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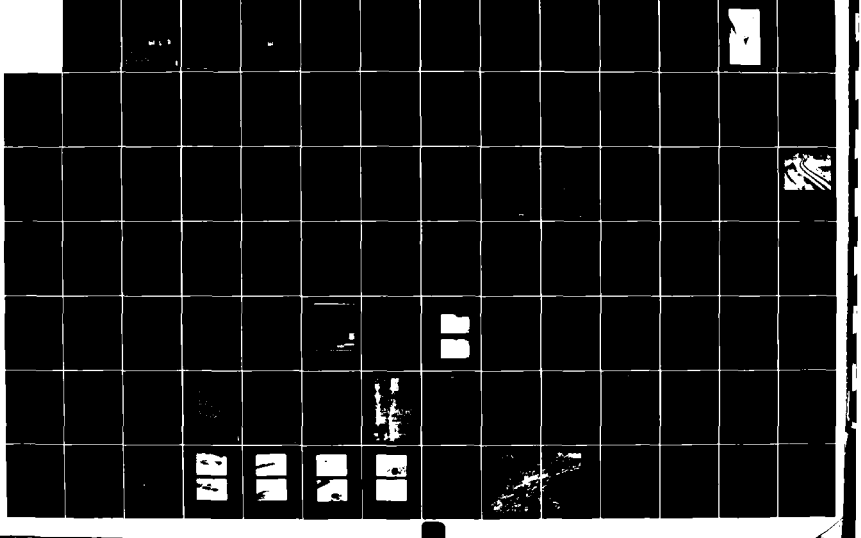

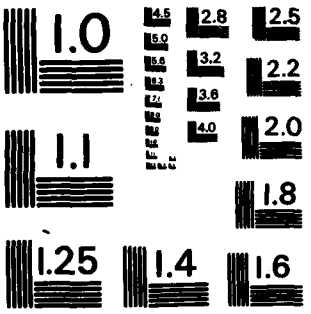

MICROCOPY RESOLUTION TEST CHART
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(1)

(3) HOUSATONIC RIVER BASIN

(4) TORRINGTON, CONNECTICUT

(2) STILLWATER POND DAM
(CT 00098)

(5) PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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

JULY, 1979

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE	READ INSTRUCTIONS BEFORE COMPLETING FORM
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4. TITLE (and Subtitle): Housatonic River Basin Torrington, Conn., Stillwater Pond Dam NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS	5. TYPE OF REPORT & PERIOD COVERED: INSPECTION REPORT
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9. PERFORMING ORGANIZATION NAME AND ADDRESS:	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS:
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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,
Housatonic River Basin
Torrington, Conn.
Stillwater Pond Dam

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

The dam is an earth embankment approx. 15 ft. wide at the crest, 443 ft. long and 35 above the streambed of West Branch, Naugatuck River. The spillway is a 193 ft. long compound concrete weir. Three outlet pipes run from the bottom of the outlet structure through the downstream training wall. The operating mechanisms for these outlets are in the gatehouse approx. on the centerline of the dam. Peak inflow to the reservoir is 20,400 cfs; peak outflow is 19,800 cfs with the dam overtopped by 0.5 ft.

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HOUSATONIC RIVER BASIN

TORRINGTON, CONNECTICUT

STILLWATER POND DAM
CT 00098

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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

JULY, 1979

BRIEF ASSESSMENT

PHASE I INSPECTION REPORT

NATIONAL PROGRAM OF INSPECTION OF DAMS

Name of Dam:	STILLWATER POND DAM
Inventory Number:	CT-00098
State Located:	CONNECTICUT
County Located:	LITCHFIELD
Town Located:	TORRINGTON
Stream:	WEST BRANCH NAUGATUCK RIVER
Owner:	STILLWATER POND CORPORATION
Date of Inspection:	MAY 3, 1979
Inspection Team:	PETER M. HEYNEN, P.E.
	MIRON PETROVSKY
	GEORGE STEPHENS
	MOSHE NORMAN

The dam is an earth embankment approximately 15 feet wide at the crest, 443 feet long and 35 above the streambed of West Branch, Naugatuck River. The spillway is a 193 foot long compound concrete weir. Three outlet pipes (30 inch diameter, 6 inch diameter and 16 inch diameter) run from the bottom of the outlet structure through the downstream training wall. The operating mechanisms for these outlets are in the gatehouse approximately on the centerline of the dam.

Based upon the visual inspection and past performance of the dam, the dam is judged to be in fair condition. No evidence of instability was observed in any component of the dam. There is extensive spalling of the downstream face of the spillway; spalling of the top face of the upstream training wall; brush, tree growth and tree stumps on the slopes and crest of the embankment; and disrepair of the gatehouse and security fencing.

Based upon the size (Intermediate) and hazard classification (High) of the dam in accordance with Corps of Engineers Guidelines, the test flood will be equivalent to the Probable Maximum Flood (PMF). Peak inflow to the reservoir is 20,400 cfs; peak outflow is 19,800 cfs with the dam overtopped by 0.5 feet. Based upon our hydraulics computations, the spillway capacity is 16,000 cubic feet per second (cfs), which is equivalent to 81% of the routed test flood outflow.

It is recommended that further studies be undertaken to perform a more refined hydraulic/hydrologic study to determine spillway adequacy and overtopping potential. Recommendations should be made by the engineer conducting the study, and implemented by the owner.

It is further recommended that studies be undertaken pertaining to the repair of spalled concrete, removal of vegetation from the earth embankment, and inspection of those portions of the dam which were not visible.

The above recommendations, and any further remedial measures which are discussed in Section 7, should be instituted within one year of the owner's receipt of this report.

Peter M. Heynen, P.E.
Project Manager
Cahn Engineers, Inc.

STATE OF CONNECTICUT
PETER M. HEYNEN
NO. 9618
REGISTERED
PROFESSIONAL ENGINEER

Edgar B. Vinal, Jr., P.E.
Senior Vice President
Cahn Engineers, Inc.

STATE OF CONNECTICUT
EDGAR B. VINAL, JR.
No. 4158
REGISTERED
PROFESSIONAL ENGINEER

This Phase I Inspection Report on Stillwater Pond Dam 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 judgment and practice, and is hereby submitted for approval.

CHARLES G. TIERSCH, Chairman
Chief, Foundation and Materials Branch
Engineering Division

FRED J. RAVENS, Jr., Member
Chief, Design Branch
Engineering Division

SAUL C. COOPER, Member
Chief, Water Control 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 Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I 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 inspection. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I 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 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 would necessarily 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 will be detected.

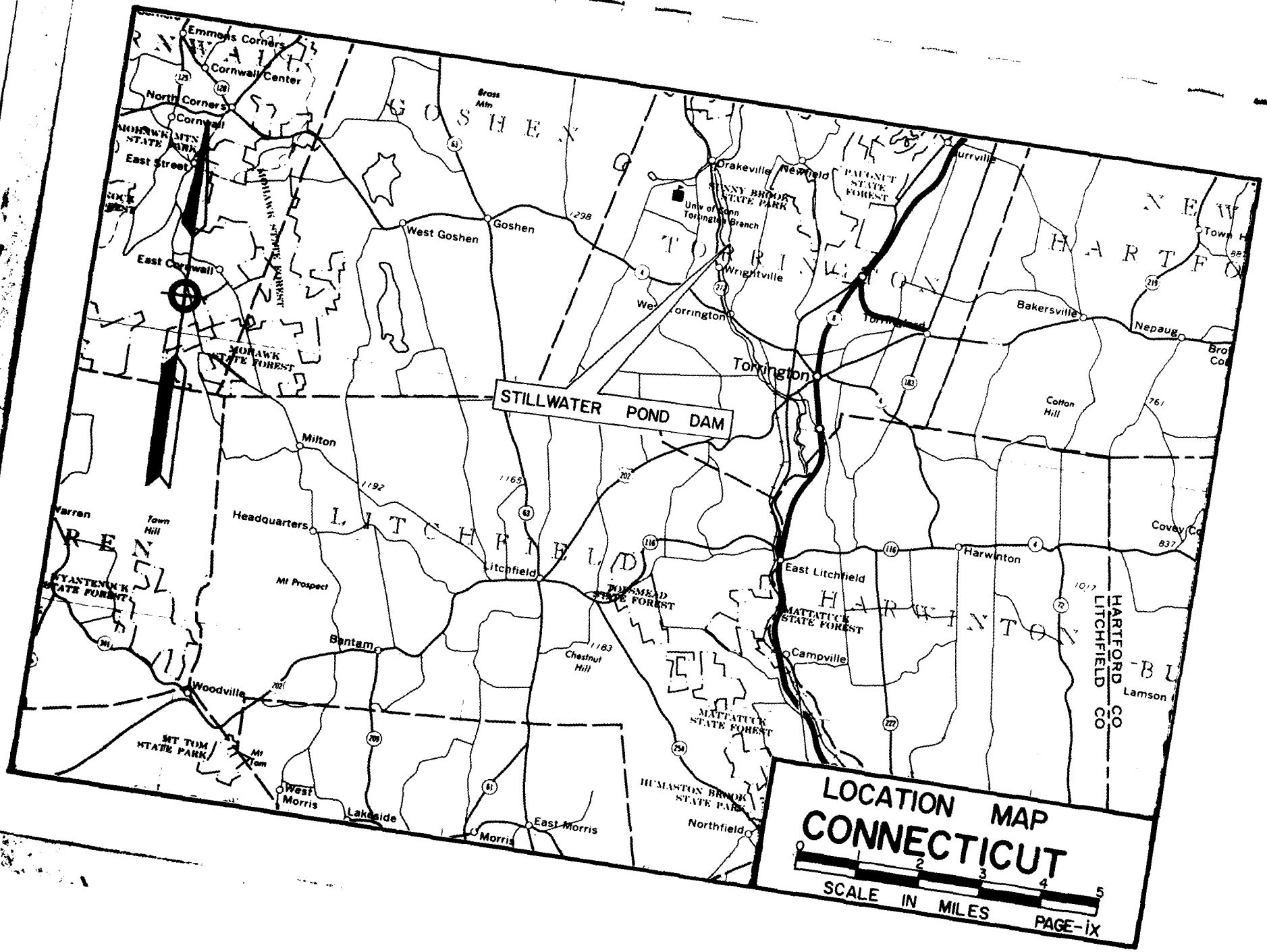
Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as neccessarily 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.

TABLE OF CONTENTS

APPENDICES

OVERVIEW PHOTO

US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.	NATIONAL PROGRAM OF	STILLWATER POND DAM	TORRINGTON	DATE March '79
CAHN ENGINEERS INC. WALLINGFORD, CONN. ENGINEER	INSPECTION OF NON-FED DAMS	W. BRANCH NAUGATUCK RIVER	CONNECTICUT	CE # 27 660 KC PAGE viii


STILLWATER POND DAM
LOCATION MAP
CONNECTICUT
SCALE IN MILES
Emmons Corners
Cornwall Center
North Corners
Cornwall
East Street
East Cornwall
West Goshen
Goshen
Drakeville
Newfield
Wrightville
Torrington
Bakersville
Nepaug
Milton
Warren
Town Hill
Headquarters
Litchfield
Mt Prospect
Bantam
Woodville
Mt Tom
West Morris
Lakeside
Morris
East Morris
Northfield
East Litchfield
Harwinton
Campville
Lamson
Cotton Hill
Chestnut Hill
HARTFORD CO
LITCHFIELD CO
PAGE-ix

PHASE I INSPECTION REPORT

STILLWATER POND DAM

SECTION I - 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. Cahn Engineers, 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 were issued to Cahn Engineers, Inc. under a letter of from John P. Chandler, Colonel, Corps of Engineers. Contract No. DACW 33-79-C-0059 has been assigned by the Corps of Engineers for this work.

b. Purpose of Inspection Program - The purposes of the program are to:

1. Perform technical inspection and evaluation of non-federal dams to identify conditions requiring correction in a timely manner by non-federal interests.

2. Encourage and prepare the States to quickly initiate effective dam inspection programs for non-federal dams.

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

c. Scope of Inspection Program - The scope of this Phase I inspection report includes:

1. Gathering, reviewing and presenting all available data that can be obtained from the owners, previous owners, the state and other associated parties.

2. A field inspection of the facility detailing the visual condition of the dam, embankments and appurtenant structures.

3. Computations concerning the hydraulics and hydrology of the facility and its relationship to the calculated flood through the existing spillway.

4. An assessment of the condition of the facility and corrective measures required.

It should be noted that this report does not pass judgement on the safety or stability of the dam other than on a visual basis. The inspection is to identify those features of the dam which need corrective action and/or further study.

1.2 DESCRIPTION OF PROJECT

a. Location - The dam is located on the West Branch, Naugatuck River in a rural area of the City of Torrington, County of Litchfield, State of Connecticut. The dam is shown on the West Torrington USGS Quadrangle Map having coordinates latitude N 41° 50.0' and longitude W 73° 08.8'.

b. Description of Dam and Appurtenances - As shown on Sheet B-1, the dam is a 443 foot long earth embankment (including 193 feet of spillway) with a concrete corewall. The top of the dam, at elevation 743.0, is approximately 35 feet above the streambed of the West Branch, Naugatuck River. The upstream slope is protected by riprap which extends to within 4 feet of the top. The exposed upstream slope (including the riprap), the crest and the downstream slope are covered by a thick growth of small trees, brush and vines. At the left end of the embankment there are numerous tree stumps (12 to 18 inches in diameter). The crest of the embankment is 15 feet wide and is used as a footpath. The top of the concrete corewall is at elevation 737.0. The concrete spillway section located at the right end of the dam is 193 feet in length and has a flow line elevation of 735.0. Separating the earth embankment and the spillway are upstream and downstream training walls. The spillway is founded on bedrock for the entire length. The outlet structure, constructed of concrete and founded on bedrock, has three stacked inlet windows protected by bar screens. The windows are each 5 feet high and range in width from 6 feet to 7 feet. The bottom of the outlet structure is at elevation 709. There are three outlets (30 inch diameter, 6 inch diameter and 16 inch diameter) which lead from the bottom of the outlet structure through the downstream training wall into the lower portion of the spillway. The invert elevation of these outlets could not be determined since they were submerged. The gatehouse is in disrepair due to vandalism and lack of maintenance. The gatehouse has a wood floor and houses the operating mechanisms for the valves on the outlet pipes. The valves for the 30 inch diameter and 16 inch diameter outlets are operable but the valve for the 6 inch diameter outlet is not. The outlet structure has slots for stop logs but this could not be viewed as the owner would not permit the floor to be opened. The upstream and downstream training walls are constructed of concrete, founded on bedrock, and separate the earth embankment from the spillway. The spillway side of these walls are battered at 1 inch per foot and the embankment side 2½ inches per foot. The top of each is sloped at 2 to 1 to follow the slope of the embankment.

c. Size Classification - INTERMEDIATE - The dam impounds 2050 acre-feet of water with the reservoir level at the top of the dam, which at elevation 743.0, is 35 feet above the (old) streambed. According to the Recommended Guidelines, the dam is classified as intermediate in size.

d. Hazard Classification - HIGH - The dam is located approximately 1800 feet upstream from eight houses, (one under construction) two of which have foundation sills approximately 10 feet above the streambed. If the dam were to be breached, there is potential for loss of life and extensive property damage at these residences and in the City of Torrington, which is 1½ miles downstream. Also, local flood protection works for the City of Torrington would be overtopped.

e. Ownership - Stillwater Pond Corporation
75 Woodside Circle
Torrington, Connecticut 06790
Mr. Harold Schwartz (203) 489-5015

The dam was previously owned by Anaconda American Brass Co. of Waterbury Ct. (successor to Coe Brass Co. which built the dam).

f. Operator - None. The dam is normally unattended.

g. Purpose of Dam - Recreational.

h. Design and Construction History - The following information is believed to be accurate based on the available plans and correspondence, which are included in Appendix B.

The Inventory of Dams in the United States reports the year completed to be 1880. However, the plans of the dam are dated 1906 and these plans are an accurate representation of the dam as it exists today except for the downstream bridge, which was replaced in 1956 after being washed away. There is no information available on the designer or contractor. The plans have the name Coe Brass Co. (predecessor to American Brass) but no records are available from Anaconda American Brass Co. There are no records of nor does it appear that any changes have been made to the dam.

i. Normal Operational Procedures - The owner stated that he partially opens the 16 inch diameter valve in the normally dry summer months but otherwise no effort is made to regulate the reservoir level.

1.3 PERTINENT DATA

a. Drainage Area - The drainage area consists of 24.2 square miles of relatively undeveloped, rolling terrain, of which 17.2 square miles drains to upstream reservoirs. Dams controlling drainage to Stillwater Pond are North Pond Dam, Reuben Hart Dam and Hall Meadow Brook Dam.

b. Discharge at Damsite

1. Outlet Works (conduits):	30" diameter - Invert Elevation Not Known 6" diameter - Invert Elevation Not Known 16" diameter - Invert Elevation Not Known
2. Maximum known flood at damsite:	11,900 cfs (Aug 1955)
3. Ungated spillway capacity @ top of dam elevation 743.0:	16,000 cfs.
4. Ungated spillway capacity @ test flood elevation 743.5:	17,600 cfs.
5. Gated spillway capacity @ normal pool elevation:	N/A
6. Gated spillway capacity @ test flood elevation:	N/A
7. Total spillway capacity @ test flood elevation 743.5:	N/A
8. Total project discharge @ test flood elevation 743.5:	19,800 cfs.

c. Elevations (Feet Above Mean Sea Level)

1. Streambed at centerline of dam:	708.0
2. Maximum tailwater @ 16,000 cfs:	716.0
3. Upstream portal invert diversion tunnel:	N/A
4. Recreation pool:	735.0
5. Full flood control pool (no freeboard):	N/A
6. Spillway crest:	735.0
7. Design surcharge (original design):	N/A
8. Top of dam:	743.0
9. Test flood design surcharge:	743.5

d. Reservoir

1. Length of maximum pool:	8,300 ft.
2. Length of recreation pool:	6,500 ft.
3. Length of flood control pool:	N/A

e. Storage

1. Recreation pool:	1,100 acre-ft.
2. Flood control pool:	N/A
3. Spillway crest pool:	1,100 acre-ft.
4. Top of dam:	2,050 acre-ft.
5. Test flood Pool:	2,115 acre-ft.

f. Reservoir Surface

1. Recreation pool:	95 acres
2. Flood control pool:	N/A
3. Spillway crest:	95 acres
4. Top of dam:	130 acres
5. Test flood pool:	N/A

g. Dam

1. Type:	Earth embankment, concrete corewall, concrete spillway
2. Length:	443 ft.
3. Height:	35 ft.
4. Top width:	15 ft.
5. Side slopes:	2H to 1V (Upstream) 2H to 1V (Downstream)
6. Zoning:	N/A
7. Impervious Core:	Concrete Corewall
8. Cutoff:	N/A

9.	Grout curtain:	N/A
10:	Other:	N/A
h.	Diversion and Regulating Tunnel	N/A
i.	Spillway	
1.	Type:	Compound
2.	Length of weir (1979 Survey)	193 ft.
3.	Crest elevation:	735
4.	Gates:	None
5.	Upstream Channel:	Lake bottom
6.	Downstream Channel:	Exposed bedrock with mortared riprap side-slope at right side, concrete training wall at left side
j.	Regulating Outlets	
1.	Invert:	N/A
2.	Size:	30" diameter, 6" diameter 16" diameter
3.	Description:	Cast iron pipe
4.	Control Mechanism:	Valves in outlet structure
5.	Other:	N/A

SECTION 2: ENGINEERING DATA

2.1 DESIGN

a. Available Data - The available data consists of Water Resources Inventory of Connecticut, Part 5, Lower Housatonic River Basin, 1974; Feasibility Study, Acquisition of Stillwater Pond, Torrington, by Connecticut DEP, 1975; Report on Brass Mill Dam on Naugatuck River by Henry H. Werner, 1975; inspection report by A.J. Macchi, 1962; inspection report by V.B. Clarke, Member, State Board of Supervision of Dams, 1955; and plans (3 sheets) entitled "Plans of Coe Brass Co. Dam, Torrington, Conn." May 1906.

b. Design Features - The plans dated 1906 indicate the design features previously stated.

c. Design Data - There are no engineering values, assumptions, test results or calculations available for the original construction and there does not appear to have been any subsequent construction.

2.2 Construction

a. Available Data - No information was available.

b. Construction Considerations - No information was available.

2.3 OPERATIONS

No formal operating records are known to exist, and reservoir level readings are not taken. To our knowledge the spillway capacity has never been exceeded nor has the dam been overtopped.

2.4 EVALUATION

a. Availability - Existing data was provided by the owner, Connecticut DEP, and Henry H. Werner, Consulting Engineer. The owner made the operations available for visual inspection.

b. Adequacy - The limited amount of detailed engineering data available was generally inadequate to perform an in-depth assessment of the dam, therefore, the final assessment of this dam must be based primarily on visual inspection, performance history, hydraulics computations of spillway capacity and approximate hydrologic judgements.

c. Validity - A comparison of records data and visual observation reveals no observable significant discrepencies in the record data except that the length of the spillway on the 1906 plans scales 220 feet but our measurement of the spillway indicates it to be 193 feet long.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General - The general condition of the dam is fair. The inspection revealed areas of the dam requiring maintenance; in particular the spalling on the top face of the upstream training wall (Photo 7), the spalling on the downstream face of the spillway (Photo 1), and the brush and tree growth on the earth embankment (Photos 2, 4, 5 and 8). At the time of our inspection there were approximately 2 inches of water flowing over the spillway (Photos 2 and 3).

b. Dam

Crest - The crest of the dam is covered by an extensive growth of brush and small trees and is used as a foot path (Photo 4).

Downstream Slope - The downstream slope is covered by an extensive growth of brush, small trees and tree stumps. There are many large trees at the toe of the slope (Photo 2).

Upstream Slope - The upstream slope is covered with riprap to within 4 feet of the crest. The riprap is in good condition except for brush growing between the rocks (Photo 8).

Spillway - The spillway section consists of upstream and downstream training walls which separate the spillway from the earth embankment (Photo 2). The concrete spillway (Photos 1, 2 and 3) is 193 feet long and has a cross section as shown on Sheet B-1. A large portion of the downstream face of the spillway is severely spalled exposing reinforcing bars and wire mesh. An approximately 1 square foot area has been eroded to a depth of several inches. The upper portion of the top face of the upstream training wall is severely spalled (Photo 7). There is some seepage through the face of the downstream training wall with efflorescence visible (Photo 2).

c. Appurtenant Structures - Except for the upper portion which was visible above the water line, it was not practical to inspect the outlet structure. There is some severe spalling and numerous cracks in the concrete (Photo 7). The brick gatehouse which sits on top of the outlet structure is in disrepair from vandalism and lack of maintenance (Photo 6). The plans indicate 3 low level outlet pipes from the base of the outlet structure which discharge into the downstream channel through the downstream training wall. The 6 inch diameter outlet pipe is not visible but the outlets of the 16 inch diameter and 30 inch diameter were examined and found to be cast iron and in good condition. The control valves on these pipes were not visible but the 16 inch and 30 inch valves were opened from the operating mechanisms (Photo 6) in the gatehouse. The 6 inch valve would not open.

d. Reservoir Area - The area around the reservoir is undeveloped except for Route 272 along the western edge and four houses on the reservoir side of Route 272.

e. Downstream Channel - The spillway channel is broad, gravel bottomed and steep sided (Photo 5). The left side is partially protected by mortared riprap and an old stone abutment; the right side is protected by mortared riprap (Photo 3), exposed bedrock, and large randomly placed riprap (Photo 5). Approximately 200 feet downstream of the dam, Brass Mill Dam Road crosses the river on a single span concrete and steel beam bridge (Photo 5).

3.2 EVALUATION

Based on the visual inspection it is possible to assess the dam as being in fair condition. The following conditions which could influence the future condition and/or stability of the dam were identified:

1. Spalling of concrete on the downstream face of the spillway exposing reinforcing bars and wire mesh.

2. Spalling of concrete on the top face of the upstream training wall, and cracks and spalling on the exposed portion of the outlet structure.

3. Extensive tree and brush growth on the slopes and crest of the earth embankment. There are also tree stumps on the left end of the upstream slope.

4. Disrepair of the gate house and security fence.

SECTION 4: OPERATIONAL PROCEDURES

4.1 REGULATING PROCEDURES

The owner stated that he opens the 16 inch diameter low level outlet about 3 turns during the dry summer months.

4.2 MAINTENANCE OF DAM

In recent years, it appears that maintenance is rarely, if ever, done on the dam and no periodic inspection schedule is in effect.

4.3 MAINTENANCE OF OPERATING FACILITIES

It appears that maintenance is rarely if ever done on the operating facilities and no periodic inspection schedule is in effect.

4.4 DESCRIPTION OF ANY FORMAL WARNING SYSTEM IN EFFECT

No formal warning system is in effect.

4.5 EVALUATION

Operation and maintenance procedures, except for opening one outlet during dry periods, do not exist. A formal program of operation and maintenance procedures should be implemented, including documentation to provide complete records for future reference. Also, a formal warning system should be developed and implemented within the time frame indicated in Section 7.1c. Remedial operation and maintenance recommendations are presented in Section 7.

SECTION 5: HYDRAULIC/HYDROLOGIC

5.1 EVALUATION OF FEATURES

a. General - The project is basically a low storage high spillage type project where the reservoir area is less than 1% of the drainage area. The peak outflow analysis includes the assumption that Route 272 is overtopped approximately 1,100 feet upstream of the dam when the water level reaches El. 740.0. The spillway crest is 8 feet below the dam crest but only 5 feet below a portion of Rt. 272 which runs along the west side of the pond.

b. Design Data - No computations could be found for the original dam construction.

c. Experience Data - No information on serious problem situations arising at the dam was found and it does not appear that the dam has been overtopped. It has been reported that during the 1955 floods the water level was within one foot of the top of the dam. If this is correct, the height of water over the spillway was 7 feet and the depth of water flowing over Route 272 was 2 feet.

d. Visual Observations - The bridge immediately downstream of the dam which replaces a bridge washed away in 1955 is a constriction in the channel but is not likely to affect flow from the spillway.

e. Test Flood Analysis - The test flood for this high hazard, intermediate size dam is equivalent to the Probable Maximum Flood (PMF). Peak inflows to the reservoir are considerably reduced by the Hall Meadow Brook Flood Control Dam and by North Pond Dam and Reuben Hart Dam. Based upon "Preliminary Guidance for Estimating Maximum Probable Discharges", dated March, 1978, and considering the flood retarding effect of the upstream reservoirs, peak inflow to the reservoir is 20,400 cfs (Appendix D-6); peak outflow is 19,800 cfs with the dam overtopped 0.5 feet and the road (Route 272) overtopped by 3.5 feet (Appendix D-12). Based upon our hydraulics computations, the spillway capacity with no freeboard is 16,000 cfs, which is approximately 81% of the routed test flood outflow at the top of dam, elevation 743.0.

Just before Route 272 is overtopped the spillway capacity is 7,800 cfs (39% of the test flood outflow). We estimate that the spillage over Route 272 (1,500 cfs) plus flow over the spillway (16,000 cfs) totals 17,500 cfs just prior to the dam being overtopped. This is 88% of the test flood outflow.

The one-half PMF peak inflow is 5,700 cfs (D-6) and peak outflow is 5,500 cfs (D-13) with the dam maintaining 3.9 feet of freeboard (D-14).

f. Dam Failure Analysis - Utilizing the April, 1978, "Rule of Thumb Guidance for Estimating Downstream Dam Failure Hydrographs", the peak failure outflow from the dam breaching would be 51,000 cubic feet per second. A breach of the dam would result in a rise of 6 feet in the water level of the stream at the initial impact area, which corresponds to an increase in the water level from a depth of 9 feet above the normal water surface just before the breach, to a depth of 15 feet above the normal water surface just after the breach. The rapid 6 foot increase in the water level at the initial impact area would inundate (5 feet above foundation sills) two houses.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations - There was no evidence of immediate structural instability. There is considerable spalling, minor efflorescence, and minor surface cracking, but these do not indicate any instability.

b. Design and Construction Data - There is no design and construction data available for this dam, therefore it was not possible to perform an in-depth assessment of the structural stability of the dam.

c. Operating Records - There are no operating records.

d. Post Construction Changes - No post construction changes are evident.

e. Seismic Stability - The dam is in Seismic Zone 1 and according to the Recommended Guidelines, need not be evaluated for seismic stability.

SECTION 7: ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Condition - Based upon the visual inspection of the site and its past performance, the dam appears to be in fair condition. No evidence of structural instability was observed in the dam or its components. The embankment is generally in fair condition. There are some areas requiring attention, such as project discharge capacity, spalled concrete, disrepair of gatehouse and security fence, and tree and brush growth on slopes and crest of the embankment.

Based upon "Preliminary Guidance for Estimating Maximum Probable Discharges" dated March, 1978 and other computations included in this report, peak inflow to the reservoir is 20,400 cubic feet per second; peak outflow is 19,800 cubic feet per second with the dam overtopped by 0.5 feet and Route 272 overtopped by 3.5 feet. Based upon our hydraulics computations, the spillway capacity with no freeboard is 16,000 cubic feet per second, which is equivalent to approximately 81% of the routed test flood outflow.

b. Adequacy of Information - The information available is such that an assessment of the condition and stability of the dam must be based on visual inspection, past performance of the dam, and sound engineering judgement.

c. Urgency - It is recommended that the measures presented in Section 7.2 and 7.3 be implemented within one year of the owner's receipt of this report.

d. Need for Additional Information - There is a need for more information as recommended in Section 7.2.

7.2 RECOMMENDATIONS

It is recommended that futher studies be made by a registered professional engineer qualified in dam design and inspection pertaining to the following:

1. More sophisticated flood routing should be undertaken to refine the test flood figures and to more accurately determine the spillway adequacy and potential for overtopping. Recommendations based upon this study should be made by the engineer and implemented by the owner. The study should also include potential damage to Route 272 resulting from overtopping and an investigation of potential downstream damage on the west side of Route 272.

2. Repairs to spalled concrete on the downstream face of the spillway. Special attention is required to this repair because of depth of the spalling and possibility that repairs to the reinforcement may be required.

3. Removal of tree growth, brush and stumps from the slopes and crest of the embankment, filling and compacting the resulting voids, and applying an appropriate ground cover.

4. Conducting a thorough inspection of those portions of the dam which were not visible at the time of inspection, including the upstream face of the spillway, the interior and exterior of the outlet structure, the gate valves on the low level outlets, and the bar screens on the outlet structure windows.

7.3 REMEDIAL MEASURES

a. Operation and Maintenance Procedures - The following measures should be undertaken by the owner within the time frame indicated in Section 7.1c, and continued on a regular basis.

1. Round-the-clock surveillance should be provided during periods of unusually heavy precipitation. The owner should develop a formal warning system with local officials for alerting downstream residents in case of an emergency.

2. A formal program of operation and maintenance procedures should be instituted and fully documented to provide accurate records for future reference.

3. A program of inspection by a registered professional engineer qualified in dam inspection should be instituted on an annual basis. The inspections should be comprehensive and should include the operation of the low level outlet works. Particular attention should be given to inspecting those portions of the dam which were not visible at the time of inspection.

4. Spalled concrete on the top face of the upstream training wall should be repaired.

5. Repairs should be made to the gatehouse and security fence.

7.4 ALTERNATIVES

This study has identified no practical alternatives to the above recommendations.

APPENDIX A

INSPECTION CHECKLIST

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT Stillwater Pond Dam

DATE: May 3, 1979

TIME: 11:00 AM

WEATHER: Partly Cloudy

W.S. ELEV. 735.2 U.S. _____ DN.S

PARTY:	INITIALS:	DISCIPLINE:
1. Peter Heynen	PH	Cahn Engineers
2. George Stephens	GS	Cahn Engineers
3. Miron Petrovsky	MP	Cahn Engineers
4. Moshe Norman	MN	Cahn Engineers
5.		
6.		

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.	Dam Embankment		
2.	Intake Structure		
3.	Training Walls and Channel		
4.	Gate House		
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			

PERIODIC INSPECTION CHECK LIST

PROJECT Stillwater Pond Dam DATE 5/3/79

PROJECT FEATURE Dam Embankment BY

AREA EVALUATED	CONDITION
DAM EMBANKMENT	
Crest Elevation	743.0
Current Pool Elevation	735.0
Maximum Impoundment to Date	Not Known
Surface Cracks	None Observed
Pavement Condition	N/A
Movement or Settlement of Crest	None Observed
Lateral Movement	None Observed
Vertical Alignment	Good
Horizontal Alignment	Good
Condition at Abutment and at Concrete Structures	Minor Erosion Due To Trespassing Adjacent To Training Walls
Indications of Movement of Structural Items on Slopes	N/A
Trespassing on Slopes	Foot Path Adjacent To Training Wall
Sloughing or Erosion of Slopes or Abutments	None Observed Except As Noted Above
Rock Slope Protection-Riprap Failures	None Observed
Unusual Movement or Cracking at or Near Toes	None Observed
Unusual Embankment or Downstream Seepage	None Observed
Piping or Boils	None Observed
Foundation Drainage Features	None Known
Toe Drains	None Known
Instrumentation System	None

PERIODIC INSPECTION CHECK LIST

PROJECT [illegible] Pond Dam DATE 5/2/79

PROJECT FEATURE Intake Structure BY

AREA EVALUATED		CONDITION
OUTLET WORKS-INTAKE CHANNEL AND INTAKE STRUCTURE		
a) Approach Channel		
Slope Conditions		
Bottom Conditions		
Rock Slides or Falls		
Log Boom		
Debris		
Condition of Concrete Lining		
Drains or Weep Holes		
b) Intake Structure		
Condition of Concrete		Some Deterioration Above Water Line
Stop Logs and Slots		Not Observed

PERIODIC INSPECTION CHECK LIST

PROJECT [illegible] Pond Dam DATE 5/3/79

PROJECT FEATURE Training Walls And Channel BY _____

AREA EVALUATED	CONDITION
OUTLET WORKS-SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a) Approach Channel	No Channel - Lake Bottom
General Condition	
Loose Rock Overhanging Channel	
Trees Overhanging Channel	
Floor of Approach Channel	
b) Weir and Training Walls	
General Condition of Concrete	Good
Rust or Staining	Rust From Post On Down Stream Training Wall
Spalling	Severe on D/S face of Weir Severe On Top Surface of Upper Portion of U/S Training Wall
Any Visible Reinforcing	None Observed
Any Seepage of Efflorescence	Some On Face of D/S Training Wall
Drain Holes	None Observed
c) Discharge Channel	
General Condition	Good
Loose Rock Overhanging Channel	None Observed
Trees Overhanging Channel	Some-Small with Limbs
Floor of Channel	Exposed Bedrock And Loose Stones
Other Obstructions	None

PERIODIC INSPECTION CHECK LIST

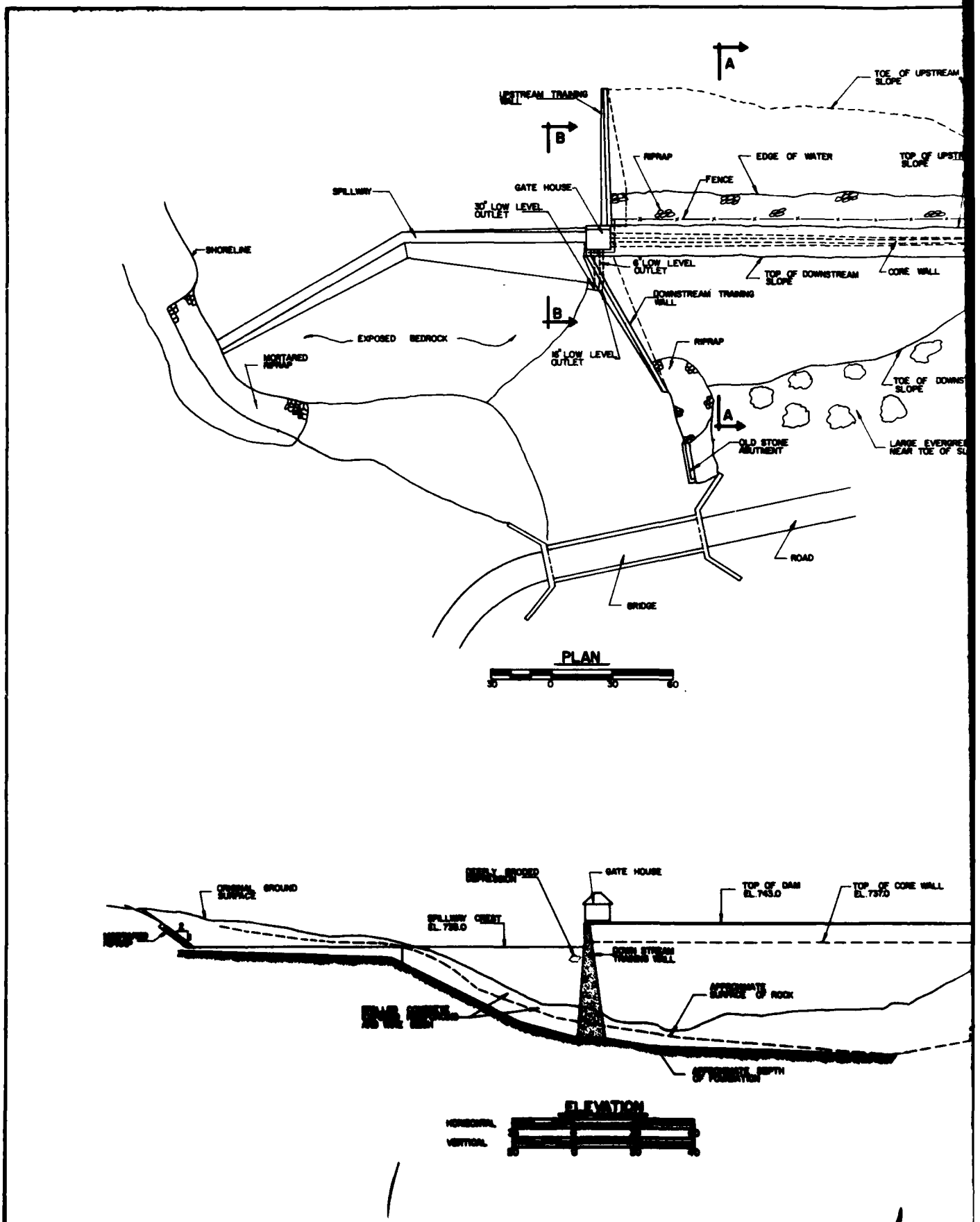
PROJECT Stillwater Pond Dam DATE 5/3/79

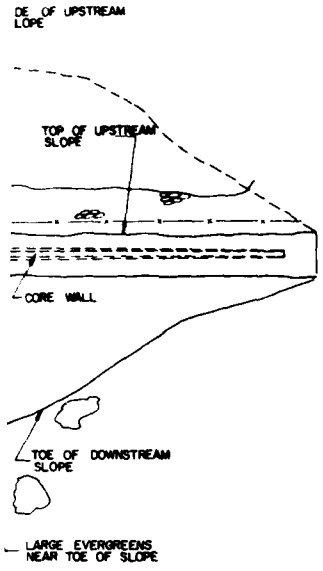
PROJECT FEATURE Gate House And Outlet Pipes BY _____

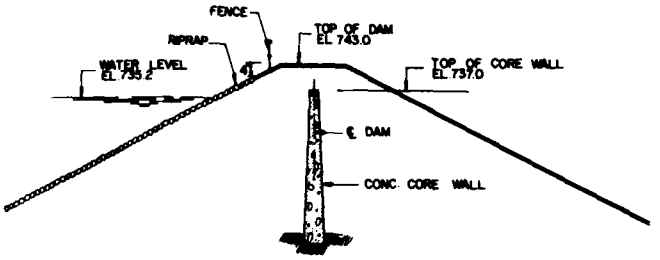
AREA EVALUATED		CONDITION
OUTLET WORKS-OUTLET STRUCTURE AND OUTLET CHANNEL		
General Condition of Concrete		Fair
Rust or Staining		None Observed
Spalling		some on upstream face
Erosion or Cavitation		None Observed
Visible Reinforcing		None Observed
Any Seepage or Efflorescence		None Observed
Condition at Joints		Good
Drain Holes		None Observed
Channel		
Loose Rock or Trees Overhanging Channel		
Condition of Discharge Channel		30"Ø And 16"Ø CI. Outlet pipes Appeared In Good condition at Training Wall Outlet

APPENDIX B

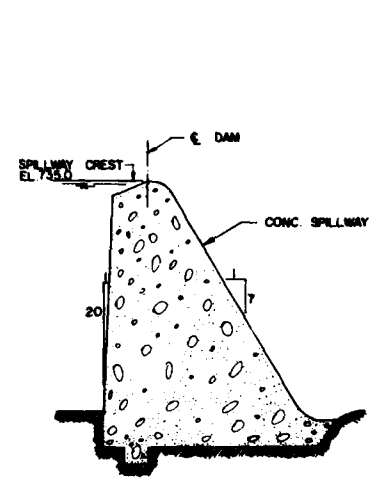
ENGINEERING DATA AND CORRESPONDENCE


A
B
TOE OF UPSTREAM SLOPE
UPSTREAM TRAINING WALL
RIPRAP
EDGE OF WATER
FENCE
GATE HOUSE
SPILLWAY
30" LOW LEVEL OUTLET
SHORELINE
6" LOW LEVEL OUTLET
TOP OF DOWNSTREAM SLOPE
CORE WALL
DOWNSTREAM TRAINING WALL
EXPOSED BEDROCK
MORTARED RIPRAP
18" LOW LEVEL OUTLET
OLD STONE ABUTMENT
ROAD
BRIDGE
PLAN
30 0 30 60
ORIGINAL GROUND SURFACE
GATE HOUSE
TOP OF DAM EL. 743.0
TOP OF CORE WALL EL. 737.0
SPILLWAY CREST EL. 728.0
APPROXIMATE SURFACE OF ROCK
ELEVATION
HORIZONTAL
VERTICAL

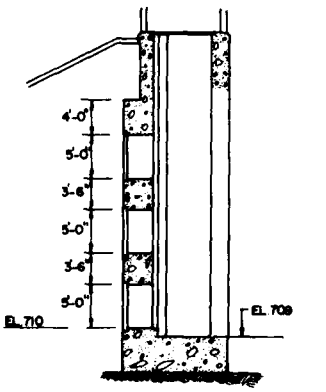




SECTION A-A



SECTION B-B



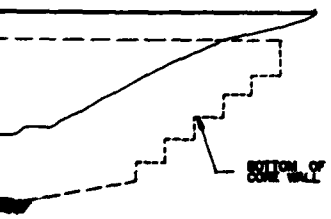
SECTION THROUGH
GATE CHAMBER

NOTES

1 THIS PLAN WAS COMPILED FROM PLANS "COE BRASS CO. DAM" DATED MAY 1908, "TOWN OF TORRINGTON BRASS MILL DAM ROAD OVER WEST BRANCH NAUGATUCK RIVER" BY LOOMIS & SULLIVAN - CONTRACTING ENGINEERS FOR CONNECTICUT STATE HIGHWAY DEPARTMENT DATED APRIL 1956 AND CAHN SUPPLEMENTARY FIELD SURVEY.
NOT ALL TOPOGRAPHIC AND/OR STRUCTURAL FEATURES ARE IDENTIFIED

2 ELEVATIONS SHOWN ARE MEAN SEA LEVEL, CONVERTED FROM THE OLD DATUM ON EXISTING PLANS.
OLD DATUM + 630 = MSL

OF CORE WALL
370



CAHN ENGINEERS INC. WALLINGFORD, CONNECTICUT ENGINEER	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

PLAN, ELEVATION & SECTIONS

STILLWATER POND DAM

W. BRANCH NAUGATUCK TORRINGTON, CONNECTICUT

DRAWN BY	CHECKED BY	APPROVED BY	SCALE: AS NOTED
N. J.	[illegible]	[illegible]	DATE: JUNE 1978 SHEET 6-1

STILLWATER POND DAM

EXISTING PLANS

Plan of Coe Brass Co. Dam
Torrington, Conn. May 1906
Scale 1 in. = 20 ft. Sheet No. 1

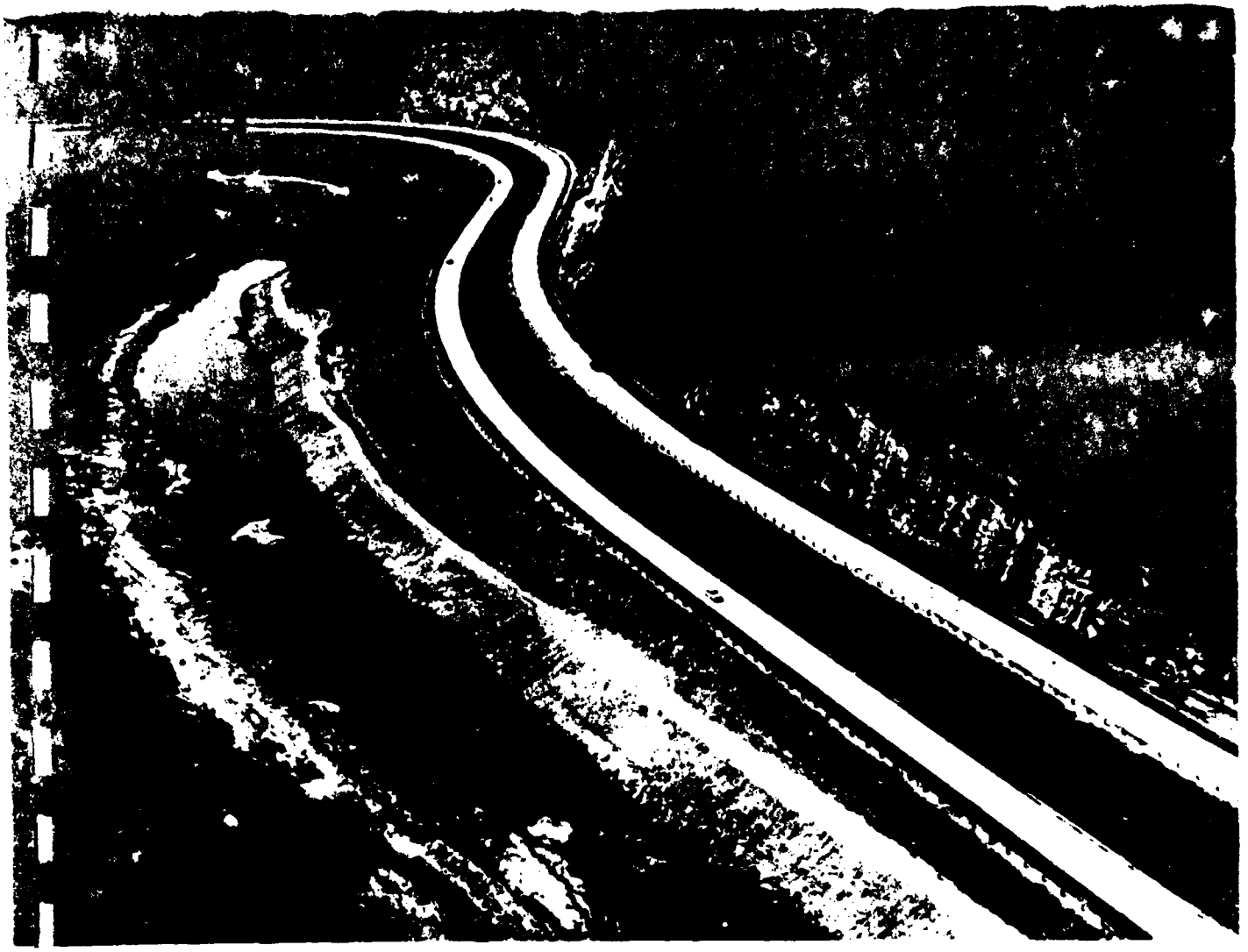
Plans of Coe Brass Co. Dam
Torrington, Conn. May 1906
Sheet No. 2

Details of Coe Brass Co. Dam
Torrington, Conn. May 1906
Scale 1/4 inc. = 1 ft. Sheet No. 3

SUMMARY OF DATA AND CORRESPONDENCE

PAGE	TO	FROM	SUBJECT	PAGE
1974		Wilson, Burke Thomas, USGS	Water Resources Inventory of Connecticut - Part 5 - Lower Housatantic River basin	
Sept. 19, 1963		Water Resources Commission	Inventory Data	
Jan. 15, 1975	Members of General Assembly	Conn. DEP Douglas M. Costle	Report on Acquisition of Stillwater Pond	
June 1 , 1979	Harold Schwartz	Cahn Engineers	Certificate of Insurance with copy	
June 2, 1979	Cahn Engineers	Henry H. Werner	Photos, Plat Plan and Contour map of Stillwater Dam	
Aug. 11, 1975		Henry H. Werner	Report on Dam	
Oct. 25, 1974	E. Zell Steever	Robert E. Sonnichsen	Interdepart. Memo on Stillwater Dam (Water & Related Resources) State of Conn.	
June 8, 1962	State of Conn.	A. J. Macchi	Inspection of Dam	
June 6, 1962	John A. Macchi	Emitt A. Dell	Request to Inspect Dam	
June 5, 1962	William S. Wise	George C. Hancock	Request to Inspect Dam	
April 3, 1962	George Hancock	J. C. Rowell	Sale of Stillwater Pond and surrounding Acreage	
April 3, 1962	William S. Wise	J. C. Rowell	Sale of Stillwater Pond	

Nov. 2, 1961	William S. Wise	J. C. Rowell	Sale of Stillwater Pond
Sept. 1, 1961	Anaconda American Brass Company	William S. Wise	Future Ownership and Maintenance of Dam
Aug. 22, 1961	William S. Wise	Chester Moore	Future Ownership and Maintenance of Dam
Oct. 4, 1955	American Brass Company	V. B. Clarke	Inspection of Dam
Oct. 4, 1955	American Brass Company	V. B. Clarke	Inspection of Dam
Sept. 24, 1955	John J. Curry	V. B. Clarke	Inspection of Church St. Dam and Stillwater Dam
Jan. 21, 1952	John Cook	Richard Martin	Stillwater Dam
Jan. 17, 1952	Richard Martin	V. B. Clarke	Dam in Torrington
Jan. 16, 1952	John Cook	Richard Martin	Stillwater Dam
Jan. 11, 1952	Mr. Martin	John Curry	Stillwater Dam
Jan. 10, 1952	State Board for the Supervision of Dams	Greene & Cook	Request for information on permit of dam at Stillwater Pond



WATER RESOURCES INVENTORY OF CONNECTICUT

PART 5

LOWER HOUSATONIC RIVER BASIN

BY

WILLIAM E. WILSON, EDWARD L. BURKE, CHESTER E. THOMAS, JR.

U. S. GEOLOGICAL SURVEY

PREPARED BY THE
U. S. GEOLOGICAL SURVEY
IN COOPERATION WITH THE
CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION

CONNECTICUT WATER RESOURCES BULLETIN NO. 19

1974

period are given in table 2. The data in table 1 can be used to construct low-flow frequency curves, such as that for Pomperaug River at Southbury, shown on figure 13. The duration curve and the low-flow frequency curve are related, and the average duration at indicated flow frequencies for long-term gaging stations in the lower Housatonic River basin is given in table 3. For example, the average duration of the 7-day annual minimum flow for the 10-year recurrence interval (plotted on plate B) is 99 percent. That is, the 10-year recurrence interval flow may be expected to be equalled or exceeded 99 percent of the time. The lowest daily discharge at 11 stream-gaging stations in the basin that was not exceeded during six different periods ranging in length from 1 to 120 consecutive days is shown in table 4.

Table 3.--Average duration of annual low flows of streams

(For reference period April 1930 to March 1960)

Period of low flow		Average percentage of time in which streamflow equaled or exceeded the lowest mean flow for indicated number of consecutive days or months at the following recurrence intervals 1/				
Consecutive days	months	2 median year	5	10	20	31 driest year
		Percent of time				
7	-	95	98	99	99.3	99.5
30	1	90	96	98	99	99
60	2	85	93	96	98	98
120	4	74	87	92	95	96
183	6	64	77	84	89	91
274	9	45	62	68	71	74
365	12	-	-	-	-	59
-	18	-	-	-	-	51
-	24	-	-	-	-	48
-	36	-	-	-	-	43
-	60	-	-	-	-	39
-	120	-	-	-	-	35
-	180	-	-	-	-	34
-	360	-	-	-	-	32

1/ Average of percentages determined from low flow frequency-duration relations at continuous-record gaging stations in or near the basin.

STORAGE OF WATER IN LAKES AND RESERVOI

The largest of the many lakes, ponds, and reservoirs in the lower Housatonic River basin is Thomaston Reservoir, with a surface area of 950 acres at spillway level and a usable capacity of 13,690 million gallons. Table 5 presents information on the more important surface-water bodies within the basin; additional information on the public supply reservoirs is given in table 28. About two-thirds of the lakes, ponds, and reservoirs listed in table 5 have usable storage (water that may be withdrawn by gravity through a valve or gate). Table 6 lists the maximum safe draft obtainable from some of these surface-water bodies at rates that would permit refilling within each year of the reference period. Maximum draft rates are given for years with low-flow conditions at the 10-year and 20-year recurrence intervals. The draft rates are given as annual average flow; for shorter periods of use, they may be increased correspondingly.

Low-flow frequency data for streams at the outlet of each of these reservoirs are presented on plate B. Methods of estimating draft rates and storage required are described in the followin section.

Estimating the amount of storage needed

If the minimum flow of a stream is insufficient to meet needs, the stream may need to be dammed and the stored water released as needed to maintain the desired flow during low-flow periods. Table 7 lists the various amounts of storage required to maintain selected rates of flow at the listed gaging stations for 10- and 20-year recurrence intervals of annual lowest mean flow in the reference period. The figures for storage required are in percentage of mean annual volume of streamflow, and selected flows to be maintained are in percentage of mean annual flow, so that the table may be used for other sites along the same stream. The figures for the Naugatuck and Housatonic Rivers have been adjusted

Table 4.--Lowest daily discharge not exceeded during indicated number of consecutive days at selected stream-gaging stations and year of occurrence

(For years beginning April 1 and periods of record ending March 1968)

Index no. (pl. B)	Stream-gaging station	Drainage area (sq mi)	Record begins	1 day (cfs)	1 day (cfs per sq mi)	Year	7 days (cfs)	7 days (cfs per sq mi)	Year	15 days (cfs)	15 days (cfs per sq mi)	Year	30 days (cfs)	30 days (cfs per sq mi)	Year	60 days (cfs)	60 days (cfs per sq mi)	Year	120 days (cfs)	120 days (cfs per sq mi)
1000	Burlington Brook near Burlington 2/	4.12	Sept. 1931	0.34	0.083	1966	0.56	0.136	1964 1966	0.90	0.220	1966	1.2	0.29	1931	1.67	0.23	1966	2.04	0.46
2000	Pomperaug River at Southbury	75.3	June 1932	3.3	.044	1966	3.7	.049	1964 1966	4.9	.065	1966	11	.095	1964	16	.12	1953	24	.21
2060	Copper Hill Brook near Monroe	2.58	June 1958	.04	.016	1964	.05	.019	1964	.09	.035	1966	.10	.046	1966	.18	.046	1966	1.6	.61
2095	Housatonic River at Stevenson	1,545	Aug. 1905	34	0	1939	100	.065	1940	260	.10	1964	432	.10	1957	795	.32	1964	869	.35
2050	West Branch Naugatuck River at Torrington	33.4	Aug. 1905	.6	3/	1966	1.1	3/	1966	1.8	3/	1966	6.4	3/	1963	8.6	3/	1966	16	3/
2057	East Branch Naugatuck River at Torrington	3/11.0	Aug. 1905	.8	.046	1957	1.3	.078	1957	2.1	.12	1966	4.3	.26	1962 1963	5.6	.31	1966	13	.72
2060	Naugatuck River near Thomaston	71.9	Oct. 1939	5.5	.048	1939	10	.13	1957	16	.14	1957	25	.22	3/	31	.28	1931 1939	49	.44
2065	Leadmine Brook near Harwinton	10.9	Feb. 1939	.3	.010	1964	.6	.014	1939	.6	.050	1964	2.0	.088	1964	4.3	.15	1966	9.3	.32
2069	Leadmine Brook near Thomaston	26.0	Sept. 1939	.7	.019	1957	1.0	.040	1939	3.5	.094	1939	7.0	.19	1939	16.0	.43	1939	48	1.03
2080	Naugatuck River at Thomaston	101	Oct. 1939	8.4	.084	1964	11	.099	1964	14	.070	1964	31	.20	1966	44	.28	1964	69	.31
2095	Naugatuck River at Beacon Falls	246	Sept. 1905	40	.16	1939 1955	50	.13	1939	60	.16	1931	80	.21	1931	93	.24	1931	151	.40

2/ Situated outside lower Housatonic River basin but close to it.

3/ Regulated.

4/ Diversion for municipal supply of city of Torrington

5/ Drainage area downstream from Lake Winchester.

6/ 1931, 1939, 1957, 1958, and 1957.

Table 5.--Lakes, ponds, and reservoirs

Index no.	Name and location	Source of data 1/	Artificial (A); natural, modified (B,M)	Drainage (sq mi)	Water surface (acres)	Elevation (ft)	Depth Maximum (ft)	Depth Average (ft)	Storage Total (ac-ft)	Storage Usable (ac-ft)	Storage Minimum release during water year 1964 (cfs)	Use
2035.1	Lockwood Reservoir near Bethlehem	W	A	1.38	78	960	20	11	888	888	131	Public water supply
2036.94	Long Meadow Pond at Bethlehem	FG	A	1.55	110	894	7	4.2	150	150	35	Recreation
2050	Lake Zoar at Stevenson	CLP	A	1,565	1,053	98	70	27.6	9,470	2,470	860	Power, recreation
2055.09	Lake Quassapaug near Middlebury	FG	B,M	1.93	271	895	65	28.5	2,671	-	90	Recreation
2055.45	Lake Housatonic at Derby	FG	A	1,581	320	96	26	9.4	1,000	-	-	Power, industry, recreation
2055.6	Hall Meadow Brook Reservoir near Torrington	CE	A	11.9	373	898	48	23.2	3,895	3,895	5.8	Flood control, recreation
2055.7	North Pond at North Goshen	T	A	.90	183	1,464	18	11.8	760	-	-	Public water supply
2055.8	Reuben Hart Reservoir near Goshen	T	A	5.00	136	910	47	18.1	750	750	-	Public water supply
2055.83	Hart Brook Reservoir near Goshen	T	A	.05	1	895	14	10.7	3.5	-	-	Not used
2055.86	White Pond near Goshen	T	B,M	.33	41.5	1,195	-	15.5	210	-	-	Public water supply
2055.9	Stillwater Pond at West Torrington	FG	A	34.1	95	735	36	11.2	365	365	14	Industry, recreation
2055.93	Allen Dam Reservoir at West Torrington	T	A	3.75	2.8	789	-	3.8	3.5	3.5	-	Public water supply
2055.94	Crystal Lake at West Torrington	T	A	4.05	6.6	723	-	8.6	18	-	-	Not used
2056.1	Lake Winchester at Winchester	FG	A	2.23	237	1,369	16	9.2	712	712	205	Industry, recreation
2056.2	Park Pond at Winchester	FG	A	.50	76.7	1,135	15	10.6	265	-	8	Recreation
2056.5	East Branch Reservoir near Torrington	CE	A	9.11	158	865	67	27.5	1,614	1,614	.8	Flood control, recreation
2066	Thomaston Reservoir near Thomaston	CE	A	98.0	950	494	134	64.2	13,690	13,690	2.2	Flood control
2068	Plymouth Reservoir at Plymouth	Tv	A	.56	17	692	-	7.7	93	-	-	Public water supply
2069.2	Northfield Pond at Northfield	FG	A	2.33	27.9	685	8	2.8	25.4	-	-	Recreation
2069.1	Hyatron Pond at Northfield	FG	A	.20	20.1	508	13	9.5	63.7	63.7	6.7	Recreation
2069.4	Northfield Brook Reservoir near Thomaston	CE	A	5.7	67	576	96	36.3	763	763	29.2	Flood control, recreation
2070	Pitch Reservoir near Thomaston	WY	A	5.39	111	727	85	38.8	1,614	1,614	210	Public water supply
2071	Harris Reservoir near Thomaston	WY	A	12.8	152	693	87	60.0	1,982	1,982	324	Public water supply
2080	Wigwam Reservoir near Thomaston	WY	A	17.3	105	560	-	21.2	737	737	12	Public water supply
2081.1	Hancock Brook Reservoir near Waterbury	CE	A	11.9	266	480	30	15.2	1,272	1,272	0	Flood control, recreation
2081.55	Lake Winnemaug near Watertown	FG	A	1.27	122	661	16	9.9	392	392	99	Industry, recreation
2081.79	Cedar Swamp Pond near Bristol	S	A	.84	139	891	13	8.2	370	370	-	Industry
2082.39	Scovill Reservoir at Woodtick	S	A	7.90	139	530	20	7.8	353	353	-	Industry
2082.69	Hitchcock Lake near Woodtick	S	A	.51	112	674	12	7.4	272	272	-	Industry
2082.73	Chestnut Hill Reservoir near Wolcott	S	A	1.66	78	657	32	17.6	447	447	-	Industry
2084.29	Long Meadow Pond near Middlebury	FG	B,M	3.42	113	999	9	6.4	179	161	37	Recreation
2084.56	New Naugatuck Reservoir near Straitsville	N	A	1.66	86.3	534	-	18.0	506	-	-	Public water supply
2084.6	Old Naugatuck Reservoir near Straitsville	N	A	2.63	33.0	630	-	31.2	335	-	-	Public water supply
2087.1	Swan Lake near Oxford	FG	A	.99	38.5	366	15	9.1	30.6	30.6	11	Recreation
2087.4	Peat Swamp Reservoir near Ansonia	A	A	.45	82.6	360	-	38.0	537	-	-	Public water supply
2088.1	Trap Falls Reservoir near Huntington	A	A	1.09	344	315	-	33.0	2,464	2,464	450	Public water supply
2088.2	Beaver Dam Lake near Nichols	FG	A	2.26	58.4	173	44	21.8	415	415	20	Recreation

1/ Sources, from (A) Ansonia Water Co., (CE) Corps of engineers, (CLP) Connecticut Light and Power Co., (FG) State Board of Fisheries and Game, (N) Naugatuck Water Co., (S) Scovill Manufacturing Co., (T) Torrington Water Co., (Tv) Terryville Water Co., (W) Watertown Fire District, (WY) City of Waterbury.

estimated low-flow augmentation. Table 7 in-
ides selected flows to be maintained that are
percent or less of the long-term average flow
ich is approximately equal to the smallest
ual mean flow) to increase the likelihood that
storage withdrawn would refill during the
r. The figures in this table were determined
m frequency-mass curves based on low-flow fre-
ncy relationships for each gaging station
ggs, 1964), and an example is given on the table
illustrate its use in estimating storage required.

A regional relation for storage required to
ntain flows at other sites in the study area is
en in table 8, and an example is given in the
le to illustrate its use. The data are pre-
ted for various percentages of median 7-day
ual minimum flow (2-year recurrence interval)
erred to the long-term mean annual flow, so
t they may be applied to sites for which these
w characteristics have been estimated. Estimates
flow characteristics for many sites in the basin
given on plate B. If plate B gives insufficient
formation for interpolation of the low-flow char-
istics, it is necessary to make a few base-flow
harge measurements at the site, preferably dur-
g a significant drought, and correlate them with
ncurrent discharges at one of the long-term gaging stations, where the median 7-day annual minimum flow has been determined. A good estimate of the long-term mean annual flow at any site may be taken from the runoff ratio map, figure 14.

The storage-required values in tables 7 and 8 are slightly smaller than the true ones because they include a bias of about 10 percent that results from approximations used in the frequency-mass computation and because losses due to evaporation and seepage are not included. These values are sufficiently accurate, however, for reconnaissance planning and for the selection of a proposed site.

FLOODS

History

Floods have occurred in the basin during every month, at one time or another. Spring floods, the most common, usually result from the combined effects of snowmelt and rain; those of late summer and fall are commonly the result of hurricanes or coastal storms.

Since the late 17th century, there have been at least 17 major floods in the basin. The earliest of these, in February 1691, in Waterbury, eroded part

No. T-16

WATER RESOURCES COMMISSION
SUPERVISION OF DAMS
INVENTORY DATA

Zone 73-8.9
Lat 41-50.1

Inventoried By WPS

Date 19 SEPT 1963

Name of Dam or Pond STILLWATER POND

Code No. H 11.7 N 36.7 WBN 3.5

Nearest Street Location BRASS MILL DAM ROAD

Town TORRINGTON

U.S.G.S. Quad. WEST TORRINGTON

Name of Stream WEST BRANCH NAUGATUCK RIVER

Owner STILLWATER POND CORP.

d 1/73

Address C/O HAROLD SCHWARTZ, PRES.

1081 Coral Parkway
Coopta Fla
32703 (exp 11/18)

~~7272 SOUTHWEST 132 ND. ST.~~
~~MIAMI, FLA. 33156~~

DA 24.45M
101.9

Pond Used For RECREATION

Dimensions of Pond: Width 600 FEET Length 6500 FEET Area ~~100 Acres~~

Total Length of Dam 500 FEET Length of Spillway 100 FEET

Location of Spillway CENTER OF DAM

Height of Pond Above Stream Bed 30 FEET

Height of Embankment Above Spillway 10 FEET

Type of Spillway Construction CONCRETE

Type of Dike Construction EARTH

Downstream Conditions CITY OF TORRINGTON

Summary of File Data DAM WAS INSPECTED BY MACCHI ON 8-6-62. FOU
TO BE IN SATISFACTORY CONDITION WITH MINOR MAINTENANCE REQUI

Remarks

Would [illegible] e Cause Damage? YES Class A

-B7-

N/A

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

DOUGLAS M. COSTLE
COMMISSIONER

January 15, 1975

M E M O R A N D U M

TO: ALL MEMBERS OF THE GENERAL ASSEMBLY

FROM: DOUGLAS M. COSTLE, COMMISSIONER

It is a pleasure to submit for your consideration a report concerning acquisition of Stillwater Pond in the City of Torrington.

This report was prepared by the Department of Environmental Protection under direction of Special Act No. 74-101.

Douglas M. Costle
Commissioner

FEASIBILITY STUDY

ACQUISITION OF STILLWATER POND

TORRINGTON

FEASIBILITY STUDY

ACQUISITION OF STILLWATER POND

TORRINGTON

TABLE OF CONTENTS

FEASIBILITY STUDY

ACQUISITION OF STILLWATER POND

TORRINGTON

INTRODUCTION

Special Act No. 74-101, approved May 28, 1974, directed the Commissioner of Environmental Protection to undertake a feasibility study of the acquisition of Stillwater Pond in the City of Torrington, formerly the property of Anaconda-American Brass Company, and such land immediately adjacent thereto as may be needed to provide an area for the establishment of a State Park or to be made available to the public as open space for recreation. (Exhibit I)

This report is the result of an intra-department study conducted by Department of Environmental Protection staff members.

INVESTIGATIONS

Location and Topography

Stillwater Pond was created by impounding the West Branch of the Naugatuck River at the Drakesville Section of Torrington. The area is typical of the western uplands of Connecticut which may be described as irregular and hilly. Stillwater Pond, itself, lies in a steep sided, narrow valley, with both valley walls rising more than 200 feet above the elevation of the water's surface at a slope of more than 20%. As a consequence, any development taking place on either side of the valley will be entirely visible from the other side. Although the pond is close to metropolitan Torrington, the lake valley is still largely undisturbed with the exception of the residential development on the west side of the pond and upstream. Exhibit II illustrates the area studied. The pond and adjacent land immediately surrounding the pond consists of approximately 250 acres east of Route 272 and north of Brass Mill Dam Road in Torrington.

Hydrology

The pond has a surface area of appproximately 95 acres with a drainage area of 24.4 square miles. Maximum water depth is 26 feet with an average of 11.7 feet. As stated before, this impoundment was created by the daming of the West Branch of the Naugatuck River. Other feeder streams which are directly involved include a branch of Marshall Lake Brook and an unnamed stream which originates in the wetland to the east of Hall Meadow Brook near the Winchester Town line.

1100 acre foot

-B12-

Surface Water Flow

Surface water flow for the West Branch of the Naugatuck is monitored at Torrington, 3 miles downstream from Stillwater Pond and gives some indication of the flow regime for the pond. The records are available on an annual basis in the publication "Water Resources for Connecticut," published by the Geological Survey of the Department of the Interior. The average discharge over a 17-year period of record for this station is 52.4 c.f.s. Maximum discharge for the period of record was 3,600 c.f.s. on September 12, 1960. A minimum daily discharge for the period of record of 0.3 c.f.s. was recorded on September 1, 1968. For the 1973 calendar year mean discharge at the Torrington station was 108 c.f.s. The maximum was 710 c.f.s. and the minimum 6.0 c.f.s. Again this is only an indication of the expected flows at Stillwater Pond as the drainage area for the Torrington gaging station is 33.7 square miles, 9.3 square miles greater than the watershed at Stillwater Pond. 33.7 - 9.3 = 24.4

Water Quality

The present and anticipated water quality for the West Branch of the Naugatuck River at Stillwater Pond is Class A which is suitable for all purposes including water supply.

Bedrock Geology

The bedrock underlying the Stillwater Pond area is the Waramaug Formation, a metasedimentary biotite gneiss. This information has its northeastern terminus approximately 1 mile from the pond and continues in a six-mile band to the south of New Milford.

A possible fault has been identified on the eastern valley wall between Brass Mill Dam Road on the south and Marshall Lake Brook on the north.

Surficial Geology

The unconsolidated materials on both the east and west sides of the pond consist primarily of till. A large number of bedrock outcrops and boulders are present on the east side. At the northern end of the pond and along the western shore are areas of ice contact stratified drift, undivided, which have been identified. This same deposit is also present on the southeastern shore.

To the north of the pond alluvium and alluvial fan deposits are present.

Soils

The area's predominant soils with their urban designation as described in the Soil Survey of Litchfield County, Connecticut are listed below.

CrC - Charlton very stony fine sandy loam, 3-15% slopes,
Natural Soils Group B-1c, Urban Group 4

CrD - Charlton very stony fine sandy loam, 15-35% slopes,
Natural Soils Group B-1c, Urban Group 7

ChB - Charlton stony fine sandy loam, 3-8% slopes,
Natural Soils Group B-1a, Urban Group 3

ChC - Charlton stony fine sandy loam, 8-15% slopes,
Natural Soils Group B-1b, Urban Group 4

ChD - Charlton stony fine sandy loam, 15-25% slopes,
Natural Soils Group B-1d, Urban Group 7

SwB - Sutton stony fine sandy loam, 3-8% slopes,
Natural Soils Group B-2a, Urban Group 8

SxC - Sutton very stony fine sandy loam, 3-15% slopes,
Natural Soils Group B-2b, Urban Group 8

MyB - Merrimac sandy loam, 3-8% slopes,
Natural Soils Group A-1d, Urban Group 1

Am - Alluvial land
Natural Soils Group E-3a, Urban Group 13

Lg - Leicester-Ridgebury and Whitman very stony fine sandy loam, Natural Soils Group B-3b, Urban Group 11

Tg - Terrace escarpments
Natural Soils Group A-1c, Urban Group 7

The Dam

The Stillwater Pond Dam has a concrete spillway crest approximately 100 feet long, founded on ledge. The dike section of the dam is earth approximately 250 feet long also tied into ledge at the eastern abutment. The downstream slope of the earthen dike is quite steep, but shows no signs of seepage or deterioration.

The concrete spillway and wing walls appear to be in acceptable condition, with only slight spalling and wear showing along the face of the spillway. A photograph taken in 1963 shows that at that time the spillway condition was similar to its condition at the present time and that deterioration has been very slow.

The draw down gate house was locked on the day of inspection making examination of the equipment impossible. The house itself is in good condition, however, indicating that the equipment has been protected.

The overall condition of the dam is very good, with no necessary repairs foreseen in the immediate future.

Since the foundation of the dam is tied to ledge, the earthen slopes showed no signs of seepage, and the concrete work was in good condition. The structure is considered stable.

Municipal Plans and Study

The Torrington Comprehensive Plan adopted in 1968 and amended in 1974 indicates future land use proposals for the Stillwater Pond Area.

The west side of the pond as indicated on Exhibit III is designated residential medium density (2-4 units/acre); the east side of the pond is designated residential low density (0-1 unit/acre).

There were no proposals made for City or State acquisition and/or development of Stillwater Pond as a recreational facility.

Municipal Plans and Studies - Continued

A consultant study, done for the Torrington Conservation Commission 1970, strongly recommends the Stillwater Pond area be designated as Open Space as well as a Wildlife Sanctuary. It further recommends the area for a municipal public recreation area including swimming, picnicking, camping, hiking, trail and boating areas. Specific reasons for conversion to a park include:

A. Torrington's Recreational Land Deficiencies (147 acres in 1970)

B. The cost of development in terms of services provided would be greater to the City than City purchase of the land.

C. Preservation would provide fire, water and health protection for the City.

D. Water from the Pond could be a source of low flow augmentation needed in times of drought.

E. The Pond would be used as a future water supply source for the City.

F. The Pond, if properly regulated at its discharge point, could be a flood protection/retardation mechanism.

Regional Reports and Studies

The Litchfield Hills Regional Planning Agency Open Space Study, defining areas suitable for public open space, gives the Stillwater Pond area a priority III ranking out of six priority categories based on the existence of steep slopes (15-35%) and shallow to bedrock features.

The Sewer, Water and Drainage Report considers the use of Stillwater Pond as a water supply reservoir doubtful but a possibility. A sanitary sewer extension is proposed which would extend a sewer line northward past the Pond on the west side. The area could thus be part of a future water supply service area.

Regional Reports and Studies - Continued

The water resources map indicates that an aquifer of unknown yield underlies the southern end of the Pond and extends southward into the City. The aquifer area abutting the Pond would see extensive development, including buildings, pavement, etc., as proposed by a private development plan.

The Region's Preliminary Plan of Development shows the east side of Stillwater Pond as a low-moderate residential area of 1 to 4 acres per family.

At this time the Litchfield Hills Regional Planning Agency has set in motion on the Stillwater Pond Area an Environmental Impact Review.

State Plan

In the State of Connecticut Plan of Conservation and Development, the Stillwater Pond area is shown on the "Land Use Policy Map" as an area proposed for permanent open space and on the "Water Use Policy Map" the area is shown as a limited use water body. The "Conservation Area Map" in this Plan shows the area bordering the western side of the Pond containing Route 272, a major access road, proposed for a scenic ridge/valley area.

In accordance with the Inland Wetlands and Water Courses Act and its relation to Stillwater Pond, the Department of Environmental Protection is presently regulating the wetlands and water courses in Torrington. As a water course, Stillwater Pond is definitely a "regulated area" and any alteration of the pond or adjoining stream and wetlands is within Agency jurisdiction.

Private Plans

The proposed development of 253 acres on the east side of Stillwater Pond will involve the construction of a condominium cluster consisting of 1,500 units to be used as a retirement and second-home complex.

The area proposed for development is currently zoned industrial due to the fact that, until sold in 1964, it was owned by the American Brass Company. Application for a zone change to R-6 is expected to be acted upon soon.

EVALUATION AND ANALYSIS

In this feasibility study the physical characteristics of Stillwater Pond and the immediately adjacent contiguous land were evaluated for potential recreational and open space use.

The obvious value of this area would be concentrated around Stillwater Pond itself for water based recreation. To properly develop this potential, however, requires a degree of relatively flat land suitable for the installation of support facilities and provisions for ancillary activities in the immediate proximity of the shoreline. Comparing this requirement with the ownership map of the area led to the conclusion that the property presently owned by the Stillwater Pond Corporation offered the only suitable land close enough to the water for those functions. The on-site investigation was therefore limited to this property.

Eighty-five percent of the east and west shorelines are too steep to allow any significant development. The western shore is also limited in width by the location of Route 272. The shoreline immediately northeast of the dam does have a desirable gradient for water access but contains a high water table and densely vegetated wetlands. The area southwest of the dam consisting of approximately 20 acres apparently offered the only site for parking and structures but was found to be prohibitive for these purposes. Although a topographic map shows gentle slopes, the actual configuration is comprised of abrupt undulations with vertical relief averaging six to ten feet.

Soils within the site proved to be another outstanding restriction. With the exception of two isolated pockets of sandy loam, the surface and subsoil of the entire site are saturated with glacial boulders ranging from one to ten feet in diameter.

B18-

Further site analysis is unjustified because the site cannot accommodate intensive outdoor recreation requiring support facilities.

The Stillwater Pond area is appropriately suited for open space and could provide for passive activities such as boating, fishing and hiking, especially with Stillwater Pond designated as a Class "A" - water resource.

The topography of surrounding land and the pond itself does not present any significant potential for extensive wildlife management. The island is heavily wooded and even if cleared, it would have only limited potential for Canada Goose management.

Although the property offers some forested land, forest management objectives should consider esthetic values which would further enhance the natural attractiveness of the water body itself other than the harvest of timber.

Stillwater Pond would provide significant sport fishing opportunities. The pond has a surface area of 95 acres, a maximum depth of 26 feet and an average depth of 11.7 feet. It is virtually within the city limits of Torrington and is capable of providing considerable fishing for area and State residents.

While the pond is only marginal trout water, it is of good enough quality to warrant trout stocking. Reasonable plants of hatchery trout can provide 3,000 to 6,000 man days of trout fishing per year.

Public access would need to be provided on the west side of the pond probably a short distance upstream of the dam. A public boat launching facility at this point could provide 6,000 to 10,000 man days of fishing per year or 60 to 100 man days per acre per year. In order to provide this amount of sport fishing opportunity, it would be necessary to acquire the pond and a minimum of 150 acres of adjacent upland.

At the present time the future permitted uses on Stillwater Pond properties are in a state of flux because of proposed zone changes and private development plans. The development of reasonably accurate land values is difficult.

The property is presently zoned "Industry". Yet there is little or no industry in the area nor does there appear to be any demand for this use. There are no sewers available to the site, and therefore, its potential as an industrial site is limited. In all likelihood this zone classification was applied because, in the past, the land and water belonged to the American Brass Company.

The present owners requested a zone change from "Industry" to R-6 on July 23, 1974 and a hearing was held in the City of Torrington on October 9, 10, and 14, 1975. The owner's presented plans for 1500 high rise apartments with a year round resort environment. On January 8, 1975 this request was withdrawn by the owners before a decision by the Planning and Zoning Commission was reached. It is indicated that the owners are planning to resubmit the zone change request in two phases. Approval of the original request or similar request in two phases would have a great effect on property value. Recent sales of residential property in the general area indicate a range of $2,000 to $4,000 per acre for residentially zoned land. A potential buyer would likely buy the present property surrounding Stillwater Pond with anticipation of a zone change and pay somewhat less than residential values, perhaps in the range of $1,000 to $2,000 per acre. The present value of the property as industrial land would likely be the same $1,000 to $2,000 per acre value as that to a potential buyer anticipating a zone change.

Any benefits attributed to the value of the dam, flowage rights and pond bottom add an increment of value to the adjacent upland. This would most likely be reflected however by a potential buyer paying approximately the same value per acre for pond bottom including the dam and flowage rights as a potential buyer would pay for the associated upland acreage.

CONCLUSIONS

The land area adjacent to Stillwater Pond will not support intensive outdoor recreation such as swimming, picnicking and camping at a level which would justify state acquisition and development. Proper space for necessary support facilities is lacking.

Minetto State Park is only a short distance north of Stillwater Pond. Development monies would be better spent in improving and expanding these existing facilities than in developing a new recreation area.

Intensive recreational development is not feasible or warranted. Sport fishing, non-motorized boating and hiking appear to be the only feasible public uses. The provision of these recreational opportunities would require the acquisition of the entire pond (dam, flowage rights and pond bottom), a strip of land on the western shoreline between the high water mark and Route 272, including two acres for development of a public boat launch facility and about 150 acres on the eastern hillside from the high water mark to the top of the ridge for open space preservation and watershed protection.

A formal, professional property appraisal of fair market value would be necessary to determine the cost for acquisition of land in the Stillwater Pond area. Present circumstances and existing zoning indicate a $250,000 acquisition cost for approximately 250 acres of land, including the dam site, flowage rights and pond bottom. Related acquisition costs for property survey, appraisal and legal fees, are estimated at $25,000. Development costs, including engineering fees, for a boat launch facility would be approximately $25,000 based on prevailing construction rates.

Total acquisition and development costs are estimated to be $300,000 at current market levels.

EXHIBIT 1

Substitute House Bill No. 5158

SPECIAL ACT NO. 74-101

AN ACT CONCERNING THE ACQUISITION OF STILLWATER POND IN TORRINGTON BY THE STATE.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

The commissioner of environmental protection shall undertake a feasibility study of the acquisition of Stillwater Pond in the city of Torrington, formerly the property of Anaconda-American Brass Company, and such land immediately adjacent thereto as may be needed to provide an area for the establishment of a state park or to be made available to the public as open space for recreation. Said commissioner shall report his recommendations to the general assembly not later than January 15, 1975.

Certified as correct by

_____
Legislative Commissioner.

_____
Clerk of the Senate.

_____
Clerk of the House.

Approved 5/28, 1974.

_____
Governor.

B22-

INOVA

Cahn Engineers Inc.

CONSULTING ENGINEERS-COMMUNITY DEVELOPMENT CONSULTANTS

ESTABLISHED 1909

June 15, 1979

Mr. Harold Schwartz
75 Woodside Circle
Torrington, Connecticut 06790

Re: Stillwater Dam
27 660 KC

Dear Mr. Schwartz:

Enclosed is a carbon copy of Certificate of Insurance from Bertha M. McCollam, Inc., agents for Travelers, which shows our Valuable Papers (Policy No. 650-261B377-9-IND-78) coverage.

We agree that the value of the documents (3-blueprints of this dam) which you will be loaning us for a 48 hour period,could be worth as much as $15,000 in terms of the cost of replacement.

Very truly yours,

CAHN ENGINEERS, INC.

Edgar B. Vinal, Jr.
Senior Vice President

EBV/na
cc: D.Cherpak

Reply to:
20 Alexander Drive
PO Box 787
Wallingford, Conn. 06492
Phone (203) 265-8741

Reply to:
7151 Frankford Avenue
Philadelphia, Pennsylvania 19135
Phone (215) 333-3100

Reply to:
815 Wyoming Avenue
Forty Fort, Pennsylvania 18704
Phone (717) 288-6481

ard

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER
THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES LISTED BELOW

NAME AND ADDRESS OF AGENCY

Bertha M. McCollam, Inc.
10 Mansfield St.
Bethel, Conn. 06801

NAME AND ADDRESS OF INSURED

Cahn Engineers Inc.
Alexander Drive
Wallingford, Conn 06492

COMPANIES AFFORDING COVERAGES	
COMPANY LETTER A	Travelers
COMPANY LETTER B	
COMPANY LETTER C	
COMPANY LETTER D	
COMPANY LETTER E	

This is to certify that policies of insurance listed below have been issued to the insured named above and are in force at this time.

CO. LTR.	TYPE OF INSURANCE	POLICY NUMBER	POLICY EXPIRATION DATE	Limits of Liability in Thousands (000)	EACH OCCURRENCE	AGGREGATE
A	GENERAL LIABILITY [X] COMPREHENSIVE FORM [ ] PREMISES—OPERATIONS [ ] EXPLOSION AND COLLAPSE HAZARD [ ] UNDERGROUND HAZARD [ ] PRODUCTS/COMPLETED OPERATIONS HAZARD [ ] CONTRACTUAL INSURANCE [ ] BROAD FORM PROPERTY DAMAGE [ ] INDEPENDENT CONTRACTORS [ ] PERSONAL INJURY	650-261B377-9-IND-78	10/15/79	BODILY INJURY	$	$
				PROPERTY DAMAGE	$	$
				BODILY INJURY AND PROPERTY DAMAGE COMBINED	$ 500,000.00	
				PERSONAL INJURY		$
	AUTOMOBILE LIABILITY [X] COMPREHENSIVE FORM [X] OWNED [X] HIRED [X] NON OWNED	"	10/15/79	BODILY INJURY (EACH PERSON)	$	
				BODILY INJURY (EACH ACCIDENT)	$	
				PROPERTY DAMAGE	$	
				BODILY INJURY AND PROPERTY DAMAGE COMBINED	$ 500,00	
A	EXCESS LIABILITY [X] UMBRELLA FORM [ ] OTHER THAN UMBRELLA FORM	CUP 261B643-2	10/15/79	BODILY INJURY AND PROPERTY DAMAGE COMBINED	$ 1,000,000.00	
	WORKERS' COMPENSATION and EMPLOYERS' LIABILITY			STATUTORY		
					$ (EACH ACCIDENT)	
A	OTHER Valuable Papers	650-261B377-9-IND-78	10/15/79	$75,000.00 on premises $20,000.00 off premises		

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES

Engineering Services

Cancellation: Should any of the above described policies be cancelled before the expiration date thereof, the issuing company will endeavor to mail _____ days written notice to the below named certificate holder, but failure to mail such notice shall impose no obligation or liability of any kind upon the company.

NAME AND ADDRESS OF CERTIFICATE HOLDER:

DATE ISSUED: 6/14/79

Mary M McCollam
AUTHORIZED REPRESENTATIVE

B24

368-2966
AREA CODE 305

HENRY H. WERNER
CONSULTING ENGINEER
861 N. E. APPLEBY ST.
BOCA RATON, FL. 33431

RECEIVED
JUN 7 1979
CAHN ENGINEERS

June 2, 1979.

[illegible] P.C.
[illegible]r.
Wallingford, Conn. 06492

Re: Grass Hill Dam

Att: Mr. George Stevens

Regarding above dam on Naugatuck river in Torrington, also called Stillwater Pond, I am sending you by separate mail one aerial contour map and one plot plan of the property.

Original construction drawings of the dam and outlet works are at Harold Schwartz's in Connecticut.

Inclosed photos show the upriver side of the gatehouse inlet and the dam during a draw-down in July 1975.

I personally inspected this dam periodically since 1968. Contact me if any of my observations may be of interest to you.

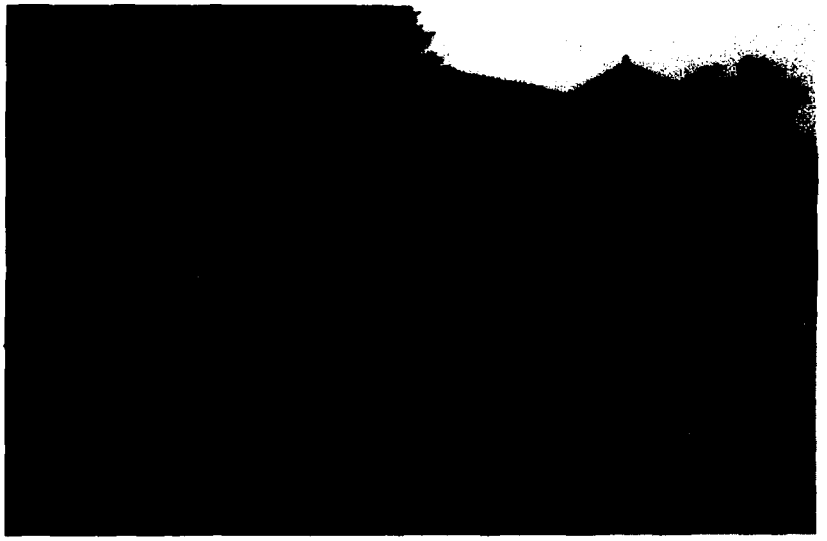
Sincerely,

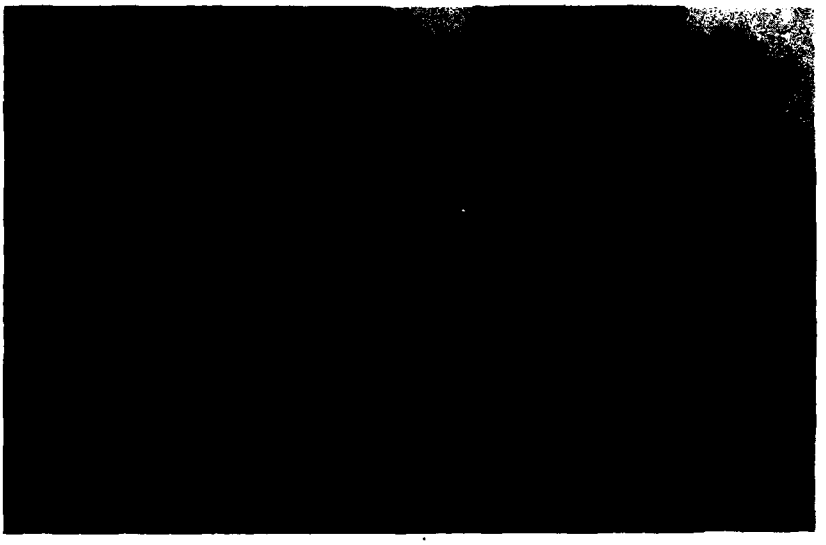
Henry H. Werner

hhw/cm
cc: H. Schwartz

B25

Photographs Enclosed With Henry H. Werner Letter to Cahn Engineers, Inc. on June 2, 1979





RA. 6-6502
AREA CODE 212

HENRY H. WERNER
CONSULTING ENGINEER
21-43 SHORE BOULEVARD
LONG ISLAND CITY, N. Y. 11105

11 Aug 75

REPORT on the BRASS MILL DAM on NAUGATUCK RIVER

Torrington, Conn.

On July 15, 1975 I inspected above dam as the water in Stillwater Pond behind was drawn down substantially but unfortunately not completely.

This man-made pondwas formerly used for industrial water storage and was regularly drawn down in dry seasons. At such times, the up-river face of the dam and its outlet works were inspected and maintenance work was done as required. When the original use and periodical inspections were relinquished more then 10 years ago the pond became a steady body of water without the benefit of in-depth dam inspection. With this in mind I had asked to drain the pond for inspection.

My inspection observations are as follows:

1) There is little silt and organic mud deposited in the lower end of the pond. There are banks of sand and gravel in this area, apparentl excavation material from the dam construction.

2) The up-stream rip rap protection of the earth embankment is in perfect condition. There is no root growth through the stone joints and no dislocation of stones.

3) The earth dam, adjacent to the spillway, is overgrown with small trees and shrubs and I advice that they be removed, together with all vines growing on and over fences.

4) The rock ledge in front of the spillway is in good condition with little evidence of erosion. There are various indications of water filtration through fine rock and concrete fissures, but none of them has sign of erosion or dissolution.

5) The concrete spillway dam and its up-river face (now exposed) are in good condition. There is some superficial spalling of the "gumite" concrete overlay of the spillway. This is caused by corrosion of reinforcing imbedded in the "gumite". This overlay is about six (6) inch thick on top of the dam and there are pipe inserts in this for flashboard installation.

./.

HENRY H. WERNER
CONSULTING ENGINEER

Curvature in this pipe.

Although as previously mentioned, I was not able to fully inspect the valves and trash racks, it should be noted that the functioning of these items concerns only the ability to control water levels of the pond, and they have no bearing on the integrity of the dam.

In my opinion the dam and its appurtenances continue to be sound and safe.

August 11, 1975.

Henry H. Werner

HHW/cm

Interdepartment Message

CO-201 REV. 3/74 STATE OF CONNECTICUT
(Stock No. 6938-051-01)

SAVE TIME: *Handwritten messages are acceptable. Use carbon if you really need a copy. If typewritten, ignore faint lines.*

	NAME	TITLE	DATE
To	E. Zell Steever	Director	25 October 1974
	AGENCY	ADDRESS	
	Water and Related Resources		
	NAME	TITLE	TELEPHONE
From	Robert E. Sonnichsen	Engineer Intern	
	AGENCY	ADDRESS	
	Water and Related Resources		

SUBJECT: Still Water Pond Dam, Torrington

The Still Water Pond Dam on the West Branch of the Naugatuck River has a concrete spillway crest approximately 100 feet long, founded on ledge. The dike section of the dam is earth approximately 250 feet long also tied into ledge at the eastern abutment. The downstream slope of the earthen dike was quite steep, but showed no signs of seepage or deterioration.

The concrete spillway and wing walls appeared to be in acceptable condition, with only slight spalling and wear showing along the face of the spillway. A photograph taken in 1963 shows that at that time the spillway condition was similar to its condition at the present time and that deterioration has been very slow.

The draw down gate house was locked on the day of my inspection making examination of the equipment impossible. The house itself is in good condition, however, indicating that the equipment has been protected.

The overall condition of the dam is very good, with no necessary repairs forseen in the immediate future.

Since the foundation of the dam is tied to ledge, the earthen slopes showed no signs of seepage, and the concrete work was in good condition. I would consider the structure stable.

Robert Sonnichsen
Engineer Intern

RES:ljg

SAVE TIME: *If convenient, handwrite reply to sender on this same sheet.*

B30

A. J. MACCHI • ENGINEERS
DR. GIULIO PIZZETTI — ASSOCIATE CONSULTANT

44 GILLETT STREET — HARTFORD, CONN. — PHONE JA 5-6631
17 CORSO DUCA ABRUZZI — TORINO, ITALY — PHONE 519-473

N.S.P.E. — A.S.C.E. — A.C.I.

June 8, 1962

State of Connecticut
Water Resources Commission
State Office Building
165 Capitol Avenue
Hartford, Connecticut

Attention Mr. Emitt A. Dell
Field Inspector

Re: Still Water Pond
Torrington, Conn.

Gentlemen:

We have inspected the dam at Still Water Pond in accordance with your request of June 6, 1962.

In general, we find the dam and appurtenances to be in a satisfactory condition. The only repairs necessary are to gunite the top and downstream surfaces of the concrete spillway which have spalled to some extent.

Very truly yours,

A. J. MACCHI, ENGINEERS

A. J. MACCHI

cc.

B31

June 6, 1962

Mr. John A. Macchi
44 Gillett Street
Hartford, Connecticut

Re: Still Water Pond
Torrington, Connecticut

Dear John:

Enclosed please find a copy of a letter from George Hancock regarding Still Water Pond in Torrington, Connecticut.

As a result of the interest shown by the Fish and Game Commission in acquiring this property, would you, under your terms as a consultant to this office, make a survey of this dam and submit a report stating:

1. Safety of the dam
2. Amount of repairs required to place dam in a safe condition.

Very truly yours,

Emitt A. Dell
Field Inspector

EAD:js
Enclosure

STATE OF CONNECTICUT

BOARD OF FISHERIES AND GAME

650 MAIN STREET · HARTFORD, CONNECTICUT

June 5, 1962

Mr. William S. Wise, Director
Water Resources Commission
650 Main Street
Hartford, Connecticut

Dear Mr. Wise: Re: Still Water Pond, Torrington

We would like your Department to inspect the dam at Still Water Pond in Torrington before our department makes any final committments on purchasing the dam and the water rights appurtenant thereto.

The Acaconda Brass Company is the owner of this lake and they have requested that our department make a proposal within the next thirty days.

Very truly yours,

George G. Hancock

George G. Hancock, Chief
Land Acquisition Division

GCH:N

B33

ANACONDA AMERICAN BRASS COMPANY

April 3, 1962

File: Real Estate -
Torrington, State of Conn.
(Stillwater Pond)

Mr. George C. Hancock
Chief-Land Acquisition Division
Connecticut State Board of Fisheries and Game
650 Main Street
Hartford, Connecticut

Dear Sir,

On February 5, 1962 you wrote inquiring if the Stillwater Pond property was for sale. It was not at the time, but is now available. The pond and the land surrounding it, comprise approximately 253 acres, located east of Route 72, and approximately 20 acres west of the highway.

We also have for sale approximately 241 acres of woodland west of Route 72 and fronting on the highway, near the new flood control dam at Hall Meadow.

If you are interested in purchasing either of these two properties, we would be glad to discuss the matter with you, or furnish any additional information you might require. We would appreciate hearing from you, whether or not you are interested.

Yours very truly,

J. C. ROWELL
DIRECTOR OF ENGINEERING

By_____
F.M.Noonan-Division Engineer
Civil & Construction

FMN PK

CC Wm.S[illegible]e, Director
Wat[illegible]ources Commission

B34

ANACONDA AMERICAN BRASS COMPANY

WATERBURY 20
CONNECTICUT

April 3, 1962

File: Real Estate -
Torrington, State of Conn.
(Stillwater Pond)

Mr. William S. Wise, Director
Water Resources Commission
State of Connecticut
Room 317, State Office Building
Hartford 15, Connecticut

Dear Sir,

You wrote on September 1, 1961, expressing an interest in the ultimate disposition of Stillwater Pond. In our letter of November 20, we explained that we did not know at that time.

It has now been decided to sell Stillwater Pond and the adjacent property. Attached is a copy of a letter which we are sending to Mr. George C. Hancock of the Connecticut State Board of Fisheries and Game, acquainting him with this fact, and asking if the State is interested in purchasing this property.

Yours very truly,

J. C. ROSELL
DIRECTOR OF ENGINEERING

By F. N. Noonan
F.N. Noonan-Division Engineer
Civil & Construction

Dam file

FNN FK
Attachment

B 35

ANACONDA AMERICAN BRASS COMPANY

WATERBURY 20
CONNECTICUT

November 20, 1961

File: Real Estate
-Torrington

Mr. William S. Wise, Director
Water Resources Commission
State of Connecticut
Room 317, State Office Building
Hartford 15, Connecticut

Dear Sir,

In reply to your letter concerning the future status of the Stillwater Reservoir, we are afraid we cannot be of much help to you at this time. The ultimate disposition of our property in Torrington is still in the exploratory and planning stage, and we do not know at present just what will be done with the Stillwater Reservoir.

In view of your interest in the matter, we will endeavor to keep you informed if there is any change in the present status of the property.

Yours very truly,

J. C. ROWELL
DIRECTOR OF ENGINEERING

By Francis J. Noonan
F.N.Noonan-Division Engineer
Civil & Construction

FNN PK

B36

September 1, 1961

Anaconda American Brass Company
414 Meadow Street
Waterbury, Connecticut

Re: Still Water Reservoir & Dam
Norfolk Road, Torrington

Gentlemen:

The City of Torrington is concerned over the future operation and maintenance of the Still Water Reservoir and Dam, Norfolk Road, Torrington. The city is well aware of the excellent operation and maintenance which you have given to this dam and reservoir and the cooperative attitude that you have always taken in operating the reservoir to fit into the best interests of the city.

Because of your great curtailment of activities in the city and the indication of further curtailments the city is naturally concerned with the future of the reservoir and dam. The city and this Commission naturally are interested in some assurance that under curtailment activities its operation and maintenance will continue in a manner as satisfactory as it has been in the past. We also assume that if its ownership should change, that some provision might be made to operate it in a manner that would be in the interest of the city.

We would appreciate your comments and views on this matter.

Very truly yours,

William S. Wise
Director

WSW:jo

B37

CITY OF TORRINGTON

FLOOD AND EROSION CONTROL BOARD

Torrington, Connecticut

Rooms 313-314
City Hall

Telephone:
HUnter 9-8028
HU 2-8521

August 22, 1961

Mr. William S. Wise, Director
State Water Resources Commission
State Office Building
Hartford, Connecticut

Re: Still Water Reservoir & Dam
Norfolk Road, Torrington

Dear Mr. Wise:

In view of the fact that the Anaconda American Brass Company has cut back on industrial activities in this city and has announced further reduction in the near future and since they have already disposed of considerable acreage which they have held for some time in the northwestern section of the city, there have been many questions asked and much apprehension expressed concerning the future of Still Water Reservoir and particularly the dam on the Norfolk Road here in Torrington which they own and control. This company has been most cooperative with the municipality in the past with reference to water level at the dam to assure protection downstream on the West Branch.

Should this company decide to dispose of the Still Water Reservoir and Dam, or should they fail to continue to operate the dam with the same caution they have used in the past, what could be done to continue the safeguard and eliminate any future hazard?

At a meeting of the Flood and Erosion Control Board last week, this subject came up for discussion, it having been referred to the Board by a city official who had been worried about this matter. Is there any action the Flood Board could or should take? What advice would the State Water Resources Commission give on this question?

Would it be possible for the State Water Resources Commission to communicate with the Anaconda American Brass Company on this matter to assure adequate protection for the downstream areas in the heavily populated section of Torrington?

Very truly yours,

Chester W. Moore

Chester W. Moore, Chairman
By: Margaret G. Lizotte, Secretary
FLOOD & EROSION CONTROL BOARD

B38

COPY

October 4, 1955

V. B. Clarke
356 Main St.
Ansonia, Conn.

The American Brass Company
Waterbury, Conn.

Attn. Mr. Howard M. Pritchard
Division Engineer.

Dear Sir:

At your request I inspected the Still Water Dam in the Northerly portion of Torrington to give you my opinion as a member of the Board as to its safety.

After my inspection of the dam and also the examinations of the original drawings I see nothing whatever to be concerned about as to its safety.

As stated before, the plans are very good and I consider the dam perfectly safe.

Very truly yours,

State Board of Supervision of Dams

By _____
V. B. Clarke
Member

VBC:M

B39

October 4,

V. B. Clarke
356 Main St.
Ansonia, Conn.

Brass Company
Penn.

Attn. Mr. Howard E. Pritchard
Division Engineer.

Dear Mr. Pritchard:

Enclosing a letter concerning the safety of the Still River Dam owned by your Company and have several suggestions:

The down-stream [illegible] the dam there is projecting lodg[illegible] it appears to [illegible] have a tendency to divert the [illegible] coming over the [illegible] toward the East wing-wall of the [illegible]. In fact there [illegible] wall area there that the rec[illegible] loosened up [illegible] like top of the wing-wall. I [illegible] suggest that you repair the embankment at the junction of [illegible] wing-wall at the point I have just referred to.

[illegible] we are very happy to have a dam that could stand up [illegible] during the recent flood. It is testimony it [illegible] and [illegible] invested in the first place.

I [illegible] on the down-stream side which well [illegible] importance. It might be [illegible] trees removed and then

[illegible] yours,

[illegible] OF SUPERVISION OF DAMS

[illegible], Member

340

STATE BOARD OF SUPERVISION OF DAMS

ROOM 317, STATE OFFICE BUILDING, HARTFORD

Created by Chapter 290 of the Public Acts of 1939 to supervise dams, dikes, reservoirs and other similar structures. "All such structures, with their appurtenances, without exception and without further definition or enumeration herein, which, by breaking away or otherwise, might endanger life or property, shall be subject to the jurisdiction conferred by this act."

PLEASE REPLY TO V. B. Clarke
356 Main Street
Ansonia, Conn.

September 24, 1955

State Board of Supervision of Dams
Room 317, State Office Building
Hartford, Conn.

Att'n. John J. Curry, Chief Engineer

Dear Mr. Curry:

I received the result of your computations on the Church Street dam of the American Brass Company located in Torrington. I think I will suggest to them to either lengthen out the spillway,making less corewall, or increase the height of the abutments. I would like the data you used, that is; number of square miles of watershed and the slope of the Naugatuck and its tributaries which would enter into the computations.

Yesterday I had a hurry call from Mr. Scofield, Engineer of the American Brass Company, to look at a dam up above Torrington, which I believe they call the "Stillwater Dam". The reservoir they informed me has a capacity of about one-half billion gallons of water and there seemed to be considerable concern around Torrington as to the safety of this dam. The flood came within less than one foot of the top or the earth embankment. I could see nothing wrong with the dam; some of the plastering on the downstream face of the spillway of the dam had scaled off in places and I imagine people thought the

B41

dam was in bad shape on that account.

On the way back I stopped briefly at the Church Street Dam, but I am afraid not long enough to size up the situation. You spoke of a blow-off spillway in the canal which I evidently did not pay much attention to; also what the conditions downstream would be in case of flood. I think I will try to go up there again in a few days and look the situation over more carefully.

Very truly yours,

V. B. Clarke

VBC:O

V. B. Clarke, Member
State Board of Supervision of Dams

January 21, 1952

Mr. John H. Cook
Attorney at Law
30 Mason Street
Torrington, Conn.

Dear Mr. Cook:

With further reference to your letter of January 10th concerning the dam across the Naugatuck River at Stillwater Pond, please be advised that if you were to contact Mr. Frederick S. Schofield of 337 Grandview Avenue, Waterbury, Engineer for the American Brass Company, I believe he can supply you with additional information regarding this matter.

Sincerely yours,

Richard Martin
Director

RM/h

B43

STATE BOARD OF SUPERVISION OF DAMS

ROOM 317, STATE OFFICE BUILDING, HARTFORD

Created by Chapter 290 of the Public Acts of 1939 to supervise dams, dikes, reservoirs and other similar structures. "All such structures, with their appurtenances, without exception and without further definition or enumeration herein, which, by breaking away or otherwise, might endanger life or property, shall be subject to the jurisdiction conferred by this act."

January 17, 1952

PLEASE REPLY TO V. B. Clarke
356 Main St.
Ansonia, Conn.

State Board of Supervision of Dams
Mr. Richard Martin, Chairman
State Office Bldg.
Hartford, Conn.

Dear Mr. Martin:

Acknowledging receipt of correspondence concerning a dam apparently owned by the American Brass Company in Torrington, I have no information whatsoever regarding this matter. I think if you were to contact Mr. Frederick S. Schofield, Engineer for the American Brass Company whose address is 337 Grandview Waterbury he can supply you with whatever information is wanted.

Very truly yours,

V. B. Clarke

VBC:M

V. B. Clarke, Member
State Board of Supervision of Dams

B44

January 16, 1952

Mr. John H. Cook
Attorney at Law
30 Mason Street
Torrington, Connecticut

Dear Mr. Cook:

This is in reply to your letter of January 10th concerning the dam across the Naugatuck River at Stillwater Pond.

As you know this Board was established in 1939. Prior to 1939 these matters were handled by the Board of Civil Engineers. We have checked through our files and such records as were turned over to us by the predecessor Board but find nothing concerning the dam at Stillwater Pond.

Sincerely yours,

Richard Martin
Chairman

RM/h
cc Mr. Clarke

B 45

January 11, 1952

Memo to Mr. Martin:

Stillwater Pond is within the town of Torrington on the West Branch of the Naugatuck River.

I find nothing in our Torrington file on this dam. A search through the copies of permits issued from the old voucher books shows none for this dam. I assume, therefore, it was built before the organization of the Board.

As a further possibility we might ask Vince Clarke if he has a record or recollection or we might contact the City of Torrington to see if a permit was ever filed or we could ask the American Brass Company

Respectfully submitted

John J. Curry
Senior Engineer

C:l

B 46

GREENE AND COOK
ATTORNEYS AT LAW
THIRTY MASON STREET
TORRINGTON, CONNECTICUT

THURSTON GREENE
JOHN H. COOK

TELEPHONE
TORRINGTON 0240

10 January 1952

State Board for the Supervision
of Dams, Dykes, Reservoirs and
other similar Structures
307 State Office Building
Hartford, Connecticut

Gentlemen:

Will you be good enough to furnish us with a copy of the permit under which a dam is maintained by American Brass Company across the Naugatuck River in Litchfield County, at the outlet of Stillwater Pond?

It may be that the permit was obtained in the name of American Brass Company's predecessor, Coe Brass Company.

If you will let us know your charges, we shall be pleased to remit.

Very truly yours,

Greene & Cook

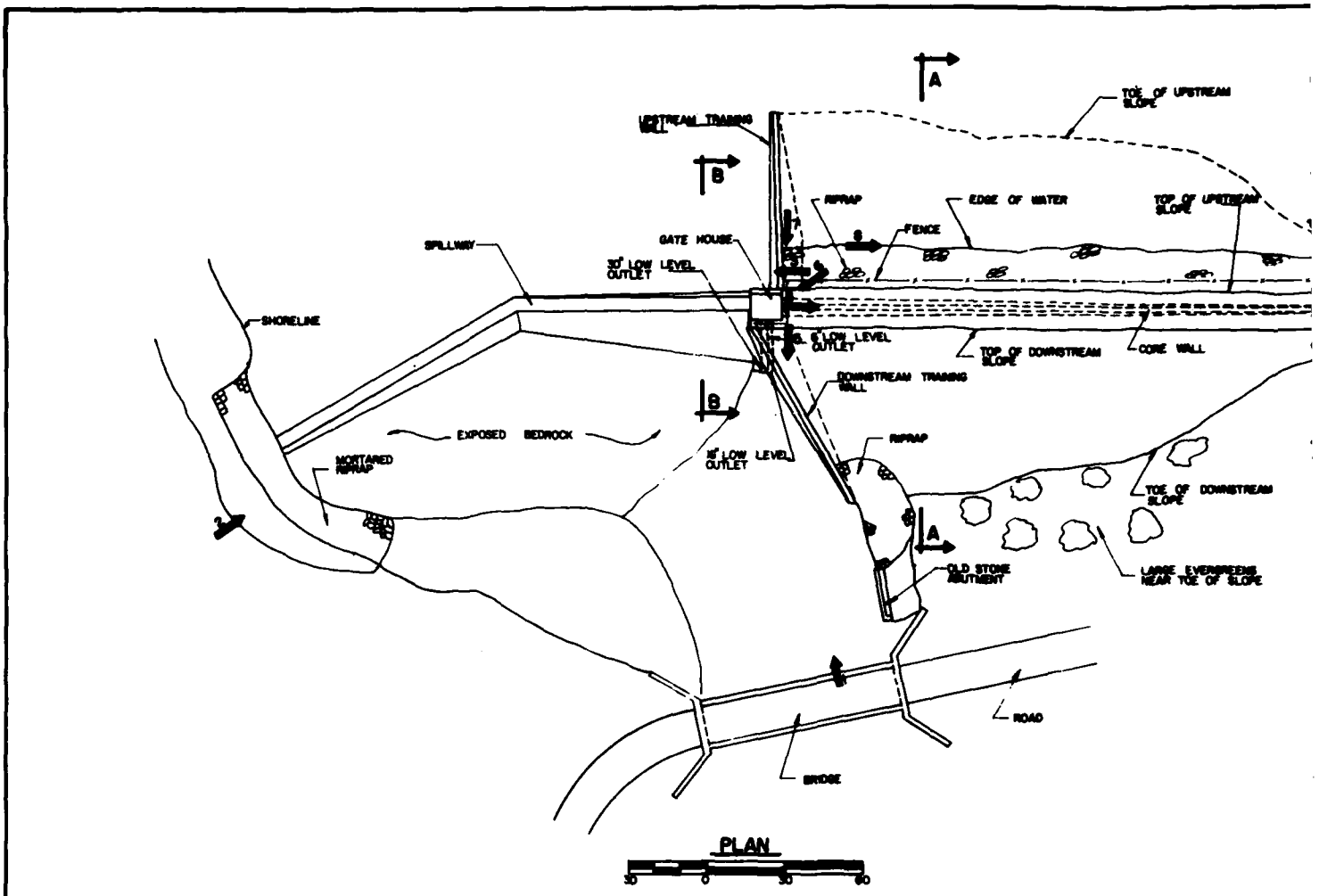
GREENE and COOK

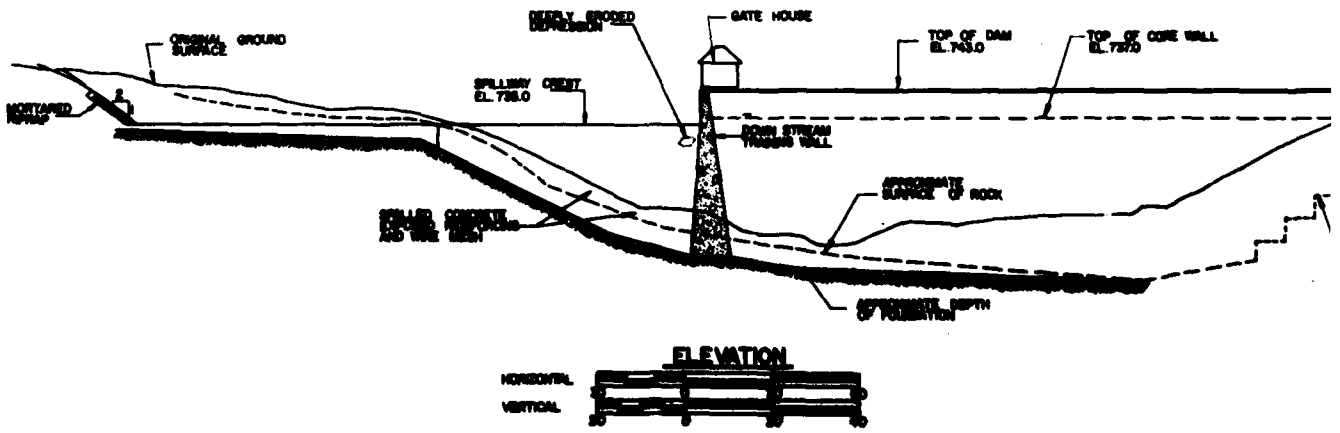
TG/s

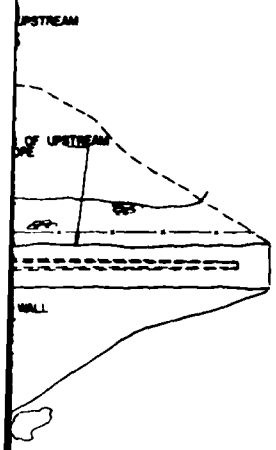
B47

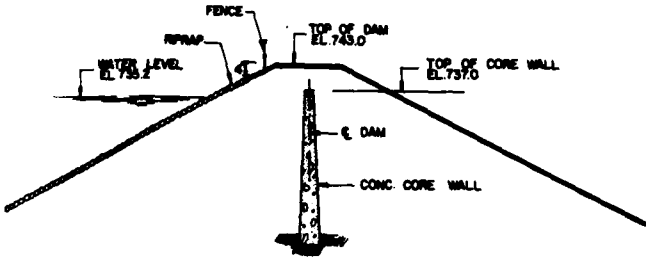
APPENDIX C

DETAIL PHOTOGRAPHS

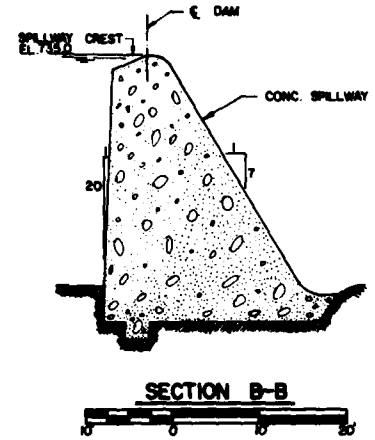

A
B
TOE OF UPSTREAM SLOPE
UPSTREAM TRAINING WALL
RIPRAP
EDGE OF WATER
TOP OF UPSTREAM SLOPE
FENCE
GATE HOUSE
SPILLWAY
30" LOW LEVEL OUTLET
SHORELINE
18" LOW LEVEL OUTLET
TOP OF DOWNSTREAM SLOPE
CORE WALL
DOWNSTREAM TRAINING WALL
EXPOSED BEDROCK
MORTARED RIPRAP
TOE OF DOWNSTREAM SLOPE
OLD STONE ABUTMENT
LARGE EVERGREENS NEAR TOE OF SLOPE
ROAD
BRIDGE
PLAN
30 0 30 60


ORIGINAL GROUND SURFACE
DEEPLY ERODED DEPRESSION
GATE HOUSE
TOP OF DAM EL. 743.0
TOP OF CORE WALL EL. 737.0
SPILLWAY CREST EL. 738.0
MORTARED RIPRAP
DOWN STREAM TRAINING WALL
APPROXIMATE SURFACE OF ROCK
REINFORCED CONCRETE CUTOFF WALL AND TOE KEY
APPROXIMATE DEPTH OF FOUNDATION
ELEVATION
HORIZONTAL
VERTICAL
30 0 30 60

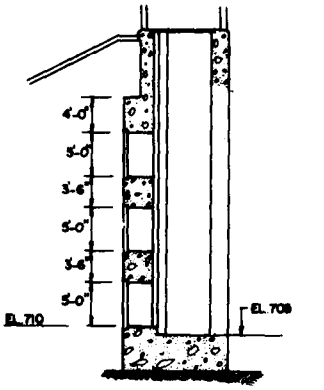




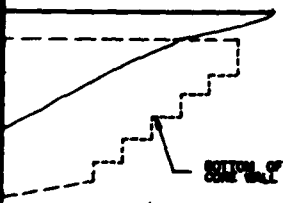
SECTION A-A



SECTION B-B



SECTION THROUGH GATE CHAMBER



NOTES

1 THIS PLAN WAS COMPILED FROM PLANS "COE BRASS CO. DAM" DATED MAY 1908, "TOWN OF TORRINGTON BRASS MILL DAM ROAD OVER WEST BRANCH NAUGATUCK RIVER" BY LOOMIS & SULLIVAN - CONTRACTING ENGINEERS FOR CONNECTICUT STATE HIGHWAY DEPARTMENT DATED APRIL 1936 AND CAHN SUPPLEMENTARY FIELD SURVEY.
NOT ALL TOPOGRAPHIC AND/OR STRUCTURAL FEATURES ARE IDENTIFIED

2 ELEVATIONS SHOWN ARE MEAN SEA LEVEL, CONVERTED FROM THE OLD DATUM ON EXISTING PLANS.
OLD DATUM + 630 = MSL

3 ◀ PHOTO NUMBER AND DIRECTION.

CAHN ENGINEERS INC. WALLINGFORD, CONNECTICUT ENGINEER	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

LOCATION PLAN OF PHOTOS
STILLWATER POND DAM

W. BRANCH NAUGATUCK TORRINGTON, CONNECTICUT

DRAWN BY	CHECKED BY	SUBMITTED BY	DATE	SCALE AS SHOWN
N.T.	[illegible]	[illegible]	[illegible]	[illegible]

PHOTO 1 - Downstream face of spillway and downstream channel. (May, 1979).

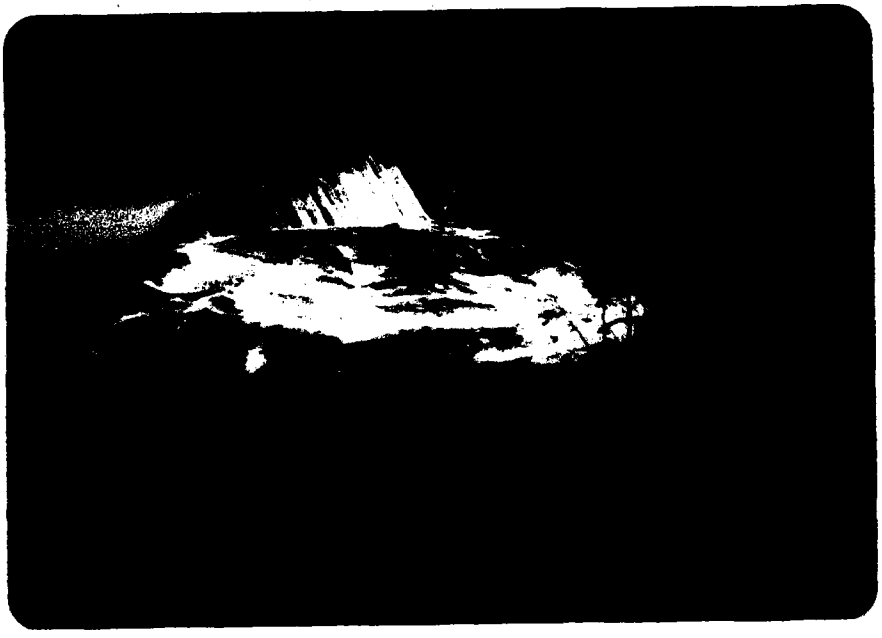


PHOTO 2 - Spillway, downstream training wall and upper portion of outlet structure (May, 1979).

US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.	NATIONAL PROGRAM OF	Stillwater Pond Dam W. Branch Naugatuck River Torrington, Connecticut
CAHN ENGINEERS INC. WALLINGFORD, CONN. ENGINEER	INSPECTION OF NON-FED. DAMS	CE# 27 660 KC DATE July '79 PAGE C-1

PHOTO 3 - Spillway and mortared riprap on right abutment of dam. (May, 1979).

PHOTO 4 - Crest of embankment showing brush and tree growth. (May, 1979).

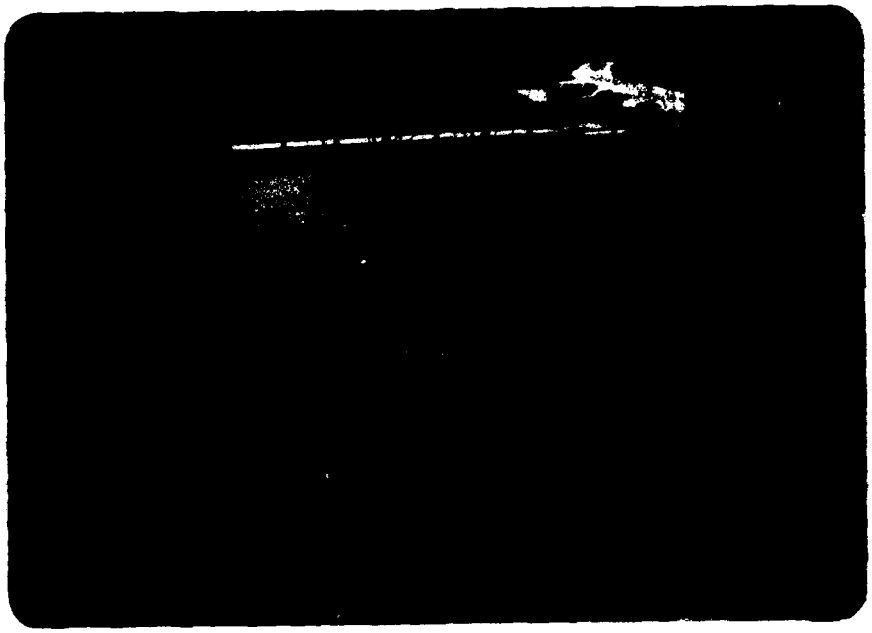


PHOTO 5 - Downstream channel and roadway bridge. Note footpath. (May, 1979)

PHOTO 6 - Interior of gatehouse showing operating mechanism and debris (May, 1979).

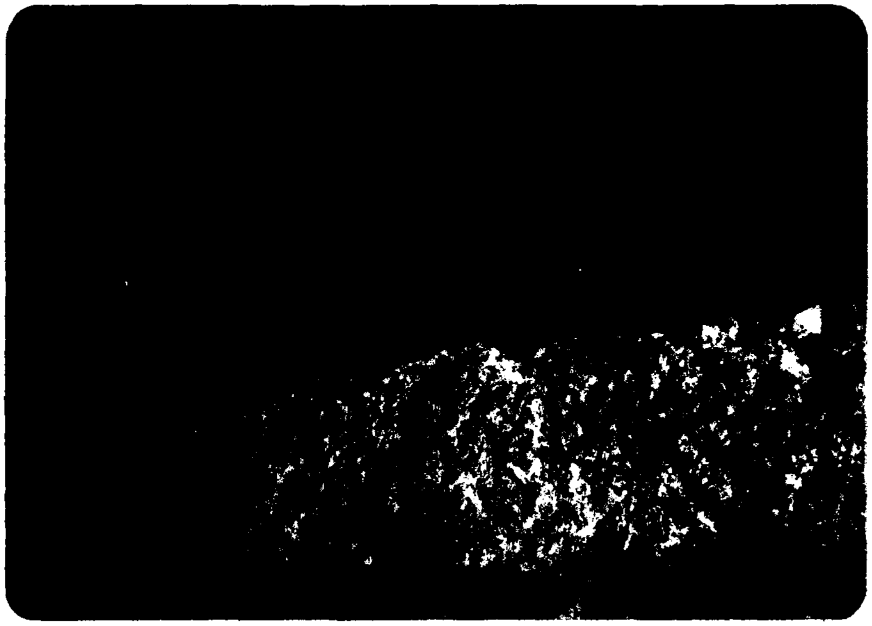


PHOTO 7 - Top of upstream training wall and upstream face of outlet structure showing spalled concrete. (May, 1979).

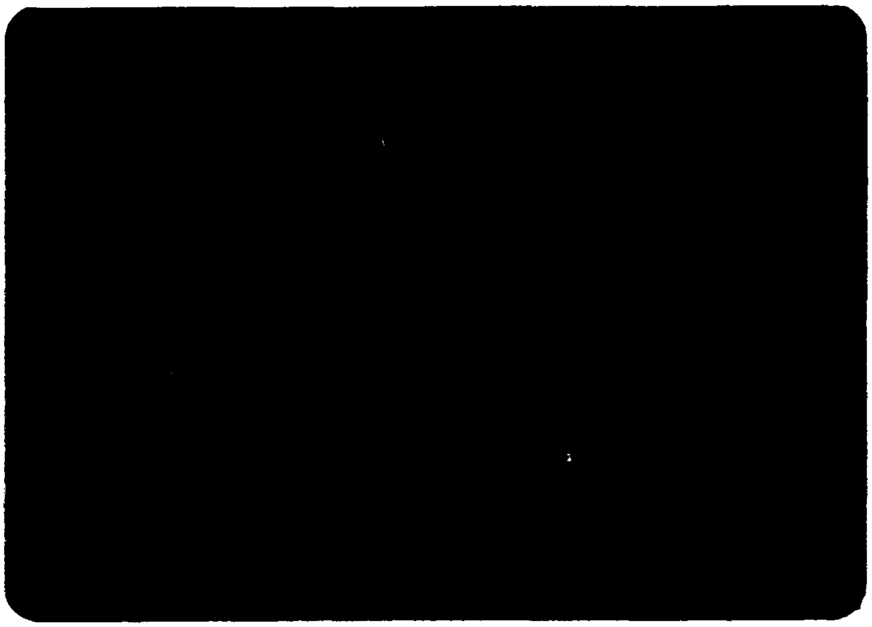
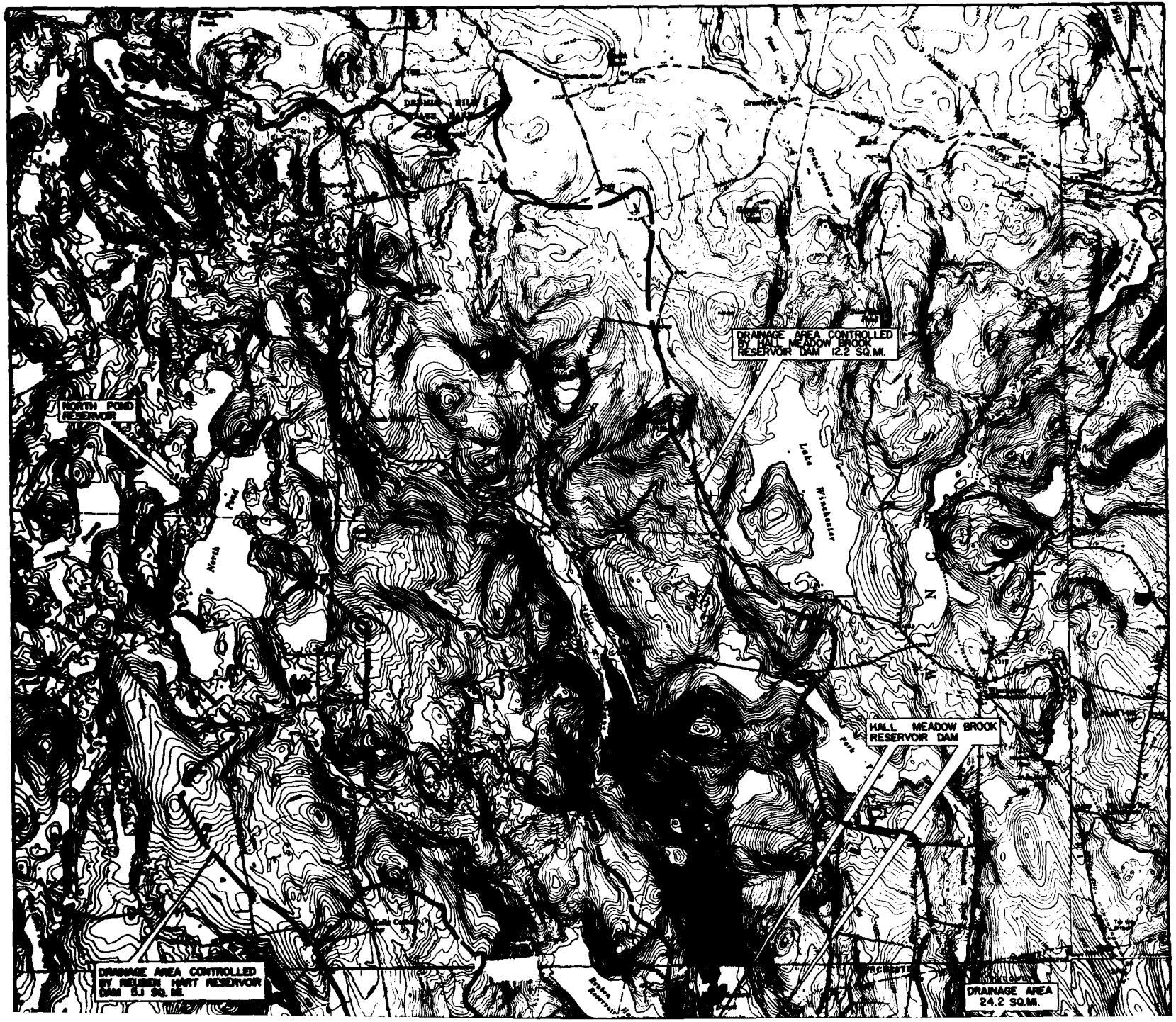


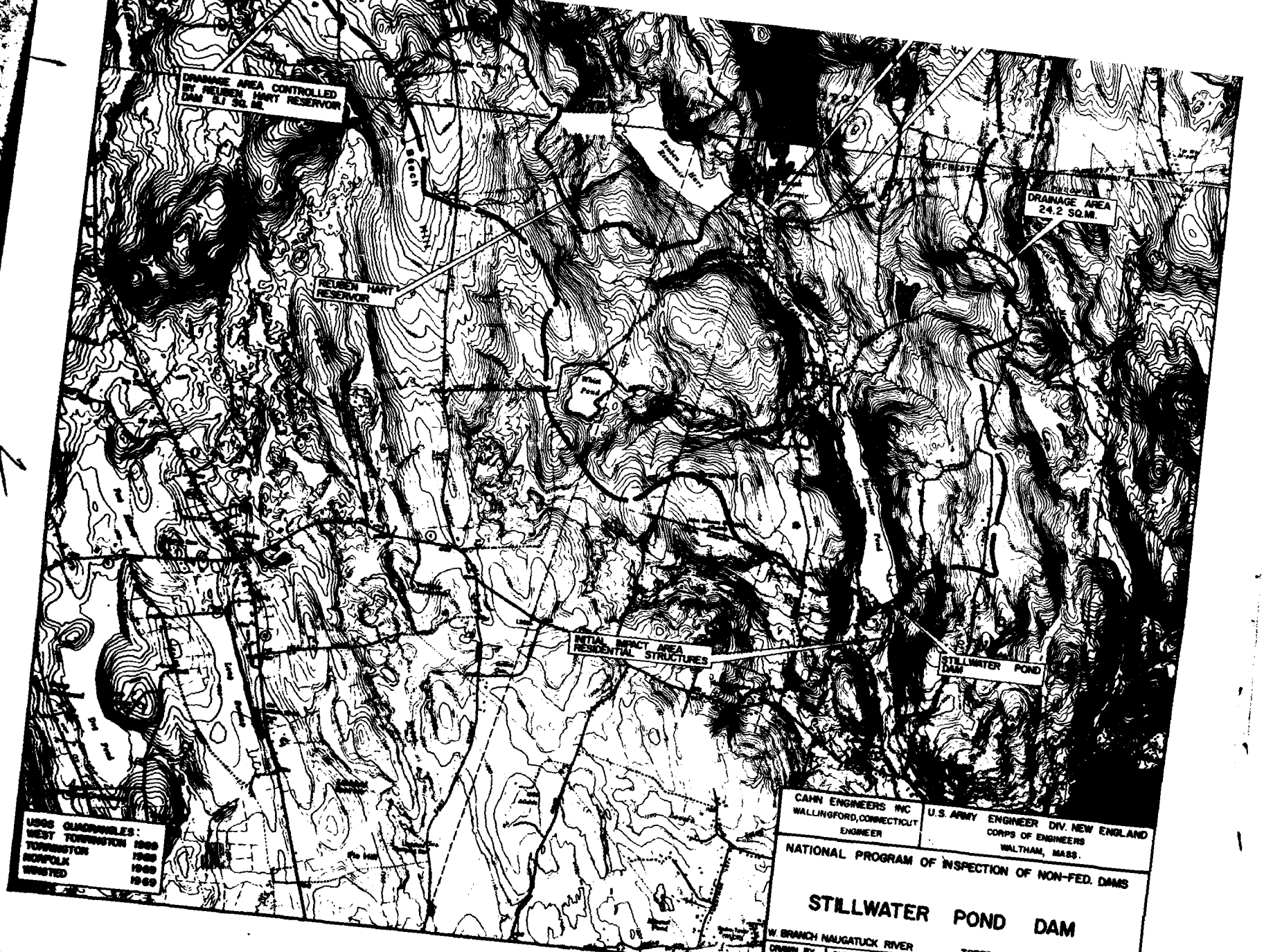
PHOTO 8 - Riprap on upstream face of embankment showing extensive growth of brush. (May, 1979).

US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	Stillwater Pond Dam W. Branch Naugatuck River Torrington, Connecticut
CAHN ENGINEERS INC. WALLINGFORD, CONN. ENGINEER		CE# 27 660 KC DATE July '79 PAGE C-4

APPENDIX D

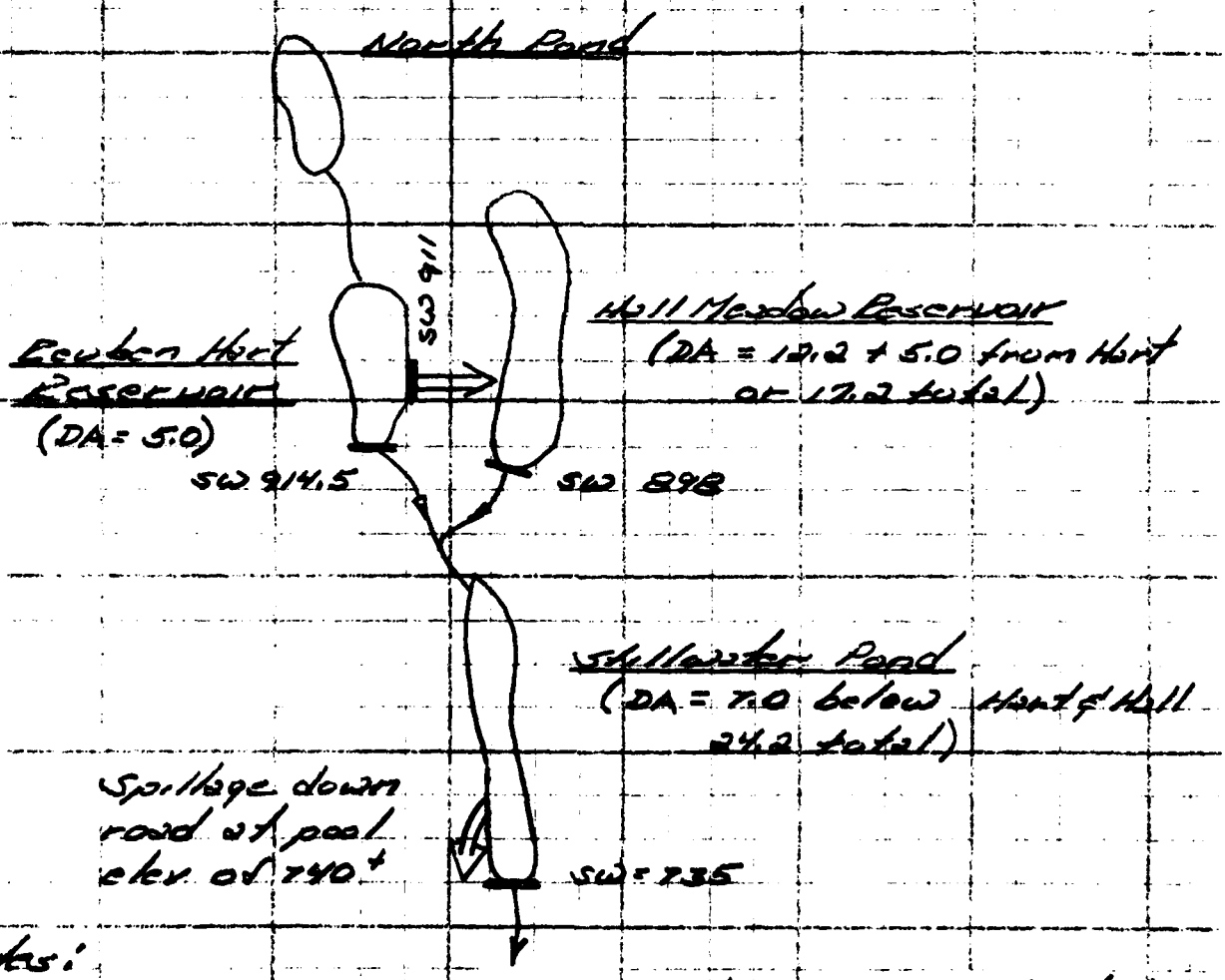
HYDRAULICS/HYDROLOGIC COMPUTATIONS


DRAINAGE AREA CONTROLLED BY HALL MEADOW BROOK RESERVOIR DAM 12.2 SQ.MI.
NORTH POND RESERVOIR
HALL MEADOW BROOK RESERVOIR DAM
DRAINAGE AREA CONTROLLED BY REUBEN HART RESERVOIR DAM 5.1 SQ. MI.
DRAINAGE AREA 24.2 SQ.MI.


DRAINAGE AREA CONTROLLED BY REUBEN HART RESERVOIR DAM 8.1 SQ. MI.
REUBEN HART RESERVOIR
DRAINAGE AREA 24.2 SQ.MI.
INITIAL IMPACT AREA RESIDENTIAL STRUCTURES
STILLWATER POND DAM
USGS QUADRANGLES:
WEST TORRINGTON 1969
TORRINGTON 1969
NORFOLK 1969
WINSTED 1969
CAHN ENGINEERS INC
WALLINGFORD, CONNECTICUT
ENGINEER
U.S. ARMY ENGINEER DIV. NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.
NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS
STILLWATER POND DAM
W. BRANCH NAUGATUCK RIVER
TORRINGTON, CONNECTICUT
DRAWN BY H.N.
CHECKED BY
APPROVED BY
SCALE: 1" = 4000'
DATE: JULY 1979
SHEET O-1

Hydrologic / Hydraulic Inspection
Stillwater Pond Dam, Torrington, Ct.

A Schematic of Watershed



Notes:
DA = drainage area in square miles (see B-sheet 2)
SW = spillway (elev is msl)

Cahn Engineers Inc. — Consulting Engineers

Project Stillwater Pond Dam — Sheet 2 of 17
Computed By GAB — Checked By HH CRG — Date 19 JUN 79
Field Book Ref. ____ — Other Refs. ____ — Revisions ____

B Drainage Areas in Square Miles

Dam	USGS (1)	Conn DEP (2)	Phase I Study (3)	USACE (4)	Use
Hart	5.0	-	5.07	5.0	5.0
Hall	11.9	-	-	12.2	12.2
Stillwater	24.2	24.4	-	24.2	24.2

(1) Water Resources Inventory - 1974

(2) Report concerning acquisition of Stillwater Pond - 1975

(3) Phase I Inspection Report Reuben Hart Dam

(4) Hall Meadow Brook Dam and Reservoir Design Memorandum No 1 - 1960

C Study Flows

1) MPF into Hall Meadow

From	To	Phase I Studies (cfs)	USACE (cfs)	Use (cfs)
D. Area 2	Hall	19,500 (1)	20,500	—
Hart	Hall	6,900 (2)	6,100	—
Total		26,400	26,600	26,500

(1) 12.2 s. miles (Classified Rolling) at 1600 cfs/s. mile

(2) From Phase I Inspection of Reuben Hart Dam

2) MPF from Hart to Stillwater

From	To	Phase I study (cfs)	USACE (cfs)	Use (cfs)
Hart	Stillwater	2,400	1,650	2,000

HENRY H. WERNER
CONSULTING ENGINEER

6) The main training wall at the gatehouse is in good condition except some frost spalling on its upstream top face and some light frost spalling on its downstream vertical face. There are no signs of dislocation or cracks in this training wall.

7) The training wall at the up-river and earth dam side of the gatehouse has extensive frost damage on its top, above normal water level. There is also frost damage to the concrete wall at the right hand side of the trash racks, looking downstream. While the frost damage does not affect the soundness of the walls, repairs should be made whenever other concrete work is being done.

8) The gatehouse windows and vents are in bad condition due to repeated forced entry by vandals. The floor and its support require repair.

9) Because of heavy rains during the several days prior to and on the morning of my inspection, it was impossible to make visual inspection of the gate valves. The thirty (30) inch and the sixteen inch valves were tested by opening and closing. The thirty (30) inch valve worked well, but the sixteen (16) inch one not quite as easily The eight (8) inch valve was inoperative. This eight (8) inch valve is not important to the safety of the structure, but its operation would permit you to better modulate the flow from the dam during the dry summer months.

Due to rain and debris at the inlet racks, water was standing in the deep valve pit which prevented descent into it. At the next inspection, some time in the next few years, I would suggest that the pond be drained to the lowest possible level with debris removed in front of the inlet racks. Arrangements should then be made to prevent inflow temporarily in order to permit safe descend into the pit. I would want to be accompanied by a competend wainwright for complete inspection of valves, racks, pipes, ladder, pit, etc.

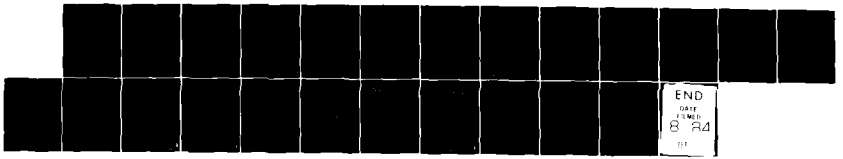
10) During this inspection I could see only the upper trash rack which shows substantial amount of corrosion. Nevertheless, there appears to be more than sufficient metal left for safe functi More detailed observations will be made during low level inspectior

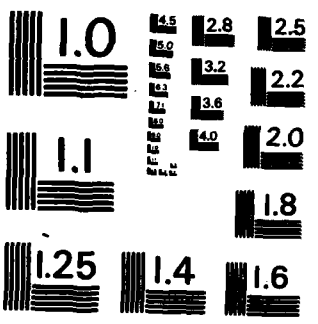
11) I was able to inspect the 30 inch pipe fron its valve to its outlet. There is little interior corrosion, it is clean and sound and has one (1) inch thick steel wall. The outlet face of it valve is similarly clean and sound.

The 16 inch outlet pipe has three quarter inch (3/4) thick steel wall and is covered inside with rusty tubercles. Removal of these tubercles is not recommended because they would reappear with further loss of metal. The reduction of waterflow due to the is immaterial in this case. I could not see the valve due to

AD-A142 861 NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS
STILLWATER POND DAM (..(U) CORPS OF ENGINEERS WALTHAM
MA NEW ENGLAND DIV JUL 79

UNCLASSIFIED F/G 13/13 NL





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

c Study Flows (continued)

3) MPF from Hall to Stillwater (With 6" or 5,500 acre feet of prior storage in Hall)

19,200 cfs (by USACE)

4) MPF from Hall to Stillwater (With no prior storage in Hall)

Pool Elev (Hall)	Storage Acre-(Feet) (1)	Inches (2)	Q_{P_2} (cfs) (3)
904	10,600	11.6	10,300
906	14,600	12.6	8,900
908	12,500	13.6	7,500

(1) See storage curves sheet 7

(2) Storage ÷ Drainage Area

$$\frac{\text{Storage}}{(12.2)(640)(1/12)} = \frac{\text{Storage}}{917}$$

(3) $Q_{P_2} = Q_{P_1}\left(1 - \frac{.06}{.19}\right)$; $Q_{P_1} = 26{,}500$ cfs from C-1 - sheet 13

C study Flows (continued)

4) Continued

Plotting Q_{B3} vs Pool Elevations on Spillway Rating Curve for Hall Meadow Sheet 8 gives a peak outflow (Q_{B3}) of 8,600 cfs)

5) MPF into Stillwater (With 6" of prior storage in Hall)

From	cfs	Comments
D. Area 2	9,800	7 acres at 1400 cfs/acre (rate for 21.2 sq. mi.)
Hall	19,200	See C-3 sheet 4
Hart	2,000	See C-2 sheet 3
Total	31,000	

6) MPF into Stillwater (With no prior storage in Hall)

From	cfs	Comments
D. Area 2	9,800	7 sq. mi. @ 1400 cfs/sq. mile
Hall	8,600	See C-4 sheets 4 & 5
Hart	2,000	See C-2 sheet 3
Total	20,400	

C Study Flows (Continued)

7) 1/2 MPF into Stillwater (With no prior storage in Hall)

From	Phase I (cfs)	USACE (cfs)	Use (cfs)
D. Area	4,900 (1)	—	4900
Hall	—	450	300
Hart	300 (2)	0	300
		Total	5,700

(1) 1/2 × 7 Sq. miles × 1400 cfs/Sq. mile (1400 cfs to be based on entire 242 sq mile drainage area)

(2) From Phase I Inspection of Reuben Hart Dam

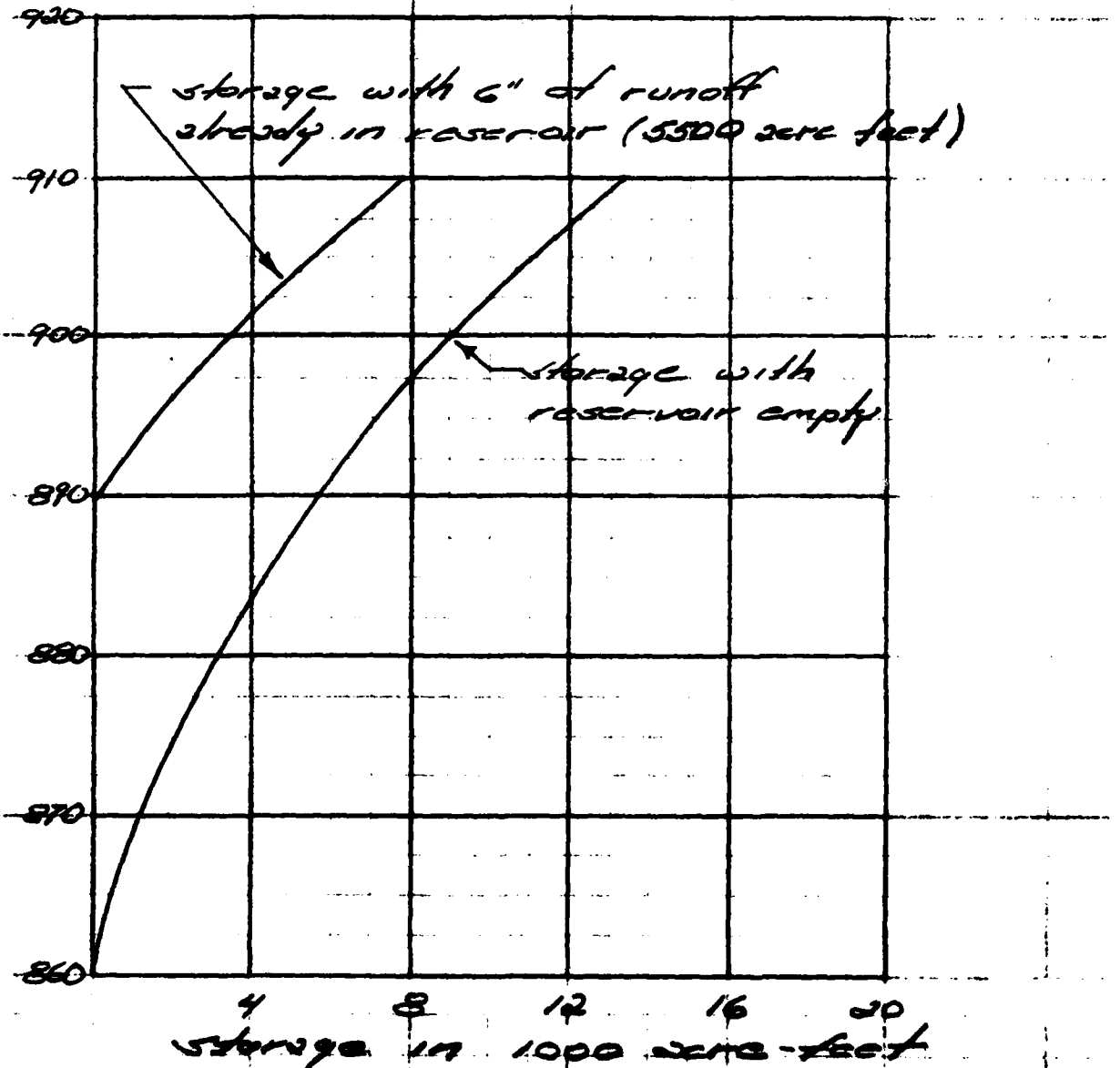
8) Summary of Study Inflows to Stillwater

Study Flow	6" Prior Storage in Hall (cfs)	No Prior Storage in Hall (cfs)
MPF	31,000	20,400
1/6 MPF	—	5,700

Cahn Engineers Inc. Consulting Engineers

Project Stillwater Road Dam — Sheet 7 of 17
Computed By GAB — Checked By CRG — Date 19 Jun 79
Field Book Ref. — Other Refs. — Revisions

Storage Curves
Hall Meadow Brook Reservoir



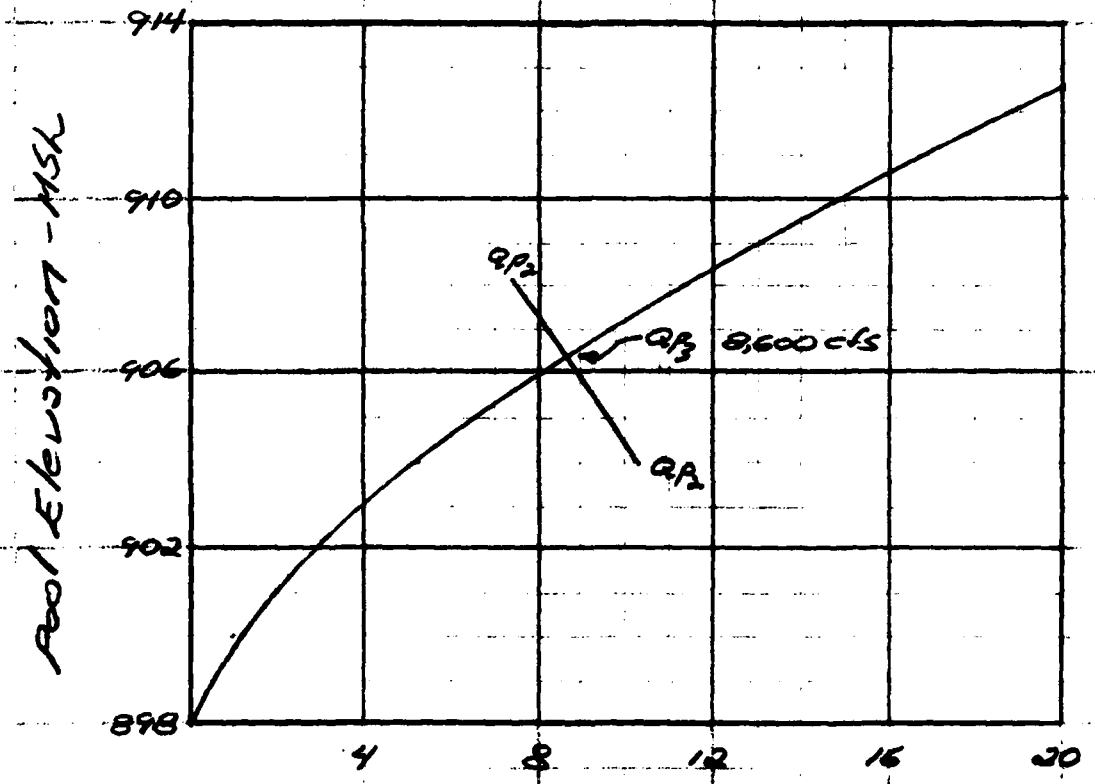
from: USACE Design Memorandum No 1 Dated May 1960

D-7

Cahn Engineers Inc. — Consulting Engineers

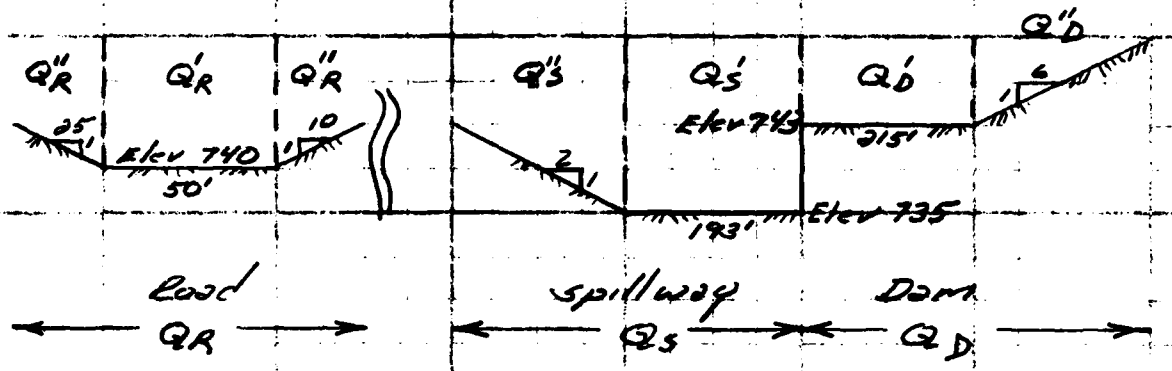
Project: Stillwater Pond Dam — Sheet 8 of 17
Computed By: GAB — Checked By: CRG — Date: 19 Jun 79
Field Book Ref.: — Other Refs.: — Revisions:

Spillway Rating Curve
Hill Meadow Brook Reservoir



from: USACE Design Memorandum No 1 Detail May 1960

D Rating Curve for St. Maarten



Spillway

$Q'_s \quad L_s = 193'$

$C'_s = (110' @ 3.2 + 83' @ 3.3) \div 193' = 3.5$

$Q''_s \quad L''_s = (2/3)(2)(H_s) = 4/3\, H_s$

$Q_s = Q'_s + Q''_s$

$= (3.5)(193)(H_s)^{3/2} + (3.0)(4/3 H_s)(H_s)^{3/2}$

$= 676\, H_s^{3/2} + 4\, H_s^{5/2}$

Road

$Q'_R \quad L'_R = 50'$

$C'_R = 3.0$ (roadway)

$Q''_R \quad L''_R = (25 H_R + 10 H_R)^{2/3} = 23.2\, H_R$

$C_R = 2.0$ (wooded)

$Q_R = Q'_R + Q''_R$

$= (3.0)(50)(H_R)^{3/2} + (2.0)(23.2\, H_R)(H_R)^{3/2}$

$= 150\, H_R^{3/2} + 46.4\, H_R^{5/2}$

D Rating Curve for Stillwater (continued)

Dam

Q'_D $L'_D = 215'$
$C'_D = 3.0$ (gross)

Q''_D $L''_D = (2/3)(6H_D) = 4H_D$
$C''_D = 3.0$ (gross)

$Q_D = Q'_D + Q''_D$

$= (3.0)(215)(H_D)^{3/2} + (3.0)(4H_D)(H_D)^{3/2}$
$= 645 H_D^{3/2} + 12 H_D^{5/2}$

Elev	H_S (Ft)	H_R (Ft)	H_D (Ft)	Q_S (cfs)	Q_R (cfs)	Q_D (cfs)	Q_T (cfs) Rounded
735	0	-	-	0	-	-	0
737	2	-	-	4,930	-	-	1,900
740	5	0	-	7,280	0	-	7,800
743	8	3	0	16,090	1510	0	17,500
745	10	5	2	22,600	4220	1890	28,800
747	12	7	4	30,100	8870	5540	44,500

This table used to develop the Rating Curve for Stillwater Outflow plotted on Sheet 14

Cahn Engineers Inc. Consulting Engineers

Project Stillwater Pond Dam — Sheet 11 of 17
Computed By GAB — Checked By CRG — Date 20 JUN 79
Field Book Ref. — Other Refs. — Revisions

E Outflows from Stillwater

1) MPF (with 6" pool storage in Hall)

Elev	Storage (Acre-Ft) (1)	Inches (2)	Q_{P_2} (cfs) (3)
743	953	0.74	29,800
745	1213	0.94	29,500
747	1473	1.14	29,100

(1) Pool @ spillway crest (735) = 95 acres
@ elevation 740 = 130.2 acres
@ above elev. 740 = 130 acres / foot

(2) $\frac{\text{storage}}{(24.2)(24.2)(1/12)} = \frac{\text{storage}}{1290}$

(3) $Q_{P_2} = Q_{P_1}\left(1 - \frac{\text{Sto}}{\text{Inf}}\right)$

Q_{P_1} = 31,000 cfs (See GB sheet 8)

Plotting Q_{P_2} vs Pool Elevations on the Routing Curve for Stillwater Outflow (Sheet 14) gives a peak outflow (Q_{P_3}) of 29,300 cfs

E Outflows from Stillwater (continued)

2) MPF (with no prior storage in Hall)

Elev	Storage (Acre Ft) (1)	Inches (2)	Qp_2 (cfs) (3)
742	823	0.64	19,700
744	1083	0.84	19,500
746	1343	1.04	19,300

(1) & (2) See E-1 sheet 11

(3) $Qp_2 = Qp_1\left(1 - \frac{5.4}{R}\right)$

Qp_1 = 20,400 cfs (see C-8 sheet E)

Plotting Qp_2 vs Peak Elevations on the Routing Curve for Stillwater Outflow (sheet 14) gives a peak outflow (Qp_2) of 19,800 cfs

E Outflows from Stillwater (Continued)

3) 1/2 PMF (with no prior storage in Hill)

Elev	Storage (Acre Ft) (1)	Inches (2)	Q_{P_2} (cfs) (3)
737	299	.23	5600
739	436	.34	5500
741	693	.54	5400

(1)+(2) See E-1 sheet 11

(3) $Q_{P_2} = Q_P\left(1 - \frac{sto}{9.5}\right)$

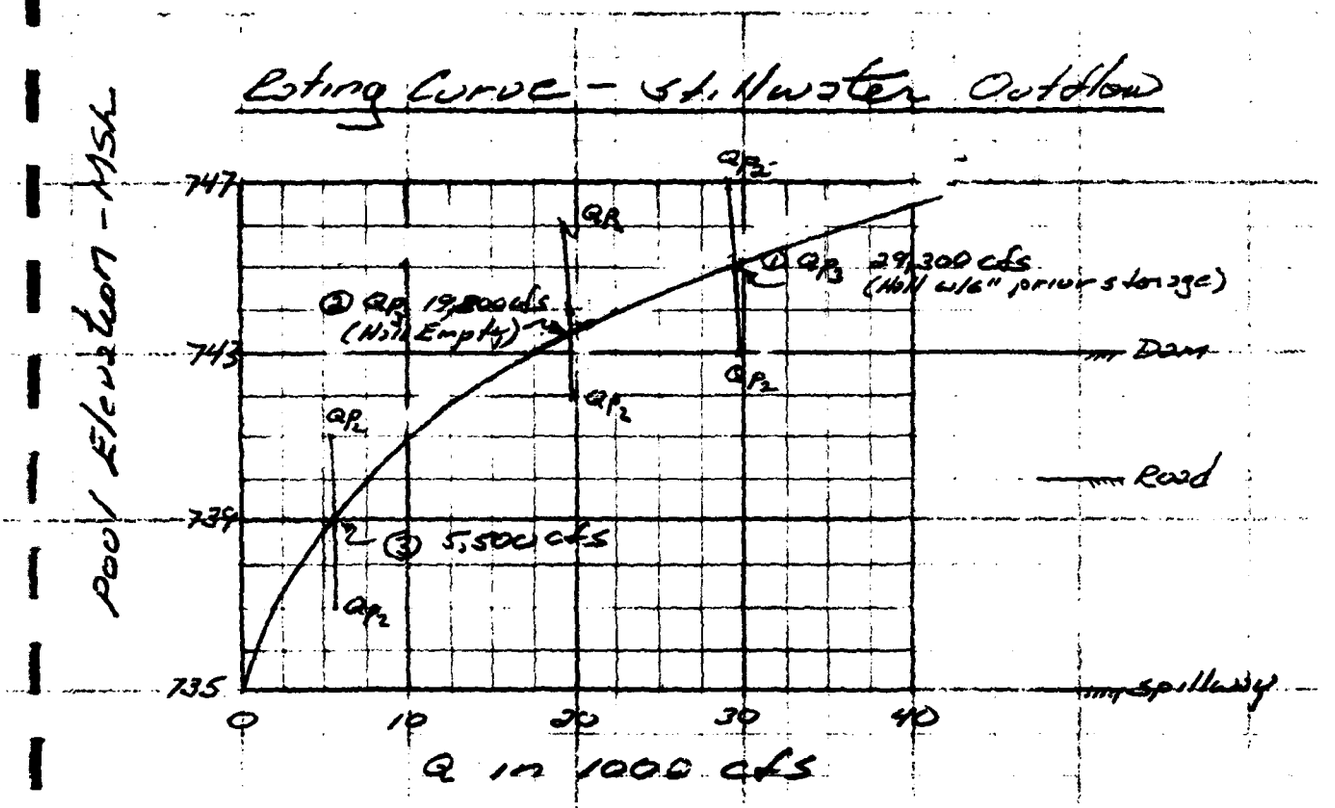
Q_P = 5,700 cfs (See C-2 sheet 2)

Plotting Q_{P_2} vs Pool Elevations on the Rating Curve for Stillwater Outflow (sheet 11) gives a peak outflow (Q_{P_3}) of 5,500 cfs

Cahn Engineers Inc. — Consulting Engineers

Project: Stillwater Pond Dam — Sheet 14 of 17
Computed By: GBB — Checked By: CG — Date: 21 Jun 79
Field Book Ref.: — Other Refs.: — Revisions:

Rating Curve – St. Nwater Outflow



① MPF/SDE (Hill Reservoir w/6" of prior storage) (29,300 cfs)

Dam overtopped by	2.0'	(1900 cfs)
Road overtopped by	5.0'	(4300 cfs)

② MPF/SDF (Hill Reservoir Empty) (19,800 cfs)

Dam overtopped by	0.5'	(230 cfs)
Road overtopped by	3.5'	(2,000 cfs)

③ ½ MPF/SPA (Hill Reservoir Empty) (5,500 cfs)

Flow passes with: 3.9' clear board (Dam)
0.9' clear board (Road)

F Dam Classification

		Category
Height	35'	Small
Storage (1)	2000 acre feet	Intermediate
Hazard (2)		High
Size (According to Guidlines)		Intermediate

(1) 1100 acre ft to spillway / USGS
+950 acre ft to top of dam
2,050 acre ft total

(2) Two houses (1 existing & 1 under construction) located about 1800' downstream from the dam base foundation rills about 10' above the stream bed. More importantly, the City of Torrington is about 1½ miles downstream.

With a size classification of Intermediate, the SDF should equal the MPF

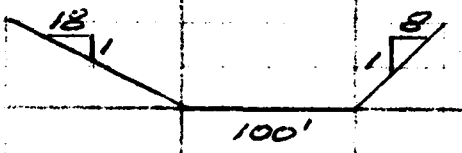
The MPF (with Hall Meadow Reservoir empty) will overtop the dam by 0.5' (see sheet 14)

Cahn Engineers Inc. — Consulting Engineers

Project: Stillwater Road Dam — Sheet 16 of 17
Computed By: EAB — Checked By: CRG — Date: 21 Jun 79
Field Book Ref.: — Other Refs.: — Revisions:

G Downstream Failure Hazard

Section through immediate impact area 1800' below dam (from USGS mapping)



n = 0.05
S = 0.22%

Spillway discharge with pool at top of dam:

$Q_s = 676 H_s^{3/2} + 4 H_s^{5/2}$ (sheet 9)

$H_s = 8'$; $Q = 16{,}000$ cfs

(Flow which leaves the pond by overtopping the road does not reach this impact area)

Normal depth for 16,000 cfs in the above channel section is 9 feet

G Downstream Failure Hazard (Continued)

Peak flow resulting from dam failure is estimated as follows:

Elev top of dam = 748
Mid point Elev. = $748 - \frac{35}{2} = 725.5$

Mid point length = 250'

$W_b = .4 \times 250 = 100'$
$y_o = 35'$

$Q_b = 8/27(100)\sqrt{32.2}(35)^{3/2} \cong 35{,}000$ cfs

Q spillway (sheet 16) = 16,000 cfs

Q total = 51,000 cfs

Flood stage resulting from dam failure is estimated as follows:

$y = .44\, y_o = .44(35) = 15'$

or
normal depth for 51,000 cfs through section shown on sheet 16 = 15'

Increase in flood stage =

15' (depth for 51,000 cfs) − 9' (depth for 16,000 cfs)
= 6'

PRELIMINARY GUIDANCE

FOR ESTIMATING

MAXIMUM PROBABLE DISCHARGES

IN

PHASE I DAM SAFETY

INVESTIGATIONS

New England Division
Corps of Engineers

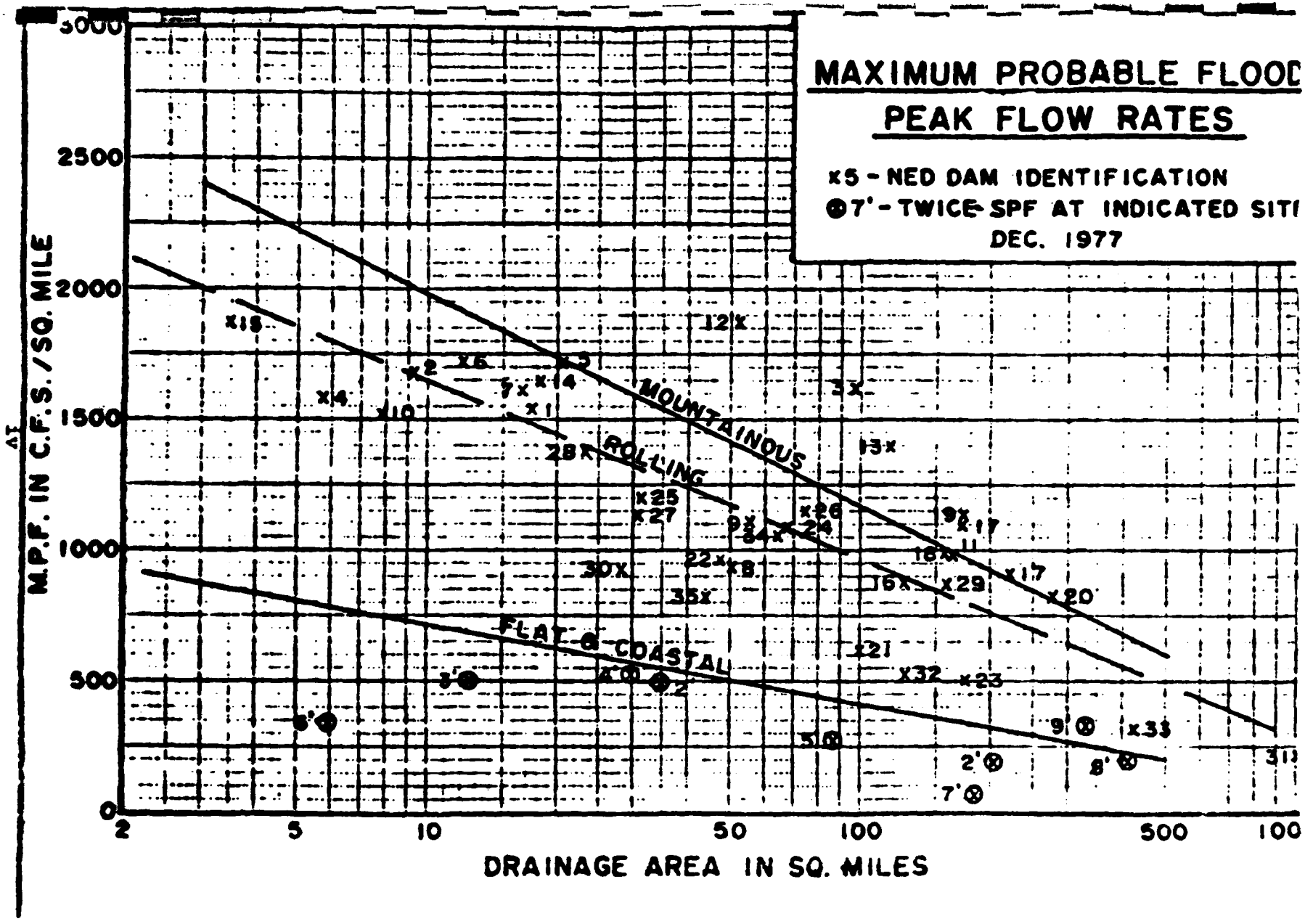
March 1978

MAXIMUM PROBABLE FLOOD INFLOWS
NED RESERVOIRS

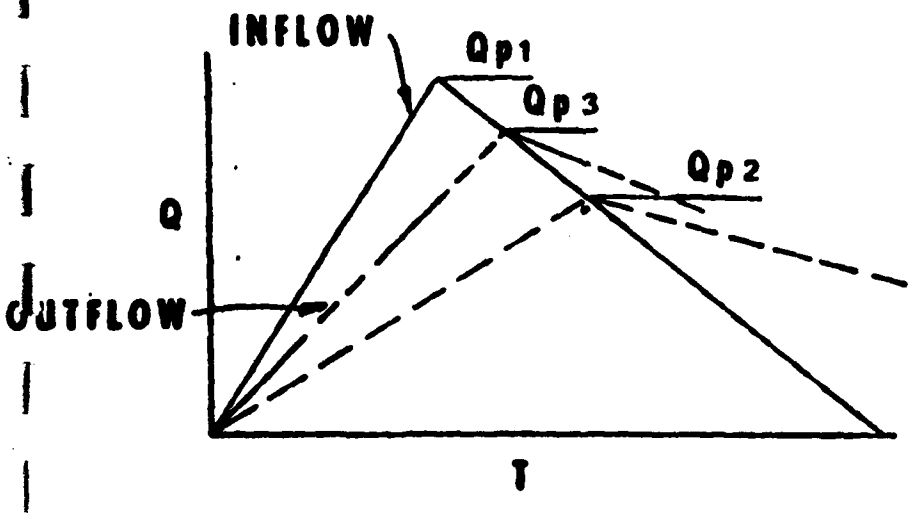
	Project	Q (cfs)	D.A. (sq. mi.)	MPF cfs/sq. mi.
1.	Hall Meadow Brook	26,600	17.2	1,546
2.	East Branch	15,500	9.25	1,675
3.	Thomaston	158,000	97.2	1,625
4.	Northfield Brook	9,000	5.7	1,580
5.	Black Rock	35,000	20.4	1,715
6.	Hancock Brook	20,700	12.0	1,725
7.	Hop Brook	26,400	16.4	1,610
8.	Tully	47,000	50.0	940
9.	Barre Falls	61,000	55.0	1,109
10.	Conant Brook	11,900	7.8	1,525
11.	Knightville	160,000	162.0	987
12.	Littleville	98,000	52.3	1,870
13.	Colebrook River	165,000	118.0	1,400
14.	Mad River	30,000	18.2	1,650
15.	Sucker Brook	6,500	3.43	1,895
16.	Union Village	110,000	126.0	873
17.	North Hartland	199,000	220.0	904
18.	North Springfield	157,000	158.0	994
19.	Ball Mountain	190,000	172.0	1,105
20.	Townshend	228,000	106.0(278 total)	820
21.	Surry Mountain	63,000	100.0	630
22.	Otter Brook	45,000	47.0	957
23.	Birch Hill	88,500	175.0	505
24.	East Brimfield	73,900	67.5	1,095
25.	Westville	38,400	99.5(32 net)	1,200
26.	West Thompson	85,000	173.5(74 net)	1,150
27.	Hodges Village	35,600	31.1	1,145
28.	Buffumville	36,500	26.5	1,377
29.	Mansfield Hollow	125,000	159.0	786
30.	West Hill	26,000	28.0	928
31.	Franklin Falls	210,000	1000.0	210
32.	Blackwater	66,500	128.0	520
33.	Hopkinton	135,000	426.0	316
34.	Everett	68,000	64.0	1,062
35.	MacDowell	36,300	44.0	825

MAXIMUM PROBABLE FLOWS
BASED ON TWICE THE
STANDARD PROJECT FLOOD
(Flat and Coastal Areas)

River	SPF (cfs)	D.A. (sq. mi.)	MPF (cfs/sq. mi.)
1. Pawtuxet River	19,000	200	190
2. Mill River (R.I.)	8,500	34	500
3. Peters River (R.I.)	3,200	13	490
4. Kettle Brook	8,000	30	530
5. Sudbury River.	11,700	86	270
6. Indian Brook (Hopk.)	1,000	5.9	340
7. Charles River.	6,000	184	65
8. Blackstone River.	43,000	416	200
9. Quinebaug River	55,000	331	330


MAXIMUM PROBABLE FLOOD
PEAK FLOW RATES
x5 - NED DAM IDENTIFICATION
⊗7' - TWICE SPF AT INDICATED SITE
DEC. 1977
M.P.F. IN C.F.S./SQ. MILE
DRAINAGE AREA IN SQ. MILES
3000
2500
2000
1500
1000
500
0
2
5
10
50
100
500
MOUNTAINOUS
ROLLING
FLAT & COASTAL
x18
x4
x10
x2
x6
x14
x1
12x
3x
28x
13x
x25
x27
9x
x26
x24
x17
22x
x8
30x
35x
16x
x29
x17
x20
x21
x32
x23
x33
3'
5'
2'
9'
8'
7'
51
31

ESTIMATING EFFECT OF SURCHARGE STORAGE ON MAXIMUM PROBABLE DISCHARGES



STEP 1: Determine Peak Inflow (Qp_1) from Guide Curves.

STEP 2: a. Determine Surcharge Height To Pass "Qp_1".

b. Determine Volume of Surcharge ($STOR_1$) In Inches of Runoff.

c. Maximum Probable Flood Runoff In New England equals Approx. 19", Therefore

$$Qp_2 = Qp_1 \times \left(1 - \frac{STOR_1}{19}\right)$$

STEP 3: a. Determine Surcharge Height and "$STOR_2$" To Pass "Qp_2"

b. Average "$STOR_1$" and "$STOR_2$" and Determine Average Surcharge and Resulting Peak Outflow "Qp_3".

SURCHARGE STORAGE ROUTING SUPPLEMENT

STEP 3: a. Determine Surcharge Height and "$STOR_2$" To Pass "Qp_2"

b. Avg "$STOR_1$" and "$STOR_2$" and Compute "Qp_3".

c. If Surcharge Height for Qp_3 and "$STOR_{AVG}$" agree O.K. If Not:

STEP 4: a. Determine Surcharge Height and "$STOR_3$" To Pass "Qp_3"

b. Avg. "Old $STOR_{AVG}$" and "$STOR_3$" and Compute "Qp_4"

c. Surcharge Height for Qp_4 and "New $STOR_{Avg}$" should Agree closely

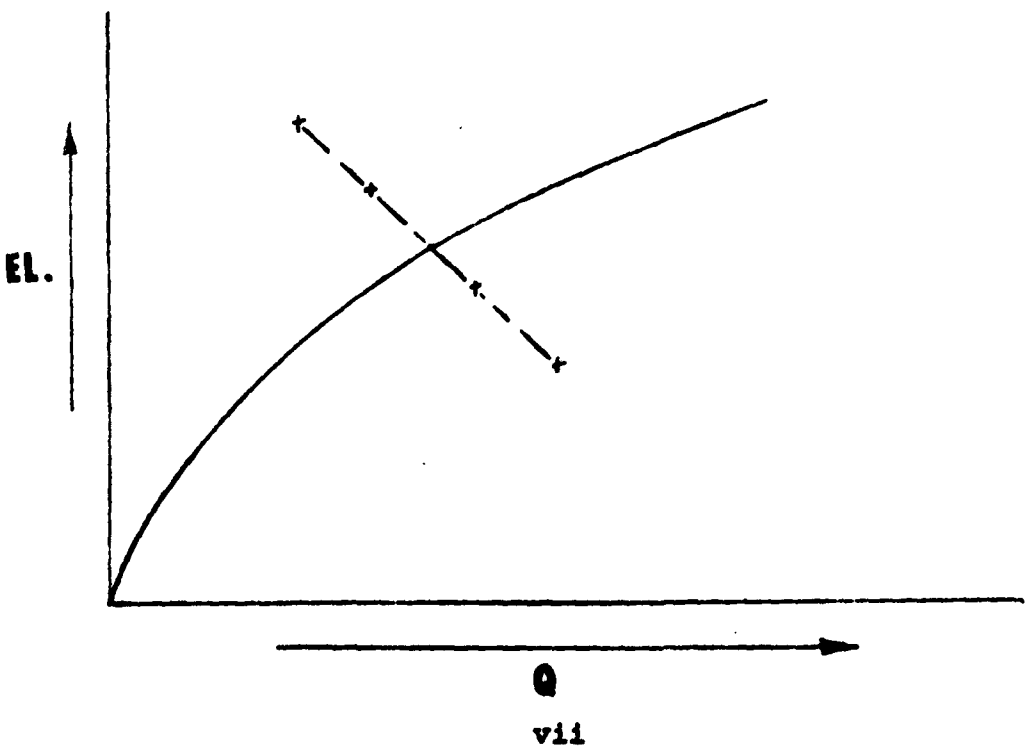
SURCHARGE STORAGE ROUTING ALTERNATE

$$Q_{p2} = Q_{p1} \times \left(1 - \frac{STOR}{19}\right)$$

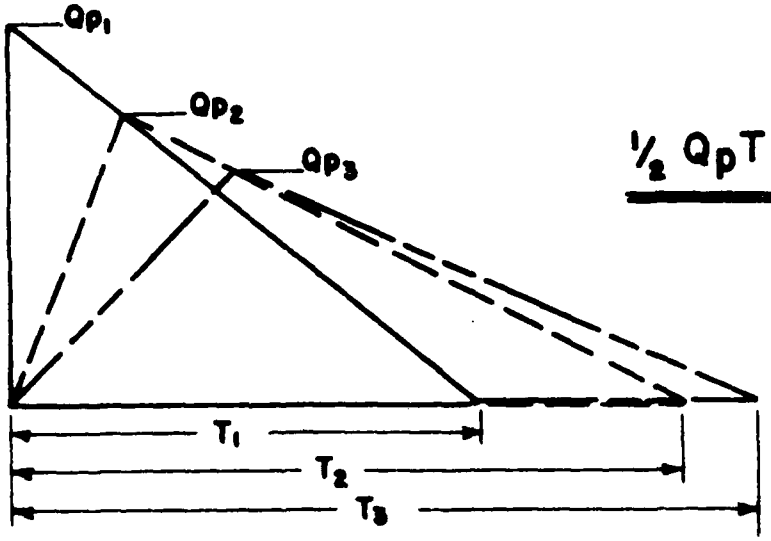
$$Q_{p2} = Q_{p1} - Q_{p1}\left(\frac{STOR}{19}\right)$$

FOR KNOWN Q_{p1} AND 19'' R.O.

Q_{p2}	STOR	EL.



"RULE OF THUMB" GUIDANCE FOR ESTIMATING DOWNSTREAM DAM FAILURE HYDROGRAPHS



$\frac{1}{2} Q_p T = 12 S$

STEP 1: DETERMINE OR ESTIMATE RESERVOIR STORAGE (S) IN AC-FT AT TIME OF FAILURE.

STEP 2: DETERMINE PEAK FAILURE OUTFLOW (Q_{p1}).

$$Q_{p_1} = \frac{8}{27} W_b \sqrt{g} Y_o^{\frac{3}{2}}$$

W_b = BREACH WIDTH - SUGGEST VALUE NOT GREATER THAN 40% OF DAM LENGTH ACROSS RIVER AT MID HEIGHT.

Y_o = TOTAL HEIGHT FROM RIVER BED TO POOL LEVEL AT FAILURE.

STEP 3: USING USGS TOPO OR OTHER DATA, DEVELOP REPRESENTATIVE STAGE-DISCHARGE RATING FOR SELECTED DOWNSTREAM RIVER REACH.

STEP 4: ESTIMATE REACH OUTFLOW (Q_{p2}) USING FOLLOWING ITERATION.

A. APPLY Q_{p1} TO STAGE RATING, DETERMINE STAGE AND ACCOPMANYING VOLUME (V_1) IN REACH IN AC-FT. (NOTE: IF V_1 EXCEEDS 1/2 OF S, SELECT SHORTER REACH.)

B. DETERMINE TRIAL Q_{p2}.

$$Q_{p_2}(\text{TRIAL}) = Q_{p_1}\left(1 - \frac{V_1}{S}\right)$$

C. COMPUTE V_2 USING Q_{p2} (TRIAL).

D. AVERAGE V_1 AND V_2 AND COMPUTE Q_{p2}.

$$Q_{p_2} = Q_{p_1}\left(1 - \frac{V_{avg}}{S}\right)$$

STEP 5: FOR SUCCEEDING REACHES REPEAT STEPS 3 AND 4.

APRIL 1978

APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS