

Town of Londonderry Williams Dam

Williams Dam (State ID #115.01) is a run-of-the-river, is owned by the Town of Londonderry.

Dam Background & History

A three-story machine shop on Main Street was erected in 1867, which led to, Mr. Williams to construct a stone dam across the West River in 1883.



1908 – Mill Dam, Bridge and Bacon's Store

Williams Dam has endured several significant flood events: 1927 flood, 1973 flood and the 2011 Tropical Storm Irene flooding. (2011 flood pictured below)



Alternative Analysis

- Review of available information and records,
- Inspection of the dam & sediment sampling,
- Meetings with Town Staff and State of Vermont Dam Safety engineers,
- Hydraulic analysis of conceptual alternatives
- Conceptual plans and construction cost estimates,
- Review of permitting requirements
- Prepare report to present findings to the Town



Vermont Dam Safety Program conducted an inspection in August 2015 and issued a report identifying concerns regarding the dam's condition and provided the dam an overall condition rating of Poor.

In November 2021, the Town engage DuBois & King, Inc., to evaluate the condition of the dam and to determine comparative costs of taking no action, or completing project to rehabilitate, replace or remove the dam.



**DuBois
& King** inc.



Vermont Dam Safety Coordination

Several meetings to discuss the dam's condition, upcoming dam regulation changes, the dam's hazard classification, and other aspects of the dam.

Dam Safety Program completed an updated hazard analysis of the dam. The classification of the dam is important to the alternative analysis as it establishes the regulatory and design standards for the dam rehabilitation and replacement alternatives. The breach and hazard analysis resulted in a reclassification of Williams Dam to Significant Hazard.

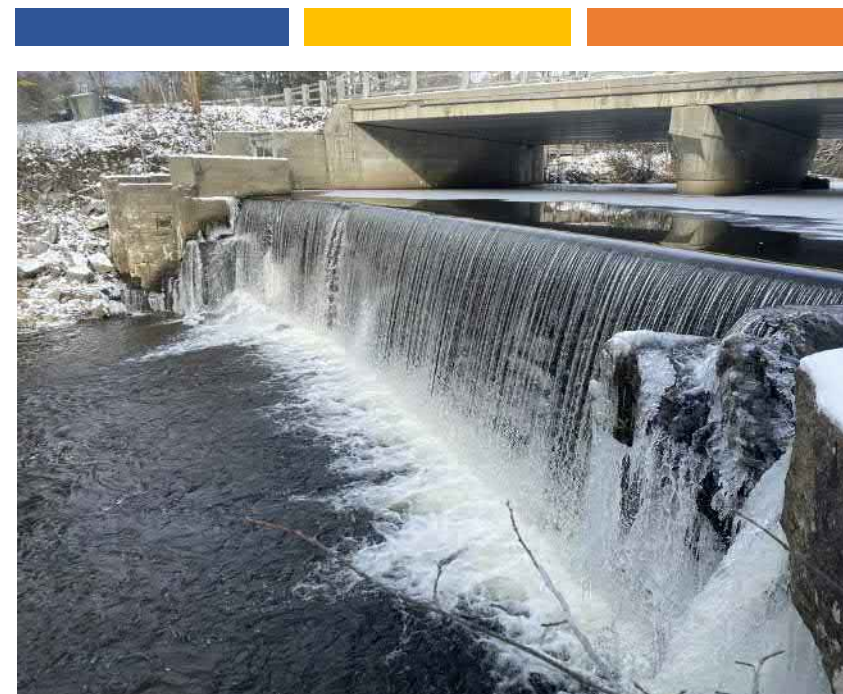
Data Collection

The following tasks were completed to collect information about the dam to complete assessment of the existing condition of the dam and to develop alternative options for the dam.

- Topographic survey of the dam, Route 11 bridge, and surrounding area
- Bathymetric survey of the upstream river
- Dam Inspection
- Sampling and Testing of the upstream sediment
- Wetland Review

Hydraulic Analysis

Developed a 2-dimension hydraulic model of the West River and Williams Dam to evaluate existing conditions and alternatives for various flood events (10-yr, 50-yr, 100-yr, and 1000-yr). See attached hydraulic exhibits.



Summary of Deficiencies

Williams Dam is in poor condition and requires action by the Town of Londonderry. The following are a list of deficiencies identified during the site inspection, by Vermont Dam Safety, and from the analysis:

- Dam Structural Integrity
- Inadequate Dam Operating Controls
- Insufficient Hydraulic Capacity



Alternatives

- No Action
What occurs if the Town does not complete remedial action to the dam?
- Dam Rehabilitation
Retain existing dam and construct independent or supporting structure
- Dam Replacement
Construct new dam and demolish existing dam
- Dam Removal
Demolish existing dam and reconstruct West River channel

No Action Alternative

This alternative assumed the dam would continue remain in its current condition and that the Town would not implement any remedial measures to repair the dam. Without improvements to the dam, the structure is expected to continue to deteriorate. Failure of the dam may occur due to the deterioration of the dam.

With the implementation of the new dam rules, the State of Vermont will focus initially on High and Significant Hazard Dams to ensure that action is taken to rehabilitate dams in poor condition. Because of this, a no action alternative may not be acceptable to the Dam Safety Program. It is likely the Dam Safety program may take enforcement actions to ensure public safety, which will require the Town to implement one of the following alternatives.

Dam Rehabilitation Alternative

Retain the existing dam and maintain the current water level. The existing spillway is left in place with minor repairs, however, a new concrete wall is constructed on the upstream face of the dam. This structure will be designed to be independent of the existing dam. The following are a description of improvements associated with this alternative:

- Construct new concrete spillway on upstream face of existing spillway.
- Dredge sediment to approximately 50-feet upstream of existing dam.
- Demolish a portion of the existing low-level outlet structure to remove the headwall, corrugate outlet pipe, and slide gate.
- construct a new headwall with access deck, new slide gate, and downstream concrete flume walls within existing walls.
- New trashrack/debris diversion to protect slide gate and access deck.
- Install new abutment training walls and stone riprap along abutments.
- Dredge existing dry hydrant location.



Dam Replacement Alternative

Construct a new concrete dam downstream of the existing dam. The location of the new dam, approximately 20-ft downstream was selected to allow for a longer spillway to improve hydraulics and to allow for construction of the new dam with the existing dam in-place. The following are a description of improvements associated with this alternative:

- Construct new concrete spillway on upstream face of existing spillway.
- Construct new concrete dam downstream of the existing dam.
- New low-level outlet with new slide gate, new trashrack/debris diversion, new access deck, and new outlet flume.
- Dredge sediment to approximately 50-feet upstream of existing dam and demolish existing dam.
- Install new abutment training walls and stone riprap along abutments
- Abandon existing hydrant location and install new hydrant location at the Veteran's Park.

Dam Removal Alternative

Demolish the existing dam and dredge the West River to create new stable river channel. Based upon the historic information and the down-stream river bottom, it is presumed that there is a bedrock bottom of the West River below the sediment. The following are a description of improvements associated with this alternative:

- Dredge upstream of the existing to natural channel bottom.
- Demolish the existing dam.
- Stabilize the new channel with natural stabilization techniques and with rip rap.
- Abandon existing hydrant location.



Alternative Cost Comparison

	No-Action	Dam Rehabilitation	Dam Replacement	Dam Removal
Annual Fees	\$2,000	\$2,000	\$2,000	\$0
Construction Cost	\$0	\$800,000	\$2,100,000	\$400,000
Engineering Fees	\$0	\$80,000	\$120,000	\$40,000
Permit Application Fees	\$0	\$13,000	\$23,000	\$20,000
Total	\$2,000*	\$895,000	\$2,245,000	\$460,000

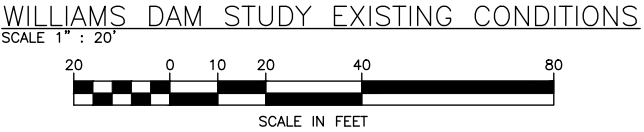
(D&K internal review occurring on alternatives and costs may adjust.)

	Dam Alternatives			
	No-Action	Dam Rehabilitation	Dam Replacement	Dam Removal
Addresses Deficiencies	This alternative does not address any deficiencies.	✓✓ This alternative improves structural integrity, and dam controls	✓✓✓ This alternative replaces existing dam with dam design to all applicable standards.	✓✓✓ This alternative removes the existing dam.
Continued Maintenance Costs and Annual Fees	This alternative does not address any deficiencies.	✓✓ This alternative improves structural integrity, and dam controls	✓✓✓ This alternative replaces existing dam with dam design to all applicable standards.	✓✓✓ This alternative removes the existing dam.
Total Cost	\$1,850 Although least expensive alternative, the dam requires action which will result in some cost in the future.	✓✓ \$892,350 This alternative is the most cost efficient that maintains a dam structure.	✓ \$1,330,350 This alternative replaces the existing structure with a new dam.	✓✓✓ \$424,700 Most cost effective that removes all future expenses.
Additional Funding Available		✓ Possible funding through State Historic Preservation Grant		✓✓✓ This alternative numerous funding options.





DATUM:
VERTICAL: NAVD 88 GPS DERIVED
HORIZONTAL: NAD 83 GPS DERIVED



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**NOT FOR
CONSTRUCTION**

NO.	DATE	DESCRIPTION	BY	CK'D

TOWN OF
LONDONDERRY
100 OLD SCHOOL
STREET
S. LONDONDERRY,
VT 05155

WILLIAMS DAM
STUDY (#115.01)
LONDONDERRY, VT

SHEET TITLE

EXISTING
CONDITIONS SITE
PLAN

DRAWN BY RJL	DATE PROGRESS
CHECKED BY CWJ	D&K PROJECT # 827442
PROJ. ENG. CWJ	

SHEET NUMBER

1
SHEET 1 OF 7

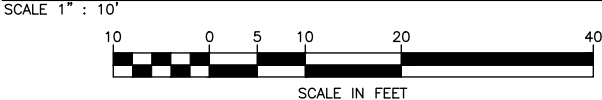


1. NEW CONCRETE WALL ON UPSTREAM FACE OF EXISTING DAM.
2. LEAVE EXISTING DAM IN PLACE AND CONSTRUCT A PUBLIC INFORMATION BOARD.
3. NEW LOW LEVEL OUTLET WITH NEW PIPE AND HEADGATE.
4. NEW TRASHRACK/DEBRIS DIVERSION.
5. NEW ABUTMENT TRAINING WALLS AND STONE RIPRAP ALONG ABUTMENTS.
6. DREDGE ACCUMULATED SEDIMENT BEHIND EXISTING DAM AND EXISTING DRY HYDRANT LOCATION.



DATUM:
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HORIZONTAL: NAD 83 GPS DERIVED

CONCEPTUAL ALTERNATIVE DAM REPLACEMENT



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TOWN OF
LONDONDERRY
100 OLD SCHOOL
STREET
S. LONDONDERRY,
VT 05155

WILLIAMS DAM
STUDY (#115.01)

LONDONDERRY, VT

SHEET TITLE

DAM REHABILITATION ORTHOIMAGERY

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CHECKED BY	D&K PROJECT # 827442
PROJ. ENG. CWJ	

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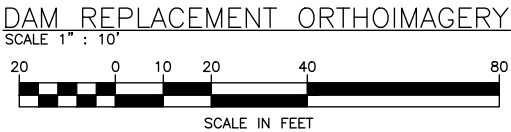
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SHEET 3 OF 7

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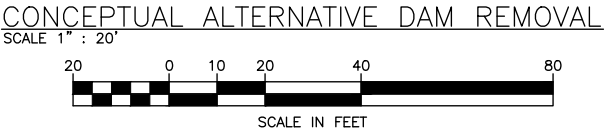
SHEET 5 OF 7

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DATUM:
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HORIZONTAL: NAD 83 GPS DERIVED

REMOVAL ALTERNATIVE:

1. DREDGE ACCUMULATED SEDIMENT UPSTREAM OF THE EXISTING DAM TO THE NATURAL CHANNEL BOTTOM.
2. NEW STONE RIPRAP ALONG RIVER BANKS.
3. DEMOLISH THE EXISTING DAM. TO PRESERVE ITS HISTORIC SIGNIFICANCE, CONSTRUCT A PUBLIC INFORMATION BOARD IN VETERAN'S PARK.
4. ABANDON EXISTING HYDRANT LOCATION.



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WILLIAMS DAM
STUDY (#115.01)

LONDONDERRY, VT

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DAM REMOVAL
ORTHOIMAGERY

DRAWN BY RJL	DATE PROGRESS
CHECKED BY	D&K PROJECT # 827442
PROJ. ENG. CWJ	

SHEET NUMBER

7

SHEET 7 OF 7

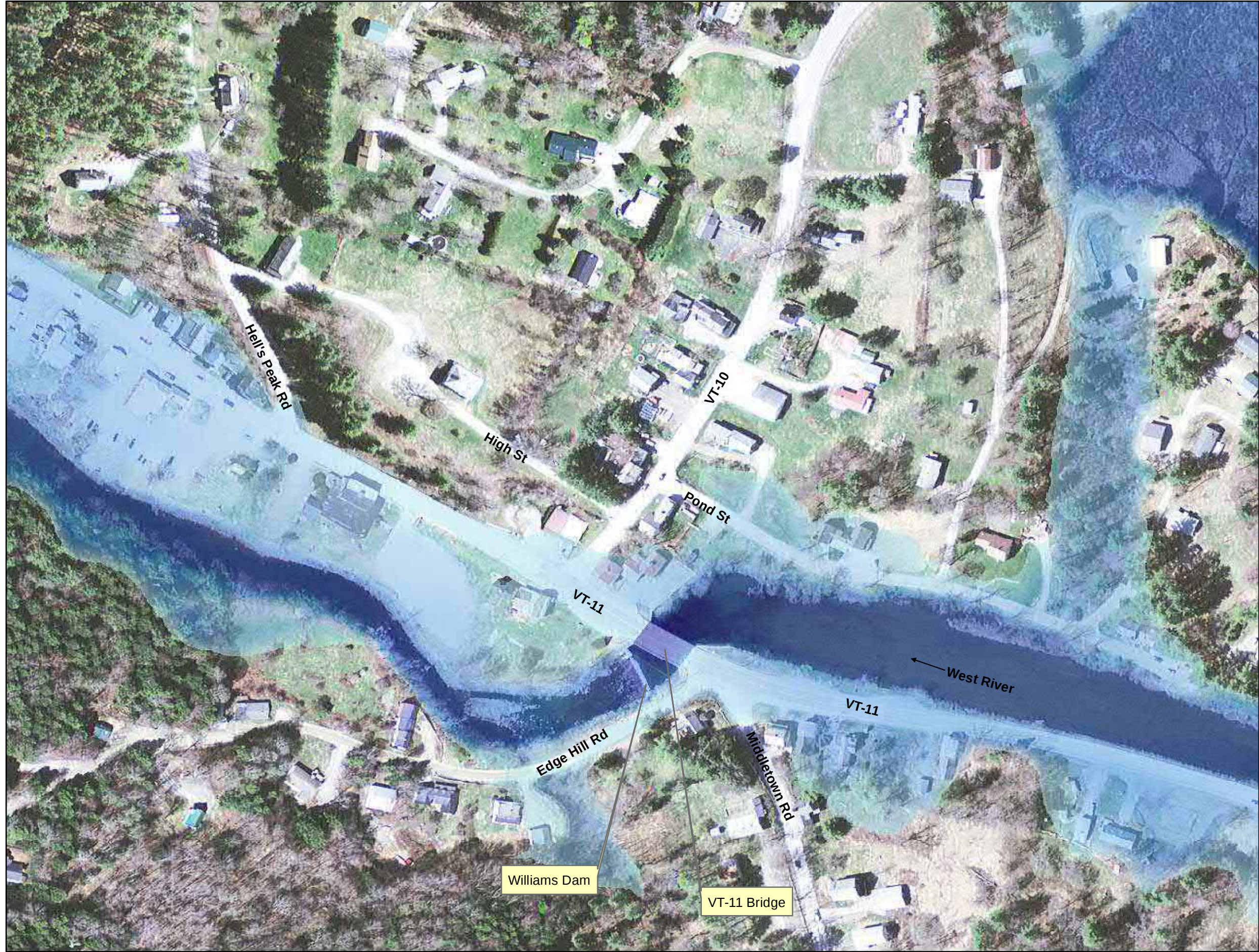


Figure 4

**Existing Conditions
100-Yr Water Depth**

**Williams Dam Study
(#115.01)**

**Town of Londonderry
100 Old School Street
S. Londonderry
VT 05155**

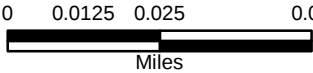
Legend

Existing 100-yr Flood Depth

Value

High : 22.2 ft

Low : 0.01 ft



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& King
INC.**