Hands Mill Dam 225.01
Washington

VERMONT

Vermont Department of Environmental Conservation
Facilities Engineering Division
1 National Life Drive, 1 Main [phone] 802-490-6229
Montpelier, VT 05620

Agency of Natural Resources

MEMORANDUM

TO: To The File
FROM: Steven Hanna, Dam Safety Engineer
DATE: December 9, 2016
SUBJECT: Inspection of Hands Mill Dam, Washington.

On August 11, 2016, Stephen Bushman, P.E., Steven Hanna and Louisa Deering made a routine inspection of the Hands Mill Pond Dam in Washington, Vermont, State Identification Number 225.01. The inspection was carried out under the provisions of Title 10 of Vermont Statutes Annotated, Section 1105. The Town of Washington owns the dam. A number of photographs and field notes were taken. The dam was last inspected by the Department on August 5, 2013, and the report of that inspection is on file. This report updates previous observations and records additional information.

OVERALL CONDITION

The overall condition of the dam is **POOR** and the dam is currently **Partially Breached.** The dam is continuing to deteriorate and progressively breach.

DOWNSTREAM HAZARD CLASSIFICATION

The dam is classified as a Class 2, "Significant Hazard" dam. Significant hazard potential category structures are those located in predominantly rural or agricultural areas where failure may damage isolated homes, secondary highways or minor railroads, or cause interruption of service of relatively important public utilities. **The potential for loss of life is few and the potential economic loss is appreciable**.

JURISDICTION

Since the dam impounds more than 500,000 cubic feet, any alteration, reconstruction or breaching would require prior approval from the Department under provisions of 10 VSA Chapter 43.

RECOMMENDATIONS FOR OWNER

1. Retain a professional engineer experienced in the design and investigation of dams to develop plans to remove the dam and restore the upstream channel. The dam is progressively breaching. **A failure of the dam could cause public and private property damage and loss of life downstream.**

2. Develop, implement and keep current an Emergency Action Plan (EAP) for use during an unusual or emergency event at the dam. The purpose of an EAP is to reduce the risk of human life loss and injury and minimize property damage. The EAP should be reviewed and tested at least annually. Submit a copy of the EAP to the Dam Safety Program.

3. Clear the dam crest, the upstream slope and the downstream slope of trees, woody vegetation, and debris extending 15 feet beyond the toe of the dam, outlet structure, and both abutments.

INSPECTION

The inspection of the dam was conducted on August 11, 2016 at 1430 hours. The weather was partly cloudy and humid with temperatures in the mid-80s. The ground conditions were dry. The following was observed:

1. Embankment Section: The earth embankment section is primarily left of the spillway tying into the left abutment that was a firm parking lot. The downstream slope of this section was covered in grass and thick brush.

2. Downstream Wall: The wall consists of cyclopean concrete (concrete with large round stones). The concrete is deteriorating and there are several areas of the wall with significant stone loss. The area to the left of the spillway had a large area of scour and several loose stones where there had been concrete loss. Several large pieces of concrete had fallen off the wall about 50 feet to the right of the spillway. This area also appeared to be impacted by overtopping events. At the extreme left end, the downstream wall consisted of large rounded stone dry-laid. The wall was irregular but appeared more stable than the rest, most likely because it has been less impacted by high flows. Most of the downstream wall had moderate to large trees growing on or adjacent to it. These are also destabilizing the wall. There were multiple areas of seepage on both sides of the spillway.

3. Upstream Wall: The right end of the dam consisted of a concrete wall. Most of the wall was covered in thick brush but the exposed section had significant cracking. The spillway and left end of the dam had significant scour. The additional large stone that has been placed appeared stable at the time of the inspection.

4. Crest: The crest was in poor condition, covered in grass, heavy brush, and trees. There were multiple locations with signs of overtopping, erosion. The dam was partially breached near its mid-section, with fallen concrete and concrete that was leaning up to 10 feet downstream.

5. Toe: Trees, woody vegetation and debris covered the toe.

6. Principal Concrete Spillway:

    a) Approach Channel: The approach channel was clear of debris. The concrete of the spillway was cracked and eroded along the whole width of the channel.

    b) Weir: The weir structure was in poor condition, the left end has been partially breached and the rest of the weir was highly eroded and in poor condition. Large rock had been placed along the contact between the spillway and left crest as protection from high flows. This erosion appears to be a continuing problem, based on previous inspections.

    c) Downstream Section: The downstream section is a cyclopean wall that has eroded. There is stone and concrete loss and water is flowing through (within) the structure.

d) Discharge Channel: The downstream channel was clear of debris.

7. Sluice: The low level sluiceway was in poor condition and is inoperable. The sluiceway channel was about 12 feet long through the dam. The sluice gate was either closed or stop logs were in place and there was seepage coming through the logs. There were multiple seepages with water flowing heavily.

HYDROLOGY AND HYDRAULICS

The drainage area at this site is about 4,130 acres (6.45 square miles). The pond area at the normal pool is 2 acres with storage of about twelve acre-feet including sediments. At the top of the crest the dam stores 16 acre-feet. The maximum spillway capacity is about 800 cubic feet per second.

VERMONT

Vermont Department of Environmental Conservation *Agency of Natural Resources*
Facilities Engineering Division
1 National Life Drive, 1 Main [phone] 802-490-6229
Montpelier, VT 05620

MEMORANDUM

TO:	To The File
FROM:	Stephen Bushman, P.E., Dam Safety Engineer
DATE:	August 8, 2013
SUBJECT:	Inspection of Hands Mill Dam, Washington.

On August 5, 2013, Stephen P. Bushman, P.E., and Steve Hanna, made a routine inspection of the Hands Mill Pond Dam in Washington, Vermont. A number of photographs were taken. The dam was last inspected by the Department on May 30, 2007, and the report of that inspection is on file. This report updates that report and records additional information. The inspection was carried out under the provisions of 10 VSA 1105.

OVERALL CONDITION

The overall condition of the dam is POOR. With authorization of the VT Department of Environmental Conservation, the dam should either be removed or repaired.

DOWNSTREAM HAZARD CLASSIFICATION

The dam is a Class 2, "significant hazard" dam.

JURISDICTION

Since the dam impounds more than 500,000 cubic feet, any alteration, reconstruction or breaching would require prior approval from the Department under provisions of 10 VSA Chapter 43.

RECOMMENDATIONS FOR OWNER

1. Retain a professional engineer experienced in the design and investigation of dams to develop plans to either remove or reconstruct the dam and restore the upstream channel. The dam is progressively breaching. **A sudden failure of the dam during regional high water could cause public and private property damage and loss of life downstream.**

2. Until a professional engineer is retained, monitor the condition of the dam. Report any changes to your engineer.

3. Maintenance of the dam should be improved to include clearing and brushing of the dam along the crest, the upstream slope, and the downstream slope. Brushing should be pushed 10-15 feet past the toe of the dam, 15 feet around any outlet structure, and 15 feet surrounding both abutments.

4. An emergency action plan (EAP) should be developed, implemented, and tested. The plan should indicate who would be responsible for routine and flood-time observation of the dam, the conditions

which would be cause for alarm and the way in which people possibly affected downstream would be notified.

INSPECTION

The inspection of the dam was conducted on August 5, 2013, at 1400 hours. The weather was sunny and in the 70's. The ground was dry. The following was observed:

1. Embankment Section: Most of the earth embankment section is left of the spillway (looking downstream). The left abutment was a firm parking lot, and the downstream slope of this section was covered in grass and thick brush.

2. Stone Section:

a) Downstream Wall: The downstream wall consists of cyclopean concrete for about 50 feet to the left of the spillway, in the spillway section, and for about 100 feet to the right of the spillway. There were several areas where significant stone loss had occurred: Immediately to the left of the spillway and about 50 feet to the right. The area to the left of the spillway had a large area of scour in addition to several loose stones where the concrete had been loss. This area appears to be impacted by high flows since it is on the bend of the river. Based on the photos from 2007, this section has deteriorated rapidly, probably as a result of TS Irene and recent high water. About 50 feet to the right of the spillway, several large pieces of concrete had fallen off the wall. This area appeared to be impacted by overtopping also. At the extreme left end, the downstream wall consisted of large rounded stone dry-laid. The wall was irregular but appeared more stable than the rest, most likely because it has been less impacted by high flows. Most of the downstream wall had moderate to large trees growing on or adjacent to it. These are also destabilizing the wall. There were multiple areas of seepage on both sides of the spillway.

b) Upstream Slope: The right end of the dam consisted of a concrete wall. Most of the wall was covered in thick brush but the exposed section had significant cracking. The area to the left of the spillway had significant scour that was noted in the previous inspection. However, additional large stone had been added and the area appeared stable at the time of the inspection.

c) Crest: The crest was found to be in poor condition. The crest was covered in grass, heavy brush, and trees. Structurally, there were multiple signs of overtopping, erosion, and the dam was partially breached near its mid-section. The mid-section of the dam had severe damage with fallen concrete and concrete that was leaning up to 10 feet downstream.

d) Toe: Woody vegetation covered the toe.

3. Principal Concrete Spillway:

a) Approach Channel: The approach channel was clear of debris. The concrete of the spillway was cracked and eroded along the whole width of the channel.

b) Weir: The weir structure was in poor condition. The left end of the weir has been partially breached, and the rest of the weir was highly eroded and in poor condition. Large rock, as noted

above, had been placed along the contact between the spillway and left crest as protection from high flows. This appears to be a continuing problem, based on previous inspections.

c) Downstream Section: The downstream section of the spillway is a cyclopean wall. At the time of the inspection a significant amount of water was flowing over it preventing a thorough inspection. Based on the surrounding walls and weir condition, it is expected that there is some stone and concrete loss.

d) Discharge Channel: The outlet channel downstream was clear of debris.

4. Sluice: The sluiceway appeared to be in poor condition. There were multiple signs of seepage with water flowing heavily.

HYDROLOGY AND HYDRAULICS

The drainage area at this site is about 4,130 acres. The pond area at the normal pool is 2 acres with storage of about twelve acre-feet including sediments. At the top of the crest the dam stores sixteen acre-feet. The maximum spillway capacity is about 800 cfs.

VERMONT

Vermont Department of Environmental Conservation *Agency of Natural Resources*
Facilities Engineering Division, Dam Safety and Hydrology Section
103 South Main Street, [phone] 802-241-3450
Waterbury, VT 05671-0511 [fax] 802-244-4516

June 25, 2007

Carol Davis
Town Clerk
2974 VT Route 110
Washington, VT 05675

Re: Inspection of Hands Mill Dam in Washington, VT

Dear Ms. Davis,

Attached is a report of our May 30, 2007 inspection of Hands Mill Dam owned by the Town of Washington in Washington, Vermont. As was identified in 2001 the dam is in poor condition and continues to deteriorate. At that time, a recommendation to retain a professional engineer experienced in the design of dams to develop plans to either reconstruct or remove the dam and restore the upstream channel was made. That same recommendation is being made at this time. The dam is considered a significant hazard, and a sudden failure of the dam would cause probable loss of life and property damage. Consultation with your Town attorney about the liabilities of dam ownership would be prudent.

The report outlines the condition of the dam, recommendations for the owner and information about the jurisdiction of the Department under the statue on dams (10 VSA Chapter 43).

Please contact me if you have any questions on the report or recommendations.

Sincerely,

Stephen P. Bushman, P.E.
Dam Safety Engineer

VERMONT

Vermont Department of Environmental Conservation *Agency of Natural Resources*
Facilities Engineering Division, Dam Safety and Hydrology Section
103 South Main Street, [phone] 802-241-3450
Waterbury, VT 05671-0511 [fax] 802-244-4516

MEMORANDUM

TO: For the File

FROM: Stephen Bushman, P.E., Dam Safety Engineer SB

DATE: June 25, 2007

SUBJECT: Inspection of Hands Mill Dam, Washington.

On May 30, 2007, Stephen P. Bushman, P.E., Brian Terhhune, and Henry Nyenbrink, made a routine inspection of the Hands Mill Pond Dam in Washington, Vermont. A number of photographs were taken. The dam was last inspected by the Department on June 20, 2001, and the report of that inspection is on file. This report updates that report and records additional information. The inspection was carried out under the provisions of 10 VSA 1105.

OVERALL CONDITION

The overall condition of the dam is poor.

DOWNSTREAM HAZARD CLASSIFICATION

The dam is a Class 2, "significant hazard" dam.

RECOMMENDATIONS FOR OWNER

1. The owner should retain a professional engineer experienced in the design of dams to develop plans to either reconstruct or remove the dam and restore the upstream channel. Even though the dam has withstood flood and weather for decades, it will not last forever. A sudden failure of the dam during regional high water could cause public and private property damage and loss of life downstream.

2. Maintenance of the dam should be improved to include clearing and brushing of the dam along the crest, the upstream slope, and the downstream slope to ten feet below the toe of the dam.

3. Remove the trailers and tractors from the left abutment so this area can be properly inspected and monitored for sinkholes.

4. An emergency action plan (EAP) should be developed, implemented, and tested. The plan should indicate who would be responsible for routine and flood-time observation of the dam, the conditions which would be cause for alarm and the way in which people possibly affected downstream would be notified

INSPECTION

The inspection of the dam was conducted on May 30, 2007, between 1430 and 1515 hours. The weather was partly cloudy and in the 60's. The ground was dry. The following was observed:

1. Embankment Section.

a) Upstream Slope. The upstream slope was covered in grass and thick brush. There were multiple signs of erosion. The left abutment was severely eroded while the right abutment appeared sound. There was an exposed concrete cutoff wall near the right end of the dam in a deteriorated condition.

b) Downstream Slope. The slope was covered in grass and moderate brush and trees. At the mid-point of the wall there was an eroded section that was about five-feet wide by twelve-feet high. There were multiple signs of seepage to the right of the spillway. The portion of the downstream embankment with a large rip rap wall was in fair condition.

c) Crest. The crest was found to be in poor condition. The crest was covered in grass, heavy brush, and trees. There were multiple signs of overtopping and erosion near the mid-point of the dam. There was a portion of the concrete on the crest that has failed. There were logs and woody debris along the length of the crest. In June, 2001 a sinkhole was reported on the crest to the left of the spillway. This area is now covered with trailers and tractors, presumable from the adjacent farm, so it could not be inspected.

d) Toe. The toe was wet from the multiple seeps. There was woody vegetation along the toe.

2. Principal Concrete Spillway.

a) Approach. The approach was clear of debris, but the pond is largely filled in with sediment. The concrete of the spillway was cracked and eroded along the whole width of the channel.

b) Weir. The weir structure was in poor condition. The left end of the weir appears to be failing and it is noticeably lower that the remaining structure. Excessive erosion and channel cutting was occurring around the left end of the weir structure.

c) Downstream Section. The downstream slope is a cyclopean wall that had a substantial amount of stone and concrete that was in a deteriorated state or missing. Portions of the

wall were covered with seeps, moss, ferns, and small trees.

d) Outlet Channel. The outlet channel was clear of debris.

3. Sluice. The sluice was difficult to inspect but appeared to be in poor condition. There were multiple signs of seepage at the sluice.

HYDROLOGY AND HYDRAULICS

The drainage area at this site is about 4,130 acres. The pond area at the normal pool is 2 acres with storage of about twelve acre-feet including sediments. At the top of the crest the dam stores sixteen acre-feet. The maximum spillway capacity is about 800 cfs.

JURISDICTION

Since the dam impounds more than 500,000 cubic feet, any alteration, reconstruction or breaching would require prior approval from the Department under provisions of 10 VSA Chapter 43.

Please don't hesitate to call me at 241-3450 if I can be of further assistance.

State of Vermont
Department of Environmental Conservation
Dam Safety Section
103 South Main Street
Waterbury, VT 05671-0407

DAM INSPECTION CHECK LIST

Dam HANDS MILL — DEC ID. No. _____

Town WASHINGTON — NatDam ID No. VT000 _____

Owner TOWN OF — Inspection Date 5-30-07

Address _____ — Time ~~1210~~ 1430-1515

_____ — Last Inspected/by _____

Telephone _____ — Last D/S Haz Class _____

Right of Entry _____

PERSONS PRESENT AT TIME OF INSPECTION (Name and Organization)

Inspection Party SPB, BAT, MN

_____

Others _____

I. Conditions at Time of Inspection

Weather: Today PT CLOUDY, 60's Previous CLEAR, 70's

Ground Conditions DRY Other _____

Water Level _____ w/r/t _____

Accessibility _____

Reservoir Area _____

Remarks POOR CONDITION, DAM SHOULD BE REMOVED & CHANNEL U/S RESTORED

_____

_____

_____

II. Condition of Main Structure

Type of Construction CYCLOPEAN CONCRETE / EARTH EMBANKMENT

A. Upstream Face or Slope

1. Vegetative Cover GRASS / THICK BRUSH

2. Erosion MODERATE ALONG EMBANKMENT SECTION

3. Slumps, Slides, Cracks

4. Animal Burrows NN

5. Slope Protection

6. Debris

7. Structural

8. Abutments LT ABUTMENT ENDED / RT ABUTMENT SOUND

9. Alignment

10. Movement

11. Remarks EXPOSED CONCRETE CUT-OFF WALL NORM AT END. DETERIORATED CONDITION.

E. Downstream Face or Slope and Toe

1. Vegetative Cover GRASSES, MODERATE BRUSH & TREES

2. Erosion

3. Slumps, Slides, Cracks MID POINT OF DAM HAS AN ERODED SECTION ≈ 5' WIDE x 12' HIGH

4. Animal Burrows

5. Slope Protection

6. Debris

7. Seepage NOTED JUST RT OF SPILLWAY THROUGH CYCLOPEAN WALL.

8. Piping

9. Boils

10. Toe Drains NONE

11. Scour

12. Structural CYCLOPEAN WALL HAS LOST SUBSTANTIAL AMOUNT OF STONE, IN DETERIORATED STATE

13. Abutments RT SOUND, LT ERODED LT ALSO HAS TRACTOR & TRACTOR ON THAT DURING INSPECTION

14. Alignment

15. Movement

16. Remarks STONE WALL SECTION AT RIGHT END BULGES OUTWARD IN SEVERAL PLACES

C. Top of Dam

1. Vegetative Cover GRASS, HEAVY BRUSH & TREES

2. Erosion

3. Evidence of Overtopping YES, ABOUT AT MID-POINT PORTION OF CONCRETE ON CREST HAS FAILED

4. Settlement, Cracks

5. Animal Burrows NN

6. Debris LOGS, WOODY DEBRIS

7. Use of crest (road, trail, etc.) NONE

8. Structural POOR CONDITION

9. Abutments RT: FAIR, LT: SEVERELY ERODED

10. Alignment _____

_____

11. Remarks _____

_____

_____

III. Condition of Outlet Works

A. Principal Spillway

Type CIRCULAR CONCRETE _____

_____

Controlled or Uncontrolled UNC _____

_____

1. Approach Channel CLEAN, BUT IN GENERAL POND U/S OF DAM FULL OF SEDIMENTS _____

2. Transition _____

_____

3. Control Section CONCRETE SEVERELY DETERIORATED _____

_____

4. Discharge Channel CLEAN _____

_____

5. Intake Structure _____

_____

6. Conduit _____

_____

7. Outlet Structure _____

_____

8. Trash Racks _____

9. Anti-vortex Devices _____

10. Stop Logs, Flash Boards _____

_____

11. Remarks _____

_____

_____

B. Emergency Spillway

Type _____

_____

Controlled or Uncontrolled _____

1. Approach Channel _____

_____

2. Transition _____

_____

3. Control Section _____

_____

4. Discharge Channel _____

_____

5. Remarks _____

_____

_____

C. Drawdown Facilities, Gates, Drains, Appurtenances, Etc.

1. Drawdown Facility _____

_____

Condition _____

_____

2. Other Gates, Drains, Appurtenances_____

_____

Condition_____

_____

3. Remarks_____

_____

_____

_____

IV. Operation and Maintenance

_____

_____

_____

_____

V. Inspection Summary

A. Information Obtained

1. Photographs_____

2. Dimensions_____

3. Other_____

B. Additional Information Needed

_____

_____

_____

C. Overall Condition of Dam

_____

_____

_____

_____

VI Owner Interview Yes No When/where _____

(A) Plans, inspection reports, photos, other records? _____

_____

(B) History of dam _____

_____

(C) Performance, floods, operation, etc. _____

_____

(D) Property lines, access, water rights, etc. _____

_____

(E) Other Information _____

_____

VII. General Comments

_____

_____

_____

_____

Check List completed by Name _____

Title _____

Date _____

Attachments: _____

_____

_____

State of

AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Department of Fish and Wildlife
Department of Forests, Parks and Recreation
Department of Environmental Conservation
State Geologist
RELAY SERVICE FOR THE HEARING IMPAIRED
1-800-253-0191 TDD>Voice
1-800-253-0195 Voice>TDD

November 14, 2001

Carol Davis
Town Clerk
2974 VT Route 110
Washington, VT 05675

Re: Hands Mill Dam - Washington

Dear Ms. Davis,

Attached is a report of our June 20, 2001 inspection of the dam owned by the Town of Washington in Washington, Vermont. Some items in the recommendations of the reports should be given early attention.

The report outlines the condition of the dam, recommendations for the owner and information about the jurisdiction of the Department under the statue on dams (10 VSA Chapter 43).

Please contact me if you have any questions on the report or recommendations.

Sincerely,

Robert B. Finucane, P.E.
Dam Safety Engineer

cc: Larry R. Fitch, P.E., Director, Facilities Engineering Division.

State of Vermont

AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Department of Fish and Wildlife
Department of Forests, Parks and Recreation
Department of Environmental Conservation
State Geologist
RELAY SERVICE FOR THE HEARING IMPAIRED
1-800-253-0191 TDD>Voice
1-800-253-0195 Voice>TDD

MEMORANDUM

TO: For the Record

FROM: Robert B. Finucane, P.E., Assistant Dam Safety Engineer

DATE: November 14, 2001

SUBJECT: Inspection of the Hands Mill Pond Dam, Washington

On June 20, 2001, Robert B. Finucane, and Jennifer Vosburgh, made a routine inspection of the Hands Mill Pond Dam in Washington, Vermont. A number of photographs were taken. A second visit to the site was made on August 3, 2001 to set a benchmark. The dam was last inspected by the Department on November 14, 1984, and the report of that inspection is on file. This report updates that report and records additional information. The inspection was carried out under the provisions of 10 VSA 1105. Permission to inspect the dam was given by Selectman Don Milne in a phone conversation on June 19.

OVERALL CONDITION

The overall condition of the dam is poor. The spillway section is partially failed at the left end and exhibits widespread concrete deterioration, spalling and erosion. The embankment section is overgrown with trees and brush.

RECOMMENDATIONS FOR OWNER

Recommendations for the owner include:

1) The owner should retain an professional engineer experienced in the design of dams to develop plans to either reconstruct or remove the dam. Even though the dam has withstood flood and weather for decades, it will not last forever. A sudden failure of the dam during regional high water could cause public and private property damage and loss of life downstream.

2) Maintenance of the dam should be improved to include clearing and brushing of the dam along the crest, the upstream slope, and the downstream slope to ten feet below the toe of the dam.

3) An emergency action plan (EAP) should be developed, implemented, and tested. The plan should indicate who would be responsible for routine and flood-time observation of the

dam, the conditions which would be cause for alarm and the way in which people possibly affected downstream would be notified

INSPECTION

The inspection of the dam was conducted on June 20, 2001, between 1300 and 1430 hours. The weather was partly cloudy and in the 80's. The pond level on August 3, 2001 was 0.2 feet below the PK nail set in a 4x4 in the crest of the dam and about the same as during the June 20 inspection. The ground was dry. Portions of the first visit to the site were observed by Ann Jennings and Brian Fitzgerald from the Water Quality Division. Washington Selectman, Don Milne was also present. The following was observed:

1. Embankment Section.

a) Upstream Slope. The upstream slope was in fair condition, and was found to be firm, dry, and irregular and heavily overgrown with brush and trees.

b) Downstream Slope. The downstream slope of the dam was also overgrown, steep, dry and irregular. Portions of the slope on the right side of the spillway are covered with riprap. At the right of the spillway, there is evidence of historic overtopping and sloughing of the embankment. On the left side of the spillway, the foundations of the old mill building form the slope.

c) Crest. The crest was found to be in poor condition. The crest to the right of the spillway is narrow, and overgrown with vegetation, including trees twelve inches in diameter breast high. The roots of these trees grow into the embankment generating pathways which allow water to enter and cause the embankment to deteriorate and eventually fail.

A 4-inch diameter, 12 inch deep hole was found in the crest to the left of the spillway, and a grade stake with flagging on it was placed in the hole. When revisited on August 3, the hole had grown to 18 inches diameter and 12 inches deep. It is believed that the hole is caused by topsoil washing into the old stone mill foundation.

d) Toe. The toe was firm, dry, and irregular and overgrown with vegetation on the right side of the spillway. Seepage was found flowing at approximately 5-10 gallons per minute from the old mill sluice that had been previously filled in at the left end of the spillway.

2. Principal Spillway.

a) Approach. The approach was in fair condition. The pond is largely silted in and with the crest of the dam lowered, the stream meanders through the sediments to form a small pool above the spillway.

b) Weir. The weir structure was in poor condition. The height of the dam appears to be

the same as it was as it was at the last inspection in 1984. The weir is constructed of cyclopean concrete. Portions of the wall were covered with seepage and moss, ferns, and other small plants. Spalling was observed up to twelve inches in depth on the right side of the spillway, and seepage with various flow rates was found along the entire length of the wall to the right of the spillway. Portions of the wall have failed and debris has collected at the end of the wall on the right side of the downstream slope. Comparison with the 1979 photos documents widespread concrete deterioration.

c) Outlet Channel. The outlet channel is clear. A concrete training wall downstream of the right side of the spillway visible in the 1979 photographs has collapsed.

3. Sluice. The sluice was in fair condition. Minor seepage and efflorescence was observed.

HYDROLOGY AND HYDRAULICS

The drainage area at this site is about 4,130 acres. The pond area at the normal pool is 2 acres with storage of about twelve acre-feet including sediments. At the top of the crest the dam stores sixteen acre-feet. The maximum spillway capacity is about 800 cfs.

DOWNSTREAM HAZARD CLASSIFICATION

The dam is a Class 2, "significant hazard" dam.

JURISDICTION

Since the dam impounds more than 500,000 cubic feet, any alteration, reconstruction or breaching would require prior approval from the Department under provisions of 10 VSA Chapter 43.

Hands Mill Dam, Washington
2001

Spillway. Note vegetation, seepage, and concrete deterioration on walls and rubble in spillway crest.

Spillway from left abutment.

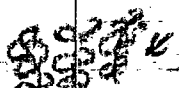
Hands Mill 8/3/61
NBF
JMU

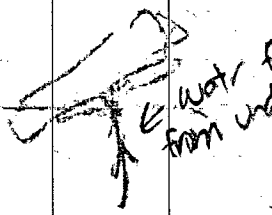
Wk = 0.1" below pk nail
set in wood 4k 4'in
typ wash

Sink hole in left abut now
18" dia x 12" deep
previously noted as
flagged at 4" dia

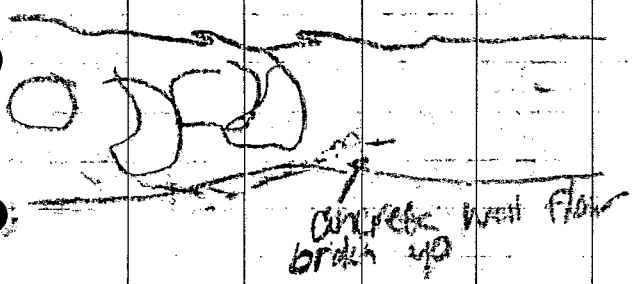
Hands Hill dam

6/20/01
RSF
JHV

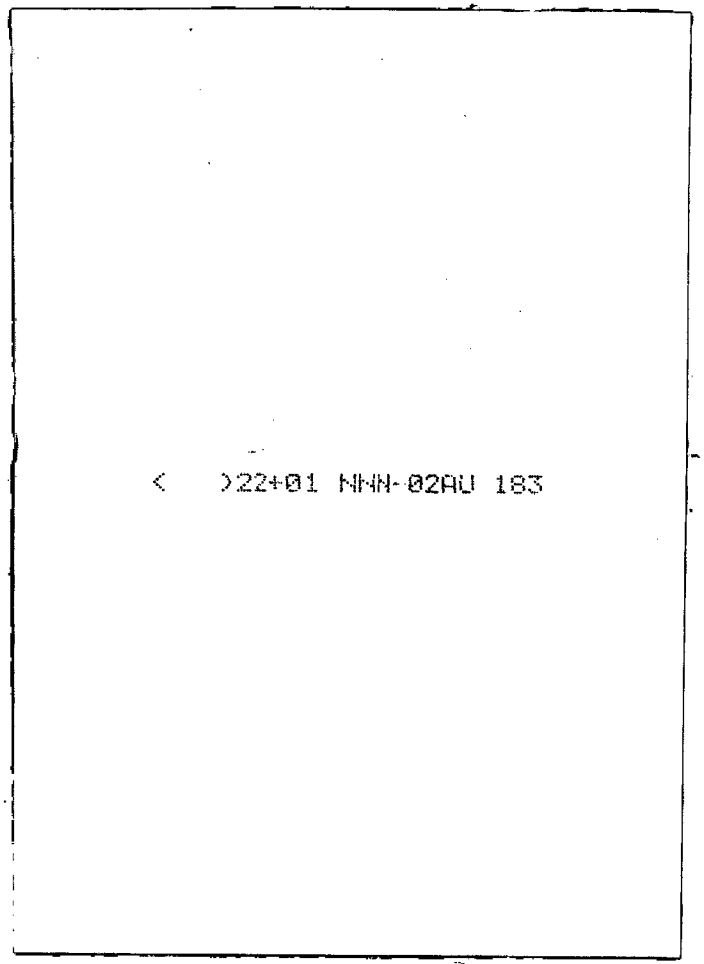




right embankment completely saturated by water (bottom ½)



01-31-01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DOCUMENTS WERE FOUND STUCK TOGETHER

1-31-24

Hamls Mill 6/20
[2001]

Carl~~[illegible]~~ stone RT embkmt

Trees up To 12" dbh
diameter breast high

heavy brush

cyclopian 1300

cyc cone main [illegible]

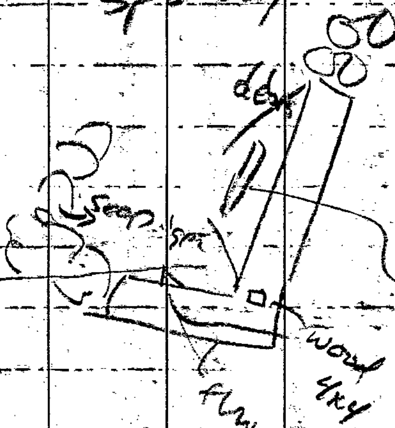
spwy [illegible]

ann jennings

RBF

JMV

PC 80s



cone spalled
up To 12"
deep
seepage generally

RT side crest failed (end)
visible d/s wall [illegible]

hole cross hill about
sticks + flags

old mill sluice filled in
5-10 yrs ago

down sluice 2x Planks ago

Filename: Document4
Directory:
Template: C:\Documents and Settings\paulak\Application Data\Microsoft\Templates\Normal.dot
Title:
Subject:
Author: Staff
Keywords:
Comments:
Creation Date: 12/9/2004 10:04 AM
Change Number: 1
Last Saved On:
Last Saved By:
Total Editing Time: 0 Minutes
Last Printed On: 12/9/2004 10:06 AM
As of Last Complete Printing
Number of Pages: 1
Number of Words: 0 (approx.)
Number of Characters: 4 (approx.)

State of Vermont

Department of Fish and Wildlife
Department of Forests, Parks and Recreation
Department of Environmental Conservation
State Geologist
RELAY SERVICE FOR THE HEARING IMPAIRED
1-800-253-0191 TDD>Voice
1-800-253-0195 Voice>TDD

AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Dam Safety Section
Facilities Engineering Division
103 South Main Street
Waterbury, VT 05671-0407

Telephone (802) 241-3451
FAX (802) 241-3273
peter.barranco@anrmail.anr.state.vt.us

May 4, 1999

Carol Davis
Town Clerk
2974 VT. Route 110
Washington VT 05675

Re: Hands Mill Dam - Washington

Dear Ms. Davis:

This will confirm our telephone conversation this morning regarding the Department's request to make a routine safety inspection of the Hands Mill Dam this summer under provisions of 10 VSA Section 1105 (copy enclosed). The dam was last inspected by the Department in 1984 and a report sent to the Town.

It is my understanding that you will bring this to the attention of the Selectmen for their consideration. I would appreciate it if you or the Select Board could write me confirming we have the Town's permission to make the inspection. We will let you know in advance of the inspection date in the event someone from the Town would like to accompany us. A report will be prepared following the inspection and a copy will be sent to the Town.

Thank you for your assistance. Please give me a call if you have any questions or we can be of any help.

Sincerely,

A. Peter Barranco, Jr., P.E.
Dam Safety Engineer

Enclosure as noted.

c: Harry K. Roush, Fire Chief, Washington
Larry R. Fitch, P.E., Director, Facilities Engineering

5/4/99
DDB

Hawks Mill Dam - Washington

5/4/99 @ 0900 tclcon Harry Roach (Fire Chief) 241-3584
re: ~~status of dam~~ → still partially breached left side, silted in. Advised plan to inspect this ~~summer~~ - who should we contact?
→ Carol Davis TC @ 883-[illegible] 2218
@ 0920 tclcon Carol Davis - OK to do inspection - she will advise Selectmen - Harry Roach called her already - will send her letter + call again when we have it scheduled (summer sometime).
2974 VT Route 110
Washington VT 05675

7/31/97
ADD

HANDS MILL VT00308 DEC # 225-1

Add to Nat Dam Inv

Tentative Class 2 (changed from Class 3 even though silted in until further verified).

USGS 44-B

Lat 44 05 + $\left(\frac{20.3}{37.9}\right)(2.5)$ = 44 06.34

Lon 72 25 ± $\left(\frac{8.9}{27.4}\right)(2.5)$ = 72 25.81

dimensions from file - reports

L = 325 (incl. spillway) H = ? 22' SHH ? 18' DHS (scale of plan) bott. of spill to stream bed? Say H = 20' ±

Spillway 68' x 2' (min) cyclo. conc.

DA = 6.45 mi² = 4128 A

H ↕ 2.4

C = 2.8 @ 2' ±

3.1 @ 3'

pond shown on 1960 SHH says (1930) at least 45 years old (historic spill marked out in 1927 flood)

Orig dam c. 1860

conc. spwy c. 1925

1972 survey Top of embank - irregular 2'-3' above spillway crest

Call it 2.5' for no overtopping except possible 0.5' at rt. end spill.

$Q = (3.0)(68)(2.5)^{1.5} = 806$ cfs ± very approx ± 800

(doesn't not include flow through gates & blocks)

DHS report uses 1025 cfs

VERMONT DAM INVENTORY

Dam name HANDS MILL

Other name

Hydro Fac Name
Hydro Fac Owner

Town WASHINGTON County ORANGE
Latitude 44- 6.34 Longitude 72-25.81
River or Stream JAIL BRANCH
Nearest City/Town WASHINGTON
Distance Nearest City/Town .00 MI
Owner Name(1) TOWN OF WASHINGTON
Address WASHINGTON, VT 05675

Telephone Owner type(1) L
Owner Name(2)
Address

Telephone Owner type(2)
Non-Fed Dam on Fed Prop N

Orig const date 1860 Purpose MILL POWER
Design St Auth NR
Recon/Mod 1 date 1928 Purpose CONC SPILLWAY
Design UNKNOWN St Auth NR
Recon/Mod 2 date 0 Purpose
Design St Auth

Dike Type Height 0 FT Length 0 FT
D/S Haz Stor:Nor 0 AF Max 0 AF

Prin spill CYCL CONC OVERFALL 68'L X 2.5'D
Design cap 0 CFS Max cap 800 CFS
Emer spill NONE
Design cap 0 CFS Max cap 0 CFS

Plans NO Specs NO Des docs NO
Field dwg YES Photos YES Other SURVEY

USGS Quad 44-B Corps L-9 VT7420-16-155
Other AP VT-62-H-47-167 Ortho
Other maps

Remark ORIG DAM MAY DATE TO 1860'S. TIMBER SPILLWAY WASHED OUT IN 1927 FLOOD, REPLACED WITH CONCRETE C.1928. POND SILTED-IN. MAY BE CLASS 3.

State ID	225-1
National ID	VT00308
FERC No	0
Basin No	8
Basin name	WINOOSKI RIVER
State Reg Agency	DEC
Fed Reg Agency	
Downstream Hazard	2
Size Category	
Hazard subclass	
Purposes	O
Year Completed	1860
Status	ABANDONED
Dam type	RE
Constr type	EARTHFILL
Dam height	20 FT
Dam length	325 FT
Maximum storage	16 AF
Nor storage	12 AF
Maximum discharge	800 CFS
Surface Area	2 A
Drainage area(1)	4130 A
Drainage Area(2)	6 SQM
Reservoir type	A
Structural height	20 FT
Hydraulic height	20 FT
Hydro fac type	
Hydro devel date	0
Installed capacity	0 KW
Phase I inspection	N
Phase I insp date	
Phase I report	
Inspection date	11/14/84
Inspected by	DEC
Authority	10 VSA 1105
Emergency action plan	NR
Last State inspection	1984
Next State insp due	0
RECORD	590

7/31/91

7/19/99

Hanks Mill Dam

7/19/99 1415 Don Milne, Selectman of Washington called to say we have Town's permission to Transport. He would like to be there. The town is interested in finding out what they should do with the dam. They're concerned with the condition even though it is rated as [illegible]

828-7241 work

Obviously we would be glad to have him there and will call in advance. Expect it would be during the first three weeks of August.

VERMONT DEPARTMENT OF WATER RESOURCES

INFORMATION SHEET

Name of Dam Hands Mill Town Washington

Owner Town of Washington Name of Stream Jail Brook

Address Classification

Vermont

U.S.G.S. Coordinates: Lat. 44° 3' 24" Long. 72° 26' 0" (6 15)

U.S.G.S. Map East Barre Aerial Photos VT-68-H 47-166 to 167

U.S.G.S. Elev. @ Spillway

Total Length of Dam 260' Crest Width of Emergency Spillway 60-70'

Width of Top 2.35' Maximum Height 20' 15' check

Spillway Capacity: Principal Emergency ~~3600 cfs~~

Pond Area 2 acres Drainage Area 6.45 sq mi

Pond Volume: Normal Water Level Design High Water Level

Maximum Water Depth: Normal Water Level Design High Water Level

Storage Before Emergency Spillway is Used

Use of Reservoir N/a

Description of Dam: Earth filled with masonry concrete spillway

Description of Spillway(s): Concrete 60-70' wide, 2' below top of dam 3 in 1' downstream 1 in 1' upstream

Designed by Year Built 1928*

Hearing Date Order Date

Additional Remarks: * Concrete Section; unknown for rest.

State of Vermont

AGENCY OF ENVIRONMENTAL CONSERVATION

Department of Fish and Game
Department of Forests, Parks, and Recreation
Department of Water Resources & Environmental Engineering
Natural Resources Conservation Council

Montpelier, Vermont 05602
Department of Water Resources
and
Environmental Engineering

(802) 828-2761

November 18, 1984

Ms. Patricia Woodward
Town of Washington
P.O. Box 5
Washington, Vermont 05676

Re: Hands Mill Dam - Washington

Dear Ms. Woodward:

Enclosed is a copy of the Department's 1975 report on the Hands Mill Dam which you requested by telephone on November 14.

The dam has been inspected by the Department in 1950, 1953, 1972, 1973, 1975, 1979 and most recently on November 14, 1984. The latter was a cursory inspection due to snow, ice and stream conditions. The dam is judged to be in very poor condition and deterioration has been noted over the years.

Further failure of the structure could occur duing periods of high inflows, or at other times. Since the pond has very small storage due to the sedimentation, damages due to a failure would be less severe than if the pond was at the original capacity. However, a major failure would undoubtedly damage the road and structures below the dam. Direct threat to loss of life due to discharges associated with a failure of the dam itself, i.e. not considering concurrent flooding from the watershed, is probably low in its present silted-in condition.

The Department recommends that the Town either rehabilitate the dam to an acceptable condition or remove part or all of the spillway to reduce the risk of failure and resulting damages. The latter approach would necessitate an acceptable plan to stabilize sediments behind the dam and prevent their release downstream. Since the dam is or was capable of impounding more than 500,000 cu. ft., prior approval from the Department is needed to reconstruct, alter or breach the dam under provisions of 10 VSA Chapter 43, Dams (copy enclosed).

Should you or other town officials have any questions, please get in touch.

Sincerely,

A. PETER BARRANCO, Jr., P.E.
Dam Safety Engineer

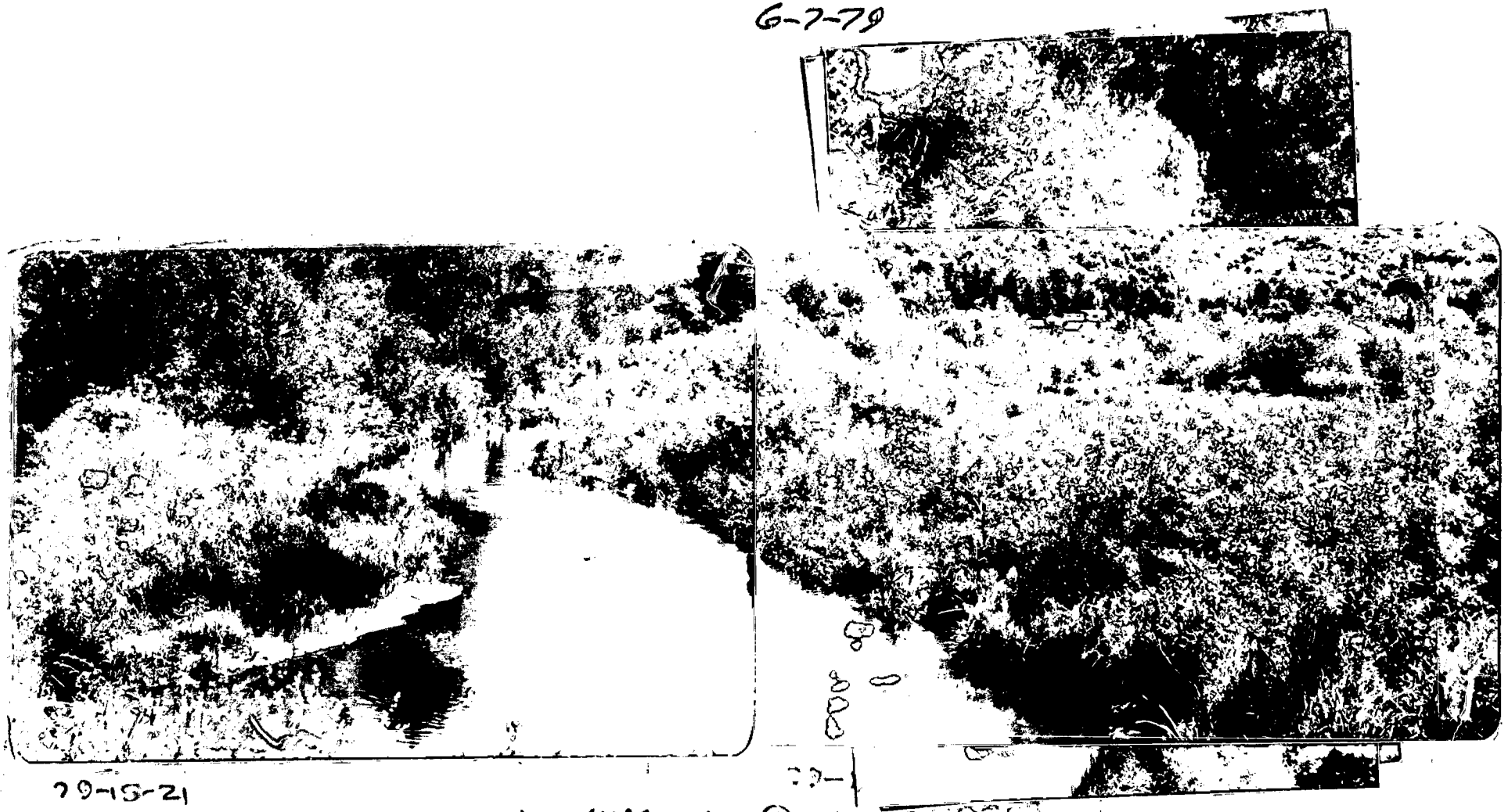
APB:j

cc: Board of Selectman, Town of Washington

encl: (1) 1975 report and transmittal letter
(2) Copy of 10 VSA Chapter 43

HANDS MILL DAM

6-7-79



29-15-21

↑

CREST OF E/F SECTION

LOOKING U/S ④ [illegible]

(SILTED IN)

APB

AGENCY OF ENVIRONMENTAL CONSERVATION

MONTPELIER, VERMONT

AGENCY MEMORANDUM

SUBJECT

TO:

FROM:

DATE:

HODS MILL DAM
6-7-79

79-15-2x

79-15-28 WASTE GATE TO RIGHT OF SPILLWAY

APB

AGENCY OF ENVIRONMENTAL CONSERVATION

MONTPELIER, VERMONT

AGENCY MEMORANDUM

SUBJECT

TO:

FROM:

DATE:

HANDS MILL DAM

C-7-79

79-15-30

UNDERMINING @ RIGHT ABUTMENT OF MAIN SECTION

AGENCY OF ENVIRONMENTAL CONSERVATION

MONTPELIER, VERMONT

AGENCY MEMORANDUM

SUBJECT

TO:

FROM:

DATE:

NDS MILL DAM
Washington

79-15-25 25

79-15-31 TAIL RACE IN BANK OF LEFT SIDE
MILL MILL SHOWN PHOTO 25

AR3

AGENCY OF ENVIRONMENTAL CONSERVATION

MONTPELIER, VERMONT

AGENCY MEMORANDUM

SUBJECT

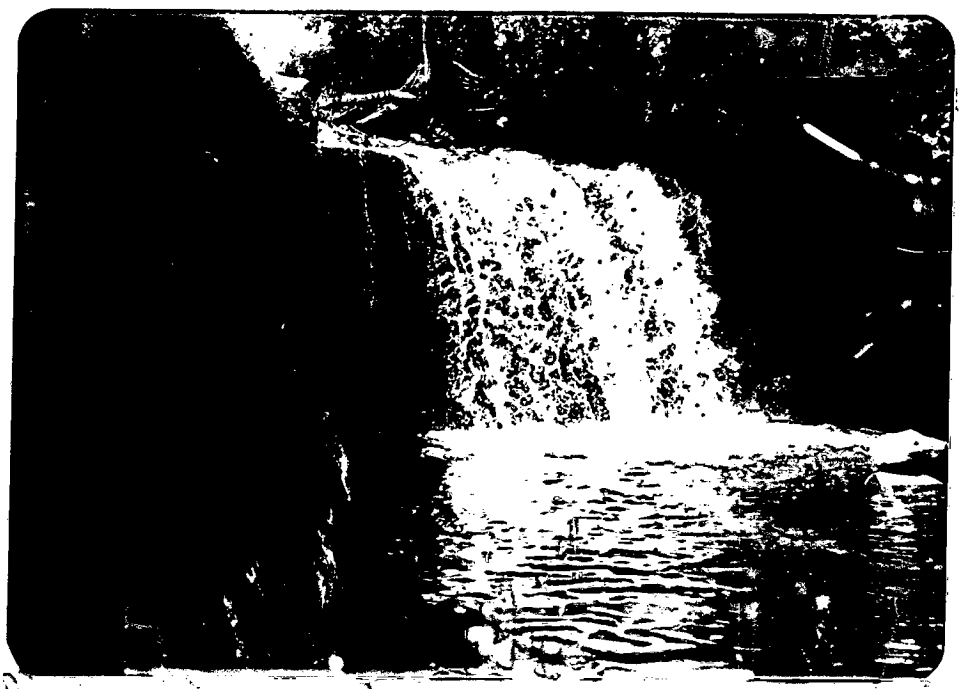
TO:

FROM:

DATE:

[redacted] MILL DAM
Washington
6-7-79

79-15-21 [redacted] BREACH



LOOKING ALONG U/S [redacted] OF
[redacted] BREACH TO LEFT OF SPILLWAY

ARC

HANDS MILL DAM

79-15-26

-27

D/S FACE

79-15-18

79-15-19

AGENCY OF ENVIRONMENTAL CONSERVATION

MONTPELIER, VERMONT

AGENCY MEMORANDUM

SUBJECT

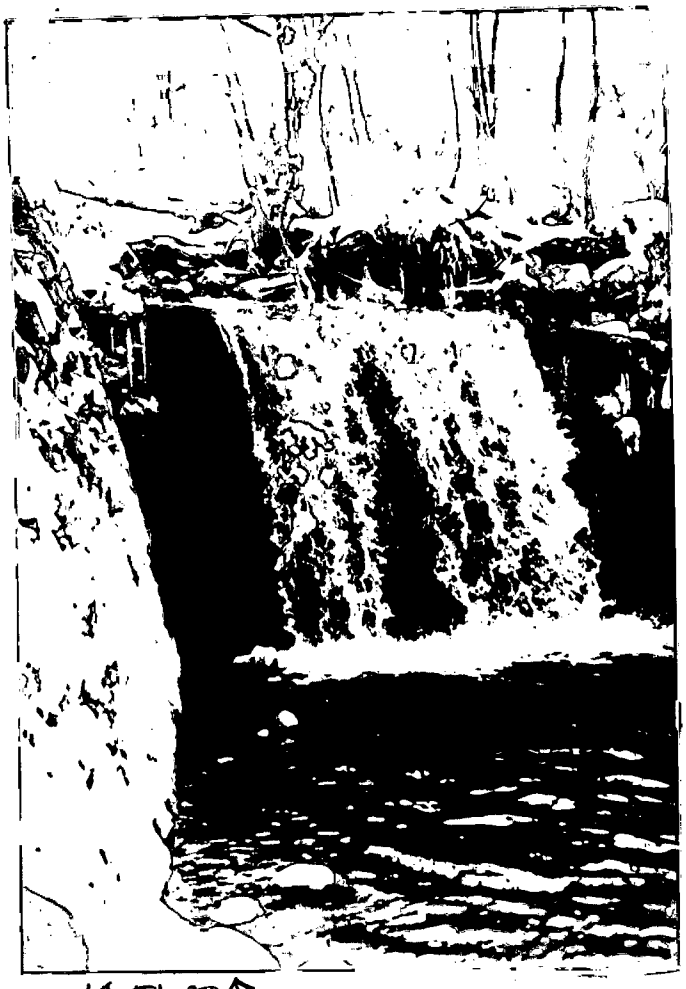
TO:

FROM:

DATE:

HAMPS MILL DAM
11-14-84

C-51-25



84-51-30

D/S Face spillway adjacent to breach

84-51-32

APB

ANDS MILL DAM
11-14-84

Left end
breach

84-51-23

Looking d/s along
right side mill wall
and wheel pit structure.

D/S

84-51-24

Collapsed and eroded area at
right end spillway at embankment (right).

APB

HANDS MILL DAM
11-14-84

84-51-21

84-51-22

Views of breach to left of spillway

A-13

HANDS MILL DAM

11-14-84

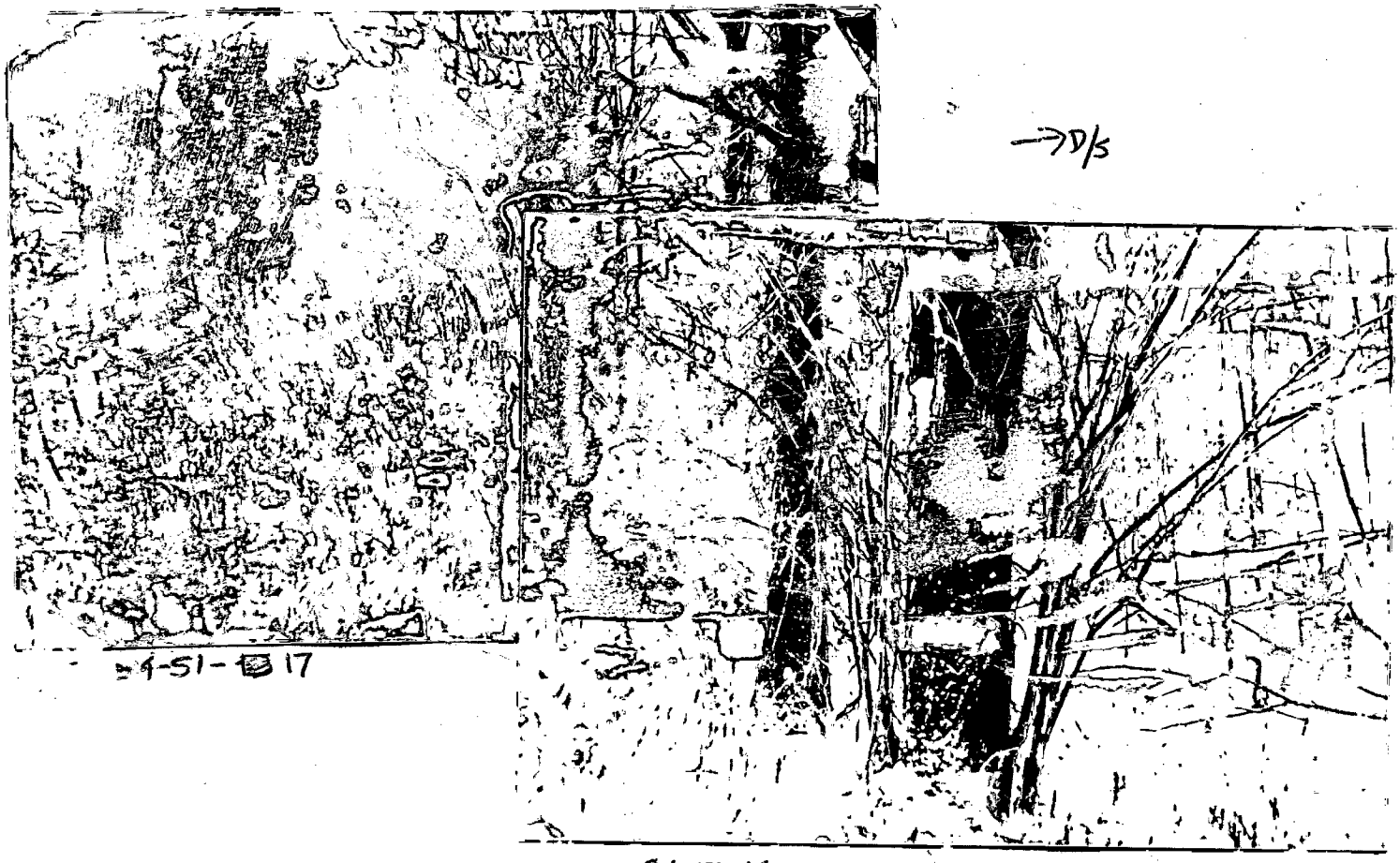
8-51-89 D/S channel

8-51-20 "Reservoir" as viewed from crest of dam on R/S spillway near breach - looking U/S.

ARB

HOODS MILL DAM

11-14-84



→D/s

84-51-17

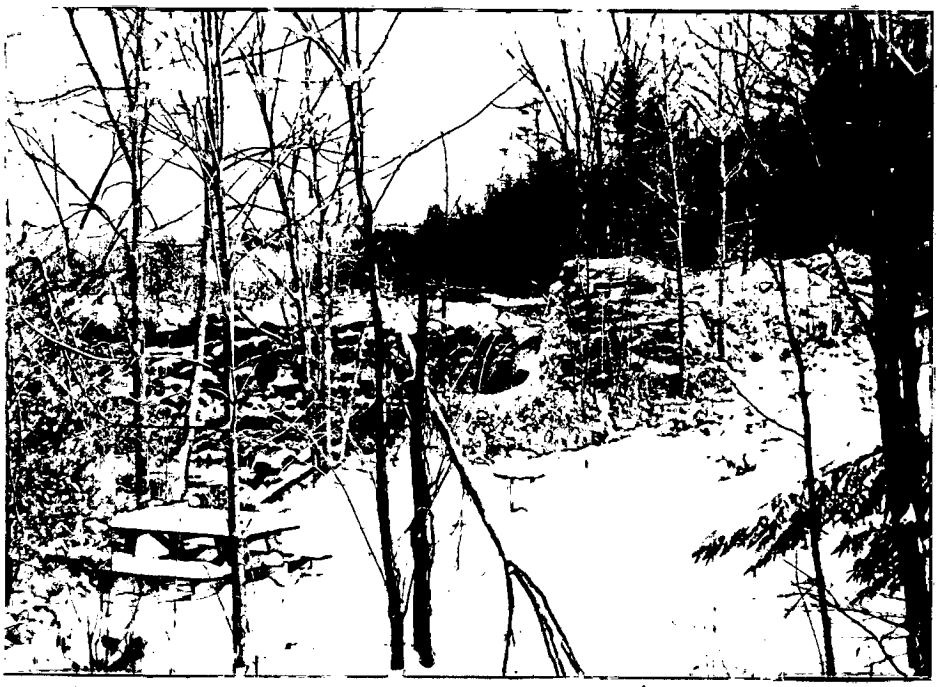
84-51-18

Crest and d/s slope near right abutment.

APB

HARRIS MILL DAM

11-14-84



← left embankment

84-51-34

↑ spillway

↑ Structure or chamber for wheel (?)

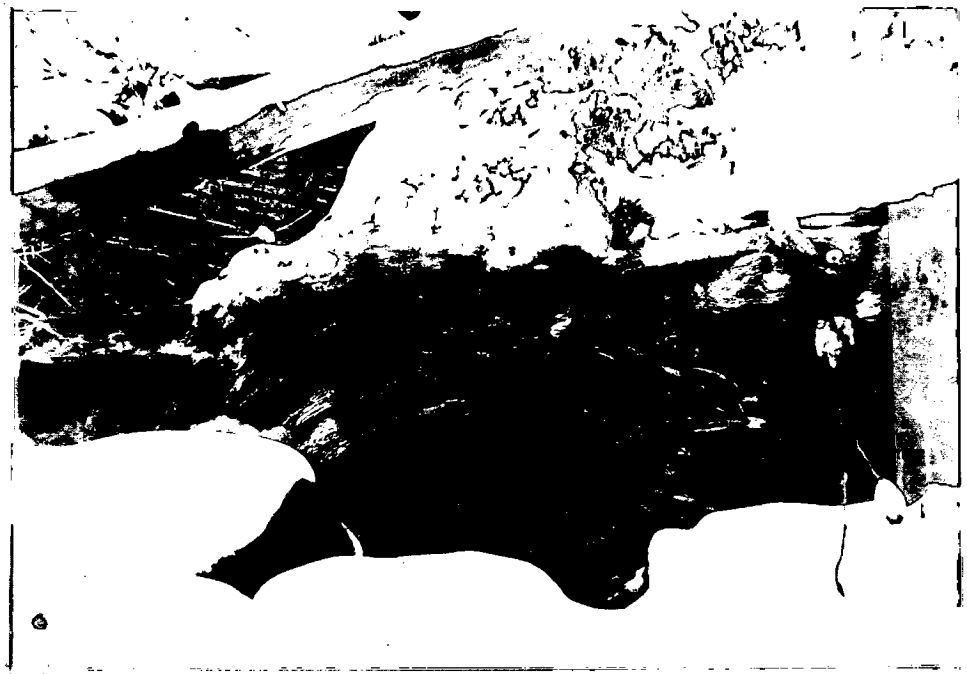
84-51-35

Left embankment and wheel chamber(?)

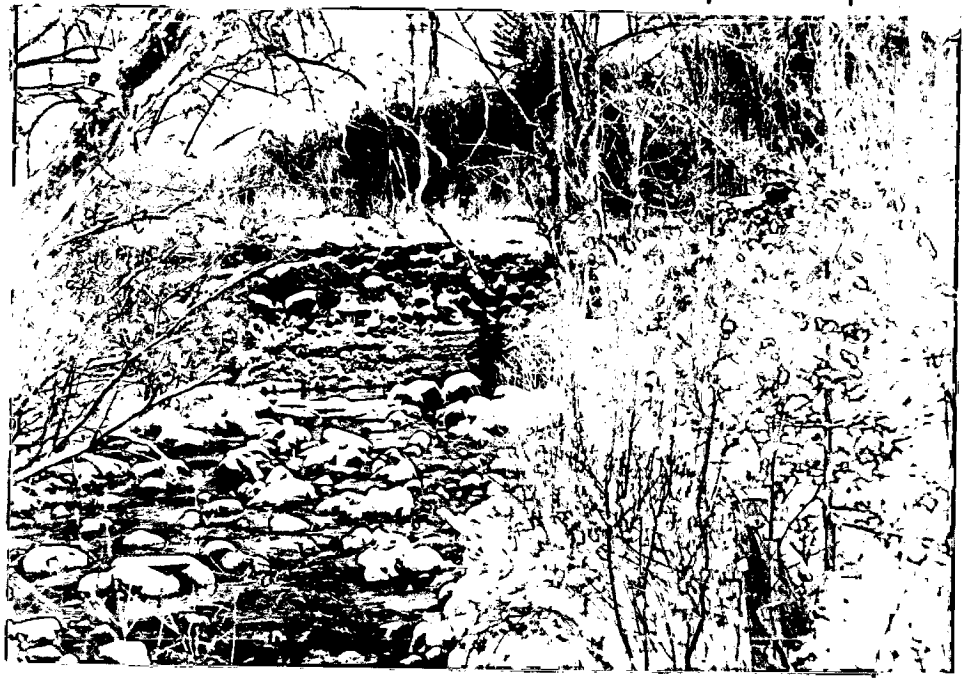
APB

HANDS MILL DAM
11-14-84

84-51-31 Remnants of wall at right end spillway and embankment



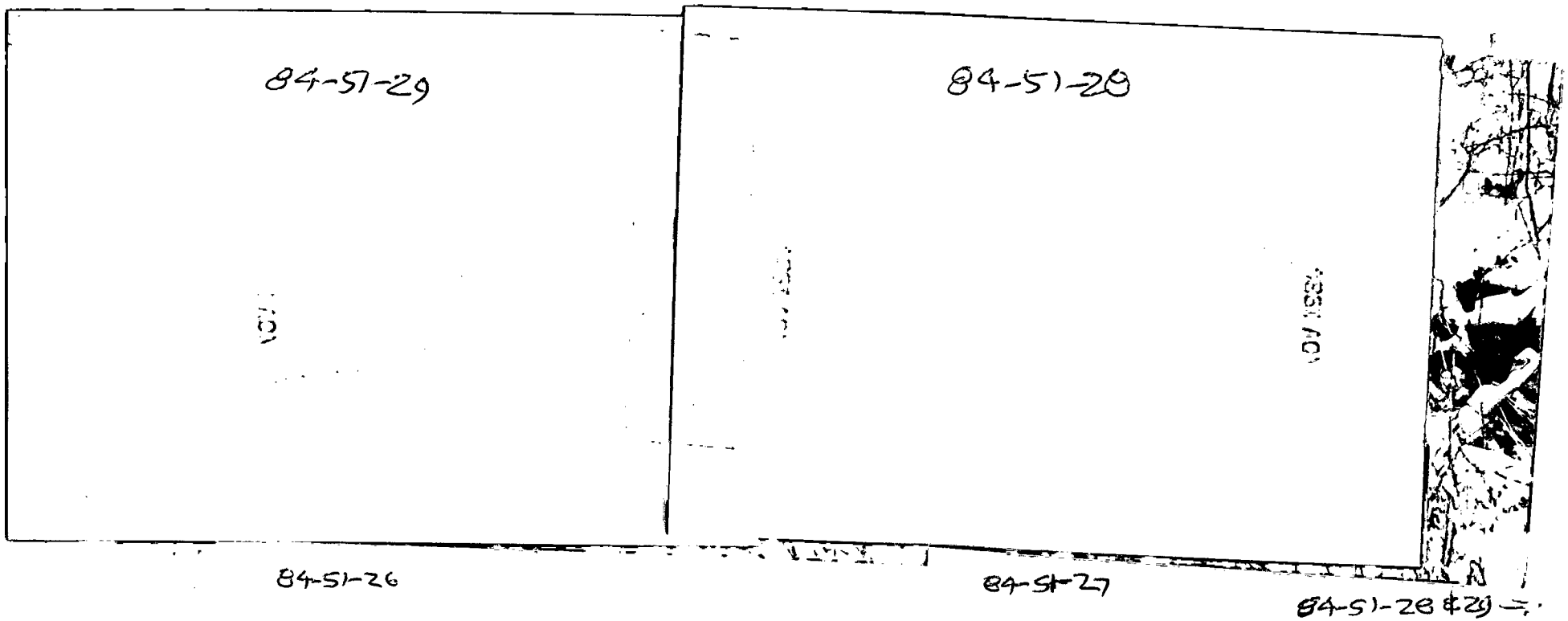
84-51-36 Breach at left end of spillway.



84-51-33

APB

HANDS MILL DAM
11-14-84



D/S Face of right embankment. Note dry boulder wall containing embankment along part of d/s face.

AFS

Wed 11-14-84 AM 5
35° clear, windy, 4" ± snow

Hands Mill Dam on ground

1350 – 1430 inspected dam.

Cursory inspection due to snow, ice and water conditions.

Rt. Embankment: Crest & U/S slope – brush; U/S slope + toe brush, trees up to 18" including large snag: D/S well intact but irregular and bulging (may be the way constructed – large boulders – not cut stone)

Lt. Embankment: Too much snow to inspect. Brush

Spillway: D/S face; seepage, deeply eroded, crumbling; cyclopean concrete; crest snow covered.

(OVER)

Hinds Mill Dam p. 2
11-14-64

Left spillway abut. - breach looks about the same - est 0.5' water through breach.

Right Spillway abut. Appear to be further erosion + movement of remnants of abut. wall. Depression in "silt" on upstream wall in this area - probably pierce water at high pond levels or is result of piping.

Overall in very poor condition. Only apparent change is further erosion / undermining at right abutment of spillway.

Photos

HANDS MILL LOAM

3-10-80

GP = 44 05 + $\left(\frac{1.50}{5.82}\right)(5)$ = 44 06.29

72 25 + $\left(\frac{0.70}{4.19}\right)(5)$ = 72 25.84

SA = 2 A ±

MAX Vert = 20 X 1.4 X 2 = 16 AF (silted in)

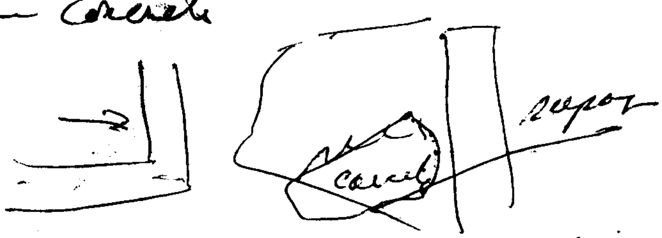
NC = 16 - 4 = 12 AF (silted in)

AIF photos VT-62-H 47-167

VT 7420 16-155

225-1 Harris Mill — Washington 6-7-79 AMB

- leakage base (gate? chamber) (wheel pit?
- partially breached left end (may have been old ~~[illegible]~~ headworks)
- d/s face eroded — cyclopean concrete
- sand silted in
- right abut — undermined
- stable

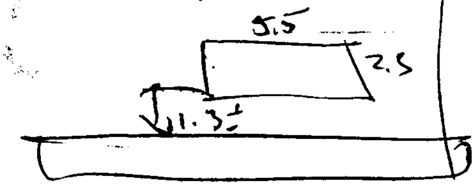


pot. { — 3sty FH ½ up down = ½ up 1st floor — left side before breach
{ — 2 " " — d/s below bung probably old

(spillway no storage)

- repair entire length d/s face from toe to 1/2 way up

repair through old tail race



11-12-75

HANDS MILL DAM

"HANDS MILL DAM - WASHINGTON
'BREACH' AT LEFT END OF SPILLWAY.
W/L IS 2.3' BELOW THE CREST
OF THE SPILLWAY.
11-12-75 DON SPIES "

ROUTING

GENERAL

DAS 6/27/75

dm

ar 6/27

JEC pc

SUSPEND TO

FILE Hamlin Mill Dam

MANAGEMENT & ENGINEERING DIVISION

June 25, 1975

Chairman, Board of Selectmen
Washington
Vermont 05675

Gentlemen:

The Department of Water Resources is pleased to present you with a copy of its recently completed report on Hamlin's Mill Dam in Washington.

Essentially, the investigation found the dam to be in a further deteriorated condition since our previous visit. Your attention is invited to the recommendations contained within the report.

We are, of course, available to meet with you and welcome any comments you may have.

Sincerely yours,

Andre J. Boulieu
Assistant Director

AJR/jcf
cc: Catherine Bothwell, Water Resources Board

Agency of Environmental Conservation
Department of Water Resources
Management & Engineering Division
June, 1975

INSPECTION REPORT

on

HAND'S MILL DAM
Washington, Vermont

Owner	Town of Washington
Date Built	Prior to 1927 (original construction) 1928 (partial reconstruction)
Type of Structure	Earth fill flanking a concrete gravity spillway
Watershed Area	6.45 square miles
Probable Spillway Capacity	1,025 cfs (no freeboard)
Peak Flood Inflow Used In Analysis	715 cfs (100-year frequency)

TABLE OF CONTENTS

HAND'S MILL DAM

I. INTRODUCTION

Vermont has a long history of major floods during which loss of life and considerable property damage has occurred. The failure of dams has added materially to the peak flood flows and related losses. Basically, many of these failures are a result of either inadequate spillways; improper design and/or construction; or improper or insufficient maintenance.

Under Chapter 43, Title 10, Vermont Statutes Annotated, the Water Resources Board has jurisdiction over all dams impounding more than 500,000 cubic feet of water and not incident to the generation of electric energy for public use. The Department of Water Resources assists the Board by conducting a continuing program of inspection and investigation of existing statute-size dams. These investigations serve as a means of obtaining up-to-date information on existing dams, particularly with regards to their maintenance and their safety. As part of this program, an examination was made of the Hand's Mill Dam.

II. PURPOSE

1. To summarize the findings from the Department's investigation of the Hand's Mill Dam in the Town of Washington, Orange County, State of Vermont.

2. To report on the present condition of the structure and on the adequacy of its maintenance.

3. To determine the capacity of the spillway and evaluate its ability to pass reasonable flood flows.

(Continued)

4. To recommend appropriate action to be taken with regards to any flood hazards associated with the existing structure.

5. To recommend necessary repairs and alterations.

III. SCOPE

The scope of this investigation included a topographic survey and visual inspection of the structure on June 19 and 20, 1972. Additional inspections were made on July 17, 1973 and April 23, 1975. Office studies of the spillway capacity and the ability of the structure to pass flood flows were conducted. The summarization of the various findings have been incorporated into this report.

IV. WATERSHED DESCRIPTION

The watershed above Hand's Mill Dam has a drainage area of approximately 6.45 Square miles (see Appendix 1) and can be divided into two sub-basins—one for the Jail Branch and one for a tributary with its confluence at Hand's Mill Pond. The Jail Branch starts in the southeastern corner of the watershed and drops more than 1,050 feet before reaching the pond; this sub-basin is basically oval-shaped with its major axis oriented along an approximate northwest-to-southeast line. The other stream begins in the northeastern corner of the watershed and has a drop of about 1,075 feet before reaching the pond; this sub-basin is roughly rectangular in shape with its major axis along an approximate northeast-to southwest line. Both streams have steep gradients. The watershed terrains are predominantly hilly and about evenly divided between farm land and forest cover. There are no significant bodies of water above the site.

(Continued)

V. SITE DESCRIPTION

Hand's Mill Pond is an artificial impoundment located on the Jail Branch in the southeast corner of the Village of Washington. The pond has a surface area of approximately two acres and is roughly circular in shape. At the present, the pond is almost entirely silted in. The only apparent purpose the pond now serves is as a home to some waterfowl and beavers.

VI. STRUCTURE

A. DESCRIPTION

Hand's Mill Dam consists of a concrete gravity section, which serves as the spillway, and flanking earth embankment sections. Portions of the embankments adjacent to the spillway are backfilled against dry stone walls which form the downstream face.

Little is known about the history of this dam. It is known a mill existed at the site as early as 1866; since the mill ran on water power, it is assumed there was a mill pond and dam. The concrete section was built after 1927, its timber predecessor having been destroyed during the flood of November in that year.

B. CONDITION

The east embankment is overgrown with trees and brush and also appears to have insufficient cross-section. The west embankment has small brush on its downstream face. No seepage was noted along the embankment sections.

The concrete is badly deteriorated. The downstream face is severely spalled, and there is seepage through much of the section. The downstream

(Continued)

abutment wall at the east end of the spillway has collapsed but doesn't appear to have weakened the spillway. At the west end, a section of the abutment has collapsed allowing water to pass around the end of the spillway. This section has gradually increased in size over the years. The owner of the dam has dumped granite grout on the adjacent embankment to reduce the erosion.

The dam is in poor condition, but it does not appear to be in immediate danger of failing.

C. SPILLWAY ANALYSIS

1. Hydraulic

The existing conditions were analyzed by considering the eroded section as a spillway section. The eroded area was treated as a broad-crested spillway, and the spillway was treated as a sharp-crested weir. With the water level approximately up to the low section of the embankment, the combined flow through the spillway area is approximately 1,025 cubic feet per second (cfs).

2. Hydrologic

Flows of the Hand's Mill Dam were determined from the records of an adjoining gaged watershed. A 100-year-return flood at the dam has a peak flow of about 715 cfs. The surcharge storage in the pond is virtually negligible, resulting is little reduction of the peak in-flow; thus, the peak out-flow will be almost identical to the peak in-flow. For the 100-year flood, the peak water level will be less than six inches below the low section of the embankment.

(Continued)

D. CLASSIFICATION

Each dam under the jurisdiction of the Water Resources Board is classed into one of three categories according to the potential amount of downstream damage that particular dam could inflict should it fail. Class I dams are all structures, due to their size and/or location, a failure of which would result in major downstream damage, including the destruction of buildings, major disruption of utilities and/or transportation facilities, or the possible loss of human life. Class II dams are those due to size and/or location whose failure would result in some downstream damage including damages to buildings and possible disruption of utilities and/or transportation facilities, but would probably not result in the loss of life. Dams in Class III are those, due to size and/or location, whose failure would result in only minor damage.

Below Hand's Mill Dam is a house, Town Highway No. 9 , and Bridge No.29 which could possibly suffer some damage from a failure of the dam. The house is likely to be limited to minor damage—such as silt and water damage—to the basement and first floor. The highway could suffer erosional damage, particularly the gravel-surface bridge approaches; a severance of the highway would not isolate anyone, but it would force them to go several miles out of their way. The bridge, which has concrete abutments and a cast-in-place concrete deck on steel beams, will probably not suffer any direct damage, but it could become plugged with debris. Therefore, Hand's Mill Dam is classified as a Class II Dam.

VII. RECOMMENDATIONS

Due to the present condition and the continuing deterioration, it is

(Continued)

recommended that the concrete spillway be removed. The Town through its Selectmen should prepare a program suitable to the Department of Water Resources for removal of the spillway and removal and/or stabilization of the sediment in the pond.

VIII. SELECTED REFERENCES

1) "Design Of Small Dams", Bureau of Reclamation, 1973.

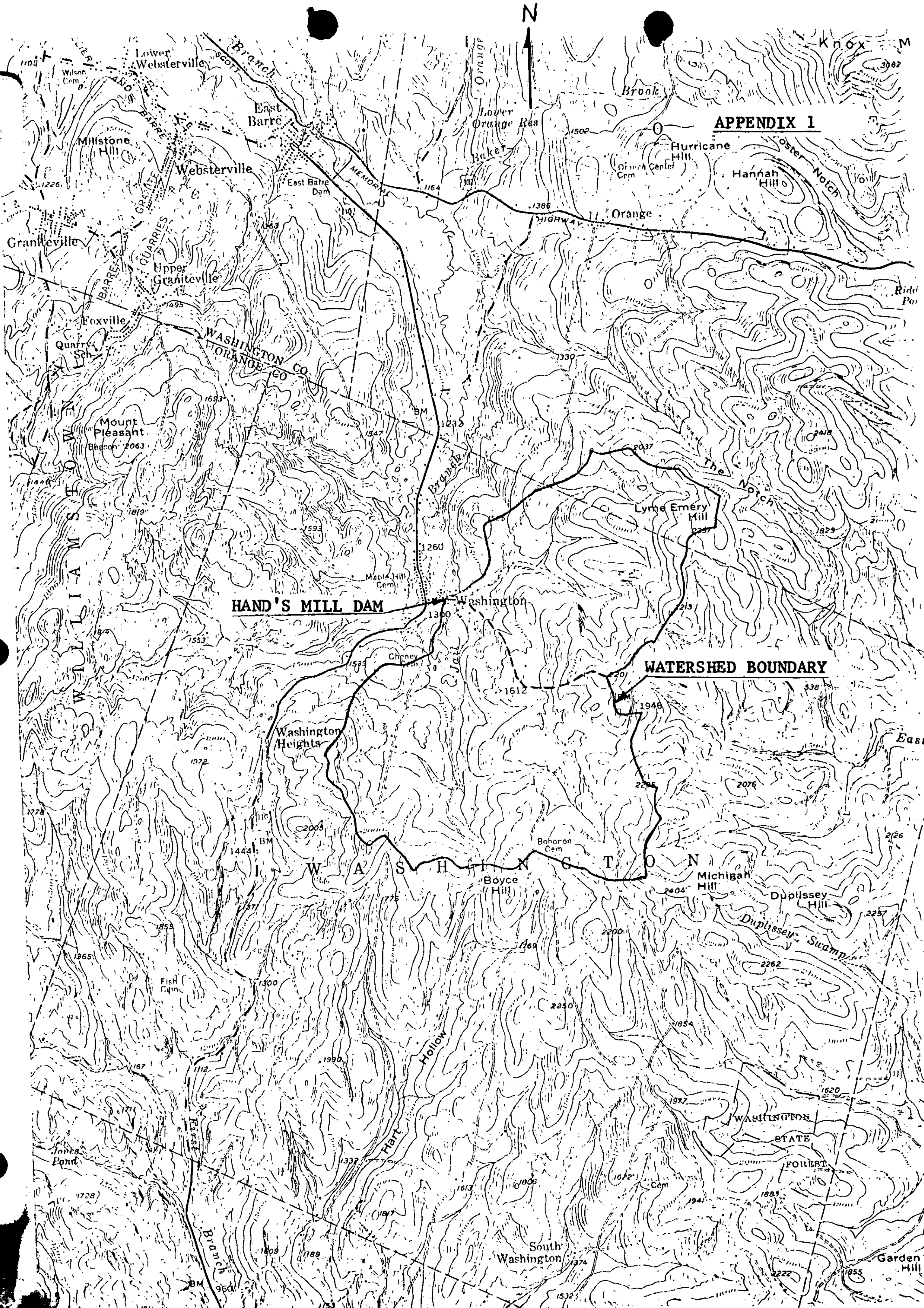
IX. APPENDICES

1) Watershed Map.

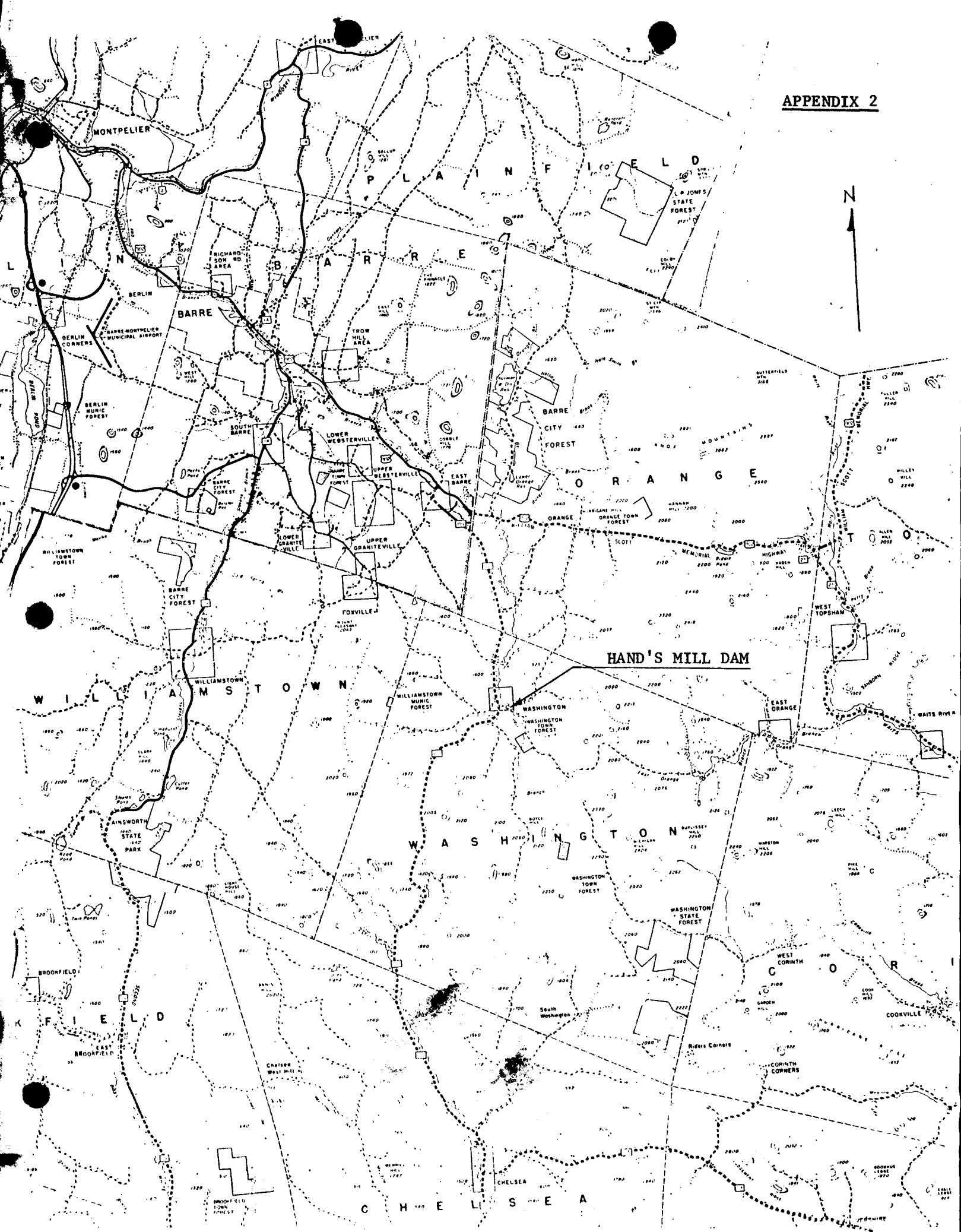
2) Location Map.

3) Photographs.

4) Plans.


N
APPENDIX 1
HAND'S MILL DAM
WATERSHED BOUNDARY
Lower Websterville
East Barre
Millstone Hill
Websterville
East Barre Dam
Graniteville
Upper Graniteville
Foxville
Quarry Sch
WASHINGTON CO
ORANGE CO
Mount Pleasant
Lower Orange Res
Hurricane Hill
Hannah Hill
Orange
HIGHWAY
MEMORIAL
Lyme Emery Hill
The Notch
Maple Hill Cem
Washington
Cheney Cem
Washington Heights
Bohonon Cem
Boyce Hill
Michigan Hill
Duplissey Hill
Duplissey Swamp
W A S H I N G T O N
W I L L I A M S T O W N
Fish Cem
Hart Hollow
First Branch
Jones Pond
South Washington
WASHINGTON STATE FOREST
Garden Hill
East
Brook
Branch
Knox

APPENDIX 2


HAND'S MILL DAM
MONTPELIER
BARRE
BERLIN
BERLIN CORNERS
BARRE-MONTPELIER MUNICIPAL AIRPORT
BERLIN MUNIC FOREST
SOUTH BARRE
LOWER WEBSTERVILLE
UPPER WEBSTERVILLE
EAST BARRE
BARRE CITY FOREST
BARRE TOWN FOREST
LOWER GRANITEVILLE
UPPER GRANITEVILLE
FOXVILLE
WILLIAMSTOWN
WILLIAMSTOWN MUNIC FOREST
WILLIAMSTOWN TOWN FOREST
AINSWORTH STATE PARK
WASHINGTON
WASHINGTON TOWN FOREST
WASHINGTON STATE FOREST
BROOKFIELD
EAST BROOKFIELD
BROOKFIELD TOWN FOREST
CHELSEA
ORANGE
ORANGE TOWN FOREST
EAST ORANGE
WEST TOPSHAM
WEST CORINTH
CORINTH CORNERS
COOKVILLE
South Washington
Riders Corners
RICHARDSON RD AREA
TROW HILL AREA
L. P. JONES STATE FOREST
BARRE CITY FOREST
KNOX MOUNTAINS
SCOTT MEMORIAL HIGHWAY
WAITS RIVER
N

HAND'S MILL DAM

Looking across spillway toward east embankment

Upstream face of west embankment

Downstream face of spillway

The undersigned representatives of the U.S. Army Corps of Engineers, New England Division visually inspected the _____ Dam on _____ 1973 between the hours of _____, and _____. On the basis of visual observations, the following comments are made:

_____

_____

_____

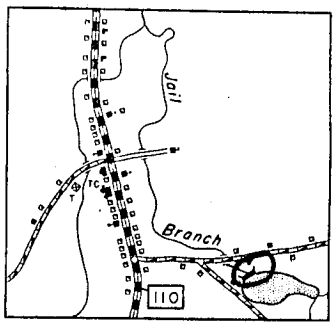
CF:
(Town Official):
Vt. Water Resources Board
Coordinator, COE
Dam Inspection Team
Mr. E. P. Gould

Location: Town of _____, County of _____, State of Vermont
Stream:
Map Coords.:
Other:

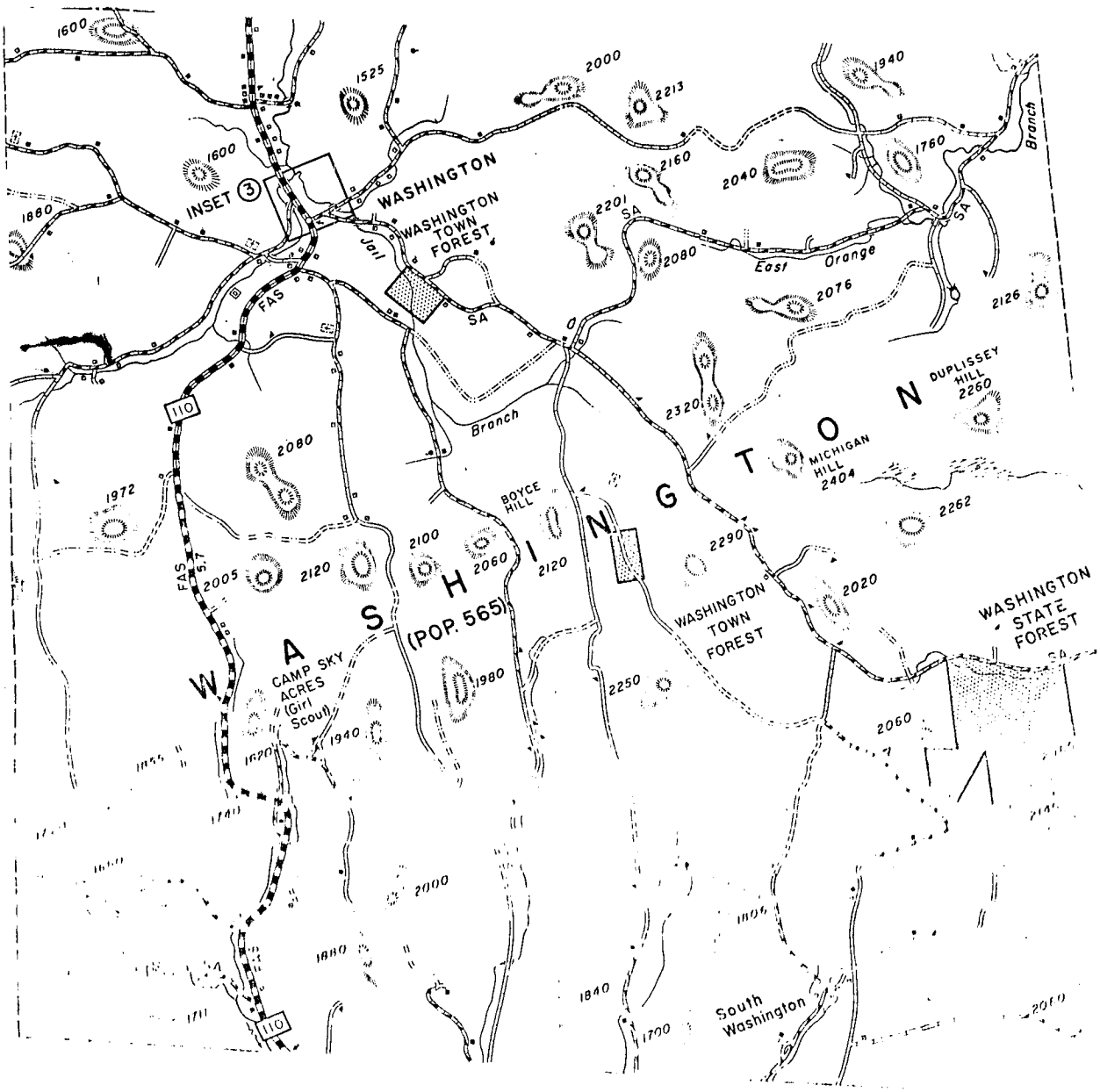
Owner:
Function of Dam:

JULY 17, 1973

Photos taken during damaged survey inspection by DWR & COE following 1973 flood.



INSET (3)
WASHINGTON
SCALE



Hand's Mill Dam

Washington

6-19-72

Warm

Overcast

A - Don Spicer
N - Jim Hum[illegible]
Ø - Jim Thomas

6-20-72

Warm

Overcast

A - DHS
N - "
Ø - JT

COPY

Sta.	Rod Reading	Stadia Interval	Distance	Horiz. ∠	Vert. ∠
	(BS)	(H.I.)			
BM #1	1.50	101.50			
BM #1	1.50	0.53	53	39°-24'	-
1	3.00	0.69	69	18°-5'	-
2	3.18	0.61	61	2°-14'	-
3	7.07	0.60	60	353°-48'	-
4	4.56	0.33	33	15°-21.5'	-
5	4.57	0.32	32	14°-56'	-
6	7.72	0.39	39	348°-46'	-
7	4.97	0.22	22	348°-46'	-
8	5.41	0.19	19	320°-33'	-
9	7.50	0.22	22	320°-33'	-
10	4.65	0.07	7	320°-33'	-
11	4.99	0.13	13	292°-48'	-
12	5.17	0.27	27	271°-6'	-
13	5.47	0.28	28	289°-43'	-
14	7.43	0.32	32	289°-43'	-
15	7.68	0.35	35	289°-43'	-
16	5.60	0.32	32	281°-0'	-
17	7.22	0.38	38	281°-0'	-
18	7.71	0.42	42	281°-0'	-
19	5.35	0.34	34	273°-10'	-
20	7.74	0.48	48	273°-10'	-
21	5.54	0.43	43	263°-13'	-

Line 0° 0' S 21° 30' E (true)

100.00	X	chiseled in rock outcrop on east side of road
100.00		
98.57	1	edge of road
98.32	2	edge of road
94.13	3	bottom of bank
96.04	4	edge of water
96.93	5	top of bank
93.78	6	bottom of bank
96.63	7	top of bank
96.63	8	top of bank
94.00	9	edge of water
96.51	10	℄ of dam
96.51	11	℄ of dam
94.13	12	℄ of dam
96.03	13	top of bank
93.91	14	bottom of bank
93.82	15	edge of water
95.90	16	top of bank
94.28	17	bottom of bank
93.99	18	edge of water
96.15	19	top of bank
93.96	20	edge of water
95.96	21	top of bank

Sta.	Rod Reading	Stadia Interval	Distance	Horiz. ∠	Verti ∠
22	9.06	0.52	52	263°-13'	-
23	5.98	0.48	48	261°-0'	-
24	6.43	0.53	53	257°-24'	-
25	6.04	0.47	47	257°-24'	-
26	6.12	0.36	36	259°-36'	-
27	5.56	0.33	33	259°-36'	-
28	8.26	0.33	33	251°-5'	-
29	5.92	0.14	14	252°-0'	-
30	5.10	0.06	6	249°-33'	-
31	5.53	0.06	6	125°-0'	-
32	6.39	0.13	13	126°-53'	-
33	7.92	0.29	29	145°-11'	-
34	8.05	0.31	31	141°-32'	-
35	7.90	0.45	45	116°-54'	-
36	5.05	0.10	10	30°-30'	-
37	8.23	0.12	12	208°-52'	-
38	10.78	0.18	18	176°-8'	-
39	12.02	0.24	24	206°-36'	-
40	12.47	0.29	29	203°-41'	-
41	11.55	0.26	26	187°-0'	-
42	9.16	0.23	23	154°-33'	-
43	7.53	0.13	13	151°-49'	-
44	9.68	0.23	23	245°-47'	-
45	10.49	0.26	26	229°-13'	-

Elev.		0° 0' = mag S 21° 30' E
[illegible]	22	[illegible]
95.[illegible]	23	top of bank
95.[illegible]	24	top of bank
95.[illegible]	25	top of bank
[illegible]	26	top of bank
[illegible]	27	top of bank
93.24	28	bank
95.[illegible]	29	top of bank
96.10	30	top of bank
95.97	31	top of bank
[illegible]	32	top of bank
[illegible]	33	top of bank
93.45	34	edge of road
93.65	35	edge of road
96.05	36	℄ of dam
93.[illegible]	37	bank
90.22	38	bottom of bank
[illegible]	39	bottom of bank
89.63	40	bank
89.95	41	bank
92.34	42	bank
[illegible]	43	bank
[illegible]	44	bank
[illegible]	45	bank

Sta.	Rod Reading (BS)	Stadia Interval (H.I.)	Distance	Horiz. ∠	Vert. ∠
BM #1	1.09	101.09			
BM #1	1.09	0.88	88	58°-3'	-
1	4.61	0.40	40	81°-42'	-
2	9.43	0.07	7	192°-38'	-
3	7.55	0.12	12	135°-3'	-
4	8.64	0.15	15	[illegible]°-15'	-
5	5.10	0.29	29	201°-23'	-
6	6.38	0.42	42	200°-48'	-
~~7~~	~~14.00~~	~~0.19~~		~~163°-2' / 2°-46'~~	
8	12.63	0.33	32	202°-29'	-8°-17'
9	14.51	0.19	19	16[illegible]°-34'	2°-39'
10	8.39	0.17	17	246°-36'	-
11	8.95	0.14	14	228°-35'	-
12	8.88	0.27	27	234°-26'	-
13	8.68	0.22	22	251°-8'	-
14	11.44	0.24	24	250°-47'	-
15	7.13	0.26	26	276°-15'	-
16	8.73	0.22	22	272°-0'	-
17	10.93	0.25	25	269°-25'	-
18	6.99	0.51	51	278°-0'	-
19	6.99	0.88	88	278°-44'	-
20	6.98	0.90	90	280°-14'	-
21	4.84	0.92	92	280°-[illegible]'	-

Elev. 0°-0' = mag S 21°-30'E

100.00		
100.00		
[illegible]	1	1st set up
91.66	2	bottom of bank
93.59	3	top [illegible] wall
92.45	4	top stone wall
[illegible]	5	[illegible]
94.11	6	[illegible]
[illegible]	7	bottom [illegible]
83.95	8	bottom corner
85.70	9	bottom [illegible] wall
92.[illegible]	10	bottom of bank
92.19	11	bottom of bank
92.21	12	end of bank
92.[illegible]	13	end of bank
[illegible]	14	top [illegible], (downstream) outside edge
93.96	15	top [illegible], outside edge (downstream)
92.36	16	top [illegible], outside edge (downstream)
90.[illegible]	17	top [illegible], outside edge (downstream)
91.10	18	top spillway, outside edge (downstream)
[illegible]	19	top spillway, outside edge (downstream)
[illegible]	20	top spillway, [illegible] edge
92.25	21	top of rock abutment

Note: [illegible] top of spillway = 0.35'

Sta.	Rod Reading	Stadia Interval	Distance	Horiz. ∠	Vert. ∠
22	14.00	0.88	87	278° 4'	4° 57'
23	14.00	0.76	75	274° 31'	5° 28'
24	14.03	0.50	49	274° 6'	9° 28'
25	14.50	0.26	24	260° 10'	16° 41'
	(B.S.)	(H.I.)			
BM #1	2.41	102.41			
BM #1	2.41	1.87	187	82° 46'	-
1	5.92	1.54	154	96° 32'	-
2	6.25	0.19	19	113° 58'	-
3	5.41	0.16	16	113° 58'	-
4	7.85	0.16	16	99° 22'	-
5	8.52	0.17	17	89° 40'	-
6	7.18	0.15 (0.24)	15 (24)	137° 36'	-
7	10.66	0.34	34	150° 9'	-
8	13.38	0.26	26	156° 6'	-
9	9.19	0.08	8	30° 36'	-
10	6.13	0.09	9	193° 6'	-
11	8.42	0.15	15	196° 47'	-
12	14.40	0.16	16	196° 47'	-
13	4.68	0.07	7	281° 40'	-
14	9.38	0.25	25	308° 43'	-
15	4.90	0.23	23	289° 17'	-
16	5.92	0.25	25	274° 6'	-

0° 0' = mag S 21° 30' E

80.84	22	spillway wall
79.52	23	bottom spillway wall
78.95	24	bottom spillway wall
79.44	25	bottom spillway wall
100.00		
100.00		
86.49	1	1st survey point
86.14	2	top abutment
[illegible]	3	& dam
[illegible]16	4	bottom at bank
93.[illegible]	5	edge of water
[illegible].43	6	bank
[illegible]	7	top stone wall
89.03	8	bottom stone wall
93.22	9	edge of water
96.25	10	bank
[illegible]	11	top stone wall
[illegible]	12	bottom stone wall
92.73	13	& of stone
93.03	14	edge of water
[illegible]	15	& of dam
96.49	16	bank

Sta.	Rod Reading	Stadia Interval	Distance	Horiz ∠	Vert ∠
17	14.81	0.29	29	166° 0'	-
18	14.58	0.22	22	201° 0'	-
		6-20-72			
	(B.S.)	(H.I.)			
BM #1	2.49	102.49			
BM #1	2.49	1.88	188	61° 18'	-
1	6.92	1.09	109	103° 49'	-
2	8.23	1.01	101	98° 9'	-
BM #2	6.32	0.19	19	89° 51'	-
	(B.S.)	(H.I.)			
BM #2	7.23	103.40			
BM #2	7.23	0.44	44	89° 36'	-
1	5.19	0.24	24	90° 5 [illegible]	-
2	7.55	0.11	11	161° 31'	-
3	12.79	0.11	11	167° [illegible]	
4	8.66	0.28	28	286° 22'	-
5	4.60	0.27	27	272° 36'	-
6	7.40	0.28	28	254° 56'	-
7	11.65	0.29	29	239° 37'	-
8	13.23	0.33	33	229° 24'	-

Elev. 0° 0' = mag S 21° 30' E

87.14 12 in field

87.88 16 in field

0° 0' mag S

100.00

100.00

95.57 1 [illegible]

94.86 2 [illegible]

96.17 top [illegible] of [illegible] of [illegible]

96.17

96.17

98.21 1 3rd [illegible] point

95.85 2 top [illegible]

90.61 3 bottom steps wall

94.74 4 edge of [illegible]

98.80 5 ℄ of [illegible]

96.00 6 bank

91.05 7 bottom of bank

90.11 8 in field

Sta.	Rod Reading	Stadia Interval	Distance	Horiz. ∠	Vert. ∠
9	14.52	0.24	24	168° 14'	—
10	7.35	0.17	17	24[illegible]	—
11	9.98	0.1[illegible]	17	20[illegible]° 18'	—
	(B.S.)	(H.I.)			
~~BM #2~~	~~6.59~~	—			
~~BM #2~~	~~6.59~~	~~1.18~~		~~93° 22'~~	—
	(B.S.)	(H.I.)			
BM #2	6.27	102.44			
BM #2	6.27	1.18	118	93° 25'	—
1	4.96	0.74	74	95° 23'	—
2	9.44	0.31	31	86° 13'	—
3	4.92	0.29	29	100° 29'	—
4	8.21	0.28	28	113° 53'	—
5	11.91	0.30	30	127° 49'	—
6	12.79	0.32	32	135° 20'	—
7	8.69	0.10	10	37° 29'	—
8	8.26	0.08	8	46° 28'	—
9	4.83	0.08	8	100° 58'	—
10	7.50	0.07	7	155° 29'	—
11	10.95	0.11	11	166° 7'	—
12	11.69	0.17	17	170° 14'	—

Elev. 0° 0' Mag. S

EE. 88		½ fico
96.05	10	end of weir top
93.42		end of weir bottom
96.17		
96.17		
92.48	1	½" set point
95.00	2	edge of water
92.52	3	℄ of dam
94.25	4	bank
90.53	5	bottom of bank
89.95	6	in field
93.73	7	edge of bank
91.13	8	bottom of bank
91.61	9	℄ of dam
94.54	10	bank
91.49	11	bottom of bank
90.05	12	in field

Sta.	Rod Reading	Stadia Interval	Distance	Horiz. ∠	Vert. ∠
13	8.68	0.25	25	327°-32'	—
14	8.40	0.20	20	302°-[illegible]	-
15	4.10	0.18	18	274°-44'	-
16	6.13	0.20	20	257°-45'	—
17	9.44	0.23	23	242°- 3'	-
18	9.65	0.27	27	233°-4'	-
19	8.70	0.41	41	292°-54'	-
20	7.38	0.39	39	283°-31'	-
21	4.10	0.40	40	271°-27'	-
22	6.36	0.42	42	255°-0'	-
23	7.87	0.42	42	247°-24'	-
24	4.36	0.49	49	272°-37'	-
25	6.48	0.63	63	274°-31'	-
26	8.73	0.43	43	235°-11'	-
27	5.49	0.64	64	24[illegible]	-
28	8.22	0.61	67	292°-44'	-
BM#1	2.46	2.76	276	72°-28'	-

Elev		o's o's mgg S
93.76	13	edge of water
94.04	14	bottom of bank
90.34	15	℄ of dam
96.31	16	bank
93.00	17	bottom of bank
92.79	18	in field
93.71	19	edge of water
9[illegible].96	20	bottom of bank
98.31	21	℄ of dam
96.98	22	bank
94.52	23	bottom of bank
98.98	24	℄ of dam
95.96	25	℄ of dam
93.71	26	in field
96.95	27	in field
94.22	28	in mud flat
99.98		

Washington

~~$Q = C L H^{3/2}$~~ ~~$C = 3.50$~~

~~$= 3.50 (64)(2.0)^{3/2}$~~ ~~$L = 64'$~~

~~$= 2241 (2.83)$~~ ~~$H = 2.0'$~~

~~$= 6344$ cfs.~~

recurse

546-975

DHS

Drainage Area

1st	2nd	3rd	4th	Average
47.22	53.87	60.41	67.04	6.75
40.47	47.22	53.87	60.41	6.65
6.75	6.65	6.54	6.63	6.541
				6.63
				4|26.57
				6.64 sq. in.

1 sq. in = 0.973 sq. mi.

D.A. = 6.64 (0.973) = 6.45 sq. mi.


WILLIAMSTOWN 4.5 MI.
(BARRE)
WILLIAMSTOWN
Mount Pleasant
Washington Heights
WASHINGTON
Hart Hollow
First Branch
Branch
Jail
Washington
Boyce Hill
South Washington
Michigan Hill
Duplissey Hill
Duplissey Swamp
Washington State Forest
Lyme Emery Hill
The Notch
Garden Hill
Marston Hill
East Orange
West Corinth
Leech Hill
Pike Hill
Cook Hill
Hurricane
CORINTH
Sanborn

Hand's Mill Dam

Don Spies
May 16, 1975

Hydrology

Flows at Hand's Mill Dam will be determined from the adjacent East Orange Brook Watershed. The fifty-year and one hundred year peak flows were calculated for East Orange and transposed to Hand's Mill using the following formula:

$$Q_{at\ site} = Q_{at\ gage}\left(\frac{\text{Drainage Area at Site}}{\text{Drainage Area at Gage}}\right)$$

	Q_{50}	Q_{100}
E. Orange Brook	790	914
Hand's Mill Dam	618	715

Hydraulic

The eroded section will be treated as a broad crested weir with a bottom width of eight feet, crest elevation two lower than the spillway and one end contraction. The spillway will be considered as a sharp crested weir with a crest length of 60' and one end contraction.

flow through eroded area:

$$Q_1 = 2.85 L_1 \left(H_1 + \frac{V_{a1}^2}{2g}\right)^{3/2}$$

where $L_1 = 8 - 0.1\left(H_1 + \frac{V_{a1}^2}{2g}\right)$

flow over spillway

$$Q_2 = 3.30 L_2 \left(H_2 + \frac{V_{a2}^2}{2g}\right)^{3/2}$$

where $L_2 = 68 - 0.1\left(H_2 + \frac{V_{a2}^2}{2g}\right)$

and $H_2 = H_1 - 2.0$

Table of Stage versus Discharge

H_1	Q_1	Q_2	Total
0	0	0	0
1	30	0	30
2	84	0	84
3	148	259	407
4	221	804	1025

Assuming a straight line relation for discharge between $H_1 = 3'$ and $H_1 = 4'$ then the stage for the 50-year flow is:

$$H_1 = 3 + \frac{618 - 407}{1025 - 407} = 3 + \frac{211}{618} = 3.34' \quad \text{and}$$

for the 100-year flow is:

$$H_1 = 3 + \frac{715 - 407}{618} = 3 + \frac{308}{618} = 3.50'$$

4-23-75

[illegible]'s Mill Dam
lower bridge covered ~~[illegible]~~ concrete deck on
steel ~~beams~~ girders
16' wide x 8.5' high.
clay material placed on South end of dam. w/ ~1' below top of spillway
water going around south end
face of spillway badly deteriorated
sill level practically at top spillway.

Setup # 2

Sta. 8

H.I. = 101.09 $\not{\alpha}$ = 8° 17'

R = 0.33 Rod Reading = 12.63

From Table II, Elementary Surveying

h = 97.92 ; v = 14.26

H = 97.92 (0.33) = 32'

V = 14.26 (0.33) = 4.71'

Elev. = 101.09 - 12.63 - 4.71

= 101.09 - 17.34

= 83.75

Sta. 9

H.I. = 101.09 $\not{\alpha}$ = 2° 39'

R = 0.19 Rod Reading = 14.51

From Table II, Elementary Surveying

h = 99.78 ; v = 4.62

H = 99.78 (0.19) = 19'

V = 4.62 (0.19) = 0.88

Elev. = 101.09 - 14.51 - 0.88

= 101.09 - 15.39

= 85.70

Sta. 22

H. I. = 101.09 $\quad \measuredangle = 4^\circ 57'$

R = 0.88 $\quad$ Rod Reading = 14.00

From Table II, Elementary Surveying

h = 99.25 ; v = 8.60

H = 99.25 (0.88) = 87'

V = 8.60 (0.88) = 7.57'

Elev. = 101.09 - 14.00 - 7.57

= 101.09 - 21.57

= 79.52

Sta. 23

H. I. = 101.09 $\quad \measuredangle = 5^\circ 28'$

R = 0.76 $\quad$ Rod Reading = 14.00

From Table II, Elementary Surveying

h = 99.09 ; v = 9.48

H = 99.09 (0.76) = 75'

V = 9.48 (0.76) = 7.20'

Elev. = 101.09 - 14.00 - 7.20

= 101.09 - 21.20

= 80.89

Sta. 24

H. I. = 101.09 ∠ = 9°-28'

R = 0.50 Rod Reading = 14.03

From Table II, Elementary Surveying

h = 97.29 ; v = 16.22

H = 97.29 (0.50) = 49'

V = 16.22 (0.50) = 8.11'

Elev. = 101.09 - 14.03 - 8.11

= 101.09 = 22.14

= 78.95

Sta. 25

H. I. = ~~101.09~~ ∠ 16°-41'

R = 0.26 Rod Reading = 14.50

From Table II, Elementary Surveying

h = 91.75 ; V = 27.50

H = 91.75 (0.26) = 24'

V = 27.50 (0.26) = 7.15'

Elev. = 101.09 - 14.50 - 7.15

= 101.09 - 21.65

= 79.44

[redacted]

9-21-72

GUS. BARRE-MONT[illegible]

Water Resources Approves Of Washington Pond

WASHINGTON — The Department of Water Resources has found the water quality of the Hand's Mill Pond to be well within the limit suitable for recreation purposes. The pond has been considered by the Washington Planning Commission as a possible recreation site for the town.

John Malter, an official of Water Resources Department, told members about the survey findings in their meeting at the Town Clerk's Office Wednesday night. He and Donald Spies, also from the department, discussed the site with members.

Spies, who took a survey of the dam, consisting of a concrete spillway and land banks said another spring like the last could cause a slight rupture of the dam. Although he said the danger is not great in the event of the rupture, the cellar of an adjacent home could be flooded. He said trees and shrub on the banks also serve to weaken the structure because they attract and hold water. A report on the structure will be available in the winter and Spies said there is nothing binding about the findings.

Members and officials discussed possible methods of eliminating the hazard which included the possibility of lowering the dam and reducing the pond level.

George Plumb offered to evaluate the pond as a recreation site and he will inspect the site with Paul Vermette, selectman.

Members also approved the extension of a power line requested by the Washington Electric Cooperative of East Montpelier. The extension received earlier approval from town selectmen and the Central Vermont Regional Planning Commission. The line will run adja[redacted]

[redacted]ARTMENT OF WATER RESOURCE[redacted]

MEMORANDUM

ROUTING		
GENERAL		
TO	NOTED	DATE
JAM		
RJW		
JEC		
SUSPEND TO		
FILE	Hands Mill Dam	

TO: **Fred Kent, Chief, Water Resources Laboratory**

FROM: **John Malter**

RE:

DATE: **August 14, 1972**

The Town of Washington is currently assessing potential water-based recreation sites. The impoundment behind the Hands Mill Dam in Washington is of major interest. I would like three water samples from this site analyzed for total and fecal coliform. This should give us a handle as to whether the water quality at this site is suitable for a water-based recreation area in this town. George Plumb from the Division of Recreation is obtaining the samples.

Thank you for your assistance.

ROUTING

GENERAL

TO	NOTED	DATE
JEC		
DHS		5-17-72

SUSPEND TO

FILE ✓

May 17, 1972

Board of Selectmen
Town of Washington
Washington, Vermont 05675

Dear Sir:

The Vermont Water Resources Board is charged with the authority to investigate certain dams under the jurisdiction of the Board. The investigations are primarily to assure the public that the dams are in a safe state of upkeep and repair, and are also adequate to pass the flows of water which may reasonably be expected. This does not in any way relieve the owners of the structure from their usual responsibility, however.

In order to obtain factual data regarding the structure, the Department of Water Resources will be making an investigation which will include an inspection of the structure (dam), an analysis of the capacity and adequacy of the spillway, and other related data, to be submitted in a report form.

Several investigations will be conducted between June 1, 1972 and September 1, 1972. Hand's Mill Dam has been selected for such an investigation. The report and conclusions of the investigations will be available to the owners and other interested parties at the office of the Department of Water Resources. If you have any questions regarding the procedure or information, please feel free to contact this office. Your cooperation with our agents will be greatly appreciated.

Sincerely yours,

John E. Cerutti, Director
Management & Engineering Division

JEC/DHS/kmp

DEPARTMENT OF WATER RESOURCES
MONTPELIER, VERMONT

OFFICE MEMORANDUM

ROUTING		
GENERAL		
TO	NOTED	DATE
DEC		
DHS	DHS	
SUSPEND TO		
FILE Green Dam and Hand's Mill Dam ✓		

TO: File

FROM: Donald H. Spies

SUBJECT: Meeting of Board of Selectmen, Washington, Vermont

DATE: May 21, 1971

On May 19, 1970, this writer attended the subject meeting in order to keep informed of the situation regarding the town road at the Green Dam site and also, to inform the Selectmen of the situation at the Hand's Mill Dam. Mr. Raymond Green and a neighbor, Mr. Harold Heinzelman, were present and gave testimony on their own behalf in favor of having the road removed from the town lists and changing it to a trail. The Selectmen were in favor of abandoning the road, however, they were hesitant to do so because they were not sure of the legalities involved. The end result, so far as the Department is concerned, is that the Town will attempt to have the road removed from their list, and if this is not possible, Mr. Green will have the road relocated around his impoundment. The Selectmen are to send a letter to this writer stating their views and the final decision reached at the meeting.

After the above discussion, this writer informed the Selectmen of the erosion of the west abutment of Hand's Mill Dam. It was pointed out to the Selectmen that immediate action was not absolutely essential, but that they should consider some sort of remedial action. They stated that the matter would be taken into consideration.

April 12, 1953

Inspection by John E. Cerutti
Dept. of Water Resources

April 2 1953

Washington Dam

North wing wall has fallen down and water has started to erode the earth em bank ment behind it.

Earth em bank ment is 3' above spill way section and appears quite stable

Section of dam south of spill way appears to be in worse condition. Water is leaking thru the south abut. of spill way. Old retaining wall is badly broken up & water going thru it. Water is leaking thru part of dam that forms foundation of mill.

There is about a 30' section of dam to south of the mill. This section has been entrapped and the down stream slope is eroded. Top of this section is about 2' above spillway.

Although there may be a short apron at the bottom of the spill way the water appears to be quite deep and it is believed some erosion is taken place & may be working back under the spillway apron.

JEC

STATE OF VERMONT
WATER CONSERVATION BOARD

MONTPELIER, VERMONT

REPORT ON HAND'S MILL DAM
IN WASHINGTON, VERMONT

A report is made herein on the weakened condition of a dam in the town of Washington, Vermont.

GENERAL

This dam is located on Jail Branch on the upstream edge of the Village of Washington. It is presently owned by Mr. Clarence H. Hand who acquired the property in 1947. The mechanical power feature of this development has been abandoned, its principle purpose now is for the storage of logs for the saw mill at the site.

For this dam the pondage is small being about 2 acres in surface area and a little over 500,000 cubic feet in volume. The drainage area is 6 square miles.

Layout of the dam

The dam, about 260 feet long, is made up of an earth embankment section flanking a heavy concrete spillway section. This spillway section is between 60 and 70 feet long and reaches a maximum depth of 22 feet above channel bottom.

In cross section, it indicates a flat crest 2 feet wide and 2 feet below the top of the dam, with both faces sloping outward about 3 on 1 on the downstream side and 1 on 1 on the upstream side. Rubble concrete end-walls retain the embankment. Also a short concrete apron 5 to 6 feet wide, is provided at the downstream toe. No flashboards are used on the crest.

Extending northward from the spillway is an earth embankment about 180 feet long and about 10 feet high at maximum section. It has an average top width of 8 feet and side slopes at a natural angle of repose. A short length of this embankment is retained on the downstream side by a stone wall.

To the south of the spillway is a short embankment section which also serves as part of the foundation for the saw mill. It is topped by a masonry wall, partly extended into the embankment. An abandoned intake and a sluicway exist at this end of the spillway.

Observations and comments

From an examination of the dam, made on May 23, 1950, the writer noted the physical condition of the dam as follows:

The dam is an old structure (probably over 45 years) in a somewhat abandoned stage. Originally, it has a timber spillway section, but this was destroyed in the November 1927 flood, and afterwards replaced by the present massive concrete section. This "newer" section is in the best condition. As indicated in Figure 1, it has a minor degree of surface scaling. Some scour of the soft foundation material underneath the apron has occurred, particularly along the north half, but its progress has not reached a stage where stability of the section might be seriously concerned.

The older, original masonry end sections, are badly broken up. In such a condition is the south abutment wall shown in Figure 2. This is the top portion which has partly failed and leaks considerably. The lower portion of the section is still in a sound condition.

Figure 3 shows the condition of the north abutment wall which also serves to

retain the embankment. The poor quality concrete has been eroded away in time so that stability of the wall is in question. Not only has the base of this wall been decomposed but also some of the material behind it has been washed out. A deep hole, about 6 feet in diameter and 10 feet deep now exists. Here is a likely point of failure, much so if aggravated by high water.

The embankment section, in general, has settled and stabilized itself. It is uneven and overgrown with brush. Beavers have burrowed into the section and have caused small local cave-ins. Some seepage was detected. The nature of the material making up the embankment is not known.

A check on the probable maximum flood (in proportion to the November 1927 flood) indicates that a peak flow of 3600 c.f.s. is possible. Because of a limited discharge capacity, the dam would be overtopped with this size of flood. With this type of dam, overtopping would mean failure.

CONCLUSIONS

From a routine investigation the writer comes up with this dam which, in his opinion, is in a weakened condition. The impending failure of the dam would cause flooding in the vicinity. However, the extent of flood damage is limited because of the relatively small storage volume involved.

The dam needs immediate repairs to restore its stability. Consideration should also be given to improving the discharge capacity.

Stephen H. Haybrook

Stephen H. Haybrook
Hydraulic Engineer

July 6, 1950
Report # 141

Figure 1.-Spillway face and apron of the dam. The north embankment section continues in the background.

Figure 2.-Disintegrated condition of the south abutment wall.

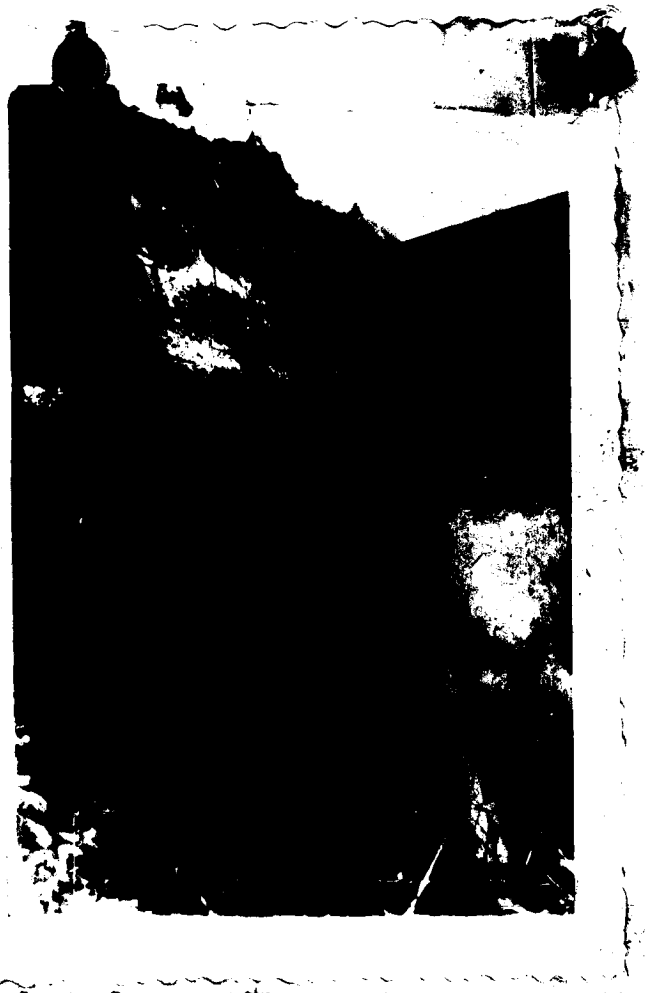


Figure 3.-A closeup of the north abutment wall. Note the scour through and under the section.