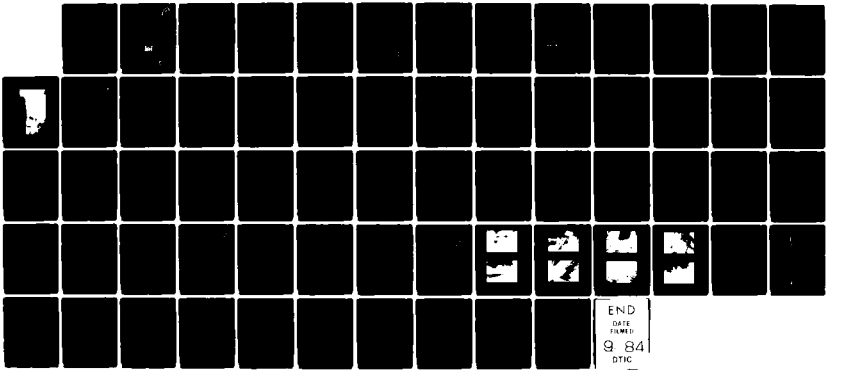
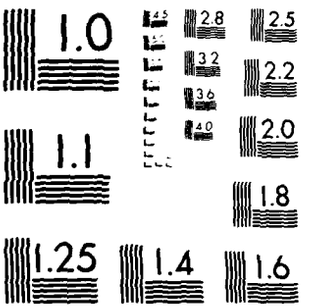
AD-A144 618 NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS 1/1
SIMPSON POND DAM (CT..(U) CORPS OF ENGINEERS WALTHAM MA
NEW ENGLAND DIV FEB 81

UNCLASSIFIED F/G 13/13 NL



END
DATE FILMED
9 84
DTIC



QUINNIPIAC RIVER BASIN
WALLINGFORD, CONNECTICUT

SIMPSON POND DAM
CT 00630

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

FEBRUARY, 1981

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER CT 00630	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Simpson 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 February 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,

Quinnipiac River Basin
Wallingford, Connecticut

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

Simpson Pond Dam is a stone masonry and earth embankment structure approximately 300 feet long and 22.3 feet high. The dam is judged to be in fair condition with several areas that require attention. The dam is classified as SMALL and has a HIGH hazard potential. The test flood according to these guidelines ranges from ½ the PMF to the PMF.

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-E

MAR 17 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 Simpson Pond Dam (CT-00630) Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. The report is based upon a visual inspection, a review of past performance, and a preliminary hydrological analysis. A brief assessment is included at the beginning of the report.

The preliminary hydrologic analysis has indicated that the spillway capacity for the Simpson Pond Dam would likely be exceeded by floods greater than 15 percent of the Probable Maximum Flood (PMF). Our screening criteria specifies that a dam of this class which does not have sufficient spillway capacity to discharge fifty percent of the PMF, should be adjudged as having a seriously inadequate spillway and the dam assessed as unsafe, non-emergency, until more detailed studies prove otherwise or corrective measures are completed.

The term "unsafe" applied to a dam because of an inadequate spillway does not indicate the same degree of emergency as that term would if applied because of structural deficiency. It does indicate, however, that a severe storm may cause overtopping and possible failure of the dam, with significant damage and potential loss of life downstream.

It is recommended that within twelve months from the date of this report the owner of the dam engage the services of a professional or consulting engineer to determine by more sophisticated methods and procedures the magnitude of the spillway deficiency. Based on this determination, appropriate remedial mitigating measures should be designed and completed within 24 months of this date of notification. In the interim a detailed emergency operation plan and warning system should be promptly developed. During periods of unusually heavy precipitation, round-the-clock surveillance should be provided.

NEDED-E
Honorable William A. O'Neill

I have approved the report and support the findings and recommendations described in Section 7, with qualifications as noted above. I request that you keep me informed of the actions taken to implement these recommendations since this follow-up is an important part of the non-Federal Dam Inspection Program.

A copy of this report has been forwarded to the Department of Environmental Protection, the cooperating agency for the State of Connecticut. This report has also been furnished to the owner of the project, Carabetta Management, Meriden, CT.

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

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

Sincerely,

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

SIMPSON POND DAM

CT 00630

QUINNIPIAC RIVER BASIN

WALLINGFORD, CONNECTICUT

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM

PHASE I INSPECTION REPORT

Identification Number:	CT 00630
Name:	Simpson Pond Dam
Town:	Wallingford
County and State:	New Haven County, Connecticut
Stream:	Wharton Brook
Date of Inspection:	October 23, 1980

BRIEF ASSESSMENT

Simpson Pond Dam is a stone masonry and earth embankment structure approximately 300 feet long and 22.3 feet high. The northern third of the downstream face of the dam is stone masonry either vertical or built in steps. The downstream face of the southern two thirds of the dam is earth, with 1:1 slopes and a crest width of approximately 10 feet. The main spillway is located near the northern end of the dam and is 42 feet long. There is also an auxiliary spillway at the northern end of the dam that is 55 feet long and 1 foot higher than the main spillway. There is a service bridge leading to a platform and gate which controls a low-level discharge pipe that passes through the base of the dam. The gate is operable and is used to lower the pond for maintenance purposes. There is an abandoned gate house on the earth embankment crest that was used to operate a power conduit. The power conduit discharges into the downstream channel approximately 300 feet from the dam. Presently, the pond is used for recreational purposes only. The drainage area is 3.1 square miles and the reservoir has 71 acre-feet of storage capacity.

The assessment of the dam is based on a visual inspection and hydraulic/hydrologic computations. The dam is judged to be in FAIR condition with several areas that require attention. These areas include seepage through the dam below and adjacent to the spillway, missing capstones on the spillway

weir, vegetation on the earth embankment and in the downstream channel and severe scouring of the northern downstream channel bank below the auxiliary spillway.

The dam is classified as SMALL and has a HIGH hazard potential in accordance with guidelines established by the Corps of Engineers. The test flood according to these guidelines ranges from 1/2 the Probable Maximum Flood (PMF) to the PMF. The test flood for this dam is 1/2 the PMF and is calculated to be 3,000 cfs. The spillway capacity at the top of the dam is 885 cfs or 30 percent of the test flood outflow. The test flood outflow will overtop the dam by 1.9 feet.

It is recommended that the owner engage the services of a qualified registered engineer experienced in the design of dams to investigate the seepage through the dam, supervise the removal of trees on the earth embankment, prepare a detailed hydraulic/hydrologic study to determine the spillway's adequacy and investigate means to prevent scouring of the downstream channel bank below the auxiliary spillway. It is also recommended that the Owner remove vegetation from the embankment and downstream channel, repair the banks and walls of the downstream channel, replace the capstones on the spillway weir, establish a formal warning system and initiate an annual technical inspection program.

The owner should implement the recommendations and remedial measures described above, and in greater detail in Section 7, within one year after receipt of this Phase I Inspection Report.

Joseph F. Merluzzo
Connecticut P.E. #7639
Project Manager

Gary J. Giroux
Connecticut P.E. #11477
Project Engineer

This Phase I Inspection Report on Simpson Pond Dam (CT-00630) 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 I Inspections. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Inspection 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 investigations and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Inspection; 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 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.

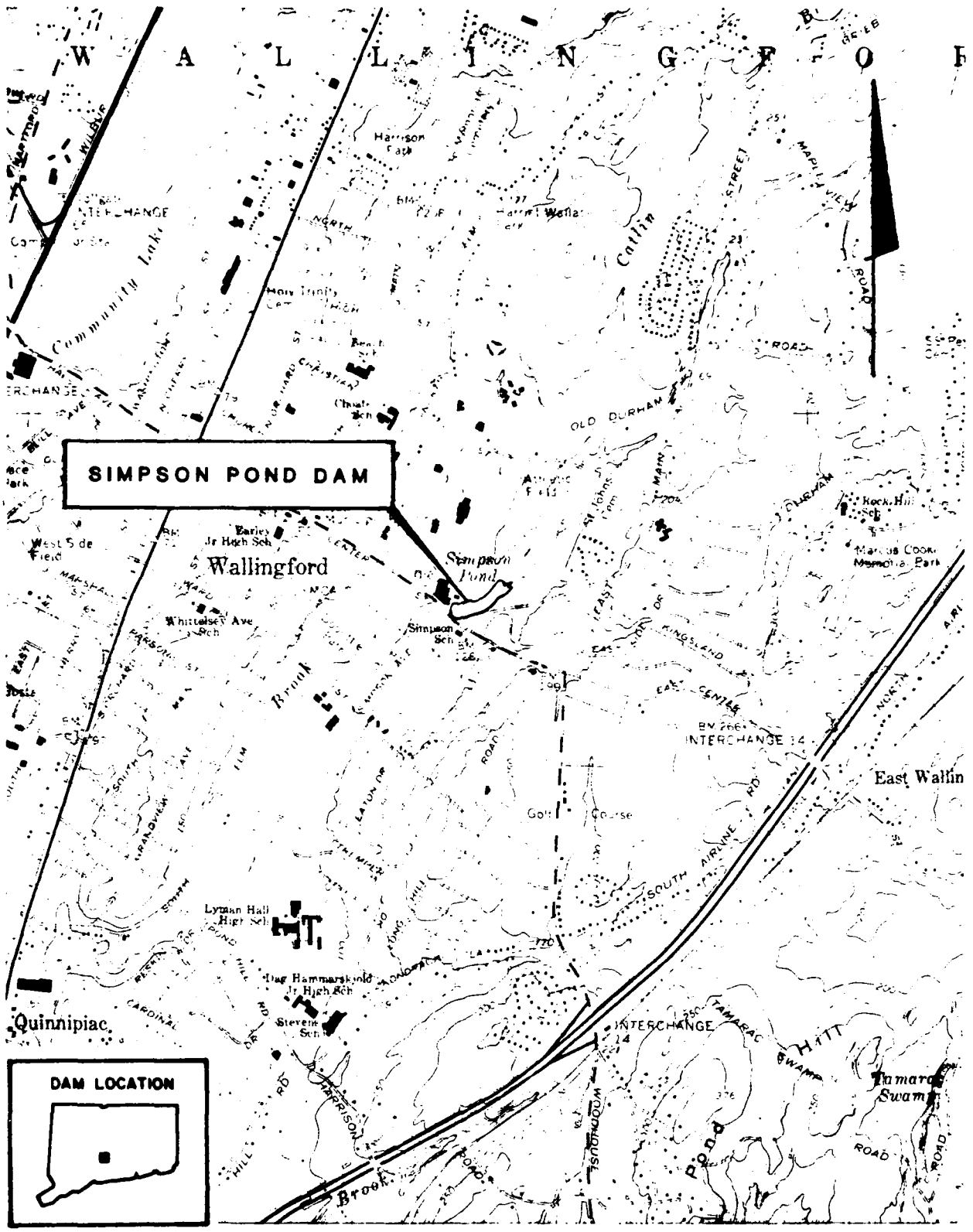
It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the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

Phase I 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 reasonably possible storm runoff), or fractions thereof. Because of the magnitude and variety 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 aide 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 I Inspection 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 Occupational Safety and Health Administration's (OSHA) rules and regulations is also excluded.

TABLE OF CONTENTS

SIMPSON POND DAM



QUADRANGLE: WALLINGFORD, CT

US ARMY, CORPS OF ENGINEERS
NEW ENGLAND DIVISION
WALTHAM, MASS.

SCALE IN FEET
2000' 0 2000' 4000'
1" = 2000'

LOCATION MAP

PHASE I INSPECTION REPORT

SIMPSON POND DAM CT 00630

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. Storch Engineers 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 were issued to Storch Engineers under a letter of October 30, 1980 from William E. Hodgson, Jr., Colonel, Corps of Engineers. Contract No. DACW33-80-C-0035 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 prepare the states to quickly initiate effective dam safety programs for non-Federal dams.

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

1.2 Description of Project

a. Location - Simpson Pond Dam is located in the Town of Wallingford, New Haven County, Connecticut. The dam and pond are adjacent to the intersection of Constitution Street and Center Street about 1/2 mile east of the center of town.

The coordinates of the dam are approximately 41°-27.05' north latitude and 72°-48.59' west longitude. The dam is located on Wharton Brook in the Quinnipiac River Basin.

b. Description of Dam and Appurtenances - Simpson Pond Dam is a stone masonry and earth embankment dam approximately 300 feet long and 22.3 feet high. About two thirds of the length of the dam is an earth embankment with 1:1 slopes and covered with brush and grass. The remainder of the dam consists of stone masonry. The upstream face was underwater so its slope could not be determined. The top of the dam is approximately 10 feet wide.

The main spillway is located near the northern end of the dam and is 42 feet long. At this location, the entire downstream face of the dam is stepped, stone masonry with a solid stone apron at the base. Adjacent to and north of the main spillway and approximately 1 foot higher is an auxiliary spillway approximately 30 feet long and extending to the end of the dam. The downstream face at this location is vertical stone masonry. Adjacent to the spillway is a service bridge that leads to controls for an operable 27-inch low-level discharge pipe that passes through the base of the dam. An abandoned gate house approximately 100 feet south of the spillway controls a power conduit that discharges into the downstream channel approximately 300 feet from the dam. Its operability is unknown.

c. Size Classification - Simpson Pond Dam has a maximum height of 22.3 feet and a maximum capacity of 71 acre-feet at the top of the dam. In accordance with the Recommended Guidelines for Safety Inspection of Dams established by the Corps of Engineers, the dam is classified as SMALL (height less than 40 feet, storage less than 1,000 acre-feet).

d. Hazard Classification - Simpson Pond Dam is classified as having a HIGH hazard potential. Failure of the dam could result in the loss of more than a few lives and cause significant property damage. Approximately 400 feet downstream,

the flood wave would strike an apartment complex. The first floor sill of the apartments are approximately 6 feet above the streambed. Estimated flow and water depth at this location just prior to dam failure is 885 cfs and 5 feet and just after dam failure is 15,000 cfs and 10 feet. Therefore, the water level would rise approximately 4.6 feet above the first floor sills.

e. Ownership - Simpson Pond Dam is owned by:

Carabetta Management
P.O. Box 240
Meriden, Connecticut 06450
(203) 237-7400

f. Operator - Operating personnel are under the direction of:

Mr. Elmer B. Howell
Silver Pond Apartments
656 Center Street
Wallingford, Connecticut 06492
(203) 265-5456

g. Purpose of Dam - The dam originally supplied power to the International Silver Company. Presently, the pond and dam are used for recreational purposes only.

h. Design and Construction History - Simpson Pond Dam was constructed around 1880. No information is available on the design or construction of the dam.

i. Normal Operational Procedures - There are no operational procedures for Simpson Pond Dam, however, the low-level discharge gate is operable and the operator could lower the pond if necessary.

1.3 Pertinent Data

a. Drainage Area - The Simpson Pond drainage basin is located in the Town of Wallingford, Connecticut and is irregular in shape. The area of the drainage basin is 3.1 square miles (Appendix D - Plate 4). Approximately 5 percent of the drainage basin is natural storage and about 30 percent is undeveloped. The topography is rolling with elevations ranging from 350 (NGVD) to 115.0 (NGVD) at the spillway crest.

b. Discharge at Damsite - There are no records available for discharge at the dam.

(1)	Outlet works (conduit) size:	27 inches
	Invert elevation (NGVD):	102.5
	Discharge Capacity at top of dam:	95 cfs
(2)	Maximum known flood at damsite:	unknown
(3)	Ungated spillway capacity at top of dam:	885 cfs
	Elevation (NGVD):	118.0
(4)	Ungated spillway capacity at test flood elevation:	3,000 cfs
	Elevation (NGVD):	119.9
(5)	Gated spillway capacity at normal pool elevation:	N/A
	Elevation (NGVD):	N/A
(6)	Gated spillway capacity at test flood elevation:	N/A
	Elevation (NGVD):	N/A
(7)	Total Spillway capacity at test flood elevation:	3,000 cfs
	Elevation (NGVD):	119.9
(8)	Total project discharge at top of dam:	980 cfs
	Elevation (NGVD):	118.0
(9)	Total project discharge at test flood elevation:	3,095 cfs
	Elevation (NGVD):	119.9

c. Elevation (feet above NGVD)

(1)	Streambed at toe of dam:	95.7
(2)	Bottom of cutoff:	unknown

(3)	Maximum tailwater:	100.7
(4)	Normal pool:	115.0
(5)	Full flood control pool:	N/A
(6)	Spillway crest (ungated):	115.0
(7)	Auxillary spillway crest	116.0
(8)	Design surcharge (original design):	unknown
(9)	Top of dam:	118.0
(10)	Test flood surcharge:	119.9

d. Reservoir (length in feet)

(1)	Normal pool:	1,200
(2)	Flood control pool:	N/A
(3)	Spillway crest pool:	1,200
(4)	Top of dam:	1,550
(5)	Test flood pool:	1,700

e. Storage (acre-feet)

(1)	Normal pool:	53
(2)	Flood control pool:	N/A
(3)	Spillway crest pool:	53
(4)	Top of dam:	71
(5)	Test flood pool:	78

f. Reservoir Surface (acres)

(1)	Normal pool:	5
(2)	Flood control pool:	N/A
(3)	Spillway crest:	5
(4)	Test flood pool:	7
(5)	Top of dam:	7

g.	Dam		
	(1) Type:	stone masonry earth embankment	
	(2) Length:	300 feet	
	(3) Height:	22.3 feet	
	(4) Top width:	10 feet	
	(5) Side slopes:	vertical and stepped at downstream masonry portion; 1:1 at downstream earth embankment	
	(6) Zoning:	unknown	
	(7) Impervious core:	unknown	
	(8) Cutoff:	unknown	
	(9) Grout curtain:	unknown	
	(10) Other:	N/A	
h.	Diversion and Regulating Tunnel:	N/A	
i.	Spillway	Main	Aux.
	(1) Type:	masonry broad crested weir	Same
	(2) Length of weir:	42 feet	55 feet
	(3) Crest elevation	115.0	116.0
	(4) Gates:	N/A	N/A
	(5) U/S channel:	none	none
	(6) D/S channel:	stone and concrete apron-natural channel	natural channel
	(7) General:	N/A	N/A

j. Regulating Outlets

(1) Invert elevation (NGVD):	102.5
(2) Size:	27 inches
(3) Description:	metal pipe
(4) Control Mechanism	manually operated gate
(5) Other:	gate operable

SECTION 2 - ENGINEERING DATA

2.1 Design Data

No design computations or drawings are available for this dam.

2.2 Construction Data

The dam was constructed around 1880. No construction drawings or data are available for this dam.

2.3 Operation Data

The dam at one time supplied industrial power to the International Silver Company. Presently, the dam is used for recreational purposes only. The low level discharge gate is operable. No operating records for this dam have been maintained.

2.4 Evaluation of Data

a. Availability - No design, construction or operation data is available for this dam.

b. Adequacy - Since no information is available, a visual inspection and hydraulic/hydrologic computations were used to assess the condition of the facility.

c. Validity - The conclusions and recommendations found in this report are based on a visual inspection and hydraulic/hydrologic computations.

SECTION 3 - VISUAL INSPECTION

3.1 Findings

a. General - A visual inspection was conducted on October 23, 1980 by members of the engineering staff of Storch Engineers, D. Baugh and Associates, Inc. and Matthews Associates. A copy of the visual inspection checklist is contained in Appendix A of this report. Selected photos of the dam are contained in Appendix C.

In general, the overall condition of the dam and its appurtenant structures is FAIR.

b. Dam - The dam is a stone masonry and earth embankment structure. The downstream face below the spillway is stone masonry built in a stepped fashion as shown in the Overview Photo. The southern two thirds of the dam is an earth embankment with a 1:1 slope and is covered with grass, brush and small trees (Photo 2). The upstream earthen face is primarily below the pond surface. That portion above water is covered with brush and trees (Photo 3).

There are several areas of seepage through and adjacent to the masonry face of the dam (Photos 5 and 7 - See Photo Location Plan Plate 3 for location). On the north side of the spillway, below the auxiliary spillway is a concrete buttress that has seepage beneath it. It is undermined and spalled. The stone masonry face below the south side of the spillway and near the toe has seepage also. The amount of seepage at all locations could not be measured. The seepage was clear and showed no signs of particle movement.

c. Appurtenant Structures - The main spillway is 42 feet long and the auxiliary spillway is 55 feet long (Photo 1). At the base of the main spillway is a solid stone apron. Several capstones are missing from the top of the main spillway and near the south abutment water is flowing under the capstones. The north abutment

is 1 foot above the main spillway. There is a 55-foot auxiliary spillway north of the main spillway, (Photo 1) with a chain link fence along the crest. This fence has debris collecting on the upstream side and does inhibit flow when the auxilary spillway is in use. The downstream face is mortared stone masonry. There is a large scour hole in the downstream channel bank below the auxiliary spillway caused by water flowing over the auxiliary spillway (Photos 1 and 4).

A service bridge extends about 20 feet from the south abutment to a low level discharge gate (Photo 3). The bridge, consisting of wooden boards on steel beams and columns, is in good condition. The gate is kept locked to inhibit vandalism. The gate is operable and controls a 27-inch metal low-level discharge pipe that passes through the base of the dam (Photo 6).

There is an abandoned brick gate house on the earthen crest approximately 100 feet south of the spillway (Photo 2). The gate controls power conduit that discharges into the downstream channel approximately 300 feet from the dam. The system was apparently used for power supply at one time. The operability is unknown.

d. Reservoir Area - The area immediately adjacent to the pond is gently sloped and in a natural state. The shoreline shows no signs of sloughing or erosion. A rapid rise in the water level of the pond will not endanger life or property.

e. Downstream Channel - The downstream channel is natural with a stone masonry wall and a natural bank containing it (Photo 8). The northern bank near the dam are eroded somewhat and are covered with brush. Portions of the stone wall are out of alignment and in poor condition.

3.2 Evaluation

Overall, the general condition of the dam is FAIR. The visual inspection revealed items that lead to this assessment, such as:

a. Seepage through the dam below and adjacent to the spillway.

b. Missing capstones on the main spillway.

c. Spalled and undermined buttress.

d. Large scour hole in the bank of the downstream channel adjacent to the dam.

e. A fence along the crest of the auxilary spillway.

f. Vegetation on the earth embankments and downstream channel.

SECTION 4 - OPERATIONAL AND MAINTENANCE PROCEDURES

4.1 Operational Procedures

a. General - The operation of this facility was strictly for industrial power, but this purpose was abandoned sometime ago. Presently, the pond is used for recreation. The water level is controlled by the low-level discharge facility which is operable.

b. Description of Any Warning System in Effect - There is no formal warning system in effect for this dam.

4.2 Maintenance Procedures

a. General - There is no specific maintenance program for this dam.

b. Operating Facilities - The gate and the discharge pipe are operable.

4.3 Evaluation

There is no regularly scheduled maintenance program. A systematic and complete maintenance program should be instituted at the dam and a formal warning system should be developed.

SECTION 5 - EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

5.1 General

Simpson Pond Dam is a stone masonry and earth embankment dam approximately 300 feet long and 22.3 feet high. The northern third of the dam is stone masonry and the southern two thirds is an earth embankment. There is a 42-foot long main spillway near the northern end of the dam and adjacent to it and running to the north end of the dam is a 55-foot long auxiliary spillway. There is a service bridge extending about 20 feet from the south abutment that leads to a gate valve. This gate controls an operating low-level discharge pipe that passes through the base of the dam.

The watershed encompasses 3.1 square miles and is approximately 30 percent undeveloped. The topography is rolling with terrain rising 235 feet from the spillway crest.

The pond has a total capacity of approximately 53 acre-feet at the spillway crest and approximately 71 acre-feet when the pond is at the top of the dam.

5.2 Design Data

No design data is available.

5.3 Experience Data

No historical data for recorded discharges or water surface elevation is available for this dam, however, the dam has withstood past major floods such as; March 1936, September 1938 and August 1955 as well as January and February 1978 and January 1979. The flood of record in the Wallingford area resulted from the storm of September, 1938.

5.4 Test Flood Analysis

Based on the Recommended Guidelines for Safety Inspection of Dams, the dam is classified as a SMALL structure with a HIGH hazard potential. The test flood for

these conditions ranges from 1/2 the probable maximum flood (PMF) to the PMF. One half of the PMF was used for this dam because of the dam's small size.

Using guide curves established by the Corps of Engineers (rolling terrain), the test flood inflow is 3,050 cfs. The routing procedure established by the Corps' guidelines gives an approximate outflow of 3,000 cfs. The spillway capacity of the dam is approximately 885 cfs or 30 percent of the routed test flood outflow. The test flood will overtop the dam by 1.9 feet.

The water in the pond is basically uncontrolled and therefore the storage behind the dam was assumed to begin at the elevation of the spillway crest. Storage was determined by an average area depth analysis. Capacity curves for the spillway assumed a broad crested weir.

5.5 Dam Failure Analysis

A dam failure analysis was performed using the Rule of Thumb method in accordance with guidelines established by the Corps of Engineers. Failure was assumed to occur when the water level in the pond was at the top of the dam.

The spillway discharge just prior to dam failure is 885 cfs and the calculated dam failure discharge is 19,830 cfs.

Failure of Simpson Pond Dam could result in the loss of more than a few lives. Approximately 400 feet downstream of the dam is an apartment complex with first floor sill approximately 6 feet above the streambed. Estimated flow and water depths at this location just prior to dam failure is 885 cfs and 5 feet and just after dam failure is 1,500 cfs and 10.6 feet. Therefore, the water level would rise approximately 4.6 feet above the first floor sill of the apartments. Also, approximately 800 feet downstream are several homes with their first floor sills ranging from 4 to 6 feet above the streambed. Estimated flow and water depth at this location just after dam failure is approximately 10,000 cfs and 8 feet.

SECTION 6 - EVALUATION OF STRUCTURAL STABILITY

6.1 Visual Observations

The general structural stability of the dam is good as evidenced by the vertical, horizontal and lateral alignment. The stone masonry shows no movement although several capstones need to be replaced. The earth embankment portions of the dam also show no evidence of instability. The concrete buttress, below the auxilary spillway is spalled and being undermined. The structural stability of the dam, however, can be affected by the items noted in Section 3.2.

6.2 Design and Construction Data

The dam was constructed around 1880. No plans or construction information are available for this dam.

6.3 Post-Construction Changes

The only post-construction change was the abandonment of the power supply gate house and conduit.

6.4 Seismic Stability

The dam is located in Seismic Zone 1 and in accordance with Recommended Phase I Guidelines does not warrant a seismic analysis.

SECTION 7 - ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition - After consideration of the available information, the results of the inspection, contact with the owner and hydraulic/hydrologic computations, the general condition of the Simpson Pond Dam is FAIR.

b. Adequacy of Information - The information available is such that the assessment of the safety of the dam was based on the visual inspection results and computations developed for this report.

c. Urgency - It is considered that the recommendations and remedial measures suggested below should be implemented within one year after receipt of this Phase I Inspection Report.

7.2 Recommendations

The following recommendations should be carried out under the direction of a qualified registered engineer.

a. Seepage through the dam and the spillway training walls should be investigated further to determine its origin and monitored to determine any changes.

b. Trees, including stumps and root systems, should be removed from the crest and embankment slopes and backfilled with proper material.

c. Investigate a means to prevent scouring of the downstream channel bank below the auxiliary spillway and the undermining of the buttress.

d. Prepare a detailed hydraulic/hydrologic investigation to assess further the potential of overtopping the dam and the need for and the means to increase the project discharge capacity. Also, during this investigation, the engineer should determine the effect of the fence along the auxilary spillway crest on its capacity.

7.3 Remedial Measures

a. Operation and Maintenance Procedures -

(1) Remove all brush from the earth embankment, within 20 feet of the toe of the dam and from the downstream channel.

(2) Repair and replace capstones on the main spillway weir.

(3) Repair stone walls and eroded banks of downstream channel.

(4) Institute a program of annual technical inspection by a qualified Engineer.

(5) Develop plans for around-the-clock surveillance for periods of unusually heavy rains and institute a formal downstream warning system for use in the event of an emergency.

7.4 Alternatives

There are no practical alternatives to the above recommendations.

APPENDIX A

INSPECTION CHECK LIST

INSPECTION CHECK LIST

PARTY ORGANIZATION

PROJECT Simpson Pond Dam

DATE 10/23/80

TIME 10:30 a.m.

WEATHER Sunny, 40's

W.S. ELEV._____ U.S.____ DN.S.

PARTY:

1. Gary Giroux, SE, Hyd./Struct.
2. Hermann Hani, SE, Technician
3. Ben Cohen, SE, Civil
4. Floyd Austin, DBA, Civil
5. Peter Austin, DBA, Civil
6. Michael Pozzato, MA, Mech.
7.
8.
9.
10.

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.	Dam Embankment	F. Austin P. Austin	Fair
2.	Mechanical	M. Pozzato	Good
3.	Spillway	G. Giroux B. Cohen	Fair
4.	Discharge Channel	G. Giroux H. Hani	Fair
5.			
6.			
7.			
8.			
9.			
10.			

INSPECTION CHECK LIST

PROJECT Simpson Pond Dam DATE 10/23/80

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITIONS
DAM EMBANKMENT	
Crest Elevation	118 (NGVD)
Current Pool Elevation	115.1 (NGVD)
Maximum Impoundment to Date	Unknown
Surface Cracks	None (masonry + earth)
Pavement Condition	N/A
Movement or Settlement of Crest	None
Lateral Movement	None
Vertical Alignment	Good
Horizontal Alignment	Good
Condition at Abutment and at Concrete Structures	Good
Indications of Movement of Structural Items on Slopes	None
Trespassing on Slopes	Problem
Vegitation on Slopes	Heavy brush and small trees
Sloughing or Erosion of Slopes or Abutments	Large scour hole down stream of north abutment
Rock Slope Protection - Riprap Failures	None
Unusual Movement or Cracking at or near Toes	None
Unusual Embankment or Downstream Seepage	Some seepage on either side of spillway
Piping or Boils	None
Foundation Drainage Features	None Observed
Toe Drains	None Observed
Instrumentation System	None

INSPECTION CHECK LIST

PROJECT Simpson Pond Dam DATE 10/23/80

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
a. Approach Channel	Underwater
Slope Conditions	
Bottom Conditions	
Rock Slides or Falls	
Log Boom	
Debris	
Condition of Concrete Lining	
Drains or Weep Holes	
b. Intake Structure	Underwater
Condition of Concrete	
Stop Logs and Slots	

INSPECTION CHECK LIST

PROJECT Simpson Pond Dam DATE 10/23/80

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	Operable
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System in Gate Chamber	

INSPECTION CHECK LIST

PROJECT Simpson Pond Dam DATE 10/23/80

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - TRANSITION AND CONDUIT	N/A
General Condition of Concrete	
Rust or Staining on Concrete	
Spalling	
Erosion or Cavitation	
Cracking	
Alignment of Monoliths	
Alignment of Joints	
Numbering of Monoliths	

INSPECTION CHECK LIST

PROJECT Simpson Pond Dam DATE 10/23/80

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	
General Condition	Unknown - underwater
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	None
Floor of Approach Channel	Underwater
b. Weir and Training Walls	
General Condition of Concrete	Fair - some capstones and mortar missing
Rust or Staining	None
Spalling	None
Any Visible Reinforcing	N/A
Any Seepage or Efflorescence	Some through spillway
Drain Holes	None observed
c. Discharge Channel	
General Condition	Fair
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	Some
Floor of Channel	Fair contains rocks, bush, debris
Other Obstructions	Downstream bridges

INSPECTION CHECK LIST

PROJECT Simpson Pond Dam DATE 10/23/80

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	
General Condition of Concrete	
Rust or Staining	
Spalling	
Erosion or Cavitation	
Visible Reinforcing	
Any Seepage or Efflorescence	
Condition at Joints	
Drain holes	
Channel	Outlet pipe discharges into spillway channel
Loose Rock or Trees Overhanging Channel	
Condition of Discharge Channel	

INSPECTION CHECK LIST

PROJECT Simpson Pond Dam DATE 10/23/80

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

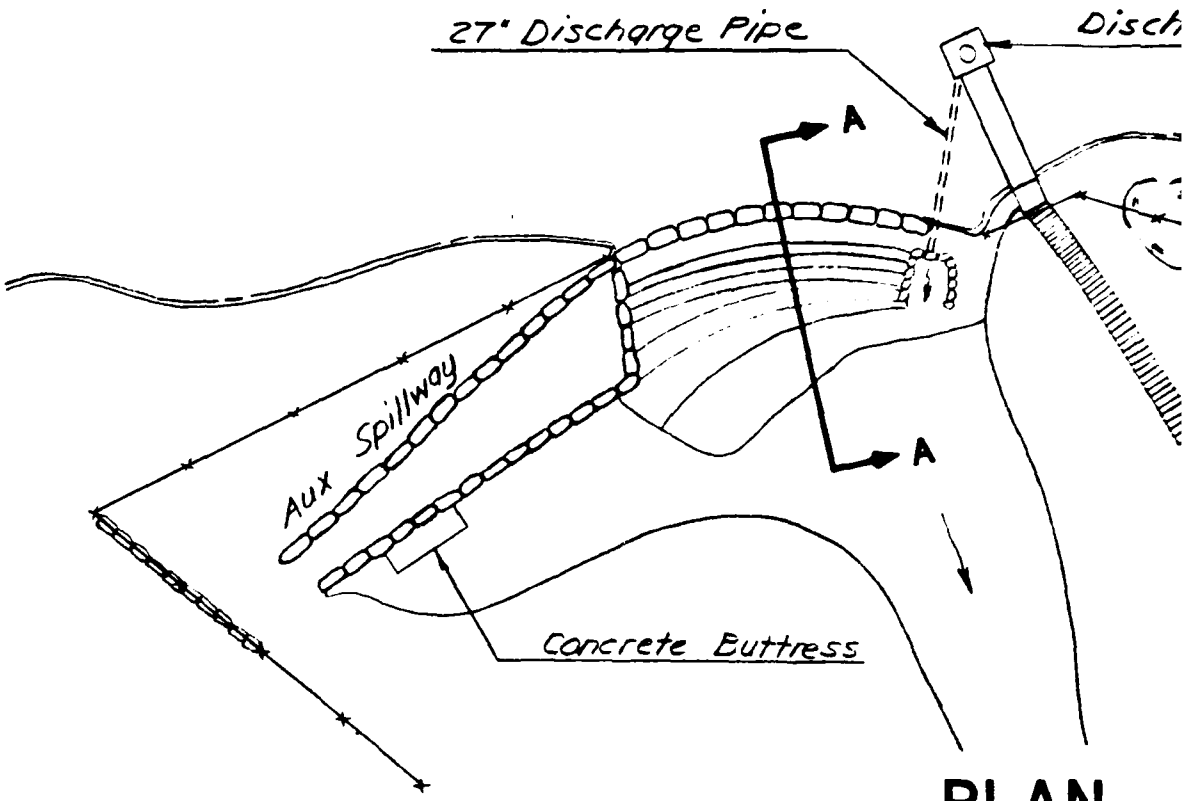
AREA EVALUATED	CONDITION
OUTLET WORKS - SERVICE BRIDGE	
a. Super Structure	
Bearings	None
Anchor Bolts	
Bridge Seat	Good
Longitudinal Members	Good
Under Side of Deck	Good
Secondary Bracing	None
Deck	Wood
Drainage System	None
Railings	None
Expansion Joints	None
Paint	Fair
b. Abutment & Piers	
General Condition of Concrete	Good
Alignment of Abutment	Good
Approach to Bridge	Good
Condition of Seat & Backwall	Good

APPENDIX B

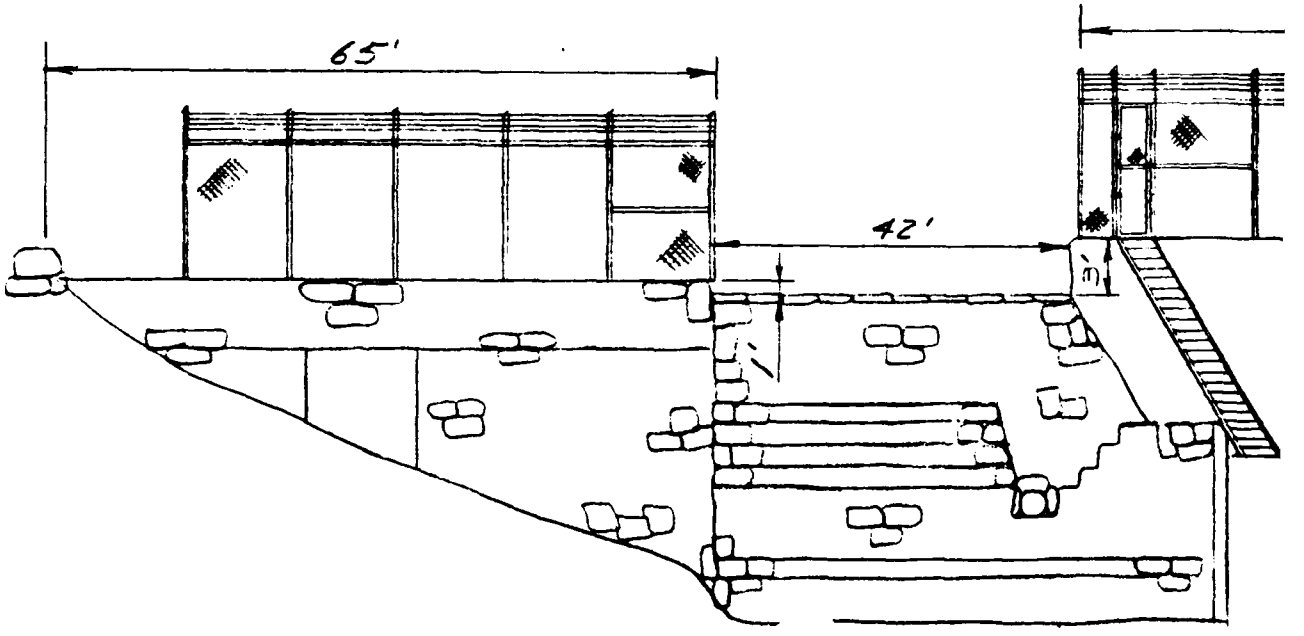
ENGINEERING DATA

Any information pertaining to the history, maintenance and past inspection reports are located at:

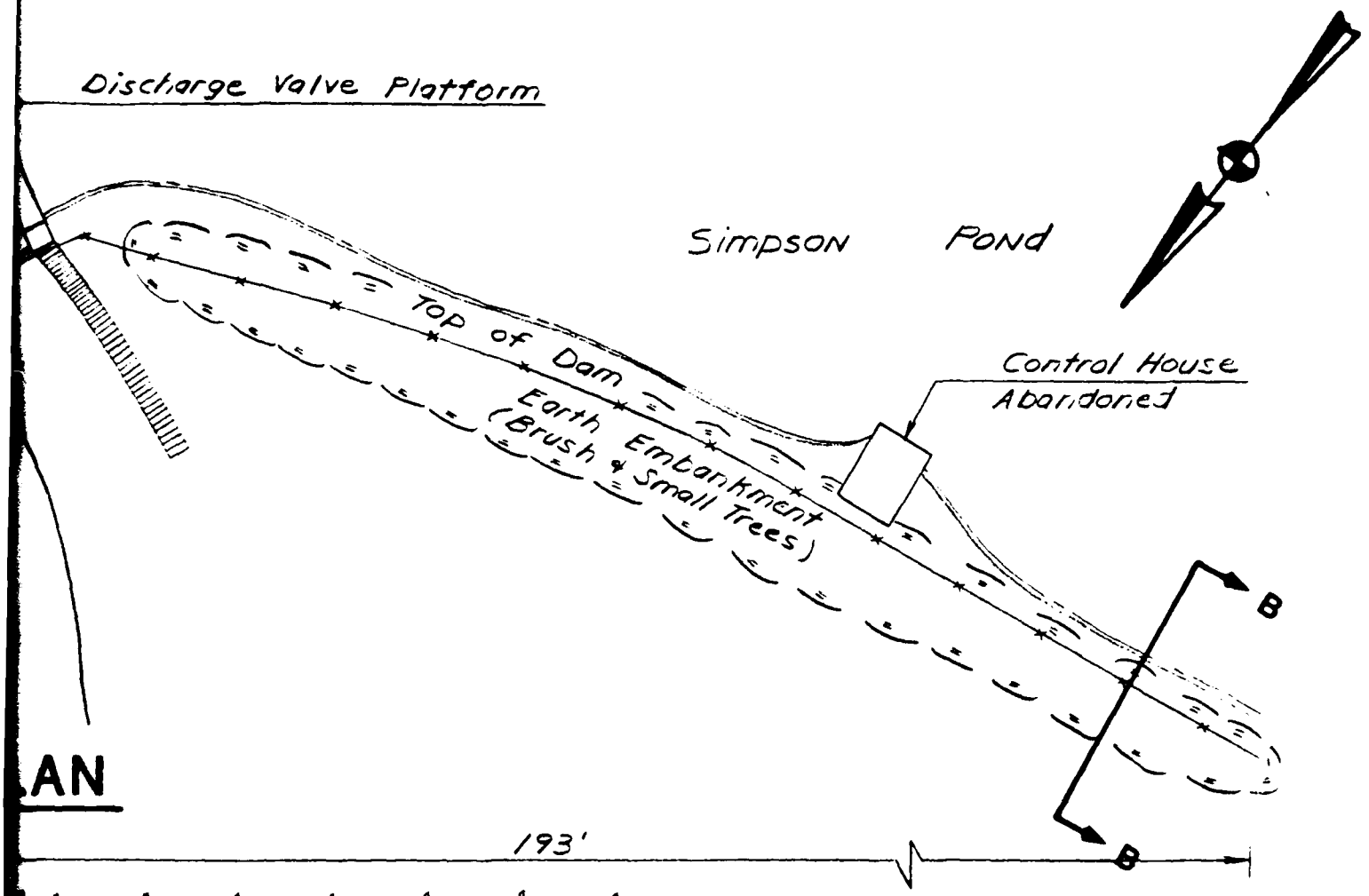
State of Connecticut
Department of Environmental
Protection
Water Resources Unit
State Office Building
Hartford, Connecticut 06115



PLAN



ELEVATION



AN

NOT TO SCALE

PLATE 1

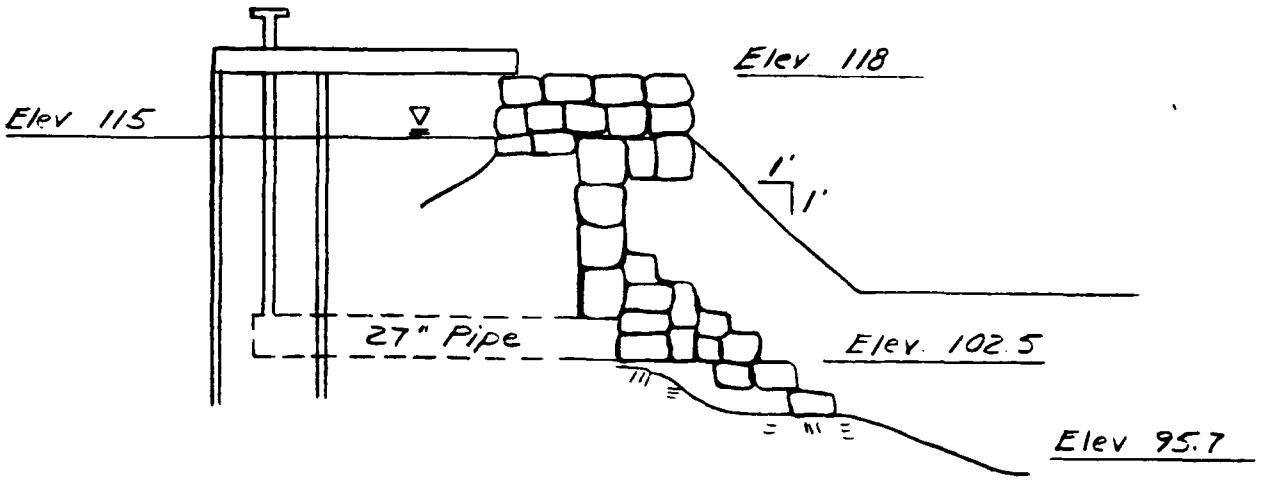
STORCH ENGINEERS WETHERSFIELD, CONNECTICUT	U.S. ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

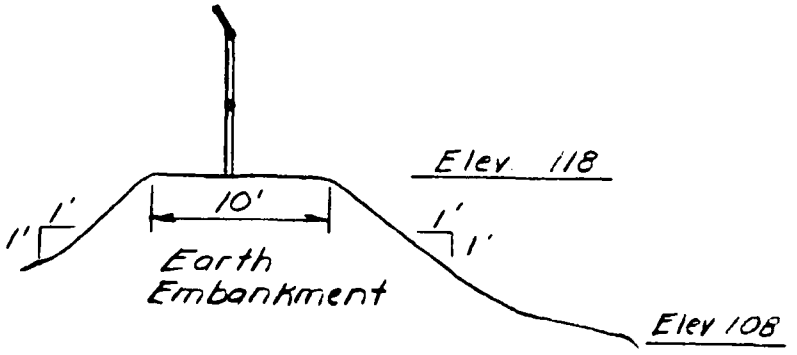
SIMPSON POND DAM

SCALE: AS SHOWN

DATE: FEBRUARY 1981



SECTION A-A



SECTION B-B

NOT TO SCALE

PLATE 2

STORCH ENGINEERS WETHERSFIELD, CONNECTICUT	U S ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS

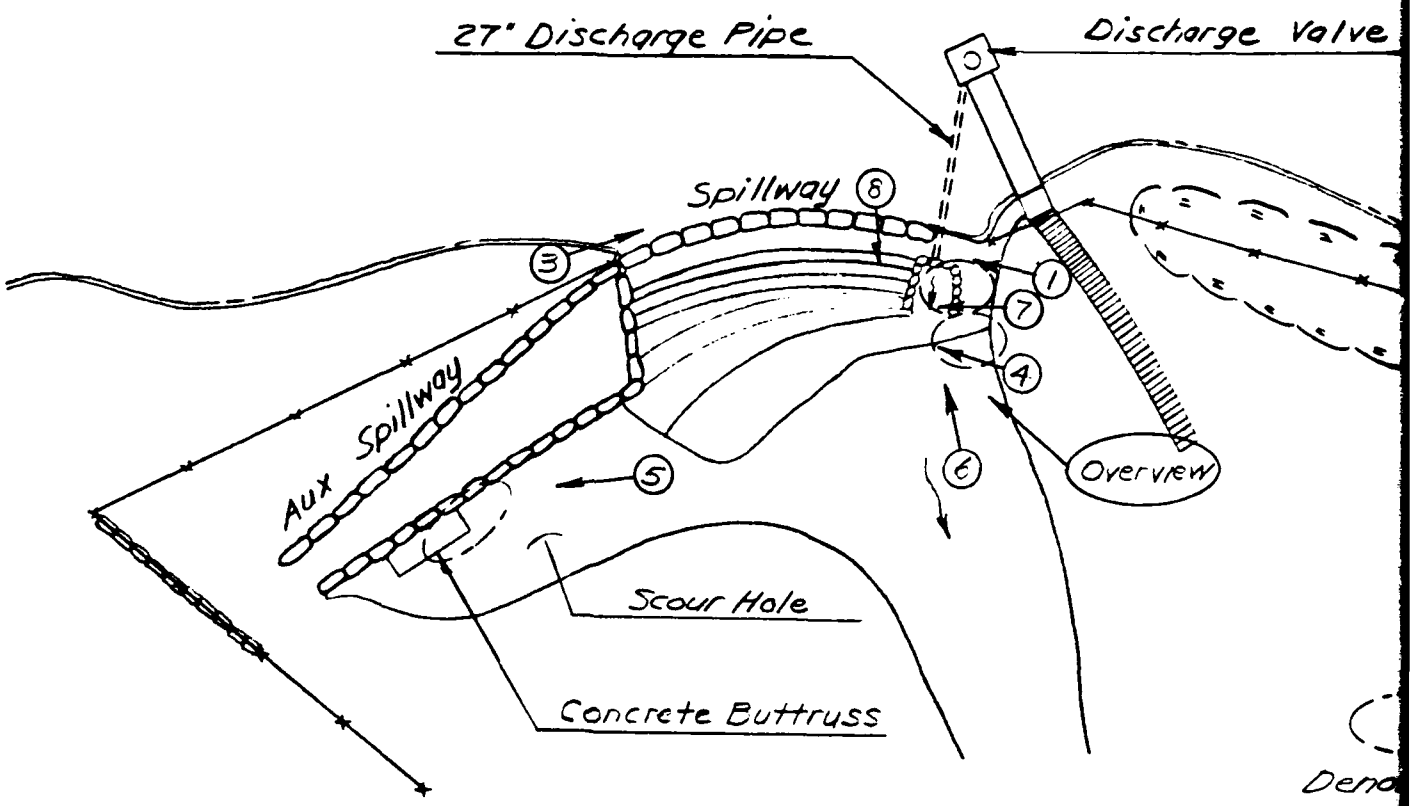
SIMPSON POND DAM

SCALE: AS SHOWN

DATE: FEBRUARY 1981

APPENDIX C

PHOTOGRAPHS


27" Discharge Pipe
Discharge Valve
Spillway
8
3
1
7
4
Aux Spillway
5
6
Overview
Scour Hole
Concrete Buttruss

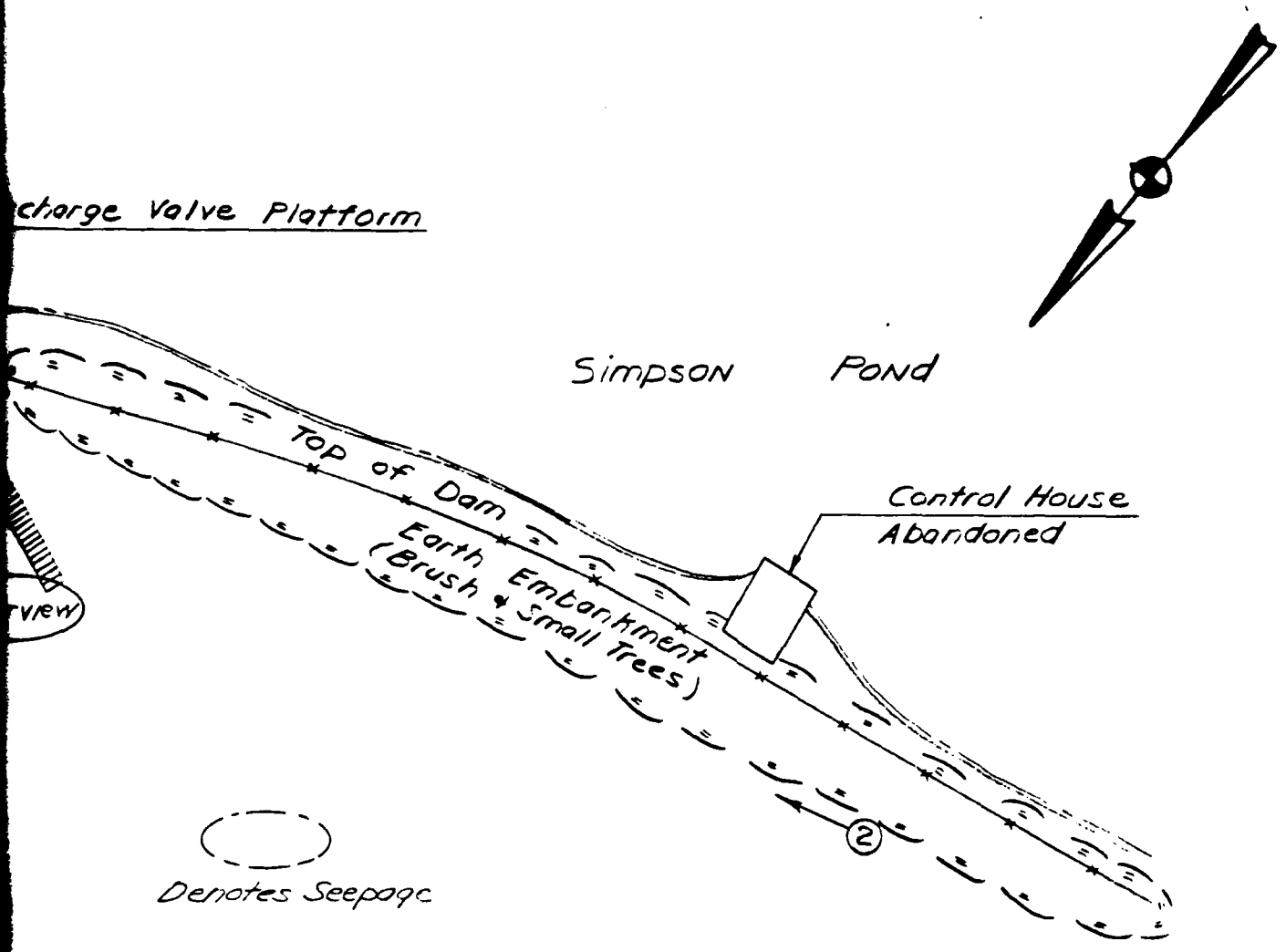


PHOTO LOCATION PLAN

PLATE 3

STORCH ENGINEERS WETHERSFIELD, CONNECTICUT	U.S. ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

SIMPSON POND DAM

NOT TO SCALE

SCALE: AS SHOWN

DATE: FEBRUARY 1981

PHOTO 1
TOP OF DAM - SPILLWAY - NORTH ABUTMENT

PHOTO 2
DOWNSTREAM FACE LOOKING NORTH

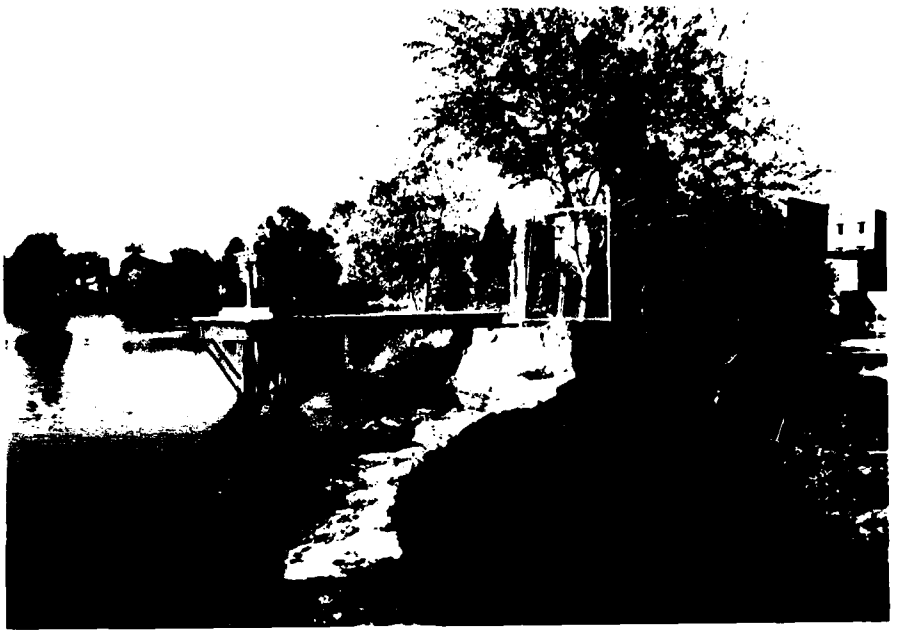


PHOTO 3

SPILLWAY - SOUTH ABUTMENT - CONTROL GATE

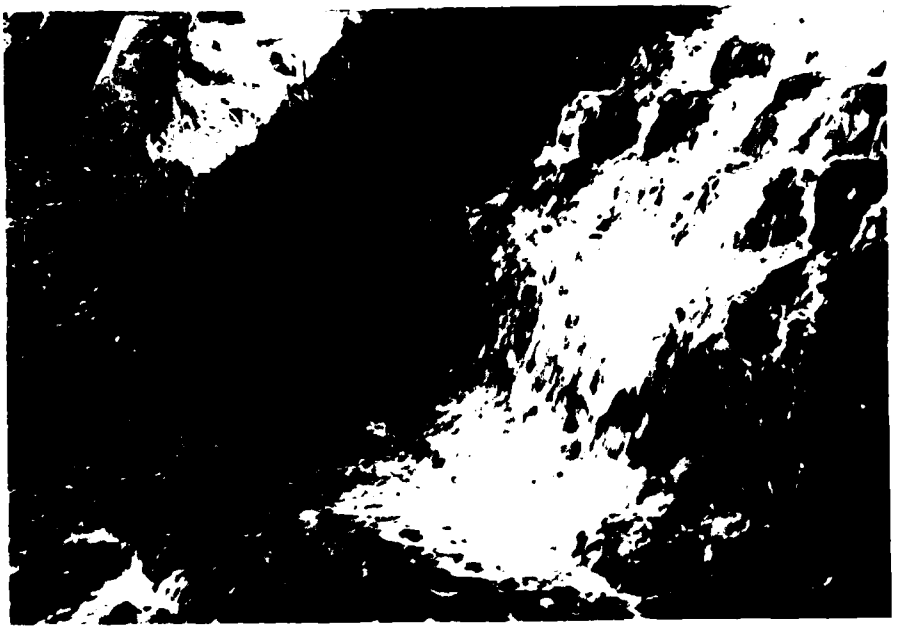


PHOTO 4

SPILLWAY - NORTH ABUTMENT

PHOTO 5

SEEPAGE - EROSION - DOWNSTREAM FACE

PHOTO 6

LOW LEVEL DISCHARGE OUTLET

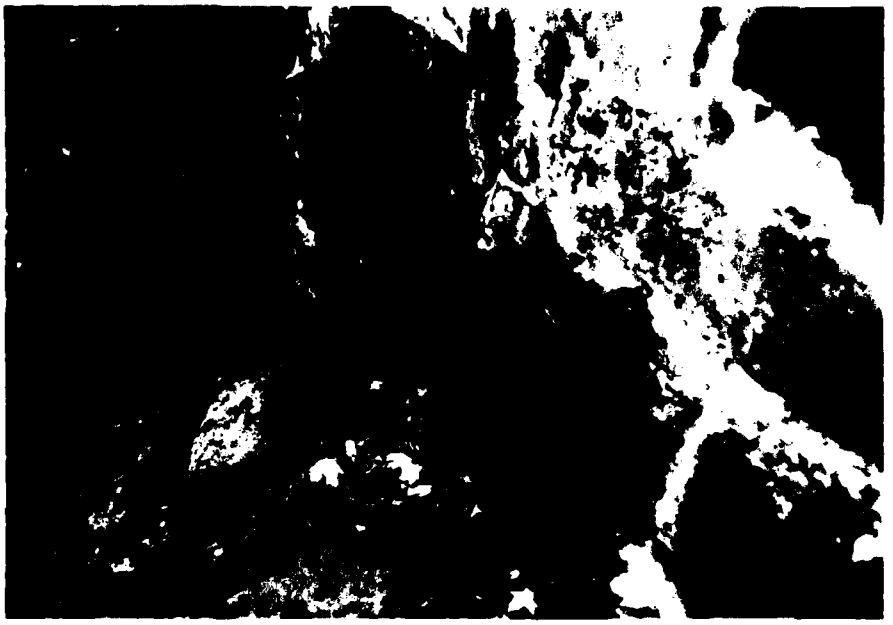


PHOTO 7

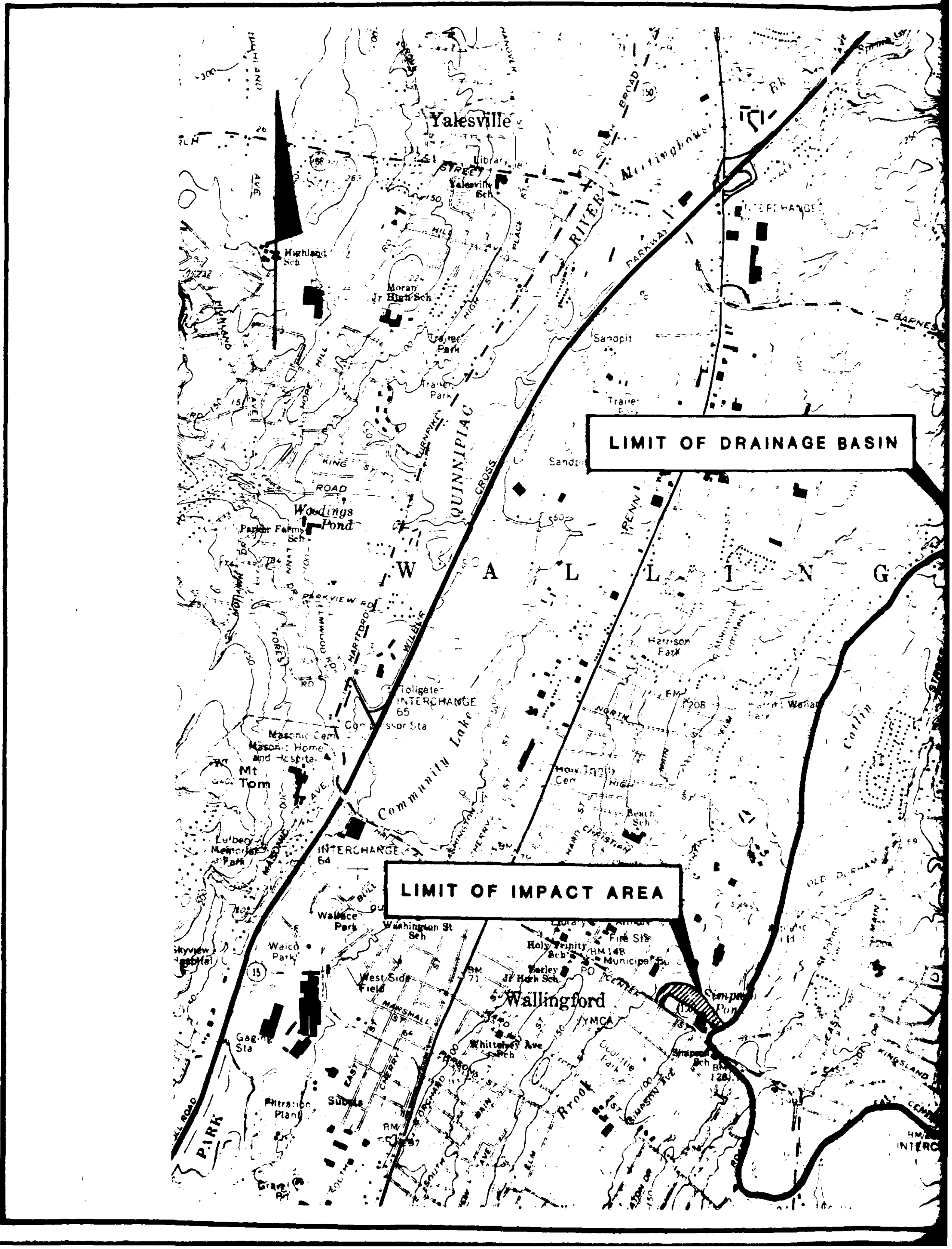
SEEPAGE - DOWNSTREAM FACE - LOW LEVEL DISCHARGE OUTLET

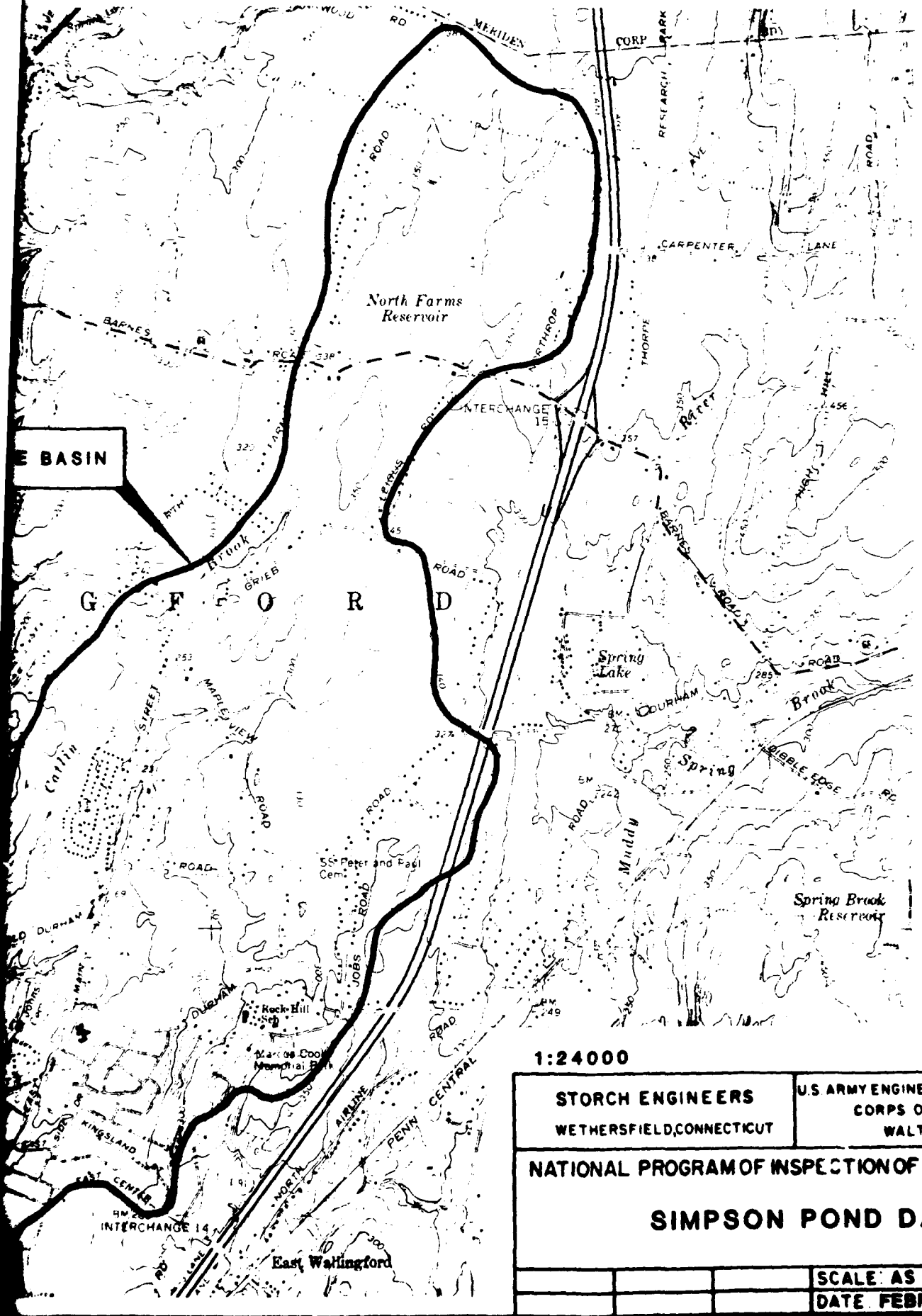
PHOTO 8

DOWNSTREAM CHANNEL

APPENDIX D

HYDRAULIC AND HYDROLOGIC COMPUTATIONS


LIMIT OF DRAINAGE BASIN
LIMIT OF IMPACT AREA
Yalesville
Wallingford
W A L L I N G
QUINNIPIAC RIVER
Community Lake
Wallace Park
Highland Sch
Moran Jr High Sch
Woodings Pond
Parker Farms Sch
INTERCHANGE 65
INTERCHANGE 64
Mt Tom
Masonic Home and Hospital
Harrison Park
Simpson Sch
Filtration Plant
Gaging Sta
West Side Field
YMCA



1:24000

PLATE 4

STORCH ENGINEERS WETHERSFIELD, CONNECTICUT	U.S. ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

SIMPSON POND DAM

			SCALE: AS SHOWN
			DATE: FEBRUARY 1981

STORCH ENGINEERS
Engineers · Landscape Architects
Planners · Environmental Consultants

JOB Phase I Dam Inspection - #4463
SHEET NO _____ OF _____
CALCULATED BY GJG DATE 12/3/80
CHECKED BY RLC DATE 12/9/80

Determination of Test Flood

NAME OF DAM Simpson Pond Dam

DRAINAGE AREA 1975 acres 3.08 SM

INFLOW Size: Small Rolling Terrain Hazard: High Test Flood: 1/2 PMF

PFR = 990 cfs/SM

$Q = 990(3.08) = 3049$ cfs

Estimating the effect of surcharge storage on the Maximum Test Flood

1. Q_{P1} = 3050 cfs
2a. H_1 = 4.9' (elev.)
b. $STOR_1$ = .164"
c. $Q_{P2} = Q_{P1}(1 - STOR_1/9.5)$ = 3000 cfs
3a. H_2 = 4.9' $STOR_2$ = .164"
b. $STOR_A$ = .164"

$Q_{PA} = 3050(1 - .164/9.5) = 3000$ cfs

H_A = 4.9' $STOR_A$ = .164"

Test Flood = 3000 cfs

Capacity of the spillway when the pond elevation is at the top of the dam

Q = 885 cfs or 30 % of the Test Flood

STORCH ENGINEERS
Engineers - Landscape Architects
Planners - Environmental Consultants

JOB Phase I Dam Inspection 4463
SHEET NO _____ OF _____
CALCULATED BY GJG DATE 11/7/80
CHECKED BY BDC DATE 11/9/80

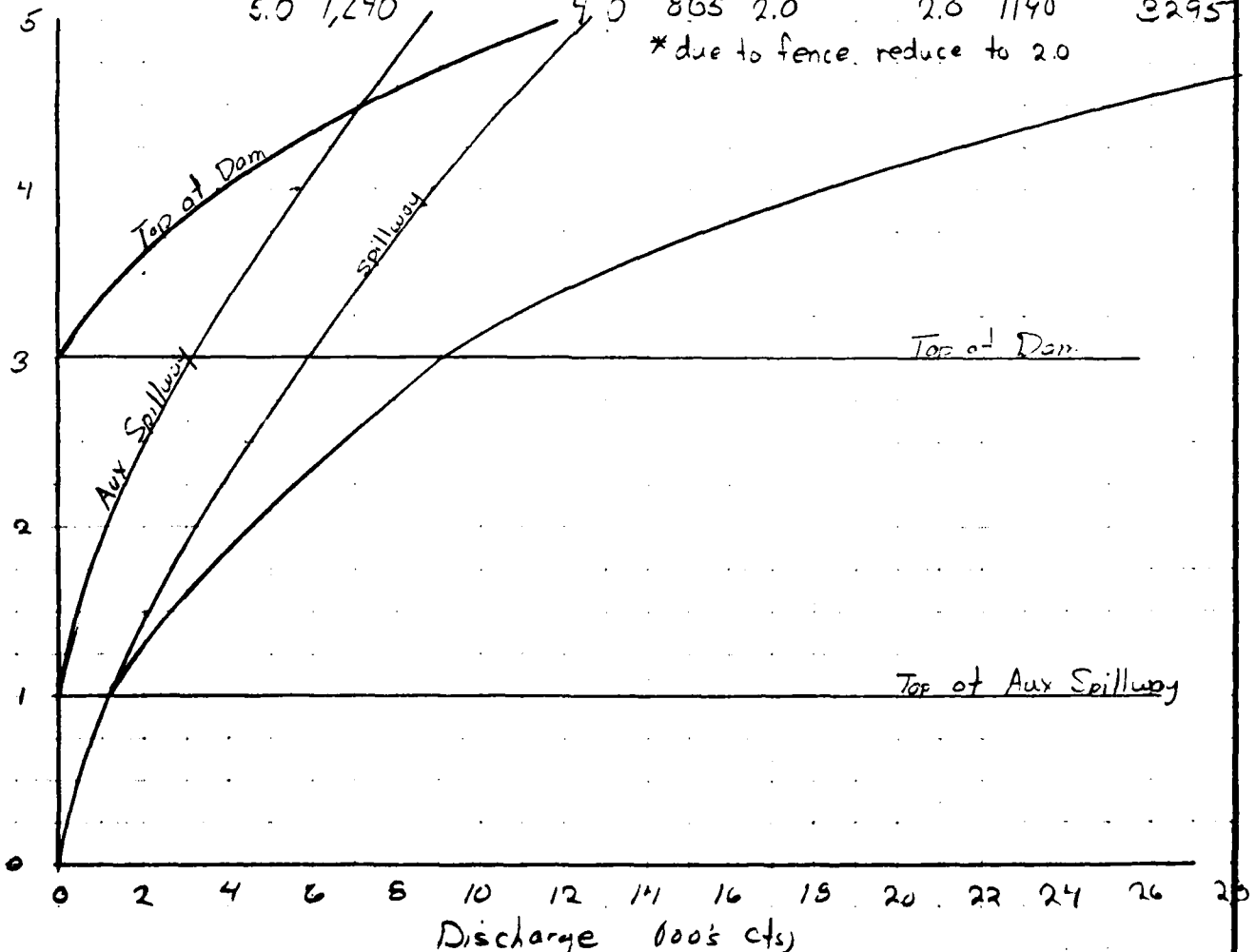
Stage Discharge

NAME OF DAM Simpson Pond Dam

$Q = CLH^{3/2}$

Elev	Spillway I C	Spillway I L	Spillway I H	Spillway I Q	Aux Spillway II C*	Aux Spillway II L	Aux Spillway II H	Aux Spillway II Q	Dam C*	Dam L	Dam H	Dam Q	QT
		4/2	0	0									0
	2.63		.5	40									40
	2.68		1.0	110		55	0	0					110
	2.66		1.5	205	2.0		.5	40					245
	2.64		2.0	315	2.0		1.0	110					425
			2.5	440			1.5	200					760
			3.0	575			2.0	310		210	0	0	885
			3.5	725			2.5	425	2.0		.5	150	1300
			4.0	885			3.0	560	2.0		1.0	375	1825
			5.0	1,240			4.0	805	2.0		2.0	1190	3295

*due to fence, reduce to 2.0



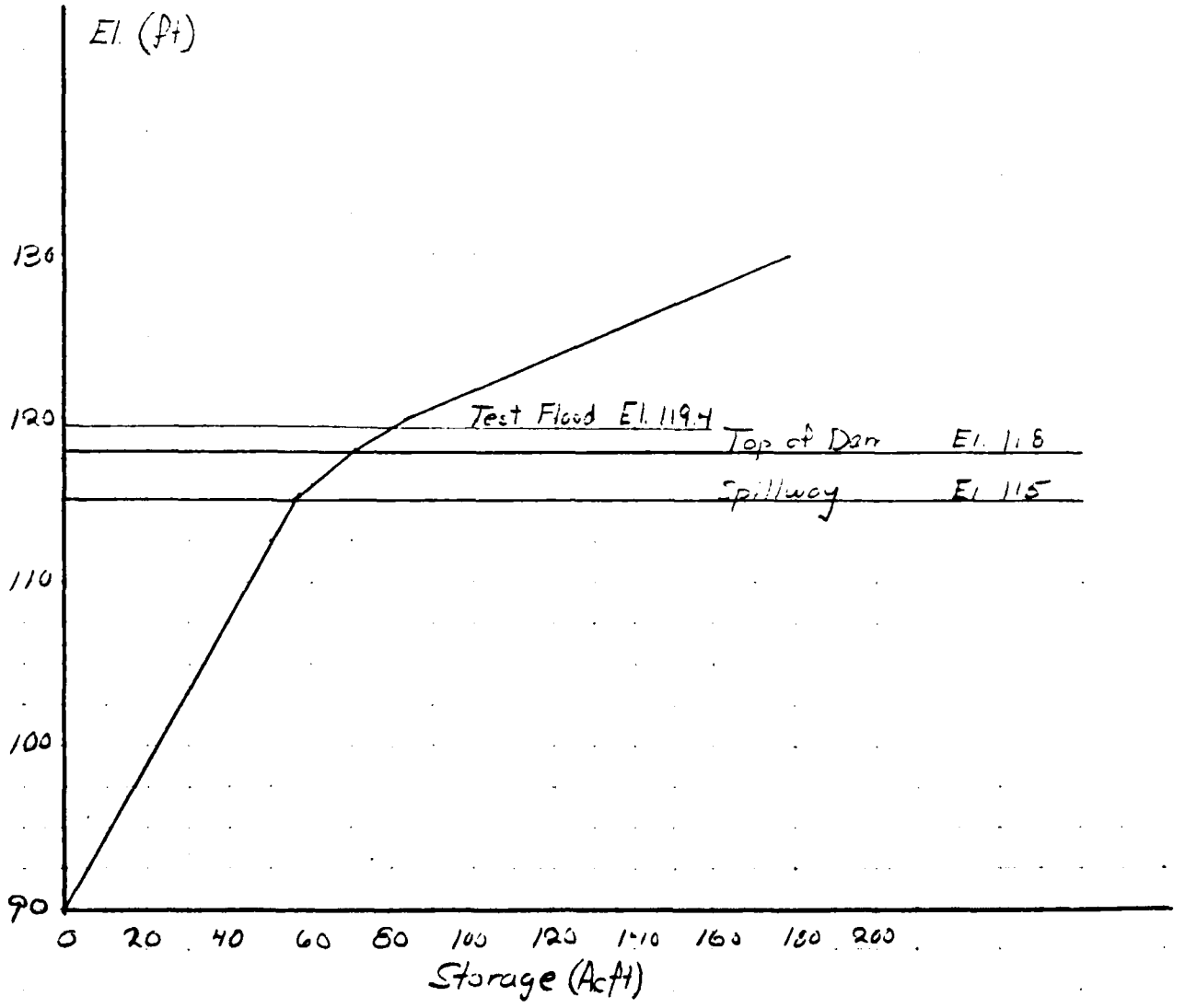
STORCH ENGINEERS
Engineers - Landscape Architects
Planners - Environmental Consultants

JOB Phase I Dam Inspection 4463
SHEET NO _____ OF _____
CALCULATED BY GJG DATE 12/3/80
CHECKED BY BDC DATE 12/9/80

AREA - CAPACITY

Name of Dam: Simpson Pond Dam

ELEV	DEPTH	AREA	AVG. AREA	VOL	Σ VOL
115		5.0			0
	3		6.0	18.0	
118		7.0			18.0
	2		7.65	15.0	
120		8.3			33.0
	10		9.4	94.0	
130		10.5			127.0



STORCH ENGINEERS
Engineers - Landscape Architects
Planners - Environmental Consultants

JOB Phase I Dam Inspection - #4463
SHEET NO _____ OF _____
CALCULATED BY BDC DATE 11/13/80
CHECKED BY GJS DATE 12/3/80
Downstream Hydrographs

"Rule of Thumb" Guidance for Estimating Downstream Failure Hydrographs

NAME OF DAM

Section I at Dam

1. $S = \frac{71.2}{} \text{ Acft}$
2. $Q_{p1} = 8/27\ W_b \sqrt{g}\ Y^{3/2} = 8/27(1.2)\sqrt{32.2}\ (22.3)^{1.5} = 19,830$
3. See Sections

Section II at

4a. $H_2 =$ 11.4' $A_2 =$ 2000 $L_2 =$ 410 $V_2 =$ 18.8 Acft

b. $Q_{p2} = Q_{p1}(1-V_2/S) =$ 14,587 cfs

c. $H_2 =$ 10.4' $A_2 =$ 1,630

$A_A =$ 1,815 $V_2 =$ 17.1 Acft

$Q_{p2} = 19,830(1-17.1/71.2) = 15,072$ $H =$ 10.6'

Section III at

4a. $H_3 =$ 9.6' $A_3 = *\frac{(4130+1,815)}{2} = 2,960$ $L_3 =$ 290 $V_3 =$ 19.7 Acft

b. $Q_{p3} = Q_{p2}(1-V_3/S) =$ 9,587 cfs

c. $H_3 =$ 8.4' $A_3 = \frac{(3080+1815)}{2} = 2,450$

$A_A =$ 2,710 $V_3 =$ 18.0 Acft

$Q_{p3} = 15,072(1-18.9/54.1) = 10,046$ $H =$ 8.5'

Section IV at

4a. $H_4 =$ 8.5 $A_4 =$ 3,180 $L_4 =$ 290 $V_4 =$ 21.2 Acft

b. $Q_{p4} = Q_{p3}(1-V_4/S) =$ 4,155 cfs

c. $H_4 =$ 6.2 $A_4 =$ 1,610

$A_A =$ 2,395 $V_4 =$ 15.9 Acft

$Q_{p4} = 10,046(1-15.9/36.1) = 5,621$ $H =$ 6.9'

* Areas are averaged with preceding section.

Downstream Hydrographs (Continued)

Section V at

4a. H_5 = 6.9' A_5 = 1,610 L_5 = 240 V_5 = 8.9 Acft

b. $Q_{P5} = Q_{P4}\ (1-V_5/S)$ = 3,144 cfs

c. H_5 = 5.6' A_5 = 1,280

A_A = 1,445 V_5 = 8.0 Acft

Q_{P5} = 5,621 (1 - 8.0/20.2) = 3,395 H = 6.1'

Section VI at

4a. H_6 = _____ A_6 = _____ L_6 = _____ V_6 = _____ Acft

b. $Q_{P6} = Q_{P5}\ (1-V_6/S)$ = _____ cfs

c. H_6 = _____ A_6 = _____

A_A = _____ V_6 = _____ Acft

Section VII at

4a. H_7 = _____ A_7 = _____ L_7 = _____ V_7 = _____ Acft

b. $Q_{P7} = Q_{P6}(1-V_7/S)$ = _____ cfs

c. H_7 = _____ A_7 = _____

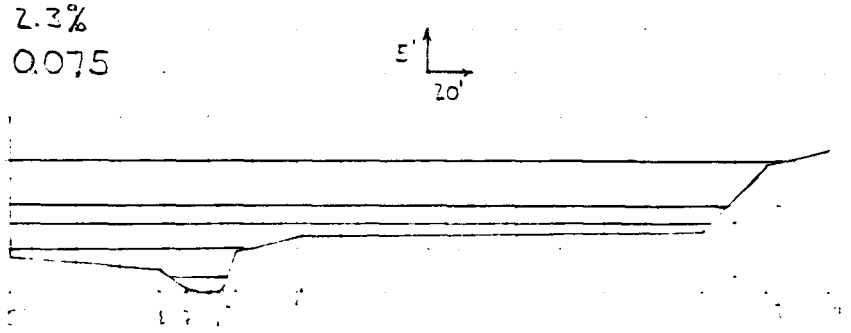
A_A = _____ V_7 = _____ Acft

Q_{P7} =

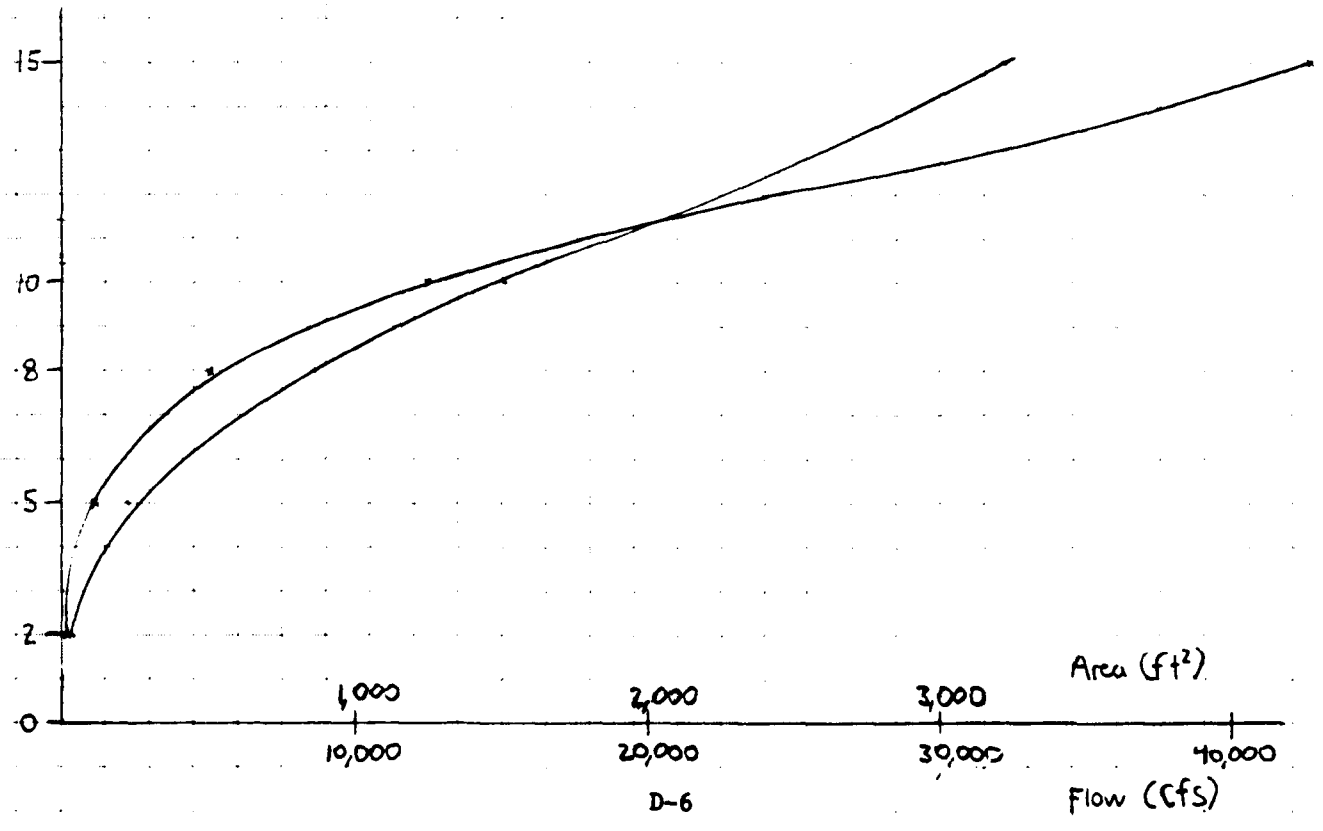
STORCH ENGINEERS/STORCH ASSOCIATES
Engineers - Landscape Architects
Planners - Environmental Consultants

JOB Simeon Pond Dam
SHEET NO ____ OF ____
CALCULATED BY ED DATE 11/12/80
CHECKED BY GJK DATE 12/3/80
SCALE ____

$S = 2.3\%$
$n = 0.075$



D.	WP	A.	R	$R^{2/3}$	$S^{1/2}$	V	Q
2	24	34	1.42	1.26	0.152	3.80	129
5	106	219	2.07	1.62	"	4.89	1,071
8	318	855	2.69	1.93	"	5.84	4,992
10	332	1,505	4.53	2.74	"	8.27	12,448
15	350	3,210	9.17	4.38	"	13.23	42,471



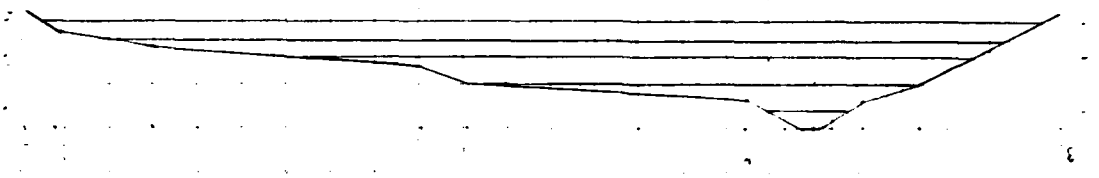
D-6

STORCH ENGINEERS/STORCH ASSOCIATES
Engineers - Landscape Architects
Planners - Environmental Consultants

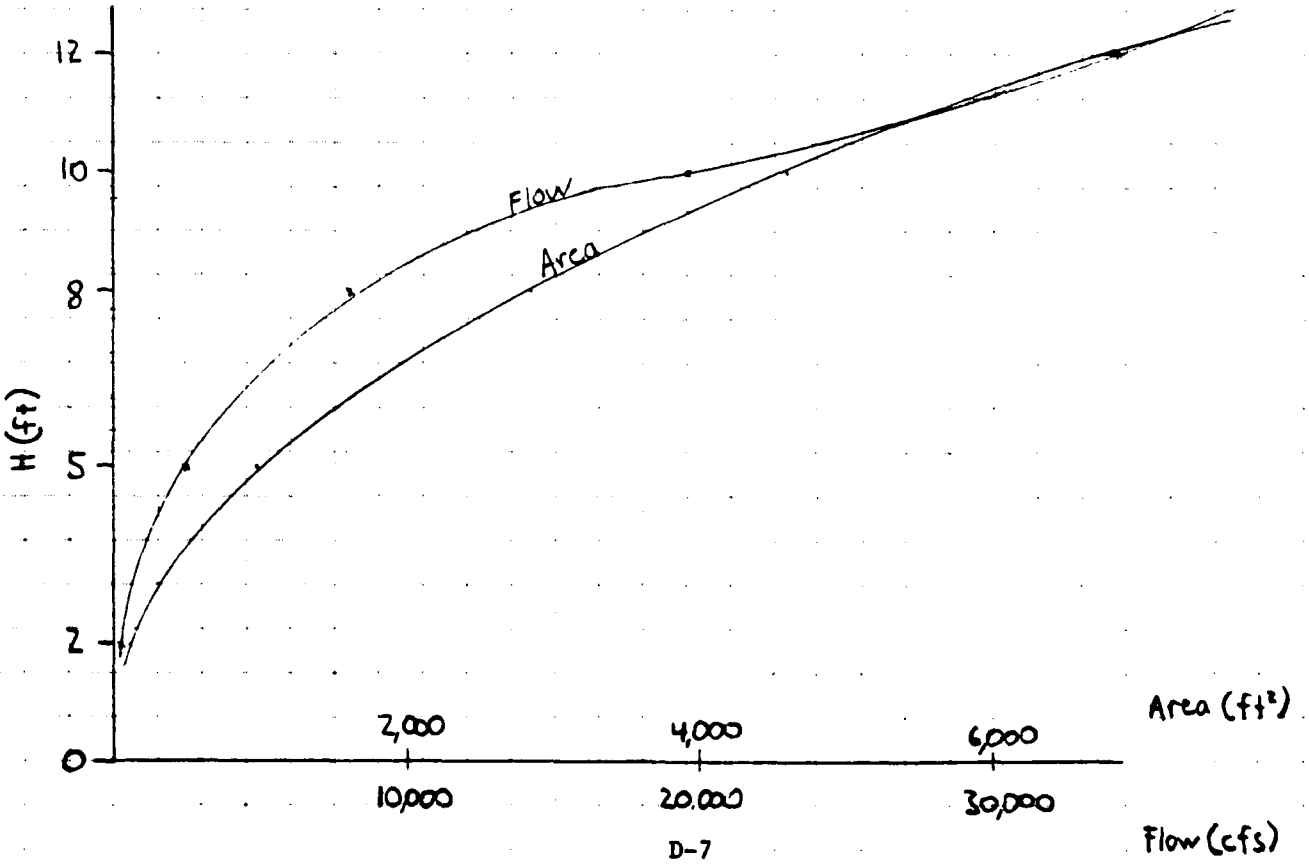
JOB
SHEET NO. OF
CALCULATED BY BDC DATE 11/13/80
CHECKED BY G. L DATE 12/2/80
SCALE

S = 0.61%
n = 0.075

5' / 50'



D	WP	A	R	$R^{2/3}$	$S^{1/2}$	V	Q
2	90	110	1.22	1.14	0.078	1.77	195
5	485	973	2.01	1.59	"	2.47	2,402
8	750	2,825	2.47	1.83	"	2.84	8,023
10	1,005	4,580	4.56	2.75	"	4.27	19,534
12	1,130	6,715	5.94	3.28	"	5.09	34,183



APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS

NOT AVAILABLE AT THIS TIME