

AD-A142 830

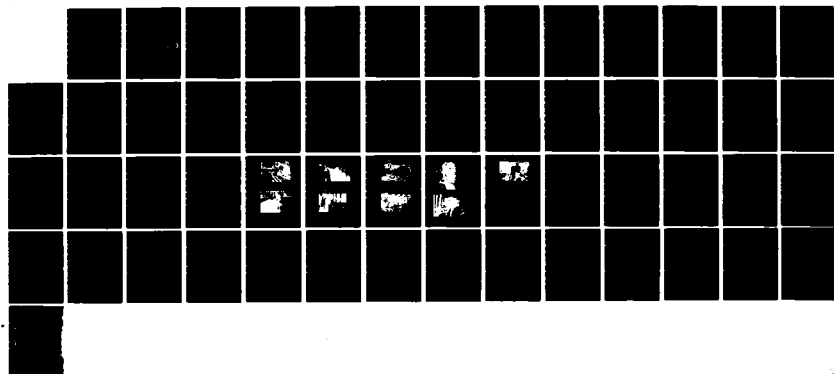
NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS
SUCCESS LAKE DAM (CT.) (U) CORPS OF ENGINEERS WALTHAM MA
NEW ENGLAND DIV MAY 81

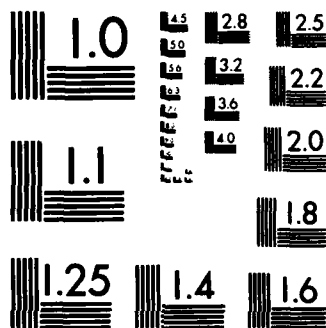
1/1

UNCLASSIFIED

F/G 13/13

NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER CT 00079	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Success Lake Dam Conn. Coastal Basin, Bridgeport, Conn. NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS		5. TYPE OF REPORT & PERIOD COVERED INSPECTION REPORT
7. AUTHOR(s) U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS DEPT. OF THE ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION, NEDED 424 TRAPELO ROAD, WALTHAM, MA. 02254		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		12. REPORT DATE May 1981
		13. NUMBER OF PAGES 50
		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) APPROVAL FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) DAMS, INSPECTION, DAM SAFETY, Success Lake Dam Conn. Coastal Basin Bridgeport, Conn.		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The Success Lake Dam, constructed in 1875, is a 132 ft. long, 17 ft. high structure composed of two earthfill embankments and a central 33 ft. long broad crested spillway. The original timber spillway decking has since been capped with concrete. There is a small single land bridge, across the overflow spillway section. Flow over the spillway is channeled through five 4 ft. wide, 2 ft. high openings, and one 3.3 ft. wide, 2 ft. high, opening formed by the bridge piers. The upstream concrete face of the spillway has a slope of approx. 2H:1V and the masonry downstream face is vertical.		

AD-A142 830

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A

SUCCESS LAKE DAM

CT 00079

CONNECTICUT COASTAL BASIN

BRIDGEPORT, CONNECTICUT

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

MAY 1981



Report For	☒
1. FBI	☐
2. State	☐
3. Local	☐
4. Other	
5. Distribution	
6. Comments	
7. Action/	
8. Responsibility Codes	
9. Agent and/or	
10. Special	

A1

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CONSULTING
ENGINEERS

INTERNATIONAL ENGINEERING COMPANY, INC.
A MORRISON-KNUDSEN COMPANY

EASTERN DISTRICT OFFICE
777 POST ROAD DAREN, CONNECTICUT 06620
PHONE (203) 655-3345

11410
2616-110

May 7, 1981

Mr. E. P. Gould
Project Management Branch
Department of the Army
New England Division
Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Reference: Contract No. DACW33-81-C-0015
Inspection and Evaluation of Non-Federal Dams
FY-81, Southwestern Connecticut

Dear Mr. Gould:

The inspection of Success Lake Dam and subsequent hydrologic-hydraulic investigation revealed that the dam should be classified as having a low hazard potential. The following is an abbreviated Phase I Inspection report to substantiate this classification.

Sincerely,



Reynold A. Hokenson, P. E.
Project Manager

RAH:mem

Enclosures

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DAM INSPECTION PROGRAM

PHASE I INSPECTION REPORT

Identification No: CT 00079

Name of Dam: Success Lake Dam

Town: Bridgeport

County and State: Fairfield, Connecticut

Stream: Yellow Mill Channel

Dates of Inspection: February 5 and 19, 1981

BRIEF ASSESSMENT

The Success Lake Dam impounds Success Lake on the Yellow Mill Channel tributary in Bridgeport, Fairfield County, Connecticut. The structure is currently owned by Remington Arms Company, Inc., 939 Barnum Avenue, Bridgeport, Connecticut. The operation of the facility is the responsibility of Robert H. Gruss, Plant Engineer, Remington Arms Co., Inc., (203) 333-1112. Currently, the impoundment is maintained for aesthetics and wildlife conservation.

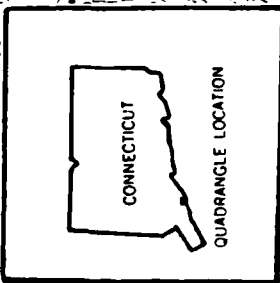
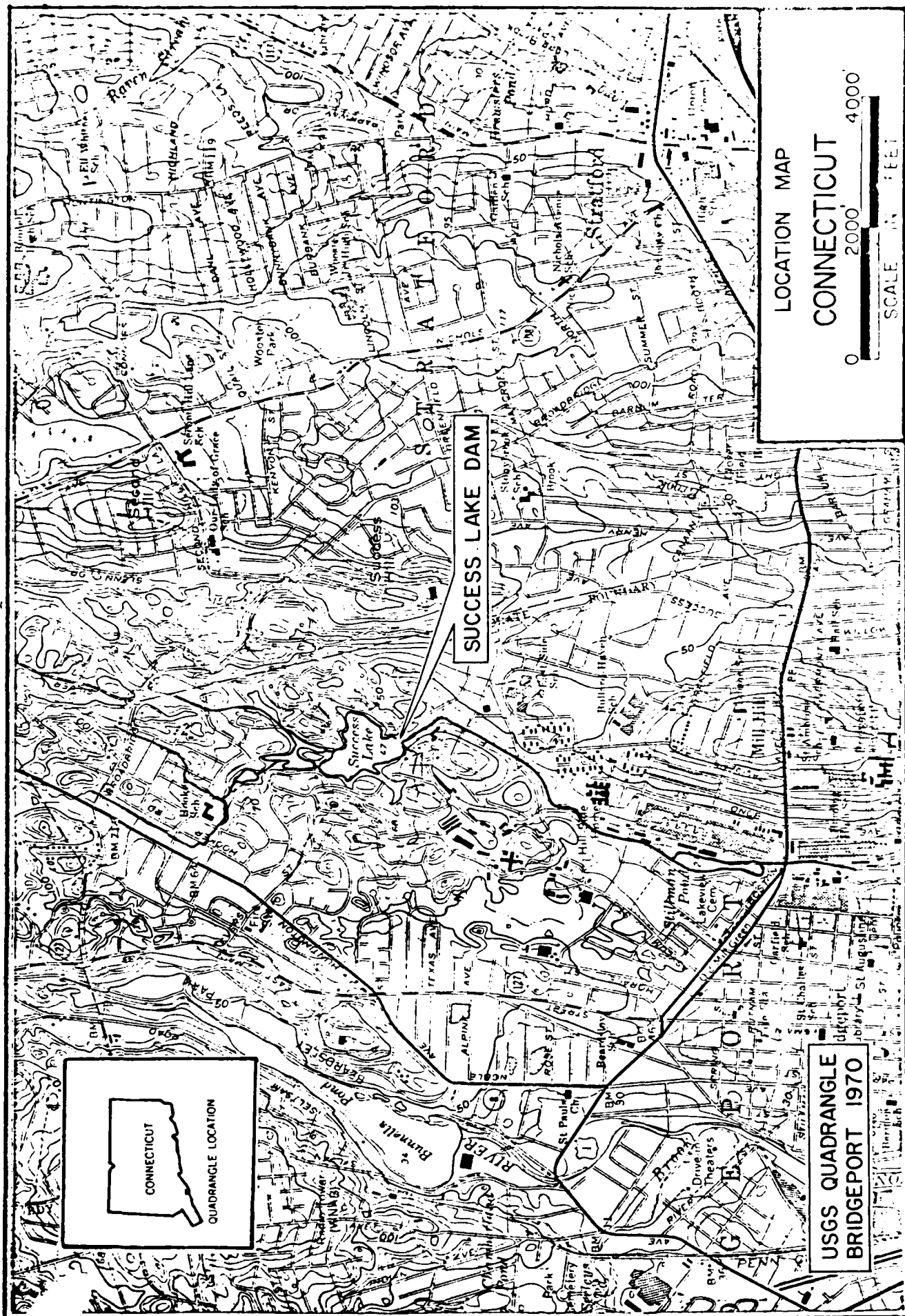
The Success Lake Dam, constructed in 1875, is a 132-foot-long, 17-foot-high structure composed of two earthfill embankments and a central 33-foot-long broad crested spillway. The original timber spillway decking has since been capped with concrete. There is a small single land bridge, across the overflow spillway section (Photo 1). Flow over the spillway is channeled through five 4-foot-wide, 2-foot-high openings, and one 3.3-foot-wide, 2-foot-high, opening formed by the bridge piers. The upstream concrete face of the spillway has a slope of approximately 2H:1V and the masonry downstream face is vertical. The downstream slopes of the two-side embankments are formed by vertical stone retaining walls. The upstream slopes also appeared to be vertical stone retaining walls, however, these areas were, for the most part, concealed beneath the water surface and accumulated sediments (Photos 2 and 3).

Two cast iron conduits pass through the earthfill embankment at the right abutment of the dam and provide additional outlets from the impoundment. A 14 inch diameter conduit exits the dam near its base approximately 12 feet from the right side of the spillway. Discharges from this conduit are regulated by a hand operated valve which is housed in a small masonry structure (Photo 9). The second conduit is 8 inches in diameter and emerges from the right embankment, approximately 5 feet below the top of the dam and about 25 feet from the spillway (Photo 7). This conduit extends 126 feet downstream to a small brick structure where, at one time, it provided water for the generation of steam (Photo 8). The brick structure formerly housed equipment for the generation and distribution of steam to the various industrial processes that were performed by Remington Arms Company, Inc., in the 1940's. This equipment was removed from the site and the building was converted to an employee locker room. The 8-inch conduit leading to this building, though deteriorated, is still intact.

Visual inspection of the site indicated that the dam is in poor condition. The inspection revealed the following: deterioration of the vertical downstream face of the spillway, cracked and missing portions of the concrete spillway crest along the downstream edge (Photo 4), cracks along the upstream and downstream interfaces of the spillway and abutments, exposed aggregate on the concrete spillway cap, seepage along the toe of the left embankment has resulted in a 20-foot by 30-foot marshy area approximately 40 feet from the dam, and a potentially inoperable low-level outlet. The seepage beneath the spillway, described in the inspection report submitted by William P. Sanders of the State of Connecticut Water Resource Commission on July 22, 1964 (see Correspondence), was not confirmed during the inspections conducted by IECO on February 2 and 19, 1981. During these inspections, an accumulation of rocks at the base of the spillway, ice formations on the downstream face of the spillway and particularly water flowing over the spillway made it impossible to examine this portion of the dam closely (Photos 5 and 6). Water was observed draining vertically through cracks in the concrete cap near the left upstream spillway abutment, but no corresponding of discharge was noted on the downstream

face of the spillway. In addition, localized outward movement of the stone retaining wall and the concrete spillway cap were also found in the vicinity of the left spillway abutment. The effected area is approximately 7 feet wide, but the movement has been slight and is a local condition not threatening the dam.

The Success Lake Dam has a maximum potential storage capacity of 119 acre-feet (ac-ft) and is approximately 17 feet in height. Since the dam falls within the Corp's criteria for the small size category based on storage (between 50 and 1,000 ac-ft), the dam is considered to be SMALL in size. The dam breach analysis was conducted in accordance with the "Rule of Thumb Guidance for Estimating Downstream Dam Failure Hydrographs", dated April 1978, and the potential impact area was defined. Failure of the dam would cause the water surface within the streambed immediately downstream of the dam to rise from 4.7 feet at a prefailure outflow of 310 cfs to 11.1 feet at an outflow of 2,360 cfs. The first floor of the brick structure located approximately 130 feet downstream from the dam is more than 20 feet above the streambed, and this will not be effected by the flood wave. The only remaining other structures adjacent to the Yellow Mill Channel are located 3,500 feet downstream from the dam. These will sustain little or no damage since the water surface within this reach will rise only 1.8 feet above the streambed. Since failure of the dam will cause little or no property damage and no loss of life, the dam has been classified as having a LOW hazard potential.



LOCATION MAP

CONNECTICUT

0 2000' 4000'

SCALE IN FEET

USGS QUADRANGLE
BRIDGEPORT 1970

APPENDIX A

INSPECTION CHECKLIST

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT Success Lake Dam

DATE 02/5 & 19/81

TIME 10:00 a.m.

WEATHER Sunny, Cold

W.S. ELEV. 47.1

PARTY:

INITIALS:

1. Jeffrey T. Klaucke	JK
2. Myron B. Petrovsky	MP
3. Ernst H. Buggisch	EB
4. Paul Archer	PA
5. Harold Farnham	HF (Matthews Associates)

PROJECT FEATURE:

INSPECTED BY:

1. Dam	JK, MP, EB, PA
2. Intake Channel	JK, MP
3. Valvehouse	JK, HF, MP
4. Powerhouse Conduit	HF, JK, MP
5. Low Level Outlet	HF, JK, MP
6. Low level Outlet Channel	JK, MP, EB, PA
7. Spillway	JK, MP, EB
8. Bridge	JK, PA, EB

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam

DATE: 02/5 & 19/81

PROJECT FEATURE: Dam

NAME: JK, MP, EB, PA

AREA EVALUATED	CONDITION
<u>DAM EMBANKMENT</u>	
Crest Elevation	47.0
Current Pool Elevation	47.1
Maximum Impoundment to Date	Approximately 50.0
Surface Cracks	None
Pavement Condition	Good
Movement or Settlement of Crest	None
Lateral Movement	Local movement on upstream face near left spillway abutment.
Vertical Alignment	Good
Horizontal Alignment	Good
Condition at Abutment and at Concrete Structures	Cracks along U/S and D/S interfaces with spillway.
Indications of Movement of Structural Items on Slopes	Minor bulging of U/S and D/S retaining walls.
Trespassing on Slopes	None.
Sloughing or Erosion	None
Rock Slope Protection	The exposed U/S walls were irregular and missing stones.
Unusual Movement or Cracking at or near Toes	None
Unusual Embankment or Downstream Seepage	Wet area at D/S toe on the left bank. Seepage noted through valvehouse.
Piping or Boils	Possible piping along low level outlet conduit.

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam

DATE: 02/5 & 19/81

PROJECT FEATURE: Dam (Continued)

NAME: JK, MF, EB, PA

AREA EVALUATED	CONDITION
Foundation Drainage Features	Unknown
Toe Drains	Unknown
Instrumentation System	None

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam

DATE: 02/5 & 19/81

PROJECT FEATURE: Intake Channel

NAME: JK, MP

AREA EVALUATED	CONDITION
<u>OUTLETS WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE</u>	
a. Approach Channel	Success Lake
Slope Conditions	
Bottom Conditions	
Rock Slides or Falls	
Log Boom	
Debris	
Condition of Concrete Lining	
Drains or Weep Holes	
b. Intake Structure	No structure visible above current pool level.
Condition of Concrete	
Stop Logs and Slots	

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam

DATE: 02/5 & 19/81

PROJECT FEATURE: Valvehouse

NAME: JK, HF, MP

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - CONTROL TOWER</u>	
a. Concrete and Structural	
General Condition	Fair, wooden roof rotted.
Condition of Joints	Good
Spalling	None
Visible Reinforcing	None
Rusting or Staining of Concrete	Near crack in valvehouse wall
Any Seepage or Efflorescence	Seepage noted through crack in valvehouse wall.
Joint Alignment	Good
Unusual Seepage or Leaks in Gate Chamber	None
Cracks	Right wall of valvehouse
Rusting or Corrosion of Steel	Exposed portion of low level outlet conduit.
b. Mechanical and Electrical	
Air Vents	
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	
Mechanical Valve	Not tested at owner's request
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System	

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam

DATE: 02/5 & 19/81

PROJECT FEATURE: Low level Outlet

NAME: HF, JK, MP

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - TRANSITION AND CONDUIT</u>	
General Condition of Conduit	Fair
Rust or Staining on Conduit	Superficial rust on exposed conduit.
Spalling	N/A
Erosion or Cavitation	None
Cracking	None
Alignment of Monoliths	N/A
Alignment of Joints	N/A
Numbering of Monoliths	N/A
	<u>Note:</u> Only a small portion of the cast iron conduit (approximately 8 in.) was visible.

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam

DATE: 02/5 & 19/81

PROJECT FEATURE: Low Level Outlet Channel

NAME: JK, MP, EB, PA

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL</u>	
General Condition of Concrete	N/A
Rust or Staining	
Spalling	
Erosion or Cavitation	
Visible Reinforcing	
Any Seepage or Efflorescence	
Condition at Joints	
Drain holes	
Channel	
Loose Rock or Trees Overhanging Channel	Large rocks and 5 to 20 in. diameter trees were found immediately D/S of the outlet and adjacent to the spillway discharge channel.
Condition of Discharge Channel	Large rocks have accumulated on the channel floor.

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam

DATE: 02/5 & 19/81

PROJECT FEATURE: Spillway

NAME: JK, HF, EB

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS</u>	
a. Approach Channel	Success Lake
General Condition	
Loose Rock Overhanging Channel	
Trees Overhanging Channel	
Floor of Approach Channel	
b. Weir and Training Walls	
General Condition of Masonry	Loose stones in retaining walls, some stones missing and wall movements noted near spillway.
Rust or Staining	None
Spalling of spillway concrete cap	Near downstream edge of spillway weir.
Any Visible Reinforcing	None
Any Seepage	Some vertical drainage into dam through cracks in the spillway cap.
Drain Holes	None
c. Discharge Channel	
General Condition	Fair
Loose Rock Overhanging Channel	Loose rocks from downstream walls of spillway have accumulated in discharge channel.
Trees Overhanging Channel	Large tree on right bank between valvehouse and spillway.
Floor of Channel	Strewn with large rocks.
Other Obstructions	None

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam

DATE: 02/5 & 19/81

PROJECT FEATURE: Bridge

NAME: JK, PA, EB

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - BRIDGE</u>	
a. Super Structure	N/A
Bearings	
Anchor Bolts	N/A
Bridge Seat	N/A
Longitudinal Members	N/A
Under Side of Deck	Good
Secondary Bracing	None
Deck	Good
Drainage System	All 3 inch diameter drains in curbs were free of obstructions.
Railings	Good
Expansion Joints	None
Paint	N/A
b. Piers	
General Condition of Concrete	Good
Alignment of Abutment	
Approach to Bridge	
Condition of Seat & Backwall	
	<u>Note:</u> The bridge is supported 2 feet above the spillway by 4 concrete piers that are founded on the spillway.

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam

DATE: 02/5 & 19/81

PROJECT FEATURE: Powerhouse Conduit

NAME: JK, HF, MP

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - CONTROL TOWER</u>	
a. Concrete and Structural	
General Condition	N/A
Condition of Joints	
Spalling	
Visible Reinforcing	
Rusting or Staining of Concrete	
Any Seepage or Efflorescence	
Joint Alignment	
Unusual Seepage or Leaks in Gate Chamber	
Cracks	
Rusting or Corrosion of Steel	
b. Mechanical and Electrical	
Air Vents	
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	
Mechanical Valve	Valve inoperable, conduit has not been used since the 1940's.
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System	

APPENDIX B

ENGINEERING DATA

SUMMARY OF DATA AND CORRESPONDENCE

<u>DATE</u>	<u>TO</u>	<u>FROM</u>	<u>SUBJECT</u>	<u>PAGE</u>
6/7/66	Mr. W.H. O'Brien III Water Resources Commission State of Connecticut	Joseph W. Cone Civil Engineer	Water Resources Inventory Data	B-2
			Inspection	B-3
10/9/64	State of Connecticut Water Resources Commission	J. P. Barry Works Engineer Remington Arms Company, Inc.	Verification upon completion of suggested repairs	B-6
7/22/64	H.M. Pierce Jr. Plant Manager Remington Arms Company, Inc.	William P. Sander Engineer-Geologist State of Connecticut	Suggested spillway repairs	B-7
			COE Inventory Data	B-8

No. _____

WATER RESOURCES UNIT
SUPERVISION OF DAMS
INVENTORY DATA

Inventoried
By _____

Lat: 41° 12.3'

Long: 73° 9.9'

Date _____

Name of Dam or Pond SUCCESS LAKE

Code No. _____

Nearest Street Location Huntington Turnpike

Town Bridgeport

U.S.G.S. Quad. Bridgeport

Name of Stream Unnamed

Owner Remington Arms Company, Inc.

Address Barnum Avenue

Bridgeport, CT

Pond Used For Fire Protection Drainage Area 2.43 sq. mi.

Dimensions of Pond: Width 700' Length 1100' Area 18.3 ac.

Total Length of Dam 125' Length of Spillway 35'

Location of Spillway Center of dam

Height of Pond Above Stream Bed 15'

Height of Embankment Above Spillway 3'

Type of Spillway Construction Concrete cap

Type of Dike Construction Masonry

Downstream Conditions Bridgeport

Summary of File Data _____

Remarks _____

Would Failure Cause Damage? _____ Class _____

JOSEPH W. CONE
CIVIL ENGINEER
124 HAYEMEYER PLACE
GREENWICH, CONNECTICUT
06830

June 7, 1966

TELEPHONE
STATE TOWNSEND 9-2152
COMMISSION
RECEIVED
JUN 10 1966
ANSWERED.....
REFERRED.....
FILED.....

Mr. William H. O'Brien III
Water Resources Commission
State Office Building
Hartford 15, Conn.

Re: Dam #46 Stillman Pond-Bdpt.
AND SUCCESS LAKE DAM

Dear Mr. O'Brien:

As requested, I have inspected the Stillman Pond Dam and the tributary watershed. Also permission was obtained from Remington Arms office to inspect Success Lake Dam, being escorted by one of their guards, since the condition of this dam is involved with Stillman.

	Success	Stillman
Watershed	2.28 sq.mi.	3.44 sq. mi.
Peak Q pres 100 yr	1250 cfs	1890 cfs
" " 2000 AD 400 yr	4370 "	5130 "

Both dams are solidly constructed and, in my opinion, will not fail but both will be overtopped in the future. Both have very low headroom, Success 6 openings averaging 4'x2'; openings were not measured at Stillman, it was evident that dam is safe although it will be overtopped.

Tracks serving the G.E. Plant will be flooded in the future during a severe storm due to channel of inadequate capacity.

Copies of work sheets, three photos and map of watersheds are enclosed. See Lake Forest for more applicable data.

My recommendation is that your office suggest to Remington Arms and General Electric that there be a standing order that their maintenance men see to it that openings at dams be kept clear of debris during heavy storms, this to reduce frequency of overtopping.

Very truly yours,


J. W. Cone

JWC/dr
Enc: 6

Forest & Forests

FOREST 12.5 Ac — 1.45 sp. mi. — 1.2

(Chart 3) Q present = 850 cfs. (Chart 1950) 1.08

Entire stand developing rapidly. Rolling terrain.

Q present 25yr = $RF \times LF \times FF \times Q$ cfs/Ac

" 100 yr = $1 \times 0.8 \times 1.8 \times 850 = 1220$ 1.32

" 400 yr = $1 \times 0.8 \times 3.8 \times 850 = 2530$ 2.8

" 2000 AD " = $1 \times 1.0 \times 3.8 \times 850 = 3240$ 3.5

Compare 3240 with 1955 Floods. 1.5 sp. mi. on $Q = 5050 \text{ JA} = 4150 \text{ P/A}$
= 6000 in 1945

SUCCESS 14.60 Ac — 2.28 sp. mi

Entire area developing rapidly except 132 Ac. owned by R. L. Brown. Rolling terrain rather flat.

Chart B $Q = 1150$ cfs (Chart 695)

Q present 25yr = $RF \times LF \times FF \times Q$
= $1 \times 0.6 \times 1 \times 1150 = 690$ cfs. 0.97

" 100 = $1 \times 0.6 \times 1.8 \times 1150 = 1250$ 1.05

" 400 = $1 \times 0.6 \times 3.8 \times 1150 = 2620$ 1.8

2000 AD " = $1 \times 1.0 \times 3.8 \times 1150 = 4370$ 3.0

Provided R. L. Brown Controls 1639c area.

STILL MORE 2200 Ac. Chart B $Q = 1500$ (Chart 455)
3 A4.59 mi.

Q present 25yr = $RF \times LF \times FF \times Q$
= $1 \times 0.7 \times 1 \times 1500 = 1050$ 0.48 cfs/Ac

" 100 = $1 \times 0.7 \times 1.8 \times 1500 = 1890$ 0.86

" 400 = $1 \times 0.7 \times 3.8 \times 1500 = 4000$ 1.8

2000 AD " = $1 \times 0.9 \times 3.8 \times 1500 = 5130$ 2.3

Provided R. L. Brown & G. L. do not fence 330 Ac.

(A)

J. D. L.
5/13/51

Forest #25

5/4/66
5/3/66

Lake Forest #25

580
21.55
5775

Water shed
Catchment area
1043 sq mi
925 Ac

Lake Forest
5.42
2.52
41.42
105 sq mi
5 Ac

Long Point Forest
1.05 sq mi
105 Ac

Storage Ratio 1:14

Fair

Lake Forest Success area Stillman

Water shed

Lake Forest

913
2115.24
419.12
2.28 sq mi
1460 Ac

018
310.46
4153
0.38 sq mi
24 Ac

Long Point Forest
1.05 sq mi
105 Ac
205 sq mi 132 Ac

Storage Ratio 1:61 Very Poor

Stillman Pond below Success

Water shed

Lake Forest

4.70

0.06

1.05 sq mi

2.52 sq mi

750 Ac

105 sq mi

Divided by Bear River
to G.E. trib to
Stillman including
trib to Success

412.05
515 320 Ac

Storage Ratio 1:83 Very Bad practically 0

TOTAL Stillman #46 (includes Success)

Water shed

Lake Forest

Long Point Forest
1.05 sq mi
105 Ac

13.76
27.55
4113.77
3.44 sq mi

Success 24 Ac

Stillman 9

Total 33 Ac

2200 Ac
1460
750
2210 Chieff

Total Storage Ratio 1:67 Very poor

Remington



REMINGTON ARMS COMPANY, INC.

PETERS

MANUFACTURERS OF
SPORTING FIREARMS, AMMUNITION

TRAPS

TARGETS

ARMS AND CARTRIDGE POWERED TOOLS
ILLION, N. Y.

AMMUNITION, BRIDGEPORT, CONN.
POWER TOOLS, PARK FOREST, ILL.

POWER TOOLS

BRIDGEPORT 2, CONNECTICUT

PETERS CARTRIDGE DIVISION
BRIDGEPORT, CONN.
TRAPS AND TARGETS, FINDLAY, OHIO
CABLE - HARTLEY, BRIDGEPORT
- ALL CODES -

October 9, 1964

SUCCESS LAKE DAM
BRIDGEPORT

State of Connecticut
Water Resources Commission
State Office Building
Hartford 15, Connecticut

Attention Mr. William P. Sander, Engineer-Geologist

Gentlemen:

Reference - Your letter of July 22, 1964

The leakage under the spillway is a condition we are aware of and have been checking periodically. There is no apparent increase in the water flow over the past ten years and we, therefore, feel this is not a condition to cause concern. The massive construction of this dam should be adequate if the leaks do not become larger, or general deterioration set in.

We have a periodic inspection set up whereby the quantity of water leaking is measured and checked against previous findings. Any increase will be readily recognized and prompt remedial action will be taken.

The trees specified in your report have been removed.

Very truly yours,

REMINGTON ARMS COMPANY, INC.
H.M. PIERCE, JR., WORKS MANAGER

J. P. Barry
J. P. Barry
Works Engineer

JPB:O'L

STATE WATER RESOURCES COMMISSION RECEIVED OCT 13 1964 ANSWERED _____ REFERRED _____ FILED _____

B-6

July 22, 1964

Mr. H. M. Pierce, Jr., Plant Manager
Remington Arms Company, Inc.
Barnum Avenue
Bridgeport, Connecticut

Dear Sir:

The Water Resources Commission has recently completed an inventory of all the dams in the Town of Bridgeport.

During the inventory, the dam forming Success Lake was inspected and was found to be in need of repair. At the date of the inspection, all stream flow was through leakage under the spillway. In addition, the trees which are growing on the dam should be removed. These points are not critical at the present time but represent a condition which could lead to failure of the dam.

We would appreciate hearing what plans you have to place this structure in a safe condition.

Very truly yours,

William P. Sander
Engineer - Geologist

WPS:js

APPENDIX C

PHOTOGRAPHS

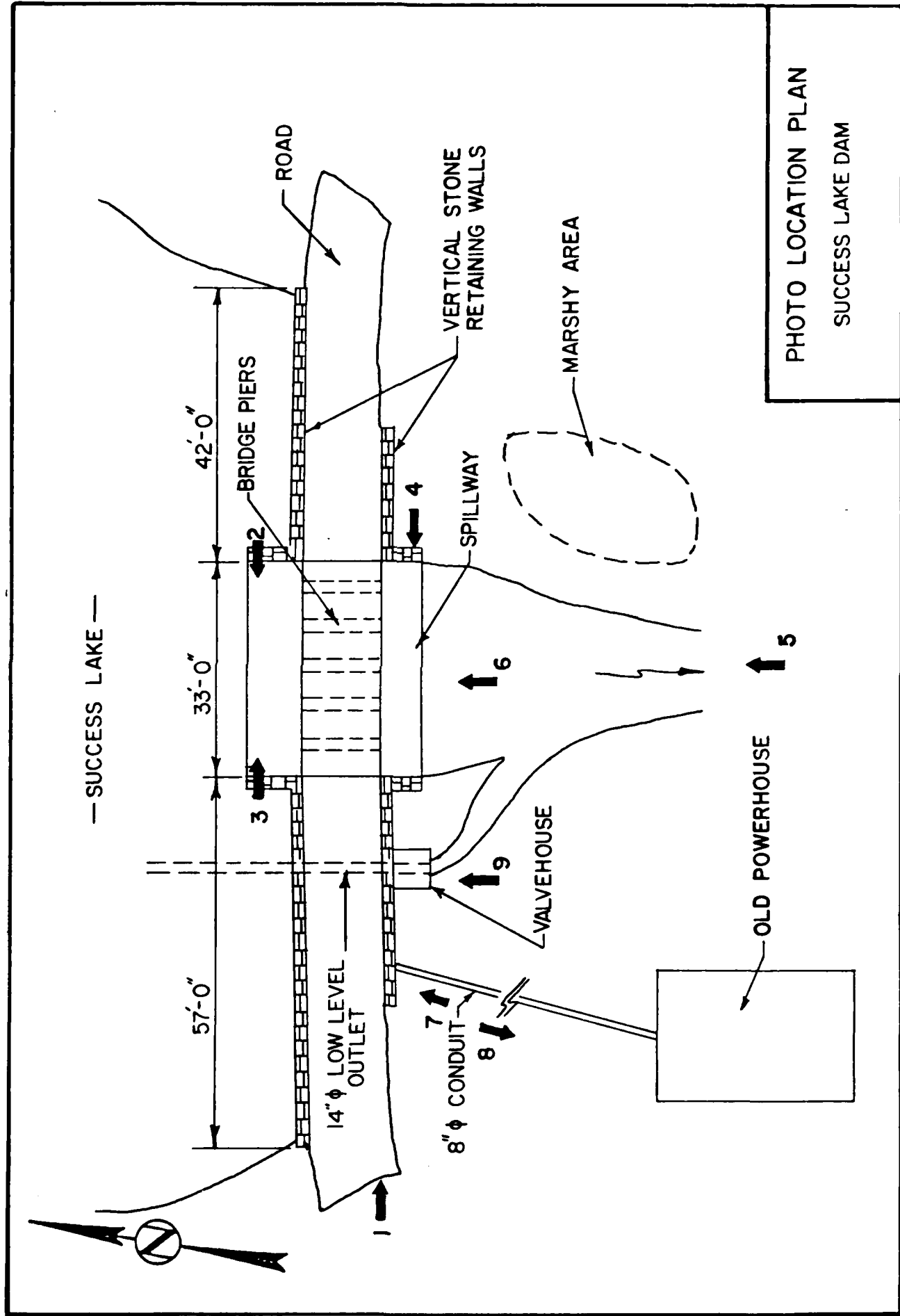


PHOTO LOCATION PLAN
SUCCESS LAKE DAM



Photo 1 Top of dam and single lane road.



Photo 2 Upstream face of dam, spillway crest and right dam embankment.



Photo 3 Upstream face of dam, spillway crest and left dam embankment.



Photo 4 Downstream spillway crest and bridge piers.



Photo 5 Downstream face of dam.



Photo 6 Downstream masonry face of spillway.



Photo 7 Downstream masonry face
of right dam embankment,
8 inch diameter conduit
and control valve.



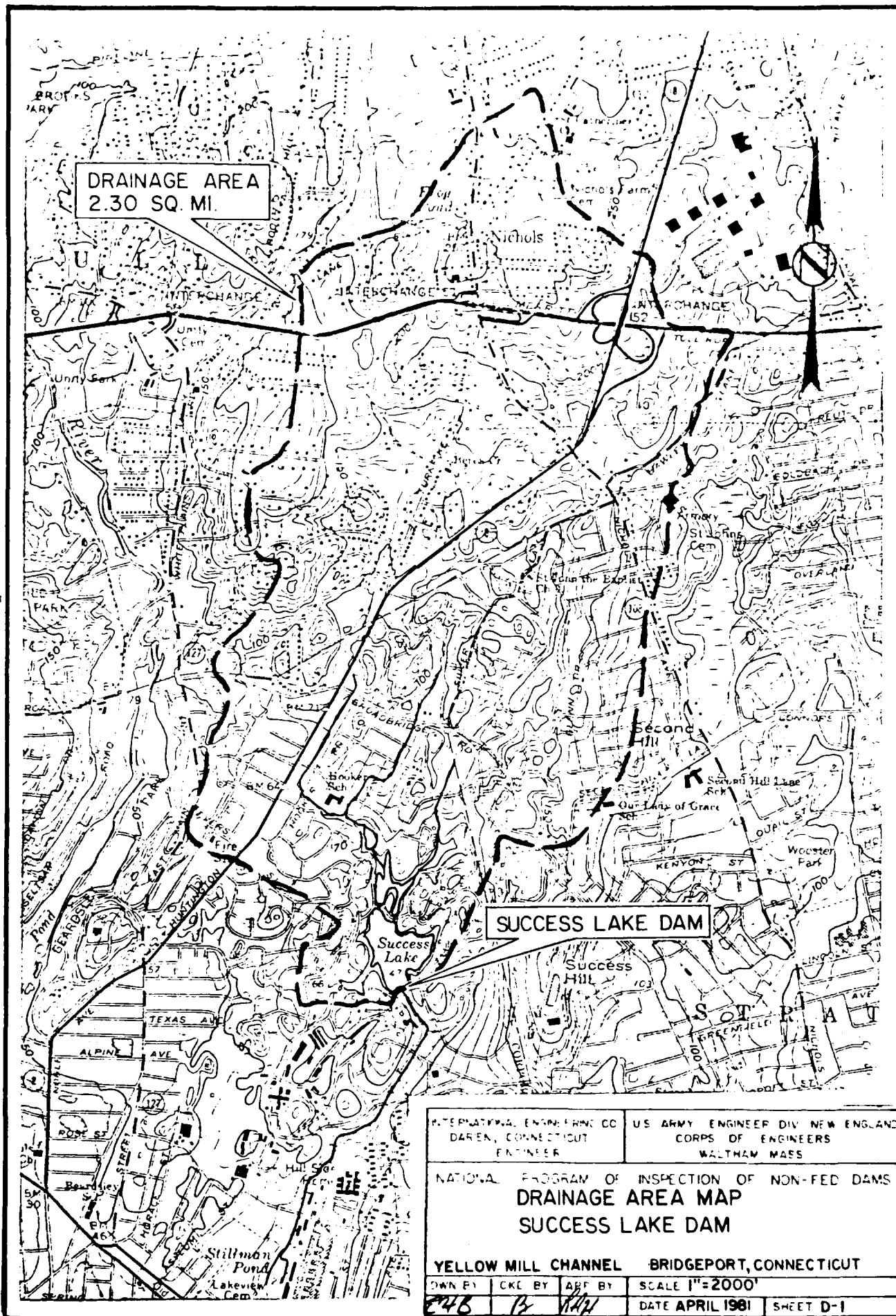
Photo 8 Brick structure and 8 inch diameter conduit.



Photo 9 Low-level outlet and valvehouse.

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS



INTERNATIONAL ENGINEERING CO. DAREN, CONNECTICUT ENGINEER	US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.
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NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS
DRAINAGE AREA MAP
SUCCESS LAKE DAM

YELLOW MILL CHANNEL BRIDGEPORT, CONNECTICUT

OWN BY	CHK BY	APP BY	SCALE 1"=2000'
246	B	HAH	DATE APRIL 1981
			SHEET D-1



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Project

NATIONAL DAM INSPECTION PROGRAM (NDIP)

Feature

SUCCESS LAKE DAM, BRIDGEPORT, CT

Item

CT00079

Contract No. 2616-04

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Sheet D-1

File No.

Date 3/10/81

Date

HYDRAULIC / HYDROLOGIC INSPECTION

SUCCESS LAKE DAM, BRIDGEPORT, CT CT00079

I. PERFORMANCE AT PEAK FLOOD CONDITIONS

1. MAXIMUM PROBABLE FLOOD

a. WATERSHED CLASSIFIED AS "ROLLING"

b. WATERSHED AREA (D.A.) = 2.30 SQ. MI. *

* FROM IECO MEASUREMENTS ON THE BRIDGEPORT USGS QUADRANGLE MAP, CT. FROM U.S. CORPS OF ENGINEERS (ACE) DATA, D.A. IS 2.43 SQ. MI.

c. EXTRAPOLATING FROM NED-ACE GUIDE CURVES

$$PMF \approx 2080 \text{ CFS / SQ. MI.}$$

d. THEREFORE, PEAK INFLOW:

$$PMF = 2080 \times 2.3 \approx 4780 \text{ CFS}$$

$$\frac{1}{2} PMF \approx 2390 \text{ CFS}$$

2. SURCHARGE AT PEAK INFLOWS (PMF AND $\frac{1}{2}$ PMF).

a. OUTFLOW RATING CURVE

i. SPILLWAY

THE MASONRY SPILLWAY IN THE MID-SECTION OF SUCCESS LAKE DAM IS

A BROAD-CRESTED WEIR WITH A VERTICAL DOWNSTREAM FACE

(SEE SKETCHES ON P. D-2).





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SUCCESS LAKE DAM

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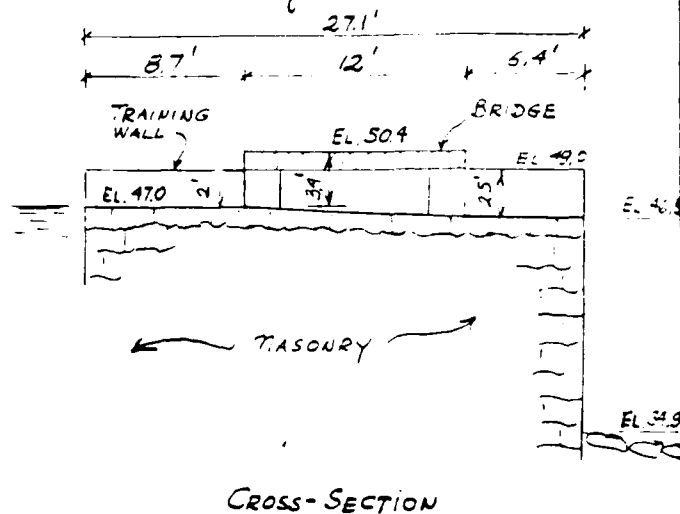
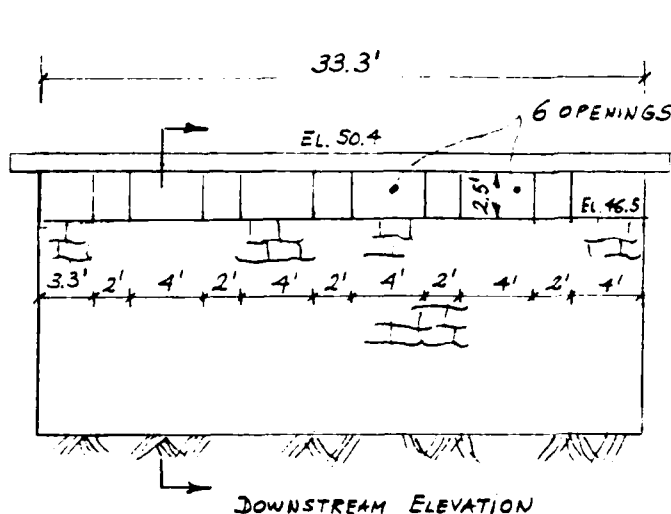
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J.F.



THE 33.3-FT-WIDE AND 27.1-FT-LONG SPILLWAY HAS A CONCRETE ROAD BRIDGE WITH 6 OPENINGS THE FIVE OF WHICH HAVE A WIDTH OF 4 FT AND THE ONE OPENING ON THE RIGHT SIDE IS A 3.3-FT WIDE. THE HEIGHT OF THE OPENINGS IS 2 FT ON THE UPSTREAM BRIDGE EDGE AND 2.5 FT ON THE DOWNSTREAM EDGE. THE TOTAL LENGTH OF THE OPENINGS IS 23.3 FT (L_o) AND THE TOTAL AREA OF THE OPENINGS ON THE UPSTREAM SIDE IS 46.6 SQ. FT (A_o).

ASSUMING $C_1 = 2.2$ ($H < 2$ FT) AND $C_2 = 0.6$ ($H > 2$ FT) AND ADOPTING THE SPILLWAY CREST ELEV. 47.0 AS DATUM, THE SPILLWAY DISCHARGE IS APPROXIMATING BY :

$$Q_s = C_1 L_o H_1^{3/2} + C_2 A_o \sqrt{2g} (H_2 - \frac{3}{2})^{1/2} = 2.2 \times 23.3 \times H_1^{3/2} + 0.6 \times 46.6 \times \sqrt{64.4} (H_2 - \frac{3}{2})^{1/2}$$

$$Q_s = 51.3 H_1^{3/2} + 224.4 (H_2 - \frac{3}{2})^{1/2} \quad (\text{WHEN } H_1 < 2 \text{ FT, } H_2 = \frac{3}{2}; \text{ WHEN } H_2 > 2, H_1 = 0)$$





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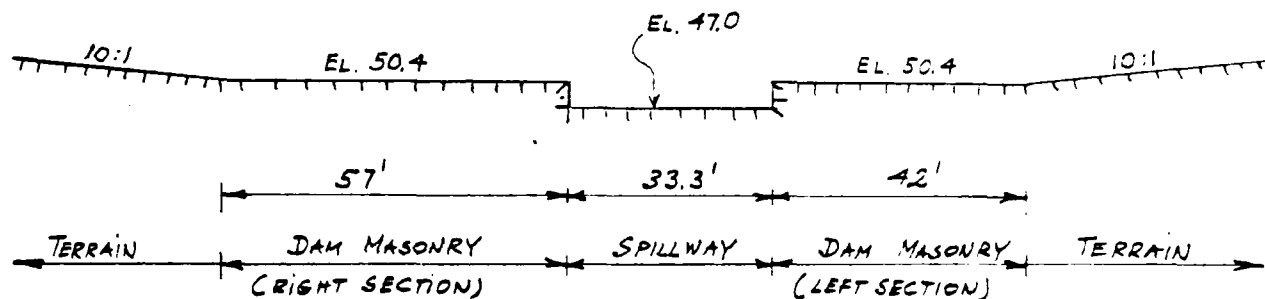
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ii. EXTENSION OF THE RATING CURVE FOR SURCHARGE OVERTOPPING THE DAM AND/OR ADJACENT TERRAIN

THE SUCCESS LAKE DAM IS A MASONRY STRUCTURE WITH A TOP ELEVATION OF 50.4 AND TOTAL LENGTH OF 99 FT. THE TERRAINS ADJACENT TO THE DAM HAVE SLOPES APPROXIMATELY 10:1 (SEE SKETCH BELOW).



DUE TO THE IRREGULARITIES IN THE PROFILE AN EQUIVALENT WEIR LENGTH MUST BE COMPUTED. ASSUMING A DISCHARGE COEFFICIENT $C=2.3$ AND ADOPTING THE SPILLWAY CREST AS DATUM (EL. 47.0), THE OVERFLOW CAN BE APPROXIMATED BY THE FOLLOWING EQUATIONS:

(1) TOP OF DAM AT EL. 50.4.

$$Q_3 = 2.3 \times \frac{132.3}{12.3} \times (H_3 - 3.4)^{3/2} = 304.3 (H_3 - 3.4)^{3/2}, \quad (H_3 > 3.4 \text{ ft})$$

(2) SLOPING TERRAIN TO THE LEFT AND RIGHT OF THE DAM:

$$L_5 = \left(\frac{2}{5}\right) \times (H_3 - 3.4) = \left(\frac{2}{5}\right) 10 (H_3 - 3.4) = 4 (H_3 - 3.4)$$

$\therefore$ DISCHARGE OVER LEFT AND RIGHT TERRAINS

$$Q_5 = 2 L_5 (H_3 - 3.4)^{5/2} = 2 \times 4 (H_3 - 3.4)^{5/2} = 8 (H_3 - 3.4)^{5/2}$$





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SUCCESS LAKE DAM

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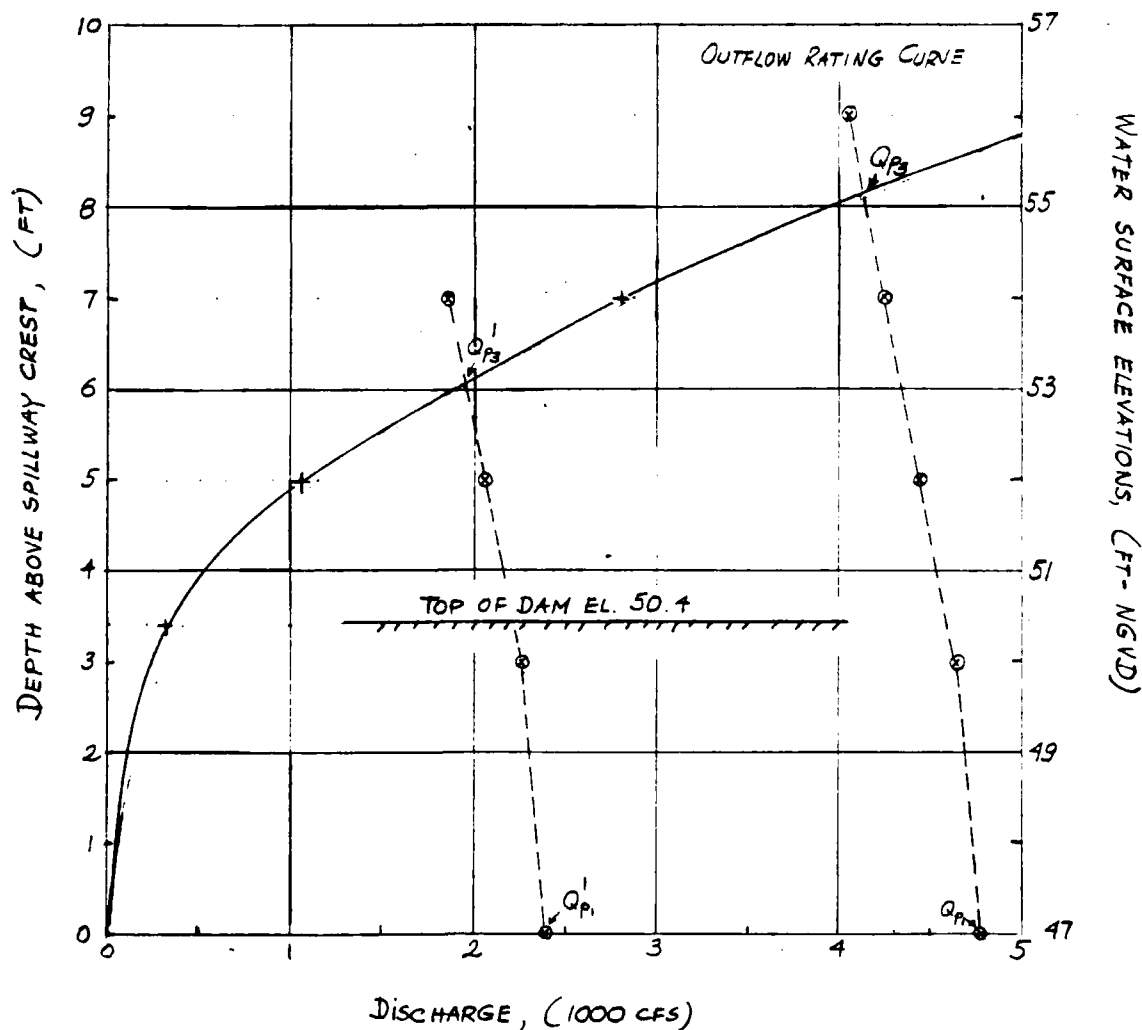
Date

THEREFORE, THE TOTAL OUTFLOW RATING CURVE IS APPROXIMATED BY:

$$Q = 51.3 H_1^{3/2} + 224.4 \left(H_2 - \frac{3}{2} \right)^{1/2} + 304.3 (H_3 - 3.4)^{3/2} + 8 (H_3 - 3.4)^{5/2} \quad H_3 \geq 3.4$$

WHEN $H_1 < 2 \text{ FT}$, $H_2 = \frac{3}{2}$; WHEN $H_2 > 2$, $H_1 = 0$

THE RESULTING OUTFLOW RATING CURVE IS AS FOLLOWS:





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b. SURCHARGE HEIGHT TO PASS PEAK INFLOWS (Q_p AND Q_p')

i. @ $Q_p = 4780$ CFS

$H_1 \approx 8.6$ FT

ii @ $Q_p' = 2390$ CFS

$H_1' \approx 6.6$ FT

c. EFFECT OF SURCHARGE STORAGE ON PEAK OUTFLOWS :

i. AVERAGE POND AREA WITHIN EXPECTED SURCHARGE :

(1) POND AREA AT FLOW LINE (EL. 47.0)

$A_{47}^* = 12.85$ AC

(2) POND AREA AT EL. 50.0

$A_{50}^* = 30.3$ AC

(3) AREA AT CONTOUR 60.0

$A_{60}^* = 68.8$ AC

* FROM IECO MEASUREMENTS ON THE BRIDGEPORT USGS QUADRANGLE MAP, CT

ASSUMING NORMAL POOL AT SPILLWAY CREST EL. 47.0, APPROXIMATING

STAGE-STORAGE RATING CURVE WAS CONSTRUCTED (SEE P D-6).

ii. DISCHARGE (Q_{p2}) AT VARIOUS HYPOTHETICAL SURCHARGE ELEVATIONS :

$H = 9$ FT, $V = 362$ AC-FT, $\therefore S = \frac{362}{2.3 \times 53.3} = 2.95$ IN

$H = 7$ FT; $V = 262$ AC-FT; $S = 2.14$ IN

$H = 5$ FT; $V = 162$ AC-FT; $S = 1.32$ IN

$H = 3$ FT; $V = 65$ AC-FT; $S = 0.53$ IN





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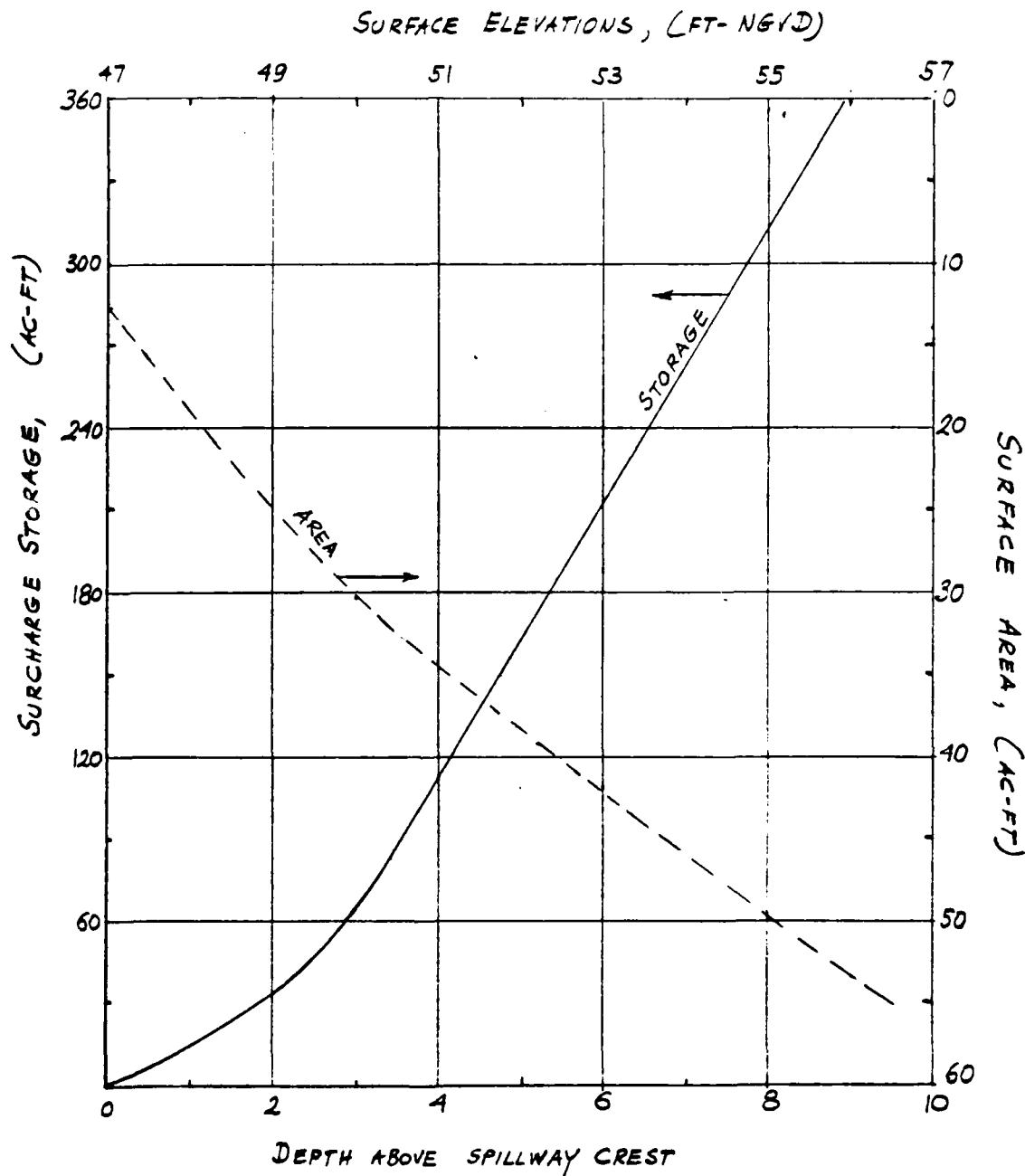
D-6

File No.

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STAGE-STORAGE AND STAGE-AREA CURVES



D-6





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FROM APPROXIMATE ROUTING NED-ACE GUIDELINES AND 19 IN. MAXIMUM POSSIBLE
RUNOFF IN NEW ENGLAND:

$$Q_{p2} = Q_{p1} \left(1 - \frac{S}{19}\right) \text{ AND FOR } 1/2 \text{ PMF } Q_{p2}' = Q_{p1}' \left(1 - \frac{S}{19.5}\right)$$

∴ FOR THE PREVIOUS HYPOTHETICAL SURCHARGES:

$$H = 9 \text{ FT}; \quad Q_{p2} = 4038 \text{ CFS}, \quad Q_{p2}' = 1648 \text{ CFS}$$

$$H = 7 \text{ FT}, \quad Q_{p2} = 4242 \text{ CFS}, \quad Q_{p2}' = 1852 \text{ CFS}$$

$$H = 5 \text{ FT}, \quad Q_{p2} = 4448 \text{ CFS}; \quad Q_{p2}' = 2058 \text{ CFS}$$

$$H = 3 \text{ FT}, \quad Q_{p2} = 4647 \text{ CFS}; \quad Q_{p2}' = 2257 \text{ CFS}$$

d. PEAK OUTFLOWS (Q_{p3} AND Q_{p3}'):

USING NED-ACE GUIDELINES "SURCHARGE STORAGE ROUTING" ALTERNATE
METHOD AND RATING CURVE (SEE P. D-4):

$$Q_{p3} = 4120 \text{ CFS} \quad H_3 = 8.1 \text{ FT}$$

$$Q_{p3}' = 1950 \text{ CFS} \quad H_3' = 6.05 \text{ FT}$$

3. SPILLWAY CAPACITY RATIO TO PEAK INFLOW AND OUTFLOW.

SPILLWAY CAPACITY TO TOP OF DAM (EL. 50.4) IS 304 CFS

% CAPACITY OF INFLOW PMF : 6

" OUTFLOW " : 8

" INFLOW 1/2 PMF : 13

" OUTFLOW " : 16





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SUCCESS LAKE DAM

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Sheet 2-5

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II. DOWNSTREAM FAILURE HAZARD

1. POTENTIAL IMPACT AREA

THE POTENTIAL IMPACT AREA IS LOCATED 3500 FT DOWNSTREAM FROM THE DAM

LARGE 5-STORY CONCRETE BUILDING

NEAR BOND STREET, HAS FIRST FLOOR ELEVATION ABOUT 20 FT ABOVE

THE STREAMBED. THERE IS ALSO THE STATE ROUTE 1 BRIDGE LOCATED

ABOUT 1 1/3 MILES DOWNSTREAM FROM THE DAM.

2. FAILURE OF SUCCESS LAKE DAM.

a. BREACH WIDTH

i. HEIGHT OF DAM:

TOP OF DAM EL. 50.4 ; DAM DOWNSTREAM TOE 34.9; $\therefore H = 15.5$ FT

ii. DAM MID-HEIGHT EL. 42.7

(50.4 - 15.5/2 = 42.7)

iii. APPROXIMATE MID-HEIGHT LENGTH: $\ell^* \approx 50$ FT (SPILLWAY LENGTH IS NOT INCLUDED)

* FROM IECO DRAWINGS

iv. BREACH WIDTH (SEE NED-AGE DOWNSTREAM FAILURE GUIDELINES)

$$W_b = 0.4 \ell = 0.4 \times 50 = 20 \text{ FT}$$

b. PEAK FAILURE OUTFLOW (Q_p)

ASSUME SURCHARGE AT TOP OF DAM (EL. 50.4)





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SUCCESS LAKE DAM

Contract No. 2616-04

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i. HEIGHT AT TIME OF FAILURE : $Y_0 = 15.5$ FTii. SPILLWAY DISCHARGE AT TIME OF FAILURE : $Q_s = 309$ CFS

iii. BREACH OUTFLOW :

$$Q_b = 8/27 W_b \sqrt{g} Y_0^{3/2} = 8/27 \times 20 \times \sqrt{32.2} \times 15.5^{3/2} = 2052 \text{ CFS}$$

iv. PEAK FAILURE OUTFLOW TO YELLOW MILL CHANNEL TRIBUTARY

$$Q_p = Q_s + Q_b = 309 + 2052 = 2360 \text{ CFS}$$

c. FLOOD DEPTH IMMEDIATELY DOWNSTREAM FROM DAM:

$$Y = 0.44 Y_0 = 0.44 \times 15.5 = 6.8 \text{ FT}$$

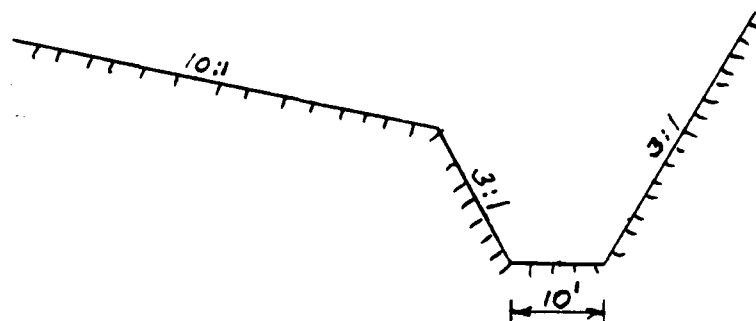
d. ESTIMATE OF DOWNSTREAM FAILURE CONDITIONS AT POTENTIAL IMPACT AREA
(SEE NED-AGE GUIDELINES FOR ESTIMATING DOWNSTREAM FAILURE HYDROGRAPHS)

i. REACH OF YELLOW MILL CHANNEL TRIBUTARY BETWEEN DAM AND IMPACT AREA.

VARIES SIGNIFKANTLY IN SECTION. THE FIRST 1500-FOOT-

LONG REACH IS APPROXIMATELY SHAPED AS SHOWN ON THE

SKETCH. BELOW:



CROSS SECTION REACH 1

THE AVERAGE SLOPE OF THE REACH IS $0.002 (\pm)$ 



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ii SUCCESS LAKE DAM RESERVOIR STORAGE AT TIME OF FAILURE.

STORAGE VOLUME BELOW SPILLWAY CREST APPROXIMATED BY $\frac{1}{4} A H$

$$= \frac{1}{4} \times 12.85 \times 12.1 = 38.9 \text{ AC-FT. SURCHARGE STORAGE TO THE OF THE DAM}$$

(EL. 50.4) IS 80.3 AC-FT (SEE STAGE-SURCHARGE CURVE ON P. D-6).

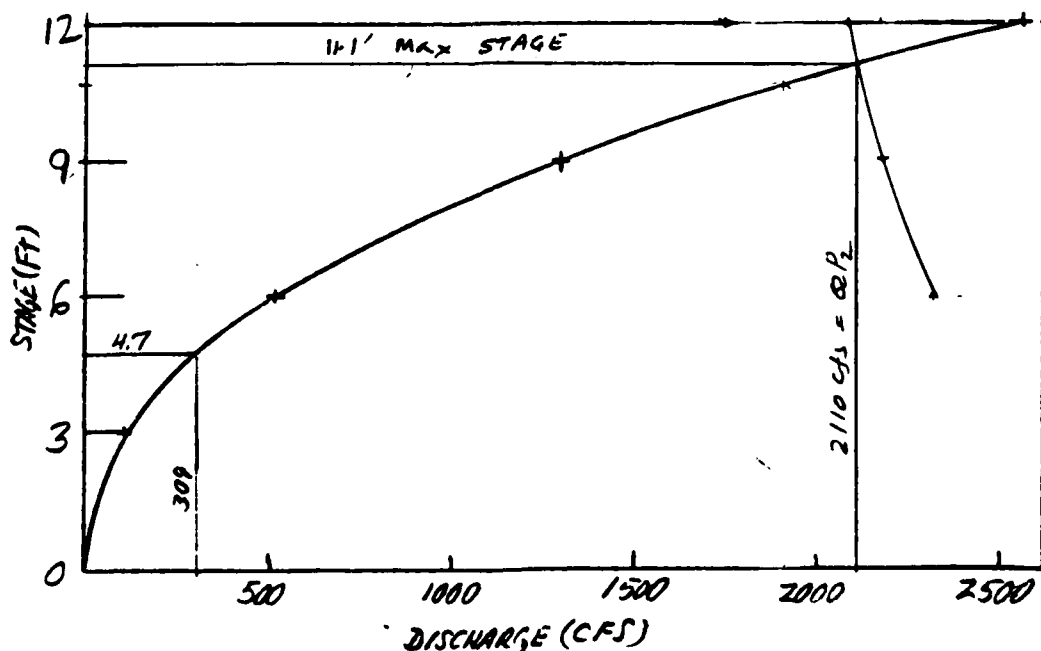
 $\therefore$ MAXIMUM STORAGE VOLUME OF THE RESERVOIR IS $38.9 + 80.3 = 119.2 \text{ AC-FT}$ ASSUME $S_{\text{MAX}} = 119 \text{ AC-FT}$ iii PEAK INFLOW TO REACH: $Q_p = 2360 \text{ CFS}$

iv. APPROXIMATE STAGE AT POTENTIAL IMPACT AREA FAILURE OF SUCCESS LAKE DAM

REACH $L = 3500 \text{ FT}$; $n = 0.05$; $S = 0.002$; COMPUTED STAGE-DISCHARGE

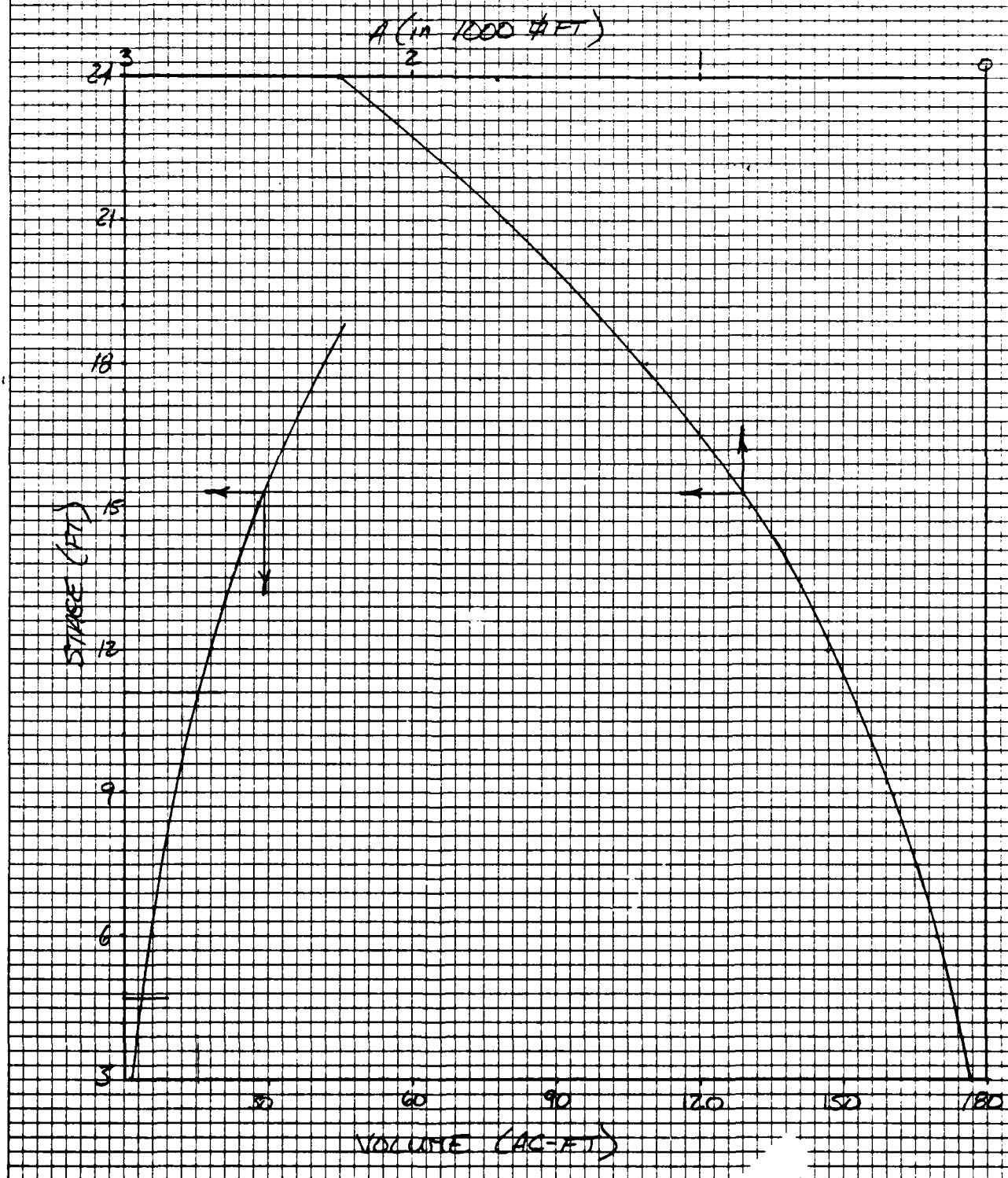
CURVE AND STAGE-AREA CURVE FOR THE BROOK SECTION AS SHOWN ON P.D-9

ARE PLOTTED ON P.D-11.

STAGE-DISCHARGE FOR CHANNEL - REACH 1

D-10

AREA CAPACITY CURVE FOR FIRST REACH (1500 FEET LONG)



46 0660

K-E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.



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D-12

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PRE FAILURE STAGE 4.7 FT DISCHARGE 309 CFS

INITIAL VOLUME ABSTRACTED & 4 AC-FT

H	V	$Q_{P2} = 2360 \left(1 - \frac{VOL-4}{119}\right)$
3	1.7	2406
6	6.0	2320
9	12.9	2183
12	18.1	2080

RISE IN STAGE $11.1 - 4.7 = 6.4'$ $Q_{P2} = 2110 \text{ CFS}$ 



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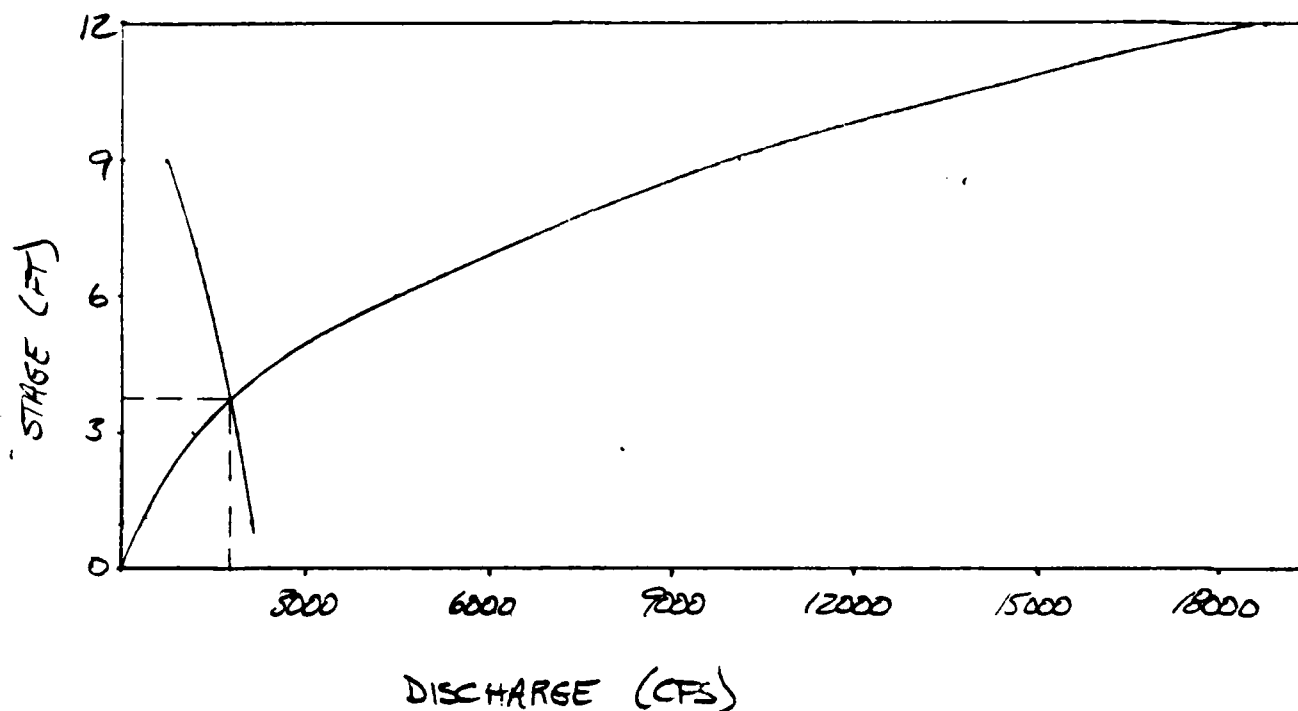
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REACH 2: $L = 1400 \text{ FT}$ $n = 0.05$ $S = 0.002$

STAGE DISCHARGE CURVE FOR REACH 2.



PRE FAILURE STAGE 1.0 FT DISCHARGE 309 CFS
 INITIAL VOLUME ABSTRACTED $V = 4.4 \text{ AC-FT}$
 VOLUME ABSTRACTED BY REACH 1 $\Delta V_1 = 11.5 \text{ AC-FT}$
 PLOTTING POINTS FOR GRAPHICAL ROUTING

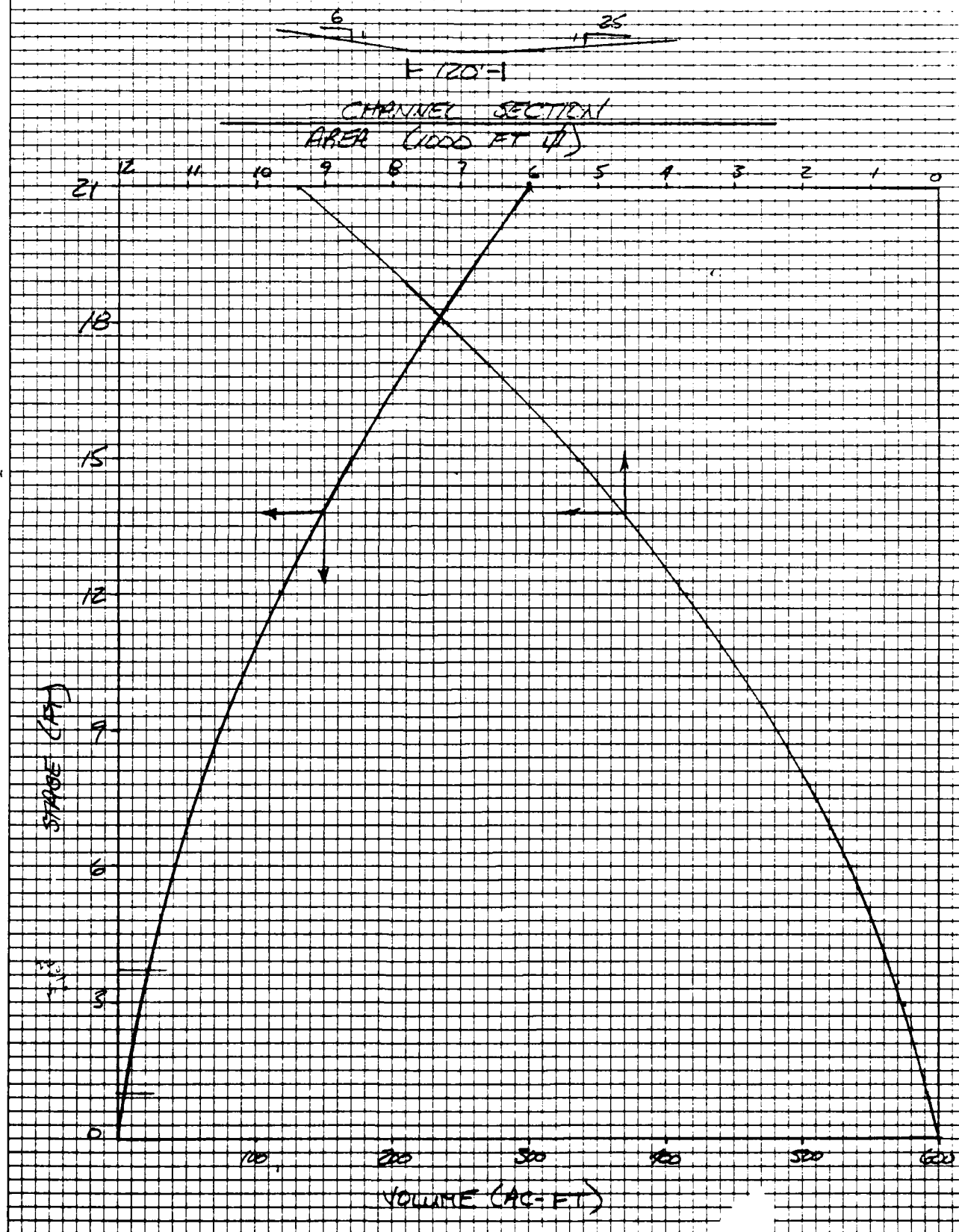
H	VOL	$Q_{P2} = 2110 \left(1 - \frac{VOL - 4.4}{119 - 11.5}\right)$
1	4.4	2110
3	16.06	1881
6	41.07	1390
9	75.04	723

 $Q_{P2} = 1800 \text{ cfs}$ $H = 3.7 \text{ FT}$ $\Delta H = 2.7 \text{ FT}$ 

D-14

A. JF

AREA CAPACITY CURVE FOR SECOND BEACH (1400 FEET LONG)



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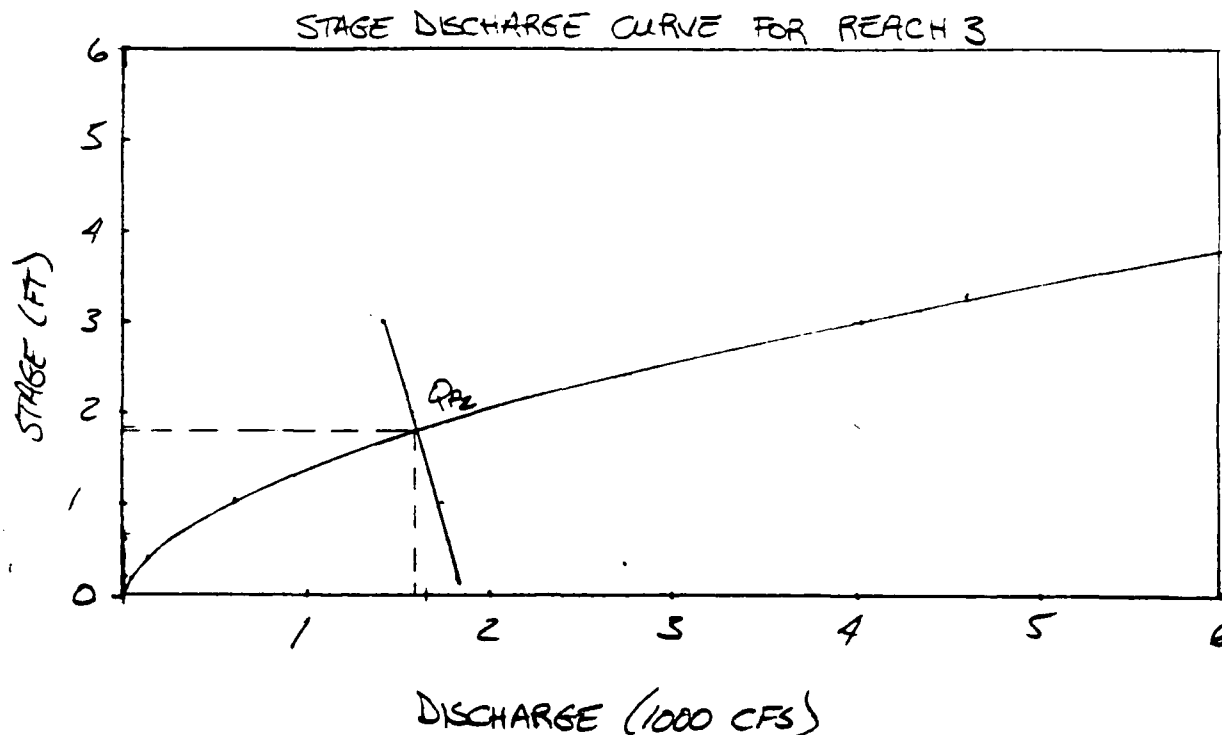
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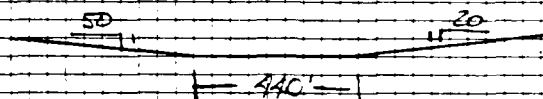
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REACH 3: $L = 600 \text{ FT}$ $A = 0.05$ $S = 0.002$ PREFAILURE STAGE $\approx 0.7 \text{ FT}$ DISCHARGE 309 CFSINITIAL VOLUME ABSTRACTED $\approx 3 \text{ AC-FT}$

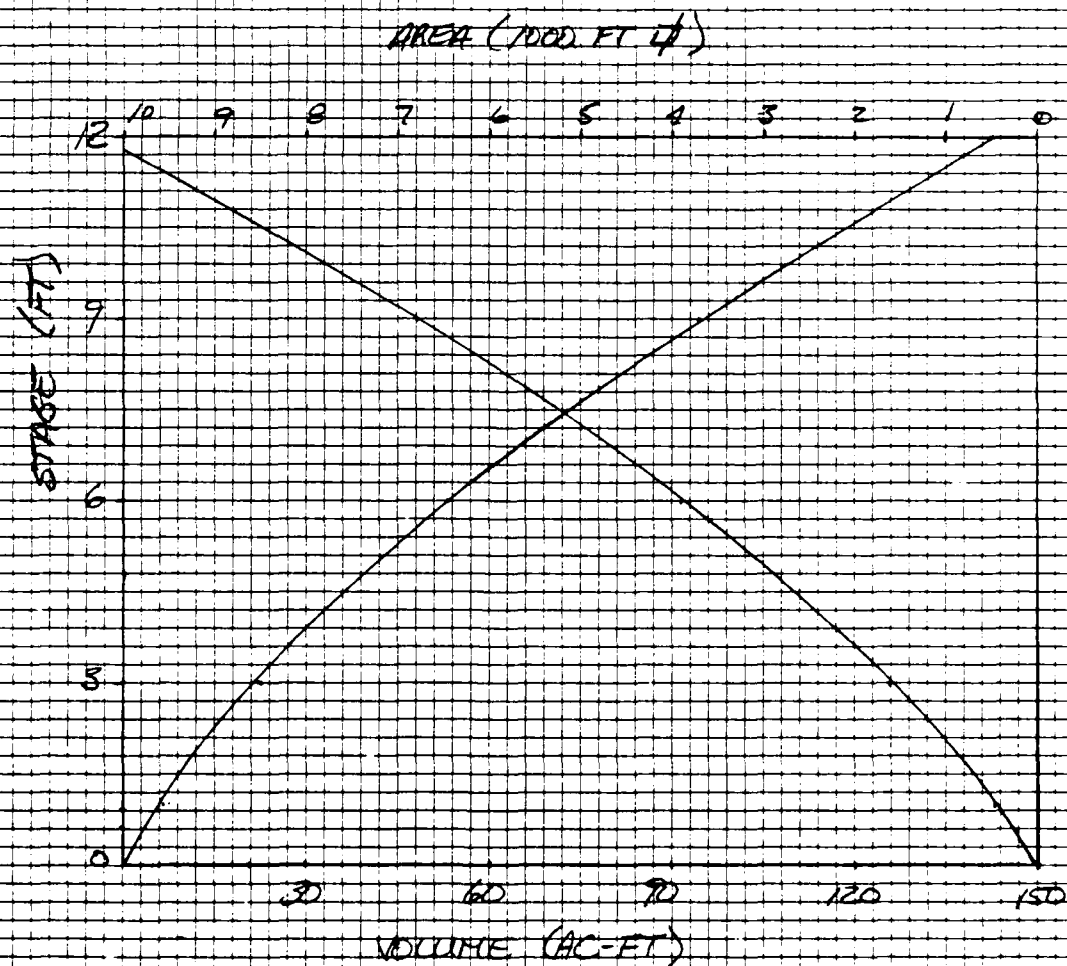
H	VOL	$Q_{p2} = 1800 \left(1 - \frac{\text{VOL} - 3}{119 - 17.5}\right)$
0.2	1.2	1836
0.6	3.8	1784
1.0	6.5	1730
1.4	9.4	1672
2.0	14.0	1580
3.0	22.5	1410



AREA CAPACITY CURVE FOR THIRD REACH (L=600 FT)



CHANNEL SECTION
THIRD REACH



46 0660

K-E 10 X 10 TO THE INCH • 7 X 10 INCHES
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$$Q_{P2} = 1620 \text{ CFS} \quad H = 1.8 \text{ FT}$$

$$\text{RISE IN STAGE } \Delta H = 1.8 - 0.7 = 1.1 \text{ FT}$$

III. THE RISE IN STAGE WITHIN THE FIRST REACH
WILL NOT EFFECT THE STRUCTURE IMMEDIATELY D/S
FROM THE DAM (1ST FLOOR EL $\approx$ 20 FT ABOVE STREAM BED)
THE RISE IN STAGE WITHIN THE THIRD REACH WILL
HAVE LITTLE OR NO EFFECT ON THE STRUCTURES NEAR
THE STREAM.



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SUCCESS LAKE DAM (CT.) (U) CORPS OF ENGINEERS WALTHAM MA
NEW ENGLAND DIV MAY 81

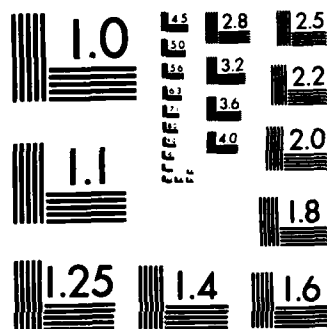
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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER CT 00079	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Success Lake Dam Conn. Coastal Basin, Bridgeport, Conn. NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS		5. TYPE OF REPORT & PERIOD COVERED INSPECTION REPORT
7. AUTHOR(s) U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS DEPT. OF THE ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION, NEDED 424 TRAPELO ROAD, WALTHAM, MA. 02254		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		12. REPORT DATE May 1981
		13. NUMBER OF PAGES 50
		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) APPROVAL FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) DAMS, INSPECTION, DAM SAFETY, Success Lake Dam Conn. Coastal Basin Bridgeport, Conn.		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The Success Lake Dam, constructed in 1875, is a 132 ft. long, 17 ft. high structure composed of two earthfill embankments and a central 33 ft. long broad crested spillway. The original timber spillway decking has since been capped with concrete. There is a small single land bridge, across the overflow spillway section. Flow over the spillway is channeled through five 4 ft. wide, 2 ft. high openings, and one 3.3 ft. wide, 2 ft. high, opening formed by the bridge piers. The upstream concrete face of the spillway has a slope of approx. 2H:1V and the masonry downstream face is vertical.		

AD-A142 830

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SUCCESS LAKE DAM

CT 00079

CONNECTICUT COASTAL BASIN

BRIDGEPORT, CONNECTICUT

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

MAY 1981



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11410
2616-110

May 7, 1981

Mr. E. P. Gould
Project Management Branch
Department of the Army
New England Division
Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Reference: Contract No. DACW33-81-C-0015
Inspection and Evaluation of Non-Federal Dams
FY-81, Southwestern Connecticut

Dear Mr. Gould:

The inspection of Success Lake Dam and subsequent hydrologic-hydraulic investigation revealed that the dam should be classified as having a low hazard potential. The following is an abbreviated Phase I Inspection report to substantiate this classification.

Sincerely,

Reynold A. Hokenson

Reynold A. Hokenson, P. E.
Project Manager

RAH:mem

Enclosures

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DAM INSPECTION PROGRAM

PHASE I INSPECTION REPORT

Identification No: CT 00079
Name of Dam: Success Lake Dam
Town: Bridgeport
County and State: Fairfield, Connecticut
Stream: Yellow Mill Channel
Dates of Inspection: February 5 and 19, 1981

BRIEF ASSESSMENT

The Success Lake Dam impounds Success Lake on the Yellow Mill Channel tributary in Bridgeport, Fairfield County, Connecticut. The structure is currently owned by Remington Arms Company, Inc., 939 Barnum Avenue, Bridgeport, Connecticut. The operation of the facility is the responsibility of Robert H. Gruss, Plant Engineer, Remington Arms Co., Inc., (203) 333-1112. Currently, the impoundment is maintained for aesthetics and wildlife conservation.

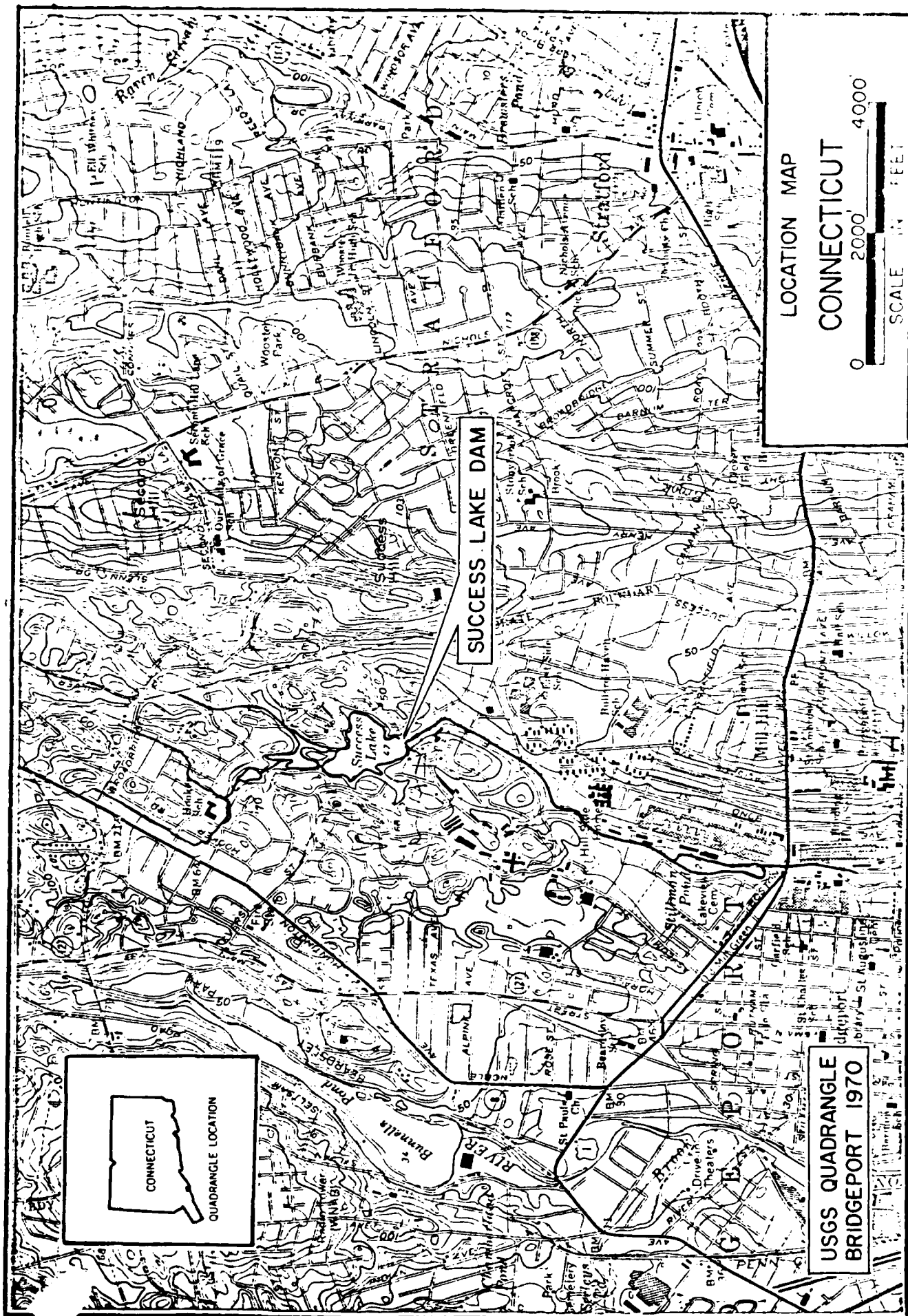
The Success Lake Dam, constructed in 1875, is a 132-foot-long, 17-foot-high structure composed of two earthfill embankments and a central 33-foot-long broad crested spillway. The original timber spillway decking has since been capped with concrete. There is a small single land bridge, across the overflow spillway section (Photo 1). Flow over the spillway is channeled through five 4-foot-wide, 2-foot-high openings, and one 3.3-foot-wide, 2-foot-high, opening formed by the bridge piers. The upstream concrete face of the spillway has a slope of approximately 2H:1V and the masonry downstream face is vertical. The downstream slopes of the two-side embankments are formed by vertical stone retaining walls. The upstream slopes also appeared to be vertical stone retaining walls, however, these areas were, for the most part, concealed beneath the water surface and accumulated sediments (Photos 2 and 3).

Two cast iron conduits pass through the earthfill embankment at the right abutment of the dam and provide additional outlets from the impoundment. A 14 inch diameter conduit exits the dam near its base approximately 12 feet from the right side of the spillway. Discharges from this conduit are regulated by a hand operated valve which is housed in a small masonry structure (Photo 9). The second conduit is 8 inches in diameter and emerges from the right embankment, approximately 5 feet below the top of the dam and about 25 feet from the spillway (Photo 7). This conduit extends 126 feet downstream to a small brick structure where, at one time, it provided water for the generation of steam (Photo 8). The brick structure formerly housed equipment for the generation and distribution of steam to the various industrial processes that were performed by Remington Arms Company, Inc., in the 1940's. This equipment was removed from the site and the building was converted to an employee locker room. The 8-inch conduit leading to this building, though deteriorated, is still intact.

Visual inspection of the site indicated that the dam is in poor condition. The inspection revealed the following: deterioration of the vertical downstream face of the spillway, cracked and missing portions of the concrete spillway crest along the downstream edge (Photo 4), cracks along the upstream and downstream interfaces of the spillway and abutments, exposed aggregate on the concrete spillway cap, seepage along the toe of the left embankment has resulted in a 20-foot by 30-foot marshy area approximately 40 feet from the dam, and a potentially inoperable low-level outlet. The seepage beneath the spillway, described in the inspection report submitted by William P. Sanders of the State of Connecticut Water Resource Commission on July 22, 1964 (see Correspondence), was not confirmed during the inspections conducted by IECO on February 2 and 19, 1981. During these inspections, an accumulation of rocks at the base of the spillway, ice formations on the downstream face of the spillway and particularly water flowing over the spillway made it impossible to examine this portion of the dam closely (Photos 5 and 6). Water was observed draining vertically through cracks in the concrete cap near the left upstream spillway abutment, but no corresponding discharge was noted on the downstream

face of the spillway. In addition, localized outward movement of the stone retaining wall and the concrete spillway cap were also found in the vicinity of the left spillway abutment. The effected area is approximately 7 feet wide, but the movement has been slight and is a local condition not threatening the dam.

The Success Lake Dam has a maximum potential storage capacity of 119 acre-feet (ac-ft) and is approximately 17 feet in height. Since the dam falls within the Corp's criteria for the small size category based on storage (between 50 and 1,000 ac-ft), the dam is considered to be SMALL in size. The dam breach analysis was conducted in accordance with the "Rule of Thumb Guidance for Estimating Downstream Dam Failure Hydrographs", dated April 1978, and the potential impact area was defined. Failure of the dam would cause the water surface within the streambed immediately downstream of the dam to rise from 4.7 feet at a prefailure outflow of 310 cfs to 11.1 feet at an outflow of 2,360 cfs. The first floor of the brick structure located approximately 130 feet downstream from the dam is more than 20 feet above the streambed, and this will not be effected by the flood wave. The only remaining other structures adjacent to the Yellow Mill Channel are located 3,500 feet downstream from the dam. These will sustain little or no damage since the water surface within this reach will rise only 1.8 feet above the streambed. Since failure of the dam will cause little or no property damage and no loss of life, the dam has been classified as having a LOW hazard potential.



APPENDIX A

INSPECTION CHECKLIST

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT Success Lake Dam

DATE 02/5 & 19/81

TIME 10:00 a.m.

WEATHER Sunny, Cold

W.S. ELEV. 47.1

PARTY:

INITIALS:

1. Jeffrey T. Klaucke	JK
2. Myron B. Petrovsky	MP
3. Ernst H. Buggisch	EB
4. Paul Archer	PA
5. Harold Farnham	HF (Matthews Associates)

PROJECT FEATURE:

INSPECTED BY:

1. Dam	JK, MP, EB, PA
2. Intake Channel	JK, MP
3. Valvehouse	JK, HF, MP
4. Powerhouse Conduit	HF, JK, MP
5. Low Level Outlet	HF, JK, MP
6. Low level Outlet Channel	JK, MP, EB, PA
7. Spillway	JK, MP, EB
8. Bridge	JK, PA, EB

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam

DATE: 02/5 & 19/81

PROJECT FEATURE: Dam

NAME: JK, MP, EB, PA

AREA EVALUATED	CONDITION
<u>DAM EMBANKMENT</u>	
Crest Elevation	47.0
Current Pool Elevation	47.1
Maximum Impoundment to Date	Approximately 50.0
Surface Cracks	None
Pavement Condition	Good
Movement or Settlement of Crest	None
Lateral Movement	Local movement on upstream face near left spillway abutment.
Vertical Alignment	Good
Horizontal Alignment	Good
Condition at Abutment and at Concrete Structures	Cracks along U/S and D/S interfaces with spillway.
Indications of Movement of Structural Items on Slopes	Minor bulging of U/S and D/S retaining walls.
Trespassing on Slopes	None.
Sloughing or Erosion	None
Rock Slope Protection	The exposed U/S walls were irregular and missing stones.
Unusual Movement or Cracking at or near Toes	None
Unusual Embankment or Downstream Seepage	Wet area at D/S toe on the left bank. Seepage noted through valvehouse.
Piping or Boils	Possible piping along low level outlet conduit.

PERIODIC INSPECTION CHECK LIST	
PROJECT: <u>Success Lake Dam</u>	DATE: <u>02/5 & 19/81</u>
PROJECT FEATURE: <u>Dam (Continued)</u>	NAME: <u>JK, MF, EB, PA</u>
AREA EVALUATED	CONDITION
Foundation Drainage Features	Unknown
Toe Drains	Unknown
Instrumentation System	None

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam

DATE: 02/5 & 19/81

PROJECT FEATURE: Intake Channel

NAME: JK, MP

AREA EVALUATED	CONDITION
<u>OUTLETS WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE</u> a. Approach Channel Slope Conditions Bottom Conditions Rock Slides or Falls Log Boom Debris Condition of Concrete Lining Drains or Weep Holes b. Intake Structure Condition of Concrete Stop Logs and Slots	Success Lake No structure visible above current pool level.

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam

DATE: 02/5 & 19/81

PROJECT FEATURE: Valvehouse

NAME: JK, HF, MP

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - CONTROL TOWER</u>	
a. Concrete and Structural	
General Condition	Fair, wooden roof rotted.
Condition of Joints	Good
Spalling	None
Visible Reinforcing	None
Rusting or Staining of Concrete	Near crack in valvehouse wall
Any Seepage or Efflorescence	Seepage noted through crack in valvehouse wall.
Joint Alignment	Good
Unusual Seepage or Leaks in Gate Chamber	None
Cracks	Right wall of valvehouse
Rusting or Corrosion of Steel	Exposed portion of low level outlet conduit.
b. Mechanical and Electrical	
Air Vents	
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	
Mechanical Valve	Not tested at owner's request
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System	

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam

DATE: 02/5 & 19/81

PROJECT FEATURE: Low level Outlet

NAME: HF, JK, MP

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - TRANSITION AND CONDUIT</u>	
General Condition of Conduit	Fair
Rust or Staining on Conduit	Superficial rust on exposed conduit.
Spalling	N/A
Erosion or Cavitation	None
Cracking	None
Alignment of Monoliths	N/A
Alignment of Joints	N/A
Numbering of Monoliths	N/A
<u>Note:</u> Only a small portion of the cast iron conduit (approximately 8 in.) was visible.	

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam

DATE: 02/5 & 19/81

PROJECT FEATURE: Low Level Outlet Channel

NAME: JK, MP, EB, PA

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL</u> General Condition of Concrete Rust or Staining Spalling Erosion or Cavitation Visible Reinforcing Any Seepage or Efflorescence Condition at Joints Drain holes Channel Loose Rock or Trees Overhanging Channel Condition of Discharge Channel	N/A Large rocks and 5 to 20 in. diameter trees were found immediately D/S of the outlet and adjacent to the spillway discharge channel. Large rocks have accumulated on the channel floor.

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam

DATE: 02/5 & 19/81

PROJECT FEATURE: Spillway

NAME: JK, HF, EB

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS</u>	
a. Approach Channel	Success Lake
General Condition	
Loose Rock Overhanging Channel	
Trees Overhanging Channel	
Floor of Approach Channel	
b. Weir and Training Walls	
General Condition of Masonry	Loose stones in retaining walls, some stones missing and wall movements noted near spillway.
Rust or Staining	None
Spalling of spillway concrete cap	Near downstream edge of spillway weir.
Any Visible Reinforcing	None
Any Seepage	Some vertical drainage into dam through cracks in the spillway cap.
Drain Holes	None
c. Discharge Channel	
General Condition	Fair
Loose Rock Overhanging Channel	Loose rocks from downstream walls of spillway have accumulated in discharge channel.
Trees Overhanging Channel	Large tree on right bank between valvehouse and spillway.
Floor of Channel	Strewn with large rocks.
Other Obstructions	None

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam

DATE: 02/5 & 19/81

PROJECT FEATURE: Bridge

NAME: JK, PA, EB

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - BRIDGE</u>	
a. Super Structure	N/A
Bearings	
Anchor Bolts	N/A
Bridge Seat	N/A
Longitudinal Members	N/A
Under Side of Deck	Good
Secondary Bracing	None
Deck	Good
Drainage System	All 3 inch diameter drains in curbs were free of obstructions.
Railings	Good
Expansion Joints	None
Paint	N/A
b. Piers	
General Condition of Concrete	Good
Alignment of Abutment	
Approach to Bridge	
Condition of Seat & Backwall	
	<u>Note:</u> The bridge is supported 2 feet above the spillway by 4 concrete piers that are founded on the spillway.

PERIODIC INSPECTION CHECK LIST

PROJECT: Success Lake Dam

DATE: 02/5 & 19/81

PROJECT FEATURE: Powerhouse Conduit

NAME: JK, HF, MP

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - CONTROL TOWER</u>	
a. Concrete and Structural	
General Condition	N/A
Condition of Joints	
Spalling	
Visible Reinforcing	
Rusting or Staining of Concrete	
Any Seepage or Efflorescence	
Joint Alignment	
Unusual Seepage or Leaks in Gate Chamber	
Cracks	
Rusting or Corrosion of Steel	
b. Mechanical and Electrical	
Air Vents	
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	
Mechanical Valve	Valve inoperable, conduit has not been used since the 1940's.
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System	

APPENDIX B

ENGINEERING DATA

SUMMARY OF DATA AND CORRESPONDENCE

<u>DATE</u>	<u>TO</u>	<u>FROM</u>	<u>SUBJECT</u>	<u>PAGE</u>
6/7/66	Mr. W.H. O'Brien III Water Resources Commission State of Connecticut	Joseph W. Cone Civil Engineer	Water Resources Inventory Data	B-2
			Inspection	B-3
10/9/64	State of Connecticut Water Resources Commission	J. P. Barry Works Engineer Remington Arms Company, Inc.	Verification upon completion of suggested repairs	B-6
7/22/64	H.M. Pierce Jr. Plant Manager Remington Arms Company, Inc.	William P. Sander Engineer-Geologist State of Connecticut	Suggested spillway repairs	B-7
			COE Inventory Data	B-8

No. _____

WATER RESOURCES UNIT
SUPERVISION OF DAMS
INVENTORY DATA

Inventoried

By _____

Lat: 41° 12.3'

Long: 73° 9.9'

Date _____

Name of Dam or Pond SUCCESS LAKE

Code No. _____

Nearest Street Location Huntington Turnpike

Town Bridgeport

U.S.G.S. Quad. Bridgeport

Name of Stream Unnamed

Owner Remington Arms Company, Inc.

Address Barnum Avenue

Bridgeport, CT

Pond Used For Fire Protection Drainage Area 2.43 sq. mi.

Dimensions of Pond: Width 700' Length 1100' Area 18.3 ac.

Total Length of Dam 125' Length of Spillway 35'

Location of Spillway Center of dam

Height of Pond Above Stream Bed 15'

Height of Embankment Above Spillway 3'

Type of Spillway Construction Concrete cap

Type of Dike Construction Masonry

Downstream Conditions Bridgeport

Summary of File Data _____

Remarks _____

Would Failure Cause Damage? _____ Class _____

JOSEPH W. CONE
CIVIL ENGINEER
124 HAVEMEYER PLACE
GREENWICH, CONNECTICUT
06830

June 7, 1966

TELEPHONE
STATE TOWNSEND 9-2152
COMMISSION
RECEIVED
JUN 10 1966
ANSWERED
REFERRED
FILED

Mr. William H. O'Brien III
Water Resources Commission
State Office Building
Hartford 15, Conn.

Re: Dam #46 Stillman Pond-Bdpt.
AND SUCCESS LAKE DAM

Dear Mr. O'Brien:

As requested, I have inspected the Stillman Pond Dam and the tributary watershed. Also permission was obtained from Remington Arms office to inspect Success Lake Dam, being escorted by one of their guards, since the condition of this dam is involved with Stillman.

	Success	Stillman
Watershed	2.28 sq.mi.	3.44 sq. mi.
Peak Q pres 100 yr	1250 cfs	1890 cfs
" " 2000 AD 400 yr	4370 "	5130 "

Both dams are solidly constructed and, in my opinion, will not fail but both will be overtopped in the future. Both have very low headroom, Success 6 openings averaging 4'x2'; openings were not measured at Stillman, it was evident that dam is safe although it will be overtopped.

Tracks serving the G.E. Plant will be flooded in the future during a severe storm due to channel of inadequate capacity.

Copies of work sheets, three photos and map of watersheds are enclosed. See Lake Forest for more applicable data.

My recommendation is that your office suggest to Remington Arms and General Electric that there be a standing order that their maintenance men see to it that openings at dams be kept clear of debris during heavy storms, this to reduce frequency of overtopping.

Very truly yours,


J. W. Cone

JWC/dr
Enc: 6

Forest & Steep

Forest & Steep

FOREST 725 Ac — 1.45 sp. mi. 1.2

(Chart 3) Q Peak = 850 cfs Wooded 1950 Constant 1.02

Fishing stream developing rapidly. Rolling terrain.

Q present 25yr = $RF \times LF \times FF \times Q$ cfs/Ac

= $1 \times 0.8 \times 1 \times 850 = 680$ cfs 0.73

Q " 100 yr = $1 \times 0.8 \times 1.8 \times 850 = 1220$ 1.22

Q " 400 yr = $1 \times 0.8 \times 3.8 \times 850 = 2580$ 2.8

" 2000 AD " = $1 \times 1.0 \times 3.8 \times 850 = 3240$ 3.5

Compare 3240 with 1955 Flooding 1.5 sp. mi. on $Q = 5000$ $JA = 4150$ $P1/2 = 6000$ on 1945

SUCCESS 1460 Ac — 2.28 sp. mi

Entire area developing rapidly except 132 Ac occupied by Riverbank

Rolling terrain rather flat

Chart B $Q = 1150$ cfs

Constant 695

Q pres. 25yr = $RF \times LF \times FF \times Q$

= $1 \times 0.6 \times 1 \times 1150 = 690$ cfs 0.47

" 100 = $1 \times 0.6 \times 1.8 \times 1150 = 1250$ 0.65

" 400 = $1 \times 0.6 \times 3.8 \times 1150 = 2620$ 1.8

2000 AD " = $1 \times 1.0 \times 3.8 \times 1150 = 4370$ 3.0

Provided River banks controls large area.

STILL 2200 Ac 3.44 sp. mi. Chart B $Q = 1500$

Constant 455

Q pres 25yr = $RF \times LF \times FF \times Q$

= $1 \times 0.7 \times 1 \times 1500 = 1050$ 0.48 cfs/Ac

" 100 = $1 \times 0.7 \times 1.8 \times 1500 = 1890$ 0.86

" 400 = $1 \times 0.7 \times 3.8 \times 1500 = 4000$ 1.8

2000 AD " = $1 \times 0.9 \times 3.8 \times 1500 = 5130$ 2.3

Provided River banks & G.E. do not flood 330 Ac

(A)

J.V. 5/13/54

Forest #25

5/4/66

Lake Forest #25

580
21.55
5775

Water shed
Catchment area
1.443 sq mi
925 Ac

Lake Forest
Catchment area
1.057 sq mi

Storage Ratio 1:14

Fair

Lake Forest Success below Stillman

Water shed
9.13
2115.24
419.12
2.28 sq mi
1460 Ac

Lake Forest
0.18
310.46
4153
0.038 sq mi
24 Ac

Storage Ratio 1:61 Very Poor

Success below New Area
Catchment area
21.82
2053 sq mi 132 Ac

Stillman Pool below Success

Water shed
4.70
2115.24
419.12
2.28 sq mi
750 Ac

Lake Forest
0.06
2115.24
419.12
2.28 sq mi
9 Ac

Storage Ratio 1:83 Very Bad practically 0

Downed by Bear Run
to G.E. trib to
Stillman including
trib to Success
412.05
515 320 Ac.

TOTAL Stillman #46 (including Success)

Water shed

13.76
21.55
4115.77
3.44 sq mi
2200 Ac

1460
750
2210 chie

Lake Forest

Success 24 Ac
Stillman 9
Total 33 Ac

Catchment 5.15 mi
Avalanche 1.1 ± "

Total Storage Ratio 1:67 Very poor

Remington



PETERS



REMINGTON ARMS COMPANY, INC.

MANUFACTURERS OF
SPORTING FIREARMS, AMMUNITION

TRAPS

TARGETS

POWER TOOLS

ARMS AND CARTRIDGE POWERED TOOLS
ILLION, N. Y.

AMMUNITION, BRIDGEPORT, CONN.

POWER TOOLS, PARK FOREST, ILL.

BRIDGEPORT 2, CONNECTICUT

PETERS CARTRIDGE DIVISION
BRIDGEPORT, CONN.
TRAPS AND TARGETS, FINDLAY, OHIO
CABLE - HARTLEY, BRIDGEPORT
- ALL CODES -

October 9, 1964

SUCCESS LAKE DAM
BRIDGEPORT

State of Connecticut
Water Resources Commission
State Office Building
Hartford 15, Connecticut

Attention Mr. William P. Sander, Engineer-Geologist

Gentlemen:

Reference - Your letter of July 22, 1964

The leakage under the spillway is a condition we are aware of and have been checking periodically. There is no apparent increase in the water flow over the past ten years and we, therefore, feel this is not a condition to cause concern. The massive construction of this dam should be adequate if the leaks do not become larger, or general deterioration set in.

We have a periodic inspection set up whereby the quantity of water leaking is measured and checked against previous findings. Any increase will be readily recognized and prompt remedial action will be taken.

The trees specified in your report have been removed.

Very truly yours,

REMINGTON ARMS COMPANY, INC.
H.M. PIERCE, JR., WORKS MANAGER

J. P. Barry
J. P. Barry
Works Engineer

JPB:O'L

STATE WATER RESOURCES
COMMISSION
RECEIVED

OCT 13 1964

ANSWERED _____
REFERRED _____
FILED _____

B-6

July 22, 1964

Mr. H. M. Pierce, Jr., Plant Manager
Remington Arms Company, Inc.
Barnum Avenue
Bridgeport, Connecticut

Dear Sir:

The Water Resources Commission has recently completed an inventory of all the dams in the Town of Bridgeport.

During the inventory, the dam forming Success Lake was inspected and was found to be in need of repair. At the date of the inspection, all stream flow was through leakage under the spillway. In addition, the trees which are growing on the dam should be removed. These points are not critical at the present time but represent a condition which could lead to failure of the dam.

We would appreciate hearing what plans you have to place this structure in a safe condition.

Very truly yours,

William P. Sander
Engineer - Geologist

WPS:js

REPORTS CONTROL SYMBOL DASH - CWS - 17

STATE	DIVISION	DATE	COUNTY	CONC.	NAME	LATITUDE	LONGITUDE	REPORT DATE
CT	79	NEU	001	04	SUCCESS LAKE DAM	4112.3	7309.9	10DEC73

POPULAR NAME	NAME OF IMPONUMENT
	SUCCESS LAKE

REGION	RIVER OR STREAM	NEAREST DOWNSTREAM CITY-TOWN-VILLAGE	DIST FROM DAM (MI.)	POPULATION
01 07	TR-YELLOW MILL CHANNEL	MILL HULL	1	250000

TYPE OF DAM	YEAR COMPLETED	PURPOSES	STATUS	HYDRAULIC	IMPOUNDING CAPACITIES
C1	1975	0	18	17	124 109

DIST UMN FED R PHV/FED 808 A VEN/DATE NEU

REMARKS
20-ESTIMATE 22-ESTIMATE

DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
125	35		

OWNER	ENGINEERING BY	CONSTRUCTION BY
HEMINGTON ARMS		

DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE

INSPECTION BY	INSPECTION DATE	AUTHORITY FOR INSPECTION
DEPT ENV PROT	03NOV72	PA 571 86CT 25-11 ST OF CT

REMARKS

CALL to reserve clearance. on days notice.
Bob Gross Ext 1316.

letter approx. time 1:30 PM
2 weeks

APPENDIX C

PHOTOGRAPHS

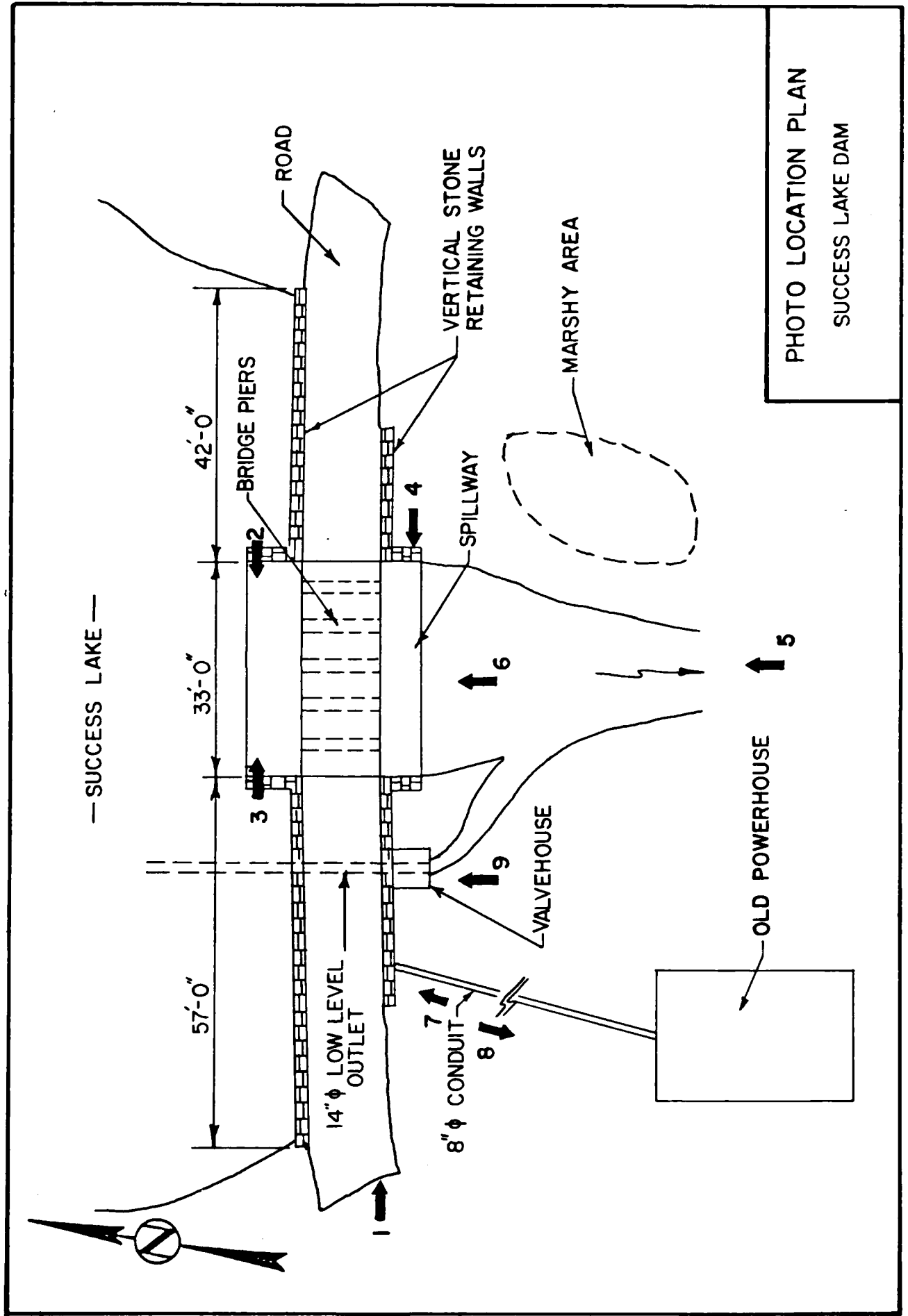




Photo 1 Top of dam and single lane road.



Photo 2 Upstream face of dam, spillway crest and right dam embankment.



Photo 3 Upstream face of dam, spillway crest and left dam embankment.



Photo 4 Downstream spillway crest and bridge piers.



Photo 5 Downstream face of dam.



Photo 6 Downstream masonry face of spillway.



Photo 7 Downstream masonry face
of right dam embankment,
8 inch diameter conduit
and control valve.



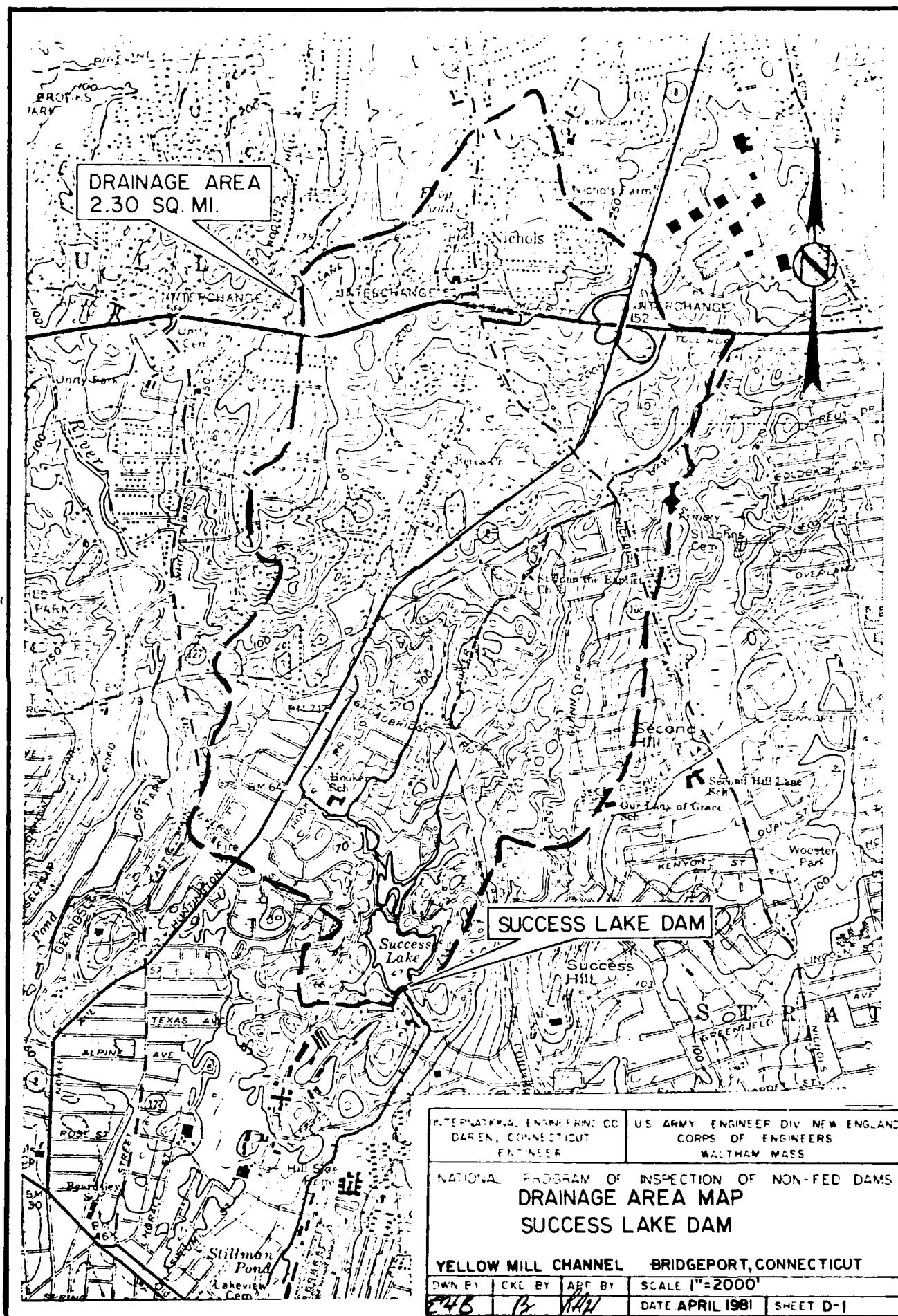
Photo 8 Brick structure and 8 inch diameter conduit.



Photo 9 Low-level outlet and valvehouse.

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS



INTERNATIONAL ENGINEERING CO DAREN, CONNECTICUT ENGINEER	US ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM MASS
--	--

NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS
DRAINAGE AREA MAP
SUCCESS LAKE DAM

YELLOW MILL CHANNEL BRIDGEPORT, CONNECTICUT

OWN BY	CKD BY	APP BY	SCALE 1"=2000'
246	B	HAZ	DATE APRIL 1981
			SHEET D-1



INTERNATIONAL ENGINEERING COMPANY, INC.

Project NATIONAL DAM INSPECTION PROGRAM (NDIP)
Feature SUCCESS LAKE DAM, BRIDGEPORT, CT
Item CT00079

Contract No. 2E16-04

Designed M.P.

Checked R. J.

Sheet D-1

File No. _____

Date 3/10/81

Date _____

HYDRAULIC / HYDROLOGIC INSPECTION

SUCCESS LAKE DAM, BRIDGEPORT, CT CT00079

I. PERFORMANCE AT PEAK FLOOD CONDITIONS

1. MAXIMUM PROBABLE FLOOD

a. WATERSHED CLASSIFIED AS "ROLLING"

b. WATERSHED AREA (D.A.) = 2.30 SQ. MI. *

* FROM IECO MEASUREMENTS ON THE BRIDGEPORT USGS QUADRANGLE MAP, CT. FROM U.S. CORPS OF ENGINEERS (ACE) DATA, D.A. IS 2.13 SQ. MI.

c. EXTRAPOLATING FROM NED-ACE GUIDE CURVES

$$PMF \approx 2080 \text{ CFS / SQ. MI.}$$

d. THEREFORE, PEAK INFLOW:

$$PMF = 2080 \times 2.3 \approx 4780 \text{ CFS}$$

$$\frac{1}{2} PMF \approx 2390 \text{ CFS}$$

2. SURCHARGE AT PEAK INFLOWS (PMF AND 1/2 PMF)

a. OUTFLOW RATING CURVE

i. SPILLWAY

THE MASONRY SPILLWAY IN THE MID-SECTION OF SUCCESS LAKE DAM IS

A BROAD-CRESTED WEIR WITH A VERTICAL DOWNSTREAM FACE

(SEE SKETCHES ON P. D-2).





INTERNATIONAL ENGINEERING COMPANY, INC.

Project

NDIP

Feature

SUCCESS LAKE DAM

Item

Contract No. 266-C

Sheet 3-2

File No.

Designed

M.P.

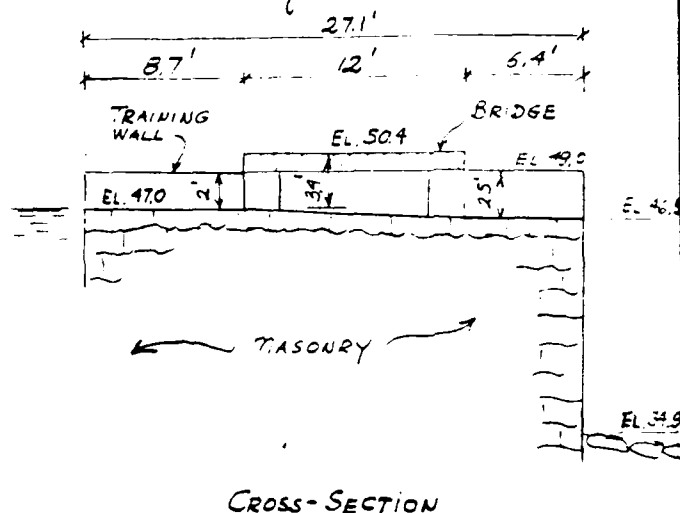
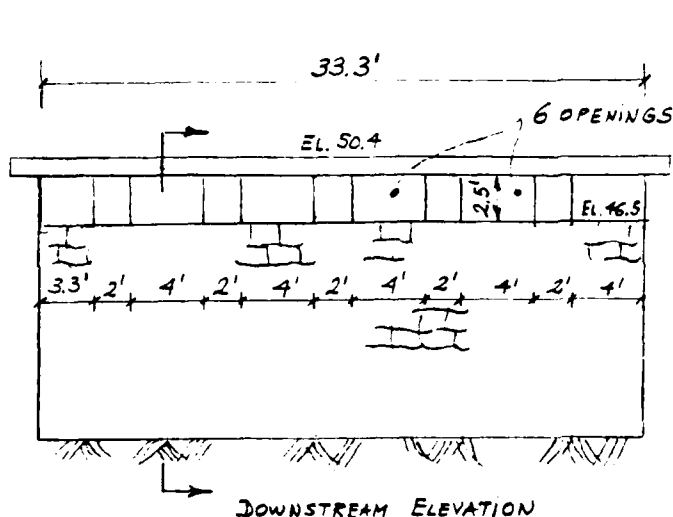
Date

3-5-51

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J.F.

Date



THE 33.3-FT-WIDE AND 27.1-FT-LONG SPILLWAY HAS A CONCRETE ROAD BRIDGE WITH 6 OPENINGS THE FIVE OF WHICH HAVE A WIDTH OF 4 FT AND THE ONE OPENING ON THE RIGHT SIDE IS A 3.3-FT WIDE. THE HEIGHT OF THE OPENINGS IS 2 FT ON THE UPSTREAM BRIDGE EDGE AND 2.5 FT ON THE DOWNSTREAM EDGE.

THE TOTAL LENGTH OF THE OPENINGS IS 23.3 FT (L_o) AND THE TOTAL AREA OF THE OPENINGS ON THE UPSTREAM SIDE IS 46.6 SQ. FT (A_o).

ASSUMING $C_1 = 2.2$ ($H < 2$ FT) AND $C_2 = 0.6$ ($H > 2$ FT) AND ADOPTING THE SPILLWAY CREST ELEV. 47.0 AS DATUM, THE SPILLWAY DISCHARGE IS APPROXIMATING BY :

$$Q_s = C_1 L_o H_1^{3/2} + C_2 A_o \sqrt{2g} (H_2 - \frac{3}{2})^{1/2} = 2.2 \times 23.3 \times H_1^{3/2} + 0.6 \times 46.6 \times \sqrt{64.4} (H_2 - \frac{3}{2})^{1/2}$$

$$Q_s = 51.3 H_1^{3/2} + 224.4 (H_2 - \frac{3}{2})^{1/2} \quad (\text{WHEN } H_1 < 2 \text{ FT, } H_2 = \frac{3}{2}; \text{ WHEN } H_2 > 2, H_1 = 0)$$





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Feature

SUCCESS LAKE DAM

Designed MPDate 3/10/5

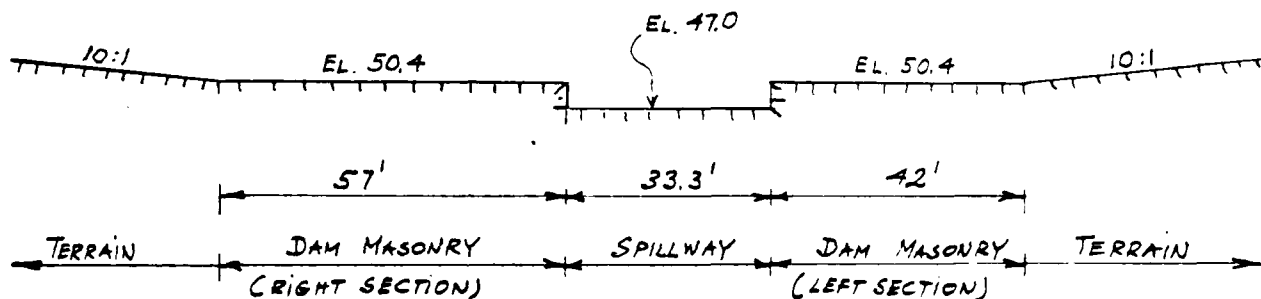
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ii. EXTENSION OF THE RATING CURVE FOR SURCHARGE OVERTOPPING THE DAM AND/OR ADJACENT TERRAIN

THE SUCCESS LAKE DAM IS A MASONRY STRUCTURE WITH A TOP ELEVATION OF 50.4 AND TOTAL LENGTH OF 99 FT. THE TERRAINS ADJACENT TO THE DAM HAVE SLOPES APPROXIMATELY 10:1 (SEE SKETCH BELOW).



DUE TO THE IRREGULARITIES IN THE PROFILE AN EQUIVALENT WEIR LENGTH MUST BE COMPUTED. ASSUMING A DISCHARGE COEFFICIENT $C=2.3$ AND ADOPTING THE SPILLWAY CREST AS DATUM (EL. 47.0), THE OVERFLOW CAN BE APPROXIMATED BY THE FOLLOWING EQUATIONS:

- (1) TOP OF DAM AT EL. 50.4.

$$Q_3 = 2.3 \times \frac{132.3}{128.3} \times (H_3 - 3.4)^{3/2} = 304.3 (H_3 - 3.4)^{3/2}, \quad (H_3 > 3.4 \text{ FT})$$

- (2) SLOPING TERRAIN TO THE LEFT AND RIGHT OF THE DAM:

$$L_s = \left(\frac{2}{5}\right) Z (H_3 - 3.4) = \left(\frac{2}{5}\right) 10 (H_3 - 3.4) = 4 (H_3 - 3.4)$$

$\therefore$ DISCHARGE OVER LEFT AND RIGHT TERRAINS

$$Q_s = 2 L_s (H_3 - 3.4)^{5/2} = 2 \times 4 (H_3 - 3.4)^{5/2} = 8 (H_3 - 3.4)^{5/2}$$





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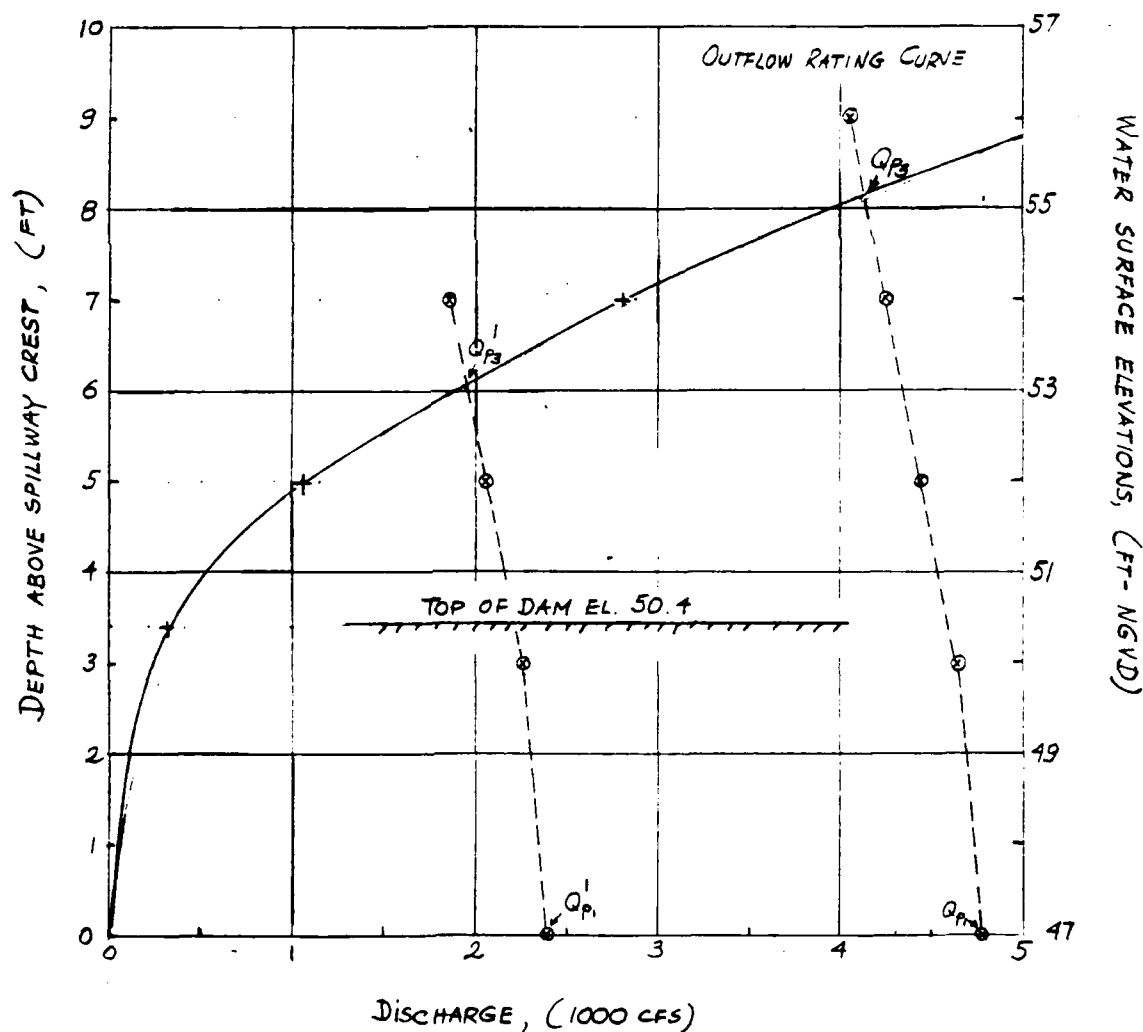
Date _____

THEREFORE, THE TOTAL OUTFLOW RATING CURVE IS APPROXIMATED BY:

$$Q = 51.3 H_1^{3/2} + 224.4 \left(H_2 - \frac{3}{2} \right)^{1/2} + 304.3 (H_3 - 3.4)^{3/2} + 8 (H_3 - 3.4)^{5/2} \quad H_3 \geq 3.4$$

WHEN $H_1 < 2 \text{ FT}$, $H_2 = \frac{3}{2}$; WHEN $H_2 > 2$, $H_1 = 0$

THE RESULTING OUTFLOW RATING CURVE IS AS FOLLOWS:





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b. SURCHARGE HEIGHT TO PASS PEAK INFLOWS (Q_p AND Q_p')

i. @ $Q_p = 4780$ CFS $H_1 \approx 8.6$ FT

ii @ $Q_p' = 2390$ CFS $H_1' \approx 6.6$ FT

c. EFFECT OF SURCHARGE STORAGE ON PEAK OUTFLOWS :

i. AVERAGE POND AREA WITHIN EXPECTED SURCHARGE :

(1) POND AREA AT FLOW LINE (EL. 47.0) $A_{47}^* = 12.85$ AC

(2) POND AREA AT EL. 50.0 $A_{50}^* = 30.3$ AC

(3) AREA AT CONTOUR 60.0 $A_{60}^* = 68.8$ AC

* FROM IECO MEASUREMENTS ON THE BRIDGEPORT USGS QUADRANGLE MAP, CT

ASSUMING NORMAL POOL AT SPILLWAY CREST EL. 47.0, APPROXIMATING

STAGE - STORAGE RATING CURVE WAS CONSTRUCTED (SEE P. D-6).

ii. DISCHARGE (Q_{p2}) AT VARIOUS HYPOTHETICAL SURCHARGE ELEVATIONS :

$$H = 9 \text{ FT}, \quad V = 362 \text{ AC-FT}, \quad \therefore S = \frac{362}{2.3 \times 53.3} = 2.95 \text{ IN}$$

$$H = 7 \text{ FT}; \quad V = 262 \text{ AC-FT}; \quad S = 2.14 \text{ IN}$$

$$H = 5 \text{ FT}; \quad V = 162 \text{ AC-FT}; \quad S = 1.32 \text{ IN}$$

$$H = 3 \text{ FT}; \quad V = 65 \text{ AC-FT}; \quad S = 0.53 \text{ IN}$$





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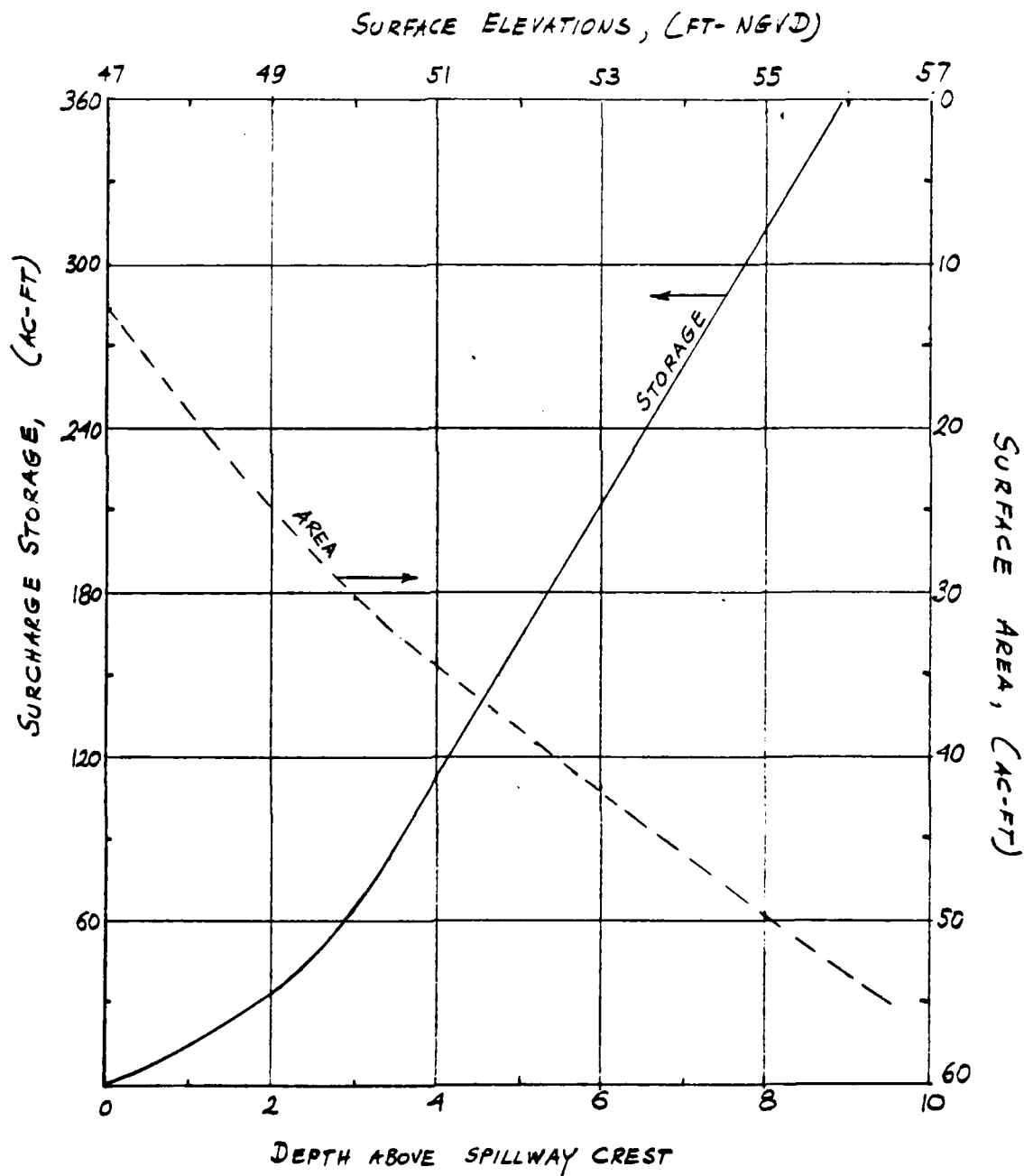
D-6

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STAGE-STORAGE AND STAGE-AREA CURVES





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Sheet 3-7

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FROM APPROXIMATE ROUTING NED-ACE GUIDELINES AND 19 IN MAXIMUM POSSIBLE

RUNOFF IN NEW ENGLAND:

$$Q_{p2} = Q_{p1} \left(1 - \frac{S}{19}\right) \text{ AND FOR } \frac{1}{2} \text{ PMF } Q_{p2}' = Q_{p1}' \left(1 - \frac{S}{19.5}\right)$$

∴ FOR THE PREVIOUS HYPOTHETICAL SURCHARGES:

$$H = 9 \text{ FT}; \quad Q_{p2} = 4038 \text{ CFS};$$

$$Q_{p2}' = 1648 \text{ CFS}$$

$$H = 7 \text{ FT}; \quad Q_{p2} = 4242 \text{ CFS};$$

$$Q_{p2}' = 1852 \text{ CFS}$$

$$H = 5 \text{ FT}; \quad Q_{p2} = 4418 \text{ CFS};$$

$$Q_{p2}' = 2058 \text{ CFS}$$

$$H = 3 \text{ FT}; \quad Q_{p2} = 4647 \text{ CFS};$$

$$Q_{p2}' = 2257 \text{ CFS}$$

d. PEAK OUTFLOWS (Q_{p3} AND Q_{p3}'):

USING NED-ACE GUIDELINES "SURCHARGE STORAGE ROUTING" ALTERNATE

METHOD AND RATING CURVE (SEE P. D-4):

$$Q_{p3} = 4120 \text{ CFS}$$

$$H_3 = 8.1 \text{ FT}$$

$$Q_{p3}' = 1950 \text{ CFS}$$

$$H_3' = 6.05 \text{ FT}$$

3. SPILLWAY CAPACITY RATIO TO PEAK INFLOW AND OUTFLOW.

SPILLWAY CAPACITY TO TOP OF DAM (EL. 50.4) IS 309 CFS

% CAPACITY OF INFLOW PMF : 6

" OUTFLOW " : 8

" INFLOW 1/2 PMF : 13

" OUTFLOW " : 16





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Sheet

D-5

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II. DOWNSTREAM FAILURE HAZARD1. POTENTIAL IMPACT AREA

THE POTENTIAL IMPACT AREA IS LOCATED 3500 FT DOWNSTREAM FROM THE DAM

LARGE 5-STORY CONCRETE BUILDING

NEAR BOND STREET, HAS FIRST FLOOR ELEVATION ABOUT 20 FT ABOVE

THE STREAMBED. THERE IS ALSO THE STATE ROUTE 1 BRIDGE LOCATED

ABOUT 1 1/3 MILES DOWNSTREAM FROM THE DAM.

2. FAILURE OF SUCCESS LAKE DAM.a. BREACH WIDTHi. HEIGHT OF DAM:

TOP OF DAM EL. 50.4 ; DAM DOWNSTREAM TOE 34.9; $\therefore H = 15.5$ FT

ii. DAM MID-HEIGHT EL. 42.7

(50.4 - 15.5/2 = 42.7)

iii. APPROXIMATE MID-HEIGHT LENGTH: $\ell^* \approx 50$ FT (SPILLWAY LENGTH IS NOT INCLUDED)

* FROM IECO DRAWINGS

iv. BREACH WIDTH (SEE NED-ACE DOWNSTREAM FAILURE GUIDELINES)

$$W_b = 0.4 \ell = 0.4 \times 50 = 20 \text{ FT}$$

b. PEAK FAILURE OUTFLOW (Q_p)

ASSUME SURCHARGE AT TOP OF DAM (EL. 50.4)





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SUCCESS LAKE DAM

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Sheet 3-9

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i. HEIGHT AT TIME OF FAILURE : $Y_0 = 15.5$ FTii. SPILLWAY DISCHARGE AT TIME OF FAILURE : $Q_s = 309$ CFS

iii. BREACH OUTFLOW :

$$Q_b = 8/27 W_b \sqrt{g} Y_0^{3/2} = 8/27 \times 20 \times \sqrt{32.2} \times 15.5^{3/2} = 2052 \text{ CFS}$$

iv. PEAK FAILURE OUTFLOW TO YELLOW MILL CHANNEL TRIBUTARY

$$Q_p = Q_s + Q_b = 309 + 2052 = 2360 \text{ CFS}$$

c. FLOOD DEPTH IMMEDIATELY DOWNSTREAM FROM DAM:

$$Y = 0.44 Y_0 = 0.44 \times 15.5 = 6.8 \text{ FT}$$

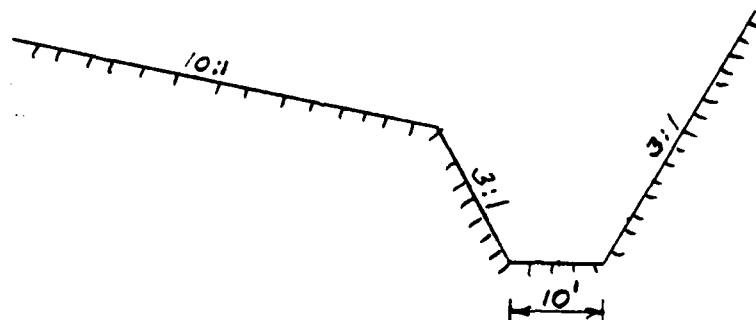
d. ESTIMATE OF DOWNSTREAM FAILURE CONDITIONS AT POTENTIAL IMPACT AREA
(SEE NED-ACE GUIDELINES FOR ESTIMATING DOWNSTREAM FAILURE HYDROGRAPHS)

i. REACH OF YELLOW MILL CHANNEL TRIBUTARY BETWEEN DAM AND IMPACT AREA.

VARIES SIGNIFICANTLY IN SECTION. THE FIRST 1500-FOOT-

LONG REACH IS APPROXIMATELY SHAPED AS SHOWN ON THE

SKETCH BELOW:

THE AVERAGE SLOPE OF THE REACH IS 0.002 ($\pm$)



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Sheet D-10

File No.

Date 3/11/81

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ii SUCCESS LAKE DAM RESERVOIR STORAGE AT TIME OF FAILURE.

STORAGE VOLUME BELOW SPILLWAY CREST APPROXIMATED BY $\frac{1}{4} AH$ $= \frac{1}{4} \times 12.85 \times 12.1 = 38.9 \text{ AC-FT.}$ SURCHARGE STORAGE TO THE OF THE DAM

(EL. 50.4) IS 80.3 AC-FT (SEE STAGE-SURCHARGE CURVE ON P. D-6).

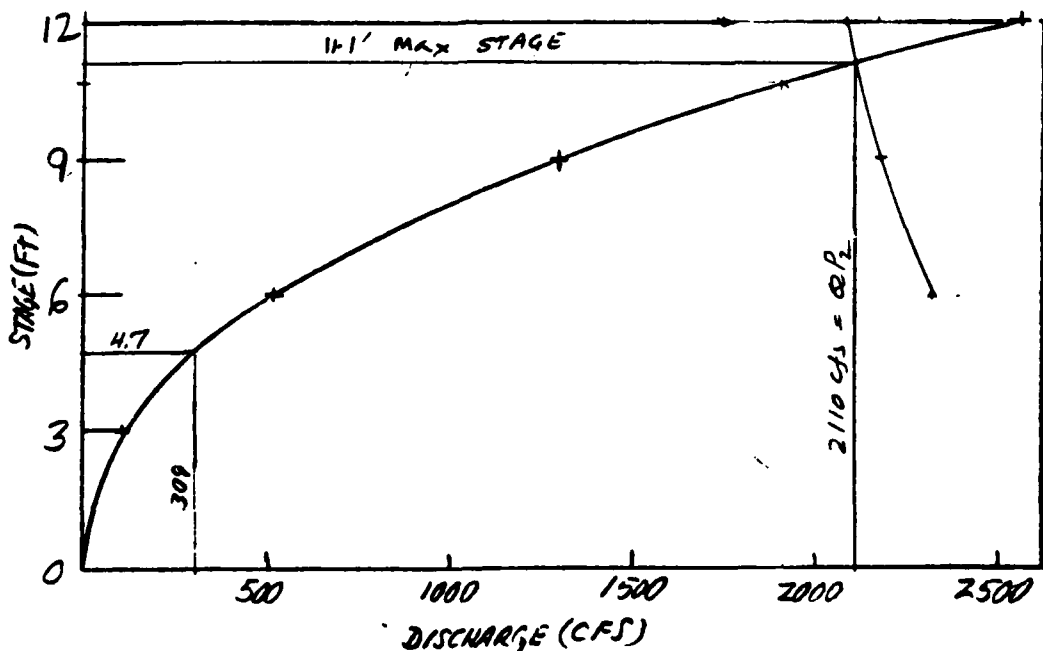
 $\therefore$ MAXIMUM STORAGE VOLUME OF THE RESERVOIR IS $38.9 + 80.3 = 119.2 \text{ AC-FT.}$ ASSUME $S_{MAX} = 119 \text{ AC-FT}$ iii PEAK INFLOW TO REACH: $Q_p = 2360 \text{ CFS}$

iv. APPROXIMATE STAGE AT POTENTIAL IMPACT AREA FAILURE OF SUCCESS LAKE DAM

REACH $L = 3500 \text{ FT}$; $n = 0.05$; $S = 0.002$; COMPUTED STAGE-DISCHARGE

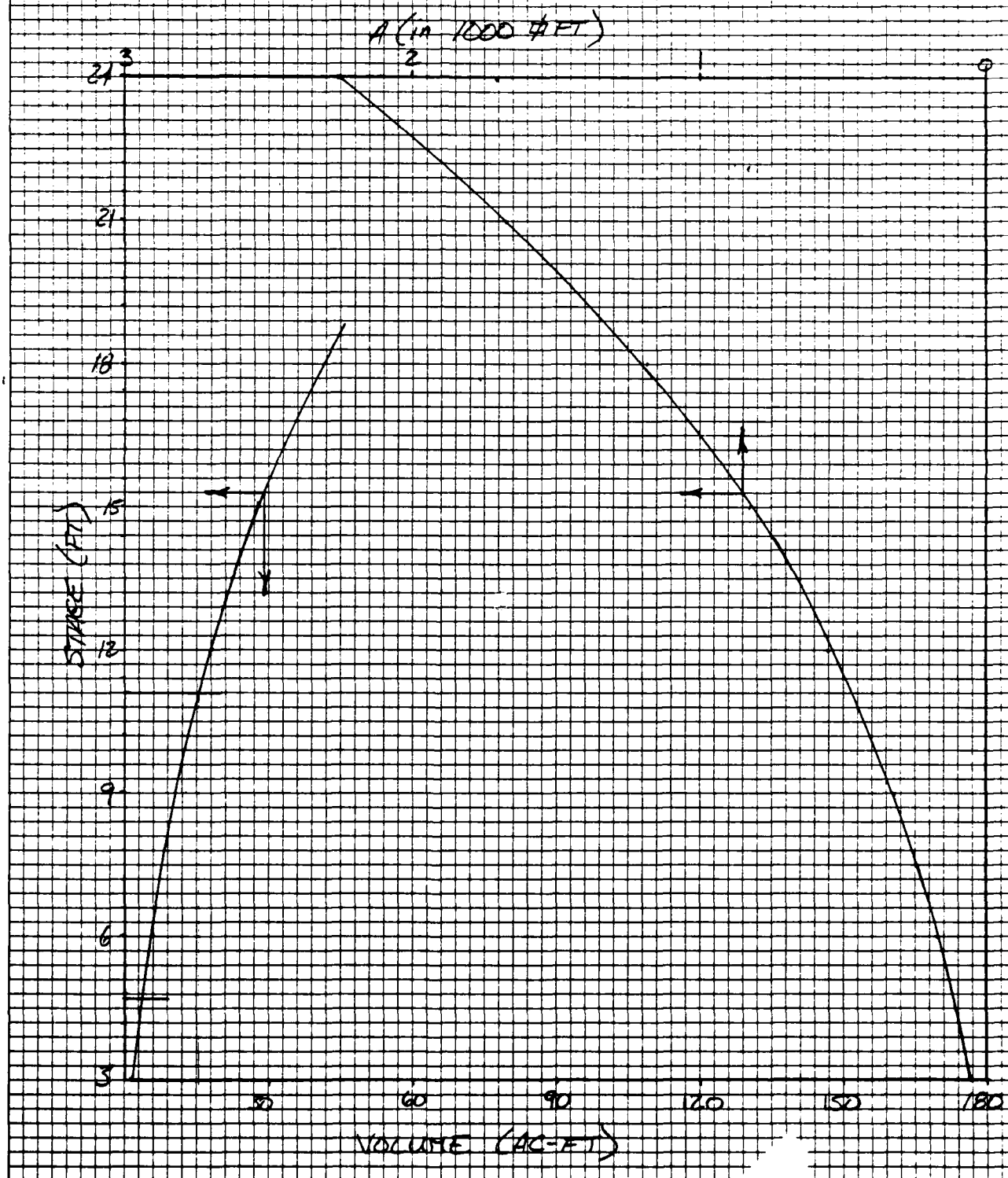
CURVE AND STAGE-AREA CURVE FOR THE BROOK SECTION AS SHOWN ON P. D-9

ARE PLOTTED ON P. D-11.

STAGE-DISCHARGE FOR CHANNEL - REACH 1

D-10

AREA CAPACITY CURVE FOR FIRST REACH (1500 FEET LONG)



46 0660

K-E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.15.3
3.7
11.5



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Sheet 2-12

File No.

Date 3/23/21

Date

PRE FAILURE STAGE 4.7 FT DISCHARGE 309 CFS

INITIAL VOLUME ABSTRACTED 4 AC-FT

H	V	$Q_{P2} = 2360 \left(1 - \frac{VOL-4}{119}\right)$
3	1.7	2406
6	6.0	2320
9	12.9	2183
12	18.1	2080

RISE IN STAGE $11.1 - 4.7 = 6.4'$ $Q_{P2} = 2110 \text{ CFS}$ 



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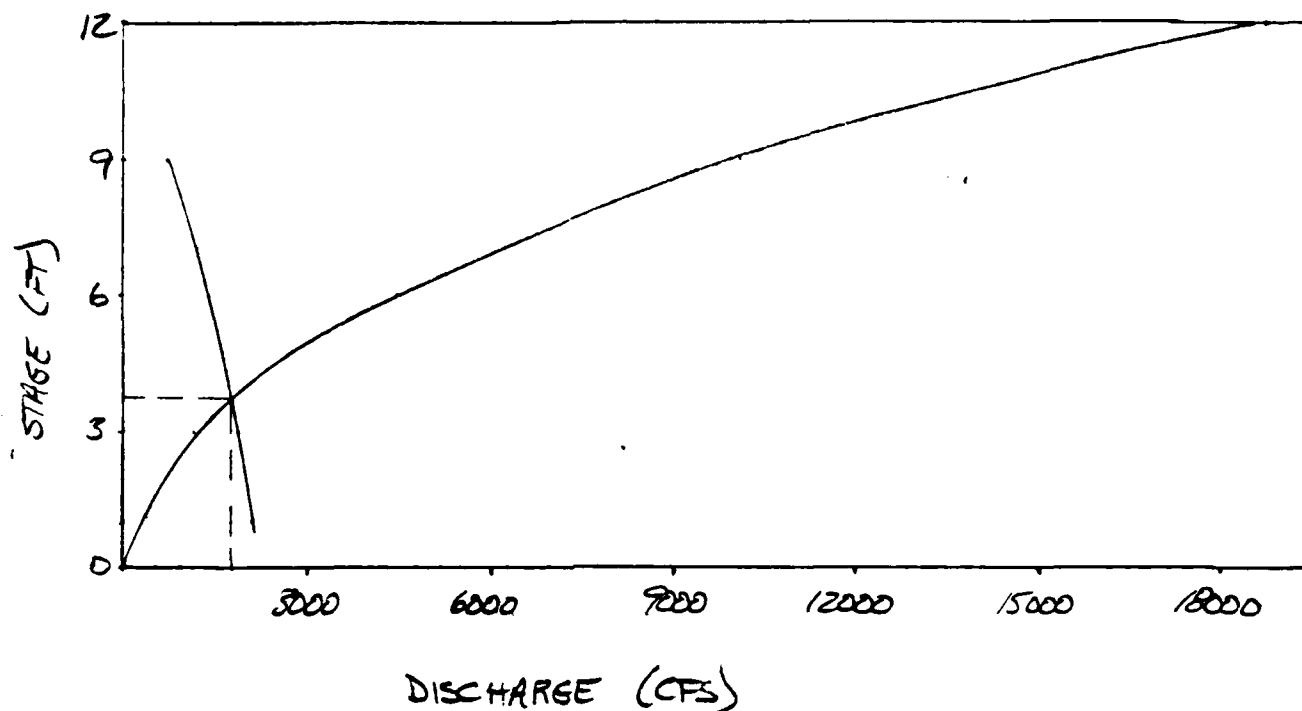
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Date 3/23/81

Date

REACH 2: $L = 1400 \text{ FT}$ $n = 0.05$ $S = 0.002$

STAGE DISCHARGE CURVE FOR REACH 2.



PRE FAILURE STAGE 1.0 FT DISCHARGE 309 CFS
 INITIAL VOLUME ABSTRACTED $V = 4.4 \text{ CC-FT}$
 VOLUME ABSTRACTED BY REACH 1 $\Delta V_1 = 11.5 \text{ AC-FT}$
 ROUTING POINTS FOR GRAPHICAL ROUTING

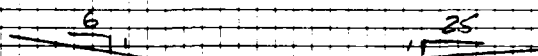
H	VOL	$Q_{P2} = 2110 \left(1 - \frac{VOL - 4.4}{119 - 11.5}\right)$
1	4.4	2110
3	16.06	1881
6	41.07	1390
9	75.04	723

$Q_{P2} = 1800 \text{ cfs}$ $H = 3.7 \text{ FT}$ $\Delta H = 2.7 \text{ FT}$



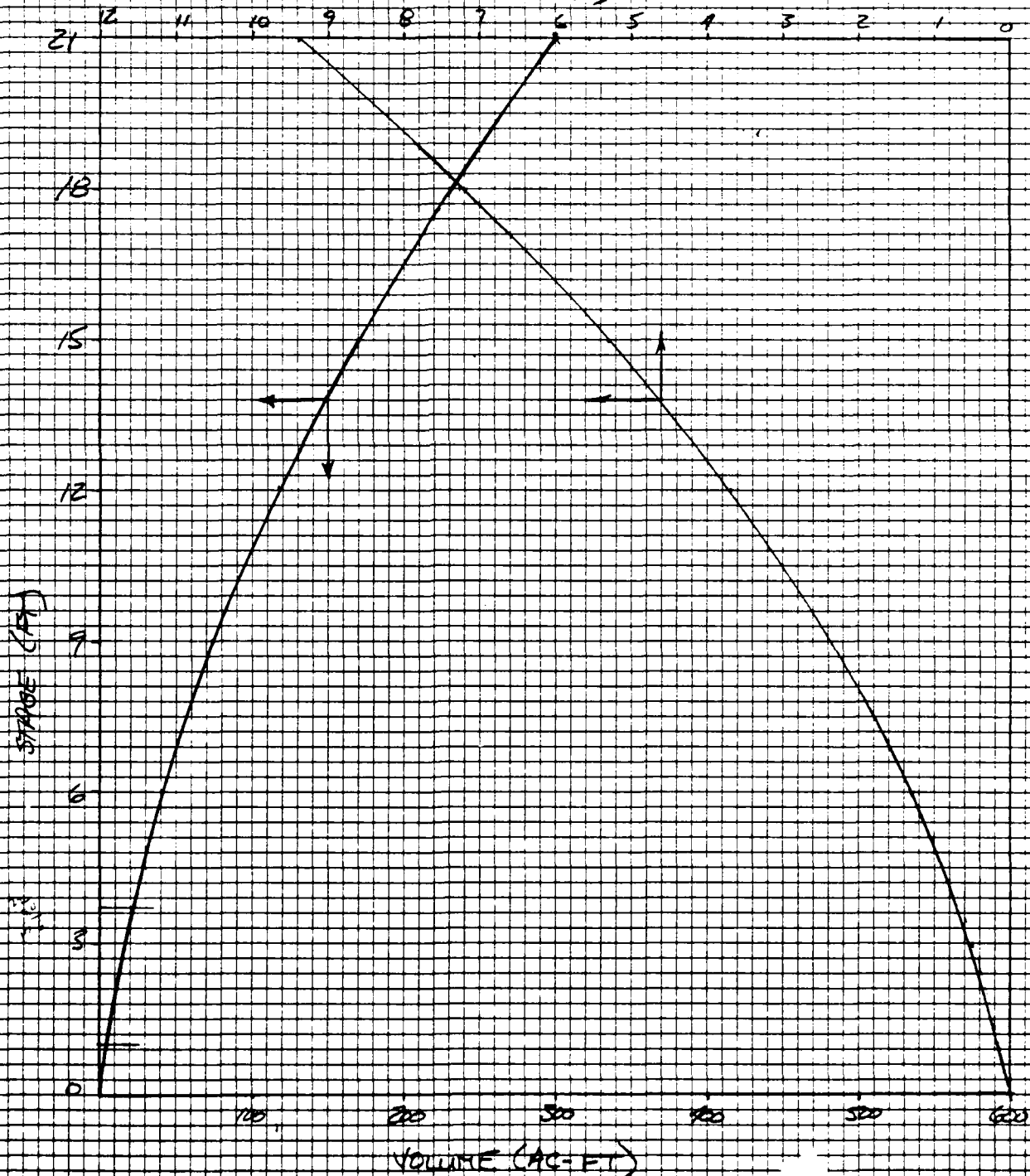
D-14 35F

AREA CAPACITY CURVE FOR SECOND BEACH (1400 FEET LONG)



170 sq ft

CHANNEL SECTION
AREA (1000 FT²)



46 0660

K-E 10 X 10 TO THE INCH • 7 X 10 INCHES
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Feature

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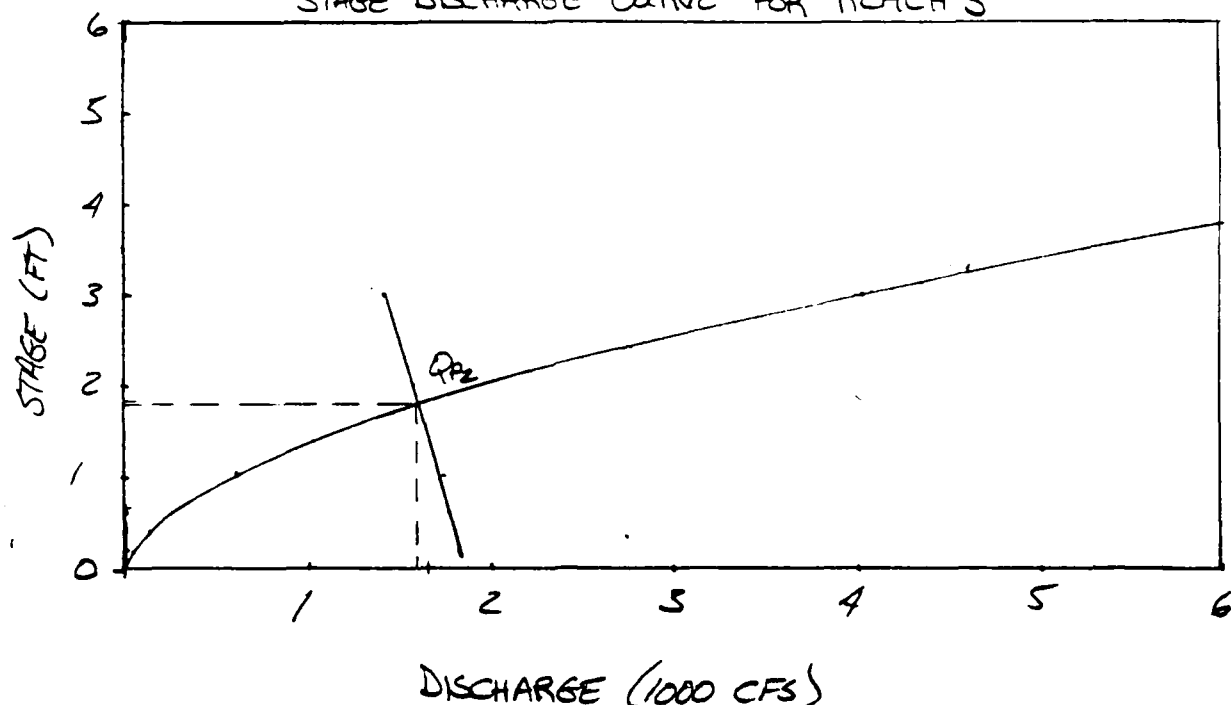
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Date 3/25/91

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REACH 3: $L = 600 \text{ FT}$ $A = 0.05$ $S = 0.002$

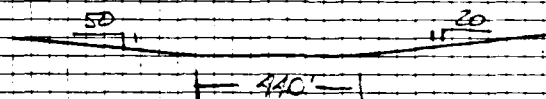
STAGE DISCHARGE CURVE FOR REACH 3

PREFAILURE STAGE $\approx 0.7 \text{ FT}$ DISCHARGE 309 CFSINITIAL VOLUME ABSTRACTED $\approx 3 \text{ AC-FT}$

H	VOL	$Q_{P2} = 1800 \left(1 - \frac{VOL - 3}{119 - 17.5}\right)$
0.2	1.2	1836
0.6	3.8	1784
1.0	6.5	1730
1.4	9.4	1672
2.0	14.0	1580
3.0	22.5	1410

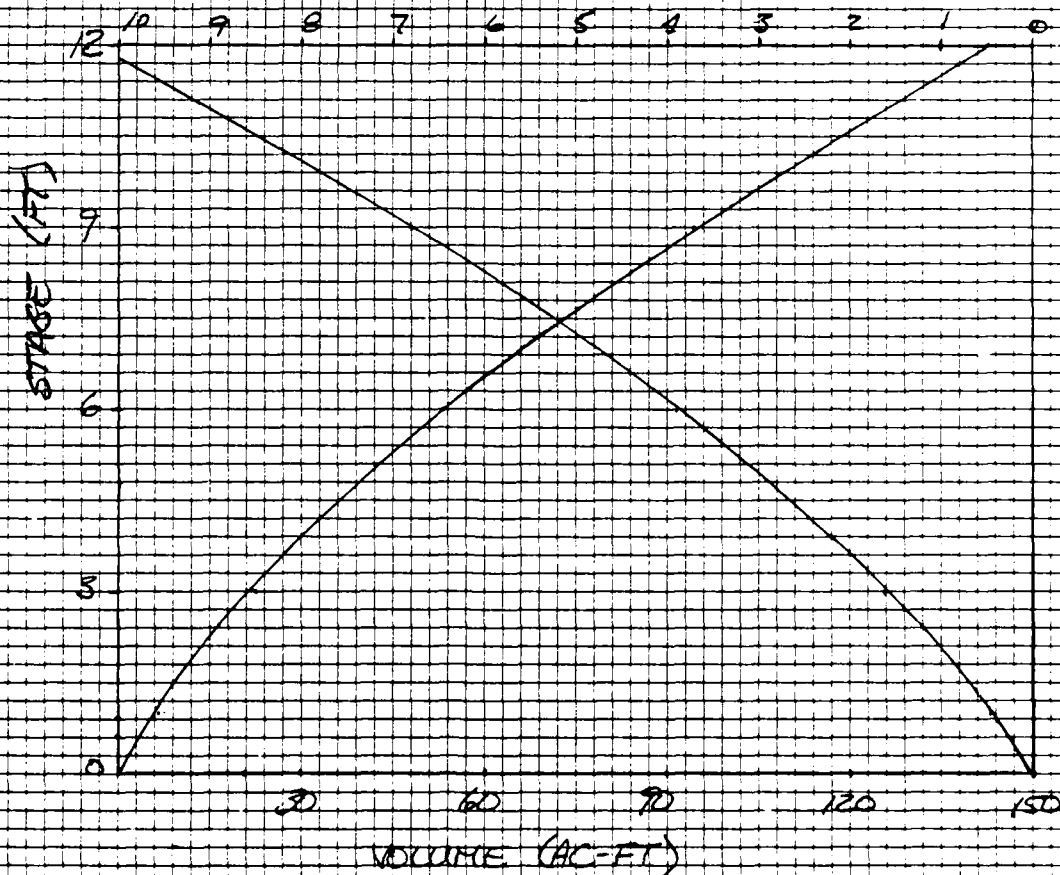


AREA CAPACITY CURVE FOR THIRD REACH (L = 600 FT.)



CHANNEL SECTION
THIRD REACH

AREA (1000 FT²)



46 0660

K-E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.



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Feature SUCCESS LAKE DAM
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File No. _____

Date 3/23/61

Date _____

$$Q_{P2} = 1620 \text{ CFS} \quad H = 1.8 \text{ FT}$$

$$\text{RISE IN STAGE } \Delta H = 1.8 - 0.7 = 1.1 \text{ FT}$$

III. THE RISE IN STAGE WITHIN THE FIRST REACH WILL NOT EFFECT THE STRUCTURE IMMEDIATELY D/S FROM THE DAM (1ST FLOOR EL $\approx$ 20 FT ABOVE STREAM BED) THE RISE IN STAGE WITHIN THE THIRD REACH WILL HAVE LITTLE OR NO EFFECT ON THE STRUCTURES NEAR THE STREAM.



REPRODUCED

FILMED

8