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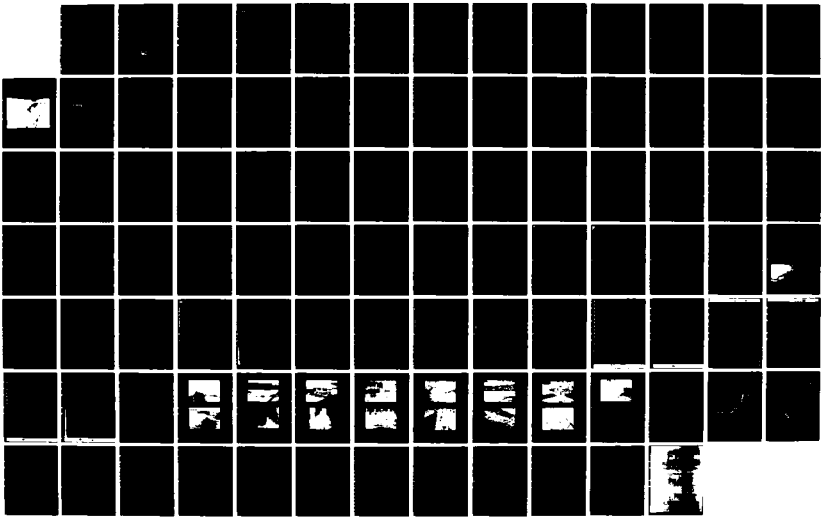

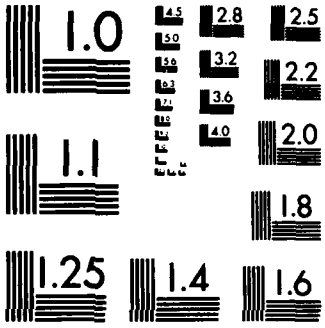

MICROCOPY RESOLUTION TEST CHART
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THAMES RIVER BASIN
BOZRAH, CONNECTICUT

AD-A144 698

FITCHVILLE POND DAM
CT 00510

PHASE 1 INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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

JUNE 1979

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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DAMS, INSPECTION, DAM SAFETY,

Thames River Basin
Bozrah, Connecticut

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

Fitchville Pond Dam is a stone masonry and concrete gravity dam. The dam has a height of 27 feet and is approximately 200 feet in length. Based upon the visual inspection at the site and the lack of engineering, operational and maintenance data, there are areas of concern. The dam is considered to be in FAIR condition. The dam is classified as SMALL in size and a SIGNIFICANT hazard structure. The test flood outflow for this dam is equal to ½ the PMF.

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF
NEDED

AUG 16 1979

Honorable Ella T. Grasso
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

Dear Governor Grasso:

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

A copy of this report has been forwarded to the Department of Environmental Protection, the cooperating agency for the State of Connecticut. In addition, a copy of the report has also been furnished the owner, Mr. Seymour Adelman, c/o Seymour's Sand & Stone, Inc., Fitchville, Connecticut.

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

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

Sincerely yours,

MAX B. SCHEIDER
Colonel, Corps of Engineers
Division Engineer

Incl
As stated

THAMES RIVER BASIN

BOZRAH, CONNECTICUT

FITCHVILLE POND DAM

CT 00510

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM

PHASE I - INSPECTION REPORT

Identification No.:	CT 00510
Name of Dam:	Fitchville Dam
Town:	Bozrah
County and State:	New London County, Connecticut
Stream:	Yantic River
Date of Inspection:	11 April 1979

BRIEF ASSESSMENT

Fitchville Pond Dam is a stone masonry and concrete gravity dam constructed about 1871 and is used solely for recreation. The dam has a height of 27 feet and is approximately 200 feet in length. The spillway is an uncontrolled ogee overflow structure which comprises the right two thirds of the dam. The outlet works for the dam consists of three manually operated sluice gates which discharge flows into a waste way at the left abutment of the dam. Due to its age, Fitchville Pond Dam was neither designed nor constructed by present state-of-the-art procedures.

Based upon the visual inspection at the site and the lack of engineering, operational and maintenance data, there are areas of concern which must be corrected to assure the long-term performance of this dam. The dam is considered to be in FAIR condition. Deficiencies include trees growing on the dam embankment, the potential for overtopping due to the limited discharge capacity of the overflow spillway; cracking and seepage through the walls of the outlet works discharge channel; and erosion of the earth slope at the right abutment.

The dam is classified as SMALL in size and a SIGNIFICANT hazard structure in accordance with the recommended guidelines established by the Corps of Engineers. The test flood outflow for this dam is equal to one-half the Probable Maximum Flood (PMF) or approximately 30,000 CFS (500 CSM) and would overtop the dam by about 11 feet. The maximum spillway discharge of

7120 CFS represents only 24 percent of the test flood outflow assuming no outlet conduit discharge. Overtopping could result in the failure of the earth embankment abutments of this dam.

It is recommended that the Owner engage the services of an engineer experienced in the design of dams to accomplish the following: establish a procedure for removal of large trees and roots from the dam embankment; develop a plan of clearing rock rubble from the downstream channel, perform more detailed hydrologic studies of spillway adequacy and commence corrective measures to reduce the overtopping potential and improve the discharge capacity of the dam; evaluate the condition of spillway surfaces and training walls and develop a program for their rehabilitation; evaluate the cause of cracking and seepage through the walls of the outlet works discharge channel; and develop an erosion protection system for the earth slope at the right abutment.

Recommendations and remedial measures are listed in Section 7 of this report and should be implemented by the Owner within one year after receipt of this Phase I Inspection Report.

CE MAGUIRE, INC.

BY: Richard W. Long

Richard W. Long, P.E.
Vice President

STATE OF CONNECTICUT
RICHARD W. LONG
NO. 9568
REGISTERED
PROFESSIONAL ENGINEER

This Phase I Inspection Report on Fitchville 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.

Joseph W. Finegan

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

Joseph A. Mc Elroy

JOSEPH A. MCELROY, MEMBER
Foundation & Materials Branch
Engineering Division

Carney M. Terzian

CARNEY M. TERZIAN, CHAIRMAN
Chief, Structural Section
Design Branch
Engineering Division

APPROVAL RECOMMENDED:

Joe B. Fryar

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, DC 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or to property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase 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 will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any opportunity to detect unsafe conditions.

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 reasonable possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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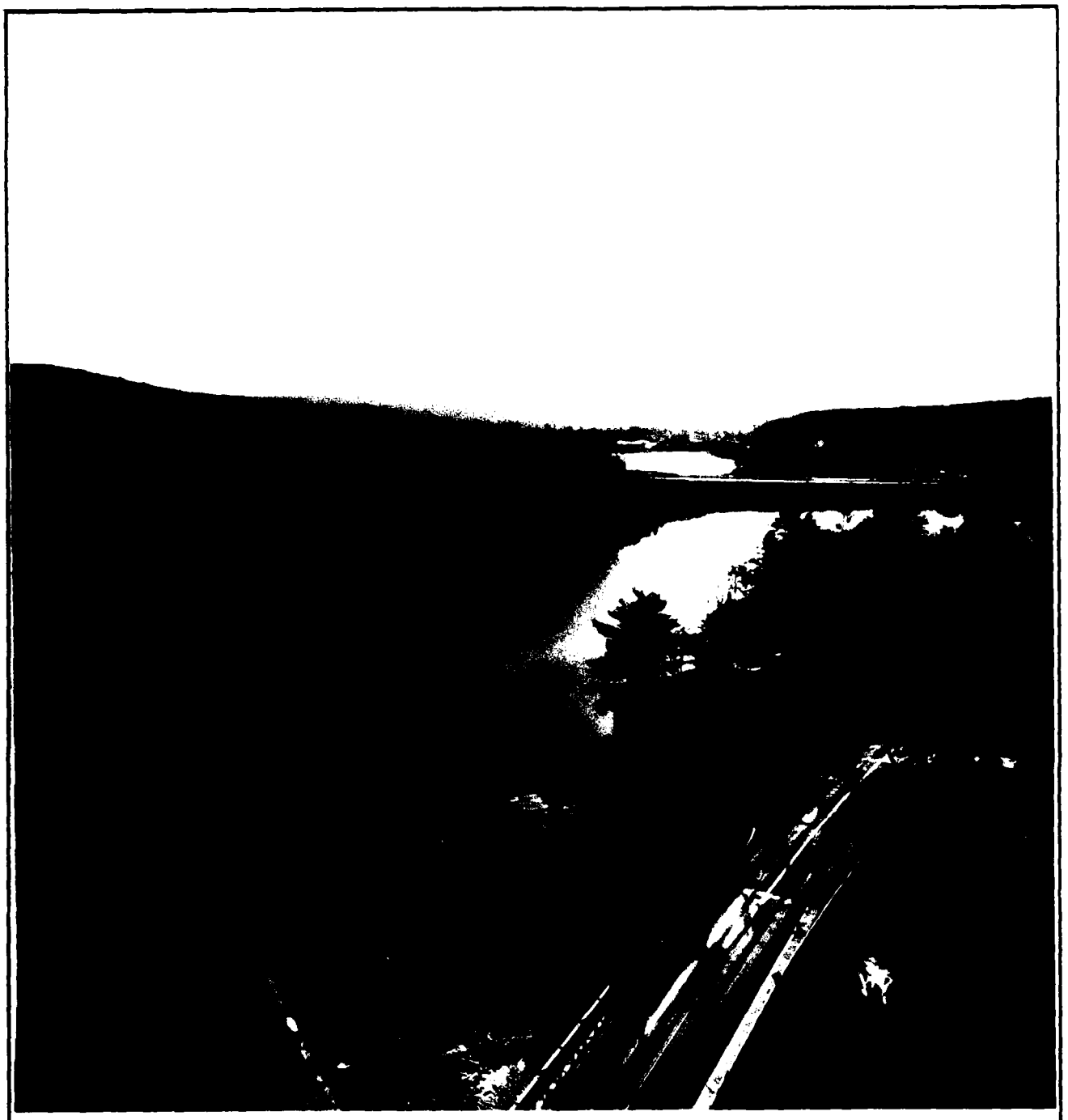
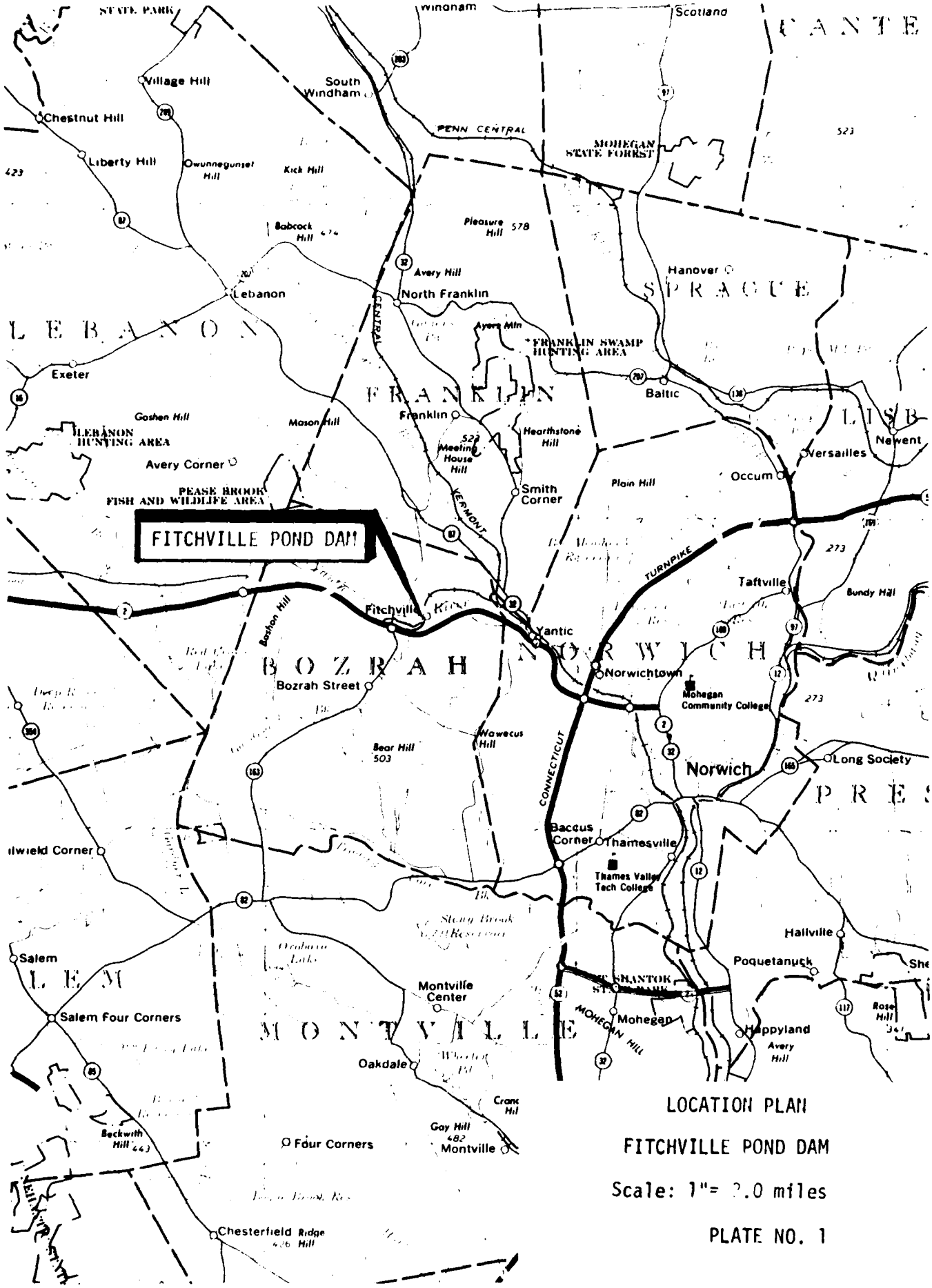
APPENDICES



OVERVIEW PHOTO - FITCHVILLE POND DAM



LOCATION PLAN

FITCHVILLE POND DAM

Scale: 1"= 2.0 miles

PLATE NO. 1

NATIONAL DAM INSPECTION PROGRAM

PHASE I - INSPECTION REPORT

NAME OF DAM: FITCHVILLE POND DAM

SECTION 1

PROJECT INFORMATION

1.1 General

a. Authority. Public Law 92-367, August 8, 1972, authorized the Secretary of the Army through the Corps of Engineers to initiate a national program of dam inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. C E Maguire, Inc., has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed was issued to C E Maguire, Inc., under a letter from Ralph T. Garver, Colonel, Corps of Engineers. Contract No. DACW33-79-C-0015 has been assigned by the Corps of Engineers for this work.

b. Purpose of Inspection.

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

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

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

1.2 Description of the Project

a. Location. Fitchville Pond Dam is located in the Town of Bozrah, New London County, Connecticut. Coordinates of the dam are about 41° 33.8'N Latitude and 72° 09.4'W Longitude. (See Plate No. 1.) The dam is located 500 feet south from the intersection of Route 163 and the

Norwich-Colchester Turnpike in the Village of Fitchville. The dam impounds water from the Yantic River and several small tributaries and drains a watershed of 68.5 sq. miles.

b. Description of Dam and Appurtenances. The Fitchville Pond Dam is a masonry and concrete structure located on the Yantic River in the Village of Fitchville, Connecticut. The dam is approximately 200 feet in length and 27 feet high. There is a concrete ogee spillway 108 feet in length at the right center of the dam and that portion left of center includes the outlet works, the "blocked" penstock which led to the mill complex below the dam and the left abutment structure. The outlet works consists of three manually operated sluice gates 2.5 feet wide by 4.5 feet high which discharge into a waste way at the left abutment of the dam. Adjacent to the outlet works is the former 9.0-foot diameter corrugated metal penstock (now blocked) leading to the mill below the dam. At the left abutment area the approach shoreline to the dam has been stone faced.

Water flowing over the uncontrolled spillway passes beneath the Norwich-Colchester Turnpike bridge and continues down the Yantic River.

c. Size Classification. Fitchville Pond Dam has an impoundment capacity at the top of the dam (Elev. 158.7 NGVD) equal to 759 Ac-Ft and a height of 27 feet. Both of these parameters place this structure in the SMALL classification.

d. Hazard Classification. This dam is classified as a SIGNIFICANT hazard structure because it is located in an area where its failure discharge can cause damage due to high velocity, impact from debris and flooding to homes (1), commercial properties (1), roadways (Norwich-Colchester Turnpike) and utilities (telephone and power lines adjacent to the turnpike). In addition, immediately below the dam the 30 inch diameter water supply for the City of Norwich crosses the river on its own bridge support adjacent to the roadway bridge and at the level of the roadway. The estimated water depth due to the possible dam failure discharge of 9620 CFS may range from 17.0 feet at the dam to 12.0 feet at a distance of 10,000 feet downstream.

e. Ownership. Fitchville Pond Dam is owned by Mr. Seymour Adelman, c/o Seymour's Sand and Stone, Inc., Fitchville, Connecticut.

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

Mr. Seymour Adelman
Seymour's Sand & Stone, Inc.
Fitchville, CT (203)-889-3395

g. Purpose of the Dam. The dam was originally constructed to provide process water for the Palmer Brothers Company mill complex which is no longer in existence. The impoundment is used now solely for recreation.

h. Design and Construction History. The original dam at the site was a masonry-timber structure with earth embankments constructed about 1871. That structure was modified in 1914 based on a design by Charles E. Chandler of Chandler & Palmer - Civil Engineers and Surveyors, Norwich, CT. The work was accomplished by Charles M. Williams, Contractor, in September and October, 1914, and was under the supervision of Mr. Frank Palmer, the Assistant General Manager of the Palmer Brothers Company, the owner. The work included the construction of the concrete overflow spillway, using the existing dam spillway as its foundation, and the reconstruction of the outlet gates and adjacent walls. In May, 1963, as the result of an on-site inspection, the State of Connecticut considered the structure to be in an unsafe condition and directed the present owner (Rose-maid Poultry, Inc.) to make the necessary repairs. The repairs were accomplished in 1964 under the direction of Mr. John J. Mozzochi and Associates, Civil Engineers of Glastonbury, Connecticut. Based on an inspection by Buck and Buck, Engineers, Hartford, Connecticut, in July, 1972, the State issued an order to repair the leakage at the penstock inlet to the mill. This repair work was completed in April, 1973 by the present owners based on designs developed by Chandler and Palmer. In 1978, the State reconstructed the highway bridge below the dam.

i. Normal Operating Procedures. There are no operating procedures for this facility. There is no regulation of the water surface and all flows discharge over the uncontrolled spillway. No releases are made during periods of low flow for stream downstream.

1.3 Pertinent Data

a. Drainage Area. Fitchville Pond is located in New London County in eastern Connecticut. The basin is generally oblong in shape with a length of approximately 11 miles, a width of about 7 miles, and a total drainage area of 68.50 square miles. (See Drainage Basin Map in Appendix D.) The topography is generally rolling terrain with elevations ranging from a high of 587 feet (National Geodetic Vertical Datum) NGVD to 152 feet at the spillway crest. Basin slopes are steep to moderate with grades of 0.045 feet/foot to 0.085 feet/foot. The average time of concentration for the entire drainage basin is estimated to be 6 - 8 hours, and is considered relatively large; resulting in the probability that all surface runoff will not peak simultaneously at the reservoir site during a high intensity rainfall event. The small storage areas in the watershed will moderately dampen and delay the peak of the surface runoff.

b. Discharge at Dam Site. No records of spillway or outlet works discharges are available. Listed below are calculated discharge data for the spillway and outlet works:

1. Gated Outlet Works: three 2.5-ft. wide by 4.5-ft. high rectangular gates: invert elevation 133.7.

2. Maximum Known Flood at Dam Site - Unknown.

3. Overflow spillway capacity @ top of Dam - 7,117 CFS at Elevation 158.7.

4. Overflow spillway capacity at "Test Flood Level" - 29,015 CFS at Elevation 170.0.

5. Gated outlet capacity at normal pool level - 675 CFS at Elevation 152.0 (spillway crest).

6. Gated outlet capacity at maximum pool level - 804 CFS at Elevation 158.7.

7. Total discharge capacity at "Top of Dam" - 7,921 CFS at Elevation 158.7.

8. Gated outlet capacity at test flood level - 984 CFS at Elevation 170.0.

9. Total outflow discharge capacity at "Test Flood Level" - 30,000 CFS at Elevation 170.0.

c. Elevations (Feet above National Geodetic Vertical Datum, NGVD)

1.	Streambed at centerline of dam -	Upstream - not observable Downstream - 131.5
2.	Maximum Tailwater	Unknown
3.	Upstream Inlet Invert	133.7
4.	Recreation Pool	N/A
5.	Flood Control Pool	N/A
6.	Spillway Crest	152.0
7.	Top of Dam	158.7
8.	Test Flood Level	170.0

d. Reservoir Length (in Feet)

1.	Maximum Pool	3,000
2.	Recreation Pool	N/A
3.	Flood Control Pool	N/A

e. Storage (Ac-Ft.)

1.	Recreation Pool	N/A
2.	Flood Control Pool	N/A
3.	Test Flood Pool	1,098
4.	Spillway Crest	350
5.	Top of Dam (Elevation 158.7)	759

6. Net storage between top of dam (Elevation 158.7) and spillway crest is 409 Ac.-Ft. and represents 0.11 inches of runoff from the drainage area of 68.5 square miles.

7. Each foot of surcharge storage from spillway crest to top of dam equals 0.017 inches of runoff from the drainage area of 68.5 square miles.

f. Reservoir Surface (Acres)

1.	Top of Dam	61
2.	Test Flood Pool	61
3.	Flood Control Pool	N/A
4.	Normal Pool	61
5.	Spillway Crest	61

g. Dam

1.	Type	Earth Embankment
2.	Length	200 feet
3.	Height	27 feet
4.	Top Width	20 feet
5.	Side Slopes	Upstream 2 H:IV Downstream - Varies
6.	Zoning	Unknown
7.	Impervious Core	Unknown
8.	Cutoff	Unknown
9.	Grout Curtain	Unknown

h. Diversion and Regulating Tunnel N/A

i. Spillway

1.	Type	Overflow, concrete ogee

2.	Length of Weir	108 feet
3.	Crest Elevation	152 (from USGS Topographic sheet)
4.	Gates	None
5.	U/S Channel	Natural bed
6.	D/S Channel	Natural bed
7.	Design Surcharge	Unknown

j. <u>Regulating Outlet</u>

Refer to paragraph 1.2b "Description of Dam and Appurtenances" for description of outlet works.

1.	Downstream Invert	133.7
2.	Size	Three 2.5-ft. wide by 4.5-ft. high rectangular stone masonry openings.
3.	Control mechanism	Manually operated sluice gates, unprotected, on concrete slab platform.

SECTION 2

ENGINEERING DATA

2.1 Design

The following documents which contain the principal information regarding this dam were reviewed in the preparation of this report:

Plan of Dam Built by Palmer Bros. Co. at Fitchville, Conn. 1914, Chandler and Palmer, Engineers - Sheet 1 of 2

Cross Sections and Elevations of Dam - Sheet 2 of 2

Plan of Repairs to Fitchville Dam for Samuel M. Morse and Bertram H. Weingart - April, 1973.

2.2 Construction Data

No record of construction or repairs exists.

2.3 Operation Data

No record of operation for this facility has been maintained.

2.4 Evaluation of Data

a. Availability. The information noted above for this facility is available in the files of the Department of Environmental Protection, State of Connecticut.

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

c. Validity. The validity of the limited information available must be verified.

SECTION 3

VISUAL INSPECTION

3.1 Findings

a. General. Based on the visual inspection, history and general appearance, the Fitchville Pond Dam and its appurtenances are judged to be in FAIR condition. The dam embankment has five large trees growing on it, and unchecked erosion areas eixst.

The gate mechanism for the outlet works appeared to be in working order; however, the mechanism is exposed and is subject to vandalism.

b. Dam. The main dam is a concrete-covered stone masonry gravity structure. There is a short, broad earth embankment section on the left side of the main dam. No construction drawings are available, nor are the details of design and subsequent repairs known.

Repairs on the dam were performed by Chandler, Palmer & King, Inc. in 1973, which involved raising the existing stone masonry dam, converting the spillway to a concrete ogee structure and renovations to the outlet works. No details concerning the design or construction of these repairs are known other than those shown on the plan of repairs in Appendix B-3.

1. Crest. The crest of the earth embankment section is very broad, and the transition between the crest and downstream slope is not well-defined. The crest is grass-covered. There are five large trees up to 3 ft. in diameter growing on the crest just behind the stone masonry wall which forms the upstream face, as shown in Photo C-13. One of these trees has dislodged a capstone of the wall which has resulted in some minor surface erosion.

2. Upstream Slope. The upstream face of the earth embankment section consists of a wet stone masonry wall, shown in Photo C-7. The wall is in generally good condition. Some of the pointing between the stones is missing in some locations.

3. Downstream Slope. The downstream slope of the earth embankment section is very broad and has an extremely gentle grade. The slope is variable in nature, consisting of flat grassed slopes and low sections of stone masonry wall. The downstream slope includes a section of road which crosses the downstream channel over a bridge located just downstream from the dam. The downstream toe is not well-defined. The downstream slope is in generally good condition.

c. Appurtenant Structures. The appurtenant structures for this dam are the overflow spillway and the control gate outlet works structure.

1. Spillway and Training Walls. There is an ogee crested spillway over the main concrete-covered stone masonry dam. The general configuration of the spillway is shown in Photos C-1 and C-2. Water was flowing over the spillway at the time of the inspection.

The spillway training walls are in poor condition. As shown in Photo C-2, the concrete facing is missing from the left training wall just downstream from the spillway crest and the underlying open stonework is exposed. Concrete facing is also missing from the left training wall just downstream from the outlet gate raceway and seepage is occurring through the exposed open stonework, as shown in Photo C-10. As shown in Photos C-11 and C-15, the concrete facing on the right training wall is intact, but seepage is occurring through the open stonework in a 25-ft. section starting about 15 ft. downstream from the spillway toe where the concrete facing extends only partway up the training wall. The dry stone masonry wall is damaged with a number of stones missing in a 15-ft. section immediately downstream of the concrete-faced section, as shown in the same photos.

Extensive erosion has occurred on the earth slope above the right wall of the spillway channel, as illustrated in Photos C-11 and C-12. Erosion gullies up to 6-ft.-wide and 2-ft.-deep (Photos C-11 and C-12) and erosion holes up to about 5 ft. in diameter (Photo C-11) were observed. Erosion has occurred along the contact between the spillway and right abutment, as shown in Photo C-1.

2. Outlet Works. The outlet gate structure is located at the left abutment of the spillway. The general configuration of the outlet gate structure is shown in Photos C-5, C-6 and C-13. Flow from the outlet gate enters the downstream spillway channel through a short raceway section. Large cracks and extensive seepage were noted in the concrete covering of the stone masonry outlet structure, as illustrated in Photo C-5. The outlet works gates were not exercised at the time of the inspection but are reportedly operable according to the Owner of the dam.

There is an old abandoned outlet, located in the same outlet structure, that exits downstream through a penstock. The entrance to the penstock is blocked with precast concrete panels, as shown in Photo C-7. The outlet for the abandoned penstock is located to the left of the downstream channel and is shown in Photo C-8.

d. Reservoir Area. No specific detrimental features in the reservoir area were observed during the visual inspection. The slopes of the watershed are well-covered with growth to preclude sloughing of shore line material. Two causeways are located upstream of the dam within Fitchville Pond as shown on Plate No. D-2 in the Appendix.

e. Downstream Channel. The downstream channel for the Fitchville Pond Dam is the Yantic River. Directly below the spillway, the channel is confined by dry stone masonry walls, as shown in Photographs C-3, C-10 and C-13. There is a large amount of rock rubble piled in the downstream channel below the spillway which obstructs low flow and will be carried downstream during high flow periods.

3.2 Evaluation

Based on the visual inspection, the dam appears to be in fair condition with several areas which require attention:

Large trees are growing on the crest of the dam immediately behind the stone masonry wall which forms the upstream face of the earth embankment section. The tree roots provide seepage path for water if allowed to grow. Uprooting of large trees can also cause serious "piping" problems by creating pathways through the embankments.

Concrete facing is missing from the left spillway training wall and the underlying open stonework is exposed.

A section of the dry stone masonry wall on the right side of the downstream spillway channel is damaged with a number of stones missing.

Extensive erosion has occurred on the earth slope above the right wall of the spillway channel, including erosion at the contact between the spillway and right abutment.

There is large rock rubble piled on the floor of the downstream spillway channel, which obstructs the flow from the spillway and should be removed.

Several large cracks and extensive seepage were noted in the concrete covering of the stone masonry outlet structure.

SECTION 4

OPERATIONAL PROCEDURES

4.1 Procedures

Downstream textile mills no longer use the waters impounded by the Fitchville Dam. Instead, the reservoir is used at this time solely for recreation. The reservoir water surface level is not regulated at any time during the year but all flows are allowed to discharge over the uncontrolled spillway, letting the reservoir pool seek its own level.

4.2 Maintenance of the Dam

Maintenance of the dam has been limited. The present Owner repaired leakage in the 9.0-foot diameter penstock in 1973 and "walled up" the headrace at the same time. Recently, a large tree was removed from the dam superstructure. No other maintenance has occurred and several components of the dam are in disrepair.

4.3 Maintenance of the Operating Equipment

The operating gates of the outlet works were rehabilitated under the repair work that was accomplished in 1973. It is unknown if trash and debris screens are present upstream of the gates or how often they are cleared. At the time of the visual inspection slight leakage was noted through the masonry monolith that houses the gates. The walls of the downstream wasteway were badly eroded and in poor condition. These channel walls have the potential for further erosion from flows through gates.

4.4 Description of Any Warning System in Effect

Impending storms or intense rainfalls are monitored by the Owner from local weather forecasts. There is no pre-planned warning system for the failure of Fitchville Pond Dam. An emergency action plan must be developed so that operating personnel can notify authorities for mobilization of State or local emergency forces, organize remedial measures to minimize or prevent complete failure when possible, and have an awareness of the locations of supplies, standby equipment and materials.

4.5 Evaluation

Regular operational or maintenance procedures for this dam have not been developed or followed. In view of the neglected condition of this structure and its appurtenances, it is important that the Owner institute a program of monitoring, inspection and maintenance.

An "emergency action plan" should be prepared to prevent or minimize the impact of failure. This plan should list the expedient action to be taken and authorities to be contacted.

SECTION 5

HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features.

a. General. Fitchville Pond Dam, constructed for use by adjacent mills in the late 1800's and modified as recently as 1973, is located on the Yantic River in the Village of Fitchville, Connecticut. It is used now for recreation only.

The dam has an overflow spillway length of 108 feet which represents approximately 54 percent of the total length of the dam. The structure is considered a run of river type dam. This facility has an available total surcharge storage capacity of 409 Ac-Ft which is equivalent to 0.11 inch of runoff from the watershed. The maximum spillway capacity of 7120 CFS is 24 percent of the test flood outflow. This dam, therefore, is considered a low storage - high spillage structure.

b. Design Data.

No specific data is available for the watershed or structures of Fitchville Pond Dam. In lieu of existing design information, U.S.G.S. Topographic Maps (Scale 1" = 2000') were utilized to develop hydrologic parameters such as drainage areas, reservoir surface areas, basin slopes, time of concentration, and other runoff characteristics. Elevation - storage relationships for the reservoir were approximated. Surcharge was computed assuming that the surface area remained constant above the spillway crest. Some of the pertinent hydraulic design data was obtained and/or confirmed by actual field measurements at the time of visual field inspection.

Outflow values (routing procedures) and dam failure profiles were determined in accordance with the Corps of Engineers guidelines. Final values as detailed in this report are quite approximate and are no substitute for actual detail analysis.

c. Experience Data. No historical data for recorded discharges or water surface elevations is available at the dam. At 2.5 miles downstream from the dam at the Yantic River gaging station (01127500) there are recorded 1936

and 1938 peak flows of 6,300 and 13,500 CFS, respectively.

d. Visual Observations.

1. Freeboard (height between spillway crest and top of dam) and length of spillway for this dam are small considering the large watershed area.

2. The discharge channel has rock rubble lying on the bed of the channel which obstructs low flow and will be transported downstream under high flow condi tions. This should be removed.

3. The spillway and downstream channel training walls have open joints with damaged and missing stonework and require repair.

4. The outlet structure has several large cracks and there is extensive seepage through the walls of the outlet channel which requires rehabilitation.

e. Test Flood Analysis. Recommended guidelines for the Safety Inspection of Dams by the Corps of Engineers were used for the selection of the "Test Flood". This dam is classified under those guidelines as a significant hazard and small structure. Guidelines indicate that a range from one half the Probable Maximum Flood (PMF) to the 100-year frequency storm event be used as the test flood for such classifications. The watershed has a total drainage area of 68.5 square miles, of which approximately 6.85 square miles (10%) is swampy. The average basin slope is 0.06 feet/foot which is considered steep to moderate, and the general terrain is rolling. A "test flood" equal to one half of the PMF was calculated to be 500 CSM, equal to 34,250 CFS. It is assumed the discharge of 34,250 CFS will reach the dam site without attenuation from upstream causeways. Outflow discharges were also developed using the criteria of the Corps of Engineers for approximate routing. The outflow discharge for the test flood inflow was equal to 30,000 CFS. Additional design data developed for this investigation is listed in tabular form at the end of this section.

The spillway capacity is hydraulically limited to pass the adopted "test flood" (1/2 PMF) and would overtop the dam by approximately 11 feet assuming the overflow length of dam to be approximately 200 feet. The inflow and outflow discharge values for this test flood are 34,250 CFS

and 30,000 CFS, respectively. The maximum outflow capacity of the spillway, in a still reservoir condition, without overtopping the dam is 7,117 CFS, which represents 24 percent of the test flood discharge. A spillway, tail water and outlet rating curves are included in Appendix D of this report.

At the spillway crest elevation of 152.0 (NGVD), the capacity of the outlet structure is equal to 675 CFS. It will require approximately one hour to lower the reservoir level one foot assuming a pool surface area of 61 acres.

A one foot-depth in the reservoir at the spillway crest level can accommodate 0.017 inches of effective rainfall. Consequently, it is estimated that overtopping of the dam by the "Test Flood" cannot be eliminated even if the water level in the reservoir is lowered a few feet below the spillway crest elevation as a precautionary measure.

f. Dam Failure Analysis. This dam is classified as a significant hazard structure because it is located in an area where its failure discharge can cause damage due to high velocity, impact from debris and flooding to homes (1), commercial properties (1), roadways (Norwich-Colchester Turnpike) and utilities adjacent to that roadway. Below the dam, approximately 200 feet, the main water supply pipe for the City of Norwich is carried over the Yantic River on the roadway bridge. Loss of this water supply could result in a health and economic impact to the City of Norwich. Applying the calculated dam failure discharge of 9,600 CFS when the impounded water level in the reservoir is at the top of the dam will produce an approximate water surface elevation of 143.0 immediately downstream from the dam at failure. This discharge will raise that water surface below the dam approximately 1.0 foot above the depth just prior to failure when the discharge is 7,120 CFS. Normal uniform flow based on Manning's formula will occur approximately 10,000 feet downstream from the dam when the depth of flow will equal 12.0 feet. Depths of flow will range from 17.0 feet at the dam to 12.0 feet at a distance of 10,000 feet below the dam. Water surface elevations due to failure of the dam and a tailwater rating curve are listed in Appendix D.

STONE HILL RESERVOIR DAM

Inflow, Outflow and Surcharge Data

FREQUENCY IN YEARS	24-HOUR TOTAL RAINFALL IN INCHES	24-HOUR* EFFECTIVE RAINFALL IN INCHES	MAXIMUM INFLOW IN C.F.S.	MAXIMUM** OUTFLOW IN C.F.S.	SURCHARGE HEIGHT IN FEET	SURCHARGE STORAGE ELEVATION
10	5.0	2.6	8,400	6,000	5.97	157.97
50	6.5	4.1	13,300	10,500	9.86	159.86
100	7.0	4.6	15,000	12,500	11.00	163.00
1/2 PMF	11.9	9.5	34,250	30,000	18.00	170.00

= Test Flood

*Infiltration assumed as 0.1"/hour.
**Lake assumed initially full at spillway crest elevation 152.0. (top of dam = 158.7).

NOTES:

1. Q_{10}; Q_{50}; Q_{100}; inflow discharges were computed by the approximate methodology of the Soil Conservation Service.

2. One-half PMF and the "test flood" computation are based on COE instructions and guidelines.

3. The maximum capacity of the spillway without overtopping the top of the dam (elevation 158.7) is equal to 7,120 C.F.S.

4. Surcharge storage is allowed to overtop the dam when exceeding the spillway capacity.

5. Test flood = one-half PMF - 500 CSM = 34,250 CFS (D.A. = 68.5 square miles).

SECTION 6

STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability.

a. Visual Observations. The visual inspection did not disclose any immediate stability problems. The locations where erosion is currently occurring and where it has occurred in the past should be restored to avoid potential future difficulties.

b. Design and Construction Data. There is no design and construction data for evaluation of structural stability for this dam.

c. Operating Records. There are no operating records available that could be used in a stability analysis of this embankment.

d. Post-construction Changes. The dam was raised and repaired in 1973, however, there is no design data available which would allow a stability analysis of the dam.

e. Seismic Stability. The Fitchville Pond Dam is in Seismic Zone 1 and hence does not require evaluation for seismic stability according to the Corps of Engineers Recommended Guidelines.

SECTION 7

ASSESSMENT, RECOMMENDATIONS, AND REMEDIAL MEASURES

7.1 Dam Assessment.

a. Condition. The visual inspection indicated that the Fitchville Pond Dam is in FAIR condition. The major concerns regarding the long-term performance of this dam include:

1. Tree growth on the embankment with attendent root systems.

2. Large cracks and seepage emerging through the masonry walls of the outlet works discharge channel.

3. Missing concrete facing on the left spillway training wall.

4. Extensive erosion of the embankment at the right spillway abutment and above the right training wall of the discharge channel.

5. The overtopping of the dam by the test flood flow and the inadequate freeboard allowance for that flow and for lesser storm activity.

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

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

d. Need For Additional Investigation. No data was recovered for this inspection that indicates that recent formal engineering analyses were performed for this dam. The visual inspection and operational history indicate that attention should be given to the collection of current data in order that the recommendations listed below may be implemented.

7.2 Recommendations. The Owner should engage the services of an engineer experienced in the design of dams to accomplish the following:

1. Evaluate the condition of the spillway surfaces and training walls and develop a program for their rehabilitation.

2. Trees and brush on the upstream and downstream slope should be removed. The stumps of the trees should be removed only after a procedure has been developed by a competent engineer for proper backfill and compaction.

3. Evaluate the cause of the cracking and seepage through the walls of the outlet works discharge channel and implement a program of rehabilitation.

4. Develop a suitable erosion protection system to protect the earth slope above the right wall of the spillway and discharge channel.

5. Design and install a trash rack and cleaning system at the entrance to the outlet works.

6. A topographic survey of the dam and its appurtenances should be made that will result in accurate drawings of the existing conditions to be used in a program of rehabilitation of the dam.

7. Perform further hydrologic studies of spillway adequacy.

7.3 Remedial Measures.

a. Operating and Maintenance Procedure.

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

2. Implement a program to clear and rehabilitate the discharge channel of rock rubble in order to increase the efficiency of the outlet.

3. The owner should remove and properly maintain the vegetation on the upstream and downstream slopes of the dam.

4. Provisions should be taken to prevent trespassing and possible vandalism of the gate mechanism for the outlet structure.

5. Continue the technical inspections of this facility on an annual basis.

6. Develop and post an emergency action plan including a warning system in order to prevent or minimize the impact of dam failure. It should include the expedient action to be taken, authorities to be contacted, and locations of emergency equipment and materials.

7.4 Alternatives. None

APPENDIX A

INSPECTION CHECK LIST

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT Fitchville Dam

DATE 4/11/79

TIME

WEATHER Cool, Clear

W.S.ELEV. _____ U.S. _____ D.S.

PARTY:

1. A. Reed - CEM
2. R. Brown - CEM
3. R. Murdock - GEI
4. D. Shields - GEI
5.
6.
7.
8.
9.
10.

PROJECT FEATURE	INSPECTED BY	REMARKS
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

PERIODIC INSPECTION CHECK LIST

PROJECT Fitchville Dam DATE 4/11/79

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
DAM EMBANKMENT	
Crest Elevation	El. 152.0
Current Pool Elevation	El. 98.20 152.2
Maximum Impoundment to Date	Unknown
Surface Cracks	None observed
Pavement Condition	No pavement grass covered
Movement or Settlement of Crest	None observed
Lateral Movement	None observed
Vertical Alignment	Irregular
Horizontal Alignment	Irregular
Condition at Abutment and at Concrete Structures	Erosion at contact between spillway and right abutment
Indications of Movement of Structural Items on Slopes	Large cracks in concrete covering of stone masonry outlet structure
Trespassing on Slopes	No evidence
Sloughing or Erosion of Slopes or Abutments	Erosion at right abutment
Rock Slope Protection - Riprap Failures	Stone masonry wall forms upstream face
Unusual Movement or Cracking at or Near Toe	None observed
Unsual Embankment or Downstream Seepage	None observed
Piping or Boils	None observed
Foundation Drainage Features	Plans show drains under concrete cover on stone masonry gravity section.

PERIODIC INSPECTION CHECK LIST

PROJECT Fitchville Dam DATE 4/11/79

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
DAM EMBANKMENT (Continued)	
Toe Drains	Unknown
Instrumentation System	None
Vegetation	Large trees on crest

PERIODIC INSPECTION CHECK LIST

PROJECT Fitchville Dam DATE 4/11/79

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
a. Approach Channel	
Slope Conditions	N/A
Bottom Conditions	Not visible, under water
Rock Slides or Falls	N/A
Log Boom	None
Debris	None observable
Condition of Concrete Lining	Not observable
Drains or Weep Holes	None observed
b. Intake Structure	
Condition of Concrete	Mortored Stone Masonry with concrete Cap. Intake Structure is part of Control Tower
Stop Logs and Slots	None observed.

PERIODIC INSPECTION CHECK LIST

PROJECT Fitchville Dam DATE 4/11/79

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - CONTROL TOWER	Control tower consists of a concrete wall between a stone masonry wall and a stone masonry pier. Both the wall and the pier are capped with concrete.
a. Concrete and Structural	
General Condition	Fair to poor
Condition of Joints	Cracking and separation of joints observed
Spalling	Yes
Visible Reinforcing	Yes and corroded
Rusting or Staining of Concrete	Considerable
Any Seepage or Efflorescence	Seepage through masonry quite evident
Joint Alignment	Fair to poor due to settlement of stone masonry pier after concrete was placed.
Unusual Seepage or Leaks in Gate Chamber	Extensive seepage around gates and corners.
Cracks	Many observed
Rusting or Corrosion of Steel	Yes
b. Mechanical and Electrical	
Air Vents	
Float Wells	
Crane Hoist	Gate mechanisms are manually operated vertical sluice gates
Elevator	
Hydraulic System	

PERIODIC INSPECTION CHECK LIST

PROJECT Fitchville Dam DATE 4/11/79

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - CONTROL TOWER (Cont.)	
b. Mechanical and Electrical	
Service Gates	
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System	

PERIODIC INSPECTION CHECK LIST

PROJECT Fitchville Dam DATE 4/11/79

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - TRANSITION AND CONDUIT	
General Condition of Concrete	No Conduit
Rust or Staining on Concrete	
Spalling	
Erosion or Cavitation	
Cracking	
Alignment of Monoliths	
Alignment of Joints	
Numbering of Monoliths	

PERIODIC INSPECTION CHECK LIST

PROJECT Fitchville Dam DATE 4/11/79

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	
General Condition of Concrete	See Page A-4 for condition of structure
Rust or Staining	
Spalling	
Erosion or Cavitation	
Visible Reinforcing	
Any Seepage or Efflorescence	
Condition at Joints	
Drain holes	None observed
Channel	Concrete lined
Loose Rock or Trees Overhanging Channel	None
Condition of Discharge Channel	Fair - some concrete facing missing and dislodged stonework

PERIODIC INSPECTION CHECK LIST

PROJECT Fitchville Dam DATE 4/11/79

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	Open natural stream bed
a. Approach Channel	
General Condition	Good
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	None
Floor of Approach Channel	Not visible, under water
b. Weir and Training Walls	
General Condition of Masonry	Masonry leaking with open joints.
Rust or Staining	Masonry capped with concrete
Spalling	None observed
Any Visible Reinforcing	Yes, corroded
Any Seepage or Efflorescence	Some observed
Drain Holes	None observed
c. Discharge Channel	
General Condition	Fair
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	None
Floor of Channel	Large rock rubble in channel forcing flow against walls
Other Obstructions	None

APPENDIX B

ENGINEERING DATA

Appendix B-1

Operating and Maintenance Records Location

Victor J. Galgowski, Dam Safety Engineer
Department of Environmental Protection
State Office Building
165 Capitol Avenue
Hartford, Connecticut 06115

Mr. Seymour Adelwan
Seymour's Sand and Stone, Inc.
Fitchville, Connecticut (203) 889-3395

Appendix B-2

Copies of Past Inspection Reports

BUCK & BUCK
ENGINEERS
98 WADSWORTH STREET, HARTFORD, CONNECTICUT 06106

JAMES A. THOMPSON
ROBINSON W. BUCK
LAWRENCE P. BUCK

HENRY WOLCOTT BUCK
1871-1965
ROBINSON B. BUCK
1875-1950

COMM. 5713-63 June 8, 1973

Mr. Victor Galgowski
Supt. of Dams
Dept. of Environmental Protection
State Office Building
Hartford, CT 06106

RE: Fitchville Dam

Dear Vic:

The following is a report on our inspection of the subject dam on May 22, 1973.

In the ruins of the old factory, the pressure head of the water wheel has been intentionally breeched, allowing the free flow of water from the pond through the dam via the head race. By opening the head race its internal pressure was reduced and water is no longer flowing from the break in the head race formerly reported.

The gate house over the head race intake structure has been completely removed and the dam outlet gates have been opened. The gates have been partially plugged with debris so that there is considerable impoundment even though they are open.

It appeared to us that the high velocity flow from the outlet gates is beginning to erode the sides of the outlet channel. This area should be reviewed by the owner's engineer, and repaired when the other remedial work is done.

Sincerely,
BUCK & BUCK

James A. Thompson

JAT:dlb

and he felt that the wall was on Highway property and not his. I think Shep Palmer said he could check this out but I am not certain about this.

Sincerely yours,

BUCK & BUCK

James A. Thompson

RECEIVED

AUG 10 1972

DEPT. OF ENVIRONMENTAL PROTECTION
OFFICE OF THE COMMISSIONER

August 8, 1972

Re: Fitchville Pond Dam
Fitchville, Connecticut

State of Connecticut
Department of Environmental Protection
State Office Building
Hartford, Connecticut 06115

RECEIVED

AUG 11 1972

DEPT. OF ENVIRONMENTAL PROTECTION
PRESERVATION & CONSERVATION DIV.

Attention: Mr. Dan W. Lufkin, Commissioner

Dear Mr. Lufkin:-

As consultant for Mr. Morse and Mr. Weingart, the owners of the dam, I arranged a meeting at the site which took place today. Those present were Mr. Morse, Mr. William J. O'Brien, Mr. James A. Thompson, Mr. Walter Ryan (Contractor) and his assistant and the writer.

We checked the three draw-down gates and they appear to be in good operating condition. We also inspected the area below the highway where water is coming out of the top of the head race. The condition appears to be the same as it was last week. There is no erosion evident.

The camp on the pond is in full swing with about 150 youngsters and water activities are the main feature. The camp will close August 30th.

The head race gate is probably partially open and does not appear to be in good condition. It will be necessary to draw the pond down to determine the extent of the corrective measures required.

The owners are under order to have engineering plan submitted to you by August 15, 1972. We request, for the owners, an extension of time until September 15, 1972.

Our plan would be to start drawing the pond down about September 1st. If this extension is granted, I will inspect the head race leak several times each week. If any change in condition is noticed, we would have the three draw-down gates opened and notify you.

Very truly yours,

CHANDLER, PALMER & KING

SBP/ew
c.c.: Mr. Samuel M. Morse

7/20/72

TO: Stephen C. Thomson, Director, Water and Related Resources

FROM: William H. O'Brien, Civil Engineer, Water and Related Resources

SUBJECT: Fitchville Pond Dam, Bozrah

Summary of Events

July 11, 1972 - Call from Mr. Sjostedt of Civil Defense - please check dam.

I inspected dam in company of First Selectman, Ralph Fargo, and State Trooper Larson.

A three story masonry building (formerly a quilt manufacturing plant) across the street from the dam was completely gutted by a fire on July 8 or 9. A clock tower was knocked over by a crane before it fell over. The falling tower apparently ruptured an abandoned underground tailrace. Since the gates are open at the dam, the tailrace was full of water and is now escaping from the tailrace at the building and flowing from the ground with about a three foot head and spurting from a ruptured steel tank (?) under about 10 feet of head.

The condition, if ignored, could lead (1) to serious erosion, (2) possible undermining of the retaining wall of the state highway, and (3) if the tailrace and appurtenant structures in the old gutted building fail, this would drain probably at least 10 feet off the top of this 70+ acre pond, sending much debris, ash, etc., into the river below. The ash would probably kill many fish. (dam is on the Yantic River which is stocked)

The safety of the dam itself is not in question at this time, although the following should be corrected in the near future.

1. Stream retaining wall 50 feet downstream of dam on south side had collapsed.
2. Gate house is deteriorated and represents a hazard to children playing in the area.
3. Leaks through the masonry walls just downstream of the three outlet gates, should be stopped.

Recommend that Order be issued to owner of dam to seal opening leading to tailrace or drain pond at least 10 feet.

James Thompson, our consultant, inspected the dam on July 13 and arrived at essentially the same conclusions that there was no immediate known hazard but because the type of tailrace structure and its condition remain unknown, (plans were obtained from the state Library and Chandler and Palmer Engineers) the source of water pressure in the tailrace should be eliminated as above. Mr. Thompson will send us a report and recommendations and we should issue an order within one week± .

The Civil Defense (Mr. Scott) has been notified of our contemplated action July 10, 1972.

Civil Engineer

WHO:d

On or about June 2, 1969 this office received a call from Raymond Barber RFD 1, Fitchville, Bozrah, mentioning the condition of the downstream retaining wall of the subject dam.

On July 31, 1969 the undersigned inspected ths subject dam. The downstream masonry wall on the east bank has collapsed at a point about 40 feet downstream of the dam. The flow of water along the toe of this wall will eventually wash it away. It is protected somewhat against unraveling towards the dam because there is a concrete block along the toe of the wall from the break towards the dam. In rebuilding this wall, it may be well to blend the end of this block into the wall to avoid eddies at this point. This condition of the wall does not directly effect the safety of the dam at present, but deterioration may eventually require reconstruction for the protection of the remainder of the dam. It should therefore be scheduled for repair by the owner within a reasonable time.

Picture #2 shows the deteriorated condition of the valve house. The doors are open and some of the wooden floor boards are missing and many appear rotting. There are large iron hand wheels connected to timber valve stems which protrude thru the roof when raised. These wooden gates are operable by turning these wheels which are not locked. This structure presents a definite hazard to children and should be repaired to safeguard the curious and to prevent unauthorized tampering with the draw down facilities.

Some leaks were noted coming thru the masonry just below the main draw down controls (3 horizontal wheels in picture #2). [illegible] t the safety of the structure.

Civil Engnneer

BUCK & BUCK

ENGINEERS

71 CAPITOL AVENUE, HARTFORD, CONNECTICUT 06106

JAMES A. THOMPSON
ROBINSON W. BUCK

July 17, 1972

Comm. #5713-63

Mr. William H. O'Brien III, Civil Engineer
Water & Related Resources Section
Department of Environmental Protection
State of Connecticut
State Office Building
Hartford, Connecticut 06115

Subject: Fitchville Dam

Dear Bill,

We inspected the subject dam on the 13th, and also met with Mr. Fargo, Bozrah First Selectman. The principle problem concerns damage done to the pipe or conduit that leads from the gate-house of the dam to the water wheel of the Mill. Evidently, this pipe was damaged below grade, when the Mill Tower collapsed, or was pulled down during the recent fire.

A substantial flow of water is appearing at the surface between the road and the building. If this flow were to increase, it could cause severe damage in the area of the bridge abutments, and if completely unchecked it is possible the erosion could extend to the road and dam itself. We strongly recommend that the owner of the dam be ordered to close the gate at the head race. If closing of the gate doesn't stop the flow, the owner should engage an engineer to determine how it can be stopped, and then implement the engineer's plan as soon as possible. We feel it would be reasonable to order the headrace gate closed within two weeks. Periodic checks of the flow rate should be made until the gate is closed.

Regarding the dam itself, there is considerable leakage in the masonry of the outlet structure. The volume and velocity of the leakage is sufficient to warrant an order for an inspection and report by the owner's engineer. We, also, note that a large section of stone retaining wall, on the South side of the river between the dam and the bridge, has fallen away. Slope erosion has started, and unless it is checked it will work its way back to the dam. We do not consider this an urgent matter, but one that should be watched and taken care of eventually. We consider the leakage at the gate area more serious, and recommend that this be included with the order concerning the headrace closure.

Sincerely,

BUCK & BUCK

James A. Thompson

JAT:RF

FORM PUR 510 201

INTERDEPARTMENT MAIL

DATE August 7, 1969

TO Charles J. Pelletier, Division Engineer — DEPARTMENT Water Resources Commission

FROM William H. O'Brien III, Civil Engineer — DEPARTMENT Water Resources Commission

SUBJECT Fitchville Dam, Bozrah

On or about June 2, 1969 this office received a call from Raymond Barber RFD 1, Fitchville, Bozrah, mentioning the condition of the downstream retaining wall of the subject dam.

On July 31, 1969 the undersigned inspected ths subject dam. The downstream masonry wall on the east bank has collapsed at a point about 40 feet downstream of the dam. The flow of water along the toe of this wall will eventually wash it away. It is protected somewhat against unraveling towards the dam because there is a concrete block along the toe of the wall from the break towards the dam. In rebuilding this wall, it may be well to blend the end of this block into the wall to avoid eddies at this point. This condition of the wall does not directly effect the safety of the dam at present, but deterioration may eventually require reconstruction for the protection of the remainder of the dam. It should therefore be scheduled for repair by the owner within a reasonable time.

Picture #2 shows the deteriorated condition of the valve house. The doors are open and some of the wooden floor boards are missing and many appear rotting. There are large iron hand wheels connected to timber valve stems which protrude thru the roof when raised. These wooden gates are operable by turning these wheels which are not locked. This structure presents a definite hazard to children and should be repaired to safeguard the curious and to prevent unauthorized tampering with the draw down facilities.

Some leaks were noted coming thru the masonry just below the main draw down controls (3 horizontal wheels in picture #2). These leaks do not appear to affect the safety of the structure.

William H. O'Brien

Civil Engnneer

WHO:jad

March 20, 1964

Mr. Bertram H. Weinger
Mr. Samuel M. Morse
Attorneys-at-Law
55 West 42nd Street
New York 36, New York

Re: Repairs to Fitchville Dam

Gentlemen:

During a recent general inspection of the Fitchville Dam it was observed that the size of the leak through the gate structure had probably increased. At that time a vortex above the dam was observed and several boils below the dam indicated a leak of substantial size.

This condition caused some concern and it was reported to the Commission at its meeting on March 16, 1964. The matter was discussed in connection with the agreed deferment of work until September 15th. However, it was the opinion of the Commission that steps to repair this leak should be taken promptly. It is assumed that the work involved is not of an extensive nature and could reasonably be done at this time so that any drawdown of the lake would not interfere with your summer camp recreation program. It was felt that the other repairs to the dam need not necessarily be carried out at this time.

We will appreciate hearing from you concerning this matter.

Very truly yours,

William S. Wise
Director

WSW:js

cc: John J. Mozzochi
Benjamin H. Palmer

1. Repair all leaks.

2. Repair all spalled concrete areas.

3. Repair all deteriorated masonry.

4. Correct cause of "boiling" through gravel downstream from stone pier.

ORDER

In accordance with Section 25-111 of the General Statutes you are hereby ordered to make the repairs or alterations necessary to place the structure in a safe category or to remove the structure.

Due to the unusual condition or conditions found you are hereby ordered to lower and maintain the water surface in the pond at a safe level.

Any repairs or alterations to the structure or its removal shall be carried out in accordance with engineering plans and specifications prepared by a registered engineer and submitted to this Commission for approval and for the issuance of a permit prior to any construction or demolition work in accordance with Section 25-112 of the General Statutes.

The Commission shall be notified within two weeks what steps you plan to take to repair or remove the structure. The work shall be completed by September 15, 1963.

Very truly yours,

WATER RESOURCES COMMISSION

By_____
William S. Wise, Director

WSW:mac

STATE OF CONNECTICUT

WATER RESOURCES COMMISSION

STATE OFFICE BUILDING - HARTFORD 15, CONNECTICUT

1. Fitchville
884-8421 - Business
Mr. Rosen

May 6, 1963

Home
Mr. Rosen
Tel: Willimantic
HA 3-1623

Mr. Louis Rosen
Rose-Maid Poultry, Incorporated
1681 West Main Street
Willimantic, Connecticut

Dear Mr. Rosen:

According to the records in this office the so-called Fitchville Dam, located on the Yantic River just south of Route #2 in Fitchville, is under your ownership.

Section 25-110 of the 1958 Revision of the General Statutes places under the jurisdiction of this Commission all dams, "which, by breaking away or otherwise, might endanger life or property." The Commission finds that the failure of this dam would endanger life or property.

In accordance with Section 25-111 of the General Statutes this dam has been inspected and found to be in an unsafe condition. The statute states in part: . . "If, after any inspection described herein, the commission finds any such structure to be in an unsafe condition, it shall order the person, firm or corporation owning or having control thereof to place it in a safe condition or to remove it, and shall fix the time within which such order shall be carried out."

FINDING

Based on the engineers report covering the inspection of this dam the Water Resources Commission finds the structure to be in an unsafe condition. It also finds that certain repairs or alterations are necessary to place the structure in a safe condition.

The repairs or alterations to be made should include but are not necessarily limited to the following items:

BENJAMIN H. PALMER
SHEPARD B. PALMER

CHANDLER & PALMER
CIVIL ENGINEERS
114-116 THAYER BUILDING
TELEPHONE TURNER 7-5640

MEMBERS AMERICAN AND CONNECTICUT SOCIETIES
OF CIVIL ENGINEERS

DAMS
WATER SUPPLIES
SEWERAGE
APPRAISALS
REPORTS
SURVEYS

NORWICH, CONN.
April 22, 1963

Re: Fitchville Dam

State Water Resources Commission
Hartford, Connecticut

Attention: Mr. Emitt Dell

Gentlemen:-

On April 12, 1963 I made a detailed inspection of the Fitchville Dam on the Yantic River. This is located just South of Route #2 in Fitchville near the former Palmer Bros. Mill. Dam at present is owned by "Rose-Maid Poultry Inc." a Connecticut Corporation.

This dam has a concrete spillway perhaps 60 feet wide and 25 feet high. Spillway itself appears in pretty good condition. There are some bad leaks through the masonry structure near the gate house and in several places water is boiling up through the gravel downstream from the stone pier. Concrete has spalled off badly and masonry here is in poor shape.

This is another case where no money has been spent for maintenance for years. The mill is a poultry house now and no water is used for power so far as I know. There is a large drainage area here and a big pond and if the dam fails it would cause trouble below.

I have reported on this dam before and the conditions are not improved. They are worse if anything.

It is my opinion that the dam is hazardous and a danger and that the Owner should be compelled to repair it.

Very truly yours,

B H Palmer

BHP/ew

BENJAMIN H. PALMER
PARD B. PALMER

CHANDLER & PALMER
CIVIL ENGINEERS
114-116 THAYER BUILDING
TELEPHONE TURNER 7-5640

MEMBERS AMERICAN AND CONNECTICUT SOCIETIES
OF CIVIL ENGINEERS

DAMS
WATER SUPPLIES
SEWERAGE
APPRAISALS
REPORTS
SURVEYS

NORWICH, CONN.
November 30, 1957

Water Resources Commission
State Office Building
Hartford, Connecticut

Attention: Mr. Merwin Hupfer

Dear Sir:-

The Fitchville Dam is located on the Yantic River in Fitchville in the Town of Bozrah about 200 feet Southerly of State Highway Route #2. There is a concrete dam about 20 feet high with a spillway 108 feet long and stone abutments on each side. A series of gates allows water to go the mill below and allows the pond to be drawn down. The drainage area of the pond is large and the pond when full is also large.

The spillway section appears all right. The stone piers and butments around the gates leak badly with water coming through the walls and boiling up downstream from the dam. A concrete facing around the stone work has spalled off badly. This summer in dry weather the leaks were sufficient to drain the pond. At present the pond is full but the leaks are still in evidence.

If the State takes the dam over, they would certainly have to stop these leaks or have a dry pond every summer. It seems to me the way to correct this is as follows:

(1) Draw the pond down.
(2) Excavate around the gate walls as much as practical.
(3) Drive some sheeting (preferably steel) on upstream face of stone piers at gates.
(4) Fill in space between sheeting and stone work with good concrete.
(5) Leave sheeting in place but cut tops off to a good line.
(6) Point up stone walls downstream on both sides of river after leaks are stopped.

This is not an easy place in which to work. My estimate for above work is $15,000 to do a good job.

Very truly yours,

BHP/ew

EDWARD WALLACE BUSH
MEMBER AMERICAN SOCIETY OF CIVIL ENGINEERS
CIVIL ENGINEER

I observed that concrete is well mixed and placed, and work is being constructed according to the details agreed upon on September 5th.

Talked with Mr.Palmer, Jr.; also with the Contractor. Later talked with Mr.Chandler at his office. I found out from him that Palmer Bros. Company have not asked him to come to dam since September 5th. He is apparently only employed to come when they send for him.

Edward W. Bush

EDWARD WALLACE BUSH
MEMBER AMERICAN SOCIETY OF CIVIL ENGINEERS
CIVIL ENGINEER

MEMORANDUM OF INSPECTION VISIT TO PALMER BROS. COMPANY'S DAM,, FITCHVILLE, CONN., September 5,1914.

******

Visited site of dam with Mr. Chandler; approved new plan of foundation and method of construction at the bottom of the cut-off wall. Mr. Palmer was present and approved changes in details which were suggested by Mr. Chandler.

The concrete work has not yet been started. At the present time the cut-off trench is about completed. The west end of the old dam has been removed in order to provide a gap through which the leakage could be controlled.

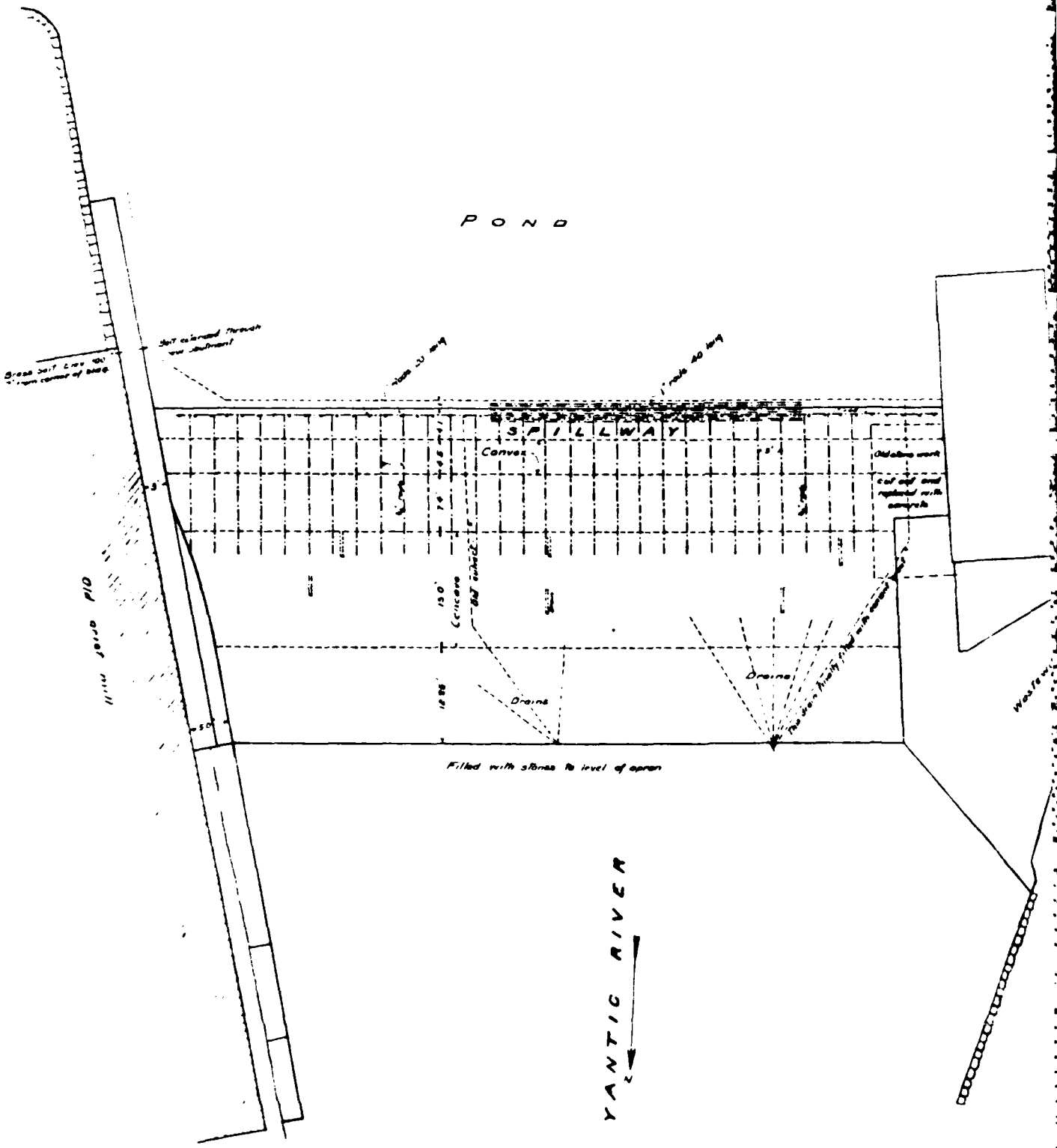
Mr. Chandler said he sounded bottom with a rod on September 4 and found good bottom except for about 26 ft. near middle portion where it is proposed to place tension rods in bottom of concrete to take care of any settlement. Mr.Chandler said he was satisfied his proposed plan would prove satisfactory.

INSPECTION VISIT SEPTEMBER 16,1914.

Visited Fitchville dam. Found concrete being placed in bottom of cut-off trench in easterly half of dam. The mixing is about as follows: four wheelbarrows of gravel, containing about 15% sand; two wheelbarrows of sand, two bags "Knickerbocker" cement. The Contractor and Mr. Palmer think they are using 1-2-4 concrete but because of considerable sand in the gravel I estimate the concrete about 1-2 1/2-4.

APPENDIX B-3

RECORD DRAWINGS AND SKETCHES


POND
SPILLWAY
Concrete
Drains
Drains
Filled with stones to level of apron
YANTIC RIVER

PLAN OF DAM BUILT BY
PALMER BROS. CO.
at Fitchville, Conn.
1914
Scale 8 feet to the inch. Chandler & Palmer, Engineers

I hereby certify that this plan correctly represents the Fitchville Dam as built
Attest: [illegible]

SHEET 1 of 2 SHEETS
Preliminary certificate of approval No 2-1 July 28, 1910
Final " " " Dec. 30 "
[illegible]
Secretary Board of Canal Engineers

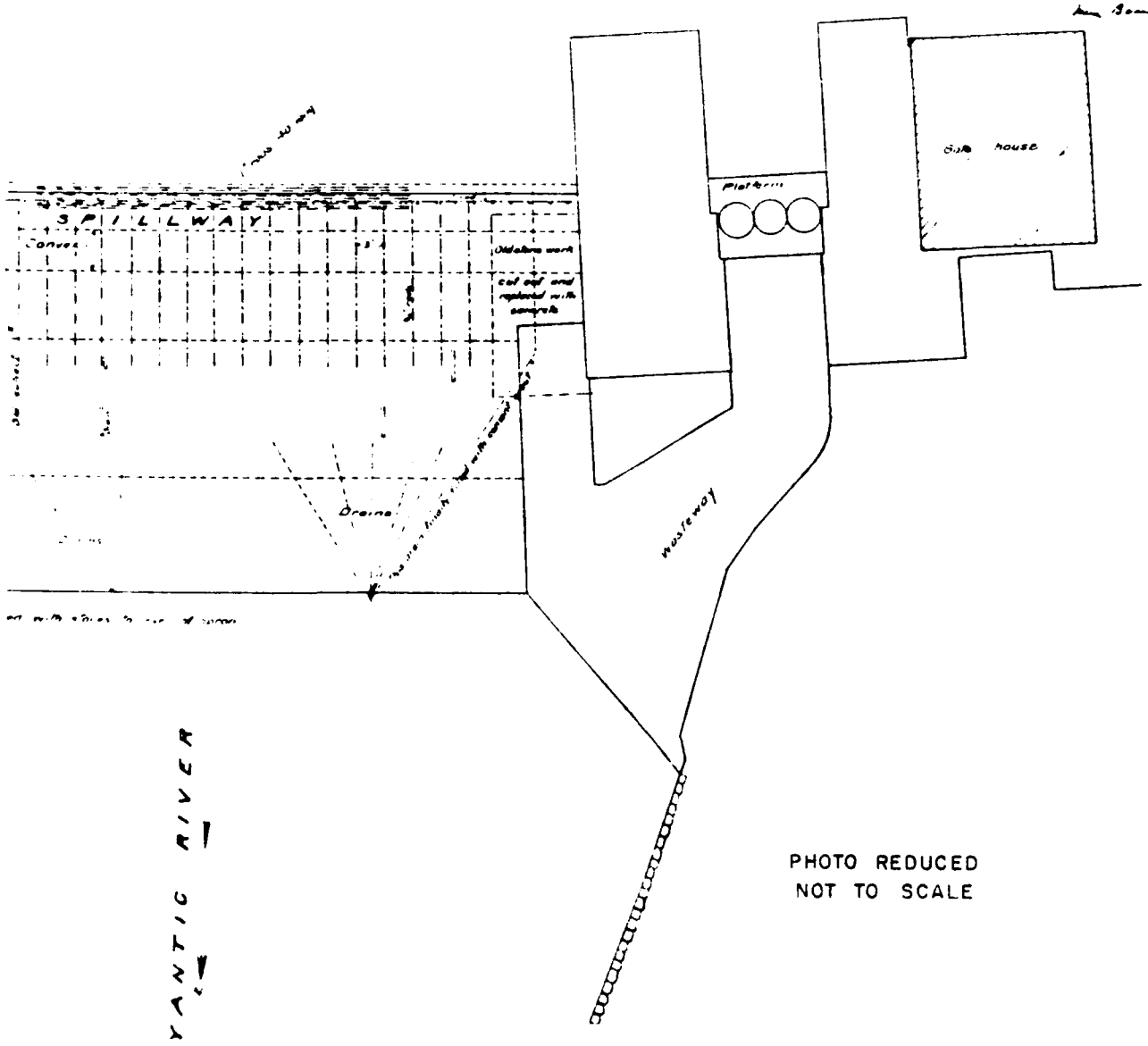
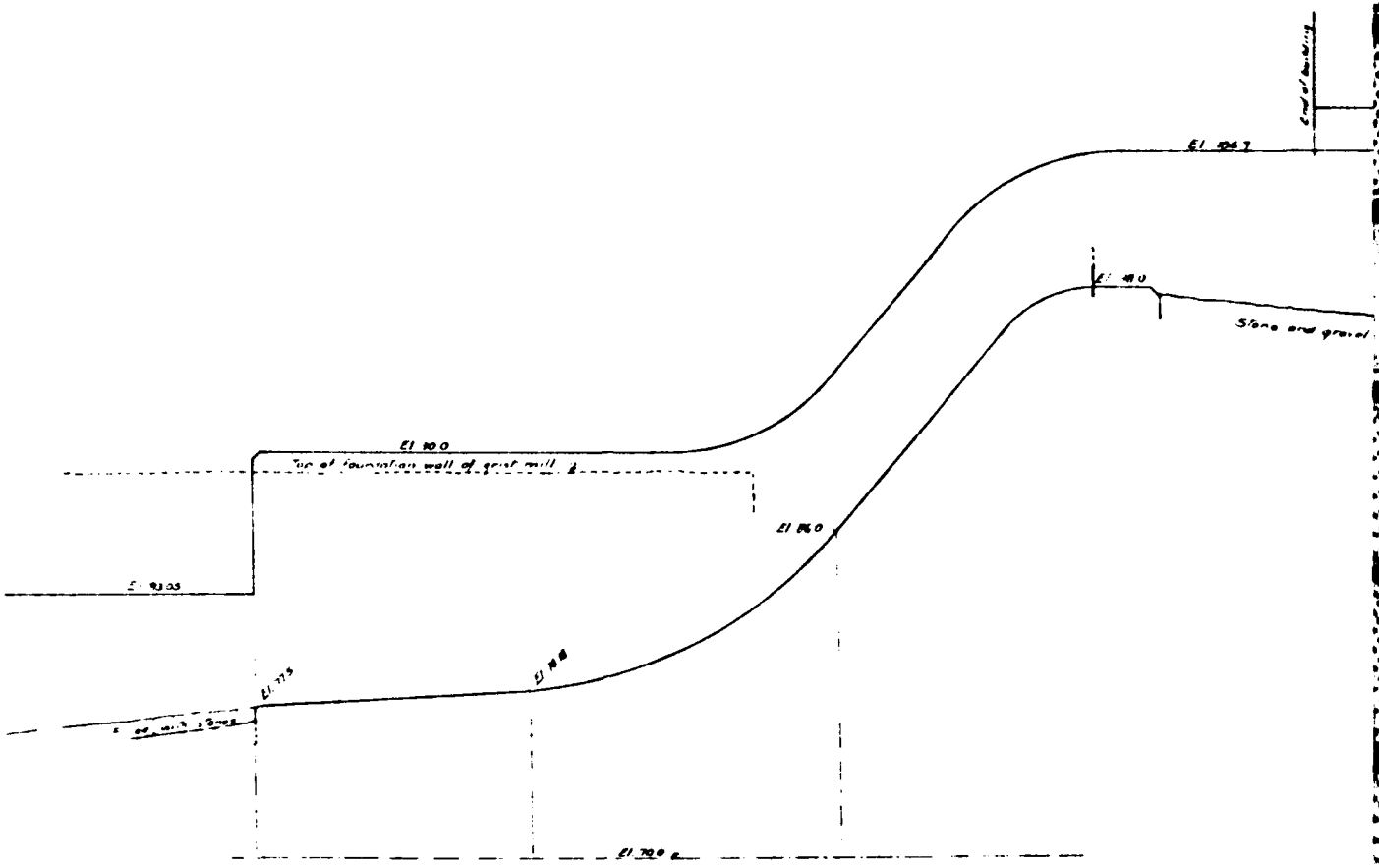
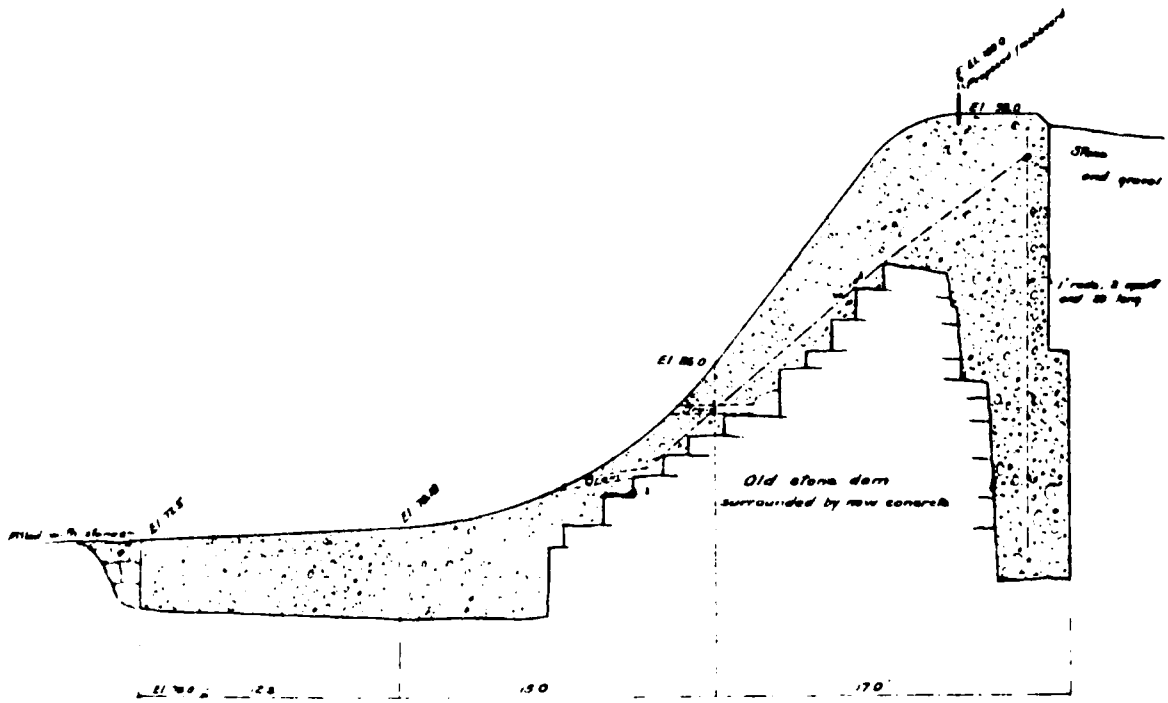


PHOTO REDUCED
NOT TO SCALE



ELEVATION OF EAST ABUTMENT



CROSS SECTION 10 FEET WEST OF OLD GRIST MILL

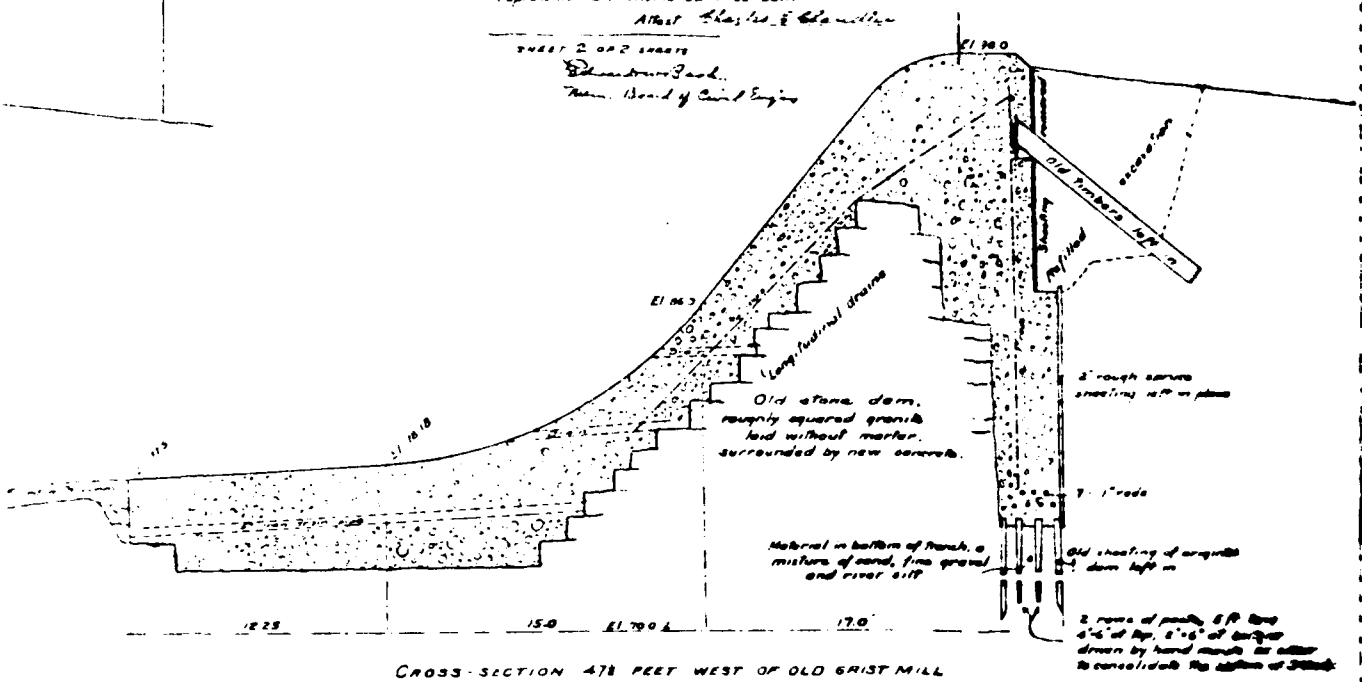
CROSS-SECTIONS AND ELEVATIONS OF DAM
BUILT BY
PALMER BROS. CO.
At Fitchville, Conn
1914
Scale 4 feet to the inch Chandler & Palmer Engineers

PHOTO REDUCED
NOT TO SCALE

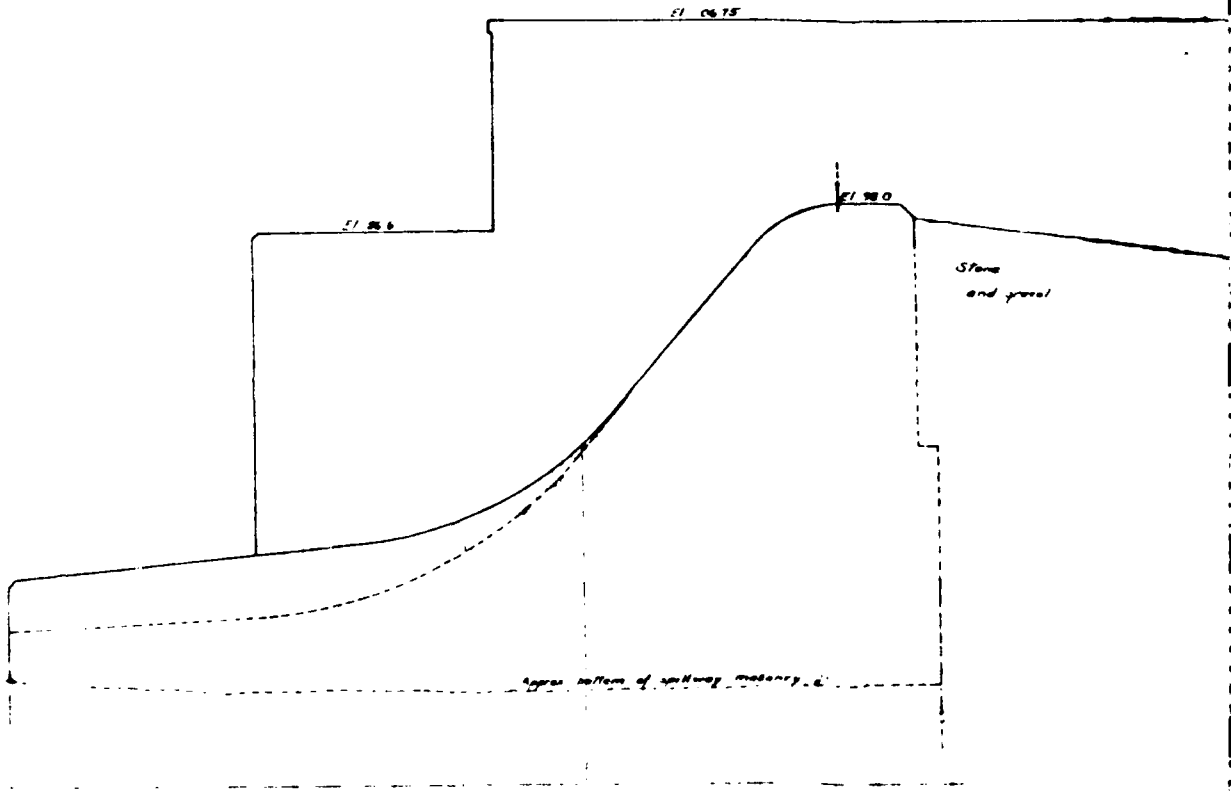
I hereby certify that this plan correctly represents the Fitchville dam as built
Attest

SHEET 2 OF 2 SHEETS

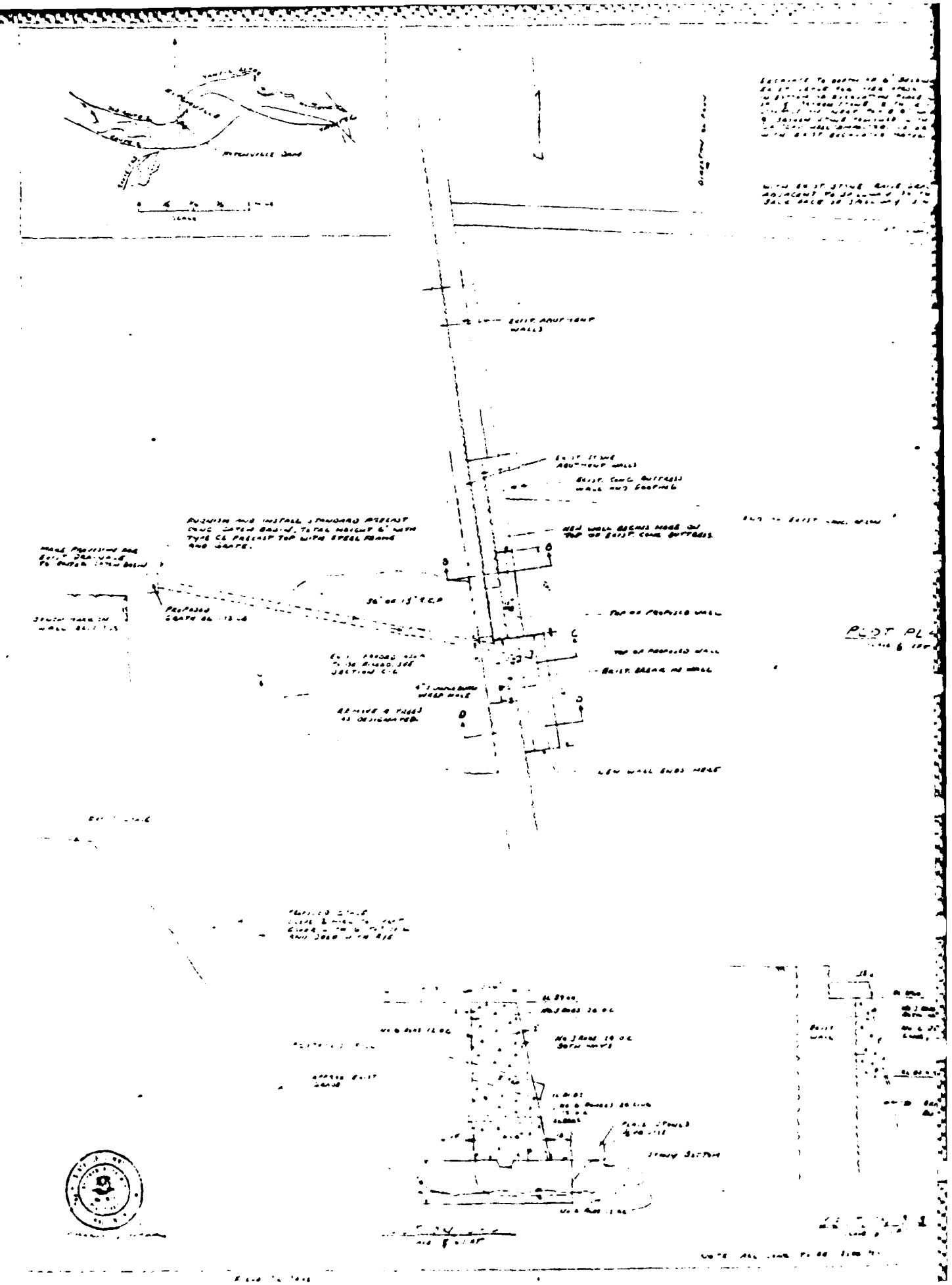
Town Board of Civil Engineers



CROSS-SECTION 478 FEET WEST OF OLD GRIST MILL



ELEVATION OF WEST ABUTMENT
LOOKING EAST



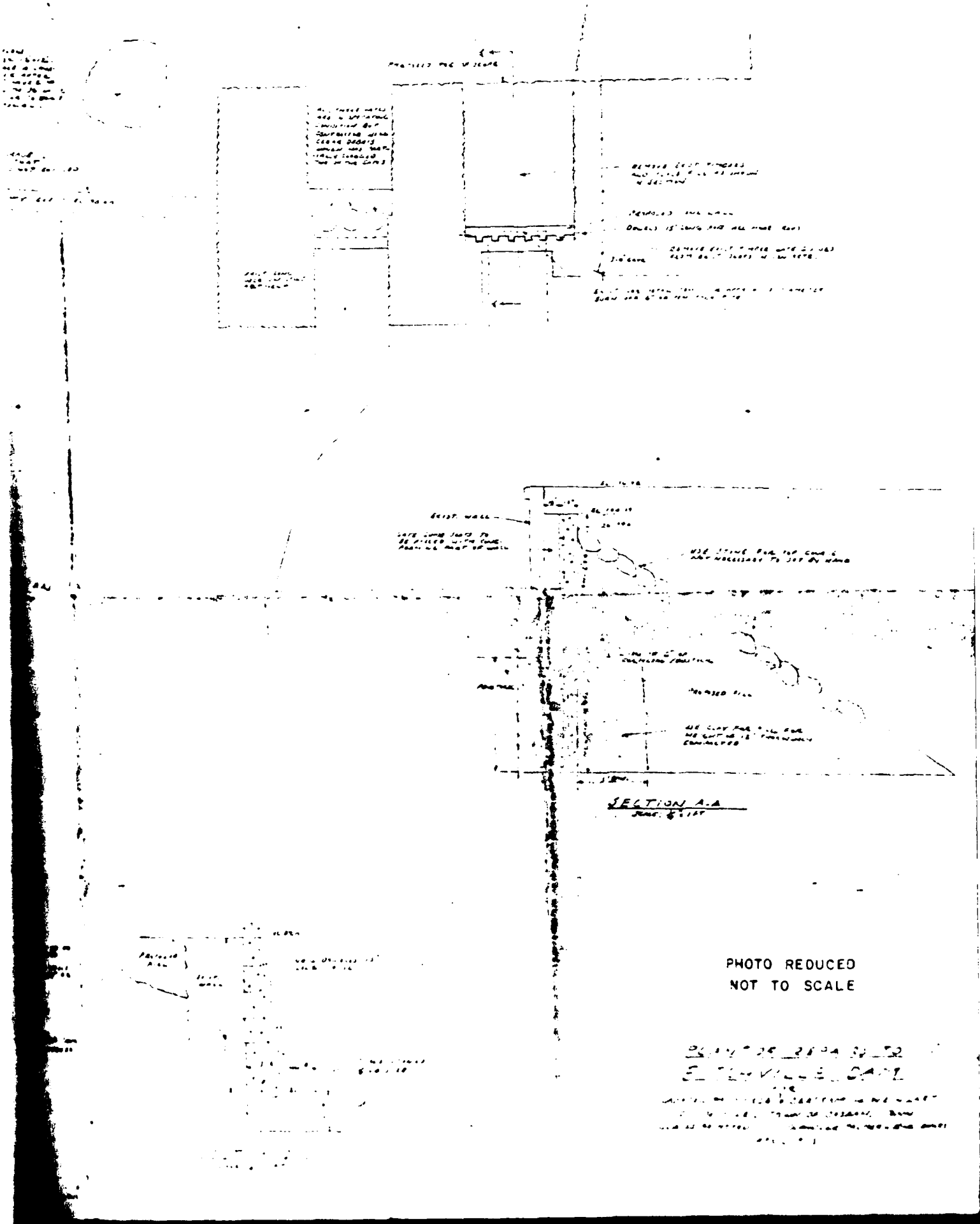
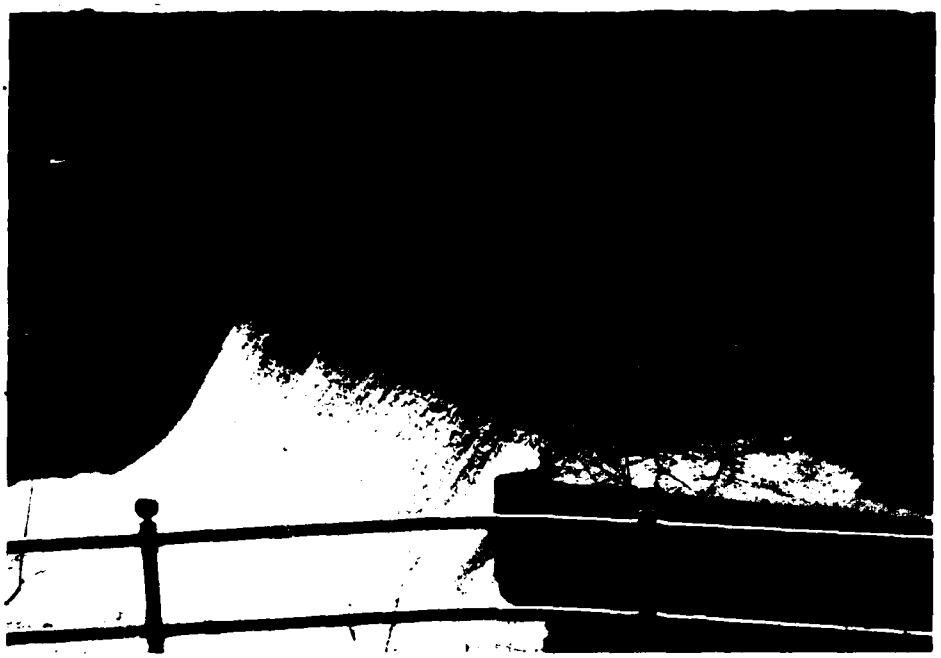


PHOTO REDUCED
NOT TO SCALE

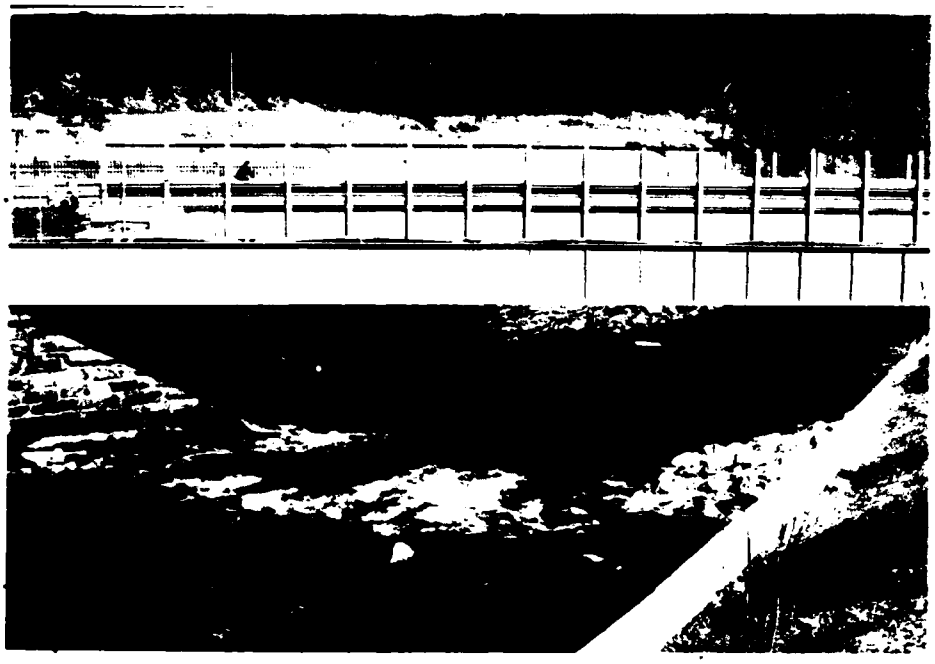
APPENDIX C

PHOTOGRAPHS

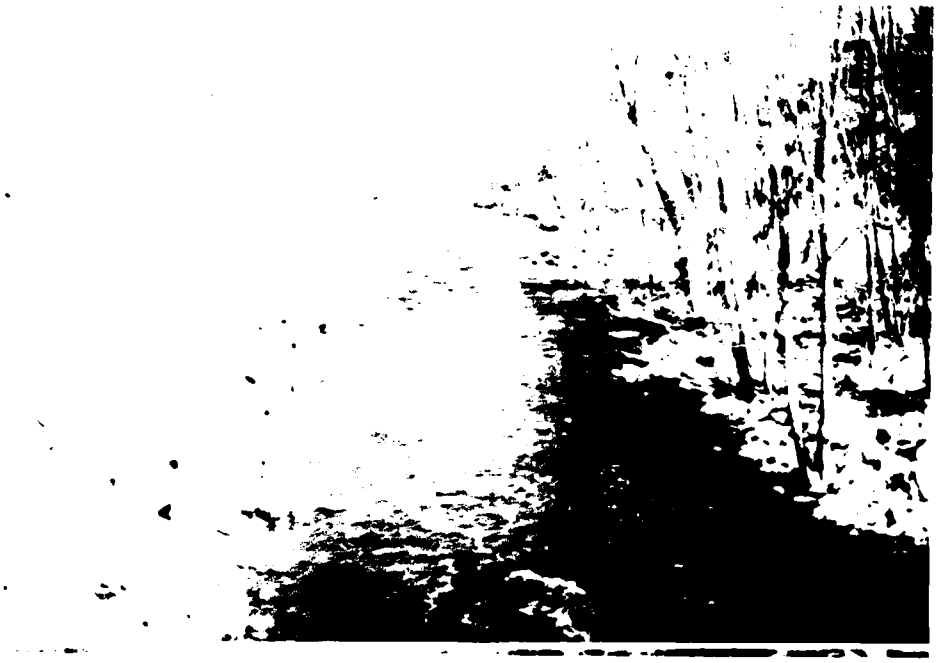


C-1 SPILLWAY - LOOKING FROM LEFT ABUTMENT

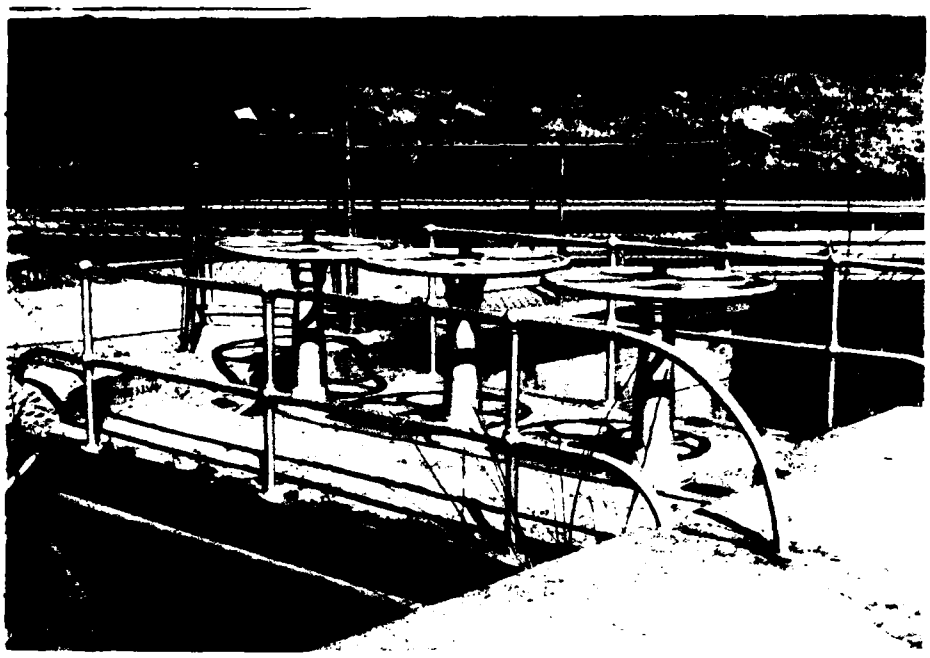
C-2 SPILLWAY - LOOKING FROM RIGHT ABUTMENT (NOTE CRACK IN CONCRETE MONOLITH ON LEFT ABUTMENT.



C-3 COLCHESTER - NORWICH TURNPIKE BRIDGE BELOW DAM

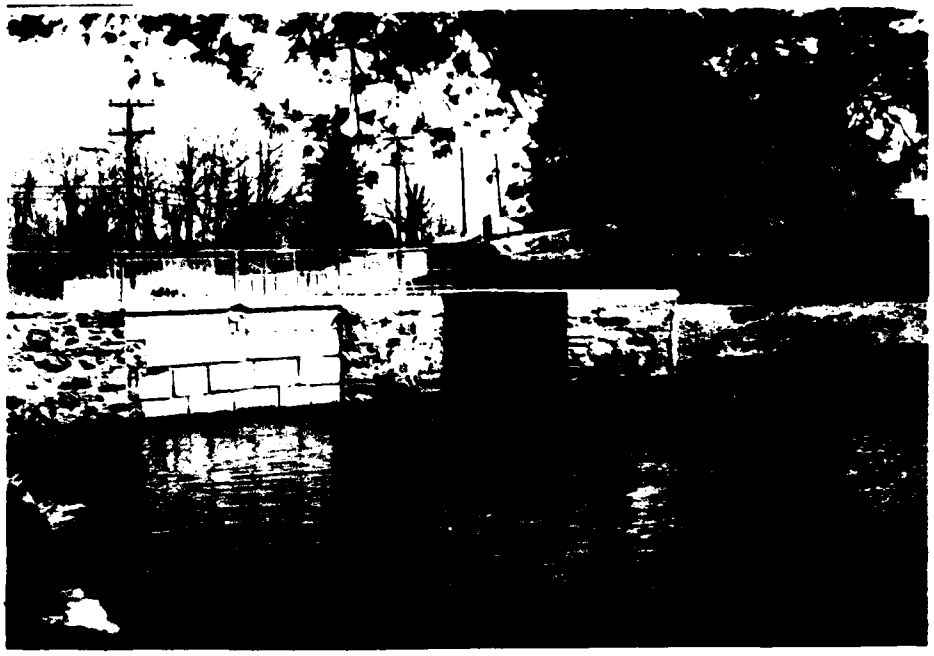


C-4 YANTIC RIVER DOWNSTREAM FROM DAM AND HIGHWAY BRIDGE



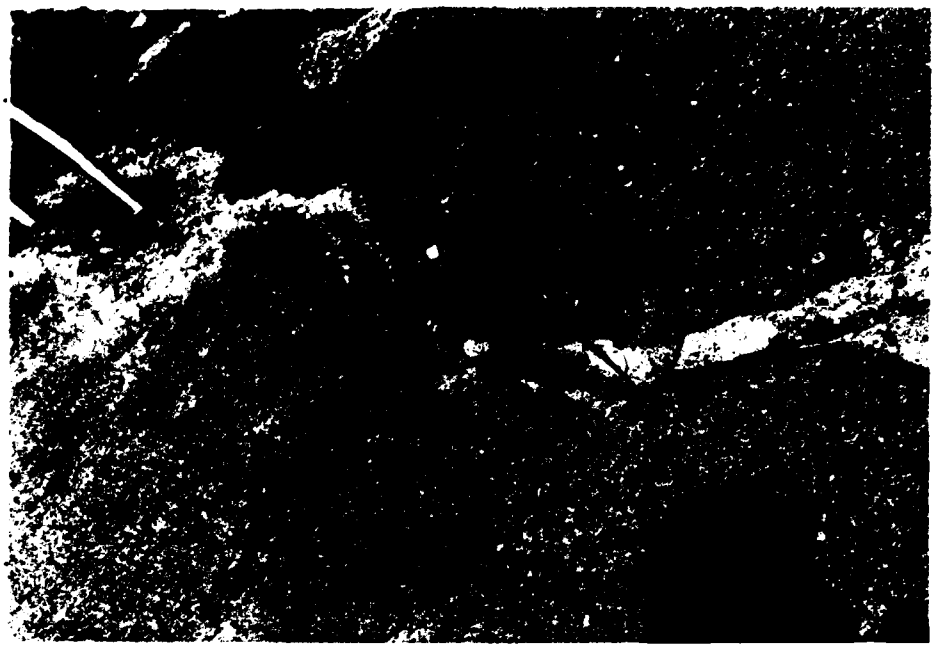
C-5 OUTLET WORKS CONTROL GATES

C-6 OUTLET WORKS (NOTE LEAKAGE AND ERODED CONCRETE)



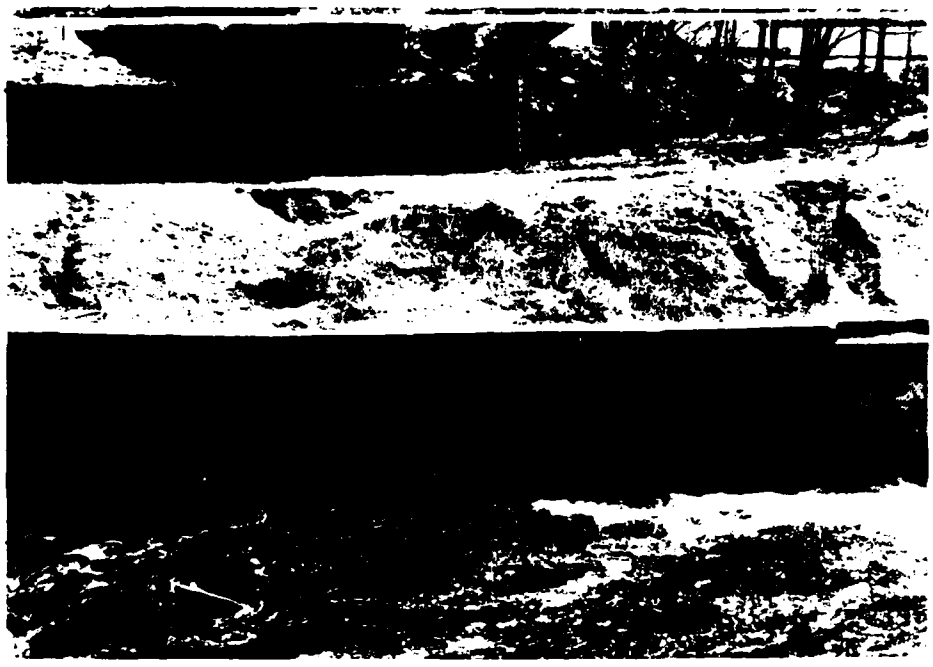
C-7 UPSTREAM FACE OF DAM AT LEFT ABUTMENT; BLOCKED PENSTOCK OPENING AT LEFT - APPROACH TO CONTROL GATES - MIDDLE - SPILLWAY AT RIGHT

C-8 OUTLET TO FORMER PENSTOCK TO MILL



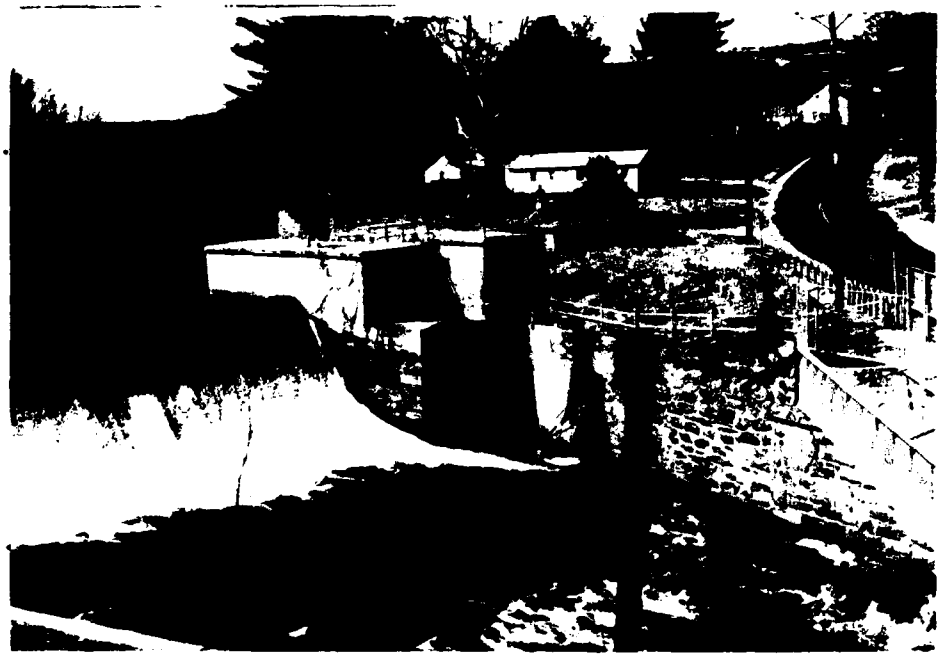
C-9 CRACK IN LEFT ABUTMENT OF SPILLWAY

C-10 ERODED CONCRETE FACING AT OUTLET WORKS DISCHARGE CHANNEL

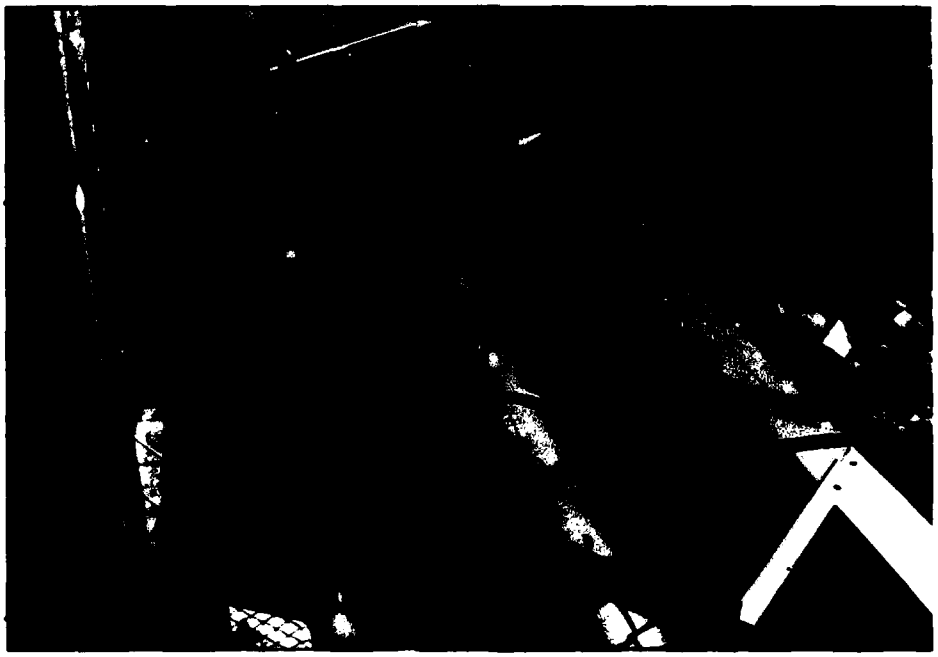


C-11 SURFACE EROSION IN EMBANKMENT BELOW DAM
STONEWORK DISLODGED IN RETAINING WALL

C-12 SURFACE EROSION FROM IMPROPER DRAINAGE FACILITY
ADJACENT TO SPILLWAY



C-13 LEFT ABUTMENT OF DAM AND OUTLET WORKS (HIGHWAY BRIDGE - RIGHT FOREGROUND)

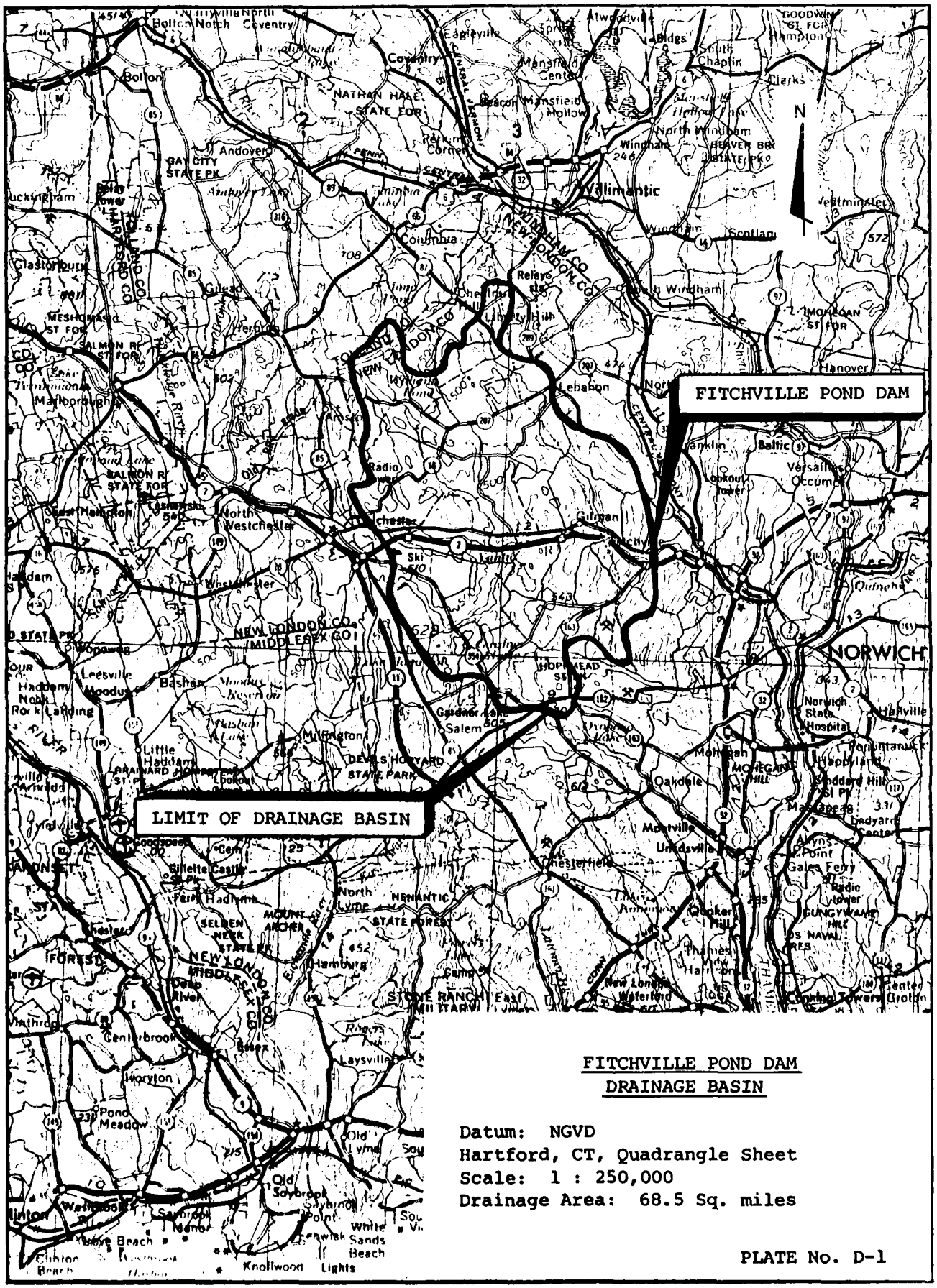


C-14 30" MAIN WATER SUPPLY FOR CITY OF NORWICH

C-15 "WASHED OUT" MASONRY WALL IMMEDIATELY BELOW DAM

APPENDIX D

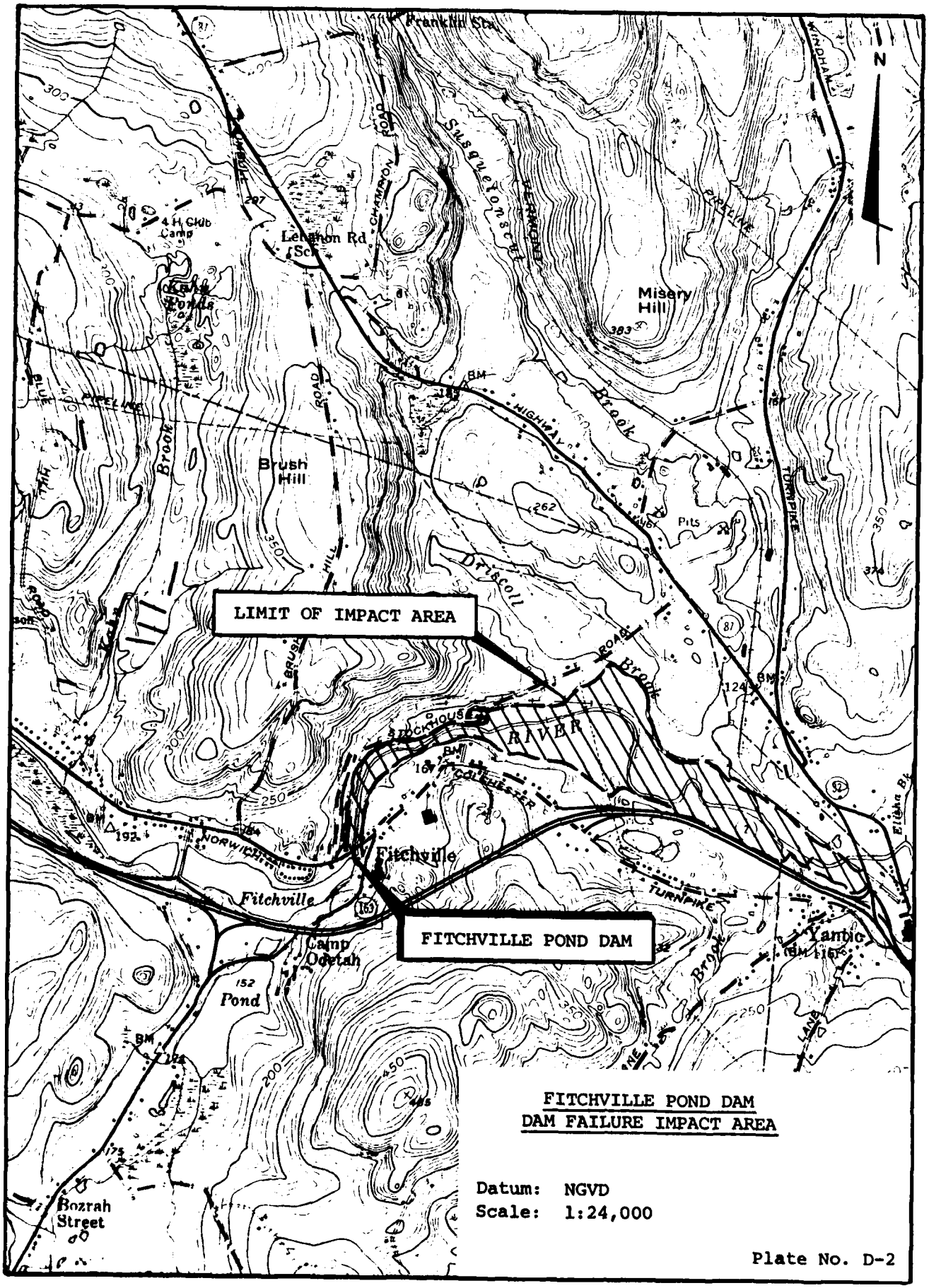
HYDROLOGIC AND HYDRAULIC COMPUTATIONS



FITCHVILLE POND DAM
DRAINAGE BASIN

Datum: NGVD
Hartford, CT, Quadrangle Sheet
Scale: 1 : 250,000
Drainage Area: 68.5 Sq. miles

PLATE No. D-1



FITCHVILLE POND DAM
DAM FAILURE IMPACT AREA

Datum: NGVD
Scale: 1:24,000

Plate No. D-2

Fitchville Pond Dam

A. Size Classification

Height of dam = 27 ft.; hence Small

Storage capacity at top of dam (elev. 158.7) = 759 AC-FT.; hence Small

Adopted size classification small

B.i) Hazard Potential

Fitchville Pond Dam is located in an area surrounded by high elevations and its failure may cause downstream disruption of roads, highways, and public utilities located adjacent to banks of river.

ii) Impact of Failure of Dam at Maximum Pool (Top of Dam)

It is estimated from the rule of "thumb" failure hydrograph, that the following adverse impacts are a possibility by the failure of this dam.

a) Loss of life ; - to - lives can be lost.
b) Loss of homes Yes ; 0 to 1 homes can be lost.
c) Loss of buildings Yes ; 0 to 1 buildings can be lost.
d) Loss of highways or roads Yes ; Colchester Turn pike can be damaged.
e) Loss of bridges Yes ; 0 to 1 bridge can be lost.
f) Miscellaneous Yes ; Utilities located adjacent to roadway.

The failure profile can affect a distance of 10000 feet from the dam. For water surface elevation, see next page in Appendix D.

C. Adopted Classifications

HAZARD	SIZE	TEST FLOOD RANGE
Significant	Small	Half PMF to 100 year.

Adopted Test Flood = Half PMF = 500 CSM

= 34250 CFS

D. Overtopping Potential

Drainage Area = 68.5 sq. miles

Spillway crest elevation = 152.0 NGVD

Top of Dam Elevation = 158.7 NGVD

Maximum spillway discharge Capacity without overtopping of dam = 7120 CFS

"test flood" inflow discharge = 34250 CFS

"test flood" outflow discharge = 30000 CFS

% of "test flood" overflow carried by spillway without overtopping = 24

"test flood" outflow discharge portion which overflows over the dam = 22883

% of test flood which overflows over the dam = 76

Estimating Maximum Probable Discharges - Inflow and Outflow Values Date of Inspection: _____

Name of Dam Fitchville Pond Dam ; Location of Dam Yantic River ; Town Bozrah

Watershed Characterization Rolling terrain, small upstream storages ; 6.85 sq. miles of drainage area is swampy or occupied by storage reservoirs

Adopted "test" flood = _____ PMF = _____ CSM = _____ CFS; Re = Effective Rainfall = 9.50 inches

D.A. = Drainage Area (Gross) = 68.50 Square Miles; Basin Slope = 0.06± hence; Moderate to steep

S.A. = Surface Area of Reservoir = 0.095 Square Miles; Time of Concentration 6-8 hours

Shape and Type of Spillway = Overflow; ogee type, concrete spillway

B = Width of Spillway = 108 feet; C = Coefficient of Discharge = (4.00-Friction) = 3.80

Maximum Capacity of Spillway Without Overtopping = 7120 CFS = 24 % of test flood

Top of Dam Elevation = 158.7 + ; Spillway Crest Elevation = 152.0

Overflow portion of Length of Dam = 200 ; C = Coefficient of discharge for Dam = 3.00

Name of Dam	Test Flood Q_p CSM	Test Flood Q_p CFS	Inflow Characteristics h_0 in feet	Inflow Characteristics S_0 in in.	Outflow Characteristics First Approximation Q_{p1} CFS	Outflow Characteristics First Approximation h_1 in ft.	Outflow Characteristics First Approximation S_1 in in.	Outflow Characteristics Second Approximation S_2 in in.	Outflow Characteristics Second Approximation h_2 in ft.	Outflow Characteristics Second Approximation Q_{p2} CFS	Outflow Characteristics Third Approximation (Adopted) S_3 in in.	Outflow Characteristics Third Approximation (Adopted) h_3 in ft.	Outflow Characteristics Third Approximation (Adopted) Q_{p3} CFS
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Fitchville Pond Dam	1/2 PMF 500	34250	19.04	0.316	--	--	--	0.29	18.0	30000	0.29	18.00	30000

Q_p = Discharge; h = Surcharge height; S = Storage in inches

NOTE: Outflow discharge values are computed as per COE guidelines.

Fitchville Pond Dam

"Rule of Thumb Guidance for Estimating Downstream Dam Failure Discharge"

BASIC DATA

Name of dam Fitchville Pond Dam Name of town Bozrah

Drainage area = 68.5 sq. mi., Top of dam 158.7 NGVD

Spillway type = Overflow, ogee, concrete Crest of spillway 152.0 NGVD

Surface area at crest elevation = 0.095 Sq. M. = 61 Acres

Reservoir bottom near dam = 133.7 NGVD

Assumed side slopes of embankments 2:1

Depth of reservoir at dam site 25.0 = y_o = 25.0 ft.

Mid-height elevation of dam = 248.7 NGVD

Length of dam at crest = 200 feet

Length of dam at mid-height = 160 feet

10% of dam length at mid-height = W_b = 16 feet

Step 1:

Elevation (NGVD)	Estimated Storage in AC-FT
152.0	350
154.0	472
156.0	594
158.0	716
158.7	759
160.0	838
162.0	960

Step 2:

$$Q_{p1} = \frac{8}{27} W_b \sqrt{g}\, y_o^{3/2} + \text{spillway discharge at time of failure.}$$

$$= 3360 + 6240 = 9600 \text{ CFS}$$

NOTE: Failure of dam is assumed to be instantaneous when pool reaches top of dam and is a full depth--partial width failure. Failure site is assumed at the center of spillway location.

Fitchville Pond Dam

Dam Failure Analysis

1. Failure discharge with pool at top of dam (elev.) = 9600 CFS

2. Depth of water in reservoir at time of failure = 25 ft.

3. Maximum depth of flow downstream of dam) at time of failure) = 17.0 ft.

4. Water surface elevation just downstream) of dam at time of failure) = 148.5 NGVD

The failure discharge of 9600 CFS will enter Yantic River and flow downstream 200 feet until the brook crosses Colchester Turnpike. There is significant valley storage in this 200 feet length of brook to reduce the discharge substantially. Also due to roughness characteristics, obstructions and frictional losses, it is very likely that the unsteady dam failure flow will dissipate its wave and kinetic energy and thus convert to steady and uniform flow obeying Manning's formulae 10,000 feet downstream. The failure profile will have the following hydraulic characteristics:

DISTANCE FROM THE DAM	WATER SURFACE ELEVATION NGVD	REMARKS
0 + 00	158.7	Upstream of dam
0 + 00	148.5	Downstream of dam
10 + 00	143.0	
20 + 00	139.0	
30 + 00	135.0	
40 + 00	131.0	
50 + 00	127.0	
60 + 00	123.0	
70 + 00	119.0	
80 + 00	115.0	
90 + 00	111.0	
100 + 00	107.0	

Beyond 10000 feet.
Failure discharge will flow in the below given channel characteristics:

Q = 8000 CFS; S = 0.0057 to 0.0017

n = 0.05 ; b = varies ; d = 12.0 feet

Side slopes = 1V on 2H.

COMPUTATIONS FOR
SPILLWAY RATING CURVE AND
OUTLET RATING CURVE COMPUTATIONS

Spillway width = 108.0 ± feet; Spillway crest elevation = 152.0 NGVD

Length of dam = 200.0 ± feet; Top of dam elevation = 158.7 NGVD

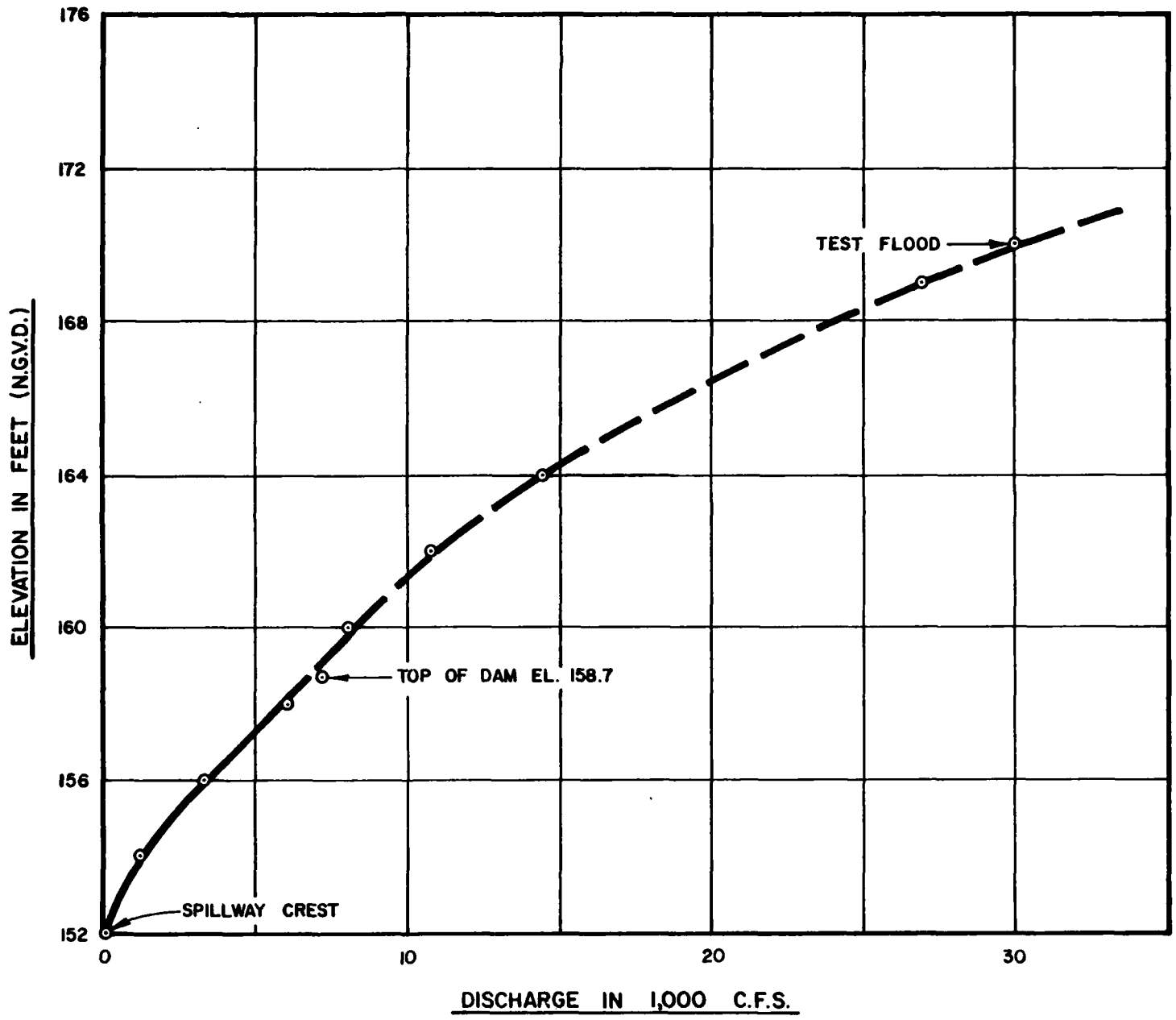
C = 3.80 for spillway and 3.0 for the dam.

i) SPILLWAY RATING CURVE COMPUTATIONS

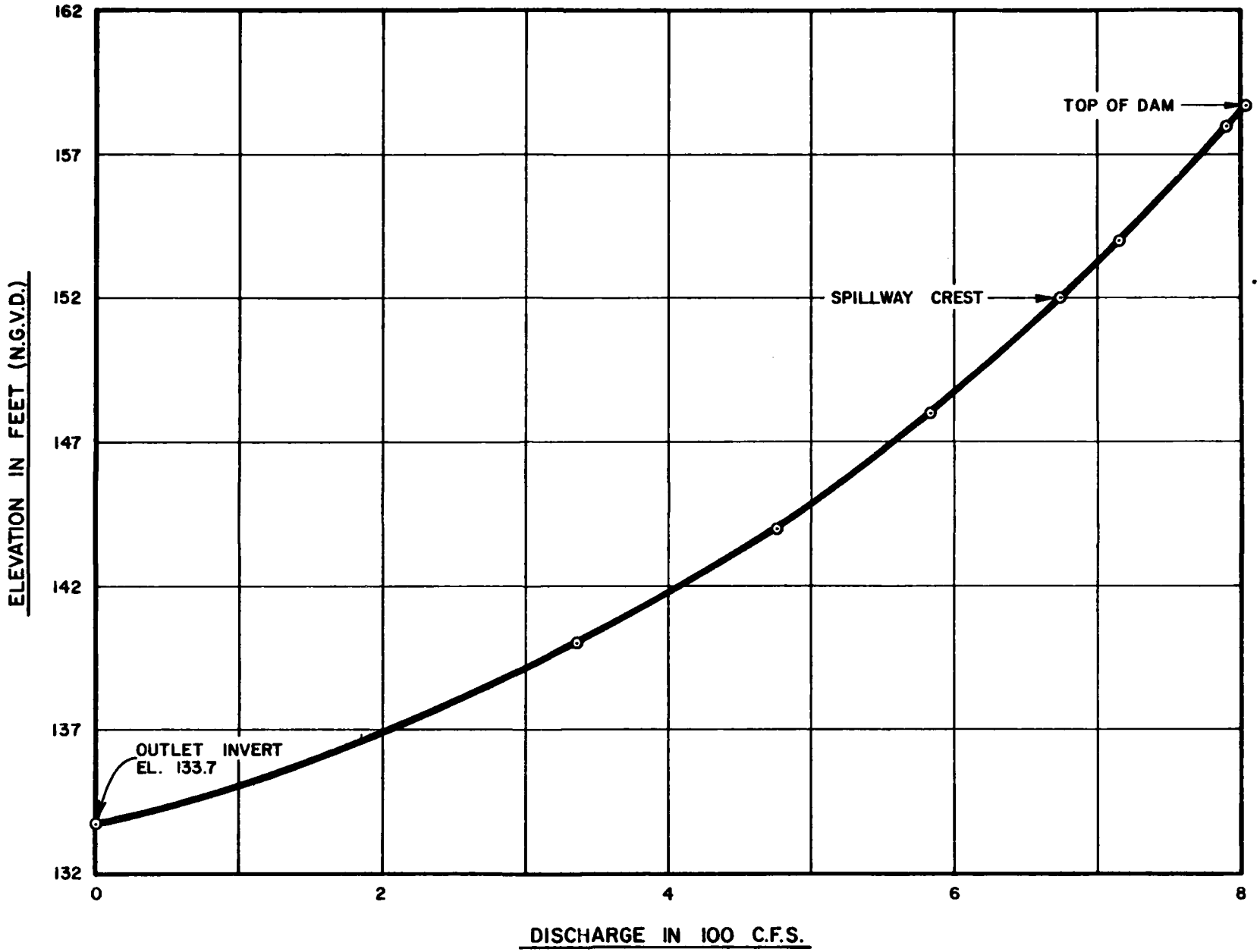
Elevation (ft.) NGVD	Spillway Discharge (CFS)	Remarks
152	0	Spillway crest
154	1161	
156	3283	
158	6032	
158.7	7117	Top of Dam
160.0	8006	
162	10713	
164	14438	
169	26951	
171.4	30000	Test Flood

ii) OUTLET RATING CURVE COMPUTATIONS (Size of outlet = 3-4.5'x2.5')
(Area of Outlet = 33.75 sq. ft.)
(Invert of Outlet = 133.7)
(Centerline of Outlet = 135.95 136.0)

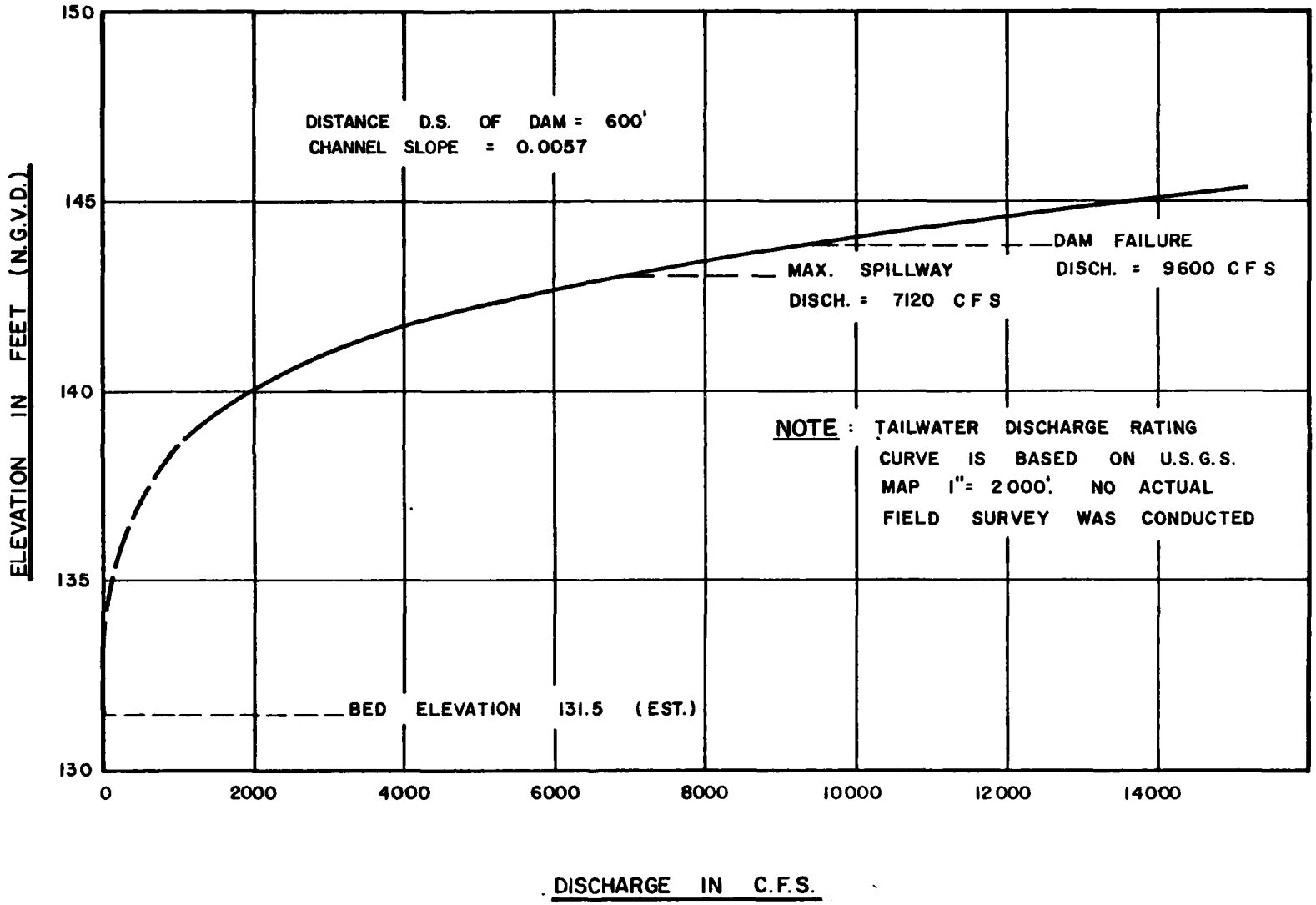
Elevation (ft.) NGVD	Discharge (CFS)	Remarks
170	984	Test Flood Elevation
166	924	
164	860	
158.7	804	Top of Dam Elevation
158	791	
154	716	
152	675	Spillway Crest Elevation
148	584	
144	477	
140	337	
136		Centerline of Outlet
133.1	0	Invert of Outlet



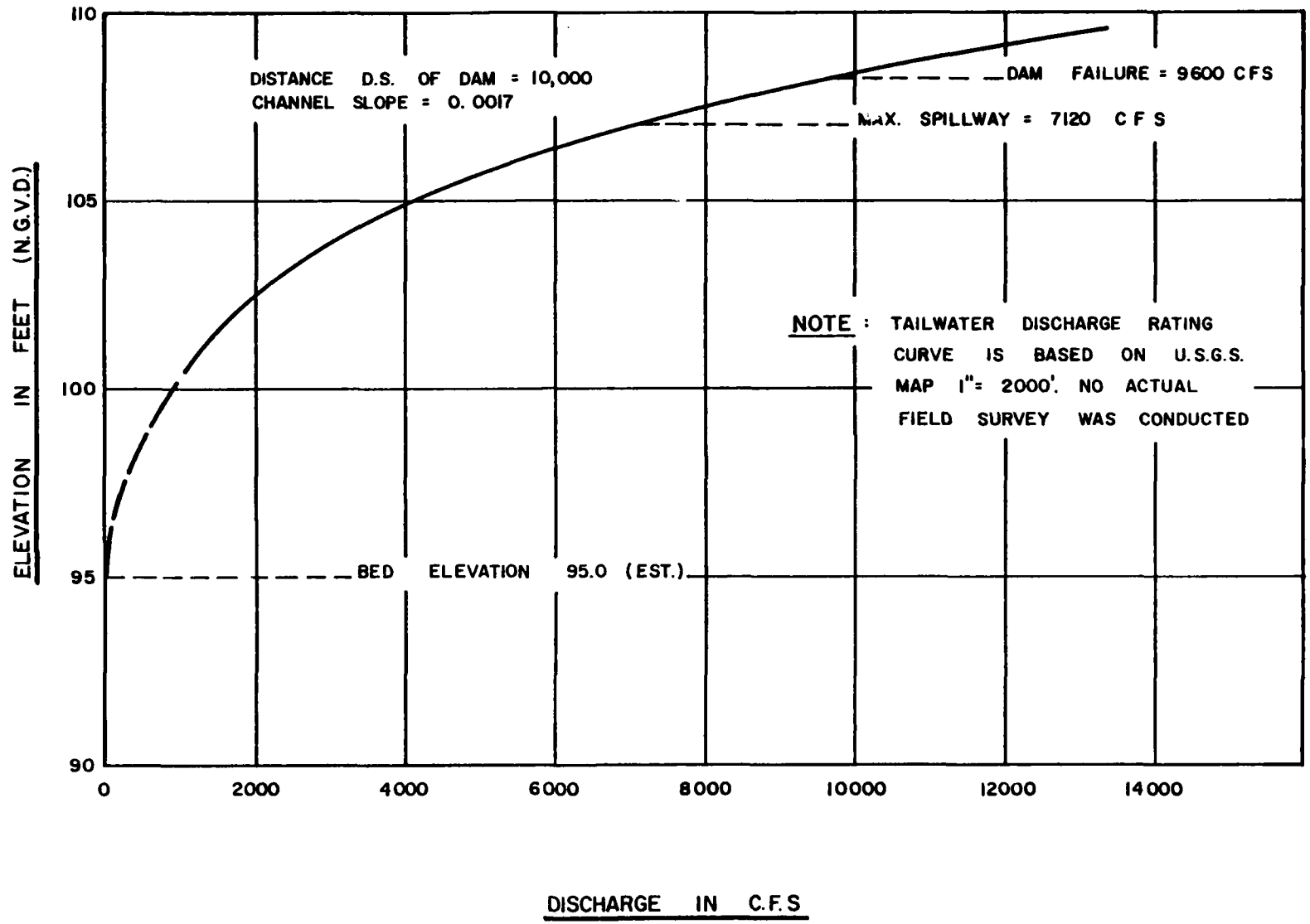
FITCHVILLE POND DAM
SPILLWAY RATING CURVE



FITCHVILLE POND DAM
OUTLET WORKS RATING CURVE



FITCHVILLE POND DAM
TAILWATER DISCHARGE RATING
CURVE NO. 1



FITCHVILLE POND DAM
TAILWATER DISCHARGE RATING
CURVE NO. 2

APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS IN THE UNITED STATES

STATE	IDENTITY NUMBER	DIVISION	STATE	COUNTY	CONGR DIST.	STATE	COUNTY	CONGR DIST.	NAME	LATITUDE (NORTH)	LONGITUDE (WEST)	REPORT DATE DAY	MO	YR
CT	510-ED		CT	011	02				FITCHVILLE POND DAM	4133.8	7209.4	17	MAY	79

POPULAR NAME	NAME OF IMPOUNDMENT
	FITCHVILLE POND

REGION	BASIN	RIVER OR STREAM	NEAREST DOWNSTREAM CITY–TOWN–VILLAGE	DIST FROM DAM (MI.)	POPULATION
01	07	YANTIC RIVER	FITCHVILLE	0	2500

TYPE OF DAM	YEAR COMPLETED	PURPOSES	STRUCTURAL HEIGHT (FT.)	HYDRAULIC HEIGHT (FT.)	IMPOUNDING CAPACITIES MAXIMUM (ACRE–FT.)	NORMAL (ACRE–FT.)	DIST	OWN	FED R	PRV/FED	SCS A	VER/DATE
RUBLE	1871	R	27	39	759	350	NED	N	N	N	N	11APR79

REMARKS
21 CONCRETE + STONE MASONRY

D/S HAS	SPILLWAY CREST LENGTH	TYPE	WIDTH (FT.)	MAXIMUM DISCHARGE (FT.)	VOLUME OF DAM (CY)	POWER CAPACITY INSTALLED (MW)	PROPOSED (MW)	NAVIGATION LOCKS NO.	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)
2	200	U	108	7117												

OWNER	ENGINEERING BY	CONSTRUCTION BY
SEYMOURS SAND + STONE	UNKNOWN	UNKNOWN

REGULATORY AGENCY			
DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
NONE	NONE	NONE	DEPT ENV PROT

INSPECTION BY	INSPECTION DATE DAY	MO	YR	AUTHORITY FOR INSPECTION
CE MAGUIRE INC	11	APR	79	PL 92-367

REMARKS:

FILMED