

Woodland Pond Dam Regulatory Compliance Update

Last Updated March, 2019

Table of Contents

- Regulatory Requirements
- Woodland Pond Dam Failure Analysis
- Compliance Alternatives studied
- Funding Alternatives studied
- Current Action Plan and timeline

Regulatory Requirements

In Virginia, dams must comply with [Title 10.1. Conservation](#) » [Chapter 6. Flood Protection and Dam Safety](#) » [Article 2. Dam Safety Act](#).

- Dams must have a hazard classification done by a competent engineer
 - WP Dam is classified as High Hazard because dam failure during flood and non flood conditions will over top Nash Road, Highland Glen Drive, and Eastfair Drive, and will flood 9 homes in the Highlands
- Dams must comply with Dam Safety Regulations based on their hazard classification
 - [Virginia Administrative Code Title 4. Conservation and Natural Resources Agency 50. Virginia Soil and Water Conservation Board Chapter 20. Impounding Structure Regulations](#)
- High Hazard earthen dams that contain 15 acre feet of water (or more), and are 25 feet high (or more) must have spillways that will pass 0.9 of the predicted maximum precipitation (PMP) without overtopping the dam.
 - WP Dam is 35 feet high, and contains a maximum of 2,242 acre ft of water.
- High hazard earthen dams that meet certain additional requirements can be in compliance if the spillways pass 0.6 PMP. One of the requirements is the dam owner must have sufficient insurance to cover downstream losses due to dam failure.
 - WPLA has not been able to obtain this insurance.

Regulatory Requirements

- The predicted maximum precipitation (PMP) for our dam is

Duration, hours	Full PMP rainfall depth, inches
6	29.5
12	33.5
24	33.5

- The PMP model was revised in 2015 and reviewed and authorized on March 23, 2016.
- Our spillways must be able to pass 13,800 cubic feet of water per second to not over top the dam during a 0.9 PMP event
 - Our current spillways can only pass 10,140 cubic feet of water per second
- A dam failure inundation map must be prepared and shared with local agencies
 - Timmons Group modeled our dam failure and provided inundation maps. The failure analysis is on the WPLA website.
 - These maps are included in our Emergency Action Plan and were provided to local agencies
- An Emergency Action Plan (EAP) must be documented and shared with appropriate agencies
 - We have a documented EAP that has been shared with appropriate agencies. The EAP is on the WPLA website.

Regulatory Requirements

- Emergency Action Plan drills should be conducted annually, and table top exercises conducted at least once every 6 years.
 - WPLA members who have roles in the EAP have reviewed the EAP and the two hurricanes in 2018 provided drills.
 - A table top exercise will be conducted in 2019
- A licensed professional engineer must inspect the dam every two years.
 - Timmons Group inspects our dam every two years. Past inspection reports are on the WPLA website.
 - Any deficiencies are addressed promptly

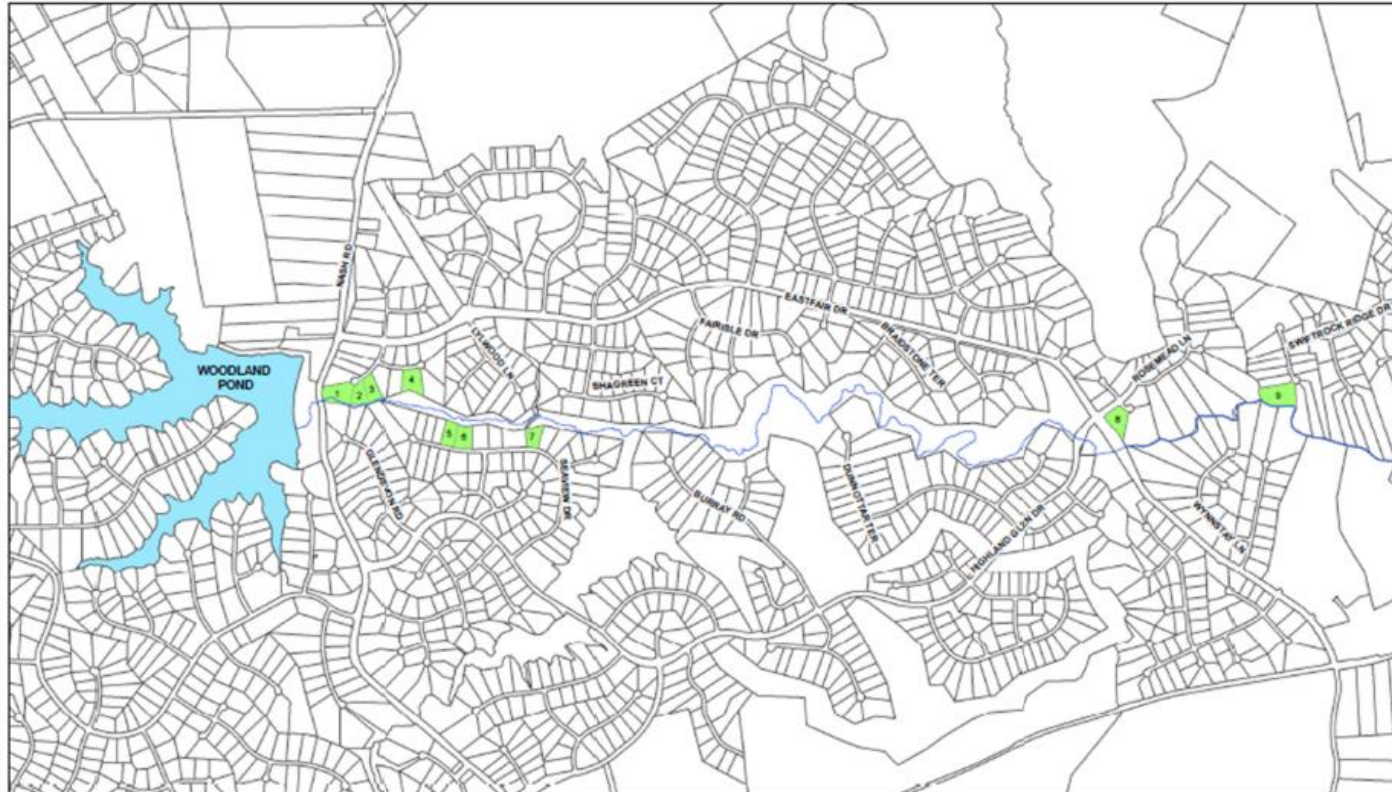
Woodland Pond Dam Failure Analysis

- If the dam fails during storm or non storm events, the following roads are impacted:

Road/Railroad Crossing	Storm Event	Water Surface Elevation (ft)	Overtopping Depth (ft)
Nash Road	0.9 PMP	151.12	11.02
	0.9 PMP Breach	157.93	17.83
	Full PMF Breach	158.42	18.32
	Sunny Day Breach	150.44	10.34
Highland Glen Drive	0.9 PMP	115.14	5.14
	0.9 PMP Breach	118.07	8.07
	Full PMF Breach	118.39	8.39
	Sunny Day Breach	113.82	3.82
Eastfair Drive	0.9 PMP	110.96	2.25
	0.9 PMP Breach	114.63	5.92
	Full PMF Breach	114.96	6.25
	Sunny Day Breach	106.09	-2.62

Woodland Pond Dam Failure Analysis

- If the dam fails during storm or non storm events, the following homes are impacted:



Map #	Address
1	11324 COVINA LN
2	11319 COVINA LN
3	11313 COVINA LN
4	8513 COVINA CT
5	8131 SEAVIEW DR
6	8137 SEAVIEW DR
7	8219 SEAVIEW DR
8	12200 NITHDALE CT
9	7224 CREEKBLUFF RIDGE DR

WOODLAND POND DAM FAILURE ANALYSIS AFFECTED PROPERTIES MAP

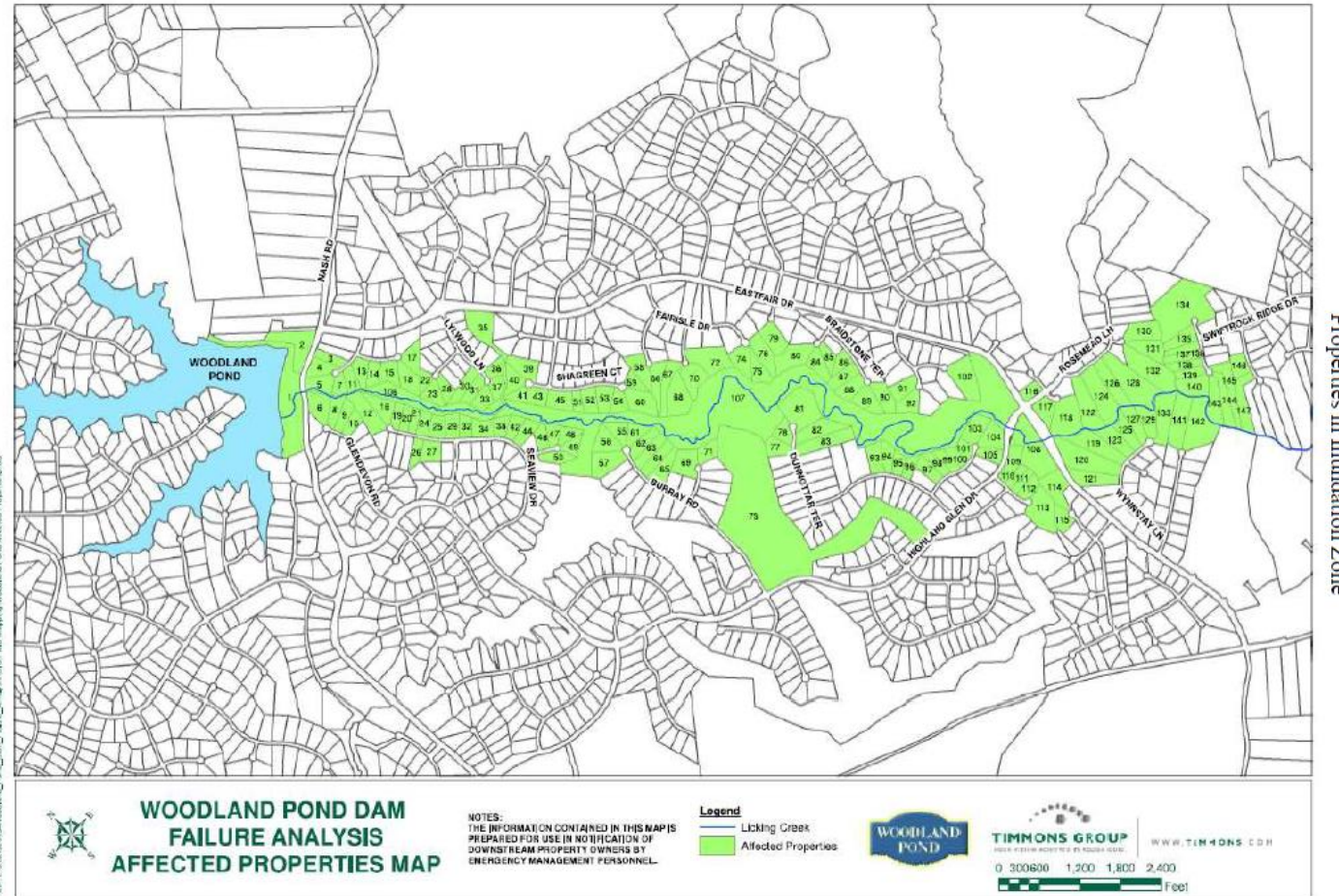
NOTES: THE INFORMATION CONTAINED IN THIS MAP IS PREPARED FOR USE IN NOTIFICATION OF DOWNSTREAM PROPERTY OWNERS BY EMERGENCY MANAGEMENT PERSONNEL.

Legend
 Licking Creek
 Inundated Homes

WOODLAND POND
 TIMMONS GROUP
 WWW.TIMMONS.COM
 0 300 600 1,200 1,800 2,400 Feet

Woodland Pond Dam Failure Analysis

- If the dam fails during storm or non storm events, the following properties are impacted:



0.9 PMP Compliance Alternatives

- Timmons Group evaluated many alternatives for revising the dam and auxiliary spillway to comply with the regulations. The alternatives analysis is on the WPLA website.

Alternative Description	Cost \$
1. Widen auxiliary spillway to 220 ft base, and raise dam crest by 2 feet 2 inches with earthen fill.	\$550,000
2. Widen auxiliary spillway to 220 ft base, and install second auxiliary spillway with 290 ft base north of primary spillway, and harden it with hydro-turf	\$1,000,000*
3. Widen auxiliary spillway to 220 ft base, and raise dam crest by 2 feet 2 inches with a concrete parapet wall along the crest of the dam	\$1,000,000**
4. Install HydroTurf overtopping protection along the dam crest and downstream slope.	\$2,500,000
5. Install Articulated Concrete Block (ACB) overtopping protection along the dam crest and downstream slope	\$2,800,000**
* Timmons needs to verify this option and provide a cost estimate ** Timmons needs to update this cost estimate	

Other Compliance Alternatives Studied

- Other alternatives were evaluated and determined to not be feasible, or were not as cost effective as other alternatives.

Alternative Description	Cost \$
1. Regrade the existing auxiliary spillway to enable the conveyance of the 0.6 PMP storm without overtopping the dam – WPLA cannot obtain Insurance for dam failure required to utilize this option	\$376,000
2. Lower the auxiliary spillway elevation to 1 ft above the overflow riser, and widen the auxiliary spillway into the existing dam impoundment and harden it with hydroturf, so we don't have to raise the height of the dam. – Determined to not be feasible.	
3. Lower the auxiliary spillway elevation to 1 ft above the overflow riser, widen the spillway without cutting into the existing dam impoundment, and raise the height of the dam with soil by adding it to the front side of the dam. – must harden the auxiliary spillway.	\$1,200,000
4. Widen the auxiliary spillway and lower the pond level so the dam is not over topped during a storm event. The pond would have to be lowered by 14 feet, drying up the coves, and making it necessary to dig the pond deeper and revise owner docks.	

Funding Alternatives Studied

- We talked with our Virginia State Representatives to see if any funds were available to alter our dam to comply with the regulation – no state funds are available
- We talked with County Supervisor to see if County funds were available for private dams for public safety – no county funds are available
- We talked with Department of Conservation and Recreation personnel to see if funds or low interest loans are available for dam remediation – no funds are available for private dam alteration.
- We consulted with Legal experts on Home Owner / Property Owner Associations to see if we might be able to share the cost of the dam alteration beyond WPLA members
 - Class A members are the only group obligated to comply with special assessments
 - Class B members can cancel their membership rather than pay a special assessment, but they cannot “rejoin” and avoid the assessment
- We plan to meet with other Woodland Pond home owners to solicit voluntary support to fund the dam alteration project.

Current Action Plan and Timeline

- 1Q2019
 - Complete Alternatives Analysis
 - Board to discuss the pro's and cons and select the best 0.9 PMP alternative.
- 2Q2019
 - Conduct Peer Review of Timmons work and address any issues
 - Hold meetings with the WPLA homeowners to discuss the alternatives and vote on how to proceed.
 - File dam alteration permit with DCR
- 3Q2019
 - Hire Firm to provide detailed design for chosen alternative
 - Obtain DCR approval
- 4Q2019
 - Request bids from 3 firms based on the detailed design
- 1Q2020
 - Obtain homeowner approval for special assessment needed to revise the dam and emergency spillway.
- 2Q2020
 - Collect assessment and award contract to selected firm
 - Apply for conditional operating permit
- 2H2020 - begin construction