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NATIONAL DAM SAFETY PROGRAM. LAKE SHERWOOD DAM (MO 10202), UPPE--ETC(U)
JAN 79 E H BAUMEYER, L KUNZE DACW43-78-C-0169

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This report was prepared under the National Program of Inspection of Non-Federal Dams. This report assesses the general condition of the dam with respect to safety, based on available data and on visual inspection, to determine if the dam poses hazards to human life or property.		



DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT, CORPS OF ENGINEERS
210 NORTH 12TH STREET
ST. LOUIS, MISSOURI 63101

IN REPLY REFER TO

SUBJECT: LAKE SHERWOOD DAM - PHASE I INSPECTION REPORT.

This report presents the results of field inspection and evaluation of the Lake Sherwood Dam.

It was prepared under the National Program of Inspection of Non-Federal Dams

This dam has been classified as unsafe, non-emergency by the St. Louis District as a result of the application of the following criteria:

- 1) Spillway will not pass 50 percent of the Probable Maximum Flood
- 2) Overtopping could result in dam failure.
- 3) Dam failure significantly increases the hazard to loss of life downstream

SIGNED

SUBMITTED BY: _____
Chief, Engineering Division

10 APR 1979

Date

APPROVED BY: _____
Colonel, CE, District Engineer

10 APR 1979

Date

Handwritten 'A' and a checkmark.

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LAKE SHERWOOD DAM
WARREN COUNTY, MISSOURI

MISSOURI INVENTORY NO. 10202

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

PREPARED BY

Kenneth Balk & Associates, Inc.
St. Louis, Missouri
Shannon & Wilson, Inc.
St. Louis, Missouri

PREPARED FOR

ST. LOUIS DISTRICT, CORPS OF ENGINEERS

JANUARY, 1979

PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam	Lake Sherwood
State Located	Missouri
County Located	Warren County
Stream	Tributary To Wolf Creek
Date of Inspection	August 25, 1978

Lake Sherwood Dam, No. 10202 was inspected using the "Recommended Guidelines for Safety Inspection of Dams". These guidelines were developed by the Chief of Engineers, U. S. Army, Washington, D.C., with the help of Federal and state agencies, professional engineering organizations, and private engineers. The resulting guidelines are considered to represent a consensus of the engineering profession.

Lake Sherwood Dam was visually inspected by an interdisciplinary team of engineers from Kenneth Balk & Associates, Inc. and Shannon & Wilson, Inc. The purpose of the inspection was to make a preliminary assessment of the general condition of the dam with respect to safety in order to determine if, in the opinion of the interdisciplinary team, the dam poses recognizable hazards to human life or property. This assessment is based solely upon data made available and visual evidence observed during the site visit.

To make a complete assessment of the safety of the dam would require detailed studies and engineering analyses beyond the scope of this preliminary assessment.

Based on the criteria in the guidelines, the dam is in the high hazard potential classification, which means that loss of life and appreciable property loss could occur in the event of failure of the dam. The estimated damage zone extends approximately five miles downstream of the dam. Within the damage zone are a wastewater treatment works, seven farm complexes with farmhouses, and one State highway crossing. Lake Sherwood Dam is in the intermediate size classification since it is greater than 40 feet high but less than 100 feet high.

The inspection and evaluation indicate that the spillway of Lake Sherwood does not meet the criteria set forth in the guidelines for a dam having the above size and hazard potential. Lake Sherwood is an Intermediate size dam with a high hazard potential, required by the guidelines to pass the PMF. The Probable Maximum Flood, (PMF) is defined as the flood discharge that may be expected from the most severe combination of critical meteorological and hydrologic

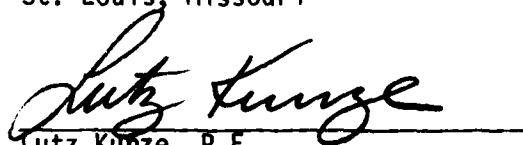
conditions that are reasonably possible in the region. Considering the high hazard potential to loss of life and property downstream of the dam, the outlet facilities of Lake Sherwood Dam should be able to pass the PMF without overtopping the dam. However, it was determined that the spillway will only pass approximately 20 percent of the PMF without overtopping the dam.

The evaluation of Lake Sherwood also indicated that the spillway will pass the 100-year flood; that is, a flood having a 1 percent chance of being equalled or exceeded during any given year.

Deficiencies visually observed by the inspection team included the lack of rip rap on the upstream face of the dam. Other deficiencies, in our opinion, are the lack of seepage and stability analyses comparable to the requirements of the Recommended Guidelines, and seismic stability analyses.

It is recommended that action be taken in the near future to correct or control the deficiencies described. A detailed report discussing each of these deficiencies is attached.


Ervin H. Baumeyer, P.E.
Principal-In-Charge
Kenneth Balk and Associates, Inc.
St. Louis, Missouri


Lutz Kunze, P.E.
Principal Engineer
Shannon & Wilson, Inc.
St. Louis, Missouri



Overview of Lake and Dam

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
LAKE SHERWOOD DAM - ID NO. 10202

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5	Spring In Left Abutment Near Toe Of Embankment
6	Wastewater Treatment Works

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority. The National Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of safety inspection of dams throughout the United States. Pursuant to the above, the St. Louis District, Corps of Engineers, District Engineer directed that a safety inspection of the Lake Sherwood Dam be made.

b. Purpose of Inspection. The purpose of the inspection was to make an assessment of the general condition of the dam with respect to safety, based upon data made available and visual inspection, in order to determine if the dam poses hazards to human life or property.

c. Evaluation Criteria. Criteria used to evaluate the dam were furnished by the Department of the Army, Office of the Chief of Engineers, in "Recommended Guidelines for Safety Inspection of Dams". These guidelines were developed with the help of several Federal agencies and many State agencies, professional engineering organizations, and private engineers.

1.2 DESCRIPTION OF PROJECT

a. General. Lake Sherwood is located downstream of a series of five reservoirs. One of these, Lake Alan is too small to be of appreciable significance to Lake Sherwood. Lake Eleanor, a 3.7 acre impoundment, discharges into lake Marian, an 8.3 acre impoundment, which then discharges into Lake Sherwood. Both of these lakes are located to the northeast of Lake Sherwood. Sugar Hollow Lake, directly to the north of Lake Sherwood, contains a pool of approximately 15.6 acres, and discharges into Lake Sherwood. Lake Robin Hood, an 8.3 acre impoundment, lies to the northwest of Lake Sherwood and also discharges into it.

b. Description of Dam and Appurtenances.

(1) The Lake Sherwood Dam is an earth structure built on Wolf Creek in the southeastern part of Warren County, Missouri. Topography adjacent to the valley is rolling to steep. Most of the area in the vicinity of the dam is covered with a residual soil overlying dolomite. Topography in the vicinity of the dam is shown on Plate 1.

(2) The principal spillway consists of three 36x58 inch corrugated metal arch pipes laid through the right abutment. An overflow spillway, generally semi-circular in shape, is located to the right of the principal spillway with the outlet channel cut into dolomite.

(3) Pertinent physical data are given in paragraph 1.3 below.

c. Location. The dam is located in the southeastern portion of Warren County, Missouri, as shown on Plate 2. The lake formed by the dam is on the Missouri-Warren County New Melle quadrangle sheet in the SE 1/4 of Section 11, T45N, R1W.

d. Size Classification. Criteria for determining the size classification of dams and impoundments are presented in the guidelines referenced in paragraph 1.1c above. Based on these criteria, this dam and impoundment is in the intermediate size category.

e. Hazard Classification. Guidelines for determining hazard classification are presented in the same guidelines as referenced in paragraph 1.1 c. Based on referenced guidelines, the Corps of Engineers has determined that this dam is in the High Hazard Classification and thus has been selected by the Corps of Engineers for a Phase 1 inspection.

f. Ownership. It is our understanding that this dam is owned by Lake Sherwood Estates Home Owners Association, Lake Sherwood, Mo.

g. Purpose of Dam. The dam forms a recreational lake.

h. Design and Construction History. The dam was completed in 1967. Some engineering data and remedial construction records were available. Leaks developed in the embankment near the left abutment and grouting was performed in 1970 by Test Drilling Services, Inc., a grouting and drilling firm, located in St. Louis, Missouri. Horner & Shifrin, Inc., a St. Louis consulting Engineering firm, were consulted regarding the leakage from the left abutment and it reportedly was their opinion that the source of the water is a solution channel in the Platin limestone. A V-notch weir was installed to measure the flow of the spring from the left abutment. The water loss is a continuing occurrence, as evidenced by a 1977 report by Dr. J. H. Williams, Chief, Applied Engineering and Urban Geology, Geology and Land Survey, State of Missouri, which states that "If the leak at Lake Sherwood is continuously monitored to assure that it remains confined to bedrock, no danger exists". According to Mr. E. Sanders, Executive Director of the Lake Sherwood Estates Home Owners Association, the flow is relatively constant at approximately 200 GPM. Both the temperature and flow of the water from the left abutment is measured at regular intervals.

i. Normal Operating Procedure. Normal rainfall, runoff, transpiration, evaporation, and spillway discharges all combine to maintain a relatively stable water surface elevation.

1.3 PERTINENT DATA

a. Drainage Area

<u>Direct Tributary Areas</u>		<u>Total Tributary Areas</u>
Lake Eleanor	= 107 Ac.	107 Ac.
Lake Marion	= 37 Ac.	144 Ac.
Lake Sugar Hollow	= 966 Ac.	966 Ac.
Lake Robin Hood	= 462 Ac.	462 Ac.
Lake Sherwood	= 1365 Ac.	2937 Ac.

b. Discharge at Damsite.

- (1) Three 36x58 inch arch-pipes - 332 c.f.s. at maximum pool.
- (2) Emergency spillway - 1204 c.f.s. at maximum pool.
- (3) Estimated experienced maximum flood at damsite - approximately two feet below top of dam, 522 cfs.

c. Elevation (U.S.G.S.)

- (1) Top of dam - 629.6 (see Plate 3).
- (2) Spillway crest - 622.8.
- (3) Streambed at centerline of dam - 560 (est.).
- (4) Maximum tailwater - unknown.

d. Reservoir. Length of maximum pool - 5,600 feet $\pm$.

e. Storage (Acre-feet).

	<u>Lake Eleanor</u>	<u>Lake Marian</u>	<u>Lake Sugar Hollow</u>	<u>Lake Robin Hood</u>	<u>Lake Sherwood</u>
(1) Normal	58	260	288	144	2400
(2) Maximum	72	291	308	155	2837

f. Reservoir Surface (Acres).

- (1) Top of dam - 163
- (2) Spillway crest - 141

g. Dam.

- (1) Type - earth embankment.
- (2) Length - 1,000 feet.
- (3) Height - 70 feet maximum.

- (4) Top width - 30 feet.
- (5) Side Slopes - (Measured with a slope meter/inclinometer in degrees and converted to ratios.)
 - (a) Downstream - 2.6 H to 1 V.
 - (b) Upstream - 3.7 H to 1 V.
- (6) Zoning - unknown
- (7) Impervious core - unknown
- (8) Cutoff - unknown
- (9) Grout curtain - unknown
- h. Diversion and Regulating Tunnel. - NONE
- i. Spillway.
 - (1) Type - Three 36" x 58" Corrugated Metal Arch Pipes
 - (2) Crest elevation - 622.9 U.S.G.S.
- j. Regulating Outlets. - NONE
- k. Overflow Spillway.
 - (1) Type - Semi Circular Weir, varying in length as water surface rises. Length at top of dam elevation is approximately 155 feet.
 - (2) Crest - 625.8

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

Design data made available (for review only) consisted of one drawing depicting a cross-section of the dam.

2.2 CONSTRUCTION

The dam was completed in 1967. Remedial design data relative to grouting to control seepage was available for review, and were considered in this report. Among these data were reports by Dr. J. H. Williams, Horner and Shifrin, Inc. and Test Drilling Services, Inc. as outlined in Paragraph 1.2 h.

2.3 OPERATION

No records of the maximum loading on the dam were available.

2.4 EVALUATION

a. Availability. Some engineering and geological data were available for review, as discussed in Paragraphs 2.2 and 1.2 h.

b. Adequacy. The engineering data made available was not sufficient to make a detailed assessment of the design, construction, and operation. The lack of seepage and stability analyses comparable to the requirements of the Recommended Guidelines is considered a deficiency. Remedial design data was considered adequate.

c. Validity. No valid engineering data on design were available. Remedial design data was available and was considered sufficient to assess the potential problem of the flow of water from springs in the left abutment.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General. A visual inspection of the Lake Sherwood Dam was carried out on August 25, 1978. Personnel making inspection were employees of Kenneth Balk and Associates, Inc. and Shannon and Wilson, Inc. of St. Louis and included civil, geotechnical, and structural engineers and an engineering geologist. Specific observations are discussed below.

b. Dam. The inspection team observed the following at the dam.

The dam is an earth embankment with a paved roadway crossing the crest. No detrimental settlement, depressions, cracking, erosion, animal burrows or slope instability was observed on either the embankment or the abutments. A waste-water treatment facility is located immediately downstream from the toe of the embankment. At the time of the inspection, construction of expansion facilities was underway.

Three springs were observed in the left abutment. The closest spring to the dam is located at the juncture of the toe and the left abutment. A V-notch weir has been constructed some 20 feet downstream from this spring and at the time of the inspection, this spring was flowing at 200 gallons per minute. The other two springs are some distance (200 feet plus) downstream from the juncture of the embankment and the left abutment and their flow was not measured.

A small area at the toe of the dam at the juncture of the left abutment was wet and soft, due to flow from the nearest spring. The flow from this spring has been channelized to flow over the weir. A line of grout pipes were observed on the downstream slope of the embankment near the left abutment. The downstream slope of the dam was partially mowed on the day of the inspection and there were no bushes or small trees visible on the unmowed portion, which is considered evidence of a regular, periodic vegetation control program.

c. Appurtenant Structures. A spillway, consisting of three (3) 36x58 inch Corrugated Metal arch pipes, is located on the right abutment. A secondary or overflow spillway is located at the right of the principal spillway, in the right abutment.

d. Reservoir Area. No wave wash, excessive erosion or slides were observed along the shore of the reservoir.

e. Damsite Geology.

Right Abutment. Exposed on the right abutment is a formation consisting of mainly argillaceous dolomite (Joachim Formation); yellowish-brown in color, thinly to medium bedded, with bedding almost horizontal, medium to finely crystalline. This formation is sparsely jointed with joints almost vertical to the bedding plane and strike almost NS. Thin layer of grayish-brown, clayey-silty shale is present at places. Chert nodules, light-gray in color, and quartz lenses are also present.

Spillway Outlet Channel. Spillway discharge channel is cut through the right abutment in yellowish-brown, argillaceous dolomite. There is no visual evidence of significant erosion of the channel.

Left Abutment. Small outcrops of argillaceous dolomite are present on the left abutment. This dolomite (Joachim Formation) is mostly covered with a thick layer of reddish-brown clayey silt and is medium to finely crystalline, sparsely jointed with joints perpendicular to the bedding planes.

Joint opening = 1/6 inch to 1/2 inch

Filling material - argillaceous and calcatic

Open joints - 10%; Closed joints - 90%

Chert nodules and quartz lenses are also present at places.

3.2 EVALUATION

Recorded monitoring on a regular schedule of the volume of the flow and the temperature of the water from the spring should be continued. The water should also be checked for clarity and if it starts to carry sediment, the situation should be reviewed with a professional engineer experienced in the design and construction of dams.

The lack of rip rap on the upstream face of the dam is considered a deficiency for a dam of this size.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

The lake level is controlled by rainfall, runoff, evaporation, and discharge through uncontrolled spillway.

4.2 MAINTENANCE OF DAM

No maintenance records of the dam were available. Mowing of the downstream slope and general cleanliness, and the monitoring of the flow from the springs discussed earlier, suggest that a regular maintenance program is in effect.

4.3 MAINTENANCE OF OPERATING FACILITIES

No regulating structure exists.

4.4 DESCRIPTION OF ANY WARNING SYSTEM IN EFFECT

The inspection team is not aware of any existing warning system for this dam.

4.5 EVALUATION

It is our opinion that the operational procedures apparently have been satisfactory notwithstanding the lack of records.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 EVALUATION OF FEATURES

a. Design Data. There were no hydraulic and hydrological design data made available.

b. Experience Data. The drainage area and lake surface area are developed from USGS New Melle, Mo. Quadrangle, 7.5 minute series, dated 1972. The spillway and dam layout are from surveys made during the inspection.

c. Visual Observations.

The spillways and outlet channel are in good condition. Spillway discharges will not affect the integrity of the dam.

Full cognizance of the upstream impoundments, Lakes Eleanor, Marian, Sugar Hollow, and Robin Hood, was taken in the analyses of the overtopping potential of Lake Sherwood. In this analysis, it was assumed that, while the dams of the upstream reservoirs might be overtopped, failure of their embankments would not occur.

Under this assumption, the upstream reservoirs have a beneficial effect on Lake Sherwood. At the time of the PMF peak outflow rate for Lake Sherwood, approximately 568 acre feet of water is in-storage in the four upstream reservoirs, being contained between the spillway crest elevations and the water surface elevations.

If simultaneous failure of all the upstream dams is assumed to occur at the same time as the peak rate of local runoff is entering Lake Sherwood, the effect of the upstream reservoirs would be negative on Lake Sherwood. If it is assumed that, in addition to simultaneous failure, instantaneous arrival of the flood waves occurs, then approximately 1886 acre feet of water would be entering Lake Sherwood, in addition to the local runoff. The 1886 acre feet being made up of the 568 acre feet mentioned above and approximately 1318 acre feet which is contained between the bottom of the reservoirs and the spillway crests.

It can be said that if the above failure, or something approaching such an event were to occur, the effect on Lake Sherwood would be to lessen the percentage of the PMF which can be accommodated, or in other words, to increase the overtopping potential of Lake Sherwood.

The results of the analysis of overtopping potential is as follows:

<u>Lake</u>	<u>% PMF</u>	<u>Maximum Depth Over Dam (Ft)</u>	<u>Maximum Storage (Ac-Ft)</u>	<u>Peak Outflow Rate (CFS)</u>	<u>Duration Of Overtopping (Hrs)</u>	<u>Time To Peak Outflow (Hrs)</u>
Eleanor	100	2.7	26	1802	11.2	15.83
"	50	1.6	21	902	7.0	15.83
Marian	100	2.0	53	2278	7.6	15.83
"	50	1.3	46	1091	5.4	15.92
Sugar Hollow	100	13.4	426	8540	14.2	16.42
"	50	6.8	288	4270	10.2	16.42
Robin Hood	100	9.4	189	4811	14.5	16.17
"	50	6.0	143	2414	11.6	16.17
Sherwood	100	4.8	1833	24300	7.2	16.42
"	50	2.4	1429	11704	4.7	16.42

The lakes and spillways have been found adequate to accommodate the following.

<u>Lake</u>	<u>% of the P.M.F. Accommodated</u>
Eleanor	Approximately 5
Marian	Approximately 10
Sugar Hollow	Less than 5
Robin Hood	Less than 5
Sherwood	Approximately 20

For the 100 year flood, an event which has a 1% chance of being equaled or exceeded at least once in any given year, the results of the analysis indicate that the spillways of Lake Sherwood are adequate, but those of the upstream reservoirs are not.

d. Overtopping Potential. The spillway has been found to be inadequate to pass the Probable Maximum Flood (PMF) without overtopping the dam. The probable maximum flood is defined as the flood discharge that may be expected from the most severe combination of critical meteorological and hydrologic conditions that are reasonably possible in the region.

The estimated damage zone extends five miles downstream of the dam. Within the damage zone are a wastewater treatment works, seven farm complexes with farmhouses, and one State highway crossing.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations. Visually observed conditions which can affect the structural stability of this dam have been discussed in Section 3, paragraph 3.1 b.

b. Design and Construction Data. No design or construction data relating to the structural stability of the dam were found except that discussed in Section 1.2, paragraph 1.2 h.

c. Operating Records. No records were available at the time of the inspection.

d. Post-Construction Changes. No post-construction changes other than referenced in Section 1, paragraph 1.2 h exists.

e. Seismic Stability. The location of Lake Sherwood Dam is in Seismic Zone 1. The engineering data available was insufficient to evaluate the seismic stability, however to our knowledge, an earthquake of the magnitude that may reasonably be expected in Seismic Zone 1 has not caused a structural collapse of a dam of this size and magnitude.

SECTION 7 - ASSESSMENT/REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Safety. Corrective measures, in our opinion, should be taken for the deficiencies visually observed by the inspection team, i.e. lack of rip rap on the upstream face of the embankment. The spring nearest to the dam, in the left abutment, is not in itself considered a deficiency, however, due to its location, should be monitored. Inadequate spillway capacities are also considered to be a deficiency.

b. Adequacy of Information. Due to the lack of sufficient engineering design and construction data, except that discussed in Section 1, the conclusions of this report were based on performance and external visual conditions. The lack of seepage and stability analyses comparable to the requirements of the recommended guidelines is a deficiency which should be corrected. The inspection team considers that these data are sufficient to support the conclusions herein.

c. Urgency. The deficiencies described herein are serious and corrective actions listed below should be initiated in the near future.

d. Necessity for Phase II. The conclusions of this report are based on a visual inspection and review of data made available. The inspection team considers these to be sufficient to make an adequate assessment of deficiencies and therefore no Phase II inspection is recommended.

7.2 REMEDIAL MEASURES

a. The following remedial measures are recommended.

(1) The spring nearest to the dam should be protected to prevent erosion of the toe of the embankment and the flow channelized to the weir.

(2) Flow from the spring should be monitored on a regular schedule and periodically checked for sedimentation.

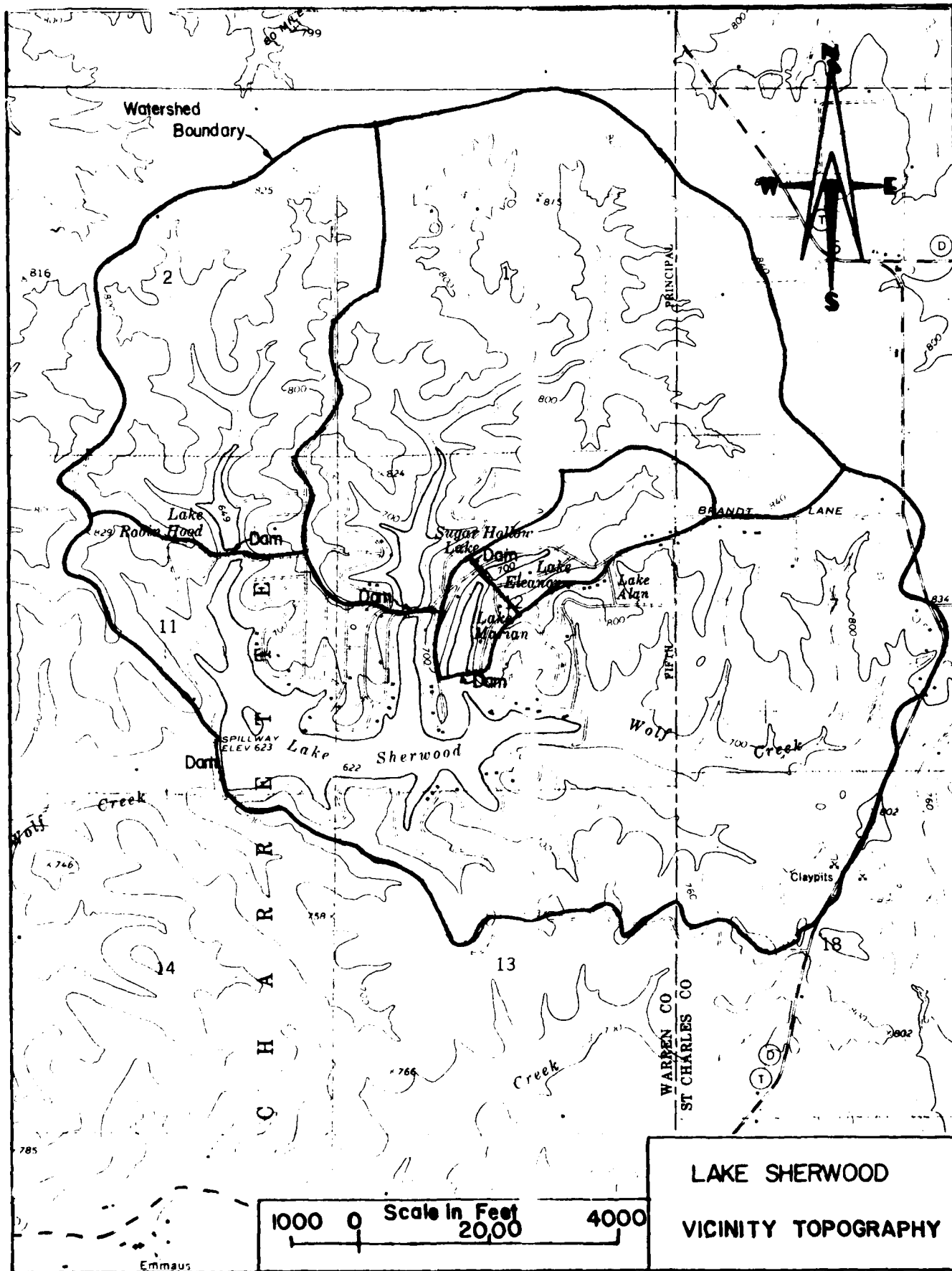
(3) Up-to-date records of all future maintenance and repairs should be kept.

(4) Spillway capacity and/or height of dam should be increased to pass 100 percent (100%) of the Probable Maximum Flood.

(5) Consideration should be given to increasing the spillway capacities and/or height of dams of the upstream reservoirs.

(6) Seepage and stability analyses should be performed by a professional engineer experienced in the design and construction of dams.

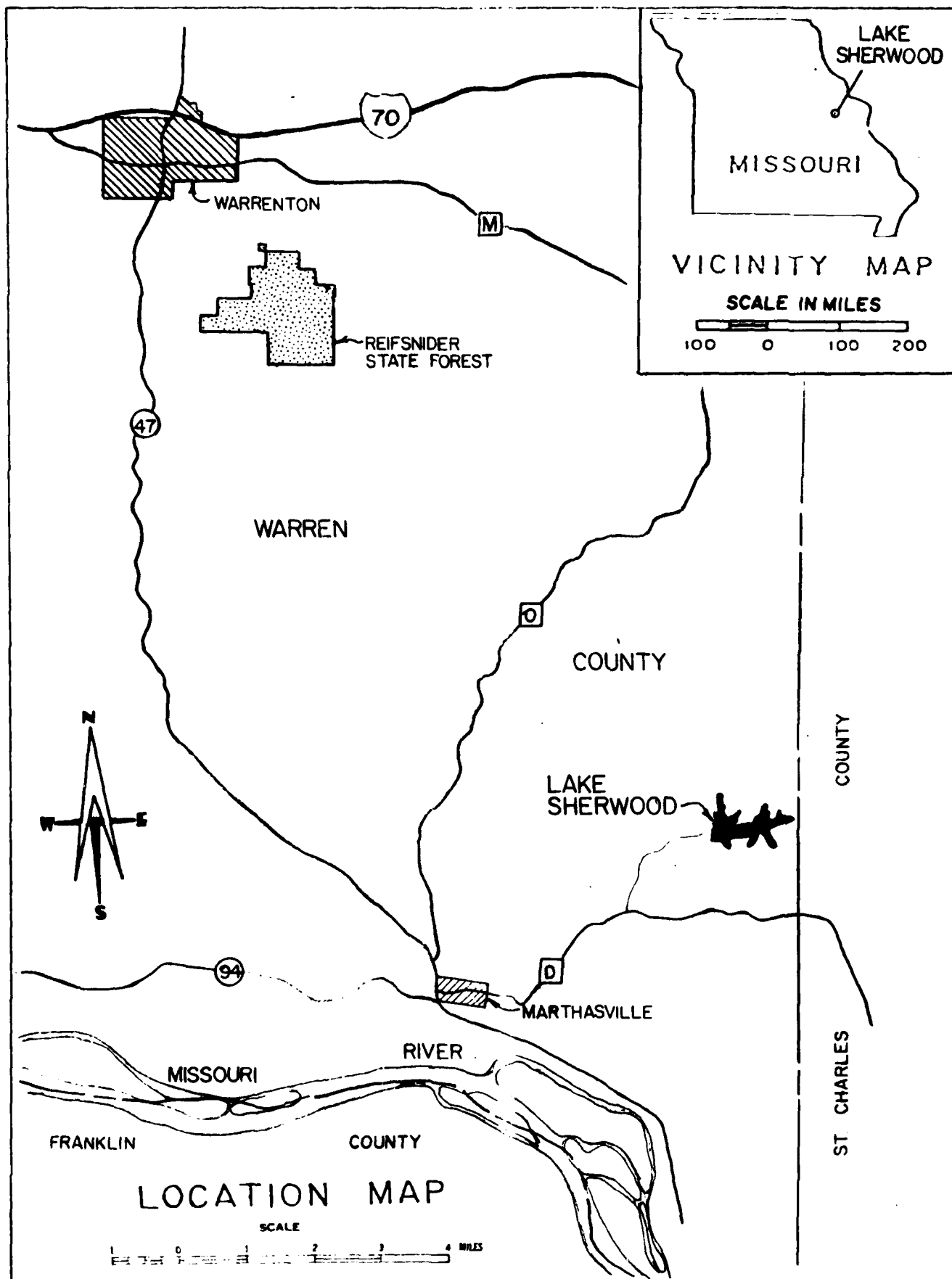
(7) The dam should be periodically inspected by an engineer experienced in the design and construction of dams, and records kept of these inspections.

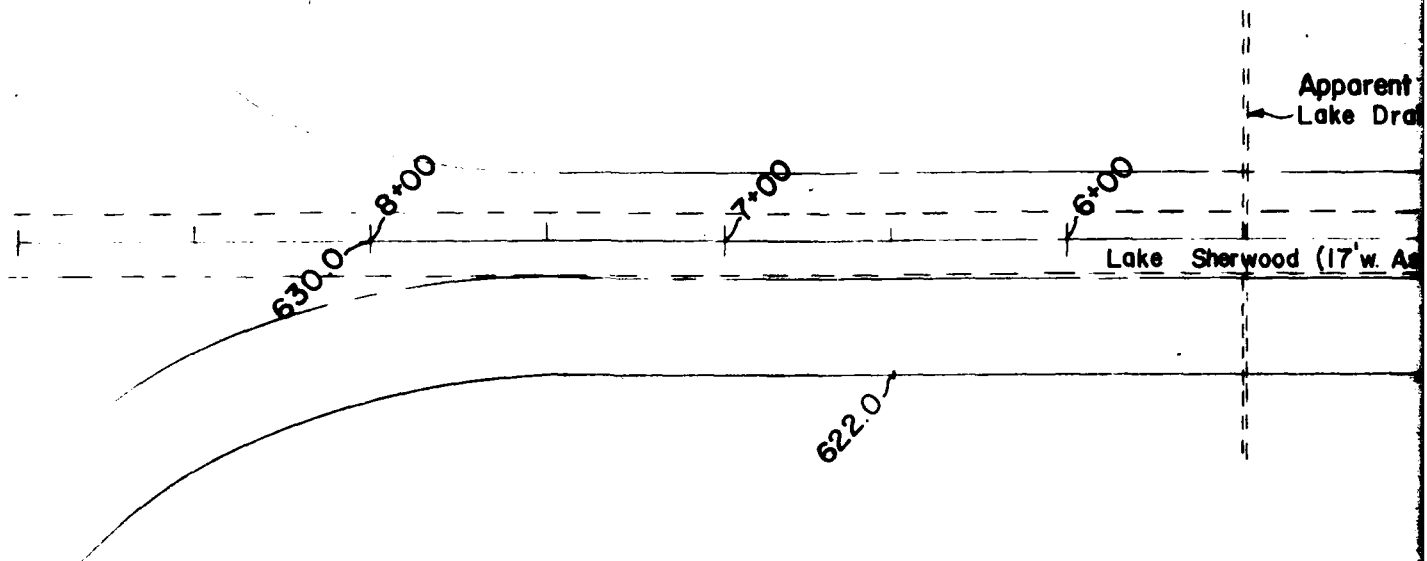


LAKE SHERWOOD

VICINITY TOPOGRAPHY

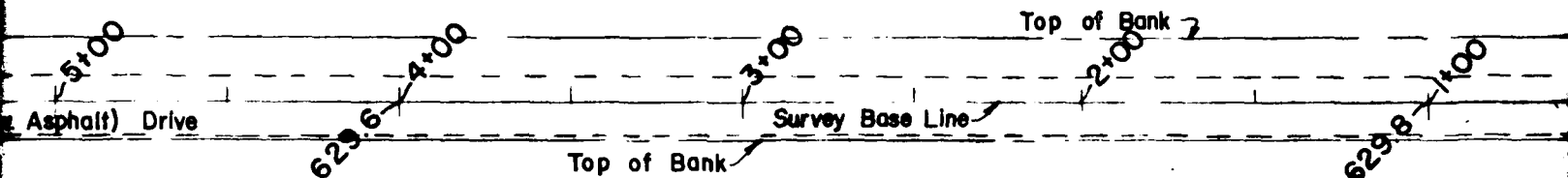
PLATE I





Princip
3 - 34

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Drain



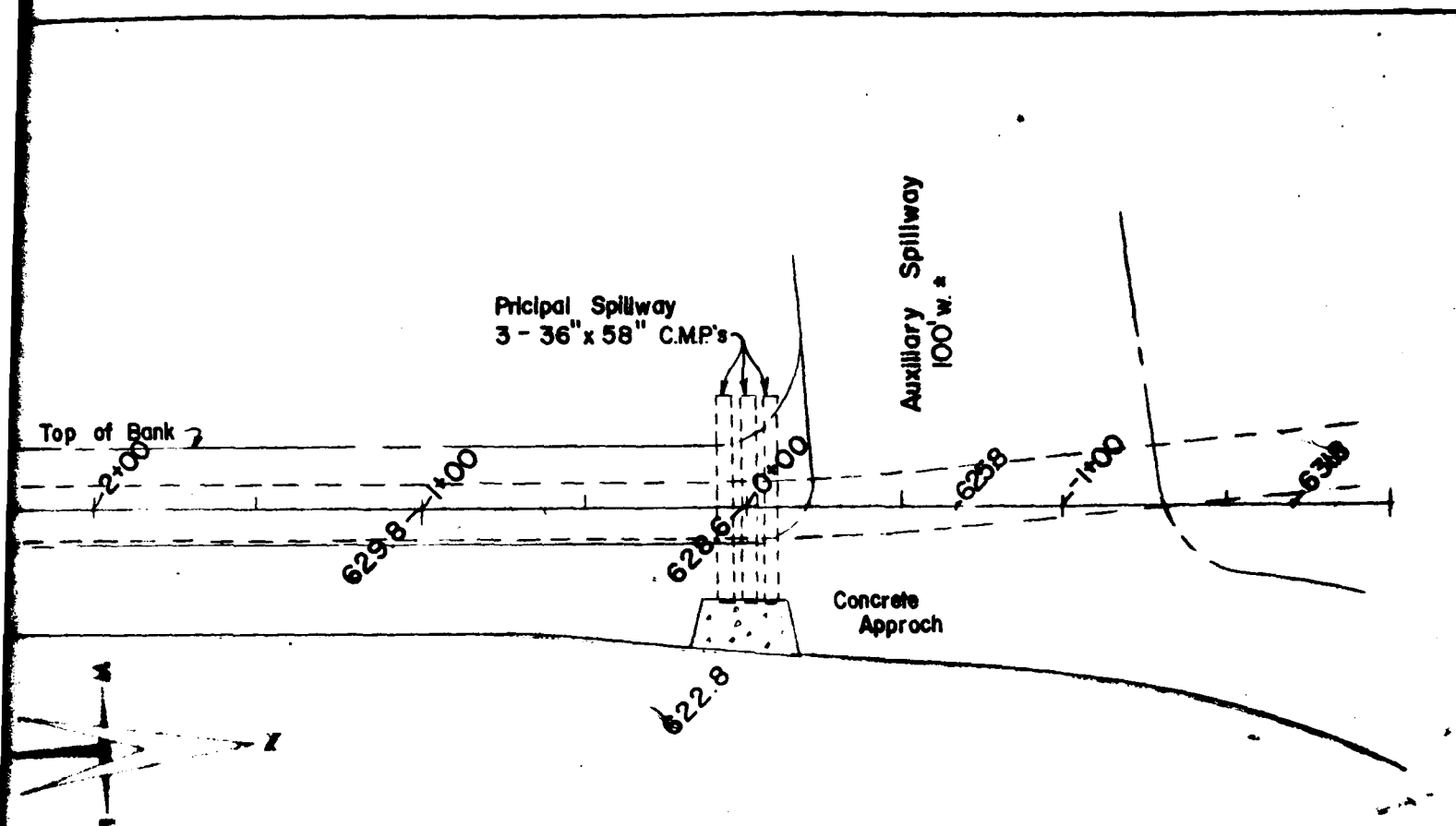
Water's Edge



LAKE SHERWOOD

Water Surface Elev. 622.0
(Aug. 25, 1978)

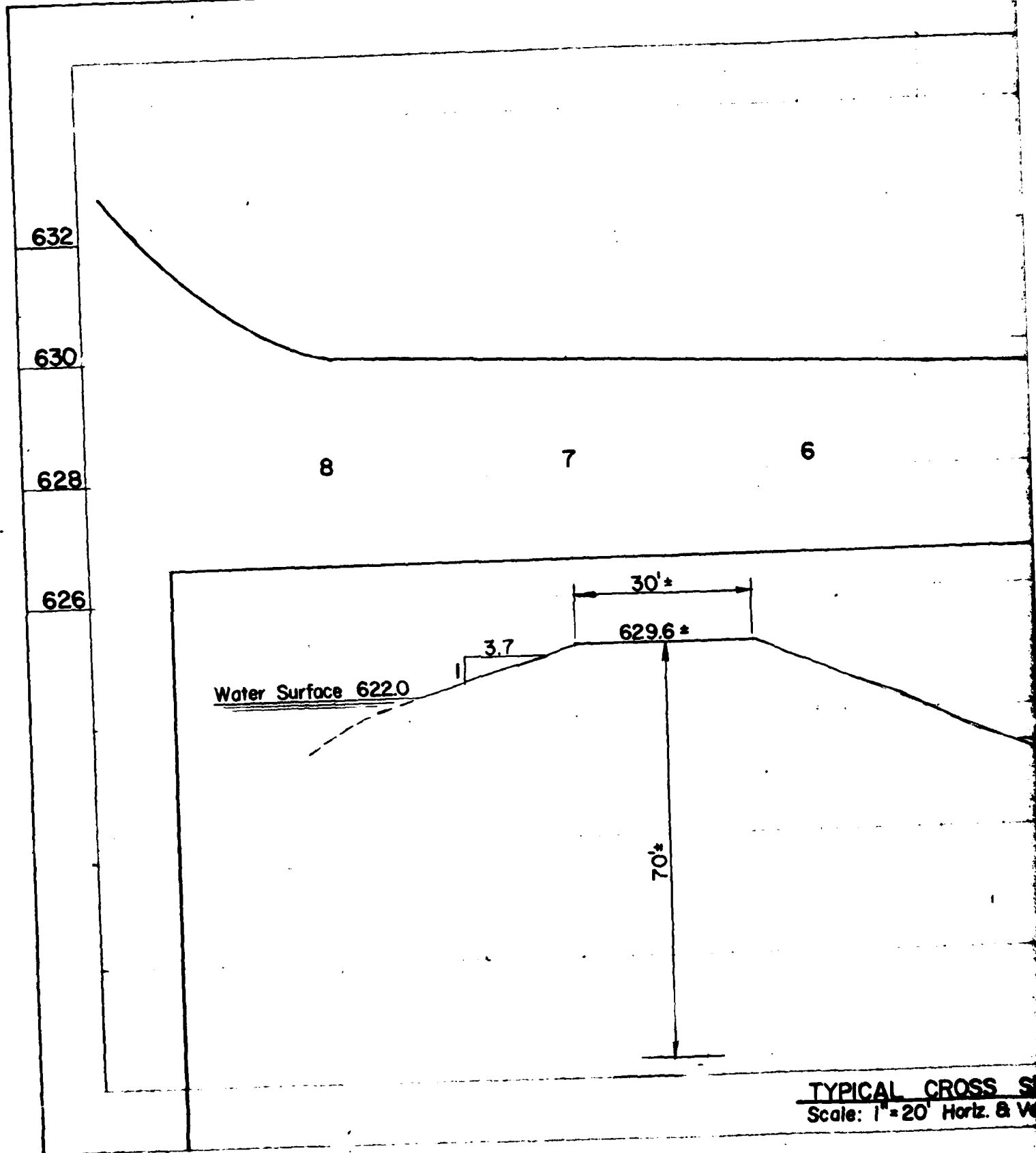
PLAN
Scale: 1"=50'



LAKE SHERWOOD
TOP OF DAM ELEVATIONS

Kenneth Balk & Assoc. Inc.

Jan. 1975



TOP OF DAM

5

4

3

2

1

TOP OF DAM PROFILE

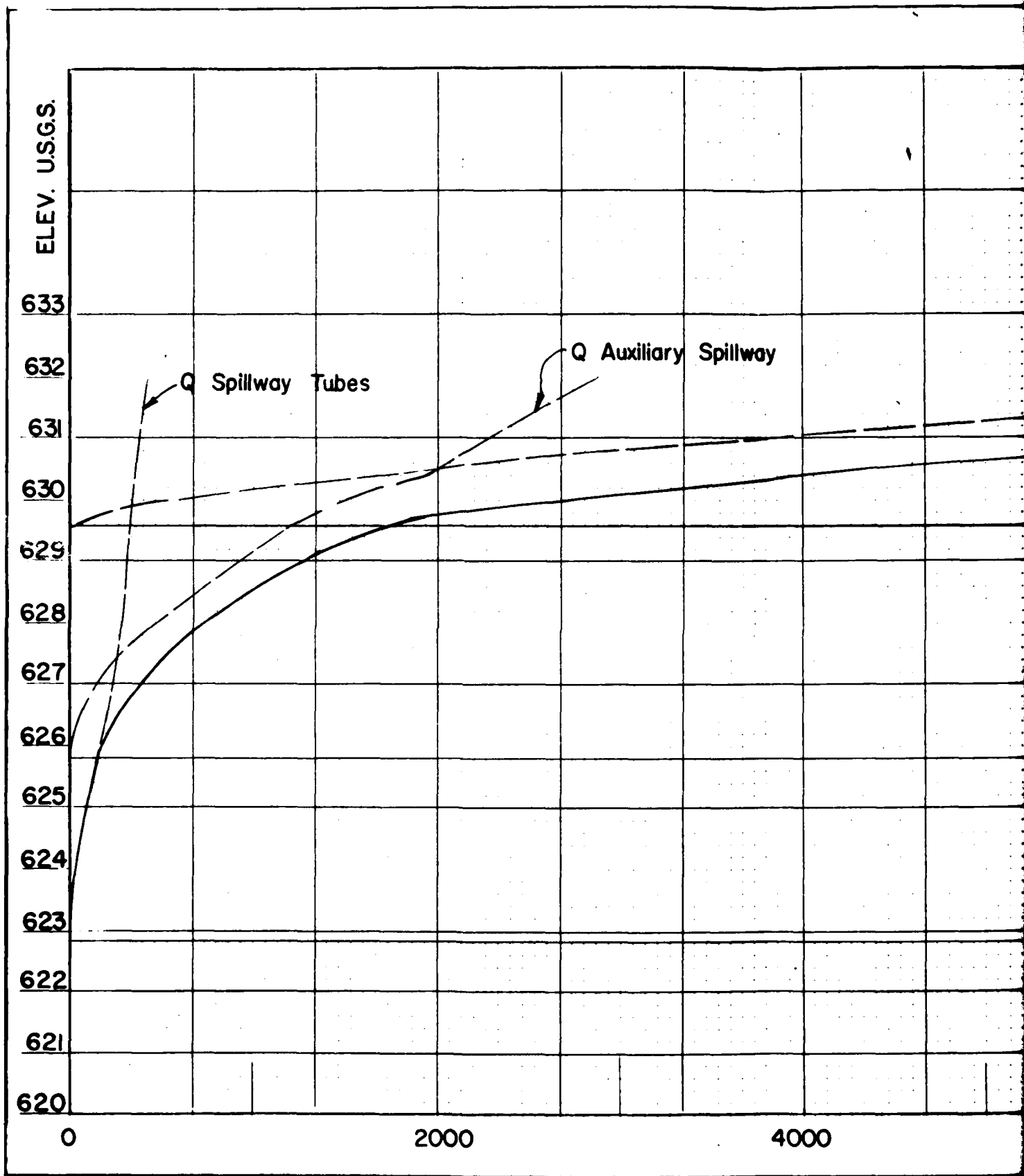
Scale: 1" = 2' V., 1" = 50' H.

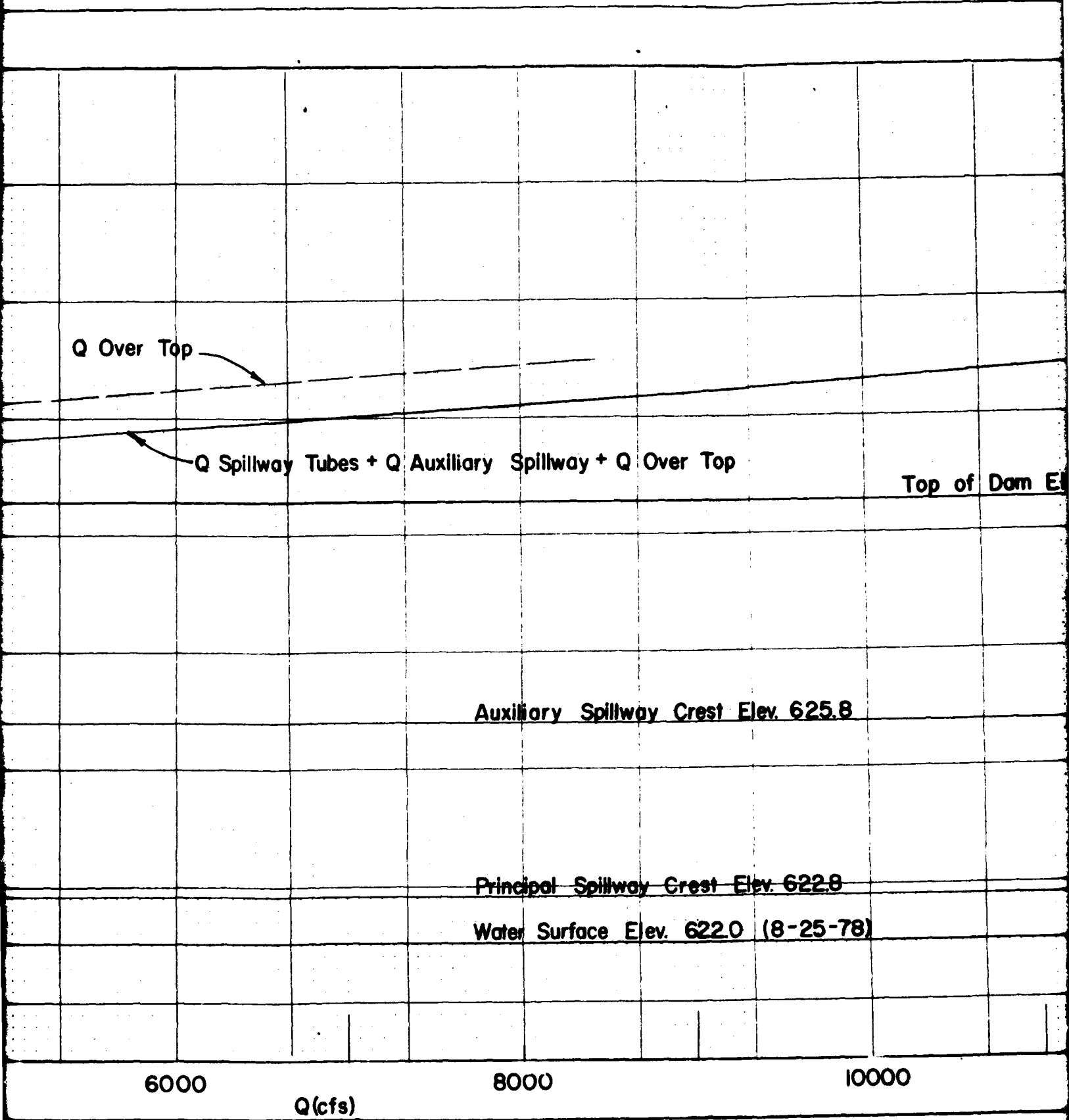
2.6

PRINCIPAL
3-36" x 68"
PIPES E

SECTION
Vert.

2



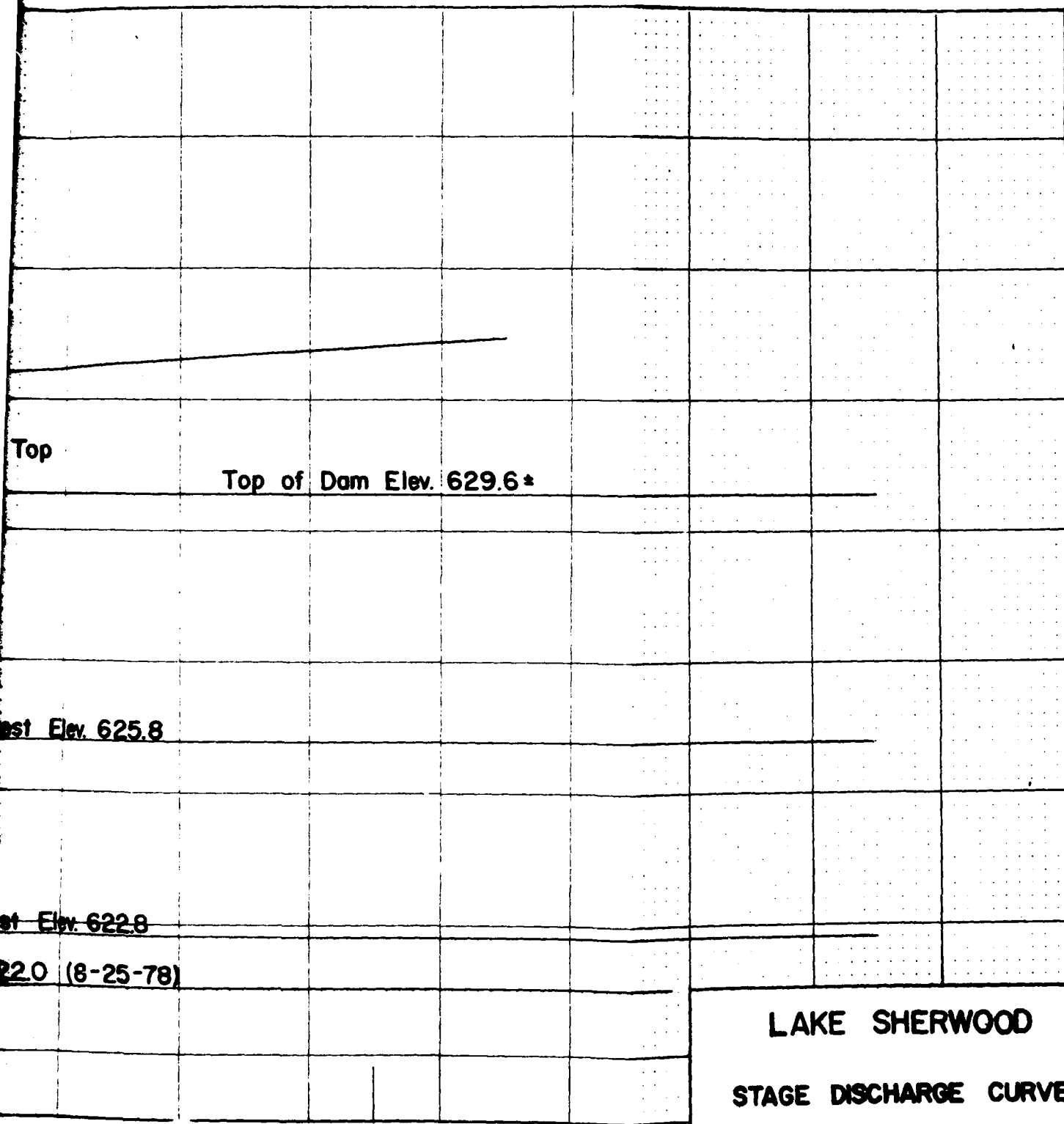


6000

Q (cfs)

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10000

12000

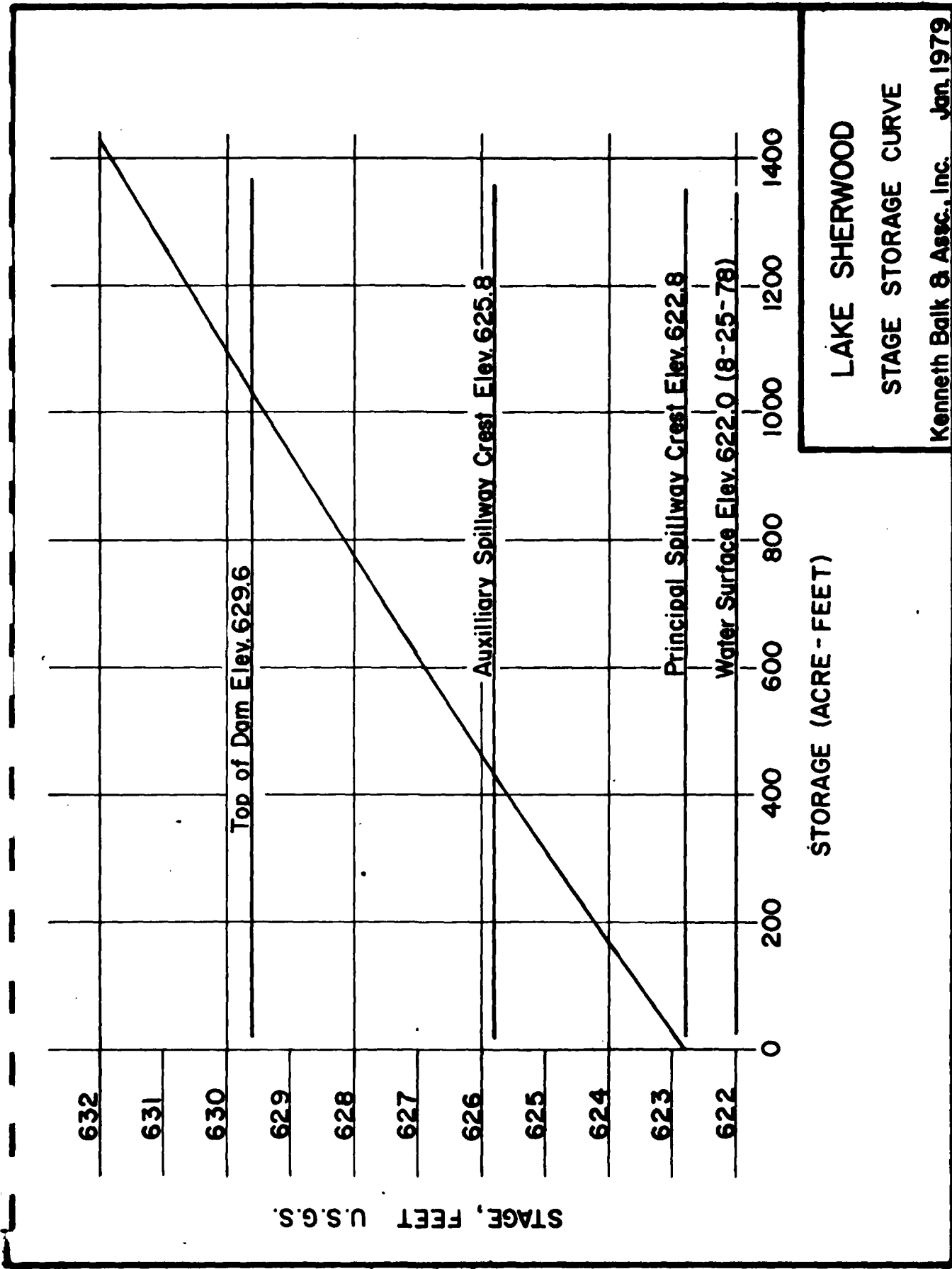
LAKE SHERWOOD

STAGE DISCHARGE CURVE

Kenneth Balk & Assoc., Inc.

Jan. 1979

PLATE 5



LAKE SHERWOOD

STAGE STORAGE CURVE

Kenneth Balk & Assoc., Inc. Jan. 1979



PHOTO 1

Overview of Lake and Dam



PHOTO 2

View from North Bank of Principal
Spillway Entrance



PHOTO 3 View from Top of Dam of Principal
Spillway Entrance



PHOTO 4 Principal Spillway Exit



PHOTO 5 Spring in Left Abutment near Toe of Embankment

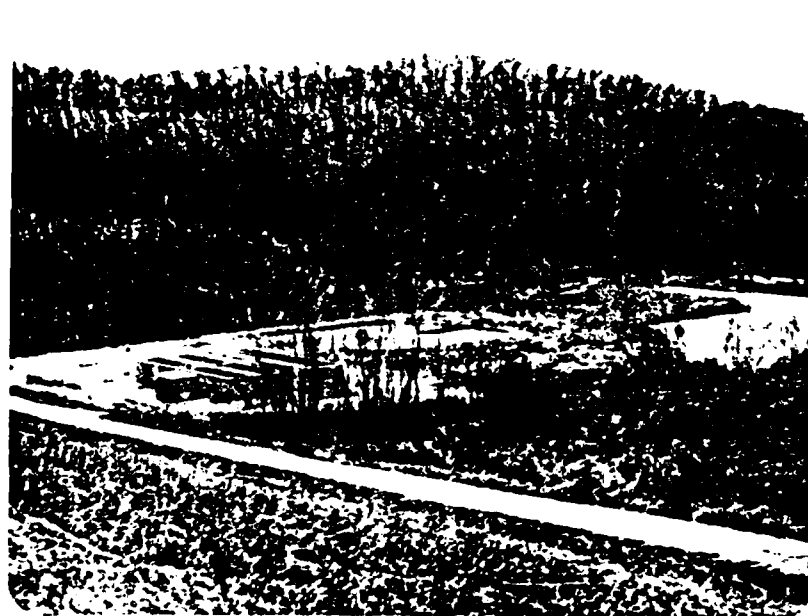


PHOTO 6 Wastewater Treatment Works

APPENDIX A

HYDROLOGIC AND HYDRAULIC ANALYSIS METHODOLOGY

HYDROLOGIC AND HYDRAULIC ANALYSIS METHODOLOGY

1. The hydrologic analysis used in development of the overtopping potential is based on applying a hypothetical storm to a unit hydrograph to obtain the inflow hydrograph for a reservoir routing. The Probable Maximum Precipitation is derived and determined from regional charts prepared by the National Weather Service in "Hydrometeorological Report No. 33." Reduction factors have not been applied. A 24-hour storm duration is assumed with the total rainfall depth distributed over 6-hour periods in accordance with procedures outlined in EM 1110-2-1411 (SPF Determination). The maximum 6-hour rainfall period is then distributed to hourly increments by the same criteria. Within-the-hour distribution is based upon NOAA Technical Memorandum NWS HYDRO-35. The nonpeak 6-hour rainfall periods are distributed uniformly. All distributed values are arranged in a critical sequence by the SPF criteria. The final inflow hydrograph is produced by utilizing the Soil Conservation Service triangle unit hydrograph using Hydrologic Soils Groups "B" and "D", Antecedent Moisture Condition III, and SCS CN 82 used to determine rainfall excess.
2. The reservoir routing is accomplished by using Modified Puls routing techniques wherein the flood hydrograph is routed through lake storage. Hydraulic capacities of the outlet works, spillway, and crest of dam are used as outlet controls in the routing. Storage in the pool area is defined by an elevation-storage capacity curve. The hydraulic capacity of the outlet works, spillway, and top of dam are defined by elevation-discharge curves.
3. Dam overtopping analysis has been conducted by hydrologic methods for this dam and lake. This computation determines the percentage of the PMF hydrograph that the reservoir can contain without the dam being overtopped. An output summary in the hydrologic appendix displays this information as well as other characteristics of the simulated dam overtopping.
4. The above methodology has been accomplished for this report using the systemized computer program HEC-1 (Dam Safety Version), July 1978, prepared by the Hydrologic Engineering Center, U.S. Army Corps of Engineers, Davis, California. The numeric parameters estimated for this site are listed in the attached computer printout. Definitions of these variables are contained in the "User's Manual" for the computer program.
5. The inflow hydrograph was routed through the reservoir using HEC-1's Modified Puls option. Releases were calculated for: 1) the principal spillway and, 2) the flow over the top of the dam. These releases were then combined at each of their respective elevations.

Flow through the principal spillways, three 36"x58" corrugated metal arch pipes, approximately 63.2 feet in length was obtained as follows:

For Part Full Flow:

$$\text{Stage} = \text{E.G.} + h_e$$

Where Stage = Pool Elevation

$$\text{E.G.} = \text{Energy Gradient Elevation in pipe} = d_f + \frac{v^2}{2g}$$

$$h_e = \text{entrance loss} = k_e \frac{v^2}{2g}, \text{ with}$$

$$k_e = 0.5$$

$$d_f = \text{depth of flow for a given discharge}$$

$$\frac{v^2}{2g} = \text{velocity head}$$

The equation then reduces to:

$$\text{Stage} = \text{IE} + d_f + 1.5 \frac{v^2}{2g}$$

$$\text{Where IE} = \begin{array}{l} \text{Invert elevation upstream} = 622.80 \text{ (South Tube)} \\ \phantom{\text{Invert elevation upstream}} = 622.87 \text{ (Center Tube)} \\ \phantom{\text{Invert elevation upstream}} = 622.94 \text{ (North Tube)} \end{array}$$

For Full And More Than Full Flow:

$$\text{Stage} = \text{IE} + D_m + \frac{v^2}{2g} + h_f + h_e$$

Where Stage = Pool Elevation

$$\text{IE} = \begin{array}{l} \text{Invert elevation downstream} = 622.32 \text{ (South Tube)} \\ \phantom{\text{Invert elevation downstream}} = 622.02 \text{ (Center Tube)} \\ \phantom{\text{Invert elevation downstream}} = 621.71 \text{ (North Tube)} \end{array}$$

$$D_m = \text{Minor Axis of pipe} = 3.0 \text{ feet}$$

$$\frac{v^2}{2g} = \text{Velocity head}$$

$$h_f = \text{Friction loss} = \frac{Q^2}{K_c} \times L$$

$$Q = \text{Discharge in cfs.}$$

k_c = Conveyance coefficient = 634.93

L = Length = 63.2 feet

h_e = Entrance loss = $k_e \frac{V^2}{2g}$, with $k_e = 0.5$

With proper substitution of numbers, the equation reduces to:

$$Q = \left(\frac{\text{Stage}-625.32}{.00034} \right)^{\frac{1}{2}} \text{ South Tube}$$

$$Q = \left(\frac{\text{Stage}-625.02}{.0034} \right)^{\frac{1}{2}} \text{ Center}$$

$$Q = \left(\frac{\text{Stage}-624.71}{.00034} \right)^{\frac{1}{2}} \text{ North Tube}$$

Flow through the overflow spillway and over the top of dam was calculated using the weir flow equation:

$$Q = CL(H)^{1.5}$$

where: C = Varies with head as outlined in "Handbook of Hydraulics" by Horace Williams King, revised by Ernest F. Brater.

L = Length in feet (varies with water surface)

H = Head of water in feet (varies with water surface)

Q = Discharge in cfs

FLOOD HYDROGRAPH PACKAGE (MFC-1)
 NEW SAFETY VERSION JULY 1978
 LAST MODIFICATION 3 AUG 78

LAKE SHERWOOD MULTI-RESERVOIR ROUTING									
JAN. 1979									
MO. INV. NO. 10202									
1	A1								
2	A2								
3	A3								
4	R	200	-0	5	-0	-0	-0	-4	-0
5	H1	5							
6	J	1							
7	J1	.10	.20	.30	.40	.50	1.00		
8	K	0	INFLOW				3	1	
9	K1		SURAREA RUNOFF FOR LAKE ELEANOR						
10	M	1	2	.17			1		
11	P		26	100	120	130			
12	T						-1	-86	.10
13	W2		.20						
14	X	.34	-.1	3					
15	K	1	ROUTING				3	1	
16	K1		RESERVOIR ROUTING FOR LAKE ELEANOR						
17	V						1		
18	V1	1					-699.78		
19	V4699.78		700.00	700.5	701.0	701.5	702.0	702.5	703.0
20	V4	704.5	705.0	705.5	706.0	706.5	707.0		704.0
21	V5	0	0.47	1.85	4.46	8.40	12.0	31.11	81.80
22	V51036.1		1443.3	1929.6	2375.5	3160.4	3944.8		200.4
23	V5	21.94	2.52	4.44	6.49	8.55	10.65	12.40	14.99
24	V5	21.94	24.23	26.65	29.12	31.64	34.20		17.23
25	V5699.78		700.0	700.5	701.0	701.5	702.0	702.5	19.52
26	V5	704.5	705.0	705.5	706.0	706.5	707.0		704.0
27	V5594.78								
28	V5707.70								
29	K	0	INFLOW				3	1	
30	K1		SURAREA RUNOFF FOR LAKE MARIAN						
31	M	1	2	.058			1		
32	P		26	100	120	130			
33	T						-1	-82	.15
34	W2		.20						
35	X	0.12	-.1	3					
36	K	2					3	1	
37	K1		ROUTING				3	1	
38	K	1	ROUTING				3	1	
39	K1		RESERVOIR ROUTING FOR LAKE MARIAN						
40	V						1		
41	V1	1					-671.02		
42	V4	671.0	671.5	672.0	672.5	673.0	673.5	674.0	674.5
43	V4	676.0	676.5	677.0	677.5	678.0	678.5	679.0	679.5
44	V5	0	1.41	7.04	15.70	24.57	39.76	61.97	74.68
45	V5855.81		1702.77	2550.27	3701.91	4861.40	5933.51	7053.24	97.28
46	V5	0	4.0	8.25	12.57	16.97	21.45	26.00	30.63
47	V5	44.97	49.91	54.92	60.00	65.14	70.40	75.72	35.33
48	V5	671.0	671.5	672.0	672.5	673.0	673.5	674.0	674.5
49	V5	676.0	676.5	677.0	677.5	678.0	678.5	679.0	679.5
50	V5671.02								

NO	DATE	INFLOW	SURAREA	RUNOFF FOR SUGARMOLLOW LAKE	1	3	1
51	K1	1	2	1.51	1		
52	M	28	100	120	130		
53	P						
54	T						
55	W						
56	Y						
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[illegible]

RUN DATE 01/25/79.
 TIME 09.12.11.

LAKE SHERWOOD MULTI-RESERVOIR ROUTING

JAN. 1970

NO. INV. NO. 10202

NO	NHR	NNIN	IDAY	JOB SPECIFICATION				IPLT	IPRT	NNTAN
288	-0	5	-0	IHR	IWIN	MEIPC	-0	-0	-4	-0
			JOPEQ	NWT	LDIPT	TRACE	-0			
			5	-0	-0	-0	-0			

MM: TI-PI ANALYSES TO BE PERFORMED

PROCES-	10	20	30	40	50	1.00
PLAN= 1						
RATIO= 6						

RT1052

SUB-AREA RUNOFF COMPUTATION

SUBAREA RUNOFF FOR LAKE ELEANOR

NAMELOW	NAMEHIG	ICOMP	IECON	ITYPE	JPLT	JPRI	INAME	ISTAGE	IAUTO
0	0	-0	-0	-0	1	3	1	-0	-0

WOLFF

HYDROGRAPH DATA

G	YAREA	SNAP	TRSDA	TPSPC	RATIO	ISNOW	ISAMF	LOCAL
1	1970	100	100	100	100	100	100	100
2	1971	100	100	100	100	100	100	100
3	1972	100	100	100	100	100	100	100
4	1973	100	100	100	100	100	100	100
5	1974	100	100	100	100	100	100	100
6	1975	100	100	100	100	100	100	100
7	1976	100	100	100	100	100	100	100
8	1977	100	100	100	100	100	100	100
9	1978	100	100	100	100	100	100	100
10	1979	100	100	100	100	100	100	100
11	1980	100	100	100	100	100	100	100
12	1981	100	100	100	100	100	100	100
13	1982	100	100	100	100	100	100	100
14	1983	100	100	100	100	100	100	100
15	1984	100	100	100	100	100	100	100
16	1985	100	100	100	100	100	100	100
17	1986	100	100	100	100	100	100	100
18	1987	100	100	100	100	100	100	100
19	1988	100	100	100	100	100	100	100
20	1989	100	100	100	100	100	100	100
21	1990	100	100	100	100	100	100	100
22	1991	100	100	100	100	100	100	100
23	1992	100	100	100	100	100	100	100
24	1993	100	100	100	100	100	100	100
25	1994	100	100	100	100	100	100	100
26	1995	100	100	100	100	100	100	100
27	1996	100	100	100	100	100	100	100
28	1997	100	100	100	100	100	100	100
29	1998	100	100	100	100	100	100	100
30	1999	100	100	100	100	100	100	100
31	2000	100	100	100	100	100	100	100
32	2001	100	100	100	100	100	100	100
33	2002	100	100	100	100	100	100	100
34	2003	100	100	100	100	100	100	100
35	2004	100	100	100	100	100	100	100
36	2005	100	100	100	100	100	100	100
37	2006	100	100	100	100	100	100	100
38	2007	100	100	100	100	100	100	100
39	2008	100	100	100	100	100	100	100
40	2009	100	100	100	100	100	100	100
41	2010	100	100	100	100	100	100	100
42	2011	100	100	100	100	100	100	100
43	2012	100	100	100	100	100	100	100
44	2013	100	100	100	100	100	100	100
45	2014	100	100	100	100	100	100	100
46	2015	100	100	100	1			

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	PRECIP DATA	P48	R72	R96
012		P2A		

	SMS	PMS	R6.	H12	K24	M12	
-0.00	100.00	100.00	120.00	130.00	-0.00	-0.00	-0.00

26.00	100.00	127.00	130.00	98.00	100.00
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LOSS DATA

	RTIOL	ERAIN	SIXXS	ATLOK	STATL	CNSTL	ALSMX	RTIMP
TKR								

[illegible]

• • • • •

96.00 WETNESS = -1.00 EFFECT CN = 86.00

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UNIT HYDROGRAPH DATA
00 0.00 1.65 30

YCS -0.00
LAW .00

RECESSION DATA

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SYSTO=          3A  QACSN=      -10  RTIOR= 3.00
RECESSORY DATA

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FORM 100

FROM 14 END OF PERIOD ORDINATES, TC= -0.00 HOURS, LAG= .20 VOL= 1.00

339.	271.	151.	47.	49.	28.	16.
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2. 1.

END-OF-PERIOD FLOW	US \$	PERIOD	RAYN	EXCS
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IN	EXCS	LOSS	COMP	Q	HR.	AN	PERIOD	MAIN	EXCS
					45.0A				

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[illegible]

1.01	.05	1	.01	.00	.01	0.	1.01	12.05	145	.22	.21	.01	102.
1.01	.10	2	.01	.00	.01	1.	1.01	12.10	146	.22	.21	.01	140.
1.01	.15	3	.01	.00	.01	1.	1.01	12.15	147	.22	.21	.01	187.
1.01	.20	4	.01	.00	.01	2.	1.01	12.20	148	.22	.21	.01	225.
1.01	.25	5	.01	.00	.01	2.	1.01	12.25	149	.22	.21	.01	287.
1.01	.30	6	.01	.00	.01	2.	1.01	12.30	150	.22	.21	.01	259.
1.01	.35	7	.01	.00	.01	2.	1.01	12.35	151	.22	.21	.01	266.
1.01	.40	8	.01	.00	.01	2.	1.01	12.40	152	.22	.21	.01	271.
1.01	.45	9	.01	.00	.01	2.	1.01	12.45	153	.22	.21	.01	273.
1.01	.50	10	.01	.00	.01	2.	1.01	12.50	154	.22	.21	.01	275.
1.01	.55	11	.01	.00	.01	2.	1.01	12.55	155	.22	.21	.01	276.
1.01	1.00	12	.01	.00	.01	2.	1.01	13.00	156	.22	.21	.01	277.
1.01	1.05	13	.01	.00	.01	2.	1.01	13.05	157	.26	.25	.01	281.
1.01	1.10	14	.01	.00	.01	2.	1.01	13.10	158	.26	.25	.01	293.
1.01	1.15	15	.01	.00	.01	2.	1.01	13.15	159	.26	.25	.01	308.
1.01	1.20	16	.01	.00	.01	2.	1.01	13.20	160	.26	.25	.01	320.
1.01	1.25	17	.01	.00	.01	2.	1.01	13.25	161	.26	.26	.00	326.
1.01	1.30	18	.01	.00	.01	2.	1.01	13.30	162	.26	.26	.00	330.
1.01	1.35	19	.01	.00	.01	2.	1.01	13.35	163	.26	.26	.00	333.
1.01	1.40	20	.01	.00	.01	2.	1.01	13.40	164	.26	.26	.00	334.
1.01	1.45	21	.01	.00	.01	2.	1.01	13.45	165	.26	.26	.00	335.
1.01	1.50	22	.01	.00	.01	2.	1.01	13.50	166	.26	.26	.00	336.
1.01	1.55	23	.01	.00	.01	2.	1.01	13.55	167	.26	.26	.00	336.
1.01	2.00	24	.01	.00	.01	2.	1.01	14.00	168	.26	.26	.00	337.
1.01	2.05	25	.01	.00	.01	2.	1.01	14.05	169	.32	.32	.00	342.
1.01	2.10	26	.01	.00	.01	2.	1.01	14.10	170	.32	.32	.00	360.
1.01	2.15	27	.01	.00	.01	2.	1.01	14.15	171	.32	.32	.00	382.
1.01	2.20	28	.01	.00	.01	3.	1.01	14.20	172	.32	.32	.00	400.
1.01	2.25	29	.01	.00	.01	3.	1.01	14.25	173	.32	.32	.00	409.
1.01	2.30	30	.01	.00	.01	3.	1.01	14.30	174	.32	.32	.00	415.
1.01	2.35	31	.01	.00	.01	3.	1.01	14.35	175	.32	.32	.00	419.
1.01	2.40	32	.01	.00	.01	4.	1.01	14.40	176	.32	.32	.00	421.
1.01	2.45	33	.01	.00	.01	4.	1.01	14.45	177	.32	.32	.00	422.
1.01	2.50	34	.01	.00	.01	4.	1.01	14.50	178	.32	.32	.00	423.
1.01	2.55	35	.01	.00	.01	4.	1.01	14.55	179	.32	.32	.00	423.
1.01	3.00	36	.01	.00	.01	5.	1.01	15.00	180	.32	.32	.00	424.
1.01	3.05	37	.01	.00	.01	5.	1.01	15.05	181	.20	.20	.00	413.
1.01	3.10	38	.01	.00	.01	5.	1.01	15.10	182	.40	.39	.00	395.
1.01	3.15	39	.01	.00	.01	5.	1.01	15.15	183	.40	.39	.00	406.
1.01	3.20	40	.01	.00	.01	6.	1.01	15.20	184	.59	.59	.00	455.
1.01	3.25	41	.01	.00	.01	6.	1.01	15.25	185	.69	.69	.00	551.
1.01	3.30	42	.01	.00	.01	6.	1.01	15.30	186	1.68	1.67	.01	744.
1.01	3.35	43	.01	.01	.01	6.	1.01	15.35	187	2.77	2.75	.01	1200.
1.01	3.40	44	.01	.01	.01	6.	1.01	15.40	188	1.09	1.08	.00	1752.
1.01	3.45	45	.01	.01	.01	7.	1.01	15.45	189	.69	.69	.00	1932.
1.01	3.50	46	.01	.01	.01	7.	1.01	15.50	190	.59	.59	.00	1712.
1.01	3.55	47	.01	.01	.01	7.	1.01	15.55	191	.40	.39	.00	1343.
1.01	4.00	48	.01	.01	.01	7.	1.01	16.00	192	.40	.39	.00	1085.
1.01	4.05	49	.01	.01	.01	7.	1.01	16.05	193	.30	.30	.00	824.
1.01	4.10	50	.01	.01	.01	7.	1.01	16.10	194	.30	.30	.00	655.
1.01	4.15	51	.01	.01	.01	8.	1.01	16.15	195	.30	.30	.00	557.
1.01	4.20	52	.01	.01	.01	8.	1.01	16.20	196	.30	.30	.00	489.
1.01	4.25	53	.01	.01	.01	8.	1.01	16.25	197	.30	.30	.00	450.
1.01	4.30	54	.01	.01	.01	8.	1.01	16.30	198	.30	.30	.00	428.
1.01	4.35	55	.01	.01	.01	8.	1.01	16.35	199	.30	.30	.00	414.
1.01	4.40	56	.01	.01	.01	8.	1.01	16.40	200	.30	.30	.00	404.
1.01	4.45	57	.01	.01	.01	9.	1.01	16.45	201	.30	.30	.00	401.
1.01	4.50	58	.01	.01	.01	9.	1.01	16.50	202	.30	.30	.00	400.
1.01	4.55	59	.01	.01	.01	9.	1.01	16.55	203	.30	.30	.00	399.
1.01	5.00	60	.01	.01	.01	9.	1.01	17.00	204	.30	.30	.00	398.
1.01	5.05	61	.01	.01	.01	9.	1.01	17.05	205	.24	.24	.00	393.
1.01	5.10	62	.01	.01	.01	9.	1.01	17.10	206	.24	.24	.00	375.
1.01	5.15	63	.01	.01	.01	9.	1.01	17.15	207	.24	.24	.00	351.

1.01	5.20	64	.01	.01	9.	1.01	17.20	209	.24	.24	.00	336.
1.01	5.25	65	.01	.01	10.	1.01	17.25	209	.24	.24	.00	326.
1.01	5.30	66	.01	.01	10.	1.01	17.30	210	.24	.24	.00	320.
1.01	5.35	67	.01	.01	10.	1.01	17.35	211	.24	.24	.00	317.
1.01	5.40	68	.01	.01	10.	1.01	17.40	212	.24	.24	.00	315.
1.01	5.45	69	.01	.01	10.	1.01	17.45	213	.24	.24	.00	314.
1.01	5.50	70	.01	.01	10.	1.01	17.50	214	.24	.24	.00	314.
1.01	5.55	71	.01	.01	10.	1.01	17.55	215	.24	.24	.00	313.
1.01	5.60	72	.01	.01	10.	1.01	18.00	216	.24	.24	.00	313.
1.01	6.05	73	.07	.04	13.	1.01	18.05	217	.02	.02	.00	295.
1.01	6.10	74	.07	.04	23.	1.01	18.10	218	.02	.02	.00	236.
1.01	6.15	75	.07	.05	35.	1.01	18.15	219	.02	.02	.00	165.
1.01	6.20	76	.07	.05	45.	1.01	18.20	220	.02	.02	.00	160.
1.01	6.25	77	.07	.05	52.	1.01	18.25	221	.02	.02	.00	148.
1.01	6.30	78	.07	.05	56.	1.01	18.30	222	.02	.02	.00	133.
1.01	6.35	79	.07	.05	60.	1.01	18.35	223	.02	.02	.00	119.
1.01	6.40	80	.07	.05	62.	1.01	18.40	224	.02	.02	.00	107.
1.01	6.45	81	.07	.05	64.	1.01	18.45	225	.02	.02	.00	96.
1.01	6.50	82	.07	.05	66.	1.01	18.50	226	.02	.02	.00	86.
1.01	6.55	83	.07	.05	68.	1.01	18.55	227	.02	.02	.00	77.
1.01	7.00	84	.07	.06	69.	1.01	19.00	228	.02	.02	.00	69.
1.01	7.05	85	.07	.06	70.	1.01	19.05	229	.02	.02	.00	62.
1.01	7.10	86	.07	.06	72.	1.01	19.10	230	.02	.02	.00	55.
1.01	7.15	87	.07	.06	73.	1.01	19.15	231	.02	.02	.00	49.
1.01	7.20	88	.07	.06	74.	1.01	19.20	232	.02	.02	.00	44.
1.01	7.25	89	.07	.06	75.	1.01	19.25	233	.02	.02	.00	40.
1.01	7.30	90	.07	.06	75.	1.01	19.30	234	.02	.02	.00	36.
1.01	7.35	91	.07	.06	76.	1.01	19.35	235	.02	.02	.00	32.
1.01	7.40	92	.07	.06	77.	1.01	19.40	236	.02	.02	.00	29.
1.01	7.45	93	.07	.06	78.	1.01	19.45	237	.02	.02	.00	28.
1.01	7.50	94	.07	.06	78.	1.01	19.50	238	.02	.02	.00	28.
1.01	7.55	95	.07	.06	79.	1.01	19.55	239	.02	.02	.00	24.
1.01	8.00	96	.07	.06	80.	1.01	20.00	240	.02	.02	.00	24.
1.01	8.05	97	.07	.06	80.	1.01	20.05	241	.02	.02	.00	24.
1.01	8.10	98	.07	.06	81.	1.01	20.10	242	.02	.02	.00	24.
1.01	8.15	99	.07	.06	81.	1.01	20.15	243	.02	.02	.00	24.
1.01	8.20	100	.07	.06	82.	1.01	20.20	244	.02	.02	.00	28.
1.01	8.25	101	.07	.06	82.	1.01	20.25	245	.02	.02	.00	28.
1.01	8.30	102	.07	.06	83.	1.01	20.30	246	.02	.02	.00	28.
1.01	8.35	103	.07	.06	83.	1.01	20.35	247	.02	.02	.00	28.
1.01	8.40	104	.07	.06	83.	1.01	20.40	248	.02	.02	.00	28.
1.01	8.45	105	.07	.06	84.	1.01	20.45	249	.02	.02	.00	28.
1.01	8.50	106	.07	.06	84.	1.01	20.50	250	.02	.02	.00	29.
1.01	8.55	107	.07	.06	84.	1.01	20.55	251	.02	.02	.00	20.
1.01	9.00	108	.07	.07	85.	1.01	21.00	252	.02	.02	.00	24.
1.01	9.05	109	.07	.07	85.	1.01	21.05	253	.02	.02	.00	24.
1.01	9.10	110	.07	.07	85.	1.01	21.10	254	.02	.02	.00	28.
1.01	9.15	111	.07	.07	86.	1.01	21.15	255	.02	.02	.00	28.
1.01	9.20	112	.07	.07	86.	1.01	21.20	256	.02	.02	.00	28.
1.01	9.25	113	.07	.07	86.	1.01	21.25	257	.02	.02	.00	28.
1.01	9.30	114	.07	.07	86.	1.01	21.30	258	.02	.02	.00	24.
1.01	9.35	115	.07	.07	87.	1.01	21.35	259	.02	.02	.00	24.
1.01	9.40	116	.07	.07	87.	1.01	21.40	260	.02	.02	.00	24.
1.01	9.45	117	.07	.07	87.	1.01	21.45	261	.02	.02	.00	24.
1.01	9.50	118	.07	.07	87.	1.01	21.50	262	.02	.02	.00	24.
1.01	9.55	119	.07	.07	88.	1.01	21.55	263	.02	.02	.00	24.
1.01	10.00	120	.07	.07	88.	1.01	22.00	264	.02	.02	.00	24.
1.01	10.05	121	.07	.07	88.	1.01	22.05	265	.02	.02	.00	24.
1.01	10.10	122	.07	.07	88.	1.01	22.10	266	.02	.02	.00	24.
1.01	10.15	123	.07	.07	88.	1.01	22.15	267	.02	.02	.00	24.
1.01	10.20	124	.07	.07	88.	1.01	22.20	268	.02	.02	.00	24.
1.01	10.25	125	.07	.07	89.	1.01	22.25	269	.02	.02	.00	24.

[illegible]

HYDROGRAPH AT STAINFLOW FOR PLAN 1. RTIO 1

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL	VOLUME
CFS	193.	47.	15.	15.		4287.
CWC	5.	1.	0.	0.		121.
INCHES		2.55	3.26	3.26		3.26
N4		64.79	42.76	42.76		62.76
AC-FT		30.	30.	30.		30.
THOUS CU M		29.	34.	36.		36.

HYDROGRAPH AT STAINFLOW FOR PLAN 1. RTIO 2

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL	VOLUME
CFS	386.	93.	30.	30.		8574.
CMS	11.	3.	1.			243.
INCHFS		5.10	6.52	6.52		6.52
44		129.59	165.51	165.51		165.51
AC-FY		4.6	59.	59.		59.
CU M		57.	73.	73.		73.
THOUS						

HYDROGRAPH AT STAINFLOW FOR PLAN 1, RTIO 3

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	579.	140.	45.	45.	12861.
CWS	16.	4.	1.	1.	364.
TNCHFS		7.65	9.77	9.77	

MM
AC-FT
FUGUE CUM

HYDROGRAPH AT STATION FLOW FOR PLAN 1. RTIO 4

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	773.	186.	60.	60.	17148.
CMS	22.	5.	2.	2.	484.
INCHFS		10.20	17.03	13.03	33.03
"M		259.17	331.03	331.03	331.03
AC-FT		118.	92.	119.	114.
HOUSE CUB M		114.	146.	146.	146.

HYDROGRAPH AT STATION 1. RTIO 5

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL	VOLUME
CFS	965.	233.	74.	74.	21435.	607.
CS	27.	7.	2.	2.	16.28	18.28
INCHES		12.75	14.59	16.29	43.79	148.
MM		323.97	413.79	413.79	148.	182.
AC-T		114.	148.	148.	182.	
AC-T		143.	182.	182.		
THOUS. CU M						

HYDROGRAPH AT STAINFLOO FOR PLAN 1. RTIO 6

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL	VOLUME
CFS	1932.	466.	149.	149.	42671.	
CMS	55.	13.	4.	4.	1214.	
INCHES		25.51	32.59	32.58	35.58	
MM		647.93	827.57	827.57	827.57	
AC-F		231.	295.	295.	295.	
HOUS. CIL M		295.	364.	364.	364.	

HYDROGRAPH ROUTING

[illegible]

[illegible][illegible]

PEAK OUTFLOW IS 344. AT TIME 15.83 HOURS

MAXIMUM STORAGE = 18.

STATION OUTING, PLAN 1. RATIO 3
END-OF-PERIOD HYDROGRAPH ORDINATES

[illegible]

[illegible]

STATION OUTING, PLAN 1, RATIO 6

END-OF-PERIOD HYDROGRAPH ORDINATES

[illegible]

HYDROGRAPH DATA
 IHWG 1 IUNG 2 IARFA .06 SNAP -0.00 TRSDA .04 TRSPC 1.00 RATIO -0.000 ISAME 1 LOCAL -0

PRECIP DATA
 SPFF -0.00 PMS 26.00 R6 100.00 R12 120.00 R24 130.00 R48 -0.00 R72 -0.00 R96 -0.00

LOSS DATA
 LROPT STORP 0LTKR RTIOL ERAIN STPKS RTIOK STRTL CNSTL ALSWX RTIMP
 -0 -0.00 -0.00 1.00 -0.00 -0.00 1.00 -1.00 -R2.00 -0.00 .15

CURVE NO = -82.00 WETNESS = -1.00 EFFECT CN = 82.00

UNIT HYDROGRAPH DATA
 TC = -0.00 LAG = .20

RECESSION DATA
 STRTQ = .12 ORCSN = -.10 RTIOR = 3.00

UNIT HYDROGRAPH 14 END OF PERIOD ORIGINATES. IC = -0.00 HOURS. LAG = 10. VOL = 1.00 3.
 28. 93. 116. 51. 30. 17. 5. 3.

W.D.	HR.	MIN	PERIOD	RAIN	EXCS	LOSS	COMP	END-OF-PERIOD FLOW	W.D.	HR.	MIN	PERIOD	RAIN	EXCS	LOSS	COMP
0	0.04	05	1	.01	.00	.01	0.	1.01	12.05	145	.22	.20	.01	.22	.20	.01
1.01	.10	2	.01	.01	.00	.01	0.	1.01	12.10	144	.22	.20	.01	.22	.20	.01
1.01	.15	3	.01	.01	.00	.01	0.	1.01	12.15	147	.22	.20	.01	.22	.20	.01
1.01	.20	4	.01	.01	.00	.01	1.	1.01	12.20	148	.22	.21	.01	.22	.21	.01
1.01	.25	5	.01	.01	.00	.01	1.	1.01	12.25	149	.22	.21	.01	.22	.21	.01
1.01	.30	6	.01	.01	.00	.01	1.	1.01	12.30	150	.22	.21	.01	.22	.21	.01
1.01	.35	7	.01	.01	.00	.01	1.	1.01	12.35	151	.22	.21	.01	.22	.21	.01
1.01	.40	8	.01	.01	.00	.01	1.	1.01	12.40	152	.22	.21	.01	.22	.21	.01
1.01	.45	9	.01	.01	.00	.01	1.	1.01	12.45	153	.22	.21	.01	.22	.21	.01
1.01	.50	10	.01	.01	.00	.01	1.	1.01	12.50	154	.22	.21	.01	.22	.21	.01
1.01	.55	11	.01	.01	.00	.01	1.	1.01	12.55	155	.27	.21	.01	.27	.21	.01
1.01	1.00	12	.01	.01	.00	.01	1.	1.01	13.00	156	.22	.21	.01	.22	.21	.01
1.01	1.05	13	.01	.01	.00	.01	1.	1.01	13.05	157	.26	.25	.01	.26	.25	.01
1.01	1.10	14	.01	.01	.00	.01	1.	1.01	13.10	158	.26	.25	.01	.26	.25	.01
1.01	1.15	15	.01	.01	.00	.01	1.	1.01	13.15	159	.25	.25	.01	.25	.25	.01
1.01	1.20	16	.01	.01	.00	.01	1.	1.01	13.20	160	.26	.25	.01	.26	.25	.01
1.01	1.25	17	.01	.01	.00	.01	1.	1.01	13.25	161	.26	.25	.01	.26	.25	.01
1.01	1.30	18	.01	.01	.00	.01	1.	1.01	13.30	162	.26	.25	.01	.26	.25	.01
1.01	1.35	19	.01	.01	.00	.01	1.	1.01	13.35	163	.26	.25	.01	.26	.25	.01
1.01	1.40	20	.01	.01	.00	.01	1.	1.01	13.40	164	.26	.25	.01	.26	.25	.01
1.01	1.45	21	.01	.01	.00	.01	1.	1.01	13.45	165	.26	.25	.01	.26	.25	.01
1.01	1.50	22	.01	.01	.00	.01	1.	1.01	13.50	166	.26	.25	.01	.26	.25	.01
1.01	1.55	23	.01	.01	.00	.01	1.	1.01	13.55	167	.26	.25	.01	.26	.25	.01
1.01	2.00	24	.01	.01	.00	.01	1.	1.01	14.00	168	.26	.25	.01	.26	.25	.01
1.01	2.05	25	.01	.01	.00	.01	1.	1.01	14.05	169	.32	.32	.01	.32	.32	.01
1.01	2.10	26	.01	.01	.00	.01	1.	1.01	14.10	170	.32	.32	.01	.32	.32	.01
1.01	2.15	27	.01	.01	.00	.01	1.	1.01	14.15	171	.32	.32	.01	.32	.32	.01
1.01	2.20	28	.01	.01	.00	.01	1.	1.01	14.20	172	.32	.32	.01	.32	.32	.01
1.01	2.25	29	.01	.01	.00	.01	1.	1.01	14.25	173	.32	.32	.01	.32	.32	.01
1.01	2.30	30	.01	.01	.00	.01	1.	1.01	14.30	174	.32	.32	.01	.32	.32	.01
1.01	2.35	31	.01	.01	.00	.01	1.	1.01	14.35	175	.32	.32	.01	.32	.32	.01
1.01	2.40	32	.01	.01	.00	.01	1.	1.01	14.40	176	.32	.32	.01	.32	.32	.01
1.01	2.45	33	.01	.01	.00	.01	1.	1.01	14.45	177	.32	.32	.01	.32	.32	.01
1.01	2.50	34	.01	.01	.00	.01	1.	1.01	14.50	178	.32	.32	.01	.32	.32	.01
1.01	2.55	35	.01	.01	.00	.01	1.	1.01	14.55	179	.32	.32	.01	.32	.32	.01
1.01	3.00	36	.01	.01	.00	.01	1.	1.01	15.00	180	.32	.32	.01	.32	.32	.01

1.01	3.05	37	.01	.00	.01	1.	1.01	15.05	181	.20	.20	.00	140.
1.01	3.10	38	.01	.00	.01	1.	1.01	15.10	182	.40	.39	.00	134.
1.01	3.15	39	.01	.00	.01	1.	1.01	15.15	183	.60	.59	.00	138.
1.01	3.20	40	.01	.00	.01	1.	1.01	15.20	184	.80	.79	.01	154.
1.01	3.25	41	.01	.00	.01	1.	1.01	15.25	185	1.00	.99	.01	187.
1.01	3.30	42	.01	.00	.01	2.	1.01	15.30	186	1.20	1.19	.02	243.
1.01	3.35	43	.01	.00	.01	2.	1.01	15.35	187	1.40	1.39	.02	408.
1.01	3.40	44	.01	.00	.01	2.	1.01	15.40	188	1.60	1.59	.01	546.
1.01	3.45	45	.01	.00	.01	2.	1.01	15.45	189	1.80	1.79	.00	657.
1.01	3.50	46	.01	.00	.01	2.	1.01	15.50	190	2.00	1.99	.00	582.
1.01	3.55	47	.01	.00	.01	2.	1.01	15.55	191	2.20	2.19	.00	457.
1.01	3.60	48	.01	.00	.01	2.	1.01	15.60	192	2.40	2.39	.00	356.
1.01	3.65	49	.01	.00	.01	2.	1.01	15.65	193	2.60	2.59	.00	241.
1.01	3.70	50	.01	.00	.01	2.	1.01	15.70	194	2.80	2.79	.00	226.
1.01	3.75	51	.01	.00	.01	2.	1.01	15.75	195	3.00	2.99	.00	190.
1.01	3.80	52	.01	.00	.01	2.	1.01	15.80	196	3.20	3.19	.00	166.
1.01	3.85	53	.01	.00	.01	2.	1.01	15.85	197	3.40	3.39	.00	153.
1.01	3.90	54	.01	.00	.01	2.	1.01	15.90	198	3.60	3.59	.00	146.
1.01	3.95	55	.01	.00	.01	2.	1.01	15.95	199	3.80	3.79	.00	141.
1.01	4.00	56	.01	.00	.01	2.	1.01	16.00	200	4.00	3.99	.00	138.
1.01	4.05	57	.01	.00	.01	2.	1.01	16.05	201	4.20	4.19	.00	137.
1.01	4.10	58	.01	.00	.01	2.	1.01	16.10	202	4.40	4.39	.00	136.
1.01	4.15	59	.01	.00	.01	2.	1.01	16.15	203	4.60	4.59	.00	136.
1.01	4.20	60	.01	.00	.01	2.	1.01	16.20	204	4.80	4.79	.00	136.
1.01	4.25	61	.01	.00	.01	3.	1.01	16.25	205	5.00	4.99	.00	134.
1.01	4.30	62	.01	.00	.01	3.	1.01	16.30	206	5.20	5.19	.00	128.
1.01	4.35	63	.01	.00	.01	3.	1.01	16.35	207	5.40	5.39	.00	120.
1.01	4.40	64	.01	.00	.01	3.	1.01	16.40	208	5.60	5.59	.00	114.
1.01	4.45	65	.01	.00	.01	3.	1.01	16.45	209	5.80	5.79	.00	111.
1.01	4.50	66	.01	.00	.01	3.	1.01	16.50	210	6.00	5.99	.00	109.
1.01	4.55	67	.01	.00	.01	3.	1.01	16.55	211	6.20	6.19	.00	107.
1.01	4.60	68	.01	.00	.01	3.	1.01	16.60	212	6.40	6.39	.00	107.
1.01	4.65	69	.01	.00	.01	3.	1.01	16.65	213	6.60	6.59	.00	107.
1.01	4.70	70	.01	.00	.01	3.	1.01	16.70	214	6.80	6.79	.00	107.
1.01	4.75	71	.01	.00	.01	3.	1.01	16.75	215	7.00	6.99	.00	107.
1.01	4.80	72	.01	.00	.01	3.	1.01	16.80	216	7.20	7.19	.00	107.
1.01	4.85	73	.01	.00	.01	4.	1.01	16.85	217	7.40	7.39	.00	101.
1.01	4.90	74	.01	.00	.01	7.	1.01	16.90	218	7.60	7.59	.00	80.
1.01	4.95	75	.01	.00	.01	10.	1.01	16.95	219	7.80	7.79	.00	63.
1.01	5.00	76	.01	.00	.01	13.	1.01	17.00	220	8.00	7.99	.00	56.
1.01	5.05	77	.01	.00	.01	15.	1.01	17.05	221	8.20	8.19	.00	50.
1.01	5.10	78	.01	.00	.01	17.	1.01	17.10	222	8.40	8.39	.00	45.
1.01	5.15	79	.01	.00	.01	18.	1.01	17.15	223	8.60	8.59	.00	41.
1.01	5.20	80	.01	.00	.01	19.	1.01	17.20	224	8.80	8.79	.00	36.
1.01	5.25	81	.01	.00	.01	19.	1.01	17.25	225	9.00	8.99	.00	33.
1.01	5.30	82	.01	.00	.01	20.	1.01	17.30	226	9.20	9.19	.00	29.
1.01	5.35	83	.01	.00	.01	21.	1.01	17.35	227	9.40	9.39	.00	26.
1.01	5.40	84	.01	.00	.01	21.	1.01	17.40	228	9.60	9.59	.00	23.
1.01	5.45	85	.01	.00	.01	22.	1.01	17.45	229	9.80	9.79	.00	21.
1.01	5.50	86	.01	.00	.01	22.	1.01	17.50	230	10.00	9.99	.00	19.
1.01	5.55	87	.01	.00	.01	22.	1.01	17.55	231	10.20	10.19	.00	17.
1.01	5.60	88	.01	.00	.01	23.	1.01	17.60	232	10.40	10.39	.00	15.
1.01	5.65	89	.01	.00	.01	23.	1.01	17.65	233	10.60	10.59	.00	14.
1.01	5.70	90	.01	.00	.01	24.	1.01	17.70	234	10.80	10.79	.00	12.
1.01	5.75	91	.01	.00	.01	24.	1.01	17.75	235	11.00	10.99	.00	11.
1.01	5.80	92	.01	.00	.01	24.	1.01	17.80	236	11.20	11.19	.00	10.
1.01	5.85	93	.01	.00	.01	24.	1.01	17.85	237	11.40	11.39	.00	10.
1.01	5.90	94	.01	.00	.01	25.	1.01	17.90	238	11.60	11.59	.00	10.
1.01	5.95	95	.01	.00	.01	25.	1.01	17.95	239	11.80	11.79	.00	10.
1.01	6.00	96	.01	.00	.01	25.	1.01	18.00	240	12.00	11.99	.00	10.
1.01	6.05	97	.01	.00	.01	25.	1.01	18.05	241	12.20	12.19	.00	10.
1.01	6.10	98	.01	.00	.01	26.	1.01	18.10	242	12.40	12.39	.00	10.
1.01	6.15	99	.01	.00	.01	26.	1.01	18.15	243	12.60	12.59	.00	10.
1.01	6.20	100	.01	.00	.01	26.	1.01	18.20	244	12.80	12.79	.00	10.

AC-FT 10. 10. 10.
THOUS CU M 10. 12. 12.

HYDROGRAPH AT STAINFLOW FOR PLAN 1. RTIO 2

PEAK 4-HOUR 24-HOUR 72-HOUR TOTAL VOLUME
131. 32. 10. 2486.
4. 1. 0. 82.
INCHES 5.07 6.43 6.43 6.43
MM 178.45 163.30 163.30 163.30
AC-FT 16. 20. 20. 20.
THOUS CU M 19. 25. 25. 25.

HYDROGRAPH AT STAINFLOW FOR PLAN 1. RTIO 3

PEAK 6-HOUR 24-HOUR 72-HOUR TOTAL VOLUME
147. 47. 15. 4329.
6. 1. 0. 123.
INCHES 7.61 9.64 9.64 9.64
MM 193.27 244.95 244.95 244.95
AC-FT 24. 30. 30. 30.
THOUS CU M 29. 37. 37. 37.

HYDROGRAPH AT STAINFLOW FOR PLAN 1. RTIO 4

PEAK 6-HOUR 24-HOUR 72-HOUR TOTAL VOLUME
263. 63. 20. 5772.
7. 2. 1. 163.
INCHES 10.15 12.86 12.86 12.86
MM 257.70 326.60 326.60 326.60
AC-FT 31. 40. 40. 40.
THOUS CU M 39. 49. 49. 49.

HYDROGRAPH AT STAINFLOW FOR PLAN 1. RTIO 5

PEAK 6-HOUR 24-HOUR 72-HOUR TOTAL VOLUME
328. 79. 25. 7215.
9. 1. 1. 204.
INCHES 12.68 16.07 16.07 16.07
MM 322.12 408.25 408.25 408.25
AC-FT 39. 50. 50. 50.
THOUS CU M 49. 61. 61. 61.

HYDROGRAPH AT STAINFLOW FOR PLAN 1. RTIO 6

PEAK 6-HOUR 24-HOUR 72-HOUR TOTAL VOLUME
657. 158. 50. 14431.
19. 4. 1. 409.
INCHES 25.34 32.15 32.15 32.15
MM 644.25 816.50 816.50 816.50
AC-FT 78. 99. 99. 99.
THOUS CU M 97. 123. 123. 123.

CFS 34. 9. 3. 763.
 INCHES 12.61 15.27 15.27
 MM 320.24 387.92 387.92
 AC-FT 153. 146. 186.
 THOUS CU M 189. 229. 229.

SUM OF 2 HYDROGRAPHS AT PLAN 1 RTIO 6
 PEAK 6-HOUR 24-HOUR 72-HOUR TOTAL VOLUME
 CFS 2391. 622. 192. 55405.
 CFS 64. 14. 5. 1569.
 INCHES 25.38 31.40 31.40 31.40
 MM 644.55 797.46 797.46 797.46
 AC-FT 308. 382. 382.
 THOUS CU M 380. 471. 471.

HYDROGRAPH ROUTING

RESERVOIR ROUTING FOR LAKE MARIAN
 ISTAT ICOMP IFCN IFAPE JPLT JPHY INAME ISTAGE IAUO
 OUTING 1 -0 -0 1 3 1 -0
 ROUTING DATA
 OLDS CLOS AVG TRES ISAME IOPT IPMP LSTR
 -0.0 -0.000 -0.000 1 1 -0 -0
 NSTPS NSTOL LAG ANSKK X TSK STORA ISPRAT
 1 -0 -0 -0.000 -0.000 -0.000 -671. -1
 STAGE 671.0 671.5 672.0 672.5 673.0 673.5 674.0 674.5 675.0 675.5
 676.0 676.5 677.0 677.5 678.0 678.5 679.0 679.5 680.0 680.5
 FLOW 0. 2. 7. 16. 27. 40. 62. 75. 97. 119.
 1703. 2550. 3702. 4861. 5934. 7053. 8172. 9290. 10408. 11526.
 CAPACITY= 0. 4. 8. 13. 17. 21. 26. 31. 35. 40.
 45. 50. 55. 60. 65. 70. 76. 81. 86. 91.
 ELEVATION= 671. 671. 672. 672. 673. 673. 674. 674. 675. 675.
 676. 676. 677. 677. 678. 678. 679. 679. 680. 680.

DAM DATA
 TOSL C000 EXPN DAMWID
 674.8 -0.0 -0.0 -0.0

STATION ROUTING, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH OPERATES

INFLOW
 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.
 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.
 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.

COMBINE HYDROGRAPHS

LAKE ELEANOR AND LAKE MARIAN HYDROGRAPHS COMBINED
 ISTAD ICOMP ITCN ITCPE JPLT JPRY INAME ISTAGE IAUO
 2 -0 -0 1 3 1 -0 -0

SUM OF 2 HYDROGRAPHS AT				
PLAN 1 RTIO 1				
PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
135.	48.	16.	16.	4470.
4.	1.	0.	0.	121.
CFS	1.05	2.53	7.53	2.53
CMS	40.42	64.34	64.34	64.34
INCHES	24.	31.	31.	31.
AC-FT	20.	38.	38.	38.
THOUS CU M				

SUM OF 2 HYDROGRAPHS AT				
PLAN 1 RTIO 2				
PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
461.	115.	35.	35.	10022.
13.	3.	1.	1.	284.
CFS	4.68	5.68	5.68	5.68
CMS	118.90	144.25	144.25	144.25
INCHES	57.	69.	69.	69.
AC-FT	70.	85.	85.	85.
THOUS CU M				

SUM OF 2 HYDROGRAPHS AT				
PLAN 1 RTIO 3				
PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
710.	181.	54.	54.	15612.
20.	5.	2.	2.	442.
CFS	7.39	8.85	8.85	8.85
CMS	187.43	224.70	224.70	224.70
INCHES	90.	108.	108.	108.
AC-FT	111.	133.	133.	133.
THOUS CU M				

SUM OF 2 HYDROGRAPHS AT				
PLAN 1 RTIO 4				
PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
953.	246.	74.	74.	21245.
27.	7.	2.	2.	602.
CFS	10.03	12.04	12.04	12.04
CMS	254.74	305.79	305.79	305.79
INCHES	122.	146.	146.	146.
AC-FT	150.	180.	180.	180.
THOUS CU M				

SUM OF 2 HYDROGRAPHS AT				
PLAN 1 RTIO 5				
PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
1197.	309.	94.	94.	24951.
CFS				

[illegible]

PEAK OUTFLOW IS 31. AT TIME 14.67 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL	VOLUME
CFS	31.	27.	9.	0.	2513.	71.
CMS	1.	1.	0.	0.	1.42	1.42
INCHES		1.04		1.42		
"		27.67	36.18	34.18		36.18
AC-FT		17.	13.	17.		17.
THOUS CU M		14.	21.	21.		21.

MAXIMUM STORAGE = 18.

STATION OUTING. PLAN 1. RATIO 2

END-OF-PERIOD HYDROGRAPH ORIGINATES

[illegible]

END-OF-PERIOD HYDROGRAPH ORIGINATES

[illegible]

PEAK OUTFLOW IS 2279. AT TIME 15.93 HOURS

MAXIMUM STORAGE = 53.

IMYNG	IUMG	IARFA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	2	1.51	-0.00	1.51	1.00	-0.000	-0	1	-0
HYDROGRAPH DATA									
PRECIP DATA									
SPFE	P4S	R6	R12	R24		R48	R72	R96	
-0.00	26.00	100.00	120.00	130.00		-0.00	-0.00	-0.00	

CURVE NO = -82.00 WETNESS = -1.00 EFFECT CN = 82.00

UNIT HYDROGRAPH DATA
TC= -0.00 LAG= .55

RECESSION DATA

RTTOR= 3.00

OMCSN= -10

3.02

STARTO=

35 END OF PERIOD ORIGINATES, TCR

-0.00 HOURS, LAG=

55 VOL= 1.00

951.

1088.

118.

12.

UNIT HYDROGRAPH 35 END OF PERIOD ORIGINATES, TCR -0.00 HOURS, LAG= 55 VOL= 1.00 951.

72. 214. 426. 728. 1016. 1179. 1231. 1200. 1088. 951.

765. 362. 458. 362. 294. 235. 183. 148. 118. 93.

74. 59. 47. 37. 30. 24. 18. 15. 12. 10.

4. 6. 4. 3. 1. 1. 1. 1. 1. 1.

0	0.00A	MPAIN	PERIOD	RAIN	EXCS	LOSS	COMP O	END-OF-PERIOD FLOW	NO.0A	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP
1.01	.05	1	.01	.00	.01	3.	1.01	12.05	145	.22	.20	.01	787.		
1.01	.10	2	.01	.00	.01	3.	1.01	12.10	146	.22	.20	.01	817.		
1.01	.15	3	.01	.00	.01	3.	1.01	12.15	147	.22	.20	.01	876.		
1.01	.20	4	.01	.00	.01	4.	1.01	12.20	148	.22	.20	.01	976.		
1.01	.25	5	.01	.00	.01	5.	1.01	12.25	149	.22	.20	.01	1116.		
1.01	.30	6	.01	.00	.01	7.	1.01	12.30	150	.22	.21	.01	1277.		
1.01	.35	7	.01	.00	.01	8.	1.01	12.35	151	.22	.21	.01	1447.		
1.01	.40	8	.01	.00	.01	10.	1.01	12.40	152	.22	.21	.01	1613.		
1.01	.45	9	.01	.00	.01	11.	1.01	12.45	153	.22	.21	.01	1764.		
1.01	.50	10	.01	.00	.01	13.	1.01	12.50	154	.22	.21	.01	1897.		
1.01	.55	11	.01	.00	.01	14.	1.01	12.55	155	.22	.21	.01	2005.		
1.01	1.00	12	.01	.00	.01	14.	1.01	13.00	156	.22	.21	.01	2049.		
1.01	1.05	13	.01	.00	.01	15.	1.01	13.05	157	.26	.25	.01	2159.		
1.01	1.10	14	.01	.00	.01	15.	1.01	13.10	158	.26	.25	.01	2222.		
1.01	1.15	15	.01	.00	.01	16.	1.01	13.15	159	.26	.25	.01	2284.		
1.01	1.20	16	.01	.00	.01	16.	1.01	13.20	160	.26	.25	.01	2352.		
1.01	1.25	17	.01	.00	.01	16.	1.01	13.25	161	.26	.25	.01	2424.		
1.01	1.30	18	.01	.00	.01	16.	1.01	13.30	162	.26	.25	.01	2498.		
1.01	1.35	19	.01	.00	.01	17.	1.01	13.35	163	.26	.25	.01	2570.		
1.01	1.40	20	.01	.00	.01	17.	1.01	13.40	164	.26	.25	.01	2637.		
1.01	1.45	21	.01	.00	.01	17.	1.01	13.45	165	.26	.25	.01	2697.		
1.01	1.50	22	.01	.00	.01	17.	1.01	13.50	166	.26	.25	.01	2749.		
1.01	1.55	23	.01	.00	.01	17.	1.01	13.55	167	.26	.25	.01	2792.		
1.01	2.00	24	.01	.00	.01	17.	1.01	14.00	168	.26	.25	.01	2826.		
1.01	2.05	25	.01	.00	.01	17.	1.01	14.05	169	.32	.32	.01	2857.		
1.01	2.10	26	.01	.00	.01	17.	1.01	14.10	170	.32	.32	.01	2893.		
1.01	2.15	27	.01	.00	.01	17.	1.01	14.15	171	.32	.32	.01	2939.		
1.01	2.20	28	.01	.00	.01	17.	1.01	14.20	172	.32	.32	.01	3001.		
1.01	2.25	29	.01	.00	.01	17.	1.01	14.25	173	.32	.32	.01	3078.		
1.01	2.30	30	.01	.00	.01	17.	1.01	14.30	174	.32	.32	.01	3164.		
1.01	2.35	31	.01	.00	.01	17.	1.01	14.35	175	.32	.32	.01	3252.		
1.01	2.40	32	.01	.00	.01	17.	1.01	14.40	176	.32	.32	.01	3336.		
1.01	2.45	33	.01	.00	.01	17.	1.01	14.45	177	.32	.32	.01	3413.		
1.01	2.50	34	.01	.00	.01	17.	1.01	14.50	178	.32	.32	.01	3479.		
1.01	2.55	35	.01	.00	.01	17.	1.01	14.55	179	.32	.32	.01	3533.		
1.01	3.00	36	.01	.00	.01	18.	1.01	15.00	180	.32	.32	.01	3574.		
1.01	3.05	37	.01	.00	.01	18.	1.01	15.05	181	.20	.19	.01	3599.		
1.01	3.10	38	.01	.00	.01	19.	1.01	15.10	182	.40	.39	.01	3613.		
1.01	3.15	39	.01	.00	.01	20.	1.01	15.15	183	.40	.39	.01	3623.		
1.01	3.20	40	.01	.00	.01	21.	1.01	15.20	184	.59	.59	.01	3647.		
1.01	3.25	41	.01	.00	.01	23.	1.01	15.25	185	.69	.68	.01	3725.		
1.01	3.30	42	.01	.00	.01	24.	1.01	15.30	186	1.68	1.66	.02	3862.		
1.01	3.35	43	.01	.00	.01	26.	1.01	15.35	187	2.77	2.74	.02	4518.		
1.01	3.40	44	.01	.00	.01	27.	1.01	15.40	188	1.09	1.09	.01	5414.		
1.01	3.45	45	.01	.00	.01	29.	1.01	15.45	189	.69	.69	.01	6637.		
1.01	3.50	46	.01	.00	.01	30.	1.01	15.50	190	.59	.59	.01	8071.		
1.01	3.55	47	.01	.00	.01	32.	1.01	15.55	191	.40	.39	.01	9359.		
1.01	4.00	48	.01	.00	.01	33.	1.01	16.00	192	.40	.39	.01	10188.		
1.01	4.05	49	.01	.00	.01	35.	1.01	16.05	193	.30	.30	.01	10521.		
1.01	4.10	50	.01	.00	.01	37.	1.01	16.10	194	.30	.30	.01	10399.		
1.01	4.15	51	.01	.00	.01	38.	1.01	16.15	195	.30	.30	.01	9895.		

1.01	4.20	52	.01	.00	.01	.40	1.01	16.20	196	.30	.30	.00	9148.
1.01	4.24	53	.01	.00	.01	41.	1.01	16.25	197	.30	.30	.00	8221.
1.01	4.30	54	.01	.00	.01	43.	1.01	16.30	198	.30	.30	.00	7310.
1.01	4.35	55	.01	.00	.01	44.	1.01	16.35	199	.30	.30	.00	6567.
1.01	4.40	56	.01	.00	.01	46.	1.01	16.40	200	.30	.30	.00	5958.
1.01	4.45	57	.01	.00	.01	47.	1.01	16.45	201	.30	.30	.00	5474.
1.01	4.50	58	.01	.01	.01	48.	1.01	16.50	202	.30	.30	.00	5075.
1.01	4.55	59	.01	.01	.01	50.	1.01	16.55	203	.30	.30	.00	4751.
1.01	5.00	60	.01	.01	.01	51.	1.01	17.00	204	.30	.30	.00	4505.
1.01	5.05	61	.01	.01	.01	53.	1.01	17.05	205	.24	.24	.00	4300.
1.01	5.10	62	.01	.01	.01	54.	1.01	17.10	206	.24	.24	.00	4125.
1.01	5.15	63	.01	.01	.01	55.	1.01	17.15	207	.24	.24	.00	3971.
1.01	5.20	64	.01	.01	.01	56.	1.01	17.20	208	.24	.24	.00	3824.
1.01	5.25	65	.01	.01	.01	58.	1.01	17.25	209	.24	.24	.00	3679.
1.01	5.30	66	.01	.01	.01	59.	1.01	17.30	210	.24	.24	.00	3539.
1.01	5.35	67	.01	.01	.01	60.	1.01	17.35	211	.24	.24	.00	3410.
1.01	5.40	68	.01	.01	.01	61.	1.01	17.40	212	.24	.24	.00	3292.
1.01	5.45	69	.01	.01	.01	63.	1.01	17.45	213	.24	.24	.00	3190.
1.01	5.50	70	.01	.01	.01	64.	1.01	17.50	214	.24	.24	.00	3105.
1.01	5.55	71	.01	.01	.01	65.	1.01	17.55	215	.24	.24	.00	3037.
1.01	6.00	72	.01	.01	.01	66.	1.01	18.00	216	.24	.24	.00	2984.
1.01	6.05	73	.07	.03	.04	69.	1.01	18.05	217	.02	.02	.00	2925.
1.01	6.10	74	.07	.04	.04	76.	1.01	18.10	218	.02	.02	.00	2843.
1.01	6.15	75	.07	.04	.04	89.	1.01	18.15	219	.02	.02	.00	2721.
1.01	6.20	76	.07	.04	.03	111.	1.01	18.20	220	.02	.02	.00	2539.
1.01	6.25	77	.07	.04	.03	141.	1.01	18.25	221	.02	.02	.00	2299.
1.01	6.30	78	.07	.04	.03	178.	1.01	18.30	222	.02	.02	.00	2030.
1.01	6.35	79	.07	.04	.03	219.	1.01	18.35	223	.02	.02	.00	1755.
1.01	6.40	80	.07	.04	.03	259.	1.01	18.40	224	.02	.02	.00	1489.
1.01	6.45	81	.07	.05	.03	298.	1.01	18.45	225	.02	.02	.00	1249.
1.01	6.50	82	.07	.05	.03	335.	1.01	18.50	226	.02	.02	.00	1045.
1.01	6.55	83	.07	.05	.02	369.	1.01	18.55	227	.02	.02	.00	937.
1.01	7.00	84	.07	.05	.02	397.	1.01	19.00	228	.02	.02	.00	839.
1.01	7.05	85	.07	.05	.02	423.	1.01	19.05	229	.02	.02	.00	752.
1.01	7.10	86	.07	.05	.02	446.	1.01	19.10	230	.02	.02	.00	674.
1.01	7.15	87	.07	.05	.02	467.	1.01	19.15	231	.02	.02	.00	604.
1.01	7.20	88	.07	.05	.02	487.	1.01	19.20	232	.02	.02	.00	541.
1.01	7.25	89	.07	.05	.02	504.	1.01	19.25	233	.02	.02	.00	485.
1.01	7.30	90	.07	.05	.02	520.	1.01	19.30	234	.02	.02	.00	434.
1.01	7.35	91	.07	.05	.02	535.	1.01	19.35	235	.02	.02	.00	389.
1.01	7.40	92	.07	.05	.02	549.	1.01	19.40	236	.02	.02	.00	348.
1.01	7.45	93	.07	.06	.02	561.	1.01	19.45	237	.02	.02	.00	312.
1.01	7.50	94	.07	.06	.02	573.	1.01	19.50	238	.02	.02	.00	299.
1.01	7.55	95	.07	.06	.02	584.	1.01	19.55	239	.02	.02	.00	289.
1.01	8.00	96	.07	.06	.02	595.	1.01	20.00	240	.02	.02	.00	281.
1.01	8.05	97	.07	.06	.02	604.	1.01	20.05	241	.02	.02	.00	274.
1.01	8.10	98	.07	.06	.01	611.	1.01	20.10	242	.02	.02	.00	269.
1.01	8.15	99	.07	.06	.01	622.	1.01	20.15	243	.02	.02	.00	265.
1.01	8.20	100	.07	.06	.01	630.	1.01	20.20	244	.02	.02	.00	262.
1.01	8.25	101	.07	.06	.01	637.	1.01	20.25	245	.02	.02	.00	259.
1.01	8.30	102	.07	.06	.01	645.	1.01	20.30	246	.02	.02	.00	257.
1.01	8.35	103	.07	.06	.01	651.	1.01	20.35	247	.02	.02	.00	255.
1.01	8.40	104	.07	.06	.01	658.	1.01	20.40	248	.02	.02	.00	254.
1.01	8.45	105	.07	.06	.01	664.	1.01	20.45	249	.02	.02	.00	253.
1.01	8.50	106	.07	.06	.01	670.	1.01	20.50	250	.02	.02	.00	252.
1.01	8.55	107	.07	.06	.01	675.	1.01	20.55	251	.02	.02	.00	252.
1.01	9.00	108	.07	.06	.01	680.	1.01	21.00	252	.02	.02	.00	252.
1.01	9.05	109	.07	.06	.01	685.	1.01	21.05	253	.02	.02	.00	252.
1.01	9.10	110	.07	.06	.01	690.	1.01	21.10	254	.02	.02	.00	252.
1.01	9.15	111	.07	.06	.01	694.	1.01	21.15	255	.02	.02	.00	252.
1.01	9.20	112	.07	.06	.01	699.	1.01	21.20	256	.02	.02	.00	252.
1.01	9.25	113	.07	.06	.01	703.	1.01	21.25	257	.02	.02	.00	252.
1.01	9.30	114	.07	.06	.01	707.	1.01	21.30	258	.02	.02	.00	252.
1.01	9.35	115	.07	.06	.01	711.	1.01	21.35	259	.02	.02	.00	252.

1.01	9.40	116	.07	.06	.01	714.	1.01	51.45	261	.02	.00	252.
1.01	9.45	117	.07	.06	.01	718.	1.01	21.45	261	.02	.00	252.
1.01	9.50	119	.07	.06	.01	721.	1.01	21.50	262	.02	.00	252.
1.01	9.55	119	.07	.06	.01	724.	1.01	21.55	263	.02	.00	252.
1.01	10.00	120	.07	.06	.01	727.	1.01	22.00	264	.02	.00	252.
1.01	10.05	121	.07	.06	.01	730.	1.01	22.05	265	.02	.00	252.
1.01	10.10	121	.07	.06	.01	733.	1.01	22.10	266	.02	.00	252.
1.01	10.15	122	.07	.06	.01	736.	1.01	22.15	267	.02	.00	252.
1.01	10.20	123	.07	.06	.01	739.	1.01	22.20	268	.02	.00	252.
1.01	10.25	124	.07	.06	.01	741.	1.01	22.25	269	.02	.00	252.
1.01	10.30	125	.07	.07	.01	744.	1.01	22.30	270	.02	.00	252.
1.01	10.35	126	.07	.07	.01	746.	1.01	22.35	271	.02	.00	252.
1.01	10.40	127	.07	.07	.01	748.	1.01	22.40	272	.02	.00	252.
1.01	10.45	129	.07	.07	.01	751.	1.01	22.45	273	.02	.00	252.
1.01	10.50	129	.07	.07	.01	753.	1.01	22.50	274	.02	.00	252.
1.01	10.55	130	.07	.07	.01	755.	1.01	22.55	275	.02	.00	252.
1.01	11.00	131	.07	.07	.01	757.	1.01	23.00	276	.02	.00	252.
1.01	11.05	132	.07	.07	.01	759.	1.01	23.05	277	.02	.00	252.
1.01	11.10	133	.07	.07	.01	761.	1.01	23.10	278	.02	.00	252.
1.01	11.15	134	.07	.07	.01	762.	1.01	23.15	279	.02	.00	252.
1.01	11.20	135	.07	.07	.01	764.	1.01	23.20	280	.02	.00	252.
1.01	11.25	136	.07	.07	.01	766.	1.01	23.25	281	.02	.00	252.
1.01	11.30	137	.07	.07	.01	767.	1.01	23.30	282	.02	.00	252.
1.01	11.35	138	.07	.07	.01	769.	1.01	23.35	283	.02	.00	252.
1.01	11.40	139	.07	.07	.01	771.	1.01	23.40	284	.02	.00	252.
1.01	11.45	140	.07	.07	.01	772.	1.01	23.45	285	.02	.00	252.
1.01	11.50	142	.07	.07	.01	773.	1.01	23.50	286	.02	.00	252.
1.01	11.55	143	.07	.07	.01	775.	1.01	23.55	287	.02	.00	252.
1.01	12.00	144	.07	.07	.00	776.	1.02	0.00	288	.02	.00	252.
SUM										33.80	31.55	2.25
										(859.16	801.16	57.110406.161

PEAK	10521.	1276.	1276.	367372.
CFS	4052.	1276.	1276.	367372.
CMS	115.	36.	36.	10403.
INCHES	24.97	31.43	31.43	31.43
MM	634.12	798.40	798.40	798.40
AC-FT	2019.	2530.	2530.	2530.
THOUS CU M	2679.	3121.	3121.	3121.

HYDROGRAPH AT STAINFLOW FOR PLAN 1. RTIO 1

PEAK	1052.	128.	128.	36737.
CFS	405.	128.	128.	36737.
CMS	11.	4.	4.	1040.
INCHES	2.50	3.14	3.14	3.14
MM	63.41	79.84	79.84	79.84
AC-FT	201.	253.	253.	253.
THOUS CU M	248.	312.	312.	312.

HYDROGRAPH AT STAINFLOW FOR PLAN 1. RTIO 2

PEAK	2104.	255.	255.	73474.
CFS	810.	255.	255.	73474.
CMS	23.	7.	7.	2081.
INCHES	4.99	6.29	6.29	6.29
MM	126.82	159.68	159.68	159.68
AC-FT	402.	506.	506.	506.
THOUS CU M	496.	624.	624.	624.

HYDROGRAPH AT STAINFLOW FOR PLAN 1. RTIO 3

PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
3156.	1216.	383.	383.	110212.
89.	34.	11.	11.	3121.
CFS	7.49	9.43	9.43	9.43
CMS	190.24	239.52	239.52	239.52
INCHES	603.	759.	759.	759.
MM	744.	936.	936.	936.
AC-FT				
THOUS CU M				

HYDROGRAPH AT STAINFLOW FOR PLAN 1. RTIO 4

PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
4208.	1621.	510.	510.	146949.
119.	46.	14.	14.	4161.
CFS	9.99	12.57	12.57	12.57
CMS	253.65	319.36	319.36	319.36
INCHES	504.	1012.	1012.	1012.
MM	991.	1248.	1248.	1248.
AC-FT				
THOUS CU M				

HYDROGRAPH AT STAINFLOW FOR PLAN 1. RTIO 5

PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
5261.	2026.	638.	638.	163686.
149.	57.	18.	18.	5201.
CFS	12.48	15.72	15.72	15.72
CMS	317.06	399.20	399.20	399.20
INCHES	1005.	1265.	1265.	1265.
MM	1239.	1560.	1560.	1560.
AC-FT				
THOUS CU M				

HYDROGRAPH AT STAINFLOW FOR PLAN 1. RTIO 6

PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
10521.	4052.	1276.	1276.	367372.
298.	115.	36.	36.	10403.
CFS	24.97	31.43	31.43	31.43
CMS	634.12	798.40	798.40	798.40
INCHES	2010.	2530.	2530.	2530.
MM	2479.	3121.	3121.	3121.
AC-FT				
THOUS CU M				

HYDROGRAPH ROUTING

RESERVOIR ROUTING FOR SUGARHOLLOW LAKE									
ISTAQ	ICOMP	IECON	ITAKE	JPLT	JPRT	INAME	ISTAGE	IAUTO	
OUTING	1	-0	-0	1	3	1	-0	-0	
ROUTING DATA									
LOSS	CLOSS	AVG	IPES	ISAME	IOPT	IPMP	LSTP		
-0.0	-0.000	-0.00	1	1	-0	-0	-0		
NSIPS	NSIOL	LAG	AMSKK	X	TSK	STORA	ISPRAT		
1	-0	-0	-0.000	-0.000	-0.000	-459.	-1		

STAGE 650.3 650.5 651.0 651.5 652.0 652.5 653.0 653.5 654.0 654.5
 655.0 655.5 656.0 656.5 657.0 657.5 658.0 659.0 660.0 661.0

FLOW 0. 3. 19. 43. 60. 69. 76. 81. 89. 95.
 100. 106. 111. 115. 120. 124. 130. 136. 141. 149.

CAPACITY= 0. 3. 11. 19. 27. 36. 44. 53. 62. 71.
 80. 89. 99. 108. 118. 128. 138. 148. 158. 168.

ELEVATION= 650. 650. 651. 651. 652. 652. 653. 653. 654. 654.
 655. 655. 656. 656. 657. 657. 658. 659. 660. 661.

DAM DATA
 TOPEL 658.2
 COOL -0.0
 EXPD -0.0
 DAMWID -0.0

STATION OUTING, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW									
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
2.	2.	3.	3.	3.	4.	4.	4.	5.	6.
4.	7.	8.	9.	10.	10.	11.	11.	12.	12.
13.	14.	15.	16.	17.	17.	18.	19.	19.	20.
21.	22.	23.	24.	25.	26.	27.	28.	29.	29.
31.	31.	32.	33.	34.	35.	36.	37.	37.	38.
39.	39.	40.	40.	41.	42.	43.	44.	44.	45.
45.	45.	46.	46.	47.	48.	49.	50.	50.	51.
51.	53.	54.	56.	58.	60.	61.	63.	64.	65.
66.	67.	68.	70.	71.	73.	74.	76.	77.	77.
78.	79.	80.	82.	83.	85.	87.	89.	89.	90.
90.	92.	93.	94.	95.	98.	99.	101.	104.	104.
107.	110.	113.	116.	119.	122.	124.	126.	129.	137.
155.	171.	184.	196.	206.	215.	223.	230.	236.	241.
246.	249.	252.	255.	258.	260.	270.	274.	277.	281.
267.	268.	269.	271.	272.	273.	274.	275.	276.	277.
214.	203.	197.	191.	184.	178.	172.	166.	161.	155.
150.	145.	140.	135.	130.	124.	118.	112.	106.	100.
126.	127.	127.	126.	126.	125.	125.	124.	124.	124.
124.	124.	123.	123.	123.	122.	122.	122.	121.	121.
121.	121.	120.	120.	119.	119.	119.	119.	118.	118.
118.	118.	117.	117.	116.	116.	116.	116.	116.	116.

STORAGE

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
2.	2.	3.	3.	3.	4.	4.	4.	5.	6.
4.	7.	8.	9.	10.	10.	11.	11.	12.	12.
13.	14.	15.	16.	17.	17.	18.	19.	19.	20.
21.	22.	23.	24.	25.	26.	27.	28.	29.	29.
31.	31.	32.	33.	34.	35.	36.	37.	37.	38.
39.	39.	40.	40.	41.	42.	43.	44.	44.	45.
45.	45.	46.	46.	47.	48.	49.	50.	50.	51.
51.	53.	54.	56.	58.	60.	61.	63.	64.	65.
66.	67.	68.	70.	71.	73.	74.	76.	77.	77.
78.	79.	80.	82.	83.	85.	87.	89.	89.	90.
90.	92.	93.	94.	95.	98.	99.	101.	104.	104.
107.	110.	113.	116.	119.	122.	124.	126.	129.	137.
155.	171.	184.	196.	206.	215.	223.	230.	236.	241.
246.	249.	252.	255.	258.	260.	270.	274.	277.	281.
267.	268.	269.	271.	272.	273.	274.	275.	276.	277.
214.	203.	197.	191.	184.	178.	172.	166.	161.	155.
150.	145.	140.	135.	130.	124.	118.	112.	106.	100.
126.	127.	127.	126.	126.	125.	125.	124.	124.	124.
124.	124.	123.	123.	123.	122.	122.	122.	121.	121.
121.	121.	120.	120.	119.	119.	119.	119.	118.	118.
118.	118.	117.	117.	116.	116.	116.	116.	116.	116.

MAXIMUM STORAGE = 159.

STATION OUTING, PLAN 1. RATIO 2
END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW									
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
5.	6.	7.	8.	10.	11.	12.	13.	14.	14.
16.	17.	18.	20.	22.	24.	27.	29.	31.	31.
33.	37.	41.	43.	44.	45.	47.	47.	48.	48.
44.	51.	57.	58.	58.	58.	58.	58.	58.	58.
61.	62.	63.	63.	63.	63.	63.	63.	63.	63.
57.	64.	64.	69.	70.	70.	71.	71.	72.	72.
72.	73.	73.	74.	74.	75.	75.	75.	77.	77.
78.	80.	81.	83.	84.	86.	89.	91.	92.	92.
64.	64.	67.	69.	101.	103.	106.	108.	110.	110.
111.	113.	115.	116.	118.	120.	121.	123.	125.	125.
130.	151.	175.	198.	221.	244.	307.	426.	562.	720.
943.	1163.	1342.	1486.	1590.	1650.	1667.	1645.	1596.	1530.
1456.	1379.	1203.	1231.	1163.	1102.	1046.	905.	648.	421.
404.	781.	758.	736.	715.	695.	677.	659.	642.	621.
598.	569.	536.	499.	460.	420.	381.	346.	313.	284.
257.	251.	245.	238.	232.	225.	219.	212.	206.	200.
144.	144.	142.	137.	130.	129.	129.	129.	129.	129.
144.	140.	137.	131.	127.	127.	126.	126.	126.	126.
124.	124.	125.	127.	124.	124.	123.	123.	123.	123.
123.	122.	122.	122.	122.	122.	121.	121.	121.	121.

STORAGE									
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
4.	4.	5.	5.	6.	6.	6.	6.	6.	6.
9.	10.	11.	11.	12.	13.	14.	15.	15.	15.
16.	17.	18.	18.	18.	19.	20.	21.	22.	22.
22.	23.	23.	24.	25.	25.	26.	27.	28.	28.
28.	29.	29.	30.	31.	31.	32.	33.	33.	33.
34.	35.	35.	36.	36.	37.	38.	39.	39.	39.
40.	40.	41.	41.	42.	43.	44.	45.	46.	46.
47.	49.	51.	53.	55.	57.	62.	64.	67.	67.
69.	72.	75.	78.	81.	84.	90.	93.	97.	97.
109.	103.	107.	110.	114.	117.	121.	129.	133.	133.
137.	141.	145.	149.	152.	154.	160.	164.	169.	175.
141.	137.	133.	127.	121.	114.	107.	100.	93.	87.
106.	104.	101.	97.	91.	85.	78.	71.	64.	58.
178.	177.	176.	175.	174.	173.	173.	172.	171.	171.

SUB-AREA RUNOFF COMPUTATION

SURAREA RUNOFF FOR LAKE ROBINHOOD
ISTAO ICOMP IECON ITAPE JPLT JPRT INAME ISTAGE IAUOTO
INFLOW 0 -0 -0 1 3 1 -0 -0

HYDROGRAPH DATA
INVOG IUMG TAREA SNAP TRSDA TRSPC RATIO ISNOW ISAME LOCAL
1 2 .72 -0.00 .72 1.00 -0.000 -0 1 -0

PRECIP DATA
SPFE PMS R4 R12 R24 R48 R72 R96
-0.00 26.00 100.00 120.00 130.00 -0.00 -0.00 -0.00

LOSS DATA
LROPT STRKR DLTGM RTIOL ERAIN STRKS RTIOK STRYL CNSTL ALSMX RTIMP
-0 -0.00 -0.00 1.00 -0.00 -0.00 1.00 -1.00 -82.00 -0.00 .10

CURVE NO = -82.00 WETNESS = -1.00 EFFECT CN = 82.00

UNIT HYDROGRAPH DATA
TC = -0.00 LAG = .45

RECESSION DATA
STRTO = 1.44 ORCSN = -.10 RTIOR = 3.00

UNIT HYDROGRAPH 29 END OF PERIOD ORIGINATES, TC = -0.00 HOURS, LAG = .45 VOL = 1.00
56. 144. 344. 556. 678. 707. 664. 577. 460. 329.
249. 189. 146. 110. 84. 64. 48. 36. 28. 21.
16. 9. 7. 6. 4. 3. 2. 1.

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	.05	1	.01	.00	.01	1.	1.01	12.05	145	.22	.20	.01	379.
1.01	.10	2	.01	.00	.01	1.	1.01	12.10	146	.22	.20	.01	403.
1.01	.15	3	.01	.00	.01	2.	1.01	12.15	147	.22	.20	.01	450.
1.01	.20	4	.01	.00	.01	3.	1.01	12.20	148	.22	.20	.01	526.
1.01	.25	5	.01	.00	.01	3.	1.01	12.25	149	.22	.20	.01	618.
1.01	.30	6	.01	.00	.01	4.	1.01	12.30	150	.22	.21	.01	715.
1.01	.35	7	.01	.00	.01	5.	1.01	12.35	151	.22	.21	.01	807.
1.01	.40	8	.01	.00	.01	6.	1.01	12.40	152	.22	.21	.01	887.
1.01	.45	9	.01	.00	.01	7.	1.01	12.45	153	.22	.21	.01	952.
1.01	.50	10	.01	.00	.01	7.	1.01	12.50	154	.22	.21	.01	999.
1.01	.55	11	.01	.00	.01	7.	1.01	12.55	155	.22	.21	.01	1035.
1.01	1.00	12	.01	.00	.01	8.	1.01	13.00	156	.22	.21	.01	1063.
1.01	1.05	13	.01	.00	.01	8.	1.01	13.05	157	.26	.25	.01	1088.
1.01	1.10	14	.01	.00	.01	8.	1.01	13.10	158	.26	.25	.01	1112.
1.01	1.15	15	.01	.00	.01	8.	1.01	13.15	159	.26	.25	.01	1140.
1.01	1.20	16	.01	.00	.01	8.	1.01	13.20	160	.26	.25	.01	1174.
1.01	1.25	17	.01	.00	.01	8.	1.01	13.25	161	.26	.25	.01	1211.
1.01	1.30	18	.01	.00	.01	8.	1.01	13.30	162	.26	.25	.01	1248.
1.01	1.35	19	.01	.00	.01	8.	1.01	13.35	163	.26	.25	.01	1282.
1.01	1.40	20	.01	.00	.01	8.	1.01	13.40	164	.26	.25	.01	1311.
1.01	1.45	21	.01	.00	.01	8.	1.01	13.45	165	.26	.25	.01	1335.
1.01	1.50	22	.01	.00	.01	8.	1.01	13.50	166	.26	.25	.01	1352.
1.01	1.55	23	.01	.00	.01	8.	1.01	13.55	167	.26	.25	.01	1366.
1.01	2.00	24	.01	.00	.01	8.	1.01	14.00	168	.26	.25	.01	1377.
1.01	2.05	25	.01	.00	.01	8.	1.01	14.05	169	.32	.32	.01	1389.

1.01	2.10	26	.01	.00	.01	8.	1.01	14.10	170	.32	.32	.01	1406.
1.01	2.15	27	.01	.00	.01	8.	1.01	14.15	171	.32	.32	.01	1434.
1.01	2.20	28	.01	.00	.01	8.	1.01	14.20	172	.32	.32	.01	1474.
1.01	2.25	29	.01	.00	.01	8.	1.01	14.25	173	.32	.32	.01	1521.
1.01	2.30	30	.01	.00	.01	8.	1.01	14.30	174	.32	.32	.01	1569.
1.01	2.35	31	.01	.00	.01	8.	1.01	14.35	175	.32	.32	.01	1614.
1.01	2.40	32	.01	.00	.01	8.	1.01	14.40	176	.32	.32	.01	1653.
1.01	2.45	33	.01	.00	.01	8.	1.01	14.45	177	.32	.32	.01	1694.
1.01	2.50	34	.01	.00	.01	8.	1.01	14.50	178	.32	.32	.00	1707.
1.01	2.55	35	.01	.00	.01	8.	1.01	14.55	179	.32	.32	.00	1725.
1.01	3.00	36	.01	.00	.01	9.	1.01	15.00	180	.32	.32	.00	1739.
1.01	3.05	37	.01	.00	.01	9.	1.01	15.05	181	.20	.19	.00	1742.
1.01	3.10	38	.01	.00	.01	10.	1.01	15.10	182	.40	.39	.01	1741.
1.01	3.15	39	.01	.00	.01	10.	1.01	15.15	183	.40	.39	.01	1737.
1.01	3.20	40	.01	.00	.01	11.	1.01	15.20	184	.59	.59	.01	1750.
1.01	3.25	41	.01	.00	.01	12.	1.01	15.25	185	.69	.68	.01	1816.
1.01	3.30	42	.01	.00	.01	12.	1.01	15.30	186	1.68	1.66	.02	2001.
1.01	3.35	43	.01	.00	.01	13.	1.01	15.35	187	2.77	2.74	.02	2424.
1.01	3.40	44	.01	.00	.01	14.	1.01	15.40	188	1.09	1.08	.01	3096.
1.01	3.45	45	.01	.00	.01	15.	1.01	15.45	189	.69	.69	.00	3972.
1.01	3.50	46	.01	.00	.01	16.	1.01	15.50	190	.59	.59	.00	4841.
1.01	3.55	47	.01	.00	.01	16.	1.01	15.55	191	.40	.39	.00	5391.
1.01	4.00	48	.01	.00	.01	17.	1.01	16.00	192	.30	.30	.00	5553.
1.01	4.05	49	.01	.00	.01	18.	1.01	16.05	193	.30	.30	.00	5405.
1.01	4.10	50	.01	.00	.01	19.	1.01	16.10	194	.30	.30	.00	5002.
1.01	4.15	51	.01	.00	.01	19.	1.01	16.15	195	.30	.30	.00	4439.
1.01	4.20	52	.01	.00	.01	20.	1.01	16.20	196	.30	.30	.00	3848.
1.01	4.25	53	.01	.00	.01	21.	1.01	16.25	197	.30	.30	.00	3168.
1.01	4.30	54	.01	.00	.01	21.	1.01	16.30	198	.30	.30	.00	2982.
1.01	4.35	55	.01	.00	.01	22.	1.01	16.35	199	.30	.30	.00	2675.
1.01	4.40	56	.01	.00	.01	23.	1.01	16.40	200	.30	.30	.00	2436.
1.01	4.45	57	.01	.00	.01	23.	1.01	16.45	201	.30	.30	.00	2254.
1.01	4.50	58	.01	.01	.01	24.	1.01	16.50	202	.30	.30	.00	2117.
1.01	4.55	59	.01	.01	.01	25.	1.01	16.55	203	.30	.30	.00	2011.
1.01	5.00	60	.01	.01	.01	25.	1.01	17.00	204	.30	.30	.00	1931.
1.01	5.05	61	.01	.01	.01	26.	1.01	17.05	205	.24	.24	.00	1867.
1.01	5.10	62	.01	.01	.01	27.	1.01	17.10	206	.24	.24	.00	1811.
1.01	5.15	63	.01	.01	.01	27.	1.01	17.15	207	.24	.24	.00	1755.
1.01	5.20	64	.01	.01	.01	28.	1.01	17.20	208	.24	.24	.00	1693.
1.01	5.25	65	.01	.01	.01	28.	1.01	17.25	209	.24	.24	.00	1629.
1.01	5.30	66	.01	.01	.01	29.	1.01	17.30	210	.24	.24	.00	1569.
1.01	5.35	67	.01	.01	.01	30.	1.01	17.35	211	.24	.24	.00	1515.
1.01	5.40	68	.01	.01	.01	30.	1.01	17.40	212	.24	.24	.00	1468.
1.01	5.45	69	.01	.01	.01	31.	1.01	17.45	213	.24	.24	.00	1430.
1.01	5.50	70	.01	.01	.01	31.	1.01	17.50	214	.24	.24	.00	1402.
1.01	5.55	71	.01	.01	.01	32.	1.01	17.55	215	.24	.24	.00	1380.
1.01	6.00	72	.01	.01	.01	32.	1.01	18.00	216	.24	.24	.00	1364.
1.01	6.05	73	.07	.03	.04	34.	1.01	18.05	217	.02	.02	.00	1341.
1.01	6.10	74	.07	.04	.04	39.	1.01	18.10	218	.02	.02	.00	1297.
1.01	6.15	75	.07	.04	.04	49.	1.01	18.15	219	.02	.02	.00	1217.
1.01	6.20	76	.07	.04	.03	66.	1.01	18.20	220	.02	.02	.00	1093.
1.01	6.25	77	.07	.04	.03	86.	1.01	18.25	221	.02	.02	.00	944.
1.01	6.30	78	.07	.04	.03	109.	1.01	18.30	222	.02	.02	.00	789.
1.01	6.35	79	.07	.04	.03	131.	1.01	18.35	223	.02	.02	.00	644.
1.01	6.40	80	.07	.04	.03	152.	1.01	18.40	224	.02	.02	.00	539.
1.01	6.45	81	.07	.05	.03	170.	1.01	18.45	225	.02	.02	.00	483.
1.01	6.50	82	.07	.05	.03	186.	1.01	18.50	226	.02	.02	.00	432.
1.01	6.55	83	.07	.05	.02	199.	1.01	18.55	227	.02	.02	.00	387.
1.01	7.00	84	.07	.05	.02	211.	1.01	19.00	228	.02	.02	.00	347.
1.01	7.05	85	.07	.05	.02	222.	1.01	19.05	229	.02	.02	.00	311.
1.01	7.10	86	.07	.05	.02	231.	1.01	19.10	230	.02	.02	.00	279.
1.01	7.15	87	.07	.05	.02	240.	1.01	19.15	231	.02	.02	.00	250.
1.01	7.20	88	.07	.05	.02	248.	1.01	19.20	232	.02	.02	.00	224.
1.01	7.25	89	.07	.05	.02	255.	1.01	19.25	233	.02	.02	.00	200.

1.01	7.30	90	.07	.05	.02	261.	1.01	19.30	234	.02	.02	.00	180.
1.01	7.35	91	.07	.05	.02	267.	1.01	19.35	235	.02	.02	.00	161.
1.01	7.40	92	.07	.05	.02	273.	1.01	19.40	236	.02	.02	.00	144.
1.01	7.45	93	.07	.06	.02	278.	1.01	19.45	237	.02	.02	.00	130.
1.01	7.50	94	.07	.06	.02	283.	1.01	19.50	238	.02	.02	.00	127.
1.01	7.55	95	.07	.06	.02	288.	1.01	19.55	239	.02	.02	.00	125.
1.01	8.00	96	.07	.06	.02	292.	1.01	20.00	240	.02	.02	.00	124.
1.01	8.05	97	.07	.06	.02	296.	1.01	20.05	241	.02	.02	.00	122.
1.01	8.10	98	.07	.06	.01	300.	1.01	20.10	242	.02	.02	.00	121.
1.01	8.15	99	.07	.06	.01	304.	1.01	20.15	243	.02	.02	.00	121.
1.01	8.20	100	.07	.06	.01	307.	1.01	20.20	244	.02	.02	.00	120.
1.01	8.25	101	.07	.06	.01	310.	1.01	20.25	245	.02	.02	.00	120.
1.01	8.30	102	.07	.06	.01	313.	1.01	20.30	246	.02	.02	.00	120.
1.01	8.35	103	.07	.06	.01	316.	1.01	20.35	247	.02	.02	.00	120.
1.01	8.40	104	.07	.06	.01	319.	1.01	20.40	248	.02	.02	.00	120.
1.01	8.45	105	.07	.06	.01	321.	1.01	20.45	249	.02	.02	.00	120.
1.01	8.50	106	.07	.06	.01	324.	1.01	20.50	250	.02	.02	.00	120.
1.01	8.55	107	.07	.06	.01	326.	1.01	20.55	251	.02	.02	.00	120.
1.01	9.00	108	.07	.06	.01	329.	1.01	21.00	252	.02	.02	.00	120.
1.01	9.05	109	.07	.06	.01	331.	1.01	21.05	253	.02	.02	.00	120.
1.01	9.10	110	.07	.06	.01	333.	1.01	21.10	254	.02	.02	.00	120.
1.01	9.15	111	.07	.06	.01	335.	1.01	21.15	255	.02	.02	.00	120.
1.01	9.20	112	.07	.06	.01	337.	1.01	21.20	256	.02	.02	.00	120.
1.01	9.25	113	.07	.06	.01	338.	1.01	21.25	257	.02	.02	.00	120.
1.01	9.30	114	.07	.06	.01	340.	1.01	21.30	258	.02	.02	.00	120.
1.01	9.35	115	.07	.06	.01	342.	1.01	21.35	259	.02	.02	.00	120.
1.01	9.40	116	.07	.06	.01	343.	1.01	21.40	260	.02	.02	.00	120.
1.01	9.45	117	.07	.06	.01	345.	1.01	21.45	261	.02	.02	.00	120.
1.01	9.50	118	.07	.06	.01	346.	1.01	21.50	262	.02	.02	.00	120.
1.01	9.55	119	.07	.06	.01	348.	1.01	21.55	263	.02	.02	.00	120.
1.01	10.00	120	.07	.06	.01	349.	1.01	22.00	264	.02	.02	.00	120.
1.01	10.05	121	.07	.06	.01	351.	1.01	22.05	265	.02	.02	.00	120.
1.01	10.10	122	.07	.06	.01	352.	1.01	22.10	266	.02	.02	.00	120.
1.01	10.15	123	.07	.06	.01	353.	1.01	22.15	267	.02	.02	.00	120.
1.01	10.20	124	.07	.06	.01	354.	1.01	22.20	268	.02	.02	.00	120.
1.01	10.25	125	.07	.07	.01	355.	1.01	22.25	269	.02	.02	.00	120.
1.01	10.30	126	.07	.07	.01	356.	1.01	22.30	270	.02	.02	.00	120.
1.01	10.35	127	.07	.07	.01	358.	1.01	22.35	271	.02	.02	.00	120.
1.01	10.40	128	.07	.07	.01	359.	1.01	22.40	272	.02	.02	.00	120.
1.01	10.45	129	.07	.07	.01	360.	1.01	22.45	273	.02	.02	.00	120.
1.01	10.50	130	.07	.07	.01	361.	1.01	22.50	274	.02	.02	.00	120.
1.01	10.55	131	.07	.07	.01	361.	1.01	22.55	275	.02	.02	.00	120.
1.01	11.00	132	.07	.07	.01	362.	1.01	23.00	276	.02	.02	.00	120.
1.01	11.05	133	.07	.07	.01	363.	1.01	23.05	277	.02	.02	.00	120.
1.01	11.10	134	.07	.07	.01	364.	1.01	23.10	278	.02	.02	.00	120.
1.01	11.15	135	.07	.07	.01	365.	1.01	23.15	279	.02	.02	.00	120.
1.01	11.20	136	.07	.07	.01	366.	1.01	23.20	280	.02	.02	.00	120.
1.01	11.25	137	.07	.07	.01	366.	1.01	23.25	281	.02	.02	.00	120.
1.01	11.30	138	.07	.07	.01	367.	1.01	23.30	282	.02	.02	.00	120.
1.01	11.35	139	.07	.07	.01	368.	1.01	23.35	283	.02	.02	.00	120.
1.01	11.40	140	.07	.07	.01	369.	1.01	23.40	284	.02	.02	.00	120.
1.01	11.45	141	.07	.07	.01	369.	1.01	23.45	285	.02	.02	.00	120.
1.01	11.50	142	.07	.07	.01	370.	1.01	23.50	286	.02	.02	.00	120.
1.01	11.55	143	.07	.07	.01	371.	1.01	23.55	287	.02	.02	.00	120.
1.01	12.00	144	.07	.07	.00	371.	1.02	0.00	288	.02	.02	.00	120.

SUM 33.80 31.55 2.25 175A26.
(859.)(801.)(57.)(497A.84)

TOTAL VOLUME
175780.
4978.

72-HOUR
610.
17.

24-HOUR
610.
17.

6-HOUR
1941.
55.

PEAK
5563.
158.

CFS
CWS

INCHES
MM
AC-FT
THOUS CU M

25.07	31.54	31.54	31.54
636.83	801.18	801.18	801.18
962.	1211.	1211.	1211.
1187.	1493.	1493.	1493.

HYDROGRAPH AT STAINFLOW FOR PLAN 1. RTIO 1

PEAK
556.
16.

6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
194.	61.	61.	17578.
5.	2.	2.	498.
2.51	3.15	3.15	3.15
63.68	80.12	80.12	80.12
96.	121.	121.	121.
119.	149.	149.	149.

CFS
CMS
INCHES
MM
AC-FT
THOUS CU M

HYDROGRAPH AT STAINFLOW FOR PLAN 1. RTIO 2

PEAK
1113.
32.

6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
388.	122.	122.	3156.
11.	3.	3.	996.
5.01	6.31	6.31	6.31
127.37	160.24	160.24	160.24
192.	242.	242.	242.
237.	299.	299.	299.

CFS
CMS
INCHES
MM
AC-FT
THOUS CU M

HYDROGRAPH AT STAINFLOW FOR PLAN 1. RTIO 3

PEAK
1669.
47.

6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
582.	183.	183.	52734.
16.	5.	5.	1493.
7.52	9.46	9.46	9.46
191.05	240.35	240.35	240.35
289.	363.	363.	363.
356.	448.	448.	448.

CFS
CMS
INCHES
MM
AC-FT
THOUS CU M

HYDROGRAPH AT STAINFLOW FOR PLAN 1. RTIO 4

PEAK
2225.
63.

6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
776.	244.	244.	70312.
22.	7.	7.	1991.
10.03	12.62	12.62	12.62
254.73	320.47	320.47	320.47
385.	484.	484.	484.
475.	597.	597.	597.

CFS
CMS
INCHES
MM
AC-FT
THOUS CU M

HYDROGRAPH AT STAINFLOW FOR PLAN 1. RTIO 5

PEAK
2782.
79.

6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
970.	305.	305.	87890.
27.	9.	9.	2489.
12.54	15.77	15.77	15.77
318.42	400.59	400.59	400.59
481.	605.	605.	605.
591.	747.	747.	747.

CFS
CMS
INCHES
MM
AC-FT
THOUS CU M

AD-A105 042

BALK (KENNETH) AND ASSOCIATES INC ST LOUIS MO
NATIONAL DAM SAFETY PROGRAM, LAKE SHERWOOD DAM (NO 10202), UPPE--ETC(U)
JAN 79 E H BAUMEYER, L KUNZE

F/6 13/13

DACW43-78-C-0169

NL

UNCLASSIFIED

2-2

AS 2
1-1047



END
DATE
FILMED
0 81
DTIC

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CPS	5563.	1941.	610.	610.	174780.
CMS	158.	55.	17.	17.	4978.
INCHES		25.07	31.54	31.54	901.18
44		436.43	801.18	801.18	901.18
AC-FT		962.	1211.	1211.	1211.
THOUS CU M		1197.	1493.	1493.	1493.

[illegible]

RESERVOIR ROUTING FOR LAKE ROBINHOOD

RESERVOIR ROUTING FOR LAKE ROBINHOOD									
ISTAD	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO	
ROUTING	1	-0	-0	1	3	1	-0	-0	
ROUTING DATA									
QLOSS	CLOSS	AVG	IRSS	ISAME	IPRT	LSTR			
-0.0	-0.000	-0.00	1	1	-0	-0			
LAG AMSKK									
NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT		
1	-0	-0	-0.000	-0.000	-0.000	-448.	-1		

STAGE	648.1	649.0	650.0	651.0	652.0	653.0	654.0	655.0	656.0	657.0
	658.0	659.0	660.0	661.0	662.0					
FLOW	0.	3.	11.	23.	33.	41.	48.	55.	63.	109.
	371.	871.	1579.	2287.	2995.					
CAPACITY=	0.	9.	17.	26.	36.	46.	56.	67.	78.	90.
	102.	114.	127.	140.	154.					
ELEVATION=	649.	649.	650.	651.	652.	653.	654.	655.	656.	657.
	654.	659.	660.	661.	662.					

TOPEL	CO2D	EXPD	DAWID
655.2	-0.0	-0.0	-0.

STATION OUTING, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

[illegible]

648.6	648.6	648.7	648.7	648.8	648.8
648.6	648.9	648.9	648.9	649.0	649.0
648.9	649.1	649.2	649.2	649.2	649.3
649.1	649.1	649.4	649.4	649.5	649.5
649.3	649.6	649.6	649.6	649.7	649.7
649.6	649.6	649.6	650.2	650.2	649.8
649.9	650.0	650.2	650.2	650.4	650.5
650.0	650.1	650.9	651.0	651.2	651.3
650.5	650.8	651.7	651.8	652.0	652.1
651.4	651.5	651.6	652.8	652.9	653.0
652.3	652.5	652.6	652.8	653.1	653.5
652.9	653.2	653.4	655.0	655.6	655.8
653.8	654.1	654.8	655.3	656.3	656.4
655.9	656.1	656.2	656.2	656.4	656.4
656.4	656.4	656.4	656.4	656.4	656.4
656.4	656.4	656.3	656.2	656.2	656.1
656.4	656.4	655.9	655.9	655.8	655.7
656.1	656.0	655.9	655.9	655.7	655.7
656.2	655.7	655.6	655.5	655.4	655.4
655.3	655.3	655.2	655.2	655.1	655.1
655.3	655.6	655.2	654.9	654.9	654.8
655.0	655.0	654.9	654.9	654.8	654.8
654.7	654.7	654.7	654.6	654.6	654.6
654.5	654.5	654.4	654.4	654.3	654.5

	PEAK	4-HOUR	24-HOUR	72-HOUR	TOTAL
CFS	130.	81.	31.	31.	865.
CWS	4.	2.	1.	1.	251.
INCHES			1.12	1.59	1.59
NH		28.49	40.40	40.40	40.40
AC-F		61.	61.	61.	61.
THOUS CU Y		53.	75.	75.	75.

MAXIMUM STORAGE = 83.

STATION OUTING, PLAN 1. RATIO 2
END-OF-PERIOD HYDROGRAPH ORDINATES

[illegible]

MAXIMUM STORAGE = 124.

STATION OUTING. PLAN 1. RATIO 4

END-OF-PERIOD HYDROGRAPH ORDINATES

[illegible]

[illegible]

MAXIMUM STORAGE = 143.

STATION OUTING, PLAN 1, RATIO 6
END-OF-PERIOD HYDROGRAPH ORDINATES

[illegible]

663.1	663.8	664.3	664.4	664.5	664.3	663.8	663.4	662.6	662.4
662.0	661.7	661.4	661.1	660.9	660.7	660.6	660.5	660.4	660.3
660.2	660.1	660.0	659.9	659.9	659.8	659.8	659.7	659.7	659.6
659.5	659.3	659.1	659.0	658.8	658.6	658.5	658.4	658.3	658.2
658.1	658.0	657.9	657.8	657.7	657.6	657.5	657.4	657.3	657.2
657.2	657.2	657.1	657.1	657.0	657.0	656.9	656.9	656.9	656.8
656.8	656.8	656.8	656.7	656.7	656.7	656.7	656.6	656.6	656.6
656.6	656.6	656.5	656.6	656.5	656.5	656.5	656.5	656.5	656.5
656.5	656.5	656.5	656.5	656.5	656.4	656.4	656.4	656.4	656.4
656.4	656.4	656.4	656.4	656.4	656.4	656.4	656.4	656.4	656.4

PEAK OUTFLOW IS 4811. AT TIME 16.17 HOURS

CFS		PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CMS		4811.	1927.	568.	568.	163727.
INCHES		136.	55.	16.	16.	4636.
MM			24.90	29.38	29.38	29.38
AC-FT			632.39	746.24	746.24	746.24
THOUS CU M			956.	1128.	1128.	1128.
			1179.	1391.	1391.	1391.

MAXIMUM STORAGE = 189.

SUR-AREA RUNOFF COMPUTATION

SURAREA RUNOFF FOR LAKE SHERWOOD

INSTAG	I COMP	I CON	I TAPE	J PL	J PR	I NAME	I STAGE	I AUTO
0	-0	-0	-0	1	3	1	-0	-0

HYDROGRAPH DATA

IHYDG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	2	2.13	-0.00	2.13	1.00	-0.000	-0	1	-0

PRECIP DATA

SPFE	PWS	R6	R12	R24	R48	R72	R96
-0.00	26.00	100.00	120.00	130.00	-0.00	-0.00	-0.00

LOSS DATA

LROPT	STPKR	DLTKR	RTIOL	ERAIN	STKRS	RTIOK	STATL	CNSTL	ALSMX	RTIMP
-0	-0.00	-0.00	1.00	-0.00	-0.00	1.00	-1.00	-82.00	-0.00	.10

CURVE NO = -82.00 WETNESS = -1.00 EFFECT CN = 82.00

UNIT HYDROGRAPH DATA

TC = -0.00 LAG = .45

RECESSION DATA

STRTO = 4.24 ORCSN = -.10 RTIOR = 3.00

UNIT HYDROGRAPH 29 END OF PERIOD ORIGINATES. TC = -0.00 HOURS. LAG = .45 VOL = 1.00 974.

165.	496.	1016.	1643.	2007.	2091.	1965.	1707.	1360.	974.
736.	540.	431.	325.	24P.	149.	143.	107.	81.	62.
47.	36.	27.	21.	17.	13.	9.	5.	2.	

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP	0	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP	0
-------	-------	--------	------	------	------	------	---	-------	-------	--------	------	------	------	------	---

1.01	.05	1	.01	.00	.01	4.	1.01	12.05	145	.22	.20	.01	1122.
1.01	.10	2	.01	.00	.01	4.	1.01	12.10	146	.22	.20	.01	1191.
1.01	.15	3	.01	.00	.01	5.	1.01	12.15	147	.22	.20	.01	1330.
1.01	.20	4	.01	.00	.01	5.	1.01	12.20	148	.22	.20	.01	1555.
1.01	.25	5	.01	.00	.01	10.	1.01	12.25	149	.22	.20	.01	1829.
1.01	.30	6	.01	.00	.01	13.	1.01	12.30	150	.22	.21	.01	2116.
1.01	.35	7	.01	.00	.01	16.	1.01	12.35	151	.22	.21	.01	2387.
1.01	.40	8	.01	.00	.01	18.	1.01	12.40	152	.22	.21	.01	2624.
1.01	.45	9	.01	.00	.01	20.	1.01	12.45	153	.22	.21	.01	2815.
1.01	.50	10	.01	.00	.01	21.	1.01	12.50	154	.22	.21	.01	2955.
1.01	.55	11	.01	.00	.01	22.	1.01	12.55	155	.22	.21	.01	3062.
1.01	1.00	12	.01	.00	.01	22.	1.01	13.00	156	.22	.21	.01	3145.
1.01	1.05	13	.01	.00	.01	23.	1.01	13.05	157	.26	.25	.01	3218.
1.01	1.10	14	.01	.00	.01	23.	1.01	13.10	158	.26	.25	.01	3290.
1.01	1.15	15	.01	.00	.01	24.	1.01	13.15	159	.26	.25	.01	3373.
1.01	1.20	16	.01	.00	.01	24.	1.01	13.20	160	.26	.25	.01	3474.
1.01	1.25	17	.01	.00	.01	24.	1.01	13.25	161	.26	.25	.01	3554.
1.01	1.30	18	.01	.00	.01	24.	1.01	13.30	162	.26	.25	.01	3693.
1.01	1.35	19	.01	.00	.01	24.	1.01	13.35	163	.26	.25	.01	3792.
1.01	1.40	20	.01	.00	.01	24.	1.01	13.40	164	.26	.25	.01	3879.
1.01	1.45	21	.01	.00	.01	24.	1.01	13.45	165	.26	.25	.01	3949.
1.01	1.50	22	.01	.00	.01	24.	1.01	13.50	166	.26	.25	.01	4000.
1.01	1.55	23	.01	.00	.01	24.	1.01	13.55	167	.26	.25	.01	4040.
1.01	2.00	24	.01	.00	.01	24.	1.01	14.00	168	.26	.25	.01	4072.
1.01	2.05	25	.01	.00	.01	24.	1.01	14.05	169	.32	.32	.01	4109.
1.01	2.10	26	.01	.00	.01	24.	1.01	14.10	170	.32	.32	.01	4161.
1.01	2.15	27	.01	.00	.01	24.	1.01	14.15	171	.32	.32	.01	4242.
1.01	2.20	28	.01	.00	.01	24.	1.01	14.20	172	.32	.32	.01	4360.
1.01	2.25	29	.01	.00	.01	24.	1.01	14.25	173	.32	.32	.01	4499.
1.01	2.30	30	.01	.00	.01	24.	1.01	14.30	174	.32	.32	.01	4641.
1.01	2.35	31	.01	.00	.01	24.	1.01	14.35	175	.32	.32	.01	4774.
1.01	2.40	32	.01	.00	.01	24.	1.01	14.40	176	.32	.32	.01	4890.
1.01	2.45	33	.01	.00	.01	24.	1.01	14.45	177	.32	.32	.01	5083.
1.01	2.50	34	.01	.00	.01	24.	1.01	14.50	178	.32	.32	.00	5050.
1.01	2.55	35	.01	.00	.01	25.	1.01	14.55	179	.32	.32	.00	5103.
1.01	3.00	36	.01	.00	.01	25.	1.01	15.00	180	.32	.32	.00	5143.
1.01	3.05	37	.01	.00	.01	27.	1.01	15.05	181	.20	.19	.00	5155.
1.01	3.10	38	.01	.00	.01	29.	1.01	15.10	182	.40	.39	.01	5150.
1.01	3.15	39	.01	.00	.01	31.	1.01	15.15	183	.40	.39	.01	5138.
1.01	3.20	40	.01	.00	.01	32.	1.01	15.20	184	.59	.59	.01	5178.
1.01	3.25	41	.01	.00	.01	35.	1.01	15.25	185	.69	.69	.01	5371.
1.01	3.30	42	.01	.00	.01	37.	1.01	15.30	186	1.68	1.66	.02	5918.
1.01	3.35	43	.01	.00	.01	39.	1.01	15.35	187	2.77	2.74	.02	7171.
1.01	3.40	44	.01	.00	.01	41.	1.01	15.40	188	1.09	1.08	.01	9158.
1.01	3.45	45	.01	.00	.01	44.	1.01	15.45	189	.69	.69	.00	11749.
1.01	3.50	46	.01	.00	.01	46.	1.01	15.50	190	.59	.59	.00	14321.
1.01	3.55	47	.01	.00	.01	48.	1.01	15.55	191	.40	.39	.00	15948.
1.01	4.00	48	.01	.00	.01	50.	1.01	16.00	192	.40	.39	.00	16458.
1.01	4.05	49	.01	.00	.01	53.	1.01	16.05	193	.30	.30	.00	15991.
1.01	4.10	50	.01	.00	.01	55.	1.01	16.10	194	.30	.30	.00	14799.
1.01	4.15	51	.01	.00	.01	57.	1.01	16.15	195	.30	.30	.00	13133.
1.01	4.20	52	.01	.00	.01	59.	1.01	16.20	196	.30	.30	.00	11384.
1.01	4.25	53	.01	.00	.01	61.	1.01	16.25	197	.30	.30	.00	9963.
1.01	4.30	54	.01	.00	.01	63.	1.01	16.30	198	.30	.30	.00	8821.
1.01	4.35	55	.01	.00	.01	65.	1.01	16.35	199	.30	.30	.00	7914.
1.01	4.40	56	.01	.00	.01	67.	1.01	16.40	200	.30	.30	.00	7207.
1.01	4.45	57	.01	.00	.01	69.	1.01	16.45	201	.30	.30	.00	6668.
1.01	4.50	58	.01	.01	.01	71.	1.01	16.50	202	.30	.30	.00	6262.
1.01	4.55	59	.01	.01	.01	73.	1.01	16.55	203	.30	.30	.00	5949.
1.01	5.00	60	.01	.01	.01	75.	1.01	17.00	204	.30	.30	.00	5713.
1.01	5.05	61	.01	.01	.01	77.	1.01	17.05	205	.24	.24	.00	5524.
1.01	5.10	62	.01	.01	.01	79.	1.01	17.10	206	.24	.24	.00	5350.

1.01	10.30	126	.07	.07	.01	1055.	1.01	22.30	270	.02	.02	.00	356.
1.01	10.35	127	.07	.07	.01	1058.	1.01	22.35	271	.02	.02	.00	356.
1.01	10.40	128	.07	.07	.01	1061.	1.01	22.40	272	.02	.02	.00	356.
1.01	10.45	129	.07	.07	.01	1064.	1.01	22.45	273	.02	.02	.00	356.
1.01	10.50	130	.07	.07	.01	1067.	1.01	22.50	274	.02	.02	.00	356.
1.01	10.55	131	.07	.07	.01	1069.	1.01	22.55	275	.02	.02	.00	356.
1.01	11.00	132	.07	.07	.01	1072.	1.01	23.00	276	.02	.02	.00	355.
1.01	11.05	133	.07	.07	.01	1075.	1.01	23.05	277	.02	.02	.00	356.
1.01	11.10	134	.07	.07	.01	1077.	1.01	23.10	278	.02	.02	.00	356.
1.01	11.15	135	.07	.07	.01	1079.	1.01	23.15	279	.02	.02	.00	356.
1.01	11.20	136	.07	.07	.01	1082.	1.01	23.20	280	.02	.02	.00	356.
1.01	11.25	137	.07	.07	.01	1084.	1.01	23.25	281	.02	.02	.00	356.
1.01	11.30	138	.07	.07	.01	1086.	1.01	23.30	282	.02	.02	.00	356.
1.01	11.35	139	.07	.07	.01	1089.	1.01	23.35	283	.02	.02	.00	356.
1.01	11.40	140	.07	.07	.01	1090.	1.01	23.40	284	.02	.02	.00	356.
1.01	11.45	141	.07	.07	.01	1092.	1.01	23.45	285	.02	.02	.00	356.
1.01	11.50	142	.07	.07	.01	1094.	1.01	23.50	286	.02	.02	.00	356.
1.01	11.55	143	.07	.07	.01	1096.	1.01	23.55	287	.02	.02	.00	356.
1.01	12.00	144	.07	.07	.00	1098.	1.02	0.00	288	.02	.02	.00	356.
SUM 33.60 31.55 2.25 520200.										(859.11 801.11 57.11 14730.42)			

PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
16458.	5741.	1806.	1806.	520015.
466.	163.	51.	51.	14725.
	25.07	31.54	31.54	31.54
	636.83	801.18	801.18	801.18
	2847.	3581.	3581.	3581.
	3511.	4418.	4418.	4418.

HYDROGRAPH AT STAINFLO FOR PLAN 1. RTIO 1

PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
1646.	574.	181.	181.	52002.
47.	16.	5.	5.	1473.
	2.51	3.15	3.15	3.15
	63.68	80.12	80.12	80.12
	285.	358.	358.	358.
	351.	442.	442.	442.

HYDROGRAPH AT STAINFLO FOR PLAN 1. RTIO 2

PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
3292.	1148.	361.	361.	104003.
93.	33.	10.	10.	2945.
	5.01	6.31	6.31	6.31
	127.37	160.24	160.24	160.24
	569.	716.	716.	716.
	702.	884.	884.	884.

HYDROGRAPH AT STAINFLO FOR PLAN 1. RTIO 3

PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
4937.	1722.	542.	542.	156005.
140.	49.	15.	15.	4418.
	7.52	9.46	9.46	9.46

1.01	5.15	63	.01	.01	.01	81.	1.01	17.15	207	.24	.24	5191.
1.01	5.20	64	.01	.01	.01	82.	1.01	17.20	208	.24	.24	5008.
1.01	5.25	65	.01	.01	.01	84.	1.01	17.25	209	.24	.24	4821.
1.01	5.30	66	.01	.01	.01	86.	1.01	17.30	210	.24	.24	4643.
1.01	5.35	67	.01	.01	.01	88.	1.01	17.35	211	.24	.24	4482.
1.01	5.40	68	.01	.01	.01	89.	1.01	17.40	212	.24	.24	4344.
1.01	5.45	69	.01	.01	.01	91.	1.01	17.45	213	.24	.24	4231.
1.01	5.50	70	.01	.01	.01	92.	1.01	17.50	214	.24	.24	4147.
1.01	5.55	71	.01	.01	.01	94.	1.01	17.55	215	.24	.24	4082.
1.01	6.00	72	.01	.01	.01	96.	1.01	18.00	216	.24	.24	4036.
1.01	6.05	73	.07	.03	.04	101.	1.01	18.05	217	.02	.02	3968.
1.01	6.10	74	.07	.04	.04	117.	1.01	18.10	218	.02	.02	3834.
1.01	6.15	75	.07	.04	.04	146.	1.01	18.15	219	.02	.02	3601.
1.01	6.20	76	.07	.04	.03	195.	1.01	18.20	220	.02	.02	3234.
1.01	6.25	77	.07	.04	.03	255.	1.01	18.25	221	.02	.02	2791.
1.01	6.30	78	.07	.04	.03	322.	1.01	18.30	222	.02	.02	2333.
1.01	6.35	79	.07	.04	.03	388.	1.01	18.35	223	.02	.02	1904.
1.01	6.40	80	.07	.04	.03	450.	1.01	18.40	224	.02	.02	1593.
1.01	6.45	81	.07	.05	.03	504.	1.01	18.45	225	.02	.02	1427.
1.01	6.50	82	.07	.05	.03	550.	1.01	18.50	226	.02	.02	1279.
1.01	6.55	83	.07	.05	.02	590.	1.01	18.55	227	.02	.02	1146.
1.01	7.00	84	.07	.05	.02	625.	1.01	19.00	228	.02	.02	1027.
1.01	7.05	85	.07	.05	.02	656.	1.01	19.05	229	.02	.02	920.
1.01	7.10	86	.07	.05	.02	684.	1.01	19.10	230	.02	.02	820.
1.01	7.15	87	.07	.05	.02	709.	1.01	19.15	231	.02	.02	738.
1.01	7.20	88	.07	.05	.02	733.	1.01	19.20	232	.02	.02	662.
1.01	7.25	89	.07	.05	.02	754.	1.01	19.25	233	.02	.02	591.
1.01	7.30	90	.07	.05	.02	773.	1.01	19.30	234	.02	.02	531.
1.01	7.35	91	.07	.05	.02	791.	1.01	19.35	235	.02	.02	476.
1.01	7.40	92	.07	.05	.02	807.	1.01	19.40	236	.02	.02	426.
1.01	7.45	93	.07	.06	.02	824.	1.01	19.45	237	.02	.02	384.
1.01	7.50	94	.07	.06	.02	837.	1.01	19.50	238	.02	.02	376.
1.01	7.55	95	.07	.06	.02	851.	1.01	19.55	239	.02	.02	370.
1.01	8.00	96	.07	.06	.02	864.	1.01	20.00	240	.02	.02	366.
1.01	8.05	97	.07	.06	.02	876.	1.01	20.05	241	.02	.02	362.
1.01	8.10	98	.07	.06	.01	887.	1.01	20.10	242	.02	.02	359.
1.01	8.15	99	.07	.06	.01	898.	1.01	20.15	243	.02	.02	357.
1.01	8.20	100	.07	.06	.01	908.	1.01	20.20	244	.02	.02	356.
1.01	8.25	101	.07	.06	.01	917.	1.01	20.25	245	.02	.02	356.
1.01	8.30	102	.07	.06	.01	926.	1.01	20.30	246	.02	.02	356.
1.01	8.35	103	.07	.06	.01	934.	1.01	20.35	247	.02	.02	356.
1.01	8.40	104	.07	.06	.01	943.	1.01	20.40	248	.02	.02	356.
1.01	8.45	105	.07	.06	.01	950.	1.01	20.45	249	.02	.02	356.
1.01	8.50	106	.07	.06	.01	958.	1.01	20.50	250	.02	.02	356.
1.01	8.55	107	.07	.06	.01	965.	1.01	20.55	251	.02	.02	356.
1.01	9.00	108	.07	.06	.01	971.	1.01	21.00	252	.02	.02	356.
1.01	9.05	109	.07	.06	.01	978.	1.01	21.05	253	.02	.02	356.
1.01	9.10	110	.07	.06	.01	984.	1.01	21.10	254	.02	.02	356.
1.01	9.15	111	.07	.06	.01	990.	1.01	21.15	255	.02	.02	356.
1.01	9.20	112	.07	.06	.01	996.	1.01	21.20	256	.02	.02	356.
1.01	9.25	113	.07	.06	.01	1001.	1.01	21.25	257	.02	.02	356.
1.01	9.30	114	.07	.06	.01	1006.	1.01	21.30	258	.02	.02	356.
1.01	9.35	115	.07	.06	.01	1011.	1.01	21.35	259	.02	.02	356.
1.01	9.40	116	.07	.06	.01	1016.	1.01	21.40	260	.02	.02	356.
1.01	9.45	117	.07	.06	.01	1020.	1.01	21.45	261	.02	.02	356.
1.01	9.50	118	.07	.06	.01	1025.	1.01	21.50	262	.02	.02	356.
1.01	9.55	119	.07	.06	.01	1029.	1.01	21.55	263	.02	.02	356.
1.01	10.00	120	.07	.06	.01	1033.	1.01	22.00	264	.02	.02	356.
1.01	10.05	121	.07	.06	.01	1037.	1.01	22.05	265	.02	.02	356.
1.01	10.10	122	.07	.06	.01	1041.	1.01	22.10	266	.02	.02	356.
1.01	10.15	123	.07	.06	.01	1044.	1.01	22.15	267	.02	.02	356.
1.01	10.20	124	.07	.06	.01	1048.	1.01	22.20	268	.02	.02	356.
1.01	10.25	125	.07	.07	.01	1051.	1.01	22.25	269	.02	.02	354.

1.01	10.30	.07	.07	.01	1055.	1.01	22.30	270	.02	.02	356.
1.01	10.35	.07	.07	.01	1058.	1.01	22.35	271	.02	.02	356.
1.01	10.40	.07	.07	.01	1061.	1.01	22.40	272	.02	.02	356.
1.01	10.45	.07	.07	.01	1064.	1.01	22.45	273	.02	.02	356.
1.01	10.50	.07	.07	.01	1067.	1.01	22.50	274	.02	.02	356.
1.01	10.55	.07	.07	.01	1069.	1.01	22.55	275	.02	.02	356.
1.01	11.00	.07	.07	.01	1072.	1.01	23.00	276	.02	.02	356.
1.01	11.05	.07	.07	.01	1075.	1.01	23.05	277	.02	.02	356.
1.01	11.10	.07	.07	.01	1077.	1.01	23.10	278	.02	.02	356.
1.01	11.15	.07	.07	.01	1079.	1.01	23.15	279	.02	.02	356.
1.01	11.20	.07	.07	.01	1082.	1.01	23.20	280	.02	.02	356.
1.01	11.25	.07	.07	.01	1084.	1.01	23.25	281	.02	.02	356.
1.01	11.30	.07	.07	.01	1086.	1.01	23.30	282	.02	.02	356.
1.01	11.35	.07	.07	.01	1089.	1.01	23.35	283	.02	.02	356.
1.01	11.40	.07	.07	.01	1090.	1.01	23.40	284	.02	.02	356.
1.01	11.45	.07	.07	.01	1092.	1.01	23.45	285	.02	.02	356.
1.01	11.50	.07	.07	.01	1094.	1.01	23.50	286	.02	.02	356.
1.01	11.55	.07	.07	.01	1096.	1.01	23.55	287	.02	.02	356.
1.01	12.00	.07	.07	.00	1098.	1.02	0.00	288	.02	.02	356.
SUM 33.80 31.55 2.25 520200.									(859.11 801.11 57.111730.42)		

PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
16458.	5741.	1805.	1806.	520015.
466.	163.	51.	51.	14725.
	25.07	31.54	31.54	31.54
	636.83	801.18	801.18	801.18
	2847.	3581.	3581.	3581.
	3511.	4418.	4418.	4418.

HYDROGRAPH AT STAINFLOW FOR PLAN 1. RTIO 1

PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
1646.	574.	181.	181.	52002.
47.	14.	5.	5.	1473.
	2.51	3.15	3.15	3.15
	63.68	80.12	80.12	80.12
	285.	358.	358.	358.
	351.	442.	442.	442.

HYDROGRAPH AT STAINFLOW FOR PLAN 1. RTIO 2

PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
3292.	1148.	361.	361.	104003.
93.	33.	10.	10.	2945.
	5.01	6.31	6.31	6.31
	127.37	160.24	160.24	160.24
	569.	716.	716.	716.
	702.	884.	884.	884.

HYDROGRAPH AT STAINFLOW FOR PLAN 1. RTIO 3

PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
4937.	1722.	542.	542.	156005.
140.	49.	15.	15.	4418.
	7.52	9.46	9.46	9.46
	191.05	240.35	240.35	240.35

AC-FT 654. 1074. 1074. 1074.
THOUS CU M 1053. 1325. 1325. 1325.

HYDROGRAPH AT STAINFLOW FOR PLAN 1. RTIO 4

PEAK 6583. 2296. 722. 722. 208006.
CFS 186. 65. 20. 20. 5890.
CM 10.03 12.42 12.62 12.62
INCHES 254.73 320.47 320.47 320.47
MM 1139. 1433. 1433. 1433.
AC-FT 1405. 1767. 1767. 1767.
THOUS CU M

HYDROGRAPH AT STAINFLOW FOR PLAN 1. RTIO 5

PEAK 8229. 2970. 903. 903. 260008.
CFS 233. 81. 26. 26. 7363.
CM 12.54 15.77 15.77 15.77
INCHES 318.42 400.59 400.59 400.59
MM 1423. 1791. 1791. 1791.
AC-FT 1756. 2209. 2209. 2209.
THOUS CU M

HYDROGRAPH AT STAINFLOW FOR PLAN 1. RTIO 6

PEAK 16458. 5741. 1806. 1806. 520015.
CFS 466. 163. 51. 51. 14725.
CM 25.07 31.54 31.54 31.54
INCHES 636.83 801.18 801.18 801.18
MM 2847. 3581. 3581. 3581.
AC-FT 3511. 4418. 4418. 4418.
THOUS CU M

***** COMBINE HYDROGRAPHS *****
LAKES MARIAN, SUGARHOLLOW, ROBINHOOD, AND SHERWOOD HYDRO
ISTAQ ICOMP IECON ITAPE JPLT JPRI INAME ISTAGE IAUTO
4 -0 -0 1 1 -0 -0

SUM OF 4 HYDROGRAPHS AT PLAN 1 RTIO 1

PEAK 1814. 792. 293. 293. 84284.
CFS 51. 22. 8. 8. 2387.
CM 1.41 2.37 2.37 2.37
INCHES 40.79 60.29 60.29 60.29
MM 393. 580. 580. 580.
AC-FT 484. 716. 716. 716.
THOUS CU M

SUM OF 4 HYDROGRAPHS AT

	PEAK	6-HOUR	24-HOUR	PLAN 1	RTIO 2	72-HOUR	TOTAL VOLUME
CFS	5303.	2049.	670.	670.	102930.		
CMS	150.	58.	19.	19.	5463.		
INCHES		4.15	5.43	5.43	5.43		
MM		105.54	138.00	138.00	138.00		
AC-FT		1016.	1329.	1329.	1329.		
THOUS CU M		1253.	1639.	1639.	1639.		

SUM OF 4 HYDROGRAPHS AT

	PEAK	6-HOUR	24-HOUR	PLAN 1	RTIO 3	72-HOUR	TOTAL VOLUME
CFS	8840.	3356.	1052.	1052.	302953.		
CMS	250.	95.	30.	30.	8579.		
INCHES		6.81	8.53	8.53	8.53		
MM		172.85	216.69	216.69	216.69		
AC-FT		1664.	2086.	2086.	2086.		
THOUS CU M		2053.	2574.	2574.	2574.		

SUM OF 4 HYDROGRAPHS AT

	PEAK	6-HOUR	24-HOUR	PLAN 1	RTIO 4	72-HOUR	TOTAL VOLUME
CFS	11940.	4574.	1435.	1435.	413407.		
CMS	335.	132.	41.	41.	11706.		
INCHES		9.48	11.64	11.64	11.64		
MM		240.68	295.70	295.70	295.70		
AC-FT		2317.	2847.	2847.	2847.		
THOUS CU M		2859.	3512.	3512.	3512.		

SUM OF 4 HYDROGRAPHS AT

	PEAK	6-HOUR	24-HOUR	PLAN 1	RTIO 5	72-HOUR	TOTAL VOLUME
CFS	14742.	5990.	1820.	1820.	524304.		
CMS	417.	170.	52.	52.	14847.		
INCHES		12.15	14.76	14.76	14.76		
MM		308.51	375.02	375.02	375.02		
AC-FT		2970.	3611.	3611.	3611.		
THOUS CU M		3644.	4454.	4454.	4454.		

SUM OF 4 HYDROGRAPHS AT

	PEAK	6-HOUR	24-HOUR	PLAN 1	RTIO 6	72-HOUR	TOTAL VOLUME
CFS	29409.	12238.	3750.	3750.	1080122.		
CMS	833.	347.	106.	106.	30586.		
INCHES		24.81	30.42	30.42	30.42		
MM		630.27	772.58	772.58	772.58		
AC-FT		6049.	7439.	7439.	7439.		
THOUS CU M		7486.	9176.	9176.	9176.		

HYDROGRAPH ROUTING

RESERVOIR ROUTING FOR LAKE SHERWOOD													
STAGE	FLOW	CAPACITY	ELEVATION	ISTAG	ICOMP	IETAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO	LSTR	ISPRAT
				OUTING	1	-0	2	2	1	-0	-0		
				ROUTING DATA									
				CLOSS	AVG	IPRES	ISAME	IOPT	IPMP				
				-0.0	-0.000	-0.00	1	1	-0	-0			
				NSTPS									
				1	-0	LAG	AMSKK	X	STORA	ISPRAT			
				622.8	623.0	624.0	-0	-0.000	-0.000	-623.	-1		
				627.5	628.0	629.0	623.5	624.5	625.0	625.5	626.0	626.5	627.0
				522.	748.	13.	996.	35.	98.	135.	183.	252.	376.
				0.	775.	172.	100.	1242.	2645.	4298.	6443.	8926.	11749.
				0.	696.	934.	854.	244.	318.	392.	446.	542.	619.
				627.	628.	629.	623.	624.	625.	625.	626.	626.	627.
				627.	628.	629.	628.	629.	630.	630.	631.	631.	632.
				CREL	SPWID	COOR	EXPW	ELEV	COAL	CAREA	EXPL		
				622.8	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0

	STORAGE					
0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.
1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.
2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.
3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.
4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.
5.	5.	5.	5.	5.	5.	5.
8.	9.	10.	11.	12.	13.	14.
18.	19.	20.	21.	22.	23.	24.
31.	33.	34.	36.	38.	39.	41.
48.	49.	51.	53.	55.	56.	58.
66.	68.	69.	71.	73.	75.	77.
85.	87.	89.	91.	93.	95.	97.
105.	107.	109.	111.	113.	115.	116.
130.	134.	139.	143.	148.	153.	158.
179.	185.	191.	197.	203.	215.	209.
241.	248.	254.	261.	276.	285.	291.
315.	323.	331.	340.	349.	359.	370.
455.	487.	521.	555.	590.	621.	651.
746.	765.	782.	798.	812.	837.	858.
875.	883.	889.	896.	902.	907.	912.
927.	930.	936.	939.	948.	956.	968.
910.	916.	920.	927.	929.	934.	940.

STORAGE			
0.	0.	0.	0.
0.	0.	1.	1.
1.	1.	1.	1.
1.	1.	2.	2.
2.	2.	3.	3.
3.	3.	4.	4.
5.	5.	6.	6.
7.	7.	8.	10.
12.	13.	19.	22.
27.	29.	35.	41.
48.	50.	57.	64.
74.	77.	82.	90.
101.	104.	109.	118.
124.	129.	135.	146.
155.	161.	167.	173.
191.	203.	217.	231.
262.	279.	296.	315.
346.	378.	404.	437.
507.	545.	584.	627.
774.	824.	931.	1025.
1159.	1165.	1170.	1171.
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END-OF-PERIOD HYDROGRAPH ORDINATES

[illegible]

[illegible]

PEAK OUTFLOW IS 6122. AT TIME 16.58 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	8122.	3561.	1034.	1034.	297896.
CMS	230.	101.	29.	29.	8435.
INCHES		7.22	6.39	6.39	8.39
AC-FT		143.41	213.08	213.08	213.08
MM		1766.	2052.	2052.	2052.
THOUS CU M		2178.	2531.	2531.	2531.

MAXIMUM STORAGE = 1318.

STATION OUTING, PLAN 1, MAY 10 5
END-OF-PERIOD HYDROGRAPH ORDINATES

[illegible]

[illegible]

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
 AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS					
				RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6
				.10	.20	.30	.40	.50	1.00
HYDROGRAPH AT	INFLW	.17 (.44)	1	193. (5.47)	386. (10.94)	579. (16.41)	773. (21.88)	966. (27.35)	1932. (54.70)
	ROUTED TO	.17 (.44)	1	99. (2.79)	344. (9.75)	535. (15.16)	720. (20.40)	902. (25.55)	1802. (51.03)
HYDROGRAPH AT	INFLW	.06 (.15)	1	66. (1.86)	131. (3.72)	197. (5.58)	263. (7.44)	328. (9.30)	657. (18.60)
	ROUTED TO	.23 (.59)	1	135. (3.82)	461. (13.05)	710. (20.10)	953. (26.99)	1197. (33.90)	2391. (67.71)
ROUTED TO	ROUTING	.23 (.59)	1	31. (.88)	123. (3.47)	542. (15.36)	815. (23.08)	1091. (30.89)	2278. (64.51)
HYDROGRAPH AT	INFLW	1.51 (3.91)	1	1052. (29.79)	2104. (59.58)	3156. (89.38)	4208. (119.17)	5261. (148.96)	10521. (297.92)
	ROUTED TO	1.51 (3.91)	1	274. (7.77)	1667. (47.20)	2561. (72.52)	3416. (96.72)	4270. (120.91)	8540. (241.82)
HYDROGRAPH AT	INFLW	.72 (1.86)	1	556. (15.75)	1113. (31.51)	1669. (47.26)	2225. (63.01)	2782. (78.77)	5563. (157.53)
	ROUTED TO	.72 (1.86)	1	130. (3.67)	817. (23.14)	1444. (40.88)	1933. (54.74)	2416. (68.36)	4811. (136.22)
HYDROGRAPH AT	INFLW	2.13 (5.52)	1	1646. (46.40)	3292. (93.21)	4937. (139.41)	6583. (186.41)	8229. (233.02)	16458. (466.03)
	ROUTED TO	4.59 (11.88)	1	1014. (51.42)	5303. (150.18)	8840. (250.33)	11840. (335.27)	14742. (417.43)	29409. (832.77)
ROUTED TO	ROUTING	4.59 (11.88)	1	186. (5.26)	1229. (34.80)	4138. (117.17)	8122. (229.99)	11706. (331.42)	24300. (688.09)

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	ELEVATION STORAGE OUTFLOW	INITIAL VALUE 699.78 0. 0.	SPILLWAY CREST 699.78 0. 0.	TOP OF DAM 702.70 14. 51.	DURATION OVER TOP HOURS	MAXIMUM OUTFLOW CFS	MAXIMUM STORAGE AC-FT	MAXIMUM DEPTH OVER DAM	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.10	703.07					1.25	99.	15.	.37	14.00	0.00
.20	703.69					4.25	344.	18.	.99	15.83	0.00
.30	703.93					5.75	535.	19.	1.23	15.83	0.00
.40	704.15					6.58	720.	20.	1.45	15.83	0.00
.50	704.35					7.00	902.	21.	1.65	15.83	0.00
1.00	705.36					11.17	1402.	26.	2.66	15.83	0.00

Lake Eleanor
Computer Summary Analysis

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1

RATIO OF PMF	ELEVATION STORAGE OUTFLOW	INITIAL VALUE 671.02	SPILLWAY CREST 671.02	TOP OF DAM 674.80	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
		0.	0.	33.		
		0.	0.	88.		
MAXIMUM RESERVOIR W.S. ELEV	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS	
673.17	18.	31.	0.00	18.67	0.00	
675.13	36.	123.	2.58	16.75	0.00	
675.50	41.	542.	3.54	16.00	0.00	
675.95	44.	815.	4.58	15.92	0.00	
676.14	46.	1091.	5.42	15.92	0.00	
676.84	53.	2279.	7.58	15.83	0.00	

LAKE MARION
COMPUTER SUMMARY ANALYSIS

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1	ELEVATION STORAGE OUTFLOW	INITIAL VALUE 650.30 0. 0.	SPILLWAY CREST 650.30 0. 0.	TOP OF DAM 650.20 142. 155.	TIME OF FAILURE HOURS		
RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.10	659.03	.83	150.	274.	3.25	14.25	0.00
.20	661.11	2.91	203.	1667.	5.50	14.42	0.00
.30	662.45	4.25	232.	2561.	7.25	16.42	0.00
.40	663.73	5.53	260.	3416.	8.58	16.42	0.00
.50	665.01	6.91	288.	4270.	10.25	16.42	0.00
1.00	671.40	13.20	426.	8540.	14.25	16.42	0.00

SUGAR HOLLOW LAKE
COMPUTER SUMMARY ANALYSIS

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1

RATIO OF P4F	MAXIMUM RESERVOIR W.S.ELEV	ELEVATION STOPPAGE OUTFLOW	INITIAL VALUE 648.07	SPILLWAY CREST 648.07	TOP OF DAM 655.20	DURATION OVER TOP HOURS	MAXIMUM OUTFLOW CFS	MAXIMUM STORAGE AC-FT	MAXIMUM DEPTH OVER DAM	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.1	656.44		0.	0.	60.	4.92	130.	83.	1.24	18.17	0.00
0.2	658.49		0.	0.	49.	6.00	817.	113.	3.69	16.33	0.00
0.3	659.81		0.	0.	49.	10.33	1444.	124.	4.61	16.17	0.00
0.4	660.50		0.	0.	49.	11.08	1933.	133.	5.30	16.17	0.00
0.5	661.18		0.	0.	49.	11.58	2414.	143.	5.98	16.17	0.00
1.00	664.57		0.	0.	49.	14.50	4011.	189.	9.37	16.17	0.00

LAKE ZEBUNARD
COMPUTER SUMMARY ANALYSIS

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1							
WATIO OF P4F	MAXIMUM RESEPOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.10	626.02	0.00	470.	186.	0.00	24.00	0.00
.20	628.57	0.00	930.	1229.	0.00	14.58	0.00
.30	630.45	.85	1171.	413A.	3.08	17.17	0.00
.40	631.74	1.74	131A.	8122.	3.83	16.58	0.00
.50	631.99	2.39	1429.	11704.	4.67	16.42	0.00
1.00	634.36	4.76	1833.	24300.	7.25	16.42	0.00

Lake Sherwood
Computer Summary August 30