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NATIONAL DAM SAFETY PROGRAM. LAC-PIETE DAM (MO 10886), MISSOURI--ETC(U)
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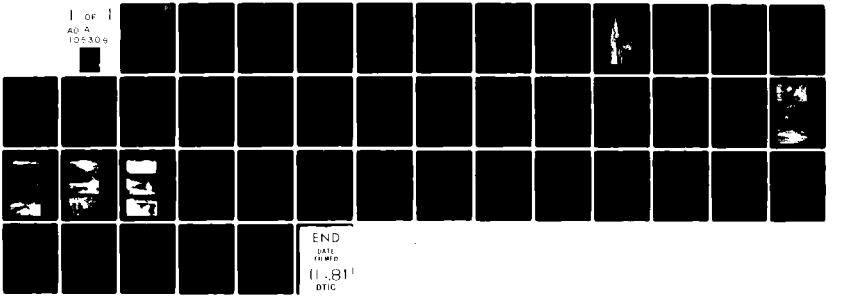

LEVEL II

MISSOURI-KANSAS CITY BASIN

LAC-PIETE DAM

CALLAWAY COUNTY, MISSOURI

MO 10886

AD A105308

PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

PREPARED BY: HOSKINS-WESTERN-SONDEREGGER, INC.

FOR: STATE OF MISSOURI

SEPTEMBER, 1978

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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1. REPORT NUMBER	2. GOVT ACCESSION NO. AD-A105 308 / 3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Phase I Dam Inspection Report National Dam Safety Program Lac Piete Dam (MO 10886) Callaway County, Missouri	5. TYPE OF REPORT & PERIOD COVERED Final Report. / 6. PERFORMING ORG. REPORT NUMBER
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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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DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT, CORPS OF ENGINEERS
210 NORTH 12TH STREET
ST. LOUIS, MISSOURI 63101

IN REPLY REFER TO

SUBJECT: Lac-Piete Dam Phase I Inspection Report

This report presents the results of field inspection and evaluation of the Lac-Piete Dam. It was prepared under the National Program of Inspection of Non-Federal Dams.

SUBMITTED BY: SIGNED
Chief, Engineering Division

19 FEB 1979
Date

APPROVED BY: SIGNED
Colonel, CE, District Engineer

12 FEB 1979
Date

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
LAC-PIETE DAM
MO 10886

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PHASE I REPORT

NATIONAL DAM SAFETY PROGRAM

Name of Dam	Lac-Piete Dam
State Located	Missouri
County Located	Callaway County
Stream	Tributary to Stinson Creek
Date of Inspection	September 13, 1978

Lac-Piete Dam was inspected by an interdisciplinary team of engineers from Hoskins-Western-Sonderegger, Inc. 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. Failure would threaten life and property. The estimated damage zone extends two miles downstream of the dam. Within the damage zone are three farm houses and associated buildings and one county road.

Our inspection and evaluation indicates that in consideration of the small volume of water impounded and the three houses downstream, 50% of the Probable Maximum Flood is the appropriate design flood. The spillway of this dam does not meet this criteria. The spillway will pass the 100-year flood (flood having a one percent chance of being exceeded in any year) as well as 23% of the Probable Maximum Flood (PMF) without overtopping the dam. The Probable Maximum Flood (PMF) is defined as the flood that may be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in the region.

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 analyses should be obtained in the future.

Deficiencies visually observed by the inspection team were willows nearly covering the upstream slope, wave erosion of the upstream slope above the water line at the left end of the dam, downstream slope badly overgrown with shrubs and trees, significant seepage along the downstream toe of the dam (Sta. 1+00 to Sta. 4+50), erosion around the outlet end of the spillway pipe, willows growing around the inlet to the spillway and heavy growth of trees in the channel downstream of the dam.

Several items of preventive maintenance need to be initiated by the owner. These are described in detail in the body of the report.

H. P. Hoskins

Harold P. Hoskins, P.E.
Hoskins-Western-Sonderegger, Inc.
Lincoln, Nebraska

PHOTO NO. 1
OVERVIEW

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
LAC-PIETE DAM-MO 10886
CALLAWAY COUNTY, MISSOURI
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 Lac-Piete 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." 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 fill about 500 feet long and 22± feet high. Topography adjacent to the site is rolling to moderately steep. Materials exposed on the slopes are highly plastic (CH) and are probably developed from cherty limestone.

(2) The principal spillway consists of an 18 inch diameter ungated corrugated metal pipe passing through the embankment on the right (east) end of the dam.

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

b. Location. The dam is located in the west central portion of Callaway County, Missouri, as shown on Plate A2. The dam and the lake formed by the dam is shown on Plate A-1 in the SW¼ of Section 7, T47N, R9W.

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, this dam and impoundment is in the small size category.

Although the size and storage of Lac-Piete Dam are marginal as far as the small size classification is concerned, the dam was included in the inspection program due to its high downstream hazard potential and the fact the size and storage of Lac-Piete are significant when compared to the size requirements of the program.

d. Hazard Classification. Guidelines for determining hazard classification are presented in the same guidelines as referenced in paragraph c above. Based on referenced guidelines, this dam is in the High Hazard Classification. The estimated damage zone extends two miles downstream of the dam. Within the damage zone are three farm houses and associated buildings and one county road.

e. Ownership. The dam is owned by the Christopher Subdivision, c/o J.D. McDonald, Route 6, Fulton, Missouri 65251.

f. Purpose of Dam. The dam forms a 3 acre recreational lake.

g. Design and Construction History. No design or construction records were available. The dam was reportedly built in 1966 or 1967.

h. Normal Operating Procedures. There are no controlled outlets for this dam. No information was available on the frequency or duration of spillway operation.

1.3 PERTINENT DATA

a. Drainage Area - 34 acres.

b. Discharge at Damsite.

(1) All discharge at the damsite is through an ungated corrugated metal pipe spillway.

(2) Estimated maximum flood at damsite - unknown.

(3) The spillway capacity varies from 0 c.f.s. at elevation (808.7) to 15 c.f.s. at the minimum elevation (812.2) of the dam top.

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

(1) Top dam - 812.7± (Average) - 812.2± (Minimum at Sta. 1+00).

(2) Principal spillway invert elevation - 808.7±(at Sta. 4+30±).

(3) Streambed at centerline of dam - 790±.

(4) Maximum tailwater - unknown.

d. Reservoir. Length of maximum pool - 500 feet±.

e. Storage (Acre - feet). Top of dam - 28.

f. Reservoir Surface (Acres).

(1) Top of dam - 5 acres±.

(2) Spillway invert elevation - 3 acres±.

g. Dam

(1) Type - earth embankment

(2) Length - 500 feet±.

(3) Height - 22 feet±.

(4) Top width - 24 feet±.

(5) Side Slopes

(a) Downstream - 2.3H on 1V (Measured)

(b) Upstream - 3H on 1V (measured on exposed slope)

(6) Zoning - unknown.

(7) Impervious Core - unknown.

(8) Cutoff - unknown.

(9) Grout Curtain - unknown.

(10) Wave Protection - none.

h. Diversion and Regulating Tunnel. None.

i. Spillway

(1) Type - 18" diameter ungated corrugated metal pipe.

(2) Length of pipe - 39 feet.

(3) Inlet invert elevation - 808.7 feet M.S.L.
Outlet invert elevation - 808.6 feet M.S.L.

(4) Upstream channel - Many willows were found growing in upstream channel.

(5) Downstream channel - Many willows and small trees found in downstream channel.

j. Regulating Outlets. None.

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

No design data were available for this dam.

2.2 CONSTRUCTION

The dam was constructed in 1966 or 1967. No other construction data were available.

2.3 OPERATION

There are no control outlets for this dam.

2.4 EVALUATION

a. Availability. No engineering data were available.

b. Adequacy. Seepage and stability analyses comparable to the requirements of the 'Recommended Guidelines for Safety Inspection of of Dams' were not available, which is considered a deficiency. These seepage and stability analyses should be performed for appropriate loading conditions (including earthquake loads) and made a matter of record.

c. Validity. Not applicable.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General. A visual inspection of the Lac-Piete Dam was made on September 13, 1978. Engineers from Hoskins-Western-Sonderegger, Inc., Lincoln, Nebraska making the inspection were: Rey Decker, Geology and Soil Mechanics; Garold Ulmer, Civil Engineer; Richard Walker and Gordon Jamison, Hydrology. Specific observations are discussed below.

b. Dam. The crest of the dam serves as an access road for the adjacent home development area. Rough measurements, (see Appendix C) along the crest indicate that the right end of the dam is about 2 feet lower in elevation than the remainder of the dam. The upstream slope is nearly covered with willows from about Station 2+00 to the right end. Some wave erosion was noted on the upstream slope above the present water line on the left end of the dam (℄ Station 0+00 to 2+00).

The downstream slope is badly overgrown with shrubs and trees up to 5 inches in diameter. A number of drying cracks were noted on the downstream slope and on the crest of the dam. No other significant cracks, slides or abnormal deformations were noted on the embankment. Materials exposed in the left abutment downstream from the dam consisted of highly plastic clay (CH). No slides or seepage were noted in the abutments.

Significant seepage was noted along the downstream toe of the dam from about ℄ Station 1+00 to 4+50. No boils were observed and seepage appeared to be clear. An 8 inch cast iron sewer line runs along the toe of the dam (approximately ℄ Stations 5+00 to 3+00)

An 8 inch cast iron sewer line, serving the homes on the right (east) side of the dam and lake, runs along the downstream toe of the dam between approximate ℄ stations 5+00 to 3+00. Another 8 inch sewer line serving the left (west) side of the lake empties into an open manhole at the toe of the dam downstream from about ℄ station 1+00. (See Photo No. 10). Both of the sewer lines outlet into the sewage lagoon located immediately downstream from the dam.

c. Appurtenant Structures. The spillway is located on the right abutment. It is uncontrolled and consists of an 18 inch corrugated metal pipe about 39 feet long passing through the embankment. The spillway outlets into a poorly defined earth channel running down the slope of the dam. Some erosion was noted at the outlet of the spillway pipe. Several willows are growing around the inlet to the spillway.

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

e. Downstream channel. The old stream channel is heavily wooded downstream from the dam.

f. Downstream Hazards. Two sewage lagoons are located downstream from the dam, one of which is only about 25 feet from the toe of the dam at about ℄ Station 3+00.

3.2 EVALUATION

The tree growth on both slopes of the dam could lead to potential of failure if left uncontrolled. Erosion at the outlet of the spillway could ultimately lead to potential of failure and damage to the sewer line serving the right (east) side of the lake. Additional studies would be required to determine the affects of seepage on the stability of the structure.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

There are no controlled outlets for this dam.

4.2 MAINTENANCE OF DAM

The number and size of trees growing on both slopes indicates that there is no regular maintenance program in effect for this dam.

4.3 MAINTENANCE OF OPERATING FACILITIES

No operating facilities exist at this dam.

4.4 DESCRIPTION OF ANY WARNING SYSTEM IN EFFECT

The inspection team is not aware of any warning system in effect at this dam.

4.5 EVALUATION

Trees growing on both slopes of the dam and erosion in the outlet channel of the spillway could lead to potential of failure if left uncontrolled.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 EVALUATION OF FEATURES

a. Design Data. No hydraulic and hydrologic data were furnished by the owner. Therefore all computations are based on field inspection and surveys by the consultant. The plan, profiles, and cross sections from the survey are attached in Appendix C.

b. Experience. The drainage area and contour surface areas are developed from the U.S.G.S. Fulton, Missouri (7.5') Quadrangle. The spillway and dam layouts are from surveys made during inspection.

c. Visual Observations.

(1) The spillway pipe appeared to be in good condition.

(2) The spillway is located in the right abutment of the dam. Spillway releases flow along the downstream toe of the dam and into the old stream channel.

(3) Many willows and small trees in both the upstream and downstream channels.

(4) No drawdown facilities are available to evacuate the pool.

d. Overtopping Potential. The spillway is too small to pass the probable maximum flood without overtopping. One-half the PMF will overtop the dam by 0.7 feet for a period of 5 1/2 hours. The spillway will pass the 0.23 PMF without overtopping. The existing spillway will pass the 100 year frequency flood without overtopping. The 0.23 PMF is approximately equal to the 100 year frequency flood. The results of the routings through the dam are tabulated in regards to the following conditions.

Frequency	Inflow Discharge c.f.s.	Outflow Discharge c.f.s.	Maximum Pool Elevation	Freeboard Top of Dam Min. Elevation 812.2	Time Dam Overtopping Hr.
100 Yr.	75	15	812.2	0	0
1/2 PMF	176	174	812.9	-0.7	5 1/2
PMF	352	*361	813.1	-0.9	8 1/2
0.23 PMF	79	15	812.2	0	0

* Due to the inaccuracy of the stage - storage curve. See paragraph 4 in Appendix D.

According to the recommended guidelines from the Department of the Army, Office of the Chief of Engineers, this dam is classified as having a high hazard rating and a small size. Therefore, 50% of the PMF is the test for the adequacy of the dam and its spillway.

The St. Louis District Corps of Engineers, in a letter dated 11 August, 1978 has estimated the damage zone as extending two miles downstream of the dam. Within the damage zone are three farm houses and associated buildings and one county road.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations. Visual observations which could affect the structural stability of this dam are discussed in Section 3. These include the following features: trees growing on both slopes of the embankment, erosion in the spillway outlet, seepage along the downstream toe of the dam.

b. Design and Construction Data

No design or construction data were available.

c. Operating Records. There are no operating facilities for this dam and no records of spillway operation were available.

d. Post Construction Changes. The inspection team is not aware of any post construction changes on this dam.

e. Seismic Stability. This dam is located in Seismic Zone 1. An earthquake of this magnitude is not expected to cause structural failure of this dam.

SECTION 7 - ASSESSMENT/REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Safety. Several items were noted during the visual inspection that could lead to potential of failure. These items include uncontrolled tree growth on both slopes of the dam and erosion on the upstream slope and in the spillway outlet. The slopes measured on this embankment should provide adequate safety against shear failure for a dam of this height. However, the seepage observed at the downstream toe could adversely affect the safety of the structure.

According to available data, the spillway will not pass 50% of the probable maximum flood (PMF) without overtopping the dam. The spillway will pass the 100 year flood and 23% of the PMF without overtopping.

b. Adequacy of Information. No engineering or construction data were available for this dam. Conclusions in this report are based upon performance history and observations and measurements made during the visual inspection. The inspection team considers that this information is sufficient to support the conclusions herein. Neither seepage nor stability analyses were available which are deficiencies that should be corrected in the future.

c. Urgency. There does not appear to be an immediate urgency to accomplish the remedial measures discussed in Paragraph 7.2.

d. Necessity for Phase II. Phase II investigations are not considered necessary.

e. Seismic Stability. The safety of this dam should not be adversely affected by an earthquake of the magnitude to be expected in this area.

7.2 REMEDIAL MEASURES

a. Alternatives

(1) The size of the existing spillway should be increased or an emergency earth spillway should be constructed through one of the abutments to prevent overtopping of the dam by 50% of the probable maximum flood.

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

(3) The services of an engineer experienced in the design of dams should be obtained to evaluate the hydraulic/ hydrologic and the structural stability aspects of this dam and to design remedial measures that may be required.

b. O & M Maintenance and Procedures

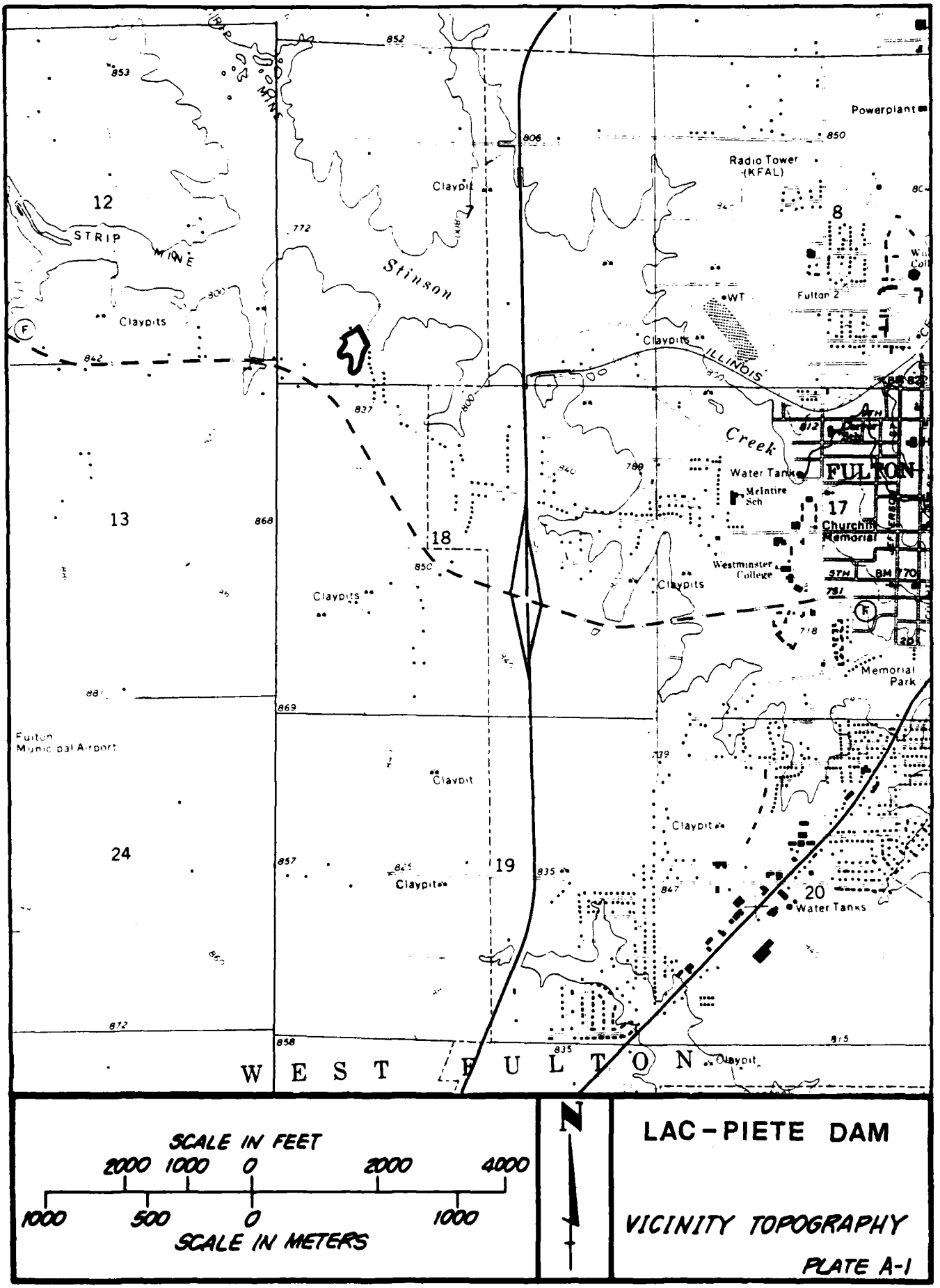
(1) Trees and heavy vegetation growing on the embankment should be removed.

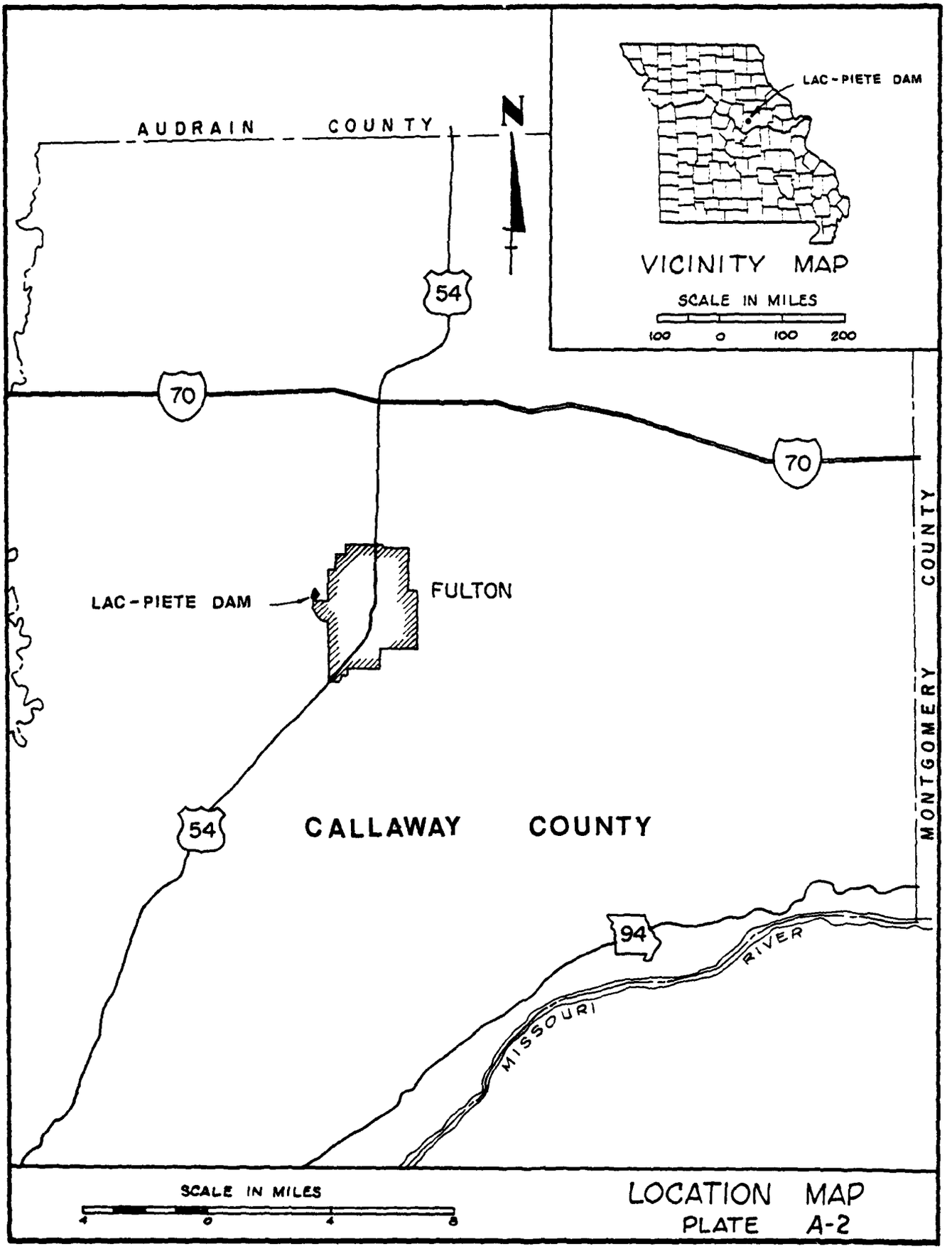
(2) The spillway outlet should be improved and stabilized against erosion.

(3) Erosion on the upstream face of the dam should be corrected.

(4) A program of regular inspection and maintenance should be initiated. The program should include inspection of all items which could adversely affect the stability of the dam. Records should be kept of all inspections, maintenance, and remedial measures accomplished.

APPENDIX A
MAPS


Powerplant
Radio Tower (KFAL)
Claypit
STRIP MINE
Stinson
Claypits
Fulton 2
WT
ILLINOIS
Creek
Water Tanks
FULTON
McIntire Sch
Churchill Memorial
Westminster College
Memorial Park
Fulton Municipal Airport
Claypit
Claypits
Water Tanks
12
13
18
17
8
24
19
20
WEST FULTON
SCALE IN FEET
2000 1000 0 2000 4000
1000 500 0 1000
SCALE IN METERS
N
LAC-PIETE DAM
VICINITY TOPOGRAPHY
PLATE A-1


LAC-PIETE DAM
VICINITY MAP
SCALE IN MILES
100 0 100 200
N
AUDRAIN COUNTY
54
70
70
LAC-PIETE DAM
FULTON
54
CALLAWAY COUNTY
MONTGOMERY COUNTY
94
MISSOURI RIVER
SCALE IN MILES
4 0 4 8
LOCATION MAP
PLATE A-2

APPENDIX B
PHOTOGRAPHS

PHOTO NO. 2
LOOKING UPSTREAM
AT OUTLET END OF
CORRUGATED METAL
PIPE SPILLWAY

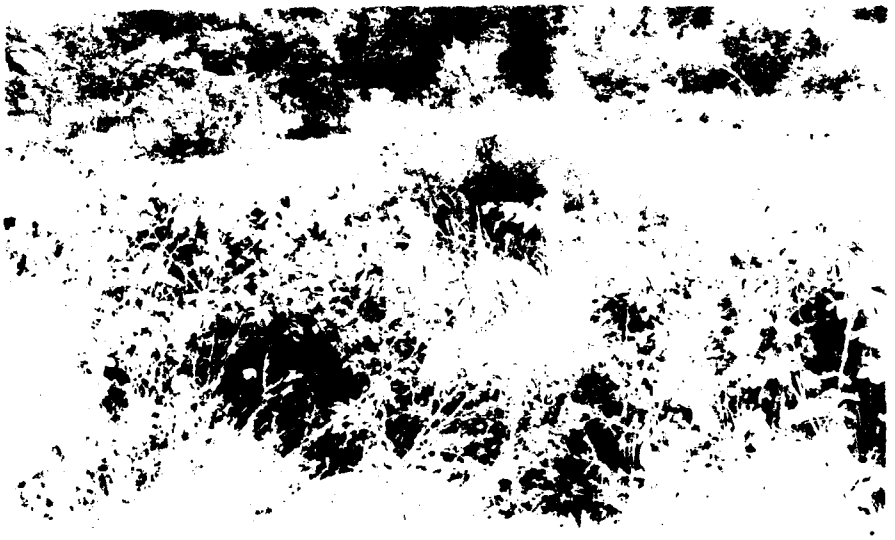


PHOTO NO. 3
LOOKING DOWNSTREAM
FROM RIGHT END OF DAM

PHOTO NO. 4
LOOKING WEST ALONG
DOWNSTREAM SLOPE
OF DAM.

PLATE B-1

PHOTO NO. 5
LOOKING WEST
ALONG DOWNSTREAM
SLOPE OF DAM.

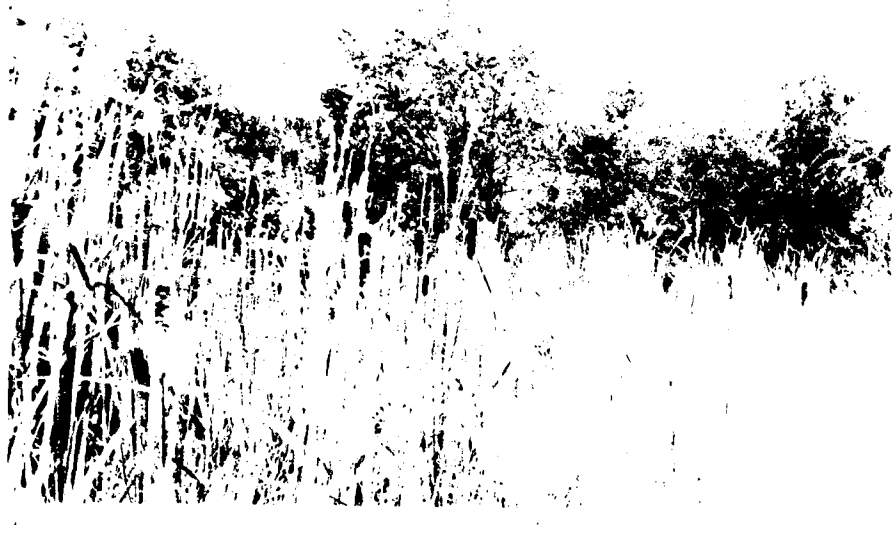


PHOTO NO. 6
SEEP AREA BELOW
CENTERLINE STA. 3+50.

PHOTO NO. 7
LOOKING ALONG
CENTERLINE OF
DAM FROM RIGHT
TO LEFT. COUNTY
ROAD CROSSES DAM.

PHOTO NO. 8
UPSTREAM SLOPE
FROM RIGHT SIDE.

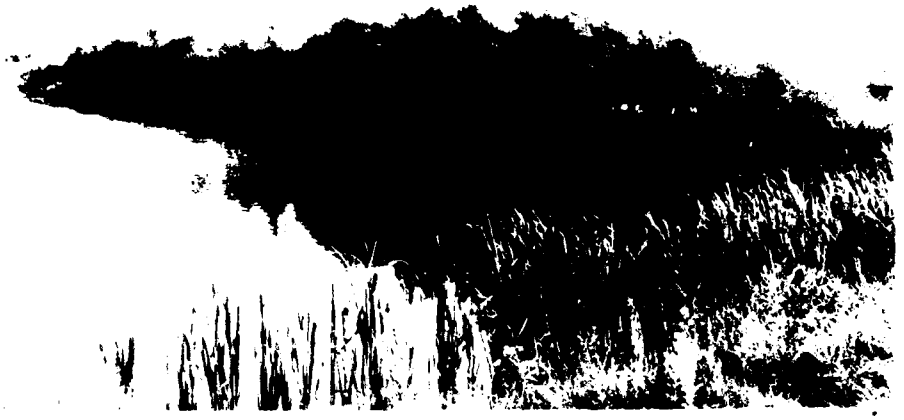


PHOTO NO. 9
LOOKING DOWNSTREAM
FROM STA. 3+35 AT
SEWAGE LAGOON.

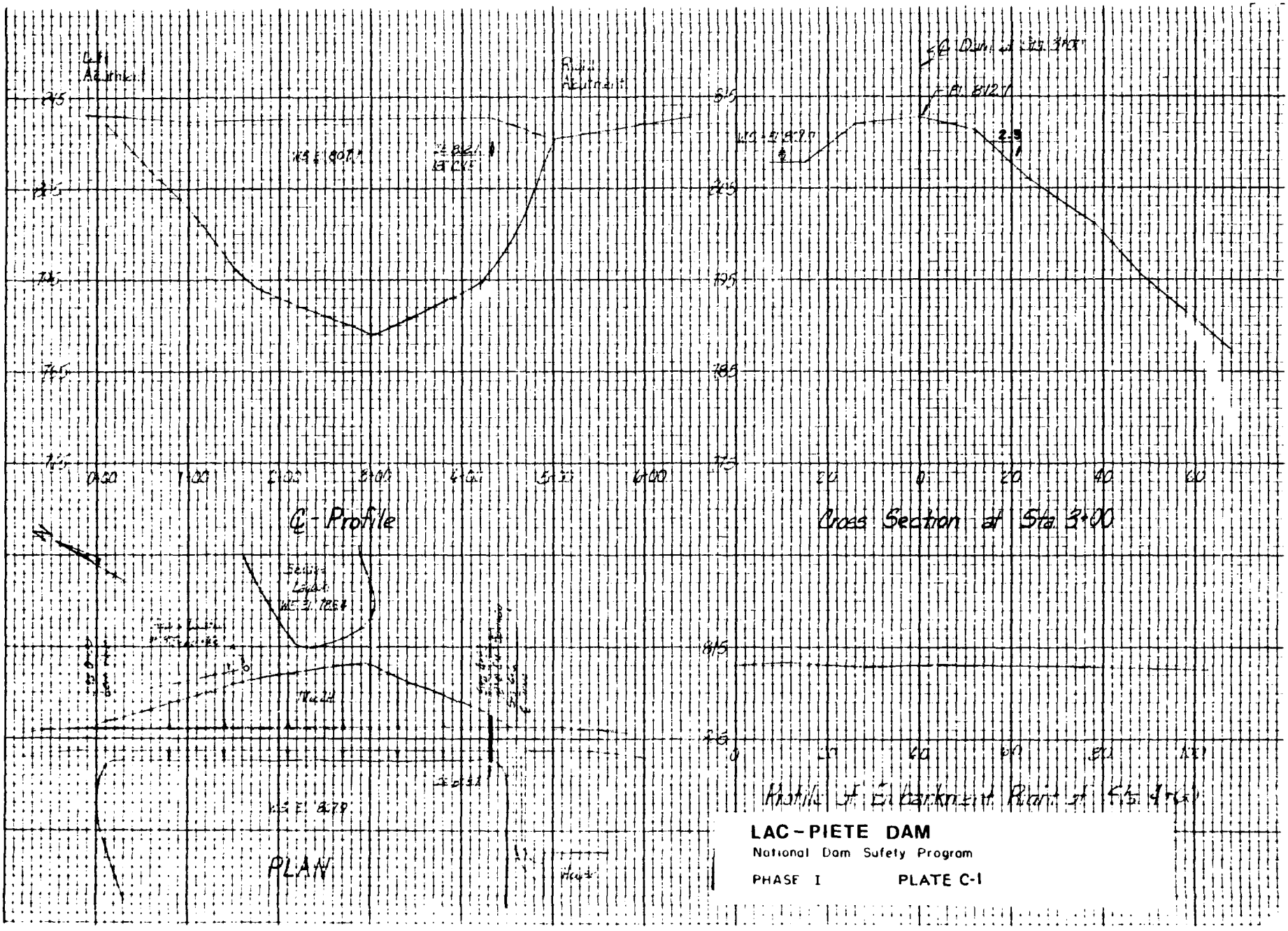
PHOTO NO. 10
SANITARY SEWER
OUTLET AT STA.
1+60.

PHOTO NO. 11
DOWNSTREAM SLOPE
LOOKING FROM LEFT
TO RIGHT.

PHOTO NO. 12
UPSTREAM SLOPE
LOOKING FROM
LEFT TO RIGHT.

PHOTO NO. 13
TAKEN FROM TOP
OF DAM TO LEFT
AND UPSTREAM.

APPENDIX C
PLAN, PROFILES & SECTION


℄ - Profile
Cross Section at Sta. 3+00
PLAN
LAC - PIETE DAM
National Dam Safety Program
PHASE I
PLATE C-1

APPENDIX D
HYDROLOGIC COMPUTATIONS

HYDROLOGIC COMPUTATIONS

1. The Mockes dimensionless standard curvalinear unit hydrograph and the SCS TR-20 program were used to develop the inflow hydrographs (see Plate D1).

   a. Twenty four-hour, 12-hour, and 6-hour 100-year rainfalls for the dam location were taken from NWS Technical Paper 40. The 24-hour probable maximum precipitation was taken from the curves of Hydrometeorological Report No. 33 and current OCE directives furnished 4 August 1978 and formally stated in a letter dated 21 August 1978.

   b. Drainage area = 0.05 square miles.

   c. Time of concentration of runoff = 7 minutes.

   d. The antecedent storm conditions were heavy rainfall and low temperatures which occurred on the previous 5 days (SCS AMCIII). The initial pool elevation was assumed at the invert of the spillway.

   e. The total 24-hour storm duration losses (interception, infiltration, and evapotranspiration) for the 100-year storm were 0.64 inches which is approximately a 0.23 PMF storm. The total losses for the 24-hour duration ½PMF storm were 0.66 inches. The total losses for the PMF storm were 0.72 inches. These data are based on SCS runoff curve No. 86 and antecedent moisture conditions from SCS AMCIII.

   f. Average soil loss rates = 0.05 inch per hour approximately.

2. The combined discharge rating consisted of two components; the flow through the spillway and flow going over the top of the dam. The spillway rates are based on the full flow equation

$$Q = a\sqrt{\frac{2gH}{1 + K_e + K_b + K_pL}}$$

where a = cross-sectional area of pipe, ft^2 = 1.77
H = total head, ft.
K_e = coefficient for entrance loss = 0.5
K_b = coefficient for bend loss = 0
K_p = coefficient for pipe friction loss = 0.0243
L = length of pipe, ft. = 39

The flows over the dam are based on the broad-crested weir equation ($Q = CLH^{1.5}$) where H is the head on the dam crest, L is the effective length acting as a weir, and C is an appropriate weir coefficient which varies with head and is based on U.S. Geological Survey criteria.

3. Floods were routed through the spillway using the TR-20 program to determine the capability of the spillway and dam embankment crest. The storm rainfall patterns, inflow hydrographs and routed outflow hydrographs are given on Plate D1.

4. The discrepancy between the PMF inflow and outflow discharges in the tabular data in Section 5 is due to the lack of data available for an accurate stage-storage curve. The power curve method, obtained from information given during the hydrologic/hydraulic standard meeting held on 4 August, 1978 in St. Louis, was used to develop the stage-storage curve used.

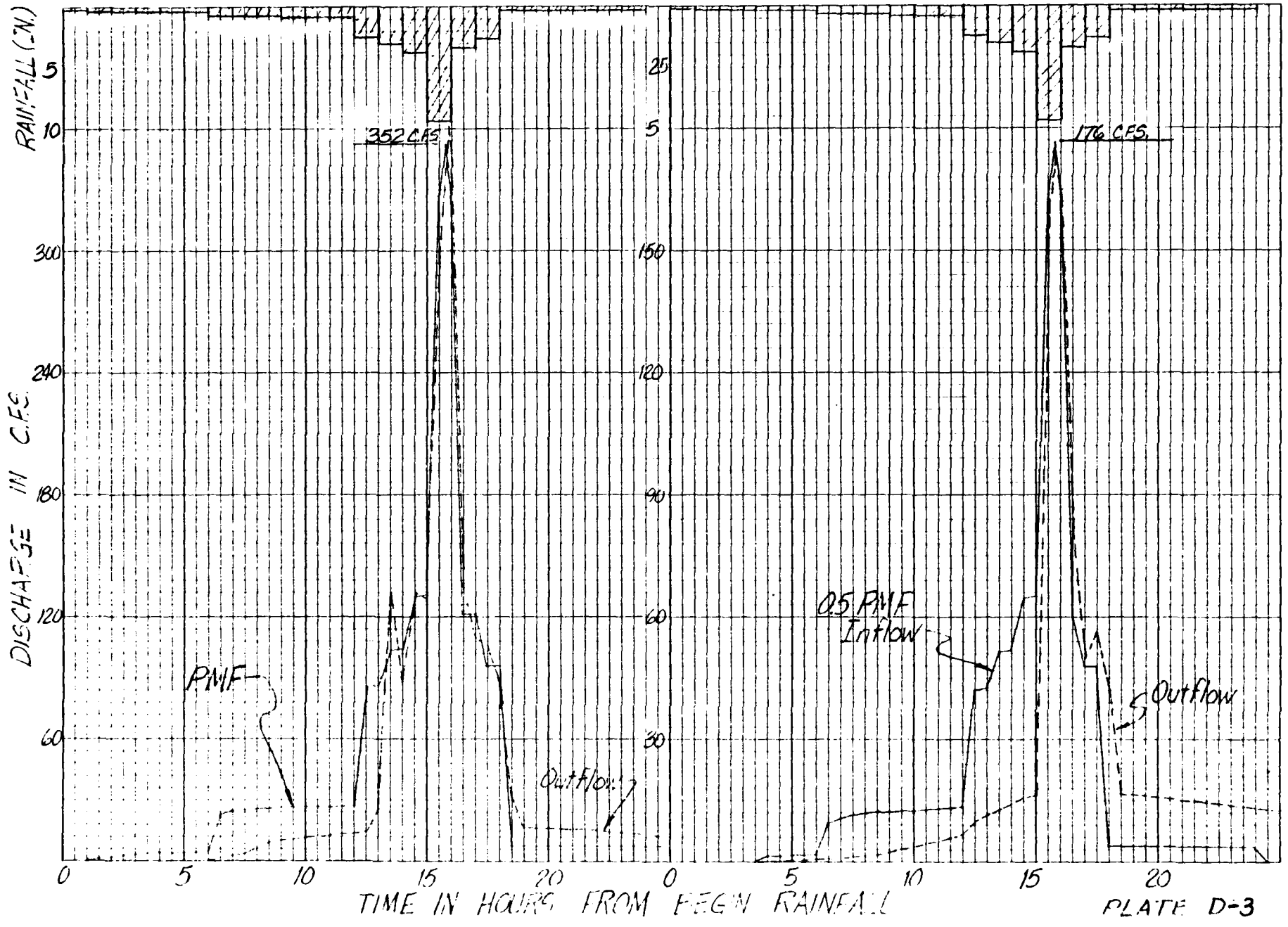


PLATE D-3

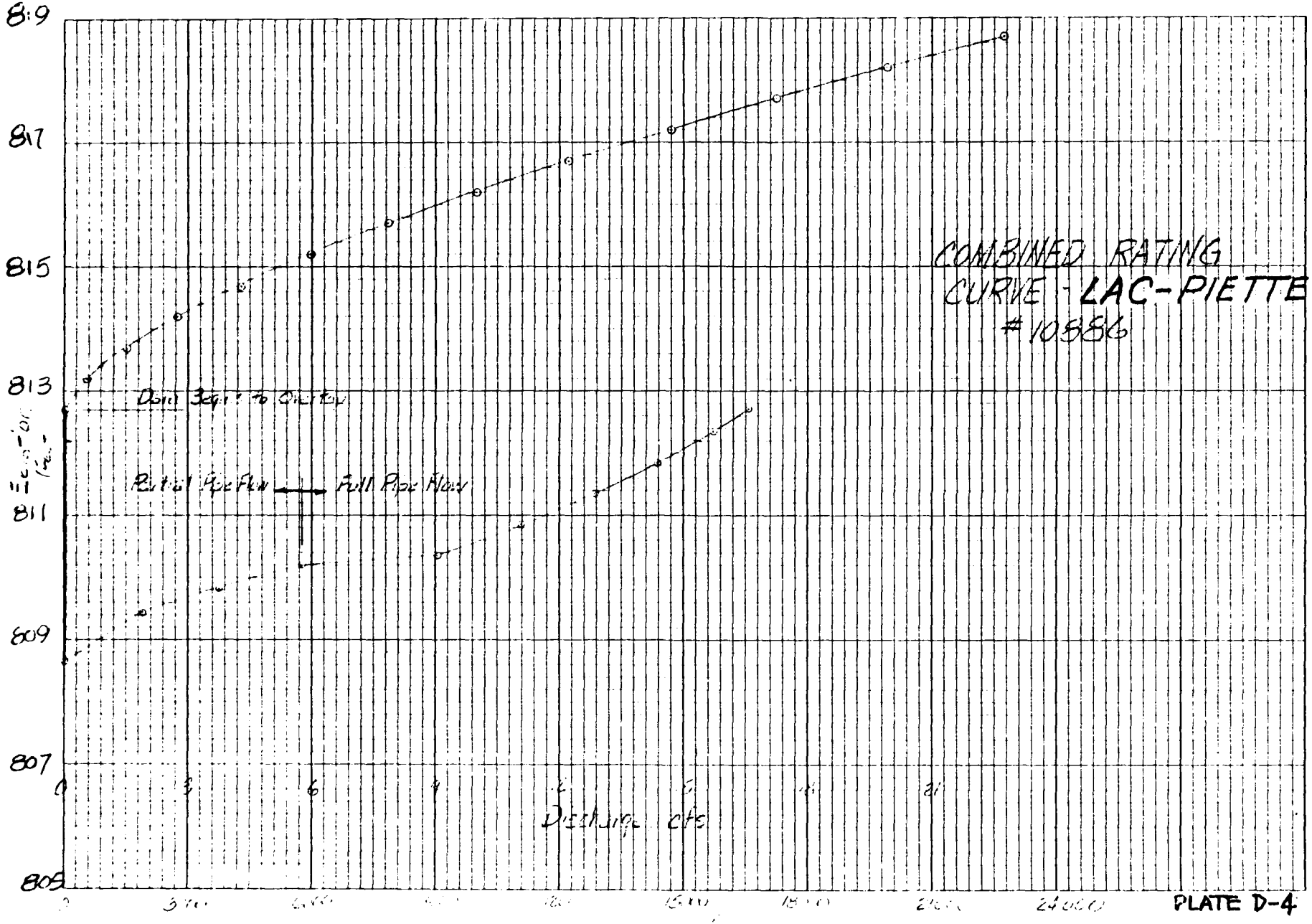

COMBINED RATING
CURVE - LAC-PIETTE
#10556
Partial Pipe Flow
Full Pipe Flow
Discharge cfs
809
811
813
815
817

PLATE D-4

HYDROLOGY PROGRAM FOR IBM 1130 - DATED JULY, 1968

MO DAM INSPECTION J.D. MACDONALD FULTON MO. LAC-PIETTE TR-20 ROUTING.

EXECUTIVE CONTROL CARD OPERATION LIST

MO DAM INSPECTION J.D. MACDONALD FULTON MO.

C TABLE VELOCITY INCREMENT = 0.200

8	0.0000	0.0800	0.1800	0.2500	0.3200
8	0.3700	0.4100	0.4500	0.4900	0.5100
8	0.5400	0.5700	0.5900	0.6100	0.6300
8	0.6500	0.6600	0.6700	0.6900	0.7000
8	0.7100	0.7200	0.7300	0.7400	0.7500
8	0.7600	0.7700	0.7700	0.7800	0.7900
8	0.7900	0.8000	0.8100	0.8100	0.8200
8	0.8200	0.8300	0.8300	0.8400	0.8400
8	0.8400	0.8500	0.8500	0.8600	0.8600
8	0.8600	0.8600	0.8700	0.8700	0.8700
8	0.8800	0.8800	0.8800	0.8900	0.8900
8	0.8900	0.8900	0.8900	0.8900	0.9000
8	0.9000	0.9000	0.9000	0.9000	0.9100
8	0.9100	0.9100	0.9100	0.9100	0.9100
8	0.9200	0.9200	0.9200	0.9200	0.9200
8	0.9200	0.9200	0.9200	0.9300	0.9300
9 ENDTBL					

STRUCTURE NO. 1

	ELEVATION	DISCHARGE	STORAGE
8	808.7000	0.0000	16.6499
8	809.4500	1.9000	18.8099
8	809.8250	3.7500	19.9599
8	810.2000	5.7500	21.1499
8	810.3500	9.0600	21.6399
8	810.8500	11.1000	23.3299
8	811.3500	12.8100	25.1099
8	811.8500	14.3300	26.9799
8	812.3500	15.6900	28.9399
8	812.7000	16.5700	30.3699
8	812.8701	122.1400	31.0799
8	812.9000	151.2300	31.2099
8	813.0400	314.7800	31.7999
8	813.0700	355.0600	31.9299
8	813.1000	397.0100	32.0599
8	813.2000	548.1000	32.4899
8	813.9500	2115.7402	45.8599
8	814.2000	2775.6303	37.0299
8	814.7000	4263.5908	39.4599
9 ENDTBL			

DIMENSIONLESS HYDROGRAPH - DELTA T =484.00

8	0.0000	0.0300	0.1000	0.1900	0.3100
8	0.4700	0.6600	0.8200	0.9300	0.9900
8	1.0000	0.9900	0.9300	0.8600	0.7800
8	0.6800	0.5600	0.4600	0.3900	0.3300
8	0.2800	0.2410	0.2070	0.1740	0.1470
8	0.1260	0.1070	0.0910	0.0770	0.0660
8	0.0550	0.0470	0.0400	0.0340	0.0290
8	0.0250	0.0210	0.0180	0.0150	0.0130
8	0.0110	0.0090	0.0080	0.0070	0.0060
8	0.0050	0.0040	0.0030	0.0020	0.0010
8	0.0000	0.0000	0.0000	0.0000	0.0000
9 ENDTBL					

RAINFALL TABLE NO. 1 TIME INCREMENT = 0.50

8	0.0000	0.0080	0.0170	0.0260	0.0350
8	0.0450	0.0550	0.0650	0.0760	0.0870
8	0.0990	0.1120	0.1250	0.1400	0.1560
8	0.1740	0.1940	0.2190	0.2540	0.3030
8	0.3150	0.3830	0.6240	0.6540	0.6820
8	0.7050	0.7270	0.7480	0.7670	0.7840
8	0.8000	0.8160	0.8300	0.8440	0.8570
8	0.8700	0.8820	0.8930	0.9050	0.9160
8	0.9260	0.9360	0.9460	0.9550	0.9650
8	0.9740	0.9830	0.9920	1.0000	1.0000
9 ENDTBL					

RAINFALL TABLE NO. 2 TIME INCREMENT = 0.02

PLATE D-5

8	0.0000	0.0100	0.0200	0.0200	0.0300
8	0.0400	0.0500	0.0600	0.0700	0.0800
8	0.1000	0.1100	0.1300	0.1400	0.1700
8	0.1900	0.2200	0.2700	0.3500	0.4400
8	0.5200	0.6000	0.6300	0.6600	0.6800
8	0.7000	0.7200	0.7400	0.7600	0.7700
8	0.7900	0.8000	0.8200	0.8300	0.8400
8	0.8500	0.8700	0.8800	0.8900	0.9000
8	0.9100	0.9200	0.9300	0.9400	0.9500
8	0.9567	0.9633	0.9700	0.9800	0.9900
8	1.0000	1.0000	1.0000	1.0000	1.0000
9 ENDTBL					

RAINFALL TABLE NO. 3 TIME INCREMENT = 0.50

8	0.0000	0.0700	0.1400	0.2100	0.2900
8	0.3600	0.4400	0.5100	0.5900	0.6600
8	0.7400	0.8100	0.8900	1.2800	1.6700
8	2.0600	2.4500	2.8400	3.2300	3.6200
8	4.0200	4.4100	4.8100	5.2000	5.6000
8	6.8600	8.1300	9.6500	11.1700	13.0700
8	14.9700	19.7700	24.5800	26.3500	28.1200
8	29.5100	30.9000	31.0100	31.1300	31.2400
8	31.3600	31.4700	31.5800	31.6900	31.8000
8	31.9100	32.0200	32.1300	32.2400	32.2400
9 ENDTBL					

PLATE D-6

STANDARD CONTROL INSTRUCTIONS

SUBRTN	XSECTN	STRCT	HYDROGRAPHS IN1	IN2	OUT	DATA NO. 1	DATA NO. 2	DATA NO. 3	OUTPUT OPTIONS PK	H	E	V	PU	SM
RUNOFF	0	1	0	0	6	0.053	86.000	0.120	1	1	0	1	0	0
RESVOR	0	1	6	0	7	808.700	0.000	0.000	1	1	1	1	0	0
ENDATA														

END OF LISTING

PLATE D-7

```
EXECUTIVE CONTROL CARD          OPERATION  INCREM.     MAIN TIME INCREMENT=  0.50
EXECUTIVE CONTROL CARD          OPERATION  COMPUT.     FROM XSECTN/STRUCT   0/  1     TO XSECTN/STRUCT   0/  1
        STARTING TIME=  0.00    RAIN DEPTH=  1.00    RAIN DURATION=  1.00    RAIN TABLE NO.= 3    SOIL CONDITION= 3
        ALTERNATE NO.= 1        STORM NO.= 1

SUBROUTINE RUNOFF   STRUCTURE   1
        AREA=   0.05    INPUT RUNOFF CURVE=  86.0    TIME OF CONCENTRATION=  0.12
        COMPUTED CURVE NO. =  94.4

        PEAK TIMES              PEAK DISCHARGES          PEAK ELEVATIONS
            3.20                    3.150                  (RUNOFF)
            4.11                    3.742                  (RUNOFF)
            5.07                    4.139                  (RUNOFF)
           10.03                   26.851                  (RUNOFF)
           11.01                   26.987                  (RUNOFF)
           15.74                  352.450                  (RUNOFF)
           18.99                    8.197                  (RUNOFF)
           19.99                    8.197                  (RUNOFF)
           23.25                    7.523                  (RUNOFF)

  TIME                          HYDROGRAPH, TZERO=   1.00    DELTA T= 0.50    DRAINAGE AREA=   0.05
  1.00  DISCHG      0.00      1.04      2.03      2.28      3.08      3.00      3.71      3.44      4.12      3.74
  6.00  DISCHG      4.51     23.32     24.46     25.10     25.50     25.76     25.94     26.08     26.84     26.25
 11.00  DISCHG     26.98     26.36     27.43     85.53     86.39    103.52    103.79    129.62    130.49    327.82
 16.00  DISCHG    327.70    120.92    120.76     94.97     94.90      7.52      8.19      7.51      8.19      7.51
 21.00  DISCHG      7.51      7.51      7.51      7.51      7.51      7.51      7.47      0.00

        TOTAL WATER, IN INCHES ON DRAINAGE AREA=  31.5250      CFS-HRS=     1078.30      ACRE-FT=      89.11

SUBROUTINE RESVOR   STRUCTURE   1
        SURFACE ELEVATION=  808.70

        PEAK TIMES              PEAK DISCHARGES          PEAK ELEVATIONS
           13.60                  134.674                  812.88
           14.72                  136.107                  812.88
           15.84                  361.226                  813.07

  TIME                          HYDROGRAPH, TZERO=   1.00    DELTA T= 0.50    DRAINAGE AREA=   0.05
  1.00  DISCHG      0.00      0.01      0.07      0.14      0.23      0.33      0.44      0.55      0.67      0.79
  1.00  ELEV     808.70    808.70    808.72    808.75    808.79    808.83    808.87    808.92    808.96    809.01

  6.00  DISCHG      0.90      1.57      2.40      3.84      5.28      9.03      9.87     10.65     11.36     11.95
  6.00  ELEV     809.05    809.24    809.55    809.84    810.11    810.34    810.54    810.74    810.92    811.09

 11.00  DISCHG     12.52     13.03     13.49     14.82     25.10    131.26     88.86    131.65    129.02    298.73
 11.00  ELEV     811.26    811.42    811.57    812.03    812.71    812.87    812.81    812.87    812.87    813.02

 16.00  DISCHG    348.69    136.89    111.46    106.03     89.28     31.83     16.22     16.01     15.80     15.59
 16.00  ELEV     813.06    812.88    812.85    812.84    812.81    812.72    812.56    812.47    812.39    812.31

 21.00  DISCHG     15.36     15.14     14.93     14.72     14.51     14.31     14.09     13.75     13.29     12.85
 21.00  ELEV     812.23    812.15    812.07    811.99    811.91    811.84    811.77    811.65    811.51    811.36

 26.00  DISCHG     12.36     11.88     11.42     10.94     10.41      9.90      9.42      8.58      6.48      5.51
 26.00  ELEV     811.21    811.07    810.94    810.81    810.68    810.55    810.43    810.32    810.23    810.15

 31.00  DISCHG      5.14      4.80      4.47      4.17      3.89      3.64      3.40      3.18      2.98      2.78
 31.00  ELEV     810.08    810.02    809.96    809.90    809.85    809.80    809.75    809.71    809.66    809.63

 36.00  DISCHG      2.61      2.44      2.28      2.13      2.00      1.88      1.81      1.75      1.68      1.62
 36.00  ELEV     809.59    809.55    809.52    809.49    809.47    809.44    809.41    809.39    809.36    809.34

 41.00  DISCHG      1.57      1.51      1.46      1.40      1.35      1.31      1.26      1.21      1.17      1.13
 41.00  ELEV     809.32    809.29    809.27    809.25    809.23    809.21    809.19    809.18    809.16    809.14

 46.00  DISCHG      1.09      1.05      1.01      0.97      0.94      0.91      0.87      0.84      0.81      0.78
 46.00  ELEV     809.13    809.11    809.10    809.08    809.07    809.05    809.04    809.03    809.02    809.01

        TOTAL WATER, IN INCHES ON DRAINAGE AREA=  31.4664      CFS-HRS=     1076.29      ACRE-FT=      88.94

ENDCMP 1
```

PLATE D-8

EXECUTIVE CONTROL CARD OPERATION COMPUT. FROM XSECTN/STRUCT 0/ 1 TO XSECTN/STRUCT 0/ 1
STARTING TIME= 0.00 RAIN DEPTH= 0.50 RAIN DURATION= 1.00 RAIN TABLE NO.= 3 SOIL CONDITION= 3
ALTERNATE NO.= 1 STORM NO.= 1

SUBROUTINE RUNOFF STRUCTURE 1
AREA= 0.05 INPUT RUNOFF CURVE= 86.0 TIME OF CONCENTRATION= 0.12
COMPUTED CURVE NO. = 94.4

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
5.15	1.376	(RUNOFF)
10.09	12.878	(RUNOFF)
11.06	13.080	(RUNOFF)
15.75	176.462	(RUNOFF)
18.99	4.094	(RUNOFF)
20.00	4.094	(RUNOFF)
23.26	3.757	(RUNOFF)

HYDROGRAPH, TZERO= 3.50 DELTA T= 0.50 DRAINAGE AREA= 0.05

TIME											
3.50	DISCHG	0.00	1.07	1.07	1.36	1.28	1.61	9.28	10.42	11.14	11.63
8.50	DISCHG	11.96	12.21	12.40	12.06	12.66	13.07	12.82	13.38	42.00	42.63
13.50	DISCHG	51.26	51.51	64.45	64.96	163.47	163.56	60.37	60.30	47.43	47.40
18.50	DISCHG	3.75	4.09	3.75	4.09	3.75	3.75	3.75	3.75	3.75	3.75
23.50	DISCHG	3.75	3.73	0.00							

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 15.4624 CFS-HRS= 528.88 ACRE-FT= 43.70

SUBROUTINE RESVOR STRUCTURE 1
SURFACE ELEVATION= 808.70

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
15.76	174.083	812.91
17.41	56.287	812.76

HYDROGRAPH, TZERO= 3.50 DELTA T= 0.50 DRAINAGE AREA= 0.05

TIME											
3.50	DISCHG	0.00	0.01	0.05	0.09	0.14	0.18	0.37	0.71	1.07	1.44
3.50	ELEV	808.70	808.70	808.72	808.73	808.75	808.77	808.84	808.98	809.12	809.26
8.50	DISCHG	1.81	2.40	3.04	3.65	4.26	4.84	5.38	6.31	9.55	11.13
8.50	ELEV	809.41	809.55	809.68	809.80	809.92	810.02	810.13	810.22	810.47	810.86
13.50	DISCHG	12.53	13.85	15.17	16.47	162.02	164.57	81.28	49.68	55.99	43.04
13.50	ELEV	811.26	811.69	812.16	812.66	812.90	812.91	812.80	812.75	812.76	812.74
18.50	DISCHG	16.68	16.25	15.94	15.63	15.30	14.97	14.65	14.35	14.00	13.66
18.50	ELEV	812.70	812.57	812.45	812.32	812.20	812.08	811.97	811.85	811.74	811.63
23.50	DISCHG	13.33	13.02	12.62	12.13	11.66	11.20	10.68	10.16	9.67	9.20
23.50	ELEV	811.52	811.41	811.29	811.15	811.01	810.88	810.74	810.62	810.50	810.38
28.50	DISCHG	7.52	5.73	5.34	4.98	4.65	4.34	4.04	3.77	3.53	3.30
28.50	ELEV	810.28	810.19	810.12	810.05	809.99	809.93	809.88	809.83	809.78	809.73
33.50	DISCHG	3.09	2.89	2.70	2.53	2.37	2.21	2.07	1.94	1.85	1.78
33.50	ELEV	809.69	809.65	809.61	809.57	809.54	809.51	809.48	809.45	809.43	809.40
38.50	DISCHG	1.72	1.66	1.60	1.54	1.49	1.43	1.38	1.33	1.28	1.24
38.50	ELEV	809.38	809.35	809.33	809.31	809.28	809.26	809.24	809.22	809.20	809.19
43.50	DISCHG	1.19	1.15	1.11	1.07	1.03	0.99	0.96	0.92	0.89	0.86
43.50	ELEV	809.17	809.15	809.14	809.12	809.10	809.09	809.08	809.06	809.05	809.04
48.50	DISCHG	0.83	0.80	0.77	0.74	0.72	0.69	0.66	0.64	0.62	0.60
48.50	ELEV	809.02	809.01	809.00	808.99	808.98	808.97	808.96	808.95	808.94	808.93

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 14.9778 CFS-HRS= 512.31 ACRE-FT= 42.33

ENDCMP 1

END OF JOB TR20 RHW
BATCH JOB
JOB NUMBER 78/3095 PHASE 0
DATE RAN 9/27/78 QUEUE B24

PLATE D-9

HYDROLOGY PROGRAM FOR IBM 1130 - DATED JULY, 1968

MO DAM INSPECTION J.D. MACDONALD FULTON MO. LAC-PIETTE TR-20 ROUTING.

EXECUTIVE CONTROL CARD OPERATION LIST

MO DAM INSPECTION J.D. MACDONALD FULTON MO.

C TABLE VELOCITY INCREMENT = 0.200

8	0.0000	0.0800	0.1800	0.2500	0.3200
8	0.3700	0.4100	0.4500	0.4900	0.5100
8	0.5400	0.5700	0.5900	0.6100	0.6300
8	0.6500	0.6600	0.6700	0.6900	0.7000
8	0.7100	0.7200	0.7300	0.7400	0.7500
8	0.7600	0.7700	0.7700	0.7800	0.7900
8	0.7900	0.8000	0.8100	0.8100	0.8200
8	0.8200	0.8300	0.8300	0.8400	0.8400
8	0.8400	0.8500	0.8500	0.8600	0.8600
8	0.8600	0.8600	0.8700	0.8700	0.8700
8	0.8800	0.8800	0.8800	0.8900	0.8900
8	0.8900	0.8900	0.8900	0.8900	0.9000
8	0.9000	0.9000	0.9000	0.9000	0.9100
8	0.9100	0.9100	0.9100	0.9100	0.9100
8	0.9200	0.9200	0.9200	0.9200	0.9200
8	0.9200	0.9200	0.9200	0.9300	0.9300
9 ENDTBL					

STRUCTURE NO. 1

	ELEVATION	DISCHARGE	STORAGE
8	808.7000	0.0000	16.6499
8	809.4500	1.9000	18.8099
8	809.8250	3.7500	19.9599
8	810.2000	5.7500	21.1499
8	810.3500	9.0600	21.6399
8	810.8500	11.1000	23.3299
8	811.3500	12.8100	25.1099
8	811.8500	14.3300	26.9799
8	812.3500	15.6900	28.9399
8	812.7000	16.5700	30.3699
8	812.8701	122.1400	31.0799
8	812.9000	151.2300	31.2099
8	813.0400	314.7800	31.7999
8	813.0700	355.0600	31.9299
8	813.1000	397.0100	32.0599
8	813.2000	548.1000	32.4899
8	813.9500	2115.7402	35.8599
8	814.2000	2775.6303	37.0299
8	814.7000	4263.5908	39.4599
9 ENDTBL			

DIMENSIONLESS HYDROGRAPH - DELTA T =484.00

8	0.0000	0.0300	0.1000	0.1900	0.3100
8	0.4700	0.6600	0.8200	0.9300	0.9900
8	1.0000	0.9900	0.9300	0.8600	0.7800
8	0.6800	0.5600	0.4600	0.3900	0.3300
8	0.2800	0.2410	0.2070	0.1740	0.1470
8	0.1260	0.1070	0.0910	0.0770	0.0660
8	0.0550	0.0470	0.0400	0.0340	0.0290
8	0.0250	0.0210	0.0180	0.0150	0.0130
8	0.0110	0.0090	0.0080	0.0070	0.0060
8	0.0050	0.0040	0.0030	0.0020	0.0010
8	0.0000	0.0000	0.0000	0.0000	0.0000
9 ENDTBL					

RAINFALL TABLE NO. 1 TIME INCREMENT = 0.50

8	0.0000	0.0080	0.0170	0.0260	0.0350
8	0.0450	0.0550	0.0650	0.0760	0.0870
8	0.0990	0.1120	0.1250	0.1400	0.1560
8	0.1740	0.1940	0.2190	0.2540	0.3030
8	0.5150	0.5830	0.6240	0.6540	0.6820
8	0.7050	0.7270	0.7480	0.7670	0.7840
8	0.8000	0.8160	0.8300	0.8440	0.8570
8	0.8700	0.8820	0.8930	0.9050	0.9160
8	0.9260	0.9360	0.9460	0.9550	0.9650
8	0.9740	0.9830	0.9920	1.0000	1.0000
9 ENDTBL					

RAINFALL TABLE NO. 2 TIME INCREMENT = 0.02

PLATE D-10

```
8                0.0000    0.0100    0.0200    0.0200    0.0300
8                0.0400    0.0500    0.0600    0.0700    0.0800
8                0.1000    0.1100    0.1300    0.1400    0.1700
8                0.1900    0.2200    0.2700    0.3500    0.4400
8                0.5200    0.6000    0.6300    0.6600    0.6800
8                0.7000    0.7200    0.7400    0.7600    0.7700
8                0.7900    0.8000    0.8200    0.8300    0.8400
8                0.8500    0.8700    0.8800    0.8900    0.9000
8                0.9100    0.9200    0.9300    0.9400    0.9500
8                0.9567    0.9633    0.9700    0.9800    0.9900
8                1.0000    1.0000    1.0000    1.0000    1.0000
9 ENDTBL
```

RAINFALL TABLE NO. 3 TIME INCREMENT = 0.50

```
8                0.0000    0.0300    0.0600    0.0900    0.1200
8                0.1500    0.1800    0.2100    0.2400    0.2700
8                0.3000    0.3300    0.3600    0.4400    0.5200
8                0.6000    0.6800    0.7600    0.8500    0.9300
8                1.0200    1.1000    1.1900    1.2700    1.3600
8                1.6300    1.9000    2.2200    2.5500    2.9500
8                3.3600    4.3800    5.4100    5.7900    6.1700
8                6.4600    6.7600    6.8000    6.8500    6.8900
8                6.9400    6.9800    7.0300    7.0700    7.1200
8                7.1600    7.2100    7.2500    7.3000    7.3000
9 ENDTBL
```

PLATE D-11

STANDARD CONTROL INSTRUCTIONS

SUBRTN	XSECTN	STRCT	HYDROGRAPHS IN1	IN2	OUT	DATA NO. 1	DATA NO. 2	DATA NO. 3	OUTPUT OPTIONS PK	H	E	V	PH	SM
RUNOFF	0	1	0	0	6	0.053	86.000	0.120	1	1	0	1	0	0
RESVOR	0	1	6	0	7	808.700	0.000	0.000	1	1	1	1	0	0
ENDATA														

END OF LISTING

PLATE D-12

EXECUTIVE CONTROL CARD OPERATION INCREM, MAIN TIME INCREMENT= 0.50
EXECUTIVE CONTROL CARD OPERATION COMPUT, FROM XSECTN/STRUCT 0/ 1 TO XSECTN/STRUCT 0/ 1
STARTING TIME= 0.00 RAIN DEPTH= 1.00 RAIN DURATION= 1.00 RAIN TABLE NO.= 3 SOIL CONDITION= 3
ALTERNATE NO.= 1 STORM NO.= 1

SUBROUTINE RUNOFF STRUCTURE 1
AREA= 0.05 INPUT RUNOFF CURVE= 86.0 TIME OF CONCENTRATION= 0.12
COMPUTED CURVE NO. = 94.4

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.06	4.891	(RUNOFF)
10.04	5.163	(RUNOFF)
11.03	5.353	(RUNOFF)
15.75	74.604	(RUNOFF)
17.76	22.312	(RUNOFF)
20.00	3.391	(RUNOFF)
20.99	3.394	(RUNOFF)
22.00	3.391	(RUNOFF)
23.00	3.395	(RUNOFF)
23.83	3.609	(RUNOFF)

HYDROGRAPH, TZERO= 5.50 DELTA T= 0.50 DRAINAGE AREA= 0.05

TIME											
5.50	DISCHG	0.00	1.01	3.08	3.46	3.75	3.98	4.17	4.88	4.47	5.15
10.50	DISCHG	4.68	5.35	4.82	5.56	16.91	17.25	20.76	21.68	26.48	27.49
15.50	DISCHG	68.59	69.45	25.73	25.72	19.67	20.35	2.72	3.39	2.71	3.39
20.50	DISCHG	2.72	3.39	2.72	3.39	2.72	3.39	2.72	3.37	0.00	

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 6.6554 CFS-HRS= 227.64 ACRE-FT= 18.81

SUBROUTINE RESVOR STRUCTURE 1
SURFACE ELEVATION= 808.70

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
19.02	15.347	812.22

HYDROGRAPH, TZERO= 5.50 DELTA T= 0.50 DRAINAGE AREA= 0.05

TIME											
5.50	DISCHG	0.00	0.01	0.09	0.20	0.32	0.45	0.58	0.72	0.86	1.00
5.50	ELEV	808.70	808.70	808.73	808.78	808.82	808.87	808.92	808.98	809.04	809.09
10.50	DISCHG	1.14	1.28	1.41	1.55	1.89	2.87	3.92	5.08	7.96	9.76
10.50	ELEV	809.15	809.20	809.26	809.31	809.44	809.64	809.85	810.07	810.30	810.52
15.50	DISCHG	11.52	13.61	14.68	14.99	15.21	15.34	15.24	14.89	14.56	14.21
15.50	ELEV	810.97	811.61	811.97	812.09	812.17	812.22	812.18	812.05	811.93	811.81
20.50	DISCHG	13.85	13.49	13.14	12.81	12.43	12.07	11.72	11.38	10.98	10.44
20.50	ELEV	811.69	811.57	811.46	811.35	811.24	811.13	811.03	810.93	810.82	810.69
25.50	DISCHG	9.94	9.45	8.74	6.59	5.53	5.16	4.82	4.49	4.19	3.91
25.50	ELEV	810.56	810.44	810.33	810.23	810.16	810.09	810.02	809.96	809.90	809.85
30.50	DISCHG	3.65	3.42	3.20	2.99	2.80	2.62	2.45	2.29	2.14	2.00
30.50	ELEV	809.80	809.75	809.71	809.67	809.63	809.59	809.56	809.53	809.50	809.47
35.50	DISCHG	1.88	1.82	1.75	1.69	1.63	1.57	1.51	1.46	1.41	1.36
35.50	ELEV	809.44	809.41	809.39	809.36	809.34	809.32	809.29	809.27	809.25	809.23
40.50	DISCHG	1.31	1.26	1.22	1.17	1.13	1.09	1.05	1.01	0.98	0.94
40.50	ELEV	809.21	809.19	809.18	809.16	809.14	809.13	809.11	809.10	809.08	809.07
45.50	DISCHG	0.91	0.88	0.84	0.81	0.78	0.76	0.73	0.70	0.68	0.65
45.50	ELEV	809.06	809.04	809.03	809.02	809.01	809.00	808.98	808.97	808.96	808.95
50.50	DISCHG	0.63	0.61	0.59	0.56	0.54	0.52	0.51	0.49	0.47	0.45
50.50	ELEV	808.95	808.94	808.93	808.92	808.91	808.90	808.90	808.89	808.88	808.88

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 6.4079 CFS-HRS= 219.18 ACRE-FT= 18.11

ENDCMP 1

END OF JOB TR20 R&W

BATCH JOB

JOB NUMBER 7X/5015 PHASE 0

Rainfall
7.3000
6.6554

PLATE D-13


DAT
ILM