STATE OF VERMONT
AGENCY OF TRANPORTATION

Scoping Report

FOR

Calais BHF 037-2(12)

VT 14, Bridge 77 over the Kingsbury Branch

December 13, 2012

I. Contents

I. Site Information

The bridge is located in a rural area along VT Route 14 approximately 7.6 miles north of the junction with U.S. 2E. The bridge is located on a curved segment of VT Route 14. The existing conditions were gathered from a combination of a Site Visit, the Inspection Report, the Route Log and the existing Survey. See correspondence in the Appendix for more detailed information.

Roadway Classification	Rural Minor Arterial (State Highway)
Year of Construction	1928; widened in 1977
Bridge Type	Concrete T-Beam
Bridge Length	38’
Width of Bridge	33.4’
Width of Roadway Approach	33’
Ownership	State of Vermont

Need

The following is a list of the deficiencies of Bridge 77 and VT Route 14 in this location.

1. The original central bays of the deck are in poor condition and the original T-Beams show significant deterioration as well.

2. The existing bridge railing does not meet the current standard.

3. The existing bridge does not meet the standards with regards to the vertical grade, vertical sag curve, and stopping sight distance.

4. The existing bridge does not meet the hydraulic standard.

Traffic

A traffic study of this site was performed by the Vermont Agency of Transportation. The traffic volumes are projected for the years 2015 and 2035.

TRAFFIC DATA	2015	2035	2055
ADT	3,100	3,300	~
DHV	360	390	~
ADTT	290	440	~
%T	6.7	9.5	~
%D	72	72	~
FLEXIBLE ESAL	~	2015 ~ 2035	2015 ~ 2055
		2,609,000	5,803,000

Design Criteria

The design standards for this bridge project are the Vermont State Standards, dated October 22, 1997. Minimum standards are based on an ADT > 2000 and a design speed of 50 mph.

Design Criteria	Source	Existing Condition	Minimum Standard	Comment
Approach Lane and Shoulder Widths	VSS Table 4.3	11'/3' (28')[1]	11'/5' (32')[2]	Substandard
Bridge Lane and Shoulder Widths	VSS Table 4.3	11'/6' (34')	11'/5' (32')	
Clear Zone Distance	VSS Table 4.4	Mailbox on NE corner violates setback	20' fill / 12' cut	Potential issue
Banking	VSS Section 4.13	Transition to normal crown	8% (max)	
Speed		50 mph (Posted)	50 mph (Design)	
Horizontal Alignment	AASHTO Green Book Table 3-10b	R=1432'	R_{min}=758'	
Vertical Grade	VSS Table 4.5	6.5%	5% (max) for rolling terrain	Substandard
K Values for Vertical Curves	VSS Table 4.1	K = 26	110 crest / 90 sag	Substandard
Vertical Clearance Issues	VSS Section 4.8	None noted	14'-3" (min)	
Stopping Sight Distance	VSS Table 4.1	156'	400'	Substandard
Bicycle/Pedestrian Criteria	VSS Table 4.7	6' Shoulder	5' Shoulder	
Bridge Railing	Structures Design Manual Section 13	W rail mounted on fascia	TL-3	Substandard

Inspection Report Summary

Deck Rating	5 Fair
Superstructure Rating	5 Fair
Substructure Rating	7 Good
Channel Rating	6 Satisfactory

07/18/2011 – Deck and superstructure have some advanced contamination and or deterioration and are rated as fair at this time. Bridge would be a good candidate for reconstruction with prestressed concrete superstructure components within the next 10 years. ~ MJ/DK

04/14/2009 – This structure is in poor to good condition. The deck and superstructure continue to deteriorate. Could use a major rehab project to replace the deck and superstructure. ~ DCP

[1] Measured several hundred feet north and south of the bridge.

[2] Additional foot added for shared use per VSS Section 4.14.1.

Hydraulics
Two options were evaluated. A new structure with a clear span of 50', a minimum low beam elevation of 758.8' and stone fill protection, which would provide adequate hydraulic capacity for the Q50 design storm event. The existing bridge would need to be raised approximately 1.75 feet to meet the same hydraulic criteria. However, this option would not "not provide any additional scour protection from the existing conditions and the stream will continue to have a constriction at the downstream end of a large bend."

Utilities
There are overhead utility lines traversing the project on the upstream side of the bridge.

Right Of Way
The existing Right-of-Way is shown on the Layout sheet.

Environmental Resources
The environmental resources present at this project are shown on the Layout sheet.

Agricultural
Prime agricultural soils are not present within 500 feet of the bridge.

Archaeological
No Archaeological Resources have been identified at the site.

Biological
Fisheries

The Kingsbury Branch is a cold-water stream known to host a variety of native fish species, and although it is not classified as Essential Fish Habitat, standard time-of-year restrictions will apply for all in-stream work.

Wetlands

There wetlands present both upstream and downstream of the bridge.

Wildlife Habitat

According to the Significant Habitat Map for the Town of Calais, there are no known species or habitats of special concern within the potential limits of the project.

Hazardous Materials
According to the Vermont Agency of Natural Resources (VANR) Vermont Hazardous Sites List, there are no known hazardous materials in the project area.

Historic
Bridge 77 is not historic and there are no historic resources within the project area.

Stormwater
There are no stormwater concerns for this project.

II. Maintenance of Traffic

The Vermont Agency of Transportation is in the process of finalizing an Accelerated Bridge Program, which focuses on faster delivery of construction plans, permitting, and Right of Way, as well as faster construction of projects in the field. One practice that will help in this endeavor is closing bridges for portions of the construction period, rather than providing temporary bridges. In addition to saving money, the intention is to minimize the length of construction with faster construction techniques and incentives to contractors to complete projects early. The Agency will consider the closure option on most projects where rapid reconstruction or rehabilitation is feasible. The use of precast elements in new bridges will also expedite construction schedules. This can apply to decks, superstructures, and substructures. Accelerated Construction should provide enhanced safety for the workers and the travelling public while maintaining project quality. The following options have been considered:

Option 1: Temporary Bridge

Based on the length of the bridge and the traffic volumes at this location, a one lane two-way temporary bridge with traffic signals would be an appropriate choice for this location. Because the river closely parallels the road on the northwest side of the project, a temporary bridge would ideally be located on the eastern (downstream) side of the bridge.

Advantages: A temporary bridge maintains traffic along the existing corridor during construction.

Disadvantages: A temporary bridge increases the length of time required to both deliver and construct a project. Part of the increase in time is attributable to the necessity of acquiring additional Right of Way (ROW) to construct the temporary bridge. The increased duration to deliver and construct the project, along with the additional ROW, will all increase the cost of the project. Several mature trees would be cut down and wetlands impacted by placing a temporary bridge downstream of the existing bridge. The property owner in the northeast quadrant of the project would be severely impacted by the use of a temporary bridge in this location. While the corridor will be open to traffic during construction, traffic will still be delayed and disrupted by the traffic signals and construction vehicles and equipment entering and exiting the site. Placing construction workers and equipment in close proximity to vehicular traffic also increases the probability of accidents.

Option 2: Phased Construction

Another method of maintaining traffic along the corridor during construction is to build a new structure one lane at a time, or in phases. The existing bridge is wide enough and traffic volumes are low enough at this location that this would be an option.

Advantages: This would provide the advantage of a temporary bridge by maintaining traffic along the existing corridor during construction. An additional advantage over a temporary bridge is the reduced impacts to the wetland, trees and property owners adjacent to the bridge. No additional ROW would be required for the installation of a temporary bridge, saving time and money for the project.

Disadvantages: While the time and cost required to construct a phased project may be less than that required to construct a project with a temporary bridge, the time required to construct a phased construction project is still longer than a project constructed without phasing, because some of the construction tasks have to be performed multiple times and cannot be performed concurrently. The costs of construction also increase over unphased work because of this increase

in the length of time, the additional inconvenience of working around traffic, and the effort involved in coordinating the joints between the phases. Once again, while the corridor will be open to traffic during construction, traffic will still be delayed and disrupted by the traffic signals and construction vehicles and equipment entering and exiting the site. The construction workers and equipment will still be in close proximity to vehicular traffic increasing the probability of accidents.

Option 3: Off-Site Detour

This option would close the section of VT 14 near the bridge to through traffic for a limited time during construction. The detour would utilize VT 15 and US 2 to circumvent the closed section of VT 14. This detour adds approximately 12.9 miles for through traffic.

There are also multiple local bypass routes which may see increased traffic. Local bypass routes are not signed detours, but may experience higher traffic volumes if VT 14 is closed during construction. Two of the most likely are listed below.

1. Local Bypass Route 1: Max Gray Rd to Luce Rd to Marshfield Rd adding 0.9 miles.
2. Local Bypass Route 2: Pekin Brook Rd to North Calais Rd to Moscow Woods Rd adding 3.6 miles.

Maps of the detour and bypass routes are located in the Appendix.

Advantages: This option would decrease the length of time required to deliver and construct the project. The cost to deliver and construct the project would be reduced as well. No additional ROW would need to be purchased to construct a temporary bridge. This option would have the smallest impact to the surrounding trees and wetlands. The construction site will be safer by removing traffic from within close proximity to the construction workers and equipment. Traffic following the detour will not be delayed by traffic signals at the construction site or construction equipment entering or exiting the site.

Disadvantages: Traffic will not be maintained along the existing corridor for a limited portion of construction.

III. Alternatives Discussion

The following were identified as issues that should be addressed at this site: the bridge superstructure is in need of repair or replacement, the bridge rail is not appropriate for the vehicular speeds at this site, the existing structure is hydraulically inadequate, VT 14 is too narrow for a Minor Arterial, the grade of the road is too steep and the transition and accompanying sight distance is too short on the north side of the bridge.

It would cost millions of dollars to widen VT 14 north and south of the bridge and significantly change the scope and justifications to consider rectifying the substandard width for this project. Therefore, none of the alternatives considered will increase the width of the VT 14 beyond the bridge. In addition, the amount of additional road work required to fix the vertical alignment in this location would be significant and expensive and will not be considered further.

No Action

In order for a structure to be classified as No Action, there should not be any work done on the structure within the next 10 years. Given the deck and superstructure condition of this bridge, it is

pushing the limits on whether any work should or will have to be done on this structure in the next 10 years. While it is unlikely that this structure will remain untouched for the next 10 years, it is a possibility and will be included as an alternative. With this alternative, none of the identified deficiencies will be rectified.

Alternative 1: Bridge Rehabilitation

The main issue with this bridge is the deteriorated state of the deck and superstructure. Because the deck acts integrally with the superstructure and they are both in equally bad shape, it would be easiest and cheapest to replace the entire superstructure with new precast concrete NEXT beams. There are several cracks and deteriorated sections in the substructure which could be patched during a rehabilitation project.

The hydraulics report recommended raising the low beam elevation for a superstructure replacement. However, based on the record plans, the existing substructure would not be sufficient to retain the extra backfill required. Either a creative option, such as lightweight backfill would need to be used, or the existing substructure would need to be reinforced to support a raised superstructure. The cost involved with a fix of this nature would be better spent on replacing the 80+ year old substructure. Thus, this alternative will only consider a superstructure replacement on the existing horizontal and vertical alignment. This would address all of the inadequacies being considered in this report except the substandard hydraulic opening.

Alternative 2: Bridge Replacement

Since both the hydraulics report and the input from the Town of Calais identified hydraulic issues at this structure, any replacement option should meet the recommended hydraulic criteria for this location. This would involve creating a wider opening and raising grade of the road. A new 66' single span bridge on integral abutments skewed 10° to the road will meet the requirements at this location. Raising the grade in order to meet the hydraulic criteria will necessitate obtaining temporary rights to match in to the field drive on the southwest corner of the site. No additional permanent rights should be required for this option. This alternative will meet all of the issues identified as addressable for this project.

IV. Alternatives Summary

Alternatives 1 and 2 will be considered with the three maintenance of traffic options listed previously. A high level comparison of the costs and engineering considerations for each of the alternatives still under consideration is given below.

V. Cost Matrix[3]

Calais BHF 037-2(12)		Do Nothing	Alt 1a	Alt 1b	Alt 1c	Alt 2a	Alt 2b	Alt 2c
			Superstructure Replacement			Complete Replacement		
			Temp Bridge	Phased	Offsite Detour	Temp Bridge	Phased	Offsite Detour
COST	Bridge Cost	$0	$174,000	$192,000	$174,000	$578,000	$635,000	$578,000
	Removal of Structure	$0	$27,000	$30,000	$27,000	$40,000	$44,000	$40,000
	Roadway	$0	$86,000	$75,000	$72,000	$450,000	$439,000	$437,000
	Maintenance of Traffic	$0	$150,000	$40,000	$15,000	$150,000	$40,000	$15,000
	Construction Costs	$0	$437,000	$337,000	$288,000	$1,218,000	$1,158,000	$1,070,000
	Construction Engineering + Contingencies	$0	$131,100	$101,100	$86,400	$365,400	$347,400	$267,500
	Total Construction Costs w CEC	$0	$568,100	$438,100	$374,400	$1,583,400	$1,505,400	$1,337,500
	Preliminary Engineering[4]	$0	$153,000	$107,900	$92,200	$341,100	$266,400	$246,100
	Right of Way	$0	$61,000	$0	$0	$61,000	$38,200	$38,200
	Total Project Costs	$0	$782,100	$546,000	$466,600	$1,985,500	$1,810,000	$1,621,800
SCHEDULING	Project Development Duration[5]		4 years	2 years	2 years	4 years	3 years	3 years
	Construction Duration		16 months	6 months	3 months	18 months	8 months	4 months
	Mobility Impacts		48 weeks	8 weeks	2 weeks	56 weeks	12 weeks	4 weeks
ENGINEERING	Typical Section - Roadway (feet)	28'	No Change	No Change	No Change	No Change	No Change	No Change
	Typical Section - Bridge (feet)	6-11-11-6	5-11-11-5	5-11-11-5	5-11-11-5	5-11-11-5	5-11-11-5	5-11-11-5
	Geometric Design Criteria	No Change	No Change	No Change	No Change	No Change	No Change	No Change
	Traffic Safety	No Change	Improved	Improved	Improved	Improved	Improved	Improved
	Alignment Change	No	No	No	No	Vertical	Vertical	Vertical
	Bicycle Access	No Change	No Change	No Change	No Change	No Change	No Change	No Change
	Hydraulic Performance	No Change	No Change	No Change	No Change	Improved	Improved	Improved
	Pedestrian Access	No Change	No Change	No Change	No Change	No Change	No Change	No Change
	Utility	No Change	No Change	No Change	No Change	No Change	No Change	No Change
OTHER	ROW Acquisition	No	Yes	No	No	Yes	Yes	Yes
	Road Closure	No	No	No	Yes	No	No	Yes
	Design Life	~10 years	40 years	40 years	40 years	80 years	80 years	80 years

[3] Costs are estimated and should only be used for comparison purposes.
[4] Preliminary Engineering costs are estimated starting from the end of the Project Definition Phase.
[5] Project Development Durations are starting from the end of the Project Definition Phase.

VI. Conclusion

The recommendation is to proceed with Alternative 1B, Replace the Superstructure utilizing Phased Construction.

There appears to be sufficient life left in the substructure and the cost of a superstructure replacement is less than one-third of the cost of a complete replacement. A temporary bridge was not chosen as the means of maintaining traffic in order to avoid impacting the wetlands, avoid acquiring Right of Way for that purpose, and avoid reconfiguring the driveways adjacent to the bridge. For these reasons and the others mentioned previously, traffic should be maintained in phases during construction.

None of the alternatives considered would have rectified the substandard vertical curve at this location or the narrow shoulder widths along VT 14. The proposed alternative will not fully meet the hydraulic standard for this location, but based on the Local Input, there are other undersized culverts getting blocked with ice on the system and Bridge 74 just south of the subject bridge is not able to meet hydraulic criteria even with a completely new bridge. Thus, the existing hydraulic opening should be adequate for the next 40 years of proposed life remaining for the bridge.

VII. Appendices

- Site Pictures
- Town Map
- Bridge Inspection Report
- Hydraulics Memo
- Preliminary Geotechnical Information
- Natural Resources Memo
- Archaeology Memo
- Historic Memo
- Stormwater Memo
- Hazardous Waste Sites
- Community Input
- Detour Route
- Local Bypass Routes
- Plans
    - Typical Sections
    - Existing Conditions
    - Alternative #1
        - Layout
        - Profile
    - Phasing Plans
    - Alternative #2
        - Layout
        - Profile
    - Temporary Bridge Layout

Pavement Distress due to Deck Deterioration

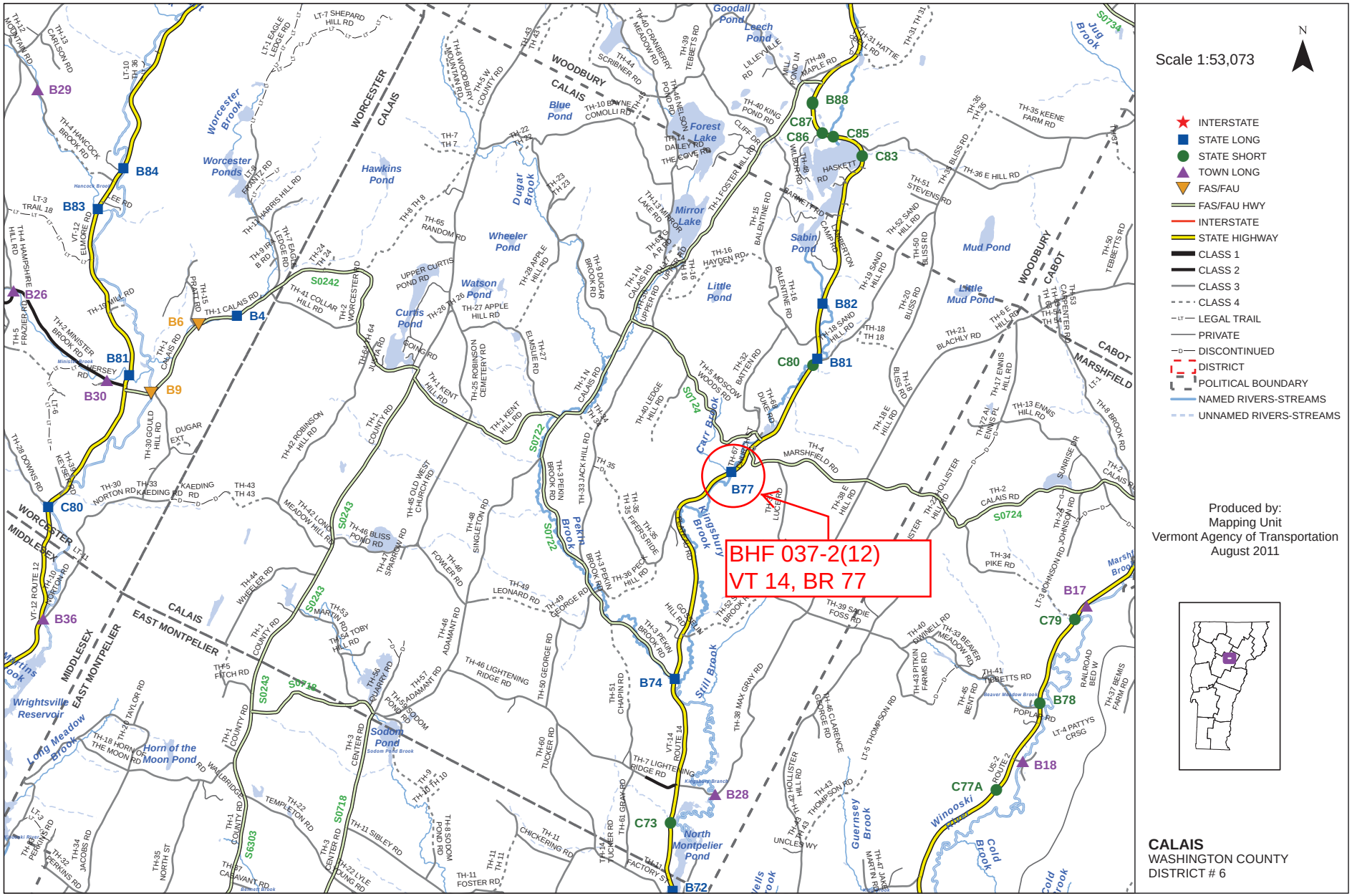
Deck and Superstructure Deterioration

Additional T-beam and Deck deterioration

Substructure Patching

Looking North along Bridge

Looking South along Bridge


BHF 037-2(12)
VT 14, BR 77
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FAS/FAU
FAS/FAU HWY
INTERSTATE
STATE HIGHWAY
CLASS 1
CLASS 2
CLASS 3
CLASS 4
LEGAL TRAIL
PRIVATE
DISCONTINUED
DISTRICT
POLITICAL BOUNDARY
NAMED RIVERS-STREAMS
UNNAMED RIVERS-STREAMS
Produced by:
Mapping Unit
Vermont Agency of Transportation
August 2011
CALAIS
WASHINGTON COUNTY
DISTRICT # 6

STRUCTURE INSPECTION, INVENTORY and APPRAISAL SHEET

Vermont Agency of Transportation ~ Structures Section ~ Bridge Management and Inspection Unit

Inspection Report for CALAIS **bridge no.:** 00077 **District:** 6

Located on: VT 00014 ML **over** KINGSBURY BRANCH **approximately** 7.6 MI N JCT. U.S.2 E **Owner:** 01 STATE-OWNED

CONDITION

Deck Rating: 5 FAIR

Superstructure Rating: 5 FAIR

Substructure Rating: 7 GOOD

Channel Rating: 6 SATISFACTORY

Culvert Rating: N NOT APPLICABLE

Federal Str. Number: 200037007712052

Federal Sufficiency Rating: 71

Deficiency Status of Structure: SD

AGE and SERVICE

Year Built: 1928 **Year Reconstructed:** 1977

Service On: 1 HIGHWAY

Service Under: 5 WATERWAY

Lanes On the Structure: 02

Lanes Under the Structure: 00

Bypass, Detour Length (miles): 15

ADT: 003100 **% Truck ADT:** 09

Year of ADT: 1998

GEOMETRIC DATA

Length of Maximum Span (ft): 0036

Structure Length (ft): 000038

Lt Curb/Sidewalk Width (ft): 0.2

Rt Curb/Sidewalk Width (ft): 0.2

Bridge Rdwy Width Curb-to-Curb (ft): 33.4

Deck Width Out-to-Out (ft): 35

Appr. Roadway Width (ft): 033

Skew: 00

Bridge Median: 0 NO MEDIAN

Min Vertical Clr Over (ft): 99 FT 99 IN

Feature Under: FEATURE NOT A HIGHWAY OR RAILROAD

Min Vertical Underclr (ft): 00 FT 00 IN

STRUCTURE TYPE and MATERIALS

Bridge Type: CONCRETE T-BEAM

Number of Approach Spans: 0000 **Number of Main Spans:** 001

Kind of Material and/or Design: 1 CONCRETE

Deck Structure Type: 1 CONCRETE CIP

Type of Wearing Surface: 6 BITUMINOUS

Type of Membrane 0 NONE

Deck Protection: 0 NONE

APPRAISAL *AS COMPARED TO FEDERAL STANDARDS

Bridge Railings: 1 MEETS CURRENT STANDARD

Transitions: 1 MEETS CURRENT STANDARD

Approach Guardrail: 1 MEETS CURRENT STANDARD

Approach Guardrail Ends: 1 MEETS CURRENT STANDARD

Structural Evaluation: 5 BETTER THAN MINIMUM TOLERABLE CRITERIA

Deck Geometry: 4 MEETS MINIMUM TOLERABLE CRITERIA

Underclearances Vertical and Horizontal: N NOT APPLICABLE

Waterway Adequacy: 6 OCCASIONAL OVERTOPPING OF ROADWAY WITH INSIGNIFICANT TRAFFIC DELAYS

Approach Roadway Alignment: 8 EQUAL TO DESIRABLE CRITERIA

Scour Critical Bridges: 5 STABLE FOR CALCULATED SCOUR

DESIGN VEHICLE, RATING, and POSTING

Load Rating Method (Inv): 2 ALLOWABLE STRESS (AS)

Posting Status: A OPEN, NO RESTRICTION

Bridge Posting: 5 NO POSTING REQUIRED

Load Posting: 10 NO LOAD POSTING SIGNS ARE NEEDED

Posted Vehicle: POSTING NOT REQUIRED

Posted Weight (tons):

Design Load: 2 H 15

INSPECTION and CROSS REFERENCE

X-Ref. Route:

Insp. Date: 072011 **Insp. Freq. (months)** 24 **X-Ref. BrNum:**

INSPECTION SUMMARY and NEEDS

*07/18/2011 - * Deck and superstructure have some advanced contamination and or deterioration and are rated as fair at this time. Bridge would be a good candidate for reconstruction with prestressed concrete superstructure components within the next 10 years. ~ MJ/DK*

04/14/09 This structure is in poor to good condition. The deck and superstructure continue to deteriorate. Could use a major rehab project to replace the deck and superstructure. DCP

VT AGENCY OF TRANSPORTATION PROGRAM DEVELOPMENT DIVISION

HYDRAULICS UNIT

TO: Chris Williams, Structures Project Manager

FROM: Brian Bennett, Hydraulics Project Engineer (McFarland Johnson)
via Nick Wark, VTrans Hydraulic Engineer

DATE: August 21, 2012

SUBJECT: CALAIS – BHF-037-2(12) –VT 14 Bridge 77 over Kingsbury Branch of Winooski

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

Existing Bridge Information

The original bridge was constructed in 1928 with a widening performed in 1977 based on available information. The bridge is owned by the State. The original bridge is 2-lane single-span constructed of a concrete T-beam with an asphalt surface having a width of approximately 35 feet normal to the roadway. The total superstructure depth is approximately 2.8 feet based on record information and verified with field measurements. The normal clear span between the abutment faces is approximately 34.5 feet. The existing abutments are cast-in-place concrete. The approximate maximum height to the bottom of the superstructure to the streambed is approximately 9 – 10 feet, but is significantly less on the Left abutment due to deposition of sediment. The structure is located in an incised channel at the downstream tangent point of a sharp 90° bend. The bridge is basically normal to the stream with the abutments also basically parallel with the stream channel at this location.

The calculated Q_{50} flow does not pass through the existing structure, but does not overtop the roadway. However, the Q_{10} flow event does meet the hydraulic standard for this structure based on our analysis of the existing conditions. Therefore, this bridge will not meet hydraulic standards with only a superstructure replacement as suggested in the pre-scoping report. We did not evaluate the scour for the existing or any proposed bridge configurations as part of the preliminary design. Scour calculations will be performed during final hydraulics.

Recommendations

If the existing bridge is to be replaced with a new bridge, it is assumed the replacement will be located in the existing alignment based on site constraints. It is anticipated the proposed deck will be approximately the same as the existing conditions of 35 feet to meet the VTrans road design standards. For a replacement structure, we have anticipated that the proposed abutments will be vertical face concrete abutments with sloped stone fill scour protection placed in front of the abutments.

Based on our analysis of having a new structure, the recommendation will be for a bridge having a 50-foot clear span normal to the stream channel (between the abutment faces) with a low beam elevation at or above 758.8 feet with 3H:2V stone fill protection to allow for adequate hydraulic capacity for the Q_{50} design storm event. To match the existing roadway alignment, the bridge should have abutments parallel to the stream. The proposed wider structure will not constrict the stream channel width like the existing condition bridge, even with the additional stone fill used for scour protection. It is noted based on the proposed low beam elevation, it has been assumed that the

roadway elevations will be raised from the existing grades by approximately 2 feet (depending on the final superstructure depth). Therefore, the new top of bridge final grade should be transitioned back down to the existing roadway grades on the right (South) approach to the structure. The South approach will continue to allow the flood waters to overtop the roadway and act as a relief channel for an extremely large storm (i.e. Q_{500} or larger) event or in the event of a blockage of the bridge opening.

An additional alternative was also reviewed as part of the hydraulic analysis which re-used the existing abutments to lower the construction costs. However, these abutments would need to be modified by raising the bridge seats/low beam elevation and adjusting the roadway grades. The recommended alternate option would raise the low beam elevation to an elevation of 758.9 feet (approximately 1.7 feet) to allow the Q_{50} design event to pass through the structure. For this shorter term solution to be possible, an analysis of the ability to raise the bridge seats on the existing abutments needs to be performed. Furthermore, it should be noted that this short term option does not provide any additional scour protection from the existing conditions and the stream will continue to have a constriction at the downstream end of a large bend.

As noted above, scour was not reviewed during the preliminary design. However based on the velocities from the analyses and evidence from the site, it is anticipated that Type 3 Stone Fill will be necessary for armoring the abutments and channel banks near the replacement structure.

Temporary Bridge

Based on notes from the pre-scoping information, it is anticipated that a temporary bridge locate downstream of the existing bridge will be used during the construction of the new bridge, but this needs to be confirmed prior to final hydraulics.

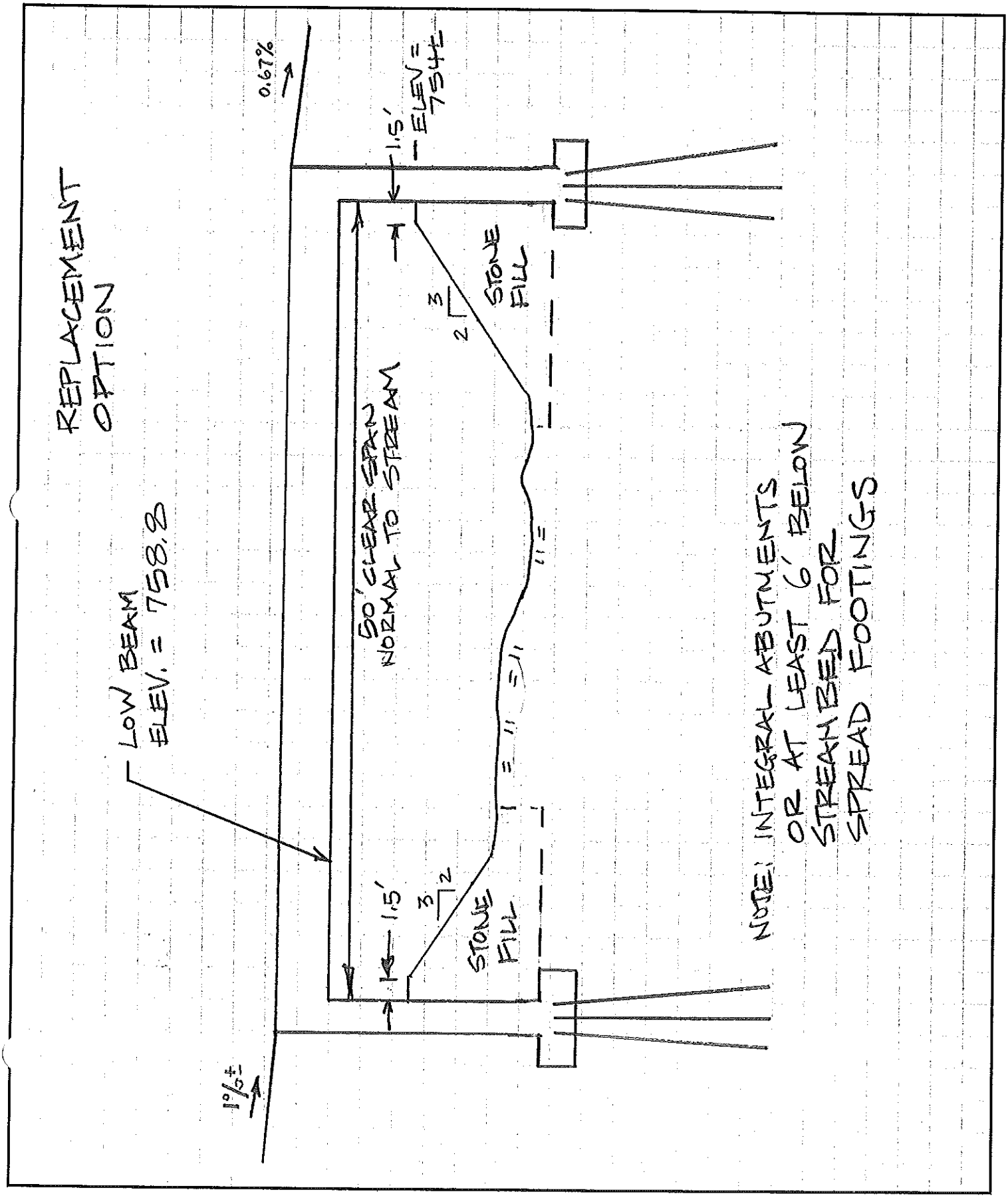
Please contact us if you have any questions or if we may be of further assistance.

BMB
cc: Hydraulics Project File via NJW
Hydraulics Chrono File

VTrans Working to Get You There
Vermont Agency of Transportation

JOB CALAIS VT 14 BR 77
BHF-037-2(12) - 12b148

CALCULATED BY BMB DATE 8-2-12
CHECKED BY NJW DATE 8-19-12
SCALE N.T.S.



VTrans Working to Get You There
Vermont Agency of Transportation

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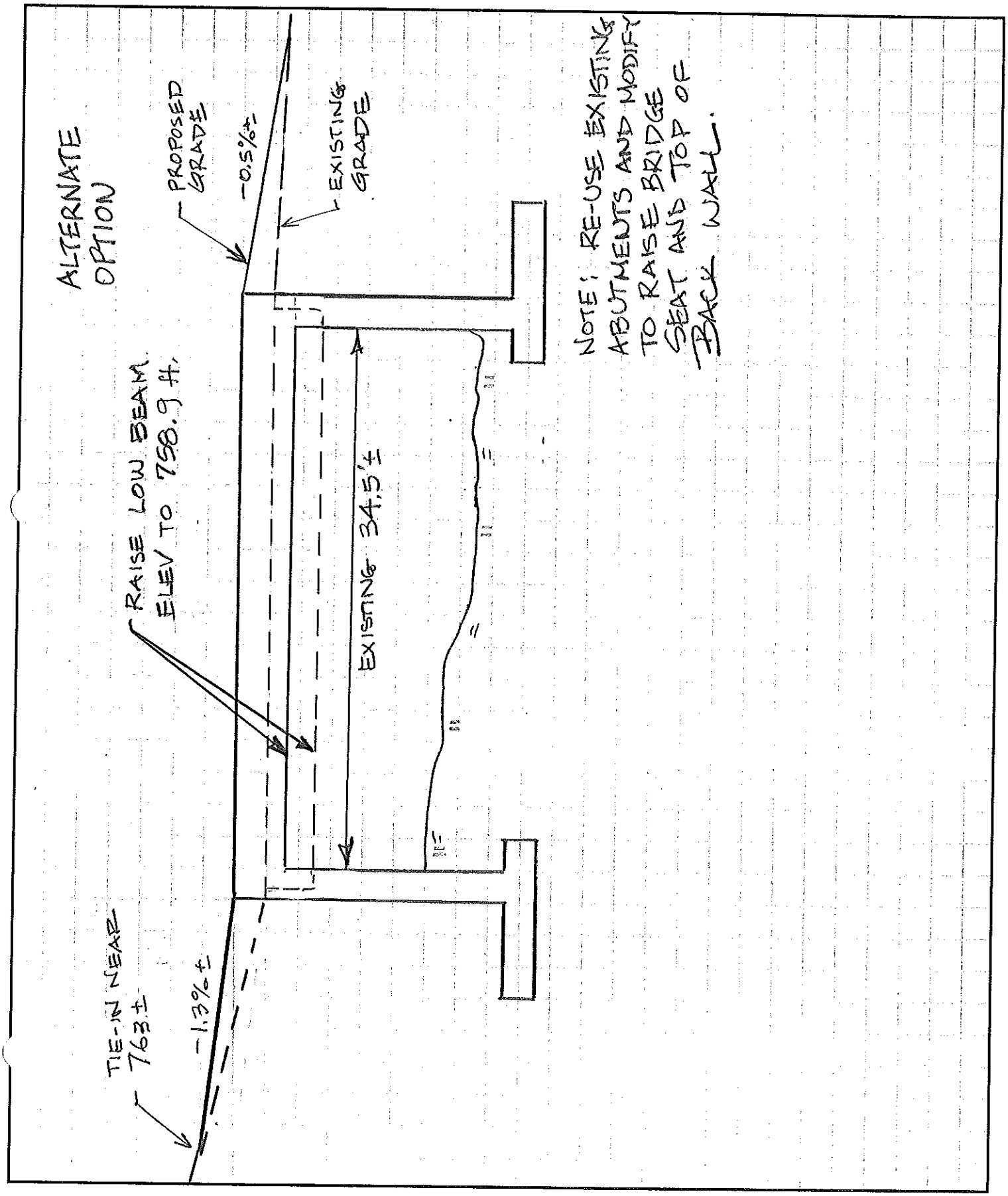

AGENCY OF TRANSPORTATION **OFFICE MEMORANDUM**

To: Chris Williams, Project Manager, Structures

From: Chad A. Allen, Geotechnical Engineer via Christopher C. Benda, Soils and Foundations Engineer

Date: June 6, 2012

Subject: Calais BHF 037-1(12) VT 14, Bridge 77 Geotechnical Scoping Report

1.0 Introduction

In an effort to assist the Structures Section with their bridge type study, the Soils and Foundations Unit within the Materials and Research Section has completed a review of available geological data for Bridge 77 on VT 14. Bridge 77, see Figure 1, is a single span structure that crosses over the Kingsbury Branch River in Calais, VT. This scoping report includes a review of VTrans record plans, USDA Natural Resources Conservation soil survey records, surficial geology and bedrock maps of Vermont and the Agency of Natural Resources' water well logs.

Figure 1: VT 14, Bridge 77 over Kingsbury Branch River

2.0 Surficial and Bedrock Geology

The Agency of Natural Resources (ANR) documents and publishes all reported water well information for wells drilled for both residential and commercial purposes. Published online, the logs can be used to determine general characteristics of soil strata in the area. There may be undocumented water wells that are not discussed herein. In addition, the soil description

recorded on the logs is provided by field personnel with unknown qualifications, and as such, should only be used as an approximation. Surrounding well logs were examined for depths to bedrock and soil strata. Well locations are shown in Figure 2 and a summary of the specific wells used to gain information on the subsurface conditions are presented in Table 1. The two closest wells, wells No. 254 and 33649 are located between 150 and 675 ft from the project location.

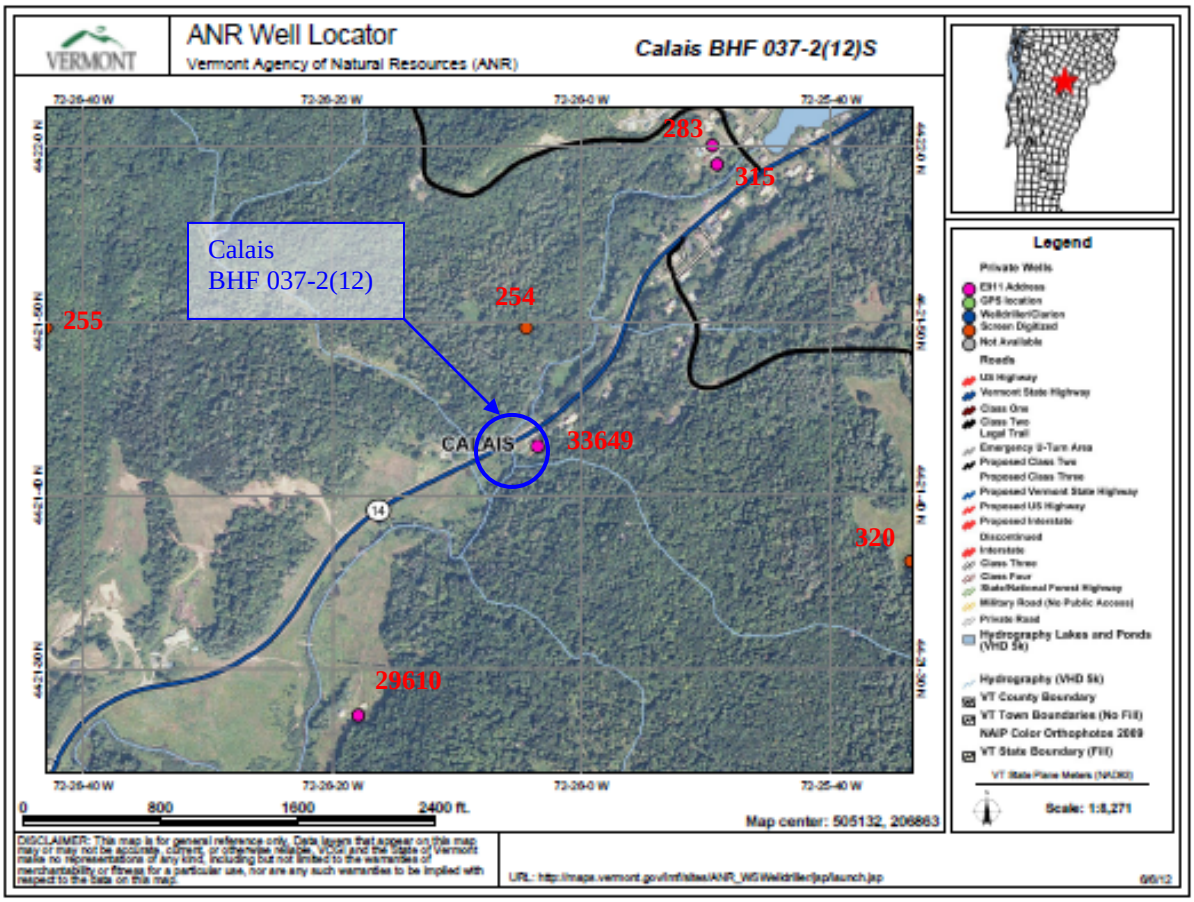

Figure 2: ANR Well Locations near Bridge 77 – VT 14 in Calais, VT

Well	Overburden Description	Overburden Thickness
254	Sand / Silt	80
33649	Unknown	40

Table 1: Summary of ANR Well Data & Well Driller Soil Stratigraphy Notes

The Calais BMA 6759 project plans from the late 1970s indicate that the bridge deck was widened and new wingwalls were constructed to support the widening of VT 14. The footings for the substructure appear to be spread footings. These plans do not indicate the soil stratigraphy beneath the existing bridge.

The 1970 Surficial Geologic Map of Vermont indicates that the Calais BHF 037-2(12) project site is located in an area classified (primarily) as Machias fine sandy loam with 3 to 8% slopes and that the geological landform is likely a terrace or kame consisting of coarse loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits. The geography of the area, the streambed which appears to be gravelly sand with cobbles (See Figure 3) and the subsurface

information from Well 254 of the ANR Well Logs corroborate the information from the surficial geology map.

Driller's information reported for Well 254 indicates that bedrock may be at a depth of 40 ft. The abutments and wingwall heights are between 15 and 20 ft which would place the top of bedrock with 20 to 25 feet of the bottom of footing locations. Surficial bedrock maps of the area indicate that the existing bedrock deposit is of the Waits River formation (DSw) and likely consists of a combination of phyllite and limestone.

3.0 Utility / Construction Considerations

This bridge is in a high speed (50 mph) rural setting. There are overhead wires along the west side of the highway. Temporary bridge construction could be problematic as the river runs tight to the west side and there is a house/business on the northern end of the west side. Potentially, a temporary may be installed to land in the parking lot at the north end of the bridge. If the temporary structure could be skewed it may reduce or eliminate potential traffic conflicts with the home/business.

Consideration should be given to orchestrating the construction of VT 14 Bridges 74 and 77 so that both projects have complete closures detouring traffic onto TH 38 (Max Gray Rd) and TH 4 (Marshfield Rd). Homes and businesses between the bridges could utilize TH 36 (Peck Hill Rd) to get back onto VT 14.

4.0 Recommendations

The existing bridge is a 38 ft long, straight single span structure. The current grade difference between the abutments is negligible. The bridge is located at a bend in the river and the channel seems to be migrating south towards the southern abutment, see Figure 3. Consideration of the migration of the stream should be given, which may result in an increase in the overall superstructure length.

Figure 3: Bridge 77 Elevation View

The subsurface investigation should include, but not be limited to, a determination of the soil and bedrock properties (strength, material composition, RQD, etc), ground water conditions and the bedrock depth. Two borings are recommended to be drilled to completely assess the subsurface conditions at this site. One boring should be located in the right-of-way at the northeast and southwest corners of the proposed bridge abutment locations. The boring located in the southwest corner should be placed 15 to 20 ft behind the abutment to prevent drilling through the concrete footing.

Borings should be positioned a minimum of 10 feet away from any overhead power lines. Final recommendations for boring locations can be provided once an alignment and preliminary structure type have been selected. Temporary traffic control, including flaggers, may be necessary at this site to facilitate a safe work zone.

There does not appear to be any serious drilling equipment and/or access limitations, except for the overhead wires at this site. Bedrock is anticipated to be shallow. An integral abutment structure may be a good solution at this location and could provide the space necessary for the lateral migration of the stream. Integral abutment bridges appeared to hold up well during Irene even when the abutment backfill was hydraulically removed.

Based on the information in this scoping report, possible foundation options for this bridge replacement project include the following:

- Reinforced concrete abutments on spread footings, or
- Precast arch supported on spread footings (may be a good site for the “Bridge in a Backpack structure http://www.maine.gov/mdot/tr/bridgebackpack.htm), or an
- Integral abutment bridge on steel H-piles.

If you have any questions, please feel free to contact us at (802) 828-2561.

cc: WEA/Read File
CCB/Project File

AGENCY OF TRANSPORTATION **OFFICE MEMORANDUM**

TO: Jeff Ramsey, Environmental Specialist

FROM: John Lepore, Transportation Biologist

DATE: May 10, 2012

SUBJECT: CALAIS BHF 037-2 (12)
VT 14, Br. 77 over Kingsbury Branch

The purpose of this memorandum is to let you know that I have completed the initial resource identification which included a site visit using GPS and ArcMap..

WETLANDS & FLOODPLAINS

Wetlands are located both upstream and downstream of Bridge 77 and were picked up using GPS. Given the horizontal and vertical alignment of the road and the proximity to the wetlands, if a temporary bridge/detour is required, a one-lane detour, located downstream would be the simplest to permit. All wetlands include a 50' regulated buffer zone.

AGRICULTURAL SOILS

Prime agricultural soils are not present within 500 feet of the bridge.

SPECIES / HABITAT OF SPECIAL CONCERN

According to the Significant Habitat Map for the Town of Calais, there are no known species or habitats of special concern within the potential limits of the project.

FISHERIES

The Kingsbury Branch is a cold-water stream known to host a variety of native fish species, and although it is not classified as *Essential Fish Habitat*, standard time-of-year restrictions will apply for all in-stream work.

PERMITS

The Kingsbury Branch is not classified as either a *Navigable Waterway* or *Essential Fish Habitat* but any in-stream impacts would need both state and federal permits. Any widening of the approaches, temporary bridges, or construction access pads will trigger additional permit concerns.

Calais BHF 037-2 (12)
VT 14, Br 77 over Kingsbury Branch

1:1,108

N

Legend

non-delineated wetland boundary

Town Boundaries

Resource ID by J.Lepore
VTrans Environmental Section
May 2012

VERMONT

Jeannine Russell
VTrans Archaeology Officer
State of Vermont
Environmental Section
One National Life Drive
Montpelier, VT 05633-5001
www.aot.state.vt.us

Agency of Transportation

[phone] 802-828-3981
[fax] 802-828-2334
[ttd] 800-253-0191

To: Jeff Ramsey, VTrans Environmental Specialist

From: Jeannine Russell, VTrans Archaeology Officer
via Brennan Gauthier, VTrans Assistant Archaeologist

Date: 5/23/2012

Subject: Calais BHF 037-2(12) – Archaeological Resource ID

Jeff,

I've completed my initial resource identification for Calais BHF 037-2(12). A field visit conducted on 4/25/2012 as part of the 2012 GPS scoping initiative was adequate to identify potential resources in the project area. There are *no archaeological resources* present in the APE, and likewise no concerns for archaeology.

Please feel free to contact me with any questions or concerns.

~Brennan

Brennan Gauthier
VTrans Assistant Archaeologist
tel. 802-828-3965
Brennan.Gauthier@state.vt.us

VTrans Working to Get You There
Vermont Agency of Transportation

Ramsey, Jeff

From: O'Shea, Kaitlin
Sent: Thursday, April 12, 2012 4:01 PM
To: Ramsey, Jeff
Cc: Williams, Chris; Newman, Scott
Subject: Pilot Project - Calais BHF037-2(12) Historic Resource ID

Good afternoon,

I have completed the historic resource review for Calais BHF037-2(12): Bridge 77 is not historic and there are no historic resources within the project area.

This resource ID is part of the GPS/GIS Pilot Project. As discussed, initial review for historic resources is completed via desk review (maps, bridge inspection photos, Google Earth) and can be determined to have no historic resources without site visits. Other projects will require a site visit in order to determine if there are historic resources located within the project area. Historic resources will continue to be identified on a map and scanned for the project files. When appropriate, historic resources will be mapped by the GPS in order to compare and contrast the effectiveness and application of these resource ID procedures.

I am keeping a spreadsheet for these pilot projects which outlines review methods, resource notes, resource ID and how the ID is submitted (GPS data, email memo, resource map, etc.) I'll bring this to the next project meeting.

Let me know if you have any questions.
Thanks,
Kaitlin

Kaitlin O'Shea
Historic Preservation Specialist
Vermont Agency of Transportation

802-279-0869
Kaitlin.O'Shea@state.vt.us

Ramsey, Jeff

From: Armstrong, Jon
Sent: Wednesday, May 23, 2012 11:35 AM
To: Ramsey, Jeff
Subject: RE: Environmental Request NOTIFICATION: CALAIS BHF 037-2(12)

Hi Jeff,
I have no stormwater related concerns of note to offer at this time for this project.

Jonathan B. Armstrong, PE
VTrans Stormwater Management Engineer
(802) 828-1332

"*We forget that the water cycle and the life cycle are one*."
- Jacques Cousteau

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From: Ramsey, Jeff
Sent: Wednesday, March 28, 2012 8:15 AM
To: Armstrong, Jon; Gingras, Glenn; Gauthier, Brennan; O'Shea, Kaitlin
Subject: FW: Environmental Request NOTIFICATION: CALAIS BHF 037-2(12)

Hi all,
This project is one of the Chris Williams Pilot Projects. The entire pilot group will go out to visit a site to work through the process so they all know how to do it and what to look for. That visit will happen in the very near future.

Comments: The resource ID will be conducted by a pilot group under PDWP GIS/GPS work plan. This group is part of the GIS Experimental work plan and is researching innovative ways to streamline the ID process.

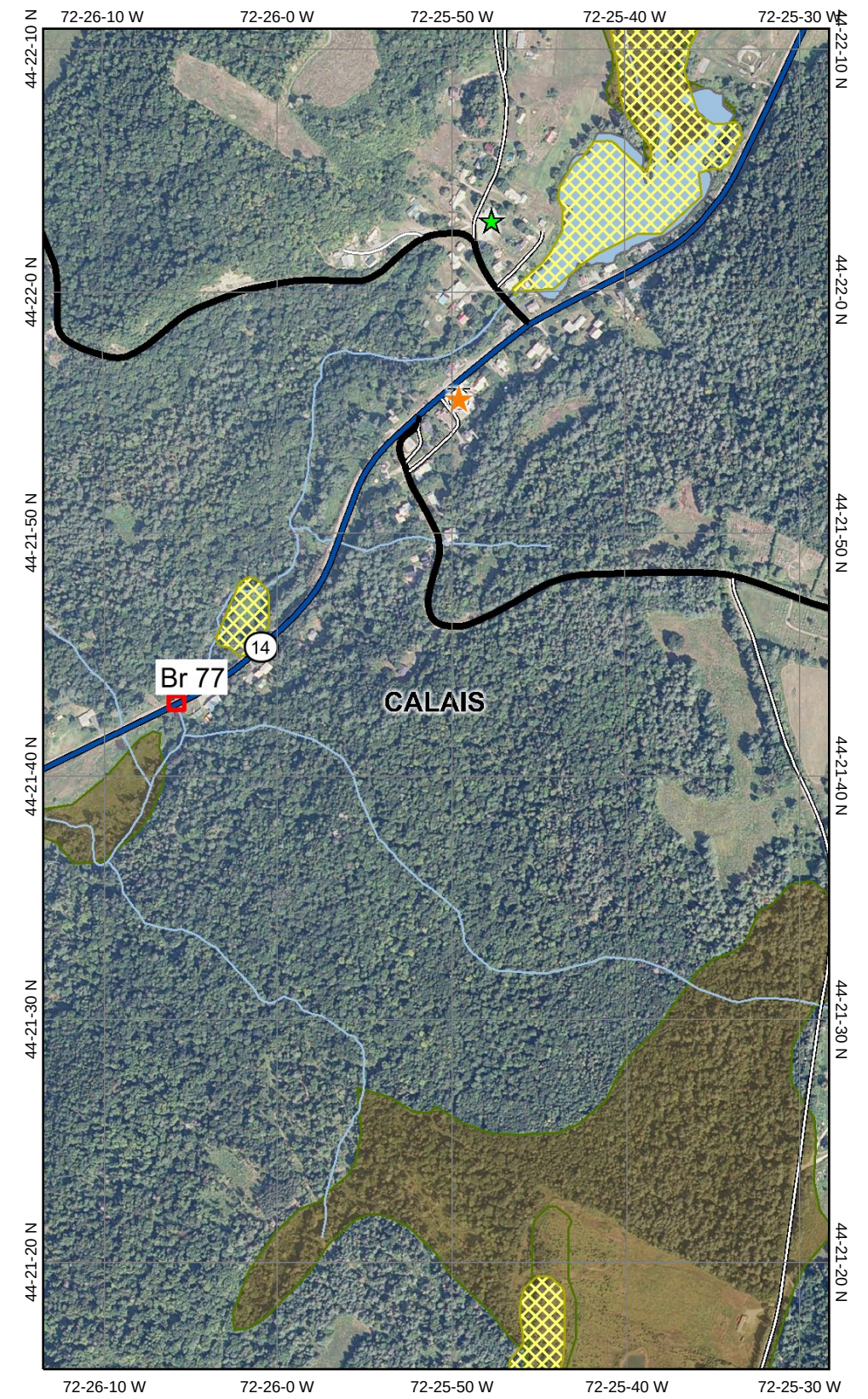
Folder Link:
Z:\Projects-Engineering\CalaisBHF037-2(12)12b148\Environmental\ResourceIDandClearances\ResourceID

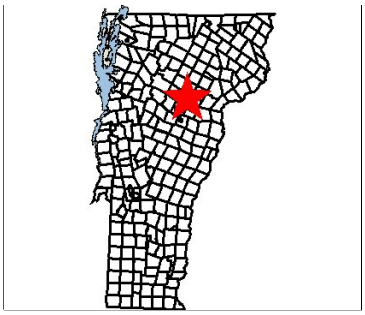
Please let me know if you have any questions.
Thanks,
Jeff

Jeff Ramsey
Environmental Specialist - North Region
Vermont Agency of Transportation
Program Development Division
Environmental Section
1 National Life Drive
Montpelier, VT 05633
tel. 802-828-1278
jeff.ramsey@state.vt.us

ANR Environmental Interest Locator

Vermont Agency of Natural Resources (ANR)





Legend

- Hazardous Waste Site
- Hazardous Waste Site Generator
- Underground Storage Tank

Roads

- US Highway
- Vermont State Highway
- Class One
- Class Two
- Legal Trail
- Emergency U-Turn Area
- Proposed Class Two
- Proposed Class Three
- Proposed Vermont State Highway
- Proposed US Highway
- Proposed Interstate
- Discontinued
- Interstate
- Class Three
- Class Four
- State/National Forest Highway
- Military Road (No Public Access)
- Private Road
- Wetland Advisory Layer: Class 3 Wetlands

VSWI

- Class 1 Wetland
- Class 2 Wetland
- Hydrography Lakes and Ponds (VHD 5k)
- Hydrography (VHD 5k)
- VT County Boundary

Hydric Soils

- Hydric Soils
- VT Town Boundaries (No Fill)
- NAIP Color Orthophotos 2009
- VT State Boundary (Fill)

0 475 950 ft.

VT State Plane Meters (NAD83)

Scale: 1:8,193

Map center: 505516, 206865

URL: http://maps.vermont.gov/imf/sites/ANR_NATRESViewer/jsp/launch.jsp

9/19/12

Calais Community Considerations 2012

1. Are there any scheduled public events in the community that will generate increased traffic, or may be difficult to stage if the bridge is closed during construction? Examples include: a bike race, festivals, cultural events, farmers market, concerts, etc. that could be impacted? If yes, please provide date, location and event organizers' contact info.

   The Cross Vermont Trail has an a bicycle event sometime in June, see http://www.centralvtcyclingtour.org/ and Eric Scharnberg is the contact. 802-498-0079 ext. 1 eric@crossvermont.org

2. Is there a "slow season" or period of time from May through October where traffic is less?

   No.

3. Please describe the location of emergency responders (fire, police, and ambulance) and emergency response routes.

   The East Montpelier/Calais Fire and Ambulance service uses Route 14 coming from E. Mont. and Woodbury Fire Dept. uses Route 14 coming from Woodbury. This is a significant consideration as we need to have emergency services available to all residents.

4. Where are the schools in your community and what are their schedules?

   Calais Elementary School is located on Lightening Ridge Rd. and uses Route 14 for the buses – I am not sure of the bus route (check with school administrators). U32 buses also use Route 14 and other side roads – both schools operate under the normal school schedule.

5. Is the proposed project on an established school or public transit bus route(s)?

   Yes, the school (E. Calais Elementary and U32) and GMTA buses use Route 14 on a daily basis.

6. Are there any businesses (including agricultural operations) that would be adversely impacted either by a detour or due to work zone proximity?

   Legare Farm and Grand View Winery operate a business and would be affected by detours near the Pekin Brook Bridge. Going into E. Calais many businesses would be affected by detours in and around the E. Calais Village bridge the same is true for the bridge near Sand Hill Rd. which includes our town garage.

7. Are there any important public buildings (town hall or community center) or community facilities (recreational fields or library) in close proximity to the proposed project?

   In E. Calais there is the Post Office and recreational field.

8. Are there any town highways that might be adversely impacted by traffic bypassing the construction on another local road?

   Any detour or traffic diversion onto our already well traveled back roads would be impacted by detours that would create additional traffic. Additional traffic will create more maintenance to our roads and impact our already tight roads budget. We had this situation recently with work done on the "singing bridge" in N. Montpelier. Little was done by the State to avert or support our residents impacted by the additional traffic. **The Selectboard spent significant time and effort in trying to work with the State but repeated attempts offered little relief or respect for our needs.**

9. Are there any other municipal operations that could be adversely impacted if the bridge is closed during construction? If yes, please explain.

   Yes, to our residents and non-residents traveling to our Town Office and Town Hall via Pekin Brook Rd. or travelling south from Woodbury on Route 14.

   Our town road crew would be adversely impacted by construction on Sand Hill Rd. They would have to travel an alternate route up and over Balentine Rd. into Woodbury which would be 8-10 miles out of their way.

10. Please identify any local communication channels that are available—e.g. weekly or daily newspapers, blogs, radio, public access TV, Front Porch Forum, etc. Also include any unconventional means such as local low-power FM.

    Calais is member of Front Porch Forum and word of mouth is powerful.

11. Is there a local business association, chamber of commerce or other downtown group that we should be working with?

    Yes, the Calais Selectboard, Road Commissioner, Planning Commission, Conservation Commission and Town Clerk.

Bridge Design Considerations

1. Are there any concerns with the alignment of the existing bridge? For example, if the bridge is located on a curve, has this created any problems that we should be aware of?

   The bridge on Sand Hill Rd. is on a corner and intersects w/ Hand Hill Rd. could the corner be straightened?

2. Are there any concerns with the width of the existing bridge?

   Bicycle lanes.

3. If a sidewalk is present on the existing bridge, should the new structure have one?

Calais does not have any sidewalks.

4. Is there a need for a sidewalk if one does not currently exist? Please explain.

   No, a sidewalk does not currently exist.

5. Does the bridge provide an important link in the town's pedestrian network such that pedestrian traffic should be accommodated during construction?

   E. Calais Village has a considerable amount of pedestrians. The town in general has a significant amount of residents that walk, run and ride bicycles on all our roads therefore increased traffic via detours would be a safety concern.

6. Is bicycle traffic common on the bridge?

   Yes, on all 3 bridges proposed for maintenance.

7. Are there any special aesthetic considerations we should be aware of?

   It would be important to maintain our rural character.

8. Is there any traffic, pedestrian or bicycle safety concerns associated with the current bridge? If yes, please explain.

   The current bridges do not have an adequate or well maintained pedestrian/bicycle lane.

9. Does the location have a history of flooding? If yes, please explain.

   Yes, quite often in the spring the Pekin Brook is often up to the top of the road near Route 14.

   The bridge below E. Calais Village has a history of ice jams with blocked culverts which create significant water running over the bridge onto Route 14.

10. Are you aware of any nearby Hazardous Material Sites?

    None that we are aware of at this time.

11. Are you aware of any historic and/or other environmental resource issues?

    Erosion and run off.

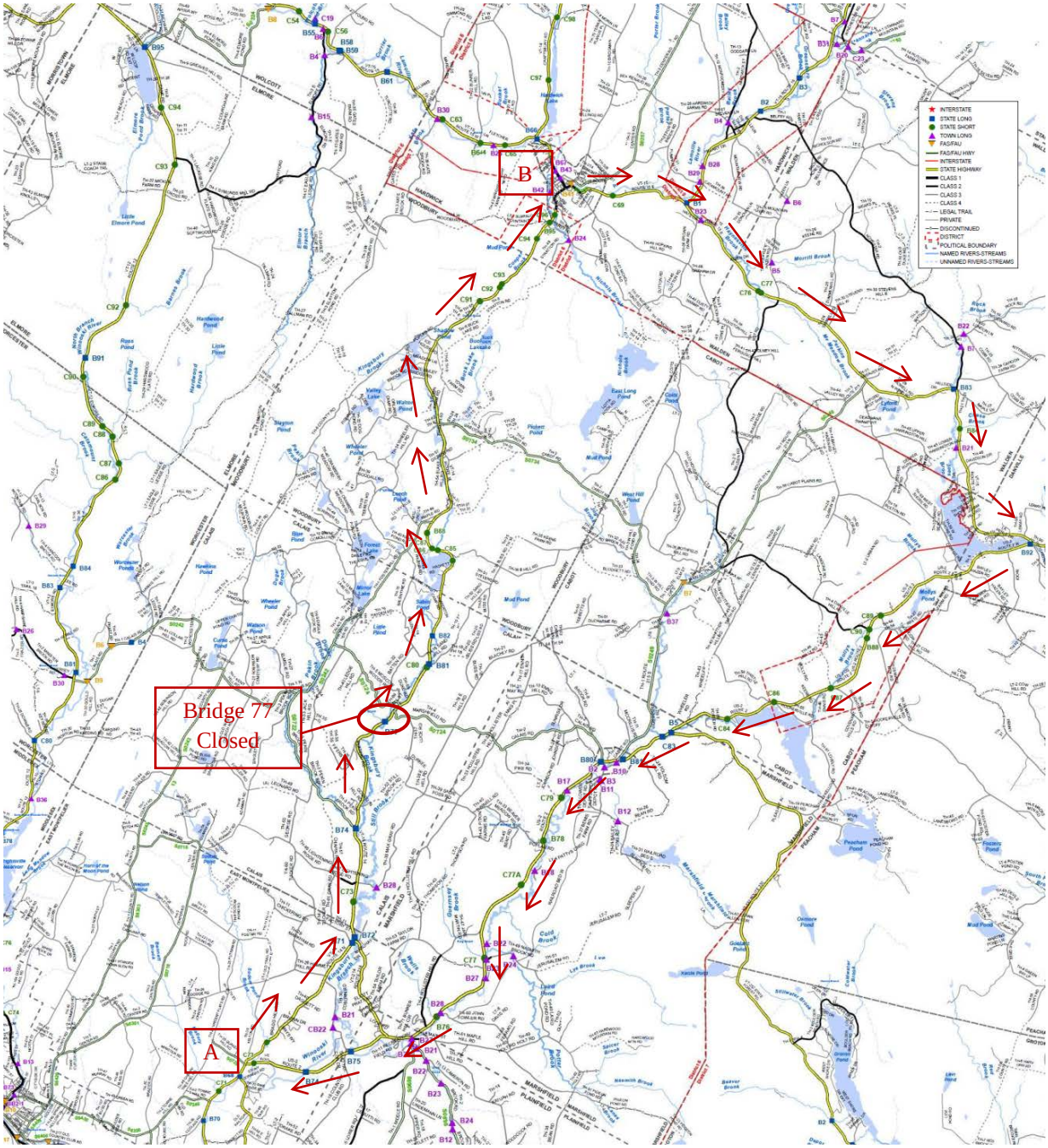
12. Are there any other comments you feel are important for us to consider that we have not mentioned yet?

Communication, communication and more communication – a well advertised public meeting to advise the residents and municipal officials of the construction schedule and to address concerns and a contact person that is readily available to address issues as they arise during the construction project.

Updated: 9/9/12 dw

C:\Selectboard\Roads\Bridges 2012.doc

Proposed Detour:



Detour Route: VT 14 to VT 15 to US 2 to VT 14.

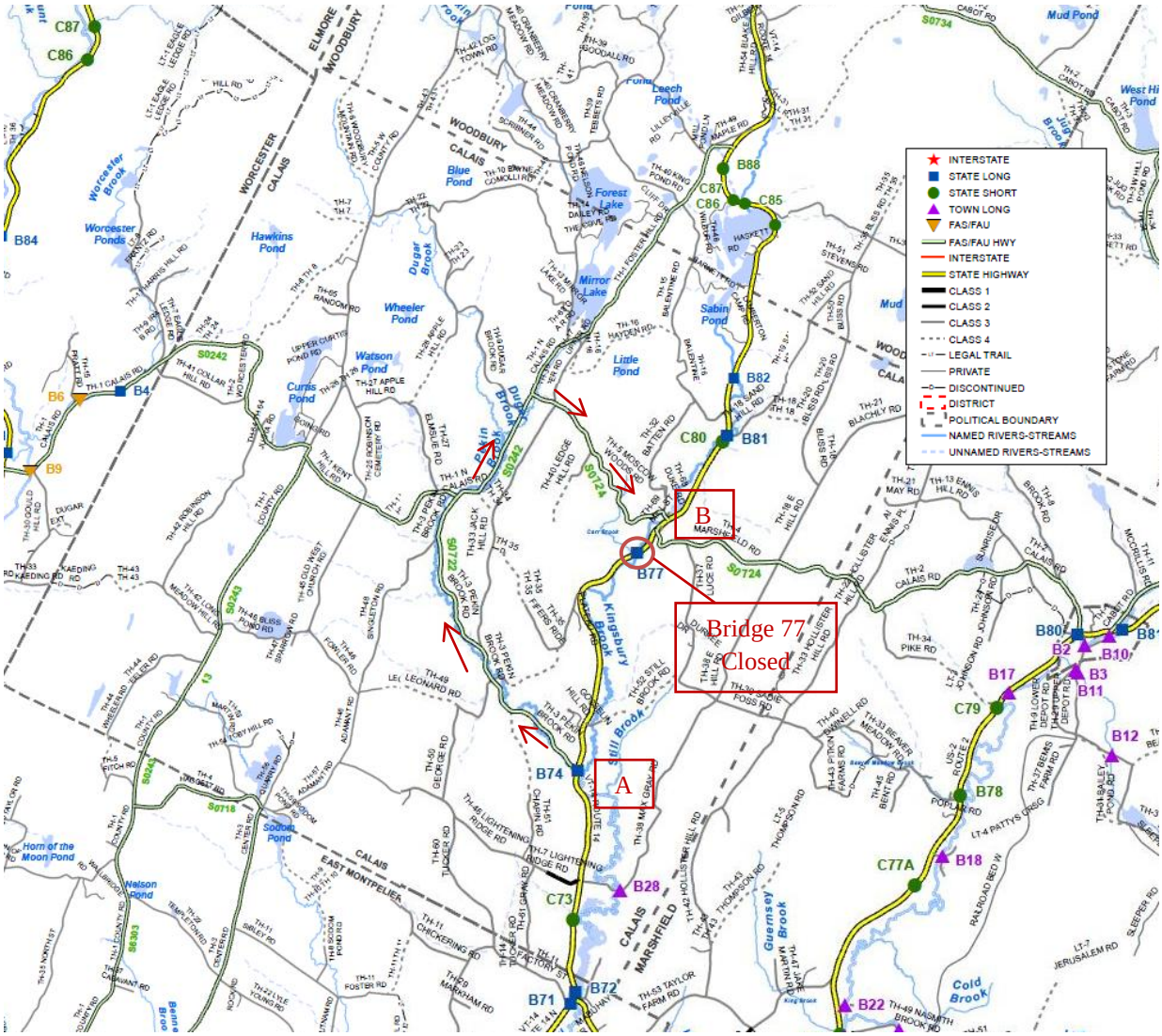
A-B Through Distance: 19.5 miles

A-B Detour Distance: 32.4 miles

Added Miles: 12.9 miles

End to End Distance: 51.9 mile

Local Bypass Route Option 1:



Bypass Route: VT 14 to Pekin Brook Rd. (TH 3) to North Calais Rd. (TH 1) to Moscow Woods Rd. (TH 5) to VT 14.

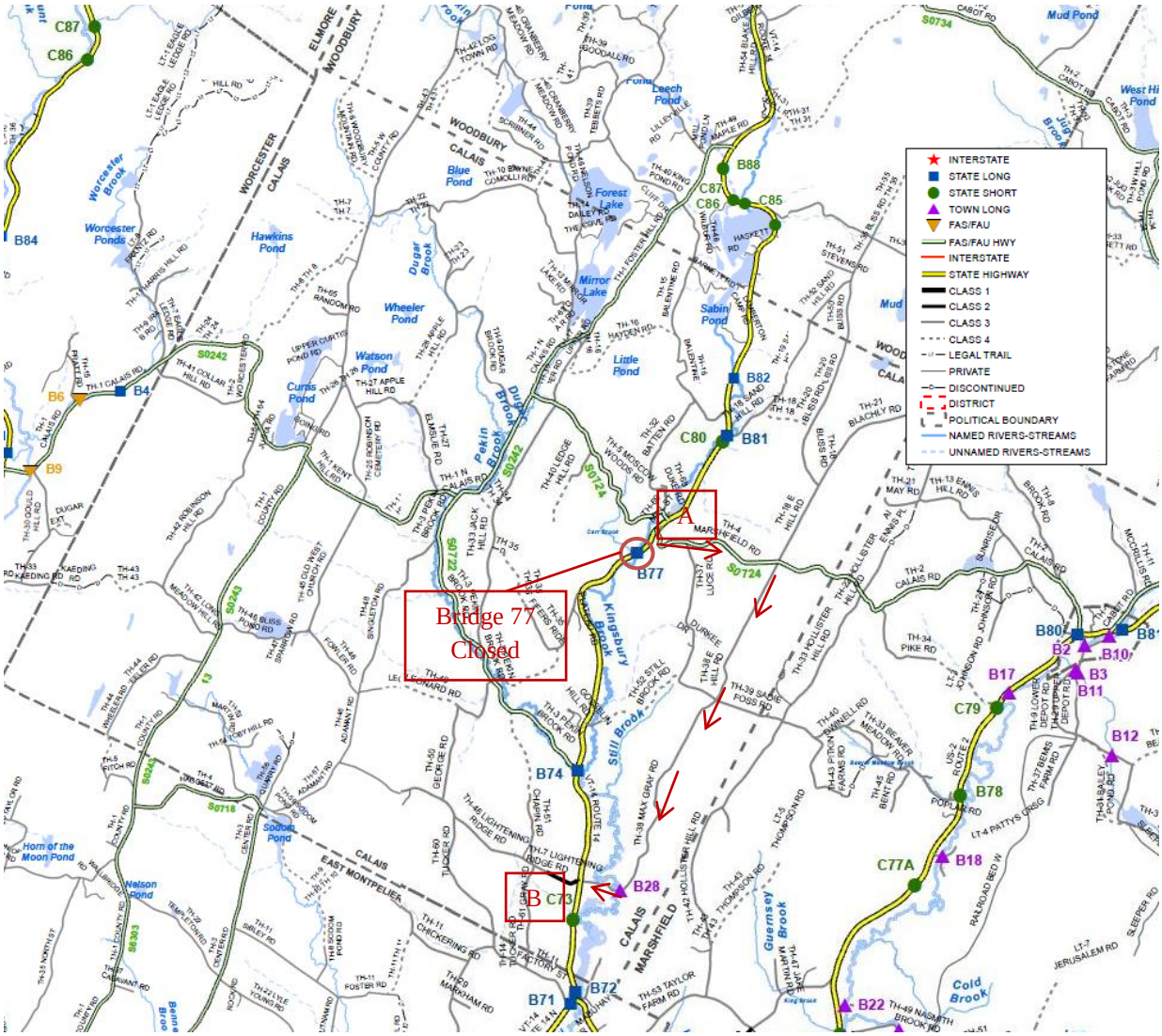
A-B Through Distance: 2.7 miles

Added Miles: 2.5 mile

A-B Bypass Distance: 5.2 miles

End to End Distance: 7.9 miles

Local Bypass Route Option 2:



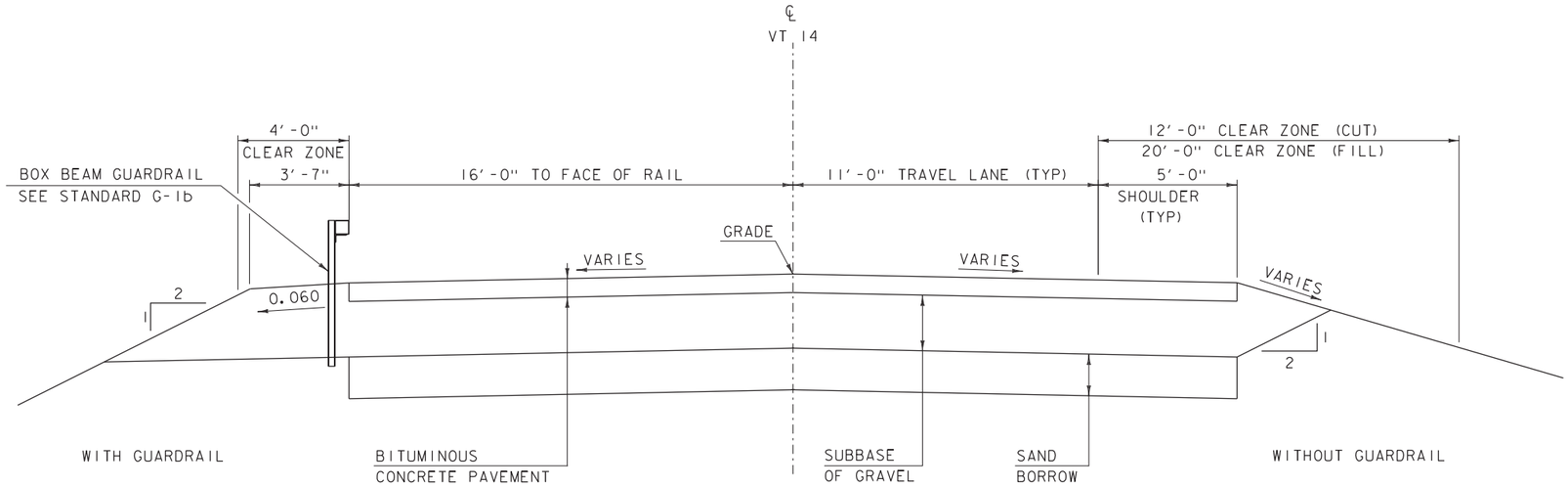
Bypass Route: VT 14 to Marshfield Rd. (TH 4) to East Hill Rd. (TH 39) to Max Grey Rd. (TH 39) to VT 14.

A-B Through Distance: 3.6 miles

Added Miles: 1.7 miles

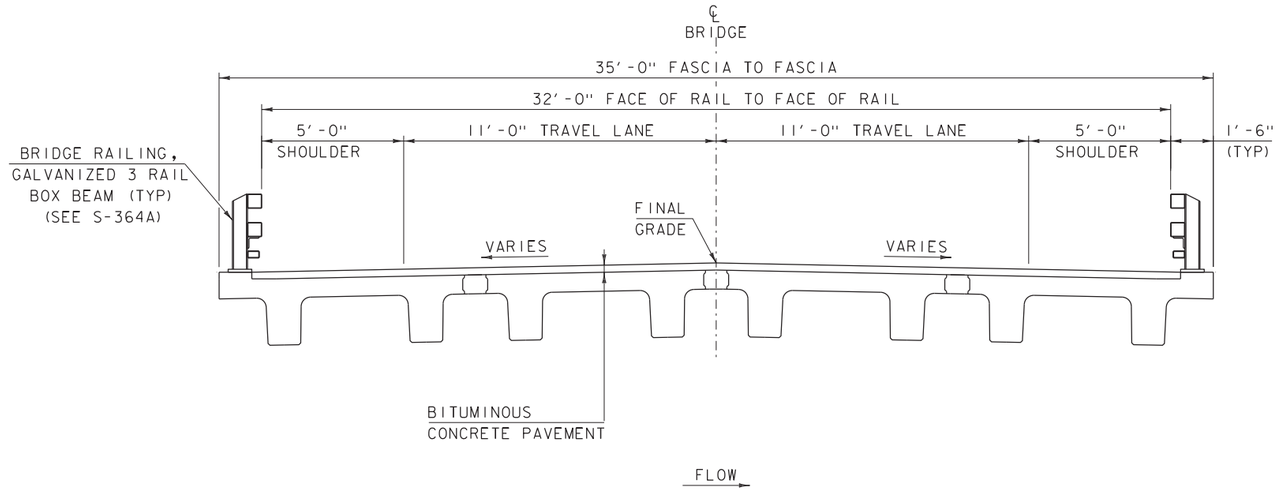
A-B Bypass Distance: 5.3 miles

End to End Distance: 8.9 miles



PROPOSED VT 14 TYPICAL SECTION

SCALE 3/8" = 1'-0"



PROPOSED BRIDGE TYPICAL SECTION

SCALE 3/8" = 1'-0"

MATERIAL TOLERANCES

(IF USED ON PROJECT)

SURFACE	
- PAVEMENT (TOTAL THICKNESS)	+/- 1/4"
- AGGREGATE SURFACE COURSE	+/- 1/2"
SUBBASE	+/- 1"
SAND BORROW	+/- 1"

NOTE: SUPERSTRUCTURE NOT DESIGNED.
NEXT 28D SHOWN FOR EXAMPLE

PROJECT NAME: CALAIS
PROJECT NUMBER: BHF 037-2(12)

FILE NAME: 12bl48/sl2bl48typical.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: ------
TYPICAL SECTIONS

PLOT DATE: 13-DEC-2012
DRAWN BY: L.E.GALIHER
CHECKED BY: D.D.BEARD
SHEET 1 OF 9

N

VT STATE PLANE GRID

POB
STA 50+00.00

PC
STA 21+10.56

PI
STA 23+34.86

KINGSBURY BRANCH
FLOW

VT 14
TO EAST MONTPELIER

VT 14
TO WOODBURY

WOODS
DRIVE

COMB
150

COMB
151
199

COMB
152

COMB
154
202

COMB
201
153

WM
0140
1205
0420

STONE FILL

UNKNOWN PIPE
FLOW

60" CMP
FLOW

W3-5
(35)

GRAVEL
DRIVE

#4206

WOOD
FENCE

ARTESIAN
WELL

18+00
19+00
20+00
21+00
22+00
23+00

50+00
51+00
52+00

VT 14 CURVE DATA
DELTA = 17°47'59"
D = 4°00'00"
R = 1432.39'
T = 224.30'
L = 444.99'
E = 17.46'

EXISTING CONDITIONS

SCALE 1" = 20'-0"
20 0 20

PROJECT NAME:	CALAIS
PROJECT NUMBER:	BHF 037-2(12)
FILE NAME:	12bl48\sl2bl48bdr.dgn
PROJECT LEADER:	C.P.WILLIAMS
DESIGNED BY:	------
EXISTING CONDITIONS	
PLOT DATE:	03-OCT-2012
DRAWN BY:	D.D.BEARD
CHECKED BY:	------
SHEET	1 OF 1

N

VT STATE PLANE GRID

DWINELL HOMESTEAD ASSN. INC.

LARKIN, JOSHUA S. & DAPHNE E.

WHEELER, AARON & POLLY

TREMPER, CARLTON O.

50+00 POB STA 50+00.00

51+00

52+00 POE STA 52+00.00

BEGIN APPROACH STA 234+75.00

BEGIN PROJECT STA 235+75.00

END PROJECT STA 236+75.00

PC STA 236+76.46

END APPROACH STA 237+75.00

PROPOSED PROJECT LIMITS

BEGIN BRIDGE STA 236+11.23

END BRIDGE STA 236+48.23

PROPOSED PROJECT LIMITS

PI STA 238+79.82

CURVE DATA
DELTA = 17°46'53"
D = 4°24'27"
R = 1300.00'
T = 203.36'
L = 403.45'
E = 15.81'

VT 14 TO EAST MONTPELIER

VT 14 TO WOODBURY

KINGSBURY BRANCH FLOW

WOODS DRIVE

GRAVEL DRIVE

#4206

GRAVEL DRIVE

STONE FILL

STONE FILL

STONE FILL

STONE FILL

UNKNOWN PIPE FLOW

24" CMP FLOW

WOOD FENCE

ARTESIAN WELL

W3-5 (35)

COMB 150

COMB 151 199

COMB 152

COMB 153 201

COMB 154 202

MM 0140 1205 0420

GUY

234+00

235+00

236+00

237+00

238+00

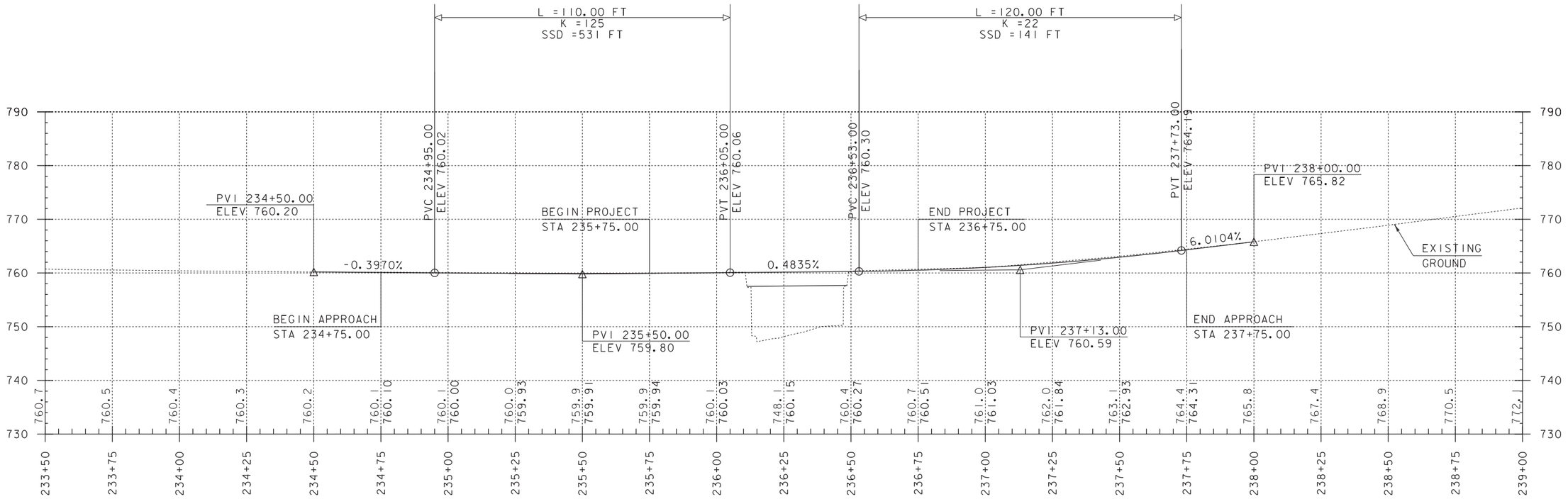
239+00

SUPERSTRUCTURE REPLACEMENT LAYOUT

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME: CALAIS	
PROJECT NUMBER: BHF 037-2(12)	
FILE NAME: 12bl48\sl2bl48bdr.dgn	PLOT DATE: 10-DEC-2012
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
ALTERNATIVE 1LAYOUT SHEET	SHEET 2 OF 10



VT RT 14 SUPERSTRUCTURE REPLACEMENT PROFILE

SCALE: HORIZONTAL 1"=20'
VERTICAL 1"=10'

NOTE:

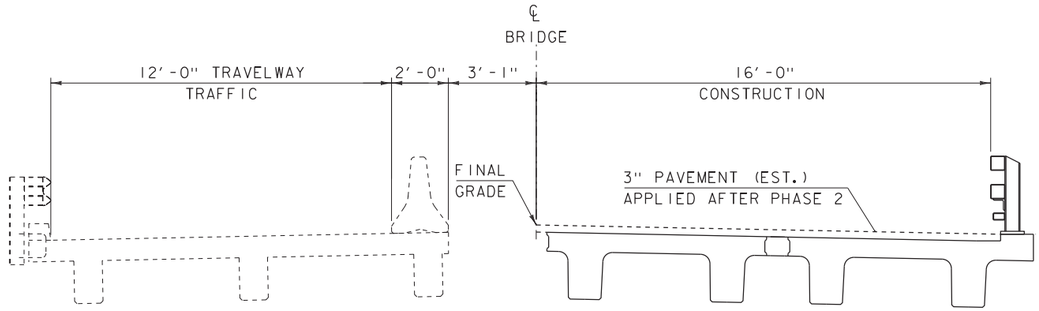
GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: CALAIS
PROJECT NUMBER: BHF 037-2(12)

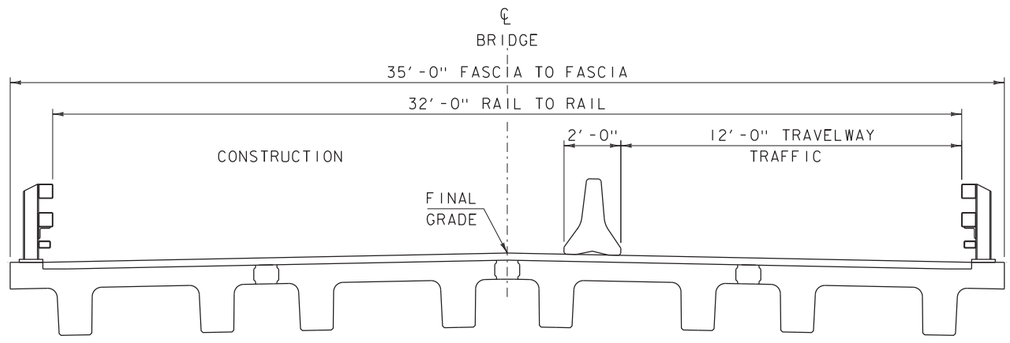
FILE NAME: 12b148\sl2b148profile.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: T.C.FILLBACH
ALTERNATIVE 1PROFILE SHEET

PLOT DATE: 26-NOV-2012
DRAWN BY: D.D.BEARD
CHECKED BY: ------
SHEET 3 OF 10



SUPERSTRUCTURE REPLACEMENT PHASE #1 TYPICAL SECTION

SCALE 3/8" = 1′-0"



SUPERSTRUCTURE REPLACEMENT PHASE #2 TYPICAL SECTION

SCALE 3/8" = 1′-0"

PROJECT NAME:	CALAIS
PROJECT NUMBER:	BHF 037-2(12)
FILE NAME: 12bl48/sl2bl48typical.dgn	PLOT DATE: 13-DEC-2012
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
ALTERNATIVE IPHASING TYPICAL SECTIONS	SHEET 4 OF 9

N

VT STATE PLANE GRID

DWINELL HOMESTEAD ASSN. INC.

LARKIN, JOSHUA S. & DAPHNE E.

WHEELER, AARON & POLLY

TREMPER, CARLTON O.

POB
STA 50+00.00

PC
STA 236+76.46

PI
STA 238+79.82

KINGSBURY BRANCH
FLOW

STONE FILL

WOODS DRIVE

GRAVEL DRIVE

WOOD FENCE

ARTESIAN WELL

#4206

COMB 151 199

COMB 150

COMB 152

COMB 201 153

COMB 154 202

COMB 69

MM 0140 1205 0420

GUY

VED IVE

W3-5 (35)

VT 14
TO EAST MONTPELIER

VT 14
TO WOODBURY

UNKNOWN PIPE FLOW

234+00 235+00 236+00 237+00 238+00 239+00

50+00 51+00 52+00

CURVE DATA
DELTA = 17°46'53"
D = 4°24'27"
R = 1300.00'
T = 203.36'
L = 403.45'
E = 15.81'

Energy Absorption Attenuator

SUPERSTRUCTURE REPLACEMENT PHASE I LAYOUT

SCALE 1" = 20'-0"
20 0 20

PROJECT NAME:	CALAIS
PROJECT NUMBER:	BHF 037-2(12)
FILE NAME:	I2bI48\sI2bI48bdr.dgn
PROJECT LEADER:	C.P.WILLIAMS
DESIGNED BY:	------
ALTERNATIVE	IPHASE ILAYOUT
PLOT DATE:	10-DEC-2012
DRAWN BY:	D.D.BEARD
CHECKED BY:	------
SHEET	5 OF 10

N

VT STATE PLANE GRID

DWINELL HOMESTEAD ASSN. INC.

LARKIN, JOSHUA S. & DAPHNE E.

WHEELER, AARON & POLLY

TREMPER, CARLTON O.

POB
STA 50+00.00

PC
STA 236+76.46

PI
STA 238+79.82

50+00

52+00

KINGSBURY BRANCH
FLOW

VT 14
TO EAST MONTPELIER

VT 14
TO WOODBURY

234+00
235+00
236+00
237+00
238+00
239+00

COMB
150

COMB
151
199

COMB
152

COMB
153
201

COMB
154
202

MM
0140
1205
0420

GUY

WOODS
DRIVE

STONE FILL

UNKNOWN PIPE FLOW

69" CMP FLOW

W3-5
(35)

GRAVEL
DRIVE

#4206

WOOD
FENCE

ARTESIAN
WELL

CURVE DATA
DELTA = 17°46'53"
D = 4°24'27"
R = 1300.00'
T = 203.36'
L = 403.45'
E = 15.81'

Energy Absorption Attenuator

SUPERSTRUCTURE REPLACEMENT PHASE 2 LAYOUT

SCALE 1" = 20'-0"
20 0 20

PROJECT NAME:	CALAIS
PROJECT NUMBER:	BHF 037-2(12)
FILE NAME:	12b148\sl2b148bdr.dgn
PROJECT LEADER:	C.P.WILLIAMS
DESIGNED BY:	------
ALTERNATIVE 1PHASE 2 LAYOUT	
PLOT DATE:	13-DEC-2012
DRAWN BY:	D.D.BEARD
CHECKED BY:	------
SHEET	6 OF 9

N

VT STATE PLANE GRID

DWINELL HOMESTEAD ASSN. INC.

LARKIN, JOSHUA S. & DAPHNE E.

BEGIN APPROACH
STA 234+00.00

END PROJECT
STA 234+50.00

POB
STA 50+00.00

PC
STA 236+76.46

END PROJECT
STA 238+00.00

END APPROACH
STA 238+50.00

KINGSBURY BRANCH
FLOW

COMB 151 199

COMB 150

COMB 152

COMB 154 202

COMB 201 153

MM 0140 1205 0420

GUY

WOODS DRIVE

STONE FILL

VT 14
TO EAST MONTPELIER

VT 14
TO WOODBURY

UNKNOWN PIPE FLOW

60" COMP FLOW

234+00

235+00

236+00

237+00

238+00

239+00

50+00

51+00

52+00

W3-5
(35)

GRAVEL DRIVE

#4206

STONE FILL

PROPOSED
PROJECT LIMITS

BEGIN BRIDGE
STA 236+00.00

END BRIDGE
STA 236+66.00

PROPOSED
PROJECT LIMITS

EXISTING ROW

GRAVEL DRIVE

ARTESIAN WELL

P.I.
STA 238+79.82

WOOD FENCE

WHEELER, AARON & POLLY

TREMPER, CARLTON O.

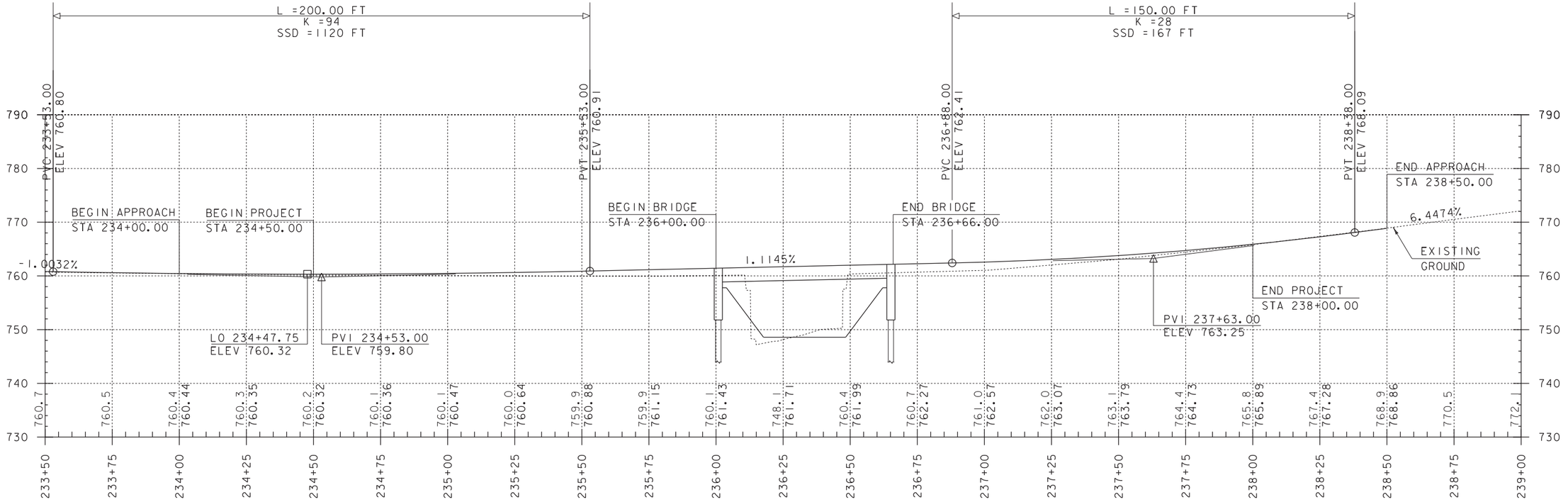
POE
STA 52+00.00

BRIDGE REPLACEMENT LAYOUT

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME: CALAIS	
PROJECT NUMBER: BHF 037-2(12)	
FILE NAME: 12b148\s12b148bdr.dgn	PLOT DATE: 26-NOV-2012
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
ALTERNATIVE 2 LAYOUT SHEET	SHEET 7 OF 10



VT RT 14 BRIDGE REPLACEMENT PROFILE

SCALE: HORIZONTAL 1"=20'
VERTICAL 1"=10'

NOTE:

GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: CALAIS
PROJECT NUMBER: BHF 037-2(12)

FILE NAME: 12b148\sl2b148profile.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: T.C.FILLBACH
ALTERNATIVE 2 PROFILE SHEET

PLOT DATE: 26-NOV-2012
DRAWN BY: D.D.BEARD
CHECKED BY: ------
SHEET 8 OF 10

N

VT STATE PLANE GRID

DWINELL HOMESTEAD ASSN. INC.

LARKIN, JOSHUA S. & DAPHNE E.

WHEELER, AARON & POLLY

TREMPER, CARLTON O.

POB
STA 50+00.00

PC
STA 236+76.46

PI
STA 33+92.01

PC
STA 33+21.36

PRC
STA 34+61.54

PI
STA 35+32.24

PT
STA 36+01.82

PC
STA 36+61.82

POE
STA 52+00.00

PI
STA 37+58.04

PI
STA 38+51.46

PI
STA 39+00.92

PI
STA 238+79.82

KINGSBURY BRANCH
FLOW

VT 14
TO EAST MONTPELIER

VT 14
TO WOODBURY

UNKNOWN PIPE
FLOW

STONE FILL

WOODS
DRIVE

GRAVEL
DRIVE

#4206

WOOD
FENCE

ARTESIAN
WELL

GUY

COMB
150

COMB
151
199

COMB
152

COMB
153

COMB
154
202

MM
0140
1205
0420

60" CMP
FLOW

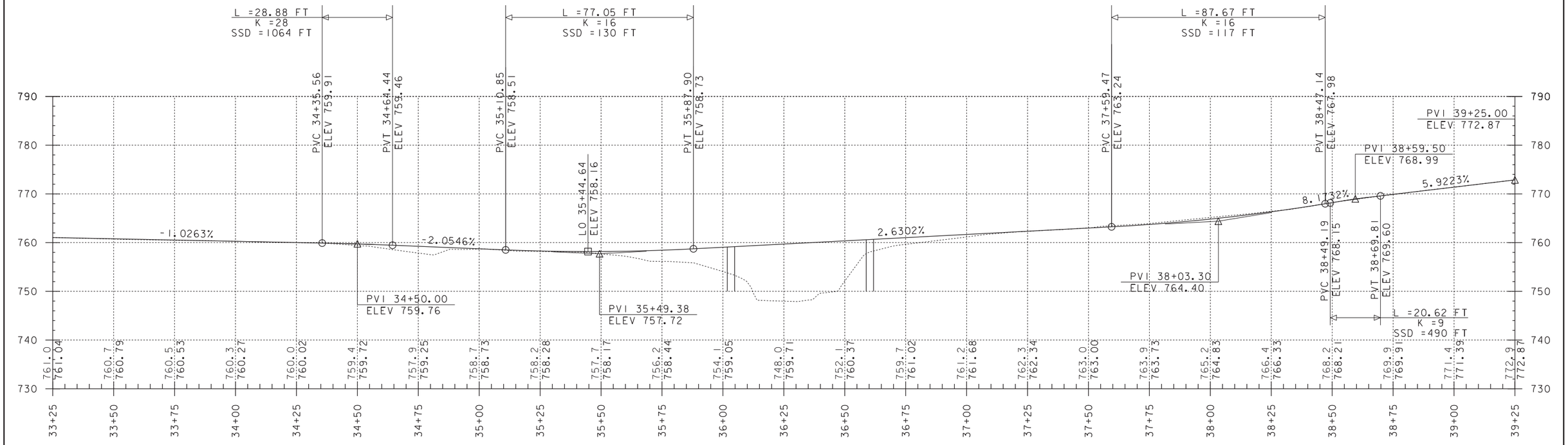
W3-5
(35)

234+00
235+00
236+00
237+00
238+00
239+00
34+00
35+00
36+00
37+00
38+00
39+00
51+00
52+00

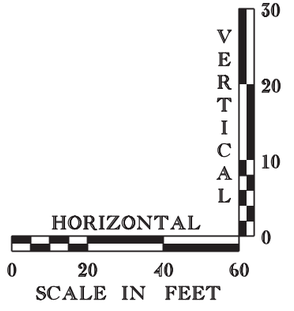
TEMPORARY BRIDGE LAYOUT

SCALE 1" = 20'-0"
20 0 20

PROJECT NAME:	CALAIS
PROJECT NUMBER:	BHF 037-2(12)
FILE NAME: l2bl48\sl2bl48bdr.dgn	PLOT DATE: 26-NOV-2012
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
TEMPORARY BRIDGE LAYOUT SHEET	SHEET 9 OF 10



TEMPORARY BRIDGE PROFILE



NOTE:

GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: CALAIS
PROJECT NUMBER: BHF 037-2(12)

FILE NAME: 12b148\sl2b148tempbridge.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: T.E.FILLBACH
TEMPORARY BRIDGE PROFILE

PLOT DATE: 26-NOV-2012
DRAWN BY: D.D.BEARD
CHECKED BY: ------
SHEET 10 OF 10