

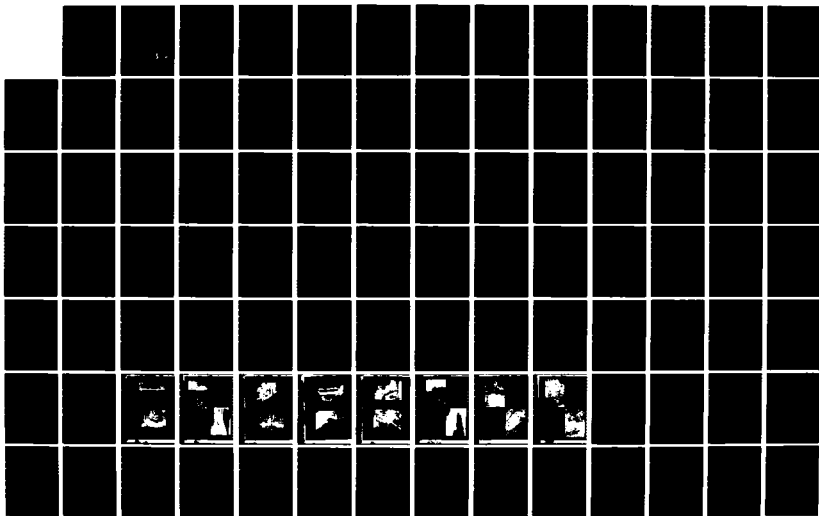
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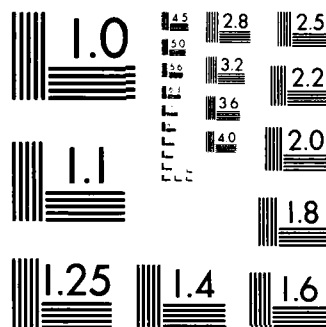
NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS
PLUNKETT RESERVOIR DA. (U) CORPS OF ENGINEERS WALTHAM
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HOUSATONIC RIVER BASIN
HINSDALE, MASSACHUSETTS

PLUNKETT RESERVOIR DAM
MA 00226

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM



DEPARTMENT OF THE ARMY

NEW ENGLAND DIVISION, CORPS OF ENGINEERS

WALTHAM, MASS. 02154

AUGUST 1981

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number) DAMS, INSPECTION, DAM SAFETY, Housatonic River Basin Hinsdale, Massachusetts Welch Brook		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The dam is a 24.5 foot high, 570 foot long earth embankment dam. It has an ungated concrete, 40 foot long spillway weir, with provisions for flashboards and a manually controlled 24 inch drain. The dam is in poor condition. It has an intermediate size classification and a high hazard classification.		



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO
ATTENTION OF:

NEDED

SEP 11 1961

Honorable Edward J. King
Governor of the Commonwealth of
Massachusetts
State House
Boston, Massachusetts 02133

Dear Governor King:

Inclosed is a copy of the Plunkett Reservoir Dam (MA-00226) Phase I Inspection Report, prepared under the National Program for Inspection of Non-Federal Dams. This report is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. I approve 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 vitally important.

Copies of this report have been forwarded to the Department of Environmental Quality Engineering, and to the owner, Town of Hinsdale. Copies will be available to the public in thirty days.

I wish to thank you and the Department of Environmental Quality Engineering for your cooperation in this program.

Sincerely,

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

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As stated

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CRASI	☒
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NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT
BRIEF ASSESSMENT

IDENTIFICATION NO.: MA 00226
NAME OF DAM: Plunkett Reservoir Dam
TOWN: Hinsdale
COUNTY AND STATE: Berkshire County, Massachusetts
STREAM: Welch Brook
DATE OF INSPECTION: June 30, 1981

The dam is a 24.5 foot high, 570 foot long earth embankment dam. It has an ungated concrete, 40 foot long spillway weir, with provisions for flashboards, and a manually controlled 24 inch drain. The dam was built about 1875. It is owned by the Town of Hinsdale and is maintained and operated by the Town of Hinsdale Conservation Commission. The purpose of the dam is recreation.

The visual inspection indicates that the dam is in poor condition. The upstream riprap face was eroded and seepage was observed at the downstream toe. There were many trees observed on the downstream face. The spillway training walls and wingwalls have experienced significant deterioration.

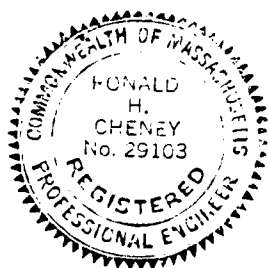
The dam has a size classification of intermediate and a hazard classification of high due to the potential loss of more than a few lives from an assumed dam failure. Based on Corps Guidelines the test flood would be the full PMF of 5600 cfs from the 2.8 s.m. drainage area. With 1.2 feet of flashboards in place, the routed test flood outflow is 4750 cfs at elevation 1506.4. The dam is overtopped by 1.4 feet. The spillway under these conditions can handle 41 percent of the routed outflow. The routed test flood

outflow, without flashboards in the spillway, is 4775 cfs at elevation 1506.25. The dam is overtopped by 1.25 feet. The spillway can handle 57 percent of the outflow.

The dam is in generally poor condition. It is recommended that the Owner engage a qualified registered professional engineer to investigate and design remedial measures for: repair of the upstream face; the source of seepage at the toe; removing and backfilling of trees and roots; the misalignment and collapse of the spillway training walls and left wingwall and laterally strengthening the spillway bridge. The Owner should also engage a qualified registered professional engineer to perform a detailed hydrologic/hydraulic study to determine spillway adequacy and overtopping potential.

Futhermore, the Owner should institute remedial measures which should include: routine cutting of brush on the slopes; cutting of trees within 10 feet of the left spillway training wall; removal of brush and overhanging trees in the spillway channel and outlet channel; cleaning out the outlet channel to allow free flow of water; repair of the outlet masonry headwall; restoration of the turf cover between the gatehouse and outlet headwall; instituting a program of annual technical inspection and development of a formal downstream warning system.

The Owner should institute these recommendations and remedial measures within one year after receipt of this Phase I Inspection Report.



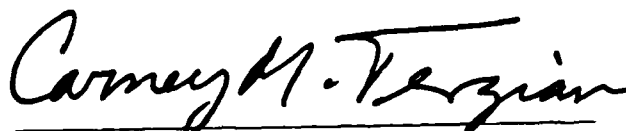
Ronald H. Cheney
Ronald H. Cheney, P.E.
Vice President

Hayden, Harding & Buchanan, Inc.
Boston, Massachusetts

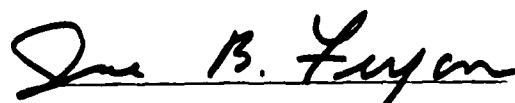
This Phase I Inspection Report on Plunkett Reservoir Dam (MA-00226) has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgement and practice, and is hereby submitted for approval.


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


ARAMAST MAHTESIAN, MEMBER
Geotechnical Engineering Branch
Engineering Division


CARNEY M. TERZIAN, CHAIRMAN
Design 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.

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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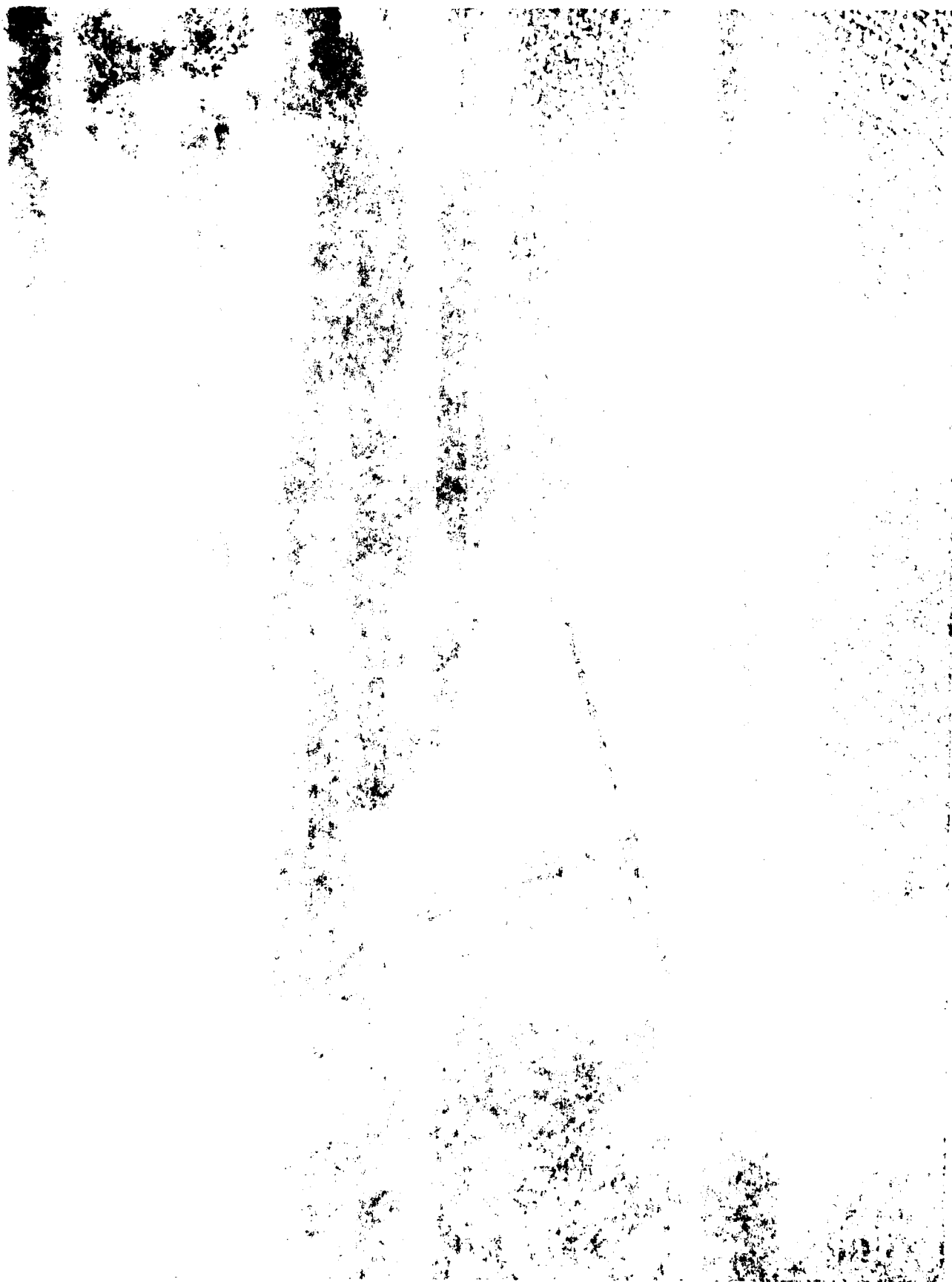
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2. Crest

The crest of the dam, shown in photograph 8 is grass covered and well maintained. Tree roots from trees growing on the downstream slope were visible on the crest. No settlement or cracking of the crest was observed except at the spillway, where the crest becomes much wider. The settlement of the crest in this area is associated with the significant misalignment and deterioration of the right spillway training wall as shown in photograph 11.

3. Downstream Slope

The downstream face of the dam is sloped at about 1.75H:1V. It is generally covered with brush and many large trees up to 22 inches in diameter, particularly near the crest (photograph 5). The lower portion of the slope is heavily overgrown with brush and trees. A path between the gate structure and the outlet headwall has destroyed the turf in this area.

Seepage was observed at two locations near the toe at 100 and 130 feet south of the gate structure (photographs 15 and 16). The flow of water from these seeps was clear. The largest seep was about 1 gpm located 100 feet from the gate structure.

A spongy area was observed near the toe about 50 feet north of the gate structure.

SECTION 3
VISUAL INSPECTION

3.1 Findings

a. General

The dam was inspected on June 30, 1981. At the time of the inspection the water level of the reservoir was at the top of the in place 14 inches of flashboards or approximate elevation 1501.

b. Dam

The dam is an earth embankment with a length of 570 feet, a height of 24.5 feet and a crest width of 8 feet.

A 40 foot long concrete spillway weir is located between the left end of the dam and the left abutment.

1. Upstream Slope

The upstream face of the dam has a slope of 2H:1V above the reservoir level as shown in photograph 3. The riprap protection generally extends to the reservoir level or slightly above. However, the riprap has experienced numerous collapses, and the soil on the slope is eroded at several locations. This has resulted in some nearly vertical sloughs near the present water level.

Erosion of the upstream slope on the right end of the concrete wingwall for the spillway has created an indentation about 2 feet into the slope, as shown in photograph *9.

c. Validity

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

SECTION 2
ENGINEERING DATA

2.1 Design Data

No information was located indicating when or by whom the dam was designed. Design calculations were not located.

2.2 Construction Data

Construction data was not located for this dam.

2.3 Operation Data

There is no operational manual for this dam.

2.4 Evaluation of Data

a. Availability

State Inspection Reports for the years 1971, 1973 and 1975 along with various correspondences were made available at the State Department of Environmental Quality Engineering, Division of Waterways, Boston Office. No additional engineering data was located regarding the dam.

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.

i. Spillway

- | | |
|--|---|
| (1) Type ----- | concrete ogee weir |
| (2) Length of Weir ----- | 40' |
| (3) Crest elevation-with 14" flashboard ---- | 1501 |
| -without 14" flashboard - | 1499.8 |
| (4) Gates ----- | None |
| (5) U/S Channel - None ----- | opens directly to lake |
| (6) D/S Channel ----- | mortar and stone apron to
natural stream channel |

j. Regulating Outlets

The 24 inch outlet pipe (inlet elevation assumed to be 1481.5+) is regulated by a manual gate located at the gate structure. The gate is reported to be operable and is regulated dependent on the elevation of the reservoir.

The spillway has provisions for 24 inches of flashboards, which are manually installed. Normally there are 14 inches of flashboard in place in the spring and summer which are removed in the fall.

(3)	Spillway crest pool -----	2000
(4)	Top of dam -----	2000
(5)	Test flood pool -----	2000
e.	<u>Storage</u> (acre-feet)	
(1)	Spillway crest pool-(Elevation 1499.8)--	1017
(2)	Normal pool-(Elevation 1501) -----	1090
(3)	Top of dam-(Elevation 1505) -----	1386
(4)	Test flood pool-(no flashboards 1506.25) (with flashboards 1506.4)	1442 1525
(5)	Flood control pool -----	N/A
f.	<u>Reservoir Surface</u> (acres)	
(1)	Spillway crest -----	73
(2)	Normal pool -----	73
(3)	Top of dam -----	75
(4)	Test flood pool -----	75
(5)	Flood control pool -----	N/A
g.	<u>Dam</u>	
(1)	Type -----	earth
(2)	Length -----	570'
(3)	Height -----	24.5'
(4)	Top Width -----	8+'
(5)	Side Slopes-(variable approx.) - U.S.---	2H:1V
	- D.S.---	1.75H:1V
(6)	Zoning -----	Unknown
(7)	Impervious Core -----	Unknown
(8)	Cutoff -----	Unknown
(9)	Grout curtain -----	Unknown
h.	<u>Diversion and Regulating Tunnel</u> -----	none at this project

The spillway capacity with 14 inches of flashboard in place the drain closed and the water level at elevation 1506.4 (test flood elevation with flashboards) is 1950 cfs. The dam is overtopped by 1.4 feet.

5. Total Project Discharge at Top of Dam

With the main drain open, flashboards in place and with water at the top of dam the total project discharge is 1255 cfs. Under these conditions, without flashboards, the discharge is 1880+ cfs.

6. Total Project discharge at Test Flood Elevation

At the test flood elevation, the total project discharge, with the drain open and no flashboards in place is 2755 cfs. Under these conditons, with flashboards in place the discharge is 2000 cfs.

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

(1)	Streambed at toe of dam -----	1480.5 <u>+</u>
(2)	Bottom of cutoff -----	Unknown
(3)	Maximum tailwater -----	Unknown
(4)	Normal pool -----	1501
(5)	Full flood control pool -----	N/A
(6)	Spillway crest-(with 14" flashboards)---	1501
	-(without flashboards)---	1499.8
(7)	Design surcharge (Original Design) ----	Unknown
(8)	Top of dam -----	1505
(9)	Test flood surcharge(with 14" flashboards)	1506.4
	(without flashboards)	1506.25

d. Reservoir (Length in feet)

(1)	Normal pool -----	2000
(2)	Flood control pool -----	N/A

The concrete spillway weir is 40 feet long, has provisions for 24 inches of flashboards and is spanned by a foot bridge. The elevation of the crest is 1499.8 and there is 5 feet of freeboard between the spillway crest and the bottom of bridge. There are normally 14 inches of flashboard on the spillway during the spring and summer which are removed in the fall.

2. Maximum Known Flood at Dam Site

There are no records of maximum flood at the dam. The United States Weather Bureau records indicate that between 4 and 6 inches of rainfall occurred near the general location of the dam from August 11 to 15 and again from August 17 to 19, 1955.

3. Ungated Spillway Capacity at Top of Dam

The spillway capacity without flashboards, with the drain closed and with water to the top of dam, elevation 1505 is 1825₊ cfs.

The spillway capacity with the drain closed, with 14 inches of flashboard in place and the water level at the top of dam is 1200 cfs.

4. Ungated Spillway Capacity at Test Flood Elevation

The spillway capacity without flashboards, the drain closed and with water at the test flood elevation of 1506.25 is 2700 cfs. The dam is overtopped by 1.25₊ feet.

and the gate is left partially opened. Fourteen inches of flashboard are in place on the spillway weir in the spring and summer. Flashboards are removed in the fall and winter.

1.3 Pertinent Data

a. Drainage Area

The 2.8+ s.m. (1812+ acres) drainage area is hilly, wooded, undeveloped land located in Hinsdale Massachusetts. The major drainage path is Welch Brook which enters the reservoir on the western side. There are two smaller unnamed brooks which discharge into the reservoir on the west and southwest sides. The drainage area contains two small reservoirs named Belmont Reservoir and Fernwood Reservoir. Discharge from the Belmont Reservoir joins discharge from the Fernwood Reservoir (Welch Brook) approximately 1000 feet northwest of Plunkett Reservoir. The only major roads located within the drainage area are the roads that service the cottages which line the shores of the reservoir. Ground elevations within the area vary from 1501, reservoir level, to a maximum elevation of 2065.

b. Discharge at Dam Site

1. Outlet Works

The outlets located at the dam are the 24 inch drain pipe and the spillway. The 24 inch outlet discharges at the stone headwall structure located approximately 42 feet downstream of the gatehouse. The invert elevation of this pipe at its outlet is 1480.3. It has a capacity of 50+ cfs with the water level at elevation 1505, top of dam.

be damaged by 1.5 to 5 feet of flood water above first floor levels. Consideration of base flow conditions prior to dam failure, would result in even higher depths of flooding.

e. Ownership

The dam is owned by the Town of Hinsdale. According to records at the Registry of Deeds the Town has been the legal owner of the dam since 1964.

f. Operator

The dam is maintained and operated by the Town of Hinsdale Conservation Commission, Hinsdale, Massachusetts. Mr. Harry Freshler Jr. of Holmes Road, Hinsdale, is the caretaker for the Commission. His telephone number is (413) 655-2652.

g. Purpose of Dam

The purpose of the dam is recreation. It was originally used for manufacturing.

h. Design and Construction History

The dam was built about 1875. Records indicate it was repaired in 1936 following the March 1936 flood. Modifications to the dam at that time included building the spillway and outlet channel. Concrete at the right lower spillway wingwall indicates the date 1949. No other information or records indicating subsequent repairs were located.

i. Normal Operating Procedure

Plunkett Reservoir is maintained for recreation. The controls in the intake structure are normally regulated by the caretaker during periodic checks of the water level of the reservoir. The level of the reservoir is kept lower in the winter

pipe that inlets at the toe of the upstream embankment and travels under the embankment. The pipe outlets at a stone headwall structure located approximately 42 feet downstream of the gate structure. Further explanation of these facilities and normal operational procedures are outlined in Section 1.2.i of this report.

The dam embankment is turf covered with an 8 foot wide crest. The upstream side slope varies along the length of the dam with a typical slope of about 2H:1V. The upstream face is ripraped to about 3 feet below the crest. There is a 1'6" wide, 5 foot high concrete wingwall extending approximately 57 feet south of the right spillway training wall and a 25 foot long section located to the north of the left spillway training wall. The top of this wall is about the same elevation as the crest. The downstream face is turf covered having numerous 18 to 22 inch diameter trees (see photographs 5 and 14 in Appendix B) and is inclined at approximately 1.75 H:1V.

c. Size Classification

The dam size classification is intermediate due to its storage capacity of 1386 acre-feet. Corps Guidance for intermediate size is a storage capacity of 1000 to 50,000 acre-feet and/or a hydraulic height of 40 to 100 feet.

d. Hazard Classification

The dam has a high hazard potential due to the potential loss of more than a few lives from an assumed dam failure. It is estimated that at least 14 homes in Hinsdale and along Route 8 could

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

1.2 Description of Project

a. Location

Plunkett Reservoir Dam is located in the Town of Hinsdale, Berkshire County, Massachusetts. The dam impounds the water of Plunkett Reservoir which is fed primarily by Welch Brook. The outlet brook, Frisell Brook, flows about 1/2 mile northeast into the East Branch of the Housatonic River. It is shown on the Peru Massachusetts U.S.G.S. Quadrangle having the approximate coordinates of North $42^{\circ} 25' 28''$, West $73^{\circ} 07' 30''$.

b. Description of Dam and Appurtenances

Plunkett Reservoir Dam is a 24.5 foot high earth embankment dam containing a 24 inch drain and concrete spillway. The dam has a total crest length of 570 feet and a width of 8 $\pm$ feet. The spillway, located on the left end of the dam has a 40 foot long weir, spanned by a wooden deck, steel channel beam bridge with wood posts and rails. The weir has provisions for 24 inches of flashboards and has a freeboard height to the bottom of the bridge deck of 5 feet. The spillway has concrete wingwalls and stone and concrete training walls which extend approximately 100 feet downstream of the spillway weir. The spillway apron is stone and mortar.

There is a wood frame gatehouse located at the center of the dam embankment which contains a manually controlled gate to operate the drain. The intake for the drain is a 24 inch cast iron

PHASE I
NATIONAL DAM INSPECTION PROGRAM

SECTION 1
PROJECT INFORMATION

1.1 General

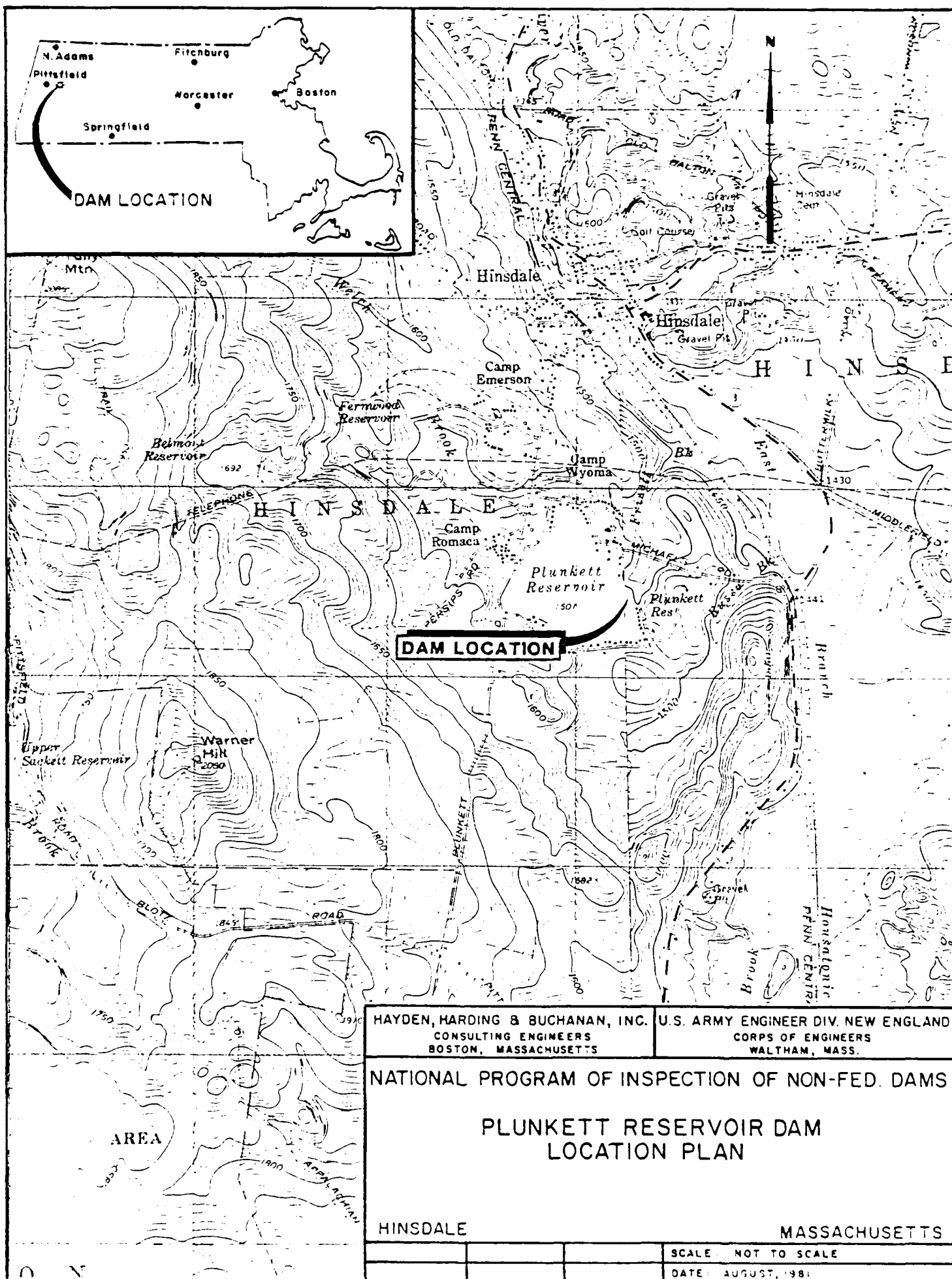
a. Authority

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 to Hayden, Harding & Buchanan, Inc. under a letter of 26 June 1981 by 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.



c. Appurtenant Structures

1. Spillway

The spillway channel downstream of the weir section, shown in photograph 10, consists of a stone and mortar channel bottom with masonry training walls. The right wall has been reinforced with concrete along its lower half.

The left training wall is in poor condition and has experienced a collapse about 70 feet downstream of the crest as shown in photograph 10. Heavy brush and tree growth is present behind and overhanging this wall. The right training wall has become badly misaligned and partially collapsed resulting in subsidence of the widened crest in this area. The channel floor is overgrown with short brush.

The left spillway wingwall at the left abutment has been displaced out into the reservoir resulting in misalignment and cracking of the wall, as shown in photograph 12.

The spillway weir was in good condition. There were 14 inches of flashboard in place at the weir during the inspection. The pins and flashboards, shown in photograph 4 were observed to be in good condition. The spillway bridge was in good condition, however, it lacked lateral bracing and shook sideways easily.

2. Outlet Works

The wood frame gate structure was observed to be in good condition. The manually operated gate is reported to be

in operating condition by the caretaker. He reported that it was operated approximately one week prior to the field inspection.

The outlet headwall, shown in photograph 13 is constructed of dry masonry which is generally intact except near the right side where a small collapse has occurred. Trees and brush are present behind portions of this headwall.

d. Reservoir Area

There are no indications of instability along the banks of the reservoir in the vicinity of the dam.

e. Downstream Channel

The discharge channel for the spillway is generally clear, but overhanging trees are present.

The discharge channel for the outlet pipe is heavily overgrown with brush.

3.2 Evaluation

Visual inspection indicates that the dam is in generally poor condition. The inspection disclosed the following items which require attention:

a. The upstream slope riprap is in poor condition and the upstream face is being eroded. This condition could eventually lead to instability of the upstream slope.

b. The two areas of seepage and one wet area near the toe of the dam, if left unattended, could result in instability of the dam.

c. The roots of trees on the downstream face of the dam could provide seepage paths leading to instability of the dam. If these trees are uprooted, they could result in local sloughing leading to instability of the dam.

d. The spillway training walls have experienced significant deterioration and collapse resulting in subsidence of the crest. Further deterioration could eventually lead to failure of the dam.

e. Failure of the left spillway wingwall could lead to failure of the left spillway training wall resulting in a breach through the left abutment.

SECTION 4

OPERATIONAL AND MAINTENANCE PROCEDURES

4.1 Operational Procedures

a. General

The purpose of the dam is for recreation. Flashboards are used at the spillway to control the water surface elevation. Typically, 14 inches of flashboard are in place during the spring and summer. Flashboards are removed in the fall and winter. The gate at the intake structure is normally maintained by the caretaker based on the water level of the reservoir.

b. Description of Warning System in Effect

There are no warning systems at this dam.

4.2 Maintenance Procedures

a. General

The dam is maintained by the Hinsdale Conservation Commission with funds provided by the Town of Hinsdale. Normal maintenance includes mowing the grass on the crest and downstream slopes and maintaining the external features of the outlet structure and spillway.

b. Operating Facilities

There is no formal operational procedure for this facility. The dam is used for recreation. The Hinsdale Conservation Commission regulates the height of flashboards at the spillway for summer and winter use.

4.3 Evaluation

The caretaker has maintained the grass turf. According to the caretaker, the gate at the intake structure is operable. Trees on the downstream slope should be removed. The Owner should implement formal operation, maintenance and emergency downstream warning plans. The Owner should also institute a program of annual technical inspection.

SECTION 5

EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

5.1 General

Plunkett Reservoir is located in the Town of Hinsdale, about 0.75 miles south of the town center. The 2.8 s.m. (1,812 acres) drainage area is wooded, undeveloped land. The terrain is rolling, with one main brook (Welch Brook) and two small ponds.

The reservoir outlet, Frisell Brook, flows northeast about 1/2 mile to enter the East Branch of the Housatonic River. The East Branch flows northwest about one mile to reach the town center of Hinsdale and then another five miles northwest into Pittsfield.

5.2 Design Data

The dam was built about 1875. No design data was found.

5.3 Experience Data

No records of rainfall or flood stages were located for this dam. Originally the dam did not have a spillway and the 24 inch drain was used to control the water level. According to a local resident, in 1936 the dam washed out at the location of the present spillway. The existing spillway was then built to control the water level.

5.4 Test Flood Analysis

The dam has a size classification of intermediate and a high hazard potential. Based upon Corps Guidelines, the test flood would be the full PMF. Test flood inflow from the 2.8 s.m. drainage area is 5,600 cfs. This is based upon Corps Guidance of 2000 cfs/s.m. from a rolling terrain area. The routed outflow, without flashboards in the spillway is 4775 cfs, at elevation 1506.25, 1.25 feet over the top of dam. The spillway area can pass 2700 cfs or 57 percent of the outflow.

With the 1.2 foot flashboards in place, the routed outflow is 4750 cfs, at elevation 1506.4, 1.4 feet over the top of dam. The spillway area can pass 1950 cfs or 41 percent of the outflow.

Both situations above assume that the reservoir was initially filled to the level of the spillway crest elevation 1498.8, without flashboards, and elevation 1501, top of flashboards, prior to test flood inflow occurring. The 24 inch drain was assumed closed.

5.5 Dam Failure Analysis

This dam was determined to have a high hazard potential due to the potential for loss of more than a few lives from an assumed dam failure flood. The dam was assumed to have failed with the water level at elevation 1505, top of dam. The peak failure discharge of 30,580+ cfs is developed by assuming a breach length of 150 feet for the 24.5 foot high structure.

The outlet channel, Frisell Brook, runs about 1/2 mile northeast before entering the East Branch of the Housatonic River. At station 6+00, Michaels Road would be flooded by at least 15 feet of water.

Just prior to the dam failure, flood water entering the East Branch swamp/flood plain, (base flow runoff), from the surrounding 22 s.m. watershed, would have flooded the entire area to elevation 1434₊. This assumes that the narrow East Branch stream channel, at Hinsdale (station 60+00) restricts the base flow runoff of 2465 cfs from the watershed area causing flooding conditions to develop. At least ten homes appear to have been built near elevation 1434₊ (approximate first floor level) in Hinsdale and 4 additional homes along Route 8 southeast of Hinsdale center.

As the dam failure flood water (27,000 cfs 20 feet deep) enters the flood plain it will raise the water surface, causing additional flood damage potential.

At elevation 1434, the flood plain has a surface area of about 900 acres. The entire volume of water stored in the reservoir prior to failure is 1386 acre-feet. This stored water could cover the entire 900 acres to a depth of about 1.5 feet (if little outflow occurred at station 60+00), thus causing additional damage to the 14 homes.

Additional flood damage, depths at least 5 feet or more above elevation 1434 (approximate first floor level), could be assumed to develop as the initial 20 foot high flood wave (at station 20+00) is reduced by flow/storage in the 900 acre flood plain. This damage has the best potential to occur along Route 8 and near the narrow

outlet channel in Hinsdale, as this area of the flood plain accounts for about 1/4 of the potential surface storage area. The remaining potential storage area exists to the southeast, along the East Branch channel (about 2 miles long) where the flood plain is 1000 to 2000₊ feet wide.

SECTION 6
EVALUATION OF STRUCTURAL STABILITY

6.1 Visual Observations

The visual inspection indicates the following potential structural problem:

- a. Erosion and sloughs on the upstream face could lead to instability of the upstream slope.
- b. The presence of seepage at the downstream toe of the embankment, if left uncontrolled, could lead to failure of the dam.
- c. Areas of erosion or seepage could be created by the uprooting or decaying of trees located on the downstream face of the dam.
- d. Continued deterioration of the spillway training walls and left wingwall could lead to instability of the dam.
- e. Lack of lateral bracing at the spillway bridge.

6.2 Design and Construction Data

No original design and construction data are available for the dam.

6.3 Post Construction Changes

No in-depth engineering information is available about post construction changes.

6.4 Seismic Stability

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

SECTION 7

ASSESSMENT, RECOMMENDATIONS, REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition

The visual inspection indicated the dam to be in generally poor condition. This assessment is based on the poor condition of the riprap on the upstream slope, the presence of large trees near the crest with roots visible across the dam crest, the seepage at the downstream toe and the deterioration of the spillway training walls.

b. Adequacy of Information

The information available and the assessment of the dam condition, is based principally on 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 investigate and design required remedial measures for:

1. Repair of the riprap and existing sloughing on the upstream face of the dam.
2. The source of seepage found at the toe of the dam.

3. Removing trees and roots from the downstream slope of the dam and within 20 feet of the downstream toe and selecting acceptable backfill for holes caused by root removal.

4. The misalignment and collapse of the spillway training walls and left wingwall.

5. Laterally strengthening the spillway bridge.

b. The Owner should engage a qualified registered professional engineer to perform a detailed hydraulic/hydrologic study and evaluate spillway adequacy and overtopping potential.

The Owner should implement the recommendations of the engineer.

7.3 Remedial Measures

a. Operating and Maintenance Procedures

1. Brush growth on the upstream and downstream slopes should be cut as part of routine annual maintenance.

2. All trees within 10 feet of the left spillway training wall should be cut.

3. Brush and overhanging trees in the spillway channel and outlet channel should be removed.

4. The outlet channel should be cleaned out to allow free flow of water.

5. The minor collapse of the outlet masonry headwall should be repaired.

6. The turf cover between the gate structure and outlet structure should be restored.

7. The Owner should institute a program of annual technical inspection.

8. The Owner should develop a formal warning system for downstream areas in case of an emergency.

7.4 Alternative

There are no practical alternatives for the recommendations and remedial measures.

January 13, 1976

Board of Selectmen
Town Hall
Hinsdale, Massachusetts

Re: Inspection - Dam #1-2-132-6
Hinsdale
Plunkett Reservoir Dam

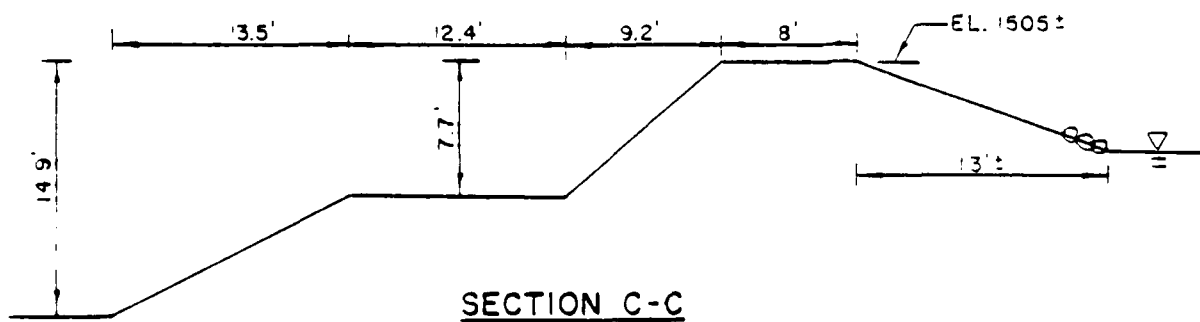
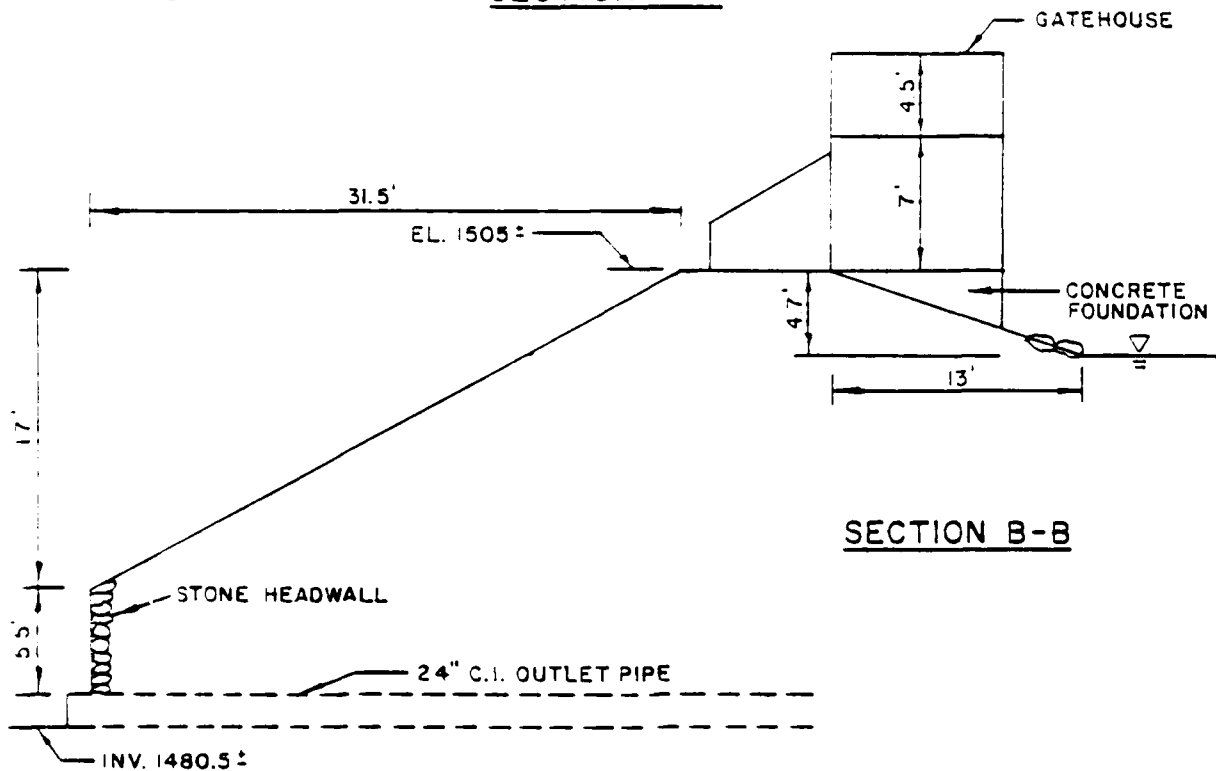
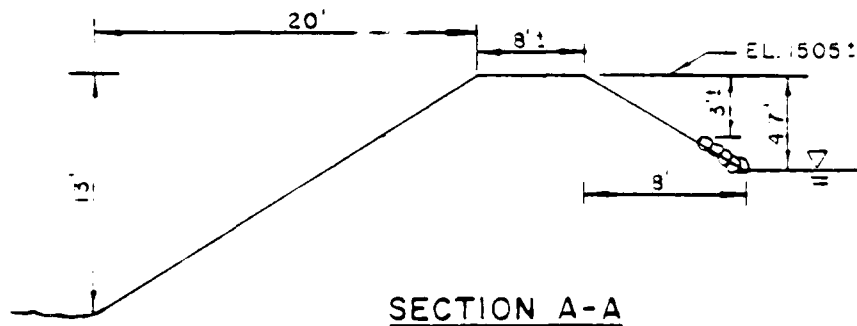
Gentlemen:

On October 27, 1975, an engineer from the Massachusetts Department of Public Works made a visual inspection of the above dam. Our records indicate that the Town of Hinsdale is the owner. Will you please notify this office if this information is not current.

The inspection was made in accordance with the provisions of Chapter 26B of the Massachusetts General Laws as amended (Dams-Safety Act). Chapter 106 of the Acts of 1975 transferred the jurisdiction of the so-called "Dams-Safety Program" to the Commissioner of the Department of Environmental Quality Engineering.

The results of the inspection indicate that repairs are needed. It appears that no repairs have been made since the notice of June 26, 1974 as deterioration continues. The following conditions were noted that require attention:

1. Erosion continues at each end of the upstream walls.
2. Concrete has spalled at the crack in the wall westerly of the spillway.
3. Several large trees are growing on the downstream embankment of the dam.
4. The spillway chute has deteriorated badly since the last inspection (May 11, 1973). Considerable brush is growing on the spillway floor and large sections of the stone masonry abutments have fallen into the chute.



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
PLUNKETT RESERVOIR DAM
SECTIONS

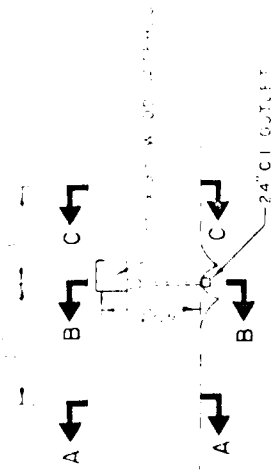
HINSDALE

MASSACHUSETTS.

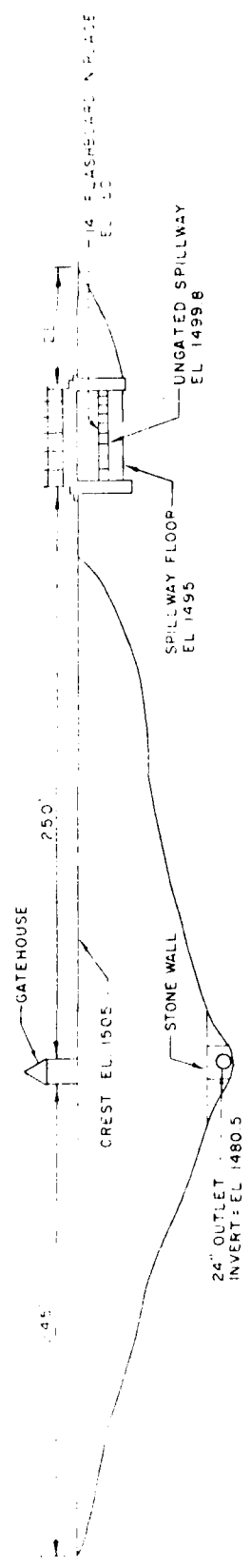
PLAN DEVELOPED FROM
ON-SITE INSPECTION

SCALE NOT TO SCALE

DATE AUGUST, 1981



PLAN



ELEVATION

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

US ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

PLUNKETT RESERVOIR DAM
PLAN & ELEVATION

DATE	1954
BY	W. J. BUCHANAN
CHECKED BY	W. J. BUCHANAN
APPROVED BY	W. J. BUCHANAN

LIST OF AVAILABLE ENGINEERING DATA

State Inspection Reports from the years 1971, 1973 and 1975 and a 1968 County Inspection Report were made available at the State Department of Environmental Quality Engineering, Division of Waterways, 100 Nashua Street, Boston, Massachusetts 02114.

No additional engineering data was located.

APPENDIX B
ENGINEERING DATA

PERIODIC INSPECTION CHECKLIST

PROJECT PLUNKETT RESERVOIR DAM DATE 6/30/81
 PROJECT FEATURE Service Bridge NAME K. Dalenberg, D. Vine
 DISCIPLINE Geotechnical, structural, hydraulic NAME 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	Good.
Alignment of Abutment	Good.
Approach to Bridge	Good.
Condition of Seat & Backwall	Good.

PERIODIC INSPECTION CHECKLIST

PROJECT PLUNKETT RESERVOIR DAM

DATE 6/30/81

PROJECT FEATURE Spillway

NAME K. Dalenberg, D. Vine

DISCIPLINE Geotechnical, structural, hydraulic

NAME R. Cheney, M. Angieri

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS</u> a. Approach Channel General Condition Loose Rock Overhanging Channel Trees Overhanging Channel Floor of Approach Channel b. Weir and Training Walls General Condition of Concrete Rust or Staining Spalling Any Visible Reinforcing Any Seepage or Efflorescence Drain Holes c. Discharge Channel General Condition Loose Rock Overhanging Channel Trees Overhanging Channel Floor of Channel Other Obstructions Other Comments	Below water. None. None. Below water. Good. None observed None observed None observed None observed None observed. Poor. Masonry walls of channel collapsing. Trees above left channel wall on abutment and overhanging discharge channel. Riprap - partially overgrown; some debris.

PERIODIC INSPECTION CHECKLIST

PROJECT FLUNKETT RESERVOIR DAM DATE 6/30/81
 PROJECT FEATURE Outlet Works NAME K. Dalenberg, D. Vine
 DISCIPLINE Geotechnical, structural, hydraulic NAME R. Cheney, M. Angieri

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - OUTLET STRUCTURE AND</u> <u>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	There is no gated outlet structure. The 24 inch outlet pipe discharges through masonry headwall. Partial collapse of stone on right side has occurred. None observed. Random riprap bottom. Partial collapse of masonry headwall near outlet. Trees overhanging channel. Overgrown.

PERIODIC INSPECTION CHECKLIST

PROJECT PLUNKETT RESERVOIR DAM DATE 6/30/81

PROJECT FEATURE Outlet Works NAME K. Dalenberg, D. Vine

DISCIPLINE Geotechnical, Structural, Hy-
draulic NAME 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	<u>PLUNKETT RESERVOIR DAM</u>	DATE	<u>6/30/81</u>
PROJECT FEATURE	<u>Outlet Works</u>	NAME	<u>K. Dalenberg, D. Vine</u>
DISCIPLINE	<u>Geotechnical, Structural, Hydraulic</u>	NAME	<u>R. Cheney, M. Angieri</u>

1c

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - CONTROL TOWER</u>	No Control tower.
a. Concrete and Structural	
General Condition	Wood frame gatehouse in good 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	All controls are manual.
Air Vents	
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	
Service Gates	
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System	

PERIODIC INSPECTION CHECKLIST

PROJECT PLUNKETT RESERVOIR DAM DATE 6/30/81
 PROJECT FEATURE Outlet Works NAME K. Dalenberg, D. Vine
 DISCIPLINE Geotechnical, Structural, Hydraulic NAME R. Cheney, M. Angieri

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

PERIODIC INSPECTION CHECKLIST

PROJECT PLUNKETT RESERVOIR DAM DATE 6/30/81
 PROJECT FEATURE Dam Embankment NAME K.Dalenberg, D. Vine
 DISCIPLINE Geotechnical, Structural, Hydraulic NAME R. Cheney, M. Angieri

AREA EVALUATED	CONDITION
<u>DAM EMBANKMENT</u>	
Crest Elevation	1505
Current Pool Elevation	1501
Maximum Impoundment to Date	Unknown
Surface Cracks	None observed.
Pavement Condition	Not paved.
Movement or Settlement of Crest	Settlement behind right spillway wall on crest.
Lateral Movement	At left abutment, movement of wingwall toward reservoir.
Vertical Alignment	Crest good.
Horizontal Alignment	Crest ok - upstream slope irregular due to sloughing and riprap collapse.
Condition at Abutment and at Concrete Structures	Settlement behind right spillway channel wall, and erosion of slope adjacent to right end of spillway wingwall.
Indications of Movement of Structural Items on Slopes	None observed.
Trespassing on Slopes	Trail on downstream slope from gatehouse to outlet structure.
Sloughing or Erosion of Slopes or Abutments	Significant sloughing of upstream slope and associated riprap collapses.
Rock Slope Protection - Riprap Failures	Most of riprap has collapsed to a level at or below present water level.
Unusual Movement or Cracking at or Near Toe	None observed.
Unusual Embankment or Downstream Seepage	Spongy area at toe - 40-50 ft north of gatehouse. Seepage at toe - beginning 100 ft south of gatehouse - 24 gpm, water clear.
Piping or Boils-	None observed.
Foundation Drainage Features	None observed.
Toe Drains	None observed.
Instrumentation System	None known.
Vegetation	Downstream slope and toe heavily overgrown with trees up to 32-in. diameter

VISUAL INSPECTION CHECKLIST
PARTY ORGANIZATION

PROJECT PLUNKETT RESERVOIR DAM

DATE 6/30/61

TIME 1:30 p.m.

WEATHER Sunny, 80°

W.S. ELEV. 1501 U.S. DN.S.

PARTY:

- | | |
|--|---|
| 1. <u>Ron Cheney - HHB</u> | 6. <u> </u> |
| 2. <u>Dave Vine - HHB</u> | 7. <u> </u> |
| 3. <u>Mike Angieri - HHB</u> | 8. <u> </u> |
| 4. <u>Karl Dalenberg - GEI</u> | 9. <u> </u> |
| 5. <u> </u> | 10. <u> </u> |

PROJECT FEATURE	INSPECTED BY	REMARKS
1. <u>Dam Embankment</u>	<u>All</u>	<u> </u>
2. <u>Spillway</u>	<u>All</u>	<u> </u>
3. <u>Outlet Works</u>	<u>All</u>	<u> </u>
4. <u> </u>	<u> </u>	<u> </u>
5. <u> </u>	<u> </u>	<u> </u>
6. <u> </u>	<u> </u>	<u> </u>
7. <u> </u>	<u> </u>	<u> </u>
8. <u> </u>	<u> </u>	<u> </u>
9. <u> </u>	<u> </u>	<u> </u>
10. <u> </u>	<u> </u>	<u> </u>

APPENDIX A
INSPECTION CHECKLIST

Inspection-Dams
Hinsdale
Blunkett Reservoir Dam

-2-

January 13, 1976

An early reply indicating a course of action is necessary. As the owner of the dam you must keep it in a safe condition. We call these conditions to your attention before they become serious and more expensive to correct. With any correspondence please include the number of the dam as indicated above.

Very truly yours,

[Signature]
LHA:jap
cc: Hinsdale Conservation Commission
 L. P. Wilson
 L. Jordan

[Signature]
DAVID STANLEY
Commissioner

INSPECTION REPORT - DAMS AND RESERVOIRS

1. Location: ~~City~~/Town HINSDALE.Dam No. 1-2-132-6.Name of Dam Plunket Reservoir.Inspected by: RJordan-RDegen.Date of Inspection 10/27/75.

2. Owner/s: per: Assessors _____.

Prev. Inspection X.

Reg. of Deeds _____ Pers. Contact _____.

1. Town of Hinsdale Hinsdale, MA
Name St. & No. City/Town State Tel. No.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.

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

4. No. of Pictures taken 6.

5. Degree of Hazard: [if dam should fail completely]*

1. Minor _____ 2. Moderate X.

3. Severe _____ 4. Disastrous _____.

*This rating may change as land use changes [future development]

6. Outlet Control: Automatic _____ Manual X.Operative _____ yes: X no.

Comments: _____

Upstream Face of Dam: Condition:

1. Good _____ 2. Minor Repairs _____.

3. Major Repairs _____ 4. Urgent Repairs _____.

Comments: _____

8.

Downstream Face of Dam: Condition: 1. Good____. 2. Minor Repairs____.
3. Major Repairs X 4. Urgent Repairs____.

Comments: _____

9.

Emergency Spillway: Condition: 1. Good____. 2. Minor Repairs____.
3. Major Repairs____. 4. Urgent Repairs____.

Comments: _____

10.

Water level @ time of inspection: _____ 1. ft. above____. below x____.
top of dam_____
principal spillway x_____
other_____

11.

Summary of Deficiencies Noted:

Growth [Trees and Brush] on Embankment x_____

Animal Burrows and Wascouts_____

Damage to slopes or top of dam_____

Cracked or Damaged Masonry x_____

Evidence of Slippage_____

Evidence of Piping_____

Erosion x_____

Leaks_____

Trash and/or debris impeding flow_____

Clogged or blocked spillway x_____

Other_____

12. Remarks & Recommendations: [Fully Explain] PREVIOUS INSPECTION DATE: May 31, 73

No repairs have been made on this structure since the 1973 inspection. The erosion continues at each end of the upstream walls. Concrete has spalled at the crack in the wall west of the spillway.

The slopes are clear of brush, but several large trees are growing on the downstream slopes.

The spillway chute has deteriorated badly since the 1973 inspection. A considerable amount of brush is growing in the chute floor and large sections of both stone masonry sidewalls have fallen into the chute, greatly reducing the cross sectional area. Repairs should be initiated as soon as weather conditions allow.

According to deeds on file at the Berkshire Middle Registry of Deeds, the owner of the structure is the Town of Hinsdale, however, town officials deny ownership.

Therefore, it can be assumed that no corrective action will be taken.

For location see topo sheet 5-B.

13.

Overall Condition:

1. Safe _____.
2. Minor repairs needed X _____.
3. Conditionally safe - major repairs needed _____.
4. Unsafe _____.
5. Reservoir impoundment no longer exists [explain]
Recommend removal from inspection list _____.

June 19, 1973

Mrs Guy Weston
Michael Road
Hinsdale, Massachusetts

RE: Inspection-Dam #1-2-132-6
Hinsdale
Blunkett Reservoir Dam

Dear Mrs Weston:

An engineer from the Massachusetts Department of Public Works has inspected the above dam, of which you are the owner.

The inspection was made in accordance with Chapter 253 of the Massachusetts General Laws, as amended by Chapter 595 of the Acts of 1970/

As a result of a letter from Attorney James A. Bowes, dated March 30, 1972, wherein it was indicated that ownership of the dam is with the Town of Hinsdale and not the heirs of the Walsh family, a review of the extent of ownership was made. The result of our review indicates that you are an owner.

The results of the inspection indicate that this dam is safe; however, the following conditions were noted that require attention:

1. Repair the large crack in the concrete wall located on the easterly side of the spillway.
2. Correct the erosion at the east and west ends of the concrete wall.
3. Remove the growth of trees from the embankment.

We call these conditions to your attention now, before they become serious and more expensive to correct.

Very truly yours,

F. C. Schmitt

FRED. C. SCHMITT, PE.
Deputy Chief Engineer

LRA/afs

cc: D. P. Amidon, R. Jordan
Hinsdale Board of Selectman
Attorney James A. Bowes

INSPECTION REPORT - DAMS AND RESERVOIRS

1. Location: City/Town Hinsdale. Dam No. 1-2-132-6.
 Name of Dam Plunkett Res.. Inspected by: Jordan-Tracy.
 Date of Inspection 5-31-73.

2. Owner/s: per: Assessors _____. Prev. Inspection X.
 Reg. of Deeds _____. Pers. Contact _____.

1. Mr. Guy Weston Michael Rd. Hinsdale, MA
 Name St. & No. City/Town State Tel. No.
 2. Mr. Adams No. Adams MA MA MA
 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.
 Name St. & No. City/Town State Tel. No.

4. No. of Pictures taken 2.

5. Degree of Hazard: [if dam should fail completely]*
 1. Minor _____. 2. Moderate X.
 3. Severe _____. 4. Disastrous _____.

*This rating may change as land use changes [future development]

6. Outlet Control: Automatic _____. Manual X.
 Operative X yes. _____ no.

Comments: _____

7. Upstream Face of Dam: Condition:
 1. Good X. 2. Minor Repairs _____.
 3. Major Repairs _____. 4. Urgent Repairs _____.

Comments: _____

8.

Downstream Face of Dam: Condition: 1. Good x. 2. Minor Repairs_____
3. Major Repairs____ 4. Urgent Repairs_____

Comments: _____

9.

Emergency Spillway: Condition: 1. Good_____. 2. Minor Repairs_____
3. Major Repairs____ 4. Urgent Repairs_____

Comments: _____

10.

Water level at time of inspection 0.2 ft. above x below_____
top of dam_____
principal spillway Flashboards_____
other_____

11.

Summary of Deficiencies noted:

Growth [Trees and Brush] on Embankment_____

Animal Burrows and Passes_____

Damage to slopes or top of dam_____

Cracked or Damaged Masonry: x_____

Evidence of Seepage_____

Evidence of Piping_____

Erosion x_____

Leaks_____

Trash and/or debris impeding flow_____

Clogged or blocked spillway_____

Other_____

12. Remarks & Recommendations: [Fully Explain]

In general, the Dam appears to be in good condition. The following minor deficiencies were noted during the inspection.

The concrete wall at the west side of the spillway has a large crack which requires sealing. There is some erosion at the east and west ends of the concrete walls. The embankments at these points are extremely wide and there is no danger of failure. However, freezing and thawing cycles can severely damage the exposed concrete at the eroded areas. The downstream slope is well cleared of brush, but there are several large trees growing from the embankment. There is no visible signs of the seepage noted in the 1971 report.

In my opinion this dam is safe. The owners should be advised to repair the concrete wall and eroded areas prior to the winter season.

Failure could cause moderate to severe damage to the Town of Hinsdale, approximately 1 mile downstream.

Hinsdale
Plankett Res. Dam
No. 1-2-132-6
Mon 6/14/73
Call from Bob Seidman -
Tracked by Survey
of Town Counsel about
the Walsh family
owns the dam.
Letters to be sent to
Mr. Westland (married to
Walsh girl), and the
lives near the dam.
J.H.P.

13.

Overall Condition:

1. Safe X
2. Minor repairs needed _____
3. Conditionally safe - major repairs needed _____
4. Unsafe _____
5. If service impoundment no longer exists [explain] _____
- Recommend removal from inspection list _____

DESCRIPTION OF DAM

DISTRICT 1Submitted by R. D. JordanDam No. 1-2-132-6Date 5-31-73~~City/Town~~ HinsdaleName of Dam Plunket Res.1. Location: Top Sheet No. 5B

Provide 8-1/2" x 11" in. or copy of same with location of dam clearly indicated.

Year built: 1875Years of subsequent raising 2. Purpose of Dam: Water Supply , Irrigation X
Flood Control , Other 3. Drainage Area: 1 sq. mi. acres.4. Normal Ponding Area: 70 Acres: Avg. Depth
Impoundment: ft. acre ft.5. No. and type of dwellings located adjacent to pond or reservoir
i.e. summer homes etc. 6. Dimensions of Dam: Length 560 Max. Height 30'
Slopes: Upstream Face Earth 1:1
Downstream Face Earth 2:1
Width across top 12'7. Classification of Dam by Material:
Earth X, Stone Masonry , Concrete Masonry
Timber , Rockfill , Other 8. A. Description of proposed land usage downstream of dam: 50' rural 50' urban
B. Is there a storage pond or flood plain downstream of the dam which could accommodate the impoundment in the event of a complete dam failure?
Yes No X

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

No. of people _____.

No. of homes _____.

No. of Businesses _____.

No. of Industries _____.

No. of Utilities _____.

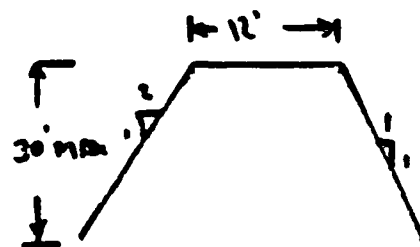
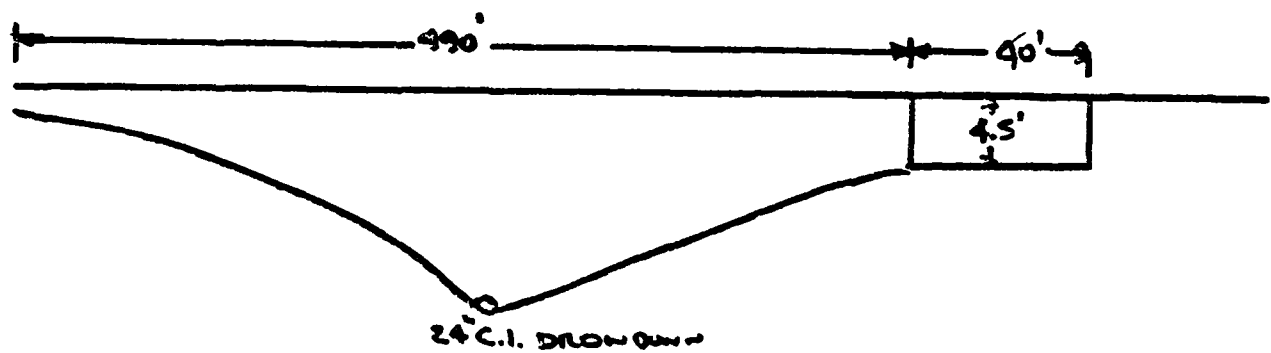
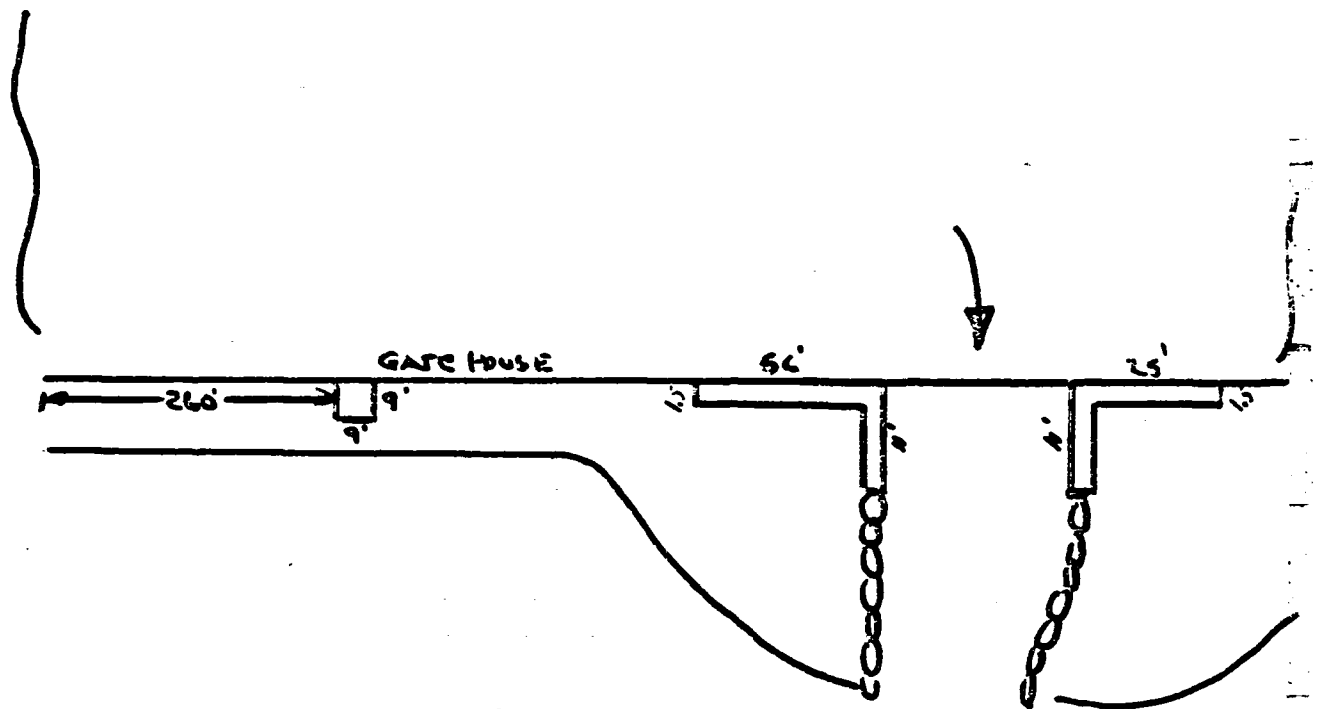
Railroads Penn Central _____.

Other Grist Mill _____.

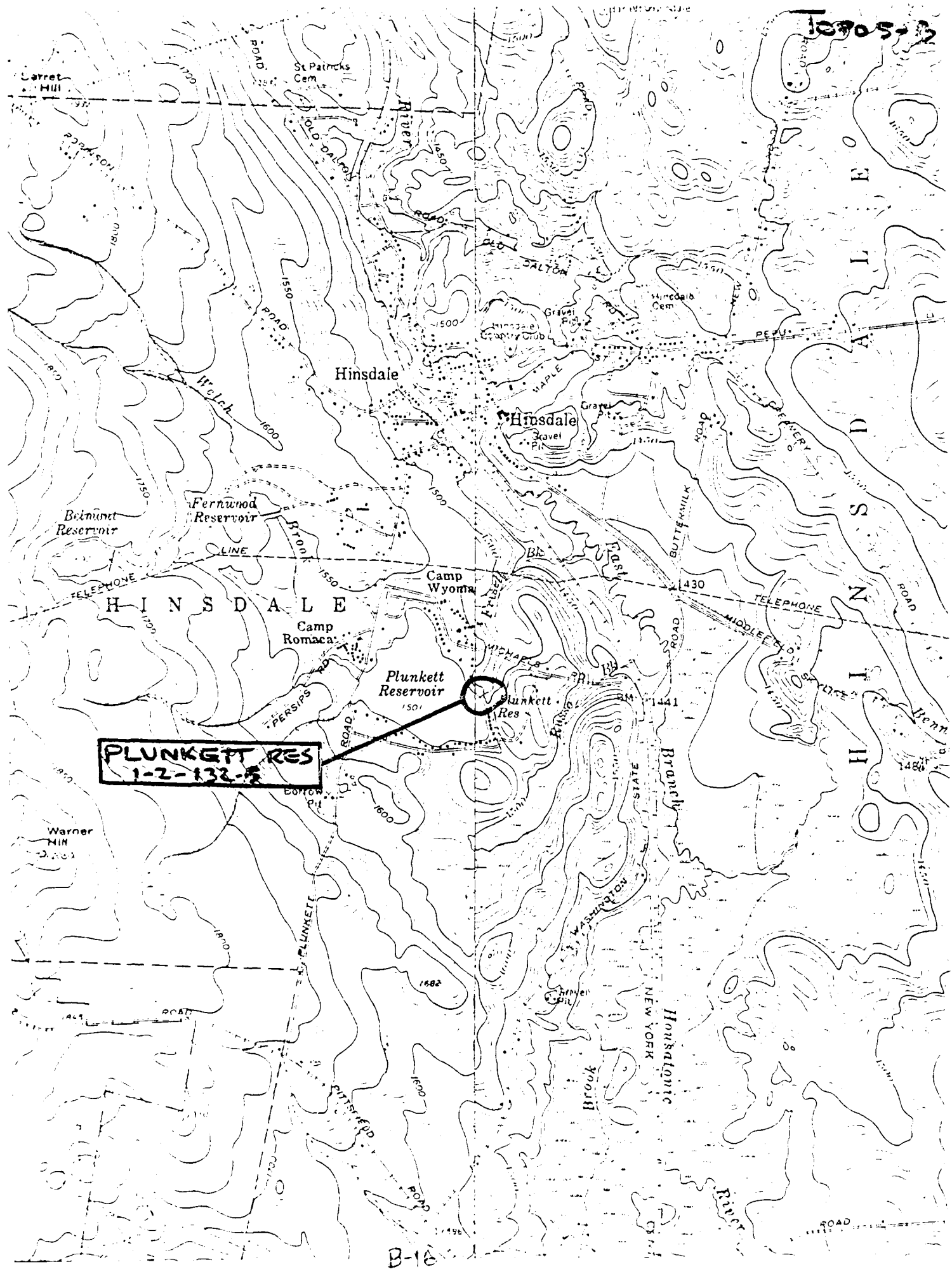
Oth. _____.

11. Attach Sketch of dam to this form showing section and plan on 8-1/2" x 11" sheet.

PLUNKET RES.
1-2-132-6



10905-3



PLUNKETT RES
1-2-132-3

INSPECTION OF DAMS

Dam 11-6

City or Town of Hinsdale Date June 1, 1971
Name of Dam Plunket Reservoir Inspector R. Northrup
P. Pezzie
Owner Town of Hinsdale Address Town Hall, Hinsdale
Caretaker Town of Hinsdale Address Town Hall, Hinsdale
Location 1 1/2 miles south of Town - South of Michaels Road
Type of Dimensions Earth embankment - 450' long - 30' high

Spillway, type and size concrete - 40' long - 4.5' freeboard
Outlets, type and size gatehouse containing 24" gate in 24" CI pipe
Flashboards, type and height 18" wood
Date Built 1875 Condition fair
When last repaired 1936 By whose orders County Commissioner
Nature of Repairs new spillway and paved over flow

Purpose of Dam recreation
Approximate storage of water 70 acres
Approximate area of water shed 1 square mile
Possible damage due to failure of dam roads and RR below

Remarks water 1" over flashboards - seepage at southeast end of embankment -
seepage at toe of downstream face of embankment - 100' east of spillway - several
large trees on downstream side of embankment - west end of spillway cracked

Recommendations investigate seepage and make corrections - repair spillway side
wall - clear downstream embankment of trees and brush

COUNTY OF BERKSHIRE, MASS.
INSPECTION OF DAMS

City or Town of Hinsdale Date November 6, 1968

Name of Dam Plunkett Reservoir Inspector William A. Heaphy

Owner Town of Hinsdale Address Town Hall, Hinsdale, Mass. Tel. _____

Caretaker Rowland Armacost Address Stone House Road, Hinsdale, Mass. Tel. _____

Location 1 1/2 mile south of Town.

Type and Dimensions Earth embankment- 450' long - 30' high

Spillway, type and size Concrete 40' long- 4.5' freeboard

Outlets, type and size Gate house containing 24" gate on 24" cast iron pipe.

Flashboards, type and height 20" removable from catwalk.

Date Built 1875 Condition Good

When last repaired 1936 By whose orders Owners and County Commissioners

Nature of Repairs New spillway and paved overflow with general repairs following
1936 flood.

Purpose of Dam Formerly manufacturing- Now recreation,

Approximate storage of water 70 Acres

Approximate area of water shed --

Possible damage due to failure of dam Town roads and possible to Boston and Albany Railroad.

Remarks Water about 18" below spillway no flashboards on . Spillway channel
developing much growth. Some slight cracks appearing in concrete at spillway.

Recommendations Clear spillway channel. Check cracks in spillway.

NO 79206.1001
E 7-28-81
BY 16 WA



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

SHEET NO. D-4
JOB Dams
SUBJECT Plunkett
CLIENT COE

Test Flood Analysis

Size Class

hydraulic height = 24.5' "small"
storage capacity = 1386. "intermediate"

Size Class = Intermediate

Hazard Potential (HIGH)

The analysis made for dam Failure Flooding indicates this structure has a "high" hazard potential. Up to 15 structures could receive floodwater from 1.5 to 5 feet deep.

Test Flood Inflow

Drainage Area = 1812 acres = 2.8 s.m.

Rolling Ground Characteristics, Corps Guide curves indicate inflow of 2000 cfs/s.m.

Inflow = $2000 \frac{\text{cfs}}{\text{s.m.}} \times 2.8 \text{ s.m.} = 5600 \text{ cfs}$
into reservoir

JOB NO. 77-206-111
 DATE 7-24-81
 BY WJA
 CH'D BY Superior

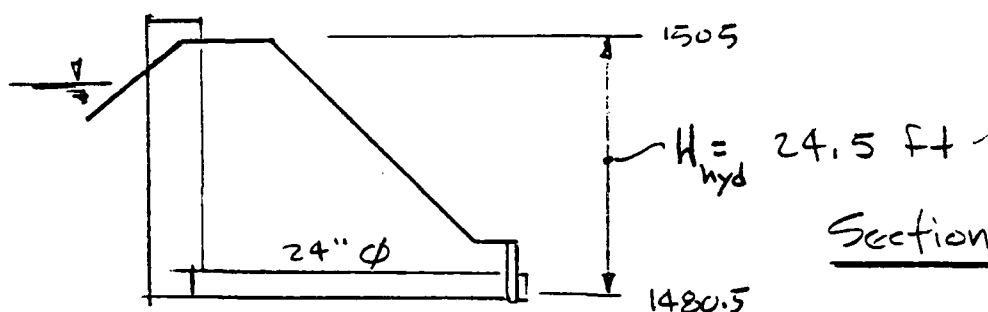


HAYDEN, HARDING & BUCHANAN, INC.
 CONSULTING ENGINEERS
 BOSTON — WEST HARTFORD

SHEET NO. D-3

JOB 105
 SUBJECT 105
 CLIENT 105

Dam Failure Analysis



Section At Gate House

Hydraulic Height = 24.5 ft ✓

Length at mid height = 375. ft ✓

Dam Failure Outflow

$$Q_F = \frac{8}{27} (0.4 \times 375') \sqrt{32.2} (24.5')^{1.5}$$

$$Q_F = 30,584. \text{ cfs. } \checkmark$$

At Sta 60+00, Hinsdale, the large swamp/flood plain of the East Branch Housatonic River "enters" a narrow outlet channel". Here, base flow 2465 cfs will be causing flooding to elev 1434±, which will back up into the swamp.

Dam Failure Flow could raise the water level by 1.5 to 5 feet, or more, damaging at least 15 structures along route 8 and in Hinsdale.

The dam has a high hazard potential.

JOB NO. 79206.1001
DATE 7-31-81
BY MJA
CH'D BY



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

SHEET NO. D-2
JOB Dams
SUBJECT Plunkett
CLIENT COE

Plunkett Reservoir, Hinsdale, Mass.

Dam's Size : Intermediate

24.5' $\pm$ hydraulic height
1386 $\pm$ d-f storage capacity
Earth Embankment

Hazard Potential : High, 14 homes, or
more impacted by dam failure
flooding 1.5 to 5 $\pm$ ft. deep.,
initial outflow $\approx$ 30,584 cfs

Test Flood : Inflow = 5600 cfs
from 2.8 sq. mi. drainage area

Routed Outflow :

a) with flashboards removed = 4775 cfs
at elev. 1506.25, dam is
over topped by 1.25 $\pm$ ft.
spillway area can handle 2700 $\pm$ cfs
or 57% of outflow

b) with 1.2' of flashboards in place = 4751 cfs
at elev. 1506.4, dam is over-
topped by 1.4 $\pm$ ft.
spillway area can handle
1950 $\pm$ cfs or 41% of outflow.

APPENDIX D
HYDROLOGIC AND HYDRAULIC COMPUTATIONS



PHOTO NO.15 - Seepage of about 1 GPM
at downstream toe about
100 feet right of gate-
house.

PHOTO NO.16 - Seepage area near
downstream toe
about 130 feet
right of gate-
house.





PHOTO NO.13 - View of downstream face
between outlet and
gatehouse.

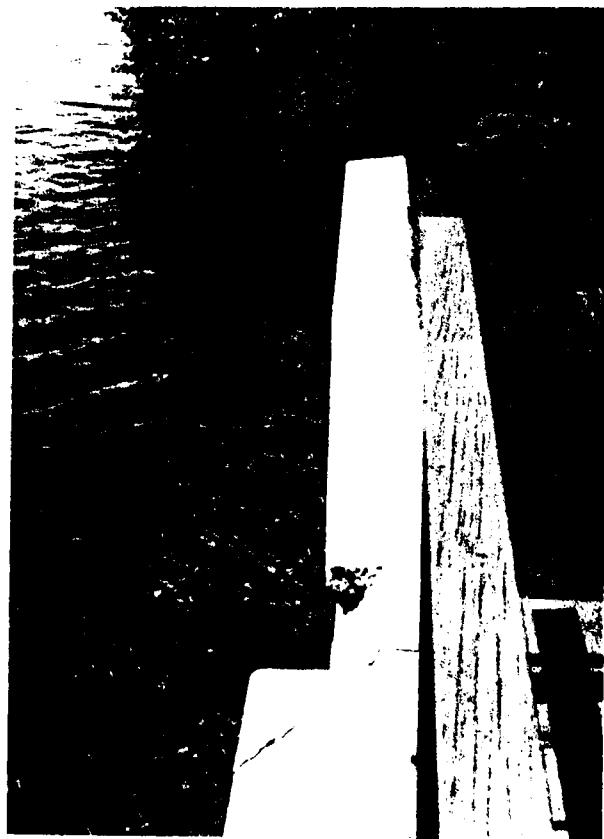
PHOTO NO.14 - Heavy tree growth
on downstream face
from gatehouse
looking toward
right abutment.





PHOTO NO.11 - Right spillway
training wall showing
wall misalignments and
movements and subsi-
dence behind the wall.

PHOTO NO.12 - Wingwall on left
side of spillway
showing cracks in
wall resulting
from outward move-
ment of wall.



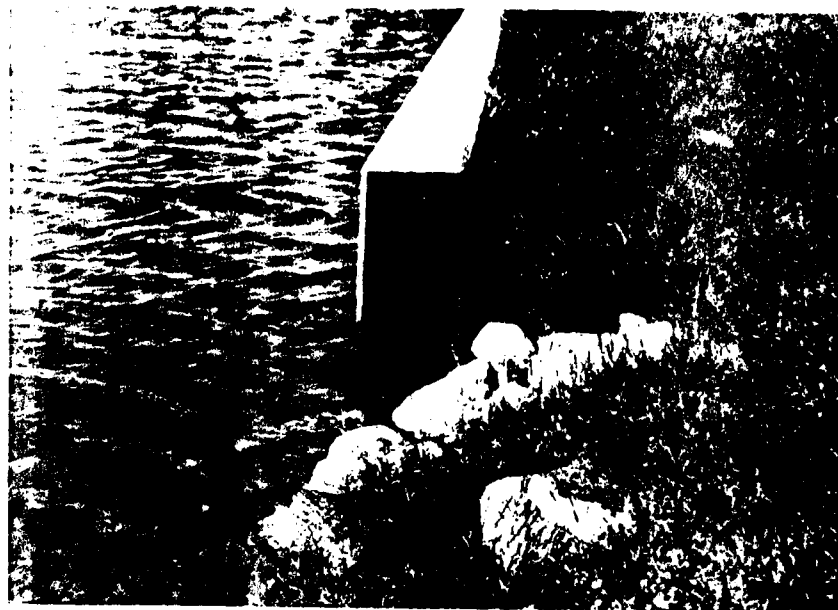


PHOTO NO.9 - Eroded area on upstream face at right end of spillway wingwall.



PHOTO NO.10 - General view of spillway discharge channel showing brush in channel and trees overhanging channel.



PHOTO NO.7 - View of spillway weir and bridge.
There are 14 inches of flashboards
in place.



PHOTO NO.8 - Crest of right half of dam from
gatehouse.



PHOTO NO.5 - Upper portion of downstream face of dam north of gatehouse showing large trees, up to 22 inch diameter on slope.



PHOTO NO.6 - View of 24 inch outlet pipe and stone outlet headwall.

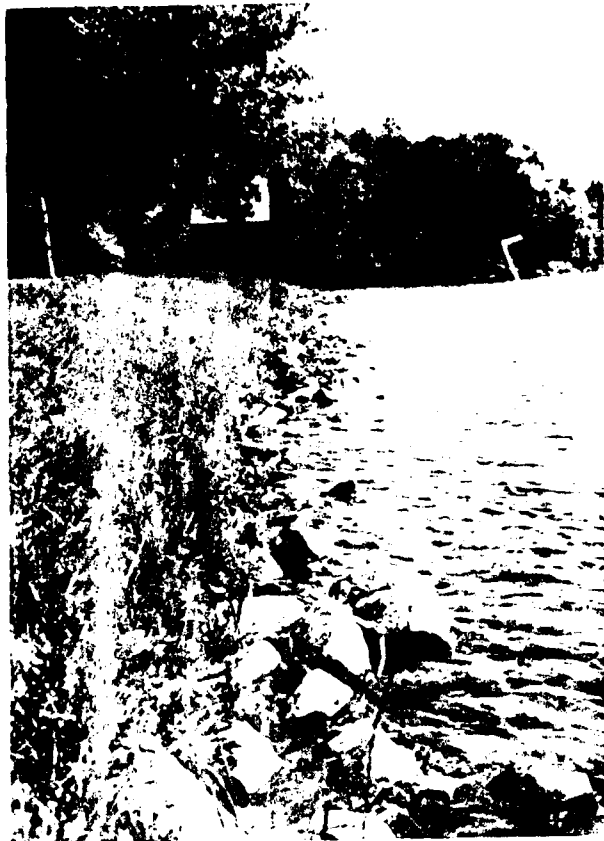


PHOTO NO.3 - Left half of up-
stream face of
dam from spillway.

PHOTO NO.4 - Spillway flash-
board assembly
viewed from right
side of spillway.

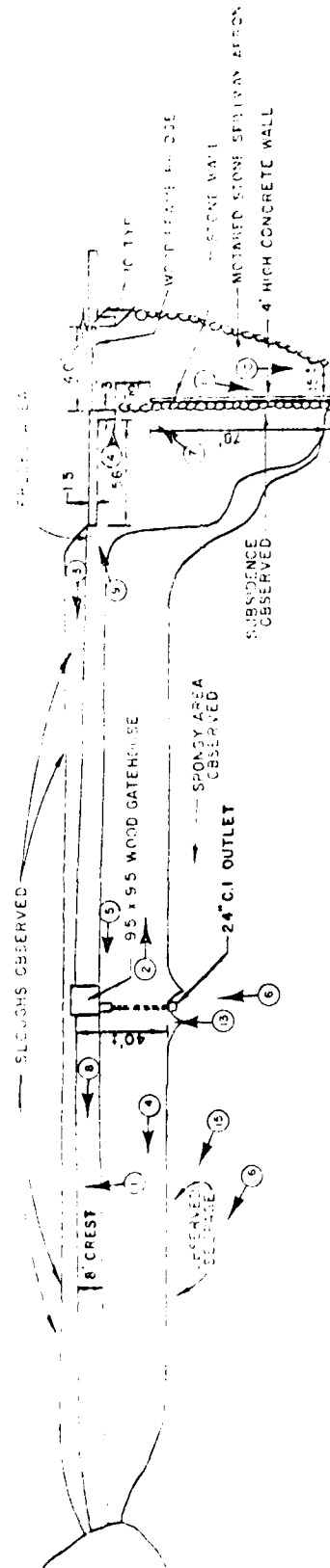




PHOTO NO.1 - View of Reservoir.



PHOTO NO.2 - Downstream face of dam viewed
from downstream of gatehouse.



HAYDEN HARRINGTON & BUCHANAN, INC.
US ARMY ENGINEER CORPS
CONSULTING ENGINEERS
FITCH, MASSACHUSETTS

NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS

PLUNKETT RESERVOIR DAM PHOTO LOCATIONS

PLUNKETT

MASSACHUSETTS

DATE: 10/1/81

APPENDIX C
PHOTOGRAPHS

JOB NO. _____
DATE 7-30-81
BY MJA
CH'D BY _____



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

SHEET NO. D5
JOB Dams
SUBJECT Plunkett
CLIENT COE

Test Flood Outflow

Without Flashboards in Spillway

Spillway Capacity to top of dam is 1826 cfs
" dam is over topped

$$Q_{P1} = 5600 \text{ cfs} \quad D_1 = 1506.35 \quad \text{Stor}_1 = 435 \text{ a-f} \text{ or } 2.85''$$

$$Q_{P2} = 5600 \left(1 - \frac{2.85}{19''}\right) = 4737$$

$$D_2 = 1506.2 \quad V_2 = 420 \text{ a-f on } 2.75'' \quad V_a = 2.8''$$

$$Q_{P3} = 5600 \left(1 - \frac{2.8}{19}\right) = 4775 \text{ cfs} \quad \text{Elev} = 1506.25 \pm$$

dam overtopped by 1.23 $\pm$ ft.

With Flashboards in Spillway

$$Q_{P1} = 5600 \text{ cfs} \quad D_1 = 1506.5$$

$\text{Stor}_1 = 440 \text{ a-f or } 2.91''$

$$Q_{P2} = 5600 \left(1 - \frac{2.91}{19}\right) = 4742 \text{ cfs} \quad D_2 = 1506.35$$

$$V_2 = \frac{430(12)}{1812} = 2.85'' \quad V_a = 2.88$$

$$Q_{P3} = 5600 \left(1 - \frac{2.88}{19}\right) = 4751 \text{ cfs} \quad \text{Elev. } 1506.4$$

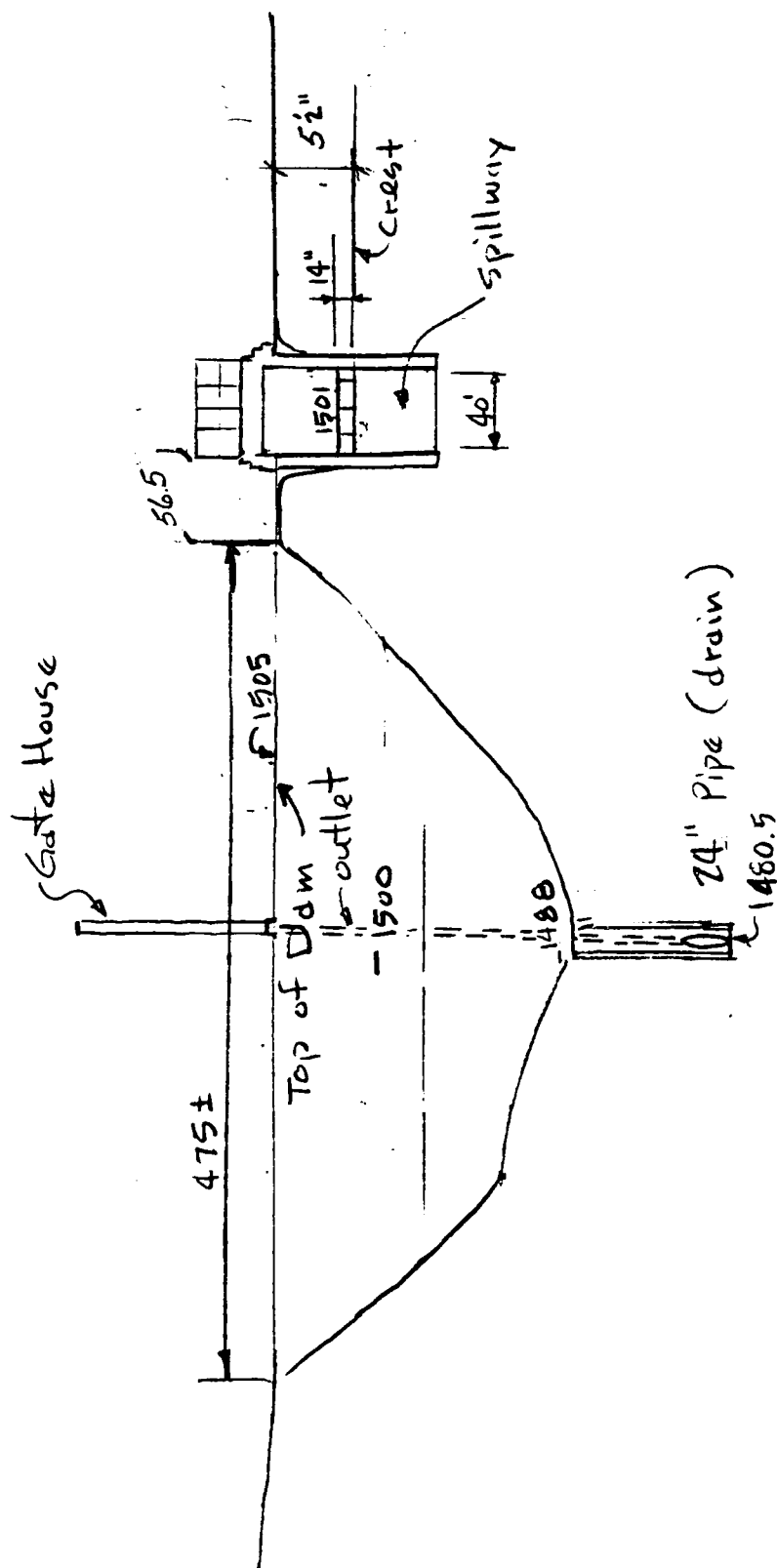
dam overtopped by 1.40 $\pm$ ft.

JOB NO. 79,206.1601
 DATE 7-9-81
 BY WJA
 CH'D BY JEP/MS



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

JOB Dams SHEET NO. D 6
 SUBJECT Plunkett
 CLIENT COE



ELEV. ALONG DAM.

10' 100

JOB NO. 7-28-81
 DATE WJA
 BY WJA
 CH'D BY



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

SHEET NO. D-7

JOB
 SUBJECT Plunk
 CLIENT

Spillway Capacity

With Existing Flashboards

$$Q = C L H^{3/2}$$

H	H ^{3/2}	C	L	Q	Elev
1	1	3.6	40'	144.	1502
2	2.82	3.65	"	412.	1503
3	5.2	3.7	"	780.	1504
4	8.	3.75	"	1200.	1505
5	11.18	3.8	"	1700.	1506
5.5	12.9	3.88	"	2000.	1506.5

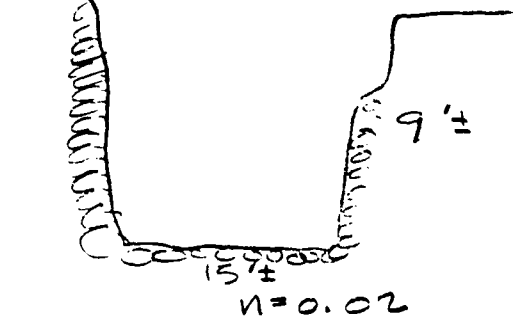
With Flashboard Removed

H	H ^{3/2}	C	L	Q	Elev
1.2	1.31	3.3	40'	174	1501.
2.2	3.26	3.55	"	463	1502
3.2	5.72	3.65	"	836	1503
4.2	8.6	3.75	"	1291	1504
5.2	11.86	3.85	"	1826	1505
6.2	15.49	3.95	"	2439	1506
6.7	17.34	4.05	"	2809	1506.5

Outlet Channel Capacity

$$V = \frac{1.486}{.02} R^{2/3} (.02)^{1/2} = R^{2/3} 10.51$$

D	WP	A	R ^{2/3}	"10.51"	V	Q
1	17	15	.92	"	9.7	145
2	19	30	1.36	"	14.21	428
4	23	60	1.9	"	20	1200
6	27	90	2.24	"	23.5	2119
8	31	120	2.48	"	26.03	3123
9	33	135	2.57	"	27	3646



Will not carry
 test flood outflow.

JOB NO. 7A2061601
 DATE 7-29-61
 BY WJH
 CH'D BY _____



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

SHEET NO. D-8
 JOB Dams
 SUBJECT Plunkett
 CLIENT CCF

Discharge For Dam Over Flow

Top of dam length $\approx 600' \pm$ (at elev 1505 $\pm$)

$$Q = CLH^{3/2}$$

Elev	H	$H^{3/2}$	L	C	Q	$\underline{\underline{Q_{TNF}}}$	$\underline{\underline{Q_{TF}}}$
1505.0	-	-	-	-	0	1826	1200
1505.5	1/2	0.35	600	2.6	550, $\pm$	2700	2000
1506.0	1	1	650	2.6	1690, $\pm$	4129	3390
1506.5	1 1/2	1.84	700	2.6	3340, $\pm$	6149	5340

JOB NO. A2061001
 DATE 7-28-21
 BY MJA
 CH'D BY _____



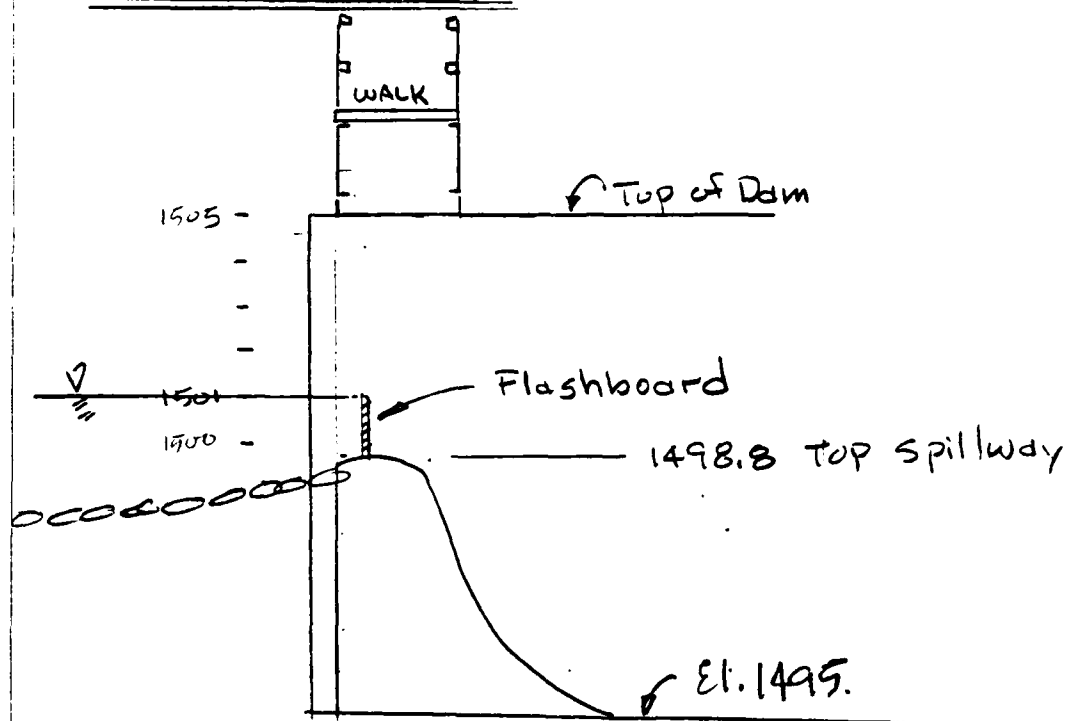
HAYDEN, HARDING & BUCHANAN, INC.
 CONSULTING ENGINEERS
 BOSTON — WEST HARTFORD

JOB Dams SHEET NO. D-9
 SUBJECT Plunkett
 CLIENT COE

Storage In Reservoir

<u>ELEV.</u>	<u>Area</u>	<u>A_{ave}</u>	<u>Vol</u>	<u>Total Vol</u>
1480	20.4	0	-	-
1490	55	37.7	37.7	37.7
1500	73	64.0	64.0	1017.4
1501	73	73.0	73	1090
1505	75	74.0	296	1386

Spillway Capacity



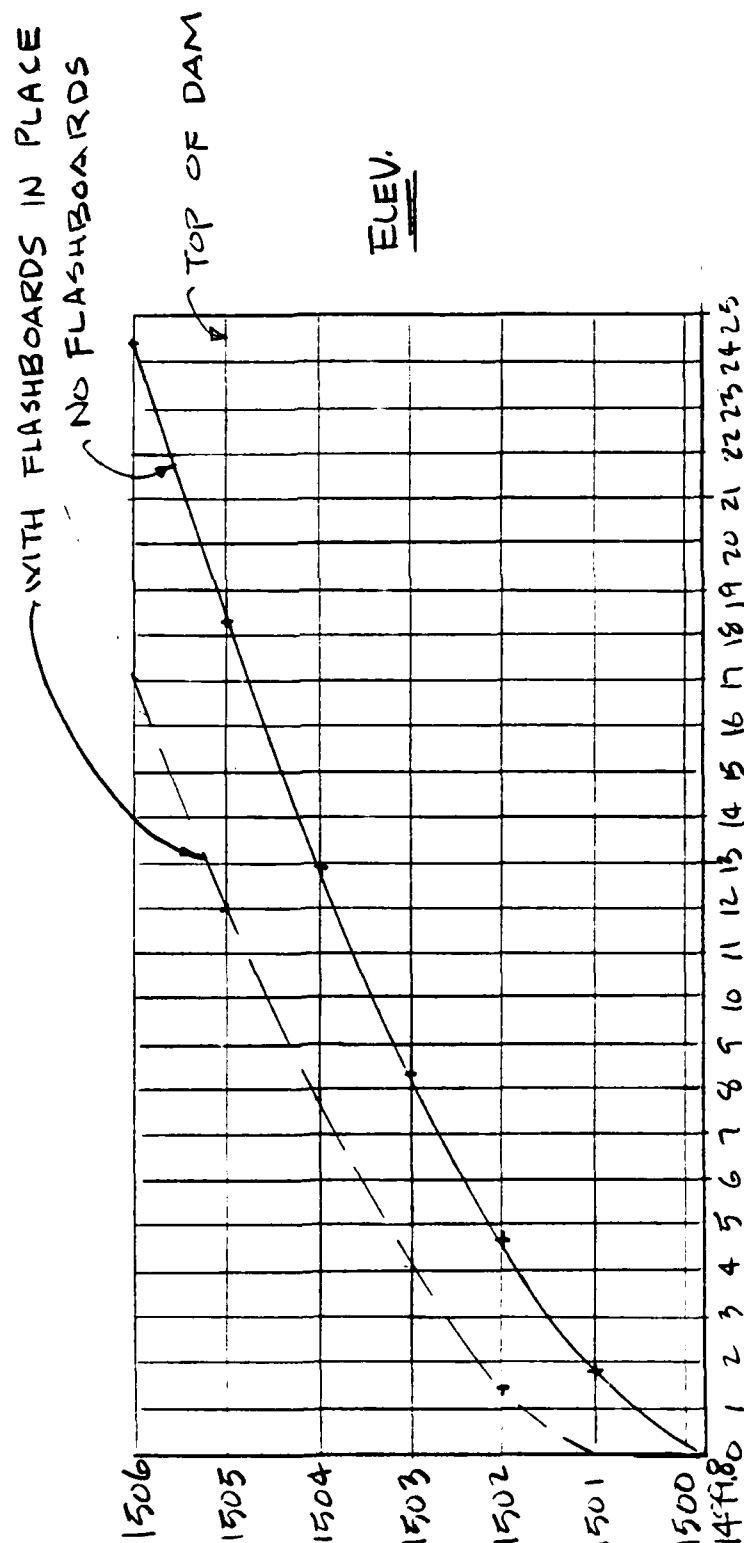
JOB NO. Plunkett
 DATE 7-28-81
 BY MJA
 CH'D BY _____



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 CONSULTING ENGINEERS
 BOSTON — WEST HARTFORD

JOB Dams SHEET NO. D 10
 SUBJECT Plunkett
 CLIENT COE

Spillway Capacity



Discharge cfs x 100.

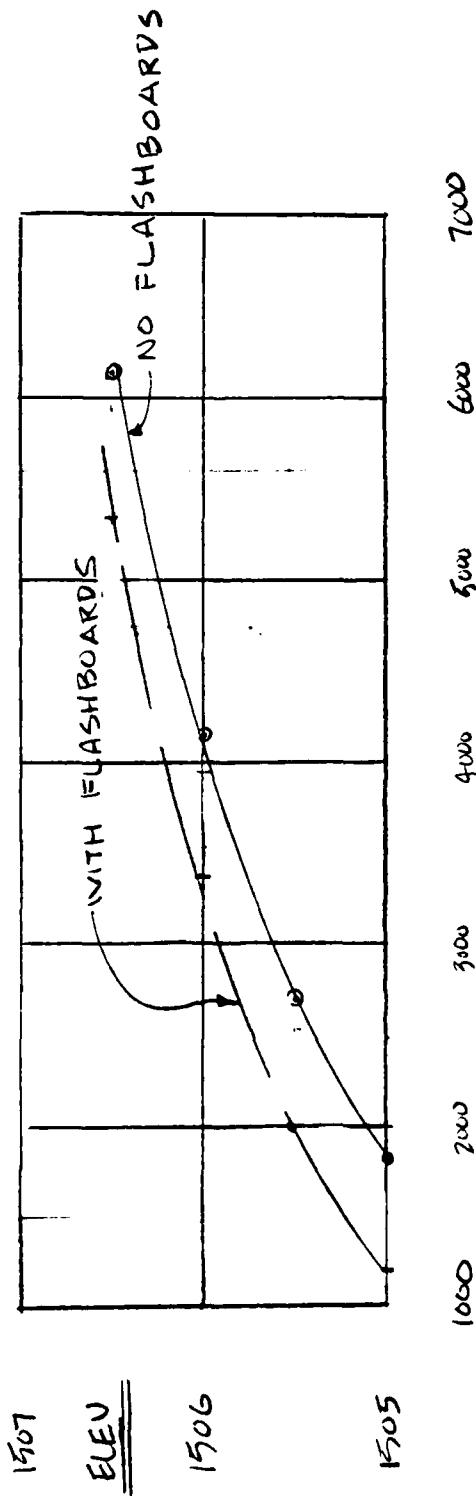
JOB NO. 792061001
 DATE 7-29-81
 BY MJA
 CH'D BY _____



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 CONSULTING ENGINEERS
 BOSTON — WEST HARTFORD

SHEET NO. D 11
 JOB Dams
 SUBJECT Plunkett
 CLIENT COFE

Combined Discharge - spillway plus overflow



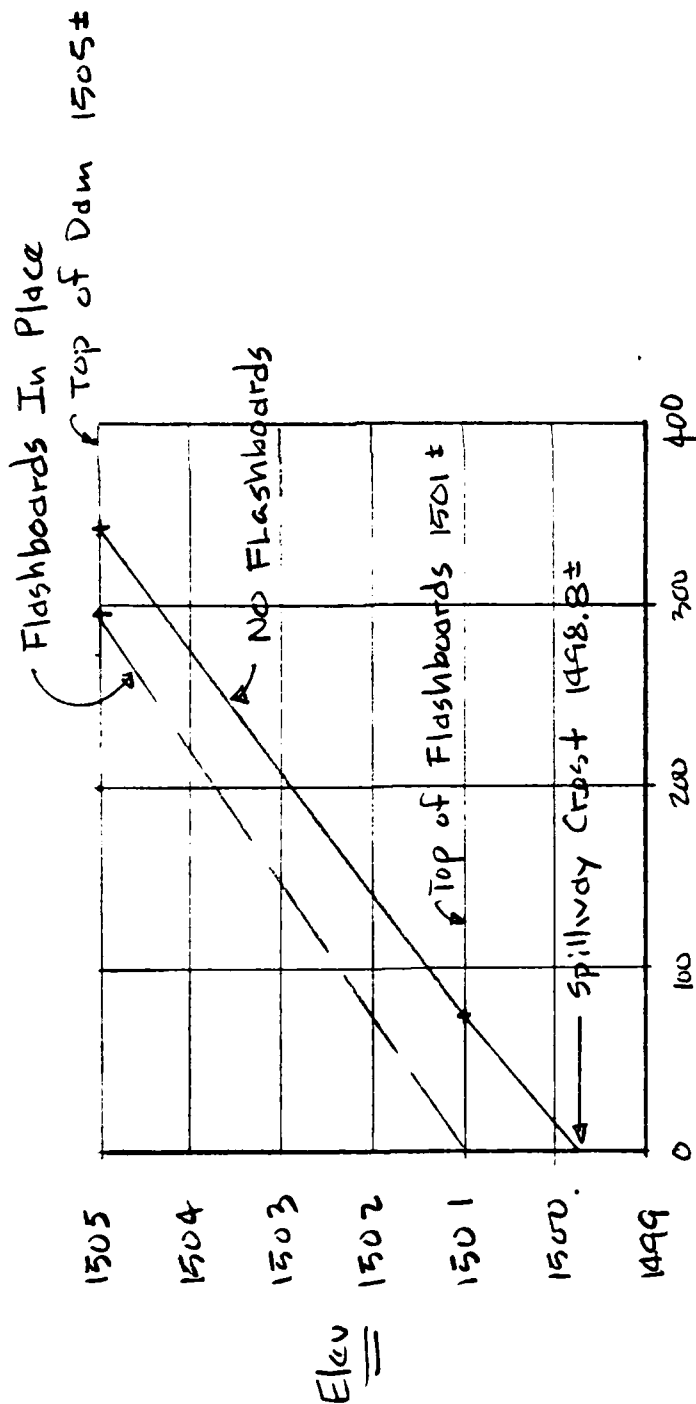
JOB NO. 792061001
 DATE 7-29-81
 BY WJA
 CH'D BY _____



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

SHEET NO. D 12
 JOB Dams
 SUBJECT Plan View
 CLIENT COE

Storage Capacity



Storage, a-f

(does not include base storage below
 elev. 1498.8±)

JOB NO. 79.206.1001
 DATE 7-7-81
 BY C.H.
 CH'D BY J. F. REISS



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

SHEET NO. D-13
 JOB Dams
 SUBJECT Plunkett
 CLIENT CCE

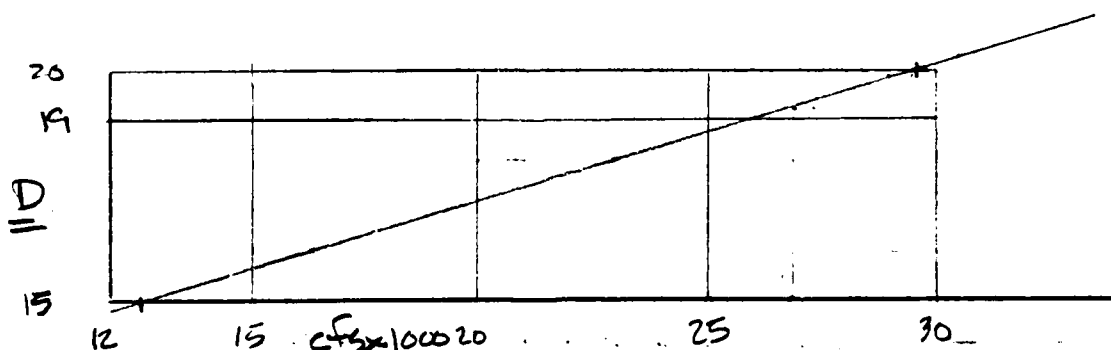
Dam Failure Routing

Section 20+00 (w sta 10+00) $Q_{P1} = 30,584$

$$V = \frac{1.486}{10} \times (R^{2/3}) (S)^{1/2}$$

$$\text{Slope} = 1490 - 1460 / 2000 = 0.015 : S^{1/2} = 0.1225 \checkmark$$

D	WP	A	$R^{2/3}$	V	Q = AV
10	176	850	2.86 ✓	5.20 ✓	4420 ✓
15	264	1875	3.70 ✓	6.73 ✓	12610 ✓
20	352	3500	4.62 ✓	8.42 ✓	29,460 ✓
30	528	7875	6.06 ✓	11.03 ✓	86,870 ✓
40	705	14000	7.33 ✓	13.35 ✓	186,900 ✓



$$Q_{P1} = 30,584 \quad D_1 = 20.4 \quad V_1 = \frac{3600 + 3675}{2} \left(\frac{2000}{43560} \right) = 167 \checkmark$$

$$Q_{P2} = 30,584 \left(1 - \frac{167}{1386} \right) = 26,900 \pm \quad D_2 = 19.2 \checkmark$$

$$Vol_2 = \frac{3200 + 3675}{2} () = 158 \checkmark \quad V_{ave} = 163 \checkmark$$

$$Q_{P3} = 30,584 \left(1 - \frac{163}{1386} \right) = 27,000 \pm \quad CFs$$

$$\text{Elev} = 1479.3$$

considering base flow (1800 cfs) Elev = 1480.

JOB NO. 79.206.1001
 DATE 7-27-81
 BY WJA
 CH'D BY _____



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

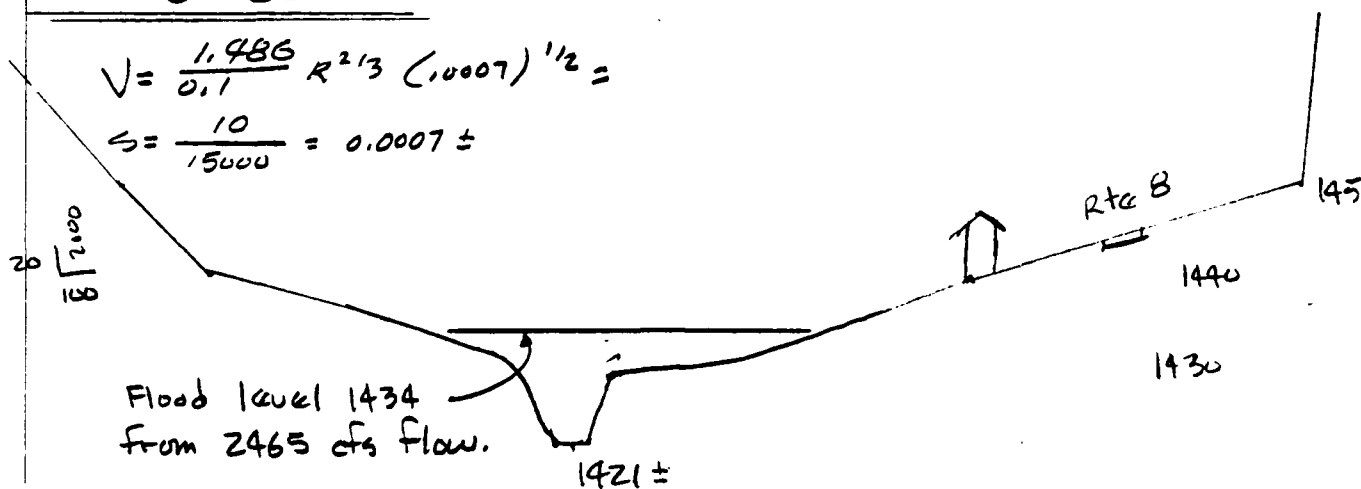
SHEET NO. 014
 JOB Dam
 SUBJECT Plunkett
 CLIENT COE

Dam Failure Routing

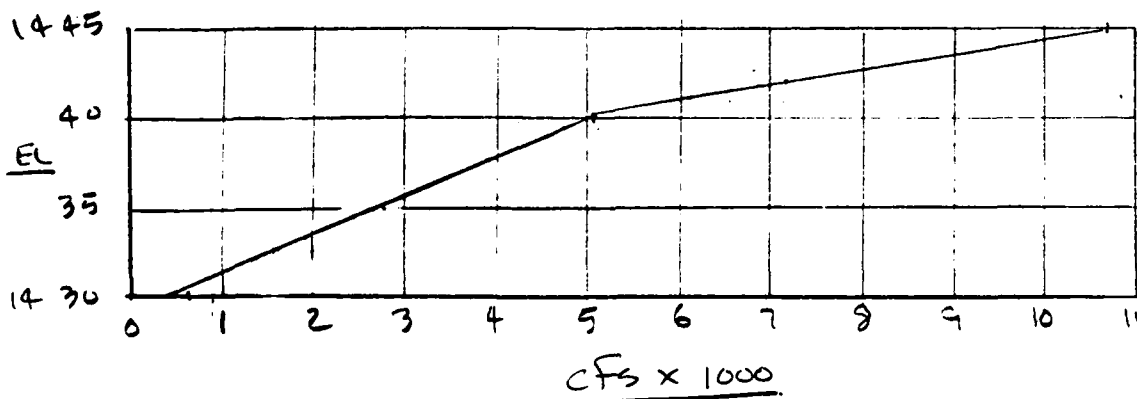
Sta 60+00

$$V = \frac{1.486}{0.1} R^{2/3} (0.0007)^{1/2} =$$

$$S = \frac{10}{15000} = 0.0007 \pm$$



D	WP	A	R ^{2/3}	"0.39"	Vel.	Q cfs
1425	30	100	2.24	"	0.87	87
1430	50	300	3.32	"	1.29	389
1440	400	3200	4.03	"	1.57	5027.
1445	535	5650	4.85	"	1.89	10,690.
1450	650	8550	5.6	"	2.19	18,741.
1455	670	11850	6.9	"	2.67	31,674



JOB NO. 79206.1001
 DATE 7-28-81
 BY mja
 CH'D BY _____



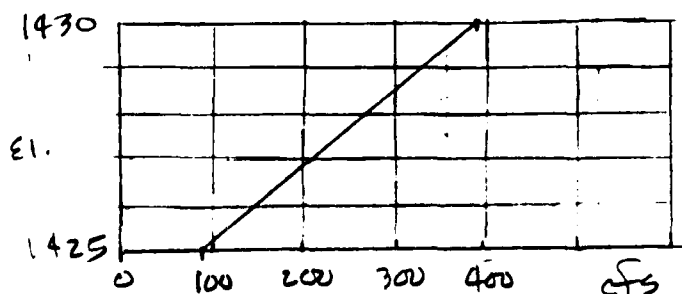
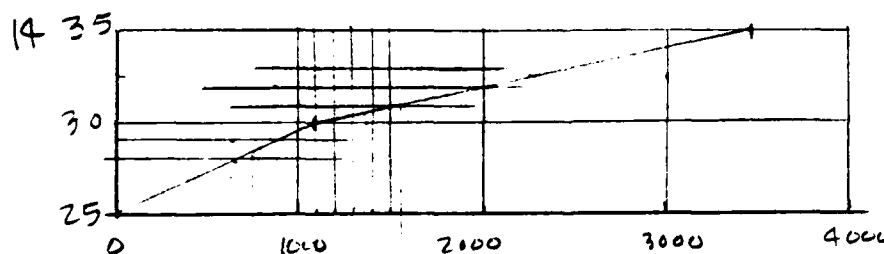
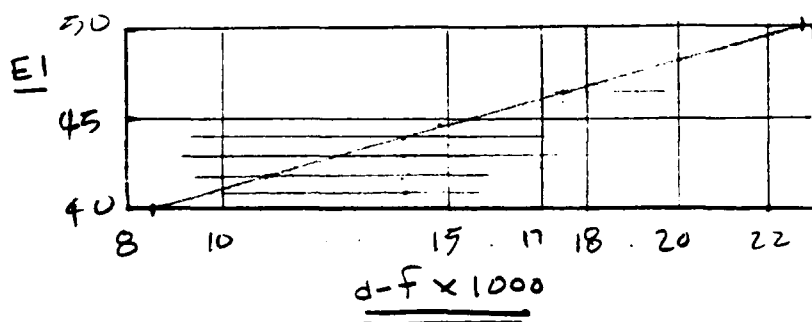
HAYDEN, HARDING & BUCHANAN, INC.
 CONSULTING ENGINEERS
 BOSTON — WEST HARTFORD

SHEET NO. D-5
 JOB Dams
 SUBJECT Plunkett
 CLIENT COE

Dam Failure Routing

Sts 60+00

Elav	<u>Area</u> acres	<u>A_{ave}</u>	D	<u>Vol.</u>	<u>Vol. Total</u>	d-f
1425	60	-	-	-	-	
1430	380	220	5	1100	1100	
1435	916	477	5	2385	3485	
1440	1100	1008	5	5040	8523	
1450	1748	1428	10	14280	22803	



JOB NO. 79206.1001
DATE 7-29-81
BY MJA
CHK'D BY



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

SHEET NO. D 16
JOB Dams
SUBJECT Plunkett
CLIENT COE

The swamp along the East Branch Housatonic River contains about 380 acres up to elev. 1430 and another 700 acres up to elev. 1440 which is available for flood storage. The swamp slopes (S. to N) about 0.0007 ft/ft, with several road, R.R. crossings which restrict flow. The East Branch drainage area is $22 \pm$ sq. mi., with several lakes and swamps to restrict direct runoff. Peak runoff allowing for flow reductions could approach $22 \times 112 \pm \text{csm} = 2465 \text{ cfs}$ (Sep 21, 1938 peak flow 6400 cfs at Coltsville, Mass. for 57.1 sq. mi., W.S.P. 1301 Geological Survey).

At sta 60+00 this peak base flow of 2465 could cause flooding to elev 1434 $\pm$ (dam base flow = 1800 cfs is assumed contributing to the 2465 cfs.). The bridge/culverts over the stream at Hinsdale will not be overly restrictive to flow, but channel is not particularly large. Channel capacity will be exceeded and at least 10 homes could receive flood damage of 1 to 3 ft. depending on their elevation.

Significant flooding in the flood plain will already have occurred when the 27,000 cfs dam failure flood enters the flood plain. Upon entering the flood plain the failure flow is about 20 feet deep. The failure flow direction is North-East, the East Branch flows South-North thru the swamp/flood plain. The failure wave will be "quickly dissipated" as it

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JOB Dams
SUBJECT Plunkett
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Spreads out into the flood plain and possibly cross Route 8 (1000 $\pm$ ft. to the north-east) flooding the road by several $\pm$ feet above elev. 1434. At least 4 homes could be damaged by 1.5 to 5 $\pm$ feet of failure flood water.

At elev. 1434, the flood plain covers about 900 acres. The water stored in the reservoir, at failure, is 1386 a-f, which could only raise the water surface level in the swamp by about 1.5 $\pm$ ft. to elev 1435.5 maximum, if allowed to slowly enter the flood plain and seek its own depth. But, the failure wave will cause localized flood depths higher than 1.5 ft., possible up to at least 5 ft., or more, as it flows north, south, and east. A detailed study would be needed to determine the exact flood conditions which would develop within this flood plain area and is beyond the scope of this report.

In Hinsdale, at least 10 homes and other buildings could receive between 1.5 and 5 $\pm$ feet of dam failure flood damage. Additional damage could occur further down stream towards Pittsfield (6 $\pm$ miles).

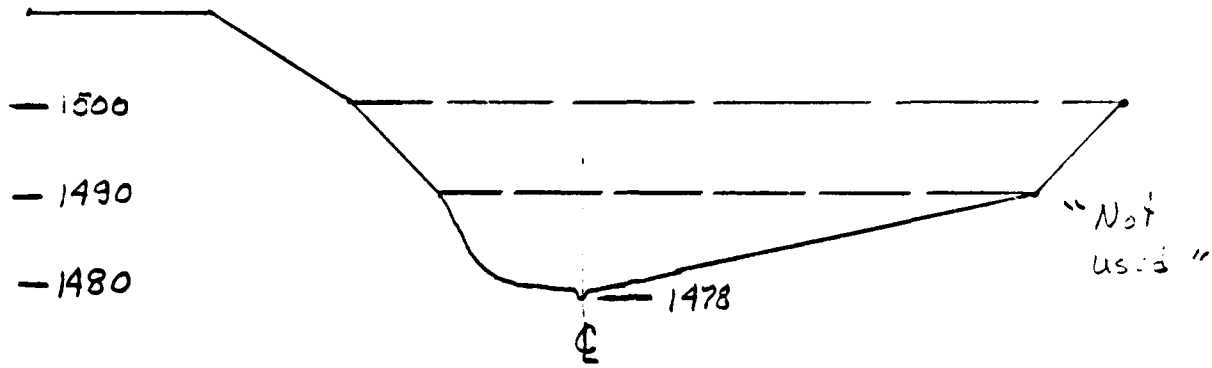
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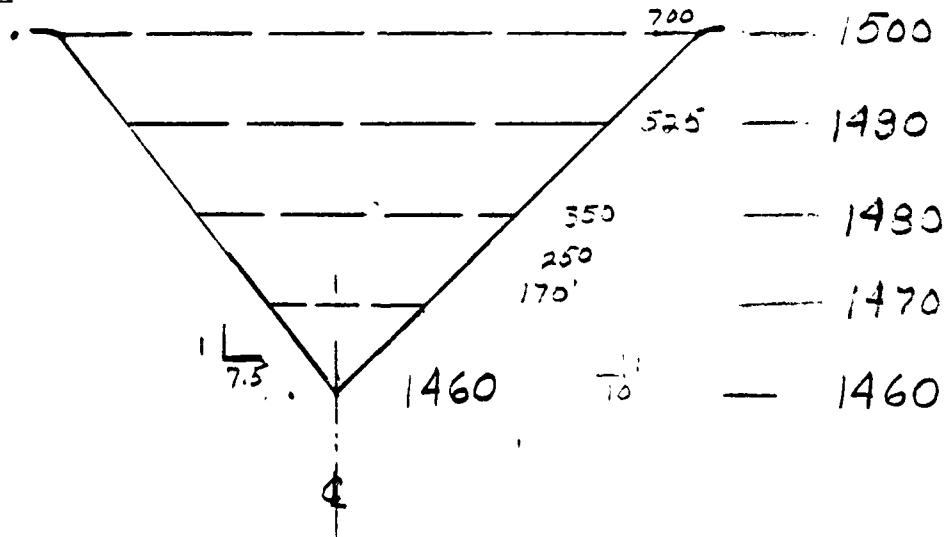
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 JOB Dennis
 SUBJECT Plunkett
 CLIENT COE

Sta 10+00



Sta 20+00



Scale + 1" = 200'
 V 1" = 20'

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NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS
PLUNKETT RESERVOIR DA. (U) CORPS OF ENGINEERS WALTHAM
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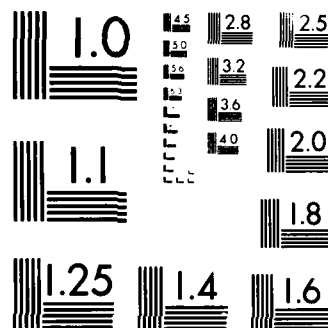
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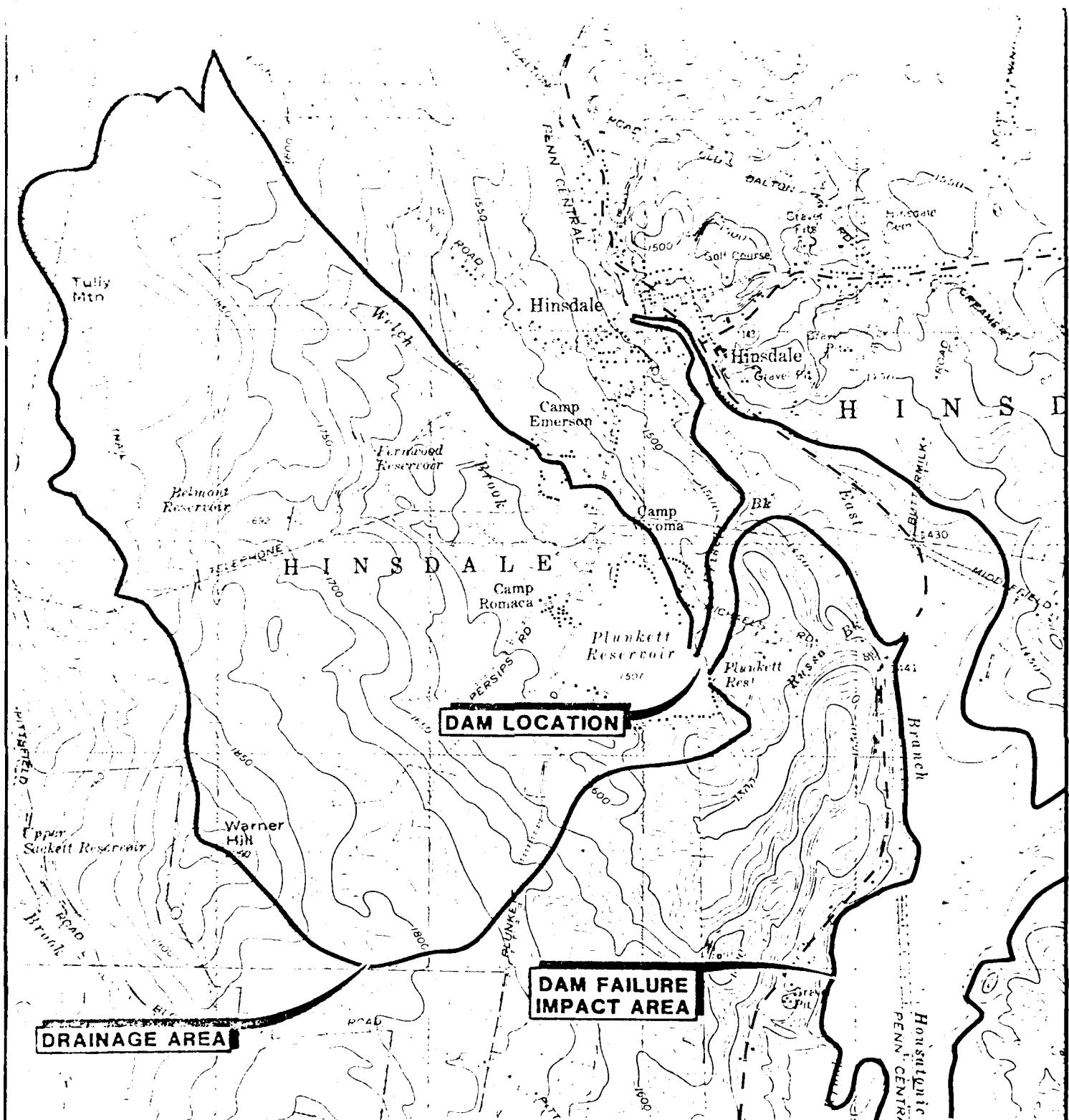
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NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS			
PLUNKETT RESERVOIR DAM DAM FAILURE IMPACT & DRAINAGE AREAS			
HINSDALE		MASSACHUSETTS	
		SCALE: 1:25000	
		DATE: AUGUST, 1981	

APPENDIX E

INFORMATION AS CONTAINED IN THE
NATIONAL INVENTORY OF DAMS

NOT AVAILABLE AT THIS TIME

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