Ledyard Up-Down Sawmill Dam Condition Assessment and proposed solutions

Dam description and history

- Dam is about 150 feet long and 4.5 feet high (~9 feet from top to bottom of spillway).
- The 16.5 foot wide stone masonry spillway is raised with a 6-inch wood flashboard during sawmill operating season to raise the pond level.
- **Historic dam**. There was a dam in place in the 19th century when there were mills on this site.
- **1970**. Work on the dam was part of the multi-year mill restoration around 1970 which included rebuilding the spillway and head gate and race. The pond was also dredged.
- **Mid-1980s**. There were modifications to the dam in 1983 following a dam overflow in June 1982 which damaged the mill foundation. A buried concrete wall was added to the upstream dam embankment in front of the mill building.
- Stream flow is highly seasonly and responds quickly to rain events. Most summers the brook flow reduces to a trickle. Late fall, winter and spring are highest flow rates.
- **Overflows since 2000**. There have been 8-10 overflows following heavy rain events. Largest overflow event was following the heavy rains which occurred in late March 2010.
  - During the largest overflows since 2000, water has flowed down into and through the dam-side mill foundation into the lower level of the mill, and around north and south sides of mill.
  - Over flows during this period have caused damage to the dam earth embankment and masonry supports, and also results in voids directly in front of the mill building pond-side foundation
- **Apparent changes in the dam.** Since 2000, there has been noticeable settlement and movement of stones in the dam face, settling in the dam crest, and washout along the dam and in front of the mill foundation.

Evaluation of current dam condition and risks

- In spring 2025, the Historic District Commission contracted with GZA GeoEnvironmental, Inc. to evaluate the condition of the dam, provide an overview of risks, and outline options to reconfigure the dam to address risks.

Inspection and report (April/May 2025)

- James Davis, P.E. (GZA GeoEnvironmental, Inc. Glastonbury CT office)

GZA key findings and analysis

- Overall the dam is in good condition (although at risk from floods that lead to overtopping).
- The crest of embankment is uneven with settlement apparent along downstream stone wall (included misplaced stones). Spillway is in good condition.
- Dam is at risk from overtopping which is the most common cause of failure for similar dams.
  - "deficiencies included an uneven crest, erosion at the masonry wall downstream toe, misaligned stones in the wall, and voids in portions of the downstream wall at the sawmill building." (GZA report page 5)
  - "Overtopping of an earthen and stone masonry dam is a serious dam safety concern that, left unaddressed, is likely to lead to dam failure." (GZA report page 3)
  - "With a 1 foot of water over the dam, I think the potential for failure is high, at least partial failure." (J. Davis 6/24/2025 email)

Table 1. Estimated inflow from storms

Storm	Inflow to pond (cfs)	Estimated dam overtopping
2-year	80	Overtopping threshold
10-year	190	0.6
50-year	330	1
100-year	400	1.2
500-year	600	1.6

Notes for table:
Capacity of current 16.5 ft wide spillway is **63 cfs**.

10- and 50-year estimates from J. Davis 6/24/2025 email.
100- and 500-year estimates from May 2025 GZA report.

Conceptual Alternative No. 1 Rehabilitation - Overtopping Protection (from GZA)

Key features

- New 2-foot earthen dike near NE corner of pond
- New 2 foot parapet wall on top of dam (south end at existing spillway)
- New 2 foot parapet wall below dam on south and east sides of mill building
- New ACB (articulated concrete block) on dam embankment.
  - See example photos of ACB usage on last page
- New ACB on downstream side of dam
- New 2-foot tall earthen dike south of existing spillway

Drawing from GZA report 47451 - Lee Brook Pond Dam - OPC Memo -Final 4.9.2026. - Revision 1.pdf

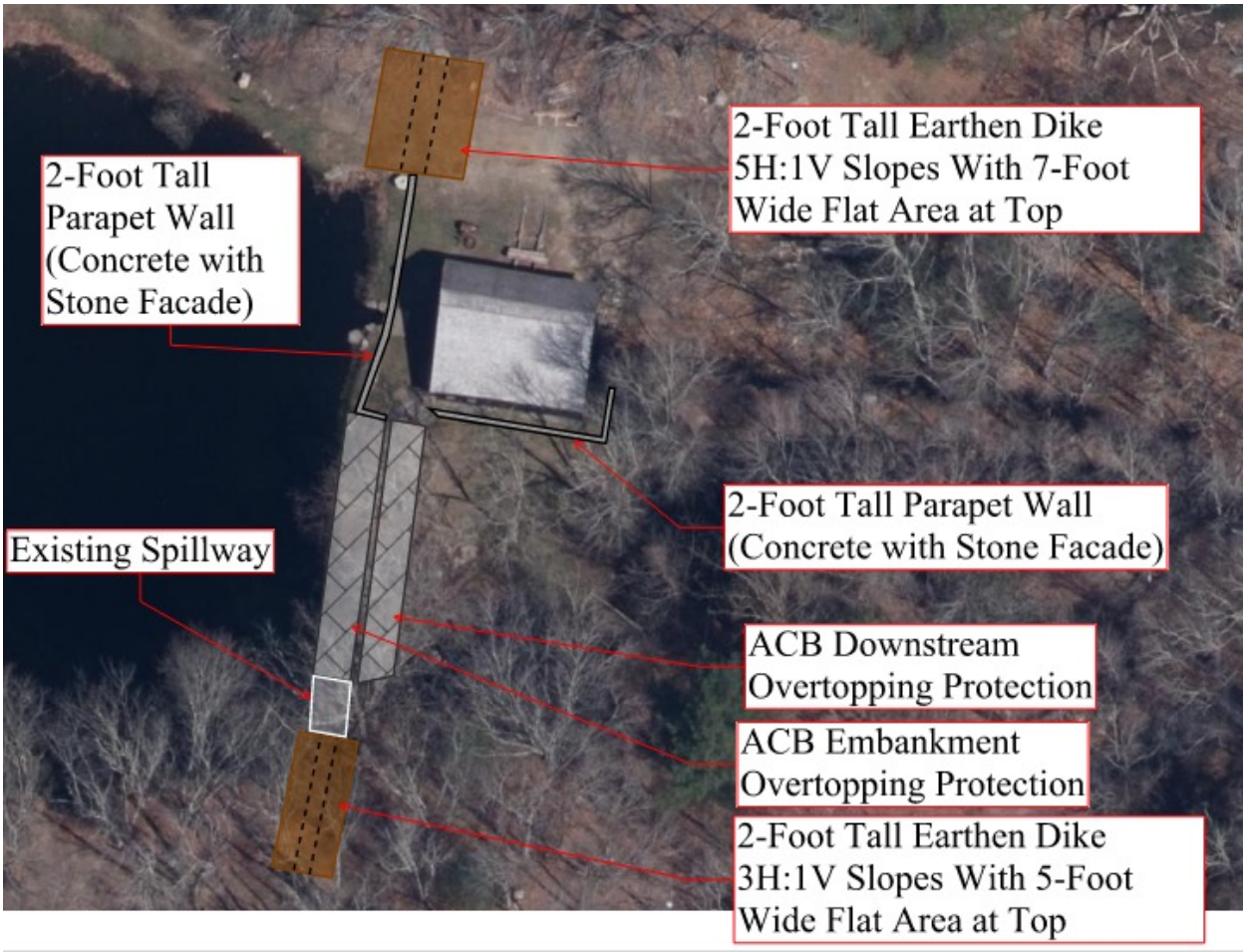

Figure 1- Conceptual Alternative No. 1 Rehabilitation- Overtopping Protection

Conceptual Alternative No. 2 Rehabilitation- Auxiliary Spillway (from GZA)

Key features

- New 2-foot earthen dike near NE corner of pond
- New 2 foot parapet wall on top of dam (south end at existing spillway)
- New 2 foot parapet wall below dam on south and east sides of mill building
- New auxiliary spillway south of existing spillway
- New Auxiliary spillway channel

Drawing from GZA report 47451 - Lee Brook Pond Dam - OPC Memo -Final 4.9.2026. - Revision 1.pdf

Figure 2- Conceptual Alternative No. 2 Rehabilitation- Auxiliary Spillway

Examples of Articulated Concrete Blocks (ACB) for concept 1 - Overtopping Protection
(Photos provided by GZA)