

July 9, 2021

Collings Lakes Civic Association
PO Box 475
Williamstown, NJ 08094

Attn: Kyle Smith, President
Email: ksmith@collingslakes.org
Phone: 609-374-4184

**RE: Braddock Lake Dam (NJ Dam File No. 31-97)
Dam Assessment
Borough of Folsom, Atlantic County, NJ
PH #2016.001**

Dear Mr. Smith:

Princeton Hydro has been contracted to perform an individual assessment of the construction at Braddock Lake dam, to obtain a third-party opinion prior to closing out the project. I have repaired this report summarizing my findings based on a review of existing information and a site visit.

Document Review

Our office was provided with the following documentation:

- Plan set entitled "Braddock Lake Dam Proposed Dam Modifications," prepared by Pennoni Associates and Lippincott Jacobs, revised through September 23, 2020.
- Technical Report, Amended Design Report for Braddock Lake Dam, prepared by Pennoni Associates, dated September 23, 2020.
- Plan entitled "As Built" prepared by Pennoni Associates, dated June 24, 2021.
- Plan entitled "Braddock Lake Dam As-Built" prepared by Mountain View Layout, dated June 7, 2021.

The earthen embankment dam has two spillways. The function of the primary spillway is to maintain a consistent water surface elevation during a normal day without precipitation. During rainfall events, the primary spillway will discharge more water as the elevation of the lake rises. The function of the secondary spillway is to convey water downstream during rainfall events. On a typical day, the water surface elevation should be about two to three inches below the top of the secondary spillway.

As a Class III dam, Braddock Lake Dam must safely pass the runoff from the 100-year storm event, which is approximately 8.8 inches of rain in a 24-hour period. According to the Technical Report, the 100-year flow is 4,450 cubic feet per second (approximately two million gallons per minute as a reference). Therefore, a significant spillway structure is required to provide the capacity and control the water surface elevation.



Site Visit Observations

On June 28, 2021, I met with Kyle Smith, Nick Ninfa, and Tom Veneziale at the Braddock Lake Dam. At the time of the inspection, there had been no rainfall within the previous 24-48 hours.

The earthen embankment of Braddock Lake Dam is generally level and has been stabilized with an erosion control mat and straw. Grass has begun to grow. Proper stabilization will be achieved when the grass has fully matured.

The primary spillway is an arch spillway constructed with sheet piling. At the time of the visit, water was flowing through the low flow weirs, with a depth of approximately two inches. Water was trickling over the pile cap. The sluice gate was in the closed position. The primary spillway appears to be of sound construction. No debris in or around the spillway was observed.



Figure 1. Primary Spillway operating at normal pool level.
Lake elevation ± 2 inches above low-flow weirs

The secondary spillway has been armored with articulated concrete blocks (ACB), which are anchored to the slope by concrete at the lake level and toe of slope. The water level of Braddock Lake was approximately two inches below the top of the concrete. At the toe of the slope is a long riprap stilling basin, which serves to dissipate energy and prevent erosion from discharge during rainfall events. The stilling basin had standing water, approximately one foot deep. The side slopes are concrete, which tie the ACB mats to the dam crest and abutment. No debris in or around the spillway was observed.



Figure 2. Secondary Spillway operating at normal pool level.
 Lake elevation 2" below upstream concrete apron

A 30" sluice gate has been installed on the river left wall of the primary spillway. The purpose of this sluice gate is to provide a means to lower the lake to perform maintenance along the shorelines or to drawdown the lake during emergency conditions. This is a typical device used in the construction of many dams, as a low-level outlet is generally required by the Bureau of Dam Safety.

Findings

I reviewed the as-built surveys and evaluated them against the approved construction plan set. The following table compares the design elevations to the as-built conditions:

Feature	Design Elevation (ft)	As-built Elevation (ft)
Top of Embankment	75.10	74.8*
Top of Primary Spillway Cap (At embankment)	75.60	75.60
Top of Primary Spillway Cap (At lake level)	71.50	71.50
Primary Spillway Low Flow Weir	71.17	71.17
Secondary Spillway Entrance	71.70	71.66
Secondary Spillway Toe of Slope	66.00	66.0*
Rip Rap Stilling Basin	64.50	65±



**Elevations along the dam crest and toe of slope are variable; values represent an average. Range of elevations are within one to two inches of the averages*

As you can see from the table, the as-built survey confirms that the construction generally complies with the construction plan set. However, it does appear that the dam does not have the required freeboard of one foot. The 100-year storm elevation of Braddock Lake is 73.98. Therefore, although the design elevation is 75.10, the minimum elevation the berm could be is 75.00. The as-built survey prepared by Pennoni Associates shows spot elevations of 74.7 and 74.8 to either side of the proposed spillway. This may be questioned by the NJDEP Bureau of Dam Safety when the as-builts are submitted as part of the close-out procedure.

Another area of concern is the river right corner of the secondary spillway. If you look at Figure 2 above, there are loose pieces of the articulated concrete block. The area has been backfilled with stone. I was unable to confirm that the ACB mats are properly toed in under the concrete apron in this spot. This area could be susceptible to erosion and undermining if storm events wash away the stone and block. I would recommend reaching out to the contractor to discuss and ensure that it was constructed properly or that it will be corrected.

Conclusion

Based on the information obtained from the Collings Lakes Civic Association and from the site visit, it is my opinion that the Braddock Lake Dam has been constructed as designed and approved by the NJDEP Bureau of Dam Safety.

If you have any questions or comments, please feel free to contact me at 609-413-4033 or mherrmann@princetonhydro.com.

Sincerely,

A handwritten signature in blue ink, appearing to read 'M. Herrmann'.

Mark Herrmann, PE, CFM
Senior Project Manager