	176.	176.	1573.	182.	1573.
680.500	182.	182.	1663.	188.	1663.
681.000	189.	189.	1756.	194.	1756.
681.500	195.	195.	1851.	201.	1851.
682.000	201.	201.	1950.	207.	1950.
682.500	215.	215.	2054.	221.	2054.
683.000	228.	228.	2165.	234.	2165.
683.500	241.	241.	2282.	247.	2282.
684.000	253.	253.	2406.	260.	2406.
684.500	266.	266.	2535.	273.	2535.
685.000	278.	278.	2671.	285.	2671.
685.500	291.	291.	2814.	298.	2814.
686.000	304.	304.	2963.	311.	2963.
686.500	316.	316.	3118.	324.	3118.
687.000	329.	329.	3279.	336.	3279.
687.500	341.	341.	3446.	349.	3446.
688.000	354.	354.	3620.	362.	3620.
688.500	367.	367.	3800.	375.	3800.
689.000	379.	379.	3987.	387.	3987.
689.500	391.	391.	4179.	399.	4179.
690.000	403.	403.	4378.	412.	4378.
690.500	416.	416.	4582.	425.	4582.
691.000	429.	429.	4794.	438.	4794.
691.500	442.	442.	5012.	452.	5012.
692.000	455.	455.	5236.	465.	5236.
692.500	468.	468.	5467.	478.	5467.
693.000	481.	481.	5704.	492.	5704.
693.500	494.	494.	5948.	505.	5948.
694.000	507.	507.	6199.	518.	6199.
694.500	521.	521.	6456.	532.	6456.
695.000	534.	534.	6719.	545.	6719.
695.500	545.	545.	6989.	557.	6989.
696.000	557.	557.	7265.	569.	7265.
696.500	569.	569.	7546.	581.	7546.
697.000	581.	581.	7833.	593.	7833.
697.500	592.	592.	8127.	605.	8127.
698.000	604.	604.	8426.	617.	8426.
698.500	616.	616.	8731.	629.	8731.
699.000	628.	628.	9041.	641.	9041.
699.500	639.	639.	9358.	653.	9358.
700.000	651.	651.	9681.	665.	9681.

REACH 1550

CROSS-SECTION 3

DISTANCE 31,700 ft.



X — SECTION

REVILLON COUPÉ

10 JULY 1970 Q = 2100 C.F.S.

REACH 1550

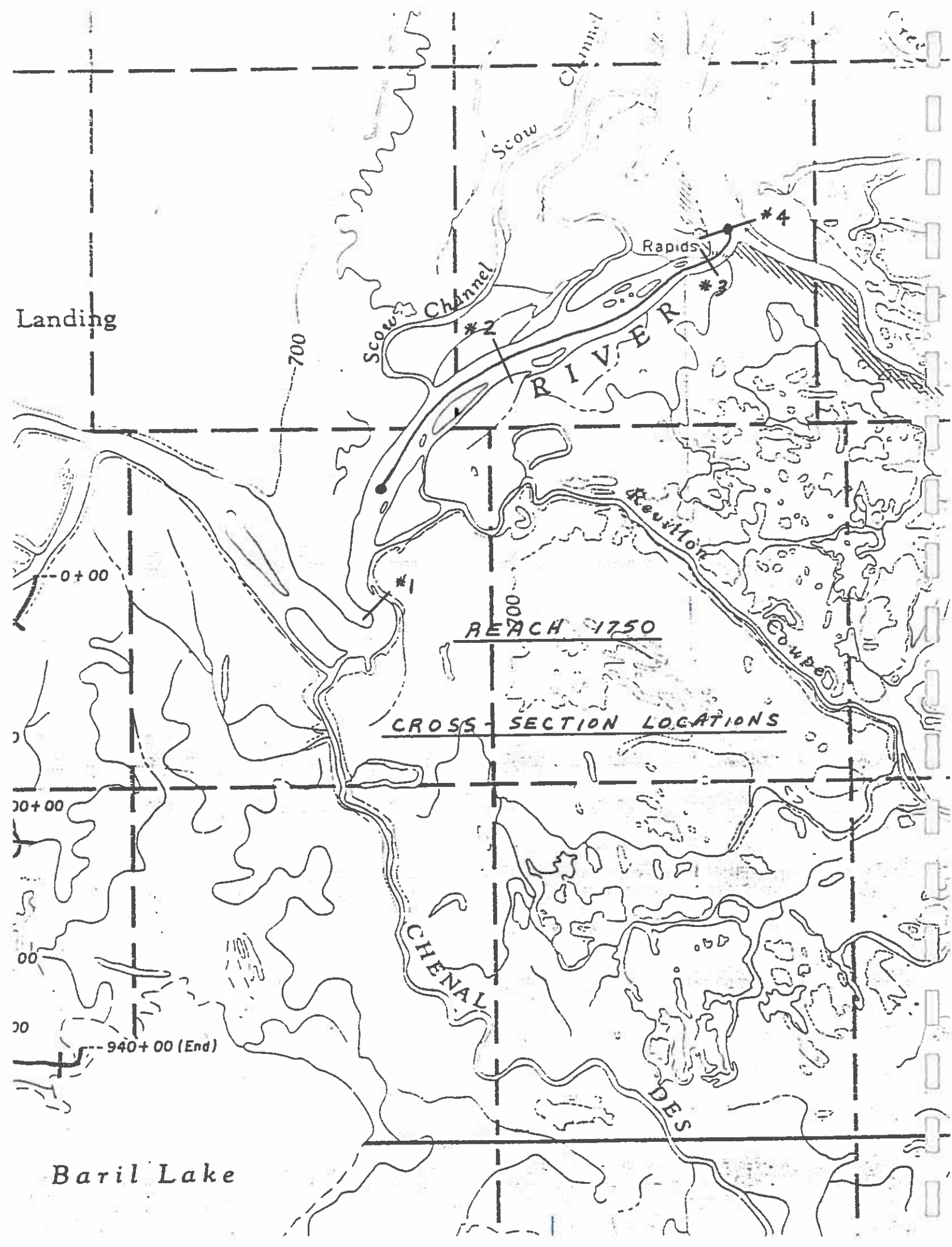
CROSS-SECTION 3

DISTANCE 31,700 ft.

LEGEND

E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	80.	80.	320.	82.	320.
670.500	85.	85.	361.	87.	361.
671.000	89.	89.	405.	92.	405.
671.500	94.	94.	451.	96.	451.
672.000	98.	98.	499.	101.	499.
672.500	103.	103.	549.	105.	549.
673.000	107.	107.	602.	110.	602.
673.500	112.	112.	656.	115.	656.
674.000	116.	116.	713.	119.	713.
674.500	121.	121.	773.	124.	773.
675.000	125.	125.	834.	128.	834.
675.500	129.	129.	898.	132.	898.
676.000	133.	133.	963.	137.	963.
676.500	137.	137.	1031.	141.	1031.
677.000	141.	141.	1100.	145.	1100.
677.500	145.	145.	1172.	149.	1172.
678.000	151.	151.	1246.	156.	1246.
678.500	158.	158.	1323.	162.	1323.
679.000	164.	164.	1403.	169.	1403.
679.500	170.	170.	1487.	175.	1487.
680.000	176.	176.	1573.	182.	1573.
680.500	162.	182.	1665.	188.	1665.
681.000	189.	189.	1756.	194.	1756.
681.500	195.	195.	1851.	201.	1851.
682.000	201.	201.	1950.	207.	1950.
682.500	215.	215.	2054.	221.	2054.
683.000	228.	228.	2165.	234.	2165.
683.500	241.	241.	2282.	247.	2282.
684.000	253.	253.	2406.	260.	2406.
684.500	266.	266.	2535.	273.	2535.
685.000	278.	278.	2671.	285.	2671.
685.500	291.	291.	2814.	298.	2814.
686.000	304.	304.	2963.	311.	2963.
686.500	316.	316.	3118.	324.	3118.
687.000	329.	329.	3279.	336.	3279.
687.500	341.	341.	3446.	349.	3446.
688.000	354.	354.	3620.	362.	3620.
688.500	367.	367.	3800.	375.	3800.
689.000	379.	379.	3987.	387.	3987.
689.500	391.	391.	4179.	399.	4179.
690.000	403.	403.	4378.	412.	4378.
690.500	416.	416.	4582.	425.	4582.
691.000	429.	429.	4794.	438.	4794.
691.500	442.	442.	5012.	452.	5012.
692.000	455.	455.	5236.	465.	5236.
692.500	468.	468.	5467.	478.	5467.
693.000	481.	481.	5704.	492.	5704.
693.500	494.	494.	5948.	505.	5948.
694.000	507.	507.	6199.	518.	6199.
694.500	521.	521.	6456.	532.	6456.
695.000	534.	534.	6719.	545.	6719.
695.500	545.	545.	6989.	557.	6989.
696.000	557.	557.	7265.	569.	7265.
696.500	569.	569.	7546.	581.	7546.
697.000	581.	581.	7833.	593.	7833.
697.500	592.	592.	8127.	605.	8127.
698.000	604.	604.	8426.	617.	8426.
698.500	616.	616.	8731.	629.	8731.
699.000	628.	628.	9041.	641.	9041.
699.500	639.	639.	9358.	653.	9358.
700.000	651.	651.	9681.	665.	9681.


Scow Channel
Scow Channel
Rapids
#4
#3
#2
#1
RIVER
Landing
700
Reuillon
Coupe
0+00
000
REACH 1750
CROSS-SECTION LOCATIONS
00+00
00
00
940+00 (End)
CHENAL
DES
Baril Lake

REACH NUMBER - 1750

DESCRIPTION - Peace River from Revillon Coupe to Riviere des Rochers

REACH LENGTH - 40,800 feet

UPSTREAM NODE - 13

DOWNSTREAM NODE - 14

CROSS-SECTION - 4

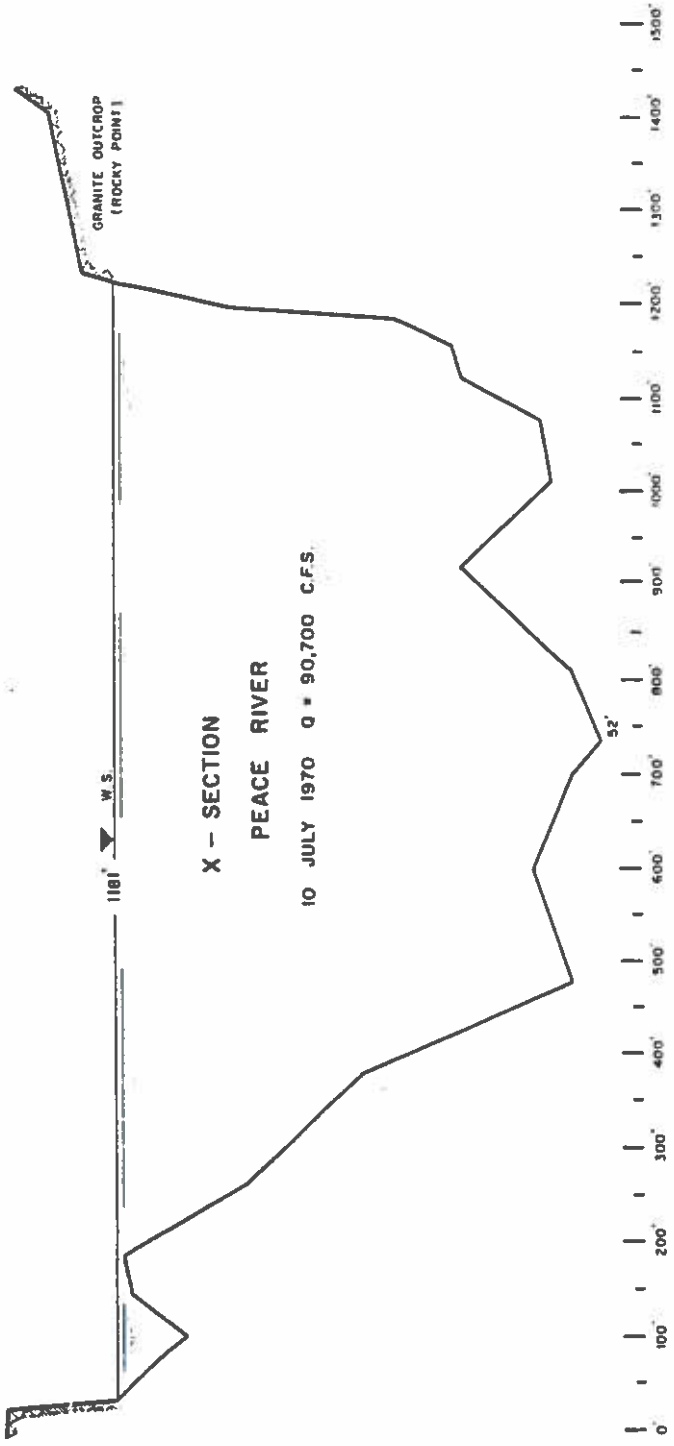
Section Number	Distance from Upstream Node (ft)
1	-11,700
2	16,700
3	37,200
4	40,800

REMARKS: These cross-sections were surveyed by the Technical Services Division of Alberta Environment in 1970. Cross-section 4 is the same as cross-section 1 in reach 1950.

REACH 1750

CROSS-SECTION 1

DISTANCE - 11,700 ft.



REACH 1750

CROSS-SECTION 1

DISTANCE -11,700 ft.

LEGEND

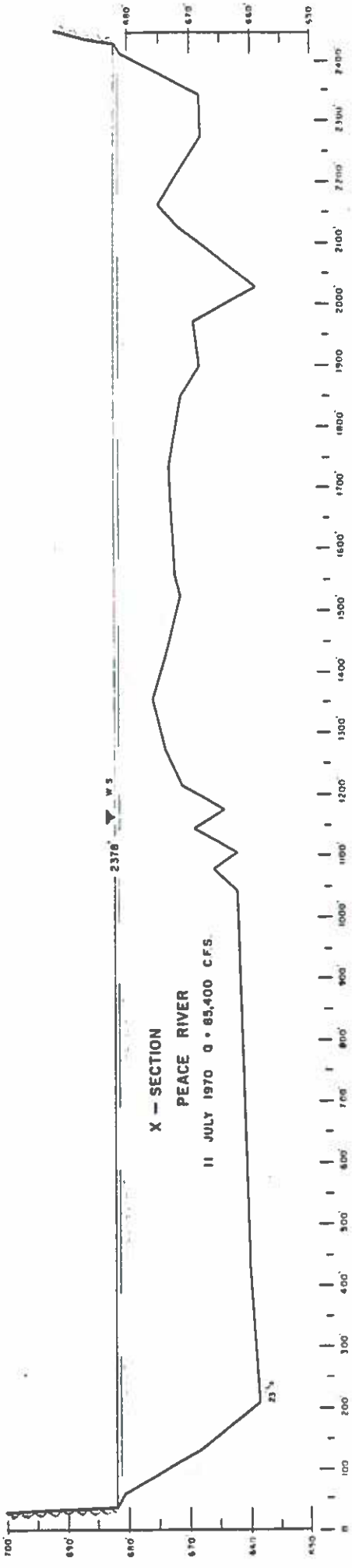
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	934.	934.	26191.	950.	26191.
670.500	937.	937.	26659.	954.	26659.
671.000	941.	941.	27129.	958.	27129.
671.500	946.	946.	27600.	962.	27600.
672.000	950.	950.	28074.	967.	28074.
672.500	954.	954.	28550.	971.	28550.
673.000	958.	958.	29028.	975.	29028.
673.500	962.	962.	29508.	979.	29508.
674.000	966.	966.	29990.	984.	29990.
674.500	970.	970.	30474.	988.	30474.
675.000	974.	974.	30960.	992.	30960.
675.500	986.	986.	31451.	1004.	31451.
676.000	998.	998.	31946.	1016.	31946.
676.500	1009.	1009.	32448.	1027.	32448.
677.000	1021.	1021.	32956.	1039.	32956.
677.500	1032.	1032.	33469.	1051.	33469.
678.000	1044.	1044.	33988.	1063.	33988.
678.500	1056.	1056.	34512.	1075.	34512.
679.000	1068.	1068.	35043.	1087.	35043.
679.500	1080.	1080.	35580.	1100.	35580.
680.000	1092.	1092.	36123.	1112.	36123.
680.500	1104.	1104.	36673.	1125.	36673.
681.000	1117.	1117.	37228.	1137.	37228.
681.500	1145.	1145.	37792.	1166.	37792.
682.000	1172.	1172.	38373.	1195.	38373.
682.500	1178.	1178.	38960.	1199.	38960.
683.000	1181.	1181.	39550.	1202.	39550.
683.500	1183.	1183.	40141.	1204.	40141.
684.000	1184.	1184.	40733.	1206.	40733.
684.500	1186.	1186.	41325.	1209.	41325.
685.000	1188.	1188.	41919.	1211.	41919.
685.500	1190.	1190.	42513.	1213.	42515.
686.000	1191.	1191.	43108.	1215.	43108.
686.500	1215.	1215.	43710.	1239.	43710.
687.000	1240.	1240.	44324.	1264.	44324.
687.500	1264.	1264.	44950.	1288.	44950.
688.000	1288.	1288.	45587.	1312.	45587.
688.500	1312.	1312.	46237.	1337.	46237.
689.000	1336.	1336.	46899.	1361.	46899.
689.500	1360.	1360.	47573.	1385.	47573.
690.000	1372.	1372.	48258.	1398.	48258.
690.500	1376.	1376.	48945.	1402.	48945.
691.000	1380.	1380.	49634.	1406.	49634.
691.500	1384.	1384.	50324.	1410.	50324.
692.000	1387.	1387.	51017.	1414.	51017.
692.500	1391.	1391.	51712.	1418.	51712.
693.000	1395.	1395.	52408.	1423.	52408.
693.500	1399.	1399.	53107.	1427.	53107.
694.000	1403.	1403.	53807.	1431.	53807.
694.500	1422.	1422.	54510.	1450.	54510.
695.000	1440.	1440.	55229.	1469.	55229.
695.500	1444.	1444.	55950.	1473.	55950.
696.000	1447.	1447.	56672.	1477.	56672.
696.500	1451.	1451.	57397.	1481.	57397.
697.000	1454.	1454.	58123.	1485.	58123.
697.500	1458.	1458.	58851.	1489.	58851.
698.000	1461.	1461.	59580.	1493.	59580.
698.500	1465.	1465.	60312.	1497.	60312.
699.000	1468.	1468.	61045.	1501.	61045.
699.500	1472.	1472.	61780.	1505.	61780.
700.000	1475.	1475.	62516.	1509.	62516.

REACH 1750

CROSS-SECTION 2

DISTANCE 16,700 ft.



REACH 1750

CROSS-SECTION 2

DISTANCE 16,700 ft.

LEGEND

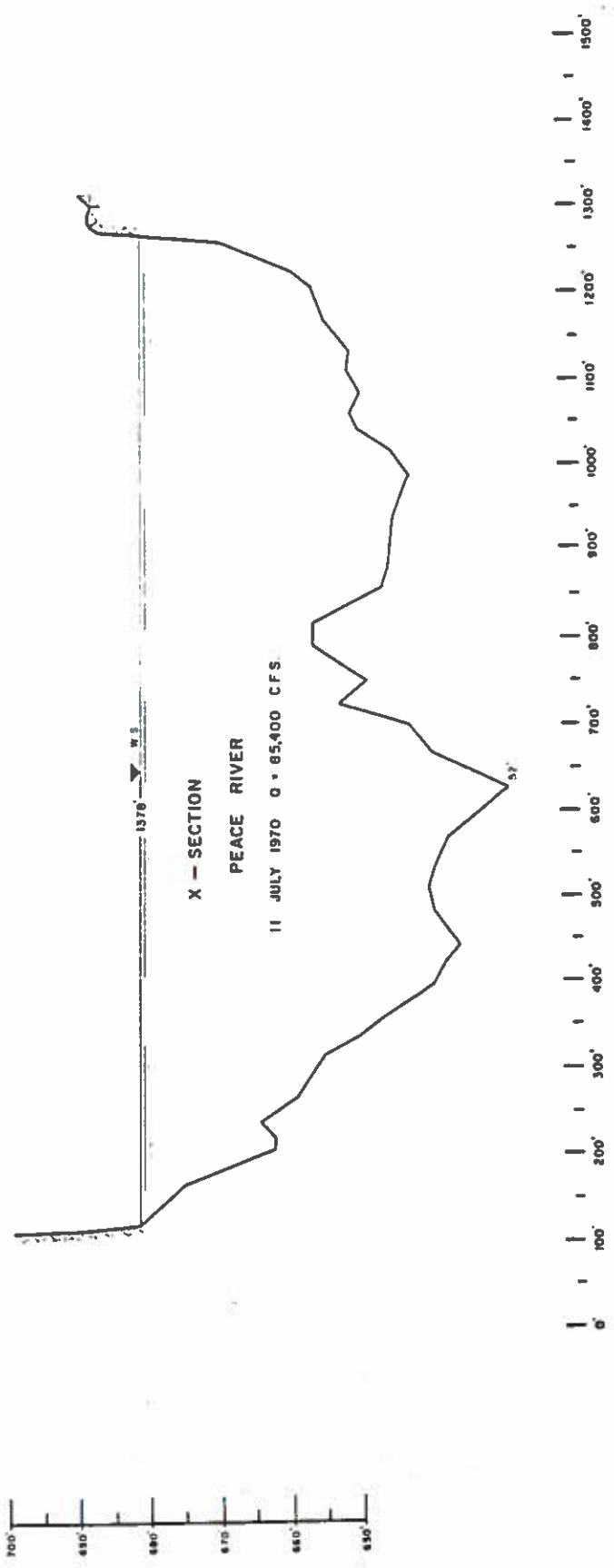
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	1441.	1441.	10171.	1446.	10171.
670.500	1470.	1470.	10899.	1475.	10899.
671.000	1498.	1498.	11641.	1503.	11641.
671.500	1579.	1579.	12407.	1584.	12407.
672.000	1675.	1675.	13221.	1680.	13221.
672.500	1844.	1844.	14101.	1849.	14101.
673.000	2013.	2013.	15065.	2019.	15065.
673.500	2058.	2058.	16082.	2064.	16082.
674.000	2107.	2107.	17123.	2113.	17123.
674.500	2162.	2162.	18190.	2168.	18190.
675.000	2216.	2216.	19285.	2222.	19285.
675.500	2258.	2258.	20403.	2264.	20403.
676.000	2285.	2285.	21541.	2291.	21541.
676.500	2291.	2291.	22685.	2297.	22685.
677.000	2296.	2296.	23832.	2303.	23832.
677.500	2302.	2302.	24981.	2309.	24981.
678.000	2307.	2307.	26133.	2314.	26133.
678.500	2313.	2313.	27288.	2320.	27288.
679.000	2319.	2319.	28446.	2326.	28446.
679.500	2324.	2324.	29607.	2331.	29607.
680.000	2330.	2330.	30771.	2337.	30771.
680.500	2335.	2335.	31937.	2343.	31937.
681.000	2341.	2341.	33106.	2348.	33106.
681.500	2359.	2359.	34281.	2366.	34281.
682.000	2377.	2377.	35465.	2384.	35465.
682.500	2378.	2378.	36654.	2386.	36654.
683.000	2379.	2379.	37843.	2387.	37843.
683.500	2380.	2380.	39032.	2389.	39032.
684.000	2381.	2381.	40223.	2390.	40223.
684.500	2382.	2382.	41413.	2392.	41413.
685.000	2382.	2382.	42604.	2393.	42604.
685.500	2383.	2383.	43796.	2394.	43796.
686.000	2384.	2384.	44987.	2396.	44987.
686.500	2385.	2385.	46180.	2397.	46180.
687.000	2386.	2386.	47373.	2399.	47373.
687.500	2388.	2388.	48566.	2401.	48566.
688.000	2389.	2389.	49760.	2403.	49760.
688.500	2390.	2390.	50955.	2404.	50955.
689.000	2392.	2392.	52151.	2406.	52151.
689.500	2393.	2393.	53347.	2408.	53347.
690.000	2395.	2395.	54544.	2410.	54544.
690.500	2397.	2397.	55742.	2412.	55742.
691.000	2398.	2398.	56941.	2414.	56941.
691.500	2400.	2400.	58140.	2416.	58140.
692.000	2401.	2401.	59341.	2418.	59341.
692.500	2402.	2402.	60542.	2420.	60542.
693.000	2403.	2403.	61743.	2421.	61743.
693.500	2404.	2404.	62945.	2422.	62945.
694.000	2405.	2405.	64147.	2424.	64147.
694.500	2406.	2406.	65349.	2425.	65349.
695.000	2406.	2406.	66552.	2427.	66552.
695.500	2408.	2408.	67756.	2429.	67756.
696.000	2410.	2410.	68961.	2431.	68961.
696.500	2412.	2412.	70166.	2434.	70166.
697.000	2414.	2414.	71373.	2436.	71373.
697.500	2416.	2416.	72580.	2439.	72580.
698.000	2418.	2418.	73789.	2441.	73789.
698.500	2420.	2420.	74999.	2443.	74999.
699.000	2422.	2422.	76209.	2446.	76209.
699.500	2424.	2424.	77421.	2448.	77421.
700.000	2426.	2426.	78633.	2451.	78633.

REACH 1750

CROSS-SECTION 3

DISTANCE 37,200 ft.



REACH 1750

CROSS-SECTION 3

DISTANCE 37,200 ft.

LEGEND

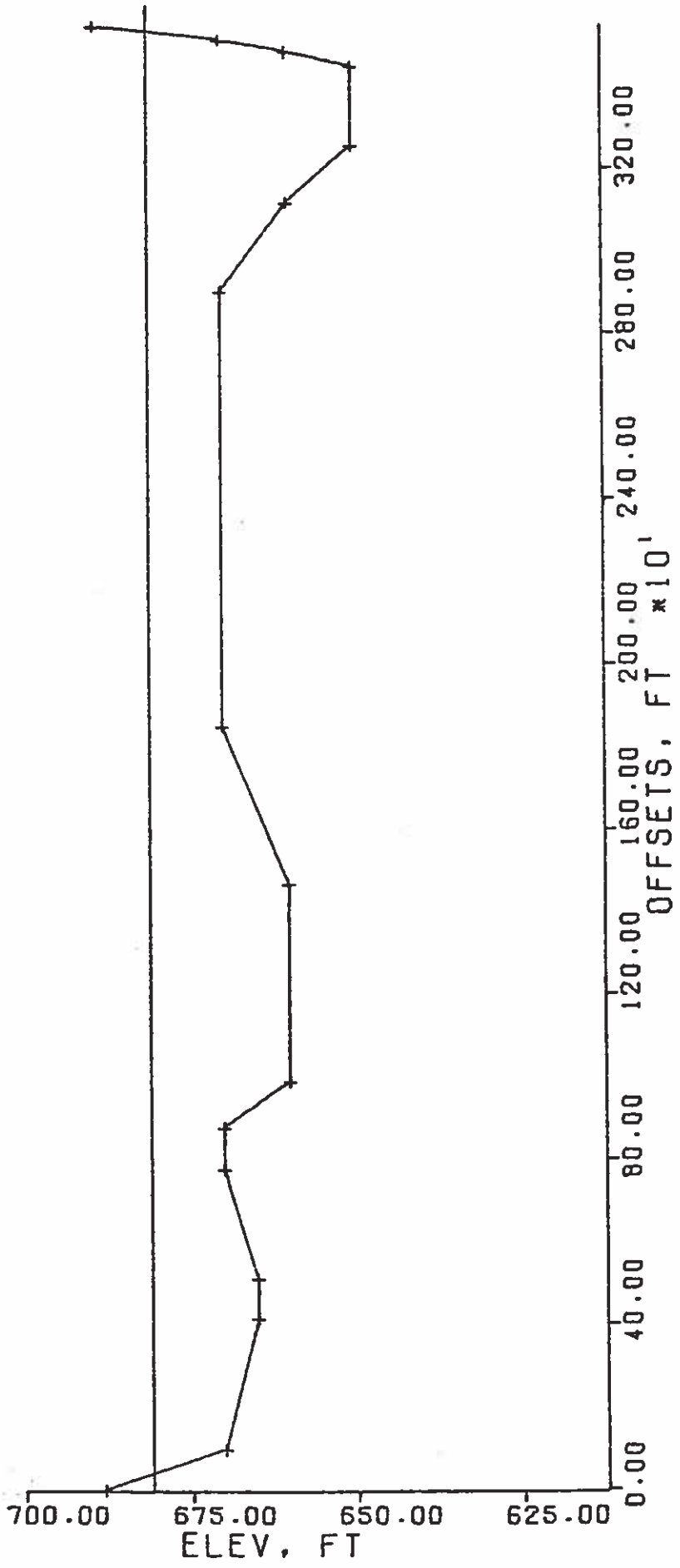
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	1294.	1294.	27440.	1304.	27440.
670.500	1296.	1296.	28068.	1307.	28088.
671.000	1298.	1298.	28736.	1310.	28736.
671.500	1301.	1301.	29386.	1312.	29386.
672.000	1303.	1303.	30037.	1315.	30037.
672.500	1305.	1305.	30689.	1317.	30689.
673.000	1307.	1307.	31342.	1320.	31342.
673.500	1310.	1310.	31997.	1323.	31997.
674.000	1312.	1312.	32652.	1325.	32652.
674.500	1314.	1314.	33309.	1328.	33309.
675.000	1317.	1317.	33966.	1330.	33966.
675.500	1319.	1319.	34625.	1333.	34625.
676.000	1324.	1324.	35286.	1338.	35286.
676.500	1329.	1329.	35949.	1343.	35949.
677.000	1333.	1333.	36614.	1348.	36614.
677.500	1338.	1338.	37282.	1354.	37282.
678.000	1343.	1343.	37952.	1359.	37952.
678.500	1348.	1348.	38625.	1364.	38625.
679.000	1353.	1353.	39300.	1369.	39300.
679.500	1358.	1358.	39978.	1374.	39978.
680.000	1362.	1362.	40658.	1379.	40658.
680.500	1367.	1367.	41340.	1384.	41340.
681.000	1373.	1373.	42025.	1390.	42025.
681.500	1378.	1378.	42713.	1396.	42713.
682.000	1379.	1379.	43402.	1397.	43402.
682.500	1380.	1380.	44092.	1398.	44092.
683.000	1380.	1380.	44782.	1399.	44782.
683.500	1381.	1381.	45472.	1401.	45472.
684.000	1382.	1382.	46163.	1402.	46163.
684.500	1383.	1383.	46854.	1403.	46854.
685.000	1384.	1384.	47546.	1405.	47546.
685.500	1384.	1384.	48238.	1406.	48238.
686.000	1385.	1385.	48930.	1407.	48930.
686.500	1386.	1386.	49623.	1408.	49623.
687.000	1387.	1387.	50316.	1410.	50316.
687.500	1387.	1387.	51009.	1411.	51009.
688.000	1390.	1390.	51704.	1414.	51704.
688.500	1393.	1393.	52400.	1417.	52400.
689.000	1412.	1412.	53101.	1437.	53101.
689.500	1432.	1432.	53816.	1457.	53816.
690.000	1437.	1437.	54533.	1462.	54533.
690.500	1441.	1441.	55253.	1467.	55253.
691.000	1445.	1445.	55974.	1470.	55974.
691.500	1448.	1448.	56697.	1474.	56697.
692.000	1451.	1451.	57422.	1477.	57422.
692.500	1454.	1454.	58148.	1481.	58148.
693.000	1458.	1458.	58876.	1464.	58876.
693.500	1461.	1461.	59606.	1488.	59606.
694.000	1464.	1464.	60337.	1491.	60337.
694.500	1467.	1467.	61070.	1495.	61070.
695.000	1471.	1471.	61804.	1499.	61804.
695.500	1474.	1474.	62540.	1502.	62540.
696.000	1478.	1478.	63278.	1506.	63278.
696.500	1482.	1482.	64018.	1510.	64018.
697.000	1486.	1486.	64760.	1514.	64760.
697.500	1489.	1489.	65504.	1518.	65504.
698.000	1493.	1493.	66249.	1523.	66249.
698.500	1497.	1497.	66997.	1527.	66997.
699.000	1501.	1501.	67747.	1531.	67747.
699.500	1505.	1505.	68498.	1535.	68498.
700.000	1509.	1509.	69252.	1539.	69252.

REACH 1750

CROSS-SECTION 4

DISTANCE 40,800 ft.



REACH 1750

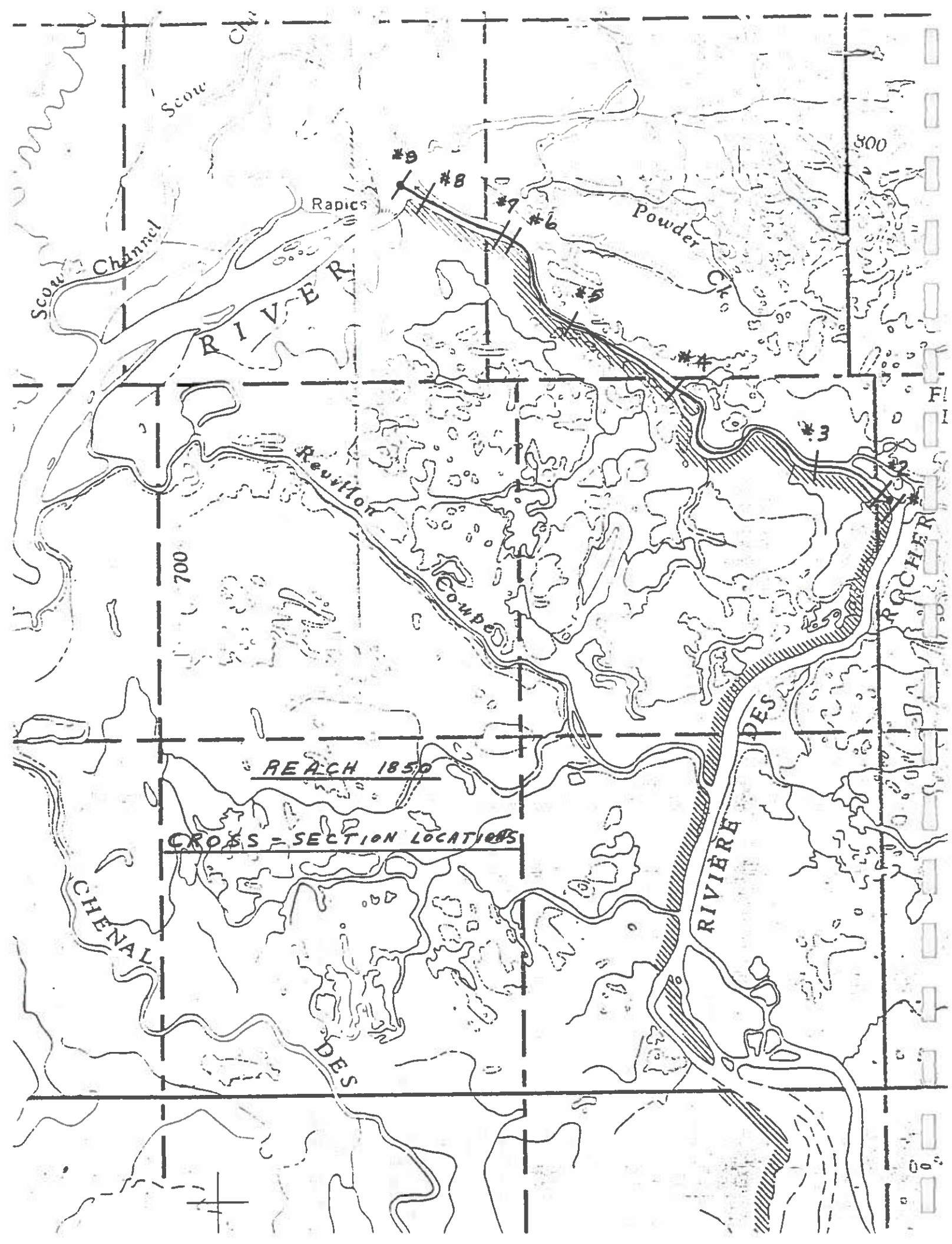
CROSS-SECTION 4

DISTANCE 40,800 ft.

LEGEND

E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	2260.	2260.	16835.	2265.	16835.
670.500	3416.	3416.	18542.	3420.	18542.
671.000	3420.	3420.	20251.	3424.	20251.
671.500	3423.	3423.	21961.	3428.	21961.
672.000	3427.	3427.	23674.	3432.	23674.
672.500	3431.	3431.	25389.	3436.	25389.
673.000	3434.	3434.	27105.	3440.	27105.
673.500	3438.	3438.	28823.	3444.	28823.
674.000	3442.	3442.	30543.	3448.	30543.
674.500	3446.	3446.	32265.	3451.	32265.
675.000	3449.	3449.	33988.	3455.	33988.
675.500	3453.	3453.	35714.	3459.	35714.
676.000	3457.	3457.	37441.	3463.	37441.
676.500	3460.	3460.	39171.	3467.	39171.
677.000	3464.	3464.	40902.	3471.	40902.
677.500	3468.	3468.	42635.	3475.	42635.
678.000	3471.	3471.	44369.	3478.	44369.
678.500	3475.	3475.	46106.	3482.	46106.
679.000	3479.	3479.	47844.	3486.	47844.
679.500	3482.	3482.	49585.	3490.	49585.
680.000	3486.	3486.	51327.	3494.	51327.
680.500	3490.	3490.	53071.	3498.	53071.
681.000	3493.	3493.	54817.	3502.	54817.
681.500	3497.	3497.	56564.	3505.	56564.
682.000	3501.	3501.	58314.	3509.	58314.
682.500	3505.	3505.	60065.	3513.	60065.
683.000	3508.	3508.	61818.	3517.	61818.
683.500	3512.	3512.	63573.	3521.	63573.
684.000	3516.	3516.	65330.	3525.	65330.
684.500	3519.	3519.	67089.	3529.	67089.
685.000	3523.	3523.	68850.	3533.	68850.
685.500	3527.	3527.	70612.	3536.	70612.
686.000	3530.	3530.	72376.	3540.	72376.
686.500	3534.	3534.	74142.	3544.	74142.
687.000	3538.	3538.	75910.	3548.	75910.
687.500	3541.	3541.	77680.	3552.	77680.
688.000	3545.	3545.	79452.	3556.	79452.
688.500	3547.	3547.	81225.	3558.	81225.
689.000	3549.	3549.	82999.	3560.	82999.
689.500	3551.	3551.	84774.	3562.	84774.
690.000	3553.	3553.	86550.	3565.	86550.
690.500	3555.	3555.	88327.	3567.	88327.
691.000	3557.	3557.	90105.	3569.	90105.
691.500	3559.	3559.	91884.	3571.	91884.
692.000	3561.	3561.	93664.	3573.	93664.
692.500	3563.	3563.	95445.	3576.	95445.
693.000	3565.	3565.	97227.	3578.	97227.
693.500	3567.	3567.	99010.	3580.	99010.
694.000	3569.	3569.	100794.	3582.	100794.
694.500	3571.	3571.	102579.	3585.	102579.
695.000	3573.	3573.	104365.	3587.	104365.
695.500	3575.	3575.	106152.	3589.	106152.
696.000	3577.	3577.	107940.	3591.	107940.
696.500	3579.	3579.	109729.	3594.	109729.
697.000	3581.	3581.	111519.	3596.	111519.
697.500	3583.	3583.	113310.	3598.	113310.
698.000	3585.	3585.	115102.	3600.	115102.
698.500	3587.	3587.	116895.	3603.	116895.
699.000	3589.	3589.	118689.	3605.	118689.
699.500	3591.	3591.	120484.	3607.	120484.
700.000	3593.	3593.	122280.	3609.	122280.


Scow Channel
RIVER
Rapics
#9
#8
#7
#6
#5
#4
#3
#2
#1
Powder Cr.
Revillon
Coupe
700
800
REACH 1850
CROSS-SECTION LOCATIONS
CHENAL DES
RIVIÈRE DES

REACH NUMBER - 1850

DESCRIPTION - Riviere des Rochers from the Structure to the Peace River

REACH LENGTH - 57,100 feet

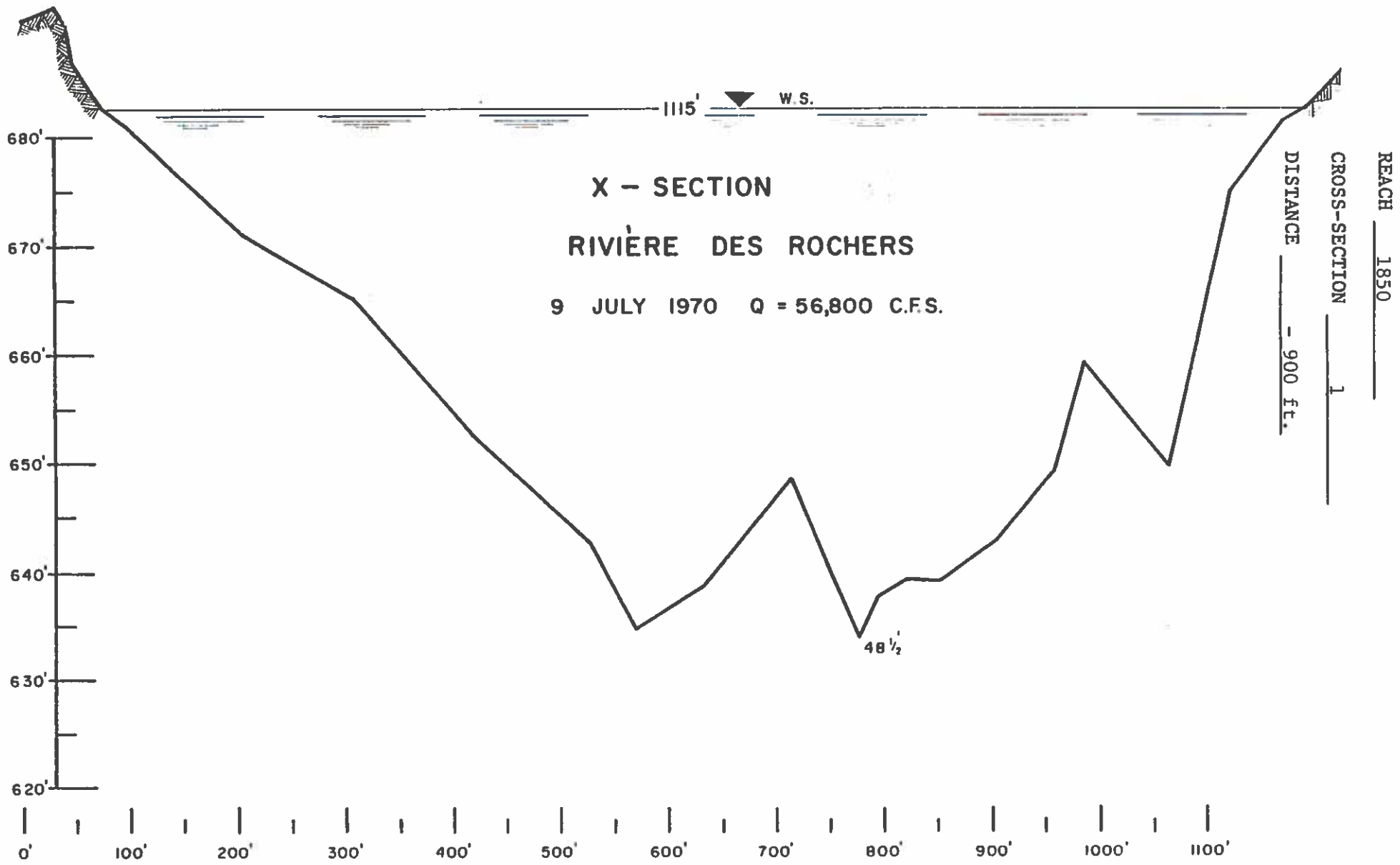
UPSTREAM NODE - 19

DOWNSTREAM NODE - 14

CROSS-SECTION - 9

Section Number	Distance from Upstream Node (ft)
1	-900
2	900
3	7,655
4	26,663
5	37,963
6	48,998
7	50,001
8	55,545
9	57,100

REMARKS: These cross-sections were surveyed by the Technical Services Division of Alberta Environment in 1970. Cross-section 8 was transposed to the end of the reach and was relabelled as cross-section 9.


1115' W.S.
X – SECTION
RIVIÈRE DES ROCHERS
9 JULY 1970 Q = 56,800 C.F.S.
48½'
680'
670'
660'
650'
640'
630'
620'
0'
100'
200'
300'
400'
500'
600'
700'
800'
900'
1000'
1100'
REACH 1850
CROSS-SECTION 1
DISTANCE - 900 ft.

REACH 1850

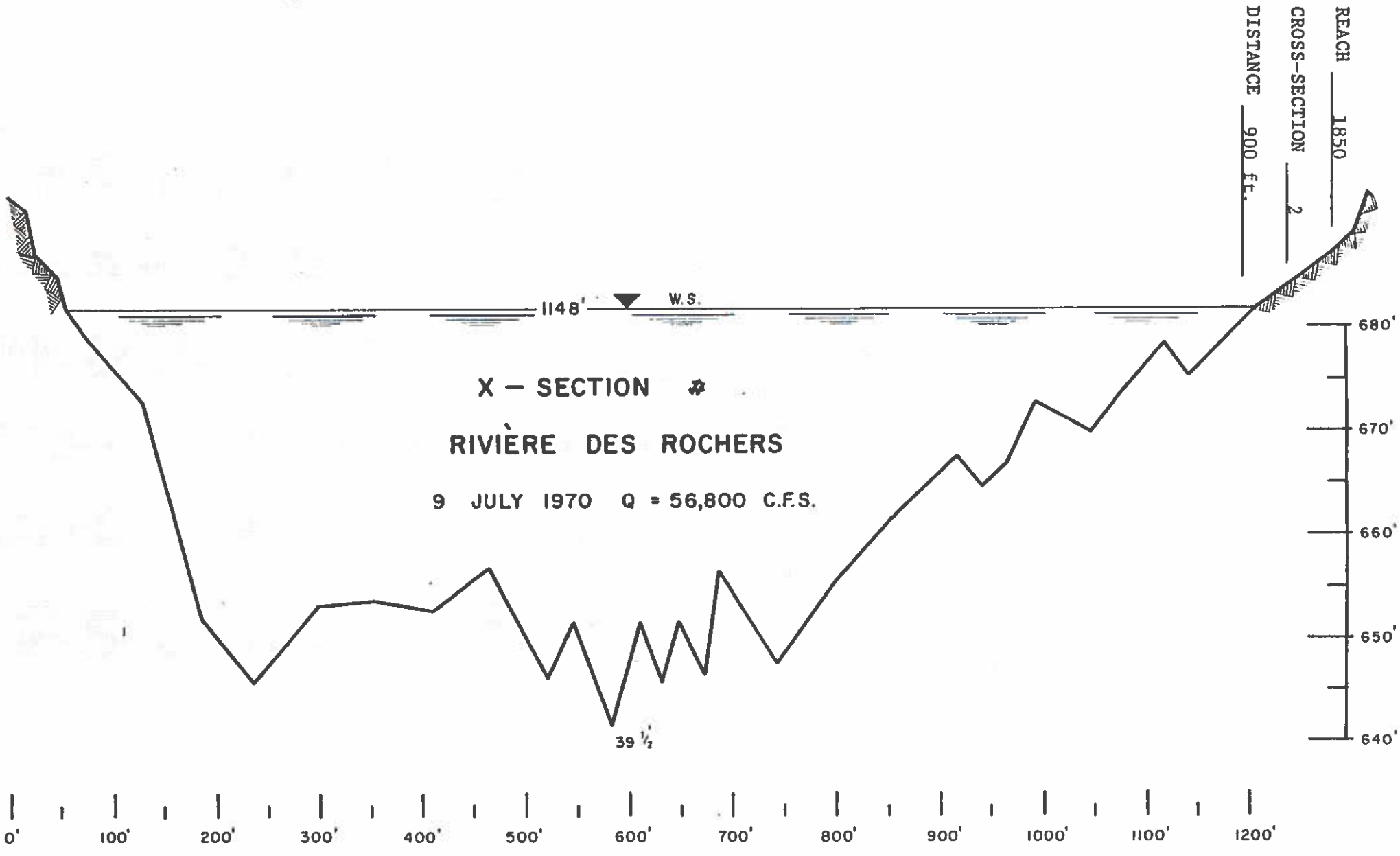
CROSS-SECTION 1

DISTANCE -900 ft.

LEGEND

E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	881.	881.	18374.	893.	18374.
670.500	892.	892.	18817.	904.	18817.
671.000	902.	902.	19266.	914.	19266.
671.500	911.	911.	19719.	923.	19719.
672.000	917.	917.	20176.	930.	20176.
672.500	924.	924.	20636.	936.	20636.
673.000	930.	930.	21100.	943.	21100.
673.500	937.	937.	21566.	950.	21566.
674.000	943.	943.	22036.	956.	22036.
674.500	949.	949.	22509.	963.	22509.
675.000	957.	957.	22986.	971.	22986.
675.500	967.	967.	23467.	980.	23467.
676.000	976.	976.	23952.	989.	23952.
676.500	985.	985.	24443.	998.	24443.
677.000	994.	994.	24937.	1008.	24937.
677.500	1003.	1003.	25437.	1017.	25437.
678.000	1012.	1012.	25940.	1026.	25940.
678.500	1021.	1021.	26449.	1035.	26449.
679.000	1030.	1030.	26962.	1044.	26962.
679.500	1040.	1040.	27479.	1053.	27479.
680.000	1049.	1049.	28001.	1063.	28001.
680.500	1058.	1058.	28528.	1072.	28528.
681.000	1067.	1067.	29059.	1081.	29059.
681.500	1076.	1076.	29595.	1090.	29595.
682.000	1091.	1091.	30136.	1105.	30136.
682.500	1107.	1107.	30686.	1121.	30686.
683.000	1119.	1119.	31243.	1133.	31243.
683.500	1127.	1127.	31805.	1141.	31805.
684.000	1135.	1135.	32370.	1150.	32370.
684.500	1143.	1143.	32940.	1158.	32940.
685.000	1151.	1151.	33513.	1166.	33513.
685.500	1159.	1159.	34091.	1174.	34091.
686.000	1167.	1167.	34673.	1182.	34673.
686.500	1175.	1175.	35258.	1190.	35258.
687.000	1183.	1183.	35848.	1198.	35848.
687.500	1190.	1190.	36441.	1205.	36441.
688.000	1196.	1196.	37038.	1211.	37038.
688.500	1202.	1202.	37637.	1217.	37637.
689.000	1208.	1208.	38240.	1223.	38240.
689.500	1213.	1213.	38845.	1229.	38845.
690.000	1217.	1217.	39453.	1232.	39453.
690.500	1219.	1219.	40062.	1235.	40062.
691.000	1224.	1224.	40672.	1240.	40672.
691.500	1232.	1232.	41286.	1248.	41286.
692.000	1240.	1240.	41904.	1256.	41904.
692.500	1246.	1246.	42526.	1262.	42526.
693.000	1252.	1252.	43150.	1268.	43150.
693.500	1258.	1258.	43778.	1274.	43778.
694.000	1264.	1264.	44408.	1280.	44408.
694.500	1270.	1270.	45042.	1287.	45042.
695.000	1276.	1276.	45678.	1293.	45678.
695.500	1282.	1282.	46318.	1299.	46318.
696.000	1288.	1288.	46960.	1305.	46960.
696.500	1294.	1294.	47606.	1311.	47606.
697.000	1300.	1300.	48254.	1317.	48254.
697.500	1306.	1306.	48906.	1323.	48906.
698.000	1312.	1312.	49560.	1329.	49560.
698.500	1318.	1318.	50217.	1335.	50217.
699.000	1324.	1324.	50878.	1341.	50878.
699.500	1329.	1329.	51541.	1347.	51541.
700.000	1335.	1335.	52207.	1353.	52207.


REACH 1850
CROSS-SECTION 2
DISTANCE 900 ft.
1148'
W.S.
X – SECTION #
RIVIÈRE DES ROCHERS
9 JULY 1970 Q = 56,800 C.F.S.
39 ½'
680'
670'
660'
650'
640'
0'
100'
200'
300'
400'
500'
600'
700'
800'
900'
1000'
1100'
1200'

REACH 1850

CROSS-SECTION 2

DISTANCE 900 ft.

LEGEND

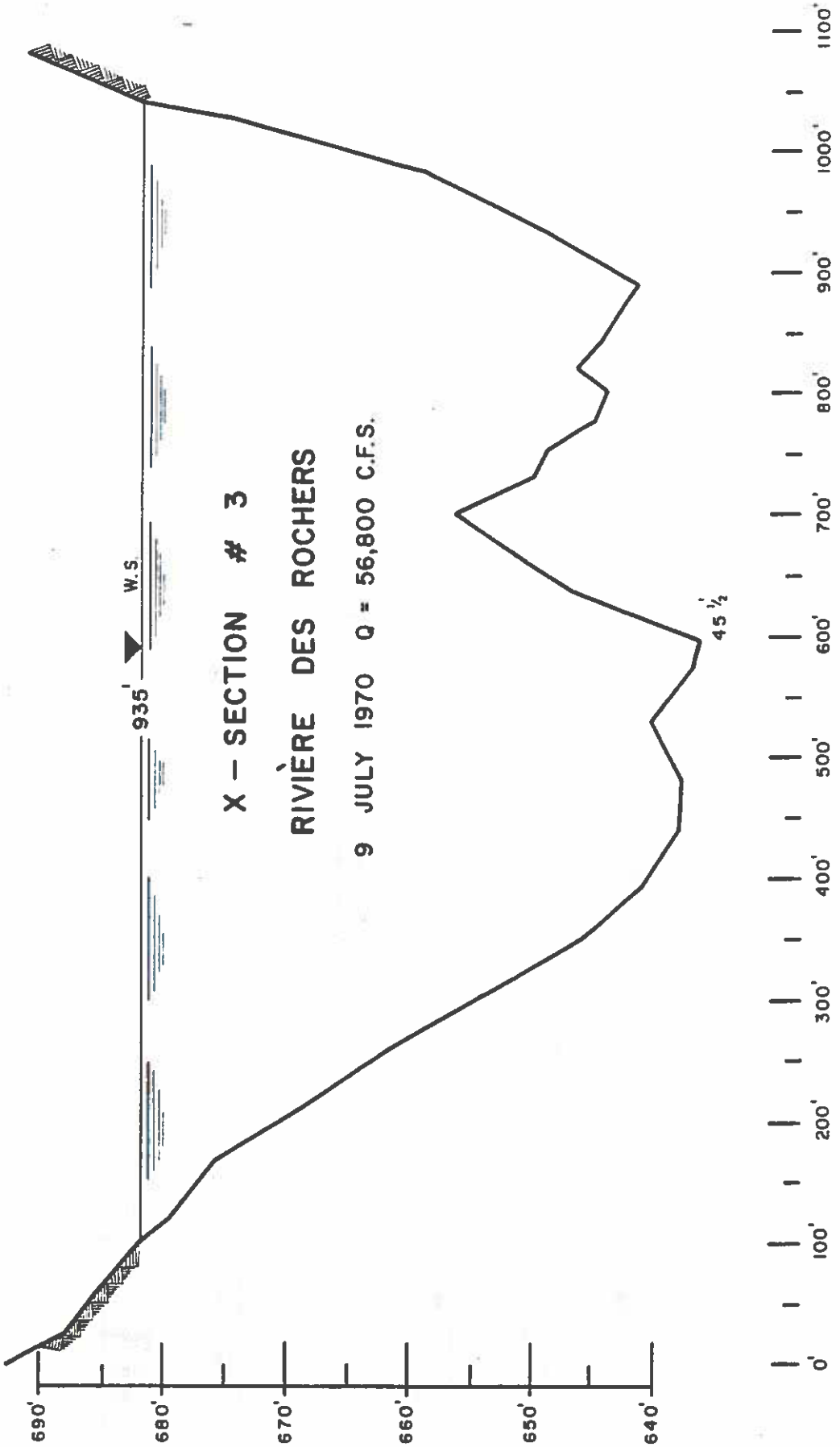
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	843.	843.	13281.	859.	13281.
670.500	859.	859.	13707.	876.	13707.
671.000	875.	875.	14140.	892.	14140.
671.500	891.	891.	14582.	908.	14582.
672.000	908.	908.	15032.	925.	15032.
672.500	924.	924.	15489.	941.	15489.
673.000	936.	936.	15955.	953.	15955.
673.500	944.	944.	16425.	962.	16425.
674.000	954.	954.	16899.	971.	16899.
674.500	963.	963.	17378.	981.	17378.
675.000	972.	972.	17862.	990.	17862.
675.500	985.	985.	18351.	1003.	18351.
676.000	1003.	1003.	18848.	1021.	18848.
676.500	1021.	1021.	19354.	1039.	19554.
677.000	1039.	1039.	19868.	1057.	19868.
677.500	1056.	1056.	20392.	1075.	20392.
678.000	1074.	1074.	20925.	1093.	20925.
678.500	1091.	1091.	21466.	1109.	21466.
679.000	1100.	1100.	22014.	1116.	22014.
679.500	1108.	1108.	22566.	1127.	22566.
680.000	1116.	1116.	23122.	1135.	23122.
680.500	1125.	1125.	23682.	1144.	23682.
681.000	1134.	1134.	24247.	1153.	24247.
681.500	1143.	1143.	24816.	1162.	24816.
682.000	1151.	1151.	25390.	1170.	25390.
682.500	1159.	1159.	25967.	1178.	25967.
683.000	1167.	1167.	26549.	1186.	26549.
683.500	1175.	1175.	27134.	1194.	27134.
684.000	1183.	1183.	27723.	1202.	27723.
684.500	1191.	1191.	28317.	1211.	28317.
685.000	1199.	1199.	28914.	1219.	28914.
685.500	1212.	1212.	29517.	1232.	29517.
686.000	1225.	1225.	30126.	1245.	30126.
686.500	1238.	1238.	30742.	1258.	30742.
687.000	1250.	1250.	31364.	1270.	31364.
687.500	1257.	1257.	31991.	1278.	31991.
688.000	1264.	1264.	32622.	1284.	32622.
688.500	1270.	1270.	33255.	1291.	33255.
689.000	1276.	1276.	33892.	1297.	33892.
689.500	1279.	1279.	34530.	1300.	34530.
690.000	1282.	1282.	35171.	1303.	35171.
690.500	1284.	1284.	35812.	1306.	35812.
691.000	1287.	1287.	36455.	1308.	36455.
691.500	1292.	1292.	37099.	1313.	37099.
692.000	1300.	1300.	37747.	1322.	37747.
692.500	1309.	1309.	38399.	1331.	38399.
693.000	1313.	1313.	39055.	1335.	39055.
693.500	1319.	1319.	39713.	1341.	39713.
694.000	1324.	1324.	40374.	1347.	40374.
694.500	1330.	1330.	41037.	1352.	41037.
695.000	1335.	1335.	41703.	1358.	41703.
695.500	1341.	1341.	42372.	1363.	42372.
696.000	1346.	1346.	43044.	1369.	43044.
696.500	1352.	1352.	43719.	1375.	43719.
697.000	1357.	1357.	44396.	1380.	44396.
697.500	1363.	1363.	45076.	1386.	45076.
698.000	1368.	1368.	45758.	1391.	45758.
698.500	1374.	1374.	46444.	1397.	46444.
699.000	1379.	1379.	47132.	1402.	47132.
699.500	1385.	1385.	47823.	1406.	47823.
700.000	1390.	1390.	48516.	1414.	48516.

REACH 1850

CROSS-SECTION 3

DISTANCE 7655 ft.



REACH 1850

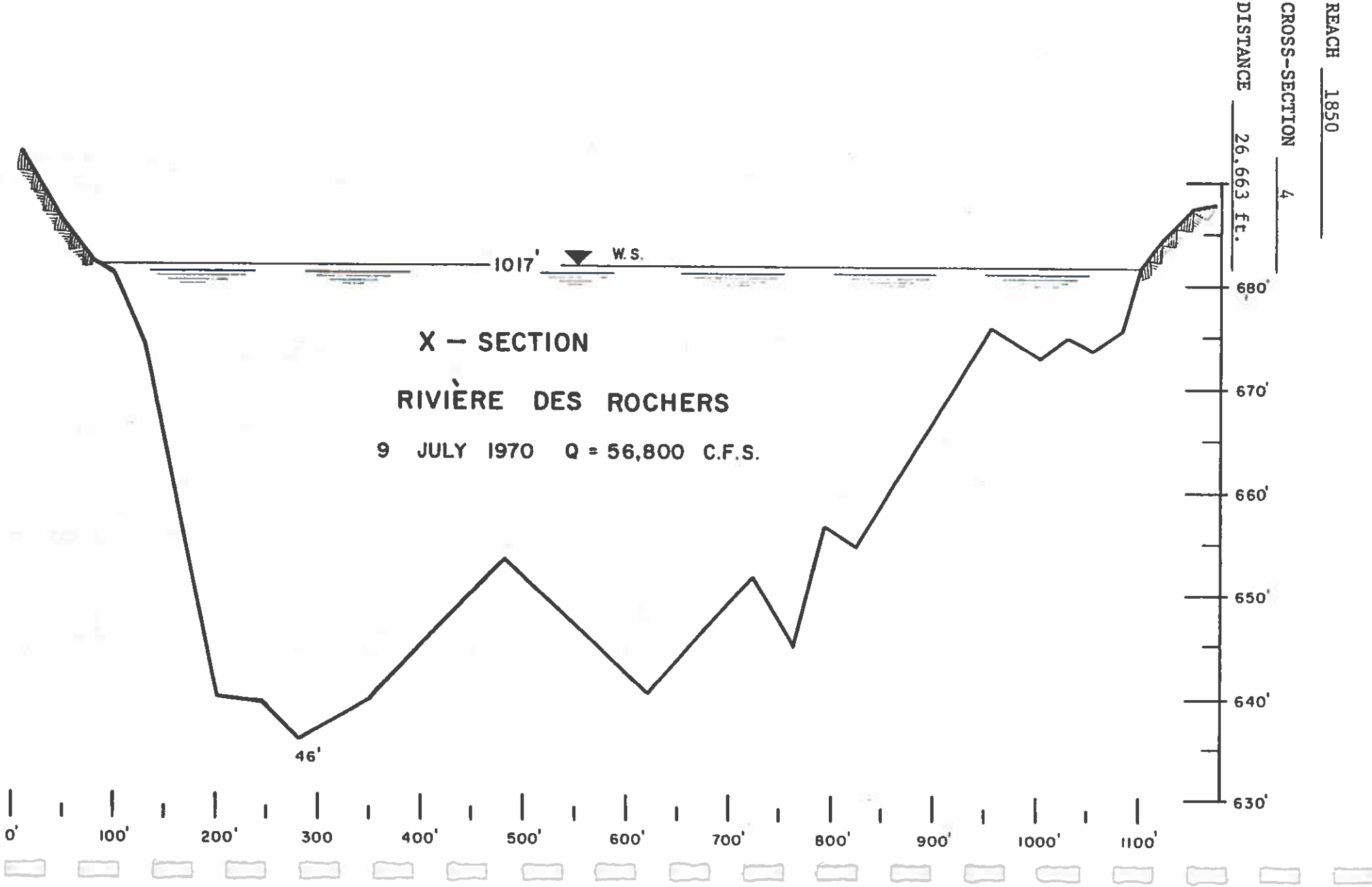
CROSS-SECTION 3

DISTANCE 7655 ft.

LEGEND

E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	809.	809.	18175.	818.	18175.
670.500	813.	813.	18580.	823.	18580.
671.000	818.	818.	18988.	827.	18988.
671.500	822.	822.	19398.	832.	19398.
672.000	827.	827.	19810.	837.	19810.
672.500	831.	831.	20225.	841.	20225.
673.000	836.	836.	20642.	846.	20642.
673.500	840.	840.	21061.	850.	21061.
674.000	845.	845.	21482.	855.	21482.
674.500	849.	849.	21905.	860.	21905.
675.000	853.	853.	22331.	864.	22331.
675.500	857.	857.	22756.	868.	22759.
676.000	863.	863.	23189.	874.	23189.
676.500	871.	871.	23622.	882.	23622.
677.000	878.	878.	24059.	889.	24059.
677.500	886.	886.	24500.	897.	24500.
678.000	894.	894.	24945.	905.	24945.
678.500	901.	901.	25394.	913.	25394.
679.000	909.	909.	25847.	921.	25847.
679.500	916.	916.	26303.	928.	26303.
680.000	921.	921.	26762.	933.	26762.
680.500	925.	925.	27223.	938.	27223.
681.000	930.	930.	27687.	943.	27687.
681.500	935.	935.	28154.	948.	28154.
682.000	941.	941.	28623.	954.	28623.
682.500	949.	949.	29095.	962.	29095.
683.000	957.	957.	29571.	969.	29571.
683.500	964.	964.	30052.	977.	30052.
684.000	972.	972.	30536.	985.	30536.
684.500	980.	980.	31024.	993.	31024.
685.000	988.	988.	31515.	1001.	31515.
685.500	996.	996.	32011.	1009.	32011.
686.000	1004.	1004.	32511.	1018.	32511.
686.500	1013.	1013.	33016.	1027.	33016.
687.000	1022.	1022.	33525.	1036.	33525.
687.500	1031.	1031.	34038.	1045.	34038.
688.000	1040.	1040.	34556.	1054.	34556.
688.500	1045.	1045.	35077.	1059.	35077.
689.000	1050.	1050.	35601.	1064.	35601.
689.500	1055.	1055.	36127.	1069.	36127.
690.000	1060.	1060.	36656.	1074.	36656.
690.500	1065.	1065.	37187.	1079.	37187.
691.000	1070.	1070.	37721.	1084.	37721.
691.500	1075.	1075.	38257.	1089.	38257.
692.000	1081.	1081.	38796.	1095.	38796.
692.500	1086.	1086.	39338.	1101.	39336.
693.000	1092.	1092.	39882.	1107.	39882.
693.500	1098.	1098.	40430.	1113.	40430.
694.000	1104.	1104.	40981.	1119.	40981.
694.500	1111.	1111.	41534.	1125.	41534.
695.000	1117.	1117.	42091.	1132.	42091.
695.500	1123.	1123.	42651.	1138.	42651.
696.000	1128.	1128.	43214.	1143.	43214.
696.500	1134.	1134.	43779.	1149.	43779.
697.000	1140.	1140.	44348.	1155.	44348.
697.500	1146.	1146.	44919.	1161.	44919.
698.000	1152.	1152.	45494.	1167.	45494.
698.500	1158.	1158.	46071.	1173.	46071.
699.000	1163.	1163.	46651.	1179.	46651.
699.500	1169.	1169.	47234.	1185.	47234.
700.000	1175.	1175.	47820.	1191.	47820.


REACH 1850
CROSS-SECTION 4
DISTANCE 26,663 ft.
1017'
W.S.
X — SECTION
RIVIÈRE DES ROCHERS
9 JULY 1970 Q = 56,800 C.F.S.
46'
680'
670'
660'
650'
640'
630'
0'
100'
200'
300
400'
500'
600'
700'
800'
900'
1000'
1100'

REACH 1850

CROSS-SECTION 4

DISTANCE 26,663 ft.

LEGEND

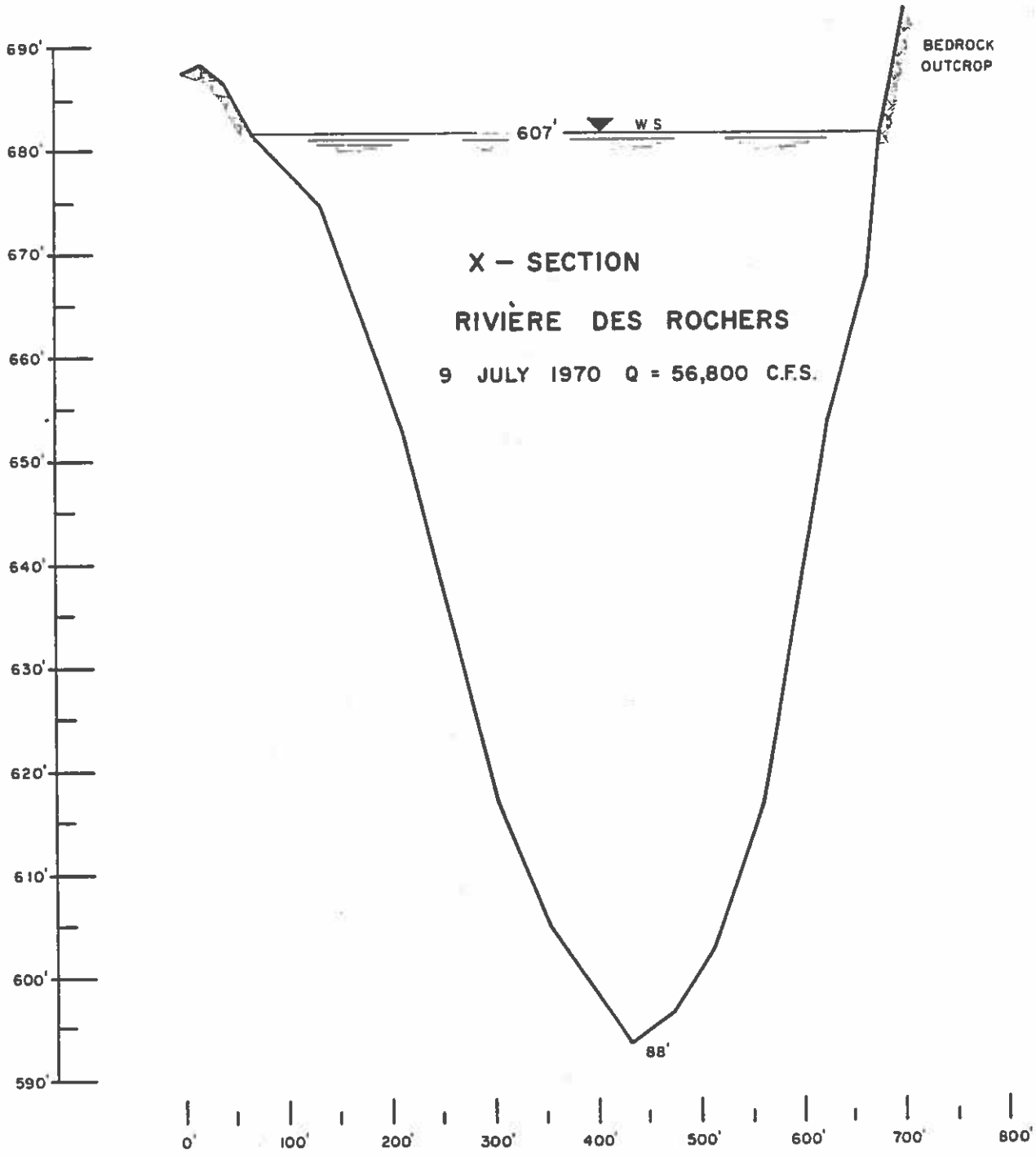
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	777.	777.	17036.	790.	17036.
670.500	781.	781.	17426.	794.	17426.
671.000	785.	785.	17817.	798.	17817.
671.500	789.	789.	18211.	803.	18211.
672.000	794.	794.	18607.	807.	18607.
672.500	798.	798.	19005.	811.	19005.
673.000	808.	808.	19405.	822.	19405.
673.500	827.	827.	19814.	841.	19814.
674.000	862.	862.	20236.	877.	20236.
674.500	901.	901.	20677.	916.	20677.
675.000	929.	929.	21135.	944.	21135.
675.500	950.	950.	21605.	965.	21605.
676.000	960.	960.	22084.	974.	22084.
676.500	963.	963.	22564.	976.	22564.
677.000	967.	967.	23047.	982.	23047.
677.500	971.	971.	23531.	986.	23531.
678.000	974.	974.	24017.	990.	24017.
678.500	978.	978.	24506.	993.	24506.
679.000	982.	982.	24995.	997.	24995.
679.500	985.	985.	25487.	1001.	25487.
680.000	989.	989.	25981.	1005.	25981.
680.500	992.	992.	26476.	1008.	26476.
681.000	1002.	1002.	26975.	1018.	26975.
681.500	1012.	1012.	27478.	1028.	27478.
682.000	1021.	1021.	27986.	1037.	27986.
682.500	1028.	1028.	28499.	1045.	28499.
683.000	1036.	1036.	29015.	1052.	29015.
683.500	1044.	1044.	29534.	1060.	29534.
684.000	1051.	1051.	30058.	1068.	30058.
684.500	1059.	1059.	30586.	1076.	30586.
685.000	1068.	1068.	31117.	1085.	31117.
685.500	1077.	1077.	31654.	1094.	31654.
686.000	1085.	1085.	32194.	1102.	32194.
686.500	1093.	1093.	32739.	1110.	32739.
687.000	1101.	1101.	33287.	1118.	33287.
687.500	1112.	1112.	33839.	1129.	33839.
688.000	1135.	1135.	34402.	1152.	34402.
688.500	1141.	1141.	34971.	1158.	34971.
689.000	1147.	1147.	35543.	1164.	35543.
689.500	1153.	1153.	36118.	1170.	36118.
690.000	1159.	1159.	36696.	1176.	36696.
690.500	1165.	1165.	37276.	1182.	37276.
691.000	1171.	1171.	37860.	1188.	37860.
691.500	1177.	1177.	38447.	1194.	38447.
692.000	1183.	1183.	39037.	1200.	39037.
692.500	1189.	1189.	39630.	1206.	39630.
693.000	1194.	1194.	40225.	1212.	40225.
693.500	1199.	1199.	40823.	1217.	40823.
694.000	1204.	1204.	41424.	1222.	41424.
694.500	1209.	1209.	42027.	1227.	42027.
695.000	1214.	1214.	42633.	1232.	42633.
695.500	1219.	1219.	43241.	1238.	43241.
696.000	1224.	1224.	43852.	1243.	43852.
696.500	1229.	1229.	44465.	1248.	44465.
697.000	1234.	1234.	45081.	1253.	45081.
697.500	1240.	1240.	45700.	1258.	45700.
698.000	1245.	1245.	46321.	1264.	46321.
698.500	1250.	1250.	46944.	1269.	46944.
699.000	1255.	1255.	47570.	1274.	47570.
699.500	1260.	1260.	48199.	1279.	48199.
700.000	1265.	1265.	48830.	1284.	48830.

REACH 1850

CROSS-SECTION 5

DISTANCE 37,963 ft.



REACH 1850

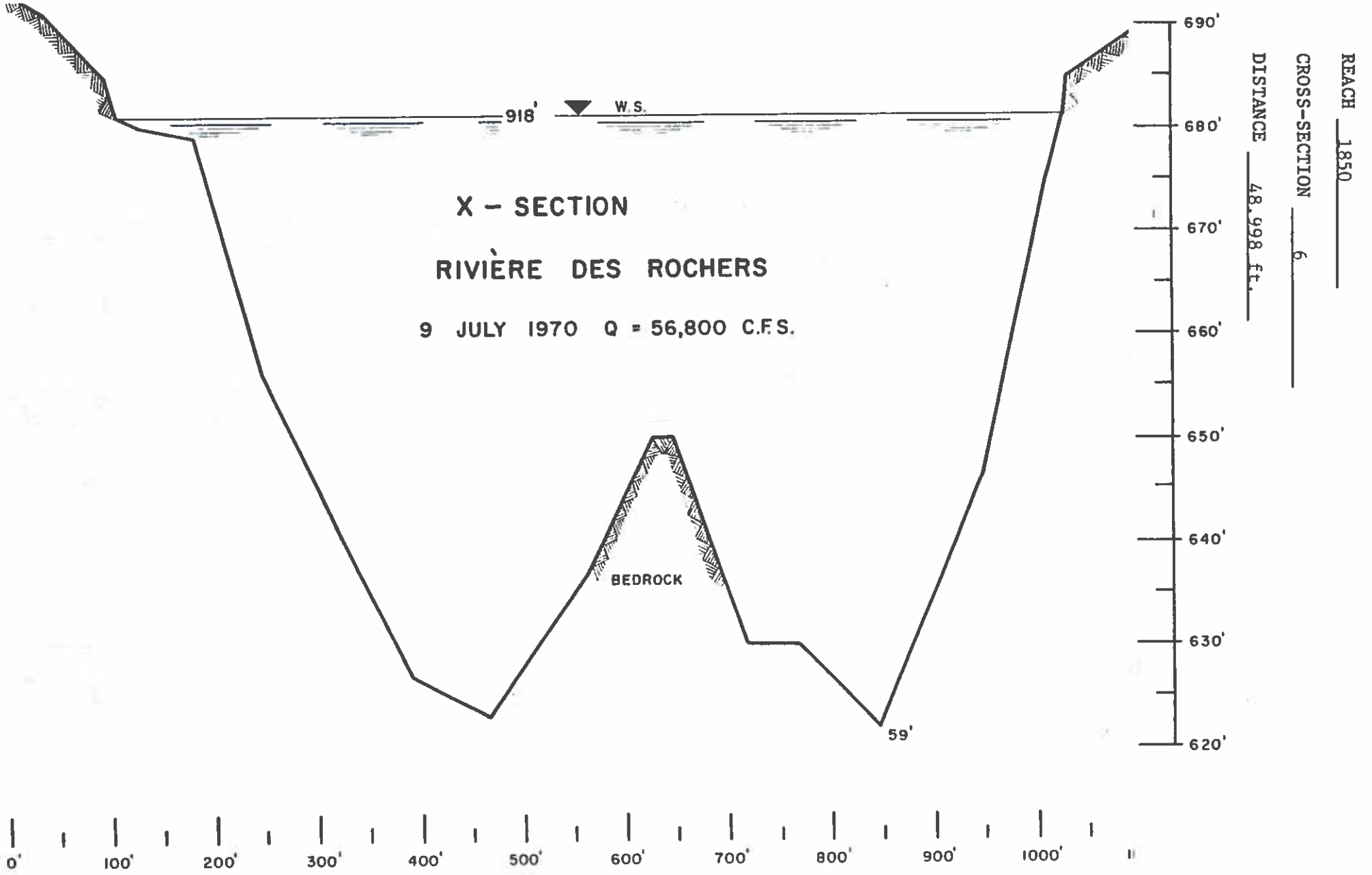
CROSS-SECTION 5

DISTANCE 37,963 ft.

LEGEND

E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	515.	515.	23571.	542.	23571.
670.500	517.	517.	23829.	545.	23829.
671.000	519.	519.	24088.	547.	24088.
671.500	521.	521.	24348.	550.	24348.
672.000	524.	524.	24609.	552.	24609.
672.500	526.	526.	24872.	555.	24872.
673.000	528.	528.	25135.	557.	25135.
673.500	530.	530.	25400.	560.	25400.
674.000	533.	533.	25666.	563.	25666.
674.500	535.	535.	25932.	565.	25932.
675.000	539.	539.	26201.	569.	26201.
675.500	544.	544.	26471.	575.	26471.
676.000	549.	549.	26745.	580.	26745.
676.500	554.	554.	27021.	586.	27021.
677.000	560.	560.	27299.	591.	27299.
677.500	565.	565.	27580.	596.	27580.
678.000	570.	570.	27864.	602.	27864.
678.500	575.	575.	28150.	607.	28150.
679.000	580.	580.	28439.	613.	28439.
679.500	585.	585.	28731.	618.	28731.
680.000	591.	591.	29025.	624.	29025.
680.500	596.	596.	29321.	629.	29321.
681.000	600.	600.	29620.	634.	29620.
681.500	605.	605.	29922.	639.	29922.
682.000	610.	610.	30225.	643.	30225.
682.500	613.	613.	30531.	647.	30531.
683.000	617.	617.	30839.	651.	30839.
683.500	621.	621.	31148.	655.	31148.
684.000	624.	624.	31459.	659.	31459.
684.500	628.	628.	31772.	663.	31772.
685.000	632.	632.	32087.	666.	32087.
685.500	635.	635.	32404.	670.	32404.
686.000	639.	639.	32722.	674.	32722.
686.500	642.	642.	33043.	678.	33043.
687.000	650.	650.	33366.	686.	33366.
687.500	658.	658.	33693.	694.	33693.
688.000	666.	666.	34024.	702.	34024.
688.500	673.	673.	34359.	709.	34359.
689.000	679.	679.	34697.	715.	34697.
689.500	684.	684.	35038.	720.	35038.
690.000	689.	689.	35381.	725.	35381.
690.500	694.	694.	35727.	731.	35727.
691.000	700.	700.	36076.	736.	36076.
691.500	705.	705.	36427.	742.	36427.
692.000	710.	710.	36780.	747.	36780.
692.500	715.	715.	37137.	752.	37137.
693.000	720.	720.	37496.	758.	37496.
693.500	726.	726.	37857.	763.	37857.
694.000	731.	731.	38221.	768.	38221.
694.500	736.	736.	38588.	774.	38588.
695.000	741.	741.	38957.	779.	38957.
695.500	746.	746.	39329.	784.	39329.
696.000	752.	752.	39704.	790.	39704.
696.500	757.	757.	40081.	795.	40081.
697.000	762.	762.	40460.	800.	40460.
697.500	767.	767.	40843.	806.	40843.
698.000	772.	772.	41227.	811.	41227.
698.500	777.	777.	41615.	816.	41615.
699.000	783.	783.	42005.	822.	42005.
699.500	788.	788.	42397.	827.	42397.
700.000	793.	793.	42793.	832.	42793.


X – SECTION
RIVIÈRE DES ROCHERS
9 JULY 1970 Q = 56,800 C.F.S.
918'
W.S.
BEDROCK
59'
690'
680'
670'
660'
650'
640'
630'
620'
0'
100'
200'
300'
400'
500'
600'
700'
800'
900'
1000'
REACH 1850
CROSS-SECTION 6
DISTANCE 48,998 ft.

REACH 1850

CROSS-SECTION 6

DISTANCE 48,998 ft.

LEGEND

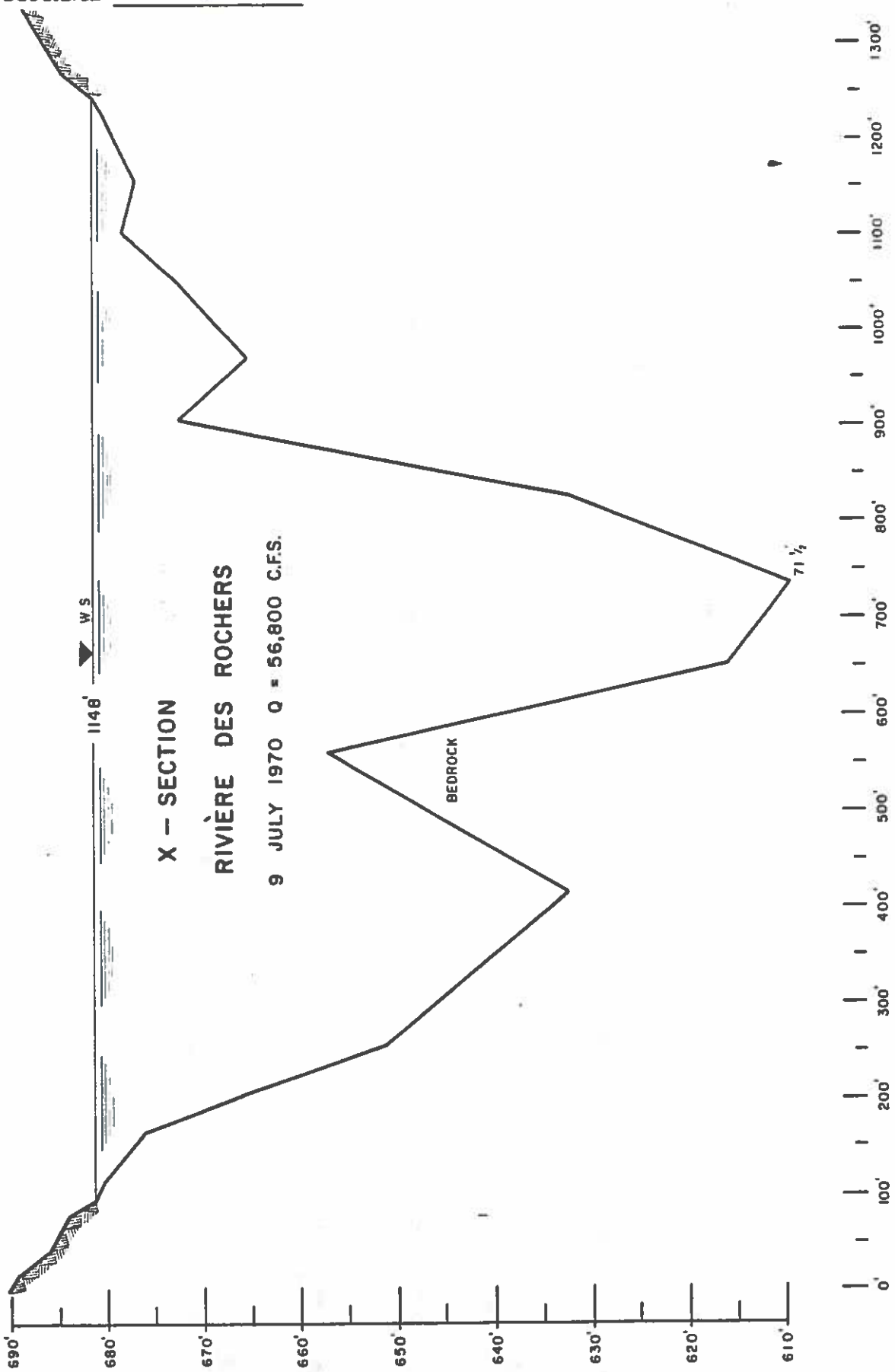
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	788.	788.	25331.	807.	25331.
670.500	791.	791.	25726.	810.	25726.
671.000	793.	793.	26122.	813.	26122.
671.500	796.	796.	26519.	816.	26519.
672.000	798.	798.	26918.	818.	26918.
672.500	801.	801.	27318.	821.	27318.
673.000	803.	803.	27719.	824.	27719.
673.500	806.	806.	28121.	826.	28121.
674.000	809.	809.	28525.	829.	28525.
674.500	811.	811.	28930.	832.	28930.
675.000	814.	814.	29336.	835.	29336.
675.500	817.	817.	29744.	838.	29744.
676.000	819.	819.	30153.	841.	30153.
676.500	822.	822.	30563.	844.	30563.
677.000	825.	825.	30975.	847.	30975.
677.500	828.	828.	31388.	849.	31388.
678.000	830.	830.	31802.	852.	31802.
678.500	833.	833.	32218.	855.	32218.
679.000	835.	836.	32636.	858.	32636.
679.500	847.	847.	33055.	870.	33055.
680.000	872.	872.	33485.	894.	33485.
680.500	896.	896.	33927.	919.	33927.
681.000	907.	907.	34378.	930.	34378.
681.500	919.	919.	34834.	942.	34834.
682.000	921.	921.	35294.	944.	35294.
682.500	923.	923.	35755.	946.	35755.
683.000	925.	925.	36218.	949.	36218.
683.500	928.	928.	36681.	951.	36681.
684.000	930.	930.	37145.	954.	37145.
684.500	932.	932.	37610.	956.	37610.
685.000	934.	934.	38077.	958.	38077.
685.500	946.	946.	38547.	970.	38547.
686.000	958.	958.	39023.	982.	39023.
686.500	969.	969.	39504.	994.	39504.
687.000	981.	981.	39992.	1006.	39992.
687.500	993.	993.	40485.	1017.	40485.
688.000	1005.	1005.	40985.	1029.	40985.
688.500	1016.	1016.	41490.	1041.	41490.
689.000	1028.	1028.	42001.	1053.	42001.
689.500	1040.	1040.	42518.	1065.	42518.
690.000	1052.	1052.	43041.	1076.	43041.
690.500	1063.	1063.	43569.	1088.	43569.
691.000	1071.	1071.	44103.	1097.	44103.
691.500	1083.	1083.	44641.	1108.	44641.
692.000	1096.	1096.	45186.	1121.	45186.
692.500	1117.	1117.	45738.	1143.	45738.
693.000	1142.	1142.	46304.	1168.	46304.
693.500	1153.	1153.	46878.	1179.	46878.
694.000	1160.	1160.	47457.	1185.	47457.
694.500	1166.	1166.	48038.	1191.	48038.
695.000	1172.	1172.	48622.	1197.	48622.
695.500	1178.	1178.	49210.	1204.	49210.
696.000	1184.	1184.	49800.	1210.	49800.
696.500	1190.	1190.	50394.	1216.	50394.
697.000	1196.	1196.	50990.	1222.	50990.
697.500	1202.	1202.	51590.	1228.	51590.
698.000	1209.	1209.	52193.	1235.	52193.
698.500	1215.	1215.	52799.	1241.	52799.
699.000	1221.	1221.	53407.	1247.	53407.
699.500	1227.	1227.	54019.	1253.	54019.
700.000	1233.	1233.	54634.	1259.	54634.

REACH 1850

CROSS-SECTION 7

DISTANCE 50,001 ft.



REACH 1850

CROSS-SECTION 7

DISTANCE 50,001 ft.

LEGEND

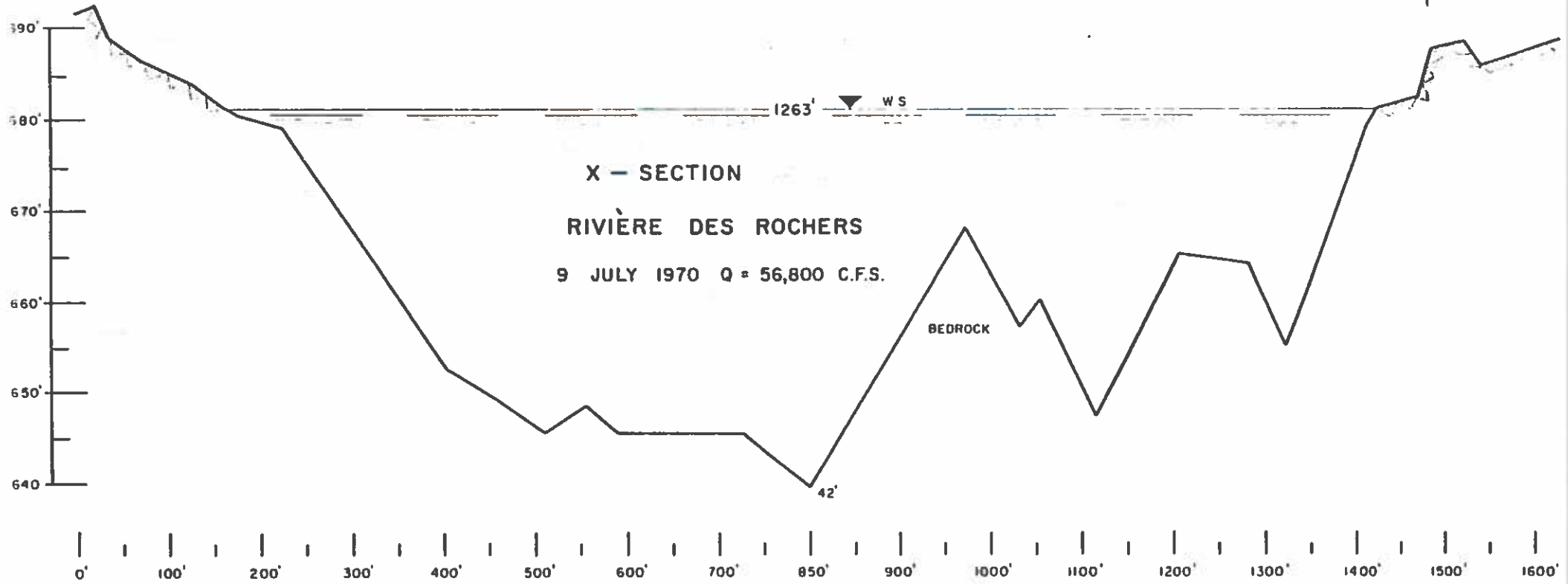
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	805.	805.	22714.	832.	22714.
670.500	817.	817.	23119.	845.	23119.
671.000	830.	830.	23531.	857.	23531.
671.500	842.	842.	23949.	870.	23949.
672.000	854.	854.	24373.	883.	24373.
672.500	862.	862.	24802.	890.	24802.
673.000	870.	870.	25235.	898.	25235.
673.500	878.	878.	25673.	906.	25673.
674.000	886.	886.	26114.	914.	26114.
674.500	894.	894.	26558.	922.	26558.
675.000	901.	901.	27007.	929.	27007.
675.500	907.	907.	27459.	936.	27459.
676.000	914.	914.	27914.	942.	27914.
676.500	922.	922.	28373.	951.	28373.
677.000	951.	951.	28839.	980.	28839.
677.500	994.	994.	29326.	1023.	29326.
678.000	1036.	1036.	29853.	1065.	29833.
678.500	1052.	1052.	30355.	1082.	30355.
679.000	1069.	1069.	30885.	1098.	30885.
679.500	1086.	1086.	31424.	1115.	31424.
680.000	1102.	1102.	31971.	1131.	31971.
680.500	1117.	1117.	32526.	1146.	32526.
681.000	1135.	1135.	33089.	1165.	33089.
681.500	1150.	1150.	33661.	1179.	33661.
682.000	1156.	1156.	34237.	1186.	34237.
682.500	1163.	1163.	34817.	1192.	34817.
683.000	1170.	1170.	35400.	1199.	35400.
683.500	1176.	1176.	35987.	1206.	35987.
684.000	1183.	1183.	36576.	1212.	36576.
684.500	1199.	1199.	37171.	1228.	37171.
685.000	1219.	1219.	37776.	1248.	37776.
685.500	1236.	1236.	38389.	1265.	38389.
686.000	1253.	1253.	39011.	1283.	39011.
686.500	1264.	1264.	39641.	1294.	39641.
687.000	1276.	1276.	40276.	1306.	40276.
687.500	1287.	1287.	40916.	1317.	40916.
688.000	1299.	1299.	41563.	1328.	41563.
688.500	1310.	1310.	42215.	1340.	42215.
689.000	1321.	1321.	42872.	1351.	42872.
689.500	1328.	1328.	43535.	1358.	43535.
690.000	1339.	1339.	44201.	1370.	44201.
690.500	1350.	1350.	44874.	1380.	44874.
691.000	1355.	1355.	45550.	1386.	45550.
691.500	1361.	1361.	46229.	1391.	46229.
692.000	1367.	1367.	46911.	1398.	46911.
692.500	1373.	1373.	47596.	1404.	47596.
693.000	1380.	1380.	48285.	1411.	48285.
693.500	1386.	1386.	48976.	1417.	48976.
694.000	1392.	1392.	49671.	1423.	49671.
694.500	1399.	1399.	50369.	1430.	50369.
695.000	1405.	1405.	51069.	1436.	51069.
695.500	1412.	1412.	51774.	1443.	51774.
696.000	1419.	1419.	52481.	1450.	52481.
696.500	1426.	1426.	53193.	1457.	53193.
697.000	1433.	1433.	53907.	1464.	53907.
697.500	1440.	1440.	54625.	1471.	54625.
698.000	1446.	1446.	55347.	1478.	55347.
698.500	1453.	1453.	56072.	1485.	56072.
699.000	1460.	1460.	56800.	1492.	56800.
699.500	1467.	1467.	57532.	1499.	57532.
700.000	1474.	1474.	58267.	1506.	58267.

REACH 1850

CROSS-SECTION 8

DISTANCE 55,545 ft.



X — SECTION

RIVIÈRE DES ROCHERS

9 JULY 1970 Q = 56,800 C.F.S.

REACH 1850

CROSS-SECTION 8

DISTANCE 55,545 ft.

LEGEND

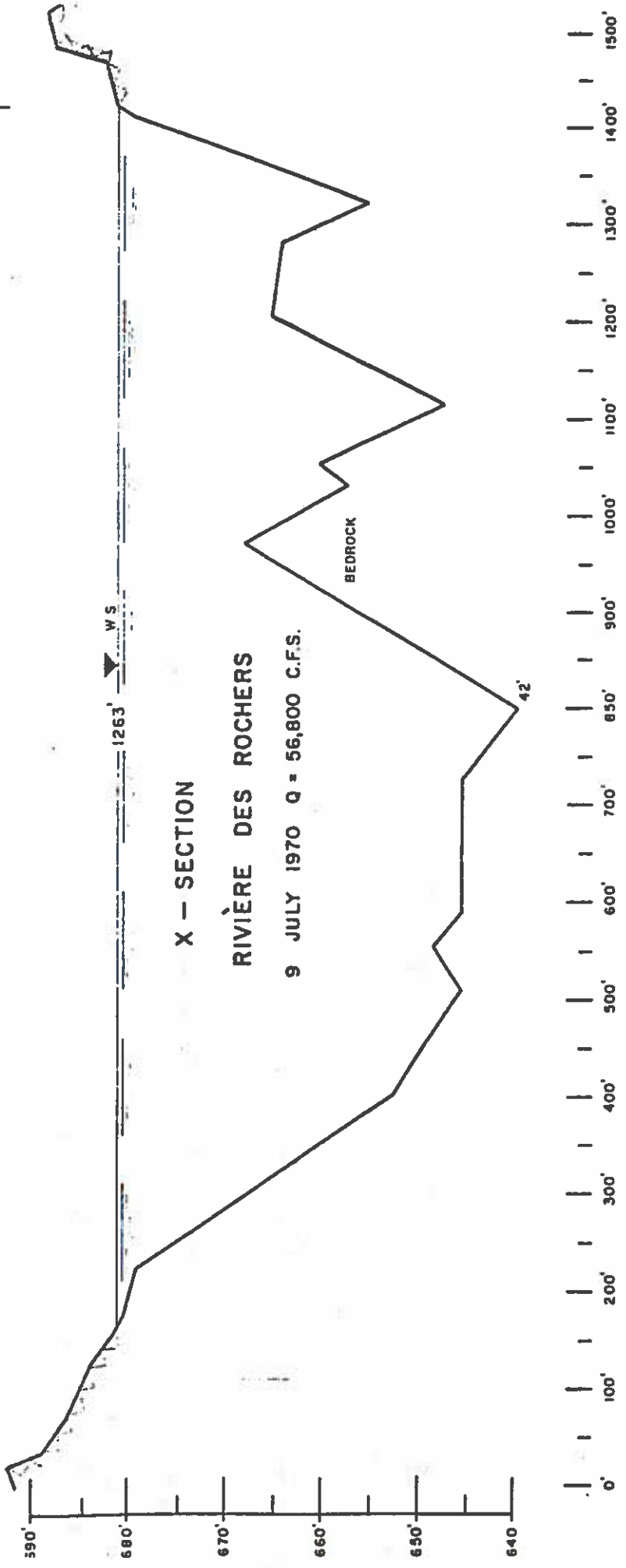
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	1088.	1088.	17567.	1100.	17567.
670.500	1094.	1094.	18112.	1105.	18112.
671.000	1099.	1099.	18660.	1111.	18660.
671.500	1104.	1104.	19211.	1116.	19211.
672.000	1109.	1109.	19764.	1121.	19764.
672.500	1114.	1114.	20320.	1127.	20320.
673.000	1119.	1119.	20878.	1132.	20878.
673.500	1125.	1125.	21439.	1137.	21439.
674.000	1130.	1130.	22003.	1142.	22003.
674.500	1135.	1135.	22569.	1148.	22569.
675.000	1140.	1140.	23138.	1153.	23138.
675.500	1145.	1145.	23709.	1158.	23709.
676.000	1151.	1151.	24283.	1164.	24283.
676.500	1156.	1156.	24860.	1169.	24860.
677.000	1161.	1161.	25439.	1174.	25439.
677.500	1166.	1166.	26021.	1179.	26021.
678.000	1171.	1171.	26605.	1185.	26605.
678.500	1176.	1176.	27192.	1190.	27192.
679.000	1182.	1182.	27782.	1195.	27782.
679.500	1202.	1202.	28377.	1216.	28377.
680.000	1225.	1225.	28984.	1239.	28984.
680.500	1241.	1241.	29601.	1255.	29601.
681.000	1254.	1254.	30224.	1268.	30224.
681.500	1272.	1272.	30855.	1286.	30855.
682.000	1300.	1300.	31498.	1314.	31498.
682.500	1324.	1324.	32155.	1338.	32155.
683.000	1331.	1331.	32819.	1345.	32819.
683.500	1338.	1338.	33486.	1352.	33486.
684.000	1348.	1348.	34158.	1363.	34158.
684.500	1360.	1360.	34835.	1375.	34835.
685.000	1372.	1372.	35518.	1387.	35518.
685.500	1384.	1384.	36207.	1399.	36207.
686.000	1403.	1403.	36902.	1418.	36902.
686.500	1433.	1433.	37611.	1448.	37611.
687.000	1460.	1460.	38335.	1475.	38335.
687.500	1487.	1487.	39071.	1502.	39071.
688.000	1523.	1523.	39822.	1539.	39822.
688.500	1571.	1571.	40596.	1587.	40596.
689.000	1592.	1592.	41389.	1607.	41389.
689.500	1596.	1596.	42186.	1612.	42186.
690.000	1600.	1600.	42985.	1616.	42965.
690.500	1605.	1605.	43786.	1621.	43786.
691.000	1609.	1609.	44590.	1625.	44590.
691.500	1613.	1613.	45395.	1630.	45395.
692.000	1618.	1618.	46203.	1654.	46203.
692.500	1622.	1622.	47013.	1639.	47013.
693.000	1627.	1627.	47825.	1643.	47825.
693.500	1632.	1632.	48640.	1648.	48640.
694.000	1636.	1636.	49457.	1653.	49457.
694.500	1641.	1641.	50276.	1658.	50276.
695.000	1646.	1646.	51098.	1663.	51098.
695.500	1650.	1650.	51922.	1667.	51922.
696.000	1655.	1655.	52749.	1672.	52749.
696.500	1660.	1660.	53577.	1677.	53577.
697.000	1665.	1665.	54408.	1682.	54408.
697.500	1670.	1670.	55242.	1687.	55242.
698.000	1675.	1675.	56078.	1692.	56078.
698.500	1680.	1680.	56917.	1697.	56917.
699.000	1685.	1685.	57758.	1703.	57758.
699.500	1690.	1690.	58602.	1708.	58602.
700.000	1695.	1695.	59448.	1713.	59448.

REACH 1850

CROSS-SECTION 9

DISTANCE 57,100 ft.



REACH 1850

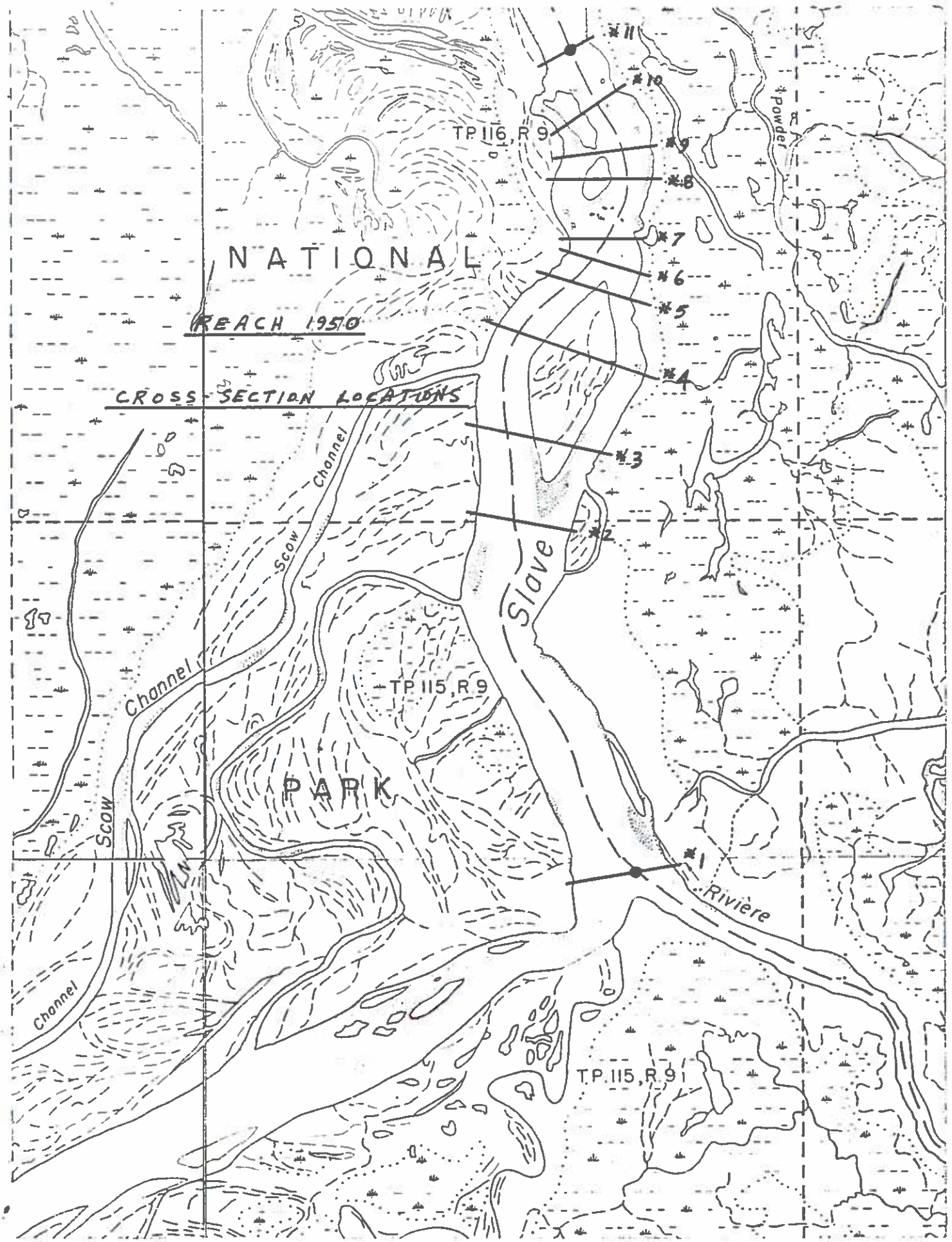
CROSS-SECTION 9

DISTANCE 57,100 ft.

LEGEND

E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	1088.	1088.	17567.	1100.	17567.
670.500	1094.	1094.	18112.	1105.	18112.
671.000	1099.	1099.	18660.	1111.	18660.
671.500	1104.	1104.	19211.	1116.	19211.
672.000	1109.	1109.	19764.	1121.	19764.
672.500	1114.	1114.	20320.	1127.	20320.
673.000	1119.	1119.	20878.	1132.	20878.
673.500	1125.	1125.	21439.	1137.	21439.
674.000	1130.	1130.	22003.	1142.	22003.
674.500	1135.	1135.	22569.	1148.	22569.
675.000	1140.	1140.	23138.	1153.	23138.
675.500	1145.	1145.	23709.	1158.	23709.
676.000	1151.	1151.	24283.	1164.	24283.
676.500	1156.	1156.	24860.	1169.	24860.
677.000	1161.	1161.	25439.	1174.	25439.
677.500	1166.	1166.	26021.	1179.	26021.
678.000	1171.	1171.	26605.	1185.	26605.
678.500	1176.	1176.	27192.	1190.	27192.
679.000	1182.	1182.	27782.	1195.	27782.
679.500	1202.	1202.	28377.	1216.	28377.
680.000	1225.	1225.	28984.	1239.	28984.
680.500	1241.	1241.	29601.	1255.	29601.
681.000	1254.	1254.	30224.	1268.	30224.
681.500	1272.	1272.	30855.	1286.	30855.
682.000	1300.	1300.	31498.	1314.	31498.
682.500	1324.	1324.	32155.	1338.	32155.
683.000	1331.	1331.	32819.	1345.	32819.
683.500	1338.	1338.	33486.	1352.	33486.
684.000	1348.	1348.	34158.	1362.	34158.
684.500	1360.	1360.	34835.	1375.	34835.
685.000	1372.	1372.	35518.	1387.	35518.
685.500	1384.	1384.	36207.	1399.	36207.
686.000	1403.	1403.	36902.	1418.	36902.
686.500	1433.	1433.	37611.	1448.	37611.
687.000	1460.	1460.	38335.	1475.	38335.
687.500	1487.	1487.	39071.	1502.	39071.
688.000	1523.	1523.	39822.	1538.	39822.
688.500	1571.	1571.	40596.	1587.	40596.
689.000	1592.	1592.	41389.	1607.	41389.
689.500	1596.	1596.	42186.	1612.	42186.
690.000	1600.	1600.	42985.	1616.	42985.
690.500	1605.	1605.	43786.	1621.	43786.
691.000	1609.	1609.	44590.	1625.	44590.
691.500	1613.	1613.	45395.	1630.	45395.
692.000	1618.	1618.	46203.	1634.	46203.
692.500	1622.	1622.	47013.	1639.	47013.
693.000	1627.	1627.	47825.	1643.	47825.
693.500	1632.	1632.	48640.	1648.	48640.
694.000	1636.	1636.	49457.	1653.	49457.
694.500	1641.	1641.	50276.	1658.	50276.
695.000	1646.	1646.	51098.	1663.	51098.
695.500	1650.	1650.	51922.	1667.	51922.
696.000	1655.	1655.	52749.	1672.	52749.
696.500	1660.	1660.	53577.	1677.	53577.
697.000	1665.	1665.	54408.	1682.	54408.
697.500	1670.	1670.	55242.	1687.	55242.
698.000	1675.	1675.	56078.	1692.	56078.
698.500	1680.	1680.	56917.	1697.	56917.
699.000	1685.	1685.	57758.	1703.	57758.
699.500	1690.	1690.	58602.	1708.	58602.
700.000	1695.	1695.	59448.	1713.	59448.


NATIONAL
PARK
REACH 1950
CROSS-SECTION LOCATIONS
TP 116, R 9
TP 115, R 9
TP 115, R 9
Slave
Powder R.
Scow Channel
Scow Channel
Scow Channel
Riviere
#11
#10
#9
#8
#7
#6
#5
#4
#3
#2
#1

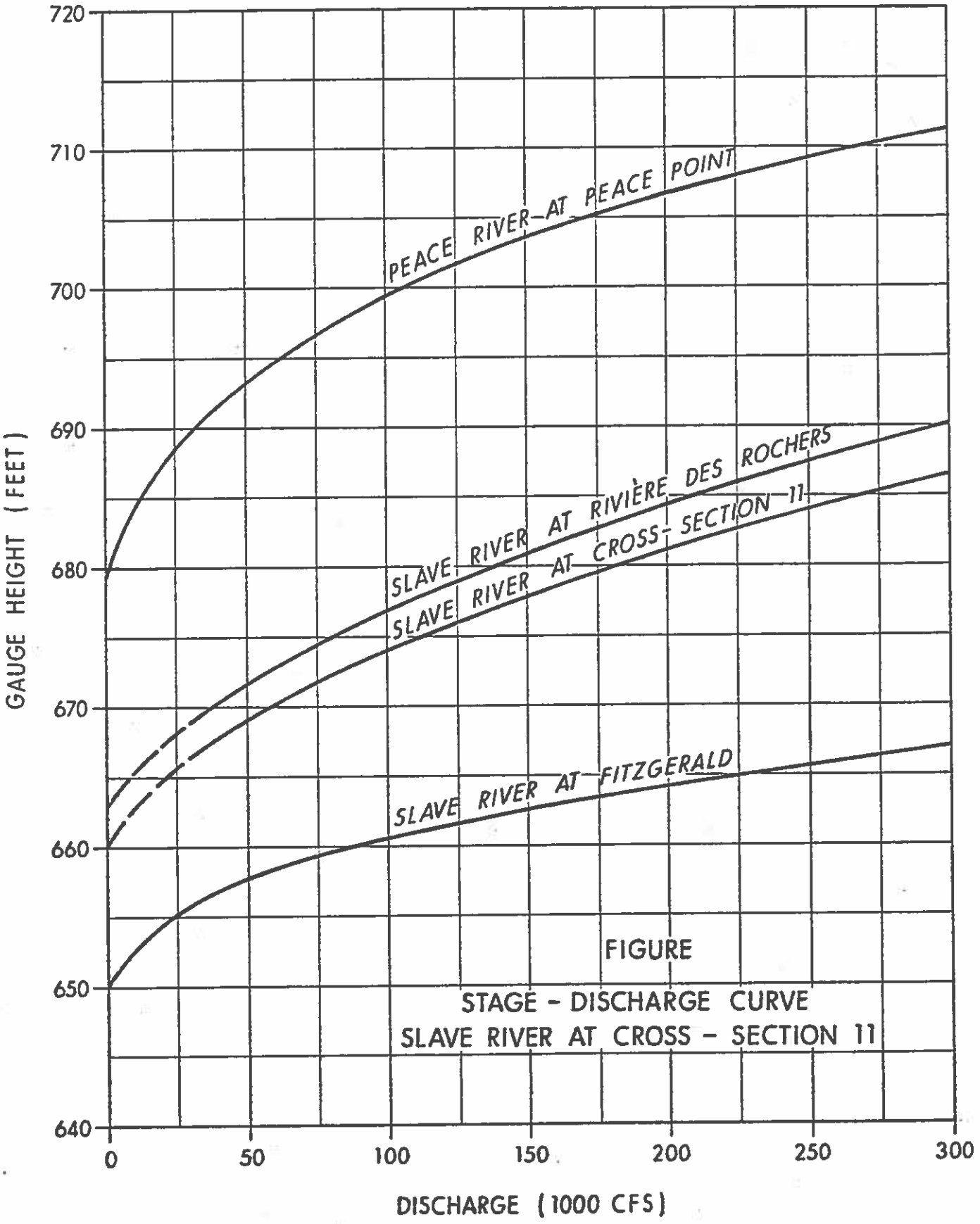
REACH NUMBER - 1950
DESCRIPTION - Slave River
REACH LENGTH - 39,072
UPSTREAM NODE - 14
DOWNSTREAM NODE - 15
CROSS-SECTION - 11

Section Number	Distance from Upstream Node (ft)
1	0
2	20,754
3	24,420
4	27,453
5	30,023
6	30,955
7	31,872
8	34,009
9	35,091
10	36,689
11	39,072

REMARKS: These cross-sections were surveyed by the Technical Services Division of Alberta Environment in 1970. Cross-section 2 was transposed to the beginning of the reach and was relabelled as cross-section 1.

The hydraulic boundary condition at node 15 is a stage discharge relationship. This relationship is defined as follows:

Water Surface Elevation (ft)	Discharge (cfs)
660.00	0
666.31	30,000
669.04	50,000
674.05	100,000
677.98	150,000
681.13	200,000
683.98	250,000
686.55	300,000
688.92	350,000



FIGURE

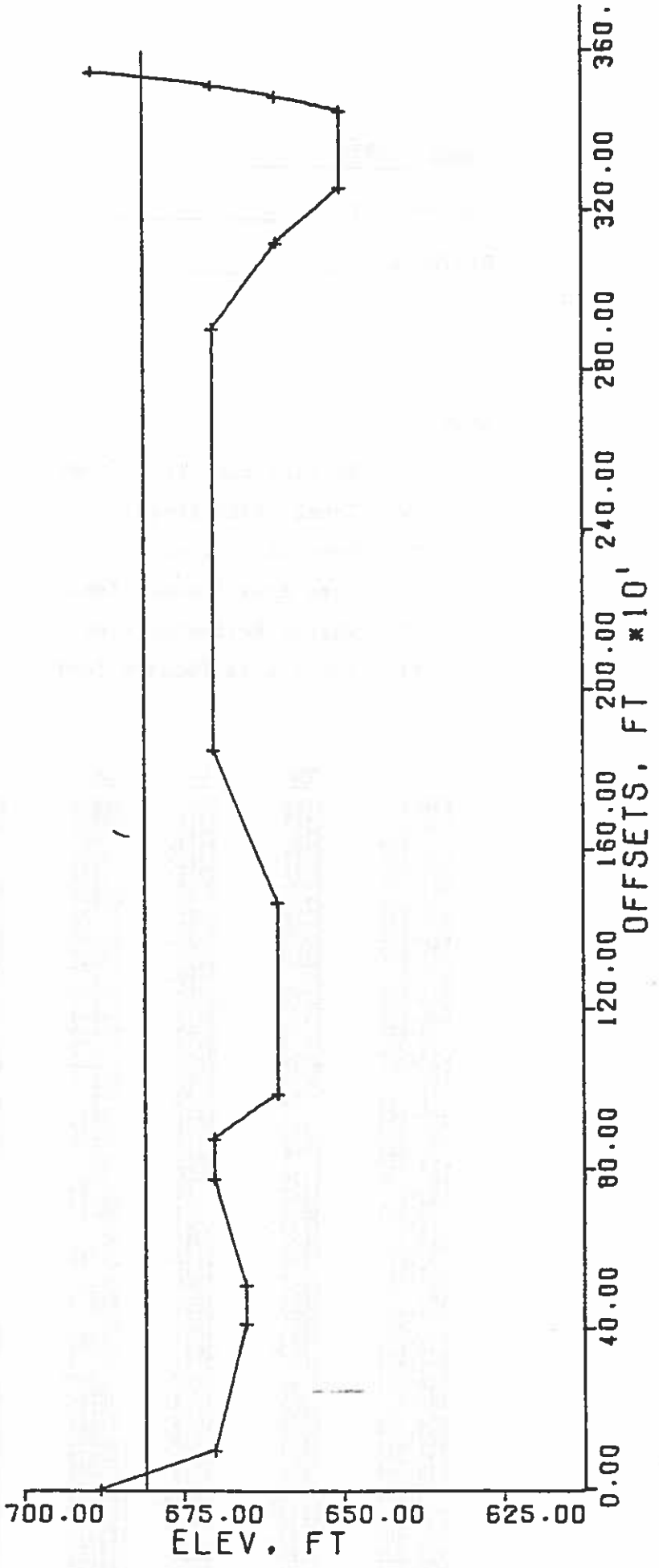
STAGE - DISCHARGE CURVE

SLAVE RIVER AT CROSS - SECTION 11

REACH 1950

CROSS-SECTION 1

DISTANCE 0 ft.



REACH 1950

CROSS-SECTION 1

DISTANCE 0 ft.

LEGEND

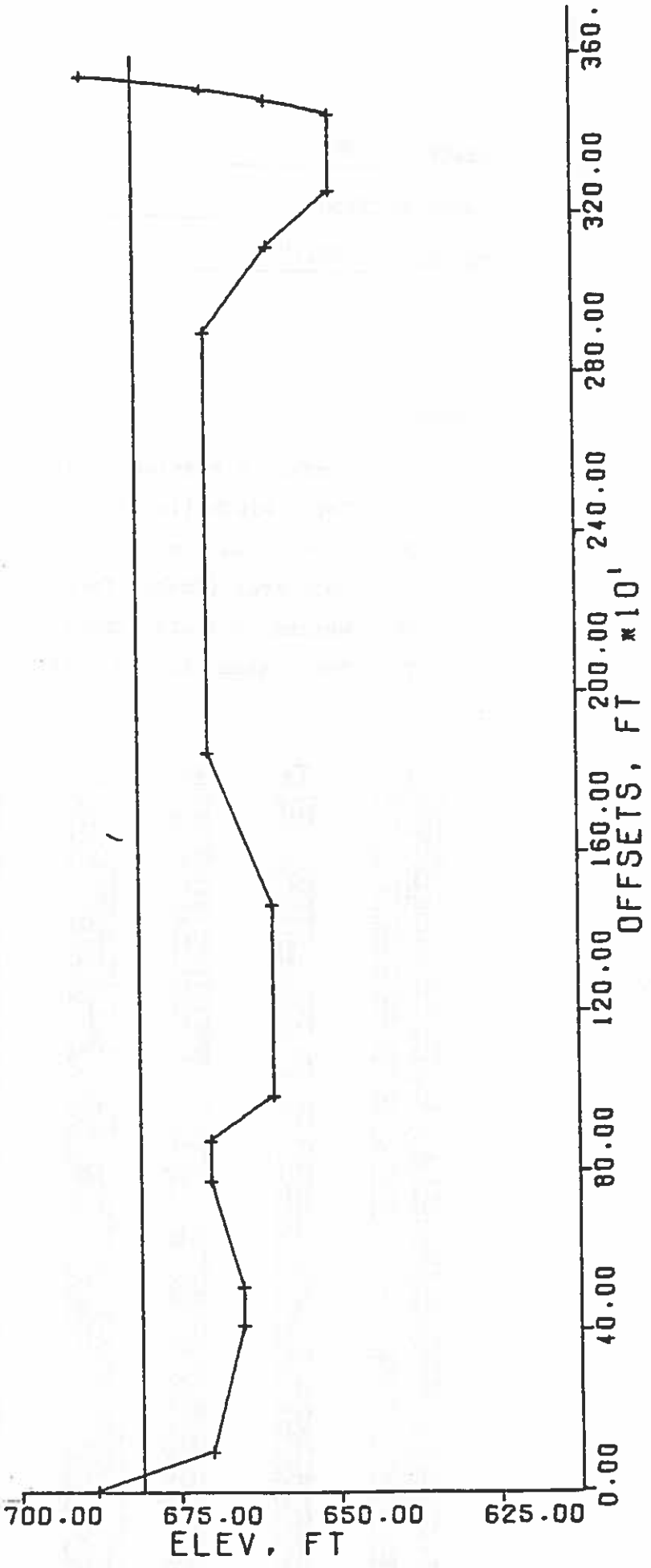
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	2260.	2260.	16835.	2265.	16835.
670.500	3416.	3416.	18542.	3420.	18542.
671.000	3420.	3420.	20251.	3424.	20251.
671.500	3423.	3423.	21961.	3428.	21961.
672.000	3427.	3427.	23674.	3432.	23674.
672.500	3431.	3431.	25389.	3436.	25389.
673.000	3434.	3434.	27105.	3440.	27105.
673.500	3438.	3438.	28823.	3444.	28823.
674.000	3442.	3442.	30543.	3448.	30543.
674.500	3446.	3446.	32265.	3451.	32265.
675.000	3449.	3449.	33988.	3455.	33988.
675.500	3453.	3453.	35714.	3459.	35714.
676.000	3457.	3457.	37441.	3463.	37441.
676.500	3460.	3460.	39171.	3467.	39171.
677.000	3464.	3464.	40902.	3471.	40902.
677.500	3468.	3468.	42635.	3475.	42635.
678.000	3471.	3471.	44369.	3478.	44369.
678.500	3475.	3475.	46106.	3482.	46106.
679.000	3479.	3479.	47844.	3486.	47844.
679.500	3482.	3482.	49585.	3490.	49585.
680.000	3486.	3486.	51327.	3494.	51327.
680.500	3490.	3490.	53071.	3498.	53071.
681.000	3493.	3493.	54817.	3502.	54817.
681.500	3497.	3497.	56564.	3506.	56564.
682.000	3501.	3501.	58314.	3509.	58314.
682.500	3505.	3505.	60065.	3513.	60065.
683.000	3508.	3508.	61818.	3517.	61818.
683.500	3512.	3512.	63573.	3521.	63573.
684.000	3516.	3516.	65330.	3525.	65330.
684.500	3519.	3519.	67089.	3529.	67089.
685.000	3523.	3523.	68850.	3533.	68850.
685.500	3527.	3527.	70612.	3536.	70612.
686.000	3530.	3530.	72376.	3540.	72376.
686.500	3534.	3534.	74142.	3544.	74142.
687.000	3538.	3538.	75910.	3548.	75910.
687.500	3541.	3541.	77680.	3552.	77680.
688.000	3545.	3545.	79452.	3556.	79452.
688.500	3547.	3547.	81225.	3558.	81225.
689.000	3549.	3549.	82999.	3560.	82999.
689.500	3551.	3551.	84774.	3562.	84774.
690.000	3553.	3553.	86550.	3565.	86550.
690.500	3555.	3555.	88327.	3567.	88327.
691.000	3557.	3557.	90105.	3569.	90105.
691.500	3559.	3559.	91884.	3571.	91884.
692.000	3561.	3561.	93664.	3573.	93664.
692.500	3563.	3563.	95445.	3576.	95445.
693.000	3565.	3565.	97227.	3578.	97227.
693.500	3567.	3567.	99010.	3580.	99010.
694.000	3569.	3569.	100794.	3582.	100794.
694.500	3571.	3571.	102579.	3585.	102579.
695.000	3573.	3573.	104365.	3587.	104365.
695.500	3575.	3575.	106152.	3589.	106152.
696.000	3577.	3577.	107940.	3591.	107940.
696.500	3579.	3579.	109729.	3594.	109729.
697.000	3581.	3581.	111519.	3596.	111519.
697.500	3583.	3583.	113310.	3598.	113310.
698.000	3585.	3585.	115102.	3600.	115102.
698.500	3587.	3587.	116895.	3603.	116895.
699.000	3589.	3589.	118689.	3605.	118689.
699.500	3591.	3591.	120484.	3607.	120484.
700.000	3593.	3593.	122280.	3609.	122280.

REACH 1950

CROSS-SECTION 2

DISTANCE 20,754 ft.



REACH 1950

CROSS-SECTION 2

DISTANCE 20,754 ft.

LEGEND

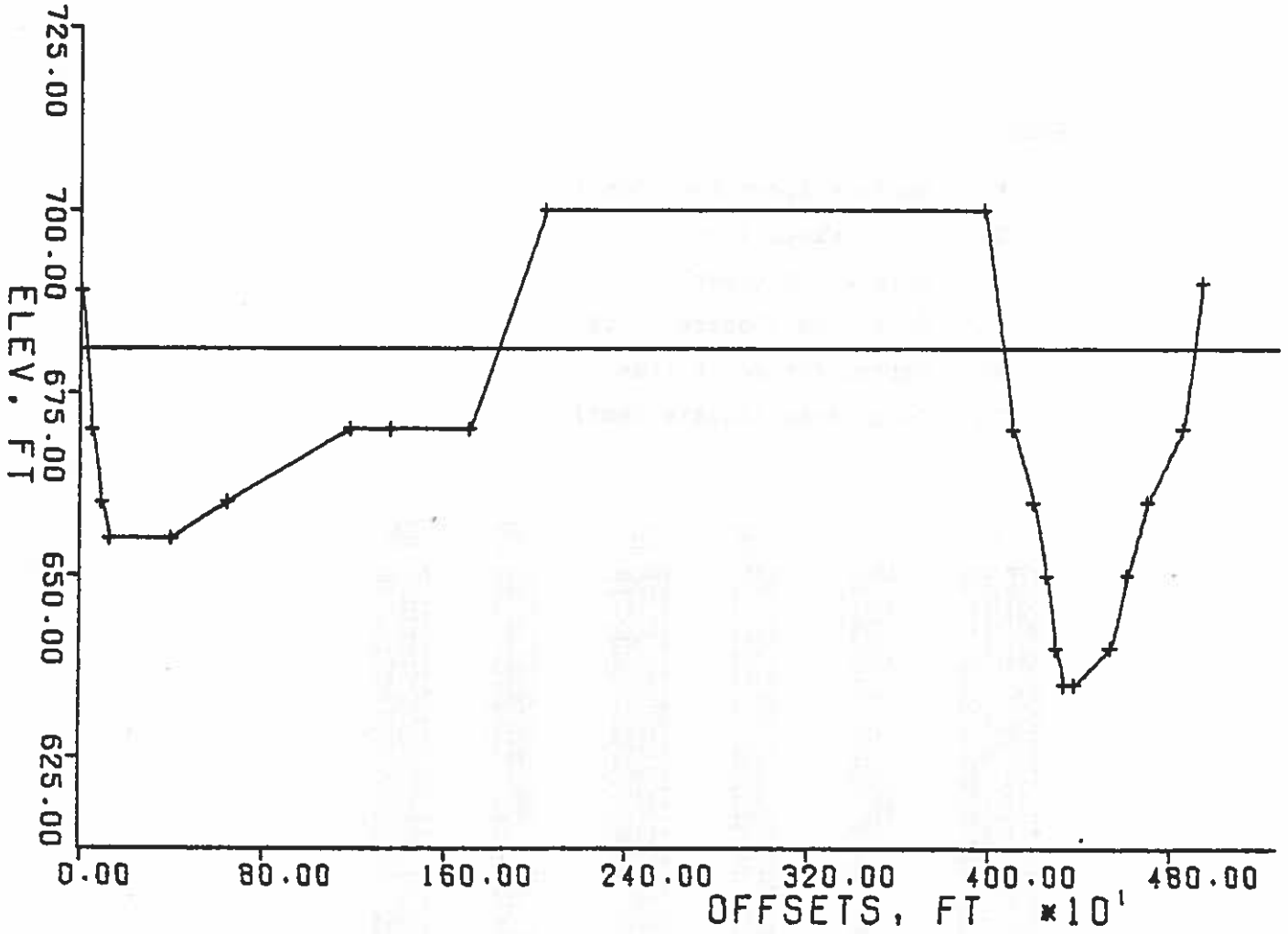
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	2260.	2260.	16835.	2265.	16835.
670.500	3416.	3416.	18542.	3420.	18542.
671.000	3420.	3420.	20251.	3424.	20251.
671.500	3423.	3423.	21961.	3428.	21961.
672.000	3427.	3427.	23674.	3432.	23674.
672.500	3431.	3431.	25389.	3436.	25389.
673.000	3434.	3434.	27105.	3440.	27105.
673.500	3438.	3438.	28823.	3444.	28823.
674.000	3442.	3442.	30543.	3448.	30543.
674.500	3446.	3446.	32265.	3451.	32265.
675.000	3449.	3449.	33988.	3455.	33988.
675.500	3453.	3453.	35714.	3459.	35714.
676.000	3457.	3457.	37441.	3463.	37441.
676.500	3460.	3460.	39171.	3467.	39171.
677.000	3464.	3464.	40902.	3471.	40902.
677.500	3468.	3468.	42635.	3475.	42635.
678.000	3471.	3471.	44369.	3478.	44369.
678.500	3475.	3475.	46106.	3482.	46106.
679.000	3479.	3479.	47844.	3486.	47844.
679.500	3482.	3482.	49585.	3490.	49585.
680.000	3486.	3486.	51327.	3494.	51327.
680.500	3490.	3490.	53071.	3498.	53071.
681.000	3493.	3493.	54817.	3502.	54817.
681.500	3497.	3497.	56564.	3506.	56564.
682.000	3501.	3501.	58314.	3509.	58314.
682.500	3505.	3505.	60065.	3513.	60065.
683.000	3508.	3508.	61818.	3517.	61818.
683.500	3512.	3512.	63573.	3521.	63573.
684.000	3516.	3516.	65330.	3525.	65330.
684.500	3519.	3519.	67089.	3529.	67089.
685.000	3523.	3523.	68850.	3533.	68850.
685.500	3527.	3527.	70612.	3536.	70612.
686.000	3530.	3530.	72376.	3540.	72376.
686.500	3534.	3534.	74142.	3544.	74142.
687.000	3538.	3538.	75910.	3548.	75910.
687.500	3541.	3541.	77680.	3552.	77680.
688.000	3545.	3545.	79452.	3556.	79452.
688.500	3547.	3547.	81225.	3558.	81225.
689.000	3549.	3549.	82999.	3560.	82999.
689.500	3551.	3551.	84774.	3562.	84774.
690.000	3553.	3553.	86550.	3565.	86550.
690.500	3555.	3555.	88327.	3567.	88327.
691.000	3557.	3557.	90105.	3569.	90105.
691.500	3559.	3559.	91884.	3571.	91884.
692.000	3561.	3561.	93664.	3573.	93664.
692.500	3563.	3563.	95445.	3576.	95445.
693.000	3565.	3565.	97227.	3578.	97227.
693.500	3567.	3567.	99010.	3580.	99010.
694.000	3569.	3569.	100794.	3582.	100794.
694.500	3571.	3571.	102579.	3585.	102579.
695.000	3573.	3573.	104365.	3587.	104365.
695.500	3575.	3575.	106152.	3589.	106152.
696.000	3577.	3577.	107940.	3591.	107940.
696.500	3579.	3579.	109729.	3594.	109729.
697.000	3581.	3581.	111519.	3596.	111519.
697.500	3583.	3583.	113310.	3598.	113310.
698.000	3585.	3585.	115102.	3600.	115102.
698.500	3587.	3587.	116895.	3603.	116895.
699.000	3589.	3589.	118689.	3605.	118689.
699.500	3591.	3591.	120484.	3607.	120484.
700.000	3593.	3593.	122280.	3609.	122280.

REACH 1950

CROSS-SECTION 3

DISTANCE 24,420 ft.



REACH 1950

CROSS-SECTION 3

DISTANCE 24,420 ft.

LEGEND

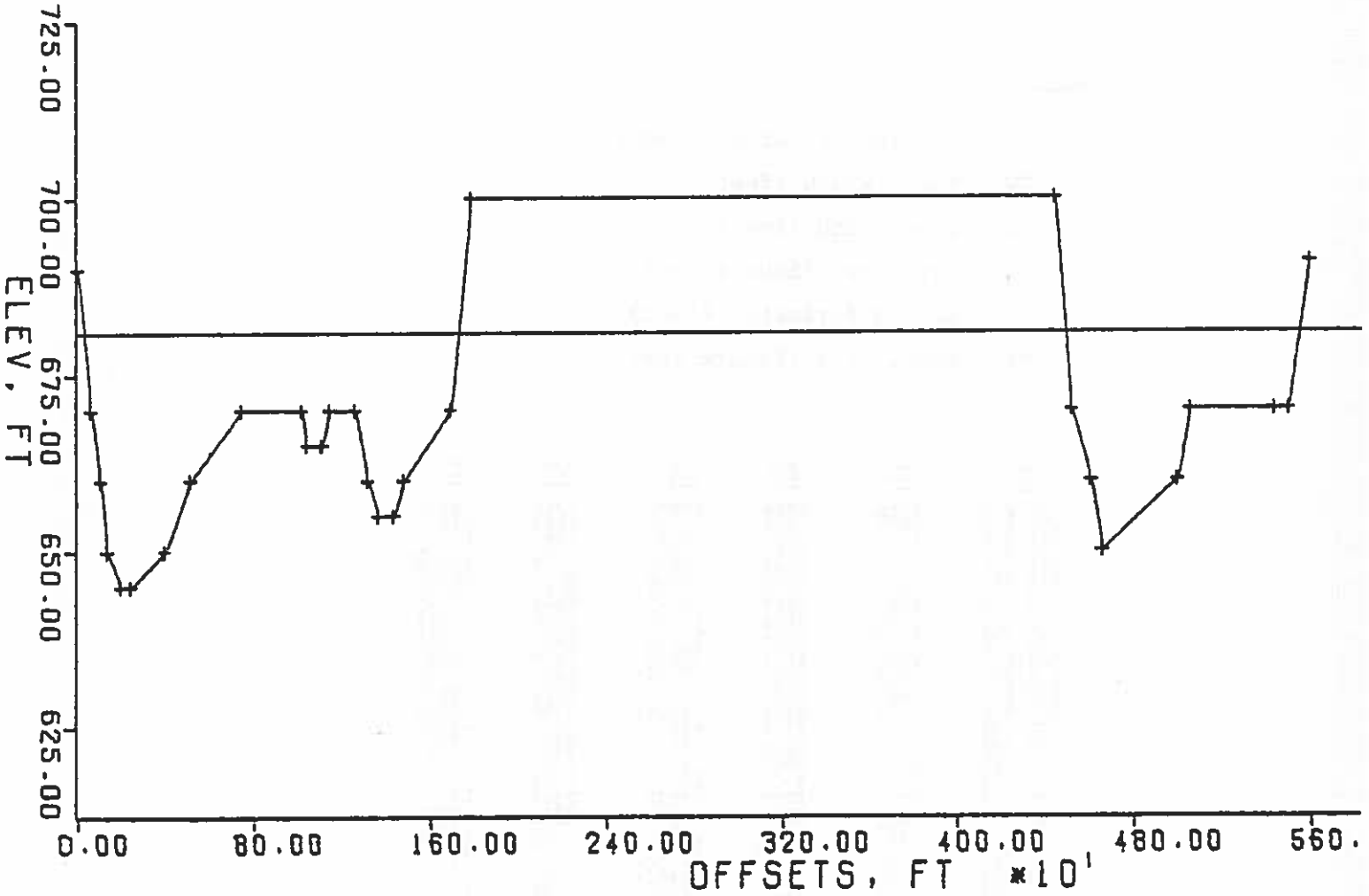
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	1884.	1884.	24682.	1890.	24682.
670.500	2420.	2420.	25869.	2426.	25869.
671.000	2431.	2431.	27102.	2437.	27102.
671.500	2442.	2442.	28320.	2449.	28320.
672.000	2453.	2453.	29544.	2460.	29544.
672.500	2464.	2464.	30773.	2471.	30773.
673.000	2475.	2475.	32008.	2483.	32008.
673.500	2486.	2486.	33248.	2494.	33248.
674.000	2497.	2497.	34494.	2506.	34494.
674.500	2509.	2509.	35746.	2517.	35746.
675.000	2520.	2520.	37003.	2528.	37003.
675.500	2531.	2531.	38265.	2540.	38265.
676.000	2542.	2542.	39534.	2551.	39534.
676.500	2553.	2553.	40807.	2562.	40807.
677.000	2564.	2564.	42087.	2574.	42087.
677.500	2575.	2575.	43372.	2585.	43372.
678.000	2586.	2586.	44662.	2596.	44662.
678.500	2597.	2597.	45958.	2608.	45958.
679.000	2609.	2609.	47259.	2619.	47259.
679.500	2620.	2620.	48567.	2630.	48567.
680.000	2631.	2631.	49879.	2642.	49879.
680.500	2642.	2642.	51197.	2653.	51197.
681.000	2653.	2653.	52521.	2664.	52521.
681.500	2664.	2664.	53850.	2676.	53850.
682.000	2675.	2675.	55185.	2687.	55185.
682.500	2686.	2686.	56526.	2698.	56526.
683.000	2698.	2698.	57872.	2710.	57872.
683.500	2709.	2709.	59223.	2721.	59223.
684.000	2720.	2720.	60580.	2732.	60580.
684.500	2731.	2731.	61943.	2744.	61943.
685.000	2742.	2742.	63311.	2755.	63311.
685.500	2753.	2753.	64685.	2766.	64685.
686.000	2764.	2764.	66064.	2778.	66064.
686.500	2775.	2775.	67449.	2789.	67449.
687.000	2786.	2786.	68839.	2801.	68839.
687.500	2798.	2798.	70235.	2812.	70235.
688.000	2809.	2809.	71637.	2823.	71637.
688.500	2820.	2820.	73044.	2835.	73044.
689.000	2831.	2831.	74457.	2846.	74457.
689.500	2842.	2842.	75875.	2857.	75875.
690.000	2853.	2853.	77298.	2868.	77298.
690.500	2862.	2862.	78727.	2878.	78727.
691.000	2872.	2872.	80161.	2888.	80161.
691.500	2882.	2882.	81599.	2898.	81599.
692.000	2892.	2892.	83043.	2908.	83043.
692.500	2901.	2901.	84491.	2918.	84491.
693.000	2911.	2911.	85944.	2929.	85944.
693.500	2921.	2921.	87402.	2939.	87402.
694.000	2931.	2931.	88865.	2949.	88865.
694.500	2940.	2940.	90333.	2959.	90333.
695.000	2950.	2950.	91805.	2969.	91805.
695.500	2960.	2960.	93283.	2979.	93283.
696.000	2970.	2970.	94765.	2989.	94765.
696.500	2979.	2979.	96252.	2999.	96252.
697.000	2989.	2989.	97745.	3009.	97745.
697.500	2999.	2999.	99242.	3019.	99242.
698.000	3009.	3009.	100744.	3029.	100744.
698.500	3019.	3019.	102250.	3039.	102250.
699.000	3028.	3028.	103762.	3050.	103762.
699.500	3038.	3038.	105279.	3060.	105279.
700.000	3048.	3048.	106800.	3070.	106800.

REACH 1950

CROSS-SECTION 4

DISTANCE 27,453 ft.



REACH 1950

CROSS-SECTION 4

DISTANCE 27,453 ft.

LEGEND

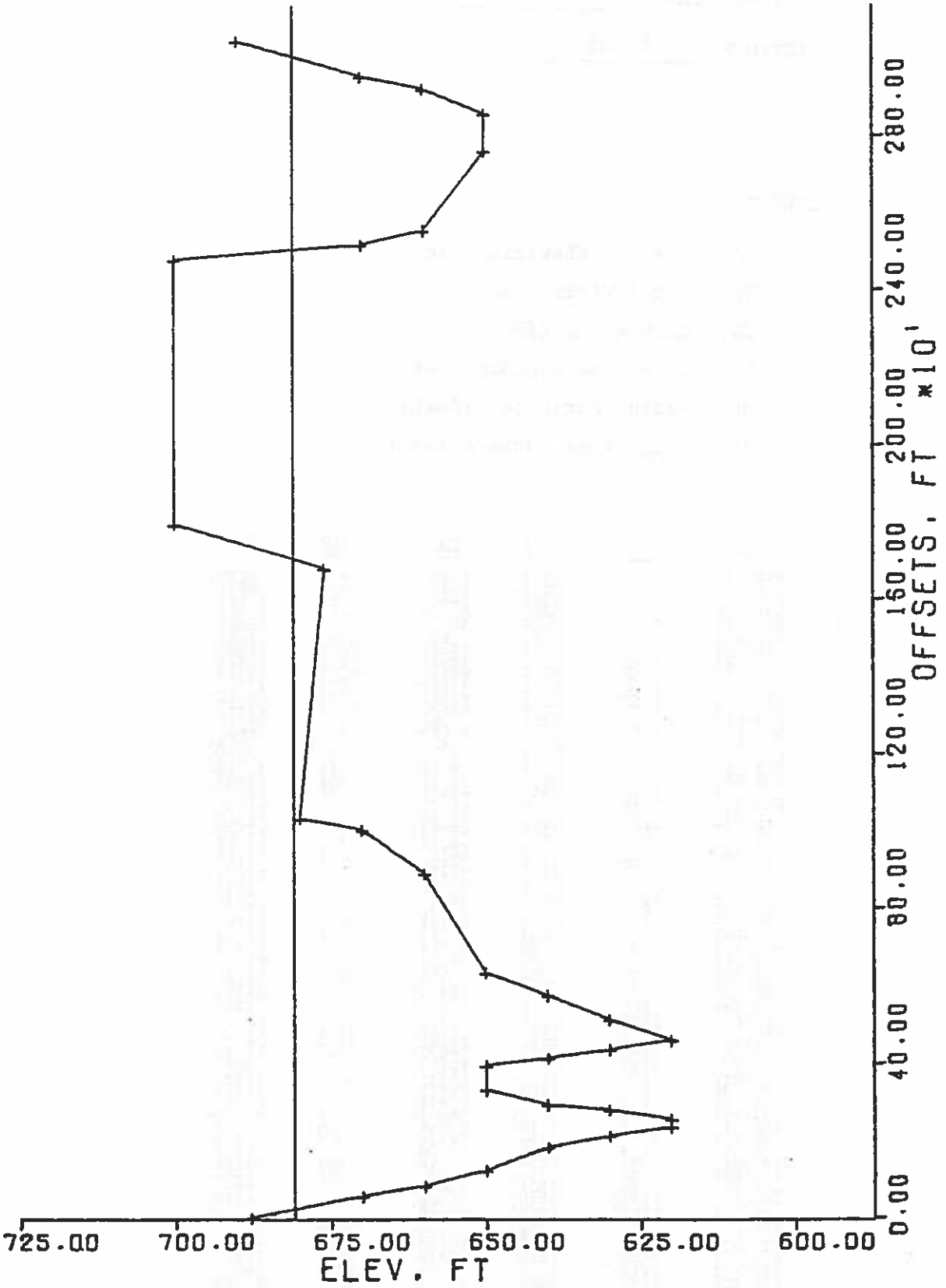
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	1786.	1786.	20270.	1795.	20270.
670.500	2628.	2628.	21582.	2637.	21582.
671.000	2634.	2634.	22897.	2644.	22897.
671.500	2641.	2641.	24216.	2651.	24216.
672.000	2647.	2647.	25538.	2657.	25538.
672.500	2654.	2654.	26864.	2664.	26864.
673.000	2660.	2660.	28192.	2671.	28192.
673.500	2667.	2667.	29524.	2678.	29524.
674.000	2674.	2674.	30859.	2685.	30859.
674.500	2680.	2680.	32198.	2692.	32198.
675.000	2687.	2687.	33539.	2699.	33539.
675.500	2693.	2693.	34884.	2705.	34884.
676.000	2700.	2700.	36233.	2712.	36233.
676.500	2706.	2706.	37584.	2719.	37584.
677.000	2713.	2713.	38939.	2726.	38939.
677.500	2719.	2719.	40297.	2733.	40297.
678.000	2726.	2726.	41658.	2740.	41658.
678.500	2732.	2732.	43023.	2747.	43023.
679.000	2739.	2739.	44391.	2753.	44391.
679.500	2746.	2746.	45762.	2760.	45762.
680.000	2752.	2752.	47136.	2767.	47136.
680.500	2759.	2759.	48514.	2774.	48514.
681.000	2765.	2765.	49895.	2781.	49895.
681.500	2772.	2772.	51279.	2788.	51279.
682.000	2778.	2778.	52667.	2794.	52667.
682.500	2785.	2785.	54057.	2801.	54057.
683.000	2791.	2791.	55451.	2808.	55451.
683.500	2798.	2798.	56649.	2815.	56649.
684.000	2804.	2804.	58249.	2822.	58249.
684.500	2811.	2811.	59653.	2829.	59653.
685.000	2818.	2818.	61060.	2836.	61060.
685.500	2824.	2824.	62471.	2842.	62471.
686.000	2831.	2831.	63884.	2849.	63884.
686.500	2837.	2837.	65301.	2856.	65301.
687.000	2844.	2844.	66721.	2863.	66721.
687.500	2850.	2850.	68145.	2870.	68145.
688.000	2857.	2857.	69572.	2877.	69572.
688.500	2863.	2863.	71002.	2884.	71002.
689.000	2870.	2870.	72435.	2890.	72435.
689.500	2876.	2876.	73871.	2897.	73871.
690.000	2883.	2883.	75311.	2904.	75311.
690.500	2889.	2889.	76754.	2910.	76754.
691.000	2895.	2895.	78200.	2917.	78200.
691.500	2900.	2900.	79649.	2922.	79649.
692.000	2905.	2905.	81100.	2927.	81100.
692.500	2909.	2909.	82553.	2932.	82553.
693.000	2914.	2914.	84009.	2938.	84009.
693.500	2919.	2919.	85467.	2943.	85467.
694.000	2924.	2924.	86928.	2948.	86928.
694.500	2929.	2929.	88391.	2953.	88391.
695.000	2933.	2933.	89857.	2959.	89857.
695.500	2938.	2938.	91325.	2964.	91325.
696.000	2943.	2943.	92795.	2969.	92795.
696.500	2948.	2948.	94268.	2974.	94268.
697.000	2953.	2953.	95743.	2979.	95743.
697.500	2957.	2957.	97220.	2985.	97220.
698.000	2962.	2962.	98700.	2990.	98700.
698.500	2967.	2967.	100182.	2995.	100182.
699.000	2972.	2972.	101667.	3000.	101667.
699.500	2977.	2977.	103154.	3005.	103154.
700.000	2981.	2981.	104644.	3011.	104644.

REACH 1950

CROSS-SECTION 5

DISTANCE 30.023 ft.



REACH 1950

CROSS-SECTION 5

DISTANCE 30,023 ft.

LEGEND

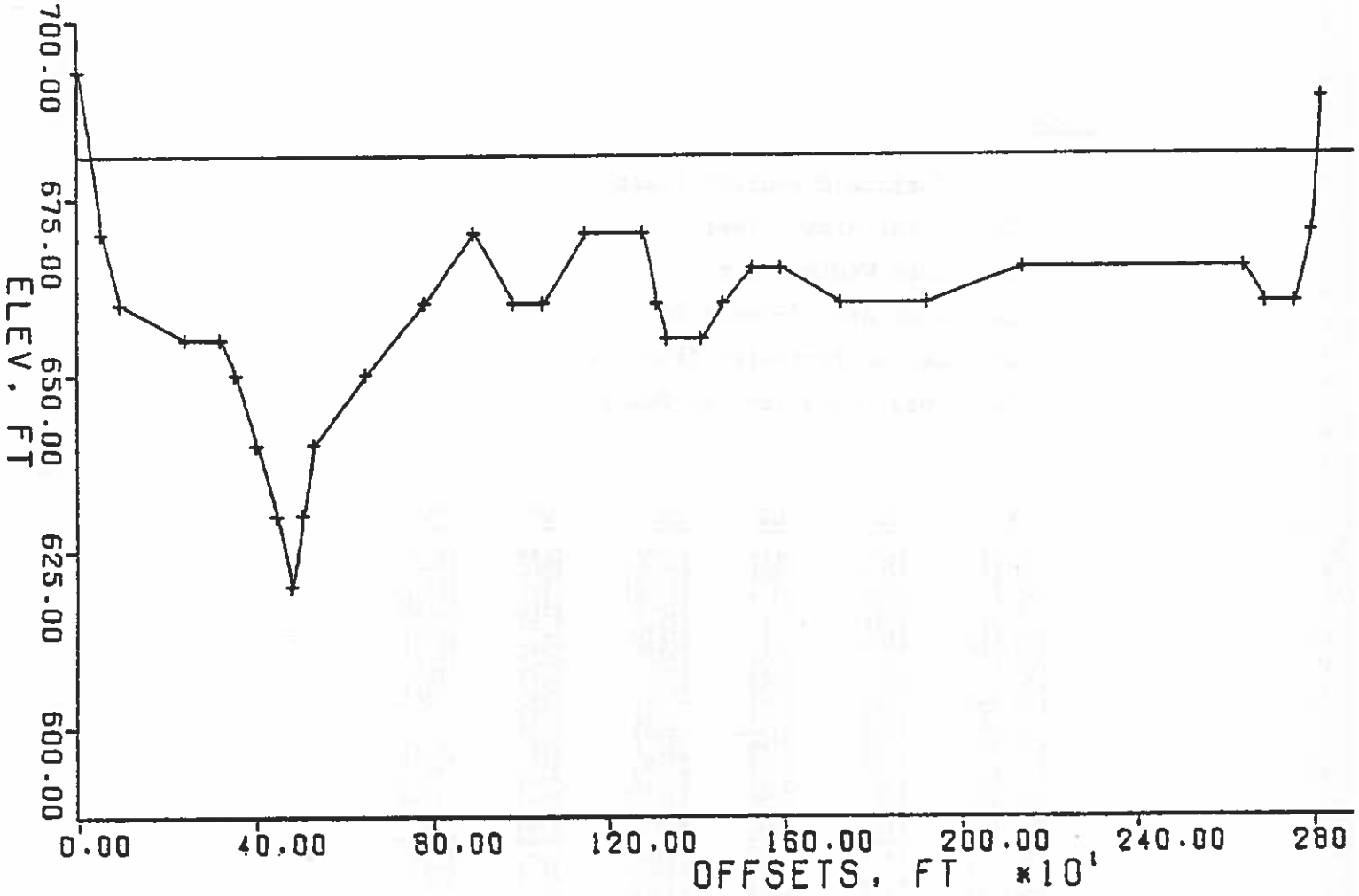
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	1382.	1382.	28179.	1409.	28179.
670.500	1388.	1388.	28872.	1416.	28872.
671.000	1394.	1394.	29567.	1422.	29567.
671.500	1400.	1400.	30265.	1429.	30265.
672.000	1406.	1406.	30967.	1435.	30967.
672.500	1412.	1412.	31671.	1442.	31671.
673.000	1418.	1418.	32379.	1448.	32379.
673.500	1424.	1424.	33089.	1454.	33089.
674.000	1430.	1430.	33802.	1461.	33802.
674.500	1436.	1436.	34519.	1467.	34519.
675.000	1442.	1442.	35238.	1474.	35238.
675.500	1448.	1448.	35961.	1480.	35961.
676.000	1454.	1454.	36686.	1486.	36686.
676.500	1543.	1543.	37436.	1576.	37436.
677.000	1632.	1632.	38230.	1666.	38230.
677.500	1722.	1722.	39068.	1755.	39068.
678.000	1811.	1811.	39951.	1845.	39951.
678.500	1900.	1900.	40879.	1935.	40879.
679.000	1989.	1989.	41851.	2024.	41851.
679.500	2078.	2078.	42868.	2114.	42868.
680.000	2168.	2168.	43930.	2204.	43930.
680.500	2175.	2175.	45015.	2211.	45015.
681.000	2182.	2182.	46104.	2218.	46104.
681.500	2188.	2188.	47197.	2225.	47197.
682.000	2195.	2195.	48293.	2233.	48293.
682.500	2202.	2202.	49392.	2240.	49392.
683.000	2209.	2209.	50495.	2247.	50495.
683.500	2216.	2216.	51601.	2255.	51601.
684.000	2223.	2223.	52711.	2262.	52711.
684.500	2230.	2230.	53825.	2269.	53825.
685.000	2237.	2237.	54941.	2276.	54941.
685.500	2244.	2244.	56062.	2284.	56062.
686.000	2251.	2251.	57185.	2291.	57185.
686.500	2258.	2258.	58313.	2298.	58313.
687.000	2265.	2265.	59443.	2306.	59443.
687.500	2272.	2272.	60577.	2313.	60577.
688.000	2279.	2279.	61715.	2320.	61715.
688.500	2285.	2285.	62856.	2327.	62856.
689.000	2291.	2291.	64000.	2334.	64000.
689.500	2298.	2298.	65147.	2340.	65147.
690.000	2304.	2304.	66298.	2347.	66298.
690.500	2309.	2309.	67451.	2353.	67451.
691.000	2314.	2314.	68607.	2358.	68607.
691.500	2319.	2319.	69765.	2364.	69765.
692.000	2324.	2324.	70926.	2369.	70926.
692.500	2329.	2329.	72090.	2375.	72090.
693.000	2334.	2334.	73255.	2380.	73255.
693.500	2339.	2339.	74424.	2386.	74424.
694.000	2345.	2345.	75595.	2391.	75595.
694.500	2350.	2350.	76768.	2397.	76768.
695.000	2355.	2355.	77945.	2402.	77945.
695.500	2360.	2360.	79123.	2408.	79123.
696.000	2365.	2365.	80304.	2413.	80304.
696.500	2370.	2370.	81488.	2419.	81488.
697.000	2375.	2375.	82674.	2424.	82674.
697.500	2380.	2380.	83863.	2430.	83863.
698.000	2385.	2385.	85054.	2435.	85054.
698.500	2390.	2390.	86248.	2441.	86248.
699.000	2395.	2395.	87444.	2446.	87444.
699.500	2400.	2400.	88643.	2452.	88643.
700.000	2405.	2405.	89844.	2457.	89844.

REACH 1950

CROSS-SECTION 6

DISTANCE 30,955 ft.



REACH 1950

CROSS-SECTION 6

DISTANCE 30,955 ft.

LEGEND

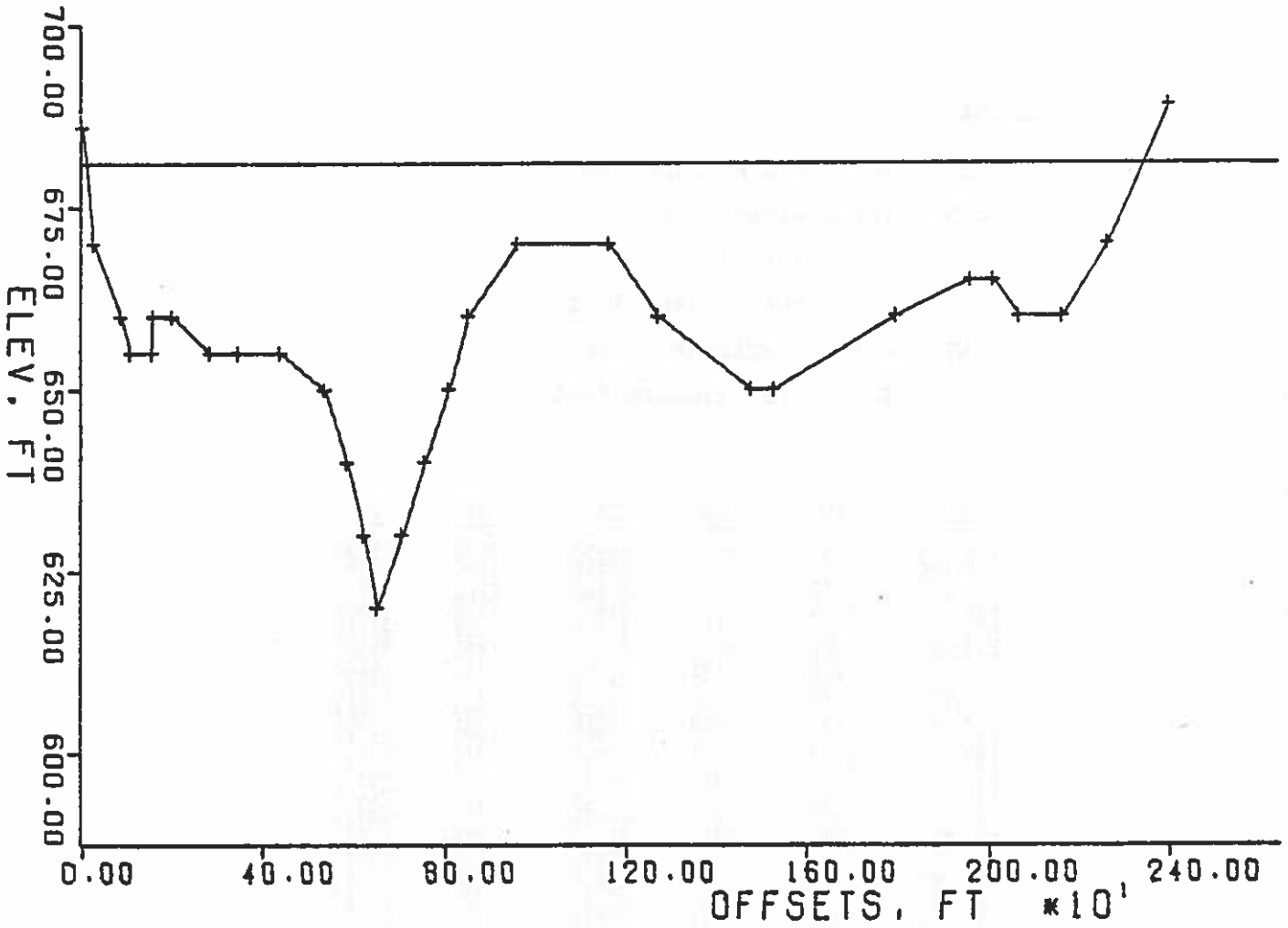
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	2614.	2614.	28598.	2629.	28598.
670.500	2746.	2746.	29970.	2762.	29970.
671.000	2747.	2747.	31343.	2764.	31343.
671.500	2749.	2749.	32718.	2766.	32718.
672.000	2751.	2751.	34093.	2768.	34093.
672.500	2752.	2752.	35468.	2770.	35468.
673.000	2754.	2754.	36845.	2772.	36845.
673.500	2756.	2756.	38222.	2774.	38222.
674.000	2758.	2758.	39601.	2776.	39601.
674.500	2759.	2759.	40980.	2778.	40980.
675.000	2761.	2761.	42360.	2780.	42360.
675.500	2763.	2763.	43741.	2782.	43741.
676.000	2764.	2764.	45123.	2784.	45123.
676.500	2766.	2766.	46505.	2786.	46505.
677.000	2768.	2768.	47889.	2787.	47889.
677.500	2769.	2769.	49273.	2789.	49273.
678.000	2771.	2771.	50658.	2791.	50658.
678.500	2773.	2773.	52044.	2793.	52044.
679.000	2774.	2774.	53431.	2795.	53431.
679.500	2776.	2776.	54818.	2797.	54818.
680.000	2778.	2778.	56207.	2799.	56207.
680.500	2779.	2779.	57596.	2801.	57596.
681.000	2781.	2781.	58986.	2603.	58986.
681.500	2783.	2783.	60377.	2805.	60377.
682.000	2784.	2784.	61769.	2807.	61769.
682.500	2786.	2786.	63162.	2809.	63162.
683.000	2788.	2788.	64555.	2811.	64555.
683.500	2790.	2790.	65949.	2813.	65949.
684.000	2791.	2791.	67345.	2815.	67345.
684.500	2793.	2793.	68741.	2817.	68741.
685.000	2795.	2795.	70137.	2819.	70137.
685.500	2796.	2796.	71535.	2821.	71535.
686.000	2798.	2798.	72934.	2823.	72934.
686.500	2600.	2800.	74333.	2825.	74333.
687.000	2801.	2801.	75733.	2827.	75733.
687.500	2803.	2803.	77134.	2829.	77134.
688.000	2805.	2805.	78536.	2831.	78536.
688.500	2806.	2806.	79939.	2833.	79939.
689.000	2808.	2808.	81343.	2835.	81343.
689.500	2810.	2810.	82747.	2837.	82747.
690.000	2812.	2812.	64153.	2840.	64153.
690.500	2814.	2814.	85560.	2842.	85560.
691.000	2817.	2817.	86967.	2844.	86967.
691.500	2819.	2819.	88376.	2847.	88376.
692.000	2821.	2821.	89786.	2849.	89786.
692.500	2823.	2823.	91197.	2851.	91197.
693.000	2825.	2825.	92609.	2854.	92609.
693.500	2827.	2827.	94022.	2856.	94022.
694.000	2829.	2829.	95436.	2858.	95436.
694.500	2831.	2831.	96851.	2860.	96851.
695.000	2833.	2833.	98267.	2863.	98267.
695.500	2835.	2835.	99684.	2865.	99684.
696.000	2837.	2837.	101102.	2867.	101102.
696.500	2839.	2839.	102521.	2869.	102521.
697.000	2841.	2841.	103941.	2872.	103941.
697.500	2843.	2843.	105362.	2874.	105362.
698.000	2845.	2845.	106784.	2876.	106784.
698.500	2847.	2847.	108207.	2878.	108207.
699.000	2849.	2849.	109631.	2881.	109631.
699.500	2851.	2851.	111056.	2883.	111056.
700.000	2853.	2853.	112482.	2885.	112482.

REACH 1950

CROSS-SECTION 7

DISTANCE 31,872 ft.



REACH 1950

CROSS-SECTION 7

DISTANCE 31,872 ft..

LEGEND

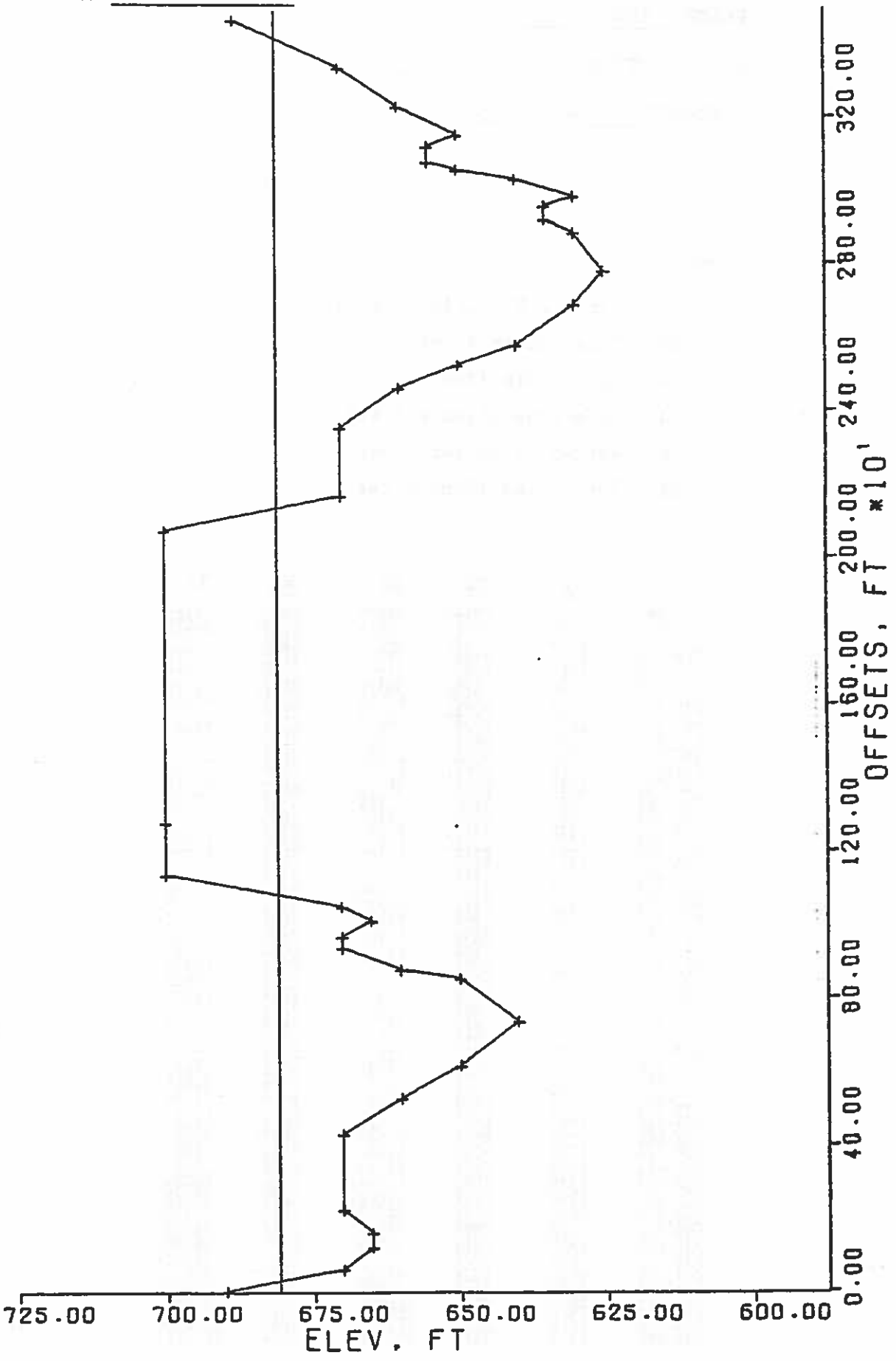
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	2037.	2037.	29430.	2052.	29430.
670.500	2241.	2241.	30550.	2257.	30550.
671.000	2246.	2246.	31672.	2261.	31672.
671.500	2250.	2250.	32796.	2266.	32796.
672.000	2254.	2254.	33922.	2270.	33922.
672.500	2259.	2259.	35050.	2275.	35050.
673.000	2263.	2263.	36180.	2279.	36180.
673.500	2267.	2267.	37313.	2284.	37313.
674.000	2272.	2272.	38448.	2288.	38448.
674.500	2276.	2276.	39585.	2293.	39585.
675.000	2280.	2280.	40724.	2297.	40724.
675.500	2285.	2285.	41865.	2302.	41865.
676.000	2289.	2289.	43008.	2306.	43008.
676.500	2293.	2293.	44154.	2311.	44154.
677.000	2297.	2297.	45301.	2315.	45301.
677.500	2302.	2302.	46451.	2320.	46451.
678.000	2306.	2306.	47603.	2324.	47603.
678.500	2310.	2310.	48757.	2329.	48757.
679.000	2315.	2315.	49914.	2333.	49914.
679.500	2319.	2319.	51072.	2338.	51072.
680.000	2323.	2323.	52233.	2342.	52235.
680.500	2328.	2328.	53395.	2347.	53395.
681.000	2332.	2332.	54560.	2351.	54560.
681.500	2336.	2336.	55727.	2356.	55727.
682.000	2341.	2341.	56896.	2360.	56896.
682.500	2345.	2345.	58068.	2365.	58068.
683.000	2349.	2349.	59241.	2369.	59241.
683.500	2354.	2354.	60417.	2374.	60417.
684.000	2358.	2358.	61595.	2378.	61595.
684.500	2362.	2362.	62775.	2383.	62775.
685.000	2366.	2366.	63957.	2387.	63957.
685.500	2371.	2371.	65141.	2392.	65141.
686.000	2375.	2375.	66328.	2396.	66328.
686.500	2380.	2380.	67517.	2401.	67517.
687.000	2384.	2384.	68707.	2406.	68707.
687.500	2389.	2389.	69901.	2411.	69901.
688.000	2393.	2393.	71096.	2415.	71096.
688.500	2398.	2398.	72294.	2420.	72294.
689.000	2402.	2402.	73494.	2425.	73494.
689.500	2404.	2404.	74696.	2427.	74696.
690.000	2406.	2406.	75899.	2429.	75899.
690.500	2408.	2408.	77102.	2431.	77102.
691.000	2410.	2410.	78307.	2434.	78307.
691.500	2412.	2412.	79513.	2436.	79513.
692.000	2414.	2414.	80720.	2438.	80720.
692.500	2416.	2416.	81927.	2440.	81927.
693.000	2418.	2418.	83136.	2443.	83136.
693.500	2420.	2420.	84346.	2445.	84346.
694.000	2422.	2422.	85557.	2447.	85557.
694.500	2424.	2424.	86768.	2449.	86768.
695.000	2426.	2426.	87981.	2452.	87981.
695.500	2428.	2428.	89195.	2454.	89195.
696.000	2430.	2430.	90410.	2456.	90410.
696.500	2432.	2432.	91625.	2458.	91625.
697.000	2434.	2434.	92842.	2460.	92842.
697.500	2436.	2436.	94060.	2463.	94060.
698.000	2438.	2438.	95279.	2465.	95279.
698.500	2440.	2440.	96498.	2467.	96498.
699.000	2442.	2442.	97719.	2469.	97719.
699.500	2444.	2444.	98941.	2472.	98941.
700.000	2446.	2446.	100164.	2474.	100164.

REACH 1950

CROSS-SECTION 8

DISTANCE 34,009 ft.



REACH 1950

CROSS-SECTION 8

DISTANCE 34,009 ft.

LEGEND

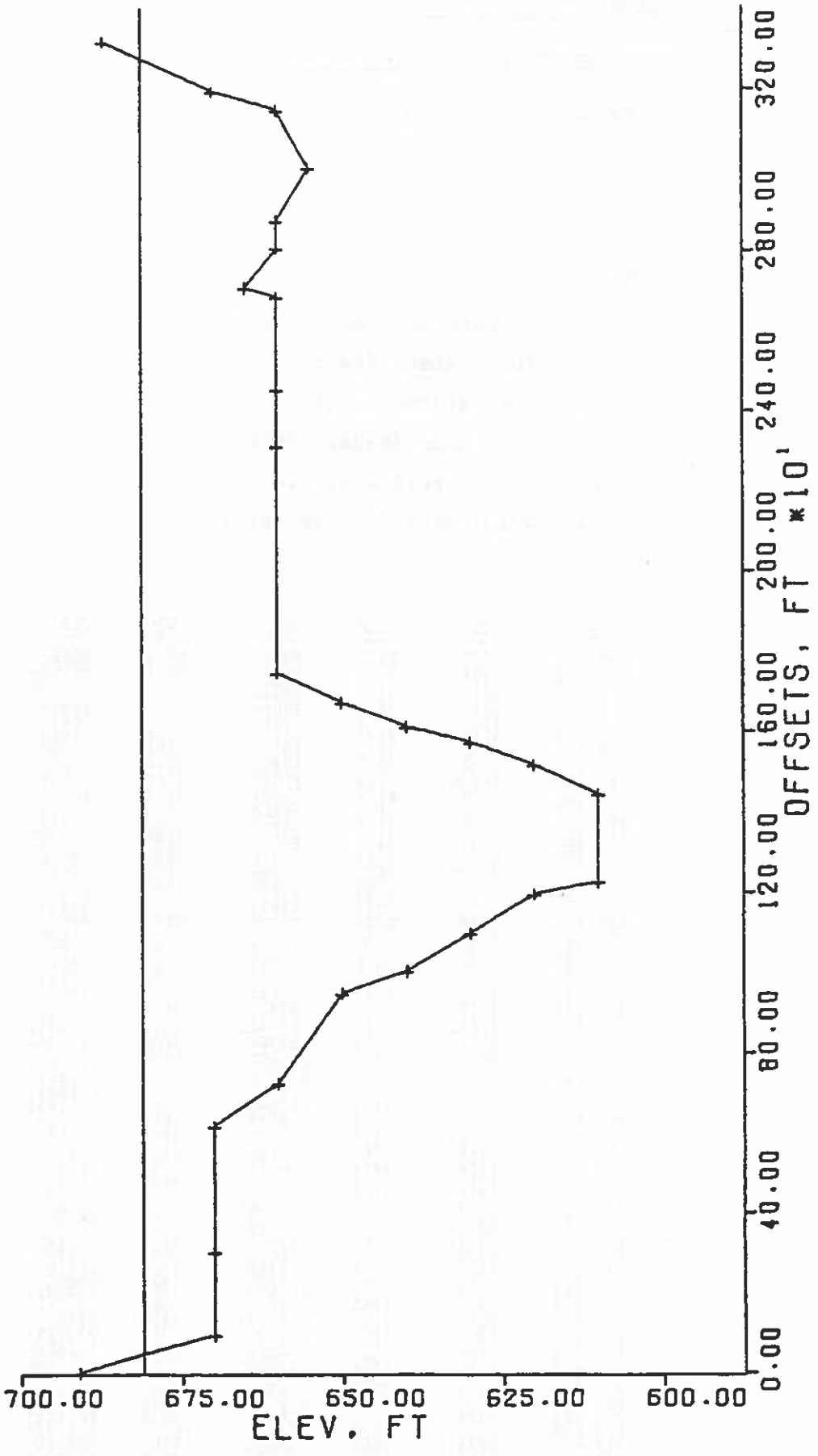
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	1734.	1734.	33333.	1749.	33333.
670.500	2165.	2165.	34413.	2179.	34413.
671.000	2173.	2173.	35497.	2188.	35497.
671.500	2181.	2181.	36586.	2196.	36586.
672.000	2189.	2189.	37678.	2204.	37678.
672.500	2197.	2197.	38775.	2213.	38775.
673.000	2205.	2205.	39875.	2221.	39875.
673.500	2213.	2213.	40980.	2230.	40980.
674.000	2221.	2221.	42089.	2238.	42089.
674.500	2230.	2230.	43202.	2246.	43202.
675.000	2238.	2238.	44318.	2255.	44318.
675.500	2246.	2246.	45439.	2263.	45439.
676.000	2254.	2254.	46564.	2272.	46564.
676.500	2262.	2262.	47693.	2280.	47693.
677.000	2270.	2270.	48826.	2288.	48826.
677.500	2278.	2278.	49963.	2297.	49963.
678.000	2286.	2286.	51104.	2305.	51104.
678.500	2294.	2294.	52249.	2313.	52249.
679.000	2302.	2302.	53399.	2322.	53399.
679.500	2311.	2311.	54552.	2330.	54552.
680.000	2319.	2319.	55709.	2339.	55709.
680.500	2327.	2327.	56871.	2347.	56871.
681.000	2335.	2335.	58036.	2355.	58036.
681.500	2343.	2343.	59206.	2364.	59206.
682.000	2351.	2351.	60379.	2372.	60379.
682.500	2359.	2359.	61557.	2380.	61557.
683.000	2367.	2367.	62738.	2389.	62738.
683.500	2375.	2375.	63924.	2397.	63924.
684.000	2384.	2384.	65114.	2406.	65114.
684.500	2392.	2392.	66308.	2414.	66308.
685.000	2400.	2400.	67505.	2422.	67505.
685.500	2408.	2408.	68707.	2431.	68707.
686.000	2416.	2416.	69913.	2439.	69913.
686.500	2424.	2424.	71123.	2448.	71123.
687.000	2432.	2432.	72337.	2456.	72337.
687.500	2440.	2440.	73556.	2464.	73556.
688.000	2448.	2448.	74778.	2473.	74778.
688.500	2454.	2454.	76003.	2479.	76003.
689.000	2459.	2459.	77232.	2484.	77232.
689.500	2465.	2465.	78463.	2490.	78463.
690.000	2470.	2470.	79696.	2496.	79696.
690.500	2475.	2475.	80933.	2502.	80933.
691.000	2480.	2480.	82172.	2507.	82172.
691.500	2485.	2485.	83413.	2512.	83413.
692.000	2490.	2490.	84657.	2518.	84657.
692.500	2495.	2495.	85904.	2523.	85904.
693.000	2500.	2500.	87153.	2529.	87153.
693.500	2505.	2505.	88404.	2534.	88404.
694.000	2510.	2510.	89658.	2539.	89658.
694.500	2515.	2515.	90915.	2545.	90915.
695.000	2520.	2520.	92174.	2550.	92174.
695.500	2525.	2525.	93435.	2556.	93435.
696.000	2530.	2530.	94699.	2561.	94699.
696.500	2535.	2535.	95966.	2566.	95966.
697.000	2540.	2540.	97234.	2572.	97234.
697.500	2545.	2545.	98506.	2577.	98506.
698.000	2550.	2550.	99780.	2583.	99780.
698.500	2555.	2555.	101056.	2588.	101056.
699.000	2560.	2560.	102335.	2593.	102335.
699.500	2565.	2565.	103617.	2599.	103617.
700.000	2570.	2570.	104901.	2604.	104901.

REACH 1950

CROSS-SECTION 9

DISTANCE 35,091 ft.



REACH 1950

CROSS-SECTION 9

DISTANCE 35,091 ft.

LEGEND

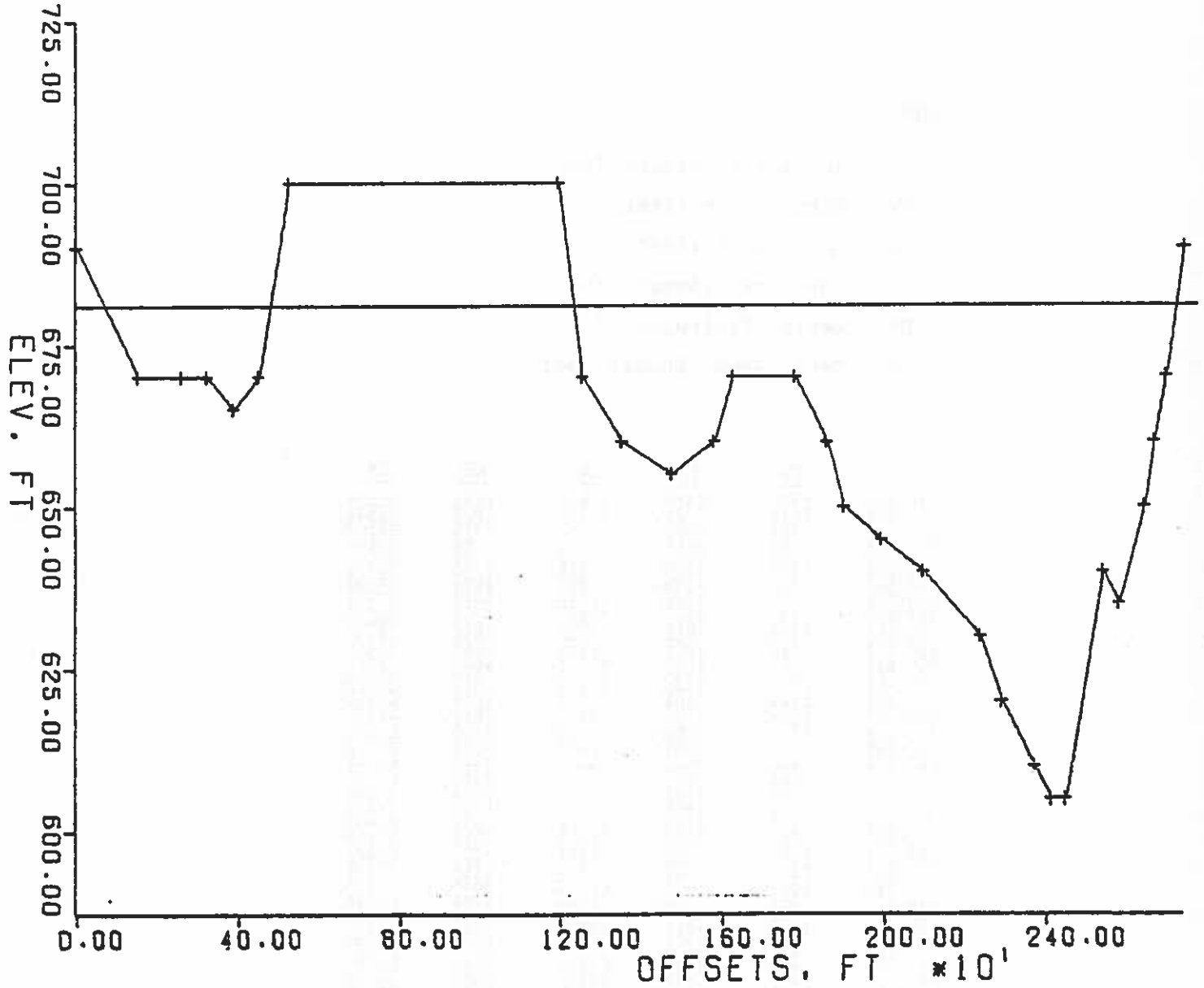
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	2577.	2577.	52837.	2588.	52837.
670.500	3105.	3105.	54388.	3116.	54388.
671.000	3111.	3111.	55942.	3122.	55942.
671.500	3117.	3117.	57499.	3128.	57499.
672.000	3123.	3123.	59059.	3134.	59059.
672.500	3129.	3129.	60622.	3140.	60622.
673.000	3135.	3135.	62188.	3146.	62188.
673.500	3141.	3141.	63757.	3152.	63757.
674.000	3147.	3147.	65329.	3158.	65329.
674.500	3153.	3153.	66904.	3164.	66904.
675.000	3159.	3159.	68482.	3170.	68482.
675.500	3165.	3165.	70063.	3176.	70063.
676.000	3171.	3171.	71647.	3182.	71647.
676.500	3177.	3177.	73233.	3188.	73233.
677.000	3183.	3183.	74823.	3194.	74823.
677.500	3188.	3188.	76416.	3200.	76416.
678.000	3194.	3194.	78012.	3206.	78012.
678.500	3200.	3200.	79610.	3212.	79610.
679.000	3206.	3206.	81212.	3216.	81212.
679.500	3212.	3212.	82817.	3224.	82817.
680.000	3218.	3218.	84424.	3230.	84424.
680.500	3224.	3224.	86035.	3236.	86035.
681.000	3230.	3230.	87648.	3242.	87648.
681.500	3236.	3236.	89265.	3248.	89265.
682.000	3242.	3242.	90884.	3254.	90884.
682.500	3248.	3248.	92507.	3260.	92507.
683.000	3254.	3254.	94132.	3267.	94132.
683.500	3260.	3260.	95761.	3273.	95761.
684.000	3266.	3266.	97392.	3279.	97392.
684.500	3272.	3272.	99026.	3285.	99026.
685.000	3278.	3278.	100664.	3291.	100664.
685.500	3284.	3284.	102304.	3297.	102304.
686.000	3289.	3289.	103947.	3303.	103947.
686.500	3295.	3295.	105593.	3309.	105593.
687.000	3301.	3301.	107243.	3315.	107243.
687.500	3305.	3305.	108894.	3318.	108894.
688.000	3308.	3308.	110547.	3322.	110547.
688.500	3311.	3311.	112202.	3325.	112202.
689.000	3314.	3314.	113858.	3328.	113858.
689.500	3318.	3318.	115516.	3332.	115516.
690.000	3321.	3321.	117176.	3335.	117176.
690.500	3324.	3324.	118837.	3339.	118837.
691.000	3327.	3327.	120500.	3342.	120500.
691.500	3329.	3329.	122164.	3344.	122164.
692.000	3331.	3331.	123830.	3347.	123830.
692.500	3333.	3333.	125496.	3349.	125496.
693.000	3335.	3335.	127163.	3351.	127163.
693.500	3337.	3337.	128831.	3353.	128831.
694.000	3339.	3339.	130500.	3356.	130500.
694.500	3341.	3341.	132171.	3358.	132171.
695.000	3343.	3343.	133842.	3360.	133842.
695.500	3345.	3345.	135514.	3362.	135514.
696.000	3347.	3347.	137187.	3365.	137187.
696.500	3349.	3349.	138862.	3367.	138862.
697.000	3351.	3351.	140537.	3369.	140537.
697.500	3353.	3353.	142213.	3371.	142213.
698.000	3355.	3355.	143890.	3374.	143890.
698.500	3357.	3357.	145568.	3376.	145568.
699.000	3359.	3359.	147248.	3378.	147248.
699.500	3361.	3361.	148928.	3380.	148928.
700.000	3363.	3363.	150609.	3382.	150609.

REACH 1950

CROSS-SECTION 10

DISTANCE 36,689 ft.



REACH 1950

CROSS-SECTION 10

DISTANCE 36,689 ft.

LEGEND

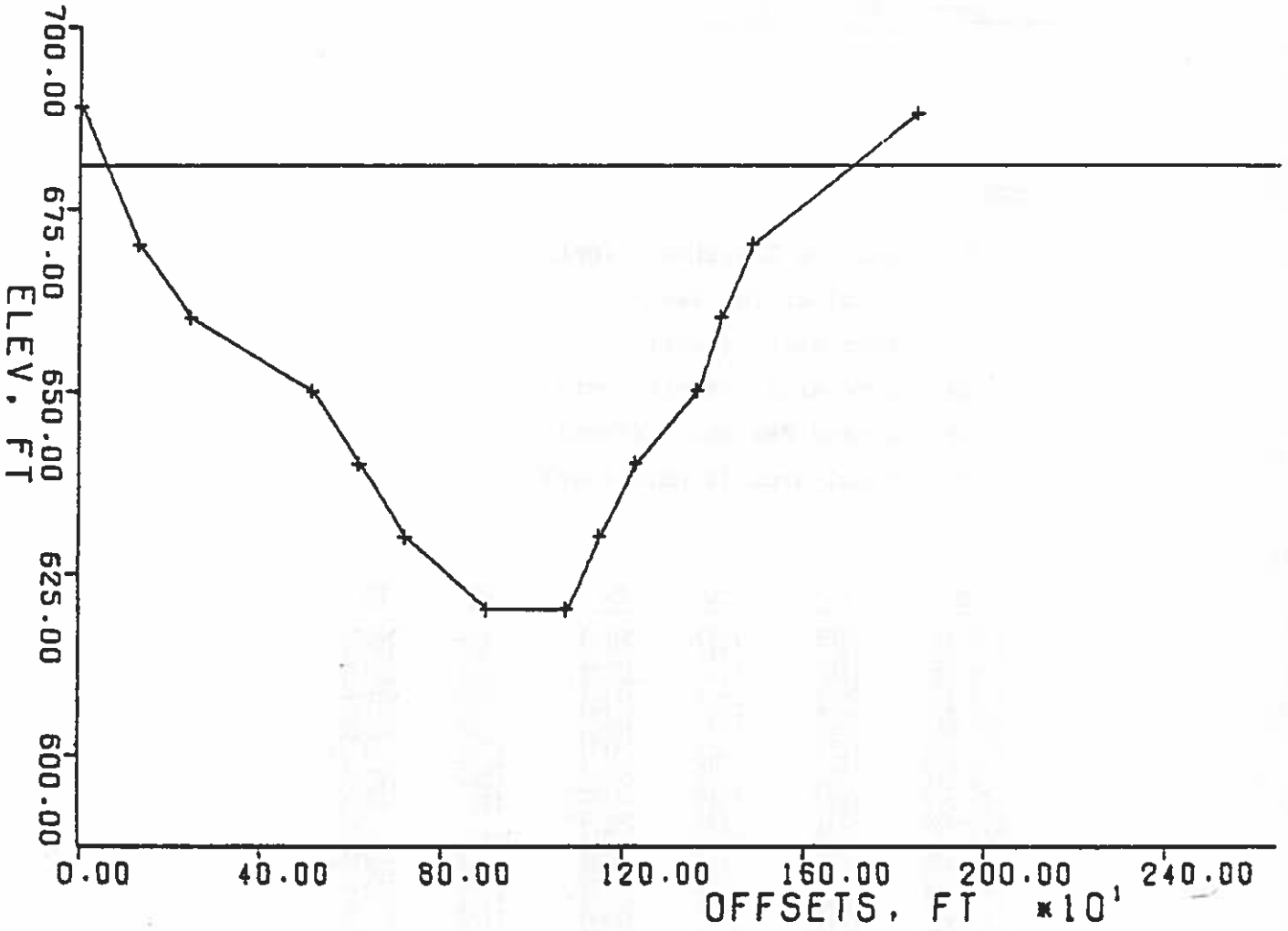
E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	1417.	1417.	34517.	1436.	34517.
670.500	1750.	1750.	35390.	1769.	35390.
671.000	1757.	1757.	36267.	1776.	36267.
671.500	1764.	1764.	37147.	1784.	37147.
672.000	1771.	1771.	38030.	1791.	38030.
672.500	1778.	1778.	38918.	1798.	38918.
673.000	1785.	1785.	39808.	1806.	39808.
673.500	1792.	1792.	40703.	1813.	40703.
674.000	1799.	1799.	41600.	1821.	41600.
674.500	1806.	1806.	42502.	1828.	42502.
675.000	1813.	1813.	43407.	1836.	43407.
675.500	1820.	1820.	44315.	1843.	44315.
676.000	1828.	1828.	45227.	1851.	45227.
676.500	1835.	1835.	46143.	1858.	46143.
677.000	1842.	1842.	47062.	1866.	47062.
677.500	1849.	1849.	47984.	1873.	47984.
678.000	1856.	1856.	48910.	1880.	48910.
678.500	1863.	1863.	49840.	1888.	49840.
679.000	1870.	1870.	50773.	1895.	50773.
679.500	1877.	1877.	51710.	1903.	51710.
680.000	1884.	1884.	52651.	1910.	52651.
680.500	1891.	1891.	53594.	1918.	53594.
681.000	1898.	1898.	54542.	1925.	54542.
681.500	1905.	1905.	55493.	1933.	55493.
682.000	1913.	1913.	56447.	1940.	56447.
682.500	1920.	1920.	57405.	1947.	57405.
683.000	1927.	1927.	58367.	1955.	58367.
683.500	1934.	1934.	59332.	1962.	59332.
684.000	1941.	1941.	60301.	1970.	60301.
684.500	1948.	1948.	61273.	1977.	61273.
685.000	1955.	1955.	62249.	1985.	62249.
685.500	1962.	1962.	63228.	1992.	63228.
686.000	1969.	1969.	64211.	2000.	64211.
686.500	1976.	1976.	65197.	2007.	65197.
687.000	1983.	1983.	66187.	2014.	66187.
687.500	1991.	1991.	67181.	2022.	67181.
688.000	1998.	1998.	68178.	2029.	68178.
688.500	2005.	2005.	69178.	2037.	69178.
689.000	2012.	2012.	70182.	2044.	70182.
689.500	2019.	2019.	71190.	2052.	71190.
690.000	2026.	2026.	72201.	2059.	72201.
690.500	2030.	2030.	73215.	2064.	73215.
691.000	2034.	2034.	74231.	2068.	74231.
691.500	2038.	2038.	75250.	2073.	75250.
692.000	2043.	2043.	76270.	2078.	76270.
692.500	2047.	2047.	77292.	2082.	77292.
693.000	2051.	2051.	78317.	2087.	78317.
693.500	2055.	2055.	79343.	2092.	79343.
694.000	2059.	2059.	80372.	2096.	80372.
694.500	2064.	2064.	81403.	2101.	81403.
695.000	2068.	2068.	82436.	2106.	82436.
695.500	2072.	2072.	83470.	2110.	83470.
696.000	2076.	2076.	84507.	2115.	84507.
696.500	2080.	2080.	85547.	2119.	85547.
697.000	2084.	2084.	86588.	2124.	86588.
697.500	2089.	2089.	87631.	2129.	87631.
698.000	2093.	2093.	88676.	2133.	88676.
698.500	2097.	2097.	89724.	2138.	89724.
699.000	2101.	2101.	90773.	2143.	90773.
699.500	2105.	2105.	91825.	2147.	91825.
700.000	2110.	2110.	92879.	2152.	92879.

REACH 1950

CROSS-SECTION 11

DISTANCE 39,072 ft.



REACH 1950

CROSS-SECTION 11

DISTANCE 39,072 ft.

LEGEND

E	Surface Elevation (feet)
TW	Total Width (feet)
CW	Core Width (feet)
CA	Core Area (Square feet)
WP	Wetted Perimeter (feet)
TA	Total Area (Square feet)

E	TW	CW	CA	WP	TA
670.000	1359.	1359.	38272.	1364.	38272.
670.500	1372.	1372.	38955.	1377.	38955.
671.000	1386.	1386.	39644.	1391.	39644.
671.500	1399.	1399.	40341.	1405.	40341.
672.000	1413.	1413.	41044.	1418.	41044.
672.500	1426.	1426.	41753.	1432.	41753.
673.000	1440.	1440.	42470.	1445.	42470.
673.500	1453.	1453.	43193.	1459.	43193.
674.000	1467.	1467.	43923.	1472.	43923.
674.500	1480.	1480.	44660.	1486.	44660.
675.000	1494.	1494.	45403.	1499.	45403.
675.500	1507.	1507.	46154.	1513.	46154.
676.000	1521.	1521.	46911.	1527.	46911.
676.500	1534.	1534.	47675.	1540.	47675.
677.000	1548.	1548.	48445.	1554.	48445.
677.500	1561.	1561.	49222.	1567.	49222.
678.000	1575.	1575.	50006.	1581.	50006.
678.500	1588.	1588.	50797.	1594.	50797.
679.000	1602.	1602.	51595.	1608.	51595.
679.500	1615.	1615.	52399.	1622.	52399.
680.000	1629.	1629.	53210.	1635.	53210.
680.500	1642.	1642.	54028.	1649.	54028.
681.000	1656.	1656.	54852.	1662.	54852.
681.500	1669.	1669.	55684.	1676.	55684.
682.000	1683.	1683.	56522.	1689.	56522.
682.500	1696.	1696.	57367.	1703.	57367.
683.000	1710.	1710.	58218.	1716.	58218.
683.500	1723.	1723.	59077.	1730.	59077.
684.000	1737.	1737.	59942.	1744.	59942.
684.500	1750.	1750.	60814.	1757.	60814.
685.000	1764.	1764.	61692.	1771.	61692.
685.500	1777.	1777.	62578.	1784.	62578.
686.000	1791.	1791.	63470.	1798.	63470.
686.500	1804.	1804.	64369.	1811.	64369.
687.000	1818.	1818.	65274.	1825.	65274.
687.500	1832.	1832.	66187.	1838.	66187.
688.000	1845.	1845.	67106.	1852.	67106.
688.500	1849.	1849.	68029.	1857.	68029.
689.000	1854.	1854.	68955.	1861.	68955.
689.500	1856.	1856.	69882.	1863.	69882.
690.000	1858.	1858.	70811.	1865.	70811.
690.500	1860.	1860.	71740.	1868.	71740.
691.000	1862.	1862.	72670.	1870.	72670.
691.500	1864.	1864.	73602.	1872.	73602.
692.000	1866.	1866.	74534.	1874.	74534.
692.500	1868.	1868.	75467.	1877.	75467.
693.000	1870.	1870.	76402.	1879.	76402.
693.500	1872.	1872.	77337.	1881.	77337.
694.000	1874.	1874.	78273.	1883.	78273.
694.500	1876.	1876.	79211.	1886.	79211.
695.000	1878.	1878.	80149.	1888.	80149.
695.500	1880.	1880.	81089.	1890.	81089.
696.000	1882.	1882.	82029.	1892.	82029.
696.500	1884.	1884.	82970.	1895.	82970.
697.000	1886.	1886.	83913.	1897.	83913.
697.500	1888.	1888.	84856.	1899.	84856.
698.000	1890.	1890.	85800.	1901.	85800.
698.500	1892.	1892.	86746.	1903.	86746.
699.000	1894.	1894.	87692.	1906.	87692.
699.500	1896.	1896.	88639.	1908.	88639.
700.000	1898.	1898.	89588.	1910.	89588.

APPENDIX C

DETAILED DESCRIPTION OF THE WEIRS

THEORETICAL AND MATHEMATICAL FORMULATION OF RIVIERE DES ROCHERS & REVILLON COUPE WEIRS

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Appendix A : List of Tables
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Appendix C : Program WIRPLT
Appendix D : Program WEIR
Legend of Important Variables

OBJECTIVE:

The purpose of this section is to describe the methodology used in computing the discharge characteristics at the two control structures located in the Peace-Athabasca delta region. The two weirs are Revillon Coupé and Rivière des Rochers.

EQUATION FORMULATION - INITIAL INVESTIGATIONS

The data used in this study was supplied by Andy DeBoer of the Government of Alberta. (See Table 1, Table 2, and Table 5)

Note: The values of the crest elevation, as well as the division of the group of data which belongs to sub-critical, super-critical flow, or both, were supplied by Don Farley of Systems Operations in Ottawa. (See Figure 1 and Figure 2)

Rivière des Rochers

1) Submerged condition - occurs when headwater $\leq$ 681.00 ft., or when the head difference between the headwater and tailwater $\leq$ 2.5 feet. (From John Kerr's original PAD hydraulic model.)

$$Q = Csw * \left[-\ln S\right]^{NS} * \left[H_1 - H_2\right]^{NF}$$

where: H crest = Crest elevation (Use H crest = 671.00 ft.)

H_1 = upstream water elevation

H_2 = downstream elevation in feet

Q = discharge in cfs

$$S = \left[\frac{H_2 - H\ crest}{H_1 - H\ crest}\right] = \text{degree of submergence}$$

2) Free flow condition - occurs when headwater elevation > 681.00 feet and when the head difference (H_1-H_2) > 2.5 feet.

(Equation supplied by Andy DeBoer, Alberta)

$$Q = C_f * \left[H_1 - H \text{ crest} \right]^P$$

(Use H crest = 680.50 feet)

Revillon Coupé

1) Submerged condition - occurs when headwater ≤ 685.00 or when the head difference between the headwater and the tailwater elevation ≤ 2.5 feet.

$$Q = Csw * \left[-\ln S \right]^{NS} * \left[H_1-H_2 \right]^{NF}$$

(Use H crest = 675.00 feet)

2) Free flow condition - occurs when the headwater elevation > 685.00 feet and when the head difference (H_1-H_2) > 2.5 feet.

$$Q = Cf * \left[H_1 - H \text{ crest} \right]^P$$

(Use H crest = 684.50 feet)

REGRESSIONS OF ADOPTED PROCEDURE

To fit in the parameters of the equations so formulated, a multiple regression of the data collection had to be studied. The computer package used was IBM Massager.

RESULTS FROM REGRESSIONS

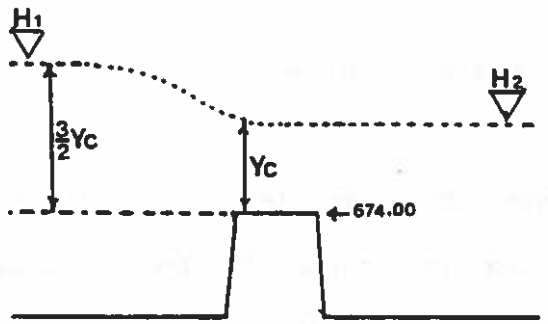
	submerged condition			free flow condition	
	CSW	NS	NF	CF	P
Rivière des Rochers	74.8076460	-2.3356774	2.8369334	10417.666	1.015073
Revillon Coupé	0.0783828	-4.2612830	4.9057749	1471.400	0.9445307
Rivière des Rochers (natrual flows)	10458.05	-0.84244 565	1.2442233	5702.493	1.2442401

LINE OF INTERCEPTION BETWEEN THE TWO FLOW CONDITIONS

	const	Expo
Rivière des Rochers	411,350.9	-1.8096072
Revillon Coupé	21,426.27	-2.3072048
Rivière des Rochers (natural flows)	22,372.73	1.2442357

Hcrest used for Natural Flow of Rivière des Rochers was 674.00 feet in elevation in both submerged and free flow conditions.

The division between submerged and free overflow was calculated from the following:



Line of Interception (See Figure 3, Figure 4, and Figure 12)

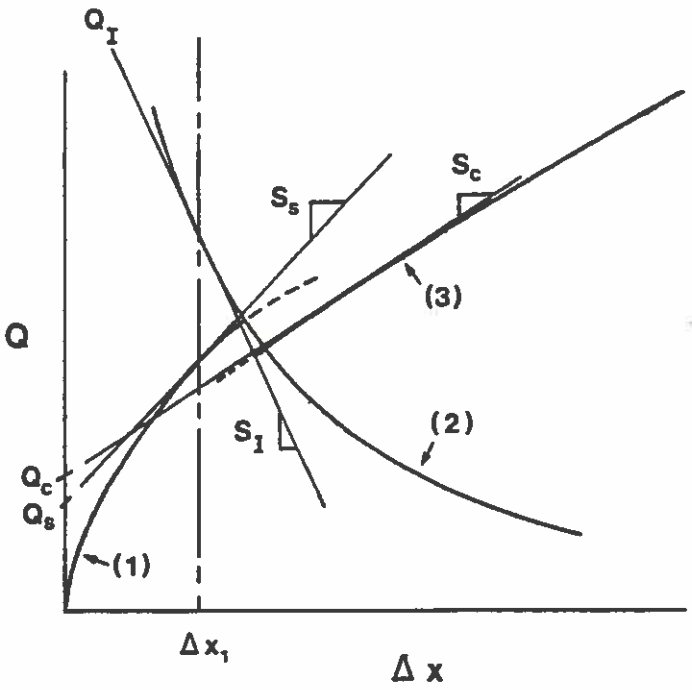
If you take the interception points between the sub-critical and super-critical flows from the regression equations above, you will notice that these points do not correspond to a fix 2.5 feet difference between the headwater and tailwater elevation.

Linearization of Weir Equations to Determine Point of Intersection

In order to determine more rapidly the solution to the weir equations, the weir subroutine was modified to solve for the point of intersection of two equations by linearization of each to a first order equation. In this way, successive solution approximations resulted in reaching the final solution point more rapidly resulting in computer computation savings.

The steps taken in this method are as follows:

First, the linear coefficients such as y-intercept and slope must be determined. Then the common solution of two simultaneous first-order equations is determined by solving for the x-value by simple substitution. The general form of the equations are shown in figure 1.



where:

(1) SUBMERGED FLOW EQ^N
(2) INTERSECTION EQ^N
(3) CRITICAL FLOW EQ^N

Q_i, S_i are discharge and slope of respective equations.

Note Q_i is also the y-intercept used in the first order simultaneous equation.

$\Delta x = (H_1 - H_2)$

or head-difference

FIGURE 1

Assume the equations to result in the form such as:

$$y = mx + b \qquad \text{where } m = \text{slope}, \quad b = \text{y-intercept}$$

then, a single solution is determined for each point of intersection for the following equations:

INTERCEPT EQUATION:

$$Q_I = \text{Const} \cdot (H_1 - H_2)^{\text{Expo}} \tag{1}$$

therefore,

$$\frac{d}{dx}(Q_I) = \text{const} \cdot \frac{d}{dx}(H_1 - H_2)^{\text{Expo}}$$

given that H_2 remains constant over the calculation step then the following holds:

$$\frac{d}{dx}(H_1 - H_2) = \frac{d}{dx}(H_1 - \text{const}_i) = \frac{d}{dx}(H_1) = 1$$

$$\therefore \quad \frac{d}{dx}(Q_I) = \text{const} \cdot \text{Expo} \cdot (H_1 - H_2)^{(\text{Expo}-1)} \tag{2}$$

SUBMERGED FLOW EQUATION:

$$Q_s = \text{Csw} \cdot [-\ln S]^{NS} \cdot [H_1 - H_2]^{NF} \tag{3}$$

where $S = \left[\dfrac{H_1 - \text{CREST}}{H_2 - \text{CREST}}\right]$

$$\frac{d}{dx}(Q_s) = \text{Csw} \cdot \frac{d}{dx}\left([-\ln S]^{NS} \cdot [H_1 - H_2]^{NF}\right)$$

$$= \text{Csw} \cdot \frac{d}{dx}\left([-\ln S]^{NS} \cdot [H_1 - H_2]^{NF}\right)$$

$$+ \text{Csw} \cdot [-\ln S]^{NS} \cdot \frac{d}{dx}\left([H_1 - H_2]^{NF}\right)$$

given that $(H_2 - \text{CREST}) = \text{constant}$

$$\frac{d}{dx}\left(\left[-\ln S\right]\right) = \frac{1}{S} \cdot \frac{d}{dx}\left(\frac{H_1 - \text{const}}{H_2 - \text{const}}\right) = \frac{1}{H_1 - \text{const}} \cdot \frac{dH_1}{dx}$$

$$\therefore \quad \frac{d}{dx}(Q_s) = CSW \cdot NS \cdot \left[-\ln S\right]^{NS-1} \cdot (H_1 - H_2)^{NF} \cdot \frac{1}{(H_1 - \text{CREST})}$$

$$+ CSW \cdot \left[-\ln S\right]^{NS} \cdot NF \cdot \left[H_1 - H_2\right]^{(NF-1)} \qquad (4)$$

CRITICAL FLOW EQUATION:

$$Q_c = C_f \cdot \left[H_1 - \text{const}\right]^{P} \qquad (5)$$

$$\frac{d}{dx}(Q_c) = C_f \cdot \frac{d}{dx}\left(\left[H_1 - \text{const}\right]^{P}\right)$$

$$= C_f \cdot P \cdot \left[H_1 - \text{const}\right]^{(p-1)} \qquad (6)$$

For the linear equation in the form $y = Ax+B$ and at pt $\Delta x = (H_1 - H_2)$

$$Y_I = -\frac{d}{dx}(Q_I) \cdot (H_1 - H_2) + Q_I \qquad (7)$$

$$Y_s = -\frac{d}{dx}(Q_s) \cdot (H_1 - H_2) + Q_s \qquad (8)$$

$$Y_c = -\frac{d}{dx}(Q_c) \cdot (H_1 - H_2) + Q_c \qquad (9)$$

Points of intersection of equation (7) and (8), and (7) and (9) are:

$$\Delta X_1 = (Y_I - Y_s) \;/\; \left(\frac{d}{dx}(Q_s) - \frac{d}{dx}(Q_I)\right) \qquad (10)$$

$$\Delta X_2 = (Y_I - Y_c) \;/\; \left(\frac{d}{dx}(Q_c) - \frac{d}{dx}(Q_I)\right) \qquad (11)$$

By successive iteration, the solution is determined when the estimated point of intersection on each curve changes by less than 0.01 ft. On an average, three iterations are sufficient to determine the intersection within the accuracy given above. The next step is to proceed and calculate the average correction and the correctional shift to the point in question.

PROBLEMS

When running the program WIRPLT, a few problems occurred in plotting the regression equations for the sub and super-critical flows.

1) A problem occurs if you switch from the sub-critical flow equation to the super-critical flow equation at the real interception points. If the tailwater elevation (H2) is greater than HCREST1 elevation, everything appears to be correct. However, if you switch from one equation to the other equation below HCREST1 (keeping the same value of H1) an ALOG error is detected by the computer and the execution stops. The reason for this is that the value of (H1-HCREST1) is less than zero.

   To avoid this problem we can increase the value of H1 to (HCREST+0.01) so that it is larger than zero. This will prevent the ALOG error. If you run program WIRPLT with this new value of H1 a shift in the super-critical flow equation, when H2 is less than HCREST1 (see figure 5) will result.

   From the above, it was found that when H2<HCREST1, the value of H1 should be equal to the crest elevation + the head difference at its real interception point.

Therefore, H1 = HCREST1 + (H1 - H2). Figure 6 and Figure 7 show the correct graphs drawn without the shifting of the plotted equations at the real interception points between the two flow conditions.

2) If a good look is taken at Figure 6 and Figure 7, it can be seen that there is a complete shift of the area on these two graphs when H2<HCREST1. This is due to a non-uniform distribution of the real points of interception. The study for the multiple regression equation of the line of interception between the two flow conditions comes in handy at this point. This line is drawn on most graphs.

When replotting the graph, with the "line of interception" being the new points of interception between the two flow conditions for all values of tailwater elevation, a new problem occurs, namely, a shift in the plots for all values of tailwater elevations in the super-critical flow. This is due to the new points of interception between the sub and super-critical flows. When H2>HCREST1 the shift can be seen between X → Y on Figure 9, and when H2<HCREST1 the shift is between A → C on Figure 8.

To overcome the shift when H2<HCREST1 (see Figure 8) the new value for H1 should be set equal to HCREST1 + DELTA (H1-HCREST1) at the new interception point. This value of DELTA(H1-HCREST1) (i.e. DELTAZ) is calculated from the super-critical flow equation at point of interception where QCAL1=discharge.

$$\therefore \quad DELTAZ = QCAL1/CF(NO) \;**\; (1/P(NO)).$$

This will bring point C (from Figure 9) to point D (Figure 9) where the discharges are equal for both sub and super-critical flows.

Adjustment

Figure 9 shows the regression equations plotted from the original real points of interception (before adjustment) and also shows these equations plotted with the new points of interception. It was decided that to to compensate for a too large error between these two, the difference should be divided by two.

→ the factor of adjustment (FACTQ) if H2>HCREST1 will be equal to

(discharge at X - discharge at Y)/2.0

FACTQ = (Qx - Qy)/2.0

∴ the final value (after adjustment) at point z will be

QCAL = Qx - FACTQ

→ the factor of adjustment (FACTH) if H2<HCREST1 will be equal to

(DELTAR - DELTAZ - DELTAH)/2.0

where: DELTAR = head difference at line of interception

DELTAZ = head difference at point D (see Figure 9)

DELTAH = head difference at real interception points

∴ the final value (after adjustment) at point B will be

DELTA = head difference at D - FACTH

Figure 10, Figure 11 and Figure 12 are the final graphs after adjustment.

RECOMMENDATIONS

In order to obtain more significance regression equations, it is greatly recommended that:

a) low flow data collection be supplied as there is not enough data for the study when the tailwater elevation is less than the crest elevation for free flow conditions, and

b) more data with small head difference be supplied as it appears to be the area where the precision of the output is low.

PROGRAM REQUIREMENTS

Program WIRPLT is written in Fortran IV for use on a CDC computer. Results are catalogued for Tektronix plot use. This file can also be attached and plotted by the Calcomp plotter if a better graph presentation is desired. Memory required to compile this program is less then 60K.

SPECIFICATION OF INPUT

Most of the data control parameters, both for the graph set-up and the regression equation parameters, in this program are declared in DATA statements.

Only one data card is needed to control the output. The parameters are described as follows:

Variable	Column(s)	Format	Description
NO	01-02	I2	number identifying the weir
IPRINT	03-04	I2	print or do not print results
Count	05-10	F5.0	increment of H2 to be plotted
DIMX	11-15	F5.0	dimension in miles along the X axis
DIMY	16-20	F5.0	dimension in miles along the Y axis

The data used in the multiple regression study are read in from file WIRDATA and subsequently plotted if desired.

Variable	Column(s)	Format	Description
QQ	01-10	F10.0	measured discharge
IT1	11-20	F10.2	measured upstream elevation
IT2	21-30	F10.2	measured tailwater elevation
ITAG-1	32	A1	.
ITAG-2	33-35	A3	Code for measured data
NUMB	37	I1	stands for weir code
IDATE	40-47	A8	date for measured data
ANG	50-55	F5.1	angle of data code to be plotted

OUTPUT DESCRIPTION

Four different outputs, for graph purposes, can be obtained with this program.

1) Variable NO is used to specify the graph for the weir to be plotted. The weir code identifier NO=1, stands for Rivière des Rochers and NO=2, stands for Revillon Coupé.

2) The size of the graph can be modified by varying the parameters DIMX and DIMY for the x and y axis respectively. The scale has to be determined in inches.

3) Any number of curves can be plotted by giving HTOP, (the first curve to be drawn) and HBOTT (the last tailwater elevation curve to be drawn).

Parameter COUNT will indicate the increment of every tailwater elevation curve to be drawn.

i.e. if HTOP = 688.0, HBOTT = 678.0 with COUNT = 1,

we will have 11 curves drawn while with COUNT = 0.1

we will have 101 curves drawn from HBOTT to HTOP.

4) The last condition we can impose is at what maximum discharge and at what maximum head difference the plotting must stop. Parameter AMAXX indicates the head difference in elevation where the plotting will stop on the x axis. AMAXY indicates the maximum discharge/1000 where the graph will stop on the y axis.

PRECISION OF OUTPUT

The accuracy of program WIRPLT is shown in Table 3, Table 4, and Table 6.

→ For Rivière des Rochers, we have an overall average absolute value of 4.15% difference from measured and calculated discharge with:
6.74% difference for sub-critical flow, and
2.83% difference for super-critical flow.

→ For Revillon Coupé, we have an overall average absolute value of 7.07% difference from measured and calculated discharge with:
9.03% difference for sub-critical flow, and
3.91% difference for super-critical flow.

→ For Rivière des Rochers (Natural Flows) we have an overall average absolute value of 7.64% difference from measured and calculated discharge.

PROGRAM WEIR

The purpose of program WEIR is to calculate discharge from a given tailwater and headwater elevation.

INTRODUCTION

The difference between WEIR and WIRPLT is that WIRPLT will calculate and plot discharge vs. head difference for all values of headwater elevation from a given tailwater elevation.

DATA INPUT

Only one data read card is needed to control output for program WEIR. The parameters are described as follows:

Variable	Column(s)	Format	Description
NO	01	I1	number identifying the weir
ICOMP	02	I2	0, compare with actual data 1, do not compare with actual data
QR	03-10	F8.0	measured discharge
H1	11-20	F10.2	headwater elevation
H2	21-30	F10.2	tailwater elevation
ITAG2	33-35	A3	code for the measured data
NUMB	37	I1	number identifying the weir
IDATE	40-47	A8	date the measurement was taken

OUTPUT

An example of the output can be seen in Table 6.

APPENDIX - A

TABLE 1

RIVIERE DES ROCHERS WEIR CALIBRATION

A = SUB-CRITICAL FLOW
B = SUPER-CRITICAL FLOW
C = SUB & SUPER-CRITICAL FLOW

CODE	DATE	DISCHARGE IN C.F.S.	HEADWATER ELEVATION FEET	TAILWATER ELEVATION FEET	HEAD DIFFERENCE FEET
A1	16/06/77	30600.	687.49	687.00	.49
A2	06/07/76	35600.	686.36	685.68	.68
A3	17/05/77	37600.	685.78	684.37	1.41
A4	07/06/77	43500.	686.61	685.75	.86
A5	17/08/76	50300.	687.15	686.15	1.00
A6	20/07/76	51600.	686.47	684.84	1.63
A7	31/08/76	62900.	687.22	685.53	1.69
A8	27/07/77	68200.	687.57	685.31	2.26
A9	LAB	128100.	693.30	691.00	2.30
B1	09/04/76	27600.	683.15	678.80	4.35
B2	25/02/76	30400.	683.25	679.39	3.86
B3	20/01/76	35000.	683.76	679.99	3.77
B4	01/06/76	55400.	685.79	682.47	3.32
B5	05/08/76	60200.	686.23	682.66	3.57
B6	15/09/76	62700.	686.45	681.98	4.47
B7	28/09/76	62900.	686.54	681.89	4.65
B8	05/10/77	66700.	686.67	681.56	5.11
B9	21/09/77	68200.	686.88	681.02	5.86
B10	13/10/76	68500.	686.76	681.78	4.98
B11	13/07/77	69100.	686.93	684.00	2.93
B12	10/08/77	70300.	687.26	684.18	3.08
B13	08/09/77	70900.	686.84	681.54	5.30
B14	23/08/77	73700.	687.23	682.55	4.68
C1	10/02/76	29900.	683.43	679.98	3.45
C2	22/06/76	53500.	685.62	683.04	2.58

TABLE 2

REVILLON COUPE WEIR CALIBRATION

A = SUB-CRITICAL FLOW
B = SUPER-CRITICAL FLOW
C = SUB & SUPER-CRITICAL FLOW

CODE	DATE	DISCHARGE IN C.F.S.	HEADWATER ELEVATION FEET	TAILWATER ELEVATION FEET	HEAD DIFFERENCE FEET
A1	17/05/77	1170.	686.39	685.89	.50
A2	31/08/76	1430.	687.47	687.26	.21
A3	17/08/76	1930.	687.81	687.42	.39
A4	22/06/77	1990.	685.92	684.88	1.04
A5	29/06/77	2040.	687.35	686.82	.53
A6	13/07/77	2910.	687.13	685.61	1.52
A7	04/08/76	3140.	686.66	684.17	2.49
A8	27/07/77	3280.	687.72	687.03	.69
A9	10/08/77	3630.	687.32	685.72	1.60
A10	07/06/77	4070.	687.85	686.68	1.17
A11	16/06/77	5620.	689.13	687.83	1.30
B1	04/08/76	3140.	686.66	684.17	2.49
B2	28/09/76	3150.	686.71	683.53	3.18
B3	13/10/76	3090.	686.69	683.40	3.29
B4	05/10/77	3210.	686.77	682.88	3.89
B5	21/09/77	3520.	687.13	682.85	4.28
B6	08/09/77	3730.	687.02	683.17	3.85
B7	22/08/77	3960.	687.44	684.07	3.37
C1	15/09/76	2430.	686.27	683.56	2.71

Table 3

RIVIERE DES ROCHERS WEIR CALIBRATION

A = SUB-CRITICAL FLOW
B = SUPER-CRITICAL FLOW
C = SUB & SUPER-CRITICAL FLOW
ERROR = MEASURED DISCHARGE - CALCULATED DISCHARGE
PERCENT = (ERROR/MEASURED DISCHARGE)*100.

CODE	DATE	DISCHARGE IN C.F.S.	HEADWATER ELEVATION FEET	TAILWATER ELEVATION FEET	DISCHARGE CALCULATED CFS	ERROR DIFFERENCE CFS	ERROR PERCENT %
		0.	687.49	687.00	36066.	0.	0.00
A1	16/06/77	30600.	687.49	687.00	36066.	-5466.	-17.86
A2	06/07/76	35600.	686.36	685.68	35471.	129.	.36
A3	17/05/77	37600.	685.78	684.37	43997.	-6397.	-17.01
A4	07/06/77	43500.	686.61	685.75	41005.	2495.	5.73
A5	17/08/76	50300.	687.15	686.15	47638.	2662.	5.29
A6	20/07/76	51600.	686.47	684.84	52225.	-625.	-1.21
A7	31/08/76	62900.	687.22	685.53	59684.	3216.	5.11
A8	27/07/77	68200.	687.57	685.31	69855.	-1655.	-2.43
A9	LAB	128100.	693.30	691.00	134128.	-6028.	-4.71
B1	09/04/76	27600.	683.15	678.80	30363.	-2763.	-10.01
B2	25/02/76	30400.	683.25	679.39	31575.	-1175.	-3.86
B3	20/01/76	35000.	683.76	679.99	36067.	-1067.	-3.05
B4	01/06/76	55400.	685.79	682.47	55607.	-207.	-.37
B5	05/08/76	60200.	686.23	682.66	60173.	27.	.05
B6	15/09/76	62700.	686.45	681.98	63225.	-525.	-.84
B7	28/09/76	62900.	686.54	681.89	64281.	-1381.	-2.20
B8	05/10/77	66700.	686.67	681.56	65970.	730.	1.09
B9	21/09/77	68200.	686.88	681.02	68801.	-601.	-.88
B10	13/10/76	68500.	686.76	681.78	66755.	1745.	2.55
B11	13/07/77	69100.	686.93	684.00	66645.	2455.	3.55
B12	10/08/77	70300.	687.26	684.18	70057.	243.	.35
B13	08/09/77	70900.	686.84	681.54	67821.	3079.	4.34
B14	23/08/77	73700.	687.23	682.55	71124.	2576.	3.50
C1	10/02/76	29900.	683.43	679.98	33361.	-3461.	-11.58
C2	22/06/76	53500.	685.62	683.04	51869.	1631.	3.05
C3	17/05/76	55100.	685.50	683.02	50245.	4855.	8.81

THE AVERAGE ERROR PERCENT IS EQUAL TO..... 4.61

CODE	DATE	DISCHARGE IN C.F.S.	HEADWATER ELEVATION FEET	TAILWATER ELEVATION FEET	DISCHARGE CALCULATED CFS	ERROR DIFFERENCE CFS	ERROR PERCENT %
		0.	683.15	678.80	30363.	0.	0.00
A1	16/06/77	30600.	687.49	687.00	36066.	-5466.	-17.86
A2	06/07/76	35600.	686.36	685.68	35471.	129.	.36
A3	17/05/77	37600.	685.78	684.37	43997.	-6397.	-17.01
A4	07/06/77	43500.	686.61	685.75	41005.	2495.	5.73
A5	17/08/76	50300.	687.15	686.15	47638.	2662.	5.29
A6	20/07/76	51600.	686.47	684.84	52225.	-625.	-1.21
A7	31/08/76	62900.	687.22	685.53	59684.	3216.	5.11
A8	27/07/77	68200.	687.57	685.31	69855.	-1655.	-2.43
A9	LAB	128100.	693.30	691.00	134128.	-6028.	-4.71
C1	10/02/76	29900.	683.43	679.98	33361.	-3461.	-11.58
C2	22/06/76	53500.	685.62	683.04	51869.	1631.	3.05
C3	17/05/76	55100.	685.50	683.02	50245.	4855.	8.81

THE AVERAGE ERROR PERCENT IS EQUAL TO..... 6.93

CODE	DATE	DISCHARGE IN C.F.S.	HEADWATER ELEVATION FEET	TAILWATER ELEVATION FEET	DISCHARGE CALCULATED CFS	ERROR DIFFERENCE CFS	ERROR PERCENT %
		0.	683.15	678.80	30363.	0.	0.00
B1	09/04/76	27600.	683.15	678.80	30363.	-2763.	-10.01
B2	25/02/76	30400.	683.25	679.39	31575.	-1175.	-3.86
B3	20/01/76	35000.	683.76	679.99	36067.	-1067.	-3.05
B4	01/06/76	55400.	685.79	682.47	55607.	-207.	-.37
B5	05/08/76	60200.	686.23	682.66	60173.	27.	.05
B6	15/09/76	62700.	686.45	681.98	63225.	-525.	-.84
B7	28/09/76	62900.	686.54	681.89	64281.	-1381.	-2.20
B8	05/10/77	66700.	686.67	681.56	65970.	730.	1.09
B9	21/09/77	68200.	686.88	681.02	68801.	-601.	-.88
B10	13/10/76	68500.	686.76	681.78	66755.	1745.	2.55
B11	13/07/77	69100.	686.93	684.00	66645.	2455.	3.55
B12	10/08/77	70300.	687.26	684.18	70057.	243.	.35
B13	08/09/77	70900.	686.84	681.54	67821.	3079.	4.34
B14	23/08/77	73700.	687.23	682.55	71124.	2576.	3.50
C1	10/02/76	29900.	683.43	679.98	33361.	-3461.	-11.58
C2	22/06/76	53500.	685.62	683.04	51869.	1631.	3.05
C3	17/05/76	55100.	685.50	683.02	50245.	4855.	8.81

THE AVERAGE ERROR PERCENT IS EQUAL TO..... 3.53

Table 4

REVILLON COUPE WEIR CALIBRATION

A = SUB-CRITICAL FLOW
B = SUPER-CRITICAL FLOW
C = SUB & SUPER-CRITICAL FLOW
ERROR = MEASURED DISCHARGE - CALCULATED DISCHARGE
PERCENT = (ERROR/MEASURED DISCHANGE)*100.

CODE	DATE	DISCHARGE IN C.F.S.	HEADWATER ELEVATION FEET	TAILWATER ELEVATION FEET	DISCHARGE CALCULATED CFS	ERROR DIFFERENCE CFS	ERROR PERCENT %
		0.	686.00	681.00	2459.	0.	0.00
A1	17/05/77	1170.	686.39	685.89	1459.	-289.	-24.67
A2	31/08/76	1430.	687.47	687.26	1272.	158.	11.02
A3	17/08/76	1930.	687.81	687.42	2051.	-121.	-6.25
A4	22/06/77	1990.	685.92	684.88	1756.	234.	11.76
A5	29/06/77	2040.	687.35	686.82	2109.	-69.	-3.39
A6	13/07/77	2910.	687.13	685.61	3258.	-348.	-11.96
A7	04/08/76	3140.	686.66	684.17	3023.	117.	3.73
A8	27/07/77	3280.	687.72	687.03	2744.	536.	16.33
A9	10/08/77	3630.	687.32	685.72	3560.	70.	1.92
A10	07/06/77	4070.	687.85	686.68	3735.	335.	8.22
A11	16/06/77	5620.	689.13	687.83	5771.	-151.	-2.69
B1	04/08/76	3140.	686.66	684.17	3023.	117.	3.73
B2	28/09/76	3150.	686.71	683.53	3144.	6.	.19
B3	13/10/76	3090.	686.69	683.40	3131.	-41.	-1.31
B4	05/10/77	3210.	686.77	682.88	3294.	-84.	-2.62
B5	21/09/77	3520.	687.13	682.85	3776.	-256.	-7.28
B6	08/09/77	3730.	687.02	683.17	3594.	136.	3.64
B7	22/08/77	3960.	687.44	684.07	4054.	-94.	-2.38
C1	15/09/76	2430.	686.27	683.56	2554.	-124.	-5.09

THE AVERAGE ERROR PERCENT IS EQUAL TO..... 6.75

CODE	DATE	DISCHARGE IN C.F.S.	HEADWATER ELEVATION FEET	TAILWATER ELEVATION FEET	DISCHARGE CALCULATED CFS	ERROR DIFFERENCE CFS	ERROR PERCENT %
		0.	686.00	684.00	2217.	0.	0.00
A1	17/05/77	1170.	686.39	685.89	1459.	-289.	-24.67
A2	31/08/76	1430.	687.47	687.26	1272.	158.	11.02
A3	17/08/76	1930.	687.81	687.42	2051.	-121.	-6.25
A4	22/06/77	1990.	685.92	684.88	1756.	234.	11.76
A5	29/06/77	2040.	687.35	686.82	2109.	-69.	-3.39
A6	13/07/77	2910.	687.13	685.61	3258.	-348.	-11.96
A7	04/08/76	3140.	686.66	684.17	3023.	117.	3.73
A8	27/07/77	3280.	687.72	687.03	2744.	536.	16.33
A9	10/08/77	3630.	687.32	685.72	3560.	70.	1.92
A10	07/06/77	4070.	687.85	686.68	3735.	335.	8.22
A11	16/06/77	5620.	689.13	687.83	5771.	-151.	-2.69
C1	15/09/76	2430.	686.27	683.56	2554.	-124.	-5.09

THE AVERAGE ERROR PERCENT IS EQUAL TO..... 8.92

CODE	DATE	DISCHARGE IN C.F.S.	HEADWATER ELEVATION FEET	TAILWATER ELEVATION FEET	DISCHARGE CALCULATED CFS	ERROR DIFFERENCE CFS	ERROR PERCENT %
		0.	686.00	684.00	2217.	0.	0.00
B1	04/08/76	3140.	686.66	684.17	3023.	117.	3.73
B2	28/09/76	3150.	686.71	683.53	3144.	6.	.19
B3	13/10/76	3090.	686.69	683.40	3131.	-41.	-1.31
B4	05/10/77	3210.	686.77	682.88	3294.	-84.	-2.62
B5	21/09/77	3520.	687.13	682.85	3776.	-256.	-7.28
B6	08/09/77	3730.	687.02	683.17	3594.	136.	3.64
B7	22/08/77	3960.	687.44	684.07	4054.	-94.	-2.38
C1	15/09/76	2430.	686.27	683.56	2554.	-124.	-5.09

THE AVERAGE ERROR PERCENT IS EQUAL TO..... 3.28

Table 5

RIVIERE DES ROCHERS WEIR CALIBRATION

NATURAL FLOWS

ERROR = MEASURED DISCHARGE - CALCULATED DISCHARGE
PERCENT = (ERROR/MEASURED DISCHARGE)*100.

CODE	DATE	DISCHARGE IN C.F.S.	HEADWATER ELEVATION FEET	TAILWATER ELEVATION FEET	HEAD DIFFERENCE FEET
03	06/14/70	58000.	683.50	682.90	.60
04	06/22/70	75000.	683.30	682.10	1.20
05	07/09/70	62000.	682.90	681.50	1.40
06	07/14/70	62900.	682.80	681.50	1.30
07	07/16/70	68000.	682.90	681.70	1.20
08	07/18/70	69500.	682.80	681.20	1.60
09	07/20/70	71300.	682.60	680.50	2.10
10	07/23/70	69500.	682.00	680.10	1.90
11	07/27/70	73200.	682.60	680.20	2.40
12	08/24/70	67400.	681.30	678.90	2.40
13	06/03/71	68200.	682.80	681.60	1.20
14	07/12/71	59300.	684.10	683.30	.80
15	07/14/71	54100.	684.80	684.30	.50
17	07/28/71	82900.	685.10	684.30	.80
18	07/30/71	77400.	684.90	683.80	1.10
19	08/03/71	90300.	684.50	683.10	1.40
20	08/06/71	85500.	684.10	682.70	1.40
21	08/09/71	91500.	684.10	682.00	2.10
22	08/12/71	84900.	683.70	682.00	1.70
23	08/13/71	85300.	683.70	682.00	1.70
24	08/17/71	88800.	683.60	681.80	1.80
25	08/20/71	90500.	683.90	681.90	2.00
26	08/23/71	83700.	682.70	681.00	1.70
27	08/26/71	74500.	682.90	681.00	1.90
28	09/08/71	76500.	681.80	679.90	1.90
29	09/17/71	65600.	682.40	680.50	1.90
30	09/28/71	59200.	680.90	679.40	1.50
31	10/15/71	58800.	681.60	680.30	1.30
32	07/05/72	63200.	687.80	687.40	.40
33	07/12/72	90100.	687.20	686.60	.60
34	07/14/72	100000.	686.70	685.60	1.10
36	07/21/72	63000.	688.10	687.70	.40
37	08/08/72	86800.	686.90	685.80	1.10
38	08/16/72	86700.	686.20	685.00	1.20
40	09/05/72	86600.	684.50	683.20	1.30
41	05/30/73	64900.	685.00	684.60	.40
42	06/14/73	59800.	686.30	685.60	.70
43	06/27/73	45000.	686.50	686.20	.30
44	07/13/73	77500.	685.90	685.10	.80
45	08/02/73	76600.	685.70	684.60	1.10
46	08/21/73	83300.	685.00	683.30	1.70
47	09/06/73	85400.	684.90	683.20	1.70
48	09/28/73	72400.	683.60	681.80	1.80
49	10/15/73	62700.	682.90	681.60	1.30

TABLE 6

RIVIERE DES ROCHERS WEIR CALIBRATION

NATURAL FLOWS

ERROR = MEASURED DISCHARGE - CALCULATED DISCHARGE
PERCENT = (ERROR/MEASURED DISCHARGE)*100.

CODE	DATE	DISCHARGE IN C.F.S.	HEADWATER ELEVATION FEET	TAILWATER ELEVATION FEET	DISCHARGE CALCULATED CFS	ERROR DIFFERENCE CFS	ERROR PERCENT %	
02	06/12/7	40000.	683.40	682.70	57937.	-17937.	-44.84	PART 1
16	07/21/7	44200.	685.30	684.70	64201.	-20001.	-45.25	
35	07/18/7	43700.	688.20	687.90	59733.	-16033.	-36.69	
39	08/21/7	74400.	685.90	685.50	57467.	16933.	22.76	
03	06/14/70	58000.	683.50	682.90	55224.	2776.	4.79	PART 2
04	06/22/70	75000.	683.30	682.10	69531.	5469.	7.29	
05	07/09/70	62000.	682.90	681.50	70325.	-8325.	-13.43	
06	07/14/70	62900.	682.80	681.50	67929.	-5029.	-7.99	
07	07/16/70	68000.	682.90	681.70	66819.	1181.	1.74	
08	07/18/70	69500.	682.80	681.60	72617.	-3117.	-4.49	
09	07/20/70	71300.	682.60	680.50	76941.	-5641.	-7.91	
10	07/23/70	69500.	682.00	680.10	69786.	-286.	-.41	
11	07/27/70	73200.	682.60	680.60	79661.	-6461.	-8.83	
12	08/24/70	67400.	681.30	678.90	67454.	-54.	-.08	
13	06/03/71	68200.	682.80	681.60	66138.	2062.	3.02	
14	07/12/71	59300.	684.10	683.30	64805.	-5505.	-9.28	
15	07/14/71	54100.	684.80	684.30	57606.	-3506.	-6.48	
17	07/28/71	82900.	685.10	684.30	70395.	12505.	15.08	
18	07/30/71	77400.	684.90	683.80	77762.	-362.	-.47	
19	08/03/71	90300.	684.50	683.10	81770.	8530.	9.45	
20	08/06/71	85500.	684.10	682.70	78939.	6561.	7.67	
21	08/09/71	91500.	684.10	682.00	89781.	1719.	1.88	
22	08/12/71	84900.	683.70	682.00	81032.	3868.	4.56	
23	08/13/71	85300.	683.70	682.00	81032.	4268.	5.00	
24	08/17/71	88800.	683.60	681.80	81695.	7105.	8.00	
25	08/20/71	90500.	683.90	681.90	86828.	3672.	4.06	
26	08/23/71	83700.	682.70	681.00	73195.	10505.	12.55	
27	08/26/71	74500.	682.90	681.00	77305.	-2805.	-3.76	
28	09/08/71	76500.	681.80	679.90	68094.	8406.	10.99	
29	09/17/71	65600.	682.40	680.50	73147.	-7547.	-11.50	
30	09/28/71	59200.	680.90	679.40	56619.	2581.	4.36	
31	10/15/71	58800.	681.60	680.30	59359.	-559.	-.95	
32	07/05/72	63200.	687.80	687.40	65236.	-2036.	-3.22	
33	07/12/72	90100.	687.20	686.60	73428.	16672.	18.50	
34	07/14/72	100000.	686.70	685.60	89028.	10972.	10.97	
36	07/21/72	63000.	688.10	687.70	66446.	-3446.	-5.47	
37	08/08/72	86800.	686.90	685.80	90263.	-3463.	-3.99	
38	08/16/72	86700.	686.20	685.00	88651.	-1951.	-2.25	
40	09/05/72	86600.	684.50	683.20	79729.	6871.	7.93	
41	05/30/73	64900.	685.00	684.00	53719.	11181.	17.23	
42	06/14/73	59800.	686.30	685.00	73238.	-13438.	-22.47	
43	06/27/73	45000.	686.50	686.20	53582.	-8582.	-19.07	
44	07/13/73	77500.	685.90	685.10	74808.	2692.	3.47	
45	08/02/73	76600.	685.70	684.00	82805.	-6205.	-8.10	
46	08/21/73	83300.	685.00	683.30	91007.	-7707.	-9.25	
47	09/06/73	85400.	684.90	683.20	90248.	-4848.	-5.68	
48	09/28/73	72400.	683.60	681.80	81695.	-9295.	-12.84	
49	10/15/73	62700.	682.90	681.80	68633.	-5933.	-9.46	

THE AVERAGE ERROR PERCENT IS EQUAL TO..... 7.64 *

PART 1 - are the data used to calculate discharge from a given headwater elevation and tailwater elevation.

PART 2 - are the data used in the regression analysis study.

If ICØMP is equal to 0, this part will be printed.

If ICØMP is equal to 1, this part will not be printed.

APPENDIX - B

FIGURE 1

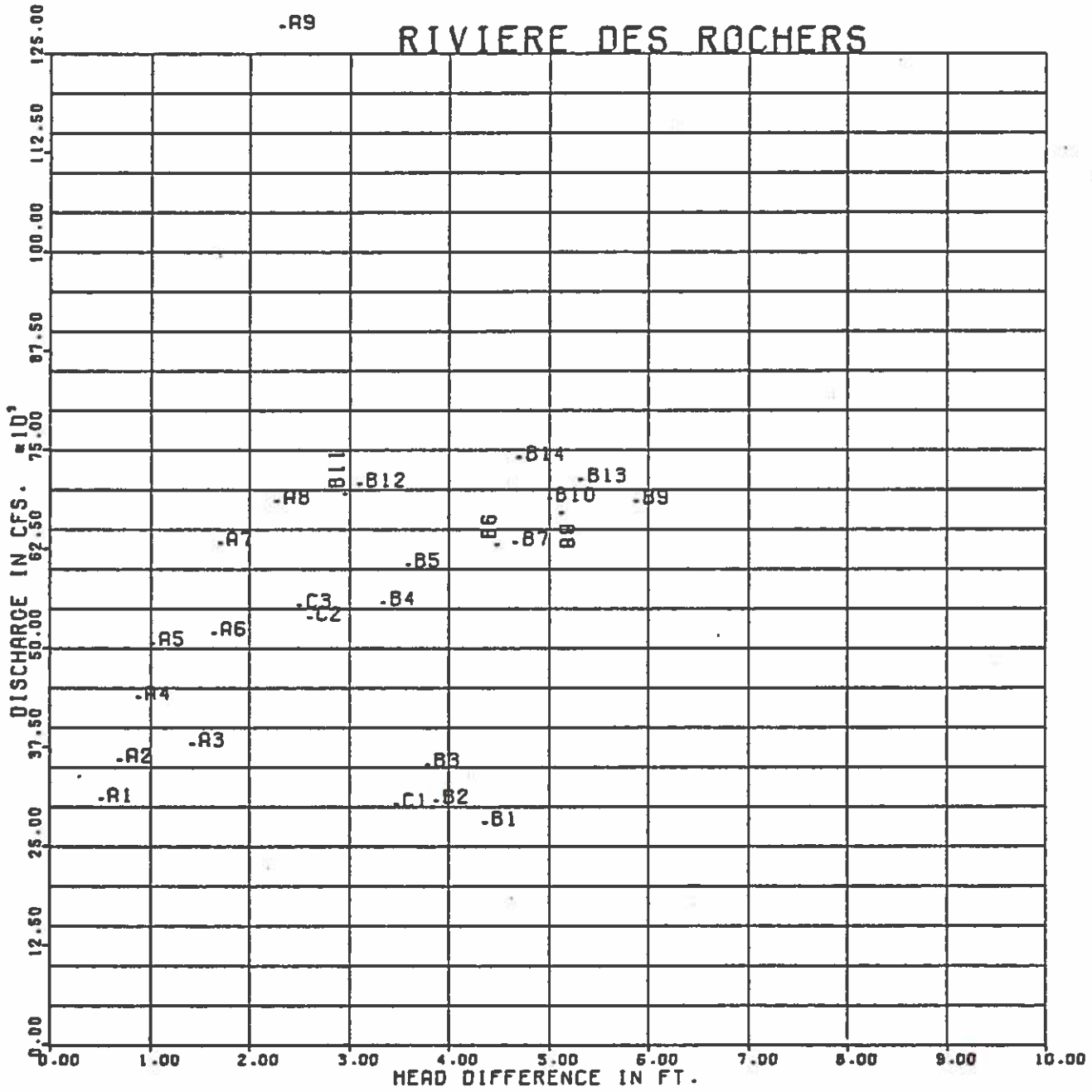

RIVIERE DES ROCHERS
DISCHARGE IN CFS. *10³
HEAD DIFFERENCE IN FT.
0.00
12.50
25.00
37.50
50.00
62.50
75.00
87.50
100.00
112.50
125.00
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
A1
A2
A3
A4
A5
A6
A7
A8
A9
B1
B2
B3
B4
B5
B6
B7
B8
B9
B10
B11
B12
B13
B14
C1
C2
C3

FIGURE 2

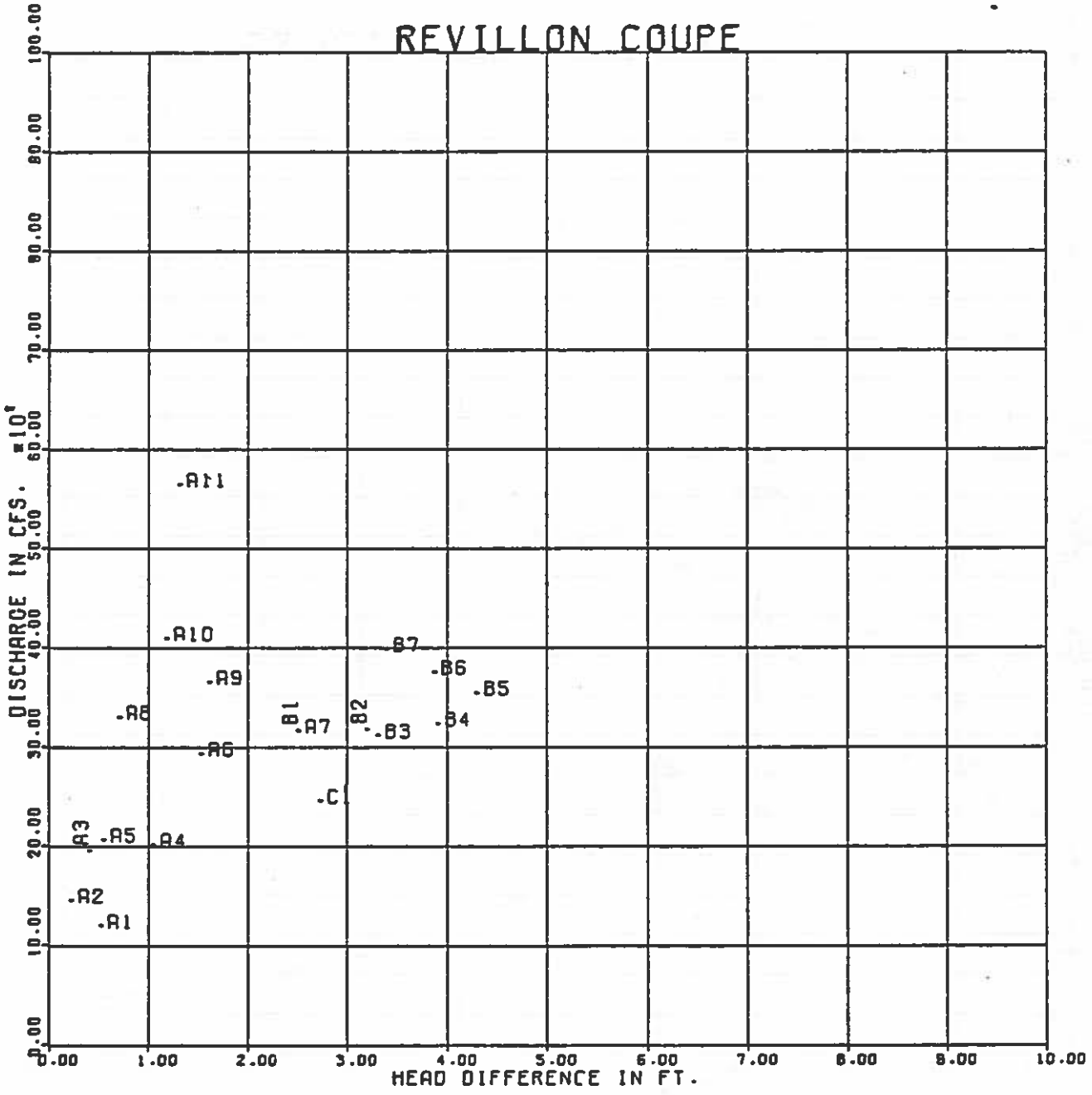

REVILLON COUPE
DISCHARGE IN CFS. *10³
HEAD DIFFERENCE IN FT.
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
10.00
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
B1
B2
B3
B4
B5
B6
B7
C

FIGURE 3

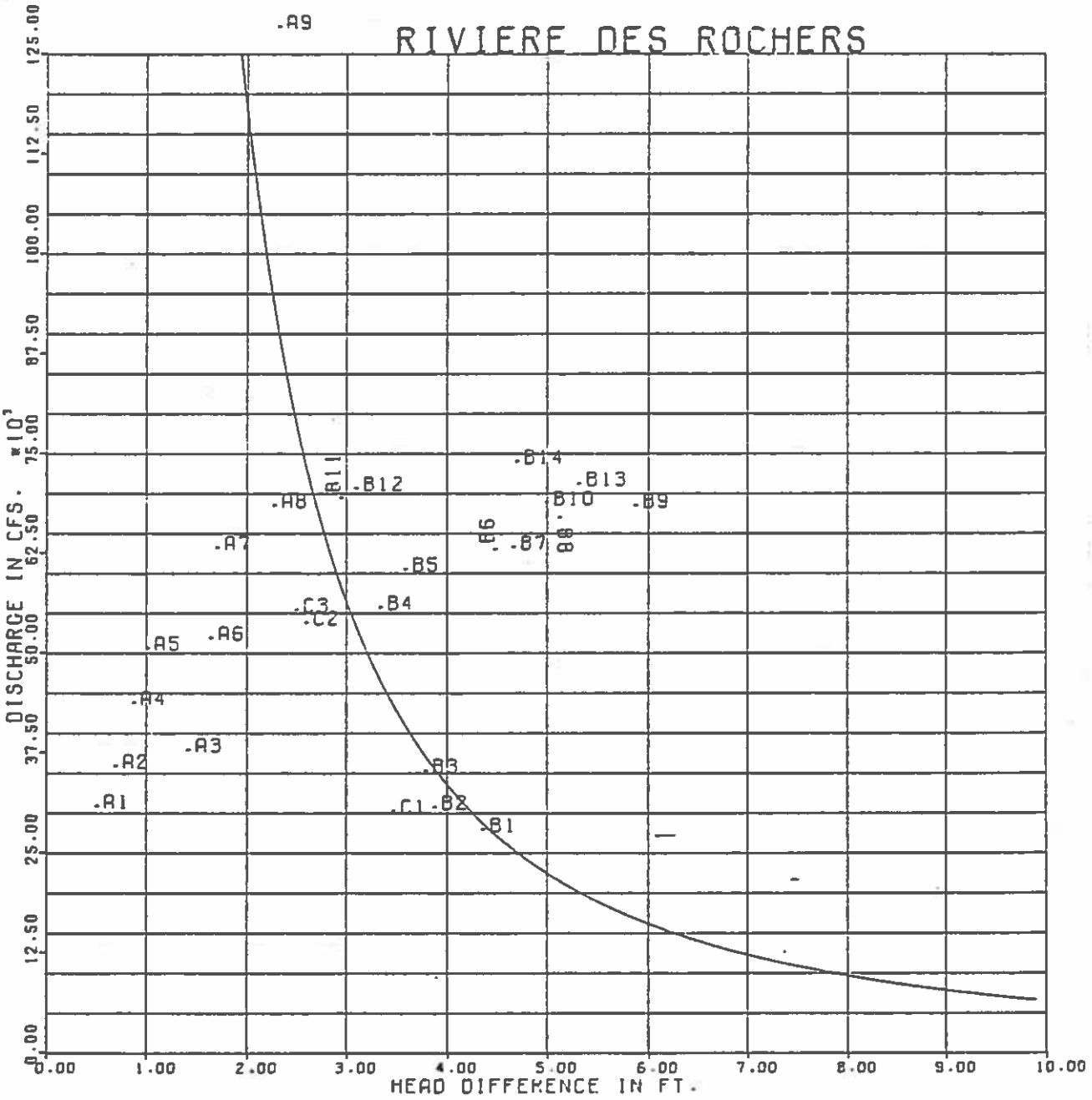

RIVIERE DES ROCHERS
DISCHARGE IN CFS. *10³
HEAD DIFFERENCE IN FT.
0.00
12.50
25.00
37.50
50.00
62.50
75.00
87.50
100.00
112.50
125.00
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
.A9
.A8
.A7
.A6
.A5
.A4
.A3
.A2
.A1
.B14
.B13
.B12
.B11
.B10
.B9
.B8
.B7
.B6
.B5
.B4
.B3
.B2
.B1
.C3
.C2
.C1

FIGURE 4

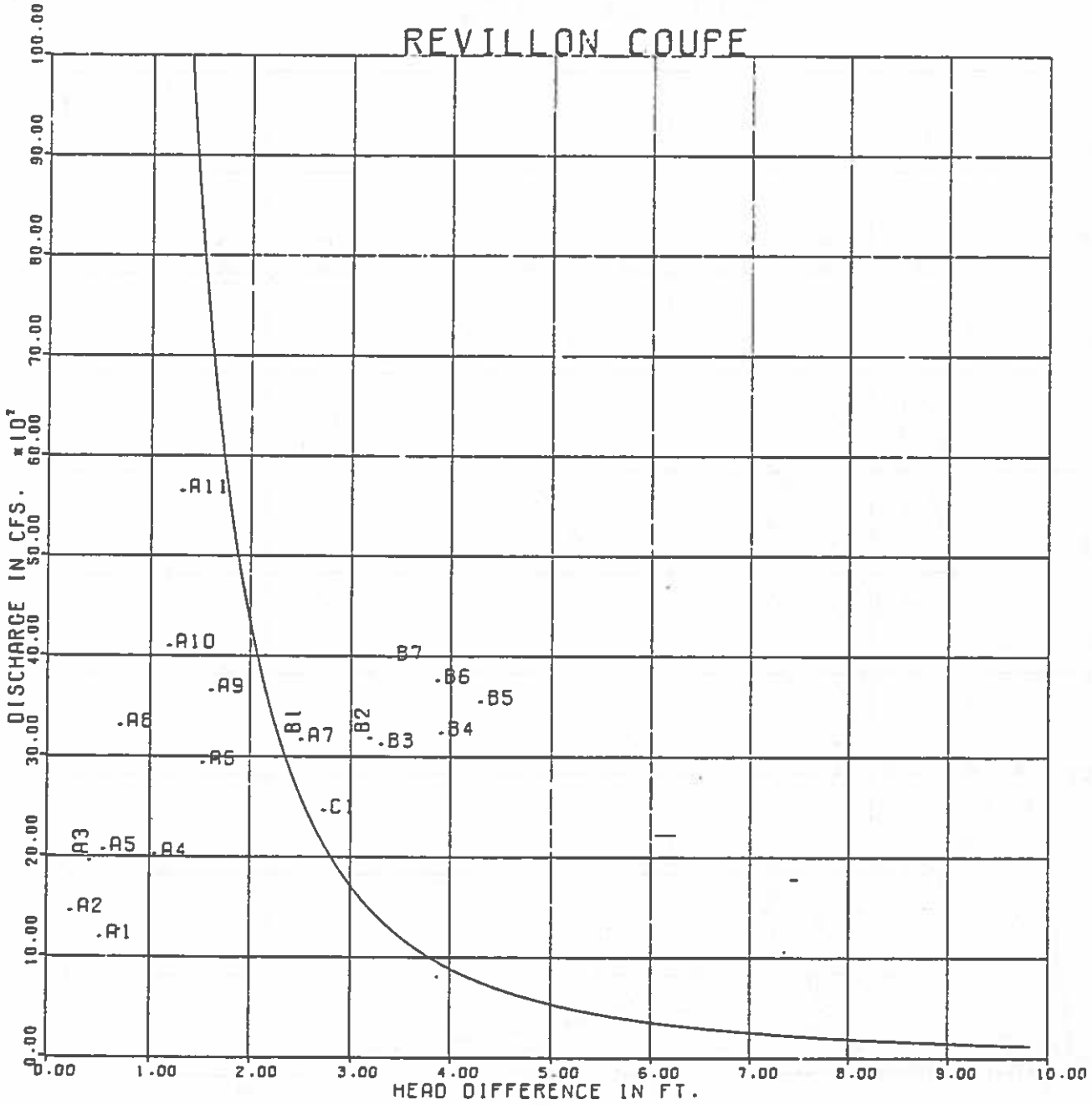

REVILLON COUPE
DISCHARGE IN CFS. *10³
HEAD DIFFERENCE IN FT.
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
A11
A10
A9
A8
A7
A6
A5
A4
A3
A2
A1
B7
B6
B5
B4
B3
B2
B1
C1

FIGURE 5

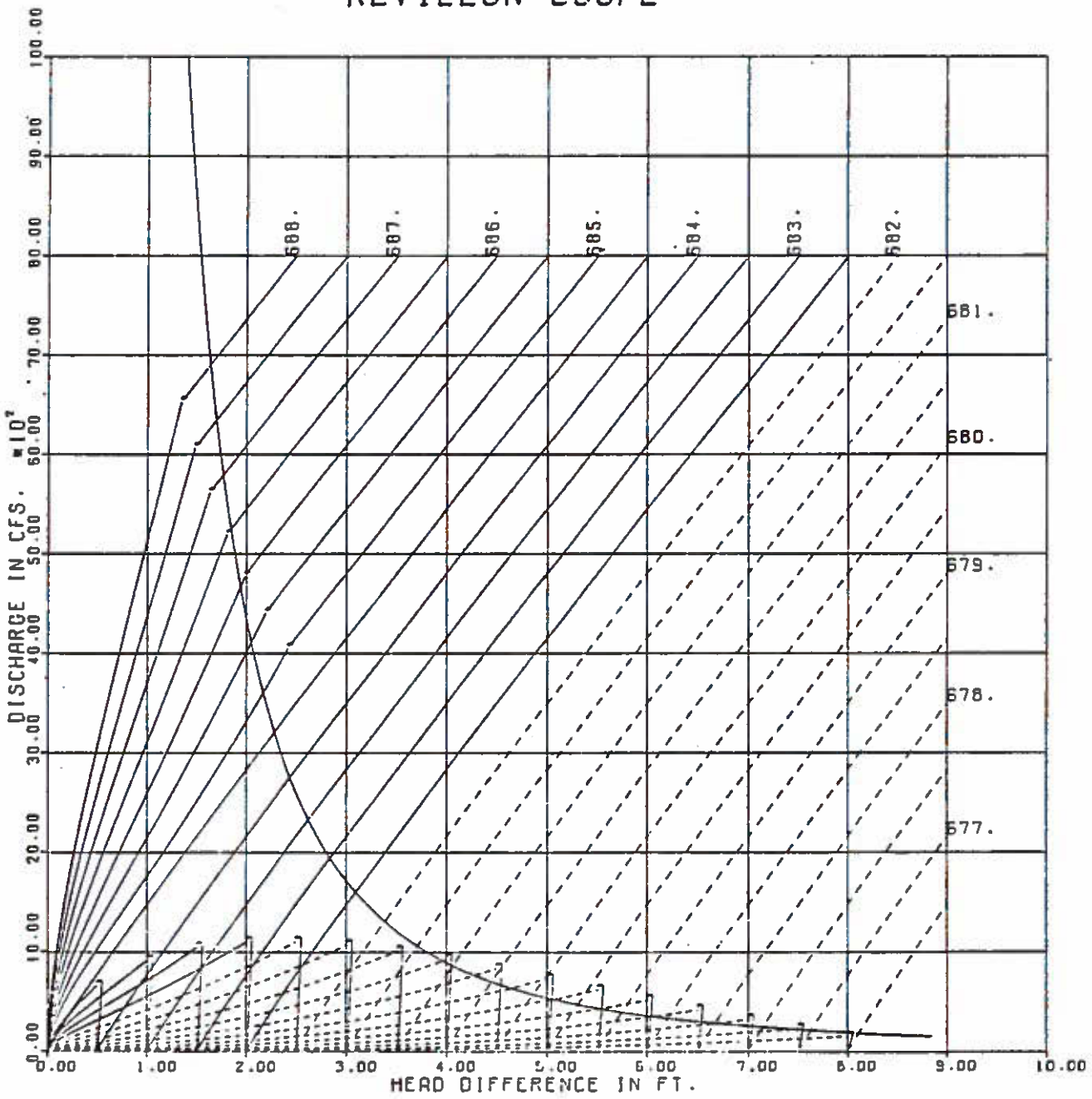

REVILLON COUPE
DISCHARGE IN CFS. *10²
HEAD DIFFERENCE IN FT.
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
588.
587.
586.
585.
584.
583.
582.
581.
580.
579.
578.
577.

FIGURE 6

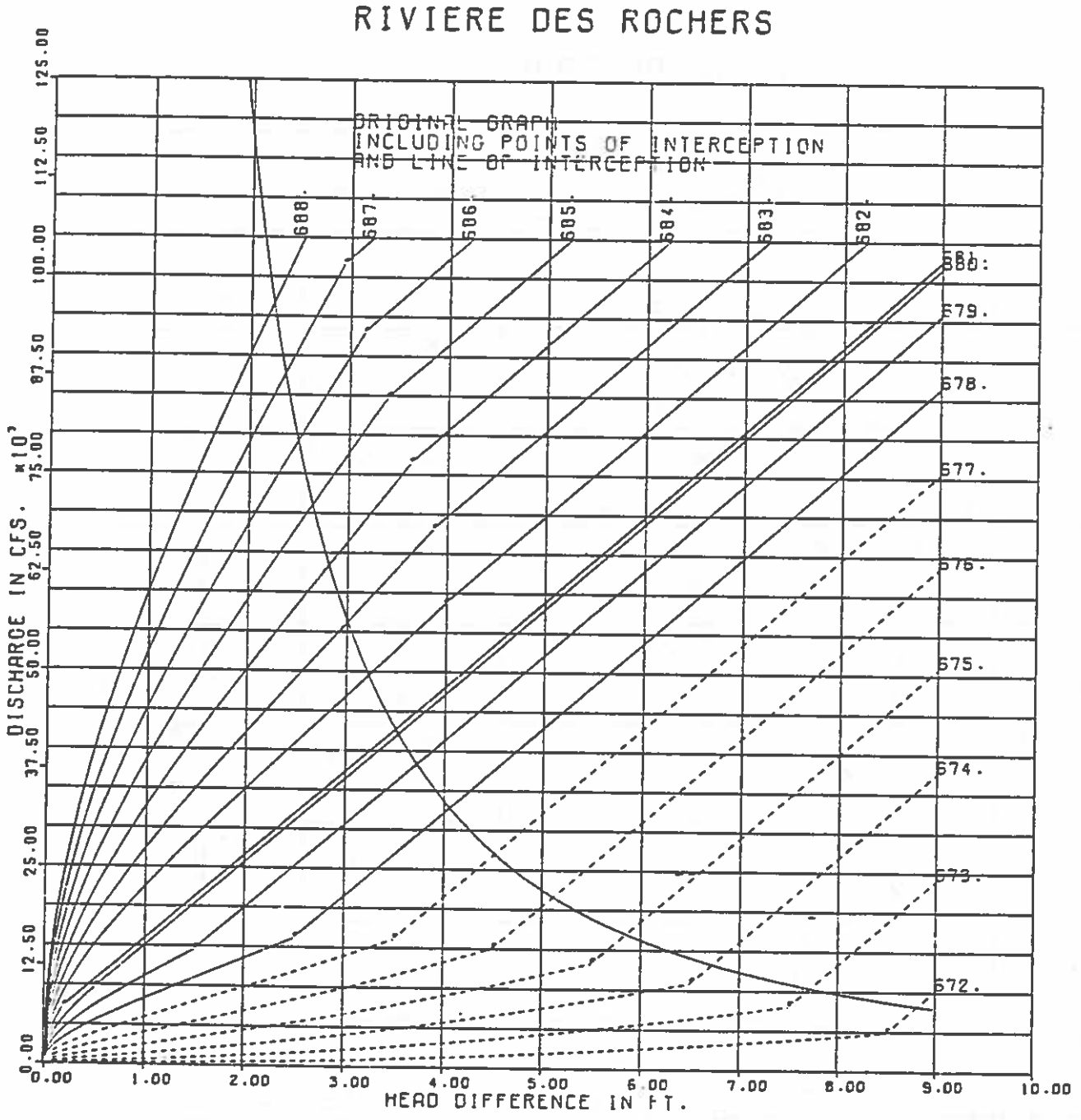

RIVIERE DES ROCHERS
ORIGINAL GRAPH
INCLUDING POINTS OF INTERCEPTION
AND LINE OF INTERCEPTION
688.
687.
686.
685.
684.
683.
682.
681.
680.
679.
678.
677.
676.
675.
674.
673.
672.
DISCHARGE IN CFS. x10³
0.00
12.50
25.00
37.50
50.00
62.50
75.00
87.50
100.00
112.50
125.00
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
HEAD DIFFERENCE IN FT.

FIGURE 7

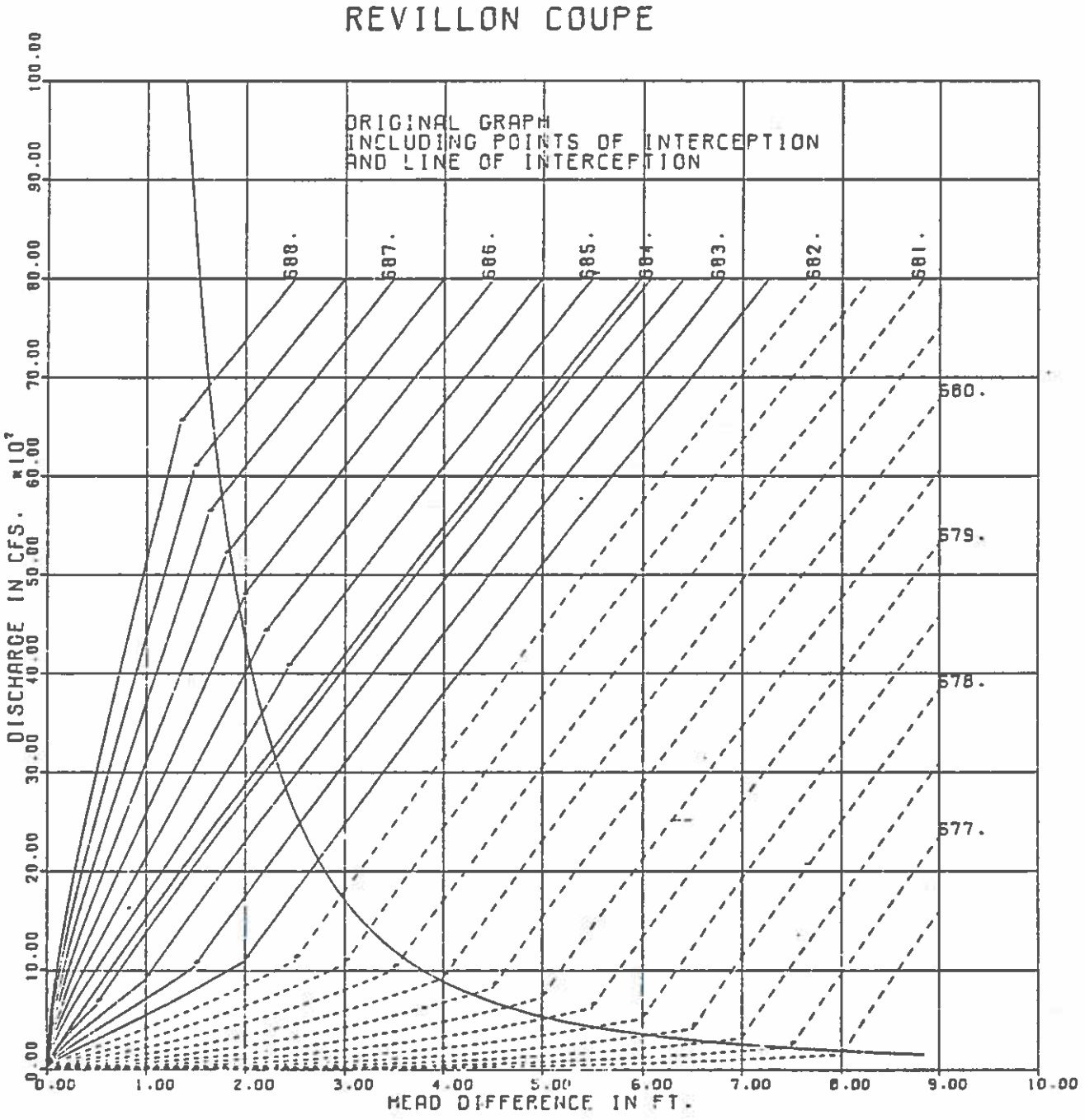

REVILLON COUPE
ORIGINAL GRAPH
INCLUDING POINTS OF INTERCEPTION
AND LINE OF INTERCEPTION
688.
687.
686.
685.
684.
683.
682.
681.
680.
679.
678.
677.
DISCHARGE IN CFS. *10²
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
HEAD DIFFERENCE IN FT.

FIGURE 8

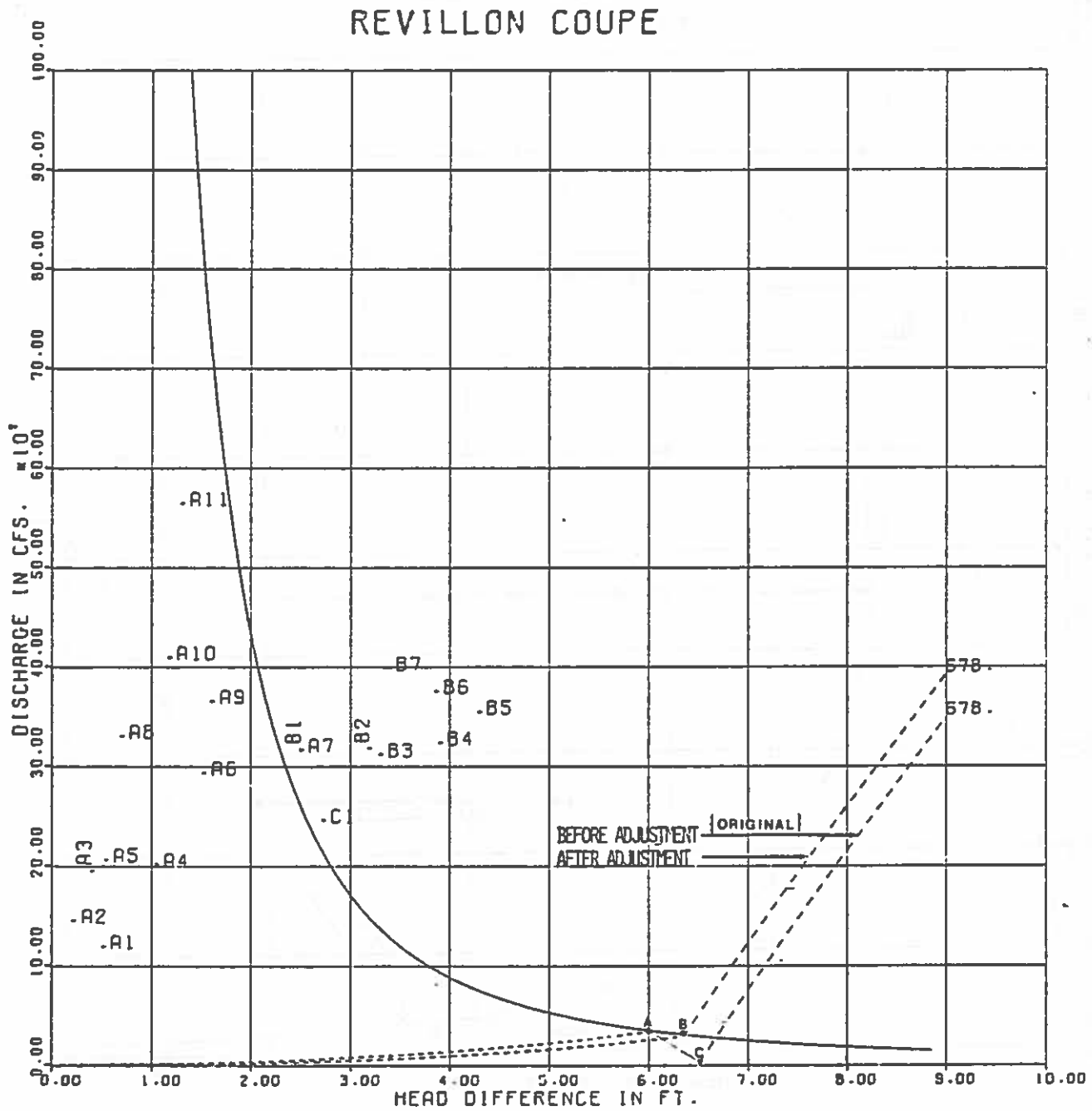

REVILLON COUPE
DISCHARGE IN CFS. *10³
HEAD DIFFERENCE IN FT.
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
.A11
.A10
.A9
.A8
.A7
.A6
.A5
.A4
.A3
.A2
.A1
.B1
.B2
.B3
.B4
.B5
.B6
.B7
.C1
578.
578.
BEFORE ADJUSTMENT (ORIGINAL)
AFTER ADJUSTMENT
A
B
C

FIGURE 9

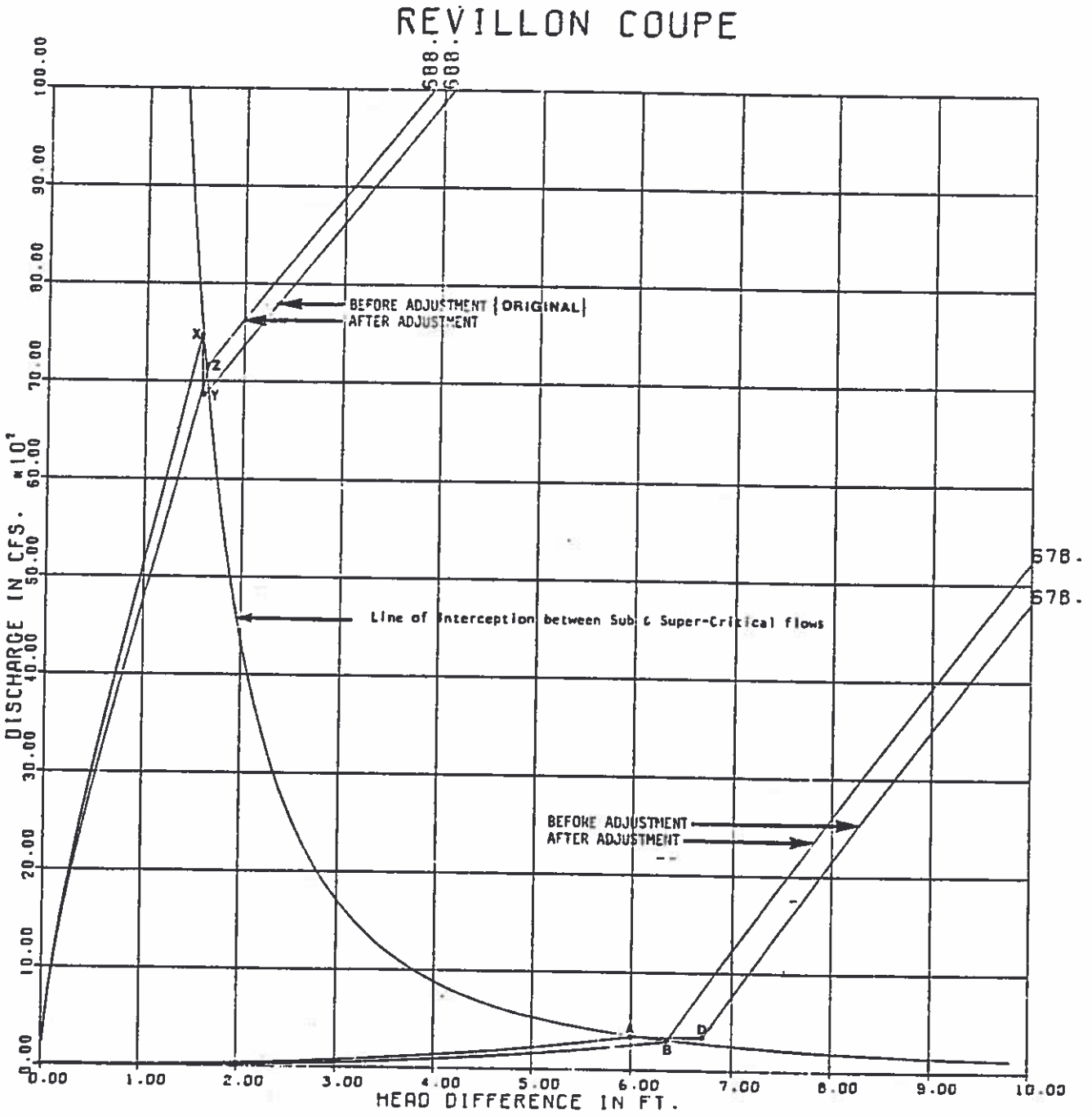

REVILLON COUPE
588.
588.
BEFORE ADJUSTMENT (ORIGINAL)
AFTER ADJUSTMENT
X
Z
Y
Line of Interception between Sub & Super-Critical flows
678.
678.
BEFORE ADJUSTMENT
AFTER ADJUSTMENT
A
B
D
DISCHARGE IN CFS. *10²
HEAD DIFFERENCE IN FT.
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00

FIGURE 10

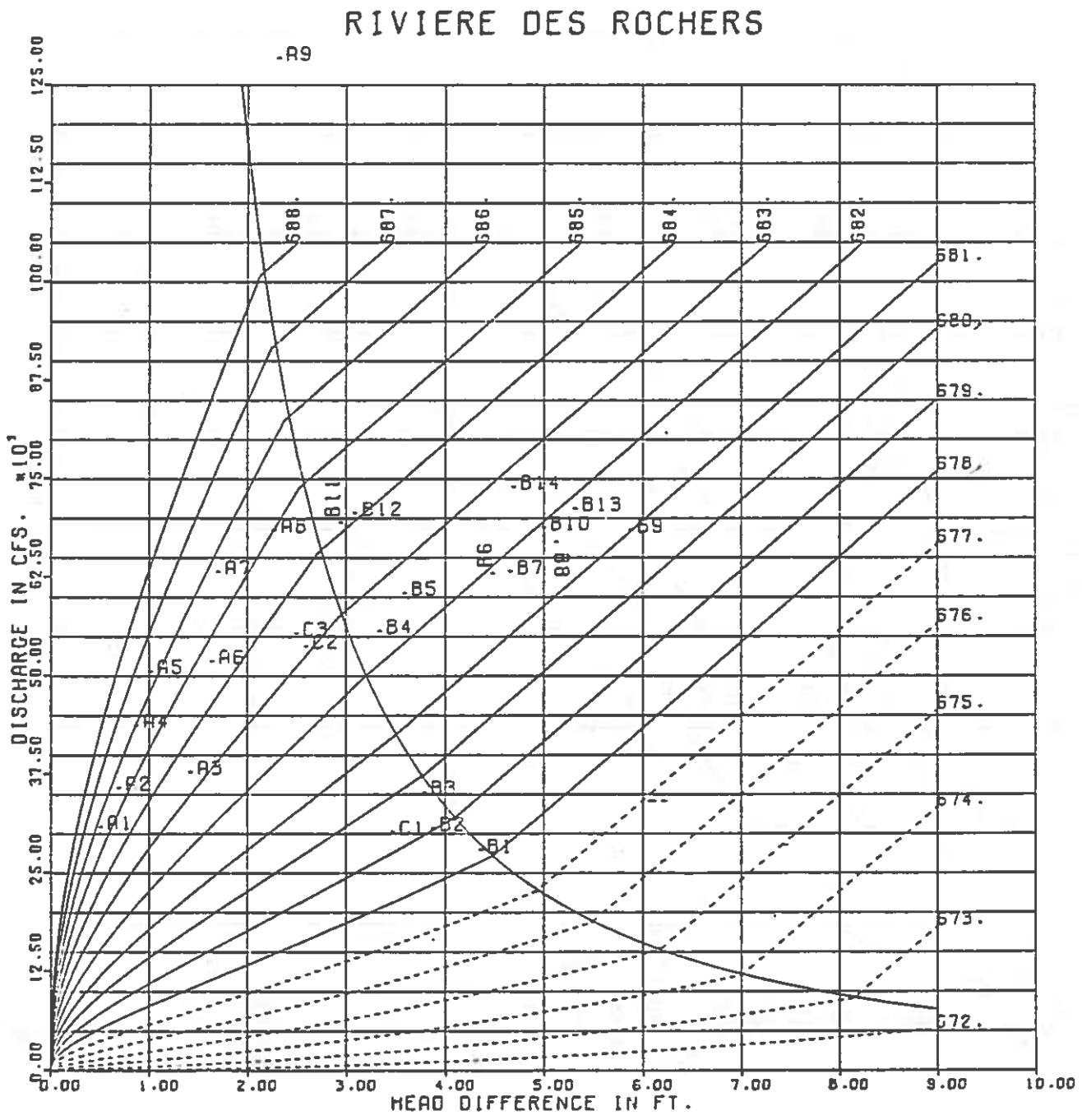

RIVIERE DES ROCHERS
DISCHARGE IN CFS. *10³
HEAD DIFFERENCE IN FT.
0.00
12.50
25.00
37.50
50.00
62.50
75.00
87.50
100.00
112.50
125.00
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
688.
687.
686.
685.
684.
683.
682.
681.
680.
679.
678.
677.
676.
675.
674.
673.
672.
-A9
-A8
-A7
-A6
-A5
-A4
-A3
-A2
-A1
-B11
-B12
-B14
-B13
-B10
-B9
-B8
-B7
-B6
-B5
-B4
-B3
-B2
-B1
-C3
-C2
-C1

FIGURE 11

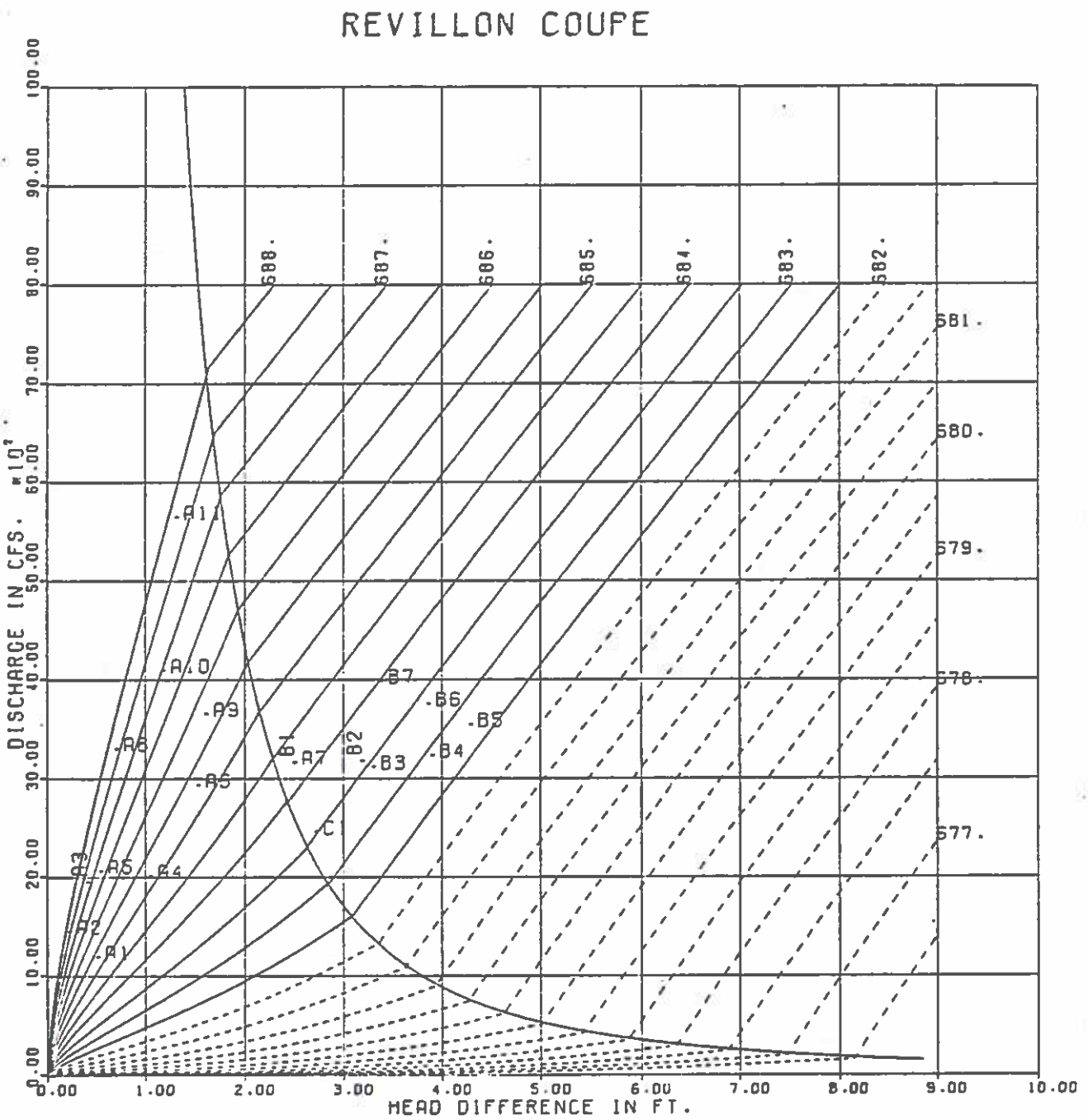

REVILLON COUPE
DISCHARGE IN CFS. *10²
HEAD DIFFERENCE IN FT.
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
688.
687.
686.
685.
684.
683.
682.
681.
680.
679.
678.
677.
A11
A10
A9
A8
A7
A6
A5
A4
A3
A2
A1
B7
B6
B5
B4
B3
B2
B1
C

Figure 12

RIVIERE DES ROCHERS

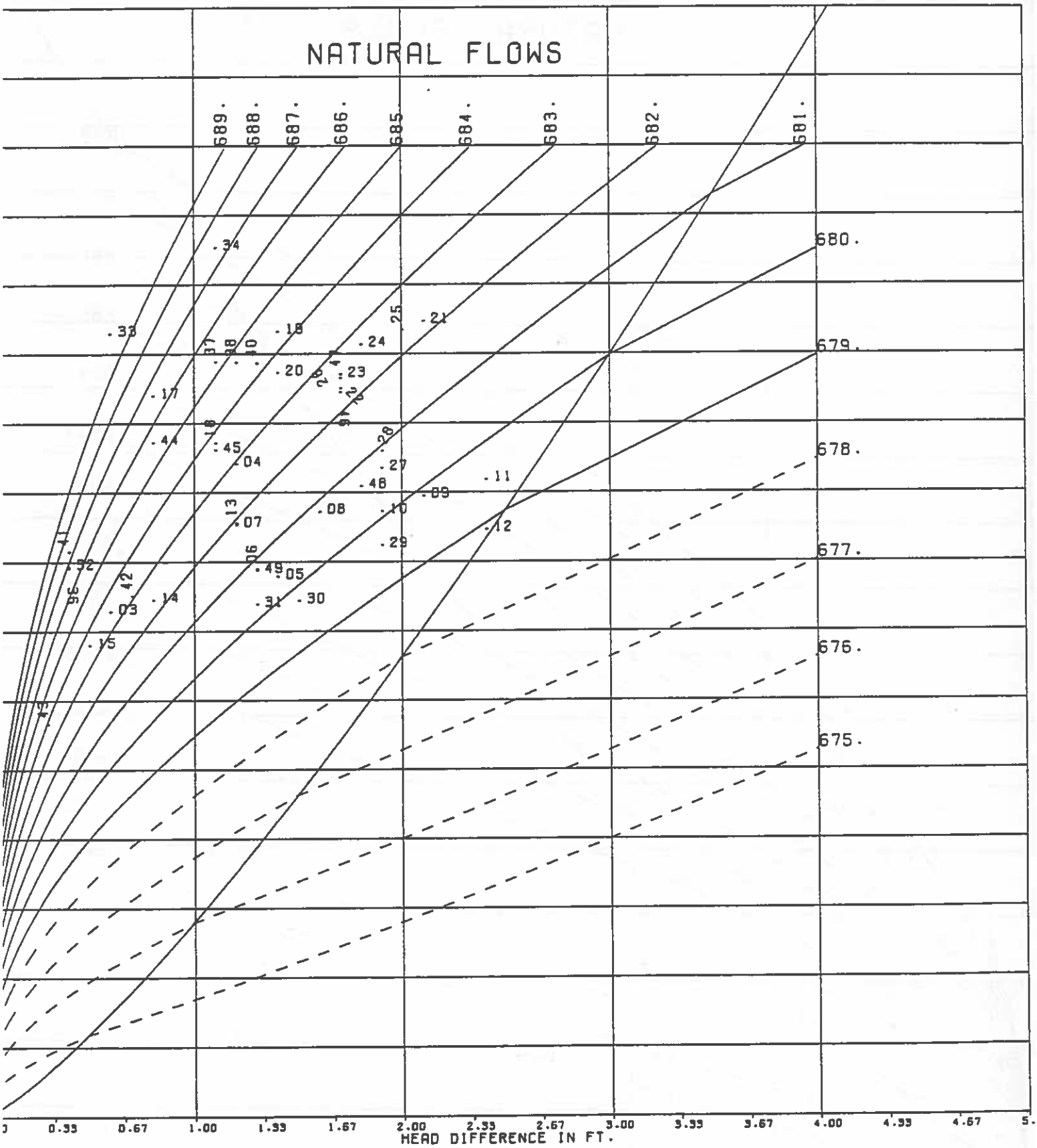
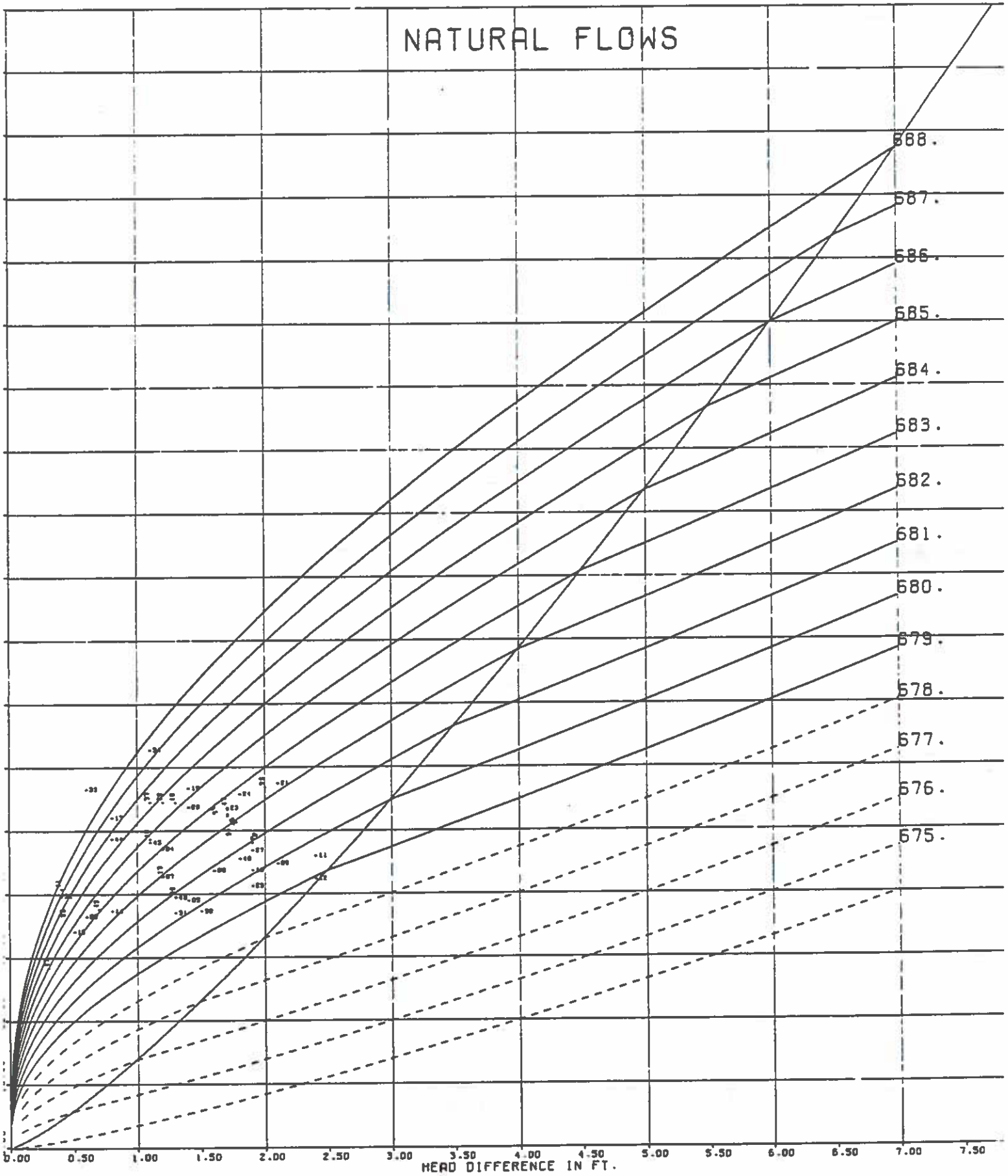


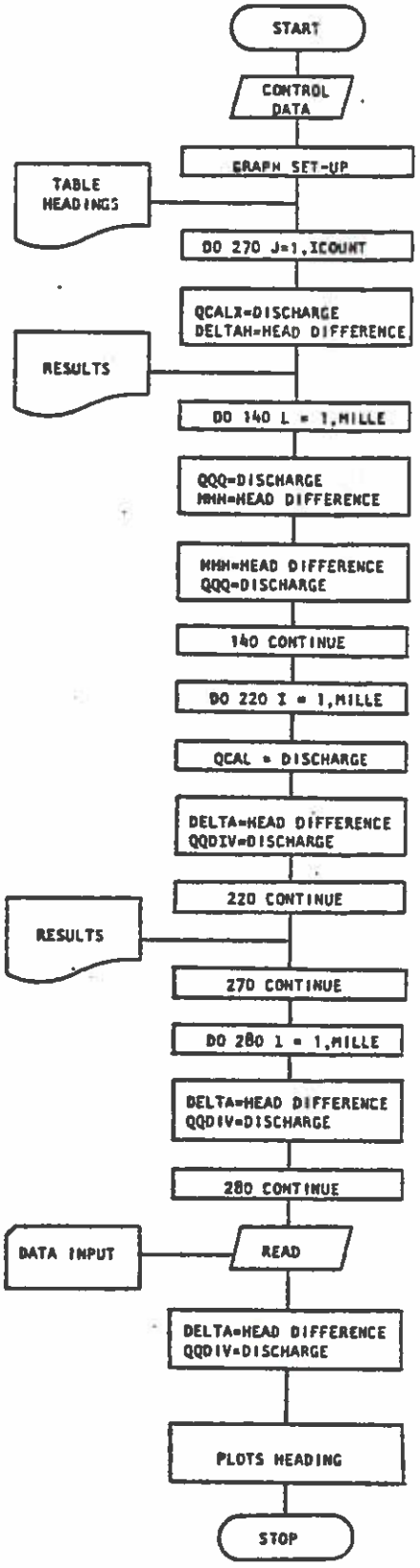
Figure 13

RIVIERE DES ROCHERS



APPENDIX - C

PROGRAM WIRPLT



- Data input for graph set-up and regression equation parameters
- Sets up the graph for the proper wier
- Prints the table headings
- Finds the real interception points between the sub and Super-Critical flows
- Prints results of the real interception points
- Finds the adjustment values when H2≥Hcrest 1, due to the new Line of interception
- Finds the adjustment values when H2<Hcrest 1, due to the new Line of interception
- Calculates the discharge value for a given head difference
- Calculates and plots the graph of the discharge vs. head difference
- Prints results of the factors of adjustment and new point of interception for a given tailwater elevation
- Calculates and draw the Line of interception
- Reads the data used for the multiple regression study
- Plots the data used for the multiple regression study
- Plots the heading for the graph

LEGEND OF IMPORTANT VARIABLES

NO	= 1, FOR RIVIERE DES ROCHERS
	= 2, FOR REVILLON COUPE
	= 3, FOR RIVIERE DES ROCHERS (NATURAL FLOWS)
IPRINT	= 1, DO NOT PRINT RESULTS
	= 0, PRINT RESULTS
COUNT	= INCREMENT OF H2 TO BE PLOTTED
H1	= UPSTREAM STAGE IN FEET ABOVE CHANNEL DATUM
H2	= DOWNSTREAM STAGE IN FEET ABOVE CHANNEL DATUM
ORGX	= ORIGIN OF PLOT IN X-AXIS
ORGY	= ORIGIN OF PLOT IN Y-AXIS
DIM(NO)	= NUMBER OF HORIZONTAL LINES IN Y-AXIS
KK(NO)	= NUMBER OF VERTICAL LINES IN THE X-AXIS AT EVERY 1.0 FOOT INCREMENT IN HEAD DIFFERENCE NOTE: THE SCALE IN THE X AXIS IS EQUAL TO KK(NO) / DIMX HEAD DIFFERENCE IN FEET PER INCH OF PLOT
DIMX	= DIMENSION IN INCHES ALONG THE X AXIS (FOR PLOT)
DIMY	= Y AXIS (FOR PLOT)
	= FOR RIVIERE DES ROCHERS (1) : DIMX=10.0, DIMY=10.0
	= FOR REVILLON COUPE (2) : DIMX=10.0, DIMY=10.0
	= FOR RIVIERE DES ROCHERS (3) : DIMX=15.0, DIMY=16.0
DASH(NO)	= AREA UNDER THE DASH LINES IS AREA UNKNOWN
AMAXX(NO)	= HEAD DIFFERENCE WHERE GRAPH WILL STOP
AMAXY(NO)	= MAX. DISCHARGE/1000. WHERE GRAPH WILL STOP
HTOP	= FIRST H2 USED
HBOTT	= LAST H2 USED
S	= DEGREE OF SUBMERGENCE
HCREST(NO)	= CREST ELEVATION FOR SUBMERGED CONDITION
HCRESTI(NO)	= CREST ELEVATION FOR FREE FLOW CONDITION
QMAX(NO)	= MAXIMUM DISCHARGE / 1000.
QCAL	= CHANNEL DISCHARGE IN CFS
CONST(NO)	= CONSTANT VALUE OF REGRESSION LINE BETWEEN SUB & SUPER CRITICAL FLOWS
EXPO(NO)	= EXPONENTIAL VALUE OF REGRESSION LINE BETWEEN SUB & SUPER CRITICAL FLOWS

JCL for WIRPLT

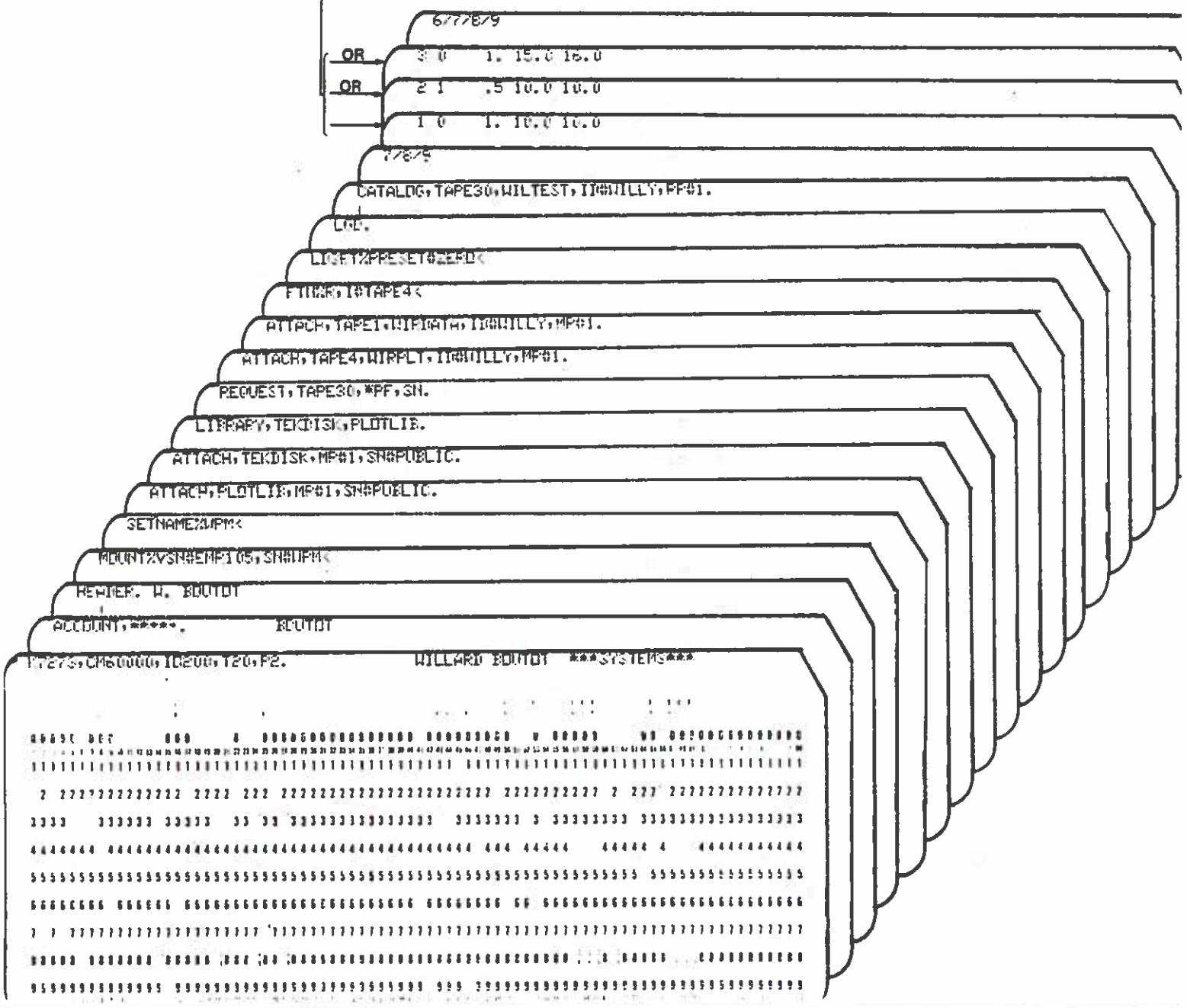
NØ = 1, for Rivière des Rochers
2, for Revillon Coupé
3, for Rivière des Rochers (Natural Flows)

IPRINT = 0, print results
1, do not print results

CØUNT = Increment of H2 (tailwater elev.) to be plotted

DIMX = Dimension in inches along the x axis

DIMY = Dimension in inches along the y axis



```
      PROGRAM WIRPLT(INPUT,OUTPUT,TAPE2=OUTPUT,TAPE1,TAPE30)
      REAL NS(3),NF(3),LONG,LONG1
      DIMENSION CSW(3),HCRFST1(3),HCREST(3),CF(3),P(3),HTOP(3)
      DIMENSION XX(35),ZZ(35),HBOTT(3),SCALX(3),KK(3)
      DIMENSION DIM(3),QMAX(3),CONST(3),EXPO(3),SCALE(3),SCALEX(3)
      DIMENSION DASH(3),AMAXY(3),AMAXX(3)
      DIMENSION IBUFF(1024)
      DATA HBOTT(1),HTOP(1),HCREST(1),HCREST1(1) /671.0,688.0,671.0,
     *680.5/
      DATA HBOTT(2),HTOP(2),HCREST(2),HCREST1(2) /675.0,688.0,675.0,
     *684.5/
      DATA HBOTT(3),HTOP(3),HCREST(3),HCREST1(3) /673.0,688.0,674.0,
     *674.0/
      DATA QMAX(1),QMAX(2),QMAX(3) /125.,10.,128./
      DATA DASH(1),DASH(2),DASH(3) /677.0,682.0,678.0/
      DATA DIM(1),DIM(2),DIM(3) /25.,10.,16./
      DATA NS(1),NF(1),CSW(1) /-2.3356774,2.8369334,74.807646/
      DATA NS(2),NF(2),CSW(2) /-4.2612830,4.9057749,0.0783828/
      DATA NS(3),NF(3),CSW(3) /-0.84244565,1.2442233,10458.05/
      DATA KK(1),KK(2),KK(3) /10,10,5/
      DATA CONST(1),EXPO(1) /411350.90,-1.8096072/
      DATA CONST(2),EXPO(2) /21426.270,-2.3072048/
      DATA CONST(3),EXPO(3) /22372.73,1.2442357/
      DATA AMAXX(1),AMAXY(1) /9.00,105.0/
      DATA AMAXX(2),AMAXY(2) /9.00,008.0/
      DATA AMAXX(3),AMAXY(3) /4.00,112.0/
      DATA CF(1),P(1) /10417.66601,1.015073/
      DATA CF(2),P(2) /1471.39984,0.94453065/
      DATA CF(3),P(3) /5702.493,1.2442401/
      DATA ORGX,ORGY /1.0,1.0/

C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C
C     LEGEND OF IMPORTANT VARIABLES
C
C     NO          = 1,FOR RIVIERE DES ROCHERS
C                 = 2,FOR REVILLON COUPE
C                 = 3,FOR RIVIERE DES ROCHERS (NATURAL FLOWS)
C     IPRINT      = 1,DO NOT PRINT RESULTS
C                 = 0,       PRINT RESULTS
C     COUNT       = INCREMENT OF H2 TO BE PLOTTED
C     H1          = UPSTREAM STAGE IN FEET ABOVE CHANNEL DATUM
C     H2          = DOWNSTREAM STAGE IN FEET ABOVE CHANNEL DATUM
C     ORGX        = ORIGIN OF PLOT IN X-AXIS
C     ORGY        = ORIGIN OF PLOT IN Y-AXIS
C     DIM(NO)     = NUMBER OF HORIZONTAL LINES IN Y-AXIS
C     KK(NO)      = NUMBER OF VERTICAL LINES IN THE X AXIS
C                   AT EVERY 1.0 FOOT INCREMENT IN HEAD  DIFFERENCE.
C                   NOTE: THE SCALE IN THE X AXIS IS EQUAL TO
C                         KK(NO) / DIMX
C                         HEAD DIFFERENCE IN FEET PER INCH OF PLOT
C     DIMX        = DIMENSION IN INCHES ALONG THE X AXIS (FOR PLOT)
C     DIMY        =                             Y AXIS (FOR PLOT)
C                   FOR RIVIERE DES ROCHERS (1) : DIMX=10.0, DIMY=10.0
C                   FOR REVILLON COUPE      (2) : DIMX=10.0 , DIMY=10.0
C                   FOR RIVIERE DES ROCHERS (3) : DIMX=15.0 , DIMY=16.0
```

```
C      DASH(NO)    = AREA UNDER THE DASH LINES ARE AREA UNKNOWN
C      AMAXX(NO)   = HEAD DIFFFRENCE WHERE GRAPH WILL STOP
C      AMAXY(NO)   = MAX. DISCHARGE/1000. WHERE GRAPH WILL STOP
C      HTOP        = FIRST H2 USED
C      HBOTT       = LAST H2 USED
C      S           = DEGREE OF SUBMERGENCE
C      HCREST(1)   = CREST ELEVATION FOR SUBMERGED COND. OF RIVIERE DES R.
C      HCREST1(1)  = CREST ELEVATION FOR FREE FLOW COND. OF RIVIERE DES R.
C      HCREST(2).  = CREST ELEVATION FOR SUBMERGED COND. OF REVILLON COUPE
C      HCREST1(2)  = CREST ELEVATION FOR FREE FLOW COND. OF REVILLON COUPE
C      QMAX(NO)    = MAXIMUM DISCHARGE / 1000.
C      QCAL        = CHANNEL DISCHARGE IN CFS
C      CONST(NO)   = CONSTANT VALUE OF REGRESSION LINE BETWEEN SUB & SUPER
C                    CRITICAL FLOWS
C      EXPO(NO)    = EXPONENTIAL VALUE OF REGRESSION LINE BETWEEN SUB &
C                    SUPER CRITICAL FLOWS
C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
      READ 1,NO,IPRINT,COUNT,DIMX,DIMY
    1 FORMAT(2I2,1X,3F5.0)
C
C     GRAPH SET-UP
C
      MILLE  = 1000
      IUP = 3
      IDN = 2
      ANGLE = 0.0
      CALL PLOTS (IBUFF,1024)
      CALL PLOT  (0.0,-30.0,-3)
      SCALE(NO) = QMAX(NO)/DIMY *1000.
      SCALEX(NO) = DIMX/KK(NO)
      SCALX(NO) = KK(NO)/DIMX
      CALL AXIS (ORGX,ORGY,17HDISCHARGE IN CFS.,17,DIMY,90.0,0.0,SCALE(N
     *O))
      CALL AXIS (ORGX,ORGY,22HHEAD DIFFERENCE IN FT.,-22,DIMX,0.0,0.0,
     *SCALX(NO))
      JJ    = DIM(NO)
      YY    = DIMX + ORGY
      DO 10 J=1,JJ
      APTY =ORGY + J*(DIMY / JJ)
      CALL PLOT (ORGX,APTY,IUP)
      CALL PLOT (YY,APTY,IDN)
   10 CONTINUE
      KKK     = KK(NO)
      XXX  = DIMY + ORGX
      DO 20 K=1,KKK
      APTX =ORGX + K*(DIMX /KKK)
      CALL PLOT (APTX,ORGY,IUP)
      CALL PLOT (APTX,XXX,IDN)
   20 CONTINUE
C
C     TABLE HEADINGS OF INTERSECTION VALUES BETWEEN SUB&SUPER-CRITICAL
C     FLOWS
C
      IF(IPRINT.EQ.1) GO TO 80
      WRITE(2,30)
   30 FORMAT(1H1)
```

```
      WRITE (2,40) HCREST(NO),CSW(NO),NS(NO),NF(NO),
     *             HCREST1(NO),CF(NO),P(NO),CONST(NO),EXPO(NO)
   40 FORMAT(///,10X,"H(CREST) FOR SUBMERGED CONDITION = ",F12.2,/,
     1          10X,"CSW ..... = ",F12.6,/,
     2          10X,"NS  ..... = ",F12.7,/,
     3          10X,"NF  ..... = ",F12.7,/,
     4          10X,"H(CREST) FOR FREE FLOW CONDITION = ",F12.2,/,
     5          10X,"CF  ..... = ",F12.3,/,
     6          10X,"P   ..... = ",F12.7,/,
     7          10X,"CONST ...INTERSECTION LINE..... = ",F12.2,/,
     8          10X,"EXPO  ...INTERSECTION LINE..... = ",F12.7,/)
      IF(NO.EQ.1.OR.NO.EQ.3) WRITE(2,50)
   50 FORMAT(////,10X,"RIVIERE DES ROCHERS",/,
     *10X,"WIER CALIBRATION",/,
     *10X,"INTERSEPTION BETWEEN SUB. AND SUPER-CRITICAL FLOW")
      IF(NO.EQ.3) WRITE(2,55)
   55 FORMAT(10X,"NATURAL FLOWS")
      IF(NO.EQ.2) WRITE(2,60)
   60 FORMAT(////,10X,"REVILLON COUPE",/,
     *10X,"WIER CALIBRATION",/,
     *10X,"INTERSEPTION BETWEEN SUB. AND SUPER-CRITICAL FLOW")
      WRITE (2,70)
   70 FORMAT(/,10X,"UPSTREAM",5X,"DOWNSTREAM",5X,"   HEAD",/,
     *       10X,"ELEVATION",4X,"ELEVATION",5X,"DIFFERENCE",5X,"DISCHA
     *RGE",/,  10X,"    H1   ",4X,"    H2   ",5X,"   H1-H2  ",5X,"   CFS
     *")
C
C     PLOTS CURVES FOR SUB&SUPER-CRITICAL FLOWS
C
   80 CONTINUE
      DIMYY  = DIMY
      DIMX   = AMAXX(NO)*SCALEX(NO)
      DIMY   = AMAXY(NO)/QMAX(NO)*DIMYY
      SNUM   = 0.14
      DIV = 1/COUNT
      ICOUNT = (HTOP(NO) - HBOTT(NO)) / COUNT
      H2 = HTOP(NO)
      DO 270 J=1,ICOUNT
      A = J/DIV
      IF(H2.LE.HCREST1(NO)) H1 = HCREST1(NO) + 0.01
      IF(H2.GT.HCREST1(NO)) H1 = H2 + 0.01
      IF (H2.LE.HCREST(NO)) H2 =  HCREST(NO)+0.01
   90 S = ALOG((H1-HCREST(NO)) / (H2-HCREST(NO)))
      QCALX  = CSW(NO)*S**NS(NO)*(H1-H2)**NF(NO)
      QCALY  = CF(NO)*(H1-HCREST1(NO))**P(NO)
      W      = QCALY - QCALX
      IF(W.LE.1.0) GO TO 100
      H1 = H1+.01
      GO TO 90
  100 DELTAH = H1 - H2
      XX(J) = QCALX
      IPEN = IUP
      ZZ(J) = DELTAH
      IF(IPRINT.EQ.1) GO TO 120
      WRITE(2,110) H1,H2,DELTAH,QCALX
  110 FORMAT( 9X,F7.2,6X,F7.2,9X,F7.2,6X,F7.0)
  120 CONTINUE
```

```
      IF(NO.EQ.3) GO TO 150
      IF(H2.LT.HCREST1(NO).AND.NO.EQ.1) GO TO 150
      DO 140 L=1,MILLE
      H1       = H2 + L*0.01
      S = ALOG((H1-HCREST(NO)) / (H2-HCREST(NO)))
      QCAL2 = CSW(NO)*S**NS(NO)*(H1-H2)**NF(NO)
      QCAL1 = CONST(NO)*(H1-H2)**EXPO(NO)
      QCAL3 = QCAL2 - QCAL1
      IF(QCAL3.LT.0.0.AND.H2.GE.HCREST1(NO)) GO TO 140
      IF(QCAL3.LT.0.0.AND.H2.LT.HCREST1(NO)) GO TO 140
      IF(QCAL3.GE.0.0.AND.H2.LT.HCREST1(NO)) GO TO 130
      QX = CF(NO)*(H1-HCREST1(NO))**P(NO)
      QQQ= (QCAL2-QX)/SCALE(NO)/2.0
      H1H2     = H1 - H2
      DELT1  = (QX/CONST(NO))**(1./EXPO(NO))
      H       = H2 + DELT1
      DELT2 = (QCAL1/CONST(NO))**(1./EXPO(NO))
      HH     = H2 + DELT2
      HHH    = H - HH
      GO TO 150
  130 DELTAR = H1 - H2
      DELTAZ = (QCAL1/CF(NO))**(1/P(NO))
      HHH      = -(DELTAR - DELTAZ - ZZ(J))/2.0
      H1H2     = H1 - H2
      H3     = H1 + HHH
      QCAL1 = CONST(NO)*(H1-H2)**EXPO(NO)
      QCAL2 = CONST(NO)*(H3-H2)**EXPO(NO)
      QQQ    =(QCAL1 - QCAL2)/SCALE(NO)
      GO TO 150
  140 CONTINUE
  150 CONTINUE
      ICONT  = 0
      QQ = 0.0
      XYZ = 0.0
      IFLAG = 0
      FACTQ    = 0.0
      FACTH    = 0.0
      QREAL  = 0.0
      IPEN    = IUP
      DO 220 I=1,MILLE
      IF(IFLAG.EQ.-1) GO TO 200
      H1 = H2 + I * .01
      S = ALOG((H1-HCREST(NO)) / (H2-HCREST(NO)))
      QCAL = CSW(NO)*S**NS(NO)*(H1-H2)**NF(NO)
      IF(NO.EQ.3.AND.QCAL.GE.XX(J)) GO TO 190
      IF(NO.EQ.3) GO TO 210
      QCAL1 = CONST(NO)*(H1-H2)**EXPO(NO)
      S = ALOG((H1-HCREST(NO)) / (H2-HCREST(NO)))
      QCAL2 = CSW(NO)*S**NS(NO)*(H1-H2)**NF(NO)
      QCAL3 = QCAL2 - QCAL1
      DELTAR = H1 - H2
      IF(H2.LT.HCREST1(NO).AND.NO.EQ.1) GO TO 160
      FACTH = HHH*(H1-H2)/H1H2
      FACTQ = QQQ*(H1-H2)/H1H2
      QREAL = QQQ*SCALE(NO)
  160 CONTINUE
      IF(QCAL3.GE.0.0.AND.H2.GE.HCREST1(NO)) GO TO 170
```

```
      IF(QCAL3.GE.0.0.AND.H2.LT.HCREST1(NO)) GO TO 180
      GO TO 210
  170 QX = CF(NO)*(H1-HCREST1(NO))**P(NO)
      QQ = (QCAL2-QX)/SCALE(NO)
      GO TO 190
  180 DELTAZ = (QCAL1/CF(NO))**(1/P(NO))
      H1 = HCREST1(NO) + 0.01
      XYZ = DELTAR - DELTAZ- ZZ(J)
  190 IFLAG = -1
  200 QCAL = CF(NO)*(H1-HCREST1(NO))**P(NO)
  210 CONTINUE
      DELTA = (H1 - H2 + XYZ + FACTH)*SCALEX(NO) + ORGX
      QQDIV = QCAL/SCALE(NO) + ORGY + QQ - FACTQ
      IF((QQDIV-ORGY).GE.DIMY)   ANGLE = 90.0
      IF((DELTA-ORGX).GE.DIMX) ANGLE = 0.0
      IF((QQDIV-ORGY).GE.DIMY.OR.(DELTA-ORGX).GE.DIMX) GO TO 230
      IF(H2.GT.DASH(NO)) GO TO 215
      ICONT  = ICONT + 1
      IF(ICONT.EQ.5) IPEN = IUP
      IF(ICONT.EQ.10) IPEN = IDN
      IF(ICONT.EQ.10) ICONT= 0
      CALL PLOT (DELTA,QQDIV,IPEN)
      GO TO 216
  215 CALL PLOT (DELTA,QQDIV,IPEN)
      IPEN = IDN
  216 IF(IFLAG.EQ.-1) H1 = H1 + 0.01
  220 CONTINUE
  230 IH2  = H2
      IF(H2.GT.IH2) GO TO 240
      SNUM   = DIMX/10.0 * 0.14
      CALL NUMBER (DELTA,QQDIV,SNUM,H2,ANGLE,0)
  240 IF(IPRINT.EQ.1) GO TO 260
      IF(FACTQ.EQ.0.0) FACTQ = 0.00000001
      XYZ    = XYZ + FACTH
      DELTAR = DELTAR - FACTH
      QCAL   = QCAL1 - FACTQ*SCALE(NO)
      IF(H2.GE.HCREST1(NO)) WRITE(2,250) HHH,QREAL,H1H2,QCAL
      IF(H2.LT.HCREST1(NO)) WRITE(2,255) XYZ,QREAL,DELTAR,QCAL
  250 FORMAT(T65,"ADJUSTMENT ABOVE HCREST IN THE X AXIS : ",F7.2," IN WA
     *TER HEAD",/,T65,"                                IN THE Y AXIS : ",F7.0,"
     *C.F.S.",/,T65,"INTERSEPTION POINT (HEAD DIFFERENCE)  : ",F7.2," FT
     *.",/,T65"                        (DISCHARGE      )  : ",F7.0," C.F.S.")
  255 FORMAT(T65,"ADJUSTMENT BELOW HCREST IN THF X AXIS : ",F7.2," IN WA
     *TER HEAD",/,T65,"                                IN THE Y AXIS : ",F7.0,"
     *C.F.S.",/,T65,"INTERSEPTION POINT (HEAD DIFFERENCE)  : ",F7.2," FT
     *.",/,T65"                        (DISCHARGE      )  : ",F7.0," C.F.S.")
  260 H2 = HTOP(NO) - A
  270 CONTINUE
C
C     DRAW THE LINE OF INTERCEPTION BETWEEN SUB & SUPER-CRITICAL FLOWS
C
      DELTAH = (QMAX(NO)*1000./CONST(NO))**(1/EXPO(NO))
      QCAL   = QMAX(NO)*1000.
      DELTA  = DELTAH*SCALEX(NO) + ORGX
      QQDIV  =  QCAL/SCALE(NO) + ORGY
      CALL PLOT(DELTA,QQDIV,IUP)
      DO 280 L= 1,MILLE
```

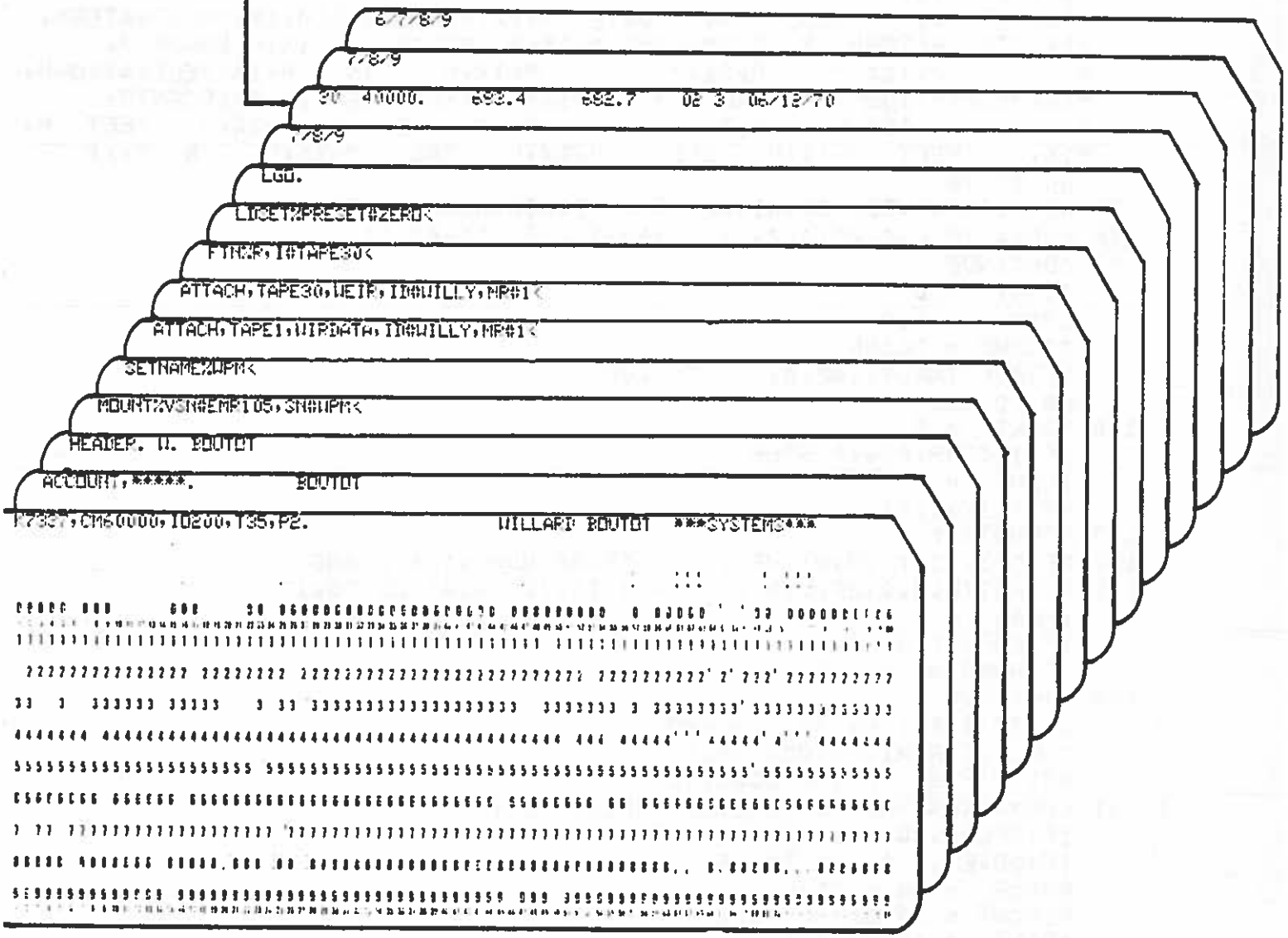
```
      DELTA  = DELTAH*SCALEX(NO) + ORGX
      QQDIV  =  QCAL/SCALE(NO) + ORGY
      CALL PLOT(DELTA,QQDIV,IDN)
      QCAL   = QCAL - QMAX(NO)
      DELTAH = (QCAL/CONST(NO))**(1/EXPO(NO))
      IF(QCAL.LE.0.0) GO TO 290
      DELTAX = DELTAH*SCALEX(NO)
      IF(NO.EQ.3) GO TO 280
      IF(DELTAX.GE.DIMX) GO TO 290
  280 CONTINUE
  290 CONTINUE
      IF(IPRINT.EQ.1) GO TO 335
      WRITE(2,30)
      IF(NO.EQ.2) WRITE(2,300)
      IF(NO.EQ.1.OR.NO.EQ.3) WRITE(2,310)
  300 FORMAT(///,25X,"REVILLON COUPE WEIR CALIBRATION")
  310 FORMAT(//,25X,"RIVIERE DES ROCHERS WEIR CALIBRATION")
      IF(NO.EQ.3) WRITE(2,315)
  315 FORMAT(/,35X,"NATURAL FLOWS")
      IF(NO.EQ.1.OR.NO.EQ.2) WRITE(2,320)
  320 FORMAT(/,25X,"A = SUB-CRITICAL FLOW",
     *       /,25X,"B = SUPER-CRITICAL FLOW",
     *       /,25X,"C = SUB & SUPER-CRITICAL FLOW")
      IF(NO.EQ.3) WRITE(2,325)
  325 FORMAT( /,21X,"ERROR = MEASURED DISCHARGE - CALCULATED DISCHARGE",
     *       /,19X,"PERCENT = (ERROR/MEASURED DISCHARGE)*100.")
      WRITE(2,330)
  330 FORMAT(/,10X,"CODE",3X,"  DATE  ",3X,"DISCHARGE",3X,"HEADWATER",
     *3X,"TAILWATER",3X,"   HEAD   ",
     *       /,10X,"    ",3X,"        ",3X,"    IN   ",3X,"ELEVATION",
     *3X,"ELEVATION",3X,"DIFFERENCE",
     *       /,10X,"    ",3X,"        ",3X,"  C.F.S. ",3X,"   FEET  ",
     *3X,"   FEET  ",3X,"   FEET   ")
  335 CONTINUE
      SYMB   = 0.14
      ANG    = 0.0
      INT    = 13
  340 READ(1,350) QQ,H1,H2,ITAG1,ITAG2,NUMB,IDATE,ANG
  350 FORMAT(F10.0,2F10.2,1X,A1,A3,1X,I1,2X,A8,2X,F5.1)
      IF(EOF(1).NE.0) GO TO 370
      IF(NUMB.NE.NO) GO TO 340
      DELTAH = H1 - H2
      DELTA  = DELTAH*SCALEX(NO) + ORGX
      QQDIV  = QQ/SCALE(NO) + ORGY
      CALL SYMBOL (DELTA,QQDIV,0.06,INT,0.0,1)
      IF(ANG.LT.090.0.AND.ANG.GT.270.0) DELTA = DELTA + 0.1
      IF(ANG.GT.090.0.AND.ANG.LT.270.0) DELTA = DELTA - 0.1
      IF(ANG.GT.000.0.AND.ANG.LT.180.0) QQVIV = QQDIV + 0.1
      IF(ANG.GT.180.0.AND.ANG.LT.360.0) QQDIV = QQDIV - 0.1
      CALL SYMBOL (DELTA,QQDIV,SYMB,ITAG2,ANG,3)
      IF(IPRINT.EQ.1) GO TO 340
      WRITE(2,360) ITAG2,IDATE,QQ,H1,H2,DELTAH
  360 FORMAT(10X,A3,3X,A8,3X,F8.0,3X,F8.2,2(4X,F8.2))
      GO TO 340
  370 CONTINUE
      SIZE   = DIMX/10.0 * 0.30
      LONG = (DIMX + ORGX)*SIZE - 1.0
```

```
      HAUT = DIMYY + ORGY + 4.0*SNUM
      LONG1  = LONG + 2.0
      HAUT1  = HAUT - 1.5
      SIZE1  = SIZE*.80
      DO 380 I=1,3
      IF(NO.EQ.1) CALL SYMBOL (LONG,HAUT,SIZE,19HRIVIERE DES ROCHERS,0.0
     *,19)
      IF(NO.EQ.2) CALL SYMBOL (LONG,HAUT,SIZE,14HREVILLON COUPE,0.0,14)
      IF(NO.EQ.3) CALL SYMBOL (LONG,HAUT,SIZE,19HRIVIERE DES ROCHERS,0.0
     *,19)
      IF(NO.EQ.3) CALL SYMBOL(LONG1,HAUT1,SIZE1,13HNATURAL FLOWS,0.0,13)
      HAUT1  = HAUT1 +0.007
      LONG1  = LONG1 + 0.007
      LONG   = LONG + 0.01
      HAUT   = HAUT + 0.01
  380 CONTINUE
      CALL PLOT (0.0,0.0,999)
      STOP
      END
```

APPENDIX - D

JCL for WEIR

Column	Format	Variable	Description
1	I1	NO	compulsary
2	I2	ICØMP	compulsary
3-10	F8.0	QR	
11-20	F10.2	H1	compulsary
21-30	F10.2	H2	compulsary
33-35	A3	ITAG2	
37	I1	NUMB	compulsary, must be the same as NØ
40-47	A8	IDATE	



```
      PROGRAM MAIN(INPUT,OUTPUT,TAPE2=OUTPUT,TAPE1,TAPE30,TAPE5=INPUT)
      INPUT = 5
      READ(INPUT,80) NO,ICOMP,QR,H1,H2,ITAG1,ITAG2,NUMB,IDATE,ANG
   80 FORMAT(2I1,F8.0,2F10.2,1X,A1,A3,1X,I2,A10,F7.1)
      WRITE(2,10)
   10 FORMAT(1H1)
      IF(NO.EQ.2) WRITE(2,20)
      IF(NO.EQ.1.OR.NO.EQ.3) WRITE(2,30)
   20 FORMAT(///,25X,"REVILLON COUPE WEIR CALIBRATION")
   30 FORMAT(//,25X,"RIVIERE DES ROCHERS WEIR CALIBRATION")
      IF(NO.EQ.3) WRITE(2,40)
   40 FORMAT(/,35X,"NATURAL FLOWS")
      IF(NO.EQ.1.OR.NO.EQ.2) WRITE(2,50)
   50 FORMAT(/,25X,"A = SUB-CRITICAL FLOW",
     *       /,25X,"B = SUPER-CRITICAL FLOW",
     *       /,25X,"C = SUB & SUPER-CRITICAL FLOW",
     *       /,21X,"ERROR = MEASURED DISCHARGE - CALCULATED DISCHARGE",
     *       /,19X,"PERCENT = (ERROR/MEASURED DISCHARGE)*100.")
      IF(NO.EQ.3) WRITE(2,60)
   60 FORMAT( /,21X,"ERROR = MEASURED DISCHARGE - CALCULATED DISCHARGE",
     *       /,19X,"PERCENT = (ERROR/MEASURED DISCHARGE)*100.")
      WRITE(2,70)
   70 FORMAT(/,10X,"CODE",3X," DATE  ",1X,"DISCHARGE",1X,"HEADWATER",
     *1X,"TAILWATER",1X,"DISCHARGE ",1X," ERROR   ",1X," ERROR ",
     *       /,10X,"    ",3X,"        ",1X,"    IN   ",1X,"ELEVATION",
     *1X,"ELEVATION",1X,"CALCULATED",1X,"DIFFERENCE",1X,"PERCENT",
     *       /,10X,"    ",3X,"        ",1X," C.F.S. ",1X,"   FEET  ",
     *1X,"   FEET  ",1X,"   CFS    ",1X,"   CFS   ",1X,"    %  ",/)
      GO TO 90
   75 READ(INPUT,76) QR,H1,H2,ITAG1,ITAG2,NUMB,IDATE,ANG
   76 FORMAT(F10.0,2F10.2,1X,A1,A3,1X,I2,A10,F7.1)
   90 CONTINUE
      ICONT  = 0
      EROR   = 0.0
      IICOMP = ICOMP
      IF(EOF(INPUT).NE.0) GO TO 100
      GO TO 135
  100 ICONT  = 0
      IF(IICOMP.EQ.1) STOP
      ICOMP  = 2
      WRITE(2,110)
  110 FORMAT(/)
  120 READ(1,130) QR,H1,H2,ITAG1,ITAG2,NUMB,IDATE,ANG
  130 FORMAT(F10.0,2F10.2,1X,A1,A3,1X,I1,2X,A8,2X,F5.1)
      IFLAG  = 1
      IF(EOF(1).NE.0) GO TO 170
      IF(NUMB.NE.NO) GO TO 120
  135 CONTINUE
C     WRITE(2,81) H1,H2,QCAL,NO
      CALL WEIR(H1,H2,QCAL,NO)
C     WRITE(2,81) H1,H2,QCAL,NO
C  81 FORMAT(5X,"H1,H2,QCAL,NO",3F10.2,I2,/)
      IF(IFLAG.EQ.-1) QCAL = -QCAL
      IF(QR.EQ.0.0) GO TO 150
      ERROR  = QR - QCAL
      PERCNT = ERROR/QR*100.
      ICONT  = ICONT + 1
```

```
      EROR   = EROR + ABS(PERCNT)
  150 WRITE(2,160) ITAG2,IDATE,QR,H1,H2,QCAL,ERROR,PERCNT
  160 FORMAT(10X,A3,3X,A8,2X,F8.0,1X,F8.2,2X,F8.2,3X,F8.0,2X,F8.0,3X,F7.
     *2)
      IF(ICOMP.EQ.2) GO TO 120
      GO TO 75
  170 CONTINUE
      IF(ICONT.EQ.0) WRITE(2,180)
  180 FORMAT(1H1,"ICONT IS EQUAL TO 0")
      ERORR  = EROR/ICONT
      WRITE(2,190) ERORR
  190 FORMAT(/,10X,"THE AVERAGE ERROR PERCENT IS EQUAL TO",29(1H.),F8.2)
      WRITE(2,10)
      STOP
      END
```

```
      SUBROUTINE WEIR(H1,H2,QCAL,NO)
C
C**** COMPUTATION OF DISCHARGE AT WEIRS - RIVIERE DE ROCHES & REVILLON
C
      REAL NS(3),NF(3)
      DIMENSION CSW(3),HCREST(3),HCREST1(3),CF(3),P(3),CONST(3),EXPO(3)
      DIMENSION Q(3),HIGH(3),HLOW(3)
      DATA HCREST/671.0,675.0,674.0/
      DATA HCREST1/680.5,684.5,674.0/
      DATA NS/-2.3356774,-4.2612830,-0.84244565/
      DATA NF/2.8369334,4.9057749,1.2442233/
      DATA CSW/74.807646,0.0783828,10458.05/
      DATA CF/10417.66601,1471.39984,5702.493/
      DATA P/1.015073,0.94453065,1.2442401/
      DATA CONST/411350.90,21426.270,22372.73/
      DATA EXPO/-1.8096072,-2.3072048,1.2442357/
      DATA Q,HIGH,HLOW / 9*0.0/
C
C**** DETERMINE HIGH ELEVATION AND ARRANGE WHEN NECESSARY
C
      HTEMP = 0.0
      IF(H1.EQ.H2) GO TO 70
      IF(H1.GT.H2) GO TO 10
      HTEMP = H1
      H1 = H2
      H2 = HTEMP
C
C**** CHECK IF PREVIOUS SOLUTION EXISTS  IE) PREVIOUS SIDE OF WEIR
C
   10 IF(H1.EQ.HIGH(NO).AND.H2.EQ.HLOW(NO)) GO TO 60
      HIGH(NO) = H1
      HLOW(NO) = H2
      QINT = 0.0
      QSUB = 0.0
      QCRIT = 0.0
      DELTAH = H1 - H2
      I = 1
      DO 35 J=1,50
C
C**** COMPUTE DISCHARGE, SLOPE, AND Y-INTERCEPT OF LINE OF FLOW DIV-N
C
   15 QA = CONST(NO)*DELTAH**EXPO(NO)
      SLOPEA = CONST(NO)*EXPO(NO)*DELTAH**(EXPO(NO)-1.)
      YINTA =  QA - SLOPEA * DELTAH
C     IF(DELTAH.GE.2.0) WRITE(2,16) QA,SLOPEA,YINTA
C  16 FORMAT(10X,"Q,S,Y",3F12.0)
      IF(I.EQ.2) GO TO 30
C
C**** COMPUTE DISCHARGE, SLOPE AND Y-INTERCEPT OF SUBMERGED EQ-N
C
   20 S = ALOG((H1 - HCREST(NO))/(H2 - HCREST(NO)))
      QB = CSW(NO)*S**NS(NO)*DELTAH**NF(NO)
      IF(QSUB.EQ.0.0) QSUB = QB
      SLOPEB = CSW(NO)*S**NS(NO)*NF(NO)*DELTAH**(NF(NO)-1.)
     *- CSW(NO)*NS(NO)*S**(NS(NO)-1.)*DELTAH**NF(NO)/(H1-HCREST(NO))
      YINTB = QB - SLOPEB * DELTAH
      DELH1 = (YINTA - YINTB)/(SLOPEB - SLOPEA)
```

```
C      IF(DELTAH.GE.2.0) WRITE(2,21) QB,SLOPEB,YINTB,DELH1
C   21 FORMAT(5X,"Q,S,Y,DELH1",3F12.0,F10.4)
       IF(J.EQ.1) GO TO 30
       IF(ABS(DELH1-DELTAH).LE.0.01) GO TO 25
       DELTAH = DELH1
       H1 = H2 + DELTAH
       GO TO 35
   25  DELTAH = DELH1
       H1 = H2 + DELTAH
       I=2
       GO TO 35
C
C**** COMPUTE DISCHARGE, SLOPE AND Y-INTERCEPT OF CRITICAL FLOW EQ-N
C
   30  QC = CF(NO)*(ABS(H1-HCREST1(NO)))**P(NO)
       IF(H1.LT.HCREST1(NO)) QC = -QC
       IF(QCRIT.EQ.0.0) QCRIT = QC
       SLOPEC = CF(NO)*P(NO)*(ABS(H1-HCREST1(NO)))**(P(NO)-1.)
       YINTC = QC - SLOPEC * DELTAH
       DELH2 = (YINTA - YINTC)/(SLOPEC - SLOPEA)
C      IF(DELTAH.GE.2.0) WRITE(2,31) QC,SLOPEC,YINTC,DELH2
C   31 FORMAT(5X,"Q,S,Y,DELH2",3F12.0,F10.4)
       IF(J.EQ.1) GO TO 32
       IF(ABS(DELH2-DELTAH).LE.0.01) GO TO 40
   32  CONTINUE
       IF(NO.NE.3) GO TO 34
       IF(J.EQ.1.AND.DELTAH.LT.4.0) DELTAH = 4.0
   34  DELTAH = DELH2
       H1 = H2 + DELTAH
   35  CONTINUE
C
C**** DETERMINE COMMON POINT FOR THE THREE CURVES
C
   40  DELTAH = (DELH1 + DELH2)/2.0
       QB     = QB + (DELTAH - DELH1)*SLOPEB
       QC     = QC + (DELTAH - DELH2)*SLOPEC
       QA     = (QB + QC)/2.0
       H1 = HIGH(NO)
       H2 = HLOW(NO)
       IF((H1-H2).GT.DELTAH) GO TO 45
       QCAL = QSUB + (H1-H2)/DELTAH*(QA-QB)
       GO TO 50
   45  QCAL = QCRIT + (QA - QC)
   50  Q(NO) = QCAL
       IF(HTEMP.EQ.0.0) RETURN
   55  HTEMP = H2
       H2 = H1
       H1 = HTEMP
       RETURN
   60  QCAL = Q(NO)
       IF(HTEMP.NE.0.0) GO TO 55
       RETURN
   70  QCAL = 0.0
       RETURN
       END
```

APPENDIX D

TEST PERIOD DATA INPUT AND DATA OUTPUT FOR THE COMPUTATION OF RESIDUAL INFLOW

TEST PERIOD DATA INPUT

FOR THE COMPUTATION OF RESIDUAL INFLOW

```
PEACE ATHABASCA DELTA FLOW SIMULATION MODEL                                      0001
       1        2        1        1        2                                     0005
       2        2        2                                                       0009
       2        2        2        2                                              0013
       1      312  1123200.0                 100      001          1             0017
      19       20        2                                                       0021
       1      150        1       20                                              0025
       2      200       20        2                                              0029
       3      350        3        4                                              0033
       4      450        4        5                                              0037
       5      500        2        8                                              0041
       6      550        5        6                                              0045
       7      650        6        7                                              0049
       8      750        7        8                                              0053
       9      800        2       10                                              0057
      10     1000        8       09                                              0061
      11     1050       11       12                                              0065
      12     1150       12        9                                              0069
      13     1350       10       16                                              0073
      14     1400        9       13                                              0077
      15     1500       10       18                                              0081
      16     1550       17       13                                              0085
      17     1750       13       14                                              0089
      18     1850       19       14                                              0093
      19     1950       14       15                                              0097
      18       19                                                                0101
      16       17                                                                0105
REACH  150      LAKE ATHABASCA                                                   0109
       150        1        2        2          1         0         0             0113
                        .030           443059.     27690.                        0117
         9        6   682.00   692.00                                            0121
   -35640.            538.000          688.000     30300.       .030             0125
         2                                                                       0129
   682.000   87578.   87578.  6196422.  87579.   6196422.                        0133
   684.000   88657.   88657.  6372657.  88659.   6372657.                        0137
   686.000   89737.   89737.  6551051.  89738.   6551051.                        0141
   688.000   90816.   90816.  6731604.  90818.   6731604.                        0145
   690.000   90816.   90816.  6913236.  90822.   6913236.                        0149
   692.000   90816.   90816.  7094868.  90826.   7094868.                        0151
    22440.            538.000          688.000     31900.       .030             0153
         2                                                                       0157
   682.000   65155.   65155.  4508486.  65157.   4508486.                        0161
   684.000   66845.   66845.  4640486.  66846.   4640486.                        0165
   686.000   68534.   68534.  4775866.  68536.   4775866.                        0169
   688.000   70224.   70224.  4914624.  70226.   4914624.                        0173
   690.000   70224.   70224.  5055072.  70230.   5055072.                        0177
   692.000   70224.   70224.  5195520.  70234.   5195520.                        0179
    89760.            438.000          688.000     33300.       .030             0181
         2                                                                       0185
   682.000  166191.  166191. 24841862. 166193.  24841862.                        0189
   684.000  166762.  166762. 25174815. 166764.  25174815.                        0193
   686.000  167333.  167333. 25508911. 167335.  25508911.                        0197
   688.000  167904.  167904. 25844148. 167906.  25844148.                        0201
   690.000  167904.  167904. 26179956. 167910.  26179956.                        0205
   692.000  167904.  167904. 26515764. 167914.  26515764.                        0207
   147840.            482.000          688.000     34100.       .030             0209
         2                                                                       0213
   682.000  136303.  136303. 11218310. 136305.  11218310.                        0217
   684.000  137069.  137069. 11491682. 137071.  11491682.                        0221
   686.000  137834.  137834. 11766586. 137837.  11766586.                        0225
   688.000  138600.  138600. 12043020. 138602.  12043020.                        0229
   690.000  138600.  138600. 12320220. 139606.  12320220.                        0233
   692.000  138600.  138600. 12597420. 138610.  12597420.                        0235
   240240.            638.000          688.000     34000.       .030             0237
         2                                                                       0241
   682.000   82833.   82833.  2341736.  82833.   2341736.                        0245
   684.000   84262.   84262.  2508832.  84262.   2508832.                        0249
   686.000   85691.   85691.  2678785.  85691.   2678785.                        0253
   688.000   87120.   87120.  2851596.  87120.   2851596.                        0257
   690.000   87120.   87120.  3025836.  87124.   3025836.                        0261
   692.000   87120.   87120.  3200076.  87128.   3200076.                        0263
   326304.            660.000          688.000     34000.       .030             0265
         2                                                                       0269
   682.000   90024.   90024.  1577532.  90024.   1577532.                        0273
   684.000   91520.   91520.  1759076.  91520.   1759076.                        0277
   686.000   93016.   93016.  1943612.  93016.   1943612.                        0281
   688.000   94512.   94512.  2131140.  94512.   2131140.                        0285
   690.000   94512.   94512.  2320164.  94516.   2320164.                        0289
   692.000   94512.   94512.  2509188.  94520.   2509188.                        0291
   389664.            668.000          688.000     34000.       .030             0293
         2                                                                       0297
   682.000   75434.   75434.   722779.  75434.    722779.                        0301
   684.000   78449.   78449.   876662.  78449.    876662.                        0305
   686.000   81465.   81465.  1036575.  81465.   1036575.                        0309
   688.000   84480.   84480.  1202520.  84480.   1202520.                        0313
   690.000   84480.   84480.  1371480.  84484.   1371480.                        0317
   692.000   84480.   84480.  1540440.  84488.   1540440.                        0319
   430504.            670.900          688.000     34000.       .030             0321
         2                                                                       0325
   682.000   74987.   74987.   559075.  74987.    559075.                        0329
```

```
      684.000     75304.     75304.    709469.     75305.    709469.                    0333
      686.000     75485.     75485.    860258.     75487.    860258.                    0337
      688.000     75666.     75666.   1011409.     75669.   1011409.                    0341
      690.000     75847.     75847.   1162923.     75851.   1162923.                    0345
      692.000     76028.     76028.   1314798.     76033.   1314798.                    0347
     455559.                676.000               688.000     34000.                    0349
          2                                                                             0353
      682.000     47526.     47526.    224514.     47526.    224514.                    0357
      684.000     53437.     53437.    325476.     53437.    325476.                    0361
      686.000     58953.     58953.    438063.     58953.    438063.                    0365
      688.000     61574.     61574.    559840.     61575.    559840.                    0369
      690.000     61696.     61696.    683110.     61697.    683110.                    0373
      692.000     61818.     61818.    806624.     61818.    806624.                    0375
REACH   200  WEST END OF LAKE ATHABASCA                                                 0377
        200           1          2          2          1          0          0          0381
                                  .025                78900.0   4930.00                 0385
            9         6     682.00     692.00                                          0389
     -12500.                670.900               688.000     34000.       .030       0393
          2                                                                             0397
      682.000     74987.     74987.    559075.     74987.    559075.                    0401
      684.000     75304.     75304.    709469.     75305.    709469.                    0405
      686.000     75485.     75485.    860258.     75487.    860258.                    0409
      688.000     75666.     75666.   1011409.     75669.   1011409.                    0413
      690.000     75847.     75847.   1162923.     75851.   1162923.                    0417
      692.000     76028.     76028.   1314798.     76033.   1314798.                    0419
      12500.                 676.000               688.000     76000.                    0421
          2                                                                             0425
      682.000     47526.     47526.    224514.     47526.    224514.                    0429
      684.000     53437.     53437.    325476.     53437.    325476.                    0433
      686.000     58953.     58953.    438063.     58953.    438063.                    0437
      688.000     61574.     61574.    559840.     61575.    559840.                    0441
      690.000     61696.     61696.    683110.     61697.    683110.                    0445
      692.000     61818.     61818.    806624.     61818.    806624.                    0447
      37700.                 677.000               688.000     76000.                    0449
          2                                                                             0453
      682.000     35338.     35338.    145507.     35338.    145507.                    0457
      684.000     36897.     36897.    217743.     36897.    217743.                    0461
      686.000     38456.     38456.    293096.     38456.    293096.                    0465
      688.000     39329.     39329.    371223.     39329.    371223.                    0469
      690.000     39521.     39521.    450073.     39521.    450073.                    0473
      692.000     39713.     39713.    529306.     39713.    529306.                    0475
      58500.                 660.500               688.000     76000.                    0477
          2                                                                             0481
      682.000     13647.     13647.     59835.     13650.     59835.                    0485
      684.000     17239.     17239.     90721.     17243.     90721.                    0489
      686.000     21063.     21063.    128850.     21066.    128850.                    0493
      688.000     22246.     22246.    172991.     22249.    172591.                    0497
      690.000     22318.     22318.    217554.     22322.    217554.                    0501
      692.000     22391.     22391.    262264.     22395.    262264.                    0503
      68900.                 647.000               688.000     76000.                    0505
          2                                                                             0509
      682.000      4856.      4856.     31169.      4862.     31169.                    0513
      684.000      6648.      6648.     42759.      6654.     42759.                    0517
      686.000      6710.      6710.     56127.      6715.     56127.                    0521
      688.000      6752.      6752.     69588.      6758.     69588.                    0525
      690.000     35323.     35323.    111663.     35329.    111663.                    0529
      692.000     35434.     35434.    182419.     35440.    182419.                    0531
      71700.                 655.000               688.000     76000.                    0533
          2                                                                             0537
      682.000      5363.      5363.     34308.      5366.     34308.                    0541
      684.000      5477.      5477.     45148.      5480.     45148.                    0545
      686.000      5550.      5550.     56195.      5553.     56195.                    0549
      688.000      5583.      5583.     67328.      5587.     67328.                    0553
      690.000      5617.      5617.     78528.      5620.     78528.                    0557
      692.000      5650.      5650.     89795.      5654.     89795.                    0559
      74900.                 656.000               688.000     76000.                    0561
          2                                                                             0565
      682.000      3779.      3779.     31919.      3782.     31919.                    0569
      684.000      4079.      4079.     39006.      4082.     39006.                    0573
      686.000      4220.      4220.     48155.      4223.     48155.                    0577
      688.000      4260.      4260.     56635.      4263.     56635.                    0581
      690.000      4300.      4300.     65195.      4304.     65195.                    0585
      692.000      4340.      4340.     73835.      4344.     73835.                    0587
      78000.                 624.000               688.000     76000.                    0589
          2                                                                             0593
      682.000      2843.      2843.     39122.      2856.     39122.                    0597
      684.000      4929.      4929.     46951.      4942.     46951.                    0601
      686.000      5070.      5070.     56990.      5084.     56990.                    0605
      688.000      5130.      5130.     67190.      5144.     67190.                    0609
      690.000      5190.      5190.     77510.      5204.     77510.                    0613
      692.000      5250.      5250.     87950.      5264.     87950.                    0615
      78900.                 624.000               688.000     76000.                    0617
          2                                                                             0621
      682.000      2843.      2843.     39122.      2856.     39122.                    0625
      684.000      4929.      4929.     46951.      4942.     46951.                    0629
      686.000      5070.      5070.     56990.      5084.     56990.                    0633
      688.000      5130.      5130.     67190.      5144.     67190.                    0637
      690.000      5190.      5190.     77510.      5204.     77510.                    0641
      692.000      5250.      5250.     87950.      5264.     87950.                    0643
REACH   350  BIRCH RIVER FROM ALICE CREEK TO LAKE CLAIRE                               0645
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          350          1          2          2          1          0          0
                                0.03                 66634.00     4759.0
            2          5     686.000    694.000
            0,                678.400                 687.980        743.       0.03
            2
        686.000       233.       233.     1207.0       242.     1207.0
        688.000       236.       236.     1615.0       246.     1615.0
        690.000       238.       238.     2088.0       251.     2088.0
        692.000       240.       240.     2566.0       255.     2566.0
        694.000       242.       242.     3048.0       260.     3048.0
          66634,                678.400                 687.880        743.       0.03
            2
        686.000       233.       233.     1207.0       242.     1207.0
        688.000       236.       236.     1614.8       246.     1614.8
        690.000       238.       238.     2088.0       251.     2088.0
        692.000       240.       240.     2566.0       255.     2566.0
        694.000       242.       242.     3048.0       260.     3048.0
REACH   450         LAKE CLAIRE
            450          1          2          2          1          0          0
                                .020                 139128.      5280.
           11          6     686.00     691.00
            0,                678.400                 687.880        464.       0.03
            2
        686.000       233.       233.     1207.        242.     1207.
        687.000       235.       235.     1441.        243.     1441.
        688.000       236.       236.     1615.        246.     1615.
        689.000       238.       238.     1851.        249.     1851.
        690.000       238.       238.     2088.        251.     2088.
        691.000       239.       239.     2326.        253.     2326.
          10771,                681.500                 687.880        445.
            2
          686.0     49104.      1000.     4486.       1009.   153120.
          687.0     54252.      1000.     5486.       1011.   206118.
          688.0     56760.      1000.     6486.       1013.   261624.
          689.0     59004.      1000.     7486.       1015.   319506.
          690.0     61248.      1000.     8486.       1017.   379632.
          691.0     64944.      1000.     9486.       1019.   422728.
          27297,                681.000                 687.880        445.
            2
          686.0     71280.      3000.    14889.       3010.   260036.
          687.0     74448.      3000.    17889.       3012.   332900.
          688.0     77616.      3000.    20889.       3014.   408932.
          689.0     81048.      3000.    23889.       3016.   488264.
          690.0     84480.      3000.    26889.       3018.   571028.
          691.0     87912.      3000.    29889.       3020.   657224.
          54014,                679.500                 687.880        445.
            2
          686.0     71280.      5000.    32188.       5013.   331848.
          687.0     82368.      5000.    37188.       5015.   412896.
          688.0     85008.      5000.    42188.       5017.   496584.
          689.0     87912.      5000.    47188.       5019.   583044.
          690.0     90816.      5000.    52188.       5021.   672408.
          691.0     93984.      5000.    57188.       5023.   764808.
          64257,                679.800                 687.880        445.
            2
          686.0    128832.      5000.    30818.       5012.   485021.
          687.0    132000.      5000.    35818.       5014.   615437.
          688.0    135168.      5000.    40818.       5016.   749021.
          689.0    138996.      5000.    44818.       5018.   886103.
          690.0    142824.      5000.    50818.       5020.  1027013.
          691.0    146388.      5000.    55818.       5022.  1171619.
          76507,                680.200                 687.880        445.
            2
          686.0    135168.      5000.    28908.       5012.   599095.
          687.0    137544.      5000.    33908.       5014.   735451.
          688.0    139920.      5000.    38908.       5016.   874183.
          689.0    142560.      5000.    43908.       5018.  1015423.
          690.0    145200.      5000.    49908.       5020.  1159303.
          691.0    147840.      5000.    53908.       5022.  1305823.
          93878,                681.700                 687.880        445.
            2
          686.0    126984.      5000.    21082.       5008.   365508.
          687.0    133188.      5000.    26082.       5010.   495594.
          688.0    139392.      5000.    31082.       5012.   631884.
          689.0    154440.      5000.    36082.       5014.   785136.
          690.0    156816.      5000.    41082.       5016.   940764.
          691.0    159456.      5000.    46082.       5018.  1098900.
         108715,                683.600                 687.880        445.
            2
          686.0     61248.      5000.    11580.       5004.    56100.
          687.0     69960.      5000.    16580.       5006.   121704.
          688.0     78672.      5000.    21580.       5008.   195020.
          689.0     90552.      5000.    26580.       5010.   280632.
          690.0    102432.      5000.    31580.       5012.   377124.
          691.0    114048.      5000.    36580.       5014.   485364.
         119645,                683.800                 687.880        445.
            2
          686.0      9474.      3000.     8743.       3006.    24490.
          687.0     10281.      3000.    11743.       3008.    34368.
          688.0     11038.      3000.    14743.       3010.    45052.
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      689.0    13200.     3000.    17743.     3012.    57196.                0977
      690.0    15312.     3000.    20743.     3014.    71453.                0981
      691.0    17424.     3000.    23743.     3016.    87820.                0983
     132053.              684.100             687.880      445.              0985
                                                                             0989
      686.0    16620.     1000.     1554.     1003.    26554.                0993
      687.0    17550.     1000.     2554.     1005.    43639.                0997
      688.0    18480.     1000.     3554.     1007.    61654.                1001
      689.0    20592.     1000.     4554.     1009.    81190.                1005
      690.0    22704.     1000.     5554.     1011.   102838.                1009
      691.0    24552.     1000.     6554.     1013.   126466.                1011
     139128.              672.000             687.880      445.              1013
                                                                             1017
      686.000    314.      314.     3379.      318.     3799.                1021
      687.000    325.      325.     3699.      328.     3699.                1025
      688.000    335.      335.     4028.      339.     4028.                1029
      689.000    345.      345.     4368.      349.     4368.                1033
      690.000    354.      354.     4717.      358.     4717.                1037
      691.000    363.      363.     5076.      367.     5076.                1039
REACH  500       LAKE ATHABASCA CHANNEL TO FOUR FORKS                        1041
       500          1         2        2         1        0         0        1045
                  .020                          26000.    4330.             1049
        723.      5    684.00    692.00                                      1053
                  673.000             688.000      6500.                    1057
                                                                             1061
      684.000    525.      525.     3922.      526.     3922.                1065
      686.000    569.      569.     5018.      571.     5019.                1069
      688.000    594.      594.     6190.      596.     6190.                1073
      690.000    603.      603.     7386.      606.     7386.                1077
      692.000    611.      611.     8600.      615.     8600.                1081
     13342.              672.500             687.800      6500.             1085
                                                                             1089
      684.000    547.      547.     4296.      548.     4296.                1093
      686.000    569.      569.     5414.      571.     5414.                1097
      688.000    588.      588.     6571.      590.     6571.                1101
      690.000    606.      606.     7765.      609.     7765.                1105
      692.000    625.      625.     8997.      628.     8997.                1109
     24483.              668.000             687.570      6500.             1113
                                                                             1117
      684.000    387.      387.     4245.      389.     4245.                1121
      686.000    397.      397.     5030.      401.     5030.                1125
      688.000    402.      402.     5830.      407.     5830.                1129
      690.000    407.      407.     6639.      414.     6639.                1133
      692.000    418.      418.     7461.      426.     7461.                1137
REACH  550       LAKE CLAIRE TO LAKE MAMAWI                                  1141
       550          1         2        2         1        0         0        1145
                  .035                          36700.    6100.             1149
          2       5    684.00    692.00                                      1153
        528.              672.000             687.880      445.              1157
                                                                             1161
      684.000    294.      294.     2771.      297.     2771.                1165
      686.000    314.      314.     3379.      318.     3379.                1169
      688.000    335.      335.     4028.      339.     4028.                1173
      690.000    354.      354.     4717.      358.     4717.                1177
      692.000    372.      372.     5444.      377.     5444.                1181
     36700.              672.000             687.660      445.              1185
                                                                             1189
      684.000    294.      294.     2771.      297.     2771.                1193
      686.000    314.      314.     3379.      318.     3379.                1197
      688.000    335.      335.     4028.      339.     4028.                1201
      690.000    354.      354.     4717.      358.     4717.                1205
      692.000    372.      372.     5444.      377.     5444.                1209
REACH  650       LAKE MAMAWI                                                 1213
       650          1         2        2         1        0         0        1217
                  .020                          56390.    2560.             1221
         10       5    684.00    692.00                                      1225
          0.              672.000             687.660      445.              1229
                                                                             1233
      684.000    294.      294.     2771.      297.     2771.                1237
      686.000    314.      314.     3379.      318.     3379.                1241
      688.000    335.      335.     4028.      339.     4028.                1245
      690.000    354.      354.     4717.      358.     4717.                1249
      692.000    372.      372.     5444.      377.     5444.                1253
     2429.               683.800             687.660      445.              1257
                                                                             1261
      684.0    2112.     1000.      153.     1000.      211.                 1265
      686.0   11968.     1000.     2153.     1004.    14291.                1269
      688.0   33264.     1000.     4153.     1008.    53803.                1273
      690.0   52536.     1000.     6153.     1012.   146335.                1277
      692.0   58344.     1000.     8153.     1016.   257215.                1281
     10454.              683.600             687.660      445.              1285
                                                                             1289
      684.0    4224.     3000.      740.     3000.      845.                 1293
      686.0   14432.     3000.     6740.     3004.    19501.                1297
      688.0   34320.     3000.    12740.     3008.    63413.                1301
      690.0   50776.     3000.    18740.     3012.   155065.                1305
      692.0   54120.     3000.    24740.     3016.   259961.                1309
     25397.              683.200             687.660      445.              1313
                                                                             1317
      684.0    6336.     5000.     2419.     5000.     2534.                1321
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      688.0      42504.      5000.      22419.      5008.      56522.                1325
      690.0      75064.      5000.      32419.      5012.     188698.                1329
      692.0      78408.      5000.      42419.      5016.     342170.                1333
    29410.                   682.800                687.660       445.                1337
                                                                                      1341
      684.0      39600.      5000.        668.      5002.      24499.                1345
      686.0      50864.      5000.      15668.      5006.     114963.                1349
      688.0      74448.      5000.      25668.      5010.     234115.                1353
      690.0      94776.      5000.      35668.      5014.     411127.                1357
      692.0      99528.      5000.      45668.      5018.     605431.                1361
    37224.                   682.800                687.660       445.                1365
         2                                                                            1369
      684.0      33792.      7000.      8390.      7002.      22968.                1373
      686.0      45760.      7000.      22390.      7006.     103787.                1377
      688.0      52272.      7000.      36390.      7010.     200323.                1381
      690.0      58432.      7000.      50390.      7014.     312699.                1385
      692.0      61248.      7000.      64390.      7018.     432379.                1389
    44722.                   683.000                687.660       445.                1393
         2                                                                            1397
      684.0      18480.      5000.      4082.      5001.       9715.                1401
      686.0      30096.      5000.      14082.      5005.      63360.                1405
      688.0      44088.      5000.      24082.      5009.     133188.                1409
      690.0      49764.      5000.      34082.      5013.     239228.                1413
      692.0      60456.      5000.      44082.      5017.     356796.                1417
    49896.                   683.200                687.660       445.                1421
         2                                                                            1425
      684.0      11088.      3000.      1869.      3001.       3511.                1429
      686.0      32528.      3000.      7869.      3005.      42750.                1433
      688.0      37224.      3000.      13869.      3009.      96386.                1437
      690.0      52448.      3000.      19869.      3013.     191910.                1441
      692.0      55968.      3000.      25869.      3017.     300326.                1445
    55968.                   685.800                687.660       445.                1449
         2                                                                            1453
      684.0          1.          1.          1.          1.          1.                1457
      686.0       9179.      1000.      1783.      1004.      12306.                1461
      688.0      14256.      1000.      3783.      1008.      35640.                1465
      690.0      18832.      1000.      5783.      1012.      69080.                1469
      692.0      22704.      1000.      7783.      1016.     110616.                1473
    56390.                   673.000                687.660       445.                1477
         2                                                                            1481
    684.000        365.        365.       2968.       367.       2968.             1485
    686.000        385.        385.       3718.       387.       3718.             1489
    688.000        405.        405.       4508.       408.       4508.             1493
    690.000        422.        422.       5335.       425.       5335.             1497
    692.000        437.        437.       6194.       440.       6194.             1501
REACH   750    LAKE MAMAWI TO FOUR FORKS                                             1505
        750          1           2          2                                       1509
                                .040                    1           0         0     1513
          2          6      682.00     692.00       25000.      3120.               1517
          0                673.000                687.660       445.                1521
          2                                                                         1525
    682.000        323.        323.       2275.       324.       2275.             1529
    684.000        365.        365.       2968.       367.       2968.             1533
    686.000        385.        385.       3718.       387.       3718.             1537
    688.000        405.        405.       4508.       408.       4508.             1541
    690.000        422.        422.       5335.       425.       5335.             1545
    692.000        437.        437.       6194.       440.       6194.             1549
    23330.                   673.000                687.570       445.                1551
         2                                                                          1553
    682.000        323.        323.       2275.       324.       2275.             1557
    684.000        365.        365.       2968.       367.       2968.             1561
    686.000        385.        385.       3718.       387.       3718.             1565
    688.000        405.        405.       4508.       408.       4508.             1569
    690.000        422.        422.       5335.       425.       5335.             1573
    692.000        437.        437.       6194.       440.       6194.             1577
REACH   800    RIVIERE DES ROCHERS FROM LAKE ATHABASCA TO REVILLIONCOUPE            1579
        800          1           2          2           1           0         0     1581
                                .022                63300.      5270.               1585
          8          6      682.00     692.00                                       1589
          0                658.100                687.810     68000.               1593
          2                                                                         1597
                                                                                    1601
    682.000       1562.       1562.      21751.      1564.      21751.             1605
    684.000       1591.       1591.      24904.      1593.      24904.             1609
    686.000       1620.       1620.      28115.      1623.      28115.             1613
    688.000       1650.       1650.      31385.      1653.      31385.             1617
    690.000       9584.       9584.      42620.      9587.      42620.             1621
    692.000       9615.       9615.      61818.      9618.      61818.             1623
       2080.                   658.100                687.810     66000.           1625
         2                                                                          1629
    682.000       1562.       1562.      21751.      1564.      21751.             1633
    684.000       1591.       1591.      24904.      1593.      24904.             1637
    686.000       1620.       1620.      28115.      1623.      28115.             1641
    688.000       1650.       1650.      31385.      1653.      31385.             1645
    690.000       9584.       9584.      42620.      9587.      42620.             1649
    692.000       9615.       9615.      61818.      9618.      61818.             1651
      20000.                   662.000                687.610     66000.           1653
         2                                                                          1657
    682.000       2298.       2298.      25721.      2302.      25721.             1661
    684.000       2615.       2615.      30654.      2620.      30654.             1665
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 686.000     2870.     2870.    36120.     2878.    36120.                1669
 688.000     2902.     2902.    41901.     2917.    41901.                1673
 690.000    33049.    33049.    83132.    33064.    83132.                1677
 692.000    33417.    33417.   149598.    33432.   149598.                1679
   30000,                613.500                687.420    68000.        1681
                                                                          1685
 682.000     1724.     1724.    36536.     1746.    36536.                1689
 684.000     1975.     1975.    40269.     1998.    40269.                1693
 686.000     2197.     2197.    44398.     2223.    44398.                1697
 688.000     2247.     2247.    48842.     2276.    48842.                1701
 690.000    19702.    19702.    78016.    19731.    78016.                1705
 692.000    19743.    19743.   117461.    19773.   117461.                1707
   43000,                636.000                687.230    68000.        1709
                                                                          1713
 682.000     1394.     1394.    28422.     1430.    28422.                1717
 684.000     1450.     1450.    31270.     1489.    31270.                1721
 686.000     1505.     1505.    34225.     1547.    34225.                1725
 688.000     1556.     1556.    37285.     1602.    37285.                1729
 690.000     1609.     1609.    40450.     1658.    40450.                1733
 692.000     1670.     1670.    43724.     1722.    43724.                1735
   52900,                630.700                687.029    68000.        1737
                                                                          1741
 682.000      911.      911.    28101.      923.    28101.                1745
 684.000      996.      996.    29997.     1008.    29997.                1749
 686.000     1103.     1103.    32094.     1115.    32094.                1753
 688.000     1205.     1205.    34410.     1217.    34410.                1757
 690.000     1229.     1229.    36844.     1241.    36844.                1761
 692.000     1278.     1278.    39345.     1290.    39345.                1763
   62400,                643.200                686.840    68000.        1765
                                                                          1769
 682.000      953.      953.    22309.      963.    22309.                1773
 684.000     1007.     1007.    24267.     1017.    24267.                1777
 686.000     1051.     1051.    26328.     1060.    26328.                1781
 688.000     1124.     1124.    28479.     1134.    28479.                1785
 690.000     1146.     1146.    30761.     1157.    30761.                1789
 692.000     1195.     1195.    33089.     1207.    33089.                1791
   64860,                640.800                686.840    68000.        1793
                                                                          1797
 682.000     1038.     1038.    26934.     1044.    26934.                1801
 684.000     1146.     1146.    29105.     1152.    29105.                1805
 686.000     1279.     1279.    31531.     1285.    31531.                1809
 688.000     1426.     1426.    34260.     1432.    34260.                1813
 690.000     1461.     1461.    37151.     1467.    37151.                1817
 692.000     1498.     1498.    40103.     1505.    40103.                1819
REACH 1000       CHENAL DES QUATRES FOURCHES                              1821
    1000          1         2         2         1         0         0      1825
                     ,026                144513.    5160.                1829
          11     7   680.00    692.00                                     1833
           0,            674.500                687.560    8000.        1837
                                                                          1841
 680.000      388.      388.     1375.      388.     1375.                1845
 682.000      437.      437.     2200.      438.     2200.                1849
 684.000      486.      486.     3124.      487.     3124.                1853
 686.000      506.      506.     4125.      508.     4125.                1857
 688.000      514.      514.     5145.      517.     5145.                1861
 690.000      532.      532.     6190.      535.     6190.                1862
 692.000      545.      545.     7267.      549.     7267.                1864
    2851,                674.500                687.560    8000.        1865
                                                                          1869
 680.000      388.      388.     1375.      388.     1375.                1873
 682.000      437.      437.     2200.      438.     2200.                1877
 684.000      486.      486.     3124.      487.     3124.                1881
 686.000      506.      506.     4125.      508.     4125.                1885
 688.000      514.      514.     5145.      517.     5145.                1889
 690.000      532.      532.     6190.      535.     6190.                1890
 692.000      545.      545.     7267.      549.     7267.                1892
   17741,                659.400                686.900    8000.        1893
                                                                          1897
 680.000      314.      314.     3481.      318.     3481.                1901
 682.000      341.      341.     4136.      346.     4136.                1905
 684.000      370.      370.     4847.      376.     4847.                1909
 686.000      384.      384.     5603.      390.     5603.                1913
 688.000      396.      396.     6381.      404.     6381.                1917
 690.000      441.      441.     7198.      450.     7198.                1918
 692.000      467.      467.     8122.      478.     8122.                1920
   34637,                669.000                686.300    8000.        1921
                                                                          1925
 680.000      361.      361.     2499.      362.     2499.                1929
 682.000      392.      392.     3252.      394.     3252.                1933
 684.000      442.      442.     4078.      443.     4079.                1937
 686.000      456.      456.     4983.      459.     4983.                1941
 688.000      461.      461.     5900.      465.     5900.                1945
 690.000      465.      465.     6925.      471.     6925.                1946
 692.000      473.      473.     7761.      481.     7761.                1948
   52219,                661.400                685.690    8000.        1949
                                                                          1953
 680.000      285.      285.     3590.      290.     3590.                1957
 682.000      303.      303.     4180.      313.     4180.                1961
 684.000      337.      337.     4823.      342.     4823.                1965
 686.000      352.      352.     5514.      359.     5514.                1969
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 668.000      365.      365.     6231.      373.     6231.                  1973
 690.000      377.      377.     6973.      387.     6973.                  1974
 692.000      388.      388.     7738.      400.     7738.                  1976
   77563.                658.200                   685.090     8000.        1977
       2                                                                    1981
 680.000      285.      285.     3423.      289.     3423.                  1985
 682.000      312.      312.     4018.      317.     4018.                  1989
 684.000      343.      343.     4672.      349.     4672.                  1993
 686.000      355.      355.     5375.      362.     5375.                  1997
 688.000      359.      359.     6089.      368.     6089.                  2001
 690.000      368.      368.     6817.      378.     6817.                  2002
 692.000      377.      377.     7562.      388.     7562.                  2004
   94459.                670.400                   684.490     8000.        2005
       2                                                                    2009
 680.000      293.      293.     1750.      294.     1750.                  2013
 682.000      326.      326.     2374.      327.     2374.                  2017
 684.000      346.      346.     3048.      347.     3048.                  2021
 686.000      361.      361.     3754.      364.     3754.                  2025
 688.000      376.      376.     4491.      380.     4491.                  2029
 690.000      391.      391.     5258.      396.     5258.                  2030
 692.000      406.      406.     6055.      413.     6055.                  2032
  108926.                654.100                   683.890     8000.        2033
       2                                                                    2037
 680.000      293.      293.     4260.      300.     4260.                  2041
 682.000      310.      310.     4863.      317.     4863.                  2045
 684.000      333.      333.     5514.      341.     5514.                  2049
 686.000      337.      337.     6183.      347.     6183.                  2053
 688.000      340.      340.     6860.      352.     6860.                  2057
 690.000      344.      344.     7545.      358.     7545.                  2058
 692.000      353.      353.     8240.      367.     8240.                  2060
  124027.                655.200                   683.280     8000.        2061
       2                                                                    2065
 680.000      249.      249.     3036.      256.     3036.                  2069
 682.000      294.      294.     3569.      301.     3569.                  2073
 684.000      325.      325.     4196.      332.     4196.                  2077
 686.000      339.      339.     4860.      348.     4860.                  2081
 688.000      354.      354.     5553.      364.     5553.                  2085
 690.000      368.      368.     6275.      380.     6275.                  2086
 692.000      380.      380.     7024.      392.     7024.                  2088
  140131.                671.200                   682.680     8000.        2089
       2                                                                    2093
 680.000      513.      513.     1892.      516.     1892.                  2097
 682.000      629.      629.     3034.      633.     3034.                  2101
 684.000      690.      690.     4379.      695.     4379.                  2105
 686.000      695.      695.     5764.      701.     5764.                  2109
 688.000      700.      700.     7159.      708.     7159.                  2113
 690.000      705.      705.     8565.      714.     8565.                  2114
 692.000      709.      709.     9980.      720.     9980.                  2116
  144513.                671.200                   682.680     8000.        2117
       2                                                                    2121
 680.000      513.      513.     1892.      516.     1892.                  2125
 682.000      629.      629.     3034.      633.     3034.                  2129
 684.000      690.      690.     4379.      695.     4379.                  2133
 686.000      695.      695.     5764.      701.     5764.                  2137
 688.000      700.      700.     7159.      708.     7159.                  2141
 690.000      705.      705.     8565.      714.     8565.                  2142
 692.000      709.      709.     9980.      720.     9980.                  2144
REACH 1050    PEACE RIVER BETWEEN PEACE POINT AND BARIL RIVER              2145
    1050          1         2         1         0         0                2149
0.000056                0.0340                 226000.    10200.         2153
       2          6     680.00    705.00                                  2157
         0.                670.000                   695.620    65900.     2161
       2                                                                    2165
  680.00       744.      774.     3328.      764.     3328.                  2169
  685.00      1023.     1023.     7629.     1053.     7629.                  2173
  690.00      1876.     1876.    14560.     1916.    14560.                  2177
  695.00      1971.     1971.    24138.     2021.    24138.                  2181
  700.00      2032.     2032.    34066.     2092.    34066.                  2185
  705.00      2069.     2069.    44366.     2139.    44366.                  2187
  226000.                656.000                   684.400    65900.       2189
       2                                                                    2193
  680.00      1956.     1956.    22158.     2004.    22158.                  2197
  685.00      2021.     2021.    32050.     2081.    32050.                  2201
  690.00      2062.     2062.    42276.     2130.    42276.                  2205
  695.00      2090.     2090.    52712.     2168.    52712.                  2209
  700.00      2116.     2116.    63200.     2204.    63200.                  2213
  705.00      2144.     2144.    73848.     2242.    73848.                  2215
REACH 1150    PEACE RIVER BETWEEN BARIL RIVER AND CHENAL DES QUATRE FOURCH  2217
    1150          1         2         1         0         0                2221
0.000056                0.0340                  43000.     5280.         2225
       2          5     680.00    700.00                                  2229
         0.                656.000                   684.400    65900.     2233
       2                                                                    2237
  680.00      1956.     1956.    22158.     2004.    22158.                  2241
  685.00      2021.     2021.    32050.     2081.    32050.                  2245
  690.00      2062.     2062.    42276.     2062.    42276.                  2249
  695.00      2090.     2090.    52712.     2168.    52712.                  2253
  700.00      2116.     2116.    63200.     2204.    63200.                  2257
  43000.                654.000                   682.68     65900.       2261
       2                                                                    2265
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      680.00      1986.      1986.     26118.      2038.     26118.                2269
      685.00      2040.      2040.     36153.      2102.     36153.                2273
      690.00      2076.      2076.     46456.      2148.     46456.                2277
      695.00      2101.      2101.     56876.      2183.     56876.                2281
      700.00      2128.      2128.     67382.      2220.     67382.                2285
REACH 1350    REVILLON COUPE FROM RIVIERE DES ROCHERS TO THE STRUCTURE            2289
      1350           1          2          2          1          0          0      2293
                  ,026                              52100.     5210.              2297
         4        6    680.00     690.00                                         2301
         0,                664.400                  686.840    2800.              2305
          2                                                                      2309
      680.000     183.       183.     1501.       186.     1501.                 2313
      682.000     223.       223.     1905.       227.     1905.                 2317
      684.000     254.       254.     2385.       258.     2385.                 2321
      686.000     276.       276.     2919.       280.     2919.                 2325
      688.000     283.       283.     3477.       289.     3477.                 2329
      690.000     302.       302.     4060.       308.     4060.                 2331
       1690,                664.400                  686.840    2800.          2333
          2                                                                      2337
      680.000     183.       183.     1501.       186.     1501.                 2341
      682.000     223.       223.     1905.       227.     1905.                 2345
      684.000     254.       254.     2385.       258.     2385.                 2349
      686.000     276.       276.     2919.       280.     2919.                 2353
      688.000     283.       283.     3477.       289.     3477.                 2357
      690.000     302.       302.     4060.       308.     4060.                 2359
      39400,                664.600                  686.340    2800.          2361
          2                                                                      2365
      680.000     227.       227.     2230.       230.     2230.                 2369
      682.000     269.       269.     2709.       252.     2709.                 2373
      684.000     272.       272.     3224.       275.     3224.                 2377
      686.000     286.       286.     3784.       291.     3784.                 2381
      688.000     299.       299.     4369.       304.     4369.                 2385
      690.000     312.       312.     4980.       317.     4980.                 2387
      75900,                663.000                  685.800    2800.          2389
          2                                                                      2393
      680.000     176.       176.     1573.       182.     1573.                 2397
      682.000     201.       201.     1950.       207.     1950.                 2401
      684.000     253.       253.     2406.       260.     2406.                 2405
      686.000     304.       304.     2963.       311.     2963.                 2409
      688.000     354.       354.     3620.       362.     3620.                 2413
      690.000     403.       403.     4378.       412.     4378.                 2415
REACH 1400    PEACE RIVER FROM CHENAL DES QUATRE FOURCHES TO REVILLON COUP       2417
      1400           1          2          2          1          0          0      2421
                  ,034                              16700.     2780.              2425
         3        5    680.00     700.00                                         2429
         0,                654.000                  682.68     72000.             2433
          2                                                                      2437
      680.00      1986.      1986.     26118.      2038.     26118.                2441
      685.00      2040.      2040.     36153.      2102.     36153.                2445
      690.00      2076.      2076.     46456.      2148.     46456.                2449
      695.00      2101.      2101.     56876.      2183.     56876.                2453
      700.00      2128.      2128.     67382.      2220.     67382.                2457
       5000,                630.200                  682.430    72000.          2461
          2                                                                      2465
      680.000     1092.      1092.     36123.      1112.     36123.                2469
      685.000     1188.      1188.     41919.      1211.     41919.                2473
      690.000     1372.      1372.     48258.      1368.     48258.                2477
      695.000     1440.      1440.     55229.      1469.     55229.                2481
      700.000     1475.      1475.     62516.      1509.     62516.                2485
      33400,                658.600                  681.300    72000.          2489
          2                                                                      2493
      680.000     2330.      2330.     30771.      2337.     30771.                2497
      685.000     2382.      2382.     42604.      2393.     42604.                2501
      690.000     2395.      2395.     54544.      2410.     54544.                2505
      695.000     2406.      2406.     66552.      2427.     66552.                2509
      700.000     2426.      2426.     78633.      2451.     78633.                2513
REACH 1500    RIVIERE DES ROCHERS FROM REVILLON COUPE TO THE STRUCTURE            2517
      1500           1          2          2          1          0          0      2521
                  ,020                              34100.     4250.              2525
         5        5    682.00     690.00                                         2529
        -900,              643.200                  686.840    65000.             2533
          2                                                                      2537
      682.000      953.       953.     22309.       963.     22309.                2541
      684.000     1007.      1007.     24267.      1017.     24267.                2545
      686.000     1051.      1051.     26328.      1060.     26328.                2549
      688.000     1124.      1124.     28479.      1134.     28479.                2553
      690.000     1146.      1146.     30761.      1157.     30761.                2557
       1560,                640.800                  686.840    65000.          2561
          2                                                                      2565
      682.000     1038.      1038.     26934.      1044.     26934.                2569
      684.000     1146.      1146.     29105.      1152.     29105.                2573
      686.000     1279.      1279.     31531.      1285.     31531.                2577
      688.000     1426.      1426.     34260.      1432.     34260.                2581
      690.000     1461.      1461.     37151.      1467.     37151.                2585
       16790,                637.000                  686.750    65000.          2589
          2                                                                      2593
      682.000      926.       926.     25347.       952.     25347.                2597
      684.000      953.       953.     27226.       979.     27226.                2601
      686.000      979.       979.     29158.      1005.     29158.                2605
      688.000     1005.      1005.     31142.      1031.     31142.                2609
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      690.000      1022.      1022.     33171.      1049.     33171.                    2613
       33200,2                633.800                686.670     65000.               2617
                                                                                       2621
      682.000      1091.      1091.     30136.      1105.     30136.                    2625
      684.000      1135.      1135.     32370.      1150.     32370.                    2629
      686.000      1167.      1167.     34673.      1182.     34673.                    2633
      688.000      1196.      1196.     37038.      1211.     37038.                    2637
      690.000      1217.      1217.     39453.      1232.     39453.                    2641
       35000,2                641.700                686.600     65000.               2645
                                                                                       2649
      682.000      1151.      1151.     25390.      1170.     25390.                    2653
      684.000      1183.      1183.     27723.      1202.     27723.                    2657
      686.000      1225.      1225.     30126.      1245.     30126.                    2661
      688.000      1264.      1264.     32622.      1284.     32622.                    2665
      690.000      1282.      1282.     35171.      1303.     35171.                    2669
REACH 1550     REVILLON COUPE FROM THE STRUCTURE TO THE PEACE RIVER                    2673
      1550             1          2          2          1          0          0         2677
                                .026                31700.     5280.                 2681
           3           6    680.00     690.00                                         2685
      -12700,2       664.600                682.000     2800.                         2689
                                                                                       2693
      680.000       227.       227.      2230.       230.      2230.                   2697
      682.000       249.       249.      2709.       252.      2709.                   2701
      684.000       272.       272.      3224.       275.      3224.                   2705
      686.000       286.       286.      3784.       291.      3784.                   2709
      688.000       299.       299.      4369.       304.      4369.                   2713
      690.000       312.       312.      4980.       317.      4980.                   2715
       23800,2                663.000                682.000     2800.                2717
                                                                                       2721
      680.000       176.       176.      1573.       182.      1573.                   2725
      682.000       201.       201.      1950.       207.      1950.                   2729
      684.000       253.       253.      2406.       260.      2406.                   2733
      686.000       304.       304.      2963.       311.      2963.                   2737
      688.000       354.       354.      3620.       362.      3620.                   2741
      690.000       403.       403.      4378.       412.      4378.                   2743
       31700,2                663.000                682.000     2800.                2745
                                                                                       2749
      680.000       176.       176.      1573.       182.      1573.                   2753
      682.000       201.       201.      1950.       207.      1950.                   2757
      684.000       253.       253.      2406.       260.      2406.                   2761
      686.000       304.       304.      2963.       311.      2963.                   2765
      688.000       354.       354.      3620.       362.      3620.                   2769
      690.000       403.       403.      4378.       412.      4378.                   2771
REACH 1750     PEACE RIVER FROM REVILLON COUPE TO RIVIERE DES ROCHERS                  2773
      1750             1          2          2          1          0          0         2777
                                .034                40800.     4750.                 2781
           4           6    680.00     690.00                                         2785
      -11700,2       630.200                682.000    73000.                         2789
                                                                                       2793
      680.000      1092.      1092.     36123.      1112.     36123.                    2797
      682.000      1172.      1172.     38373.      1193.     38373.                    2801
      684.000      1184.      1184.     40733.      1206.     40733.                    2805
      686.000      1191.      1191.     43108.      1215.     43108.                    2809
      688.000      1288.      1288.     45587.      1312.     45587.                    2813
      690.000      1372.      1372.     48258.      1398.     48258.                    2815
       16700,2                658.600                681.300     73000.               2817
                                                                                       2821
      680.000      2330.      2330.     30771.      2337.     30771.                    2825
      682.000      2377.      2377.     35465.      2384.     35465.                    2829
      684.000      2381.      2381.     40223.      2390.     40223.                    2833
      686.000      2384.      2384.     44987.      2396.     44987.                    2837
      688.000      2389.      2389.     49760.      2389.     49760.                    2841
      690.000      2395.      2395.     54544.      2410.     54544.                    2843
       37200,2                629.800                680.920     73000.               2845
                                                                                       2849
      680.000      1362.      1362.     40658.      1379.     40658.                    2853
      682.000      1379.      1379.     43402.      1397.     43402.                    2857
      684.000      1382.      1382.     46163.      1402.     46163.                    2861
      686.000      1385.      1385.     48930.      1407.     48930.                    2865
      688.000      1390.      1390.     51704.      1414.     51704.                    2869
      690.000      1437.      1437.     54533.      1462.     54533.                    2871
       40800,2                650.000                680.920     73000.               2873
                                                                                       2877
      680.000      3486.      3486.     51327.      3494.     51327.                    2881
      682.000      3501.      3501.     58314.      3509.     58314.                    2885
      684.000      3516.      3516.     65330.      3525.     65330.                    2889
      686.000      3530.      3530.     72376.      3540.     72376.                    2893
      688.000      3545.      3545.     79452.      3556.     79452.                    2897
      690.000      3553.      3553.     86550.      3565.     86550.                    2899
REACH 1850     RIVIERE DES ROCHERS FROM THE STRUCTURE TO THE PEACE RIVER                2901
      1850             1          2          2          1          0          0         2905
                                .030                57100.     4750.                 2909
           9           6    680.00     690.00                                         2913
        -900,2       633.800                682.000    65000.                         2917
                                                                                       2921
      680.000      1049.      1049.     28001.      1063.     28001.                    2925
      682.000      1091.      1091.     30136.      1105.     30136.                    2929
      684.000      1135.      1135.     32370.      1150.     32370.                    2933
      686.000      1167.      1167.     34673.      1182.     34673.                    2937
      688.000      1196.      1196.     37038.      1211.     37038.                    2941
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      690.000      1217.      1217.     39453.      1232.     39453.                    2943
          900.                641.700                681.920     65000.      .030      2945
                                                                                       2949
      680.000      1116.      1116.     23122.      1135.     23122.                    2953
      682.000      1151.      1151.     25390.      1170.     25390.                    2957
      684.000      1183.      1183.     27723.      1202.     27723.                    2961
      686.000      1225.      1225.     30126.      1245.     30126.                    2965
      688.000      1264.      1264.     32622.      1284.     32622.                    2969
      690.000      1282.      1282.     35171.      1303.     35171.                    2971
         7655.                636.000                681.750     65000.      .030      2973
                                                                                       2977
      680.000       921.       921.     26762.       933.     26762.                    2981
      682.000       941.       941.     28623.       954.     28623.                    2985
      684.000       972.       972.     30536.       985.     30536.                    2989
      686.000      1004.      1004.     32511.      1018.     32511.                    2993
      688.000      1040.      1040.     34556.      1054.     34556.                    2997
      690.000      1060.      1060.     36656.      1074.     36656.                    2999
        26663.                635.700                681.590     65000.      .030      3001
                                                                                       3005
      680.000       989.       989.     25981.      1005.     25981.                    3009
      682.000      1021.      1021.     27986.      1037.     27986.                    3013
      684.000      1051.      1051.     30058.      1068.     30058.                    3017
      686.000      1085.      1085.     32194.      1102.     32194.                    3021
      688.000      1135.      1135.     34402.      1152.     34402.                    3025
      690.000      1159.      1159.     36696.      1176.     36696.                    3027
        37963.                593.400                681.420     65000.      .030      3029
                                                                                       3033
      680.000       591.       591.     29025.       624.     29025.                    3037
      682.000       610.       610.     30225.       643.     30225.                    3041
      684.000       624.       624.     31459.       659.     31459.                    3045
      686.000       639.       639.     32722.       674.     32722.                    3049
      688.000       666.       666.     34024.       702.     34024.                    3053
      690.000       689.       689.     35381.       725.     35381.                    3055
        48998.                622.300                681.250     65000.      .030      3057
                                                                                       3061
      680.000       872.       872.     33485.       894.     33485.                    3065
      682.000       921.       921.     35294.       944.     35294.                    3069
      684.000       930.       930.     37145.       954.     37145.                    3073
      686.000       958.       958.     39023.       982.     39023.                    3077
      688.000      1005.      1005.     40985.      1029.     40985.                    3081
      690.000      1052.      1052.     43041.      1076.     43041.                    3083
        50001.                609.500                681.090     65000.      .030      3085
                                                                                       3089
      680.000      1102.      1102.     31971.      1131.     31971.                    3093
      682.000      1156.      1156.     34237.      1186.     34237.                    3097
      684.000      1183.      1183.     36576.      1212.     36576.                    3101
      686.000      1253.      1253.     39011.      1283.     39011.                    3105
      688.000      1299.      1299.     41563.      1328.     41563.                    3109
      690.000      1339.      1339.     44201.      1370.     44201.                    3111
        55545.                639.200                680.920     65000.      .030      3113
                                                                                       3117
      680.000      1225.      1225.     28984.      1239.     28984.                    3121
      682.000      1300.      1300.     31498.      1314.     31498.                    3125
      684.000      1348.      1348.     34158.      1363.     34158.                    3129
      686.000      1403.      1403.     36902.      1418.     36902.                    3133
      688.000      1523.      1523.     39822.      1538.     39822.                    3137
      690.000      1600.      1600.     42985.      1616.     42985.                    3139
        57100.                639.200                680.920     65000.      .030      3141
                                                                                       3145
      680.000      1225.      1225.     28984.      1239.     28984.                    3149
      682.000      1300.      1300.     31498.      1314.     31498.                    3153
      684.000      1348.      1348.     34158.      1363.     34158.                    3157
      686.000      1403.      1403.     36902.      1418.     36902.                    3161
      688.000      1523.      1523.     39822.      1538.     39822.                    3165
      690.000      1600.      1600.     42985.      1616.     42985.                    3167
REACH 1950          SLAVE RIVER                                                      3169
         1950            1          2          2          1          0          0      3173
                                  .034                39072.     3900.               3177
           11            5      678.00     695.00                                    3181
            0.                  650.000                680.650    138000.            3185
                                                                                       3189
       675.       3449.      3449.     33988.      3455.     33988.                    3193
       680.       3486.      3486.     51327.      3494.     51327.                    3197
       685.       3523.      3523.     68850.      3533.     68850.                    3201
       690.       3553.      3553.     86550.      3565.     86550.                    3205
       695.       3573.      3573.    104365.      3587.    104365.                    3209
      20754.                650.000                679.700    138000.            3213
                                                                                       3217
       675.       3449.      3449.     33988.      3455.     33988.                    3221
       680.       3486.      3486.     51327.      3494.     51327.                    3225
       685.       3523.      3523.     68850.      3533.     68850.                    3229
       690.       3553.      3553.     86550.      3565.     86550.                    3233
       695.       3573.      3573.    104365.      3587.    104365.                    3237
      24420.                635.000                679.550    138000.            3241
                                                                                       3245
       675.       2520.      2520.     37003.      2528.     37003.                    3249
       680.       2623.      2623.     49879.      2642.     49879.                    3253
       685.       2742.      2742.     63311.      2755.     63311.                    3257
       690.       2853.      2853.     77298.      2868.     77298.                    3261
       695.       2950.      2950.     91805.      2969.     91805.                    3265
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 27453.                  645.000                  679.100   138000.
    2
   675.      2687.      2687.     33539.      2699.     33539.
   680.      2752.      2752.     47136.      2767.     47136.
   685.      2818.      2818.     61060.      2836.     61060.
   690.      2883.      2883.     75311.      2904.     75311.
   695.      2933.      2933.     89857.      2959.     89857.
 30023.                  620.00                   679.000   138000.
    2
   675.      1442.      1442.     35238.      1474.     35238.
   680.      2168.      2168.     43930.      2204.     43930.
   685.      2237.      2237.     54941.      2276.     54941.
   690.      2304.      2304.     66298.      2347.     66298.
   695.      2355.      2355.     77945.      2402.     77945.
 30955.                  620.00                   679.000   138000.
    2
   675.      2761.      2761.     42360.      2780.     42360.
   680.      2778.      2778.     56207.      2799.     56207.
   685.      2795.      2795.     70137.      2819.     70137.
   690.      2812.      2812.     84153.      2840.     84153.
   695.      2833.      2833.     98267.      2863.     98267.
 31872.                  620.00                   678.900   138000.
    2
   675.      2280.      2280.     40724.      2297.     40724.
   680.      2323.      2323.     52233.      2342.     52233.
   685.      2366.      2366.     63957.      2387.     63957.
   690.      2406.      2406.     75899.      2429.     75899.
   695.      2426.      2426.     87981.      2452.     87981.
 34009.                  625.00                   678.800   138000.
    2
   675.      2238.      2238.     44318.      2255.     44318.
   680.      2319.      2319.     55709.      2339.     55709.
   685.      2400.      2400.     67505.      2422.     67505.
   690.      2470.      2470.     79696.      2496.     79696.
   695.      2520.      2520.     92174.      2550.     92174.
 35091.                  610.00                   678.750   138000.
    2
   675.      3159.      3159.     68482.      3170.     68482.
   680.      3218.      3218.     84424.      3230.     84424.
   685.      3278.      3278.    100604.      3291.    100604.
   690.      3321.      3321.    117176.      3335.    117176.
   695.      3343.      3343.    133842.      3360.    133842.
 36689.                  605.00                   678.70    138000.
    2
   675.      1813.      1813.     43407.      1836.     43407.
   680.      1884.      1884.     52651.      1910.     52651.
   685.      1955.      1955.     62249.      1985.     62249.
   690.      2026.      2026.     72201.      2059.     72201.
   695.      2068.      2068.     82436.      2106.     82436.
 39072.                  620.00                   678.650   138000.
    2
   675.      1494.      1494.     45403.      1499.     45403.
   680.      1629.      1629.     53210.      1635.     53210.
   685.      1764.      1764.     61692.      1771.     61692.
   690.      1858.      1858.     70811.      1865.     70811.
   695.      1878.      1878.     80149.      1888.     80149.
LATERAL INFLOWS
         1
         1       200      7628.       0.0         2        14         1
         0.    40900.
     86400.    39700.
    172800.    39500.
    259200.    39000.
    345600.    39900.
    432000.    38600.
    518400.    36900.
    604800.    35200.
    691200.    33400.
    777600.    31600.
    864000.    30600.
    950400.    29500.
   1036800.    28900.
   1123200.    30100.
NODE DESCRIPTION FOR TRIAL #1 OF LAKE ATHABASCA MODEL (NODE01 TO 20)
        01          11          2          14          1
         0.    687.97     40359.
     86400.    687.95    115286.
    172800.    687.93     52893.
    259200.    687.86    219006.
    345600.    687.82     94513.
    432000.    687.81    -84247.
    518400.    687.82     -3983.
    604800.    687.82     59153.
    691200.    687.84   -121946.
    777600.    687.81    221727.
    864000.    687.74    146025.
    950400.    687.74   -111563.
   1036800.    687.73     80212.
   1123200.    687.69     80212.
        02           0                    0
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HYDROGRAPHS AND HYDRAULIC PROFILES REQUESTED

TEST PERIOD DATA OUTPUT

FOR THE COMPUTATION OF RESIDUAL INFLOW

****

PEACE ATHABASCA DELTA FLOW SIMULATION MODEL

****

HYDRAULIC SOLUTION OPTIONS

SOLUTION COMPUTATIONS = EXECUTED
SOLUTION TYPE = TRANSIENT
SOLUTION STORAGE = EXECUTED
NETWORK TYPE = RIVER
HYDRAULIC INITIALIZATION FROM TAPE = DELETED

WATER QUALITY SOLUTION OPTIONS

SOLUTION COMPUTATIONS = DELETED
SOLUTION TYPE = TRANSIENT
SOLUTION STORAGE = DELETED

SALINITY = DELETED
TEMPERATURE = DELETED
BOD = DELETED
DO = DELETED

SOLUTION TIME PARAMETERS

NUMBER OF PERIODS = 1
NUMBER OF HYDRAULIC TIME STEPS PER PERIOD = 312
LENGTH OF PERIOD = 1123200.0
LENGTH OF HYDRAULIC TIME STEP = 3600.0
MAXIMUM ITERATIONS FOR INITIAL CONDITION = 100
ERROR TOLERANCE FOR INITIAL CONDITION = 0.0100
NUMBER OF LEAD-IN PERIODS TO BE READ FROM TAPE = 1
NUMBER OF LEAD IN INCREMENTS IF RIVER STUDY = 48

NETWORK CONTAINS 19 REACHES WHICH CONNECT 20 JUNCTION AND BOUNDARY NODES 2 CONTROL STRUCTURE(S)

1	REACH ID = 150	UPSTREAM NODE = 1	DOWNSTREAM NODE = 20
2	REACH ID = 200	UPSTREAM NODE = 20	DOWNSTREAM NODE = 2
3	REACH ID = 350	UPSTREAM NODE = 3	DOWNSTREAM NODE = 4
4	REACH ID = 450	UPSTREAM NODE = 4	DOWNSTREAM NODE = 5
5	REACH ID = 500	UPSTREAM NODE = 2	DOWNSTREAM NODE = 8
6	REACH ID = 550	UPSTREAM NODE = 5	DOWNSTREAM NODE = 6
7	REACH ID = 650	UPSTREAM NODE = 6	DOWNSTREAM NODE = 7
8	REACH ID = 750	UPSTREAM NODE = 7	DOWNSTREAM NODE = 8
9	REACH ID = 800	UPSTREAM NODE = 2	DOWNSTREAM NODE = 10
10	REACH ID = 1000	UPSTREAM NODE = 8	DOWNSTREAM NODE = 9
11	REACH ID = 1050	UPSTREAM NODE = 11	DOWNSTREAM NODE = 12
12	REACH ID = 1150	UPSTREAM NODE = 12	DOWNSTREAM NODE = 9
13	REACH ID = 1350	UPSTREAM NODE = 10	DOWNSTREAM NODE = 16
14	REACH ID = 1400	UPSTREAM NODE = 9	DOWNSTREAM NODE = 13
15	REACH ID = 1500	UPSTREAM NODE = 10	DOWNSTREAM NODE = 18
16	REACH ID = 1550	UPSTREAM NODE = 17	DOWNSTREAM NODE = 13
17	REACH ID = 1750	UPSTREAM NODE = 13	DOWNSTREAM NODE = 14
18	REACH ID = 1850	UPSTREAM NODE = 19	DOWNSTREAM NODE = 14
19	REACH ID = 1950	UPSTREAM NODE = 14	DOWNSTREAM NODE = 15

CONTROL STRUCTURES BETWEEN NODES	UPSTREAM	DOWNSTREAM
	18	19
	16	17

****

MATRIX PARAMETERS FOR HYDRAULICS

LENGTH OF COEFFICIENT MATRIX STORAGE VECTOR = 3364
NUMBER OF ROWS = 58
HALF BANDWIDTH = 58

MATRIX PARAMETERS FOR WATER QUALITY

LENGTH OF COEFFICIENT MATRIX STORAGE VECTOR = 400
NUMBER OF ROWS = 20
HALF BANDWIDTH = 20

****

HYDRAULIC DESCRIPTION OF THE REACHES

****

DESCRIPTION FOR REACH 150 REACH 150 LAKE ATHABASCA

CROSS-SECTION SHAPE = IRREGULAR NON-PRISMATIC
BOTTOM SLOPE = VARIABLE
FRICTION COEFFICIENT = MANNING

NO ICE COVER

BOTTOM SLOPE = 0.0 SIDE SLOPE = 0.0 MANNING N = 0.0300 ROUGHNESS = 0.0
TOTAL LENGTH OF REACH = 443059.00 FT
ESTIMATED MESH SPACING = 27690.00 FT
COMPUTED MESH SPACING = 27691.19 FT
NUMBER OF HYDRAULIC MESH POINTS = 17
DATA CROSS-SECTIONS = 9 TABLE ENTRIES = 6 FIRST DEPTH = 682.000 FT LAST DEPTH = 692.000 FT

SECTION 1 X = -35640.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 538.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 688.000 FT INITIAL DISCHARGE = 30300.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	87578.	87578.	6196422.	87579.	6196422.
2	684.00	88657.	88657.	6372657.	88659.	6372657.
3	686.00	89737.	89737.	6551051.	89738.	6551051.
4	688.00	90816.	90816.	6731604.	90818.	6731604.
5	690.00	90816.	90816.	6913236.	90822.	6913236.
6	692.00	90816.	90816.	7094868.	90826.	7094868.

SECTION 2 X = 22440.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 538.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 688.000 FT INITIAL DISCHARGE = 31900.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	65155.	65155.	4508486.	65157.	4508486.
2	684.00	66845.	66845.	4640486.	66846.	4640486.
3	686.00	68534.	68534.	4775866.	68536.	4775866.
4	688.00	70224.	70224.	4914624.	70226.	4914624.
5	690.00	70224.	70224.	5055072.	70230.	5055072.
6	692.00	70224.	70224.	5195520.	70234.	5195520.

SECTION 3 X = 89760.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 438.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 688.000 FT INITIAL DISCHARGE = 33300.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	166191.	166191.	24841856.	166193.	24841856.
2	684.00	166762.	166762.	25174816.	166764.	25174816.
3	686.00	167333.	167333.	25508912.	167335.	25508912.
4	688.00	167904.	167904.	25844144.	167906.	25844144.
5	690.00	167904.	167904.	26179952.	167910.	26179952.
6	692.00	167904.	167904.	26515760.	167914.	26515760.

SECTION 4 X = 147840.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 482.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 688.000 FT INITIAL DISCHARGE = 34100.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	136303.	136303.	11218310.	136305.	11218310.
2	684.00	137069.	137069.	11491682.	137071.	11491682.
3	686.00	137834.	137834.	11765586.	137837.	11765586.
4	688.00	138600.	138600.	12043020.	138602.	12043020.
5	690.00	138600.	138600.	12320220.	138606.	12320220.
6	692.00	138600.	138600.	12597420.	138610.	12597420.

SECTION 5 X = 240240.00 FT

BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 638.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 688.000 FT INITIAL DISCHARGE = 34000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	82833.	82833.	2341736.	82833.	2341736.
2	684.00	84262.	84262.	2508832.	84262.	2508832.
3	686.00	85691.	85691.	2678785.	85691.	2678785.
4	688.00	87120.	87120.	2851596.	87120.	2851596.
5	690.00	87120.	87120.	3025836.	87124.	3025836.
6	692.00	87120.	87120.	3200076.	87128.	3200076.

SECTION 6 X = 326304.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 660.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 688.000 FT INITIAL DISCHARGE = 34000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	90024.	90024.	1577532.	90024.	1577532.
2	684.00	91520.	91520.	1759076.	91520.	1759076.
3	686.00	93016.	93016.	1943612.	93016.	1943612.
4	688.00	94512.	94512.	2131140.	94512.	2131140.
5	690.00	94512.	94512.	2320164.	94516.	2320164.
6	692.00	94512.	94512.	2509188.	94520.	2509188.

SECTION 7 X = 389664.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 668.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 688.000 FT INITIAL DISCHARGE = 34000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	75434.	75434.	722779.	75434.	722779.
2	684.00	78449.	78449.	876662.	78449.	876662.
3	686.00	81465.	81465.	1036575.	81465.	1036575.
4	688.00	84480.	84480.	1202520.	84480.	1202520.
5	690.00	84480.	84480.	1371480.	84484.	1371480.
6	692.00	84480.	84480.	1540440.	84488.	1540440.

SECTION 8 X = 430584.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 670.900 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 688.000 FT INITIAL DISCHARGE = 34000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	74987.	74987.	559075.	74987.	559075.
2	684.00	75304.	75304.	709469.	75305.	709469.
3	686.00	75485.	75485.	860258.	75487.	860258.
4	688.00	75666.	75666.	1011409.	75669.	1011409.
5	690.00	75487.	75487.	1162923.	75851.	1162923.
6	692.00	76028.	76028.	1314798.	76033.	1314798.

SECTION 9 X = 455559.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 676.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 688.000 FT INITIAL DISCHARGE = 34000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	47526.	47526.	224514.	47526.	224514.
2	684.00	53437.	53437.	325476.	53437.	325476.
3	686.00	58953.	58953.	439063.	58953.	439063.
4	688.00	61574.	61574.	559940.	61575.	559940.
5	690.00	61696.	61696.	683110.	61697.	683110.
6	692.00	61818.	61818.	806624.	61818.	806624.

DESCRIPTION FOR REACH 200 REACH 200 WEST END OF LAKE ATHABASCA

CROSS-SECTION SHAPE = IRREGULAR NON-PRISMATIC
BOTTOM SLOPE = VARIABLE
FRICTION COEFFICIENT = MANNING

NO ICE COVER

BOTTOM SLOPE = 0.0 SIDE SLOPE = 0.0 MANNING N = 0.0250 ROUGHNESS = 0.0
TOTAL LENGTH OF REACH = 78900.00 FT
ESTIMATED MESH SPACING = 4930.00 FT
COMPUTED MESH SPACING = 4931.25 FT
NUMBER OF HYDRAULIC MESH POINTS = 17
DATA CROSS-SECTIONS = 9 TABLE ENTRIES = 6 FIRST DEPTH = 682.000 FT LAST DEPTH = 692.000 FT

SECTION 1 X = -12500.00 FT

BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 670.900 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 688.000 FT INITIAL DISCHARGE = 34000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	74987.	74987.	559075.	74987.	559075.
2	684.00	75304.	75304.	709469.	75305.	709469.
3	686.00	75485.	75485.	860258.	75487.	860258.
4	688.00	75666.	75666.	1011409.	75669.	1011409.
5	690.00	75847.	75847.	1162923.	75851.	1162923.
6	692.00	76028.	76028.	1314798.	76033.	1314798.

SECTION 2 X = 12500.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 676.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 688.000 FT INITIAL DISCHARGE = 76000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	47526.	47526.	224514.	47526.	224514.
2	684.00	53437.	53437.	325476.	53437.	325476.
3	686.00	58953.	58953.	438063.	58953.	438063.
4	688.00	61574.	61574.	559840.	61575.	559840.
5	690.00	61696.	61696.	683110.	61697.	683110.
6	692.00	61818.	61818.	806624.	61818.	806624.

SECTION 3 X = 37700.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 677.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 688.000 FT INITIAL DISCHARGE = 76000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	35338.	35338.	145507.	35338.	145507.
2	684.00	36697.	36697.	217743.	36697.	217743.
3	686.00	38456.	38456.	293096.	38456.	293096.
4	688.00	39329.	39329.	371223.	39329.	371223.
5	690.00	39521.	39521.	450073.	39521.	450073.
6	692.00	39713.	39713.	529306.	39713.	529306.

SECTION 4 X = 58500.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 660.500 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 688.000 FT INITIAL DISCHARGE = 76000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	13647.	13647.	59835.	13650.	59835.
2	684.00	17239.	17239.	90721.	17243.	90721.
3	686.00	21063.	21063.	128850.	21066.	128850.
4	688.00	22246.	22246.	172991.	22249.	172991.
5	690.00	22318.	22318.	217554.	22322.	217554.
6	692.00	22391.	22391.	262264.	22395.	262264.

SECTION 5 X = 68900.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 647.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 688.000 FT INITIAL DISCHARGE = 76000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	4856.	4856.	31169.	4862.	31169.
2	684.00	6648.	6648.	42759.	6654.	42759.
3	686.00	6710.	6710.	56127.	6715.	56127.
4	688.00	6752.	6752.	69588.	6758.	69588.
5	690.00	35323.	35323.	111663.	35329.	111663.
6	692.00	35434.	35434.	182419.	35440.	182419.

SECTION 6 X = 71700.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 655.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 688.000 FT INITIAL DISCHARGE = 76000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	5363.	5363.	34308.	5366.	34308.
2	684.00	5477.	5477.	45148.	5480.	45148.
3	686.00	5550.	5550.	56195.	5553.	56195.
4	688.00	5583.	5583.	67328.	5587.	67328.
5	690.00	5617.	5617.	78528.	5620.	78528.
6	692.00	5650.	5650.	89795.	5654.	89795.

SECTION 7 X = 74900.00 FT

BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 656.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 688.000 FT INITIAL DISCHARGE = 76000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	3779.	3779.	31919.	3782.	31919.
2	684.00	4079.	4079.	39806.	4082.	39806.
3	686.00	4220.	4220.	48155.	4223.	48155.
4	688.00	4260.	4260.	56635.	4263.	56635.
5	690.00	4300.	4300.	65195.	4304.	65195.
6	692.00	4340.	4340.	73835.	4344.	73835.

SECTION 8 X = 78000.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 624.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 688.000 FT INITIAL DISCHARGE = 76000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	2843.	2843.	39122.	2856.	39122.
2	684.00	4929.	4929.	46951.	4942.	46951.
3	686.00	5070.	5070.	56990.	5084.	56990.
4	688.00	5130.	5130.	67190.	5144.	67190.
5	690.00	5190.	5190.	77510.	5204.	77510.
6	692.00	5250.	5250.	87950.	5264.	87950.

SECTION 9 X = 78900.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 624.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 688.000 FT INITIAL DISCHARGE = 76000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	2843.	2843.	39122.	2856.	39122.
2	684.00	4929.	4929.	46951.	4942.	46951.
3	686.00	5070.	5070.	56990.	5084.	56990.
4	688.00	5130.	5130.	67190.	5144.	67190.
5	690.00	5190.	5190.	77510.	5204.	77510.
6	692.00	5250.	5250.	87950.	5264.	87950.

DESCRIPTION FOR REACH 350 REACH 350 BIRCH RIVER FROM ALICE CREEK TO LAKE CLAIRE

CROSS-SECTION SHAPE = IRREGULAR NON-PRISMATIC
BOTTOM SLOPE = VARIABLE
FRICTION COEFFICIENT = MANNING

NO ICE COVER

BOTTOM SLOPE = 0.0 SIDE SLOPE = 0.0 MANNING N = 0.0300 ROUGHNESS = 0.0
TOTAL LENGTH OF REACH = 66634.00 FT
ESTIMATED MESH SPACING = 4759.00 FT
COMPUTED MESH SPACING = 4759.57 FT
NUMBER OF HYDRAULIC MESH POINTS = 15
DATA CROSS-SECTIONS = 2 TABLE ENTRIES = 5 FIRST DEPTH = 686.000 FT LAST DEPTH = 694.000 FT

SECTION 1 X = 0.0 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 678.400 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.980 FT INITIAL DISCHARGE = 743.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	686.00	233.	233.	1207.	242.	1207.
2	688.00	236.	236.	1615.	246.	1615.
3	690.00	238.	238.	2068.	251.	2068.
4	692.00	240.	240.	2566.	255.	2566.
5	694.00	242.	242.	3048.	260.	3048.

SECTION 2 X = 66634.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 678.400 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.880 FT INITIAL DISCHARGE = 743.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	686.00	233.	233.	1207.	242.	1207.
2	688.00	236.	236.	1615.	246.	1615.
3	690.00	238.	238.	2068.	251.	2068.
4	692.00	240.	240.	2566.	255.	2566.
5	694.00	242.	242.	3048.	260.	3048.

DESCRIPTION FOR REACH 450 REACH 450 LAKE CLAIRE

CROSS-SECTION SHAPE = IRREGULAR NON-PRISMATIC

BOTTOM SLOPE = VARIABLE
FRICTION COEFFICIENT = MANNING

NO ICE COVER

BOTTOM SLOPE = 0.0 SIDE SLOPE = 0.0 MANNING N = 0.0200 ROUGHNESS = 0.0
TOTAL LENGTH OF REACH = 139128.00 FT
ESTIMATED MESH SPACING = 5260.00 FT
COMPUTED MESH SPACING = 5351.07 FT
NUMBER OF HYDRAULIC MESH POINTS = 27
DATA CROSS-SECTIONS =11 TABLE ENTRIES = 6 FIRST DEPTH = 686.000 FT LAST DEPTH = 691.000 FT

SECTION 1 X = 0.0 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 678.400 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.880 FT INITIAL DISCHARGE = 464.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	686.00	233.	233.	1207.	242.	1207.
2	687.00	232.	232.	1441.	243.	1441.
3	688.00	236.	236.	1615.	246.	1615.
4	689.00	238.	238.	1851.	249.	1851.
5	690.00	238.	238.	2088.	251.	2088.
6	691.00	239.	239.	2326.	253.	2326.

SECTION 2 X = 10771.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 681.500 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.880 FT INITIAL DISCHARGE = 445.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	686.00	49104.	1000.	4486.	1009.	153120.
2	687.00	54252.	1000.	5486.	1011.	206118.
3	688.00	56760.	1000.	6486.	1013.	261624.
4	689.00	59004.	1000.	7486.	1015.	319506.
5	690.00	61248.	1000.	8486.	1017.	379632.
6	691.00	64944.	1000.	9486.	1019.	422728.

SECTION 3 X = 27297.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 681.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.880 FT INITIAL DISCHARGE = 445.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	686.00	71280.	3000.	14889.	3010.	260036.
2	687.00	74448.	3000.	17889.	3012.	332900.
3	688.00	77616.	3000.	20889.	3014.	408932.
4	689.00	81048.	3000.	23889.	3016.	488264.
5	690.00	84480.	3000.	26889.	3018.	571028.
6	691.00	87912.	3000.	29889.	3020.	657224.

SECTION 4 X = 54014.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 679.500 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.880 FT INITIAL DISCHARGE = 445.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	686.00	71280.	5000.	32188.	5013.	331848.
2	687.00	82368.	5000.	37188.	5015.	412896.
3	688.00	85008.	5000.	42188.	5017.	496584.
4	689.00	87912.	5000.	47188.	5019.	583044.
5	690.00	90816.	5000.	52188.	5021.	672408.
6	691.00	93984.	5000.	57188.	5023.	764808.

SECTION 5 X = 64257.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 679.800 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.880 FT INITIAL DISCHARGE = 445.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	686.00	128832.	5000.	30818.	5012.	485021.
2	687.00	132000.	5000.	35818.	5014.	615437.
3	688.00	135168.	5000.	40818.	5016.	749021.
4	689.00	138996.	5000.	45818.	5018.	885103.
5	690.00	142824.	5000.	50818.	5020.	1027013.
6	691.00	146388.	5000.	55818.	5022.	1171619.

SECTION 6 X = 76507.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 680.200 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.880 FT INITIAL DISCHARGE = 445.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	686.00	135168.	5000.	26908.	5012.	599095.
2	687.00	137544.	5000.	33908.	5014.	735451.
3	688.00	139920.	5000.	38908.	5016.	874183.
4	689.00	142560.	5000.	43908.	5018.	1015423.
5	690.00	145200.	5000.	48908.	5020.	1159303.
6	691.00	147840.	5000.	53908.	5022.	1305823.

SECTION 7 X = 93878.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 681.700 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.880 FT INITIAL DISCHARGE = 445.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	686.00	126984.	5000.	21082.	5008.	365508.
2	687.00	133188.	5000.	26082.	5010.	495594.
3	688.00	139392.	5000.	31082.	5012.	631884.
4	689.00	154440.	5000.	36082.	5014.	785136.
5	690.00	156818.	5000.	41082.	5016.	940764.
6	691.00	159456.	5000.	46082.	5018.	1098900.

SECTION 8 X = 108715.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 683.600 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.880 FT INITIAL DISCHARGE = 445.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	686.00	61248.	5000.	11580.	5004.	56100.
2	687.00	69960.	5000.	16580.	5006.	121704.
3	688.00	78672.	5000.	21580.	5008.	196020.
4	689.00	90552.	5000.	26580.	5010.	280632.
5	690.00	102432.	5000.	31580.	5012.	377124.
6	691.00	114048.	5000.	36580.	5014.	485364.

SECTION 9 X = 119645.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 683.800 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.880 FT INITIAL DISCHARGE = 445.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	686.00	9474.	3000.	8743.	3006.	24490.
2	687.00	10281.	3000.	11743.	3008.	34368.
3	688.00	11088.	3000.	14743.	3010.	45052.
4	689.00	13200.	3000.	17743.	3012.	57196.
5	690.00	15312.	3000.	20743.	3014.	71452.
6	691.00	17424.	3000.	23743.	3016.	87820.

SECTION 10 X = 132053.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 684.100 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.880 FT INITIAL DISCHARGE = 445.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	686.00	16620.	1000.	1554.	1003.	26554.
2	687.00	17550.	1000.	2554.	1005.	43639.
3	688.00	18480.	1000.	3554.	1007.	61654.
4	689.00	20592.	1000.	4554.	1009.	81190.
5	690.00	22704.	1000.	5554.	1011.	102838.
6	691.00	24552.	1000.	6554.	1013.	126466.

SECTION 11 X = 139128.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 672.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.880 FT INITIAL DISCHARGE = 445.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	686.00	314.	314.	3379.	318.	3799.
2	687.00	325.	325.	3699.	328.	3699.
3	688.00	335.	335.	4028.	339.	4028.
4	689.00	345.	345.	4358.	349.	4358.
5	690.00	354.	354.	4717.	358.	4717.
6	691.00	363.	363.	5076.	367.	5076.

DESCRIPTION FOR REACH 500 REACH 500 LAKE ATHABASCA CHANNEL TO FOUR FORKS
CROSS-SECTION SHAPE = IRREGULAR NON-PRISMATIC

BOTTOM SLOPE = VARIABLE
FRICTION COEFFICIENT = MANNING

NO ICE COVER

BOTTOM SLOPE = 0.0 SIDE SLOPE = 0.0 MANNING N = 0.0200 ROUGHNESS = 0.0
TOTAL LENGTH OF REACH = 26000.00 FT
ESTIMATED MESH SPACING = 4330.00 FT
COMPUTED MESH SPACING = 4333.33 FT
NUMBER OF HYDRAULIC MESH POINTS = 7
DATA CROSS-SECTIONS = 3 TABLE ENTRIES = 5 FIRST DEPTH = 684.000 FT LAST DEPTH = 692.000 FT

SECTION 1 X = 723.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 673.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 688.000 FT INITIAL DISCHARGE = 6500.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	684.00	525.	525.	3922.	526.	3922.
2	686.00	569.	569.	5019.	571.	5019.
3	688.00	594.	594.	6190.	595.	6190.
4	690.00	603.	603.	7386.	606.	7386.
5	692.00	611.	611.	8600.	615.	8600.

SECTION 2 X = 13342.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 672.500 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.800 FT INITIAL DISCHARGE = 6500.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	684.00	547.	547.	4296.	548.	4296.
2	686.00	569.	569.	5414.	571.	5414.
3	688.00	588.	588.	6571.	590.	6571.
4	690.00	606.	606.	7765.	609.	7765.
5	692.00	625.	625.	8997.	628.	8997.

SECTION 3 X = 24483.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 668.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.570 FT INITIAL DISCHARGE = 6500.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	684.00	387.	387.	4245.	389.	4245.
2	686.00	397.	397.	5030.	401.	5030.
3	688.00	402.	402.	5830.	407.	5830.
4	690.00	407.	407.	6639.	414.	6639.
5	692.00	418.	418.	7461.	426.	7461.

DESCRIPTION FOR REACH 550 REACH 550 LAKE CLAIRE TO LAKE MAMAWI

CROSS-SECTION SHAPE = IRREGULAR NON-PRISMATIC
BOTTOM SLOPE = VARIABLE
FRICTION COEFFICIENT = MANNING

NO ICE COVER

BOTTOM SLOPE = 0.0 SIDE SLOPE = 0.0 MANNING N = 0.0350 ROUGHNESS = 0.0
TOTAL LENGTH OF REACH = 36700.00 FT
ESTIMATED MESH SPACING = 6100.00 FT
COMPUTED MESH SPACING = 6116.66 FT
NUMBER OF HYDRAULIC MESH POINTS = 7
DATA CROSS-SECTIONS = 2 TABLE ENTRIES = 5 FIRST DEPTH = 684.000 FT LAST DEPTH = 692.000 FT

SECTION 1 X = 528.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 672.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.680 FT INITIAL DISCHARGE = 445.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	684.00	294.	294.	2771.	297.	2771.
2	686.00	314.	314.	3379.	318.	3379.
3	688.00	335.	335.	4028.	339.	4028.
4	690.00	354.	354.	4717.	359.	4717.
5	692.00	372.	372.	5444.	377.	5444.

SECTION 2 X = 36700.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 672.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.660 FT INITIAL DISCHARGE = 445.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE	TOTAL	CORE	CORE	WETTED	TOTAL

ENTRY	ELEVATION (FT)	WIDTH (FT)	WIDTH (FT)	AREA (SQ FT)	PERIMETER (FT)	AREA (SQ FT)
1	684.00	294.	294.	2771.	297.	2771.
2	686.00	314.	314.	3379.	318.	3379.
3	688.00	335.	335.	4028.	339.	4028.
4	690.00	354.	354.	4717.	358.	4717.
5	692.00	372.	372.	5444.	377.	5444.

DESCRIPTION FOR REACH 650 REACH 650 LAKE MAMAWI

CROSS-SECTION SHAPE = IRREGULAR NON-PRISMATIC
BOTTOM SLOPE = VARIABLE
FRICTION COEFFICIENT = MANNING

NO ICE COVER

BOTTOM SLOPE = 0.0 SIDE SLOPE = 0.0 MANNING N = 0.0200 ROUGHNESS = 0.0
TOTAL LENGTH OF REACH = 56390.00 FT
ESTIMATED MESH SPACING = 2560.00 FT
COMPUTED MESH SPACING = 2563.18 FT
NUMBER OF HYDRAULIC MESH POINTS = 23
DATA CROSS-SECTIONS =10 TABLE ENTRIES = 5 FIRST DEPTH = 684.000 FT LAST DEPTH = 692.000 FT

SECTION 1 X = 0.0 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 672.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.660 FT INITIAL DISCHARGE = 445.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	684.00	294.	294.	2771.	297.	2771.
2	686.00	314.	314.	3379.	318.	3379.
3	688.00	335.	335.	4028.	339.	4028.
4	690.00	354.	354.	4717.	358.	4717.
5	692.00	372.	372.	5444.	377.	5444.

SECTION 2 X = 2429.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 683.800 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.660 FT INITIAL DISCHARGE = 445.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	684.00	2112.	1000.	153.	1000.	211.
2	686.00	11968.	1000.	2153.	1004.	14291.
3	688.00	33264.	1000.	4153.	1008.	53803.
4	690.00	52536.	1000.	6153.	1012.	146335.
5	692.00	58344.	1000.	8153.	1016.	257215.

SECTION 3 X = 10454.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 683.600 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.660 FT INITIAL DISCHARGE = 445.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	684.00	4224.	3000.	740.	3000.	845.
2	686.00	14432.	3000.	6740.	3004.	19501.
3	688.00	34320.	3000.	12740.	3008.	63413.
4	690.00	50776.	3000.	18740.	3012.	155065.
5	692.00	54120.	3000.	24740.	3016.	259961.

SECTION 4 X = 25397.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 683.200 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.660 FT INITIAL DISCHARGE = 445.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	684.00	6336.	5000.	2419.	5000.	2534.
2	686.00	9856.	5000.	12419.	5004.	18726.
3	688.00	42504.	5000.	22419.	5008.	56522.
4	690.00	75064.	5000.	32419.	5012.	186698.
5	692.00	78408.	5000.	42419.	5016.	342170.

SECTION 5 X = 29410.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 682.800 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.660 FT INITIAL DISCHARGE = 445.00 CFS

TOPWIDTH = MATIC

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	684.00	39600.	5000.	668.	5002.	24499.
2	686.00	50064.	5000.	15668.	5006.	114163.
3	688.00	74448.	5000.	25668.	5010.	234115.
4	690.00	94776.	5000.	35668.	5014.	411127.

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                5          692.00          99528.          5000.          45668.          5018.          605431.

SECTION  6      X =   37224.00 FT
                BOTTOM WIDTH =     0.0  FT     BOTTOM ELEV = 682.800 FT     RADIUS =   0.0   FT
                INITIAL SURFACE ELEVATION = 687.660 FT     INITIAL DISCHARGE =     445.00 CFS

                TOPWIDTH = VARIABLE

                          SURFACE        TOTAL          CORE          CORE          WETTED        TOTAL
                ENTRY   ELEVATION (FT)  WIDTH (FT)   WIDTH (FT)   AREA (SQ FT)  PERIMETER (FT)  AREA (SQ FT)
                  1          684.00        33792.        7000.         8390.          7002.          22968.
                  2          686.00        45760.        7000.        22390.          7006.         103787.
                  3          688.00        52272.        7000.        36390.          7010.         200323.
                  4          690.00        58432.        7000.        50390.          7014.         312699.
                  5          692.00        61248.        7000.        64390.          7018.         432379.

SECTION  7      X =   44722.00 FT
                BOTTOM WIDTH =     0.0  FT     BOTTOM ELEV = 683.000 FT     RADIUS =   0.0   FT
                INITIAL SURFACE ELEVATION = 687.660 FT     INITIAL DISCHARGE =     445.00 CFS

                TOPWIDTH = VARIABLE

                          SURFACE        TOTAL          CORE          CORE          WETTED        TOTAL
                ENTRY   ELEVATION (FT)  WIDTH (FT)   WIDTH (FT)   AREA (SQ FT)  PERIMETER (FT)  AREA (SQ FT)
                  1          684.00        10480.        5000.         4082.          5001.          9715.
                  2          686.00        30096.        5000.        14082.          5005.         63360.
                  3          688.00        44088.        5000.        24082.          5009.        133188.
                  4          690.00        49764.        5000.        34082.          5013.        239228.
                  5          692.00        60456.        5000.        44082.          5017.        356796.

SECTION  8      X =   49896.00 FT
                BOTTOM WIDTH =     0.0  FT     BOTTOM ELEV = 683.200 FT     RADIUS =   0.0   FT
                INITIAL SURFACE ELEVATION = 687.660 FT     INITIAL DISCHARGE =     445.00 CFS

                TOPWIDTH = VARIABLE

                          SURFACE        TOTAL          CORE          CORE          WETTED        TOTAL
                ENTRY   ELEVATION (FT)  WIDTH (FT)   WIDTH (FT)   AREA (SQ FT)  PERIMETER (FT)  AREA (SQ FT)
                  1          684.00        11088.        3000.         1869.          3001.          3511.
                  2          686.00        22528.        3000.         7869.          3005.         42750.
                  3          688.00        37224.        3000.        13869.          3009.         96386.
                  4          690.00        52448.        3000.        19869.          3013.        191910.
                  5          692.00        55968.        3000.        25869.          3017.        300326.

SECTION  9      X =   55968.00 FT
                BOTTOM WIDTH =     0.0  FT     BOTTOM ELEV = 685.800 FT     RADIUS =   0.0   FT
                INITIAL SURFACE ELEVATION = 687.660 FT     INITIAL DISCHARGE =     445.00 CFS

                TOPWIDTH = VARIABLE

                          SURFACE        TOTAL          CORE          CORE          WETTED        TOTAL
                ENTRY   ELEVATION (FT)  WIDTH (FT)   WIDTH (FT)   AREA (SQ FT)  PERIMETER (FT)  AREA (SQ FT)
                  1          684.00           1.           1.            1.             1.             1.
                  2          686.00        9179.        1000.         1783.          1004.         12306.
                  3          688.00       14256.        1000.         3783.          1008.         35640.
                  4          690.00       18632.        1000.         5783.          1012.         69080.
                  5          692.00       22704.        1000.         7783.          1016.        110616.

SECTION 10      X =   56390.00 FT
                BOTTOM WIDTH =     0.0  FT     BOTTOM ELEV = 673.000 FT     RADIUS =   0.0   FT
                INITIAL SURFACE ELEVATION = 687.660 FT     INITIAL DISCHARGE =     445.00 CFS

                TOPWIDTH = VARIABLE

                          SURFACE        TOTAL          CORE          CORE          WETTED        TOTAL
                ENTRY   ELEVATION (FT)  WIDTH (FT)   WIDTH (FT)   AREA (SQ FT)  PERIMETER (FT)  AREA (SQ FT)
                  1          684.00         365.         365.         2968.          367.          2968.
                  2          686.00         385.         385.         3718.          387.          3718.
                  3          688.00         405.         405.         4508.          408.          4508.
                  4          690.00         422.         422.         5335.          425.          5335.
                  5          692.00         437.         437.         6194.          440.          6194.

DESCRIPTION FOR REACH    750        REACH  750       LAKE MAHAWI TO FOUR FORKS

     CROSS-SECTION SHAPE = IRREGULAR   NON-PRISMATIC
     BOTTOM SLOPE = VARIABLE
     FRICTION COEFFICIENT = MANNING

     NO ICE COVER

     BOTTOM SLOPE = 0.0          SIDE SLOPE =  0.0         MANNING N = 0.0400     ROUGHNESS = 0.0
     TOTAL LENGTH OF REACH =     25000.00 FT
     ESTIMATED MESH SPACING =  3120.00 FT
     COMPUTED MESH SPACING =  3125.00 FT
     NUMBER OF HYDRAULIC MESH POINTS =   9
     DATA CROSS-SECTIONS = 2     TABLE ENTRIES =  6     FIRST DEPTH =  682.000 FT     LAST DEPTH =  692.000 FT

SECTION  1      X =       0.0  FT
                BOTTOM WIDTH =     0.0  FT     BOTTOM ELEV = 673.000 FT     RADIUS =   0.0   FT
                INITIAL SURFACE ELEVATION = 687.660 FT     INITIAL DISCHARGE =     445.00 CFS
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TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	323.	323.	2275.	324.	2275.
2	684.00	365.	365.	2968.	367.	2968.
3	686.00	385.	385.	3718.	387.	3718.
4	688.00	405.	405.	4508.	408.	4508.
5	690.00	422.	422.	5335.	425.	5335.
6	692.00	437.	437.	6194.	440.	6194.

SECTION 2 X = 23330.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 673.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.570 FT INITIAL DISCHARGE = 445.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	323.	323.	2275.	324.	2275.
2	684.00	365.	365.	2968.	367.	2968.
3	686.00	385.	385.	3718.	387.	3718.
4	688.00	405.	405.	4508.	408.	4508.
5	690.00	422.	422.	5335.	425.	5335.
6	692.00	437.	437.	6194.	440.	6194.

DESCRIPTION FOR REACH 800 REACH 800 RIVIERE DES ROCHERS FROM LAKE ATHABASCA TO REVILLIONCOUPE

CROSS-SECTION SHAPE = IRREGULAR NON-PRISMATIC
BOTTOM SLOPE = VARIABLE
FRICTION COEFFICIENT = MANNING

NO ICE COVER

BOTTOM SLOPE = 0.0 SIDE SLOPE = 0.0 MANNING N = 0.0220 ROUGHNESS = 0.0
TOTAL LENGTH OF REACH = 63300.00 FT
ESTIMATED MESH SPACING = 5270.00 FT
COMPUTED MESH SPACING = 5275.00 FT
NUMBER OF HYDRAULIC MESH POINTS = 13
DATA CROSS-SECTIONS = 8 TABLE ENTRIES = 6 FIRST DEPTH = 682.000 FT LAST DEPTH = 692.000 FT

SECTION 1 X = 0.0 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 658.100 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.810 FT INITIAL DISCHARGE = 68000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	1562.	1562.	21751.	1564.	21751.
2	684.00	1591.	1591.	24904.	1593.	24904.
3	686.00	1620.	1620.	28115.	1623.	28115.
4	688.00	1650.	1650.	31385.	1653.	31385.
5	690.00	9584.	9584.	42620.	9587.	42620.
6	692.00	9615.	9615.	61818.	9618.	61818.

SECTION 2 X = 2080.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 658.100 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.810 FT INITIAL DISCHARGE = 68000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	1562.	1562.	21751.	1564.	21751.
2	684.00	1591.	1591.	24904.	1593.	24904.
3	686.00	1620.	1620.	28115.	1623.	28115.
4	688.00	1650.	1650.	31385.	1653.	31385.
5	690.00	9584.	9584.	42620.	9587.	42620.
6	692.00	9615.	9615.	61818.	9618.	61818.

SECTION 3 X = 20000.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 662.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.610 FT INITIAL DISCHARGE = 68000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	2298.	2298.	25721.	2302.	25721.
2	684.00	2615.	2615.	30654.	2620.	30654.
3	686.00	2870.	2870.	36120.	2878.	36120.
4	688.00	2902.	2902.	41901.	2917.	41901.
5	690.00	33049.	33049.	83132.	33064.	83132.
6	692.00	33417.	33417.	149598.	33432.	149598.

SECTION 4 X = 30000.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 613.500 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.420 FT INITIAL DISCHARGE = 68000.00 CFS

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                    TOPWIDTH = VARIABLE

                                SURFACE          TOTAL          CORE          CORE          WETTED          TOTAL
                    ENTRY    ELEVATION (FT)   WIDTH (FT)   WIDTH (FT)   AREA (SQ FT)   PERIMETER (FT)   AREA (SQ FT)
                      1          682.00          1724.        1724.         36536.          1746.          36536.
                      2          684.00          1975.        1975.         40269.          1998.          40269.
                      3          686.00          2197.        2197.         44398.          2223.          44398.
                      4          688.00          2247.        2247.         46842.          2276.          46842.
                      5          690.00         19702.       19702.         78016.         19731.          78016.
                      6          692.00         19743.       19743.        117461.         19773.         117461.

          SECTION  5     X =   43000.00 FT
                          BOTTOM WIDTH =     0.0  FT     BOTTOM ELEV = 636.000 FT     RADIUS =   0.0   FT
                          INITIAL SURFACE ELEVATION = 687.230 FT     INITIAL DISCHARGE =    68000.00 CFS

                    TOPWIDTH = VARIABLE

                                SURFACE          TOTAL          CORE          CORE          WETTED          TOTAL
                    ENTRY    ELEVATION (FT)   WIDTH (FT)   WIDTH (FT)   AREA (SQ FT)   PERIMETER (FT)   AREA (SQ FT)
                      1          682.00          1394.        1394.         28422.          1430.          28422.
                      2          684.00          1450.        1450.         31270.          1489.          31270.
                      3          686.00          1505.        1505.         34225.          1547.          34225.
                      4          688.00          1556.        1556.         37285.          1602.          37285.
                      5          690.00          1609.        1609.         40450.          1658.          40450.
                      6          692.00          1670.        1670.         43724.          1722.          43724.

          SECTION  6     X =   52900.00 FT
                          BOTTOM WIDTH =     0.0  FT     BOTTOM ELEV = 630.700 FT     RADIUS =   0.0   FT
                          INITIAL SURFACE ELEVATION = 687.029 FT     INITIAL DISCHARGE =    68000.00 CFS

                    TOPWIDTH = VARIABLE

                                SURFACE          TOTAL          CORE          CORE          WETTED          TOTAL
                    ENTRY    ELEVATION (FT)   WIDTH (FT)   WIDTH (FT)   AREA (SQ FT)   PERIMETER (FT)   AREA (SQ FT)
                      1          682.00           911.         911.         28101.           923.          28101.
                      2          684.00           996.         996.         29997.          1008.          29997.
                      3          686.00          1103.        1103.         32094.          1115.          32094.
                      4          688.00          1205.        1205.         34410.          1217.          34410.
                      5          690.00          1229.        1229.         36844.          1241.          36844.
                      6          692.00          1278.        1278.         39345.          1290.          39345.

          SECTION  7     X =   62400.00 FT
                          BOTTOM WIDTH =     0.0  FT     BOTTOM ELEV = 643.200 FT     RADIUS =   0.0   FT
                          INITIAL SURFACE ELEVATION = 686.840 FT     INITIAL DISCHARGE =    68000.00 CFS

                    TOPWIDTH = VARIABLE

                                SURFACE          TOTAL          CORE          CORE          WETTED          TOTAL
                    ENTRY    ELEVATION (FT)   WIDTH (FT)   WIDTH (FT)   AREA (SQ FT)   PERIMETER (FT)   AREA (SQ FT)
                      1          682.00           953.         953.         22309.           963.          22309.
                      2          684.00          1007.        1007.         24267.          1017.          24267.
                      3          686.00          1051.        1051.         26328.          1060.          26328.
                      4          688.00          1124.        1124.         28479.          1134.          28479.
                      5          690.00          1146.        1146.         30761.          1157.          30761.
                      6          692.00          1195.        1195.         33089.          1207.          33089.

          SECTION  8     X =   64860.00 FT
                          BOTTOM WIDTH =     0.0  FT     BOTTOM ELEV = 640.800 FT     RADIUS =   0.0   FT
                          INITIAL SURFACE ELEVATION = 686.840 FT     INITIAL DISCHARGE =    68000.00 CFS

                    TOPWIDTH = VARIABLE

                                SURFACE          TOTAL          CORE          CORE          WETTED          TOTAL
                    ENTRY    ELEVATION (FT)   WIDTH (FT)   WIDTH (FT)   AREA (SQ FT)   PERIMETER (FT)   AREA (SQ FT)
                      1          682.00          1038.        1038.         26934.          1044.          26934.
                      2          684.00          1146.        1146.         29105.          1152.          29105.
                      3          686.00          1279.        1279.         31531.          1285.          31531.
                      4          688.00          1426.        1426.         34260.          1432.          34260.
                      5          690.00          1461.        1461.         37151.          1467.          37151.
                      6          692.00          1498.        1498.         40103.          1505.          40103.

DESCRIPTION FOR REACH   1000        REACH 1000      CHENAL DES QUATRES FOURCHES

     CROSS-SECTION SHAPE = IRREGULAR    NON-PRISMATIC
     BOTTOM SLOPE = VARIABLE
     FRICTION COEFFICIENT = MANNING

     NO ICE COVER

     BOTTOM SLOPE = 0.0          SIDE SLOPE =  0.0          MANNING N = 0.0260     ROUGHNESS = 0.0
     TOTAL LENGTH OF REACH =    144513.00 FT
     ESTIMATED MESH SPACING =  5160.00 FT
     COMPUTED MESH SPACING =  5161.18 FT
     NUMBER OF HYDRAULIC MESH POINTS =  29
     DATA CROSS-SECTIONS =11     TABLE ENTRIES =  7     FIRST DEPTH =  680.000 FT     LAST DEPTH =  692.000 FT

        SECTION  1     X =        0.0  FT
                       BOTTOM WIDTH =     0.0  FT     BOTTOM ELEV = 674.500 FT     RADIUS =   0.0   FT
                       INITIAL SURFACE ELEVATION = 687.560 FT     INITIAL DISCHARGE =     8000.00 CFS
```

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	398.	398.	1375.	388.	1375.
2	682.00	437.	437.	2200.	438.	2200.
3	684.00	486.	486.	3124.	487.	3124.
4	686.00	506.	506.	4125.	508.	4125.
5	688.00	514.	514.	5145.	517.	5145.
6	690.00	532.	532.	6190.	535.	6190.
7	692.00	545.	545.	7267.	549.	7267.

SECTION 2 X = 2851.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 674.500 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 687.560 FT INITIAL DISCHARGE = 8000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	388.	388.	1375.	388.	1375.
2	682.00	437.	437.	2200.	438.	2200.
3	684.00	486.	486.	3124.	487.	3124.
4	686.00	506.	506.	4125.	508.	4125.
5	688.00	514.	514.	5145.	517.	5145.
6	690.00	532.	532.	6190.	535.	6190.
7	692.00	545.	545.	7267.	549.	7267.

SECTION 3 X = 17741.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 659.400 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 686.900 FT INITIAL DISCHARGE = 8000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	314.	314.	3481.	318.	3481.
2	682.00	341.	341.	4136.	346.	4136.
3	684.00	370.	370.	4847.	376.	4847.
4	686.00	384.	384.	5603.	390.	5603.
5	688.00	396.	396.	6381.	404.	6381.
6	690.00	441.	441.	7198.	450.	7198.
7	692.00	467.	467.	8122.	478.	8122.

SECTION 4 X = 34637.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 669.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 686.300 FT INITIAL DISCHARGE = 8000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	361.	361.	2499.	362.	2499.
2	682.00	392.	392.	3252.	394.	3252.
3	684.00	442.	442.	4078.	443.	4078.
4	686.00	456.	456.	4983.	459.	4983.
5	688.00	461.	461.	5900.	465.	5900.
6	690.00	465.	465.	6825.	471.	6825.
7	692.00	473.	473.	7761.	481.	7761.

SECTION 5 X = 52219.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 661.400 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 685.690 FT INITIAL DISCHARGE = 8000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	285.	285.	3590.	290.	3590.
2	682.00	308.	308.	4180.	313.	4180.
3	684.00	337.	337.	4823.	342.	4823.
4	686.00	352.	352.	5514.	359.	5514.
5	688.00	365.	365.	6231.	373.	6231.
6	690.00	377.	377.	6973.	387.	6973.
7	692.00	388.	388.	7738.	400.	7738.

SECTION 6 X = 77563.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 658.200 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 685.090 FT INITIAL DISCHARGE = 8000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	285.	285.	3423.	289.	3423.
2	682.00	312.	312.	4018.	317.	4018.
3	684.00	343.	343.	4672.	349.	4672.
4	686.00	355.	353.	5375.	362.	5375.
5	688.00	359.	359.	6089.	368.	6089.

6	690.00	368.	368.	6817.	378.	6817.
7	692.00	377.	377.	7562.	388.	7562.

SECTION 7 X = 94459.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 670.400 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 684.490 FT INITIAL DISCHARGE = 8000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	293.	293.	1750.	294.	1750.
2	682.00	326.	326.	2374.	327.	2374.
3	684.00	346.	346.	3048.	347.	3048.
4	686.00	361.	361.	3754.	364.	3754.
5	688.00	376.	376.	4491.	380.	4491.
6	690.00	391.	391.	5258.	396.	5258.
7	692.00	406.	406.	6055.	413.	6055.

SECTION 8 X = 108926.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 654.100 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 683.890 FT INITIAL DISCHARGE = 8000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	293.	293.	4260.	300.	4260.
2	682.00	310.	310.	4863.	317.	4863.
3	684.00	333.	333.	5514.	341.	5514.
4	686.00	337.	337.	6183.	347.	6183.
5	688.00	340.	340.	6860.	352.	6860.
6	690.00	344.	344.	7545.	358.	7545.
7	692.00	353.	353.	8240.	367.	8240.

SECTION 9 X = 124027.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 655.200 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 683.280 FT INITIAL DISCHARGE = 8000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	249.	249.	3036.	256.	3036.
2	682.00	294.	294.	3569.	301.	3569.
3	684.00	325.	325.	4196.	332.	4196.
4	686.00	339.	339.	4860.	348.	4860.
5	688.00	354.	354.	5553.	364.	5553.
6	690.00	368.	368.	6275.	380.	6275.
7	692.00	380.	380.	7024.	392.	7024.

SECTION 10 X = 140131.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 671.200 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 682.680 FT INITIAL DISCHARGE = 8000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	513.	513.	1892.	516.	1892.
2	682.00	629.	629.	3034.	633.	3034.
3	684.00	690.	690.	4379.	695.	4379.
4	686.00	695.	695.	5764.	701.	5764.
5	688.00	700.	700.	7159.	708.	7159.
6	690.00	705.	705.	8565.	714.	8565.
7	692.00	709.	709.	9980.	720.	9980.

SECTION 11 X = 144513.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 671.200 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 682.680 FT INITIAL DISCHARGE = 8000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	513.	513.	1892.	516.	1892.
2	682.00	629.	629.	3034.	633.	3034.
3	684.00	690.	690.	4379.	695.	4379.
4	686.00	695.	695.	5764.	701.	5764.
5	688.00	700.	700.	7159.	708.	7159.
6	690.00	705.	705.	8565.	714.	8565.
7	692.00	709.	709.	9980.	720.	9980.

DESCRIPTION FOR REACH 1050 REACH 1050 PEACE RIVER BETWEEN PEACE POINT AND BARIL RIVER

CROSS-SECTION SHAPE = IRREGULAR NON-PRISMATIC
BOTTOM SLOPE = VARIABLE
FRICTION COEFFICIENT = MANNING

NO ICE COVER

BOTTOM SLOPE = 0.000056 SIDE SLOPE = 0.0 MANNING N = 0.0340 ROUGHNESS = 0.0
TOTAL LENGTH OF REACH = 226000.00 FT
ESTIMATED MESH SPACING = 10200.00 FT
COMPUTED MESH SPACING = 10272.73 FT
NUMBER OF HYDRAULIC MESH POINTS = 23
DATA CROSS-SECTIONS = 2 TABLE ENTRIES = 6 FIRST DEPTH = 680.000 FT LAST DEPTH = 705.000 FT

SECTION 1 X = 0.0 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 670.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 695.620 FT INITIAL DISCHARGE = 65900.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	744.	774.	3328.	764.	3328.
2	685.00	1023.	1023.	7629.	1053.	7629.
3	690.00	1876.	1876.	14560.	1916.	14560.
4	695.00	1971.	1971.	24138.	2021.	24138.
5	700.00	2032.	2032.	34066.	2092.	34066.
6	705.00	2069.	2069.	44366.	2139.	44366.

SECTION 2 X = 226000.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 656.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 684.400 FT INITIAL DISCHARGE = 65900.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	1956.	1956.	22158.	2004.	22158.
2	685.00	2021.	2021.	32050.	2091.	32050.
3	690.00	2062.	2062.	42276.	2130.	42276.
4	695.00	2090.	2090.	52712.	2168.	52712.
5	700.00	2116.	2116.	63200.	2204.	63200.
6	705.00	2144.	2144.	73848.	2242.	73848.

DESCRIPTION FOR REACH 1150 REACH 1150 PEACE RIVER BETWEEN BARIL RIVER AND CHENAL DES QUATRE FOURCHES

CROSS-SECTION SHAPE = IRREGULAR NON-PRISMATIC
BOTTOM SLOPE = VARIABLE
FRICTION COEFFICIENT = MANNING

NO ICE COVER

BOTTOM SLOPE = 0.000056 SIDE SLOPE = 0.0 MANNING N = 0.0340 ROUGHNESS = 0.0
TOTAL LENGTH OF REACH = 43000.00 FT
ESTIMATED MESH SPACING = 5280.00 FT
COMPUTED MESH SPACING = 5375.00 FT
NUMBER OF HYDRAULIC MESH POINTS = 9
DATA CROSS-SECTIONS = 2 TABLE ENTRIES = 5 FIRST DEPTH = 680.000 FT LAST DEPTH = 700.000 FT

SECTION 1 X = 0.0 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 656.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 684.400 FT INITIAL DISCHARGE = 65900.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	1956.	1956.	22158.	2004.	22158.
2	685.00	2021.	2021.	32050.	2081.	32050.
3	690.00	2062.	2062.	42276.	2062.	42276.
4	695.00	2090.	2090.	52712.	2168.	52712.
5	700.00	2116.	2116.	63200.	2204.	63200.

SECTION 2 X = 43000.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 654.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 682.680 FT INITIAL DISCHARGE = 65900.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	1985.	1986.	26118.	2038.	26118.
2	685.00	2040.	2040.	36153.	2102.	36153.
3	690.00	2076.	2076.	46456.	2148.	46456.
4	695.00	2101.	2101.	52876.	2183.	52876.
5	700.00	2128.	2128.	67382.	2220.	67382.

DESCRIPTION FOR REACH 1350 REACH 1350 REVILLON COUPE FROM RIVIERE DES ROCHERS TO THE STRUCTURE

CROSS-SECTION SHAPE = IRREGULAR NON-PRISMATIC
BOTTOM SLOPE = VARIABLE
FRICTION COEFFICIENT = MANNING

NO ICE COVER

BOTTOM SLOPE = 0.0 SIDE SLOPE = 0.0 MANNING N = 0.0260 ROUGHNESS = 0.0

TOTAL LENGTH OF REACH = 52100.00 FT
ESTIMATED MESH SPACING = 5210.00 FT
COMPUTED MESH SPACING = 5210.00 FT
NUMBER OF HYDRAULIC MESH POINTS = 11
DATA CROSS-SECTIONS = 4 TABLE ENTRIES = 6 FIRST DEPTH = 680.000 FT LAST DEPTH = 690.000 FT

SECTION 1 X = 0.0 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 664.400 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 686.840 FT INITIAL DISCHARGE = 2800.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	183.	183.	1501.	186.	1501.
2	682.00	223.	223.	1905.	227.	1905.
3	684.00	254.	254.	2305.	258.	2385.
4	686.00	276.	276.	2919.	280.	2919.
5	688.00	283.	283.	3477.	289.	3477.
6	690.00	302.	302.	4060.	308.	4060.

SECTION 2 X = 1690.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 664.400 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 686.840 FT INITIAL DISCHARGE = 2800.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	183.	183.	1501.	186.	1501.
2	682.00	223.	223.	1905.	227.	1905.
3	684.00	254.	254.	2385.	258.	2365.
4	686.00	276.	276.	2919.	280.	2919.
5	688.00	283.	283.	3477.	289.	3477.
6	690.00	302.	302.	4060.	308.	4060.

SECTION 3 X = 39400.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 664.600 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 686.340 FT INITIAL DISCHARGE = 2800.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	227.	227.	2230.	230.	2230.
2	682.00	249.	249.	2709.	252.	2709.
3	684.00	272.	272.	3224.	275.	3224.
4	686.00	286.	286.	3784.	291.	3784.
5	688.00	299.	299.	4369.	304.	4369.
6	690.00	312.	312.	4980.	317.	4980.

SECTION 4 X = 75900.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 663.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 685.800 FT INITIAL DISCHARGE = 2800.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	176.	176.	1573.	182.	1573.
2	682.00	201.	201.	1950.	207.	1950.
3	684.00	253.	253.	2406.	260.	2406.
4	686.00	304.	304.	2963.	311.	2963.
5	688.00	354.	354.	3620.	362.	3620.
6	690.00	403.	403.	4378.	412.	4378.

DESCRIPTION FOR REACH 1400 REACH 1400 PEACE RIVER FROM CHENAL DES QUATRE FOURCHES TO REVILLON COUPE

CROSS-SECTION SHAPE = IRREGULAR NON-PRISMATIC
BOTTOM SLOPE = VARIABLE
FRICTION COEFFICIENT = MANNING

NO ICE COVER

BOTTOM SLOPE = 0.0 SIDE SLOPE = 0.0 MANNING N = 0.0340 ROUGHNESS = 0.0
TOTAL LENGTH OF REACH = 16700.00 FT
ESTIMATED MESH SPACING = 2780.00 FT
COMPUTED MESH SPACING = 2783.33 FT
NUMBER OF HYDRAULIC MESH POINTS = 7
DATA CROSS-SECTIONS = 3 TABLE ENTRIES = 5 FIRST DEPTH = 680.000 FT LAST DEPTH = 700.000 FT

SECTION 1 X = 0.0 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 654.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 682.680 FT INITIAL DISCHARGE = 72000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	1986.	1986.	26118.	2038.	26118.

2	685.00	2040.	2040.	36153.	2102.	36153.
3	690.00	2076.	2076.	46456.	2148.	46456.
4	695.00	2101.	2101.	56876.	2183.	56876.
5	700.00	2128.	2128.	67382.	2220.	67382.

SECTION 2 X = 5000.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 630.200 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 682.430 FT INITIAL DISCHAPGE = 72000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	1092.	1092.	36123.	1112.	36123.
2	685.00	1188.	1188.	41919.	1211.	41919.
3	690.00	1372.	1372.	48258.	1398.	48258.
4	695.00	1440.	1440.	55229.	1469.	55229.
5	700.00	1475.	1475.	62516.	1509.	62516.

SECTION 3 X = 33400.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 658.600 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 681.300 FT INITIAL DISCHARGE = 72000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	2330.	2330.	30771.	2337.	30771.
2	685.00	2382.	2382.	42604.	2393.	42604.
3	690.00	2395.	2395.	54544.	2410.	54544.
4	695.00	2406.	2406.	66552.	2427.	66552.
5	700.00	2426.	2426.	78633.	2451.	78633.

DESCRIPTION FOR REACH 1500 REACH 1500 RIVIERE DES ROCHERS FROM REVILLON COUPE TO THE STRUCTURE

CROSS-SECTION SHAPE = IRREGULAR NON-PRISMATIC
BOTTOM SLOPE = VARIABLE
FRICTION COEFFICIENT = MANNING

NO ICE COVER

BOTTOM SLOPE = 0.0 SIDE SLOPE = 0.0 MANNING N = 0.0200 ROUGHNESS = 0.0
TOTAL LENGTH OF REACH = 34100.00 FT
ESTIMATED MESH SPACING = 4250.00 FT
COMPUTED MESH SPACING = 4262.50 FT
NUMBER OF HYDRAULIC MESH POINTS = 9
DATA CROSS-SECTIONS = 5 TABLE ENTRIES = 5 FIRST DEPTH = 682.000 FT LAST DEPTH = 690.000 FT

SECTION 1 X = -900.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 643.200 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 686.840 FT INITIAL DISCHARGE = 65000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	953.	953.	22309.	963.	22309.
2	684.00	1007.	1007.	24267.	1017.	24267.
3	686.00	1051.	1051.	26328.	1060.	26328.
4	688.00	1124.	1124.	28479.	1134.	28479.
5	690.00	1146.	1146.	30761.	1157.	30761.

SECTION 2 X = 1560.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 640.800 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 686.840 FT INITIAL DISCHARGE = 65000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	1038.	1038.	26934.	1044.	26934.
2	684.00	1146.	1146.	29105.	1152.	29105.
3	686.00	1279.	1279.	31531.	1285.	31531.
4	688.00	1426.	1426.	34260.	1432.	34260.
5	690.00	1461.	1461.	37151.	1467.	37151.

SECTION 3 X = 16790.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 637.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 686.760 FT INITIAL DISCHARGE = 65000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	926.	926.	25347.	952.	25347.
2	684.00	953.	953.	27226.	979.	27226.
3	686.00	979.	979.	29158.	1005.	29158.
4	688.00	1005.	1005.	31142.	1031.	31142.
5	690.00	1022.	1022.	33171.	1049.	33171.

SECTION 4 X = 33200.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 633.800 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 686.670 FT INITIAL DISCHARGE = 65000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	1091.	1091.	30136.	1105.	30136.
2	684.00	1135.	1135.	32370.	1150.	32370.
3	686.00	1167.	1167.	34673.	1162.	34673.
4	688.00	1196.	1196.	37038.	1211.	37038.
5	690.00	1217.	1217.	39453.	1232.	39453.

SECTION 5 X = 35000.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 641.700 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 686.600 FT INITIAL DISCHARGE = 65000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	682.00	1151.	1151.	25390.	1170.	25390.
2	684.00	1183.	1183.	27723.	1202.	27723.
3	686.00	1225.	1225.	30126.	1245.	30126.
4	688.00	1264.	1264.	32622.	1284.	32622.
5	690.00	1282.	1282.	35171.	1303.	35171.

DESCRIPTION FOR REACH 1550 REACH 1550 REVILLON COUPE FROM THE STRUCTURE TO THE PEACE RIVER

CROSS-SECTION SHAPE = IRREGULAR NON-PRISMATIC
BOTTOM SLOPE = VARIABLE
FRICTION COEFFICIENT = MANNING

NO ICE COVER

BOTTOM SLOPE = 0.0 SIDE SLOPE = 0.0 MANNING N = 0.0260 ROUGHNESS = 0.0
TOTAL LENGTH OF REACH = 31700.00 FT
ESTIMATED MESH SPACING = 5280.00 FT
COMPUTED MESH SPACING = 5283.33 FT
NUMBER OF HYDRAULIC MESH POINTS = 7
DATA CROSS-SECTIONS = 3 TABLE ENTRIES = 6 FIRST DEPTH = 680.000 FT LAST DEPTH = 690.000 FT

SECTION 1 X = -12700.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 664.600 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 682.000 FT INITIAL DISCHARGE = 2800.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	227.	227.	2230.	230.	2230.
2	682.00	249.	249.	2709.	252.	2709.
3	684.00	272.	272.	3224.	275.	3224.
4	686.00	286.	286.	3784.	291.	3784.
5	688.00	299.	299.	4369.	304.	4369.
6	690.00	312.	312.	4980.	317.	4980.

SECTION 2 X = 23800.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 663.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 682.000 FT INITIAL DISCHARGE = 2800.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	176.	176.	1573.	182.	1573.
2	682.00	201.	201.	1950.	207.	1950.
3	684.00	253.	253.	2406.	260.	2406.
4	686.00	304.	304.	2963.	311.	2963.
5	688.00	354.	354.	3620.	362.	3620.
6	690.00	403.	403.	4378.	412.	4378.

SECTION 3 X = 31700.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 663.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 682.000 FT INITIAL DISCHARGE = 2800.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	176.	176.	1573.	182.	1573.
2	682.00	201.	201.	1950.	207.	1950.
3	684.00	253.	253.	2406.	260.	2406.
4	686.00	304.	304.	2963.	311.	2963.
5	688.00	354.	354.	3620.	362.	3620.
6	690.00	403.	403.	4378.	412.	4378.

DESCRIPTION FOR REACH 1750 REACH 1750 PEACE RIVER FROM REVILLON COUPE TO RIVIERE DES ROCHERS

CROSS-SECTION SHAPE = IRREGULAR NON-PRISMATIC
BOTTOM SLOPE = VARIABLE
FRICTION COEFFICIENT = MANNING

NO ICE COVER

BOTTOM SLOPE = 0.0 SIDE SLOPE = 0.0 MANNING N = 0.0340 ROUGHNESS = 0.0
TOTAL LENGTH OF REACH = 40800.00 FT
ESTIMATED MESH SPACING = 4750.00 FT
COMPUTED MESH SPACING = 5100.00 FT
NUMBER OF HYDRAULIC MESH POINTS = 9
DATA CROSS-SECTIONS = 4 TABLE ENTRIES = 6 FIRST DEPTH = 680.000 FT LAST DEPTH = 690.000 FT

SECTION 1 X = -11700.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 630.200 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 682.000 FT INITIAL DISCHARGE = 73000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	1092.	1092.	36123.	1112.	36123.
2	682.00	1172.	1172.	38373.	1193.	38373.
3	684.00	1184.	1184.	40733.	1206.	40733.
4	686.00	1191.	1191.	43108.	1215.	43108.
5	688.00	1288.	1288.	45587.	1312.	45587.
6	690.00	1372.	1372.	48258.	1398.	48258.

SECTION 2 X = 16700.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 658.600 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 681.300 FT INITIAL DISCHARGE = 73000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	2330.	2330.	30771.	2337.	30771.
2	682.00	2377.	2377.	35465.	2384.	35465.
3	684.00	2381.	2381.	40223.	2390.	40223.
4	686.00	2384.	2384.	44987.	2396.	44987.
5	688.00	2389.	2389.	49760.	2389.	49760.
6	690.00	2395.	2395.	54544.	2410.	54544.

SECTION 3 X = 37200.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 629.800 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 680.920 FT INITIAL DISCHARGE = 73000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	1362.	1362.	40658.	1379.	40658.
2	682.00	1379.	1379.	43402.	1397.	43402.
3	684.00	1382.	1382.	46163.	1402.	46163.
4	686.00	1385.	1385.	48930.	1407.	48930.
5	688.00	1390.	1390.	51704.	1414.	51704.
6	690.00	1437.	1437.	54533.	1462.	54533.

SECTION 4 X = 40800.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 650.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 680.920 FT INITIAL DISCHARGE = 73000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	3486.	3486.	51327.	3494.	51327.
2	682.00	3501.	3501.	58314.	3509.	58314.
3	684.00	3516.	3516.	65330.	3525.	65330.
4	686.00	3530.	3530.	72376.	3540.	72376.
5	688.00	3545.	3545.	79452.	3556.	79452.
6	690.00	3553.	3553.	86550.	3565.	86550.

DESCRIPTION FOR REACH 1850 REACH 1850 RIVIERE DES ROCHERS FROM THE STRUCTURE TO THE PEACE RIVER

CROSS-SECTION SHAPE = IRREGULAR NON-PRISMATIC
BOTTOM SLOPE = VARIABLE
FRICTION COEFFICIENT = MANNING

NO ICE COVER

BOTTOM SLOPE = 0.0 SIDE SLOPE = 0.0 MANNING N = 0.0300 ROUGHNESS = 0.0
TOTAL LENGTH OF REACH = 57100.00 FT
ESTIMATED MESH SPACING = 4750.00 FT
COMPUTED MESH SPACING = 4758.33 FT
NUMBER OF HYDRAULIC MESH POINTS = 13
DATA CROSS-SECTIONS = 9 TABLE ENTRIES = 6 FIRST DEPTH = 680.000 FT LAST DEPTH = 690.000 FT

SECTION 1 X = -900.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 633.800 FT RADIUS = 0.0 FT

INITIAL SURFACE ELEVATION = 682.000 FT INITIAL DISCHARGE = 65000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	1049.	1049.	28001.	1063.	28001.
2	682.00	1091.	1091.	30136.	1105.	30136.
3	684.00	1135.	1135.	32370.	1150.	32370.
4	686.00	1167.	1167.	34673.	1182.	34673.
5	688.00	1196.	1196.	37038.	1211.	37038.
6	690.00	1217.	1217.	39453.	1232.	39453.

SECTION 2 X = 900.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 641.700 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 681.920 FT INITIAL DISCHARGE = 65000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	1116.	1116.	23122.	1135.	23122.
2	682.00	1151.	1151.	25390.	1170.	25390.
3	684.00	1183.	1183.	27723.	1202.	27723.
4	686.00	1225.	1225.	30126.	1245.	30126.
5	688.00	1264.	1264.	32622.	1284.	32622.
6	690.00	1282.	1282.	35171.	1303.	35171.

SECTION 3 X = 7655.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 636.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 681.750 FT INITIAL DISCHARGE = 65000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	921.	921.	26762.	933.	26762.
2	682.00	941.	941.	28623.	954.	28623.
3	684.00	972.	972.	30536.	985.	30536.
4	686.00	1004.	1004.	32511.	1018.	32511.
5	688.00	1040.	1040.	34556.	1054.	34556.
6	690.00	1060.	1060.	36656.	1074.	36656.

SECTION 4 X = 26663.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 635.700 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 681.590 FT INITIAL DISCHARGE = 65000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	989.	989.	25981.	1005.	25981.
2	682.00	1021.	1021.	27986.	1037.	27986.
3	684.00	1051.	1051.	30058.	1068.	30058.
4	686.00	1085.	1085.	32194.	1102.	32194.
5	688.00	1135.	1135.	34402.	1152.	34402.
6	690.00	1159.	1159.	36696.	1176.	36696.

SECTION 5 X = 37963.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 593.400 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 681.420 FT INITIAL DISCHARGE = 65000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	591.	591.	29025.	624.	29025.
2	682.00	610.	610.	30225.	643.	30225.
3	684.00	624.	624.	31459.	659.	31459.
4	686.00	639.	639.	32722.	674.	32722.
5	688.00	666.	666.	34024.	702.	34024.
6	690.00	689.	689.	35381.	725.	35381.

SECTION 6 X = 48998.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 622.300 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 681.250 FT INITIAL DISCHARGE = 65000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	872.	872.	33485.	894.	33485.
2	682.00	921.	921.	35294.	944.	35294.
3	684.00	930.	930.	37145.	954.	37145.
4	686.00	958.	958.	39023.	982.	39023.
5	688.00	1005.	1005.	40985.	1029.	40985.
6	690.00	1052.	1052.	43041.	1076.	43041.

SECTION 7 X = 50001.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 609.500 FT RADIUS = 0.0 FT

INITIAL SURFACE ELEVATION = 681.090 FT INITIAL DISCHARGE = 65000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	1102.	1102.	31971.	1131.	31971.
2	682.00	1156.	1156.	34237.	1186.	34237.
3	684.00	1183.	1183.	36576.	1212.	36576.
4	686.00	1253.	1253.	39011.	1283.	39011.
5	688.00	1299.	1299.	41563.	1328.	41563.
6	690.00	1339.	1339.	44201.	1370.	44201.

SECTION 8 X = 55545.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 639.200 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 680.920 FT INITIAL DISCHARGE = 65000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	1225.	1225.	28984.	1239.	28984.
2	682.00	1300.	1300.	31498.	1314.	31498.
3	684.00	1348.	1348.	34158.	1363.	34158.
4	686.00	1403.	1403.	36902.	1418.	36902.
5	688.00	1523.	1523.	39822.	1538.	39822.
6	690.00	1600.	1600.	42985.	1616.	42985.

SECTION 9 X = 57100.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 639.200 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 680.920 FT INITIAL DISCHARGE = 65000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	680.00	1225.	1225.	28984.	1239.	28984.
2	682.00	1300.	1300.	31498.	1314.	31498.
3	684.00	1348.	1348.	34158.	1363.	34158.
4	686.00	1403.	1403.	36902.	1418.	36902.
5	688.00	1523.	1523.	39822.	1538.	39822.
6	690.00	1600.	1600.	42985.	1616.	42985.

DESCRIPTION FOR REACH 1950 REACH 1950 SLAVE RIVER

CROSS-SECTION SHAPE = IRREGULAR NON-PRISMATIC
BOTTOM SLOPE = VARIABLE
FRICTION COEFFICIENT = MANNING

NO ICE COVER

BOTTOM SLOPE = 0.0 SIDE SLOPE = 0.0 MANNING N = 0.0340 ROUGHNESS = 0.0
TOTAL LENGTH OF REACH = 39072.00 FT
ESTIMATED MESH SPACING = 3900.00 FT
COMPUTED MESH SPACING = 3907.20 FT
NUMBER OF HYDRAULIC MESH POINTS = 11
DATA CROSS-SECTIONS =11 TABLE ENTRIES = 5 FIRST DEPTH = 678.000 FT LAST DEPTH = 695.000 FT

SECTION 1 X = 0.0 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 650.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 680.650 FT INITIAL DISCHARGE = 138000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	675.00	3449.	3449.	33988.	3455.	33988.
2	680.00	3486.	3486.	51327.	3494.	51327.
3	685.00	3523.	3523.	68850.	3533.	68850.
4	690.00	3553.	3553.	86550.	3565.	86550.
5	695.00	3573.	3573.	104365.	3587.	104365.

SECTION 2 X = 20754.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 650.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 679.700 FT INITIAL DISCHARGE = 138000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	675.00	3449.	3449.	33988.	3455.	33988.
2	680.00	3486.	3486.	51327.	3494.	51327.
3	685.00	3523.	3523.	68850.	3533.	68850.
4	690.00	3553.	3553.	86550.	3565.	86550.
5	695.00	3573.	3573.	104365.	3587.	104365.

SECTION 3 X = 24420.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 635.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 679.550 FT INITIAL DISCHARGE = 138000.00 CFS

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	675.00	2520.	2520.	37003.	2528.	37003.
2	680.00	2623.	2623.	49879.	2642.	49879.
3	685.00	2742.	2742.	63311.	2755.	63311.
4	690.00	2853.	2853.	77298.	2868.	77298.
5	695.00	2950.	2950.	91805.	2969.	91805.

SECTION 4 X = 27453.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 645.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 679.100 FT INITIAL DISCHARGE = 138000.00 CFS
TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	675.00	2687.	2687.	33539.	2699.	33539.
2	680.00	2752.	2752.	47136.	2767.	47136.
3	685.00	2818.	2818.	61060.	2836.	61060.
4	690.00	2883.	2883.	75311.	2904.	75311.
5	695.00	2933.	2933.	89857.	2959.	89857.

SECTION 5 X = 30023.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 620.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 679.000 FT INITIAL DISCHARGE = 138000.00 CFS
TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	675.00	1442.	1442.	35238.	1474.	35238.
2	680.00	2168.	2168.	43930.	2204.	43930.
3	685.00	2237.	2237.	54941.	2276.	54941.
4	690.00	2304.	2304.	66298.	2347.	66298.
5	695.00	2355.	2355.	77945.	2402.	77945.

SECTION 6 X = 30955.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 620.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 679.000 FT INITIAL DISCHARGE = 138000.00 CFS
TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	675.00	2761.	2761.	42360.	2780.	42360.
2	680.00	2778.	2778.	56207.	2799.	56207.
3	685.00	2795.	2795.	70137.	2819.	70137.
4	690.00	2812.	2812.	84153.	2840.	84153.
5	695.00	2833.	2833.	98267.	2863.	98267.

SECTION 7 X = 31872.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 620.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 678.900 FT INITIAL DISCHARGE = 138000.00 CFS
TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	675.00	2280.	2280.	40724.	2297.	40724.
2	680.00	2323.	2323.	52233.	2342.	52233.
3	685.00	2366.	2366.	63957.	2387.	63957.
4	690.00	2406.	2406.	75899.	2429.	75899.
5	695.00	2426.	2426.	87981.	2452.	87981.

SECTION 8 X = 34009.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 625.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 678.800 FT INITIAL DISCHARGE = 138000.00 CFS
TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	675.00	2238.	2238.	44318.	2255.	44318.
2	680.00	2319.	2319.	55709.	2339.	55709.
3	685.00	2400.	2400.	67505.	2422.	67505.
4	690.00	2470.	2470.	79696.	2496.	79696.
5	695.00	2520.	2520.	92174.	2550.	92174.

SECTION 9 X = 35091.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 610.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 678.750 FT INITIAL DISCHARGE = 138000.00 CFS
TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	675.00	3159.	3159.	68482.	3170.	68482.
2	680.00	3218.	3218.	84424.	3230.	84424.

3	685.00	3278.	3278.	100604.	3291.	100604.
4	690.00	3321.	3321.	117176.	3335.	117176.
5	695.00	3343.	3343.	133842.	3360.	133842.

SECTION 10 X = 36689.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 605.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 678.700 FT INITIAL DISCHARGE = 138000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	675.00	1813.	1813.	43407.	1836.	43407.
2	680.00	1884.	1884.	52651.	1910.	52651.
3	685.00	1955.	1955.	62249.	1985.	62249.
4	690.00	2026.	2026.	72201.	2059.	72201.
5	695.00	2068.	2068.	82436.	2106.	82436.

SECTION 11 X = 39078.00 FT
BOTTOM WIDTH = 0.0 FT BOTTOM ELEV = 620.000 FT RADIUS = 0.0 FT
INITIAL SURFACE ELEVATION = 678.650 FT INITIAL DISCHARGE = 138000.00 CFS

TOPWIDTH = VARIABLE

ENTRY	SURFACE ELEVATION (FT)	TOTAL WIDTH (FT)	CORE WIDTH (FT)	CORE AREA (SQ FT)	WETTED PERIMETER (FT)	TOTAL AREA (SQ FT)
1	675.00	1494.	1494.	45403.	1499.	45403.
2	680.00	1629.	1629.	53210.	1635.	53210.
3	685.00	1764.	1764.	61692.	1771.	61692.
4	690.00	1858.	1858.	70811.	1865.	70811.
5	695.00	1878.	1878.	80149.	1888.	80149.

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* *
* 263 STORAGE LOCATIONS REQUIRED FOR HYDRAULIC MESH ARRAYS *
* *
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* *
* 1519 STORAGE LOCATIONS REQUIRED FOR GRAPHS *
* *
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LATERAL INFLOWS

##########

NUMBER OF LATERAL INFLOWS = 1

DATA FOR LATERAL INFLOW 1

TIME DEPENDENCE = VARIABLE
REACH = 200
DISTANCE FROM UPSTREAM NODE = 7628.00 FEET
WIDTH = 0.0 FEET
TABLE ENTRIES = 14

TIME (SEC)	LATERAL INFLOW (CFS/FT)	SALINITY (PPM)	EXCESS TEMP (DEG F)	BOD (PPM)	DOD (PPM)
0.0	40900.00	0.0	0.0	0.0	0.0
86400.00	39700.00	0.0	0.0	0.0	0.0
172800.00	39500.00	0.0	0.0	0.0	0.0
259200.00	39800.00	0.0	0.0	0.0	0.0
345600.00	39900.00	0.0	0.0	0.0	0.0
432000.00	38600.00	0.0	0.0	0.0	0.0
518400.00	36900.00	0.0	0.0	0.0	0.0
604800.00	35200.00	0.0	0.0	0.0	0.0
691200.00	33400.00	0.0	0.0	0.0	0.0
777600.00	31800.00	0.0	0.0	0.0	0.0
864000.00	30600.00	0.0	0.0	0.0	0.0
950400.00	29500.00	0.0	0.0	0.0	0.0
1036800.00	28900.00	0.0	0.0	0.0	0.0
1123200.00	30100.00	0.0	0.0	0.0	0.0

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* *
* 14 STORAGE LOCATIONS REQUIRED FOR LATERAL INFLOWS *

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#*************************************************#

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   NODE DESCRIPTION FOR TRIAL #1 OF LAKE ATHABASCA MODEL (NODE01 TO 20)

#####################################################################################################################################

   PRESCRIBED HYDRAULIC BOUNDARY CONDITIONS FOR NODE  1     TYPE = SURFACE ELEV
        NUMBER OF TABLE ENTRIES =  14      TIME DEPENDENCE = VARIABLE
                                                             LINEAR

             TIME (SEC)     SURFACE ELEVATION (FT)     DISCHARGE (CFS)
                    0.0              687.970                40359.00
                86400.00              687.950               115286.00
               172800.00              687.930                52893.00
               259200.00              687.860               219006.00
               345600.00              687.820                94513.00
               432000.00              687.810               -84247.00
               518400.00              687.820                -3983.00
               604800.00              687.820                59153.00
               691200.00              687.840              -121946.00
               777600.00              687.810               221727.00
               864000.00              687.740               146025.00
               950400.00              687.740              -111563.00
              1036800.00              687.730                80212.00
              1123200.00              687.690                80212.00

   PRESCRIBED HYDRAULIC BOUNDARY CONDITIONS FOR NODE  2     TYPE = JUNCTION

   PRESCRIBED HYDRAULIC BOUNDARY CONDITIONS FOR NODE  3     TYPE = DISCHARGE
        NUMBER OF TABLE ENTRIES =  14      TIME DEPENDENCE = VARIABLE
                                                             LINEAR

             TIME (SEC)     SURFACE ELEVATION (FT)     DISCHARGE (CFS)
                    0.0                0.0                   743.00
                86400.00                0.0                   722.00
               172800.00                0.0                   696.00
               259200.00                0.0                   680.00
               345600.00                0.0                   666.00
               432000.00                0.0                   659.00
               518400.00                0.0                   662.00
               604800.00                0.0                   684.00
               691200.00                0.0                   722.00
               777600.00                0.0                   717.00
               864000.00                0.0                   722.00
               950400.00                0.0                   735.00
              1036800.00                0.0                   743.00
              1123200.00                0.0                   741.00

   PRESCRIBED HYDRAULIC BOUNDARY CONDITIONS FOR NODE  4     TYPE = JUNCTION

   PRESCRIBED HYDRAULIC BOUNDARY CONDITIONS FOR NODE  5     TYPE = JUNCTION

   PRESCRIBED HYDRAULIC BOUNDARY CONDITIONS FOR NODE  6     TYPE = JUNCTION

   PRESCRIBED HYDRAULIC BOUNDARY CONDITIONS FOR NODE  7     TYPE = JUNCTION

   PRESCRIBED HYDRAULIC BOUNDARY CONDITIONS FOR NODE  8     TYPE = JUNCTION

   PRESCRIBED HYDRAULIC BOUNDARY CONDITIONS FOR NODE  9     TYPE = JUNCTION

   PRESCRIBED HYDRAULIC BOUNDARY CONDITIONS FOR NODE 10     TYPE = JUNCTION

   PRESCRIBED HYDRAULIC BOUNDARY CONDITIONS FOR NODE 11     TYPE = DISCHARGE
        NUMBER OF TABLE ENTRIES =  14      TIME DEPENDENCE = VARIABLE
                                                             LINEAR

             TIME (SEC)     SURFACE ELEVATION (FT)     DISCHARGE (CFS)
                    0.0                0.0                 65900.00
                86400.00                0.0                 63900.00
               172800.00                0.0                 61400.00
               259200.00                0.0                 60800.00
               345600.00                0.0                 63100.00
               432000.00                0.0                 65600.00
               518400.00                0.0                 65700.00
```

604800.00	0.0	64100.00
691200.00	0.0	61500.00
777600.00	0.0	59400.00
864000.00	0.0	58900.00
950400.00	0.0	58800.00
1036800.00	0.0	59000.00
1123200.00	0.0	58000.00

PRESCRIBED HYDRAULIC BOUNDARY CONDITIONS FOR NODE 12 TYPE = JUNCTION

PRESCRIBED HYDRAULIC BOUNDARY CONDITIONS FOR NODE 13 TYPE = JUNCTION

PRESCRIBED HYDRAULIC BOUNDARY CONDITIONS FOR NODE 14 TYPE = JUNCTION

PRESCRIBED HYDRAULIC BOUNDARY CONDITIONS FOR NODE 15 TYPE = RATING CURVE

NUMBER OF TABLE ENTRIES = 8 TIME DEPENDENCE =

TIME (SEC)	SURFACE ELEVATION (FT)	DISCHARGE (CFS)
0.0	660.000	0.0
0.0	669.040	50000.00
0.0	674.050	100000.00
0.0	677.980	150000.00
0.0	681.130	200000.00
0.0	683.980	250000.00
0.0	686.550	300000.00
0.0	688.920	350000.00

PRESCRIBED HYDRAULIC BOUNDARY CONDITIONS FOR NODE 16 TYPE = WIER - TWO UPSTREAM NODE = 17

PRESCRIBED HYDRAULIC BOUNDARY CONDITIONS FOR NODE 17 TYPE = WIER - TWO UPSTREAM NODE = 16

PRESCRIBED HYDRAULIC BOUNDARY CONDITIONS FOR NODE 18 TYPE = WIER - ONE UPSTREAM NODE = 19

PRESCRIBED HYDRAULIC BOUNDARY CONDITIONS FOR NODE 19 TYPE = WIER - ONE UPSTREAM NODE = 18

PRESCRIBED HYDRAULIC BOUNDARY CONDITIONS FOR NODE 20 TYPE = JUNCTION

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*
* 50 STORAGE LOCATIONS REQUIRED FOR HYDRAULIC BOUNDARY CONDITIONS *
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HYDROGRAPHS AND HYDRAULIC PROFILES REQUESTED

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10 HYDROGRAPHS ARE TO BE PRINTED

HYDROGRAPH	REACH	X (FT)	PERIOD
1	150	0.	1
2	200	63700.	1
3	450	139128.	1
4	1000	0.	1
5	1150	43000.	1
6	1350	0.	1
7	1500	34100.	1
8	1750	40800.	1
9	1850	0.	1
10	1950	39072.	1

10 PROFILES ARE TO BE PRINTED

PROFILE	REACH	TIME INCREMENT	PERIOD
1	150	312	1
2	200	312	1
3	500	312	1
4	800	312	1
5	1000	312	1
6	1400	312	1
7	1500	312	1
8	1750	312	1
9	1850	312	1
10	1950	312	1

****

PEACE ATHABASCA DELTA FLOW SIMULATION MODEL

HYDROGRAPH FOR REACH 150 SECTION 1 X = REACH 150 0.0 LAKE ATHABASCA DURING PERIOD 1

TIME (SEC)	SURFACE ELEVATION (FT)	DEPTH (FT)	DISCHARGE (CFS)	VELOCITY (FT/SEC)	
0.	688.00	150.00	31282.	0.01	Sept 10/77
3600.	687.97	149.97	-130720.	-0.02	
7200.	687.97	149.97	-131028.	-0.02	
10800.	687.97	149.97	-93432.	-0.02	
14400.	687.97	149.97	-53523.	-0.01	
18000.	687.97	149.97	382.	0.00	
21600.	687.96	149.96	37038.	0.01	
25200.	687.96	149.96	59052.	0.01	
28800.	687.96	149.96	67457.	0.01	
32400.	687.96	149.96	57340.	0.01	
36000.	687.96	149.96	63434.	0.01	
39600.	687.96	149.96	46507.	0.01	
43200.	687.96	149.96	46995.	0.01	- - - MIDNIGHT
46800.	687.96	149.96	30853.	0.01	
50400.	687.96	149.96	32159.	0.01	
54000.	687.96	149.96	23946.	0.00	
57600.	687.96	149.96	13896.	0.00	
61200.	687.96	149.96	21730.	0.00	
64800.	687.95	149.95	20861.	0.00	
68400.	687.95	149.95	19482.	0.00	
72000.	687.95	149.95	33743.	0.01	
75600.	687.95	149.95	38229.	0.01	
79200.	687.95	149.95	36619.	0.01	
82800.	687.95	149.95	41105.	0.01	
86400.	687.95	149.95	38171.	0.01	
90000.	687.95	149.95	33553.	0.01	Sept 11
93600.	687.95	149.95	39209.	0.01	
97200.	687.95	149.95	26494.	0.00	
100800.	687.95	149.95	30553.	0.01	
104400.	687.95	149.95	37365.	0.01	
108000.	687.94	149.94	35428.	0.01	
111600.	687.94	149.94	37621.	0.01	
115200.	687.94	149.94	37854.	0.01	
118800.	687.94	149.94	38547.	0.01	
122400.	687.94	149.94	24828.	0.00	
126000.	687.94	149.94	18206.	0.00	
129600.	687.94	149.94	30775.	0.01	- - -
133200.	687.94	149.94	41528.	0.01	
136800.	687.94	149.94	30738.	0.01	
140400.	687.94	149.94	17064.	0.00	
144000.	687.94	149.94	22938.	0.00	
147600.	687.94	149.94	26416.	0.01	
151200.	687.93	149.93	41881.	0.01	
154800.	687.93	149.93	42835.	0.01	
158400.	687.93	149.93	36221.	0.01	
162000.	687.93	149.93	40904.	0.01	
165600.	687.93	149.93	38943.	0.01	
169200.	687.93	149.93	40664.	0.01	
172800.	687.93	149.93	24896.	0.00	
176400.	687.93	149.93	11958.	0.00	Sept 12
180000.	687.92	149.92	13909.	0.00	
183600.	687.92	149.92	3986.	0.00	
187200.	687.92	149.92	-418.	-0.00	
190800.	687.92	149.92	-12808.	-0.00	
194400.	687.91	149.91	-23272.	-0.00	
198000.	687.91	149.91	-6189.	-0.00	
201600.	687.91	149.91	10872.	0.00	
205200.	687.90	149.90	17796.	0.00	
208800.	687.90	149.90	8355.	0.00	
212400.	687.90	149.90	6869.	0.00	
216000.	687.89	149.89	8976.	0.00	- - -
219600.	687.89	149.89	3955.	0.00	
223200.	687.89	149.89	1611.	0.00	
226800.	687.89	149.89	9583.	0.00	
230400.	687.88	149.88	-4120.	-0.00	
234000.	687.88	149.88	-9321.	-0.00	
237600.	687.88	149.88	794.	0.00	
241200.	687.87	149.87	-504.	-0.00	
244800.	687.87	149.87	7009.	0.00	
248400.	687.87	149.87	3263.	0.00	
252000.	687.87	149.87	6765.	0.00	
255600.	687.86	149.86	-8532.	-0.00	
259200.	687.86	149.86	-57.	-0.00	
262800.	687.86	149.86	22055.	0.00	Sept 13
266400.	687.86	149.86	14449.	0.00	
270000.	687.85	149.85	19140.	0.00	
273600.	687.85	149.85	14882.	0.00	
277200.	687.85	149.85	26188.	0.00	
280800.	687.85	149.85	33543.	0.01	
284400.	687.85	149.85	22468.	0.00	

Sept 14

Sept 15

Sept 16

APPENDIX E

THEORY AND COMPUTATION OF THE ONE-DIMENSIONAL HYDRODYNAMIC MODEL

ONE DIMENSIONAL HYDRODYNAMIC MODEL

A. THEORETICAL CONSIDERATIONS

A.1 GOVERNING EQUATIONS AND ASSUMPTIONS *1

The process of propagation of long waves in open channels is described by the Equations of St. Venant. These equations represent the conservation of mass and momentum of flow of fluid in the channel. The fundamental assumptions that are made in the derivation of the St. Venant Equations are:

1) The flow is assumed to be one dimensional, i.e. the flow in the channel can be well approximated with uniform velocity over each cross-section and the free surface is taken to be a horizontal line across the section. This implies that centrifugal effect due to channel curvature and Coriolis effect are negligible.

2) The pressure is assumed to be hydrostatic, i.e. the vertical acceleration is neglected and the density of the fluid is assumed to be homogeneous.

3) The effects of boundary friction and turbulence can be accounted for through the introduction of a resistance force which is described by the empirical "Manning" or "Darcy Weisbach" Friction Factor Equations.

Having made these assumptions, the conservation equations may be formulated by the "material" method or the "control volume" method. In the "material" method the flow characteristics are obtained by following the motion of a

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*1 Daniel J. Gunaratnam and Frank E. Perkins, "Numerical Solution for Unsteady Flows in Open Channels", Hydrodynamics Laboratory, Report No. 127, July 1970, p. 25-32

given mass of fluid through a small increment of time in the vicinity of the fixed section. In the "control volume" method the equations are derived by considering the fluxes of mass and momentum through a fixed control volume (see Figures 1 and 2).

Derivations of the St. Venant Equations by the "material" method formulations were made by Harleman *[2]. The equations in terms of average velocity, v, and water surface elevation, z, are given below (see Figure 1 and Figure 2 for notation).

Continuity Equation

$$\underset{1}{B}\frac{\partial z}{\partial t} + \underset{2}{Bv}\frac{\partial z}{\partial x} + \underset{3}{A}\frac{\partial v}{\partial x} + \underset{4}{v}\frac{\partial A}{\partial x}\Big|_{z=\text{const.}} = \underset{5}{q_L} \qquad (1)$$

Momentum Equation

$$\underset{6}{\frac{\partial v}{\partial t}} + \underset{7}{v}\frac{\partial v}{\partial x} + \underset{8}{\frac{vq_L}{A}} = \underset{9}{g}\left(\underset{10}{S_o - \frac{v|v|}{C_z^2 R}}\right) - \underset{11}{g}\frac{\partial h}{\partial x} \qquad (2)$$

The role of the various terms are defined below:

Continuity Equation

(1) Rate of rise term which gives the storage changes due to water surface elevation changes with time.

(2) Prism storage term (see Figure 3) due to variation in velocity with space

*[2] Harleman, D.R.F. and Lee, C.H. "The Computation of Tides and Currents in Estuaries and Canals", U.S. Army Corps of Engineers Report, Oct. 1967

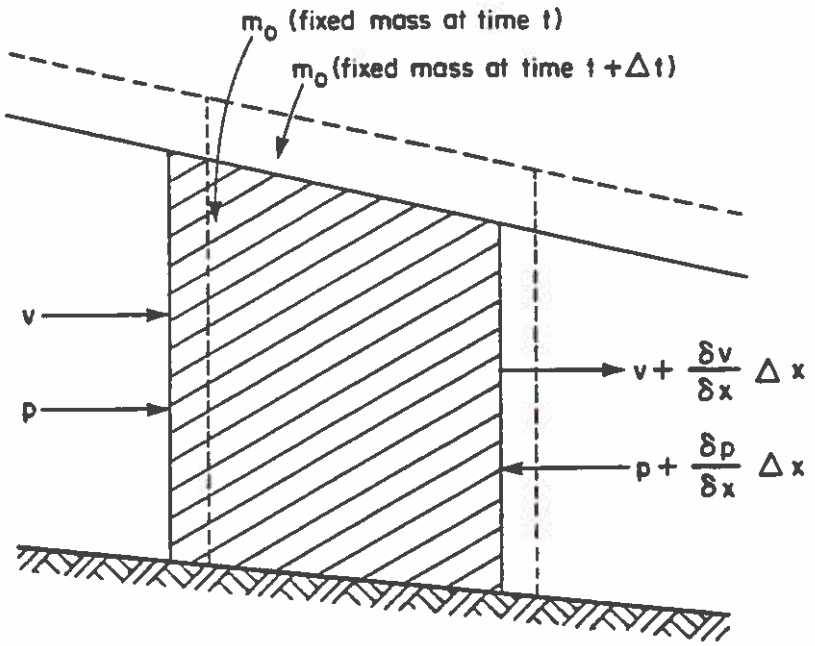

Fig. I. Definition Sketch of Control Volume

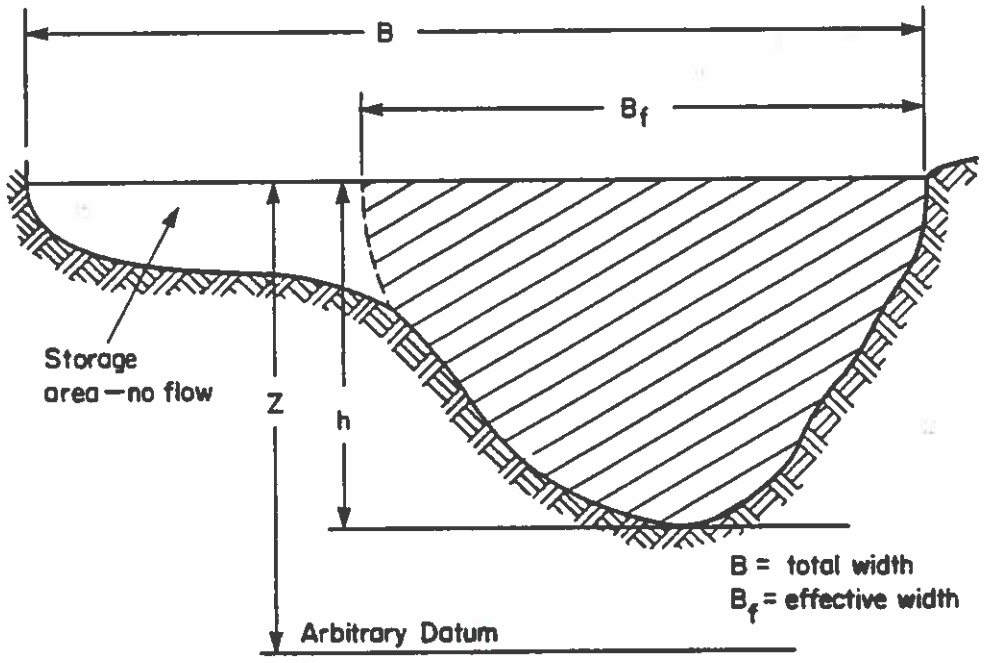

Fig. 2. Definition Sketch of Cross Section of Arbitrary Channels

(3) and (4) Wedge storage term due to aerial variations in velocity with space. (see Figure 3)

(5) Lateral inflow term which gives the net mass change spatially and temporally beyond the storage terms

Momentum Equation

(6) Acceleration due to time variation in flow

(7) Acceleration due to spatial variation in velocity

(8) Acceleration effects due to lateral inflow

(9) Gravity body force due to bed slope

(10) Frictional force effects

(11) Pressure force term

For a wide rectangular channel the equations take the special form:

Continuity Equation

$$\frac{\partial h}{\partial t} + \frac{\partial h}{\partial x} + \frac{\partial v}{\partial x} = q_L \qquad (3)$$

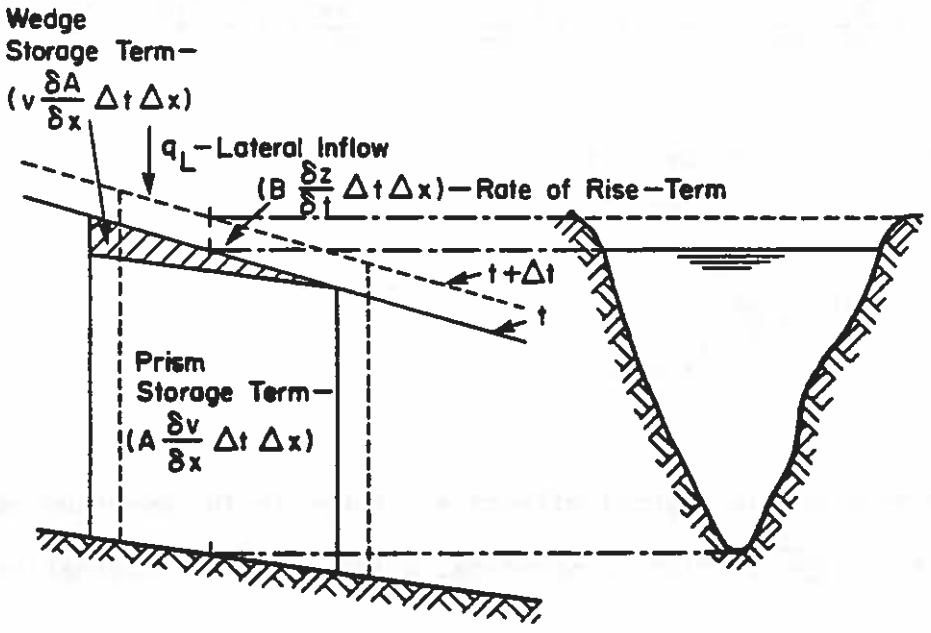

Fig. 3. Physical Representation of Terms in Continuity Equation

Momentum Equation

$$\frac{\partial v}{\partial t} + v\frac{\partial v}{\partial x} + \frac{vq_L}{h} = g\left(S_o - \frac{v|v|}{C_z^2 h}\right) - g\frac{\partial h}{\partial x} \qquad (4)$$

It has been found that since the boundary conditions are generally specified in terms of discharge, Q, or water surface elevation, z, it is more useful to express the St. Venant equations in terms of Q and z as follows:

Continuity Equation

$$B\frac{\partial z}{\partial t} + \frac{\partial Q}{\partial x} = q_L \qquad (5)$$

Momentum Equation

$$\left(\frac{\partial Q}{\partial t} + 2v\frac{\partial Q}{\partial x}\right)\frac{1}{Ag} = -\left(1 - F^2\right)\frac{\partial z}{\partial x} + \left(\frac{1}{B}\frac{\partial A^z}{\partial x}\right)F^2 - \frac{Q|Q|}{K^2} \qquad (6)$$

where: F = Froude Number

$$K = AC_z\sqrt{R}$$

$$\frac{\partial A^z}{\partial x} = \left.\frac{\partial A}{\partial x}\right|_{z = \text{const.}} \qquad (6a)$$

The non-prismatic channel effects are shown in the momentum equation by the term, $\frac{\partial A^z}{\partial x}$, which is sometimes written in the alternative form,

$$\frac{\partial A^z}{\partial x} = B \left(S_o + \frac{1}{B} \frac{\partial A^h}{\partial x} \right) \qquad (6b)$$

A.1.1 Inclusion of Vertical Acceleration Terms

In some special cases, the vertical acceleration terms which were neglected in the St. Venant Equations can be significant. In order to understand the nature of these special cases, a form of the governing equations including acceleration effects is presented. This form which was proposed by Keulegan *[3] is restricted to the following simplified cases:

1) Wide rectangular channel

2) The variation with z of the x-component of local velocity, v, is negligible i.e. $v = v(x,t)$

3) Lateral inflow and lateral velocity are neglected.

By virtue of these simplifications it is possible to focus attention solely on the effects of the vertical acceleration associated with rapid changes in the water surface elevation. A derivation of the equation is presented by Keulegan. For the present purposes it is sufficient to note that the resulting form of the governing equations is:

Continuity Equation

$$\frac{\partial h}{\partial t} + v \frac{\partial h}{\partial x} + h \frac{\partial v}{\partial x} = 0 \qquad (7)$$

*[3] Keulegan, G.H. and Patterson, G.W. "Effects of Turbulence and Channel Slope in Translation Waves", Journal of Research, National Bureau of Standards, Vol. 30, June 1943

Momentum Equation

$$\frac{\partial v}{\partial t} + v\frac{\partial v}{\partial x} + \underbrace{\frac{hv^2}{3}\left(\frac{\partial^3 h}{\partial x^3} + \frac{2}{v}\frac{\partial^3 h}{\partial x^2 \partial t} + \frac{1}{v^2}\frac{\partial^3 h}{\partial x \partial t^2}\right)}_{\text{vertical acceleration terms}} = g\left(S_o - \frac{v|v|}{C_z^2 h}\right) - g\frac{\partial h}{\partial x} \qquad (8)$$

By comparing these results with equations (3) and (4), without the lateral inflow term, it can be seen that the continuity equation is unaffected while three additional vertical acceleration terms appear in the momentum equation. The vertical acceleration terms are only significant when the water surface curvatures are large. It can be shown through an order of magnitude analysis that for normal transient flow conditions (i.e. $h/L << 1$ where h is the flow depth and L the characteristic wave length of the transient) they are second order terms (see Keulegan). The effects of these acceleration terms under strong water surface curvatures of a steep front due to rapid transients is to disperse the front (i.e. to create a series of undulations behind the front *4, *5. However, even if steep fronts do form, it is unnecessary from an engineering point of view to represent them in detail since they are small and damp out rapidly. Furthermore, by writing the St. Venant equations in conservation form, or by using some accurate, numerical procedures, the mean shape of these steep fronts can be predicted. Hence, it had been chosen to ignore the effects of the vertical acceleration terms.

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*4 Shonfield, J.C. "Distortion of Long Waves: Equilibrium and Stability, "U.G.G.I., A.I.H.S., 1951, Vol. 4, pg. 140-157

*5 Peregrine, D.H. "Long Waves on a Beach", Journal of Fluid Mechanics, Vol. 27, part 4, pg. 815-827, (1967)

B.1 COMPUTATION METHOD

B.1.1 Method of Superposition

A basic technique in formulating the network solution procedure is the method of superposition, which was proposed for channel network computations by Gunaratnam and Perkins *[1]. It resembles the method of influence functions which is commonly used in structural analysis. The technique makes use of the fact that, at a given time step, the solutions for water surface elevations, discharges, and concentrations at mesh points are given by sets of simultaneous linear equations. Because these equations are linear the principle of superposition will hold. The actual mechanics of executing the method of superposition are discussed in the following section; however, the basic notions are simple. In a given reach, the solution may be decoupled from the boundary mesh points by solving a set of equations for the interior mesh points under the assumption that solution values at the boundary mesh points are zero. This will be called a null solution. Using the same set of equations, influence factors due to unit solution values at the boundary mesh points are computed at the interior mesh points. There remains a set of equations for the boundary mesh points, which may be solved after the boundary conditions are included. Solution values at the interior mesh points are obtained next by multiplying the boundary solution values by the influence factors and adding the products to the null solution.

B.1.2 Solution Procedure

In line with the operational features of the method of superposition, discussion of the solution procedure will be divided into two sections:

one on interior mesh points and the other on boundary mesh points. Section B.1.3 - Interior mesh points, is taken from the work of Gunaratnam and Perkins. The rudiments of Section B.1.4 on Boundary mesh points are from the work of Wood, Harley and Perkins *[6]; however, the actual procedure discussed is a result of the study of Dailey and Harleman *[7].

B.1.3 Interior Mesh Points

The notation in this section is taken directly from Gunaratnam and Perkins *[1]. It differs from the notation used previously in that is is adjusted to conform more closely with subscripted variable notations in FORTRAN programming. The time step superscript n+1 has been dropped from water surface elevations and discharges.

At mesh point j, the water surface elevation z(j) and the discharge Q(j) may be written in terms of their respective null solutions and products of the appropriate influence factors and boundary values:

$$z(j)=z^{o}(j)+dx_1(j)\cdot z(1)+dx_3(j)\cdot Q(1)+dx_{11}(j)\cdot z(N)+dx_{33}(j)\cdot Q(N) \qquad (9)$$

$$Q(j)=Q^{o}(j)+dx_2(j)\cdot z(1)+dx_4(j)\cdot Q(1)+dx_{22}(j)\cdot z(N)+dx_{44}(jj)\cdot Q(N) \qquad (10)$$

where:

$z^{o}(j)$ = null solution for z(j)

$dx_1(j)$ = influence on z(j) of unit z(1)

$dx_3(j)$ = influence on z(j) of unit Q(1)

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*[6] Eric F. Wood, Brendal M. Harley and Frank R. Perkins, "Operational Characteristics of a Numerical Solution for the Simulation of Open Channel Flow", Report No. 150, M.I.T. R72-30, June 1972

*[7] James E. Dailey and Donald R.F. Harleman, "Numerical Model for the Prediction of Transient Water Quality in Estuary Networks" Report No. 158, M.I.T. R72-72, Oct. 1972

$dx_{11}(j)$ = influence on z(j) of unit z(N)

$dx_{33}(j)$ = influence on z(j) of unit Q(N)

$Q^{o}(j)$ = null solution for Q(j)

$dx_{2}(j)$ = influence on Q(j) of unit z(1)

$dx_{4}(j)$ = influence on Q(j) of unit 0(1)

$dx_{22}(j)$ = influence on Q(j) of unit z(N)

$dx_{44}(j)$ = influence on Q(j) of unit Q(N)

The set of simultaneous linear equations resulting from the finite difference scheme and consisting of Equation (3.9) and the corresponding boundary equations can be written in matrix form as

$$\underline{\underline{A}}\,\underline{\underline{x}} = \underline{\underline{d}} \qquad (11)$$

where:

$$\underline{\underline{A}} = \begin{bmatrix}
b_3^1 & b_4^1 & c_3^1 & c_4^1 & & & & & & \\
a_1^2 & a_2^2 & b_1^2 & b_2^2 & c_1^2 & c_2^2 & & & & \\
a_3^2 & a_4^2 & b_3^2 & b_4^2 & c_3^2 & c_4^2 & & & & \\
 & & & & & & & & & \\
 & & a_1^{N-1} & a_2^{N-1} & b_1^{N-1} & b_2^{N-1} & c_1^{N-1} & c_2^{N-1} & & \\
 & & a_3^{N-1} & a_4^{N-1} & b_3^{N-1} & b_4^{N-1} & c_3^{N-1} & c_4^{N-1} & & \\
 & & & & a_1^{N} & a_2^{N} & b_1^{N} & b_2^{N} & &
\end{bmatrix}$$

and:

$$\underline{x} = \begin{bmatrix} z_1 \\ Q_1 \\ z_2 \\ Q_2 \\ \vdots \\ z_{N-1} \\ Q_{N-1} \\ z_N \\ Q_N \end{bmatrix} \qquad \underline{d} = \begin{bmatrix} d_2^1 \\ d_1^2 \\ d_2^2 \\ \vdots \\ d_1^{N-1} \\ d_2^{N-1} \\ d_1^N \end{bmatrix}$$

The coefficients a, b, c and d relate to the terms of the finite difference equation and are defined precisely by Dailey and Harleman.

The null solution and the influence coefficients may be obtained in a single operation by solving the following matrix equation in the computer.

$$\underline{\underline{A}}'\underline{x}' = \underline{d}' \qquad (12)$$

where:

$\underline{\underline{A}}'$ = the 2N-4 x 2N-4 bitridiagonal submatrix which is defined by the dashed lines in the coefficient matrix $\underline{\underline{A}}$ of Equation (11).

$$\underline{\underline{x}}' = \begin{bmatrix} z^o(2) & dx_1(2) & dx_3(2) & dx_{11}(2) & dx_{33}(22) \\ Q^o(2) & dx_2(2) & dx_4(2) & dx_{22}(2) & dx_{44}(22) \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ z^o(N-1) & dx_1(N-1) & dx_3(N-1) & dx_{11}(N-1) & dx_{33}(N-1) \\ Q^o(N-1) & dx_2(N-1) & dx_4(N-1) & dx_{22}(N-1) & dx_{44}(N-1) \end{bmatrix}$$

$$\underline{\underline{d}}' = \begin{bmatrix} d_1^2 & -a_1^2 & -a_2^2 & 0 & 0 \\ d_2^2 & -a_3^2 & -a_4^2 & & \\ \vdots & 0 & 0 & \vdots & \vdots \\ & & & 0 & 0 \\ d_1^{N-1} & & & -c_1^{N-1} & -c_2^{N-1} \\ d_2^{N-1} & 0 & 0 & -c_3^{N-1} & -c_4^{N-1} \end{bmatrix}$$

The first column of $\underline{\underline{d}}'$ supplies the null solution when water surface elevation and discharge are prescribed as zero at the upstream and downstream boundaries. The remaining four columns in $\underline{\underline{d}}'$ are the carry-overs from the appropriate columns outside the dashed lines in matrix $\underline{\underline{A}}$ of Equation (11). When unit water surface elevations and discharges are prescribed at the boundaries, the appropriate columns in $\underline{\underline{A}}$ are multiplied by 1 and moved to victors in $\underline{\underline{d}}'$.

A double sweep algorithm for solving a set of simultaneous linear equations whose coefficient matrix is bitridiagonal is given by Gunaratnam and Perkins. The five solution vectors in $\underline{\underline{x}}'$ are obtained by generalizing this algorithm to handle five right-hand sides. Since the solution procedure is essentially Gauss reduction, the coefficient matrix must be decomposed only once rather than five times.

Once the boundary values are computed, as shown in the following section, z(j) and Q(j) may be determined by back-substitution.

B.1.4 Boundary Mesh Points

From equation (11) the first and last equations remain to be used in solving for the boundary values. These equations may be written in terms of only the boundary values by replacing z(2), Q(2), z(N-1) and Q(N-1) with equations (9) and (10).

$$\alpha_1 z(1) + \alpha_2 Q(1) + \alpha_3 z(N) + \alpha_4 Q(N) = D_2^1 \tag{13}$$

$$\beta_1 z(1) + \beta_2 Q(1) + \beta_3 z(N) + \beta_4 Q(N) = D_1^N \tag{14}$$

where:

$$\alpha_1 = b_3(1) + dx_1(2)\cdot c_3(1) + dx_2(2)\cdot c_4(1)$$

$$\alpha_2 = b_4(1) + dx_3(2)\cdot c_3(1) + dx_4(2)\cdot c_4(1)$$

$$\alpha_3 = dx_{22}(2)\cdot c_3(1) + dx_{22}(2)\cdot c_4(1)$$

$$\alpha_4 = dx_{33}(2)\cdot c_3(1) + dx_{44}(2)\cdot c_4(1)$$

$$\beta_1 = dx_1(N-1)\cdot a_1(N) + dx_2(N-1)\cdot a_2(N)$$

$$\beta_2 = dx_3(N-1)\cdot a_1(N) + dx_4(N-1)\cdot a_2(N)$$

$$\beta_3 = b_2(N) + dx_{11}(N-1)\cdot a_1(N) + dx_{22}(N-1)\cdot a_2(N)$$

$$\beta_4 = b_2(N) + dx_{33}(N-1)\cdot a_1(N) + dx_{44}(N-1)\cdot a_2(N)$$

$$D_2^1 = d_2^1 - c_3(1)\cdot z^o(2) - c_4(1)\cdot Q^o(2)$$

$$D_1^N = d_1^N - a_1(N)\cdot z^o(N-1) - a_2(N)\cdot Q^o(N-1)$$

Equations (13) and (14) and two boundary conditions are sufficient to solve for the water surface elevations and discharges at the boundary mesh points. In formulating the network solution procedure it is useful to consider the example network in Fig. 4 once again. For each reach that enters a node, the boundary water surface elevation and the boundary discharge are unknown. As an example, there are 6 unknowns at node 2. To solve for these unknowns there is one boundary equation for each reach which enters the node. The remaining equations must be specified by boundary conditions. Thus, at exterior nodes 1 and 4, a single boundary condition specifying water surface elevation or discharge is required. At interior nodes 2 and 3, the required boundary conditions are supplied by compatibility of water surface elevations and continuity of discharge. Returning to node 2, the compatibility condition is:

$$z_N^I = z_1^{II} = z_1^{III} \qquad (15)$$

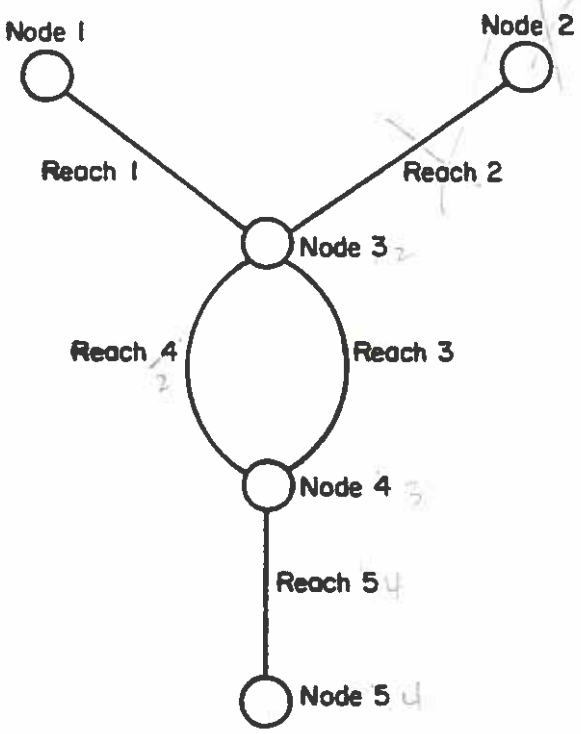


Fig. 4a Five-Reach Network Configuration

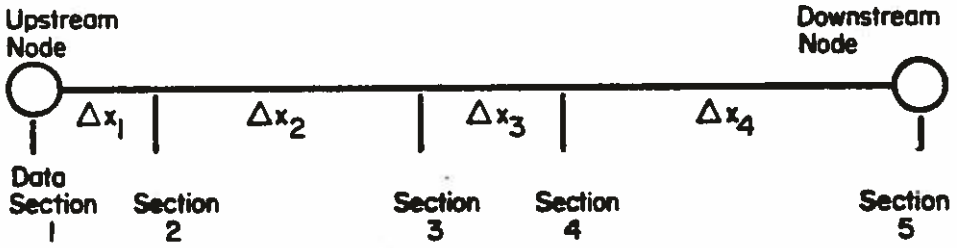


Fig. 4b Typical Reach Showing Data-Cross Sections

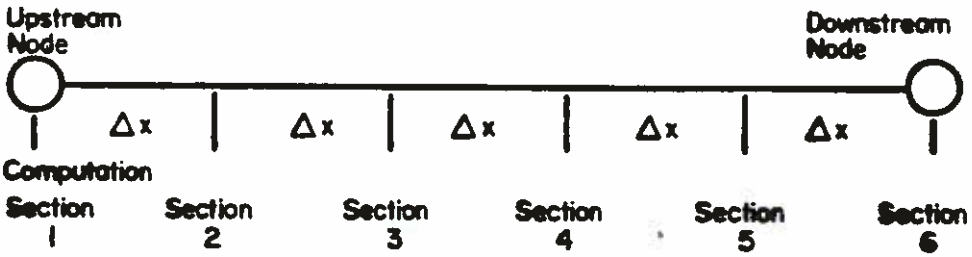


Fig. 4c Typical Reach Showing Computation Cross-Section

where:

z_N^I = water surface elevation at mesh point N of reach I

z_1^{II} = water surface elevation at mesh point 1 of reach II

z_1^{III} = water surface elevation at mesh point 1 of reach III

and the continuity condition is:

$$Q_N^I - Q_1^{II} - Q_1^{III} = 0 \qquad (16)$$

where:

Q_N^I = discharge at mesh point N of reach I

$Q_{N_1}^{II}$ = discharge at mesh point 1 of reach II

Q_1^{III} = discharge at mesh point 1 of reach III

The equations are grouped for solution by looping over the nodes. At each node, the compatibility condition is enforced by solving for a single water surface elevation. Then the boundary equations offset the unknown discharges which enter the node, and either a boundary condition or a continuity condition offsets the water surface elevation. In matrix form, the set of equations for the boundary values of the example network are grouped as follows:

$$
\begin{bmatrix}
\alpha_1^I & \alpha_2^I & \alpha_3^I & \alpha_4^I & & & & & & & & \\
1 & & & & & & & & & & & \\
\hline
\beta_1^I & \beta_2^I & \beta_3^I & \beta_4^I & & & & & & & & \\
 & & \alpha_1^{II} & & \alpha_2^{II} & & \alpha_3^{II} & \alpha_4^{II} & & & & \\
 & & \alpha_1^{III} & & & \alpha_2^{III} & \alpha_3^{III} & & \alpha_4^{III} & & & \\
 & & & 1 & -1 & -1 & & & & & & \\
\hline
 & & \beta_1^{II} & & \beta_2^{II} & & \beta_3^{II} & \beta_4^{II} & & & & \\
 & & \beta_1^{III} & & & \beta_2^{III} & \beta_3^{III} & & \beta_4^{III} & & & \\
 & & & & & & \alpha_1^{IV} & & & \alpha_2^{IV} & \alpha_3^{IV} & \alpha_4^{IV} \\
 & & & & & & & 1 & 1 & -1 & & \\
\hline
 & & & & & & \beta_1^{IV} & & & \beta_2^{IV} & \beta_3^{IV} & \beta_4^{IV} \\
 & & & & & & & & & & & 1
\end{bmatrix}
\begin{bmatrix}
z_1 \\ Q_1^I \\ \hline z_2 \\ Q_N^I \\ Q_1^{II} \\ Q_1^{III} \\ \hline z_3 \\ Q_N^{II} \\ Q_N^{III} \\ Q_1^{IV} \\ \hline z_4 \\ Q_N^{IV}
\end{bmatrix}
=
\begin{bmatrix}
D_2^{1,I} \\ \bar{z} \\ \hline D_1^{N,I} \\ D_2^{1,I} \\ D_2^{1,III} \\ 0 \\ \hline D_1^{N,II} \\ D_1^{N,III} \\ D_2^{1,IV} \\ 0 \\ \hline D_1^{N,IV} \\ \bar{Q}
\end{bmatrix}
\tag{17}
$$

In equation 17 water surface elevation $\bar{z}$ is specified at node 1 and discharge $\bar{Q}$ is specified at node 4.

A very fortunate result of grouping the equations in this way is that the coefficient matrix of equation (17) is banded. The bandwidth can be determined by checking each reach and looking for the maximum throws of the nodal submatrices from the main diagonal. In large networks, the banded structure of the coefficient matrix becomes very important computationally. The number of unknowns being evaluated in equation (17) is twice the number of reaches plus the number of nodes. For a network of 30 reaches and 30 nodes, the coefficient matrix will be 90 x 90, requiring more than 32^K bytes of computer storage (IBM 360 or 370 System) in standard precision. Depending on the network topology and efficient node numbering, banding may significantly reduce the core storage requirements and improve execution times.

B.1.5 Initial Conditions

It is presumed that one knows the initial conditions, i.e., z and Q at all computational stations at time t = o. In the absence of such detailed knowledge approximate values should be given.

In the steady-state studies a convergence to steady-state values will proceed. The better the initial approximation the sooner a convergence is obtained with a corresponding saving in computer time. In making a transient study it is advisable to "lead-in" to the initial time of the transient study by a previous steady-state run or by a previous transient

run of shorter duration. The objective of such a "lead-in"is to start the run with the best possible set of initial conditions.

B.1.6 Boundary Conditions

Both initial and boundary conditions must be specified for the existence of a unique solution to the governing equations. For subcritical flow, three possibilities exist. They are:

1) The specification of the discharge Q

2) The specification of the surface elevation Z

3) The specification of a relationship between Z and Q.

As the M.I.T. Open Channel Network Model is applicable only to subcritical flow conditions (practical considerations), only one time history Z(t), Q(t) or Z vs. Q. is required at each boundary. Typical boundary specifications would be a water surface elevation at the downstream boundary of a tidal estuary, a discharge boundary condition for upstream flood flows or releases from a dam, and a Z vs. Q. rating curve for control structures such as weirs, gates and spillways.

The concept of a control structure can be extended to the downstream boundary in long rivers in terms of a stage-routing condition. Henderson *8 shows that for flood routing a loop-rating curve applies, as shown in Fig. 5.

*8 F.M. Henderson, "Open Channel Flow", MacMillan Series in Civil Engineering" 1966, Chapter 9.

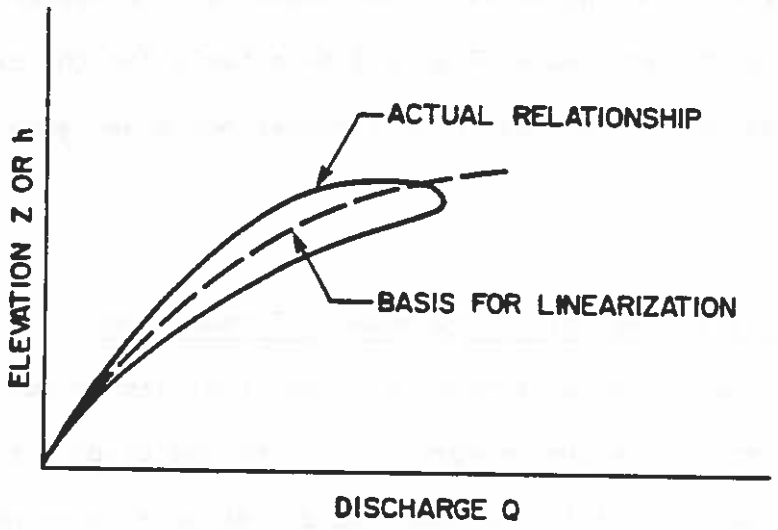


FIG 5. STAGE—DISCHARGE CURVE

The curve in Figure 5 is defined by:

$$Q = C_z A \sqrt{R\left(S_o - \frac{\partial h}{\partial x} - \frac{v}{g}\frac{\partial v}{\partial x} - \frac{1}{g}\frac{\partial v}{\partial t}\right)} \qquad (18)$$

where C_z, the Chezy coefficient, can be expressed in terms of Manning, n as $C_z = \frac{1.486}{n} R^{1/6}$.

For flood routing and for uniform flow in straight channels the terms:

$$\frac{v}{g}\frac{\partial v}{\partial x} \quad , \quad \frac{1}{g}\frac{\partial v}{\partial t} << 1$$

and $$Q = C_z A \sqrt{R\left(S_o - \frac{\partial h}{\partial x}\right)} \qquad (19)$$

Equation 19 can be used to define the relationship of Figure 5. Gunaratnam and Perkins have used this as a boundary condition inasmuch as the

relationship yields a rating curve. They expand Q in a Taylor series in time using the dashed line of Figure 5 as a basis for the expansion. The Z vs. Q relationship derived in this manner has given good results in many cases.

B.1.7 Control Structures and Rapids in the Network Formulation

The M.I.T. Open Channel Network Model has been modified to consider control structures within the network itself instead of only at the boundaries. In general it is advisable to divide up a large network into smaller ones, using control structures as the natural points of subdivision. This results in large savings in computation costs as well as organizational convenience. Such subdivisions would place control structures at boundaries, but this is not always possible, nor desirable.

The modification to the Model permits the user to specify a boundary condition at the upstream side of the control structure. The upstream side of the control structure becomes a node in the Network Topology - a boundary node. The downstream side of the control structure is also a boundary node, distinct from the upstream node. The boundary condition applied at this downstream node will be the discharge calculated at the upstream node at the previous time step or, if discharge were the specified boundary condition, the specified discharge. Figure 6 shows a typical control structure network where the flow splits at node 2 into two branches. One branch (or reach) goes directly to node 5, whereas the other passes through a control structure. Node 3 is the upstream node of the control structure, node 4 the downstream node. Confluence occurs at node 5.

One special feature, added to the Peace-Athabasca Model version, is the addition of a special site specific weir equation. These are fully described in Appendix .

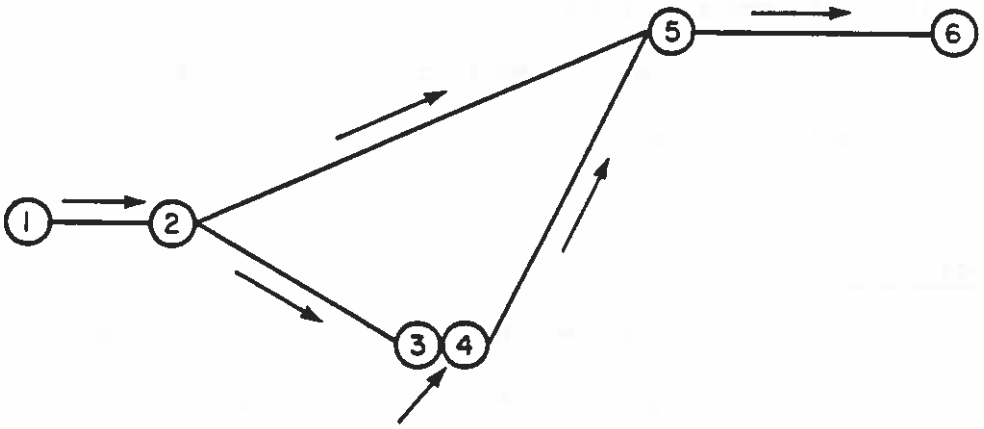


Figure 6

Rapids

Rapids represent a section of river where flow becomes critical. Although the mathematical model of Gunaratnam and Perkins is valid for such cases it is not practical as the discretization increment, Δx for critical flow would be very small in order to satisfy convergence criteria. Rapids are similar to control structures in that they can be studies in terms of a rating curve. If such a curve can be established by field measurements then the repids can be treated as a control structure. If obtaining such a curve is impractical two other possibilities exist. One is to assume a rating curve, such as:

$$q = 3.33\ H^{3/2} \qquad (20)$$

where q is the discharge per unit width and H is the depth at the head of the rapids. The other possibility is to treat the upstream boundary of the equivalent control structure as a stage-routine type boundary.

Finally, it should be mentioned that a modification, or patch, to the M.I.T. Open Channel Network Model could be made, permitting a "critical flow" reach to be treated as such.

B.1.8 Ice Cover

The effect of ice cover can be introduced into the numerical solution to the governing equations. This is accomplished through relating both the hydraulic radius R_h and the friction factor (Manning's n or Chezy Coefficient C) to the presence of an ice cover on the surface of the reach.

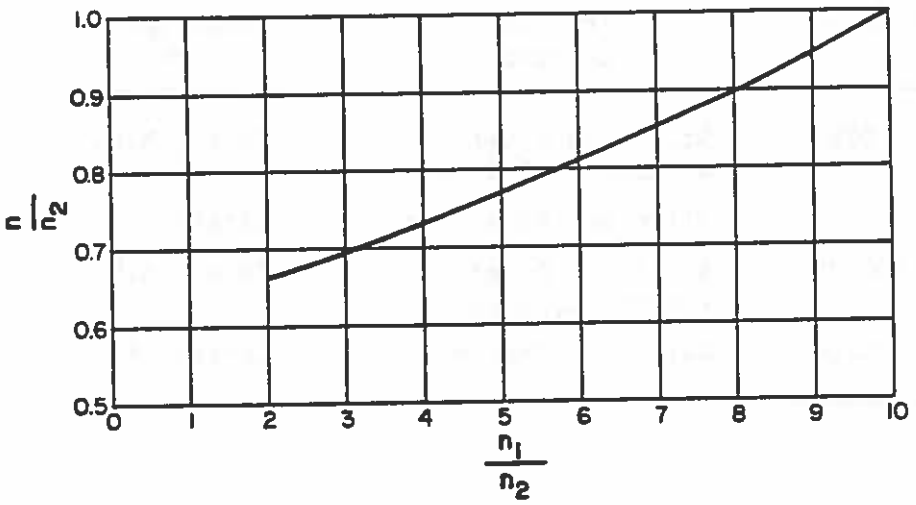
Although the M.I.T. program did not take this into account, the accompanying computer program allows the user to specify an ice cover. Such a specification effectively adds the surface width to the wetted perimeter, thereby decreasing the hydraulic radius which is defined as the cross-sectional area A, divided by the wetted perimeter WP.

$$R_h = \frac{A}{WP} \tag{21}$$

In applying the ice cover option the user must give careful consideration to the resistance coefficient which he selects for the ice-covered reach.

Larsen, *[9] has made significant contributions in this field and the following recommendations are based on his work.

The resistance coefficient, expressed as Manning's n, is determined as a composite coefficient representing the combined effects of the bottom roughness and the roughness of the ice cover. The bottom roughness is presumed known, or at least determined by having obtained satisfactory results with some coefficient when using the Hydrodynamic Network Model without ice cover. The relationship for composite roughness given by Larsen is shown in Figure 7.



Composite Manning Coefficient n as a Function of Ice and Bottom Coefficients (from Peter Larsen, 1973)

Figure 7

*[9] Larsen, P.A. "Hydraulic Roughness of Ice Covers", Journal of the Hydraulics Division, Proc. of the A.S.C.E., Volume 99, No. Hy1. January 1973.

In applying Figure 7, n_2 is the rougher of the two boundaries. The relationship is valid only for $n_2 \leq 0.04$ and the depth greater than 5 feet.

The roughness of the ice cover is not yet an easily determined quantity. Larsen's work gives a relationship for relative friction factor as a function of a form index resulting from observations of the waviness of the undersides of ice covers. This does not give a recommended n, but makes it possible to use physical data if it exists. Some observed values of n reported by Larsen are summarized in Table I.

Manning n for ice cover n_i	Physical Location	Reported by
0.0135-0.0281	St. Croix River Wisconsin, 1964-65	Carey, K.L.
0.0192	Kilforsen Power Canal	Laresn, P.
0.0039-0.0129	St. Croix River Wisconsin, 1965-66	Carey, K.L.
0.0252-0.0266	Gallejaur Channel	Larsen, P.

Table I

Larsen casts some doubts with respect to the higher n_i for the Gallejaur Channel. In general, one sees that n_i is lower than what one might expect in terms of bottom roughness.

The following example illustrates how Larsen's work could be applied to the St. Lawrence River.

Assume that ice on the St. Lawrence River has an effective roughness of $n_i = 0.02$, and that the bottom roughness is $n_b = 0.025$; as $n_b > n_i$, $n_2 = n_b$ and $n_1 = n_i$; $n_1/n_2 = 0.8$, for which Figure 7 gives $n/n_2 = 0.9$. The composite Manning coefficient n is, therefore, $n = 0.0225$.

The modification to the M.I.T. Hydraulic Network Model was verified by testing a simple channel with constant discharge, both with and without ice cover. The Manning coefficient was the same in this case as the modification being verified pertains to the hydraulic radius.

JCL & INPUT AND OUTPUT DATA SETS

INPUT DATA SETS

FT05F001 Input Data - cross-sections and hydrometric data

FT10F001 Hydraulic Solution - previous run

OUTPUT DATA SETS

```
//D988669W JOB (,
// D0E5G-ONED,3,8),J.W.HARVEY
/*SENDTO J.W.HARVEY / 8TH FLOOR P.V.M /
//JOBLIB DD DSN=D0E5G.WYL9886.LIBA,DISP=SHR
//B EXEC PGM=STLR7906,REGION=265K
//FT06F001 DD SYSOUT=A,DCB=(LRECL=133,RECFM=FA)
```

FT06F001 Printer Output

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//  DCB=(RECFM=VBS,LRECL=12,BLKSIZE=2400,BUFNO=1),DSN=D0E5G.ATHA
```

FT10F001 Hydraulic Solution - plotter & next run input

```
//FT11F001 DD DUMMY
```

FT11F001 Water Quality Solution

```
//FT11F001 DD DISP=NEW,UNIT=PUBLIC,SPACE=(TRK,(100,20)),
//  DCB=(RECFM=VBS,LRECL=12,BLKSIZE=2400,BUFNO=1)
```

FT12F001 Temporary Storage of Hydrograph Printer Data

```
//FT13F001 DD DISP=NEW,UNIT=PUBLIC,SPACE=(TRK,(100,20)),
//  DCB=(RECFM=VBS,LRECL=12,BLKSIZE=2400,BUFNO=1)
```

FT13F001 Temporary Storage of Hydraulic Profile Printer Data

```
//FT14F001 DD DUMMY
```

FT14F001 Temporary Storage for Water Quality Graphs

```
//FT15F001 DD DUMMY
```

FT15F001 Temporary Storage for Water Quality Profile