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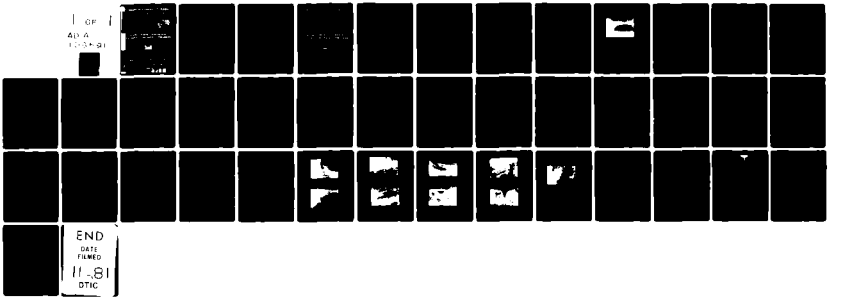

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MISSOURI-KANSAS CITY BASIN

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WILDWOOD DAM
JACKSON COUNTY, MISSOURI
MO 20045

PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

PREPARED BY: U.S. ARMY ENGINEER DISTRICT, ST. LOUIS

FOR: STATE OF MISSOURI

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SEPTEMBER 1978

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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4. TITLE (and Subtitle) Phase I Dam Inspection Report National Dam Safety Program Wildwood Dam (MO 20045) Jackson County, Missouri	5. TYPE OF REPORT & PERIOD COVERED Final Report
	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Black & Veatch, Consulting Engineers	8. CONTRACT OR GRANT NUMBER(s) DACW43-78-C-0148
9. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. Army Engineer District, St. Louis Dam Inventory and Inspection Section, LMSED-PD 210 Tucker Blvd., North, St. Louis, Mo. 63101	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS U.S. Army Engineer District, St. Louis Dam Inventory and Inspection Section, LMSED-PD 210 Tucker Blvd., North, St. Louis, Mo. 63101	12. REPORT DATE Sept[illegible]978
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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Dam Safety, Lake, Dam Inspection, Private Dams

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

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.

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

MISSOURI-KANSAS CITY BASIN

WILDWOOD DAM
JACKSON COUNTY, MISSOURI
MO 20045

PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

PREPARED BY: U.S. ARMY ENGINEER DISTRICT, ST. LOUIS

FOR: STATE OF MISSOURI

SEPTEMBER 1978

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

IN REPLY REFER TO

SUBJECT: Wildwood Lake Dam Phase I Inspection Report

This report presents the results of field inspection and evaluation of the Wildwood Lake 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 Probably Maximum Flood.
2) Overtopping could result in dam failure.
3) Dam failure significantly increases the hazard to loss of life downstream.

SUBMITTED BY: SIGNED — 9 FEB 1979
Chief, Engineering Division — Date

APPROVED BY: SIGNED — 9 FEB 1979
Colonel, CE, District Engineer — Date

WILDWOOD LAKE DAM

JACKSON COUNTY, MISSOURI

MISSOURI INVENTORY NO. 20045

PHASE I INSPECTION

NATIONAL DAM SAFETY PROGRAM

PREPARED BY:

BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MISSOURI

UNDER DIRECTION OF

ST. LOUIS DISTRICT CORPS OF ENGINEERS

FOR

GOVERNOR OF MISSOURI

SEPTEMBER 1978

PHASE I REPORT

Name of Dam	Wildwood Lake Dam
State Located	Missouri
County Located	Jackson County
Stream	Tributary to Little Blue River
Date of Inspection	19 September 1978

Wildwood Lake Dam was inspected by a team of engineers from Black & Veatch, Consulting Engineers for the St. Louis District, Corps of Engineers. The purpose of the inspection was to make an assessment of the general condition of the dam with respect to safety, based upon available data and visual inspection, in order to determine if the dam poses hazards to human life or property.

The guidelines used in the assessment were furnished by the Department of the Army, Office of the Chief of Engineers and developed with the help of several Federal and State agencies, professional engineering organizations, and private engineers. Based on these guidelines, this dam is classified as a small size dam with a high downstream hazard potential. According to the St. Louis District, Corps of Engineers failure would threaten the life and property of five families downstream of the dam and would potentially cause appreciable damage to three road crossings within the estimated damage zone which extends 2 miles downstream of the dam.

Our inspection and evaluation indicates the spillway does not meet the criteria set forth in the guidelines for a dam having the above size and hazard potential. The criteria for a spillway on a small dam in the high hazard category is that the spillway pass 50 to 100 percent of the probable maximum flood without overtopping the dam. The spillway will not pass the probable maximum flood without overtopping but will pass 10 percent of the probable maximum flood which is less than a 100-year flood. Considering the small volumes of water impounded, the five houses and three roads down stream of the dam, one-half the probable maximum flood is the appropriate spillway design flood. The probable maximum flood is defined as the flood discharge that may be expected from the most severe combination of critical meterologic and hydraulogic conditions that are reasonably possible in the region.

Deficiencies visually observed by the inspection team were erosion and the presence of an excessive number of trees on the downstream embankment slope, and seepage under the spillway.

There were no observed deficiencies or conditions existing at the time of the inspection which indicated an immediate safety hazard. Future corrective action and regular maintenance will be required to correct or control the described deficiencies. A detailed report discussing each of these deficiencies is attached.

Dwarka P. Gupta

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E.R. Burton

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Missouri E-10137

Harry L. Callahan

Harry L. Callahan, Partner
Black & Veatch

OVERVIEW OF LAKE AND DAM

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
WILDWOOD LAKE DAM

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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 District Engineer of the St. Louis District, Corps of Engineers, directed that a safety inspection of the Wildwood Lake 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 available data 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, Appendix D". 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. Description of Dam and Appurtenances.

(1) The dam is an earth structure located in the valley of a tributary to the Little Blue River in southwestern Jackson County, Missouri (Plate 1). Topography of the contributing watershed is characterized by rolling hills. The watershed is primarily comprised of residential and commercial areas. Topography in the vicinity of the dam is shown on Plate 2.

(2) A spillway is located within the right abutment. The spillway is a concrete broad-crested weir located upstream and perpendicular to the dam axis. The spillway discharge channel has a concrete bottom with rock side walls, and is spanned by a timber bridge with a concrete slab.

(3) An 8-inch diameter drawdown pipe with a manually operated valve is located near the center of the dam. The pipe discharges into the spillway discharge channel near the toe of the embankment.

(4) Pertinent physical data are given in paragraph 1.3.

b. Location. The dam is located in southwest Jackson County, Missouri, as indicated on Plate 1. The lake formed by the dam is shown on the United States Geological Survey 7.5 minute series quadrangle map for Lee's Summit, Missouri in Section 9 of T48N, R32W.

c. 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, the dam and impoundment are in the small size category.

d. Hazard Classification. The hazard classification assigned by the St. Louis District, Corps of Engineers for this dam is as follows: The Wildwood Lake Dam has a high hazard potential, meaning that the dam is located where failure may cause loss of life, and serious damage to homes, extensive agricultural, industrial and commercial facilities, and to important public utilities, main highways or railroads. For the Wildwood Lake Dam the flood damage zone extends downstream for 2 miles. Within the damage zone downstream of the dam are five houses, and three road crossings.

e. Ownership. The dam is owned by Wildwood Lakes Homeowners Association of Raytown, Missouri, 6817 Lakeshore Drive, Raytown, Missouri 64133.

f. Purpose of Dam. The dam forms an 11 acre recreational lake.

g. Design and Construction History. Data relating to the design and construction were not available. The dam was built in 1926-1927.

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

1.3 PERTINENT DATA

a. Drainage Area - 530 acres

b. Discharge at Damsite.

(1) Normal discharge at the damsite is through the uncontrolled spillway. The water level has been lowered below normal pool elevation by the use of an 8-inch drawdown pipe. (See paragraph 3.1c).

(2) Experienced maximum flood at damsite - unknown. Lake residents stated that in the September 1977 flood, the dam was overtopped by wave action.

(3) Estimated spillway capacity at maximum pool elevation - 430 cfs (water level to top of rock wall on upstream face of dam).

c. Elevation (Feet Above M.S.L.).

(1) Top of dam - 905.6 ± (see Plate 3)

(2) Top of rock wall on upstream face of dam - 906.0 ± . (See Plate 4).

(3) Spillway crest - 904.0 (Ungated)

(4) Streambed at centerline of dam - 876 ±

(4) Maximum tailwater - unknown.

d. Reservoir. Length of maximum pool - 1,700 feet ±

e. Storage (Acre-feet).

(1) Normal pool at spillway crest - 115

(2) Top of dam - 150

(3) Design surcharge - not available

f. Reservoir Surface (Acres).

(1) Top of dam - 15

(2) Spillway crest - 11

g. Dam.

(1) Type - earth embankment

(2) Length - 540 feet

(3) Height - 30 feet ±

(4) Top width - 16 feet

(5) Side Slopes - varies approximate 1.5 to 2.0H to 1V down stream slope 2.85 to 3.5 H to 1V upstream slope (see Plate 4)

(6) Zoning - (unknown)

(7) Impervious Core - (unknown)

(8) Cutoff - Core trench (unknown)

(9) Grout curtain - Unknown

h. Diversion and Regulating Tunnel - None.

i. Spillway.

(1) Type - concrete broad-crested weir (see paragraph 3.1c)

(2) Length of weir - 56 feet

(3) Crest Elevation - 904.0 feet m.s.l.

(4) Gates - None

(5) Upstream Channel - none

(6) Downstream Channel - Concrete bottom with rock side walls for approximately 30 feet downstream of the weir. After the concrete channel there is a broken shale and limestone channel with no slope protection on side slopes.

j. Regulating Outlets - An 8-inch diameter drawdown pipe with a manually operated valve.

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

No design data were available.

2.2 CONSTRUCTION

The dam was constructed in 1926-1927.

2.3 OPERATION

The maximum recorded loading on the dam is unknown.

2.4 EVALUATION

a. Availability. No engineering data were found.

b. Adequacy. No engineering data were available to make a detailed assessment of the design, construction, and operation. Seepage and stability analyses comparable to the requirements of the Recommended Guidelines for Safety Inspection of Dams were not available, which is considered a deficiency. These seepage and stability analyses should be performed for appropriate loading conditions and made a matter of record.

c. Validity. No engineering data were available to determine the validity of the design and construction of the dam.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General. A visual inspection of Wildwood Lake Dam was made on 19 September 1978. The inspection team included professional engineers with experience in dam design and construction, hydrology - hydraulic engineering, and structural engineering. Specific observations are discussed below. No observations were made of the condition of the upstream face of the dam below the pool elevation at the time of the inspection.

b. Dam. The inspection team observed the following items at the dam. The downstream slope of the embankment was severely eroded. Several erosion ditches approximately 12 to 18 inches deep and two to four feet wide were observed along the toe of slope. Dense trees and brush on the embankment prohibited an overview observation of the back slope. Spot checks between brush revealed no cracking, sliding, settlement or sink holes. No animal burrows were observed. The upstream face of the dam is protected by a grouted rock wall. During the inspection only that portion of the wall above the waterline was observed. The wall was in fair condition with some erosion behind the wall due to surface runoff.

c. Appurtenant Structures. The spillway is a side channel spillway with a concrete broad-crested weir, 56 feet long. The discharge channel has a severely weathered concrete bottom with rock side walls for approximately 30 feet downstream of the weir, that discharges into a limestone and shale discharge channel with no side slope protection. The concrete portion of the discharge channel has been undercut where it terminates. Some seepage, estimated at approximately 5 gallons per minute, was noted under the weir and discharge channel slab. An 8-inch drawdown pipe is located near the middle of the dam and discharges into the spillway discharge channel. A control valve for the drawdown pipe is reportedly located near the toe of the downstream embankment, but the inspection team could not locate the valve.

d. Reservoir Area. No slides or excessive erosion due to wave action were observed along the shore of the reservoir.

e. Downstream Channel. Moderate vegetation along the banks and mild channel slopes typical of streams in the area characterize the channel downstream of the spillway.

3.2 EVALUATION

None of the conditions observed are significant enough to indicate a need for immediate remedial action, however, if the seepage under the spillway weir, undercutting of the discharge channel, and free growth, and erosion of the downstream side of the dam continue unchecked, a serious potential for failure will develop.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

The pool is primarily controlled by rainfall, runoff, evaporation, and capacity of the spillway. The lake has been drained by the 8-inch drawdown pipe in 1959 and in 1976 for post construction changes (see paragraph 6.1d)

4.2 MAINTENANCE OF DAM

Members of the Kansas City District, Corps of Engineers, inspected Wildwood Lake Dam after the September 1977 flood. Their recommendations included regrouting the rock wall on the upstream face of the dam and filling in the voids behind this wall. The regrouting was completed in the summer of 1978 with filling of the voids to be accomplished in Fall 1978. No other maintenance was observed.

4.3 MAINTENANCE OF OPERATING FACILITIES

Maintenance of the 8-inch drawdown pipe and valve was unknown.

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

Existing seepage under the the spillway weir and severe erosion on the downstream side of the dam increases the potential for failure and warrant regular monitoring and control.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 EVALUATION OF FEATURES

a. Design Data. No design data were available.

b. Experience Data. The drainage area was developed from USGS Independence and Lee's Summit Quadrangle Maps. The spillway and dam layouts are from surveys made during the inspection and lake soundings provided by a lake resident.

c. Visual Observations.

(1) The concrete broad-crested weir and spillway channel are in fair condition. The concrete was severely weathered and seepage was noted under the weir. Where the concrete channel discharges into the natural channel the concrete bottom has been undercut.

(2) Drawdown facilities are available to drain the lake, however, the inspection team could not locate the operating valve.

(3) Due to the location of the spillway channel and to deteriation of the channel bank protection, high spillway discharges could cause erosion of the dam embankment.

d. Overtopping Potential. The spillway will not pass 50 to 100 percent of the probable maximum flood, which is the spillway design flood recommended by the guidelines, without overtopping. The probable maximum flood is defined as the flood discharge that may be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in the region. The spillway will pass 10 percent of the probable maximum flood without overtopping. This flood is less than the 100-year flood estimated according to the methodology outlined by the USGS in "Technique for Estimating the Magnitude and Frequency of Missouri Floods". According to the recommended guidelines from the Department of the Army, Office of the Chief of Engineers, a high hazard dam of small size should pass 50 to 100 percent of the probable maximum flood. The portion of the estimated peak discharge of the probable maximum flood overtopping the dam would be 5,900 cfs of the total discharge from the reservoir of 7,400 cfs. The estimated maximum depth of water over the dam would be 2.2 feet. The estimated duration of overtopping is 6.2 hours. Overtopping the dam will cause erosion of the embankment that could lead to failure of the dam.

According to the St. Louis District, Corps of Engineers, the effect from rupture of the dam could extend approximately 2 miles downstream of the dam. There are five inhabited homes and three road crossings downstream of the dam which could be severely damaged and lives could be lost should failure of the dam occur.

SECTION 6- -STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations. Visual observations of conditions which affect the structural stability of this dam are discussed in Section 3, paragraph 3.1b.

b. Design and Construction Data. No design data relating to the structural stability of the dam were found.

c. Operating Records. No operational records exist.

d. Post Construction Changes. Riprap was placed on the upstream face of the dam below the rock wall in 1959, and in 1976 the lake level was lowered to allow construction of a cross tie wall along part of the lake shore to improve lake front property.

e. Seismic Stability. The dam is located in Seismic Zone 1 which is a zone of minor seismic risk. A properly designed and constructed earth dam using sound engineering principles and conservatism should pose no serious stability problems during earthquakes in this zone.

The seismic stability of an earth dam is dependent upon a number of factors: embankment and foundation material classification and shear strengths; abutment materials, conditions, and strength; embankment zoning; and embankment geometry. Adequte description of embankment design parameters, foundation and abutment conditions, or static stability analyses to assess the seismic stability of this embankment was not available and therefore no inferences will be made regarding the seismic stability.

SECTION 7 - ASSESSMENT/REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Safety. Several items noted during the visual inspection by the inspection team which should be monitored or controlled are the seepage under the spillway weir, erosion of the downstream face of the dam, undermining of the spillway discharge channel, and the presence of trees on the downstream face of the dam.

b. Adequacy of Information. The conclusions in this report were based on performance history and visual conditions. The inspection team considers that these data are sufficient to support the conclusions herein. Because engineering data was not available, detailed analyses comparable in scope to the requirements of the Recommended Guidelines should be performed.

c. Urgency. A program should be developed as soon as possible to correct the deficiencies described in this report. There is an immediate need to correct the spillway capacity deficiency to eliminate the potential for overtopping of the dam. The remedial measures recommended in paragraph 7.2b could be accomplished now or delayed until observations and/or the recommendation of a qualified engineer indicate the necessity of action. If the safety deficiencies listed in paragraph 7.1a are not corrected, they will continue to deteriorate and lead to a serious potential of failure.

d. Necessity for Phase II. The Phase I investigation does not raise any serious questions relating to the safety of the dam or identify any serious dangers that would require a Phase II investigation.

e. Seismic Stability. This dam is located in Seismic Zone 1. Because stability analyses are not available, the seismic stability of the dam cannot be assessed. An assessment of the seismic stability should be included as part of the stability analyses required.

7.2 REMEDIAL MEASURES

a. Alternatives. The spillway will pass 10 percent of the probable maximum flood. The spillway size and/or height of dam should be increased to pass one-half the probable maximum flood. In either case, the spillway should be protected to prevent erosion.

b. O&M Maintenance and Procedures. The following O&M maintenance and procedures are recommended:

(1) Check the downstream face of the dam periodically for further erosion problems. If increased erosion is observed, the dam should be inspected and the pending condition evaluated by an engineer experienced in design and construction of earthen dams.

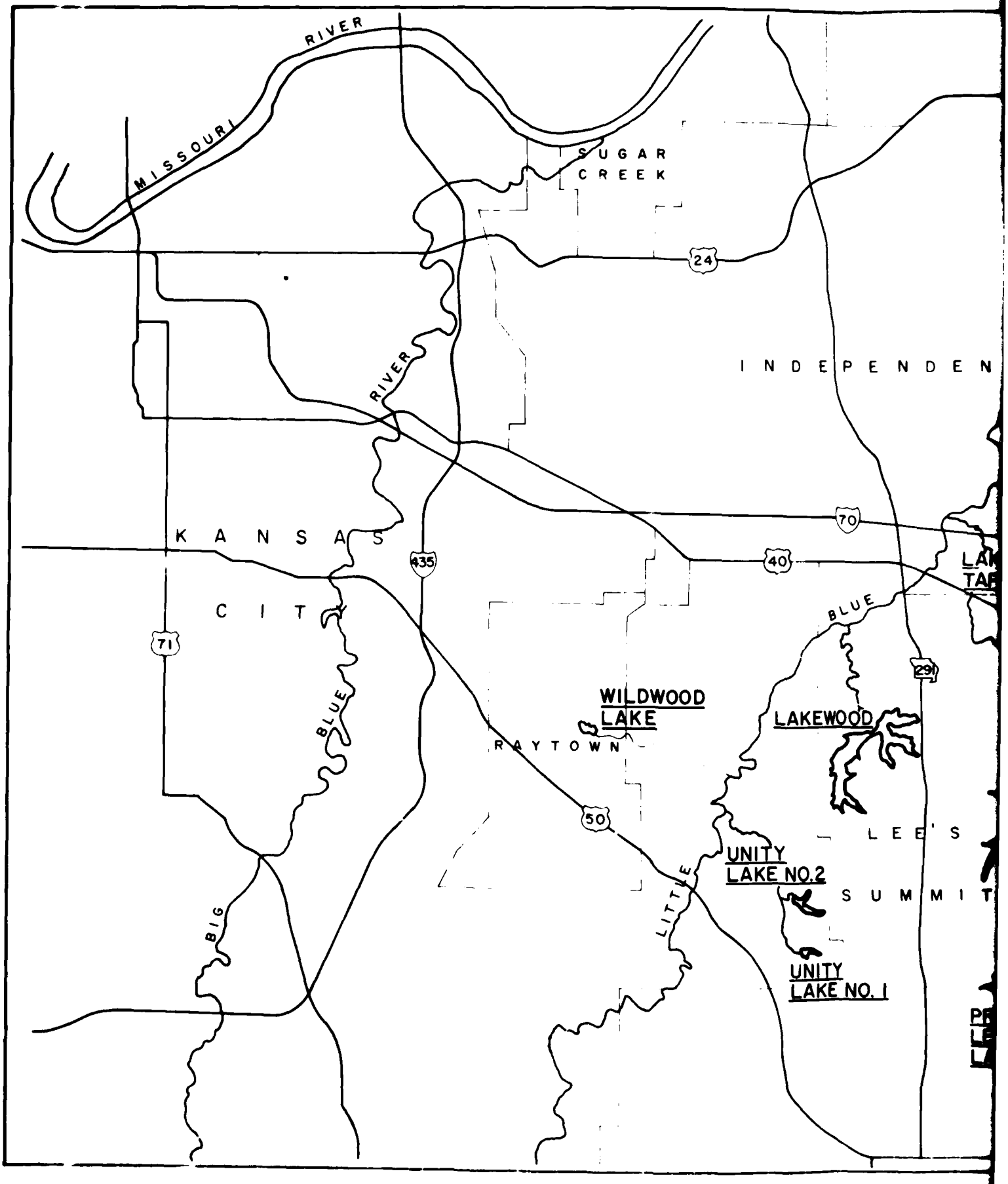
(2) A regular maintenance program should be initiated to control the growth of trees on downstream slope of the dam.

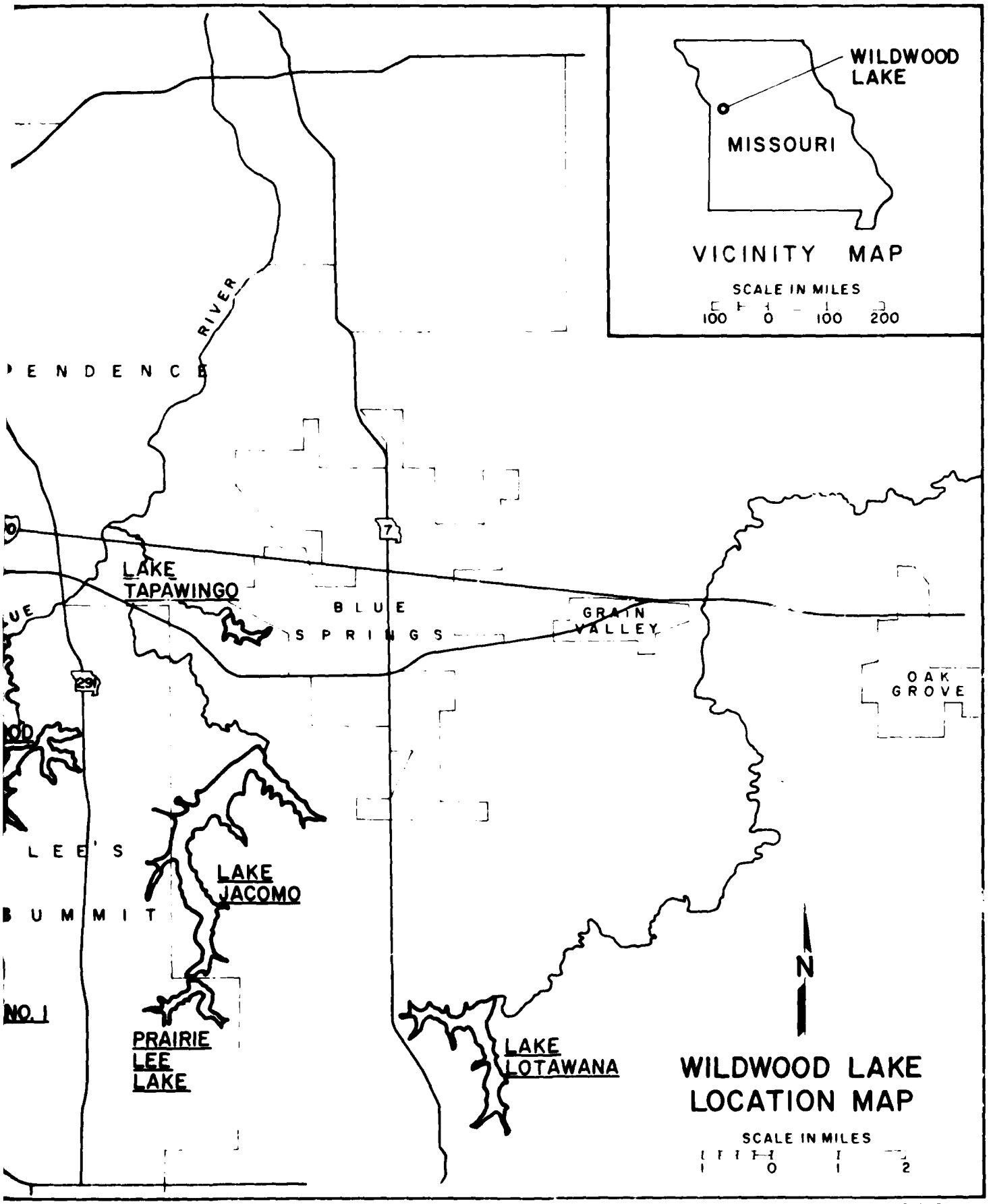
(3) Measures to curtail seepage under the weir of the spillway could be undertaken to minimize water loss and increase the integrity of the spillway.

(4) Periodically check the concrete spillway channel for seepage and undermining. Undermining should be remedied if noticed. If the undermining becomes severe or if increased seepage flow is observed, the dam should be inspected and the condition evaluated by an engineer experienced in design and construction of earthen dams.

(5) A detailed inspection of the dam should be made at least every year by an engineer experienced in design and construction of dams. More frequent inspections may be required if additional deficiencies are observed or the severity of the reported deficiencies increases.

(6) Seepage and stability analyses conforming to the requirements of the guidelines should be performed by an engineer experienced in the design and construction of earth dams.


MISSOURI RIVER
SUGAR CREEK
24
INDEPENDEN
RIVER
70
KANSAS
435
40
CITY
71
BLUE
BLUE
29
WILDWOOD LAKE
LAKEWOOD
RAYTOWN
50
LEE'S
UNITY LAKE NO.2
SUMMIT
LITTLE
BIG
UNITY LAKE NO. 1


WILDWOOD LAKE
MISSOURI
VICINITY MAP
SCALE IN MILES
100 0 100 200
RIVER
LAKE TAPAWINGO
BLUE SPRINGS
GRAIN VALLEY
OAK GROVE
LEE'S
SUMMIT
NO. 1
LAKE JACOMO
PRAIRIE LEE LAKE
LAKE LOTAWANA
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WILDWOOD LAKE LOCATION MAP
SCALE IN MILES
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PLATE 1

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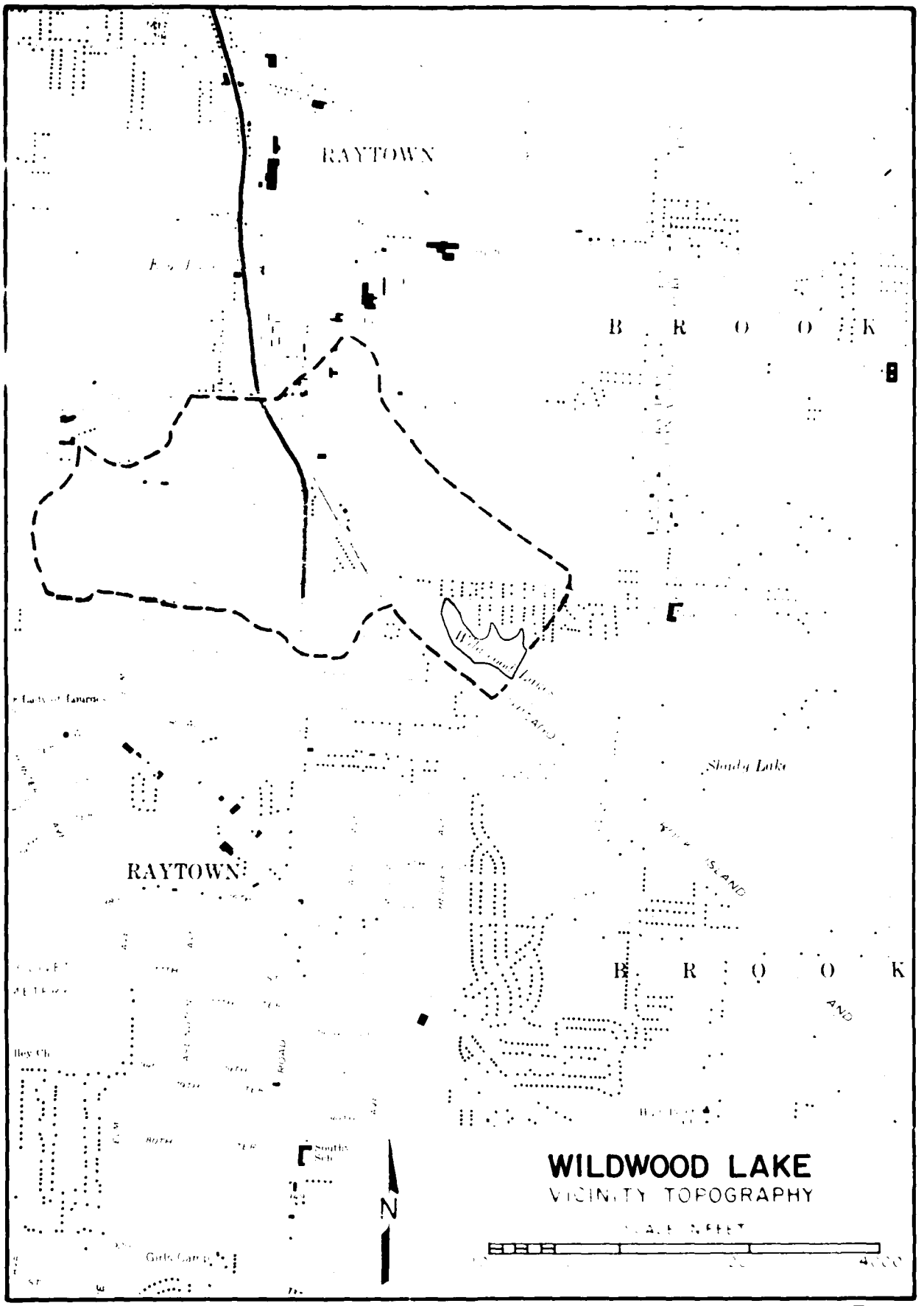
RAYTOWN
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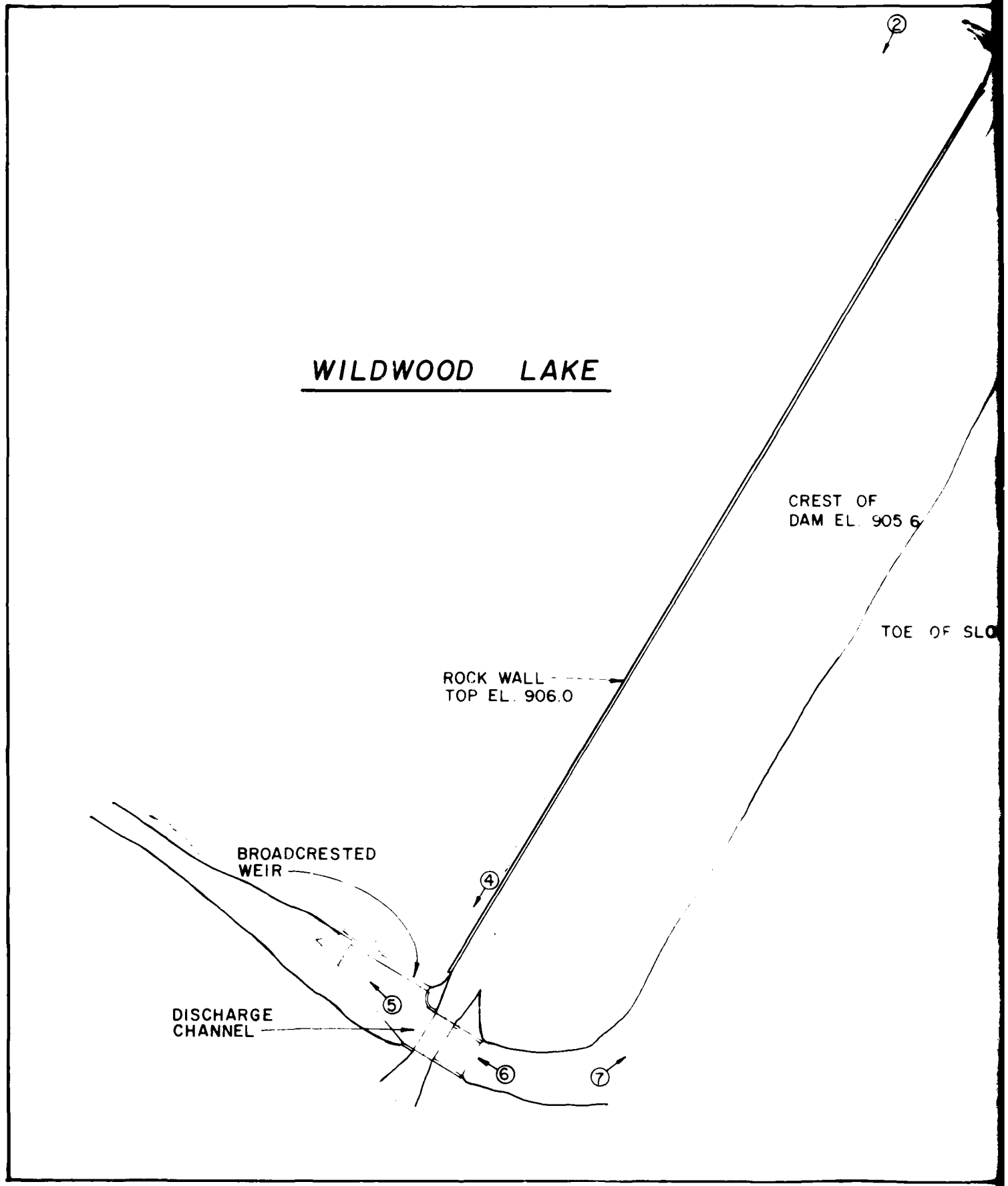
WILDWOOD LAKE
VICINITY TOPOGRAPHY

PLATE 2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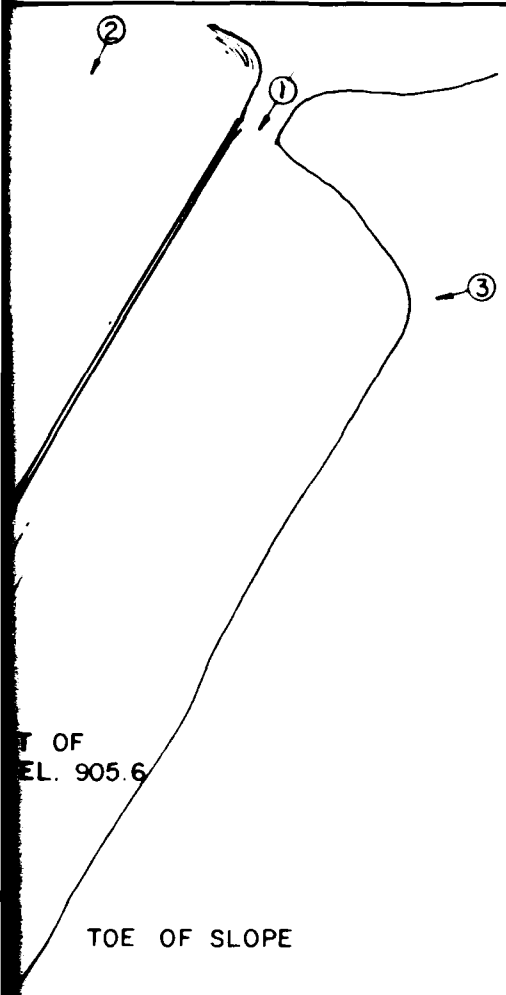

→① PHOTOGRAPH LOCATION AND DIRECTION

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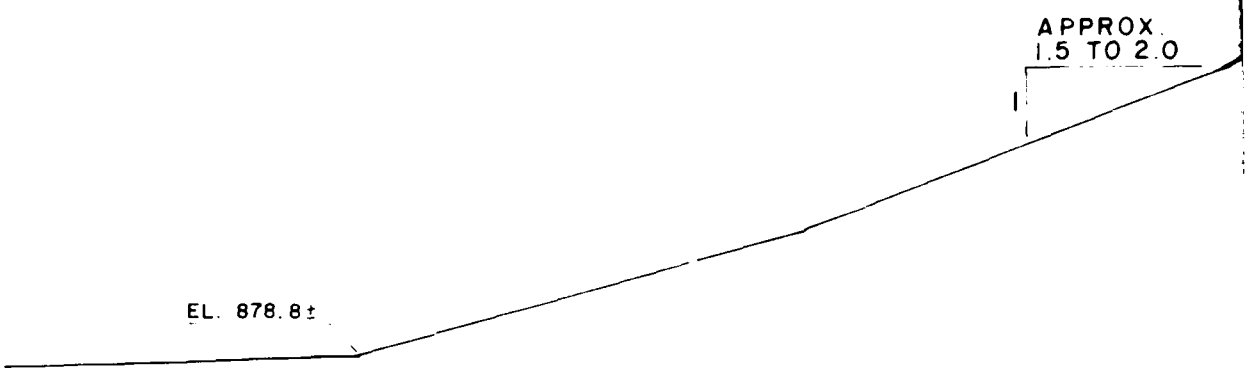
WILDWOOD LAKE
PLAN

PLATE 3

12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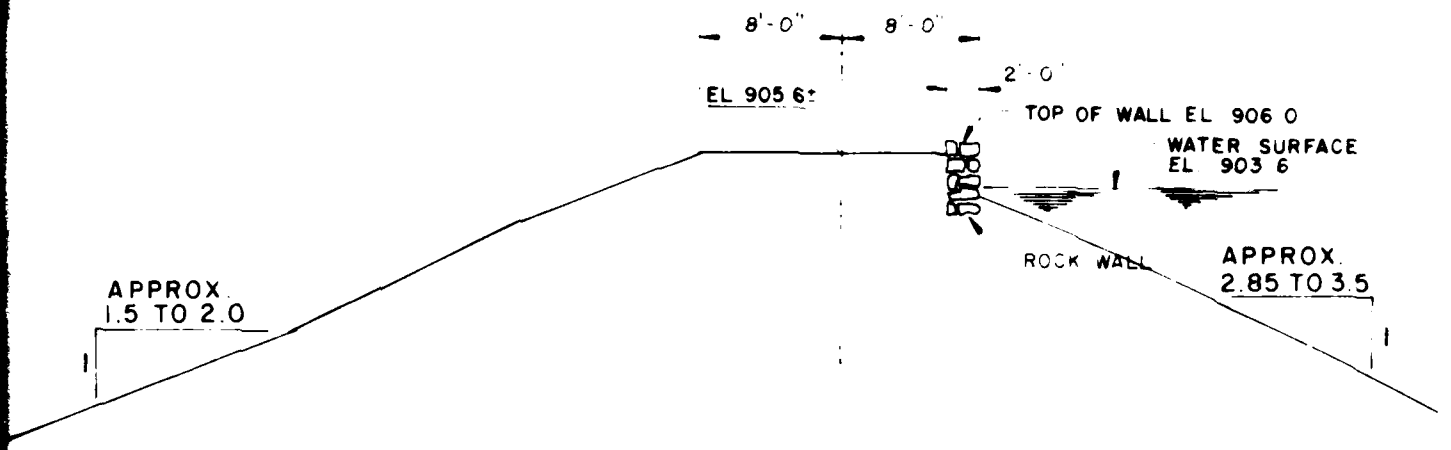
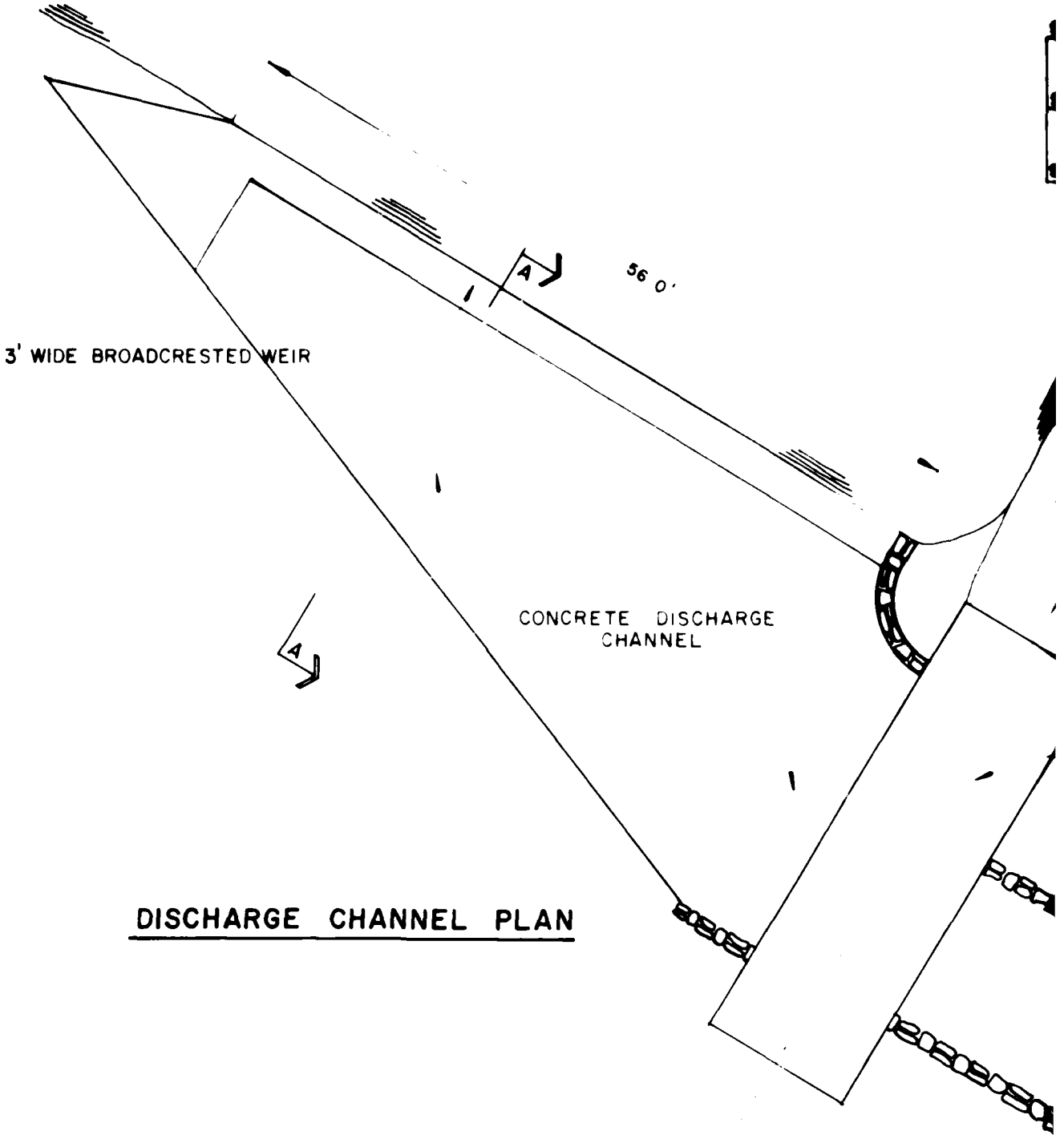


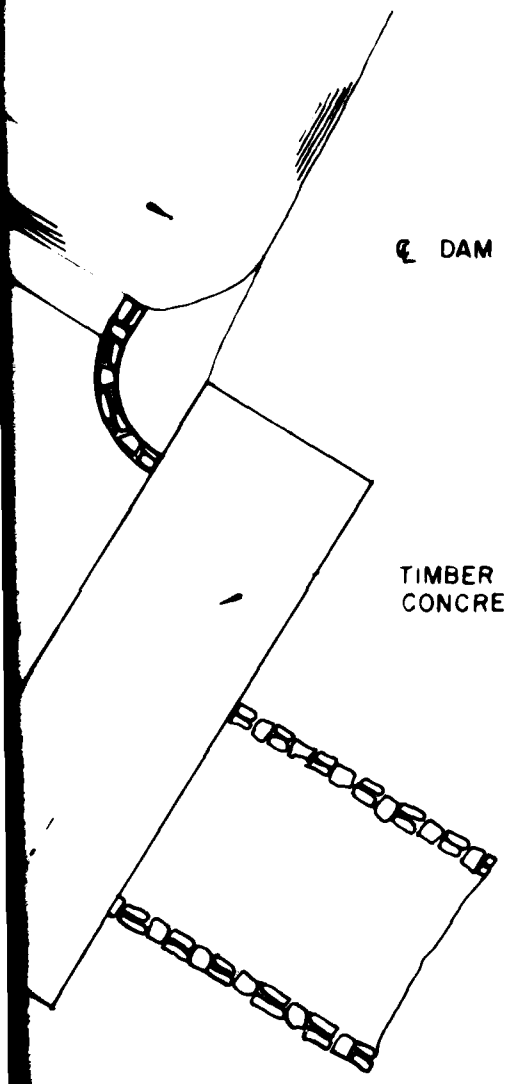
WILDWOOD LAKE
CROSS SECTION

PLATE 4



DISCHARGE CHANNEL PLAN

SECTION A-A



WILDWOOD LAKE
SPILLWAY PLAN AND SECTION

PLATE 5

PHOTO 1: TOP OF DAM (LOOKING SOUTH)

PHOTO 2: UPSTREAM FACE OF DAM (LOOKING SOUTH)

PHOTO 3: DOWNSTREAM FACE OF DAM

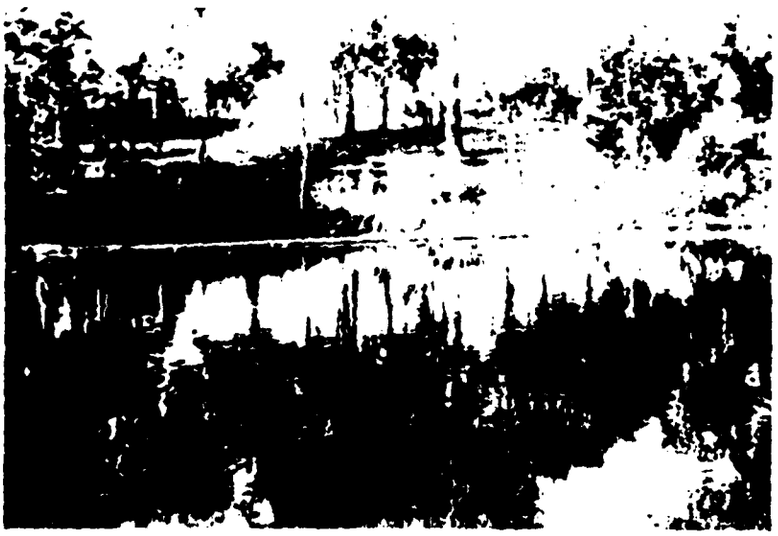


PHOTO 4: SPILLWAY (LOOKING DOWNSTREAM)

PHOTO 5: SEEPAGE UNDER SPILLWAY (LOOKING UPSTREAM)

PHOTO 6: BRIDGE OVER SPILLWAY (LOOKING UPSTREAM)

PHOTO 7: CHANNEL BELOW SPILLWAY (LOOKING DOWNSTREAM)

PHOTO 8: CULVERTS AT WOODSON ROAD, 1/2 MILE DOWNSTREAM OF DAM (LOOKING DOWNSTREAM)

PHOTO 9: STREAM CHANNEL LOOKING UPSTREAM FROM W ODSON ROAD

APPENDIX A

HYDROLOGIC COMPUTATIONS

HYDROLOGIC COMPUTATIONS

1. The Soil Conservation Service (SCS) dimensionless unit hydrograph and HEC-1 (1) were used to develop the inflow hydrograph (see Plate A-1). Hydrologic inputs are as follows:

   a. Twenty-four hour, probable maximum precipitation determined from U.S. Weather Bureau Hydrometeorological Report No. 33:

      200 square mile, 24 hour rainfall - 24.5 inches

      10 square mile, 6 hour percent of 24 hour 200 square mile rainfall - 106%

      10 square mile, 12 hour percent of 24 hour 200 square mile rainfall - 122%

      10 square mile, 24 hour percent of 24 hour 200 square mile rainfall - 131%

   b. Drainage area = 530 acres.

   c. Time of concentration: $Tc \approx (11.9 \times L^3/H)^{0.385} = 0.54$ hours = 32 minutes

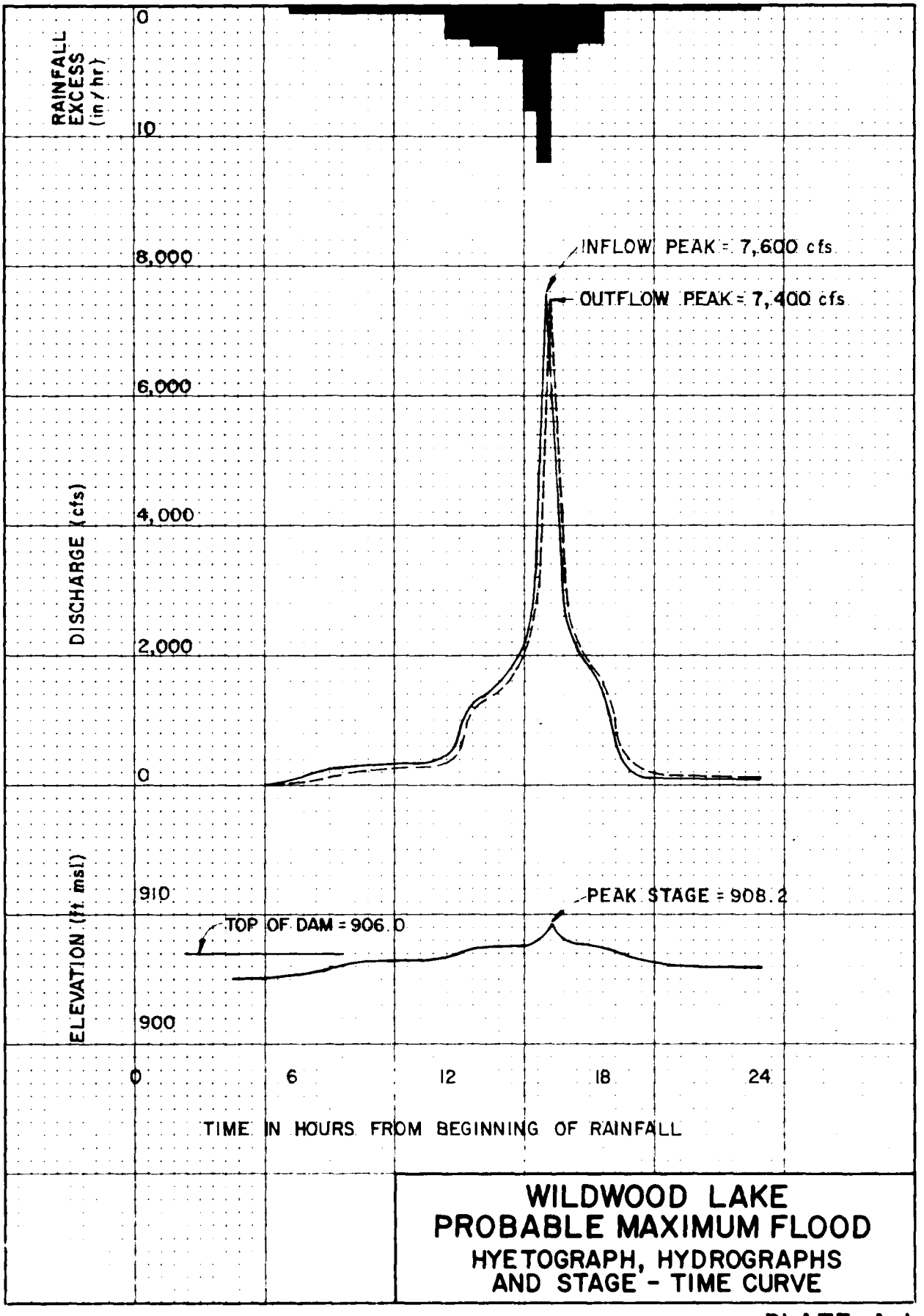
   d. Losses were determined in accordance with SCS methods for determining runoff using a curve number of 87 and antecedent moisture condition III.

2. Spillway discharge rates are based on the broad-crested weir equation: $Q = CLH^{1.5}$ (L = 56 feet, H is the head on the weir, C value for a 3 foot wide weir taken from King and Brater, Handbook of Hydraulics, and varying between 2.63 and 3.32 depending on H)

3. The elevation-storage relationship above normal pool elevation was constructed by planimetering the area enclosed within each contour above normal pool. The storage between two elevations was computed by multiplying the average of the areas at the two elevations by the elevation difference. The summation of these increments below a given elevation is the storage below that level.

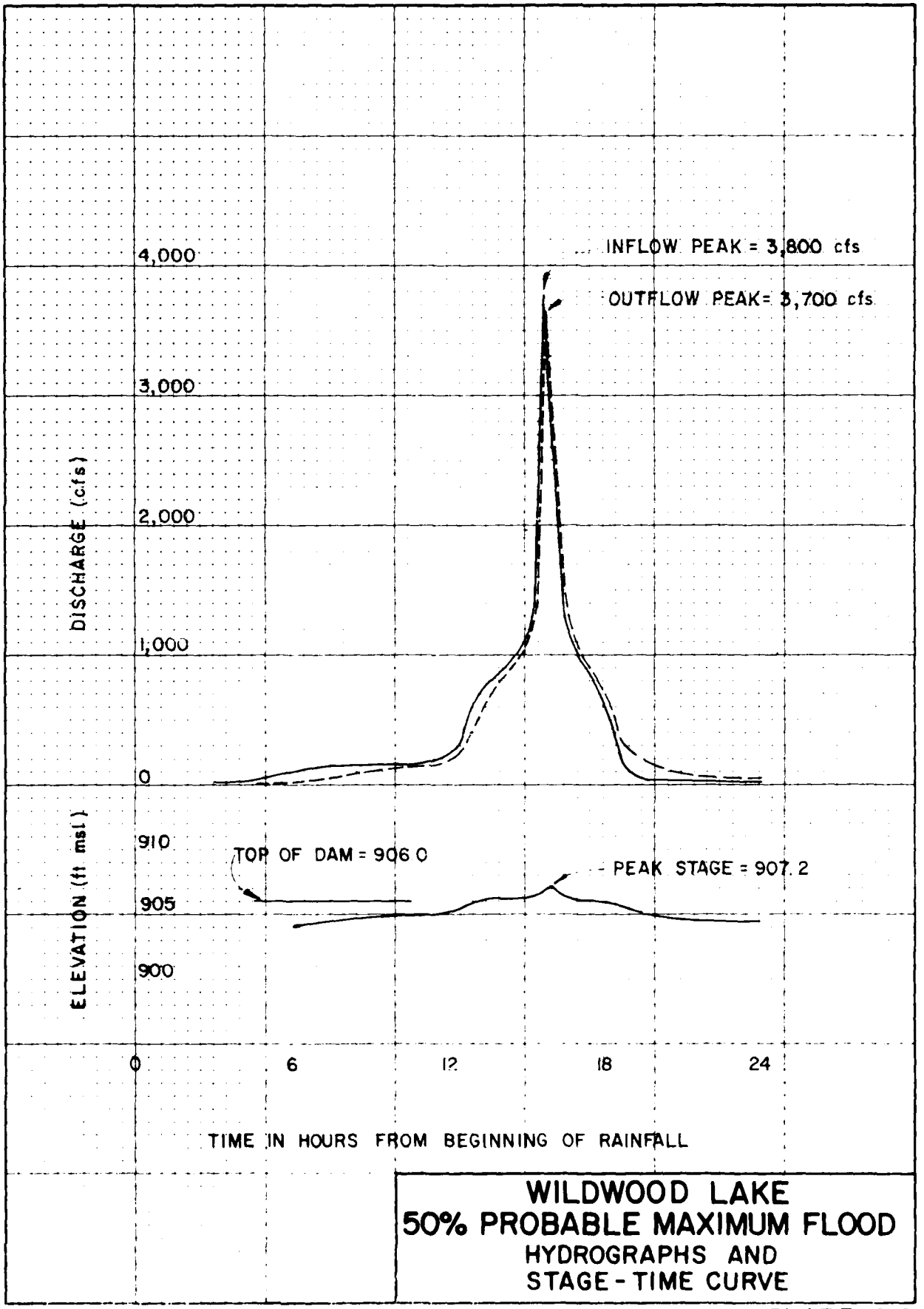
4. Floods are routed through the spillway using HEC-1, with the modified Puls routing method, to determine the capacity of the spillway. Inflow and outflow hydrographs are shown on Plates A-1, A-2 and A-3.

(1) U.S. Army Corps of Engineers, Hydrologic Engineering Center, Flood Hydrograph Package (HEC-1) Dam Safety Verson, July, 1978, Davis, California



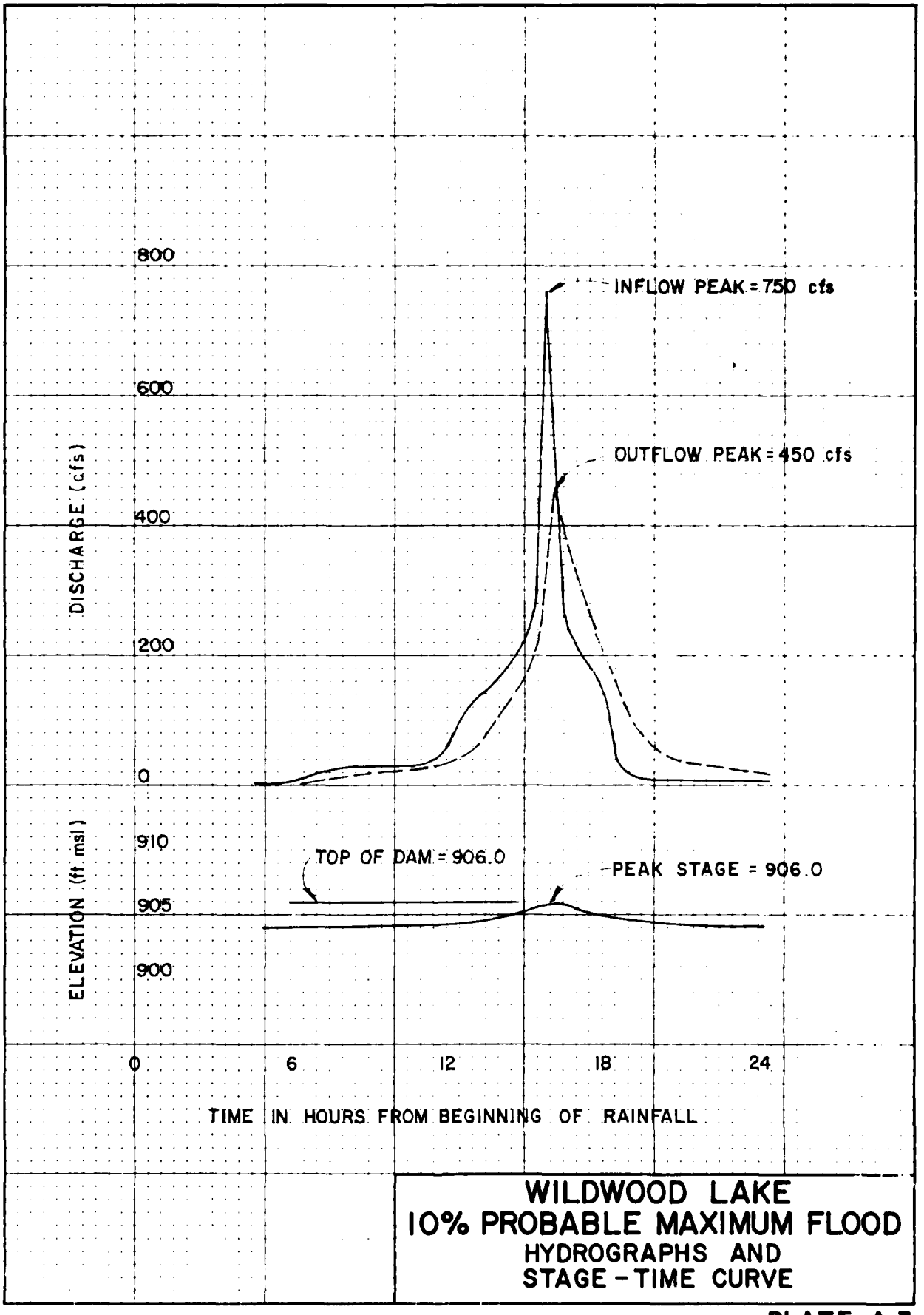
WILDWOOD LAKE
PROBABLE MAXIMUM FLOOD
HYETOGRAPH, HYDROGRAPHS AND STAGE - TIME CURVE

PLATE A-1



WILDWOOD LAKE
50% PROBABLE MAXIMUM FLOOD
HYDROGRAPHS AND STAGE - TIME CURVE

PLATE A-2



WILDWOOD LAKE
10% PROBABLE MAXIMUM FLOOD
HYDROGRAPHS AND STAGE - TIME CURVE

PLATE A-3