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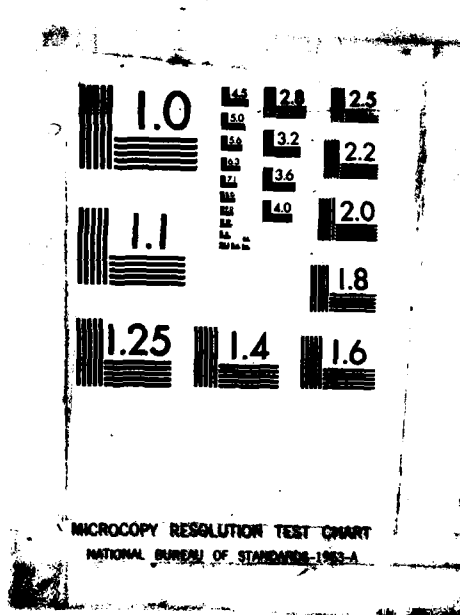
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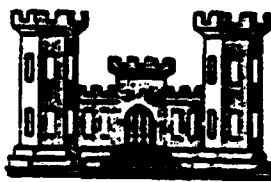
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MERRIMACK RIVER BASIN
GROTON, MASSACHUSETTS

LOST LAKE DAM
MA 00808

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PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM



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

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) —The dam is about 80 ft. long and 10 ft. high. The size is intermediate with a hazard potential of high. The visual inspection indicated the dam to be in fair condition. The owner should institute various remedial measures which are listed in the report itself.		

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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-E

Honorable Edward J. King
Governor of the Commonwealth of
Massachusetts
State House
Boston, Massachusetts

Dear Governor King:

Inclosed is a copy of the Lost Lake Dam Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. The report is based upon a visual inspection, a review of past performance, and a preliminary hydrological analysis. A brief assessment is included at the beginning of the report.

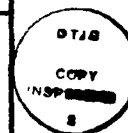
The preliminary hydrologic analysis has indicated that the spillway capacity for the Lost Lake Dam would likely be exceeded by floods greater than 3 percent of the Probable Maximum Flood (PMF), the test flood for spillway adequacy. Our screening criteria specifies that a dam of this class which does not have sufficient spillway capacity to discharge fifty percent of the PMF, should be adjudged as having a seriously inadequate spillway and the dam assessed as unsafe, non-emergency, until more detailed studies prove otherwise or corrective measures are completed.

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

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

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Honorable Edward J. King

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

A copy of this report has been forwarded to the Department of Environmental Quality Engineering, the cooperating agency for the Commonwealth of Massachusetts. This report has also been furnished to the owner of the project, Lost Lake Water Committee.

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

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

Sincerely,


MAX B. SCHEIDER

Colonel, Corps of Engineers
Division Engineer

17/11
NATIONAL DAM INSPECTION PROGRAM
PHASE I INVESTIGATION REPORT
BRIEF ASSESSMENT

Identification No.: MA 00808
Name of Dam: Lost Lake Dam
Town: Groton
County and State: Middlesex County, Massachusetts
Stream: Cow Pond Brook
Date of Inspection: November 5, 1979

The dam is about 80 feet long and 10 feet high. It was constructed of earth fill with a concrete wall at the upstream face and a small concrete spillway and outlet channel. The dam is owned and operated by the Lost Lake Water Committee. It was constructed in the early 1900's.

There was no indepth engineering data available for review. Therefore, the adequacy of the dam was primarily evaluated by visual inspection, past performance history and sound engineering judgement. The visual inspection indicated the dam to be in fair condition.

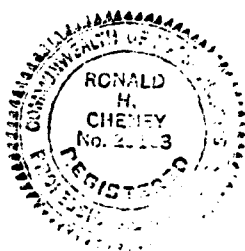
The dam has a size classification of intermediate and a hazard potential classification of high. Based upon Corps Guidelines, the PMF test flood inflow would be 3,500 cfs, from the 4.11 square mile drainage area. The test flood discharge is 2,300 cfs and 2,020 cfs, with and without stoplogs, respectively. The corresponding surcharge elevations are 219.5 and 219.1. The top of dam, elevation 216, is overtopped in both cases. The spillway has a capacity of about 75 to 200 cfs with and without stoplogs,

respectively. This equals 3 and 10 percent of the test flood outflow.

The dam is in fair condition. It is recommended that the Owner engage a qualified registered professional engineer to perform a detailed hydraulic/hydrologic investigation concerning increasing spillway capacity, providing draw down facilities, and the ability of the dam to withstand overtopping. Also a qualified registered professional engineer should supervise the removal of the large trees growing on the dam and the back-filling of the subsequent holes.

The Owner should institute remedial measures which include: operating the spillway without stoplogs to provide the maximum available discharge and storage capacity; placing slope protection at the end of the spillway outlet; development of a formal warning system for the downstream impact area; and inspecting the dam once every year by a qualified registered professional engineer.

The recommendations and remedial measures should be implemented by the Owner within one year after receipt of this Phase I Investigation Report.



Ronald H. Cheney
Ronald H. Cheney, P.E.
Vice President

Hayden, Harding & Buchanan, Inc.
Boston, Massachusetts

This Phase I Inspection Report on Lost Lake 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.

Aramast Mahteslian

ARAMAST MAHTESLIAN, MEMBER
Geotechnical Engineering Branch
Engineering Division

Carney M. Terzian

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

Richard J. DiBuono

RICHARD DIBUONO, CHAIRMAN
Water Control 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, 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 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 chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and 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.

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

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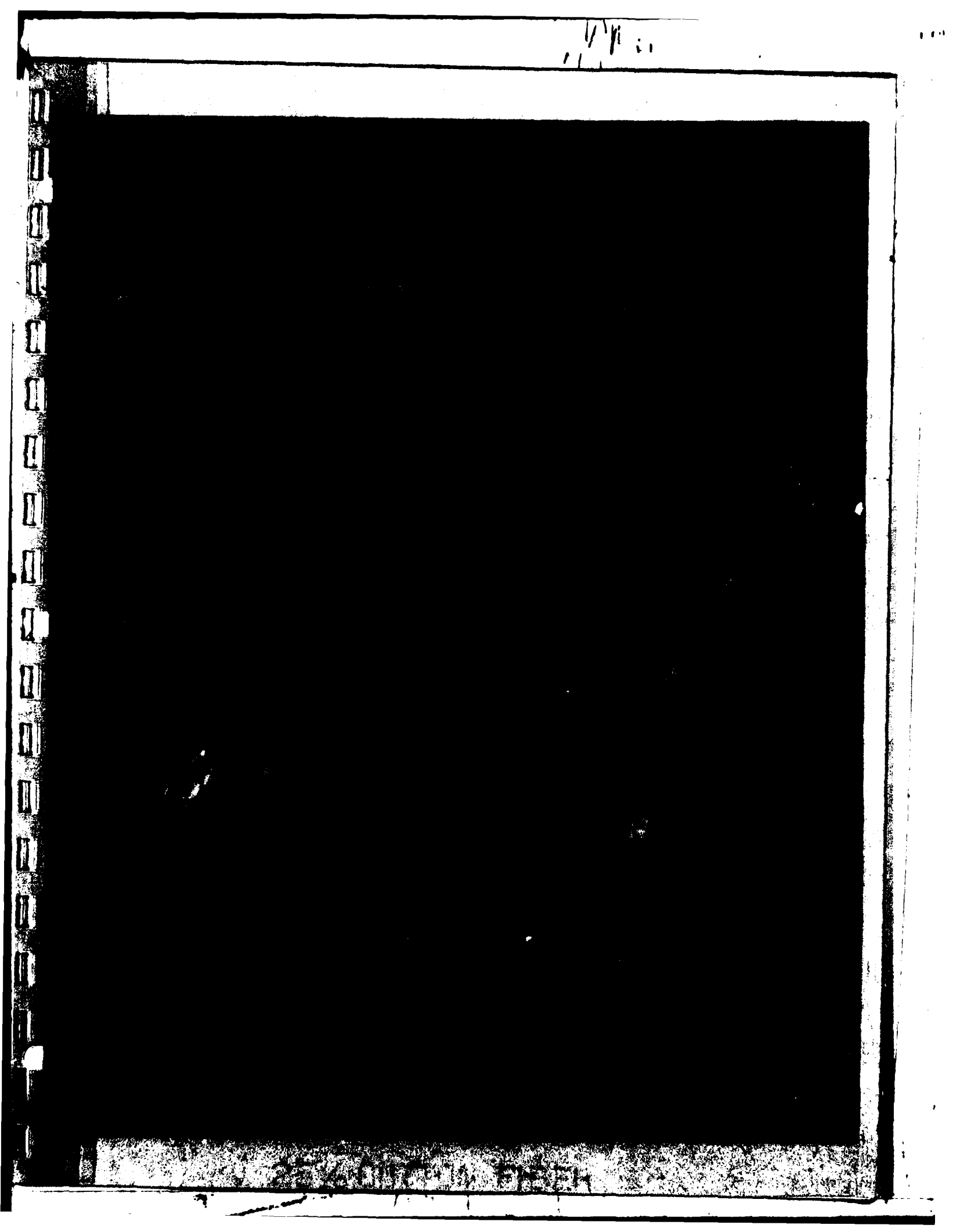
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PHASE I
NATIONAL DAM INSPECTION PROGRAM

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. Hayden, Harding & Buchanan, Inc. has been retained by the New England Division to inspect and report on selected dams in the State of Massachusetts. Authorization and notice to proceed was issued Hayden, Harding & Buchanan, Inc. under a letter of 24 October 1979 from William E. Hodgson Jr., Colonel, Corps of Engineers. Contract No. DACW 33-80-C-0006 has been assigned by the Corps of Engineers for this work.

b. Purpose

(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 Project

a. Location

Lost Lake Dam is located in the Town of Groton, in Middlesex County, Massachusetts. The dam impounds the waters of Lost Lake and is located within the northeast portion of the lake. Lost Lake Dam is shown on the Ayer U.S.G.S. Massachusetts Quadrangle with the approximate coordinates of North $42^{\circ}36'00''$, West $71^{\circ}31'07''$.

b. Description of Dam and Appurtenances

Lost Lake Dam is a 10+ foot high by 80+ foot long concrete and earth embankment structure containing a central concrete spillway. The spillway has a 15 foot wide concrete, downstream channel. Without stoplogs the spillway has a 7 foot long by 4 foot high opening, however stoplogs can be added to the crest. The spillway is flanked on the right by a 40+ foot long earth embankment having a vertical 3 foot thick stepped concrete wall on the upstream side. The left side of the spillway is flanked by a 33½+ foot earth embankment with a similar upstream wall (see photographs in Appendix C). The downstream slope is sparsely vegetated and is sloped at approximately 1½ Hor.:1 Vert. There are 6 foot long nearly vertical concrete retaining walls at the end of the downstream spillway channel. The spillway stoplogs are manually installed. There are no other operational facilities contained within the dam. Located approximately 300 feet downstream of the dam, there is an 18+ foot high roadway embankment containing a 4½ foot diameter metal culvert.

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c. Size Classification

The dam is classified as intermediate based on its storage capacity of 1,809 acre feet.

d. Hazard Classification

The dam has a high hazard potential. It is estimated that approximately 4 homes would receive flood-water damage if the dam were to fail. Flood stage could reach a depth of 5 feet. The maximum failure discharge would be 1,700 cfs.

e. Ownership

The dam is owned by shareholders in the Lost Lake Water Committee. Groton Woods Baptist Camp, of Groton, Massachusetts owns approximately 80% of the shares.

f. Operator

The dam is maintained by the Lost Lake Water Committee. Mr. Ronald Campbell of the Groton Woods Baptist Camp is the designated caretaker of the dam. (telephone 617-448-5763)

g. Purpose of Dam

The purpose of this dam is for recreation. The height of stoplogs in the spillway controls the water level.

h. Design and Construction History

There were no records located which indicate the year the structure was built or when subsequent repairs or modifications, if any, were made.

i. Normal Operational Procedures

The caretaker installs stoplogs in the spring and removes them in the fall. The elevation of the lake is

maintained approximately 2 feet higher in the summer than the winter.

1.3 Pertinent Data

a. Drainage Area

The drainage area 4.11 s.m. (2,630 acres) is basically rural with rolling hills and flat swamp areas. The lake is located at the southern end of the Merrimack River Drainage Basin about 3.5 miles from the Town of Ayer. See the drainage area map in Appendix D and photographs in Appendix C. The land around the lake was developed for summer homes, many of which are now used year-round.

The longest drainage path is Martins Pond Brook. It flows 10,000 feet from Martins Pond (elevation 317) to Lost Lake (elevation 212). This brook and the swamps to the northeast of Lost Lake control about 50 percent of the drainage area. All other drainage paths which flow into Lost Lake pass through swamp areas. The large amount of swamp areas will have a significant impact on peak storm runoff discharge.

Development downstream of the lake is limited to several homes within 1,500 feet of the dam. Beyond that, the area is undeveloped swampland.

b. Discharge at Damsite

1. Outlet Works

The dam at Lost Lake has no outlet conduits. The only outlet is the spillway.

2. Maximum Known Flood at Damsite

There are no records of the maximum flood at the dam. The United States Weather Bureau records indicate that about 8 inches

of rainfall occurred near the general location of the dam from August 17 to 20, 1955 and September 17 to 22, 1938.

3. Ungated Spillway Capacity at Top of Dam

The spillway's dimensions are 7+ feet long at the top by 4+ feet deep. The bottom width, at elevation 212, is 6+ feet. Without stoplogs, its maximum capacity is 200+ cfs, at elevation 216.

4. Gated Spillway Capacity at Normal Pool Elevation

With 2+ feet of stoplogs in place, normal pool elevation of 214, the spillway maximum capacity would be 75+ cfs, when the water level is at elevation 216, top of dam.

5. Total Project Discharge at Test Flood Elevation

The PMF test flood surcharge elevation is 219.5. The total project discharge is 2,300 cfs, with 2 feet of stoplogs in place. Without stoplogs, the discharge is 2,020 cfs and the test flood elevation is 219.1.

c. Elevation (ft. above NGVD elevations are approximate)

- (1) Streambed at toe of dam ----- 206
- (2) Bottom of cutoff ----- unknown
- (3) Maximum tailwater ----- 216.5
- (4) Recreation pool ----- 214
- (5) Full flood control pool ----- N/A
- (6) Spillway crest ----- 212
- (7) Design surcharge (Original Design) ----- unknown
- (8) Top of dam ----- 216
- (9) Test flood surcharge - 219.5 with 2' of stoplogs
219.1 without stoplogs

d. Reservoir (Length in feet)

- (1) Normal pool ----- 5000
- (2) Flood control pool ----- N/A
- (3) Spillway crest pool ----- 5000
- (4) Top of dam ----- 5000
- (5) Test flood pool ----- 5000+

e. Storage (acre-feet)

- (1) Spillway crest pool ----- 945 (elevation 212)
- (2) Normal pool ----- 1350 (elevation 214+)
- (3) Top of dam ----- 1809 (elevation 216)
- (4) Test flood pool ----- 2940 (elevation 219.5)
- (5) Flood control pool ----- N/A

f. Reservoir Surface (acres)

- (1) Spillway crest ----- 200
- (2) Normal pool ----- 216
- (3) Top of dam ----- 232
- (4) Test flood pool ----- 260
- (5) Flood control pool ----- N/A

g. Dam

- (1) Type ----- gravity, concrete, masonry, earth
- (2) Length ----- 80+'
- (3) Height ----- 10+'
- (4) Top Width ----- 12+'
- (5) Side Slopes - u.s. vertical, d.s. sloped 1½:1+
- (6) Zoning ----- unknown
- (7) Impervious Core ----- unknown
- (8) Cutoff ----- unknown
- (9) Grout curtain ----- unknown
- (10) Other ----- entire composition of embankment
is unknown

h. Diversion and Regulating Tunnel ----- none at this
project

i. Spillway

- (1) Type ----- irregular shape - concrete
- (2) Length of weir ----- 7+'
- (3) Crest elevation ----- 214 with stoplogs
212 without stoplogs
- (4) Gates ----- none
- (5) U/S Channel --- none - opens directly to lake
- (6) D/S Channel ----- concrete channel through
dam then natural stream
channel

j. Regulating Outlets

The only regulating outlet is the spillway. It has provisions for up to four feet of stoplogs which would raise the level of the reservoir to the top of dam elevation of 216. Normally 2 feet of stoplogs are used.

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SECTION 2
ENGINEERING DATA

2.1 Design Data

No information was located indicating when or by whom the dam was designed. No indepth design calculations were located.

2.2 Construction Data

No construction data was located for this dam.

2.3 Operation Data

No operational manual exists for this dam.

2.4 Evaluation of Data

a. Availability

No engineering data was located regarding Lost Lake Dam. A State Inspection Report for 1974 was made available at the State Department of Environmental Quality Engineering, Division of Waterways, Boston Office.

b. Adequacy

The lack of indepth engineering data does not allow for a definitive review. Therefore, the adequacy of this dam, structurally and hydraulically, can not be assessed from the standpoint of review of design calculations, but must be based primarily on the visual inspection, past performance history, and sound engineering judgement.

c. Validity

The visual inspection of this facility showed no reason to question the validity of the information supplied on the State Inspection Reports.

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SECTION 3
VISUAL INSPECTION

3.1 Findings

a. General

The dam consists of an earth embankment with a concrete upstream face. A spillway is located at the approximate center of the dam.

b. Dam

The upstream face of the dam consists of a vertical concrete wall, photograph 1. The concrete is generally in good condition. There is no riprap at the junction of the wall and the left abutment.

The crest of the dam is covered with grass, photograph 2. The crest of the dam to the right of the spillway appears to have settled about 3 in. below the top of the concrete wall on the upstream face of the dam.

The downstream face of the dam is partially covered with grass. Large trees up to about 16 in. in diameter are growing on the downstream face, photograph 3. Erosion was observed at the junction of the downstream face and the left abutment and at the junction with the right abutment, photograph 4.

The dam has no draw down facilities. The spillway is normally operated with 24 inches of flashboards.

c. Appurtenant Structure

The spillway which is located in the center of the dam is shown in photograph 5. Water was flowing over the spillway

at the time of the inspection. The concrete of the training walls has deteriorated at the downstream end near the base of the walls, as shown in photograph 6. Wing walls on the downstream slope of the dam have separated slightly from the spillway training walls, as shown in photograph 6.

d. Reservoir Area

Erosion was observed along the lake bank under the slab for a house located about 100 ft. upstream of the dam, photograph 7.

e. Downstream Channel

The downstream channel is a natural streambed, photograph 8. There is a roadway embankment located across the downstream channel about 300 ft. downstream of the dam, which has a 4.5 ft. diameter metal culvert located in the embankment to pass stream flows.

3.2 Evaluation

Visual inspection indicates that the dam is in generally fair condition. Trees growing on the downstream face of the dam should be removed to prevent their roots from causing deterioration of the embankment.

A draw down facility should be provided to allow the lake level to be lowered.

SECTION 4

OPERATIONAL AND MAINTENANCE PROCEDURES

4.1 Operational Procedures

a. General

The purpose of the dam is for recreation. Stoplogs are used at the spillway to control the water surface elevation. Typically, 24 inches of stoplogs are used, depending upon winter or summer use. The spillway has provisions for 48 inches of stoplogs.

b. Description of Warning Systems

There are no warning systems at this dam.

4.2 Maintenance Procedures

a. General

General maintenance is the responsibility of the Lost Lake Water Committee. Typically, maintenance consists of regulating the height of stoplogs at the spillway for winter and summer use. The level is normally higher during the summer.

b. Operating Facilities

There is no formal operational procedure for this facility. The dam is used for recreation.

4.3 Evaluation

There is no formal maintenance procedure at this dam. Vegetation and trees on the dam should be removed. New vegetation growth should be removed every year. The dam should be inspected every year by a qualified registered professional engineer who can identify conditions of concern which if left unchecked could jeopardize the safety of the dam.

SECTION 5

EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

5.1 General

Lost Lake is located in the Town of Groton, Massachusetts, just north of the Town of Ayer. The drainage area 4.11 s.m. (2,630 acres) is comprised of gently rolling hills and flat swampy areas which may significantly affect the rate of storm water runoff. The area is rural and many of the houses around the lake were summer cottages. The lake, comprised of Lost Lake and Knops Pond, has a surface area of 232 acres. Water discharges from the spillway, located at the north end of the lake. The outlet brook, Cow Pond Brook, becomes Salmon Brook, which flows northerly to the Merrimac River, at Nashua, New Hampshire, 13 miles away. The outlet brook channel has a flat slope and the normal channel section is about 15 feet wide with variable bank heights immediately downstream of the dam. See photographs in Appendix C. See the drainage area map and drawings in Appendixes B and D and Section 1.3.

5.2 Design Data

Hydraulic/hydrologic design data for this project could not be located.

5.3 Experience Data

Records of past flood experience and possible overtopping of the dam could not be found. The United States Weather Bureau records indicate that from August 17 to 20, 1955 about 8 inches of rainfall occurred near the general location of Lost Lake.

5.4 Test Flood Analysis

The dam has an intermediate size classification and a high hazard potential. Based upon Corps Guidelines, the test flood would be in the PMF. The PMF inflow based upon the 4.11 s.m., flat drainage area is 3,500.

Normally, 24 inches of stoplogs are used in the spillway. Recreational pond level is at elevation 214. See photographs 5 and 1. This leaves a spillway capacity of about 75 cfs before the top of dam, elevation 216 $\pm$, would be overtopped. Without stoplogs, the spillway capacity would be about 200 cfs. See Appendix D for hydraulic calculations.

With the initial water elevation at 214 $\pm$, the inflow of 3,500 cfs would surcharge the lake to elevation 219.5 $\pm$. The resulting outflow would be 2,300 cfs. Without stoplogs, initial elevation 212, the discharge is 2,020 cfs and the surcharge elevation is 219.1 $\pm$. The spillway passes 3 percent of the test flood outflow with stoplogs and 10 percent without stoplogs. The remaining flow overtops the dam by 3.5 and 3.1 feet, respectively. The lake will be providing stage storage for 6.5 to 8.0 inches of runoff.

About 300 feet downstream, an earthen road embankment crosses the outlet brook. See photographs 10, 11 and 13. A 4.5 foot diameter metal culvert passes through the embankment. The culvert and embankment (top elevation of 213 $\pm$) could cause a back water condition at the dam. The structural integrity of the earth roadway embankment may also be seriously reduced by an increased water level on the upstream face.

5.5 Dam Failure Analysis

Failure analysis was performed assuming an initial water level

at elevation 216, top of dam. See photograph 5. The dam has a hydraulic height of 10 feet and a maximum storage capacity of 1,809 acre-feet (a-f). Just prior to failure, the spillway would be discharging water at 75+ cfs. This flow would not cause any significant downstream flooding, prior to dam failure, or damage houses along the outlet brook.

Assuming that 40% of the 80 foot long concrete and earth embankment dam failed, (see photographs 5 and 2) the peak failure outflow would be 1,700+ cfs. The peak failure outflow was determined using Corps "rule of thumb" guidance. The failure discharge would flow 300 feet downstream to the 18 foot high earthen road embankment. The 4.5 foot diameter road culvert will not carry the failure outflow. The road embankment could be overtopped. The channel downstream of the embankment would carry the failure flow at a depth of 5+ feet. At least 4 homes (see photograph 14) would be damaged by floodwater. Damage would vary from floodwater 1 to 5+ feet deep, depending upon the elevation of each structure.

Floodwater due to dam failure could also cause the failure of the road embankment. This would depend upon the structural integrity of the embankment. Visual inspection of this roadway embankment indicates that the embankment could not be counted on to impound the released water from the upstream dam failure. It is likely that a secondary failure of this roadway embankment

would occur. The failure of this roadway could serve to increase the flooding to the 4 homes immediately downstream.

SECTION 6

EVALUATION OF STRUCTURAL STABILITY

6.1 Visual Observations

The visual inspection did not disclose any immediate stability problems. However, the roots of the trees growing on the downstream face of the dam could lead to deterioration of the dam due to blow downs during storms.

6.2 Design and Construction Data

There are no available design and construction data.

6.3 Post Construction Changes

There are no known post construction changes of the dam.

6.4 Seismic Stability

The dam is located in Seismic Zone 2 and in accordance with the recommended Phase I guidelines does not warrant seismic analysis.

SECTION 7

ASSESSMENT, RECOMMENDATIONS & REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition

On the basis of the visual inspection, the dam is judged to be in generally fair condition. The future safety of the dam can be endangered by the blowing down of trees growing on the downstream face of the dam.

b. Adequacy of Information

The information available was very limited, and this assessment of the condition of the dam is based principally on the visual inspection.

c. Urgency

The recommendations and remedial measures presented in Section 7.2 and 7.3 should be implemented within one year after receipt of the Phase I Inspection Report by the Owner.

7.2 Recommendations

a. The Owner should engage a qualified registered professional engineer to perform a detailed hydraulic/hydrologic investigation and make recommendations concerning increasing the spillway's capacity, determining the size and location of a draw down facility, and the ability of the dam to withstand overtopping.

b. Trees and brushes growing on the dam should be removed and later growth cut every year. The removal of these large trees and roots, and the backfilling of the created holes should be under the direction of a qualified registered professional engineer.

7.3 Remedial Measures

a. Operation & Maintenance Procedures

1. The dam should be inspected every year by a qualified registered professional engineer.

2. The spillway should be operated without stoplogs to provide the maximum available discharge and storage capacity until recommendation 7.2.a. has been implemented.

3. Slope protection should be placed at the end of the spillway outlet channel to prevent erosion of the downstream toe of dam and undermining of the concrete outlet.

4. The Owner should develop a formal warning system for downstream areas in case of an emergency and provide around the clock monitoring of the dam during periods of heavy rainfall.

7.4 Alternative

There are no practical alternatives for this dam.

APPENDIX A
INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST
PARTY ORGANIZATION

PROJECT Lost Lake Dam

DATE November 5, 1979

TIME 0930

WEATHER Sunny, Cool

W.S. ELEV. 214 U.S. -- DN.S.

PARTY:

- | | |
|---------------------------------|-----------|
| 1. <u>Ron Cheney - HHB</u> | 6. _____ |
| 2. <u>Dave Vine - HHB</u> | 7. _____ |
| 3. <u>Dan LaGatta - GEI</u> | 8. _____ |
| 4. <u>Steve Whiteside - GEI</u> | 9. _____ |
| 5. <u>Mike Angieri - HHB</u> | 10. _____ |

PROJECT FEATURE	INSPECTED BY	REMARKS
1. <u>Embankment Dam</u>	<u>D. LaGatta, S. Whiteside</u>	
2. <u>Spillway</u>	<u>R. Cheney, D. Vine, M. Angieri</u>	
3. _____		
4. _____		
5. _____		
6. _____		
7. _____		
8. _____		
9. _____		
10. _____		

PERIODIC INSPECTION CHECKLIST

PROJECT Lost Lake Dam DATE 11/5/79
 PROJECT FEATURE Dam Embankment NAME D. LaGatta
 DISCIPLINE Geotechnical Engineer NAME S. Whiteside
Structural Engineer R. Cheney
M. Angieri

AREA EVALUATED	CONDITION
<u>DAM EMBANKMENT</u>	
Crest Elevation	216+ (from USGS map)
Current Pool Elevation	212+
Maximum Impoundment to Date	Unknown
Surface Cracks	None observed.
Pavement Condition	No pavement.
Movement or Settlement of Crest	Soil portion of crest to right of spillway appeared to have settled about 3-in below top of concrete section of crest.
Lateral Movement	None observed.
Vertical Alignment	Good.
Horizontal Alignment	Good.
Condition at Abutment and at Concrete Structures	No riprap protection at junction of dam and abutments.
Indications of Movement of Structural Items on Slopes	None observed.
Trespassing on Slopes	Pedestrian paths on crest and downstream slope.
Sloughing or Erosion of Slopes or Abutments	Erosion evident on downstream slope.
Rock Slope Protection - Riprap Failures	No riprap observed.
Unusual Movement or Cracking at or Near Toe	None observed. Wet spot about 30 ft downstream of concrete wall to right of spillway channel. Probably accumulated surface runoff.
Unusual Embankment or Downstream Seepage	None observed.
Piping or Boils	None observed.
Foundation Drainage Features	None observed.
Toe Drains	None observed.
Instrumentation System	None observed.
Vegetation	Large trees (up to 16-in dia.) on downstream slope.

PERIODIC INSPECTION CHECKLIST

PROJECT <u>Lost Lake Dam</u>	DATE <u>11/5/79</u>
PROJECT FEATURE <u>Outlet Works</u>	NAME <u>D. LaGatta</u>
DISCIPLINE <u>Geotechnical Engineer</u>	NAME <u>S. Whiteside</u>
<u>Structural Engineer</u>	<u>R. Cheney, M. Angieri</u>

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE</u> a. Approach Channel Slope Conditions Bottom Conditions Rock Slides or Falls Log Boom Debris Condition of Concrete Lining Drains or Weep Holes b. Intake Structure Condition of Concrete Stop Logs and Slots	None observed.

PERIODIC INSPECTION CHECKLIST

PROJECT <u>Lost Lake Dam</u>	DATE <u>11/5/79</u>
PROJECT FEATURE <u>Outlet Works</u>	NAME <u>D. LaGatta</u>
DISCIPLINE <u>Geotechnical Engineer</u>	NAME <u>S. Whiteside</u>
<u>Structural Engineer</u>	<u>R. Cheney, M. Angieri</u>

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - CONTROL TOWER</u> a. Concrete and Structural General Condition Condition of Joints Spalling Visible Reinforcing Rusting or Staining of Concrete Any Seepage or Efflorescence Joint Alignment Unusual Seepage or Leaks in Gate Chamber Cracks Rusting or Corrosion of Steel b. Mechanical and Electrical Air Vents Float Wells Crane Hoist Elevator Hydraulic System Service Gates Emergency Gates Lightning Protection System Emergency Power System Wiring and Lighting System	None at this project

PERIODIC INSPECTION CHECKLIST

PROJECT Lost Lake Dam DATE 11/5/79
 PROJECT FEATURE Outlet Works NAME D. LaGatta
 DISCIPLINE Geotechnical Engineer NAME S. Whiteside
Structural Engineer R. Cheney, M. Angieri

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - TRANSITION AND CONDUIT</u> General Condition of Concrete Rust or Staining on Concrete Spalling Erosion or Cavitation Cracking Alignment of Monoliths Alignment of Joints Numbering of Monoliths	None at this project.

PERIODIC INSPECTION CHECKLIST

PROJECT Lost Lake Dam DATE 11/5/79
 PROJECT FEATURE Outlet Structure NAME D. LaGatta
 DISCIPLINE Geotechnical Engineer NAME S. Whiteside
Structural Engineer R. Cheney, M. Angieri

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL</u> General Condition of Concrete Rust or Staining Spalling Erosion or Cavitation Visible Reinforcing Any Seepage or Efflorescence Condition at Joints Drain holes Channel Loose Rock or Trees Overhanging Channel Condition of Discharge Channel	None observed.

PERIODIC INSPECTION CHECKLIST

PROJECT Lost Lake Dam DATE 11/5/79
 PROJECT FEATURE Spillway Weir & Training Walls NAME D. LaGatta
 DISCIPLINE Geotechnical Engineer NAME S. Whiteside
Structural Engineer R. Cheney, M. Angieri

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS</u>	
a. Approach Channel	No approach channel
General Condition	
Loose Rock Overhanging Channel	
Trees Overhanging Channel	
Floor of Approach Channel	
b. Weir and Training Walls	
General Condition of Concrete	Fair to Good
Rust or Staining	Some evidence
Spalling	Some at joints
Any Visible Reinforcing	None found
Any Seepage or Efflorescence	Efflorescence at some joints, no seepage found
Drain Holes	None observed.
c. Discharge Channel	
General Condition	Good.
Loose Rock Overhanging Channel	None observed.
Trees Overhanging Channel	Large trees overhanging channel.
Floor of Channel	Natural streambed with large boulders and cobbles.
Other Obstructions	Roadway embankment located across downstream channel about 300 ft downstream of dam.

PERIODIC INSPECTION CHECKLIST

PROJECT Lost Lake Dam DATE 11/5/79
 PROJECT FEATURE Service Bridge NAME D. LaGatta
 DISCIPLINE Geotechnical Engineer NAME S. Whiteside
Structural Engineer R. Cheney, M. Angieri

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - SERVICE BRIDGE</u> a. Super Structure Bearings Anchor Bolts Bridge Seat Longitudinal Members Underside of Deck Secondary Bracing Deck Drainage System Railings Expansion Joints Paint b. Abutment & Piers General Condition of Concrete Alignment of Abutment Approach to Bridge Condition of Seat & Backwall	None at this project

APPENDIX B
ENGINEERING DATA

B-1

Lost Lake Dam

1/18 ..

LIST OF ENGINEERING DATA

A State Inspection Report for 1974 was made available at the State Department of Environment Quality Engineering, Division of Waterways Office, 100 Nashua Street, Boston, Massachusetts 02114.

No additional Engineering Data was located.

OF
FILE

INSPECTION REPORT - DAMS AND RESERVOIRS

(1.) Location: City/Town GROTON

DAM NO. 4-9-115-4

Name of Dam LOST LAKE DAM

Inspected by A. Z. PIZAN *

F. H. PARE

Date of Inspection 4-17-'74

(2.) Owners: per: Ans. ✓ Prev. Inspection _____

Reg. of Deeds _____ Pers. Contact _____

1. AMERICAN BAPTISTS GROTON WOODS BAPTIST CAMP 448-5763
Name St. & No. City/Town State Tel. No.
GROTON, MASS. - 01450

2. _____
Name St. & No. City/Town State Tel. No.

3. _____
Name St. & No. City/Town State Tel. No.

(3.) Caretaker: (if any) e.g. superintendent, plant manager, appointed by absentee owner, appointed by multi owners.

RONALD CAMPBELL, GROTON WOODS BAPTIST CAMP 448-5763
Name St. & No. City/Town State Tel. No.
GROTON, MASS. - 01450

(4.) No. of Pictures taken NONE

(5.) Degree of Hazard: (if dam should fail completely)*

1. Minor ✓ 2. Moderate _____

3. Severe _____ 4. Disastrous _____

*This rating may change as land use changes (future development)

(6.) Outlet Control: Automatic _____ Manual ✓

Operative ✓ Yes: _____ No: _____

Comments: _____

(7.) Upstream Side of Dam: Condition:

1. Good ✓ 2. Minor Repairs _____

3. Major Repairs _____ 4. Urgent Repairs _____

Comments: _____

228 70.4-9-115-4

1. Condition: 1. Good ☒ 2. Minor Repairs ☐
3. Major Repairs ☐ 4. Urgent Repr ☐

Comments: _____

2. Emergency spillway: Condition: 1. Good ☒ 2. Minor Repairs ☐
3. Major Repairs ☐ 4. Urgent Rep ☐

Comments: _____

3. Inspection 1 ft. above ☒ below ☐
top of dam ☐ Principal spillway ☒
other ☐

4. Remarks or observations noted:

Grass (under of brush) on Embankment BRUSH ON EMBANKMENT.

Animal tracks and washouts _____

Damage to structure or top of dam _____

Cracks or leakage nearby _____

Evidence on seepage _____

Evidence of sliding _____

Shoring _____

Beams _____

Brush and/or debris impeding flow _____

Chopped or blocked spillway _____

Other _____

(12) Remarks & Recommendations: (Fully Explain)

DAM IS IN GOOD CONDITION.

(13) Overall Condition:

1. Safe ☒ _____
2. Minor repairs needed _____
3. Conditionally safe - major repairs needed _____
4. Unsafe _____
5. Reservoir impoundment no longer exists (explain) _____
6. Recommend removal from inspection list _____

DESCRIPTION OF DAM
DISTRICT 14

Submitted by FRANCIS H. PARE & ADAM Z. PIZAN Dam No. 4-9-115-4
Date 4-12-54 City/Town GROTON
Name of Dam LOST LAKE DAM

1. Location: Topo Sheet No. 22D
Provide 8 1/2" x 11" in clear copy of topo map with location of Dam clearly indicated.

2. Year built: UNKNOWN Year/s of subsequent repairs UNKNOWN

3. Purpose of Dam: Water Supply _____, Recreational ☒
Irrigation _____, Other _____

4. Drainage Area: 2 SQ. MI. 1280 ACRES.

5. Normal Ponding Area: 120 acres; Ave. Depth 10'
impoundment: 400 MIL gals; 1200 acre ft.

6. No. and type of dwellings located adjacent to pond or reservoir
i.e. summer homes etc. 50 COTTAGES ADJ. TO POND & HSE. TRAILER

7. Dimensions of Dam: Length 60' Max. Height 5'
Slopes: Upstream Face VERT.
Downstream Face "
Width across top 15'

8. Classifications of Dam by Materials:
Earth ☒ Conc. Masonry ☒ Stone Masonry _____
Timber ☒ Rockfill _____ Other _____

9. A. Description of present land usage downstream of dam: 80% rural;
20% urban
B. Is there a storage area or flood plain downstream of dam: which could accommodate the impoundment in the event of a complete dam failure
no ☒ yes _____

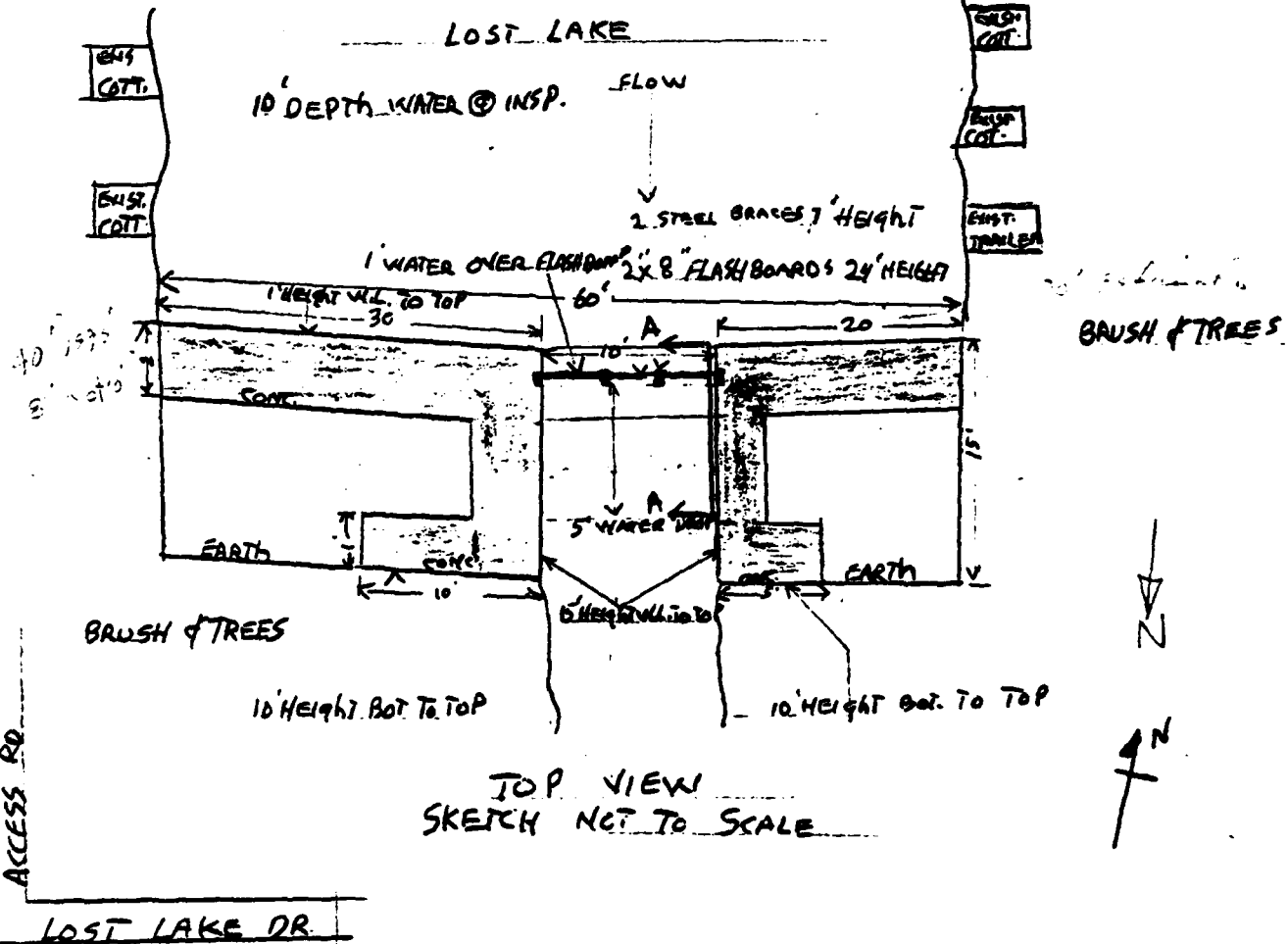
DAM NO. 4-9-115-4

10. Risk to life and property in event of complete failure.

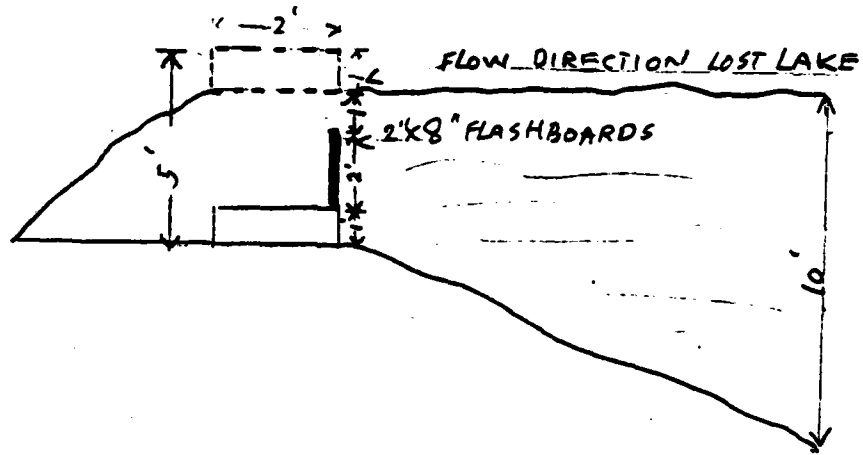
No. of people 150
No. of homes 50
No. of businesses NONE
No. of industries 0
No. of utilities 0
Railroads 0
Other dams NONE
Other _____

Type _____
Type _____

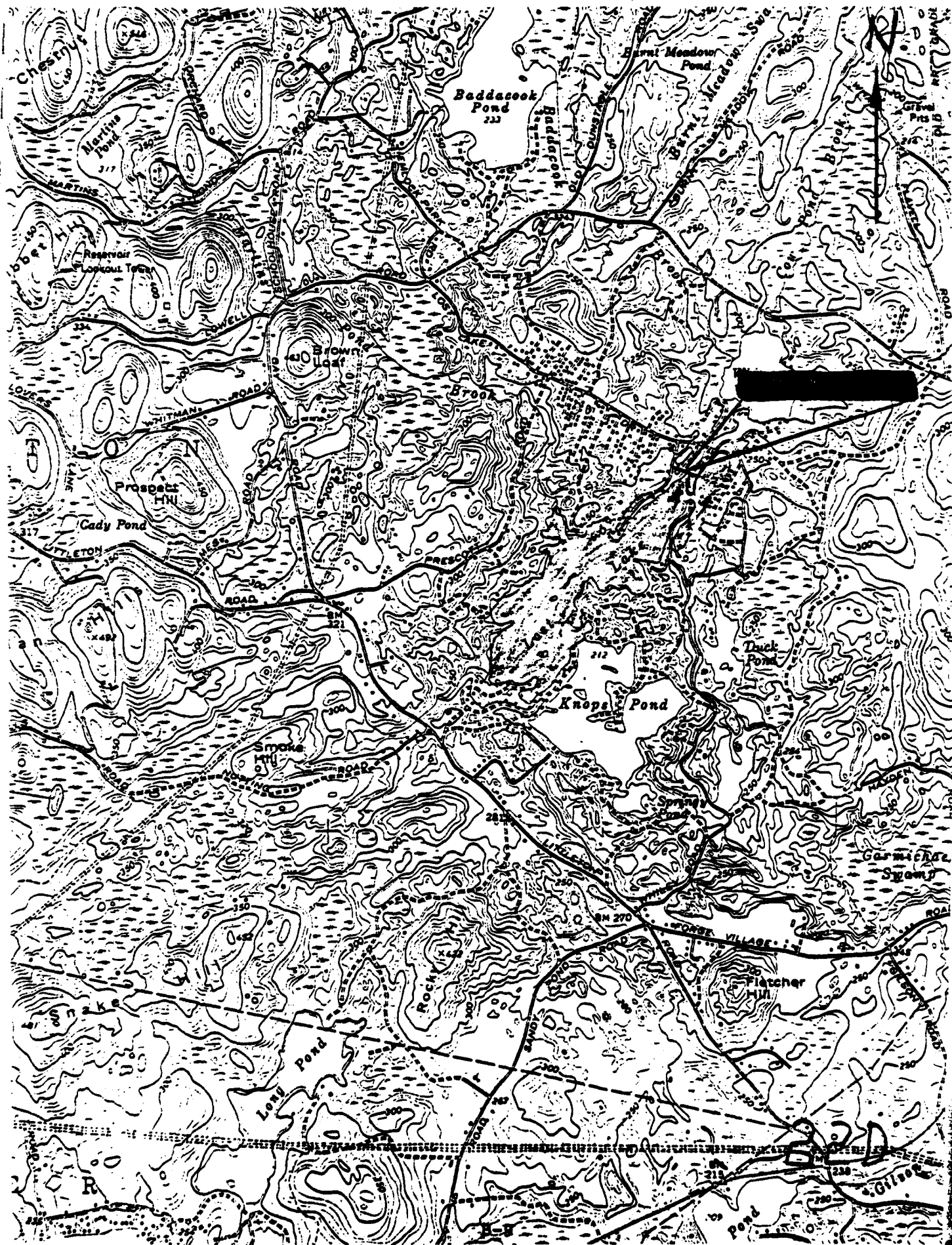
11. Attach sketch of dam to this form showing section and plan 8½" x 11" Sheet.

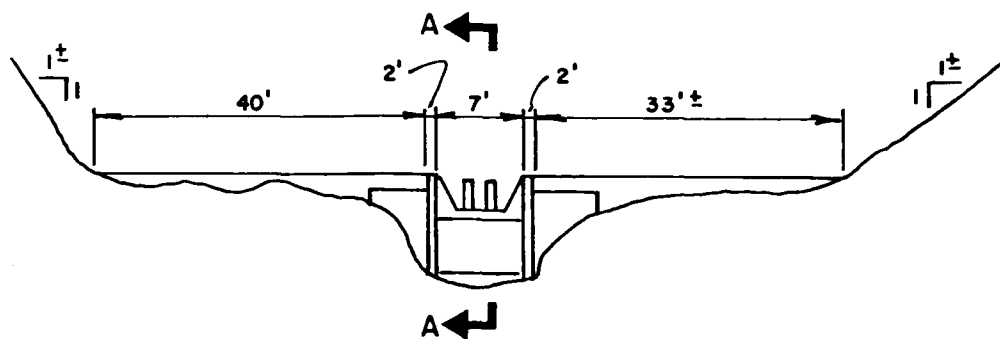
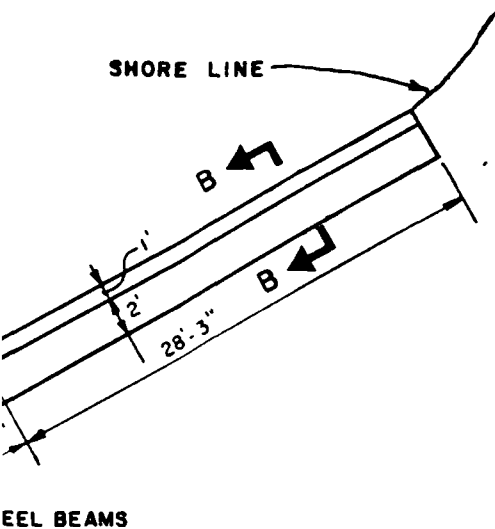


4-9-115-4

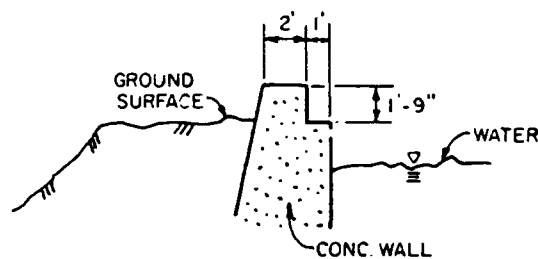


X SECTION
SKETCH NOT TO SCALE



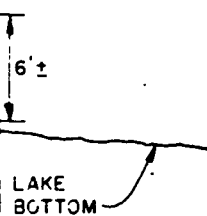


ELEVATION VIEW



SECTION B-B

STOPLOGS



HAYDEN, HARDING & BUCHANAN, INC.
CONSULTING ENGINEERS
BOSTON, MASSACHUSETTS

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

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

LOST LAKE DAM PLAN & ELEVATION VIEWS & SECTIONS

GROTON

MASSACHUSETTS

PLAN DEVELOPED FROM ON-SITE INSPECTION

SCALE NOT TO SCALE

DATE DECEMBER 1979

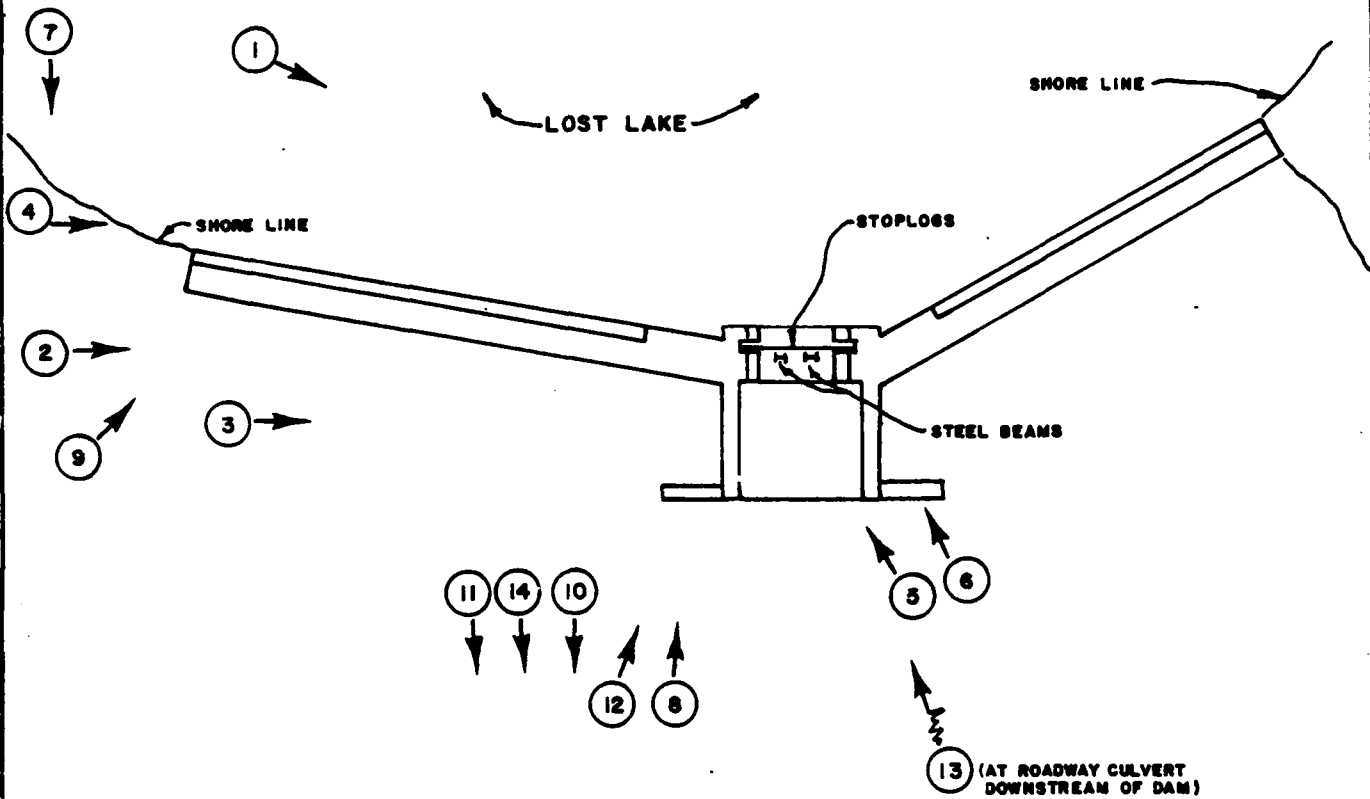
3

APPENDIX C
PHOTOGRAPHS

C-1

Lost Lake Dam

1/1/79



PLAN VIEW

HAYDEN, HARDING & BUCHANAN, INC. CONSULTING ENGINEERS BOSTON, MASSACHUSETTS		U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.	
NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS			
LOST LAKE DAM PHOTO LOCATIONS			
GROTON		MASSACHUSETTS	
		SCALE: NOT TO SCALE	
		DATE: DECEMBER 1979	



PHOTO NO. 1 - View of upstream face of Dam taken from
the right side upstream area.

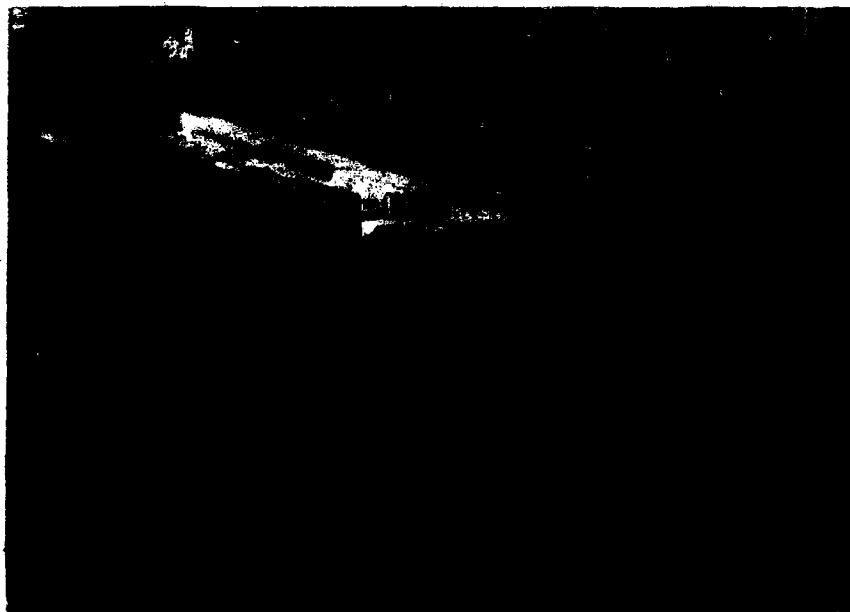


PHOTO NO. 2 - View looking across the top of Dam
taken from the right abutment area.



PHOTO NO. 3 - Crest and downstream face of Dam
to right of spillway.

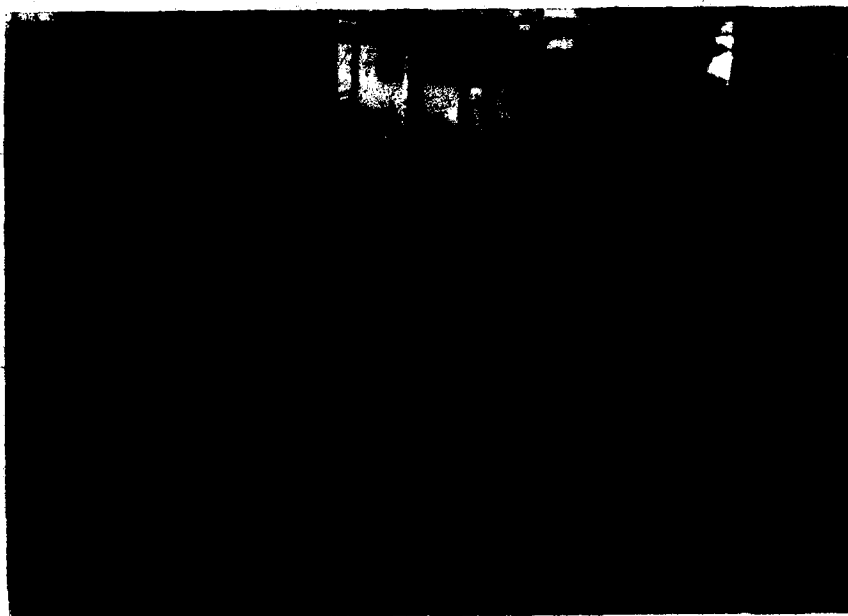


PHOTO NO. 4 - Erosion at junction of right abutment
and downstream face of Dam.



PHOTO NO. 5 - View of the downstream face of Dam showing the spillway. - Note the concrete outlet channel and retaining walls which lead into the earth embankments.

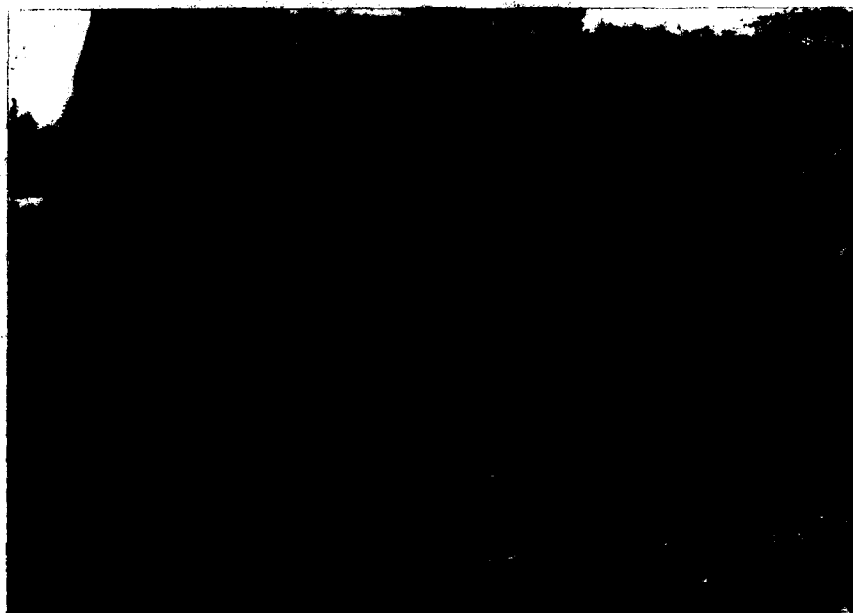


PHOTO NO. 6 - Wingwall at end of left training wall of spillway.

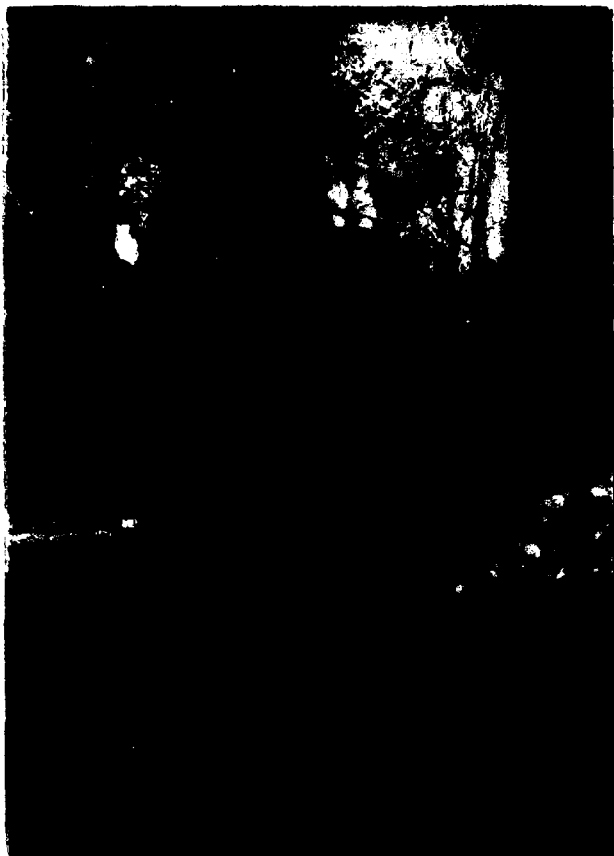


PHOTO NO. 7 - Erosion under
slab of house located on
reservoir shore. Approx-
imately 100 feet upstream
of dam.

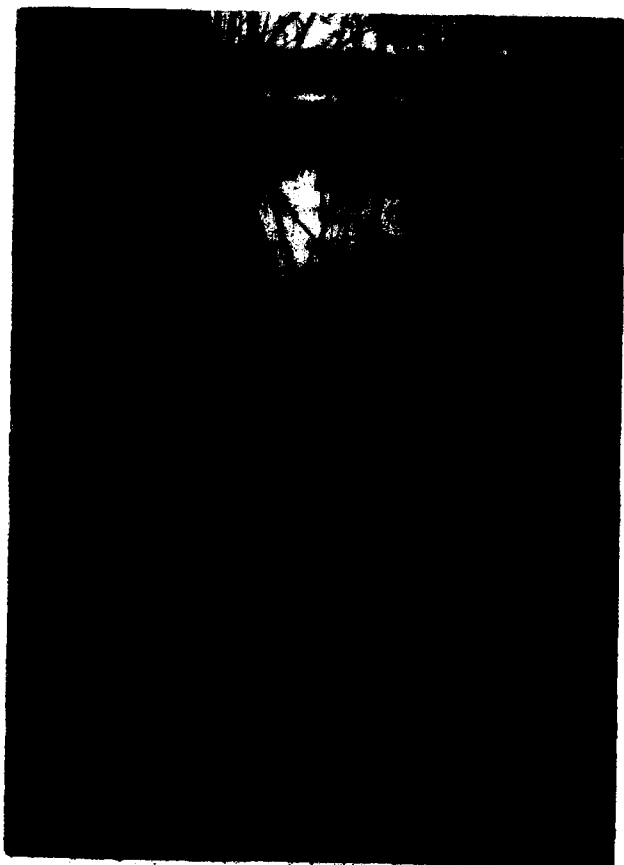


PHOTO NO. 8 - Channel between Dam
and Roadway embankment as
viewed from roadway.

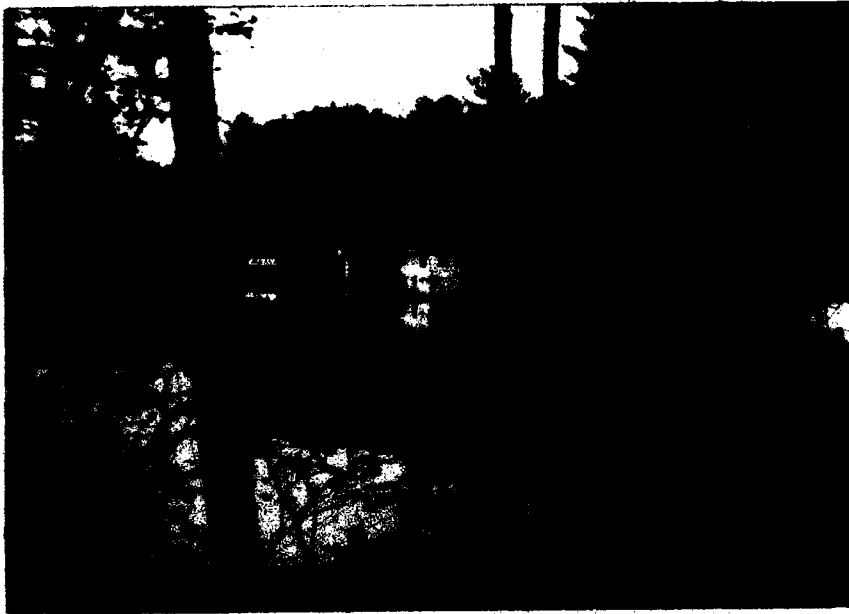


PHOTO NO. 9 - View of upstream development typical around the shores of Lost Lake. Note the top of Dam in lower portion of Photo.



PHOTO NO. 10 - View of immediate downstream channel taken from the toe of Dam. Note the roadway embankment, culvert and ponding area. Failure of the Dam could result in the failure of this embankment.



PHOTO NO. 11 - Close up view of downstream roadway embankment and culvert discussed in Photo No. 10.



PHOTO NO. 12 - View of Dam taken from the downstream roadway embankment.

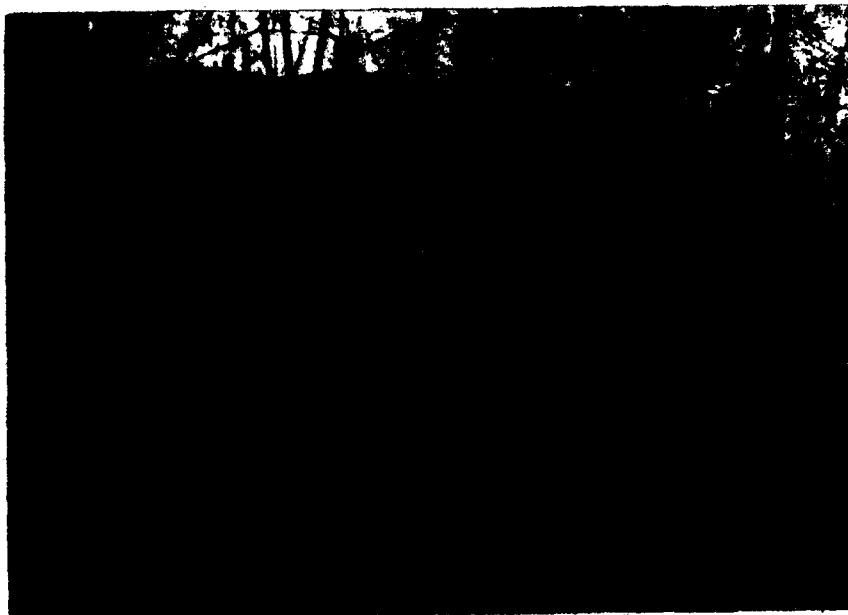


PHOTO NO. 13 - Downstream face of roadway embankment.
Note culvert outlet.

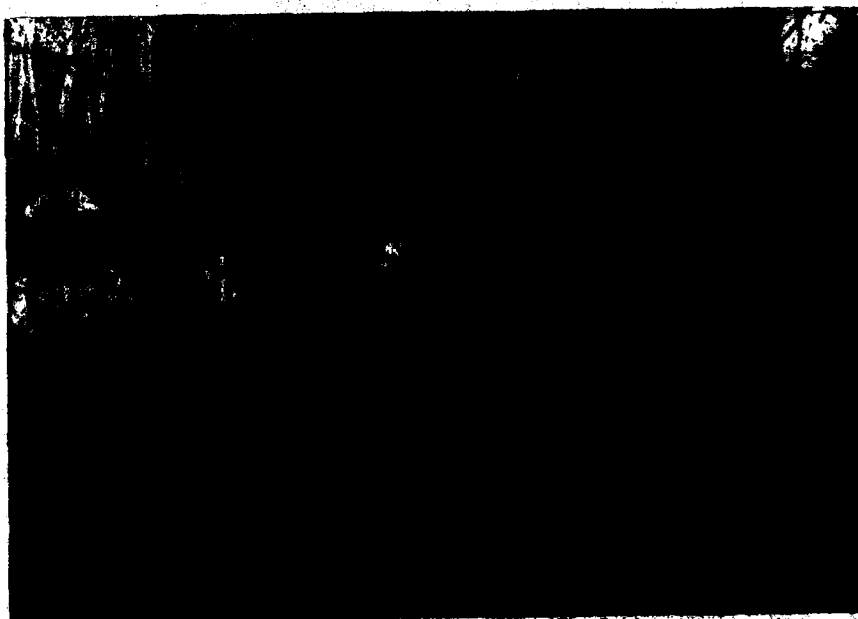


PHOTO NO. 14 - Typical location of homes within Dam failure impact area. These homes are just beyond the roadway embankment. First floor levels of several homes are just above the stream bank level. Portions of some homes (note house at left) are supported by wood columns, and are susceptible to major damage even though their first floors are at higher elevations.

APPENDIX D
HYDROLOGIC AND HYDRAULIC COMPUTATIONS

JOB NO. 79.206.12
 DATE 10-18-79
 BY MA
 CH'D BY FDD



HAYDEN, HARDING & BUCHANAN, INC.
 CONSULTING ENGINEERS
 BOSTON, MASSACHUSETTS

SHEET NO. D2
 JOB Dams
 SUBJECT Lost Lake
 CLIENT CE

Height: 10. ft. (small)

Storage Capacity: 1809. a-f (Intermediate)

Size Class: Intermediate

Hazard Potential: HIGH
 (rural area - 4 homes)

Test Flood: Full PMF

Drainage Area: 4.11 sm (2630 a) flat
 swampy drainage paths, many restrictions

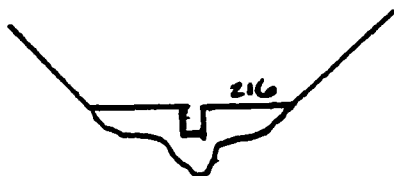
Test Flood = $1 \times 850 \frac{\text{cfs}}{\text{sm}} \times 4.11 \text{ sm} = 3500 \pm \text{cfs}$
 Inflow

Spillway Capacity (normally use 2' stoplogs)
 is 4' x 7' or 2' x 7' w/ stoplogs

$$Q = 3.7 (7) (4)^{3/2} \approx 211 \text{ cfs w/o stoplogs}$$

$$3.7 (7) (2)^{3/2} = 75 \text{ cfs w/ 2' "}$$

$$Q = CLH^{3/2} \quad C = 3.39$$



Elev	D	C	L	H ^{3/2}	Q	Q ₊₇₅	Q ₊₂₀₀
217	1	3.39	100	1	339 cfs	414	540 ±
218	2	"	101	2.828	968	1043	1170
219	3	"	102	5.196	1797	1872	2000 ±
220	4	"	103	8	2793	2868	3000
220.5	4.5	"	104	9.5	3366	3441	3566

JOB NO. 792061
DATE 1-18-80
BY MA
CH'D BY FDD



HAYDEN, HARDING & BUCHANAN, INC.
CONSULTING ENGINEERS
BOSTON — WEST HARTFORD

SHEET NO. D 3
JOB Dams
SUBJECT East Lake
CLIENT COE

Test Flood Discharge w/ 2 ft. stoplogs

$$Q_{P1} = 3500 \text{ cfs} \quad h_1 = 220.6$$

$$str_1 = 2940 - 1350 = 1590 \text{ a-f or } 7.25'' \text{ runoff}$$

$$Q_{P2} = 3500 \left(1 - \frac{7.25}{19}\right) = 2165 \text{ cfs} \quad h_2 = 219.3$$

$$str_2 = 2600 - 1350 = 1250 \text{ a-f or } 5.7''$$

$$str_{ave} = \frac{7.25 + 5.7}{2} = 6.5''$$

$$Q_{P3} = 3500 \left(1 - \frac{6.5}{19}\right) = 2300 \text{ cfs}$$

$$H_3 = 219.5$$

Dam overtopped by 3.5 ft.

Test Flood Discharge w/o stoplogs

$$Q_{P1} = 3500 \quad h_1 = 220.4$$

$$str_1 = 2900 - 945 = 1955 \text{ a-f or } 8.92''$$

$$Q_{P2} = 3500 \left(1 - \frac{8.92}{19}\right) = 1857 \text{ cfs} \quad h_2 = 218.8$$

$$str_2 = 2510 - 945 = 1565 \text{ a-f or } 7.14''$$

$$str_{ave} = \frac{8.92 + 7.14}{2} = 8.03''$$

$$Q_{P3} = 3500 \left(1 - \frac{8.03}{19}\right) = 2020 \text{ cfs}$$

$$H_3 = 219.1$$

Dam overtopped by 3.1 ft.

JOB NO. 79.206.12
 DATE 10-19-79
 BY MA
 CH'D BY FDD

HH & B HAYDEN, HARDING & BUCHANAN, INC.
 CONSULTING ENGINEERS
 BOSTON, MASSACHUSETTS

SHEET NO. D 4
 JOB Dams
 SUBJECT Lost Lake
 CLIENT COE

Drainage Area 2630. acres, 4.61 sq. mi.
wooded / swamp area

Lake Elevation 212 (USGS) = outlet elev.

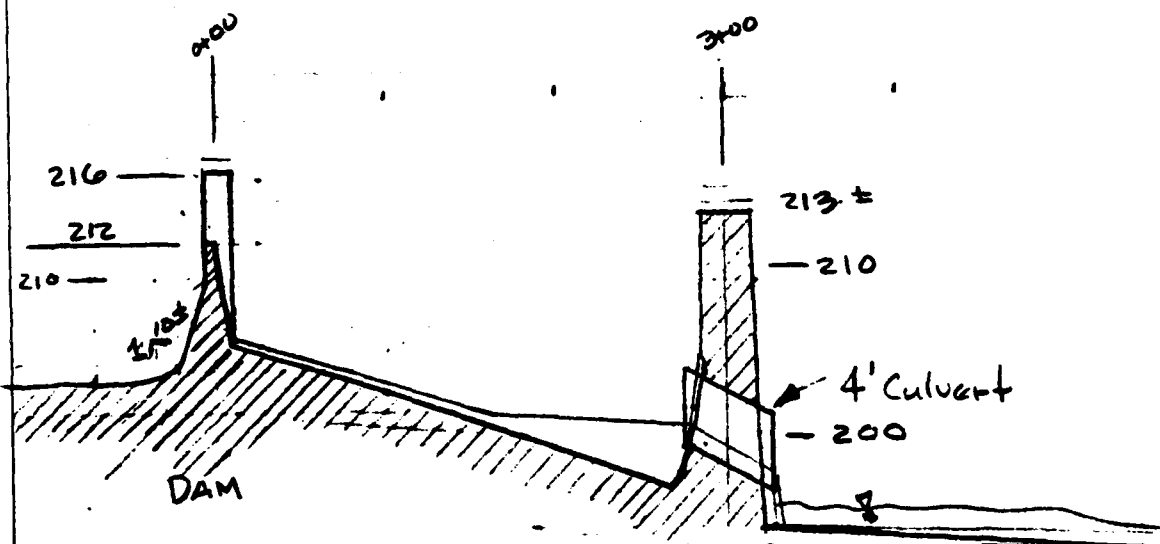
Lake Area = 200 acres

Stage Storage

Elev Ft.	Area a.	Ft.	Stor d-f	Cumm stor
220	265	4	994	2803

216	232	2	448	1809
214	216	2	416	1361
212	200	6	945	945
206	115			

Normal Level



Elevations based on
 USGS map, approximate only.

Roadway

JOB NO. 79.206.1
 DATE 11-6-79
 BY MA
 CH'D BY FDD

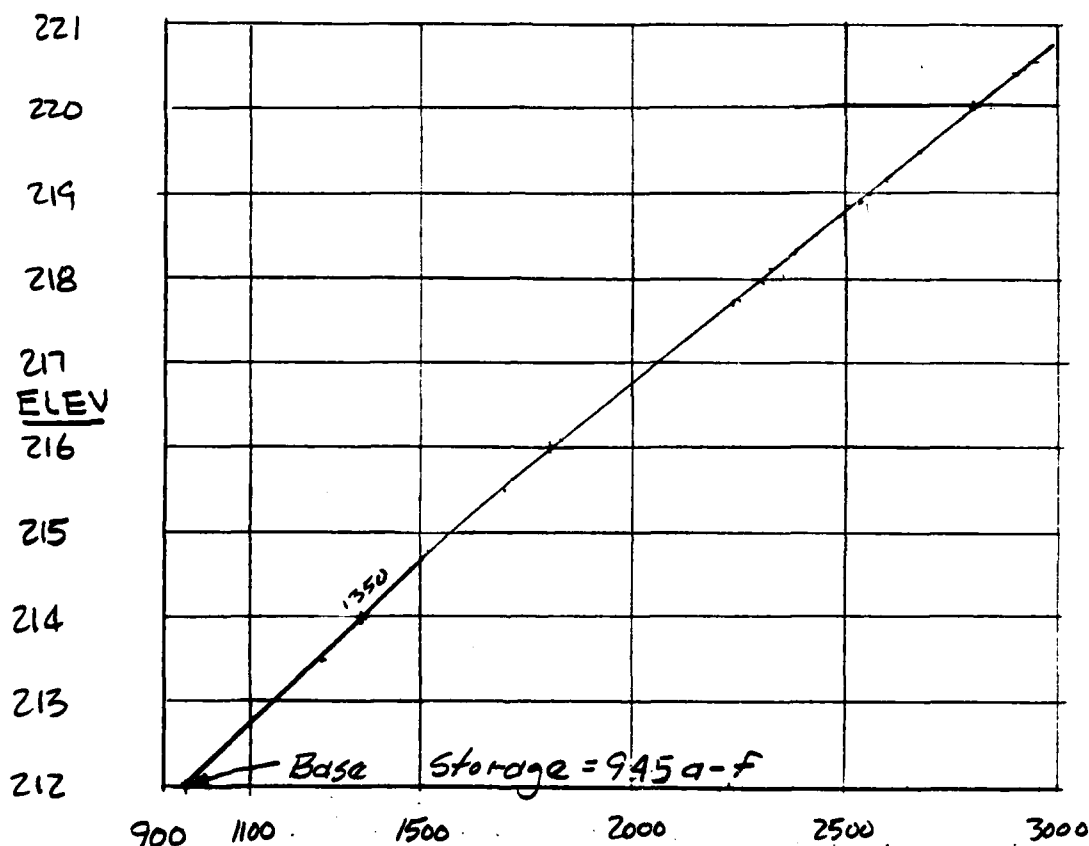


HAYDEN, HARDING & BUCHANAN, INC.
 CONSULTING ENGINEERS
 BOSTON - WEST HARTFORD

SHEET NO. D5
 JOB Dams
 SUBJECT Lost Lake
 CLIENT COE

Nov 1-18-80

Stage Storage



Storage - a-f

1/2 PMF Discharge w/ stoplogs

$$Q_{H1} = 3500 \div 2 = 1750 \text{ cfs} \quad h_1 = 218.9$$

$$St_{H1} = 2530 - 1350 = 1180 \text{ a-f} = 5.4''$$

$$Q_{H2} = 1750 \left(1 - \frac{5.4}{9.5}\right) = 758 \quad h_2 = 217.5$$

$$St_{H2} = 2190 - 1350 = 840 \text{ a-f} = 3.83''$$

$$Q_{H3} = 1750 \left(1 - \frac{9.62}{9.5}\right) = 900 \pm \text{cfs} \quad H_3 = 217.8$$

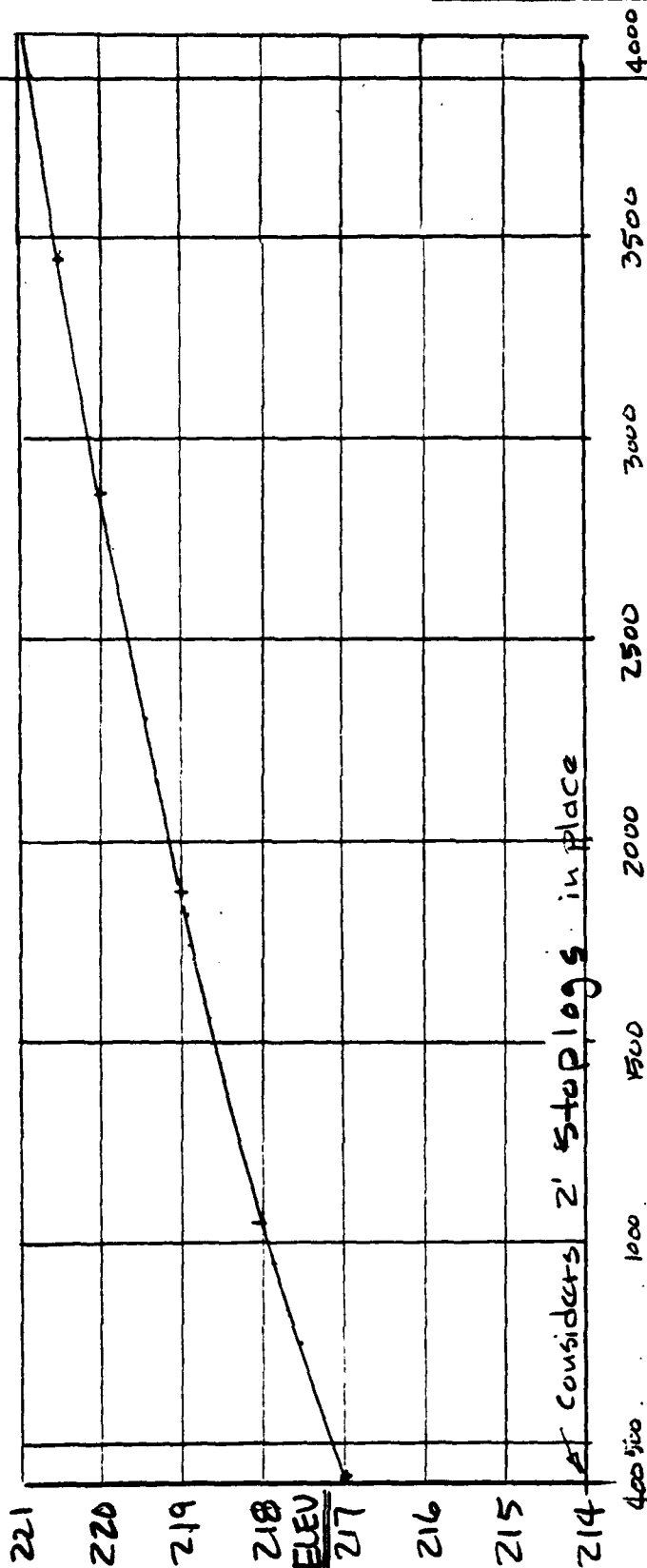
Dam over-topped by 1.8 ft
 w/o stoplogs $H_3 = 217.5 \pm$

JOB NO. A.206.1
 DATE 11-6-79
 BY MA
 CH'D BY FDD



HAYDEN, HARDING & BUCHANAN, INC.
 CONSULTING ENGINEERS
 BOSTON — WEST HARTFORD

SHEET NO. D 6
 JOB Dams
 SUBJECT West Lake
 CLIENT COE



considers 2' stoplogs in place

Discharge - cfs

STAGE DISCHARGE

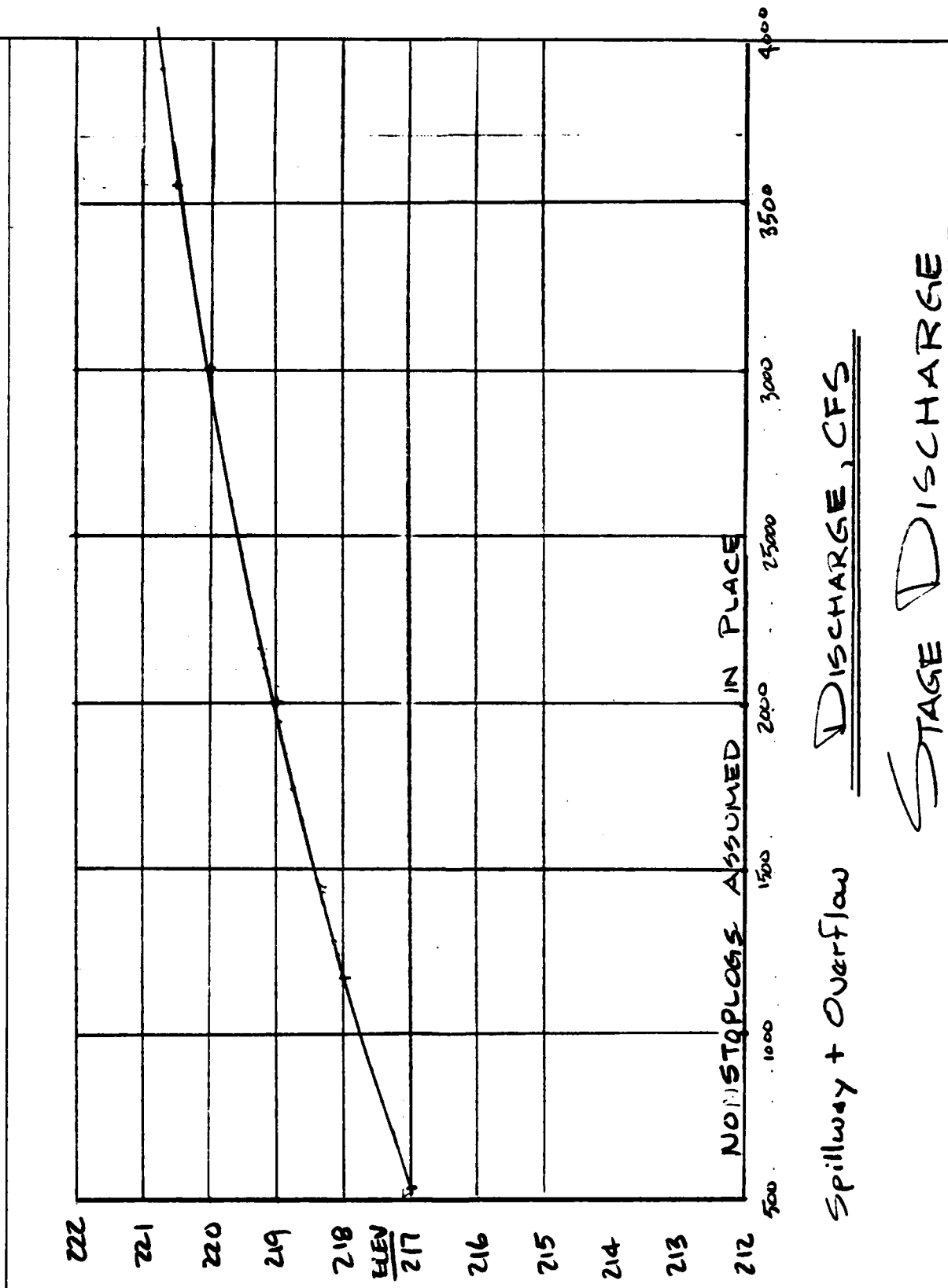
Spillway + overflow

JOB NO. 79.206.1
 DATE 11-21-79
 BY MA
 CH'D BY FDD



HAYDEN, HARDING & BUCHANAN, INC.
 CONSULTING ENGINEERS
 BOSTON — WEST HARTFORD

JOB DAMS SHEET NO. D 7
 SUBJECT LOST LAKE
 CLIENT COE



Spillway + Overflow

DISCHARGE, CFS

STAGE DISCHARGE

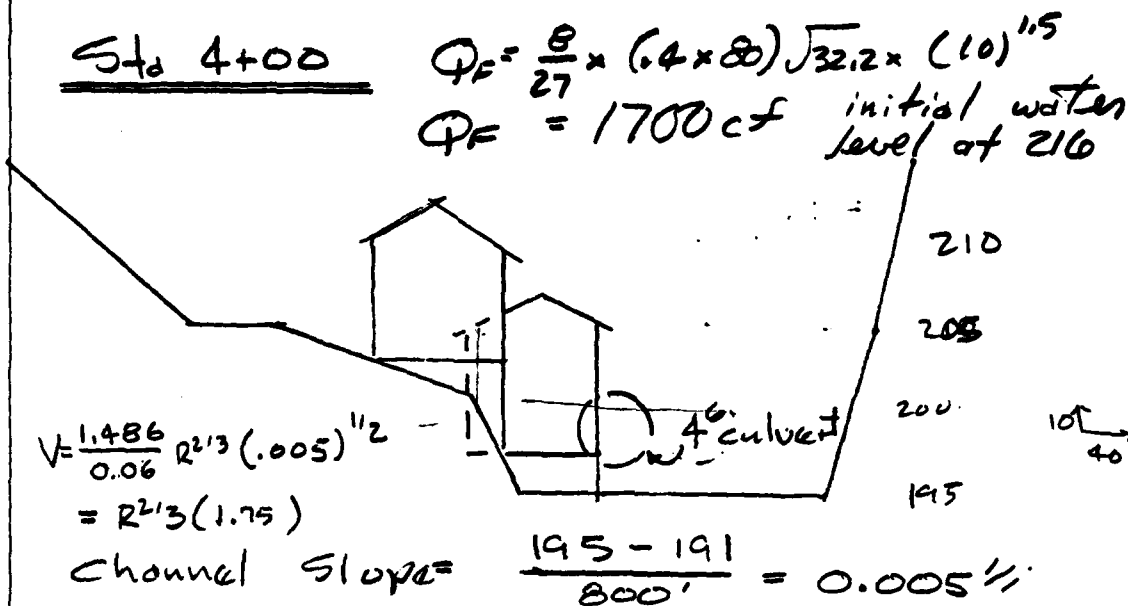
JOB NO. 79.206.1
 DATE 11-6-79
 BY MA
 CH'D BY FDD



HAYDEN, HARDING & BUCHANAN, INC.
 CONSULTING ENGINEERS
 BOSTON — WEST HARTFORD

SHEET NO. D8
 JOB Dams
 SUBJECT Cost Lake
 CLIENT COE

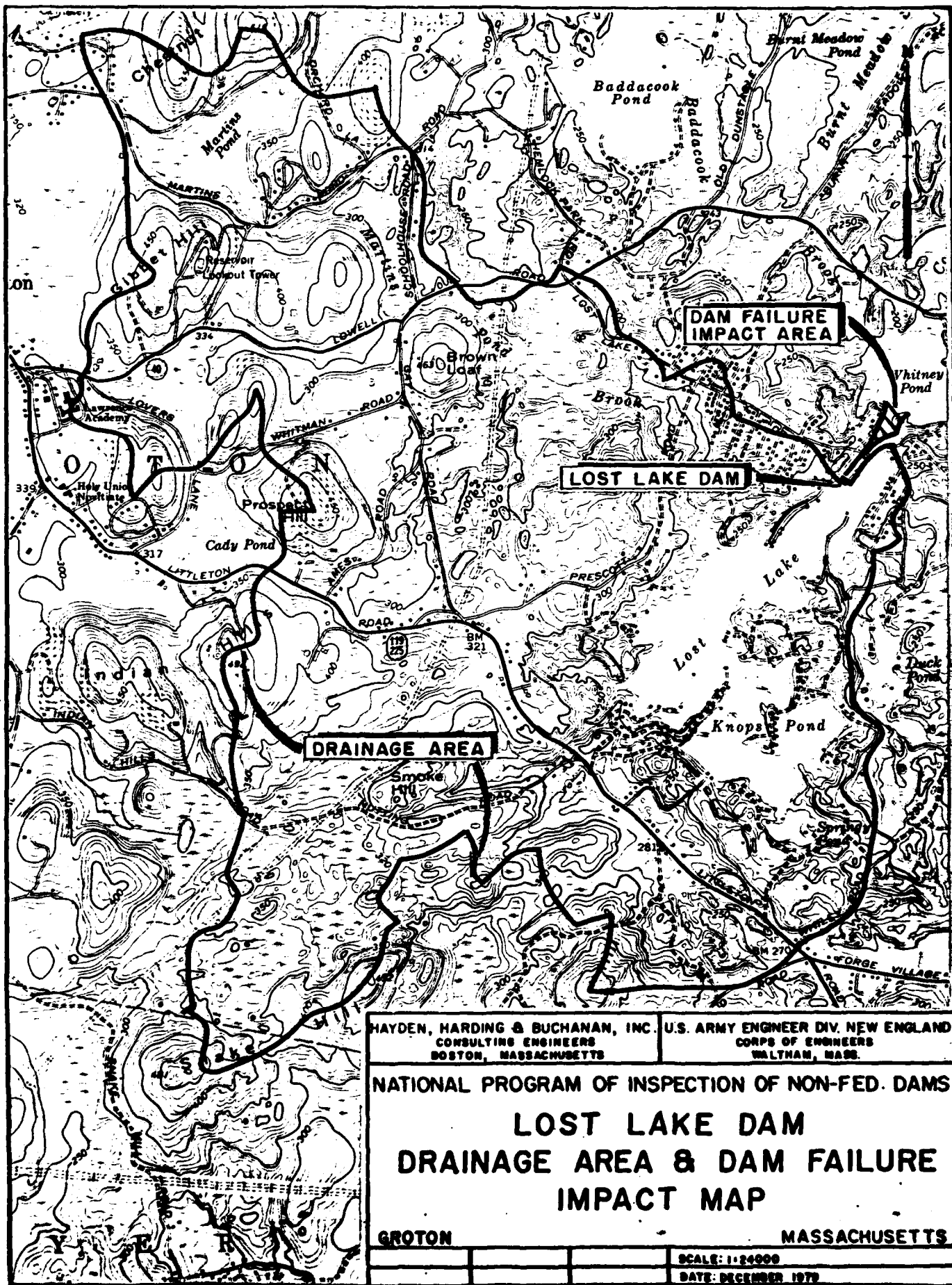
1-18-80



$Q_F = 1700 \text{ cfs.}$

D	WP	A	$R^{2/3}$	V	Q
5	85	400	2.8	1.75	5.2000
10	150	925	3.38	"	5.95480
15	200	1800	4.36	"	7.613730
17	215	2200	4.75	"	8.318290

Could assume road embankment at 3+00 has failed.
 These two homes would be damaged.
 IF the roadway did not fail, these homes would still be damaged.



APPENDIX E
INFORMATION AS CONTAINED IN THE
NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS IN THE UNITED STATES

STATE	IDENTITY NUMBER	DIVISION	STATE	COUNTY	CORNER DIST.	STATE	COUNTY	CORNER DIST.	NAME	LATITUDE (NORTH)	LONGITUDE (WEST)	REPORT DATE DAY MO YR
MA	808	NED	MA	017	05				LOST LAKE DAM	4236.0	7131.1	28DEC79

POPULAR NAME	NAME OF REPOUNDMENT
	LOST LAKE

(A)		(B)	(C)	(D)	(E)
WFOB DATA	RIVER OR STREAM	NEAREST DOWNSTREAM CITY-TOWN-VILLAGE	DIST FROM DAM (MI.)	POPULATION	
01 06	MARTINS POND BROOK	GROTON	0	3100	

TYPE OF DAM	YEAR COMPLETED	PURPOSES	HYDRAU- LIC HEADING (FT.)	HYDRAU- LIC HEADING (FT.)	FOUNDING CAPACITIES		DIST	OWN	FED R	PRV/FED	SCS A	VER/D
					RESISTION (ACRE-FT.)	HEAVY (ACRE-FT.)						
REPGOT	1950	R	10	10	1809	1350	NED	N	N	N	N	

REMARKS	
21 CONCRETE	22 APPROX SPILLWAY RECONSTRUCTION

[illegible]

OWNER	ENGINEERING BY	CONSTRUCTION BY
LOST LAKE WATER COMMITTEE	UNKNOWN	UNKNOWN

REGULATORY AGENCY			
DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
NONE	NONE	NONE	NONE

INSPECTION BY	INSPECTION DATE DAY MO YR	AUTHORITY FOR INSPECTION
HAYDEN, HARDING & BUCHANAN, INC.	05NOV79	P.L. 92-367

REMARKS	

DATE
FILMED
-8

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