December 16, 2022

Town of Londonderry
Shane O’Keefe
Town Administrator
100 Old School Street
South Londonderry, VT 05155

Dear Shane,

Please find attached/enclosed a Preliminary Investigation and Feasibility Report (PIFR) for Williams Dam, which was completed by RJH Consultants, Inc. Based in the information in this PIFR, we do not believe that renovation or replacement of this dam would be eligible for USDA-Natural Resources Conservation Service’s Watershed and Flood Prevention Operations (WFPO) program. The “Pie-in-the-Sky” alternative #4 on page 8 states:

“Alternative 4 represents a “pie-in-the-sky” solution. This alternative includes the replacement of Williams Dam as described in Alternative 2 and the construction of floodwalls on both sides of the West River floodplain boundary upstream of Williams Dam to provide 10-year flood protection to Londonderry. The floodwalls will have an average height of approximately 10 feet and a total length of approximately 8,500 feet. Additionally, approximately 2,000 feet of Route 100 will be raised an average of 6 feet to intersect the required crest elevation of the western floodwall and contain 10-year flood flows in the West River floodplain.”

A “run of the river” dam in this location, at best, will only provide protection from a 10 year flood event. Under WFPO, dams must meet the flood prevention criteria stated in TR-60 which requires a minimum protection from a 100 year flood event. We do not feel it is feasible for this dam in this location to provide the necessary flood protection and storage. However, the program could provide funding for the removal of this dam for the purpose of enhancing fish and wildlife migration and habitat.

It is our understanding that you have already been contacted by the Connecticut River Conservancy regarding removal of this dam and they offered to provide the necessary technical and financial assistance to properly remove the dam. Unless you can find other sources of money to renovate this dam, NRCS recommends the removal of the Dam through the Connecticut River Conservancy.

If you have any question regarding the attached/enclosed PIFR or the project in general, please contact Bob Thompson, State Conservation Engineer (802)951-6796 x232.

TRAVIS L. THOMASON
State Conservationist

Attachment/Enclosure: Preliminary Investigation Findings Report, Williams Dam, Londonderry, VT
Natural Resources Conservation Service (NRCS) Watershed Operations Program

Preliminary Investigation

Findings Report (PIFR)

Williams Dam, Londonderry, VT
Contents

Abbreviations .................................................................................................................. 4
References ......................................................................................................................... 5
Summary ............................................................................................................................. 8
Applicable Agency Authority and Authorized Purposes .................................................. 9
Potential for 20 Percent Agricultural (Rural) Benefits ..................................................... 10
Project Overview ............................................................................................................. 10
Proposed Project Name ................................................................................................... 10
State ................................................................................................................................. 10
County/Parish .................................................................................................................. 10
Congressional District .................................................................................................... 10
USGS Hydrologic Unit Code (HUC) and Watershed Name ........................................... 10
General Coordinates of the Watershed ......................................................................... 10
Project Setting ................................................................................................................. 11
Potential Project Area - Size ......................................................................................... 11
Energy .............................................................................................................................. 14
Human ............................................................................................................................. 14
Resources of Special Concern ....................................................................................... 15
Clean Water Act ............................................................................................................... 15
Clean Air Act .................................................................................................................... 15
Coastal Zone Management ............................................................................................. 15
Coral Reefs ...................................................................................................................... 15
Cultural Resources ......................................................................................................... 16
Endangered & Threatened Species ................................................................................ 16
Environmental Justice .................................................................................................. 16
Essential Fish Habitat .................................................................................................... 17
Floodplain Management ............................................................................................... 17
Invasive Species .............................................................................................................. 17
Migratory Birds/Bald & Golden Eagle Protection Act .................................................... 17
Natural Areas .................................................................................................................. 18
Prime and Unique Farmlands ....................................................................................... 18
Riparian Area ................................................................................................................... 18
Scenic Beauty .................................................................................................................. 18
Wetlands .......................................................................................................................... 19
Wild and Scenic Rivers ................................................................................................. 19
Proposed Project Purpose and Need Statement ............................................................. 20
Resource Concerns and Opportunities ......................................................................... 21
Opportunities .................................................................................................................. 22
Soil .................................................................................................................................. 22
Water .............................................................................................................................. 22
Air ...................................................................................................................................................... 22
Plants .................................................................................................................................................. 22
Animals ............................................................................................................................................. 22
Energy ............................................................................................................................................... 22
Human ............................................................................................................................................... 22
State, Tribal, Federal Stakeholder Engagement ............................................................................. 23
Potential Alternatives ....................................................................................................................... 24
General Discussion of Alternatives ................................................................................................ 24
Alternative 1: .................................................................................................................................. 24
Alternative 2: .................................................................................................................................. 25
Alternative 3: .................................................................................................................................. 25
Alternative 4: .................................................................................................................................. 25
Facilitating Factors .......................................................................................................................... 29
Obstructing Factors .......................................................................................................................... 30
Environmental Document .................................................................................................................. 31
Sponsors ............................................................................................................................................ 32
Potential Cooperating Agencies ....................................................................................................... 33
Potential Stakeholders ...................................................................................................................... 34
Notifications ..................................................................................................................................... 35
Estimated Project Implementation Timeline ...................................................................................... 35
Recommendation .............................................................................................................................. 36
Glossary ............................................................................................................................................ 37
Appendix .......................................................................................................................................... 37
Abbreviations

BCC  Birds of Conservation Concern
CFS  Cubic Feet Per Second
D&K  DuBois & King Engineering
EA   Environmental Assessment
EE   Environmental Evaluation
EPA  Environmental Protection Agency
FEMA Federal Emergency Management Agency
GIS  Geographic Information System
HUC  Hydrologic Unit Code
MOU  Memorandum of Understanding
N/A  Not Applicable
NRCS Natural Resources Conservation Service
NWPM National Watershed Program Manual
PIFR Preliminary Investigation Feasibility Report
STC  State Conservationist
SWAPA Soil, Water, Air, Plants, and Animals
TMDL Total Maximum Daily Load
USACE U.S. Army Corps of Engineers
USFWS U.S. Fish and Wildlife Service
VT DSP Vermont Dam Safety Program
VTDEC Vermont Department of Environmental Conservation
VTFWD Vermont Fish and Wildlife Department
WSP  WSP USA Environment & Infrastructure
References


[22] National Oceanic and Atmospheric Administration. Essential Fish Habitat Mapper. Available at the following link: EFH Mapper (noaa.gov). Accessed on 10/14/2022


[31] Williams Dam Inspection Report 2015-08-25

Summary
The Town of Londonderry, Vermont (Londonderry) is requesting assistance with the Williams Dam Rehabilitation Project. The project area is within Londonderry and includes the dam site and the reaches of the West River upstream and downstream of the dam structure. Londonderry will be involved with the project through its completion and will take responsibility for operation and maintenance of the project area.

The primary PL-566 project purpose is flood prevention, with secondary purposes including public recreation, public fish and wildlife, and maintenance of a water supply for fire protection. Williams Dam is currently in poor condition. The State of Vermont Dam Safety Program (VT DSP) has required action from Londonderry to address the dam safety deficiencies by either replacing, rehabilitating, or removing Williams Dam. In 2022, VT DSP increased the hazard classification of Williams Dam from low to significant hazard. The flooding that would result from the failure of Williams Dam is a threat to the public health and safety of Londonderry.

Londonderry has primary interest in rehabilitating or rebuilding Williams Dam for the aesthetic and socio-economic value it provides. The impoundment also provides recreational opportunities and is a source of water for firefighting.

NRCS considered four alternatives: 1) a “No Action/Future Without Project” alternative, 2) a structural alternative, 3) a non-structural alternative, and 4) a pie-in-the-sky alternative. Each alternative is briefly summarized below:

1. Alternative 1 represents the “No Action/Future Without Project” alternative. This alternative would postpone the project indefinitely while other sources of funding were secured. During the delay, the public will remain at risk of the flooding associated with the failure of Williams Dam. Temporary rehabilitation measures or dam removal may be required to address dam safety deficiencies and reduce the public risk.

2. Alternative 2 represents a structural solution. This alternative includes demolition and removal of the existing dam and construction of a new concrete gravity dam approximately 20 feet downstream of the existing structure. The new dam will also be a run-of-the-river dam and consist of a principal spillway and a low-level outlet structure. The crest elevation of the new dam will be the same as the existing dam and the extents of the impoundment will be unchanged. Approximately 66 feet of the length of the dam crest will serve as a straight-drop overfall principal spillway to maintain the aesthetics of the existing dam.

3. Alternative 3 represents a non-structural solution. This concept includes purchasing 11 structures located in the area inundated by a breach of Williams Dam, demolishing and removing the structures and utilities, and rezoning the land areas to prevent future development. This concept addresses human safety but does not address the deficiencies at Williams Dam.

4. Alternative 4 represents a “pie-in-the-sky” solution. This alternative includes the replacement of Williams Dam as described in Alternative 2 and the construction of floodwalls on both sides of the West River floodplain boundary upstream of Williams Dam to provide 10-year flood protection to Londonderry. The floodwalls will have an average height of approximately 10 feet and a total length of approximately 8,500 feet. Additionally, approximately 2,000 feet of Route 100 will be raised an average of 6 feet to intersect the required crest elevation of the western floodwall and contain 10-year flood flows in the West River floodplain.
Applicable Agency Authority and Authorized Purposes

The table below provides documentation that the project is eligible for federal assistance and will meet statutory requirements.

<table>
<thead>
<tr>
<th>Describe the potential project watershed area; how does the area meet the requirements outlined in NRCS’s National Watershed Program Manual [22].</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Response:</strong> The potential project watershed is primarily comprised of northern hardwood forest, comprised of steep slopes, and contains West River. The watershed area is sparsely populated.</td>
</tr>
<tr>
<td><strong>Will the project area exceed 250,000 acres in size?</strong></td>
</tr>
<tr>
<td><strong>If over 250,000 acres will it be divided into sub-watersheds in one plan?</strong></td>
</tr>
<tr>
<td><strong>Potential Project Area Size:</strong></td>
</tr>
<tr>
<td><strong>Will any single structure provide more than 12,500 acre-feet of floodwater detention capacity, or have a 25,000 acre-feet of total capacity?</strong></td>
</tr>
<tr>
<td><strong>How many recreational developments will be included in the project area?</strong></td>
</tr>
<tr>
<td>• One development in a project area less than 75,000 acres</td>
</tr>
<tr>
<td>• Two developments in a project area between 75,000 and 150,000 acres</td>
</tr>
<tr>
<td>• Three developments in a project area greater than 150,000 acres</td>
</tr>
<tr>
<td><strong>Which authorized purposes will the project address? (Indicate only one purpose as primary):</strong></td>
</tr>
<tr>
<td><strong>Primary</strong></td>
</tr>
<tr>
<td>• Flood prevention</td>
</tr>
<tr>
<td>• Watershed Protection</td>
</tr>
<tr>
<td>• Public Recreation</td>
</tr>
<tr>
<td>• Public Fish and Wildlife</td>
</tr>
<tr>
<td>• Agricultural Water Management</td>
</tr>
<tr>
<td>• Municipal or Industrial Water Supply</td>
</tr>
<tr>
<td>• Water Quality Management</td>
</tr>
<tr>
<td><strong>Will the project produce substantial benefits to the general public, to communities, and to groups of landowners?</strong></td>
</tr>
<tr>
<td><strong>Can the project be installed by individual or collective landowners under alternative cost-sharing assistance?</strong></td>
</tr>
<tr>
<td><strong>Will the project have strong local citizen and sponsor support through agreements to obtain land rights, permits, contribute the local cost of construction, and carry out operation and maintenance.</strong></td>
</tr>
<tr>
<td><strong>Will the project take place in a Special Designated Area? (if yes, check applicable area below.)</strong></td>
</tr>
</tbody>
</table>

1- For specific appropriations, the 250,000 acres is waived except for watershed projects with the flood prevention purpose.
2- Watersheds exceeding 250,000 acres can be broken up into smaller sub-watersheds.
3- The project will not meet the statutory requirements.
Potential for 20 Percent Agricultural (Rural) Benefits

The Williams Dam Rehabilitation Project will have the authorized purpose of flood prevention. The other identified purposes of the project include public recreation, public fish and wildlife, and maintenance of a water supply for fire protection. The loss of the Williams Dam impoundment would have a negative impact to the local community and visitors to the area. The Town of Londonderry, Vermont had a recorded population of 180 during the 2020 U.S. census and qualifies as a rural area. Rural benefits associated with the project are estimated to include community recreation and wildlife habitat.

Project Overview

<table>
<thead>
<tr>
<th>Proposed Project Name</th>
<th>Description: Williams Dam Rehabilitation Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>Vermont</td>
</tr>
<tr>
<td>County/Parish</td>
<td>Windham</td>
</tr>
<tr>
<td>Congressional District</td>
<td>Vermont: At-large</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>USGS Hydrologic Unit Code (HUC) and Watershed Name</th>
</tr>
</thead>
</table>

Map of the Headwaters West River Watershed, Windham County, VT

Williams Dam is located within the Headwaters West River Watershed (010801070301), which is a sub-watershed to the Headwaters West River Watershed (0108010703).

- Headwaters West River: 010801070301
- Total Watershed Drainage Area: 26,122 acres
- Approximate center of watershed: 43°14'48"N, 72°50'06"W

General Coordinates of the Watershed
## Project Setting

Williams Dam is located in Windham County, Vermont, about 18 miles west of Rockingham, VT. Newfane is the County seat of Windham County.

Williams Dam is a run-of-the-river dam constructed across West River consisting of a stone masonry primary spillway with a concrete cap and low-level outlet at the right abutment. The dam was originally constructed in 1883 for a machine shop. The dam is approximately 13 feet in height and impounds approximately 24.2 acre-feet of water at the principal spillway crest elevation [2].

The watershed is situated on the Green Mountain massif. Regional bedrock primarily consists of Middle and Early Mesoproterozoic era biotite-quartz-plagioclase and other aluminous schist and gneisses of the Washington Genesis and Wilcox formations and related rocks. Middle and early Mesoproterozoic South Londonderry Igneous Suit and Stratton Mountain Intrusive Suit gneisses are also commonly observed within the watershed. Bedrock transitions to Lower Cambrian and Neoproterozoic Tyson Formation near the western and eastern edges of the watershed. A thrust fault is mapped approximately at the location of Williams Dam; however, the fault is inactive [32,33].

South-central Vermont has a cold and temperate climate. High temperatures in the area in July average in the 70s °F; high temperatures in January average in the 20s °F, while the average low is around 10 °F.

The majority of the West River Basin upstream of Williams Dam is undeveloped and composed of northern hardwood forest. Residential houses are sparsely spaced along and adjacent to West River upstream of the dam. The Town of Weston is located approximately 5 miles north of the dam along West River.

## Potential Project Area - Size

The West River Basin upstream of Williams Dam has an area of approximately 40.8 square miles (about 26,122 acres) and lies within the Headwaters of West River Watershed (HUC 010801070301).
<table>
<thead>
<tr>
<th>Resource Information</th>
</tr>
</thead>
</table>
| **Soils** | A variety of soil types have been identified around the project site. Mundal fine sandy loam is very stony, moderately to well drained, and is found on 8 to 15 percent slopes. Houghtonville fine sandy loam is very stony, well-drained, and found on 8 to 15 percent slopes. Worden loam contains boulders, is poorly drained, and is found on 8 to 15 percent slopes. Colton gravelly sandy loam is excessively drained and found on 8 to 15 percent slopes. Ondoawa fine sandy loam is well drained, found on 0 to 3 percent slopes, and is occasionally flooded. Rumney fine sandy loam is poorly drained and found on 0 to 3 percent slopes. The sediment built up behind the Williams dam has been sampled in two locations for contaminants. Samples were collected upstream of the dam, tested, and then compared to the “Vermont Watershed Management Division’s Recommended Guidelines for Evaluating Contaminant Concentrations in Freshwater Sediments and the Potential for those Contaminant Concentrations to Adversely Affect Aquatic Biota”. The samples did not reflect the presence of contaminants above Vermont thresholds. [1,2]  
| **Water** | The Williams Dam is a run-of-the-river dam that obstructs the West River in Londonderry, VT. The drainage area to the dam is 40.8 square miles. The basin gets an average of 53.6 inches of rain per year. The inundation area at the principal spillway crest elevation is 9.3 surface acres with a total storage volume of 24.2 acre-feet [2]. The total storage volume at the dam crest elevation is 97.1 acre-feet [2]. The maximum discharge at the dam is estimated to be 1600 cubic feet per second (cfs). The hazard class of this dam was upgraded to significant in 2022. [3,4]  
| **Air** | Based on 2021 data, air quality in the region is good 84.7 percent of the time, moderate 15.0 percent of the time, and unhealthy for sensitive groups 0.3 percent of the time. [5]  
| **Plants** | American Ginseng, Northeastern Bulrush, Butternut, Ornamental Hemlocks, and Spotted Wintergreens are likely found in the area. No endangered plant species are known to be in the area. Vermont has 71 state-endangered and 93 state-threatened plants. A complete list of these species can be found through the Vermont Natural Heritage Inventory and Vermont Fish and Wildlife Department. These species are protected under Vermont’s Endangered Species Law (10 V.S.A. Chap. 123). These listed plant species should continue to be considered and monitored throughout the project. [11,29]  

| Animals          | Three other dams are located downstream of the Williams Dam before the West River discharges into the Connecticut River. These dams inhibit fish passage from the Connecticut River to the project area. Fish are present in the project area but are generally confined between the reaches of rivers between dams. The project area includes Brook Trout Waters and used to be a prime area for Rainbow Trout fishing. Mussel species and Wood Turtles are also found upstream of the dam. Additionally, a deer wintering area is located 1.1 miles away from the project site. The dam is located in an urbanized area of a small town and is not expected to have a lot of wildlife habitat in the direct vicinity. Other animals that could likely be in the surrounding area and are not endangered, or threatened species include West Virginia Whites and the Common Loon. The forested area on the left overbanks 0.4 miles downstream of the dam is the most likely area for wildlife activity in close proximity to the project site. [6, 29] |
Windham county has eight powerplants that supply around 43,300 people with power. Of the 8 power plants, 5 are hydroelectric power plants, 2 are nuclear power plants, and 1 is a solar power plant. Londonderry is located in Windham County but does not have any power plants within its borders. [10]

Based on the census of 2020, the population of Londonderry, VT is 180 people. Ninety-four percent of people identify as white, four percent as multi-ethnic, one percent as Asian, and one percent as another race. One and a half percent of these people are Hispanic or Latino people of any race. Twelve percent of the population in Londonderry is over the age of 65, and the median age is 27.8 years old. The employment rate is 65.2 percent, and the median household income is $28,125. [9]

Route 11 (Main St) is a major road in the area. Construction at the dam could increase traffic on this road and Veteran’s Bridge (the Route 11 Bridge over the West River). Additionally, the left overbank adjacent to the dam consists of residential houses. Noise from the project would likely cause a temporary disturbance to the folks who live here during construction. Similarly, upstream of the dam on both overbanks are residential houses that could be within earshot of construction noise.

Overhead power lines are located on Route 11 near the dam. These power lines would need to be considered when determining site access.

The impounded water behind the dam (known as Mill Pond) was formerly a popular recreation spot. It was used by residents for fishing, swimming, and paddling. After years of sediment deposition behind the dam, Mill Pond has nearly lost all of its recreational use. A project at the Williams Dam would likely include dredging and could restore many of these recreational activities in Mill Pond. Additional water accesses would potentially be included in the project.

A dry hydrant used for fire protection is located upstream of the dam in Mill Pond. It is very important that the functionality of this hydrant be maintained. This dry hydrant is currently used by the Londonderry fire department and would likely be used by the South Londonderry fire department if the intake was cleared of sediment.
<table>
<thead>
<tr>
<th>Resources of Special Concern</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clean Water Act</strong></td>
<td>Vermont started the National Clean Watershed Needs Survey in March of 2022. The survey is scheduled to be completed in February 2023. The state will work with the Environmental Protection Agency (EPA) to complete this survey and evaluate what needs to be done to comply with the Clean Water Act. After this survey is completed, the results should be scanned for any information pertaining to the West River.</td>
</tr>
<tr>
<td></td>
<td>Starting three miles downstream of the dam, a 1.5-mile reach of the West River has been identified as having elevated bacteria levels. This section of river has been placed on the 303(d) list as an impaired river. Based on previous studies, this is a point source issue within that 1.5-mile reach of the West River. In 2011 a (TMDL) for E. Coli was established for this reach of the river. The TMDLs are 33, 77, and 126 organisms/100 ml for VT Class A, VT Class B, and the National Recommended Water Quality Criteria respectfully. [12,13]</td>
</tr>
<tr>
<td></td>
<td>The Vermont Department of Environmental Conservation - Rivers Program requires certain permits related to river work. For alternatives that involve construction or excavation in the river, are exempt from municipal regulation in flood hazard areas and river corridors, or involve water withdrawals, dam removal, or hydroelectric power, permits may be required. [15]</td>
</tr>
<tr>
<td></td>
<td>For project alternatives that require earth disturbance within or adjacent to waterways, a Section 404 permit will need to be acquired before beginning construction. [14]</td>
</tr>
<tr>
<td><strong>Clean Air Act</strong></td>
<td>Air quality is generally good in the proposed project area. Air quality only reaches moderate to unhealthy levels for sensitive groups a few days out of the year. The primary source of air pollution associated with the proposed project area is likely traffic on nearby roadways. Activities associated with the proposed project are unlikely to require a Title V permit. [5]</td>
</tr>
<tr>
<td><strong>Coastal Zone Management</strong></td>
<td>The West River drains into the Connecticut River and eventually into Long Island Sound. Long Island Sound has a Coastal Management Program, but due to the scale of the project and its distance from the mouth of the Connecticut River, this project will not likely have an impact on this coastal zone. [16]</td>
</tr>
<tr>
<td><strong>Coral Reefs</strong></td>
<td>N/A</td>
</tr>
</tbody>
</table>

Page 15
| Cultural Resources | Historically, Londonderry was occupied by Native American tribes. Some archeological sites have been found in the western and eastern valleys. Native American relics have been found close to Under Mountain Road in Londonderry. Those artifacts are now located in the Londonderry Historic Society Museum. Three other areas have been archeologically studied in Londonderry, and no archeologically significant findings were made in any of the three. Even though this area has already experienced construction and ground disturbance, this historic background should still be considered during the project. [18]  

The area around the project is not a historic zoning district. Additionally, there are no identified registered historic places in the area. The Vermont Division for Historic Preservation should be contacted during the planning process. [19, 20] |
| Endangered & Threatened Species | Northern Long-eared Bats may potentially be located near or within the proposed project area, and this species is currently listed as threatened under the U.S. Endangered Species Act. Monarch Butterflies may also be located near or within the proposed project area and are currently considered a candidate species for protection under the U.S. Endangered Species Act. The Little Brown Bat and the Tricolored Bat could also be in this area and are listed state endangered species. The Yellow-banded Bumble Bee is found in the area and is a listed state-threatened species. [17, 29]  

Vermont has 37 state-endangered and 16 state-threatened species. They are protected by the Vermont Protection of Endangered Species law (10 V.S.A. Chap. 123). These listed animal species should continue to be considered and monitored throughout the project.[11]  

According to local residents in Londonderry, there is at least one rare, threatened, or endangered mussel species upstream of the dam; however, this could not be confirmed based on available state Geographic Information System (GIS) data. |
| Environmental Justice | In 2009 the non-profit organization Neighborhood Connection was formed. This group provides underserved people in the area resources such as preventative health care, health education, and social services. The group helps individuals work through social service systems, counseling, and crisis management. [21]  

In Londonderry, minority groups represent 6 percent of the population. 19.6 percent and 12 percent of the population are under the age of 5 and over the age of 65, respectively. There are no individuals living below the poverty line in Londonderry. |
<table>
<thead>
<tr>
<th>Essential Fish Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>About nine miles downstream of the project site, the West River gains an Essential Fish Habitat designation. Given the distance downstream and the additional dam between the Williams Dam and the designated Essential Fish Habitat, this project is unlikely to have a significant impact on Essential Fish Habitat. [6, 22]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Floodplain Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>The project site is located within the 100-year Federal Emergency Management Agency (FEMA) Zone AE floodplain. Water surface elevation above sea level during a 100-year flood event is predicted to reach 1153 feet at the project site. Flooding over the banks of the West River occurs both upstream and downstream of the Williams Dam during this event. Residential and commercial structures on the right overbanks of the West River are within the 100-year floodplain near the project site. There has been historic flooding around the dam documented during large storms. For example, during Hurricane Irene in 2011, parking areas on the right overbank near the dam were under multiple feet of water following the storm. Hydraulic analysis by both FEMA and DuBois &amp; King shows that the dam and the Route 11 bridge impede the flow of the West River, leading to increased flooding upstream. [23] Hydraulic analysis showed that structures upstream and downstream of the dam are impacted by the 10-year flood event, which has a peak flow of approximately 5,400 cfs [2]; inundation mapping for more frequent flood events is not available.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Invasive Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>No aquatic invasive species have been detected in the project area. The U.S. Department of Agriculture had warnings of Lanternflies, Spongy Moths, and the relationship of firewood and invasive pests in Vermont. The projects plans should consider these warnings and follow guidance to ensure no invasive species are introduced during the project. [24, 25]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Migratory Birds/Bald &amp; Golden Eagle Protection Act</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bald Eagles are known to inhabit the proposed project area and typically breed between mid-October and the end of August. Other Birds of Conservation Concern (BCC) that may breed within the proposed project area include Black-billed Cuckoo, Bobolink, Canada Warbler, Chimney Swift, and Wood Thrush. Other birds in the BCC designation that could pass through the project area before or after breeding season include Cape May Warbler, Evening Grosbeak, and Olive-sided Flycatcher. [17]</td>
</tr>
</tbody>
</table>
### Natural Areas

Two official Natural areas in Vermont are near the project. Terrible Mountain is 12 miles north of the site, and Jamaica State Park is 12 miles south. Neither of these designated Natural areas are close enough to the site to be affected. [30]

Veterans Park is located next to the project site. This park has been proposed as a location for a historical plaque in the event that the dam is removed or replaced. This park will be affected during construction, but no negative long-term effects are expected.

Lowell Lake State Park is the closest state park to the Williams Dam and is 3.3 miles away. This project will have no impact on this park. However, if the Route 11 bridge had to close for any reason during the project, people who live on the north side of the West River would need to take an alternate and less direct route to get to the State Park.

The West River Trail is a popular natural area in Londonderry. The nearest trailhead to the project site is 4.4 miles downstream. This project is not expected to have any adverse impacts on this trail. [27]

### Prime and Unique Farmlands

Soils that have been identified as prime Farmland and Farmland of statewide importance have been found in the area around the project site. Ondoawa fine sandy loam is considered Prime Farmland. Rumney fine sandy loam is considered Farmland of statewide importance. These soils are located along the right overbank of the West River upstream and downstream of the project site. Areas with these soils have already been developed, so this project is unlikely to have any further impact. [1]

### Riparian Area

The riparian area downstream of the dam is mostly forest on the left overbank with some neighborhood development present. For about 500 feet downstream of the dam, Edge Hill Road runs parallel to the West River at a 30-foot offset on average until only forest is present in the riparian zone. The left overbank upstream of the dam is paralleled by Route 11 and Derry Woods Road. This imperviousness in the riparian zone could lead to increased stormwater runoff directly into the river. The right overbank of the West River is more developed both upstream and downstream of the dam. Urbanization is not overly intense and consists of homes, stores, and open space. Starting 2,600 feet upstream of the dam, the riparian area on both overbanks is made up mostly of wetlands and shrublands. [6]

### Scenic Beauty

The Williams Dam has been in place since 1883. Due to its long history, members of the public have grown an emotional connection to it and the dam feels like part of the town. The aesthetics and sounds of the dam and water are important to many members of the community. However, not all residents share these views.
| **Wetlands** | 32.5 acres of wetlands are located beginning 1,400 feet upstream of the dam and extend upstream in the floodplain corridor. Wetlands are of great ecological importance, so considerations of these sensitive areas must be factored into design and construction. Wetlands near the construction area should be flagged by a qualified consultant and applicable construction permits should be secured through the Vermont Department of Environmental Conservation. A Wetland Permit is expected to be needed for this project. [6,8] |
| **Wild and Scenic Rivers** | The National Rivers Inventory lists the West River as having an outstandingly remarkable value in the recreational and scenic categories. The Williams Dam is located nearly in the middle of the 21 miles of the West River, holding this designation. However, the West River does not hold a federal Wild and Scenic River designation. [26] |
Proposed Project Purpose and Need Statement

Description:

Project Purpose:

The purpose of the proposed project is to improve flood safety in the Town of Londonderry by addressing the dam safety deficiencies at Williams Dam.

Project Need:

The project is needed because the existing dam was identified as being in poor condition by VT DSP in their 2015 inspection. Flood inundation of surrounding structures begins with the 10-year flood event. The dam is on the state’s list of priority dams for removal and must be rehabilitated or removed.

Background:

Recent evaluations of Williams Dam by VT DSP concluded that the hazard potential classification of Williams Dam be increased from Low to Significant. Williams Dam is a run-of-the-river dam constructed in the mid to late 1800s to provide power for a machine shop. The dam is stone masonry and concrete and is about 13-feet tall and 90-feet wide. The existing low-level outlet is a 6-foot diameter corrugated metal pipe that is delaminating from the concrete encasement. Pressurized seepage through the dam and significant flows through the left abutment were observed in the inspection.

Sediment build-up reduces upstream flood capacity for the town of Londonderry. Portions of Londonderry are currently within the 100-year floodplain. Recent hydraulic analysis showed that structures upstream and downstream of the dam are impacted by the 10-year flood event, and that the Route 11 bridge over West River, directly upstream of Williams Dam, constricts flood flows and overtops during the 50-year storm event. The dam hazard classification report by VT DSP concluded that five structures in Londonderry would be impacted by a sunny-day breach of Williams Dam.

The impounded portion of the West River upstream of the dam is used as a water source by the fire department. The significant amount of accumulated sediment currently impounded behind Williams Dam restricts the use of the dry hydrant.

Two wetland areas have been identified upstream of the dam.
## Resource Concerns and Opportunities

### Potential Effects of Proposed Alternatives on Soil, Water, Air, Plants, and Animals (SWAPA) + E + H Resources and Resources of Special Concern

**Use:**  
+ Positive Impact  
- Negative Impact  
0 No Impact

### Resource Concerns: SWAPA + Energy + Human

<table>
<thead>
<tr>
<th></th>
<th>Alt 1 - No Action/Future Without Project</th>
<th>Alt 2 - Structural Description: Replace the existing dam with a new concrete dam.</th>
<th>Alt 3 - Nonstructural Description: Purchase 11 properties, demolish structures, and rezone land in the downstream breach inundation area.</th>
<th>Alt 4 - Pie in the Sky Description: Replace the dam, construct floodwalls on both sides of the floodplain upstream, raise Route 100.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Soil</strong></td>
<td>0</td>
<td>-/0</td>
<td>-/+-</td>
<td>-/0</td>
</tr>
<tr>
<td><strong>Water</strong></td>
<td>-</td>
<td>-/+</td>
<td>-/+-</td>
<td>-/+</td>
</tr>
<tr>
<td><strong>Air</strong></td>
<td>0</td>
<td>-/0</td>
<td>-/0</td>
<td>-/0</td>
</tr>
<tr>
<td><strong>Plants</strong></td>
<td>0</td>
<td>-/0</td>
<td>-/+</td>
<td>-/0</td>
</tr>
<tr>
<td><strong>Animals</strong></td>
<td>-</td>
<td>-/0</td>
<td>-/+</td>
<td>-/0</td>
</tr>
<tr>
<td><strong>Energy</strong></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Human</strong></td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>

### Resources of Special Concern

<table>
<thead>
<tr>
<th></th>
<th>Clean Air Act</th>
<th>Clean Water Act/Waters of the U.S.</th>
<th>Coastal Zone Management</th>
<th>Coral Reefs</th>
<th>Cultural Resources/Historic Properties</th>
<th>Endangered &amp; Threatened Species</th>
<th>Environmental Justice</th>
<th>Essential Fish Habitat</th>
<th>Floodplain Management</th>
<th>Invasive Species</th>
<th>Migratory Birds/Bald and Golden Eagle Protection Act</th>
<th>Natural Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>-/0</td>
<td>-/0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-/0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

---

Page 21
Prime and Unique Farmland | 0 | 0 | 0 | 0
Riparian Area | 0 | -/0 | + | -/0
Scenic Beauty | 0 | -/0 | -/0 | -
Wetlands | + | 0 | 0 | -
Wild and Scenic Rivers | 0 | 0 | 0 | 0

* Dual ratings indicate temporary impacts and permanent impacts. Temporary impacts are listed first, and permanent impacts are listed second. For example, negative impacts to air quality will occur during construction, but after completion of construction there will be no impacts on air quality. These impacts would receive a rating of -/0.

Opportunities
Potential opportunities for each of the resource concerns are summarized below.

Soil
There were no opportunities identified to improve soil conditions.

Water
Alternatives 2 and 4 provide an opportunity to improve water quality by removing sediment upstream of the existing dam.

Air
There were no opportunities identified to improve air quality.

Plants
There were no opportunities identified to improve plant life.

Animals
There may be an opportunity to work with Vermont Fish and Wildlife Department (VTFWD) to maintain the ponded area for recreational fishing and aquatic habitat. The opportunities are located on lands owned by the Sponsor.

Energy
There were no opportunities identified to provide energy. Hydropower was considered as a component of Alternative 4 but was eliminated because a hydropower facility at Williams Dam is not anticipated to provide substantial benefit.

Human
The local community is very supportive of Williams Dam and the efforts to rehabilitate or replace the dam. The local fire department also uses the ponded area behind the dam to supply a dry hydrant. Dam replacement alternatives may allow for recreational opportunities. The opportunities are located on lands owned by the Sponsor.
State, Tribal, Federal Stakeholder Engagement

NRCS and the Sponsor, the Town of Londonderry, met virtually on September 15, 2022, to discuss the proposed PL-566 watershed project. The group discussed the current state of the dam, the dry hydrant, the public attachment to the dam, and potential alternatives for the project. On October 20, 2022 representatives of WSP USA Environment & Infrastructure (WSP), NRCS, and the Town of Londonderry met at the Williams Dam for a site visit. The group discussed historical and current dam conditions, including flooding history, dry hydrant usage, ecology, recreation, resident opinions, and proposed project alternatives. Town of Londonderry officials reiterated the importance of analyzing all possible alternatives to perform proper due diligence on behalf of the Londonderry community.

NRCS and the Sponsor will schedule a future meeting with the U.S. Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service (USFWS), VTFWD, and/or Vermont Department of Environmental Conservation (VTDEC), the Vermont Division for Historic Preservation as well as any other local, state, and/or federal agencies that may have an interest in this proposed project to recount the discussion of the September 15 meeting and to provide each agency/office represented the opportunity to ask questions about the potential project and to discuss any perceived controversies surrounding the project from their organization's perspective.
Potential Alternatives

General Discussion of Alternatives

Alternatives were evaluated to address the dam safety deficiencies noted by VT DSP in 2015. Only structural deficiencies were identified in this inspection because a detailed hydrologic study has not been performed for Williams Dam, and hydrologic and hydraulic criteria for the dam has not been established. The deficiencies are summarized as follows:

- The concrete sluiceway is deteriorated. Pressurized water flows through the structure and below the outlet pipe.
- Water flows through the main section of the dam and dam face.
- Water flows through and erodes the left abutment.
- The outlet stem is damaged, and the operator cannot drain the impoundment in an emergency.

NRCS TR210-60 requirements were considered in the development of these alternatives, although the requirements are intended for earthen embankments with the primary purpose of flood control and are generally not applicable to Williams Dam. Williams Dam is a significant hazard structure according to NRCS criteria and would be required to safely route a 10-day-duration, 100-year precipitation hydrograph through the principal spillway. The principal spillway in NRCS criteria is generally an ungated pipe structure, but this structure is not applicable to Williams Dam and does not meet the Sponsor’s purpose and need for the structure. The uncontrolled principal spillway structure at Williams Dam is a straight-drop overfall weir structure in the dam crest, and there is no auxiliary spillway structure at the dam. It is estimated that the flow over the Williams Dam principal spillway structure is restricted by the low chord of the Route 11 bridge over West River, located approximately 15 feet upstream of the existing Williams Dam. FEMA FIS 100-year floodplain modeling shows that the 100-year flows exit the stream channel, flow over and around the Route 11 bridge and Williams Dam, and cause flooding in surrounding areas [2]. Flood mapping performed by D&K in 2022 confirms that flow is restricted and flooding occurs for the 100-year event even when Williams Dam is removed. The model information from FEMA and Dubois & King Inc. (D&K) confirm that the dam crest elevation required to safely attenuate and pass the 100-year storm event through a principal spillway pipe is unachievable because of topographic restraints in the West River channel. Williams Dam generally is not compatible with NRCS TR-210-60 requirements and, even with rehabilitation, is unlikely to meet the requirements.

Williams Dam was evaluated in these alternatives primarily based on dam engineering best practices and the criteria suggested for the dam in the VT DSP hazard classification, which include the following considerations:

- Stability for ice loading conditions
- Stability for the design controlling storm event identified by VT DSP, which approximates the 100-year storm event
- Industry-standard engineering design for concrete gravity dams
- Ability to lower the water surface elevation in the impoundment through a low-level outlet structure

Alternative 1:

Alternative 1 would postpone the project indefinitely while other sources of funding were secured. During the delay, the public will remain at risk of the flooding associated with the failure of Williams Dam. Temporary rehabilitation measures or dam removal may be required to address dam safety deficiencies and reduce public risk.
Alternative 2:
Alternative 2 represents a structural solution. This alternative includes demolition and removal of the existing dam and construction of a new concrete gravity dam approximately 20 feet downstream of the existing structure. The new dam will also be a run-of-the-river dam and consist of a principal spillway weir and a low-level outlet structure. The spillway crest elevation of the new dam will be the same as the existing dam and the extents of the impoundment will be unchanged.

The maximum section of the dam will be approximately 13 feet high. The total dam crest length will be approximately 140 feet, consisting of a 66-foot-long principal spillway and abutments. The principal spillway weir will be a straight-drop overfall weir in the dam crest with a control elevation of 1,142 feet and provide similar flow appearance as the existing structure. The abutments will have a top elevation of 1,149 feet and connect with bedrock. The low-level outlet works will consist of a 30-inch-diameter steel pipe, trash rack, manually operated slide gate. Access to the hand wheel will be provided from the top of the right abutment. The dam will be founded on bedrock and key into component bedrock at both abutments, which is shallow according to available inspection data [31]. A properly designed concrete gravity dam with these characteristics will sustain being fully overtopped by extreme storm events without failure.

The construction of the new gravity dam will address the dam safety deficiencies identified by VT DSP by providing a new structure that is stable during normal and extreme loading events and allows the safe evacuation of the impoundment through a low-level outlet structure.

In 2021, the Sponsor retained D&K to evaluate the existing condition of the dam and analyze different alternatives for addressing dam deficiencies, one of which was replacing the dam. Criteria used in developing the replacement design was not documented in the report, but the design generally consisted of a vertical concrete wall similar to the existing dam rather than a structure with a traditional gravity dam cross-section. The design evaluated in this report is similar in functionality to the structure proposed in the D&K report, but instead considers a structure with a traditional gravity dam cross-section to conservatively account for stability and feasibility at this stage of planning. In further levels of design, the structure proposed by D&K or other configurations could be evaluated to provide adequate stability, which could reduce cost.

The use of the existing dry hydrant is currently restricted by the accumulation of sediment upstream of the existing Williams Dam. Alternative 2 also includes the dredging of sediment to increase hydraulic capacity in the impoundment and installation of a new dry hydrant adjacent to the new dam that has an intake located behind the trash rack for the low-level outlet.

Alternative 3:
Alternative 3 represents a non-structural solution. This concept includes purchasing 11 structures located in the area inundated by a breach of Williams Dam, demolishing and removing the structures and utilities, and rezoning the land areas to prevent future development. The 11 impacted structures were identified in the controlling failure scenario for the Williams Dam hazard classification [2]. This concept addresses human safety but does not address the deficiencies at Williams Dam.

Alternative 4:
Alternative 4 represents a “pie-in-the-sky” solution. This alternative includes the replacement of Williams Dam as described in Alternative 2 and the construction of floodwalls on both sides of the West River floodplain boundary upstream of Williams Dam to provide 10-year flood protection to Londonderry. The floodwalls will have an average height of approximately 10 feet above existing ground and a total length of approximately 8,500 feet. The floodwalls would consist of sheet pile (below ground) and concrete (above ground). The sheet pile would be about 15 feet deep to manage under-seepage and maintain seepage stability. Additionally, approximately 2,000 feet of Vermont Route 100 will be raised an average of 6 feet to
intersect the required crest elevation of the western floodwall and contain 10-year flood flows in the West River floodplain. The floodwalls and raised road will extend north of Williams Dam to approximately the intersection of Route 100 and Evergreen Lane.
<table>
<thead>
<tr>
<th>Alternatives</th>
<th>Possible Positive Impacts and Effects</th>
<th>Possible Adverse Impacts and Effects</th>
</tr>
</thead>
</table>
| **Alternative 1** - No Action/Future Without Project.  
**Description:** The Sponsor does not implement flood protection measures using Federal funds. | • No Federal cost.  
• Condition of the dam will continue to deteriorate over time.  
• Sponsor will still need to invest funds to temporarily address deficiencies and lower water level.  
• Likely need to lower the pond water level to reduce risk.  
  Reduction in recreational area.  
  Lower water level will negatively impact existing wetlands.  
• Lower water and impounded sediment will continue to negatively impact flood fighting. | |
| Estimated Cost: $75,000           |                                      |                                     |
| **Alternative 2** - Structural.  
**Description:** Replace the existing dam with a new concrete dam. | • Reduces the likelihood of dam failure and addresses dam breach flooding risk.  
• Maintains impoundment behind reservoir for recreation, habitat (including possible Class II wetlands), and dry hydrant tap for the Town of Londonderry.  
• Quasi-preserves aesthetics of the existing dam.  
• Improved ability to manage and release sediment impounded by Williams Dam. | • Temporary damage to the environment during construction.  
• Increased heavy traffic on area roadways during construction.  
• Historical and aesthetic significance of original Williams Dam is lost.  
• Does not provide additional flood protection beyond that provided by a structurally intact Williams Dam. |
| Estimated Cost: $3,900,000         |                                      |                                     |
| Alternative 3 - Non-Structural. | Prevents damage to structures and reduces threat to public health and safety. | Capital cost that doesn’t benefit residents. |
| Description: Purchase properties, demolish structures, and rezone land in the downstream breach inundation area. | Potential for zoning to include recreational areas and trails. | Williams Dam may fail and the historical and aesthetic significance will be lost. |
| Estimated Cost: $7,200,000 | Negative environmental impacts associated with a breach and uncontrolled release of sediment downstream. | Negative environmental impacts associated with a breach and uncontrolled release of sediment downstream. |
| | Relocating residents and businesses that may not want to move. | Relocating residents and businesses that may not want to move. |

| Alternative 4 - Pie in the Sky, if money was no object, all rules, regulations and permitting were approved (may be an action outside of NRCS program authority). | Reduces the likelihood of dam failure. | Temporary damage to the environment during construction. |
| Description: Replace the dam, construct floodwalls on both sides of the floodplain upstream, raise Route 100 | Maintains impoundment behind reservoir for recreation, habitat (including possible Class II wetlands), and dry hydrant tap for the Londonderry. | Increased heavy traffic on area roadways during construction. |
| | Quasi-presents aesthetics of the existing dam. | Historical and aesthetic significance of original Williams Dam is lost. |
| | Improved ability to manage and release sediment impounded by Williams Dam. | Londonderry will be required to fund maintenance of the floodwalls. |
| | Provides 10-year flood protection for approximately 25 structures upstream of Williams Dam. | The floodwall will have a negative visual impact by blocking the view of West River. |
| Estimated Cost: $30,600,000 | | |
Facilitating Factors

Facilitating factors are those which ease implementation of the alternative and/or which improve the desired result.

Facilitating factors of Alternative 1:

- The alternative has the lowest capital cost of the evaluated alternatives.
- Removal of the dam addresses the dam safety deficiencies that have been identified by VT DSP.

Facilitating factors of Alternative 2:

- The proposed project has support from local residents.
- The proposed project addresses the dam safety deficiencies that have been identified by VT DSP.
- The proposed dam will have a low-level outlet works to allow evacuation of the impoundment and improve flood safety.
- The Sponsor will regain the ability to use the impoundment as a water supply for fire protection.
- The Sponsor will be responsible for the operation and maintenance of the new facility.

Facilitating factors of Alternative 3:

- The flood risk is reduced in Londonderry by vacating the breach inundation area.
- The rezoning of the land could include recreational areas and trails.

Facilitating factors of Alternative 4:

- The proposed project addresses the dam safety deficiencies that have been identified by VT DSP.
- The proposed dam will have a low-level outlet works to allow evacuation of the impoundment and improve flood safety.
- The Sponsor will regain the ability to use the impoundment as a water supply for fire protection.
- The Sponsor will be responsible for the operation and maintenance of the new dam facility and maintenance of the floodwalls.
- Provides 10-year flood protection for approximately 25 structures upstream of Williams Dam.
Obstructing Factors
Obstructing factors defined as those that make it more difficult for an alternative to happen and/or decreases the ability to attain a specified goal.

Obstructing factors for Alternative 1 include:

- Temporary rehabilitation measures will be difficult to implement in the existing structure and will not fully address dam safety deficiencies.
- There will be strong opposition from local residents to the removal of Williams Dam.
- VT DSP may require the lowering of the water surface elevation of the impoundment to reduce risk, which will negatively affect portions of the existing wetlands and public utility of the pond.
- The Sponsor will remain unable to use the impoundment as a water supply for fire protection.
- Removal of Williams Dam would not significantly reduce flooding in Londonderry.

Obstructing factors for Alternative 2 include:

- Construction of this alternative will have short-term impacts to the environment in areas adjacent to the dam.
- Construction staging area adjacent to the dam site is minimal.
- It is unlikely that the proposed dam structure will conform with NRCS TR210-60 requirements.
- The historical and aesthetic significance of the original Williams Dam will be lost.
- Construction will require a Section 404 Permit.
- Portions of Londonderry will still flood at approximately the 10-year event.

Obstructing factors for Alternative 3 include:

- There will be strong opposition from the community.
- VT DSP may require the lowering of the water surface elevation of the impoundment to reduce risk, which will negatively affect portions of the existing wetlands and public utility of the pond.
- The Sponsor will remain unable to use the impoundment as a water supply for fire protection.

Obstructing factors for Alternative 4 include:

- Construction of this alternative will have short-term impacts to the environment in areas adjacent to the dam.
- Construction staging area adjacent to the dam site is minimal.
- Route 100 will require closure during construction and disrupt traffic patterns.
- The construction of the floodwalls will have temporary environmental impacts during construction and likely some permanent environmental impacts.
- It is unlikely that the proposed dam structure will conform with NRCS TR210-60 requirements.
- The historical and aesthetic significance of the original Williams Dam will be lost.
- Portions of Londonderry will still flood at approximately the 10-year event.
- This alternative is more costly than Alternative 2 and the additional cost may not be justified by the benefits.
- The Sponsor may not be able to fund their cost-share portion.
- Increased maintenance costs for the floodwalls.
- Construction will require a Section 404 Permit.
- Permitting of the floodwall may be challenging because of the likely impact to wetlands.
Environmental Document

A potentially viable alternative for the proposed watershed project is to replace the existing significant hazard Williams Dam (Alternative 2). The existing Williams Dam hazard classification was revised from low to significant in 2022. By replacing the existing dam with a new structure, the likelihood of dam failure will drop significantly. Replacing the dam will likely improve the functionality of the dry hydrant and maintain the visual and audible aesthetic of the dam that is enjoyed by residents of the community. However, this alternative will not improve the flood protection either upstream or downstream of the dam. At this point in the planning process, the interdisciplinary team has determined that the appropriate Plan - Environmental Document for Alternative 2 will likely be a Plan-Environmental Assessment (Plan-EA). However, if any of the NRCS categorical exclusions are deemed to apply to the proposed alternative then the Environmental Document for Alternative 2 would be a Plan Environmental Evaluation (Plan-EE).

Alternative 4 is very similar to Alternative 2 but includes construction of floodwalls on both sides of the West River floodplain boundary upstream of Williams Dam to provide 10-year flood protection to Londonderry. The floodwalls will have an average height of approximately 10 feet and a total length of approximately 8,500 feet. Additionally, approximately 2,000 feet of Route 100 will be raised an average of 6 feet to intersect the required crest elevation of the western floodwall and contain 10-year flood flows in the West River floodplain. This Alternative has been determined by the interdisciplinary team to require an Environmental Impact Statement.

Alternative 3 involves purchasing 11 structures located in the area inundated by a breach of Williams Dam, demolishing and removing the structures and utilities, and rezoning the land areas to prevent future development. This concept addresses human safety but does not address the deficiencies at Williams Dam. The interdisciplinary team has determined that a Plan-EA is the required environmental document for Alternative 3. However, the proposed non-structural alternative may qualify for a categorical exclusion due to the removal of buildings from the breach inundation area of the dam. The potentially applicable NRCS categorical exclusion under CFR § 650.6 is listed as the following: (6) Removing or relocating residential, commercial, and other public and private buildings and associated structures constructed in the 100-year floodplain or within the breach inundation area of an existing dam or other flood control structure in order to restore natural hydrologic conditions of inundation or saturation, vegetation, or reduce hazards posed to public safety. With this categorical exclusion, the Environmental Document would be a Plan-EE assuming that the hazard classification of the existing dam does not justify a Plan-EA.

Alternative 1 represents a “No Action/Future Without Project” alternative. This alternative would postpone the project indefinitely while other sources of funding were secured. During the delay, the public will remain at risk of the flooding associated with the failure of Williams Dam. Temporary rehabilitation measures or dam removal may be required to address dam safety deficiencies. No Environmental Document would be needed until a course of action is selected.
Sponsors

<table>
<thead>
<tr>
<th>Sponsor Will</th>
<th>Assist in Planning</th>
<th>Land Rights / Eminent Domain</th>
<th>Local Cost Share</th>
<th>O/M Funds</th>
<th>Permits</th>
<th>Land Treatment</th>
<th>In-Kind MOU</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Town of Londonderry, VT</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Sponsor will:

- Assist in the locally led planning effort.
- Obtain needed land rights including the use of power of eminent domain, if necessary.
- Provide local cost-share funds and/or in-kind services to provide the required portion of total project costs.
- Provide funds for continuing operation and maintenance actions.
- Obtain required permits and approvals at sponsor cost:
- Provide leadership to help ensure adequate conservation land treatment measures are maintained on at least 50 percent of the watershed area above retention reservoirs.
- Before being credited with the value of any in-kind contribution for any in-kind services and/or acquisition of land rights, Sponsor will sign a Memorandum of Understanding (MOU) with NRCS.
## Potential Cooperating Agencies

<table>
<thead>
<tr>
<th>Agency</th>
<th>Contact Information</th>
<th>Type of Involvement</th>
</tr>
</thead>
</table>
| U.S. Army Corps of Engineers                               | USACE - Vermont Project Office  
11 Lincoln Street, Room 210  
Essex Junction, VT 05452  
802-872-2893                                                     | Regulatory [X]  
Informed [ ]  
Prepare permits or letters of permission document [X]  
Provide input [ ]                                             |
| U.S. Fish and Wildlife Service                             | 11 Lincoln Street  
Essex Junction, VT 05452  
802-879-1859                                                     | Regulatory [ ]  
Informed [X]  
Prepare permits or letters of permission document [ ]  
Provide input [X]                                             |
| Vermont Department of Environmental Conservation - Watershed Management Division | 1 National Life Drive  
Montpelier, VT 05602  
anr.wsmd@vermont.gov  
802-828-1115                                                     | Regulatory [X]  
Informed [ ]  
Prepare permits or letters of permission document [X]  
Provide input [X]                                             |
| Vermont Department of Environmental Conservation - Dam Safety Program | 1 National Life Drive  
Montpelier, VT 05602  
802-622-4093 or  
802-490-6123                                                     | Regulatory [X]  
Informed [ ]  
Prepare permits or letters of permission document [X]  
Provide input [X]                                             |
| USDA Natural Resources Conservation Service                | 356 Mountain Drive, Suite 105  
Colchester, VT 05446  
802-951-6796                                                     | Regulatory [ ]  
Informed [X]  
Prepare permits or letters of permission document [ ]  
Provide input [X]                                             |
| Vermont Agency of Commerce and Community Development - Office of Historic Preservation | 1 National Life Drive  
Deane C. Davis Building, 6th Floor  
Montpelier, VT 05620  
802-828-3222                                                     | Regulatory [ ]  
Informed [X]  
Prepare permits or letters of permission document [ ]  
Provide input [X]                                             |
| Vermont Agency of Natural Resources - Fish and Wildlife Department | 1 National Life Drive  
Deane C. Davis Building, 2nd Floor  
Montpelier, VT 05620  
fwinformation@vermont.gov  
802-828-1000                                                    | Regulatory [ ]  
Informed [X]  
Prepare permits or letters of permission document [ ]  
Provide input [X]                                             |
# Potential Stakeholders

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Role</th>
<th>Resources</th>
<th>Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Town of Londonderry, VT</td>
<td>Sponsor</td>
<td>Cost-share funds, administration for completion of Plan-EA, design, construction.</td>
<td>Complete Plan-EA with permits, scoping, public meetings, mailings, overall administration of project</td>
</tr>
<tr>
<td>USDA-Natural Resources Conservation Service</td>
<td>Lead Agency for Plan-EA, FA/TA, Reviews</td>
<td>Funding, technical reviews</td>
<td>Reviews for project alternatives, inventory needs, Plan-EA supplement</td>
</tr>
<tr>
<td>Army Corps of Engineers</td>
<td>404 Permit</td>
<td>Technical reviews, Wetlands-Waters of the US jurisdiction</td>
<td>Permitting, technical review</td>
</tr>
<tr>
<td>Vermont Department of Environmental Conservation - Watershed Management Division</td>
<td>Permits</td>
<td>Review for permit</td>
<td>Review for permit</td>
</tr>
<tr>
<td>Vermont Department of Environmental Conservation - Dam Safety Program</td>
<td>Dam permits, Water rights review</td>
<td>Technical review &amp; coordination</td>
<td>Technical review, alternate evaluation</td>
</tr>
<tr>
<td>Vermont Agency of Commerce and Community Development - Office of Historic Preservation</td>
<td>Cultural review</td>
<td>Review of project APE</td>
<td>Permit for project APE, cultural resource inventory</td>
</tr>
<tr>
<td>US Fish and Wildlife Service</td>
<td>Review, Cooperating agency for Plan-EA</td>
<td>Alternatives, ecological inventories</td>
<td>Alternatives, environmental reviews</td>
</tr>
<tr>
<td>Vermont Agency of Natural Resources - Fish and Wildlife Department</td>
<td>Permits, Cooperating agency for Plan-EA</td>
<td>Review of Plan-EA</td>
<td>Review of Plan-EA</td>
</tr>
<tr>
<td>Principal Sponsors - Primary Stakeholders who will make financial and in-kind commitments to the project.</td>
<td>Regulatory - Entities involved in regulatory aspects of the project’s implementation.</td>
<td>Keep Informed - Stakeholders who should be kept informed of the project’s progress.</td>
<td></td>
</tr>
</tbody>
</table>
Notifications
If a preliminary investigation findings report is undertaken, the State Conservationist (STC) must notify in writing the Governors concerned, the U.S. Fish and Wildlife Service, the National Oceanic Atmospheric Administration National Marine Fisheries Service, the USACE, and all other Federal agencies concerned with a decision to initiate any survey or field investigation involving water resources development work and furnish them with appropriate information regarding the scope, nature, status, and results of such survey or investigation (Executive Order 10584 Section 3).

<table>
<thead>
<tr>
<th></th>
<th>Method and Date Notified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governor</td>
<td>Letter - 12/15/2022</td>
</tr>
<tr>
<td>U.S. Fish and Wildlife Service</td>
<td>Letter - 12/15/2022, Email - 12/21/2022</td>
</tr>
<tr>
<td>National Oceanic Atmospheric Administration National Marine Fisheries Service</td>
<td>Letter - 12/15/2022, Email - 12/21/2022</td>
</tr>
<tr>
<td>U.S. Army Corps of Engineers</td>
<td>Letter - 12/15/2022, Email - 12/21/2022</td>
</tr>
<tr>
<td>Other Federal Agency:</td>
<td></td>
</tr>
<tr>
<td>Other Federal Agency:</td>
<td></td>
</tr>
<tr>
<td>Other Federal Agency:</td>
<td></td>
</tr>
</tbody>
</table>

Estimated Project Implementation Timeline

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning Start</td>
<td>5/1/2023</td>
</tr>
<tr>
<td>Planning End</td>
<td>5/5/2025</td>
</tr>
<tr>
<td>Design Start</td>
<td>11/3/2025</td>
</tr>
<tr>
<td>Design End</td>
<td>11/1/2027</td>
</tr>
<tr>
<td>Construction Start</td>
<td>5/1/2028</td>
</tr>
<tr>
<td>Construction End</td>
<td>11/5/2030</td>
</tr>
</tbody>
</table>
Recommendation

This preliminary investigation and feasibility report has been completed and submitted for approval to:
Robert Thompson.

By:

Name: Robert Huzjak
Title: Project Manager
Date: 12/13/22

Organization: KJH Consultants, Inc.

It has been determined that this potential PL-566 watershed operations project:

<table>
<thead>
<tr>
<th>Does</th>
<th>Does Not</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>☒</td>
<td>☐</td>
<td>meet the statutory acreage, volume/capacity of structure and recreational limit requirements;</td>
</tr>
<tr>
<td>☐</td>
<td>☒</td>
<td>meet the requirements of one or more Watershed Operations authorized purposes;</td>
</tr>
<tr>
<td>☒</td>
<td>☐</td>
<td>have the potential for a minimum of 20 percent agricultural, or rural, benefits;</td>
</tr>
<tr>
<td>☒</td>
<td>☐</td>
<td>have one or more viable alternatives;</td>
</tr>
<tr>
<td>☒</td>
<td>☐</td>
<td>have potential project sponsor(s) that meet and agree to all terms of responsibilities;</td>
</tr>
<tr>
<td>☐</td>
<td>☒</td>
<td>have apparent insurmountable obstacles.</td>
</tr>
</tbody>
</table>

Preparer Signature: __________________________ Date: 12/13/22

Robert Huzjak

State Watershed Operations Program Manager

Signature: __________________________ Date: __________________________

Robert Thompson

Dec. 14, 2022

State Technical Lead (SRC, SCE, Other)

Signature: __________________________ Date: __________________________

Robert Thompson

Dec. 14, 2022

Not recommended for planning funding

Accepted and recommended for Planning Funding

Dec. 14, 2022

State Conservationist

Signature: __________________________ Date: __________________________

Travis Thomason
Glossary
Rural - All territories of a State that are not within the outer boundary of any city or town that has a population of 50,000 or more according to the latest decennial census of the United States (2010 Census Urban and Rural Classification and Urban Area Criteria). [390-506-M, 4th Ed., Apr 2014, National Watershed Program Manual (NWPM) Part 506.50 Glossary, MMM]

Watershed - A watershed area comprises all land and water within the confines of a drainage divide and must follow hydrologic boundaries. In the case of irrigation or salinity projects, the watershed boundary may be based on the irrigation problem area or subsurface hydrologic area, respectively. A watershed area may comprise the land and water of two or more minor drainageways that are separate tributaries to a stream, artificial waterway, lake, or tidal area. Areas from which water is brought in by diversion may be excluded from the watershed if these sources of water have no significant effect on the flood prevention and water management problems of the watershed area. The watershed area must include all direct tributary drainageways and lands from which, after project installation, water and sediment could adversely affect any proposed structural measure, such as an irrigation or drainage canal, floodway, or floodwater retarding structure, included in the plan. (390-506-M, 4th Ed., Apr 2014, NWPM Part 506.50 Glossary, TTT)


Appendix
- Sponsor Letter of Request
- WS-4 - PIFR Sponsor Declaration Forms
- Preliminary Environmental Evaluation (CPA 52)
- Preliminary Cost Estimates for Alternatives
- Hydraulic Evaluation for Alternative 4
May 26, 2022

Travis Thomason
State Conservationist
USDA - Natural Resources Conservation Service
356 Mountain View Drive
Colchester, VT 05446

Dear Mr. Thomason:

The Town of Londonderry, Vermont hereby requests NRCS Watershed Program planning assistance for a potential Public Law (PL) 566 project in Windham County, specifically the repair/rehabilitation of the Williams Dam on the West River (State of Vermont ID #115.01). The project, if approved, would improve flood control characteristics of the West River, a major tributary of the Connecticut River. The condition of the overall structure of the dam is considered to be very poor, and in March 2022 the Vermont Dam Safety Program recharacterized the dam from a low to a significant hazard potential classification.

We are a unit of local government that owns the dam and as such has a legal interest in and responsibility for the watershed project proposed. We understand, as sponsors of a PL 566 planning effort, that our responsibilities will include:

- Assisting in the locally led planning effort,
- Contributing a share of the project costs, as determined by NRCS, by providing funds or eligible services necessary to undertake the activity,
- Before being credited with the value of any in-kind contributions for in-kind services and/or acquisition of land rights, Sponsor will sign a Memorandum of Understanding (MOU) with NRCS,
- Obtaining any necessary real property rights, by eminent domain, if necessary,
- Obtaining any needed water rights, and regulatory permits at the Sponsor’s cost,
- Agreeing to provide for any required operation and maintenance of the completed measures.

We look forward to working with NRCS staff to complete a Preliminary Investigation Feasibility Report (PIFR) to provide reasonable assurance that a potential watershed project can be developed that addresses a PL 566 purpose and that there are no apparent insurmountable obstacles to the completion of that project.

In support of this request, I include a completed for SF-424, wetlands and watershed delineation boundary maps, and the narrative portion of a dam study recently prepared for the Town.

Please contact me for any additional information that you might need in assessing our request.

Sincerely,

[Signature]

Shane P. O’Keefe
Town Administrator
townadmin@londonderryvt.org
802-824-3356, ext.5

Cc: Tom Cavanagh, Selectboard Chair, Bob Thompson USDA-NRCS State Conservation Engineer
Londonderry Wetlands Map
Vermont Agency of Natural Resources

NOTES
Map created using ANR's Natural Resources Atlas

LEGEND
- Wetland - VSWI
  - Class 1 Wetland
  - Class 2 Wetland
  - Buffer
- Wetlands Advisory Layer
- River Corridors (Aug 27, 2019)
  - .5 - 2 sqmi.
  - .25 - .5 sqmi.
- Soils - Hydric
- Parcels (standardized)
- Roads
  - Interstate
  - US Highway; 1
  - State Highway
  - Town Highway (Class 1)
  - Town Highway (Class 2,3)
  - Town Highway (Class 4)
  - State Forest Trail
  - National Forest Trail
  - Legal Trail
  - Private Road/Driveway
  - Proposed Roads
- Stream/River
  - Stream
  - Intermittent Stream
- Town Boundary

DISCLAIMER: This map is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. ANR and the State of Vermont make no representations of any kind, including but not limited to, the warranties of merchantability, or fitness for a particular use, nor are any such warranties to be implied with respect to the data on this map.

November 30, 2021

1:2,945

© Vermont Agency of Natural Resources
State: VT  County: Windham  Watershed: HUC 12 - 010801070301

Project Name: Williams Dam Rehabilitation Project

<table>
<thead>
<tr>
<th>Sponsor's Name:</th>
<th>Town of Londonderry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sponsor's Mailing Address:</td>
<td>100 Old School Street, South Londonderry, VT 05115</td>
</tr>
<tr>
<td>Contact Name:</td>
<td>Shane O'Keefe</td>
</tr>
<tr>
<td>Phone:</td>
<td>(802)824-3356 ext. 5</td>
</tr>
<tr>
<td>Title:</td>
<td>Town Administrator</td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:townadmin@londonderryvt.org">townadmin@londonderryvt.org</a></td>
</tr>
<tr>
<td>Sponsor Website:</td>
<td><a href="https://www.londonderryvt.org/">https://www.londonderryvt.org/</a></td>
</tr>
</tbody>
</table>

Description of the existing condition in the watershed that would be addressed through a Watershed Flood Prevention Operations program project.

Failing dam needs to be renovated. Town wishes to preserve and rebuild dam to maintain aesthetic beauty of the town and to maintain fire protection.

Potential benefits of a Watershed Flood Prevention Operations program project.

The renovated dam will maintain aesthetic nature of surrounding area and maintain wetland resources. Also, the dam will preserve fire protection access for the town and recreation.

Specific Watershed Programs information can be found at: https://usdagcc.sharepoint.com/sites/nrcs_programs/watershed/
Watershed Programs Standard Memorandum
Preliminary Investigation – Feasibility Report
Sponsor Authority and Role Declaration

State: VT  County: Windham  Watershed: HUC 12 - 010801070301

Project Name: Williams Dam Rehabilitation Project

SPONSOR WILL:

- Assist in the locally led planning effort: YES  X  NO
- Obtain needed land rights including the use of power of eminent domain, if necessary: YES  X  NO
- Provide local cost-share funds and/or in-kind services to provide the required portion of total project costs: YES  X  NO
- Provide Funds for continuing Operation and Maintenance actions: YES  X  NO
- Obtain required permits and approvals at Sponsor cost: YES  X  NO
- Provide leadership to help ensure adequate conservation land treatment measures are maintained on at least 50% of the watershed area above retention reservoirs: N/A  YES  X  NO
- Before being credited with the value of any in-kind contribution for any in-kind services and/or acquisition of land rights, Sponsor will sign a Memorandum of Understanding (MOU) with NRCS: YES  X  NO

Authorized Representative of Sponsor

Name (printed): Shane O'Keefe  Title: Town Administrator

Signature: ________________________________  Date: December 13, 2022

Specific Watershed Programs information can be found at: https://usdagcc.sharepoint.com/sites/nrcs_programs/watershed/
### Environmental Evaluation Worksheet

**A. Client Name:** Town of Londonderry  
**B. Conservation Plan ID # (as applicable):**  
**C. Identification # (farm, tract, field #, etc. as required):**

#### E. Alternatives

<table>
<thead>
<tr>
<th>Lack of maintenance has led to deterioration of the existing dam. Significant overdue work is required to fix the dam and restore it to its proper functionality. The dam is classified as a significant hazard dam.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Structural</th>
<th>Non-Structural</th>
<th>Pie-in-the-Sky</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace the dam. Demolish and remove the existing dam and construct a new concrete gravity dam approximately 20 feet downstream of the existing structure.</td>
<td>Purchase 11 structures located in the area inundated by a breach of the Williams Dam. Demolish and remove the structures and utilities and rezone the land areas to prevent future development.</td>
<td>Replace the existing dam generally lowering the concept presented by Dubois &amp; King. Construct levees with 10-year event flood protection on both sides of the West River floodplain boundary upstream of the dam. Additionally, raise approximately 2,000 feet of Route 100 to contain the 10-year flood flows.</td>
</tr>
</tbody>
</table>

#### G. Resource Concerns

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SOIL</strong></td>
<td><strong>EROSION</strong></td>
<td><strong>SOIL QUALITY DEGRADATION</strong></td>
<td><strong>WATER: EXCESS / INSUFFICIENT WATER</strong></td>
<td><strong>WATER: WATER QUALITY DEGRADATION</strong></td>
</tr>
<tr>
<td>No resource concern identified</td>
<td>Water will continue to bypass the dam on the left embankment and could possibly lead to future bank erosion issues.</td>
<td>Existing conditions will persist and no significant changes to soil quality are likely to occur.</td>
<td>MI Pond will continue to be full of sediment and will serve little recreational opportunity.</td>
<td>No water quality concerns have been identified within the proposed project area.</td>
</tr>
<tr>
<td>Refer to FOTG section “Resource Information” subsection “Soils” for information on soil classification within the project area. No signs of significant erosion have been identified.</td>
<td>Increased erosion may occur during construction. However, appropriate erosion and sedimentation controls will limit these effects.</td>
<td>Minor compaction of soils around the project area may occur from the presence of construction equipment. Impacts are expected to be minimal.</td>
<td>Flows will be disturbed during construction but after the new dam is built the Mill Pond will again be a place of recreation and fish habitat.</td>
<td>Commercial and residential development within the proposed project area will continue.</td>
</tr>
<tr>
<td>Refer to FOTG section “Resource Information” subsection “Soils” for information on soil classification within the project area. No signs of significant compaction have been identified.</td>
<td>Increased erosion may occur during demolition. However, appropriate erosion and sedimentation controls will limit these effects.</td>
<td>Minor compaction of soils around the project area may occur from the presence of construction equipment. Impacts are expected to be minimal.</td>
<td>Flows will be disturbed during construction but after the new dam is built the Mill Pond will again be a place of recreation and fish habitat.</td>
<td>Commercial and residential development within the proposed project area will continue.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount, Status, Description</th>
<th>If does not meet PC</th>
<th>If does not meet PC</th>
<th>If does not meet PC</th>
<th>If does not meet PC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Document both short and long term impacts.</td>
<td>√ if RMS</td>
<td>√ if RMS</td>
<td>√ if RMS</td>
<td>√ if RMS</td>
</tr>
<tr>
<td>Document both short and long term impacts.</td>
<td>√ if RMS</td>
<td>√ if RMS</td>
<td>√ if RMS</td>
<td>√ if RMS</td>
</tr>
<tr>
<td>Document both short and long term impacts.</td>
<td>√ if RMS</td>
<td>√ if RMS</td>
<td>√ if RMS</td>
<td>√ if RMS</td>
</tr>
</tbody>
</table>

#### H. Effects of Alternatives

- No Action: 
- Structural: 
- Non-Structural: 
- Pie-in-the-Sky: 

<table>
<thead>
<tr>
<th>Amount, Status, Description</th>
<th>If does not meet PC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Document both short and long term impacts.</td>
<td>√ if RMS</td>
</tr>
</tbody>
</table>
### AIR: AIR QUALITY IMPACTS

<table>
<thead>
<tr>
<th>Conditions</th>
<th>No Action</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
<th>Alternative 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emissions of Particulate Matter (PM) and PM Precursors</td>
<td>No impacts to air quality are expected to occur.</td>
<td>Construction activities may result in temporarily increased ozone and PM concentrations. Impacts are expected to be minimal.</td>
<td>Construction activities may result in temporarily increased ozone and PM concentrations. Impacts are expected to be minimal.</td>
<td>Construction activities may result in temporarily increased ozone and PM concentrations. Impacts are expected to be minimal.</td>
</tr>
<tr>
<td>No significant source of GHG emissions are located within the vicinity of the proposed project area.</td>
<td>No impacts to air quality are expected to occur.</td>
<td>Construction activities may result in temporarily increased GHG concentrations. Impacts are expected to be minimal.</td>
<td>Construction activities may result in temporarily increased GHG concentrations. Impacts are expected to be minimal.</td>
<td>Construction activities may result in temporarily increased GHG concentrations. Impacts are expected to be minimal.</td>
</tr>
</tbody>
</table>

### PLANTS: DEGRADED PLANT CONDITION

- The proposed project is located in a developed town. Plants will continue to live in current conditions.

### ANIMALS: INADEQUATE HABITAT FOR FISH AND WILDLIFE

- Mill Pond has lost much of its volume to sediment deposition. Sediment will continue to deposit further limiting once thriving trout from populating the pond.
- The pond and inhabiting organisms will be disturbed during dredging. Mill Pond will be restored to its full capacity, opening the door for different ecosystem composition.
- Sediment will continue to deposit further limiting once thriving trout from populating the pond. Floodplain habitat will be improved. The pond and inhabiting organisms will be disturbed during dredging. Mill Pond will be restored to its full capacity, opening the door for different ecosystem composition.

### ANIMALS: LIVESTOCK PRODUCTION LIMITATION

- No resources associated with livestock have been identified near or within the proposed project area. No impacts are expected to occur.

### ENERGY: ENERGY CONSUMPTION

- No resource concern identified. No impacts are expected to occur.

### HUMAN: ECONOMIC AND SOCIAL CONSIDERATIONS

- Land Use: Mill Pond used to provide recreation before excessive sediment deposition. Continued sediment deposition will continue to lower the recreational value of Mill Pond. After construction the dredging of the pond may restore the past recreational benefits of Mill Pond. Continued sediment deposition will continue to lower the recreational value of Mill Pond. After construction the dredging of the pond may restore the past recreational benefits of Mill Pond.
No Effect  | Alternative 1  | Alternative 2  | Alternative 3  |
--- | --- | --- | --- |
No pollution entering equipment or excavation will be required, therefore, emissions will not increase. | May Effect | Construction activities may temporarily decrease emissions of GHGs, and PM and ozone precursors. However, this increase is expected to be minimal and temporary. The need for a Title V permit is unlikely. | May Effect | Construction activities may temporarily decrease emissions of GHGs, and PM and ozone precursors. However, this increase is expected to be minimal and temporary. The need for a Title V permit is unlikely. | May Effect | Construction activities may temporarily decrease emissions of GHGs, and PM and ozone precursors. However, this increase is expected to be minimal and temporary. The need for a Title V permit is unlikely. |
No waters within the proposed project area are currently impaired. | No Effect | Increased erosion and sedimentation may occur from excavation during construction. Erosion and sedimentation control methods are required throughout the duration of construction. Re-seeding of areas impacted by construction is required to prevent future erosion. A Section 404 Permit will likely be required. | May Effect | Increased erosion and sedimentation may occur from excavation during construction. Erosion and sedimentation control methods are required throughout the duration of construction. Re-seeding of areas impacted by construction is required to prevent future erosion. A Section 404 Permit will likely be required. | Yes  | Alternative 2 |
Neither cultural resources nor historic properties have been identified near or within the proposed project area. | No Effect | Neither cultural resources nor historic properties have been identified near or within the proposed project area. The Vermont Division for Historic Preservation Office will be consulted during planning to ensure no impacts to cultural resources occur. | No Effect | Neither cultural resources nor historic properties have been identified near or within the proposed project area. The Vermont Division for Historic Preservation Office will be consulted during planning to ensure no impacts to cultural resources occur. | Yes  | Alternative 2 |
ML Pond will continue to accumulate sediment and the habitat behind the dam is expected to degrade. However, most identified RTE species will be largely unaffected. | May Effect | Construction activities may temporarily disrupt protected species. However, removal of structures and impervious cover in favor of plants and trees may improve habitat for RTE species. ML Pond will continue to accumulate sediment and the habitat behind the dam is expected to degrade. | May Effect | Construction activities may temporarily disrupt protected species. However, removal of structures and impervious cover in favor of plants and trees may improve habitat for RTE species. ML Pond will continue to accumulate sediment and the habitat behind the dam is expected to degrade. | Yes  | Alternative 2 |
Reconstruction of the dam will improve current opportunities for recreation in ML Pond. | No Effect | Families within the 100-year floodplain may vacate their homes and relocate. This causes temporary hardship while limiting threats to safety. | No Effect | Reconstruction of the dam will improve current opportunities for recreation in ML Pond. | No Effect |
No federally regulated essential fish habitat is located within the project area. There is essential fish habitat downstream but there is a second dam in between there and the project area. | No Effect | Essential fish habitat is unlikely to be affected. | No Effect | Essential fish habitat is unlikely to be affected. | No Effect |
<table>
<thead>
<tr>
<th><strong>Riparian Area</strong></th>
<th><strong>Guide Sheet Fact Sheet</strong></th>
<th><strong>Ref to PIFR section</strong></th>
<th><strong>Resources of Special Concern</strong></th>
<th><strong>subsection “Riparian Area” for detailed information.</strong></th>
<th><strong>No Effect</strong></th>
<th><strong>May Effect</strong></th>
<th><strong>May Effect</strong></th>
<th><strong>May Effect</strong></th>
<th><strong>May Effect</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>No change to the current conditions expected.</td>
<td>Construction activities could damage the riparian area around the existing dam temporarily. Riparian function expected to return to current conditions after construction.</td>
<td>Construction activities could damage the riparian area around the existing dam temporarily. Riparian function expected to return to current conditions after construction.</td>
<td>Construction activities could damage the riparian area around the existing dam temporarily. Riparian function expected to return to current conditions after construction.</td>
<td>Construction activities could damage the riparian area around the existing dam temporarily. Riparian function expected to return to current conditions after construction.</td>
<td>Construction activities could damage the riparian area around the existing dam temporarily. Riparian function expected to return to current conditions after construction.</td>
<td>Construction activities could damage the riparian area around the existing dam temporarily. Riparian function expected to return to current conditions after construction.</td>
<td>Construction activities could damage the riparian area around the existing dam temporarily. Riparian function expected to return to current conditions after construction.</td>
<td>Construction activities could damage the riparian area around the existing dam temporarily. Riparian function expected to return to current conditions after construction.</td>
<td>Construction activities could damage the riparian area around the existing dam temporarily. Riparian function expected to return to current conditions after construction.</td>
</tr>
<tr>
<td><strong>Soil Cover</strong></td>
<td><strong>Guide Sheet Fact Sheet</strong></td>
<td><strong>Ref to PIFR section</strong></td>
<td><strong>Resources of Special Concern</strong></td>
<td><strong>subsection “Soil Cover” for detailed information.</strong></td>
<td><strong>No Effect</strong></td>
<td><strong>May Effect</strong></td>
<td><strong>May Effect</strong></td>
<td><strong>May Effect</strong></td>
<td><strong>May Effect</strong></td>
</tr>
<tr>
<td>No Effect</td>
<td>The aesthetic of the dam will remain.</td>
<td>Construction will temporarily disrupt the beauty of the river. The replacement dam may not offer equal aesthetics, though the design will likely be similar.</td>
<td>Construction will temporarily disrupt the beauty of the river. The aesthetic of the dam will remain.</td>
<td>Construction will temporarily disrupt the beauty of the river. The aesthetic of the dam will remain.</td>
<td>Construction will temporarily disrupt the beauty of the river. The replacement dam may not offer equal aesthetics, though the design will likely be similar.</td>
<td>Construction will temporarily disrupt the beauty of the river. The aesthetic of the dam will remain.</td>
<td>Construction will temporarily disrupt the beauty of the river. The replacement dam may not offer equal aesthetics, though the design will likely be similar.</td>
<td>Construction will temporarily disrupt the beauty of the river. The aesthetic of the dam will remain.</td>
<td>Construction will temporarily disrupt the beauty of the river. The replacement dam may not offer equal aesthetics, though the design will likely be similar.</td>
</tr>
<tr>
<td><strong>Northeast Land</strong></td>
<td><strong>Guide Sheet Fact Sheet</strong></td>
<td><strong>Ref to PIFR section</strong></td>
<td><strong>Resources of Special Concern</strong></td>
<td><strong>subsection “Northeast Land” for detailed information.</strong></td>
<td><strong>No Effect</strong></td>
<td><strong>May Effect</strong></td>
<td><strong>May Effect</strong></td>
<td><strong>May Effect</strong></td>
<td><strong>May Effect</strong></td>
</tr>
<tr>
<td>No criterion exists for determination of wetland.</td>
<td>Wetlands will not be disturbed.</td>
<td>Wetlands will not be disturbed.</td>
<td>Wetlands will not be disturbed.</td>
<td>Wetlands will not be disturbed.</td>
<td>Wetlands will not be disturbed.</td>
<td>Wetlands will not be disturbed.</td>
<td>Wetlands will not be disturbed.</td>
<td>Wetlands will not be disturbed.</td>
<td>Wetlands will not be disturbed.</td>
</tr>
<tr>
<td><strong>Soil Land</strong></td>
<td><strong>Guide Sheet Fact Sheet</strong></td>
<td><strong>Ref to PIFR section</strong></td>
<td><strong>Resources of Special Concern</strong></td>
<td><strong>subsection “Soil Land” for detailed information.</strong></td>
<td><strong>No Effect</strong></td>
<td><strong>May Effect</strong></td>
<td><strong>May Effect</strong></td>
<td><strong>May Effect</strong></td>
<td><strong>May Effect</strong></td>
</tr>
<tr>
<td>No Effect</td>
<td>The aesthetic of the dam will remain.</td>
<td>Construction will temporarily disrupt the beauty of the river. The replacement dam may not offer equal aesthetics, though the design will likely be similar.</td>
<td>Construction will temporarily disrupt the beauty of the river. The aesthetic of the dam will remain.</td>
<td>Construction will temporarily disrupt the beauty of the river. The replacement dam may not offer equal aesthetics, though the design will likely be similar.</td>
<td>Construction will temporarily disrupt the beauty of the river. The replacement dam may not offer equal aesthetics, though the design will likely be similar.</td>
<td>Construction will temporarily disrupt the beauty of the river. The aesthetic of the dam will remain.</td>
<td>Construction will temporarily disrupt the beauty of the river. The replacement dam may not offer equal aesthetics, though the design will likely be similar.</td>
<td>Construction will temporarily disrupt the beauty of the river. The replacement dam may not offer equal aesthetics, though the design will likely be similar.</td>
<td>Construction will temporarily disrupt the beauty of the river. The replacement dam may not offer equal aesthetics, though the design will likely be similar.</td>
</tr>
</tbody>
</table>

NRCS-CPA-52, April 2013
### Wild and Scenic Rivers

- **No Effect**
  - No Wild and Scenic Rivers are located within or downstream of the proposed project area.

- **Alternative 1**
  - No Wild and Scenic Rivers are located within or downstream of the proposed project area.

- **Alternative 2**
  - No Wild and Scenic Rivers are located within or downstream of the proposed project area.

- **Alternative 3**
  - No Wild and Scenic Rivers are located within or downstream of the proposed project area.

### Mitigation

(Remote actions to avoid, minimize, and compensate)

### Preferred Alternative

- **No Effect**
  - No Wild and Scenic Rivers are located within or downstream of the proposed project area.

- **Alternative 1**
  - No Wild and Scenic Rivers are located within or downstream of the proposed project area.

- **Alternative 2**
  - No Wild and Scenic Rivers are located within or downstream of the proposed project area.

- **Alternative 3**
  - No Wild and Scenic Rivers are located within or downstream of the proposed project area.

### Other Agencies and Broad Public Concerns

- **No Action**
  - No Wild and Scenic Rivers are located within or downstream of the proposed project area.

- **Alternative 1**
  - No Wild and Scenic Rivers are located within or downstream of the proposed project area.

- **Alternative 2**
  - No Wild and Scenic Rivers are located within or downstream of the proposed project area.

- **Alternative 3**
  - No Wild and Scenic Rivers are located within or downstream of the proposed project area.

### Cumulative Effects Narrative

(Describe the cumulative impacts considered, including past, present, and known future actions regardless of who performed the actions)

<table>
<thead>
<tr>
<th>Impact</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
<th>Alternative 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Effect</td>
<td>No Effect</td>
<td>No Effect</td>
<td>No Effect</td>
</tr>
</tbody>
</table>

### Context (Record context of alternatives analysis)

The significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality.

### Determination of Significance or Extraordinary Circumstances

**Intensity:** Refers to the severity of impact. Impacts may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.

If you answer ANY of the below questions "yes" then contact the State Environmental Liaison as there may be extraordinary circumstances and significance issues to consider and a site specific NEPA analysis may be required.

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

- **Is the preferred alternative expected to cause significant effects on public health or safety?**
- **Is the preferred alternative expected to significantly affect unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas?**
- **Are the effects of the preferred alternative on the quality of the human environment likely to be highly controversial?**
- **Does the preferred alternative have highly uncertain effects or involve unique or unknown risks on the human environment?**
- **Does the preferred alternative establish a precedent for future actions with significant impacts or represent a decision in principle about a future consideration?**
- **Is the preferred alternative known or reasonably expected to have potentially significant environment impacts on the quality of the human environment individually or cumulatively over time?**
- **Will the preferred alternative likely have a significant adverse effect on ANY of the special environmental concerns?**
- **Will the preferred alternative threaten a violation of Federal, State, or local law or requirements for the protection of the environment?**

### To the best of my knowledge, the data shown on this form is accurate and complete.

<table>
<thead>
<tr>
<th>Signature (TSP if applicable)</th>
<th>Title</th>
<th>Date</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Signature (NRCS)</th>
<th>Title</th>
<th>Date</th>
</tr>
</thead>
</table>

If preferred alternative is not a federal action where NRCS has control or responsibility and this NRCS-CPA-52 is shared with someone other than the client then indicate to whom this is being provided.
The following sections are to be completed by the Responsible Federal Official (RFO)

NRCS is the RFO if the action is subject to NRCS control and responsibility (e.g., actions financed, funded, assisted, conducted, regulated, or approved by NRCS). These actions do not include situations in which NRCS is only providing technical assistance because NRCS cannot control what the client ultimately does with that assistance and situations where NRCS is making a technical determination (such as Farm Bill HEI, or wetland determinations) not associated with the planning process.

<table>
<thead>
<tr>
<th>Q. NEPA Compliance Finding (check one)</th>
<th>Action required</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) is not a federal action where the agency has control or responsibility.</td>
<td>Document in &quot;R.1&quot; below. No additional analysis is required</td>
</tr>
<tr>
<td>2) is a federal action ALL of which is categorically excluded from further environmental analysis AND there are no extraordinary circumstances as identified in Section &quot;O&quot;.</td>
<td>Document in &quot;R.2&quot; below. No additional analysis is required</td>
</tr>
<tr>
<td>3) is a federal action that has been sufficiently analyzed in an existing Agency state, regional, or national NEPA document and there are no predicted significant adverse environmental effects or extraordinary circumstances.</td>
<td>Document in &quot;R.1&quot; below. No additional analysis is required</td>
</tr>
<tr>
<td>4) is a federal action that has been sufficiently analyzed in another Federal agency’s NEPA document (EA or EIS) that addresses the proposed NRCS action and its’ effects and has been formally adopted by NRCS. NRCS is required to prepare and publish its own Finding of No Significant Impact for an EA or Record of Decision for an EIS when adopting another agency’s EA or EIS document. (Note: This box is not applicable to FSA)</td>
<td>Contact the State Environmental Liaison for list of NEPA documents formally adopted and available for tiering. Document in &quot;R.1&quot; below. No additional analysis is required</td>
</tr>
<tr>
<td>5) is a federal action that has NOT been sufficiently analyzed or may involve predicted significant adverse environmental effects or extraordinary circumstances and may require an EA or EIS.</td>
<td>Contact the State Environmental Liaison. Further NEPA analysis required</td>
</tr>
</tbody>
</table>

R. Rationale Supporting the Finding

R.1 Findings Documentation

R.2 Applicable Categorical Exclusion(s) (more than one may apply)

7 CFR Part 650 Compliance With NEPA, subpart 650.6 Categorical Exclusions states prior to determining that a proposed action is categorically excluded under paragraph (d) of this section, the proposed action must meet six sideboard criteria. See NECH 610.116.

I have considered the effects of the alternatives on the Resource Concerns, Economic and Social Considerations, Special Environmental Concerns, and Extraordinary Circumstances as defined by Agency regulation and policy and based on that made the finding indicated above.

S. Signature of Responsible Federal Official:

<table>
<thead>
<tr>
<th>Signature</th>
<th>Title</th>
<th>Date</th>
</tr>
</thead>
</table>

Additional notes
## Opinion of Probable Construction Costs

**Williams Dam Alternative 2**  
**RJH Project No. 22117**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Total Quantity</th>
<th>Unit</th>
<th>Unit Price</th>
<th>Extension</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mobilization @ 10% of BCS</td>
<td>1</td>
<td>Lump Sum</td>
<td>$177,222</td>
<td>$177,222</td>
</tr>
<tr>
<td>2</td>
<td>Temporary Facilities</td>
<td>1</td>
<td>Lump Sum</td>
<td>$150,000</td>
<td>$150,000</td>
</tr>
<tr>
<td>3</td>
<td>Site Restoration</td>
<td>1</td>
<td>Lump Sum</td>
<td>$50,000</td>
<td>$50,000</td>
</tr>
<tr>
<td>4</td>
<td>Dewatering</td>
<td>1</td>
<td>Lump Sum</td>
<td>$75,000</td>
<td>$75,000</td>
</tr>
<tr>
<td>5</td>
<td>Dam Removal</td>
<td>1</td>
<td>Lump Sum</td>
<td>$90,000</td>
<td>$90,000</td>
</tr>
<tr>
<td>6</td>
<td>New Concrete Dam</td>
<td>1</td>
<td>Lump Sum</td>
<td>$1,060,000</td>
<td>$1,060,000</td>
</tr>
<tr>
<td>7</td>
<td>Sediment Excavation</td>
<td>6,000</td>
<td>Cubic Yard</td>
<td>$18</td>
<td>$108,000</td>
</tr>
<tr>
<td>8</td>
<td>Sediment Haul</td>
<td>6,000</td>
<td>Cubic Yard</td>
<td>$22</td>
<td>$132,000</td>
</tr>
<tr>
<td>9</td>
<td>Other Improvements</td>
<td>1</td>
<td>Lump Sum</td>
<td>$50,000</td>
<td>$50,000</td>
</tr>
</tbody>
</table>

### General Items

- **Base Construction Subtotal (BCS)**  
  - Bonds/Insurance (2% of BCS): 2%  
  - Unscheduled Items (20% of BCS): 20%  
  - **Total**: $1,892,222

- **Direct Construction Subtotal (DCS)**  
  - Construction Contigencies (30% of DCS): 30%  
  - Permitting (15% of DCS): 15%  
  - Design Engineering (12% of DCS): 12%  
  - Construction Engineering and Testing (12% of DCS): 12%  
  - **Total**: $2,308,511

- **Construction Contigencies (30% of DCS)**: $692,553
- **Permitting (15% of DCS)**: $346,277
- **Design Engineering (12% of DCS)**: $277,021
- **Construction Engineering and Testing (12% of DCS)**: $277,021

- **OPINION OF PROBABLE CONSTRUCTION COSTS**: $3,901,384
END WALLS (PROJECTED AND BEYOND)

SIDE WALL (PROJECTED AND BEYOND)

CONTAINMENT SILL (PROJECTED AND BEYOND)

FLOW

ASSUMED COMPETENT BEDROCK

SCALE IN FEET

0 2.5 5 10
<table>
<thead>
<tr>
<th>Unit</th>
<th>Description</th>
<th>Estimated Value</th>
<th>Square Footage</th>
<th>Demolition Cost</th>
<th>Disposal Cost</th>
<th>Total Unit Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Restaurant/Bar</td>
<td>$1,225,000</td>
<td>7,000</td>
<td>$30,000</td>
<td>$65,625</td>
<td>$1,320,625</td>
</tr>
<tr>
<td>2</td>
<td>Restaurant</td>
<td>$800,000</td>
<td>4,000</td>
<td>$25,000</td>
<td>$37,500</td>
<td>$862,500</td>
</tr>
<tr>
<td>3</td>
<td>Residence</td>
<td>$50,000</td>
<td>800</td>
<td>$10,000</td>
<td>$7,500</td>
<td>$67,500</td>
</tr>
<tr>
<td>4</td>
<td>Restaurant</td>
<td>$800,000</td>
<td>4,000</td>
<td>$25,000</td>
<td>$37,500</td>
<td>$862,500</td>
</tr>
<tr>
<td>5</td>
<td>Market</td>
<td>$437,500</td>
<td>2,500</td>
<td>$20,000</td>
<td>$50,000</td>
<td>$507,500</td>
</tr>
<tr>
<td>6</td>
<td>Liquor Store</td>
<td>$665,000</td>
<td>3,800</td>
<td>$25,000</td>
<td>$35,625</td>
<td>$725,625</td>
</tr>
<tr>
<td>7</td>
<td>Salon</td>
<td>$350,000</td>
<td>2,000</td>
<td>$15,000</td>
<td>$18,750</td>
<td>$383,750</td>
</tr>
<tr>
<td>8</td>
<td>Auto Store</td>
<td>$525,000</td>
<td>3,000</td>
<td>$20,000</td>
<td>$28,125</td>
<td>$573,125</td>
</tr>
<tr>
<td>9</td>
<td>Residence</td>
<td>$200,000</td>
<td>1,500</td>
<td>$15,000</td>
<td>$250,000</td>
<td>$465,000</td>
</tr>
<tr>
<td>10</td>
<td>Residence</td>
<td>$200,000</td>
<td>1,500</td>
<td>$15,000</td>
<td>$250,000</td>
<td>$465,000</td>
</tr>
<tr>
<td>11</td>
<td>Residence</td>
<td>$250,000</td>
<td>1,800</td>
<td>$15,000</td>
<td>$16,875</td>
<td>$281,875</td>
</tr>
</tbody>
</table>

Subtotal $6,515,000

Total (Subtotal x 110%) $7,166,500

Notes:

1. Square footage and value approximated.
2. Value approximated.
3. Value approximated based on average building costs per square foot.
Alternative 3 - Buy Out Impacted Structures
Cost Estimate Figure

Notes:
- Map represents controlling hazard classification dam breach scenario (see accompanying memorandum).
- Failure occurs at reservoir elevation 1146 ft (top of dam), with a 1,570 cfs discharge in West River.
- Depicted inundation, depths, velocities, and arrival times are approximate (derived from computer simulation).
- Actual flood conditions may vary. Inundation mapping is to be used as approximate guidance only.
- Depths are measured in reference to ground surface adjacent to building (not above first floor).
## Opinion of Probable Construction Costs

**Williams Dam Alternative 4**  
**RJH Project No. 22117**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Total Quantity</th>
<th>Unit</th>
<th>Unit Price</th>
<th>Extension</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General Items</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Mobilization @ 10% of BCS</td>
<td>1</td>
<td>Lump Sum</td>
<td>$1,497,778</td>
<td>$1,497,778</td>
</tr>
<tr>
<td>2</td>
<td>Temporary Facilities and Traffic Control</td>
<td>1</td>
<td>Lump Sum</td>
<td>$500,000</td>
<td>$500,000</td>
</tr>
<tr>
<td>3</td>
<td>Site Restoration</td>
<td>1</td>
<td>Lump Sum</td>
<td>$100,000</td>
<td>$100,000</td>
</tr>
<tr>
<td>4</td>
<td>Dewatering</td>
<td>1</td>
<td>Lump Sum</td>
<td>$200,000</td>
<td>$200,000</td>
</tr>
<tr>
<td><strong>Williams Dam Removal and Replacement</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Dam Removal</td>
<td>1</td>
<td>Lump Sum</td>
<td>$90,000</td>
<td>$90,000</td>
</tr>
<tr>
<td>6</td>
<td>New Concrete Dam</td>
<td>1</td>
<td>Lump Sum</td>
<td>$1,060,000</td>
<td>$1,060,000</td>
</tr>
<tr>
<td><strong>Channel and Reservoir Improvements</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Sediment Excavation</td>
<td>6,000</td>
<td>Cubic Yard</td>
<td>$18</td>
<td>$108,000</td>
</tr>
<tr>
<td>8</td>
<td>Sediment Haul</td>
<td>6,000</td>
<td>Cubic Yard</td>
<td>$22</td>
<td>$132,000</td>
</tr>
<tr>
<td>9</td>
<td>Other Improvements</td>
<td>1</td>
<td>Lump Sum</td>
<td>$50,000</td>
<td>$50,000</td>
</tr>
<tr>
<td><strong>Flood Protection</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Flood Risk Reduction Floodwall</td>
<td>8,500</td>
<td>Lineal Foot</td>
<td>$1,220</td>
<td>$10,370,000</td>
</tr>
<tr>
<td>12</td>
<td>Vermont Rte 100 Road Raise</td>
<td>2,000</td>
<td>Lineal Foot</td>
<td>$370</td>
<td>$740,000</td>
</tr>
</tbody>
</table>

**Base Construction Subtotal (BCS)**  
$14,847,778

- Bonds/Insurance (2% of BCS)  
  $296,956
- Unsheduled Items (20% of BCS)  
  $2,969,556

**Direct Construction Subtotal (DCS)**  
$18,114,289

- Construction Contigencies (30% of DCS)  
  $5,434,287
- Permitting (15% of DCS)  
  $2,717,143
- Design Engineering (12% of DCS)  
  $2,173,715
- Construction Engineering and Testing (12% of DCS)  
  $2,173,715

**OPINION OF PROBABLE CONSTRUCTION COSTS**  
$30,613,148
Inundation from 10-year peak runoff, which is 5,420 cfs according to the D&K Engineering Assessment, 2022.

Raise Route 100.
Total Length: 2,000 feet
Average Raise Height: 6 feet

Floodwalls on both sides of floodplain.
Total Crest Length: 8,500 feet
Average Crest Height: 10 feet

This concept was developed using a 2D unsteady flow model in HEC-RAS Version 6.3, with an upstream flow hydrograph set to the constant 10-year peak runoff flow rate of 5,420 cfs.
The topography used in the model was the 1-meter resolution DEM LiDAR data publicly available from the State of Vermont.
National Land Cover Database data was used to assign land cover types and manning’s “n” values to grid elements in the model.
A 10-foot grid spacing and a variable model time step of 30 seconds was used, controlled by a courant number.
The terrain was modified and breaklines were added to incorporate floodwalls into the model. Floodwall heights were adjusted as necessary to contain flows.