

Dam Inspection/H&H Analysis Form

Dam number: D149004
Hazard Classification: **Low, recommend upgrading to Significant**
Condition Assessment: Fair
Dam name(s): **Pea Porridge Pond Middle & Little Dam**
Town: **Madison**
Date of inspection/s: May 29 & June 5, 2019
Inspector: Charlie Krautmann
Inspection Attendees: Adam Leiser (Commissioner), Kelly Robitaille (Highway Dept) and other abutters to the ponds
Water level: ~0.48' flowing over the stoplog bay and 0.81' below the top of the concrete drop inlet structure.
Report date: June 12, 2019

Pertinent Data:

Maximum Height:	17 ft	Storage:	210 ac-ft perm, 406 ac-ft max.*
Overall Length:	~175 ft**	Drainage Area:	2.7 mi ² or 1,731 acres
Pond Area:	46 acres		
Design event:	100-year storm		
50 Year Storm:	536 cfs inflow routed to 136 cfs outflow w/ 3.25 ft of freeboard		
100 Year Storm:	640 cfs inflow routed to 154 cfs outflow w/ 3.01 ft of freeboard		
Discharge Capacity:	342 cfs w/1-ft fbd- no operations		
	1,012 cfs no fbd-no operations		
Type of Construction:	Earth embankment		
Construction Date:	1966		
Outlet Works:	1 – 60' long, concrete culvert that is 48" wide and 60" high that controls outflow from the stoplog bay and horizontal orifice 1 – 3' wide stoplog bay (Design Drawings suggest it is 11' high) 1 – Horizontal Orifice/Grate that is 6.0' wide and ~5.2' long 1 – Auxiliary Spillway on Left Abutment/Beach Area along Eidelweiss Drive that diverts flow through downstream playground. Design drawings suggest invert is 80' wide		

* Storage Volumes based on previous analysis

** Excluding auxiliary spillway

Dam Inspection Observations:

Feature	Observation	Type M/S/ NA*
Downstream embankment	<ul style="list-style-type: none"> • Entire embankment covered with saplings, brush and trees 	M
Spillway	<ul style="list-style-type: none"> • Concrete has a significant amount of exposed aggregate • Crack/leakage observed in concrete drop structure along the left wall, a few feet below the top of the structure. 	M/S S
Auxiliary Spillway	<ul style="list-style-type: none"> • Trees and boat racks would impede flow at the approach to the auxiliary spillway 	M

	<ul style="list-style-type: none"> Eidelweiss Drive acts as spillway 	NA
Dam owner interview/comments	<ul style="list-style-type: none"> See discussion below. 	NA

*Type of Deficiency: M-Maintenance; S-Structural; NA-Not Applicable

Downstream Hazard Review:

Feature	Dist. d/s (miles/feet)	Observation
D149004/Eidelweiss Drive	0'	If dam completely failed, it would sever access across Eidelweiss Drive
Grachen Drive	~1,780'	60" diameter corrugated metal culvert below a gravel (Village District) road
NH Rte. 113	~3,780'	Concrete box culvert that is 68" wide and 63" high
Upper Pequawket Pond	~14,500'	NA

Hazard Classification/Justification – Low to Significant hazard, Dam Breach Analysis:

Date of last breach analysis	1979 & 1991
Requires updated analysis	No

- Grachen Drive and NH Rte. 113 are the only apparent downstream structures that have the potential to be overtopped prior to the breach being attenuated by the Pequawket River.
- A cross-section was created for the residential structure on Winnigon Drive (owner Larry Leonard) that sits close to the river. Based on the model, the house remains untouched by both breach scenarios. All other residential structures are much higher than the river bed and would not be impacted by a breach. This remains true for residential structures on Grachen Drive, Bergdorf Place, Brookstone Lane and Pebblebrook Lane.

Breach Assumptions

- Bottom Elevation: 642.71' (Based on pond bottom during survey. Culvert invert is 636.698', ie. conservative estimate).
- Breach Height: 8.0' (Dam Height is 17.0', ie. conservative estimate).
- Bottom Width: 12.0' (Based on outlet configuration and steep valley slopes).
- Start Time: 12.2 hours (Based on peak inflow at 12.65 hours).
- Breach Time: 0.4 hours

Grachen Drive

- 50 Year Storm:** 136 cfs inflow routed to 136 cfs outflow w/ 3.11 ft of freeboard
- 100 Year Storm:** 154 cfs inflow routed to 154 cfs outflow w/ 2.61 ft of freeboard
- Sunny-Day Breach:** 356 cfs inflow routed to 356 cfs outflow w/ 0.75 ft of overtopping
- 50 Yr Storm & Breach:** 477 cfs inflow routed to 477 cfs outflow w/ 1.10 ft of overtopping
- 100 Yr Storm & Breach:** 504 cfs inflow routed to 504 cfs outflow w/ 1.16 ft of overtopping

NH Route 113

- 50 Year Storm:** 555 cfs inflow routed to 555 cfs outflow w/ 0.70 ft of overtopping
- 100 Year Storm:** 692 cfs inflow routed to 692 cfs outflow w/ 0.91 ft of overtopping
- Sunny-Day Breach:** 356 cfs inflow routed to 356 cfs outflow w/ 0.20 ft of overtopping

- **50 Yr Storm & Breach:** 976 cfs inflow routed to 976 cfs outflow w/ 1.24 ft of overtopping
- **100 Yr Storm & Breach:** 1,112 cfs inflow routed to 1,112 cfs outflow w/ a maximum of 1.37 ft of overtopping. Road overtops for 8+ hours

Hydrologic/Hydraulic Analysis:

Required Discharge Capacity Env-Wr 303.11 or 403.04	100-year
Date of last analysis	2019
Meets current discharge requirement with required freeboard	Yes
If "N", does dam overtop during design event?	No
Requires updated analysis	No

- H&H performed with HydroCAD 10.00 using Atlas 14 precipitation
- 50-year, 24 hr. rain = 6.43 inches
- 100- year, 24 hr. rain = 7.17 inches
- DA = 2.7 mi² or 1,731 acres
- NHDES Dam Safety and a Surveyor from the Engineering & Construction Section surveyed (via differential leveling) the appurtenant structures along all three ponds on June 5th, 2019. The following elevations are based on that survey which have an accuracy of ±0.1'.

- **Little Pea Porridge Pond/Dam**

- Water Surface Elevation = 647.19'
- Water Surface Elevation at Middle Pea = 647.34'
- Top of Stoplogs = 646.52'
- Top of Concrete/Drop Inlet = 648.0'
- Invert of Culvert (In & Out) = 636.69'
- Pond Bottom In Front of Drop Inlet = 643.29'
- Crest of Road Above Culvert = 652.44'
- Control Point of Auxiliary Spillway = 650.69'

- **Big Pea Porridge Pond/Dam**

- Water Surface Elevation = 648.42'
- Control Point of Outlet (man-made, concrete) = 647.49'
- Pond Bottom 10' Upstream of Control Point = 645.89'
- Stream Bottom 25' Downstream of Control Point = 647.19'
- Water Surface Elevation 50' Downstream of Control Point = 647.69'

- **Big Loop Road**

- Water Surface Elevation Upstream of Culvert= 647.37'
- Water Surface Elevation Downstream of Culvert= 647.35'
- Water Surface Elevation at Middle Pea (900' downstream) = 647.34'
- Crest of Road Above Culvert = 652.38'
- Crest of Road Right Abutment (low spot) = 651.57'
- Culvert Invert Upstream = 645.40'
- Culvert Invert Downstream = 645.74'

Operations, Maintenance, and Response Form:

Plan on file, updated, and meets current requirements	No
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- An OMR was submitted in August of 2016 although reflects the dam as a low hazard

structure. The OMR should be reviewed and updated and the hazard classification should be changed to Significant.

Emergency Action Plan:

EAP on file, up to date, meets current requirements	No
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- An EAP is required based on the dam being upgraded (from a Low hazard dam) to a Significant hazard dam. A Simplified Inundation Map (Env-Wr 503.02) should be applicable in this case as only 2 structures (State and Town Road) in the near vicinity of the dam are impacted. Therefore, the owner would be exempt from a breach analysis (based on Env-Wr 502.02).

Access and Security:

- The dam is accessed by vehicle approximately 0.5' miles east of NH Route 113 at the main entrance to Eidelweiss Village District on Eidelweiss Drive. The beach area acts as the right abutment. There are a handful of houses that overlook the beach and dam area. The stoplog bay is padlocked although all areas of the dam are easily accessed by foot.

Directions:

- Take NH Rte. 16 (Chocorua Mountain Highway) to the intersection of NH Rte. 113 south in Albany/Conway. Head south on NH Rte. 113 for ~2.25 miles and then take a left (east) onto Eidelweiss Drive. The dam is approximately 0.5' miles east of NH Route 113 at the main entrance to Eidelweiss Village District on Eidelweiss Drive

Design:

- 1965, October 22 – Drawings received by L.F. Brown, Engineer (Concord, NH) for design of Dam & Roadway at Eidelweiss for Great Northern Land Corporation (Title Sheet and 3 Drawings). Sheet C1 was revised and resubmitted on December 8, 1965.
 - Sheet C1 – Control Structure Design at Outlet of Both Big Pea and Middle Pea to maintain elevation 648.0'
 - Sheet C2 – Auxiliary Spillway 80' wide with invert of 649.5'
 - Sheet C2 – Crest of Dam = 652.0'
 - Sheet C2 – Outlet Invert U/S = 637.0'
 - Sheet C2 – Outlet Invert D/S= 636.89' (Slope of 0.2%)
 - Sheet C2 – Design Elevation of Pond and Top of Stoplogs = 648.0'

Ongoing Discussions with:

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