STATE OF VERMONT
AGENCY OF TRANPORTATION

Scoping Report

FOR

Calais BHF 037-2(11)

VT ROUTE 14, Bridge 82 OVER KINGSBURY BRANCH

December 13, 2012

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I. Site Information

The bridge is located in an urban area along VT Route 14 approximately 9.5 miles north of the junction with U.S. 2E. The bridge is located on a straight segment of VT Route 14 approximately three tenths of a mile north of the intersection with Balentine Road. There are two houses located close to the bridge's southern end on the western side and there is also another house on the northwest side of the bridge. 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	1919; reconstructed in 1946
Bridge Type	Concrete T-Beam
Bridge Length	34'
Width of Bridge	31.4'
Width of Roadway Approach	28'
Ownership	State of Vermont

Need

The following is a list of the deficiencies of Bridge 82 and VT Route 14 in this location.

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

2. The approach lane widths are substandard.

3. The bridge guardrail does not meet the current standard.

4. The existing bridge is not hydraulically adequate, with the hydraulic standard not being met even for the Q10 design flow event.

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	2,700	2,900	~
DHV	320	340	~
ADTT	310	510	~
%T	9.1	14.2	~
%D	66	66	~
FLEXIBLE ESAL	~	2015 ~ 2035	2015 ~ 2055
		2,075,000	4,731,000

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')	11'/5' (32')[1]	Substandard
Bridge Lane and Shoulder Widths	VSS Table 4.3	11'/4.7' (31.4')	11'/5' (32')	Adequate
Clear Zone Distance	VSS Table 4.4	Mailbox 9' offset from traveled way	20' fill / 12' cut	
Banking	VSS Section 4.13	.5% to 2%	8% design max	
Speed		50 mph (Posted)	50 mph (Design)	
Horizontal Alignment	AASHTO Green Book Table 3-10b	R= ∞', Bridge located on a tangent	R_{min}=758'	
Vertical Grade	VSS Table 4.6	Bridge located in transition from (+)0.0963% grade to (+)0.9734% grade	5% (max) for rolling terrain	
K Values for Vertical Curves	VSS Table 4.1	Bridge located on sag (K = 369)	110 crest / 90 sag	
Vertical Clearance Issues	VSS Section 4.8	None noted	14'-3" (min)	
Stopping Sight Distance	VSS Table 4.1	1398'	400'	
Bicycle/Pedestrian Criteria	VSS Table 4.8		5' Shoulder	
Bridge Railing	N/A	W rail mounted on fascia	TL-3	

Inspection Report Summary

Deck Rating	4 Poor
Superstructure Rating	5 Fair
Substructure Rating	5 Fair
Channel Rating	7 Good

[1] 1 foot added because the portion of truck traffic is greater than 10%.

07/18/2011 – Deck is rated as poor with heavy deterioration along the centerline bay especially. Original T beam superstructure also has some areas of advanced deterioration. Bridge should be scheduled for extensive reconstruction or full replacement within the next 10 years. ~ MJ/DK

04/23/2009 – This structure is in poor to good condition. The deck and superstructure continue to deteriorate. Abutment 2 appears to have settled in the past but may have stabilized. The approach guard rails have Texas twist on the ends which could launch a vehicle if hit just right. Should replace the end. ~ DCP

Hydraulics
From preliminary hydraulics report:

Recommendations

It is recommended that a new bridge have a 50 ft. clear span with a low beam elevation of at least 900.1 ft. The low beam elevation will require that the roadway elevations will be raised to allow the Q50 design event flow to pass through the structure. The new top of bridge final grade will then need to be transitioned back to the existing roadway grades on both the north and south approaches.

General Comments
Stone fill protection is also recommended, as it will allow for adequate hydraulic capacity for the Q50 design storm event. The abutments must be parallel to the stream to match the existing roadway alignment. The proposed structure will not constrict the stream channel width.

Utilities

There are overhead electric, cable, and phone utility lines along the east side of the bridge. These utility lines will need to be moved if an option involving a temporary bridge is chosen.

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.

Archaeological:

The northeast, northwest, and southeast quadrants have been identified to be sensitive for precontact archaeology.

Biological:

The Kingsbury Branch is not classified as Essential Fish Habitat, but standard time-of-year restrictions would apply for any in-stream construction activities.

Wetlands

There are no wetlands present within or around the project area.

Wildlife Habitat

There are no species or habitats of special concern in the project area.

Rare, Threatened and Endangered Species

There are no mapped rare, threatened or endangered species within the project area.

Agricultural:

There are no prime agricultural soils within the project area.

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:

The bridge itself is not historic, but the house immediately adjacent to the bridge is classified as a historic resource.

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 closure period 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

The appropriate temporary bridge type for this project would be a one-way temporary bridge with traffic signals, because of the volume of traffic and the ample sight distance at this project site.

Due to the existence of a contributing historic house and two gravel drives just to the southwest of the bridge, the placement of a temporary bridge is recommended at this project site only downstream of the bridge. Approximately 80 ft. north of the bridge on the eastern side of RT 14, there is a gravel drive that would also need to be taken into account.

There are, however, issues related to maintaining traffic by means of a temporary bridge. Three quadrants (the northeast, southeast, and northwest) of the project site have been noted to be sensitive for precontact archaeology. For this reason, an archaeological study would be necessary. If an archaeological site were to be discovered, additional testing would need to be performed. Additional temporary Right-of-Way would need to be obtained, which would greatly lengthen the project development phase. A temporary bridge would also increase the cost of the project by approximately $200,000, and would create additional issues with safety for both the workers and the traveling public.

Option 2: Phased Construction

Phased construction is the maintenance of one lane of two-way traffic on the existing bridge while building one lane at a time of the proposed structure. This allows keeping the road open during construction, while having minimal impacts on the potentially sensitive archaeological areas and adjacent property owners.

Based on traffic volumes, it is reasonable to close one lane of traffic, and maintain one lane of traffic, both ways, with a traffic signal.

While the time required to develop a phased construction project would remain the same as that required for an offsite detour, the time required to complete a phased construction project increases because some of the construction tasks have to be performed multiple times. In addition to the increased construction costs mentioned above, the costs also increase for phased construction because of the inconvenience of working around traffic and the effort involved in coordinating the joints between the phases. Another negative aspect of phased construction is the decrease in safety of the workers and vehicular traffic, which is caused by increasing the proximity and extending the duration that

workers and moving vehicles are operating in the same confined space. Phased construction for this project has the benefit of reduced impacts to resources.

Since the width of the bridge is 33', there is ample room to close one lane of traffic for construction while leaving the room for another lane to be open for through traffic. Right-of-Way would, however, need to be obtained.

Option 3: Off-Site Detour

This option would close the bridge and reroute traffic starting on VT 14 to VT 15 to US 2 and back to VT 14. This regional detour adds approximately 12.8 miles to travel distance for through traffic. The end-to-end distance is 51.9 miles. This possible detour route is shown in the appendix.

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 possible alternatives are listed below.

1. Local Bypass Route 1: VT 14 to East Hill Road (TH-36) to Sand Hill Road (TH-50) to VT 14. (1.2 added miles)

2. Local Bypass Route 2: VT 14 to Foster Hill Road (TH-1) to North Calais Road (TH-1) to Moscow Woods Road (TH-5) to VT 14. (3.1 added miles)

Maps of the detour and the possible local bypass routes are located in the appendices.

This option would eliminate the need for a temporary bridge, which would significantly decrease cost and time of construction. Additionally, the three quadrants surrounding the project site that are sensitive for precontact archaeology would not be affected. By removing most of the traffic from the project site during construction, a safer working environment is provided for the workers and the travelling public.

III. Alternatives Discussion

The existing bridge is in poor to fair condition, with the recommendation that both the deck and the superstructure be replaced in the near future. The bridge also does not meet hydraulic standards, and has substandard approach lane widths.

Alternative 1: No Action

This alternative would involve leaving the bridge in its current condition. Because this bridge has already been noted to need either extensive reconstruction or full replacement within the next ten years, this option is not recommended. Without any action taken to improve or replace the existing structure, the bridge will remain hydraulically inadequate

and localized deck failures could occur without warning. For these reasons, this option is not recommended and will no longer be considered.

Alternative 2: Bridge Rehabilitation

There are two repair options available for the existing structure. Both options would improve the structural integrity of the bridge, but would not improve the bridge's hydraulic capacity. For this reason, neither option was considered in the preliminary hydraulic analysis.

The options are as follows:

- Deck Replacement
- Superstructure Replacement with Substructure Rehabilitation

1. Deck Replacement
   This option involves the removal and replacement of the deck of the existing structure. Just replacing the deck would be difficult to accomplish due to the fact that the T-beam superstructure acts integrally connected with the deck. It would therefore be difficult to determine where to stop the removal of the deck and where to leave the T-beams. It would be cheaper and easier to replace the entire superstructure with new precast T-beams rather than rehabilitate the existing ones. This option will therefore not be considered any further.

2. Superstructure Replacement with Substructure Rehabilitation
   This option involves the replacement of the existing bridge's superstructure. A precast concrete superstructure with a shallow depth could be chosen to reduce construction time. Choosing a superstructure with a shallow depth could slightly increase the waterway opening of the bridge, as the low beam elevation could be raised by doing this. Rehabilitation to the substructure would also need to be completed in the form of repairing cracks and spalling on the abutments and wing walls.

   This option would lengthen the life of the existing structure by approximately 40 years, and would resolve the structural issues with the deck and the superstructure. The structure would, however, remain hydraulically inadequate for this option.

Alternative 3: Full Bridge Replacement

This option involves removing the existing structure in its entirety and replacing it with a new prefabricated superstructure with integral abutments on the existing horizontal alignment. The new structure would have approximately a 50 ft. clear span, normal to the channel, but would be at the existing skew of approximately 20º, and therefore would

have a total roadway centerline length of approximately 58 ft. This bridge would have the top of bridge finish grade raised by approximately 29 inches to allow for the low beam elevation to be 900.1 ft., which is the recommendation from the preliminary hydraulics report to meet the standard for the Q50 design flow. The bridge abutments would be constructed parallel to the stream banks, and Type III stone fill would be used to protect abutments against scour.

It is assumed that a superstructure with a shallow profile would be utilized (possibly NEXT beams), and that integral abutments would be the chosen type of foundation.

IV. Alternatives Summary

Based on the existing site conditions, bridge condition, and recommendations from hydraulics, there are two viable alternatives: Superstructure Replacement with Substructure Rehabilitation and Full Bridge Replacement. Each of these alternatives will be considered with the three options for maintenance of traffic: an offsite detour, a temporary bridge, and phased construction.

A cost evaluation for each of the alternatives is shown below. Please note that the Preliminary Engineering costs and the Project Development Duration are given from the point after the Project Defined milestone has been reached.

V. Cost Matrix[2]

Calais BHF 037-2(11)		Do Nothing	Alt 1a	Alt 1b	Alt 1c	Alt 2a	Alt 2b	Alt 2c
			Superstructure Replacement			Complete Replacement		
			Offsite Detour	Temp Bridge	Phased	Offsite Detour	Temp Bridge	Phased
COST	Bridge Cost	$0	$182,000	$182,000	$200,000	$438,000	$438,000	$481,000
	Removal of Structure	$0	$24,000	$24,000	$27,000	$36,000	$36,000	$45,000
	Roadway	$0	$70,000	$84,000	$73,000	$500,000	$514,000	$503,000
	Maintenance of Traffic	$0	$15,000	$150,000	$40,000	$15,000	$150,000	$40,000
	Construction Costs	$0	$291,000	$440,000	$340,000	$989,000	$1,138,000	$1,069,000
	Construction Engineering + Contingencies	$0	$87,300	$132,000	$102,000	$296,700	$341,400	$320,700
	Total Construction Costs w CEC	$0	$378,300	$572,000	$442,000	$1,285,700	$1,479,400	$1,389,700
	Preliminary Engineering[3]	$0	$81,500	$123,200	$95,200	$296,700	$341,400	$320,700
	Right of Way	$0	$0	$91,100	$0	$57,000	$91,100	$57,000
	Total Project Costs	$0	$459,800	$786,300	$537,200	$1,639,400	$1,911,900	$1,767,400
SCHEDULING	Project Development Duration[4]		2 years	4 years	2 years	4 years	4 years	4 years
	Construction Duration		2 months	6 months	6 months	6 months	18 months	12 months
	Mobility Impacts		2 weeks	20 weeks	20 weeks	4 weeks	40 weeks	40 weeks
ENGINEERING	Typical Section - Roadway (feet)	28'	28'	28'	28'	28'	28'	28'
	Typical Section - Bridge (feet)	Acceptable	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	Meets Criteria	Meets Criteria	Meets Criteria
	Traffic Safety	No Change	New Guardrail	New Guardrail	New Guardrail	New Guardrail	New Guardrail	New Guardrail
	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	Slight Improvement	Slight Improvement	Slight Improvement	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	Relocation	Relocation	Relocation
OTHER	ROW Acquisition	No	No	Yes	No	Yes	Yes	Yes
	Road Closure	No	Yes	No	No	Yes	No	No
	Design Life	<5 years	40 years	40 years	40 years	80 years	80 years	80 years

[2] Costs are estimates only, used for comparison purposes.
[3] Preliminary Engineering Costs are estimated starting from the end of the Project Definition Phase.
[4] Project Development Durations start from the end of the Project Definition Phase.

VI. Conclusion

The alternative of a full bridge replacement with traffic maintained via phased construction is recommended. This alternative addresses the hydraulic inadequacy of the existing structure, and also solves the structural issues with the deck and the superstructure. The lifetime of the structure would be increased to an additional 80 years.

Phased construction was chosen as the means of maintaining traffic due to the length of the detour and the volume of traffic on the existing bridge. Right-of-Way will need to be obtained to remove the wingwall of the existing structure. Constructing a temporary bridge at this location would be difficult because of the proximity of the three driveways located on either end of the bridge, the historic house in the southwest quadrant of the bridge, and the possibility of precontact archaeological resources in the remaining three quadrants. The development and construction time and costs would increase for temporary bridge as well. Thus, the use of a temporary bridge has been discounted.

It is recommended that the bridge and accordingly the roadway be raised so that the bridge has a low beam elevation of 900.1', as per the recommendation from Hydraulics, to meet the standard for a Q50 design storm event. It is, however, acknowledged that this affects the project limits and therefore increases the cost of the project, so raising the bridge a lower amount may also be considered in later stages of design.

VII. Appendices

- Site Pictures
- Town Map
- Bridge Inspection Report
- Hydraulics Memo
- Preliminary Geotechnical Information
- Natural Resources Memo
- Archaeology Memo
- Historic Memo
- Stormwater Memo
- Resource ID Completion Memo
- Local Input (if town bridge)
- Official Detour Route
- Local Bypass Routes
- Plans
    - Proposal
        - Existing Conditions
        - Typical Sections
        - Layout

- Profile
- Critical Cross Section
- Phased Construction Layouts
- Downstream Temporary Bridge Layout

Looking to the south.

Looking to the north.

Looking downstream, to the east.

Looking upstream, to the west.

Spalling on a wing wall.

Exposed reinforcement on the T-beam superstructure.

Cracking in the underside of the deck.

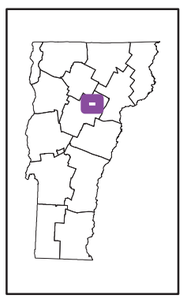
Bridge 82

Scale 1:53,073

N

- INTERSTATE
- STATE LONG
- STATE SHORT
- TOWN LONG
- 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.:** 00082 **District:** 6

Located on: VT 00014 ML **over** KINGSBURY BRANCH **approximately** 9.5 N JCT. U.S.2 E **Owner:** 01 STATE-OWNED

CONDITION

Deck Rating: 4 POOR

Superstructure Rating: 5 FAIR

Substructure Rating: 5 FAIR

Channel Rating: 7 GOOD

Culvert Rating: N NOT APPLICABLE

Federal Str. Number: 200037008212052

Federal Sufficiency Rating: 77.2

Deficiency Status of Structure: SD

AGE and SERVICE

Year Built: 1919 **Year Reconstructed:** 1946

Service On: 1 HIGHWAY

Service Under: 5 WATERWAY

Lanes On the Structure: 02

Lanes Under the Structure: 00

Bypass, Detour Length (miles): 15

ADT: 002500 **% Truck ADT:** 09

Year of ADT: 1998

GEOMETRIC DATA

Length of Maximum Span (ft): 0032

Structure Length (ft): 000034

Lt Curb/Sidewalk Width (ft): 0

Rt Curb/Sidewalk Width (ft): 0

Bridge Rdwy Width Curb-to-Curb (ft): 31.4

Deck Width Out-to-Out (ft): 33

Appr. Roadway Width (ft): 028

Skew: 25

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: 0 DOES NOT MEET 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: 8 STABLE FOR 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 is rated as poor with heavy deterioration along the centerline bay especially. Original T beam superstructure also has some areas of advanced deterioration. Bridge should be scheduled for extensive reconstruction or full replacement within the next 10 years. ~ MJ/DK*

04/23/09 This structure is in poor to good conditon.The deck and superstructure continue to deteriorate. Abutment 2 appears to have settled in the past but may have stabilized. The approach guard rails have texas twist on the ends which could launch a vehicle if hit just right. Should replace the ends. 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(11) –VT 14 Bridge 82 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 1919 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 33 feet normal to the roadway. The total superstructure depth is approximately 2.9 feet based on record information and verified with field measurements. The normal clear span between the abutment faces is approximately 30.5 feet. The existing abutments are cast-in-place concrete. There is also a small "stepped" type footing on both abutments. The approximate maximum height to the bottom of the superstructure to the streambed is approximately 7 feet, but is significantly less on the Right (South) abutment. The structure is located in an incised channel just below a bend, but in a relatively straight section. The bridge is askew to the stream at approximately 20°. However, the abutments appear to be basically parallel with the stream channel at this location.

The calculated Q_{50} flow does not pass through the existing structure and overtops the roadway. Furthermore even the Q_{10} design flow event does not meet the hydraulic standard for this structure based on our analysis of the existing conditions. We did not evaluate the scour for the existing or proposed bridge configurations as part of the preliminary design. Scour calculations will be performed during final hydraulics.

Recommendations

Based on documentation from the Structures Group, it was determined that the existing bridge will be totally replaced with a new bridge and will be located in the existing alignment. It is anticipated the proposed deck will be approximately 34 feet wide to meet the VTrans road design standards. We have anticipated that the proposed abutments will be vertical face concrete abutments with sloped stone fill scour protection. Based on the available pre-scoping documentation, it is our understanding that the abutments will be built on piles as part of an integral abutment which will aid with scour protection.

Based on our analysis, 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 900.1 feet with 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 with the roadway having a skew of approximately 20° which would have a roadway centerline length of approximately 53.2' to achieve the 50-foot normal span normal to the channel. 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 that with the proposed low beam elevation, it has been assumed that the roadway elevations will be raised from the existing grades to allow for the design storm event to pass through the structure. Therefore, the new top of bridge final grade should be transitioned back down to the existing roadway grades on both the left (North) approach and the right (South) approach to the structure. These transitions 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}) event or in the event of a blockage of the bridge opening.

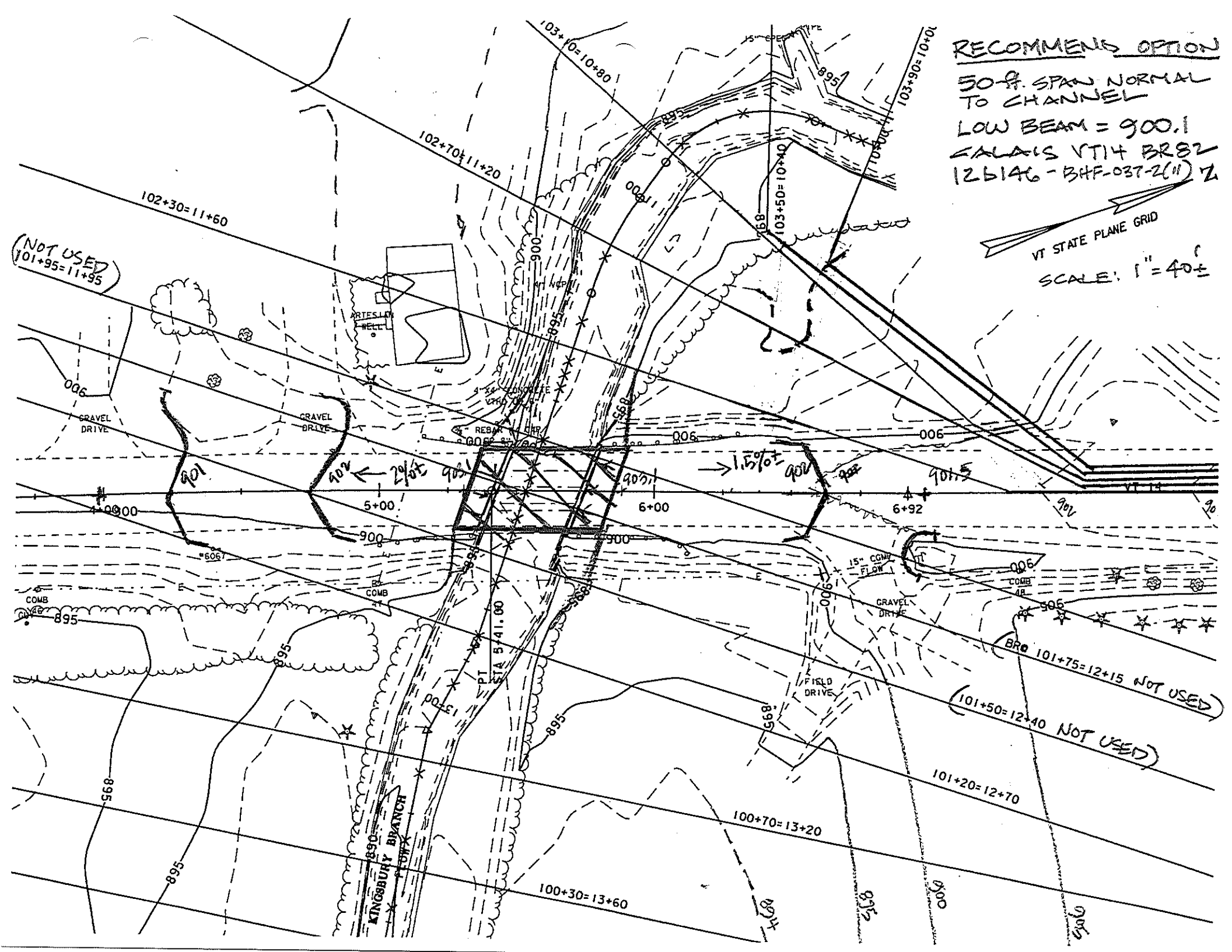
As noted above, scour was not reviewed during the preliminary design. However based on the velocities from the analyses and evidence from the site, it is anticipated that Type 3 Stone Fill will be necessary for armoring the abutments and channel banks near the replacement structure.

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.

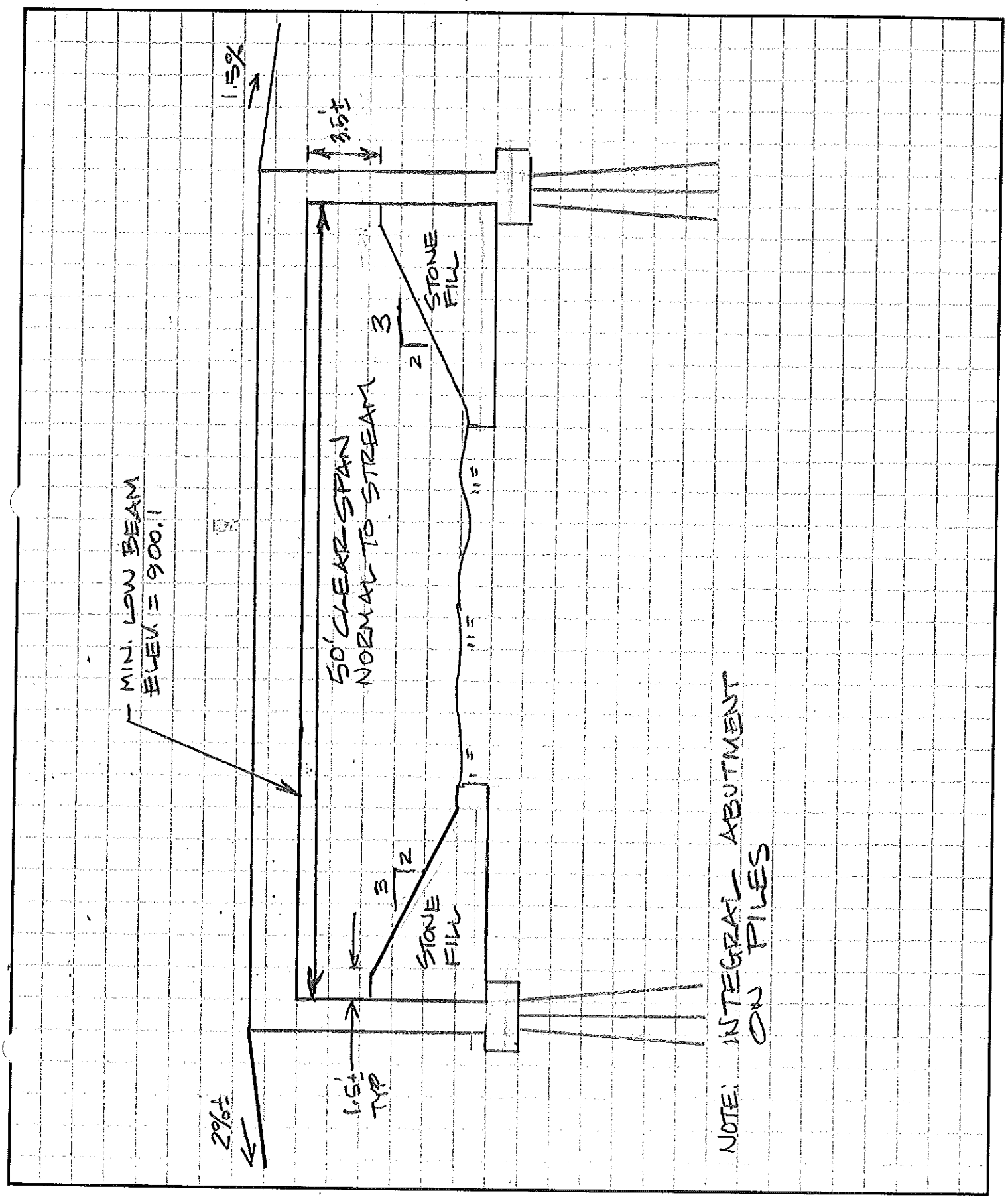
Please contact us if you have any questions or if we may be of further assistance.

BMB
cc: Hydraulics Project File via NJW
Hydraulics Chrono File


RECOMMENDS OPTION
50 ft. SPAN NORMAL TO CHANNEL
LOW BEAM = 900.1
CALAIS VT14 BR82
12B146 - BHF-037-2(11)
VT STATE PLANE GRID
SCALE: 1" = 40'±
(NOT USED 101+95=11+95)
102+70=11+20
102+30=11+60
103+10=10+80
103+90=10+40
103+50=10+40
100+70=13+20
100+30=13+60
101+20=12+70
BR@ 101+75=12+15 NOT USED
(101+50=12+40 NOT USED)
ARTESIAN WELL
GRAVEL DRIVE
FIELD DRIVE
4" CONCRETE
5/8" REBAR W/ CAP
15" CONC FLOW
COMB
KINGSBURY BRANCH FLOW
PT STA 5+41.00
VT 14
2%±
1.5%±
4+00
5+00
6+00
6+92
895
900
901
902
905
906

VTrans Working to Get You There
Vermont Agency of Transportation

JOB CALAIS VT 14 BR 82
BHF-037-2(11) 126146
CALCULATED BY BMB DATE 7-26-12
CHECKED BY NJW DATE 8-19-12
SCALE N.T.S.



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(11) VT 14, Bridge 82 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 82 on VT 14. Bridge 82, 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 82 over Kingsbury Branch River

2.0 Surficial and Bedrock Geology

The Agency of Natural Resources (ANR) documents and publishes all water well information for wells that are drilled for both residential and commercial purposes and that are reported to the

ANR. Published online, the logs can be used to determine general characteristics of soil strata in the area. There may be undocumented water wells, adjacent to the project site, 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 four closest wells, wells No. 200, 236, 324, and 15602 are located between 250 and 650 ft from the project location.

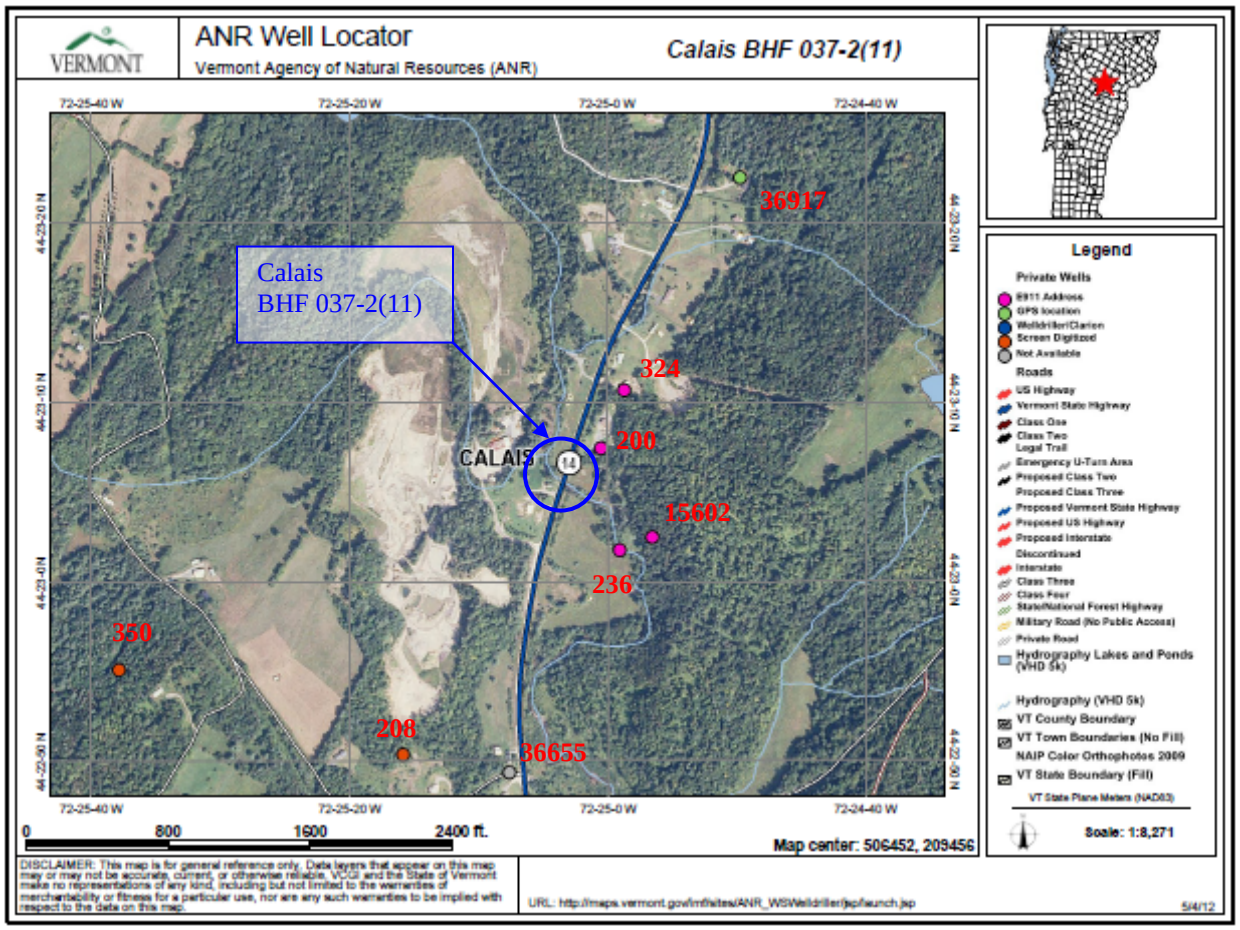


Figure 2: ANR Well Locations near Bridge 74 – VT 14 in Calais, VT

Well	Overburden Description	Overburden Thickness
200	Gravel	> 176
236	Sand / Clay	180
324	Sand and Gravel	180
15602	Sand and Gravel	210

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

The streambed appears to be gravelly sand with cobbles and there is a large sand and/or gravel surface mine immediately to the west of the project location, See Figure 2.

The 1947 record plans for Bridge 82 detail the partial removal of preexisting abutments and the reconstruction of the abutments to accommodate a widened structure. These plans do not indicate

the soil stratigraphy beneath the existing bridge but they do document that the existing bridge was widened. It is unclear whether or not the bridge is supported by spread footings or timber piles. These plans possess language for driving piles so the assumption is that this bridge is founded, at least partially, on timber piles.

The 1970 Surficial Geologic Map of Vermont indicates that the Calais BHF 037-2(11) project site is located in an area classified (primarily) as Stetson loam with 3 to 8% slopes and that the geological landform is likely a terrace or kame consisting of sandy or gravelly glaciofluvial deposits. The geography of the area (nearby sand / gravel pit), an evaluation of the stream bed and the subsurface information reported in the ANR Well Logs corroborate the information from the surficial geology map. 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 east side of the road and a house located very close to the ROW line on the west side of the highway. The utility lines may control where the borings are drilled prior to construction but they could also impact the location of a temporary bridge since the existing house site prevents the use of a temporary bridge on the west side. These overhead lines would need to be relocated prior to temporary bridge construction. The property upon which the house is located is currently advertised for sale by Heney Realtors of Montpelier, VT; there appears to be room to coordinate with property owner on stockpile locations on this property or in the nearby sand/gravel pit area.

4.0 Recommendations

The existing bridge is a 34 ft long single span structure with a 25˚ skew. The current grade difference between the abutments is negligible. 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 depth of bedrock. 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 northwest and southeast corners of the bridge. The boring located in the northwest corner could be drilled at the bottom of the embankment while the other boring could be drilled behind the guard rail and if this isn't possible then drilling in the roadway but behind the abutment footing is recommended. These borings should be positioned a minimum of 10 feet away from any overhead power lines and far enough from the abutment to avoid drilling through the abutment footings. Final recommendations for boring locations can be provided once an alignment and preliminary structure type have been selected.

There does not appear to be any serious drilling equipment and/or access limitations, except for the overhead wires at this site. Bedrock is not anticipated to be encountered at this location; therefore, borings should only be drilled to a depth that would allow for the adequate design of the replacement structure. Given the sandy and gravelly nature of the soil at this site it is unclear why the existing bridge was founded on timber piles. A spread footing on natural soils is anticipated, however, an integral abutment structure could also be feasible. The 25˚ skew is within the current Agency guidelines for skewed integral abutments.

Guard rail may need to be temporarily removed during drilling to facilitate boring placement. Temporary traffic control, including flaggers, may be necessary at this site to facilitate a safe work zone.

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 Ramsy, Environmental Specialist

FROM: John Lepore, Transportation Biologist

DATE: May 10, 2012

SUBJECT: CALAIS BHF 037-2 (11)
VT 14, Bridge 82 over Kingsbury Branch

The purpose of this memorandum is to let you know that only regulated resource in this immediate area is the Kingsbury Branch itself. Wetlands, species/habitat(s) of special concern, and agricultural soils are all absent.

There Kingsbury Branch is not classified as Essential Fish Habitat, but standard time-of-year restrictions would apply for any in-stream construction activities.

If a temporary bridge is required, a downstream structure which completely spans the bankfull width of the stream would be the best choice for ease of permitting…

If you have any questions about this, call me at 828-3963.

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: James Brady, VTrans Environmental Specialist

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

Date: 6/20/2012

Subject: Calais BHF 037-2(11) – Archaeological Resource ID

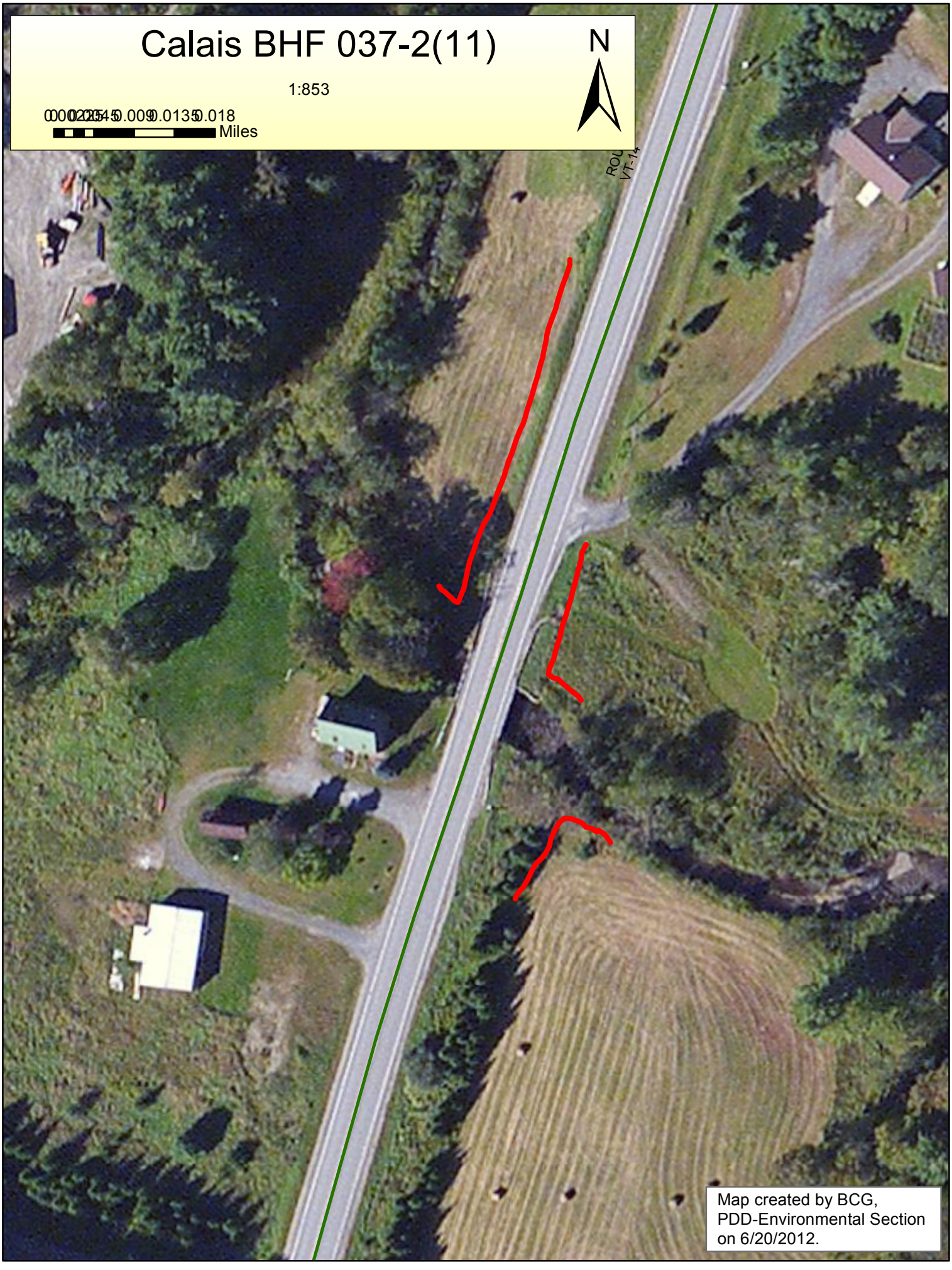
I've completed my initial resource identification for Calais BHF 037-2(11). A field visit conducted on 4/25/2012 as part of the 2012 GPS scoping initiative was adequate to identify potential resources in the project area. Three quadrants (NE,NW,SW) are sensitive for precontact archaeology and have been plotted onto the attached map. The data has been entered in the archaeology geodatabase for inclusion in future plans.

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


Calais BHF 037-2(11)
1:853
0 0.0025 0.005 0.009 0.0135 0.018
Miles
N
ROU
VT-14
Map created by BCG,
PDD-Environmental Section
on 6/20/2012.

Ramsey, Jeff

From: O'Shea, Kaitlin
Sent: Friday, April 13, 2012 3:55 PM
To: Ramsey, Jeff
Cc: Williams, Chris; Newman, Scott
Subject: Pilot Project - Calais BHF 037-2(11)
Attachments: Calais BHF 037-2(11) Historic Resource ID.pdf

Good afternoon,

I have completed the historic resource ID for Calais BHF 037-2(11): Bridge 82 is not a historic resource; however, the adjacent house is a historic resource. It is identified on the attached map.

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

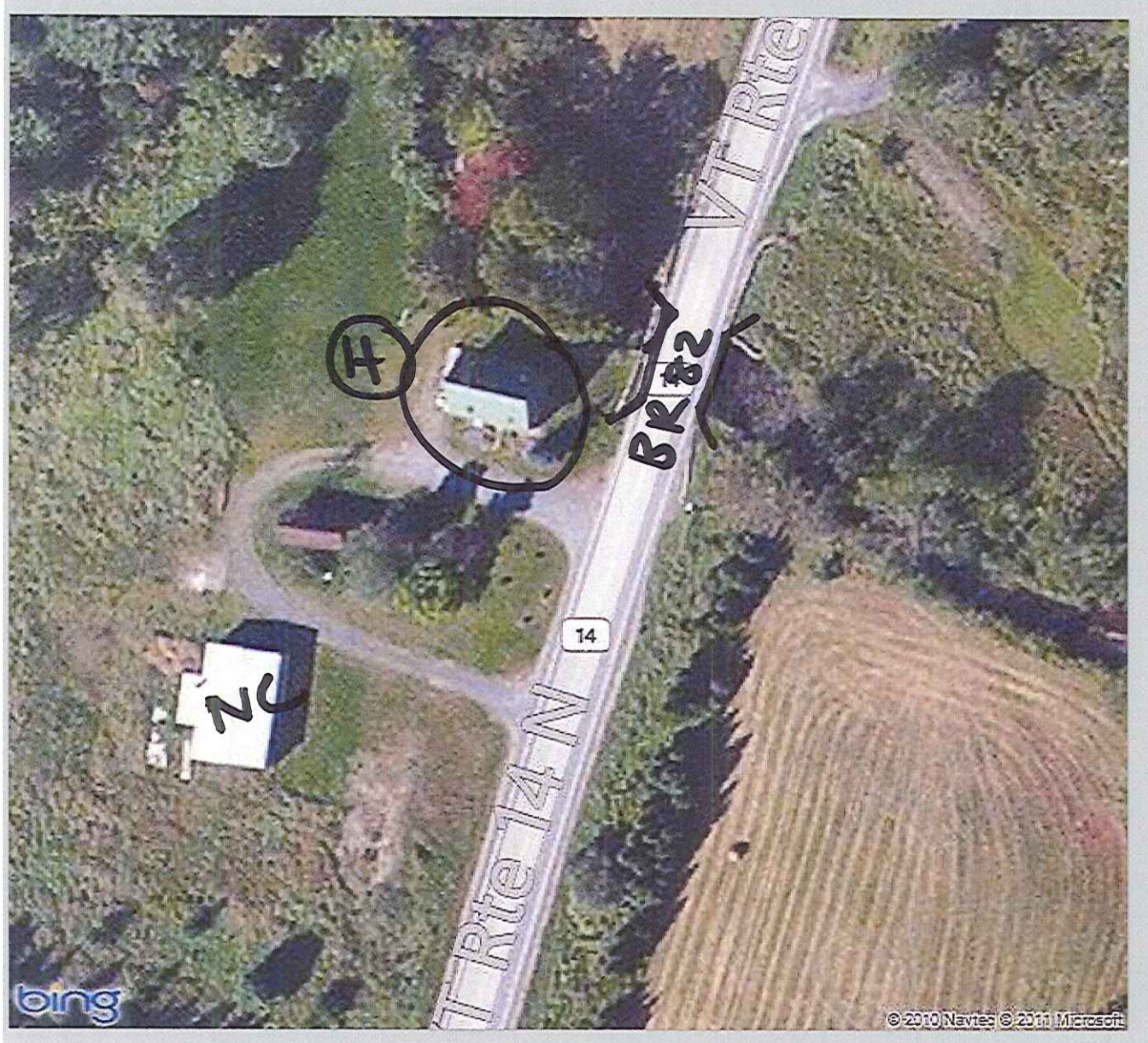
Kaitlin O'Shea
Historic Preservation Specialist
Vermont Agency of Transportation

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

bing Maps

My Notes

On the go? Use **m.bing.com** to find maps, directions, businesses, and more



Historic Resource ID
4/13/2012
K. O'Shea

Calais BHF 037-2(11)
BR 82 = NC
Not Historic

Adjacent property =
Historic

Ramsey, Jeff

From: Armstrong, Jon
Sent: Wednesday, May 23, 2012 11:08 AM
To: Ramsey, Jeff
Subject: RE: Environmental Request NOTIFICATION: CALAIS BHF 037-2(11)

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 7:55 AM
To: Gingras, Glenn; Armstrong, Jon; Gauthier, Brennan; O'Shea, Kaitlin
Cc: Williams, Chris
Subject: FW: Environmental Request NOTIFICATION: CALAIS BHF 037-2(11)

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(11)12b146\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

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

OFFICE MEMORANDUM

AOT - PROGRAM DEVELOPMENT DIVISION

RESOURCE IDENTIFICATION COMPLETION MEMO

TO: Chris Williams, Project Manager
FROM: Jeff Ramsey, Environmental Specialist
DATE: July 9, 2012

Project: Calais BHF 037-2 (11)

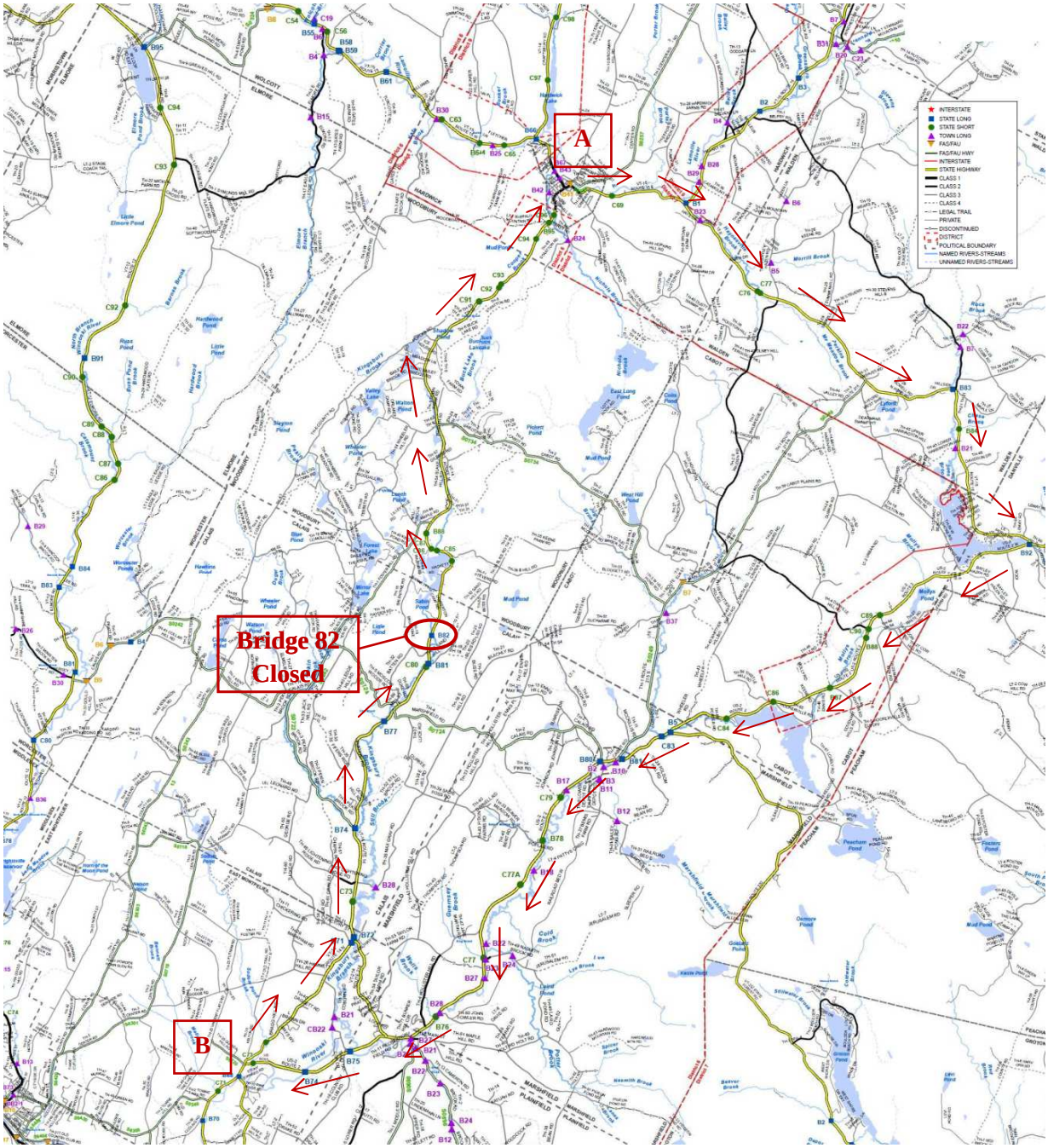
ENVIRONMENTAL RESOURCES:

Wetlands:	___	Yes	_X_	No
Historic/Historic District:	_X_	Yes	___	No See Historic Resource ID and Historic Resource ID Property
Archaeological Site:	_X_	Yes	___	No Three quadrants (NE,NW,SW) are sensitive, see Calais BHF 037-2(11) Arch Resource ID
4(f) Property:	_X_	Yes	___	No See Historic Resource ID and Historic Resource ID Property
6(f) Property:	___	Yes	_X_	No
Agricultural Land:	___	Yes	_X_	No
Fish & Wildlife Habitat:	_X_	Yes	___	No Kingsbury Branch, See Natural Resource ID
Endangered Species:	___	Yes	_X_	No
Hazardous Waste:	___	Yes	_X_	No
Stormwater:	___	Yes	_X_	No
USDA-Forest Service Lands:	___	Yes	_X_	No
Wildlife Habitat Connectivity:	___	Yes	_X_	No
Scenic Highway/ Byway:	___	Yes	_X_	No
Act 250 Permits:	___	Yes	_X_	No

If you have any questions or need additional information please let me know.
Thanks,
Jeff

cc:
Project File

Official Detour:



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

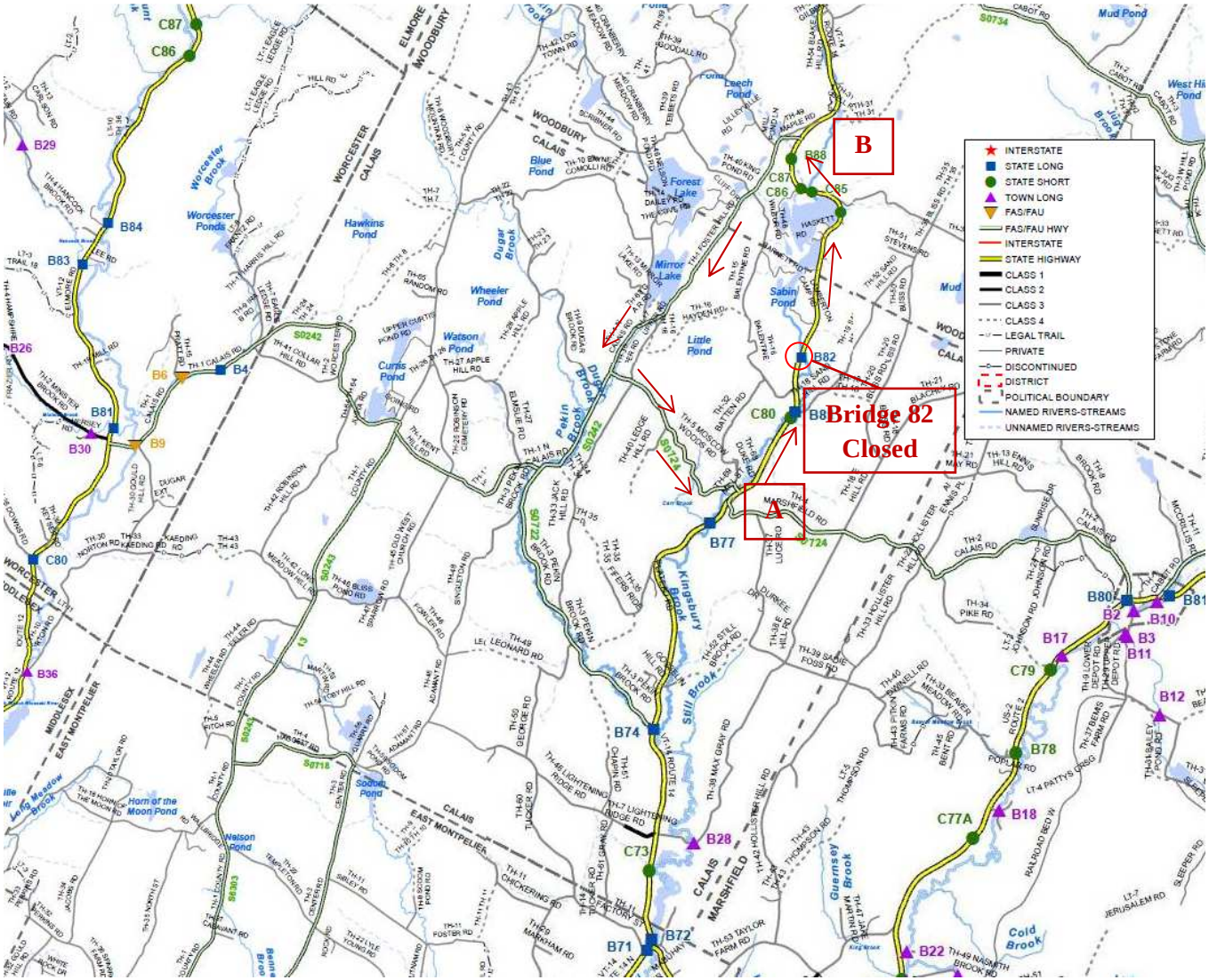
A-B Through Distance: 19.5 miles

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

Foster Hill Road (TH-1) to

North Calais Road (TH-1) to

Moscow Woods Road (TH-5)

to VT 14.

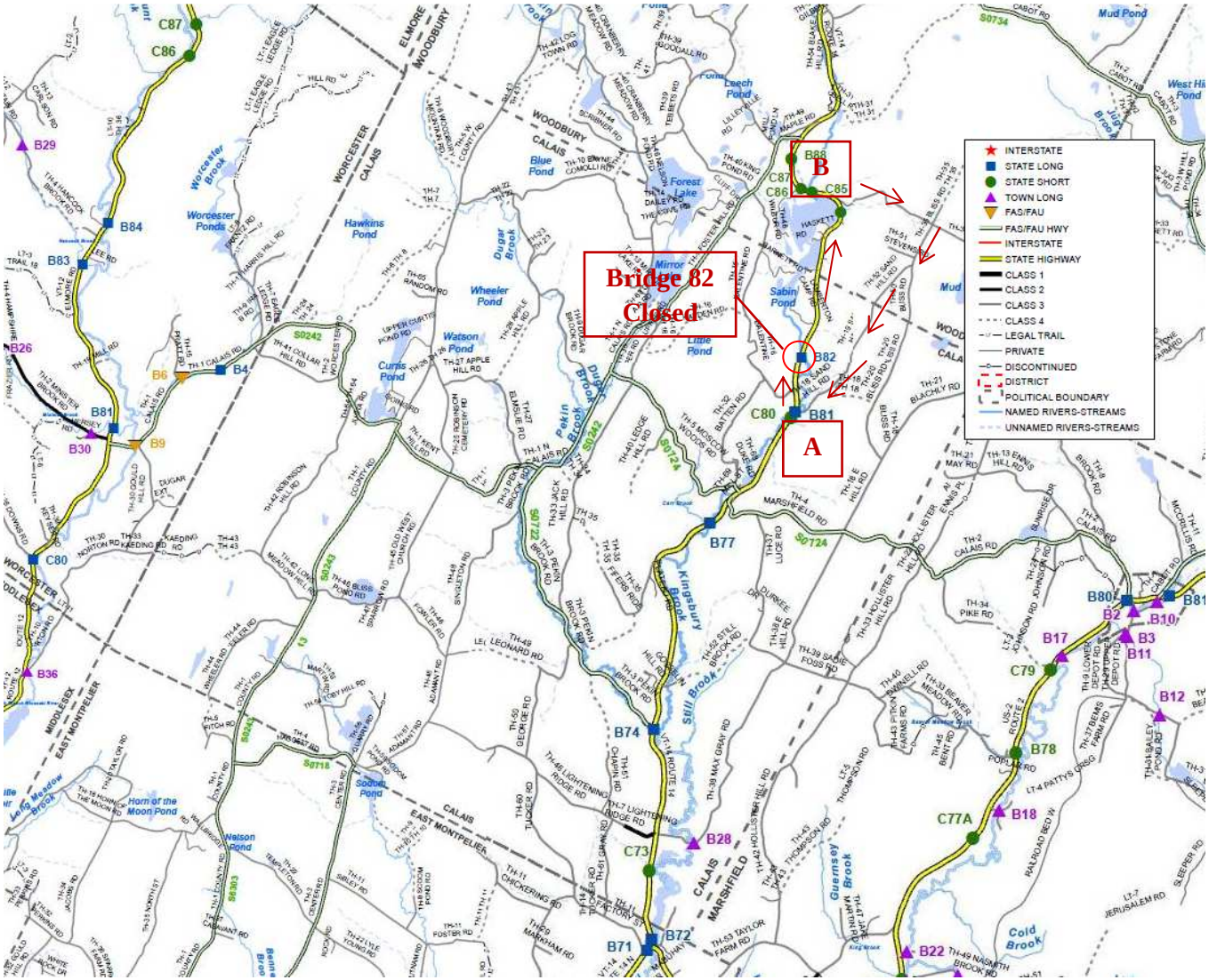
A-B Through Distance: 1.5 miles

A-B Bypass Distance: 4.6 miles

Added Miles: 3.1 miles

End to End Distance: 6.1 miles

Local Bypass Route Option 2:



Bypass Route: VT 14 to East Hill Road (TH-36) to Sand Hill Road (TH-50) to VT 14.

A-B Through Distance: 2.2 miles

A-B Bypass Distance: 3.4 miles

Added Miles: 1.2 miles

End to End Distance: 5.5 miles

N

VT STATE PLANE GRID

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HISTORIC

MATTOGNO, LISA & CHRISTOPHER

HARTMAN, FLO

MAINLINE PI #1
STA 334+64.36

MAINLINE PI #2
STA 336+64.52

50+00

STA 50+00.00 POB

EXISTING ROW

HUBB

ARCH ARCH ARCH ARCH ARCH ARCH ARCH

POE
STA 340+49.64

VT 14

335+00

336+00

337+00

338+00

339+00

VT 14

340+00

340+50

E

GUY

PC
STA 335+18.00

PT
STA 336+42.34

PC
STA 336+85.69

PT

ARCH

51+00

52+00

STA 52+00.00 POE

HARTMAN, FLO

HARTMAN, FLO

KINGSBURY BRANCH

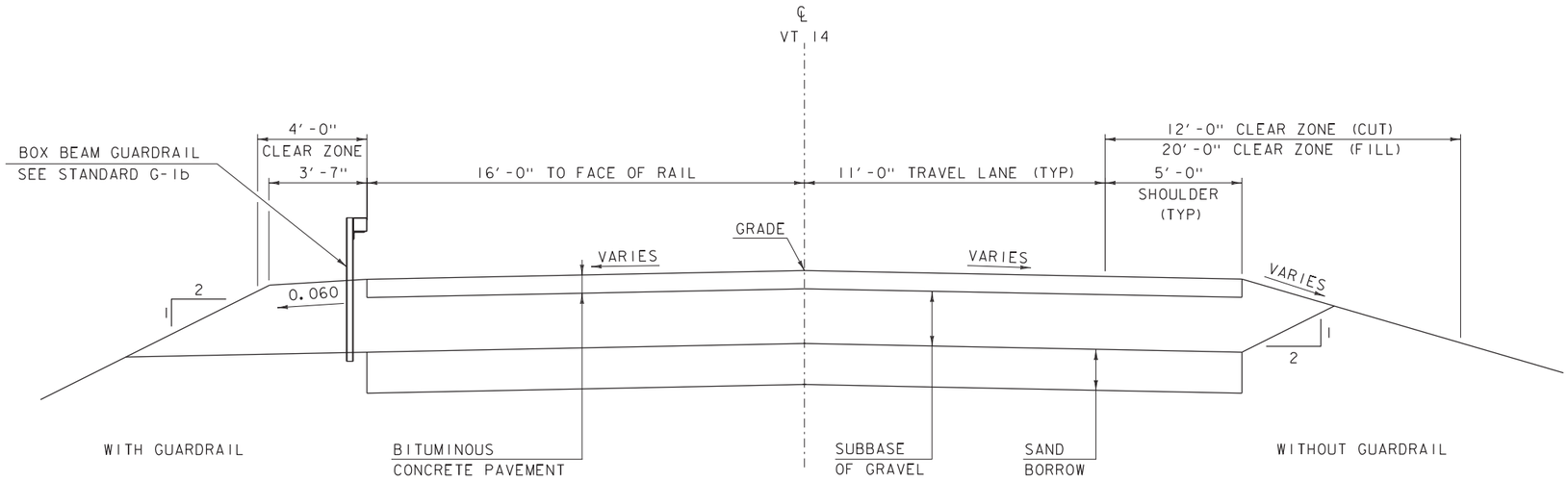
FLOW

EXISTING CONDITIONS

SCALE 1" = 20'-0"

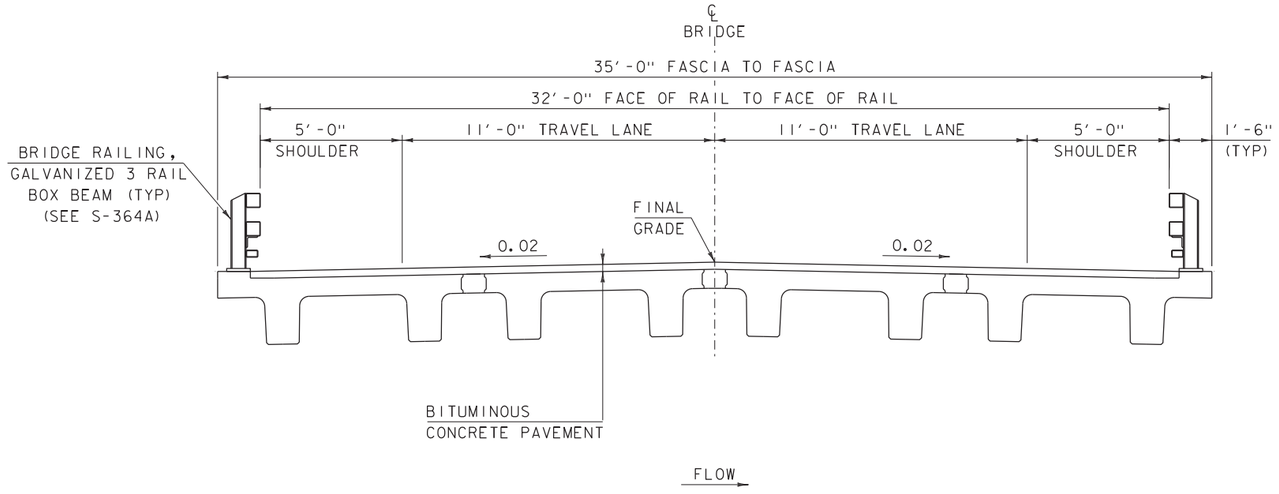
20 0 20

PROJECT NAME:	CALAIS
PROJECT NUMBER:	BHF 037-2(11)
FILE NAME: sl2bl46bdr.dgn	PLOT DATE: 07-DEC-2012
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
EXISTING CONDITIONS	SHEET 1 OF 1



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)

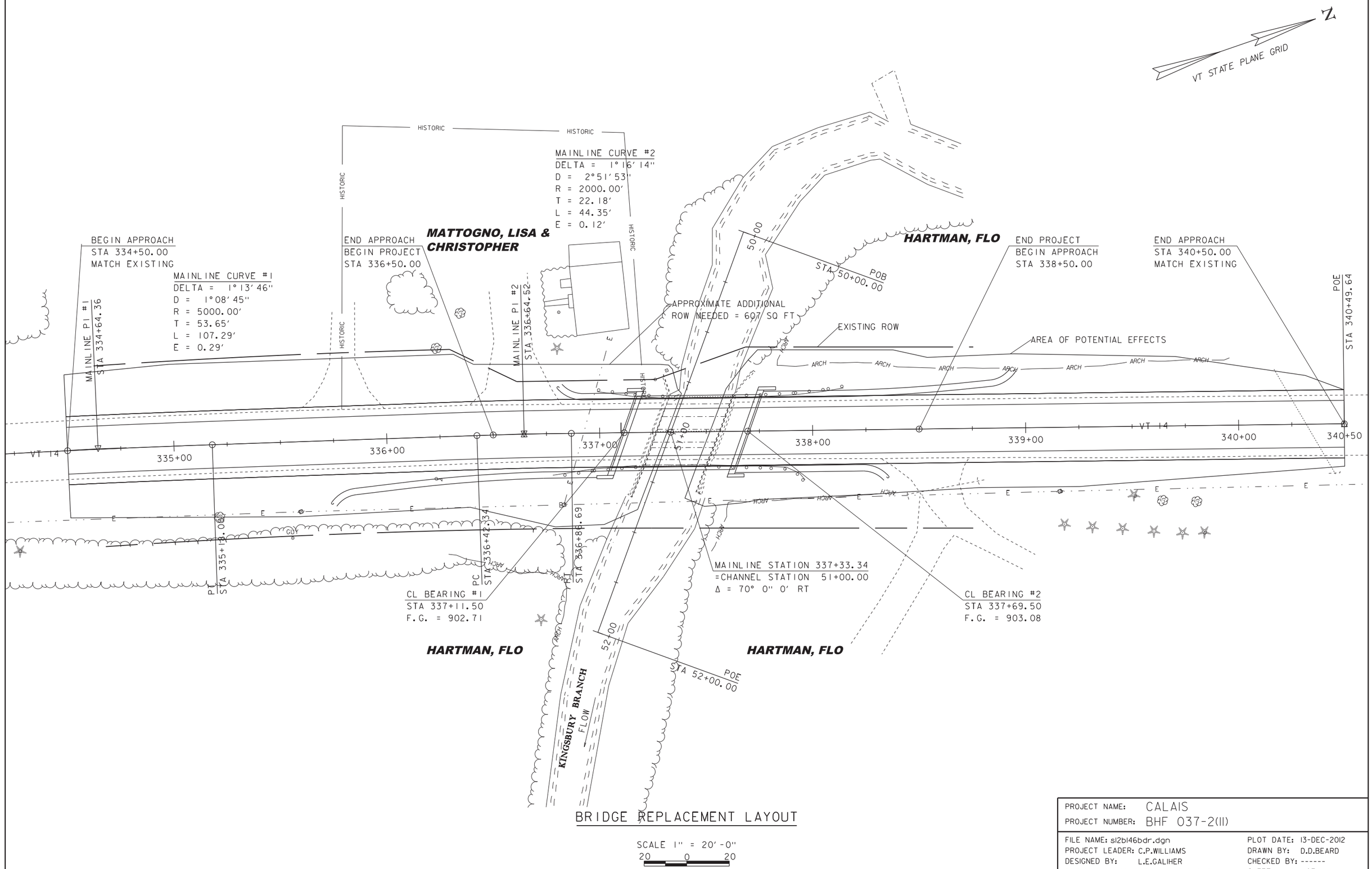
SURFACE	
- PAVEMENT (TOTAL THICKNESS)	+/- 1/4"
- AGGREGATE SURFACE COURSE	+/- 1/2"
SUBBASE	+/- 1"
SAND BORROW	+/- 1"

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

PROJECT NAME: CALAIS
PROJECT NUMBER: BHF 037-2(11)

FILE NAME: 12b146/sl2b146typical.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: ------
TYPICAL SECTIONS

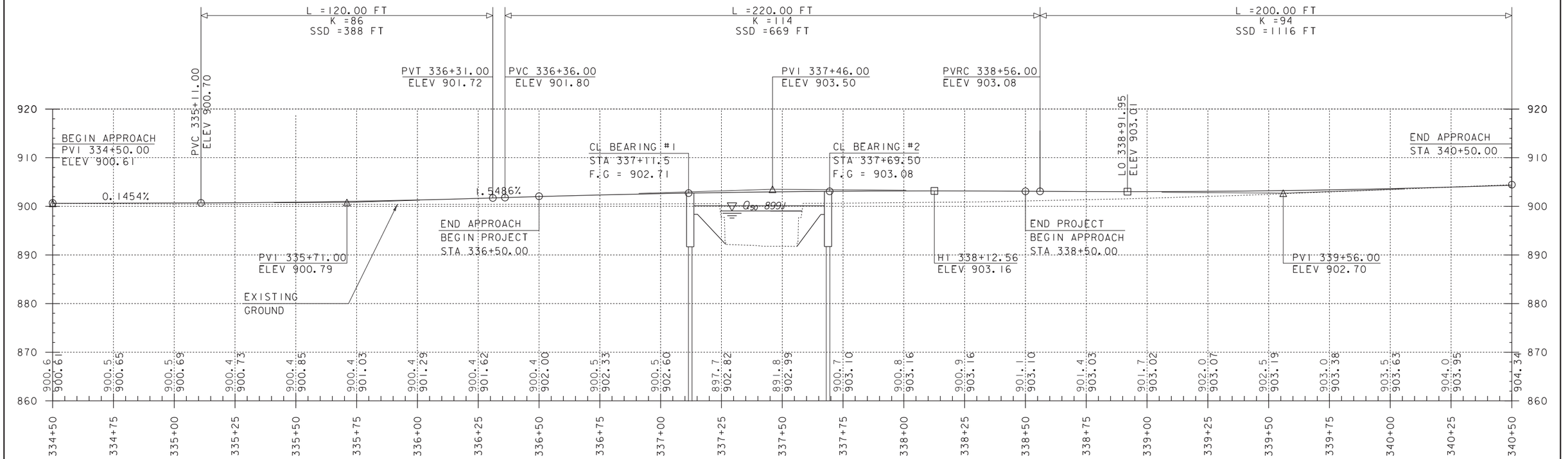
PLOT DATE: 13-DEC-2012
DRAWN BY: L.E.GALIHER
CHECKED BY: D.D.BEARD
SHEET 1 OF 8



BRIDGE REPLACEMENT LAYOUT

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

PROJECT NAME:	CALAIS
PROJECT NUMBER:	BHF 037-2(11)
FILE NAME: sl2bl46bdr.dgn	PLOT DATE: 13-DEC-2012
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: L.E.GALIHER	CHECKED BY: ------
BRIDGE REPLACEMENT LAYOUT SHEET	SHEET 2 OF 8



VT 14 BRIDGE REPLACEMENT PROFILE

SCALE: HORIZONTAL 1"=20'-0"
VERTICAL 1"=10'-0"

NOTE:

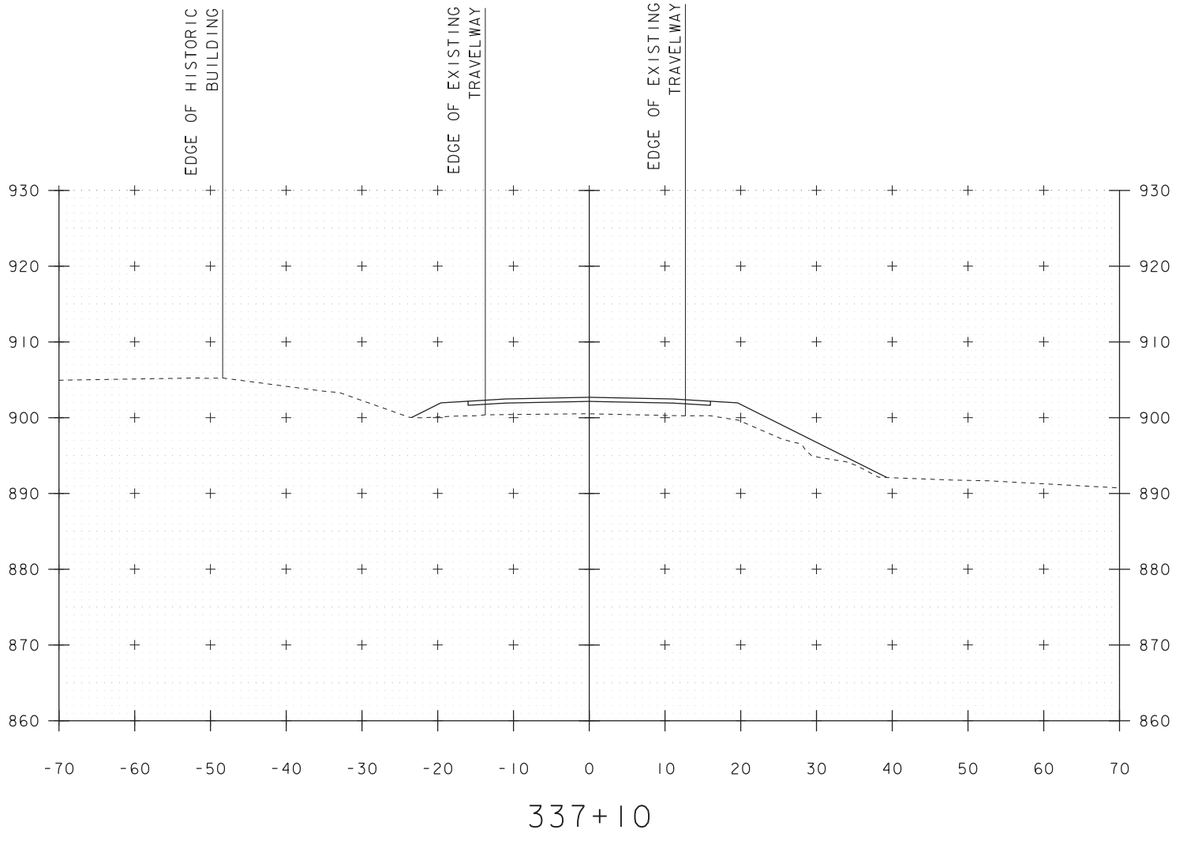
GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: CALAIS
PROJECT NUMBER: BHF 037-2(11)

FILE NAME: sl2bl46profile.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: L.E.GALIHER
PROFILE SHEET

PLOT DATE: 13-DEC-2012
DRAWN BY: L.E.GALIHER
CHECKED BY: ------
SHEET 3 OF 8



337+10

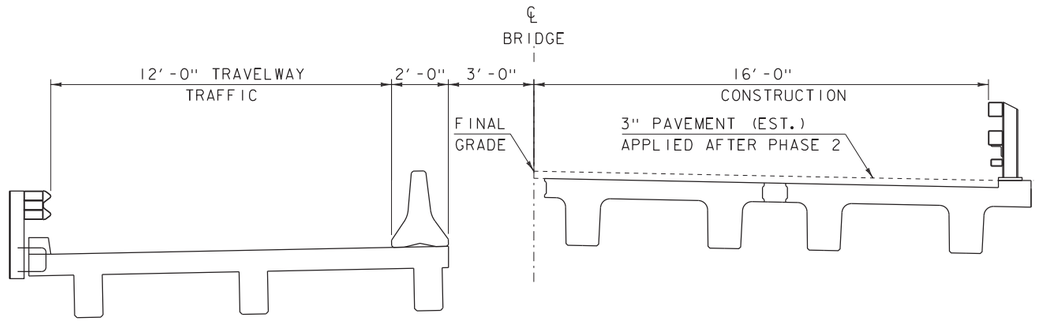
NOTE: CRITICAL CROSS SECTION SHOWN TO DELINEATE THE POSSIBLE EFFECTS OF THE PROJECT ON THE SURROUNDINGS.

STA. 337+10 TO STA. 337+10

PROJECT NAME: CALAIS
PROJECT NUMBER: BRF 037-2(11)

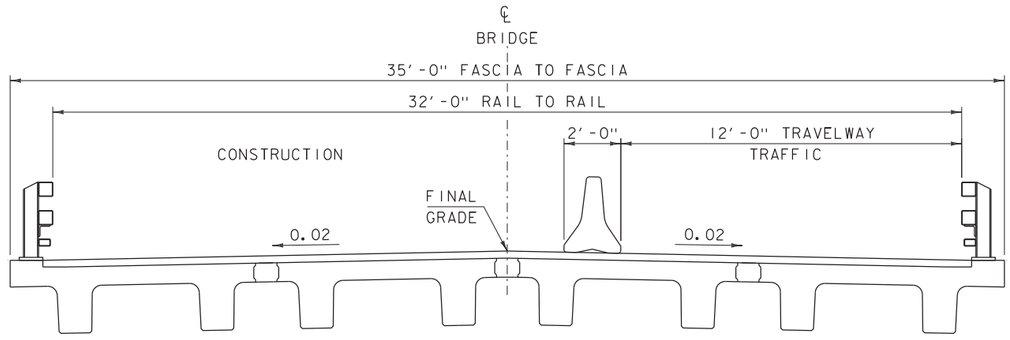
FILE NAME: sl2bl46xs.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: L.E.GALIHER
CRITICAL CROSS SECTION

PLOT DATE: 13-DEC-2012
DRAWN BY: L.E.GALIHER
CHECKED BY: ------
SHEET 4 OF 8



BRIDGE REPLACEMENT PHASE #1 TYPICAL SECTION

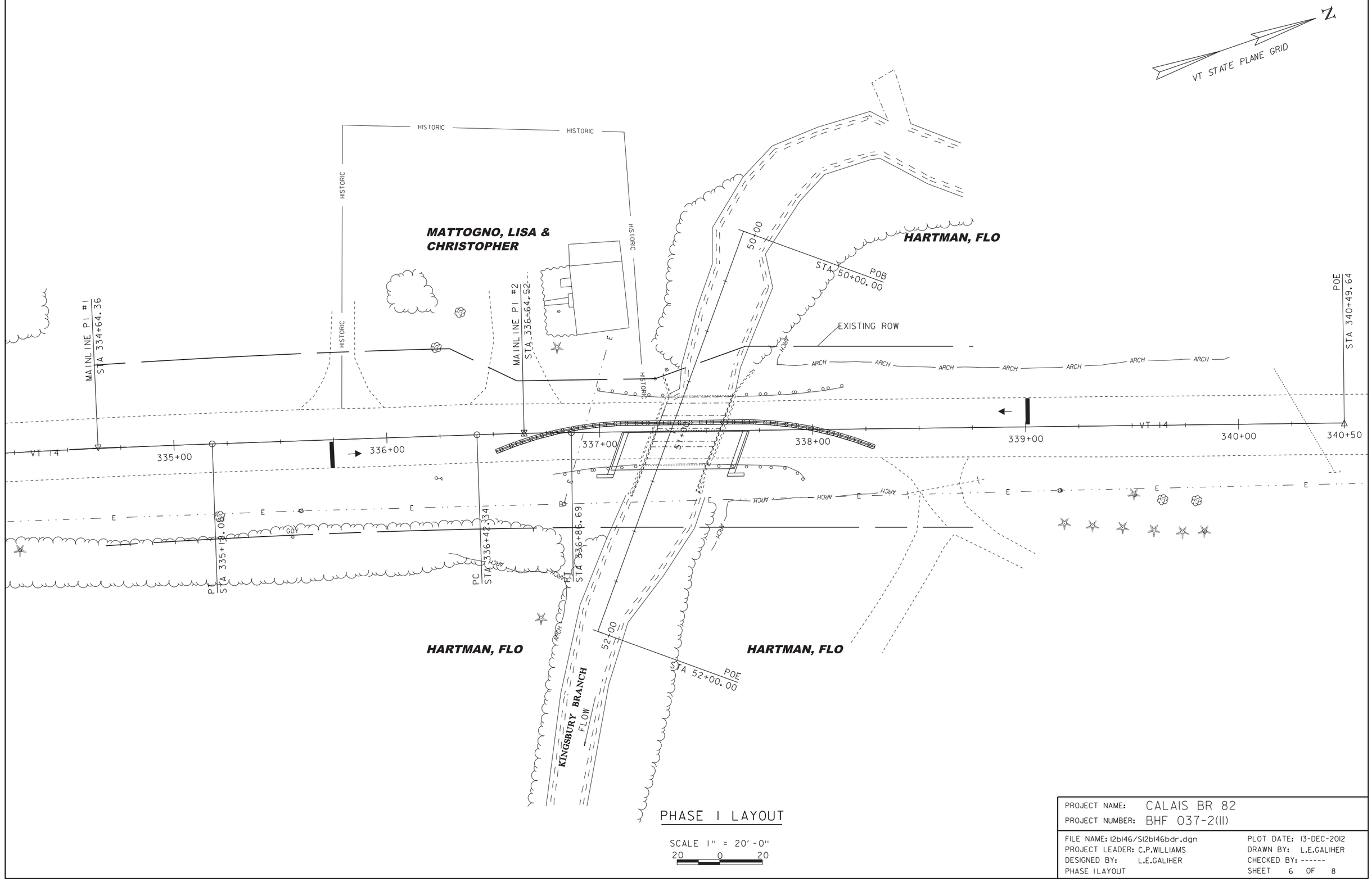
SCALE 3/8" = 1′-0"



BRIDGE REPLACEMENT PHASE #2 TYPICAL SECTION

SCALE 3/8" = 1′-0"

PROJECT NAME:	CALAIS
PROJECT NUMBER:	BHF 037-2(11)
FILE NAME: 12b146/sl2b146typical.dgn	PLOT DATE: 13-DEC-2012
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: L.E.GALIHER	CHECKED BY: ------
PHASING TYPICAL SECTIONS	SHEET 5 OF 8

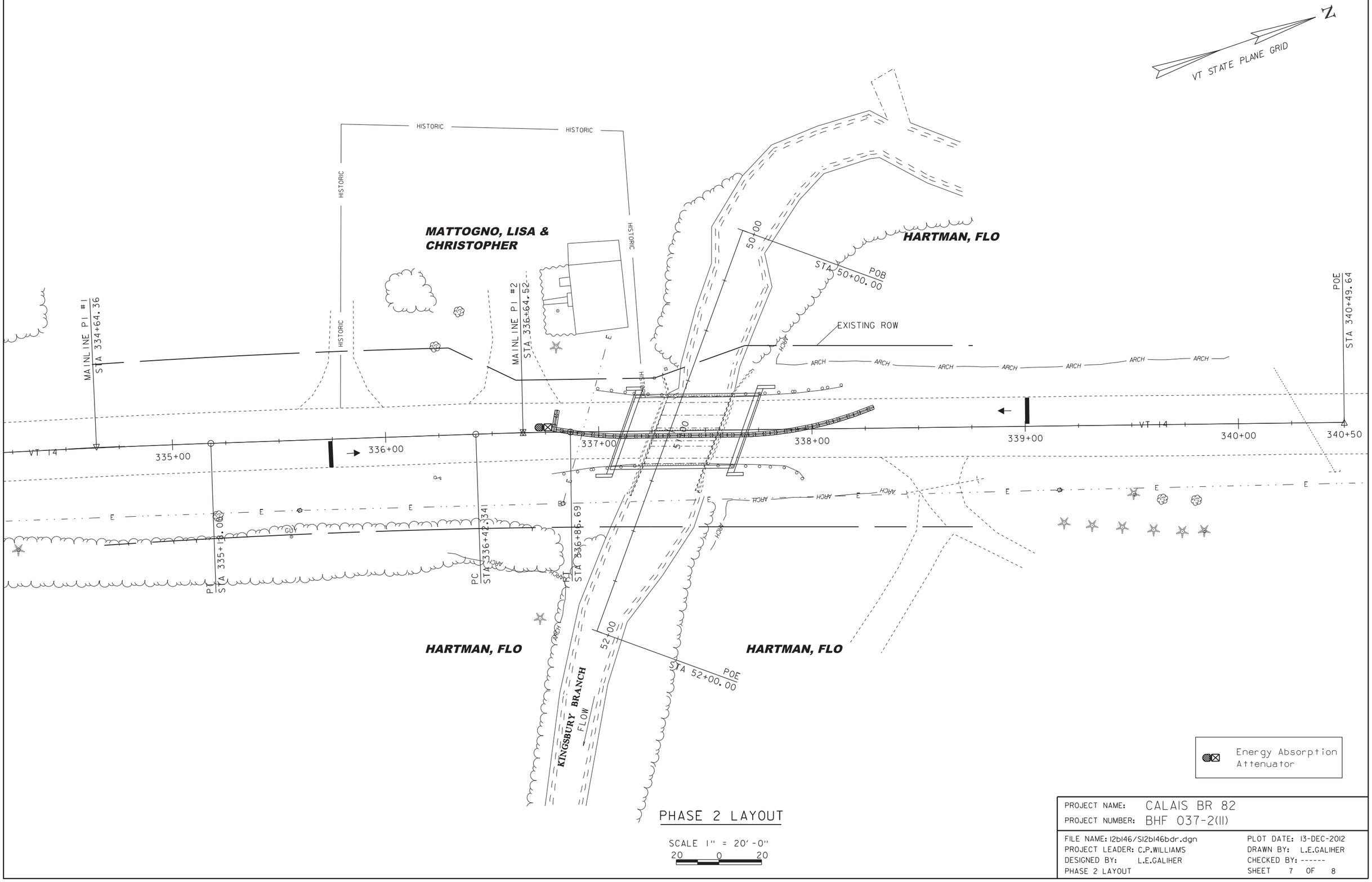


PHASE I LAYOUT

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME:	CALAIS BR 82
PROJECT NUMBER:	BHF 037-2(11)
FILE NAME:	I2bl46/SI2bl46bdr.dgn
PROJECT LEADER:	C.P.WILLIAMS
DESIGNED BY:	L.E.GALIHER
PHASE I LAYOUT	
PLOT DATE:	13-DEC-2012
DRAWN BY:	L.E.GALIHER
CHECKED BY:	------
SHEET	6 OF 8



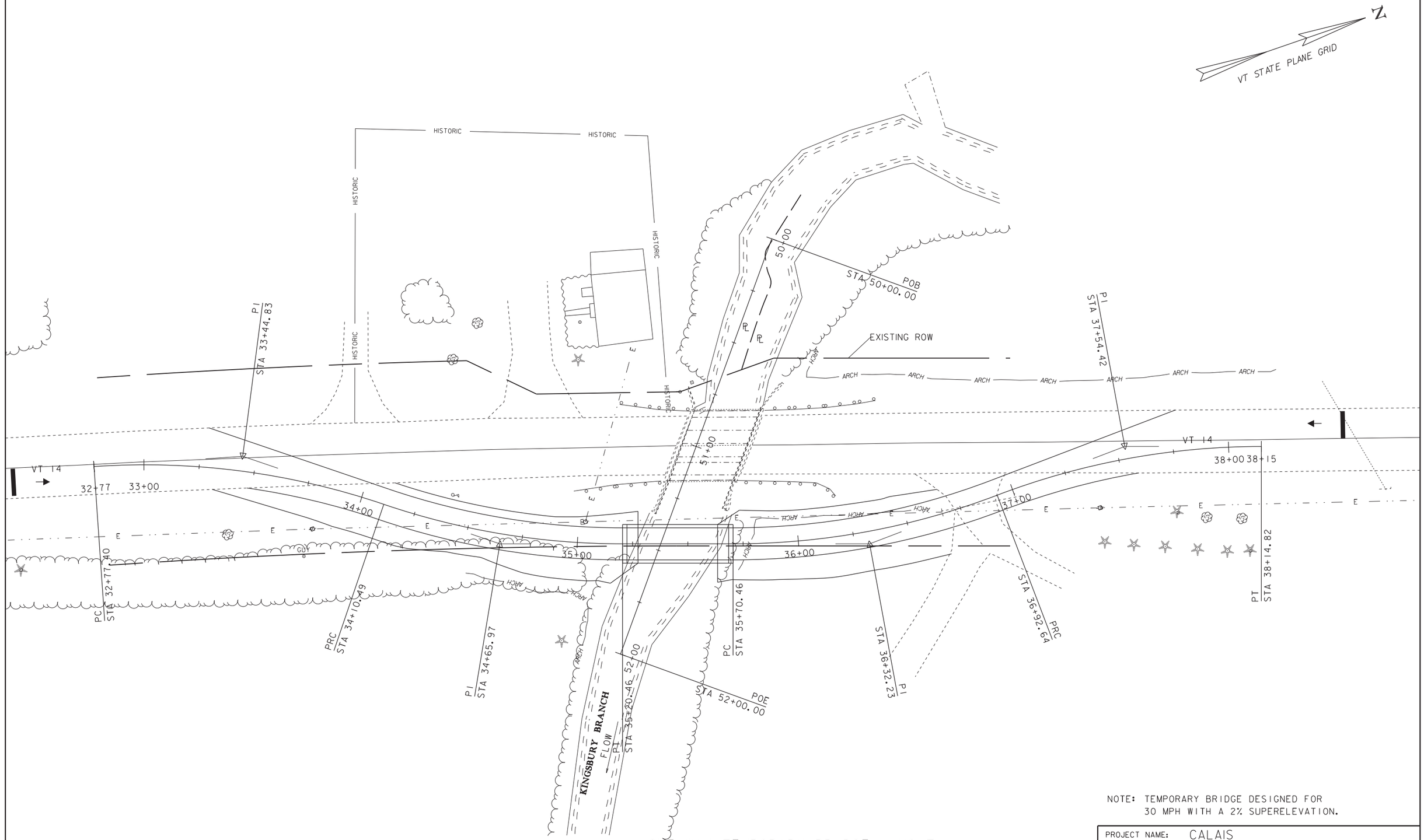
PHASE 2 LAYOUT

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME:	CALAIS BR 82
PROJECT NUMBER:	BHF 037-2(11)

FILE NAME:	12b146/S12b146bdr.dgn
PROJECT LEADER:	C.P.WILLIAMS
DESIGNED BY:	L.E.GALIHER
PHASE 2 LAYOUT	
PLOT DATE:	13-DEC-2012
DRAWN BY:	L.E.GALIHER
CHECKED BY:	------
SHEET	7 OF 8



ONE-WAY TEMPORARY BRIDGE LAYOUT

SCALE 1" = 20'-0"

20 0 20

NOTE: TEMPORARY BRIDGE DESIGNED FOR 30 MPH WITH A 2% SUPERELEVATION.

PROJECT NAME:	CALAIS
PROJECT NUMBER:	BHF 037-2(11)

FILE NAME: sl2bl46bdr.dgn	PLOT DATE: 13-DEC-2012
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: D.D.BEARD	CHECKED BY: ------
TEMPORARY BRIDGE LAYOUT SHEET	SHEET 8 OF 8