

STATE OF NEW HAMPSHIRE
INTRA-DEPARTMENT COMMUNICATION



DATE: September 8, 2021

FROM: Lorilee Mather, P.E. *LM*
Dam Safety Engineer
Dam Safety & Inspection Section (DSI)

AT: Water Division
Dam Bureau

SUBJECT: D170002, Jones Dam, New Durham
Hazard Classification: High
Inspection Notice (IN)

TO: Corey Clark, P.E.
Chief Engineering & Construction Engineer
Engineering & Construction Section

The New Hampshire Department of Environmental Services, Dam Bureau (NHDES) is responsible for ensuring the safety of dams in New Hampshire through its dam safety program. In accordance with RSA 482:12 and Env-Wr 302.02, an inspection of the subject dam was conducted on August 10, 2021. Based upon the results of the inspection along with information in our files your dam has several identified deficiencies and **does not** meet the current discharge criteria for its hazard classification. DSI is issuing this Inspection Notice to advise you of the observations made during the recent inspection and the current status of related dam safety evaluations. A Dam Inspection Report and accompanying photos are attached.

You should implement the following recommendations, which are aimed at improving the condition of the dam and extending its longevity, at the earliest practical date.

1. The dike adjacent to Merrymeeting Road has significant breakout on the downstream slope in multiple locations. It is reported that the breakout discharge is greatly reduced when the pond is lower. A lower impoundment would also reduce the stresses imposed on the dike and may allow for a more comprehensive assessment of the dike's condition. Removal of the flashboards would allow for a lower pond to facilitate these objectives.
2. Following assessment of the dike with a lowered pond, develop a plan and schedule to repair or reconstruct the dike wall and downstream embankment. If the plan includes any changes to the dike that meet the definition of "reconstruction" per RSA 482:2X (see last page of this letter), please contact the DSI to discuss.
3. The most recent H&H evaluation of the dam was last completed in 2008 by the NHDES and needs to be updated using current data and methods to confirm the extent to which the dam, including the dike, does not meet discharge capacity requirements in accordance with Env-Wr 303.11(a)(3).
 - a. A report should include all findings, recommendations, and a schedule for repair or reconstruction, as warranted, to make the dam compliant with the current standards for high hazard dams;

- b. If the analysis confirms the dam has insufficient discharge capacity, a plan to address how the dam will be modified to meet the required discharge capacity in accordance with Env-Wr 303.12 should be submitted to DSI; and
 - c. If required, based upon the results of the evaluation and proposed plan, submit all necessary environmental permit applications (dam safety and dredge and fill) to upgrade the dam to meet requirements associated with existing high hazard dams.
 4. The downstream sections of both the right and left embankment/abutments are steep and hummocky with voids, eroded areas, and animal holes.
 - a. Replenish and regrade slopes to be uniform;
 - b. If a minimum 2.5H:1V slope cannot be achieved, appropriate slope stabilization should be employed (Env-Wr 403.02(a)); and
 - c. Clear and maintain the embankment areas of woody growth and establish and maintain a consistent ground cover on all earthen portions of the dam embankments.
 5. Several areas of concrete need repair:
 - a. Horizontal joint at the intersection of the downstream stoplog apron and the gate section is eroded extending from the apron left approximately 1-foot;
 - b. Base of downstream slope at gate section is undermined at the intersection with the concrete outlet sill;
 - c. The downstream base of the pier between the left stoplog bay and the spillway is eroded/undermined;
 - d. One void estimated to be roughly 12-inches x 6-inches was observed on the downstream face of the spillway with possible exposed rebar. The location was about 10-15 feet from the left concrete abutment and roughly half way up the face; and
 - e. Large crack at the base of the downstream section of the left abutment wall extending from the spillway toe to just below the bottom horizontal joint. The wall is also undermined at the base from the spillway to the end of the wall.
 6. Repair or replace the leaking gate. Ensure that all operators are functional and test annually at a minimum.
 7. As conditions allow, inspect the CMP outlet pipe for corrosion and replace or repair as needed.
 8. Monitor the following areas for deterioration:
 - a. All concrete walls for surface wear/pitting at and below the waterline;
 - b. Excess wear and material erosion at downstream concrete flow surfaces:
 - i) right stoplog bay apron and slope;
 - ii) right side of the gate section below the stoplog apron;
 - iii) concrete sill below the CMP outlet; and
 - iv) top and downstream face of the spillway.
 - c. Horizontal concrete cracks in the gate section downstream concrete slope above and below the CMP pipe outlet;
 - d. Corrosion below the waterline on the stoplog stanchion in the right stoplog bay; and
 - e. Corrosion of the CMP outlet pipe.
 9. Monitor locations where potential seepage was observed or has been historically identified including (but not limited to):
 - a. Wet and stained areas on the rock and ledge at the right downstream earth embankment/abutment;
 - b. Interface between the concrete and CMP pipe at the outlet;

- c. Efflorescence along horizontal joints on the left concrete abutment that increases toward the lower joints and at the bend in the downstream wall;
 - d. Base of the concrete abutment wall downstream from the spillway toe; and
 - e. Seepage and breakout at in the downstream embankment of the dike.
10. The 1997 dam breach analysis is out of date and needs to be updated using currently available information (hydrology, LiDAR, etc.) and methods in accordance with current regulations in (Env-Wr 500). Accompanying downstream impact assessment and inundation mapping will also need to be updated to match a new dam breach analysis.
11. In general, it is recommended that dam owners cut all trees, brush, and woody growth from the footprint (earthen portions) of the dam and within 15-feet beyond the footprint of the dam to prevent damage to the dam from root penetration, blow down of the trees, and to create a buffer zone to monitor the dam for seepage and other maintenance concerns. Areas to clear include (but are not limited to):
 - a. Right downstream earth embankment/abutment; and
 - b. Left downstream earth embankment/abutment.
12. The current Emergency Action Plan (EAP) was last updated and tested in 2019. Per current NHDES Dam Bureau administrative rules, EAPs for all high hazard structures need to be reviewed annually and tested every two years. The EAP should be reviewed, updated as needed, and tested in accordance with Env-Wr 500. If updates are made, please distribute the changes to all EAP holders.
13. Please review the Operation, Maintenance and Response (OMR) form for your dam and, if changes are warranted, update it as required and return to NHDES (Env-Wr 303.05). The form should include monitoring and maintenance items consistent with the findings of the inspection and the recommendations below. A blank version of the form may be found on the NHDES Dam Safety, Maintenance, and Management webpage under Dam Permitting and Forms.
14. A safety boom should be considered in the impoundment upstream of the dam as a visual alert of the potential hazard.

** Review NHDES Dam Safety rule Env-Wr 403.03, this rule pertains to qualifications engineers must meet to enable them to work on dams in NH.

Hazard Classification: High

According to the breach analysis performed by NHDES in 1997, a failure of this dam could produce a breach flow estimated at 4,800 cfs if the upstream road bridge (1/2 mile upstream) were to remain. This bridge serves to impound 36 acres of pond area. With a failure of the upstream road bridge, a peak flow of 6,000 cfs would cause 5-feet of flooding in Downing Pond, overtop the road serving as the pond outlet, and may cause a failure of the Downing Pond Dam. Further downstream the breach would cause a predicted 3-feet of flooding in the vicinity of Route 11. Based upon the predicted flooding of residences in the event of a dam breach, the dam warrants a high hazard rating. (20080905 D170002 Insp Rpt.doc)

Hydraulic Discharge Capacity: Insufficient

Detailed assessments related to the design storm event applicable to the dam (2.5 times the 100-year) and the hydraulic adequacy of the dam's outlet works to pass the design inflow were **not completed** as part of this recent inspection. A hydrology and hydraulic evaluation (H&H) of the dam was last completed in 2008 by the NHDES. The analysis indicated that the dam is not capable of passing the inflow event with 1-foot of freeboard without manual operations as is a requirement for high hazard dams per Env-Wr 303.11(a)(3).

In addition, DSI did not perform an in-depth hazard classification review of the dam with regard to potentially affected areas downstream that could be impacted by a breach of the dam or dike. These analyses are performed less frequently or on an as-needed basis, and may be completed in the future. If work is planned at the dam beyond routine maintenance and repairs, please coordinate with DSI in advance of such work to ensure that it is consistent with a current assessment of the design event for the contributing watershed and includes an updated review of the dam's hazard classification and potential downstream impacts. The findings related to updated or more detailed analyses could result in the need to complete additional and/or more extensive repairs. (20080905 D170002 Insp Rpt.doc)

Condition Assessment Rating: Poor

Under the criteria NHDES uses to rate the condition of a dam, a dam with a Poor condition assessment rating is one with types and/or quantities of deficiencies that are considered significant and/or that affect the safe operation of the dam. These may include, but may not be limited to, such things as insufficient discharge capacity (without manual operations) to pass the assigned design storm event without overtopping, new or developing structural deficiencies that are deemed to require timely evaluation by a qualified engineering consultant, significant seepage/leakage issues that are both as yet uninvestigated, and/or other indications that suggest a direct detrimental relationship to some structural component of the dam or overall dam stability.

Should you consider performing modifications to spillways or other outlet works, regardless if such recommendations are included above, then a more in-depth analysis of the dam related to its contributing watershed, structural characteristics, and hazard classification should be completed to ensure that any modifications proposed meet the design requirements consistent with current dam safety regulations. In addition, should you consider performing work that otherwise meets the definition of "reconstruction" (see below), please contact the Dam Bureau for guidance.

RSA 482:2X. "Reconstruction" means:

- a) A change in the height, length, or discharge capacity of the structure;
- b) Restoring a breached dam or one in ruins;
- c) Modification of flashboards which either increases their height or increases the headwater elevation at which the flashboards will fail; or
- d) A change in the structural configuration of a dam.

You are urged to implement the recommendations listed above at the earliest practical date and commit to regular maintenance and monitoring of your dam. If the condition of the dam has changed since the inspection, or if you have any other questions related to the dam, please contact me at 271-4130 or via email at lorilee.mather@des.nh.gov.

attachments: Dam Inspection Report, Inspection Photos

cc: Jim Gallagher, P.E., Chief Water Resources Engineer

Steve Doyon, P.E., Chief Dam Safety Engineer

cc: Scott Mason, Executive Director, NHF&G

Timothy Buzinski, Director, Facilities & Lands, NHF&G

EJ Malone, Powder Mill Hatchery, NHF&G

Peter Varney, Emergency Management Director, Town of New Durham

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