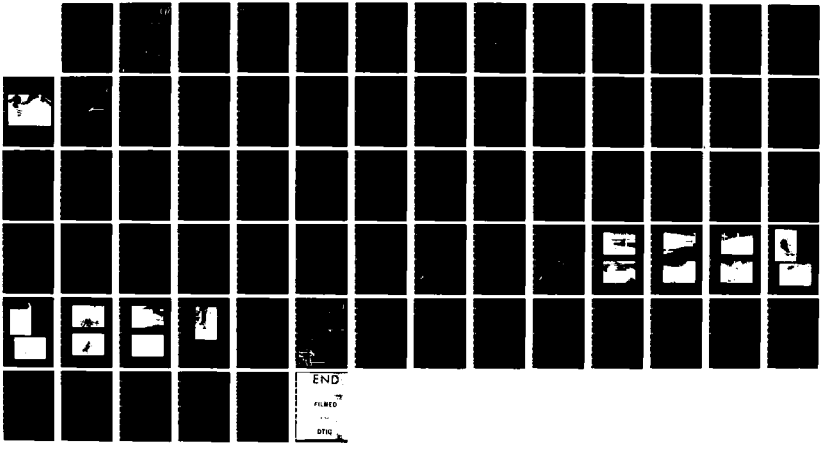
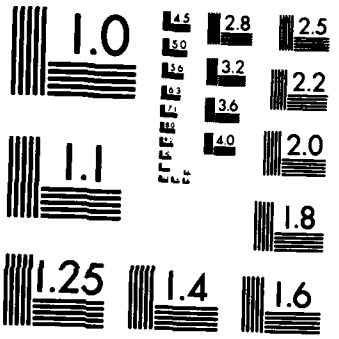
AD-A143 343 NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS 1/1
POTASH POND DAM (CT 0.. (U) CORPS OF ENGINEERS WALTHAM
MA NEW ENGLAND DIV JAN 81

UNCLASSIFIED F/G 13/13 NL





THAMES RIVER BASIN
WINDHAM, CONNECTICUT

POTASH POND DAM
CT. 00193

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

JANUARY, 1981

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER CT 00193	2. GOVT ACCESSION NO. AD-A143 343	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Potash Pond Dam NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS		5. TYPE OF REPORT & PERIOD COVERED INSPECTION REPORT 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS DEPT. OF THE ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION, NEDED 424 TRAPELO ROAD, WALTHAM, MA. 02254		12. REPORT DATE January 1981 13. NUMBER OF PAGES 45
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		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,
Thames River Basin
Windham, Conn.

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

Potash Pond dam is a stone-faced earth embankment dam constructed around 1880 with an impoundment capacity of 75 acre-feet at the spillway crest elevation of 190.0 NGVD. The dam has a maximum height of 18 ft. and is approx. 200 ft. in length with an average crest width of 14 ft. and an upstream slope of 3:1. The dam is judged to be in FAIR condition with several items that require attention to insure the long-term performance of the structure. The dam is classified as SMALL in size and a SIGNIFICANT hazard structure in accordance with the Corps of Engineers.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO
ATTENTION OF:
NEDED

MAY 08 1981

Honorable William A. O'Neill
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

Dear Governor O'Neill:

Inclosed is a copy of the Potash Pond Dam (CT-00193) Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Protection, the cooperating agency for the State of Connecticut. In addition, a copy of the report has also been furnished the owner, Dr. Michael Jacuch, Willimantic, Connecticut.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Protection for your cooperation in carrying out this program.

Sincerely,

C.E. EDGAR, III
Colonel, Corps of Engineers
Division Engineer

Incl
As stated

POTASH POND DAM

CT 00193

THAMES RIVER BASIN

WINDHAM, CONNECTICUT

PHASE 1 INPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM

PHASE 1 - INSPECTION REPORT

IDENTIFICATION NO	CT 00193
NAME OF DAM	Potash Pond Dam
COUNTY AND STATE	Windham, Connecticut
STREAM	Potash Brook
DATE OF INSPECTION	November 18, 1980 & December 2, 1980

Brief Assessment

Potash Pond dam is a stone-faced earth embankment dam constructed around 1880 with an impoundment capacity of 75 acre-feet at the spillway crest elevation of 190.0 NGVD. The dam has a maximum height of 18 feet and is approximately 200 feet in length (including the spillway) with an average crest width of 14 feet and an upstream slope of 3:1. The spillway is a stone masonry, uncontrolled, vertical fall, broad crested weir, with a 4 inch concrete cap, 55 feet in length. A 30 inch diameter steel plate penstock which serves as the outlet is located to the right of the spillway and formerly supplied water to the mill located downstream of the dam. The mill no longer exists and hydro-generation facilities are presently abandoned. The outlet was originally gated on the upstream side of the dam but the gate structure is now missing.

The assessment of the facility is based on the visual inspection since engineering, operational and maintenance data are not available. The dam is judged to be in FAIR condition with several items that require attention to insure the long-term performance of the structure. They include: apparent movements in the area of the penstock as indicated by crest settlement, deflection of the stone wall on the crest and seepage at the toe; inoperable outlet works; missing and dislodged masonry blocks on the upstream face of the dam; missing mortar between the stone masonry of the spillway training walls; the lack of a scheduled inspection or maintenance program; and trees and brush growing on top of the left abutment of the dam.

The dam is classified as SMALL in size and a SIGNIFICANT hazard structure in accordance with the recommended guidelines established by the Corps of Engineers. Based on the size and hazard classification, the test flood for this structure ranges from the 100 year frequency event to one-half of the PMF. One-half of the PMF was calculated to be 150 CSM or 2,250 CFS and was adopted as the test flood for Potash Pond Dam because of the potential damage downstream. Calculations indicate that the routed test flood

outflow of 2,200 CFS would overtop the dam by about 1.6 feet; therefore, the spillway capacity is considered inadequate. Assuming the pool elevation at the top of the dam, the spillway can pass a flow of 840 CFS, which represents only 38 percent of the routed test flood outflow.

Based on a visual inspection at the site, the dam is considered to be in POOR condition. There are several areas of concern which must be corrected to assure the long-term performance of this dam. It is recommended that the owner engage the services of a registered engineer experienced in the design of dams to accomplish the following:

1. Perform a detailed hydrologic/hydraulic investigation to assess further the potential of overtopping the dam and the need for and the means to increase project discharge capacity.

2. Install a low level outlet to provide a means to draw down the reservoir.

3. Inspect and evaluate the spillway when there is no flow over it.

4. Investigate the cause of the seepage and movements of the crest in the vicinity of the penstock.

5. Investigate and recommend methods to repair the stone masonry and halt erosion along the upstream face of the dam.

6. Remove brush, trees and roots on the dam and 20 feet downstream. Backfill the holes with suitable compacted fill.

These and other recommendations and remedial measures as described in Section 7 should be implemented by the owner within one year after receipt of this Phase 1 Inspection Report.

NEW ENGLAND ENGINEERING, INC.

BY: David A. Sluter

David A. Sluter, P. E.
President

This Phase I Inspection Report on Potash Pond Dam (CT-00193) has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgement and practice, and is hereby submitted for approval.

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

JOSEPH W. FINEGAN, JR., MEMBER
Water Control Branch
Engineering Division

ARAMAST MAHTESIAN, CHAIRMAN
Geotechnical Engineering Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase 1 Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, DC 20314. The purpose of a Phase 1 Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase 1 investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with the data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

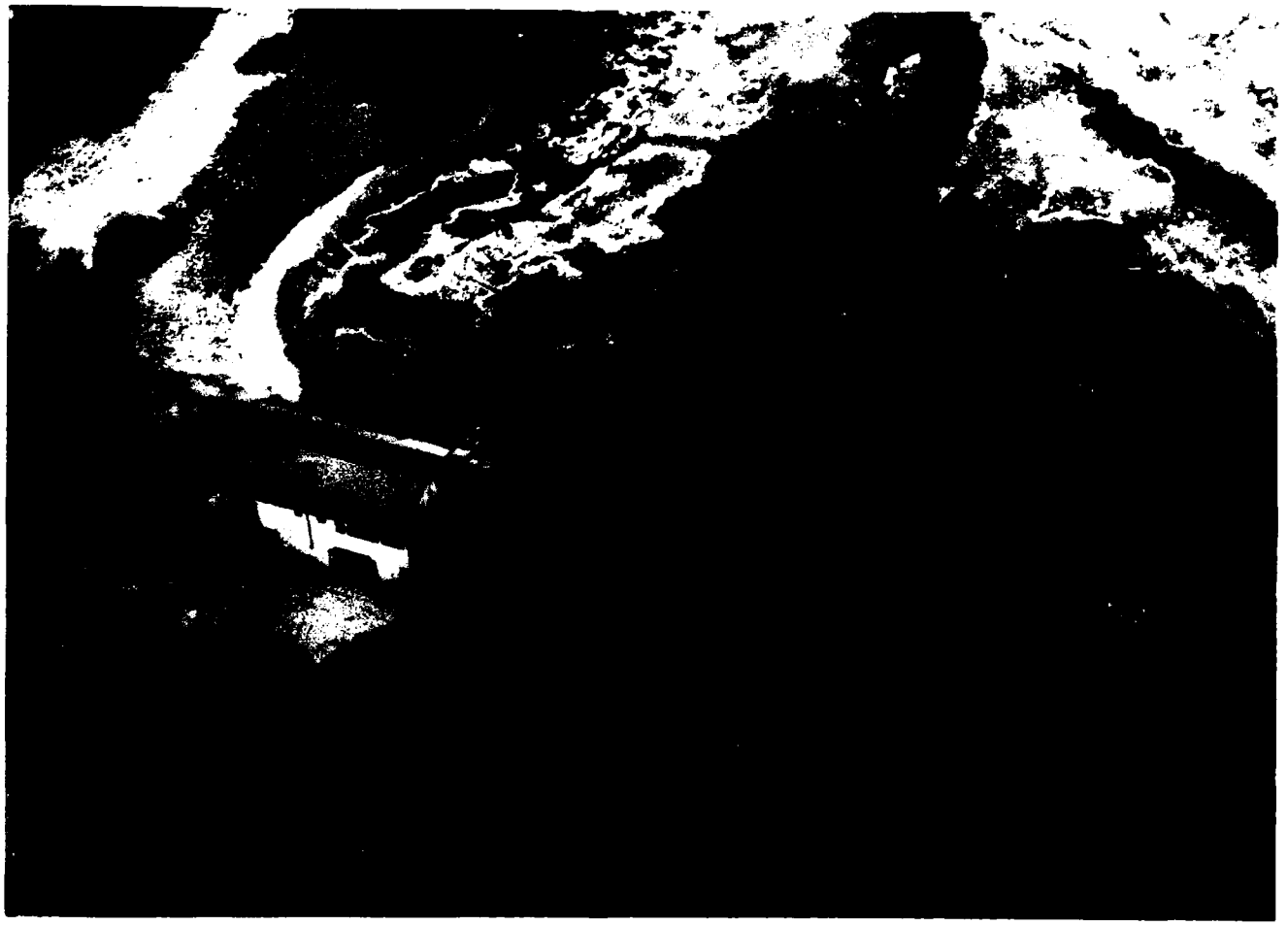
It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase 1 inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonable possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition, and the downstream damage potential.

The Phase 1 Investigation does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

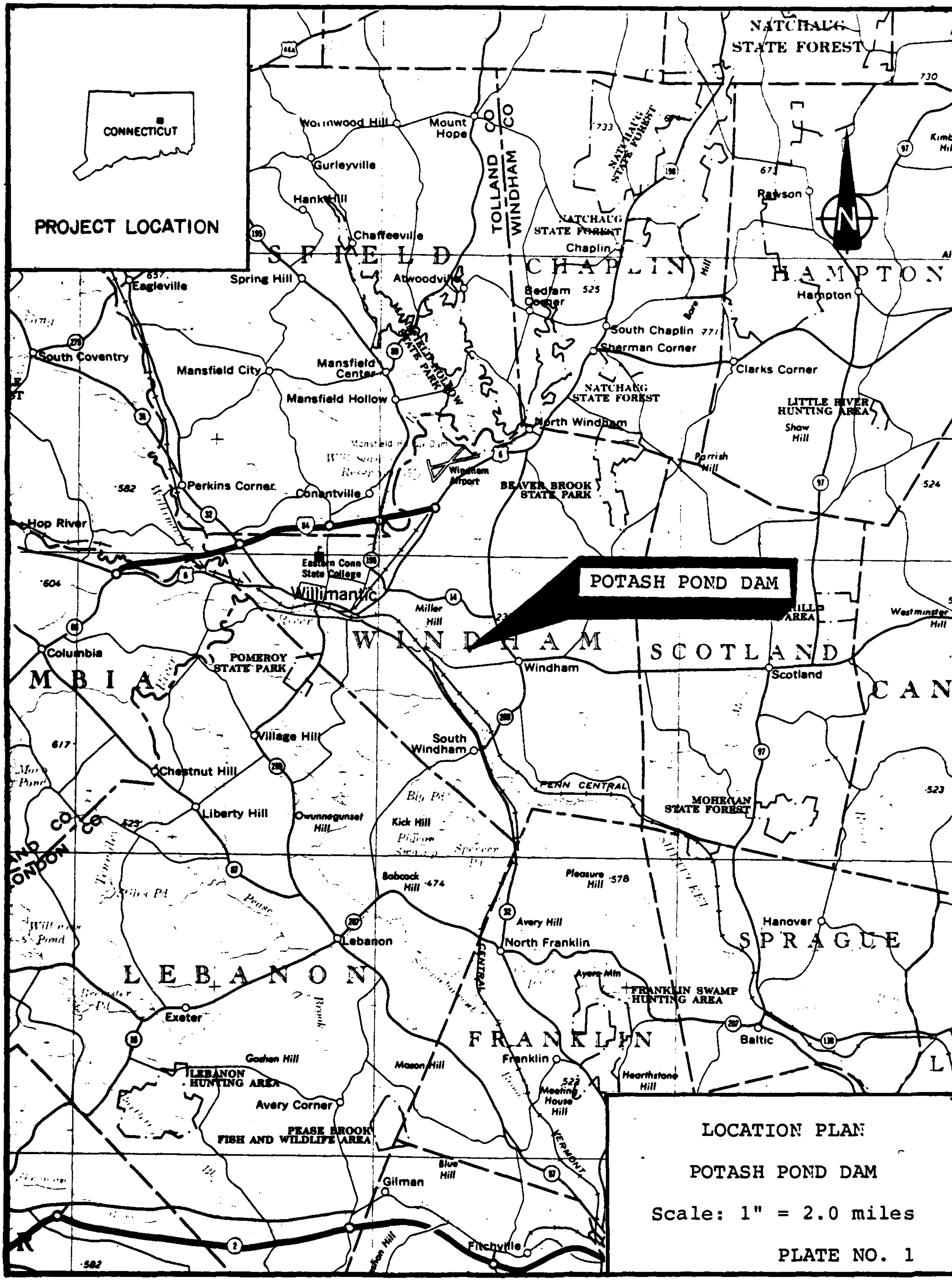
TABLE OF CONTENTS

APPENDICES



OVERVIEW PHOTO - POTASH POND DAM

December 31, 1980



LOCATION PLAN

POTASH POND DAM

Scale: 1" = 2.0 miles

PLATE NO. 1

NATIONAL DAM INSPECTION PROGRAM

PHASE 1 - INSPECTION PROGRAM

POTASH POND DAM

SECTION 1

PROJECT INFORMATION

1.1 General

a. Authority. Public Law 92-367, August 8, 1972, authorized the Secretary of the Army through the Corps of Engineers to initiate a national program of dam inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. New England Engineering, Inc. has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed was issued to New England Engineering, Inc. under a letter from William E. Hodgson, Jr., Colonel, Corps of Engineers. Contract No. DACW33-81-C-0007 has been assigned by the Corps of Engineers for this work.

b. Purpose of Inspection.

1. Perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.

2. Encourage and assist the State to initiate quickly effective dam safety programs for non-Federal dams.

3. To update, verify, and complete the National Inventory of Dams.

1.2 Description of the Project

a. Location. Potash Pond Dam is located in the southwestern part of the Town of Windham, Connecticut as shown on the Willimantic, CT, USGS quadrangle sheet. The dam, located on Potash Brook, is sited about 1,800 feet upstream of the confluence with the Shetucket River. The dam impounds water from a 2.98 square mile watershed of rolling terrain. Approximate coordinates of the dam are 41 degrees, 42.5' North Latitude and 72 degrees, 10.5 W Longitude. The pond is aligned along a northeast-southwest axis with the dam at the southwesterly extremity of the impoundment.

b. Description of Dam and Appurtenances. The Potash Pond Dam consists of a stone masonry main overflow spillway, a natural earth emergency overflow spillway, and two earth embankment sections. The earth embankment sections are about 18 feet high and are faced with stone masonry on the downstream side. The stone face is nearly vertical on the downstream side. The crest is variable in width, with the right embankment varying from 14 to 24 feet and the left from 10 to 24 feet. The total length of the dam is 200 feet including the main spillway. The main spillway length is 55 feet. The emergency overflow spillway is located approximately 15 feet to the left of the left abutment of the dam and is a trapezoidal earth channel with a 6 foot bottom width and 5:1 side slopes.

One outlet is visible on the downstream face of the dam to the right of the spillway. The outlet is a 30 inch diameter steel plate penstock. The gate control structure for the outlet is missing and the outlet is inoperable at the present time. The spillway crest is at elevation 190 feet NGVD and is approximately 55 feet long. Discharges over the spillway flow into Potash Brook. Flow through the penstock and over the emergency spillway would re-enter Potash Brook approximately 75 feet downstream of the dam.

c. Size Classification. This dam has an impoundment capacity of 96 Ac-Ft at the top of the dam (elevation 192.5 NGVD) and a maximum height of 18 feet. In accordance with the guidelines established by the Corps of Engineers, this dam is classified as SMALL in size based on its impoundment capacity. Corps of Engineers guidelines specify that dams with impoundment capacities less than 1,000 Ac-Ft and greater than or equal to 50 Ac-Ft or a height of less than 40 feet and greater than or equal to 25 feet be classified as SMALL in size.

d. Hazard Classification. This dam is classified a SIGNIFICANT hazard potential because its failure could result in a loss of a few lives and inundation of 1-2 homes downstream of the dam. It is estimated that a dam failure discharge of 7,700 CFS and flooding to a depth of 1-2 feet in the homes located within the prime dam failure impact area. The prefailure discharge of 840 CFS would not produce any flooding at these homes. The dam failure discharge was computed assuming the water level in the reservoir to be equal to the top of dam elevation of 192.5 NGVD at the time of failure. In addition, the bridge located downstream of the dam would be subject to damage from flooding as a result of a dam failure.

e. Ownership. The dam is presently owned by Dr. Michael Jacuch, RFD #2, Willimantic, Connecticut. Phone (203) 527-3684.

f. Operator. Operation is at the direction of the Owner.

g. Purpose of Dam. The dam was formerly used to supply water for electric power generation. At the present time, the dam and reservoir are used for recreation.

h. Design and Construction History. The dam was probably built around 1880. According to the owner, the dam was breached in the 1930's and was subsequently repaired. No construction history or record of subsequent repairs due to the breach is available.

i. Normal Operating Procedure. The reservoir is unregulated and all downstream flows result from flow over the uncontrolled spillway.

1.3 Pertinent Data.

a. Drainage Area. The Potash Pond Dam drainage basin is elongated in shape with a length of 3.2 miles, a width of 1.0 miles and a total drainage area of 2.98 square miles (See Appendix D for the basin map). Approximately 25 percent of the basin is swampy or occuppied by water storage reservoirs. The topography consists of rolling terrain with elevations ranging from a high of 560 feet to 190 feet at the spillway crest. Basin slopes range from 0.03 to 0.04 feet per feet and are considered moderate.

b. Discharge at Damsite. There are no discharge records available for this dam. Calculated discharge data for the dam is listed below.

1. Outlet Works

a. Conduit size	30 inch diameter steel plate penstock (inoperable). Invert = 181.7.
b. Discharge capacity with pond at spillway crest elevation = 190.0	63 CFS
c. Discharge capacity with pond at top of dam elevation = 192.5	73 CFS
d. Discharge capacity at test flood elevation = 194.1	79 CFS

2.	Maximum known flood at damsite	Unknown
3.	Ungated spillway capacity at top of dam (main and emergency)	840 CFS
4.	Ungated spillway capacity at test flood elevation (main and emergency)	1,725
5.	Gated spillway capacity at normal pool elevation	N/A
6.	Gated spillway capacity at test flood elevation	N/A
7.	Total spillway capacity at test flood elevation	1,725 CFS
8.	Total project discharge at top of dam	840 CFS
9.	Total Project discharge at test flood elevation	2,200 CFS

c. Elevations (Feet above NGVD)

1.	Streambed at toe of dam	174.5
2.	Bottom of cutoff	N/A
3.	Maximum tailwater	Unknown
4.	Normal pool	N/A
5.	Full flood control pool	N/A
6.	Spillway	
	a. Main Spillway Crest	190.0
	b. Emergency Spillway Crest	191.3
7.	Design discharge (originaldesign)	Unknown
8.	Top of dam	192.5
9.	Test Flood level	194.1

d.	Reservoir Length (in feet)	
	1. Normal pool	1,100
	2. Flood control pool	N/A
	3. Spillway crest pool	1,100
	4. Top of dam	1,100
	5. Test flood pool	1,100
e.	Storage (acre-feet)	
	1. Normal pool	75
	2. Flood control pool	N/A
	3. Spillway crest	75
	4. Top of dam	96
	5. Test flood pool	115
f.	Reservoir Surface Area (Acres)	
	1. Normal pool	7
	2. Flood control pool	N/A
	3. Spillway crest	7
	4. Test flood	12
	5. Top of dam	10
g.	Dam	
	1. Type	Earth embankment with stone facing
	2. Length (including 55.0 foot spillway).	200 feet
	3. Height	18 feet
	4. Top width	Right embankment - 14-24 feet Left embankment - 10-24 feet
	5. Side slopes	Downstream - vertical Upstream - 3:1
	6. Zoning	Unknown

7.	Impervious core	Unknown
8.	Cutoff	Unknown
9.	Grout curtain	Unknown
10.	Other	-----

h. Diversion and Regulating Tunnel — N/A

i. Spillway

1.	Type:	
	a. Main Spillway	Free overflow, broad crested, uncontrolled, vertical fall
	b. Emergency Spillway	Trapezoidal earth channel
2.	Length of Weir:	
	a. Main Spillway	55 feet
	b. Emergency Spillway	6 ft. bottom width, natural earth, 5:1 side slopes
3.	Crest Elevation:	
	a. Main Spillway	190.0
	b. Emergency Spillway	191.3
4.	Gates	None
5.	U/S Channel	Natural bed of Reservoir
6.	D/S Channel	Potash Brook
7.	General	------

j. Regulating Outlet

Refer to Paragraph 1.2b "Description of Dam and Appurtenances" Page 1-2 for description of outlet works.

1.	Downstream invert	181.7 feet
2.	Size	30 inch diameter
3.	Description	Riveted steel plate penstock pipe.
4.	Control Mechanism	Missing, upstream opening is buried.
5.	Other	--------

SECTION 2

ENGINEERING DATA

2.1 Design Data

No design data is available for this dam.

2.2 Construction Data

No record of construction or subsequent repair is available for this dam.

2.3 Operation Data

No record of operation for this facility is available.

2.4 Evaluation of Data

a. Availability. No information available.

b. Adequacy. The lack of in-depth engineering data did not allow for a definative review. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing design and construction data, but is based primarily on visual inspection, the dam's past performance and sound engineering judgement.

c. Validity. No data is available.

SECTION 3

VISUAL INSPECTION

3.1 Findings

a. General. The Phase 1 Inspection of Potash Pond Dam was performed on November 18, and December 2, 1980, by representatives of New England Engineering, Inc. and Geotechnical Engineers, Inc. A visual checklist and photographs of that inspection have been included in Appendix A and C, respectively, of this report. Based on the visual inspection, limited history and general appearance, the dam and its appurtenances are judged to be in POOR condition.

b. Dam. The dam is about 200 feet long and about 18 feet high and is an earth embankment structure with both upstream and downstream faces of stone masonry. A 55 foot main spillway is located near the left abutment and an emergency spillway is located about 15 feet to the left of the left abutment. A 30 inch diameter steel plate penstock passes through the dam approximately 30 feet to the right of the main spillway.

1. Crest. The crest of the dam varies from about 10 feet to 24 feet wide to the left of the main spillway and is about 14 feet wide to the right of the main spillway. Several tree stumps to 12 inches in diameter are located on the left embankment and a 12 inch diameter tree is also growing there. The surface of the crest is irregular with a slight dip in the crest over the penstock. Several depressions caused by erosion along the upstream face have been patched with concrete. The concrete patches are cracked and broken and subject to further erosion (Photo C-7).

2. Upstream Face. Only the upper 2 feet of the upstream face of the dam was visible at the time of inspection. The stone masonry to the right of the spillway has mortared joints which require repointing. The stone masonry face has been eroded to the right of the small wood dock (Photo C-13) and is falling into the pond. The upstream slope of the dam to the left of the spillway has no stone masonry or rock protection.

3. Downstream Face and Toe. The masonry forming the downstream face does not appear to have been mortared and the earth fill is migrating out between the open joints (Photo C-10). The stone masonry wall on the crest to the right of the spillway has settled and is tilting 10 degrees toward the upstream face (Photo C-8). There are trees growing adjacent to the downstream face ranging in size from 4 inches to 12 inches in diameter (Photos C-5, C-6). A wood frame summer house is located at the downstream face approximately 45 feet to the right of the spillway. A 30 inch diameter steel penstock passes through the dam 30 feet to the right of the spillway. The penstock formerly supplied water to a vertical hydroelectric turbine which is still in place but not serviceable (Photo C-9). This penstock is rusted completely through in several places. The wood inlet control structure for the penstock is completely rotted away and is not operable. Clear seepage was observed at the toe of the dam at the penstock and was estimated to be 2-3 gallons per minute. Minor seepage indicated by wet spots on the stone masonry was also observed in the general area of the penstock from approximately 6 feet below the water line to the toe of the dam. Several stones are missing from the downstream face of the dam and left spillway training wall at the left edge of the spillway (Photos C-1, C-6).

c. Appurtenant Structure.

1. Spillway. Water was flowing over the spillway at the time of inspection and it was not possible to fully inspect this structure. Both spillway training walls are in need of repair with open joints and missing stones in the stone masonry (Photos C-1, C-2, C-6). The stone masonry spillway has a 4 inch thick concrete cap which is not level across the entire spillway. It appears that water is leaking under the concrete cap in several places along the spillway (Photo C-6). An earth channel excavated to the left of the left abutment serves as an auxiliary emergency overflow spillway. There are numerous small trees and brush growing in the emergency spillway which reduces its capacity (Photo C-11).

2. Outlet Works. The intake structure and penstock which served as the outlet conduit are located 30 feet to the right of the spillway. At present, the outlet works are inoperable. The wood intake and gate structure are completely rotted

away and the entrance to the penstock is apparently sealed since only a minor amount of leakage (much less than 1 gallon per minute) was observed coming through the penstock. The penstock is rusted through in several places leaving holes up to 1 foot in diameter in the bottom. There is no way to drain the reservoir presently without rehabilitating the outlet works.

d. Reservoir Area. No specific detrimental features in the reservoir area were observed during the inspection. The slopes and shoreline are covered with dense vegetation which protects them from sloughing and erosion.

e. Downstream Channel. The downstream channel is a natural earth and rock channel as seen on Photo C-12. There are no major obstructions in the downstream channel. A large area of erosion has undercut the steep left bank of the channel approximately 75 feet downstream from the dam (Photos C-12, C-14). This apparently is the result of high flows and could have been the result of the reported failure of the dam in the 1930's.

3.2 Evaluation

Based on the visual observations, the dam appears to be in POOR condition. The following features could adversely affect the future performance of the dam.

a. The outlet gate structure and penstock are not operable.

b. The seepage and irregular surface and depressions in the crest in the area of the penstock which may be the result of distress of the dam.

c. Trees growing in the crest and downstream toe area which could be uprooted during a storm and cause erosion and instability of the dam. In addition, the tree roots could form seepage paths through the dam which could become "piping" outlets for seepage.

d. Displaced and missing stones on the downstream face and spillway training walls of the dam.

e. Trees growing in the emergency overflow spillway reducing its discharge capacity.

f. Partial failure of the stone masonry along the upstream face of the dam.

SECTION 4

OPERATIONAL AND MAINTENANCE PROCEDURES

4.1 Operation Procedures

a. General. The outlet works are inoperable. All discharges flow over the spillway crest to Potash Brook.

b. Description of Any Warning System in Effect. There is no warning system in effect for Potash Pond Dam.

4.2 Maintenance Procedures

a. General. The dam and appurtenances are not maintained.

b. Operating Facilities. There are no operating facilities at the dam.

4.3 Evaluation

a. The facility is not regularly maintained, monitored or regulated by the Owner. The outlet works is inoperable due to decay of the gate structure. The penstock is rusted through in several places and is not serviceable.

b. Vegetation in the form of trees and brush is present over the left embankment and downstream toe. The stone masonry on the upstream face of the right embankment and the downstream face of the left embankment is eroded and missing.

c. There is no regularly scheduled maintenance for this dam. A systematic inspection and rehabilitation program should be developed and implemented. The outlet structure should be rehabilitated so that the pond level may be lowered if required.

d. An emergency action plan should also be developed and implemented that includes reservoir dewatering procedures, locations of emergency equipment, materials or manpower to reduce or minimize dam failure damage, authorities to be contacted in emergency situations and a program of surveillance during unusual storm events.

SECTION 5

EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

5.1 General

Potash Pond Dam, constructed around 1880, is located on Potash Brook in the Thames River drainage basin in Connecticut. This reservoir has a gross drainage area of 2.98 square miles and is located 1,800 feet upstream from the confluence with the Shetucket River. Basin characteristics of this watershed include flat to moderate slopes with approximately 25% of the basin area covered by natural storages and swamps. There are no gaging stations located in this watershed, however, a gaging station is located on the Shetucket River 600 feet downstream from the confluence with Potash Brook. The reservoir has a small storage capacity of 75 Ac-Ft, a small surface area of 7.0 acres at the spillway crest elevation and a maximum spillway capacity of 840 CFS.

This dam has a main spillway length of 55 feet, and a surcharge height of 2.5 feet. The total length of dam is 200 feet. The reservoir has a total storage capacity at the spillway crest level of 75 Ac-Ft. Each foot of depth in the reservoir above spillway level can accommodate 7.0 Ac-Ft of water equivalent to 0.04 inches of runoff.

5.2 Design Data

No specific design data is available for the watershed or structures of Potash Pond Dam. In lieu of existing design information, U.S.G.S. Topographic Maps (Scale 1" = 2,000') were utilized to develop hydrologic parameters such as drainage areas, reservoir surface areas, basin slopes, and other runoff characteristics. Elevation -storage relationships for the reservoir were approximated by planimetering the surface area of the pond and the next higher contour from the U.S.G.S. Topographic Map and interpolating areas for given elevations. Some of the pertinent hydraulic design data was obtained and/or confirmed by actual field measurements at the time of the visual field inspection. Test flood inflow/outflow values and dam failure profiles were determined in accordance with the Corps of Engineers guidelines.

5.3 Experience Data

No historical data for recorded discharges or water surface elevations is available for this dam. The owner has reported that the dam was breached in the 1930's, however, no information is available concerning the breach.

5.4 Test Flood Analysis

Recommended guidelines for the Safety Inspection of Dams by the Corps of Engineers were used for selection of the Test Flood. This dam is classified under those guidelines as a SIGNIFICANT hazard and SMALL in size. Guidelines indicate that a 100 year event to one-half PMF be used as a range of test floods for such a classification. One-half the PMF was selected because of the potential for downstream damage. The watershed has a total drainage area of 2.98 square miles, 25% of which is swampy or covered by natural storages. This drainage area is largely wooded and hilly with rolling terrain. The basin slopes average 0.03 feet per feet which are considered moderate. A test flood value was selected from the Corps of Engineers PMF curves for a watershed with rolling topography and reduced by 25% for storage. The test flood for this dam was calculated to be 750 CSM, equal to 2,250 CFS. Outflow discharges were also developed using the Corps of Engineers criteria for approximate routing procedures. The routed outflow discharge for the test flood inflow was 2,200 CFS with the outlet closed. The spillway rating curve is illustrated in Appendix D. Flood routings were performed assuming an initial reservoir pool at the main spillway crest level with a uniform dam crest elevation of 192.5. Calculations indicate the spillway capacity is hydraulically inadequate to pass the routed test flood outflow and this flow will overtop the dam by approximately 1.6 feet. At the top of the dam, the main spillway has a capacity of 740 CFS and the emergency spillway has a capacity of 100 CFS. The emergency spillway is an earth channel which was excavated approximately 15 feet to the left of the left abutment. The maximum outflow capacity of the spillways, without overtopping the dam is 840 CFS which is 38% of the routed test flood discharge.

5.5 Dam Failure Analysis

An instantaneous full depth - partial width breach of 60 feet was assumed to have occurred in the dam. This adopted breach width of 60.0 feet was based on 40% of the dam length at mid-height. The calculated dam failure discharge of 7,700 CFS presumes the reservoir level was at the top of the dam before failure and that the breach was not located at the spillway. The estimated damage reach extends downstream for a distance of 1,500 feet. Failure of this structure could result in the loss of a few lives, inundation of 12 dwellings and potential damage to the Lovers Lane bridge. It is estimated that failure could result in a depth of flooding of 1-2 feet in the affected homes. No flooding of the homes is expected at the pre-failure discharge of 840 CFS.

The prime impact area that would be subject to flood damage if the dam were to fail has been delineated on the Dam Failure Impact Area Map in Appendix D. As a result of the failure analysis, the dam has been classified as a SIGNIFICANT hazard structure.

SECTION 6

EVALUATION OF STRUCTURAL STABILITY

6.1 Visual Observations

The visual observations at the dam indicated that several structural problems exist.

Settlement of the crest in the area of the penstock has occurred and soil particle movement appears to be occurring through the downstream face. The stone wall on the downstream side of the crest above the penstock is also tilting (See Section 3) and clear seepage was occurring on the day of inspection in the vicinity of the penstock (See Section 3). These observations indicate that a piping failure or collapse of the downstream face may occur due to a continuation of these processes. For this reason it is recommended that observations be made on a regular basis to check whether movements of the crest, stone wall and of soil fines is continuing, and to make recommendations on how to control the movements so that the probability of failure will be reduced.

6.2 Design and Construction Data

There are no design and construction data available.

6.3 Post-Construction Changes

According to the Owner, this dam was breached during the 1930's. It is possible that the spillway was the zone of the dam that was breached. The downstream face of this spillway is vertical whereas the downstream face of the right embankment is slightly inclined towards the downstream from top to bottom. The difference in the slopes of the two sections is observable at the right edge of the spillway as seen on Photo C-15. Also, the bank on the left side of the spillway discharge channel has been eroded to a height about 8 feet above the adjacent streambed, starting about 25 feet downstream from the downstream face (Photo C-14). This erosion may have occurred at the time of the breach and been left unrepaired. Photo C-6 shows the left side of the discharge channel immediately downstream from the dam. The slope is steep but uniform. It is possible that this zone was eroded during the breach and subsequently repaired.

No information is available on how the dam was rebuilt after the breach. Thus none of this history leads to any conclusion relative to the present stability of the dam.

The emergency spillway was reported constructed prior to 1963 when the present owner purchased the dam. No records of its design or construction are available.

6.4 Seismic Stability

This dam is in Seismic Zone 1. Therefore, according to the recommended guidelines, a seismic stability analysis is not warranted.

SECTION 7

ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition. Based on the visual inspection and review of available data, the dam is judged to be in POOR condition.

b. Adequacy of Information. The information available is such that the assessment of the dam must be based on the visual inspection.

c. Urgency. The recommendations and remedial measures described below should be implemented within one year after receipt of this Phase 1 inspection report by the Owner.

7.2 Recommendations

The following items should be carried out under the direction of a qualified registered engineer and any recommendations resulting should be implemented by the Owner.

a. Inspect and evaluate the spillway when there is no flow over it.

b. Perform a detailed hydrologic/hydraulic investigation to assess further the potential of overtopping the dam and the need for and the means to increase the project discharge capacity.

c. Design and install a low level outlet.

d. Investigate in detail with the aid of a field observation program and borings, the cause of erosion, seepage and movements that are occurring on the crest, in the vicinity of the penstock. Establish a long-term program to monitor movements in the crest and seepage, if necessary.

e. Remove trees and root systems growing on the crest and downstream toe area within 20 feet of the dam. The resulting cavities should be backfilled with appropriate material.

f. Investigate and recommend methods for repair of the concrete cap and training walls of the main spillway.

g. Investigate and recommend methods to repair the stone masonry and halt erosion along the upstream face of the dam.

7.3 Remedial Measures

a. Operation and Maintenance Procedures.

1. Develop an "Emergency Action Plan" that will include an effective preplanned downstream warning system, locations of emergency equipment, materials and manpower, authorities to contact and potential areas that require evacuation.

2. Maintain clearance of brush and trees on the crest, downstream face, and within 20 feet of the downstream toe of the dam.

3. Institute a program of annual technical inspection by a qualified registered engineer.

4. Implement and institute a program to clear and rehabilitate the emergency spillway discharge channel of trees and brush.

5. Develop a system for the recording of data with regard to items such as: water levels, discharges, time and drawdown to assist those responsible for the monitoring of the structure.

6. Implement a regular maintenance program for the facility.

7. Provide surveillance during and immediately after high intensity rainfall.

7.4 Alternatives

There are no practical alternatives to the recommendations discussed above.

APPENDIX A

INSPECTION CHECKLIST

1

VISUAL INSPECTION CHECKLIST
PARTY ORGANIZATION

PROJECT POTASH POND DAM - CT 193

DATE Dec. 2, 1980

TIME 2:00 p.m.

WEATHER Fair, 52°F.

W.S. ELEV. 190.0 U.S. 175.0 DN.S.

PARTY:

1. David Sluter - New England Engineering
2. Stephen Fodor - New England Engineer.
3. Steve J. Poulos - GEI
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.	Civil	Stephen Fodor (NEE)	
2.	Hydraulic/hydrologic	David Sluter (NEE)	
3.	Geotechnical	Steve Poulos (GEI)	
4.			
5.			
6.			
7.			
8.			
9.			
10.			

PERIODIC INSPECTION CHECKLIST

PROJECT POTASH POND DAM DATE Dec. 2, 1980

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
DAM EMBANKMENT	Sta 0+00 is at right abutment.
1 Crest Elevation	192.5
2 Current Pool Elevation	190.0
3 Maximum Impoundment to Date	Unknown
4 Surface Cracks	None observed.
5 Pavement Condition	None. Grass and partially paved with granite blocks.
6 Movement or Settlement of Crest	Sta 1+55 slight dip in crest over the penstock. Wall bows slightly downstream in plan at same point. Sinkholes behind upstream stone wall at Sta 1+55. Sta 1+00 to right end of spillway: upstream stone wall patched on surface with concrete (long time ago) apparently to plug erosion holes behind stone wall.
7 Lateral Movement	Upstream stone wall irregular ±4 in. At penstock it has moved downstream. Probably frost moved wall upstream elsewhere.
8 Vertical Alignment	Irregular, but satisfactory.
9 Horizontal Alignment	See 7.
10 Condition at Abutment and at Concrete Structures	Good at left and right abutments. No structures on dam.
11 Indications of Movement of Structural Items on Slopes	No movement evident at penstock
12 Trespassing on Slopes	Free access.
13 Sloughing or Erosion of Rock Faces	Upstream ok except at upstream wall - see 6 and 7. Downstream: at right end of spillway, stones missing from bottom of training wall. Evidence of past seepage through downstream stone wall from Sta 0+88 to 1+20. Deposits of sand and gravel in voids of wall. Highest elevation of deposits very close to water level or ∿1 ft below.
14 Rock Slope Protection - Riprap Failures	No riprap to left of spillway upstream. Stone wall to right of spillway in fair condition, but possibly moving slowly upstream due to frost action. Also possible erosion behind it.

2A

PERIODIC INSPECTION CHECKLIST

PROJECT POTASH POND DAM DATE Dec. 2, 1980

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
DAM EMBANKMENT	
15 Unusual Movement or Cracking at or Near Toe	None observed.
16 Unusual Embankment or Downstream Seepage	Seepage at Sta 1+25 ∿3 gpm at bottom of wall. Evidence of past seepage 6' below water level from stone wall at this Station. (Top of seepage about 6' above bottom of wall.) A few drops per second under penstock. Seepage at Sta 1+17 (to right of pipe) on downstream wall 2' above toe at invert of penstock ∿1 gpm. All seepage appears clear.
17 Piping or Boils	None observed.
18 Foundation Drainage Features	None.
19 Toe Drains	None.
20 Instrumentation System	None.
21 Vegetation	Grass on crest to right and left of spillway. Few trees to 12 in. size on embankment crest to left of spillway. Trees immediately downstream of left embankment and downstream face.

PERIODIC INSPECTION CHECKLIST

PROJECT POTASH POND DAM DATE Dec. 2, 1980

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
DIKE EMBANKMENT	No dike embankment.
Crest Elevation	
Current Pool Elevation	
Maximum Impoundment to Date	
Surface Cracks	
Pavement Condition	
Movement or Settlement of Crest	
Lateral Movement	
Vertical Alignment	
Horizontal Alignment	
Condition at Abutment and at Concrete Structures	
Indications of Movement of Structural Items on Slopes	
Trespassing on Slopes	
Sloughing or Erosion of Slopes or Abutments	
Rock Slope Protection - Riprap Failures	
Unusual Movement or Cracking at or Near Toes	
Unusual Embankment or Downstream Seepage	
Piping or Boils	
Foundation Drainage Features	
Toe Drains	
Instrumentation System	
Vegetation	

4

PERIODIC INSPECTION CHECKLIST

PROJECT POTASH POND DAM DATE Dec. 2, 1980

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
a. Approach Channel	
Slope Conditions	Not observable.
Bottom Conditions	Under Water
Rock Slides or Falls	None.
Log Boom	None
Debris	None
Condition of Concrete Lining	N/A
Drains or Weep Holes	N/A
b. Intake Structure	
Condition of gate structure.	Very poor - Wood structure is completely rotted away and is inoperable. Gate mechanism missing.
Stop Logs and Slots	None.

PERIODIC INSPECTION CHECKLIST

PROJECT POTASH POND DAM DATE Dec. 2, 1980

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - CONTROL TOWER	N/A.
a. Concrete and Structural	
General Condition	
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	
Service Gates	
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System	

6

PERIODIC INSPECTION CHECKLIST

PROJECT POTASH POND DAM DATE Dec. 2, 1980

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - TRANSITION AND CONDUIT	Unused; 30-in.-diameter steel penstock.
General Condition of Steel Conduit	Poor condition.
Rust	Rusted through in several places.
Erosion or Cavitation	N/A
Cracking	N/A
Alignment of Monoliths	N/A.
Alignment of Joints	N/A.
Numbering of Monoliths	N/A.

PERIODIC INSPECTION CHECKLIST

PROJECT POTASH POND DAM DATE December 2, 1980

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - PENSTOCK TURBINE AND OUTLET CHANNEL	
General Condition of Turbine Housing	Unused. Poor condition.
Rust	Rusted through
Spalling	N/A.
Erosion or Cavitation	N/A.
Visible Reinforcing	N/A.
Any Seepage	Minor seepage around penstock opening through stone wall <<1 gpm seepage.
Condition at Joints	N/A.
Drain holes	N/A.
Channel	
Loose Rock or Trees Overhanging Channel	Stones from wall fallen into channel. Wall deteriorated 40 ft downstream from dam. Forested both sides of 4 to 5-ft-wide channel.
Condition of Discharge Channel	Fair to poor. Seepage exiting from right stone wall of channel about 30 ft downstream from downstream face of dam. Iron bacteria are seen in voids between stones.

PERIODIC INSPECTION CHECKLIST

PROJECT POTASH POND DAM DATE Dec. 2, 1980

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	
General Condition	Good.
Loose Rock Overhanging Channel	None.
Trees Overhanging Channel	Trees line shore of pond. Sand pile at right abutment.
Floor of Approach Channel	Under water.
b. Weir and Training Walls	
General Condition of Concrete and Stone Walls.	Fair. Right training wall has stones missing at water level.
Rust or Staining	None.
Spalling	None.
Any Visible Reinforcing	None.
Any Seepage	Seepage under entire length of concrete cap of spillway.
Drain Holes	N/A.
c. Discharge Channel	
General Condition	Fair.
Loose Rock Overhanging Channel	None. Steep slope (near vertical) in soil which is clayey silt or silty clay. May have been carved out when dam failed.
Trees Overhanging Channel	Forested both sides.
Floor of Channel	Natural stones of stream channel.
Other Obstructions	Stump and small brush.
Other Comments	None.

PERIODIC INSPECTION CHECKLIST

PROJECT POTASH POND DAM DATE Dec. 2, 1980

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - SERVICE BRIDGE	N/A
a. Super Structure	
Bearings	
Anchor Bolts	
Bridge Seat	
Longitudinal Members	
Underside of Deck	
Secondary Bracing	
Deck	
Drainage System	
Railings	
Expansion Joints	
Paint	
b. Abutment & Piers	
General Condition of Concrete	
Alignment of Abutment	
Approach to Bridge	
Condition of Seat & Backwall	

APPENDIX B

ENGINEERING DATA

APPENDIX B-1

SELECTED COPIES OF PAST INSPECTION REPORTS

No. U

Inventoried By

Date

WATER RESOURCES COMMISSION
SUPERVISION OF DAMS
INVENTORY DATA

3 CT 193 4

LON 72-10.5

LAT 41-42.2

Name of Dam or Pond 'Potash Pond

Code No. S 15.0 PT 0.4

Nearest Street Location

Town Windham

U.S.G.S. Quad. WILLIMANTIC

Name of Stream Potash BROOK

Owner ~~Michael & Joanna Jacuch~~

Address ~~RFD #2~~

~~Willimantic~~

Omit lines crossing out owners 7/73

THESE ARE THE OWNERS

Pond Used For REC. DA 2.05 sm

Dimensions of Pond: Width Length Area 7. A

Total Length of Dam 185' Length of Spillway 45'

Location of Spillway max. Section

Height of Pond Above Stream Bed ~~13'~~ ~~12'~~ 15'

Height of Embankment Above Spillway ~~2.2~~ 2.5'

Type of Spillway Construction stone wall.

Type of Dike Construction Stone wall.

Downstream Conditions Woods (road, homes) (new development)

Summary of File Data

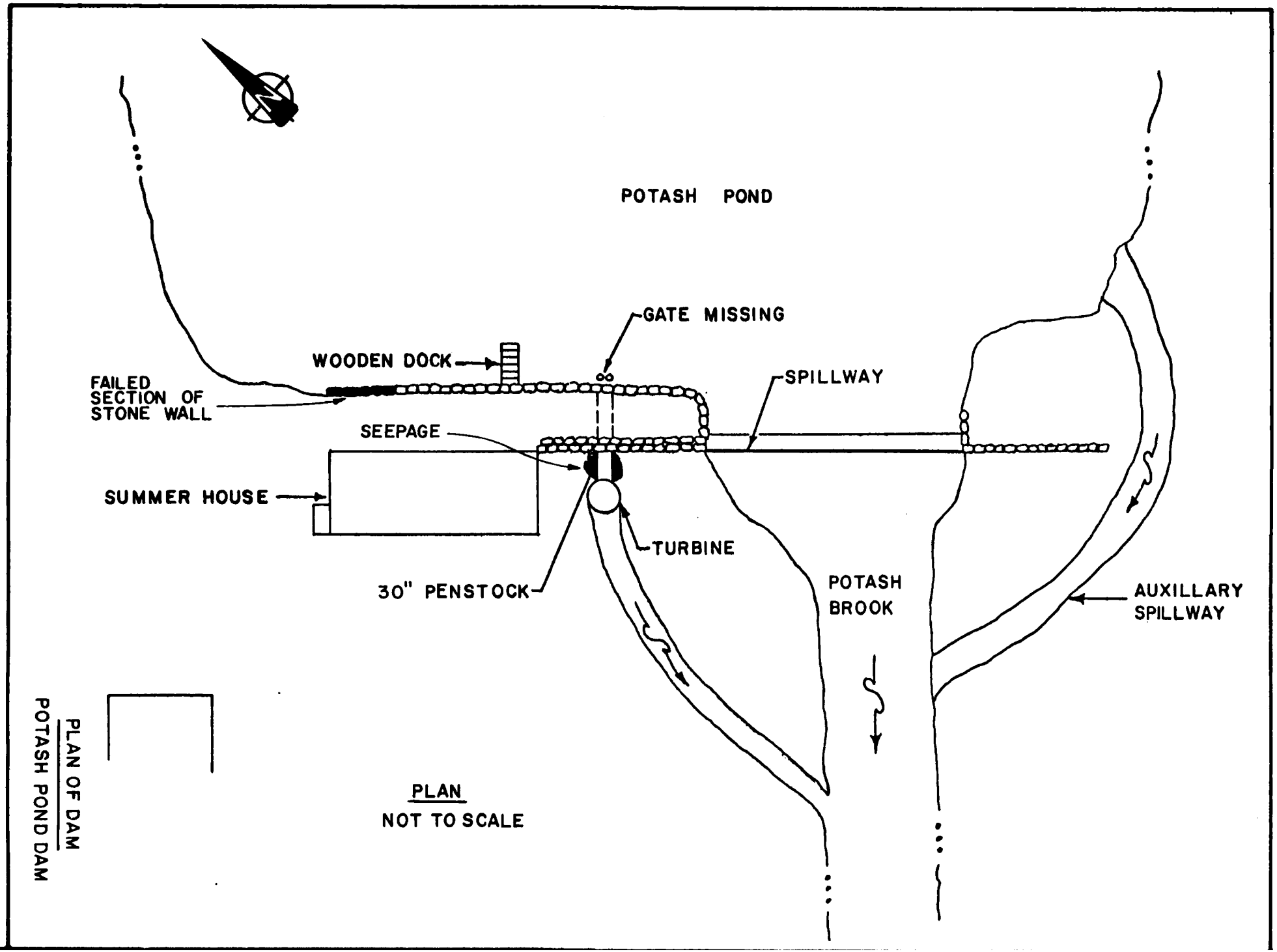
Remarks

BUILT 1880 ? -

Class

APPENDIX B-2

PLANS, SECTIONS AND DETAILS



PLAN OF DAM
POTASH POND DAM

PLATE B-

APPENDIX C

PHOTOGRAPHS

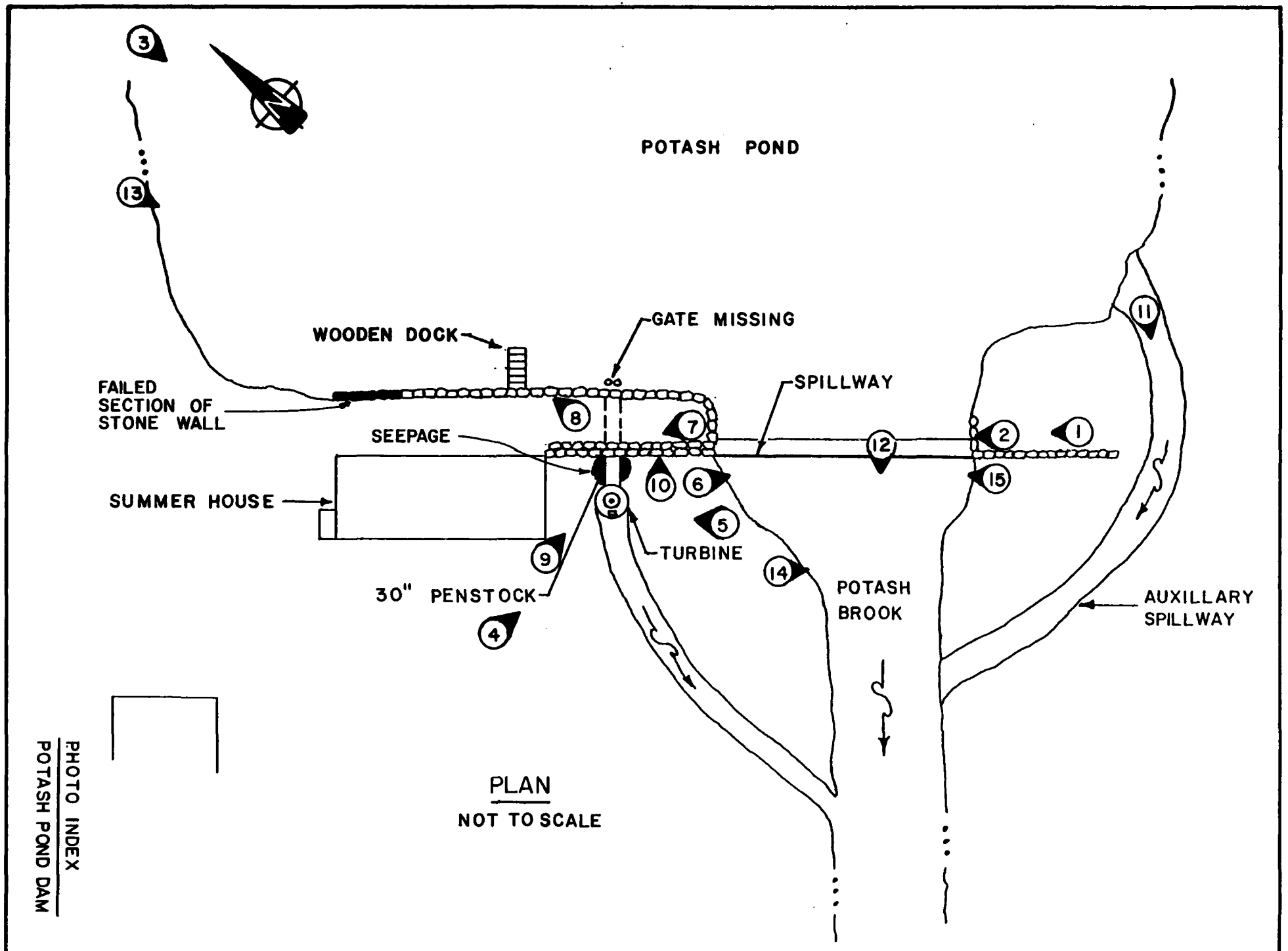

POTASH POND
WOODEN DOCK
GATE MISSING
FAILED SECTION OF STONE WALL
SPILLWAY
SEEPAGE
SUMMER HOUSE
TURBINE
30" PENSTOCK
POTASH BROOK
AUXILLARY SPILLWAY
PLAN
NOT TO SCALE
PHOTO INDEX
POTASH POND DAM

PHOTO C-1: Crest of dam and left abutment.

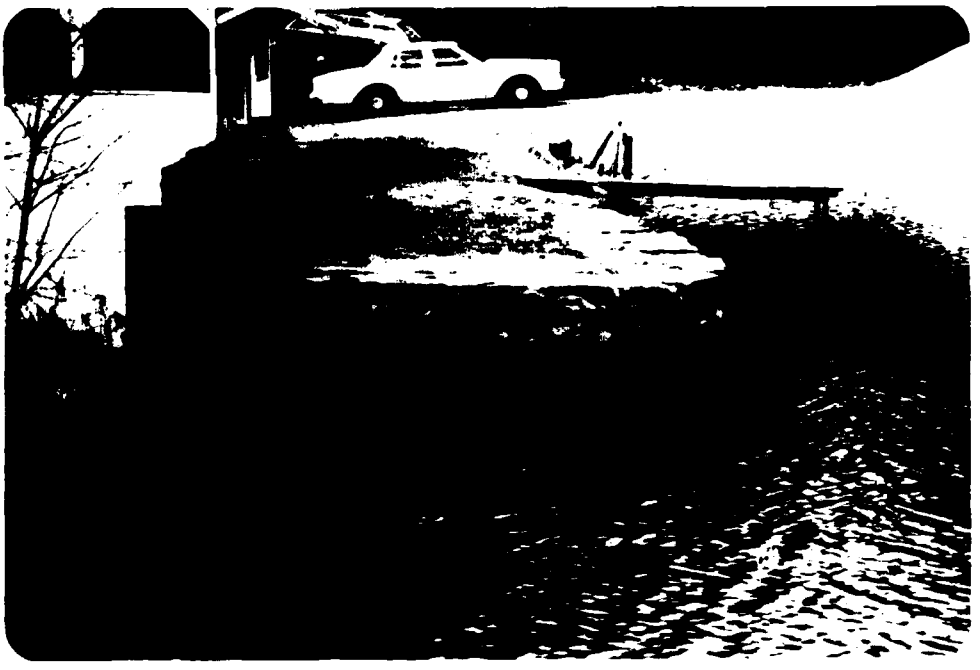


PHOTO C-2: Crest of dam and right abutment.

PHOTO C-3: Upstream face of dam from right side.

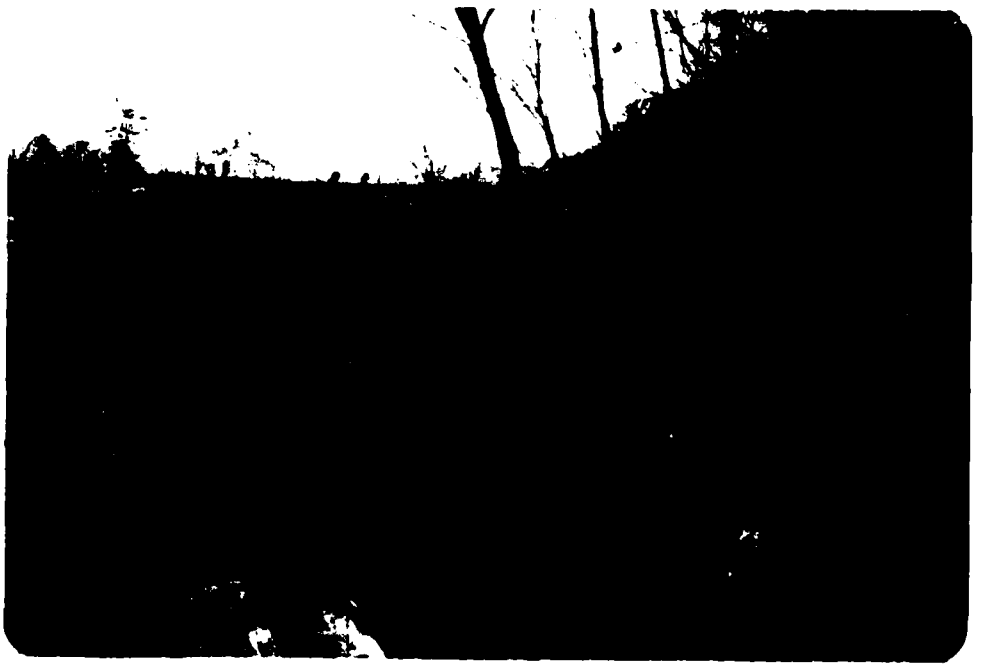


PHOTO C-4: Downstream face of dam from right side.

PHOTO C-5: Downstream face of dam from left side.

PHOTO C-6: Downstream face of dam at spillway and left abutment.

PHOTO C-7: Cracking and erosion at upstream face of the dam to the right of the spillway.

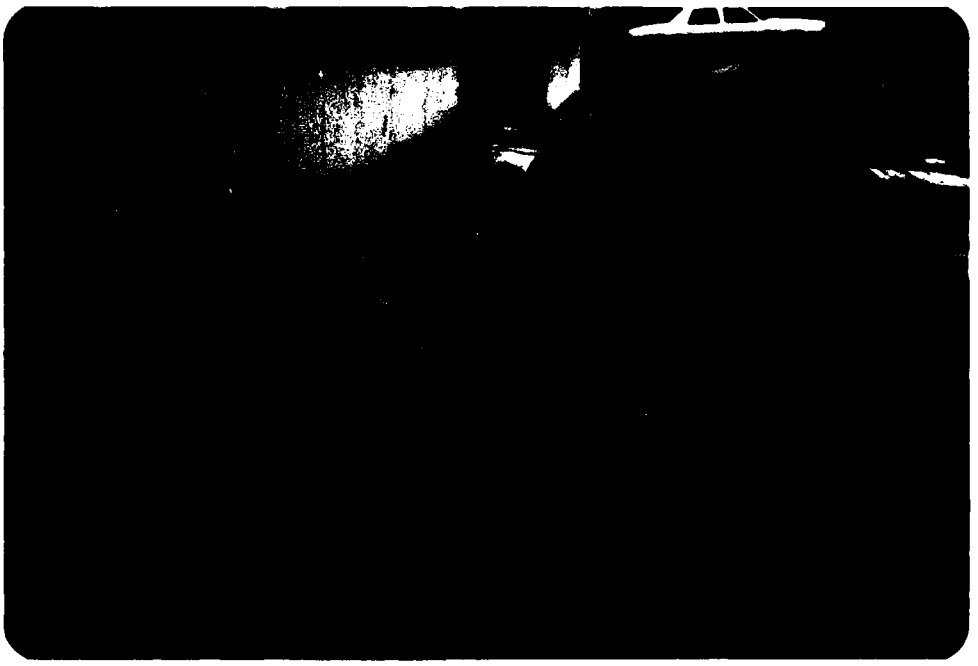


PHOTO C-8: Displacement of stone wall at downstream face of the dam, to the right of the spillway.

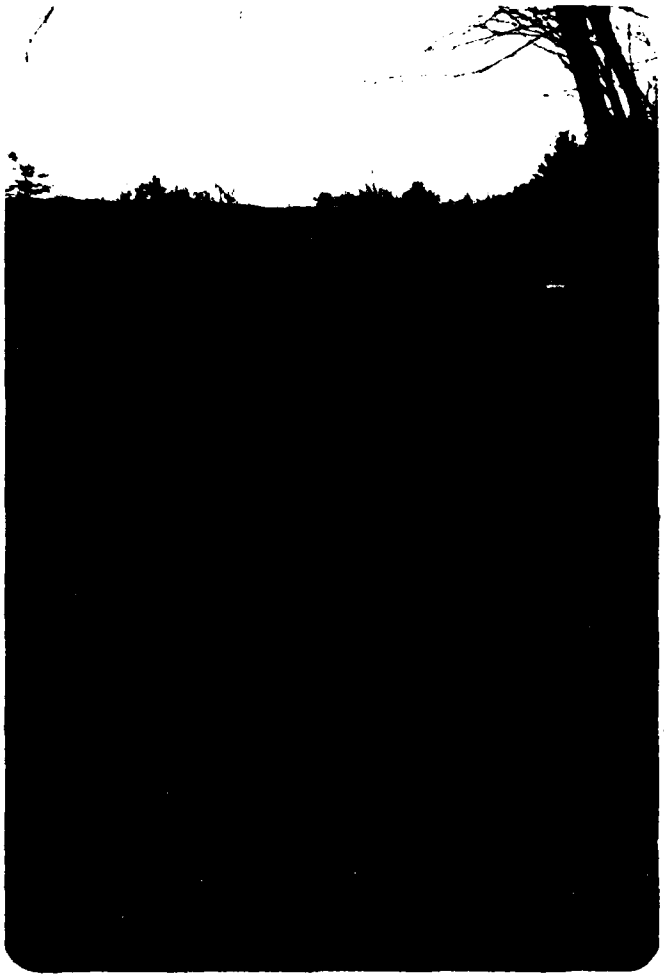


PHOTO C-9: Seepage near penstock and turbine at downstream face of dam, right side.

PHOTO C-10: Movement of earth fill out between joints of stone masonry at the downstream face of the dam, left side.

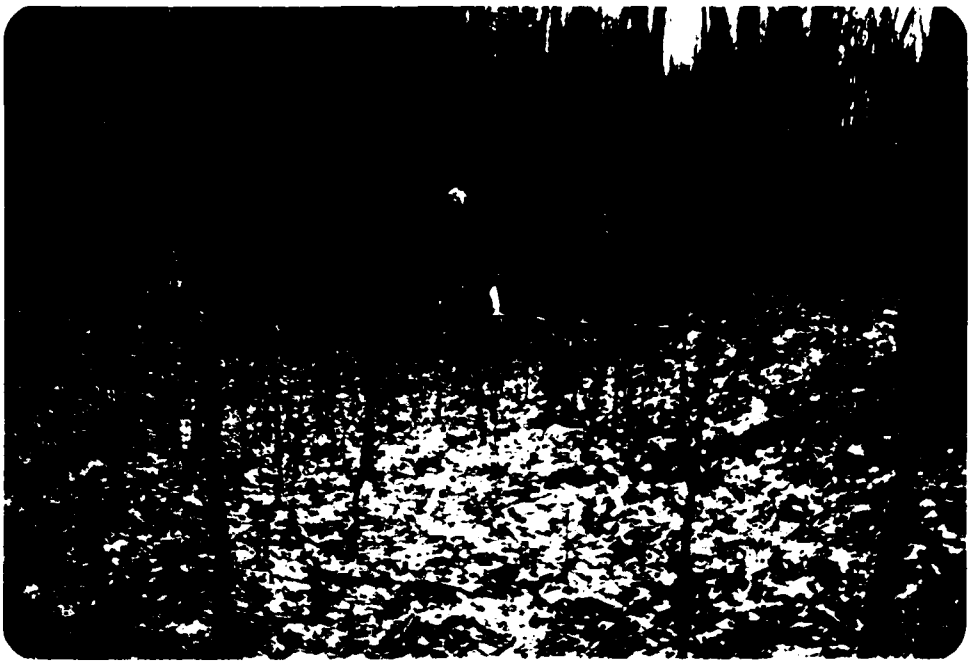


PHOTO C-11: Earth channel emergency overflow spillway to the left of the left abutment.

PHOTO C-12: Downstream channel from the spillway.

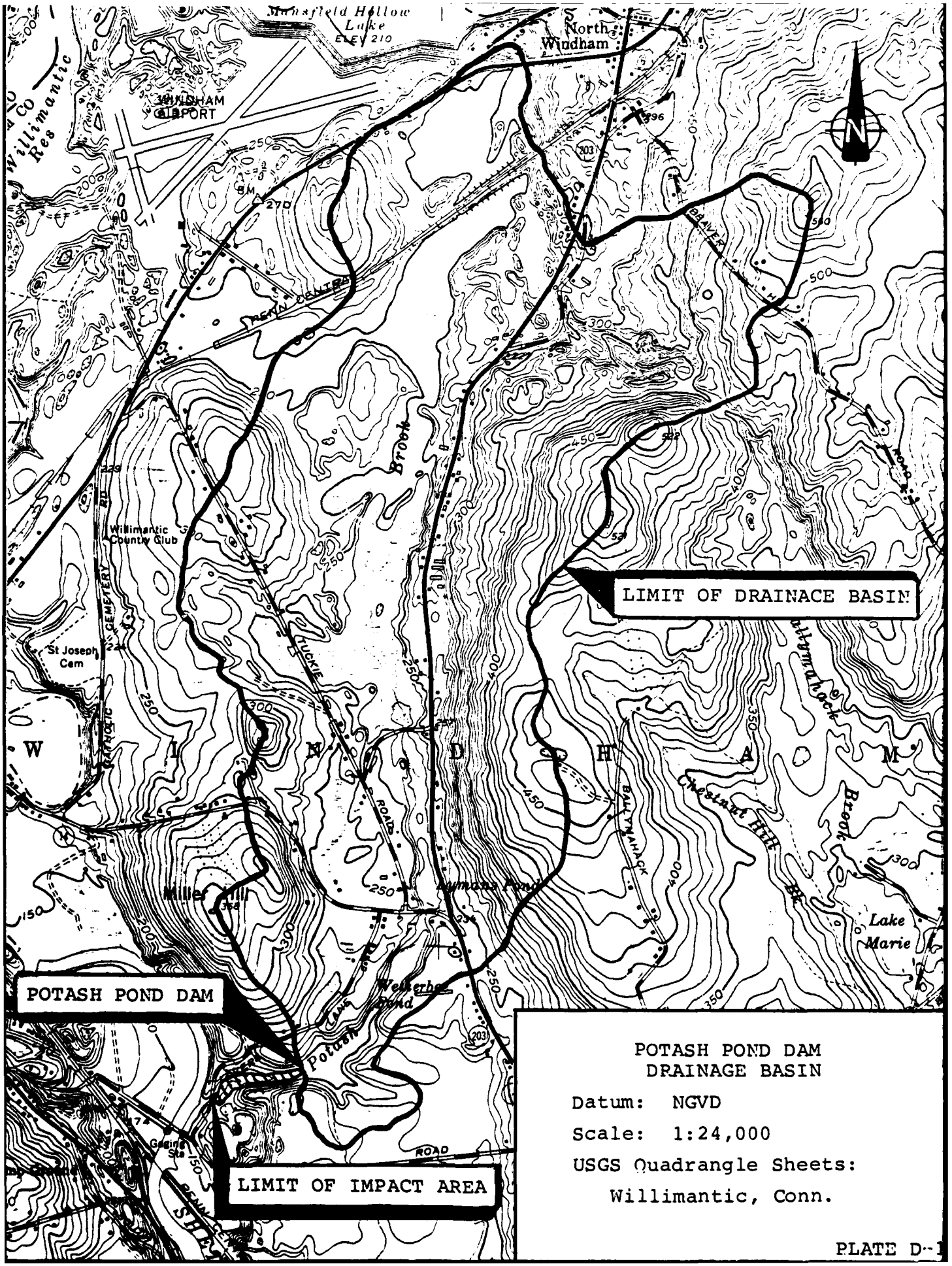
PHOTO C-13: Sloughing and erosion of the stone masonry of right portion of the upstream face of the dam.

PHOTO C-14: Erosion and undercutting of the left bank of the downstream channel.

PHOTO C-15: Downstream face of the dam from the left side showing difference in slope between the spillway and right embankment.

APPENDIX D

HYDROLOGIC & HYDRAULIC COMPUTATIONS


LIMIT OF DRAINACE BASIN
POTASH POND DAM
LIMIT OF IMPACT AREA
POTASH POND DAM
DRAINAGE BASIN
Datum: NGVD
Scale: 1:24,000
USGS Quadrangle Sheets:
Willimantic, Conn.
PLATE D-1

POTASH POND DAM

THE DAM IS LOCATED ON POTASH BROOK IN WILLIMANTIC, CT. IN THE THAMES RIVER BASIN

CLASSIFICATION :

SIZE : SMALL

HAZARD: SIGNIFICANT

BASIC DATA

DRAINAGE AREA = 2.98 SQ. MI., ROLLING TOPOGRAPHY

NORMAL POOL ELEV. = 190.0 NVGD (EST. FROM USGS)

MAX POOL ELEV. : 192.5 NGVD

RESERVOIR :

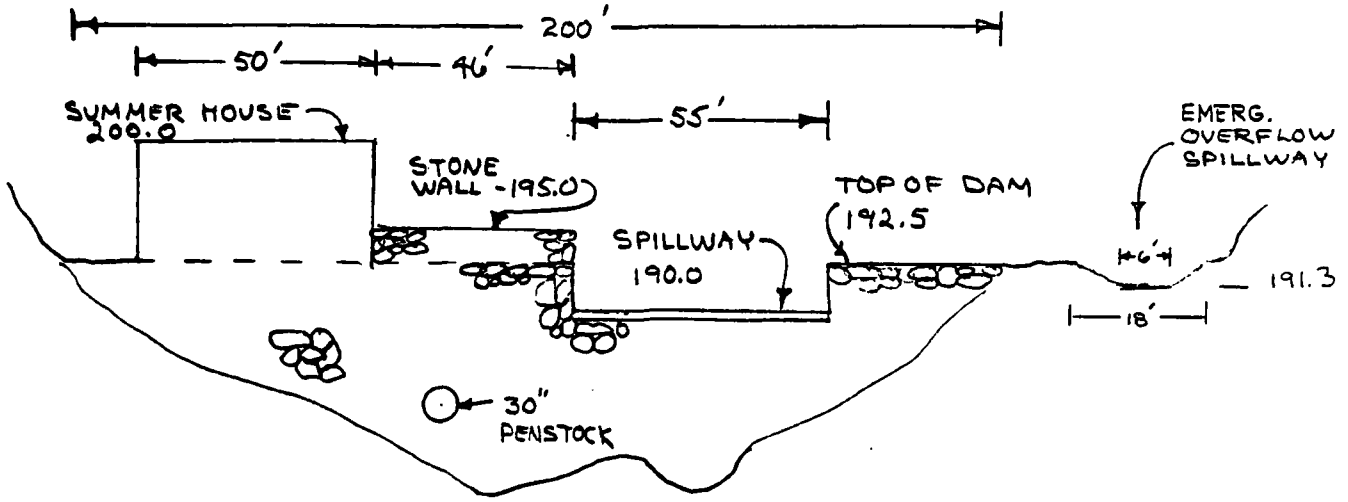
@ NORMAL POOL ELEV. - AREA = 7.0 AC.
STORAGE = 75 AC-FT

@ MAX POOL ELEV. - AREA = 10.0 AC.
STORAGE = 96 AC-FT

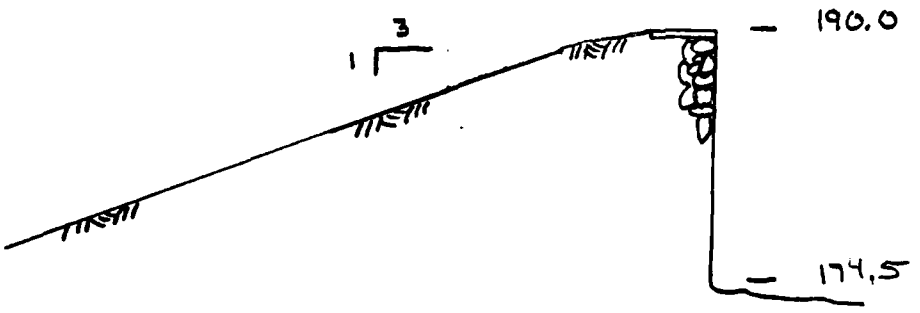
DAM : EARTHFILL W/ STONE MASONRY FACES
MAX. HEIGHT = 18.0'
LENGTH = 200'

SPILLWAY : STONE MASONRY W/ CONCRETE CAP
ELEVATION = 190.0 NGVD
LENGTH = 55.0'.

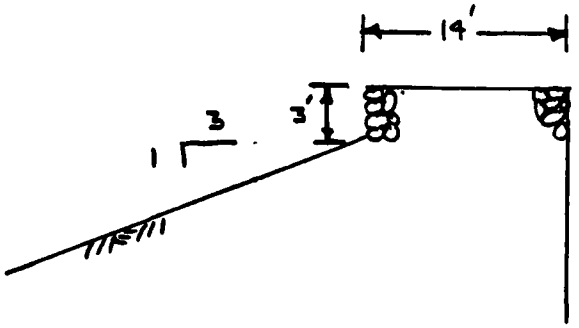
OUTLET : 30" DIA. STEEL PENSTOCK - NOT OPERABLE



LONGITUDINAL SECTION ALONG DAM - LOOKING UPSTREAM



SPILLWAY SECTION



DAM SECTION

CALCULATE TEST FLOOD

CLASSIFICATION : SIZE : SMALL
HAZARD: SIGNIFICANT

RECOMMENDED GUIDELINES SUGGEST : 100 YR TO 1/2 PMF

USE : 1/2 PMF AS TEST FLOOD

FROM MPF PEAK FLOW RATES FOR ROLLING BASIN = 2.98 SQ MI

PMF = 2000 CSM

1/2 PMF = 1000 CSM X 2.98 SQ MI
= 2980 CFS

REDUCE DISCHAGE BY 25% FOR STORAGE AREAS IN WATERSHED

TEST FLOOD = .75 X 2980 = 2250 CFS

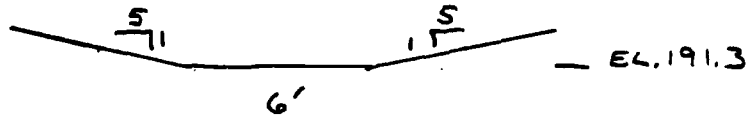
CALCULATION OF TF SURCHARGE - ASSUME STONE WALL ON DAM WILL NOT WITHSTAND TF

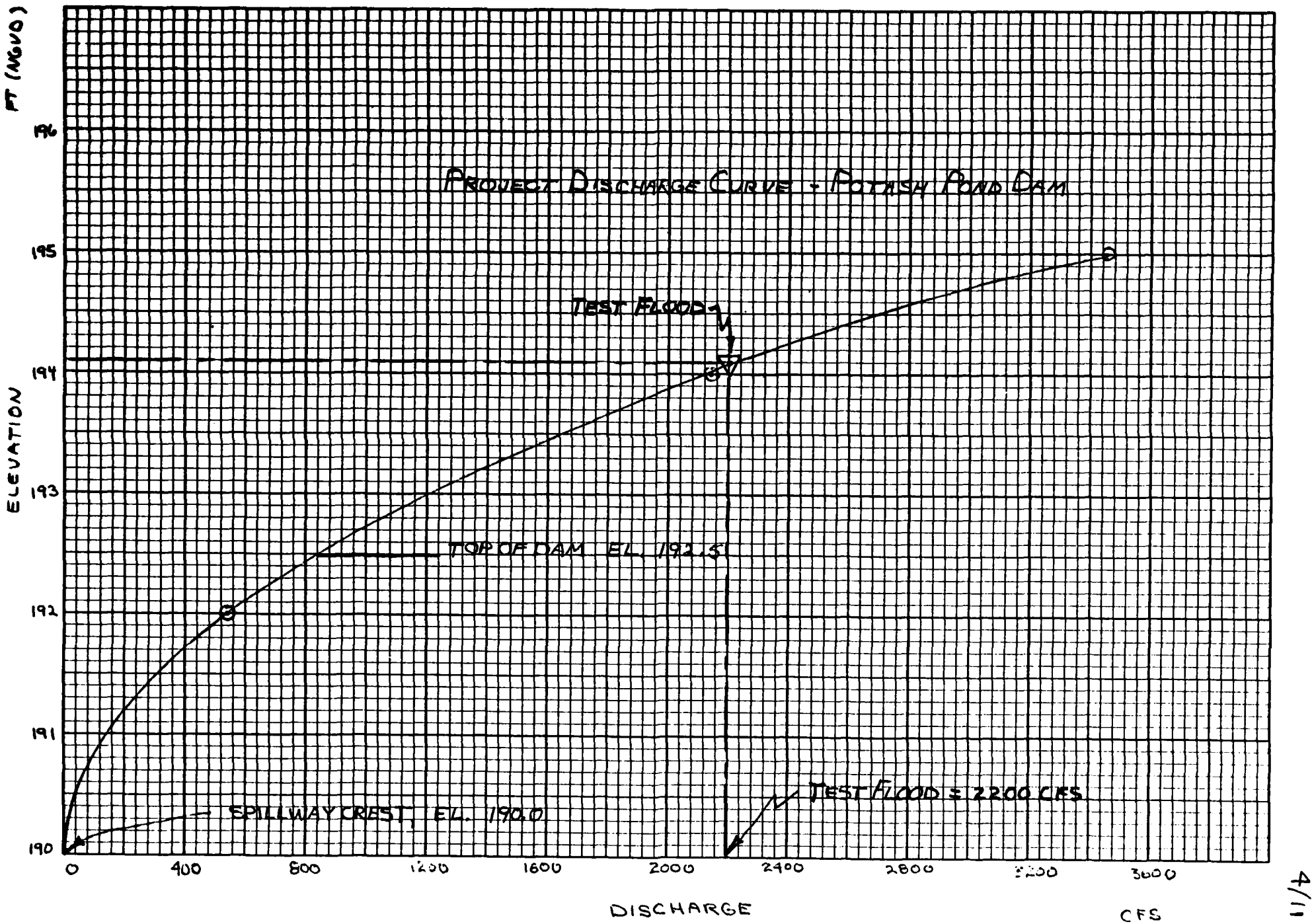
Q = 2250CFS

SPILLWAY DISCHARGE = $CLH^{3/2}$ C = 3.4 (TRAPEZOIDAL WEIR), L = 55
DAM DISCHARGE = $CLH^{3/2}$ C = 2.6 (BROADCREST WEIR, W = 14'),
L = 200' - 55' - 50' = 90'

WS ELEV.	$H_{SPILL.}$	$Q_{SPILL.}$	H_{DAM}	Q_{DAM}	$H_{E.SPILL.}$	$Q_{E.SPILL}$	Q_{TOTAL}
190.0	0	0	0	0			
192.0	2	529	0	0	0.7	14	543
194.0	4	1496	1.5	429	2.7	216	2141
195.0	5	2090	2.5	925	3.7	435	3450

EMERGENCY OVERFLOW SPILLWAY DISCHARGE = $CLH^{3/2}$, C = 2.5 L = VARIES




PROJECT DISCHARGE CURVE - POTASH POND DAM
TEST FLOOD
TOP OF DAM EL. 192.5
SPILLWAY CREST, EL. 190.0
TEST FLOOD = 2200 CFS
ELEVATION FT (NGVD)
196
195
194
193
192
191
190
0
400
800
1200
1600
2000
2400
2800
3200
3600
DISCHARGE
CFS

4/11

CALCULATION OF SURCHARGE STORAGE EFFECT ON MPF

PEAK INFLOW = 2250 CFS, SURCHARGE HEIGHT = 4.1'

$$\text{SURCHARGE VOLUME} = \frac{7\,AC + 10\,AC}{2} \times 4.1 \quad 34.9\ AC\text{-}FT$$

$$STOR_1 = \frac{34.9\ AC\text{-}FT \times 12\ IN/FT}{2.98\ SQ\ MI \times 640\ AC/SQ\ MI} = .22\ IN$$

$$Q_{P2} = 2250\left(1 - \frac{.22}{9.5}\right) = 2200\ CFS$$

SURCHARGE HEIGHT @ 2200 CFS = 4.0 FT

$$STOR_2 = \frac{4.0' \times 8.5\,AC \times 12\ IN/FT}{2.98\ SQ\ MI \times 640} = .21\ IN$$

$$STOR_{AVG} = \frac{.22 + .21}{2} = .215$$

$$Q_{P3} = 2250\left(1 - \frac{.215}{9.5}\right) = 2200\ CFS$$

$\therefore$

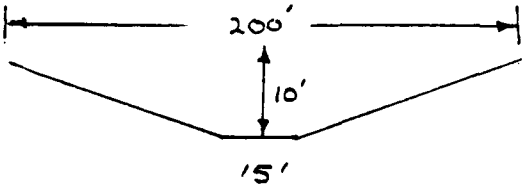
1. STORAGE WILL REDUCE THE TEST FLOOD DISCHARGE BY 50 CFS OR 2.2%
2. THE SPILLWAY CAN PASS 840 CFS OR 38% OF THE TEST FLOOD
3. AT THE TEST FLOOD DISCHARGE OF 2200 CFS, THE DAM WILL BE OVERTOPPED BY 1.6 FEET.

ESTIMATE DOWNSTREAM IMPACT AREA

DISCHARGE WITH POOL AT TOP OF DAM = 840 CFS

DEVELOP STAGE-DISCHARG RATING FOR DOWNSTREAM REACHES

REACH 1



$L = 1500'$ $S_o \approx S_f = 0.015$

$n = .05$

$Q = \frac{1.486}{n} A R^{2/3} S_f^{1/2}$

STAGE	A (FT²)	$R^{2/3}$	Q (CFS)	V (FT/S)	STOR (AC-FT)
2	67	1.18	290	4.3	2.3
4	208	1.76	1330	6.4	7.2
6	423	2.24	3440	8.1	14.6
8	712	2.67	6900	9.7	24.5
9	884	2.87	9220	10.4	30.4

MAX DEPTH OF FLOW = $\frac{4}{9} Y_o = 4/9 (18) = 8.0'$

DAM FAILURE DISCHARGE = $8/27\ W_B \sqrt{g}\ Y_o^{3/2}$

$= 8/27\ (60)\sqrt{32.2}\ (18)^{3/2}$

$= 7,700$ CFS

W_B = 40% OF DAM LENGTH @ MID HEIGHT
$= .4 \times 150 = 60$ FT

$Y_o = 18$ FT

TOTAL DAM FAILURE DISCHARGE = 7,700 + 840 (MAX. SPILLWAY DISCHARGE)

= 8540 CFS

STAGE AT FAILURE DISCHARGE = 8.7 FT (REACH 1)

ESTIMATE OUTFLOW FROM REACH 1

$A_1 = 830$

$V_1 = \frac{830 \text{ SQ FT} \times 1500 \text{ FT}}{43560} = 28.6$ AC-FT

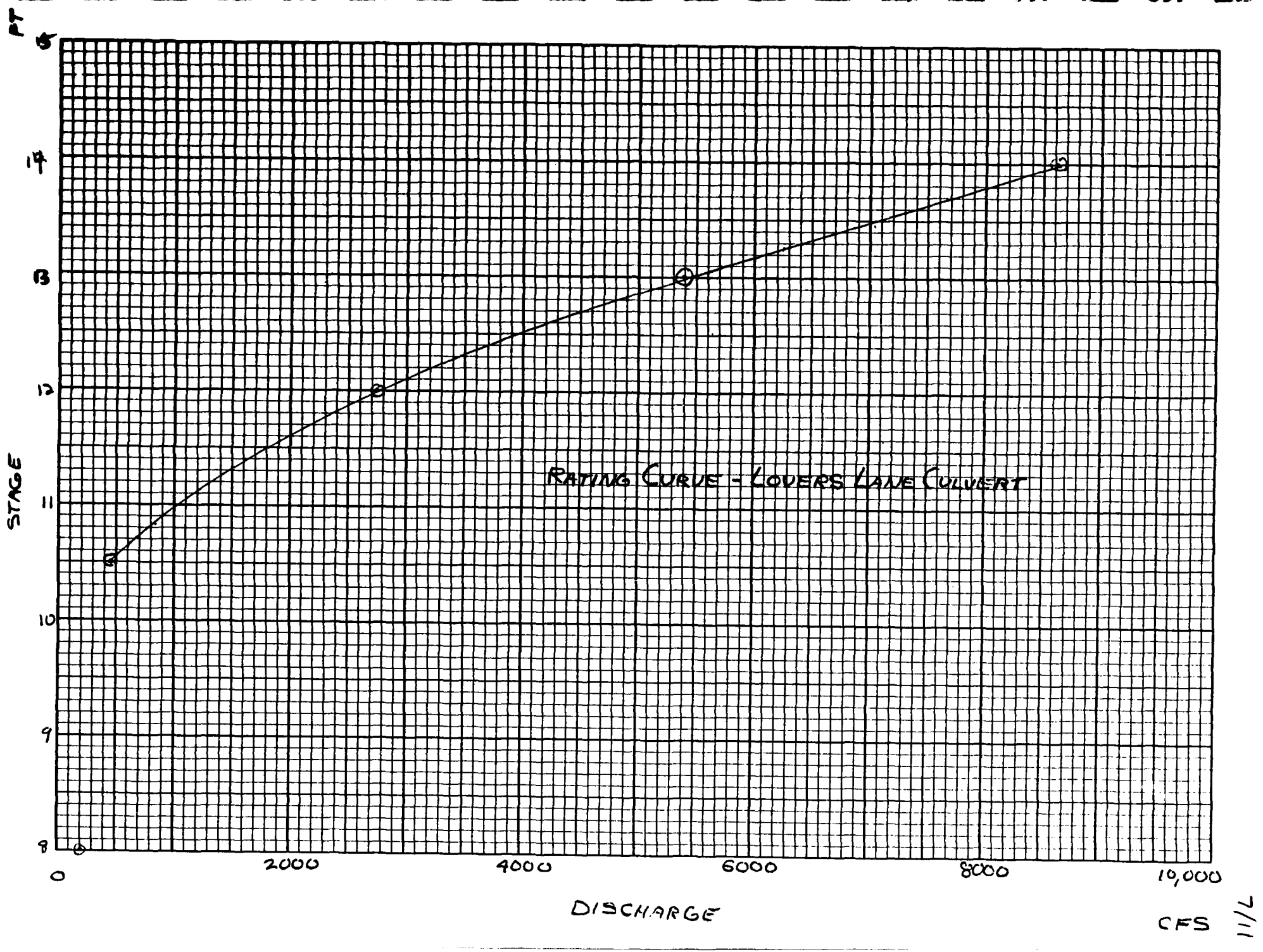
$Q_{P2} = \left(1 - \frac{V_1}{S}\right) Q_{P1} = \left(1 - \frac{28.6}{96}\right) 8540$

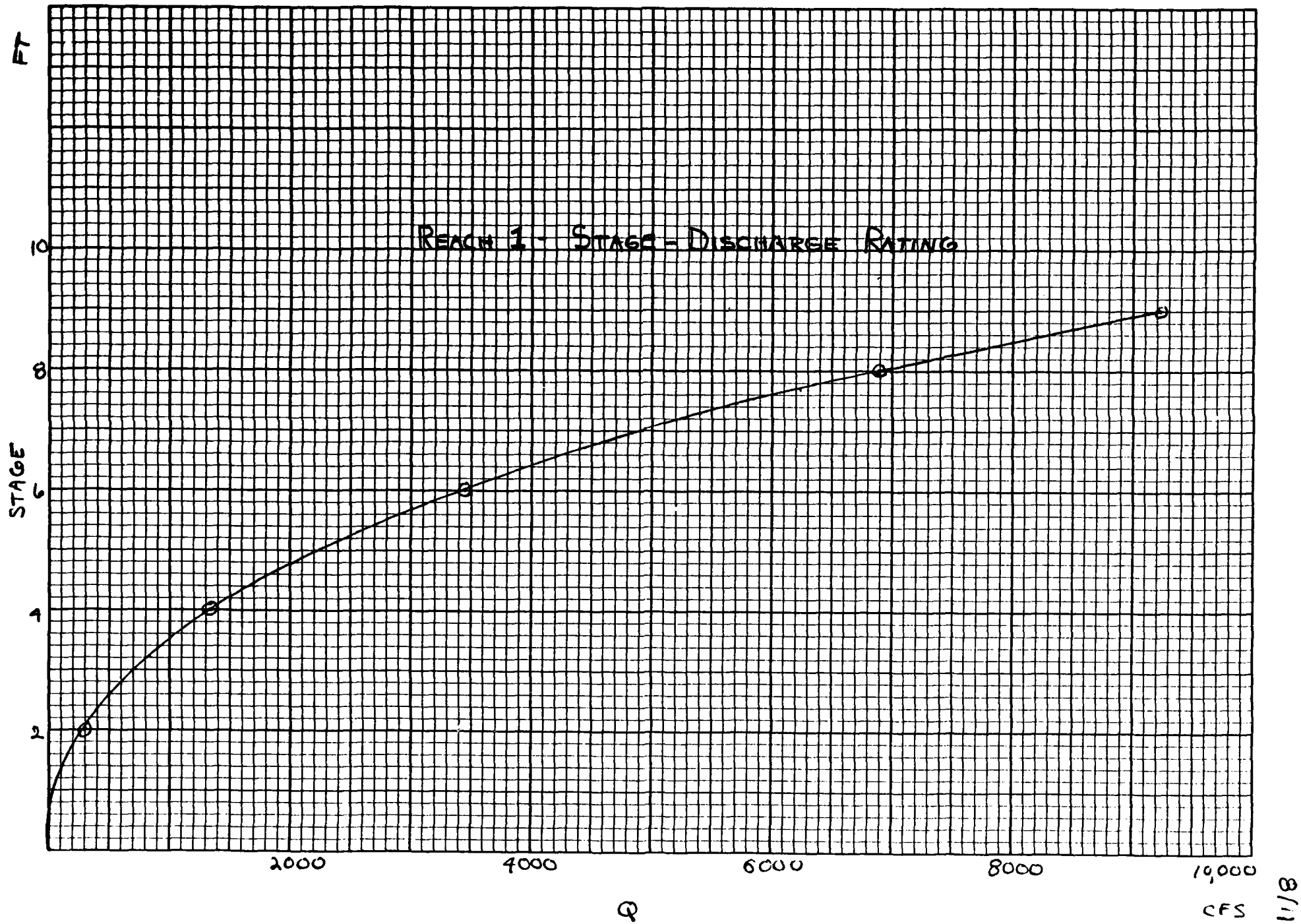
$= 6000$ CFS

@ Q = 6000 CFS, STAGE = 7.6', A = 648 SQ FT V = 22.3 AC-FT

$Q_{P2} = \left(1 - \frac{V_{AVG}}{S}\right) Q_{P1} = \left(1 - \frac{25.5}{96}\right) 8540 = 6275$

STAGE = 7.7 FT


FT
15
14
13
12
11
10
9
8
STAGE
RATING CURVE - LOVERS LANE CULVERT
0
2000
4000
6000
8000
10,000
DISCHARGE
CFS

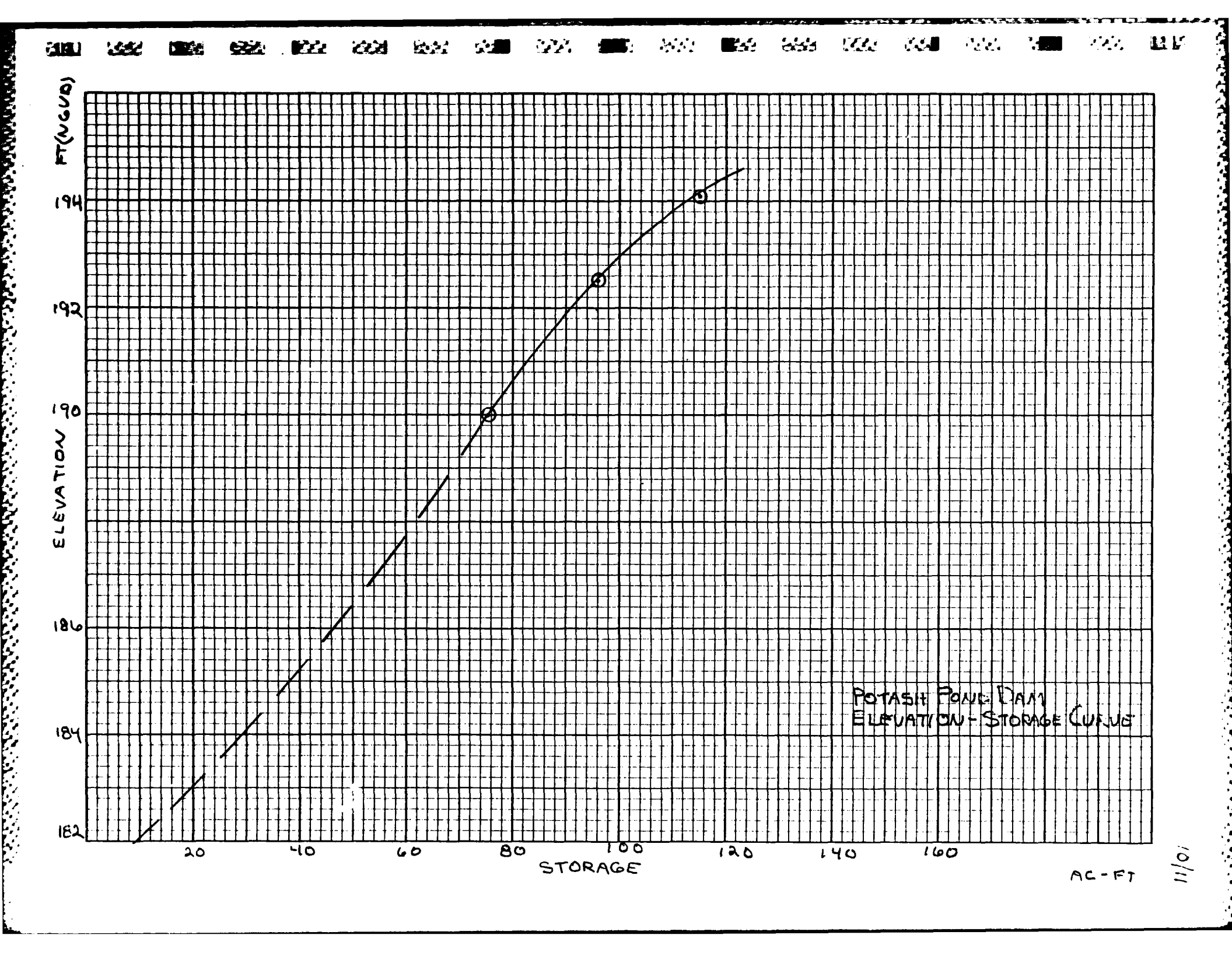

REACH 1 - STAGE - DISCHARGE RATING
FT
STAGE
10
8
6
4
2
2000
4000
6000
8000
10,000
Q
CFS

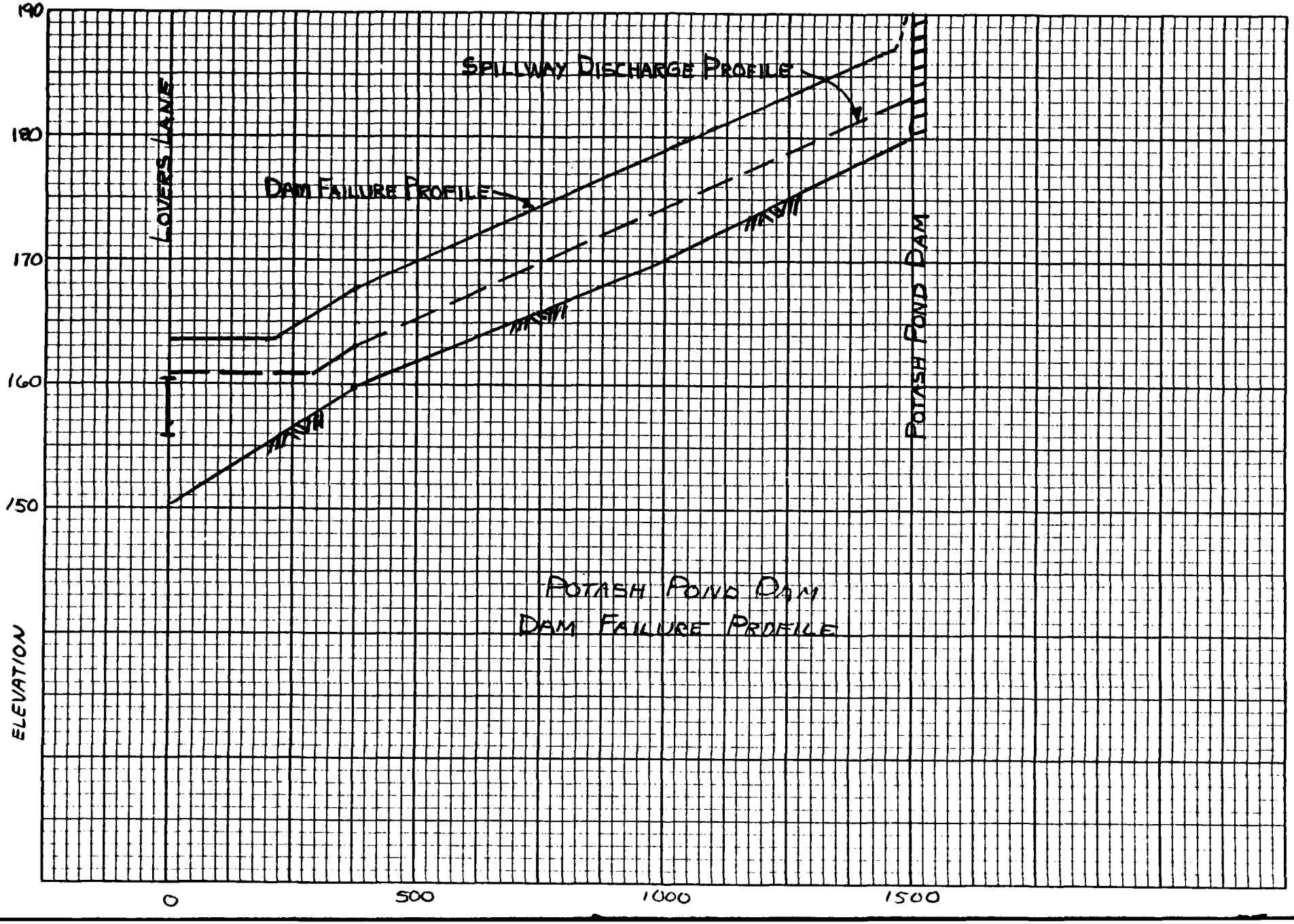
11/8

FLOW FROM REACH 1 IS CONTROLLED BY TWIN 6' DIAMETER CONC. CULVERTS UNDER LOVERS LANE. THIS STRUCTURE WILL CREAT A BACKWATER EFFECT ON THE FLOOD PROFILE FOR APPROXIMATELY 500' UPSTREAM WITH A DEPTH OF FLOW OF 13.5 FT. LOVERS LANE WILL BE OVERTOPPED BY APPROXIMATELY 3.0'. THERE ARE NO STRUCTURES LOCATED WITHIN THE FLOOD PLAIN BETWEEN LOVERS LANE (REACH 1) AND THE SHETUCKET RIVER, THEREFORE NO SIGNIFICANT DAMAGES ARE ANTICIPATED. THERE ARE 1-2 RESIDENTIAL STRUCTURES SUBJECT TO DAMAGE FROM A DAM FAILURE IN REACH. 1.

PREFAILURE FLOOD STAGE @ HOMES = 0 FT

FAILURE FLOOD STAGE @ HOMES ≈ 1-2 FT.


FT(NGVD)
194
192
190
188
186
184
182
ELEVATION
20
40
60
80
100
120
140
160
STORAGE
AC-FT
POTASH POND DAM
ELEVATION - STORAGE CURVE
11/01



POTASH POND DAM
DAM FAILURE PROFILE

APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS IN THE UNITED STATES

(1) STATE	(2) IDENTITY NUMBER	(3) DIVISION	(4) STATE	(5) COUNTY	(6) CONGR DIST.	(7) STATE	(8) COUNTY	(9) CONGR DIST.	(9) NAME	(10) LATITUDE (NORTH)	(11) LONGITUDE (WEST)	(12) REPORT DATE DAY | MO | YR
CT	195	NED	CT	015	02				POTASH POND DAM	4142.5	7210.5	00JAN81

(13) POPULAR NAME	(14) NAME OF IMPOUNDMENT
	POTASH POND

(15) REGION	(16) BASIN	(17) RIVER OR STREAM	(18) NEAREST DOWNSTREAM CITY–TOWN–VILLAGE	(19) DIST FROM DAM (MI.)	(20) POPULATION
01	10	POTASH BROOK	SOUTH WINDHAM	2	2000

(21) TYPE OF DAM	(22) YEAR COMPLETED	(23) PURPOSES	(24) STRUCTURAL HEIGHT (FT.)	(25) HYDRAULIC HEIGHT (FT.)	(26) IMPOUNDING CAPACITIES MAXIMUM (ACRE–FT.)	(27) IMPOUNDING CAPACITIES NORMAL (ACRE–FT.)	DIST	OWN	FED R	PRV/FED	SCS A	VER/DATE
REDT	1880	R	21	20	96	75	NED	N	N	N	N	

(28) REMARKS
22=ESTIMATED 21=MASONRY WALLS UP+DOWN STREAM

(29) D/S HAS	(30) SPILLWAY CREST LENGTH	(31) SPILLWAY TYPE	(32) SPILLWAY WIDTH (FT.)	(33) MAXIMUM DISCHARGE (FT.)	(34) VOLUME OF DAM (CY)	(35) POWER CAPACITY INSTALLED (MW)	(36) POWER CAPACITY PROPOSED (MW)	(37) NAVIGATION LOCKS NO.	(38) LENGTH (FT.)	(39) WIDTH (FT.)	(40) LENGTH (FT.)	(41) WIDTH (FT.)	(42) LENGTH (FT.)	(43) WIDTH (FT.)	(44) LENGTH (FT.)	(45) WIDTH (FT.)
1	200	U	55	840	4300											

(46) OWNER	(47) ENGINEERING BY	(48) CONSTRUCTION BY
MICHAEL JACHCH	UNKNOWN	UNKNOWN

(49) REGULATORY AGENCY DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
NONE	NONE	CT DEP	CT DEP

(50) INSPECTION BY	(51) INSPECTION DATE DAY | MO | YR	(52) AUTHORITY FOR INSPECTION
NEW ENGLAND ENGINEERING INC	020FEB0	PL 92-367

(53) REMARKS
31,32,33=INCLUDES AUXILIARY SPILLWAY