

Williams Dam - Periodic Inspection Report

Inspection Type: Periodic
Inspected By: Steven Hanna, Margaret Wladyslawski
Weather: Cloudy, Raining, 68°F

Inspection Date: 08/25/2025 09:44
Others Present: None
Owner: Town of Londonderry

Site Map



Dam Info

Hazard Potential Classification: Significant
StateID: 115.01
Town: Londonderry
County: Windham
Watershed: West River
Stream: West River
Type: Stone, Concrete, Gravity
Foundation Conditions: Rock; Known
Purpose: Other
Status: In Service
Height: 20 ft
Length: 87 ft
Construction Date: 1900
Reconstruction Date: 1976

Other Considerations

Dam **does not** have public road on crest.
 Dam **does not** have public bridge.
 Dam **does not** have associated dike.

Reservoir Info

Normal Storage: 24.2 acre-ft
Normal Surface Area: 9.3 acres
Max Storage: 97.1 acre-ft
Max Surface Area: 29.90 acres
Drainage Area: 26112 acres

Purpose

The Dam Safety Program is performing this inspection in accordance with 10 V.S.A. § 1105.

Limitation

The condition rating assigned below is based on a visual inspection of the dam, and using information on file.. Detailed investigations/analyses are beyond the scope of this report. Please see the **General Information** section at the end of this report for more information.

Overall Condition Rating

☐ Satisfactory ☐ Fair ☐ Poor ☒ Unsatisfactory ☐ Not Rated

See **General Information section at the end of report for definitions.*

Condition Rating Notes

Since the previous inspection, the conditions of the concrete structures, downstream wall, and LLO pipe have worsened. The sluicgate stem remains bent, leaving it inoperable. The dam is also considered to be hydraulically inadequate as it is not capable of being safely overtopped by the inflow design flood. Accordingly, the condition rating has been lowered **from POOR to UNSATISFACTORY**. It is recommended that additional maintenance, engineering, and remedial measures be implemented to further address the deficiencies noted in this report.

Prepared by: Margot Wladyslawski on 9/2/2025

Reviewed by: Steven Hanna 10/01/2025

Dam Safety Recommendations

The following recommendations and remedial measures describe the recommended approach to address current deficiencies at the dam following a visual periodic inspection performed by the Dam Safety Program. Maintenance recommendations can be performed by the Owner, while Studies and Analyses and Remedial Repair Recommendations will require the services of a qualified professional engineer registered in the State of Vermont who is experienced in dam safety engineering design, permitting, and construction.

Williams Dam has the capability to impound more than 500k cubic feet (11.48 acre-ft). Per 10 V.S.A. § 1082, performing repairs or improvements will likely require obtaining a Dam Order authorizing the work to be performed. It is recommended that Dam Owners communicate with the DSP about any planned repairs to evaluate if the planned work requires obtaining a Dam Order.

Immediate Consideration

Retain a professional engineer qualified in dam safety to evaluate erosion occurring at the left end of the dam and leakage on the right end at the low-level outlet and prepare plans for correcting the problem. The evaluation should take place with the water level of the impoundment lowered. A professional engineer should also evaluate the dam and prepare plans for repair, replacement, or removal of the dam.

Maintenance Recommendations

General	- Perform an update to the Emergency Action Plan at least every other year and provide updates to all key contacts. - Consider posting warning signage restricting public access to the dam. - On a regular basis and following unusual or extreme loading conditions, perform monitoring of the dam and its appurtenances. Report any unsafe conditions to the Dam Safety Program.
Spillways	- Maintain the principal spillway free of debris to ensure free-flow conditions. - Monitor and repair minor concrete cracking and deterioration. - Monitor the condition of the concrete joints.
Embankment Walls	Monitor the downstream stone masonry wall for unusual movement.

Studies and Analysis Recommendations

General	Perform necessary analyses to support either the design of repairs to bring the dam into compliance with current dam safety rules and guidelines or dam removal.
Hydrology and Hydraulics	- Identify alternatives to make the dam hydraulically adequate or capable of safely being overtopped during the Inflow Design Flood. - Evaluate the condition and adequacy of the low-level outlet gate and identify repair or replacement alternatives.
Operation and Maintenance (O&M)	Develop an Operations and Maintenance Manual for the dam and provide a copy to the Dam Safety Program for record keeping purposes.
Structural	- Perform engineered stability analyses of the dam. - Perform a structural inspection of the concrete elements of the dam. - Evaluate condition of the concrete and identify repair or replacement alternatives.

Remedial Repair Recommendations

- Based on the studies and analysis recommended above, develop a plan to repair, rehabilitate, or replace the dam to bring it into compliance with current dam safety rules and guidance. Alternatively, consider pursuing dam removal.
- Make the dam hydraulically adequate or capable of being safely overtopped during the Inflow Design Flood.
- Replace the deteriorated low-level outlet operator and gate.

Dam Background

The Williams Dam is a stone masonry dam with a concrete cap principal spillway with a gated low-level outlet (LLO). According to file records, the dam has a total length of 87 feet and an approximate height of 20 feet. The principal spillway is a 73-foot-long concrete broad-crested weir located at the center of the dam. The LLO consists of a 6-foot diameter corrugated galvanized metal pipe (CGMP) with a vertical aluminum slide gate at the upstream end, located at the right abutment at the 13-foot-wide sluiceway structure. A concrete training wall at the right end is connected to a new concrete bridge abutment. The drainage area of the dam is reportedly 26,112 acres, or 40.8 square miles. At normal pool, the reservoir is approximately 9.30 acres with an estimated normal storage capacity of 24.2 acre-feet and a maximum storage capacity of 97.10 acre-feet. The dam was constructed in at least 1900 or potentially earlier. A new gate was installed in 1978 to repair damage caused by the 1976 flood. Large stone fill was placed on the right abutment by VTrans to repair damages after the July 2023 flood.

Inspection History

The last periodic inspection of this dam was performed on August 6, 2015. The dam was found to be in POOR condition due to concrete conditions throughout the dam structures; leakage through the downstream wall, right abutment, and 6-foot low level outlet pipe; corrosion in the LLO pipe; and the inoperable sluiceway. A Rapid Inspection was performed after the July 2023 Flood and new scour was noted around the training walls.

Operation & Maintenance (O&M)

An O&M Manual is **NOT** on file

O&M Approved Date: N/A

Date Last Revised: N/A

Operating Problems Since Last Inspection: None reported, flood damage 2023

History of Repairs Since Last Inspection: VTrans placed large stone fill (type III) and sandy gravel on the right abutment following the July 2023 flooding.

Frequency of Mowing: As needed

Frequency of Dam Owner Surveillance: Regular
Owner Surveillance During Storm Events: ☒ Yes ☐ No

Accessibility to Outlets/Low-Level Outlet (LLO): Right abutment of dam on concrete platform

Frequency of Outlet/LLO Operation: Not operable

Seasonal Drawdown? ☐ Yes ☒ No

Access to the Dam

Access Type:

Maintained paved road

Road Name: VT-11

Distance from Access Road to Dam: 30 ft

Seasonal Access:

☒ Plowed winter ☐ Sanded winter ☐ Maintained in mud season

☐ Passable in all weather conditions

☐ Need high clearance vehicle

Access for Emergency Construction

Equipment: Access from VT RT 11 or Edge Hill Road

Action

☒ None
☐ Monitor
☐ Maintenance
☐ Engineer

Security

Device Type(s): Fences

Dam has **no** sign of vandalism, trespassing or unauthorized operation.

Action

☒ None
☐ Monitor
☐ Maintenance
☐ Engineer

Operation & Maintenance (O&M)	
Safety Considerations	Action
Confined Space Entry Required: None Fall Protection Required: None Other Safety Required: None Public Safety Consideration: Fences restrict access to dam	☒ None ☒ Monitor ☐ Maintenance ☐ Engineer
O&M Issues	Action
☐ None ☐ Revisions required ☐ Not approved ☒ No plan available ☐ Format out of date ☐ Under review	☐ None ☐ Monitor ☒ Maintenance ☐ Engineer

Hazard Potential Classification
Current classification: Significant The hazard potential classification of the dam informs dam design standards and requirements. The current classification appears appropriate, and an inundation map was used to determine the classification. There appears to be no significant changes in land use or habitation since the last inspection. According to the study performed by the VT Dam Safety Program in 2022, during a dam failure, the following could be at risk of flood damage: • VT Route 11 (N Main St) • Approximately 11 structures, including commercial buildings and private homes

Emergency Action Plan (EAP)	
EAP on file	EAP Approved Date: August 1, 2022
EAP Type: Significant Hazard	Last Revised Date: N/A
Since the dam is a SIGNIFICANT Hazard Potential Dam, an up-to-date EAP with dam failure flood inundation mapping is required.	
Has the EAP been exercised? ☐ Yes ☒ No How has the plan been exercised? N/A	
EAP Issues	Action
☐ None ☒ Revisions required – EAP and contacts should be updated at least every year ☐ Not approved ☐ No plan available ☐ Inundation study required ☐ Format out of date ☐ Under review	☐ None ☐ Monitor ☒ Maintenance ☐ Engineer

Hydrologic & Hydraulic Data		
Freeboard Measurements		
Principal Spillway/Normal Pool to Dam Crest: 4 feet	Principal Spillway/Normal Pool to Auxiliary Spillway: N/A	Auxiliary Spillway to Dam Crest: N/A

Hydrologic & Hydraulic Data

Since Williams Dam is currently rated as SIGNIFICANT hazard potential, the inflow design flood (IDF) is the 1000-year flood event according to Federal Guidance currently applied in the State of Vermont. A hydraulic analysis was carried out by Dubois & King in 2022 which provided the following results:

Key Elevations (NAVD88):

- Downstream Channel Invert: 1129.0
- Principal Spillway Crest: 1142.0
- Normal Storage Pool Elevation: 1143.0
- Top of Dam (top of gate structure): 1146.0
- Low Chord of VT RT 11 Bridge: 1150.0

Location	Associated Water Surface Elevation (ft)				
	10-year	50-year	100-year	500-year	1000-year
Bridge (Deck El. 1151.7-ft)	1150.78	1154.14	1154.25	1156.88	1157.23
Dam (Spillway El. 1141.9-ft)	1145.08	1151.07	1151.25	1154.93	1155.33

Based on the results from the hydraulic analysis, Williams Dam would have no freeboard during the IDF in its current configuration and is considered hydraulically inadequate.

Geotechnical and Structural Data

Structural stability analyses were not found on file. According to Dubois & King, the dam is likely experiencing unintended loading from sediment deposition and does not appear to have been constructed with modern materials. The dam is assumed to rely on the weight of the structure to resist loading. Erosion at the dam, specifically the left abutment, could lead to a potential breach as erosion of earthen material continues.

Upstream Slope

No upstream slope was observed during the inspection.

Visual Comments: N/A

Additional Comments: N/A

Crest

Length: 87 feet

Width: Not measured

Additional Notes: The dam crest elevation is considered to be the low chord of VT RT 11 Bridge (1150.0).

Crest Issues

Remove debris.

Action

- ☒ None
- ☒ Monitor
- ☐ Maintenance
- ☐ Engineer

Crest Image



Downstream Slope

No downstream slope was observed during the inspection.

Visual comments: N/A

Additional Comments: N/A

Seepage Collection Systems

Total Count

No seepage collection system was observed during the inspection.

0

Instrumentation

No installed instrumentation was observed during the inspection.

Water Level and Flow Observations

Normal Pool Elevation: 1143.0 (NAVD88)
(according to file records)

Pool Elevation During Inspection: Not calculated

Tailwater Elevation During Inspection: No
backwater

Reservoir Drained: ☐ Yes ☒ No

Reservoir Lowered: ☐ Yes ☒ No

Principal Spillway Flow Depth: 32 inches below
spillway crest

Auxiliary Spillway Flow Depth: N/A

Additional Notes: None

Principal Spillway	
Spillway Type: Weir Spillway Location: Center of dam Primary Material: Stone masonry capped with concrete	Weir: Broad-Crested Gate: None Erosion Control Structures: None
Spillway Components: ☐ Anti-vortex plate ☐ Filter Diaphragm ☒ Training Walls ☐ Flashboard ☐ Trashrack ☐ Other:	
Additional Notes: The principal spillway weir is 73 feet long. The concrete spillway cap inclination is 2.5H:1V, and 9.25 feet of the cap was exposed at the time of the inspection.	

Principal Spillway Issues	Action
<u>Deteriorating Materials</u> Description of Issue: Concrete spalling, scouring, and cracking across the principal spillway crest.	☐ None ☒ Monitor ☐ Maintenance ☐ Engineer
<u>Abandoned Pipe</u> Description of Issue: Exposed abandoned pipe running along the principal spillway crest. Investigate to determine purpose and any remediation.	☐ None ☒ Monitor ☐ Maintenance ☒ Engineer
<u>Trees Obstructing Spillway</u> Quantity: 2 Size: >12" Location: Inlet Description of Issue: Two large trees are on the spillway crest and should be removed.	☐ None ☐ Monitor ☒ Maintenance ☐ Engineer
<u>Training Wall Issues</u> Material: Concrete Alignment: Good alignment Condition: Poor Description of Issue: The right training wall is cracked and deteriorating with water and cementitious material eroding from the construction joints.	☐ None ☒ Monitor ☒ Maintenance ☒ Engineer

Principal Spillway Drains	Number
No drains associated with the principal spillway structure were observed during the inspection.	0

Principal Spillway Images

Photo 1. Principal spillway weir viewed from sluiceway structure (right side of dam) with large trees



Photo 2. Principal spillway viewed from Edge Hill Road (left side of dam)



Outlets
Number of Outlets: 1

Sluiceway Structure	
Elevation: Mid-height of dam	Location: Right abutment
Drain Size and Configuration: 6-foot diameter corrugated galvanized metal pipe (CGMP) sluiceway	Access: Accessible from right abutment of dam off VT RT 11
Additional Comments: The outlet was not operated during inspection. 80 inches measured from current water level to top of LLO structure.	

Outlet Issues	Action
<u>Inoperability</u> Description of Issue: The sluice gate stem is not operable due to a bend in the stem suspected to be from ice or debris. Investigate what is necessary to make operational or if replacement is needed.	☐ None ☒ Monitor ☒ Maintenance ☒ Engineer
<u>Concrete Structure</u> Issues: ☐ Bug holes☐ Popouts☒ Isolated crack ☐ Hairline crack☐ Honeycombing☐ Exposed rebar ☒ Efflorescence☐ Scaling☐ Disintegration ☐ Spalling☐ Crazed/Map cracks☐ Other: Location: Entire Surface Description of Issue: Water was leaking through cracks and separated concrete.	☐ None ☒ Monitor ☒ Maintenance ☒ Engineer
<u>Outlet Conduit</u> Description of Issue: 6-foot diameter metal pipe has numerous perforations, leakage, and corrosion throughout.	☐ None ☒ Monitor ☐ Maintenance ☒ Engineer
<u>Leakage</u> Flow Rate: approximately 100 gpm Description of Issue: Leakage was observed through the sluiceway structure with a flow rate estimated to be about or exceed 100 gpm.	☐ None ☒ Monitor ☐ Maintenance ☒ Engineer

Outlet Images

Photo 1. Concrete sluiceway structure viewed from right abutment of dam



Photo 2. 6-foot diameter corrugated galvanized metal pipe on downstream side of sluiceway structure



Outlet Images

Photo 3. LLO sluice gate on upstream side of sluiceway structure



Downstream Wall

Wall Type: Dry-set stone masonry Length: Approximately 73 feet (length of spillway weir) Wall Height (exposed): 13 feet	Horizontal Wall Alignment: Good Vertical Wall Alignment: Good Joint Condition: Enlarged joints with large voids between stones Abutment Contact Condition: Leakage observed at the right abutment connected with the concrete LLO structure. Surface Condition: Stone masonry; pressurized voids and leakage throughout	Unusual Wall Movement: ☐ Yes ☒ No
Additional Notes: Right side of the downstream wall could not be inspected due to leakage through the wall.		

Downstream Wall Issues	Action
Leakage Flow Rate (gpm): Unable to measure Description of Issue: Significant and forceful leakage is present through the downstream wall. Two known openings exist on the downstream wall: one is 3 feet wide and located at the dam toe about 10 feet from the left end of the dam, and the other is 9 feet below the crest near the angle point and has a concrete patch. This second opening could potentially be an old low-level outlet.	☐ None ☒ Monitor ☐ Maintenance ☒ Engineer

Downstream Wall Issues	Action
<u>Could Not Inspect:</u> run of river dam Description of Issue: Leakage through the dam, 200-300 gpm.	☐ None ☒ Monitor ☐ Maintenance ☐ Engineer

Downstream Wall Images

Photo 1. Leakage through downstream stone masonry wall



Photo 2. Downstream wall viewed from Edge Hill Road



GENERAL INFORMATION

DSP Website: <https://dec.vermont.gov/water-investment/dam-safety>

A dam owner is responsible for the safe management and operation of their dam, and compliance with Vermont Title 10, Chapter 43.

Purpose: The Dam Safety Program conducts periodic safety inspections of non-federal, non-power dams to determine their condition and the extent to which they pose a potential or actual threat to life, property, and the environment. The dam safety program (DSP) performed this inspection in accordance with 10 V.S.A. § 1105.

Limitations: The condition rating reported herein is based on visual inspection of the dam under conditions present at the time of the inspection, and using information on file. Detailed investigations/analyses are beyond the scope of this report. The condition of the dam depends on numerous and constantly changing internal and external conditions and is evolutionary in nature. It would be incorrect to assume that the reported condition of the dam will continue to represent the condition of the dam in the future.

Hazard Potential Classifications:

HIGH: Dams where failure or mis-operation will probably cause loss of human life.

SIGNIFICANT: Dams where failure or mis-operation results in no probable loss of human life but can cause economic loss, environment damage, disruption of lifeline facilities, or impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

LOW: Dams where failure or mis-operation results in no probable loss of human life and low economic and environmental losses.

MINIMAL: A dam that meets the LOW hazard definition, above, but is only capable of impounding less than 500,000 cubic feet.

Condition Ratings:

SATISFACTORY: No existing or potential dam safety deficiencies are recognized. Acceptable performance is expected under all loading conditions (static, hydrologic, seismic) in accordance with the applicable regulatory criteria or tolerable risk guidelines.

FAIR: No existing dam safety deficiencies are recognized for normal loading conditions. Rare or extreme hydrologic and/or seismic events may result in a dam safety deficiency. Risk may be in the range to take further action.

POOR: A dam safety deficiency is recognized for loading conditions which may realistically occur. Remedial action is necessary. POOR may also be used when uncertainties exist as to critical analysis parameters which identify a potential dam safety deficiency. Further investigations and studies are necessary.

UNSATISFACTORY: A dam safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution.

NOT RATED: The dam has not been inspected, is not under state jurisdiction, or has been inspected but, for whatever reason, has not been rated.

Definitions:

Upstream: The side of the dam that borders the impoundment located up gradient of the dam.

Downstream: The side of the dam opposite the upstream side, located down gradient of the dam.

Right: The area to the right when looking in the downstream direction (also known as “river right”).

Left: The area to the left when looking in the downstream direction (also known as “river left”).

Structural Height-of-Dam: The vertical distance from the lowest point in the stream bed or native ground surface at the downstream toe of the dam to the elevation of the lowest non-overflow section of the dam crest.

Embankment: An artificially constructed feature usually consisting of earth and rock with sloping sides and a flat crest, intended to provide a permanent barrier that impounds or is capable of impounding water.

Dam Crest: The top of the non-overflow portion of the dam.

Abutment: The part of a valley side against which a dam is constructed. An artificial abutment is sometimes constructed at the interface with a concrete gravity section.

Normal Pool: The water elevation, reservoir surface area, and reservoir storage capacity that is prevalent at the site or typical under normal, non-storm conditions. Typically, this level is controlled by the principal spillway.

Maximum Pool: The highest water elevation, reservoir surface area, and reservoir storage capacity that could be impounded by the dam, including accumulated sediments, with the water or liquid level at the top of the lowest non-overflow part of the structure or dam crest.

Principal spillway: A structure that maintains normal pool conditions and over which daily non-storm related and flood flows are discharged. Also called a primary or service spillway.

Auxiliary Spillway: The secondary spillway not in use under normal conditions but used when needed to pass flood flows that exceed the capacity of the principal spillway.

Low-level outlet or "LLO": An installed pipe and operable gate or valve typically located in or near the foundation of a dam that can be used to alter water levels, drain the reservoir, or otherwise meet operational or safety needs. Also called a pond drain.

Inflow Design Flood or "IDF": The flood event which the hydraulic capacity of the spillway structure(s) and dam is designed and required to safely pass. Dam safety rules under development are considering the following prescriptive IDF's, Low and Minimal = 100-year, Significant = 1,000-year, High = PMF. The prescriptive IDF may be refined to a site specific IDF if additional analyses are performed.

Emergency Action Plan (EAP): A written plan that identifies the area that would likely be inundated by the failure of a dam and identifies the actions that should be taken by the Owner to protect life, property, lifelines, and the environment in the event of a dam failure or threatening condition at the dam. The plan is usually implemented in cooperation with the local, regional, and state emergency personnel.

Operation and Maintenance Plan or "O&M": A plan that provides guidelines for the necessary, regular operation and maintenance activities at a dam.

Definitions from the Administrative Rule:

<https://anrweb.vt.gov/DEC/IronPIG/DownloadFile.aspx?DID=185352&DVID=0>