

emailed 4/15/13



VERMONT

AGENCY OF TRANSPORTATION

FY 2014 TOWN HIGHWAY GRANT APPLICATION

APPLYING FOR: Structures Class 2 Roadway Emergency

TOWN CONTACT (name): Alfred Larrabee
Phone: 456-7466 E-Mail: cat's road commissions at myfairpoint.net

DISTRICT CONTACT (name): Tom Anderson - D6 Project Manager
Phone: 802-828-2687 E-Mail: tom.anderson@state.vt.us

SCOPE OF WORK TO BE PERFORMED BY GRANTEE

Location of Work. The work described below involves the following town highway structure:
TH# 6, (Name) Center Road which is a class 2 town highway.
Bridge # _____, which crosses _____
Culvert # 0127, for which the original size was 5' dia. and the replacement size is 4'10" x 4'10"
Causeway: _____
Retaining Wall: _____

Anticipated Completion Date. The anticipated completion date for this project is
Nov., 20 2013

Work to Be Done:
See attachment

Detailed Cost Estimate (below or attached):

See attachment

PROJECT ESTIMATE AMOUNT: \$167,537.15

Has Town adopted codes & standards that meet or exceed the 1-4-11 template? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
Does Town have an infrastructure study (3-years old or less)? <input type="checkbox"/> YES <input type="checkbox"/> NO	
Has Town completed the following environmental resource checklist below? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
EXISTING STRUCTURES: (check all that apply)	
<input checked="" type="checkbox"/> Steel Tube Culvert	<input type="checkbox"/> Concrete Box Culvert
<input type="checkbox"/> Stone Culvert	<input type="checkbox"/> Concrete Bridge
<input type="checkbox"/> Ditch	<input type="checkbox"/> Rolled Beam/Plate Girder Bridge
<input type="checkbox"/> Metal Truss Bridge	<input type="checkbox"/> Wooden Covered Bridge
<input type="checkbox"/> There are foundation remains, mill ruins, stone walls or other.	
<input type="checkbox"/> Stone Abutments or Piers	<input type="checkbox"/> Buildings (over 50 yrs old) within 300 feet of work
PROJECT DESCRIPTION: (check all that apply)	
<input type="checkbox"/> The Project involves engineering/ planning only.	<input type="checkbox"/> The project consists of repaving existing paved surfaces only.
<input type="checkbox"/> The project consists of reestablishing existing ditches only.	<input checked="" type="checkbox"/> All work will be done from the existing road or shoulder.
<input checked="" type="checkbox"/> The structure is being replaced on existing location/alignment.	<input checked="" type="checkbox"/> There will be excavation within 300 feet of a river or stream.
<input type="checkbox"/> There will be excavation within a flood plain.	<input type="checkbox"/> Road reclaiming, reconstruction, or widening
<input type="checkbox"/> Tree cutting / clearing.	<input type="checkbox"/> Temporary off-road access is required.
<input type="checkbox"/> New ditches will be established.	<input type="checkbox"/> The roadway will be realigned.
The Town has included photos of the Project. Must show infrastructure and surrounding features, as much as possible. <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
The Town has included a detailed Scope of Work. <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	

Below this line to be filled in by VTrans staff:

Received by District (name & date): _____

Recommend Grant Award? YES NO:

Recommended Award Amount: \$ _____

Forwarded to Opns HQs by (name & date): _____

Received by Opns HQs (name & date): _____

Forwarded to Environmental Permitting Section by (name & date): _____

Received by Environmental Permitting Section (name & date): _____

Forwarded back to Opns HQs (name & date): _____

Received by Opns HQs (name & date): _____

Town of Calais, TH No. 6, (Center Road) over Brook

Proposed Scope of Work

1. Dig-Safe Project Area including where Detour Signs will be Installed
2. Erect Detour Signs, Close Road to Thru Traffic and Notify Appropriate Entities
3. Mobilize and Erect Construction Signs in Area of Intersection
4. Ensure that Brook Remains in Existing Channel and 5' CGMP
5. Excavate for New Aluminum Box Culvert and Wingwalls
6. Prefab Box Culvert (with baffles), Set in Place and Fill Invert to Depth of 1' with Streambed Material
7. Apply Roof Section and Tighten Bolts
8. Construct Reinforced Concrete Cutoff Walls and Headwalls; Construct Wingwalls
9. Begin Backfilling and Compaction Work
10. Realign Inlet Channel and Place Geotextile Fabric and Stone Fill, Type II in the Dry
11. Construct Outlet Channel and Place Geotextile Fabric and Stone Fill, Type III in the Dry
12. Turn Brook into New Structure
13. Remove Existing 5' CGMP
14. Backfill and Compact Area where Old Pipe was Removed
15. Backfill, Seal Off and Grade Former Inlet and Outlet Channels
16. Apply Subbase of Gravel, Grade and Compact
17. Apply Aggregate Surface Course, Grade and Compact
18. Install Heavy Timber Guard Rail (w/Steel Backing Plates) and Wood Posts
19. Begin Cleanup Operations and Provide Turf Establishment on all Affected Areas
20. Remove Detour Signs and Open Road to Traffic
21. Remove Construction Signs and Demobilize

Calais TH 6, Center Road over Brook

Remove Existing 5' Diameter CGMP and Replace with New 14'-10" x 4'-10" Aluminum Box Culvert with Concrete/Stone Headwalls and Wingwalls

Item No.	Item Name	Quantity	Unit	Unit Price	Total
203.27	Unclassified Channel Excavation	240	CY	\$ 13.36	\$ 3,206.40
204.25	Structure Excavation	200	CY	\$ 23.40	\$ 4,680.00
204.30	Granular Backfill for Structures	70	CY	\$ 34.92	\$ 2,444.40
301.15	Subbase of Gravel	25	CY	\$ 37.14	\$ 928.50
401.10	Aggregate Surface Course	70	CY	\$ 33.06	\$ 2,314.20
529.15	Removal of Structure	1	EA	\$ 1,000.00	\$ 1,000.00
613.11	Stone Fill, Type II (Slope Protection at Inlet)	80	CY	\$ 31.66	\$ 2,532.80
613.12	Stone Fill, Type III (Weirs & Armoring Downstream Channel)	50	CY	\$ 49.10	\$ 2,455.00
621.18	Steel Backed Timber Guardrail	50	LF	\$ 120.00	\$ 6,000.00
649.31	Geotextile under Stone Fill	110	SY	\$ 1.86	\$ 204.60
	Turf Establishment	1	LS	\$ 1,500.00	\$ 1,500.00
	14'-10" Span x 4'-10" Rise x 40'-6" Aluminum Box Culvert	1	EA	\$ 26,771.25	\$ 26,771.25
	with Concrete Headwalls & Keystone Block Wingwalls (CONTECH)			Subtotal	\$ 54,037.15
	Assembly of Pipe Arch, Headwalls & Wingwalls (Estimated)	1	LS	\$ 8,000.00	\$ 8,000.00
	Construction of Wingwalls (Estimated)	1	LS	\$ 4,000.00	\$ 4,000.00
	Survey, Design and Engineering (Estimated)	1	LS	\$ 1,500.00	\$ 1,500.00
				Total	\$ 67,537.15

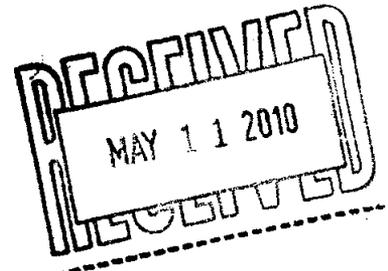
HYDRAULICS UNIT

TO: Tom Anderson, District 6 Project Manager

FROM: David Willey, Hydraulics Project Supervisor *DW*

DATE: May 7, 2010

SUBJECT: Calais T.H. 6 (Center Road) - Site in Adamant, 100' south of the intersection



We have completed our preliminary hydraulic study for the above referenced site, and offer the following information for your use:

Hydrology

This site has a hilly drainage basin. It is a mixture of forested and open land cover, with several large ponds and wetland areas. The total contributing drainage area is about 2.4 sq. mi. There is an overall length of 15,800 feet from the divide to the site, with a 610-foot drop in elevation, giving an average overall channel slope of 3.8 %. The stream slope at the site was estimated to be about 3%. Using several hydrologic methods, we came up with the following design flow rates:

<u>Recurrence Interval in Years</u>	<u>Flow Rate in Cubic Feet per Second (CFS)</u>
Q2.33	95
Q10	205
Q25	275 - Town Highway Design Flow
Q50	345
Q100	410 - Check flow

Existing Conditions

The existing structure is 5.0' diameter corrugated metal pipe, providing a waterway opening of 19.6 sq. ft. The stream is not aligned well at the inlet, as it makes several sharp turns coming into the pipe. The channel is straight going out of the pipe. There is a concrete retaining wall along one side of the downstream channel, with a house set back several feet from that wall.

Water recently overtopped the roadway at this site, when an upstream beaver dam failed and caused flooding in this area.

Our calculations show the existing structure is not adequate hydraulically. Water may overtop the roadway below the design Q25, and headwater to depth ratios exceed the allowable values.

Recommendations

In sizing a new structure we attempted to select structures that met the hydraulic standards, fit the natural channel width, the roadway grade and other site conditions. Due to the low height from the stream bed to the roadway, a box is the only type of structure that will fit the site. We recommend any of the following structures as a replacement at this site:

1. A concrete box with a 10' wide by 5' high inside opening, providing 50-sq. ft. of waterway area, could be considered. This size box would have minimal cover as there is about 6.0' from the stream bed to the roadway. This structure will result in a headwater depth at Q25 = 4.8' and at Q100 = 6.6', with no roadway overtopping at Q50.
2. If more cover is desired, a box with a 12' wide by 4' high inside opening, providing 48-sq. ft. of waterway area, could be used. This structure will result in a headwater depth at Q25 = 4.3' and at Q100 = 6.0', with no roadway overtopping at Q100.
3. Any similar structure with a minimum clear span of 10' and at least 48-sq. ft. of waterway area, that fits the site conditions, could be considered.

General comments

If a new box is installed, we recommend it have full headwalls at the inlet and outlet. The headwalls should extend at least four feet below the channel bottom, or to ledge, to act as cutoff walls and prevent undermining.

It is always desirable for a new structure of this size to have flared wingwalls at the inlet and outlet, to smoothly transition flow through the structure, and to protect the structure and roadway approaches from erosion. The wingwalls should match into the channel banks. Any new structure should be properly aligned with the channel, and constructed on a grade that matches the channel. The new box will need to be properly aligned to match into the downstream retaining wall. It would be desirable to improve the channel alignment upstream of the structure, to eliminate the sharp turns at the inlet.

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.

The Agency of Natural Resources (ANR), Corps of Engineers, or other permitting agency may have additional concerns regarding replacement of this structure, or any channel work. The Stream Alteration Engineer should be contacted with respect to those concerns, before a replacement structure is ordered. If ANR requires the invert of the box to be buried to provide a natural bottom, the size of the structure will have to be larger to provide the required waterway area.

Please keep in mind 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 the replacement of this structure should take into consideration matching the natural channel conditions, the roadway grade, environmental concerns, safety, and other requirements of the site.

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

DCW

cc: Patrick Ross, A.N.R. Stream Alteration Engineer
Mike Hedges, Structures Engineer
Hydraulics Project File via NJW
Hydraulics Chrono File