

SAWYER LAKE DAM STATUS UPDATE &

NEXT STEPS

Meeting with the Sawyer Lake Village District

January 20, 2022

A handwritten signature, possibly 'J. Sawyer', is written in dark ink. Below the signature is a large, dense scribble made of many overlapping horizontal lines, also in dark ink. A curved line underlines the entire signature and scribble area.

Findings to Date: Existing Pin spacing found to not match Dam Bureau As-built/Design Drawings.

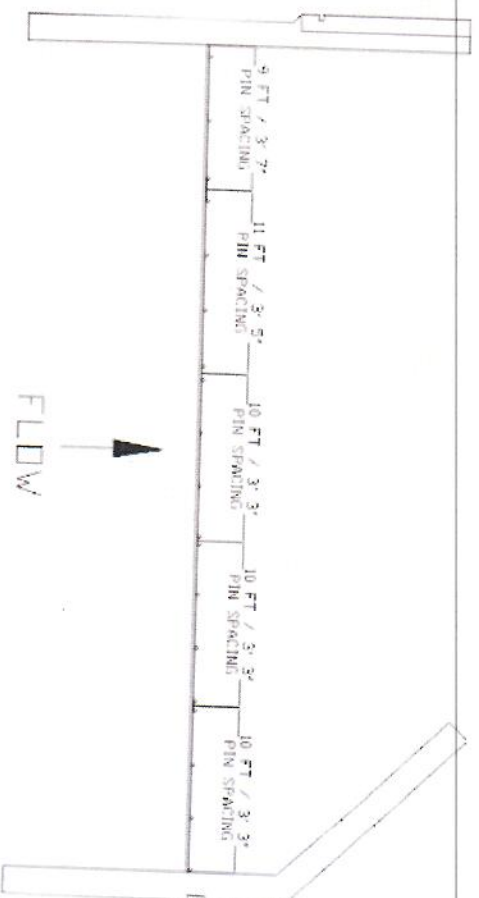


Figure 1 - pins spacing as found by QCC in As-Built Drawings, 1-1/4" diam. steel pipe pins, with 3'-3" high flashboards

Findings to Date (cont):

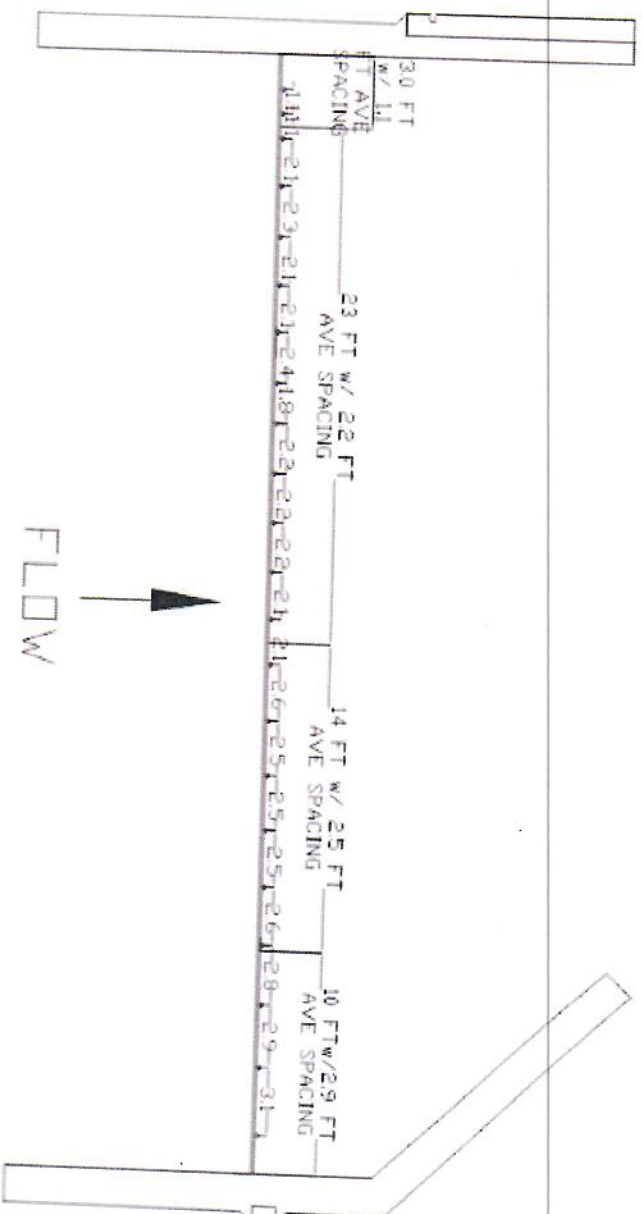


Figure 2 - pin spacing as measured March 20, 2021, 1-1/4" steel pipe pins, with 32 1/2" high boards

Findings to Date: Different pin spacing means boards will not fail as intended, which changes dam discharge capacity.

- Dam must be able to pass the design event of 2.5 x 100-year storm event with 1-foot of freeboard (distance between water level and top of dam).
- Using original As-built design, hydrologic model developed initially showed dam only slightly overtopped during the design event (2 ½ " for a short period for approx. 1 ½ hours). During the modeled 100-year event the dam had almost 1-foot of freeboard.
- Using as measured pin spacing, dam overtops more than 7" for over 3 hours. During the modeled 100-year event the dam has 0.13-feet of freeboard
- The real risk is during the 100-year event – models do not account for wind/wave runoff.

Findings to Date (continued)

- Currently the dam has about 1500 to 1600 cubic feet per second (cfs) of spillway capacity (673,247 to 718,130 gallons per minute)
- To meet freeboard requirement it would need closer to 4,500 cfs (2 million gallons per minute)
- Factors to consider:
 - Replacing existing flashboard pins with original design does not work
 - Decreasing the failure height of water has multiple consequences
 - Annoy the downstream neighbor
 - More frequent failure of flashboards, which results in longer periods of low water
 - Results in more frequent cost to remove and replace pins and boards.
 - Real risk is overtopping during the 100-year event with wind – we are getting more and more 100-year events that occur year round.

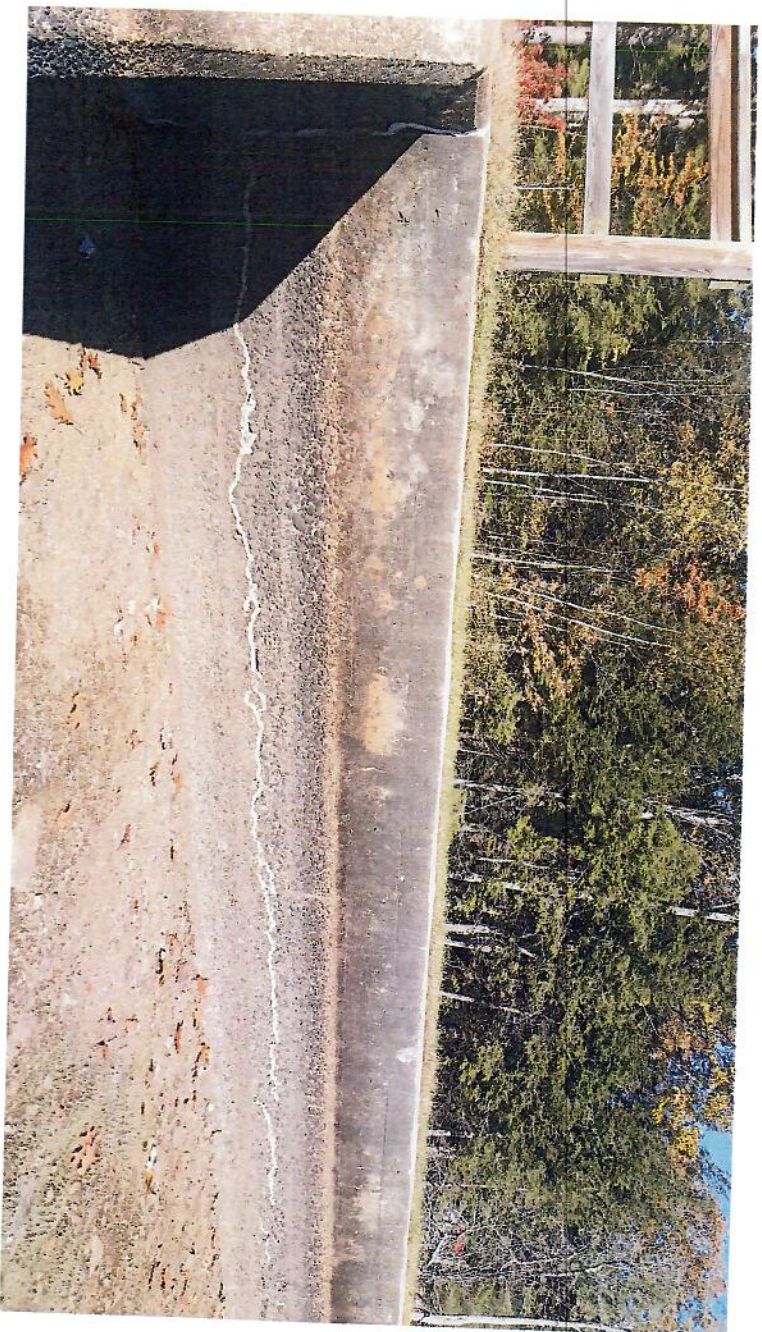
Findings to Date (continued)

- Alternatives (some)
 - Develop an auxiliary spillway by the beach section to the right of the dam
 - Existing concrete cutoff wall would need to be extended.
 - Roadway grade could be lowered and reinforced with articulated concrete block (ACB)
 - Downstream channel would need to be graded and reinforced to prevent erosion and damage to adjacent properties.
 - Would require easements
 - Replace flashboard bay with pneumatic crest gate
 - Existing concrete could be renovated to support the crest gate
 - When fully lowered the discharge capacity would satisfy freeboard requirements
 - Once the flood has gone through the gate is raised to restore normal pond (essentially instantaneous normal pond restoration)
 - Expensive; requires electricity, house for controls and compressor

CIP and Concrete Repair Drawings

- CIP highlights
 - (1-year) Feasibility Report of options to provide increased discharge capacity
 - Provide conceptual design of options, provide cost estimates of design and construction, provide “Pros & Cons” matrix for evaluating, and provide report to include revised hydrologic model of alternatives for SLVD to submit to Dam Bureau
 - (1 to 2 years) Short-term concrete repair to prolong existing wall integrity with design of replacement wall in the future to allow for funding and inclusion of any changes to the dam to accommodate additional discharge capacity
 - (3 to 5 years) Repair/replace pedestrian bridge
 - (within 3 years) Remove downed trees at downstream right toe of dam
 - (within 10-years) Replace low-level outlet and gate house and replace upstream concrete wall

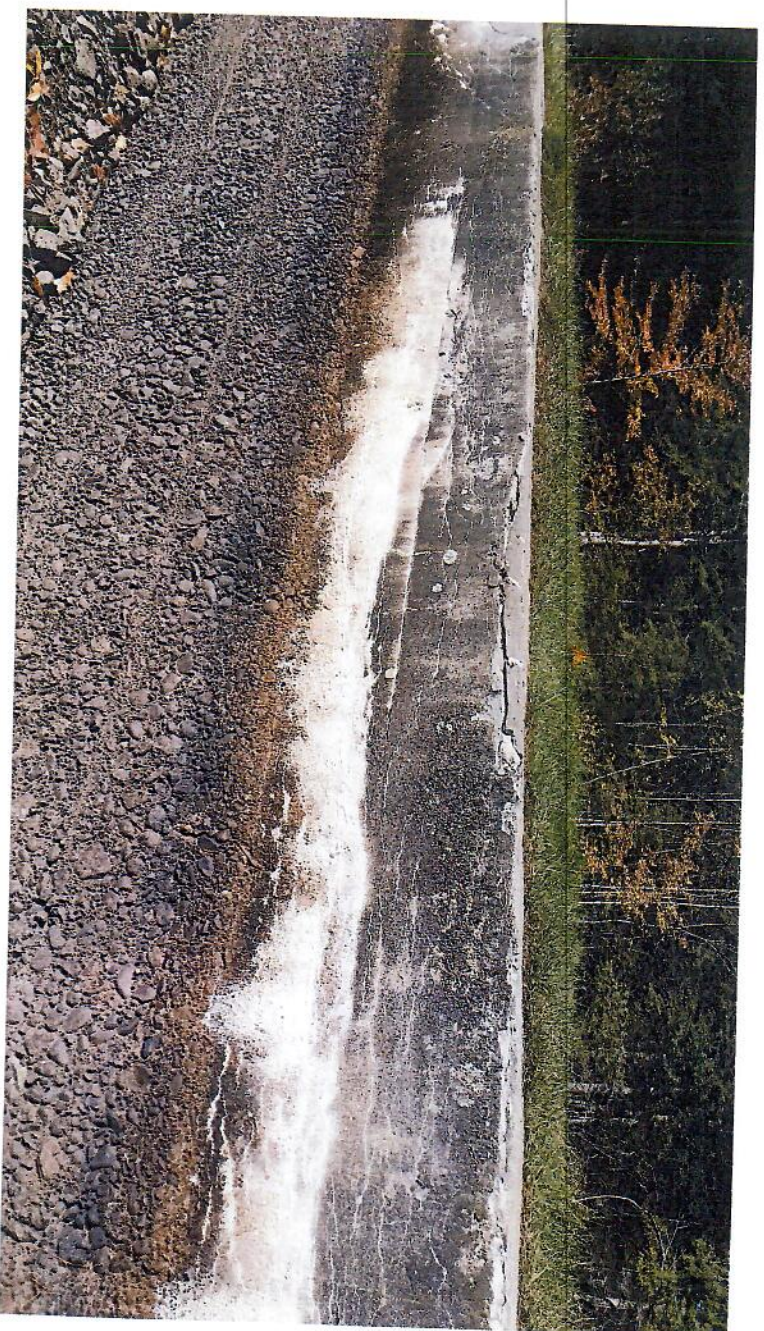
CIP and Concrete Repair Drawings (cont)



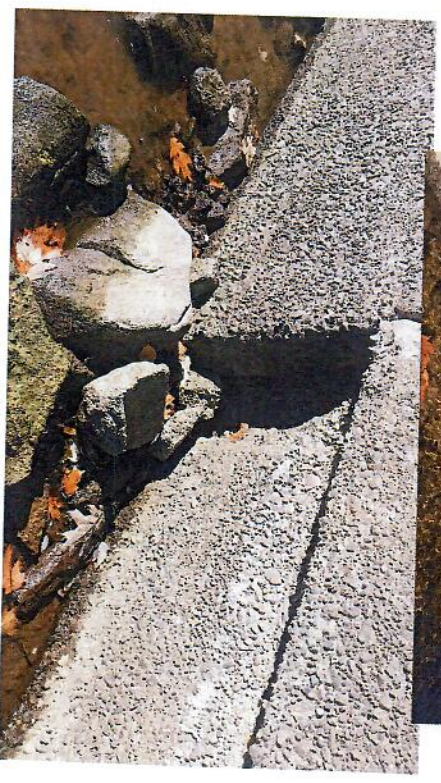
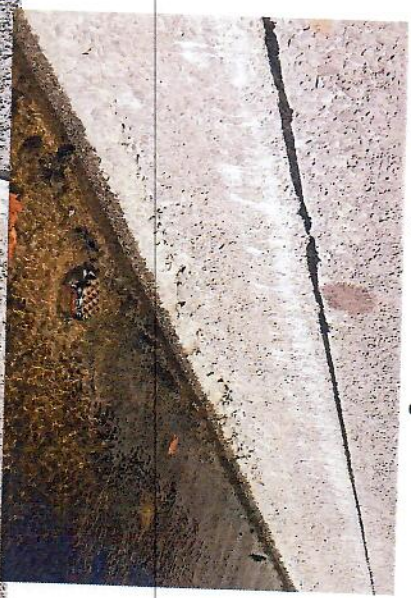
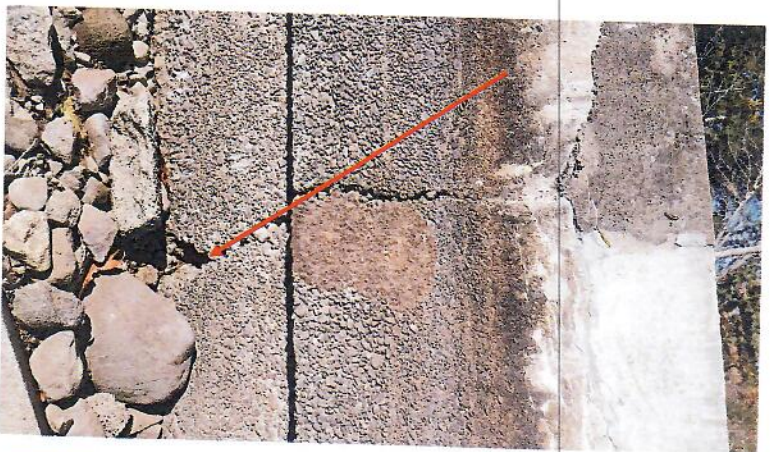
CIP and Concrete Repair Drawings (cont)



CIP and Concrete Repair Drawings (cont)



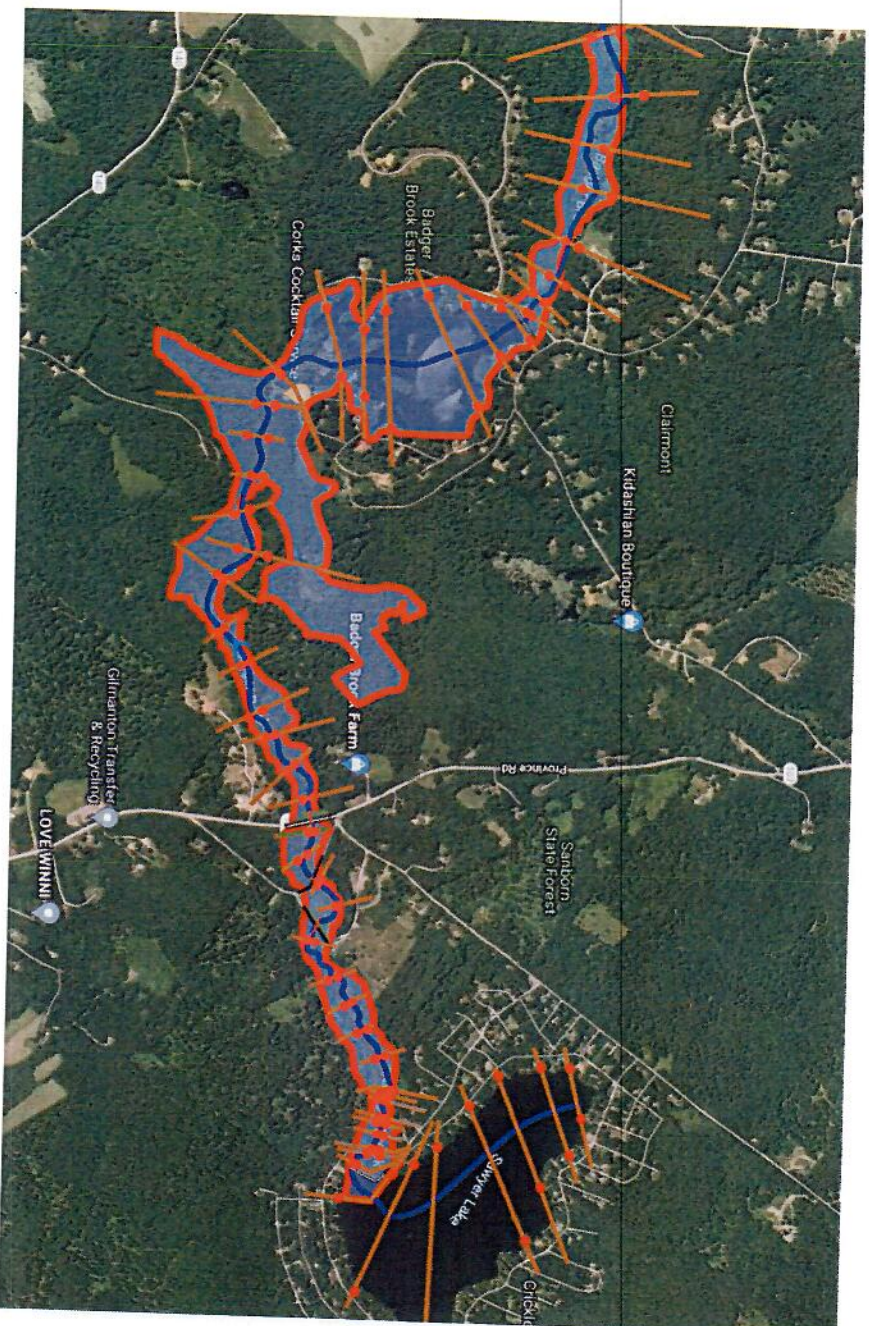
CLP and Concrete Repair Drawings (cont)



CIP and Concrete Repair Drawings

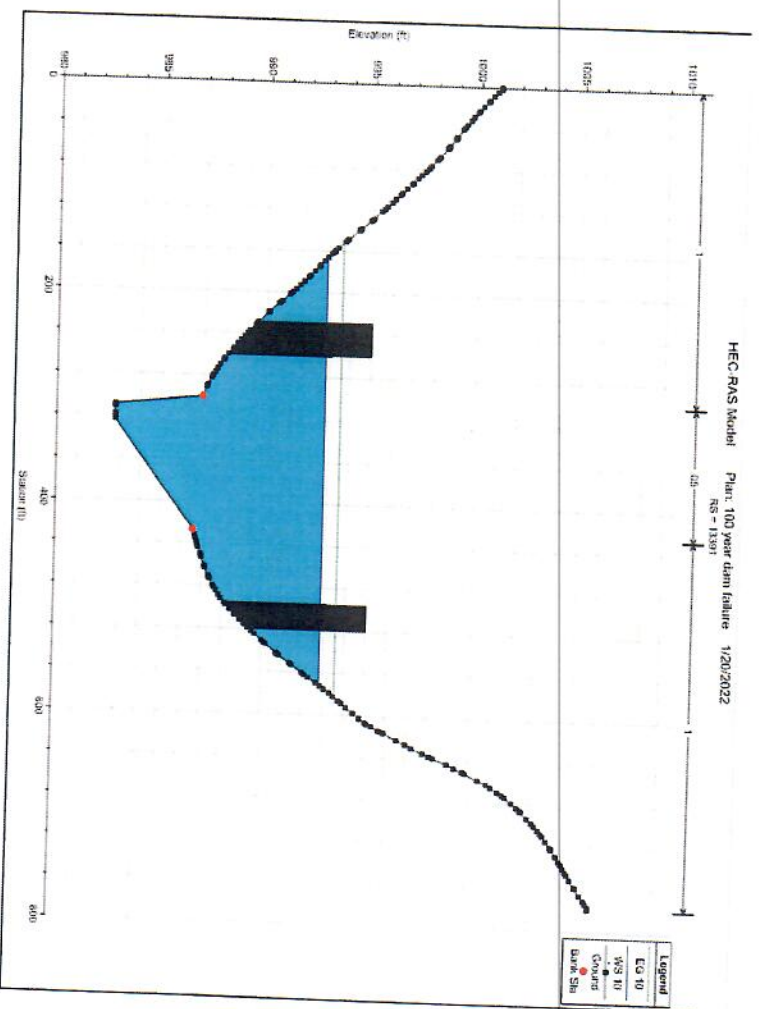
- Short term fixes to include plugging/filling voids and holes and cracks
 - Selective demolition, route, powerwash and repair existing cracks, plug existing holes with non-shrink grout, clean and remove deteriorated concrete and rebar to prevent injury to residents.
 - Provide surface treatment to protect temporary repairs
 - Couple options, one more robust to include scour coat of cementitious material, one that is basically just a sealer
 - Find and repair as many below low water level cracks and voids as possible (low smoke cementitious grout)
- Long Term fix – complete wall replacement – should be done with low-level outlet repair.

Emergency Action Plan



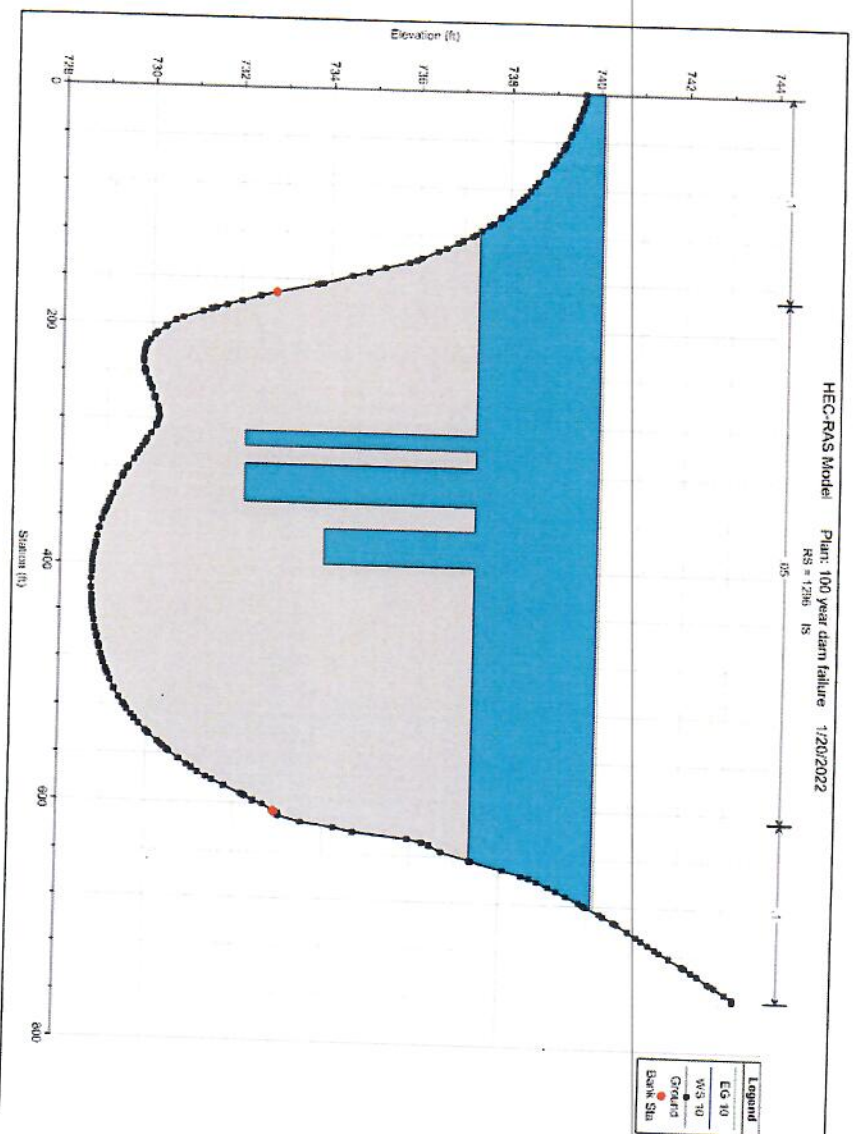
Emergency Action Plan (cont)

Model Cross
Section
immediately
downstream of
Sawyer Lake
Dam



Emergency Action Plan (cont)

Cross Section
Representing
Sargent Lake
Dam



Process & Next Steps

- Dam Bureau has a lot of material to review and I'm still uploading data files and supporting files
 - Review calculations and assumptions
 - Confirm hydrology with new spillway rating curve (flashboard failure) and run the model
 - Confirm hydrology and hydraulic assumptions are consistent and run the dam breach model
 - Review the EAP and Inundation Mapping
- I would not expect to hear back from Dam Bureau until end of March at the earliest.

Process & Next Steps

- Once Dam Bureau has finished their review, we make any revisions, which there are almost always revisions, certify submission with PE stamp and resubmit as "Final".
- SLVD will need to conduct a "Table Top Exercise" of their new EAP.
- With respect to the CIP – I would recommend NH Dams meet with the SLVD in the coming months to go through the Draft CIP, make any changes or clarifications, and submit as "Final"
- With respect to the feasibility study – I can provide you with a scope of work and proposal.
- With respect to concrete repair & restoration, assuming Dam Bureau concurs this is maintenance only and does not require a permit, NH Dams will give you the drawings to disseminate to local contractors and provide you with a more detailed estimate than is included in the CIP.

Questions???