



**VTTrans Fall 2023 Transportation Alternatives (TAP)
and
Municipal Highway and Stormwater Mitigation Program Grant (MHSMP)
Combined Application**

Thoroughly read the TAP and MHSMP application guidebooks before you begin your application. It includes important program information and step-by-step instructions. Pay particular attention to the application process requirements. **Applications are due by e-mail by December 8, 2023.** Please e-mail the completed application to: Ross.gouin@vermont.gov and Scott.robertson@vermont.gov.

<u>Parker Road Bridge 25 Replacement</u> (Project Name/Title)	<u>802-276-3352</u> (Phone)
<u>John Benson, Selectboard Chair</u> (Municipality contact person responsible for the management of this project)	<u>admin@brookfieldvt.org</u> (e-mail address)
<u>Brookfield</u> (Town)	<u>\$ 600,000</u> Amount of Federal Funds requested (no more than 80% of the project cost estimate).
<u>05036</u> (Zip Code)	<u>\$ 275,000</u> Amount of Local Match. Example: Federal Award = \$600,000 (80% of total) Local Match = \$150,000 (20% of total) Total Project Cost = \$750,000 (100% of the total)
<u>PO Box 463</u> (Mailing Address)	

County: Orange

Town/Village/City: Brookfield

Specific location, street, or road: Parker Dr TH37, 500ft south of Halfway Brook Rd

Regional Planning Commission: Two Rivers-Ottauquechee Regional Commission

If a linear project, what is the length in feet? 20ft

Is the project on or intersecting to a State maintained highway? Yes No

- Note: If yes, be sure to include documentation that you have notified the VTTrans District Transportation Administrator of the intent to apply for TA funding and have provided them with a brief (one paragraph) description of the proposed project.*

Project type being applied for: **Scoping** **Design/Construction**

The municipality understands that a typical construction project utilizing TAP or MHSMP Program funds will take roughly three years (min.) in the Design and ROW phases prior to going to construction (as pointed out in the TAP and MHSMP Application Guides)? Yes No

Does this project have a previously completed scoping or feasibility study? Yes No

Note:

Attach a map(s) of the project area and clearly show the limits of the project as well as surrounding benefits from the proposed improvement. If the project is within or adjacent to a designated downtown, village or growth center, clearly indicate the relationship of the proposed project to the boundary of the designated area. Color photos of the area are also recommended.

Fiscal Information:

Accounting System Automated Manual Combination

SAM Unique Identifier # JMUMAJMKH8N5

Fiscal Year End Month 06

Property Ownership:

If the proposed project is on private property that will need to be acquired by the Municipality through purchase, easement, or eminent domain (includes temporary construction rights) in accordance with the "Uniform Act", then the municipality is committed to exercising its right of **eminent domain** to acquire the rights to construct the project if necessary. Yes No

Funding:

Does this project already have existing funding? If so, please describe. Yes No

[Click here to enter text.](#)

Please note that existing projects will not be considered for additional funding without a current NEPA clearance and ROW clearance. Please provide date of clearances below:

[Click here to enter text.](#)

Will you accept an award less than you applied for? Yes No

- If yes, please indicate whether local funds will be used to make up the shortfall, or if the project scope will be reduced. If the project scope is to be reduced, describe what part of the project (please be specific) you would accept partial funding for.

[Click here to enter text.](#)

A support letter from the governing body of the applicant municipality or organization and an acknowledgement and source of the local match and commitment to future maintenance responsibility for construction projects is required (must be dated within 1 year of the application). Is a letter of support attached?

Yes No

Regional Planning Commission Letter of Support:

In order to apply, the project must have a letter of support from the regional planning commission. Is a letter of support attached?

Yes No

PLEASE NOTE: If this application is for salt or sand shed funding, the applicant must read and understand the ***Municipal Assistance Section Salt Shed Application Guide***. All of the following scoring questions below must thoroughly convey an understanding of the salt and sand guidance provided.

Application Scoring Criteria:

- 1. Please give a brief description of the project (be sure to indicate the primary facility type being applied for and be concise).**

(10 points max.)

Bridge 25 on Parker Dr is undersized at an existing 11 to 12.5ft span by 5.4 to 5.2 high that runs parallel to Halfway Brook. During the July 2023 storm the brook bypassed the bridge and just flowed over the road, washing out the approach on the north side of the crossing. The brook connects to the Second Branch of the White River watershed. The hydraulic study recommended the replacement structure to a 18 ft by 8 ft box or 18 span by 6 ft high bridge. FEMA will not replace the structure as it was undamaged during the event. However the condition of the existing bridge on Parker Dr has required us to post the weight limit below that required for the fuel delivery vehicle to cross thus cutting off delivery to the home on the other side.

- 2. What is the feasibility of this project? Feasibility (or Scoping) study applications will not be scored on this criterion. Also, please describe the extent of project development to date.**

(10 points max.)

The hydraulics study reported the new opening of the structure and this would be feasible for replacement. The project development would require engineering to design the alignment and structure for construction plans.

- 3. Does this project address a need identified in a local or regional planning document? If so, please describe.**

(5 points max.)

No.

- 4. Does this project:**

- A. Benefit a State Designated Center per the link below (i.e., downtowns, villages, or neighborhood growth centers recognized by the Vermont Department of Economic, Housing and Community Development?**

Not applicable for Environmental Mitigation Categories (5 points max.)

<http://maps.vermont.gov/ACCD/PlanningAtlas/index.html?viewer=PlanningAtlas>

No.

B. Benefit mobility for disadvantaged populations to include elderly, disabled, minorities, and low-income residents. Please describe this impact (if applicable) in detail. Supporting documentation, including recent data must be included.

Not applicable for Environmental Mitigation Categories (10 points max.)

No.

5. Provide a project cost estimate below (project costs below include both federal dollars and local dollars). Projects will be scored based on whether the cost appears realistic for the size and scope of the project. For scoping studies, use PE and Local Project Management lines only.

Note: If you are applying for additional funds for an existing project, show the amount being requested for this grant in the PE, ROW, Construction, Construction Engineering, and Municipal Project Management rows below. Also, be clear regarding total project cost and other funding amounts and sources in the additional funding comments box below.

(10 points max.)

Preliminary Engineering (PE) (Engineering, Surveying, Permitting)	\$ 115,944.00
Right-of-way / Acquisition (ROW) (appraisals, land acquisition and legal fees)	\$ 2,500.00
Construction (construction costs with reasonable contingency)	\$ 579,720.00
Construction Engineering (cost to provide inspection during construction)	\$ 86,958.00
Municipal Project Management Costs (minimum of 10% of total PE, ROW and Construction Phases).	\$ 78,512.20
Total Project Cost	\$ 863,634.20

Addition Funding Comments: (ex. Total and additional funding for existing projects)

[Click here to enter text.](#)

6. Select the eligibility category below (A, B, C or D) that best fits your project and answer the corresponding questions for that category (choose only one category). **10 bonus points will be awarded to projects that are primarily Bicycle or Pedestrian facilities.**

**C. Environmental Mitigation Activity Related to Stormwater and Highways
(Including Salt and Sand Sheds)**

- i. Please describe how this application provides environmental mitigation relating to stormwater and highways. **(10 points max.)**

The replacement of this undersized structure with a larger structure will increase the hydraulic capacity. There are multiple structures along Halfway Brook including this one that are undersized and cause multiple damages a year during high rain events. As evident in the July 2023 storm, this structure easily overtopped washing around the structure into the roadway. This also caused the roadway to be weight limited and is impacting residents with fuel delivery access. The inclusion of concrete flared wingwalls and headwalls will stabilize the roadway and reduce road sediment erosion at both the inlet and outlet which feeds into the Halfway Brook and the greater White River watershed. Each time the road washes out, the highway crew repairs it with roughly \$2500 of stone material plus labor and equipment (2-3 days).

- ii. What information or data is provided to substantiate the current stormwater problem and associated environmental impacts? **(10 points max.)**

Constricting the brook channel width through the structure can result in an increased potential for debris blockage. This has been the root cause of all the road washouts at this undersized structure location. This complication is known to cause ponding at the inlet, increase stream velocity and scour at the outlet, and may lead to erosion and failure of the channel banks. It's already evident with the existing failures at this site during the July 2023 flood event with the road stability. The road materials get transported into the stream and into the White River watershed.

- iii. What substantiating data or information is provided to show that the proposed application is an effective and maintainable solution to the problem? **(10 points max.)**

Based on the hydraulic study conducted by Vermont Agency of Transportation, the recommended structure opening for bridge 25 is a concrete box with a minimum opening of 8ft H x 18ft L, with bed retention sills, concrete headwalls and flared wingwalls. Due to the low height from the streambed to the road, this limits the replacement option to a box structure. The roadway would have to be raised substantially for a pipe, which could increase flooding of upstream property. It was also recommended from the study that for a new structure of this size to have flared wingwalls, matched into the channel banks at the inlet and outlet, to smoothly transition flow and protect the structure and roadway approaches from erosion. It is also recommended that full height concrete headwalls be constructed at the inlet and outlet, extending at least four feet below the channel bottom, or to ledge, to serve as cutoff walls and undermining prevention.

Parker Road Bridge 25 Design/Construction Estimate

Existing bridge = 11 to 12.5 ft span. 5.4 to 5.2 high

H&H study recommendation = 18 ft by 8 ft box or 18 span by 6 ft high bridge

DESIGN PHASE

Survey	\$2,000.00
Base Plan Prep	\$1,250.00
Borings/test Pits	\$10,000.00
Type Study	\$3,000.00
Preliminary Design	\$32,000.00
Probable Construction Cost Estimate	\$2,000.00
Permitting	
+ River Management	\$1,200.00
+ COE	\$1,200.00
* Construction Stormwater	\$1,200.00
Final Design	\$32,000.00
Special provisions	\$2,000.00
Probable Construction Cost Estimate	\$1,000.00
Bid phase (front ends, adv, etc.)	\$8,000.00
Sub Total	\$96,850.00
Contingency (15%)	\$14,527.50
Total Design phase	\$111,377.50

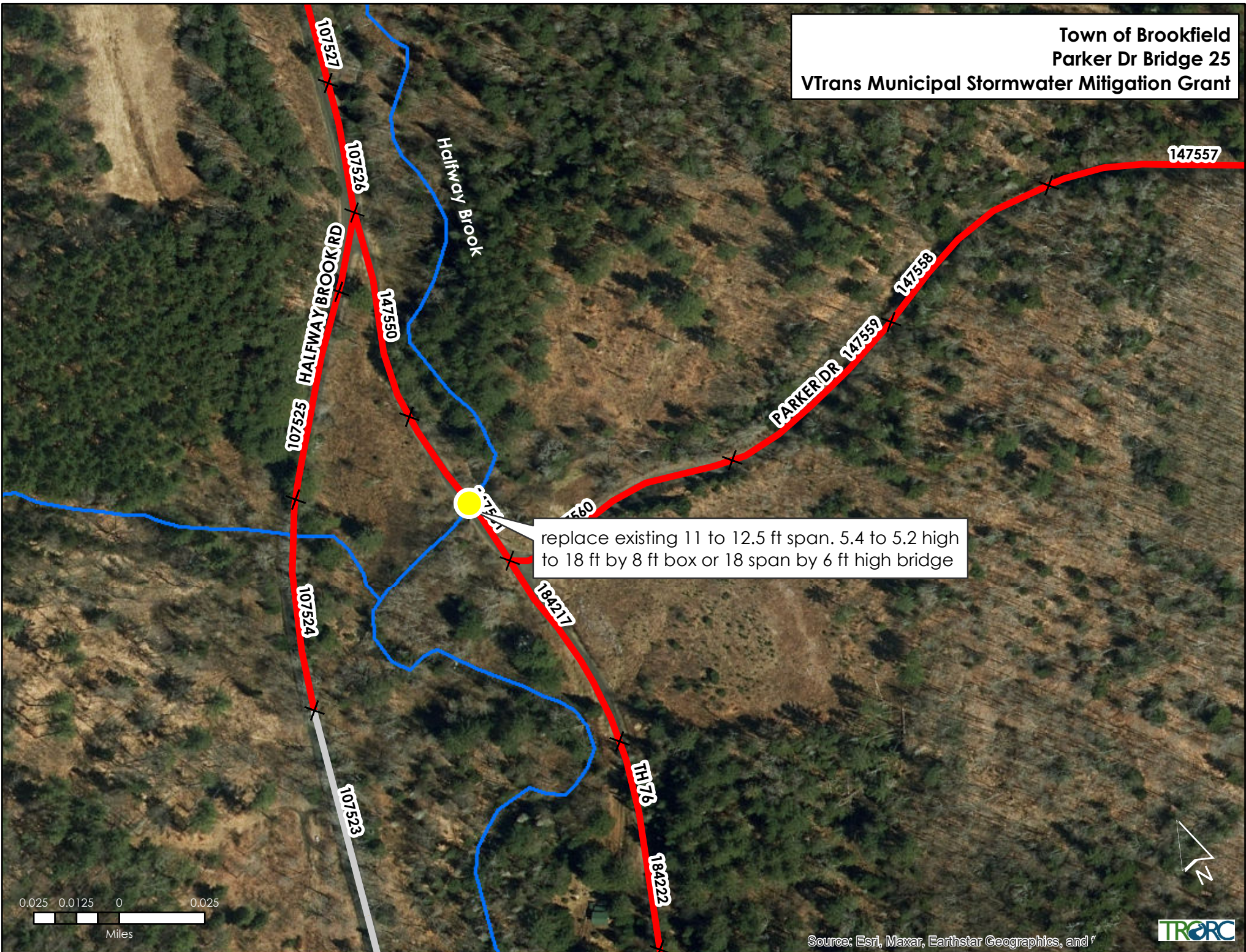
Design / Engineering (20% of construction)	\$115,944.00
Right of Way (town attorney fee for ROW certification)	\$2,500.00
Engineering Total:	\$118,444.00
18 ft by 8 ft box or 18 span by 6 ft high bridge	\$579,720.00
(includes structure removal, roadwork, stream channel work, traffic control, crane work, erosion and sediment control)	
Construction Inspection Engineering (15%)	\$86,958.00
Municipal Project Management (minimum of 10% of total PE, ROW and Construction Phases)	\$78,512.20
Total Project:	\$863,634.20
USE:	\$875,000.00
80% Grant Request:	\$600,000
20% Town Match:	\$275,000

CONSTRUCTION PHASE

Bid Analysis/Construction Award	\$1,000.00
Construction Phase Engineering Services	
* Shop Drawing Review	\$1,000.00
* RFI response	\$1,500.00
* Change Orders	\$1,000.00
* Site Visits	\$5,000.00
Construction (Contractor)	
* Demo of Ext Structure	\$75,000.00
* Temp Pedestrian Bridge	\$20,000.00
*Approaches 250 ft each side	\$25,000.00
20 ft guard rail each approach/side	\$3,600.00
* New Structure	\$350,000.00
Sub Total	\$483,100.00
Contingency (20%)	\$96,620.00
Total Construction	\$579,720.00

TOTAL ESTIMATED PROJECT COST \$691,097.50

Town of Brookfield
Parker Dr Bridge 25
VTrans Municipal Stormwater Mitigation Grant



Source: Esri, Maxar, Earthstar Geographics, and f



TOWN OF BROOKFIELD – PARKER DR BRIDGE 25 PICTURES



The July 2023 FEMA storm event overtopped the road and washed out half the road due to undersized structure

TOWN OF BROOKFIELD – PARKER DR BRIDGE 25 PICTURES



View of the deck conditions

TOWN OF BROOKFIELD – PARKER DR BRIDGE 25 PICTURES



View of the undercut abutment

TOWN OF BROOKFIELD – PARKER DR BRIDGE 25 PICTURES



View of the undersized opening of the bridge

Town of Brookfield Selectboard

PO Box 463

Brookfield, VT 05036

(802) 276-3352

December 5, 2023

Mr. Ross Gouin
Vermont Agency of Transportation
219 North Main Street
Barre, VT 05641

SUBJECT: VTrans (TAP) and (MHSMP) Grant

Dear Mr. Gouin:

The Town of Brookfield is pleased to submit this application for funding of a Bridge replacement on Parker Drive (TH37) in the Town of Brookfield under the VTrans (TAP) and (MHSMP) Grant Program. As detailed withing our application, this Bridge is undersized. During the July 10, 2023 storm event, the Bridge was unable to carry the stream flows causing the road to be overtopped and then washed out.

The hydraulic study (enclosed) documents that the existing Bridge opening is undersized and should be replaced by an 18 ft X 8 ft box or a 18' span by 6 ft high bridge. The bridge is currently load limited at 3 ton now. This is a problem as it prevents fuel delivery to house on the other side of the bridge and this is the only access to these homes. Thus fire and EMS are at risk if they try to cross the bridge.

We thank you for your consideration in this matter.

Should you have any questions or are in need of any additional information, please do not hesitate to contact myself (802-276-3460)

Sincerely,
Brookfield Selectboard



Keith Sprague, Road Commissioner

Mr. John Benson
Town of Brookfield
PO Box 463
Brookfield, VT 05036

November 30, 2023

Dear John,

I am pleased to provide a letter of support for the SFY24 Vermont Combined Transportation Alternatives Program and Environmental Mitigation Grant Program application for a structure replacement over Halfway Brook on Parker Dr. This structure replacement will allow Halfway Brook to flow freely and safely under Parker Dr and reduce the multiple road washout events during heavy rainstorms. We understand this structure upsizing is a priority for the Town since the July 2023 flood as the road is now weight limited for fuel truck deliveries to residents.

We fully support the Town's efforts in mitigating stormwater runoff, protecting a town road, and improving water quality.

Please contact me if you have any questions.

Sincerely,



Rita Seto, AICP
Senior Planner

128 King Farm Rd.
Woodstock, VT 05091
802-457-3188
trorc.org

William B. Emmons III, Chair
Peter G. Gregory, AICP, Executive Director

State of Vermont
Structures and Hydraulics Section
Barre City Place
219 North Main Street | Barre, VT 05641
vtrans.vermont.gov

[phone] 802-371-7326
[fax] 802-828-3566
[ttd] 800-253-0191

Agency of Transportation

TO: Michelle Redmond, District 6 Project Manager

CC: Jaron Borg, ANR River Management Engineer

FROM: Keith Friedland, Hydraulics Technician

DATE: January 5, 2023

SUBJECT: Brookfield TH-37, Parker Drive, over Halfway Brook tributary to Second Branch White River
Site location: 500 feet south of TH-35, Halfway Brook Road
Coordinates: 43.989641, -72.528025

We have completed our hydraulic study for the above referenced site and offer the following for your use.

Hydrology

The following physical characteristics are descriptive of this drainage basin:

Drainage Area	4.1 square miles
Land Cover	Forested with some open fields and residential areas
Avg. Drainage Basin Slope	7.4 %
Water Bodies and Wetlands (NLCD 2006)	0.7 %

Using the USGS hydrologic method, the following design flow rates were selected:

Annual Exceedance Probability (AEP)	Flow Rate in Cubic Feet per Second (cfs)	
50 %	160	
10 %	330	
4 %	440	Design Flow – Local Road
2 %	530	
1 %	630	Check Flow

Channel Morphology

The channel for this perennial stream is sinuous with an estimated local channel slope of 1%. Field measurements of bankfull width varied from 18 to 22 feet at a bankfull depth of 1 to 3 feet upstream and downstream of the structure. A considerable quantity of woody debris was found upstream of the existing structure.

Existing Conditions

The existing structure is a bridge with a span of 11 feet and a height of 5.4 feet at the inlet, providing an approximate waterway opening of 59 square feet. At the outlet the structure has a span of 12.5 feet and a height of 5.2 feet. **The existing inlet dimensions were utilized for this study.** Our calculations, field observations and measurements indicate the existing structure does not meet current standards of the VTrans Hydraulic Manual

nor does the existing structure meet state stream equilibrium standards for bankfull width (span length). The existing structure constricts the channel width, resulting in an increased potential for debris blockage. This complication is known to cause ponding at the inlet, increase stream velocity and scour at the outlet, and may lead to erosion and failure of channel banks.

This structure results in a headwater depth of approximately 6.3 feet at 4% AEP, **with water overtopping the roadway before the 2% AEP.**

Replacement Recommendations

In sizing a new structure, we attempt to select structures that meet both the current VTrans hydraulic standards, state environmental standards with regard to span length and opening height, and allow for roadway grade and other site constraints.

- A concrete box with an inside opening span of 18 feet and minimum height of 8 feet. The box invert should be buried 2 feet. This will result in a clear height of 6 feet above streambed, providing 108 square feet of waterway area. Bed retention sills should be added in the bottom of the structure. Sills should be 12 inches high at the edges of the box and 6 inches high in the center, creating a V-shape across the full width of the box. Sills should be spaced no more than 8 feet apart throughout the structure with one sill placed at both the inlet and the outlet. The structure should be filled level to the streambed with E-Stone, Type II, allowing flow to be kept above the surface, providing the conditions necessary for aquatic organism passage. This structure results in a headwater depth of 4.6 feet at 2% AEP and 5.8 feet at 1% AEP.
- A bridge with a minimum clear span of 18 feet and clear height of 6 feet, providing a waterway area of 108 square feet. *E-Stone, Type II, may need to be used to build the channel through this structure.* The bottom of abutment footings should be at least 6 feet below the channel bottom, or to ledge, to prevent undermining. This structure results in a headwater depth of 4.6 feet at 4% AEP and 5.8 feet at 1% AEP. This structure provides 1.4 feet of freeboard at the design AEP.

Note: Any similar structure that fits the site conditions could be considered. Any structure with a closed bottom should have bed retention sills and a buried invert. If an open bottom structure is installed, the VTrans Hydraulics Manual requires a minimum of 1-foot of freeboard at the design AEP.

To match the approximate local stream slope, the structures recommended above have been modeled with a slope of 1%. The local stream slope should be verified prior to installation of the new structure.

Stone Fill, Type II should be used to protect any disturbed channel banks or roadway slopes at the structure's inlet and outlet, up to a height of at least one-foot above the top of the opening. The stone fill should not constrict the channel or structure opening.

Prior to any action toward the implementation of any recommendations received from VTrans, stream type and structure size must be confirmed, and may be modified, by the VT ANR River Management Engineer to ensure compliance with state environmental standards for stream crossing structures. Regulatory authorities including the US Army Corps of Engineers may have additional concerns or requirements regarding this structure. This structure is within the Zone A mapped FEMA flood insurance study floodplain.

General Comments

It is always desirable for a new structure to have flared wingwalls, matched into the channel banks at the inlet and outlet, to smoothly transition flow and protect the structure and roadway approaches from erosion. It is also recommended that full height concrete headwalls be constructed at the inlet and outlet. Any closed bottom structure should also be equipped with cutoff walls, extending to a depth equal to the culvert rise, up to 4 feet, or

to ledge, to serve as undermining prevention. E-Stone thickness plus the bottom of structure thickness should be included when determining the total cutoff wall depth. If a new bridge is installed, the bottom of abutment footings should be at least 6 feet below the channel bottom, or to ledge, to prevent undermining. Abutments on piles should be designed to be free standing for a scour depth at least 6 feet below channel bottom. Any new structure should be properly aligned with the channel, span the natural channel width, and be constructed on a grade that matches the channel.

The structures recommended above have been sized with respect to hydraulic and environmental standards and do not consider debris blockage complications. To minimize maintenance and ensure constructability, it is recommended that the structure height be adequate for installation of E-Stone and passage of debris.

Please note that while a site visit was made, these recommendations were made without the benefit of a survey and are based on limited information. The final decision regarding replacement of this structure must comply with state regulatory standards, and should take into consideration matching natural channel conditions, roadway grade, environmental concerns, safety, and other requirements.

Please contact us if you have any questions or if we may be of further assistance.