NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS
BROWNS POND DAM MA 00. (U) CORPS OF ENGINEERS WALTHAM
MA NEW ENGLAND DIV DEC 78
NORTH RIVER BASIN
PEABODY, MASSACHUSETTS

BROWNS POND DAM
MA 00192

PHASE 1 INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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

DECEMBER 1978
Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

**KEY WORDS** (Continue on reverse side if necessary and identify by black mark)

DAMS, INSPECTION, DAM SAFETY,

North River Basin
Peabody Massachusetts

**ABSTRACT** (Continue on reverse side if necessary and identify by black mark)

Browns Pond Dam is an earthfill embankment about 200-feet long, with a maximum height of about 5-feet and a crest of about 10-feet. The dam has inadequacies and deficiencies which, if not remedied, have the potential for developing into hazardous conditions. The dam is classified as small in size with a low hazard potential.
Honorable Edward J. King
Governor of the Commonwealth of
Massachusetts
State House
Boston, Massachusetts 02133

Dear Governor King:

I am forwarding to you a copy of the Browns Pond Dam 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 Quality Engineering, the cooperating agency for the Commonwealth of Massachusetts. In addition, a copy of the report has also been furnished the owner, the City of Peabody, Public Service Department, Berry Street, Peabody, Massachusetts 01960.

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 Quality Engineering for your cooperation in carrying out this program.

Sincerely yours,

JOHN P. CHANDLER
Colonel, Corps of Engineers
Division Engineer

Incl
As stated
BROWNS POND DAM
MA 00192

NORTH RIVER BASIN
PEABODY, MASSACHUSETTS

PHASE 1 INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
BRIEF ASSESSMENT

Browns Pond Dam is an earthfill embankment about 200 feet long, with a maximum height of about 5 feet and a crest width of about 10 feet. An open topped trapezoidal concrete outlet structure is located at the right abutment contact. A 20-inch diameter cast iron pipe is located at the bottom of the structure and serves as an outlet. Discharges are controlled by a manually operated gate valve located about 200 feet downstream from the structure. A stone masonry spillway is located about 75 feet from the left end of the embankment. Across the width of the spillway is a 1.3 feet high concrete headwall, which serves as an overflow weir. At the bottom of the headwall there is a 15-inch diameter vitrified clay outlet pipe. The intake to the pipe is protected by a steel trash rack. The overflow weir is flanked by stone masonry training walls. Water discharged from the pond through the outlet structure flows underground for a distance of about 5200 feet through a series of 20- and 24-inch pipes into Tapley Brook. The discharges over the spillway and through the spillway outlet pipe flow into a natural channel which ends at a roadway embankment (Lynn Street.)

Phase I inspection and evaluation of Browns Pond Dam does not indicate conditions which would constitute an immediate hazard to human life or property. Based on engineering judgement and the performance of the earth embankment and outlet works, the project appears to be in good condition. The project, however, does have inadequacies and deficiencies which, if not remedied, have the potential for developing into hazardous conditions.
Because there are no data on Maximum Floods for the Browns Pond drainage basin, it was necessary to synthesize a test flood hydrograph for this area. Since the dam is classified as small in size, with a low hazard potential, the test flood, in accordance with Corps of Engineers guidelines is the 50 to 100-year flood. The 100-year flood was selected as the Test Flood and results in an inflow-peak of 771.5 cfs (1056.9 csm), with a runoff volume equivalent to 4.75 inches in 6 hours. The adequacy of the spillway was tested by routing the Test Flood through the reservoir using a computerized routing technique. The peak outflow from the 100-year flood was 63.3 cfs (86.7 csm) at El 81.2 or about 0.9 feet below the top of the dam.

Since the dam is not expected to be overtopped with an inflow equal to the 100-year flood, it is considered that the spillway is adequate from a hydraulic and hydrologic standpoint. Therefore no recommendations and/or further investigations are considered necessary at this time.

Remedial measures are recommended for implementation by the owner, within 24 months of receipt of this Phase I Inspection Report, to improve overall conditions. These measures, in general, are as follows:

- Repairs to embankment and appurtenant structures
- Programs for operation, maintenance and inspection

Eugene O'Brien, P.E.
New York No. 29823
This Phase I Inspection Report on Browns 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 approved for issuance.

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

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

JOSEPH A. MC ELROY, CHAIRMAN
Chief, NED Materials Testing Lab.
Foundations & Materials Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRYAR
Chief, Engineering Division
PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual 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.
# NORTH RIVER BASIN
# BROWNS POND DAM
# INVENTORY NO., MA 00192
# PHASE I INSPECTION REPORT

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E. INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS
SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 EVALUATION OF FEATURES

a. Design Data
There are no design data available for Browns Pond. The watershed is a long narrow valley with relatively low but steep side slopes. The valley, with about 60% urban development, has storage in the form of some small ponds and a swamp. The slopes have very little apparent storage and are almost completely covered by a well established hardwood forest. The drainage area of Browns Pond is 470 acres (0.73 square miles), of which about 8% is occupied by the Pond. There are no streams flowing into or out of Browns Pond. There are no defined downstream channels below the spillway, and outflow over the spillway crest would first fill the depressed area immediately downstream of the dam before flowing across Lynn Street, then downslope into the available storm sewers or overland into Fountain Pond and Spring Pond.

b. Experience Data
It is reported by persons interviewed that to their knowledge the dam has never been overtopped.

c. Visual Inspection
At the time of inspection, the water level was at about El 73.1, 3 feet below the invert of the outlet pipe located inside of the outlet structure. Both outlet structure and pipe are in generally good condition. The spillway is in fair condition. The spillway approach channel is partially blocked by debris and stone blocks fallen from the upstream training walls. The downstream training walls are in fair condition with a few stone blocks from the upper courses of the wall having fallen into the channel. For further details see Section 3.1.

d. Overtopping Potential
The potential for overtopping the dam was investigated on the basis of the adequacy of the spillway and the available surcharge storage to meet a potential emergency inflow. The dam, with a height of five feet and a maximum storage of 280 acre-feet $^{1/4}$ is classified as small. $^{2}$ In order to estimate the downstream hazard potential in the event of a dam failure, the U.S. Corps of Engineers' "Rule of Thumb" guidance was used. The estimate assumes the following: a) the reservoir surface is at the top of the dam at the time of the breach, b) a breach of 80.0 feet, equal to 40% of the dam length at mid-height, occurs, and c) the downstream channel has an average roughness coefficient (n) of 0.07. The hypothetical flood wave height was estimated at locations 30, 2130, 3480 and 5210 feet downstream from the dam. The following results were obtained:

$^{1/4}$ Numbers denote references listed at the end of the Section.
SECTION 4 - OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

Operating procedures for the project are not formally established but are based on the experience of the operating personnel.

4.2 MAINTENANCE OF DAM

There is no formal maintenance manual for the project. It is reported that maintenance is carried out as needed. There is no scheduled program of inspection by the owner. Although the State has had a program of dam inspection since 1968, it is reported that Browns Pond Dam has not been inspected under this program. Prior to 1968, Essex County conducted inspections from 1912 to 1968 and a summary of their inspection reports is given in the Appendix.

4.3 MAINTENANCE OF OPERATING FACILITIES

There is no established maintenance program for the operating facilities.

4.4 WARNING SYSTEMS IN EFFECT

There is no warning system in effect nor one planned.

4.5 EVALUATION

The maintenance and operating procedures for the dam and appurtenant structure are considered deficient. Measures to improve these deficiencies are given in Section 7.
have fallen into the spillway approach channel. In addition, minor debris has accumulated in the channel. At several locations along the walls, mortar in the joints is loose and missing. At the time of inspection, there was a steel plate flashboard at the entrance to the spillway. (See Photograph No. 6).

The downstream training walls are in fair condition; only a few stone blocks from the upper courses have fallen into the channel. At several locations on both training walls the mortar is loose and missing. About 20 feet downstream from the spillway headwall, a 5-foot section of the 15-inch diameter clay outlet pipe is broken.

d. Abutments

There were no signs of seepage or other unusual conditions at the abutments. At the left abutment there is a high voltage transmission tower. (See Photograph No. 3.)

e. Downstream channel

A poorly defined natural channel of 250 feet length abruptly ends at the Lynn Street roadway embankment and is overgrown with heavy vegetation, trees, bushes, saplings and grass. There are also high voltage transmission towers located in this vicinity (See Photograph No. 7.)

f. Reservoir Area

In the vicinity of the dam, there is no evidence of potentially unstable slopes or other unusual conditions which would adversely affect the dam.

3.2 EVALUATION OF OBSERVATIONS

Visual observations made during the course of the inspection revealed several deficiencies which at present do not adversely affect the adequacy of the dam. However, these deficiencies do require attention and should be corrected before further deterioration leads to a hazardous condition. Recommended measures to improve these conditions are given in Section 7.
SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General

A visual inspection of Browns Pond Dam was made on 16 November, 1978. The weather was sunny, temperature between $50^\circ$ and $55^\circ$ F. The last rainfall reportedly occurred two weeks before the inspection. At the time of inspection the pond level was at about El 73.1, i.e. 9 feet below the top of dam.

b. Embankment

The earthfill embankment appears in generally good condition. The horizontal and the vertical alignments of the crest are generally good. There is, however, some erosion on a path, created by pedestrian traffic, for a distance of 125 feet starting at the left abutment. (See Photograph No. 2). Also at several locations, the crest edge on the upstream side has been eroded. (See Photograph No. 8). Neither longitudinal nor transverse cracks are visible on the crest, which is covered by heavy growth of trees, saplings, bushes and overgrown grass.

The upstream slope is in relatively fair condition. The upstream slope between the normal water level and the crest edge exhibits large expanses of erosion and sloughing. No slope protection is provided on the upstream slope. (See Photograph No. 3).

The downstream slope does not show any signs of erosion or sloughing. The slope is completely covered with heavy vegetation including trees, sapling, bushes and overgrown grass. Along the toe of the slope, starting from the right abutment for a distance of 75 feet, erosion has occurred resulting from pedestrian traffic. (See Photograph No. 1).

c. Appurtenant Structures

The concrete outlet structure and the 20-inch diameter cast iron outlet pipe which is protected by a steel trash rack are in good condition. The pipe shows minimal rusting and the condition of the concrete is good. (See Photograph No. 4). It is reported that the gate valve for the outlet pipe is in operating condition.

The spillway is in good condition with the upstream training walls in fair condition. The stone blocks of the upper courses of both walls
c. **Validity**

In general, the information obtained from the available drawings, the past inspection reports, and the personal interviews is consistent with observations made during the inspection and therefore considered reliable.
SECTION 2 - ENGINEERING DATA

2.1 DESIGN

Design data and specific memoranda are not available for the original construction of the dam. There are drawings showing the survey data for the pond (see Appendix) and a plan and profile of the outlet structure and pipe combination in the files of the Owner. The elevations shown on the above drawing refer to the Peabody Water Department datum. There is no correlation available between the Peabody datum and the USGS datum. However, located on the upstream slope of Spring Pond Dam near the left abutment there is a bench mark whose elevation is reportedly based on USGS datum. At the time of the inspection, the elevation of the top of the Spring Pond Dam using this bench mark was determined by levelling. Comparing this elevation to the one shown for the top of dam on the above drawing indicates the Peabody datum to be 3.77 feet above the USGS datum. Therefore, elevations of the top of dam and invert of the outlet pipes were adjusted by this value.

2.2 CONSTRUCTION RECORDS

There are no construction records available.

2.3 OPERATION RECORDS

No operation records are available and there are no daily records of the pond elevation and rainfall at the dam site.

2.4 EVALUATION OF DATA

a. Availability

Existing information was made available by Water Division, Public Service Department, Peabody, Mass.; Engineering Department, County of Essex, Salem, Mass.; and Department of Environmental Quality Engineering, Division of Waterways, Boston, Mass.

b. Adequacy

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 visual inspection, past performance history and sound engineering judgement.
i. **Spillway** (continued)

| U/S channel | None |
| D/S channel | See description in Sections 1.2 and 3.1 |

j. **Regulating Outlets**

The regulating outlets consist of an outlet structure and a spillway.

The concrete outlet structure, trapezoidal in plan, is 7 feet wide and 2.8 feet high with sidewalls 7 feet and 11.5 feet long. The outlet from the structure is a 20-inch diameter cast iron pipe whose invert is at about El 75.0. Discharges through the pipe are manually controlled by a gate valve located 200 feet downstream.

The stone masonry spillway is 6 feet wide with a freeboard of about 3.5 feet. At the upstream end of the spillway there are provisions for flashboards; at the downstream end there is a 1.5 feet high concrete headwall surrounding a 15-inch diameter vitrified clay pipe.

Discharges from the intake structure flow underground about 5200 feet through a series of 20- and 24-inch diameter pipes into Tapley Brook. The discharges from the spillway are into a natural channel. The channel ends abruptly at the Lynn Street roadway embankment. The location of the discharge end of the spillway outlet pipe is not known.
e. **Storage** (acre-feet)

<table>
<thead>
<tr>
<th>Description</th>
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</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>Flood control pool</td>
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</tr>
<tr>
<td>Design surcharge</td>
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<td>Test flood surcharge (net)</td>
<td>175</td>
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<tr>
<td>Top of dam</td>
<td>280</td>
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f. **Reservoir Surface** (acres)

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</tr>
<tr>
<td>Test flood pool</td>
<td>55</td>
</tr>
<tr>
<td>Flood-control pool</td>
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</tr>
<tr>
<td>Recreation pool</td>
<td>37</td>
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<tr>
<td>Spillway crest</td>
<td>49.9</td>
</tr>
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g. **Dam**

<table>
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<tr>
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<tbody>
<tr>
<td>Type</td>
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<tr>
<td>Length, feet</td>
<td>200+</td>
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<tr>
<td>Height, feet</td>
<td>5±</td>
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<td>Top width, feet</td>
<td>10</td>
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<td>Side Slopes - Upstream</td>
<td>1V on 2.5H near top then 1V on 1H and 1V on 10H remainder to the water line 1V on 4.5H</td>
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<td>Unknown</td>
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<tr>
<td>Impervious core</td>
<td>Unknown</td>
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<td>Cutoff</td>
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<td>Grout curtain</td>
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h. **Diversion and Regulating Tunnel**

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<td>Closure</td>
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<td>Access</td>
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<tr>
<td>Regulating facilities</td>
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i. **Spillway**

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<thead>
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<tbody>
<tr>
<td>Type</td>
<td>Broad-crested</td>
</tr>
<tr>
<td>Length of weir, feet</td>
<td>6.0</td>
</tr>
<tr>
<td>Crest elevation, feet</td>
<td>79.0</td>
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1-5
2000 ft in length, with an area of 37.2 acres or 8% of the total area. The valley, with about 60% urban development, has storage in the form of some small ponds and a swamp. The slopes have very little apparent storage and are almost completely covered by a well established hardwood forest.

b. **Discharges at Damsite**

Discharges from Browns Pond are over a concrete weir with an outlet pipe and over an open topped outlet structure from which water is discharged through a cast iron pipe.

The spillway consists of a concrete overflow headwall 6 feet wide and 1.5 feet high which surrounds a 15-inch diameter vitrified clay outlet pipe. The computed maximum discharge capacity, with the pond level at El 81.25, is 67.0 cfs.

The height of the trapezoidal concrete outlet structure is 2.8 feet, its width 7 feet. The length of the sidewalls is 7 feet and 11.5 feet. A 20-inch diameter cast iron pipe is located at the bottom of the structure; its invert is at about El 75.0. The computed maximum discharge with head equivalent to El 81.2 is about 10 cfs.

c. **Elevation (feet above MSL)**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Top of dam</td>
<td>82.1</td>
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<tr>
<td>Maximum pool-design surcharge</td>
<td>Unknown</td>
</tr>
<tr>
<td>Maximum pool-test flood</td>
<td>81.2</td>
</tr>
<tr>
<td>Full flood control pool</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Recreation pool</td>
<td>77.6</td>
</tr>
<tr>
<td>Spillway crest (gated)</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Upstream portal invert diversion tunnel</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Downstream portal invert diversion tunnel</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Streambed at centerline of dam</td>
<td>Unknown</td>
</tr>
<tr>
<td>Maximum tailwater</td>
<td>Unknown</td>
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d. **Reservoir (feet)**

<table>
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<th>Reservoir</th>
<th>Value</th>
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</thead>
<tbody>
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<td>Length of maximum pool</td>
<td>1920+</td>
</tr>
<tr>
<td>Length of recreation pool</td>
<td>1900</td>
</tr>
<tr>
<td>Length of flood control pool</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>
e. **Design and Construction History**

Original design and construction records are not available. The exact year the dam was built is unknown but reported by the dam was constructed about 1900. Past inspection reports, summaries of which are in the Appendix, indicate that over the years several changes and repairs have been made to the appurtenances. It should be noted that the upstream face of the intake structure had a weir notch with provisions for flashboards. Recently the notch was filled with concrete.

f. **Normal Operating Procedure**

There are no normal operating procedures for the project. The pond is allowed to establish its own level.

g. **Size Classification**

The dam is less than 40 feet high and has a storage capacity less than 1000 acre-feet, therefore is classified as a "small" dam.

h. **Hazard Classification**

The dam is in a "low" hazard potential category because analysis indicates that a shallow depth flood wave would result from a dam failure. The wave would probably cause minimal property damage with probably no loss of life. For details on selection of the hazard potential category see Section 5.1d.

i. **Operator**

The person responsible for the day-to-day operation of the dam is:

Mr. Alan Taubert, Director  
Water Division  
Public Service Department  
Berry Street  
Peabody, Mass.  
Phone: (617) 531-5135 (Office)  
(617) 535-3652 (Home)

1.3 PERTINENT DATA

a. **Drainage Area**

The drainage area contributing to Browns Pond is 470 acres (0.73 square miles) with a length to width ratio of about 4. The Pond is approximately
with a maximum height of about 5 feet and a crest width of about 10 feet. The upstream slope is broken and is about 1V on 10H adjacent to the water line, then about 1V on 1H and finally 1V on 2.5H near the crest. The downstream slope is grassed and is about 1V and 4.5H.

An open topped trapezoidal concrete outlet structure is located at the right abutment contact. The height of the structure is 2.8 feet, its width 7 feet. Length of the sidewalls is 7 and 11.5 feet. A 20-inch diameter cast iron pipe is located at the bottom of the structure and serves as the outlet. (See Photograph No. 4). Discharges are controlled by a manually operated gate valve located about 200 feet downstream. Downstream of the gate valve, the pipe is 24-inch diameter vitrified clay and about 5000 feet long. It discharges into Tapley Brook adjacent to the Spring Pond Pumping Station on the left abutment of the Fountain Pond Dam (commonly called the Lower Spring Pond Dam).

A stone masonry spillway 6 feet wide, 3.5 feet high and 11 feet long is located about 75 feet from the left end of the embankment. The overflow weir consists of a concrete headwall, 1.5 feet high, 1 foot thick, which is located at the downstream end of the spillway. At the bottom of the headwall there is a 15-inch diameter vitrified clay outlet pipe of unknown length. The intake of the pipe is protected by a steel trash rack. About 11 feet upstream of the headwall there are provisions for flashboards. The top of the spillway is covered by stone slabs. The overflow weir is flanked, upstream and downstream by stone masonry training walls, 14 feet long by 3.5 feet high and 7 feet long by 3.0 feet high, respectively. (See Photograph No. 6). Discharges over the weir are into a natural channel.

b. **Location**

The dam is located in the southern portion of the City of Peabody, just north of the Peabody-Lynn borderline, south of the intersection of Lynn Street and Fairview Avenue.

c. **Ownership**

Browns Pond Dam is owned by the City of Peabody. The day-to-day operation and maintenance is managed by the Water Division, Public Service Department, Peabody, Massachusetts.

d. **Purpose of Dam**

The impoundment provided by the dam is for recreational purposes.
PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
NORTH RIVER BASIN
INVENTORY NO. MA 00192
BROWNS POND DAM
CITY OF PEABODY
ESSEX COUNTY, COMMONWEALTH OF MASSACHUSETTS

SECTION I - PROJECT INFORMATION

1.1 GENERAL

a. Authority

Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a national program of dam inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of the dams within the New England Region. Tippetts-Abbett-McCarthy-Stratton 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 to Tippetts-Abbett-McCarthy-Stratton under a letter of May 3, 1978, from Mr. Ralph T. Garver, Colonel, Corps of Engineers, Contract No. DACW33-78-C-0298 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 prepare 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. Description of Dam and Appurtenances

Browns Pond Dam is an earthfill embankment about 200 feet long.
Reaches 2 and 3 were taken across Fountain Pond and indicate raising of the pond surface of between 2.5 and 3.3 feet, respectively. The majority of flow between reaches 1 and 2 will probably be along Linden Road and Sunset Drive with shallow overland or sheet flow between the streets in the built up areas. Minimal property damage is expected with no loss of life, therefore, the hazard potential is classified as low. Since the dam is classified as small in size, with a low hazard potential, the test flood, in accordance with Corps of Engineers guidelines is the 50 to 100-year flood. The 100-year flood was selected as the Test Flood. The 100-year, 6-hour point rainfall for Peabody, Mass, is 4.75 inches. The distribution of the 100-year storm was based on data in a publication of the World Meteorological Organization. It was assumed that (a) there were no losses, (b) the reservoir at the start of the storm was at El 77.6, equivalent to the invert elevation of the spillway outlet pipe and there were no flashboards in use, and (c) that the spillway and outlet structure pipe outlets were blocked. A triangular unit hydrograph was developed to represent runoff from the land area and subsequently used to compute the flood hydrograph. The runoff from 4.75 inches of rainfall on the lake surface was added to the runoff from the watershed area to form the test flood inflow hydrograph and resulted in a peak discharge of 771.5 cfs (1056.9 csm).

The computed discharge capacity of the Browns Pond spillway, with the water level at El 81.25, equivalent to the bottom of the spillway cover, is 67.0 cfs (91.8 csm). The available surcharge storage between spillway invert El 77.6 and El 81.25 is estimated to be 179.0 acre-feet which is equivalent to about 4.5 inches of runoff over the entire basin.

The Test Flood was routed through the reservoir using a computerized routing technique and resulted in a maximum pond level of El 81.2 or about 0.9 feet below the top of the dam, with a corresponding outflow discharge of 63.3 cfs. The Test Flood peak outflow discharge is 94% of the maximum spillway capacity. Therefore, the spillway is considered adequate from a hydrologic and hydraulic standpoint.
References


6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

Visual observations did not indicate any serious structural problems with the embankment, or the outlet works. The deficiencies described in Section 3 require attention and measures to improve these deficiencies are given in Section 7.

b. Design and Construction Data

No design computations or other data pertaining to the structural stability of dam have been located. On the basis of the past performance experience, the visual inspection, as well as engineering judgment, the dam at present appears to be structurally adequate.

c. Operating Records

There are no operating records kept or available. There are no records or reports of any operational problems, which would affect the stability of the dam.

d. Post-Construction Changes

The exact year the dam was built is unknown. It is reported by those interviewed that the dam was built about 1900. There are no records of any construction changes except those noted in the Essex County summarized inspection reports. For details see Section 2.2

e. Seismic Stability

The dam is located in Seismic Zone 3. There are no seismic records at the dam site. Because of the dam's configuration, condition and the head of water retained, a seismic analysis is considered not warranted.
SECTION 7 - ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Condition

Phase I Investigation of Browns Pond Dam does not indicate conditions which would constitute an immediate hazard to human life or property. Based on engineering judgment and the performance of the earth embankment and outlet works, the project appears to be in good condition. The project, however, does have inadequacies and deficiencies which, if not remedied, have the potential for developing into hazardous conditions.

Because there are no data on Maximum Floods for such a small drainage basin it was necessary to synthesize a test flood hydrograph for the contributing area. Since the dam is classified as small in size, with a low hazard potential, the test flood, in accordance with Corps of Engineers guidelines is the 50 to 100-year flood. The 100-year flood was selected as the Test Flood. The 100-year, 6-hour point rainfall for Peabody, Mass. is 4.75 inches. The distribution of the 100-year storm was based on published data.

It was assumed that (a) there were no losses, (b) the reservoir at the start of the storm was at El 77.6, equivalent to the invert elevation of the spillway outlet pipe and there were no flashboards, and (c) both spillway and outlet structure pipe outlets were inoperative. A triangular unit hydrograph was developed to represent runoff from the land area and subsequently used to compute the flood hydrograph. The runoff from 4.75 inches of rainfall on the pond surface was added to the runoff from the watershed area to form the Test Flood inflow hydrograph and resulted in a peak discharge of 771.5 cfs (1056.9 csm).

The computed discharge capacity of the Browns Pond spillway, with the water level at El 81.25, equivalent to the bottom of the spillway cover, is 67.0 cfs (91.8 csm). The available surcharge storage between the spillway invert El 77.6 and El 81.25 is estimated to be 179.0 acre-feet which is equivalent to about 4.5 inches of runoff over the entire basin.

The Test Flood was routed through the reservoir using a computerized routing technique and resulted in a maximum pond level of El 81.2 or about 0.9 feet below the top of the dam, with a corresponding outflow discharge of 63.3 cfs. The Test Flood peak outflow discharge is 94% of the maximum spillway capacity. Therefore, the spillway is considered adequate from a hydrologic and hydraulic standpoint.

7-1
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 visual inspection, past performance history and sound engineering judgment.

c. Urgency
The remedial measures described in a subsequent paragraph should be undertaken by the owner within the next 24 months, after receipt of this Phase I Inspection Report.

d. Necessity for Additional Investigations
Additional investigations to assess the adequacy of the dam and appurtenant structures do not appear necessary.

7.2 RECOMMENDATIONS
None.

7.3 REMEDIAL MEASURES
a. Alternatives
None.

b. Operating and Maintenance Procedures
It is recommended that the following measures be undertaken by the owner within the next 24 months after receipt of this Phase I Inspection Report.

1. Establish a formal program of operation and maintenance, and initiate biennial inspections of the dam.

2. Provide round-the-clock surveillance during periods of unusually heavy precipitation.

3. Develop a formal system for warning downstream residents in case of emergency.

4. All vegetation on both slopes should be kept in a close cut condition.

5. All brush, shrubs and young saplings should be removed from the embankment and the area immediately downstream of the embankment toe. Large conifers, but not deciduous hardwoods, should be removed and the remaining trees should be inventoried.
and their condition monitored. If a tree dies, the area around the tree should be closely monitored for seepage.

6. The gullies and sloughed areas of the upstream slope should be filled with suitable material and compacted.

7. Stone blocks at the entrance and exit of the spillway should be removed.

8. Remove debris from spillway approach channel.

9. Missing stones should be replaced along the spillway training walls and all joints should be repointed.

10. The extent of the spillway outlet pipe should be determined and the broken portion of the pipe repaired.

11. The gate valve which controls discharges through the outlet pipe should be maintained in operable condition.
VISUAL INSPECTION CHECKLIST

APPENDIX A
VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT: BROWNS POND DAM

DATE 11-16-78
TIME 2:30 PM
WEATHER Sunny 50°-55°F
W.S. ELEV. 73.1 ft U.S.

PARTY:
1. Harvey S. Feldman
2. Nisatindra N. Patel
3. 
4. 
5. 

PROJECT FEATURE

INSPECTED BY

REMARKS

1. All project features inspected by party members
2. 
3. 
4. 
5. 
6. 
7. 
8. 
9. 
10. 

+ Based on USGS Datum
PERIODIC INSPECTION CHECK LIST

PROJECT: BROWNS POND DAM   DATE: 11-16-78

PROJECT FEATURE: ___________________ NAME: ___________________

DISCIPLINE: ___________________ NAME: ___________________

DAM EMBANKMENT

Crest Elevation: 82.1

Current Pool Elevation: 73.1

Maximum Impoundment to Date: _______

Surface Cracks: None

Pavement Condition: No Pavement at crest

Movement or Settlement of Crest: None (see misc. comments)

Lateral Movement: None

Vertical Alignment: Good

Horizontal Alignment: Good

Condition at Abutment and at Concrete Structures: Generally good at Abutment

Indications of Movement of Structural Items on Slopes: None

Trespassing on Slopes: Both slopes show evidence of Trespassing

Slouching or Erosion of Slopes or Abutments: Several gullies at upstream slope

See Misc. Comments

Rock Slope Protection - Riprap Failures: (riparian slope riprap complete)

Unusual Movement or Cracking at or near Toes: None

Unusual Embankment or Downstream Seepage: None
Piping or Boils: None

Foundation Drainage Features: None

Toe Drains: None

Instrumentation System: There are none at Browns Pond Dam. However, there is a Benchmark at Spring Pond Dam and is based on USGS Datum.

Miscellaneous: Entire upstream slope between normal water level and edge of the crest shows erosion and sloughing. The upstream is completely eroded.

Downstream slope does not show any erosion or sloughing. The slope is completely covered with heavy vegetation including trees, sappings, rushes and overgrown grasses. About 75 feet of the toe from the sign is undercut shows erosion resulting from pedestrian traffic.
PERIODIC INSPECTION CHECK LIST

PROJECT BROWNS POND DAM DATE 11-16-28
PROJECT FEATURE ___________________________ NAME ___________________________
DISCIPLINE ___________________________ NAME ___________________________

OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE

a. Approach Channel None
   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 Generally Good ___________________________
   Stop Logs and Slots None ___________________________

Intake structure is open at top. Discharge can only be from the top.
PERIODIC INSPECTION CHECK LIST

PROJECT ___________________ DATE ________________

PROJECT FEATURE ___________ NAME __________________

DISCIPLINE __________________ NAME ___________________

OUTLET WORKS - CONTROL TOWER

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 ________________________________________

None
<table>
<thead>
<tr>
<th>System</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydraulic System</td>
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</tr>
<tr>
<td>Service Gates</td>
<td></td>
</tr>
<tr>
<td>Emergency Gates</td>
<td></td>
</tr>
<tr>
<td>Lightning Protection System</td>
<td></td>
</tr>
<tr>
<td>Emergency Power System</td>
<td></td>
</tr>
<tr>
<td>Wiring and Lighting System</td>
<td></td>
</tr>
<tr>
<td>OUTLET WORKS - TRANSITION AND CONDUIT</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------</td>
<td></td>
</tr>
<tr>
<td>General Condition of Concrete: Good</td>
<td></td>
</tr>
<tr>
<td>Rust or Staining of Concrete: Minor rusting</td>
<td></td>
</tr>
<tr>
<td>Spalling: ___________________________</td>
<td></td>
</tr>
<tr>
<td>Erosion or Cavitation: None - where visible</td>
<td></td>
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<tr>
<td>Cracking: ___________________________</td>
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<tr>
<td>Alignment of Monoliths: ______________</td>
<td></td>
</tr>
<tr>
<td>Alignment of Joints: _______________</td>
<td></td>
</tr>
<tr>
<td>Numbering of Monoliths: _____________</td>
<td></td>
</tr>
</tbody>
</table>

* Cast iron pipe which is underground about 200 feet and then transition to 24" vitrified clay. It is then run 5000 feet underground before outfalling into Webber Stream.
COUNTY OF ESSEX, MASSACHUSETTS
ENGINEERING DEPARTMENT

Inspection of Dams, Reservoirs, and Stand Pipes

Inspector: E.L. Berlin Date: April 9, 1912

City or Town: Location: Norbury and Over Bown Pond

Owner: Norbury Water Works Use: Water Supply

Material and Type: Earth Stone Flange Connell Facing on upper side

| Elevations in feet above (+) or below (-) full pond or reservoir level. (Crown out what does not apply.) |
|---|---|---|---|---|
| For Dam | Bed of stream below | Bottom of pond | Bottom of spillway | Top of dam | Top of flash boards |
| 0 | 2 | 5 | 8 | 11 | 14 |
| For Res or S.P. | Bottom of spillway | Level of overflow pipe | Top of outlet pipe | 06 | 08 |
| For Dam | Length in ft. | Top width in ft. | | 12 | |
| | | | | | |
| Length of overflow or spillway | Outlet pipes (size and nature) |
| 6 | |
| 8 |
| Foundation and details of construction |
| Constructed by and date |
| Recent repairs and date |
| Evidence of leakage |
| Condition |
| Topography of country below |
| Nature, extent, proximity, etc. of buildings, roads or other property in danger if failure should occur. |

Plans and data wanted or available

Use separate sheet for details of necessary.
Notes, sketches, sections, etc.
Peabody Square, so that in case of the rare storm which we are considering, the whole vicinity of the stream where it flows through the city of Peabody would be badly flooded even if the dams remain intact and this area consists in part of manufacturing establishments and a considerable business section as well as residences.

Regardless of such a flood condition, however it cannot be assumed that a breaking of one or more dams at such a time would not cause some further loss or damage such as it contemplated by the law requiring inspection of dams.

\[ R_{\text{eff}} = \frac{1}{e} R_{\text{eq}} \]
should be adopted which would make it impossible to raise and hold
the water level so high that the freeboard would be less than about
three to four feet or if extra storage capacity is considered
essential, the top of the dam should be raised.

Fountain Pond Dam is probably sufficient under any con-
ditions to be reasonably expected if the water level be kept a few
feet below the top of the dam and if the gate be opened promptly when
necessary and all stop plank removed. It would be a comparatively
simple matter to pave or riprap the lower face of this dam so that it
would safely withstand an overflow along its whole length and this
would be a far more adequate protection as there are now too many
chances that some one will fail to take proper measures at the proper
time to avert trouble.

The Sidney's Pond Dam below Fountain Pond is only partially
in use and through an agreement with the proprietors of the cemetery
above, only four feet of water is maintained in it. It has apparently
been many years since the water has been raised much higher than this
and nothing is known to the tightness of this dam under such con-
ditions of high water. Assuming that it would safely withstand filling
to the top of the dam, it might provide through the present spillway a
sufficient outlet under all circumstances but there is considerable un-
certainty, and a larger outlet, at least above the normal level of the
water, might well be provided.

The Danvers Bleachery Dam just below the junction of the
two streams was built within a comparatively few years and is apparently
well built and in good condition but the capacity of the spillway as
built is less than one half of the flow which I believe might reason-
ably be expected under extreme conditions. It could be improved to a
considerable extent by removing the wall at the lower end of the outlet
chamber which has an opening in it of rather restricted area through
which the water must flow, but even then in order to safely disch arge
the required amount through the spillway it would be necessary to
raise the top of the dam at least three or four feet or to lengthen
the spillway.

The other dams on these streams I believe, are unimportant
from the standpoint of safety and those in use are generally in good
condition and reasonably safe for the condition.

These conclusions are not in most respects materially
different from what has been stated in previous reports but they are
based on a much more thorough investigation than any which had been
made up to this time, and I wish again to emphasize the fact which
has been stated in previous reports that there are other conditions
which might result in damage along this stream, which do not depend
upon the safety of these dams, or the sufficiency of their spillways,
and the flooding of the stream valley below would not be prevented by
the changes here recommended.

I believe that even the spillway of the Danvers Bleachery
dam will not probably discharge as much water as can flow through the
stream below it, which passes through nine culverts before it reaches
At the time of my report to you in 1932 upon the condition of the dams in the southeast part of the County including those in the city of Peabody, the dams on Goldthwaite Brook and Tapley Brook in that city had been inspected and were included in the table accompanying the report, but surveys were then being made to secure data for further study and it was stated that a separate report on these structures would be made as soon as possible.

These surveys were completed early in the present year and taking advantage of such opportunities as have presented themselves, we have made observations of the effect of various storms on the level of the ponds and the run-off from these watersheds to determine whether conditions here are materially different from what would ordinarily be expected. There have been several storms with heavy rainfall during the year but nothing more than what is to be reasonably expected every few years.

Under such conditions as we have observed the flow in the main stream is low for the area of watershed tributary to it, due to the storage capacity of the ponds and swamps on the watersheds above.

Two of the ponds on the watershed of Tapley's Brook which is the south branch of the main stream are used as a source of water supply, and since the city of Peabody is faced with a shortage of water it follows that these ponds are usually drawn down well below their highwater levels so that at such times they will retain the runoff from a fairly heavy storm without overflowing, and on the Goldthwaite Brook watershed, there is a large area at the upper end around Cedar Pond which is flat and swampy so that the whole area ordinarily contributes very slowly to the flow of the stream below.

It is evident, however, that this storage effect prevails only in the storms of not unusual severity and in the event of an extremely heavy rainfall such as occurs on an average of not more than once in fifty or one hundred years at the same locality, these beneficial effects of storage would be lost when all ponds and swamps were filled. Without doubt the main stream would then have a maximum discharge far in excess of what we have observed, as although the rainfall might be only three or four times as great as what we have observed, the flow would be many more times as great because with all storage capacity absorbed the entire watershed would be contributing its runoff.

We have twice observed that Spring Pond was full substantially to the top of the dam and apparently was purposely held at that level, so that it is plain that the need of heavy draft on these ponds for a water supply cannot be relied upon as a protection.

In order to put all these dams in condition such that no failure would reasonably be expected even in the event of the storm of rare frequency above assumed, some method of control of Spring Pond
this slight damage is to be avoided, the outlet at Lake Street should be improved and possibly the street should be raised and at the dam owned by J. F. Cobb the construction at the ends of the dam could well be improved.
damage due to anything which might be classed as a failure of the dam. The abandoned dam owned by the Danvers Bleachery Company on Goldthwait Brook further down the brook does not now hold back any water. The dam belonging to the Danvers Bleachery Company on Goldthwait Brook still further down the stream seems to be in good condition and has fairly ample provisions for stored water if stop plank were removed promptly, and there is flat open country and extensive in area below the dam. Below the last dam above mentioned is a small affair east of Allen's Lane owned by the Essex Gelatine Company, which could not do any damage through failure, and still further down is another structure, equally unimportant.

On the whole, I do not feel that any of these dams on Goldthwait Brook and Tapley Brook require any immediate action. The only possibility which occurs to me is, that in a very excessively heavy storm, starting at the upper end of each brook, partial failures each adding its cumulative effect might produce a condition in the lower portions of the stream as it appears at the main street in Peabody which would cause damage there, and I have not enough data at hand to feel sure that even in this event there is likelihood that such damage would be due even in major part to the possible failure of the structures rather than to the capacity or lack of capacity of the brook in its lower stretches. I gave no notice to any of the agents of the industrial plants above mentioned before inspecting the dams. The dam on Lake Street at the end of Devil's Dishfull Pond near the B. & M.R.R. is in rather uncertain condition and it is easily believable that it may overflow and possibly cut away a channel which would drain the pond down to some extent, but there seems to be no opportunity for serious damage below at least until the small ponds at Phelps Mill are reached, and here the upper dam is hardly more than a causeway through the pond while the lower dam, although not very substantial, holds the water at a level so little above the road, a few hundred feet below, that it is hard to believe that there would be any serious damage there or in the extensive low swampy land beyond the road. However, if even
With Mr. P. H. Koshier, City Engineer of Peabody, visited Browns Pond Dam, Spring Pond Dam, and Fountain Pond Dam and found conditions substantially as stated in Mr. Barker's report. The structure at Brown's Pond should hardly be classed as a dam since the pond is so little above the surrounding country and except for such water as could escape down the ditch, there could be nothing but a broad sheet of shallow water flowing from the pond in any case. At Spring Pond, with all outlets open, the run-off, even from excessive storms, could probably be taken care of and under present conditions the water would overflow the land west of the dam in a broad shallow stream through flat country before it reached the top of the dam. The dam itself would stand some overtopping and there seems to be no reason to expect a sudden failure even under extreme conditions which could occur. The overflow would find its way to the pond immediately below, Fountain Pond, and the dam at the north end of that pond has an apparently substantial masonry wall on the down stream face which should, in an emergency, stand up even if overtopped for its full length to some considerable depth. The land in the cemetery just east of the dam is slightly lower than the top of the dam and there is some possibility that the water might find its way around here and do some damage to the cemetery though apparently not very serious. With all flash boards removed from the outlet through this dam, and with the gate open, provisions for discharge of flood waters are fairly liberal. The conditions at both of these ponds last mentioned would be considerably improved by providing more adequate spillways, but the likelihood of any serious failure seems ample enough in view of the flat open country for some distance below the lower dam, so that it is doubtful whether more ample provisions should be insisted upon.

On the same day as above, I looked at other dams in Peabody as follows: The dam belonging to the Tanners Products Company on Goldthwaite Brook north of Lynnfield Street, where it would seem that, although there are possibilities of flooding the buildings from overflow, there is no possibility of
September 18, 1978

Jyoti Patel
T.A.M.S.
345 Park Ave.
New York, New York 10022

Dear Sir:

We have quite a bit of information on the Spring Pond Dam and Browns Pond Dam in Peabody, including periodic report sheets.

I suggest you come to the office and look over this information if you think any of it would be of any value to you.

Very truly yours,

[Signature]

JAMES R. CARLIN
County Engineer
DRAWINGS AND INSPECTION REPORTS

APPENDIX B
Floor of Channel  

Natural bed.

Other Obstructions  

Stone blocks and mine debris; about 250 feet downstream there is hymn still embankment.

Miscellaneous  

1. The upstream training walls suffer cause sure stone blocks are fallen into the approach channel. At several locations mortar is loose and missing.

2. The downstream training walls with few blocks from the upper course have fallen into the channel. At several locations mortar is loose and missing.

3. Outlet pipe which is vitrified clay is about 14 inches and is in fair condition with a 5 foot section broken.
PERIODIC INSPECTION CHECK LIST

PROJECT: BROWNS POND DAM  DATE: 11-16-78

PROJECT FEATURE  NAME

DISCIPLINE  NAME

OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS

<table>
<thead>
<tr>
<th>Feature Name</th>
<th>Discipline Name</th>
<th>Project Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approach Channel</td>
<td>General Condition</td>
<td>Poor</td>
</tr>
<tr>
<td>Loose Rock Overhanging Channel</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Trees Overhanging Channel</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Floor of Approach Channel</td>
<td>Silted, debris and stone blocks</td>
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<td>Weir and Training Walls</td>
<td>General Condition of Concrete</td>
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<td>Drain Holes</td>
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<td>Discharge Channel</td>
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<tr>
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<tr>
<td>Trees Overhanging Channel</td>
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Stone masonry and concrete Spellway consists of overflow concrete headwall and an outlet pipe.
Peabody D. 11

1917, March 26. Watershed 0.4 sq. m. Max. Ht. 7.0 ft. Apparent condition, Fair.

1923, Nov. 26. R. R. Evans, Insp. Peabody Water Works, Brown's Pond Dam. Dam is in good condition but its safety depends entirely on the height at which the flash boards are maintained. It would be possible to raise these to such a point about 12" below top of dam, that there would be practically no overflow capacity and the dam might be over topped. It is a low structure draining into the pond at the Pumping Station.

With 233 acres watershed and 27.7 acres pond surface, a rainfall of 6" in 24 hours might raise pond level some 4 ft. disregarding increase of area and about a third of this rise would perhaps be permissible so that some 50 c.f.s. must be wasted which might easily be accomplished by removing the top plank.


1928, July 25. C. C. Barker, Insp. Dam at the northerly end of Brown Pond west of Lynn Street, is owned by the Peabody Water Works. Peabody has not used the water since the first of the year, and has opened the pond to boating, swimming, etc. I gave Mr. Mosher, City Engineer, notice of inspection. It did not seem necessary to have anyone accompany me to the dam. The country below the dam is open and flat. In case of failure the damage would be slight and it is not likely there would be any loss of life. There has been no change since the last inspection and the conditions are the same. The dam is in fair condition. The water level today is 1' 6" below the top of the dam.

1928, Nov. 22. R. R. Evans, Insp. notes of Dams in Peabody which see.

1928 Report to Co. Comm. There are three dams in the city of Peabody which form a part of the water supply and are owned by the city. One of these at Brown's Pond is in good condition and is of very little importance, as no material damage is possible.

1929, April 23. 2:15 P. M. C. C. Barker, Insp. Brown's Pond Dam. Today 3" of water is flowing over the top of flash board which is one ft. below top of dam. A 15" pipe has been laid from the spillway to a drain in the highway. Evidently the 15" pipe would not take all the water as it has washed around the sandbags and around the pipe and some water is flowing under the culvert in the road into the field below which drains to Spring Pond. The pond has not overflowed the top of the dam.
Peabody D. 11

1930, Sept. 11. C. C. Barker, Insp. Dam at the northerly end of Brown Pond west of Lynn Street, is owned by the Peabody Water Works. I gave a copy of the notice to City Engineer R. W. MacDonald. He did not send anyone to the dam with me. The pond is used for pleasure and not for drinking water. The country below is flat and in case of failure the damage would be slight. All the stop plank pipe are removed from the outlet. The lower side of the outlet is filled with a block of concrete 2 feet deep around a 15 inch pipe to take overflow of pond. The clear opening left in the culvert is 2 feet deep and 6 feet wide. Mr. MacDonald had all the stop plank taken out to keep pond level down and prevent wash around the ice houses, and also prevent overflow into Spring Pond. The water level is 6 feet below top of dam today. The dam is in good condition.

1930 Report to Co. Comm. The dam at Brown's Pond west of Lynn St. forms a part of the Peabody water supply system, but is not now so used. In its present condition there is nothing about the structure which could cause any serious damage through failure.

1932, July 29. C. C. Barker, Insp. The condition is the same. There has been no change.

1933, See Report to Co. Comm.

1934, Sept. 26, C. C. Barker, Insp. The dam is in good condition. There is a 20 inch pipe leading out of the pond between the roadway and the spillway. The water level is about 6 feet below the top of the dam and just running into this pipe. There is a drain that leads direct from this pond to below Fountain Pond at the Pumping Station.

1934 Report to Co. Comm. See D. 5 (?)

1936 August 4, C.C. Barker, Insp. This dam is in good condition there has been no change since the last inspection. The water level is about 6 ft. below the top of the dam.

1936 Report to Co. Comm. See D. 5

1938 October 19, C. C. Barker, Insp. This dam is in good condition. There has been no change. The water level is 5.5 feet below the top of the dam.


1940 Sept. 27, C. C. Barker, Insp. This dam is in good condition except that there are bushes along the overflow and the 20 inch outlet pipe is somewhat closed by fallen stones. The water level is about 5.5 feet below the top of the dam. The ice houses are gone.

Peabody D. 11

1942 July 23, C.C. Parker, Inspect. The condition here is the same as when last inspected. There has not been any change. The water level is about 6 feet below the top of the dam.


1944 July 6, S.W. Woodbury, Inspect. The water level is about 4 1/2" above the flow line of the 20" C.I. pipe about 150 ft. south of the masonry culvert. There does not appear to have been any change here.


1946 Aug. 5, S.W. Woodbury, Inspect. I gave a copy of the notice to Mr. Harte for Mr. McCarthy and Mr. Harte went to the dam with me. Water level today is about 4" below top of outlet pipe. 1.9' below top of opening of culvert at Fairview Avenue. Condition of the dam is the same.


1948 Sept. 15, S.W. Woodbury, Inspect. Gave a copy of the notice to Mr. Thomas Harte for Mr. McCarthy and went to dam alone. Water level today: 3.5' below top of outlet pipe at Fairview Avenue. Condition of the dam is the same.


1950 Sept. 15, S.W. Woodbury, Inspect. Gave a copy of the notice to Mr. John Manning for Mr. McCarthy and went to dam alone. Water level today: About 3.5' below top of outlet pipe at Fairview Avenue or 6" below flow line of 20" C.I. pipe at Lynn St. Condition of the dam: Same. No screen over 20" C.I. outlet pipe at Lynn St.


1952 Sept. 30, E.H. Page, Inspect. Left a copy of the notice at the office of Com. of Public Works and went to dam with Mr. Driscoll from the pumping station. No repairs since last inspection. Water level today: 0.2 below 20" pipe under Lynn St. 3.1 below conc. spillway at Fairview Ave., Condition of the dam is the same.


1954, June 2, E.H. Page, Inspect. Elev. of water: 1'-6" below top of flashboards. Height of flashboards 3'-3". Water is overtop of culvert headwall at Fairview Avenue.

1954 Report to Co. Comm. At Brown's Pond, west of Lynn Street, the water was over the top of the culvert headwall at Fairview Avenue at the time of the inspection.

1956 Report to Co. Comm. At Brown's Pond, west of Lynn Street, there are some granite blocks in the spillway.


1958 Report to Co. Comm. At Brown's Pond, west of Lynn Street, there are some granite blocks in the spillway. These should be removed.


1960 Report to Co. Comm. At Brown's Pond, west of Lynn Street, there are some granite blocks in the spillway. These should be removed.


1962 Report to Co. Comm. At Brown's Pond, west of Lynn Street, there are some granite blocks and debris that should be removed from inside and outside the spillway.


1964 Report to Co. Comm. There are some granite blocks and debris that should be removed from inside and outside the spillway.


1968 Feb. 6, 1969. P.D.Killam. The pond was frozen over. No water over the spillway.
L.E. Wilkinson  11/30/71
West of Lynn St. 0.10 Mi. South of Fairview Ave.
Outlet of Brown's Pond.
City of Peabody.
Water Supply
Earth and Rocks

7.0± FT.

200.0± FT.  12.0± FT.

Water level in pond 6.0± feet below top of dam - 15" outlet pipe under spillway seems to keep water levels down. This pond in a natural shallow basin.

This structure does not appear to require inspection under Chapter 5-95.
1. VIEW OF OUTLET STRUCTURE AND OUTLET PIPE. NOTE NOTCH RECENTLY CONCRETE FILLED.

2. VIEW OF OUTLET PIPE OR TAIL IN DEPTH OF SPRING POND AT CAPTURE STATION.
5. VIEW OF SPILLWAY LOOKING DOWNSTREAM.  
NOTE STEEL PLATE FLASHBOARD AND IN BACKGROUND HEADWALL 
WITH ENTRANCE TO OUTLET PIPE COVERED WITH TRASH RACK.

6. VIEW OF DOWNSTREAM OPERATOR. NOTE VEGETATION.
A VIEW OF UPSTREAM SLOPE. NOTE SLOUGHING BELOW CREST AND RECLAMATION.

A MAN ON TOP OF UPSTREAM SLOPE.
HYDROLOGIC DATA AND COMPUTATIONS

APPENDIX D
TAMS

Job No. 149715
Project Inspection, Browns Pond
Unit hydrograph computation

Subject

Lake Area (EL73) 24.0 acres
Basin Area 469.9 acres / 0.734 mi²
Land Area 445.5 acres / 0.70 mi²

H' 0.7 f
Mean Slope over 750 ft ~ 1.4 %
V = 2 fps
Tc 65 min / 1.08 hrs
D = 120 min / 0.2 hours

\( T_p = \frac{1}{2} + 0.6 T_c = 1 + 0.65 \)
\( T_s = 0.75 T_p = 45 \) mins

\( T_b = 0.67 T_s = 30 \) mins

\( C_p = \frac{450 - A}{T_p} = \frac{450(0.70)}{75} = 40.92 ft \)
TAMS

Job No. 1497-15
Project: Inspection
Subject: Browns Pond

Date: Nov 21

Sheet 2 of 9
By: D L C
Ch'k. by: __________

Spillway Length: 6.0 ft
Crest Width: 10 ft
Spillway crest El: 79.0 ft
Lowest El of SC 5/16 ins. 81.25
Top of wall on SC 82.1 ft

El Head Q (cfs) Q (cfs)
79.0 0
79.4 0.4 2.72 4.1
80.0 1.0 2.98 17.9
81 2.0 3.30 56.0
81.25 2.25 3.31 67.0
82.1 109
83 159 459 618
84 223 1283 1526
86 361 4067 4436

Other measurements and calculations are also present on the page, but they are not legible in this image.
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<th>Δ Vol</th>
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(El 77.6 is spillway crest elevation, with flashboards removed.)

*Courts planimetered from USGS topographic sheets for Salem & Lynn, Mass.
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<th>TIME (HOURS)</th>
<th>STORAGE (CFT)</th>
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INFORMATION AS CONTAINED IN THE
NATIONAL INVENTORY OF DAMS

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<th>POWER CAPACITY (MW)</th>
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| NUFFHAM | PL-92-367       |

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