

M E M O R A N D U M

TO: For the Record

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

DATE: October 25, 1989

SUBJECT: Weston Lower Dam - Weston

On September 26, 1989 the writer inspected subject dam at the request of Roy E. Varner a representative of the owner, Weston Community Club, Weston, Vermont. Mr. Varner's mailing address is RR #1, Box 106-D, Weston, Vermont 05161; telephone 824-8172. The purpose of the inspection was to evaluate the condition of the dam and to make any recommendations regarding the dam and desilting the pond. The inspection was carried out under provisions of 10 V.S.A. § 1105.

BACKGROUND

The dam had previously been visited and photographed by the Department in 1968 in regard to a proposed desilting. The dam was photographed by the Department again in 1979 but no inspection was made. There is also an undated (c. 1950's - 1960's) photo of the dam by the Vermont Development Department. On September 21, 1989 the writer made arrangements with Mr. Varner to inspect the dam on September 26. The dam was reported partially desilted in 1982.

The date of construction and other details of the history of the dam are unknown, however, the original dam is probably over one hundred years old. It is reported that it provided storage for a downstream mill many years ago. At present it serves no purpose other than aesthetics.

DESCRIPTION OF DAM

The dam is a rubble stone masonry gravity structure 113' long and 15' high which has a sloping upstream concrete facing covering an unknown interior. The downstream face was built as a vertical dry stone wall, however, mortar has been placed in some of the joints in recent years. The dam is made up of two

straight sections joined at a flat angle point 55' from the left abutment. The left segment contains 30' long x 2' deep x 3' wide crest spillway whose crest is 13' above the bedrock at the downstream toe of the dam. A 2' x 2' sluiceway with an invert 11' below spillway crest is located below the center of the spillway. A sluice gate of unknown dimensions and construction with a chain is located at the bottom of the sloping upstream concrete facing. The left side of the pond is contained by a 168' long x 2' wide dry stone masonry wall. The dam is founded on ledge at least for most of the left segment.

The dam has a drainage area of 1677 A (2.62 square miles) and the pond has a surface area of about 0.3A. Storage at normal water level (spillway crest) is about 1.4 A.F., however, this is mostly accumulated sediments. The dam was reported partially desilted in 1982. Storage at top of dam (including sediments) is about 2.0 A.F.

### INSPECTION

The dam was inspected on September 26, 1989 between the hours of 1300 - 1415. Weather: 60° and partly cloudy (had just stopped raining). Ground still wet from rain. The writer met with Mr. Varner prior to the inspection. Water level was at the crest at right end of spillway and was overflowing, however, the majority of the flows were passing through the dam at leakage. The following was observed.

#### 1. Left Segment

- a. Downstream Face. Appears to be tipped downstream. Stone work is intact. Leakage through most of downstream face (leakage pattern appears to be the same as in C. 1950's - 1960's, 1968 and 1979 photos). The upper part of the stone wall has been mortared in recent years - could not tell if an attempt had been made to mortar it in area of leakage. Brush growing in earthfill along left toe above downstream stone wall obscures downstream face.
- b. Crest. Cap stone are in place but a little irregular in alignment and elevation - lower on right end of spillway. Appears to be some movement downstream near angle point due to tipping.
- c. Upstream Face. The upstream concrete facing was submerged but partially exposed - apparently when the dam was partially desilted in 1982. Some

cracks are visible but facing appears to be continuous. What is between concrete facing and downstream stone wall is unknown. Due to the large amount of leakage visible on the downstream face it appears that the interior material is flooded to pond level. The facing appears to provide little leakage control in this part of the dam.

- d. Spillway. Unobstructed and intact.
- e. Sluice. The downstream portal was unobstructed. Leakage with rust deposits evident. The rather flimsy crank type gate operator is located on spillway crest above the sluice. A chain is attached to it and runs down the sloping concrete face to the gate. It is not known if this is operable.

## 2. Right Segment

This is of the same construction as the left segment but is quite noticeably tipped downstream (1' - 1.5'). Some of the "new" mortar in the cap stone joints has cracked. These could be shrinkage cracks but there may be some recent downstream movement of the stones. Major leakage is located 1' - 3' above the toe line in a 30' zone beginning at right end. The heaviest leakage is at the right end of this zone. Bushes obscured most of downstream face and made it impossible to inspect in detail.

### DOWNSTREAM HAZARD CLASSIFICATION

The only structure that could be damaged by a failure of the dam is a private (?) stone bridge with steel beams and wood deck just below the dam. There are no other structures between the dam and the West River. Due to the silted-in condition of the pond there is little storage available in the event of a breach, however, the sediments that would be released would make a "mess" downstream. The dam is thus classified as a Class 3 ("low hazard") structure.

### OVERALL CONDITION

The dam is judged to be in poor condition because of the stability problem (wall tipping downstream) and the major leakage - particularly in the right segment. Although the dam was not judged to be imminent danger of failure, conditions are present that could lead to a failure if not corrected. These old dams are unpredictable and can fail under conditions they have survived in the past.

### RECOMMENDATIONS TO OWNER

1. The owner should have a qualified professional engineer experienced with the investigation, design and construction of dams further evaluate the structural and hydraulic adequacy of the dam and design and supervise construction of any needed improvements.
2. The owner should routinely monitor the structure to observe any changes that might indicate further deterioration, e.g., increase in leakage, quantity and clarity (muddy flow could indicate "piping" or internal erosion in areas where there might be an earth foundation, movement, etc.). Spillway should be kept clear.
3. Brush should be cleared from along downstream toe so that the dam can be better observed and to prevent the brush eventually growing into trees that could be detrimental to the dam.
4. If the dam is to be desilted it should first be drained by pumping or siphoning, the inflow diverted around the dam and the sediments allowed to stabilize. It should not be drained/desilted by opening the sluice gate. The excavation could then be done in the "dry".

Handling and proper disposal of the excavated material could be a problem. Excavation near the dam itself could lead to additional leakage through the dam or to other problems and it should be done under engineering supervision. Sediment control to prevent downstream turbidity would be important. Recurring sedimentation problems should be expected. If the upper pond was also desilted it would help to trap some of the sediments before they get to the lower pond.

5. If the dam is desilted, the pond drain should be made operational.

The need for further engineering evaluation, monitoring and desilting considerations were discussed with Mr. Varner at the time.

### JURISDICTION

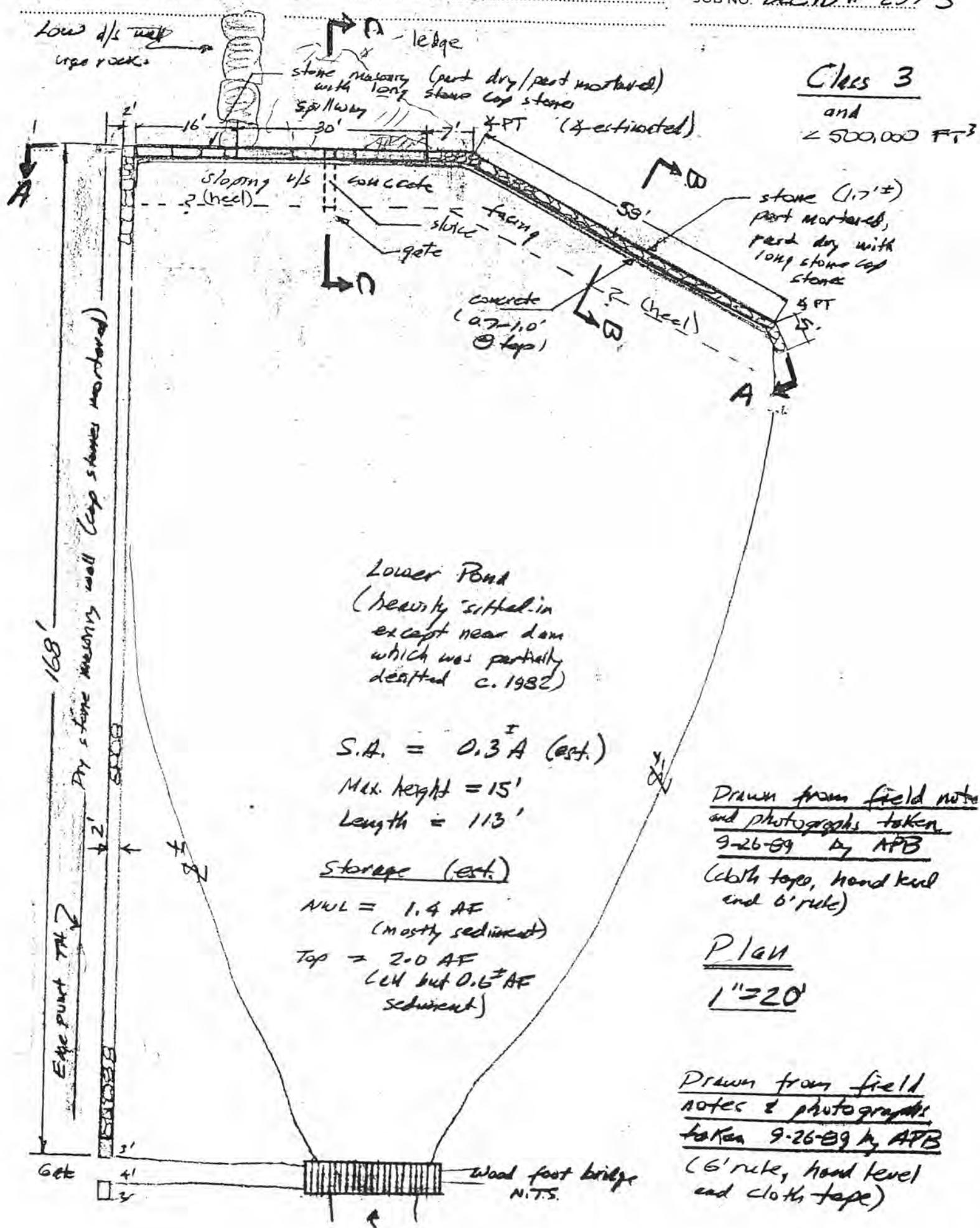
Since this dam impounds less than 500,000 cubic feet any reconstruction, alteration, or removal would not require approval from the Department under 10 V.S.A. Chapter 43. Since the drainage area is less than 10 square miles the Stream Alteration Statute (10 V.S.A. Chapter 41, Subchapter 2) also would not

apply. However, "desilting" or draining the pond would probably require Department authorization under 10 V.S.A. § 1272.

APB:arm

Enc: (1) Drawing of dam from field notes taken 9/26/89  
(2) Topo map of drainage area and downstream channel  
(3) Photos (in file)  
(4) Inspection of Dams DEC/DWREE 8/87

2.16



Class 3  
 and  
 $< 500,000 \text{ FT}^3$

Lower Pond  
 (heavily silted in  
 except near dam  
 which was partially  
 destroyed c. 1982)

$S.A. = 0.3 A$  (est.)  
 Max. height = 15'  
 Length = 113'

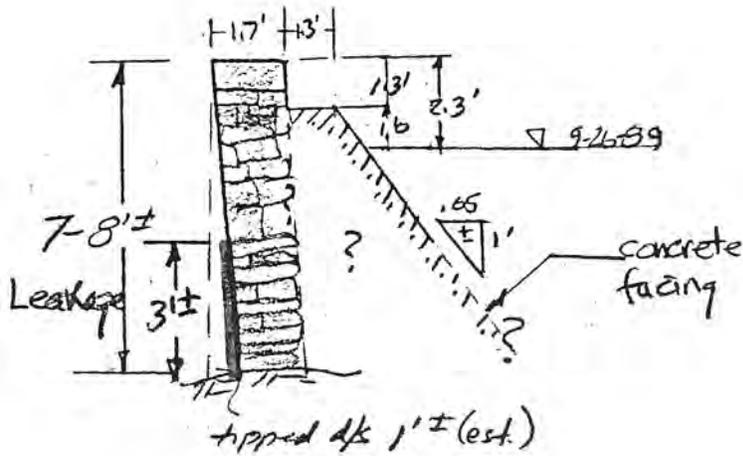
Storage (est.)  
 NWL = 1.4 AF  
 (mostly sediment)  
 Top = 2.0 AF  
 (LH but 0.6 AF  
 sediment)

Drawn from field notes  
and photographs taken  
9-26-89 by APB  
 (cloth tape, hand level  
 and 6' rule)

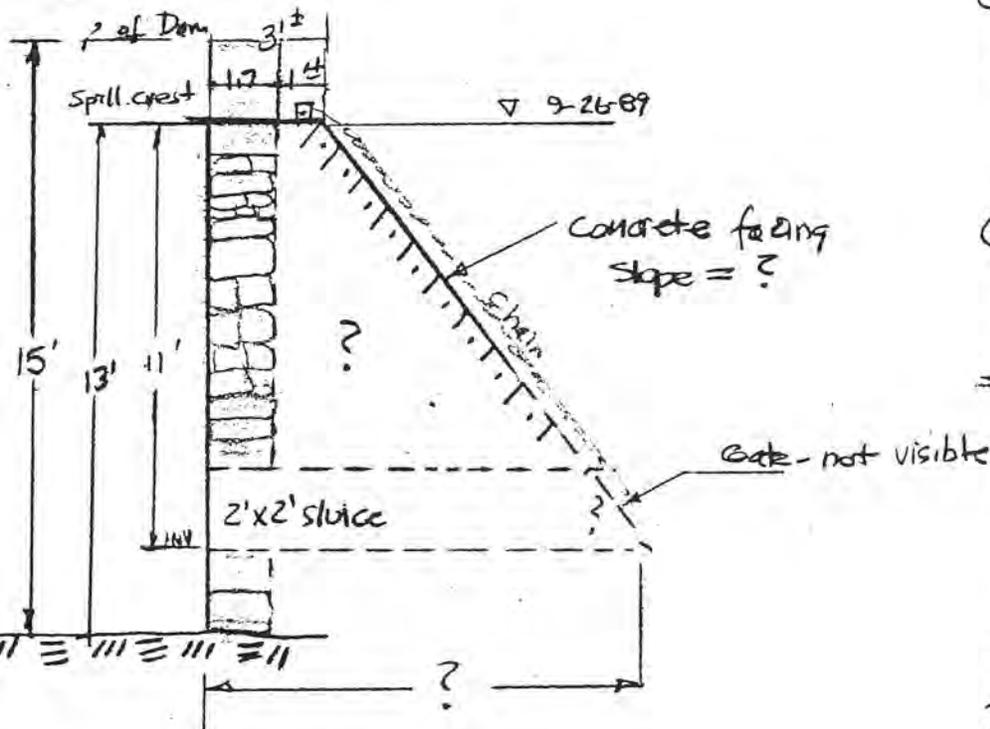
PLAN  
1"=20'

Drawn from field  
notes & photographs  
taken 9-26-89 by APB  
 (6' rule, hand level  
 and cloth tape)





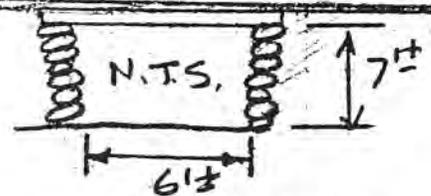
Section B-B  
Right side  
 (30'± from Rt. 3 PT)  
1" = 5' H&V



Section C-C  
Left side  
 (2' sluice at spillway)  
1" = 5' H&V

Notes:

- ① Slope of ups concrete facing (both left and right) appears to vary. There are also cracks in the concrete facing.
- ② "New" (within last few years) mortar in cap stone joints on right side have  $\frac{1}{8}$ " -  $\frac{1}{4}$ " cracks. Possibly some d/s displacement of cap stones since mortared.
- ③ Weed and bushes along d/s too of right side made it impossible to adequately inspect this part. Also vegetated growth at left end of left side obscured dam.
- ④ D/S channel. Just below dam is private stone bridge with steel beams and wood deck - could be damaged by dam failure.



There are no buildings that could be affected by a failure of the dam between the dam and the West River.

With exception of bridge, only likely damage from failure due from release of sediments.

Class 3